TEREX | DEMAG

AC 80-2 | All Terrain Crane 80 t Lifting Capacity

AC 80-2

ALL TERRAIN CRANE

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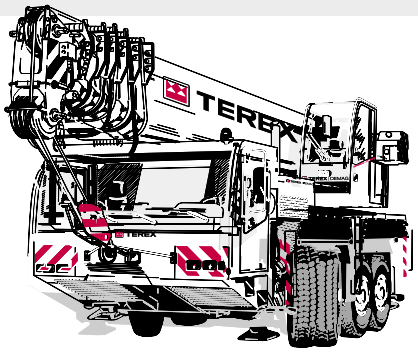
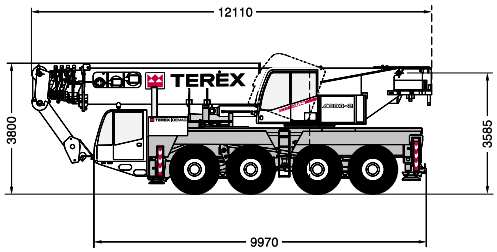
HIGHLIGHTS AC 80-2

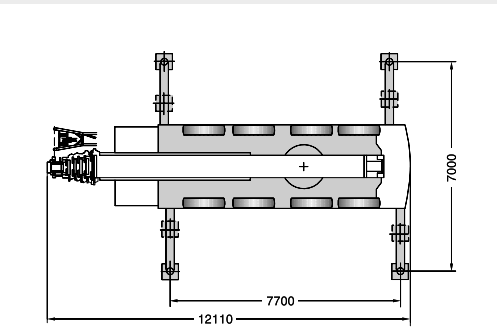
- Shortest 4-axle machine in its category
- Maximum load moment 255 mt
- Advanced high-torque DaimlerChrysler engine combined with comfortable 6-speed Allison automatic transmission ensures outstanding driving performance
- Fully hydraulic boom system for exceptionally short telescoping times and high load telescoping capacity
- Fully roadable with 8 t counterweight and 9.2 m boom extension within the statutory 12 t axle load limit
- State-of-the-art DaimlerChrysler engine technology type OM 501 LA, EURO MOT 3a
- Air-conditioning in carrier and superstructure as standard
- Limitation of working range as standard
- ABS, heated seats and electric window winders included as standard



- Kürzester 4-Achser seiner Klasse
- Maximales Lastmoment 255 mt
- Hervorragende Fahreigenschaften durch modernen drehmomentstarken DaimlerChrysler-Motor in Verbindung mit komfortablem 6-Gang Allison Automatikgetriebe
- Kürzeste Teleskopierzeiten und hohe teleskopierbare Lasten durch vollhydraulisches Auslegersystem
- 8 t Gegengewicht und Hauptauslegerverlängerung 9,2 m innerhalb der 12 t Achslastregelung verfahrbar
- Neueste DaimlerChrysler Motorentechnik vom Typ OM 501 LA, EURO MOT 3a
- Klimaanlage in Ober- und Unterwagen serienmäßig
- Arbeitsbereichsbegrenzung serienmäßig
- ABS, Sitzheizung und elektrische Fensterheber serienmäßig



- La 4 essieux la plus compacte de sa catégorie
- Couple de charge max. 255 mt
- Grand confort de conduite grâce à une motorisation DaimlerChrysler moderne au couple puissant associée à une boîte automatique Allison à 6 rapports
- Temps de télescopage ultracourts et d'énormes charges télescopables grâce au système de flèche entièrement hydraulique
- Déplacement sur route avec contrepoids de 8 t et rallonge de 9,2 m dans le respect du poids à l'essieu réglementaire de 12 t
- Motorisation DaimlerChrysler la plus récente, type OM 501 LA, EURO MOT 3a
- Climatisation dans le châssis et partie supérieure de série
- Limiteur de portée de série
- ABS, sièges chauffants et lève-vitres électriques de série



- Il 4 assi più corto della sua categoria 255 mt
- Confortevoli caratteristiche di guida grazie al motore DaimlerChrysler che insieme con il cambio automatico Allison 6 marce assicurano eccellenti prestazioni di guida
- Il sistema completamente idraulico del braccio permette tempi brevi di sfilamento senza spinature e alte possibilità di carico durante la fase telescopica
- Spostamento su strada con contrappeso da 8 t e prolunga da 9,2 m nel rispetto del peso sugli assi regolamentare di 12 t
- Motore DaimlerChrysler tipo OM 501 LA, EURO MOT 3a, d'ultima generazione
- Aria condizionata nel carro e nella torretta fornite di serie
- Limitatore di portata fornito di serie
- ABS seggiolino riscaldato e finestrini elettrici di serie

- La grúa de 4 ejes más corta de las de su categoría
- Momento máximo de carga de 255 tonelámetros
- El avanzado motor de alto par DaimlerChrysler combinado con la transmisión automática Allison de 6 velocidades permiten extraordinarias prestaciones
- Sistema de pluma totalmente hidráulica que además de unos tiempos de telescopaje muy cortos permite unas excepcionales capacidades de telescopaje con carga
- Puede circular por carretera con 8 t de contrapeso y 9,2 m de extensión de pluma sin superar las 12 t por eje reglamentarias
- Tecnología según el estado de la técnica del motor DaimlerChrysler, modelo OM 501 LA, que cumple la normativa EURO MOT 3a
- Aire acondicionado en ambas cabinas, de serie
- Limitaciones del área de trabajo, de serie
- También se incluyen ABS, asientos calefactados y elevalunas eléctrico de serie

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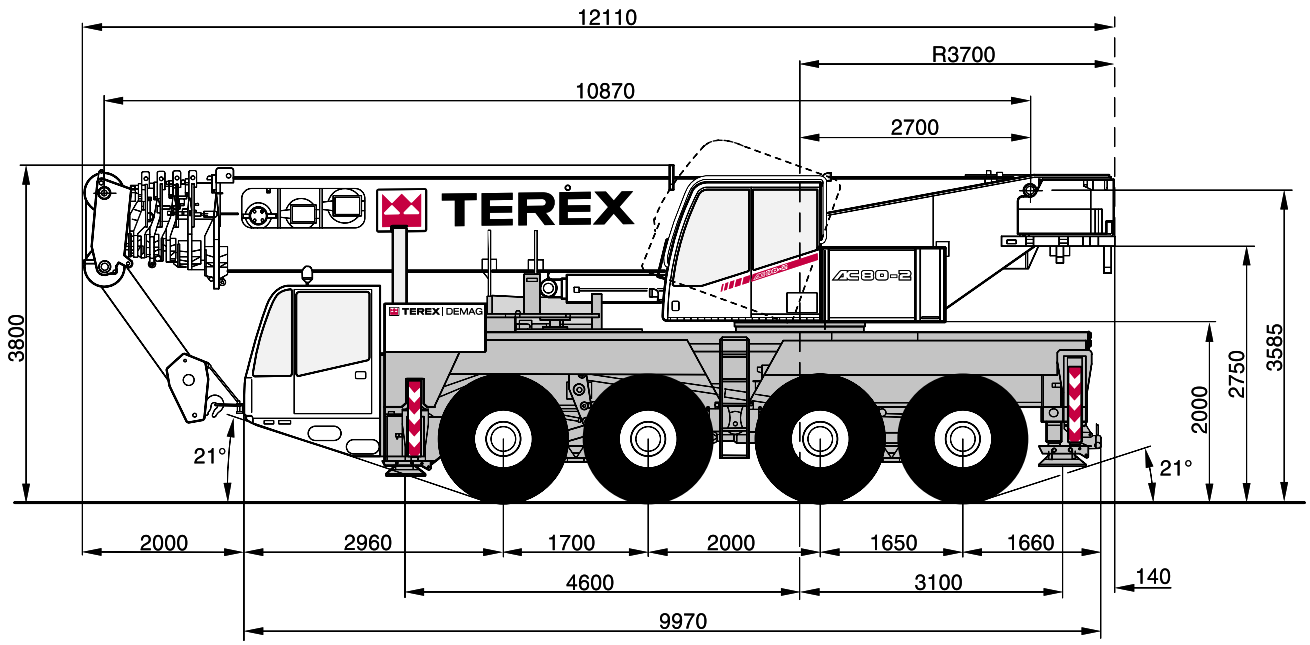
DIMENSIONS · ABMESSUNGEN · ENCOMBREMENT · DIMENSIONI · DIMENSIONES



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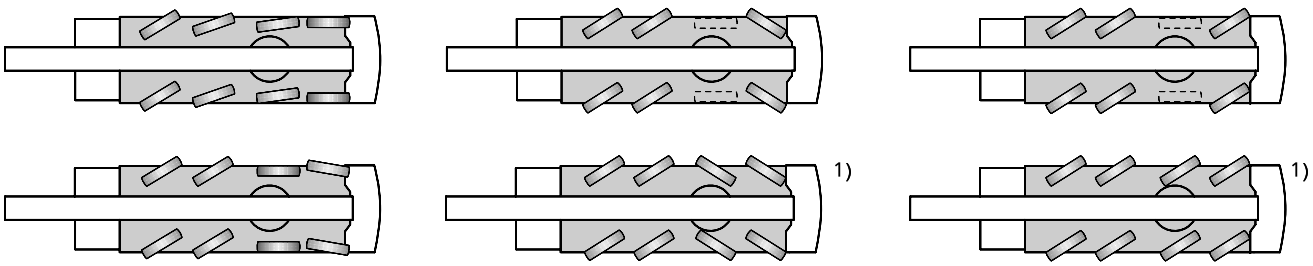

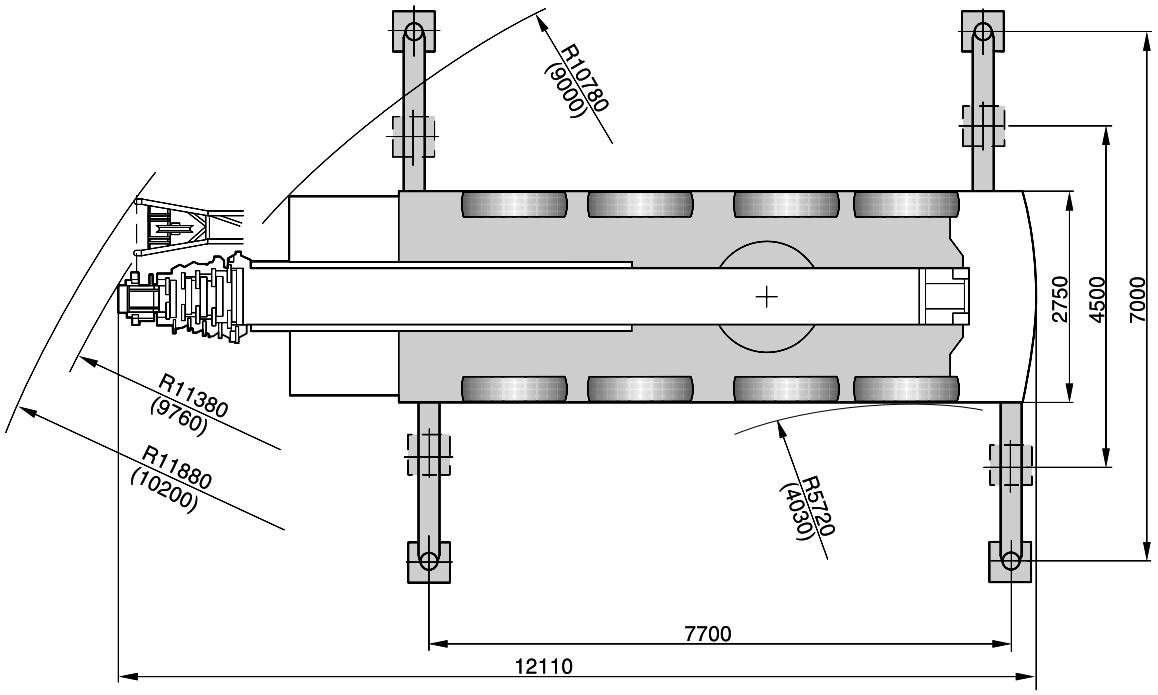

( ) with independent rear axle steering
( ) mit unabhängiger Hinterachslenkung
( ) avec direction indépendante de l'essieu arrière
( ) con sterzo indipendente assi posteriori
( ) con dirección independiente en ejes traseros

1) Option

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SPECIFICATIONS · TECHNISCHE DATEN · CARACTÉRISTIQUES · DATI TECNICI · DATOS TÉCNICOS

AXLE LOADS · ACHSLASTEN · POIDS D'ESSIEUX · PESI SUGLI ASSI · CARGA POR EJE

Crane with main boom, hook block 3-sheaves, 8 t counterweight, tyres 14.00 R 25 · Kran mit Hauptausleger, Unterflasche 3-rollig, 8 t Gegengewicht, Bereifung 14.00 R 25 · Grue avec flèche principale, crochet-moufle 3 poulies, 8 t de contrepoids, pneumatiques 14.00 R 25 · Autogrù in assetto stradale con braccio base, bozzello 3 pulegge, contrappeso 8 t, pneumatici da 14.00 R 25 · Grúa con pluma principal, gancho 3 poleas, contrapeso de 8 t, neumáticos 14.00 R 25

Axles · Achsen · Essieux · Assi · Ejes	4 x 12 000 kg
Total · Gesamt · Total · Totale · Total	48 000 kg

WORKING SPEEDS (INFINITELY VARIABLE) · ARBEITSGESCHWINDIGKEITEN (STUFENLOS REGELBAR) · VITESSES DE TRAVAIL (RÉGLABLES SANS PALIERS) · VELOCITÀ DI LAVORO (A REGOLAZIONE VARIABILE) · VELOCIDAD DE TRABAJO (INFINITAMENTE VARIABLE)

Mechanisms Antriebe Mécanismes Funzioni Mecanismos	Normal speed Normalgang Marche normale Velocità normale Velocidad normal	High speed Schnellgang Marche rapide Velocità rapida Velocidad rápida	Max. permissible line pull[1)] Max. zulässiger Seilzug[1)] Effort max. admis sur brin[1)] Tiro max. sulla fune[1)] Carga máx. por reenvío[1)]	Rope diameter / Rope length Seil ø / Seillänge Diamètre du câble / Longueur du câble Diametro / lunghezza fune Diam. cable / long. cable
Hoist I Hubwerk I Treuil de levage I Argano I Cabrestante I	53 m/min	110 m/min	55 kN	18 mm / 210 m
Hoist II Hubwerk II Treuil de levage II Argano II Cabrestante II	53 m/min	110 m/min	55 kN	18 mm / 210 m
Slewing · Drehwerk · Orientation · Rotazione · Giro				max. 1,3 1/min
Telescoping speed · Ausleger-Teleskopieren · Vitesse de télescopage · Velocità di sfilamento · Velocidad de telescopaje				10,9 – 50 m: 110 s
Boom elevation · Ausleger-Winkelverstellung · Relevage de flèche · Angolazione braccio · Elevación de pluma				–1,8° – +81,5°: 63 s

CARRIER PERFORMANCE · FAHRLEISTUNGEN · PERFORMANCE DU PORTEUR · PRESTAZIONI DEL CARRO · PRESTACIONES DEL VEHÍCULO

Travel speed · Fahrgeschwindigkeit · Vitesse sur route · Velocità su strada · Velocidad de traslación	
Forward · Vorwärts · Avant · Marcia avanti · Hacia delante	0 . . 80 km/h
Reverse · Rückwärts · Arrière · Marcia indietro · Hacia atrás	0 . . 11 km/h
Gradeability in travel order · Steigfähigkeit bei Transportgewicht · Capacité sur rampes en état de transport sur route · Pendenza superabile con gru in assetto stradale · Pendiente franqueable en orden de transporte	max. 50 %
Ground clearance · Bodenfreiheit · Dégagement au sol · Distanza dal suolo · Altura libre chasis – suelo	370 mm

HOOK BLOCK / SINGLE LINE HOOK · UNTERFLASCHE / HAKENGEHÄNGE · CROCHET-MOUFLE / BOULET · BOZZELLO / A PALLA · GANCHO / GANCHO DE TIRO DIRECTO

Type Typ Type Tipo Tipo	Possible load[1)] Mögliche Traglast[1)] Charge possible[1)] Portata possibile[1)] Carga permitida[1)]	Number of sheaves Anzahl der Rollen Nombre de poulies Nº di pulegge No de poleas	Weight Gewicht Poids Peso Peso	„D“	Number of lines Strangzahl Nombre de brins Nº max avvolgim. Reenvíos máx.	Heavy-lift attachment Schwerlasteinrichtung Equipement levage lourd Equipaggiamento pesante Equipo de carga pesada
100	77,0 t	7	750 kg	2,00 m	14	2 add. sheaves / Zusatzrollen / poulies suppl. / puleggie suppl./poleas adicionales
80	60,5 t	5	650 kg	2,00 m	11	2 add. sheaves / Zusatzrollen / poulies suppl. / puleggie suppl./poleas adicionales
50	38,5 t	3	550 kg	1,80 m	7	
20	16,5 t	1	350 kg	1,80 m	3	
6,3	5,5 t	Single line hook / Hakengehänge / Boulet / A palla / Gancho de tiro directo	170 kg	1,70 m	1	

Remarks · Bemerkungen · Remarques · Osservazioni · Observaciones

1) varies depending on national regulations · variiert je nach Ländervorschrift · varie en fonction des normes nationales · varia a secondo delle eventuali norme nazionali · varía dependiendo de las regulaciones nacionales

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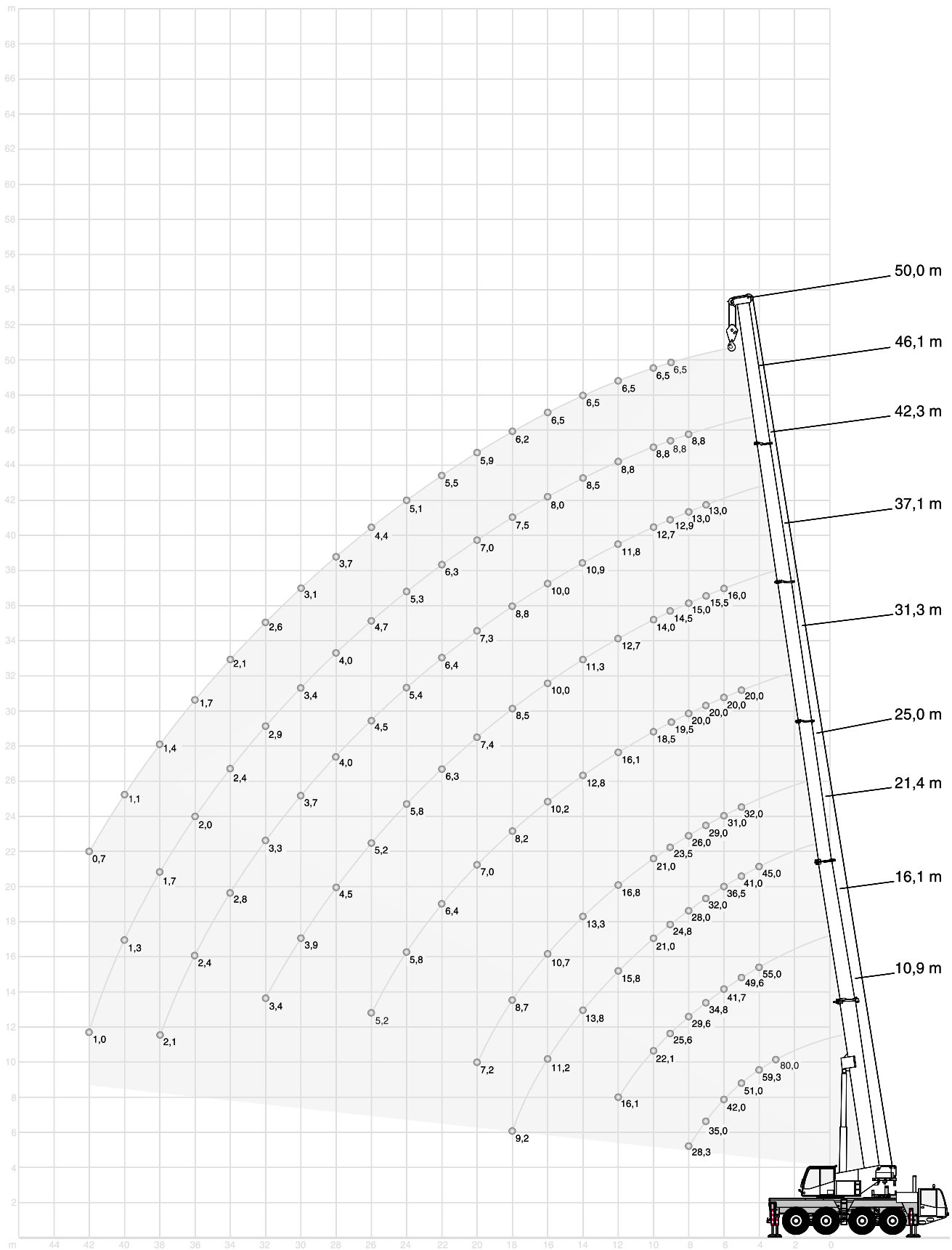
HA WORKING RANGES · ARBEITSBEREICHE · PORTÉES · CAMPO DI LAVORO · RANGOS DE TRABAJO



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HA LIFTING CAPACITIES · TRAGFÄHIGKEITEN · CAPACITÉS DE LEVAGE · PORTATE · CAPACIDADES DE CARGA

18 t — 7,70 m x 7,00 m — 360° — DIN/ISO

Main boom · Hauptausleger · Flèche principale · Braccio base · Pluma principal

Radius · Ausladung Portée Sbraccio Radio	m	10,9	16,1	21,4	25,0	31,3	37,1	42,3	46,1	50,0	10,9	16,1	Radius · Ausladung Portée Sbraccio Radio
m		t	t	t	t	t	t	t	t	t	t	t	m
3		80,0*	-	-	-	-	-	-	-	-	-	-	3
3		70,0	-	-	-	-	-	-	-	-	-	-	3
3,5		64,4	55,0	-	-	-	-	-	-	-	-	-	3,5
4		59,3	55,0	45,0	-	-	-	-	-	-	12,3	12,0	4
4,5		54,9	52,9	43,0	32,0	-	-	-	-	-	11,0	10,7	4,5
5		51,0	49,6	41,0	32,0	20,0	-	-	-	-	9,9	9,6	5
6		42,0	41,7	36,5	31,0	20,0	16,0	-	-	-	8,1	7,8	6
7		35,0	34,8	32,0	29,0	20,0	15,5	13,0	-	-	6,6	6,4	7
8		28,3	29,6	28,0	26,0	20,0	15,0	13,0	8,8	-	5,5	5,2	8
9		-	25,6	24,8	23,5	19,5	14,5	12,9	8,8	6,5	-	4,2	9
10		-	22,1	21,0	21,0	18,5	14,0	12,7	8,8	6,5	-	3,4	10
12		-	16,1	15,8	16,8	16,1	12,7	11,8	8,8	6,5	-	2,1	12
14		-	-	13,8	13,3	12,8	11,3	10,9	8,5	6,5	-	-	14
16		-	-	11,2	10,7	10,2	10,0	10,0	8,0	6,5	-	-	16
18		-	-	9,2	8,7	8,2	8,5	8,8	7,5	6,2	-	-	18
20		-	-	-	7,2	7,0	7,4	7,3	7,0	5,9	-	-	20
22		-	-	-	-	6,4	6,3	6,4	6,3	5,5	-	-	22
24		-	-	-	-	5,8	5,8	5,4	5,3	5,1	-	-	24
26		-	-	-	-	5,2	5,2	4,5	4,7	4,4	-	-	26
28		-	-	-	-	-	4,5	4,0	4,0	3,7	-	-	28
30		-	-	-	-	-	3,9	3,7	3,4	3,1	-	-	30
32		-	-	-	-	-	3,4	3,3	2,9	2,6	-	-	32
34		-	-	-	-	-	-	2,8	2,4	2,1	-	-	34
36		-	-	-	-	-	-	2,4	2,0	1,7	-	-	36
38		-	-	-	-	-	-	2,1	1,7	1,4	-	-	38
40		-	-	-	-	-	-	-	1,3	1,1	-	-	40
42		-	-	-	-	-	-	-	1,0	0,7	-	-	42

8 t — 7,70 m x 7,00 m — 360° — DIN/ISO

Main boom · Hauptausleger · Flèche principale · Braccio base · Pluma principal

Radius · Ausladung Portée Sbraccio Radio	m	10,9	16,1	21,4	25,0	31,3	37,1	42,3	46,1	50,0	10,9	16,1	Radius · Ausladung Portée Sbraccio Radio
m		t	t	t	t	t	t -	t	t	t	t	t	m
3		80,0*	-	-	-	-	-	-	-	-	-	-	3
3		70,0	-	-	-	-	-	-	-	-	-	-	3
3,5		64,1	55,0	-	-	-	-	-	-	-	-	-	3,5
4		59,0	55,0	45,0	-	-	-	-	-	-	11,7	11,4	4
4,5		52,9	52,6	43,0	32,0	-	-	-	-	-	10,4	10,2	4,5
5		46,7	46,4	41,0	32,0	20,0	-	-	-	-	9,4	9,1	5
6		37,6	37,3	34,9	31,0	20,0	16,0	-	-	-	7,6	7,4	6
7		31,3	31,0	27,4	25,7	20,0	15,5	13,0	-	-	6,2	6,0	7
8		24,2	23,7	22,3	21,0	20,0	15,0	13,0	8,8	-	5,1	4,8	8
9		-	18,9	18,0	19,0	18,1	14,5	12,9	8,8	6,5	-	3,9	9
10		-	15,5	17,3	16,8	15,5	14,0	12,7	8,8	6,5	-	3,1	10
12		-	11,0	12,7	12,1	11,5	11,5	11,1	8,8	6,5	-	1,9	12
14		-	-	9,6	9,0	9,3	9,3	9,0	8,5	6,5	-	-	14
16		-	-	7,5	7,0	8,1	8,1	7,4	7,1	6,5	-	-	16
18		-	-	6,0	5,4	6,5	6,5	5,9	6,1	5,6	-	-	18
20		-	-	-	4,2	5,4	5,3	5,1	4,8	4,5	-	-	20
22		-	-	-	-	4,4	4,4	4,3	3,9	3,6	-	-	22
24		-	-	-	-	3,6	3,6	3,5	3,1	2,8	-	-	24
26		-	-	-	-	3,0	2,9	2,9	2,4	2,1	-	-	26
28		-	-	-	-	-	2,4	2,3	1,9	1,6	-	-	28
30		-	-	-	-	-	1,9	1,9	1,4	1,2	-	-	30
32		-	-	-	-	-	1,6	1,5	1,1	0,8	-	-	32
34		-	-	-	-	-	-	1,2	0,7	-	-	-	34
36		-	-	-	-	-	-	0,9	-	-	-	-	36
38		-	-	-	-	-	-	0,6	-	-	-	-	38

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HA LIFTING CAPACITIES · TRAGFÄHIGKEITEN · CAPACITÉS DE LEVAGE · PORTATE · CAPACIDADES DE CARGA

5 t | 7,70 m x 7,00 m | 360° | DIN/ISO

Radius · Ausladung Portée Sbraccio Radio	Main boom · Hauptausleger · Flèche principale · Braccio base · Pluma principal											Radius · Ausladung Portée Sbraccio Radio
m	**10,9**	**16,1**	**21,4**	**25,0**	**31,3**	**37,1**	**42,3**	**46,1**	**50,0**	**10,9**	**16,1**	
m	t	t	t	t	t	t	t	t	t	t	t	m
3	70,0	-	-	-	-	-	-	-	-	-	-	3
3,5	64,1	55,0	-	-	-	-	-	-	-	-	-	3,5
4	58,7	55,0	45,0	-	-	-	-	-	-	11,5	11,2	4
4,5	51,1	50,8	43,0	32,0	-	-	-	-	-	10,3	10,0	4,5
5	45,1	44,8	41,0	32,0	20,0	-	-	-	-	9,2	9,0	5
6	36,3	36,0	30,9	28,7	20,0	16,0	-	-	-	7,5	7,2	6
7	28,0	27,6	24,2	22,6	20,0	15,5	13,0	-	-	6,1	5,8	7
8	21,4	21,0	19,5	19,0	18,8	15,0	13,0	8,8	-	5,0	4,7	8
9	-	16,7	18,0	17,9	15,7	14,4	12,9	8,8	6,5	-	3,8	9
10	-	13,5	15,5	14,9	13,3	12,9	12,5	8,8	6,5	-	3,0	10
12	-	9,3	11,0	10,4	10,5	10,2	9,9	8,8	6,5	-	1,6	12
14	-	-	8,2	7,7	8,9	8,9	7,8	7,4	6,5	-	-	14
16	-	-	6,4	5,8	7,0	6,9	6,2	6,2	5,7	-	-	16
18	-	-	5,0	4,4	5,6	5,5	5,5	5,0	4,6	-	-	18
20	-	-	-	3,3	4,5	4,4	4,4	3,9	3,6	-	-	20
22	-	-	-	-	3,6	3,5	3,5	3,0	2,7	-	-	22
24	-	-	-	-	2,9	2,8	2,8	2,3	2,0	-	-	24
26	-	-	-	-	2,3	2,3	2,2	1,8	1,5	-	-	26
28	-	-	-	-	-	1,8	1,7	1,3	1,0	-	-	28
30	-	-	-	-	-	1,4	1,3	0,9	0,6	-	-	30
32	-	-	-	-	-	1,0	1,0	-	-	-	-	32
34	-	-	-	-	-	-	0,7	-	-	-	-	34
36	-	-	-	-	-	-	-	-	-	-	-	36

Remarks · Bemerkungen · Remarques · Osservazioni · Observaciones

* over rear
* nach hinten
* sur l'arrière
* sul retro
* hacia atrás

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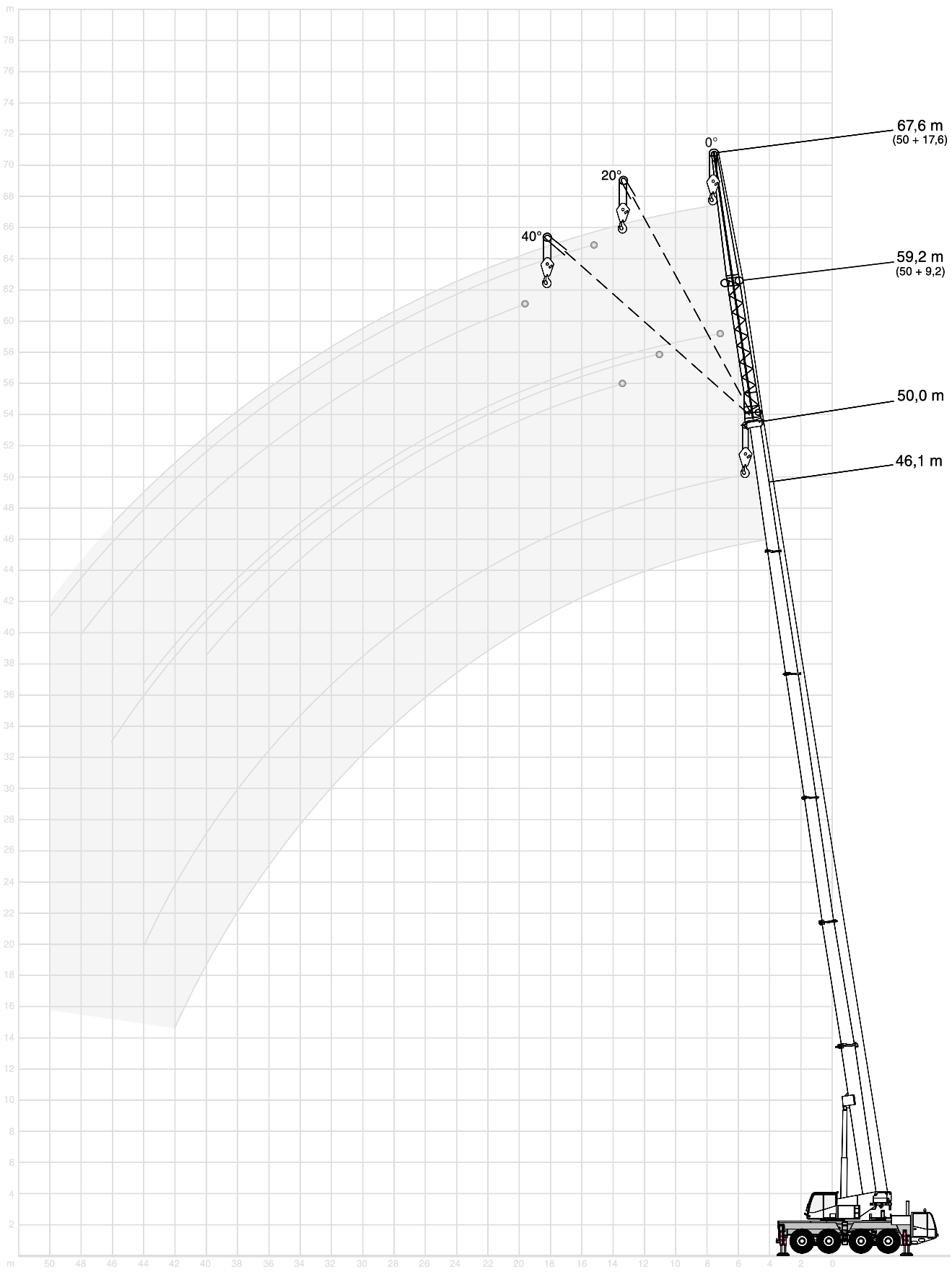

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HAV LIFTING CAPACITIES · TRAGFÄHIGKEITEN · CAPACITÉS DE LEVAGE · PORTATE · CAPACIDADES DE CARGA

18 t | 7,70 m x 7,00 m | 360° | DIN/ISO

46,1 m — **Main boom · Hauptausleger · Flèche principale · Braccio base · Pluma principal**

Radius · Ausladung · Portée · Sbraccio · Radio	Extension · Verlängerung · Rallonge · Prolunga · Extensión 9,2 m			17,6 m		
	0°	20°	40°	0°	20°	40°
m	t	t	t	t	t	t
10	3,9	-	-	-	-	-
12	3,9	-	-	1,7	-	-
14	3,9	3,4	-	1,7	-	-
16	3,9	3,4	3,0	1,7	-	-
18	3,9	3,3	3,0	1,7	1,4	-
20	3,7	3,2	2,9	1,6	1,4	-
22	3,5	3,1	2,8	1,5	1,4	-
24	3,3	2,9	2,7	1,5	1,4	1,2
26	3,1	2,8	2,6	1,4	1,4	1,1
28	3,0	2,6	2,5	1,4	1,4	1,1
30	2,8	2,5	2,4	1,3	1,3	1,1
32	2,7	2,4	2,3	1,3	1,2	1,1
34	2,4	2,3	2,2	1,2	1,1	1,1
36	2,0	2,2	2,1	1,2	1,1	1,1
38	1,6	1,8	1,9	1,1	1,1	1,0
40	1,3	1,5	1,6	1,1	1,1	1,0
42	1,0	1,2	-	1,1	1,1	1,0
44	0,8	0,9	-	1,0	1,1	1,0
46	-	0,6	-	0,8	1,1	1,0
48	-	-	-	0,6	0,8	1,0
50	-	-	-	-	0,6	-

50,0 m — **Main boom · Hauptausleger · Flèche principale · Braccio base · Pluma principal**

Radius · Ausladung · Portée · Sbraccio · Radio	Extension · Verlängerung · Rallonge · Prolunga · Extensión 9,2 m			17,6 m		
	0°	20°	40°	0°	20°	40°
m	t	t	t	t	t	t
12	3,0	-	-	-	-	-
14	3,0	3,0	-	1,2	-	-
16	3,0	3,0	2,7	1,2	-	-
18	3,0	2,9	2,7	1,2	-	-
20	2,9	2,8	2,6	1,2	1,1	-
22	2,8	2,7	2,5	1,1	1,1	-
24	2,6	2,5	2,3	1,1	1,1	1,0
26	2,5	2,4	2,2	1,0	1,1	1,0
28	2,3	2,2	2,1	1,0	1,0	1,0
30	2,2	2,1	2,0	1,0	1,0	1,0
32	2,1	2,0	1,9	1,0	1,0	1,0
34	2,0	1,9	1,9	0,9	1,0	1,0
36	1,9	1,8	1,8	0,9	0,9	0,9
38	1,5	1,8	1,8	0,9	0,9	0,9
40	1,2	1,4	1,6	0,8	0,9	0,9
42	0,9	1,1	-	0,8	0,9	0,9
44	0,7	0,9	-	0,7	0,8	0,9
46	-	0,6	-	0,7	0,8	0,8
48	-	-	-	-	0,8	0,8
50	-	-	-	-	0,6	-
52	-	-	-	-	-	-

8 t | 7,70 m x 7,00 m | 360° | DIN/ISO

46,1 m — **Main boom · Hauptausleger · Flèche principale · Braccio base · Pluma principal**

Radius · Ausladung · Portée · Sbraccio · Radio	Extension · Verlängerung · Rallonge · Prolunga · Extensión 9,2 m			17,6 m		
	0°	20°	40°	0°	20°	40°
m	t	t	t	t	t	t
10	3,9	-	-	-	-	-
12	3,9	-	-	1,7	-	-
14	3,9	3,4	-	1,7	-	-
16	3,9	3,4	3,0	1,7	-	-
18	3,9	3,3	3,0	1,7	1,4	-
20	3,7	3,2	2,9	1,6	1,4	-
22	3,5	3,1	2,8	1,5	1,4	-
24	3,1	2,9	2,7	1,5	1,4	1,2
26	2,4	2,8	2,6	1,4	1,4	1,1
28	1,9	2,3	2,5	1,4	1,4	1,1
30	1,4	1,8	2,0	1,3	1,3	1,1
32	1,0	1,3	1,5	1,3	1,2	1,1
34	0,7	1,0	1,1	1,0	1,1	1,1
36	-	0,6	0,8	0,7	1,1	1,1
38	-	-	-	-	0,8	1,0
40	-	-	-	-	0,6	0,9
42	-	-	-	-	-	0,6
44	-	-	-	-	-	-
46	-	-	-	-	-	-
48	-	-	-	-	-	-
50	-	-	-	-	-	-

50,0 m — **Main boom · Hauptausleger · Flèche principale · Braccio base · Pluma principal**

Radius · Ausladung · Portée · Sbraccio · Radio	Extension · Verlängerung · Rallonge · Prolunga · Extensión 9,2 m			17,6 m		
	0°	20°	40°	0°	20°	40°
m	t	t	t	t	t	t
12	3,0	-	-	-	-	-
14	3,0	3,0	-	1,2	-	-
16	3,0	3,0	2,7	1,2	-	-
18	3,0	2,9	2,7	1,2	-	-
20	2,9	2,8	2,6	1,2	1,1	-
22	2,8	2,7	2,5	1,1	1,1	-
24	2,6	2,5	2,3	1,1	1,1	1,0
26	2,4	2,4	2,2	1,0	1,1	1,0
28	1,8	2,2	2,1	1,0	1,0	1,0
30	1,4	1,7	2,0	1,0	1,0	1,0
32	1,0	1,3	1,5	1,0	1,0	1,0
34	0,6	0,9	1,1	0,9	1,0	1,0
36	-	0,6	0,8	0,6	0,9	0,9
38	-	-	-	-	0,8	0,9
40	-	-	-	-	-	0,8
42	-	-	-	-	-	-
44	-	-	-	-	-	-
46	-	-	-	-	-	-
48	-	-	-	-	-	-
50	-	-	-	-	-	-
52	-	-	-	-	-	-

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HAV LIFTING CAPACITIES · TRAGFÄHIGKEITEN · CAPACITÉS DE LEVAGE · PORTATE · CAPACIDADES DE CARGA

5 t | 7,70 m x 7,00 m | 360° | DIN/ISO

46,1 m — **Main boom · Hauptausleger · Flèche principale · Braccio base · Pluma principal**

Radius · Ausladung · Portée · Sbraccio · Radio	Extension · Verlängerung · Rallonge · Prolunga · Extensión 9,2 m			17,6 m		
	0°	20°	40°	0°	20°	40°
m	t	t	t	t	t	t
10	3,9	-	-	-	-	-
12	3,9	-	-	1,7	-	-
14	3,9	3,4	-	1,7	-	-
16	3,9	3,4	3,0	1,7	-	-
18	3,9	3,3	3,0	1,7	1,4	-
20	3,7	3,2	2,9	1,6	1,4	-
22	3,1	3,1	2,8	1,5	1,4	-
24	2,3	2,8	2,7	1,5	1,4	1,2
26	1,8	2,2	2,5	1,4	1,4	1,1
28	1,3	1,7	1,9	1,4	1,4	1,1
30	0,8	1,2	1,4	1,1	1,3	1,1
32	-	0,8	1,0	0,8	1,2	1,1
34	-	-	0,6	-	1,0	1,1
36	-	-	-	-	0,7	1,1
38	-	-	-	-	-	0,8

50,0 m — **Main boom · Hauptausleger · Flèche principale · Braccio base · Pluma principal**

Radius · Ausladung · Portée · Sbraccio · Radio	Extension · Verlängerung · Rallonge · Prolunga · Extensión 9,2 m			17,6 m		
	0°	20°	40°	0°	20°	40°
m	t	t	t	t	t	t
12	3,0	-	-	-	-	-
14	3,0	3,0	-	1,2	-	-
16	3,0	3,0	2,7	1,2	-	-
18	3,0	2,9	2,7	1,2	-	-
20	2,9	2,8	2,6	1,2	1,1	-
22	2,8	2,7	2,5	1,1	1,1	-
24	2,2	2,5	2,3	1,1	1,1	1,0
26	1,7	2,1	2,2	1,0	1,1	1,0
28	1,2	1,6	1,9	1,0	1,0	1,0
30	0,8	1,2	1,4	1,0	1,0	1,0
32	-	0,8	1,0	0,6	1,0	1,0
34	-	-	0,6	-	0,9	1,0
36	-	-	-	-	0,6	0,9
38	-	-	-	-	-	0,7
40	-	-	-	-	-	-

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NOTES TO LIFTING CAPACITY · ANMERKUNGEN ZU DEN TRAGFÄHIGKEITEN · CONDITIONS D'UTILISATION · ANNOTAZIONI SULLE PORTATE · CONDICIONES DE UTILIZACIÓN

Ratings are in compliance with ISO 4305 and DIN 15019.2 (test load = 1.25 x suspended load + 0.1 x dead weight of boom head).
Weight of hook blocks and slings is part of the load, and is to be deducted from the capacity ratings.

Consult operation manual for further details.

Note: Data published herein is intended as a guide only and shall not be construed to warrant applicability for lifting purposes.
Crane operation is subject to the computer charts and operation manual both supplied with the crane.

Tragfähigkeiten entsprechen ISO 4305 und DIN 15019.2 (Prüflast = 1,25 x Hublast + 0,1 x Kopfgewicht).
Das Gewicht der Unterflaschen, sowie die Lastaufnahmemittel, sind Bestandteile der Last und sind von den Tragfähigkeitsangaben abzuziehen.

Weitere Angaben in der Bedienungsanleitung des Kranes.

Anmerkung: Die Daten dieser Broschüre dienen nur zur allgemeinen Information; für ihre Richtigkeit übernehmen wir keine Haftung.
Der Betrieb des Kranes ist nur mit den Original-Tragfähigkeitstabellen und mit der Bedienungsanleitung zulässig, die mit dem Kran mitgeliefert werden.

Le tableau de charges est conforme à la norme ISO 4305 et DIN 15019.2 (charge d'essai = 1,25 x charge suspendue + 0,1 x poids de la tête de flèche).
Les poids du crochet-moufle et de tous les accessoires d'élingage font partie de la charge et sont à déduire des charges indiquées.

Pour plus de détails consulter la notice d'utilisation de la grue.

Nota: Les renseignements ci-inclus sont donnés à titre indicatif et ne représentent aucune garantie d'utilisation pour les opérations de levage.
La mise en service de la grue n'est autorisée qu'à condition que les tableaux de charges ainsi que le manuel de service, tels que fournis avec la grue, soient observés.

Le portate sono conformi alla norma ISO 4305 e alla norma DIN 15019.2 (prova di carico = 12,5 x carico di sollevamento + 0,1 del peso del braccio).
Il peso del bozzello e delle funi d'attacco fanno parte del carico e sono quindi da detrarre dai valori di tabella.

Per ulteriori dettagli sulla velocità vento, consultare il manuale di istruzione della gru.

Nota: I dati riportati su tale prospetto sono solo a titolo indicativo e pertanto non impegnativi. L'impiego della gru è ammesso solo rispettando le tabelle originali ed il manuale di uso fornito assieme alla gru.

Las capacidades de carga están sujetas a las normas ISO 4305 y DIN 15019.2 (Pruebas de carga = 1,25 x la carga suspendida + 0,1 x el peso muerto de cabeza de pluma).
El peso de los ganchos y eslingas son parte de la carga y serán deducidos de las capacidades brutas.

Consultar los manuales de operación para ampliar información.

Observación: Los datos publicados son solamente orientativos y no se deben interpretar como garantía de aplicación para determinadas operaciones de elevación. La manipulación de la grúa está sujeta a las cargas programadas en el ordenador y al manual de operaciones ambos suministrados con la grúa.

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TECHNICAL DESCRIPTION

CARRIER

Drive / Steering	8 x 6 x 6.
Frame	Monobox main frame with outrigger boxes integral, of high-strength fine-grain structural steel.
Outriggers	Four hydraulically telescoping outrigger beams with hydraulic jack legs.
Engine	Water-cooled 6 cylinder DaimlerChrysler engine OM 501 LA, output to DIN: 315 kW (428 hp) at 1800 ^{1}/min, max. torque 2000 Nm at 1300 ^{1}/min, certified in compliance with EURO MOT 3a, Tier 3 and CARB, stainless steel exhaust system with spark arrestor. Tank capacity: 400 l.
Transmission	Allison automatic transmission, transfer case with off-road range.
Axles	1st: steering. 2nd: steering. 3rd: rigid, non-steering, 4th: steering. Axles 1, 2 and 4 with planetary hubs. Differential lock-out control on 2nd axle: longitudinal and transverse. 1st and 4th axle: transverse.
Suspension	Hydropneumatic suspension, all axles hydraulically blockable.
Wheels and tyres	8 x 14.00 R 25 on 11.25-25 rims; tubeless road-tread tyres, all axles single-wheeled.
Steering	Dual-circuit semiblock mechanical steering with hydraulic booster.
Brakes	Service brake: dual-line air system with ABS, acting on all wheels. Parking brake: spring-loaded type. Sustained action brake: engine exhaust brake and constant decompression valve, automatic downhill brake control.
Travel speed	80 km/h, brake control.
Electrical equipment	24 V.
2-man driver's cab	Rubber-mounted steel cab with safety glass, carrier controls, air-sprung and heated driver's and passenger seat with integrated seat belts, height and tilt adjustable steering wheel, electric window winders, electrically adjustable and heated outside mirrors, cruise control, radio with CD-player, rotary beacon, air-conditioning.

SUPERSTRUCTURE

Hydraulic system	Driven off carrier engine at low revs, 1 variable-displacement axial piston pump and separate fixed-displacement pump for 4 simultaneous, independent working movements.
Hoist	Fixed-displacement axial-piston motor, hoist drum with planetary reduction integral and spring-applied holding brake.
Slew unit	Hydraulic motor with planetary reduction, foot-pedal brake and spring-applied holding brake.
Derricking unit	1 differential cylinder with pilot-controlled lowering brake valve.
Crane cab	Spacious all-steel comfortable cab with sliding door and large hinged windscreen, roof window with armoured glass, controls and instrumentation for all crane movements, working lights, self-contained hot water heater with timer, thermostat-controlled, windscreen washer and wiper with intermittent control, cab tiltable up to 18°, radio with CD-player, air-conditioning.
Main boom	Boom base and 5 telescopic sections of fine-grain structural steel, telescoping with partial load, buckling-resistant Demag ovaloid design.
Counterweight	8 t in sections of 5.1 t, 1.7 t and 1.2 t (6.8 t fitted on superstructure, 1.2 t hydraulically stowed on carrier deck).
Top steer facility	Included as standard.
Safety devices	Electronic safe load indicator with digital read-out for hook load, rated load, boom length, boom angle, load radius, analog display to indicate the capacity utilization. Limit switches on hoist and loweringmotions, pressure-relief and safety holding valves.
Hydraulic servo control	Hydraulic pilot control through self-centering control levers.

OPTIONAL EQUIPMENT

Drive / Steering	8 x 8 x 8.
Tyres	Optional 16.00 R 25, 17.5 R 25 or 20.5 R 25.
Telma brake	
Trailer coupling	For central axle trailers with max. 24 t total weight and ABS air hookup: D = 190; D_C = 155; V = 75.
Hoist II	Fixed displacement axial-piston motor, hoist drum with planetary reduction integral and spring-applied holding brake. Hoist II avoids re-reeving of hoist line when using the optional jib.
Main boom extension	1- or 2-part folding jib, 9.2 m or 17.6 m. 0°, 20° and 40° offset.
Additional counterweight	10 t, integrated into standard counterweight, installed hydraulically by the crane itself.
Heavy-lift attachment	Additional sheaves on boom head for duties over 60 t.
Heavy-lift runner	1.20 m long, 1-sheave.
Centralized lubrication carrier	
Stowing point for hook block	For 1 sheave and 3-sheaves hook blocks or for 5-sheaves hook block, for single line hook block.
Tackle box on the rear of the carrier	

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OVERVIEW OF STANDARD DUTY CHARTS · ÜBERSICHT STANDARD-TRAGFÄHIGKEITS-TABELLEN · TABLEAU SYNOPTIQUE DES ABAQUES STANDARD · VISIONE D'INSIEME DEI DIAGRAMMI DI CARICO STANDARD · RESÚMEN DE TABLAS DE CARGA

7,70 m x 7,00 m

Main boom · Hauptausleger · Flèche principale · Braccio base · Pluma principal

Main boom Hauptausleger Flèche principale Braccio base Pluma principal		5 t	8 t	18 t
10,9 m		X	X	X
16,1 m		X	X	X
21,4 m		X	X	X
25,0 m		X	X	X
31,2 m		X	X	X
37,1 m		X	X	X
42,3 m		X	X	X
46,1 m		X	X	X
50,0 m		X	X	X

Main boom extension · Hauptauslegerverlängerung · Rallonge de flèche · Prolunga · Plumín, extension de pluma

Main boom Hauptausleger Flèche principale Braccio base Pluma principal	Main boom extension Hauptauslegerverläng. Rallonge de flèche Prolunga Plumín, ext. de pluma 0° / 20° / 40°	5 t	8 t	18 t
46,1 m	9,2 m	X	X	X
	17,6 m	X	X	X
50,0 m	9,2 m	X	X	X
	17,6 m	X	X	X

7,70 m x 4,50 m

Main boom · Hauptausleger · Flèche principale · Braccio base · Pluma principal

Main boom Hauptausleger Flèche principale Braccio base Pluma principal		5 t	8 t	18 t
10,9 m		X	X	X
16,1 m		X	X	X
21,4 m		X	X	X
25,0 m		X	X	X
31,2 m		X	X	X
37,1 m		X	X	X
42,3 m		X	X	X
46,1 m		X	X	X
50,0 m		X	X	X

Main boom extension · Hauptauslegerverlängerung · Rallonge de flèche · Prolunga · Plumín, extension de pluma

Main boom Hauptausleger Flèche principale Braccio base Pluma principal	Main boom extension Hauptauslegerverläng. Rallonge de flèche Prolunga Plumín, ext. de pluma 0° / 20° / 40°	5 t	8 t	18 t
46,1 m	9,2 m	–	X	X
	17,6 m	–	X	X
50,0 m	9,2 m	–	X	X
	17,6 m	–	X	X

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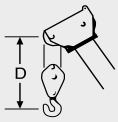
KEY · ZEICHENERKLÄRUNG · LÉGENDE · LEGGENDA · LEYENDA

Counterweight · Gegengewicht · Contrepoids · Contrappeso · Contrapeso

Lifting capacities on outriggers · Tragfähigkeiten, abgestützt · Capacités de levage sur stabilisateurs · Portate su stabilizzatori · Capacidad de elevación sobre los apoyos · 360°

free on wheels, 0° over rear · frei auf Rädern, 0° nach hinten · sur pneus, 0° sur l'arrière · portate su pneumatici, 0° sul retro · capacidad de elevación sobre ruedas, 0° hacia atrás

„D“



HA: Main boom · Hauptausleger · Flèche principale · Braccio base · Pluma principal

HAV: Main boom extension · Hauptauslegerverlängerung · Rallonge de flèche · Prolunga · Plumín, extensión de pluma

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NOTES · NOTIZEN · NOTES · NOTA · NOTAS

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Sous réserve de modification!

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¡Sujeta a cambios sin notificación previa!

03/06

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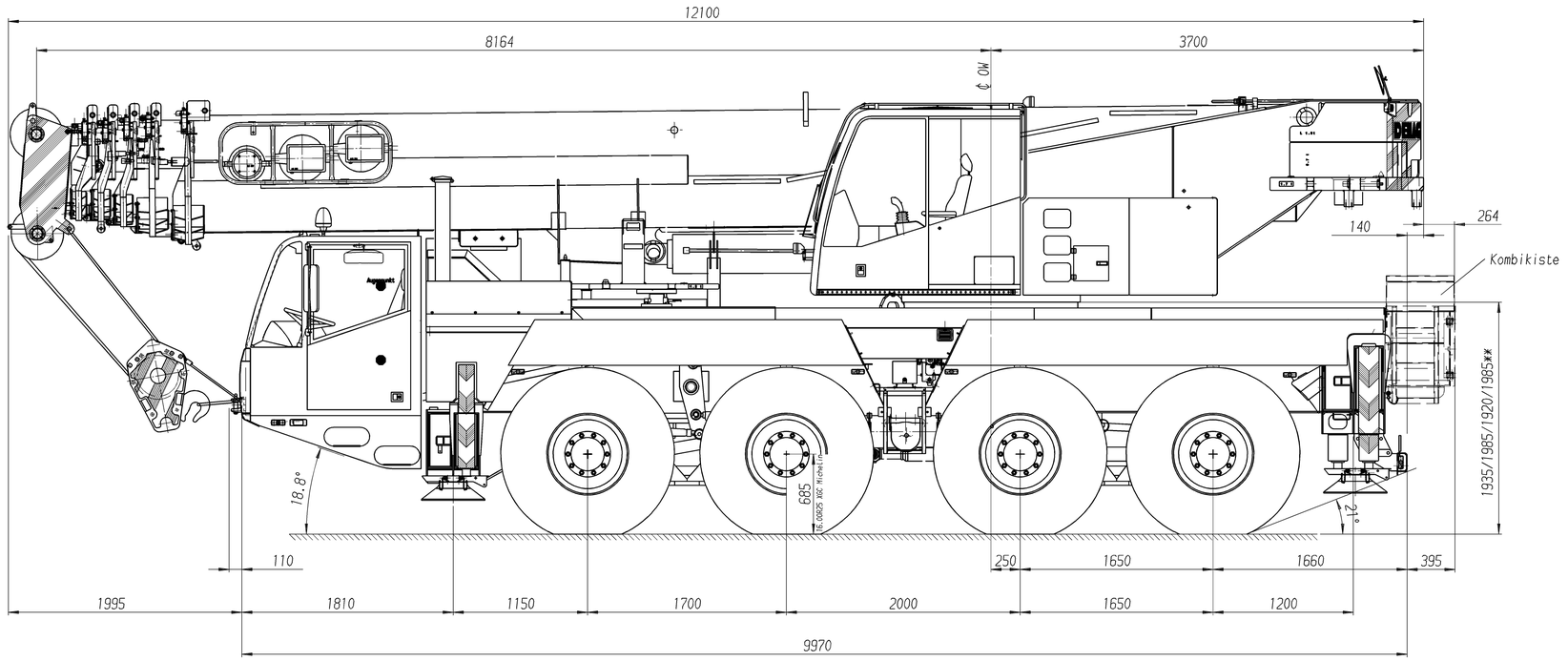

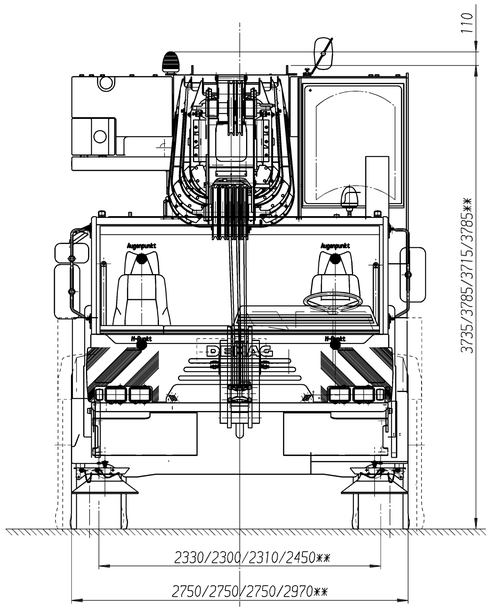

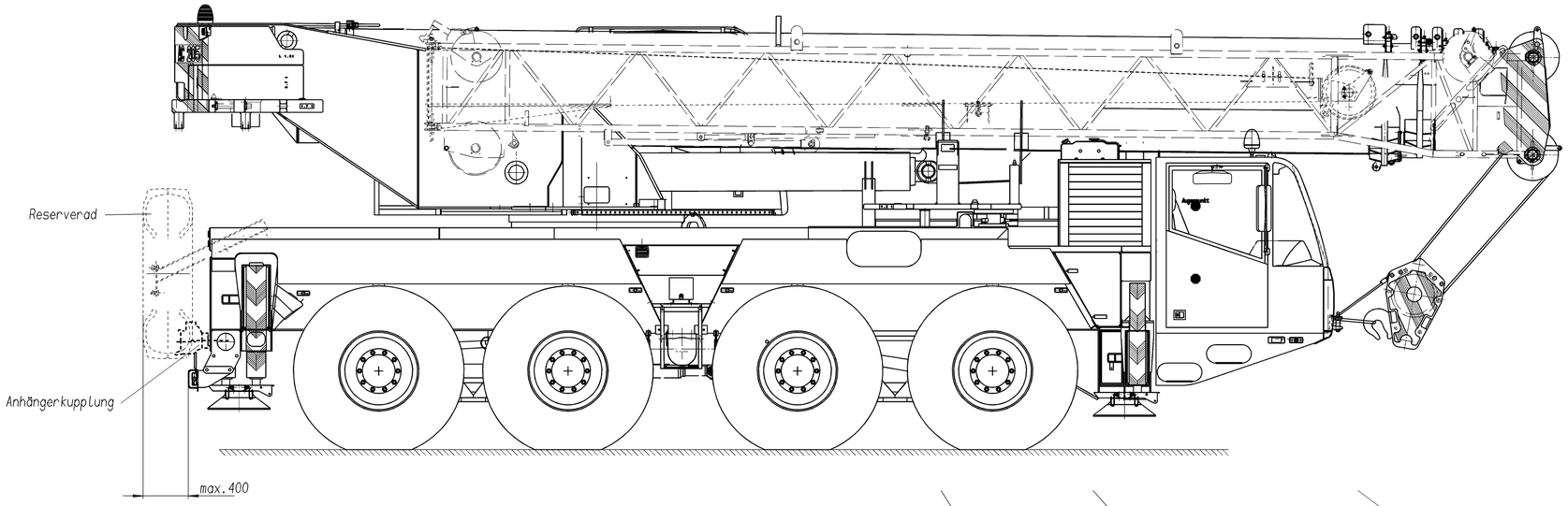

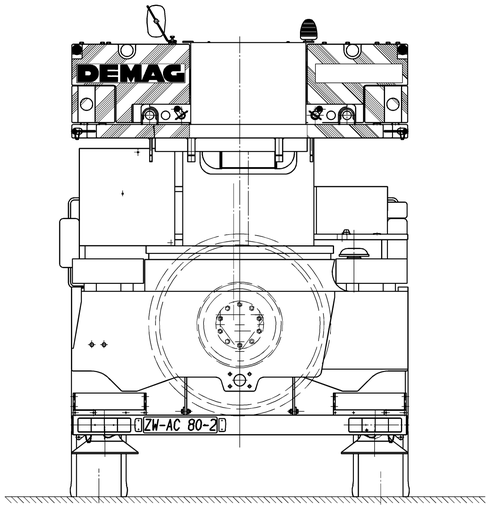

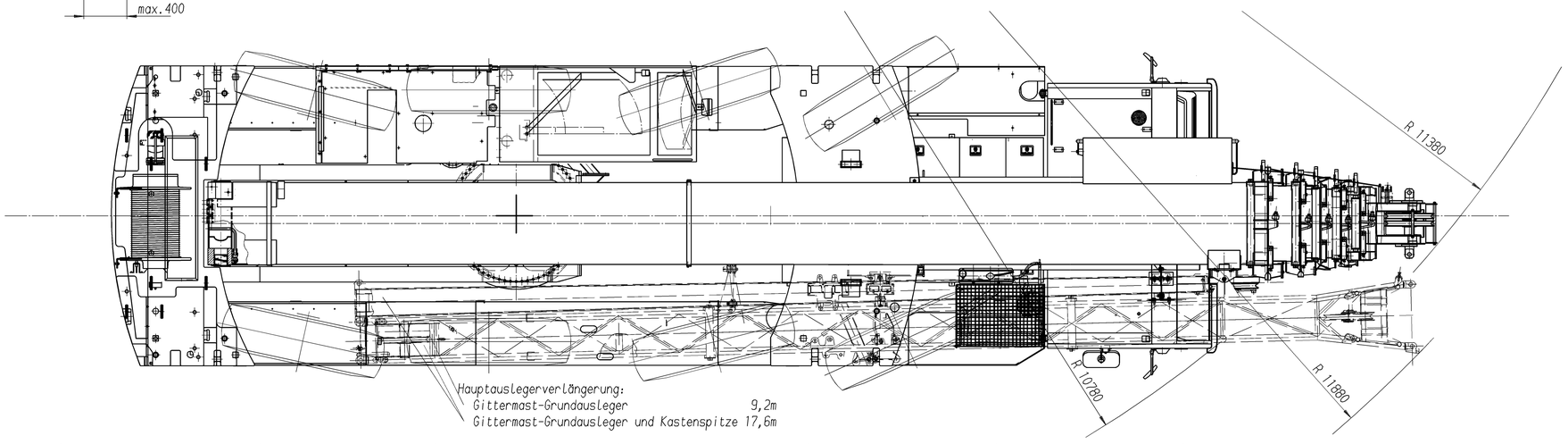

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.	_	N00000	.	.		

Allgemeintoleranzen

Spanend	DIN ISO 2768 m
Spanlos	DIN ISO 2768 c
Brennschn.	DIN 2310 II,T3,BG,T5L
Schweißko.	DIN EN ISO 13920 C,G
Oberfläche	DIN ISO 1302 Rz R2

	Datum	Name
Erst.	04.06.02	F.Wernicke
Gepr	04.06.2002	ARCHIV
Frei	.	.

Abt.: 8312 Zusatzsprache: E

Maßstab: 1 : 25 Masse: . kg Erstverwendung

Werkstoff: % Typ:AC80-2 Pos

Rohteil: . Ident-Nr. . .

Mat.-art: UNTL L: . B: . H: .

Benennung:

TRANSPORTZUSTAND AC80-2

.

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Plotstatus Plotersteller Plotdatum

DEMAG Mobile Cranes

Ident-Nr. 127 563 12 Format A1 B./Blätter 1 / 2

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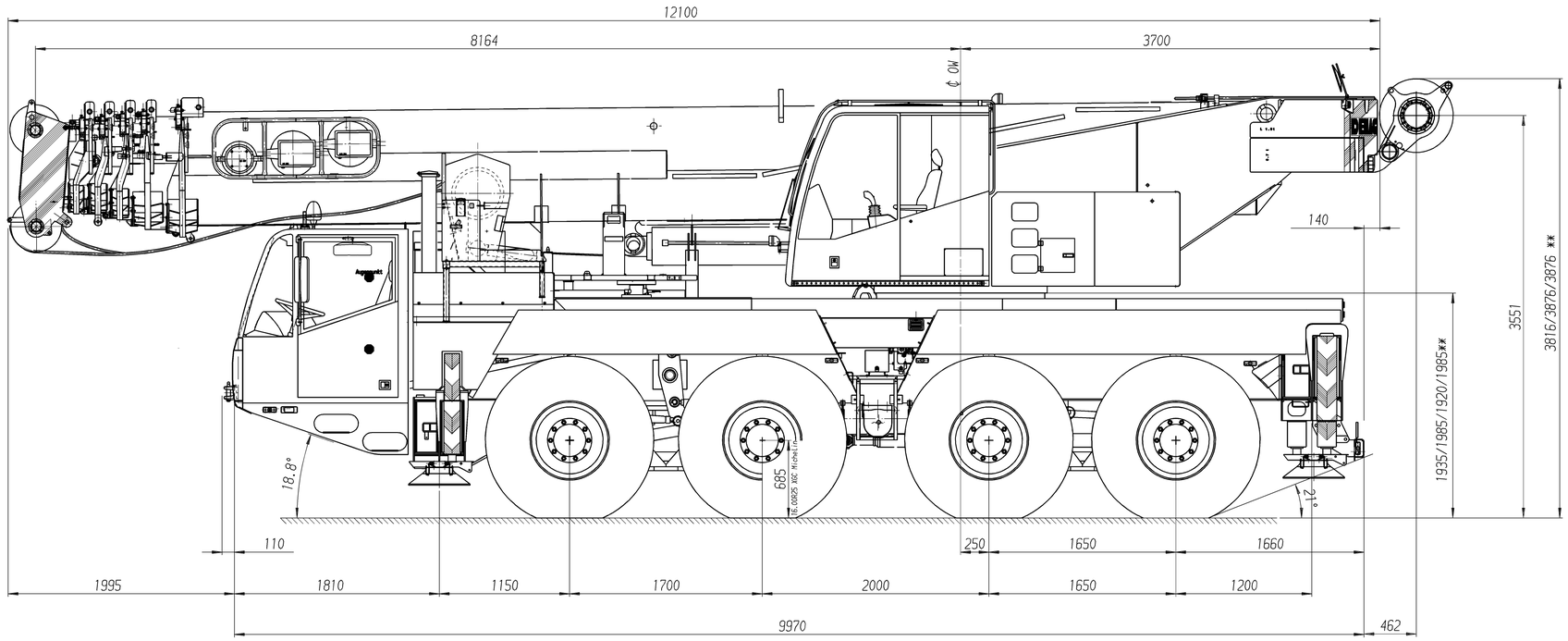

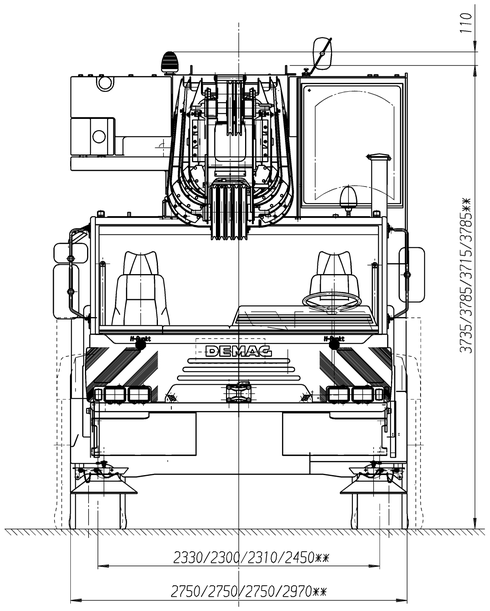

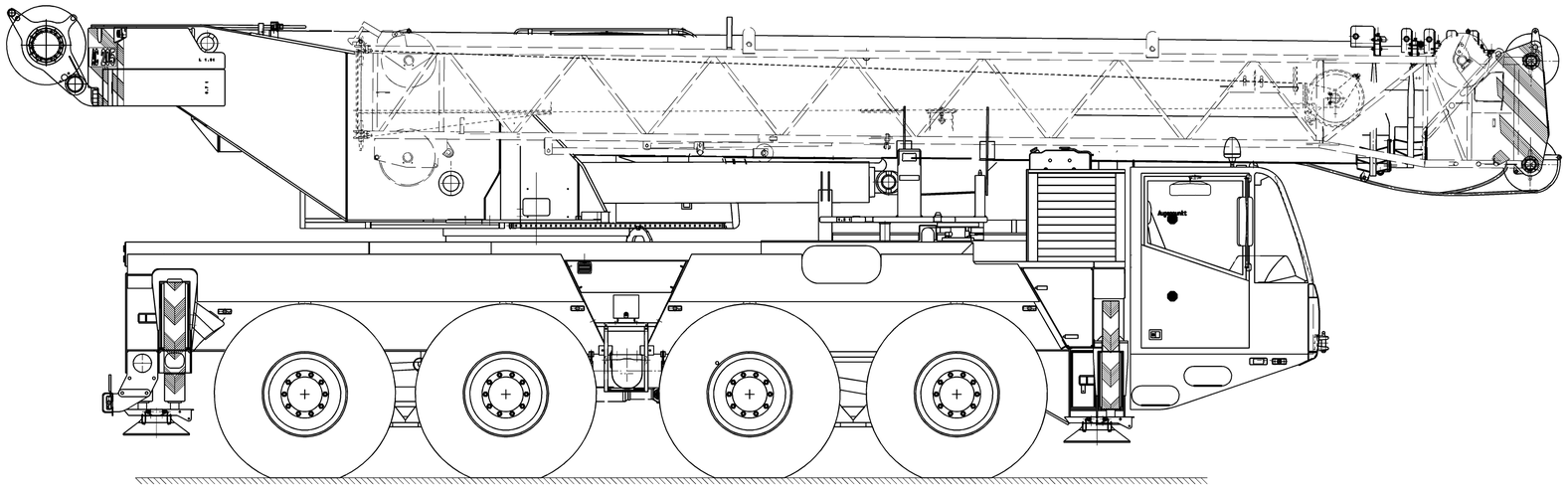

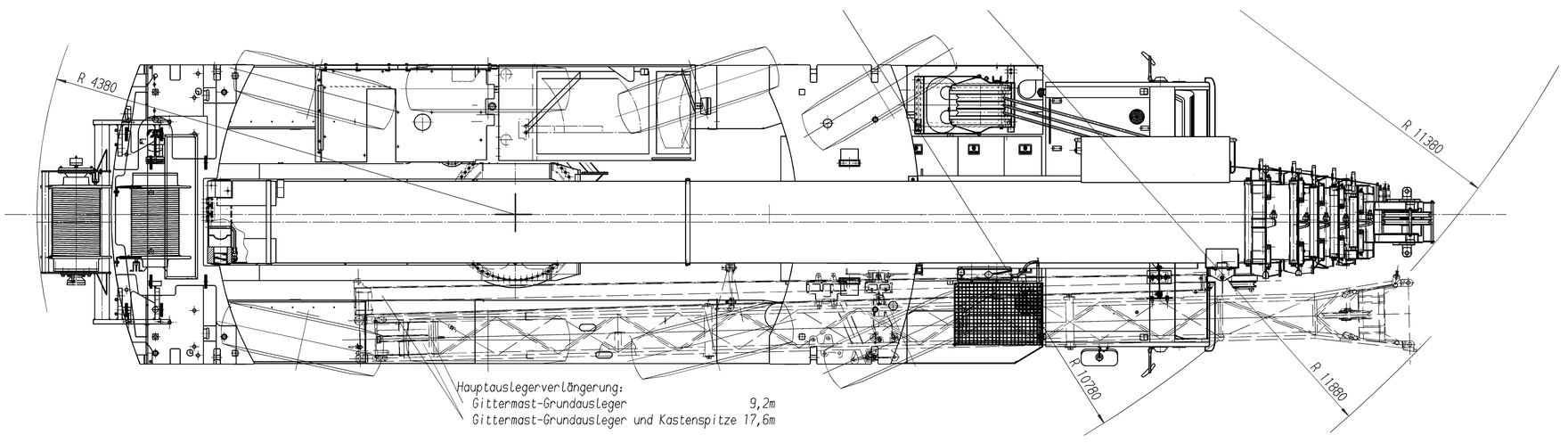

Hauptauslegerverlängerung:
Gittermast-Grundausleger 9,2m
Gittermast-Grundausleger und Kastenspitze 17,6m

** = Angaben fuer Bereifung 14.00/16.00/17.50/20.5R25

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Schweißko.	DIN EN ISO 13920 C,G	
Oberfläche	DIN ISO 1302 Rz R2	

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Benennung:

TRANSPORTZUSTAND AC80-2 mit HW2 + Ufl-Ablage

Plotstatus	Plotersteller	Plotdatum

DEMAG Mobile Cranes

Ident-Nr.	Format	B./Blätter
127 563 12	A1	2 / 2

Entstanden aus: . Ersatz für: . Ersetzt durch: . CAD

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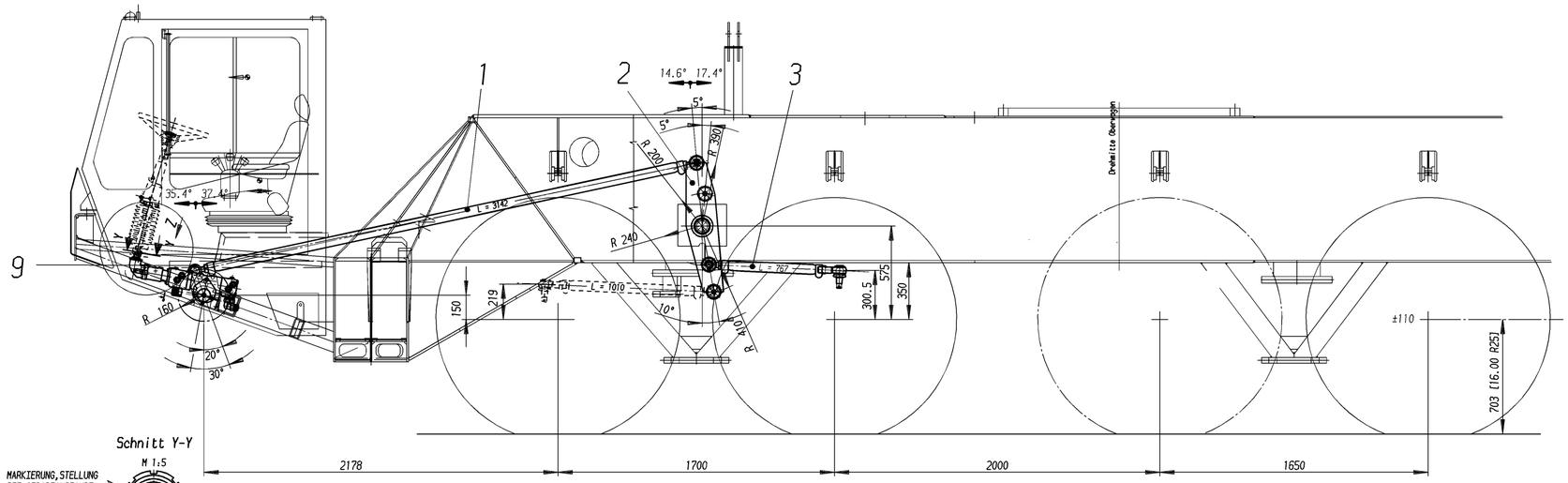
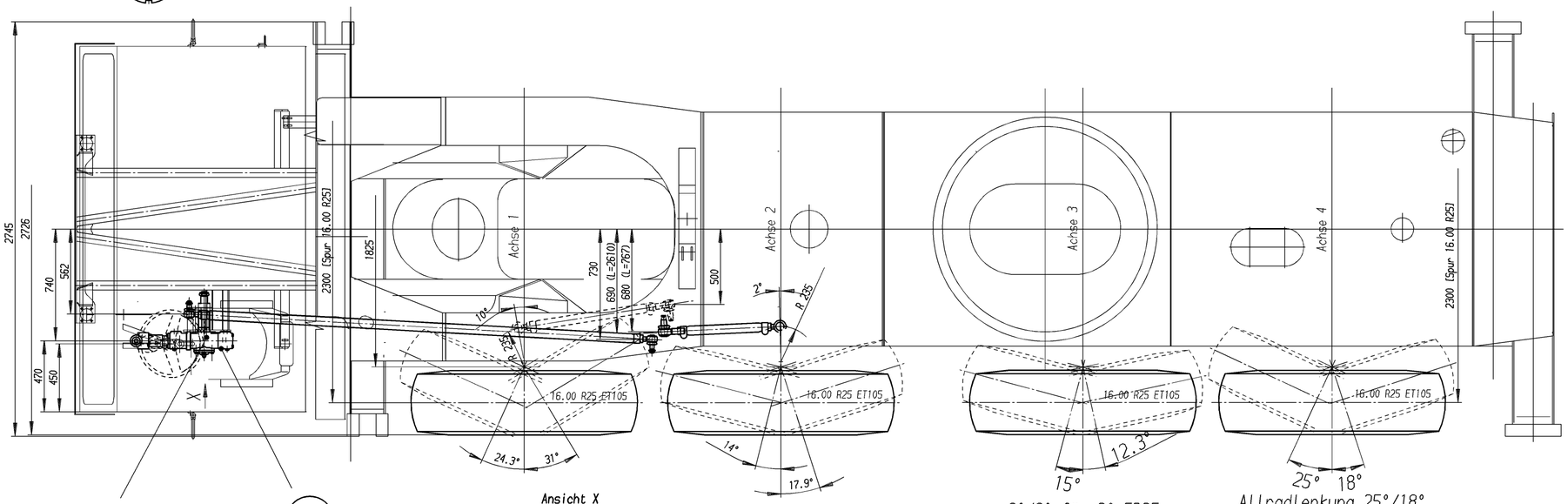


Schnitt Y-Y
M 1:5

MARKIERUNG, STELLUNG BEI GERADEAUSFAHRT



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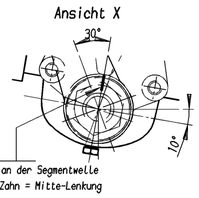
11

Ansicht X



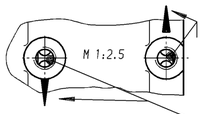
Markierung an der Segmentwelle auf Mitte-Zahn = Mitte-Lenkung

9°/8° für 20.5R25

Allradlenkung 25°/18°
Diagonallenkung 20°/13.5°

Detail Z

Einstellen der mech. Lenkbegrenzung



DURCH DREHEN DIESES STELLRINGS IN PFEILRICHTUNG WIRD DER LENKSTOCK-HEBELAUSSCHLAG FUER DIE LINKSKURVE VERKLEINERT.

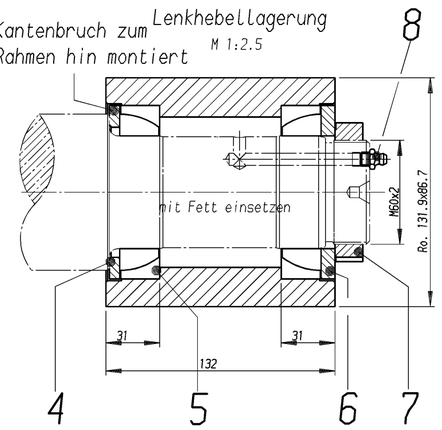
DURCH DREHEN DIESES STELLRINGS IN PFEILRICHTUNG WIRD DER LENKSTOCK-HEBELAUSSCHLAG FUER DIE RECHTSKURVE VERKLEINERT.

Montagehinweis !

1. Nutmutter festziehen, bis der Lenkhebel nicht mehr von Hand zu bewegen ist.
2. Nutmutter soweit lösen, bis der Lenkhebel sich gerade bewegen läßt.
3. Nutmutter mit Gewindestift sichern.
   - 3.1 Gewindestift A bis auf Anschlag anziehen
   - 3.2 Gewindestift B voll anziehen
   - 3.3 Gewindestift A ebenfalls voll anziehen

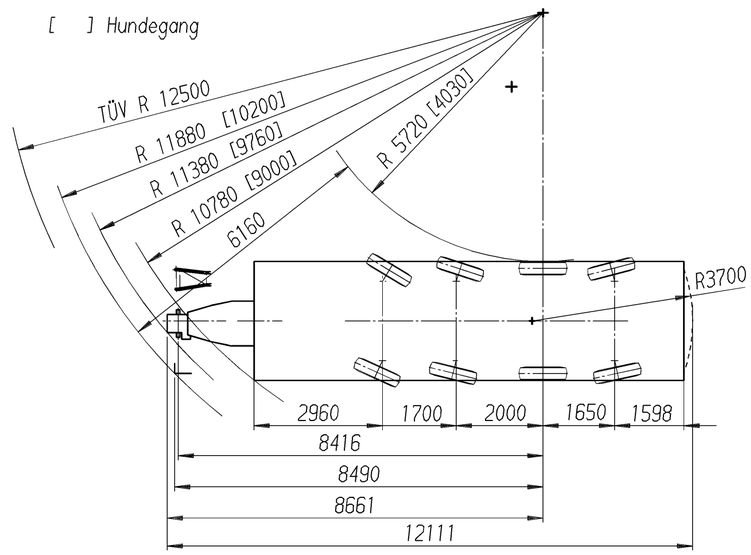
Kantenbruch zum Rahmen hin montiert

Lenkhebellagerung
M 1:2.5



Wendekreis M 1:100

[ ] Hundegang



Einstellung Lenkung siehe Fertigungsanweisung

Lenkstangen

Kronenmutter M30x1.5 MA= 430-480 Nm
Kronenmutter M24x1.5 MA = 260-280 Nm
Gewinde und Auflageflaeche geoelt
6kt.Shr. M12x1.5 MA = 70-85 Nm
Splint 6x50 DIN 94 und Splint 5x40 Din 94 lose
Die Lenkstangen sind auf die in der Zeichnung angegebenen Längen einzustellen

Lenkstockhebel

Kronenmutter M35 x 1.5 für Lenkstockhebelbefestigung MA = 400 Nm
Welches bis zur nächsten Splintlochfreigabe überschritten werden kann
Bei Montage u. Demontage des Lenkstockhebels keine Schläge in axialer Richtung ausüben, sondern Lenkstockhebel mit zugehöriger 6kt. Mu. festziehen bzw. mit Abziehvorrichtung abziehen.

Halbblock

Zyl.Schrauben M16 x 1.5 Ma = 285 Nm [Pos.4]
Lenkstange A1 + A4 siehe VM-Achsen
Lenkrad + Lenksäle siehe EM-Kabine
Lenkungsübersetzung i=25.6:1
max. Lenkstockhebelausschlag = 90° = 6.4 Lenkradumdrehungen

Allgemeintoleranzen		.	_	M0000	.	.	Paßmaß / Abmaß
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Schweißko.	DIN EN ISO 13920 C, G	Rohteil: .				Ident-Nr.	
Oberfläche	DIN ISO 1302 Rz R2	Mat.-art: B-E	L: .	B: .	H: .	.	.
	Datum / Name	Benennung: EM LENKUNGSEINBAU MECH					
Erst	19.04.02 L. SZILARD						
Gepr	22.04.2002 ARCHIV						
Frei	. .						
Abt.: 8362	Zusatzsprache: .						
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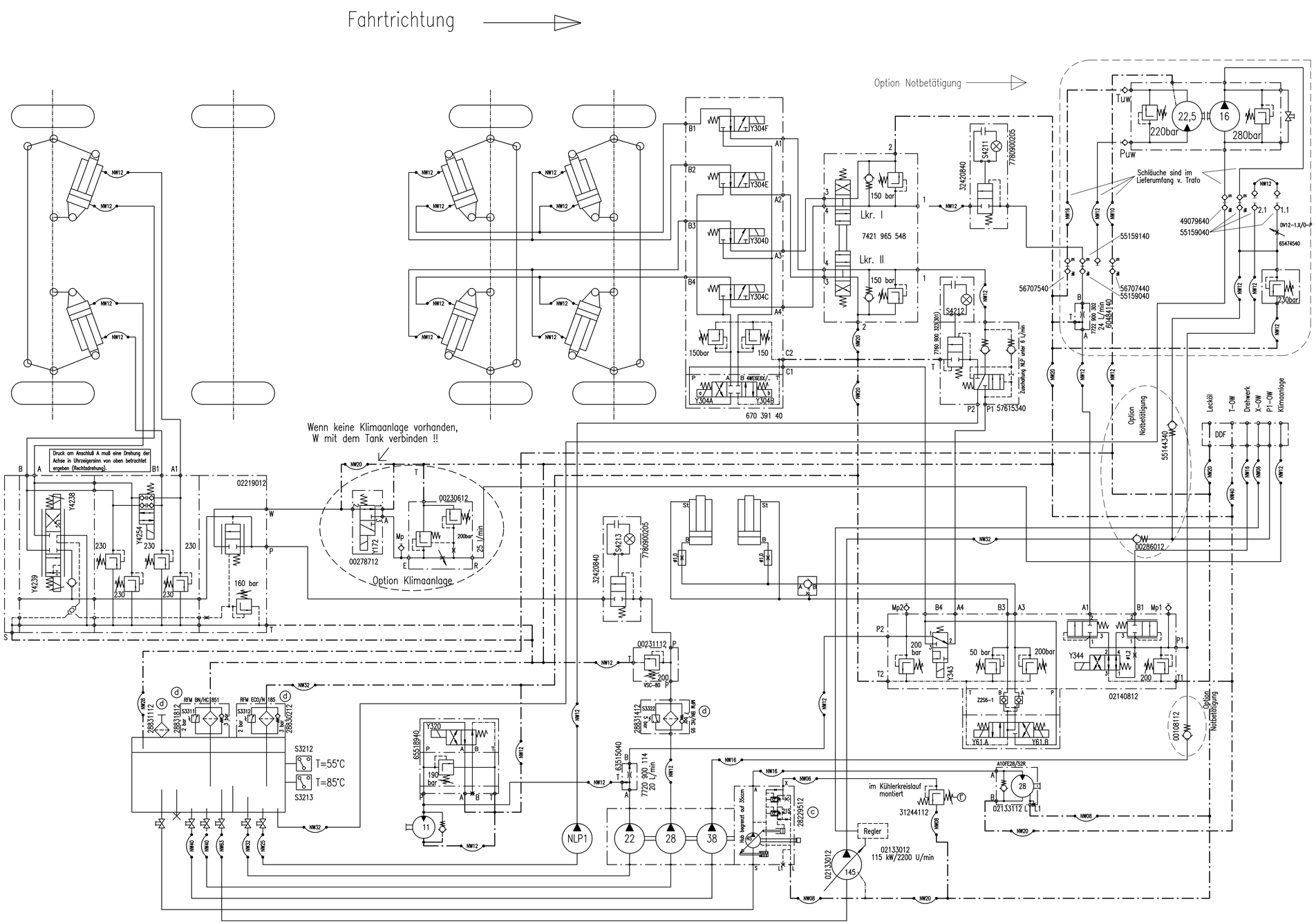

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					Mat.-art: UNTL

	Datum	Name
Erst.	25.10.01	Brenner
Gepr.		
Abteilung:	1141	

Hydraulik Lenkung AC 80-2 6 x 8

Hydraulic Diagram Steering

TEREX DEMAG

Ident-Nr: 16952512

Format: A0 | Bl. / Blätter: 1/1

Plotdatum:

ECSCAD

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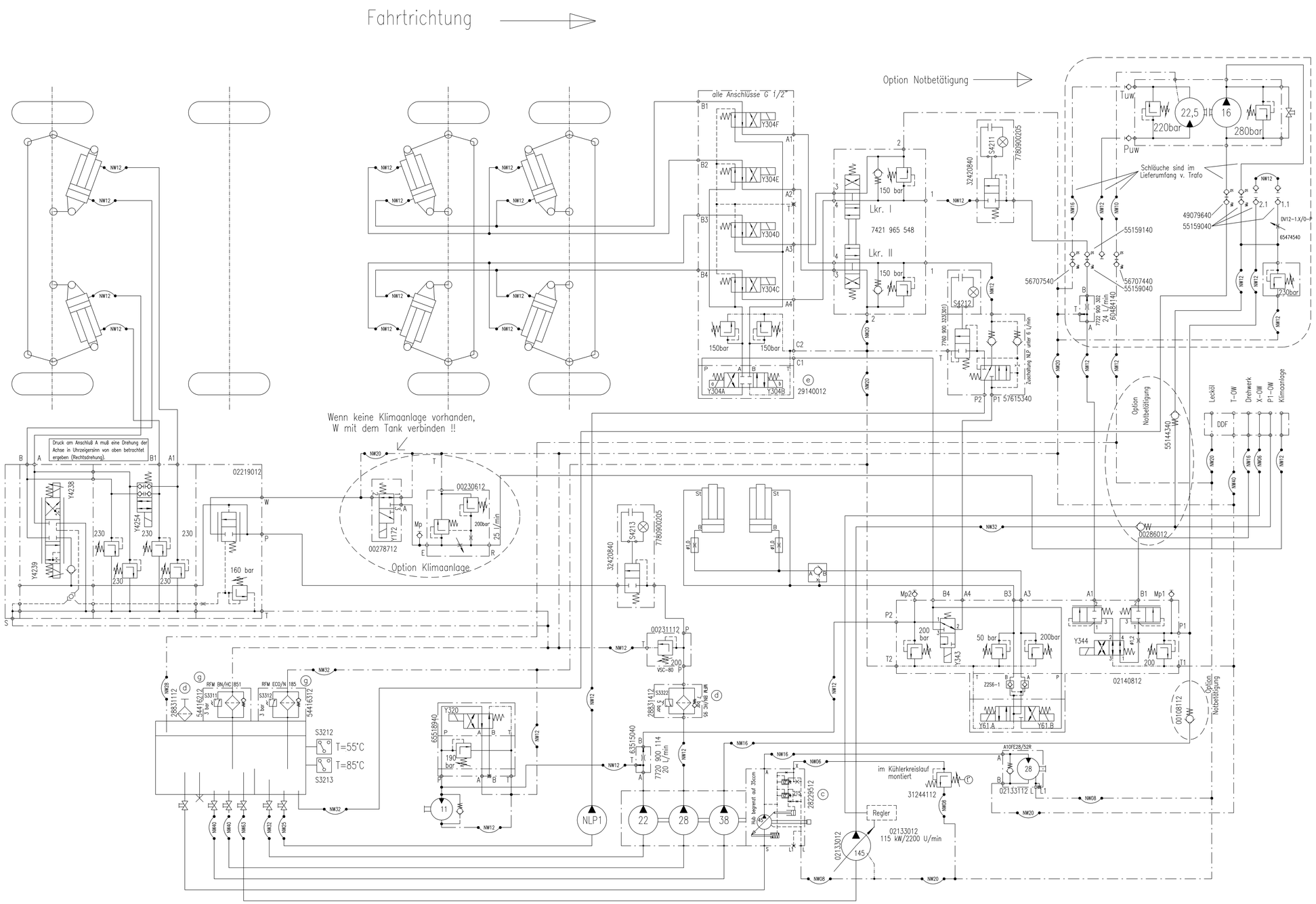

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					Mat.-art: UNTL

	Datum	Name
Erst.	25.10.01	Brenner
Gepr.		
Abteilung:	1141	

Hydraulik Lenkung AC 80-2 6 x 8

Hydraulic Diagram Steering

TEREX DEMAG

Ident-Nr: 16952512

Format: A0 | Bl. / Blätter: 1/1

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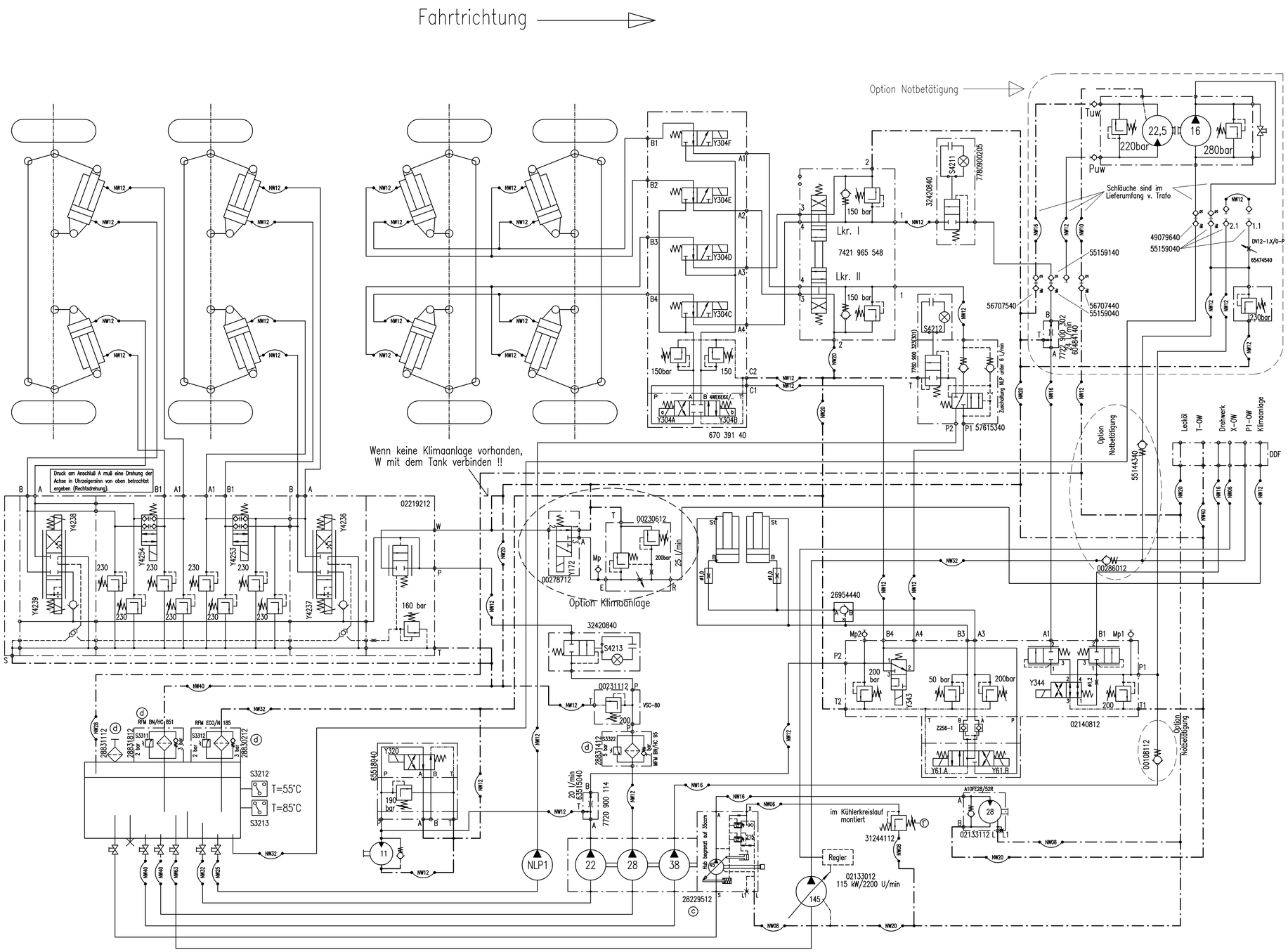

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Ind	Mitt-NR	Datum	Name		Mat.-art: UNTL

	Datum	Name
Erst.	19.01.07	rakhimov
Gepr.		
Abteilung:	1141	

Hydraulik Lenkung 8 x 8 AC 80-2

Hydraulic Diagram Steering

Ident-Nr: 16954212

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Pickdatum:

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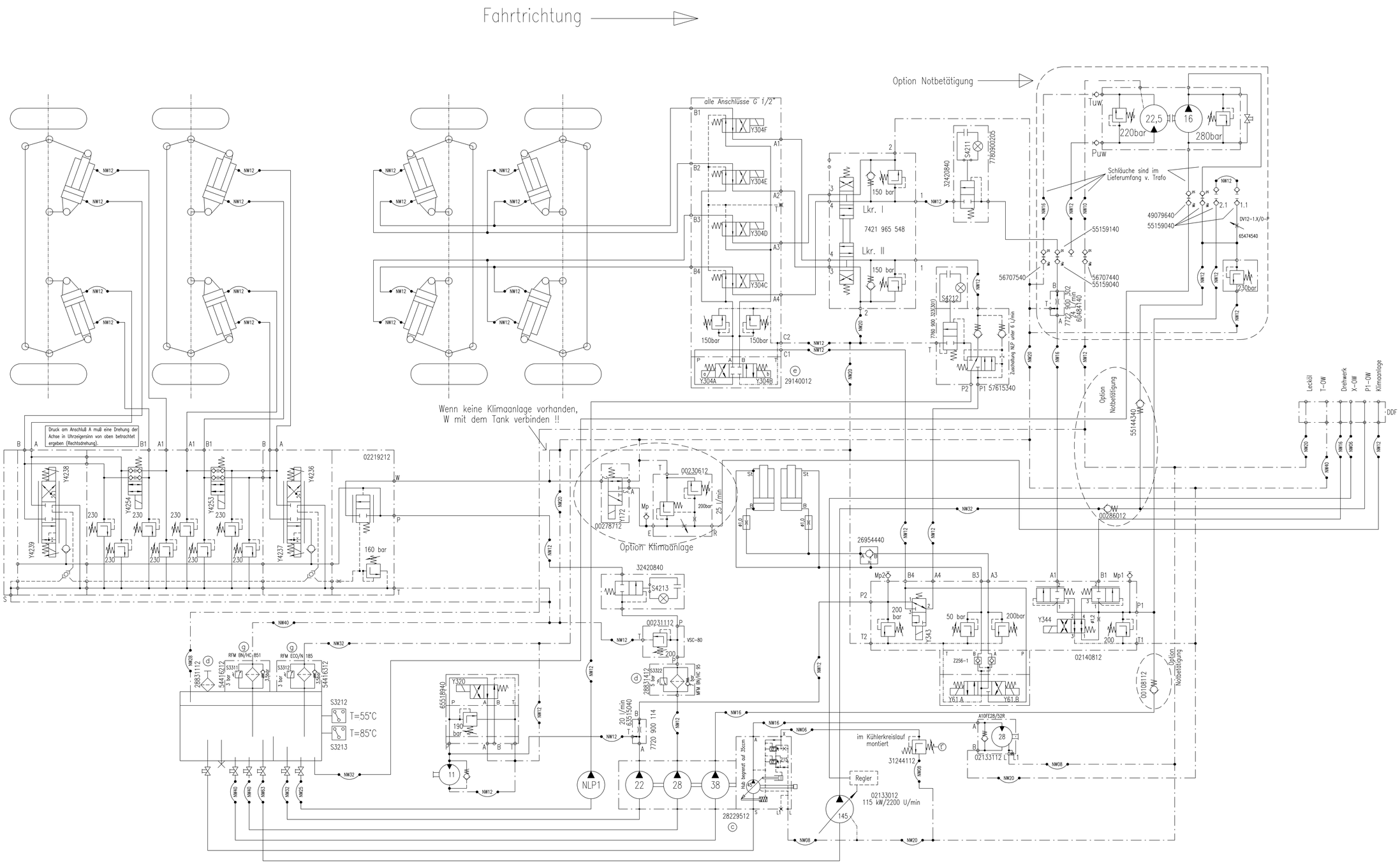

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	Datum	Name
Erst.	19.01.07	rakhimov
Gepr.		
Abteilung:	1141	

Hydraulik Lenkung 8 x 8 AC 80-2

Hydraulic Diagram Steering

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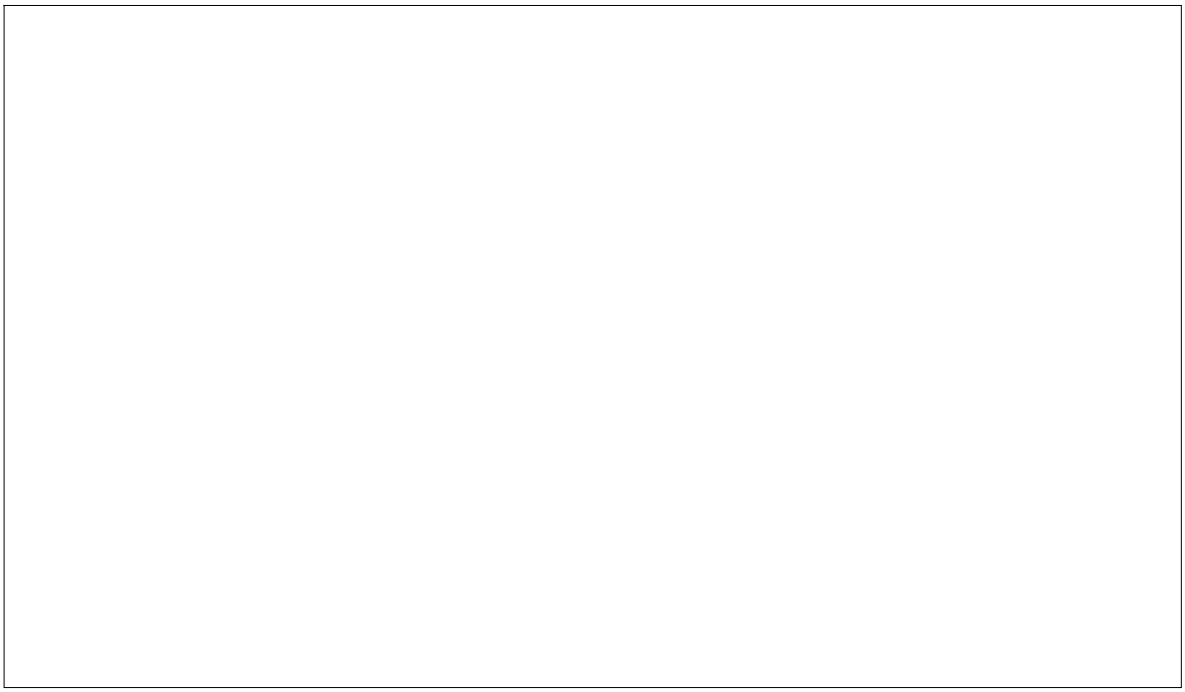
Operating Manual

Safety auxiliary Steering System
Mobile crane AC60 / AC80

Terex-DEMAG Mobile Cranes



Auxiliary steering system for 4 axle cranes

Type: AC60: SLC 019 502
AC80: SLC 019 504

MOBIL ELEKTRONIK GMBH

Bössingerstraße 33
D - 74243 Langenbeutingen
☎ 07946 / 9194 - 0
FAX 9194 - 30

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Note

This manual describes installation, start up, operation and service of the safety auxiliary steering system.

Information provided here should be followed carefully by skilled staff. The service manual covers maintenance and should be used as reference for writing the vehicles handbook.

Technical changes preserved.

File: D:\Projekte\019\019502_Doku_in_Arbeit\BA19502_EN.DOC
Date: 2002-10-08 / Gp
Author: Dipl. Ing. Plöger, Dipl. Ing. Klugesherz, Dipl.Ing. (FH) Rothweiler

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1 General

1.1 About this Document

The documentation of the safety steering computer 019 502 contains three main chapters:

Installation Manual

describes the assembly and the wiring of the angle transducers, the hydraulics installation, etc.

Start up Manual
describes the start-up procedure of the steering system until the first test drive is done

Service Manual
describes operation of the safety steering computer and provides for projekt specific documentation, such as:

- parameter list,
- alarm codes,
- system outline,
- component list,
- electric wiring schematics

and

- hydraulics schematics.

Note:

This document uses the expression “front axle” for the first axle of the vehicle. This axle has to comply harmonised european standards (70/311/EWG, ECE-R 79) or equivalent national standards. However, it has to be made sure, this axle allows for full control of the vehicles direction.

The expressions „axle“ or “rear axle” are used whenever an axle controlled by the steering computer is addressed. One particular system may contain more than one controlled axle!

1.2 Safety Hints

The safety steering computer type SLC 019 502 has been developed for hydroelectric auxiliary steering systems. Therefor the front axle will mainly control the direction of movement the rear axles are steering additionally.

The steering system is designed to meet the requirements of DIN V19250 class 4 (risc equivalent to EN954-1 category 3 or EN61508 class 2). The latter can only be met, if all components are used, installed and wired according to the installation instructions of MOBIL ELEKTRONIK. Any deviation to the installation intructions and procedures described in this document have to be agreed on by MOBIL-ELEKTRONIK.

CAUTION:

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- **Modifications of the system or its components without the agreement of MOBIL ELEKTRONIK lead to loss of type approval. MOBIL ELEKTRONIK can't be held responsible for any damage that results from unauthorised modification. The same applies, if the steering system is installed on another type of vehicle without authorisation by MOBIL ELEKTRONIK.**
- **Warranty is void if components are modified without authorisation by MOBIL ELEKTRONIK. The same applies, if the steering system or its components are damaged due to improper treatment or lack of maintenance. Do not use excessive force or inappropriate tools when mounting or demounting components.**
- **Installation, start up and maintenance have to be done by trained staff only.**
- **When doing painting work, make sure all components of the steering system are well protected.**
- **When doing welding work at the vehicle, the steering computer has to be disconnected.**

1.2.1 Welding Work at the Vehicle

Unplug the safety steering computer before doing welding work! Disconnected electronic components have to be protected against electrostatic discharge!

Make sure the unprotected electronics is not exposed to water, dirt or swarf.

1.2.2 Steering Systems with Hydraulic Accumulator

Steering systems equipped with hydraulic accumulators keep the hydraulics pressure after switching off the engine. Before working with hydraulics components release the hydraulics pressure using the release valves!

Releasing the hydraulics pressure:

Open the hand operated release valve (see hydraulics diagramm)

- Check if discharged using a pressure gauge!
- Until service work is finished, always close the pressure release valve!

Caution !

Release hydraulic accumulator pressure before doing maintenance work! Check if discharged using a pressure!

1.2.3 Working in the Steering Range of the Wheels

Before working in the steering range of the wheels, the engine has to be switched off and the steering system has to be deactivated (i.e. pull the fuse to enter fail-safe state). When the vehicle is equiped with self-centering axles, care must be taken the axle is either in the centered position or the pressure of the hydraulics acczmulator of the centering circuit is released.

Make sure that there is no person in the steering range of the axles when alignment mode is selected.

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After start-up or maintenance is done, check for any errors in hydraulics and electrical installation. Some combinations of errors may result in spontaneous axle movements at power on!

1.2.4 Overhaul

Every half year (under rough conditions more often) all components of the steering system will have to be checked due to damage, corrosion, loose. All activity may be done by trained persons only. Defective components must be replaced.

Refere to Chapter 4.2 too.

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2 Installation

2.1 General

Steering equipment used on public road systems have to meet high safety standards. An hydroelectric steering system for leading or trailing axles has to be looked at the same way as conventional mechanical steering systems.

Performance and reliability of the whole system depend on the reliability of each component. Only when the installation of all components is done properly the system will work in the desired way.

Components provided by MOBIL ELEKTRONIK correspond to the requirements of mobile applications and are of sturdy design. However they all do contain sensitive precision parts! Especially when installing hydraulics, take measures to prevent pollution of the hydraulics circuit. No component may be exposed to excessive force (e.g. usage of hammers on components that contain ball bearings).

To facilitate maintainance, the following hints should be followed:

1. **Mounting place of the safety steering computer:** A mounting place for safety steering computer should be chosen inside the vehicle or in a control cabinet to avoid direct exposure to dust, moisture and direct sunlight. If the computer is delivered with a display, this should be readable after the installation.
2. **Accassibilty of components:** Twice a year (when used in rough area more often) the components of the steering system have to be checked by trained staff for mechanical damage, corrosion or play joints. Make sure, those components can be checked at easily!

See for the handling of the individual components below!

2.2 Assembly of the Steering Cylinder

1. The cylinder has to be able to provide steering forces strong enough to allow steering movements on dry asphalt when the vehicle stands still.
2. The mechanical connections between the cylinder, the axle and the chassis have to be designed in order to stand the force created by the cylinder when maximum working pressure is applied.
3. If a combination of cylinders is used to steer one axle (e.g. in a self-centering system with seperate cylinders for steering and centering) and one cylinder may work against the other in one of the possible system states (e.g. fail-safe state), all mechanical and hydraulics components have to be designed to resist these forces.

2.3 Mounting and Connection of the Hydraulics Units

1. Mounting: hydraulics units need to be very sturdy and heavy because of the high energy density of hydraulics systems. Mounting of these units has to be equally sturdy to resist shock and vibration. Make sure that all fixing points of a hydraulics block are used. Use bolts that won´t corrode and lock all nuts. Note that improper mounting may result in mechanical strain to the moving parts of hydraulics units (sliding valves), causing them to seize.

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2. Place of mounting: The hydraulics units must not be mounted in the range of snow chains or gravel. Avoid direct contact of spray water caused by the wheels. If necessary use a sheet metal.
3. Tube connections must fit and have to be installed without any tension.
4. For the connection of the hydraulics units common parts according DIN 3852 form B (sealing groove) or form E (soft sealing gasket) may be used. Make sure to apply the correct torque!
5. Diameters of tubes must be chosen according to the hydraulics diagramm.
6. The steering system contains sliding valves with very small tolerances. Although they appear very sturdy, they are very sensitive to pollution of hydraulics fluid and to mechanical strain. To avoid sticking valve sliders, take care that filings, burr and dirt are removed from the tubes, using a suitable cleaning device.
7. The hydraulics sense of rotation is defined as follows: A hydraulics connection from P to A should result in clockwise rotation of the axle (seen from above).
8. The hydraulics tank has to compensate for difference in oil volume that is needed by hydraulics cylinders during operation. The tank has to provide two times the required oil volume. When using an accumulator system using 4 x 1-Liter accumulators, the tank should contain at least 10 Liters. The oil level can vary about 4 Liters.

2.4 Mounting and Wiring of the Safety Angle Transducers

Connections and joints of the angle transducers are safety critical parts of the steering system (same importance as a conventional track rod). In case of a failure of connection or joints, the steered axle is out of control and may steer in any direction (similar to a failure of a conventional track rod).

1. Mounting: When coupling the angle transducer to the track rod or the steering lever, it is advisable to make use of drilled holes propared by the manufecturer of the axle (drilling or welding has to be permitted by the manufacturer). When using clamps at track rods or steering levers, make a sturdy construction (e.g. use at least 4 M8-screws).
2. To mount the angle transducer it is necessary to use corrosionless screws with a firmness of 8.8. Make sure that the nut won´t losen by usage of self-locking nuts or threadlocking adhesive.
3. If strong vibrations are to be expected (e.g. when mounted to the axle) the shaft of the angle transducer should be mounted vertically (lever direction upward or downward).
4. Mounting place: The safety angle transducer must not be mounted in the range of snow chains or gravel. Avoid direct contact of spray water caused by the wheels. If necessary use a sheet metal. The ground clearance may not be limited in any case by the angle transducer or connection parts (arms, joints). Make sure, that the angle transducer and moving parts are not exposed to external forces when the vehicle is used off road. If necessary secure the mounting section by a metal sheet or a fender. A check-up of the connection has to be possible any time.
5. When selecting the mounting range, make sure that in any operation mode (e.g. full suspension range, full steering angle, operation with snow chains) the connection and joints of the angle transducer won´t touch other components. Make sure, a clearance zone of about 10mm is kept. If the vehicle is used off road, the clearance should be bigger.

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6. To compensate for all tolerances of manufacting and mounting and to avoid strain from the connection of the angle transducer, it is necessary to use ball jointed arms. The joints (nominal size 8mm) have to secured be locked. The connecting rod should be made of stainless steel with a minimum diameter od 8mm. The maximum length of the coupling rod must not exceed 400mm. The ball joints must be fixed using locknuts and threadlocking adhesive. The thread reach should be at least 8mm at both ends. Best use a rod with combining left and right thread and appropriate ball joints. See our guideline SK 410 for the standard installation.
7. Kinematic aspects for the assembly of the angle transducer: The safety angle transducer should have a swing of +/-25° to +/-55° for the full steering range (stop to stop). Take care a proportional relation between steering angle and measured angle transducer exists! In straight position of the axle, the safety transducer must be in mid position to allow for teach in (alignment) of the axle by the steering computer (maximum tolerance ± 5°).

2.5 Mounting place of the safety steering computer

1. A mounting place for safety steering computer should be chosen inside the vehicle or in a control cabinet to avoid direct exposure to dust, moisture and direct sunlight. If the computer is delivered with a display, this should be readable after the installation.
2. When doing welding work at the vehicle, the steering computer has to be disconnected. Make sure, the steering computer can be disconnected easily!

2.6 Wiring of the System

1. The electrical connections may only be made by trained staff using suitable tools. The delivered plugs and threaded connectors have to be mounted according to the their instructions. It is not permitted to leave out gaskets – all connections that are exposed to the environment must be waterproof after the mounting.
2. Never insert single wires into connectors / PG-threads. Pay attention to this when wiring safety angle transducers.
3. The isolation shell of the cable must reach deep enough into PG-threads to provide for proper sealing. The shield of shielded cable has to be connect at one end only and must not be contacted to the housing of the angle transducer (cut the shield to the same length as the jacket).
4. The PG-thread must be tightened firmly (but not forcibly) to be waterproof and to provide for strain relief. The cable must not slip out of the PG-thread, when pulled at with a force of 50N.
5. Always use bootlace ferrules with suitable crimp tools when wiring the angle transducers.
6. To avoid interferences, signal and control wires should not be routed next be to cables that lead high current or high frequency signals.
7. Sensor and magnet cables, that are too long, never should looped up commonly.

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8. Always use cables that are spacified for automotive temerature range and environmental conditions. The curvature of a cable must not be smaller than a tenth of the cable diameter or according to the cable manufacurers specifications.

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3 Start up

3.1 General

This section describes testing steps after installation including test drives.

Initial start-up of the first vehicle of its type has to include additional testing of controllability of the vehicle when switching to fail safe state during operation.

Hint

This manual decribes the start up, the programming of the parameters and the readout of the alarm memory using the operating controls of the safety steering computer.

The handling with the steering computer can be done using a Notebook/PC via serial interface (3-wire RS232). The **MOBIL ELEKTRONIK PC-Service-Software** (PCS) provides for the following functions ....

... alignment of the axles
... programming of the parameters
... display of alarm codes in plain text
... monitoring and recording of the state of in- and outputs
as well as ... internal data of the steering computer.

The usage of the PCS is covered by another manual (PCS 093 101).

3.2 Requirements

Installation of all components according to the hydraulics and electrical diagrams has to be finished and checked for errors.

The initial start-up should be done by staff trained in electrical- and vehicle engineering.

The start-up has to be done following the procedure given below.

CAUTION:

- Modifications of the system or its components without the agreement of MOBIL ELEKTRONIK lead to loss of type approval. MOBIL ELEKTRONIK can't be held responsible for any damage that results from unauthorised modification. The same applies, if the steering system is installed on another type of vehicle without authorisation by MOBIL ELEKTRONIK.
- Warranty is void if components are modified without authorisation by MOBIL ELEKTRONIK. The same applies, if the steering system or its components are damaged due to improper treatment or lack of maintenance. Do not use excessive force or inappropriate tools when mounting or demounting components.
- Installation, start up and maintenance have to be done by trained staff only.
- When doing welding work at the vehicle, the steering computer has to be disconnected

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- Never pull plugs when power supply is on!

3.3 Inspection of the electrical installation

Before connecting the safety steering computer, all connectors have to be checked against the wiring diagramm.

Especially check if...

- the supply voltage is correct and all pins except those of the digital inputs are at 0V level;
- hydraulics valves connected to the proper PWM outputs;
- all sensors and angle transducers are connected properly:
  The angle transducers are supplied with two voltages “+5ref” and “+5Vext”. Crossing over both supplys might lead to errornous readout of the angle transducers and alarm messages.

  To prevent wrong assignment of reference voltage outputs to the tracks of the angle transducers:

  1. Connect track 1 of all angle transducer according to the wiring scheme. Don’t connect the other track’s supply 5Vext.
  2. Connect PCS and turn on ECU power supply. Check if voltages at the ECU’s inputs are correct, refer to the wiring diagram.
     The alarm messages displayed may just refer to track “B” of every angle transducer.
  3. Complete wiring connecting 5Vext and restart the system. Check if all voltages are approximately 2.5V and all alarm messages are cleared.

CAUTION:

- when swapping of the angle transducer’s sense of direction is necessary, always swap the supplies of both tracks! Swapping slider pins may affect proper operation!
- An connection between 0V-supply and 0V-signal other than within the steering electronics is not permitted!

3.4 Connection of the Safety Angle Transducers

The safety angle transducers are made up of two independend sensor units A and B.

Make sure the sensors A are connected to $5V_{ref}$ and the sensors B to $5V_{ext.}$ Check the voltage between the 0V-signal and the sliders. In mid-position of the axle the voltage of sensor A should have between 2,4V and 2,6V.

The sense of direction should be as follows:

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Clockwise rotation of the axle (right direction) leads to increasing voltage at sensor A

Sense of direction at track 2:

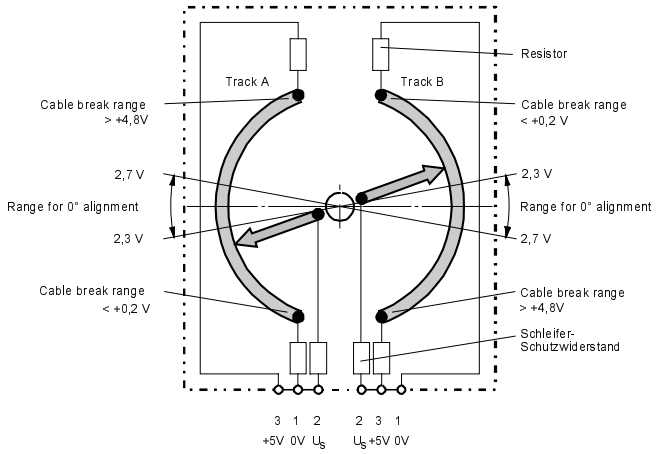
Inverse supply (parameter 64=0):	Clockwise rotation of the axle leads to a decreasing voltage.
Normal supply (parameter 64=1):	Clockwise rotation of the axle leads to an increasing voltage.

Default setup is inverse supply.

If the voltage sense does not correspond to this definition, the connection to reference voltage and 0V-signal (connected to pins 1 and 3 of the sensor units) have to be swapped.

Cable break detection:

In order to allow for cable break detection, the voltage in sensor A must not exceed 4,8V at the right mechanical stop and must not be below 0,2V at the left mechanical stop.



picture 1: scheme of angle transducer

Note:

- Take care the swing of voltages measured on either stop are about symmetric with regard to the middle!
- If, by mistake, the connection of the sensor unit's sliding contact is swapped with one of the track's reference voltage supplies, either alignment or on-line plausibility check during operation might fail!

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3.5 Axle Alignment

For axle alignment (alignment of the angle transducers) the middle, leftmost and rightmost position of the axle have to be taught in. In normal steering operation mode, the steering computer uses those stored values for the translation of sensor values to axle angles values.

CAUTION:

- During the alignment procedure the aligned axle will move!
- When working in the range of the axle, make sure the axle is not able to move. This has to be done by turning the hydraulics supply off (engine off) and by releasing pressure from the accumulators (if present).

Before doing the alignment a valid parameter set must be written in the steering computer!

Parameter step- No.:	Meaning
6 to 9	Mechanical angles of the electronic-hydraulic steered axles 1 to 4
10 to 11	Mechanical angles of the setpoint generators

Hint:

- Make sure, setting of mechanical stops of all axles matches the maximum angle as set by the steering computer's parameters.
- If the axle is equiped with mechanical locking or centering equipment, the mechanical center position has to be adjusted first (i.e. mechanical adjustment with the axle locked or centered). Teach in of the middle position should start right away from that fixed point, to ensure the 0°-position of the control system doesn't diverge from the mechanical center position.
- Alignment accuracy of the middle position may considerably affect wear of the tires and tracking stability. As there often is an influence of friction on adjustment of the middle position, before teaching in, it is recommended to reduce friction by use of turntables, jacking up the axle or at least by rolling a few meters. Best results are can be achieved by use of laser-allignment gear while the axle is jacked up.
- If a movement of the axle is not possible, the following points should be checked:
  - are the brakes released?
  - is the hydraulics supply active?
  - is hydraulics pressure sufficient?
  - is no locking device active (axle types with locking device only)?

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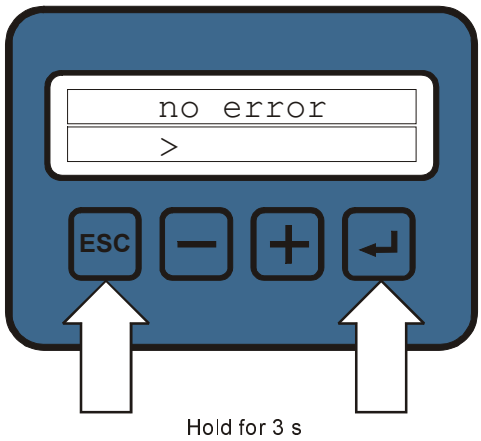
3.5.1 Entering Alignment Mode

Press the **ESCAPE** key and the **ENTER** key simultaneousnessly for at least 3 seconds.

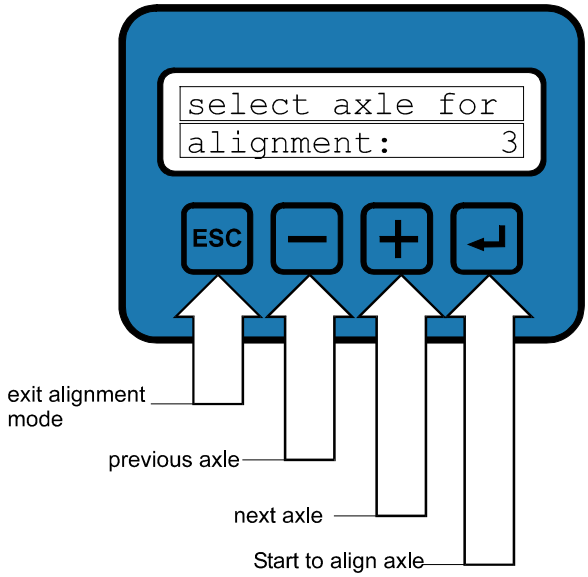


When the display's contents changes, press **PLUS** or **MINUS** until the text "alignment" comes up.

Press the **ENTER** to enter allignment mode. Enter the passcode using the **PLUS, MINUS** and **ENTER** keys.

3.5.2 Select an Axle for Alignment

The alignment can only be started if a valid axle number is selected. The selection of an axle is done using the **PLUS** and **MINUS** keys. The front axle is refered to as "axle1" (note: as to match the real axle number at the vehicle, the number assigned to steered axles can be chosen using parameters).



Starting the alignment is possible only if a axle is choosen.

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3.5.3 Alignment of Center Position

The alignment of an angle transducer is done in 3 steps:

- alignment of the center position
- mechanical left stop and
- mechanical right stop

After teaching in the angle transducer the values have to be transfered to the memory sperately.

The first line of the display leads through the separate steps of the alignment. The second line displays the actual values of the angle transducer.

The axle can be steered with the **MINUS** and **PLUS** keys. Pressing a key, axle movent starts at low speed. Speed of movement increases, as the key is pressed continuously.

While doing the alignment in straight position the axle will activate the lockingdevice (if available). The axle will lock in the straight position automatically.

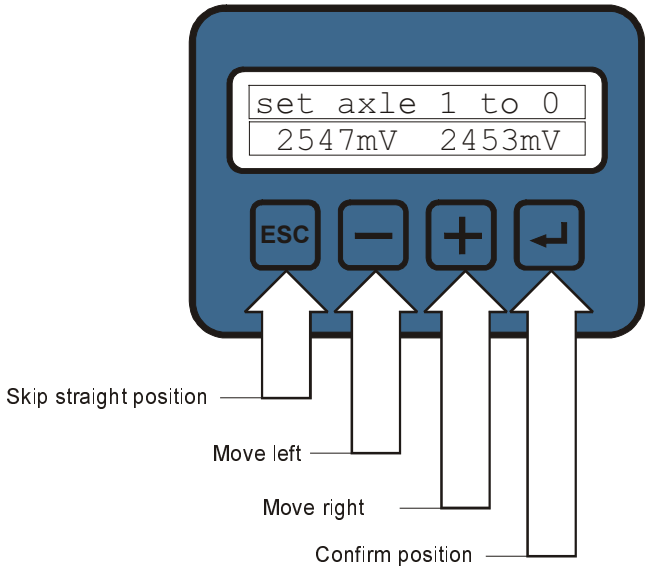
Storage of every single alignment position can be skipped pressing **ESC**. Alignment of the selected axle is skipped by pressing **ESC** twice.

Sense of rotation of the axle:

When the **MINUS** key is pressed the axle has to move to the left. Pressing the **PLUS** key, the axle has to move to the right. If the direction is the opposite, the conections of the assignment of the proportional valve's A and B side have to be swapped (however, if this has to be done, wiring diagrams should be updated).

Sense of rotation of the angle transducer:

Doing a counter-clockwise rotation of the axle (direction to the left stop), the voltage of the first track of the angle transducer should decrease, with a clockwise rotation the voltage should increase. The second voltage (track 2) should change in the sense of direction given by parameter setting (P_64).



As soon as the selected axle is positioned accuratly to 0° (with regard to a locking device if present), the value is stored by pressing **ENTER**. The voltage in the middle position has to be between 2350mV and 2650mV. If the analog value exceeds these limits, an alarm message is raised.

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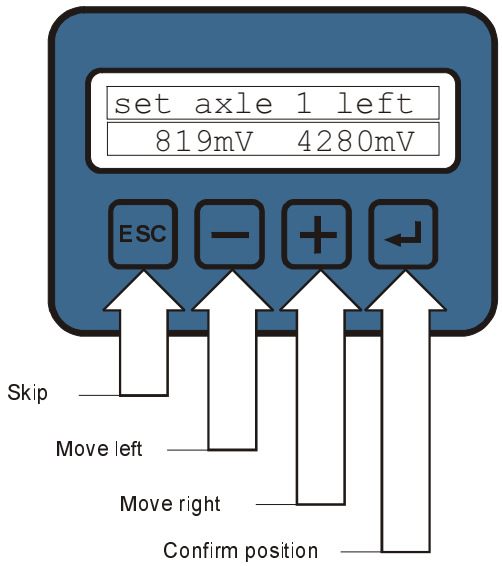
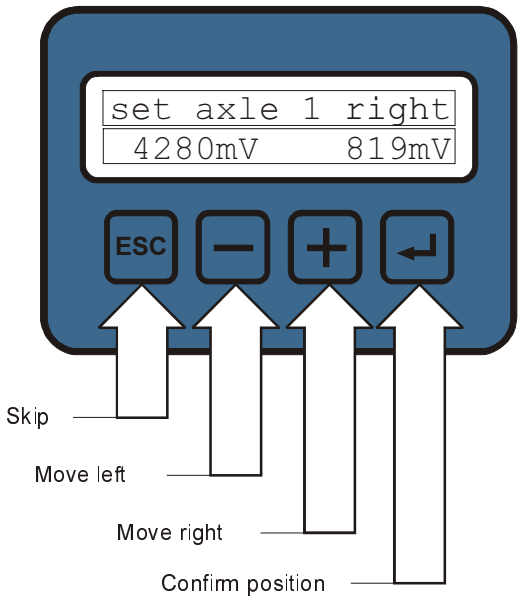
3.5.4 Alignment of the left mechanical stop

On completion of alignment of the middle position, alignment of the left mechanical stop is entered. After reaching the left mechanical stop, the present value can be stored using **ENTER**. In order to do this, the voltage of sensor unit A has to be in the range of 200mV to 2100mV.



3.5.5 Alignment right mechanical stop

On completion of alignment of the left stop, alignment of the right mechanical stop is entered. The alignment is done in the same way as before. The voltage of sensor's track1 has to be in the range of 2900mV to 4800mV.



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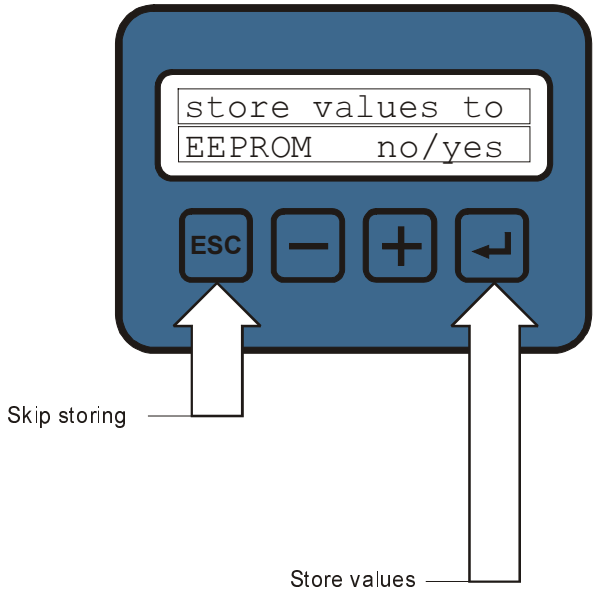
3.5.6 Confirmation of alignment

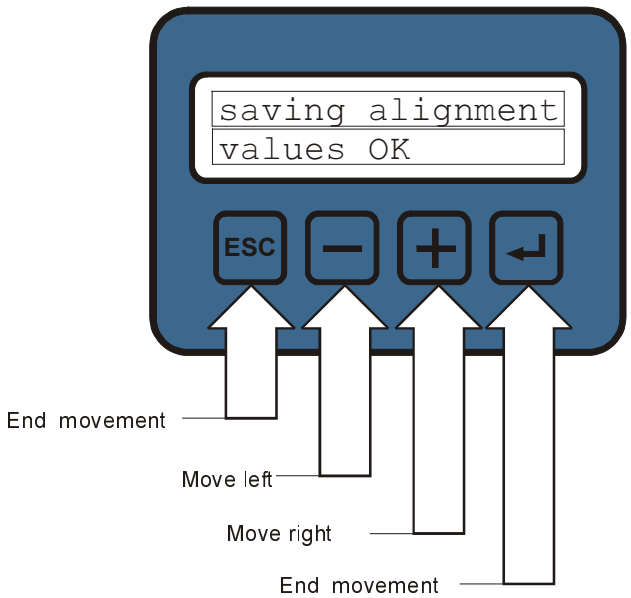
After confirmation of the right mechanical stop, storage of alignment values has to be confirmed pressing **ENTER**.

Pressing **ESC** at this point leaves the stored alignment values unchanged.



When storing has been confirmed the following message will be displayed after a while.

While this message is active the axle can be moved by pressing the **MINUS** and **PLUS** keys. So the axle can be moved in the straight position again in order to have all axles in a normal driving situation. There is no need to move the axle in the straight position exactly.



Whit **ESC** or **ENTER** the menu gets back to choose a other axle.

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3.6 First activation of Steering Mode

CAUTION:

Stay clear of the axle when activating the steering system for the first time!

When working in the range of the axle, make sure the axle is not able to move . This has to be done by turning the hydraulics supply off (engine off) and by releasing pressure from the accumulators (if present).

1. The **parameters set** provided by MOBIL ELEKTRONIK has to be used. For documentation on how to program the parameters refer the PCS 093 101 manual.
2. **Cycle the power supply** (turn the off and on again)
3. Clear the **alarm memory**.
4. Turn the **Ignition on** – the **SLC** should **raises no alarm** (Display of „no error“ respectively rotating segments on the 7- segment display). If an alarm is raised, check the the steering system for errors as indicated by the description of the alarm code.
5. **Steering while standing still**
   If the present angle of the axle is not close to the setpoint determined by the steering computer, the axle has to be either „caught“ manually (i.e. change the setpoint to match the current position of the axle) or the i.e. the front axle has to be positioned corresponding to the steering geometry. The same can by achieved by turning the steering wheel to and fro (the axle „synchronizes“ as a steering movement is detected).
6. **Control of** (as far as applicable)**:**
   - the course of the hydraulics pressure in an accumulator system (pressure lies within the programmed thresholds)
   - pressure of HLS/ELS systems with a pressure gauge
   - change of steering programs
   - additional functions like axle centering, lamps, buzzer, enable signal for vehicle functions a.s.o.

3.7 Test Drive

If the hydroelectric steered axle is working and there are no alarm messages, a test drive has to be done:

The following points have to be checked:

- Speed signals: The difference between both signals must not exceed 3km/h. For this please compare the messured signals using the PCS or the ECUs display:
  - With PC service software: select menu item „RAM data read“, watch the values „SPEED1“ and „SPEED2“.
  - With CAN diagnosis display
- Pressure course of the accumulator system (if applicable).

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- Locking functions at high speed: When the programmed locking speed is exceeded the axle is locked, if:
  - The actual value of the steered axle has to be smaller than 0,5°.
  - With PC service software „ACTUAL VALUE REAR AXLE“
  - With diagnosic display actual valueIstwert
  - Axle with mechanical locking: Check the lock- und unlock devices. When the velocity lies below the locking speed the unlocking of the axle is effected.
- Check all functions: steering programs, release a.s.o.
- After the testdrive the hydraulics oil temperature of should not exceed 70°C max.

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4 Operation Manual

This operation manual contains important informations for the manufacturer, the service staff and the user of the vehicle.

The contents of this section should be used to create the end customers manual. Note that the end-user should only get information relevant for his vehicle (e.g. include no advise for usage of a self tracking axle, if exclusively locking axles are used, refer to the correct number of axles that are used etc.).

4.1 Systemconcept

4.1.1 The Vehicle

This vehicle is equipped with hydroelectric steered axles. When in normal operating mode, axle behaviour depends on vehicle speed and the steering mode selected.

Steering behaviour is in part determined by a set of paramer values, that has to be chosen by the vehicles manufacturer in accordance with Mobil-Elektronik GmbH as to fit the type of vehicle. None of those parameters must be altered without the written permission of the vehicle manufacturer (customer parameter set) or Mobil-Elektronik (factory parameter set).

For reasons of tracking stability and safety, full steering range and independend steering capability is restricted to off-road mode and limited vehicle speed.

In normal operation mode, one axle is locked most of the time and the second axle is locked when driving at high speed.

To improve manoevrebility on public roads, off-road mode can be selected by the driver on the fly. If the off-road switch is set while driving at higher speed, the vehicle remains in public road mode until the vehicle speed is below the upper speed limit for off-road mode (the buzzer is activated periodically in a pace distinguishable from the alarm signal to indicate this state). Since speed limitation is applied once off-road mode is active, the driver will have to reset the off-road switch in order to remove the speed limitation.

4.1.2 Safety Concept

In case of failure, the steering system forces the steered axle into fail-safe state by switching off fail-safe digital outputs.

On this vehicle the fail-safe-state is defined as “locking the axles” in a actual position.

Depending on the fail-safe response the following has to be observed:

In order to maintain controllability with a steered axle locked, the steered axles maximum angle will be limited at higher speed by the steering computer, depending on a single axles influence on the vehicles manoeuvrability. However, if fail-safe state is entered while doing a a sharp turn at low speed, the vehicle should be stopped immediatly, since the steered axle may be locked at its maximum angle. To get rid of the disadvantageous lock position, procede as follows: first check for any dangers from road traffic that may result from an attempt to repair the steering system. Then power-cycle the steering system in order to reset the fail-safe reaction. If the axle remains in fail-safe state, try to repair the axle with the help of the alarm codes displayed by the steering computer. If this is not viable, center the axle by means of the palliative controls of the hydraulics unit. Note that one or more steered axles locked may lead to poor steering performance and increased tire

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abrasion! The steeering system should be checked and repaired by trained staff as soon as possible.

Safety-related components are:

- the safety steering computer which contains fail safe hardware and software for self test,
- the **MOBIL ELEKTRONIK** safety angle transducers containing two electrical independent angle transducers,
- components for measurement and limitation of speed,
- hydraulics components of the steering system.

CAUTION:

Don't tamper with speed limitation or speed measurement installations as those are vital for vehicle safety!

If disabled, the vehicle may turn uncontrollable, if the steering system goes to fail-safe state at high speed as axles may not be in straight position.

MOBIL-ELEKTRONIK can not be held responsible for any damage that results of tampering with speed related functions!

The safety concept of a steering system based on the SLC 019 502 can only meet the high demands of a steering system for public road, if all system components are assembled, installed and serviced and used according the specifications of **MOBIL ELEKTRONIK**.

4.1.3 The Steering Computer

The safety steering computer SLC 019 502 has been developed for hydroelectric control of rear axle steering systems. The steering computer is approved by TÜV and meets the requirements of DIN V 19 250 class 4, equal to EN954-1 category 3 (fail-safe with self test). The functionality of the steering system will have to be approved to meet the requirements to european standards separately.

To lead the system into the fail-safe-state the steering computer includes 8 digital outputs.

The steering computer can be applied to various system requirements by setting parameter values. As to prevent unauthorised modification of parameters, they are guarded by checking on a CRC-signature.

4.1.4 Safety Hints

If the buzzer of the steering system gets active while driving or if the error lamp is lit, the steering system is in fail-safe state. The axles will be led in the fail-safe-state, it will either be centered, locked in the current position or (in case of self tracking axles) set to self tracking mode. However, fail-safe state can result in reduced performance of the vehicle

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and it may have to be steered with special attention (e.g. tracking stability and tracking performance will decrease).

If the steering system goes to fail-safe state during operation, this should be brought to the attention of service staff as soon as possible.

For safety precautions for overhaul and repair, refer to the installation section of this manual! See Chapter 1.2

4.2 Overhaul

The following hints for daily check and overhaul should make up part of the vehicle's service manual and also are meant as reference for assay office members.

Note:

For safety precautions for overhaul and repair, refer to the installation manual! See Chapter 1.2

4.2.1 Daily Check (Departure Control)

- Check if the manual override for the fail safe circuit's check valve is unlocked.
- If there is no oil level control device, the oil level of the steering system has to be checked before departure.
- When switching on the ignition, the lamp / buzzer test has to be observed. On power up, error lamp and buzzer are activated 2 times.

Note:

It is recommended to bring daily oil level check and the power-on test to the driver's attention using a signpost.

CAUTION:

Check if the manual override for the fail safe circuit's check valve is unlocked whenever the vehicle was unattended for a longer period of time or when service tasks were carried out!

4.2.2 Half-yearly Overhaul

The checks descibed in this section should be carried every 6 months. However, if an alarm occurs, this list should be referenced by service staff to eliminate the error that caused the alarm.

- If there are alarms of priority 1,2 or 3 in the alarm memory, trained service staff have to be informed, to carry out appropriate steps to eliminate the cause of the alarms (refer to section 6 for description of alarm codes). After read out, the alarm codes should be filed and the alarm memory should be cleared. Success of measures taken, has to be

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observed by comparing of the alarm memory with filed data on the next inspection of the vehicle!

- Check if all parts of the steering system are firmly fixed and show no signs of corrosion. Corroded safety cirtical parts have to be replaced.
- Check all wiring, connectors, sensors and solenoids, that are exposed to the environment for signs of damaged insulation.. Damaged electrical components have to be replaced.
- Check ball joints and arms for play. If there is any play, check if the ball joints are worn out. In case of replacement, make sure components are mounted properly (use of threadlocking adhesive, locknuts and suffient reach of thread). Refer to the installation instructions for replacement and allignment!
- Control the ball jointed arms of the angle transducers for corrosion. Corroded parts have to be replaced as soon as possible. Refer to the installation instructions for replacement and allignment!
- The steering cylinder should not have any leakage nearby the rod. Futhermore the rod must not be scraped. If the cylinder shows any damage, it has to be replaced.
- At hydraulics units and thread joints of the hydraulics system, there should be no signs of leakage of hydraulics fluid.
- Check the hydraulics oil filters. The indication of contamination should not be active ("red mark") if the engine turns at full speed. Make sure that the hydraulics fluid has reached operation temperature before the check is done. Note: it is advisable to exchange the filter even if the ("yellow mark") is reached.
- Check if the manual override for the fail safe circuit's check valve is unlocked.
- Check if the vehicle speed limitation in off-road mode works!
- Check the steering systems speed measurement installation (compare the measured values with the tachometer).

Note:

If either a part of the angle tranducer or an cylinder with locking or centering features had to be adjusted or to be replaced, an alignment has to be carried out. Refer to the installation instructions for the alignment procedure.

4.2.3 Check every 2 years or every 200 000 km

Change the hydraulics fluid and the backflow filters

4.2.4 Check every 4 years or every 400 000 km

Change the hydraulic accumulators.

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4.3 Functional description

4.3.1 Operation of the Steering System

4.3.1.1 Steering Mode „public road“/„offroad“

The steering system SLC 019 502 has two basic modes of operation: „public road” and „offroad”. Both modes can be choosen by a switch which can be locked to the „public road“ mode.

In steering mode „public road“ axle 4 will be moved in the opposite direction of the front axle. Axle 3 normaly remains locked in the straight position.
In special situations the steering system may steer both axles to become more manoevrability. See steering programm „narrow bend“.

In the steering mode „offroad“ has three selectable steering programs: „all wheel steering“, „crab steering” , and „manual steering ”, that can be selected by control keys.

On changing the steering mode from „public road“ to „offroad“ the steering system enters to „manual steering“ first. In this situation the rear axle will move to the straight position in order to avoid sweeping out at the rear end of the vehicle (move from a wall).

4.3.1.2 Steering programs

There are several keys to choose different steering programs:

- „public-road“:
  Axle 3 remains locked in the straight position, axle 4 moves with reduced manoevrability according to the front axle. This steering program is to be choosen in order to move on public roads. There is no limitation in vehicle speed.
- „all-wheel-steering“:
  Axle 3 and 4 are steering according to the front axle. This steering programm improves manoevrability, the vehicle speed is limited.
- „narrow-bend“:
  This steering programm equals to „all-wheel-steering“ but it can be activated in steering mode „public-road“ for a short time. The steering program „narrow-bend“ can be triggered by operating the key „all-wheel-steering“ while traveling speed ist lower than 20km/h. It is acitvated below 5km/h and will be switched off at speeds more than 20km/h. The vehicle speed is limited.
- „manual-steering“:
  Axle 4 will be controlled by the keys „left“ / „right“, axle 3 will be moved correctly betwwen the front axle and axle 4. The vehicle speed is limited.
- „crab-steering“:
  Axle 3 and 4 will move in teh same direction and angle like the front axle. The vehicle can be moved in parallel. The vehicle speed is limited.

Every steering programm owns a lampe to display it is activated. A flashing lamp points out that not all axles have reached their correct position.

Changing the steering programm has been successful when all axles have found their position. In order to minimise the risk of someone is hurt by unattended axle movement when the vehicle is at stand still, movement is only allowed if at least one of the following conditions is true:

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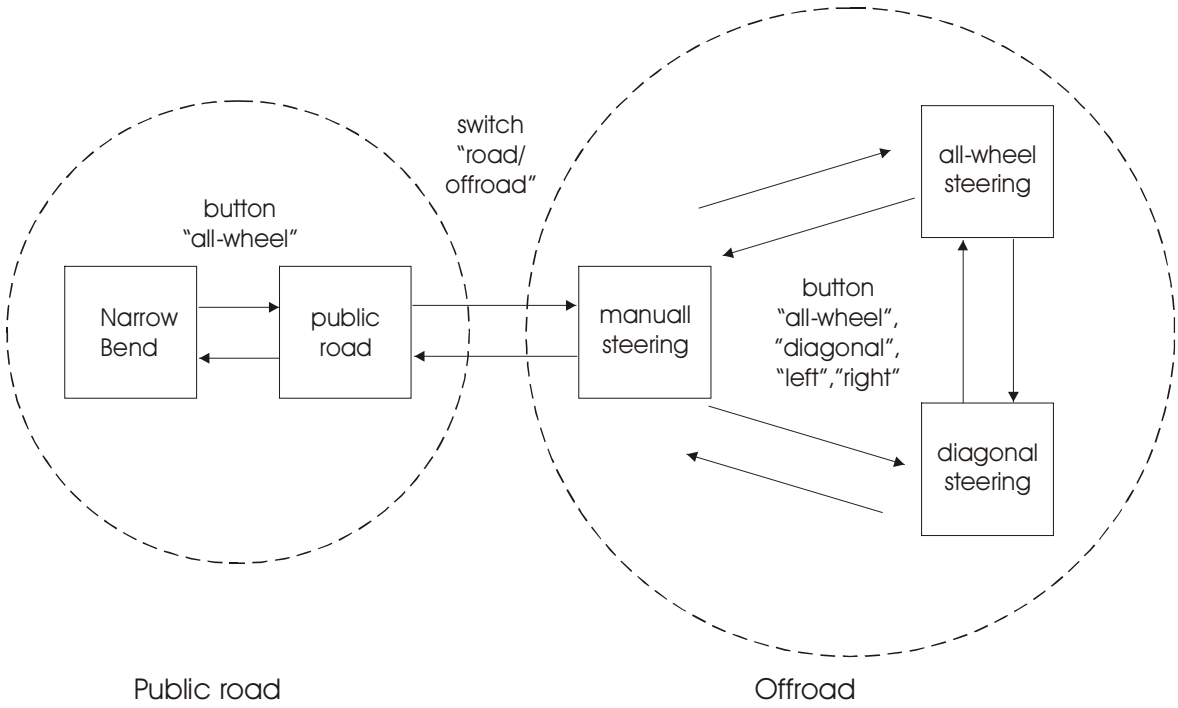
- vehicle speed > 1km/h
- the steering wheel is turned (steering movement)
- one of the steering control keys is held
- the optional digital input “synchronise axle” is active

4.3.1.3 overview of steering programs



picture 2: overview of steering programs

4.3.1.4 Other operation elements

The steering system displays alarms by a energized lamp “alarm” and a short buzzer signal. The “alarm” lamp is flashing or lit constantly.

The buzzer sounds if a new alarm is recognized or if a operating activity by the driver has been denied.

4.3.2 Special Functions

4.3.2.1 Axle Synchronisation

When a change of steering mode takes place, there is a need for transitional movements between different setpoints. These movements are refered to as synchronisation movements.

Conditions for synchronisation movements are as follows:

1. angualar speed of movement is limited
2. geometrically correct relation between the axles is maintained where possible. An exeception is transition to crab steering mode and transition from crab steering mode to

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an all wheel steering mode (public road or offroad). There all steered axles move indepedently.

3. In order to minimise the risk of someone is hurt by unattended axle movement when the vehicle is at stand still, movement is only allowed if at least one of the following conditions is true:

- vehicle speed > 1km/h
- the steering wheel is turned (steering movement)
- in offroad mode: one of the steering mode or steering control keys is held
- the optional digital input “synchronise axle” is active

4.3.2.2 Error Reactions

Errors in the system are displayed with the error lamp.

Hint
An actual error is kept active at least until the ignition is switched off!

A detailled description of the errors and the display can be found in chapter 6.

4.3.2.3 Reduction of the Steering Angle depending on Speed

In order to improve safety and stability of the vehicle at high speed, the steering angle of the rear axle will be reduced as vehicle speed increases. When exceeding an upper limit, the axle is locked in straight position.

The reduction of the steering angle can be influenced by two ECU parameters:

- start of reduction P_70
- end of reduction (locking) P_71

Below the speed set by P_70, there will be no influence on the steering range. In a speed range between P_70 and P_71, angles are reduced proportionally.

4.3.2.4 Vehicle Speed Limitation Signal

Speed limitation is set active under the following conditions:

- failsafe mode
- offroad mode
- transition to public road mode as long as axles are still being synchronised.

4.3.2.5 Output Speed Threshold

The steering computer acitvates an digital output if the vehicle speed is lower an distinct threshold in parameter P_29.

At speeds higher than this threshold the output will be switched off again. There is a hysteresis of 3km/h.

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4.3.3 Monitoring Functions

4.3.3.1 Speed Measurement

The SLC 019 502 uses two independent inputs for the speed signals. The type of speed inputs is selected using parameter **P_72 (speed measurement)**.

Most sources demand for calibration. This can be done by setting scaling factors (WIZ) (**WIZ 1: P_16, WIZ 2: P_17**).

The SLC 019 502 compares the calculated speed values and raises an alarm, if the difference between both values exceeds the amount programmed in **P_73** (**speed tolerance**).

4.3.3.2 Monitoring of the Locking Position

The trailing axle can be locked in straight position. In this position the axle is locked hydraulically. The steering computer monitors this position and reports deviations.

The maximum allowed deviation from the straight position can be programmed in P_78. If the axle exceeds the programmed angle and returns to straight position within 0,5 seconds there will be no alarm.

4.3.3.3 Monitoring of Steering Deviation

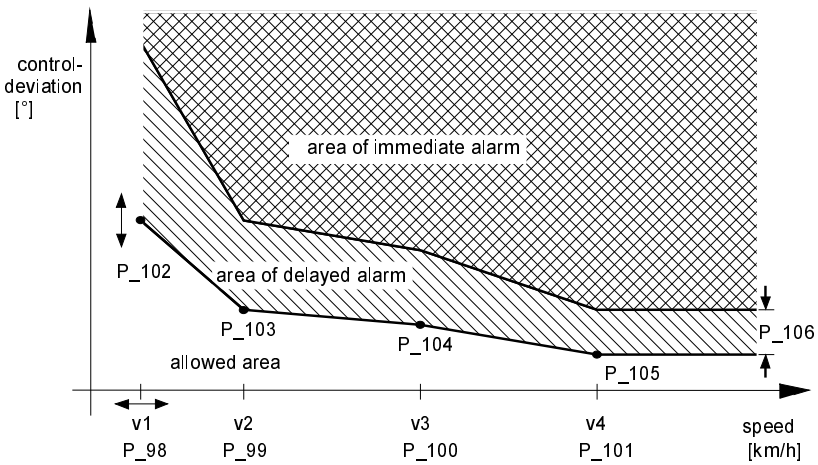
To meet high safety demands and to assure robust operation at the same time, the SLC provides for dynamic monitoring of the steering tolerance. This function consists of three functional parts:

1. Control of inverse movement

The first part of the function watches over direction of axle movement. If the axle moves to the wrong direction for more than the time defined in **P_96** (**inversal axle movement**) an error is generated. This function is independent from the vehicle speed.

2. Control deviation monitoring

The second part of the function monitors the absolute control deviation of the steered axle. If the allowed deviation is exceeded for a defined time, an alarm is raised. The allowed control deviation depends on the vehicle speed and can be determined by factory parameters.



picture 3: deviation monitoring

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3. Exceeded control deviation monitoring

High deviation raises an alarm immediately, as a second deviation threshold is exceeded. This second threshold is formed by a programmable ratio out of the first threshold (P_106).

4.3.3.4 Lamp Test

After the start up is turned on, the steering computer tests the connected lamps. The control lamps and buzzers are pulsed twice in a time span of 2,5 seconds.

Note:
The driver/operator has to check the correct function of all lamps and buzzers when starting up the vehicle.

4.3.3.5 Parameter Set Guarding

The steering computer can be applied to various system requirements by setting parameter values. These parameter values can be modified by different means (CAN hand held tester, on print diagnostic display or PC using PCS). As to prevent unauthorised modification of factory parameters, P_52 to P_254 are guarded by checking on a signature (CRC) written in P_40.

After power on, the steering computer checks on compliance of parameter settings and signature. In case of a discrepancy a alarm „31,19,0“ is raised. However, to allow for system optimisation, for the first 5 minutes after power-on, apart from alarm indications, there will be no effect on system behaviour. After 5 minutes the alarm „31,19,1“ is raised and the steering system locks all steered axles in center position. This state can only be left by switching power off and on again.

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4.3.3.6 Other Monitoring Functions

To obtain an error free operation of the steering system, there may be additional system signals that have to be watched over:

hydraulics supply ready	an active signal indicates that the engine is running and steering movement can take place. However, if the vehicle is moved, axles are operated disregarding this signal as to center steered axles. If hydraulics supply isn't available in this situation, alarms concerning control deviation monitoring may occur.
oil filter sensor	an active signal indicates operational state of the oil filter. If this signal gets inactive for more than 5sec, an alarm is raised. However, the steering system will not be affected.
oil level	has to be active to enable operation of the steering system. If the signal is changing to inactive while steering, an alarm will be raised. However, the system will stay in operational mode if this happens.

4.4 Hydraulics Pressure Supply of the Steering System

Hydraulics Load-Sensing System (HLS)

HSL provides for hydraulic load depending pressure by means of hydraulic compensators (e.g. open center load sensing) or by bias of a pressure controlled hydraulic pump (e.g. closed center load sensing).

However, it is not advisable to share a pump with other working gear that may be demanding hydraulic supply the same time as the steering system.

Open center load sensing usually works with an independend fixed displacement pump since all the hydraulics fluid not needed for an axle movement, will be bypassed to tank. Because only a small numbers of components are needed, the advantages are high reliability at low price compared to other solutions.

If no steering movement is needed, the entire oil flow from the pump is bypassed to tank, with very low system pressure. System and engine do not dissipate much power.

However, if high steering force is demanded, even small quantities of oil consumed by the axle cause considerable power disipation, which may cause oil heating.

When driving with the engine at high number of revolutions, permanently doing steering manoeuvers, there is a danger of oil overheating. If such operation modes happen frequently, tank volume has to be enlarged sufficiantly or a temperature monitoring gear has to be used.

In applications where a big span of number of revolutions has to be covered, a pump with volume flow limitation should be used.

To avoid overheating at stand still, the steering system switches off the hydraulics after a period of time, even if there is a small (but sustained) angle deviation.

Hydraulics will be reactivated if at least one of the following conditions is true:

- Setpoint values are changed
- Steering program keys are operated
- Movement of the front axle
- Vehicle movement (see 4.3.2.4 for safety precautions).

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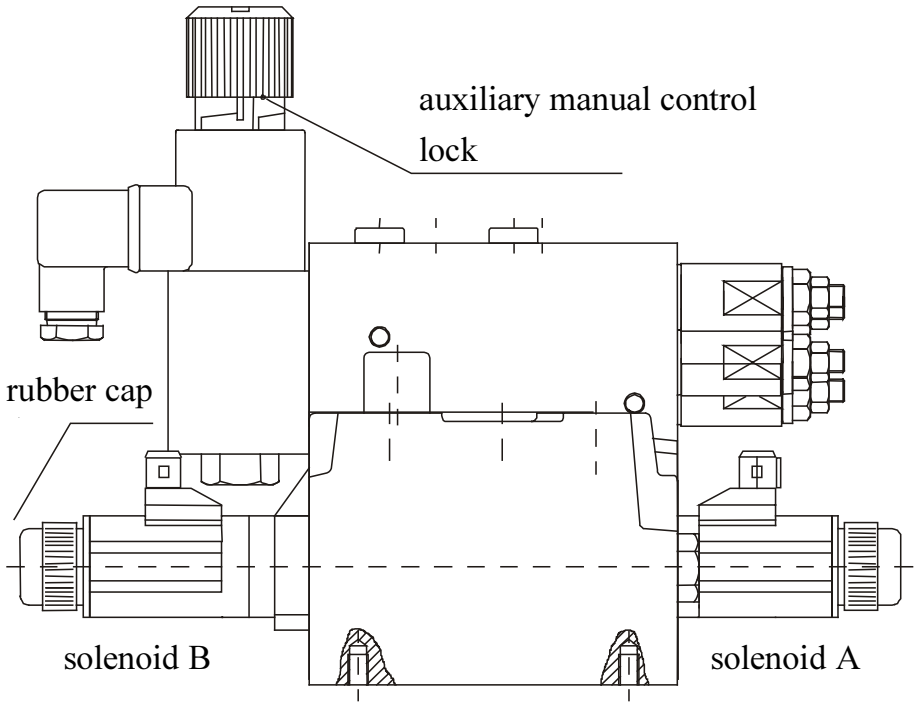
Closed center load sensing uses a controllable hydraulic pressure supply in order to minimise energy dissipation as only small quantities of hydraulic fluid at high pressure are demanded.

Due to limited efficiency of controlled pumps, this approach still can take advantage of the treatment of sustained deviation described before.

4.5 Manual Emergency Operation

If the steering system is in fail safe state while the hydraulics supply is still working, the axle can be moved using auxiliary manual controls to allow for repair or to prepare for "limp home".

1. The check valve that locks the axle has to be opened by pushing down and turning clockwise the cap of the check valves solenoid. It has to be made sure, nobody is within reach of the axle's steering range.
2. To move the axle, open the proportional valves by pressing a blunt tool (e.g. Allan key) in the center of the rubber-sealed solenoid caps.
3. after turning the axle to the desired angle, the check valve has to be unlocked to allow for proper operation!



picture 4: Manual Emergency Operation

CAUTION:

The manual override for the fail safe circuit's check valve allways has to be unlocked except when actually using the auxiliary manual control.

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4.6 User Interface for Service and Diagnosis

ESCAPE key: - quit current menu
- move input cursor to the left

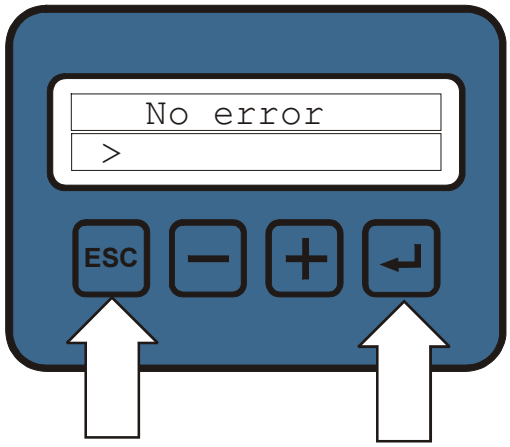
MINUS key: - one menu point back.
- Subtract value by 1

PLUS key: - one menu point forth
- increase value by 1

ENTER key: - enter selected menu.
- confirm/save value.
- move input cursor to the right

4.6.1 Entering the Service Menu

The service menu can be entered by pressing **ENTER** and **ESC** simultaneously.



Press simultaneously for at least 3 seconds

Service menu is entered as soon as the display text 'i/o data display' comes up. The choice of following submenues can be done:

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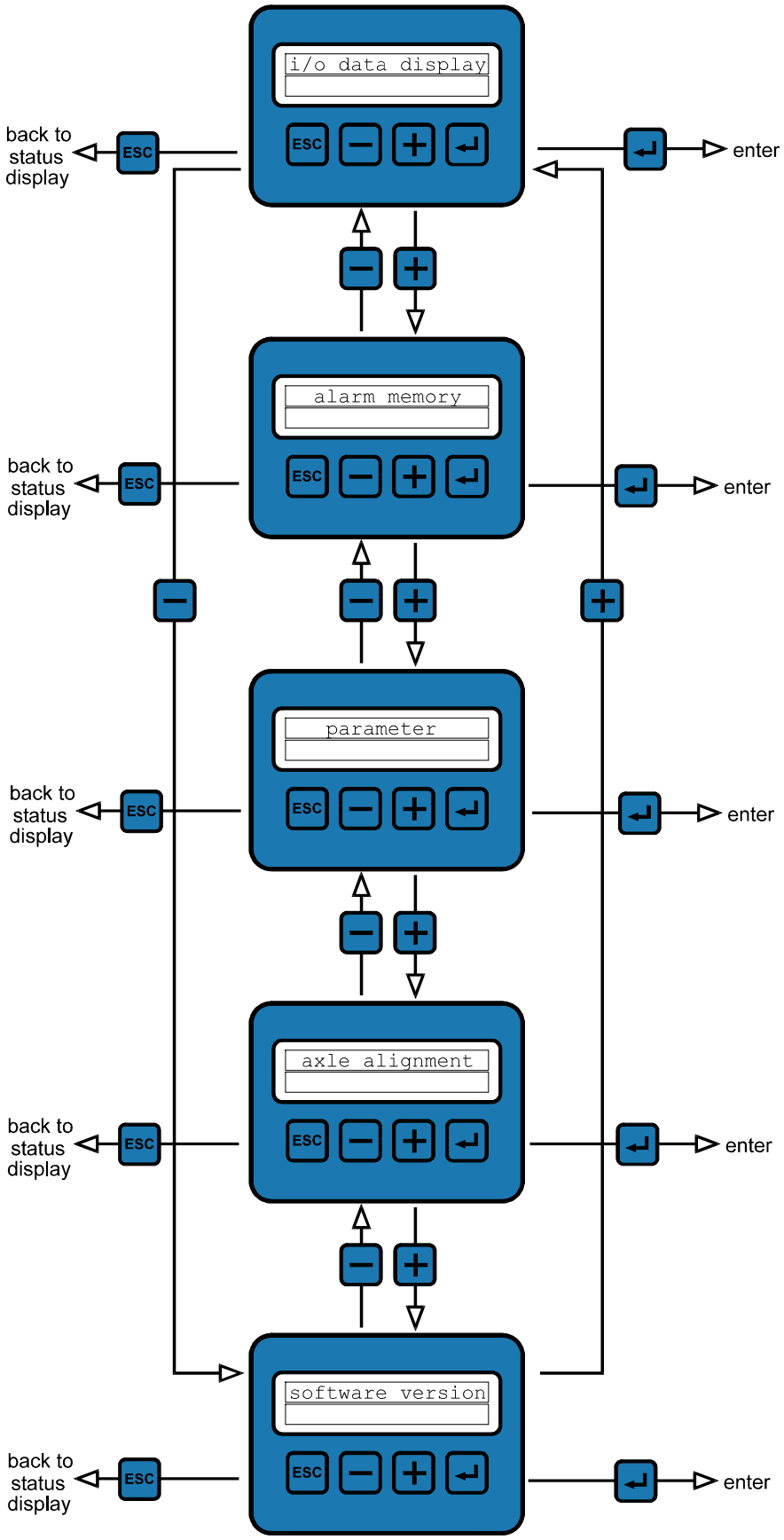

picture 5: operating the steering comuter, overview of services

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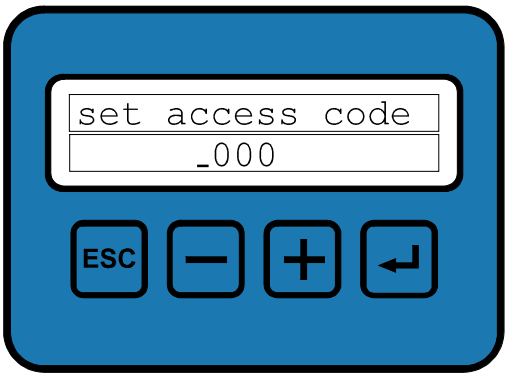
4.6.1.1 Entering Access Codes

To ensure only authorised persons can change parameter values and do axle alignments, an access code has to be keyed in order to use those services.

Opposed to entering the alignment menu, where a access code has to be entered for access, in the parameter menu, the passcode needs to be entered before the first new value can be stored. This allows for reading out parameters without knowing the passcode.



Entering access codes has to be done the same way as entering parameter values (see **Fehler! Verweisquelle konnte nicht gefunden werden.**).

4.6.1.2 Using the Parameter Value Menu

The steering computer can be applied to various system requirements by setting parameter values. These parameter values can be modified by different means (CAN hand held tester, on print diagnostic display or PC using PCS). As to prevent unauthorised modification of factory parameters, P_52 to P_254 are guarded by checking on a signature (CRC) written in P_40.

By use of parameter values the steering system receives information on:

- details of the steering system as maximum steering angles, type of angle transducers, measurement and use of vehicle speed;
- hydraulics configuration, valve specific data;
- supplementary functions as special steering modes or special monitoring functions;
- control loop adjustment.

Those values are stored in non volatile memory (EEPROM).

The submenu ‘parameter‘ can be accessed as described in section 4.6.1.

On activation of the parameter menu, the user is prompted to key in the parameter number he wants to access.

A number is keyed in digit by digit. A cursor (underscore character) marks the digit that can be changed by pressung **PLUS** and **MINUS**. A every digit has to be confirmed by pressing **ENTER**. The previous digit can be accessed by pressing **ESC**. Pressing **ESC** when the cursor is at the leftmost digit, the number input mode is exited.

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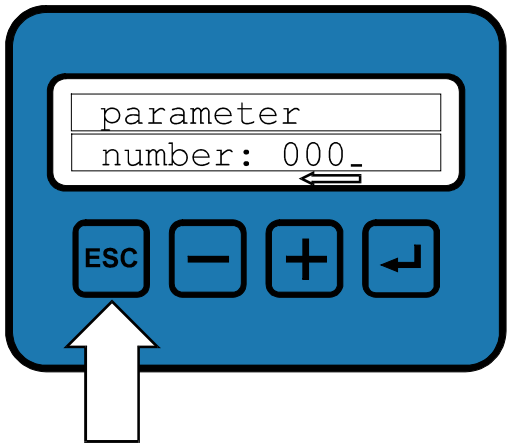
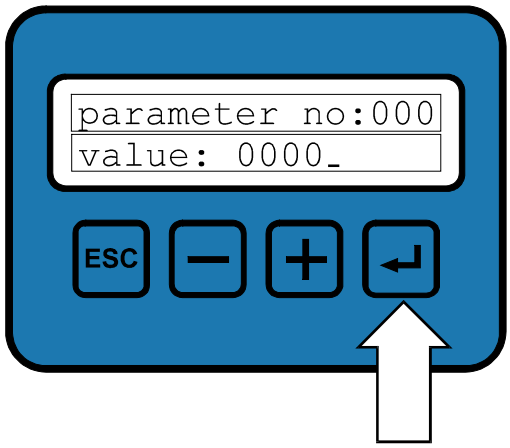


4.6.1.2.1 Reading Out Consecutive Parameters

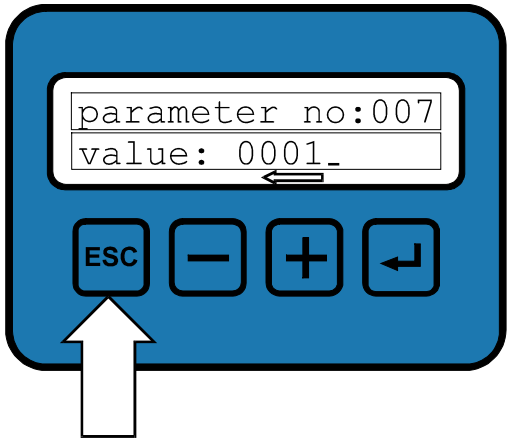
After chosing the first parameter number, the parameter's value will be displayed.



Pressung **ENTER** again, will show the next parameter number etc.

4.6.1.2.2 Key In Parameters

To change a parameter value, the cursor has to be move left by pressing **ESC** to the first digit to be changed.



After changing the digit by using **PLUS** and MINUS, the digit has to be confirmed by pressing **ENTER**.

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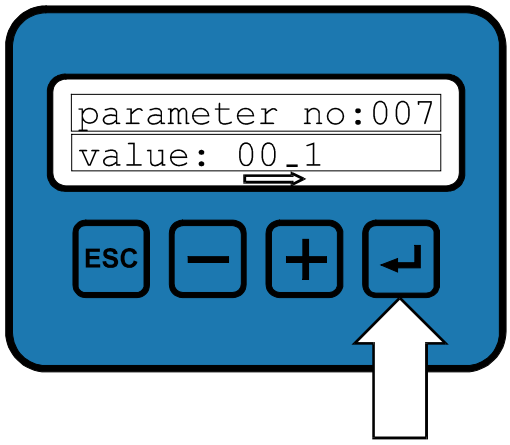
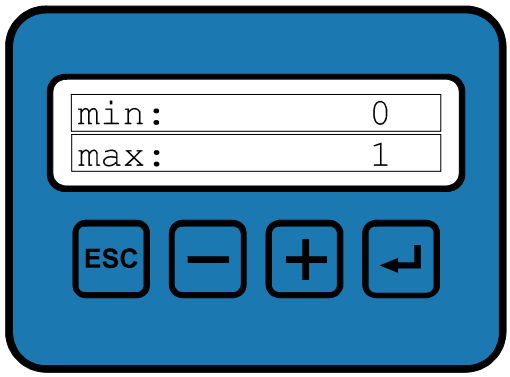


Pressing ENTER moves the cursor one digit to the right. Pressing ENTER at the rightmost position stores the value. When this is done for the first time since entering the parameter menu, the user is prompted for a passcode.

Before storage, the value is checked on limits stored in the PLC. If the value dosn't correspond to those limits, the limits are displayed.



Pressing any key, the user returns to number input mode.

4.6.1.3 Alignment

For axle alignment (alignment of the angle transducers) the middle, leftmost and rightmost position of the axle have to be taught in. In normal steering operation mode, the steering computer uses those stored values for the translation of sensor values to axle angles values.

The alignment of an angle transducer is done in several steps:

- choose a axle
- alignment of the center position
- mechanical left stop
- mechanical right stop

After teaching in the angle transducer the values have to be transfered to the memory separately.

See chapter 3.5 too.

4.6.1.4 I/O-Data Display

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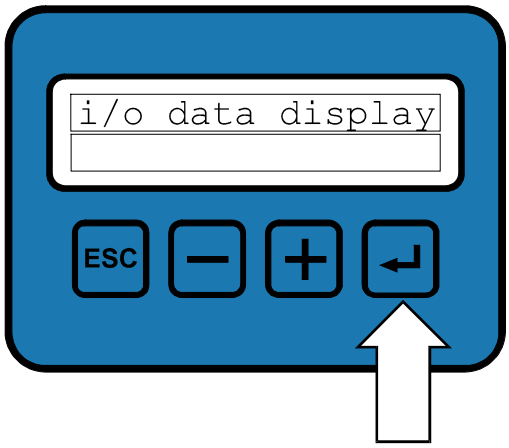
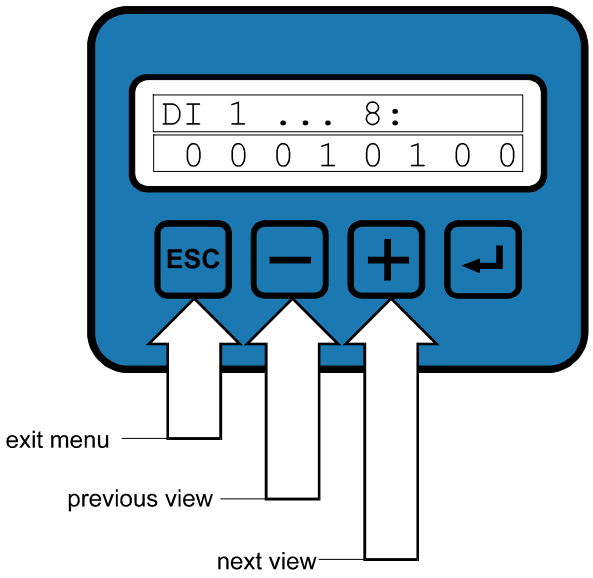
Using the 'i/o data display' all process input/output data can be displayed (digital and analog inputs and outputs). The submenu 'i/o data display' can be accessed as described in section 4.6.1.



On pressing **ENTER**, the display shows the status of digital inputs 1 to 8.

A total of 19 views can be accessed using **PLUS** and **MINUS**.



Sequentially several IO-data can be displayed:

- digital inputs
- analog inputs
- PWM outputs
- analog outputs
- digital outputs
- incremental inputs

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4.6.1.5 Error Memory

All errors which have been occured are stored in an EEPROM memory and are kept without supply. The error memory contains 32 storage positions each providing 3 error codes (location, kind of error, priority).

In order to simplify the reason for the errors they are subdivided in **location, kind of error** and **priority**.

Location and kind of error describe the defective area:

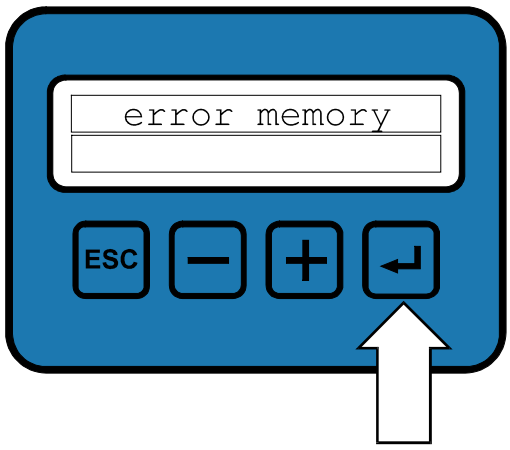
Location: e.g.: angle transducer track 1 of axle 1

Kind: e.g.: cable break, tolerance....

The priority defines the reaction of the system in case of an error:

Priority 0: Warning, the steering behaviour is not affected.
Priority 1: The steering is kept until the axle passes 0° the next time.
Priority 2: The axle is centered immediately (active steering).
Priority 3: Switch off in the secure state (setting the axle hydraulically free)

To read or erase the error memory with the diagnosis terminal please select the menu 'error memory' as described in Chap.4.6.



4.6.1.5.1 Reading the error memory

The error memory mode is activated with the **ENTER**-key. The display changes to the first error storage position. The error memory mode can be left any time by pressing the **ESC**-key.

Pressing the **PLUS**- and **MINUS**-key the errors can be read one after the other. At the end of the error memory (position 32) the display jumps back to position 1 automatically.

As soon as an error 255, 255, 255 appears in the display there are no further errors written in the memory. Thus the error position before is the last error message written to memory. If the error memory is erased completely there are only „255“ contained.

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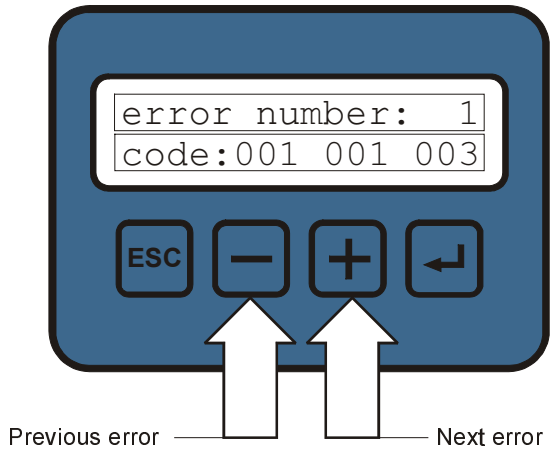
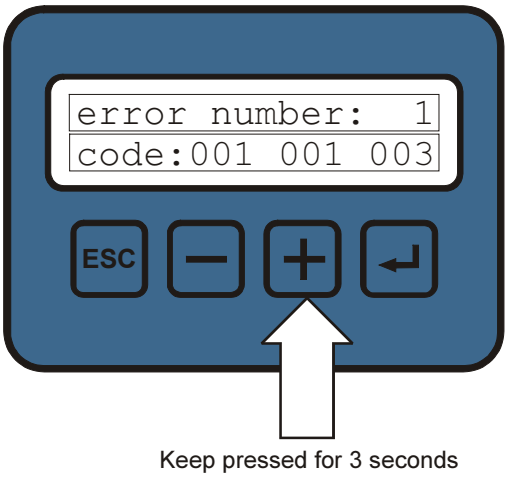
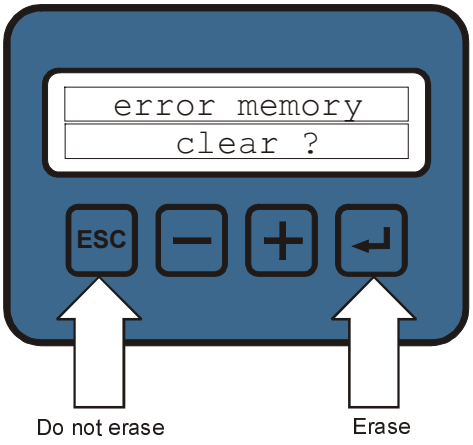


4.6.1.5.2 Erasing the Error Memory

The error memory can be erased at any state of diplay in the error memory mode.



After having pressed the **PLUS**-key for at least 3 seconds the erase process can be started by confirming the request message appering on the display.



Pressing the **ESC**-key the memory will not be erased. The display changes to the error memory mode again. Pressing the **ENTER**-key starts the erasing process.

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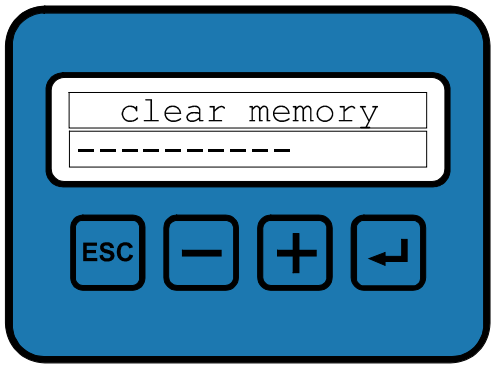
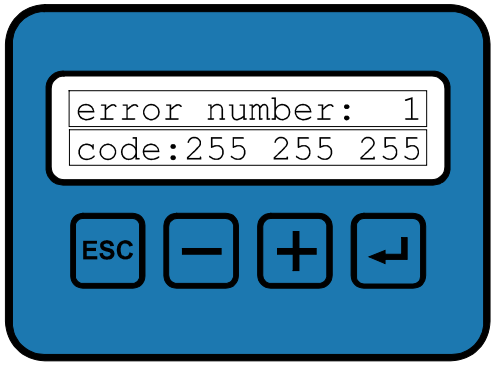
While the memory is erased the progress is displayed on the second line of the display.



After the memory has been erased all storage positions are set to 255. The display automatically changes to the first position.



The menu 'error memory' can be left by pressing the **ESC**-key.

4.6.1.6 Display of the softwareversion

Single parts of the software and the date of modification can be verified regarding their software version number. This function is only necessary for the surveillance of modifications of the steering computer and is usually meaningless for the user.

4.7 Display of Operational Data

After switching on the steering system the software version and date of the steerijng computer will be displayed.

After about 5 seconds the display automatically changes to the show the operational status. As long as no key is pressed the error display stays active during the operation of the steering computer.

4.7.1 Display in error-free operation

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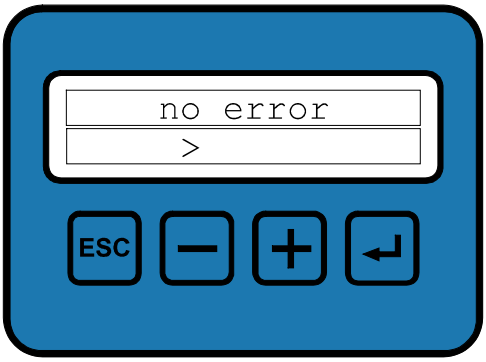
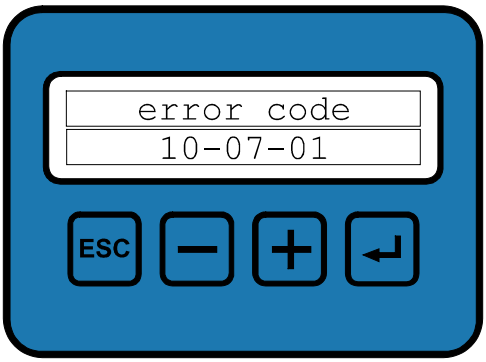


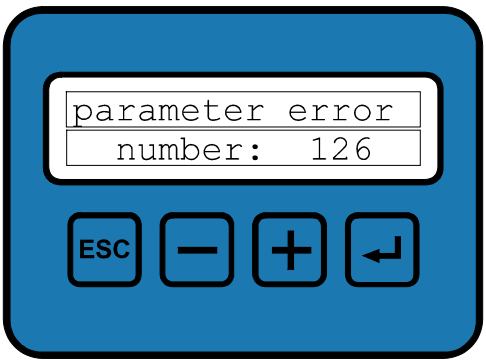
In addition to the message 'no error' there is a '>' sign moving from left to right in the second line. This means the steering computer is working and the software program is running.

4.7.2 Display of the Actual Errors



As soon as an error is recognized in the steering computer the display changes to the error memory. All single codes (location, kind of error, priority) of the error are shown. If there are several errors pending at the same time the display automatically changes to the next error position every 2,5 seconds. If all error causes are repaired the display changes back to the error-free operation. (see 4.7.1).

4.7.3 Display of faulty parameters



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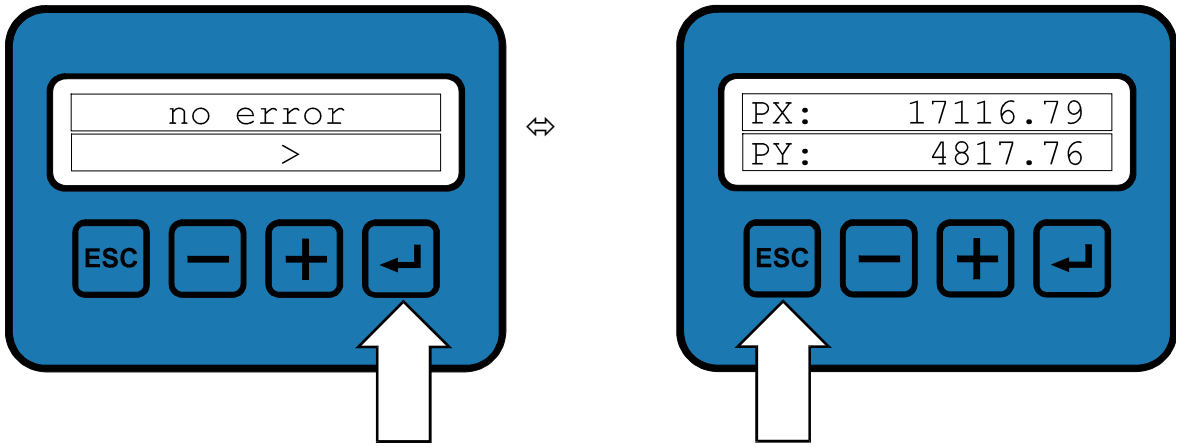
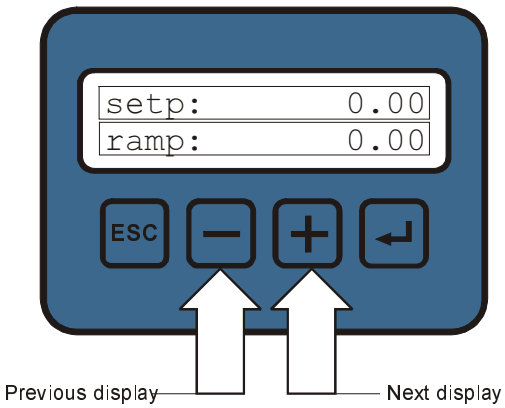
For each software parameter there is a minimum and maximum value. If the value stored in the EEPROM memory is not valid i.e. if the value lies not within the allowed range there will be a message generated on the display. The error may only be erased by reprogramming a valid parameter value. The value range of the parameters is shown in the parameter list.

4.7.4 Display of Operational Data

The display of operational data is activated by the **ENTER**-key. The display content changes into the operational data mode. The **ESCAPE**-key allows to return to the error display. If there is no key pressed for 5 minutes the screen jumps back to the error display automatically.



In the operational data mode there are several displays available. The selection of the displays is done by the **PLUS**-key and **MINUS**-key.



Display of the Steering Pole

Display of the actual steering pole with x- and y-coordinates.

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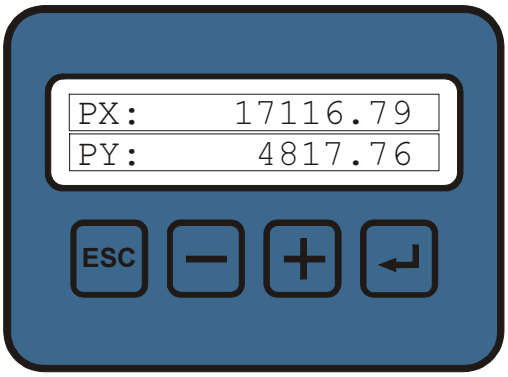
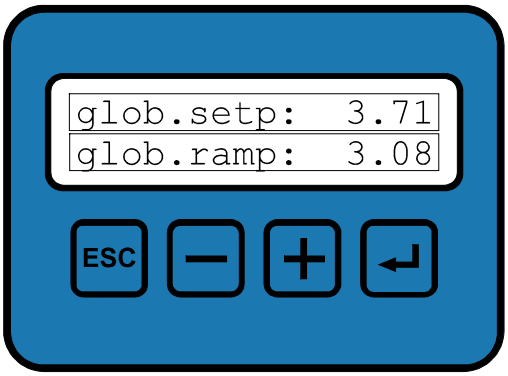


Display of Steering Setpoint

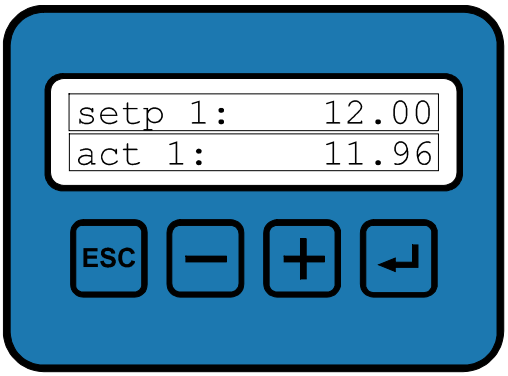
Display of the actual steering setpoint [+/- °]. The steering setpoint is resulting from the set point generator and other physical quantities like speed, pressure a.s.o.

The second line shows the internal setpoint which is damped by a setpoint ramp. This value is taken for the internal steering control process.



Position of the axles

The nominal angle and the actual angle of an individual axle is displayed. The values are given in [°].



Output of the Proportional Amplifiers

Output of the proportional amplifiers driving the proportional valve solenoids A and B of a individual axle. The values are given in [%]. The setpoint shown in the display contains a range from 0 to 100%. 100 % corresponds to an output voltage of +24V.

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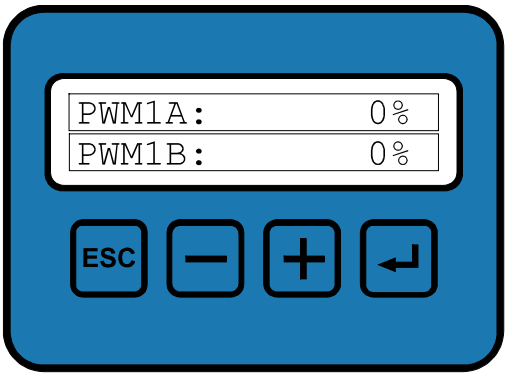
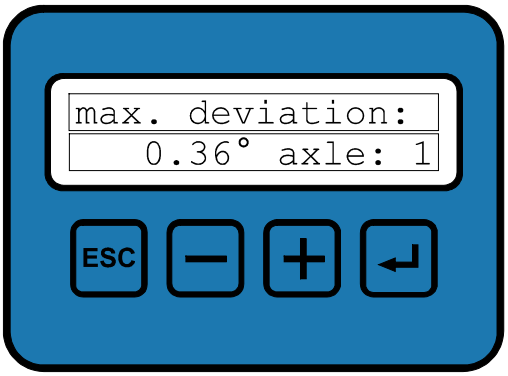


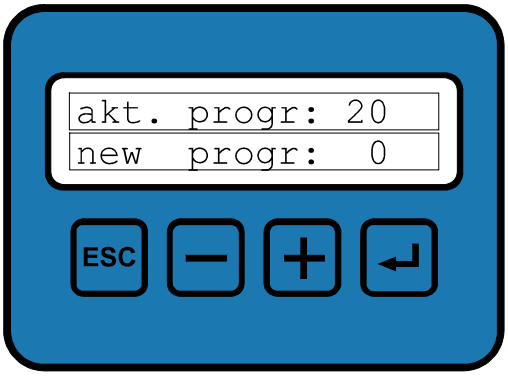
Maximum Steering Deviation

The maximum deviation is displayed in [°]. This value defines the error surveillance of the steering computer. The axle shown is the axle which had this deviation.



Display of the Steering Program

Display of the actual and the new steering program (encoded).



Vehicle speed

Display of the calculated (filtered) vehicle speed. The data is used for the calculation of the steering geometry. The vehicle speed is calculated from the values of the speed sensors.

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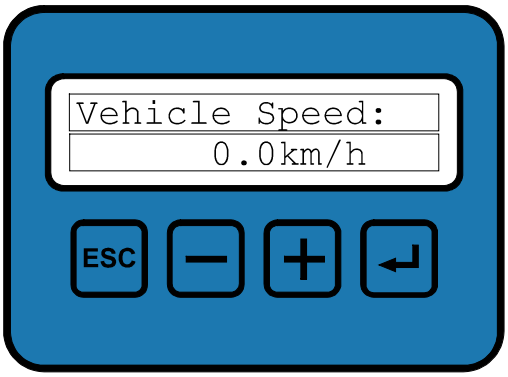
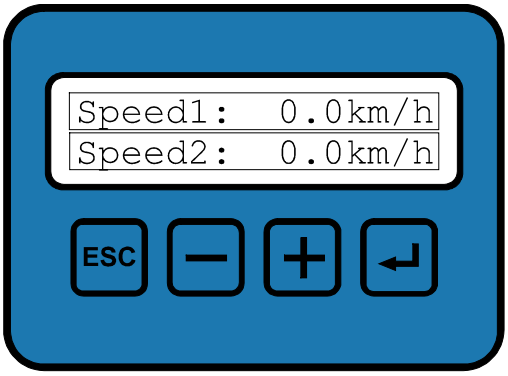


Speed sensors

Display of the actual measured speed signals (not the calculated / filtered values).



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5 Summary of Parameters

The parameters 0 to 51 are **customer parameters**, they are freely programmable.

The parameters above 52 are **ME factory parameters**, they are protected by a signature. Complete valid parameter sets can be transmitted and written by using the PC service software.

Customer parameter file 19502E01.PAR:

Step	Text	Value	Change	Description
0	Y-coordinate front axle 0 ... 9999 [mm]	5235		Distance between the front axle and the most rear axle
1	Y-coordinate steered axle 1 0 ... 9999 [mm]	1650		Distance between steered axle 1 and the most rear axle (in most cases = 0)
2	Y-coordinate steered axle 2 0 ... 9999 [mm]	0		Distance between steered axle 2 and the most rear axle(not used)
3	Y-coordinate steered axle 3 0 ... 9999 [mm]	0		Distance between steered axle 3 and the most rear axle(not used)
4	Y-coordinate steered axle 4 0 ... 9999 [mm]	0		Distance between steered axle 4 and the most rear axle(not used)
5	Y-coordinate steering line 0 ... 9999 [mm]	2617		Distance between the steering line (virtual rigid axle) and the most rear axle in „all wheel steering“
6	Mechanical stop steered axle 1 0...900 [0,1°]	190		Max. mechanically limited steering angle of the electronic-hydraulically steered axle (rear axle 1).
7	Mechanical stop steered axle 2 0...900 [0,1°]	230		Max. mechanically limited steering angle of the electronic-hydraulically steered axle (rear axle 2). (not used)
8	Mechanical stop steered axle 3 0...900 [0,1°]	0		Max. mechanically limited steering angle of the electronic-hydraulically steered axle (rear axle 3). (not used)
9	Mechanical stop steered axle 4 0...900 [0,1°]	0		Max. mechanically limited steering angle of the electronic-hydraulically steered axle (rear axle 4). (not used)
10	Mechanical stop front axle 0...900 [0,1°]	335		Max. mechanically limited steering angle of the front axle

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Step	Text	Value	Change	Description
11	Mechanical angle setpoint generator 0...900 [0,1°]	0		Max. mechanically limited angle of a manual setpoint generator
12	Max. steering angle axle1 0...900 [0,1°]	185		Maximum used angle of the steered axle 1 in normal operation.
13	Max. steering angle axle 2 0...900 [0,1°]	225		Maximum used angle of the steered axle 2 in normal operation. (not used)
14	Max. steering angle axle 3 0...900 [0,1°]	0		Maximum used angle of the steered axle 3 in normal operation. (not used)
15	Max. steering angle axle 4 0...900 [0,1°]	0		Maximum used angle of the steered axle 4 in normal operation. (not used)
16	Calibration of speed 1 0...6500 [10 Imp/km]	3000		Factor to align the number of pulses for the measurement of speed 1
17	Calibration of speed 2 0...6500 [10 Imp/km]	3000		Factor to align the number of pulses for the measurement of speed 2
18	Front axle angle for steering supression 0 ... 900 [0,1°]	10		The programmed angle of the front axle does not result in a steering movement of the rear axles.
19	Lower pressure level 0 ... 200 [bar]	0		Pressure threshold for the accumulator charge valve in hydraulic accumulator systems.
20	Upper pressure level 0 ... 200 [bar]	0		Switch-off threshold for the accumulator charge valve in hydraulic accumulator systems.
21	Reserve	0		
22	y-coordinate of the steering line in normal operation 0 ... 9999 [mm]	1650		Distance between the steering line (virtual rigid axle) and the most rear axle in „all wheel steering mode“.
23	Reserve	0		
24	Enable special functions 1	0		x|x|x|1 : Display of pressure built-up x|x|1|x : Pressure-dep. Setpoint ramp x|1|x|x : Reserved 1|x|x|x : Suppression of small angles (0 on the respective position switches the function off)
25	Reserve	0		

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Step	Text	Value	Change	Description
26	Enable special functions 3	1		x|x|x|1 : Switch-off hydraulic at dev. x|x|1|x : Reserve x|1|x|x : Reserve 1|x|x|x : Reserve (0 on the respective position switches the function off)
27	Reserve	0		
28	Warning speed for special steering programs 0 ... 100 [km/h]	20		With a speed above the programmed value the buzzer will sound in order to warn the driver.
29	Speed threshold for digital output 0...199 [km/h]	20		Exceeding this threshold an digital output will be switched.
30	Time to enable the steering program „narrow bend“ 0...120 [minutes]	2		If the steering programm „narrow bend“ is triggered but had not become active, after this time ist will be reset automatically.
31	Max. speed to trigger steering program „narrow bend“ 0...199 [km/h]	20		To trigger the steering programm „narrow bend“ the vehicle speed must be lower than this value.
32	Speed to activate a triggered steering program „narrow bend“ 0...199 [km/h]	5		A triggered steering program „narrow bend“ will get active at a speed lower than this parameter.
33	Begin of reducing the steering line in „narrow bend“ 0...30 [km/h]	10		Above this speed the behaviour „narrow bend“ will be shifted to the behaviour in „public road“.
34	End of reducing the steering line in „narrow bend“ 0...30 [km/h]	19		Above this speed the steering programm „narrow bend“ will be changed to „public road“
35	Max. difference between rear axles 0...200 [0,1°]	0		Max. difference between rear axles can be limited (in crab steering)
36	Reserve	0		
37	Selection of CAN-diagnostic messages 0...255 [bin]	0		A combination of 8 different CAN messages can be selected.

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Step	Text	Value	Change	Description
38	Version for set of parameter 0 ... 9999	100		This parameter can be used to organize different sets of parameters. This value ist displayed on the LCD after startup.
39	Signature for parameter 52 to 254 0 ... 9999	3633		The signature surveilles the factory parameters concerning changes of the parameter programming. If factory parameters and signature are nit matching the steering system can bot be activated and the error message L31,19,1 is displayed.
40	Reserve	0		
41	Selection of J1939-CAN-messages 0...3333	0		A set of CAN messages can be selected.
42...47	Reserve	0		
48	Closed-loop gain steering axle 1 0...99 [%]	40		Closed-loop gain of the steering controller of the steered axle 1
49	Closed-loop gain steering axle 2 0...99 [%]	40		Closed-loop gain of the steering controller of the steered axle 2
50	Closed-loop gain steering axle 3 0...99 [%]	0		Closed-loop gain of the steering controller of the steered axle 3
51	Closed-loop gain steering axle 4 0...99 [%]	0		Closed-loop gain of the steering controller of the steered axle 4

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Factory Parameter *.PAR:

Step	Text	Value	Change	Description
52	Axle configuration steering axle 1	11		Control configuration steering axle 1: 10: Self-tracking axle with bypass valve 11: Non self-tracking axle with check valves 13: Self-centering axle 14: Axle with mechanical locking device
53	Axle configuration steering axle 2	11		See P_52
54	Axle configuration steering axle 3	0		See P_52
55	Axle configuration steering axle 4	0		See P_52
56	Steering velocity steering axle 1 0 ... 99 [°/sec]	0		Limitation of the steering velocity 0 : no limitation
57	Steering velocity steering axle 2 0 ... 99 [°/sec]	7		Limitation of the steering velocity 0 : no limitation
58	Steering velocity steering axle 3 0 ... 99 [°/sec]	7		Limitation of the steering velocity 0 : no limitation
59	Steering velocity steering axle 4 0 ... 99 [°/sec]	0		Limitation of the steering velocity 0 : no limitation
60	Reserve	0		
61	Steering velocity for special functions 1 ... 99 [°/sec]	5		Steering velocity for: centering, bus stop function, axle synchronisation, ...
62	General setpoint velocity 0 ... 99 [°/sec]	10		Limitation of the velocity for the setpoint ramp 0000 : no limitation
63	Number of axles to be steered 1 ... 4	2		Configuration of the steering computer concerning the number of steered axles.
64	Selection of angle transducers	0		Configuration of the angle measurement: 0: two tracks, contrary sense 1: two tracks, same sense 99: one track

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Step	Text	Value	Change	Description
65	max. tolerance of the angle transducers 0...30 [%]	10		Difference between track 1 and track 2 leading to an error message.
66	max. deviation of the voltage sum 0...300 [mV]	150		Deviation of the sum of track 1 and track 2 leading to an error message. (only when angle transducers are evaluated in contrary sense).
67	Reserve	0		
68	Change of steering programs	1		Configuration of steering programs x|x|x|0 : no change x|x|x|1 : change allowed x|x|0|x : selection by keys x|x|1|x : selection by switches
69	Selection of manual setpoint generators	0		0 : Setpoint via digital inputs 1 : Setpoint via angle transducers
70	Steering angle reduction, lower threshold 0...50 [km/h]	20		Reduction speed: From this speed limit the steering angle will be reduced linear with growing speed. (smaller than locking speed - 5km/h !)
71	Steering angle reduction, lower threshold 0...60 [km/h]	40		Locking speed: If this speed limit is reached the rear axle will be locked.
72	Speed measurement	11		Configuration of speed measurement: 0|0|y|x: x = sensor 1 y = sensor 2 9|9|y|x: redundant measurement is switched off 0: Initiation switch 1 and 2 1: ABS sensor 1 and 2 2: CAN-ABS 3: Initiation switch 3 and 4 4: magnetic wheel 040 010 5: CAN-Tacho
73	max. deviation of the speed signals 1 ... 200 [0,1km/h]	50		If the speed signal deviation exceeds the programmed value an error message is created.
74	Tolerance time for speed deviation 0 ... 300 [s]	8		Tolerance time for the deviation of the speed signals until an error messeg is created.
75	Reserve	0		
76	Valve opening for alignment 0 ... 99 [%]	55		Valve opening for the axle movement in the alignment mode.

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Step	Text	Value	Change	Description
77	Time for increase of the proportional output in the alignment mode 0 ... 2000 [10ms]	500		When the key is pressed down in the axle alignment mode the output signal for the proportional valve is increased to the maximum value within the programmed value.
78	Drift from 0°-position 0 ... 100 [0,1°]	20		If the locked axle is moving from the 0° position for more than the programmed value an error message is created..
79	Reserve	0		
80	Selection of the pressure supply	0		Configuration of the pressure supply: 00 : Hydraulic load sensing (HLS) 01 : Accumulator system (SLS) 10 : Electrical load sensing (ELS)
81	ELS Pmax 0...99 [%]	0		(only ELS) maximum system pressure
82	ELS Pmin 0...99 [%]	0		(only ELS) minimum pressure kept constantly
83	ELS dead band 0...999 [0,1°]	0		(only ELS) If the deviation exceeds the programmed value the pressure is increased.
84	ELS steepness 0...999 [0,1°]	0		(only ELS) The pressure reaches its max. value if the deviation is equal to this value
85	ELS decrease time 0 ... 99 [s]	0		(only ELS) The pressure is decreased to the min. value as soon as the axle reaches its nominal value.
86..87	Reserve	0		Reserve for ELS and SLS systems
88	Min.cent.pressure 40 ... 195 [bar]	0		Minimum pressure in the centering accumulator
89	Min.steer.pressure 40 ... 195 [bar]	70		Minimum pressure in the steering accumulator
90	Max.steer.pressure 0 ... 200 [bar]	195		Maximum pressure in the steering accumulator
91	Max. charging time 1 ... 120 [s]	0		The charging time of the hydraulic accumulators after power-on may not exceed the programmed time.
92	Min. charging time 1 ... 10 [s]	0		The charging time may not be shorter than the programmed time.
93	Min. charging time centering accumulator 1 ... 10 [s]	0		The charging time of the centering accumulator may not be shorter than the programmed time.

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Step	Text	Value	Change	Description
94	Tolerance time centering pressure switches 1 ... 20 [s]	0		Tolerance time for monitoring the pressure switches at the centering cylinder.
95	Reserve	0		
96	Max. inverse axle movement 0 ... 50 [%]	20		*Monitoring inverse axle movement:* An axle movement to the wrong direction exceeding this value causes a system fault.
97	Tolerance time steering deviation 0 ... 1000 [10ms]	150		*Deviation monitoring:* If the tolerance time ends a fault is generated
98	Speed threshold v1 0 ... 100 [km/h]	3		*Deviation monitoring:* P_102 contains the maximum allowed steering deviation for the speed range v1...v2 programmed in this parameter.
99	Speed threshold v2 0 ... 100 [km/h]	15		*Deviation monitoring:* P_103 contains the maximum allowed steering deviation for the speed range between v2 and v3 (v3 > v2 !)
100	Speed threshold v3 0 ... 100 [km/h]	30		*Deviation monitoring:* P_104 contains the maximum allowed steering deviation for the speed range between v3 and v4 (v4 > v3 !)
101	Speed threshold v4 0 ... 100 [km/h]	45		*Deviation monitoring:* P_105 contains the maximum allowed steering deviation for the speed > v4
102	Control deviation at v1 0 ... 200 [0,1°]	80		*Deviation monitoring:* A bigger deviation than this value will cause a fault after the dead time (P_97). Valid in the speed range v1...v2
103	Control deviation at v2 0 ... 200 [0,1°]	40		*Deviation monitoring:* A bigger deviation than this value will cause a fault after the dead time (P_97). Valid in the speed range v2...v3
104	Control deviation at v3 0 ... 200 [0,1°]	20		*Deviation monitoring:* A bigger deviation than this value will cause a fault after the dead time (P_97). Valid in the speed range v3...v4
105	Control deviation at v4 0 ... 200 [0,1°]	15		*Deviation monitoring:* A bigger deviation than this value will cause a fault after the dead time (P_97). Valid in speed range > v4.

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Step	Text	Value	Change	Description
106	Deviation factor 0,150,200,300,400 [%]	300		*Deviation monitoring:* If a deviation exceeds this factor at the levels P_102 to P_105 an error is instantly generated.
107 ... 111	Reserve	0		
112	Selection of axles to be centered 0 ... 255 [bin]	2		If digital input „axle centering“ is activated the programmed axles are centered: 1: axle 1 2: axle 2 3: axle 1 and 2 4: axle 3
113	Selection of axles to be locked 0 ... 255 [bin]	1		If steering program „all wheel steering“ is activated the programmed axles are locked: 1: axle 1 2: axle 2 3: axle 1 and 2 4: axle 3
114 ... 115	Reserve	0		
116	Error reactions	0		Configuration of error reactions: 1|x|x|x : emergency switch-off in case x|1|x|x : Reserve x|x|1|x : Reserve x|x|x|1 : Reserve
117	Steering speed of the front axle for synchronization of the steered axles 0 ... 1999 [0,01°/s]	300		If the steered axles are not in line with the steering geometry after power-on or steering program change they will be synchronized as soon as the front axle moves with the programmed speed.
118	Reserve	0		
119	Min. steering speed 0 ... 99 [%]	0		*Reduction of the steering speed:* The global setpoint ramp (P_62) is reduced depending on the deviation of each axle until the programmed value is reached P_62 must be programmed 0 = no reduction of the steering speed

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Step	Text	Value	Change	Description
120	Lower steering speed depending on the steering deviation 0 ... 2000 [0,01°]	100		*Reduction of the steering speed:* In case of steering deviations the global setpoint ramp (P_62) is reduced linear between P_120 and P_121. Only active if P_119 > 0!
121	Upper steering speed depending on the steering deviation 0 ... 2000 [0,01°]	300		*Reduction of the steering speed:* In case of steering deviations the global setpoint ramp (P_62) is reduced linear between P_120 and P_121. Only active if P_119 > 0!
122	Steering speed depending on the pressure, lower value 0 ... 200 [bar]	0		*Reduction of the steering speed:* Lower pressure threshold for a setpoint ramp depending on the pressure (has to be < centering pressure.)
123	Steering speed depending on the pressure, upper value 0 ... 200 [bar]	0		*Reduction of the steering speed:* Upper pressure threshold for a setpoint ramp depending on the pressure (has to be > lower pressure value)
124	pulswith for axle regulation 0..500 [ms]	0		To reduce small deviation in axle position this parameter pulses the proportional valve
125	Reserve	0		
126	SLC-ID 0...5	0		In a CAN network the SLC are using different CAN-IDs
128 ... 143	Configuration of digital inputs			See wiring diagram
144 ... 159	Configuration of digital outputs			See wiring diagram
160 ... 175	Configuration of digital outputs			See wiring diagram
176	Axle 1 in alignment mode 0...10	0		In alignment mode this value is displayed instead of „axle 1“
177	Axle 2 in alignment mode 0...10	0		In alignment mode this value is displayed instead of „axle 2“
178	Axle 3 in alignment mode 0...10	0		In alignment mode this value is displayed instead of „axle 3“

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Step	Text	Value	Change	Description
179	Axle 4 in alignment mode 0...10	0		In alignment mode this value is displayed instead of „axle 4“
180	Front axle in alignment mode 0...10	0		In alignment mode this value is displayed instead of „poti 1“
181	Front axle 2 in alignment mode 0...10	0		In alignment mode this value is displayed instead of „poti 2“
182 ... 191	Reserve	0		
192	Valve overlap steered axle 1 0...99 [%]	35		Valve overlap of the proportional valve of steered axle 1. Value is given in % of the nominal valve voltage
193	Valve overlap steered axle 2 0...99 [%]	35		Valve overlap of the proportional valve of steered axle 2. Value is given in % of the nominal valve voltage
194	Valve overlap steered axle 3 0...99 [%]	0		Valve overlap of the proportional valve of steered axle 3. Value is given in % of the nominal valve voltage
195	Valve overlap steered axle 4 0...99 [%]	0		Valve overlap of the proportional valve of steered axle 4. Value is given in % of the nominal valve voltage
196 ... 199	Reserve	0		
200	Max. voltage of the proportional valve 0 ... 99 [%]	40		Ratio of supply voltage and nominal voltage of the proportional valves. e.g. 12V-valve at 24V-supply. = 50%
201	max. ELS-voltage 0 ... 99 [%]	0		Ratio of supply voltage and nominal voltage of the ELS valve.
202	PWM-frequency [Hz]	0		Clock of the pulse-width modulated power amplifiers.
203	Reserve	0		
204	Configuration of cable break detection at DO 1 ... 8 0 ... 3333	3330		x|x|x|3 : DO1 + DO2 not monitored x|x|x|2 : DO2 not monitored x|x|x|1 : DO1 not monitored x|x|x|0 : both monitored x|x|x|0 : DO1 and DO2 x|x|y|x : DO3 and DO4 x|y|x|x : DO5 and DO6 y|x|x|x : DO7 and DO8

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Step	Text	Value	Change	Description
205	Configuration of cable break detection at DO 9 ... 16	3333		x|x|x|0 : DO9 + DO10 monitored x|x|y|x : DO11 and DO12 x|y|x|x : DO13 and DO14 y|x|x|x : DO15 and DO16
206	Configuration cable break detection at PWM 1 ... 8	3300		x|x|x|0 : PWM1 + PWM 2 monitored x|x|y|x : PWM 3 + PWM4 x|y|x|x : PWM 5 + PWM6 y|x|x|x : PWM 7 + PWM8
207	Configuration cable break detection at PWM 9 bis 16	3333		x|x|x|0 : PWM9 + PWM10 monitored x|x|y|x : PWM11+PWM12 x|y|x|x : PWM13+PWM14 y|x|x|x : PWM15+PWM16
208 ... 239	Reserve	0		
240 ... 249	Configuration inverse digital inputs DI1...25	0		
250	Input resistance analogue inputs	0		
251	Input resistance digital inputs	0		
252 ... 255	Reserve	0		

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6 Alarm List

Loc.	Kind of error	Prio	Description, trouble-shooting
01	**Reserve**		
...			
04			
05 ... **19**	**Digital Outputs**		05=DO1, 06=DO2, 07=DO3, 08=DO4, 09=DO5, 10=DO6, 11=DO7, 12=DO8, 13=DO9, 14=DO10, 15=DO11, 16=DO12, 17=DO13, 18=DO14, 19=DO15
	02 *Cable break*	1	Cable break detected at the according output. The wiring has to be checked! ***Notes for the troubleshooting:*** By doing a resistance measurement at the clamps of the 54-pole-plug with the steering computer removed, the single valve solenoid coils can be checked. Switching valves have typical coil resistances from 15 up to 30 ohms. • If there are a number of outputs detecting a cable break at the same time, a disconnection of a common return wire could be possible. • If the error can not be found out by mesauring the resistance, the cross section of a common return wire could be too small.
	03 *Short circuit*	3	Short circuit detected at the according output. The wiring has to be checked! ***Notes for the troubleshooting:*** By doing a resistance and voltage measurement at the clamps with the steering computer removed from the plug, the kind of short circuit can be found out. It is possible that there are short circuits to ground potential or to +24V supply voltage. At the output clamps there must not be a voltage that exceeds 3V!
	05 *Parameter setting*	3	Internal configuration error of the computer.
	12 *> max. value*	3	Internal configuration error of the computer. This error can only be removed by factory.
20 ... **29**	**PWM outputs**		20=PWM1 (Prop.-valve axle1 solenoid A), 21=PWM2 (Prop.-valve axle1 solenoid B), 22=PWM3 (Prop.-valve axle2 solenoid A), 23=PWM4 (Prop.-valve axle2 solenoid B) ....
	02 *Cable break*	3	Cable break detected at the according output. The wiring has to be checked! ***Notes for the troubleshooting:*** By doing a resistance measurement at the clamps of the 54-pole-plug with the steering computer removed, the single valve solenoid coils can be checked. Proportional valves (9V solenoid coils) have typical coil resistances from 2 up to 3,5 ohms

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Loc.	Kind of error	Prio	Description, trouble-shooting
			• If there are a number of outputs detecting a cable break at the same time, a disconnection of a common return wire could be possible. • If the error can not be found out by mesauring the resistance, the cross section of a common return wire could be too small.
	03 *Short circuit*	3	Short circuit detected at the according output.The wiring has to be checked! ***Notes for the trouble shooting:*** See „Cable break“ of the PWM outputs.
30	**Power Supply**		
	09 *24V Ubat*	0	Cable break or burnt-out fuse of the redundant power supply to the error lamp. ***Notes for the trouble shooting:*** Measure with disconnected steering computer at the according clamp or use the PCS-software to show the inputs. The according input must have a +24V level all the time.
	10 *5V reference*	1	The reference voltage at clamp 34 exceeds the allowed tolerance range! Check the wiring of the connected angle transducers! Maybe there is a short circuit. ***Notes for the trouble shooting:*** The 5V reference supplies the angle transducers and the pressure sensors. With the steering computer connected, clamp 34 must deliver a voltage of 5V. If the voltage deviates, the angle transducers and sensors should be disconnected one after one to find out the faulty connection. The shields of the connected sensors should be controlled, too.
	11 *5V external*	1	The power supply voltage „5V external“ at clamp 33 exceeds the allowed tolerance range! Check the wiring of the connected angle transducers and pressure sensors! Maybe ther is a short circuit. ***Notes for the trouble shooting:*** See „5V reference“ of the power supply.
	12 *> max. value*	3	Maximum allowed power supply voltage is exceeded! U_{bat} at clamp J12.1 is higher than 30V!
	13 *< minimum value*	3	Minimum allowed power supply voltage is undershot! U_{bat} at clamp J12.1 is higher than 14V!
	31 *Speed > 0*	1	Power supply is switched-on at a speed higher than 10 km/h. The power supply is not secure, check the wiring! ***Notes for the trouble shooting:*** There may be a tottering contact in the power supply. Has the vehicle be towed ?

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Loc.	Kind of error	Prio	Description, trouble-shooting
31	**Parameter**		
	04 *Plausibility*	3	Memory error in the parameter range, error can only be removed in the factory.
	19 *Deviation*	1	The parameters do not match to the valid configuration. The validation code has to be programmed to P_39. ***Notes for the trouble shooting:*** Load a valid parameter set using the PCS software.
32	**Pressure Sensor**		
	02 *Cable break*	1	There is no signal from the pressure sensor. Check the wiring! ***Notes for the trouble shooting:*** Measure the voltage of the sensor output with the steering computer connected. You can also use the PCS. The voltage must have a value between 0,5V and 4,5V.
	26 *Build-up pressure*	1	Pressure signal is unplausible while pressure is built up. Check the pressure sensor and the pressure supply. The pressure signal must increase when the load valve is opened and no steering movements are done.
	27 *pressure decreasing*	1	Pressure signal is unplausible while pressure is decreasing. Check the pressure sensor and the pressure supply. The pressure signal must decrease when the load valve is closed and steering movements are done.
33	**Pressure Supply**		
	05 *Parameter*	3	The parameter setting of the hydraulics supply in P_80 is wrong.
	09 *Level*	0	Cable break or lack of oil in the tank. ***Notes for the trouble shooting:*** Check the oil level, in normal operation the input should be at $+U_{bat}$.
	12 *> max. value*	3	The maximum value (P_90) has been exceeded. Check the hydraulics supply.
	13 *< min. Wert*	3	The maximum value (P_89) has been undershot. Check the hydraulics supply.
	26 *Build-up pressure*	1	The hydraulics pressure could not be built up after the ignition system and the „load control“ has been switched on, and the time that´s programmed in P_91 has runned down. Check the pressure supply and the pressure sensor. ***Notes for the trouble shooting:*** The input „load control“ may only be set after the motor is already running.

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Loc.	Kind of error	Prio	Description, trouble-shooting
	45 *Maintenance*	0	The pressure filter is closed, the electrical monitoring was generating a message ***Note for the trouble-shooting:*** Check the state of the oil filter. In normal operation the input should be at $+U_{bat}$
34	**Load Control**		
	31 *Speed > 0*	1	The vehicle moves (>20km/h) and the load control is not active (engine is off). ***Notes for the trouble-shooting:*** ***C***heck the wiring
35	**Pressure accumulator**		
	04 *Plausibility*	1	The pressure has been build up too fast. ***Notes for the trouble-shooting:*** ***Replace accumulators.***
40, 42, 44, 46, 48, 50	**Angle Transducer Axle x Track 1**		40= axle1, 42= axle 2, 44= axle 3, 46= axle 4, 48= setpoint generator 1, 50= setpoint generator 2

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Loc.	Kind of error	Prio	Description, trouble-shooting
	02 *Cable break*	1	The voltage of the slider lies within the range of cable break detection. Check the wiring of this angle transducer. ***Notes for the trouble shooting:*** The angle transducer of the front axle is not supplied or stands in overturned position. There is also the possibility of a cable break of the „5V external“ or „5V reference“ supply line. Measure the following voltages at the analogue inputs: *Voltage > 4,8 V*: - Short circuit of the slider to clamp J10.4 or J2.11 or 24 V. - Mechanical range exceeded ? - Cable break between J2.2 and angle transducer track 1 *Voltage < 0,2 V*: - Short circuit of the slider against clamp J2.2 or against vehicle ground - Cable break between slider and angle transducer - Cable break between J10.4 and angle transducer - Mechanical range exceeded ? For exact location the following resistances should be measured with unplugged steering computer: Between clamp J10.4 and J2.2. As there are connected at least two tracks you should neasure about 1000 Ohm (750 – 1250 Ohm). In case of deviations there is a cable break / short circuit of the output „5V-Ref.” or „0V-Signal“.
	05 *Parameterprog.*	0	Parameter P_64 is programmed wrong.
	17 *Summation of tracks 1 and 2*	2	The summation of the potentiometer voltages is unplausible. The power supply of the second potentiometer track may be exchanged. ***Notes for the trouble shooting:*** When the vehicle is in use: Check the connection of the shield of the angle transducer. When doing the start-up after installation: Check the voltages of the angle transducer by using the PCS. When steering the rear axle from the left to the right mechanical stop, the voltage of the potentiometer track 1 must increase. When the voltage of track 1 is o.k. (increasing voltage when steering to the right direction) there may be an error of the supply of track 2. Exchange Pin 1 and 3 of potentiometer track 2. If the voltage of track 1 decreases when steering in right direction, there is an error of the supply of track 1. Exchange Pin1 and 3 of the potentiometer track 1.

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Loc.	Kind of error	Prio	Description, trouble-shooting
	18 *Difference tracks 1/2*	2	The measured angle difference between track 1 and 2 exceeds the value that is programmed in parameter P_65. ***Notes for the trouble shooting:*** When the vehicle is in use: Check the connection of the shield of the angle transducer. When doing the start-up after installation: The angle transducer must be aligned.
41, 43, 45, 47, 49, 51	**Angle Transducer Axle x Track 2**		40= axle 1, 42= axle 2, 44= axle 3, 46= axle 4, 48= setpoint generator 1, 51= setpoint generator 2

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Loc.	Kind of error	Prio	Description, trouble-shooting
	02 *Cable Break*	1	The voltage of the slider lies within the range of cable break detection. Check the wiring of this angle transducer. ***Notes for the trouble shooting:*** The angle transducer of the front axle is not supplied or stands in overturned position. There is also the possibility of a cable break of the „5V external“ or „5V reference“ supply line. Measure the following voltages at the analogue inputs: *Voltage > 4,8 V*: - Short circuit of the slider to clamp J10.4 or J2.11 or 24 V. - Mechanical range exceeded ? - Cable break between J2.11 and angle transducer track 2 *Voltage < 0,2 V*: - Short circuit of the slider against clamp J2.2 or against vehicle ground - Cable break between slider and angle transducer - Cable break between J2.11 and angle transducer - Mechanical range exceeded ? For exact location the following resistances should be measured with unplugged steering computer: Between clamp J2.11 and the isolated supply. There must be measured a value of ca. 2000 Ohm. In case of deviations there is a cable break or a short circuit of the output „5V-ext“ or „0V-Signal“.
52	**Speed 1**		
	02 *Cable Break*	0	The CAN message for speed signals has wrong values. ***Notes for the trouble shooting:*** Check the speed measurements by doing a test drive. Check the CAN wiring, sending device has a failure?
	05 *Parameterprog.*	1	The parameter for the speed measurement is programmed wrong. ***Notes for the trouble shooting:*** See parameters P_16, P_72
	06 *Timeout*	0	The CAN message for speed signals has been timed out. ***Notes for the trouble shooting:*** Check the speed measurements by doing a test drive. Check the CAN wiring, sending device has a failure?
	19 *Deviation*	1	Difference between speed 1 and 2 exceeds the allowed range (P_73). One of the speed signals may have a malfunction. ***Notes for the trouble shooting:*** Check the speed measurements by doing a test drive. - Is the tachymeter o.k. ? - Has the tire equipment been changed (diameter of tires?) Accomodate parameter P_17. - In case of proximity initiator switches: Check the correct distance between initiator and the metallic release.

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Loc.	Kind of error	Prio	Description, trouble-shooting
53	**Speed 2**		
	05 *Parameter-progrmming*	1	Parameter for the speed signal is programmed wrong or the value of WIZ2 (P_17) is too high.
55, 56, 57, 58	**Monitoring of the steering angle steered axle X**		55 = axle 1, 56 = axle 2, 57 = axle 3, 58 = axle 4
	05 *Parameter-programming*	0	Parameter of the steering angle deviation monitoring is programmed wrong.
	13 *< min. value*	0	The axle does not move as it is expected or the axle won´t move at all. Check the hydraulics supply. Is ist possible to steer the axle while standing still ?
	19 *Deviation*	3	The allowed control deviation is exceeded longer than defined in P_97. The axle did not reach the correct position. ***Notes for the trouble shooting:*** Are there probably too high steering forces required? Does the hydraulics supply deliver enough oil?
	30 *Inverse movement*	3	The axle moves opposite the expected direction. ***Notes for the trouble shooting:*** When doing the start-up after installation: Is the sense of rotation of the angle transducer correct and is the proportional valve connected correctly? Does the slider of the proportional valve cramp? Is there any play in the coupling of the angle transducer?
	37 *v1 > v >v2*	0	Warning: Threshold of the control deviation has been exceeded for a short time at a vehicle speed between P_98 and P_99. Check the steering speed and the hydraulics supply.
	38 *v2 > v > v3*	0	Warning: Threshold of the control deviation has been exceeded for a short time at a vehicle speed between P_99 and P_100. Check the steering speed and the hydraulics supply.
	39 *v3 > v > v4*	0	Warning: Threshold of the control deviation has been exceeded for a short time at a vehicle speed between P_100 and P_101. Check the steering speed and the hydraulics supply.
	40 *v > v4*	0	Warning: Threshold of the control deviation has been exceeded for a short time at a vehicle speed above P_101. Check the steering speed and the hydraulics supply.

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Loc.	Kind of error	Prio	Description, trouble-shooting
	41 *v > v4*	3	Warning: Threshold of the control deviation has been exceeded for a short time by the factor P_106. The axle has been switched-off immediately ***Notes for the trouble shooting:*** Are there too high steering forces ? Is the hydraulics supply sufficiant ?
60, 62, 64, 66, 68, 70	**Alignment Angle Transducer X Track 1**		60 = axle 1, 62 = axle 2, 64 = axle 3, 66 = axle 4, 68 = setpoint generator 1 70 = setpoint generator 2
	04 *Plausibility*	3	The alignment procedure of the front axle is not complete. Repeat the alignment procedure! Always do a complete alignment procedure (left stop, middle, right stop)
	42 *0° - alignment*	3	The 0° alignment value exceeds the allowed tolerance range. The 0° position of the angle transducer must be accomodorated to the 0° position of the axle.
	43 *Left alignment*	3	The alignment value of the left mechanical stop exceeds the allowed tolerance range. The angle transducer has to be aligned.
	44 *Right alignment*	3	The alignment value of the right mechanical stop exceeds the allowed tolerance range. The angle transducer has to be aligned.
	31 *speed > 0*	0	An alignment is not allowed while driving.
61, 63, 65, 67, 69, 71	**Alignment Angle Transducer X Track 1**		61 = axle 1, 63 = axle 2, 65 = axle 3, 67 = axle 4, 69 = setpoint generator 1 71 = setpoint generator 2
	04 *Plausibility*	3	The alignment procedure of the front axle is not complete. Repeat the alignment procedure! Always do a complete alignment procedure (left stop, middle, right stop)
	42 *0° - alignment*	3	The 0° alignment value exceeds the allowed tolerance range. The 0° position of the angle transducer must be accomodorated to the 0° position of the axle.
	43 *Left alignment*	3	The alignment value of the left mechanical stop

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Loc.	Kind of error	Prio	Description, trouble-shooting
			exceeds the allowed tolerance range. The angle transducer has to be aligned.
	44 *Right alignment*	3	The alignment value of the right mechanical stop exceeds the allowed tolerance range. The angle transducer has to be aligned.
72	**CAN terminal**		
	06 *Timeout*	0	The connection to the operation terminal is interrupted. ***Notes for the trouble-shooting:*** Check the wiring and fuses.
74	**Software**		
	46 *Overload*	0	The process time is exceeded and not constant anymore. ***Notes for the trouble-shooting:*** A constant process time is important in remote network systems. The warning should not appear regular. Check if there has been a change of parameters.
75	**CAN connection**		
	06 *Timeout*	0	The connection to the terminal is interrupted. ***Notes for the trouble-shooting:*** Check the wiring and fuses.
	12 *> max. value*	0	Too many CAN messages are active ***Notes for the trouble-shooting:*** Check the configuration of CAN messages
76	**Setpoint generator**		
	04 *Plausibility*	1	not used
	05 *Parameter*	3	not used
77	**Axle configuration**		
	05 *Parameterprog.*	3	At least one of the parameters P_52 to P_55 has been programmed wrong
78	**Steering suppression**		
	05 *Parameterprog.*	3	Parameter P_18 is programmed wrong.
79	**Steering angle reduction**		
	05 *Parameterprog.*	3	Parameter P_70 or P_71 is programmed wrong.

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Loc.	Kind of error	Prio	Description, trouble-shooting
80	**Global Setpoint ramp**		
	05 *Parameterprog.*	3	At least one of the parameters P_119 to P_121 is programmed wrong.
81	**Fuse check**		
	09 *Level*	0	The digital input is not active. Check the redundant fuse (3 Ampere) of the error lamp or the wiring.
82	**Centering unit**		
	02 *Cable break*	2	Cable break of the pressure sensor of the centering unit. Check the wiring and sensor.
83	**Steering Program Keys**		
	04 *Plausibility*	0	The operation elements for the steering program selection are not operated correctly. No operations will be accepted anymore ***Notes for the trouble shooting:*** Check if there is a short circuit or if there is a key cramping. Has been a key pressed while startup?
84	**Reduction of the Steering Line**		
	05 *Parameterprog.*	3	Parameter P_70 or P_71 are programmed wrong.
85	**Bus Stop Function**		
	05 *Parameterprog.*	3	At least one of the parameters P_43 to P_45 or P_17 is programmed wrong
90, 91, 92, 93	**Axle locking**		90 = axle 1, 91 = axle 2, 92 = axle 3, 93 = axle 4,

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Loc.	Kind of error	Prio	Description, trouble-shooting
	16 *Drift*	0	Only with mechanical locked axles: The locking position does not appropriate to the aligned 0°-value. Check the axle and the coupling of the angle transducer! ***Notes for the trouble shooting:*** May the axle move, caused by mechnical tensions or play of the angle transducer´s coupling? Repeat the alignment of the axle!
	19 *Deviation*	3	There is a deviation from the locking position or the retaining is not possible. The actual value is higher than 0°. The allowed deviation is set in parameter P_94. ***Notes for the trouble shooting:*** The centred axle has moved out of the 0° position or it won´t reach the 0° position to be locked. Check the mechanical coupling of the angle transducer if there is too much play. When doing the start-up after installation: The alignment procedure of the rear axle should be done. When the vehicle is in use: Check the actual value of the rear axle. The rear axle should not move in a range of more than 0,5°. Are there any axle tensions possible, especially when driving through a curve ? Does the steering axle alter when the vehicle suspends, is the angle transducer fixed to the frame?
	21 *Locking cycle*	3	The axle was not retained after the end of the locking cycle. ***Notes for the trouble shooting:*** Check the centering switch of the mechanical retainment.
	22 *Unlocking cycle*	3	The axle can not be steered even after an unlocking cycle is done. ***Notes for the trouble shooting:*** Check the centering switch and the compressed air.
	23 *Locking state*	3	The centering switches of the retained axle are not in correct position. ***Notes for the trouble shooting:*** Check the centering switches.
	24 *Unlocking state*	1	The centering switches of the retained axle are not in correct position. ***Notes for the trouble shooting:*** Check the centering switches and the compressed air.
95, 96, 97, 98	**Test of the actuator steered axle X**		95 = axle 1, 96 = axle 2, 97 = axle 3, 98 = axle 4
	32 *Check valve opened*	3	A movement of the axle is possible although the check valves are closed (currentless). Probably the check valves are defective.
	33 *Check valve*	3	The axle won´t move even if the check valves are

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Loc.	Kind of error	Prio	Description, trouble-shooting
	closed		opened (turned on). Probably the check valves are defective or the required steering forces are too high.
	34 *Circulation valve*	3	The circulation valve does not work (closed/opened).
	35 *Centering function*	3	Only axles with centering system: A centering of the axle is not possible. Check if the steering forces are too high.
	36 *Hydraulics retainment of the centering cylinder*	3	Only axles with centering system: The centering part of the cylinder is not lockable hydraulically. Maybe the non-return valve at the cylinder is defective.
100 ... 119	**Digital Inputs**		100 = DI 1, ... 119 = DI 20
	04 *Plausibility*	3	Internal error of a safety input
	05 *Parameter programming*	3	Internal configuration error. Correction of parameters necessary.
	12 *> max. value*	3	Internal configuration error. Correction of parameters necessary.
120 ... 129	**Analog Inputs**		120 = AI1, ... 29 = AI10
	03 *Short circuit*	3	Short circuit between analogue inputs. Check the wiring!
	04 *Plausibility*	3	Internal error of a safety input
140 ... 156	**Digital Inputs via CAN bus**		140 = CAN-DI 1, ... 156 = CAN-DI 16
	04 *Plausibility*	3	Internal error of a CAN input
	05 *Parameter programming*	3	Internal configuration error. Correction of parameters necessary.
	12 *> max. value*	3	Internal configuration error. Correction of parameters necessary.
160 ... 176	**Digital Outputs via CAN bus**		160 = CAN-DO1, ... 176 = CAN-DO16
	04 *Plausibility*	3	Internal error of a CAN output

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Loc.	Kind of error	Prio	Description, trouble-shooting
	05 *Parameter programming*	3	Internal configuration error. Correction of parameters necessary.
	12 *> max. value*	3	Internal configuration error. Correction of parameters necessary.
239	**Electronics**		
	1 .. 4	3	internal error, replace PLC
	5	3	error in parameter-memory 1. reprogram parameters 2. replace PLC
	6	3	checksum of program doesn't match 1. reprogram PLC 2. replace PLC
	7 .. 18	3	internal error, replace PLC
	19	3	test of internal fail safe switch failed 1. check for short circuit of digital outputs to +Ub 2. replace PLC
	20	3	internal error, replace PLC
	21 .. 36	3	test of internal fail safe switch failed 1. check for short circuit of digital outputs to +Ub 2. replace PLC
	41 .. 46	3	add-on module digital output (alarm number - 24) failed 1. check digital output (short-circuit, ...) 2. check supply of addon-card 3. replace PLC
	61 .. 74	3	add-on module digital input (alarm number - 34) failed 1. check if volatge at digital input pin is in the invalid range of 4 ... 7V 2. replace PLC
	95	3	add-on module 1 not working, replace PLC
	99	3	no supply for digital safety-outputs 1. check supply of PLC 2. replace PLC
	101 .. 105	3	internal error, replace PLC
	106	3	supply voltage too high (> 31V) 1. check power-supply 2. replace PLC
	107	3	supply voltage too low (< 14V)

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Loc.	Kind of error	Prio	Description, trouble-shooting
			1. check power-supply 2. replace PLC
	108	3	Temperature of the ECU > 85°C 1. check temperature 2. check PLC
	109 .. 113	3	internal error, replace PLC
	114	3	reference voltage 5Vref out of tolerance 1. check supply of analog sensors 2. replace PLC
	115	3	reference voltage 5Vext out of tolerance 1. check supply of analog sensors 2. replace PLC
	116	3	test of internal fail safe switch failed 1. check for short circuit of digital outputs to +Ub 2. replace PLC
	121 .. 136	3	test digital output failed (alarm number - 120) 1. check supply of PLC 2. check digital output (short-circuit, ...) 3. replace PLC
	161 .. 176	3	digital input (alarm number - 160) failed 1. check digital input 2. replace PLC
	201 .. 208	3	analog input (alarm number - 200) failed 1. check analog input 2. replace PLC
	221 .. 222	3	og output (alarm number – 220) failed 1. check analog output (short circuit, ...) 2. replace PLC
240	**redundant elektronic**		

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7 Wiring diagram

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8 Hydraulics diagram

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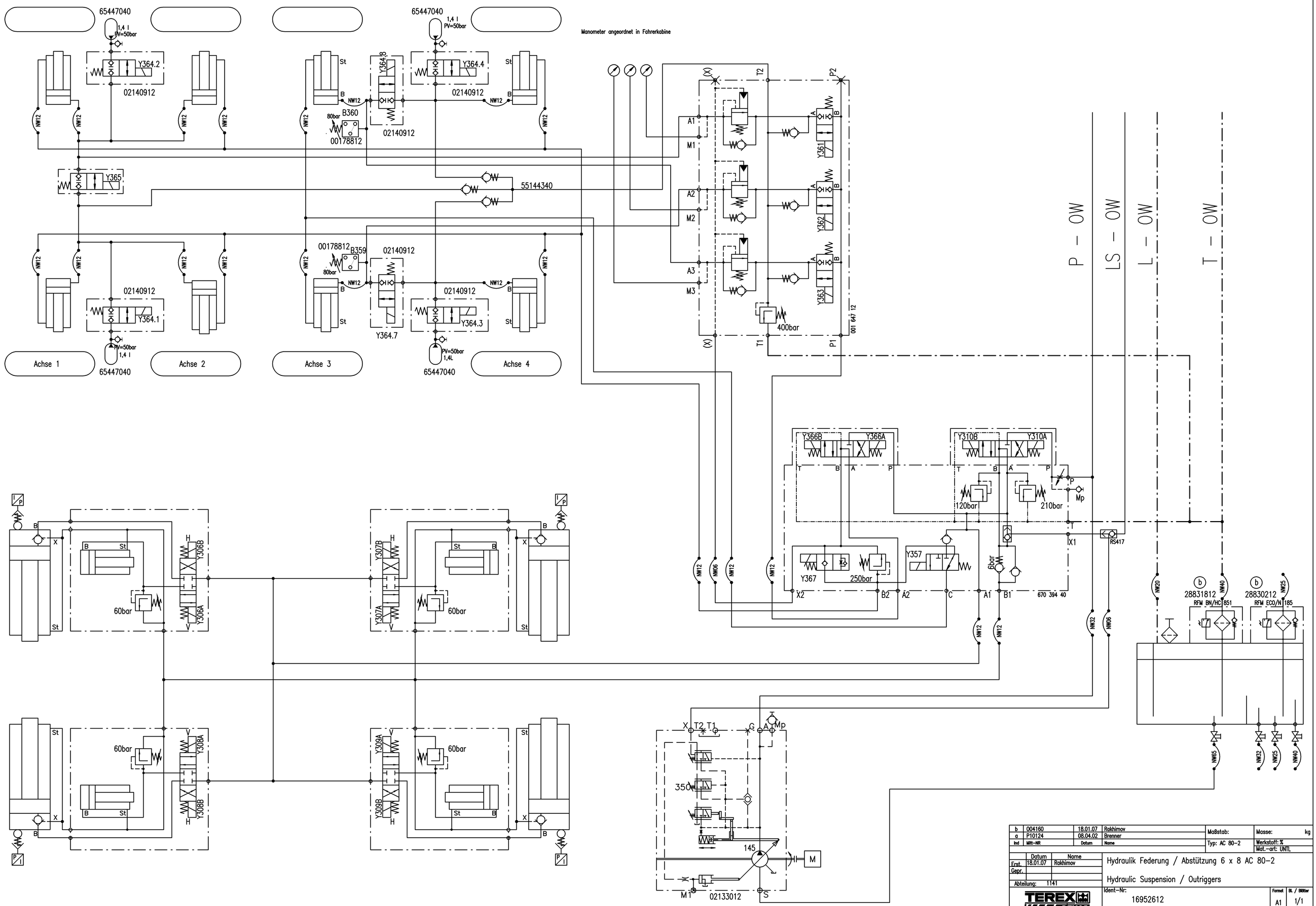

b	004160	18.01.07	Rakhimov	Maßstab:	Masse: kg
a	P10124	08.04.02	Brenner	Typ: AC 80-2	Werkstoff: %
Ind	Mitt-NR	Datum	Name		Mat.-art: UNTL

	Datum	Name
Erst.	18.01.07	Rakhimov
Gepr.		

Abteilung: 1141

Hydraulik Federung / Abstützung 6 x 8 AC 80-2

Hydraulic Suspension / Outriggers

TEREX DEMAG

Ident-Nr: 16952612

Format A1 | Bl. / Blätter 1/1

Plotstatus:

ECSCAD

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Manometer angeordnet in Fahrerkabine

65447040 1,4 l PV=50bar

Achse 1 | Achse 2 | Achse 3 | Achse 4

Y364.2 Y364.4 Y364.8 Y364.1 Y364.3 Y364.7

02140912

B360 80bar 00178812

B359 80bar 00178812

NW12

Y365

55144340

(X) T2 P2 T1 P1 (X)

A1 A2 A3 M1 M2 M3

Y361 Y362 Y363

400bar

55189912 (e)

P - OW LS - OW L - OW T - OW

Die Durchflussmenge muss an der Drossel so eingestellt werden, dass beim Ausfahren eines Horizontal-Abstützzylinders ein Druck von 80 bar an Mp gemessen werden kann.

The flow rate has to be adjusted using throttle, so that the measured pressure at Mp during extention of the horizontal outrigger cylinder is about 80 bar (1160 psi) (d)

Y366B Y366A Y310B Y310A

T B A P

(d) 165bar 210bar Mp

X1 RS417

Y357 Y367 250bar 6bar

X2 B2 A2 C A1 B1 670 394 40

NW12 NW06 NW20 NW32 NW40 NW25 NW65

(c) 54416212 RFM BN/HC 851

(c) 54416312 RFM ECO/N 185

(d) 51590140 02167012 RDE1 ø1,5

Y306B Y306A Y307B Y307A Y308B Y308A Y309B Y309A

60bar

X T2 T1 G A Mp

350W 145 M

M1 02133012 S

(d)

e	W10945	15.08.11	Mehrbreier	Maßstab:	Masse: kg
d	P11302	25.10.2010	Rakhimov	Typ: AC 80-2	Werkstoff: %
Ind	Mitt-NR	Datum	Name		Mat.-art: UNTL

	Datum	Name
Erst.	18.01.07	Rakhimov
Gepr.		
Abteilung:	111410	

Hydraulik Federung / Abstützung 6x8 AC80-2

Hydraulic Suspension / Outriggers

TEREX DEMAG

Ident-Nr: 16952612

Format A1 | Bl. / Blätter 1/1

Plotstatus: ECSCAD

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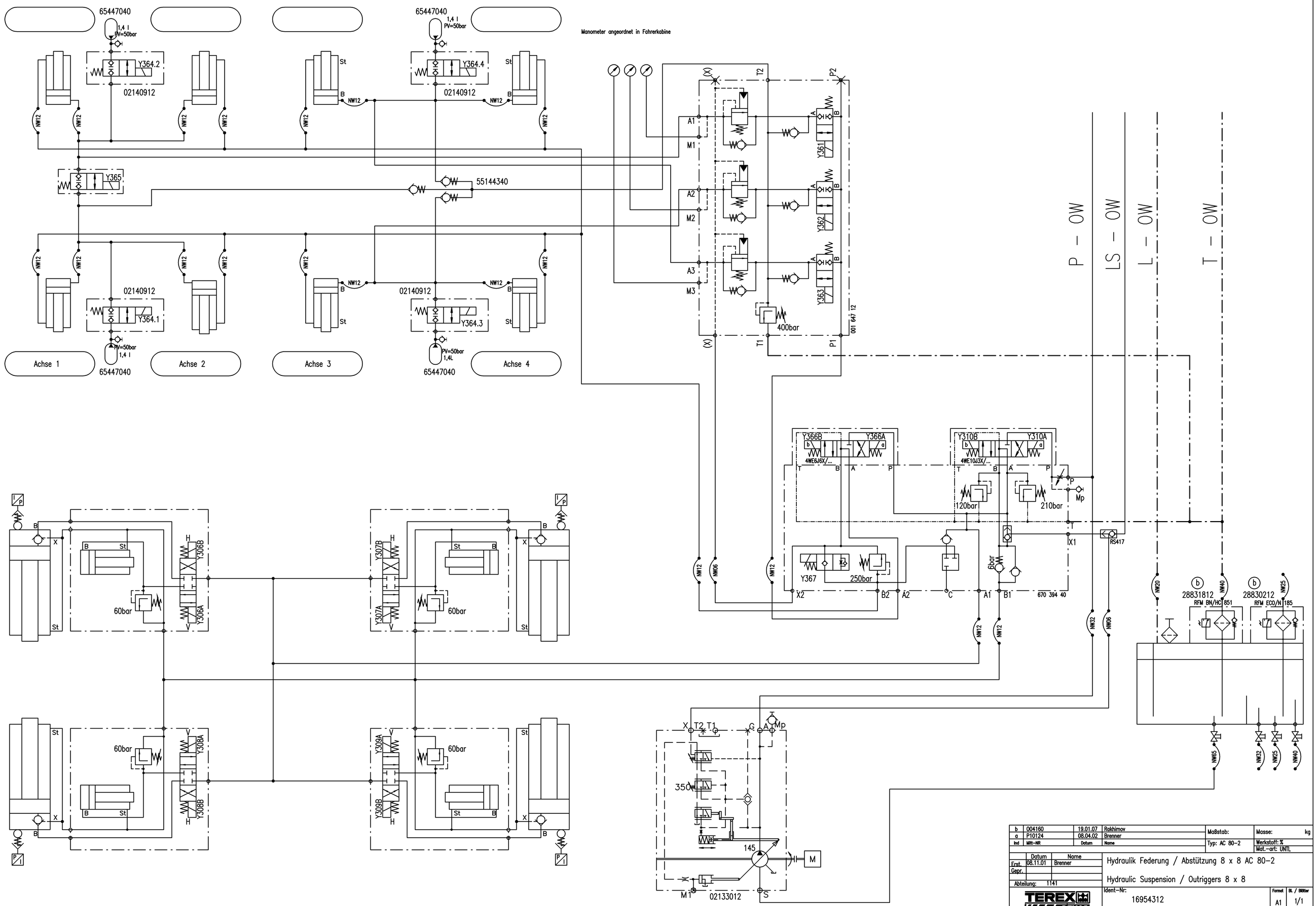

b	004160	19.01.07	Rakhimov	Maßstab:	Masse: kg
a	P10124	08.04.02	Brenner	Typ: AC 80-2	Werkstoff: %
Ind	Mitt-NR	Datum	Name		Mat.-art: UNTL

	Datum	Name
Erst.	08.11.01	Brenner
Gepr.		

Abteilung: 1141

Hydraulik Federung / Abstützung 8 x 8 AC 80-2

Hydraulic Suspension / Outriggers 8 x 8

TEREX DEMAG

Ident-Nr: 16954312

Format A1 | Bl. / Blätter 1/1

Plotstatus:

ECSCAD

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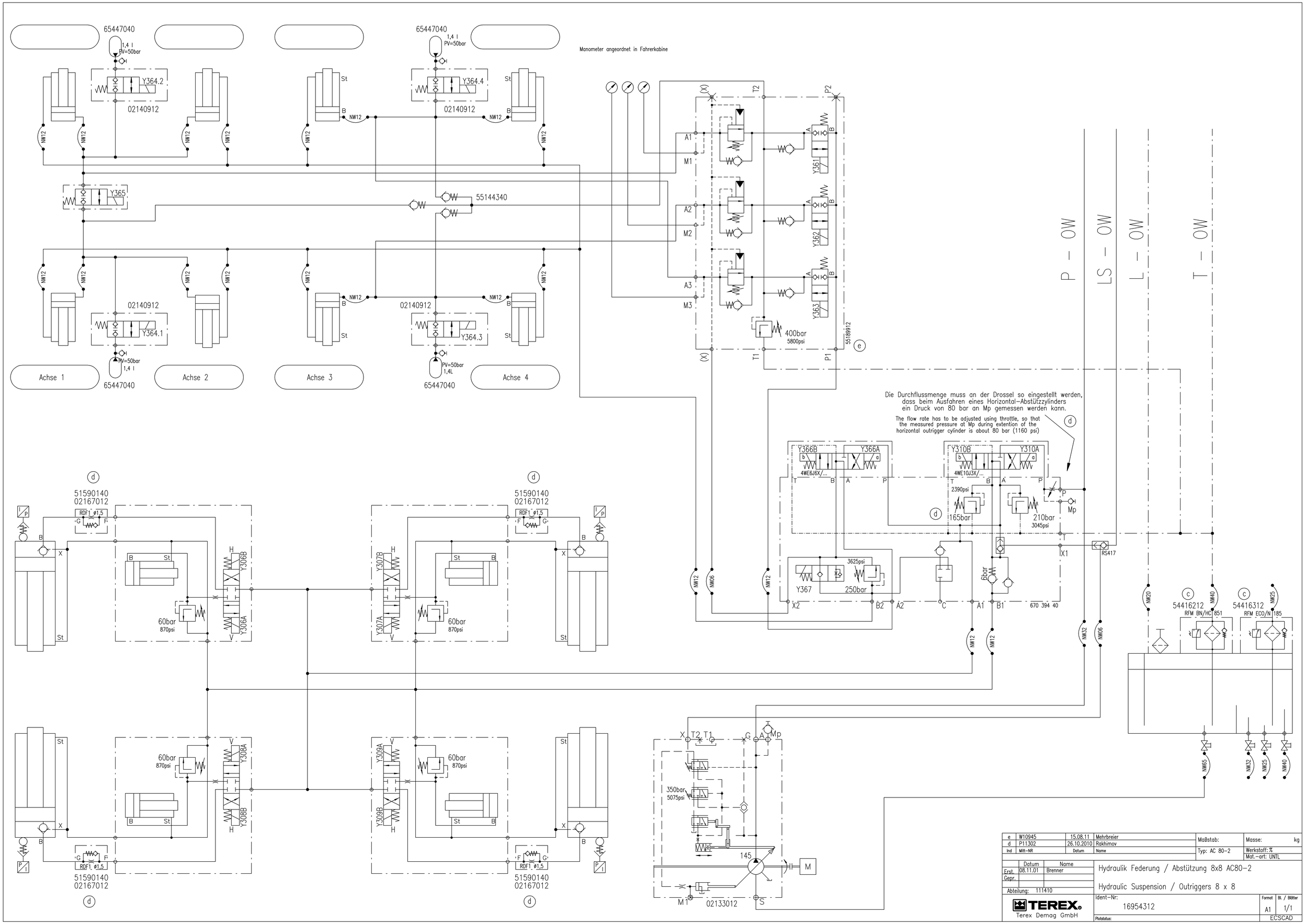

e	W10945	15.08.11	Mehrbreier	Maßstab:	Masse: kg
d	P11302	26.10.2010	Rakhimov	Typ: AC 80-2	Werkstoff: %
Ind	Mitt-NR	Datum	Name		Mat.-art: UNTL

	Datum	Name
Erst.	08.11.01	Brenner
Gepr.		

Abteilung: 111410

Hydraulik Federung / Abstützung 8x8 AC80-2

Hydraulic Suspension / Outriggers 8 x 8

TEREX®
Terex Demag GmbH

Ident-Nr: 16954312

Format: A1 | Bl. / Blätter: 1/1

Plotstatus:

ECSCAD

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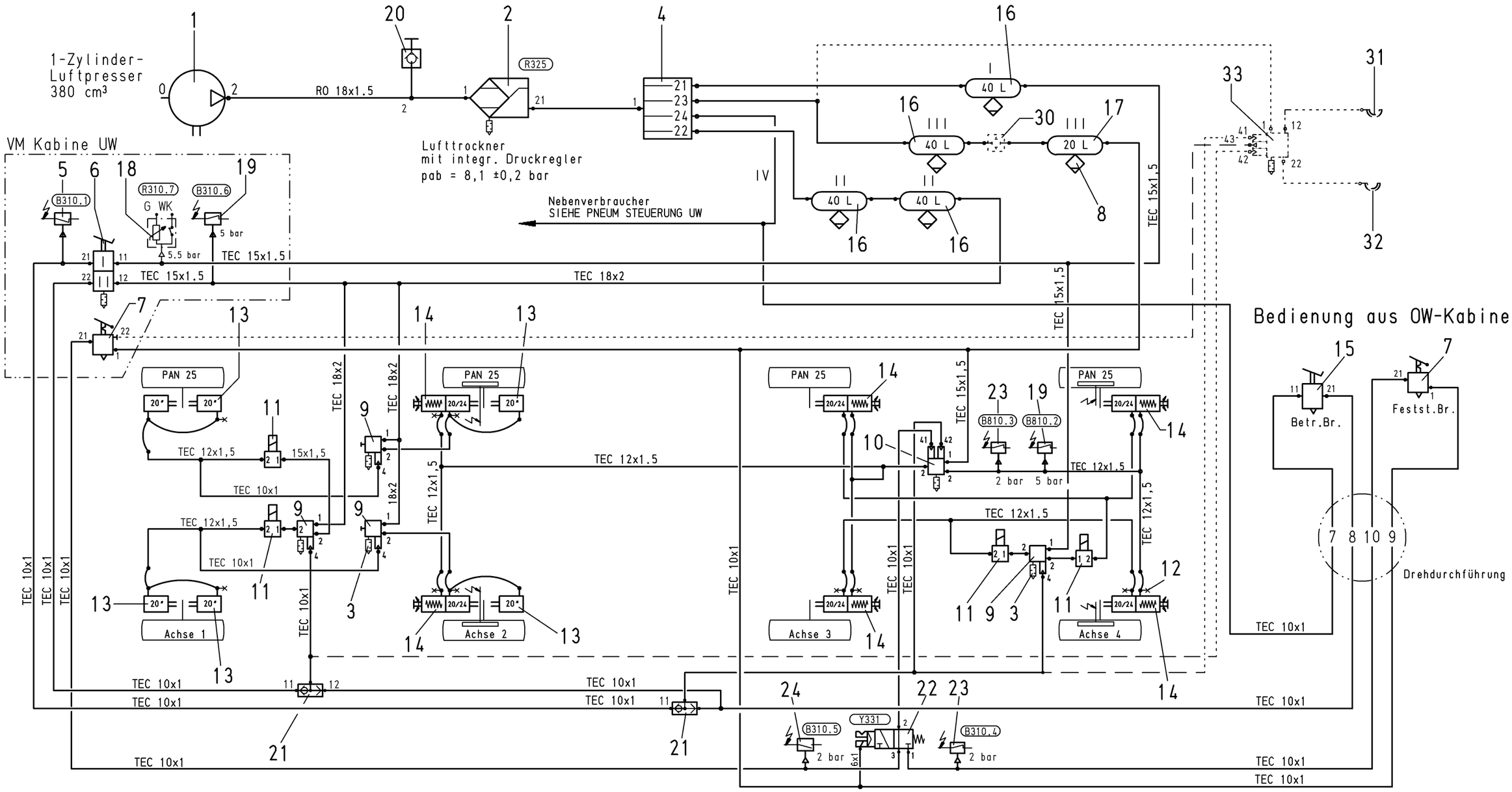

Hinweis ABS:

4-Kanal-Elektronik auf alle Achsen wirkend.
Sensoren an den Achsen 2 und 4

Bremskomponenten aufgegeben:

-EM PNEU STEUERUNG UW
-PNEU VERKLEIDUNG LI AC80-2
-VM KABINE UW AC80-2
-VM ACHSEINBAU (jeweilige Achse)

Erklärung:

Rohre und Verschraubungen
Schlauchleitungen
Zusatzteile für Anhängerkupplung (nur Option)

Erstverwendung
Typ: AC 80-2 Sch | Pos
Ident-Nr. – | –

Allg. Toleranz
Spanend DIN ISO 2768 m
Spanlos DIN ISO 2768 c
Brennschn. DIN 2310 II,T3,BG,T5L
Schweißk. DIN EN ISO 13920 C, G
Oberfläche DIN ISO 1302 Rz R2

	Datum	Name
Erst.	19.04.07	H. Bischoff
Gepr.	-	-
Frei	-	-

Abteilung: 1123

Anz	Ind	Mitt-NR	Datum	Name
	b	N04162	12.07.07	H. Bischoff
	a	N04167	21.05.07	H. Bischoff
	_	N04147	09.05.07	H. Bischoff

Paßmaß | Abmaß

Schweißkonstruktion EN 25817 B
Maßstab % | Gew. kg
Schutzvermerk ISO 16016 beachten
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Werkstoff

Benennung
Bremsanlage L-Schema Scheibenbremsen
BRAKE LINES DIAGRAM

TEREX DEMAG

Ident-Nr. 288 044 12
Format A3 | Bl. / Blätter 1/2
Plotstatus: IST FREIGEGEBEN bischoff 14-09-07 15:32:01 Ver.: 9 | UNTL | I-DEAS

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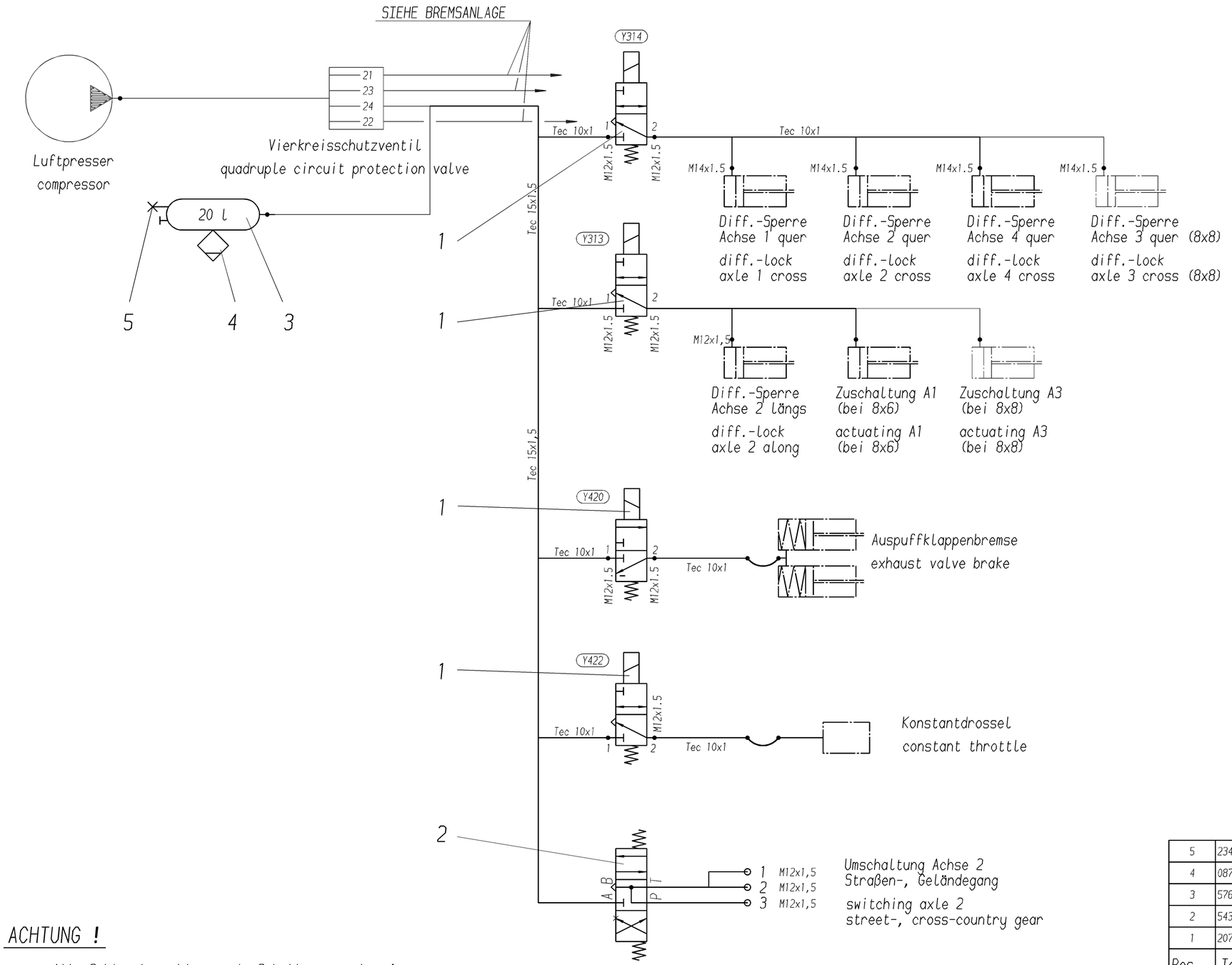

ACHTUNG !

- Alle Schlauchanschlüsse mit Schellen versehen !
- Alle Verbindungsstellen von Kunststoffrohren mit Einsteckhülsen versehen !

Komponenten aufgegeben in:

- 542 342 40 VM Motorsteuerung
- 304 879 12 Pneumatik Verkleidung, li
- 304 875 12 VM Kabine UW AC80-2

Pos.	Id.-Nr.	Best.-Nr.	Benennung	naming
5	234 679 40	463 703 106 0	Prüfanschluß	check connector
4	087 257 40	934 300 001 0	Entwässerungsventil	drain valve
3	576 197 40	246x500 20L	Druchluftbehälter 20L, EN 286/2	air reservoir 20L, EN 286/2
2	543 248 40	ZB2 BJ5	Ventil, kpl.	valve
1	207 323 40	427 123 108 0	Magnetventil	magnet valve

Allgemeintoleranzen

Spanend	DIN ISO 2768 m
Spanlos	DIN ISO 2768 c
Brennschn.	DIN 2310 II,T3,BG,T5L
Schweißko.	DIN EN ISO 13920 C,G
Oberfläche	DIN ISO 1302 Rz R2

Anz	Ind	Mitt-Nr	Datum	Name	Paßmaß	Abmaß
.	_	K00244	.	.		

Maßstab: 1 : 1	Masse: . kg	Erstverwendung	
Werkstoff: %		Typ:AC 80-2	Pos
Rohteil: .		Ident-Nr.	
Mat.-art: UNTL	L: . B: . H: .	.	.

	Datum	Name
Erst	12.12.01	U. Henzelmann
Gepr	12.12.2001	ARCHIV
Frei	.	.

Abt.: 8312.3 Zusatzsprache: .

Benennung:

PNEU STEUERUNG UW; L-SCHEMA

.

Schutzvermerk nach DIN 34 beachten
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Plotstatus	Ploterstellen	Plotdatum

DEMAG Mobile Cranes

Ident-Nr. 304 898 12

Format A2 | B./Blätter 1 / 1

Entstanden aus: . | Ersatz für: . | Ersetzt durch: . | CAD

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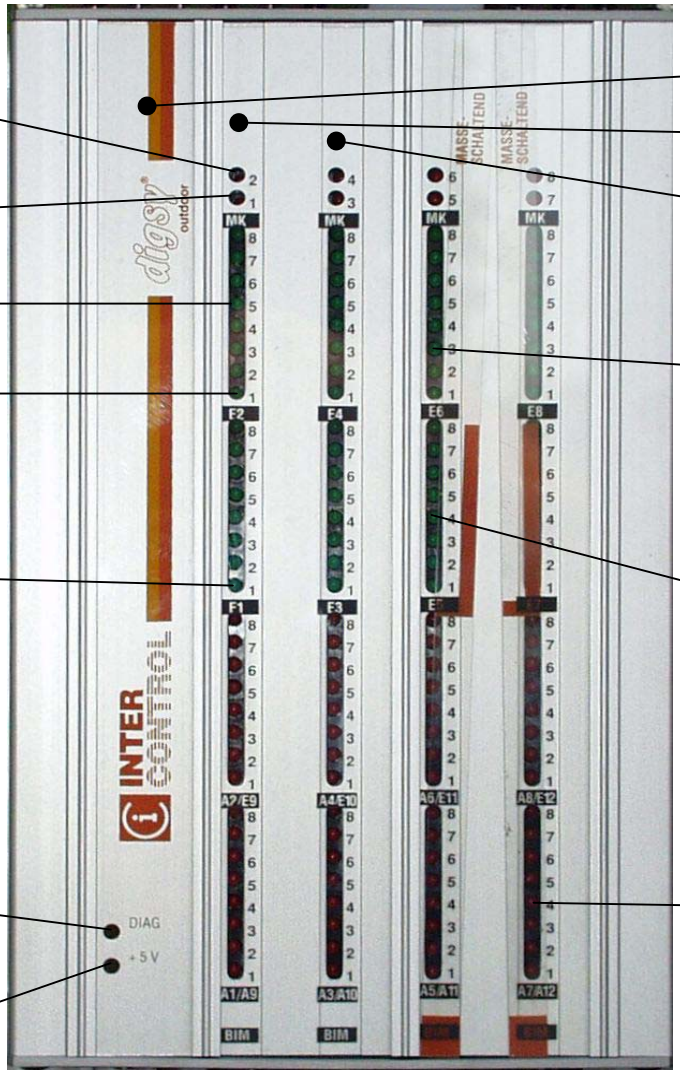

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CPU-Module

Function

- Computer with interfaces for data communication
- Engine RPM signal is adapted for the programming interface
- Two nine pin connectors are used for both serial interfaces (***PI and CI***)
- 2 LED's DIAG(Diagnostic-LED)

green	⇒ Program running
orange	⇒ Internal housing temperature too high Internal battery charge too low Programming mode SPC in waitstate 24V CPU < 14V
red	⇒ EEPROM not installed EEPROM or RAM error
out	⇒ Program stopped, no program, LED defective
blinking	⇒ Received information on the PI or CI correct

- 5V LED

green	⇒ CPU power supply functioning correctly
red	⇒ CPU stopped, power supply < 4,65V
out	⇒ CPU stopped, Power supply voltage missing, LED defective
blinking red/green	⇒ cyclical restarts/ Watchdog working
blinking red/oran.	⇒ constant reset, defective internal component

- Switch S1=0: Subscriber receives address 0
- Switch S2=3: Data transmission rate 19200 Baud
- Jumper in position R: Communications interface (CI) is RS485

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Binary Input/Output (I/O-Module)

Function

Reception of 24V switched signals
Output of 24V control signals

16 input channels for 24V switched signals

16 output channels
8 for a current of up to 2A
8 for a current of up to 400 mA (These outputs can also be configured as input channels)

The switch condition of the in- and output channels are shown through LED's
green for input channels
red for output channels

The Binary modules are addressed, therefore there is no need to set dip- switches or jumpers.

2 LED's are used as short circuit indicators, one LED for each output channel. In case of a short circuit, the afflicted output channel is automatically turned off. These LED's can be found on the front plate and are marked MK1-MK8.

The output channel short circuit indicators can show the following situations:
- Return current from an unswitched output channel
- Power supply < 17V
- Output current > 2.5A (Short circuit)

The short circuit indicators are only useful when the output channels are connected to relays that have a low resistance protection diode built in. This means that ***only relays with a low resistance protection diode*** may be used to replace existing relays in an output channel of a binary I/O card, otherwise the complete output channel will be turned off and proper function can not be achieved.

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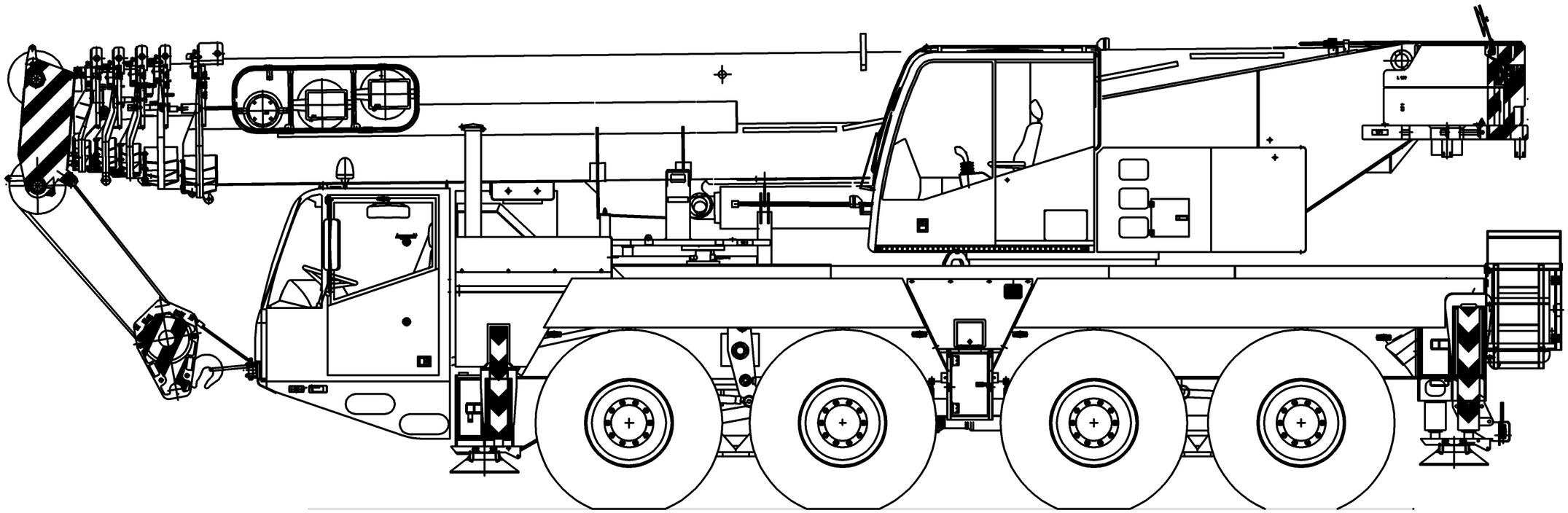
E-Plan Unterwagen AC 80-2
Schematic Diagram Carrier AC 80-2



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_	W10620	14.11.07	Rosenkranz	Erst.	14.11.07	Rosenkranz
Ind	Mitt-NR	Datum	Name	Gepr.		
Abteilung:	1142					

Projektbenennung / project description
E-PLAN AC80-2 UW V3.1.2
ELECTRIC WIRING DIAGRAM

Seitenbenennung / page description
Deckblatt
cover sheet

Baunummer. 81963-
Anlage: 0
Ort: 0
Zeichnungsnr. / drawing no. 28387512
Blatt 1
Bl. 78

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Seite page	Seitenbenennung	page description
1	Deckblatt	cover sheet
2	Inhaltsverzeichnis	directory
3	Blockschaltbild Verkabelung UW	block diagram wiring chassis
4	Blockschaltbild Verk. Stützdruckerfassung	block diagram support pressure detection
5	Blockschaltbild Verk. Wirbelstrombremse	block diagram eddy current brake
6	Batterie, Anlasser, Generator	battery, starter, generator
7	Fern-/Abblendlicht, NSL, Steckdose	low/high beam headli, rear fog li., plug
8	Hupe, Summer, Rundumleuchte	horn, buzzer, rotaflare lights
9	Scheibenwischer, Lufttrockner	windscreen wiper, air dryer
10	Klimaanlage, Zentralschmieranlage	air condition, auto lubrication
11	Bremsbelagschalter	brake pads switch
12	Bremsbelagschalter	brake pads switch
13	Sitzheizung, Spiegelverst., Fensterheber	seat heater, mirror / window adjustm.
14	Blinker, Warnblinker	flasher, hazard
15	Standlicht	parking light
16	Standlicht, Kennzeichenbeleuchtung	parking light, plate light
17	Tachograph	tachograph
18	Anzeigeinstrumente	gauge
19	Sensoren, Kontrollorgane, Störung	sensors, control, fault
20	Sensoren, Kontrollorgane, Störung	sensors, control, fault
21	Radio, Telefon, ZE Bel.	radio, phone, ilumin., wiring box
22	Differentialsp., Handbremse, Federspeicher	differential lock, handbrake, suspension
23	Option Federung für kleine Achslasten	option suspension for small axle load
24	Abstützung	stabilizer
25	Abstützung	stabilizer
26	Gegengewicht	counterweight
27	SPS-Karte 1, Achsenverstellung	PLC process card 1, axle adjustment
28	SPS Karte 1, Niveausteuerung	PLC process card 1, level control
29	SPS Karte 2, Abstützung	plc process card 2, stabilizer
30	SPS Karte 2	process card 2
31	Motorregelung	engine control
32	Motorregelung FR-SKN	engine control FR-SKN
33	Motorregelung FR-SKN	engine control FR-SKN
34	CAN-Sternpunkt, Abschlusswiderstände	CAN-starpoint, termination resistors
35	ADM-AR	ADM-AR
36	ADM-AR, Getriebeelektronik	ADM-AR, gearbox electronic
37	Getriebeelektronik	gearbox electronic
38	Getriebeelektonik	gearbox electronic
39	Getriebeelektronik	gearbox electronic
40	ABS-Steuerung	ABS-control
41	ABS-Steuerung	ABS-control
42	ABS Anhängersteckdose, Lüftersteuerung	ABS trailer socket, fan control
43	Retarderbremse	retarder brake
44	Schnellstop Motor	quick stop engine
45	Umschaltung UW - OW	switch over chassis - superstructure
46	Lenkung vom OW	steering from superstructure

Seite page	Seitenbenennung	page description
47	CAN-open, Zuschaltung Nebenabtrieb	CAN-open, enable power take off
48	Standheizung	auxilary heating
49	Lenkung	steering
50	Lenkung	steering
51	Lenkung	steering
52	Lenkung	steering
53	Winkelgeber	angle transmitter
54	Winkelgeber	angle transmitter
55	Winkelgeber	angle transmitter
56	Schalterbeleuchtung	switch illumination
57	Schalterbeleuchtung	switch illumination
58	Tasterbeleuchtung Abstützkasten	switch illumination stabilizer - box
59	Wegfahrsperre, Umsch Diesel-Heizöl	immoblizer, changeover diesel-heating oil
60	Übersicht Magnetventilsteuerung	general view magnetic valves control
61	Übersicht Magnetventilsteuerung	general view magnetic valves control
62	Motorregelung	engine control
63	Lenkstockhebel links, MFA10	strut rod left hand, MFA10
64	Lenkcomputer, ABS-Steuerung	steering computer, ABS-control
65	DIGSY-PLUS BIM	DIGSY-PLUS BIM
66	DIGSY-PLUS BIM	DIGSY-PLUS BIM
67	Belegung Sicherungsplatine F101-F128	general view fuse modul F101-F128
68	Belegung Sicherungsplatine F201-F214	general view fuse modul F201-F214
69	Relaisplatine K101-K120, 1W	relay module K101-K120, 1W
70	Relaisplatine K121-K130, 1W	relay module K121-K130, 1W
71	Relaisplatine K201-K216, 2W	relay module K201-K216, 2W
72	Diodenplatine V1-V22, 5A	diode module V1-V22, 5A
73	Steckerübersicht Relaisplatinen	general view plug relay module
74	Steckerübersicht	general view plug
75	Steckerübersicht	general view plug
76	Steckerübersicht	general view plug
77	BMK-Liste	device disignation list
78	BMK-Liste	device disignation list

Ind	Mitt-NR	Datum	Name		Datum	Name
a	W10663	18.07.08	Rosenkranz			
_	W10620	14.11.07	Rosenkranz	Erst.	14.11.07	Rosenkranz
				Gepr.		

Abteilung: 1142

Projektbenennung / project description
E-PLAN AC80-2 UW V3.1.2
ELECTRIC WIRING DIAGRAM

Seitenbenennung / page description
Inhaltsverzeichnis
directory

Baunummer. 81963-
Anlage: 0
Ort: 0
Zeichnungsnr. / drawing no. 28387512
Blatt 2
78 Bl.

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Beleuchtung vo. re.

Abstützbetätigung rechts

Beleuchtung hi. re

A386, A360, A361,
A4200, A302,
A301, A310

Kabelbaum rechts vorne

X331

X340.1

Kabelbaum rechts hinten

Kabelbaum Lenkung

X321

B362
Achse 1

Lenkungsblock

B364
Achse 3
Nur bei 8x8x8
oder Modulachse

B466
Achse 4

X199

Zentralelektrik

X316

Daimlermotor mit Getriebe (DGS)

X317

Armaturen-
brett

X318

Kabelbaum Motor

X319

Kabelbaum Getriebe

X320

Option Modulachse

Schleifringkörper

X340.1

Pendelleuchte
B109

E300

X321

X321.1

Unterfahrschutz Verlängerung

X322

X323

X324

Option Kabelbaum Stützdruck

Kabelbaum links hinten

Kabelbaum vorne links

X330

Abstützbetätigung links

Beleuchtung vo. li.

Beleuchtung hi. li.

a	W10663	18.07.08	Rosenkranz		Datum	Name
_	W10620	14.11.07	Rosenkranz	Erst.	14.11.07	Rosenkranz
Ind	Mitt-NR	Datum	Name	Gepr.		
Abteilung:	1142					

Projektbenennung / project description
E-PLAN AC80-2 UW V3.1.2
ELECTRIC WIRING DIAGRAM

Seitenbenennung / page description
Blockschaltbild Verkabelung UW
block diagram wiring chassis

Baunummer. 81963-
Anlage: 0
Ort: 0
Zeichnungsnr. / drawing no. 28387512
Blatt 3
78 Bl.

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Kundenwunsch / Option

Stützdruckerfassung vr.

Stützdruckerfassung hr.

Zentralelektrik

X320

X323

X324

E300

Digsy Compakt

Datenbus

Stützdruckerfassung vl.

Abstützbetätigung, Stützdruckanzeige

Stützdruckerfassung hl.

a	W10663	18.07.08	Rosenkranz		Datum	Name
_	W10620	14.11.07	Rosenkranz	Erst.	14.11.07	Rosenkranz
Ind	Mitt-NR	Datum	Name	Gepr.		
Abteilung:	1142					

Projektbenennung / project description
E-PLAN AC80-2 UW V3.1.2
ELECTRIC WIRING DIAGRAM

Seitenbenennung / page description
Blockschaltbild Verk. Stützdruckerfassung
block diagram support pressure detection

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Ort: 0
Zeichnungsnr. / drawing no. 28387512
Blatt 4
78 Bl.

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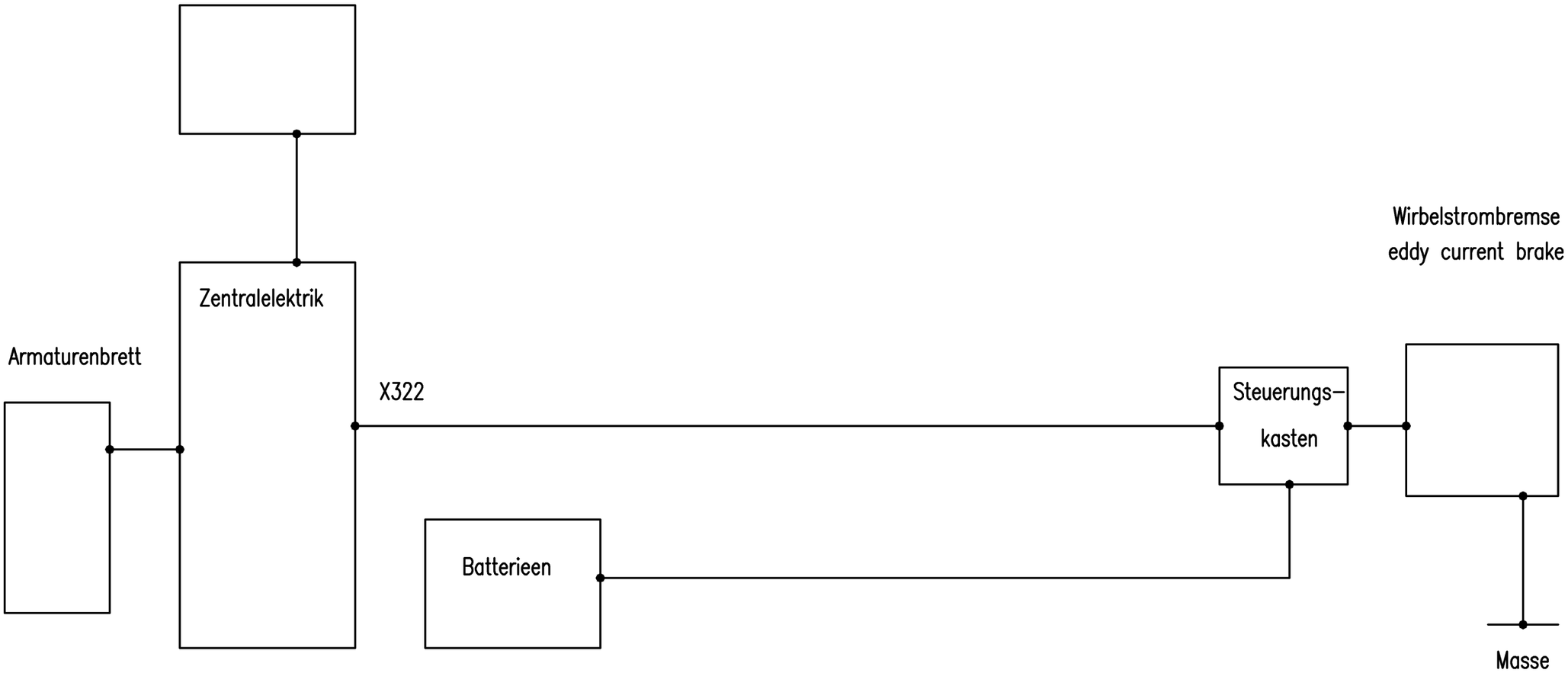
Option Wirbelstrombremse / eddy current brake



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Ind	Mitt–NR	Datum	Name	Gepr.		
Abteilung: 1142						

Projektbenennung / project description
E–PLAN AC80–2 UW V3.1.2
ELECTRIC WIRING DIAGRAM

Seitenbenennung / page description
Blockschaltbild Verk. Wirbelstrombremse
block diagram eddy current brake

Baunummer. 81963–
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Ort: 0
Zeichnungsnr. / drawing no. 28387512
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78 Bl.

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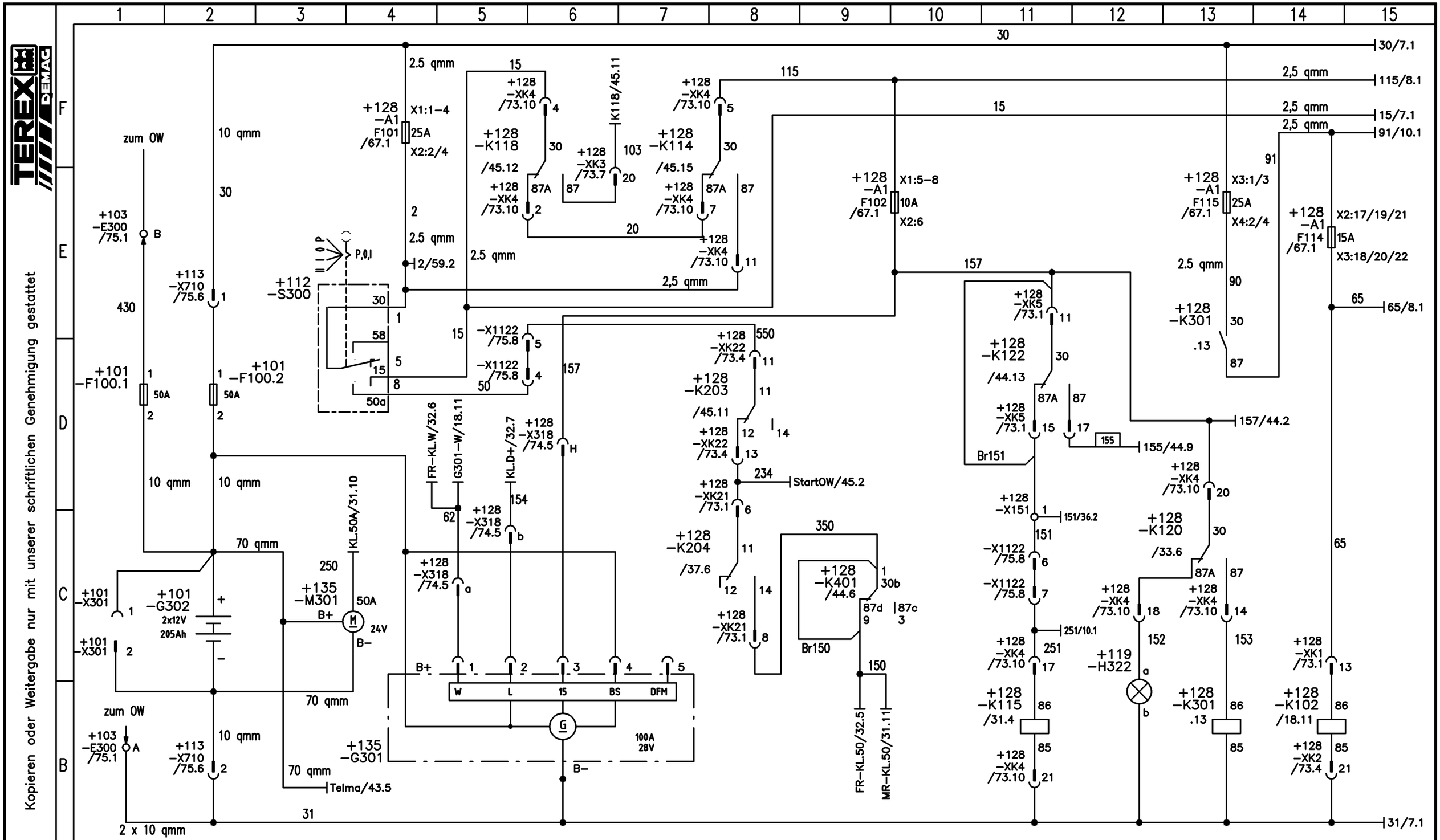

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	Fremdstarthilfe	Batterien	Zuendschalter Motor Start Anlasser	Lichtmaschine	Zündung Motor Gertriebe	Option Schnellstop Br150+Br151 entfernen	Ladekontrolleuchte Lastspannungsrelais	Freigabe Drehzahlanzeige
A	external starter	batteries	ignition switch engine start	generator	ignition engine / gear	option quick stop remove Br150+Br151	charge indicator relay for load-circuit	release revolution display

					Datum	Name
a	W10663	18.07.08	Rosenkranz			
_	W10620	14.11.07	Rosenkranz	Erst.	14.11.07	Rosenkranz
Ind	Mitt-NR	Datum	Name	Gepr.		
Abteilung:	1142					

Projektbenennung / project description
E-PLAN AC80-2 UW V3.1.2
ELECTRIC WIRING DIAGRAM

Seitenbenennung / page description
Batterie, Anlasser, Generator
battery, starter, generator

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Anlage: 0
Ort: 0
Zeichnungsnr. / drawing no. 28387512
Blatt 6
78 Bl.

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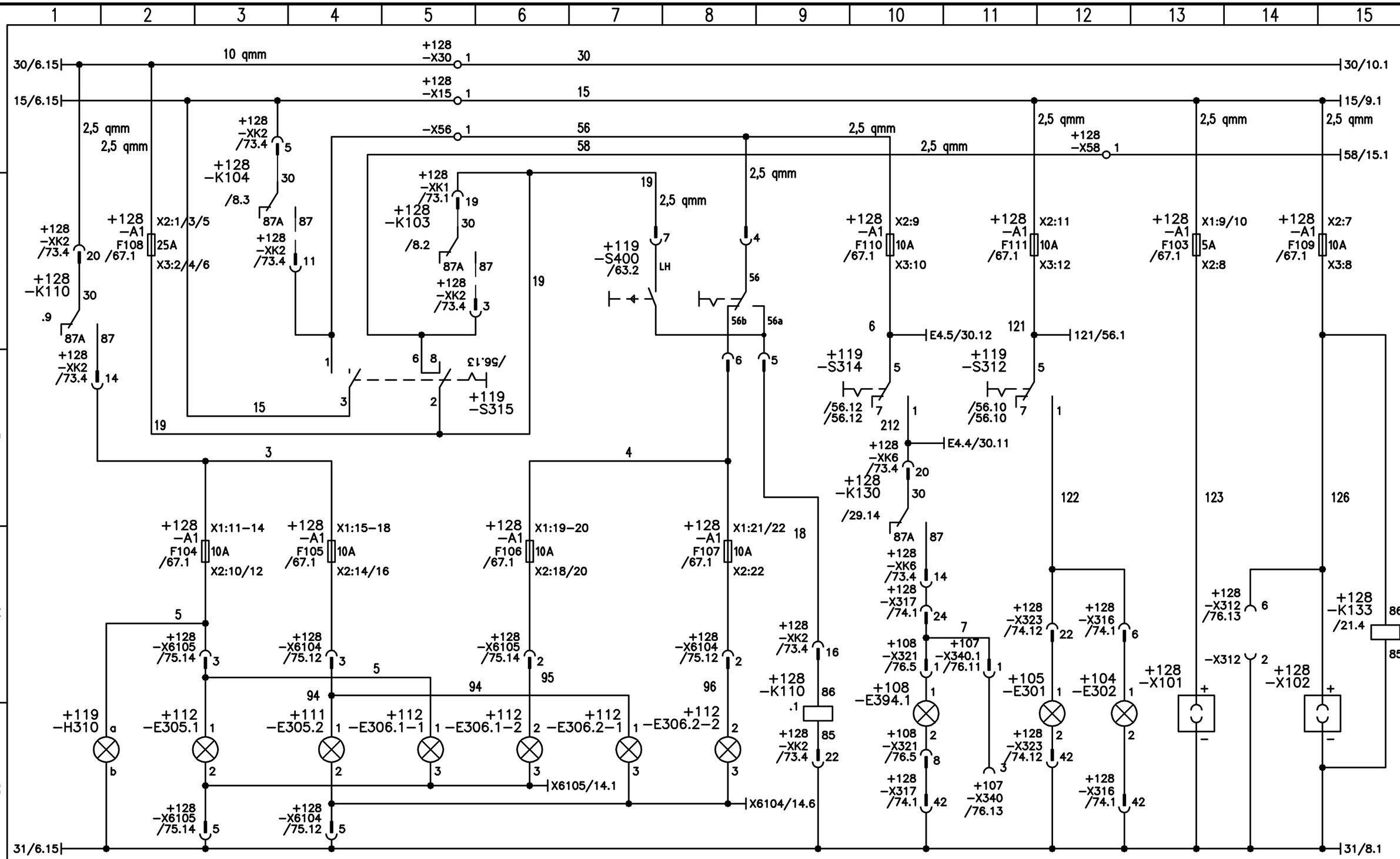

K103, K104 nur für Skandinavien (only Skandinavia)

Anzeige Fernlicht	Fernlicht links rechts	Lichtschalter	Abblendlicht links rechts	Nebelschlußleuchte	Abstützbeleuchtung	Steckdose 24V	Zigarettenanzünder
indication high beam lights	high beam light left right	headlight switch	low beam headlights left right	rear fog light	stabilizer light	socket	lighter

					Datum	Name	Projektbenennung / project description	Seitenbenennung / page description	Baunummer.	Anlage: 0
a	W10663	18.07.08	Rosenkranz				E-PLAN AC80-2 UW V3.1.2	Fern-/Abblendlicht, NSL, Steckdose	81963-	Ort: 0
_	W10620	14.11.07	Rosenkranz	Erst.	14.11.07	Rosenkranz	ELECTRIC WIRING DIAGRAM	low/high beam headli, rear fog li., plug	Zeichnungsnr. / drawing no. 28387512	Blatt 7 / 78 Bl.
Ind	Mitt-NR	Datum	Name	Gepr.						
Abteilung:	1142									

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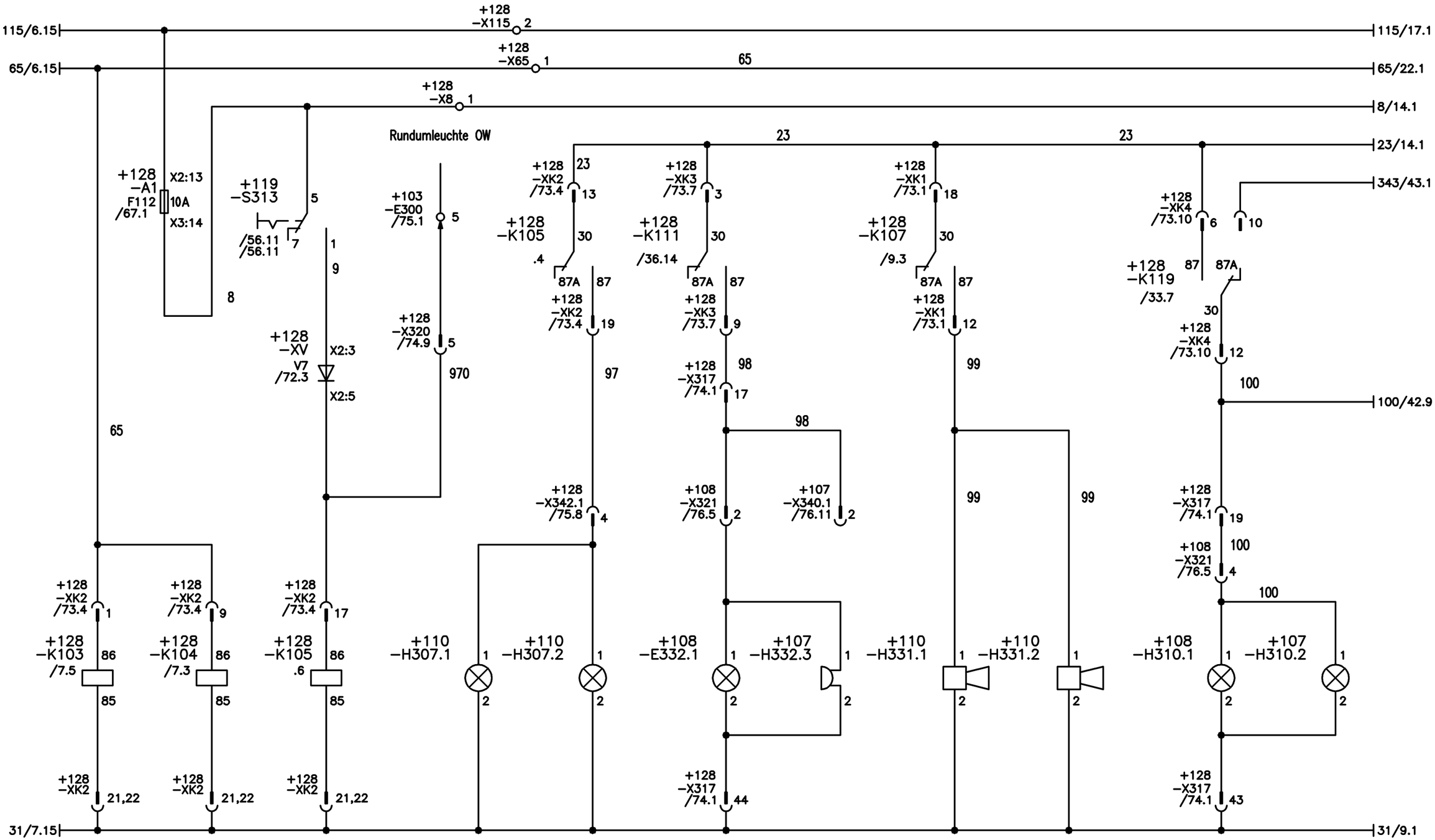

Relais Skandinavien	Rundumleuchte	Rückfahrscheinwerfer	Summer nur GB	Hupe	Bremslicht
relays Scandinavia	rotaflare lights	reversing lights	buzzer only GB	horn	stoplights

a	W10663	18.07.08	Rosenkranz		
_	W10620	14.11.07	Rosenkranz	Erst.	14.11.07
Ind	Mitt-NR	Datum	Name	Gepr.	
Abteilung:	1142				

Datum	Name
14.11.07	Rosenkranz

Projektbenennung / project description
E-PLAN AC80-2 UW V3.1.2
ELECTRIC WIRING DIAGRAM

Seitenbenennung / page description
Hupe, Summer, Rundumleuchte
horn, buzzer, rotaflare lights

Baunummer. 81963-
Anlage: 0
Ort: 0
Zeichnungsnr. / drawing no. 28387512
Blatt 8
78 Bl.

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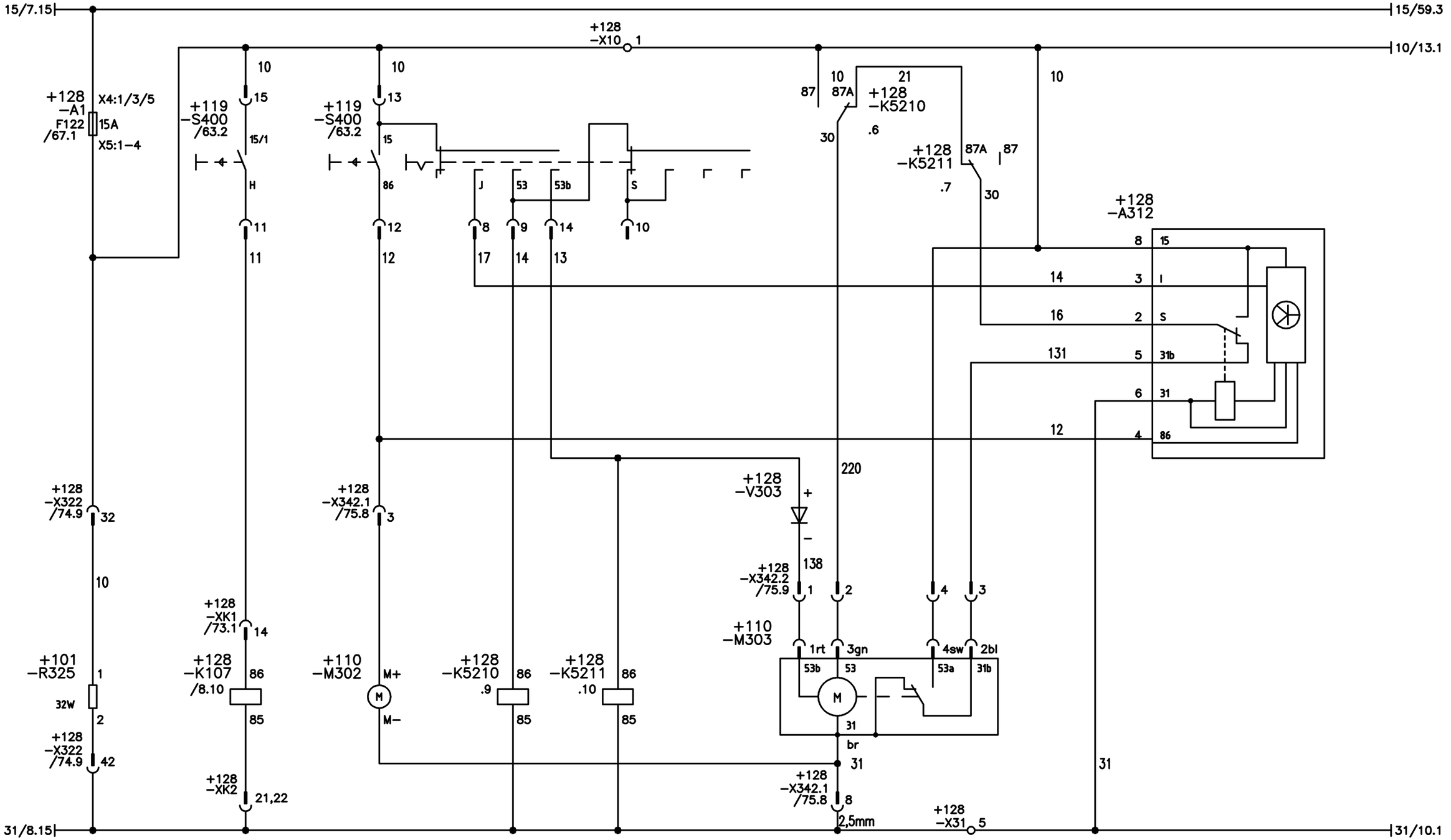

Lufttrockner	Hupenrelais	Scheibenwascher	Scheibenwischer	Impulsgeber
air dryer	relay horn	windscreenwasher	wiper motor	pulse generator

a	W10663	18.07.08	Rosenkranz		Datum	Name
_	W10620	14.11.07	Rosenkranz	Erst.	14.11.07	Rosenkranz
Ind	Mitt−NR	Datum	Name	Gepr.		
Abteilung:	1142					

Projektbenennung / project description
E−PLAN AC80−2 UW V3.1.2
ELECTRIC WIRING DIAGRAM

Seitenbenennung / page description
Scheibenwischer, Lufttrockner
windscreen wiper, air dryer

Baunummer. 81963−
Anlage: 0
Ort: 0
Zeichnungsnr. / drawing no. 28387512
Blatt 9
78 Bl.

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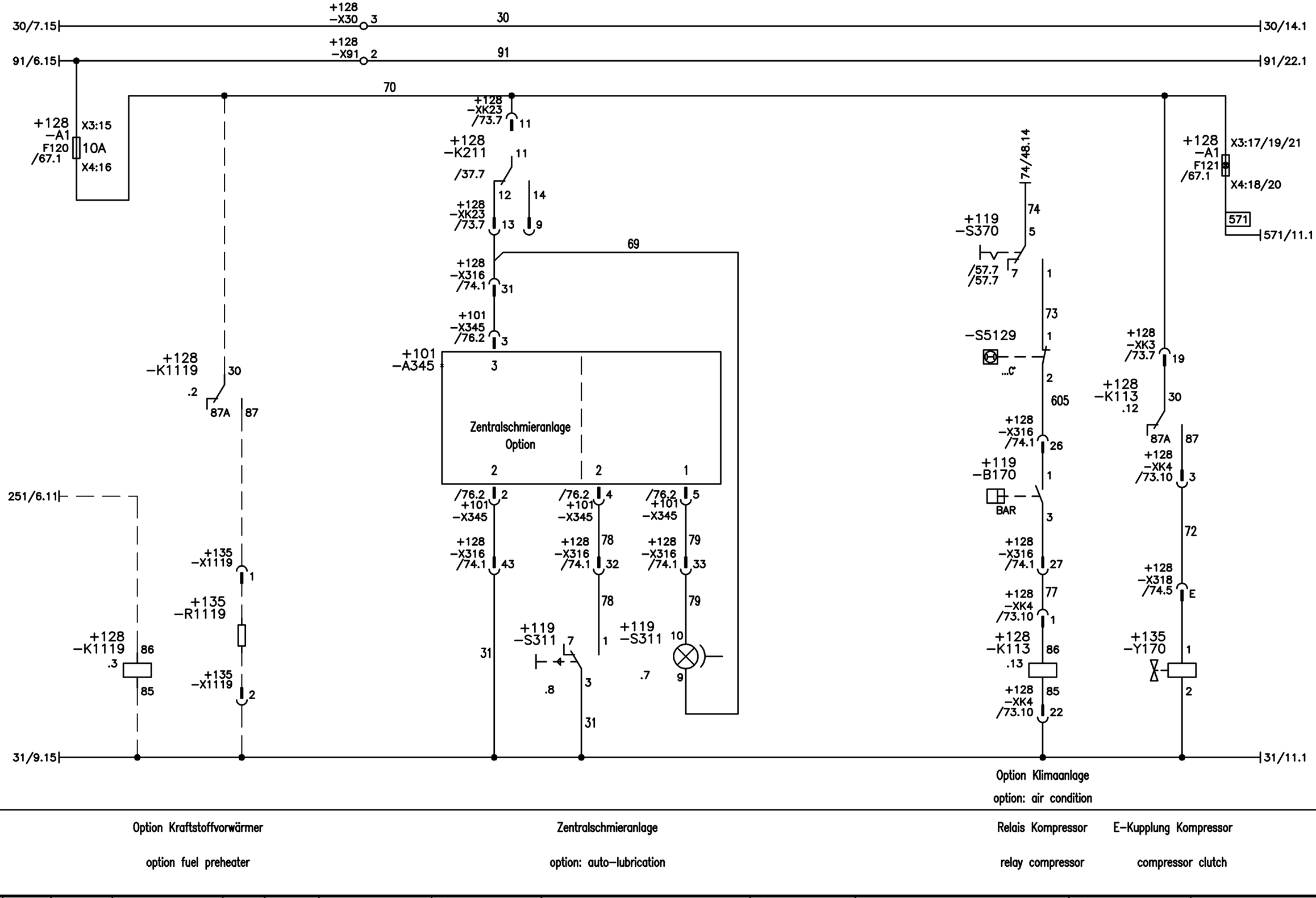

Ind	Mitt-NR	Datum	Name		Datum	Name
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_	W10620	14.11.07	Rosenkranz	Erst.	14.11.07	Rosenkranz
				Gepr.		
Abteilung:	1142					

Projektbenennung / project description	E−PLAN AC80−2 UW V3.1.2 ELECTRIC WIRING DIAGRAM
Seitenbenennung / page description	Klimaanlage, Zentralschmieranlage air condition, auto lubrication
Baunummer.	81963−
Anlage:	0
Ort:	0
Zeichnungsnr. / drawing no.	28387512
Blatt	10
Bl.	78

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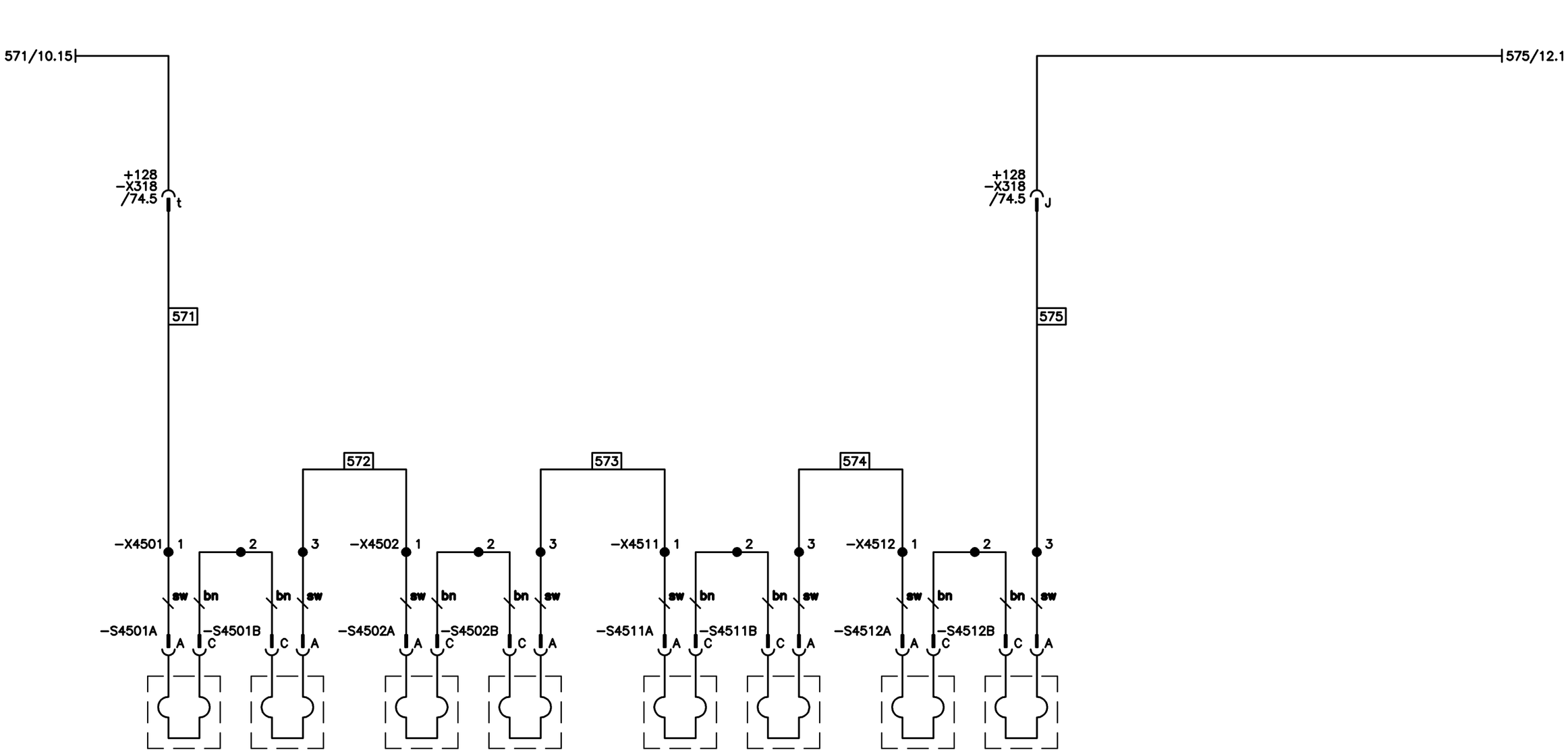

Bremsbelagschalter
Achse 1 links

brake pads switch
axle 1 left hand

Bremsbelagschalter
Achse 2 links

brake pads switch
axle 2 left hand

Bremsbelagschalter
Achse 1 rechts

brake pads switch
axle 1 right hand

Bremsbelagschalter
Achse 2 rechts

brake pads switch
axle 2 right hand

a	W10663	18.07.08	Rosenkranz		Datum	Name
_	W10620	14.11.07	Rosenkranz	Erst.	14.11.07	Rosenkranz
Ind	Mitt-NR	Datum	Name	Gepr.		
Abteilung:	1142					

Projektbenennung / project description
E-PLAN AC80-2 UW V3.1.2
ELECTRIC WIRING DIAGRAM

Seitenbenennung / page description
Bremsbelagschalter
brake pads switch

Baunummer. 81963-
Anlage: 0
Ort: 0
Zeichnungsnr. / drawing no. 28387512
Blatt 11
78 Bl.

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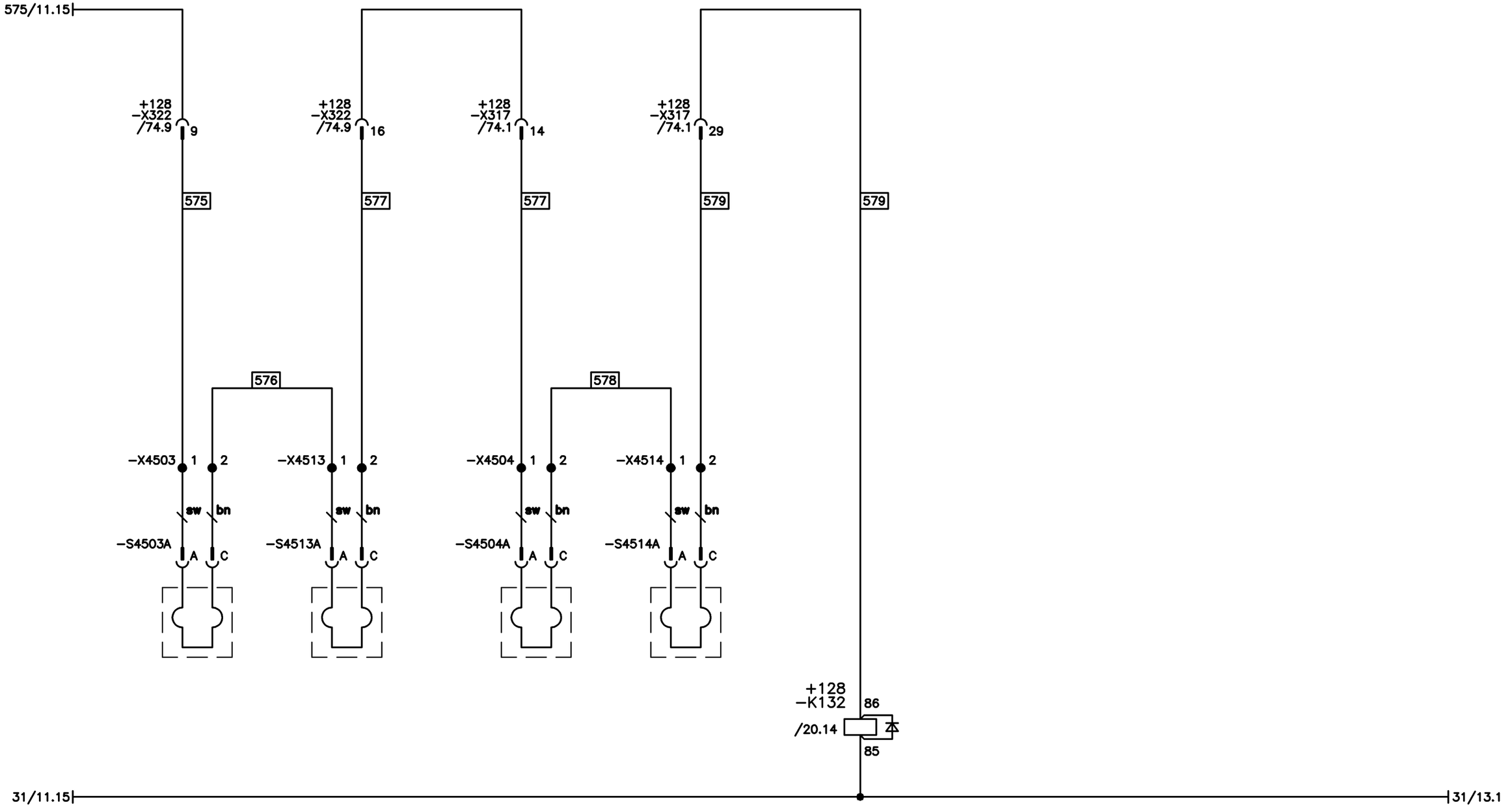

Bremsbelagschalter Achse 3 links brake pads switch axle 3 left hand	Bremsbelagschalter Achse 3 rechts brake pads switch axle 3 right hand	Bremsbelagschalter Achse 4 links brake pads switch axle 4 left hand	Bremsbelagschalter Achse 4 rechts brake pads switch axle 4 right hand

a	W10663	18.07.08	Rosenkranz		Datum	Name
_	W10620	14.11.07	Rosenkranz	Erst.	14.11.07	Rosenkranz
Ind	Mitt-NR	Datum	Name	Gepr.		
Abteilung:	1142					

Projektbenennung / project description
E-PLAN AC80-2 UW V3.1.2
ELECTRIC WIRING DIAGRAM

Seitenbenennung / page description
Bremsbelagschalter
brake pads switch

Baunummer. 81963-
Anlage: 0
Ort: 0
Zeichnungsnr. / drawing no. 28387512
Blatt 12
Bl. 78

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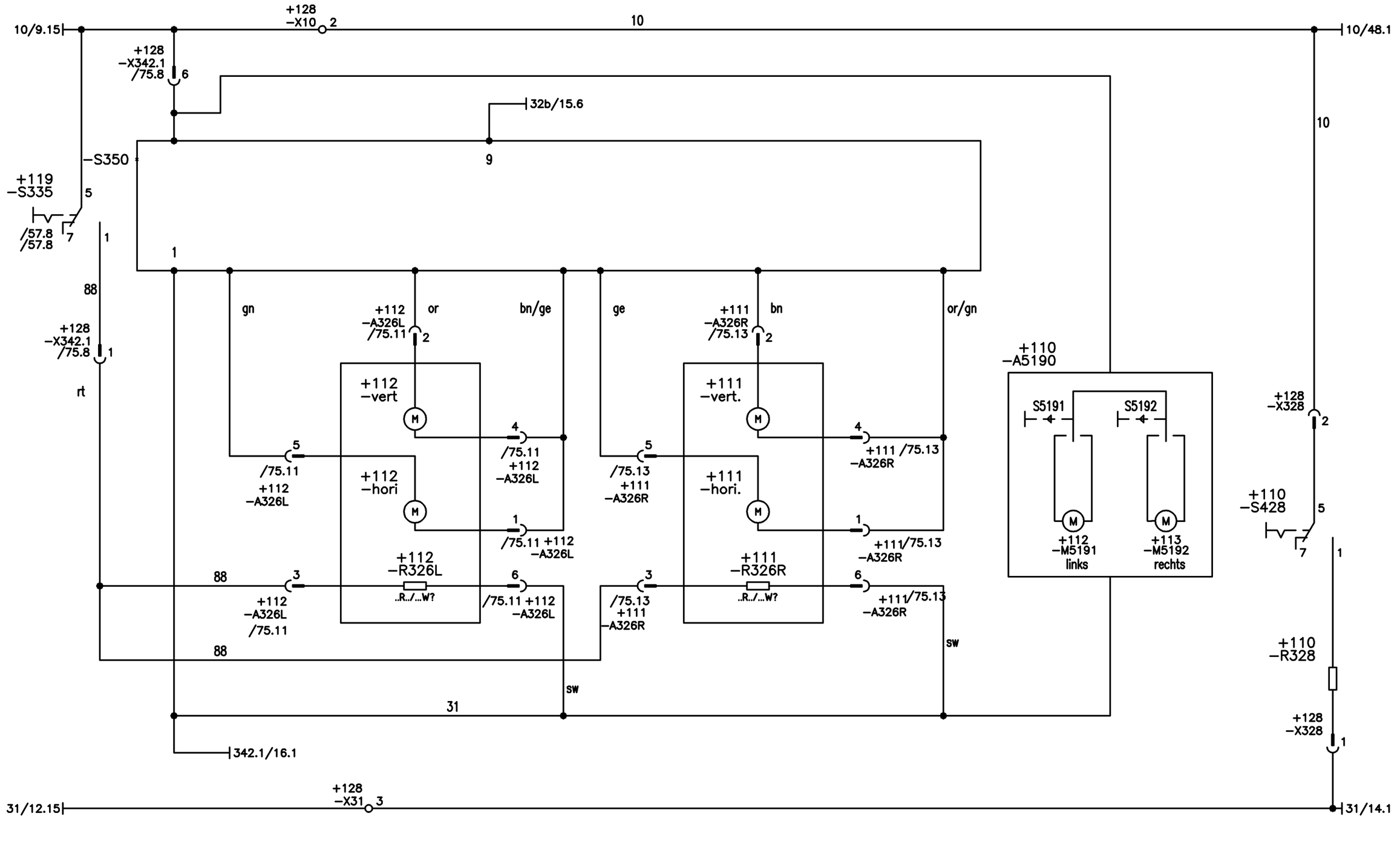

Spiegelheizung	E – Spiegelverstellung	Spiegel links	Spiegel rechts	Sitzheizung
mirror heater	mirror adjustment	mirror left	mirror right	seat heater

a	W10663	18.07.08	Rosenkranz		Datum	Name
_	W10620	14.11.07	Rosenkranz	Erst.	14.11.07	Rosenkranz
Ind	Mitt–NR	Datum	Name	Gepr.		
Abteilung:	1142					

Projektbenennung / project description
E–PLAN AC80–2 UW V3.1.2
ELECTRIC WIRING DIAGRAM

Seitenbenennung / page description
Sitzheizung, Spiegelverst., Fensterheber
seat heater, mirror / window adjustm.

Baunummer. 81963–
Anlage: 0
Ort: 0
Zeichnungsnr. / drawing no. 28387512
Blatt 13
78 Bl.

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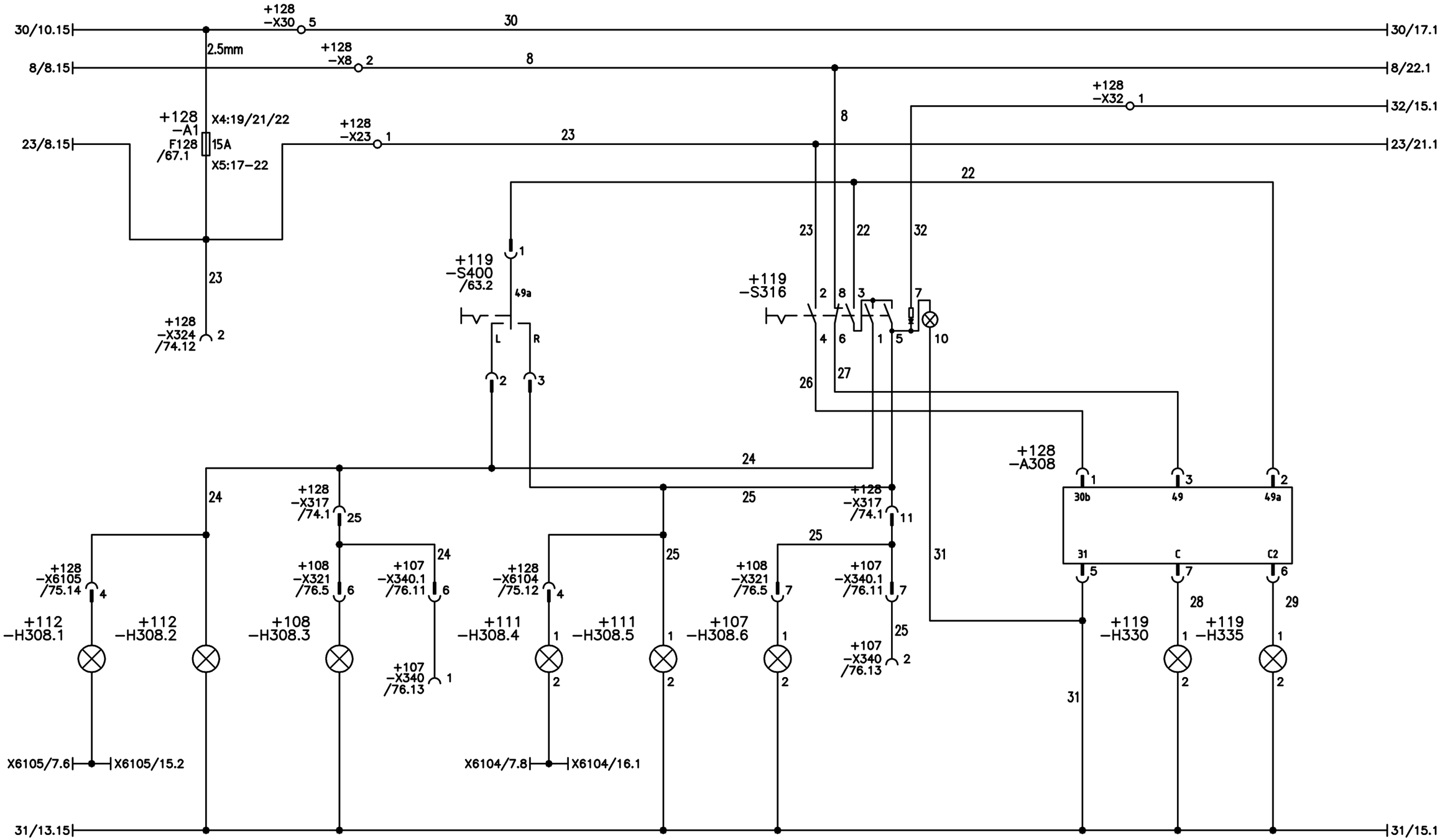

Blinker links				Blinker rechts				Blinkeranzeige	
vorne	seitlich	hinten	Anhänger	vorne	seitlich	hinten	Anhänger	Fahrzeug	Anhänger
flasher left				flasher right				flasher indication	
front	side	rear	trailer	front	side	rear	trailer	crane	trailer

					Datum	Name
a	W10663	18.07.08	Rosenkranz			
_	W10620	14.11.07	Rosenkranz	Erst.	14.11.07	Rosenkranz
Ind	Mitt−NR	Datum	Name	Gepr.		
Abteilung:	1142					

Projektbenennung / project description
E−PLAN AC80−2 UW V3.1.2
ELECTRIC WIRING DIAGRAM

Seitenbenennung / page description
Blinker, Warnblinker
flasher, hazard

Baunummer. 81963−
Anlage: 0
Ort: 0
Zeichnungsnr. / drawing no. 28387512
Blatt 14
78 Bl.

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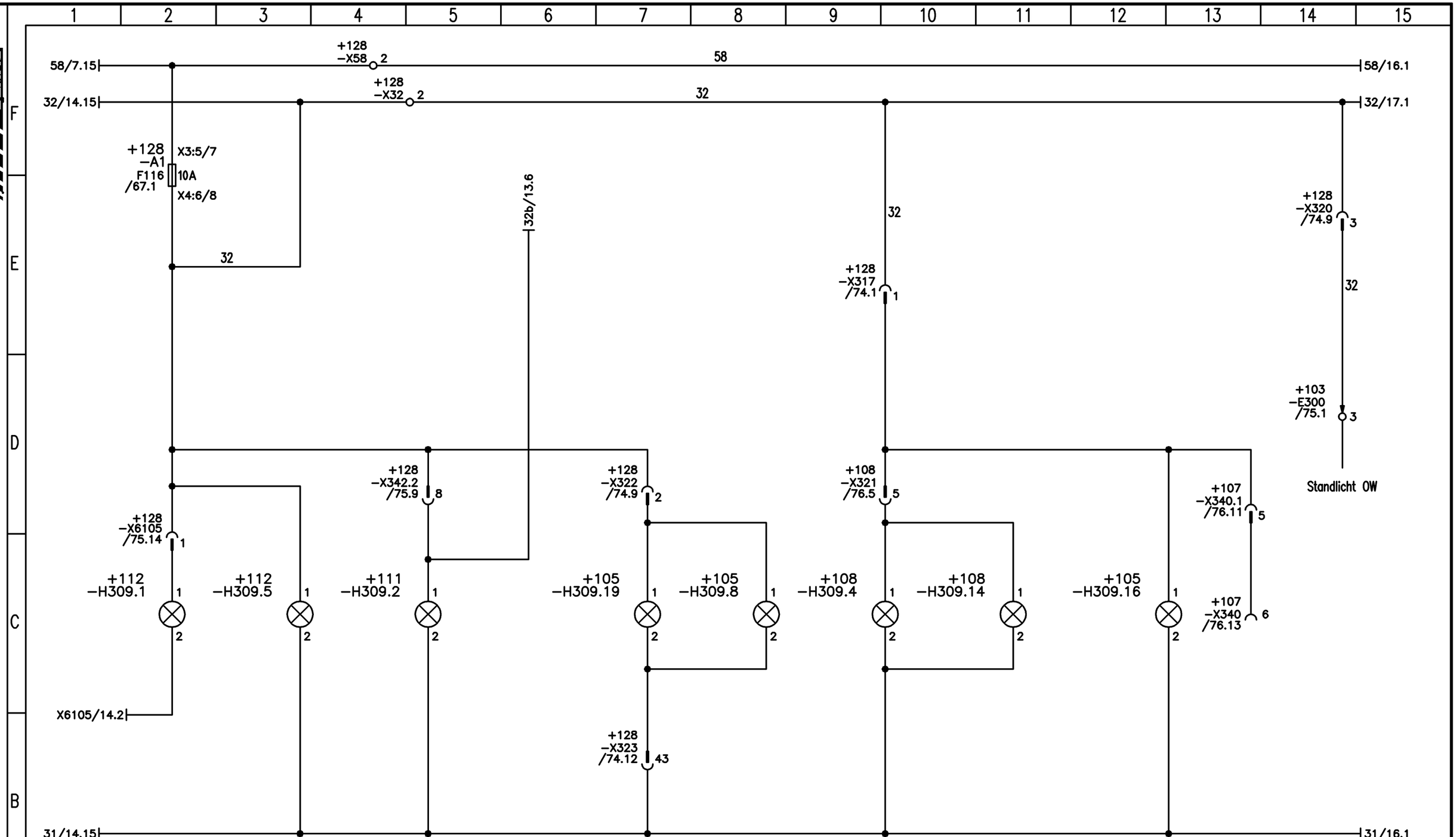

Kopieren oder Weitergabe nur mit unserer schriftlichen Genehmigung gestattet

a	W10663	18.07.08	Rosenkranz		Datum	Name
_	W10620	14.11.07	Rosenkranz	Erst.	14.11.07	Rosenkranz
Ind	Mitt-NR	Datum	Name	Gepr.		
Abteilung:	1142					

Projektbenennung / project description
E-PLAN AC80-2 UW V3.1.2
ELECTRIC WIRING DIAGRAM

Seitenbenennung / page description
Standlicht
parking light

Baunummer. 81963-
Anlage: 0
Ort: 0
Zeichnungsnr. / drawing no. 28387512
Blatt 15
Bl. 78

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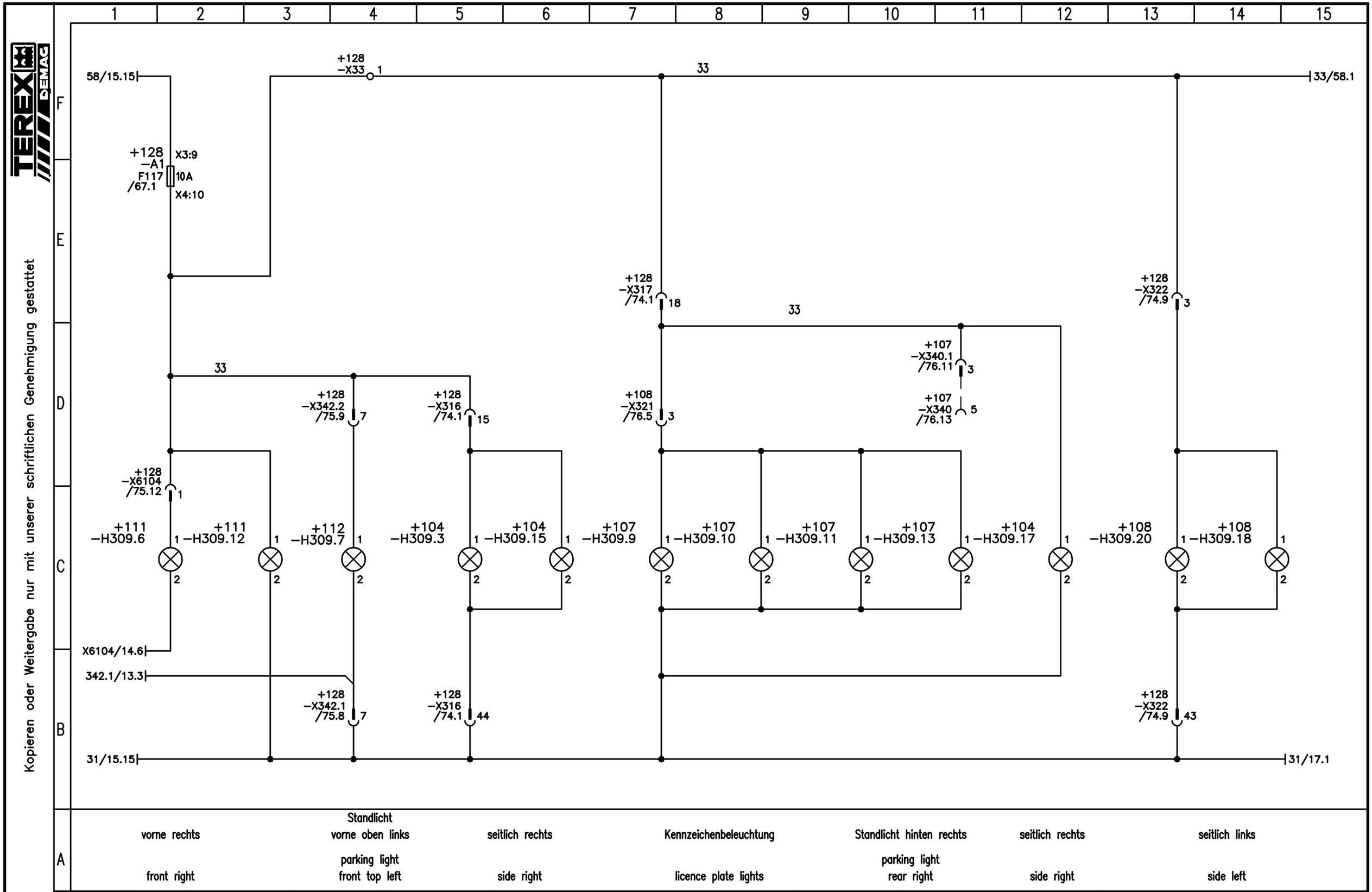

a	W10663	18.07.08	Rosenkranz		Datum	Name	Projektbenennung / project description	Seitenbenennung / page description	Baunummer.	Anlage: 0
_	W10620	14.11.07	Rosenkranz	Erst.	14.11.07	Rosenkranz	E-PLAN AC80-2 UW V3.1.2	Standlicht, Kennzeichenbeleuchtung	81963-	Ort: 0
Ind	Mitt-NR	Datum	Name	Gepr.			ELECTRIC WIRING DIAGRAM	parking light, plate light	Zeichnungsnr. / drawing no.	Blatt 16
Abteilung:	1142								28387512	78 Bl.

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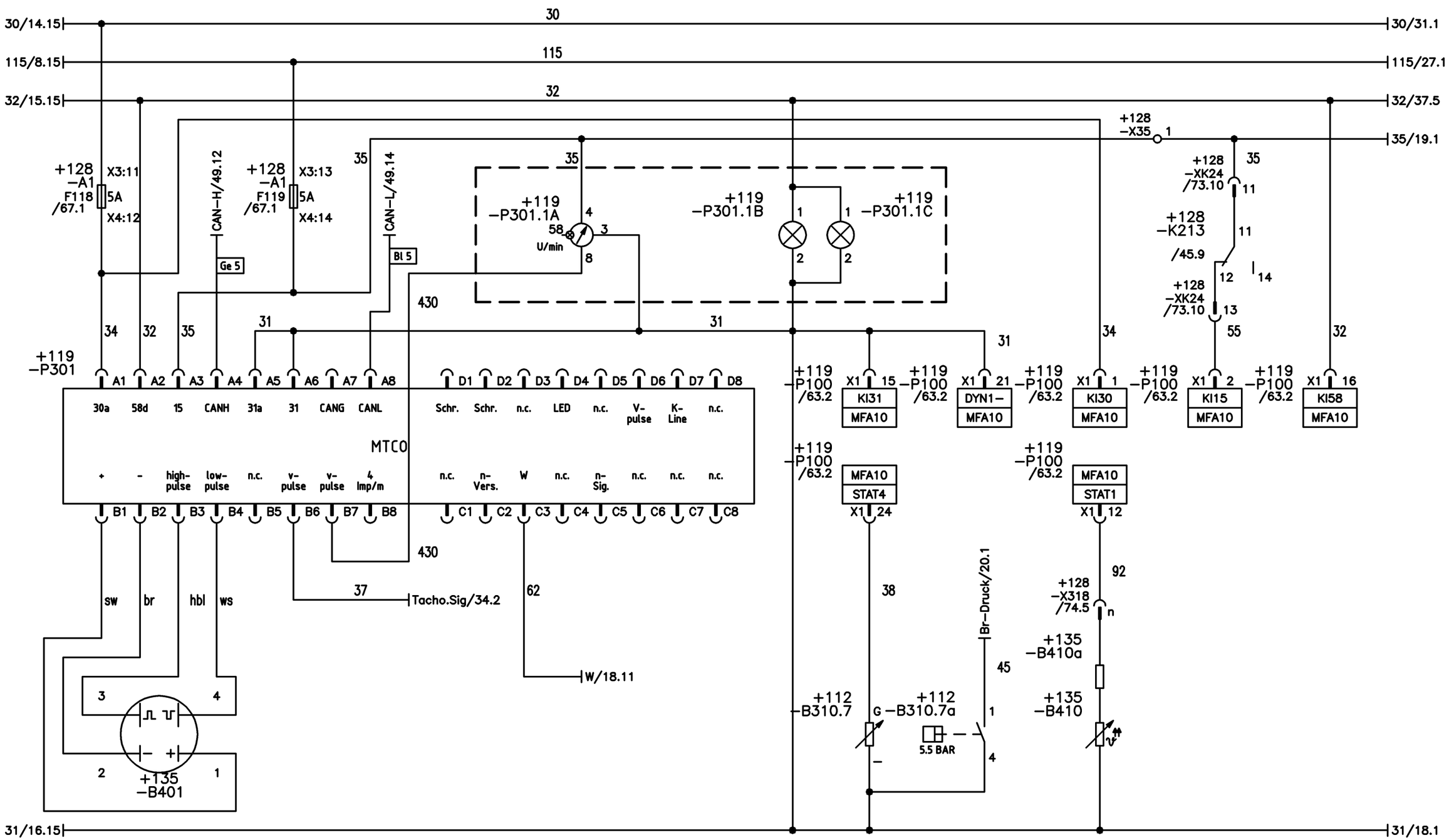

Tachogaph	Tachometer	Bremsdruckanzeige
tachograph	rpm	brake gauge

Multidisplay	Getriebetemperatur	
multiple display	transmition temperature gauge	

a	W10663	18.07.08	Rosenkranz		Datum	Name
_	W10620	14.11.07	Rosenkranz	Erst.	14.11.07	Rosenkranz
Ind	Mitt–NR	Datum	Name	Gepr.		
Abteilung:	1142					

Projektbenennung / project description
E–PLAN AC80–2 UW V3.1.2
ELECTRIC WIRING DIAGRAM

Seitenbenennung / page description
Tachograph
tachograph

Baunummer. 81963–
Anlage: 0
Ort: 0
Zeichnungsnr. / drawing no. 28387512
Blatt 17
78 Bl.

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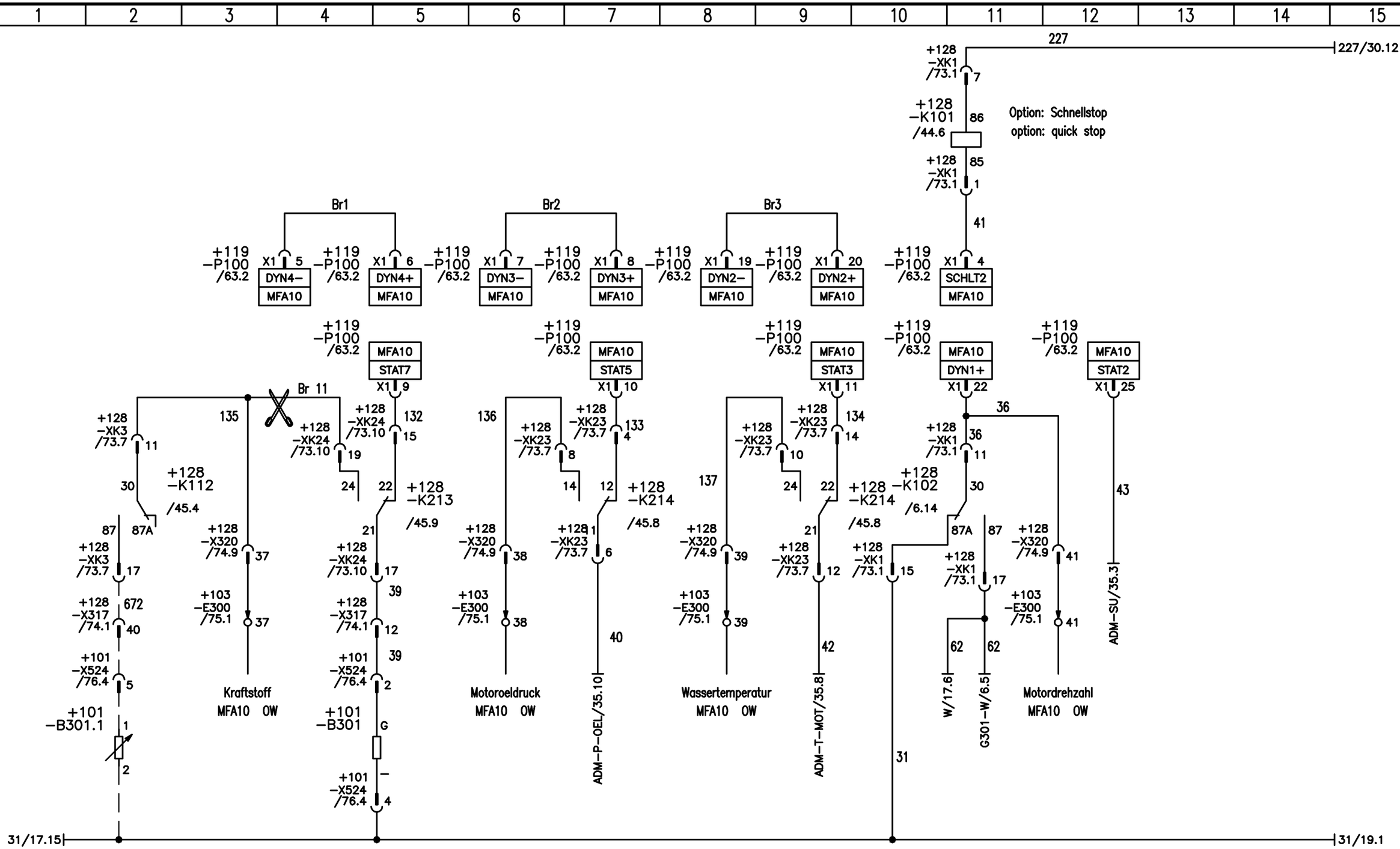

Kraftstoffanzeige
Bei Einbau eines Zusatztankes für den OW Br 11 bitte entfernen.
fuel gauge

Motoroeldruckanzeige
oil pressure gauge

Kühlwasseranzeige
water temperature gauge

Motordrehzahl
rpm

a	W10663	18.07.08	Rosenkranz		Datum	Name
_	W10620	14.11.07	Rosenkranz	Erst.	14.11.07	Rosenkranz
Ind	Mitt−NR	Datum	Name	Gepr.		
Abteilung:	1142					

Projektbenennung / project description
E−PLAN AC80−2 UW V3.1.2
ELECTRIC WIRING DIAGRAM

Seitenbenennung / page description
Anzeigeinstrumente
gauge

Baunummer. 81963−
Anlage: 0
Ort: 0
Zeichnungsnr. / drawing no. 28387512
Blatt 18
78 Bl.

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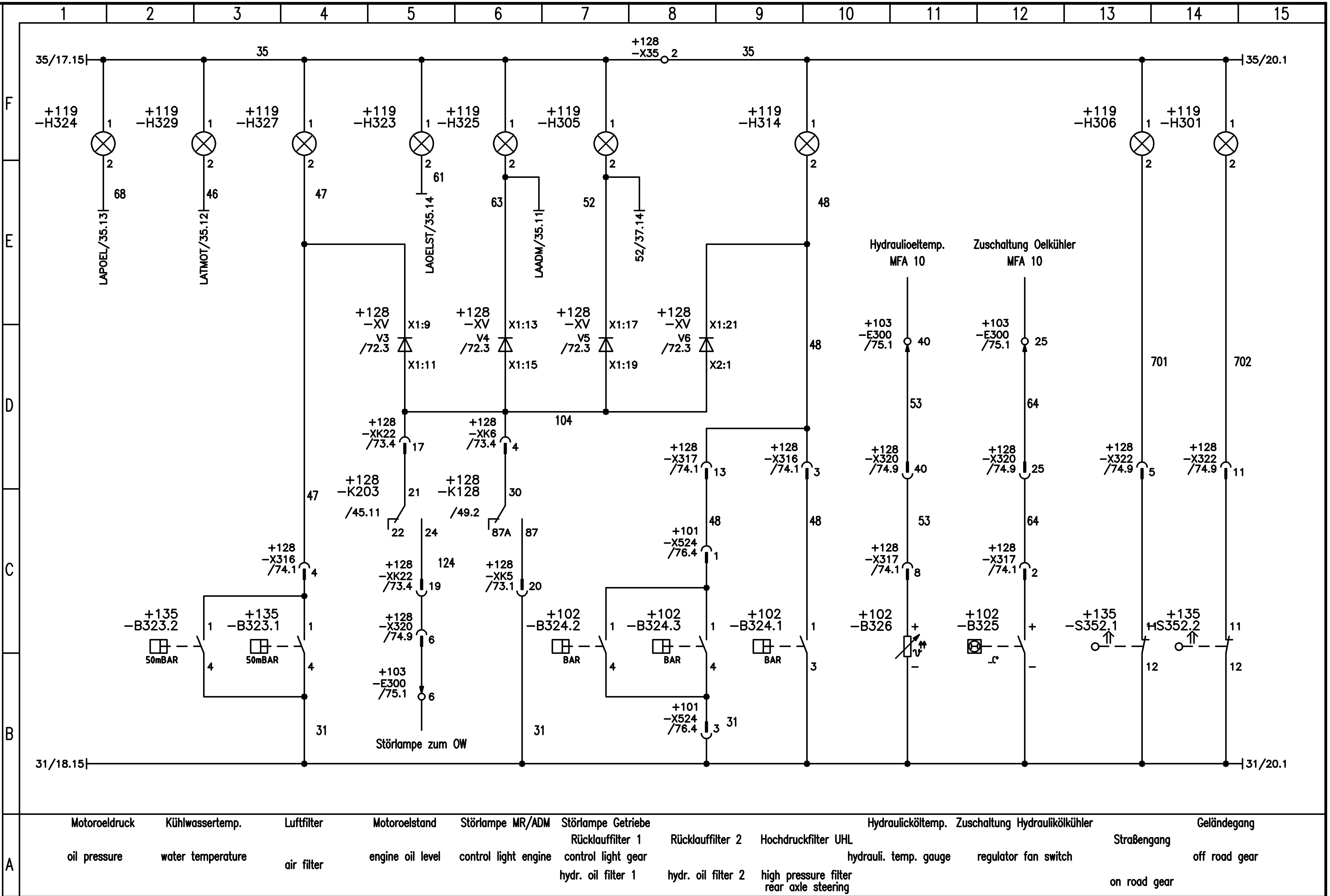

a	W10663	18.07.08	Rosenkranz		Datum	Name
_	W10620	14.11.07	Rosenkranz	Erst.	14.11.07	Rosenkranz
Ind	Mitt-NR	Datum	Name	Gepr.		
Abteilung: 1142						

Projektbenennung / project description
E-PLAN AC80-2 UW V3.1.2
ELECTRIC WIRING DIAGRAM

Seitenbenennung / page description
Sensoren, Kontrollorgane, Störung
sensors, control, fault

Baunummer. 81963-
Anlage: 0
Ort: 0
Zeichnungsnr. / drawing no. 28387512
Blatt 19
78 Bl.

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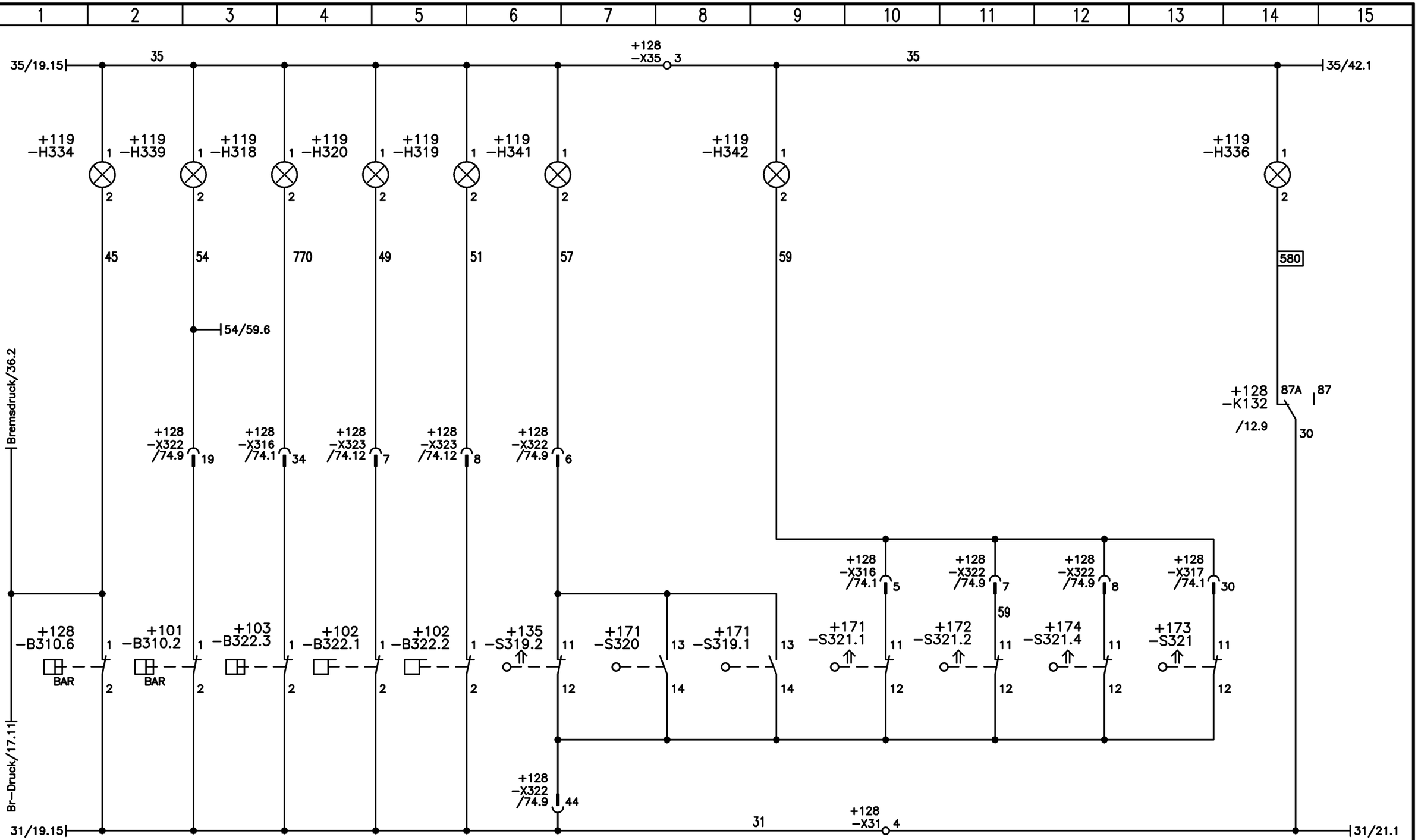

a	W10663	18.07.08	Rosenkranz		Datum	Name
_	W10620	14.11.07	Rosenkranz	Erst.	14.11.07	Rosenkranz
Ind	Mitt–NR	Datum	Name	Gepr.		
Abteilung: 1142						

Projektbenennung / project description
E–PLAN AC80–2 UW V3.1.2
ELECTRIC WIRING DIAGRAM

Seitenbenennung / page description
Sensoren, Kontrollorgane, Störung
sensors, control, fault

Baunummer. 81963–
Anlage: 0
Ort:
Zeichnungsnr. / drawing no. 28387512
Blatt 20
78 Bl.

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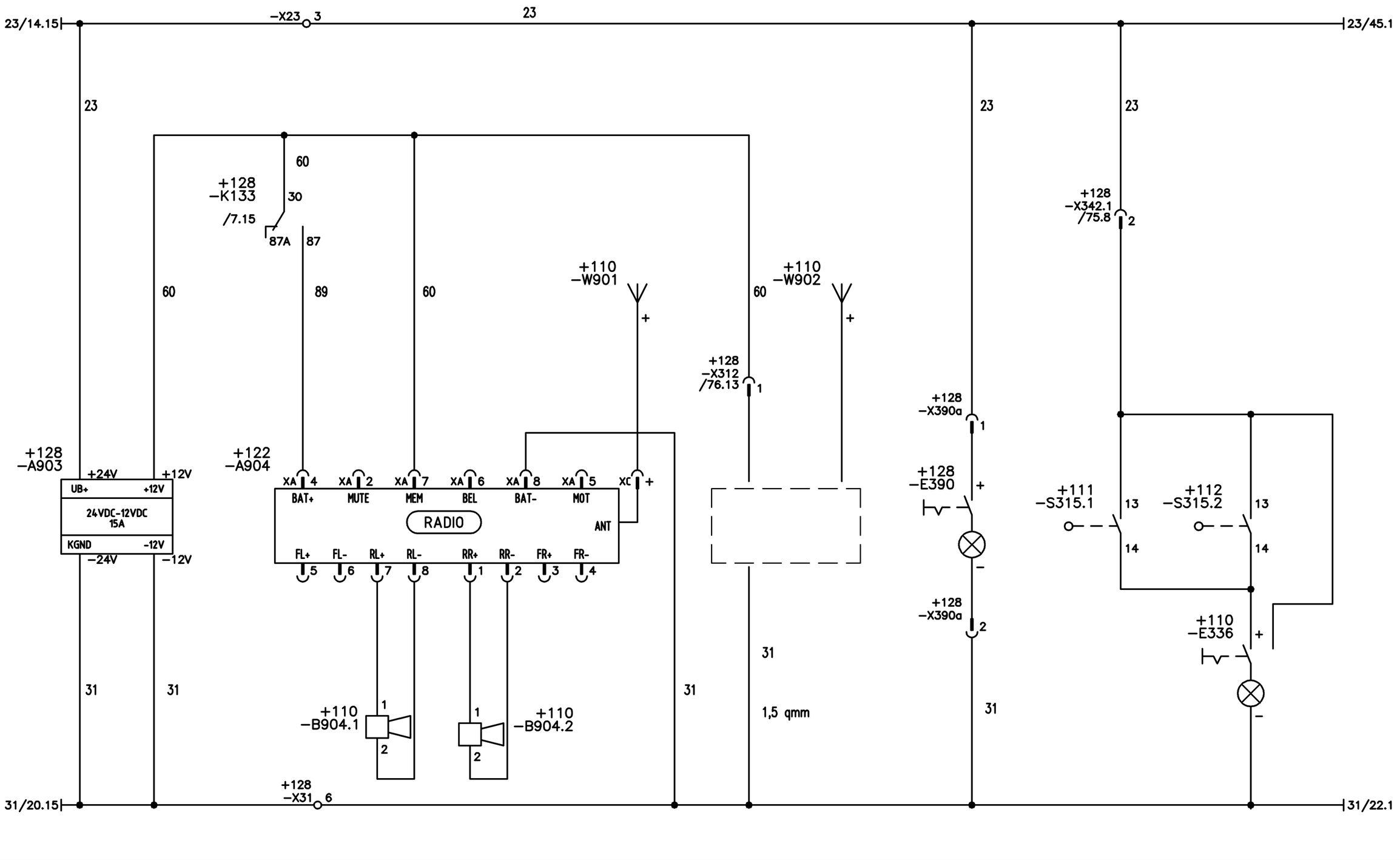

Spannungswandler	Radio	Option: Telefax	ZE Beleuchtung	Kabinenbeleuchtung
DC / DC converter	radio	option: phone/faximile	CE illumination	cabin lights

a	W10663	18.07.08	Rosenkranz		Datum	Name
_	W10620	14.11.07	Rosenkranz	Erst.	14.11.07	Rosenkranz
Ind	Mitt-NR	Datum	Name	Gepr.		
Abteilung:	1142					

Projektbenennung / project description
E-PLAN AC80-2 UW V3.1.2
ELECTRIC WIRING DIAGRAM

Seitenbenennung / page description
Radio, Telefon, ZE Bel.
radio, phone, ilumin., wiring box

Baunummer. 81963-
Anlage: 0
Ort: 0
Zeichnungsnr. / drawing no. 28387512
Blatt 21
78 Bl.

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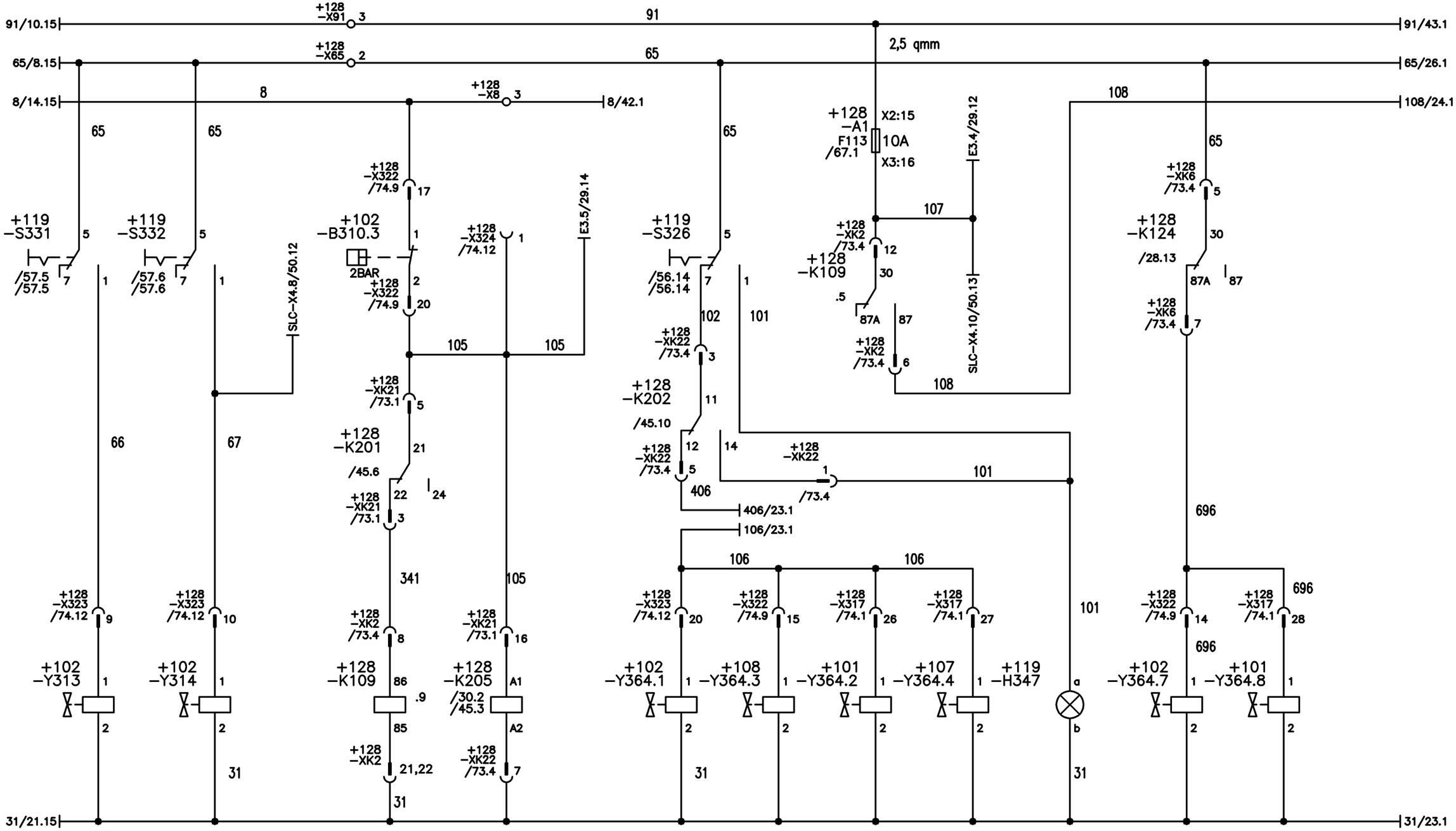

a	W10663	18.07.08	Rosenkranz		Datum	Name
_	W10620	14.11.07	Rosenkranz	Erst.	14.11.07	Rosenkranz
Ind	Mitt−NR	Datum	Name	Gepr.		
Abteilung:	1142					

Projektbenennung / project description
E−PLAN AC80−2 UW V3.1.2
ELECTRIC WIRING DIAGRAM

Seitenbenennung / page description
Differentialsp., Handbremse, Federspeicher
differential lock, handbrake, suspension

Baunummer. 81963−
Anlage: 0
Ort: 0
Zeichnungsnr. / drawing no. 28387512
Blatt 22
78 Bl.

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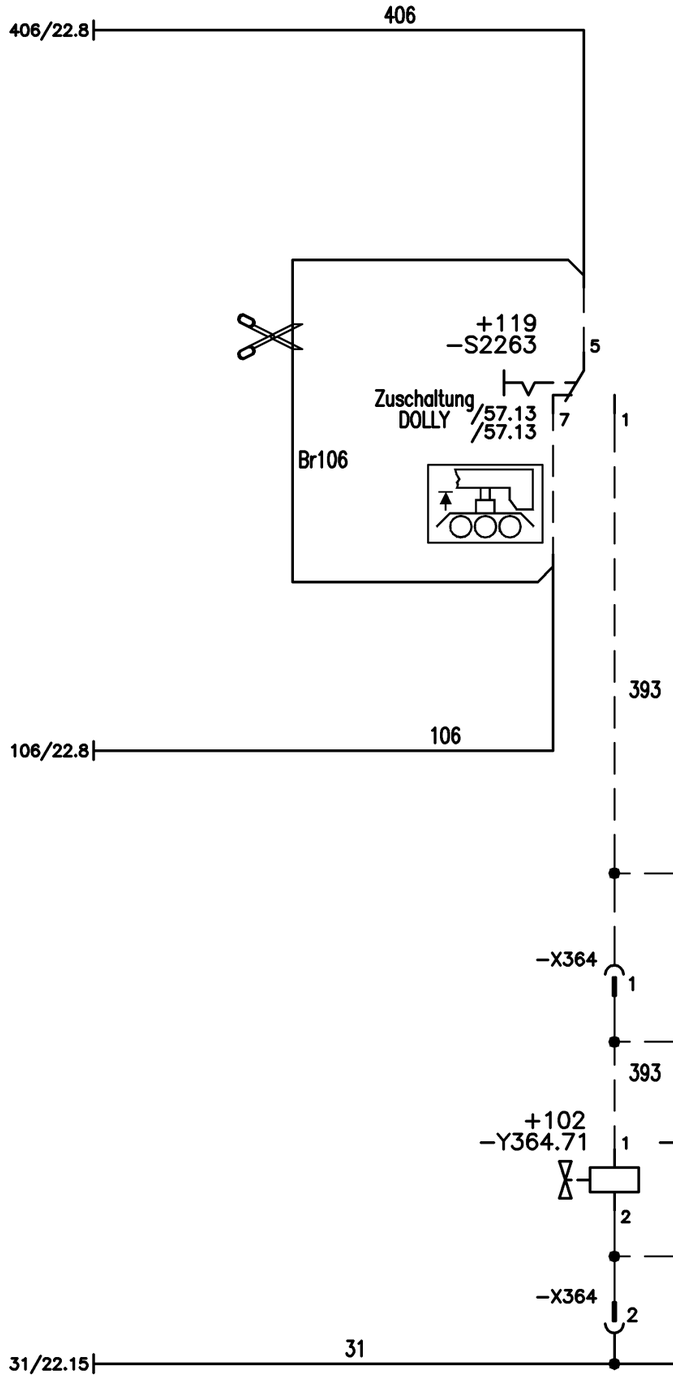

Br106 entfernen bei Option Federung für kleine Achslasten
Br106 remove with option suspension for small axle load

Federung links
suspention left hand

Federung rechts
suspention right hand

a	W10663	18.07.08	Rosenkranz		Datum	Name
_	W10620	14.11.07	Rosenkranz	Erst.	14.11.07	Rosenkranz
Ind	Mitt–NR	Datum	Name	Gepr.		
Abteilung:	1142					

Projektbenennung / project description
E–PLAN AC80–2 UW V3.1.2
ELECTRIC WIRING DIAGRAM

Seitenbenennung / page description
Option Federung für kleine Achslasten
option suspension for small axle load

Baunummer. 81963–
Anlage: 0
Ort: 0
Zeichnungsnr. / drawing no. 28387512
Blatt 23
Bl. 78

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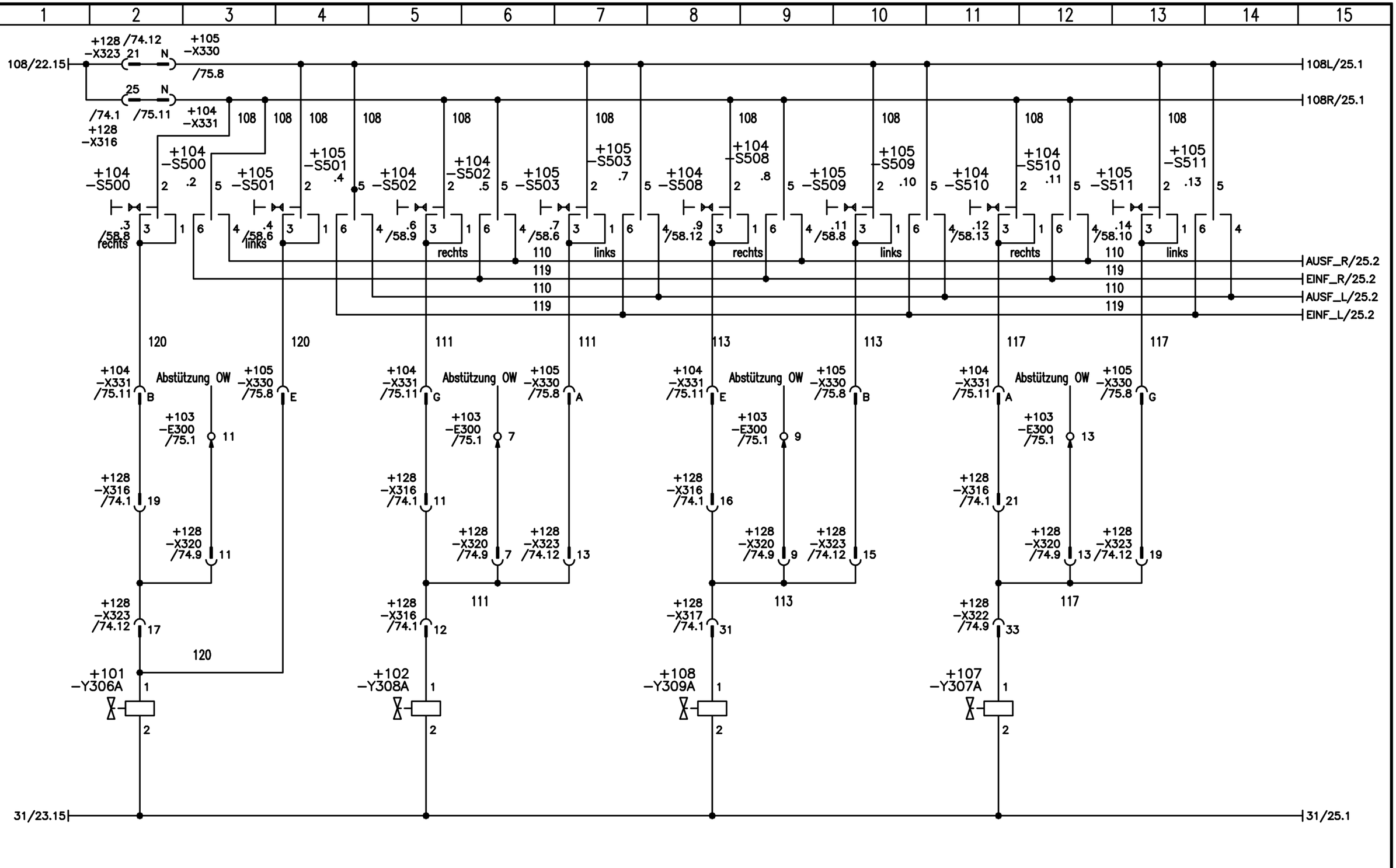

Abstützung vorne rechts vertikal stabilizer front right vertical	Abstützung vorne links vertikal stabilizer front left vertical
Abstützung hinten links vertikal stabilizer rear left vertical	Abstützung hinten rechts vertikal stabilizer rear right vertical

a	W10663	18.07.08	Rosenkranz		Datum	Name	Projektbenennung / project description	Seitenbenennung / page description	Baunummer. 81963− / Anlage: 0 / Ort: 0
_	W10620	14.11.07	Rosenkranz	Erst.	14.11.07	Rosenkranz	E−PLAN AC80−2 UW V3.1.2 ELECTRIC WIRING DIAGRAM	Abstützung stabilizer	Zeichnungsnr. / drawing no. 28387512 / Blatt 24 / 78 Bl.
Ind	Mitt−NR	Datum	Name	Gepr.					
Abteilung: 1142									

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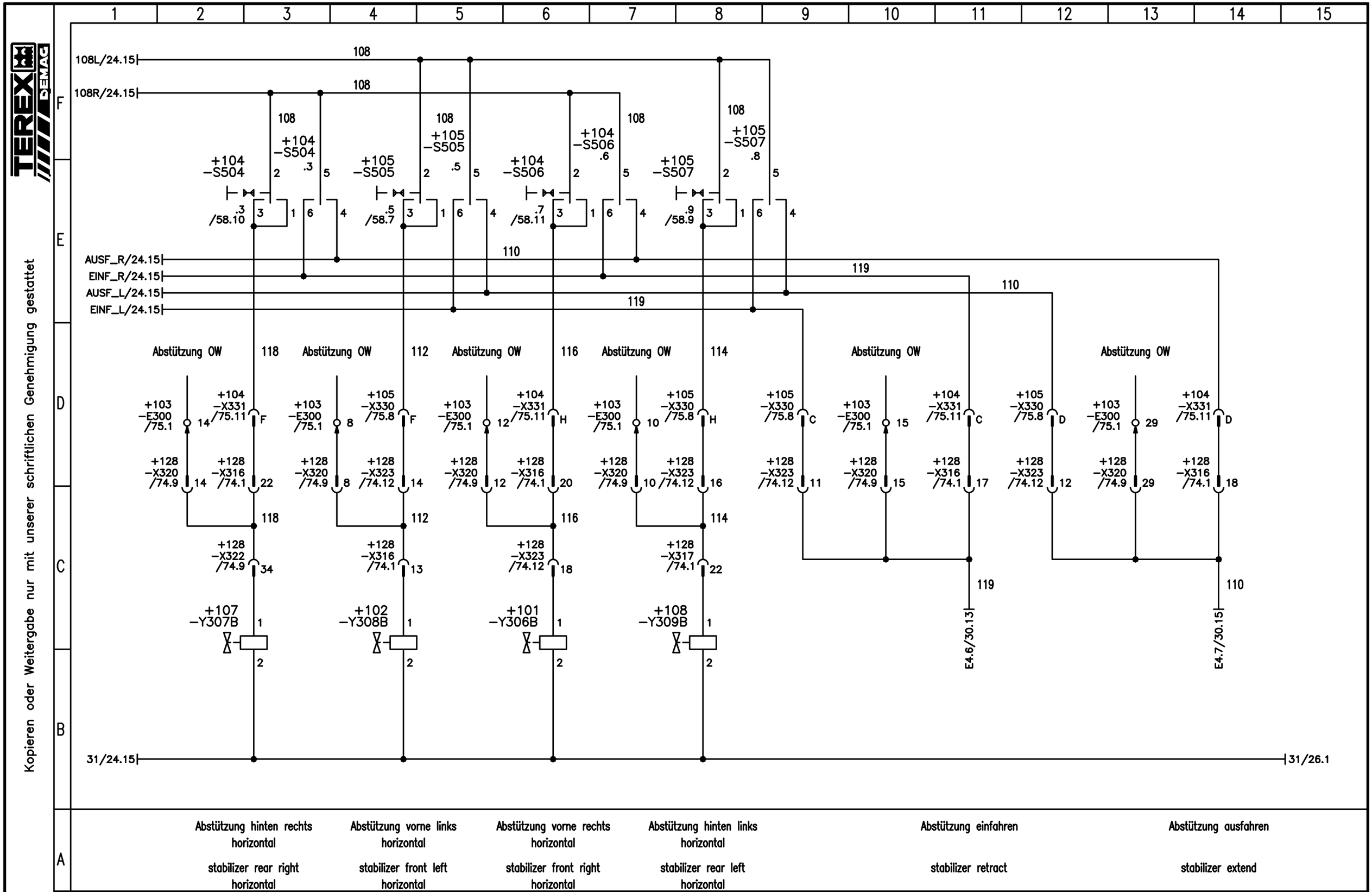

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Ind	Mitt-NR	Datum	Name		Datum	Name
a	W10663	18.07.08	Rosenkranz			
_	W10620	14.11.07	Rosenkranz	Erst.	14.11.07	Rosenkranz
				Gepr.		

Abteilung: 1142

Projektbenennung / project description
E-PLAN AC80-2 UW V3.1.2
ELECTRIC WIRING DIAGRAM

Seitenbenennung / page description
Abstützung
stabilizer

Baunummer. 81963-
Anlage: 0
Ort: 0
Zeichnungsnr. / drawing no. 28387512
Blatt 25
78 Bl.

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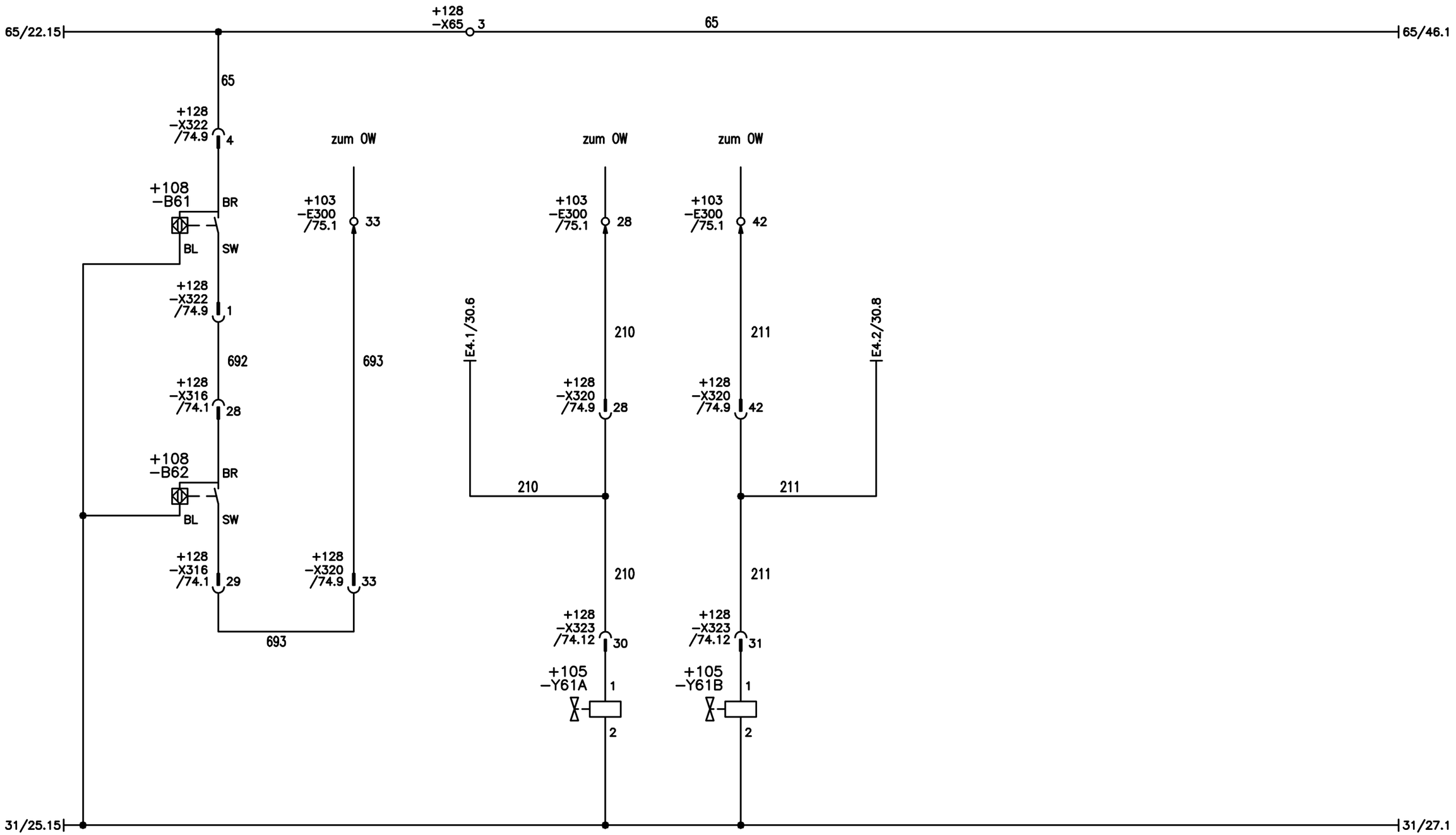

Position Gegengewicht

position counterweight

Option GGW auffahren

option counterweight up

GGW abfahren

counterweight down

a	W10663	18.07.08	Rosenkranz		Datum	Name
_	W10620	14.11.07	Rosenkranz	Erst.	14.11.07	Rosenkranz
Ind	Mitt-NR	Datum	Name	Gepr.		
Abteilung:	1142					

Projektbenennung / project description: E-PLAN AC80-2 UW V3.1.2 ELECTRIC WIRING DIAGRAM

Seitenbenennung / page description: Gegengewicht counterweight

Baunummer. 81963- | Anlage: 0 | Ort: 0

Zeichnungsnr. / drawing no. 28387512 | Blatt 26 | Bl. 78

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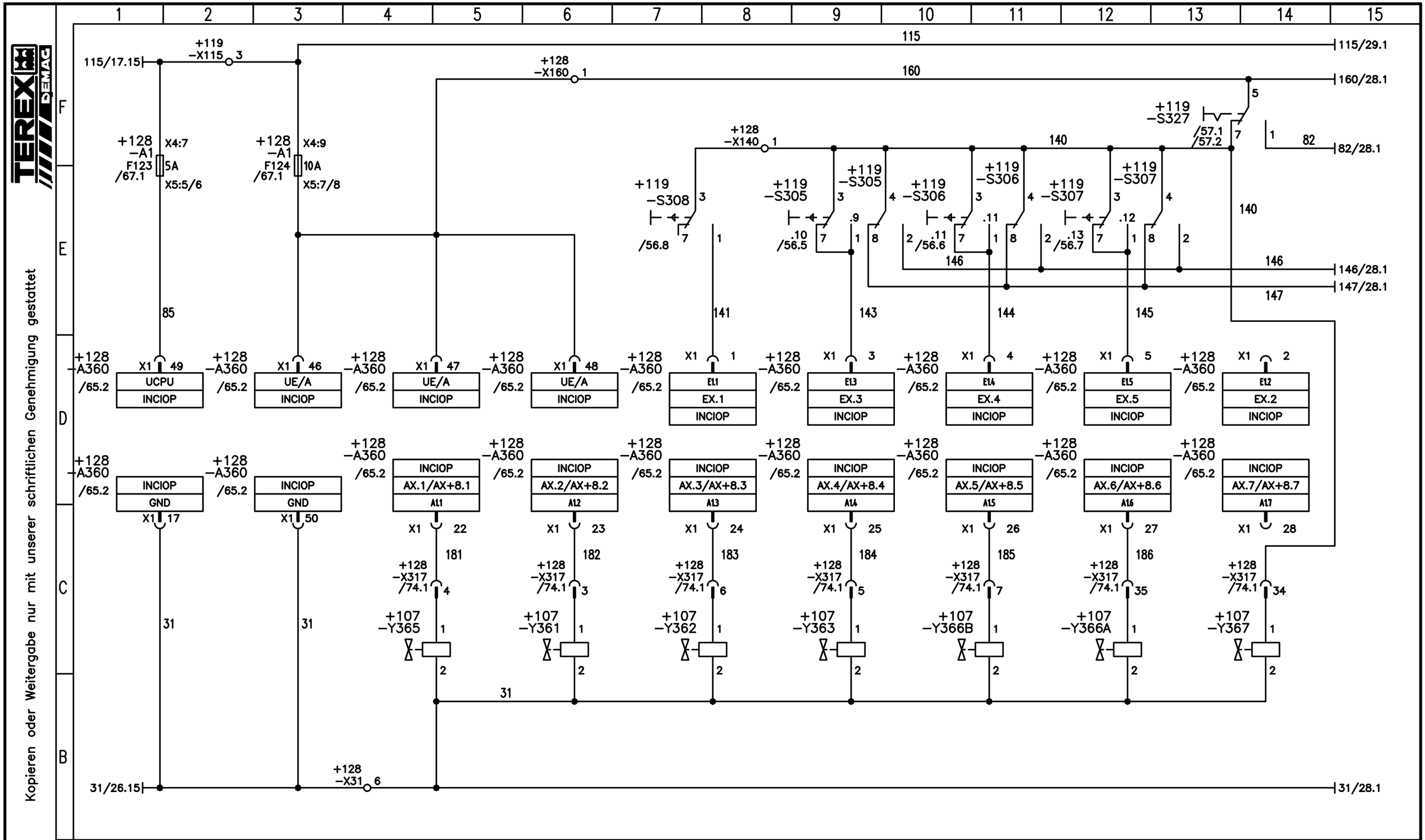

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Ind	Mitt-NR	Datum	Name		Datum	Name
a	W10663	18.07.08	Rosenkranz			
_	W10620	14.11.07	Rosenkranz	Erst.	14.11.07	Rosenkranz
				Gepr.		

Abteilung: 1142

Projektbenennung / project description
E-PLAN AC80-2 UW V3.1.2
ELECTRIC WIRING DIAGRAM

Seitenbenennung / page description
SPS-Karte 1, Achsenverstellung
PLC process card 1, axle adjustment

Baunummer. 81963-
Anlage: 0
Ort: 0
Zeichnungsnr. / drawing no. 28387512
Blatt 27
78 Bl.

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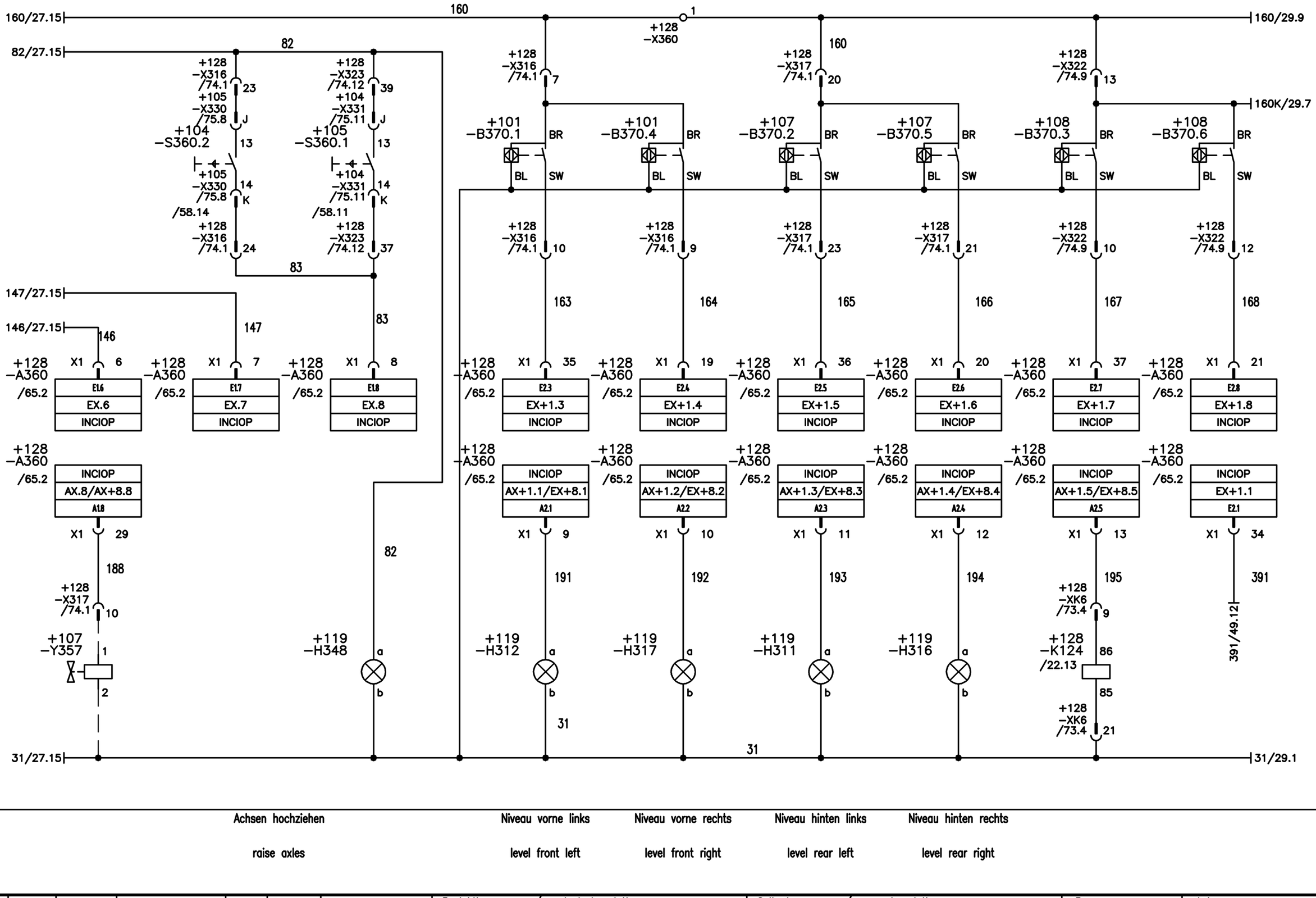

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a	W10663	18.07.08	Rosenkranz		Datum	Name
_	W10620	14.11.07	Rosenkranz	Erst.	14.11.07	Rosenkranz
Ind	Mitt–NR	Datum	Name	Gepr.		
Abteilung:	1142					

Projektbenennung / project description
E–PLAN AC80–2 UW V3.1.2
ELECTRIC WIRING DIAGRAM

Seitenbenennung / page description
SPS Karte 1, Niveausteuerung
PLC process card 1, level control

Baunummer. 81963–
Anlage: 0
Ort: 0
Zeichnungsnr. / drawing no. 28387512
Blatt 28
78 Bl.

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1 2 3 4 5 6 7 8 9 10 11 12 13 14 15

F E D C B A

115/27.15 — 115 — 115/31.1

+128 −X115 1

160K/28.15 — 160 — 160/28.15

+105 −B359 1 — 80BAR — +128 −X322 /74.9 3 18

+119 −S329 5 — /57.4 /57.4 7 — 160

616

+128 −X317 /74.1 15

+104 −B360 1 — 80BAR — +128 −X317 /74.1 3 16

169

+128 −A1 F126 /67.1 5A X4:13 X5:11/12

+128 −A1 F127 /67.1 10A X4:15/17 X5:13−16

87 — 87/47.1

87

87

86

170

E3.3/31.3 — 171

E3.4/22.10 — 107

E3.5/22.6 — 105

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	49	UCPU INCIOP	46	UE/A INCIOP	47	UE/A INCIOP	48	UE/A INCIOP	1	E3.1 EX.1 INCIOP	2	E3.2 EX.2 INCIOP	3	E3.3 EX.3 INCIOP	4	E3.4 EX.4 INCIOP	5	E3.5 EX.5 INCIOP
	17	INCIOP GND	50	INCIOP GND	22	INCIOP AX.1/AX+8.1 A3.1	24	INCIOP AX.3/AX+8.3 A3.3	25	INCIOP AX.4/AX+8.4 A3.4	26	INCIOP AX.5/AX+8.5 A3.5	27	INCIOP AX.6/AX+8.6 A3.6	28	INCIOP AX.7/AX+8.7 A3.7	29	INCIOP AX.8/AX+8.8 A3.8

31 — 31

201 — 203 — 204 — 205 — 207 — 208

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+105 −Y343 1 2 — +105 −Y310A 1 2 — +105 −Y310B 1 2

+119 −H350 a b

Fr.Nebenab./36.11

+128 −XK6 /73.4 16

+128 −K130 /7.10 86 85

+128 −XK6 /73.4 22

208/56.12

31/28.15 — 31/30.1

A

Spannungsversorgung 24 V — power supply 24 V

Umschaltung Lenkkreis 2 — steering circuit 2

3. Achse auf 80 bar befüllen nach UHL

Abstützung einfahren — stabilizer retract

Abstützung ausfahren — stabilizer extend

3. Achse oben — 3. axle top

Klima OW — option air condition

Motor läuft Nebenabtrieb rpm — auxiliary drive

Handbremse — parking brake

a	W10663	18.07.08	Rosenkranz		Datum	Name	Projektbenennung / project description: E−PLAN AC80−2 UW V3.1.2 ELECTRIC WIRING DIAGRAM
_	W10620	14.11.07	Rosenkranz	Erst.	14.11.07	Rosenkranz	
Ind	Mitt−NR	Datum	Name	Gepr.			
Abteilung:	1142						

Seitenbenennung / page description: SPS Karte 2, Abstützung — plc process card 2, stabilizer

Baunummer. 81963− | Anlage: 0 | Ort: 0

Zeichnungsnr. / drawing no. 28387512 | Blatt 29 | 78 Bl.

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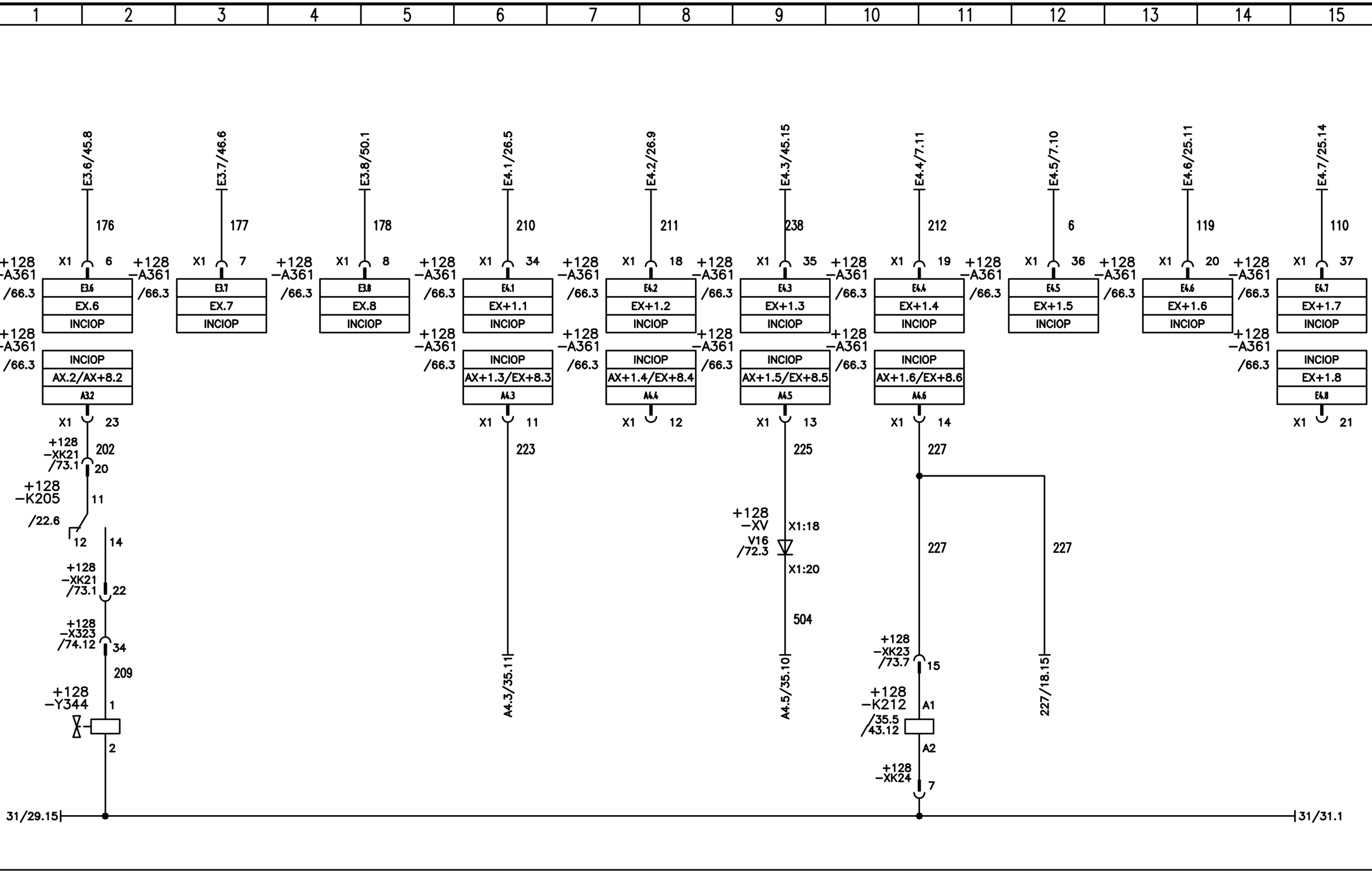

a	W10663	18.07.08	Rosenkranz		Datum	Name
_	W10620	14.11.07	Rosenkranz	Erst.	14.11.07	Rosenkranz
Ind	Mitt-NR	Datum	Name	Gepr.		
Abteilung:	1142					

Projektbenennung / project description
E-PLAN AC80-2 UW V3.1.2
ELECTRIC WIRING DIAGRAM

Seitenbenennung / page description
SPS Karte 2
process card 2

Baunummer. 81963-
Anlage: 0
Ort: 0
Zeichnungsnr. / drawing no. 28387512
Blatt 30
Bl. 78

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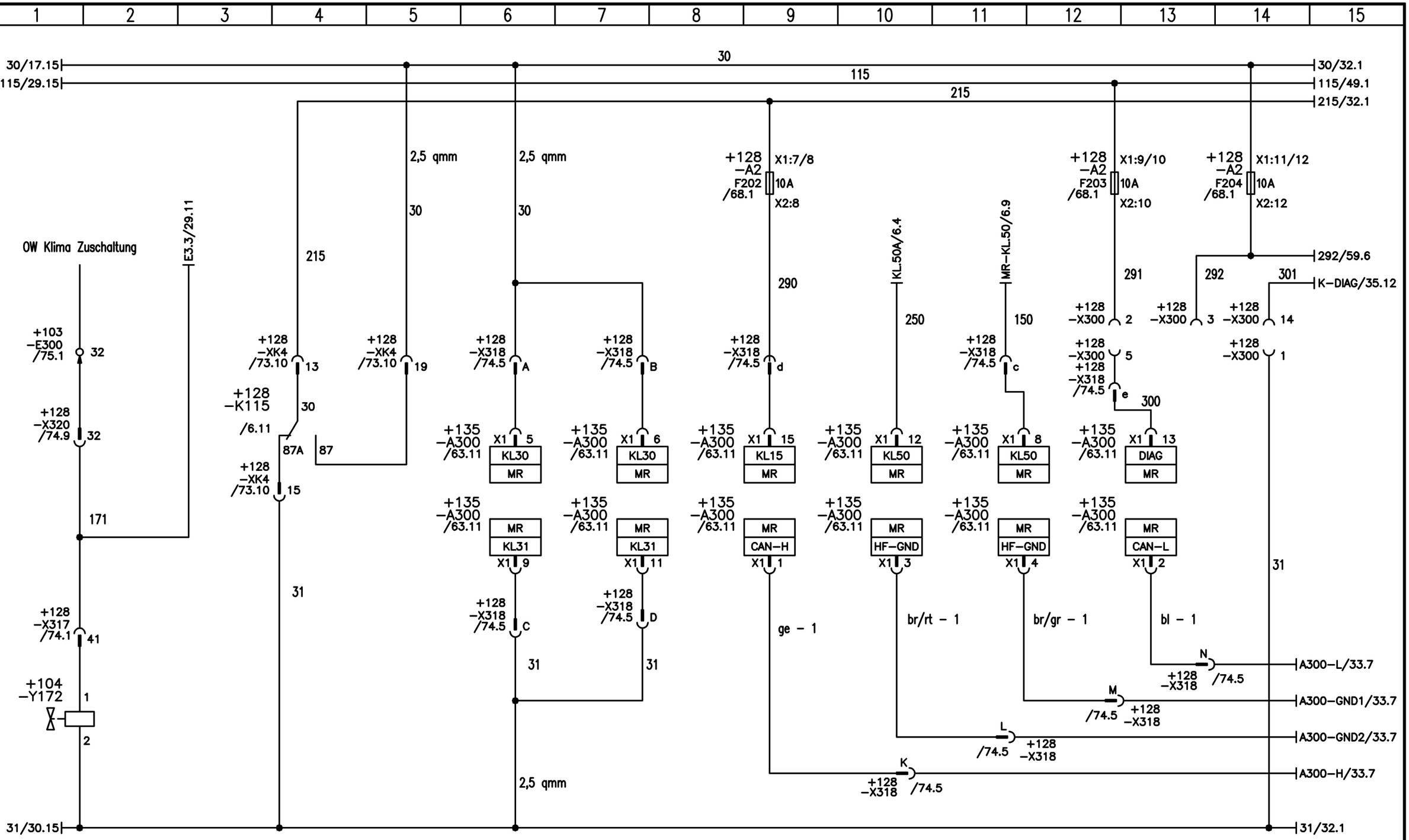

A	OW Klima Zuschaltung	Anlasser / Motordiagnose
	superstructure air condition	starter / engine gear diagnostic

a	W10663	18.07.08	Rosenkranz		Datum	Name
_	W10620	14.11.07	Rosenkranz	Erst.	14.11.07	Rosenkranz
Ind	Mitt–NR	Datum	Name	Gepr.		
Abteilung:	1142					

Projektbenennung / project description: E–PLAN AC80–2 UW V3.1.2 ELECTRIC WIRING DIAGRAM

Seitenbenennung / page description: Motorregelung engine control

Baunummer. 81963– | Anlage: 0 | Ort: 0

Zeichnungsnr. / drawing no. 28387512 | Blatt 31 | 78 Bl.

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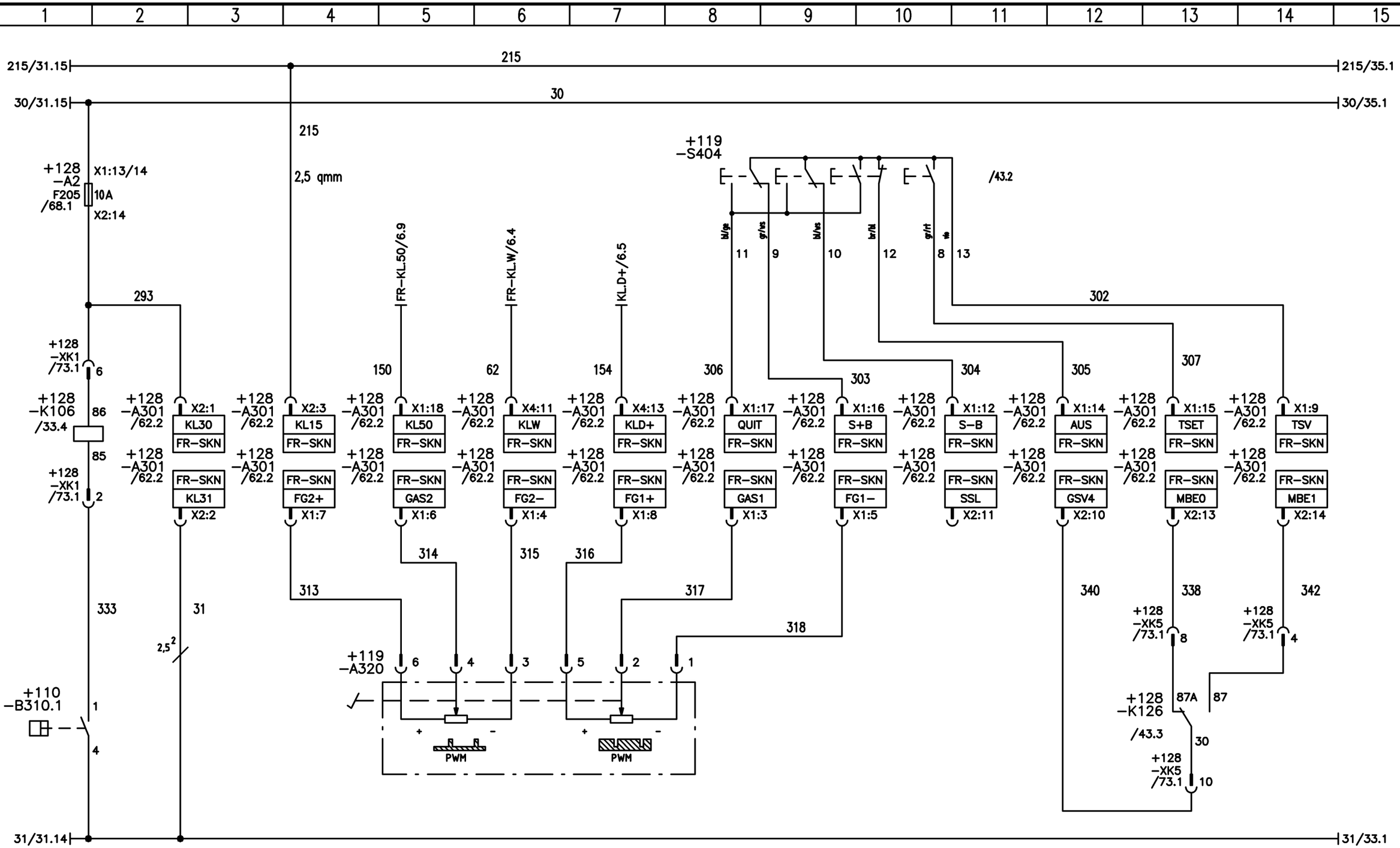

Bremslichtschalter

stop light pressure switch

el. Gaspedal

el. speed level

Tempomatschalter

tempomat switch

a	W10663	18.07.08	Rosenkranz		Datum	Name	Projektbenennung / project description	Seitenbenennung / page description	Baunummer.	Anlage: 0
_	W10620	14.11.07	Rosenkranz	Erst.	14.11.07	Rosenkranz	E-PLAN AC80-2 UW V3.1.2	Motorregelung FR-SKN	81963-	Ort: 0
Ind	Mitt-NR	Datum	Name	Gepr.			ELECTRIC WIRING DIAGRAM	engine control FR-SKN	Zeichnungsnr. / drawing no.	Blatt 32
Abteilung:	1142								28387512	78 Bl.

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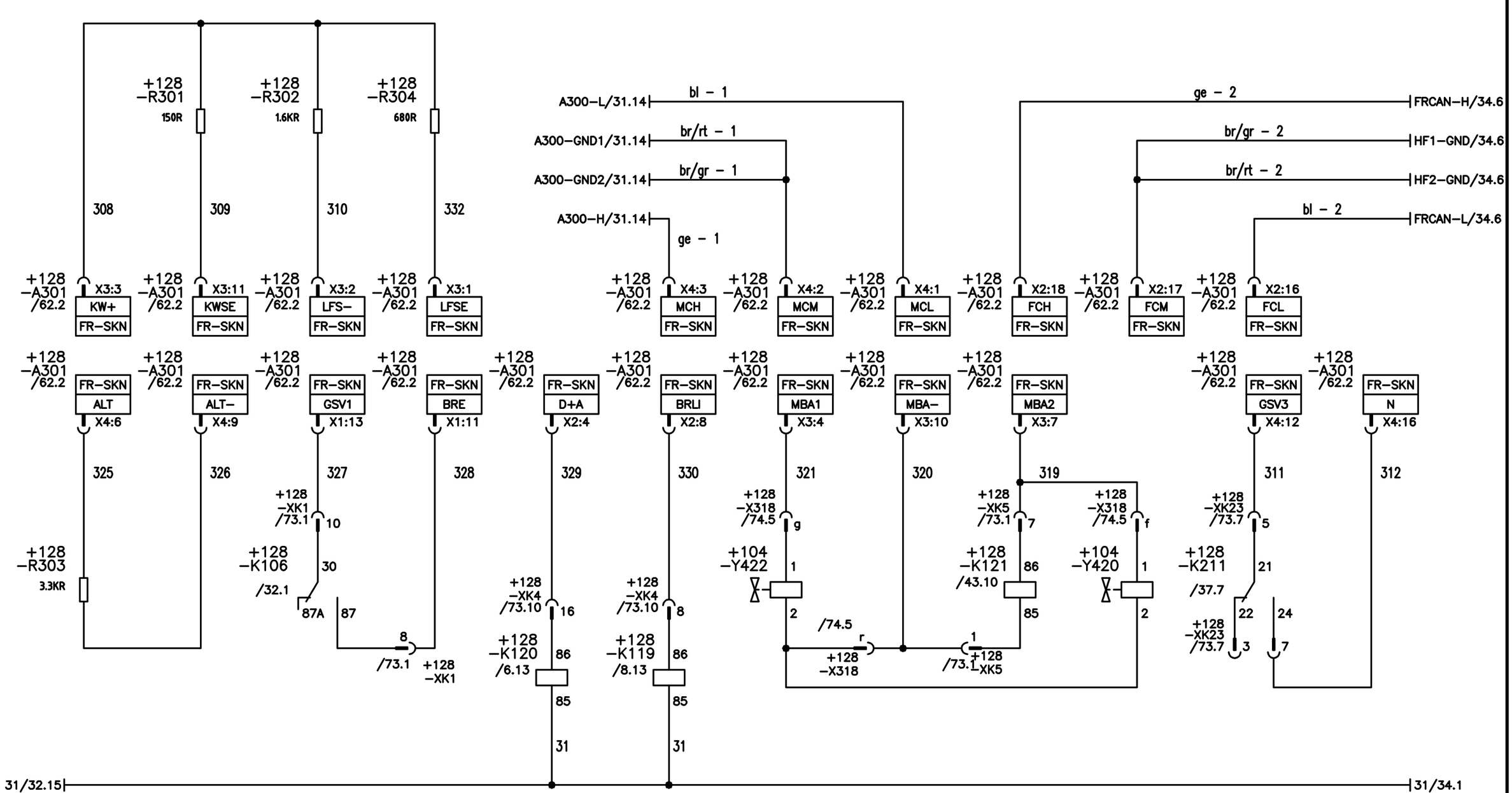

Motor läuft — engine actuation signal

Bremslicht Signal — stop light signal

Konstantdrossel — constant throttle

Motorklappenbremse — exhaust brake

a	W10663	18.07.08	Rosenkranz		Datum	Name
_	W10620	14.11.07	Rosenkranz	Erst.	14.11.07	Rosenkranz
Ind	Mitt–NR	Datum	Name	Gepr.		
Abteilung:	1142					

Projektbenennung / project description
E–PLAN AC80–2 UW V3.1.2
ELECTRIC WIRING DIAGRAM

Seitenbenennung / page description
Motorregelung FR–SKN
engine control FR–SKN

Baunummer. 81963–
Anlage: 0
Ort: 0
Zeichnungsnr. / drawing no. 28387512
Blatt 33
78 Bl.

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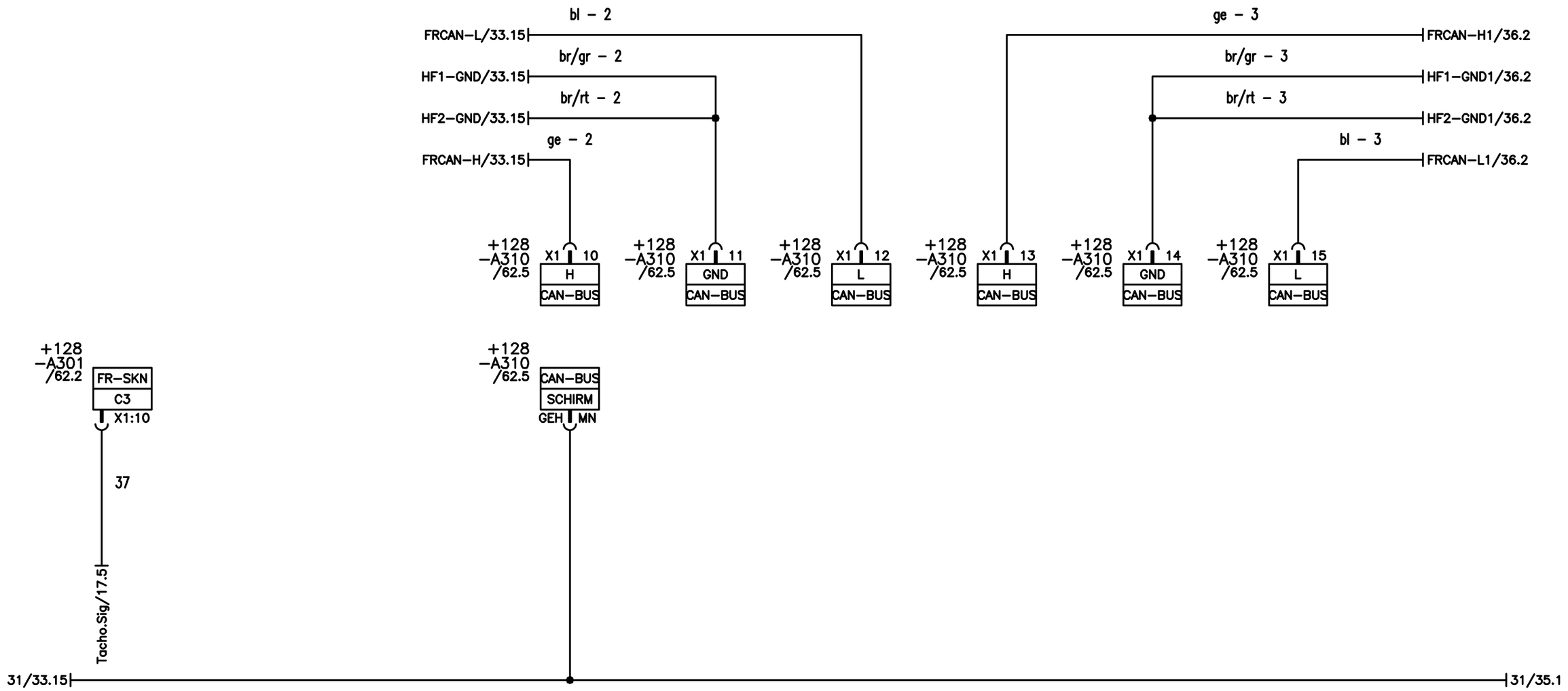

Sternpunkt (enthält die Abschlusswiderstände)

star point (contents termination resistors)

a	W10663	18.07.08	Rosenkranz		Datum	Name
_	W10620	14.11.07	Rosenkranz	Erst.	14.11.07	Rosenkranz
Ind	Mitt–NR	Datum	Name	Gepr.		
Abteilung:	1142					

Projektbenennung / project description: E–PLAN AC80–2 UW V3.1.2 ELECTRIC WIRING DIAGRAM

Seitenbenennung / page description: CAN–Sternpunkt, Abschlusswiderstände CAN–starpoint, termination resistors

Baunummer. 81963– | Anlage: 0 | Ort: 0

Zeichnungsnr. / drawing no. 28387512 | Blatt 34 | 78 Bl.

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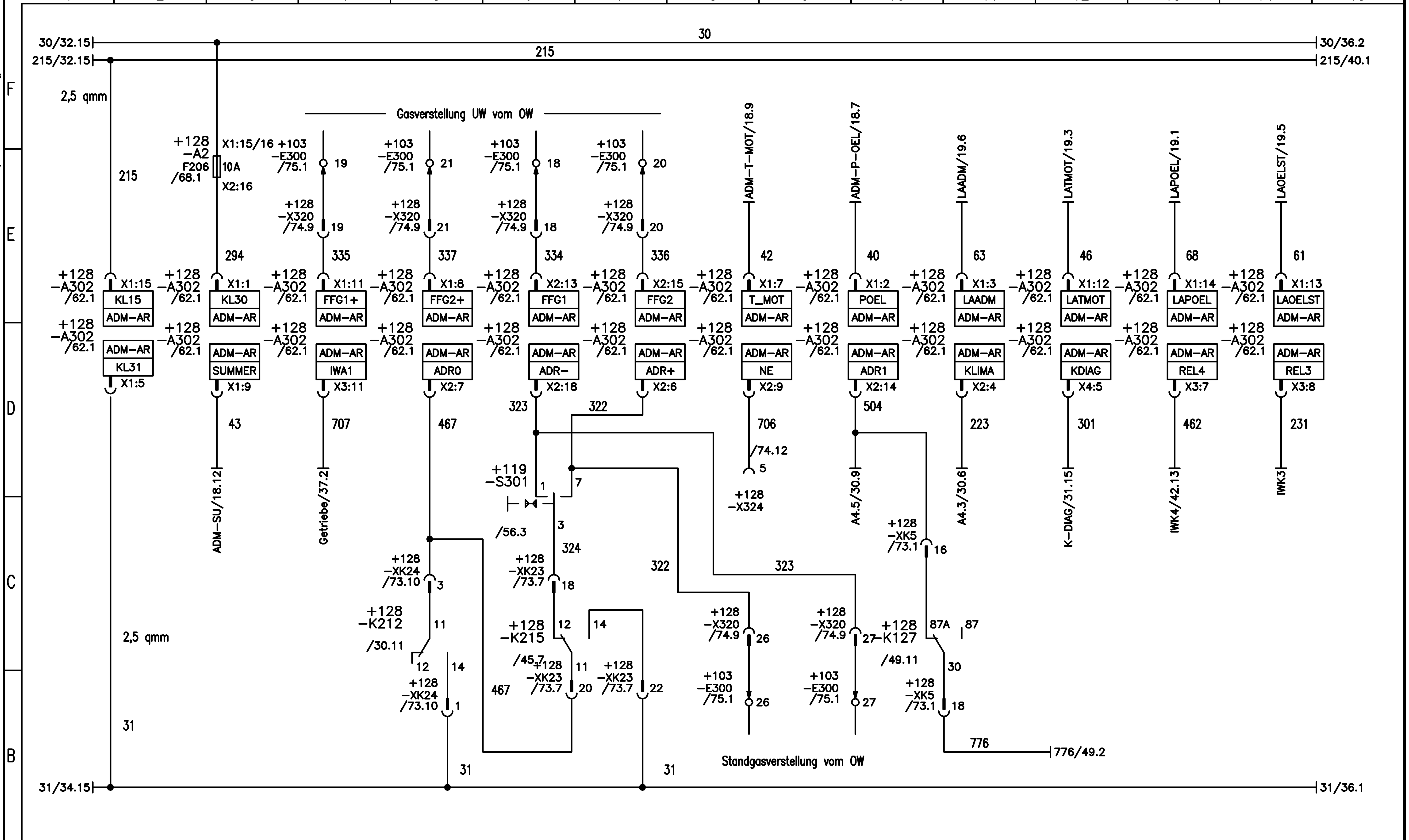

Arbeitsdrehzahlverstellung nur bei Gerätestillstand möglich

ADR 1 Eingang Geschwindigkeitsbegrenzung

speed control only in idleness possible

ADR 1 input speed limit

					Datum	Name	Projektbenennung / project description	Seitenbenennung / page description	Baunummer.	Anlage: 0	
a	W10663	18.07.08	Rosenkranz				E-PLAN AC80-2 UW V3.1.2	ADM-AR	81963-	Ort: 0	
_	W10620	14.11.07	Rosenkranz	Erst.	14.11.07	Rosenkranz	ELECTRIC WIRING DIAGRAM	ADM-AR	Zeichnungsnr. / drawing no. 28387512	Blatt	35
Ind	Mitt-NR	Datum	Name	Gepr.						78	Bl.
Abteilung: 1142											

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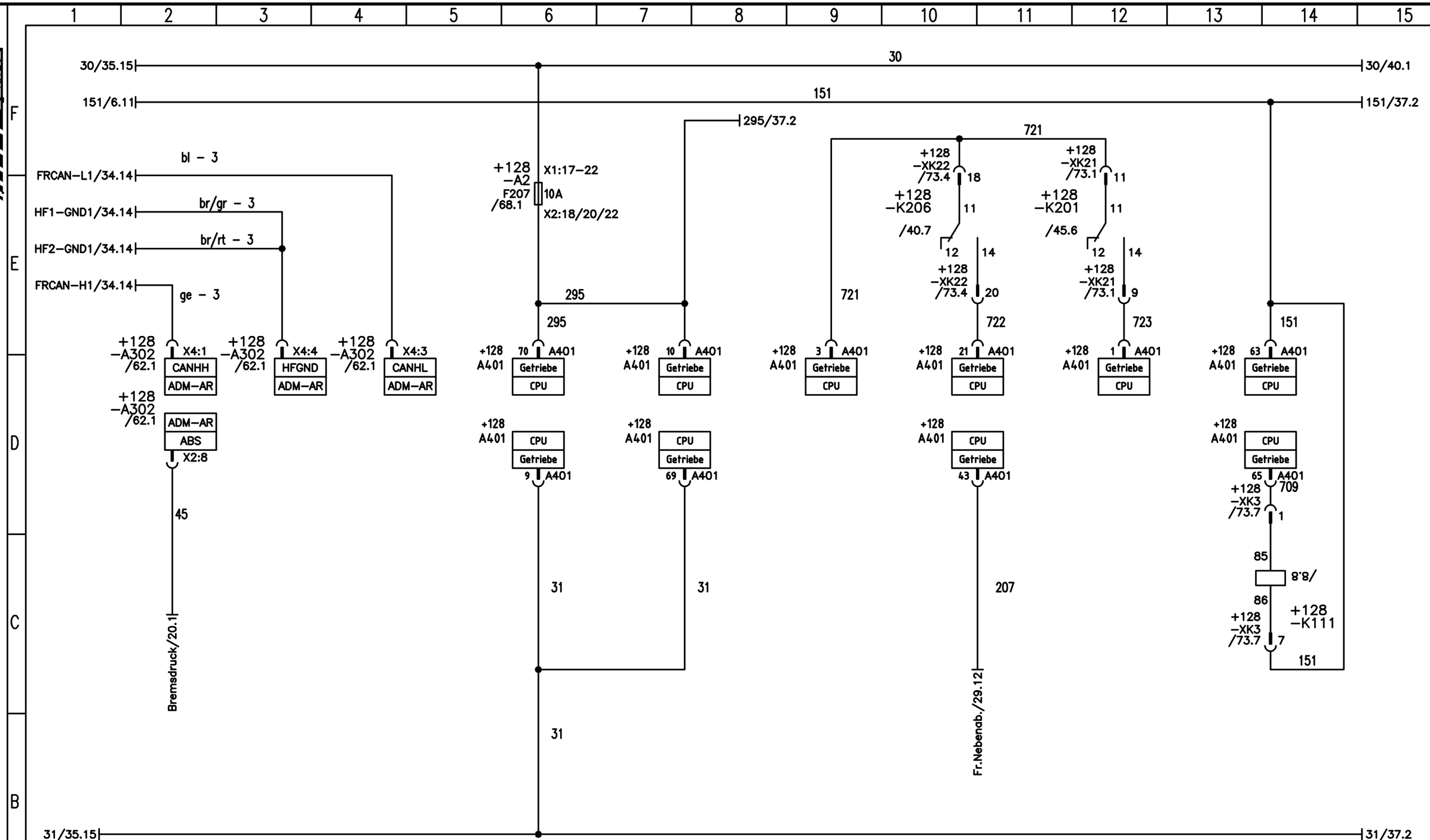

Motorelektronik
engine electronic

Getriebeelektronik
Versorgung
electronic for transmission
power supply

ABS
Freigabe Nebenabtrieb
ABS

Umschaltung Fahrschalter
selector
drive switch

Rückwärtsgang
reverse motion

a	W10663	18.07.08	Rosenkranz		Datum	Name
_	W10620	14.11.07	Rosenkranz	Erst.	14.11.07	Rosenkranz
Ind	Mitt–NR	Datum	Name	Gepr.		
Abteilung:	1142					

Projektbenennung / project description
E–PLAN AC80–2 UW V3.1.2
ELECTRIC WIRING DIAGRAM

Seitenbenennung / page description
ADM–AR, Getriebeelektronik
ADM–AR, gearbox electronic

Baunummer. 81963–
Anlage: 0
Ort: 0
Zeichnungsnr. / drawing no. 28387512
Blatt 36
78 Bl.

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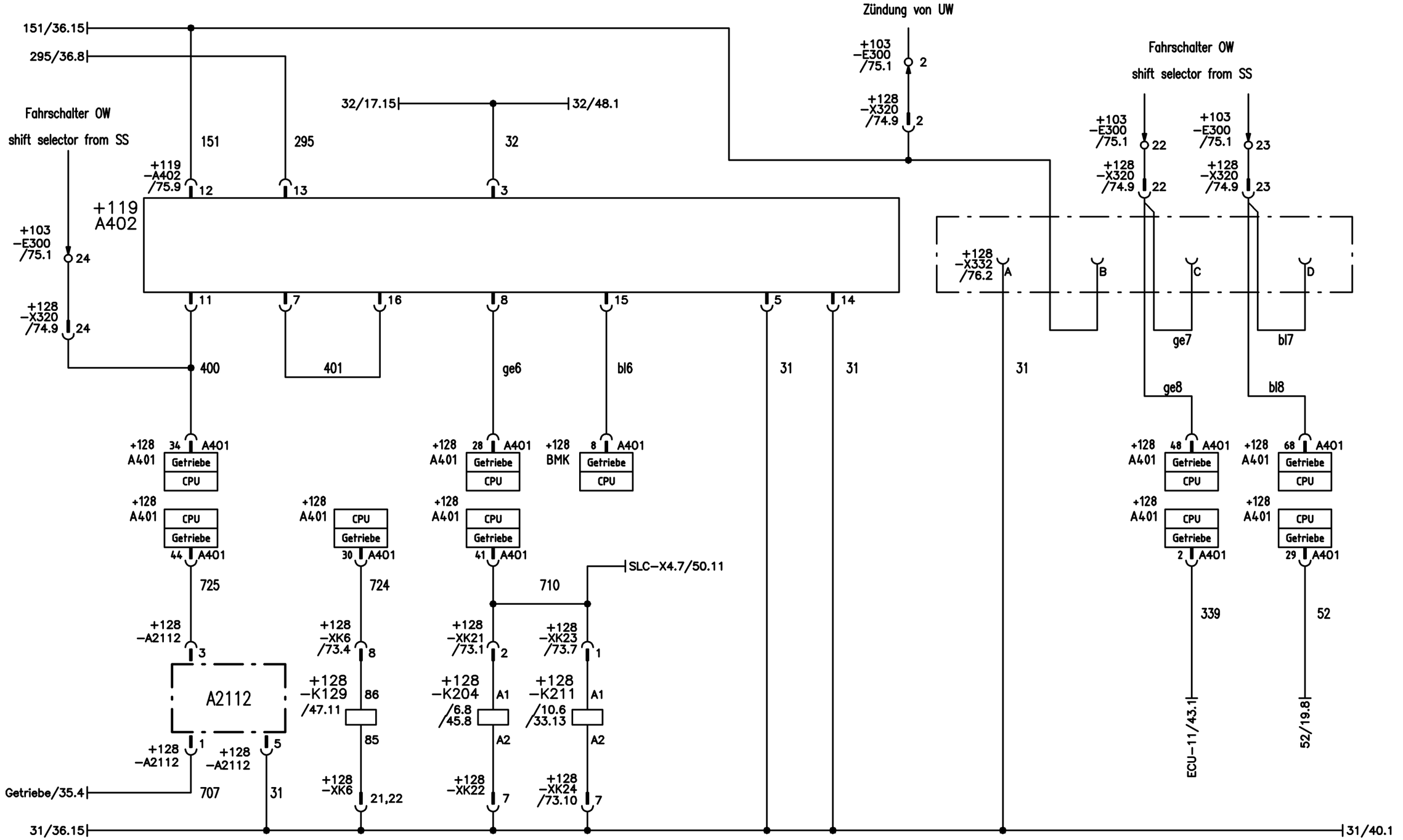

Fahrschalter Unterwagen
shift selector carrier

Wandlung des pulsbreitenmodulierten Signales Zuschaltung Nebenabtrieb Getriebe neutral
enable power take off transmission neutral

Diagnosestecker
diagnostics

Eingang Motorbremsen Ausgang Störlampe "nicht schalten"
digital input engine brake output disturb light "don't switch"

a	W10663	18.07.08	Rosenkranz		Datum	Name
_	W10620	14.11.07	Rosenkranz	Erst.	14.11.07	Rosenkranz
Ind	Mitt–NR	Datum	Name	Gepr.		
Abteilung:	1142					

Projektbenennung / project description: E–PLAN AC80–2 UW V3.1.2 ELECTRIC WIRING DIAGRAM

Seitenbenennung / page description: Getriebeelektronik gearbox electronic

Baunummer. 81963–

Anlage: 0

Ort: 0

Zeichnungsnr. / drawing no. 28387512

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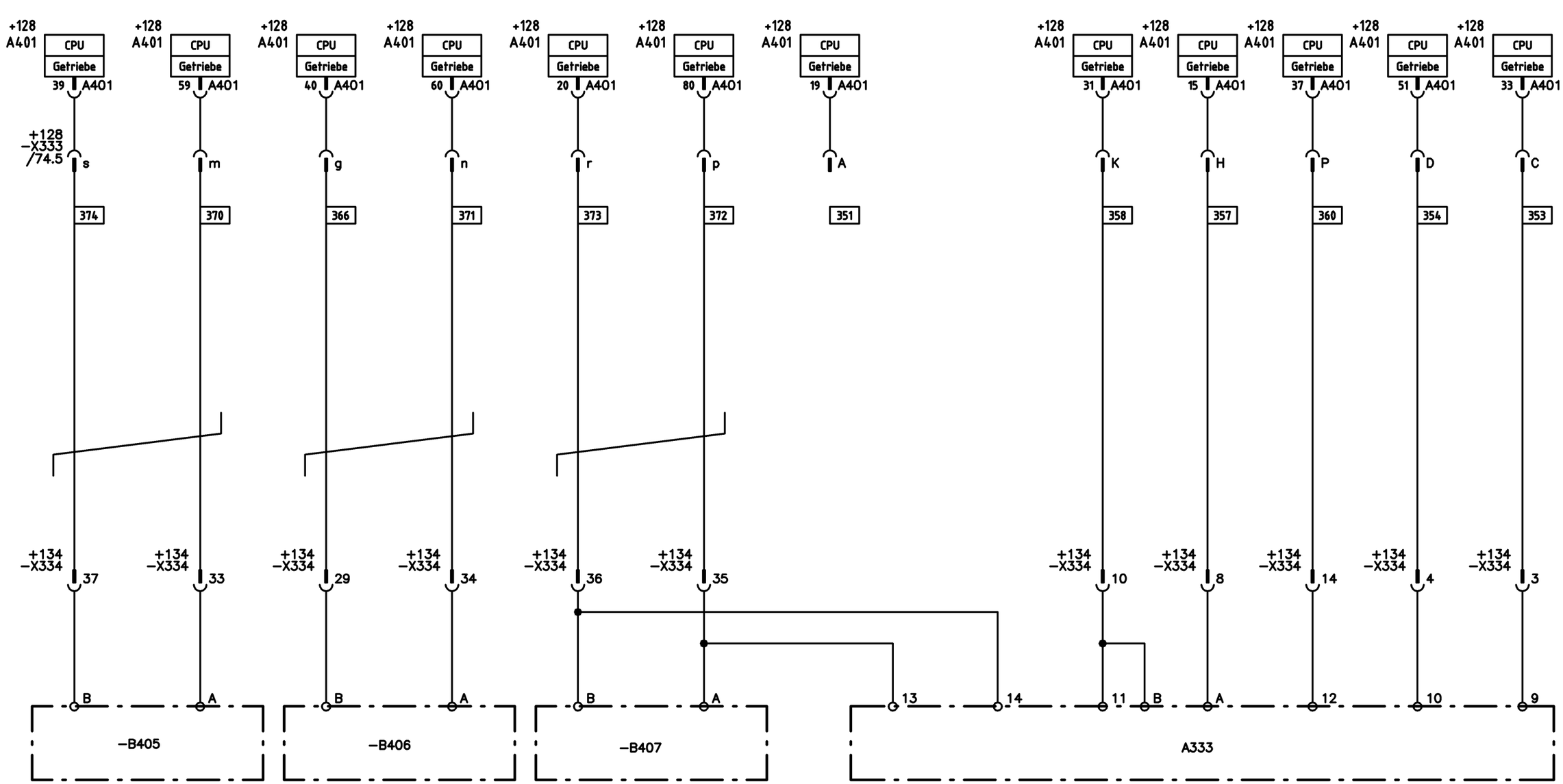

Getriebe / transmission

a	W10663	18.07.08	Rosenkranz		Datum	Name
_	W10620	14.11.07	Rosenkranz	Erst.	14.11.07	Rosenkranz
Ind	Mitt–NR	Datum	Name	Gepr.		
Abteilung:	1142					

Projektbenennung / project description
E–PLAN AC80–2 UW V3.1.2
ELECTRIC WIRING DIAGRAM

Seitenbenennung / page description
Getriebeelektonik
gearbox electronic

Baunummer. 81963–
Anlage: 0
Ort: 0
Zeichnungsnr. / drawing no. 28387512
Blatt 38
78 Bl.

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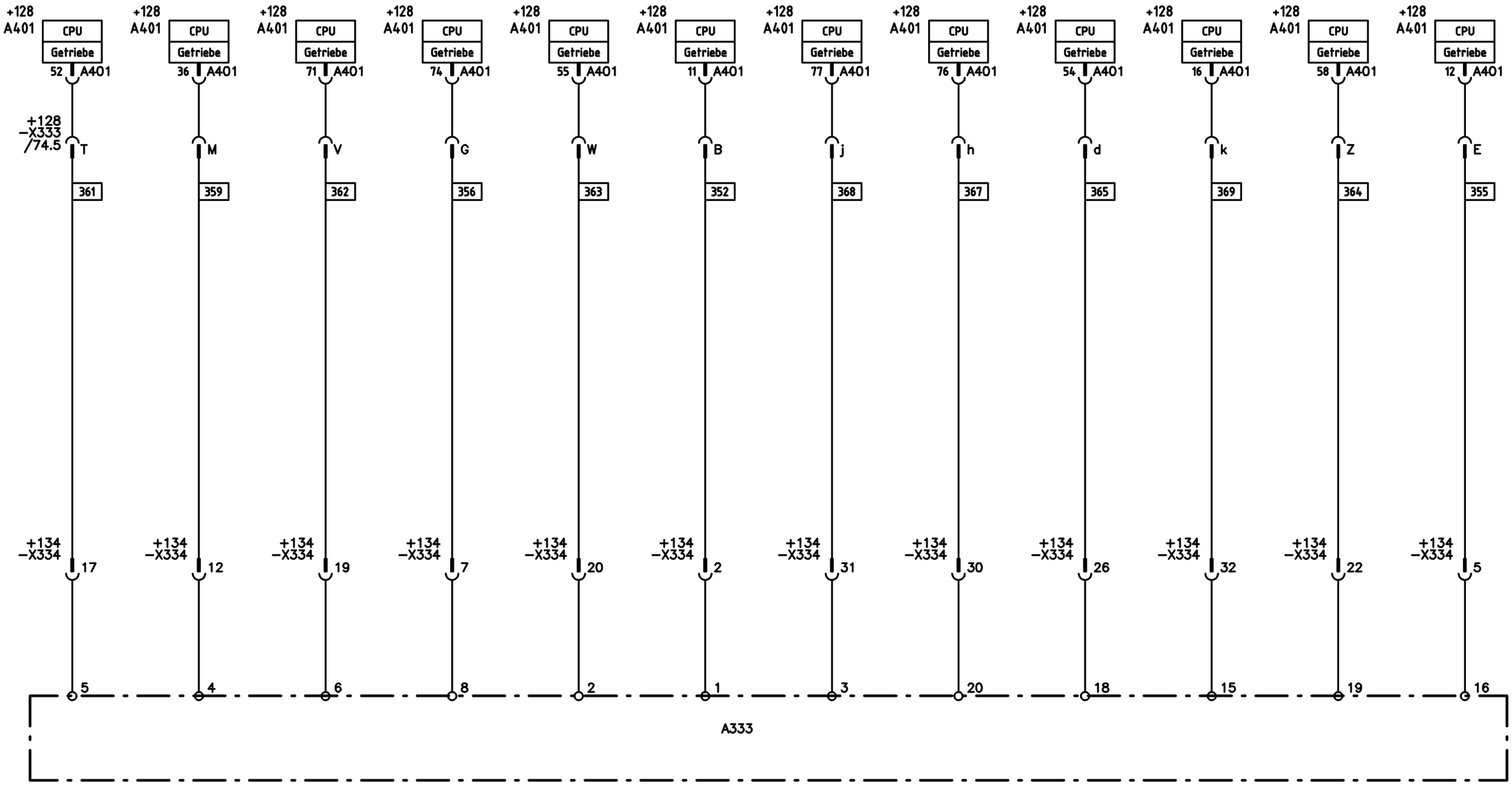

Getriebe

transmission

a	W10663	18.07.08	Rosenkranz		Datum	Name
_	W10620	14.11.07	Rosenkranz	Erst.	14.11.07	Rosenkranz
Ind	Mitt–NR	Datum	Name	Gepr.		
Abteilung:	1142					

Projektbenennung / project description
E–PLAN AC80–2 UW V3.1.2
ELECTRIC WIRING DIAGRAM

Seitenbenennung / page description
Getriebeelektronik
gearbox electronic

Baunummer. 81963–
Anlage: 0
Ort: 0
Zeichnungsnr. / drawing no. 28387512
Blatt 39
78 Bl.

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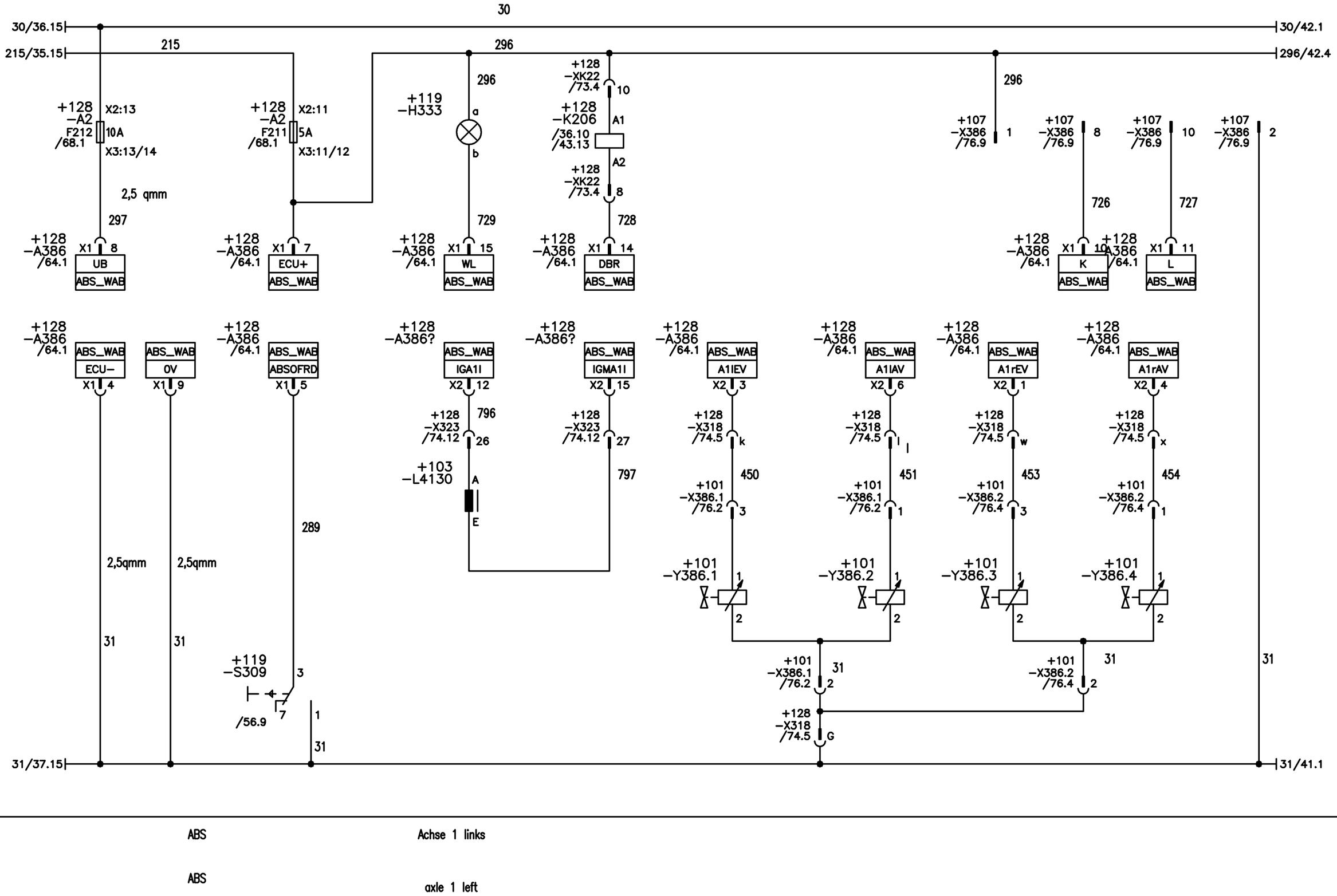

a	W10663	18.07.08	Rosenkranz		Datum	Name
_	W10620	14.11.07	Rosenkranz	Erst.	14.11.07	Rosenkranz
Ind	Mitt-NR	Datum	Name	Gepr.		
Abteilung:	1142					

Projektbenennung / project description
E-PLAN AC80-2 UW V3.1.2
ELECTRIC WIRING DIAGRAM

Seitenbenennung / page description
ABS-Steuerung
ABS-control

Baunummer. 81963-
Anlage: 0
Ort: 0
Zeichnungsnr. / drawing no. 28387512
Blatt 40
78 Bl.

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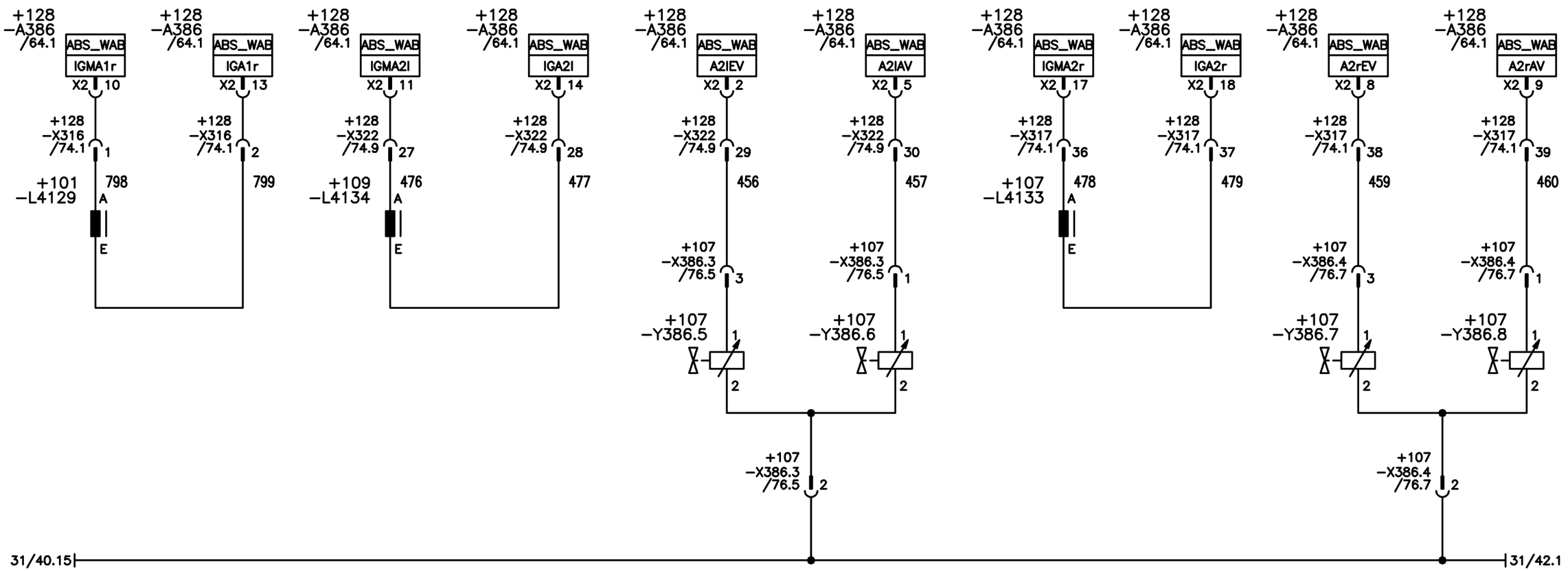

ABS Achse 1 rechts Achse 4 links Achse 4 rechts

ABS axle 1 right axle 4 left axle 4 right

a	W10663	18.07.08	Rosenkranz		Datum	Name	Projektbenennung / project description	Seitenbenennung / page description	Baunummer. 81963- / Anlage: 0 / Ort: 0
_	W10620	14.11.07	Rosenkranz	Erst.	14.11.07	Rosenkranz	E-PLAN AC80-2 UW V3.1.2	ABS-Steuerung	
Ind	Mitt-NR	Datum	Name	Gepr.			ELECTRIC WIRING DIAGRAM	ABS-control	Zeichnungsnr. / drawing no. 28387512
Abteilung: 1142									Blatt 41 / 78 Bl.

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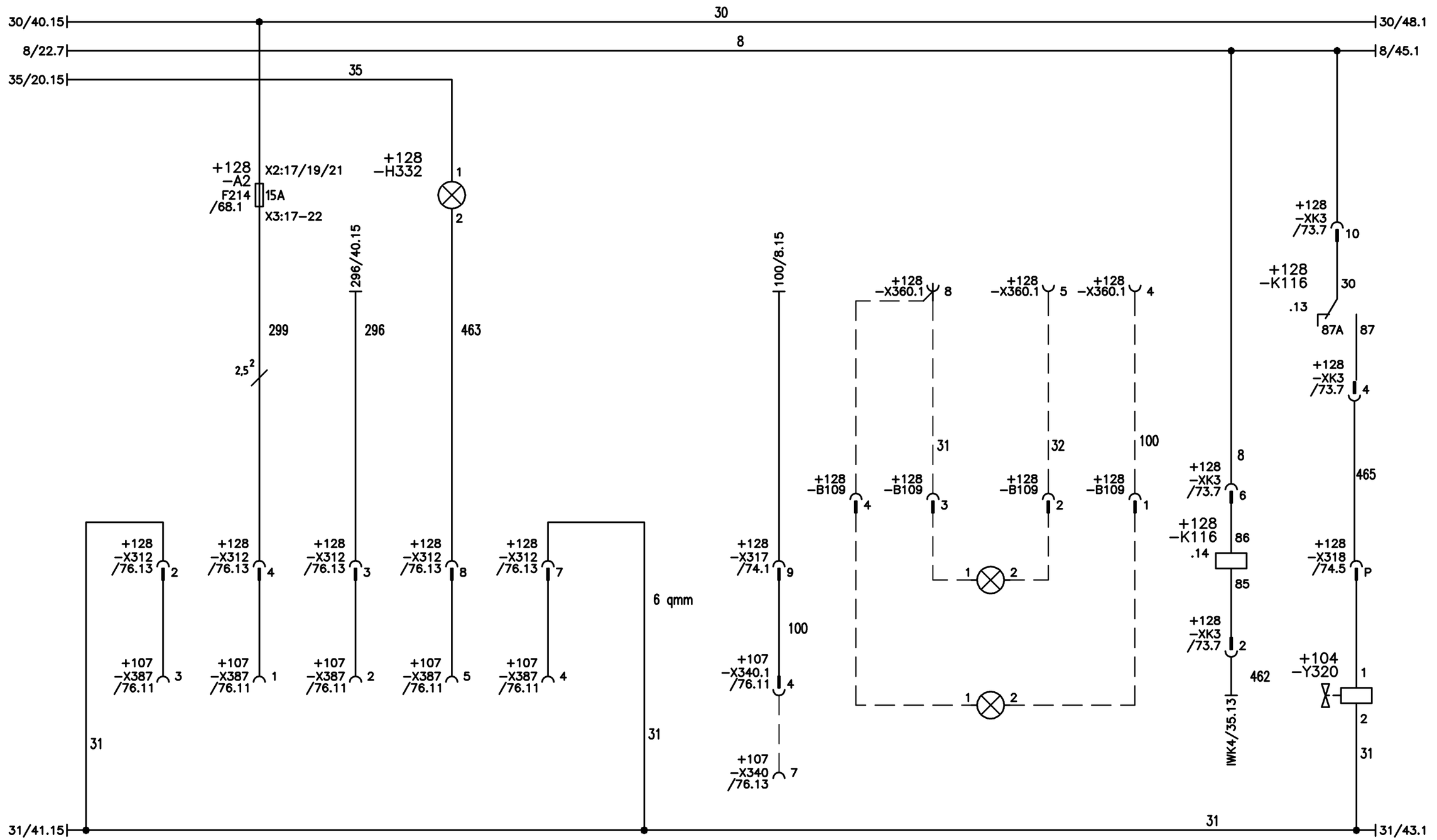

ABS Anhängersteckdose

ABS – trailer socket

Option Pendelleuchte

option pendulum light

Lüftersteuerung

fan – control

a	W10663	18.07.08	Rosenkranz		Datum	Name
_	W10620	14.11.07	Rosenkranz	Erst.	14.11.07	Rosenkranz
Ind	Mitt−NR	Datum	Name	Gepr.		
Abteilung:	1142					

Projektbenennung / project description
E−PLAN AC80−2 UW V3.1.2
ELECTRIC WIRING DIAGRAM

Seitenbenennung / page description
ABS Anhängersteckdose, Lüftersteuerung
ABS trailer socket, fan control

Baunummer. 81963−
Anlage: 0
Ort: 0
Zeichnungsnr. / drawing no. 28387512
Blatt 42
Bl. 78

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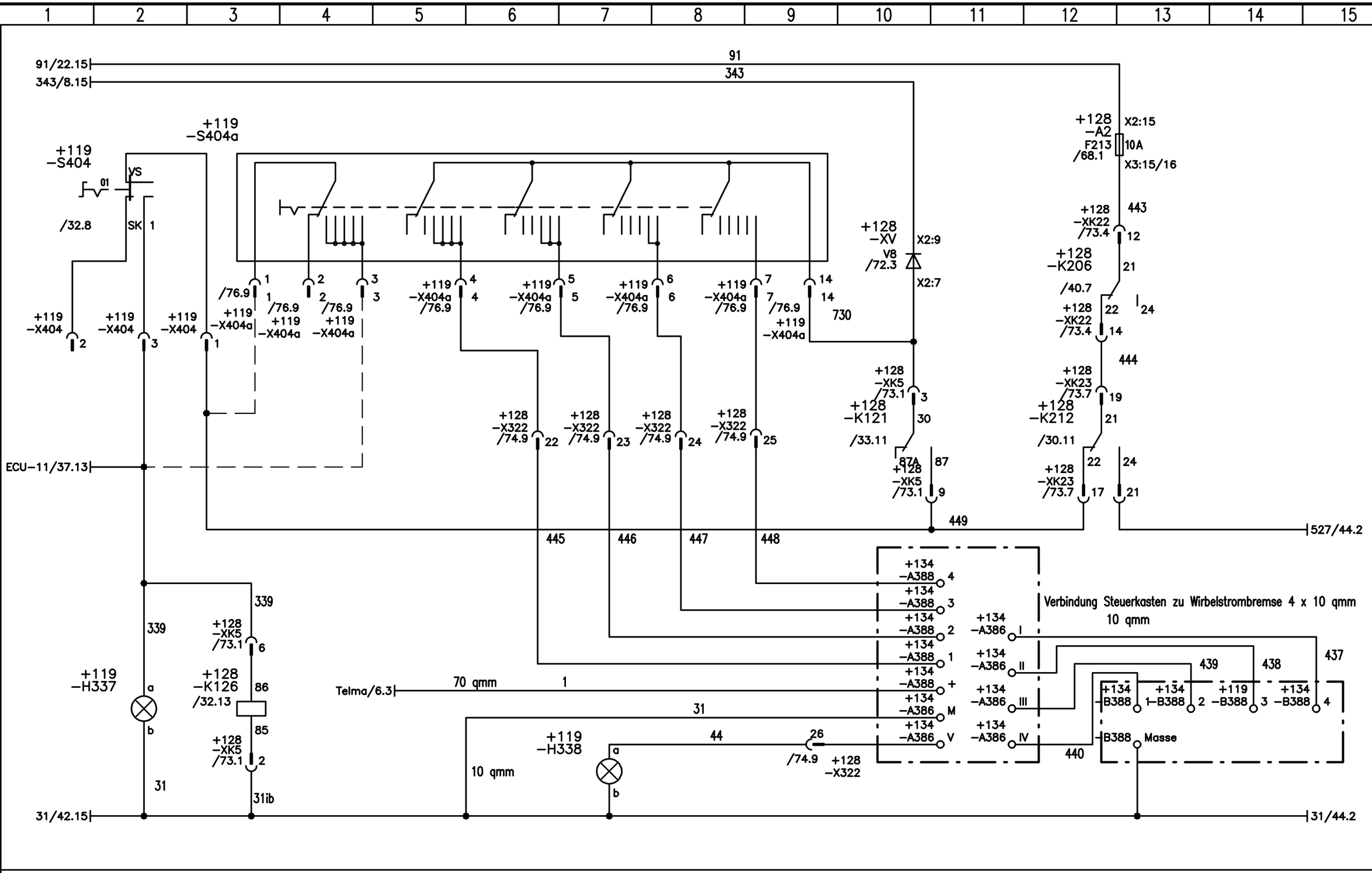

Motorbremse betätigt	Einstellung elektrischer Retarder Leuchte Retarder betätigt	Steuerungskasten	Wirbelstrombremse
engine brake	electrical retarder adjustment	control terminal box	eddy current brake

a	W10663	18.07.08	Rosenkranz		Datum	Name
_	W10620	14.11.07	Rosenkranz	Erst.	14.11.07	Rosenkranz
Ind	Mitt−NR	Datum	Name	Gepr.		
Abteilung:	1142					

Projektbenennung / project description: E−PLAN AC80−2 UW V3.1.2
ELECTRIC WIRING DIAGRAM

Seitenbenennung / page description: Retarderbremse
retarder brake

Baunummer. 81963−
Anlage: 0
Ort: 0
Zeichnungsnr. / drawing no. 28387512
Blatt 43
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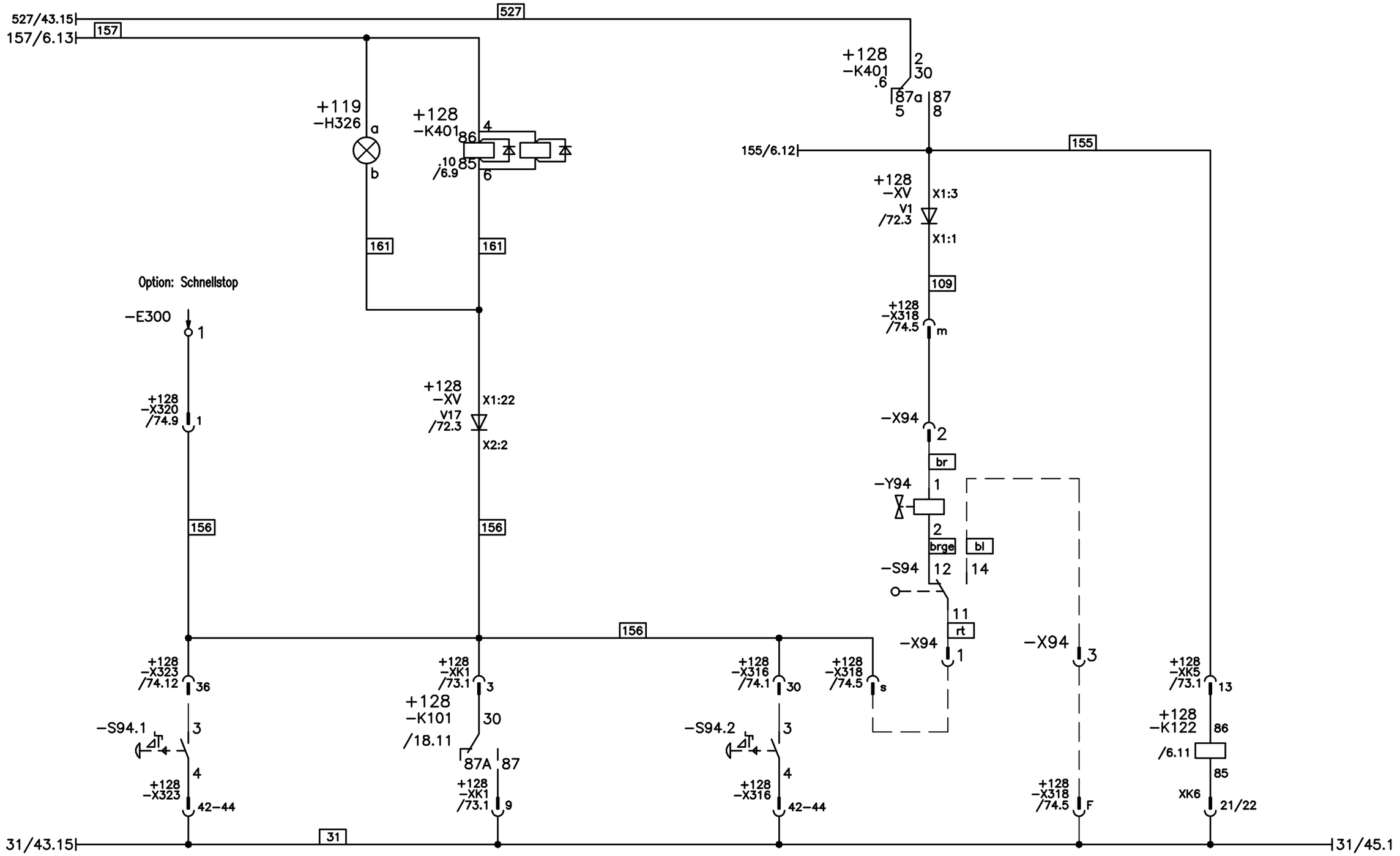

A	Kundenwunsch Schnellstop Motor UW und OW	Überdrehzahl	Schnellstop Motor stop
	Optional Quickstop engine	overspeed	quick stop engine stop

a	W10663	18.07.08	Rosenkranz		Datum	Name
_	W10620	14.11.07	Rosenkranz	Erst.	14.11.07	Rosenkranz
Ind	Mitt-NR	Datum	Name	Gepr.		
Abteilung:	1142					

Projektbenennung / project description
E-PLAN AC80-2 UW V3.1.2
ELECTRIC WIRING DIAGRAM

Seitenbenennung / page description
Schnellstop Motor
quick stop engine

Baunummer. 81963-
Anlage: 0
Ort:
Zeichnungsnr. / drawing no. 28387512
Blatt 44
Bl. 78

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Motorstart UW vom OW

Zündung UW vom OW

Umschaltung UW –OW

switch over carrier – superstructure

Umschaltung Handbremse

switch over handbrake

a	W10663	18.07.08	Rosenkranz		Datum	Name	Projektbenennung / project description: E–PLAN AC80–2 UW V3.1.2 ELECTRIC WIRING DIAGRAM
_	W10620	14.11.07	Rosenkranz	Erst.	14.11.07	Rosenkranz	
Ind	Mitt–NR	Datum	Name	Gepr.			
Abteilung:	1142						

Seitenbenennung / page description: Umschaltung UW – OW
switch over chassis – superstructure

Baunummer. 81963–

Anlage: 0

Ort: 0

Zeichnungsnr. / drawing no. 28387512

Blatt 45

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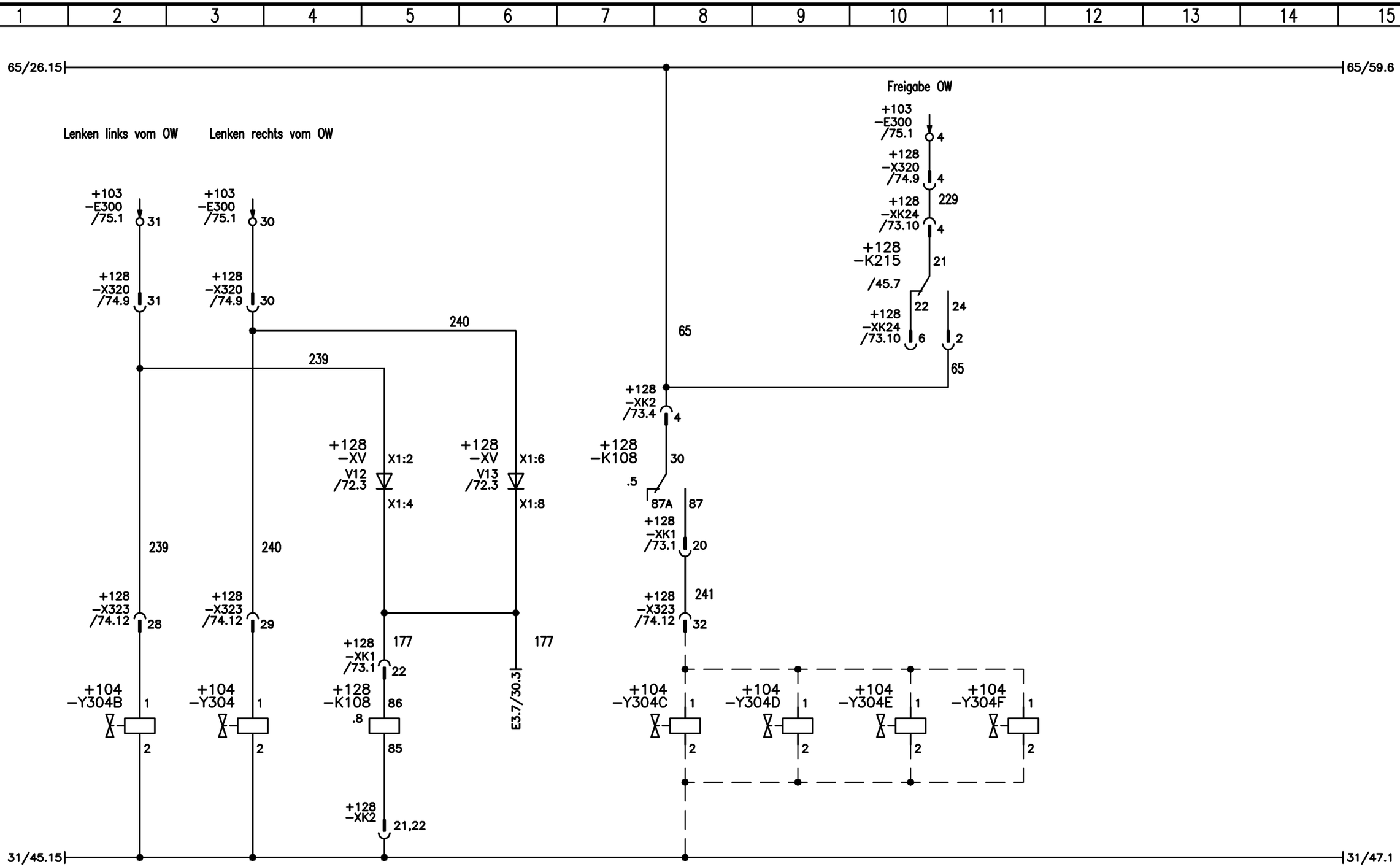

Lenken vom OW

links rechts

steering from superstructure

left right

Option fahren aus dem OW

option drive from superstructure

Umschaltung Lenkung auf den OW

switch over steering to superstructure

a	W10663	18.07.08	Rosenkranz		Datum	Name
_	W10620	14.11.07	Rosenkranz	Erst.	14.11.07	Rosenkranz
Ind	Mitt-NR	Datum	Name	Gepr.		
Abteilung: 1142						

Projektbenennung / project description
E-PLAN AC80-2 UW V3.1.2
ELECTRIC WIRING DIAGRAM

Seitenbenennung / page description
Lenkung vom OW
steering from superstructure

Baunummer. 81963-
Anlage: 0
Ort: 0
Zeichnungsnr. / drawing no. 28387512
Blatt 46
78 Bl.

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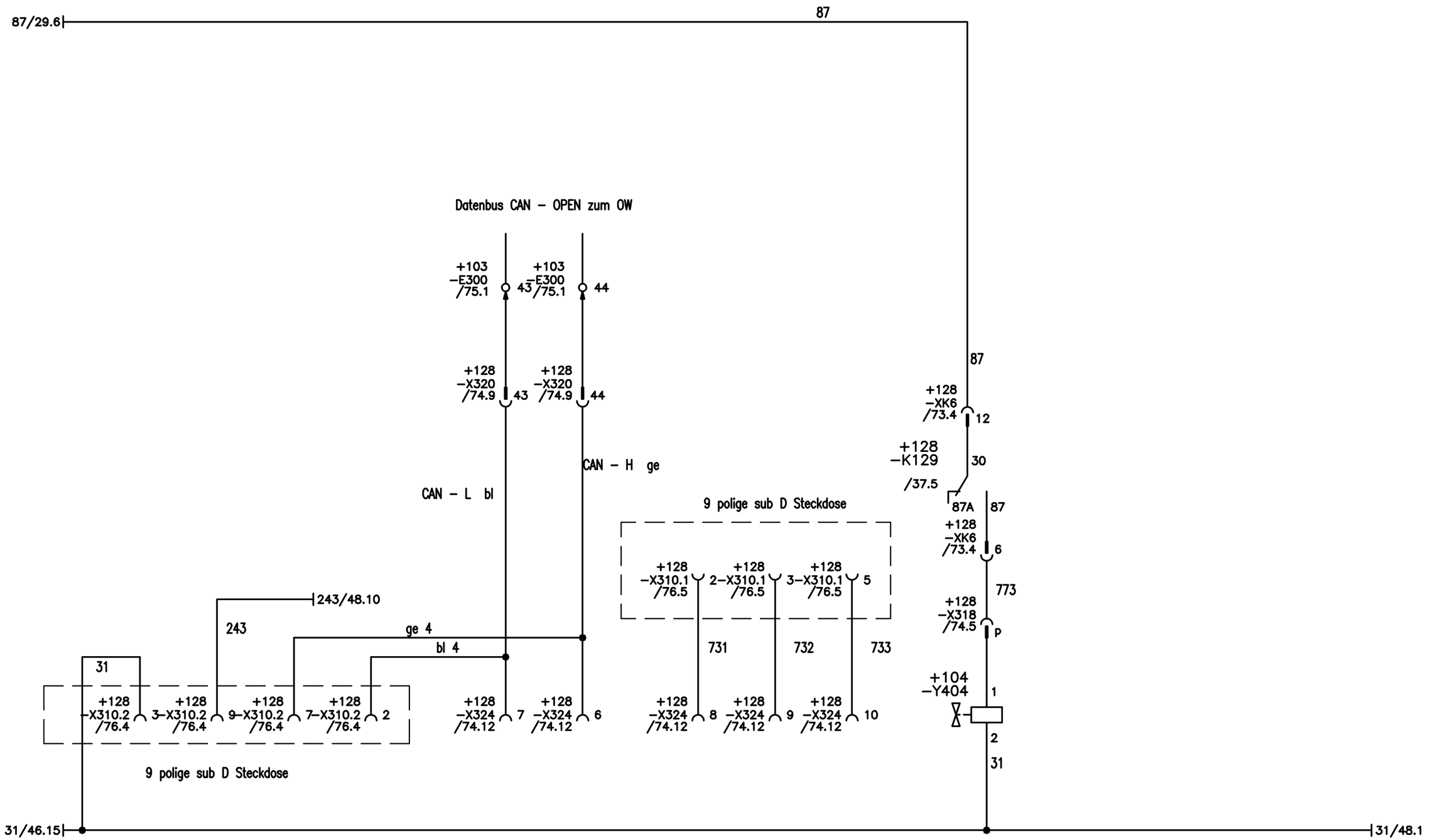

CAN – OPEN Diagnose		Datenbus CAN – OPEN zum OW		Programmierstecker		Zuschaltung Nebenabtrieb
		CAN – OPEN to superstructure		program plug		enable power take off

a	W10663	18.07.08	Rosenkranz		Datum	Name	Projektbenennung / project description	Seitenbenennung / page description
_	W10620	14.11.07	Rosenkranz	Erst.	14.11.07	Rosenkranz	E-PLAN AC80-2 UW V3.1.2	CAN-open, Zuschaltung Nebenabtrieb
Ind	Mitt-NR	Datum	Name	Gepr.			ELECTRIC WIRING DIAGRAM	CAN-open, enable power take off
Abteilung:	1142							

Baunummer.	81963-	Anlage:	0
		Ort:	0
Zeichnungsnr. / drawing no.	28387512	Blatt	47
			78 Bl.

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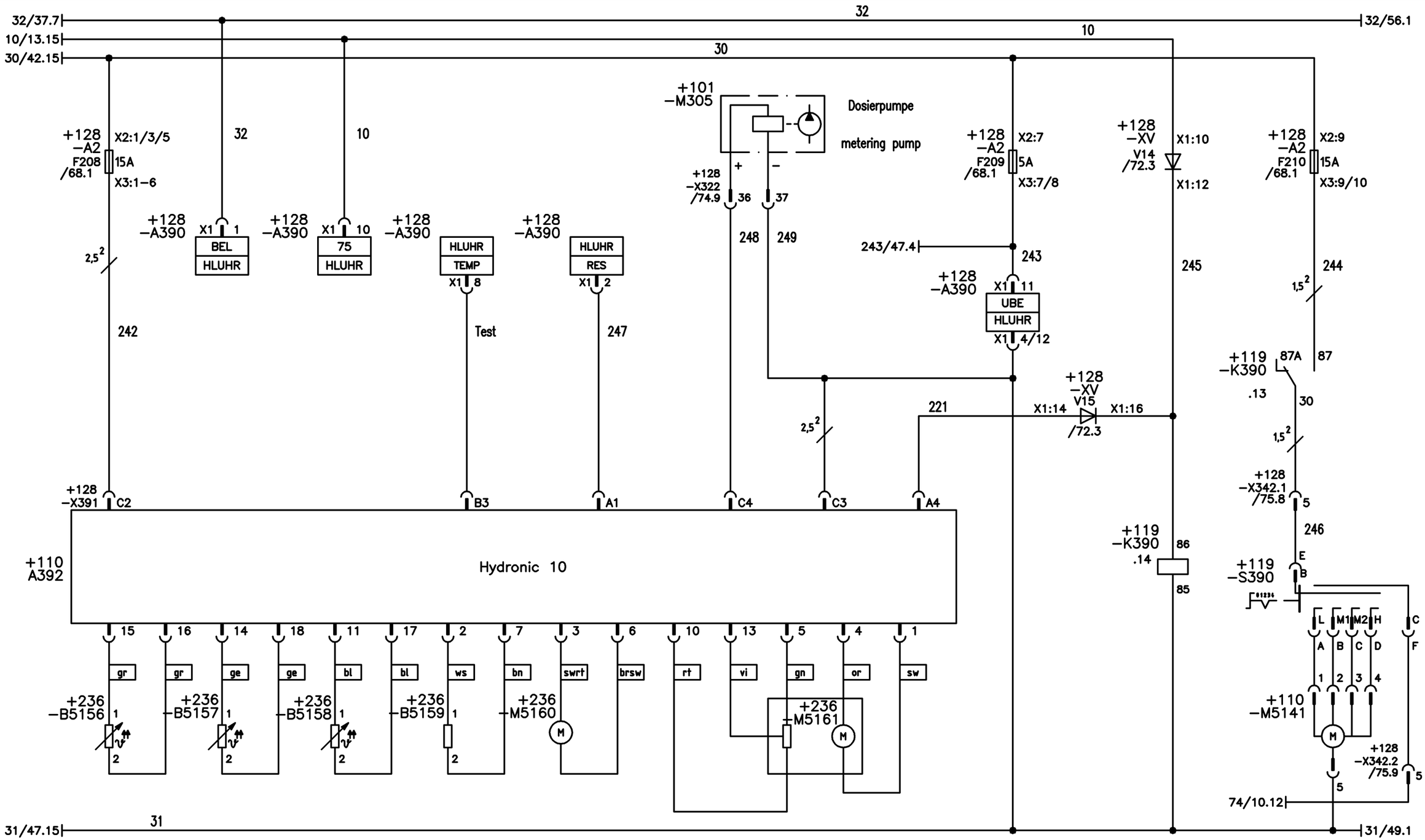

Flammfühler	flame sensor
Temp.fühler	temp. sensor
Überhitz.fühler	overheat sensor
Glühkerze	glow plug
Wasserpumpe	water pump
Option: Standheizung	option: water heater
Brennermotor	burner motor
Gebläse	fan

a	W10663	18.07.08	Rosenkranz		Datum	Name
_	W10620	14.11.07	Rosenkranz	Erst.	14.11.07	Rosenkranz
Ind	Mitt–NR	Datum	Name	Gepr.		
Abteilung:	1142					

Projektbenennung / project description
E–PLAN AC80–2 UW V3.1.2
ELECTRIC WIRING DIAGRAM

Seitenbenennung / page description
Standheizung
auxilary heating

Baunummer. 81963–
Anlage: 0
Ort: 0
Zeichnungsnr. / drawing no. 28387512
Blatt 48
78 Bl.

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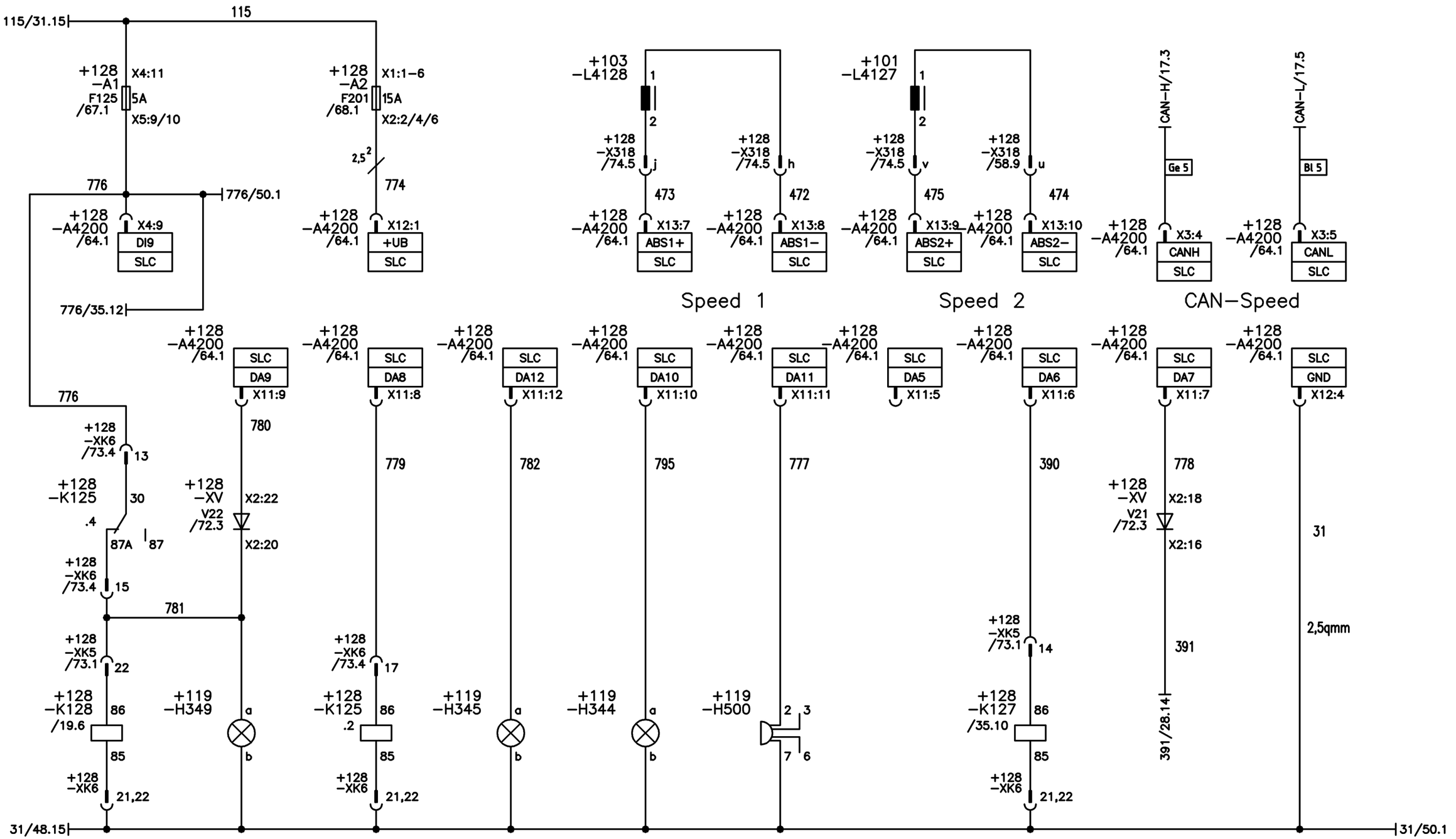

A

Spannungsversorgung
Fehleranzeige Störung
power supply
fault display malfunction

Überwachung
control

Diagonallenkung
diagonal steering

Allradlenkung
all−wheel−drive steering

Alarmsummer SLC
alert buzzer SLC

Freigabe Geschwindigkeit
release speed

Geschwindigkeitsschwelle v < 20km/h
speed threshold v < 20km/h

a	W10663	18.07.08	Rosenkranz		Datum	Name
_	W10620	14.11.07	Rosenkranz	Erst.	14.11.07	Rosenkranz
Ind	Mitt−NR	Datum	Name	Gepr.		
Abteilung:	1142					

Projektbenennung / project description
E−PLAN AC80−2 UW V3.1.2
ELECTRIC WIRING DIAGRAM

Seitenbenennung / page description
Lenkung
steering

Baunummer. 81963−
Anlage: 0
Ort: 0
Zeichnungsnr. / drawing no. 28387512
Blatt 49
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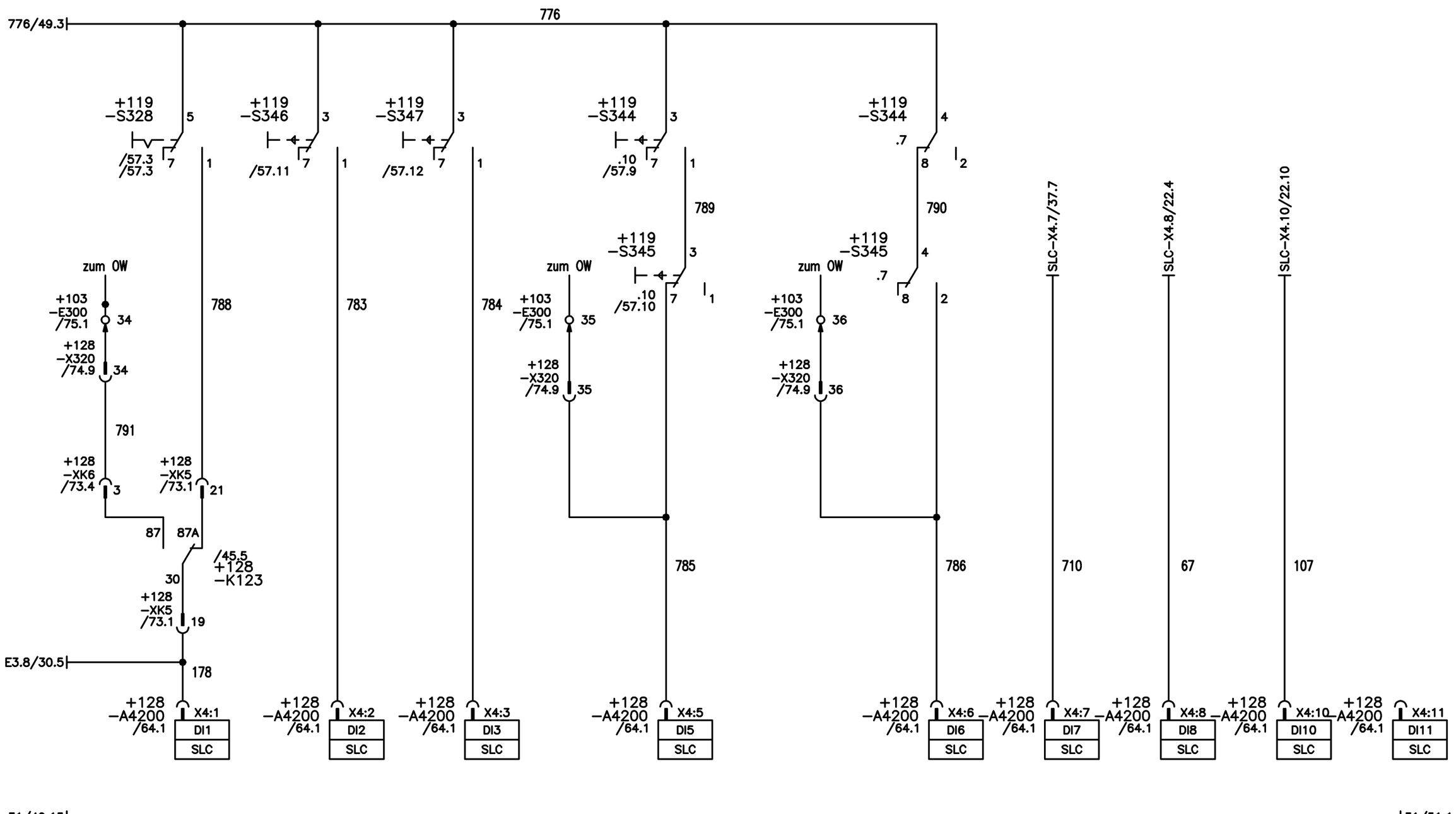

Verriegelungsschalter Straße/Baustelle — Lenkradtaste diagonal — Getriebe neutral — Differentialsperre quer — Motor läuft

Lenkradtaste Allradlenkung — manuell links — manuell rechts

steering wheel-tip switch all-wheel-drive steering — manual left — manual right — differential lock cross

locking switch street/building site — steering wheel-tip switch diagonal — transmission neutral — engine running

a	W10663	18.07.08	Rosenkranz		Datum	Name
_	W10620	14.11.07	Rosenkranz	Erst.	14.11.07	Rosenkranz
Ind	Mitt-NR	Datum	Name	Gepr.		
Abteilung:	1142					

Projektbenennung / project description: E-PLAN AC80-2 UW V3.1.2 ELECTRIC WIRING DIAGRAM

Seitenbenennung / page description: Lenkung steering

Baunummer. 81963- | Anlage: 0 | Ort: 0

Zeichnungsnr. / drawing no. 28387512 | Blatt 50 | Bl. 78

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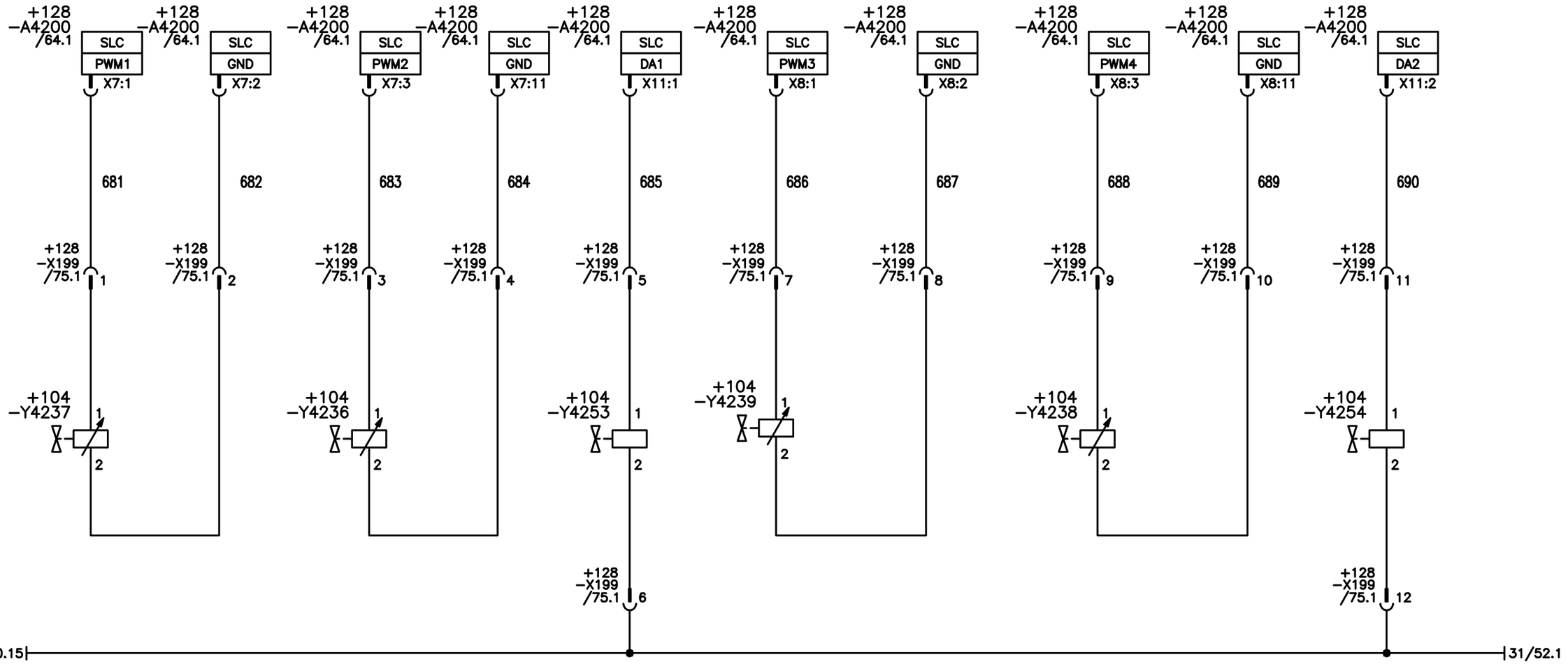
Belegung bei Antrieb 8 x 8 x 8 oder 8 x 8 x 8 TM

I/O – configuration at drive 8 x 8 x 8 or 8 x 8 x 8 TM



Lenk. Achse 3 links	Lenk. Achse 3 rechts	Lenkungssperre Achse 3	Lenk. Achse 4 links	Lenk. Achse 4 rechts	Lenkungssperre Achse 4
steering axle 3 left	steering axle 3 right	steering lock axle 3	steering axle 4 left	steering axle 4 right	steering lock axle 4

Ind	Mitt-NR	Datum	Name		Datum	Name
a	W10663	18.07.08	Rosenkranz			
_	W10620	14.11.07	Rosenkranz	Erst.	14.11.07	Rosenkranz
				Gepr.		
Abteilung: 1142						

Projektbenennung / project description
E-PLAN AC80-2 UW V3.1.2
ELECTRIC WIRING DIAGRAM

Seitenbenennung / page description
Lenkung
steering

Baunummer. 81963-
Anlage: 0
Ort: 0
Zeichnungsnr. / drawing no. 28387512
Blatt 51
78 Bl.

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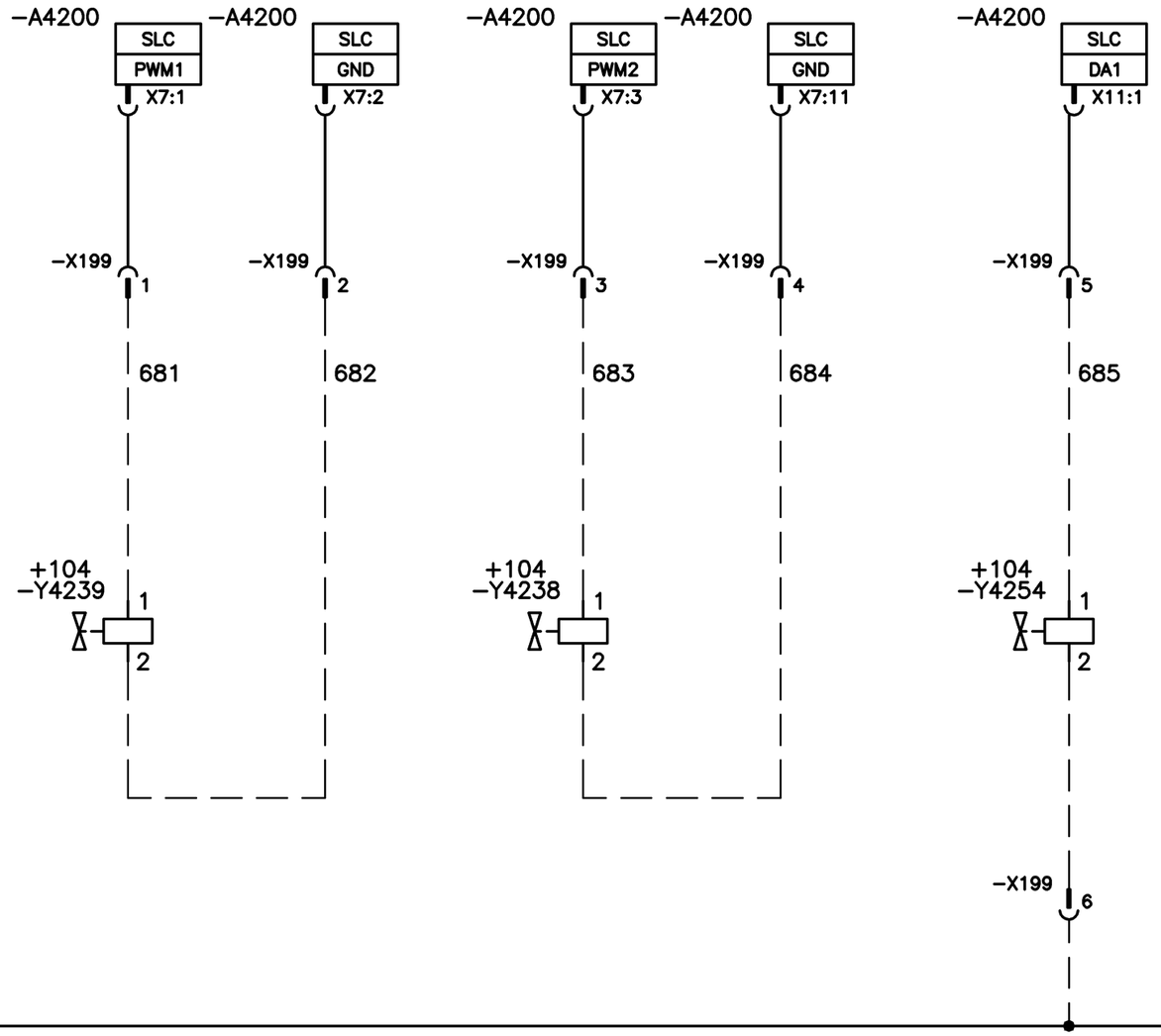
Belegung bei Antrieb 8 x 6 x 6

I/O – configuration at drive 8 x 6 x 6



Lenk. Achse 4 links

steering axle 4 left

Lenk. Achse 4 rechts

steering axle 4 right

Lenkungssperre Achse 4

steering lock axle 4

Ind	Mitt-NR	Datum	Name		Datum	Name
a	W10663	18.07.08	Rosenkranz			
_	W10620	14.11.07	Rosenkranz	Erst.	14.11.07	Rosenkranz
				Gepr.		

Abteilung: 1142

Projektbenennung / project description: E-PLAN AC80-2 UW V3.1.2 ELECTRIC WIRING DIAGRAM

Seitenbenennung / page description: Lenkung steering

Baunummer. 81963-

Anlage: 0

Ort: 0

Zeichnungsnr. / drawing no. 28387512

Blatt 52

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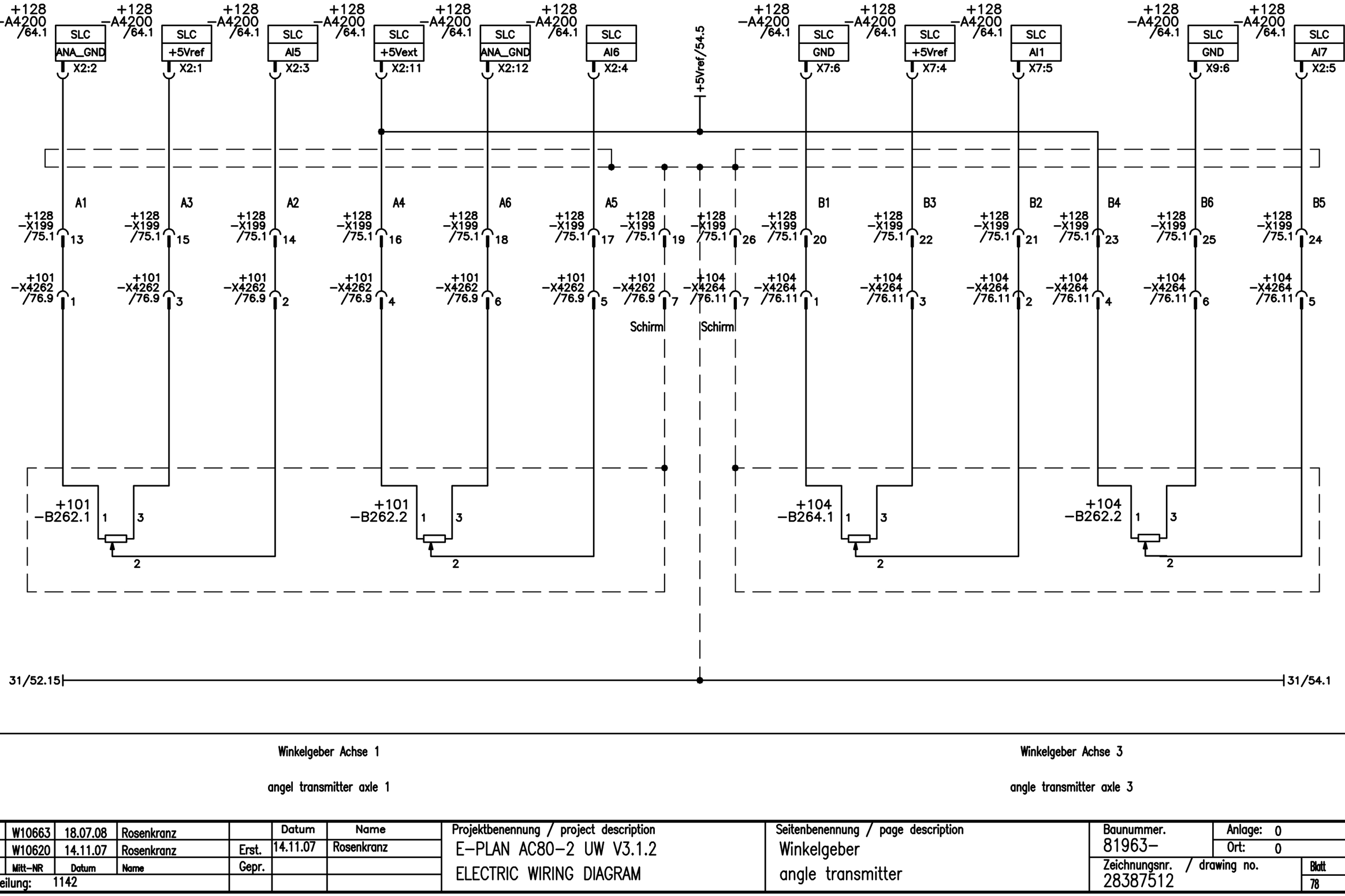
Belegung bei Antrieb 8 x 8 x 8 oder 8 x 8 x 8 TM
I/O – configuration at drive 8 x 8 x 8 or 8 x 8 x 8 TM



Winkelgeber Achse 1

angel transmitter axle 1

Winkelgeber Achse 3

angle transmitter axle 3

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a	W10663	18.07.08	Rosenkranz		Datum	Name
_	W10620	14.11.07	Rosenkranz	Erst.	14.11.07	Rosenkranz
Ind	Mitt-NR	Datum	Name	Gepr.		
Abteilung:	1142					

Projektbenennung / project description
E-PLAN AC80-2 UW V3.1.2
ELECTRIC WIRING DIAGRAM

Seitenbenennung / page description
Winkelgeber
angle transmitter

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Anlage: 0
Ort: 0
Zeichnungsnr. / drawing no. 28387512
Blatt 53
78 Bl.

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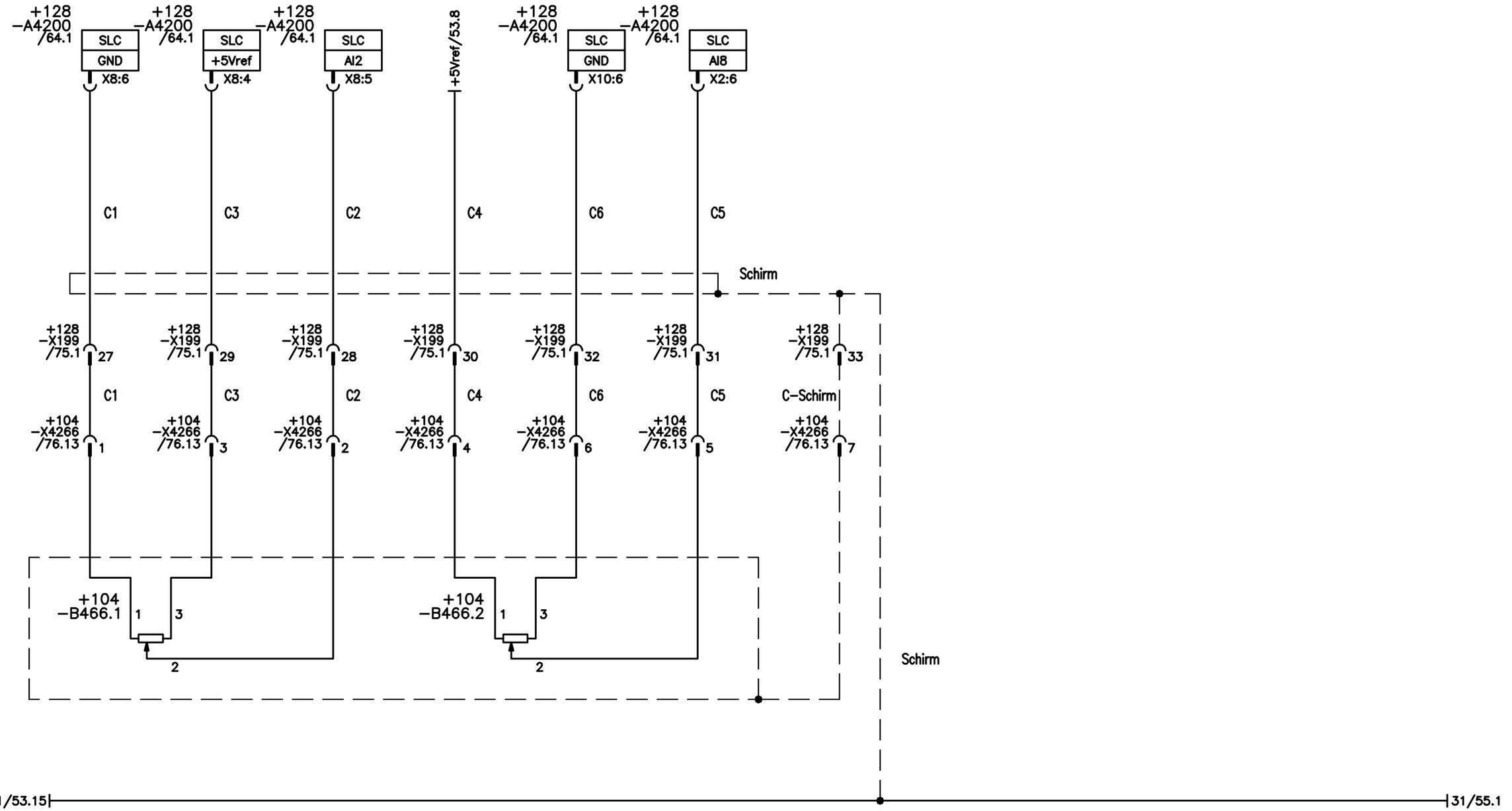
Belegung bei Antrieb 8 x 8 x 8 oder 8 x 8 x 8 TM

I/O – configuration at drive 8 x 8 x 8 or 8 x 8 x 8 TM



Winkelgeber Achse 4

angel transmitter axle 4

a	W10663	18.07.08	Rosenkranz		Datum	Name
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Ind	Mitt-NR	Datum	Name	Gepr.		
Abteilung:	1142					

Projektbenennung / project description: E-PLAN AC80-2 UW V3.1.2 ELECTRIC WIRING DIAGRAM

Seitenbenennung / page description: Winkelgeber angle transmitter

Baunummer. 81963-

Anlage: 0

Ort: 0

Zeichnungsnr. / drawing no. 28387512

Blatt 54 / Bl. 78

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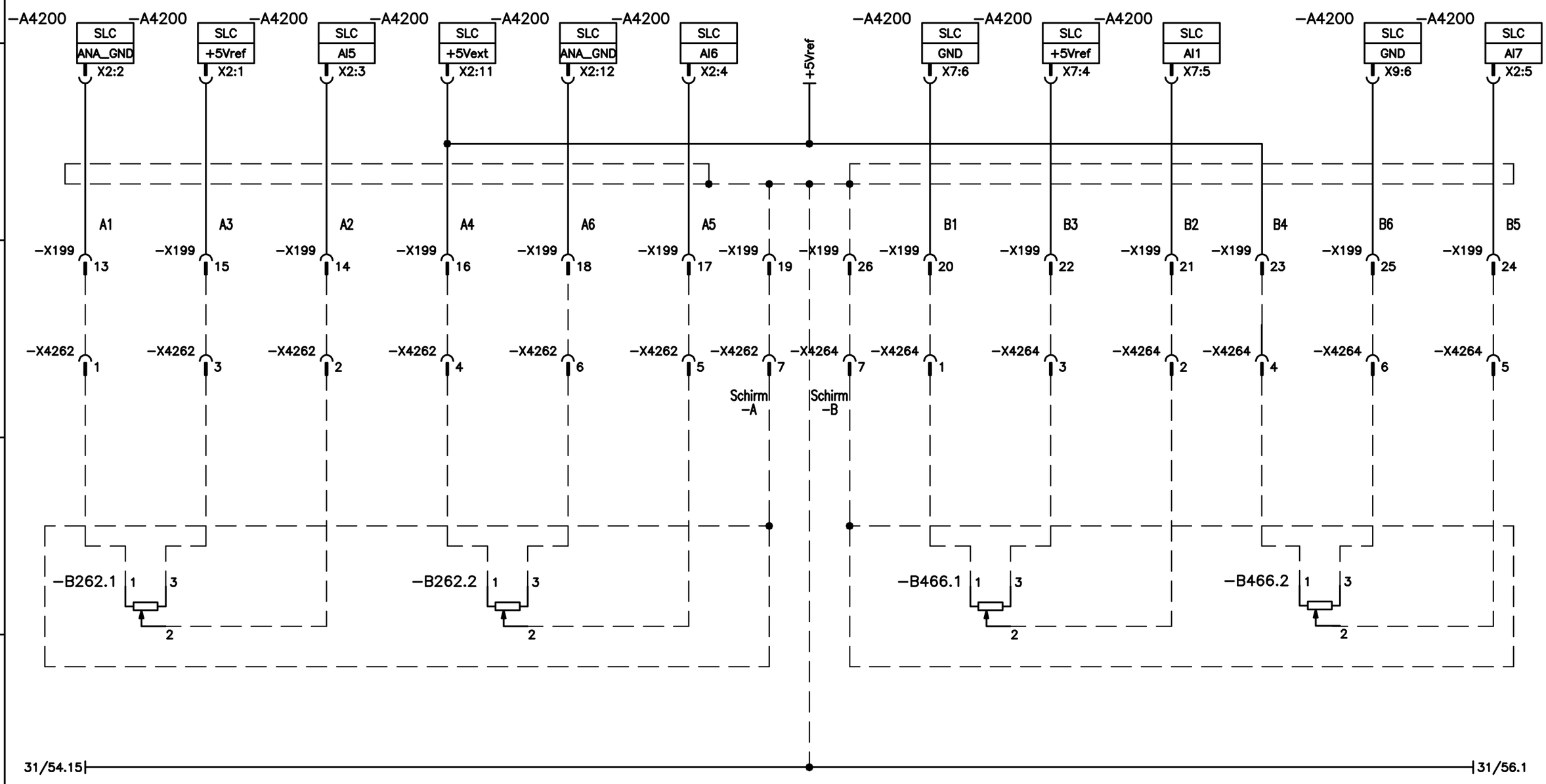
Belegung bei Antrieb 8 x 6 x 6
I/O – configuration at drive 8 x 6 x 6



Winkelgeber Achse 1

angel transmitter axle 1

Winkelgeber Achse 4

angel transmitter axle 4

a	W10663	18.07.08	Rosenkranz		Datum	Name
_	W10620	14.11.07	Rosenkranz	Erst.	14.11.07	Rosenkranz
Ind	Mitt–NR	Datum	Name	Gepr.		
Abteilung:	1142					

Projektbenennung / project description
E–PLAN AC80–2 UW V3.1.2
ELECTRIC WIRING DIAGRAM

Seitenbenennung / page description
Winkelgeber
angle transmitter

Baunummer. 81963–
Anlage: 0
Ort: 0
Zeichnungsnr. / drawing no. 28387512
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Bl. 78

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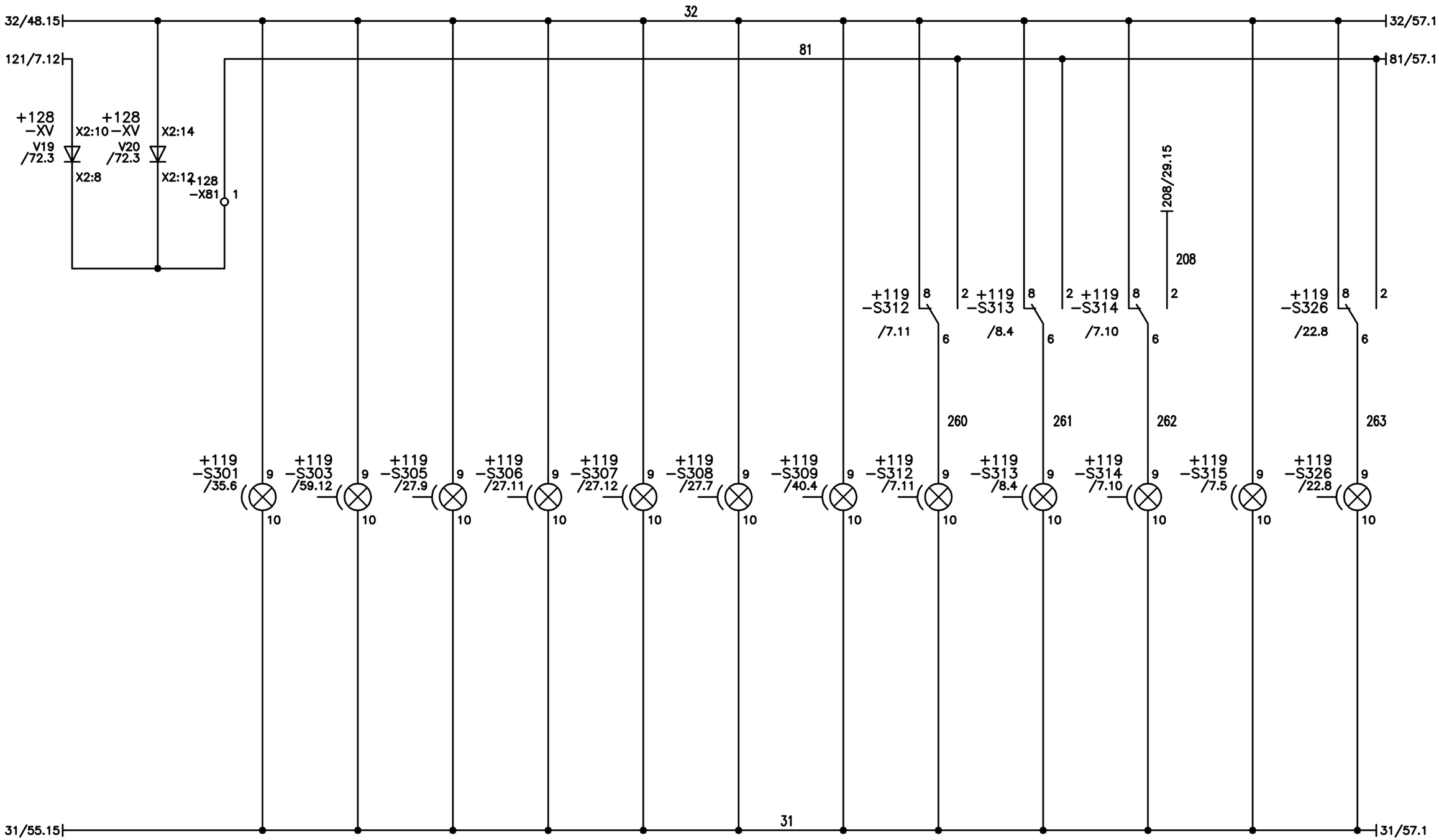

a	W10663	18.07.08	Rosenkranz		Datum	Name
_	W10620	14.11.07	Rosenkranz	Erst.	14.11.07	Rosenkranz
Ind	Mitt-NR	Datum	Name	Gepr.		
Abteilung:	1142					

Projektbenennung / project description
E-PLAN AC80-2 UW V3.1.2
ELECTRIC WIRING DIAGRAM

Seitenbenennung / page description
Schalterbeleuchtung
switch illumination

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Anlage: 0
Ort: 0
Zeichnungsnr. / drawing no. 28387512
Blatt 56
78 Bl.

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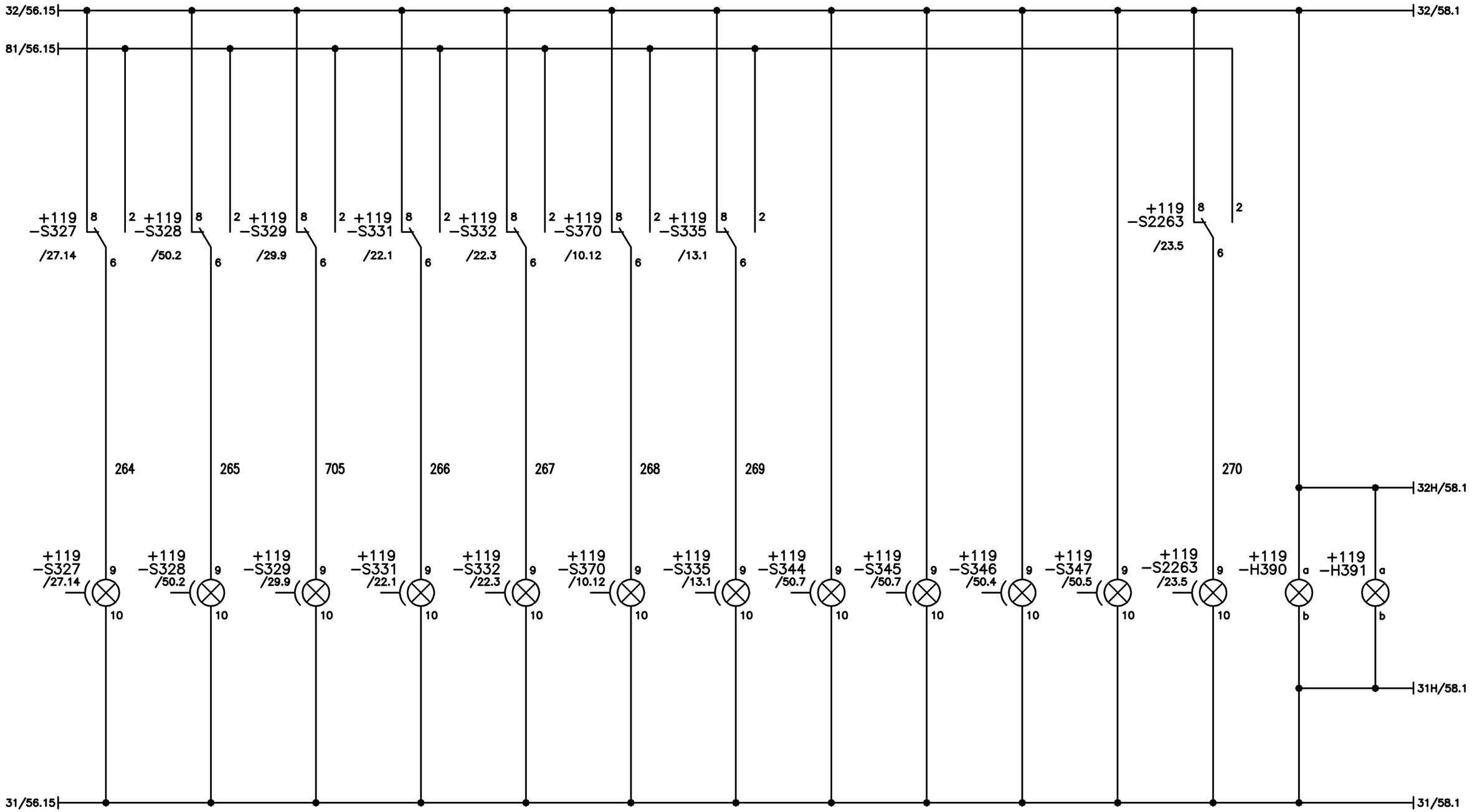

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Ind	Mitt-NR	Datum	Name	Gepr.		
Abteilung:	1142					

Projektbenennung / project description
E-PLAN AC80-2 UW V3.1.2
ELECTRIC WIRING DIAGRAM

Seitenbenennung / page description
Schalterbeleuchtung
switch illumination

Baunummer. 81963-
Anlage: 0
Ort: 0
Zeichnungsnr. / drawing no. 28387512
Blatt 57
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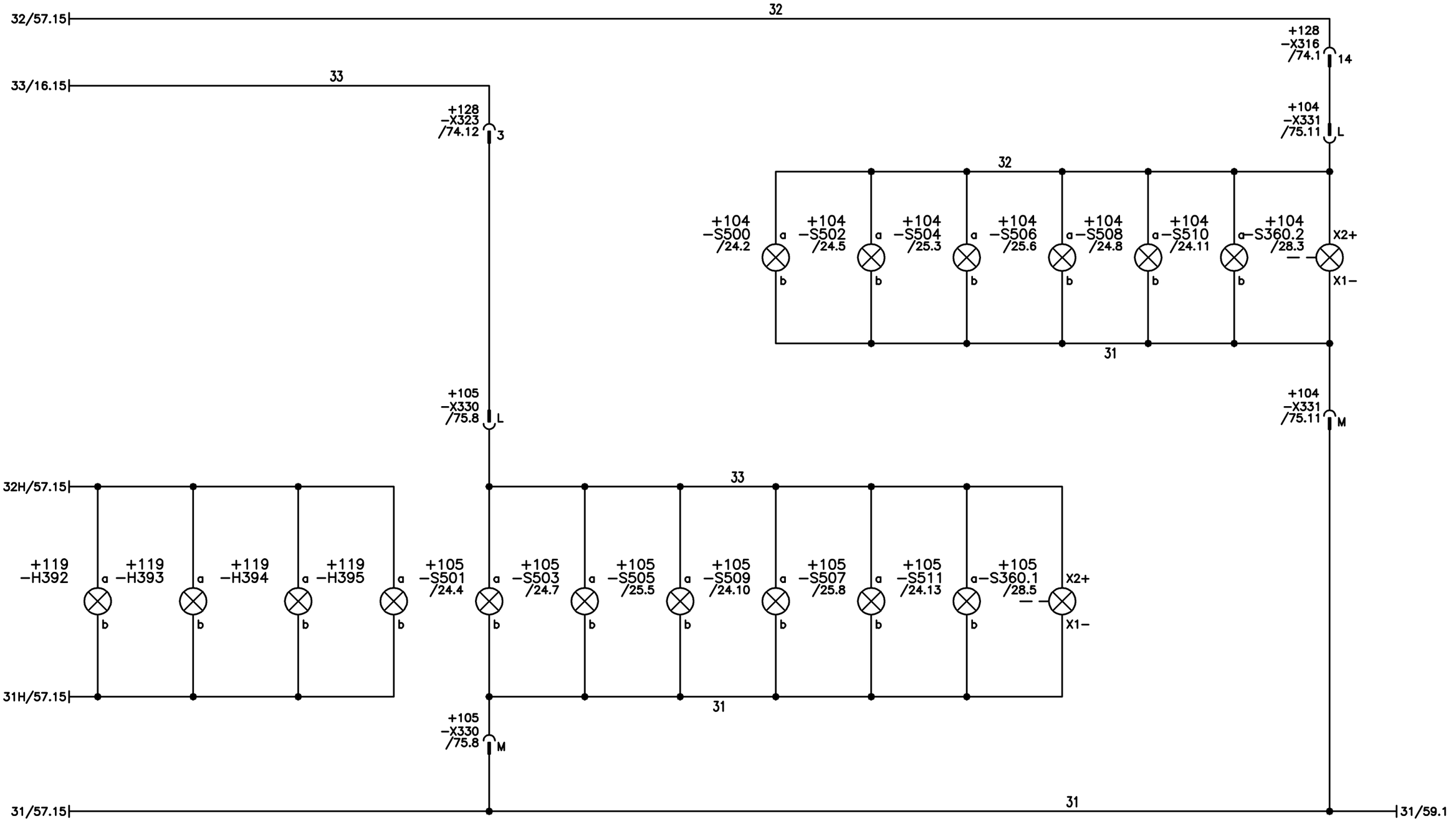

Beleuchtung Heizung

heater illumination

Tasterbeleuchtung Abstützkasten links

switch illumination stabilizer – box left hand

Tastenbeleuchtung Abstützkasten rechts

switch illumination stabilizer – box right hand

a	W10663	18.07.08	Rosenkranz		Datum	Name
_	W10620	14.11.07	Rosenkranz	Erst.	14.11.07	Rosenkranz
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Abteilung:	1142					

Projektbenennung / project description
E-PLAN AC80-2 UW V3.1.2
ELECTRIC WIRING DIAGRAM

Seitenbenennung / page description
Tasterbeleuchtung Abstützkasten
switch illumination stabilizer – box

Baunummer. 81963-
Anlage: 0
Ort: 0
Zeichnungsnr. / drawing no. 28387512
Blatt 58
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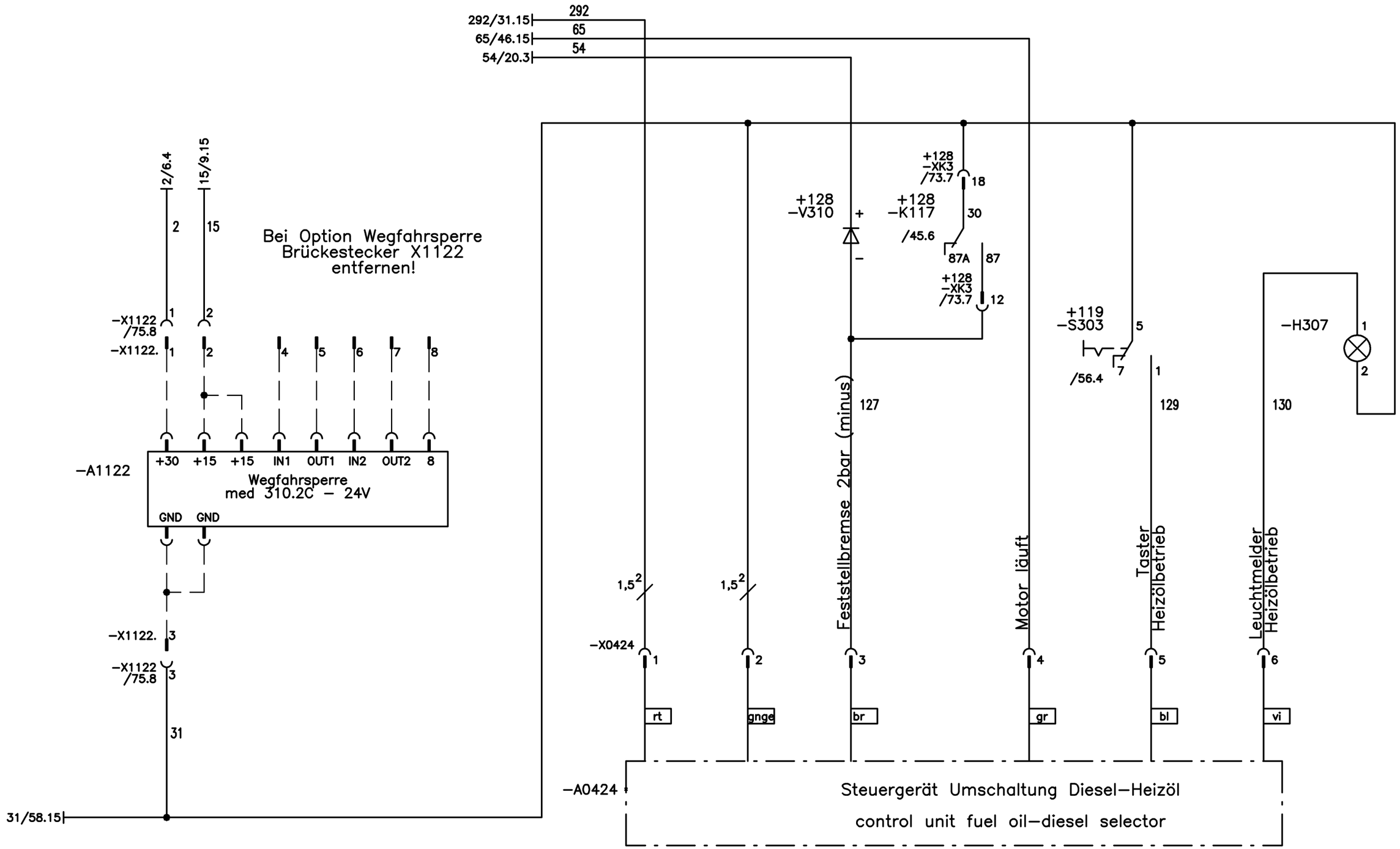

Option Wegfahrsperre

option safeguard lock

Option

a	W10663	18.07.08	Rosenkranz		Datum	Name
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Abteilung:	1142					

Projektbenennung / project description
E–PLAN AC80–2 UW V3.1.2
ELECTRIC WIRING DIAGRAM

Seitenbenennung / page description
Wegfahrsperre, Umsch Diesel–Heizöl
immoblizer, changeover diesel–heating oil

Baunummer. 81963–
Anlage: 0
Ort: 0
Zeichnungsnr. / drawing no. 28387512
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Bl. 78

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Zustandsdiagramm der Magnetventile / state diagram of the solenoid – valves

Magnetventile / solenoid – valves	Y61.A	Y61.B	Y172	Y304.A	Y304.B	Y304.C–F	Y310.A	Y310.B	Y320	Y343	Y344	Y357	Y361	Y362	Y363	Y365	Y364.1–4	Y364.7,8	Y366A	Y366B	Y367
Straßenfahrt travel with crane	0	0	0	0	0	0	0	0	1 temp	0	0	0	0	0	0	0	1	1	0	0	1
Niveau heben raise suspension	0	0	0	0	0	0	0	1	0	0	0	0	1	1	1	1	1	1	0	1	1
Niveau absenken down suspension	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	0	0	X
Federung gesperrt (mobil) suspension lock	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
Achsen hochziehen raise axles	0	0	0	0	0	0	0	1	0	0	0	0	1	1	1	1	1	1	1	0	0
Achse 3 hochziehen bei UHL raise 3. axles	0	0	0	0	0	0	0	1	0	0	0	1	0	1	1	0	1	0	1	0	X
Achse 3 oben axle 3 atop	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	1
Achse 3 absenken mit bef. lower axle 3 with fill up	0	0	0	0	0	0	0	1	0	0	0	0	0	1	1	0	1	0	0	1	1
Gegengewicht auf counterweight up	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	1	0	0	1
Gegengewicht ab counterweight down	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	1	0	0	1
Oberwagenbetrieb superstructure	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	1	1	0	0	1
Lenkung von OW links steering from superstructure left	0	0	0	1	0	1	0	0	0	1	0	0	0	0	0	0	1	1	0	0	1
Lenkung von OW rechts steering from superstructure right	0	0	0	0	1	1	0	0	0	1	0	0	0	0	0	0	1	1	0	0	1

Bemerkung / remark : 0 = spannungslos / idle ; 1 = Spannnung 24V / voltage 24V ; X = beliebig.

					Datum	Name
a	W10663	18.07.08	Rosenkranz			
_	W10620	14.11.07	Rosenkranz	Erst.	14.11.07	Rosenkranz
Ind	Mitt–NR	Datum	Name	Gepr.		
Abteilung: 1142						

Projektbenennung / project description
E–PLAN AC80–2 UW V3.1.2
ELECTRIC WIRING DIAGRAM

Seitenbenennung / page description
Übersicht Magnetventilsteuerung
general view magnetic valves control

Baunummer. 81963–
Anlage: 0
Ort: 0
Zeichnungsnr. / drawing no. 28387512
Blatt 60
Bl. 78

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Magnetventile / solenoid – valves	Y306A	Y306B	Y307A	Y307B	Y308A	Y308B	Y309A	Y309B	Y310A	Y310B	
Abstützung ausfahren stabilizers extend	1	1	1	1	1	1	1	1	0	1	
Abstützung einfahren stabilizers retract	1	1	1	1	1	1	1	1	1	0	

A = vertikal , B = horizontal

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_	W10620	14.11.07	Rosenkranz	Erst.	14.11.07	Rosenkranz
Ind	Mitt-NR	Datum	Name	Gepr.		
Abteilung:	1142					

Projektbenennung / project description
E-PLAN AC80-2 UW V3.1.2
ELECTRIC WIRING DIAGRAM

Seitenbenennung / page description
Übersicht Magnetventilsteuerung
general view magnetic valves control

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Anlage: 0
Ort: 0
Zeichnungsnr. / drawing no. 28387512
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+128
−A301

FR-SKN

X4/8	X4/7	X4/10	X4/14	X4/15	X4/4	X4/5	X4/16	X4/12	X4/18	X4/17	X1/1	X1/13	X1/2	X1/11	X3/12	X3/5	X3/9	X4/6	X4/9	X2/4	X2/8	X2/7	X1/10
SVL+	SV-	SVH+	KWG	KWG+	nG	nG-	N	GSV3	R	GSE	KUP1	GSV1	KUP2	BRE	ÖSE	GSV2	FSBE	ALT	ALT-	D+A	BRLI	RÜLI	C3

/32.2	X2/1	KL30																						
/32.4	X2/3	KL15																						
/32.2	X2/2	KL31																						
/32.6	X4/11	KLW																						
/32.7	X4/13	KLD+																						
/32.5	X1/18	KL50																						
/33.8	X3/4	MBA1																						
/33.10	X3/10	MBA-																						
/33.11	X3/7	MBA2																						
	X3/6	MÖL+																						
	X3/8	MÖL-																						

TSV	S+B	S-B	AUS	QUIT	TSET	MBE0	MBE1	MBE2	MBE3	GSV4	MSS	SSH	SSL	FG2+	GAS2	FG2-	FG1-	GAS1	FG1+	KWSE	KW+	LFS-	LFSE
X1/9	X1/16	X1/12	X1/14	X1/17	X1/15	X2/13	X2/14	X2/15	X2/9	X2/10	X2/6	X2/12	X2/11	X1/7	X1/6	X1/4	X1/5	X1/3	X1/8	X3/11	X3/3	X3/2	X3/1
/32.14	/32.9	/32.11	/32.12	/32.8	/32.13	/32.13	/32.14			/32.12			/32.11	/32.4	/32.5	/32.6	/32.9	/32.8	/32.7	/33.3	/33.1	/33.4	/33.5

MCH	MCM	MCL	PCH	PCM	PCL	FCH	FCM	FCL
X4/3	X4/2	X4/1	X3/13	X3/14	X3/15	X2/18	X2/17	X2/16
/33.7	/33.8	/33.10				/33.11	/33.12	/33.13

+128
−A302

ADM-AR

X2/1	X2/2	X2/3	X2/4	X2/5	X2/6	X2/7	X2/8	X2/9	X2/10	X2/11	X2/12	X2/13	X2/14	X2/15	X2/16	X2/17	X2/18	X4/1	X4/2	X4/3	X4/4	X4/5	X4/6	X4/7	X4/8	X4/9
C3 (PWME)	MBRE (E+)	KL.W (PWME)	KLIMA (E+)	KL.50 MSTART (+)	ADR+ (E-)	ADR0 (E-)	ABS (DSF1) (E-)	NE MSTOP (E+)	N_MOT (PWMA)	HA (E+)	DSF0 (E+)	FFG1 (PWME)	ADR1 (E+)	FFG2 (PWME)	ADR2 (E-)	HFG (PWME)	ADR- (E-)	CAN HH	BOOT LOADER	CAN HL	HF GND	K-DIAG	HF GND	CAN LH	MESS PIN	CAN LL
(+) KI30	(ANA) P_OEL	(A-) LA ADM	LA ABS (A-)	(-) KI31	(A-) LA EPS	(ANA) T_MOT	(PWME) FFG2+	(A-) SUMMER	(PWMA) IWA2	(PWME) FFG1+	(A-) LA T_MOT	(A-) LA OELST	(A-) LA P_OEL	(+) KL.15	....	....	....	(ANE) AE1	(E-) MKLE	(E+) TROE	(A-) REL4	(A-) REL3	(A-) REL2	(A-) REL1	(PWMA) IWA1	(A-) MBRA2
X1/1	X1/2	X1/3	X1/4	X1/5	X1/6	X1/7	X1/8	X1/9	X1/10	X1/11	X1/12	X1/13	X1/14	X1/15	X3/1	X3/2	X3/3	X3/4	X3/5	X3/6	X3/7	X3/8	X3/9	X3/10	X3/11	X3/12
/35.3	/35.10	/35.11		/35.1		/35.8	/35.5	/35.3		/35.4	/35.12	/35.14	/35.13	/35.1							/35.13	/35.14			/35.4	

+128
−A310

IN 1			IN 2			IN 3			IN 4			IN 5			IN 6			CAN-BUS
CAN H	CAN GND	CAN L	CAN H	CAN GND	CAN L	CAN H	CAN GND	CAN L	CAN H	CAN GND	CAN L	CAN H	CAN GND	CAN L	CAN H	CAN GND	CAN L	
X1/1	X1/2	X1/3	X1/4	X1/5	X1/6	X1/7	X1/8	X1/9	X1/10	X1/11	X1/12	X1/13	X1/14	X1/15	X1/16	X1/17	X1/18	MN
/34.6	/34.7	/34.9	/34.10	/34.11	/34.13													/34.6

a	W10663	18.07.08	Rosenkranz		Datum	Name	Projektbenennung / project description	Seitenbenennung / page description	Baunummer. 81963−	Anlage: 0
_	W10620	14.11.07	Rosenkranz	Erst.	14.11.07	Rosenkranz	E−PLAN AC80−2 UW V3.1.2	Motorregelung		Ort: 0
Ind	Mitt−NR	Datum	Name	Gepr.			ELECTRIC WIRING DIAGRAM	engine control	Zeichnungsnr. / drawing no. 28387512	Blatt 62
Abteilung:		1142								78 Bl.

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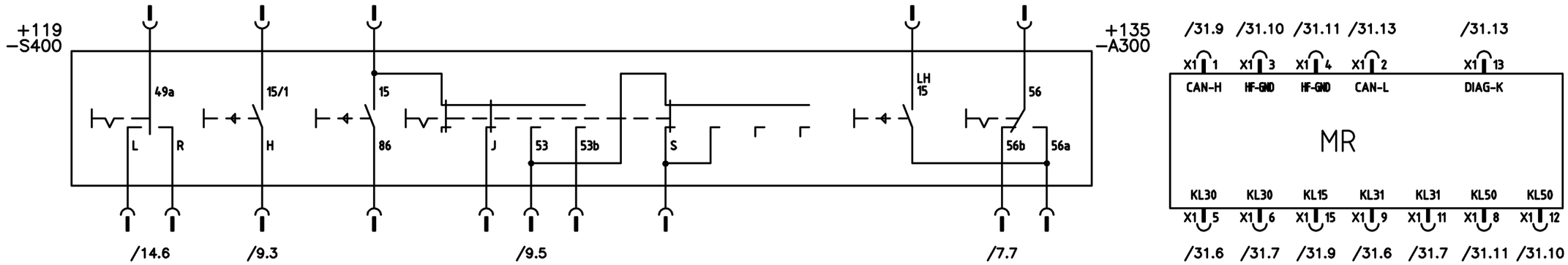

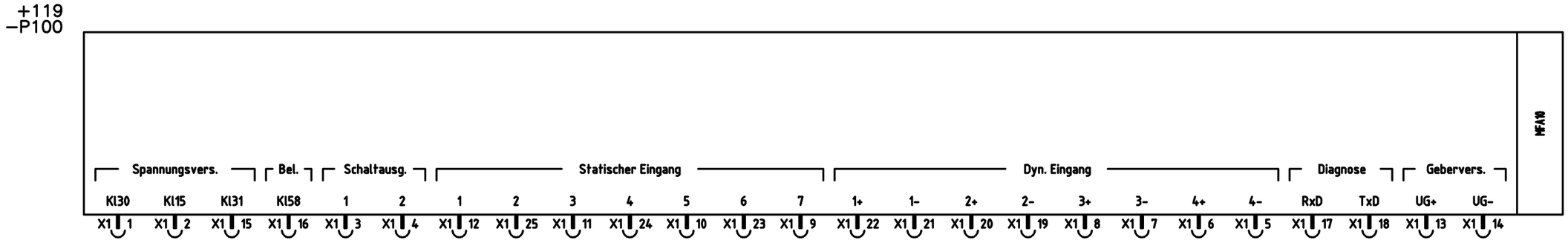

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_	W10620	14.11.07	Rosenkranz	Erst.	14.11.07	Rosenkranz
Ind	Mitt-NR	Datum	Name	Gepr.		
Abteilung:	1142					

Projektbenennung / project description
E-PLAN AC80-2 UW V3.1.2
ELECTRIC WIRING DIAGRAM

Seitenbenennung / page description
Lenkstockhebel links, MFA10
strut rod left hand, MFA10

Baunummer. 81963-
Anlage: 0
Ort: 0
Zeichnungsnr. / drawing no. 28387512
Blatt 63
78 Bl.

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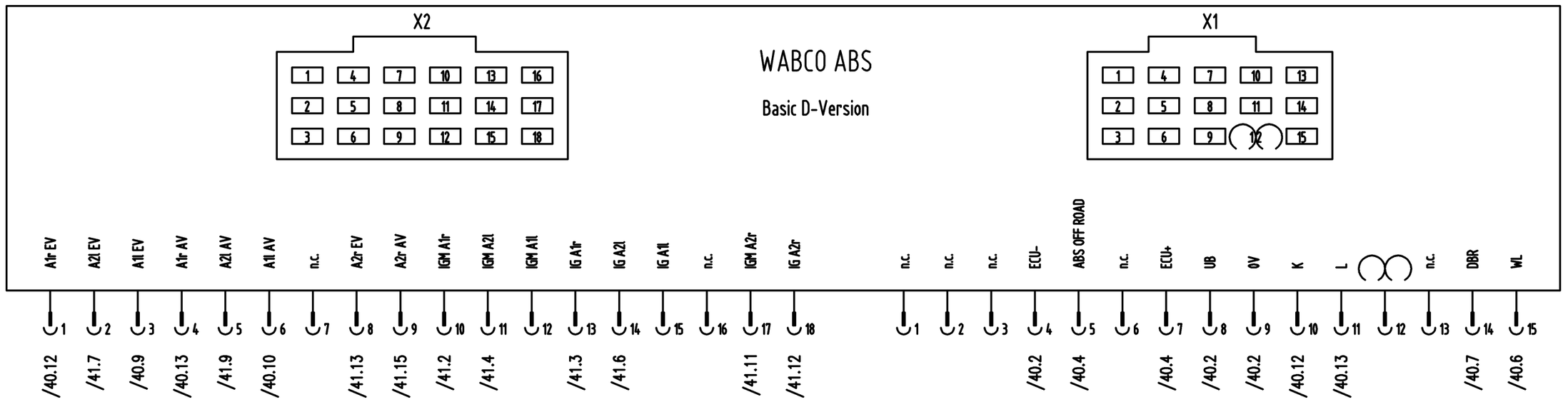
+128
−A4200

SLC STEUERELEKTRONIK HINTERACHSLENKUNG

PLUG J1 SUBD			PLUG J2			PLUG J3			PLUG J4			PLUG J5			PLUG J6			PLUG J7		
1	RxD		1	+5Vref	/53.2	1	CAN H		1	DI1	/50.2	1	DI13		1	+Vext		1	PWM1	/51.2
2	TxD		2	ANALOG GND	/53.1	2	CAN L		2	DI2	/50.4	2	DI14		2	-Vext		2	POWER GND	/51.3
3			3	AE5 / AI5	/53.4	3	CAN SHIELD		3	DI3	/50.5	3	DI15		3	ANALOG GND		3	PWM2	/51.4
4	MASSE/GND		4	AE6 / AI6	/53.7	4	CAN H	/49.12	4	DI4		4	DI16		4	AO1		4	+5Vref	/53.11
5			5	AE7 / AI7	/53.15	5	CAN L	/49.14	5	DI5	/50.7	5	DI17		5	DA13		5	AI5	/53.12
6			6	AE8 / AI8	/54.7	6	CAN SHIELD		6	DI6	/50.10	6	DI18		6	DA14		6	SIGNAL GND	/53.9
7			7	CLOCK1		7	AI1 STROM		7	DI7	/50.11	7	DI19		7	DA15		7	SHIELD	
8			8	UP/DOWN1		8	AI2 STROM		8	DI8	/50.12	8	DI20		8	DA16		8		
9			9	CLOCK2		9	AI3 STROM		9	DI9	/49.2	9	DI21		9	DA1		9	+UB	
			10	UP/DOWN2		10	AI4 STROM		10	DI10	/50.13	10	DI22		10	DA2		10	+UB	
			11	+5Vext	/53.5				11	DI11	/50.15	11	DI23		11	DA3		11	POWER GND	/51.6
			12	ANALOG GND	/53.6				12	DI12		12	DI24		12	DA4		12	POWER GND	

PLUG J8			PLUG J9			PLUG J10			PLUG J11			PLUG J12			PLUG J13		
1	PWM3	/51.8	1	PWM5		1	PWM7		1	DA1	/51.7	1	+UB	/49.4	1	UP/DN1	
2	POWER GND	/51.9	2	POWER GND		2	POWER GND		2	DA2	/51.13	2	+UB		2	CLOCK1	
3	PWM4	/51.11	3	PWM6		3	PWM8		3	DA3		3	+UB		3	POWER GND	
4	+5Vref	/54.3	4	+5Vref		4	+5Vref		4	DA4		4	POWER GND	/49.14	4	UP/DN2	
5	AI2	/54.4	5	AI3		5	AI4		5	DA5	/49.10	5	POWER GND		5	CLOCK2	
6	SIGNAL GND	/54.2	6	SIGNAL GND	/53.14	6	SIGNAL GND	/54.6	6	DA6	/49.11	6	POWER GND		6	POWER GND	
7	SHIELD		7	SHIELD		7	SHIELD		7	DA7	/49.12	7	PWM9		7	ABS1+	/49.7
8			8			8			8	DA8	/49.4	8	PWM10		8	ABS1-	/49.8
9	+UB		9	+UB		9	+UB		9	DA9	/49.3				9	ABS2+	/49.10
10	+UB		10	+UB		10	+UB		10	DA10	/49.7				10	ABS2-	/49.11
11	POWER GND	/51.12	11	POWER GND		11	POWER GND		11	DA11	/49.8				11	POWER GND	
12	POWER GND		12	POWER GND		12	POWER GND		12	DA12	/49.6				12	EXT. SHIELD	

+128
−A386



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_	W10620	14.11.07	Rosenkranz	Erst.	14.11.07	Rosenkranz
Ind	Mitt-NR	Datum	Name	Gepr.		
Abteilung:	1142					

Projektbenennung / project description
E-PLAN AC80-2 UW V3.1.2
ELECTRIC WIRING DIAGRAM

Seitenbenennung / page description
Lenkcomputer, ABS-Steuerung
steering computer, ABS-control

Baunummer. 81963-
Anlage: 0
Ort: 0
Zeichnungsnr. / drawing no. 28387512
Blatt 64
78 Bl.

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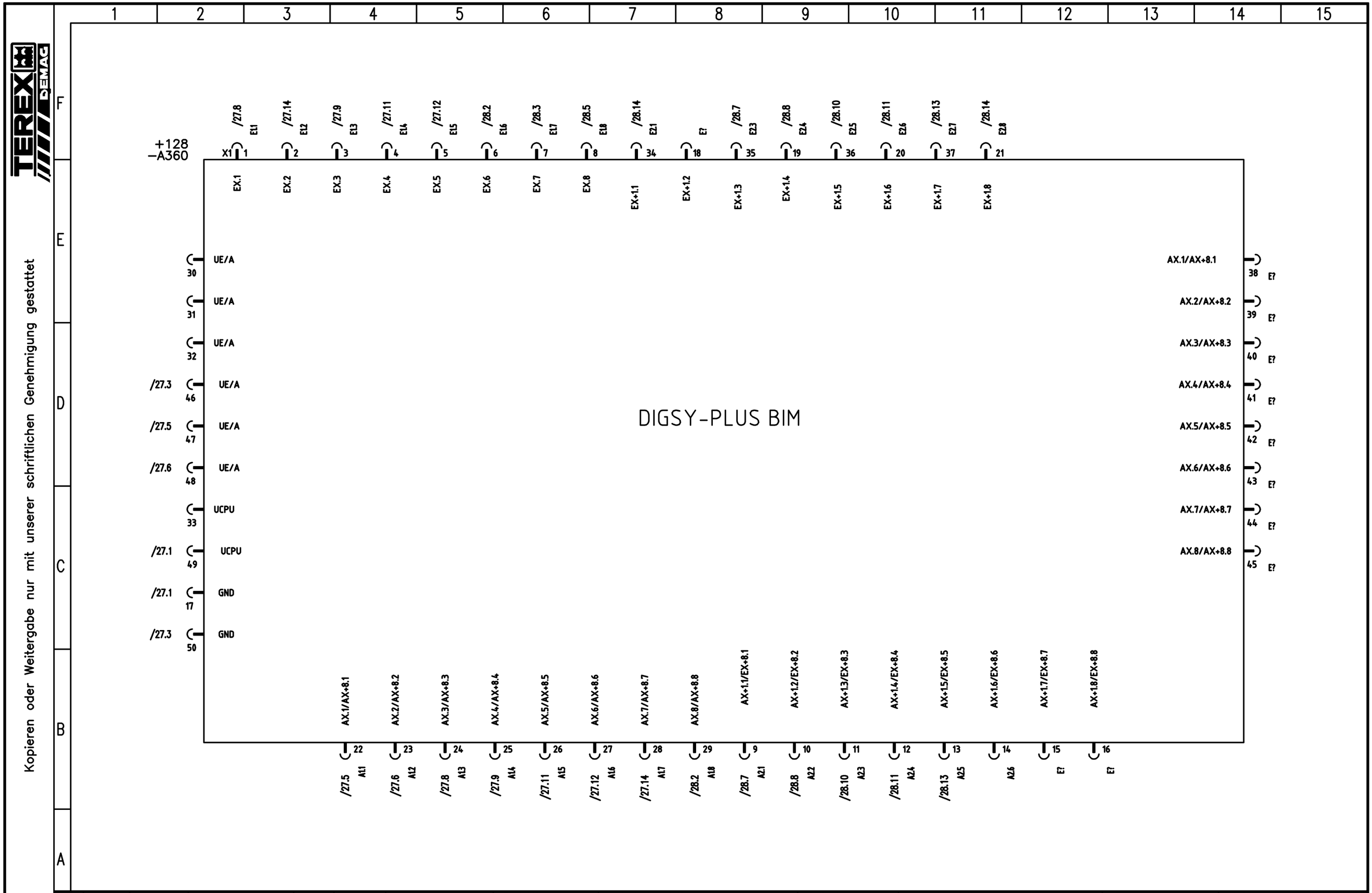

Kopieren oder Weitergabe nur mit unserer schriftlichen Genehmigung gestattet

Ind	Mitt-NR	Datum	Name		Datum	Name
a	W10663	18.07.08	Rosenkranz			
_	W10620	14.11.07	Rosenkranz	Erst.	14.11.07	Rosenkranz
				Gepr.		

Abteilung: 1142

Projektbenennung / project description
E-PLAN AC80-2 UW V3.1.2
ELECTRIC WIRING DIAGRAM

Seitenbenennung / page description
DIGSY-PLUS BIM
DIGSY-PLUS BIM

Baunummer. 81963-
Anlage: 0
Ort: 0
Zeichnungsnr. / drawing no. 28387512
Blatt 65
78 Bl.

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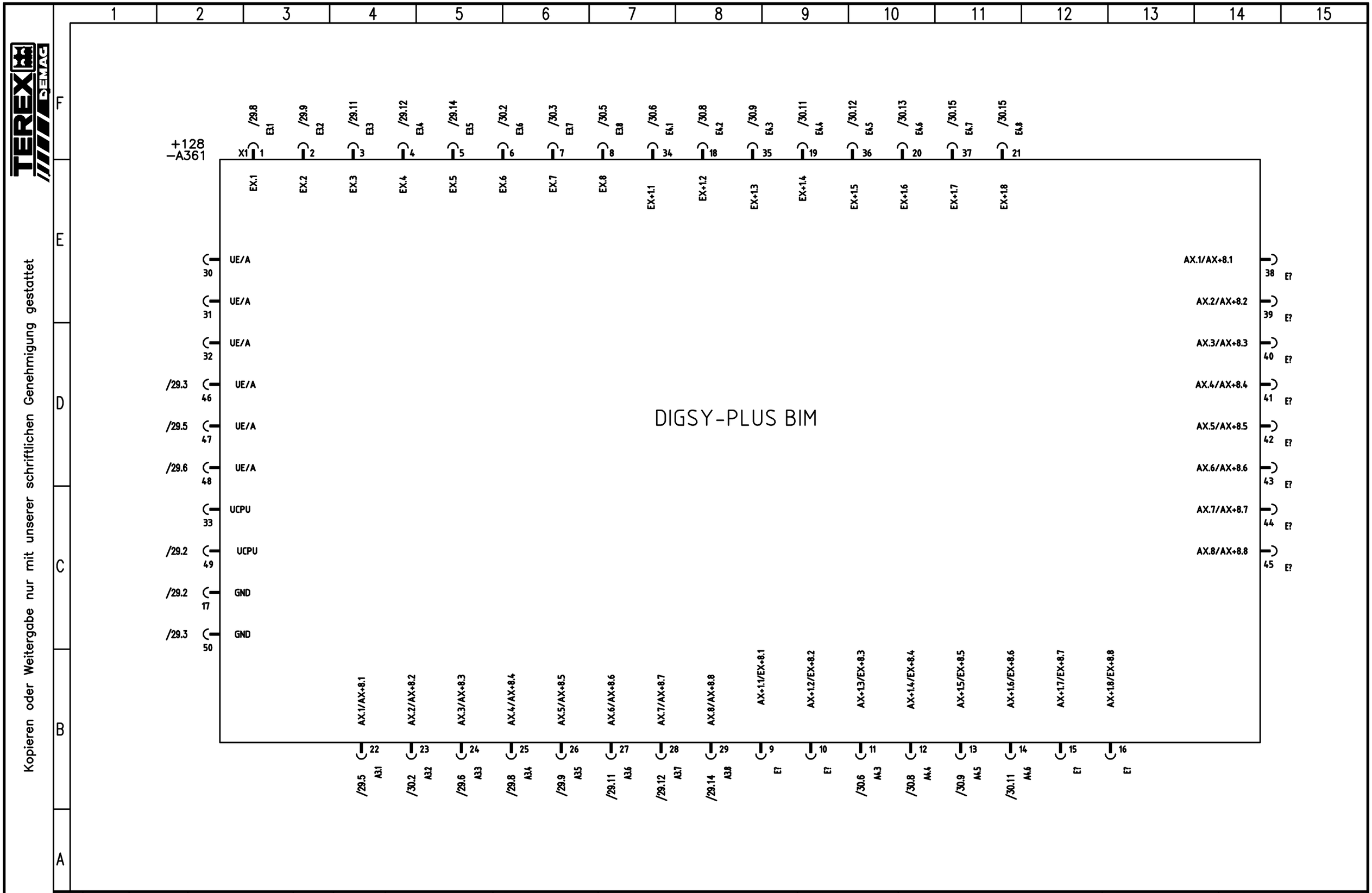

Kopieren oder Weitergabe nur mit unserer schriftlichen Genehmigung gestattet

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Ind	Mitt-NR	Datum	Name	Gepr.			ELECTRIC WIRING DIAGRAM	DIGSY-PLUS BIM	Zeichnungsnr. / drawing no.	Blatt 66
Abteilung:	1142								28387512	78 Bl.

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+128
−A1

BMK	Wert/ Value	Seite.Pfad sheet.path	Funktion	Function
F101	25A	/6.4	Vorsicherung Zündung UW	prefuse ignition chassis
F102	10A	/6.10	Ladekontrolle, Option Steuerung Schnellstop, Zündung Motor/Getriebe	charge control, option control engine stop, ignition engine/transmission
F103	5A	/7.13	Steckdose 24V	socket 24 V
F104	10A	/7.3	Fernlicht links, rechts	high beam lights left, right
F105	10A	/7.4	Fernlicht links, rechts	high beam lights left, right
F106	10A	/7.6	Abblendlicht links	low beam lights left
F107	10A	/7.8	Abblendlicht rechts	low beam lights right
F108	25A	/7.2	Vorsicherung Standlicht	prefuse parking lights
F109	10A	/7.15	Zigarettenanzünder	cigarette lighter
F110	10A	/7.10	Nebelschlußleuchte	rear fog light
F111	10A	/7.11	Abstützbeleuchtung	illumination stabilizers
F112	10A	/8.2	Blinker, Lüftersteuerung, Steuerung Umschaltung UW-OW	flasher, fan control, control switch over chassis-superstructure
F113	10A	/22.9	Abstützbeleuchtung links, rechts	illumination stabilizers left, right
F114	15A	/6.14	Schnellstop, Ventile Federspeicher, Position Gegengewicht, Option Lenkung von OW	engine stop, valves spring accumulator
F115	25A	/6.13	Vorsicherung Motor läuft Signal	prefuse engine actuation signal
F116	10A	/15.2	Standlicht links	parking lights left
F117	10A	/16.2	Standlicht rechts	parking lights right
F118	5A	/17.2	Tachograph, Multifunktionsanzeige	tachograph, multiple display
F119	5A	/17.4	Tachograph, Mulifunktionsanzeige, Meldeleuchten	tachograph, multiple display, indicator lamp
F120	10A	/10.1	Option Zentralschmieranlage, Klimaanlage, Überwachung Bremsbeläge	option lubrication system, air condition, control brake pads
F121	10A	/10.14	Überwachung Bremsbeläge	control brake pads
F122	15A	/9.2	Lufttrockner, Scheibenwischer, Scheibenwascher, Spiegelheizung/-verstellung, Sitzheizung	air dryer, wiper, windscreen washer, mirror heating/-adjustment, seat heating
F123	5A	/27.1	Spannungsversorgung SPS A360 CPU	power suply SPS A360 CPU
F124	10A	/27.3	Spannungsversorgung SPS A360 Ausgänge	power supply SPS A360 output
F125	5A	/49.2	Lenkrechner A4200	steering computer A4200
F126	5A	/29.2	Spannungsversorgung SPS A361 CPU	power supply SPS A361 CPU
F127	10A	/29.3	Spannungsversorgung SPS A361 Ausgänge	power supply SPS A361 output
F128	15A		Warnblinker, Radio, Beleucht. Kabine/ZE, Bremslicht, Hupe, Rückfahrscheinw./-summer, Rundumleuchte	hazard flasher, radio, illumination cabin, stop lights, horn, reversing lights/-buzzer, rotaflare light

a	W10663	18.07.08	Rosenkranz		Datum	Name
_	W10620	14.11.07	Rosenkranz	Erst.	14.11.07	Rosenkranz
Ind	Mitt-NR	Datum	Name	Gepr.		
Abteilung:	1142					

Projektbenennung / project description
E-PLAN AC80-2 UW V3.1.2
ELECTRIC WIRING DIAGRAM

Seitenbenennung / page description
Belegung Sicherungsplatine F101-F128
general view fuse modul F101-F128

Baunummer. 81963-
Anlage: 0
Ort: 0
Zeichnungsnr. / drawing no. 28387512
Blatt 67
78 Bl.

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+128
−A2

BMK	Wert/ Value	Seite.Pfad sheet.path	Funktion	Function
F201	10A	/49.4	Lenkrechner A4200	steering computer A4200
F202	10A	/31.9	Motorregelung	engine control
F203	10A	/31.12	Motordiagnose	engine diagnosis
F204	10A	/31.14	Motordiagnose	engine diagnosis
F205	10A	/32.1	FR−SKN	FR−SKN
F206	10A	/35.3	ADM−AR	ADM−AR
F207	10A	/36.6	Getriebesteuerung	transmission control
F208	15A	/48.2	Option Standheizung	option cabin heater
F209	5A	/48.11	Option Standheizung Uhr	option cabin heater clock
F210	15A	/48.14	Gebläse	blower
F211	5A	/40.4	ABS	ABS
F212	10A	/40.2	ABS	ABS
F213	10A	/43.13	Wirbelstrombremse	eddy current brake
F214	15A	/42.3	ABS−Anhänger	ABS−trailer

a	W10663	18.07.08	Rosenkranz		Datum	Name
_	W10620	14.11.07	Rosenkranz	Erst.	14.11.07	Rosenkranz
Ind	Mitt−NR	Datum	Name	Gepr.		
Abteilung:	1142					

Projektbenennung / project description
E−PLAN AC80−2 UW V3.1.2
ELECTRIC WIRING DIAGRAM

Seitenbenennung / page description
Belegung Sicherungsplatine F201−F214
general view fuse modul F201−F214

Baunummer. 81963−
Anlage: 0
Ort: 0
Zeichnungsnr. / drawing no. 28387512
Blatt 68
Bl. 78

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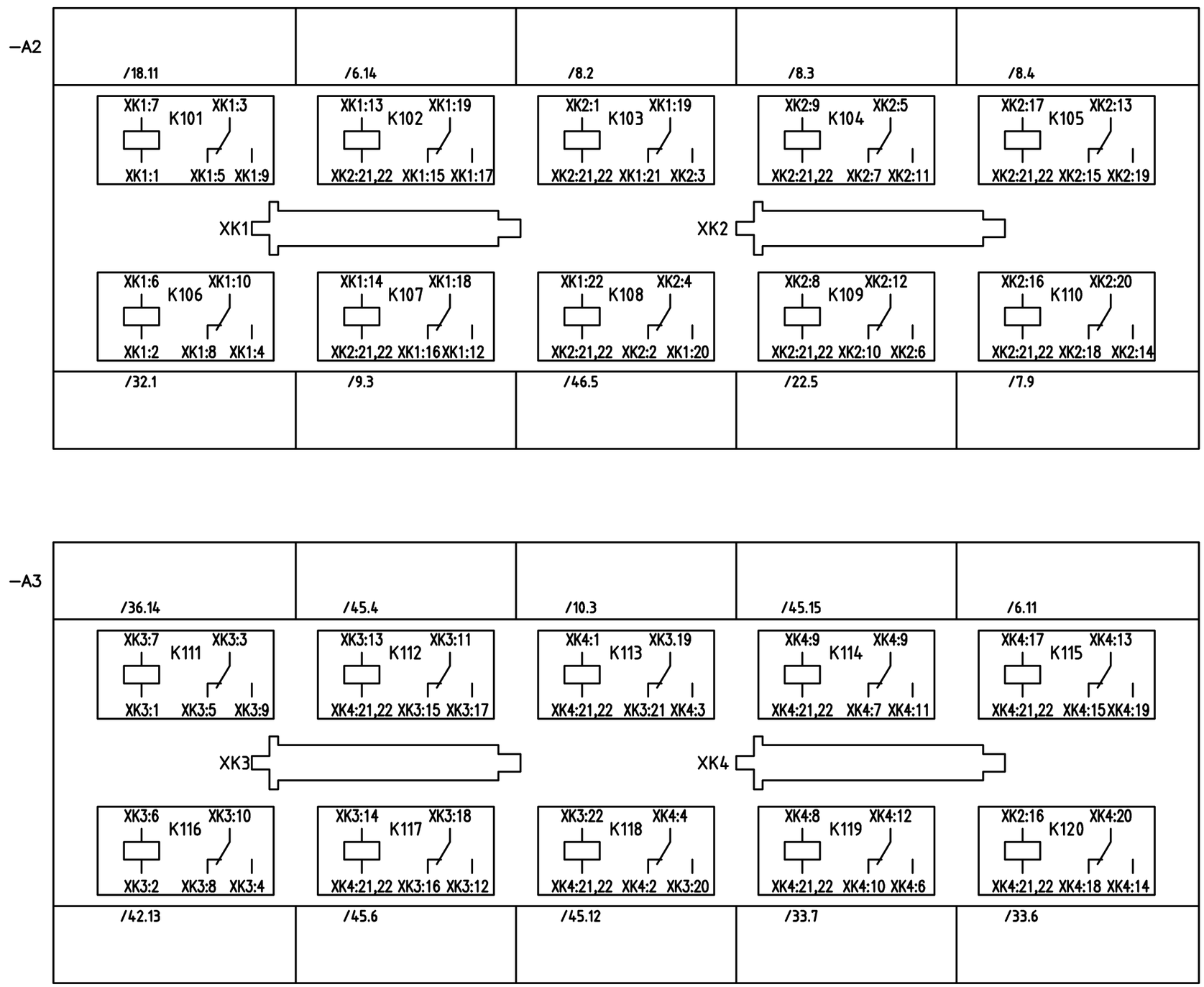

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_	W10620	14.11.07	Rosenkranz	Erst.	14.11.07	Rosenkranz
Ind	Mitt–NR	Datum	Name	Gepr.		
Abteilung:	1142					

Projektbenennung / project description
E–PLAN AC80–2 UW V3.1.2
ELECTRIC WIRING DIAGRAM

Seitenbenennung / page description
Relaisplatine K101–K120, 1W
relay module K101–K120, 1W

Baunumm
81963
Zeichnur
28387

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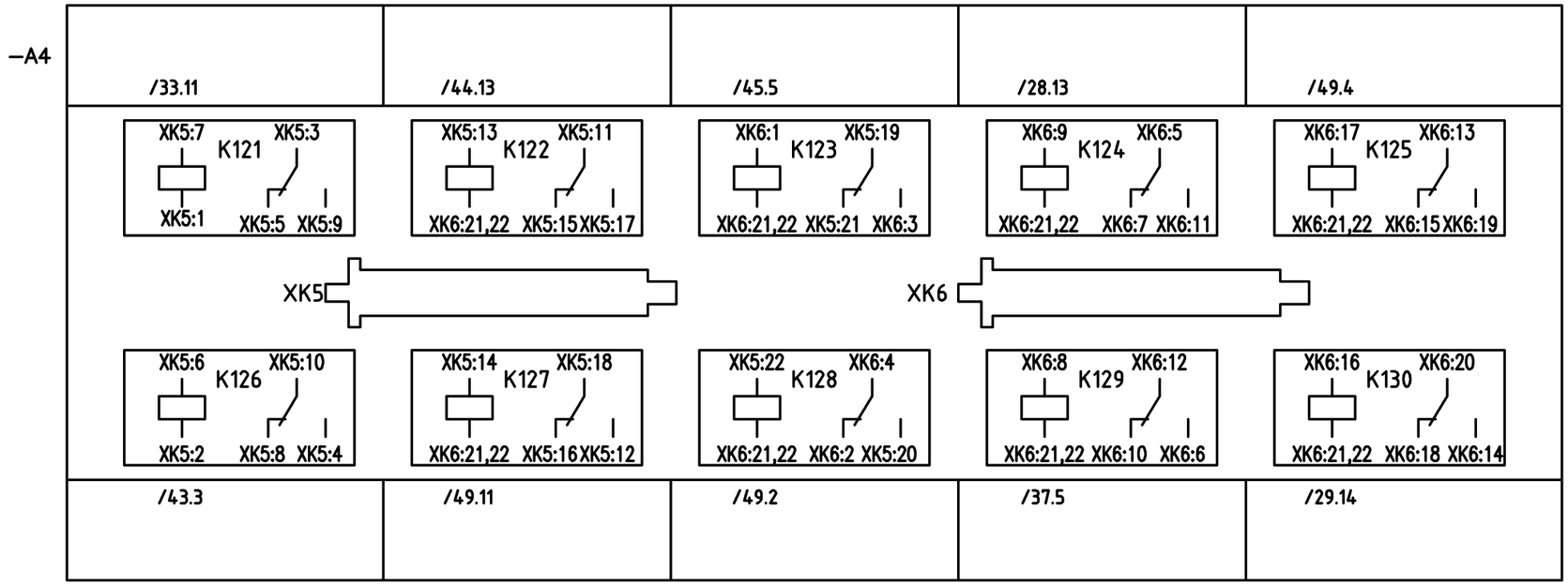

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Ind	Mitt-NR	Datum	Name	Gepr.		
Abteilung:	1142					

Projektbenennung / project description
E-PLAN AC80-2 UW V3.1.2
ELECTRIC WIRING DIAGRAM

Seitenbenennung / page description
Relaisplatine K121-K130, 1W
relay module K121-K130, 1W

Baunummer. 81963-
Anlage: 0
Ort: 0
Zeichnungsnr. / drawing no. 28387512
Blatt 70
78 Bl.

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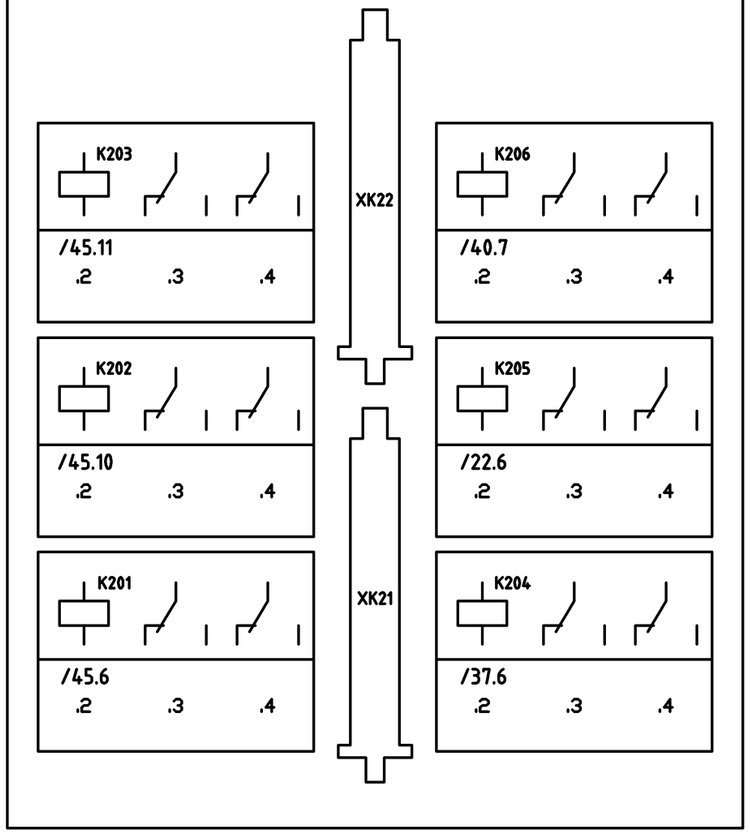
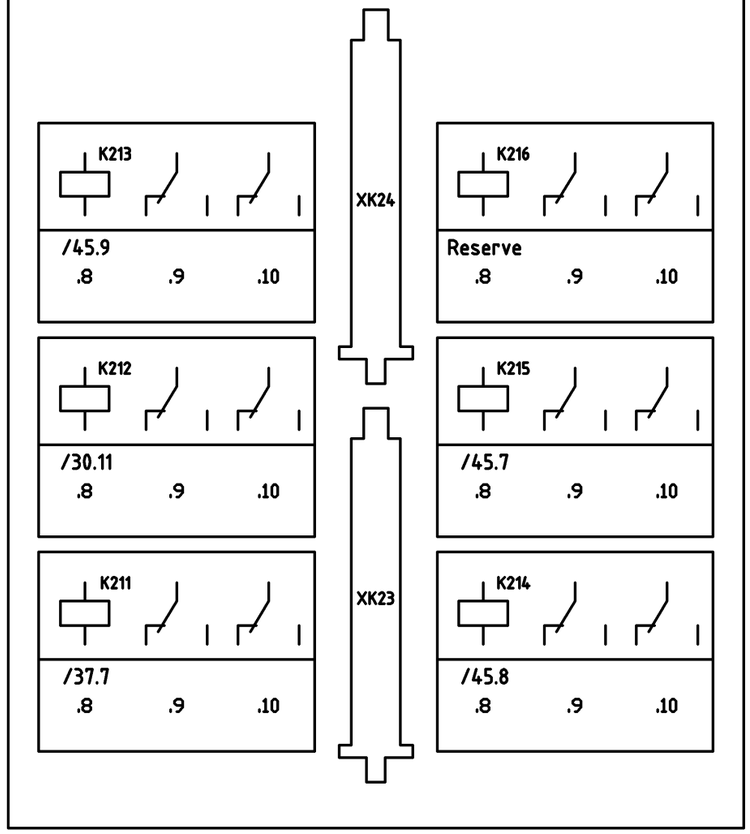
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15

F E D C B A

−A5



−A6



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_	W10620	14.11.07	Rosenkranz	Erst.	14.11.07	Rosenkranz
Ind	Mitt−NR	Datum	Name	Gepr.		
Abteilung:	1142					

Projektbenennung / project description
E−PLAN AC80−2 UW V3.1.2
ELECTRIC WIRING DIAGRAM

Seitenbenennung / page description
Relaisplatine K201−K216, 2W
relay module K201−K216, 2W

Baunummer. 81963−
Anlage: 0
Ort: 0
Zeichnungsnr. / drawing no. 28387512
Blatt 71
Bl. 78

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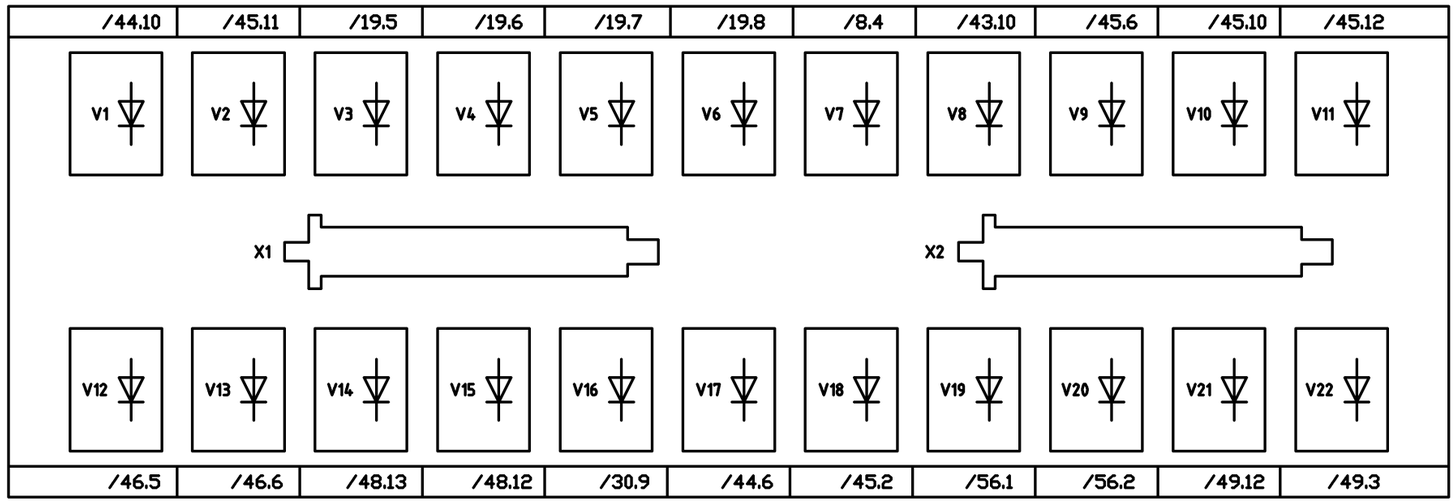
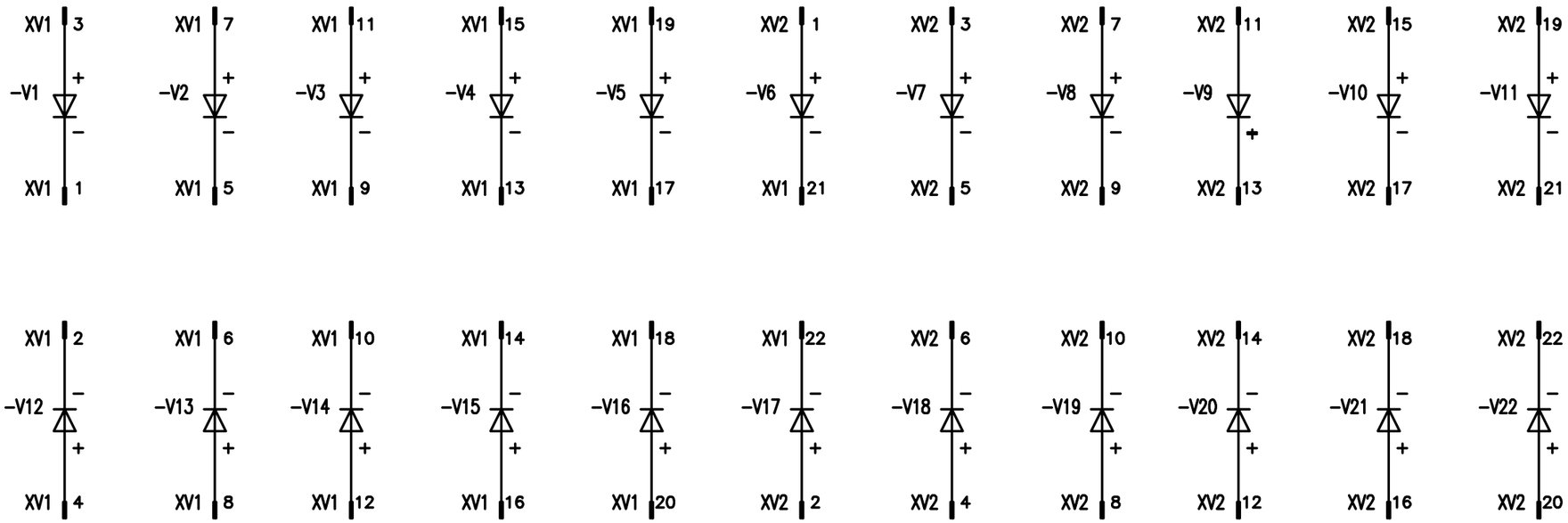
+128
–XV





Platine Dioden V1–V22, 5A Idt.:67047440

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_	W10620	14.11.07	Rosenkranz	Erst.	14.11.07	Rosenkranz
Ind	Mitt–NR	Datum	Name	Gepr.		
Abteilung:	1142					

Projektbenennung / project description
E–PLAN AC80–2 UW V3.1.2
ELECTRIC WIRING DIAGRAM

Seitenbenennung / page description
Diodenplatine V1–V22, 5A
diode module V1–V22, 5A

Baunummer. 81963–
Anlage: 0
Ort: 0
Zeichnungsnr. / drawing no. 28387512
Blatt 72
78 Bl.

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+128
−XK1

22-pol
Relaisplatine
K101−K110, 1W

1	/18.11	12	/8.10
2	/32.1	13	/6.14
3	/44.6	14	/9.3
4		15	/18.10
5		16	
6	/32.1	17	/18.11
7	/18.11	18	/8.10
8	/33.5	19	/7.5
9	/44.6	20	/46.8
10	/33.4	21	
11	/18.11	22	/46.5

+128
−XK2

22-pol
Relaisplatine
K101−K110, 1W

1	/8.2	12	/22.9
2		13	/8.6
3	/7.6	14	/7.1
4	/46.8	15	
5	/7.3	16	/7.9
6	/22.10	17	/8.4
7		18	
8	/22.5	19	/8.7
9	/8.3	20	/7.1
10		21	/6.14
11	/7.4	22	/7.9

+128
−XK3

22-pol
Relaisplatine
K111−K120, 1W

1	/36.14	12	/59.11
2	/42.13	13	/45.4
3	/8.8	14	/45.6
4	/42.14	15	
5		16	
6	/42.13	17	/18.2
7	/36.14	18	/59.11
8		19	/10.13
9	/8.8	20	/6.6
10	/42.14	21	
11	/18.2	22	/45.12

+128
−XK4

22-pol
Relaisplatine
K111−K120, 1W

1	/10.12	12	/8.13
2	/6.6	13	/31.4
3	/10.14	14	/6.13
4	/6.6	15	/31.4
5	/6.8	16	/33.6
6	/8.13	17	/6.11
7	/6.7	18	/6.12
8	/33.7	19	/31.5
9	/45.15	20	/6.13
10	/8.13	21	/6.11
11	/6.8	22	/10.12

+128
−XK5

22-pol
Relaisplatine
K121−K130, 1W

1	/33.10	12	
2	/43.3	13	/44.13
3	/43.10	14	/49.11
4	/32.14	15	/6.11
5		16	/35.10
6	/43.3	17	/6.11
7	/33.11	18	/35.11
8	/32.13	19	/50.2
9	/43.11	20	/19.6
10	/32.13	21	/50.3
11	/6.11	22	/49.2

+128
−XK6

22-pol
Relaisplatine
K121−K130, 1W

1	/45.5	12	/47.11
2		13	/49.2
3	/50.2	14	/7.10
4	/19.6	15	/49.2
5	/22.13	16	/29.14
6	/47.11	17	/49.4
7	/22.12	18	
8	/37.5	19	
9	/28.13	20	/7.10
10		21	/28.13
11		22	/29.14

+128
−XK21

22-pol
Relaisplatine
K201−K206, 2W

1	/45.6	12	/45.8
2	/37.6	13	
3	/22.5	14	
4		15	/45.10
5	/22.5	16	/22.6
6	/6.8	17	
7		18	
8	/6.8	19	/45.10
9	/36.12	20	/30.2
10	/45.8	21	/45.10
11	/36.12	22	/30.2

+128
−XK22

22-pol
Relaisplatine
K201−K206, 2W

1	/22.9	12	/43.13
2	/45.3	13	/6.8
3	/22.8	14	/43.12
4	/45.3	15	
5	/22.7	16	
6		17	/19.5
7	/22.6	18	/36.10
8	/40.7	19	/19.5
9	/45.11	20	/36.11
10	/40.7	21	
11	/6.8	22	

+128
−XK23

22-pol
Relaisplatine
K211−K216, 2W

1	/37.7	12	/18.9
2	/45.8	13	/10.6
3	/33.13	14	/18.9
4	/18.7	15	/30.11
5	/33.13	16	/45.7
6	/18.7	17	/43.12
7	/33.13	18	/35.6
8	/18.6	19	/43.12
9	/10.6	20	/35.6
10	/18.9	21	/43.13
11	/10.6	22	/35.7

+128
−XK24

22-pol
Relaisplatine
K211−K216, 2W

1	/35.5	12	
2	/46.11	13	/17.13
3	/35.5	14	
4	/46.10	15	/18.5
5		16	
6	/46.10	17	/18.5
7	/37.7	18	
8		19	/18.4
9	/45.9	20	
10		21	
11	/17.13	22	

a	W10663	18.07.08	Rosenkranz		Datum	Name
_	W10620	14.11.07	Rosenkranz	Erst.	14.11.07	Rosenkranz
Ind	Mitt−NR	Datum	Name	Gepr.		
Abteilung:		1142				

Projektbenennung / project description
E−PLAN AC80−2 UW V3.1.2
ELECTRIC WIRING DIAGRAM

Seitenbenennung / page description
Steckerübersicht Relaisplatinen
general view plug relay module

Baunummer.
81963−

Anlage: 0
Ort: 0

Zeichnungsnr. / drawing no.
28387512

Blatt 73
Bl. 78

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+128
–X316

44-pol
Kabelbaum rechts vorne

1	/41.2	17	/25.11	33	/10.8
2	/41.3	18	/25.14	34	/20.4
3	/19.10	19	/24.2	35	
4	/19.4	20	/25.6	36	
5	/20.10	21	/24.11	37	
6	/7.12	22	/25.3	38	
7	/28.7	23	/28.3	39	
8		24	/28.3	40	
9	/28.8	25	/24.2	41	
10	/28.7	26	/10.12	42	/7.12
11	/24.5	27	/10.12	43	/10.6
12	/24.5	28	/26.3	44	/16.5
13	/25.4	29	/26.3		
14	/58.14	30	/44.9		
15	/16.5	31	/10.6		
16	/24.8	32	/10.7		

+128
–X318

35-pol Schlemmer Steckverbinder
Kabelbaum Motor

A	/31.6	c	/31.11	v	/49.10
B	/31.7	d	/31.9	w	/40.12
C	/31.6	e	/31.12	x	/40.13
D	/31.7	f	/33.12		
E	/10.14	g	/33.8		
F	/44.12	h	/49.8		
G	/40.10	j	/49.7		
H	/6.6	k	/40.9		
J	/11.10	l	/40.10		
K	/31.10	m	/44.10		
L	/31.11	n	/17.12		
M	/31.12	p	/47.11		
N	/31.13	r	/33.9		
P	/42.14	s	/44.10		
a	/6.5	t	/11.2		
b	/6.5	u	/49.11		

+128
–X320

44-pol
Kabel Schleifringkörper

1	/44.3	17	/45.12	33	/26.4
2	/37.10	18	/35.6	34	/50.2
3	/15.14	19	/35.4	35	/50.6
4	/46.10	20	/35.7	36	/50.9
5	/8.5	21	/35.5	37	/18.3
6	/19.5	22	/37.13	38	/18.6
7	/24.6	23	/37.14	39	/18.8
8	/25.4	24	/37.2	40	/19.11
9	/24.9	25	/19.12	41	/18.12
10	/25.7	26	/35.8	42	/26.8
11	/24.3	27	/35.10	43	/47.6
12	/25.5	28	/26.7	44	/47.7
13	/24.12	29	/25.13		
14	/25.2	30	/46.3		
15	/25.10	31	/46.2		
16	/45.3	32	/31.1		

+128
–X323

44-pol
Kabelbaum links vorne

1		17	/24.2	33	/29.5
2		18	/25.6	34	/30.2
3	/58.6	19	/24.13	35	
4		20	/22.7	36	/44.3
5		21	/24.2	37	/28.5
6		22	/7.12	38	
7	/20.5	23		39	/28.5
8	/20.6	24		40	
9	/22.2	25		41	
10	/22.3	26	/40.6	42	/7.12
11	/25.9	27	/40.7	43	/15.7
12	/25.12	28	/46.2	44	
13	/24.7	29	/46.3		
14	/25.4	30	/26.7		
15	/24.10	31	/26.8		
16	/25.8	32	/46.8		

+128
–X317

44-pol
Kabelbaum rechts hinten

1	/15.10	17	/8.8	33	/29.8
2	/19.12	18	/16.7	34	/27.14
3	/27.6	19	/8.13	35	/27.12
4	/27.5	20	/28.10	36	/41.11
5	/27.9	21	/28.11	37	/41.12
6	/27.8	22	/25.8	38	/41.13
7	/27.11	23	/28.10	39	/41.15
8	/19.11	24	/7.10	40	/18.2
9	/42.9	25	/14.4	41	/31.1
10	/28.2	26	/22.9	42	/7.10
11	/14.10	27	/22.10	43	/8.13
12	/18.5	28	/22.13	44	/8.8
13	/19.8	29	/12.7		
14	/12.6	30	/20.13		
15	/29.8	31	/24.8		
16	/29.8	32	/29.6		

+128
–X333

37-pol Schlemmer Steckverbinder
Kabelbaum Getriebe

A	/38.8	T	/39.2	m	/38.3
B	/39.7	U		n	/38.5
C	/38.15	V	/39.4	p	/38.7
D	/38.14	W	/39.6	r	/38.6
E	/39.14	X		s	/38.1
F		Z	/39.13		
G	/39.5	a			
H	/38.12	b			
J		c			
K	/38.11	d	/39.11		
L		e			
M	/39.3	f			
N		g	/38.4		
P	/38.13	h	/39.10		
R		j	/39.9		
S		k	/39.12		

+128
–X322

44-pol
Kabelbaum links hinten

1	/26.3	17	/22.5	33	/24.11
2	/15.7	18	/29.8	34	/25.3
3	/16.13	19	/20.3	35	/45.3
4	/26.3	20	/22.5	36	/48.8
5	/19.13	21	/45.13	37	/48.8
6	/20.6	22	/43.6	38	
7	/20.11	23	/43.7	39	
8	/20.12	24	/43.8	40	/45.10
9	/12.2	25	/43.9	41	/45.10
10	/28.13	26	/43.9	42	/9.2
11	/19.14	27	/41.4	43	/16.13
12	/28.14	28	/41.6	44	/20.6
13	/28.13	29	/41.7		
14	/22.12	30	/41.9		
15	/22.8	31	/45.3		
16	/12.4	32	/9.2		

+128
–X324

44-pol
Option Stützdruckanzeige

1	/22.6	17		33	
2	/14.3	18		34	
3	/45.13	19		35	
4	/45.1	20		36	
5	/35.8	21		37	
6	/47.7	22		38	
7	/47.6	23		39	
8	/47.8	24		40	
9	/47.9	25		41	
10	/47.9	26		42	
11		27		43	
12		28		44	
13		29			
14		30			
15		31			
16		32			

a	W10663	18.07.08	Rosenkranz		Datum	Name
_	W10620	14.11.07	Rosenkranz	Erst.	14.11.07	Rosenkranz
Ind	Mitt–NR	Datum	Name	Gepr.		
Abteilung:	1142					

Projektbenennung / project description
E–PLAN AC80–2 UW V3.1.2
ELECTRIC WIRING DIAGRAM

Seitenbenennung / page description
Steckerübersicht
general view plug

Baunummer. 81963–
Anlage: 0
Ort: 0
Zeichnungsnr. / drawing no. 28387512
Blatt 74
78 Bl.

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+128
-X199

44-pol
Kabelbaum Lenkung

1	/51.2	17	/53.7	33	/54.9
2	/51.3	18	/53.6	34	
3	/51.4	19	/53.8	35	
4	/51.6	20	/53.9	36	
5	/51.7	21	/53.12	37	
6	/51.7	22	/53.11	38	
7	/51.8	23	/53.13	39	
8	/51.9	24	/53.15	40	
9	/51.11	25	/53.14	41	
10	/51.12	26	/53.9	42	
11	/51.13	27	/54.2	43	
12	/51.13	28	/54.4	44	
13	/53.1	29	/54.3		
14	/53.4	30	/54.5		
15	/53.2	31	/54.7		
16	/53.5	32	/54.6		

+113
-X710

2-pol
Zuleitung Kabinenelektrik

1	/6.2
2	/6.2

+128
-X342.1

8-pol
Kabinen-zubehör 1

1	/13.2
2	/21.12
3	/9.5
4	/8.7
5	/48.14
6	/13.2
7	/16.4
8	/9.9

+128
-X342.2

8-pol
Kabinen-zubehör 2

1	/9.9
2	/9.9
3	/9.11
4	/9.10
5	/48.15
6	
7	/16.4
8	/15.5

+112
-A326L

6-pol
Spiegel links

1	/13.6
2	/13.5
3	/13.4
4	/13.6
5	/13.4
6	/13.6

+111
-A326R

6-pol
Spiegel rechts

1	/13.9
2	/13.8
3	/13.7
4	/13.9
5	/13.7
6	/13.9

-X1122

8-pol
Wegfahrsperre

1	/59.2
2	/59.3
3	/59.2
4	/6.6
5	/6.6
6	/6.11
7	/6.11
8	

+119
-A402

16-pol Fahrschalter

1		9	
2		10	
3	/37.6	11	/37.3
4		12	/37.3
5	/37.9	13	/37.4
6		14	/37.9
7	/37.4	15	/37.7
8	/37.6	16	/37.5

+128
-X6104

6-poliger Stecker Beleuchtung vorne rechts

1	/16.2
2	/7.8
3	/7.4
4	/14.6
5	/7.4
6	

+128
-X6105

6-poliger Stecker Beleuchtung vorne links

1	/15.2
2	/7.6
3	/7.3
4	/14.1
5	/7.3
6	

+103
-E300

Schleifringkörper 49+2-polig

1		11	/24.3	21	/35.5	31	/46.2	41	/18.12	A	/6.1
2	/37.10	12	/25.5	22	/37.13	32	/31.1	42	/26.8	B	/6.1
3	/15.14	13	/24.12	23	/37.14	33	/26.4	43	/47.6		
4	/46.10	14	/25.2	24	/37.2	34	/50.2	44	/47.7		
5	/8.5	15	/25.10	25	/19.12	35	/50.6	45			
6	/19.5	16	/45.3	26	/35.8	36	/50.9	46			
7	/24.6	17	/45.12	27	/35.10	37	/18.3	47			
8	/25.4	18	/35.6	28	/26.7	38	/18.6	48			
9	/24.9	19	/35.4	29	/25.13	39	/18.8	49			
10	/25.7	20	/35.7	30	/46.3	40	/19.11				

+105
-X330

20-pol
Bedienkasten Abstützung links

A	/24.7	L	/58.6
B	/24.10	M	/58.6
C	/25.9	N	/24.2
D	/25.12	P	
E	/24.4	Q	
F	/25.4	R	
G	/24.13	S	
H	/25.8	T	
J	/28.3	U	
K	/28.3	V	

+104
-X331

20-pol?
Bedienkasten Abstützung rechts

A	/24.11	L	/58.14
B	/24.2	M	/58.14
C	/25.11	N	/24.2
D	/25.14	P	
E	/24.8	Q	
F	/25.3	R	
G	/24.5	S	
H	/25.6	T	
J	/28.5	U	
K	/28.5	V	

					Datum	Name
a	W10663	18.07.08	Rosenkranz			
_	W10620	14.11.07	Rosenkranz	Erst.	14.11.07	Rosenkranz
Ind	Mitt-NR	Datum	Name	Gepr.		
Abteilung:	1142					

Projektbenennung / project description
E-PLAN AC80-2 UW V3.1.2
ELECTRIC WIRING DIAGRAM

Seitenbenennung / page description
Steckerübersicht
general view plug

Baunummer. 81963-
Anlage: 0
Ort: 0
Zeichnungsnr. / drawing no. 28387512
Blatt 75
78 Bl.

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+101
−X345

6-pol Zentral−schmieranlage	
1	
2	/10.6
3	/10.6
4	/10.7
5	/10.8
6	

+101
−X524

5-pol Kabelbaum Tank	
1	/19.8
2	/18.5
3	/19.8
4	/18.5
5	/18.2

+108
−X321

8-pol Kabelbaum Unterfahrschutz	
1	/7.10
2	/8.8
3	/16.7
4	/8.13
5	/15.10
6	/14.4
7	/14.8
8	/7.10

+101
−X4262

7-pol Winkelgeber Achse 1	
1	/53.1
2	/53.4
3	/53.2
4	/53.5
5	/53.7
6	/53.6
7	/53.8

+104
−X4264

7-pol Winkelgeber Achse 3	
1	/53.9
2	/53.12
3	/53.11
4	/53.13
5	/53.15
6	/53.14
7	/53.9

+104
−X4266

7-pol Winkelgeber Achse 4	
1	/54.2
2	/54.4
3	/54.3
4	/54.5
5	/54.7
6	/54.6
7	/54.9

+101
−X386.1

4-pol ABS Achse 1 links	
1	/40.10
2	/40.10
3	/40.9
4	

+101
−X386.2

4-pol ABS Achse 1 rechts	
1	/40.13
2	/40.12
3	/40.12
4	

+107
−X386.3

4-pol ABS Achse 4 links	
1	/41.9
2	/41.8
3	/41.7
4	

+107
−X386.4

4-pol ABS Achse 4 rechts	
1	/41.15
2	/41.14
3	/41.13
4	

+107
−X386

10-pol ABS	
1	/40.11
2	/40.14
3	
4	
5	
6	
7	
8	/40.12
9	
10	/40.13

+107
−X387

8-pol ABS Anhänger−steckdose	
1	/42.3
2	/42.4
3	/42.2
4	/42.6
5	/42.5
6	
7	
8	

+128
−X312

8-pol ABS Anhänger−steckdose	
1	/21.8
2	/42.2
3	/42.4
4	/42.3
5	
6	/7.14
7	/42.6
8	/42.5

+128
−X332

14-pol Diagnose−stecker	
A	/37.11
B	/37.12
C	/37.13
D	/37.14
E	
F	
G	
H	
I	
J	
K	
L	
M	
N	

+128
−X310.2

9-pol CAN−open Diagnose	
1	
2	/47.5
3	/47.2
4	
5	
6	
7	/47.4
8	
9	/47.3

+128
−X310.1

9-pol Programmier−stecker	
1	
2	/47.8
3	/47.9
4	
5	/47.9
6	
7	
8	
9	

+119
−X404a

14-pol Lenkstockhebel rechts	
1	/43.3
2	/43.4
3	/43.4
4	/43.5
5	/43.7
6	/43.8
7	/43.9
8	
9	
10	
11	
12	
13	
14	/43.9

+107
−X340.1

8-pol Anhänger−steckdose	
1	/7.11
2	/8.9
3	/16.11
4	/42.9
5	/15.13
6	/14.5
7	/14.10
8	

+107
−X340

13-pol Anhänger−steckdose	
1	/14.5
2	/14.10
3	/7.11
4	
5	/16.11
6	/15.13
7	/42.9
8	
9	
10	
11	
12	
13	

a	W10663	18.07.08	Rosenkranz		Datum	Name
_	W10620	14.11.07	Rosenkranz	Erst.	14.11.07	Rosenkranz
Ind	Mitt−NR	Datum	Name	Gepr.		
Abteilung:	1142					

Projektbenennung / project description
E−PLAN AC80−2 UW V3.1.2
ELECTRIC WIRING DIAGRAM

Seitenbenennung / page description
Steckerübersicht
general view plug

Baunummer. 81963−
Anlage: 0
Ort: 0
Zeichnungsnr. / drawing no. 28387512
Blatt 76
78 Bl.

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BMK design.	Ort loc.	Seite page	Pfad line
			.
			.
			.
			.
			.
A0424	0	59.7	
A1	128	67.1	
A2	0	69.2	
A2	128	68.1	
A3	0	69.2	
A4	0	70.2	
A5	0	71.1	
A6	0	71.8	
A300	135	63.11	
A301	128	62.2	
A302	128	62.1	
A308	128	14.11	
A310	128	62.5	
A312	128	9.12	
A320	119	32.5	
A326L	112	75.11	
A326R	111	75.13	
A345	101	10.6	
A360	128	65.2	
A361	128	66.3	
A386	128	64.1	
A390	128	48.11	
A402	119	75.9	
A903	128	21.1	
A904	122	21.4	
A1122	0	59.2	
A2112	128	37.3	
A4200	0	55.2	
A4200	128	64.1	
A5190	110	13.11	
B61	108	26.3	
B62	108	26.3	
B109	128	42.12	
B170	119	10.12	
B262.1	0	55.2	
B262.1	101	53.2	
B262.2	0	55.5	
B262.2	101	53.5	
B262.2	104	53.13	
B264.1	104	53.10	
B301	101	18.5	
B301.1	101	18.2	

BMK design.	Ort loc.	Seite page	Pfad line
B310.1	110	32.1	
B310.2	101	20.3	
B310.4	102	45.3	
B310.5	101	45.10	
B310.6	128	20.2	
B310.7	112	17.9	
B310.7a	112	17.11	
B322.1	102	20.5	
B322.2	102	20.6	
B322.3	103	20.4	
B323.1	135	19.4	
B323.2	135	19.3	
B324.1	102	19.10	
B324.2	102	19.7	
B324.3	102	19.8	
B325	102	19.12	
B326	102	19.11	
B359	105	29.8	
B360	104	29.8	
B370.1	101	28.7	
B370.2	107	28.10	
B370.3	108	28.13	
B370.4	101	28.8	
B370.5	107	28.11	
B370.6	108	28.14	
B401	135	17.2	
B410	135	17.12	
B410a	135	17.12	
B466.1	0	55.10	
B466.1	104	54.2	
B466.2	0	55.13	
B466.2	104	54.6	
B904.1	110	21.5	
B904.2	110	21.6	
B5156	236	48.2	
B5157	236	48.3	
B5158	236	48.4	
B5159	236	48.5	
E300		44.3	
E300	103	75.1	
E301	105	7.12	
E302	104	7.12	
E305.1	112	7.3	
E305.2	111	7.4	
E306.1–1	112	7.5	
E306.1–2	112	7.6	
E306.2–1	112	7.7	

BMK design.	Ort loc.	Seite page	Pfad line
E306.2–2	112	7.8	
E332.1	108	8.8	
E336	110	21.14	
E390	128	21.11	
E394.1	108	7.10	
F100.1	101	6.1	
F100.2	101	6.2	
G301	135	6.4	
G302	101	6.2	
H109.1	0	42.11	
H109.2	0	42.11	
H301	119	19.14	
H305	119	19.7	
H306	119	19.13	
H307	0	59.15	
H307.1	110	8.6	
H307.2	110	8.7	
H308.1	112	14.1	
H308.2	112	14.3	
H308.3	108	14.4	
H308.4	111	14.6	
H308.5	111	14.7	
H308.6	107	14.8	
H309.1	112	15.2	
H309.2	111	15.5	
H309.3	104	16.5	
H309.4	108	15.10	
H309.5	112	15.3	
H309.6	111	16.2	
H309.7	112	16.4	
H309.8	105	15.8	
H309.9	107	16.7	
H309.10	107	16.8	
H309.11	107	16.10	
H309.12	111	16.3	
H309.13	107	16.11	
H309.14	108	15.11	
H309.15	104	16.6	
H309.16	105	15.13	
H309.17	104	16.12	
H309.18	108	16.14	
H309.19	105	15.7	
H309.20	108	16.13	
H310	119	7.2	
H310.1	108	8.13	
H310.2	107	8.14	
H311	119	28.10	

BMK design.	Ort loc.	Seite page	Pfad line
H312	119	28.7	
H314	119	19.10	
H316	119	28.11	
H317	119	28.8	
H318	119	20.4	
H319	119	20.6	
H320	119	20.5	
H322	119	6.12	
H323	119	19.5	
H324	119	19.1	
H325	119	19.6	
H326	119	44.5	
H326	119	44.5	
H327	119	19.4	
H329	119	19.3	
H330	119	14.12	
H331.1	110	8.10	
H331.2	110	8.11	
H332	128	42.5	
H332.3	107	8.9	
H333	119	40.6	
H334	119	20.2	
H335	119	14.13	
H336	119	20.14	
H337	119	43.2	
H338	119	43.7	
H339	119	20.3	
H341	119	20.6	
H342	119	20.9	
H343	119	45.14	
H344	119	49.7	
H345	119	49.6	
H348	119	28.5	
H349	119	49.3	
H350	119	29.9	
H392	119	58.2	
H393	119	58.3	
H394	119	58.4	
H395	119	58.5	
H500	119	49.8	
K101	128	18.11	
K102	128	6.14	
K103	128	8.2	
K104	128	8.3	
K105	128	8.4	
K106	128	32.1	
K107	128	9.3	

BMK design.	Ort loc.	Seite page	Pfad line
K108	128	46.5	
K109	128	22.5	
K110	128	7.9	
K111	128	36.14	
K112	128	45.4	
K113	128	10.12	
K114	128	45.15	
K115	128	6.11	
K116	128	42.13	
K117	128	45.6	
K118	128	45.12	
K119	128	33.7	
K120	128	33.6	
K121	128	33.11	
K122	128	44.13	
K123	128	45.5	
K124	128	28.13	
K125	128	49.4	
K126	128	43.3	
K127	128	49.11	
K128	128	49.2	
K129	128	37.5	
K130	128	29.14	
K132	128	12.9	
K133	128	7.15	
K201	128	45.6	
K202	128	45.10	
K203	128	45.11	
K204	128	37.6	
K205	128	22.6	
K206	128	40.7	
K211	128	37.7	
K212	128	30.11	
K213	128	45.9	
K214	128	45.8	
K215	128	45.7	
K301	128	6.13	
K390	119	48.13	
K401	128	44.6	
K1119	128	10.2	
K5210	128	9.6	
K5211	128	9.7	
L4127	101	49.10	
L4128	103	49.7	
L4129	101	41.2	
L4130	103	40.6	
L4133	107	41.11	

BMK design.	Ort loc.	Seite page	Pfad line
L4134	109	41.4	
M301	135	6.4	
M302	110	9.5	
M303	110	9.9	
M305	101	48.8	
M5141	110	48.14	
M5160	236	48.6	
M5161	236	48.9	
P100	119	63.2	
P301	119	17.2	
P301.1A	119	17.6	
P301.1B	119	17.9	
P301.1C	119	17.9	
R301	128	33.3	
R302	128	33.4	
R303	128	33.1	
R304	128	33.5	
R325	101	9.2	
R326L	112	13.5	
R326R	111	13.8	
R328	110	13.14	
R1119	135	10.3	
S94		44.11	
S94.1		44.3	
S94.2		44.9	
S300	112	6.4	
S301	119	35.6	
S303	119	59.12	
S305	119	27.9	
S306	119	27.11	
S307	119	27.12	
S308	119	27.7	
S311	119	10.7	
S312	119	7.11	
S313	119	8.4	
S314	119	7.10	
S315	119	7.5	
S315.1	111	21.12	
S315.2	112	21.14	
S316	119	14.9	
S319.1	171	20.9	
S319.2	135	20.6	
S320	171	20.8	
S321	173	20.13	
S321.1	171	20.10	
S321.2	172	20.11	
S321.4	174	20.12	

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Ind	Mitt–NR	Datum	Name		Datum	Name
a	W10663	18.07.08	Rosenkranz			
_	W10620	14.11.07	Rosenkranz	Erst.	14.11.07	Rosenkranz
				Gepr.		

Abteilung: 1142

Projektbenennung / project description
E–PLAN AC80–2 UW V3.1.2
ELECTRIC WIRING DIAGRAM

Seitenbenennung / page description
BMK–Liste
device disignation list

Baunummer. 81963–
Anlage: 0
Ort:
Zeichnungsnr. / drawing no. 28387512
Blatt 77
78 Bl.

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BMK design.	Ort loc.	Seite page	Pfad line
S326	119	22.8	
S327	119	27.14	
S328	119	50.2	
S329	119	29.9	
S335	119	13.1	
S344	119	50.7	
S345	119	50.7	
S346	119	50.4	
S347	119	50.5	
S350	0	13.2	
S352.1	135	19.13	
S352.2	135	19.14	
S360.1	105	28.5	
S360.2	104	28.3	
S370	119	10.12	
S390	119	48.14	
S400	119	63.2	
S404	119	32.8	
S404a	119	43.3	
S428	110	13.14	
S500	104	24.2	
S501	105	24.4	
S502	104	24.5	
S503	105	24.7	
S504	104	25.3	
S505	105	25.5	
S506	104	25.6	
S507	105	25.8	
S508	104	24.8	
S509	105	24.10	
S510	104	24.11	
S511	105	24.13	
S4501A	0	11.2	
S4501B	0	11.3	
S4502A	0	11.4	
S4502B	0	11.6	
S4503A	0	12.2	
S4504A	0	12.6	
S4511A	0	11.7	
S4511B	0	11.8	
S4512A	0	11.9	
S4512B	0	11.10	
S4513A	0	12.4	
S4514A	0	12.7	
S5129	0	10.12	
V303	128	9.9	
W901	110	21.7	

BMK design.	Ort loc.	Seite page	Pfad line
W902	110	21.9	
X0424	0	59.7	
X94		44.11	
X101	128	7.13	
X102	128	7.15	
X199	0	52.7	
X199	128	75.1	
X300	128	31.14	
X301	101	6.1	
X310.1	128	76.5	
X310.2	128	76.4	
X312	0	7.14	
X312	128	76.13	
X316	128	74.1	
X317	128	74.1	
X318	128	74.5	
X320	128	74.9	
X321	108	76.5	
X322	128	74.9	
X323	128	74.12	
X324	128	74.12	
X328	128	13.14	
X330	105	75.8	
X331	104	75.11	
X332	128	76.2	
X333	128	74.5	
X334	134	39.7	
X340	107	76.13	
X340.1	107	76.11	
X342.1	128	75.8	
X342.2	128	75.9	
X345	101	76.2	
X360.1	128	42.12	
X386	107	76.9	
X386.1	101	76.2	
X386.2	101	76.4	
X386.3	107	76.5	
X386.4	107	76.7	
X387	107	76.11	
X390a	128	21.11	
X404	119	43.3	
X404a	119	76.9	
X524	101	76.4	
X710	113	75.6	
X1119	135	10.3	
X1122	0	75.8	
X4262	0	55.1	

BMK design.	Ort loc.	Seite page	Pfad line
X4262	101	76.9	
X4264	0	55.9	
X4264	104	76.11	
X4266	104	76.13	
X6104	128	75.12	
X6105	128	75.14	
XK1	128	73.1	
XK2	128	73.4	
XK3	128	73.7	
XK4	128	73.10	
XK5	128	73.1	
XK6	128	73.4	
XK21	128	73.1	
XK22	128	73.4	
XK23	128	73.7	
XK24	128	73.10	
XV	128	72.3	
Y61A	105	26.7	
Y61B	105	26.8	
Y94		44.10	
Y170	135	10.14	
Y172	104	31.1	
Y304	104	46.3	
Y304B	104	46.2	
Y304C	104	46.8	
Y304D	104	46.9	
Y304E	104	46.10	
Y304F	104	46.11	
Y306A	101	24.2	
Y306B	101	25.6	
Y307A	107	24.11	
Y307B	107	25.3	
Y308A	102	24.5	
Y308B	102	25.4	
Y309A	108	24.8	
Y309B	108	25.8	
Y310A	105	29.6	
Y310B	105	29.8	
Y320	104	42.14	
Y332	102	45.13	
Y343	105	29.5	
Y344	128	30.2	
Y357	107	28.2	
Y361	107	27.6	
Y362	107	27.8	
Y363	107	27.9	
Y365	107	27.5	

BMK design.	Ort loc.	Seite page	Pfad line
Y366A	107	27.12	
Y366B	107	27.11	
Y367	107	27.14	
Y386.1	101	40.9	
Y386.2	101	40.10	
Y386.3	101	40.12	
Y386.4	101	40.13	
Y386.5	107	41.7	
Y386.6	107	41.9	
Y386.7	107	41.13	
Y386.8	107	41.15	
Y404	104	47.11	
Y420	104	33.12	
Y422	104	33.8	
Y4236	104	51.4	
Y4237	104	51.2	
Y4238	104	51.11	
Y4239	104	51.8	
Y4253	104	51.7	
Y4254	104	51.13	

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_	W10620	14.11.07	Rosenkranz	Erst.	14.11.07	Rosenkranz
Ind	Mitt-NR	Datum	Name	Gepr.		
Abteilung:	1142					

Projektbenennung / project description
E-PLAN AC80-2 UW V3.1.2
ELECTRIC WIRING DIAGRAM

Seitenbenennung / page description
BMK-Liste
device disignation list

Baunummer. 81963-
Anlage: 0
Ort:
Zeichnungsnr. / drawing no. 28387512
Blatt 78
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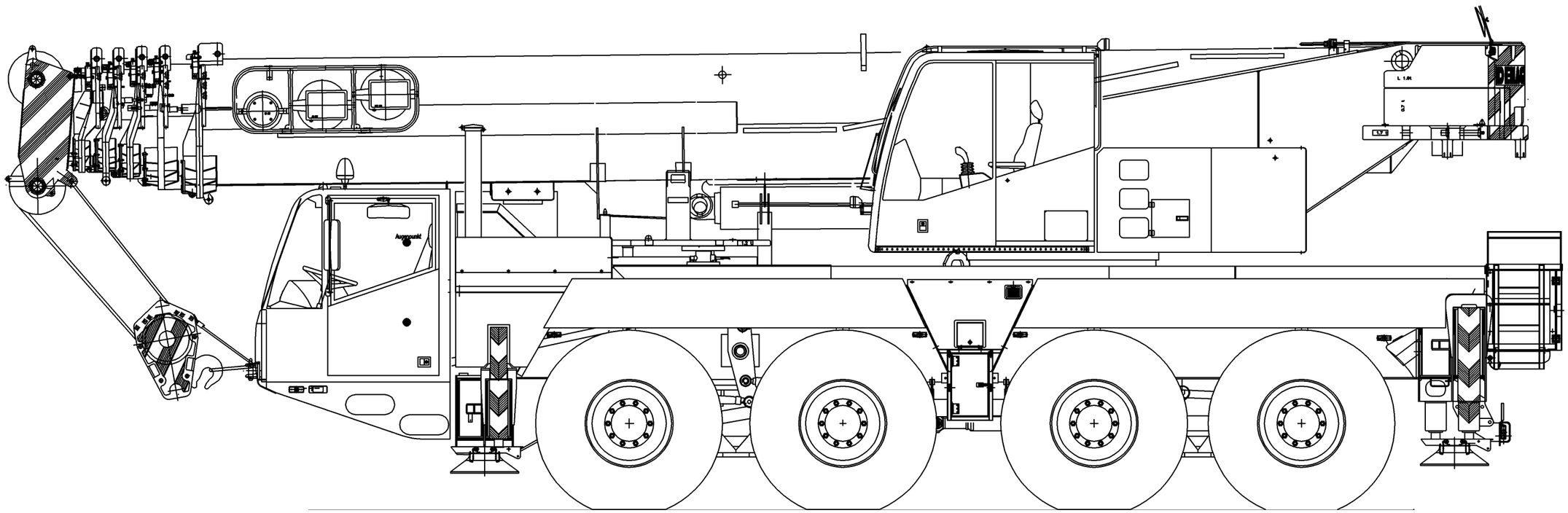
E-Plan Unterwagen AC 80-2
Schematic Diagram Carrier AC 80-2



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a	N04534	07.04.09	Rosenkranz	Erst.	21.10.08	Rosenkranz
Ind	Mitt-NR	Datum	Name	Gepr.		
Abteilung: 111410						

Projektbenennung / project description
E-PLAN AC 80-2 UW V4.2
ELECTRIC WIRING DIAGRAM

Seitenbenennung / page description
Deckblatt
cover sheet

Baunummer.

Anlage: 0
Ort: 0

Zeichnungsnr. / drawing no.
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Blatt 1
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Seite page	Seitenbenennung	page description
1	Deckblatt	cover sheet
2	Inhaltsverzeichnis	directory
3	Blockschaltbild Verkabelung UW	block diagram wiring chassis
4	Blockschaltbild Verk. Stützdruckerfassung	block diagram support pressure detection
5	Blockschaltbild Verk. Wirbelstrombremse	block diagram eddy current brake
6	Batterie, Anlasser, Generator	battery, starter, generator
7	Fern–/Abblendlicht, NSL, Steckdose	low/high beam headli, rear fog li., plug
8	Hupe, Summer, Rundumleuchte	horn, buzzer, rotaflare lights
9	Scheibenwischer, Lufttrockner	windscreen wiper, air dryer
10	Klimaanlage, Zentralschmieranlage	air condition, auto lubrication
11	Bremsbelagschalter	brake pads switch
12	Bremsbelagschalter	brake pads switch
13	Sitzheizung, Spiegelverst., Fensterheber	seat heater, mirror / window adjustm.
14	Blinker, Warnblinker	flasher, hazard
15	Standlicht	parking light
16	Standlicht, Kennzeichenbeleuchtung	parking light, plate light
17	Tachograph	tachograph
18	Anzeigeinstrumente	gauge
19	Sensoren, Kontrollorgane, Störung	sensors, control, fault
20	Sensoren, Kontrollorgane, Störung	sensors, control, fault
21	Radio, Telefon, ZE Bel.	radio, phone, ilumin., wiring box
22	Differentialsp., Handbremse, Federspeicher	differential lock, handbrake, suspension
23	Option Federung für kleine Achslasten	option suspension for small axle load
24	Abstützung	stabilizer
25	Abstützung	stabilizer
26	Gegengewicht	counterweight
27	SPS–Karte 1, Achsenverstellung	PLC process card 1, axle adjustment
28	SPS Karte 1, Niveausteuerung	PLC process card 1, level control
29	SPS Karte 2, Abstützung	plc process card 2, stabilizer
30	SPS Karte 2	process card 2
31	Motorregelung	engine control
32	Motorregelung FR–SKN	engine control FR–SKN
33	Motorregelung FR–SKN	engine control FR–SKN
34	CAN–Sternpunkt, Abschlusswiderstände	CAN–starpoint, termination resistors
35	ADM–AR	ADM–AR
36	ADM–AR, Getriebeelektronik	ADM–AR, gearbox electronic
37	Getriebeelektronik	gearbox electronic
38	Getriebeelektonik	gearbox electronic
39	Getriebeelektronik	gearbox electronic
40	ABS–Steuerung	ABS–control
41	ABS–Steuerung	ABS–control
42	ABS Anhängersteckdose, Lüftersteuerung	ABS trailer socket, fan control
43	Retarderbremse	retarder brake
44	Schnellstop Motor	quick stop engine
45	Umschaltung UW – OW	switch over chassis – superstructure
46	Lenkung vom OW	steering from superstructure

Seite page	Seitenbenennung	page description
47	CAN–open, Zuschaltung Nebenabtrieb	CAN–open, enable power take off
48	Standheizung	auxilary heating
49	Lenkung	steering
50	Lenkung	steering
51	Lenkung	steering
52	Lenkung	steering
53	Winkelgeber	angle transmitter
54	Winkelgeber	angle transmitter
55	Winkelgeber	angle transmitter
56	Schalterbeleuchtung	switch illumination
57	Schalterbeleuchtung	switch illumination
58	Tasterbeleuchtung Abstützkasten	switch illumination stabilizer – box
59	Wegfahrsperre, Umsch Diesel–Heizöl	immoblizer, changeover diesel–heating oil
60	Übersicht Magnetventilsteuerung	general view magnetic valves control
61	Übersicht Magnetventilsteuerung	general view magnetic valves control
62	Motorregelung	engine control
63	Lenkstockhebel links, MFA10	strut rod left hand, MFA10
64	Lenkcomputer, ABS–Steuerung	steering computer, ABS–control
65	DIGSY–PLUS BIM	DIGSY–PLUS BIM
66	DIGSY–PLUS BIM	DIGSY–PLUS BIM
67	Belegung Sicherungsplatine F101–F128	general view fuse modul F101–F128
68	Belegung Sicherungsplatine F201–F214	general view fuse modul F201–F214
69	Relaisplatine K101–K120, 1W	relay module K101–K120, 1W
70	Relaisplatine K121–K130, 1W	relay module K121–K130, 1W
71	Relaisplatine K201–K216, 2W	relay module K201–K216, 2W
72	Diodenplatine V1–V22, 5A	diode module V1–V22, 5A
73	Steckerübersicht Relaisplatinen	general view plug relay module
74	Steckerübersicht	general view plug
75	Steckerübersicht	general view plug
76	Steckerübersicht	general view plug
77	BMK–Liste	device disignation list
78	BMK–Liste	device disignation list

Ind	Mitt–NR	Datum	Name		Datum	Name
b	N04534	04.03.11	Rosenkranz			
a	N04534	07.04.09	Rosenkranz	Erst.	21.10.08	Rosenkranz
				Gepr.		

Abteilung: 111410

Projektbenennung / project description
E–PLAN AC 80–2 UW V4.2
ELECTRIC WIRING DIAGRAM

Seitenbenennung / page description
Inhaltsverzeichnis
directory

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Ort: 0

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Beleuchtung vo. re.

Abstützbetätigung rechts

Beleuchtung hi. re

A386, A360, A361,
A4200, A302,
A301, A310

Kabelbaum rechts vorne

X331

X340.1

Kabelbaum rechts hinten

Kabelbaum Lenkung

X321

B362
Achse 1

Lenkungsblock

B364
Achse 3
Nur bei 8x8x8
oder Modulachse

B466
Achse 4

Option Modulachse

X199

Zentralelektrik

X316

Daimlermotor mit Getriebe (DGS)

Schleifringkörper

Pendelleuchte
B109

X340.1

X317

X318 Kabelbaum Motor

X319 Kabelbaum Getriebe

X320

E300

X321

X321.1

Unterfahrschutz Verlängerung

Armaturen-
brett

X322

X323

X324

Option Kabelbaum Stützdruck

Kabelbaum links hinten

Kabelbaum vorne links

X330

Beleuchtung vo. li.

Abstützbetätigung links

Beleuchtung hi. li.

b	N04534	04.03.11	Rosenkranz		Datum	Name
a	N04534	07.04.09	Rosenkranz	Erst.	21.10.08	Rosenkranz
Ind	Mitt-NR	Datum	Name	Gepr.		
Abteilung:	111410					

Projektbenennung / project description
E-PLAN AC 80-2 UW V4.2
ELECTRIC WIRING DIAGRAM

Seitenbenennung / page description
Blockschaltbild Verkabelung UW
block diagram wiring chassis

Baunummer.

Anlage: 0

Ort: 0

Zeichnungsnr. / drawing no.
23222612

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Kundenwunsch / Option

Stützdruckerfassung vr.

Stützdruckerfassung hr.

Zentralelektrik

X320

X323

X324

E300

Digsy Compakt

Datenbus

Stützdruckerfassung vl.

Abstützbetätigung, Stützdruckanzeige

Stützdruckerfassung hl.

b	N04534	04.03.11	Rosenkranz		Datum	Name
a	N04534	07.04.09	Rosenkranz	Erst.	21.10.08	Rosenkranz
Ind	Mitt-NR	Datum	Name	Gepr.		
Abteilung: 111410						

Projektbenennung / project description
E-PLAN AC 80-2 UW V4.2
ELECTRIC WIRING DIAGRAM

Seitenbenennung / page description
Blockschaltbild Verk. Stützdruckerfassung
block diagram support pressure detection

Baunummer.

Anlage: 0

Ort: 0

Zeichnungsnr. / drawing no.
23222612

Blatt 4

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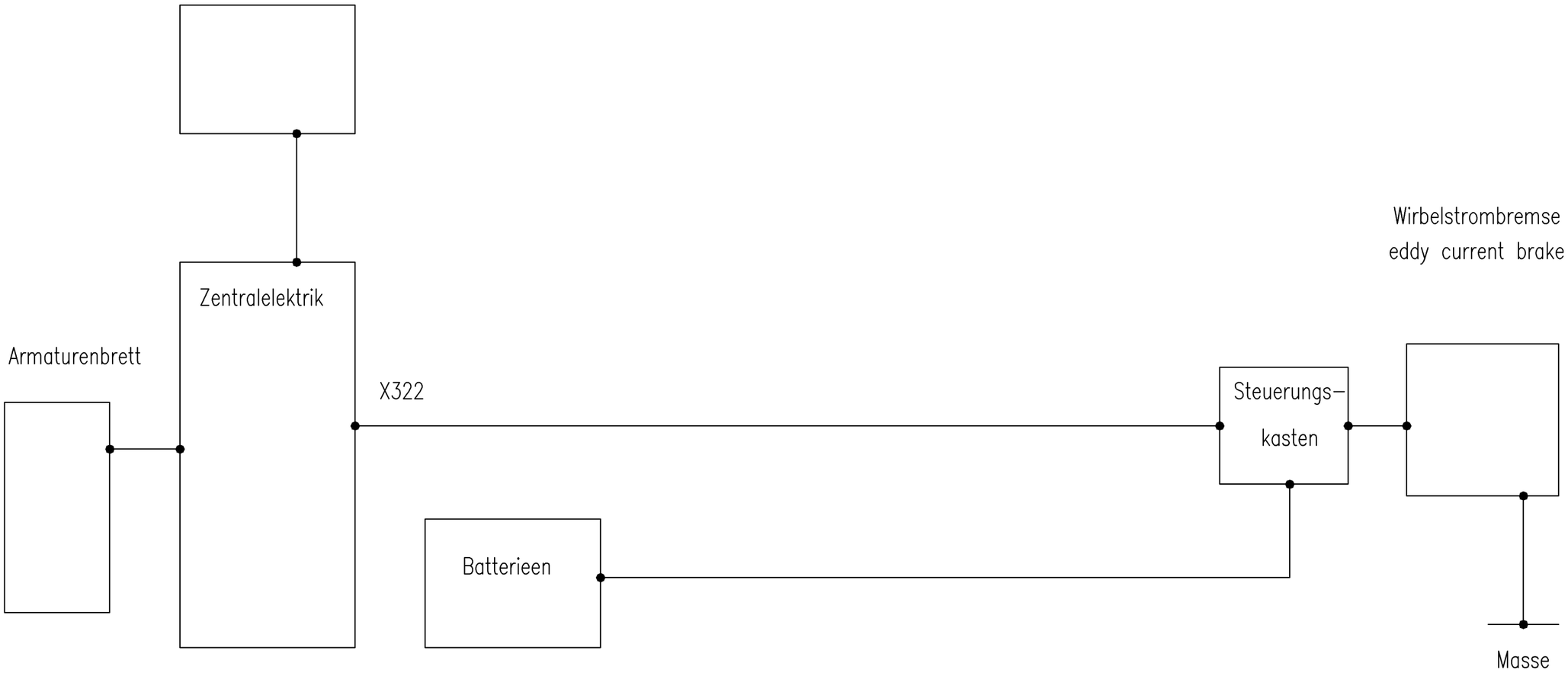
Option Wirbelstrombremse / eddy current brake



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a	N04534	07.04.09	Rosenkranz	Erst.	21.10.08	Rosenkranz
Ind	Mitt–NR	Datum	Name	Gepr.		
Abteilung: 111410						

Projektbenennung / project description
E–PLAN AC 80–2 UW V4.2
ELECTRIC WIRING DIAGRAM

Seitenbenennung / page description
Blockschaltbild Verk. Wirbelstrombremse
block diagram eddy current brake

Baunummer.

Anlage: 0
Ort: 0

Zeichnungsnr. / drawing no.
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	Fremdstarthilfe	Batterien	Zuendschalter Motor Start Anlasser	Lichtmaschine	Zündung Motor Gertriebe	Option Schnellstop Br150+Br151 entfernen	Ladekontrolleuchte Lastspannungsrelais	Freigabe Drehzahlanzeige
A	external starter	batteries	ignition switch engine start	generator	ignition engine / gear	option quick stop remove Br150+Br151	charge indicator relay for load-circuit	release revolution display

					Datum	Name
b	N04534	04.03.11	Rosenkranz			
a	N04534	07.04.09	Rosenkranz	Erst.	21.10.08	Rosenkranz
Ind	Mitt-NR	Datum	Name	Gepr.		
Abteilung: 111410						

Projektbenennung / project description
E-PLAN AC 80-2 UW V4.2
ELECTRIC WIRING DIAGRAM

Seitenbenennung / page description
Batterie, Anlasser, Generator
battery, starter, generator

Baunummer.

Anlage: 0
Ort: 0

Zeichnungsnr. / drawing no.
23222612

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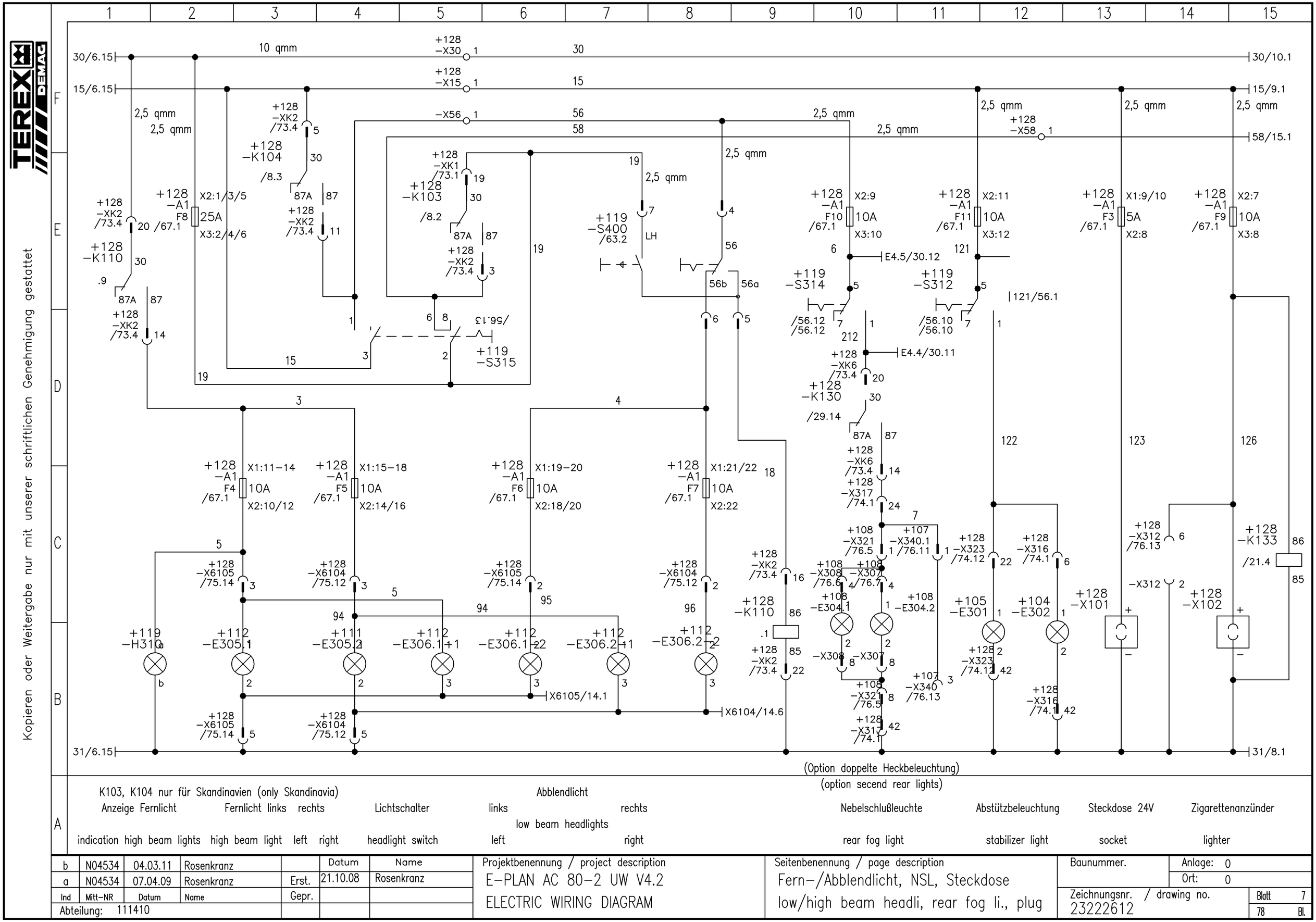

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a	N04534	07.04.09	Rosenkranz	Erst.	21.10.08	Rosenkranz
Ind	Mitt−NR	Datum	Name	Gepr.		
Abteilung: 111410						

Projektbenennung / project description
E−PLAN AC 80−2 UW V4.2
ELECTRIC WIRING DIAGRAM

Seitenbenennung / page description
Fern−/Abblendlicht, NSL, Steckdose
low/high beam headli, rear fog li., plug

Baunummer.

Anlage: 0
Ort: 0

Zeichnungsnr. / drawing no.
23222612

Blatt 7
78 Bl.

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1 2 3 4 5 6 7 8 9 10 11 12 13 14 15

F E D C B A

115/6.15 — +128 −X115 2 — 115/17.1

65/6.15 — +128 −X65 1 — 65 — 65/22.1

+128 −X8 1 — 8/14.1

Rundumleuchte OW

23 — 23/14.1

23

+128 −A1 F12 /67.1 10A X2:13 X3:14

+119 −S313 /56.11 /56.11 5 7

+103 −E300 /75.1 5

+128 −XV V7 /72.3 X2:3 X2:5

+128 −X320 /74.9 5

1 9 8 970

65

+128 −XK2 /73.4 23 13 30 .4 87A 87 +128 −XK2 /73.4 19 97

+128 −K105 30

+128 −XK3 /73.7 23 3 30 /36.14 87A 87 +128 −XK3 /73.7 9 98

+128 −K111 30

+128 −XK1 /73.1 18 30 /9.3 87A 87 +128 −XK1 /73.1 12 99

+128 −K107 30

+128 −XK4 /73.10 6 10 — 343/43.1

+128 −K119 /33.7 87 87A 30 +128 −XK4 /73.10 12 100 — 100/42.9

+128 −X342.1 /75.8 4

+128 −X317 /74.1 17 98 — 98

+108 −X321 /76.5 2

+107 −X340.1 /76.11 2

99 — 99

+128 −X317 /74.1 19 +108 −X321 /76.5 4 100

100

+128 −XK2 /73.4 1 9 17

+128 −K103 86 /7.5 85

+128 −K104 86 /7.3 85

+128 −K105 86 .6 85

+128 −XK2 21,22

+110 −H307.1 1 2

+110 −H307.2 1 2

+108 −X308 /76.6 5 3 +108 −X307 /76.7 5 3

+108 −E332.1 1 2 −X308 8

+108 −E332.2 1 2 −X307 8

+108 −H332.3 (H711) 1 2

+128 −X317 /74.1 44

+110 −H331.1 1 2

+110 −H331.2 1 2

+108 −H310.1 1 2 −X308 8

+108 −H310.2 1 2 −X307 8

+128 −X317 /74.1 43

31/7.15 — 31/9.1

(Option doppelte Heckbeleuchtung)
(option secend rear lights)

(Option doppelte Heckbeleuchtung)
(option secend rear lights)

Relais Skandinavien	Rundumleuchte	Rückfahrscheinwerfer	Summer nur GB	Hupe	Bremslicht
relays Scandinavia	rotaflare lights	reversing lights	buzzer only GB	horn	stoplights

Ind	Mitt-NR	Datum	Name		Datum	Name
b	N04534	04.03.11	Rosenkranz			
a	N04534	07.04.09	Rosenkranz	Erst.	21.10.08	Rosenkranz
				Gepr.		

Abteilung: 111410

Projektbenennung / project description
E-PLAN AC 80-2 UW V4.2
ELECTRIC WIRING DIAGRAM

Seitenbenennung / page description
Hupe, Summer, Rundumleuchte
horn, buzzer, rotaflare lights

Baunummer.

Anlage: 0

Ort: 0

Zeichnungsnr. / drawing no.
23222612

Blatt 8
78 Bl.

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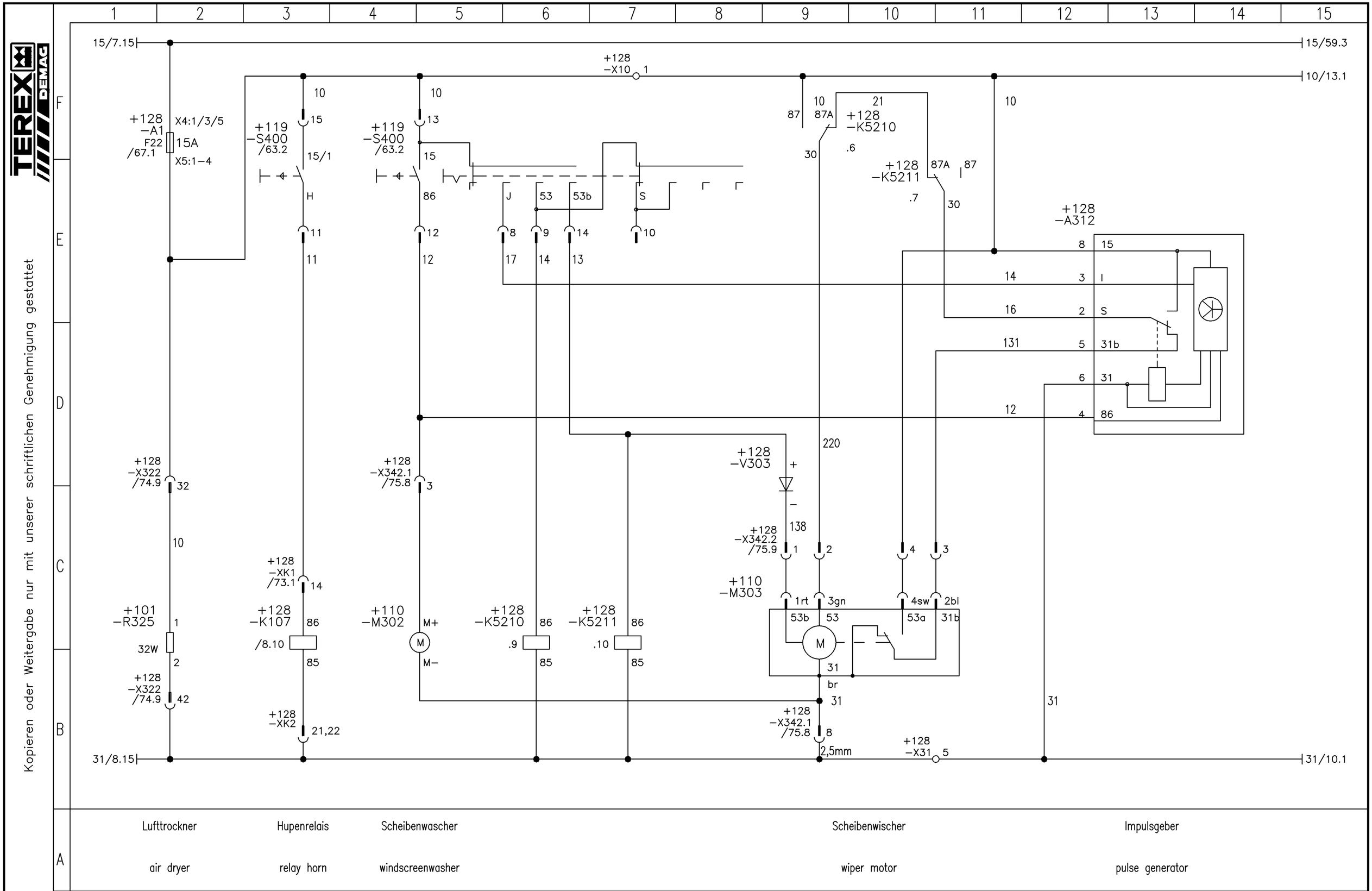

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					Datum	Name
b	N04534	04.03.11	Rosenkranz			
a	N04534	07.04.09	Rosenkranz	Erst.	21.10.08	Rosenkranz
Ind	Mitt−NR	Datum	Name	Gepr.		
Abteilung: 111410						

Projektbenennung / project description
E−PLAN AC 80−2 UW V4.2
ELECTRIC WIRING DIAGRAM

Seitenbenennung / page description
Scheibenwischer, Lufttrockner
windscreen wiper, air dryer

Baunummer.
Anlage: 0
Ort: 0
Zeichnungsnr. / drawing no.
23222612
Blatt 9
78 Bl.

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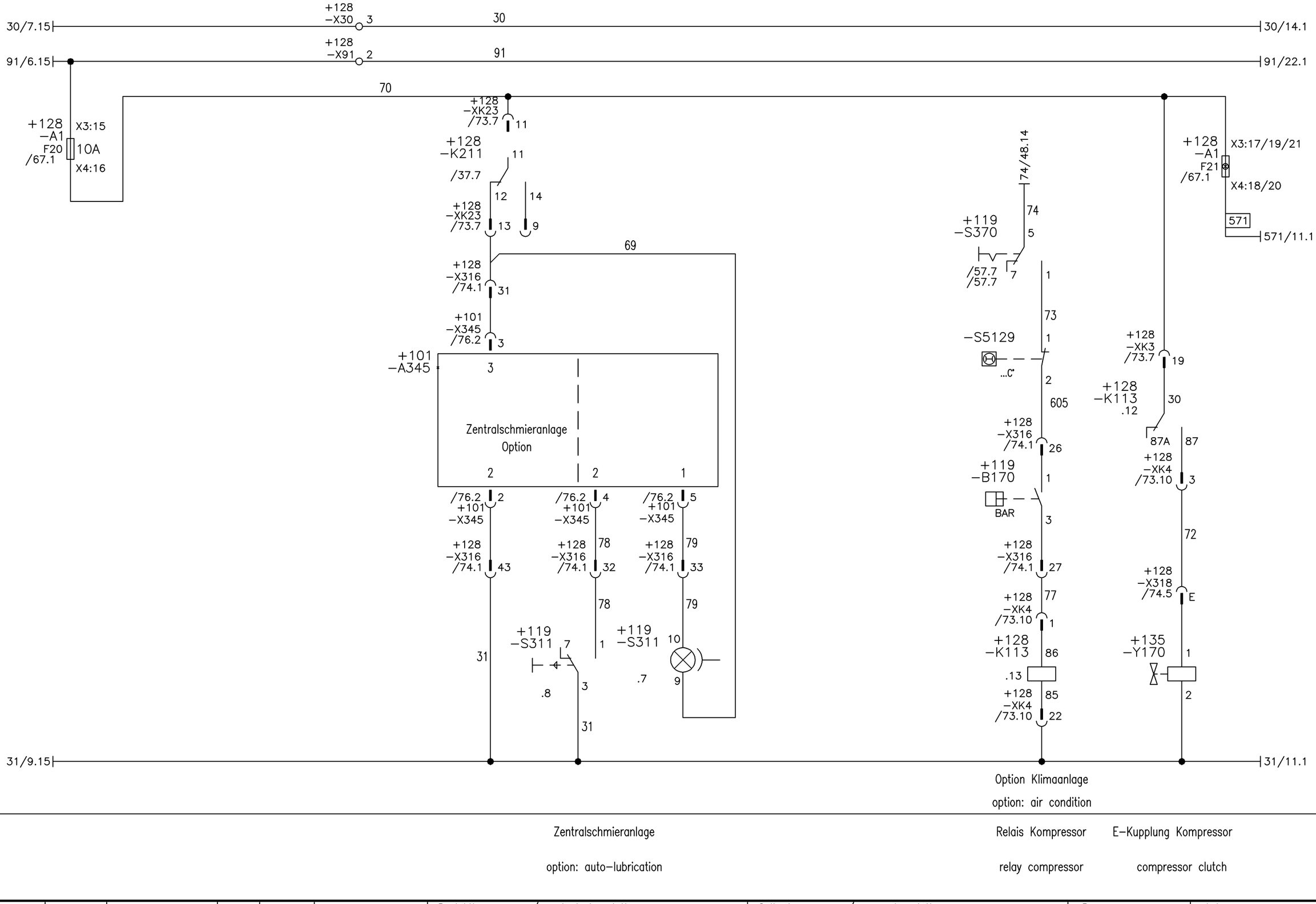

b	N04534	04.03.11	Rosenkranz		Datum	Name
a	N04534	07.04.09	Rosenkranz	Erst.	21.10.08	Rosenkranz
Ind	Mitt-NR	Datum	Name	Gepr.		
Abteilung: 111410						

Projektbenennung / project description
E-PLAN AC 80-2 UW V4.2
ELECTRIC WIRING DIAGRAM

Seitenbenennung / page description
Klimaanlage, Zentralschmieranlage
air condition, auto lubrication

Baunummer.

Anlage: 0
Ort: 0

Zeichnungsnr. / drawing no.
23222612

Blatt 10
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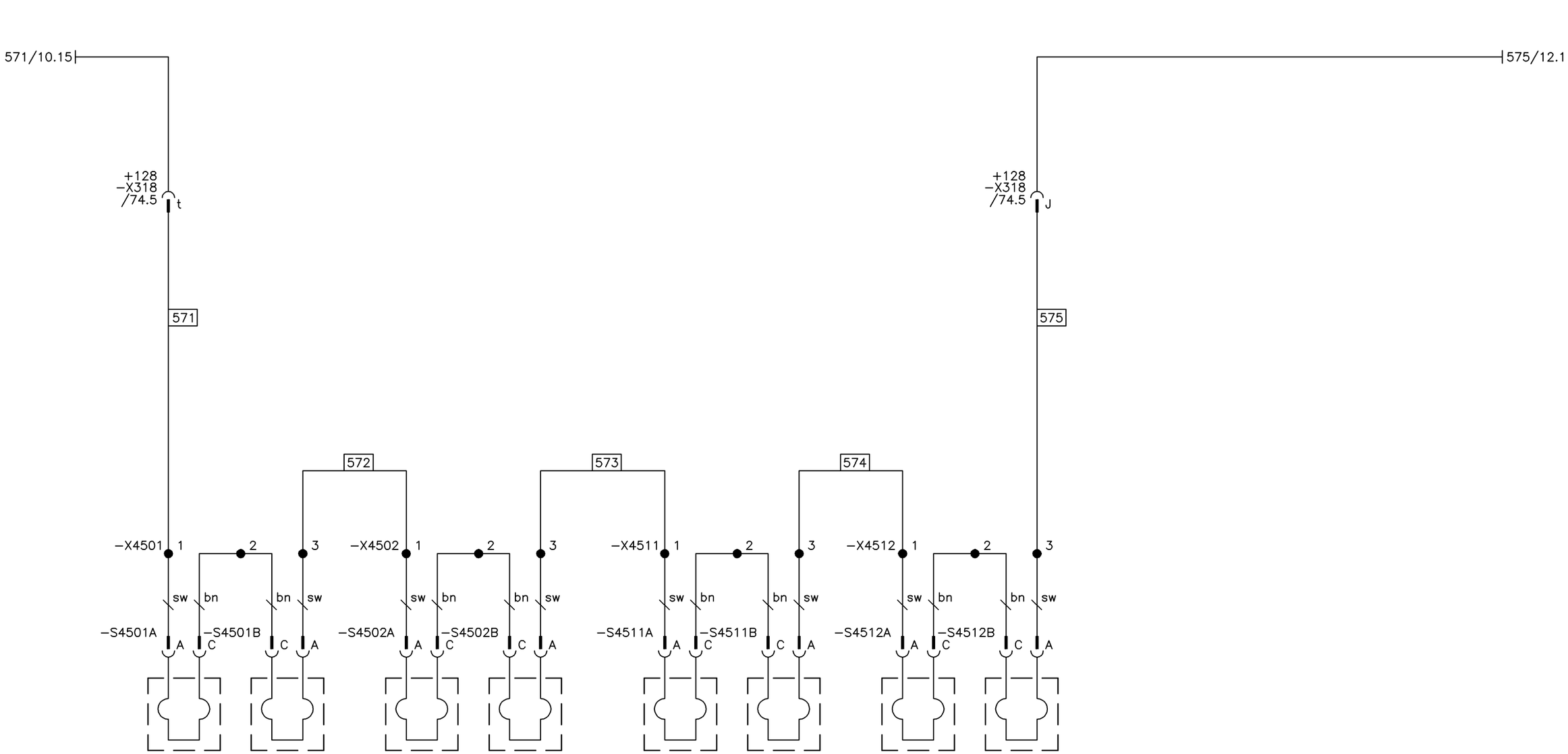

Bremsbelagschalter
Achse 1 links

brake pads switch
axle 1 left hand

Bremsbelagschalter
Achse 2 links

brake pads switch
axle 2 left hand

Bremsbelagschalter
Achse 1 rechts

brake pads switch
axle 1 right hand

Bremsbelagschalter
Achse 2 rechts

brake pads switch
axle 2 right hand

b	N04534	04.03.11	Rosenkranz		Datum	Name
a	N04534	07.04.09	Rosenkranz	Erst.	21.10.08	Rosenkranz
Ind	Mitt-NR	Datum	Name	Gepr.		
Abteilung: 111410						

Projektbenennung / project description
E-PLAN AC 80-2 UW V4.2
ELECTRIC WIRING DIAGRAM

Seitenbenennung / page description
Bremsbelagschalter
brake pads switch

Baunummer.

Anlage: 0
Ort: 0

Zeichnungsnr. / drawing no.
23222612

Blatt 11
78 Bl.

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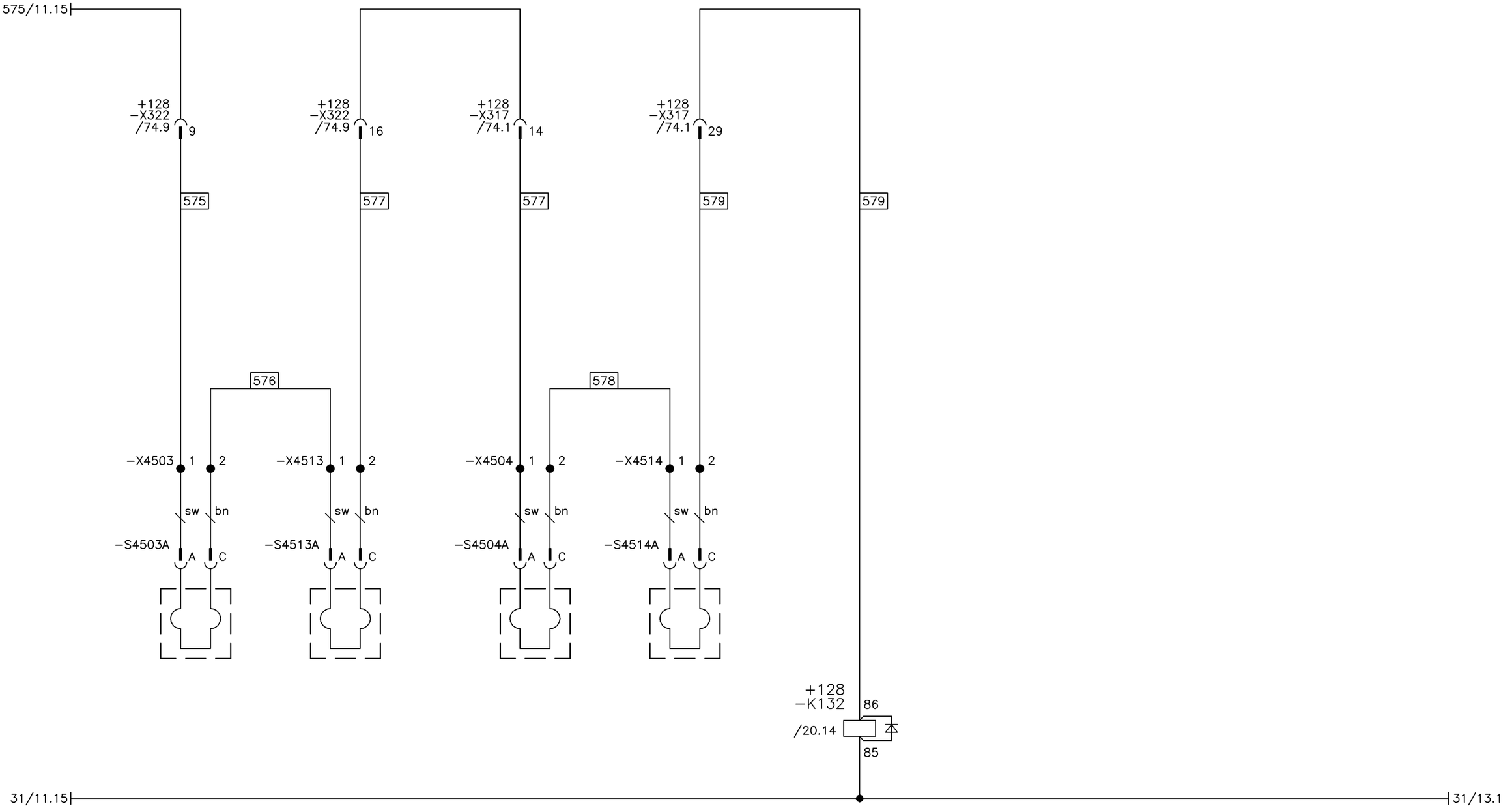

Bremsbelagschalter Achse 3 links brake pads switch axle 3 left hand	Bremsbelagschalter Achse 3 rechts brake pads switch axle 3 right hand	Bremsbelagschalter Achse 4 links brake pads switch axle 4 left hand	Bremsbelagschalter Achse 4 rechts brake pads switch axle 4 right hand

b	N04534	04.03.11	Rosenkranz		Datum	Name
a	N04534	07.04.09	Rosenkranz	Erst.	21.10.08	Rosenkranz
Ind	Mitt-NR	Datum	Name	Gepr.		
Abteilung: 111410						

Projektbenennung / project description
E-PLAN AC 80-2 UW V4.2
ELECTRIC WIRING DIAGRAM

Seitenbenennung / page description
Bremsbelagschalter
brake pads switch

Baunummer.

Anlage: 0
Ort: 0

Zeichnungsnr. / drawing no.
23222612

Blatt 12
Bl. 78

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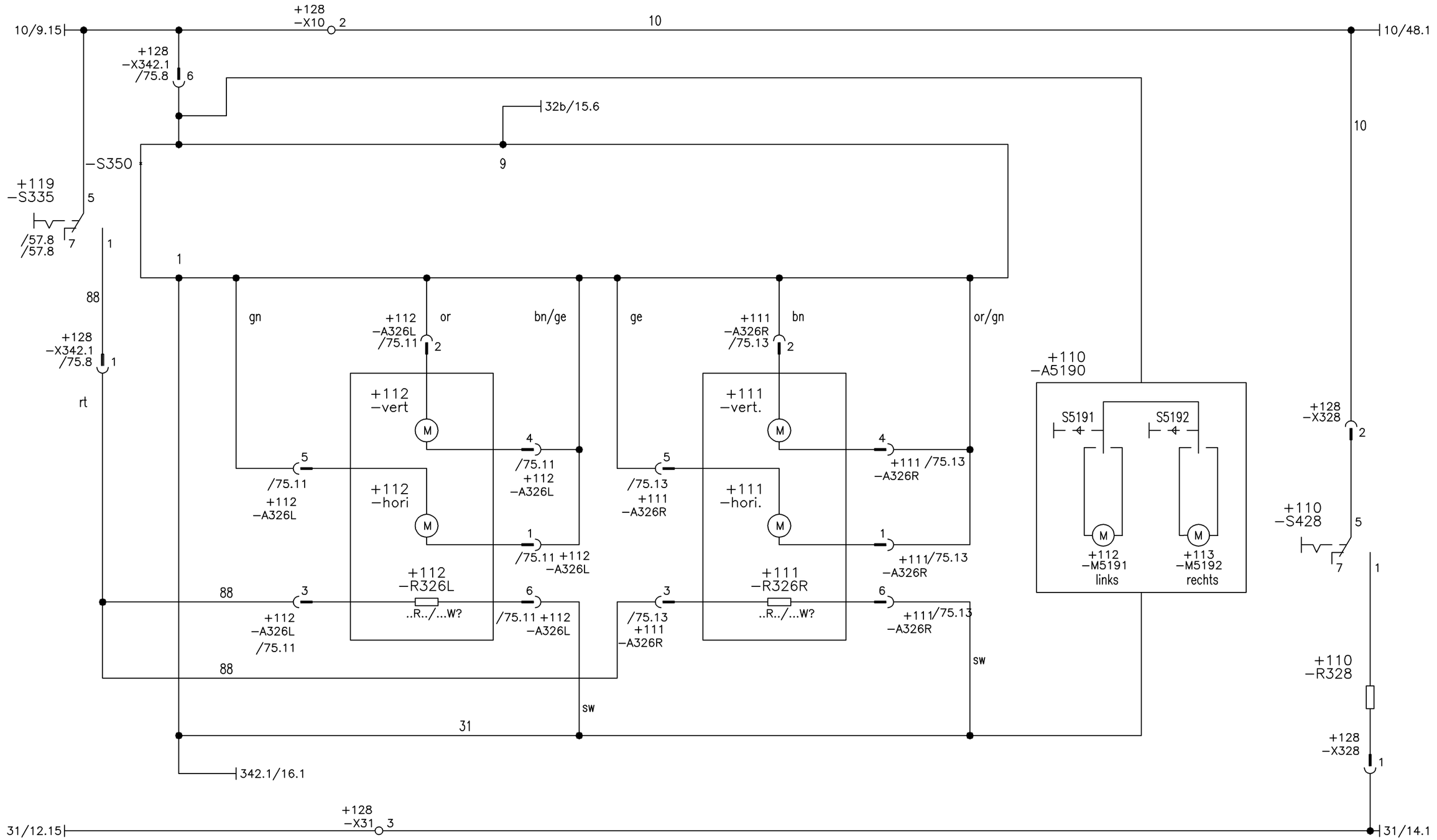

Spiegelheizung	E – Spiegelverstellung	Spiegel links	Spiegel rechts	Sitzheizung
mirror heater	mirror adjustment	mirror left	mirror right	seat heater

b	N04534	04.03.11	Rosenkranz		Datum	Name
a	N04534	07.04.09	Rosenkranz	Erst.	21.10.08	Rosenkranz
Ind	Mitt-NR	Datum	Name	Gepr.		
Abteilung:	111410					

Projektbenennung / project description
E-PLAN AC 80-2 UW V4.2
ELECTRIC WIRING DIAGRAM

Seitenbenennung / page description
Sitzheizung, Spiegelverst., Fensterheber
seat heater, mirror / window adjustm.

Baunummer.

Anlage: 0
Ort: 0

Zeichnungsnr. / drawing no.
23222612

Blatt 13
78 Bl.

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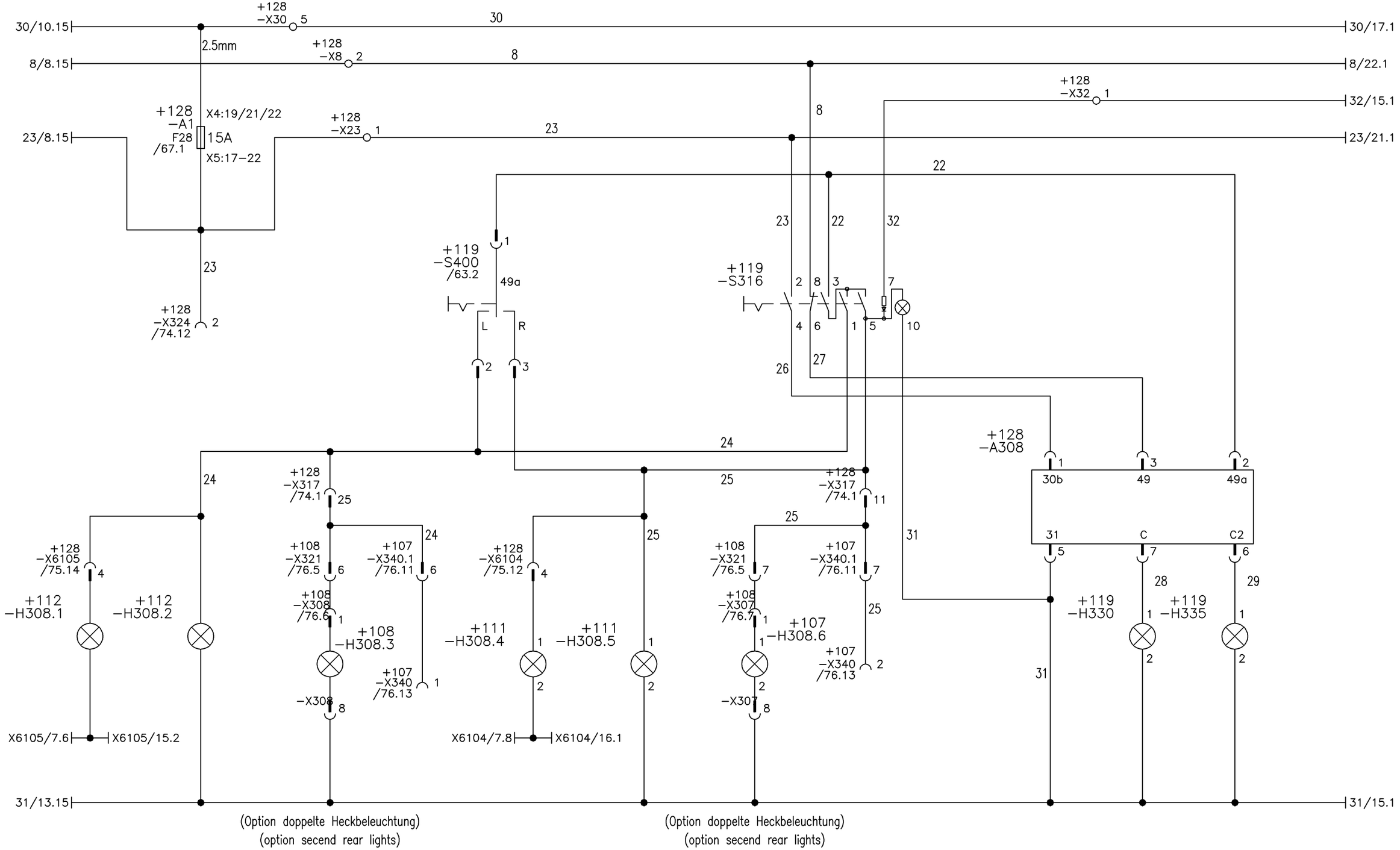

Blinker links				Blinker rechts				Blinkeranzeige	
vorne	seitlich	hinten	Anhänger	vorne	seitlich	hinten	Anhänger	Fahrzeug	Anhänger
flasher left				flasher right				flasher indication	
front	side	rear	trailer	front	side	rear	trailer	crane	trailer

					Datum	Name
b	N04534	04.03.11	Rosenkranz			
a	N04534	07.04.09	Rosenkranz	Erst.	21.10.08	Rosenkranz
Ind	Mitt−NR	Datum	Name	Gepr.		
Abteilung: 111410						

Projektbenennung / project description
E−PLAN AC 80−2 UW V4.2
ELECTRIC WIRING DIAGRAM

Seitenbenennung / page description
Blinker, Warnblinker
flasher, hazard

Baunummer.

Anlage: 0
Ort: 0

Zeichnungsnr. / drawing no.
23222612

Blatt 14
78 Bl.

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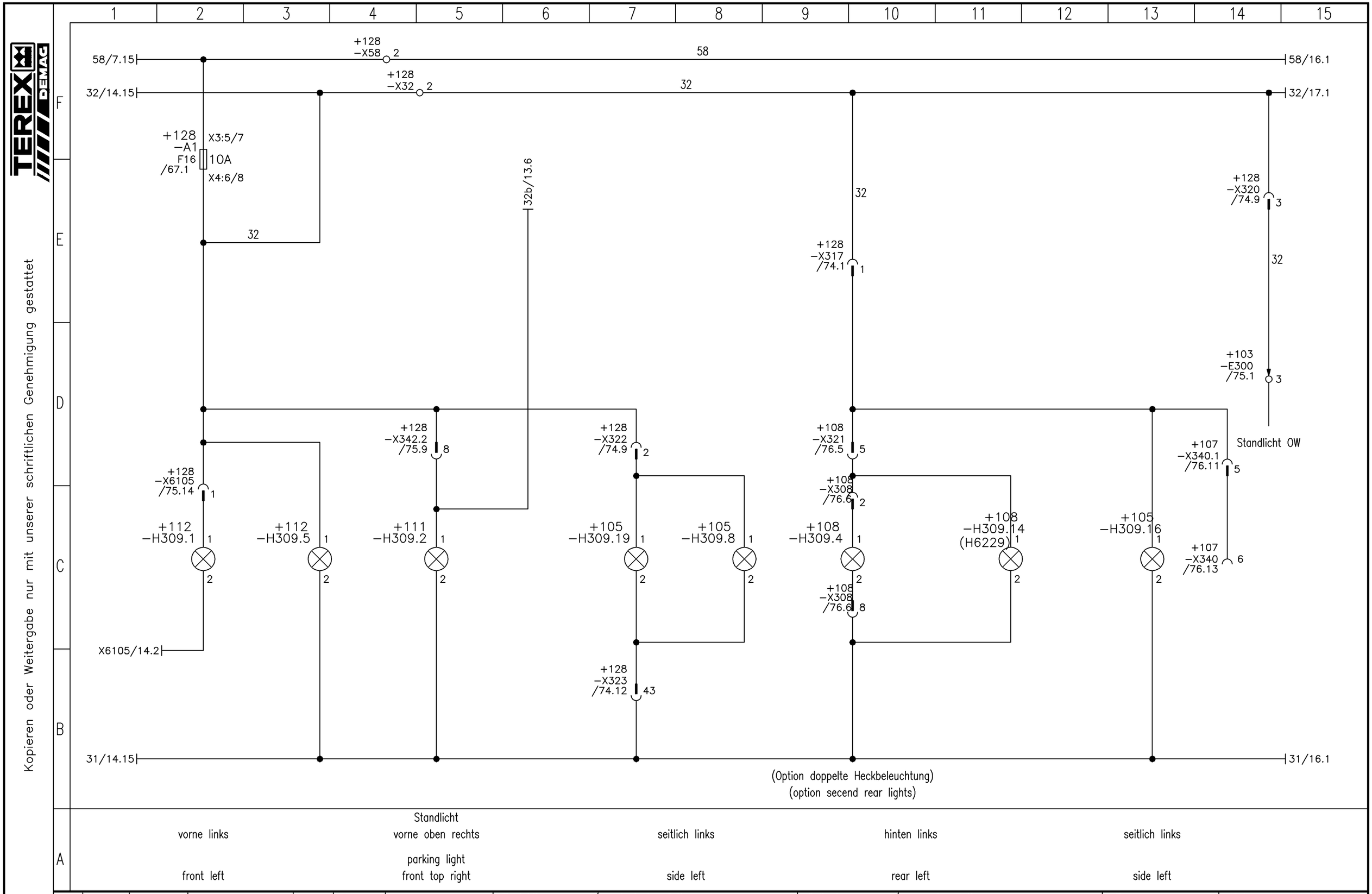

Kopieren oder Weitergabe nur mit unserer schriftlichen Genehmigung gestattet

Ind	Mitt-NR	Datum	Name		Datum	Name
b	N04534	04.03.11	Rosenkranz			
a	N04534	07.04.09	Rosenkranz	Erst.	21.10.08	Rosenkranz
				Gepr.		

Abteilung: 111410

Projektbenennung / project description
E-PLAN AC 80-2 UW V4.2
ELECTRIC WIRING DIAGRAM

Seitenbenennung / page description
Standlicht
parking light

Baunummer.

Anlage: 0
Ort: 0

Zeichnungsnr. / drawing no.
23222612

Blatt 15
78 Bl.

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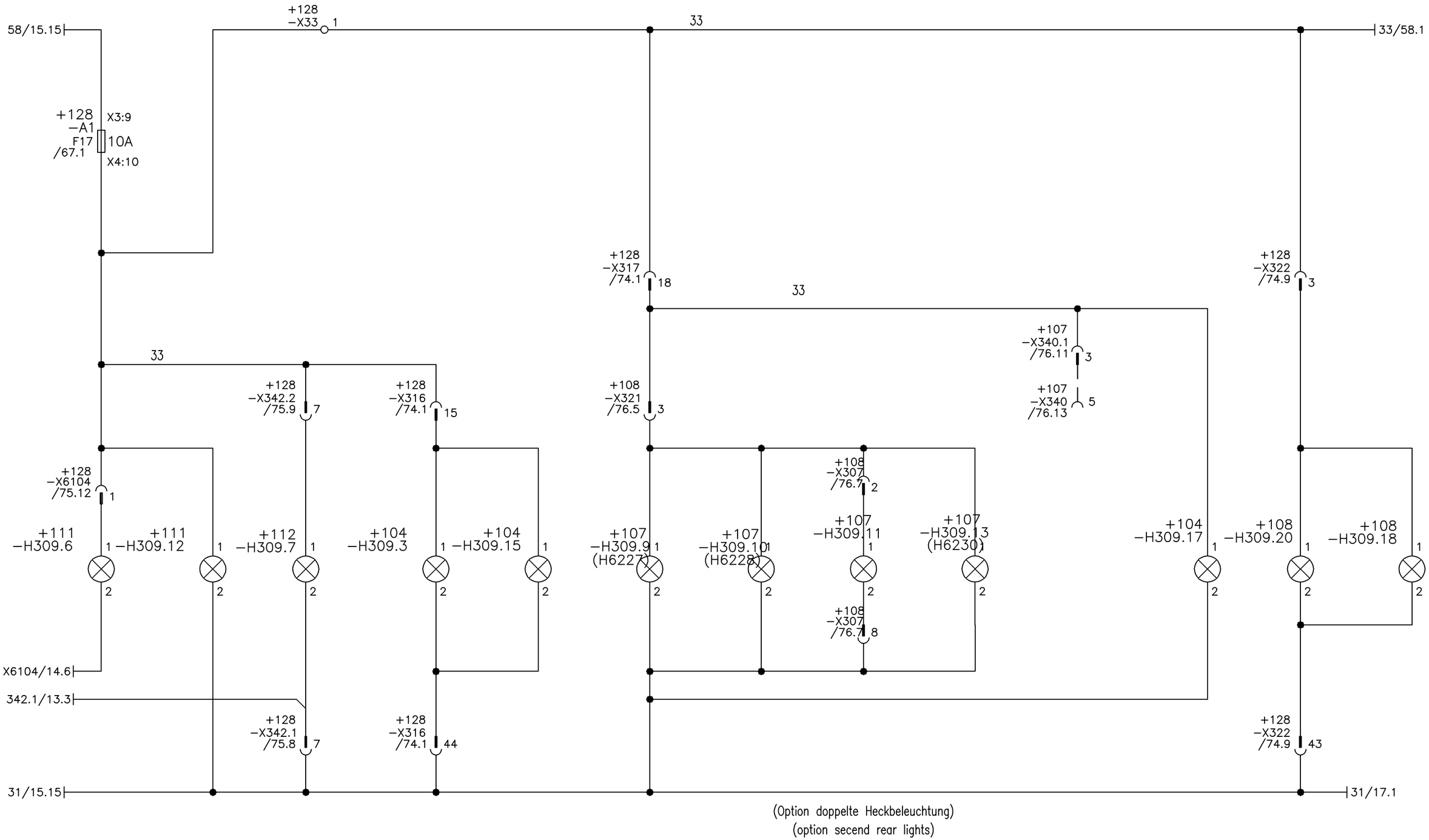

	Standlicht			Kennzeichenbeleuchtung			
	vorne rechts	vorne oben links	seitlich rechts		Standlicht hinten rechts	seitlich rechts	seitlich links
		parking light			parking light		
	front right	front top left	side right	licence plate lights	rear right	side right	side left

					Datum	Name	Projektbenennung / project description	Seitenbenennung / page description	Baunummer.	Anlage: 0	
b	N04534	04.03.11	Rosenkranz				E-PLAN AC 80-2 UW V4.2	Standlicht, Kennzeichenbeleuchtung		Ort: 0	
a	N04534	07.04.09	Rosenkranz	Erst.	21.10.08	Rosenkranz	ELECTRIC WIRING DIAGRAM	parking light, plate light	Zeichnungsnr. / drawing no. 23222612		Blatt 16
Ind	Mitt-NR	Datum	Name	Gepr.							Bl. 78
Abteilung: 111410											

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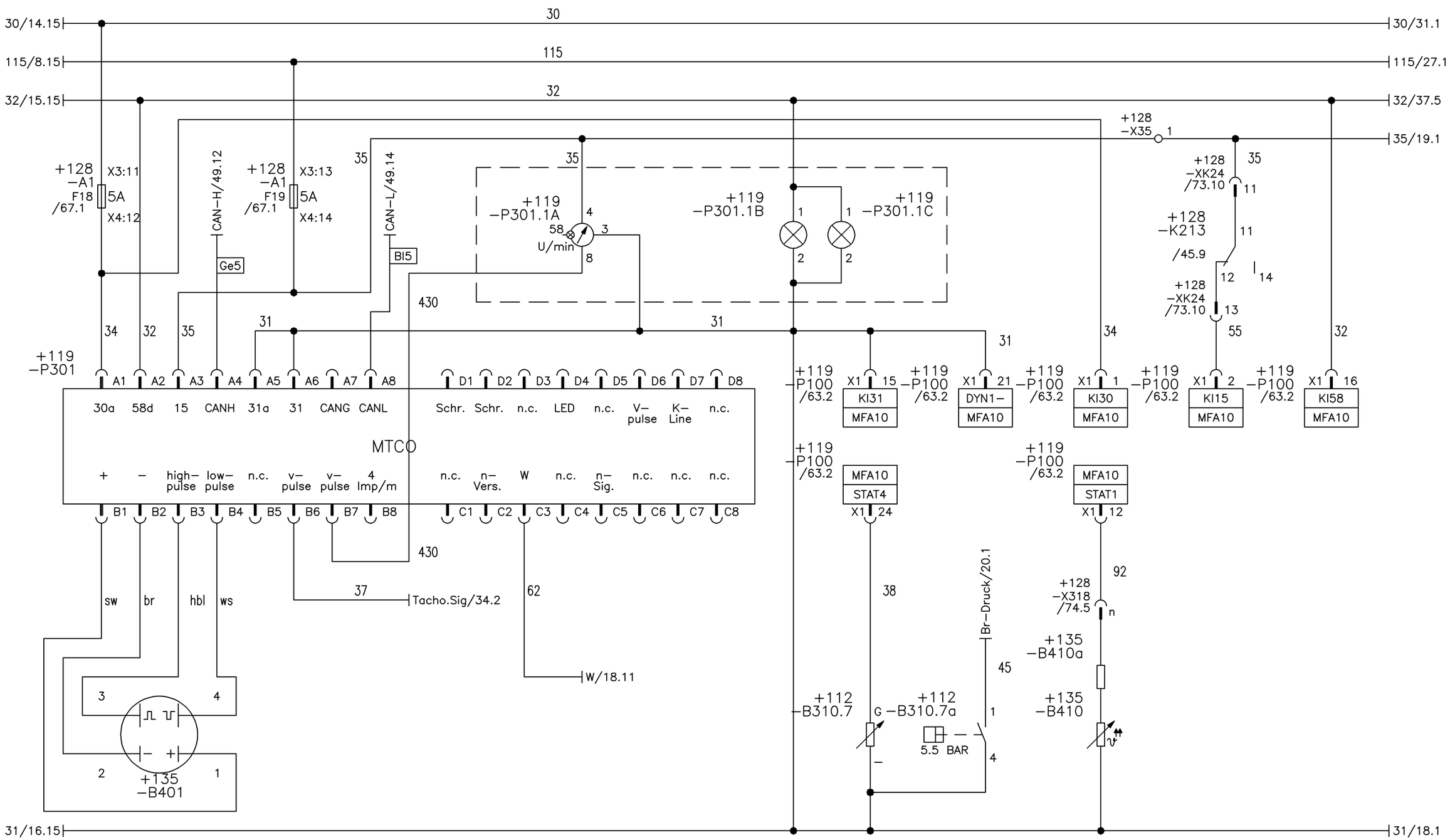

Tachogaph — Tachometer — Bremsdruckanzeige — Multidisplay — Getriebetemperatur

tachograph — rpm — brake gauge — multiple display — transmition temperature gauge

b	N04534	04.03.11	Rosenkranz		Datum	Name
a	N04534	07.04.09	Rosenkranz	Erst.	21.10.08	Rosenkranz
Ind	Mitt−NR	Datum	Name	Gepr.		
Abteilung: 111410						

Projektbenennung / project description: E−PLAN AC 80−2 UW V4.2 ELECTRIC WIRING DIAGRAM

Seitenbenennung / page description: Tachograph tachograph

Baunummer.

Anlage: 0

Ort: 0

Zeichnungsnr. / drawing no. 23222612

Blatt 17 / 78 Bl.

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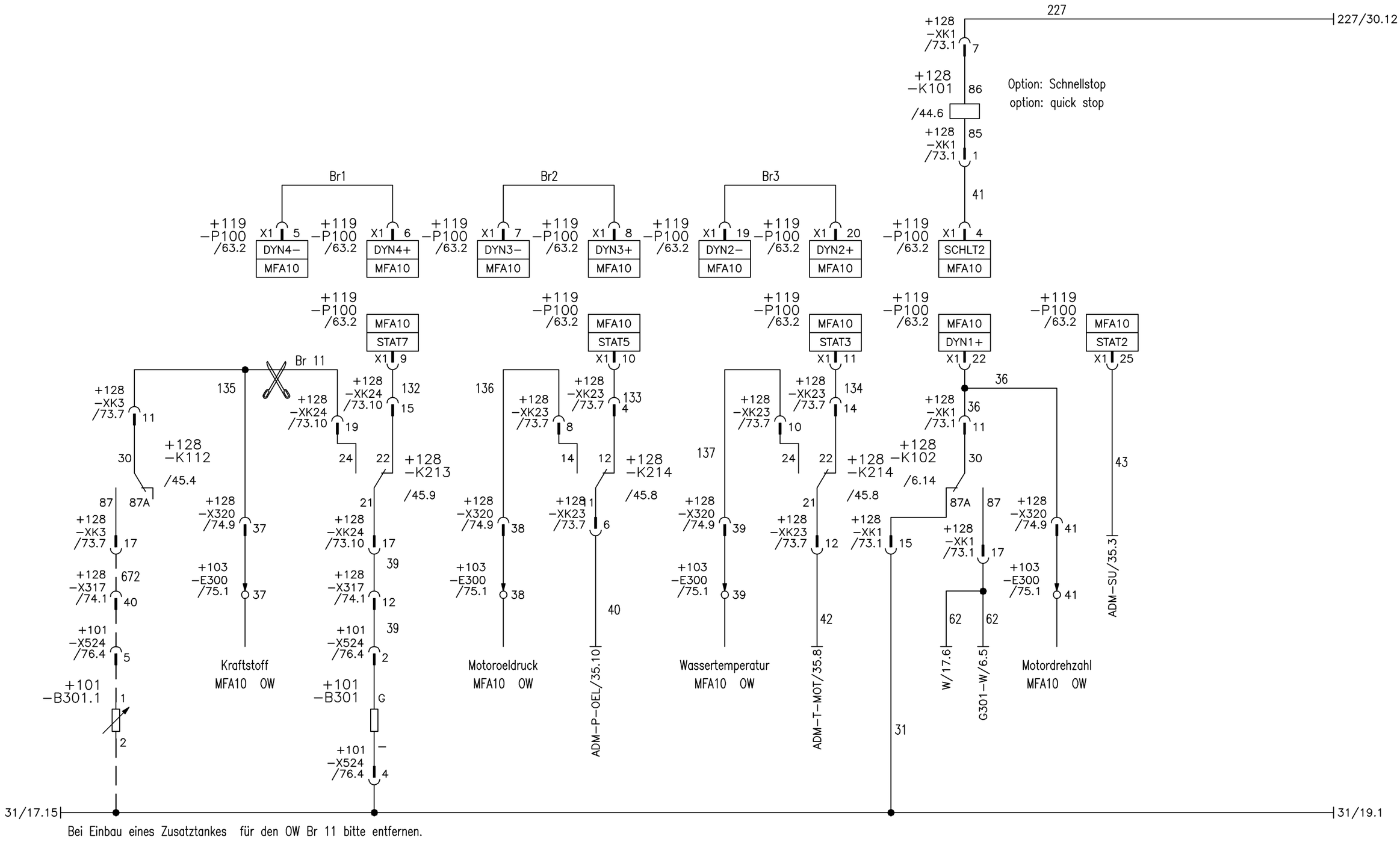

Bei Einbau eines Zusatztankes für den OW Br 11 bitte entfernen.

Kraftstoffanzeige — fuel gauge

Motoroeldruckanzeige — oil pressure gauge

Kühlwasseranzeige — water temperature gauge

Motordrehzahl — rpm

b	N04534	04.03.11	Rosenkranz		Datum	Name
a	N04534	07.04.09	Rosenkranz	Erst.	21.10.08	Rosenkranz
Ind	Mitt−NR	Datum	Name	Gepr.		
Abteilung: 111410						

Projektbenennung / project description
E−PLAN AC 80−2 UW V4.2
ELECTRIC WIRING DIAGRAM

Seitenbenennung / page description
Anzeigeinstrumente
gauge

Baunummer.
Anlage: 0
Ort: 0
Zeichnungsnr. / drawing no. 23222612
Blatt 18
78 Bl.

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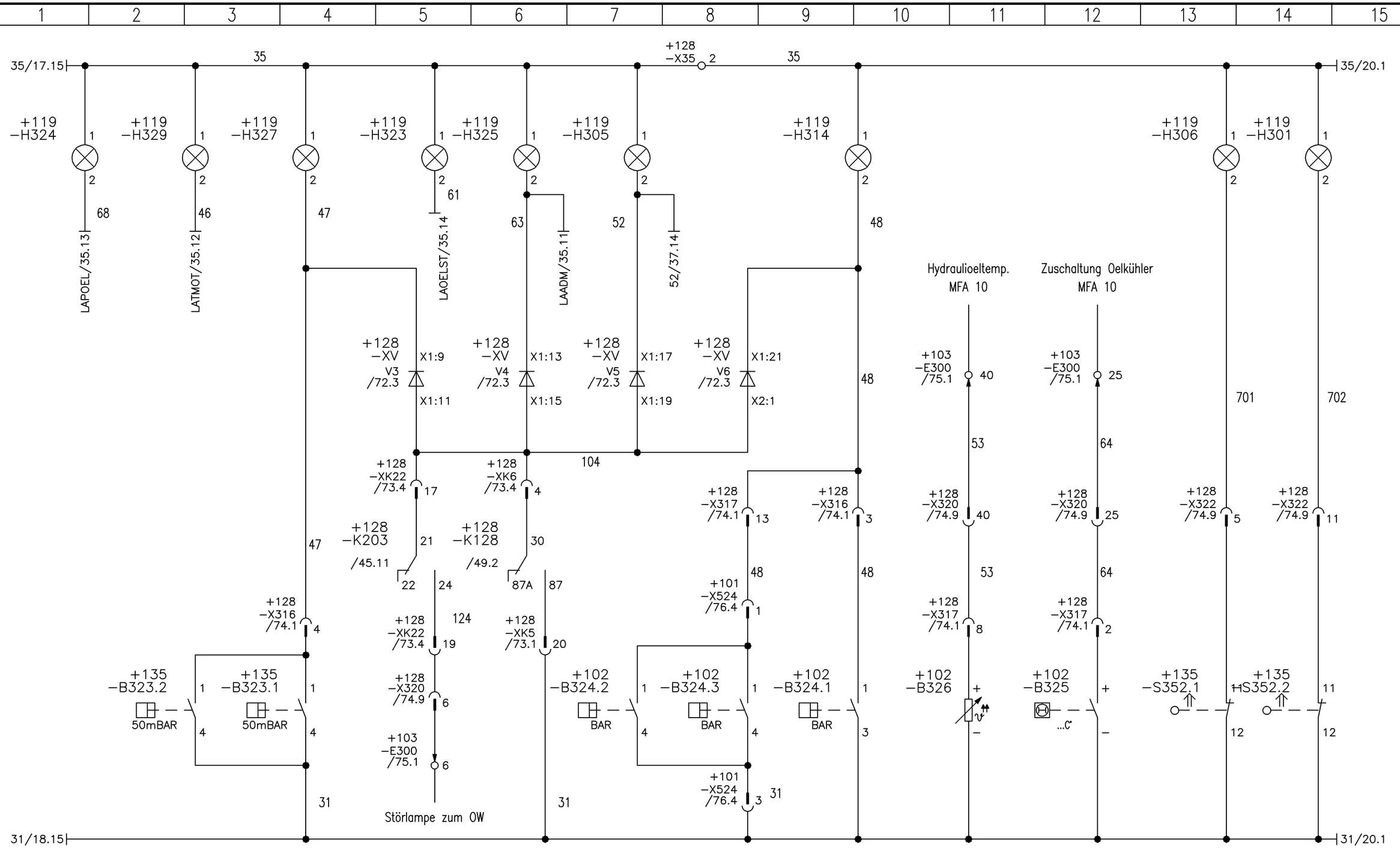

	Motoroeldruck	Kühlwassertemp.	Luftfilter	Motoroelstand	Störlampe MR/ADM	Störlampe Getriebe			Hydrauliköltemp.	Zuschaltung Hydraulikölkühler	
A	oil pressure	water temperature	air filter	engine oil level	control light engine	Rücklauffilter 1 control light gear hydr. oil filter 1	Rücklauffilter 2 hydr. oil filter 2	Hochdruckfilter UHL high pressure filter rear axle steering	hydrauli. temp. gauge	regulator fan switch	Straßengang on road gear / Geländegang off road gear

b	N04534	04.03.11	Rosenkranz		Datum	Name
a	N04534	07.04.09	Rosenkranz	Erst.	21.10.08	Rosenkranz
Ind	Mitt-NR	Datum	Name	Gepr.		
Abteilung:	111410					

Projektbenennung / project description
E-PLAN AC 80-2 UW V4.2
ELECTRIC WIRING DIAGRAM

Seitenbenennung / page description
Sensoren, Kontrollorgane, Störung
sensors, control, fault

Baunummer.

Anlage: 0
Ort: 0

Zeichnungsnr. / drawing no.
23222612

Blatt 19
78 Bl.

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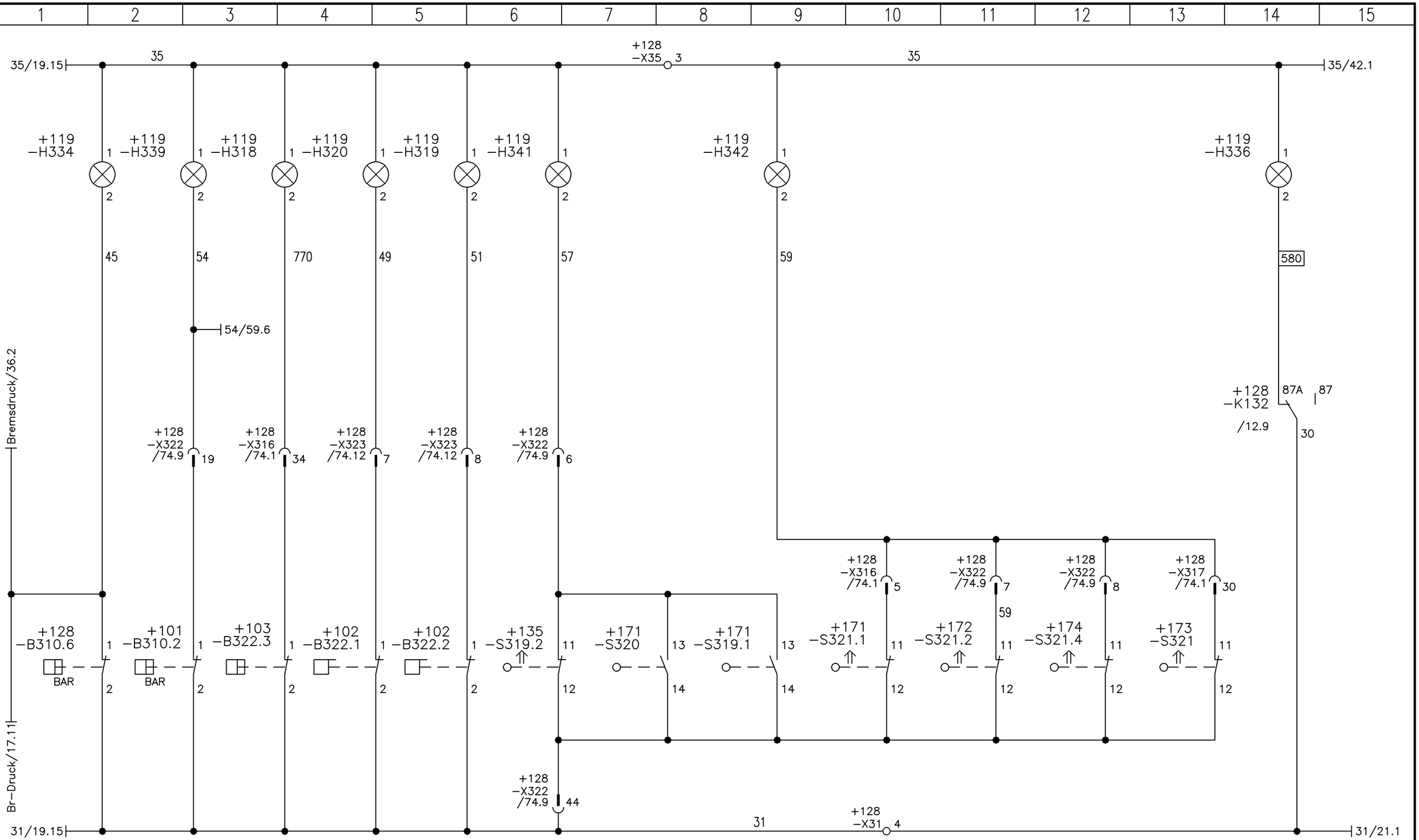

b	N04534	04.03.11	Rosenkranz		Datum	Name
a	N04534	07.04.09	Rosenkranz	Erst.	21.10.08	Rosenkranz
Ind	Mitt−NR	Datum	Name	Gepr.		
Abteilung: 111410						

Projektbenennung / project description
E−PLAN AC 80−2 UW V4.2
ELECTRIC WIRING DIAGRAM

Seitenbenennung / page description
Sensoren, Kontrollorgane, Störung
sensors, control, fault

Baunummer.

Anlage: 0
Ort:

Zeichnungsnr. / drawing no.
23222612

Blatt 20
78 Bl.

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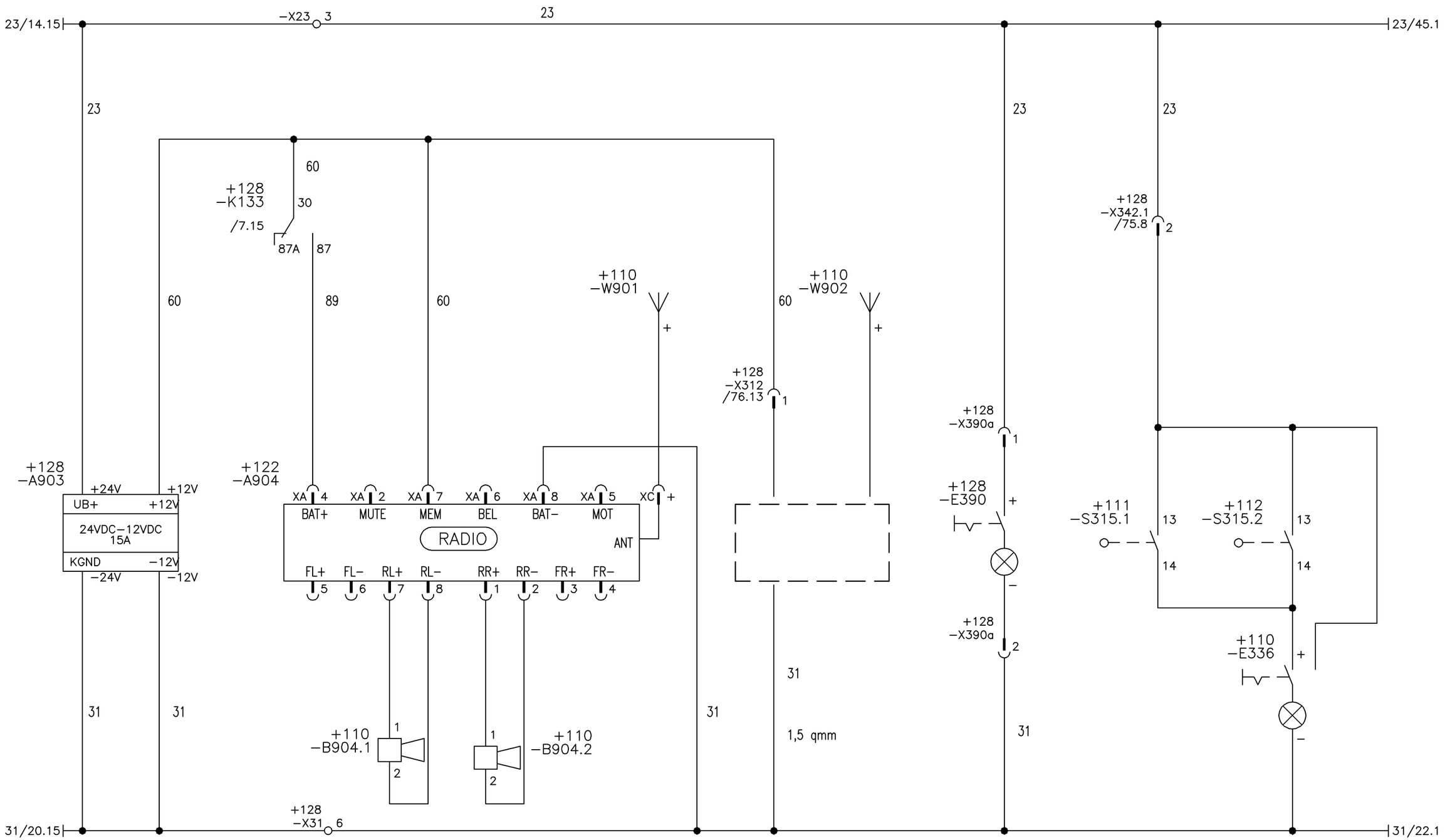

A	Spannungswandler	Radio	Option: Telefax	ZE Beleuchtung	Kabinenbeleuchtung
	DC / DC converter	radio	option: phone/faximile	CE illumination	cabin lights

Ind	Mitt-NR	Datum	Name		Datum	Name
b	N04534	04.03.11	Rosenkranz			
a	N04534	07.04.09	Rosenkranz	Erst.	21.10.08	Rosenkranz
				Gepr.		

Abteilung: 111410

Projektbenennung / project description
E-PLAN AC 80-2 UW V4.2
ELECTRIC WIRING DIAGRAM

Seitenbenennung / page description
Radio, Telefon, ZE Bel.
radio, phone, ilumin., wiring box

Baunummer.

Anlage: 0

Ort: 0

Zeichnungsnr. / drawing no.
23222612

Blatt 21

78 Bl.

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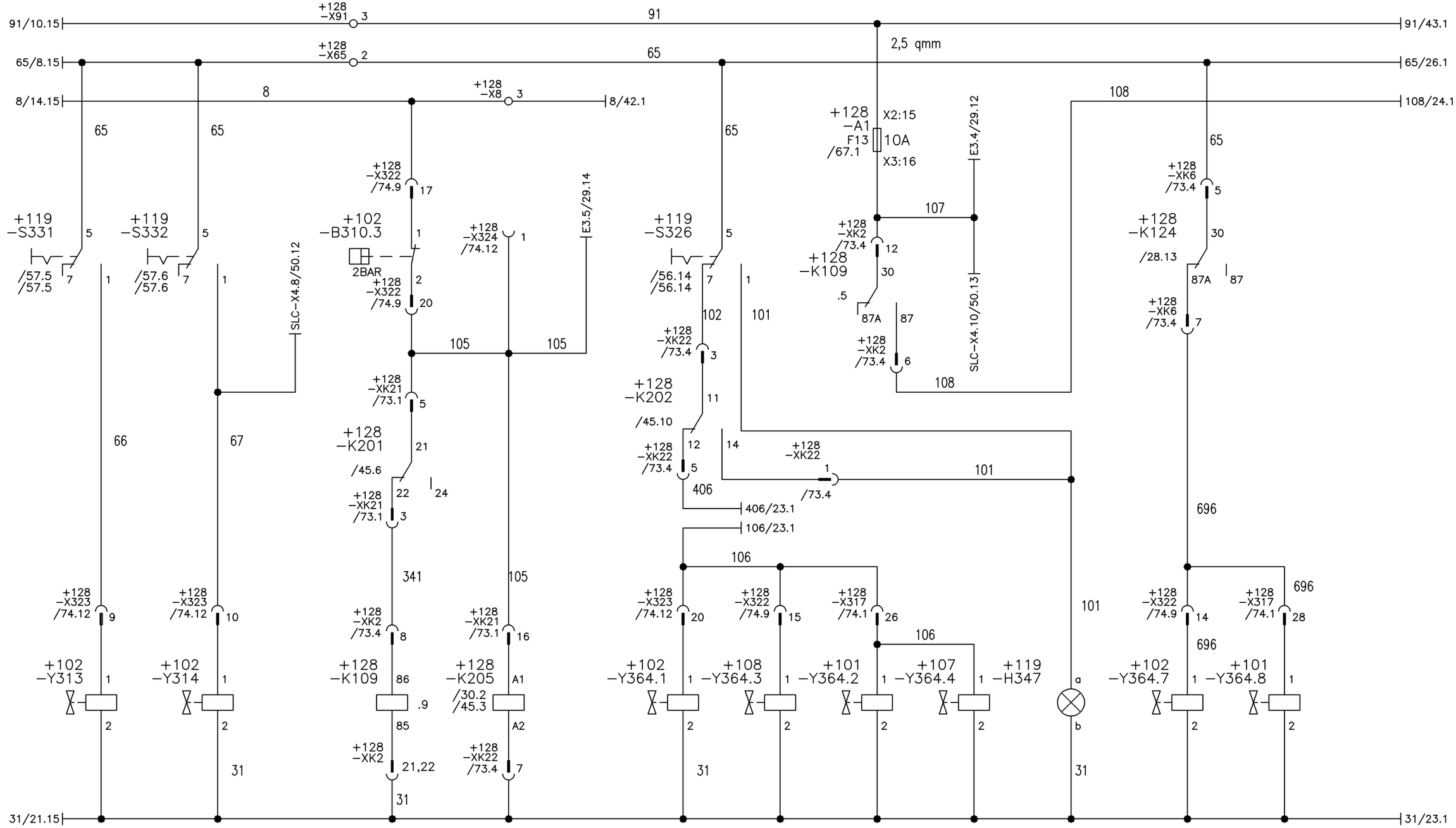

Differentialsperren — Handbremse — Federspeicher wegschalten — nur bei 8 x 6 x 6

längs — quer — links — rechts

differential locks — parking brake — suspension cylinder blocking

longitudinal — transverse — left — right

b	N04534	04.03.11	Rosenkranz		Datum	Name
a	N04534	07.04.09	Rosenkranz	Erst.	21.10.08	Rosenkranz
Ind	Mitt−NR	Datum	Name	Gepr.		
Abteilung: 111410						

Projektbenennung / project description: E−PLAN AC 80−2 UW V4.2 ELECTRIC WIRING DIAGRAM

Seitenbenennung / page description: Differentialsp., Handbremse, Federspeicher differential lock, handbrake, suspension

Baunummer.

Anlage: 0

Ort: 0

Zeichnungsnr. / drawing no. 23222612

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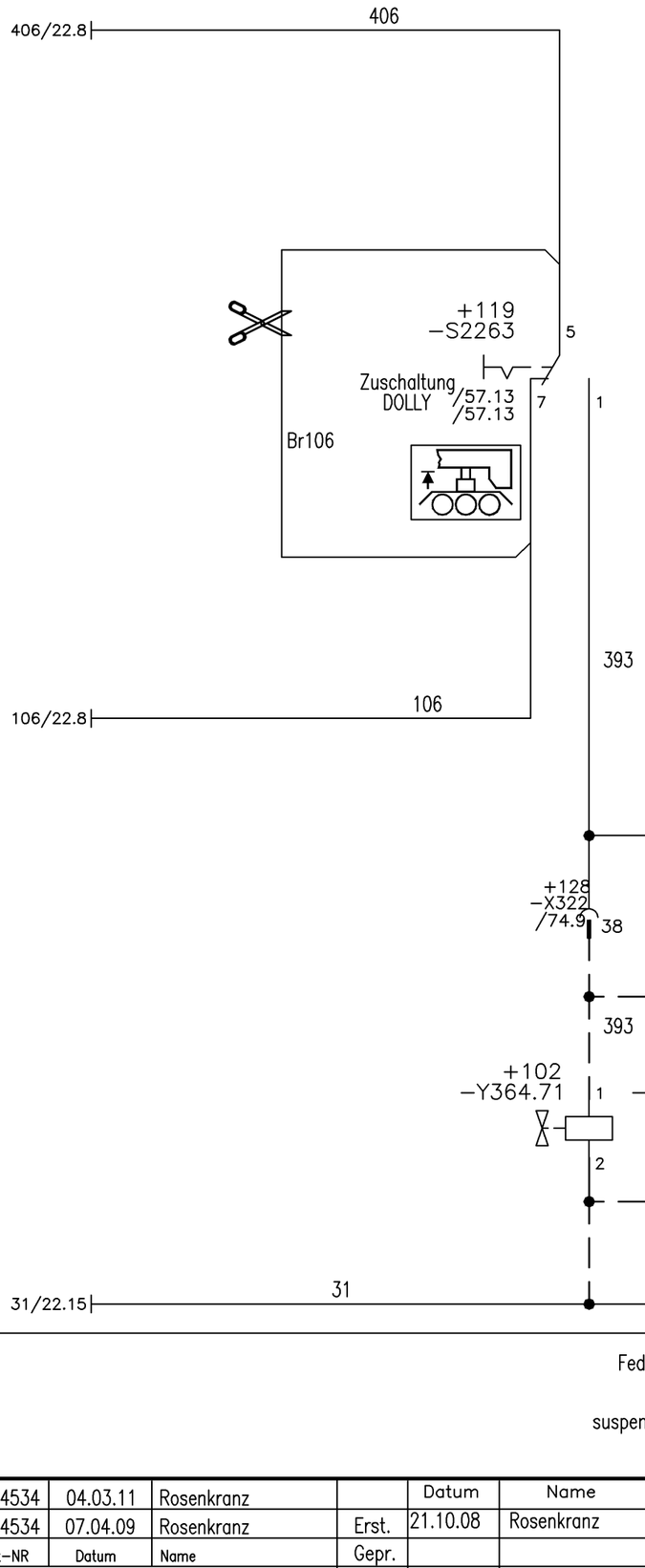

Br106 entfernen bei Option Federung für kleine Achslasten
Br106 remove with option suspension for small axle load

Federung links
suspention left hand

Federung rechts
suspention right hand

b	N04534	04.03.11	Rosenkranz		Datum	Name
a	N04534	07.04.09	Rosenkranz	Erst.	21.10.08	Rosenkranz
Ind	Mitt-NR	Datum	Name	Gepr.		
Abteilung: 111410						

Projektbenennung / project description
E-PLAN AC 80-2 UW V4.2
ELECTRIC WIRING DIAGRAM

Seitenbenennung / page description
Option Federung für kleine Achslasten
option suspension for small axle load

Baunummer.
Anlage: 0
Ort: 0
Zeichnungsnr. / drawing no.
23222612
Blatt 23
78 Bl.

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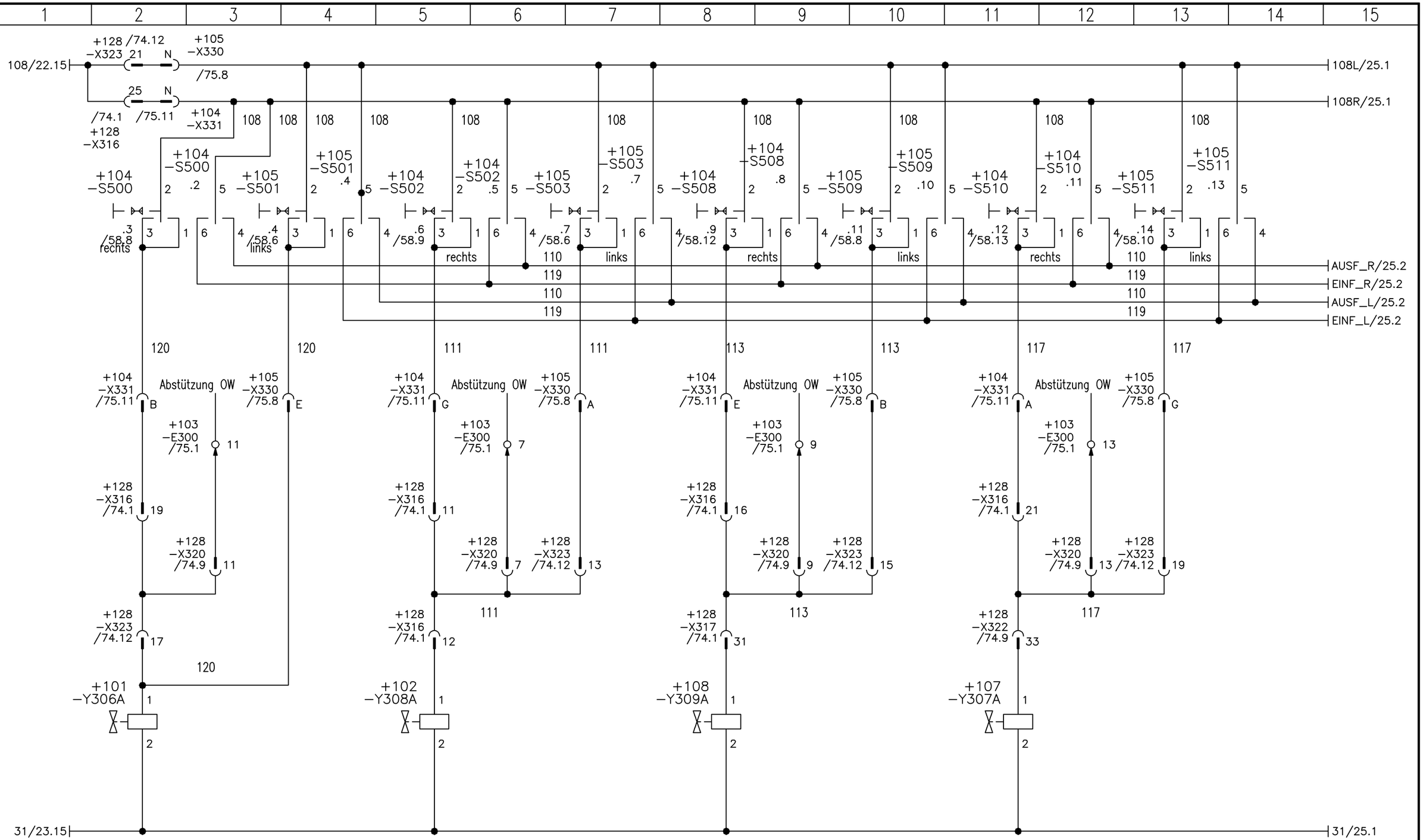

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Abstützung vorne rechts
vertikal

stabilizer front right
vertical

Abstützung vorne links
vertikal

stabilizer front left
vertical

Abstützung hinten links
vertikal

stabilizer rear left
vertical

Abstützung hinten rechts
vertikal

stabilizer rear right
vertical

b	N04534	04.03.11	Rosenkranz		Datum	Name
a	N04534	07.04.09	Rosenkranz	Erst.	21.10.08	Rosenkranz
Ind	Mitt-NR	Datum	Name	Gepr.		
Abteilung: 111410						

Projektbenennung / project description
E-PLAN AC 80-2 UW V4.2
ELECTRIC WIRING DIAGRAM

Seitenbenennung / page description
Abstützung
stabilizer

Baunummer.

Anlage: 0
Ort: 0

Zeichnungsnr. / drawing no.
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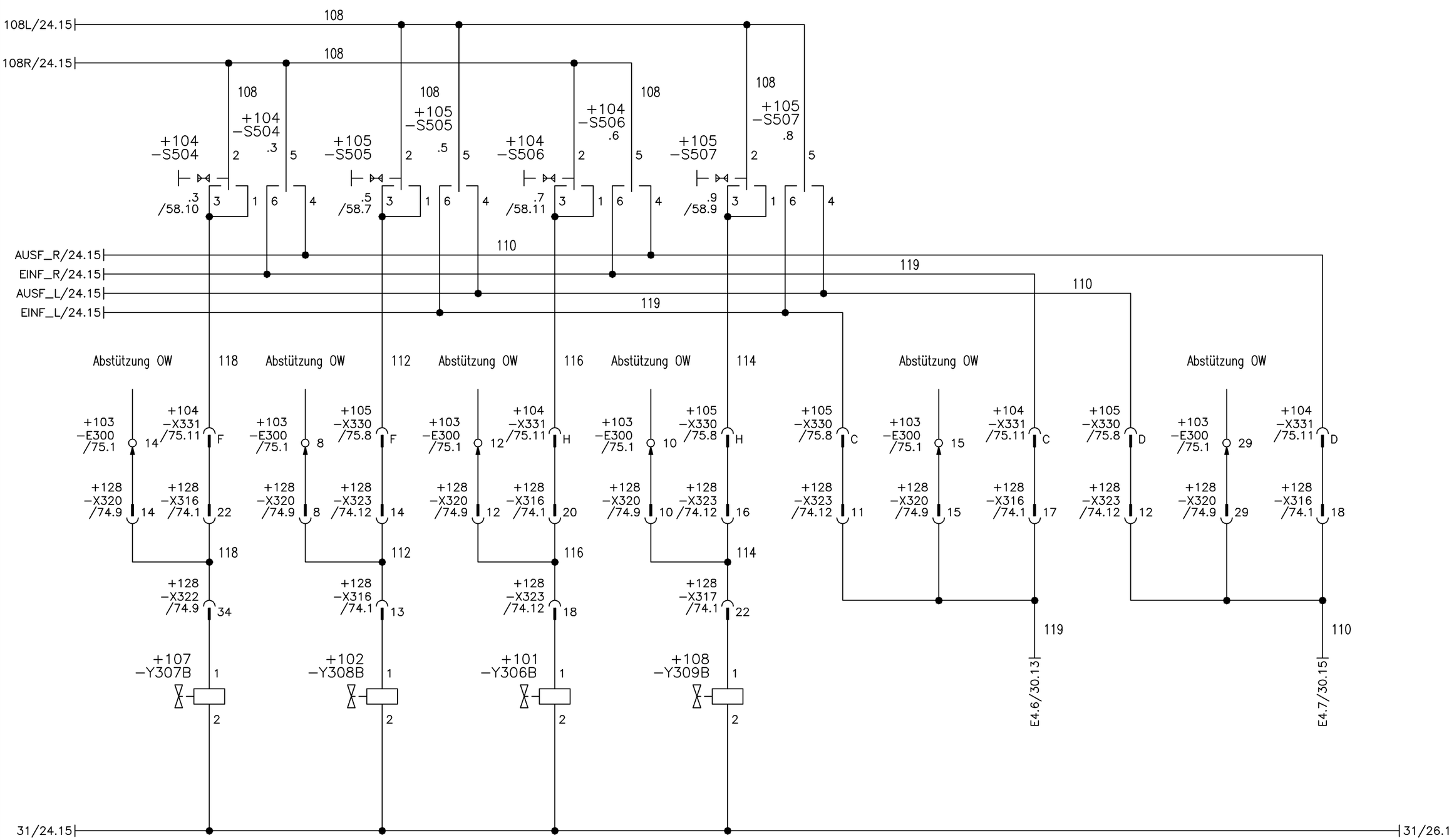

Abstützung hinten rechts horizontal	Abstützung vorne links horizontal	Abstützung vorne rechts horizontal	Abstützung hinten links horizontal
stabilizer rear right horizontal	stabilizer front left horizontal	stabilizer front right horizontal	stabilizer rear left horizontal

Abstützung einfahren / stabilizer retract

Abstützung ausfahren / stabilizer extend

b	N04534	04.03.11	Rosenkranz		Datum	Name
a	N04534	07.04.09	Rosenkranz	Erst.	21.10.08	Rosenkranz
Ind	Mitt-NR	Datum	Name	Gepr.		
Abteilung: 111410						

Projektbenennung / project description
E-PLAN AC 80-2 UW V4.2
ELECTRIC WIRING DIAGRAM

Seitenbenennung / page description
Abstützung
stabilizer

Baunummer.

Anlage: 0
Ort: 0

Zeichnungsnr. / drawing no.
23222612

Blatt 25
78 Bl.

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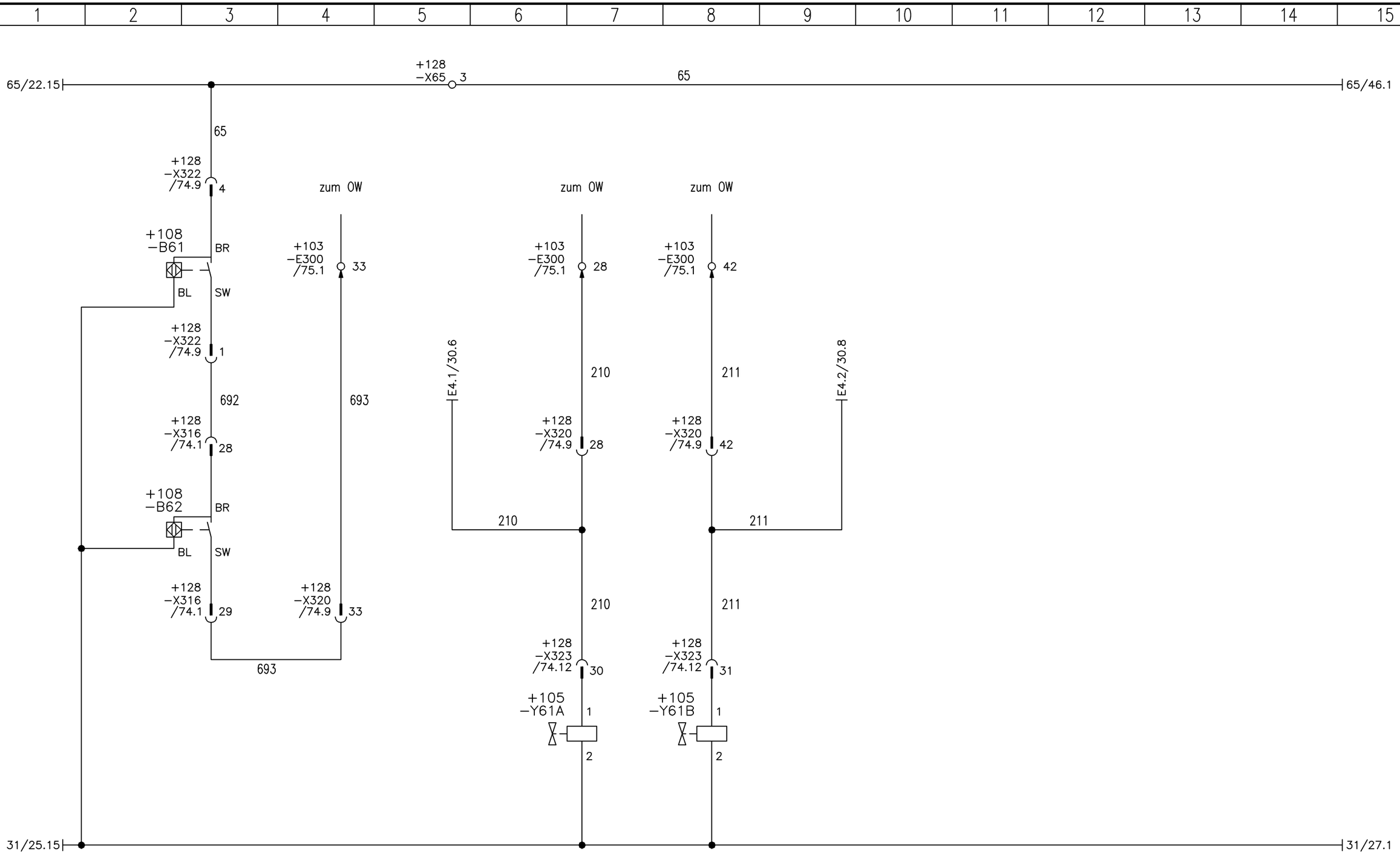

Position Gegengewicht

position counterweight

Option GGW auffahren

option counterweight up

GGW abfahren

counterweight down

b	N04534	04.03.11	Rosenkranz		Datum	Name
a	N04534	07.04.09	Rosenkranz	Erst.	21.10.08	Rosenkranz
Ind	Mitt-NR	Datum	Name	Gepr.		
Abteilung:	111410					

Projektbenennung / project description: E-PLAN AC 80-2 UW V4.2 ELECTRIC WIRING DIAGRAM

Seitenbenennung / page description: Gegengewicht counterweight

Baunummer.

Anlage: 0

Ort: 0

Zeichnungsnr. / drawing no. 23222612

Blatt 26

Bl. 78

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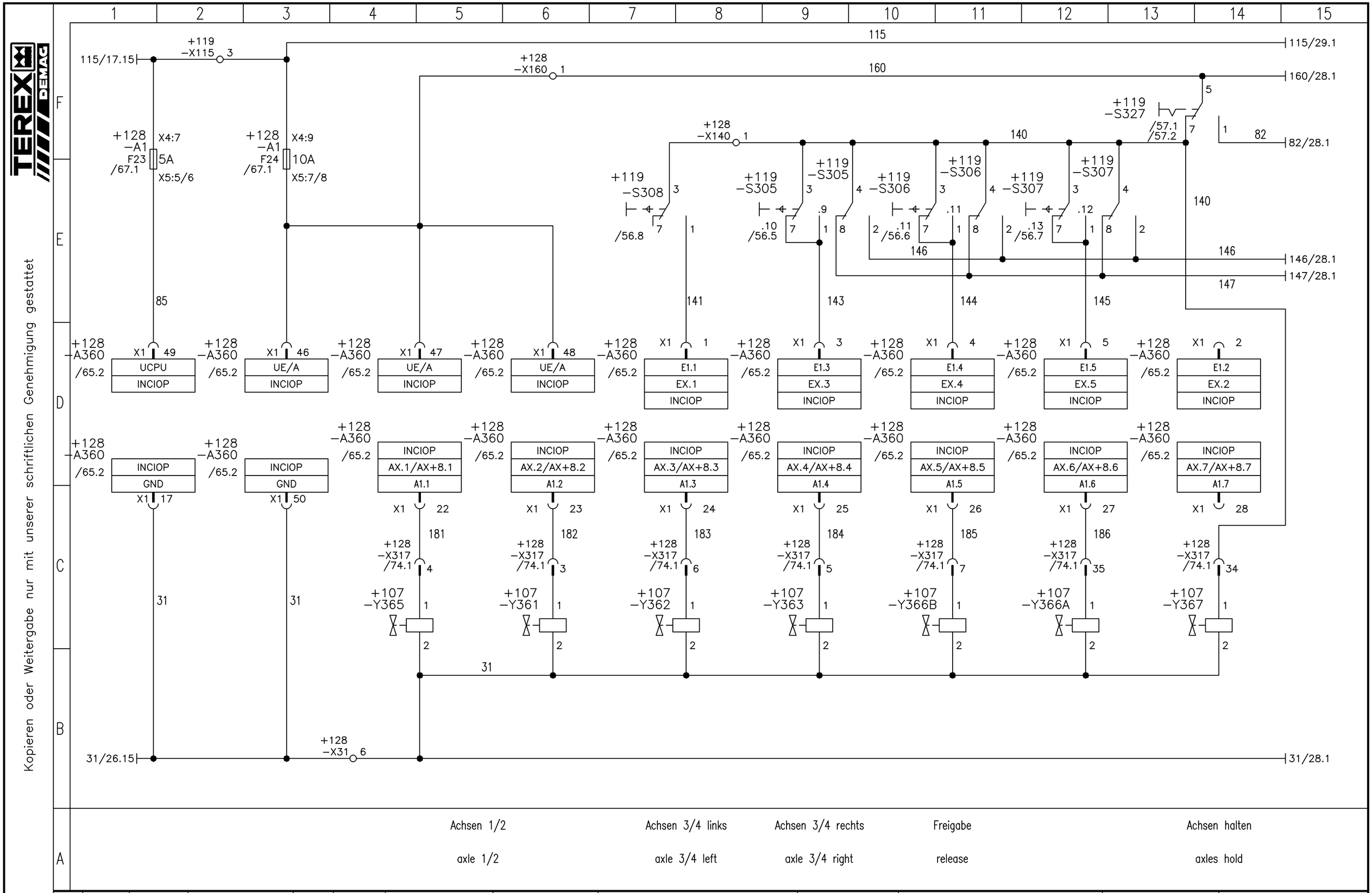

Ind	Mitt-NR	Datum	Name		Datum	Name
b	N04534	04.03.11	Rosenkranz			
a	N04534	07.04.09	Rosenkranz	Erst.	21.10.08	Rosenkranz
				Gepr.		

Abteilung: 111410

Projektbenennung / project description
E-PLAN AC 80-2 UW V4.2
ELECTRIC WIRING DIAGRAM

Seitenbenennung / page description
SPS-Karte 1, Achsenverstellung
PLC process card 1, axle adjustment

Baunummer.

Anlage: 0
Ort: 0

Zeichnungsnr. / drawing no.
23222612

Blatt 27
78 Bl.

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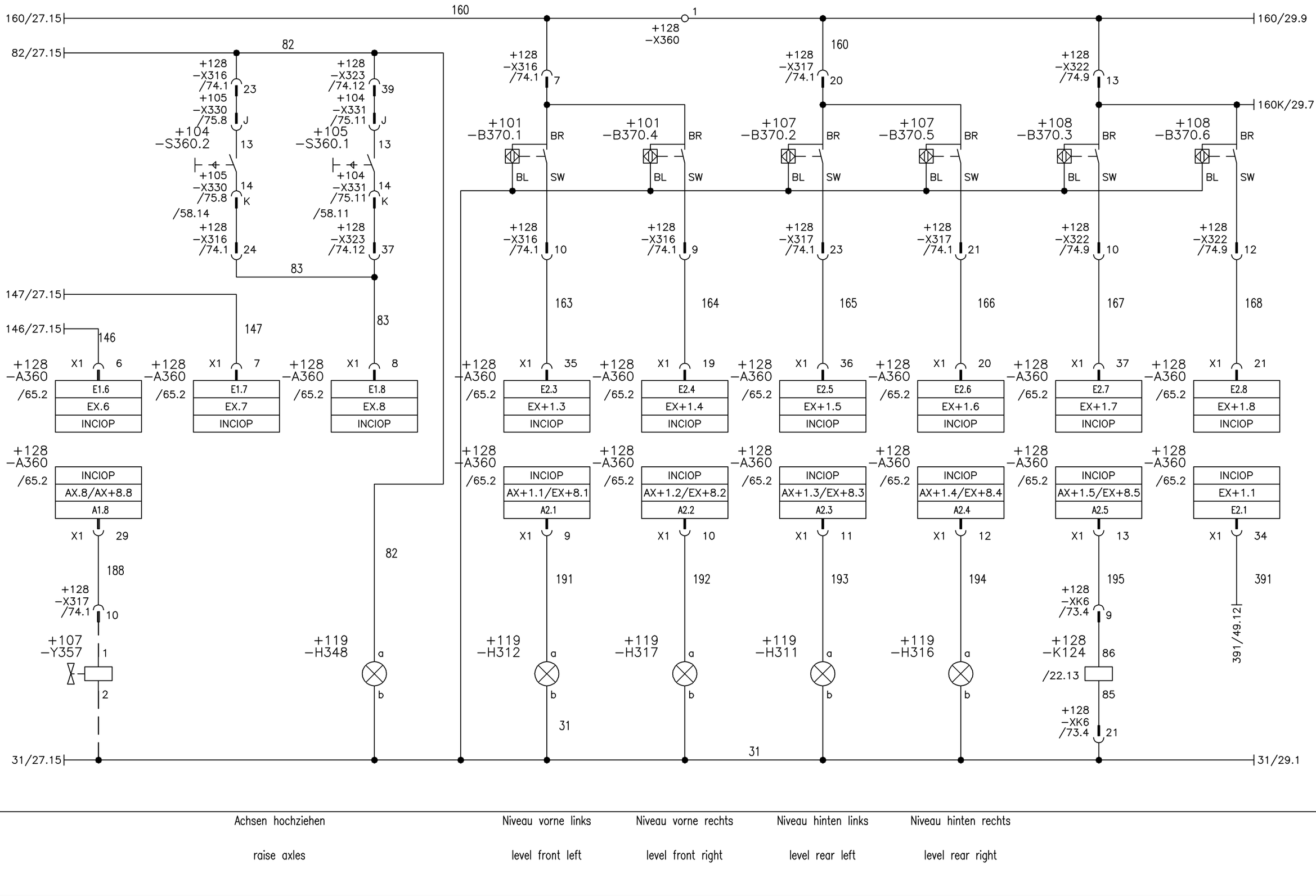

Ind	Mitt-NR	Datum	Name		Datum	Name
b	N04534	04.03.11	Rosenkranz			
a	N04534	07.04.09	Rosenkranz	Erst.	21.10.08	Rosenkranz
				Gepr.		
Abteilung: 111410						

Projektbenennung / project description
E-PLAN AC 80-2 UW V4.2
ELECTRIC WIRING DIAGRAM

Seitenbenennung / page description
SPS Karte 1, Niveausteuerung
PLC process card 1, level control

Baunummer.

Anlage: 0
Ort: 0

Zeichnungsnr. / drawing no.
23222612

Blatt 28
78 Bl.

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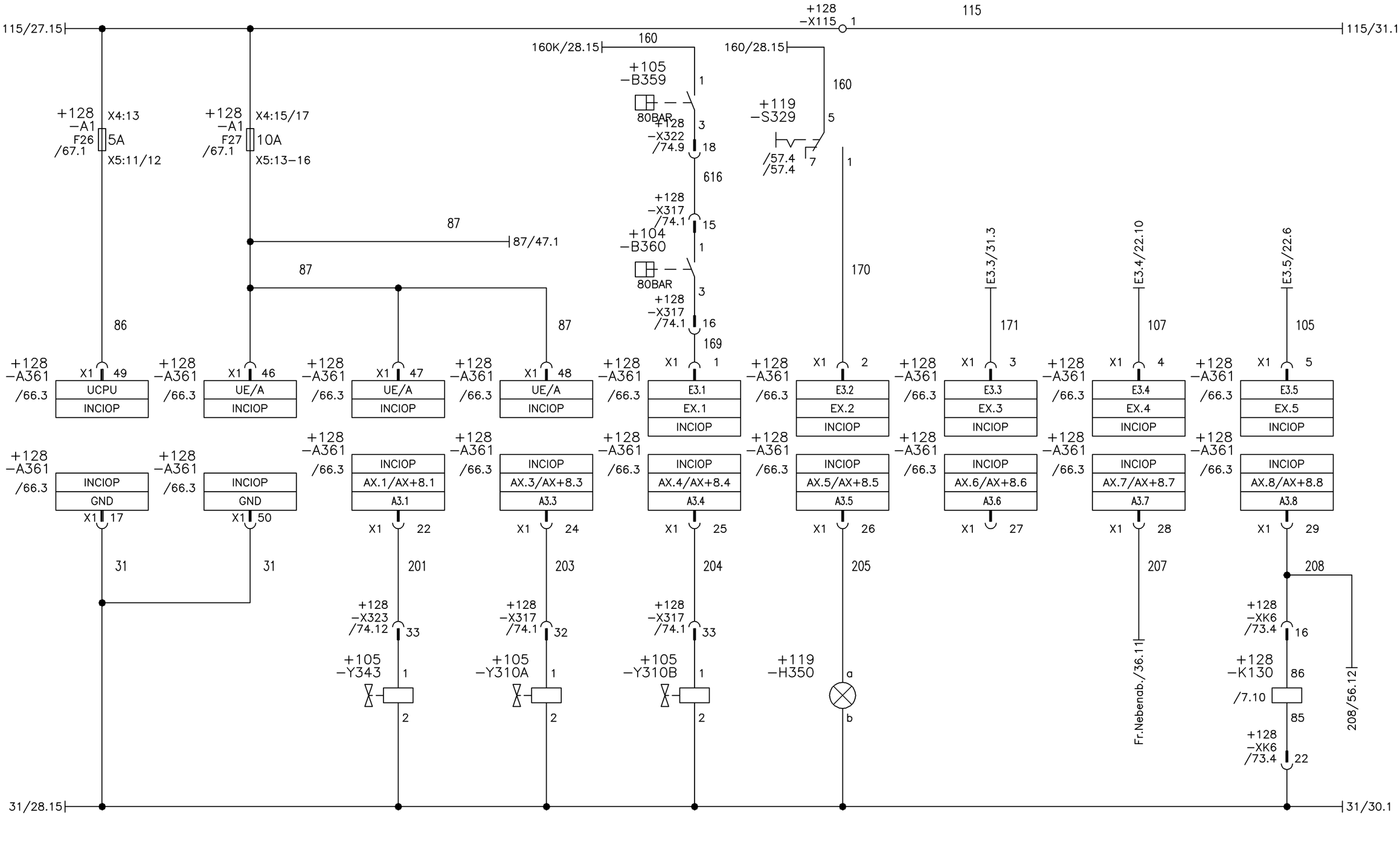

Spannungsversorgung 24 V	Umschaltung Lenkkreis 2	3. Achse auf 80 bar befüllen nach UHL Abstützung einfahren	Abstützung ausfahren	3. Achse oben	Klima OW	Motor läuft Nebenabtrieb	Handbremse
power supply 24 V	steering circuit 2	stabilizer retract	stabilizer extend	3. axle top	option air condition	rpm auxiliary drive	parking brake

b	N04534	04.03.11	Rosenkranz		Datum	Name	
a	N04534	07.04.09	Rosenkranz	Erst.	21.10.08	Rosenkranz	
Ind	Mitt−NR	Datum	Name	Gepr.			
Abteilung: 111410							

Projektbenennung / project description
E−PLAN AC 80−2 UW V4.2
ELECTRIC WIRING DIAGRAM

Seitenbenennung / page description
SPS Karte 2, Abstützung
plc process card 2, stabilizer

Baunummer.
Anlage: 0
Ort: 0
Zeichnungsnr. / drawing no. 23222612
Blatt 29
Bl. 78

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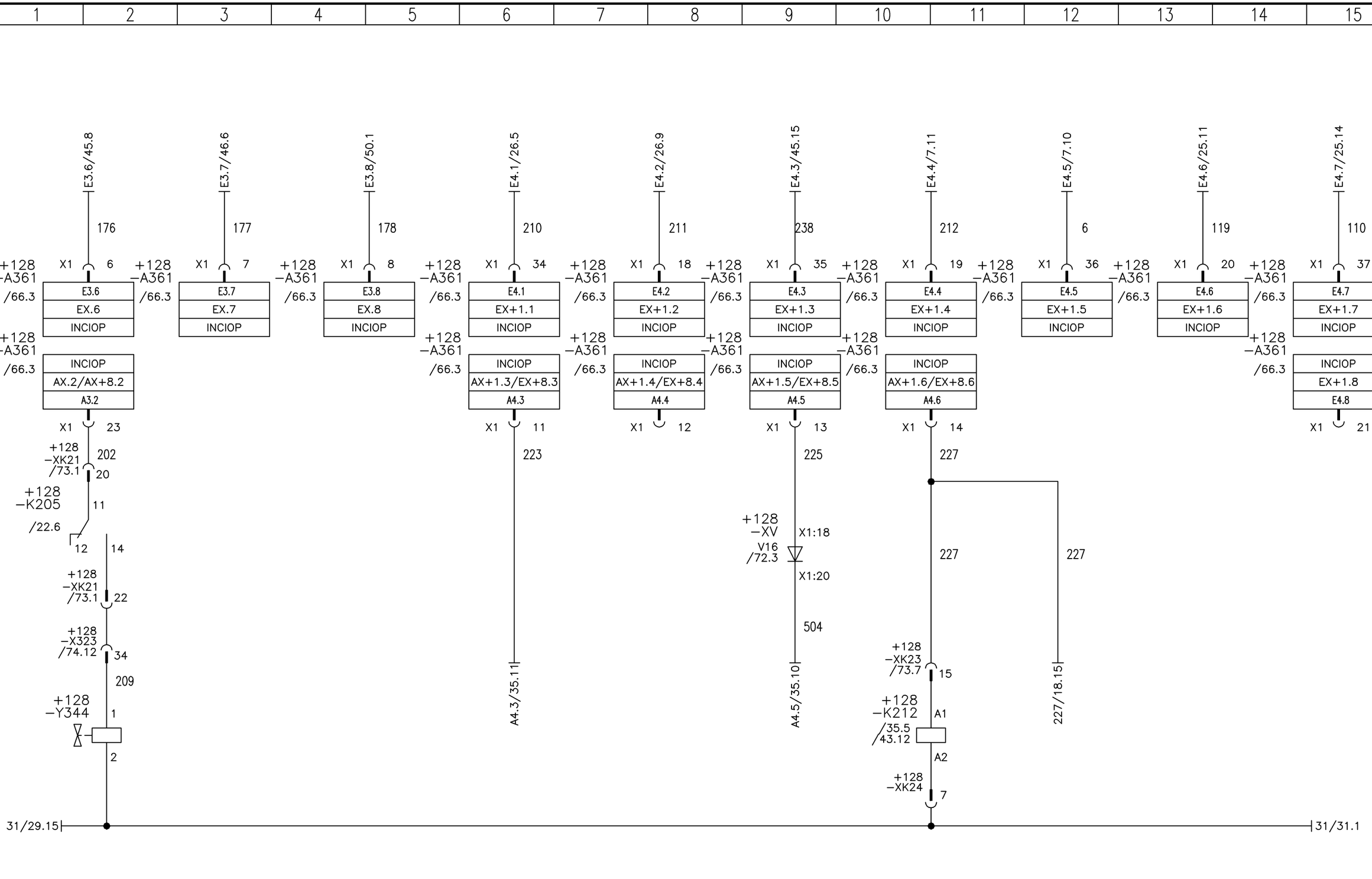

Getriebe neutral — gear neutral
Lenkung vom OW — steering from superstructure
UHL
Gegengewicht auffahren — counterweight down — Drehzahlerhöhung engine speed high
Gegengewicht abfahren — up
Zündung UW vom OW — ignition from superstructure — Geschwindigkeitssperre speed limit
Nebelschlußleuchte — rear fog light
Beleuchtung — low beam lights
Motor läuft, neutral, Handbremse — engine run, neutral, handbrake
Abstützung einfahren — stabilizer retract
ausfahren — extend

b	N04534	04.03.11	Rosenkranz		Datum	Name
a	N04534	07.04.09	Rosenkranz	Erst.	21.10.08	Rosenkranz
Ind	Mitt-NR	Datum	Name	Gepr.		
Abteilung: 111410						

Projektbenennung / project description: E-PLAN AC 80-2 UW V4.2
ELECTRIC WIRING DIAGRAM

Seitenbenennung / page description: SPS Karte 2
process card 2

Baunummer.
Anlage: 0
Ort: 0
Zeichnungsnr. / drawing no. 23222612
Blatt 30
Bl. 78

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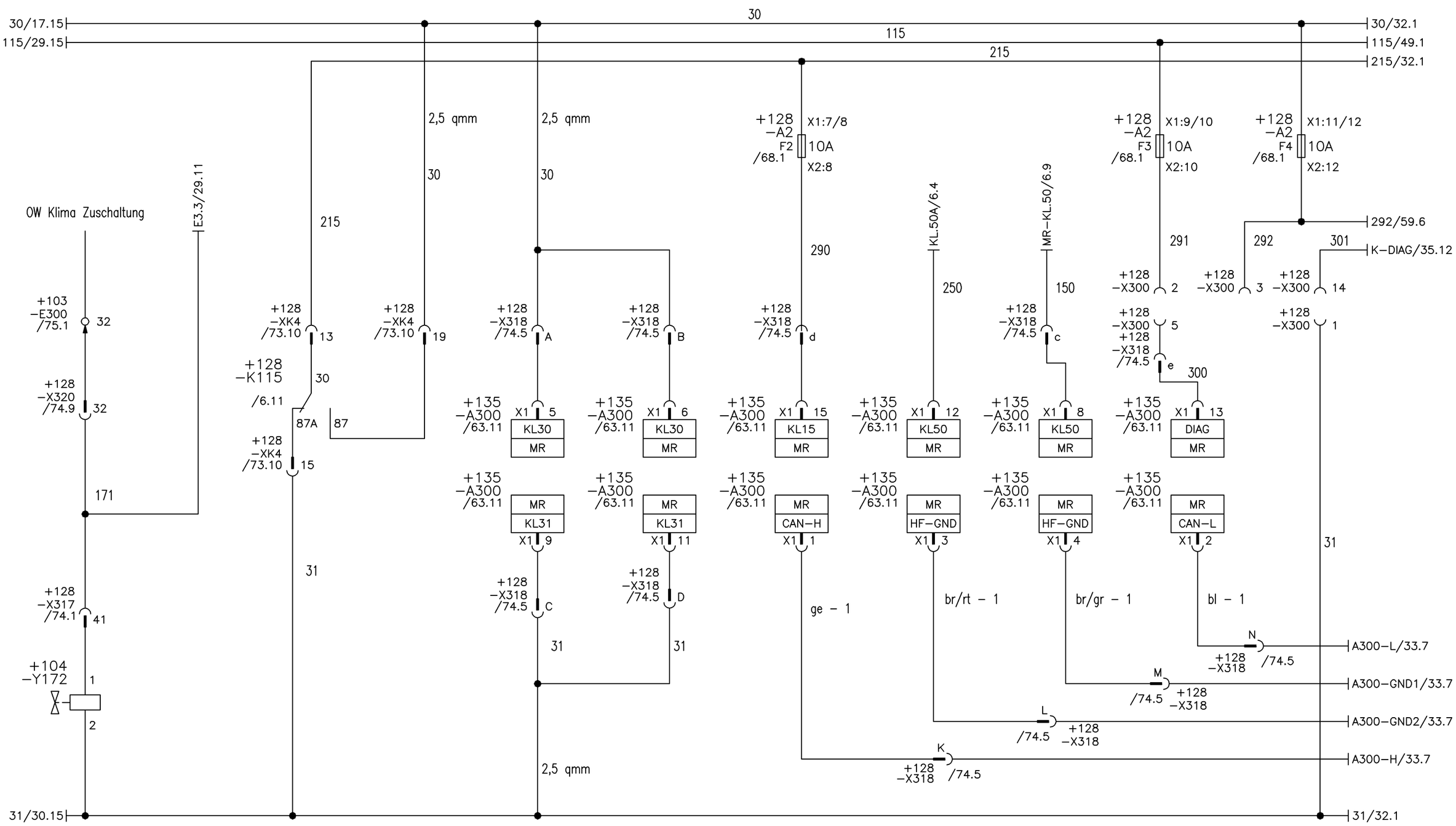

A	OW Klima Zuschaltung	Anlasser / Motordiagnose
	superstructure air condition	starter / engine gear diagnostic

b	N04534	04.03.11	Rosenkranz		Datum	Name
a	N04534	07.04.09	Rosenkranz	Erst.	21.10.08	Rosenkranz
Ind	Mitt−NR	Datum	Name	Gepr.		
Abteilung: 111410						

Projektbenennung / project description
E−PLAN AC 80−2 UW V4.2
ELECTRIC WIRING DIAGRAM

Seitenbenennung / page description
Motorregelung
engine control

Baunummer.
Anlage: 0
Ort: 0
Zeichnungsnr. / drawing no. 23222612
Blatt 31
78 Bl.

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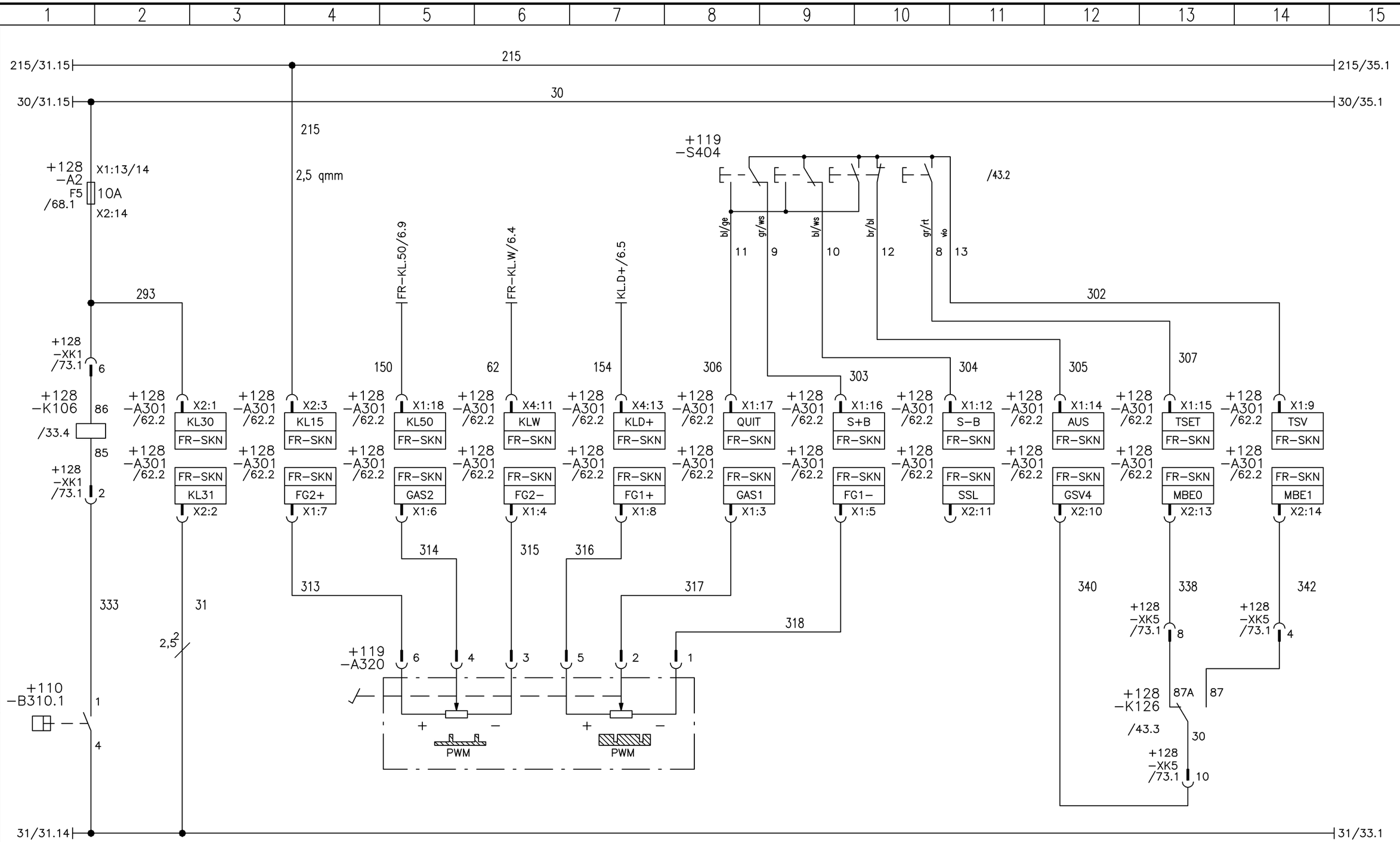

Bremslichtschalter

stop light pressure switch

el. Gaspedal

el. speed level

Tempomatschalter

tempomat switch

b	N04534	04.03.11	Rosenkranz		Datum	Name
a	N04534	07.04.09	Rosenkranz	Erst.	21.10.08	Rosenkranz
Ind	Mitt−NR	Datum	Name	Gepr.		
Abteilung: 111410						

Projektbenennung / project description
E−PLAN AC 80−2 UW V4.2
ELECTRIC WIRING DIAGRAM

Seitenbenennung / page description
Motorregelung FR−SKN
engine control FR−SKN

Baunummer.

Anlage: 0

Ort: 0

Zeichnungsnr. / drawing no.
23222612

Blatt 32
78 Bl.

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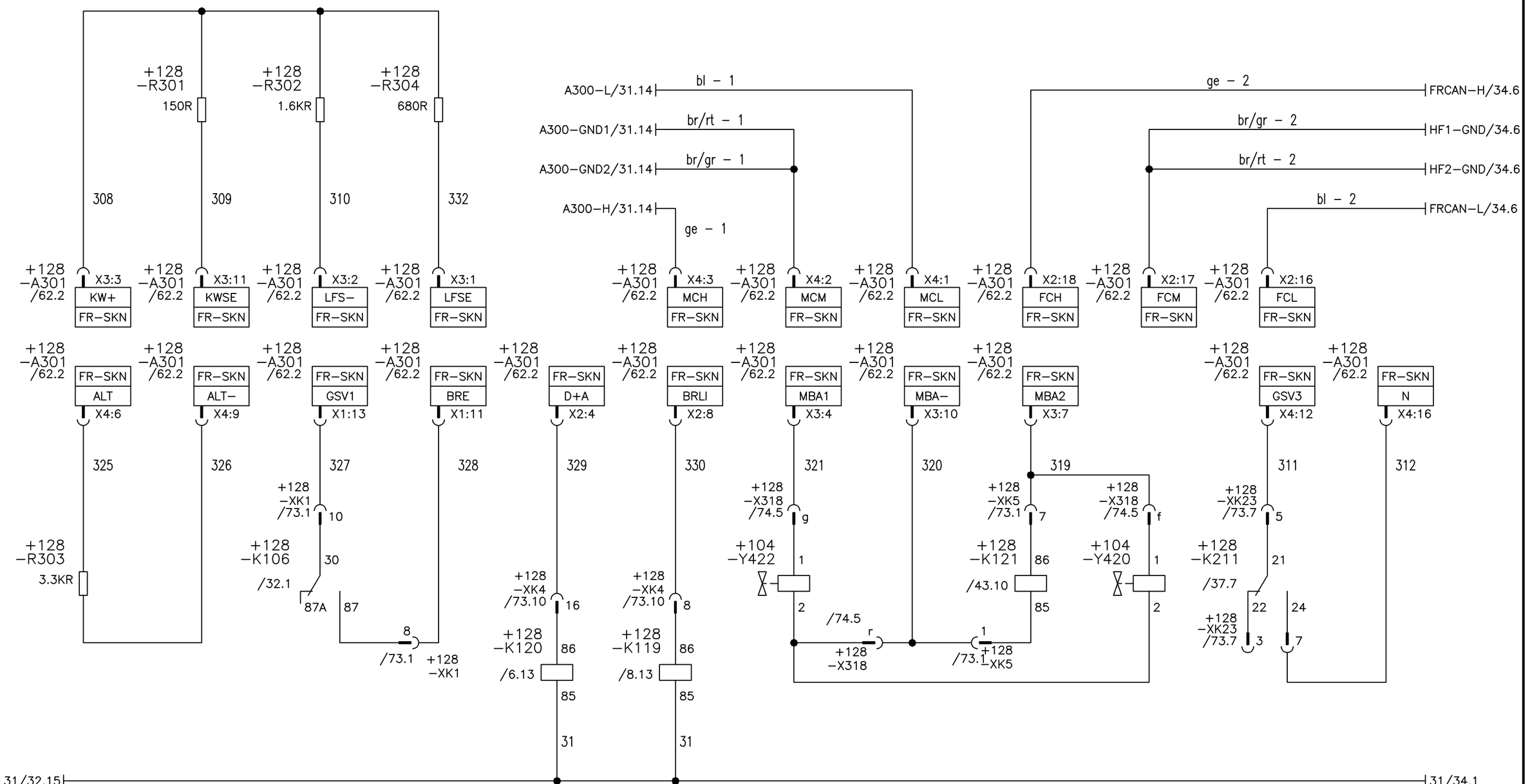

Motor läuft — engine actuation signal

Bremslicht Signal — stop light signal

Konstantdrossel — constant throttle

Motorklappenbremse — exhaust brake

b	N04534	04.03.11	Rosenkranz		Datum	Name
a	N04534	07.04.09	Rosenkranz	Erst.	21.10.08	Rosenkranz
Ind	Mitt−NR	Datum	Name	Gepr.		
Abteilung: 111410						

Projektbenennung / project description
E−PLAN AC 80−2 UW V4.2
ELECTRIC WIRING DIAGRAM

Seitenbenennung / page description
Motorregelung FR−SKN
engine control FR−SKN

Baunummer.

Anlage: 0

Ort: 0

Zeichnungsnr. / drawing no.
23222612

Blatt 33
78 Bl.

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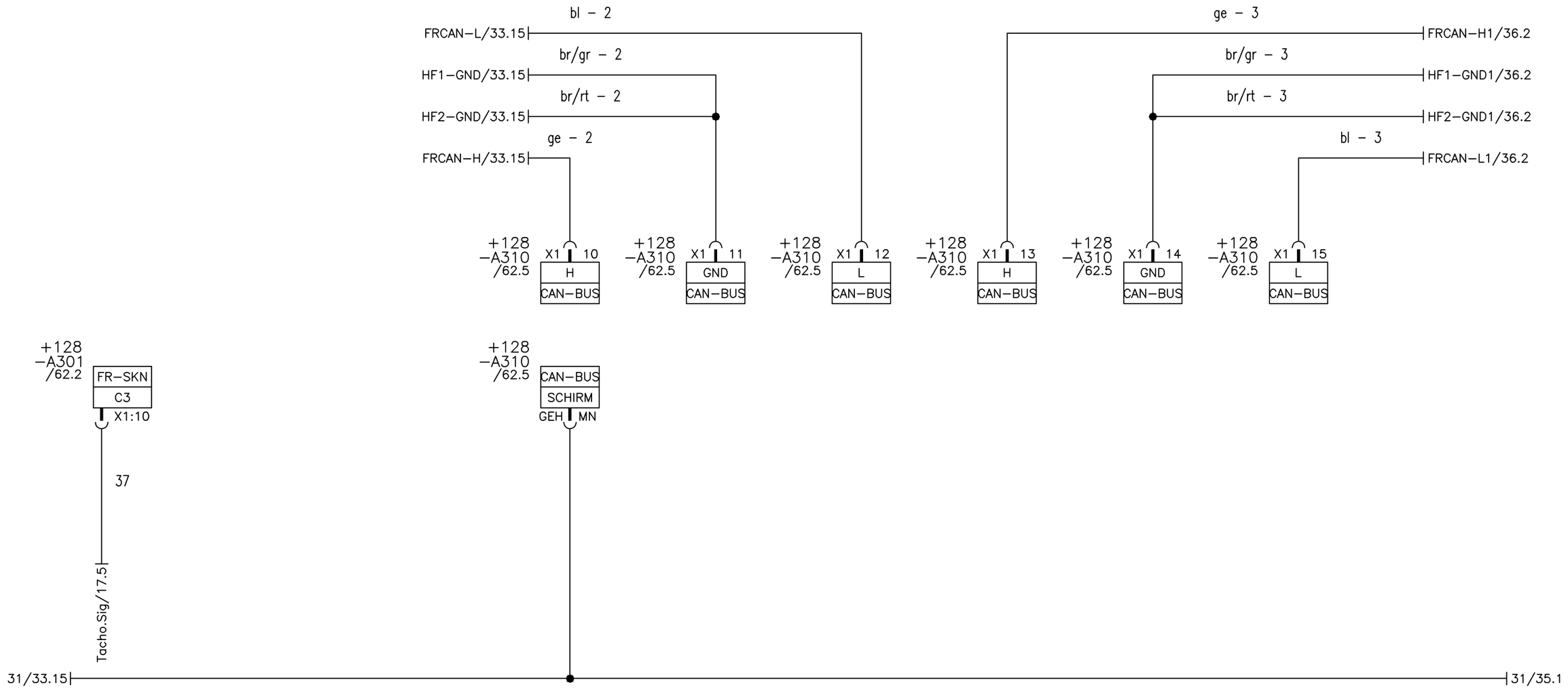

Sternpunkt (enthält die Abschlusswiderstände)

star point (contents termination resistors)

b	N04534	04.03.11	Rosenkranz		Datum	Name
a	N04534	07.04.09	Rosenkranz	Erst.	21.10.08	Rosenkranz
Ind	Mitt–NR	Datum	Name	Gepr.		
Abteilung: 111410						

Projektbenennung / project description
E–PLAN AC 80–2 UW V4.2
ELECTRIC WIRING DIAGRAM

Seitenbenennung / page description
CAN–Sternpunkt, Abschlusswiderstände
CAN–starpoint, termination resistors

Baunummer.

Anlage: 0
Ort: 0

Zeichnungsnr. / drawing no.
23222612

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30/32.15 — 30 — 30/36.2
215/32.15 — 215 — 215/40.1

2,5 qmm

215

+128 −A2 F6 /68.1 — X1:15/16 — 10A — X2:16

+103 −E300 /75.1 — 19 — +128 −X320 /74.9 — 19

+103 −E300 /75.1 — 21 — +128 −X320 /74.9 — 21

+103 −E300 /75.1 — 18 — +128 −X320 /74.9 — 18

+103 −E300 /75.1 — 20 — +128 −X320 /74.9 — 20

Gasverstellung UW vom OW

ADM−T−MOT/18.9 — ADM−P−OEL/18.7 — LAADM/19.6 — LATMOT/19.3 — LAPOEL/19.1 — LAOELST/19.5

+128 −A302 /62.1	X1:15	+128 −A302 /62.1	X1:1	+128 −A302 /62.1	X1:11	+128 −A302 /62.1	X1:8	+128 −A302 /62.1	X2:13	+128 −A302 /62.1	X2:15	+128 −A302 /62.1	X1:7
	KL15		KL30		FFG1+		FFG2+		FFG1		FFG2		T_MOT
	ADM−AR		ADM−AR		ADM−AR		ADM−AR		ADM−AR		ADM−AR		ADM−AR
+128 −A302 /62.1	ADM−AR KL31 X1:5	+128 −A302 /62.1	ADM−AR SUMMER X1:9	+128 −A302 /62.1	ADM−AR IWA1 X3:11	+128 −A302 /62.1	ADM−AR ADR0 X2:7	+128 −A302 /62.1	ADM−AR ADR− X2:18	+128 −A302 /62.1	ADM−AR ADR+ X2:6	+128 −A302 /62.1	ADM−AR NE X2:9

+128 −A302 /62.1	X1:2	+128 −A302 /62.1	X1:3	+128 −A302 /62.1	X1:12	+128 −A302 /62.1	X1:14	+128 −A302 /62.1	X1:13				
	POEL		LAADM		LATMOT		LAPOEL		LAOELST				
	ADM−AR		ADM−AR		ADM−AR		ADM−AR		ADM−AR				
+128 −A302 /62.1	ADM−AR ADR1 X2:14	+128 −A302 /62.1	ADM−AR KLIMA X2:4	+128 −A302 /62.1	ADM−AR KDIAG X4:5	+128 −A302 /62.1	ADM−AR REL4 X3:7	+128 −A302 /62.1	ADM−AR REL3 X3:8				

294 — 335 — 337 — 334 — 336 — 42 — 40 — 63 — 46 — 68 — 61

43 — 707 — 467 — 323 — 322 — 706 — 504 — 223 — 301 — 462 — 231

/74.12 5

+128 −X324

ADM−SU/18.12 — Getriebe/37.2 — A4.5/30.9 — A4.3/30.6 — K−DIAG/31.15 — IWK4/42.13 — IWK3

+119 −S301 — 1 — 7 — 3 — /56.3 — 324

+128 −XK24 /73.10 — 3 — +128 −XK23 /73.7 — 18 — +128 −XK5 /73.1 — 16

+128 −K212 — 11 — /30.11 — 12 — 14 — +128 −XK24 /73.10 — 1

+128 −K215 — 12 — 14 — /45.7 — +128 −XK23 /73.7 — 11 — 467 — +128 −XK23 /73.7 — 20 — +128 −XK23 /73.7 — 22

322 — 323

+128 −X320 /74.9 — 26 — +103 −E300 /75.1 — 26

+128 −X320 /74.9 — 27 — +103 −E300 /75.1 — 27

+128 −K127 — 87A — 87 — /49.11 — 30 — +128 −XK5 /73.1 — 18

776 — 776/49.2

Standgasverstellung vom OW

2,5 qmm

31 — 31 — 31

31/34.15 — 31/36.1

Arbeitsdrehzahlverstellung nur bei Gerätestillstand möglich

ADR 1 Eingang Geschwindigkeitsbegrenzung

speed control only in idleness possible

ADR 1 input speed limit

b	N04534	04.03.11	Rosenkranz		Datum	Name
a	N04534	07.04.09	Rosenkranz	Erst.	21.10.08	Rosenkranz
Ind	Mitt−NR	Datum	Name	Gepr.		
Abteilung: 111410						

Projektbenennung / project description: E−PLAN AC 80−2 UW V4.2 — ELECTRIC WIRING DIAGRAM

Seitenbenennung / page description: ADM−AR — ADM−AR

Baunummer.

Anlage: 0

Ort: 0

Zeichnungsnr. / drawing no.: 23222612

Blatt 35 / Bl. 78

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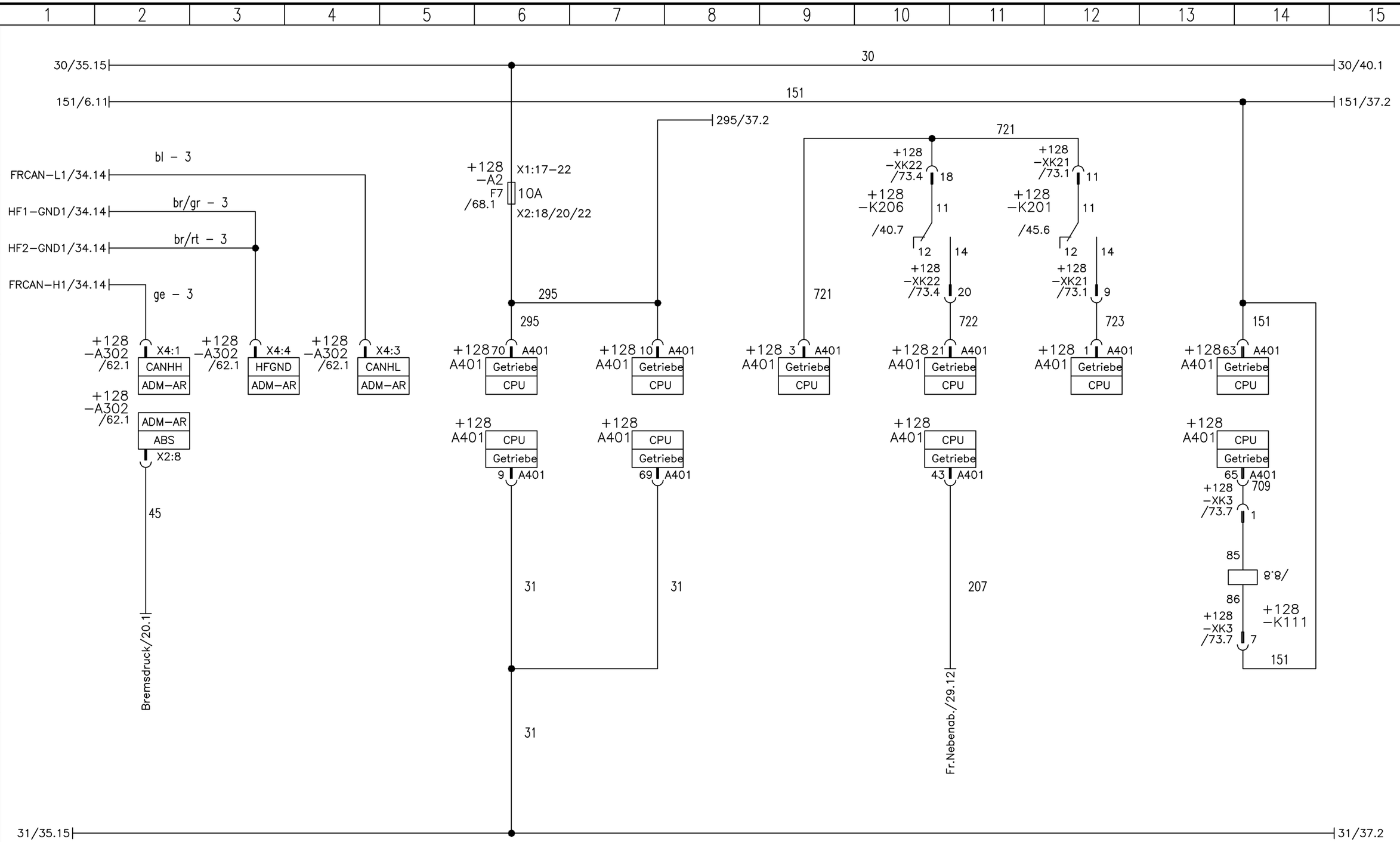

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b	N04534	04.03.11	Rosenkranz		Datum	Name
a	N04534	07.04.09	Rosenkranz	Erst.	21.10.08	Rosenkranz
Ind	Mitt–NR	Datum	Name	Gepr.		
Abteilung: 111410						

Projektbenennung / project description
E–PLAN AC 80–2 UW V4.2
ELECTRIC WIRING DIAGRAM

Seitenbenennung / page description
ADM–AR, Getriebeelektronik
ADM–AR, gearbox electronic

Baunummer.

Anlage: 0
Ort: 0

Zeichnungsnr. / drawing no.
23222612

Blatt 36
78 Bl.

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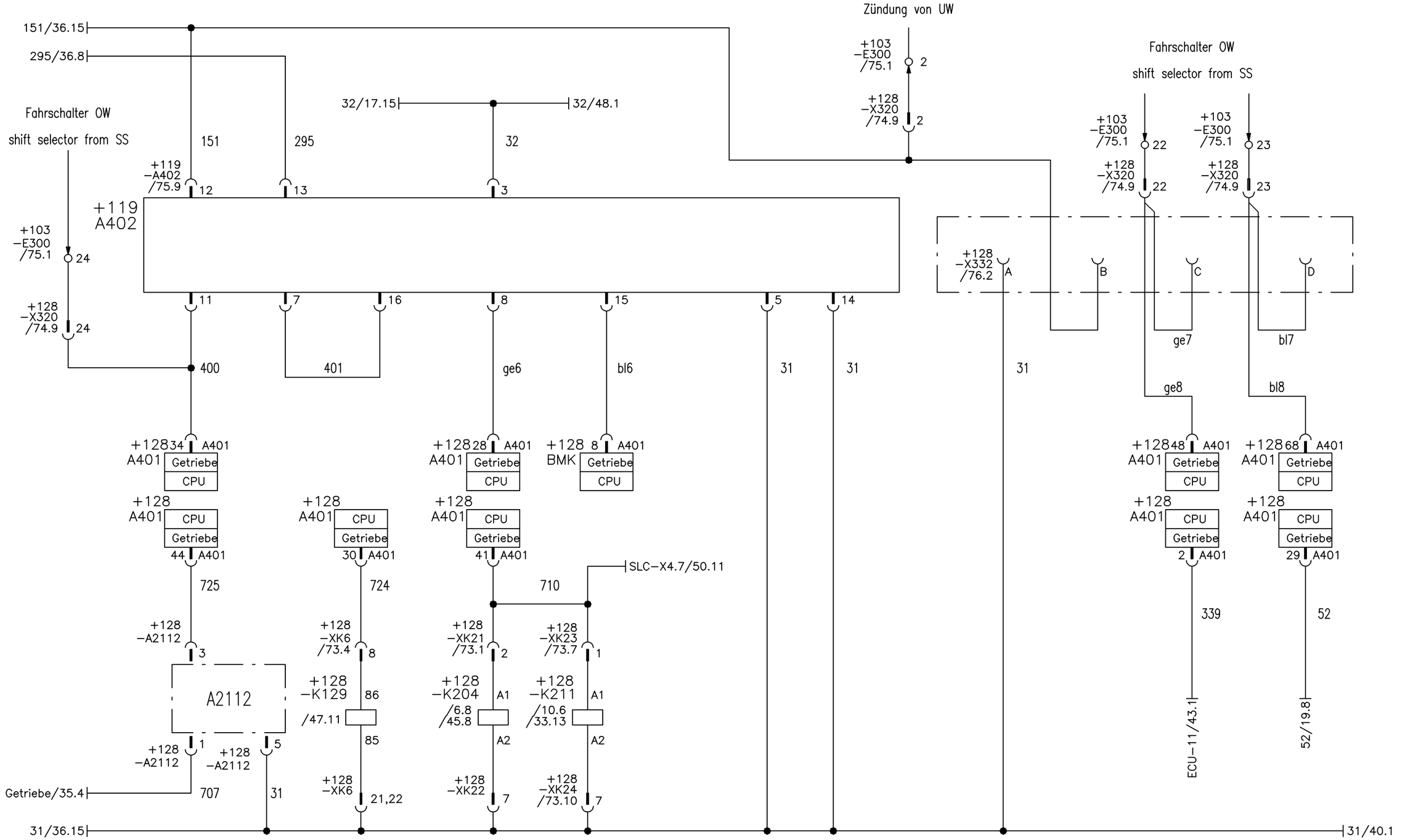

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A

Fahrschalter Unterwagen
Wandlung des pulsbreitenmodulierten Signales Zuschaltung Nebenabtrieb Getriebe neutral
shift selector carrier
enable power take off transmission neutral

Diagnosestecker
Eingang Motorbremsen Ausgang Störlampe "nicht schalten"
diagnostics
digital input engine brake output disturb light "don't switch"

					Datum	Name
b	N04534	04.03.11	Rosenkranz			
a	N04534	07.04.09	Rosenkranz	Erst.	21.10.08	Rosenkranz
Ind	Mitt−NR	Datum	Name	Gepr.		
Abteilung: 111410						

Projektbenennung / project description
E−PLAN AC 80−2 UW V4.2
ELECTRIC WIRING DIAGRAM

Seitenbenennung / page description
Getriebeelektronik
gearbox electronic

Baunummer.

Anlage: 0
Ort: 0

Zeichnungsnr. / drawing no.
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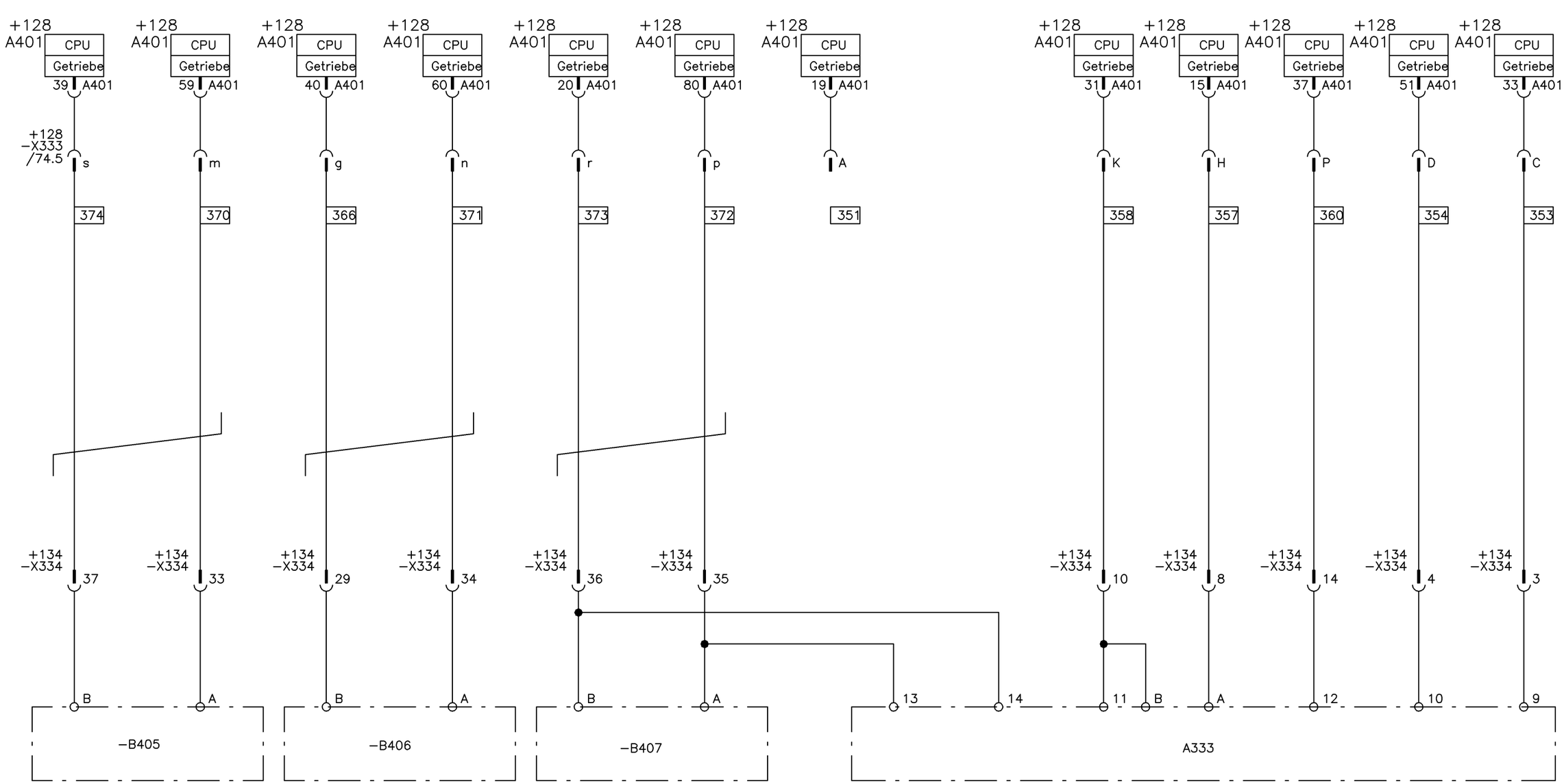

Getriebe / transmission

b	N04534	04.03.11	Rosenkranz		Datum	Name
a	N04534	07.04.09	Rosenkranz	Erst.	21.10.08	Rosenkranz
Ind	Mitt−NR	Datum	Name	Gepr.		
Abteilung: 111410						

Projektbenennung / project description
E−PLAN AC 80−2 UW V4.2
ELECTRIC WIRING DIAGRAM

Seitenbenennung / page description
Getriebeelektronik
gearbox electronic

Baunummer.

Anlage: 0
Ort: 0

Zeichnungsnr. / drawing no.
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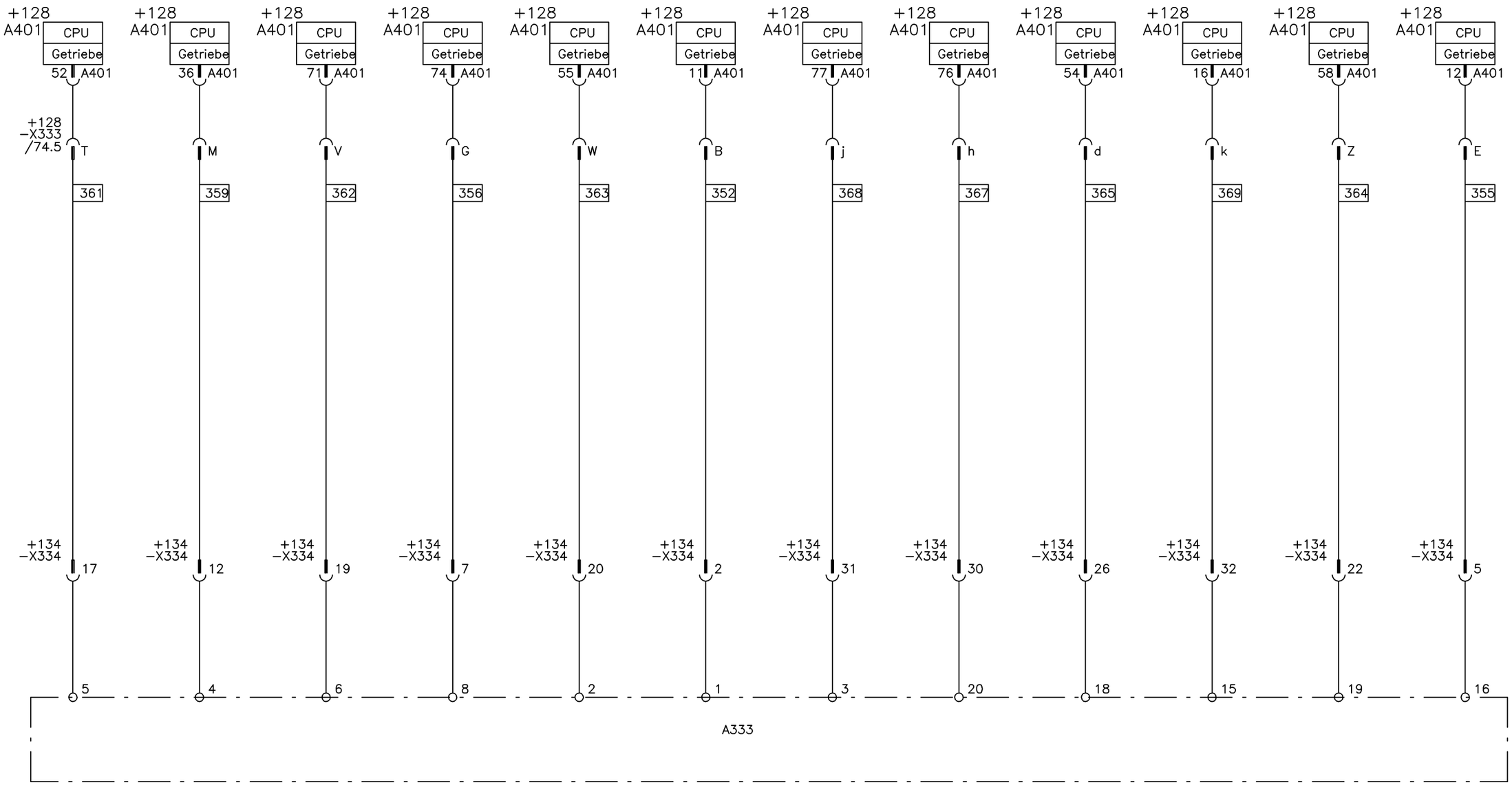

Getriebe

transmission

b	N04534	04.03.11	Rosenkranz		Datum	Name
a	N04534	07.04.09	Rosenkranz	Erst.	21.10.08	Rosenkranz
Ind	Mitt-NR	Datum	Name	Gepr.		
Abteilung: 111410						

Projektbenennung / project description
E-PLAN AC 80-2 UW V4.2
ELECTRIC WIRING DIAGRAM

Seitenbenennung / page description
Getriebeelektronik
gearbox electronic

Baunummer.

Anlage: 0
Ort: 0

Zeichnungsnr. / drawing no.
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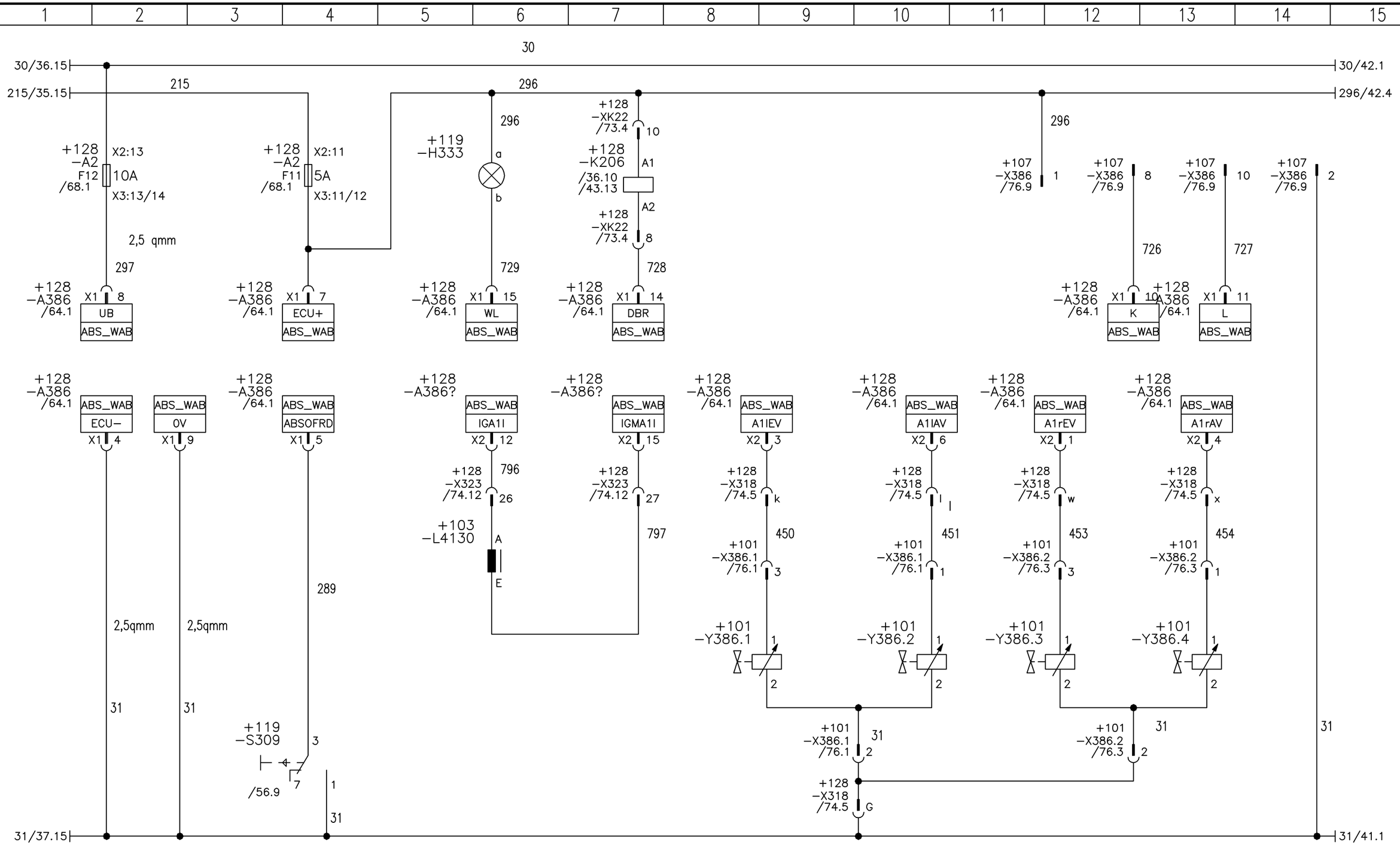

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b	N04534	04.03.11	Rosenkranz		Datum	Name
a	N04534	07.04.09	Rosenkranz	Erst.	21.10.08	Rosenkranz
Ind	Mitt−NR	Datum	Name	Gepr.		
Abteilung:	111410					

Projektbenennung / project description
E−PLAN AC 80−2 UW V4.2
ELECTRIC WIRING DIAGRAM

Seitenbenennung / page description
ABS−Steuerung
ABS−control

Baunummer.

Anlage: 0
Ort: 0

Zeichnungsnr. / drawing no.
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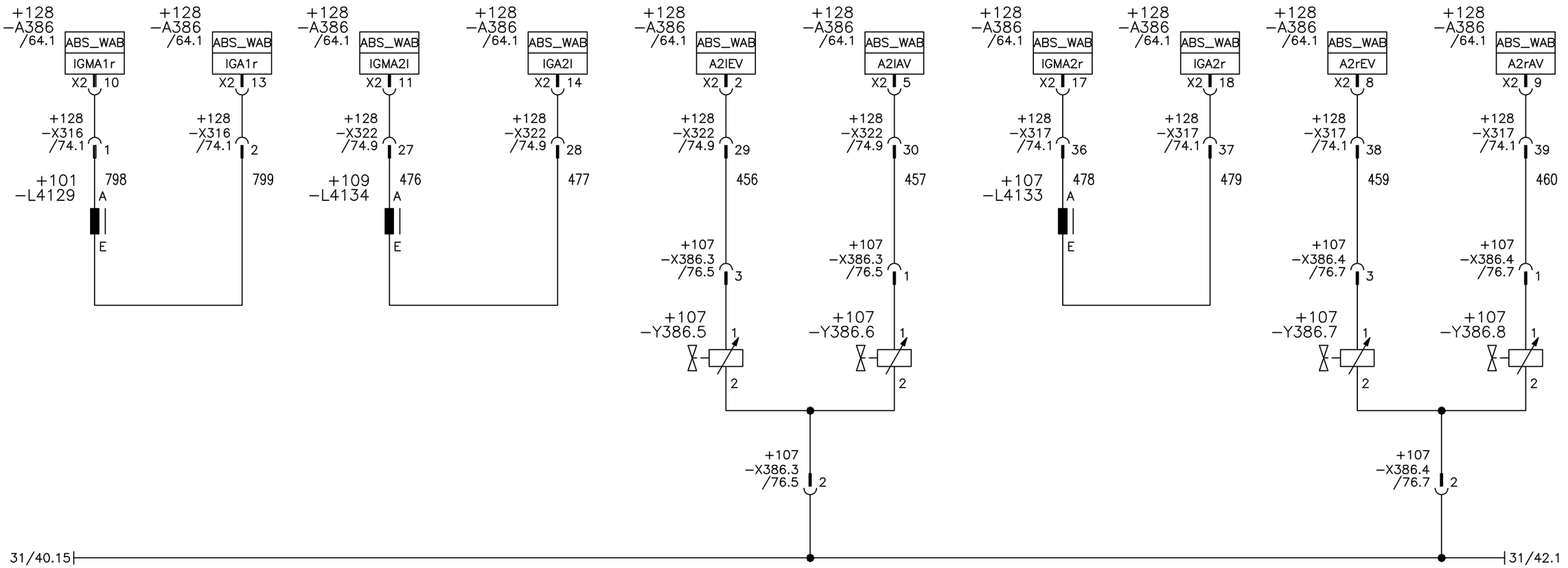

ABS Achse 2 rechts Achse 4 links Achse 4 rechts

ABS axle 2 right axle 4 left axle 4 right

b	N04534	04.03.11	Rosenkranz		Datum	Name
a	N04534	07.04.09	Rosenkranz	Erst.	21.10.08	Rosenkranz
Ind	Mitt-NR	Datum	Name	Gepr.		
Abteilung: 111410						

Projektbenennung / project description
E-PLAN AC 80-2 UW V4.2
ELECTRIC WIRING DIAGRAM

Seitenbenennung / page description
ABS-Steuerung
ABS-control

Baunummer.

Anlage: 0
Ort: 0

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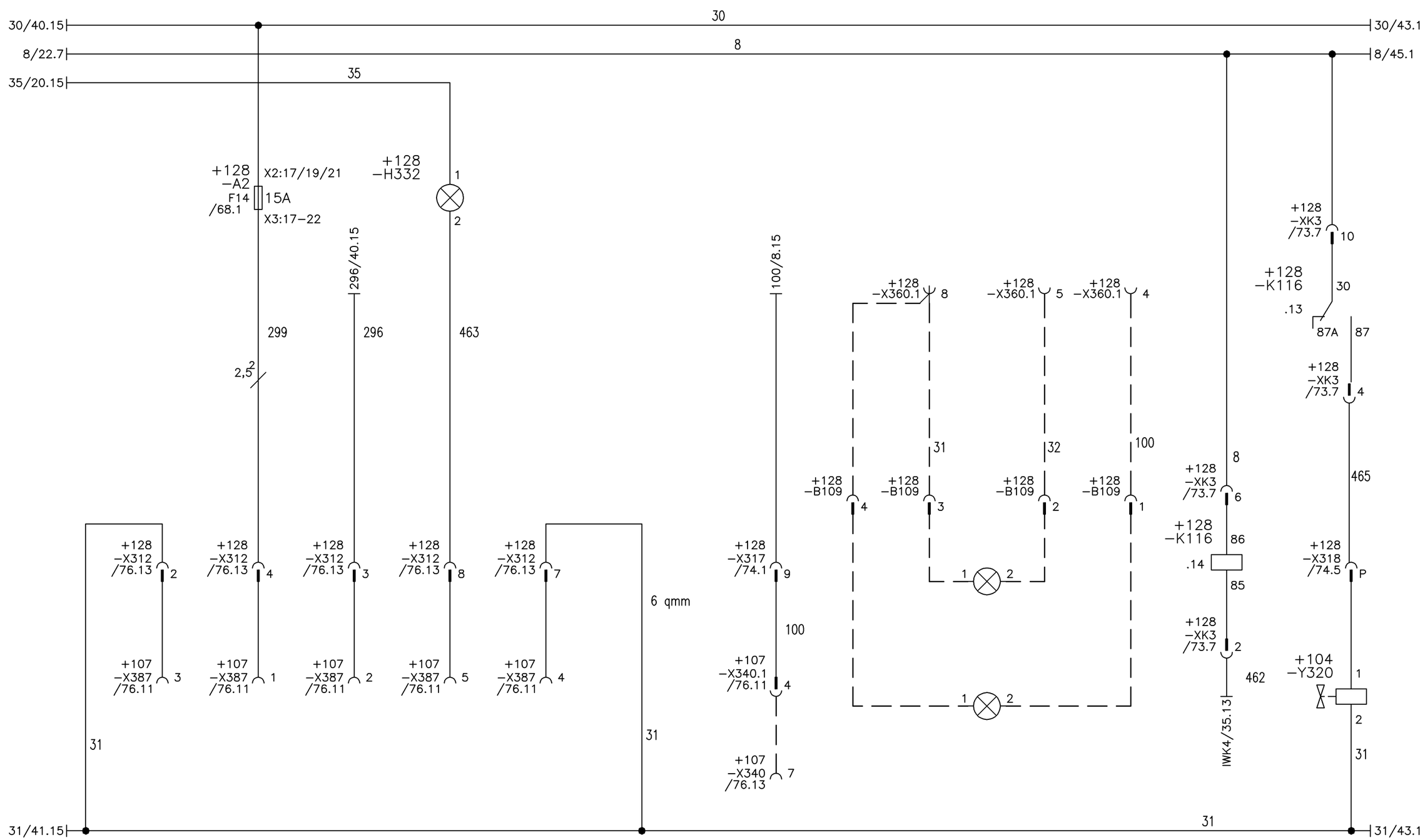

ABS Anhängersteckdose

ABS – trailer socket

Option Pendelleuchte

option pendulum light

Lüftersteuerung

fan – control

					Datum	Name
b	N04534	04.03.11	Rosenkranz			
a	N04534	07.04.09	Rosenkranz	Erst.	21.10.08	Rosenkranz
Ind	Mitt−NR	Datum	Name	Gepr.		
Abteilung: 111410						

Projektbenennung / project description
E−PLAN AC 80−2 UW V4.2
ELECTRIC WIRING DIAGRAM

Seitenbenennung / page description
ABS Anhängersteckdose, Lüftersteuerung
ABS trailer socket, fan control

Baunummer.

Anlage: 0

Ort: 0

Zeichnungsnr. / drawing no.
23222612

Blatt 42

Bl. 78

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30/42.15 — 30 — 30/48.1
91/22.15 — 91
343/8.15 — 343

+119 −S404a
+119 −S404
01 VS
/32.8 SK 1
+119 −X404 2
+119 −X404 3
+119 −X404 1
+119 −X404a /76.9 1
+119 −X404a /76.9 2
+119 −X404a /76.9 3
+119 −X404a /76.9 4
+119 −X404a /76.9 5
+119 −X404a /76.9 6
+119 −X404a /76.9 7
14
730

+128 −XV V8 /72.3 X2:9 X2:7

+128 −A2 F13 /68.1 X2:15 10A X3:15/16
443
+128 −XK22 /73.4 12
21
+128 −K206 /40.7
22 24
+128 −XK22 /73.4 14
444
+128 −XK23 /73.7 19
+128 −K212 /30.11 21
22 24
+128 −XK23 /73.7 17 21

+128 −F315 20A
Zusatz–sicherung auxilary fuse
+135 −X1119 3 1
350W +/−30% 4 2

+128 −XK5 /73.1 3
+128 −K121 /33.11 30
87A 87
+128 −XK5 /73.1 9
449

ECU–11/37.13

+128 −X322 /74.9 22 — 445
+128 −X322 /74.9 23 — 446
+128 −X322 /74.9 24 — 447
+128 −X322 /74.9 25 — 448

527/44.2

+134 −A388 4
+134 −A388 3
+134 −A388 2
+134 −A388 1
+134 −A388 +
+134 −A388 M
+134 −A386 V

Verbindung Steuerkasten zu Wirbelstrombremse 4 x 10 qmm
10 qmm

+134 −A386 I
+134 −A386 II
+134 −A386 III
+134 −A386 IV

437
439
438
+134 −B388 1
+134 −B388 2
+119 −B388 3
+134 −B388 4
+134 −B388
Masse
440

339
+128 −XK5 /73.1 6
+119 −H337 a b
+128 −K126 86 /32.13 85
+128 −XK5 /73.1 2
31
31ib
339
31/42.15

Telma/6.3 — 70 qmm — 1
31
10 qmm
+119 −H338 a b
44
26 /74.9 +128 −X322

31/44.2

Motorbremse betätigt
engine brake

Einstellung elektrischer Retarder
Leuchte Retarder betätigt
electrical retarder adjustment

Steuerungskasten
control terminal box

Wirbelstrombremse
eddy current brake

Option Kraftstoffvorwärmung
option fuel preheater

Ind	Mitt-NR	Datum	Name		Datum	Name
b	N04534	04.03.11	Rosenkranz			
a	N04534	07.04.09	Rosenkranz	Erst.	21.10.08	Rosenkranz
				Gepr.		

Abteilung: 111410

Projektbenennung / project description
E-PLAN AC 80-2 UW V4.2
ELECTRIC WIRING DIAGRAM

Seitenbenennung / page description
Retarderbremse
retarder brake

Baunummer.
Anlage: 0
Ort: 0
Zeichnungsnr. / drawing no. 23222612
Blatt 43
78 Bl.

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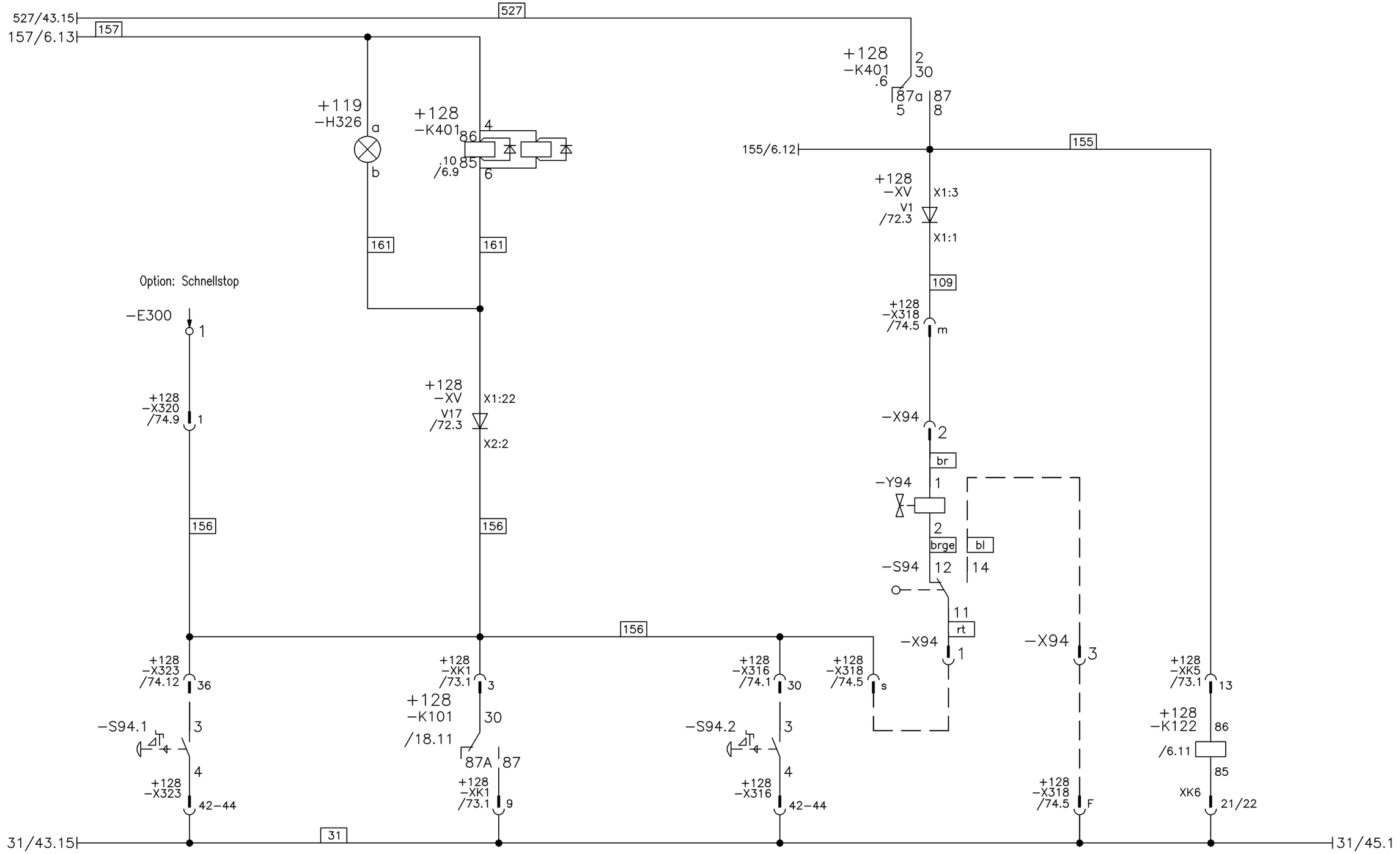

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Kundenwunsch	Schnellstop Motor UW und OW	Überdrehzahl
Optional Quickstop engine		overspeed

Schnellstop Motor stop

quick stop engine stop

b	N04534	04.03.11	Rosenkranz		Datum	Name
a	N04534	07.04.09	Rosenkranz	Erst.	21.10.08	Rosenkranz
Ind	Mitt−NR	Datum	Name	Gepr.		
Abteilung:	111410					

Projektbenennung / project description
E−PLAN AC 80−2 UW V4.2
ELECTRIC WIRING DIAGRAM

Seitenbenennung / page description
Schnellstop Motor
quick stop engine

Baunummer.

Anlage: 0

Ort:

Zeichnungsnr. / drawing no.
23222612

Blatt 44
78 Bl.

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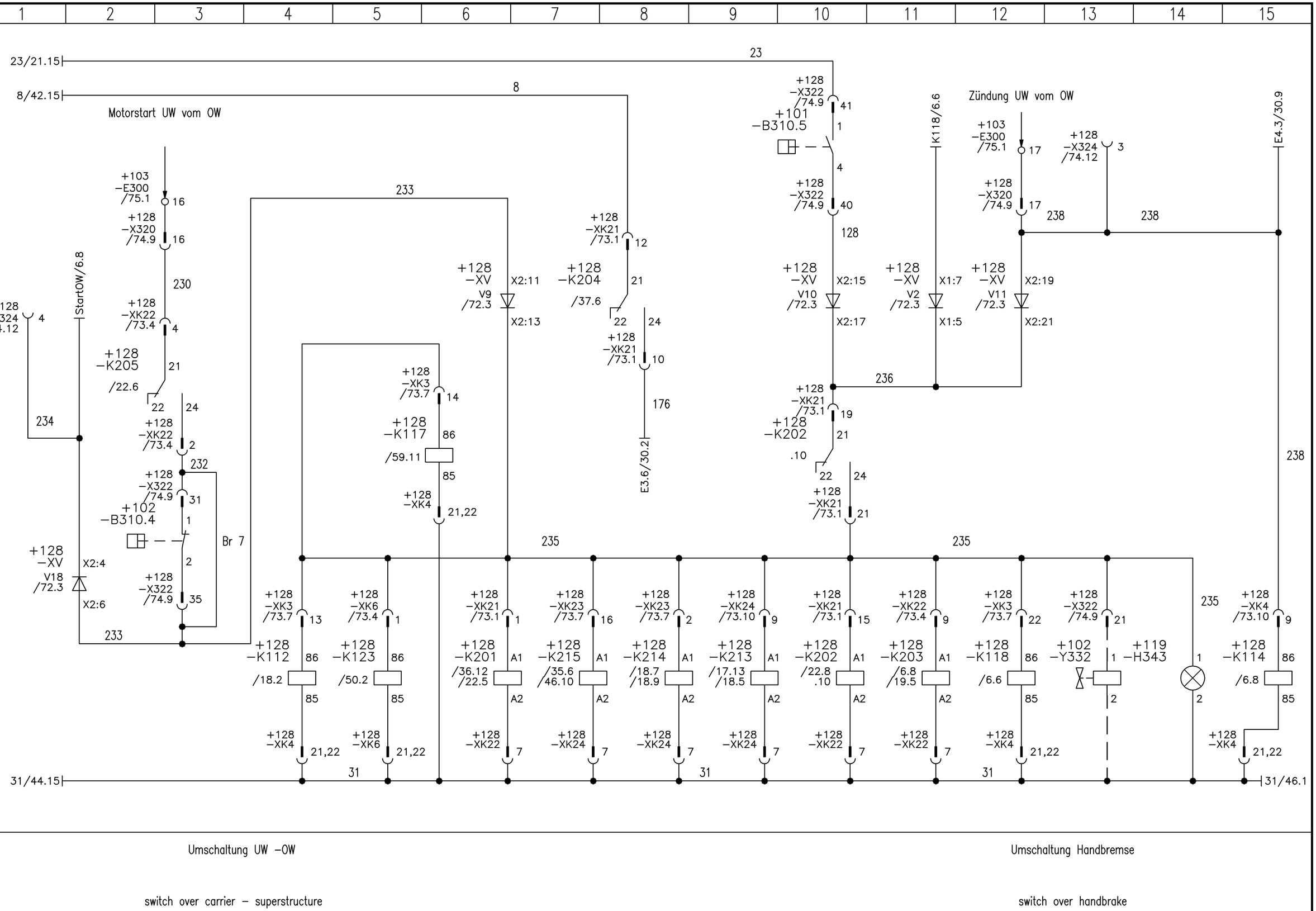

					Datum	Name
b	N04534	04.03.11	Rosenkranz			
a	N04534	07.04.09	Rosenkranz	Erst.	21.10.08	Rosenkranz
Ind	Mitt−NR	Datum	Name	Gepr.		
Abteilung: 111410						

Projektbenennung / project description
E−PLAN AC 80−2 UW V4.2
ELECTRIC WIRING DIAGRAM

Seitenbenennung / page description
Umschaltung UW − OW
switch over chassis − superstructure

Baunummer.

Anlage: 0
Ort: 0

Zeichnungsnr. / drawing no.
23222612

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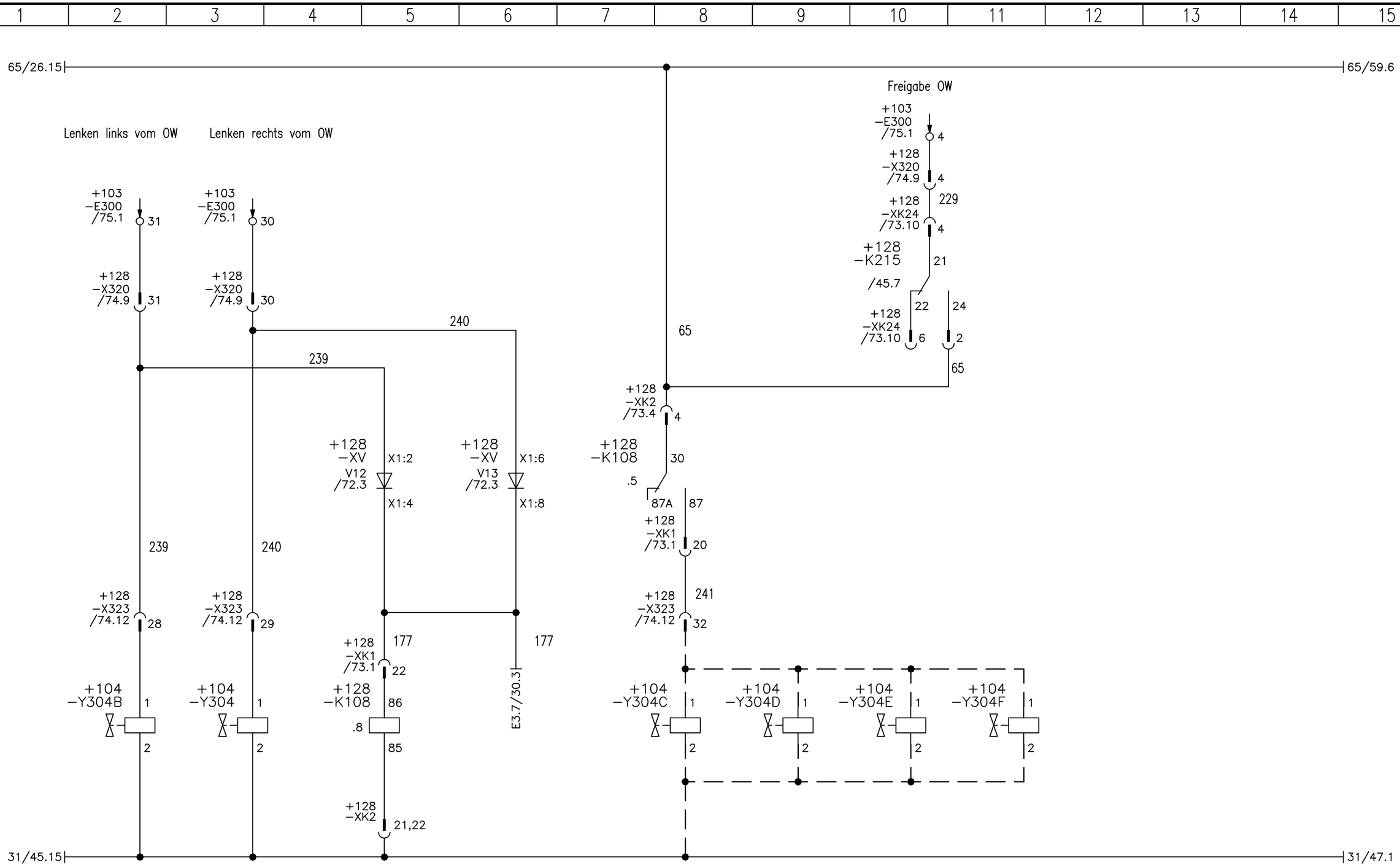

Lenken vom OW

links rechts

steering from superstructure

left right

Option fahren aus dem OW

option drive from superstructure

Umschaltung Lenkung auf den OW

switch over steering to superstructure

b	N04534	04.03.11	Rosenkranz		Datum	Name
a	N04534	07.04.09	Rosenkranz	Erst.	21.10.08	Rosenkranz
Ind	Mitt-NR	Datum	Name	Gepr.		
Abteilung: 111410						

Projektbenennung / project description
E-PLAN AC 80-2 UW V4.2
ELECTRIC WIRING DIAGRAM

Seitenbenennung / page description
Lenkung vom OW
steering from superstructure

Baunummer.

Anlage: 0

Ort: 0

Zeichnungsnr. / drawing no.
23222612

Blatt 46

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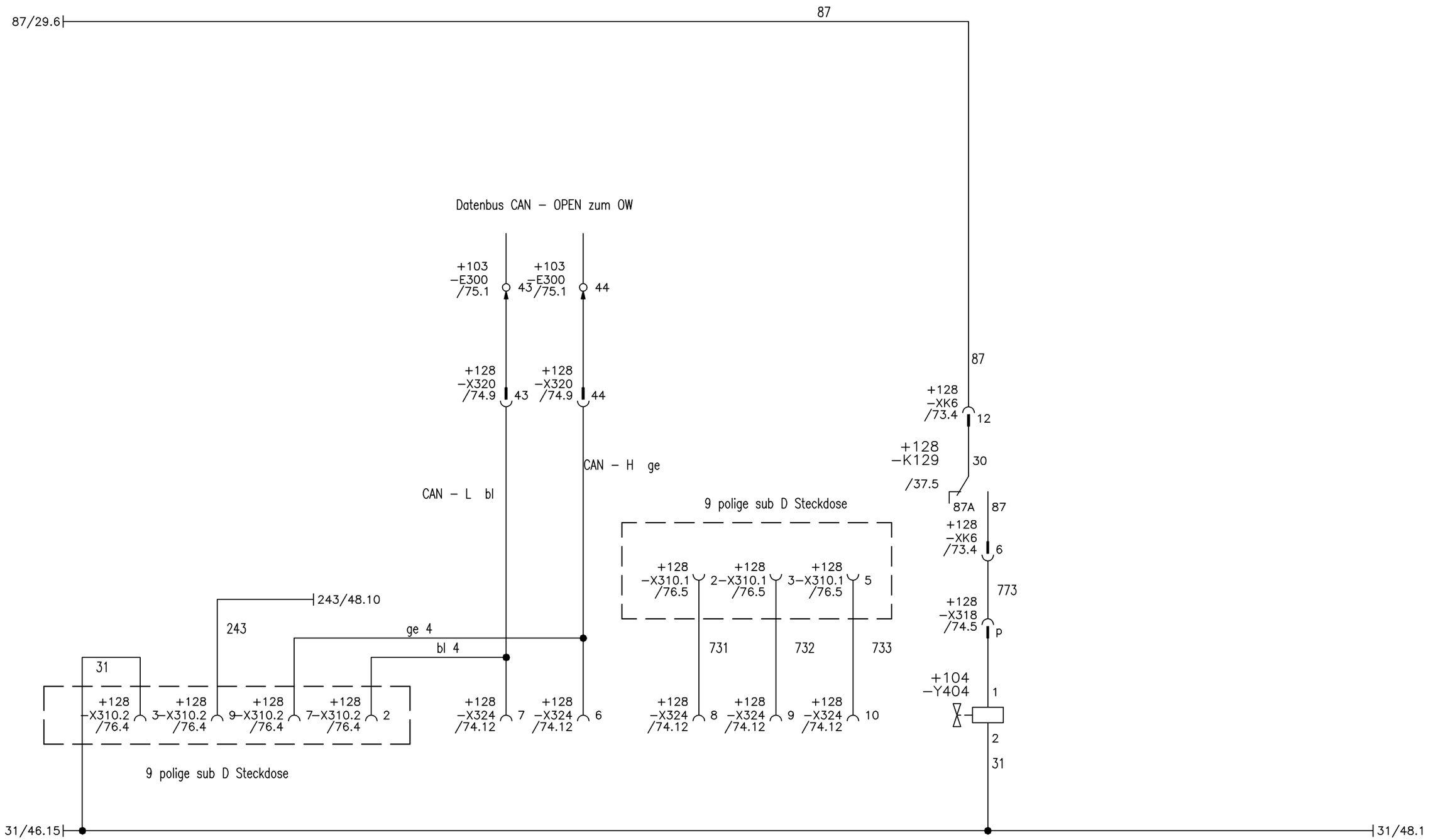

CAN – OPEN Diagnose

Datenbus CAN – OPEN zum OW
CAN – OPEN to superstructure

Programmierstecker
program plug

Zuschaltung Nebenabtrieb
enable power take off

					Datum	Name
b	N04534	04.03.11	Rosenkranz			
a	N04534	07.04.09	Rosenkranz	Erst.	21.10.08	Rosenkranz
Ind	Mitt–NR	Datum	Name	Gepr.		
Abteilung: 111410						

Projektbenennung / project description
E–PLAN AC 80–2 UW V4.2
ELECTRIC WIRING DIAGRAM

Seitenbenennung / page description
CAN–open, Zuschaltung Nebenabtrieb
CAN–open, enable power take off

Baunummer.
Anlage: 0
Ort: 0
Zeichnungsnr. / drawing no. 23222612
Blatt 47
Bl. 78

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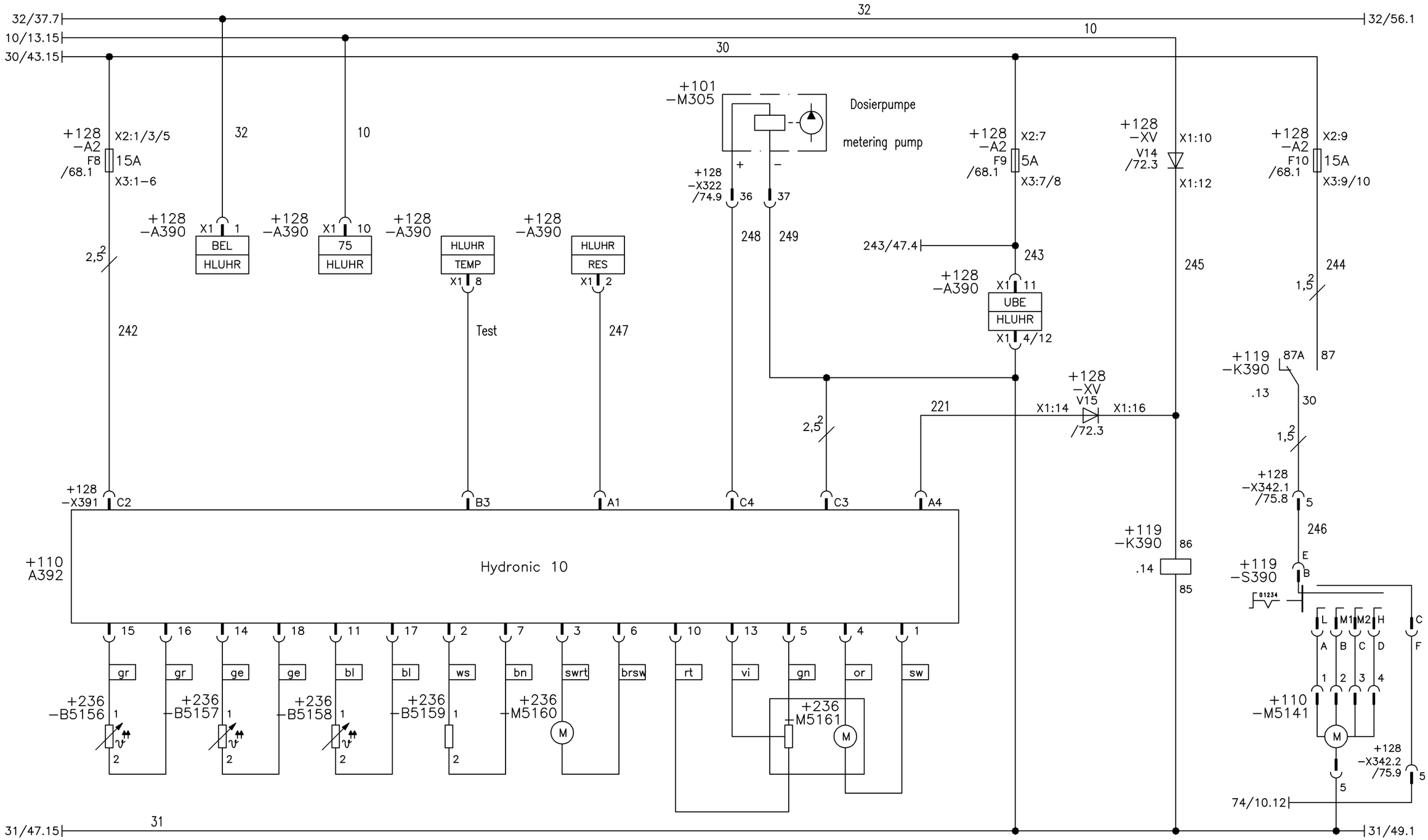

A

Flammfühler	Temp.fühler	Überhitz.fühler	Glühkerze	Wasserpumpe	Option: Standheizung	Brennermotor	Gebläse
flame sensor	temp. sensor	overheat sensor	glow plug	water pump	option: water heater	burner motor	fan

					Datum	Name
b	N04534	04.03.11	Rosenkranz			
a	N04534	07.04.09	Rosenkranz	Erst.	21.10.08	Rosenkranz
Ind	Mitt−NR	Datum	Name	Gepr.		
Abteilung: 111410						

Projektbenennung / project description
E−PLAN AC 80−2 UW V4.2
ELECTRIC WIRING DIAGRAM

Seitenbenennung / page description
Standheizung
auxilary heating

Baunummer.

Anlage: 0
Ort: 0

Zeichnungsnr. / drawing no.
23222612

Blatt 48
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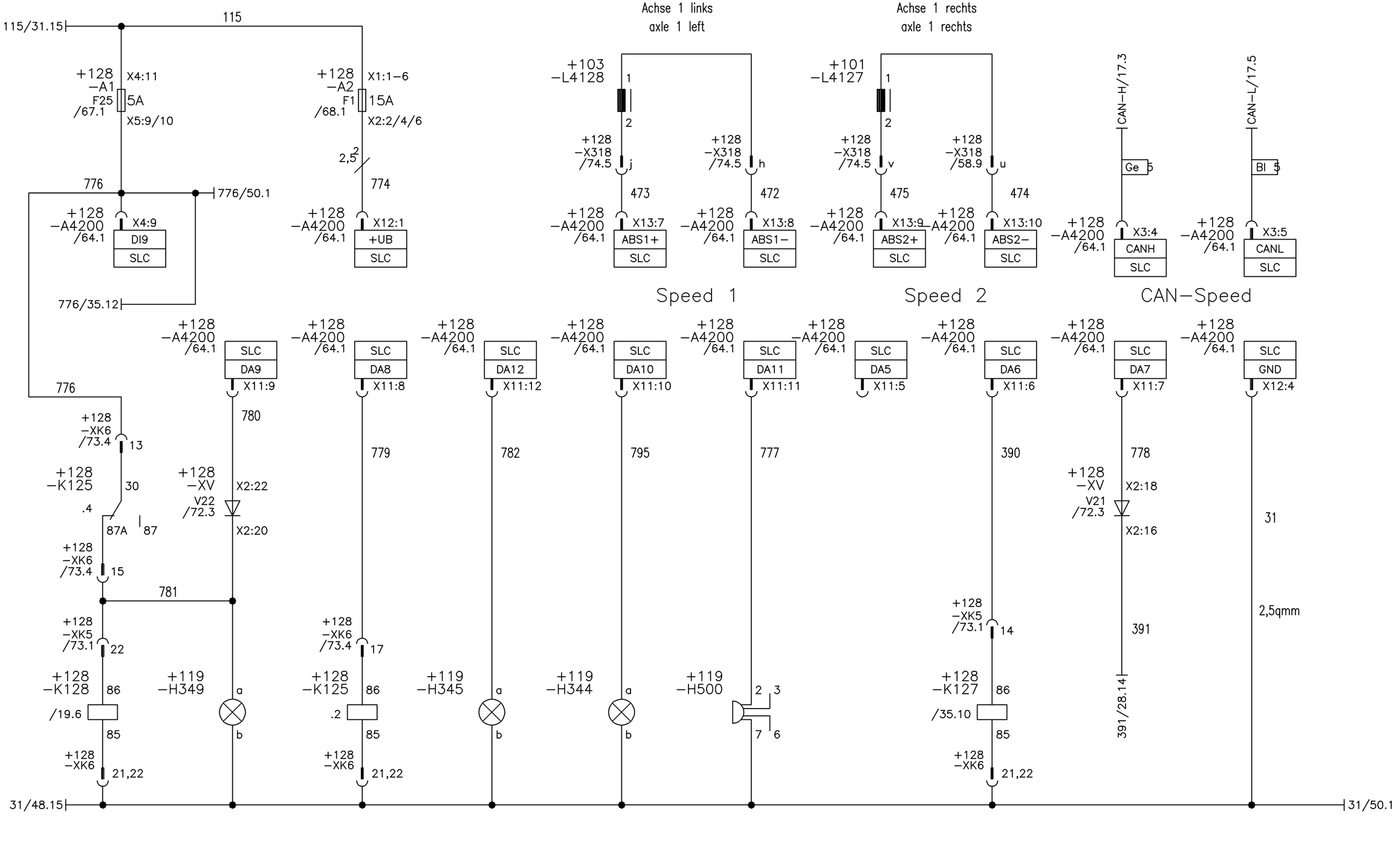

A	Spannungsversorgung Fehleranzeige Störung power supply fault display malfunction
	Überwachung control
	Diagonallenkung diagonal steering
	Allradlenkung all–wheel–drive steering
	Alarmsummer SLC alert buzzer SLC
	Freigabe Geschwindigkeit release speed
	Geschwindigkeitsschwelle v < 20km/h speed threshold v < 20km/h

					Datum	Name
b	N04534	04.03.11	Rosenkranz			
a	N04534	07.04.09	Rosenkranz	Erst.	21.10.08	Rosenkranz
Ind	Mitt–NR	Datum	Name	Gepr.		
Abteilung: 111410						

Projektbenennung / project description
E–PLAN AC 80–2 UW V4.2
ELECTRIC WIRING DIAGRAM

Seitenbenennung / page description
Lenkung
steering

Baunummer.

Anlage: 0
Ort: 0

Zeichnungsnr. / drawing no.
23222612

Blatt 49
Bl. 78

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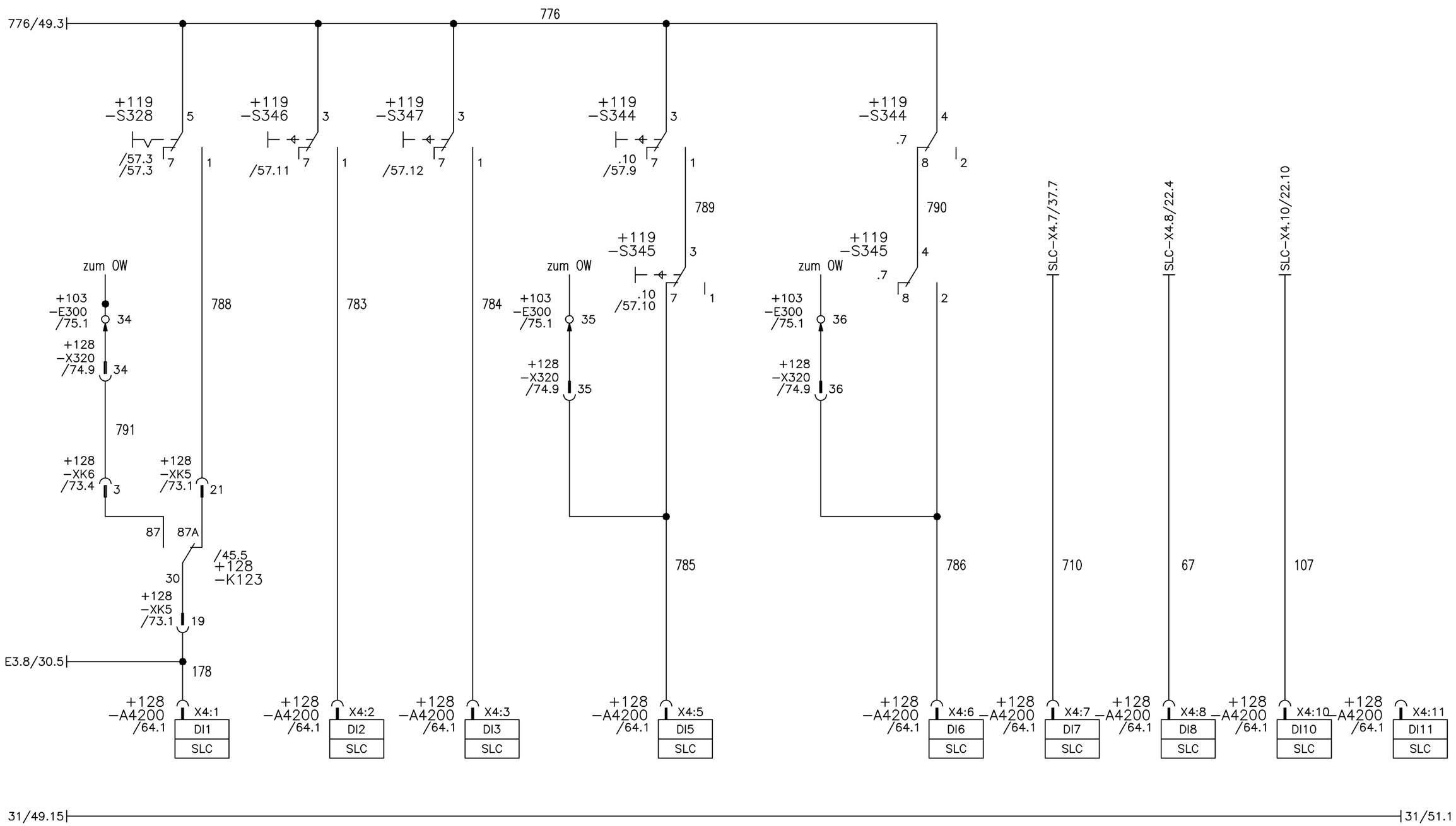

Verriegelungsschalter Straße/Baustelle — Lenkradtaste diagonal — manuell links — manuell rechts — Getriebe neutral — Differentialsperre quer — Motor läuft

Lenkradtaste Allradlenkung

steering wheel-tip switch all-wheel-drive steering — manual left — manual right — differential lock cross

locking switch street/building site — steering wheel-tip switch diagonal — transmission neutral — engine running

b	N04534	04.03.11	Rosenkranz		Datum	Name
a	N04534	07.04.09	Rosenkranz	Erst.	21.10.08	Rosenkranz
Ind	Mitt-NR	Datum	Name	Gepr.		
Abteilung: 111410						

Projektbenennung / project description: E-PLAN AC 80-2 UW V4.2
ELECTRIC WIRING DIAGRAM

Seitenbenennung / page description: Lenkung
steering

Baunummer.

Anlage: 0
Ort: 0

Zeichnungsnr. / drawing no.: 23222612

Blatt 50
Bl. 78

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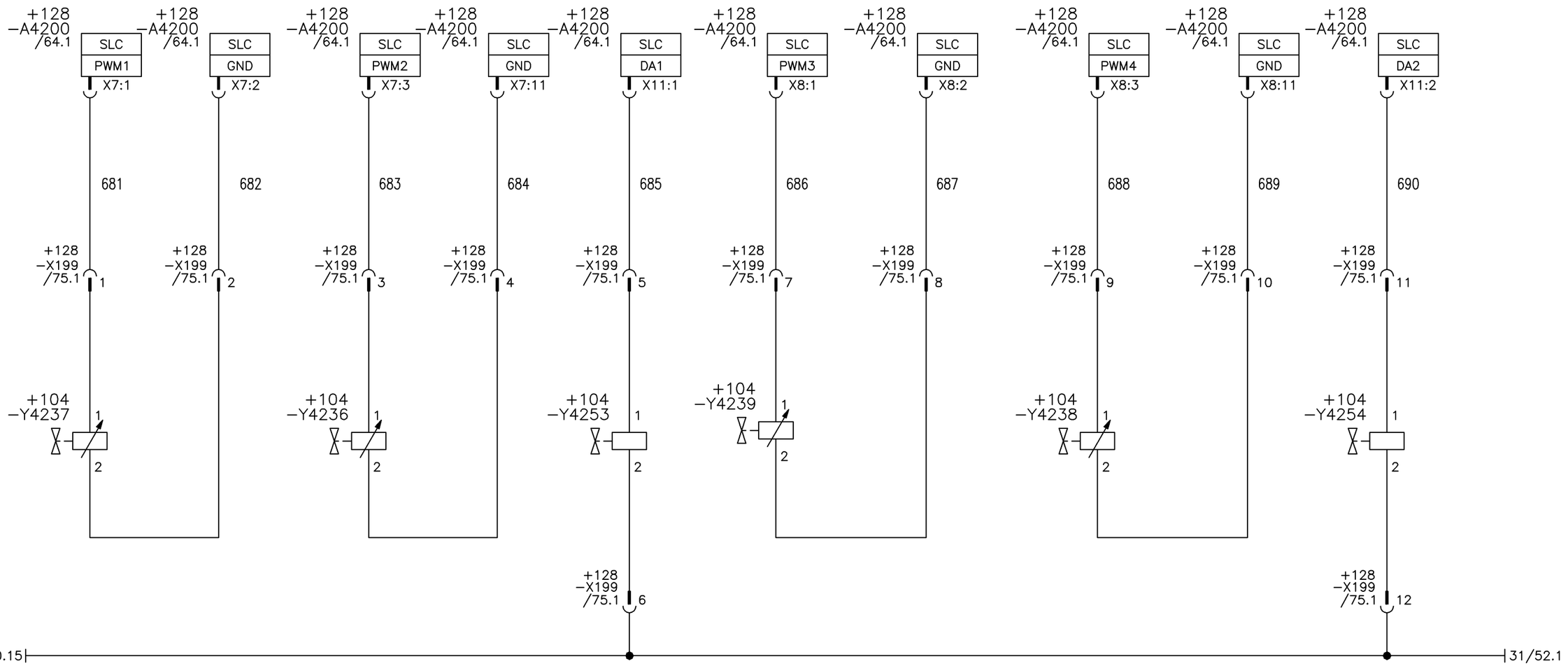
Belegung bei Antrieb 8 x 8 x 8 oder 8 x 8 x 8 TM

I/O – configuration at drive 8 x 8 x 8 or 8 x 8 x 8 TM



Lenk. Achse 3 links	Lenk. Achse 3 rechts	Lenkungssperre Achse 3	Lenk. Achse 4 links	Lenk. Achse 4 rechts	Lenkungssperre Achse 4
steering axle 3 left	steering axle 3 right	steering lock axle 3	steering axle 4 left	steering axle 4 right	steering lock axle 4

b	N04534	04.03.11	Rosenkranz		
a	N04534	07.04.09	Rosenkranz	Erst.	21.10.08 Rosenkranz
Ind	Mitt-NR	Datum	Name	Gepr.	
Abteilung: 111410					

Projektbenennung / project description
E-PLAN AC 80-2 UW V4.2
ELECTRIC WIRING DIAGRAM

Seitenbenennung / page description
Lenkung
steering

Baunummer.

Anlage: 0
Ort: 0

Zeichnungsnr. / drawing no.
23222612

Blatt 51
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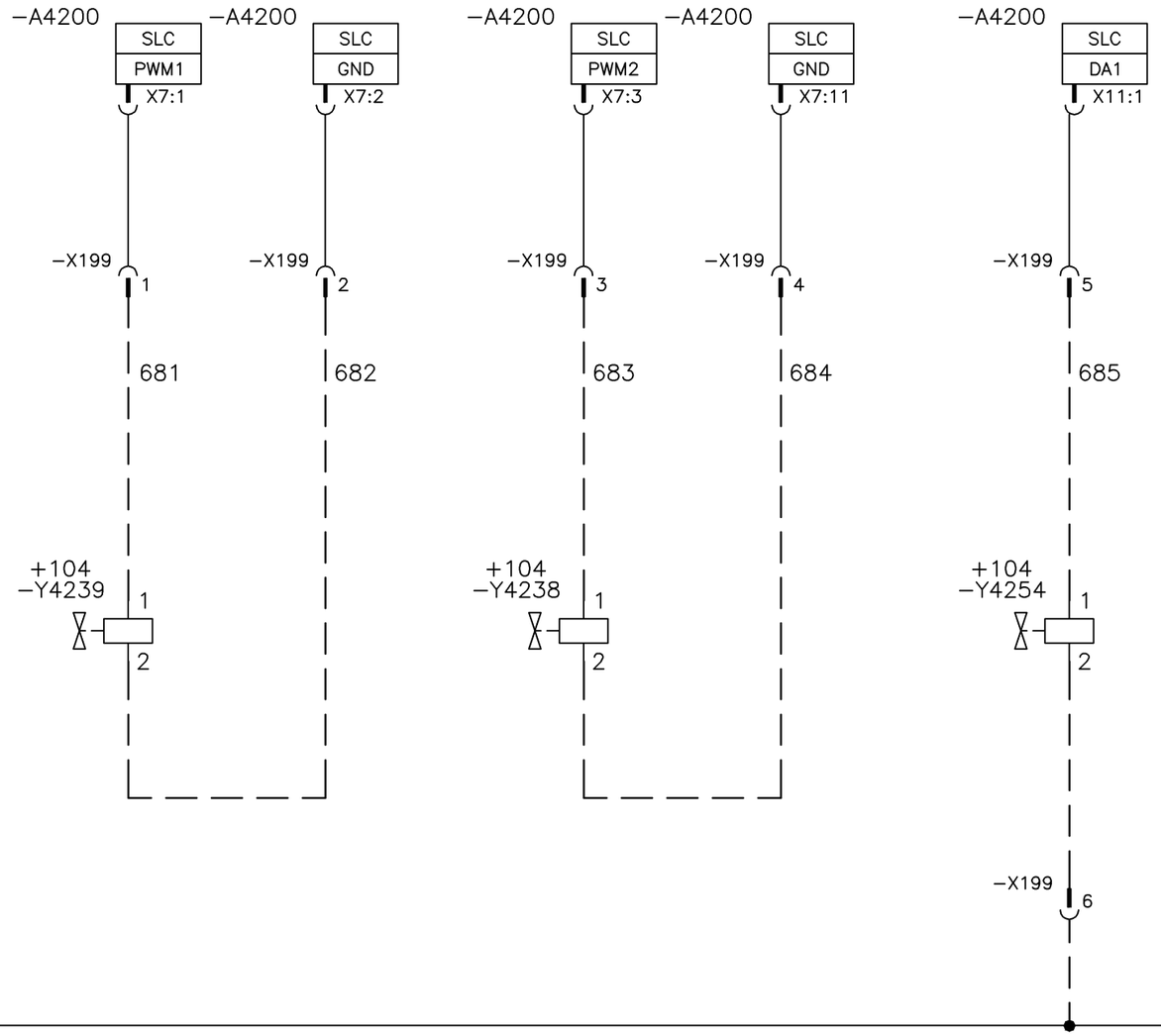
Belegung bei Antrieb 8 x 6 x 6

I/O – configuration at drive 8 x 6 x 6



Lenk. Achse 4 links

steering axle 4 left

Lenk. Achse 4 rechts

steering axle 4 right

Lenkungssperre Achse 4

steering lock axle 4

b	N04534	04.03.11	Rosenkranz		Datum	Name
a	N04534	07.04.09	Rosenkranz	Erst.	21.10.08	Rosenkranz
Ind	Mitt-NR	Datum	Name	Gepr.		
Abteilung: 111410						

Projektbenennung / project description
E-PLAN AC 80-2 UW V4.2
ELECTRIC WIRING DIAGRAM

Seitenbenennung / page description
Lenkung
steering

Baunummer.

Anlage: 0
Ort: 0

Zeichnungsnr. / drawing no.
23222612

Blatt 52
78 Bl.

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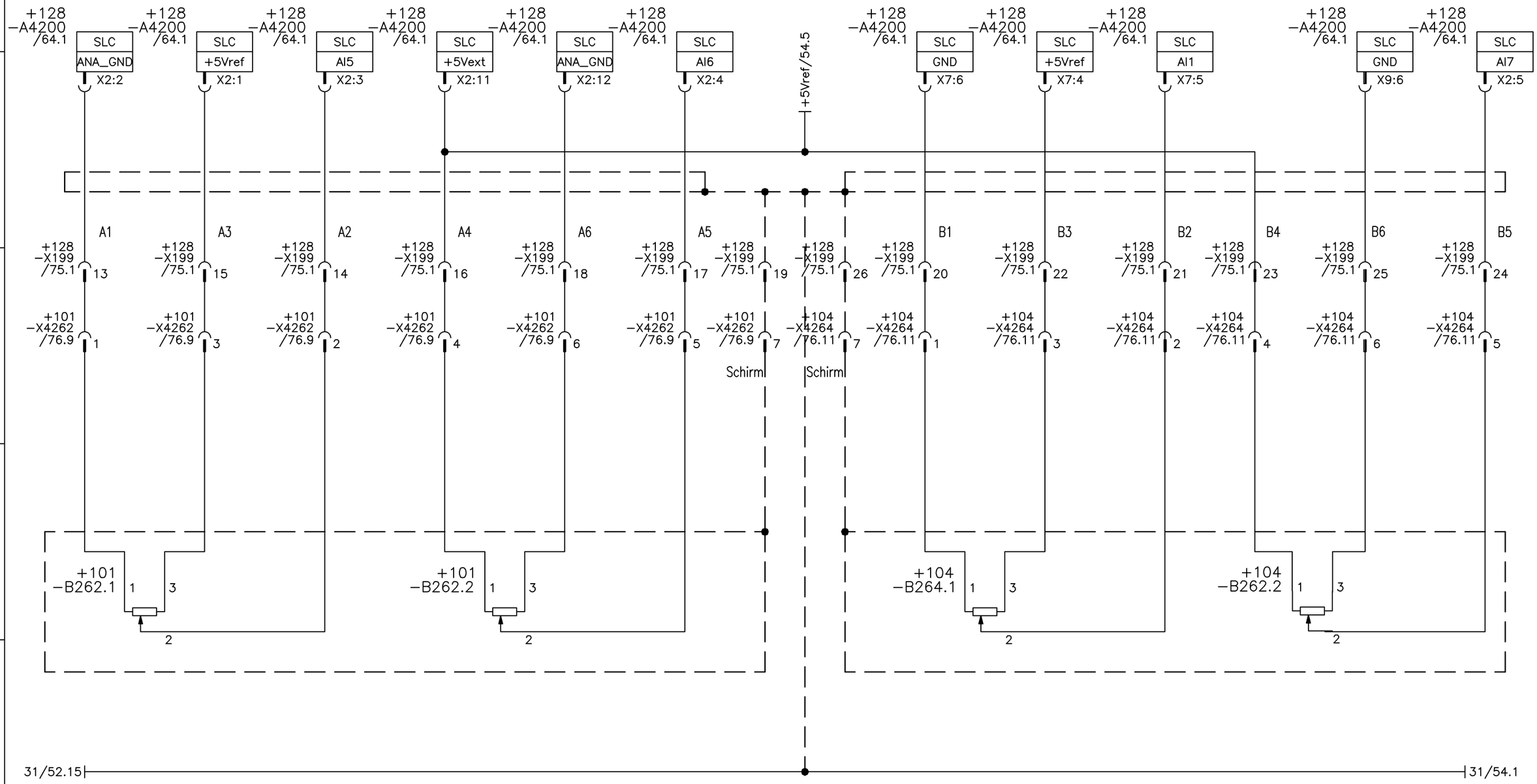
Belegung bei Antrieb 8 x 8 x 8 oder 8 x 8 x 8 TM
I/O – configuration at drive 8 x 8 x 8 or 8 x 8 x 8 TM



Winkelgeber Achse 1

angel transmitter axle 1

Winkelgeber Achse 3

angle transmitter axle 3

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b	N04534	04.03.11	Rosenkranz		Datum	Name
a	N04534	07.04.09	Rosenkranz	Erst.	21.10.08	Rosenkranz
Ind	Mitt-NR	Datum	Name	Gepr.		
Abteilung: 111410						

Projektbenennung / project description
E-PLAN AC 80-2 UW V4.2
ELECTRIC WIRING DIAGRAM

Seitenbenennung / page description
Winkelgeber
angle transmitter

Baunummer.

Anlage: 0
Ort: 0

Zeichnungsnr. / drawing no.
23222612

Blatt 53
78 Bl.

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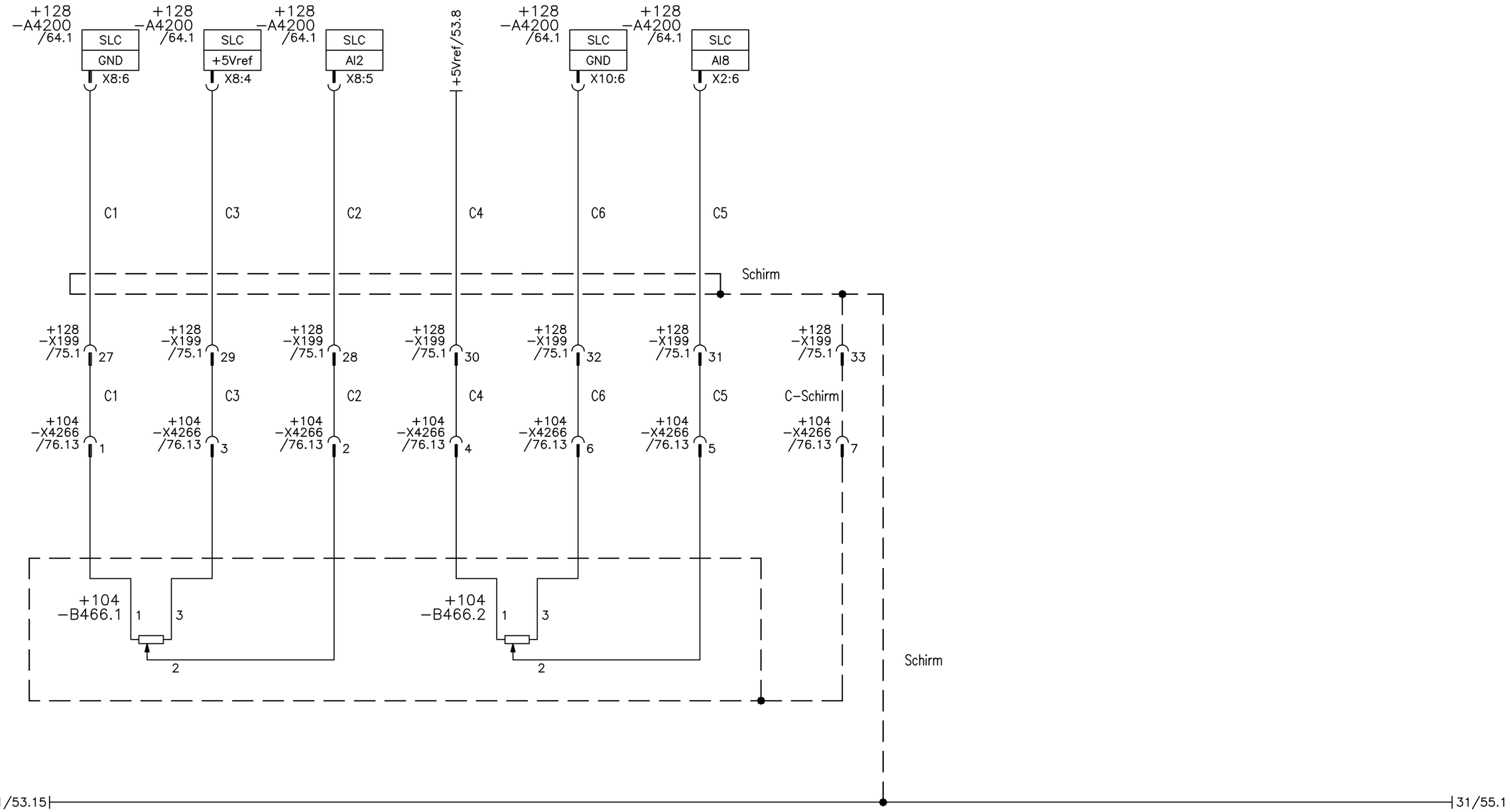
Belegung bei Antrieb 8 x 8 x 8 oder 8 x 8 x 8 TM

I/O – configuration at drive 8 x 8 x 8 or 8 x 8 x 8 TM



Winkelgeber Achse 4

angel transmitter axle 4

b	N04534	04.03.11	Rosenkranz		Datum	Name
a	N04534	07.04.09	Rosenkranz	Erst.	21.10.08	Rosenkranz
Ind	Mitt-NR	Datum	Name	Gepr.		
Abteilung: 111410						

Projektbenennung / project description
E-PLAN AC 80-2 UW V4.2
ELECTRIC WIRING DIAGRAM

Seitenbenennung / page description
Winkelgeber
angle transmitter

Baunummer.

Anlage: 0

Ort: 0

Zeichnungsnr. / drawing no.
23222612

Blatt 54

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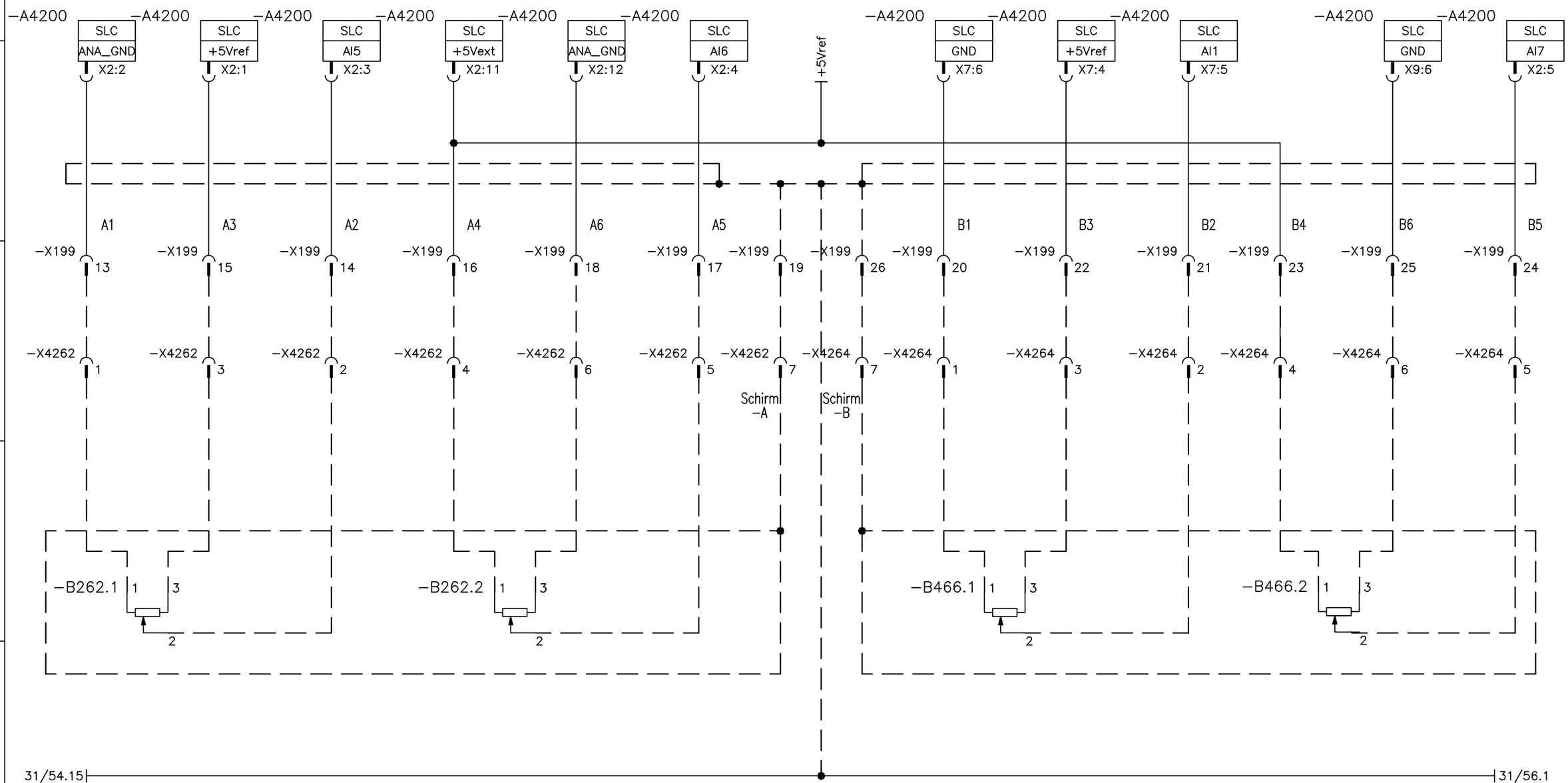
Belegung bei Antrieb 8 x 6 x 6
I/O – configuration at drive 8 x 6 x 6



Winkelgeber Achse 1

angel transmitter axle 1

Winkelgeber Achse 4

angel transmitter axle 4

b	N04534	04.03.11	Rosenkranz		Datum	Name
a	N04534	07.04.09	Rosenkranz	Erst.	21.10.08	Rosenkranz
Ind	Mitt-NR	Datum	Name	Gepr.		
Abteilung: 111410						

Projektbenennung / project description
E-PLAN AC 80-2 UW V4.2
ELECTRIC WIRING DIAGRAM

Seitenbenennung / page description
Winkelgeber
angle transmitter

Baunummer.

Anlage: 0

Ort: 0

Zeichnungsnr. / drawing no.
23222612

Blatt 55

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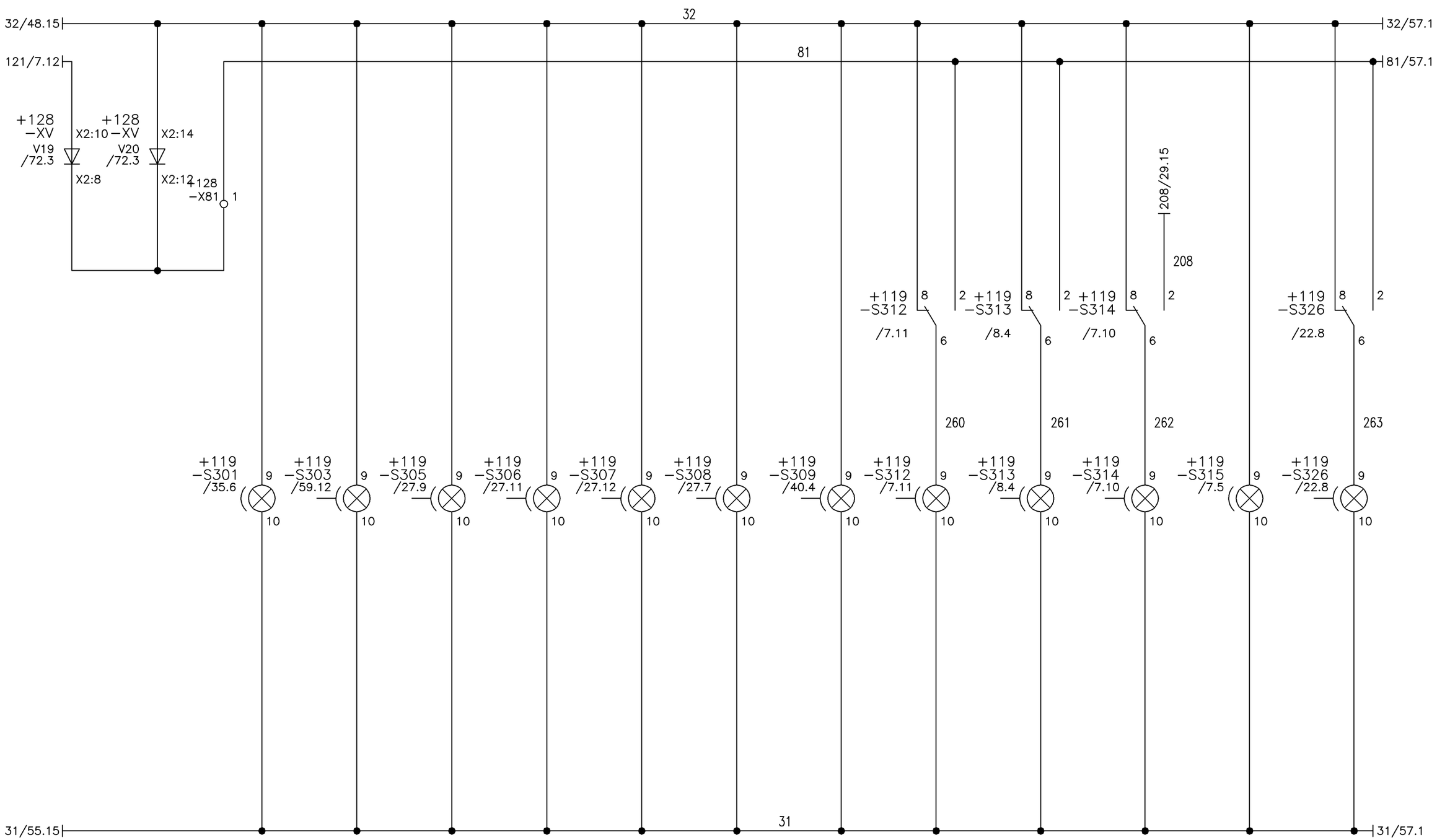

b	N04534	04.03.11	Rosenkranz		Datum	Name
a	N04534	07.04.09	Rosenkranz	Erst.	21.10.08	Rosenkranz
Ind	Mitt-NR	Datum	Name	Gepr.		
Abteilung: 111410						

Projektbenennung / project description
E-PLAN AC 80-2 UW V4.2
ELECTRIC WIRING DIAGRAM

Seitenbenennung / page description
Schalterbeleuchtung
switch illumination

Baunummer.

Anlage: 0
Ort: 0

Zeichnungsnr. / drawing no.
23222612

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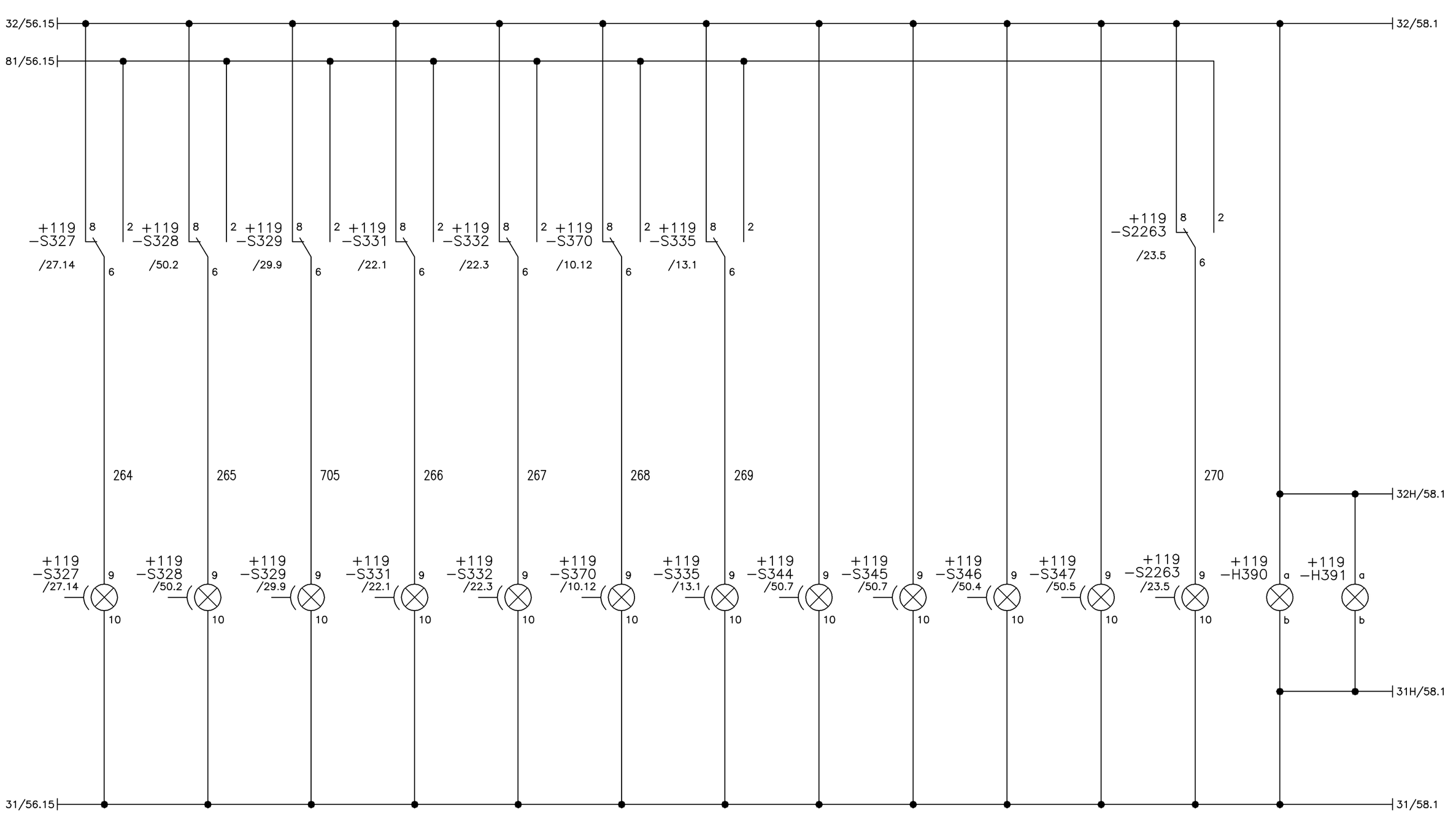

					Datum	Name
b	N04534	04.03.11	Rosenkranz			
a	N04534	07.04.09	Rosenkranz	Erst.	21.10.08	Rosenkranz
Ind	Mitt-NR	Datum	Name	Gepr.		
Abteilung: 111410						

Projektbenennung / project description
E-PLAN AC 80-2 UW V4.2
ELECTRIC WIRING DIAGRAM

Seitenbenennung / page description
Schalterbeleuchtung
switch illumination

Baunummer.

Anlage: 0
Ort: 0

Zeichnungsnr. / drawing no.
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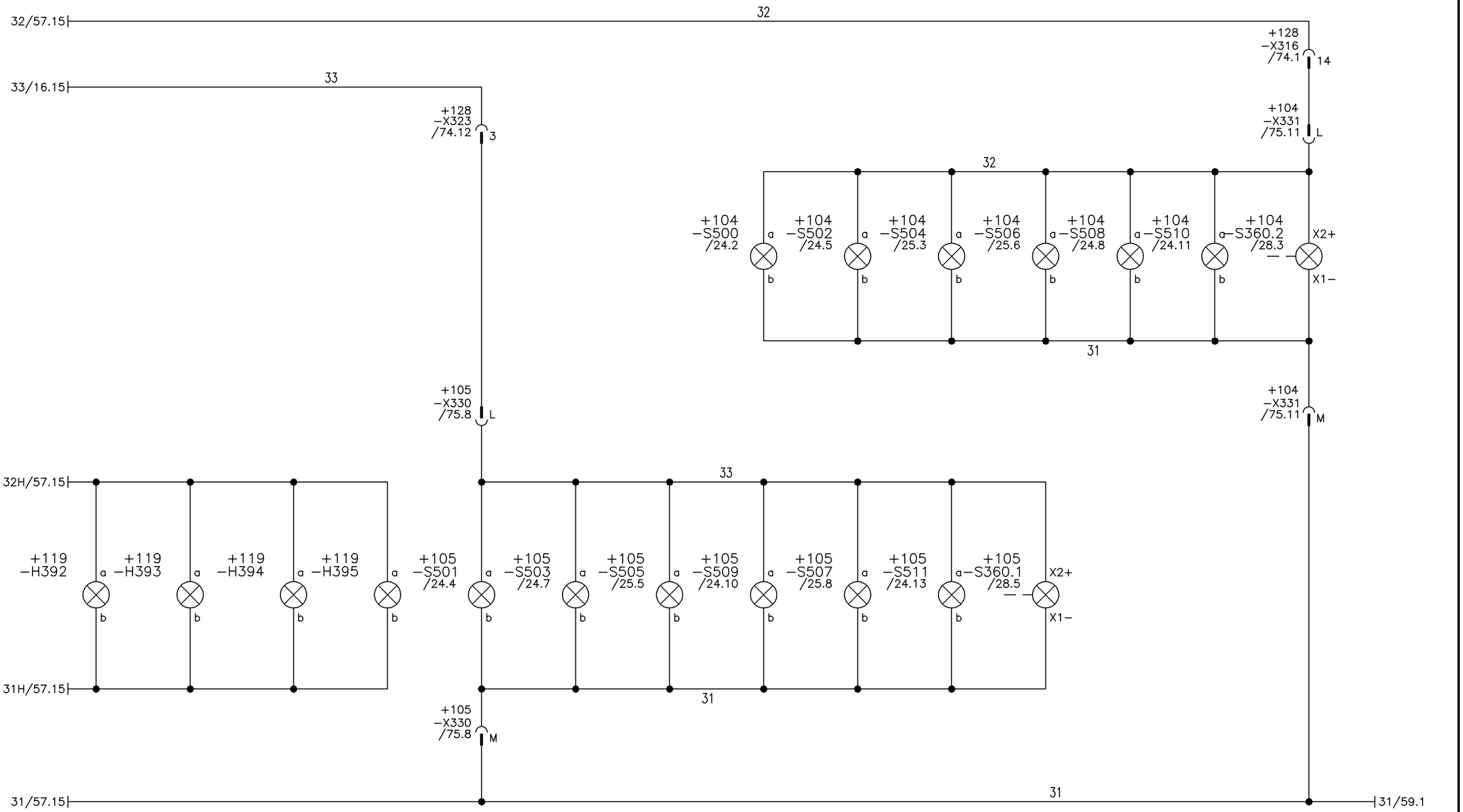

Beleuchtung Heizung

heater illumination

Tasterbeleuchtung Abstützkasten links

switch illumination stabilizer – box left hand

Tastenbeleuchtung Abstützkasten rechts

switch illumination stabilizer – box right hand

b	N04534	04.03.11	Rosenkranz		Datum	Name
a	N04534	07.04.09	Rosenkranz	Erst.	21.10.08	Rosenkranz
Ind	Mitt-NR	Datum	Name	Gepr.		
Abteilung: 111410						

Projektbenennung / project description
E-PLAN AC 80-2 UW V4.2
ELECTRIC WIRING DIAGRAM

Seitenbenennung / page description
Tasterbeleuchtung Abstützkasten
switch illumination stabilizer – box

Baunummer.

Anlage: 0

Ort: 0

Zeichnungsnr. / drawing no.
23222612

Blatt 58

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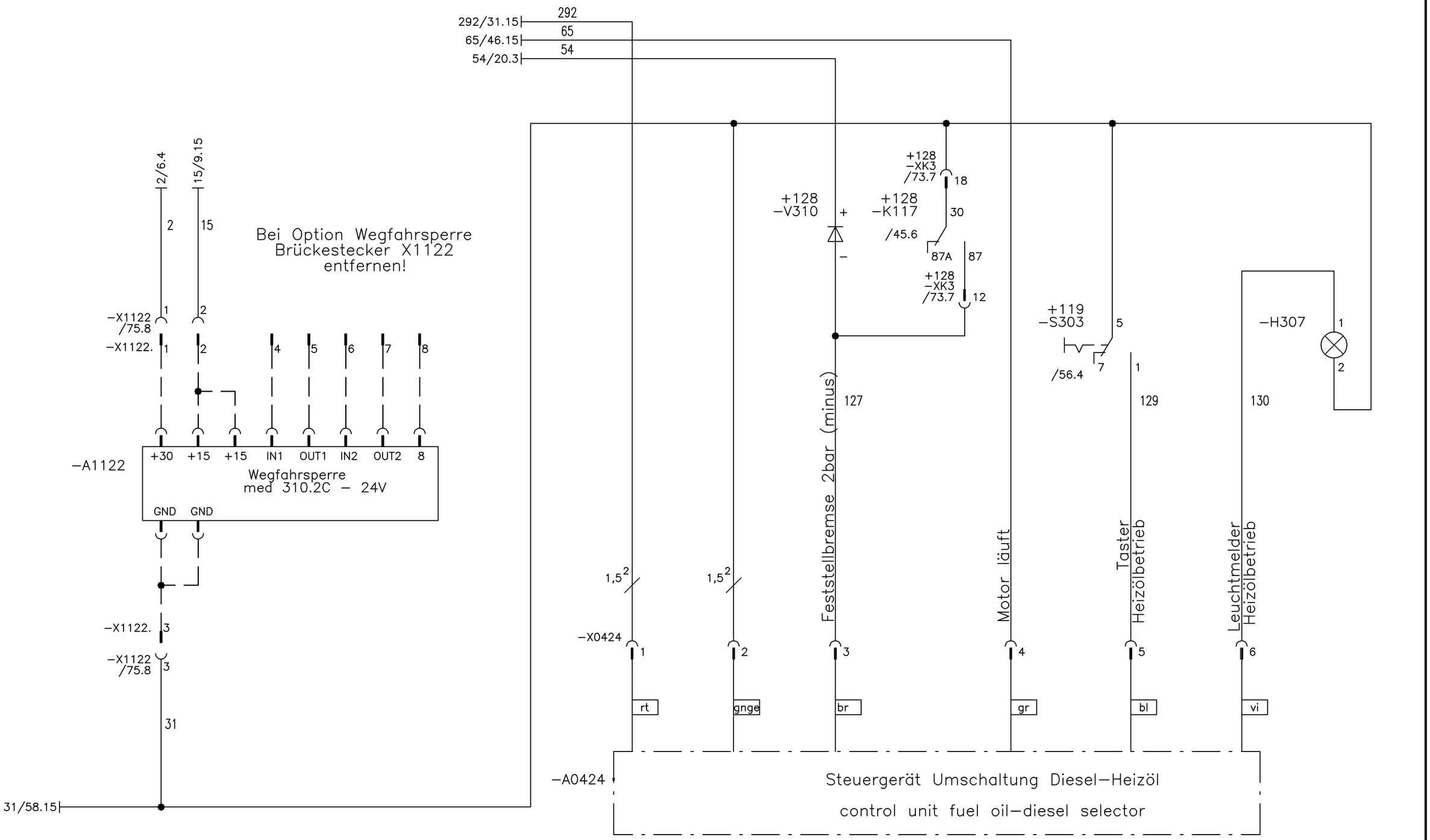

Option Wegfahrsperre

option safeguard lock

Option

					Datum	Name
b	N04534	04.03.11	Rosenkranz			
a	N04534	07.04.09	Rosenkranz	Erst.	21.10.08	Rosenkranz
Ind	Mitt–NR	Datum	Name	Gepr.		
Abteilung: 111410						

Projektbenennung / project description
E–PLAN AC 80–2 UW V4.2
ELECTRIC WIRING DIAGRAM

Seitenbenennung / page description
Wegfahrsperre, Umsch Diesel–Heizöl
immoblizer, changeover diesel–heating oil

Baunummer.

Anlage: 0

Ort: 0

Zeichnungsnr. / drawing no.
23222612

Blatt 59

Bl. 78

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Zustandsdiagramm der Magnetventile / state diagram of the solenoid – valves

Magnetventile / solenoid – valves	Y61.A	Y61.B	Y172	Y304.A	Y304.B	Y304.C–F	Y310.A	Y310.B	Y320	Y343	Y344	Y357	Y361	Y362	Y363	Y365	Y364.1–4	Y364.7,8	Y366A	Y366B	Y367
Straßenfahrt travel with crane	0	0	0	0	0	0	0	0	1 temp	0	0	0	0	0	0	0	1	1	0	0	1
Niveau heben raise suspension	0	0	0	0	0	0	0	1	0	0	0	0	1	1	1	1	1	1	0	1	1
Niveau absenken down suspension	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	0	0	X
Federung gesperrt (mobil) suspension lock	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
Achsen hochziehen raise axles	0	0	0	0	0	0	0	1	0	0	0	0	1	1	1	1	1	1	1	0	0
Achse 3 hochziehen bei UHL raise 3. axles	0	0	0	0	0	0	0	1	0	0	0	1	0	1	1	0	1	0	1	0	X
Achse 3 oben axle 3 atop	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	1
Achse 3 absenken mit bef. lower axle 3 with fill up	0	0	0	0	0	0	0	1	0	0	0	0	0	1	1	0	1	0	0	1	1
Gegengewicht auf counterweight up	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	1	0	0	1
Gegengewicht ab counterweight down	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	1	0	0	1
Oberwagenbetrieb superstructure	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	1	1	0	0	1
Lenkung von OW links steering from superstructure left	0	0	0	1	0	1	0	0	0	1	0	0	0	0	0	0	1	1	0	0	1
Lenkung von OW rechts steering from superstructure right	0	0	0	0	1	1	0	0	0	1	0	0	0	0	0	0	1	1	0	0	1

Bemerkung / remark : 0 = spannungslos / idle ; 1 = Spannnung 24V / voltage 24V ; X = beliebig.

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Projektbenennung / project description
E–PLAN AC 80–2 UW V4.2
ELECTRIC WIRING DIAGRAM

Seitenbenennung / page description
Übersicht Magnetventilsteuerung
general view magnetic valves control

Baunummer.

Anlage: 0
Ort: 0

Zeichnungsnr. / drawing no.
23222612

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Magnetventile / solenoid – valves	Y306A	Y306B	Y307A	Y307B	Y308A	Y308B	Y309A	Y309B	Y310A	Y310B	
Abstützung ausfahren stabilizers extend	1	1	1	1	1	1	1	1	0	1	
Abstützung einfahren stabilizers retract	1	1	1	1	1	1	1	1	1	0	

A = vertikal , B = horizontal

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Ind	Mitt-NR	Datum	Name	Gepr.		
Abteilung: 111410						

Projektbenennung / project description
E-PLAN AC 80-2 UW V4.2
ELECTRIC WIRING DIAGRAM

Seitenbenennung / page description
Übersicht Magnetventilsteuerung
general view magnetic valves control

Baunummer.

Anlage: 0
Ort: 0

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+128
–A301

FR–SKN

							/33.14	/33.13				/33.4		/33.5				/33.1	/33.3	/33.6	/33.7		/34.2	
		X4/8	X4/7	X4/10	X4/14	X4/15	X4/4	X4/5	X4/16	X4/12	X4/18	X4/17	X1/1	X1/13	X1/2	X1/11	X3/12	X3/5	X3/9	X4/6	X4/9	X2/4	X2/8	X2/7	X1/10
		SVL+	SV–	SVH+	KWG	KWG+	nG	nG–	N	GSV3	R	GSE	KUP1	GSV1	KUP2	BRE	ÖSE	GSV2	FSBE	ALT	ALT–	D+A	BRLI	RÜLI	C3
/32.2	X2/1	KL30																							MCH X4/3 /33.7
/32.4	X2/3	KL15																							MCM X4/2 /33.8
/32.2	X2/2	KL31																							MCL X4/1 /33.10
/32.6	X4/11	KLW																							PCH X3/13
/32.7	X4/13	KLD+																							PCM X3/14
/32.5	X1/18	KL50																							PCL X3/15
/33.8	X3/4	MBA1																							FCH X2/18 /33.11
/33.10	X3/10	MBA–																							FCM X2/17 /33.12
/33.11	X3/7	MBA2																							FCL X2/16 /33.13
	X3/6	MÖL+																							
	X3/8	MÖL–																							
		TSV	S+B	S–B	AUS	QUIT	TSET	MBE0	MBE1	MBE2	MBE3	GSV4	MSS	SSH	SSL	FG2+	GAS2	FG2–	FG1–	GAS1	FG1+	KWSE	KW+	LFS–	LFSE
		X1/9	X1/16	X1/12	X1/14	X1/17	X1/15	X2/13	X2/14	X2/15	X2/9	X2/10	X2/6	X2/12	X2/11	X1/7	X1/6	X1/4	X1/5	X1/3	X1/8	X3/11	X3/3	X3/2	X3/1
		/32.14	/32.9	/32.11	/32.12	/32.8	/32.13	/32.13	/32.14			/32.12			/32.11	/32.4	/32.5	/32.6	/32.9	/32.8	/32.7	/33.3	/33.1	/33.4	/33.5

+128
–A302

ADM–AR

				/35.11		/35.7	/35.5	/36.2	/35.8			/35.6	/35.10	/35.7		/35.6		/36.2		/36.4	/36.3	/35.12			
	X2/1	X2/2	X2/3	X2/4	X2/5	X2/6	X2/7	X2/8	X2/9	X2/10	X2/11	X2/12	X2/13	X2/14	X2/15	X2/16	X2/17	X2/18	X4/1	X4/2	X4/3	X4/4	X4/5	X4/6	X4/7	X4/8	X4/9
	C3 (PWME)	MBRE (E+)	KL.W (PWME)	KLIMA (E+)	KL.50 MSTART (+)	ADR+ (E–)	ADR0 (E–)	ABS (DSF1) (E–)	NE MSTOP (E+)	N_MOT (PWMA)	HA (E+)	DSF0 (E+)	FFG1 (PWME)	ADR1 (E+)	FFG2 (PWME)	ADR2 (E–)	HFG (PWME)	ADR– (E–)	CAN HH	BOOT LOADER	CAN HL	HF GND	K–DIAG	HF GND	CAN LH	MESS PIN	CAN LL
	(+) KI30	(ANA) P_OEL	(A–) LA ADM	LA ABS (A–)	(–) KI31	(A–) LA EPS	(ANA) T_MOT	(PWME) FFG2+	(A–) SUMMER	(PWMA) IWA2	(PWME) FFG1+	(A–) LA T_MOT	(A–) LA OELST	(A–) LA P_OEL	(+) KL.15	....	....	....	(ANE) AE1	(E–) MKLE	(E+) TROE	(A–) REL4	(A–) REL3	(A–) REL2	(A–) REL1	(PWMA) IWA1	(A–) MBRA2
	X1/1	X1/2	X1/3	X1/4	X1/5	X1/6	X1/7	X1/8	X1/9	X1/10	X1/11	X1/12	X1/13	X1/14	X1/15	X3/1	X3/2	X3/3	X3/4	X3/5	X3/6	X3/7	X3/8	X3/9	X3/10	X3/11	X3/12
	/35.3	/35.10	/35.11		/35.1		/35.8	/35.5	/35.3		/35.4	/35.12	/35.14	/35.13	/35.1							/35.13	/35.14			/35.4	

+128
–A310

	IN 1			IN 2			IN 3			IN 4			IN 5			IN 6			CAN-BUS						
	CAN H	CAN GND	CAN L	CAN H	CAN GND	CAN L	CAN H	CAN GND	CAN L	CAN H	CAN GND	CAN L	CAN H	CAN GND	CAN L	CAN H	CAN GND	CAN L							
	X1/1	X1/2	X1/3	X1/4	X1/5	X1/6	X2/7	X2/8	X2/9	X2/10	X2/11	X2/12	X2/13	X2/14	X2/15	X2/16	X2/17	X2/18	MN						
	/34.6	/34.7	/34.9	/34.10	/34.11	/34.13													/34.6						

b	N04534	04.03.11	Rosenkranz		Datum	Name	Projektbenennung / project description	Seitenbenennung / page description	Baunummer.	Anlage: 0	
a	N04534	07.04.09	Rosenkranz	Erst.	21.10.08	Rosenkranz	E-PLAN AC 80-2 UW V4.2	Motorregelung		Ort: 0	
Ind	Mitt-NR	Datum	Name	Gepr.			ELECTRIC WIRING DIAGRAM	engine control	Zeichnungsnr. / drawing no. 23222612	Blatt 62	78 Bl.
Abteilung: 111410											

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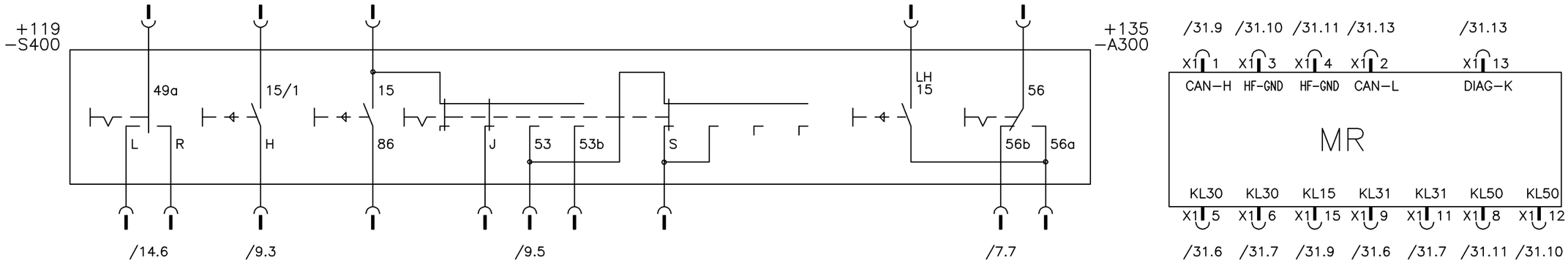

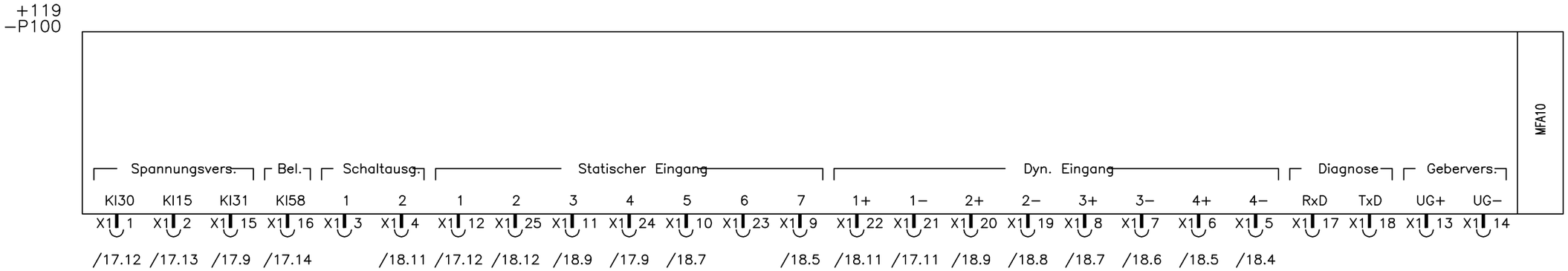

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Ind	Mitt-NR	Datum	Name	Gepr.		
Abteilung: 111410						

Projektbenennung / project description
E-PLAN AC 80-2 UW V4.2
ELECTRIC WIRING DIAGRAM

Seitenbenennung / page description
Lenkstockhebel links, MFA10
strut rod left hand, MFA10

Baunummer.

Anlage: 0
Ort: 0

Zeichnungsnr. / drawing no.
23222612

Blatt 63
78 Bl.

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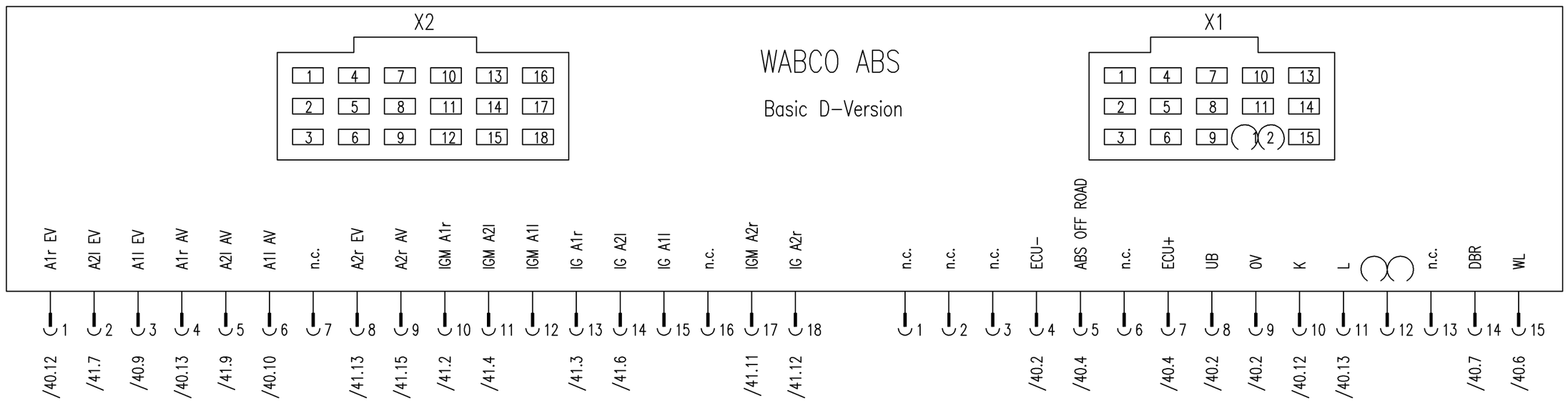
−A4200

SLC STEUERELEKTRONIK HINTERACHSLENKUNG

PLUG J1 SUBD			PLUG J2			PLUG J3			PLUG J4			PLUG J5			PLUG J6			PLUG J7		
1	RxD		1	+5Vref	/53.2	1	CAN H		1	DI1	/50.2	1	DI13		1	+Vext		1	PWM1	/51.2
2	TxD		2	ANALOG GND	/53.1	2	CAN L		2	DI2	/50.4	2	DI14		2	−Vext		2	POWER GND	/51.3
3			3	AE5 / AI5	/53.4	3	CAN SHIELD		3	DI3	/50.5	3	DI15		3	ANALOG GND		3	PWM2	/51.4
4	MASSE/GND		4	AE6 / AI6	/53.7	4	CAN H	/49.12	4	DI4		4	DI16		4	AO1		4	+5Vref	/53.11
5			5	AE7 / AI7	/53.15	5	CAN L	/49.14	5	DI5	/50.7	5	DI17		5	DA13		5	AI5	/53.12
6			6	AE8 / AI8	/54.7	6	CAN SHIELD		6	DI6	/50.10	6	DI18		6	DA14		6	SIGNAL GND	/53.9
7			7	CLOCK1		7	AI1 STROM		7	DI7	/50.11	7	DI19		7	DA15		7	SHIELD	
8			8	UP/DOWN1		8	AI2 STROM		8	DI8	/50.12	8	DI20		8	DA16		8		
9			9	CLOCK2		9	AI3 STROM		9	DI9	/49.2	9	DI21		9	DA1		9	+UB	
			10	UP/DOWN2		10	AI4 STROM		10	DI10	/50.13	10	DI22		10	DA2		10	+UB	
			11	+5Vext	/53.5				11	DI11	/50.15	11	DI23		11	DA3		11	POWER GND	/51.6
			12	ANALOG GND	/53.6				12	DI12		12	DI24		12	DA4		12	POWER GND	

PLUG J8			PLUG J9			PLUG J10			PLUG J11			PLUG J12			PLUG J13		
1	PWM3	/51.8	1	PWM5		1	PWM7		1	DA1	/51.7	1	+UB	/49.4	1	UP/DN1	
2	POWER GND	/51.9	2	POWER GND		2	POWER GND		2	DA2	/51.13	2	+UB		2	CLOCK1	
3	PWM4	/51.11	3	PWM6		3	PWM8		3	DA3		3	+UB		3	POWER GND	
4	+5Vref	/54.3	4	+5Vref		4	+5Vref		4	DA4		4	POWER GND	/49.14	4	UP/DN2	
5	AI2	/54.4	5	AI3		5	AI4		5	DA5	/49.10	5	POWER GND		5	CLOCK2	
6	SIGNAL GND	/54.2	6	SIGNAL GND	/53.14	6	SIGNAL GND	/54.6	6	DA6	/49.11	6	POWER GND		6	POWER GND	
7	SHIELD		7	SHIELD		7	SHIELD		7	DA7	/49.12	7	PWM9		7	ABS1+	/49.7
8			8			8			8	DA8	/49.4	8	PWM10		8	ABS1−	/49.8
9	+UB		9	+UB		9	+UB		9	DA9	/49.3				9	ABS2+	/49.10
10	+UB		10	+UB		10	+UB		10	DA10	/49.7				10	ABS2−	/49.11
11	POWER GND	/51.12	11	POWER GND		11	POWER GND		11	DA11	/49.8				11	POWER GND	
12	POWER GND		12	POWER GND		12	POWER GND		12	DA12	/49.6				12	EXT. SHIELD	

+128
−A386



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Abteilung: 111410						

Projektbenennung / project description
E−PLAN AC 80−2 UW V4.2
ELECTRIC WIRING DIAGRAM

Seitenbenennung / page description
Lenkcomputer, ABS−Steuerung
steering computer, ABS−control

Baunummer.

Anlage: 0
Ort: 0

Zeichnungsnr. / drawing no.
23222612

Blatt 64
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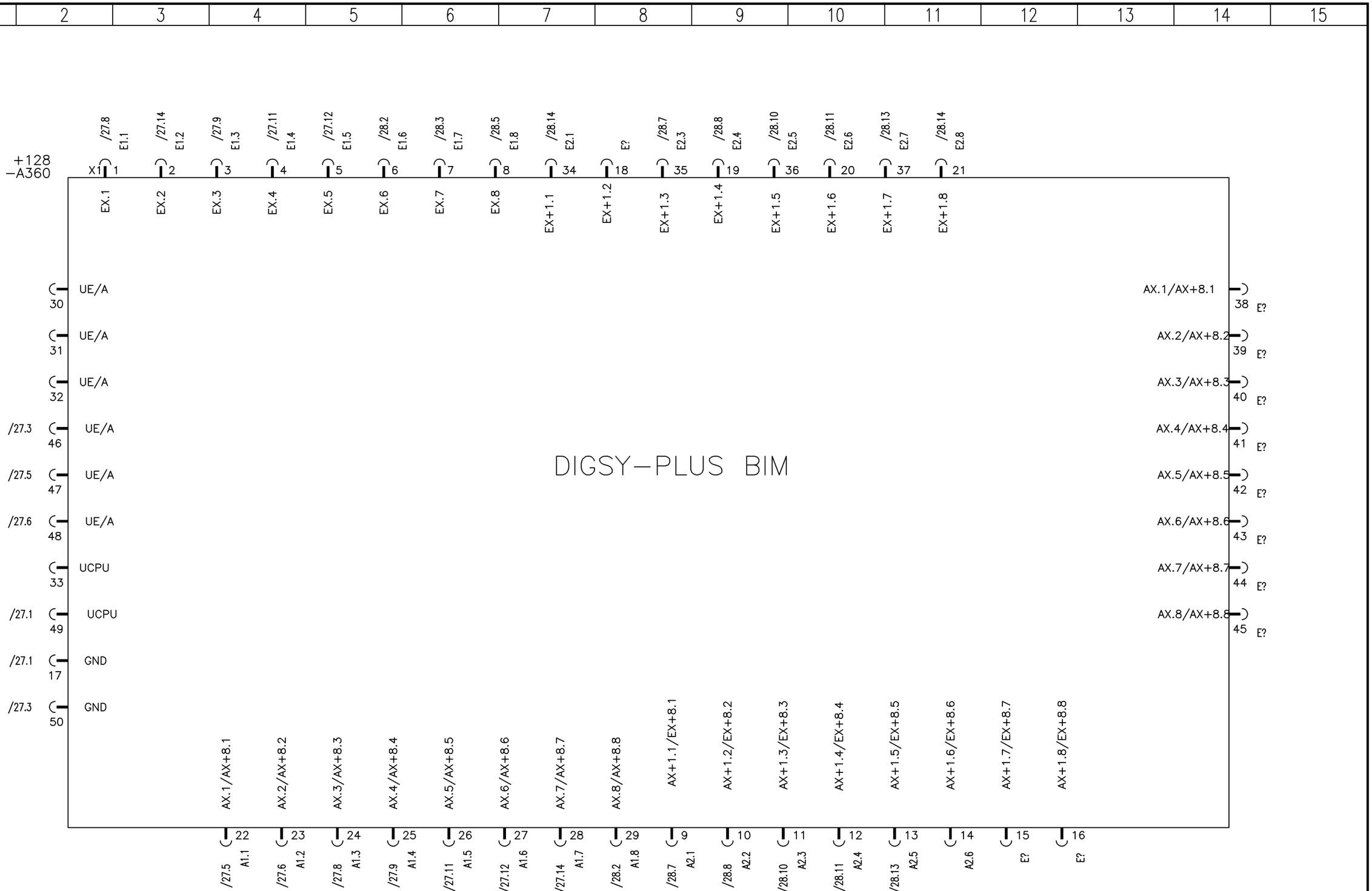

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Ind	Mitt–NR	Datum	Name	Gepr.		
Abteilung: 111410						

Projektbenennung / project description
E–PLAN AC 80–2 UW V4.2
ELECTRIC WIRING DIAGRAM

Seitenbenennung / page description
DIGSY–PLUS BIM
DIGSY–PLUS BIM

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Anlage: 0
Ort: 0

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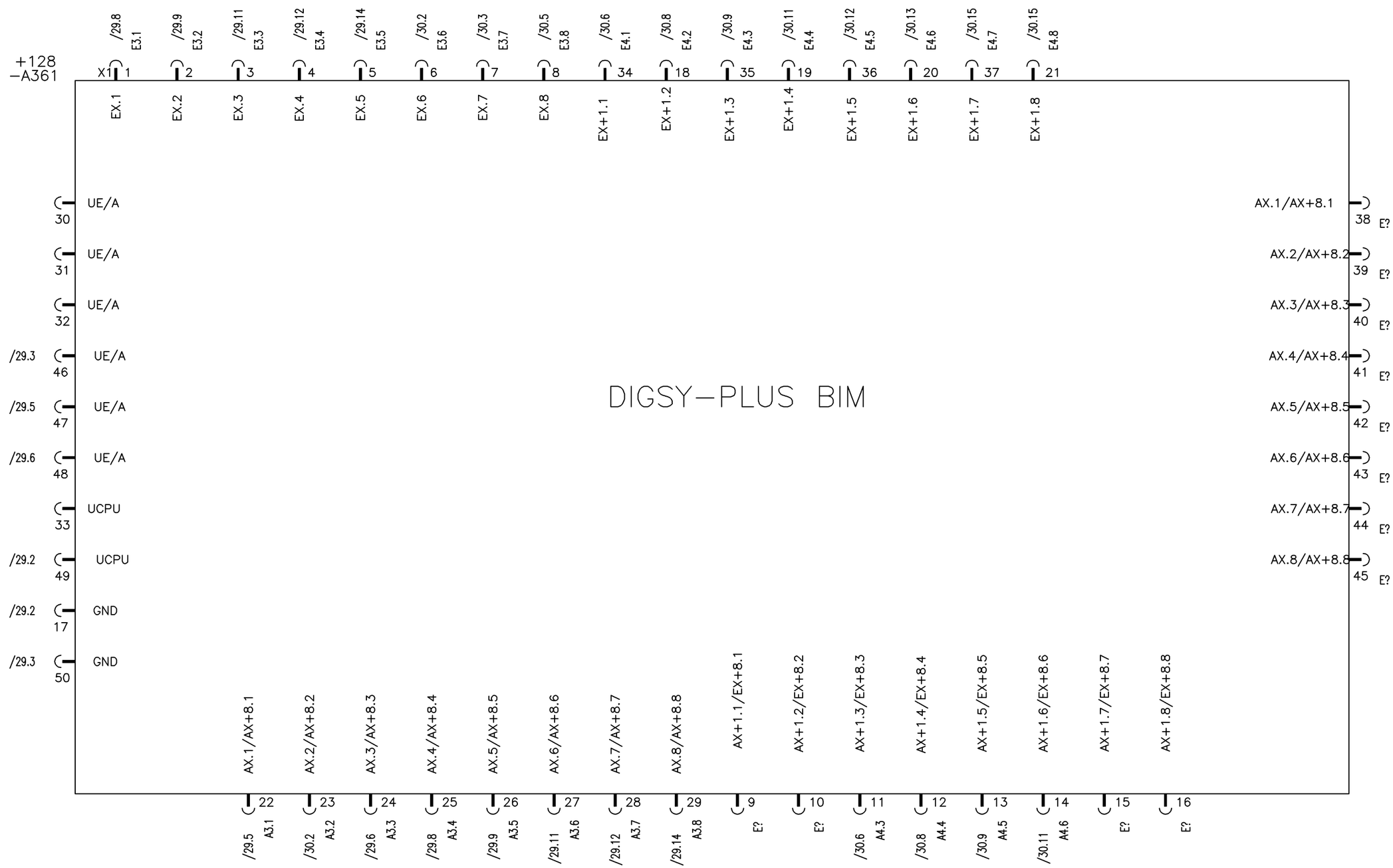

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Abteilung: 111410						

Projektbenennung / project description
E−PLAN AC 80−2 UW V4.2
ELECTRIC WIRING DIAGRAM

Seitenbenennung / page description
DIGSY−PLUS BIM
DIGSY−PLUS BIM

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BMK	Wert/ Value	Seite.Pfad sheet.path	Funktion	Function
F101	25A	/6.4	Vorsicherung Zündung UW	prefuse ignition chassis
F102	10A	/6.10	Ladekontrolle, Option Steuerung Schnellstop, Zündung Motor/Getriebe	charge control, option control engine stop, ignition engine/transmission
F103	5A	/7.13	Steckdose 24V	socket 24 V
F104	10A	/7.3	Fernlicht links, rechts	high beam lights left, right
F105	10A	/7.4	Fernlicht links, rechts	high beam lights left, right
F106	10A	/7.6	Abblendlicht links	low beam lights left
F107	10A	/7.8	Abblendlicht rechts	low beam lights right
F108	25A	/7.2	Vorsicherung Standlicht	prefuse parking lights
F109	10A	/7.15	Zigarettenanzünder	cigarette lighter
F110	10A	/7.10	Nebelschlußleuchte	rear fog light
F111	10A	/7.11	Abstützbeleuchtung	illumination stabilizers
F112	10A	/8.2	Blinker, Lüftersteuerung, Steuerung Umschaltung UW−OW	flasher, fan control, control switch over chassis-superstructure
F113	10A	/22.9	Abstützbeleuchtung links, rechts	illumination stabilizers left, right
F114	15A	/6.14	Schnellstop, Ventile Federspeicher, Position Gegengewicht, Option Lenkung von UW	engine stop, valves spring accumulator
F115	25A	/6.13	Vorsicherung Motor läuft Signal	prefuse engine actuation signal
F116	10A	/15.2	Standlicht links	parking lights left
F117	10A	/16.2	Standlicht rechts	parking lights right
F118	5A	/17.2	Tachograph, Multifunktionsanzeige	tachograph, multiple display
F119	5A	/17.4	Tachograph, Mulifunktionsanzeige, Meldeleuchten	tachograph, multiple display, indicator lamp
F120	10A	/10.1	Option Zentralschmieranlage, Klimaanlage, Überwachung Bremsbeläge	option lubrication system, air condition, control brake pads
F121	10A	/10.14	Überwachung Bremsbeläge	control brake pads
F122	15A	/9.2	Lufttrockner, Scheibenwischer, Scheibenwascher, Spiegelheizung/−verstellung, Sitzheizung	air dryer, wiper, windscreen washer, mirror heating/-adjustment, seat heating
F123	5A	/27.1	Spannungsversorgung SPS A360 CPU	power suply SPS A360 CPU
F124	10A	/27.3	Spannungsversorgung SPS A360 Ausgänge	power supply SPS A360 output
F125	5A	/49.2	Lenkrechner A4200	steering computer A4200
F126	5A	/29.2	Spannungsversorgung SPS A361 CPU	power supply SPS A361 CPU
F127	10A	/29.3	Spannungsversorgung SPS A361 Ausgänge	power supply SPS A361 output
F128	15A	/14.3	Warnblinker, Radio, Beleucht. Kabine/ZE, Bremslicht, Hupe, Rückfahrscheinw./−summer, R	hazard flasher, radio, illumination cabin, stop lights, horn, reversing lights/-buzzer, rotaflare light

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Ind	Mitt−NR	Datum	Name	Gepr.		
Abteilung: 111410						

Projektbenennung / project description
E−PLAN AC 80−2 UW V4.2
ELECTRIC WIRING DIAGRAM

Seitenbenennung / page description
Belegung Sicherungsplatine F101−F128
general view fuse modul F101−F128

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Anlage: 0
Ort: 0
Zeichnungsnr. / drawing no. 23222612
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−A2

BMK	Wert/ Value	Seite.Pfad sheet.path	Funktion	Function
F201	10A	/49.4	Lenkrechner A4200	steering computer A4200
F202	10A	/31.9	Motorregelung	engine control
F203	10A	/31.12	Motordiagnose	engine diagnosis
F204	10A	/31.14	Motordiagnose	engine diagnosis
F205	10A	/32.1	FR−SKN	FR−SKN
F206	10A	/35.3	ADM−AR	ADM−AR
F207	10A	/36.6	Getriebesteuerung	transmission control
F208	15A	/48.2	Option Standheizung	option cabin heater
F209	5A	/48.11	Option Standheizung Uhr	option cabin heater clock
F210	15A	/48.14	Gebläse	blower
F211	5A	/40.4	ABS	ABS
F212	10A	/40.2	ABS	ABS
F213	10A	/43.13	Wirbelstrombremse	eddy current brake
F214	15A	/42.3	ABS−Anhänger	ABS−trailer

b	N04534	04.03.11	Rosenkranz		Datum	Name
a	N04534	07.04.09	Rosenkranz	Erst.	21.10.08	Rosenkranz
Ind	Mitt−NR	Datum	Name	Gepr.		
Abteilung: 111410						

Projektbenennung / project description
E−PLAN AC 80−2 UW V4.2
ELECTRIC WIRING DIAGRAM

Seitenbenennung / page description
Belegung Sicherungsplatine F201−F214
general view fuse modul F201−F214

Baunummer.

Anlage: 0
Ort: 0

Zeichnungsnr. / drawing no.
23222612

Blatt 68
78 Bl.

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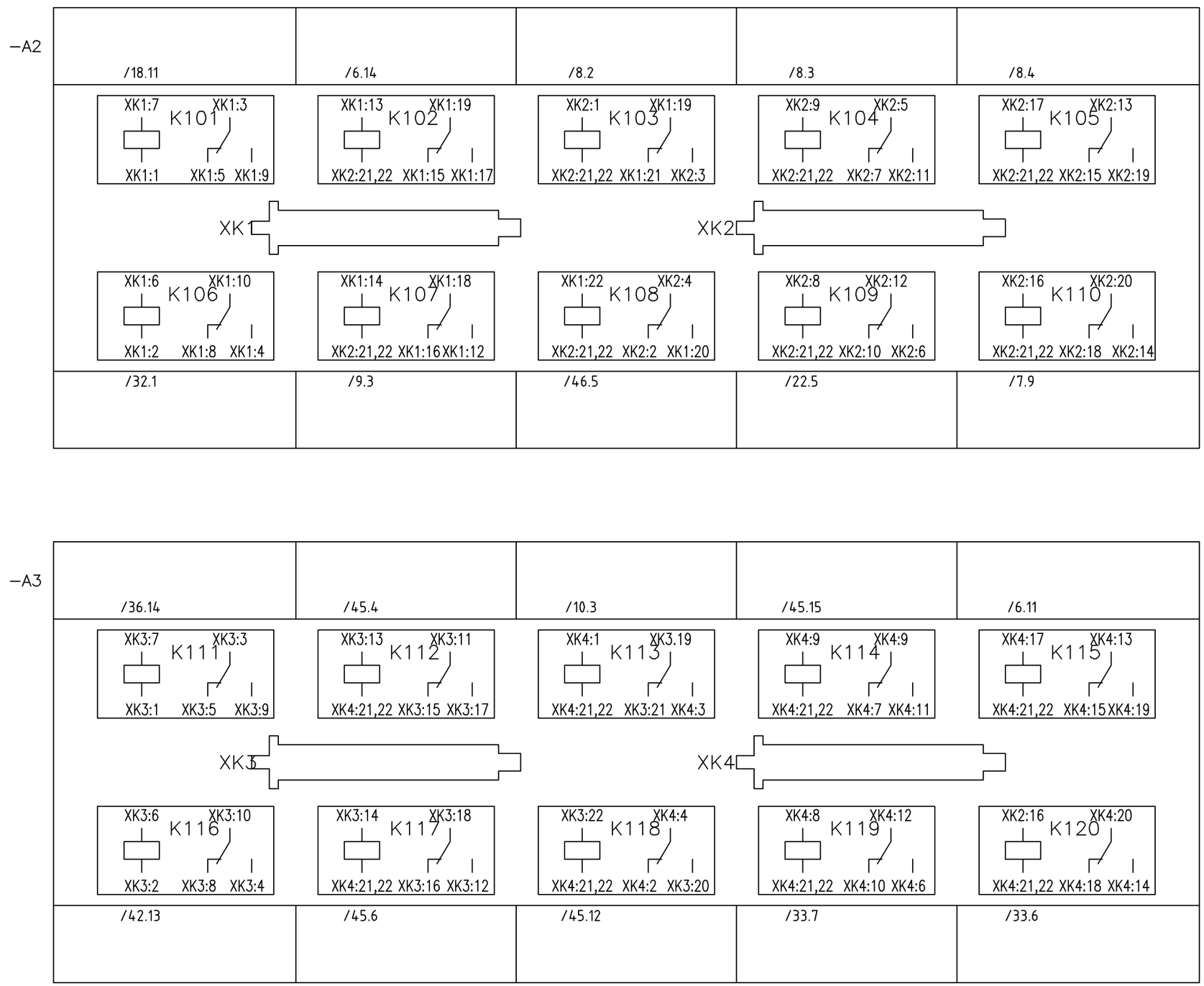

					Datum	Name
b	N04534	04.03.11	Rosenkranz			
a	N04534	07.04.09	Rosenkranz	Erst.	21.10.08	Rosenkranz
Ind	Mitt–NR	Datum	Name	Gepr.		
Abteilung: 111410						

Projektbenennung / project description
E–PLAN AC 80–2 UW V4.2
ELECTRIC WIRING DIAGRAM

Seitenbenennung / page description
Relaisplatine K101–K120, 1W
relay module K101–K120, 1W

Baunumm

Zeichnur
23222

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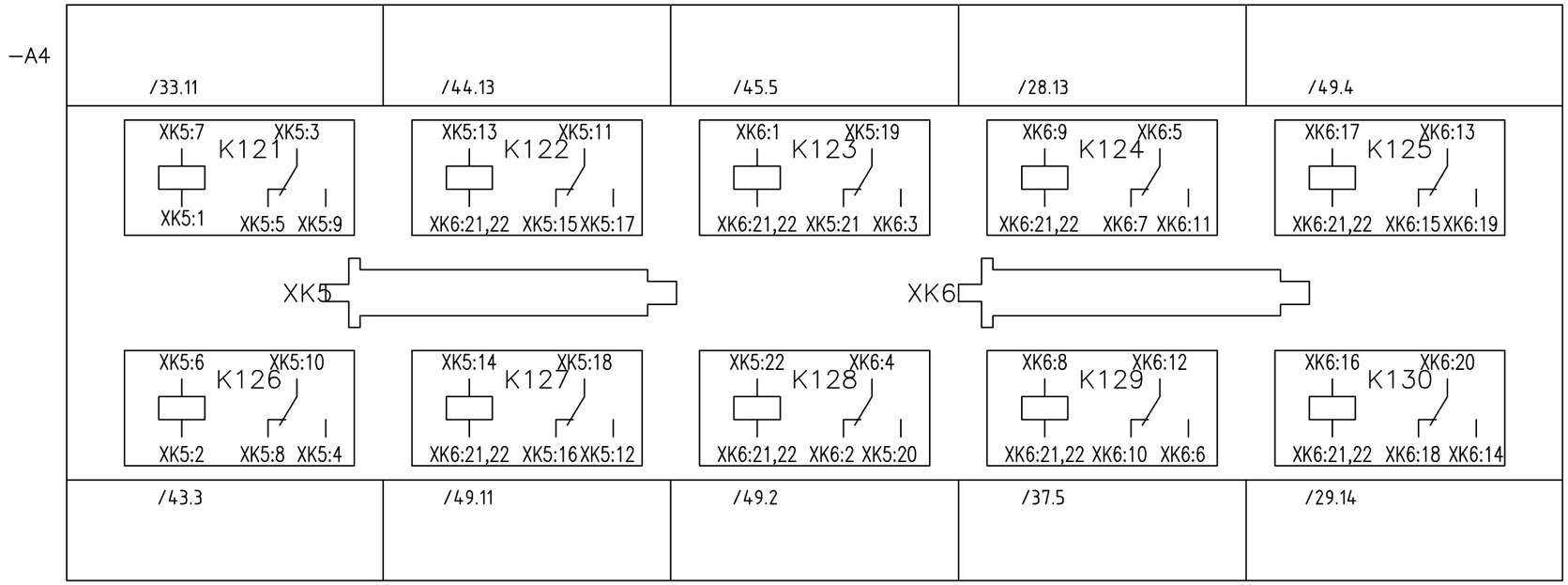

b	N04534	04.03.11	Rosenkranz		Datum	Name
a	N04534	07.04.09	Rosenkranz	Erst.	21.10.08	Rosenkranz
Ind	Mitt–NR	Datum	Name	Gepr.		
Abteilung: 111410						

Projektbenennung / project description
E–PLAN AC 80–2 UW V4.2
ELECTRIC WIRING DIAGRAM

Seitenbenennung / page description
Relaisplatine K121–K130, 1W
relay module K121–K130, 1W

Baunummer.

Anlage: 0
Ort: 0

Zeichnungsnr. / drawing no.
23222612

Blatt 70
78 Bl.

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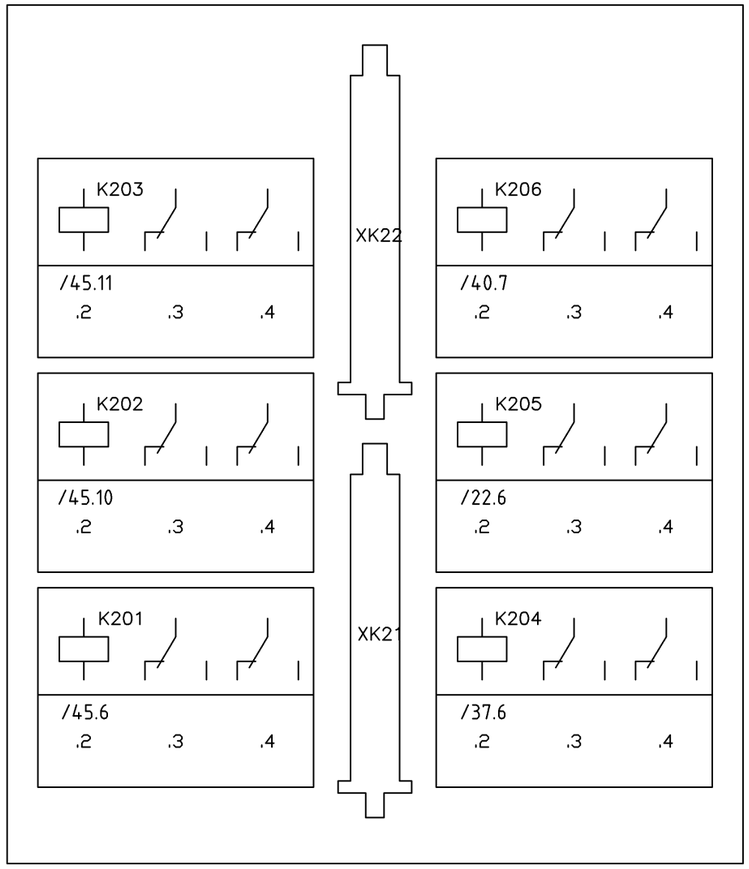
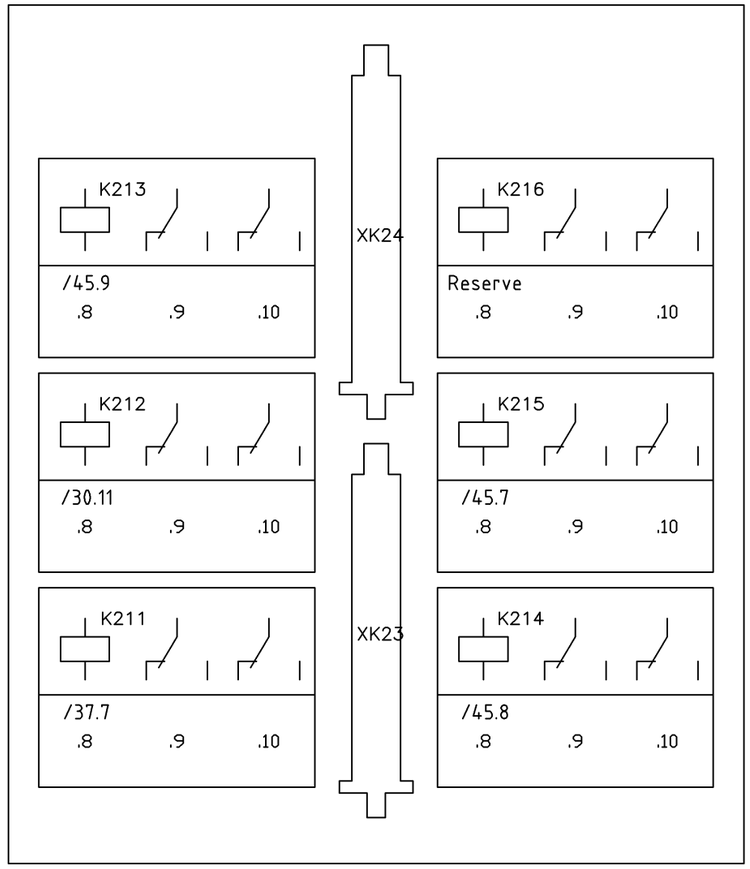
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15

F E D C B A

−A5



−A6



b	N04534	04.03.11	Rosenkranz		Datum	Name
a	N04534	07.04.09	Rosenkranz	Erst.	21.10.08	Rosenkranz
Ind	Mitt−NR	Datum	Name	Gepr.		
Abteilung:	111410					

Projektbenennung / project description
E−PLAN AC 80−2 UW V4.2
ELECTRIC WIRING DIAGRAM

Seitenbenennung / page description
Relaisplatine K201−K216, 2W
relay module K201−K216, 2W

Baunummer.

Anlage: 0
Ort: 0

Zeichnungsnr. / drawing no.
23222612

Blatt 71
Bl. 78

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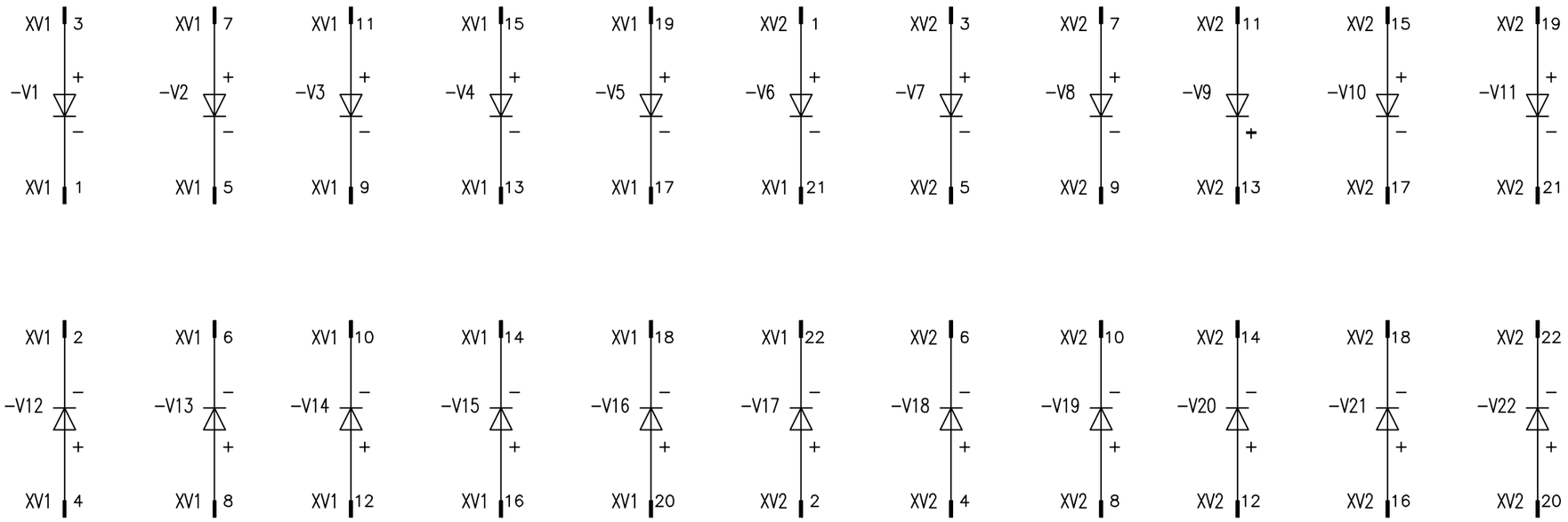
+128
−XV

/44.10	/45.11	/19.5	/19.6	/19.7	/19.8	/8.4	/43.10	/45.6	/45.10	/45.12
V1	V2	V3	V4	V5	V6	V7	V8	V9	V10	V11
				X1				X2		
V12	V13	V14	V15	V16	V17	V18	V19	V20	V21	V22
/46.5	/46.6	/48.13	/48.12	/30.9	/44.6	/45.2	/56.1	/56.2	/49.12	/49.3



Platine Dioden V1−V22, 5A Idt.:67047440

					Datum	Name
b	N04534	04.03.11	Rosenkranz			
a	N04534	07.04.09	Rosenkranz	Erst.	21.10.08	Rosenkranz
Ind	Mitt−NR	Datum	Name	Gepr.		
Abteilung: 111410						

Projektbenennung / project description
E−PLAN AC 80−2 UW V4.2
ELECTRIC WIRING DIAGRAM

Seitenbenennung / page description
Diodenplatine V1−V22, 5A
diode module V1−V22, 5A

Baunummer.

Anlage: 0
Ort: 0

Zeichnungsnr. / drawing no.
23222612

Blatt 72
78 Bl.

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+128
−XK1

22−pol Relaisplatine K101−K110, 1W			
1	/18.11	12	/8.10
2	/32.1	13	/6.14
3	/44.6	14	/9.3
4		15	/18.10
5		16	
6	/32.1	17	/18.11
7	/18.11	18	/8.10
8	/33.5	19	/7.5
9	/44.6	20	/46.8
10	/33.4	21	
11	/18.11	22	/46.5

+128
−XK2

22−pol Relaisplatine K101−K110, 1W			
1	/8.2	12	/22.9
2		13	/8.6
3	/7.6	14	/7.1
4	/46.8	15	
5	/7.3	16	/7.9
6	/22.10	17	/8.4
7		18	
8	/22.5	19	/8.7
9	/8.3	20	/7.1
10		21	/6.14
11	/7.4	22	/7.9

+128
−XK3

22−pol Relaisplatine K111−K120, 1W			
1	/36.14	12	/59.11
2	/42.13	13	/45.4
3	/8.8	14	/45.6
4	/42.14	15	
5		16	
6	/42.13	17	/18.2
7	/36.14	18	/59.11
8		19	/10.13
9	/8.8	20	/6.6
10	/42.14	21	
11	/18.2	22	/45.12

+128
−XK4

22−pol Relaisplatine K111−K120, 1W			
1	/10.12	12	/8.13
2	/6.6	13	/31.4
3	/10.14	14	/6.13
4	/6.6	15	/31.4
5	/6.8	16	/33.6
6	/8.13	17	/6.11
7	/6.7	18	/6.12
8	/33.7	19	/31.5
9	/45.15	20	/6.13
10	/8.13	21	/6.11
11	/6.8	22	/10.12

+128
−XK5

22−pol Relaisplatine K121−K130, 1W			
1	/33.10	12	
2	/43.3	13	/44.13
3	/43.10	14	/49.11
4	/32.14	15	/6.11
5		16	/35.10
6	/43.3	17	/6.11
7	/33.11	18	/35.11
8	/32.13	19	/50.2
9	/43.11	20	/19.6
10	/32.13	21	/50.3
11	/6.11	22	/49.2

+128
−XK6

22−pol Relaisplatine K121−K130, 1W			
1	/45.5	12	/47.11
2		13	/49.2
3	/50.2	14	/7.10
4	/19.6	15	/49.2
5	/22.13	16	/29.14
6	/47.11	17	/49.4
7	/22.12	18	
8	/37.5	19	
9	/28.13	20	/7.10
10		21	/28.13
11		22	/29.14

+128
−XK21

22−pol Relaisplatine K201−K206, 2W			
1	/45.6	12	/45.8
2	/37.6	13	
3	/22.5	14	
4		15	/45.10
5	/22.5	16	/22.6
6	/6.8	17	
7		18	
8	/6.8	19	/45.10
9	/36.12	20	/30.2
10	/45.8	21	/45.10
11	/36.12	22	/30.2

+128
−XK22

22−pol Relaisplatine K201−K206, 2W			
1	/22.9	12	/43.13
2	/45.3	13	/6.8
3	/22.8	14	/43.12
4	/45.3	15	
5	/22.7	16	
6		17	/19.5
7	/22.6	18	/36.10
8	/40.7	19	/19.5
9	/45.11	20	/36.11
10	/40.7	21	
11	/6.8	22	

+128
−XK23

22−pol Relaisplatine K211−K216, 2W			
1	/37.7	12	/18.9
2	/45.8	13	/10.6
3	/33.13	14	/18.9
4	/18.7	15	/30.11
5	/33.13	16	/45.7
6	/18.7	17	/43.12
7	/33.13	18	/35.6
8	/18.6	19	/43.12
9	/10.6	20	/35.6
10	/18.9	21	/43.13
11	/10.6	22	/35.7

+128
−XK24

22−pol Relaisplatine K211−K216, 2W			
1	/35.5	12	
2	/46.11	13	/17.13
3	/35.5	14	
4	/46.10	15	/18.5
5		16	
6	/46.10	17	/18.5
7	/37.7	18	
8		19	/18.4
9	/45.9	20	
10		21	
11	/17.13	22	

					Datum	Name
b	N04534	04.03.11	Rosenkranz			
a	N04534	07.04.09	Rosenkranz	Erst.	21.10.08	Rosenkranz
Ind	Mitt−NR	Datum	Name	Gepr.		
Abteilung: 111410						

Projektbenennung / project description
E−PLAN AC 80−2 UW V4.2
ELECTRIC WIRING DIAGRAM

Seitenbenennung / page description
Steckerübersicht Relaisplatinen
general view plug relay module

Baunummer.

Anlage: 0
Ort: 0

Zeichnungsnr. / drawing no.
23222612

Blatt 73
78 Bl.

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+128
−X316

44−pol
Kabelbaum rechts vorne

1	/41.2	17	/25.11	33	/10.8
2	/41.3	18	/25.14	34	/20.4
3	/19.10	19	/24.2	35	
4	/19.4	20	/25.6	36	
5	/20.10	21	/24.11	37	
6	/7.12	22	/25.3	38	
7	/28.7	23	/28.3	39	
8		24	/28.3	40	
9	/28.8	25	/24.2	41	
10	/28.7	26	/10.12	42	/7.12
11	/24.5	27	/10.12	43	/10.6
12	/24.5	28	/26.3	44	/16.5
13	/25.4	29	/26.3		
14	/58.14	30	/44.9		
15	/16.5	31	/10.6		
16	/24.8	32	/10.7		

+128
−X318

35−pol Schlemmer Steckverbinder
Kabelbaum Motor

A	/31.6	c	/31.11	v	/49.10
B	/31.7	d	/31.9	w	/40.12
C	/31.6	e	/31.12	x	/40.13
D	/31.7	f	/33.12		
E	/10.14	g	/33.8		
F	/44.12	h	/49.8		
G	/40.10	j	/49.7		
H	/6.6	k	/40.9		
J	/11.10	l	/40.10		
K	/31.10	m	/44.10		
L	/31.11	n	/17.12		
M	/31.12	p	/47.11		
N	/31.13	r	/33.9		
P	/42.14	s	/44.10		
a	/6.5	t	/11.2		
b	/6.5	u	/49.11		

+128
−X320

44−pol
Kabel Schleifringkörper

1	/44.3	17	/45.12	33	/26.4
2	/37.10	18	/35.6	34	/50.2
3	/15.14	19	/35.4	35	/50.6
4	/46.10	20	/35.7	36	/50.9
5	/8.5	21	/35.5	37	/18.3
6	/19.5	22	/37.13	38	/18.6
7	/24.6	23	/37.14	39	/18.8
8	/25.4	24	/37.2	40	/19.11
9	/24.9	25	/19.12	41	/18.12
10	/25.7	26	/35.8	42	/26.8
11	/24.3	27	/35.10	43	/47.6
12	/25.5	28	/26.7	44	/47.7
13	/24.12	29	/25.13		
14	/25.2	30	/46.3		
15	/25.10	31	/46.2		
16	/45.3	32	/31.1		

+128
−X323

44−pol
Kabelbaum links vorne

1		17	/24.2	33	/29.5
2		18	/25.6	34	/30.2
3	/58.6	19	/24.13	35	
4		20	/22.7	36	/44.3
5		21	/24.2	37	/28.5
6		22	/7.12	38	
7	/20.5	23		39	/28.5
8	/20.6	24		40	
9	/22.2	25		41	
10	/22.3	26	/40.6	42	/7.12
11	/25.9	27	/40.7	43	/15.7
12	/25.12	28	/46.2	44	
13	/24.7	29	/46.3		
14	/25.4	30	/26.7		
15	/24.10	31	/26.8		
16	/25.8	32	/46.8		

+128
−X317

44−pol
Kabelbaum rechts hinten

1	/15.10	17	/8.8	33	/29.8
2	/19.12	18	/16.7	34	/27.14
3	/27.6	19	/8.13	35	/27.12
4	/27.5	20	/28.10	36	/41.11
5	/27.9	21	/28.11	37	/41.12
6	/27.8	22	/25.8	38	/41.13
7	/27.11	23	/28.10	39	/41.15
8	/19.11	24	/7.10	40	/18.2
9	/42.9	25	/14.4	41	/31.1
10	/28.2	26	/22.9	42	/7.10
11	/14.10	27	/23.7	43	/8.13
12	/18.5	28	/22.13	44	/8.8
13	/19.8	29	/12.7		
14	/12.6	30	/20.13		
15	/29.8	31	/24.8		
16	/29.8	32	/29.6		

+128
−X333

37−pol Schlemmer Steckverbinder
Kabelbaum Getriebe

A	/38.8	T	/39.2	m	/38.3
B	/39.7	U		n	/38.5
C	/38.15	V	/39.4	p	/38.7
D	/38.14	W	/39.6	r	/38.6
E	/39.14	X		s	/38.1
F		Z	/39.13		
G	/39.5	a			
H	/38.12	b			
J		c			
K	/38.11	d	/39.11		
L		e			
M	/39.3	f			
N		g	/38.4		
P	/38.13	h	/39.10		
R		j	/39.9		
S		k	/39.12		

+128
−X322

44−pol
Kabelbaum links hinten

1	/26.3	17	/22.5	33	/24.11
2	/15.7	18	/29.8	34	/25.3
3	/16.14	19	/20.3	35	/45.3
4	/26.3	20	/22.5	36	/48.8
5	/19.13	21	/45.13	37	/48.8
6	/20.6	22	/43.6	38	/23.5
7	/20.11	23	/43.7	39	
8	/20.12	24	/43.8	40	/45.10
9	/12.2	25	/43.9	41	/45.10
10	/28.13	26	/43.9	42	/9.2
11	/19.14	27	/41.4	43	/16.14
12	/28.14	28	/41.6	44	/20.6
13	/28.13	29	/41.7		
14	/22.12	30	/41.9		
15	/22.8	31	/45.3		
16	/12.4	32	/9.2		

+128
−X324

44−pol
Option Stützdruckanzeige

1	/22.6	17		33	
2	/14.3	18		34	
3	/45.13	19		35	
4	/45.1	20		36	
5	/35.8	21		37	
6	/47.7	22		38	
7	/47.6	23		39	
8	/47.8	24		40	
9	/47.9	25		41	
10	/47.9	26		42	
11		27		43	
12		28		44	
13		29			
14		30			
15		31			
16		32			

b	N04534	04.03.11	Rosenkranz		Datum	Name
a	N04534	07.04.09	Rosenkranz	Erst.	21.10.08	Rosenkranz
Ind	Mitt−NR	Datum	Name	Gepr.		
Abteilung: 111410						

Projektbenennung / project description
E−PLAN AC 80−2 UW V4.2
ELECTRIC WIRING DIAGRAM

Seitenbenennung / page description
Steckerübersicht
general view plug

Baunummer.
Anlage: 0
Ort: 0
Zeichnungsnr. / drawing no.
23222612
Blatt 74
Bl. 78

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+128
−X199

44−pol
Kabelbaum Lenkung

1	/51.2	17	/53.7	33	/54.9
2	/51.3	18	/53.6	34	
3	/51.4	19	/53.8	35	
4	/51.6	20	/53.9	36	
5	/51.7	21	/53.12	37	
6	/51.7	22	/53.11	38	
7	/51.8	23	/53.13	39	
8	/51.9	24	/53.15	40	
9	/51.11	25	/53.14	41	
10	/51.12	26	/53.9	42	
11	/51.13	27	/54.2	43	
12	/51.13	28	/54.4	44	
13	/53.1	29	/54.3		
14	/53.4	30	/54.5		
15	/53.2	31	/54.7		
16	/53.5	32	/54.6		

+113
−X710

2−pol
Zuleitung Kabinenelektrik

1	/6.2
2	/6.2

+128
−X342.1

8−pol
Kabinen−zubehör 1

1	/13.2
2	/21.12
3	/9.5
4	/8.7
5	/48.14
6	/13.2
7	/16.4
8	/9.9

+128
−X342.2

8−pol
Kabinen−zubehör 2

1	/9.9
2	/9.9
3	/9.11
4	/9.10
5	/48.15
6	
7	/16.4
8	/15.5

+112
−A326L

6−pol
Spiegel links

1	/13.6
2	/13.5
3	/13.4
4	/13.6
5	/13.4
6	/13.6

+111
−A326R

6−pol
Spiegel rechts

1	/13.9
2	/13.8
3	/13.7
4	/13.9
5	/13.7
6	/13.9

−X1122
+119
−A402

8−pol
Wegfahrsperre

1	/59.2
2	/59.3
3	/59.2
4	/6.6
5	/6.6
6	/6.11
7	/6.11
8	

16−pol Fahrschalter

1		9	
2		10	
3	/37.6	11	/37.3
4		12	/37.3
5	/37.9	13	/37.4
6		14	/37.9
7	/37.4	15	/37.7
8	/37.6	16	/37.5

+128
−X6104

6−poliger Stecker Beleuchtung vorne rechts

1	/16.2
2	/7.8
3	/7.4
4	/14.6
5	/7.4
6	

+128
−X6105

6−poliger Stecker Beleuchtung vorne links

1	/15.2
2	/7.6
3	/7.3
4	/14.1
5	/7.3
6	

+103
−E300

Schleifringkörper 49+2−polig

1		11	/24.3	21	/35.5	31	/46.2	41	/18.12	A	/6.1
2	/37.10	12	/25.5	22	/37.13	32	/31.1	42	/26.8	B	/6.1
3	/15.14	13	/24.12	23	/37.14	33	/26.4	43	/47.6		
4	/46.10	14	/25.2	24	/37.2	34	/50.2	44	/47.7		
5	/8.5	15	/25.10	25	/19.12	35	/50.6	45			
6	/19.5	16	/45.3	26	/35.8	36	/50.9	46			
7	/24.6	17	/45.12	27	/35.10	37	/18.3	47			
8	/25.4	18	/35.6	28	/26.7	38	/18.6	48			
9	/24.9	19	/35.4	29	/25.13	39	/18.8	49			
10	/25.7	20	/35.7	30	/46.3	40	/19.11				

+105
−X330

20−pol
Bedienkasten Abstützung links

A	/24.7	L	/58.6
B	/24.10	M	/58.6
C	/25.9	N	/24.2
D	/25.12	P	
E	/24.4	Q	
F	/25.4	R	
G	/24.13	S	
H	/25.8	T	
J	/28.3	U	
K	/28.3	V	

+104
−X331

20−pol?
Bedienkasten Abstützung rechts

A	/24.11	L	/58.14
B	/24.2	M	/58.14
C	/25.11	N	/24.2
D	/25.14	P	
E	/24.8	Q	
F	/25.3	R	
G	/24.5	S	
H	/25.6	T	
J	/28.5	U	
K	/28.5	V	

b	N04534	04.03.11	Rosenkranz		Datum	Name
a	N04534	07.04.09	Rosenkranz	Erst.	21.10.08	Rosenkranz
Ind	Mitt−NR	Datum	Name	Gepr.		
Abteilung: 111410						

Projektbenennung / project description
E−PLAN AC 80−2 UW V4.2
ELECTRIC WIRING DIAGRAM

Seitenbenennung / page description
Steckerübersicht
general view plug

Baunummer.
Anlage: 0
Ort: 0
Zeichnungsnr. / drawing no. 23222612
Blatt 75
78 Bl.

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Kopieren oder Weitergabe nur mit unserer schriftlichen Genehmigung gestattet

+101 −X345

6-pol
Zentral-schmieranlage

1	
2	/10.6
3	/10.6
4	/10.7
5	/10.8
6	

+101 −X524

5-pol
Kabelbaum Tank

1	/19.8
2	/18.5
3	/19.8
4	/18.5
5	/18.2

+108 −X324 (X0083)

8-pol
Kabelbaum Unterfahrschutz

1	/7.10
2	/8.8
3	/16.7
4	/8.13
5	/15.10
6	/14.4
7	/14.8
8	/7.10

+108 −X308

8-pol
5-Kammer-Rueckleuchte links

1	/14.4
2	/15.10
3	/8.13
4	/7.10
5	/8.7
6	
7	
8	/15.10

+108 −X307

8-pol
5-Kammer-Rueckleuchte rechts

1	/14.8
2	/16.10
3	/8.14
4	/7.10
5	/8.8
6	
7	
8	/16.10

X308 und X307 nur nach Umstellung auf 5-Kammer-Rückleuchte vorhanden
X308 and X308 only after changerover to 5-chamber-rear light available

+101 −X4262

7-pol
Winkelgeber Achse 1

1	/53.1
2	/53.4
3	/53.2
4	/53.5
5	/53.7
6	/53.6
7	/53.8

+104 −X4264

7-pol
Winkelgeber Achse 3

1	/53.9
2	/53.12
3	/53.11
4	/53.13
5	/53.15
6	/53.14
7	/53.9

+104 −X4266

7-pol
Winkelgeber Achse 4

1	/54.2
2	/54.4
3	/54.3
4	/54.5
5	/54.7
6	/54.6
7	/54.9

+101 −X386.1

4-pol
ABS Achse 1 links

1	/40.10
2	/40.10
3	/40.9
4	

+101 −X386.2

4-pol
ABS Achse 1 rechts

1	/40.13
2	/40.12
3	/40.12
4	

+107 −X386.3

4-pol
ABS Achse 4 links

1	/41.9
2	/41.8
3	/41.7
4	

+107 −X386.4

4-pol
ABS Achse 4 rechts

1	/41.15
2	/41.14
3	/41.13
4	

+107 −X386

10-pol
ABS

1	/40.11
2	/40.14
3	
4	
5	
6	
7	
8	/40.12
9	
10	/40.13

+107 −X387

8-pol
ABS Anhänger-steckdose

1	/42.3
2	/42.4
3	/42.2
4	/42.6
5	/42.5
6	
7	
8	

+128 −X312

8-pol
ABS Anhänger-steckdose

1	/21.8
2	/42.2
3	/42.4
4	/42.3
5	
6	/7.14
7	/42.6
8	/42.5

+128 −X332

14-pol
Diagnose-stecker

A	/37.11
B	/37.12
C	/37.13
D	/37.14
E	
F	
G	
H	
I	
J	
K	
L	
M	
N	

+128 −X310.2

9-pol
CAN-open Diagnose

1	
2	/47.5
3	/47.2
4	
5	
6	
7	/47.4
8	
9	/47.3

+128 −X310.1

9-pol
Programmier-stecker

1	
2	/47.8
3	/47.9
4	
5	/47.9
6	
7	
8	
9	

+119 −X404a

14-pol
Lenkstockhebel rechts

1	/43.3
2	/43.4
3	/43.4
4	/43.5
5	/43.7
6	/43.8
7	/43.9
8	
9	
10	
11	
12	
13	
14	/43.9

+107 −X340.1

8-pol
Anhänger-steckdose

1	/7.11
2	/8.9
3	/16.12
4	/42.9
5	/15.14
6	/14.5
7	/14.10
8	

+107 −X340

13-pol
Anhänger-steckdose

1	/14.5
2	/14.10
3	/7.11
4	
5	/16.12
6	/15.14
7	/42.9
8	
9	
10	
11	
12	
13	

b	N04534	04.03.11	Rosenkranz		Datum	Name
a	N04534	07.04.09	Rosenkranz	Erst.	21.10.08	Rosenkranz
Ind	Mitt-NR	Datum	Name	Gepr.		
Abteilung:	111410					

Projektbenennung / project description
E-PLAN AC 80-2 UW V4.2
ELECTRIC WIRING DIAGRAM

Seitenbenennung / page description
Steckerübersicht
general view plug

Baunummer.

Anlage: 0
Ort: 0

Zeichnungsnr. / drawing no.
23222612

Blatt 76
78 Bl.

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BMK design.	Ort loc.	Seite page	Pfad line
A0424	0	59.7
A1	128	67.1
A1122	0	59.2
A2	0	69.2
A2	128	68.1
A2112	128	37.3
A3	0	69.2
A300	135	63.11
A301	128	62.2
A302	128	62.1
A308	128	14.11
A310	128	62.5
A312	128	9.12
A320	119	32.5
A326L	112	75.11
A326R	111	75.13
A345	101	10.6
A360	128	65.2
A361	128	66.3
A386	128	64.1
A390	128	48.11
A4	0	70.2
A402	119	75.9
A4200	0	55.2
A4200	128	64.1
A5	0	71.1
A5190	110	13.11
A6	0	71.8
A903	128	21.1
A904	122	21.4
B109	128	42.12
B170	119	10.12
B262.1	0	55.2
B262.1	101	53.2
B262.2	0	55.5
B262.2	101	53.5
B262.2	104	53.13
B264.1	104	53.10
B301	101	18.5
B301.1	101	18.2
B310.1	110	32.1
B310.2	101	20.3
B310.4	102	45.3
B310.5	101	45.10
B310.6	128	20.2
B310.7	112	17.9
B310.7a	112	17.11

BMK design.	Ort loc.	Seite page	Pfad line
B322.1	102	20.5
B322.2	102	20.6
B322.3	103	20.4
B323.1	135	19.4
B323.2	135	19.3
B324.1	102	19.10
B324.2	102	19.7
B324.3	102	19.8
B325	102	19.12
B326	102	19.11
B359	105	29.8
B360	104	29.8
B370.1	101	28.7
B370.2	107	28.10
B370.3	108	28.13
B370.4	101	28.8
B370.5	107	28.11
B370.6	108	28.14
B401	135	17.2
B410	135	17.12
B410a	135	17.12
B466.1	0	55.10
B466.1	104	54.2
B466.2	0	55.13
B466.2	104	54.6
B5156	236	48.2
B5157	236	48.3
B5158	236	48.4
B5159	236	48.5
B61	108	26.3
B62	108	26.3
B904.1	110	21.5
B904.2	110	21.6
E300		44.3
E300	103	75.1
E301	105	7.12
E302	104	7.12
E305.1	112	7.3
E305.2	111	7.4
E306.1–1	112	7.5
E306.1–2	112	7.6
E306.2–1	112	7.7
E306.2–2	112	7.8
E332.1	108	8.8
E336	110	21.14
E390	128	21.11
E394.1	108	7.10

BMK design.	Ort loc.	Seite page	Pfad line
F100.1	101	6.1
F100.2	101	6.2
F315	128	43.14
G301	135	6.4
G302	101	6.2
H109.1	0	42.11
H109.2	0	42.11
H301	119	19.14
H305	119	19.7
H306	119	19.13
H307	0	59.15
H307.1	110	8.6
H307.2	110	8.7
H308.1	112	14.1
H308.2	112	14.3
H308.3	108	14.4
H308.4	111	14.6
H308.5	111	14.7
H308.6	107	14.8
H309.1	112	15.2
H309.10	107	16.8
H309.11	107	16.10
H309.12	111	16.3
H309.13	107	16.11
H309.14	108	15.11
H309.15	104	16.6
H309.16	105	15.13
H309.17	104	16.13
H309.18	108	16.15
H309.19	105	15.7
H309.2	111	15.5
H309.20	108	16.14
H309.3	104	16.5
H309.4	108	15.10
H309.5	112	15.3
H309.6	111	16.2
H309.7	112	16.4
H309.8	105	15.8
H309.9	107	16.7
H310	119	7.2
H310.1	108	8.13
H310.2	107	8.14
H311	108	7.10
H311	119	28.10
H312	108	8.7
H312	119	28.7
H313	108	8.14

BMK design.	Ort loc.	Seite page	Pfad line
H314	107	8.15
H314	119	19.10
H316	119	28.11
H317	119	28.8
H318	0	15.10
H318	119	20.4
H319	0	15.12
H319	119	20.6
H320	0	14.3
H320	119	20.5
H321	0	14.8
H322	0	16.9
H322	119	6.12
H323	0	16.12
H323	119	19.5
H324	119	19.1
H325	119	19.6
H326	119	44.5
H326	119	44.5
H327	119	19.4
H329	119	19.3
H330	119	14.12
H331.1	110	8.10
H331.2	110	8.11
H332	128	42.5
H332.3	107	8.9
H333	119	40.6
H334	119	20.2
H335	119	14.13
H336	119	20.14
H337	119	43.2
H338	119	43.7
H339	119	20.3
H341	119	20.6
H342	119	20.9
H343	119	45.14
H344	119	49.7
H345	119	49.6
H348	119	28.5
H349	119	49.3
H350	119	29.9
H392	119	58.2
H393	119	58.3
H394	119	58.4
H395	119	58.5
H500	119	49.8
K101	128	18.11

BMK design.	Ort loc.	Seite page	Pfad line
K102	128	6.14
K103	128	8.2
K104	128	8.3
K105	128	8.4
K106	128	32.1
K107	128	9.3
K108	128	46.5
K109	128	22.5
K110	128	7.9
K111	128	36.14
K112	128	45.4
K113	128	10.12
K114	128	45.15
K115	128	6.11
K116	128	42.13
K117	128	45.6
K118	128	45.12
K119	128	33.7
K120	128	33.6
K121	128	33.11
K122	128	44.13
K123	128	45.5
K124	128	28.13
K125	128	49.4
K126	128	43.3
K127	128	49.11
K128	128	49.2
K129	128	37.5
K130	128	29.14
K132	128	12.9
K133	128	7.15
K201	128	45.6
K202	128	45.10
K203	128	45.11
K204	128	37.6
K205	128	22.6
K206	128	40.7
K211	128	37.7
K212	128	30.11
K213	128	45.9
K214	128	45.8
K215	128	45.7
K301	128	6.13
K390	119	48.13
K401	128	44.6
K5210	128	9.6
K5211	128	9.7

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Ind	Mitt-NR	Datum	Name		Datum	Name
b	N04534	04.03.11	Rosenkranz			
a	N04534	07.04.09	Rosenkranz	Erst.	21.10.08	Rosenkranz
				Gepr.		

Abteilung: 111410

Projektbenennung / project description
E-PLAN AC 80-2 UW V4.2
ELECTRIC WIRING DIAGRAM

Seitenbenennung / page description
BMK-Liste
device disignation list

Baunummer.

Anlage: 0
Ort:

Zeichnungsnr. / drawing no.
23222612

Blatt 77
78 Bl.

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BMK design.	Ort loc.	Seite page	Pfad line
L4127	101	49.10	
L4128	103	49.7	
L4129	101	41.2	
L4130	103	40.6	
L4133	107	41.11	
L4134	109	41.4	
M301	135	6.4	
M302	110	9.5	
M303	110	9.9	
M305	101	48.8	
M5141	110	48.14	
M5160	236	48.6	
M5161	236	48.9	
P100	119	63.2	
P301	119	17.2	
P301.1A	119	17.6	
P301.1B	119	17.9	
P301.1C	119	17.9	
R301	128	33.3	
R302	128	33.4	
R303	128	33.1	
R304	128	33.5	
R325	101	9.2	
R326L	112	13.5	
R326R	111	13.8	
R328	110	13.14	
S300	112	6.4	
S301	119	35.6	
S303	119	59.12	
S305	119	27.9	
S306	119	27.11	
S307	119	27.12	
S308	119	27.7	
S311	119	10.7	
S312	119	7.11	
S313	119	8.4	
S314	119	7.10	
S315	119	7.5	
S315.1	111	21.12	
S315.2	112	21.14	
S316	119	14.9	
S319.1	171	20.9	
S319.2	135	20.6	
S320	171	20.8	
S321	173	20.13	
S321.1	171	20.10	
S321.2	172	20.11	

BMK design.	Ort loc.	Seite page	Pfad line
S321.4	174	20.12	
S326	119	22.8	
S327	119	27.14	
S328	119	50.2	
S329	119	29.9	
S335	119	13.1	
S344	119	50.7	
S345	119	50.7	
S346	119	50.4	
S347	119	50.5	
S350	0	13.2	
S352.1	135	19.13	
S352.2	135	19.14	
S360.1	105	28.5	
S360.2	104	28.3	
S370	119	10.12	
S390	119	48.14	
S400	119	63.2	
S404	119	32.8	
S404a	119	43.3	
S428	110	13.14	
S4501A	0	11.2	
S4501B	0	11.3	
S4502A	0	11.4	
S4502B	0	11.6	
S4503A	0	12.2	
S4504A	0	12.6	
S4511A	0	11.7	
S4511B	0	11.8	
S4512A	0	11.9	
S4512B	0	11.10	
S4513A	0	12.4	
S4514A	0	12.7	
S500	104	24.2	
S501	105	24.4	
S502	104	24.5	
S503	105	24.7	
S504	104	25.3	
S505	105	25.5	
S506	104	25.6	
S507	105	25.8	
S508	104	24.8	
S509	105	24.10	
S510	104	24.11	
S511	105	24.13	
S5129	0	10.12	
S94		44.11	

BMK design.	Ort loc.	Seite page	Pfad line
S94.1		44.3	
S94.2		44.9	
V303	128	9.9	
W901	110	21.7	
W902	110	21.9	
X0424	0	59.7	
X101	128	7.13	
X102	128	7.15	
X1119	135	43.14	
X1122	0	75.8	
X199	0	52.7	
X199	128	75.1	
X300	128	31.14	
X301	101	6.1	
X310.1	128	76.5	
X310.2	128	76.4	
X312	0	7.14	
X312	128	76.13	
X316	128	74.1	
X317	128	74.1	
X318	128	74.5	
X320	128	74.9	
X321	108	76.5	
X322	128	74.9	
X323	128	74.12	
X324	128	74.12	
X328	128	13.14	
X330	105	75.8	
X331	104	75.11	
X332	128	76.2	
X333	128	74.5	
X334	134	39.7	
X340	107	76.13	
X340.1	107	76.11	
X342.1	128	75.8	
X342.2	128	75.9	
X345	101	76.2	
X360.1	128	42.12	
X386	107	76.9	
X386.1	101	76.2	
X386.2	101	76.4	
X386.3	107	76.5	
X386.4	107	76.7	
X387	107	76.11	
X390a	128	21.11	
X404	119	43.3	
X404a	119	76.9	

BMK design.	Ort loc.	Seite page	Pfad line
X4262	0	55.1	
X4262	101	76.9	
X4264	0	55.9	
X4264	104	76.11	
X4266	104	76.13	
X524	101	76.4	
X6104	128	75.12	
X6105	128	75.14	
X710	113	75.6	
X94		44.11	
XK1	128	73.1	
XK2	128	73.4	
XK21	128	73.1	
XK22	128	73.4	
XK23	128	73.7	
XK24	128	73.10	
XK3	128	73.7	
XK4	128	73.10	
XK5	128	73.1	
XK6	128	73.4	
XV	128	72.3	
Y170	135	10.14	
Y172	104	31.1	
Y304	104	46.3	
Y304B	104	46.2	
Y304C	104	46.8	
Y304D	104	46.9	
Y304E	104	46.10	
Y304F	104	46.11	
Y306A	101	24.2	
Y306B	101	25.6	
Y307A	107	24.11	
Y307B	107	25.3	
Y308A	102	24.5	
Y308B	102	25.4	
Y309A	108	24.8	
Y309B	108	25.8	
Y310A	105	29.6	
Y310B	105	29.8	
Y320	104	42.14	
Y332	102	45.13	
Y343	105	29.5	
Y344	128	30.2	
Y357	107	28.2	
Y361	107	27.6	
Y362	107	27.8	
Y363	107	27.9	

BMK design.	Ort loc.	Seite page	Pfad line
Y365	107	27.5	
Y366A	107	27.12	
Y366B	107	27.11	
Y367	107	27.14	
Y386.1	101	40.9	
Y386.2	101	40.10	
Y386.3	101	40.12	
Y386.4	101	40.13	
Y386.5	107	41.7	
Y386.6	107	41.9	
Y386.7	107	41.13	
Y386.8	107	41.15	
Y404	104	47.11	
Y420	104	33.12	
Y422	104	33.8	
Y4236	104	51.4	
Y4237	104	51.2	
Y4238	104	51.11	
Y4239	104	51.8	
Y4253	104	51.7	
Y4254	104	51.13	
Y61A	105	26.7	
Y61B	105	26.8	
Y94		44.10	

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Ind	Mitt-NR	Datum	Name		Datum	Name
b	N04534	04.03.11	Rosenkranz			
a	N04534	07.04.09	Rosenkranz	Erst.	21.10.08	Rosenkranz
				Gepr.		

Abteilung: 111410

Projektbenennung / project description
E-PLAN AC 80-2 UW V4.2
ELECTRIC WIRING DIAGRAM

Seitenbenennung / page description
BMK-Liste
device disignation list

Baunummer.

Anlage: 0

Ort:

Zeichnungsnr. / drawing no.
23222612

Blatt 78

78 Bl.

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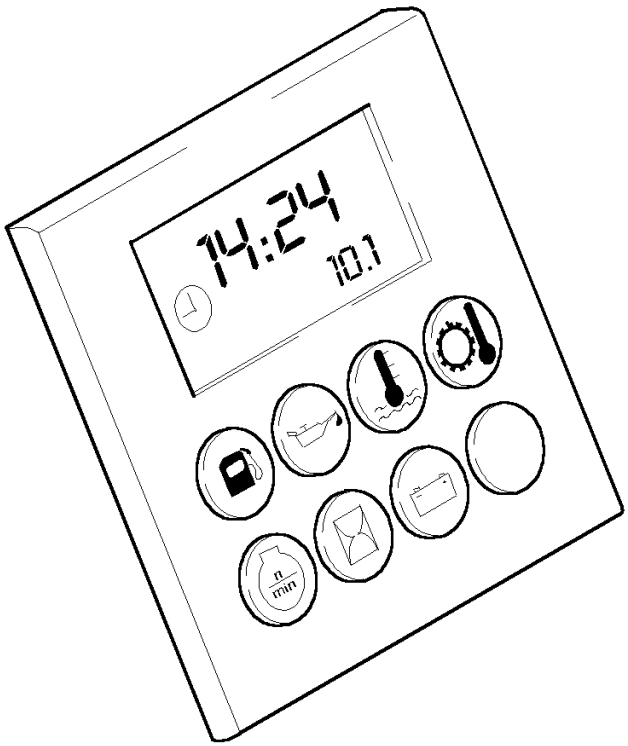
engineering
mannesmann
Dematic

Mobile Cranes

Service Bulletin
No. : 60 - 11

Model:	Type:	Replacement for:	Date:	Produced by:	Tel No.:	Fax No.:
Telescopic crane	AC 25, 40-1, 50E, 80, 120	-	06. 98	Dept. 8333 Mr. Sieger	06332 83 2575	06332 83 2579



Information regarding the MFA 10 multifunction display in the cab of the superstructure and/or chassis and its operation

On the strength of our receiving a number of enquiries on the matter, the following pages will hopefully provide a clarification as to how the "MFA 10" multifunction display is **operated** and help clear up the problems you seem to be having with the "**display** of **actual values**".

Location:	MFA 10 Spare Part No.
Crane cabin AC 120 (395)	000 096 12
Driver's cabin AC 25, 40-1, 50E (150),120 (395)	654 149 40

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(Benien) (Rübel)

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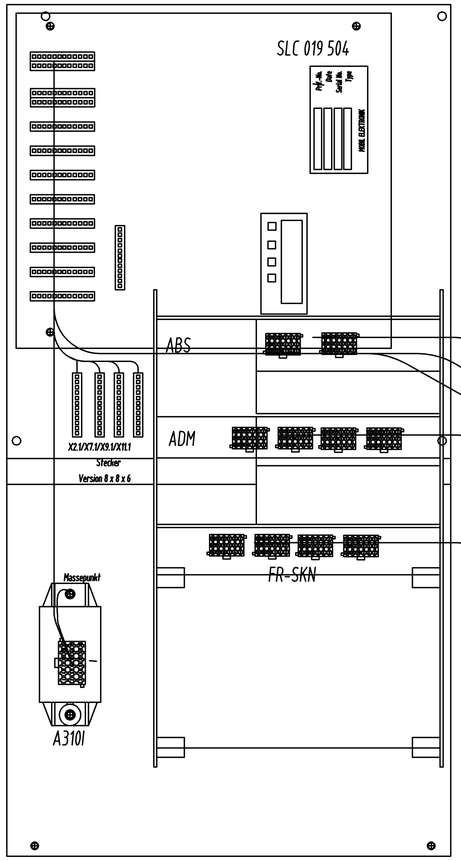
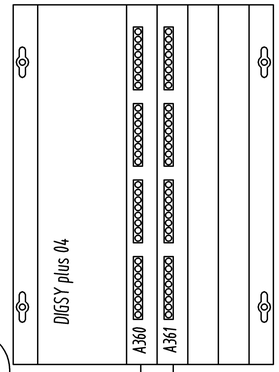
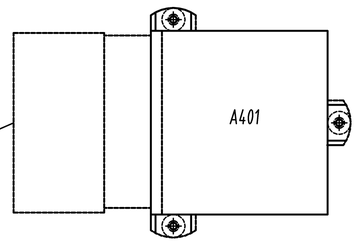






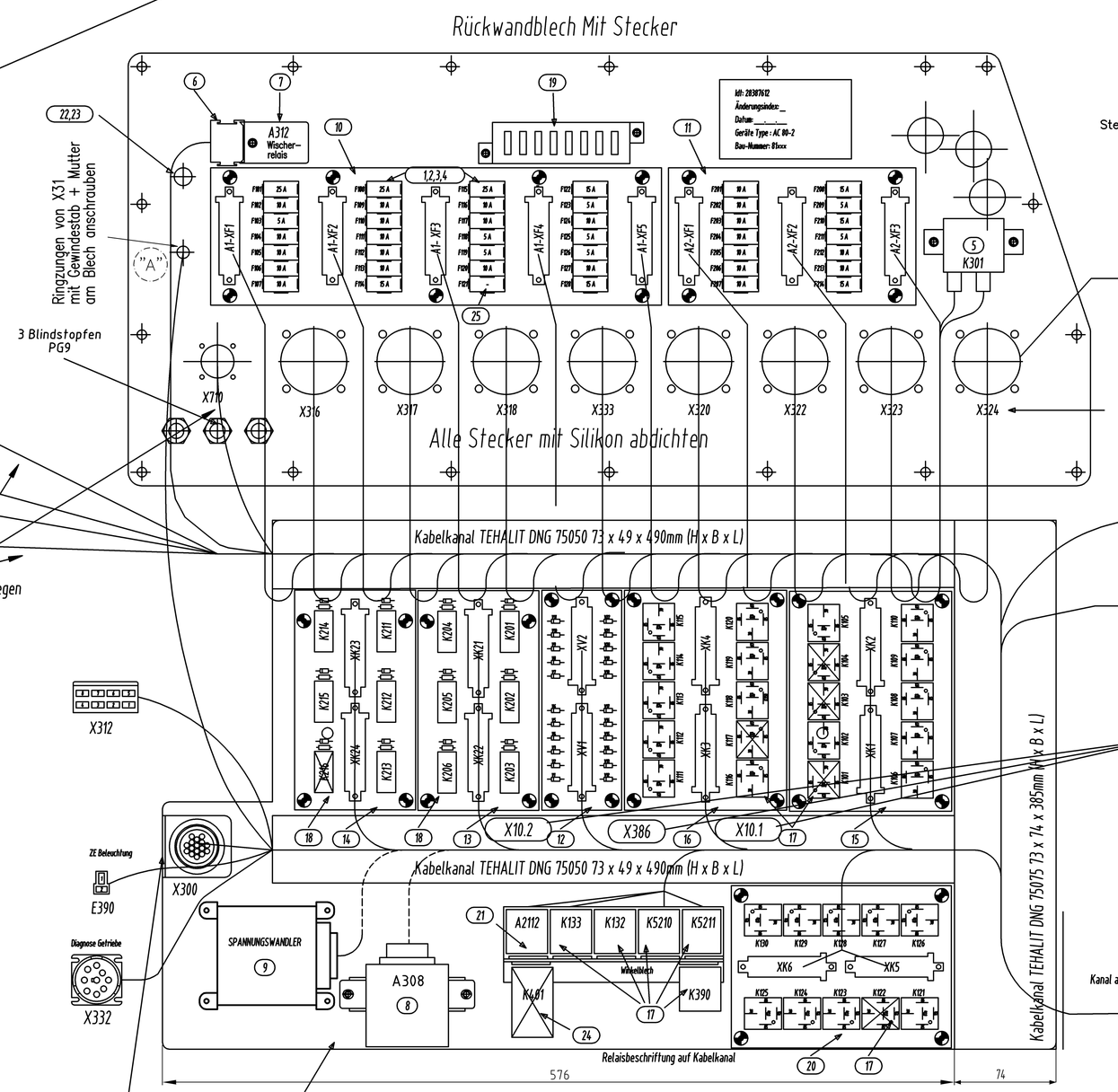
A401 im Deckel montiert

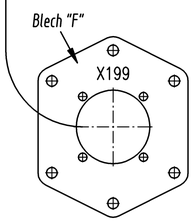
Bezeichnungsschild mit Identnummer, Krantyp und Baunummer gut sichtbar auf Steckerblech anbringen

Es dürfen keine Schrauben oder sonstige Montage-materialien aus der Blechunterseite hervorstehen Ausser den zwei 8 x 15 Stehbolsen

Bauteile sind zu beschriften, bei Sicherungen mit Angabe des Sicherungswertes als Aufkleber auf die Platine Kleben

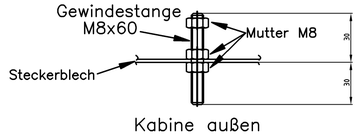
Relais K101, K103, K104, K117, K122, K216, K401 gehören nicht zum Lieferumfang der Kabinenelektrik





Blech lose mit liefern

In Lackschlauch verlegen



X324 mit Verschlusskappe VK7 versehen.

Beschriftung auf beiden Seiten des Bleches

Pos.	Beschreibung	Lieferant	Best-Nr.	Terex-Demag-Ident-Nr.
1	Flachsicherung 5A	Würth	731005	50941898
2	Flachsicherung 10A	Würth	731010	50941798
3	Flachsicherung 15A	Würth	731015	54941998
4	Flachsicherung 25A	Würth	731025	50942098
5	Leistungsrelais	Bosch	0 332 002 257	60499540
6	Relaissockel	Hella	8JA 003 526-001	22044312
7	Impulsgeber	FM	SR 2 0120	46076012
8	Warnblinkgeber 24V(3+1)	Bosch	22644740	60499740
9	Spannungwandler 10A	Ratho	RTO-2412-10N	28032012
10	Sicherungs-Platine			67048040
11	Sicherungs-Platine			67070840
12	Diode-Platine			67047440
13	Relais-Platine			67047140
14	Relais-Platine			67047240
15	Relais-Platine			67047740
16	Relais-Platine			67047840
17	Würfelrelais	Bosch	0 332 204 204	51574340
18	Relais 2WE, 8A	Schrack	RT 424024	65475140
19	Reservesicherungshalter mit Sicherung (3x5A,10A;1x15A,25A)	Merrit	151003	43168673
20	Relais-Platine			67047940
21	Gasstellungsgeber	DGS	01 232	27262512
22	Verschraubung VSHR2	Schlemmer	7800002	49009112
23	Ueberwurfmutter geschl. PG11	Schlemmer	9800891	42122212
24	Doppelrelais	FTM GmbH	N5-2010-0001	22596512
25	Flachsicherung mit Lampe	MTA Italy	06.00200	29103312

Stecker mit kleinem Halter befestigen

a	W10663	26.02.08	Rosenkranz	Maßstab:	Masse: 35 kg	
_	W10620	14.11.07	Rosenkranz	Typ: AC 80-2	Werkstoff: %	
Ind	Mitt-NR	Datum	Name		Mat.-art: UNTL	
	Datum	Name	KABINENELEKTRIK AC 80-2 UW V4.1.5			
Erst.	14.11.07	Rosenkranz	ELECTRIC CAB AC 80-2 CHASSIS V4.1.5			
Gepr.						
Abteilung:	1142		Ident-Nr: 28387612	Format A1	Bl. / Blätter 1/14	
			Prototatus:		ECSCAD	

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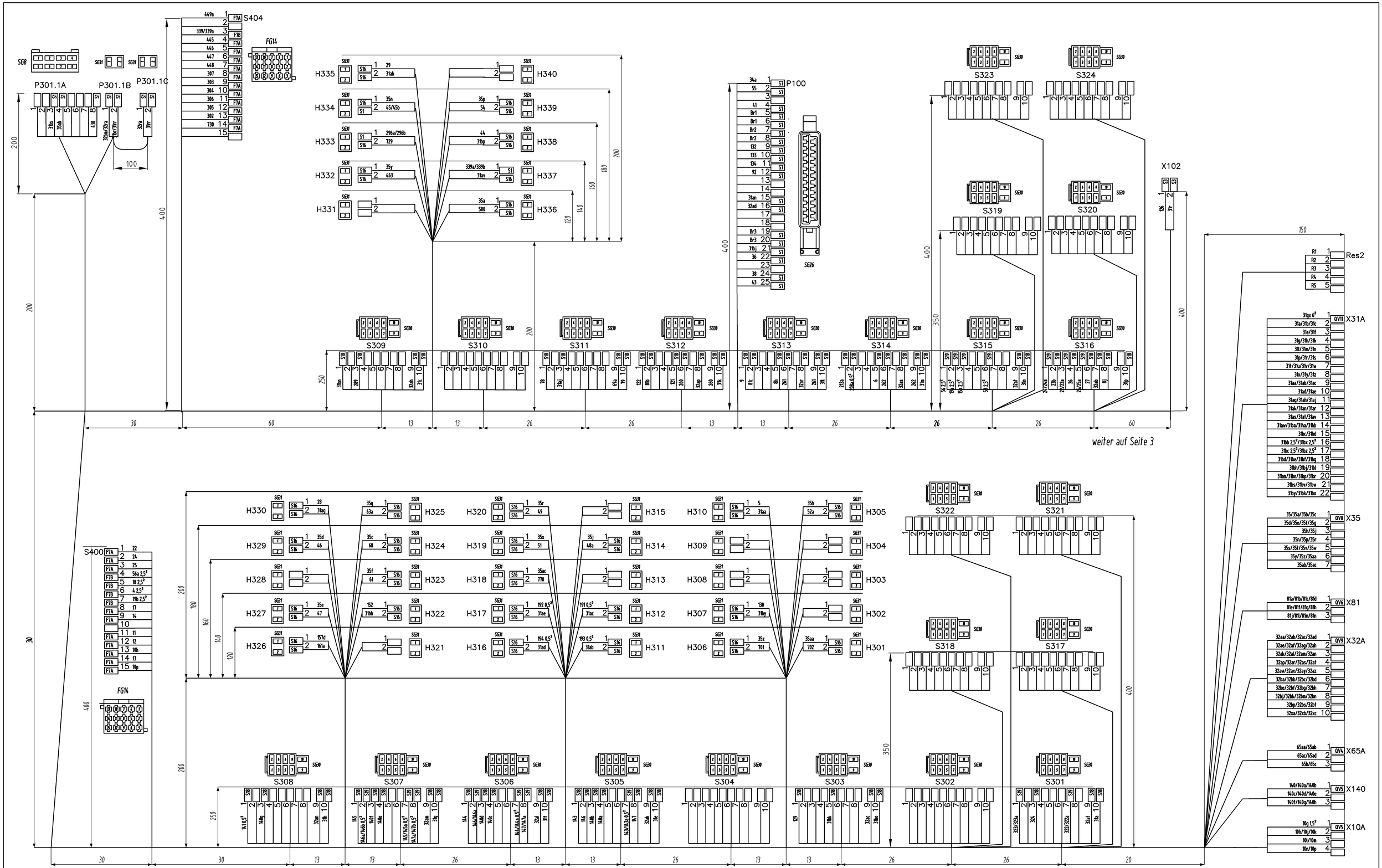

ALLE STECKER MIT POSITIONSBEZEICHNUNGEN MARKIEREN!

- LEITUNGEN NACH DIN 72551-FLRY-WEISS, POTENTIAL 31 BRAUN
- WEISSE LEITUNGEN ALLE 25 MM MIT POTENTIALNUMMER BEDRUCKEN
- KABELBAUMZUBEHOER WIE IN TEILEKATALOG SPEZIFIZIERT!
- ALLE STECKER MIT POSITIONSBEZEICHNUNGEN MARKIEREN!
- ALLE QUETSCHVERBINDER MIT SCHRUMPFSCHLAUCHISOLIEREN.
- TL 666 632 40 (AKTUELLER INDEX) BEACHTEN.

a	W10663	26.02.08	Rosenkranz	Maßstab:	Masse: 35 kg
–	W10620	14.11.07	Rosenkranz	Typ: AC 80-2	Werkstoff: %
Ind	Mitt-NR	Datum	Name		Mat.-art: UNTL

	Datum	Name
Erst.	14.11.07	Rosenkranz
Gepr.		

Abteilung: 1142

KABINENELEKTRIK AC 80-2 UW V4.1.5

ELECTRIC CAB AC 80-2 CHASSIS V4.1.5

Ident-Nr: 28387612

Format A1 | Bl. / Blätter 2/14

Prototatus: ECSCAD

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- LEITUNGEN NACH DIN 72551-FLRY-WEISS, POTENTIAL 31 BRAUN
- WEISSE LEITUNGEN ALLE 25 MM MIT POTENTIALNUMMER BEDRUCKEN
- KABELBAUMZUBEHOER WIE IN TEILEKATALOG SPEZIFIZIERT!
- ALLE STECKER MIT POSITIONSBEZEICHNUNGEN MARKIEREN!

Gaspedal

FG13 A320

SG2 S5129

Tacho MTCO

SG22 weiss

SG23 gelb

SG24 rot

P301A P301B P301C

Spannungsversorgung Radio

SG13 A904

In Lackschlauch verlegen

X1122_1

X1122

FG8

SG8

H341 H342 H343 H344 H345

H346 H347 H348 H349 H350

S2263 S326 S327 S328 S329 S330

S331 S332 S333

S334 S335 S336

A390

S300

S370

H394 H395 H392 H393 H390 H391

X342.1 X342.2

X101

H500

Alarmgeber im Kabelbaum mit Kabelband befestigen

Hersteller : Lummitas
Bestell Nr.: 31 - 810.005
Ident Nr. : 256 587 40

weiter auf Seite 4

a	W10663	26.02.08	Rosenkranz	Maßstab:	Masse: 35 kg
_	W10620	14.11.07	Rosenkranz	Typ: AC 80-2	Werkstoff: %
Ind	Mitt-NR	Datum	Name		Mat.-art: UNTL

	Datum	Name
Erst.	14.11.07	Rosenkranz
Gepr.		
Abteilung:	1142	

KABINENELEKTRIK AC 80-2 UW V4.1.5

ELECTRIC CAB AC 80-2 CHASSIS V4.1.5

Ident-Nr: 28387612 | Format A1 | Bl. / Blätter 3/14

Prototatus: ECSCAD

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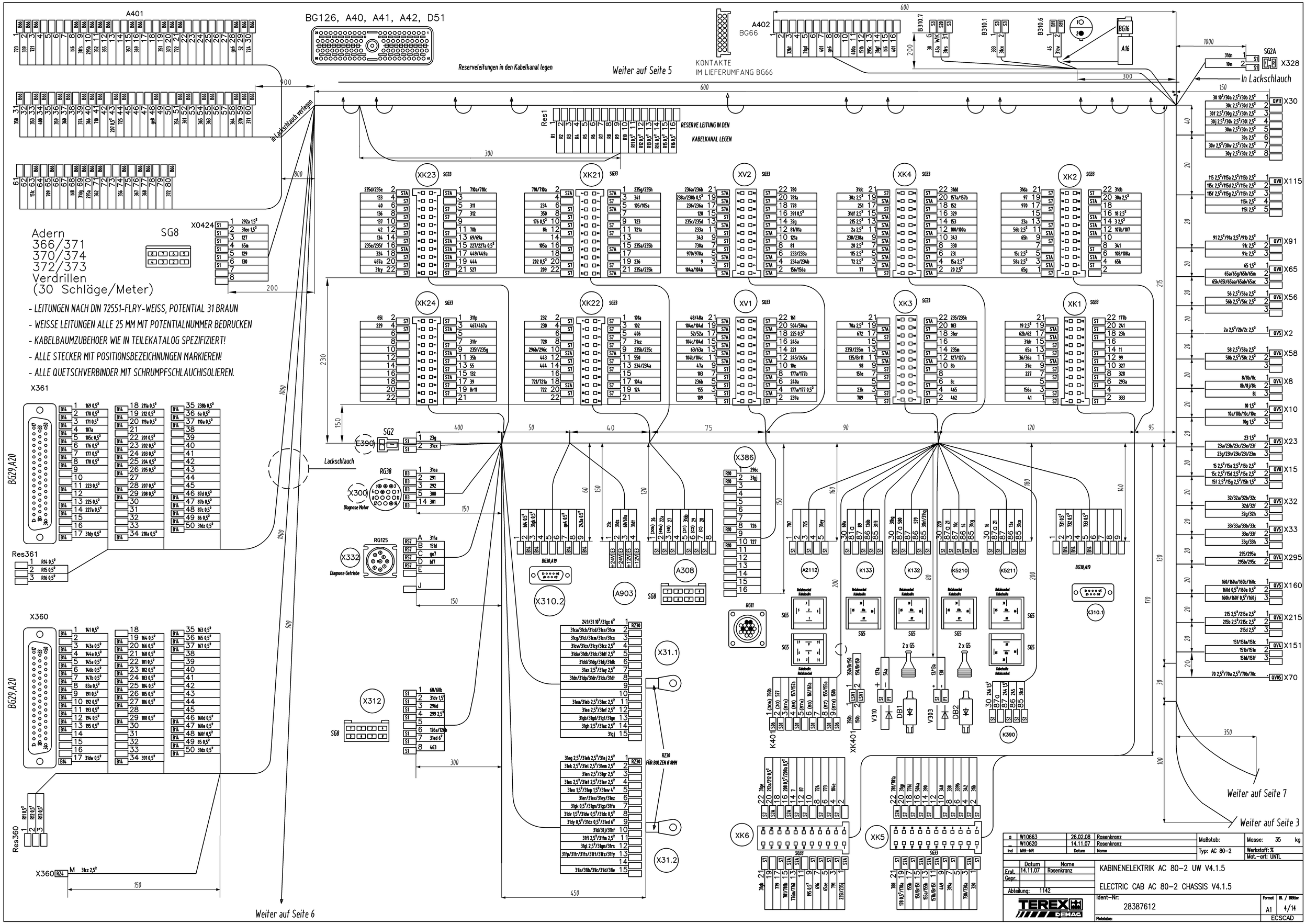

Ind	Mitt-NR	Datum	Name
a	W10663	26.02.08	Rosenkranz
_	W10620	14.11.07	Rosenkranz

Maßstab:
Typ: AC 80-2
Masse: 35 kg
Werkstoff: %
Mat.-art: UNTL

	Datum	Name
Erst.	14.11.07	Rosenkranz
Gepr.		

Abteilung: 1142

KABINENELEKTRIK AC 80-2 UW V4.1.5

ELECTRIC CAB AC 80-2 CHASSIS V4.1.5

TEREX DEMAG

Ident-Nr: 28387612

Format A1 | BL / Blätter 4/14

Plotstatus:

ECSCAD

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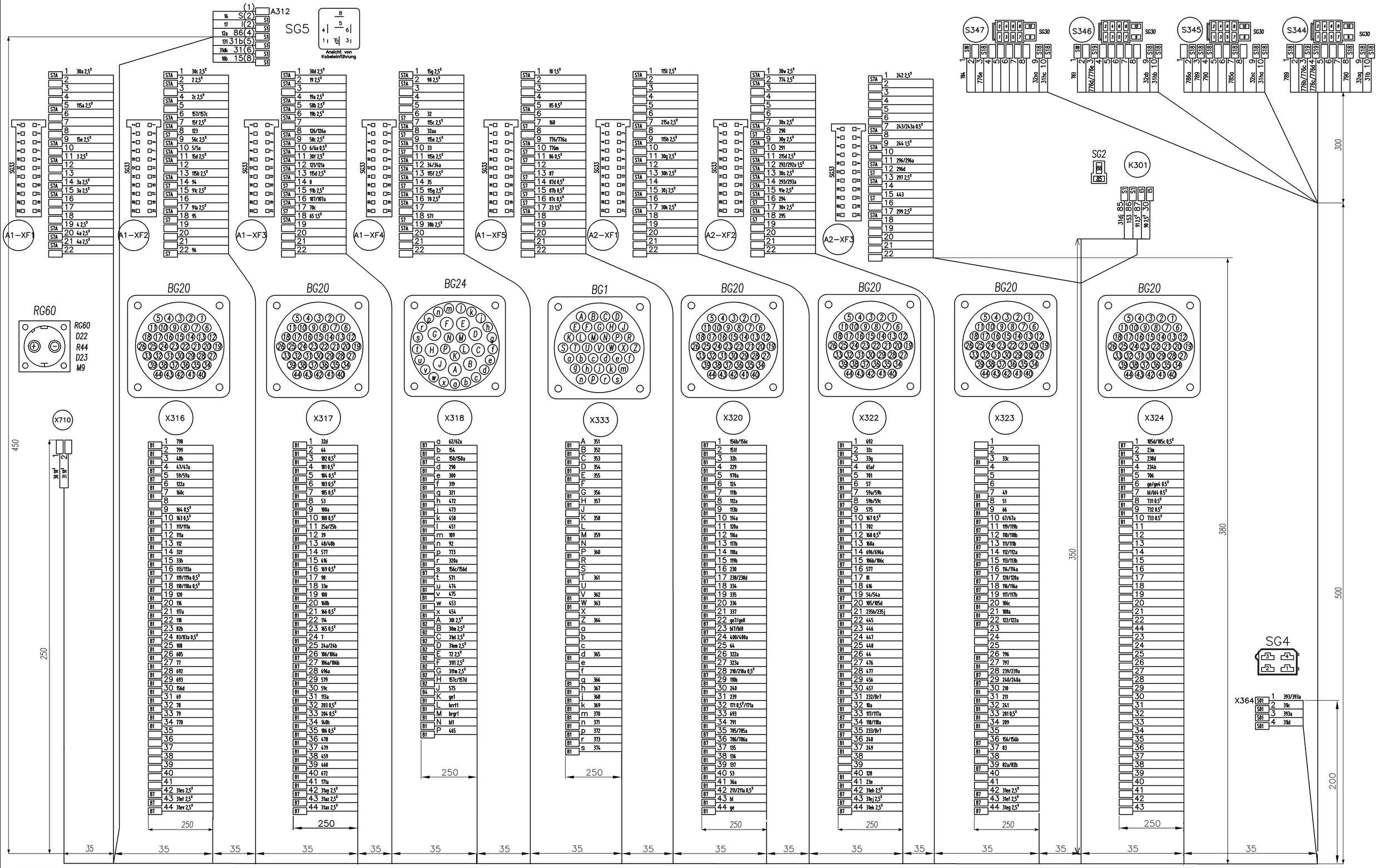

Weiter auf Seite 4

a	W10663	26.02.08	Rosenkranz	Maßstab:	Masse: 35 kg
_	W10620	14.11.07	Rosenkranz	Typ: AC 80–2	Werkstoff: %
Ind	Mitt–NR	Datum	Name		Mat.–art: UNTL

	Datum	Name
Erst.	14.11.07	Rosenkranz
Gepr.		

Abteilung: 1142

KABINENELEKTRIK AC 80–2 UW V4.1.5

ELECTRIC CAB AC 80–2 CHASSIS V4.1.5

TEREX DEMAG

Ident–Nr: 28387612

Format A1 | Bl. / Blätter 5/14

Plotstatus:

ECSCAD

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An SG51/SG52 Endhülsen ohne Kuststoffkragen verwenden

BG20

X199

A4200-X2 SG52 A3 0,5² A1 0,5² A2 0,5² A5 0,5² B5 0,5² C5 0,5² D4 0,5² A6 0,5²

A4200-X3 SG52 ge5 bl5

A4200-X4 SG52 178a 783 784 785 786 710c 67a 776 187b

A4200-X5 SG52

A4200-X6 SG52

A4200-X7 SG52 681 682 683 B3 0,5² B2 0,5² B1 0,5² 684

A4200-X8 SG52 686 687 688 C3 0,5² C2 0,5² C1 0,5² 689

A4200-X9 SG52 B6 0,5²

A4200-X10 SG52 C6 0,5²

A4200-X11 SG52 685 690 390 778 779 780 795 777 782

A4200-X12 SG51 774 2,5² 31gl 2,5²

A4200-X13 SG52 473 472 475 474

X4200 A4 0,5² B4 0,5² C4 0,5² D4 0,5²

X31B A-Schirm B-Schirm C-Schirm 31bz 2,5² 31gy 2,5²

B1 681 682 683 684 685 31d 686 687 688 689 690 31j A1 0,5² A2 0,5² A3 0,5² A4 0,5² A5 0,5² A6 0,5² A-Schirm B1 0,5² B2 0,5² B3 0,5² B4 0,5² B5 0,5² B6 0,5² B-Schirm C1 0,5² C2 0,5² C3 0,5² C4 0,5² C5 0,5² C6 0,5² C-Schirm

318 350 250 65 300 100

Lackschlauch Zip30

Res3 R6 R7 R8 R9 R10

LEITUNG ge1 LEITUNG brrt1 LEITUNG brgr1 LEITUNG bl1 | LEITUNG ge2 LEITUNG brrt2 LEITUNG brgr2 LEITUNG bl2 | LEITUNG ge3 LEITUNG brrt3 LEITUNG brgr3 LEITUNG bl3

Sternvierer Kabel
Lieferant: Daimler Benz
N° 0005461601

bl bl4 - bl8
ge ge4 - bl8

verdrilltes kabel
30 schläge/meter
Lieferant: Daimler Benz
Nr. 0005461501

Pot 472 Pot 473 | Pot 474 Pot 475 | Pot 476 Pot 477 | Pot 478 Pot 479

verdrilltes kabel
30 schläge/meter

LEITUNG A, B, C

geschirmte Leitung 7x0,5mm²

- LEITUNGEN NACH DIN 72551-FLRY-WEISS, POTENTIAL 31 BRAUN
- WEISSE LEITUNGEN ALLE 25 MM MIT POTENTIALNUMMER BEDRUCKEN
- KABELBAUMZUBEHOER WIE IN TEILEKATALOG SPEZIFIZIERT!
- ALLE STECKER MIT POSITIONSBEZEICHNUNGEN MARKIEREN!
- ALLE QUETSCHVERBINDER MIT SCHRUMPFSCHLAUCHISOLIEREN.

Geh310 Massepunkt

A310I 31gy 2,5² ge2 brrt2/brgr2 bl2 ge3 brrt3/brgr3 bl3

SG40 SG43 SG39 SG34 SG38

Geh RZ14 31ew 4²

SG43 A386-X1 1 2 3 4 31gr 2,5² 5 289 6 7 296 8 297 2,5² 9 31gh 2,5² 10 726 11 727 12 13 14 728 15 729

SG40 A386-X2 1 453 2 456 3 450 4 454 5 457 6 451 7 8 459 9 460 10 798 11 476 12 796 13 799 14 477 15 797 16 17 478 18 479

BG74

SG39 A302I 1 294 2 40 3 63 4 5 31ec 2,5² 6 7 42 8 337 9 43 10 11 335 12 46 13 61 14 68 15 215c 2,5²

SG40 A302II 1 2 3 4 223 0,5² 5 6 322 7 467 8 45a/45b 9 786 10 11 12 13 334 14 504 15 336 16 17 18 323

SG34 A302III 1 2 3 4 5 6 7 462 8 9 10 11 707 12

SG38 A302IV 1 ge3 2 3 bl3 4 brrt3/brgr3 5 301 6 7 8 9

X391 247 A1 A2 A3 221 A4 B1 B2 Test B3 B4 C1 242 2,5² C2 31en 2,5² C3 248 C4 BL46 D20

SG40 A301I 1 2 3 317 4 315 5 318 6 314 7 313 8 316 9 302 10 37 11 328 12 304 13 327 14 305 15 307 16 303 17 306 18 150a

SG40 A301II 1 293 2 31eb 2,5² 3 215b 2,5² 4 329 5 6 7 8 330 9 10 340 11 12 13 338 14 342 15 16 bl2 17 brrt2/brgr2 18 ge2

SG39 A301III 1 332 2 310 3 308/308a 4 321 5 6 7 319/319a 8 9 10 320/320a 11 309 12 13 14 15

SG40 A301IV 1 bl1 2 brrt1/brgr1 3 ge1 4 5 6 325 7 8 9 326 10 11 62a 12 311 13 154 14 15 16 312 17 18

R304 680 1/4W 1 308b 2 332

R302 1,6K 1/4W 1 308a/308b 2 310

R303 3,3K 1/4W 1 325 2 326

R301 150 1/4W 1 308 2 309

20 40 140 50 60 35 30 50 40 140 50 100 800 160

Lackschlauch

× Widerstaende zwischen Potentiale loeten und mit Schrumpfschlauch ueberziehen

Weiter auf Seite 4

a	W10663	26.02.08	Rosenkranz	Maßstab:	Masse: 35 kg
_	W10620	14.11.07	Rosenkranz	Typ: AC 80-2	Werkstoff: %
Ind	Mitt-NR	Datum	Name		Mat.-art: UNTL

	Datum	Name
Erst.	14.11.07	Rosenkranz
Gepr.		
Abteilung:	1142	

KABINENELEKTRIK AC 80-2 UW V4.1.5

ELECTRIC CAB AC 80-2 CHASSIS V4.1.5

TEREX DEMAG

Ident-Nr: 28387612 | Format A1 | Bl. / Blätter 6/14

Plotstatus: | ECSCAD

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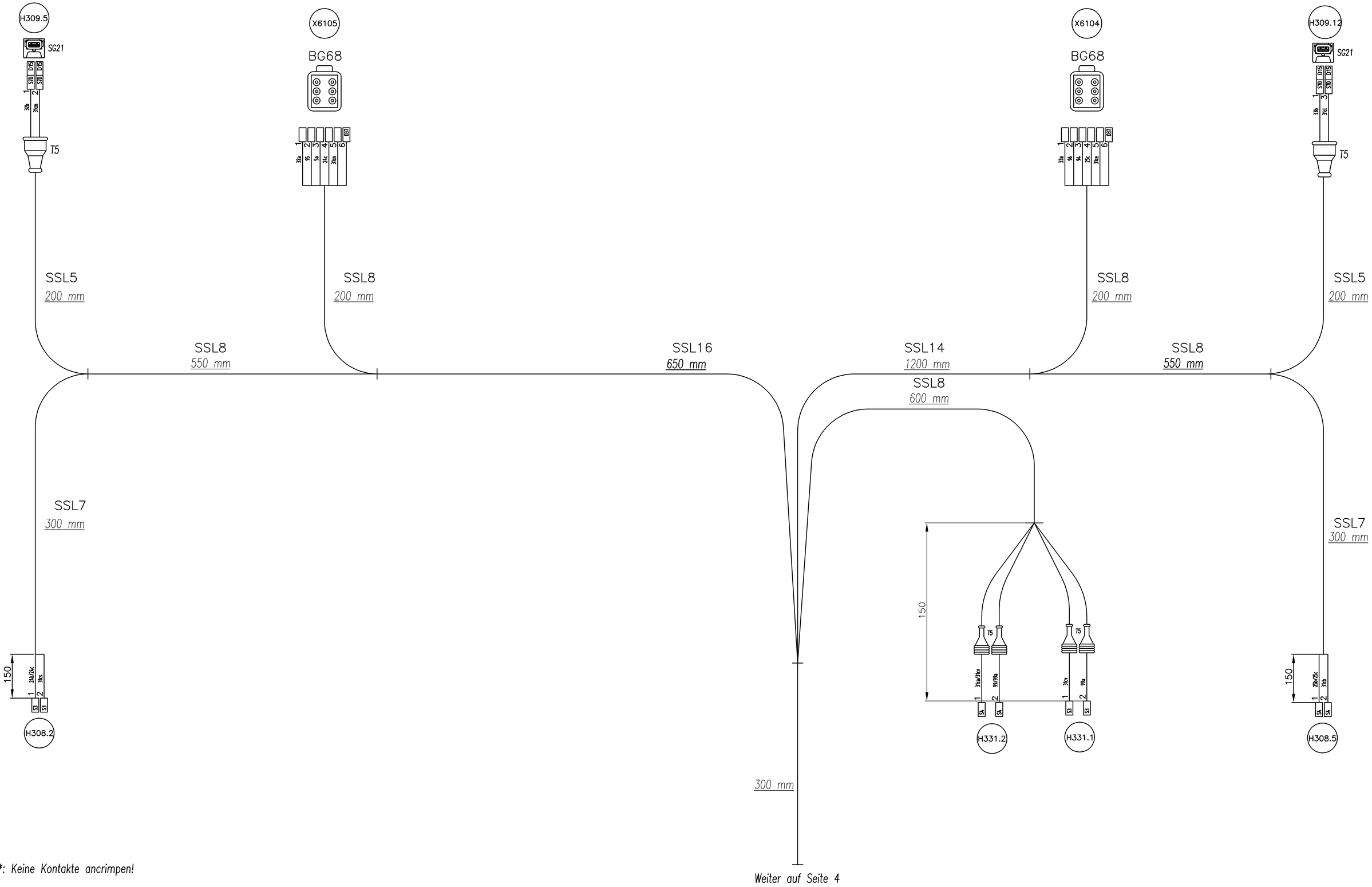

Weiter auf Seite 4

*: Keine Kontakte ancrimpen!

- LEITUNGEN NACH DIN 72551-FLRY-WEISS, POTENTIAL 31 BRAUN
- WEISSE LEITUNGEN ALLE 25 MM MIT POTENTIALNUMMER BEDRUCKEN
- KABELBAUMZUBEHOER WIE IN TEILEKATALOG SPEZIFIZIERT!
- ALLE STECKER MIT POSITIONSBEZEICHNUNGEN MARKIEREN!
- ALLE QUETSCHVERBINDER MIT SCHRUMPFSCHLAUCHISOLIEREN.

ALLE UNTERSTRICHENEN KABELLAENGEN SIND IN PASSENDEN LACKSCHLAUCH ZU VERLEGEN !

a	W10663	26.02.08	Rosenkranz	Maßstab:	Masse: 35 kg
_	W10620	14.11.07	Rosenkranz	Typ: AC 80-2	Werkstoff: %
Ind	Mitt-NR	Datum	Name		Mat.-art: UNTL

	Datum	Name
Erst.	14.11.07	Rosenkranz
Gepr.		
Abteilung:	1142	

KABINENELEKTRIK AC 80-2 UW V4.1.5

ELECTRIC CAB AC 80-2 CHASSIS V4.1.5

TEREX DEMAG

Ident-Nr: 28387612

Format: A1 | Bl. / Blätter: 7/14

Plotstatus: ECSCAD

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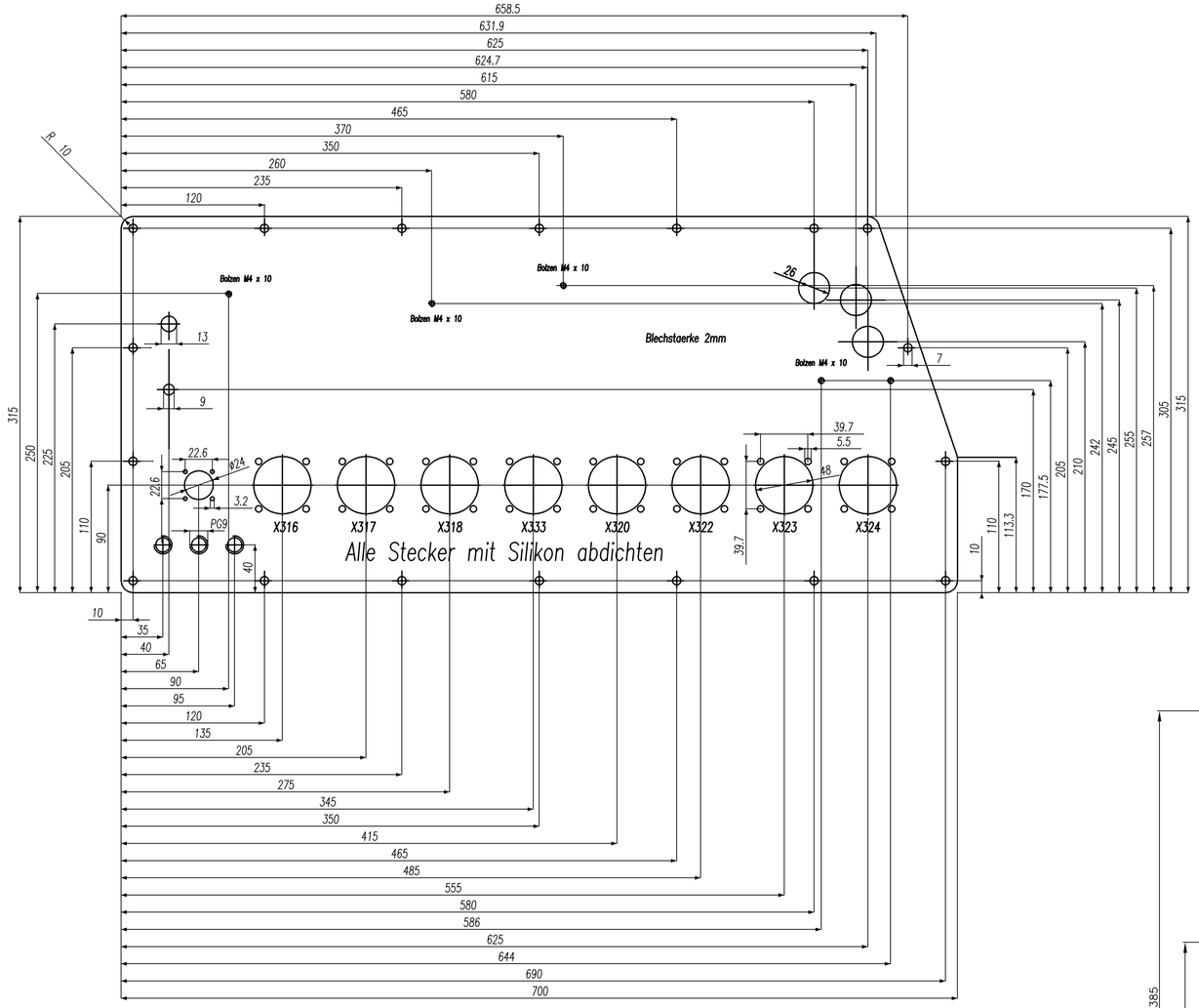
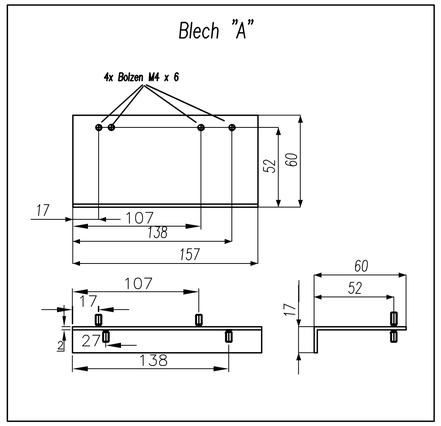
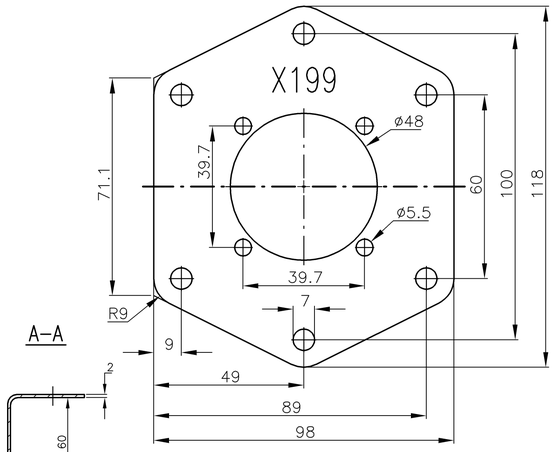
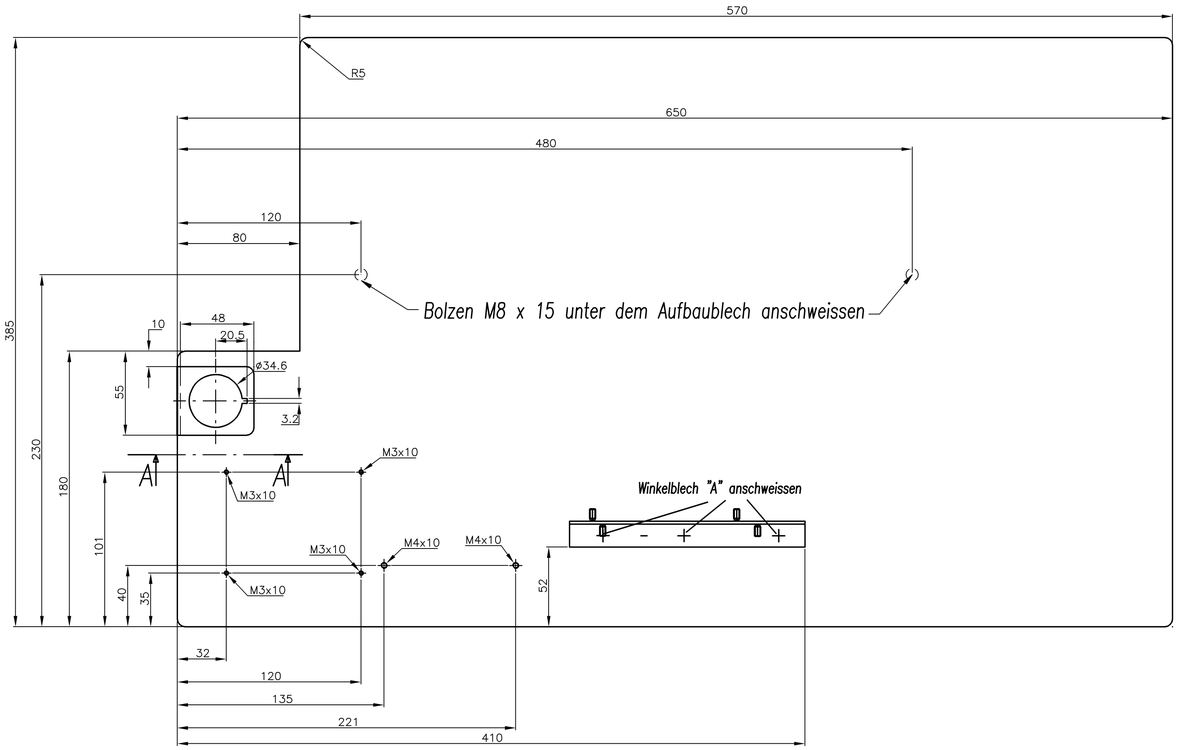


Aufbaublech Zentralelektrik:
Befestigungsbolzen gemäß Bohrbildern der Bauteile
Werkstoff galvanisch verzinkt

Blech "F"







Stecker–Montageblech Innenseite:
Bezeichnungen der Stecker auf beiden Seiten des Bleches Wasserfest anbringen
Befestigungsbolzen gemäß Bohrbildern der Bauteile
Werkstoff galvanisch verzinkt aussen schwarz pulverisiert
Alle Stecker mit Silikon abdichten und mit Blechschrauben 4,2x9.5 F A2 DIN 7971 befestigen

a	W10663	26.02.08	Rosenkranz	Maßstab:	Masse: 35 kg
_	W10620	14.11.07	Rosenkranz	Typ: AC 80–2	Werkstoff: %
Ind	Mitt–NR	Datum	Name		Mat.–art: UNTL

	Datum	Name
Erst.	14.11.07	Rosenkranz
Gepr.		
Abteilung:	1142	

KABINENELEKTRIK AC 80–2 UW V4.1.5

ELECTRIC CAB AC 80–2 CHASSIS V4.1.5

TEREX DEMAG

Ident–Nr: 28387612

Format A1 | Bl. / Blätter 8/14

Plotstatus: ECSCAD

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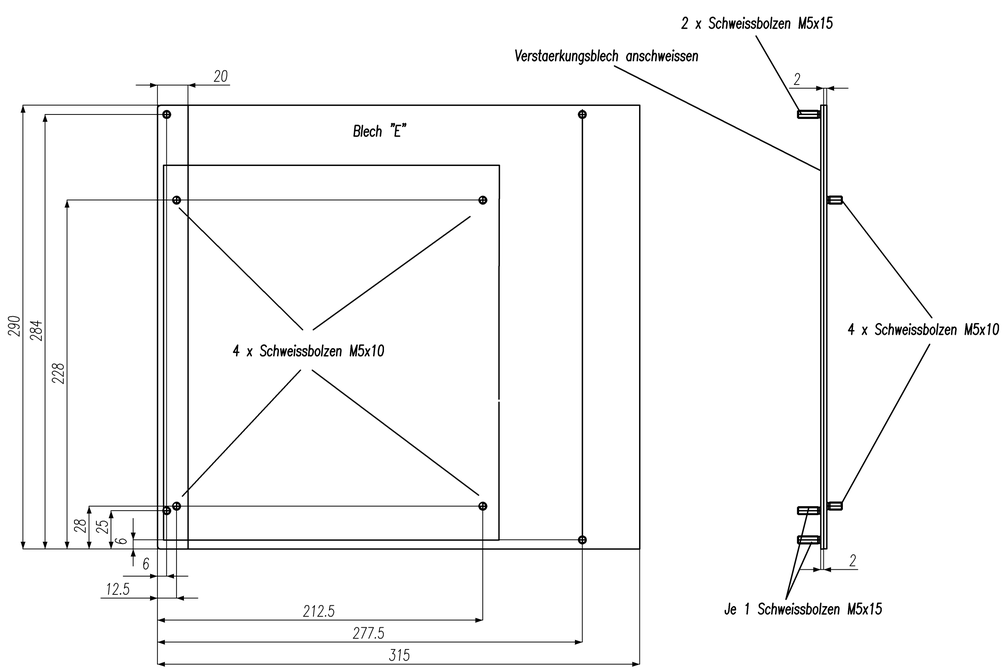

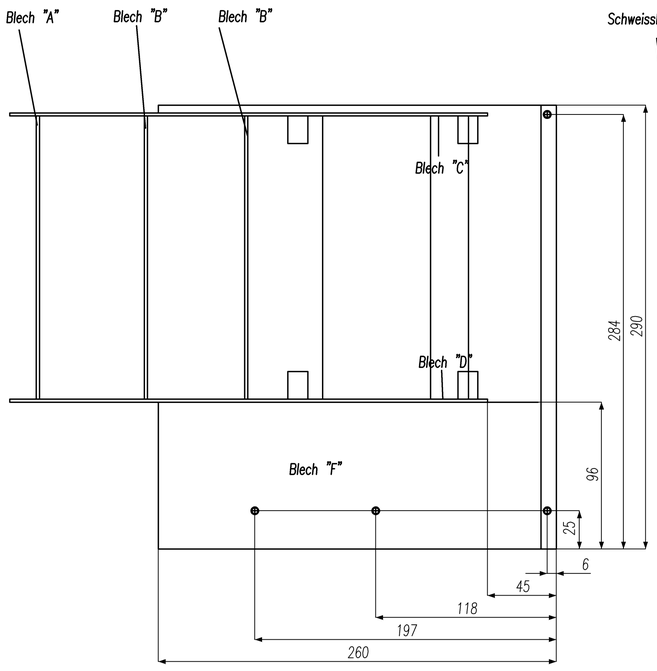

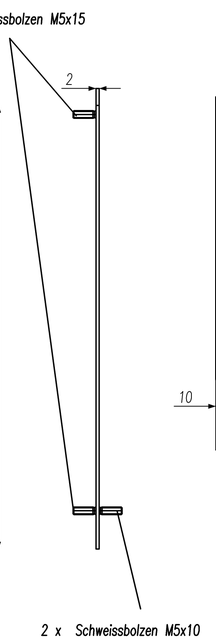

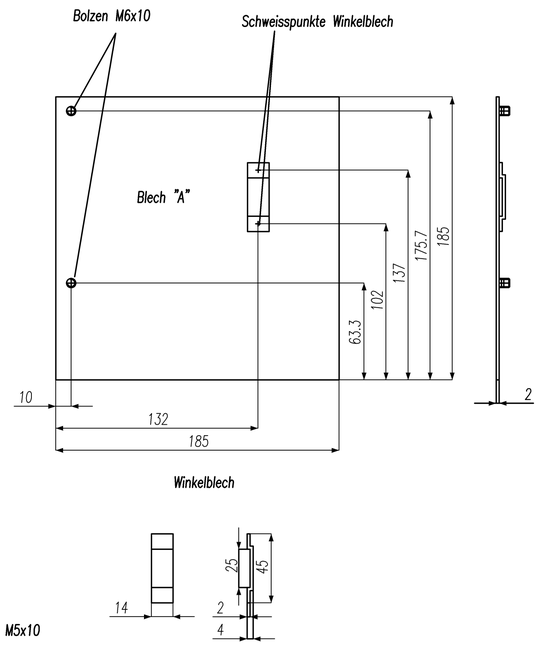

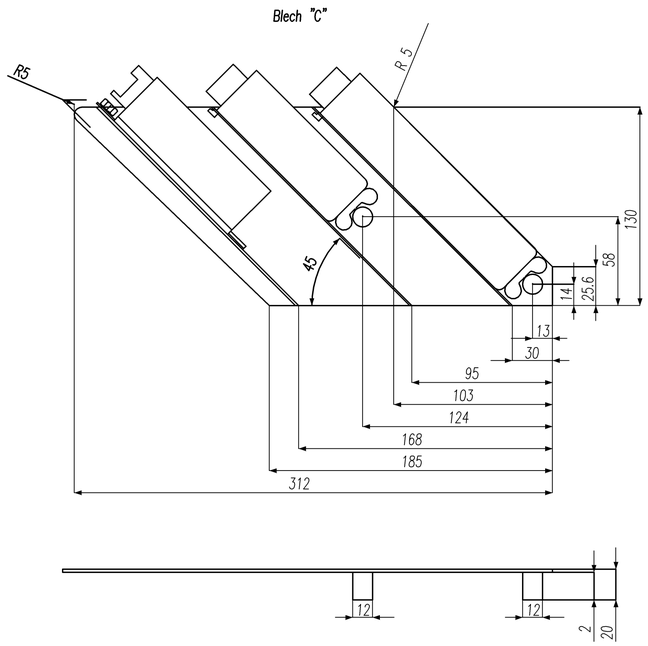

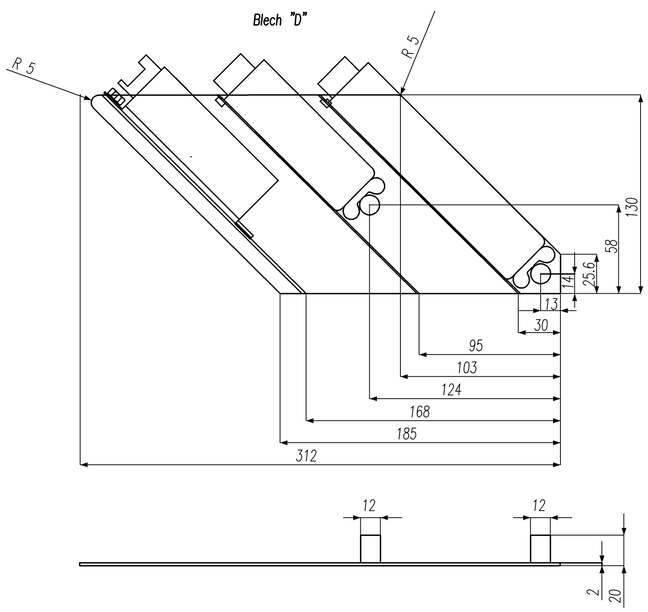

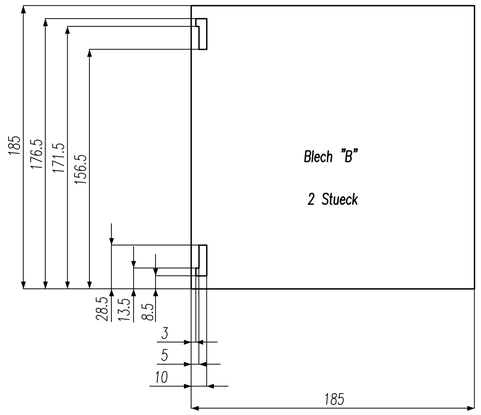

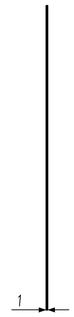

a	W10663	26.02.08	Rosenkranz	Maßstab:	Masse: 35 kg
_	W10620	14.11.07	Rosenkranz	Typ: AC 80-2	Werkstoff: %
Ind	Mitt-NR	Datum	Name		Mat.-art: UNTL

	Datum	Name
Erst.	14.11.07	Rosenkranz
Gepr.		
Abteilung:	1142	

KABINENELEKTRIK AC 80-2 UW V4.1.5

ELECTRIC CAB AC 80-2 CHASSIS V4.1.5

TEREX DEMAG

Ident-Nr:	Format	Bl. / Blätter
28387612	A1	9/14
Plotstatus:		ECSCAD

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Potential	Querschnitt [mm²]	Von	Nach
A–Schirm	1	X199–19	X31B–1
A1	0,5	X199–13	A4200–X2–2
A2	0,5	A4200–X2–3	X199–14
A3	0,5	A4200–X2–1	X199–15
A4	0,5	X199–16	X4200–1
A5	0,5	X199–17	A4200–X2–4
A6	0,5	X199–18	A4200–X2–12
B–Schirm	1	X199–26	X31B–2
B1	0,5	X199–20	A4200–X7–6
B2	0,5	X199–21	A4200–X7–5
B3	0,5	A4200–X7–4	X199–22
B4	0,5	X4200–2	X199–23
B5	0,5	A4200–X2–5	X199–24
B6	0,5	X199–25	A4200–X9–6
C–Schirm	1	X31B–3	X199–33
C1	0,5	A4200–X8–6	X199–27
C2	0,5	A4200–X8–5	X199–28
C3	0,5	A4200–X8–4	X199–29
C4	0,5	X4200–3	X199–30
C5	0,5	X199–31	A4200–X2–6
C6	0,5	A4200–X10–6	X199–32
D4	0,5	A4200–X2–11	X4200–4
R1	1	Res2–1	Res1–1
R2	1	Res2–2	Res1–2
R3	1	Res2–3	Res1–3
R4	1	Res2–4	Res1–4
R5	1	Res2–5	Res1–5
R6	1	Res1–6	Res3–1
R7	1	Res1–7	Res3–2
R8	1	Res1–8	Res3–3
R9	1	Res1–9	Res3–4
R10	1	Res1–10	Res3–5
R11	0,5	Res360–1	Res1–11
R12	0,5	Res1–12	Res360–2
R13	0,5	Res360–3	Res1–13
R14	0,5	Res1–14	Res361–1
R15	0,5	Res1–15	Res361–2
R16	0,5	Res1–16	Res361–3
Br1	1	P100–6	P100–5
Br2	1	P100–7	P100–8
Br3	1	P100–19	P100–20
Br7	1	X322–35	X322–31
Br8	1	X1122_1–5	X1122_1–4
Br9	1	X1122_1–7	X1122_1–6
Br11	1	XK3–11	XK24–19
Br106	1	S2263–7	S2263–5
Br150	1	XK401–2	XK401–1
Br151	1	XK5–15	XK5–11
Test	1	A390–8	X391–B3
bl	1	X320–43	X324–7

Potential	Querschnitt [mm²]	Von	Nach
bl1	1	A301IV–1	X318–N
bl2	1	A310I–12	A301II–16
bl3	1	A310I–15	A302IV–3
bl4	0.5	X310.2–2	X324–7
bl5	1	P301A–8	X4200–X3–5
bl6	1	A401–8	A402–15
bl7	1	X332–D	X320–23
bl8	1	A401–68	X320–23
ge	1	X324–6	X320–44
ge1	1	X318–K	A301IV–3
ge2	1	A301II–18	A310I–10
ge3	1	A302IV–1	A310I–13
ge4	0.5	X310.2–7	X324–6
ge5	1	P301A–4	X4200–X3–4
ge6	1	A402–8	A401–28
ge7	1	X332–C	X320–22
ge8	1	A401–48	X320–22
brgr1	1	A301IV–2	X318–M
brgr2	1	A310I–11	A301II–17
brgr3	1	A302IV–4	A310I–14
brrt1	1	A301IV–2	X318–L
brrt2	1	A310I–11	A301II–17
brrt3	1	A310I–14	A302IV–4
2	2,5	A1–XF2–2	S300–1
2a	2,5	XK4–11	X2–1
2b	1	X2–1	X1122–1
2c	2,5	A1–XF2–4	X2–1
3	2,5	XK2–14	A1–XF1–11
3a	2,5	A1–XF1–15	A1–XF1–14
4	2,5	S400–6	A1–XF1–19
4a	2,5	A1–XF1–21	A1–XF1–20
5	1	H310–1	A1–XF2–10
5a	1	A1–XF2–10	X6105–3
6	1	S314–5	A1–XF3–10
6a	0,5	X361–36	A1–XF3–10
7	1	XK6–14	X317–24
8	1	X8–1	A1–XF3–14
8b	1	X8–1	XK3–10
8c	1	X8–1	XK3–6
8h	1	X8–2	S313–5
8j	1	X8–2	S316–8
8k	1	XK21–12	X8–2
8l	1	X8–3	X322–17
9	1	S313–1	XV2–3
10	1,5	X10–1	A1–XF5–1
10a	1	X10–2	X322–32
10b	1	X10–2	A312–15(8)
10c	1	X10–2	K5210–87
10e	1	XV1–10	X10–2
10g	1,5	X10A–1	X10–3

Potential	Querschnitt [mm²]	Von	Nach
10h	1	X10A–2	S400–13
10j	1	X10A–2	X342.2–4
10k	1	X342.1–6	X10A–2
10l	1	X10A–3	S335–5
10m	1	X328–2	X10A–3
10n	1	X10A–4	A390–10
10p	1	X10A–4	S400–15
11	1	S400–11	XK1–14
12	1	X342.1–3	S400–12
12a	1	X342.1–3	A312–86(4)
13	1	S400–14	V303–+
13a	1	K5211–86	V303–+
14	1	S400–9	K5210–86
15	2,5	S300–5	X15–1
15a	2,5	X15–1	XK4–4
15b	2,5	S315–3	X15–1
15c	2,5	XK2–5	X15–2
15d	2,5	X15–2	A1–XF2–11
15e	2,5	X15–2	A1–XF1–9
15f	2,5	A1–XF2–7	X15–3
15g	2,5	X15–3	A1–XF4–1
15h	1,5	X15–3	X1122–2
16	1	K5211–30	A312–S(2)
17	1	S400–8	A312–I(2)
18	2,5	XK2–16	S400–5
19	2,5	XK1–19	A1–XF3–2
19a	2,5	S315–2	A1–XF3–4
19b	2,5	S400–7	A1–XF3–6
20	2,5	XK4–7	XK4–2
21	1	K5211–87a	K5210–87a
22	1	S316–3	S400–1
22a	1	S316–3	A308–2
23	1,5	X23–1	A1–XF5–17
23a	1	X23–2	XK2–13
23b	1	S316–2	X23–2
23c	1	A903–1	X23–2
23e	1	X23–2	X322–41
23f	1	X342.1–2	X23–2
23g	1	E390–1	X23–3
23h	1	XK1–18	X23–3
23k	1	XK3–3	X23–3
23l	1	X23–3	XK4–6
23m	1	X23–3	X324–2
24	1	S400–2	S316–1
24a	1	S316–1	X317–25
24b	1	H308.2–1	X317–25
24c	1	X6105–4	H308.2–1
25	1	S316–5	S400–3
25a	1	S316–5	X317–11
25b	1	H308.5–1	X317–11

Potential	Querschnitt [mm²]	Von	Nach
25c	1	X6104–4	H308.5–1
26	1	A308–1	S316–4
27	1	S316–6	A308–3
28	1	A308–7	H330–1
29	1	H335–1	A308–6
30	10	X30–1	X710–1
30a	2,5	X30–1	A1–XF1–1
30b	2,5	X30–1	A1–XF4–19
30c	2,5	A1–XF2–1	X30–2
30d	2,5	X30–2	A1–XF3–1
30f	2,5	X30–3	A1–XF3–11
30g	2,5	X30–3	A2–XF1–11
30h	2,5	X30–3	A2–XF1–13
30j	2,5	X30–4	A2–XF1–15
30k	2,5	X30–4	A2–XF1–17
30l	2,5	X30–4	X318–A
30m	2,5	X30–5	X318–B
30n	2,5	X30–5	XK2–20
30s	2,5	X30–6	A2–XF2–13
30v	2,5	X30–7	A2–XF2–17
30w	2,5	X30–7	A2–XF2–1
30x	2,5	X30–7	A2–XF2–7
30y	2,5	X30–8	A2–XF2–9
30z	2,5	XK4–19	X30–8
31	10	X31.1–1	X710–2
31a	1	S301–10	X31A–2
31b	1	X31A–2	S344–10
31c	1	X31A–2	S309–10
31d	1	X31.2–10	X199–6
31e	1	X31A–3	S305–10
31f	1	S306–10	X31A–3
31g	1	X31A–4	S307–10
31h	1	X31A–4	S308–10
31j	1	X31.2–10	X199–12
31k	1	X31A–4	S312–10
31l	1	X31A–5	S313–10
31m	1	X31A–5	S314–10
31n	1	S315–10	X31A–5
31p	1	X31A–6	S316–10
31r	1	X102–2	X31A–6
31s	1	X31A–6	S326–10
31t	1	S327–10	X31A–7
31u	1	A904–8	X31A–7
31v	1	X31A–7	S328–10
31w	1	X31A–7	S331–10
31x	1	S332–10	X31A–8
31y	1	S370–10	X31A–8
31z	1	X31A–8	S335–10
31aa	1	X31A–9	H310–2
31ab	1	H311–2	X31A–9

a	W10663	26.02.08	Rosenkranz	Maßstab:	Masse: 35 kg
_	W10620	14.11.07	Rosenkranz		
Ind	Mitt–NR	Datum	Name	Typ: AC 80–2	Werkstoff: %
					Mat.–art: UNTL

	Datum	Name
Erst.	06.03.08	Rosenkranz
Gepr.		

Abteilung: 1142

KABINENELEKTRIK AC 80–2 UW V4.1.5

ELECTRIC CAB AC 80–2 CHASSIS V4.1.5

TEREX DEMAG

Ident–Nr: 28387612

Format: A1 | Bl. / Blätter: 10/14

Plotstatus: ECSCAD

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Potential	Querschnitt [mm²]	Von	Nach
31ac	1	H312–2	X31A–9
31ad	1	H316–2	X31A–10
31ae	1	X31A–10	H317–2
31ag	1	X31A–11	H330–2
31ah	1	H335–2	X31A–11
31aj	1	S311–3	X31A–11
31ak	1	X101–2	X31A–12
31an	1	P100–15	X31A–12
31ar	1	X31A–12	H347–2
31as	1	X31A–13	H348–2
31at	1	H349–2	X31A–13
31av	1	X31A–13	H337–2
31aw	1	X31A–14	H343–2
31ax	2,5	X31.1–7	X317–44
31ay	2,5	X31.1–7	X317–42
31az	2,5	X31.1–14	X317–43
31ba	1	A390–12	X31A–14
31bb	2,5	X342.1–7	X31A–16
31bc	2,5	X31A–17	X342.1–8
31bd	1	H392–2	X31A–18
31be	1	H393–2	X31A–18
31bf	1	X31A–18	H394–2
31bg	1	X31A–18	H395–2
31bh	1	H322–2	X31A–19
31bj	1	X31A–19	P100–21
31bk	1	S303–5	X31A–22
31bl	1	X31A–19	H390–2
31bm	1	X31A–20	H391–2
31bn	1	X31A–20	S309–1
31bo	1	S303–10	X31A–22
31bp	1	X31A–20	H338–2
31br	1	P301.1B–2	X31A–20
31bs	1	P301.1A–3	X31A–21
31bv	1	X31A–21	H345–2
31bw	1	H344–2	X31A–21
31bx	2,5	A390–4	X31A–16
31by	1	H307–2	X31A–22
31bz	2,5	X31A–17	X31B–4
31ca	1	X31.1–2	H331.2–1
31cb	1	X31.1–2	H308.5–2
31cd	1	X31.1–2	K390–85
31ce	1	X31.1–2	X6104–5
31cg	1	X31.1–3	K5210–85
31cl	1	X31.1–3	H309.12–3
31cm	1	X31.1–3	H309.5–2
31cn	1	X31.1–3	X6105–5
31co	1	X31.1–2	K5211–85
31cs	1	X31.1–3	H308.2–2
31cv	1	H331.1–1	H331.2–1
31cw	1	X31.1–4	B310.6–2

Potential	Querschnitt [mm²]	Von	Nach
31cx	1	X31.1–4	B310.1–2
31cy	1	XK23–22	X31.1–4
31cz	2,5	X360–M	X31.1–4
31da	1	XK2–21	X31.1–5
31db	1	X31.1–5	XK2–22
31dc	1	X31.1–5	XK4–21
31dd	1	XK4–22	X31.1–6
31df	2,5	XK4–15	X31.1–5
31dg	1	A401–69	X31.1–6
31dj	1	X31.1–6	K301–85
31dk	1	X31.1–6	A312–31(6)
31dn	1	X328–1	X31.1–8
31dp	1	A308–5	X31.1–8
31dr	1	XK1–15	X31.1–8
31ds	1	A903–2	X31.1–8
31dt	1	A903–4	X31.1–8
31dv	1,5	X31.2–8	X312–2
31dw	0,5	X360–17	X31.2–8
31dx	0,5	X31.2–8	X360–50
31dy	0,5	X361–17	X31.2–9
31dz	0,5	X361–50	X31.2–9
31ea	1	X31.1–11	X300–1
31eb	2,5	X31.1–11	A301II–2
31ec	2,5	X31.1–11	A302I–5
31ed	6	X312–7	X31.2–9
31ee	2,5	X31.1–12	X323–42
31ef	2,5	X31.1–12	X323–43
31eg	2,5	X31.2–1	X323–44
31eh	2,5	X31.2–1	X322–42
31ej	2,5	X31.2–1	X322–43
31ek	2,5	X31.2–2	X322–44
31el	2,5	X31.2–2	X318–C
31em	2,5	X31.2–2	X318–D
31en	2,5	X31.2–3	X391–C3
31eo	1,5	X31.2–5	X0424–2
31ep	1,5	X31.2–5	X1122–3
31er	1	X31.2–6	XK3–18
31es	2,5	X31.2–4	X316–42
31et	2,5	X31.2–4	X316–43
31ev	2,5	X31.2–4	X316–44
31ew	4	X31.2–5	Geh–1
31ex	1	E390–2	X31.2–6
31ey	1	A2112–5	X31.2–6
31ez	1	X31.2–6	XK22–7
31fa	1	X332–A	X31.2–7
31fl	2,5	X31.2–11	X318–F
31fm	2,5	X31.2–11	X318–G
31fp	1	X31.2–13	XK24–1
31fr	1	XK24–7	X31.2–13
31fs	1	A401–9	X31.2–13

Potential	Querschnitt [mm²]	Von	Nach
31ft	1	X31.2–13	K133–85
31fy	1	P301A–5	X31.2–13
31fz	1	P301A–6	X31.2–13
31gb	1	XK6–21	X31.1–13
31gd	1	A402–5	X31.1–13
31ge	1	X31.1–13	XK6–22
31gf	1	X31.1–13	A402–14
31gh	2,5	X31.1–14	A386–X1–9
31gj	1	X31.1–15	X386–2
31gk	0,5	X310.2–3	X31.2–7
31gl	2,5	X31.2–12	A4200–X12–4
31gm	1	H500–7	X31.2–12
31gn	1	X31.2–7	S329–10
31gp	1	X31.2–7	XK5–20
31gr	2,5	X31.2–3	A386–X1–4
31gx	6	X31.1–1	X31A–1
31gy	2,5	X31B–5	Geh310–1
31ha	1	S345–10	X31A–14
31hb	1	X31A–14	S346–10
31hc	1	X31A–15	S347–10
31hd	1	X31A–15	S2263–10
31hf	1	K132–85	X31.2–10
31hg	1	K132–30	K132–85
31ia	1	X31.2–15	H350–2
31ib	1	X31.2–15	XK5–2
31ic	1	X31.2–15	X364–2
31id	1	X31.2–15	X364–4
31ie	1	XK1–9	X31.2–15
31rr	1	P301.1C–2	P301.1B–2
31rs	1	X31.2–12	B310.7–31
32	1	X32–1	A1–XF4–6
32a	1	X32–1	X6105–1
32b	1	X32–1	H309.5–1
32c	1	X32–1	X322–2
32d	1	X32–2	X317–1
32f	1	X32–2	X316–14
32g	1	XV2–14	X32–3
32h	1	X32–3	X320–3
32aa	1	X32A–1	A1–XF4–8
32ab	1	S316–7	X32A–1
32ac	1	S303–9	X32A–1
32ad	1	P100–16	X32A–1
32ae	1	A390–1	X32A–2
32af	1	S301–9	X32A–2
32ag	1	S344–9	X32A–2
32ah	1	S309–9	X32A–2
32ak	1	X32A–3	S305–9
32al	1	S306–9	X32A–3
32am	1	S307–9	X32A–3
32an	1	S308–9	X32A–3

Potential	Querschnitt [mm²]	Von	Nach
32ap	1	S312–8	X32A–4
32ar	1	X32A–4	S313–8
32as	1	S314–8	X32A–4
32at	1	X32A–4	S315–9
32aw	1	S326–8	X32A–5
32ax	1	S327–8	X32A–5
32ay	1	S328–8	X32A–5
32az	1	X32A–5	S331–8
32ba	1	X32A–6	S332–8
32bb	1	S2263–8	X32A–6
32bc	1	S335–8	X32A–6
32bd	1	X32A–6	X342.2–8
32be	1	X32A–7	H392–1
32bf	1	X32A–7	H393–1
32bg	1	X32A–7	H394–1
32bh	1	X32A–7	H395–1
32bj	1	H390–1	X32A–8
32bk	1	X32A–8	H391–1
32bm	1	P301.1B–1	X32A–8
32bn	1	S329–8	X32A–8
32bp	1	S370–8	X32A–9
32bs	1	P301A–2	X32A–9
32bt	1	X32A–9	A402–3
32ra	1	P301.1B–1	P301.1C–1
32xa	1	X32A–10	S347–9
32xb	1	X32A–10	S346–9
32xc	1	X32A–10	S345–9
33	1	X33–1	A1–XF4–10
33a	1	X33–1	X6104–1
33b	1	X33–1	H309.12–1
33c	1	X33–1	X323–3
33e	1	X33–2	X317–18
33f	1	X33–2	X342.2–7
33g	1	X33–3	X322–3
33h	1	X33–3	X316–15
34	1	P301A–1	A1–XF4–12
34a	1	P100–1	A1–XF4–12
35	1	X35–1	A1–XF4–14
35a	1	X35–1	H336–1
35b	1	X35–1	XK24–11
35c	1	X35–1	H324–1
35d	1	H329–1	X35–2
35e	1	H327–1	X35–2
35f	1	X35–2	H323–1
35g	1	X35–2	H325–1
35h	1	H305–1	X35–3
35j	1	H314–1	X35–3
35n	1	X35–4	H334–1
35p	1	X35–4	H339–1
35r	1	X35–4	H320–1

a	W10663	26.02.08	Rosenkranz	Maßstab:	Masse: 35 kg
_	W10620	14.11.07	Rosenkranz		
Ind	Mitt–NR	Datum	Name	Typ: AC 80–2	Werkstoff: %
					Mat.–art: UNTL

	Datum	Name
Erst.	06.03.08	Rosenkranz
Gepr.		
Abteilung:	1142	

KABINENELEKTRIK AC 80–2 UW V4.1.5

ELECTRIC CAB AC 80–2 CHASSIS V4.1.5

TEREX DEMAG

Ident–Nr: 28387612

Format: A1 | Bl. / Blätter: 11/14

Plotstatus: ECSCAD

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Potential	Querschnitt [mm²]	Von	Nach
35s	1	X35–5	H319–1
35t	1	H341–1	X35–5
35v	1	X35–5	H342–1
35w	1	P301A–3	X35–5
35y	1	X35–6	H332–1
35z	1	H306–1	X35–6
35aa	1	X35–6	H301–1
35ab	1	X35–7	P301.1A–4
35ac	1	H318–1	X35–7
36	1	XK1–11	P100–22
36a	1	XK1–11	X320–41
37	1	P301B–6	A301I–10
38	1	P100–24	B310.7–G
39	1	XK24–17	X317–12
40	1	XK23–6	A302I–2
41	1	P100–4	XK1–1
42	1	XK23–12	A302I–7
43	1	P100–25	A302I–9
44	1	H338–1	X322–26
45	1	H334–2	B310.6–1
45a	1	A302II–8	B310.7–WK
45b	1	H334–2	A302II–8
46	1	H329–2	A302I–12
47	1	H327–2	X316–4
47a	1	XV1–9	X316–4
48	1	XV1–21	X317–13
48a	1	XV1–21	H314–2
48b	1	X316–3	X317–13
49	1	H320–2	X323–7
50	1	S300–8	X1122–4
51	1	H319–2	X323–8
52	1	A401–29	XV1–17
52a	1	XV1–17	H305–2
53	1	X317–8	X320–40
54	1	H339–2	X322–19
54a	1	V310––	X322–19
55	1	XK24–13	P100–2
56	2,5	X56–1	S315–1
56a	2,5	X56–1	S400–4
56b	2,5	XK2–11	X56–2
56c	2,5	A1–XF2–9	X56–2
57	1	H341–2	X322–6
58	2,5	S315–6	X58–1
58a	2,5	X58–1	XK2–3
58b	2,5	X58–2	A1–XF3–5
58c	2,5	X58–2	A1–XF3–9
59	1	H342–2	X316–5
59a	1	X316–5	X322–7
59b	1	X322–7	X322–8
59c	1	X317–30	X322–8

Potential	Querschnitt [mm²]	Von	Nach
60	1	A903–3	X312–1
60a	1	A903–3	K133–30
60b	1	A904–7	X312–1
61	1	H323–2	A302I–13
62	1	XK1–17	X318–a
62a	1	X318–a	A301IV–11
62b	1	P301C–3	XK1–17
63	1	XV1–13	A302I–3
63a	1	H325–2	XV1–13
64	1	X320–25	X317–2
65	1,5	X65–1	A1–XF3–18
65a	1	XK1–13	X65–2
65b	1	X65A–3	S331–5
65c	1	X65A–3	S332–5
65g	1	XK2–1	X65–2
65h	1	XK2–9	X65–2
65k	1	XK2–4	X65–3
65l	1	X65–3	XK24–2
65m	1	X65–2	X0424–4
65aa	1	X65A–1	X65–3
65ab	1	X65–3	X65A–1
65ac	1	X65–3	X65A–2
65ad	1	X65A–2	S326–5
65ae	1	S331–5	XK6–5
65af	1	S332–5	X322–4
66	1	S331–1	X323–9
67	1	S332–1	X323–10
67a	1	A4200–X4–8	X323–10
68	1	H324–2	A302I–14
69	1	XK23–13	X316–31
69a	1	XK23–13	S311–9
70	2,5	X70–.	A1–XF4–16
70a	2,5	XK3–19	X70–.
70b	1	XK23–11	X70–.
70c	1	A1–XF3–17	X70–.
72	2,5	XK4–3	X318–E
73	1	S370–1	S5129–1
74	1	X342.2–5	S370–5
77	1	XK4–1	X316–27
78	1	S311–1	X316–32
79	1	S311–10	X316–33
81	1	XV2–12	XV2–8
81a	1	X81–1	XV2–12
81b	1	X81–1	S312–2
81c	1	S313–2	X81–1
81d	1	X81–1	S2263–2
81e	1	S326–2	X81–2
81f	1	S327–2	X81–2
81g	1	X81–2	S328–2
81h	1	X81–2	S331–2

Potential	Querschnitt [mm²]	Von	Nach
81j	1	S332–2	X81–3
81l	1	S335–2	X81–3
81m	1	S329–2	X81–3
81n	1	X81–3	S370–2
82	1	H348–1	S327–1
82a	1	S327–1	X323–39
82b	1	X316–23	X323–39
83	1	X323–37	X316–24
83a	0,5	X360–8	X316–24
85	0,5	X360–49	A1–XF5–5
86	0,5	X361–49	A1–XF5–11
87	1	XK6–12	A1–XF5–13
87b	0,5	X361–47	A1–XF5–15
87c	0,5	X361–48	A1–XF5–16
87d	0,5	X361–46	A1–XF5–14
88	1	S335–1	X342.1–1
89	1	A904–4	K133–87
90	2,5	K301–30	A1–XF4–2
91	2,5	K301–87	X91–1
91a	2,5	X91–1	A1–XF2–17
91b	2,5	X91–1	A1–XF3–15
91c	2,5	X91–2	A1–XF2–15
91e	2,5	X91–3	A2–XF2–15
92	1	P100–12	X318–n
94	1	A1–XF2–14	X6104–3
95	1	A1–XF2–18	X6105–2
96	1	A1–XF2–22	X6104–2
97	1	XK2–19	X342.1–4
98	1	XK3–9	X317–17
99	1	XK1–12	H331.2–2
99a	1	H331.1–2	H331.2–2
100	1	XK4–12	X317–19
100a	1	XK4–12	X317–9
101	1	S326–1	H347–1
101a	1	S326–1	XK22–1
102	1	S326–7	XK22–3
103	1	XK3–20	XV1–7
104a	1	XV2–1	XK22–17
104b	1	XV1–11	XV2–1
104c	1	XV1–15	XV1–11
104d	1	XV1–19	XV1–15
104e	1	XK6–4	XV1–19
105	1	XK21–5	X322–20
105a	1	XK21–16	XK21–5
105c	0,5	X361–5	X324–1
105d	1	X322–20	X324–1
106	1	S2263–7	X317–26
106a	1	X317–26	X317–27
106b	1	X317–27	X322–15
106c	1	X322–15	X323–20

Potential	Querschnitt [mm²]	Von	Nach
107	1	XK2–12	A1–XF3–16
107a	1	X361–4	A1–XF3–16
107b	1	XK2–12	A4200–X4–10
108	1	XK2–6	X316–25
108a	1	XK2–6	X323–21
109	1	XV1–1	X318–m
110	1	X323–12	X316–18
110a	0,5	X361–37	X316–18
110b	1	X323–12	X320–29
111	1	X316–11	X323–13
111a	1	X316–11	X316–12
111b	1	X320–7	X323–13
112	1	X316–13	X323–14
112a	1	X320–8	X323–14
113	1	X323–15	X316–16
113a	1	X316–16	X317–31
113b	1	X320–9	X323–15
114	1	X317–22	X323–16
114a	1	X323–16	X320–10
115	2,5	XK4–5	X115–1
115a	2,5	X115–1	A1–XF1–5
115b	2,5	X115–1	A1–XF2–13
115c	2,5	X115–2	A1–XF4–7
115d	2,5	X115–2	A1–XF3–13
115e	2,5	X115–2	A1–XF4–9
115f	2,5	X115–3	A1–XF4–13
115g	2,5	X115–3	A1–XF4–15
115h	2,5	X115–3	A2–XF1–9
115k	2,5	X115–4	A1–XF4–11
115l	2,5	X115–5	A2–XF1–1
116	1	X323–18	X316–20
116a	1	X323–18	X320–12
117	1	X323–19	X322–33
117a	1	X316–21	X322–33
117b	1	X320–13	X323–19
118	1	X316–22	X322–34
118a	1	X322–34	X320–14
119	1	X323–11	X316–17
119a	0,5	X361–20	X316–17
119b	1	X323–11	X320–15
120	1	X323–17	X316–19
120a	1	X323–17	X320–11
121	1	S312–5	A1–XF3–12
121a	1	XV2–10	A1–XF3–12
122	1	S312–1	X323–22
122a	1	X323–22	X316–6
123	1	A1–XF2–8	X101–1
124	1	XK22–19	X320–6
126	1	X102–1	A1–XF3–8
126a	1	X312–6	A1–XF3–8

a	W10663	26.02.08	Rosenkranz	Maßstab:	Masse: 35 kg
–	W10620	14.11.07	Rosenkranz		
Ind	Mitt–NR	Datum	Name	Typ: AC 80–2	Werkstoff: %
					Mat.–art: UNTL

	Datum	Name
Erst.	06.03.08	Rosenkranz
Gepr.		

Abteilung: 1142

KABINENELEKTRIK AC 80–2 UW V4.1.5

ELECTRIC CAB AC 80–2 CHASSIS V4.1.5

TEREX DEMAG

Ident–Nr: 28387612

Format: A1 | Bl. / Blätter: 12/14

Plotstatus: ECSCAD

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Potential	Querschnitt [mm²]	Von	Nach
126b	1	X312–6	K133–86
127	1	XK3–12	X0424–3
127a	1	XK3–12	V310–+
128	1	XV2–15	X322–40
129	1	S303–1	X0424–5
130	1	H307–1	X0424–6
131	1	X342.2–3	A312–31b(5)
132	1	XK24–15	P100–9
133	1	XK23–4	P100–10
134	1	XK23–14	P100–11
135	1	XK3–11	X320–37
136	1	XK23–8	X320–38
137	1	XK23–10	X320–39
138	1	X342.2–1	V303––
140	1	X140–1	S327–7
140a	1	X140–1	S305–4
140b	1	X140–1	S305–3
140c	1	S306–4	X140–2
140d	1	S306–3	X140–2
140e	1	S307–4	X140–2
140f	1	S307–3	X140–3
140g	1	S308–3	X140–3
140h	1	X140–3	X317–34
141	0,5	S308–1	X360–1
143	1	S305–7	S305–1
143a	0,5	S305–7	X360–3
144	1	S306–1	S306–7
144a	0,5	S306–7	X360–4
145	1	S307–1	S307–7
145a	0,5	X360–5	S307–7
146	1	S306–2	S305–2
146a	1	S306–2	S307–2
146b	0,5	X360–6	S307–2
147	1	S305–8	S306–8
147a	1	S306–8	S307–8
147b	0,5	X360–7	S307–8
150	1	XK401–2	X318–c
150a	1	X318–c	A301I–18
150b	1	K401–9	XK401–2
151	1	X151–1	XK5–15
151a	1	X151–1	X1122–6
151b	1	X151–2	A402–12
151c	1	X151–1	A401–63
151d	1	X151–3	X332–B
151e	1	XK3–7	X151–2
151f	1	X151–3	X320–2
152	1	XK4–18	H322–1
153	1	K301–86	XK4–14
154	1	X318–b	A301IV–13
155	1	XV1–3	K401–8

Potential	Querschnitt [mm²]	Von	Nach
155a	1	XK5–13	K401–8
155b	1	XK5–13	XK5–17
156	1	XV2–2	X323–36
156a	1	XK1–3	XV2–2
156b	1	X323–36	X320–1
156c	1	X318–s	X320–1
156d	1	X316–30	X318–s
157	1	A1–XF2–6	K401–4
157a	1	XK4–20	K401–4
157b	1	XK5–11	XK4–20
157c	1	A1–XF2–6	X318–H
157d	1	H326–1	X318–H
160	1	X160–1	A1–XF5–7
160a	1	X160–1	X322–13
160b	1	X160–1	X317–20
160c	1	X160–1	X316–7
160d	0,5	X160–2	X360–46
160e	0,5	X360–47	X160–2
160f	0,5	X160–3	X360–48
160h	1	X160–3	S327–5
160j	1	X160–3	S329–5
161	1	XV1–22	K401–6
161a	1	H326–2	K401–6
163	0,5	X360–35	X316–10
164	0,5	X360–19	X316–9
165	0,5	X360–36	X317–23
166	0,5	X360–20	X317–21
167	0,5	X360–37	X322–10
168	0,5	X360–21	X322–12
169	0,5	X361–1	X317–16
170	0,5	X361–2	S329–1
171	0,5	X361–3	X320–32
171a	1	X320–32	X317–41
176	0,5	X361–6	XK21–10
177	0,5	XV1–4	X361–7
177a	1	XV1–4	XV1–8
177b	1	XV1–8	XK1–22
178	0,5	XK5–19	X361–8
178a	1	XK5–19	A4200–X4–1
181	0,5	X360–22	X317–4
182	0,5	X360–23	X317–3
183	0,5	X360–24	X317–6
184	0,5	X360–25	X317–5
185	0,5	X360–26	X317–7
186	0,5	X360–27	X317–35
188	0,5	X360–29	X317–10
191	0,5	X360–9	H312–1
192	0,5	X360–10	H317–1
193	0,5	X360–11	H311–1
194	0,5	H316–1	X360–12

Potential	Querschnitt [mm²]	Von	Nach
195	0,5	XK6–9	X360–13
201	0,5	X361–22	X323–33
202	0,5	XK21–20	X361–23
203	0,5	X361–24	X317–32
204	0,5	X361–25	X317–33
205	0,5	X361–26	H350–1
207	0,5	A401–43	X361–28
208	0,5	X361–29	XK6–16
208a	0,5	S314–2	XK6–16
209	1	XK21–22	X323–34
210	1	X320–28	X323–30
210a	0,5	X361–34	X320–28
211	1	X320–42	X323–31
211a	0,5	X361–18	X320–42
212	0,5	X361–19	XK6–20
212a	1	S314–1	XK6–20
215	2,5	X215–1	XK4–13
215a	2,5	X215–1	A2–XF1–7
215b	2,5	X215–2	A301II–3
215c	2,5	X215–2	A302I–15
215d	2,5	X215–3	A2–XF2–11
220	1	X342.2–2	K5210–30
221	1	XV1–14	X391–A4
223	0,5	X361–11	A302II–4
225	0,5	X361–13	XV1–18
227	1	XK1–7	XK23–15
227a	0,5	XK23–15	X361–14
229	1	XK24–4	X320–4
230	1	XK22–4	X320–16
232	1	XK22–2	X322–31
233	1	XV2–6	X322–35
233a	1	XV2–11	XV2–6
234	1	XK21–6	XK22–13
234a	1	XV2–4	XK22–13
234b	1	XV2–4	X324–4
235	1	H343–1	XK3–22
235a	1	XK21–15	XK21–21
235b	1	XK21–15	XK22–9
235c	1	XV2–13	XK22–9
235d	1	XV2–13	XK23–2
235e	1	XK23–2	XK23–16
235f	1	XK23–16	XK24–9
235g	1	XK24–9	XK21–1
235h	1	XK21–1	X322–21
235j	1	XK6–1	X322–21
235k	1	XK21–21	XK3–22
235l	1	XK3–13	XK6–1
235m	1	XK3–13	XK3–14
236	1	XK21–19	XV2–17
236a	1	XV2–21	XV2–17

Potential	Querschnitt [mm²]	Von	Nach
236b	1	XV2–21	XV1–5
238	1	XK4–9	X320–17
238a	1	XV2–19	XK4–9
238b	0,5	X361–35	XV2–19
238d	1	X320–17	X324–3
239	1	X320–31	X323–28
239a	1	XV1–2	X323–28
240	1	X320–30	X323–29
240a	1	XV1–6	X323–29
241	1	XK1–20	X323–32
242	2,5	X391–C2	A2–XF3–1
243	1	A390–11	A2–XF3–7
243a	0.5	X310.2–9	A2–XF3–7
244	1,5	K390–87	A2–XF3–9
245	1	XV1–12	K390–86
245a	1	XV1–12	XV1–16
246	1,5	X342.1–5	K390–30
247	1	A390–2	X391–A1
248	1	X391–C4	X322–36
249	1	X31.1–1	X322–37
251	1	XK4–17	X1122–7
260	1	S312–9	S312–6
261	1	S313–6	S313–9
262	1	S314–9	S314–6
263	1	S326–6	S326–9
264	1	S327–6	S327–9
265	1	S328–6	S328–9
266	1	S331–6	S331–9
267	1	S332–9	S332–6
268	1	S370–6	S370–9
269	1	S335–6	S335–9
270	1	S2263–6	S2263–9
289	1	S309–3	A386–X1–5
290	1	A2–XF2–8	X318–d
291	1	X300–2	A2–XF2–10
292	1	X300–3	A2–XF2–12
292a	1,5	A2–XF2–12	X0424–1
293	1	A2–XF2–14	A301II–1
293a	1	XK1–6	A2–XF2–14
294	1	A2–XF2–16	A302I–1
295	1	X295–1	A2–XF2–18
295a	1	A401–70	X295–1
295b	1	A401–10	X295–2
295c	1	A402–13	X295–2
296	1	A386–X1–7	A2–XF3–11
296a	1	H333–1	A2–XF3–11
296b	1	XK22–10	H333–1
296c	1	X386–1	XK22–10
296d	1	X312–3	A2–XF3–12
297	2,5	A2–XF3–13	A386–X1–8

a	W10663	26.02.08	Rosenkranz	Maßstab:	Masse: 35 kg
–	W10620	14.11.07	Rosenkranz		
Ind	Mitt–NR	Datum	Name	Typ: AC 80–2	Werkstoff: %
					Mat.–art: UNTL

	Datum	Name
Erst.	06.03.08	Rosenkranz
Gepr.		

Abteilung: 1142

KABINENELEKTRIK AC 80–2 UW V4.1.5

ELECTRIC CAB AC 80–2 CHASSIS V4.1.5

TEREX DEMAG

Ident–Nr: 28387612

Format: A1 | Bl. / Blätter: 13/14

Plotstatus: ECSCAD

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Potential	Querschnitt [mm²]	Von	Nach
299	2,5	X312–4	A2–XF3–17
300	1	X300–5	X318–e
301	1	X300–14	A302IV–5
302	1	S404–13	A301I–9
303	1	S404–9	A301I–16
304	1	S404–10	A301I–12
305	1	S404–12	A301I–14
306	1	S404–11	A301I–17
307	1	S404–8	A301I–15
308	1	R301–1	A301III–3
308a	1	R302–1	A301III–3
308b	1	R302–1	R304–1
309	1	R301–2	A301III–11
310	1	R302–2	A301III–2
311	1	XK23–5	A301IV–12
312	1	XK23–7	A301IV–16
313	1	A320–6	A301I–7
314	1	A320–4	A301I–6
315	1	A320–3	A301I–4
316	1	A320–5	A301I–8
317	1	A320–2	A301I–3
318	1	A320–1	A301I–5
319	1	A301III–7	X318–f
319a	1	XK5–7	A301III–7
320	1	XK5–1	A301III–10
320a	1	A301III–10	X318–r
321	1	A301III–4	X318–g
322	1	S301–7	A302II–6
322a	1	S301–7	X320–26
323	1	S301–1	A302II–18
323a	1	S301–1	X320–27
324	1	XK23–18	S301–3
325	1	R303–1	A301IV–6
326	1	R303–2	A301IV–9
327	1	XK1–10	A301I–13
328	1	XK1–8	A301I–11
329	1	XK4–16	A301II–4
330	1	XK4–8	A301II–8
332	1	A301III–1	R304–2
333	1	XK1–2	B310.1–1
334	1	X320–18	A302II–13
335	1	X320–19	A302I–11
336	1	A302II–15	X320–20
337	1	X320–21	A302I–8
338	1	XK5–8	A301II–13
339	1	S404–3	A401–2
339a	1	H337–1	S404–3
339b	1	H337–1	XK5–6
340	1	XK5–10	A301II–10
341	1	XK21–3	XK2–8

Potential	Querschnitt [mm²]	Von	Nach
342	1	XK5–4	A301II–14
343	1	XV2–9	XK4–10
350	1	XK21–8	XK401–1
350b	1	K401–1	XK401–1
351	1	A401–19	X333–A
352	1	A401–11	X333–B
353	1	A401–33	X333–C
354	1	A401–51	X333–D
355	1	A401–12	X333–E
356	1	A401–74	X333–G
357	1	A401–15	X333–H
358	1	A401–31	X333–K
359	1	A401–36	X333–M
360	1	A401–37	X333–P
361	1	A401–52	X333–T
362	1	A401–71	X333–V
363	1	A401–55	X333–W
364	1	A401–58	X333–Z
365	1	A401–54	X333–d
366	1	A401–40	X333–g
367	1	A401–76	X333–h
368	1	A401–77	X333–j
369	1	A401–16	X333–k
370	1	A401–59	X333–m
371	1	A401–60	X333–n
372	1	A401–80	X333–p
373	1	A401–20	X333–r
374	1	A401–39	X333–s
390	1	XK5–14	A4200–X11–6
391	0,5	XV2–16	X360–34
393	1	S2263–1	X364–1
393a	1	X364–3	X364–1
400	1	A401–34	X320–24
400a	1	A402–11	X320–24
401	1	A402–16	A402–7
406	1	S2263–5	XK22–5
430	1	P301B–7	P301.1A–8
443	1	XK22–12	A2–XF3–15
444	1	XK22–14	XK23–19
445	1	S404–4	X322–22
446	1	S404–5	X322–23
447	1	S404–6	X322–24
448	1	S404–7	X322–25
449	1	XK5–9	XK23–17
449a	1	S404–1	XK23–17
450	1	A386–X2–3	X318–k
451	1	A386–X2–6	X318–l
453	1	X318–w	A386–X2–1
454	1	X318–x	A386–X2–4
456	1	X322–29	A386–X2–2

Potential	Querschnitt [mm²]	Von	Nach
457	1	A386–X2–5	X322–30
459	1	A386–X2–8	X317–38
460	1	X317–39	A386–X2–9
462	1	XK3–2	A302III–7
463	1	H332–2	X312–8
465	1	XK3–4	X318–P
467	1	XK24–3	A302II–7
467a	1	XK23–20	XK24–3
472	1	A4200–X13–8	X318–h
473	1	X318–j	A4200–X13–7
474	1	X318–u	A4200–X13–10
475	1	A4200–X13–9	X318–v
476	1	A386–X2–11	X322–27
477	1	X322–28	A386–X2–14
478	1	A386–X2–17	X317–36
479	1	A386–X2–18	X317–37
504	1	XV1–20	A302II–14
504a	1	XK5–16	XV1–20
527	1	XK23–21	K401–2
550	1	XK22–11	X1122–5
571	1	X318–t	A1–XF4–18
575	1	X318–J	X322–9
577	1	X322–16	X317–14
579	1	K132–86	X317–29
580	1	K132–87a	H336–2
605	1	S5129–2	X316–26
616	1	X322–18	X317–15
672	1	XK3–17	X317–40
681	1	A4200–X7–1	X199–1
682	1	A4200–X7–2	X199–2
683	1	X199–3	A4200–X7–3
684	1	X199–4	A4200–X7–11
685	1	A4200–X11–1	X199–5
686	1	X199–7	A4200–X8–1
687	1	X199–8	A4200–X8–2
688	1	X199–9	A4200–X8–3
689	1	A4200–X8–11	X199–10
690	1	X199–11	A4200–X11–2
692	1	X316–28	X322–1
693	1	X320–33	X316–29
696	1	XK6–7	X322–14
696a	1	X317–28	X322–14
701	1	H306–2	X322–5
702	1	H301–2	X322–11
705	1	S329–6	S329–9
706	1	A302II–9	X324–5
707	1	A2112–1	A302III–11
709	1	A401–65	XK3–1
710	1	A401–41	XK21–2
710a	1	XK23–1	XK21–2
970	1	XV2–5	XK2–17
970a	1	XV2–5	X320–5

Potential	Querschnitt [mm²]	Von	Nach
710c	1	XK23–1	A4200–X4–7
721	1	A401–3	XK22–18
721a	1	XK21–11	XK22–18
722	1	A401–21	XK22–20
723	1	A401–1	XK21–9
724	1	A401–30	XK6–8
725	1	A2112–3	A401–44
726	1	X386–8	A386–X1–10
727	1	X386–10	A386–X1–11
728	1	XK22–8	A386–X1–14
729	1	H333–2	A386–X1–15
730	1	S404–14	XK5–3
730a	1	XK5–3	XV2–7
731	0.5	X310.1–2	X324–8
732	0.5	X310.1–3	X324–9
733	0.5	X310.1–5	X324–10
770	1	H318–2	X316–34
773	1	XK6–6	X318–p
774	2,5	A2–XF2–2	A4200–X12–1
776	1	A1–XF5–9	A4200–X4–9
776a	1	S328–5	A1–XF5–9
776b	1	S328–5	S344–3
776c	1	S344–3	S344–4
776d	1	S344–4	S346–3
776e	1	S347–3	S346–3
776l	1	XK5–18	XK6–13
776m	1	XK6–13	A1–XF5–10
777	1	H500–2	A4200–X11–11
778	1	XV2–18	A4200–X11–7
779	1	XK6–17	A4200–X11–8
780	1	XV2–22	A4200–X11–9
781	1	XK6–15	XK5–22
781a	1	XV2–20	XK5–22
781b	1	H349–1	XK6–15
782	1	H345–1	A4200–X11–12
783	1	A4200–X4–2	S346–1
784	1	S347–1	A4200–X4–3
785	1	A4200–X4–5	X320–35
785a	1	S345–7	X320–35
786	1	A4200–X4–6	X320–36
786a	1	S345–2	X320–36
788	1	XK5–21	S328–1
789	1	S345–3	S344–1
790	1	S344–8	S345–4
791	1	XK6–3	X320–34
795	1	H344–1	A4200–X11–10
796	1	X323–26	A386–X2–12
797	1	X323–27	A386–X2–15
798	1	X316–1	A386–X2–10
799	1	A386–X2–13	X316–2

a	W10663	26.02.08	Rosenkranz	Maßstab:	Masse: 35 kg
–	W10620	14.11.07	Rosenkranz	Typ: AC 80–2	Werkstoff: %
Ind	Mitt–NR	Datum	Name		Mat.–art: UNTL

	Datum	Name
Erst.	06.03.08	Rosenkranz
Gepr.		

Abteilung: 1142

KABINENELEKTRIK AC 80–2 UW V4.1.5

ELECTRIC CAB AC 80–2 CHASSIS V4.1.5

Ident–Nr: 28387612

Format: A1 | Bl. / Blätter: 14/14

Plotstatus: ECSCAD

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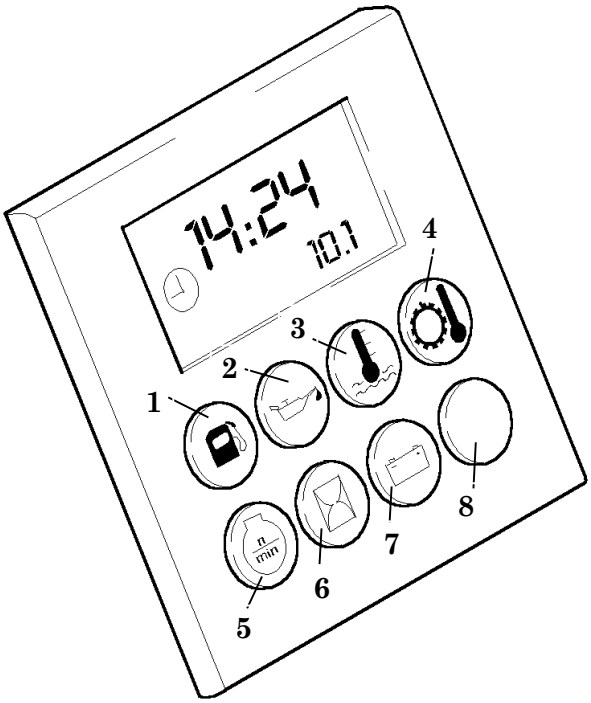
1) Operating the MFA 10 multifunction display:



While the ignition remains switched off and provided you have not yet called up any information on it, this display will show the correct time and the number of operating hours elapsed (all LEDs are off).

A self-test will be carried out when the ignition is switched on

As soon as the ignition is switched on, the MFA 10 will carry out its own self-test.
All the different segments of the display will be activated and the LEDs will light up.
All the various sensors will then be checked. Any defective sensors will be shown up as sensor error messages (SEnS 12 to SEnS 18) and this information will be stored.
The MFA will then be ready for operation.

Functions of buttons 1 to 8
1 - Fuel level
2 - Engine oil pressure
3 - Coolant temperature in the engine
4 - Transmission oil temperature in the chassis, hydraulic oil temperature in the superstructure
5 - Engine speed
6 - Daily operating hours
7 - Line voltage of generator
8 - not assigned in the chassis, wind speed in km/h in the superstructure (optional)

As soon as one of the above buttons is pressed, its LED will light up. The relevant value and unit symbol will be shown on the display.

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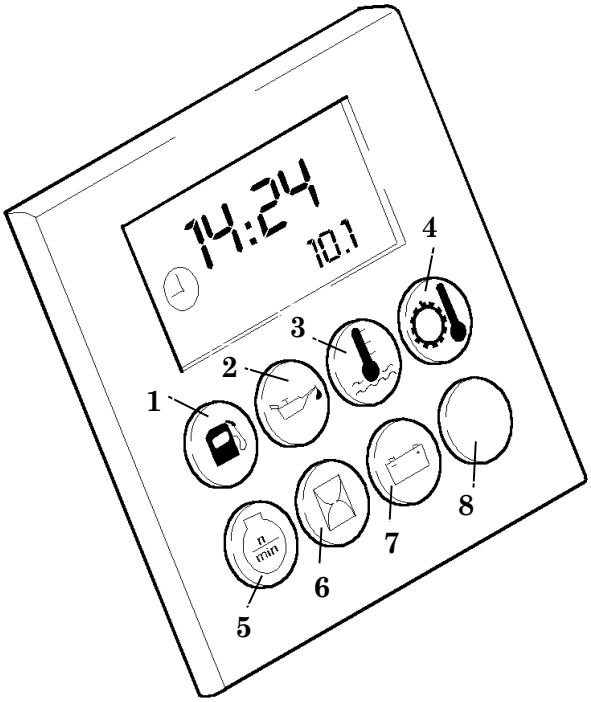

Displaying sensor error messages during the self-test

Sensor errors are displayed during the self-test as follows:

- The relevant LED on button 1 to 8 lights up.
- The unit symbol for the sensor found to be defective is shown on the display.
- The number of the connector pin for static input is shown in the top line of the display, the static input (SEnS 12 to SEnS 18) of the defective sensor in the line at the bottom of the display.
- Sensor errors are shown as " -- -- -- " on the display once the self-test has been completed.

Setting the clock

Proceed as follows to set the time:

- Press buttons 6 and 7 at the same time for five seconds.
  The time will flash on the display.
- Press button 5, 6, 7 or 8 until the correct time is shown.
- To store the time you have set, press buttons 6 and 7 at the same time until the time displayed no longer flashes.

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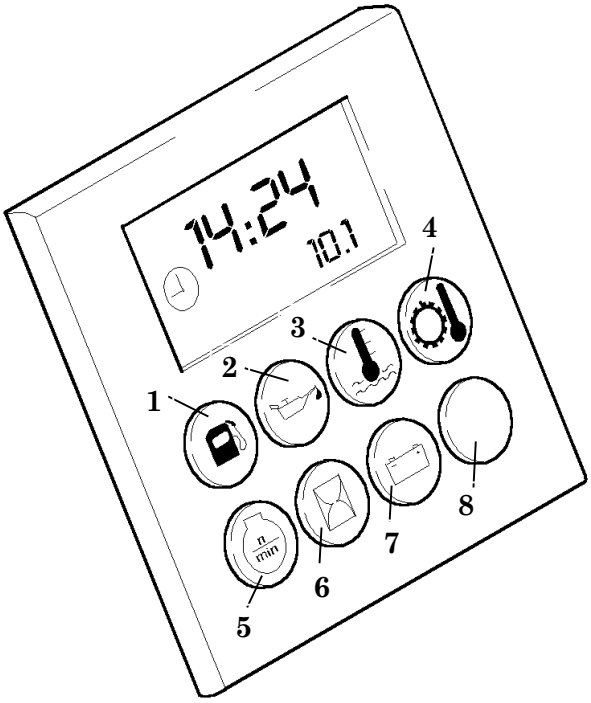

Confirming the warning limits (buzzer active)

A warning buzzer is triggered when a value which has been programmed into the system has either not been reached or has been exceeded.
The value concerned will be shown on the display and the relevant LED on the button will start to flash.
The warning limit will be automatically reset as soon as the value concerned returns to normal.
To confirm this, press the relevant button for approx. three seconds until the buzzer switches off. The display will then return to its original display mode.

You must always find out what caused the warning in the first place!

The warning limit "Engine speed exceeded" cannot be confirmed (switch off the buzzer). When driving downhill, the speed of the vehicle must be reduced by braking until the buzzer switches off.

Resetting the daily number of operating hours

Press button **6** for approx. three seconds.
The display will be reset to 0.

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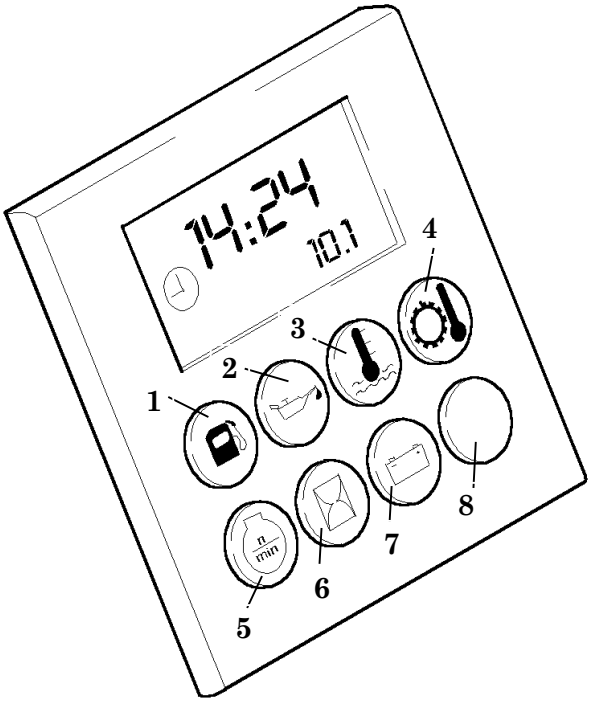

Reading information on limit values being exceeded and reading sensor errors from the memory store

The number of times limit values have not been reached or have been exceeded and various sensor errors are stored as messages. This memory store can be read.
Proceed as follows:

- Switch off the ignition.
- Press buttons **5** and **6** at the same time for at least three seconds.

First, the display shows the limit values from SEnS 0 to SEnS 11 which have been stored and then any sensor errors from SEnS 11 to SEnS 18 which have also been stored.

Displaying limit values:
The top line of the display shows the number of times (how often) the relevant warning limit has not been reached or has been exceeded.
The line at the bottom of the display shows the assignment of dynamic input in the comparator (SEnS 0 to SEnS 4) and the assignment of static input in the comparator (SEnS 5 to SEnS 11).

Displaying sensor errors:
The top line of the display shows the number of the connector pin which is used for static input.
The line at the bottom of the display shows the assignment of static input in the various sensors (SEnS 11 to SEnS 18).

This memory store can only be reset using the software!

The table overleaf shows how the various comparators and sensors are assigned to each dynamic and static input.

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Limit values : (programmed limit values either not reached or exceeded)

Display		Assignment
top line	bottom line	
	SEnS 0	Engine speed
	SEnS 1	n/a in the chassis, wind speed in the superstructure
	SEnS 2	n/a, bridge between pin 7 + 8
Number	SEnS 3	n/a, bridge between pin 5 + 6
	SEnS 4	n/a
of	SEnS 5	transmission oil temperature in the chassis, hydraulic oil temperature in the superstructure
	SEnS 6	n/a
messages	SEnS 7	coolant temperature in the engine
	SEnS 8	n/a
	SEnS 9	engine oil pressure
	SEnS 10	n/a
	SEnS 11	n/a

Sensor errors : (defective sensors, short-circuits, broken cables)

Display		Assignment of sensors
top line	bottom line	
Pin No. 12	SEnS 12	transmission oil temperature
	SEnS 13	n/a
Pin No. 11	SEnS 14	coolant temperature in the engine
	SEnS 15	n/a
Pin No. 10	SEnS 16	engine oil pressure
	SEnS 17	n/a
Pin No. 9	SEnS 18	fuel level

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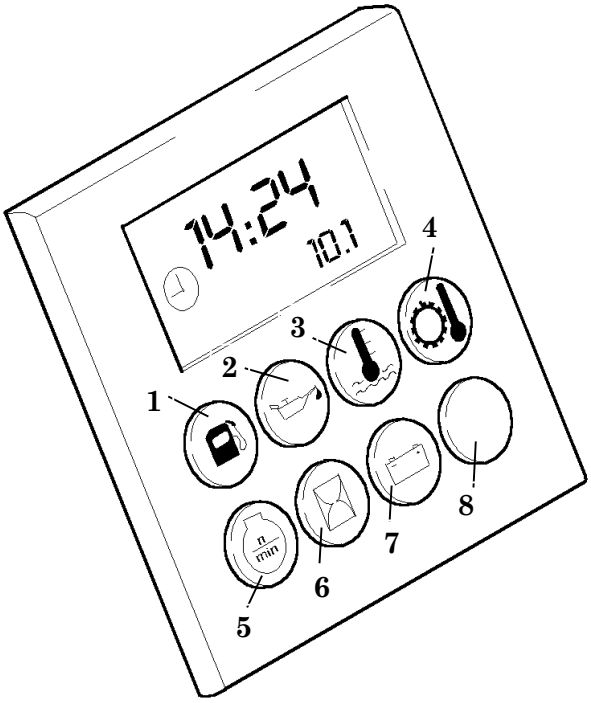

Resetting the service interval display

The MFA 10 triggers a service interval display (SIA) to be shown every 250 operating hours.
This display is intended purely to remind the crane driver to carry out the tasks specified in the lubrication and maintenance instructions for the crane concerned at the correct time.

The service interval display (SIA) can only be reset when the vehicle is stationary.

The service interval display is reset as follows:

- Switch off the ignition.
- Press buttons **7** and **8** at the same time and hold them down.
- Switch on the ignition.
- Wait a moment to allow the self-test to run its course.
- Switch off the ignition.
- Release buttons **7** and **8**.
- The display will show "SIA 0".

The service interval display (SIA) will now be reset.

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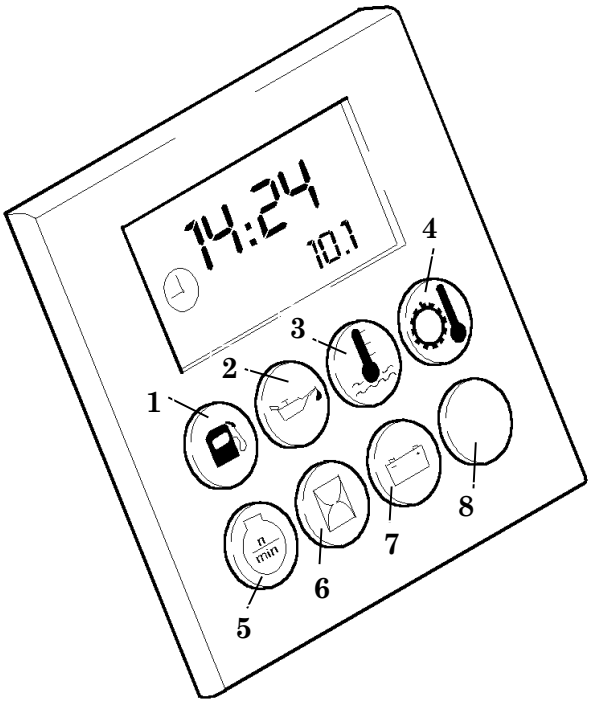
2) Display of actual values:



All the information shown on the multifunction display in the cab of the superstructure and/or chassis is given in the form of numerical values.

These numerical values are based on the signal values (voltage, current) issued by the relevant pressure and temperature transmitters. In assessing the information shown, remember to take into account the accuracy of each of the individual transmitters.
The transmitters have a tolerance of approx. ±10%.

Ambient temperatures of below 0° C are not shown with a minus sign.
For example:
A coolant temperature of - 5° C will be shown as 0° C on the display.

In some cases, minimum values can be programmed into the system. This means that these minimum values will be displayed until they are exceeded, regardless of the actual situation.

Take, for example, the display of hydraulic oil temperature on the AC 120 superstructure (AC 395-1):

→ Display of minimum value of approx. 40° C ←

The minimum value programmed into the system (approx. 40°) will be shown on the multifunction display up until it is exceeded, regardless of the actual temperature of the hydraulic oil.

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The level of tolerance shown by the transmitters will however also affect the warning limits already programmed. Variations may therefore be seen between models from the same range.

As soon as the warning limit programmed into the system is reached, a buzzer will be activated and the display will automatically switch over to the relevant value.
The value shown will be represented on the display and the relevant LED in the selector button will start to flash.
If the warning threshold is exceeded, this can be confirmed (acknowledged) by pressing the relevant button (for three seconds).

If you cannot determine the reason for the fault, e.g. defective transmitter or cable, this might be because an error has occurred in the master instrument of the MFA 10. In this case, the master instrument must be replaced.

If the customer expresses concern about the warning limit for the temperature of the hydraulic oil (hydraulic oil temperature <50°C), the MFA 10 master instrument should then be replaced.

Please note:
When placing an order, always state the crane model, chassis, superstructure and construction numbers as well as the number of operating hours relevant to both the chassis and the superstructure.
The new master instrument can then be programmed with the appropriate number of operating hours for the crane.

Problems may also arise with the pressure switches of the warning display for the hydraulic filters on the AC 395 superstructure.
When the hydraulic oil is cold, the dynamic pressure ahead of the filter element sometimes increases so much that the relevant indicator light comes on.
As the temperature of the oil increases while the filter element remains **clear of any clogging**, the indicator light should **go out**.
If the indicator light comes on again once the hydraulic oil is warm, you must find out the reason behind this error display.
For example, it might be due to a defective pressure switch (spare part no. 420 358 12), a broken cable etc.

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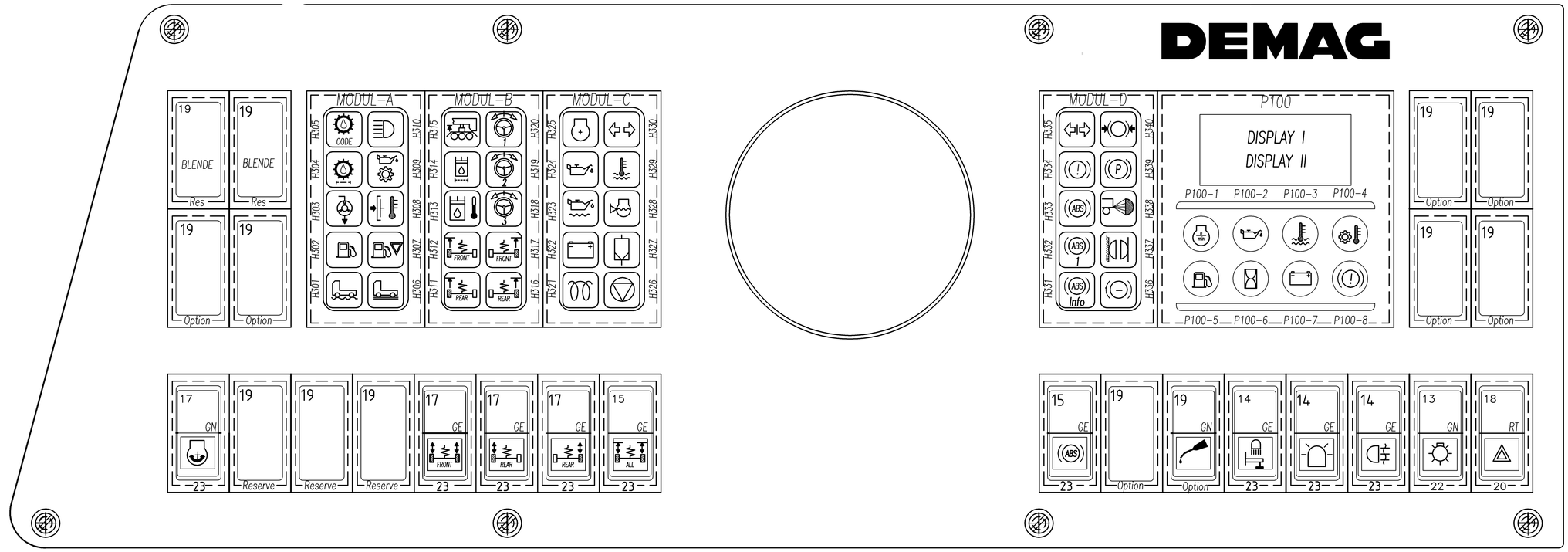

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c	W10073	02.05.02	Heisel		
Ind	Mitt-NR	Datum	Name	Typ: AC 80-2	Werkstoff:
					Mat.-art: ET-KT

	Datum	Name
Erst.	22.08.02	Focke_M
Gepr.		

Abteilung: 8315.2

ARMATURENINSTALLATION
UW AC 80-2

DEMAG Mobile Cranes

Ident-Nr: 133542

Format: A1

Bl. / Blätter: 1/2

Protototus:

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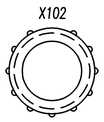

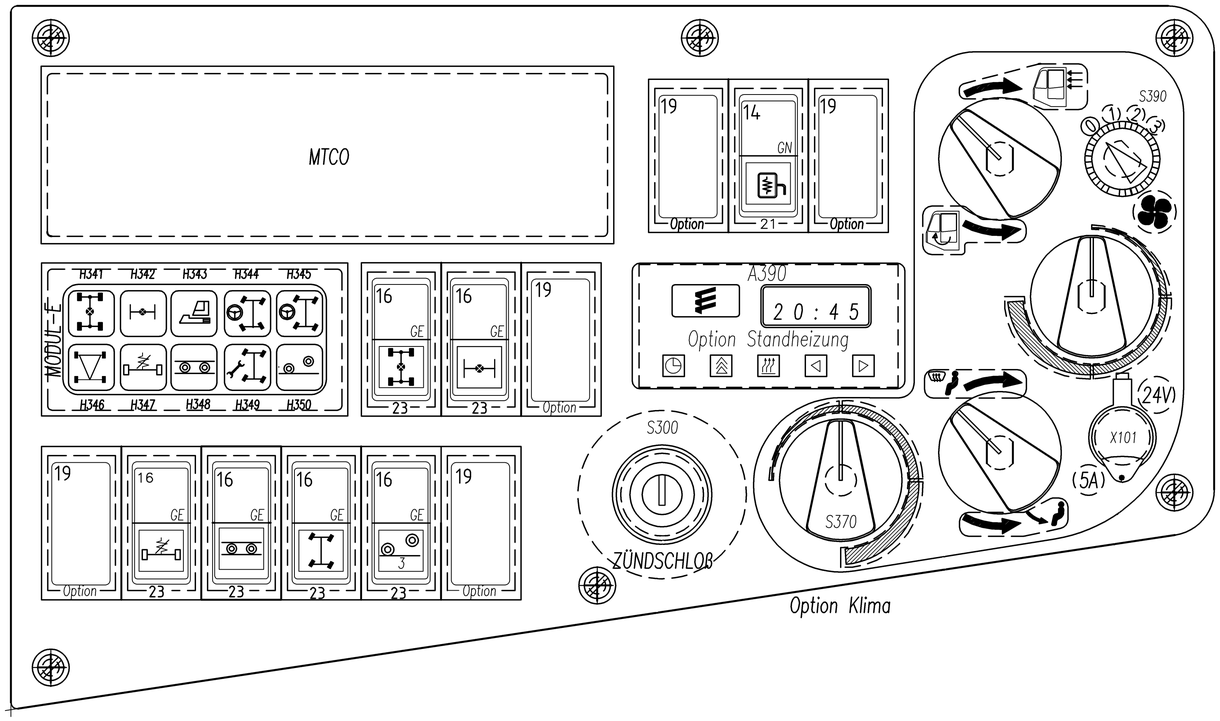

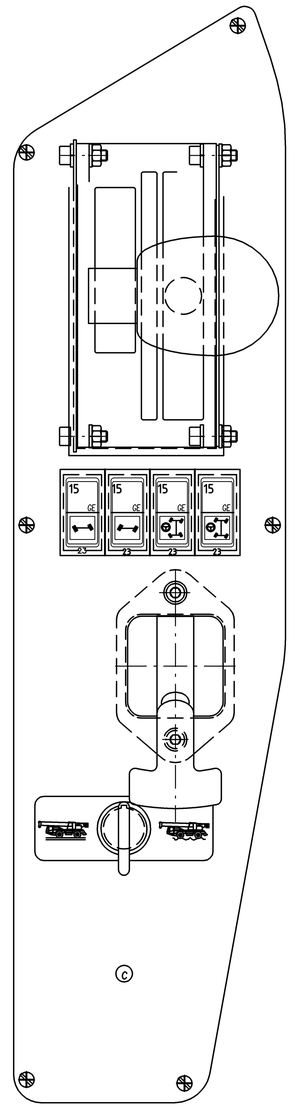

d	W10114	22.08.02	Focke_M	Maßstab:	Masse: 4.46 kg
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Ind	Mitt-NR	Datum	Name		Mat.-art: ET-KT

	Datum	Name
Erst.	22.08.02	Focke_M
Gepr.		
Abteilung:	8315.2	

ARMATURENINSTALLATION
UW AC 80-2

DEMAG Mobile Cranes

Ident-Nr: 133542

Format: A1 | Bl. / Blätter: 2/2

Plotstatus:

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TS2973EN

Troubleshooting Manual

Allison On-Highway

MD/HD/B Series Transmissions
WTEC III Controls (TransID 1 and 2)

MD 3060/MD 3066/MD 3560(P)(R)
MD 3070PT
HD 4060/HD 4070/HD 4560(P)(R)
B 300/B 400/B 500(P)(R)

1999 APRIL

Allison Transmission
Division of General Motors Corporation
P.O. Box 894 Indianapolis, Indiana 46206-0894

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FOREWORD — How to Use This Manual

This manual provides troubleshooting information for Allison Transmission Division, MD/HD/B Series On-Highway Transmissions. Service Manuals SM2148EN and SM2457EN, plus Parts Catalogs PC2150EN and PC2456EN may be used in conjunction with this manual.

This manual includes:

- Description of the WTEC III electronic control system.
- Description of the electronic control system components.
- Description of diagnostic codes, system responses to faults, and troubleshooting.
- Wire, terminal, and connector repair information.

Specific instructions for using many of the available or required service tools and equipment are not included in this manual. The service tool manufacturer will furnish instructions for using the tools or equipment.

Additional information may be published from time to time in Service Information Letters (SIL) and will be included in future revisions of this and other manuals. Please use these SILs to obtain up-to-date information concerning Allison Transmission products.

This publication is revised periodically to include improvements, new models, special tools, and procedures. A revision is indicated by a letter suffix added to the publication number. Check with your Allison Transmission service outlet for the currently applicable publication. Additional copies of this publication may be purchased from authorized Allison Transmission service outlets. Look in your telephone directory under the heading of Transmissions — Truck, Tractor, etc.

Take time to review the Table of Contents and the manual. Reviewing the Table of Contents will aid you in quickly locating information.

NOTE: Allison Transmission is providing for service of wiring harnesses and wiring harness components as follows:

- Repair parts for the internal wiring harness and for wiring harness components attached to the shift selector will be available through the Allison Transmission Parts Distribution Center (PDC). Use the P/N from your appropriate parts catalog or from Appendix E in this manual. Allison Transmission is responsible for warranty on these parts.
- Repair parts for the external harnesses and external harness components must be obtained from St. Clair Technologies Inc. (SCTI). SCTI provides parts to any Allison customer or OEM and is responsible for warranty on these parts. SCTI recognizes ATD, manufacturers, and SCTI part numbers. SCTI provides a technical HELPLINE at 519-627-1673 (Wallaceburg). SCTI will have parts catalogs available. The SCTI addresses and phone numbers for parts outlets are:

St. Clair Technologies, Inc.
1050 Old Glass Road
Wallaceburg, Ontario, Canada, N8A 3T2
Phone: (519) 627-1673
Fax: (519) 627-4227

St. Clair Technologies, Inc.
1111 Mikesell Street
Charlotte, Michigan 48813
Phone: (517) 541-8166
Fax: (517) 541-8167

St. Clair Technologies, Inc.
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Carr. Internationale KM 1969
Guadalajara – Nogales, KM2
Empalme, Sonora, Mexico
Phone: 011-52-622-34661
Fax: 011-52-622-34662

- St. Clair Technologies, Inc. stocks a WTEC III external harness repair kit, P/N 29532362, as a source for some external harness repair parts. SCTI is the source for external harness repair parts.

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IMPORTANT SAFETY NOTICE

IT IS YOUR RESPONSIBILITY to be completely familiar with the warnings and cautions used in this manual. These warnings and cautions advise against using specific service procedures that can result in personal injury, equipment damage, or cause the equipment to become unsafe. These warnings and cautions are not exhaustive. Allison Transmission could not possibly know, evaluate, or advise the service trade of all conceivable procedures by which service might be performed or of the possible hazardous consequences of each procedure. Consequently, Allison Transmission has not undertaken any such broad evaluation. Accordingly, ANYONE WHO USES A SERVICE PROCEDURE OR TOOL WHICH IS NOT RECOMMENDED BY ALLISON TRANSMISSION MUST first be thoroughly satisfied that neither personal safety nor equipment safety will be jeopardized by the service procedures used.

Also, be sure to review and observe WARNINGS, CAUTIONS, and NOTES provided by the vehicle manufacturer and/or body builder before servicing the Allison transmission in that vehicle.

Proper service and repair is important to the safe and reliable operation of the equipment. The service procedures recommended by Allison Transmission and described in this manual are effective methods for performing troubleshooting operations. Some procedures require using specially designed tools. Use special tools when and in the manner recommended.

The WARNINGS, CAUTIONS, and NOTES in this manual apply only to the Allison transmission and not to other vehicle systems which may interact with the transmission. Be sure to review and observe any vehicle system information provided by the vehicle manufacturer and/or body builder at all times the Allison transmission is being serviced.

WARNINGS, CAUTIONS, AND NOTES

Three types of headings are used in this manual to attract your attention:

WARNING!	**Is used when an operating procedure, practice, etc., which, if not correctly followed, could result in injury or loss of life.**

CAUTION:	Is used when an operating procedure, practice, etc., which, if not strictly observed, could result in damage to or destruction of equipment.

NOTE: Is used when an operating procedure, practice, etc., is essential to highlight.

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SHIFT SELECTOR TERMS AND DISPLAY INDICATIONS

Shift selector terms and displays are represented in this manual as follows:

- Button Names —⇑, ⇓, “display mode”, **MODE**, etc.
- Transmission Ranges — **D** (Drive), **N** (Neutral), **R** (Reverse), **1** (First), **2** (Second), etc.
- Displays — “**o**, **L**”; “**o**, **K**”, etc. (Display occurs one character at a time.)

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SECTION 1 — GENERAL DESCRIPTION

1–1. TRANSMISSION

The World Transmission Electronic Controls (WTEC III) system features closed-loop clutch control to provide superior shift quality over a wide range of operating conditions. MD 3000, HD 4000, and B Series configurations can be programmed to have up to six forward ranges, neutral, and one reverse range. The MD 3070 and HD 4070 have up to seven forward ranges and one reverse range.

Figure 1–1 is a block diagram of the basic system inputs and outputs.

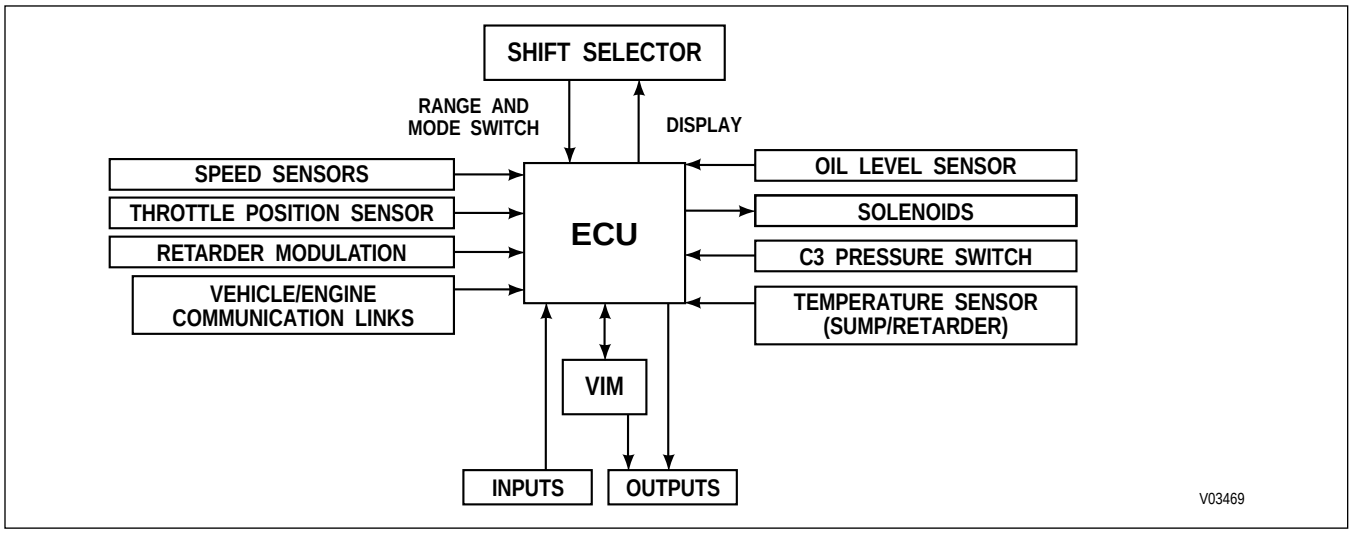

Figure 1–1. Electronic Control Unit Block Diagram

Figure 1–2 shows WTEC III electronic control components.

WTEC III Electronic Controls consist of the following elements:

- Remote 12/24V Max Feature Sealed Electronic Control Unit (ECU)
- Remote Pushbutton or Lever Shift Selector
- Optional Secondary Shift Selector
- Throttle Position Sensor (TPS) (or electronic engine throttle data or PWM signal)
- Engine, Turbine, and Output Speed Sensors
- Control Module (Electro-Hydraulic Valve Body)
- Wiring Harnesses
- Vehicle Interface Module (VIM)
- Autodetect Feature
- TransID Feature
- Optional Retarder Controls
- Optional Engine Coolant Temperature Input

NOTE:
- ***All external harnesses are OEM supplied***
- ***Some OEMs may supply their own shift selector***
- ***The VIM is an OEM option***

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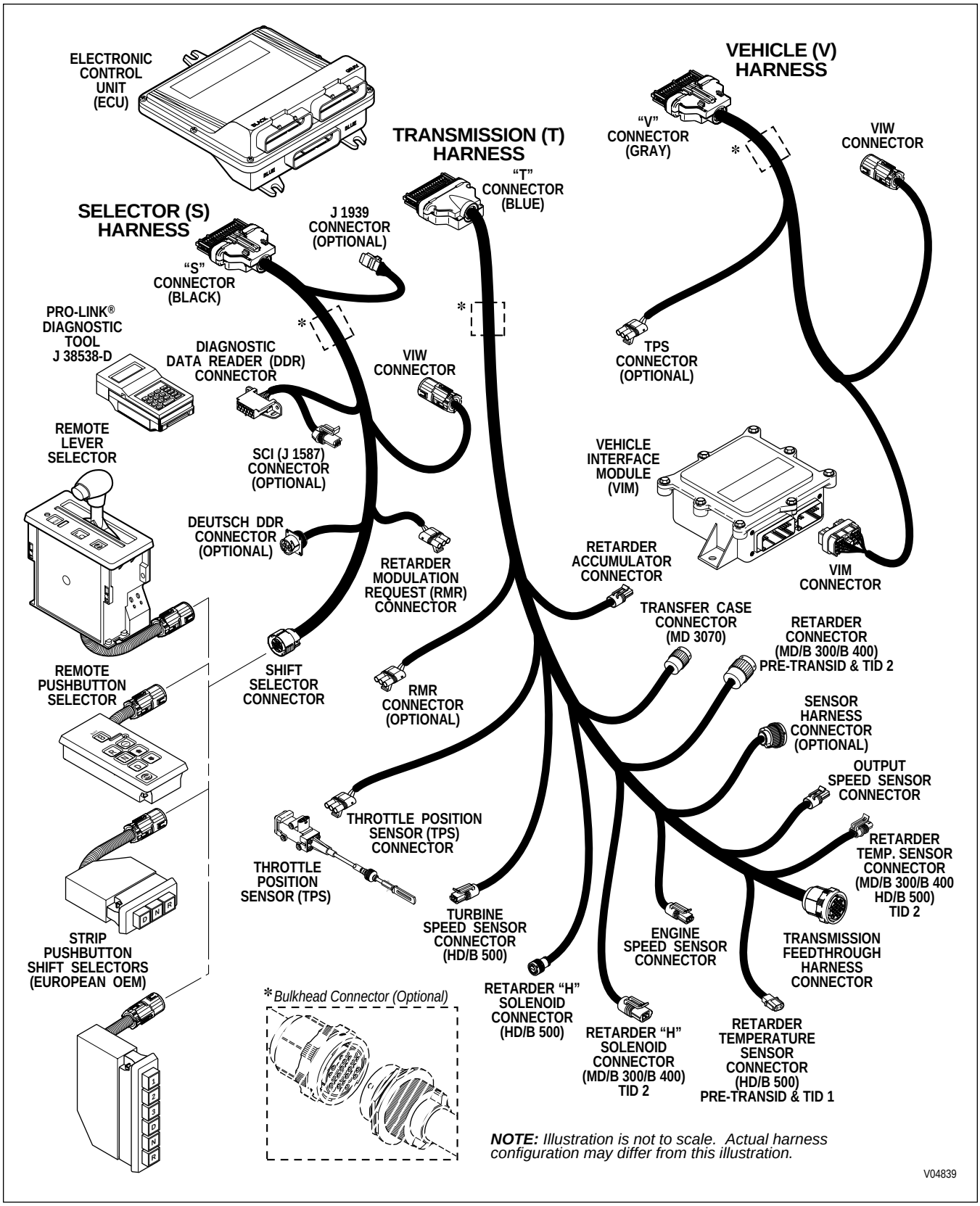

Figure 1–2. WTEC III Electronic Control Components

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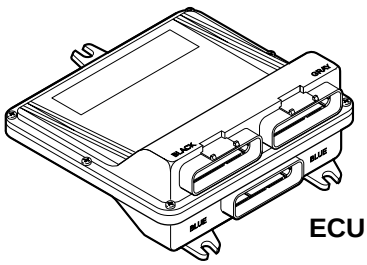
GENERAL DESCRIPTION

1–2. ELECTRONIC CONTROL UNIT (ECU)

The ECU (Figure 1–3) contains the microcomputer which is the brain of the control system. The ECU receives and processes information defining: shift selector position, throttle position, sump/retarder temperature, engine speed, turbine speed, and transmission output speed. The ECU uses the information to control transmission solenoids and valves, supply system status, and provide diagnostic information.

Each ECU has a date code stamped on the label which is attached to the outer case of the ECU. This is the date when the ECU passed final test. This date is commonly used to denote the change configuration level of the ECU. It is normal for the ECU date displayed electronically to be a few days prior to the date shown on the label.



ECU

NOTE: *ECU wiring harness connector retainers are individually keyed and color-coded to ensure that the proper connector is attached to the correct ECU socket. The color of the connector retainer should match the color of the connector strain relief (see Appendix E, Paragraph 1–1).*

V03352.01

Figure 1–3. Electronic Control Unit (ECU)

1–3. SHIFT SELECTOR

Pushbutton and lever shift selectors for the WTEC III Series are remote mounted from the ECU and connected to the ECU by a wiring harness. Both of these shift selectors have a single digit LED display and a mode indicator (LED). During normal transmission operation, illumination of the LED indicator shows that a secondary or special operating condition has been selected by pressing the **MODE** button. During diagnostic display mode, illumination of the LED indicator shows that the displayed diagnostic code is active. Display brightness is regulated by the same vehicle potentiometer that controls dash light display brightness. More information on both types of shift selectors is continued below.

A. Pushbutton Shift Selector *(Figure 1–4)*

There is a full-function pushbutton shift selector and a strip pushbutton shift selector. Strip pushbutton shift selectors are used by European OEMs. A full-function shift selector has a **MODE** button and diagnostic display capability through the single digit LED display. The strip pushbutton shift selector does not have a **MODE** button, diagnostic capability, or adjustable illumination. The full-function pushbutton shift selector has six (6) pushbuttons which are **R** (Reverse), **N** (Neutral), **D** (Drive), ⇓ (Down), ⇑ (Up), and **MODE**. Manual forward range downshifts and upshifts are made by pressing the ⇓ (Down) or ⇑ (Up) arrow buttons after selecting **D** (Drive). The **N** (Neutral) button has a raised lip to aid in finding it by touch. The **MODE** button is pressed to select a secondary or special operating condition, such as ECONOMY shift schedule. Diagnostic information is obtained by pressing the ⇑ (Up) and ⇓ (Down) arrow buttons at the same time. The strip pushbutton shift selector has either three or six range selection positions as shown in Figure 1–4. When a strip pushbutton shift selector is used, diagnostic information must be obtained by using the Pro-Link® 9000 or a customer-furnished remote display.

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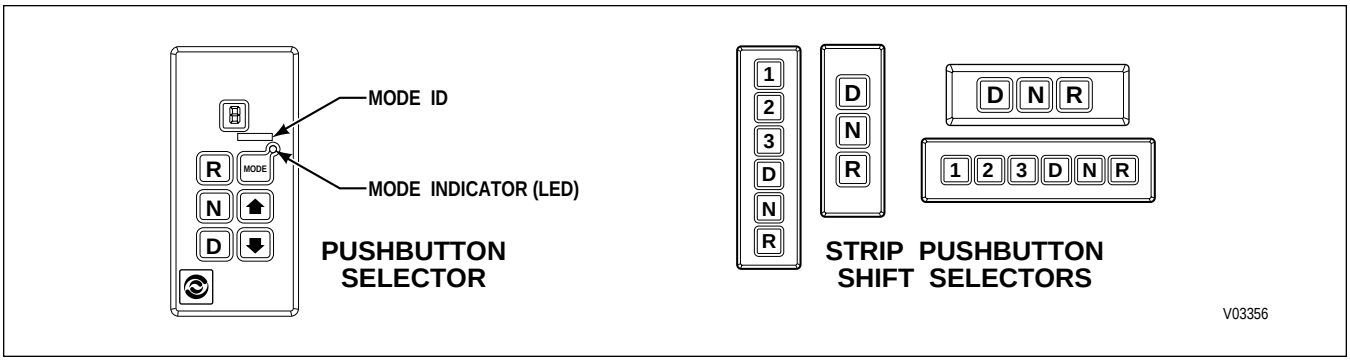

Figure 1–4. Pushbutton Shift Selectors

B. Lever Shift Selector *(Figure 1–5)*

The lever shift selector can have as many as six forward range positions (seven for the MD 3070PT and HD 4070), as well as **R** (Reverse) and **N** (Neutral). There is a hold override button which must be pressed and held in order to move between certain selector positions. The hold override button must be pressed when shifting between **R**, **N,** and **D**. The hold override button is released when the desired selector position is reached. The selector lever can be moved freely between **D** and the numbered forward ranges without pressing the hold override button. The lever selector can be chosen with the lever on the left side or on the right side and with the **R** (Reverse) position toward the front or toward the rear of the selector. Diagnostic and oil level (if sensor is present) information is obtained from the single digit LED display by pressing the "display mode" button.

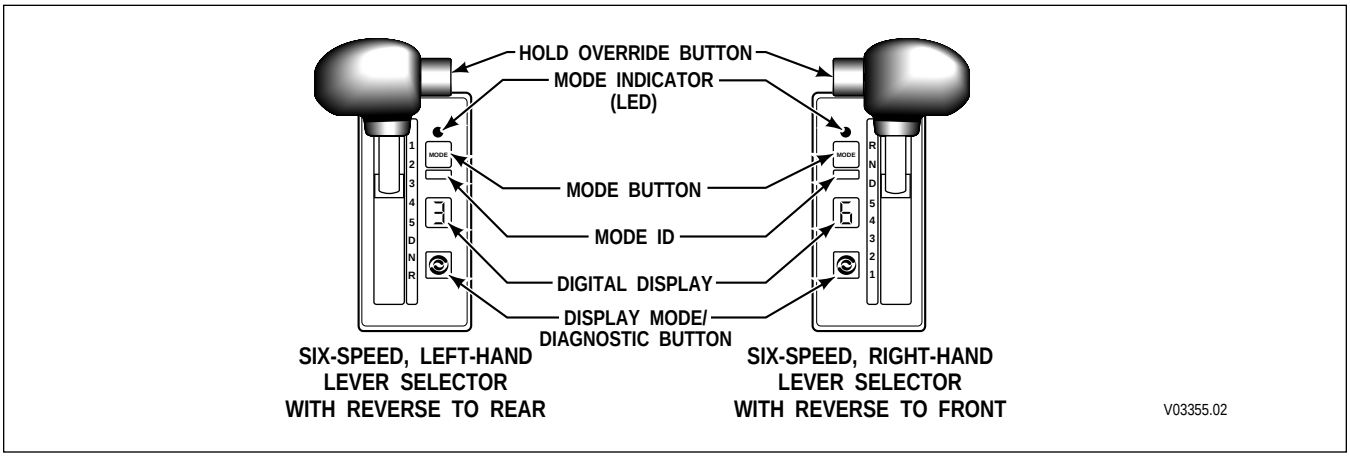

Figure 1–5. Typical Lever Shift Selector

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GENERAL DESCRIPTION

1–4. THROTTLE POSITION SENSOR *(Figure 1–6)*

The Throttle Position Sensor (TPS) can be mounted to the engine, chassis, or transmission. The TPS contains a pull actuation cable and a potentiometer. One end of the cable is attached to the engine fuel lever and the other, inside a protective housing, to the TPS potentiometer. Output voltage from the TPS is directed to the ECU through the external harness. The voltage signal indicates the throttle position and, in combination with other input data, determines shift timing.

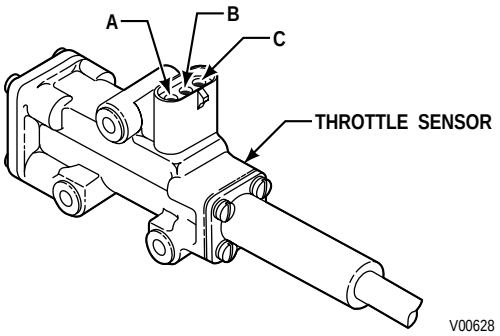

Figure 1–6. Throttle Position Sensor

1–5. SPEED SENSORS *(Figure 1–7)*

Three speed sensors — engine speed, turbine speed, and output speed — provide information to the ECU. The engine speed signal is generated by ribs on the shell of the torque converter pump. The turbine speed signal is generated by the rotating-clutch housing spline contours. The output speed signal is generated by a toothed member attached to the output shaft (except for the MD 3070, where the toothed member is the transfer case idler gear). The speed ratios between the various speed sensors allow the ECU to determine if the transmission is in the selected range. Speed sensor information is also used to control the timing of clutch apply pressures, resulting in the smoothest shifts possible. Hydraulic problems are detected by comparing the speed sensor information for the current range to that range's speed sensor information stored in the ECU memory.

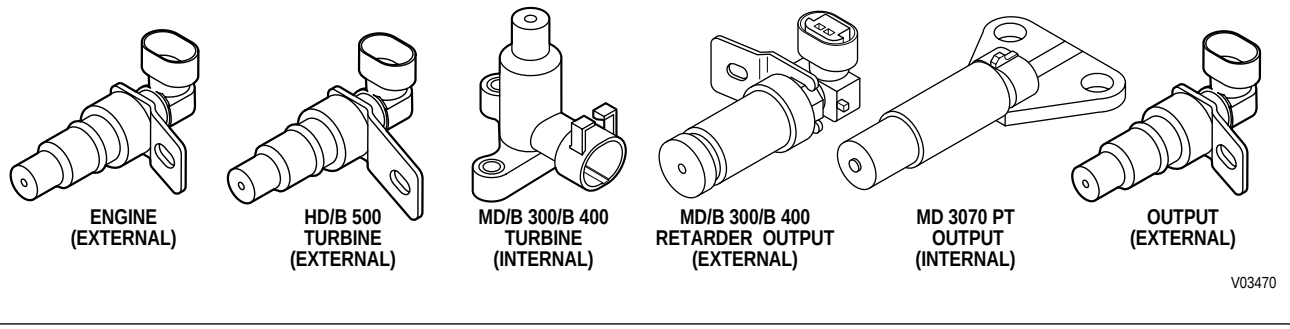

Figure 1–7. Speed Sensors

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GENERAL DESCRIPTION

1–6. CONTROL MODULE *(Figure 1–8)*

The WT Series transmission control module contains a channel plate on which is mounted: the main valve body assembly, the stationary-clutch valve body assembly, and the rotating-clutch valve body assembly. For valve locations, refer to SIL 27-WT-93, Rev. A. Pulse width modulated solenoids are used in the valve bodies. The rotating-clutch valve body assembly contains A (C1), B (C2), and F (lockup) solenoids, solenoid regulator valves controlled by the solenoids, and the C3 pressure switch. The stationary-clutch valve body assembly contains C (C3), D (C4), and E (C5) solenoids and solenoid regulator valves controlled by the solenoids and the C3 accumulator relay valve. The main valve body assembly contains G solenoid and the C1 and C2 latch valves controlled by the solenoid, the main and lube regulator valves, the control main and converter regulator valves, and the converter flow valve and exhaust backfill valves. The low valve body assembly (MD 3070PT and HD 4070) contains N and J solenoids.

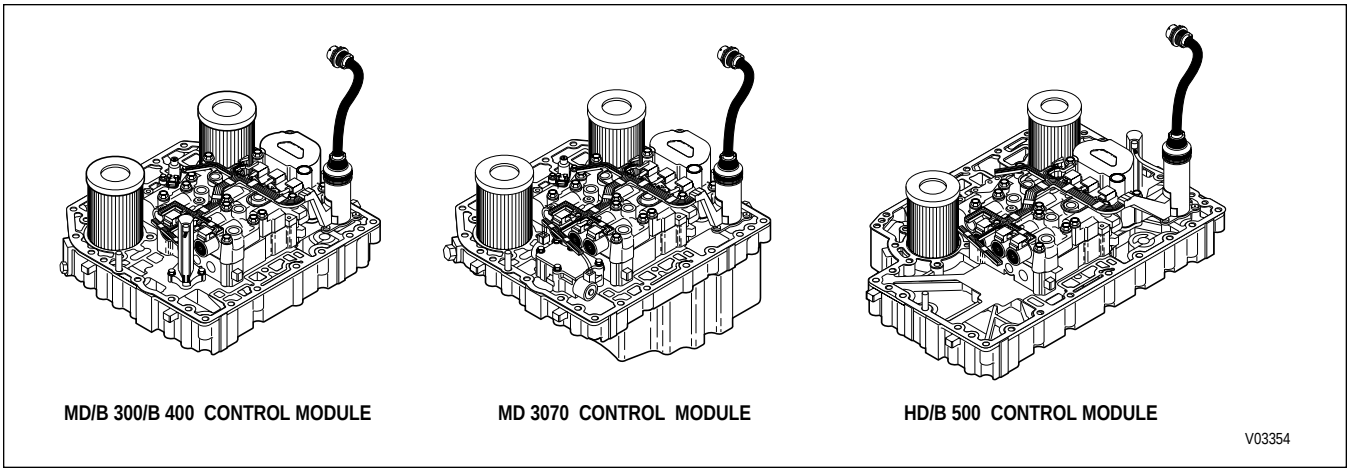

Figure 1–8. WTEC III Control Module

A temperature sensor (thermistor) is located in the internal wiring harness. Changes in sump fluid temperature are indicated by changes in sensor resistance which changes the signal sent to the ECU (see chart in Section 6, Code 24).

The oil level sensor is a float type device, mounted on the control module channel plate, which senses transmission fluid level by electronically measuring the buoyancy forces on the float. The sensor operates on 5 VDC supplied by the ECU. The oil level sensor is required on all models with a shallow sump but is optional on other models. The oil level sensor is not available on the MD 3070.

The C3 pressure switch is mounted on the rotating-clutch valve body assembly and indicates when pressure exists in the C3 clutch-apply passage. An accumulator/relay valve is in-line ahead of the C3 pressure switch and prevents high frequency hydraulic pulses generated by the C3 solenoid from cycling the C3 pressure switch.

Also mounted in the control module is the turbine speed sensor for the MD/B 300/B 400 models. The turbine speed sensor is directed at the rotating-clutch housing. (The turbine speed sensor on the HD/B 500 models is located on the outside of the main housing.)

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GENERAL DESCRIPTION

1–7. WIRING HARNESSES

A. External Wiring Harness *(Figure 1–9)*

WTEC III uses three external wiring harnesses to provide a connection between the ECU, the transmission (including engine, turbine, and output speed sensors), the throttle position sensor, the vehicle interface module (VIM), retarder control module, shift selectors, diagnostic tool connector, retarder, retarder temperature sensor, accumulator, and vehicle interface. Many harnesses will include a bulkhead fitting to separate cab and chassis components. Also, many different styles and materials for harnesses are likely to be encountered.

NOTE: Allison Transmission is providing for service of wiring harnesses and wiring harness components as follows:

- Repair parts for the internal wiring harness and for wiring harness components attached to the shift selector will be available through the Allison Transmission Parts Distribution Center (PDC). Use the P/N from your appropriate parts catalog or from Appendix E in this manual. Allison Transmission is responsible for warranty on these parts.
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1050 Old Glass Road
Wallaceburg, Ontario, Canada N8A 3T2
Phone: (519) 627-1673
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1111 Mikesell Street
Charlotte, Michigan 48813
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St. Clair Technologies, Inc.
c/o Mequilas Tetakawi
Carr. Internationale KM 1969
Guadalajara – Nogales, KM2
Empalme, Sonora, Mexico
Phone: 011-52-622-34661
Fax: 011-52-622-34662

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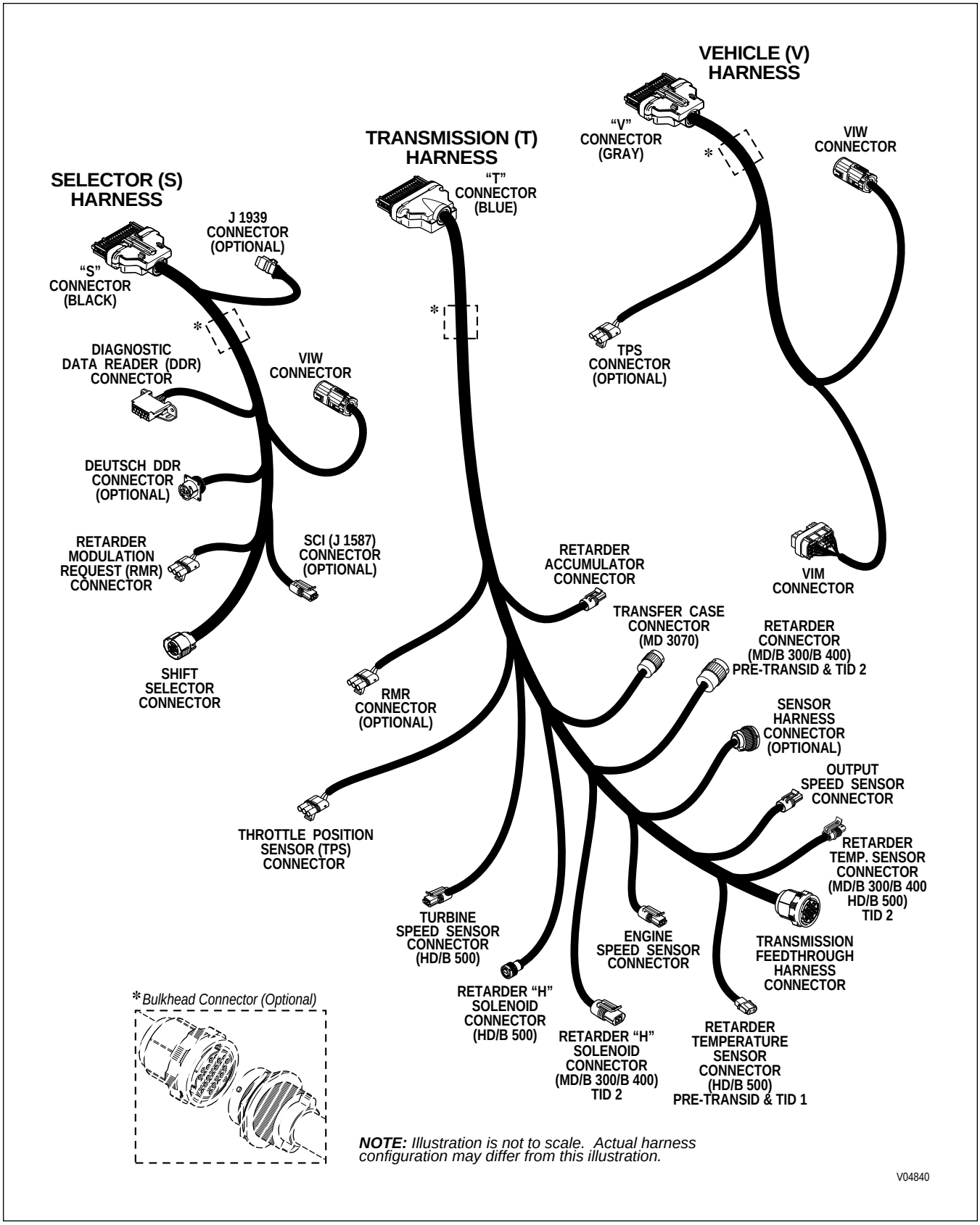

Figure 1–9. WTEC III External Wiring Harnesses

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GENERAL DESCRIPTION

B. Internal Wiring Harness *(Figure 1–10)*

The internal wiring harness provides connection between the external harness, the pulse width modulated solenoids, oil level sensor, C3 pressure switch, and the temperature sensor.

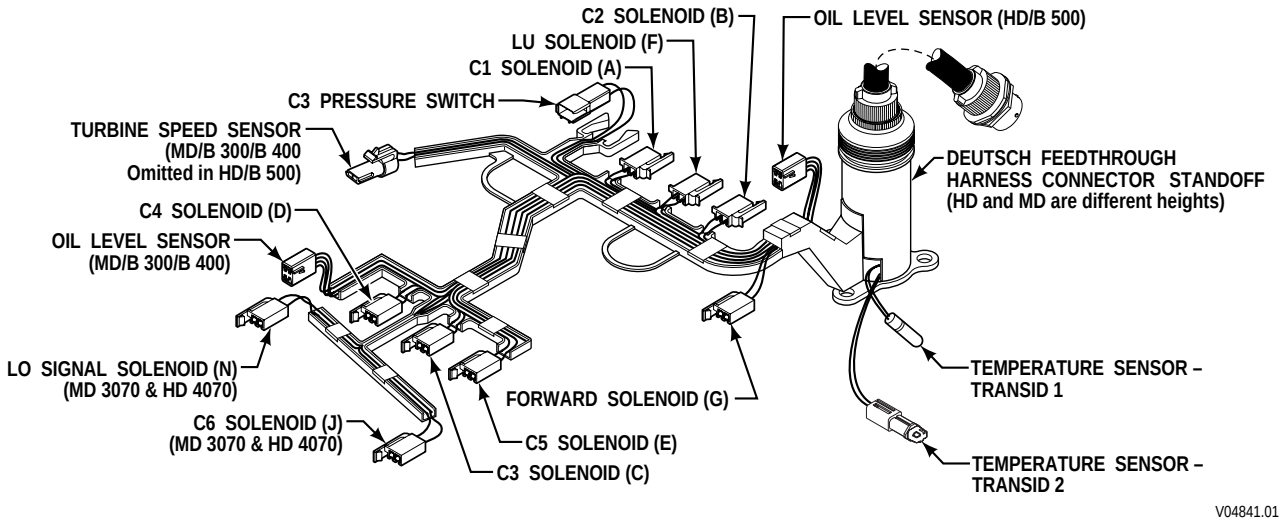

Figure 1–10. WTEC III Internal Wiring Harness

1–8. VEHICLE INTERFACE MODULE *(Figure 1–11)*

The vehicle interface module (VIM) provides relays, fuses, and connection points for interface with the output side of the vehicle electrical system. VIMs are available for both 12V and 24V electrical systems. The VIM for 12V systems uses all 12V relays. The VIM for 24V systems has all 24V relays. Refer to the Parts Catalog for the transmission assembly number that you are servicing for detailed parts information. Refer to Pages D–23 and D–24 for VIM wire number and terminal information.

Some OEMs may provide their own equivalent for the VIM which performs the same functions as the VIM shown in Figure 1–11.

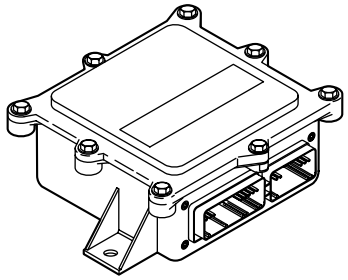

Figure 1–11. Vehicle Interface Module (VIM)

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GENERAL DESCRIPTION

1–9. AUTODETECT FEATURE

Autodetect is active on the first 24 engine starts or a larger calibration number of engine starts, depending upon the component or sensor being detected (details follow in A through D below). Autodetect takes place within the first 30 seconds of each engine start monitored. Autodetect searches for the presence of the following transmission components or data inputs:

Retarder	Present, Not Present
Oil Level Sensor (OLS)	Present, Not Present
Throttle	Analog, J1939, J1587
Engine Coolant Temperature	Analog, J1939, J1587

Even after autodetect has been completed, it can be reset to monitor an additional group of engine starts. Reset may be necessary if a device known to be present is not detected or if an autodetectable component or sensor was added after the initial vehicle build. Reset is accomplished by using the Pro-Link®. Using a WTEC II Pro-Link®, select "RESET TO UNADAPTED SHIFTS." Using a WTEC III Pro-Link®, select "RESET AUTODETECT." The WTEC III Pro-Link® can also be used to override autodetect and manually enter the component or sensor to be recognized by the ECU by changing appropriate "customer modifiable constants". The four items above are the only customer modifiable constants (CMC's) that are autodetected. Other CMC's can be changed at any time and are not related to autodetect. Consult the WTEC III Pro-Link® manual for detailed instructions related to WTEC III "customer modifiable constants." Additional details for each of the four autodetectable features are given below.

A. Retarder

Autodetect searches for the presence of the H (retarder) solenoid during the first 24 engine ignition cycles. The H solenoid must be present on the 24th engine start or the retarder is not detected and will not function on subsequent engine starts.

WARNING!	**If a retarder is present but is not detected by autodetect, the retarder will not function. Be sure to check for proper retarder function immediately after the 24th engine start. If the retarder is not functioning, check H solenoid for open, short-to-ground or short-to-battery condition. Use Pro-Link® to reset autodetect or to manually select the presence of the retarder after the H solenoid circuit is repaired.**

B. Oil Level Sensor (OLS)

NOTE: ***If an OLS is known to be present, but has not been detected, a possible cause is that the transmission fluid level is too low. Check the fluid level before beginning OLS troubleshooting.***

No oil level sensor diagnostics take place until the OLS is detected. Frequently check for the presence of oil level diagnostics if the transmission is known to contain an OLS. If an OLS is not detected during the first 24 engine starts, autodetect continues for a calibration number of engine starts. Autodetect stops when an OLS is detected or when the calibration number of starts is reached. When the calibrated number of engine starts is reached, the ECU concludes that no OLS is present. If an OLS is known to be present, but has not been detected, troubleshooting of the OLS circuit is required. After the OLS circuit is repaired, reset autodetect or manually select the OLS function using the Pro-Link®.

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C. Throttle Source

Whenever autodetect is functioning and no throttle source is found, a code 26 00 is logged. If a datalink throttle source (J1939 or J1587) is detected, autodetect stops looking for that function. However, if no analog throttle source was detected prior to engine start 25, autodetect continues for engine starts 25 through a calibration number. Autodetect for analog throttle stops as soon as a device is detected or when the calibration number of starts is reached. If an analog throttle source is known to be present, but is not detected, troubleshooting of the analog throttle circuit is required. After the analog throttle circuit is repaired, reset autodetect or manually select the analog throttle function using the Pro-Link®. An engine throttle source must be present. A PWM throttle source requires a unique calibration or must be manually selected using the Pro-Link®.

D. Engine Coolant Temperature

Autodetect looks for an engine coolant temperature source during the first 24 engine starts. However, code 26 11 is not logged unless the calibration calls for engine coolant temperature data to be used for retarder capacity reduction or preselect downshifts due to retarder overheating. Autodetect remembers whatever engine coolant temperature source was present on engine start 24. If no analog engine coolant temperature source is found on engine start 24, autodetect concludes that no sensor is present. Therefore, if an engine coolant temperature is known to be present at engine start 24, but is not detected, troubleshooting of the engine coolant temperature circuit is required. After the engine coolant temperature circuit is repaired, reset autodetect or manually select the engine coolant temperature function using the Pro-Link®.

1–10. TRANSID FEATURE

A. General Description

The TransID feature has been provided so that Allison Transmission can make component changes which require calibration changes but still retain both the original transmission A/N (prior to feature based ordering — FBO) and the original calibrated ECU A/N. The purpose of TransID is to reduce the need for OEMs to use cross-reference lists of transmission and calibrated ECU A/Ns when such changes to the transmission are made. Since FBO began in April, 1998, the OEM now needs to be sure the ECU being used is compatible with the TransID level stamped on the nameplate of the transmission.

The basis for the TransID system is the creation of a TransID wire in the WTEC III system to provide the signal to the ECU of the TransID level of the transmission. This wire will at first be connected directly to the Analog Return (wire 135) to signal TransID level 1 (TID 1). TransID levels 2 through 8 will then be indicated by connecting the TransID wire in sequence to the return of solenoids A, B, C, D, E, G, and F. Corresponding to the hardware changes is the ability in the V8A WTEC III ECU to contain up to eight calibrations. The connection point of the TransID wire will provide the signal to tell the ECU which calibration is required by the transmission.

Whenever a TransID level change is to be made, the new TransID level calibrations will be placed in the PROM Calibration Configurator System (PCCS) before the change(s) is(are) made in production to the transmissions. All ECUs programmed and sold after that date will then be loaded with the new TransID level calibration. These ECUs will contain calibrations for the new level transmission and all previous TransID levels and will automatically load the correct calibration for the transmission based on the TransID signal sensed by AutoDetect during the first twenty-five engine starts. This eliminates worry on the part of the OEM of coordinating the implementation of the new ECU and the new transmission and allows their focus to be on using the stock of the earlier level ECU.

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GENERAL DESCRIPTION

B. Transmission Changes Versus TransID Number

1. TransID 1

The internal wiring harness wiring change to make a TID 1 transmission was put into production before the introduction of the WTEC III system. The TID 1 internal harness was made by connecting the C3 Pressure Switch ground (digital/signal ground; WTEC II wire 161) to the Sump Temperature Sensor and Oil Level Sensor ground (analog ground; wire 135) in the internal harness. In WTEC II, the signal ground wire (wire 161) is routed through the transmission connector, terminal W, and then to the ECU, terminal B27. In WTEC III, this same wire in the internal harness becomes the TransID wire (wire 195), and it goes to the ECU, terminal T13 (blue connector). The purpose of TransID 1 was to provide a common transmission for use with both WTEC II and WTEC III systems (V7A and V8).

The only difference between a pre-TransID transmission and a TransID 1 transmission is the internal wiring harness which connects the digital and analog grounds on the TID 1 harness. Adapter harness P/N 200100 can be ordered from St. Clair Technologies to provide the same connection outside the transmission and allow a pre-TransID transmission to be “converted” to a TransID 1 transmission.

All models of the World Transmission were built with the TransID 1 internal (feedthrough) harness beginning in September, 1996. Two changes were rolled into this update: the wiring change for TID 1 and a change to use a molded channel rather than the braided covering which was previously used. Both changes were rolled into the same internal harness P/N even though there was a delay in implementing the channel which resulted in the two S/N breaks. Table 1–1 lists the harness P/Ns for the different transmission models along with the S/Ns for both changes for each harness.

Table 1–1. TransID 1 S/N Breakpoint

Transmission Model	Pre-TransID Harness P/N	TransID 1 Harness P/N	S/N at Wiring Change	S/N at U-Channel
MD 3000/B 300/B 400 w/OLS	29516322	29529472	6510088864	6510096671
MD 3000/B 300/B 400 w/o OLS	29516323	29529473	6510089316	6510096683
MD 3070 PT	29516324	29529474	6510090786	6510096675
HD 4000/B 500 w/OLS	29516325	29529475	6610014067	6610015591
HD 4000/B 500 w/o OLS	29516326	29529476	6610014084	6610015700
HD 4070	N/A	N/A	N/A	N/A

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2. TransID 2

The purpose of the TransID 2 change is to indicate the use of new sump and retarder temperature sensors (thermistors) and a new MD/B 300/B 400 retarder design. The new retarder requires a different calibration than the old retarder. Retarder performance complaints will occur if the new retarder is controlled by the old retarder calibration or the old retarder is controlled by the new retarder calibration. TransID 2 internal harnesses contain both the new sump temperature sensor and a new connection point for the TransID wire. The TransID wire (195) is connected to Solenoid A ground (wire 120) to signal TID 2 to the ECU. The new temperature sensors are discussed below. A TransID 2 transmission will only work with a V8A ECU (WTEC III) and V8A ECUs are calibrated to accommodate both TransID 1 and TransID 2 transmissions. The HD 4070 was equipped with TransID 2 at the start of production.

The internal harness change to all models for TID 2 began in late December, 1997 production. The S/N breakpoints are shown in Table 1–2.

Table 1–2. TransID 2 S/N Breakpoint

Transmission Model	TransID 1 Harness P/N	TransID 2 Harness P/N	S/N at Thermistor and Wiring Change
MD 3000/B 300/B 400 w/OLS	29529472	29533652	6510141464
MD 3000/B 300/B 400 w/o OLS	29529473	29533653	6510141470
MD 3070 PT	29529474	29533654	6510142172
HD 4000/B 500 w/OLS	29529475	29533655	6610026328
HD 4000/B 500 w/o OLS	29529476	29533656	6610026319
HD 4070	N/A	29533657	6610034908 (start of production)

The new retarder thermistor used on TransID 2 retarder model transmissions has a molded connector and is the same on all TransID 2 retarders. The TransID 1 and pre-TransID retarder thermistor had a two terminal connector attached to it when it was used on B 500R/HD 4000R transmissions. It was part of a retarder harness assembly when used on B300R/B 400R/MD 3000R transmissions. See Appendix Q which describes the new and old temperature sensors. A graph and a table of resistance values for different temperatures are also included in Appendix Q.

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GENERAL DESCRIPTION

Table 1–3 shows the old (pre-TransID and TransID 1) and the new (TransID 2) part numbers of the retarder temperature sensors and the serial number when the change was made.

Table 1–3. New Retarder Temperature Sensor S/N Breakpoint

Transmission Model	Former Thermistor Used	P/N Where Former Thermistor Used	New Thermistor P/N (TID 2)	First S/N For New Thermistor
B 300R/B 400R/MD 3000R	built into retarder harness	29510662	15326309	6510142059
B 500R/HD 4000R	built with connector attached	29511861	15326309	6610026472

C. Compatibility Between TransID Level And ECU Calibration Level

Table 1–4 shows the compatibility of the different ECU software levels with the different TransID level transmissions.

Table 1–4.

	CIN Compatibility Number	Software Level	Compatible with TransID Level	ECU Production Dates
WTEC II	07	V6E	pre-TransID and TID 1	until 9/94
	08	V7 and V7A	pre-TransID and TID 1	9/94 until 12/97
WTEC III	0A	V8	TID 1	2/97 until 9/97
	0B	V8A	TID 1 and TID 2	beginning 10/97

The manufacture and sale of both WTEC II and WTEC III ECUs during most of 1997 required a means of using a common transmission with either a WTEC II or a WTEC III ECU. A TID 1 transmission is the common transmission configuration for both control systems and production began in September, 1996 (see Table 1–3). A TransID level 1 transmission is compatible with V6E, V7, V7A, V8, and V8A ECUs.

TransID level 2 transmissions were produced beginning in late December, 1997 (see Table 1–4). A TransID 2 transmission is compatible with only V8A ECUs.

Pre-TransID transmissions are only compatible with V6E, V7, and V7A ECUs. Pre-TransID transmissions were produced before the first S/N break in Table 1–3.

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SECTION 2 — DEFINITIONS AND ABBREVIATIONS

2–1. CHECK TRANS LIGHT

When the ECU detects a serious fault, the **CHECK TRANS** light (usually located on the vehicle instrument panel) illuminates and action is automatically taken to protect operator, vehicle, and the transmission. A diagnostic code will nearly always be registered when the **CHECK TRANS** light is on; however, not all diagnostic codes will turn on the **CHECK TRANS** light. Codes related to the **CHECK TRANS** light are detailed in the code chart (refer to Section 6).

Illumination of the **CHECK TRANS** light indicates that a condition was detected that requires service attention. Operation may or may not be restricted but even when restricted will allow the vehicle to reach a service assistance location. Depending upon the cause for the **CHECK TRANS** light illumination, the ECU may or may not respond to shift selector requests. The transmission may be locked in a range. That range will be shown on the shift selector display. Both upshifts and downshifts may be restricted when the **CHECK TRANS** light is illuminated. Seek service assistance as soon as possible.

Each time the engine is started, the **CHECK TRANS** light illuminates briefly and then goes off. This momentary lighting shows the light circuit is working properly. If the light does not come on during engine start, request service immediately.

2–2. DIAGNOSTIC DATA READER *(Figure 2–1)*

The current Diagnostic Data Reader (DDR) is the Pro-Link® 9000 diagnostic tool which is available through Kent-Moore Heavy-Duty Division. A portable microcomputer-based receiver/transmitter/display unit, the Pro-Link® transmits and receives data to and from the ECU, processes the data, and displays appropriate information. Use the Pro-Link® during installation checkout and troubleshooting. There is a new Pro-Link® cartridge needed for use with WTEC III controls. The new Multi-Protocol Cartridge (MPC) contains a programmed PCMCIA card which allows for reprogramming of GPI/GPO packages. Reprogramming includes selection of a GPI/GPO package, enabling/disabling of wires and modification of certain data parameters. Operating instructions are supplied with each Pro-Link® and further information is also included in Appendix N of this manual. Connect the Pro-Link® 9000 to the diagnostic connector provided in the selector wiring harness.

Tool part numbers for the Pro-Link® are as follows:

- Diagnostic Kit J 38538D + J 38500–313 (PROM Update) = J 38538E
- Diagnostic Cartridge J 38500-302 + J 38500–313 = J 38500–303
- MPC J 38500–1500C
- PCMCIA (Diagnostic And Reprogramming) J 38500–1700B
- PCMCIA (Diagnostic Only) J 38500–1800A

NOTE: ***The new MPC is usable with WTEC II controls but the old WTEC II reprogramming cartridge will not display the WTEC III new information. The new MPC must be used to reprogram WTEC III systems.***

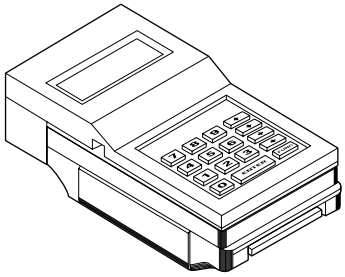

Figure 2–1. Pro-Link® 9000 Diagnostic Tool

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DEFINITIONS AND ABBREVIATIONS

2–3. ABBREVIATIONS

A/N	**A**ssembly **N**umber
ABS	**A**nti-lock **B**rake **S**ystem — OEM-provided means to detect and prevent wheel stoppage to enhance vehicle handling. Retarder and engine brakes will not apply when ABS is active.
Amp	Unit of electrical current.
C3PS	**C3 P**ressure **S**witch — Pressure switch to signal the presence or absence of pressure in the C3 clutch-apply circuit.
CAN	**C**ontroller **A**rea **N**etwork — A network for all SAE J1939 communications in a vehicle (engine, trnasmission, ABS, etc.)
COP	**C**omputer **O**perating **P**roperly — Hardware protection which causes the ECU to reset if software gets lost.
CT	**C**losed **T**hrottle
DDR	**D**iagnostic **D**ata **R**eader — Diagnostic tool; most current version is the Pro-Link® 9000 made by MicroProcessor Systems, Inc. Used to interrogate the ECU for diagnostic information and for reprogramming I/O packages in a calibration.
DNA	**D**oes **N**ot **A**dapt — Adaptive shift control is disabled.
DNS	**D**O **N**OT **S**HIFT — Refers to the **DO NOT SHIFT** diagnostic response during which the **CHECK TRANS** light is illuminated and the transmission will not shift and will not respond to the Shift Selector.
DVOM	**D**igital **v**olt/**o**hm**m**eter
ECU	**E**lectronic **C**ontrol **U**nit (also commonly referred to as the “computer”)
GPI	**G**eneral **P**urpose **I**nput — Input signal to the ECU to request a special operating mode or condition.
GPO	**G**eneral **P**urpose **O**utput — Output signal from the ECU to control vehicle components (such as PTOs, backup lights, etc.) or allow a special operating mode or condition.
J1587	Engine/transmission serial data communications link.
J1939	High-speed vehicle serial data communications link.
LED	**L**ight-**E**mitting **D**iode — Electronic device used for illumination.
NNC	**N**eutral **N**o **C**lutches — Neutral commanded with no clutches applied.
NVL	**N**eutral **V**ery **L**ow — The ECU has sensed turbine speed below 150 rpm when output speed is below 100 rpm and engine speed is above 400 rpm when **N** (Neutral) was selected. This is usually caused by a dragging C1 or C3 clutch or a failed turbine speed sensor. NVL is attained by turning D solenoid “ON” (in addition to E solenoid) and the C4 and C5 clutches are applied to lock the transmission output.
OEM	**O**riginal **E**quipment **M**anufacturer — Maker of vehicle or equipment.
Ohm	Unit of electrical resistance.
OL	**O**ver **L**imit or **O**il **L**evel — For **O**ver **L**imit see “∞”. Indicates **O**il **L**evel is being displayed on a shift selector.

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DEFINITIONS AND ABBREVIATIONS

2–3. ABBREVIATIONS *(cont'd)*

OLS	**O**il **L**evel **S**ensor — Electronic device (optional) on control module for indicating transmission fluid level.
PCCS	**P**ROM **C**alibration **C**onfigurator **S**ystem
PCMCIA	**P**ersonal **C**omputer **M**emory **C**ard **I**nternational **A**ssociation — Memory device for use with Pro-Link® containing Allison Transmission programming and diagnostics.
PROM	**P**rogrammable **R**ead **O**nly **M**emory
PSS	**P**rimary **S**hift **S**elector — Main shift selector in a two-selector control system.
PTO	**P**ower **T**ake**o**ff
PWM Solenoid	**P**ulse **W**idth **M**odulated **Solenoid** — Solenoids are controlled by pulse width modulation. Solenoid control of clutch pressures is based on the solenoid's duty cycle. Duty cycle is determined by the ratio of solenoid's on-time to off-time.
RMR	**R**etarder **M**odulation **R**equest — Signal from a retarder control device.
RPR	**R**eturn to **P**revious **R**ange — Diagnostic response in which the transmission is commanded to return to previously commanded range.
SCI	**S**erial **C**ommunication **I**nterface — Used to transmit data and messages between the diagnostic tool and the ECU and other systems such as electronically-controlled engines.
SOL OFF	All **SOL**enoids **OFF**
SPI	**S**erial **P**eripheral **I**nterface — The means of communication between the microprocessor and the interface circuits.
SSS	**S**econdary **S**hift **S**elector — Alternate shift selector in a two-selector control system.
TID	**T**rans**ID** — A feature which allows the ECU to know the transmission configuration and provide the corresponding calibration required.
TPS	**T**hrottle **P**osition **S**ensor — Potentiometer for signaling the position of the engine fuel control lever.
V	**V**ersion — Abbreviation used in describing ECU software levels.
VDC	**V**olts **D**irect **C**urrent (DC)
VIM	**V**ehicle **I**nterface **M**odule — A watertight box containing relays and fuses — interfaces the transmission electronic control system with components on the vehicle.
VIW	**V**ehicle **I**nterface **W**iring — Interfaces ECU programmed input and output functions with the vehicle wiring.
Volt	Unit of electrical force.
VOM	**V**olt/**o**hm**m**eter
WOT	**W**ide **O**pen **T**hrottle
WT	**W**orld **T**ransmission
∞	Infinity — Condition of a circuit with higher resistance than can be measured, effectively an open circuit.

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DEFINITIONS AND ABBREVIATIONS

NOTES

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SECTION 3 — BASIC KNOWLEDGE

3–1. BASIC KNOWLEDGE REQUIRED

To service WTEC III Electronic Controls, the technician must understand basic electrical concepts. Technicians need to know how to use a volt/ohmmeter (VOM) to make resistance and continuity checks. Most troubleshooting checks consist of checking resistance, continuity, and checking for shorts between wires and to ground. The technician should be able to use jumper wires and breakout harnesses and connectors. Technicians unsure of making the required checks should ask questions of experienced personnel or find instruction.

The technician should also have the mechanical aptitude required to connect pressure gauges or transducers to identified pressure ports used in the troubleshooting process. Pressure tap locations and pressure values are shown in Appendix B — Checking Clutch Pressures.

Input power, ground, neutral start circuitry, etc., can cause problems with electronic controls or vehicle functioning and may not generate a diagnostic code. A working knowledge of WT Series Electronic Controls vehicle installation is necessary in troubleshooting installation-related problems.

Refer to Section 8 for information concerning performance complaints (non-code) troubleshooting. A complete wiring schematic is shown in Appendix J. Refer to the WTEC III Controls and General Information Sales Tech Data Book for information concerning electronic controls installation and the Installation Checklist. Reliable transmission operation and performance depend upon a correctly installed transmission. Review the Installation Checklist in the MD, HD, B 300/B 400, and B 500 Sales Tech Data Books to ensure proper installation.

NOTE: Allison Transmission is providing for service of wiring harnesses and wiring harness components as follows:

- Repair parts for the internal wiring harness and for wiring harness components attached to the shift selector will be available through the Allison Transmission Parts Distribution Center (PDC). Use the P/N from your appropriate parts catalog or from Appendix E in this manual. Allison Transmission is responsible for warranty on these parts.
- Repair parts for the external harnesses and external harness components must be obtained from St. Clair Technologies Inc. (SCTI). SCTI provides parts to any Allison customer or OEM and is responsible for warranty on these parts. SCTI recognizes ATD, manufacturers, and SCTI part numbers. SCTI provides a technical HELPLINE at 519-627-1673 (Wallaceburg). SCTI will have parts catalogs available. The SCTI addresses and phone numbers for parts outlets are:

  St. Clair Technologies, Inc.
  1050 Old Glass Road
  Wallaceburg, Ontario, Canada, N8A 3T2
  Phone: (519) 627-1673
  Fax: (519) 627-4227

  St. Clair Technologies, Inc.
  1111 Mikesell Street
  Charlotte, Michigan 48813
  Phone: (517) 541-8166
  Fax: (517) 541-8167

  St. Clair Technologies, Inc.
  c/o Mequilas Tetakawi
  Carr. Internationale KM 1969
  Guadalajara – Nogales, KM2
  Empalme, Sonora, Mexico
  Phone: 011-52-622-34661
  Fax: 011-52-622-34662

- St. Clair Technologies, Inc. stocks a WTEC III external harness repair kit, P/N 29532362, as a source for some external harness repair parts. SCTI is the source for external harness repair parts.

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BASIC KNOWLEDGE

3–2. USING THE TROUBLESHOOTING MANUAL

Use this manual as an aid to troubleshooting the WTEC III Electronic Controls. Every possible problem and its solution cannot be encompassed by any manual. However, this manual does provide a starting point from which most problems can be resolved.

Once a problem solution is discovered in the manual do not look further for other solutions. It is necessary to determine *why* a problem occurred. For example, taping a wire that has been rubbing on a frame rail will not correct the problem unless the rubbing contact is eliminated.

3–3. SYSTEM OVERVIEW

WTEC III Electronic Control functions are controlled by the ECU. The ECU reads shift selector range selection, output speed, and throttle position to determine when to command a shift. When a shift occurs, the ECU monitors turbine speed, output speed, and throttle position to control the oncoming and off-going clutches during the shift.

When the ECU detects an electrical fault, it logs a diagnostic code indicating the faulty circuit and may alter the transmission operation to prevent or reduce damage.

When the ECU detects a non-electrical problem while trying to make a shift, the ECU may try that shift a second or third time before setting a diagnostic code. Once that shift has been retried, and a fault is still detected, the ECU sets a diagnostic code and holds the transmission in a fail-to-range mode of operation.

3–4. IMPORTANT INFORMATION IN THE TROUBLESHOOTING PROCESS

Before beginning the troubleshooting process, read and understand the following:

- WTEC III wire identification presents the wire number followed by the ECU terminal source (i.e., 157-S30). If there is a letter suffix following the wire number, there is a splice between the ECU source and wire destination (i.e., 136A-S16).
- Shut off the engine and ignition before any harness connectors are disconnected or connected.
- Remember to do the following when checking for shorts and opens:
  - — Minimize movement of wiring harnesses when looking for shorts. Shorts involve wire-to-wire or wire-to-ground contacts and moving the harnesses may eliminate the problem.
  - — Wiggle connectors, harnesses, and splices when looking for opens. This simulates vehicle movements which occur during actual operation.
- When disconnecting a harness connector, be sure that pulling force is applied to the connector itself and **not the wires** extending from the connector.
- Resistance checks involving the wiring between the ECU connectors and other components adds about one ohm of resistance to the component resistance shown.

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- Inspect all connector terminals for damage. Terminals may have bent or lost the necessary tension to maintain firm contact.

- Clean dirty terminals or connectors with isopropyl alcohol and a cotton swab, or a good quality, non-residue, non-lubricating, cleaning solvent such as LPS Electro Contact Cleaner® or LPS NoFlash Electro Contact Cleaner®.

CAUTION:	The cleaning solvent must not be chlorine based, contain petroleum distillates, or conduct electricity. The cleaning solvent should evaporate quickly to prevent the possibility of condensation within the connectors. Always blow or shake any excess cleaner from the connector before assembling it to its mating connector or hardware. Cleaner trapped in the connector can affect the connector seal. (Refer to SIL 17-TR-94 for detailed information on the recommended cleaners.)

CAUTION:	Care should be taken when welding on a vehicle equipped with electronic controls. Refer to Appendix G, Paragraph 1–1.

- Diagnostic codes displayed after system power is turned on with a harness connector disconnected, can be ignored and cleared from memory. Refer to Section 6, Diagnostic Codes, for the code clearing procedure.

3–5. BEGINNING THE TROUBLESHOOTING PROCESS

NOTE: Whenever a transmission is overhauled, exchanged, or has undergone internal repairs, the Electronic Control Unit (ECU) must be "RESET TO UNADAPTED SHIFTS." See Service Information Letter 16-WT-96, Revision A for further details.

1. Begin troubleshooting by checking the transmission fluid level and ECU input voltage. Remember that some problems may be temperature related. Do troubleshooting at the temperature level where the problem occurs. Check diagnostic codes by:

   - Using the shift selector display. (See Paragraph 6–2 for code reading.)
   - Using the Pro-Link® 9000 diagnostic tool.

2. When a problem exists but a diagnostic code is not indicated, refer to the Performance Complaint Section (Section 8) for a listing of various electrical and hydraulic problems, their causes, and remedies.

3. If a diagnostic code is found in the ECU memory, record all available code information and clear the active indicator (refer to Section 6).

4. Test drive the vehicle to confirm a diagnostic code or performance complaint.

   - If the code reappears, refer to the Diagnostic Code section (Section 6) and the appropriate code chart. The Diagnostic Code section lists diagnostic codes and their description. Locate the appropriate troubleshooting chart and follow the instructions.

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BASIC KNOWLEDGE

- If the code does not reappear, it may be an intermittent problem. Use the Pro-Link® and the code display procedure described in Section 6. The code display procedure will indicate the number of times the diagnostic code has occurred. Refer to the troubleshooting chart for possible cause(s) of the problem.
- Appendix A deals with the identification of potential circuit problems. Refer to Appendix A if a circuit problem is suspected.

NOTE: Information concerning specific items is contained in the appendices located in the back of this manual. The appendices are referred to throughout the manual.

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SECTION 4 — WIRE CHECK PROCEDURES

4–1. CHECKING OPENS, SHORTS BETWEEN WIRES, AND SHORTS-TO-GROUND

(Use Digital Volt/Ohmmeter J 34520-A and Jumper Wire Set J 39197)

NOTE: Please refer to Paragraph 3–5 to begin the troubleshooting process.

1. Make sure all connectors are tightly connected and re-check the circuit.
2. Disconnect and inspect all connectors.
3. Thoroughly clean corroded or dirty terminals. If dirty or corroded terminals are the probable cause of the problems, reconnect the clean connectors and operate the vehicle normally. If the problem recurs, proceed with Step (4).

CAUTION:	The cleaning solvent must not be chlorine based, contain petroleum distillates, or conduct electricity. The cleaning solvent should evaporate quickly to prevent the possibility of condensation within the connectors. Always blow or shake any excess cleaner from the connector before assembling it to its mating connector or hardware. Cleaner trapped in the connector can affect the connector seal. (Refer to SIL 17-TR-94 for detailed information on the recommended cleaners.)

4. Review the WTEC III wire numbering system described in Paragraph 3–4.
5. If all connectors are clean and connected correctly, determine which wires in the chassis harness are indicated by the diagnostic code. For example, Code 41 12, indicates an open or short-to-ground in the solenoid A circuit — wires 102-T1 and 120-T4.
   a. Check continuity of wires 102-T1 and 120-T4 by performing the following (refer to Figure 4–1):
      (1) Disconnect the blue "T" connector from the ECU and disconnect the harness from the transmission main connector. At one end of the harness, using jumper wire kit J 39197 and connector probes in J 39775-CP, connect wire 102-T1 and 120-T4 to each other, being careful not to distort the terminals. Jumping the wires together creates a circuit between wires 102-T1 and 120-T4.

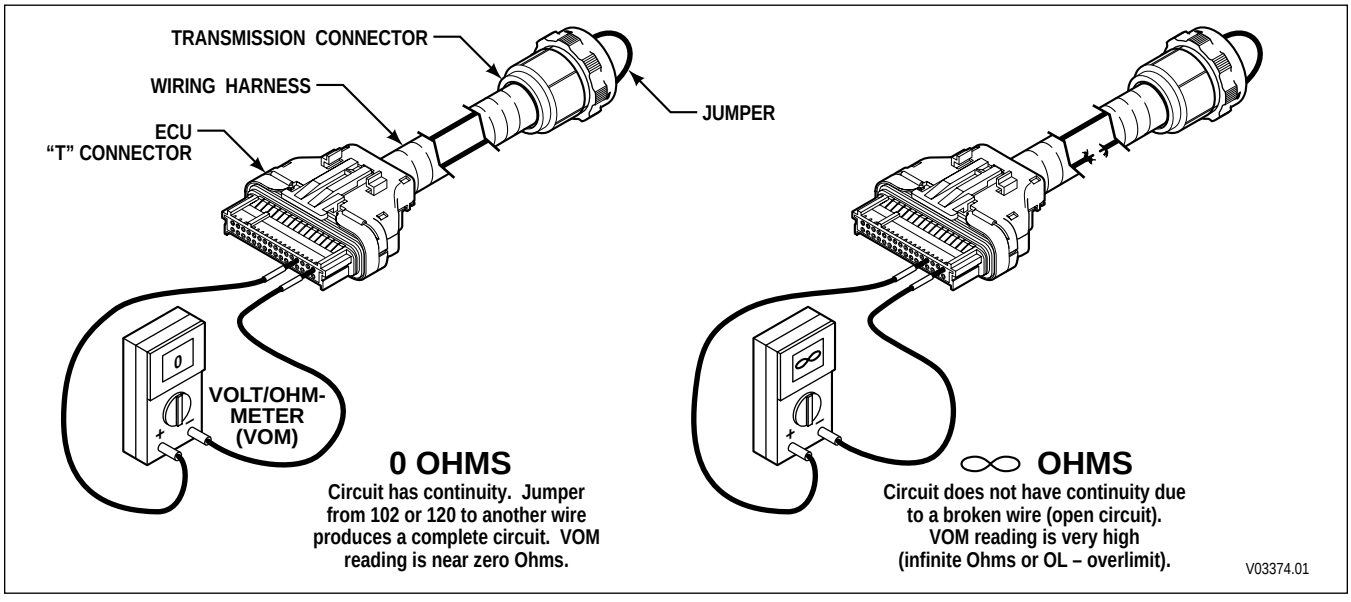

Figure 4–1. Open Circuit

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WIRE CHECK PROCEDURES

(2) On the opposite end of the harness, check the continuity of the jumpered pair. No continuity in a jumpered pair circuit (infinite resistance reading) indicates an open in the wire being tested. Locate and repair the damaged portion of the wire.

b. If the continuity check is good (0–2 Ohms resistance), remove the jumpers. Check the harness for shorts between wires and shorts-to-ground by performing the following (refer to Figure 4–2):

(1) At the ECU end of the harness, touch one VOM probe to one wire of the circuit being tested and touch the other probe to each terminal in the same connector, then touch the probe to chassis ground and to the transmission main housing. Do this for both wires in the circuit being tested.

(2) If at any time the VOM shows zero to low resistance, or the meter's continuity beeper sounds, there is a short between the two points being probed — wire-to-wire or wire-to-ground. Isolate and repair the short.

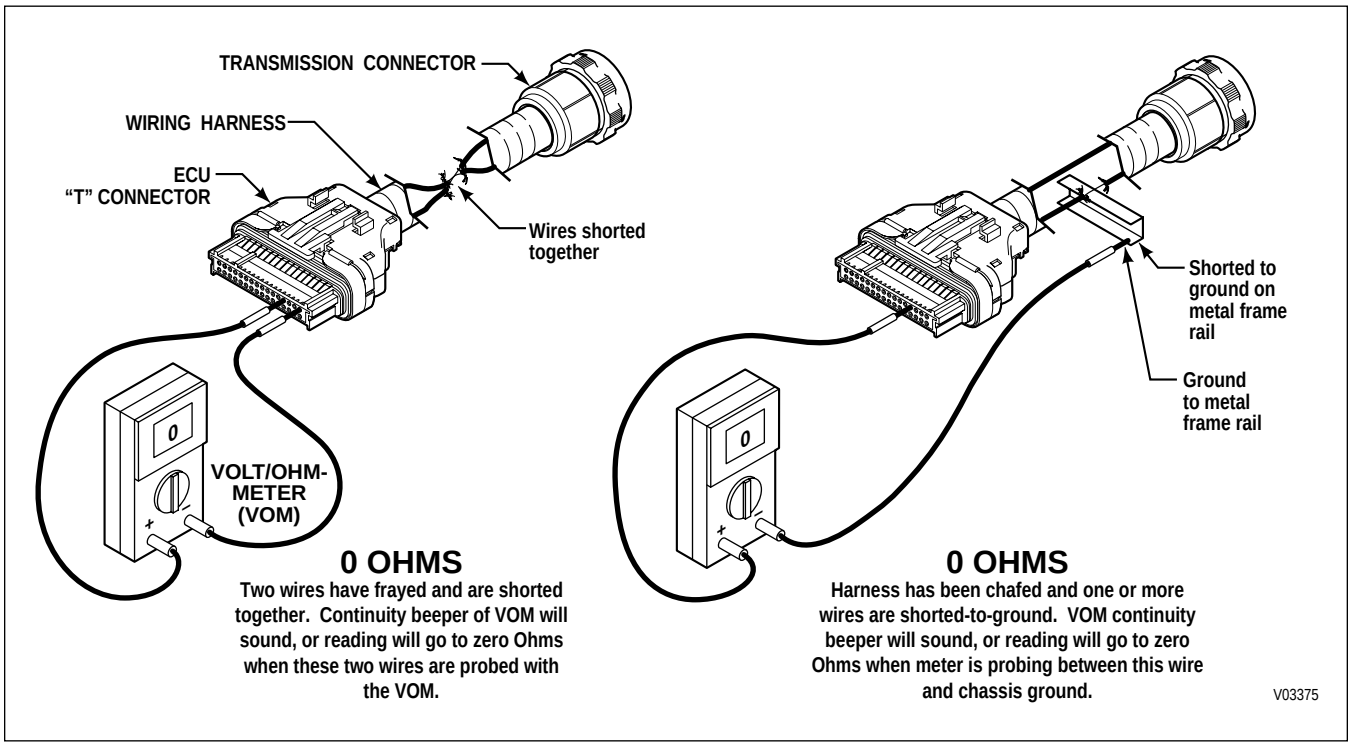

Figure 4–2. Short Between Wires and to Ground

4–2. CHECKING AT TRANSMISSION CONNECTOR AND THE INTERNAL HARNESS FOR OPENS, SHORTS BETWEEN WIRES, AND SHORTS-TO-GROUND

1. Disconnect the external wiring harness from the transmission.

2. Inspect the connectors. Any terminals which are corroded or dirty must be thoroughly cleaned.

3. If the connectors are clean and connected correctly, determine which wires in the harness to test. Use the diagnostic code system schematic to locate the wire terminals. For this example, Code 41 12 indicates an open or short-to-ground in solenoid "A" circuit — wires 102-T1 and 120-T4 (refer to Figure 4–3 and 4–4).

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WIRE CHECK PROCEDURES

CAUTION: The cleaning solvent must not be chlorine based, contain petroleum distillates, or conduct electricity. The cleaning solvent should evaporate quickly to prevent the possibility of condensation within the connectors. Always blow or shake any excess cleaner from the connector before assembling it to its mating connector or hardware. Cleaner trapped in the connector can affect the connector seal. (Refer to SIL 17-TR-94 for detailed information on the recommended cleaners.)

a. At the transmission connector, check the resistance of the A solenoid circuit. Resistance of a solenoid circuit should be 2.4–5 Ohms — covering a temperature range of –18°C to 149°C (0°F to 300°F). Refer to Solenoid Resistance vs. Temperature chart in Appendix K. No continuity in the circuit (infinite resistance) indicates an open in the internal harness, the feedthrough connector, or the solenoid coil. Locate and repair the open in the internal harness or replace the internal harness, replace the feedthrough connector, or replace the solenoid.

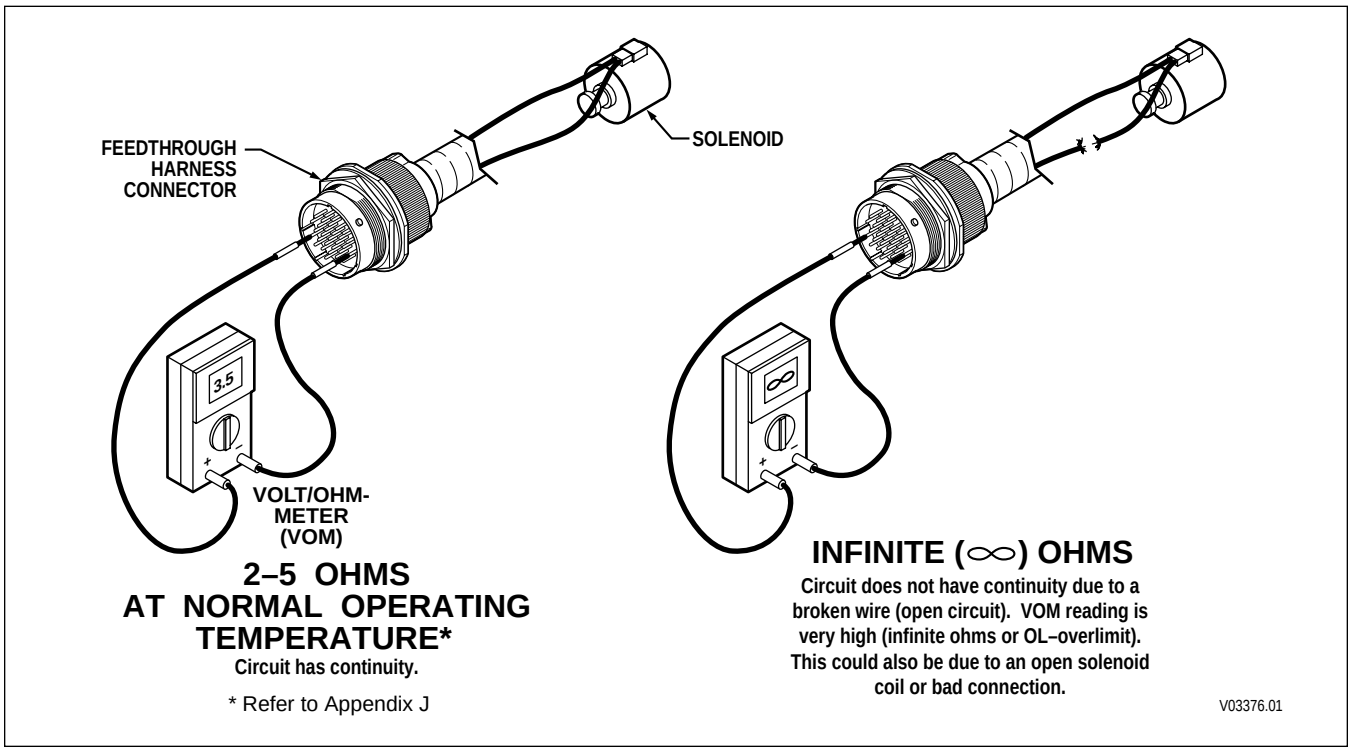

Figure 4–3. Checking Continuity

b. If the resistance check is good, check the harness for shorts between wires and to ground by performing the following (refer to Figure 4–4):

(1) At the transmission connector, touch one probe of the VOM to one wire of the circuit being tested and touch the other probe to each terminal in the connector and to chassis ground and the transmission main housing. Do this for both wires in the circuit being tested.

(2) If the VOM shows zero to low resistance, or the continuity beeper sounds, there is a short between the two points being probed, wire-to-wire or wire-to-ground. An indication of a short may be caused by a splice to the wire being checked. Check the wiring diagram in Appendix J for splice locations. If the short is not a splice, then isolate and repair the short.

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WIRE CHECK PROCEDURES

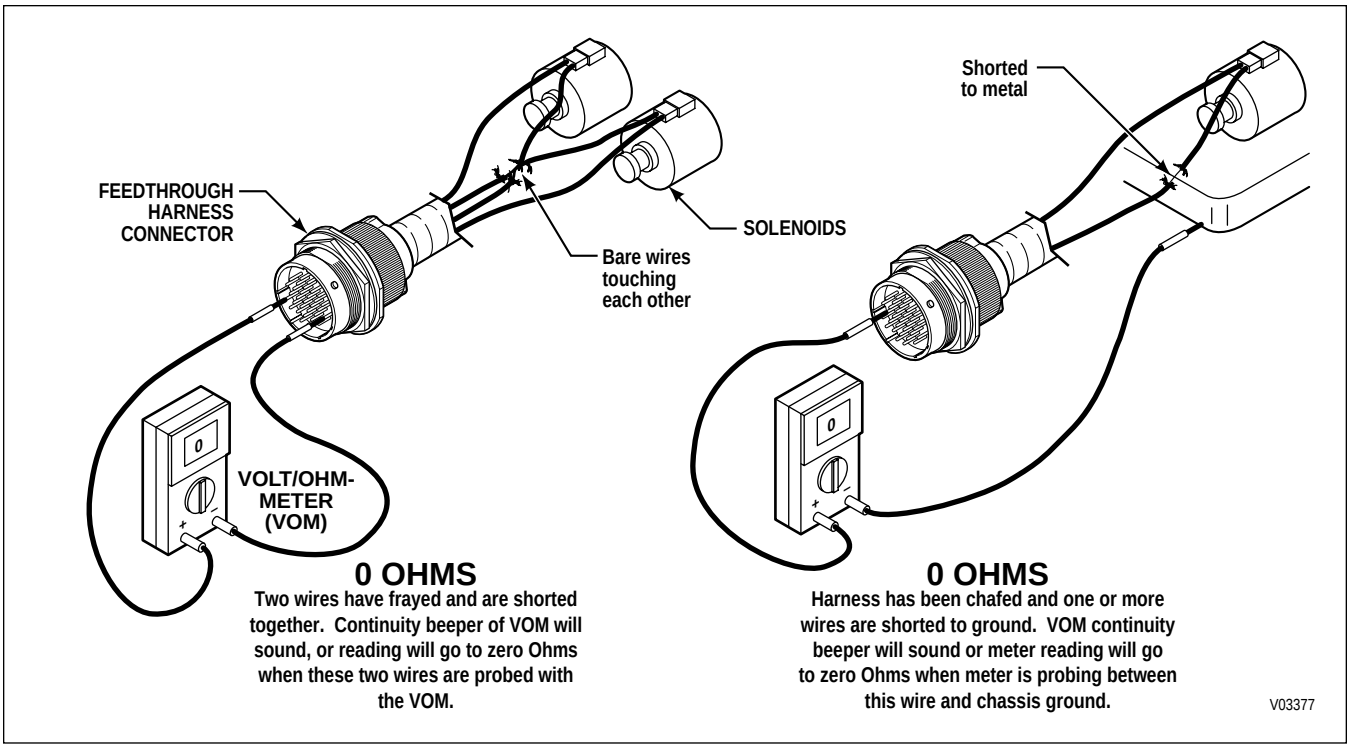

Figure 4–4. Short Between Wires and to Ground

NOTE: ***When conducting circuit checks that include the external harness, add one (1) Ohm to the values shown. Speed sensor resistance is 270–330 Ohms. C3 pressure switch resistance is two (2) Ohms maximum when switch is closed and 20,000 Ohms minimum when switch is open.***

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SECTION 5 — OIL LEVEL SENSOR

The Oil Level Sensor (Figure 5–1) provides a means of electronically checking the transmission fluid level from the shift selector display, the Pro-Link® 9000 (DDR) diagnostic tool, or a customer-furnished remote display.

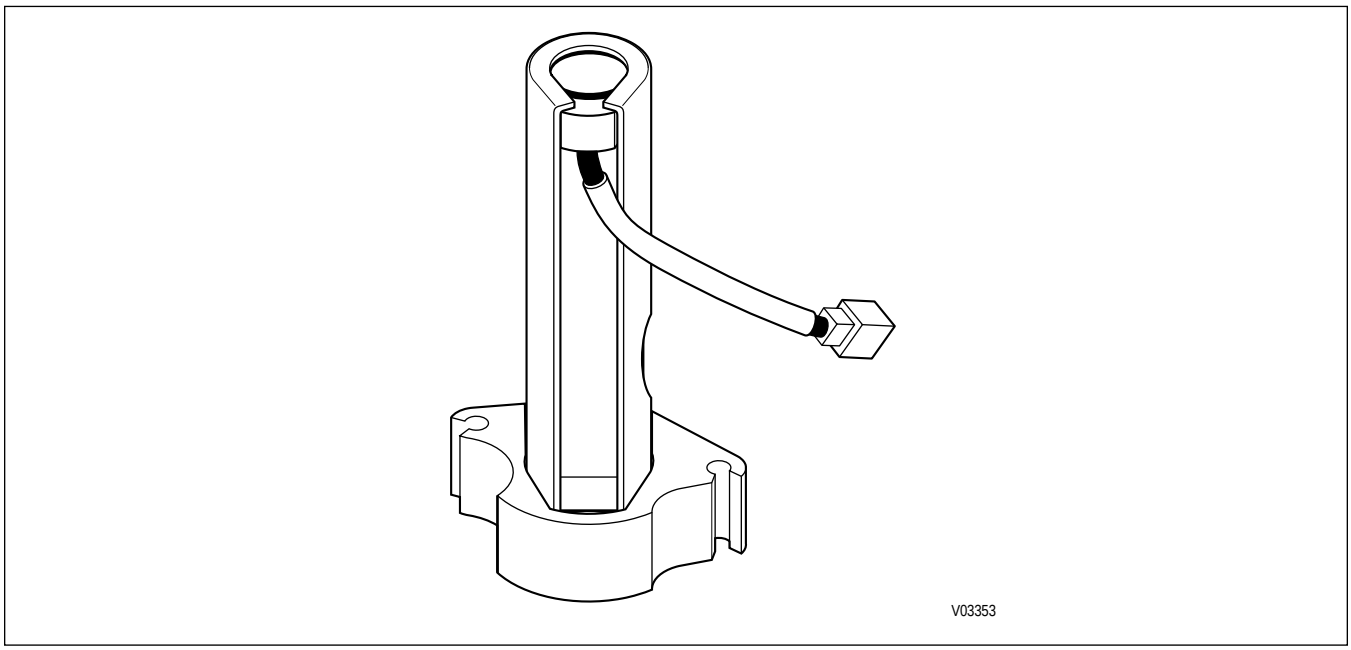

Figure 5–1. Oil Level Sensor

5–1. ELECTRONIC FLUID LEVEL CHECK (SHIFT SELECTOR)

NOTE: ***The pushbutton and lever shift selectors can display one character at one time. The strip pushbutton shift selector has no diagnostic or display capability. The Pro-Link® 9000 or a customer-furnished remote display must be used to obtain fluid level information when using the strip pushbutton shift selector.***

A. Fluid Level Check Procedure

1. Park the vehicle on a level surface and shift to **N** (Neutral). Apply the parking brake.
2. On the Pushbutton shift selector, simultaneously press the ⇑ (Up) and ⇓ (Down) arrow buttons once.
3. On the Lever shift selector, press the “display mode” button once.
4. For a strip pushbutton shift selector, refer to the Pro-Link® 9000 manual or to Appendix N in this manual.

NOTE: ***The ECU may delay the fluid level check until the following conditions are met:***

- ***The fluid temperature is between 60°C (140°F) and 104°C (220°F).***
- ***The transmission is in N (Neutral).***
- ***The vehicle has been stationary for approximately two minutes to allow the fluid to settle.***
- ***The engine is at idle (below 1000 rpm — not “fast” idle).***

See “Invalid for Display” information in Steps (8) and (9).

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OIL LEVEL SENSOR

5. Correct fluid level is reported when **o**, **L** is displayed (**o**, **L** indicates the Oil Level Check Mode), followed by **o**, **K**. The **o**, **K** display indicates the fluid level is within the proper fluid level zone. **Remember that the display occurs one character at a time.** The sensor display and the transmission dipstick may not agree exactly because the oil level sensor compensates for fluid temperature.

   Example: **o**, **L**; **o**, **K** — Indicates correct fluid level.

6. Low fluid level is reported when **o**, **L** is displayed, followed by **L**, **o** and a number. **L**, **o** indicates a low fluid level and the number is the number of quarts of fluid the transmission requires.

   Example: **o**, **L**; **L**, **o**; **2** — Indicates 2 additional quarts of fluid will bring the fluid level within the proper fluid level.

7. High fluid level is reported when **o**, **L** is displayed, followed by **H**, **I** and a number. **H**, **I** indicates high fluid level and the number shows how many quarts the transmission is overfilled.

   Example: **o**, **L**, **H**, **I**, **1** — Indicates one quart of fluid above the full level.

CAUTION: A low or high fluid level causes overheating and irregular shift patterns. An incorrect fluid level can damage the transmission.

8. An Invalid for Display condition is reported when **o**, **L** is displayed, followed by "–" and a number display. The displayed number is a fault code and indicates improper conditions or a system malfunction.

   Example: **o**, **L**, –, **7,0** — Indicates an Invalid for Display condition and fault code 70.

9. Invalid for Display is activated when conditions do not allow the fluid level to be checked electronically. Review the following codes and conditions, and correct as necessary.

Table 5–1. Invalid for Display Codes

CODE		CAUSE OF CODE
X*	—	Settling time too short
5,0	—	Engine speed (rpm) too low
5,9	—	Engine speed (rpm) too high
6,5	—	**N** (Neutral) must be selected
7,0	—	Sump fluid temperature too low
7,9	—	Sump fluid temperature too high
8,9	—	Output shaft rotation
9,5	—	Sensor failure**

* A number between 8 and 1 that flashes during the countdown period.

** Speed sensor, throttle sensor, temperature sensor, or oil level sensor.

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OIL LEVEL SENSOR

10. To exit the fluid level display mode:

    - Pushbutton shift selector — press the **N** (Neutral) pushbutton or press ⇑ and ⇓ arrow pushbuttons simultaneously two times.
    - Lever shift selector — press the "display mode" button two times or move the lever.

5–2. ELECTRONIC FLUID LEVEL CHECK (PRO-LINK® 9000)

The Pro-Link® 9000 (DDR) can also be used to electronically check the transmission's fluid level. Further detail is also provided in Appendix N of this manual.

CAUTION:	A low or high fluid level causes overheating and irregular shift patterns and, if not corrected, can damage the transmission.

A. Fluid Level Check Procedure

1. Connect the DDR to the DDR connector.
2. Scroll (down) the Diagnostic Data List to "OIL LVL" display.
3. Read the fluid level, repeat the check to confirm the first reading.

NOTE: The ECU may delay the fluid level check until the following conditions are met:

- ***The fluid temperature is between 60°C (140°F) and 104°C (220°F).***
- ***The transmission is in N (Neutral).***
- ***The vehicle has been stationary for approximately two minutes to allow the fluid to settle.***
- ***The engine is at idle.***

The reason for a delayed fluid level check is indicated on the DDR by one of the following diagnostic messages:

Table 5–1.

DDR MESSAGE		
O L	—	SETTLING TIME (8 down to 1)
O L	—	ENGINE SPEED LO
O L	—	ENGINE SPEED HI
O L	—	SELECT **N** (NEUTRAL)
O L	—	SUMP TEMP LO
O L	—	SUMP TEMP HI
O L	—	OUTPUT SPEED HI
O L	—	CHECK CODES

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OIL LEVEL SENSOR

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SECTION 6 — DIAGNOSTIC CODES

6–1. DIAGNOSTIC CODE MEMORY

Diagnostic codes are logged in a list in memory (sometimes referred to as the queue), listing the most recently occurring code first and logging up to five codes. The codes contained in the list have information recorded as shown in the table below (codes are examples). Access to the code list position, main code, subcode and active indicator is through either the shift selector display or the Pro-Link® diagnostic tool. Access to ignition cycle counter and event counter information is through the diagnostic tool only. Further detail on the use of Pro-Link® 9000 DDR is presented in Appendix N of this manual.

Table 6–1. Code List

Code List Position	Main Code	Subcode	Active Indicator	Ignition Cycle Counter	Event Counter
d1	21	12	YES	00	10
d2	41	12	YES	00	04
d3	23	12	NO	08	02
d4	34	12	NO	13	01
d5	56	11	NO	22	02
Displayed on shift selector and diagnostic tool d = “diagnostic”			YES = LED indicator illuminated	Not available on shift selector display	

The following paragraphs define the different parts of the code list.

A. Code List Position. The position which a code occupies in the code list. Positions are displayed as “d1” through “d5” (Code List Position #1 through Code List Position #5).

B. Main Code. The general condition or area of fault detected by the ECU.

C. Subcode. The specific area or condition related to the main code in which a fault is detected.

D. Active Indicator. Indicates when a diagnostic code is active. The MODE indicator LED on the shift selector is illuminated or the diagnostic tool displays **YES**.

E. Ignition Cycle Counter. Determines when inactive diagnostic codes are automatically cleared from the code list. The counter is increased by one each time a normal ECU power down occurs (ignition turned off). Inactive codes are cleared from the code list after the counter exceeds 25.

F. Event Counter. Counts the number of occurrences of a diagnostic code. If a code is already in the code list and the code is again detected, that code is moved to position d1, the active indicator is turned on, the Ignition Cycle Counter is cleared, and 1 is added to the Event Counter.

6–2. CODE READING AND CODE CLEARING

Diagnostic codes can be read and cleared by two methods: by using the Pro-Link® 9000 diagnostic tool or by entering the diagnostic display mode and using the shift selector display. The use of the Pro-Link® 9000 diagnostic tool is described in the instruction manual furnished with each tool and briefly in Appendix N of this manual. The method of reading and clearing codes described in this section refers to entering the diagnostic display mode by the proper button movements on the shift selector.

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DIAGNOSTIC CODES

The diagnostic display mode may be entered for viewing of codes at any speed. Active codes can only be cleared when the output speed = 0 and no output speed sensor failure is active.

A. Reading Codes. Enter the diagnostic display mode by pressing the ⇑ (Up) and ⇓ (Down) arrow buttons at the same time on a pushbutton selector, or by momentarily pressing the "display mode" button on a lever shift selector.

NOTE: If a DO NOT SHIFT condition is present (CHECK TRANS light illuminated) at this time, the shift selector may or may not respond to requested range changes.

NOTE: If an oil level sensor is present, then fluid level will be displayed first. Diagnostic code display is achieved by simultaneously depressing the ⇑ (Up) and ⇓ (Down) arrow buttons a second time or the "display mode" button a second time.

The code list or queue position is the first item displayed, followed by the main code and the subcode. Each item is displayed for about one second. The display cycles continuously until the next code list position is accessed by pressing the **MODE** button. The following list represents the display cycle using code 25 11 as an example:

1. Code list position — **d**, **1**
2. Main code — **2**, **5**
3. Subcode —**1**, **1**
4. Cycle repeats — **d**, **1**, **2**, **5**, **1**, **1**

To view the second, third, fourth, and fifth positions (d2, d3, d4, and d5), momentarily press the **MODE** button as explained above.

Momentarily press the **MODE** button after the fifth position is displayed to restart the sequence of code list positions.

An active code is indicated by the illumination of the LED indicator when a code position is displayed while in the diagnostic display mode. In the normal operating mode, the LED indicator illuminates to show a secondary mode operation.

Any code position which does not have a diagnostic code logged will display "–" for both the main and subcodes. No diagnostic codes are logged after an empty code position.

B. Clearing Active Indicators. A diagnostic code's active indicator can be cleared, which allows the code inhibit to be cleared but remains in the queue as inactive.

The active indicator clearing methods are:

1. Power down — All active indicators, except code 69 34 (refer to the code chart), are cleared at ECU power down.
2. Self-clearing — Some codes will clear their active indicator when the condition causing the code is no longer detected by the ECU.

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3. Manual — Some active indicators can be cleared manually, while in the diagnostic display mode, after the condition causing the code is corrected.

CAUTION:	If an active indicator is cleared while the transmission is locked in a forward range or reverse (fail-to-range), the transmission will remain in the forward range or reverse after the clearing procedure is completed. Neutral must be manually selected.

C. Manually Clearing Codes and Active Indicators from the Code List. To clear active indicators or all codes:

1. Enter the diagnostic display mode.
2. Press and hold the **MODE** button for approximately three seconds until the LED indicator flashes. All active indicators are cleared. To remove all inactive codes, press and hold the **MODE** button for about ten seconds until the LED indicator flashes again. All active indicators will be cleared at ECU power down.
3. Codes that cannot be manually cleared will remain.

D. Exiting the diagnostic display mode. Exit the diagnostic display mode using one of the following procedures:

1. On a pushbutton shift selector, press the ⇑ (Up) and ⇓ (Down) arrow buttons at the same time or press any range button, **D**, **N**, or **R**. The shift (**D**, **N**, or **R**) is commanded if not inhibited by an active code.
2. On a lever shift selector, momentarily press the “display mode” button or move the shift lever to any shift position other than the one it was in when the diagnostic display mode was activated. If the shift is inhibited, the ECU will continue to command the current transmission range attained and the lever should be returned to its original position.
3. Wait until timeout (approximately 10 minutes) and the system will automatically return to the normal operating mode.
4. Turn off power to the ECU (turn off the vehicle engine at the ignition switch).

6–3. DIAGNOSTIC CODE RESPONSE

The following ECU responses to a fault provide for safe transmission operation:

- **D**o **N**ot **S**hift (DNS) Response
  - — Release lockup clutch and inhibit lockup operation.
  - — Inhibit all shifts.
  - — Turn on the **CHECK TRANS** light.
  - — Display the range attained.
  - — Ignore any range selection inputs from the pushbutton or lever shift selector.
- **D**o **N**ot **A**dapt (DNA) Response
  - — The ECU stops adaptive shift control while the code is active. Do not adapt shifts when a code with the DNA response is active.

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DIAGNOSTIC CODES

- **SOL**enoid **OFF** (SOL OFF) Response
  - — All solenoids are commanded off (turning solenoids “A” and “B” off electrically causes them to be on hydraulically).
- **R**eturn to **P**revious **R**ange (RPR) Response
  - — When the speed sensor ratio or C3 pressure switch tests associated with a shift are not successful, the ECU commands the same range as commanded before the shift.
- **N**eutral **N**o **C**lutches (NNC) Response
  - — When certain speed sensor ratio or C3 pressure switch tests are not successful, the ECU commands a neutral condition with no clutches applied.

6–4. SHIFT SELECTOR DISPLAYS RELATED TO ACTIVE CODES

- “Cateye” — The forward slash segments and the middle horizontal segments (-\-) may be on under the following conditions:
  - — RSI link fault is active (code 23 12 or 23 14)
  - — When two COP timeouts occur within two seconds of each other (reference code 69 33)
  - — Shift selector display line fault is active (23 16)
- All Segments Displayed — All display segments will be illuminated if a severity 1 diagnostic code is present during initialization, or if an electrical code for solenoids A, B, C, D, E, or G is logged before initialization completes.

6–5. DIAGNOSTIC CODE LIST AND DESCRIPTION

Table 6–2. WT Series Diagnostic Codes

Main Code	Sub-code	Description	CHECK TRANS Light	Inhibited Operation Description
13 (pg 6–20)	12	ECU input voltage, low	Yes	DNS, DNA, SOL OFF (hydraulic default)
	13	ECU input voltage, medium low	No	DNA
	23	ECU input voltage, high	Yes	DNS, SOL OFF (hydraulic default)
14	12	Oil level sensor, failed low	No	None
(pg 6–24)	23	Oil level sensor, failed high	No	None
21	12	Throttle position sensor, failed low	No	Use throttle default values, DNA
(pg 6–28)	23	Throttle position sensor, failed high	No	Use throttle default values, DNA
22 (pg 6–32)	14	Engine speed sensor reasonableness test	No	Use default engine speed, DNA
	15	Turbine speed sensor reasonableness test	Yes	DNS, lock in current range, DNA
	16	Output speed sensor reasonableness test	Yes (1)	DNS, lock in current range, DNA

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DIAGNOSTIC CODES

Table 6–2. WT Series Diagnostic Codes *(cont'd)*

Main Code	Sub-code	Description	CHECK TRANS Light	Inhibited Operation Description
23 (pg 6–36)	12	Primary shift selector or RSI link fault	No	Hold in last valid direction. May cause "cateye" display.
	13	Primary shift selector mode function fault	No	Mode change not permitted
	14	Secondary shift selector or RSI link fault	No	Hold in last valid direction. May cause "cateye" display.
	15	Secondary shift selector mode function fault	No	Mode change not permitted
	16	Shift Selector display line fault	No	None. May cause "cateye" display.
24	12	Sump fluid temperature, cold	Yes	DNS, lock in neutral
(pg 6–38)	23	Sump fluid temperature, hot	No	No upshifts above a calibration range
25 (pg 6–44)	00	Output speed sensor, detected at 0 output rpm, Low	Yes (1)	DNS, lock in current range (Low), DNA
	11	Output speed sensor, detected at 0 output rpm, 1st	Yes (1)	DNS, lock in current range (1st), DNA
	22	Output speed sensor, detected at 0 output rpm, 2nd	Yes (1)	DNS, lock in current range (2nd), DNA
	33	Output speed sensor, detected at 0 output rpm, 3rd	Yes (1)	DNS, lock in current range (3rd), DNA
	44	Output speed sensor, detected at 0 output rpm, 4th	Yes (1)	DNS, lock in current range (4th), DNA
	55	Output speed sensor, detected at 0 output rpm, 5th	Yes (1)	DNS, lock in current range (5th), DNA
	66	Output speed sensor, detected at 0 output rpm, 6th	Yes (1)	DNS, lock in current range (6th), DNA
	77	Output speed sensor, detected at 0 output rpm, Reverse range	Yes (1)	DNS, lock in current range (R), DNA
26	00	Throttle source not detected	No	Use throttle default values, DNA
(pg 6–47)	11	Engine coolant source not detected	No	Use default value of –18˚C (0˚F)
32	00	C3 pressure switch open, Low range	Yes	DNS, lock in current range (Low), DNA
(pg 6–48)	33	C3 pressure switch open, 3rd range	Yes	DNS, lock in current range (3rd), DNA
	55	C3 pressure switch open, 5th range	Yes	DNS, lock in current range (5th), DNA
	77	C3 pressure switch open, Reverse range	Yes	DNS, lock in current range (R), DNA
33 (pg 6–50)	12	Sump oil temperature sensor failed low	No	Use default value of 93˚C (200˚F)
	23	Sump oil temperature sensor failed high	No	Use default value of 93˚C (200˚F)

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DIAGNOSTIC CODES

Table 6–2. WT Series Diagnostic Codes *(cont'd)*

Main Code	Sub-code	Description	CHECK TRANS Light	Inhibited Operation Description
34 (pg 6–53)	12	Factory calibration compatibility number wrong	Yes(5)	DNS, SOL OFF (hydraulic default), DNA
	13	Factory calibration block checksum	Yes(5)	DNS, SOL OFF (hydraulic default), DNA
	14	Power off block checksum	No	Use previous location, or factory calibration and reset adaptive, DNA
	15	Diagnostic queue block checksum	No	Use previous location, or clear diagnostic queue, DNA
	16	Real time block checksum	Yes	DNS, SOL OFF (hydraulic default), DNA
	17	Customer modifiable constants checksum	Yes(5)	DNS, SOL OFF (hydraulic default), DNA
35 (pg 6–54)	00	Power interruption (code set after power restored)	No	None (hydraulic default during interruption)
	16	Real time write interruption	Yes	DNS, SOL OFF (hydraulic default), DNA
36 (pg 6–57)	00	Hardware/software not compatible	Yes (2)	DNS, SOL OFF (hydraulic default), DNA
	01	TID not compatible with hardware/ software	No(2)	Use TIDCAP cal
	02	TID did not complete	No	Use TIDCAP cal, code 42 XX or 69 XX may be logged
42 (pg 6–58)	12	Short-to-battery, A solenoid circuit	Yes	DNS, SOL OFF, DNA
	13	Short-to-battery, B solenoid circuit	Yes	DNS, SOL OFF, DNA
	14	Short-to-battery, C solenoid circuit	Yes	DNS, SOL OFF, DNA
	15	Short-to-battery, D solenoid circuit	Yes	DNS, SOL OFF, DNA
	16	Short-to-battery, E solenoid circuit	Yes	DNS, SOL OFF, DNA
	21	Short-to-battery, F solenoid circuit	No	Lockup inhibited, DNA
	22	Short-to-battery, G solenoid circuit	Yes	DNS, SOL OFF, DNA
	23	Short-to-battery, H solenoid circuit	No	Differential lock inhibited (3070 only), retarder inhibited
	24	Short-to-battery, J solenoid circuit	No	Low and 1st inhibited
	26	Short-to-battery, N solenoid circuit	No	Low and 1st inhibited, allow retarder
44 (pg 6–62)	12	Short-to-ground, A solenoid circuit	Yes	DNS, SOL OFF (hydraulic default), DNA
	13	Short-to-ground, B solenoid circuit	Yes	DNS, SOL OFF (hydraulic default), DNA
	14	Short-to-ground, C solenoid circuit	Yes	DNS, SOL OFF (hydraulic default), DNA
	15	Short-to-ground, D solenoid circuit	Yes	DNS, SOL OFF (hydraulic default), DNA
	16	Short-to-ground, E solenoid circuit	Yes	DNS, SOL OFF (hydraulic default), DNA
	21	Short-to-ground, F solenoid circuit	No	Lockup inhibited, DNA
	22	Short-to-ground, G solenoid circuit	Yes	DNS, SOL OFF (hydraulic default), DNA

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DIAGNOSTIC CODES

Table 6–2. WT Series Diagnostic Codes *(cont'd)*

Main Code	Sub-code	Description	CHECK TRANS Light	Inhibited Operation Description
44 *(cont'd)*	23	Short-to-ground, H solenoid circuit	No	Differential lock inhibited (3070 only), retarder operation inhibited
	24	Short-to-ground, J solenoid circuit	No	Low and 1st inhibited
	26	Short-to-ground, N solenoid circuit	No	Low and 1st inhibited, retarder allowed
45	12	Open circuit, A solenoid circuit	Yes	DNS, SOL OFF (hydraulic default), DNA
(pg 6–66)	13	Open circuit, B solenoid circuit	Yes	DNS, SOL OFF (hydraulic default), DNA
	14	Open circuit, C solenoid circuit	Yes	DNS, SOL OFF (hydraulic default), DNA
	15	Open circuit, D solenoid circuit	Yes	DNS, SOL OFF (hydraulic default), DNA
	16	Open circuit, E solenoid circuit	Yes	DNS, SOL OFF (hydraulic default), DNA
	21	Open circuit, F solenoid circuit	No	Lockup inhibited, DNA
	22	Open circuit, G solenoid circuit	Yes	DNS, SOL OFF (hydraulic default), DNA
	23	Open circuit, H solenoid circuit	No	Differential lock inhibited (3070 only), retarder inhibited
	24	Open circuit, J solenoid circuit	No	Low and 1st inhibited
	26	Open circuit, N solenoid circuit	No	Low and 1st inhibited, retarder allowed
46	21	Overcurrent, F solenoid circuit	No	Lockup inhibited, DNA
(pg 6–70)	26	Overcurrent, N and H solenoid circuit	No	Low and first inhibited or retarder inhibited, DNA
	27	Overcurrent, A-Hi solenoid circuit	Yes	DNS, SOL OFF (hydraulic default), DNA
51 (pg 6–72)	01	Offgoing ratio test (during shift), Low to 1	Yes	DNS, RPR, DNA
	10	Offgoing ratio test (during shift), 1 to Low	Yes	DNS, RPR, DNA
	12	Offgoing ratio test (during shift), 1 to 2	Yes	DNS, RPR, DNA
	21	Offgoing ratio test (during shift), 2 to 1	Yes	DNS, RPR, DNA
	23	Offgoing ratio test (during shift), 2 to 3	Yes	DNS, RPR, DNA
	24	Offgoing ratio test (during shift), 2 to 4	Yes	DNS, RPR, DNA
	35	Offgoing ratio test (during shift), 3 to 5	Yes	DNS, RPR, DNA
	42	Offgoing ratio test (during shift), 4 to 2	Yes	DNS, RPR, DNA
	43	Offgoing ratio test (during shift), 4 to 3	Yes (1)	DNS, RPR, DNA
	45	Offgoing ratio test (during shift), 4 to 5	Yes (1)	DNS, RPR, DNA

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DIAGNOSTIC CODES

Table 6–2. WT Series Diagnostic Codes *(cont'd)*

Main Code	Sub-code	Description	CHECK TRANS Light	Inhibited Operation Description
51 *(cont'd)*	46	Offgoing ratio test (during shift), 4 to 6	Yes	DNS, RPR, DNA
	53	Offgoing ratio test (during shift), 5 to 3	Yes	DNS, RPR, DNA
	64	Offgoing ratio test (during shift), 6 to 4	Yes	DNS, RPR, DNA
	65	Offgoing ratio test (during shift), 6 to 5	Yes	DNS, RPR, DNA
	XY	Offgoing ratio test, X to Y (3)		
52 (pg 6–74)	01	Offgoing C3PS test (during shift), Low to 1	Yes	DNS, RPR, DNA
	08	Offgoing C3PS test (during shift), Low to N1	Yes	DNS, NNC, DNA
	32	Offgoing C3PS test (during shift), 3 to 2	Yes	DNS, RPR, DNA
	34	Offgoing C3PS test (during shift), 3 to 4	Yes	DNS, RPR, DNA
	54	Offgoing C3PS test (during shift), 5 to 4	Yes	DNS, RPR, DNA
	56	Offgoing C3PS test (during shift), 5 to 6	Yes	DNS, RPR, DNA
	71	Offgoing C3PS test (during shift), R to 1	Yes	DNS, NNC, DNA
	72	Offgoing C3PS test (during shift), R to 2	Yes	DNS, NNC, DNA
	78	Offgoing C3PS test (during shift), R to N1	Yes	DNS, NNC, DNA
	99	Offgoing C3PS test (during shift), N3 to N2	Yes	DNS, RPR, DNA
	XY	Offgoing C3PS test, X to Y (3)		
53 (pg 6–76)	08	Offgoing speed test (during shift), L to N1	Yes (1)	DNS, NNC, DNA
	18	Offgoing speed test (during shift), 1 to N1	Yes (1)	DNS, NNC, DNA
	28	Offgoing speed test (during shift), 2 to N1	Yes (1)	DNS, NNC, DNA
	29	Offgoing speed test (during shift), 2 to N2	Yes (1)	DNS, RPR, DNA
	38	Offgoing speed test (during shift), 3 to N1	Yes (1)	DNS, NNC, DNA

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DIAGNOSTIC CODES

Table 6–2. WT Series Diagnostic Codes *(cont'd)*

Main Code	Sub-code	Description	CHECK TRANS Light	Inhibited Operation Description
53 *(cont'd)*	39	Offgoing speed test (during shift), 3 to N3	Yes (1)	DNS, RPR, DNA
	48	Offgoing speed test (during shift), 4 to N1	Yes (1)	DNS, NNC, DNA
	49	Offgoing speed test (during shift), 4 to N3	Yes (1)	DNS, RPR, DNA
	58	Offgoing speed test (during shift), 5 to N1	Yes (1)	DNS, NNC, DNA
	59	Offgoing speed test (during shift), 5 to N3	Yes (1)	DNS, RPR, DNA
	68	Offgoing speed test (during shift), 6 to N1	Yes (1)	DNS, NNC, DNA
	69	Offgoing speed test (during shift), 6 to N4	Yes (1)	DNS, RPR, DNA
	78	Offgoing speed test (during shift), R to N1	Yes	DNS, NNC, DNA
	99	Offgoing speed test (during shift), N2 to N3 or N3 to N2	Yes	DNS, RPR, DNA
	XY	Offgoing speed test (during shift), X to Y (3)		
54 (pg 6–78)	01	Oncoming ratio test (after shift), L to 1	Yes	DNS, RPR, DNA
	07	Oncoming ratio test (after shift), L to R	Yes	DNS, NNC, DNA
	10	Oncoming ratio test (after shift), 1 to L	Yes	DNS, RPR, DNA
	12	Oncoming ratio test (after shift), 1 to 2	Yes	DNS, RPR, DNA
	17	Oncoming ratio test (after shift), 1 to R	Yes	DNS, NNC, DNA
	21	Oncoming ratio test (after shift), 2 to 1	Yes	DNS, RPR, DNA
	23	Oncoming ratio test (after shift), 2 to 3	Yes	DNS, RPR, DNA
	24	Oncoming ratio test (during shift), 2 to 4	Yes	DNS, RPR, DNA
	27	Oncoming ratio test (after shift), 2 to R	Yes	DNS, RPR, DNA
	32	Oncoming ratio test (after shift), 3 to 2	Yes	DNS, RPR, DNA
	34	Oncoming ratio test (after shift), 3 to 4	Yes	DNS, RPR, DNA

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Table 6–2. WT Series Diagnostic Codes *(cont'd)*

Main Code	Sub-code	Description	CHECK TRANS Light	Inhibited Operation Description
54 *(cont'd)*	35	Oncoming ratio test (during shift), 3 to 5	Yes	DNS, RPR, DNA
	42	Oncoming ratio test (during shift), 4 to 2	Yes	DNS, RPR, DNA
	43	Oncoming ratio test (after shift), 4 to 3	Yes	DNS, RPR, DNA
	45	Oncoming ratio test (after shift), 4 to 5	Yes	DNS, RPR or SOL OFF (hydraulic default), DNA
	46	Oncoming ratio test (during shift), 4 to 6	Yes	DNS, RPR, DNA
	53	Oncoming ratio test (during shift), 5 to 3	Yes	DNS, RPR, DNA
	54	Oncoming ratio test (after shift), 5 to 4	Yes	DNS, RPR, DNA
	56	Oncoming ratio test (after shift), 5 to 6	Yes	DNS, RPR, DNA
	64	Oncoming ratio test (after shift), 6 to 4	Yes	DNS, RPR, DNA
	65	Oncoming ratio test (after shift), 6 to 5	Yes	DNS, RPR, DNA
	70	Oncoming ratio test (after shift), R to L	Yes	DNS, NNC, DNA
	71	Oncoming ratio test (after shift), R to 1	Yes	DNS, NNC, DNA
	72	Oncoming ratio test (after shift), R to 2	Yes	DNS, NNC, DNA
	80	Oncoming ratio test (after shift), N1 to L	Yes	DNS, RPR, DNA
	81	Oncoming ratio test (after shift), N1 to 1	Yes	DNS, RPR, DNA
	82	Oncoming ratio test (after shift), N1 to 2	Yes	DNS, RPR, DNA
	83	Oncoming ratio test (after shift), N1 to 3	Yes	DNS, RPR, DNA
	85	Oncoming ratio test (after shift), N1 to 5	Yes	DNS, RPR, DNA
	86	Oncoming ratio test (after shift), N1 to 6	Yes	DNS, RPR, DNA
	92	Oncoming ratio test (after shift), N2 to 2	Yes	DNS, RPR, DNA

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Table 6–2. WT Series Diagnostic Codes *(cont'd)*

Main Code	Sub-code	Description	CHECK TRANS Light	Inhibited Operation Description
54 *(cont'd)*	93	Oncoming ratio test (after shift), N3 to 3	Yes	DNS, RPR, DNA
	95	Oncoming ratio test (after shift), N3 to 5	Yes	DNS, RPR, DNA
	96	Oncoming ratio test (after shift), N4 to 6	Yes	DNS, RPR, DNA
	XY	Oncoming ratio test (after shift), X to Y (3)		
55 (pg 6–80)	07	Oncoming C3PS test (after shift), Low to R	Yes (1)	DNS, NNC, DNA
	17	Oncoming C3PS test (after shift), 1 to R	Yes (1)	DNS, NNC, DNA
	27	Oncoming C3PS test (after shift), 2 to R	Yes (1)	DNS, NNC, DNA
	87	Oncoming C3PS test (after shift), N1 to R	Yes	DNS, RPR, DNA
	97	Oncoming C3PS test (after shift), NVL to R	Yes (1)	DNS, NNC, DNA
	XY	Oncoming C3PS test (after shift), X to Y(3)		
56	00	Range verification test, L	Yes (1)	DNS, 1st, Low, or SOL OFF (Low), DNA
(pg 6–82)	11	Range verification ratio test, 1st	Yes	DNS, 6th, DNA
	22	Range verification ratio test, 2nd	Yes (1)	DNS, 6th or 5th, DNA
	33	Range verification ratio test, 3rd	Yes (1)	DNS, 5th or SOL OFF (4th), DNA
	44	Range verification ratio test, 4th	Yes	DNS, 3rd or 5th, DNA
	55	Range verification ratio test, 5th	Yes (1)	DNS, SOL OFF (5th) or 3rd, DNA
	66	Range verification ratio test, 6th	Yes	DNS, 5th, 3rd, or SOL OFF (3rd), DNA
	77	Range verification ratio test, R	Yes	DNS, N2 or N3, DNA
57	11	Range verification C3PS test, 1st	Yes	DNS, SOL OFF (3rd), DNA
(pg 6–84)	22	Range verification C3PS test, 2nd	Yes	DNS, 3rd, DNA
	44	Range verification C3PS test, 4th	Yes	DNS, 5th or SOL OFF (3rd), DNA
	66	Range verification C3PS test, 6th	Yes	DNS, SOL OFF (5th), DNA
	88	Range verification C3PS test, N1	Yes	DNS, N3, DNA
	99	Range verification C3PS test, N2 or N4	Yes	DNS, N3, DNA
61	00	Retarder oil temperature, hot	No	None
(pg 6–85)				

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DIAGNOSTIC CODES

Table 6–2. WT Series Diagnostic Codes *(cont'd)*

Main Code	Sub-code	Description	CHECK TRANS Light	Inhibited Operation Description
62 (pg 6–88)	12	Retarder temperature sensor failed low	No	None
	23	Retarder temperature sensor failed high	No	None
	32	Engine coolant sensor failed low	No	Use default value of 0˚F
	33	Engine coolant sensor failed high	No	Use default value of 0˚F
63 (pg 6–91)	00	Input function fault	No	Does not prevent neutral to range shifts for Aux Function Range Inhibit-Special when two signals required are not "on" within 120 seconds of each other.
	26	Kickdown input failed on	No	Kickdown operation inhibited
	40	Service brake status input failed on	No	No auto Neutral to Drive shifts for refuse packer. (I/O package #41). No retarder if a TPS code is also active
	41	Pump/pack and a neutral general purpose input	No	No auto N–D shifts for refuse packer (I/O package #41)
64 (pg 6–92)	12	Retarder modulation request sensor failed low	No	Retarder operation inhibited
	23	Retarder modulation request sensor failed high	No	Retarder operation inhibited
		Engine rating too high	Yes	DNS, Lock-in-neutral, DNA
65 (pg 6–95)	00	Engine rating too high	Yes	DNS, Lock-in-neutral
66	00	Serial communications interface fault	No	Use default throttle values, DNA
(pg 6–96)	11	SCI engine coolant source fault	No	Use default value of 0˚F
69	27	ECU, inoperative A-Hi switch	Yes	DNS, NNC, DNA
(pg 6–98)	28	ECU, inoperative F-Hi switch	Yes	Lockup inhibited, DNA
	29	ECU, inoperative N and H-Hi switch	No	Low and first inhibited, retarder inhibited, DNA
	33	ECU, Computer Operating Properly (COP) timeout	No	Reset ECU, shutdown ECU on 2nd occurrence (power loss; hydraulic defaults). May cause "cateye" display or all segments blank display, DNA(4)
	34	ECU, write timeout	Yes	DNS, SOL OFF (hydraulic default), DNA
	35	ECU, checksum test	No	Induce COP timeout (reset ECU), DNA(4)
	36	ECU, RAM self test	No	Induce COP timeout (reset ECU), DNA(4)
	39	Communication chip addressing error	No	Use defaults for J1939 data, DNA
	41	ECU, I/O ASIC addressing test	No	Induce COP timeout (reset ECU), DNA(4)

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DIAGNOSTIC CODES

Table 6–2. WT Series Diagnostic Codes *(cont'd)*

Main Code	Sub-code	Description	CHECK TRANS Light	Inhibited Operation Description
69 *(cont'd)*	42	SPI output failure	Yes	GPO 1–8 and reverse warning inoperable
	43	SPI input failure	Yes	DNS, lock-in-range, DNA
70	12	Software, minor loop overrun	No	Induce COP timeout (reset ECU)
	13	Illegal write to address $0000	No	Induce COP timeout (reset ECU)
	14	Software, major loop overrun	No	Induce COP timeout (reset ECU)

NOTES

(1) This code is logged to real time to protect the transmission in case a loss of power to the ECU (Power Interruption, code 35 00) occurs.

(2) The ECU hardware or software must be changed so that they are compatible.

(3) Additional codes could be logged for other shifts where X indicates range shifted from and Y indicates range shifted to.

(4) The COP reset will clear the active inhibit.

(5) The factory calibration must be rewritten to the ECU, or a different factory calibration is required to match the software in the ECU.

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TRANSMISSION COMPONENT WIRING DIAGRAMS AND DIAGNOSTICS

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6–6. DIAGNOSTIC CODE TROUBLESHOOTING

A. Beginning The Troubleshooting Process

1. Begin troubleshooting by checking the transmission fluid level and ECU input voltage. Check diagnostic codes by:
   - Using the shift selector display.
   - Using the Pro-Link® 9000 diagnostic tool.
2. When a problem exists but a diagnostic code is not indicated, refer to the Performance Complaint Section for a listing of various electrical and hydraulic problems, their causes, and remedies.
3. If a diagnostic code is found in the ECU memory, record all available code information and clear the active indicator (refer to Paragraph 6–2).
4. Test drive the vehicle to confirm a diagnostic code or performance complaint.
   - If the code reappears, refer to the Diagnostic Code section (Section 6) and the appropriate code chart. The Diagnostic Code section lists diagnostic codes and their description. Locate the appropriate troubleshooting chart and follow the instructions.
   - If the code does not reappear, it may be an intermittent problem. Use the Pro-Link® and the code display procedure described in Section 6. The code display procedure will indicate the number of times the diagnostic code has occurred. Refer to the troubleshooting chart for possible cause(s) of the problem.
   - Appendix A deals with the identification of potential circuit problems. Refer to Appendix A if a circuit problem is suspected.

NOTE: Information concerning specific items is contained in the appendices located in the back of this manual. The appendices are referred to throughout the manual.

B. Solenoid Locations

Solenoid locations in the control module are as illustrated in Figure 6–1. Refer to Figure 6–1 as necessary when using the diagnostic code schematics.

C. Diagnostic Code Schematics

The diagnostic code schematics in this section show wiring for both the optional oil level sensor and retarder, where applicable. If your transmission is not equipped with an oil level sensor or retarder, disregard the portions of the schematic pertaining to those optional pieces of equipment. Refer to the appropriate transmission Service Manual for solenoid replacement procedures.

D. Wire/Terminal Numbering Scheme

WTEC III wire identification presents the wire number followed by the ECU terminal source (i.e., 157-S30). This is done to retain the wire number/function assignments from WTEC II and indicate the ECU connector and terminal origination for WTEC III. If there is a letter suffix following the wire number, there is a splice between the ECU source and wire destination (i.e., 136A-S16).

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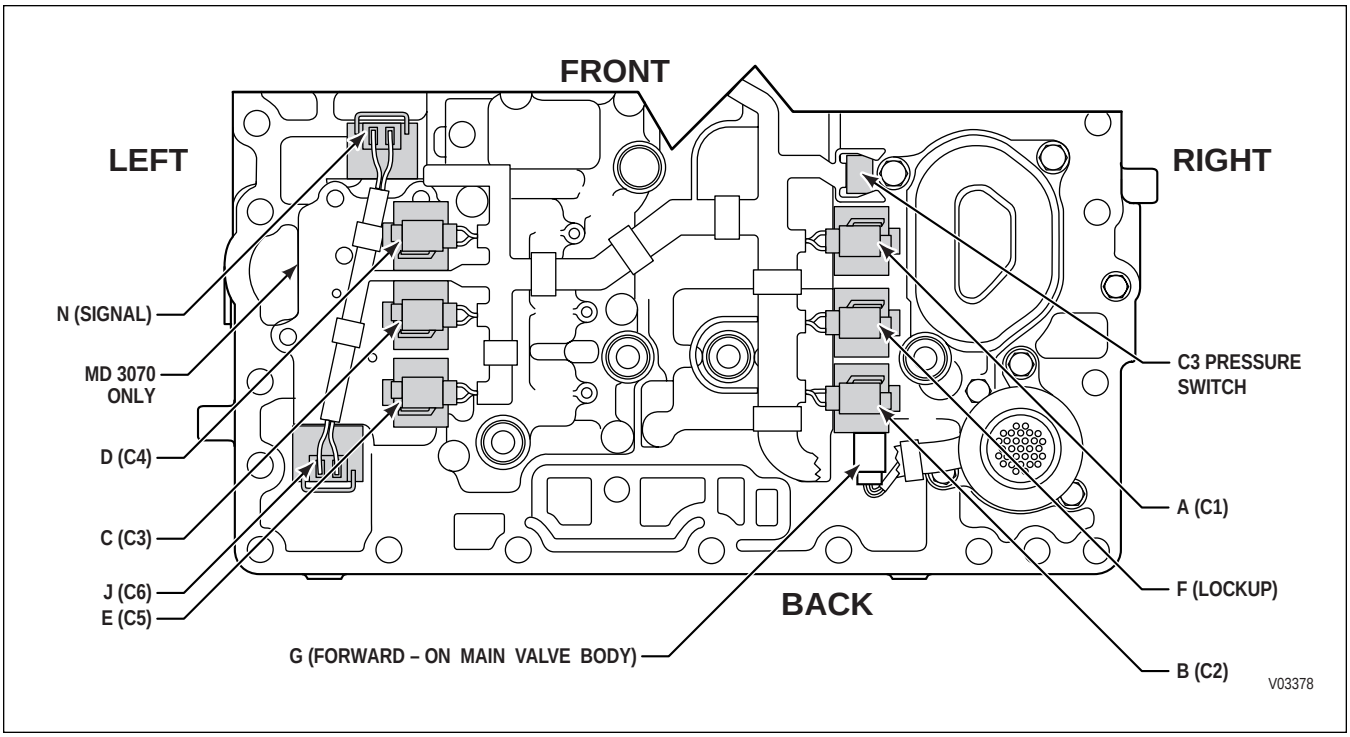

Figure 6–1. Control Module Solenoid Location

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CODE 13 XX — ECU INPUT VOLTAGE

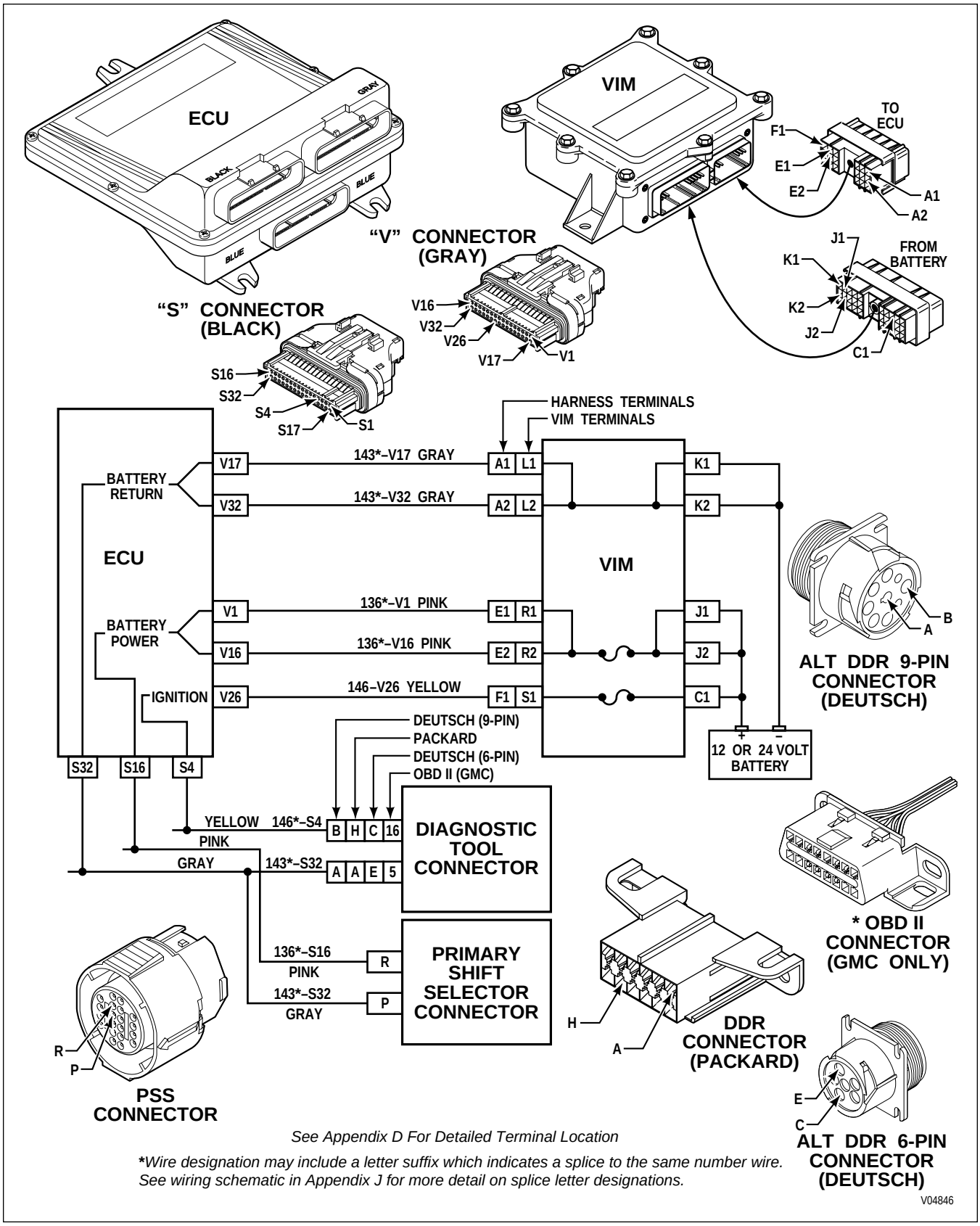

Figure 6–2. Code 13 Schematic Drawing

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CODE 13 XX — ECU INPUT VOLTAGE *(Figure 6–2)*

Main code 13 indicates either a high or low input voltage. Low voltage is less than 8 volts. High voltage is over 33 volts.

Common causes for a low voltage code are:

- Bad batteries
- Faulty vehicle charging system
- No dedicated power and ground connection directly to the battery or through an electronic bus bar to the battery

Common causes for the high voltage code are:

- Faulty vehicle alternator
- Faulty vehicle voltage regulator

In the event of a power loss, the transmission fails to the ranges indicated in the following, depending upon which latch valve releases first:

Attained Range	Fail to Range
Reverse and neutral	Neutral
Low, 1	3C
2, 3, 4	4C usually, 3C sometimes
5	4C usually, 5C sometimes
6	5C

Main Code	Subcode	Meaning
13	12	Battery voltage to the ECU too low
13	13	Battery voltage to the ECU too low (medium)
13	23	Battery voltage to the ECU too high

A. Active Indicator Clearing Procedure:

- Power down
- Manual
- Self-clearing

B. Troubleshooting:

1. Connect the diagnostic tool and turn on vehicle ignition. Select Diagnostic Data to find input voltage. Record reading.

2. Turn off vehicle ignition and remove the connectors from the ECU.

3. Check system voltage at wire 136A and 136C, pin V1 and V16. If power is low or high at this point, and the diagnostic tool reading is also low or high, the vehicle wiring is suspect. Check for fuse problems, lack of battery-direct power and ground, faulty charging system/batteries, and loose or dirty connections (see Appendix A). Power may also be low or high at pins V1 and V16 (system power) if the batteries/charging system is faulty. Bad grounds may also cause incorrect input power readings.

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CODE 13 XX — ECU INPUT VOLTAGE *(Figure 6–2)*

4. If power is correct but the diagnostic tool reading indicates incorrect voltage, closely inspect terminals V1 and V16 or S16; make sure they are not corroded or deformed. Clean or replace as necessary (see Appendix E, Paragraph 1–1).
5. If the voltage condition is intermittent, closely inspect the vehicle wiring for transmission system power and grounds. Check for loose, dirty, or painted connections. Check the VIM for loose, incorrect, or overheating relays or fuses (refer to Appendix G). Check for wires that are chafed and touching other components.
6. If no other cause is found, replace the ECU. If replacing the ECU corrects the problem, reinstall the original (bad) ECU to confirm that the problem is in the ECU. If the original ECU now works, inspect the ECU connectors for any corrosion or damage which may cause an intermittent condition. If the original problem recurs, reinstall the replacement ECU.

Table 6–3. Voltage Chart

Voltage	Condition
33.0 (High Set Point)	High Fail Limit
32.0	Maximum Continuous ECU Voltage
10.0 (Medium Low Set Point)	Cannot Compensate With Sub-Modulation (Bad Shifts). Adaptive logic stops functioning
8.0	Low Voltage Fail Limit, Set Code, DNS
7.0 (Low Set Point)	Software Off (ECU loses power)
4.5	Neutral Start Off

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CODE 14 XX — OIL LEVEL SENSOR (OLS)

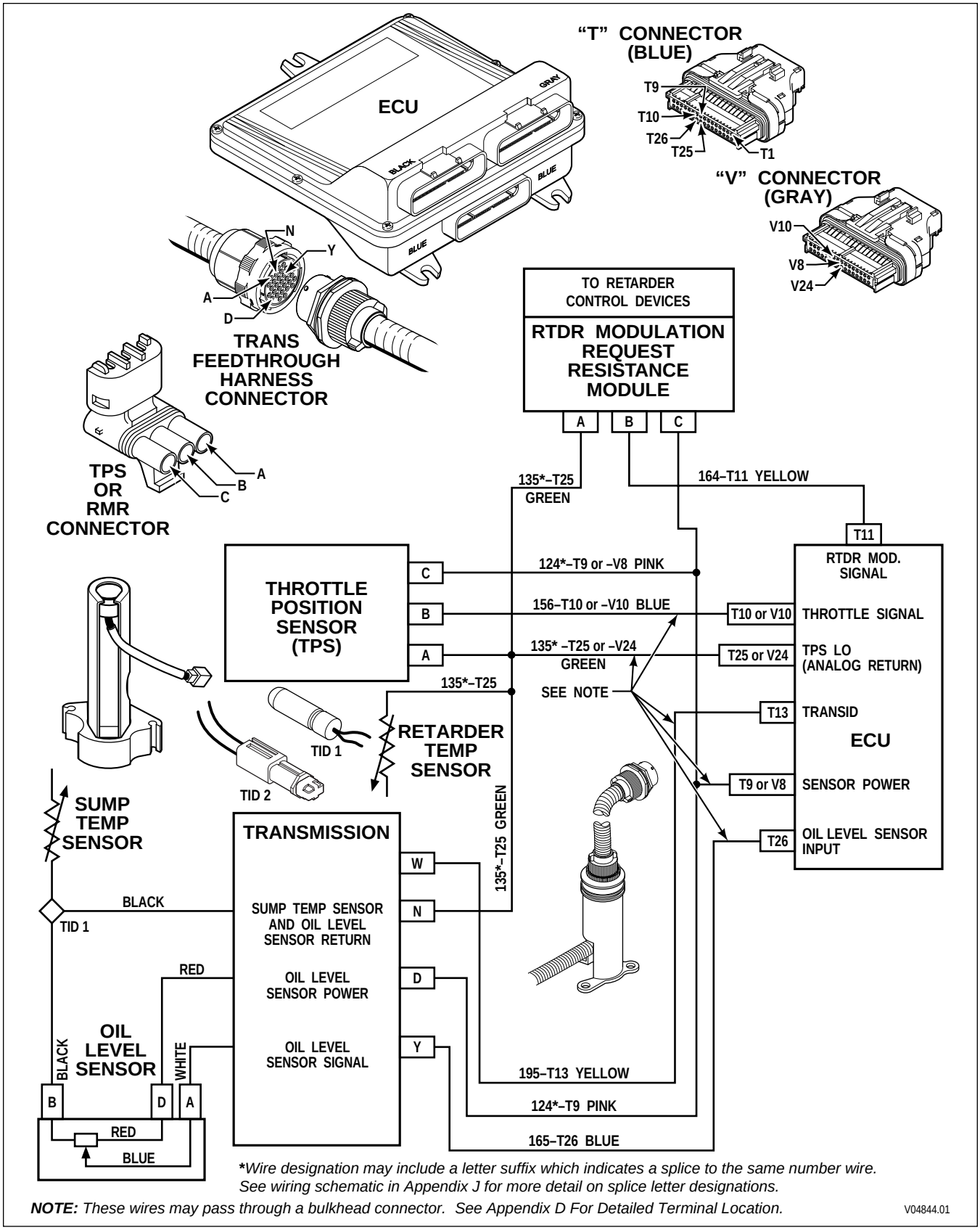

Figure 6–3. Code 14 Schematic Drawing

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CODE 14 XX — OIL LEVEL SENSOR (OLS) *(Figure 6–3)*

The oil level sensor (OLS) must have been recognized by autodetect or manually selected using the Pro-Link® (see WTEC III Pro-Link® Manual) before these codes can be logged. See Paragraph 1–9 for further information.

Code 14 12 indicates the ECU has detected a voltage signal in the low error zone.

Code 14 12 can be caused by:

- Faulty wiring to the OLS
- A faulty OLS
- A faulty ECU

CAUTION:	Never use a volt/ohmmeter to measure any parameters on the OLS. Damage to the OLS will result.

OLS ground wire 135B is common to the TPS and the RMR devices. A power wire short-to-ground for any of these devices will cause “sensor failed low” codes (21 12 and 64 12) and shutdown of the electronic pushbutton or lever selector. An OLS signal open or short-to-ground results in a code 14 12 only. Code 14 23 is programmed out of all calibrations.

A permanent maximum voltage signal generates a steady OLS sensor maximum count and a maximum fluid level overfill indication. A maximum overfill indication occurs if signal wire 165 or power wire 124 is shorted to battery or the ground wire (wire 135) is open between the OLS and the sump temperature sensor branch. An open in the ground circuit wire 135 in the portion common to the OLS, TPS and RMR devices results in code 14 12, 21 23, and 64 23.

If the ECU software supports it, Oil Level Sensor counts can be read by a DDR with Pro-Link® version 3.0 (or later). For a complete description of fluid level checking procedures using the oil level sensor, see Section 5. Normal operation of the OLS can be checked as follows: Attach the DDR and display OIL LEVEL COUNTS. Read the number of counts when the engine is not running, but the ignition is ON. The count reading should be near 255. Start the engine and observe the counts. In normal operation, the count should be 100–200 because the oil level drops when the engine starts and oil from the sump is delivered to other parts of the transmission.

NOTE: Intermittent connections or lack of battery-direct power and ground connections can cause this and other electronic control codes.

Main Code	Subcode	Meaning
14	12	Oil level sensor failed low
14	23	Oil level sensor failed high (not used)

A. Active Indicator Clearing Procedure:

- Power down
- Manual
- Self-clearing

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CODE 14 XX — OIL LEVEL SENSOR (OLS) *(Figure 6–3)*

NOTE: Before troubleshooting, read Paragraph 6–6. Also, check the following:

- ***Fluid level, using dipstick***
- ***Battery voltage***
- ***ECU input voltage***
- ***Other diagnostic codes***

B. Troubleshooting:

The following procedure is to find the cause for an OLS problem. The procedure is sequential. Follow the procedure until the cause for the OLS problem is found and repaired. Once the problem is found and repaired, STOP. For example, if the problem is fixed in step 3, there is no need to continue to the other steps.

1. Disconnect the external wiring harness at the transmission feedthrough connector. With the ignition ON, verify there is 5.0 VDC between the OLS power and ground pins (see page D–10) on the external harness connector. This is to verify that power and ground are getting to the OLS. If the 5.0 VDC is not present, check the wiring for the OLS power and ground circuits (wires 124–T9 and 135–T25, respectively). If there are no wiring problems (opens, shorts-to-ground, shorts-to-battery), and if the 5.0 VDC is present, go to Step 2.
2. Observe the OIL LEVEL COUNTS on the DDR while jumpering the OLS power pin to the OLS signal pin. If the count jumps from 0 to 250+, the OLS signal line is good and the ECU function is good. Continue to Step 3. If the count remains at zero, locate and repair problems in the wiring of OLS signal (wire 165–T26). If there are no wiring problems, and the count still remains at zero, the ECU may be bad. Go to Step 5.
3. If all checks prior to this have been normal, the problem is either in the OLS itself, the internal harness wires or the transmission side of the feedthrough harness connection. Inspect the transmission feedthrough harness connector to be sure that the OLS power, ground and signal pins are not loose or out of position. Correct any connector problems found. Reconnect the external harness to the transmission feedthrough harness connector. See if Code 14 12 recurs before continuing to Step 4.
4. Consult the appropriate transmission Service Manual for proper procedure and remove the control module from the transmission. Remove the OLS from the channel plate. Reconnect the external harness to the transmission feedthrough connector, if not done in Step 3. With the ignition ON, observe OIL LEVEL COUNTS on the DDR. With the OLS in normal position, the count should be 8–35. Invert the OLS and the count should be 192–255. If the counts are abnormal, replace the sensor. Check the new sensor in both normal and inverted positions. If the counts respond correctly, the problem should be resolved. Attach the new OLS to the channel plate and reinstall the control module using the appropriate transmission Service Manual for proper procedure.
5. Replace the ECU. If replacing the ECU corrects the problem, reinstall the original (bad) ECU to confirm that the problem is in the ECU. If the original ECU now works, inspect the ECU connectors for any corrosion or damage which may cause an intermittent condition. If the original problem recurs, reinstall the replacement ECU.

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CODE 21 XX — THROTTLE OR PWM FAULT

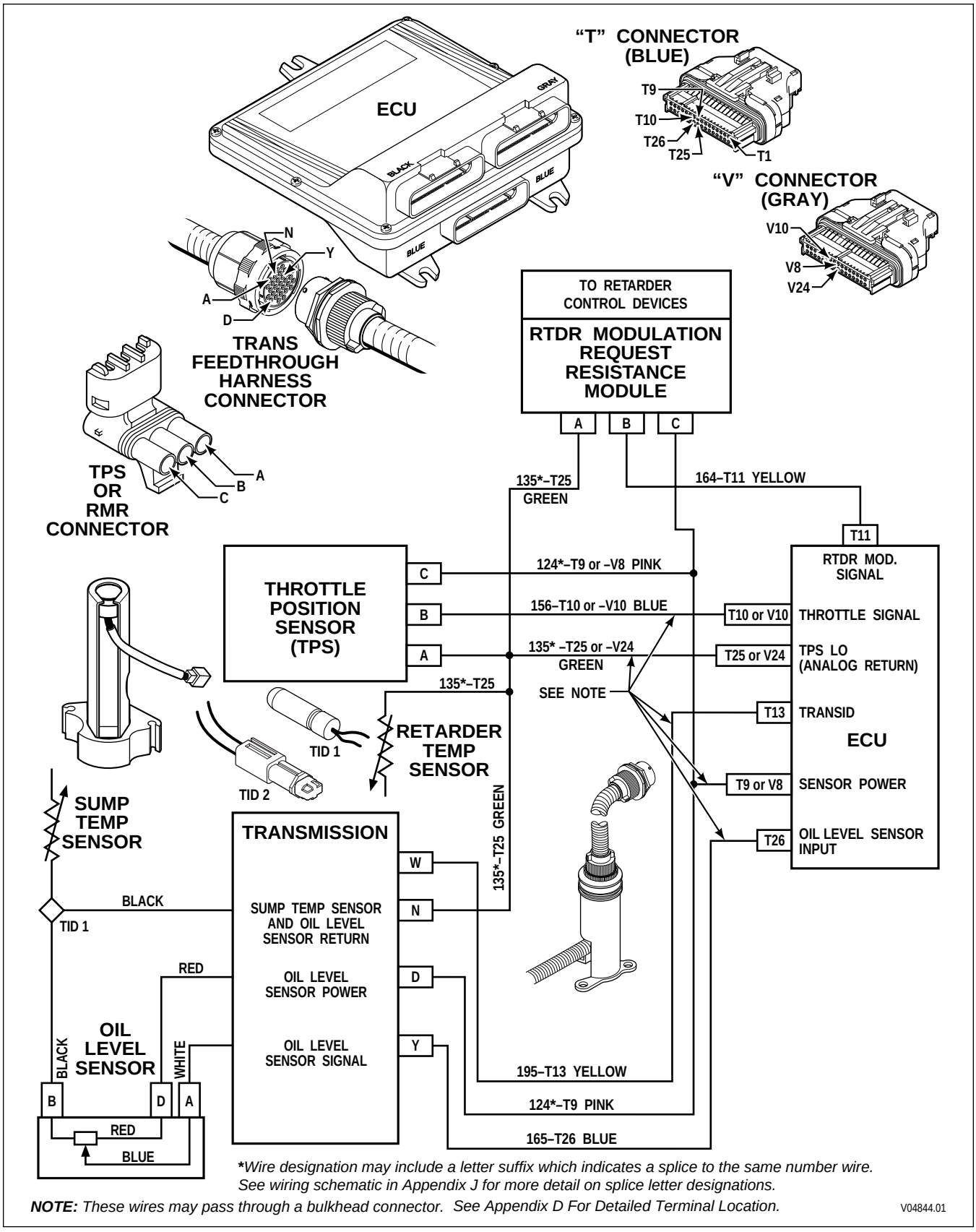

Figure 6–4. Code 21 Schematic Drawing

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CODE 21 XX — THROTTLE OR PWM FAULT *(Figure 6–4)*

The throttle sensor must have been recognized by autodetect or manually selected using the Pro-Link® (see WTEC III Pro-Link® Manual) before these codes can be logged. See Paragraph 1–9 for further information.

Main code 21 indicates the throttle position sensor has been retracted or extended by its linkage into an error zone. This may be due to a fault with the sensor, or a fault in the wiring to the sensor or to the ECU. This code may also indicate a PWM signal problem. A PWM signal is proportional to throttle position and comes from some source other than an analog throttle position sensor. Code 21 12 is set when the ECU receives TPS counts of 14 or less. Code 21 23 is set when the ECU senses TPS counts of 233–255. Whenever a code 21 XX condition is detected, the system uses default throttle values and shifts will not adapt.

NOTE: Code 21 XX in conjunction with code 33 XX or code 14 XX indicates the potential loss of common ground wire 135 between the throttle, temperature sensor, and oil level sensor.

Main Code	Subcode	Meaning
21	12	Throttle position sensor failed low and ECU signals throttle default value
21	23	Throttle position sensor failed high and ECU signals a throttle default value

A. Active Indicator Clearing Procedure:

- Power down
- Manual
- Self-clearing

NOTE: Before troubleshooting, read Paragraph 6–6. Also, check the ECU input voltage.

B. Troubleshooting:

1. Plug in the DDR, select Diagnostic Data, and read throttle counts and percent. If the TPS failed high (code 21 23), the problem may be toward the full throttle end of the TPS travel. If the TPS failed low (code 21 12), the problem may be at the closed throttle end of the TPS travel.

NOTE: Code 21 12 may occur when the throttle source is J1587 or J1939 and an analog throttle source is falsely detected. This condition may be due to a problem in an unused TPS branch of a universal external harness. To prevent this occurrence, remove wire 156 from the ECU connector and insert a cavity plug in the space vacated by the wire. Be sure that the unused TPS branch is routed away from potential induced voltage sources and the connector is protected from external contamination.

NOTE: Code 21 12 can result when the +5V line (wire 124) which powers the analog sensor is shorted to ground. Wire 124 also powers the OLS, RMR, retarder temperature sensor, sump temperature sensor, and shift selector and is present in all three ECU connectors.

2. If counts are high but the percentage never reaches 100 percent, TPS linkage may have bound up and overstroked the TPS to set a false 100 percent reading. After TPS overstroking ceases, the TPS will not automatically return to 100 percent. After the TPS is correctly installed and adjusted, use the Pro-Link® to reset throttle calibration or cycle the ignition 5 times to reset the 0 percent and 100 percent settings. See the TPS section of this book (Appendix F) for installation and adjustment procedures.

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CODE 21 XX — THROTTLE OR PWM FAULT *(Figure 6–4)*

3. If the throttle counts do not change or are erratic, check the throttle sensor wiring for opens, shorts between wires, or shorts-to-ground. Also check for correct TPS voltages using test wiring harness J 41339. If wiring problems are found, isolate and repair the fault (refer to Appendix E for repair information).

4. If the wiring is satisfactory, replace the throttle position sensor and adjust its linkage so the counts are not in the error zones (see Appendix F).

5. If the throttle sensor and its linkage adjustment are correct and the wiring to the sensor is satisfactory, the condition is intermittent. Replace the sensor and properly adjust the new sensor.

6. If the condition recurs, use a spare wire, if available, or provide a new wire (St. Clair P/N 200153 may be used for this purpose) for the throttle sensor circuit. See Appendix E for connector repair information.

7. If the condition persists, replace the ECU. If replacing the ECU corrects the problem, reinstall the original (bad) ECU to confirm that the problem is in the ECU. If the original ECU now works, inspect the ECU connectors for any corrosion or damage which may cause an intermittent condition. If the original problem recurs, reinstall the replacement ECU.

NOTE: A good throttle position sensor should have resistance of:

(1) 9000–15,000 Ohms across terminals A and C.

(2) 500 Ohms, moving to 9000–15,000 Ohms as TPS is stroked (measured across terminals A and B).

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CODE 22 XX — SPEED SENSOR/CIRCUITRY FAULT

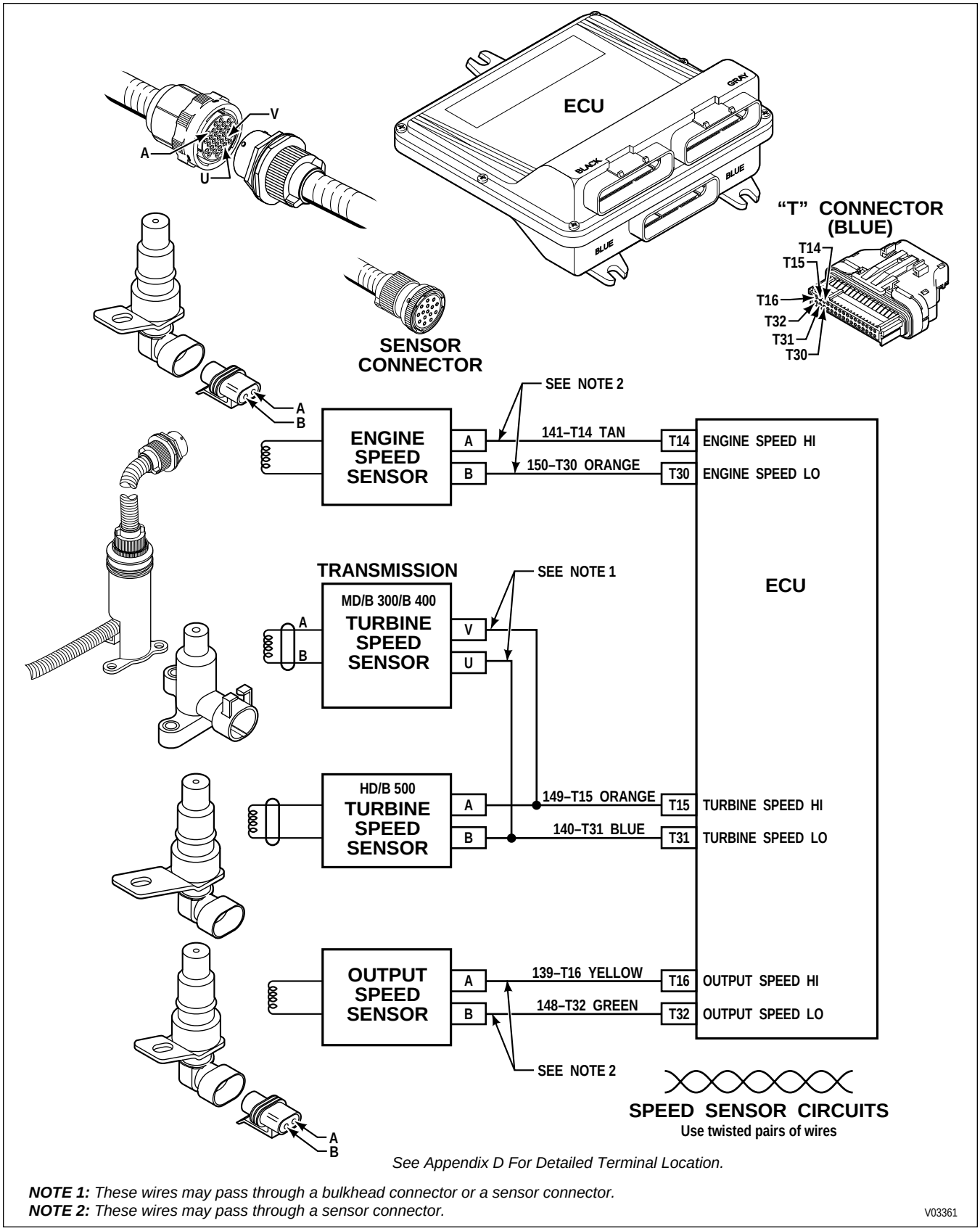

Figure 6–5. Code 22 Schematic Drawing

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CODE 22 XX — SPEED SENSOR/CIRCUITRY FAULT *(Figure 6–5)*

Main code 22 indicates a fault within a speed sensor, the wiring to a speed sensor, incorrect speed sensor gap, or damaged bumps or teeth which create the speed signal. This fault is determined by the reasonableness of a speed sensor signal when compared with the other two speed sensors and the commanded range. A speed sensor will not pass the reasonableness test if there is no signal at all from that sensor when a signal should be present.

NOTE: If turbine speed is below 150 rpm when output speed is below 100 rpm and engine speed is above 400 rpm, Neutral Very Low (NVL) is commanded when N (Neutral) is the range selected. NVL is attained by turning D solenoid "ON" in addition to E solenoid. This causes the output to be locked (C4 and C5 clutch applied).

NOTE: If the engine speed sensor code (22 14) is active and a range verification test is failed, the range verification code will not be set but a DO NOT SHIFT response is commanded.

Main Code	Subcode	Failed Sensor
22	14	Engine Speed
22	15	Turbine Speed
22	16	Output Speed

A. Active Indicator Clearing Procedure:

- Power down
- Manual
- Self-clearing

NOTE: Before troubleshooting, read Paragraph 6–6. Also, check the ECU input voltage.

B. Troubleshooting:

1. Check to see if the sensor is loose, missing, or disconnected. If not, disconnect the wiring harness from the sensor and measure the resistance of the sensor (see chart below). Also check the terminals for dirt, corrosion, or damage. If resistance is not correct, replace the sensor.

Resistance	Temp ˚C	Temp ˚F
200 Ω	–40	–40
300 Ω	20	68
400 Ω	110	230

2. Remove the transmission harness connector from the ECU. Check the sensor circuit (in the external harness) for open wires, shorts between wires, or shorts-to-ground. Isolate and repair any faults (refer to Appendix E for repair information).

3. If no opens or shorts are found, the condition must be intermittent. Replace the sensor indicated by the trouble code. Before replacing a speed sensor, check the sensor for physical damage or contamination. Refer to the appropriate transmission Service Manual for proper replacement procedure.

4. If the condition recurs, install new wiring (twisted-pair) for the sensor circuit between the ECU and the transmission. Use St. Clair P/N 200153 Service Harness Twisted Pair for this purpose.

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CODE 22 XX — SPEED SENSOR/CIRCUITRY FAULT *(Figure 6–5)*

5. If the condition again recurs, connect the diagnostic tool and select the speed signal indicated by the trouble code. Drive the vehicle and watch the speed reading on the diagnostic tool. If the signal is erratic, sensor gap, vehicle vibration, an external AC signal source, or intermittent connector contact may be inducing the erratic signal. Inspect the sensor and its surroundings for irregularities that would affect sensor gap. Isolate and correct any abnormal vehicle vibrations (particularly driveline and abnormal engine torsionals, see Sales Tech Data Book, Part II, Section C). Recheck the sensor wiring for intermittent conditions (see Appendix A).
6. If the condition persists, replace the ECU. If replacing the ECU corrects the problem, reinstall the original (bad) ECU to confirm that the problem is in the ECU. If the original ECU now works, inspect the ECU connectors for any corrosion or damage which may cause an intermittent condition. If the original problem recurs, reinstall the replacement ECU.

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CODE 23 XX — SHIFT SELECTOR

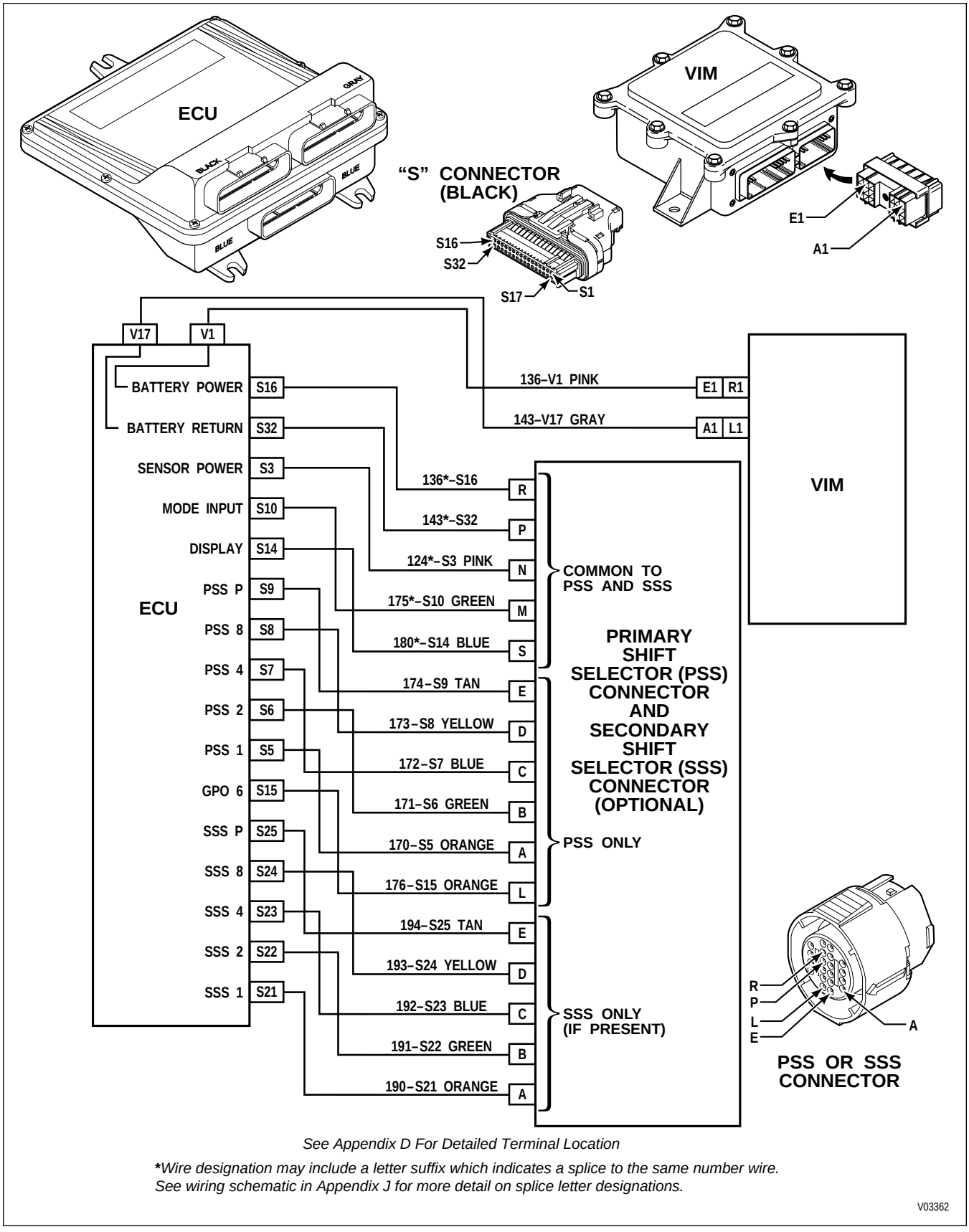

Figure 6–6. Code 23 Schematic Drawing

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CODE 23 XX — SHIFT SELECTOR *(Figure 6–6)*

Main code 23 indicates a fault with a shift selector or the wiring between a shift selector and the ECU.

Main Code	Subcode	Meaning
23	12	Primary shift selector fault — a “cateye” type display may occur
23	13	Primary shift selector mode function fault. Mode change not permitted
23	14	Secondary shift selector fault — a “cateye” type display may occur
23	15	Secondary shift selector mode function fault. Mode change not permitted
23	16	Shift selector display line fault

A. Active Indicator Clearing Procedure:

- Power down
- Manual
- Self-clearing

NOTE: Before troubleshooting, read Paragraph 6–6.

B. Troubleshooting:

1. Clear the active indicator for code 23 XX. If code recurs, continue to Step (2).
2. Check for a poor connection at the shift selector.

NOTE: Code 23 12 can result when the +5V line (wire 124) which powers the shift selector is shorted to ground. Wire 124 also powers the TPS, OLS, RMR, retarder temperature sensor, and sump oil temperature sensor and is present in all three ECU connectors.

3. Disconnect the selector “S” harness connector from the ECU and from the shift selector and check for opens, shorts, and shorts-to-ground between the shift selector and ECU (refer to Section 4). Repair as needed (refer to Appendix E).
4. If no problem is found with the shift selector connection or wiring, replace the shift selector.
5. If the condition persists, replace the ECU. If replacing the ECU corrects the problem, reinstall the original (bad) ECU to confirm that the problem is in the ECU. If the original ECU now works, inspect the ECU connectors for any corrosion or damage which may cause an intermittent condition. If the original problem recurs, reinstall the replacement ECU.

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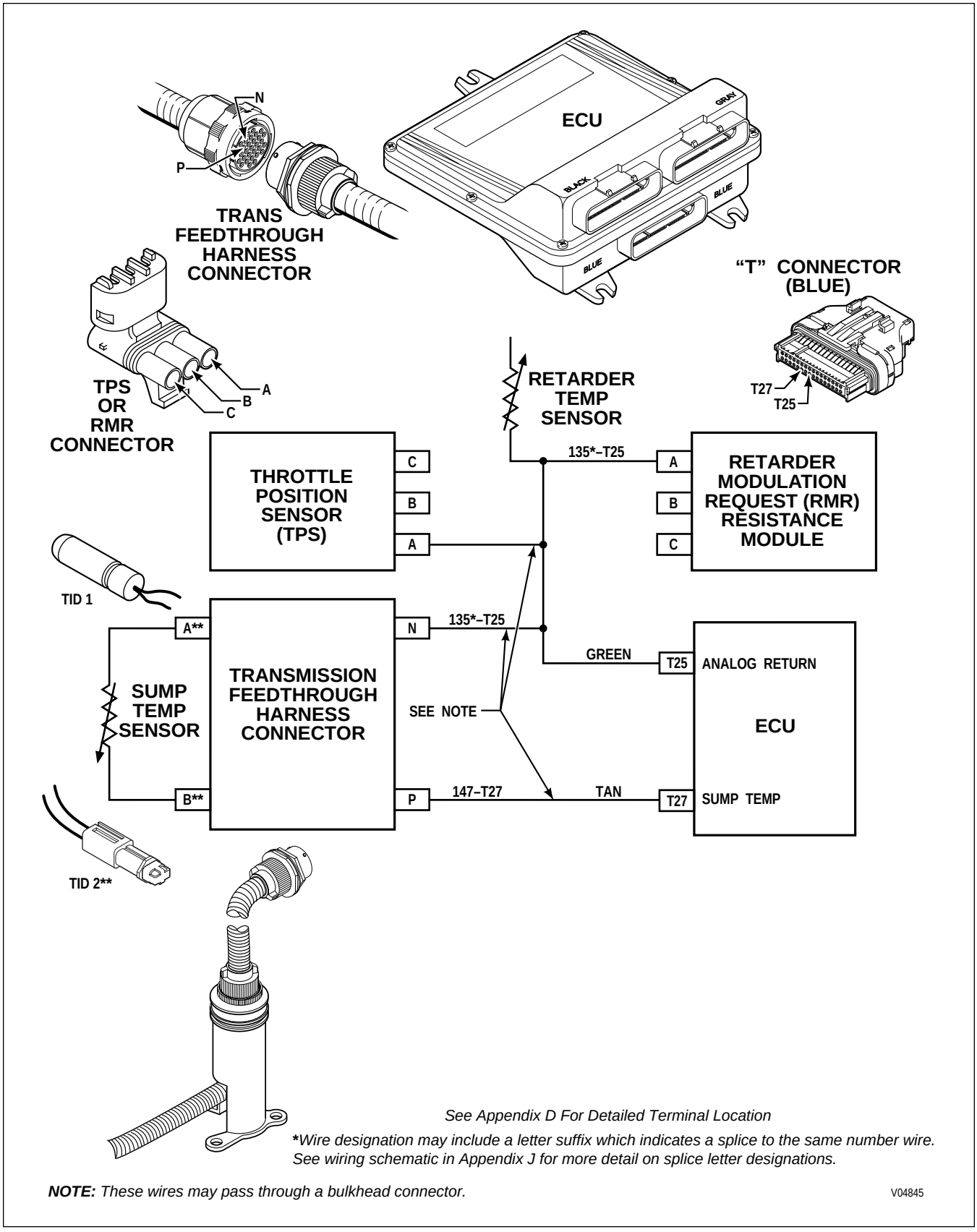
CODE 24 XX — SUMP FLUID TEMPERATURE



See Appendix D For Detailed Terminal Location

***Wire designation may include a letter suffix which indicates a splice to the same number wire. See wiring schematic in Appendix J for more detail on splice letter designations.*

***NOTE:** These wires may pass through a bulkhead connector.*

V04845

Figure 6–7. Code 24 Schematic Drawing

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CODE 24 XX — SUMP FLUID TEMPERATURE *(Figure 6–7)*

Main code 24 indicates the ECU has detected either a high or low fluid temperature in the transmission sump (via the sump temperature sensor in the internal harness). All shifts are inhibited when code 24 12 is set (only Neutral range operation is allowed). No upshifts are allowed above a calibration range when code 24 23 is set. All inhibits are cleared when the temperature conditions are normal. A related code is 33 12 which indicates a temperature reading outside the usable range of the sensor and indicates a probable sensor failure.

NOTE: When an ECU with a version 8 calibration (CIN=0A...) is used with a TransID 2 transmission, 24 XX codes are set because the ECU does not have the proper calibrations for the TID 2 thermistors. The ECU calibration must be updated to version 8A or later (CIN=0B).

TransID (TID) information related to thermistor changes is in Paragraph 1–10 and detailed troubleshooting information for TID 2 thermistors is shown in Appendix Q.

Main Code	Subcode	Meaning
24	12	Sump fluid temperature cold
24	23	Sump fluid temperature hot

A. Active Indicator Clearing Procedure:

- Power down
- Manual
- Self-clearing

NOTE: Before troubleshooting, read Paragraph 6–6. Also, check the ECU input voltage.

B. Troubleshooting:

Code 24 12:

1. If the outside temperature is between –32˚C (–26˚F) and –7˚C (+19˚F), the ECU will allow reverse, neutral, and second-range start operation. Only hold override upshifts are allowed. (See Table 6–4 on next page.) The sump must be warmed to an acceptable temperature to avoid logging codes and transmission diagnostic response.

NOTE: Code 24 12 can result when the +5V line (wire 124) which powers the sump temperature sensor is shorted to ground. Wire 124 also powers the TPS, OLS, RMR, retarder temperature sensor, and shift selectors and is present in all three ECU connectors.

2. After allowing the temperatures to normalize, if ambient temperature does not match the sump temperature reading (check using diagnostic tool), compare resistance versus sump fluid temperature. Refer to Figure 6–8 for TID 1 thermistors and Appendix Q for TID 2 thermistors. If resistance check is acceptable, then check the sensor wiring for opens, shorts, or shorts-to-ground.

3. If the sensor wiring is satisfactory, drain the fluid, remove the control module, and replace the temperature sensor (refer to appropriate transmission Service Manual).

4. If the condition persists, replace the ECU. If replacing the ECU corrects the problem, reinstall the original (bad) ECU to confirm that the problem is in the ECU. If the original ECU now works, inspect the ECU connectors for any corrosion or damage that may cause an intermittent condition. If the original problem recurs, reinstall the replacement ECU.

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CODE 24 XX — SUMP FLUID TEMPERATURE *(Figure 6–7)*

Table 6–4. Transmission Operation as a Function of Temperature

Condition	Version 8 Software	
	˚C	˚F
Temperature sensor failed high (refer to code 33 23)	177	350
Hot fluid (code 24 23) adaptive turned off; maximum range limited (not limited in "emergency" calibration)	128	262
Output function "on" for sump over temp above this temperature	121	250
Output function "off" for sump over temp below this temperature	116	240
Cool/cold fluid; adaptive turned off	34	93
Turbine reasonableness and speed tie-up tests turned off	0	32
Medium cold fluid R, N, D allowed, 2nd range start (hold override upshifts only)	–7	19
All C3 Pressure Switch tests turned off	–32	–25
Temperature sensor failed low (refer to code 33 12)	–45	–49

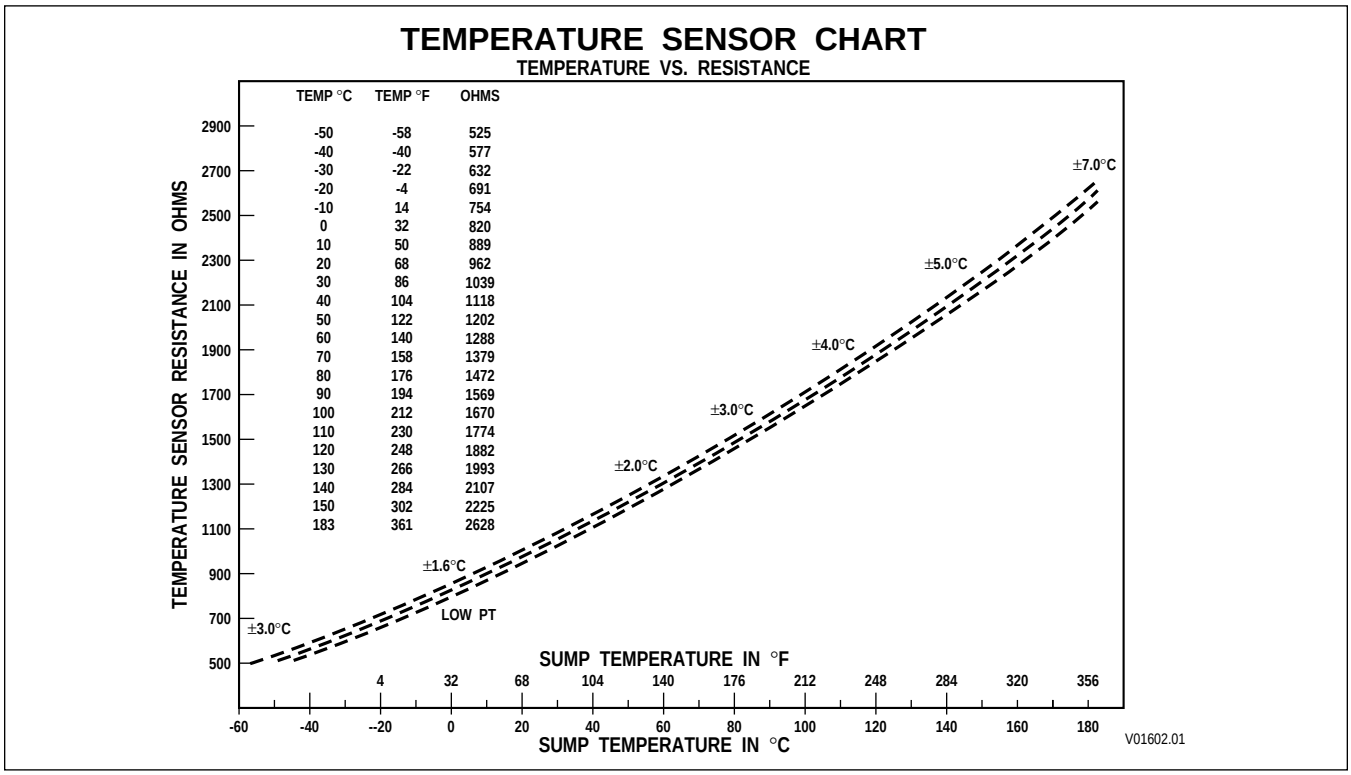

Figure 6–8. TransID 1 Temperature Sensor Chart

Code 24 23:

1. Install temperature gauges for transmission temperature and engine water temperature. Drive the vehicle. Verify that the code can be reproduced and verify the reading shown on the diagnostic tool. Observe the gauges and check for hot fluid when the code is produced.

2. If the fluid is not hot when the code is produced, remove the transmission "T" harness connector at the ECU and the transmission. Check the fluid temperature sensor wiring for opens, shorts, and shorts-to-ground. Compare the resistance readings of the sensor and the actual temperature

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CODE 24 XX — SUMP FLUID TEMPERATURE *(Figure 6–7)*

as shown on the gauge with Figure 6–8 for TID 1 thermistors and Appendix Q for TID 2 thermistors. If wiring problems or a great difference between temperature and resistance compared with the chart are found, drain the fluid, remove the control module, and replace the temperature sensor (refer to the Service Manual for the transmission being checked). If wiring problems are found, repair or replace as necessary.

3. If the fluid is hot when the code is produced, observe the gauges to see if the engine became hot before the transmission. If the engine cooling system is overheating and heating the transmission, the problem is with the engine or its cooling system.

4. If the transmission became hot before the engine, allow the vehicle to idle for 3–5 minutes and check the transmission fluid level. Correct the fluid level if necessary.

5. Attach pressure gauges to the cooling system (from a "to cooler" connection to a point after the cooling circuit filter) and check for pressure drop problems. If pressure drop is excessive (refer to Table 6–5), check for a plugged cooler filter, collapsed lines, obstructions, etc.

6. If the fluid level is correct and the cooling circuits satisfactory, drain the fluid, remove the control module, and inspect for damaged valve body gaskets. Replace any damaged gaskets (refer to the appropriate transmission Service Manual).

7. If no problems are found in the control module area, remove the transmission and disassemble, inspecting for causes of overheating (stuck stator, plugged orifices, dragging clutches, etc.). (See the Service Manual for the transmission being checked.)

Table 6–5. External Hydraulic Circuit Characteristics
Basic, PTO, 93˚C (200˚F) Sump Temperature

HD/B 500

CONVERTER OPERATION MAXIMUM COOLER FLOW AT MINIMUM PRESSURE DROP				
Input	Flow		Pressure Drop	
rpm	L/s	gpm	kPa	psi
600	0.22	3.4	0	0
900	0.38	6.1	0	0
1200	0.55	8.7	0	0
1500	0.80	12.7	0	0
1800	1.03	16.4	0	0
2100	1.13	18.0	0	0
2300	1.20	19.0	0	0

CONVERTER OPERATION COOLER FLOW AT MAXIMUM ALLOWABLE PRESSURE DROP				
Input	Flow		Pressure Drop	
rpm	L/s	gpm	kPa	psi
600	0.20	3.2	31	4.5
900	0.37	5.8	63	9.1
1200	0.55	8.7	108	15.7
1500	0.77	12.2	167	24.2
1800	0.92	14.5	213	30.9
2100	0.97	15.3	238	34.5
2300	1.00	15.9	250	36.3

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CODE 24 XX — SUMP FLUID TEMPERATURE *(Figure 6–7)*

Table 6–6. External Hydraulic Circuit Characteristics
Basic, PTO, 93˚C (200˚F) Sump Temperature

MD/B 300/B 400

CONVERTER OPERATION MAXIMUM COOLER FLOW AT MINIMUM PRESSURE DROP				
Input	Flow		Pressure Drop	
rpm	L/s	gpm	kPa	psi
600	0.10	1.6	0	0
800	0.23	3.7	0	0
1200	0.47	7.4	0	0
1400	0.61	9.7	0	0
1600	0.74	11.7	0	0
2000	0.94	14.9	0	0
2400	1.19	18.9	0	0
3200	1.28	20.3	0	0

LOCKUP OPERATION MAXIMUM COOLER FLOW AT MINIMUM PRESSURE DROP				
Input	Flow		Pressure Drop	
rpm	L/s	gpm	kPa	psi
600	0.10	1.6	0	0
800	0.23	3.7	0	0
1200	0.50	7.9	0	0
1400	0.63	10.0	0	0
1600	0.77	12.2	0	0
2000	0.95	15.1	0	0
2400	1.12	17.8	0	0
2800	1.22	19.3	0	0
3200	1.28	20.3	0	0

CONVERTER OPERATION MAXIMUM ALLOWABLE PRESSURE DROP				
Input	Flow		Pressure Drop	
rpm	L/s	gpm	kPa	psi
600	0.10	1.6	10	1.5
800	0.22	3.5	40	5.8
1200	0.45	7.1	159	23.1
1400	0.57	9.0	252	36.5
1600	0.67	10.6	338	49.0
2000	0.80	12.7	481	69.8
2400	0.85	13.5	549	79.6
3200	0.85	13.5	549	79.6

LOCKUP OPERATION MAXIMUM ALLOWABLE PRESSURE DROP				
Input	Flow		Pressure Drop	
rpm	L/s	gpm	kPa	psi
600	0.10	1.6	5	0.7
800	0.23	3.7	46	6.7
1200	0.48	7.6	148	21.5
1400	0.62	9.8	247	35.8
1600	0.73	11.6	346	50.2
2000	0.90	14.3	561	81.4
2400	1.07	17.0	737	106.9
2800	1.10	17.4	770	111.7
3200	1.10	17.4	791	114.7

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DIAGNOSTIC CODES

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CODE 25 XX — OUTPUT SPEED SENSOR, DETECTED AT ZERO SPEED, X RANGE

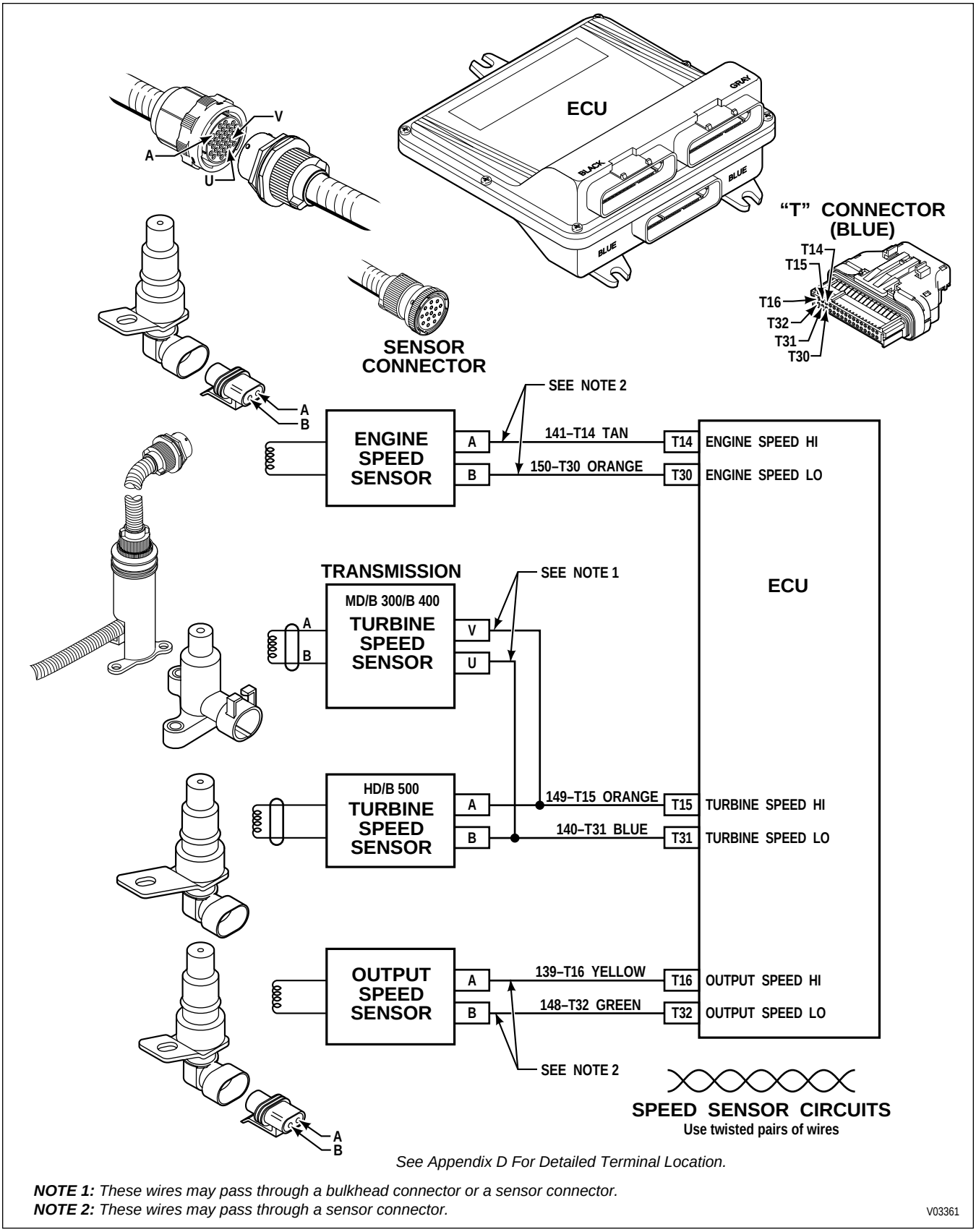

Figure 6–9. Code 25 Schematic Drawing

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CODE 25 XX — OUTPUT SPEED SENSOR, DETECTED AT ZERO SPEED, X RANGE *(Figure 6–9)*

Main code 25 occurs if the output speed sensor reports a zero speed reading while both engine and turbine speeds are approximately equal, turbine speed is above a calibration value, and neutral is not selected or commanded. Main code 25 indicates either the output speed sensor has failed or the required oncoming clutch or clutches did not come on. Code 25 11 can be generated by a false turbine speed reading. This may be due to crosstalk between solenoid and turbine speed sensor circuits caused by direct wire-to-wire short or by water in the electrical connectors. See Section 4 for corrective action.

NOTE: If code 25 XX is in memory at ECU initialization (ignition on), all display segments are illuminated.

Main Code	Subcode	Meaning	Applied Clutches
25	00	Output speed sensor, detected at zero speed, Low range	C3, C6
25	11	Output speed sensor, detected at zero speed, 1st range	C1, C5
25	22	Output speed sensor, detected at zero speed, 2nd range	C1, C4
25	33	Output speed sensor, detected at zero speed, 3rd range	C1, C3
25	44	Output speed sensor, detected at zero speed, 4th range	C1, C2
25	55	Output speed sensor, detected at zero speed, 5th range	C2, C3
25	66	Output speed sensor, detected at zero speed, 6th range	C2, C4
25	77	Output speed sensor, detected at zero speed, Reverse	C3, C5

A. Active Indicator Clearing Procedure:

- Power down
- Manual
- Self-clearing

NOTE: Before troubleshooting, read Paragraph 6–6. Also, check battery and ECU input voltages.

NOTE: Intermittent connections or lack of battery-direct power and ground connections can cause this and other codes.

B. Troubleshooting:

1. Check the transmission fluid level and ensure correct fluid level.
2. Check for the presence of code 22 16. If code 22 16 is in the code list, go to code 22 XX section and follow troubleshooting steps for code 22 16.
3. Connect the Pro-Link® 9000 with ignition on, engine off; check for indication of turbine speed. If turbine speed is indicated, refer to Paragraph 4–2 for corrective action.
4. If the output speed sensor and wiring are satisfactory, install pressure gauges into the appropriate clutch pressure taps (see appropriate transmission Service Manual or Appendix B in this manual) and make the shift again. See if either of the clutches has low or no pressure. Lack of pressure in C1 in first range may be due to a G solenoid stuck closed. Lack of pressure in C5 in first range may be due to an E solenoid stuck closed.
5. If a clutch is leaking pressure, drain the fluid, remove the control module and check for damaged valve body gaskets and stuck or sticky valves. If no problems are found, replace the solenoids for the clutches used in the range indicated by the code (refer to Figure 6–1). Refer to the appropriate transmission Service Manual for replacement procedure.

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CODE 25 XX — OUTPUT SPEED SENSOR, DETECTED AT ZERO SPEED, X RANGE *(Figure 6–9)*

6. If, after detecting leaking pressure and replacing solenoids, the problem persists, check for worn clutch or piston seals. Remove the transmission and repair or replace as necessary (refer to the proper transmission Service Manual).

7. This code requires accurate output and turbine speed readings. If there were no transmission problems detected, use the diagnostic tool and watch the speed readings for noise (erratic signals) from low speed to high speed in the range indicated by the code.

8. If a noisy sensor is found, check the sensor resistance (refer to the sensor resistance chart below) and check its wiring for opens, shorts, and shorts-to-ground (see code 22 XX). Also closely check the terminals in the connectors for corrosion, contamination, or damage. Ensure the wiring to the sensors is a properly twisted wire pair. Remove sensor and check for damage at the tone wheel end. Check for looseness of the tone wheel. Refer to the appropriate Service Manual if repair of a loose tone wheel is necessary. Replace the sensor if it is damaged or if its resistance (refer to Service Manual for proper procedure) is incorrect and isolate and repair any noted wiring problems. (Use St. Clair P/N 200153 Service Harness Twisted Pair for this procedure.)

Resistance	Temp. ˚C	Temp. ˚F
200 Ω	–40	–40
300 Ω	20	68
400 Ω	110	230

9. If no apparent cause for the code can be located, replace the turbine and output speed sensors. Refer to the appropriate transmission Service Manual for proper procedure.

10. If the condition persists, replace the ECU. If replacing the ECU corrects the problem, reinstall the original (bad) ECU to confirm that the problem is in the ECU. If the original ECU now works, inspect the ECU connectors for any corrosion or damage which may cause an intermittent condition. If the original problem recurs, reinstall the replacement ECU.

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CODE 26 XX — THROTTLE SOURCE/ENGINE COOLANT SOURCE NOT DETECTED

Main code 26 occurs when the ECU has not detected either a throttle source or an engine coolant source. This is a new code related to the autodetect feature which is described in Paragraph 1–9.

Main Code	Subcode	Meaning
26	00	Throttle source not detected
26	11	Engine coolant source not detected

Code 26 00 means that the ECU has not detected the presence of engine throttle data or analog circuitry. For details about autodetect or using Pro-Link® to select a throttle source, see Paragraph 1–9 and the WTEC III Pro-Link® Manual.

Code 26 11 means that the ECU has not detected the presence of engine coolant temperature data or analog circuitry. For details about autodetect or using Pro-Link® to select an engine coolant temperature source, see Paragraph 1–9 and the WTEC III Pro-Link® Manual.

A. Active Indicator Clearing Procedure

- Power down
- Manual

B. Troubleshooting

1. When code 26 00 is logged and an analog TPS is known to be installed, refer to code 21 XX for troubleshooting steps. If a J1587 or J1939 throttle signal is used, refer to code 66 00 for troubleshooting steps.
2. When code 26 11 is logged and if an analog engine coolant temperature sensor is being used, refer to code 62 XX for troubleshooting steps. If a J1587 or J1939 engine coolant temperature signal is being used, refer to code 66 00 for troubleshooting steps.

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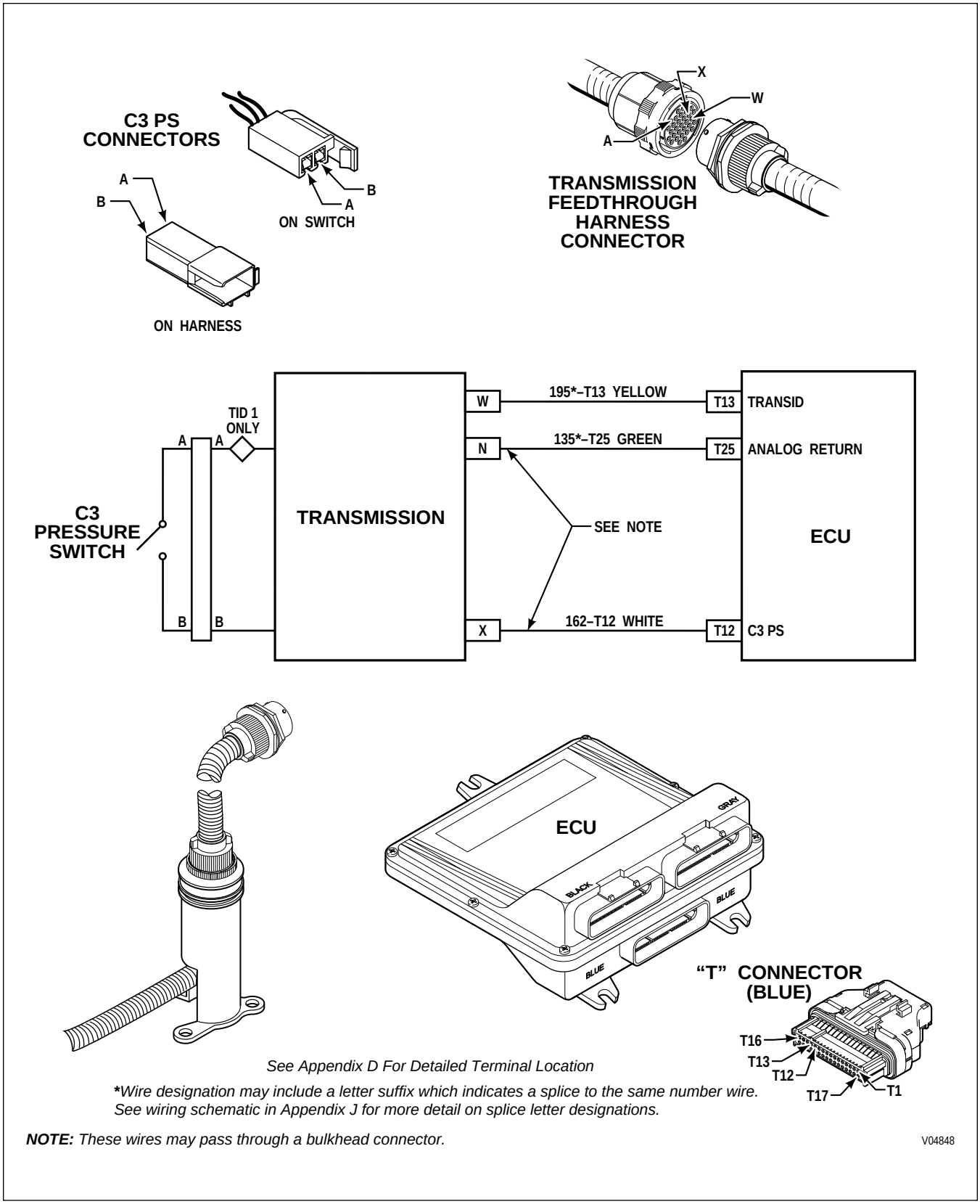
CODE 32 XX — C3 PRESSURE SWITCH



See Appendix D For Detailed Terminal Location

***Wire designation may include a letter suffix which indicates a splice to the same number wire. See wiring schematic in Appendix J for more detail on splice letter designations.*

***NOTE:** These wires may pass through a bulkhead connector.*

V04848

Figure 6–10. Code 32 Schematic Drawing

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CODE 32 XX — C3 PRESSURE SWITCH *(Figure 6–10)*

Main code 32 indicates the transmission gear ratio is correct, but the C3 pressure switch is open when it should be closed.

NOTE: When an ECU with a version 8 or 8A calibration is used with a pre-TransID transmission, 32 XX codes are set because the ECU sees wire 195 is open. To correct this condition, convert to a TID 1 internal harness or install Adapter P/N 200100 available from St. Clair Technologies. See addresses on Page 1–7.

Further TransID (TID) information is in Paragraph 1–10.

Main Code	Subcode	Meaning
32	00	C3 switch open in low range (MD 3070 or HD 4070 only)
32	33	C3 switch open in third range
32	55	C3 switch open in fifth range
32	77	C3 switch open in reverse range

A. Active Indicator Clearing Procedure:

- Power down
- Manual
- Self-clearing

NOTE: Before troubleshooting, read Paragraph 6–6. Also, check battery and ECU input voltages.

B. Troubleshooting:

1. Disconnect the transmission "T" harness connector at the ECU and the transmission. Check the C3 switch circuit for opens, shorts to other wires, shorts-to-ground, or short-to-battery. If wiring problems are found, isolate and repair. The C3 pressure switch closes at 206.8 ± 48 kPa (30 ± 7 psi); resistance should be 2 Ohms maximum when the switch is closed and 20,000 to infinity when the switch is open. Infinity is often indicated as OL (over limit) on a DVOM.

2. If problems are not found in the external harness, drain the fluid, remove the control module, and check the internal harness for opens, shorts between wires, or shorts-to-ground (refer to the proper transmission Service Manual). If wiring problems are found, isolate and repair (see Appendix E, Paragraph 1–9).

3. If no wiring problems are found, replace the C3 pressure switch (refer to transmission Service Manual).

4. If the problem recurs, use a spare wire, if available, or provide a new wire (St. Clair P/N 200153 may be used for this purpose) for the C3 pressure switch circuit.

5. If the problem recurs again, replace the internal harness.

6. If the condition persists, replace the ECU. If replacing the ECU corrects the problem, reinstall the original (bad) ECU to confirm that the problem is in the ECU. If the original ECU now works, inspect the ECU connectors for any corrosion or damage which may cause an intermittent condition. If the original problem recurs, reinstall the replacement ECU.

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CODE 33 XX — SUMP OIL TEMPERATURE SENSOR

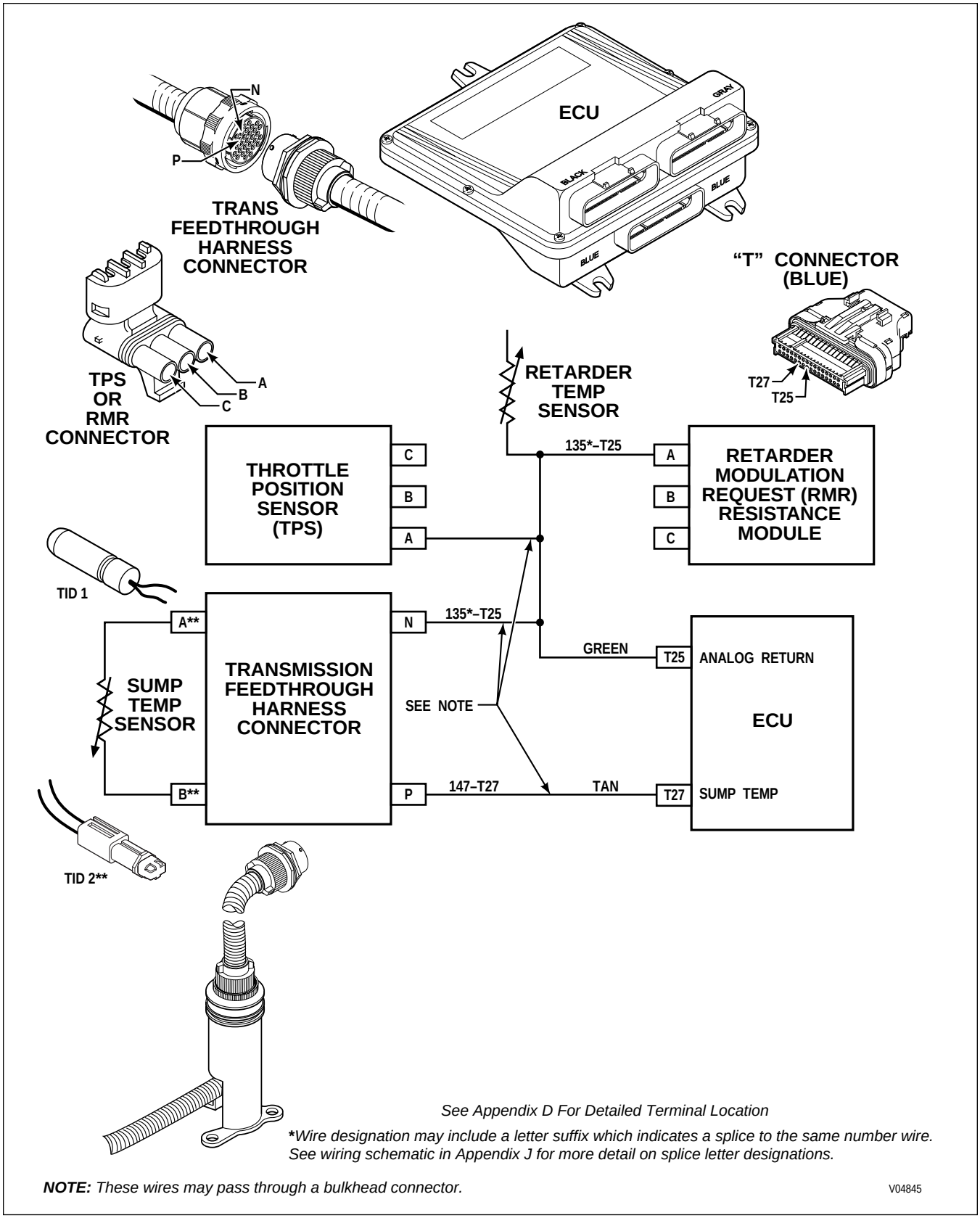

Figure 6–11. Code 33 Schematic Drawing

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CODE 33 XX — SUMP OIL TEMPERATURE SENSOR *(Figure 6–11)*

NOTE: When an ECU with a version 8 calibration(CIN=0A...) is used with a Trans ID 2 transmission, 33 XX codes are set because the ECU does not have the proper calibrations for the TID 2 thermistors. The ECU calibration must be updated to version 8A or later (CIN=0B...).

TransID (TID) information related to thermistor changes is in Paragraph 1–10 and detailed troubleshooting information for TID 2 thermistors is shown in Appendix Q.

Main code 33 indicates the sump temperature sensor is providing a signal outside the usable range of the ECU. This code indicates the sensor failed showing abnormally high or low temperature readings. Main code 33 can be caused by a component or circuit failure or by extremely high or low temperatures. There are no operational inhibits related to main code 33. The ECU assumes a hardware failure and that transmission temperatures are normal (93ºC; 200ºF). Temperatures above or below normal cause poor shift quality.

NOTE: Code 33 23 in conjunction with code 21 23 indicates the loss of common ground (wire 135) between the throttle and temperature sensors.

Main Code	Subcode	Meaning
33	12	Sump oil temperature sensor failed low
33	23	Sump oil temperature sensor failed high

A. Active Indicator Clearing Procedure:

- Power down
- Manual
- Self-clearing

NOTE: Before troubleshooting, read Paragraph 6–6. Also, check the transmission fluid level.

B. Troubleshooting:

NOTE: Code 33 12 can be caused when the +5V power line (wire 124) is shorted to ground or open. Wire 124 also provides power for the OLS, TPS, RMR, retarder temperature sensor, and shift selectors and is present in all three ECU connectors.

1. If possible, check the sump temperature with a DDR. Use the fastest sample rate available on the DDR. This is necessary to catch momentary changes due to an intermittent open or short to ground. If a DDR is not available, use the shift selector display to determine if the code is active (refer to Paragraph 6–2). Disconnect the transmission “T” harness at the ECU and check resistance of the sensor and compare with Figure 6–12 for TID 1 and Appendix Q for TID 2.

2. If Step (1) reveals that the extreme temperature indication is no longer present, the temperature limit could have been reached due to operational or ambient temperature extremes. Also, you may be experiencing an intermittent problem and the code will not be active. Proceed cautiously, it is unlikely there is a sensor hardware fault.

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CODE 33 XX — SUMP OIL TEMPERATURE SENSOR *(Figure 6–11)*

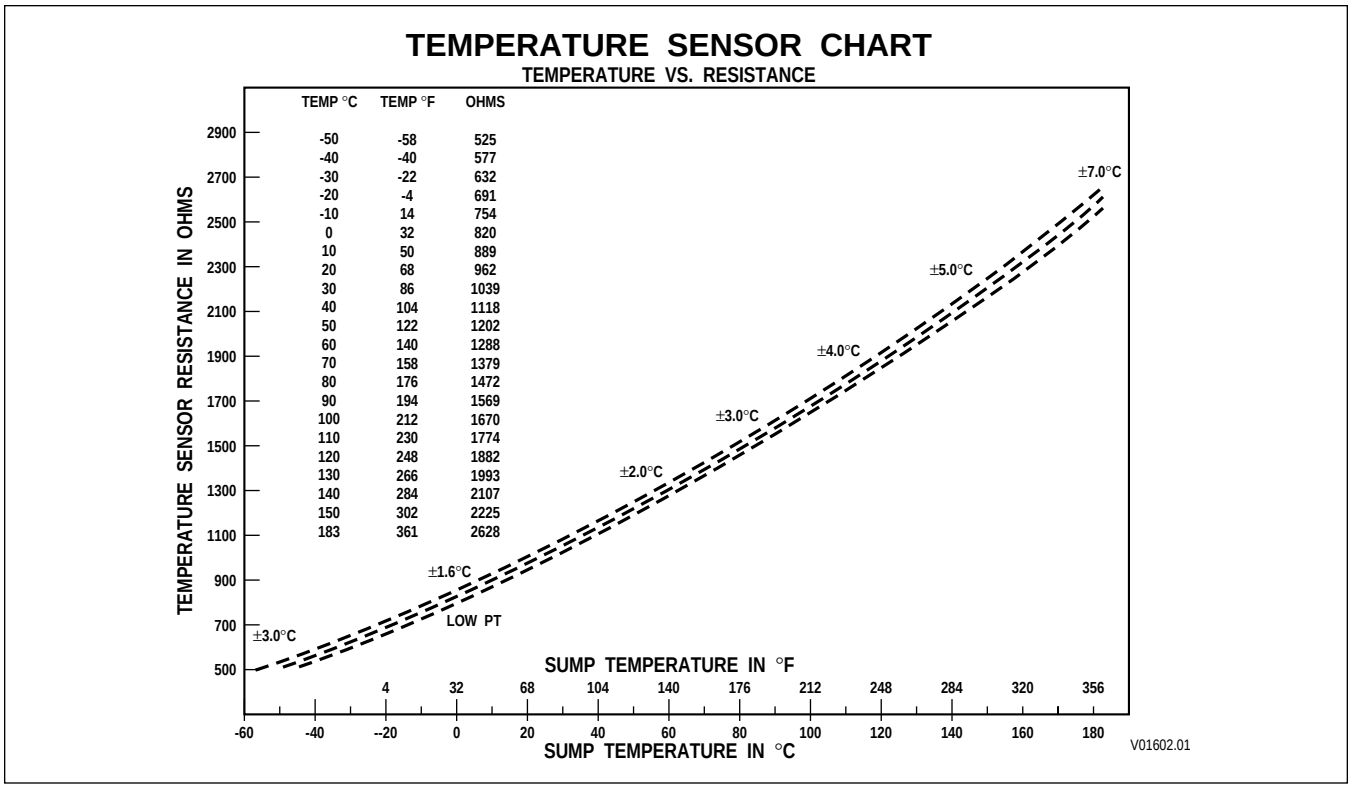

Figure 6–12. Temperature Sensor Chart

3. Disconnect the external harness at the transmission. Check the connectors and terminals for dirt, corrosion, or damage. Clean or replace as necessary.

4. Check the sensor wires in the external harness for opens (code 33 23), shorts between wires, or shorts-to-ground (code 33 12 — refer to Section 4). If wiring problems are found, isolate and repair as described in Appendix E.

5. If no harness problems are found, check the feedthrough harness for damage. If the feedthrough harness connector is satisfactory, drain the fluid and remove the control module. Check for chafing of the sensor wires, especially near the separator plate. Eliminate the chafe point. If no chafe point is found, replace the sensor (refer to the Transmission Service Manual and Appendix E, Paragraph 1–12 in this manual).

6. If the problem recurs, use a spare wire, if available, or provide a new wire (St. Clair P/N 200153 may be used for this purpose) for the temperature sensor circuit.

7. If the condition persists, replace the ECU. If replacing the ECU corrects the problem, reinstall the original (bad) ECU to confirm that the problem is in the ECU. If the original ECU now works, inspect the ECU connectors for any corrosion or damage which may cause an intermittent condition. If the original problem recurs, reinstall the replacement ECU.

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CODE 34 XX — CALIBRATION COMPATIBILITY OR CHECKSUM FAULT

Main code 34 indicates there is a problem with the calibration.

Main Code	Subcode	Meaning
34	12	Factory calibration compatibility number wrong
34	13	Factory calibration checksum
34	14	Power off block checksum
34	15	Diagnostic queue block checksum
34	16	Real-time block checksum
34	17	Customer modifiable constants checksum

A. Active Indicator Clearing Procedure:

- Power down

NOTE: Copying the current calibration from the ECU and reloading it will not correct the fault. The calibration must be downloaded directly from PCCS.

B. Troubleshooting:

1. If the code set is 34 14 and it occurs in conjunction with code 35 00, proceed to find the cause for code 35 00 and correct it.
2. After the cause for code 35 00 has been corrected, drive the vehicle to see if code 34 14 recurs. If code 34 14 recurs, proceed to Step (3).
3. Reprogram the correct calibration. Contact your nearest Allison distributor/dealer location qualified to do recalibration. Be certain the calibration and the software level are compatible.
4. If the code recurs after reprogramming, replace the ECU.
5. If the code set is 34 17, reprogram the GPI/GPO package after re-calibration of the ECU.

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CODE 35 XX — POWER INTERRUPTION

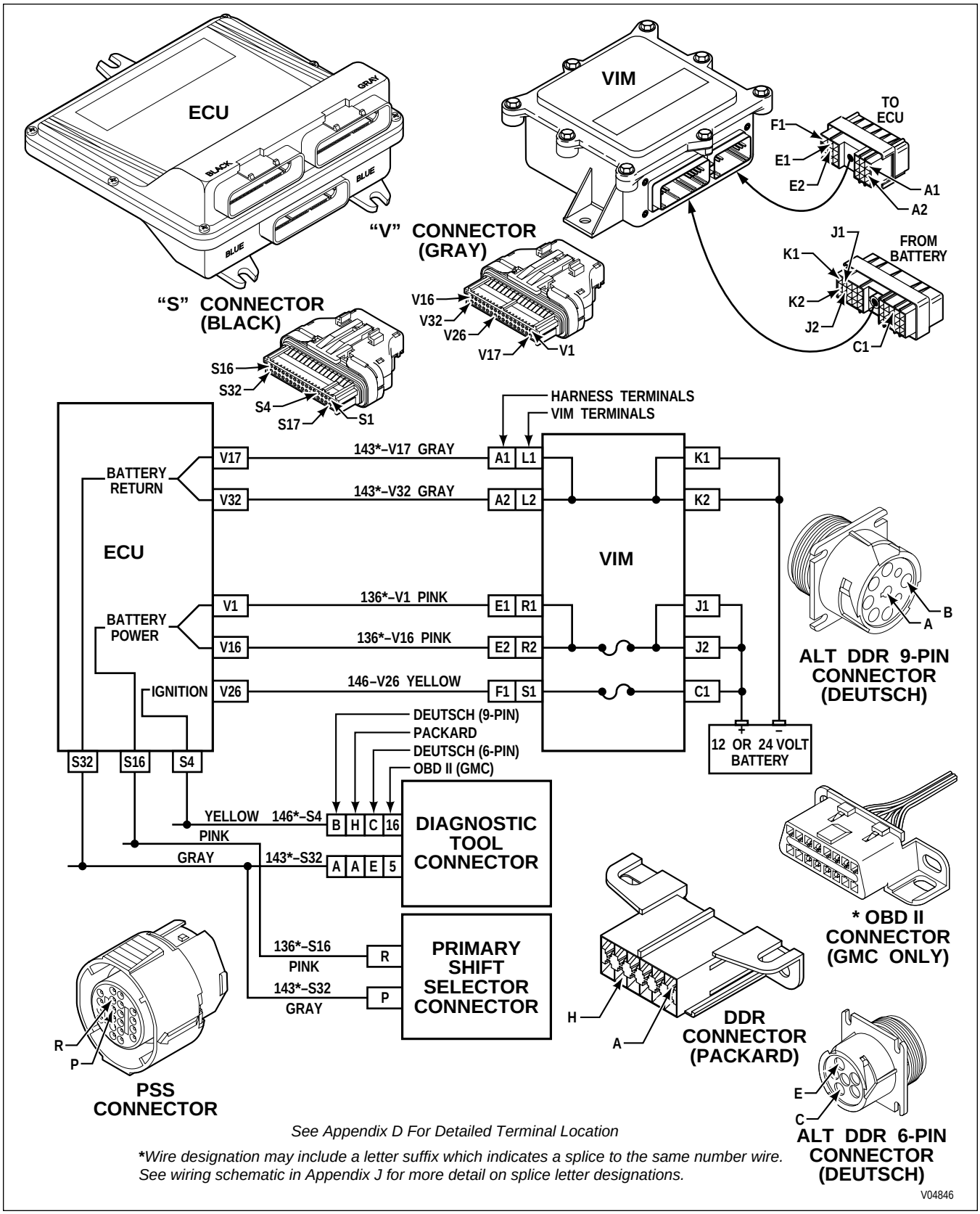

Figure 6–13. Code 35 Schematic Drawing

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CODE 35 XX — POWER INTERRUPTION *(Figure 6–13)*

Main code 35 indicates the ECU has detected a complete power loss before the ignition was turned off or before ECU shutdown is completed. When this happens, the ECU is not able to save the current operating parameters in memory before turning itself off.

Main Code	Subcode	Meaning
35	00	Power interruption. (Not an active code; only appears after power is restored.) During power interruption, DNS light is not illuminated and the transmission will not shift.
35	16	Real-time write interruption. (Power interruption at the same time the ECU is recording a critical code to the real-time section.)

A. Active Indicator Clearing Procedure:

- Power down
- Manual — except code 35 16

NOTE: Before troubleshooting, read Paragraph 6–6. Also, check battery and ECU input voltages.

B. Troubleshooting:

1. If the vehicle has a master switch controlling battery power to the ECU and an ignition switch, turning the master switch off before turning the ignition switch off can cause this code. Turning the master switch off before ECU shutdown is completed will also cause this code. No troubleshooting is necessary.

2. If improper switch sequencing is not the cause, check ECU power and ground for opens, shorts, and shorts-to-ground. Not using battery-direct power and battery ground connections can cause this code. A defective charging system, or open battery fuse or fusible link can also cause this code. The battery fuse or fusible link may be at the battery or in the VIM. Dirty, corroded, or painted power and ground connections can also cause this code.

3. If all system power and ground connections are satisfactory and the problem persists, replace the ECU. If replacing the ECU corrects the problem, reinstall the original (bad) ECU to confirm that the problem is in the ECU. If the original ECU now works, inspect the ECU connectors for any corrosion or damage which may cause an intermittent condition. If the original problem reoccurs, reinstall the replacement ECU.

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DIAGNOSTIC CODES

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CODE 36 XX — HARDWARE AND SOFTWARE NOT COMPATIBLE

Main code 36 indicates the system has detected a mismatch between the ECU hardware and the ECU software or that there is a TransID (TID) problem.

Main Code	Subcode	Meaning
36	00	Mismatch between ECU hardware and software
36	01	TransID not compatible with hardware/software
36	02	TransID did not complete

A. Active Indicator Clearing Procedure:

- Power down

B. Troubleshooting:

1. Correction for code 36 00 requires the installation of software that is compatible with the ECU hardware involved. (If a different calibration is required, update the ECU hardware to be compatible.)

2. Correction for code 36 01 is to update the ECU calibration. Installation of the latest calibration makes the ECU compatible with the latest TransID configuration.

NOTE: For further information about TransID see Paragraph 1–10 and SIL 7-WT-98.

3. Correction for code 36 02 is to troubleshoot TransID wire 195 for short-to-battery. Codes 42 XX or 69 XX may be associated with this code.

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CODE 42 XX — SHORT-TO-BATTERY IN SOLENOID CIRCUIT

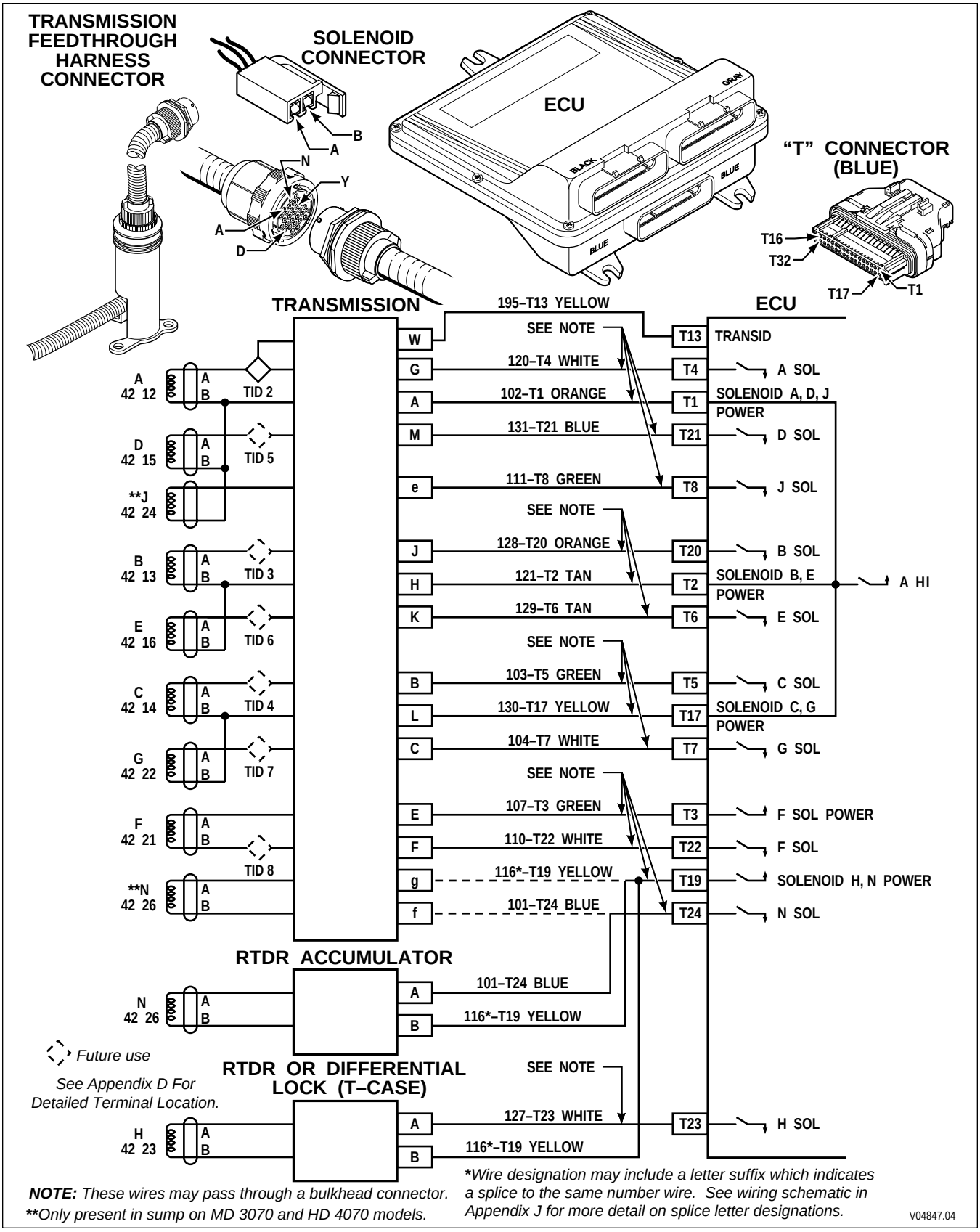

Figure 6–14. Code 42 Schematic Drawing

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CODE 42 XX — SHORT-TO-BATTERY IN SOLENOID CIRCUIT *(Figure 6–14)*

Main code 42 indicates the ECU has detected a short-to-battery condition in a solenoid wiring circuit. The **DO NOT SHIFT** response is activated when some subcodes are detected, all solenoids are turned off and the **CHECK TRANS** light is illuminated. All solenoids have a driver on the low (ground) side which can turn off the solenoid. All solenoids also have a driver on the high (power) side of the solenoid. Even though the high side driver can be turned off, a short-to-battery means the solenoid is continuously powered at an unregulated 12V or 24V instead of a regulated (pulse width modulated) voltage. The low side driver will not tolerate direct battery current and will open, causing the solenoid to be deenergized.

NOTE: For subcodes 12, 13, 14, 15, 16, 22 — neutral start is inoperable; all display segments are on if the code is logged during ECU initialization (ignition on). Subcodes 21, 23, 24, and 26 will not trigger the CHECK TRANS light.

Main Code	Subcode	Meaning
42	12	Short-to-battery A Solenoid Circuit
42	13	Short-to-battery B Solenoid Circuit
42	14	Short-to-battery C Solenoid Circuit
42	15	Short-to-battery D Solenoid Circuit
42	16	Short-to-battery E Solenoid Circuit
42	21	Short-to-battery F Solenoid Circuit
42	22	Short-to-battery G Solenoid Circuit
42	23	Short-to-battery H Solenoid Circuit
42	24	Short-to-battery J Solenoid Circuit
42	26	Short-to-battery N Solenoid Circuit

A. Active Indicator Clearing Procedure:

- Power down
- Manual

NOTE: Intermittent connections or lack of battery-direct power and ground connections may cause this and other codes.

NOTE: Before troubleshooting, read Paragraph 6–6. Also, check battery and ECU input voltages.

NOTE: Energizing the solenoids and listening for ball/plunger movement is sometimes useful in troubleshooting.

NOTE: "N" solenoid on the retarder accumulator has either a 12.5 ± 1.5 Ohm coil or a 23.5 ± 2.4 Ohm coil and is not correlated to sump temperature.

PROBING THE CONNECTOR

When testing the control system from the feedthrough connector with the internal harness connected, the resistance of each solenoid can be measured by using a VOM. Refer to Figure 6–15 for solenoid resistance versus temperature.

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CODE 42 XX — SHORT-TO-BATTERY IN SOLENOID CIRCUIT *(Figure 6–14)*

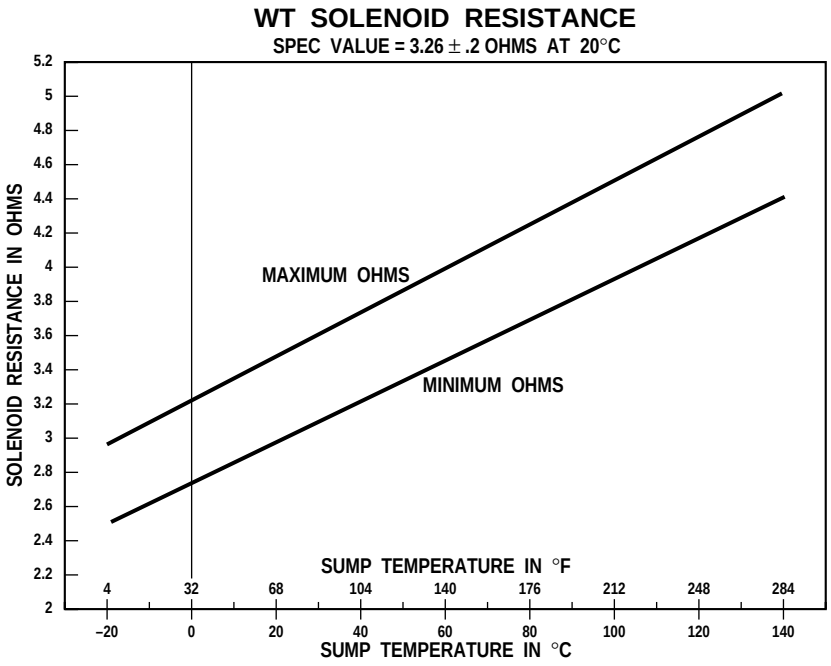

Figure 6–15. Solenoid Resistance vs. Temperature

B. Troubleshooting:

1. Make sure the transmission connector is tightly connected. If the connector is properly connected, disconnect the wiring harness at the transmission. Check the connector for corroded or damaged terminals. Clean or replace as necessary.

2. Test each solenoid circuit at the transmission connector for shorts between the solenoid circuit being diagnosed and all other terminals in the connector. This test may be simplified by using the J 41612 test tool. Refer to the system schematic and/or chart to identify wires in the internal harness which are connected. If a short is found, isolate and repair the short. The short will probably be in the internal wiring harness.

3. If multiple code 42s occur (42 12, 42 13, 42 14, 42 12, 42 16, 42 22, and 42 24), and wiring and solenoids check okay, the A-Hi driver is probably failed open.

4. Replace the ECU. If replacing the ECU corrects the problem, reinstall the original (bad) ECU to confirm that the problem is in the ECU. If the problem recurs, reinstall the new ECU to complete the repair.

5. If code 42 21 occurs repeatedly and the F solenoid and wiring checks okay, the F-Hi or F-Lo driver may be failed open. Follow Step (4) above.

6. If codes 42 23 and 42 26 occur repeatedly and solenoids and wiring check okay, the H and N-Hi driver may be failed open. Follow Step (4) above.

7. If the short is not found at the transmission connector, disconnect the transmission "T" harness connector at the ECU and check the wires of the solenoid circuit for shorts between the solenoid wires. If the short is found in one of the wires, isolate and repair it. Use a spare wire, if available, or provide a new wire (St. Clair P/N 200153 may be used for this purpose).

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CODE 42 XX — SHORT-TO-BATTERY IN SOLENOID CIRCUIT *(Figure 6–14)*

8. If the short is not found in either the transmission or the harness, the condition must be intermittent.
9. Drain the fluid, remove the control module (see the transmission Service Manual) and closely inspect the internal harness for damage. Repair or replace as necessary.
10. If the condition recurs, use a spare wire, if available, or provide a new wire (St. Clair P/N 200153 may be used for this purpose) for the solenoid circuit indicated by the trouble code. (Refer to Appendix E for connector assembly/disassembly information.)
11. If the condition persists, replace the ECU. If replacing the ECU corrects the problem, reinstall the original (bad) ECU to confirm that the problem is in the ECU. If the original ECU now works, inspect the ECU connectors for any corrosion or damage which may cause an intermittent condition. If the original problem recurs, reinstall the replacement ECU.

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CODE 44 XX — SHORT-TO-GROUND IN SOLENOID CIRCUIT

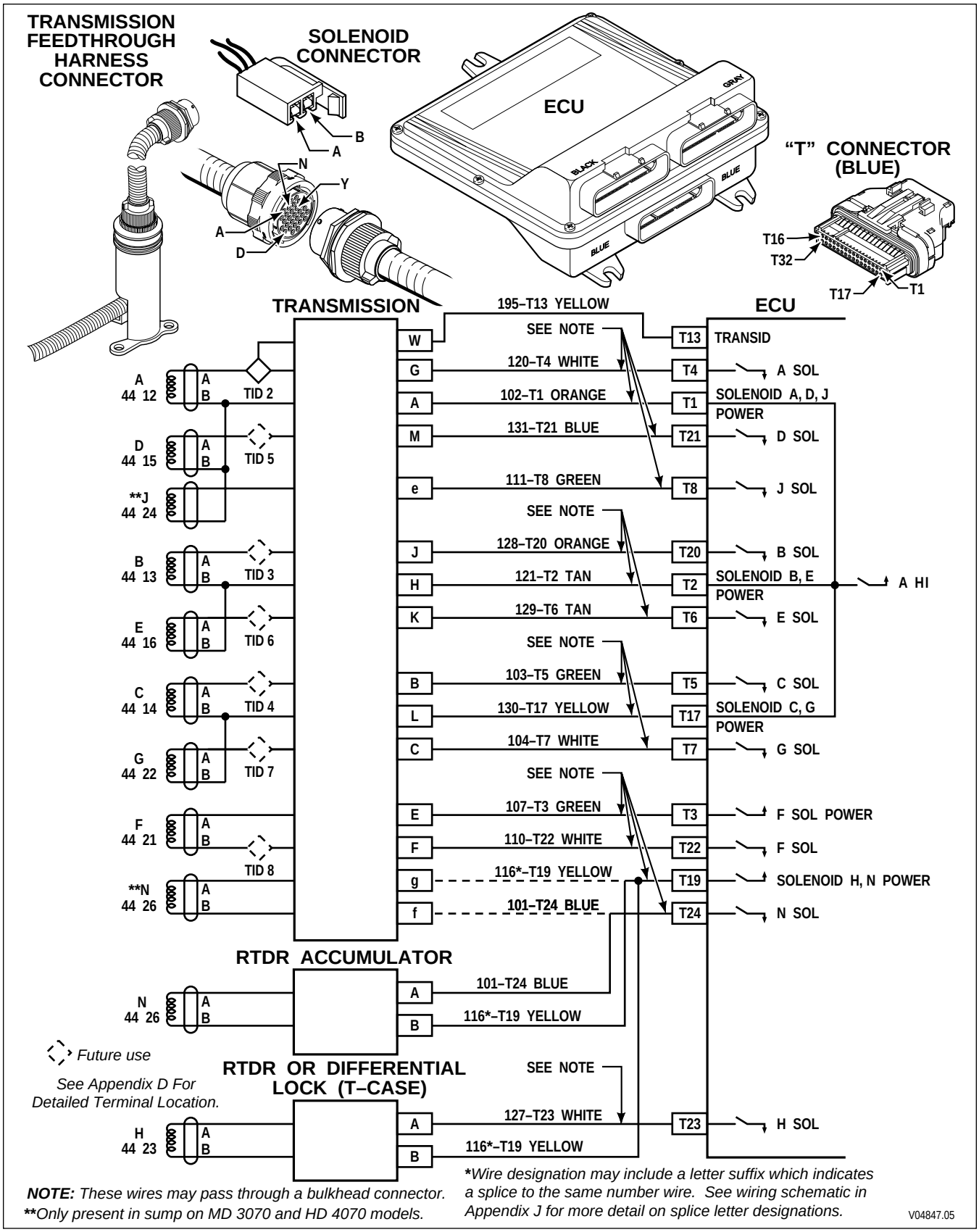

Figure 6–16. Code 44 Schematic Drawing

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CODE 44 XX — SHORT-TO-GROUND IN SOLENOID CIRCUIT *(Figure 6–16)*

Main code 44 indicates the ECU has detected a short-to-ground in a solenoid or its wiring. The **DO NOT SHIFT** response is activated when some subcodes are detected, all solenoids are turned off, and the **CHECK TRANS** light is illuminated.

NOTE: For subcodes 12, 13, 14, 15, 16, 22 — neutral start is inoperable. Subcodes 21, 23, 24, and 26 do not trigger the CHECK TRANS light.

Main Code	Subcode	Meaning
44	12	Short-to-ground A Solenoid Circuit
44	13	Short-to-ground B Solenoid Circuit
44	14	Short-to-ground C Solenoid Circuit
44	15	Short-to-ground D Solenoid Circuit
44	16	Short-to-ground E Solenoid Circuit
44	21	Short-to-ground F Solenoid Circuit
44	22	Short-to-ground G Solenoid Circuit
44	23	Short-to-ground H Solenoid Circuit
44	24	Short-to-ground J Solenoid Circuit
44	26	Short-to-ground N Solenoid Circuit

A. Active Indicator Clearing Procedure:

- Power down
- Manual

NOTE: Intermittent connections or lack of battery-direct power and ground connections may cause this and other codes.

NOTE: Before troubleshooting, read Paragraph 6–6. Also, check battery and ECU input voltages.

PROBING THE CONNECTOR

When testing the control system from the feedthrough connector with the internal harness connected, the resistance of each solenoid can be checked using a VOM. Refer to Figure 6–17 for resistance values versus temperature.

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CODE 44 XX — SHORT-TO-GROUND IN SOLENOID CIRCUIT *(Figure 6–16)*

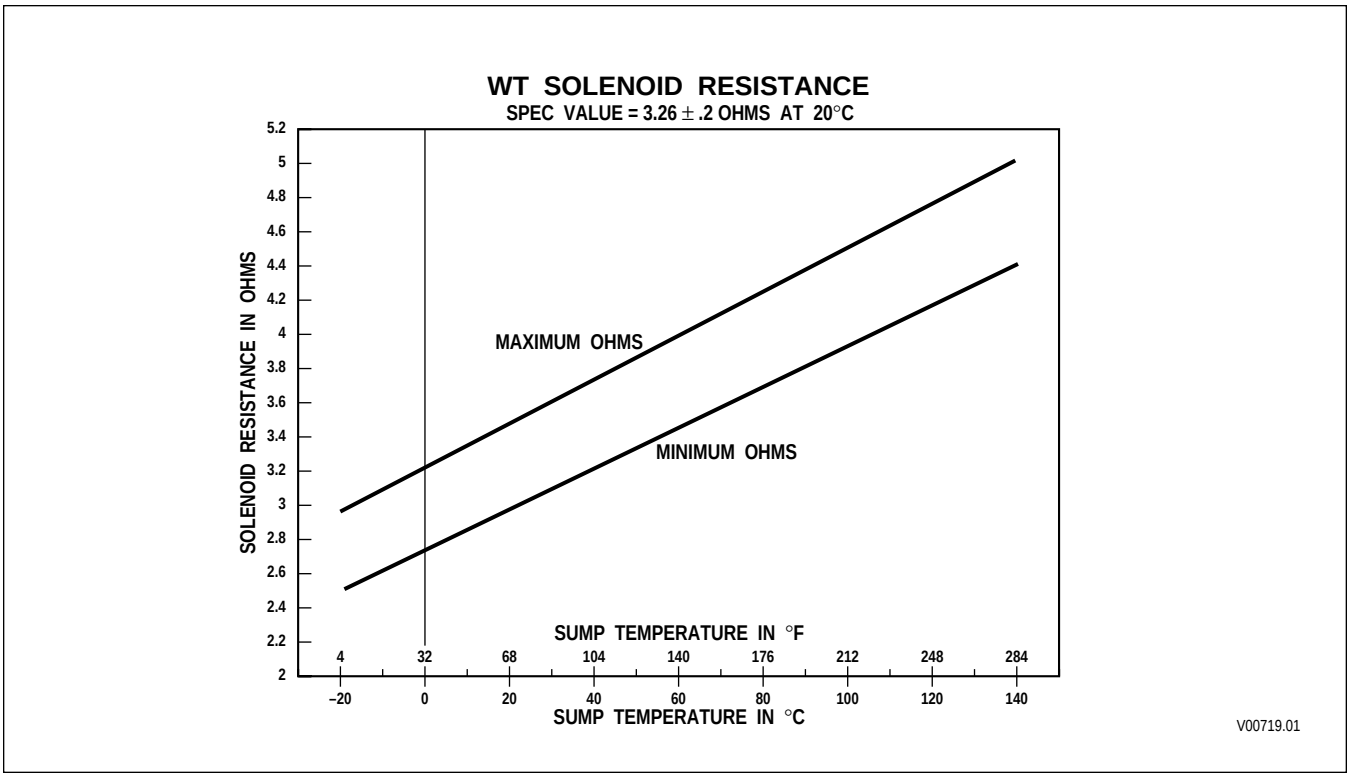

Figure 6–17. Solenoid Resistance vs. Temperature

B. Troubleshooting:

1. Check the transmission connector and make sure it is tightly connected. If the connector is properly connected, disconnect the harness at the transmission and inspect the terminals in the transmission harness and feedthrough harness connectors. Clean or replace as necessary (Appendix D).

2. If the connector is connected, clean, and not damaged, check the solenoid circuit in the transmission for shorts to other wires. (Tool J 41612 may be useful in making this test.) Refer to the system schematic and/or chart to identify wires in the internal harness which are connected. If the short circuit is found, drain the fluid, remove the control module (refer to the transmission Service Manual), and isolate the short. The short is probably in the feedthrough harness, or the solenoid itself (refer to Figure 6–1 for solenoid locations).

3. If the short is not found in the transmission, disconnect the transmission harness connector at the ECU and inspect the terminals for damage or contamination. Clean or replace as necessary. If the terminals are satisfactory, check the wires of the solenoid circuit in the transmission harness for shorts-to-ground or shorts between wires. If a short is found in one of the wires, isolate and repair it or use a spare wire, if available, or provide a new wire (St. Clair P/N 200153 may be used for this purpose) in the external harness. Refer to Appendix E for connector/terminal repair information.

4. If the short is not found in either the transmission or the harness, the condition must be intermittent.

5. Drain the fluid, remove the control module, and closely inspect the solenoid and internal harness for damage. Repair or replace as necessary (refer to the transmission Service Manual).

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CODE 44 XX — SHORT-TO-GROUND IN SOLENOID CIRCUIT *(Figure 6–16)*

6. If the condition recurs, use a spare wire, if available, or provide a new wire (St. Clair P/N 200153 may be used for this purpose) for the solenoid circuit indicated by the diagnostic code. See Appendix E for connector assembly/disassembly information.
7. If the condition persists, replace the ECU. If replacing the ECU corrects the problem, reinstall the original (bad) ECU to confirm that the problem is in the ECU. If the original ECU now works, inspect the ECU connectors for any corrosion or damage which may cause an intermittent condition. If the original problem recurs, reinstall the replacement ECU.

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CODE 45 XX — OPEN CONDITION IN SOLENOID CIRCUIT

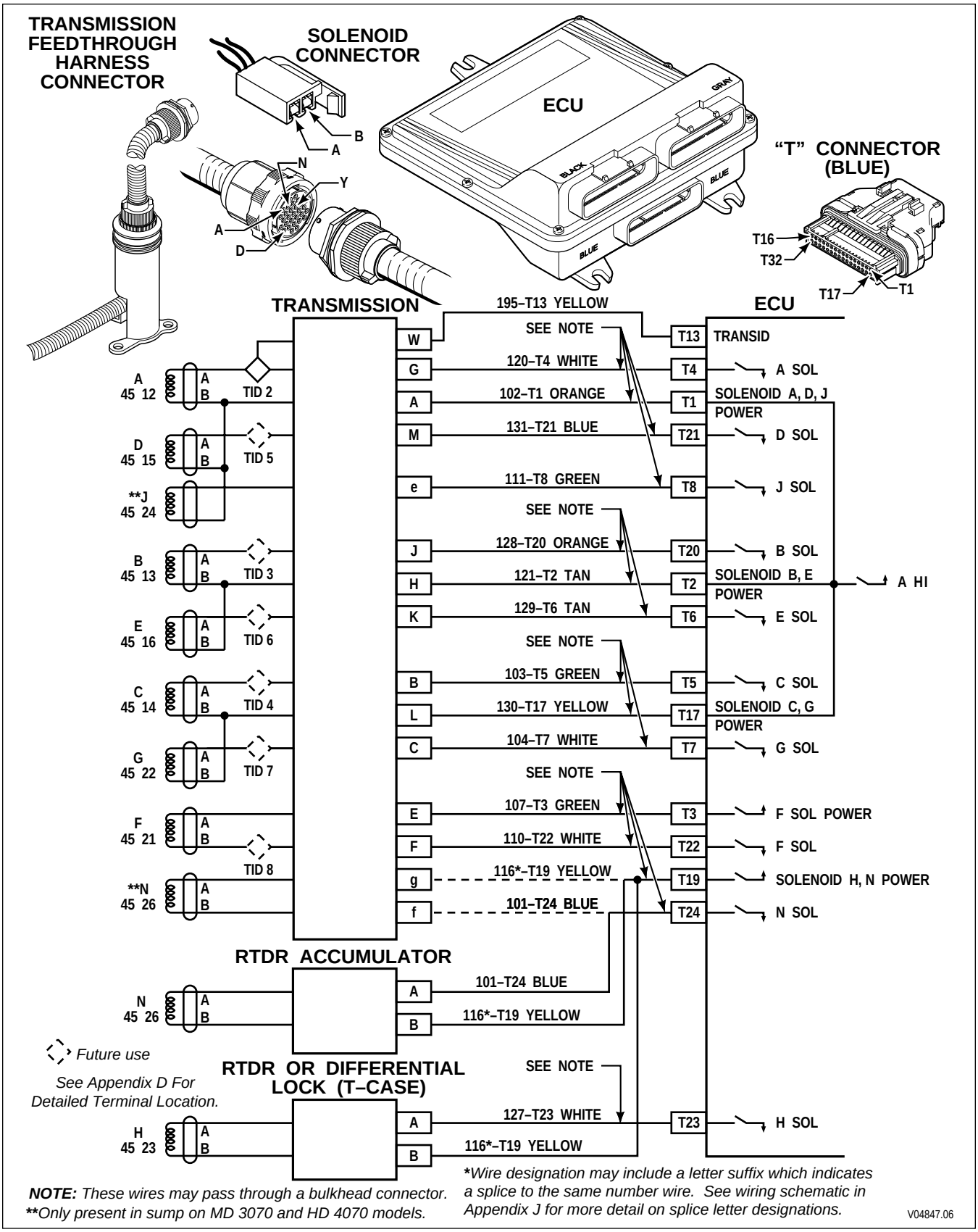

Figure 6–18. Code 45 Schematic Drawing

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CODE 45 XX — OPEN CONDITION IN SOLENOID CIRCUIT *(Figure 6–18)*

Main code 45 indicates the ECU has detected either an open circuit condition in a solenoid coil or the wiring to that solenoid. The **DO NOT SHIFT** response is activated when some subcodes are detected, all solenoids are turned off, and the **CHECK TRANS** light is illuminated.

Main Code	Subcode	Meaning
45	12	Open Circuit A Solenoid Circuit
45	13	Open Circuit B Solenoid Circuit
45	14	Open Circuit C Solenoid Circuit
45	15	Open Circuit D Solenoid Circuit
45	16	Open Circuit E Solenoid Circuit
45	21	Open Circuit F Solenoid Circuit
45	22	Open Circuit G Solenoid Circuit
45	23	Open Circuit H Solenoid Circuit
45	24	Open Circuit J Solenoid Circuit
45	26	Open Circuit N Solenoid Circuit

A. Active Indicator Clearing Procedure:

- Power down
- Manual

NOTE: Intermittent connections or lack of battery-direct power and ground connections may cause this and other codes.

NOTE: Before troubleshooting, read Paragraph 6–6. Also, check battery and ECU input voltages.

PROBING THE CONNECTOR

When testing the control system from the feedthrough connector with the internal harness connected, the resistance of each solenoid can be checked using a VOM. Refer to Figure 6–19 for solenoid resistance values versus temperature.

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CODE 45 XX — OPEN CONDITION IN SOLENOID CIRCUIT *(Figure 6–18)*

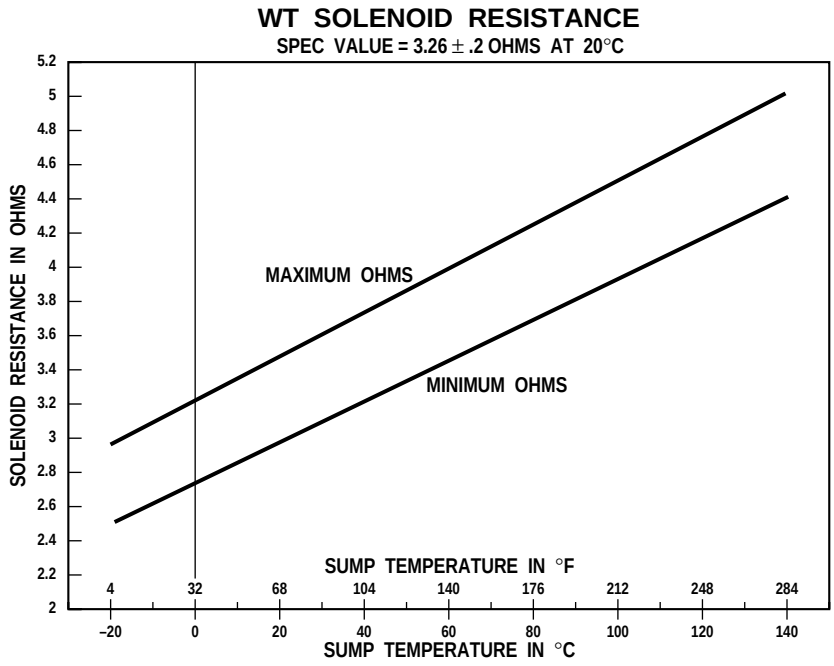

Figure 6–19. Solenoid Resistance vs. Temperature

B. Troubleshooting:

1. Check the transmission connector and make sure it is tightly connected. If the connector is properly connected, disconnect the harness at the feedthrough harness connector and check the terminals in the transmission harness and feedthrough harness connectors. Clean or replace as necessary (Appendix E).

2. If the connector is connected, clean, and not damaged, check the solenoid circuit in the transmission for opens. Refer to the system schematic and/or chart to identify wires in the internal harness which are connected. If the open circuit is found, drain the fluid, remove the control module (see the transmission Service Manual), and isolate the open. The fault will be in the feedthrough harness or the solenoid itself (see Figure 6–1 for solenoid locations).

3. If the open is not found at the transmission connector, disconnect the transmission harness connector at the ECU and inspect the terminals in the connector and the ECU for damage or contamination. Clean or replace as necessary. If the terminals are satisfactory, check the wires of the solenoid circuit in the transmission harness for continuity. If the open is found in one of the wires, isolate and repair it. If this is not feasible, use a spare wire, if available, or provide a new wire (St. Clair P/N 200153 may be used for this purpose). See Appendix E for information on connector/wire repair.

4. If multiple code 45s occur (45 12, 45 13, 45 14, 45 15, 45 16, 45 22, and 45 24), and wiring and solenoids check okay, the A-Hi driver is probably failed open.

5. Replace the ECU. If replacing the ECU corrects the problem, reinstall the original (bad) ECU to confirm that the problem is in the ECU. If the problem recurs, reinstall the new ECU to complete the repair.

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CODE 45 XX — OPEN CONDITION IN SOLENOID CIRCUIT *(Figure 6–18)*

6. If code 45 21 occurs repeatedly and the F solenoid and wiring checks okay, the F-Hi or F-Lo driver may be failed open. Follow Step (5) above.

7. If codes 45 23 and 45 26 occur repeatedly and solenoids and wiring check okay, the H and N-Hi driver may be failed open. Follow Step (5) above.

8. If the open is not found in either the transmission or the harness or the ECU drivers, the condition must be intermittent.

9. Drain the fluid, remove the control module, and closely inspect the solenoid and internal harness for damage. Repair or replace as necessary (refer to the transmission Service Manual).

10. If the condition recurs, use a spare wire, if available, or provide a new wire (St. Clair P/N 200153 may be used for this purpose) for the solenoid circuit indicated by the diagnostic code. See Appendix E for information on connector assembly/disassembly.

11. If the condition persists, replace the ECU. If replacing the ECU corrects the problem, reinstall the original (bad) ECU to confirm that the problem is in the ECU. If the original ECU now works, inspect the ECU connectors for any corrosion or damage which may cause an intermittent condition. If the original problem recurs, reinstall the replacement ECU.

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CODE 46 XX — OVERCURRENT TO SOLENOIDS

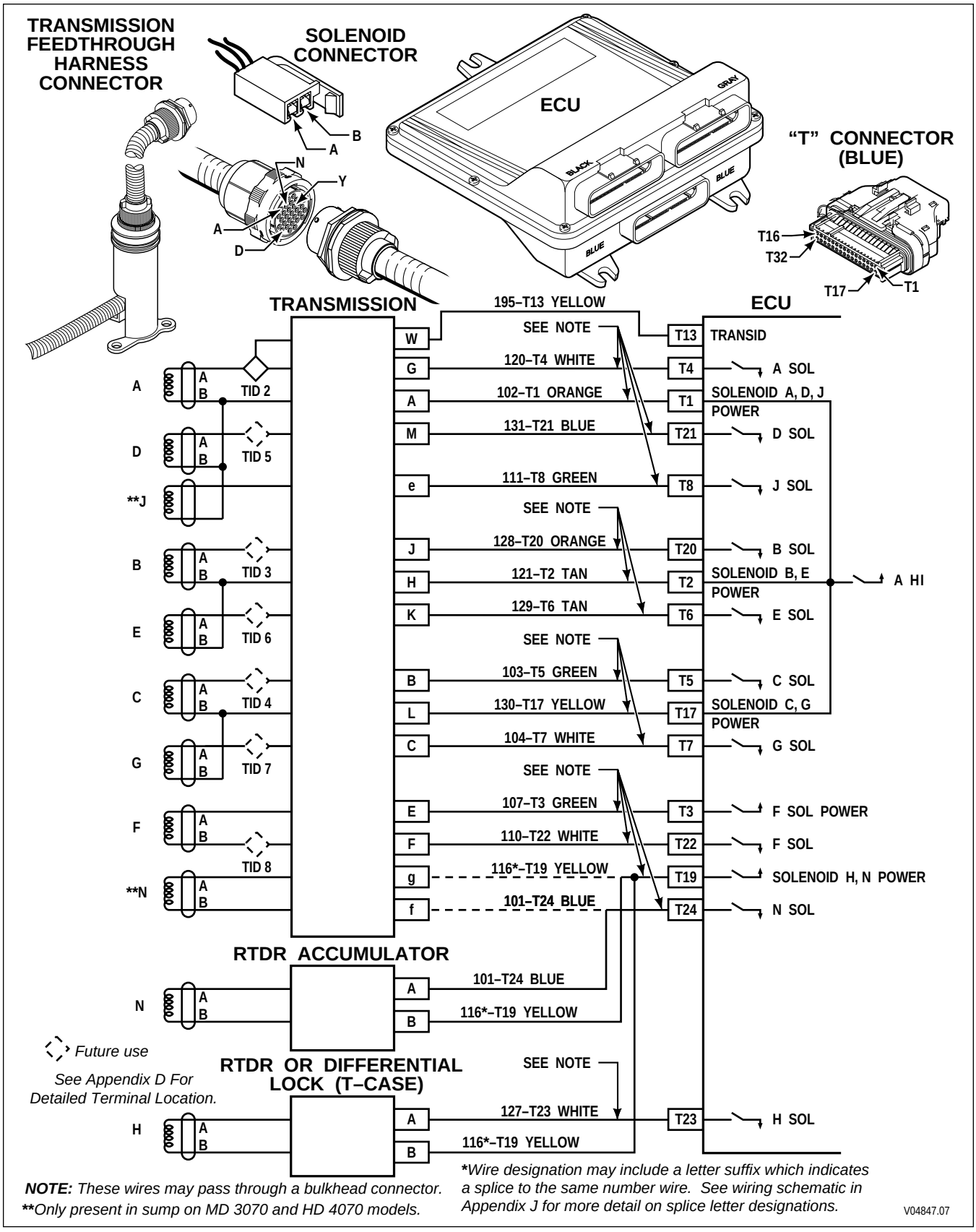

Figure 6–20. Code 46 Schematic Drawing

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CODE 46 XX — OVERCURRENT TO SOLENOIDS *(Figure 6–20)*

Main code 46 indicates that an overcurrent condition exists in one of the switches sending power to the transmission control solenoids.

Main Code	Subcode	Meaning
46	21	Overcurrent, F-High solenoid circuit
46	26	Overcurrent, N and H-High solenoid circuit
46	27	Overcurrent, A-High solenoid circuit

A. Active Indicator Clearing Procedure:

- Power down
- Manual

B. Troubleshooting:

1. Probable cause is a wiring problem. A solenoid wire is probably shorted to ground or the solenoid has a shorted coil which would cause an overcurrent condition. May also be an ECU problem.
2. Follow the troubleshooting steps for code 44 XX.

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CODE 51 XX — OFFGOING RATIO TEST DURING SHIFT (TIE-UP TEST)

Main code 51 indicates a failed offgoing ratio test. An offgoing ratio test occurs during a shift and uses turbine and output speed sensor readings to calculate the ratio between them. The calculated speed sensor ratio is then compared to the programmed speed sensor ratio of the commanded range. After a shift is commanded, the ECU, after a period of time, expects the old ratio to be gone. If the ratio does not change properly, the ECU assumes the offgoing clutch did not release. The shift is retried if conditions still exist to schedule the shift. If the second shift is not successfully completed, code 51 XX is set and the ECU returns the transmission to the previous range. Additional codes could be logged for other shifts where "X" indicates the range from and "Y" indicates the range to.

NOTE: This test is not performed below a calibrated transmission output speed of 200 rpm.

Main Code	Subcode	Meaning
51	01	Low–1 upshift
51	10	1–Low downshift
51	12	1–2 upshift
51	21	2–1 downshift
51	23	2–3 upshift
51	24	2–4 upshift
51	35	3–5 upshift
51	42	4–2 downshift
51	43	4–3 downshift
51	45	4–5 upshift
51	46	4–6 upshift
51	53	5–3 downshift
51	64	6–4 downshift
51	65	6–5 downshift
51	XY	X–Y upshift or downshift

A. Active Indicator Clearing Procedure:

- Power down
- Manual — except subcodes 35, 42, 43, 45, 53

NOTE: Before troubleshooting, read Paragraph 6–6. Also, check battery and ECU input voltages.

NOTE: Intermittent connections or lack of battery-direct power and ground connections may cause this and other codes.

B. Troubleshooting:

1. Incorrect fluid level can cause 51 series codes. Allow the vehicle to idle for 3–4 minutes and check the transmission fluid level. If level is not correct, add or drain fluid to correct level.

2. If the fluid level is correct, connect a pressure gauge into the pressure tap for the offgoing clutch indicated by the code (refer to solenoid and clutch chart, Appendix C). Make the shift indicated by the subcode or use the Pro-Link® diagnostic tool clutch test mode to put the transmission in the off-going and oncoming ranges (refer to Appendix B for clutch pressure check information).

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CODE 51 XX — OFFGOING RATIO TEST DURING SHIFT (TIE-UP TEST)

3. If the offgoing clutch stays pressurized, drain the fluid, remove the control module, disassemble the control module and clean it, inspecting for damaged valve body gaskets and stuck or sticky valves. Inspect the transmission for signs of clutch damage indicating the need to remove and overhaul the transmission (refer to the transmission Service Manual).
4. If the problem has not been isolated, replace the solenoid for the offgoing clutch (refer to the transmission Service Manual).
5. If after replacing the solenoid the problem persists, install another ECU. If this corrects the problem, temporarily reinstall the old ECU to verify the repair.
6. If this does not correct the problem, reinstall the original ECU and check for mechanical problems. The clutch may be mechanically held (coned, burned and welded, etc.). It may be necessary to remove the transmission and repair or rebuild as required (see the transmission Service Manual).

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CODE 52 XX — OFFGOING C3 PRESSURE SWITCH TEST DURING SHIFT

Main code 52 indicates a failed C3 pressure switch test. When a shift is commanded and C3 is the offgoing clutch, the ECU expects the C3 pressure switch to open within a period of time after the shift is commanded. If the ECU does not see the switch open, it assumes C3 has not released. If conditions for a shift exist, the shift is retried. If the C3 pressure switch still remains closed, the code is logged and the **DO NOT SHIFT** response is commanded. If the code is set during a direction change, neutral with no clutches is commanded, otherwise the transmission is commanded to the previous range. Additional codes could be logged for other shifts where "X" indicates the range from and "Y" indicates the range to.

NOTE: C3 tests are turned off below a calibrated temperature of –32ºC (–25˚F).

Main Code	Subcode	Meaning
52	01	L–1 upshift
52	08	L–N1 shift
52	32	3–2 downshift
52	34	3–4 upshift
52	54	5–4 downshift
52	56	5–6 upshift
52	71	R–1 shift
52	72	R–2 shift
52	78	R–N1 shift
52	79	R–2 shift (R to NNC to 2)
52	99	N3–N2 shift
52	XY	X–Y shift

A. Active Indicator Clearing Procedure:

- Power down
- Manual

NOTE: Before troubleshooting, read Paragraph 6–6. Also, check battery and ECU input voltages.

NOTE: Intermittent connections or lack of battery-direct power and ground connections may cause this and other codes.

B. Troubleshooting:

1. Use the Pro-Link® diagnostic tool to check the state of the C3 pressure switch.
2. Check the C3 pressure switch wiring for a short-to-ground or a switch stuck closed (refer to code 32 XX). If a short is found, isolate and repair; or replace the switch if it is stuck closed.
3. If a fault is not found with the C3 pressure switch or circuitry, connect a pressure gauge to the C3 pressure tap.
4. Drive the vehicle to make the shift indicated by the subcode or use the DDR clutch test mode. Compare actual C3 pressure value with the table of specifications in Appendix B.

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CODE 52 XX — OFFGOING C3 PRESSURE SWITCH TEST DURING SHIFT

5. If C3 is being held on hydraulically (C3 remains pressurized), drain the fluid, remove the control module, disassemble and clean the control module, checking for damaged valve body gaskets or stuck and sticky valves (see the transmission Service Manual).

6. If the problem recurs, use a spare wire, if available, or provide a new wire (St. Clair P/N 200153 may be used for this purpose) for the C3 pressure switch in the external harness. See Appendix E for connector service information.

7. If the problem again recurs, replace the C solenoid (refer to the transmission Service Manual).

8. If the condition persists, replace the ECU. If replacing the ECU corrects the problem, reinstall the original (bad) ECU to confirm that the problem is in the ECU. If the original ECU now works, inspect the ECU connectors for any corrosion or damage which may cause an intermittent condition. If the original problem recurs, reinstall the replacement ECU.

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CODE 53 XX — OFFGOING SPEED TEST (DURING SHIFT)

Main code 53 indicates a failed offgoing speed test. The speed test during a shift is designed to ensure neutral is attained during shifts to neutral. This test compares engine speed to turbine speed. If neutral is selected and turbine speed is found to be much lower than engine speed, the ECU sees this as neutral not being attained. The transmission is commanded to Neutral with No Clutches and code 53 XX is set. Additional codes could be logged for other shifts where "X" indicates the range from and "Y" indicates the range to.

NOTE: This test is not performed if neutral output is below 200 rpm or when temperatures are below a calibrated 0˚C (32˚F).

Main Code	Subcode	Meaning
53	08	L–N1 shift
53	18	1–N1 shift
53	28	2–N1 shift
53	29	2–N2 shift
53	38	3–N1 shift
53	39	3–N3 shift
53	48	4–N1 shift
53	49	4–N3 shift
53	58	5–N1 shift
53	59	5–N3 shift
53	68	6–N1 shift
53	69	6–N4 shift
53	78	R–N1 shift
53	99	N3–N2 or N2–N3 shift
53	XY	X–Y shift

A. Active Indicator Clearing Procedure:

- Power down
- Manual — subcodes 78 and 99 only

NOTE: Before troubleshooting, read Paragraph 6–6. Also, check battery and ECU input voltages.

NOTE: Intermittent connections or lack of battery-direct power and ground connections may cause this and other codes.

B. Troubleshooting:

1. Be sure the transmission is warm and the fluid level is correct. Correct transmission fluid level as necessary.

2. Using the DDR, check the engine and turbine speed sensor signals under steady conditions. If a tachometer is available, compare the tachometer reading with the engine rpm reading on the diagnostic tool. Check signals in neutral, at idle, high idle, and maximum no load rpm. If a signal is erratic, check sensor wiring for opens, shorts, and shorts-to-ground (refer to code 22 XX). Check all connections for dirt and corrosion. If wiring problems are found, repair or replace as necessary. See Appendix E for connector service information.

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CODE 53 XX — OFFGOING SPEED TEST (DURING SHIFT)

3. If fluid and wiring are satisfactory, install a pressure gauge in the pressure tap for the offgoing clutch. Make the shift indicated by the subcode using the clutch test mode of the Pro-Link® diagnostic tool. If the pressure gauge shows clutch pressure (above 55 kPa or 8 psi) remains in the offgoing clutch, drain the fluid and remove the control module (see the transmission Service Manual). Disassemble and clean the control module and check for damaged valve body gaskets and stuck or sticky valves, particularly latch valves and solenoid second-stage valves.
4. If excessive clutch pressure is not remaining in the offgoing clutch, replace the engine speed sensor and the turbine speed sensor (refer to the transmission Service Manual).
5. If the control module is removed to replace the turbine speed sensor (MD, B 300, B 400), clean the control module and inspect for stuck or sticky valves (particularly the latch valves and solenoid G second stage valve). Check the rotating clutch drum to which the turbine speed sensor is directed for damage, contamination, or signs of contact between the drum and the sensor.
6. If the problem recurs, replace the solenoid(s) for the offgoing clutch(es) (refer to the transmission Service Manual).
7. If the problem again recurs, the offgoing clutch must be held on mechanically (coned, burned, etc.). Remove the transmission and repair or rebuild as necessary (see the transmission Service Manual).
8. If the condition persists, replace the ECU. If replacing the ECU corrects the problem, reinstall the original (bad) ECU to confirm that the problem is in the ECU. If the original ECU now works, inspect the ECU connectors for any corrosion or damage which may cause an intermittent condition. If the original problem recurs, reinstall the replacement ECU.

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CODE 54 XX — ONCOMING SPEED TEST (AFTER SHIFT)

Main code 54 indicates a failed oncoming ratio test. The ratio test after a shift is failed when the ECU has commanded the end of a shift and has not seen the transmission shift into the target range (comparing turbine and output speeds). Erratic readings from speed sensors are a likely cause of an oncoming ratio test failure. If conditions for a shift still exist, the shift will be retried one more time. If the ratio test is still not met, a code is logged and the **DO NOT SHIFT** response is commanded. If the code is set during a direction change, Neutral with No Clutches is commanded, otherwise the transmission is commanded to the previous range. **Code 54 12 can also be caused by the ECU being calibrated for a close ratio transmission and installed with a wide ratio transmission, or vice versa.** Additional codes could be logged for other shifts where "X" indicates the range from and "Y" indicates the range to.

NOTE: This test is not performed below a calibrated transmission output speed of 200 rpm.

Main Code	Subcode	Meaning
54	01	L–1 upshift
54	07	L–R shift
54	10	1–L downshift
54	12	1–2 upshift — incorrect calibration, wide ratio vs. close ratio
54	17	1–R shift
54	21	2–1 downshift
54	23	2–3 upshift
54	24	2–4 upshift
54	27	2–R shift
54	32	3–2 downshift
54	34	3–4 upshift
54	35	3–5 upshift
54	42	4–2 downshift
54	43	4–3 downshift
54	45	4–5 upshift
54	46	4–6 downshift
54	53	5–3 downshift
54	54	5–4 downshift
54	56	5–6 upshift
54	64	6–4 downshift
54	65	6–5 downshift
54	70	R–L shift
54	71	R–1 shift
54	72	R–2 shift
54	80	N1–L shift
54	81	N1–1 shift
54	82	N1–2 shift
54	83	N1–3 shift
54	85	N1–5 shift
54	86	N1–6 shift
54	92	N2–2 shift
54	93	N3–3 shift
54	95	N3–5 shift
54	96	N4–6 shift
54	XY	X to Y shift

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CODE 54 XX — ONCOMING SPEED TEST (AFTER SHIFT)

A. Active Indicator Clearing Procedure:

- Power down
- Manual

NOTE: Before troubleshooting, read Paragraph 6–6. Also, check battery and ECU input voltages.

NOTE: Intermittent connections or lack of battery-direct power and ground connections may cause this and other codes.

B. Troubleshooting:

1. After the transmission is at operating temperature, allow the vehicle to idle on level ground for 3–4 minutes. Check transmission fluid level. If improper fluid level is found, correct as necessary. Improper fluid level could be the cause of the code (not enough or too much fluid may produce inadequate clutch pressure).

2. Connect a pressure gauge and check main pressure. If pressure is not adequate, the pump is possibly worn. See Appendix B for main pressure specifications.

3. If the fluid level is correct, check the turbine and output speed sensors for accurate, steady signals using the diagnostic tool (check with vehicle stopped and in range to confirm a zero speed reading from the turbine and output speed sensors). Check the wiring for opens and shorts (refer to code 22 XX) and the sensor coils for proper resistance. If problems are found, repair or replace as necessary. Remove speed sensor and check for loose tone wheel.

4. If sensor and wiring resistance are acceptable, connect a pressure gauge(s) to the pressure tap for the oncoming clutches indicated by the subcode (refer to solenoid and clutch chart in Appendix C). Make the shift indicated by the code by operating the vehicle or by using the diagnostic tool's clutch test mode.

5. If the clutch pressure does not show on the gauge(s), the control module is probably not commanding the clutch on. Drain the fluid and remove the control module (see the transmission Service Manual). Disassemble and clean the control module, inspect for stuck or sticking valves.

6. Internal leakage is indicated by the clutch pressure gauge showing that pressure is being sent to the clutch but the clutch fails to hold. The fault may be: missing or damaged face seals, burnt clutch, leaking piston sealrings, or damaged control module gaskets. Drain the fluid, remove the control module (refer to the transmission Service Manual), and inspect the face seals and control module gaskets. If the seals and gaskets are satisfactory, replace the solenoid(s) indicated by the code. If replacing the solenoid does not eliminate the code, remove the transmission and repair as necessary.

7. If clutch pressures are correct and the clutch appears to be holding, replace the output and turbine speed sensors (refer to the transmission Service Manual for the proper procedure).

8. If the problem recurs, use the diagnostic tool to check the speed sensor signals for erratic readings. Possible causes of erratic speed readings are: loose sensors, intermittent contact in the wiring, vehicle-induced vibrations, or speed sensor wiring that is not a properly twisted-pair. If necessary, use a twisted-pair for a new speed sensor circuit — Service Harness Twisted Pair P/N 200153 is available from St. Clair Technologies for this purpose.

9. If the condition persists, replace the ECU. If replacing the ECU corrects the problem, reinstall the original (bad) ECU to confirm that the problem is in the ECU. If the original ECU now works, inspect the ECU connectors for any corrosion or damage which may cause an intermittent condition. If the original problem recurs, reinstall the replacement ECU.

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CODE 55 XX — ONCOMING C3 PRESSURE SWITCH (AFTER SHIFT)

Main code 55 indicates the C3 clutch is the oncoming clutch in a shift and the C3 pressure switch did not close at the end of the shift. When this code is set, the **DO NOT SHIFT** response and **Neutral with No Clutches** is commanded. On the N1 to R shift the transmission is commanded to the previous range. Additional codes could be logged for other shifts where "X" indicates the range from and "Y" indicates the range to.

NOTE: When an ECU with a version 8 or 8A calibration is used with a pre-TransID transmission, 55 XX codes are set because the ECU sees wire 195 is open. To correct this condition, convert to a TID 1 internal harness or install Adapter P/N 200100 available from St. Clair Technologies.

Further TransID (TID) information is in Paragraph 1–10.

Main Code	Subcode	Meaning
55	07*	Oncoming C3PS (after shift), L–R shift
55	17*	Oncoming C3PS (after shift), 1–R shift
55	27*	Oncoming C3PS (after shift), 2–R shift
55	87	Oncoming C3PS (after shift), N1–R shift
55	97	Oncoming C3PS (after shift), N1–L to R shift
55	XY	Oncoming C3PS (after shift), X to Y shift

****NOTE: When sump temperature is below 10˚C (50˚F), and transmission fluid is C4 (not DEXRON®), follow this procedure when making directional change shifts:***

- ***To shift from forward to reverse; select N (Neutral) and then R (Reverse).***
- ***Failure to follow this procedure may cause illumination of the CHECK TRANS light and then transmission operation will be restricted to N (Neutral).***

A. Active Indicator Clearing Procedure:

- Power down
- Manual — subcode 87 only

NOTE: Intermittent connections or lack of battery-direct power and ground connections may cause this and other codes.

NOTE: Check battery and ECU input voltages before troubleshooting.

B. Troubleshooting:

NOTE: Do not bring the transmission to operating temperature if the problem occurs at sump temperatures below that level. Do troubleshooting at the temperature level where the problem occurs.

1. After the transmission is at operating temperature, allow vehicle engine to idle on level ground for 3–4 minutes. Check transmission fluid level. If improper fluid level is found, correct as necessary. Improper fluid level could be the cause of the code (not enough or too much fluid may produce inadequate clutch pressure).
2. Connect a pressure gauge and check main pressure. If pressure is not adequate, the pump is possibly worn. See Appendix B for main pressure specifications.

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CODE 55 XX — ONCOMING C3 PRESSURE SWITCH (AFTER SHIFT)

3. If fluid level and main pressure are adequate, connect a pressure gauge to the C3 pressure tap on the transmission and make the shift indicated by operating the vehicle using the Pro-Link® diagnostic tool's CLUTCH TEST MODE.

NOTE: When using the CLUTCH TEST MODE on the Pro-Link®, be sure to use the correct pressure specification. If testing is done with the vehicle stopped, the lockup clutch is not applied, so use the clutch pressure specification for converter operation (see Appendix B; pressure in 3C would be the same as in 2C). If testing is done with the vehicle moving, the lockup clutch may be applied depending upon the vehicle speed and throttle position. Be sure to use the clutch pressure specification for lockup operation (see Appendix B).

4. If, when making the shift and producing the code, the C3 clutch does not show any pressure, drain the fluid and remove the control module (refer to the transmission Service Manual). Disassemble, clean, and inspect the control module for stuck or sticky valves (particularly the "C" solenoid second stage valve and C-1 latch valve). If no obvious problems are found, replace the "C" solenoid and reassemble (see Figure 6–1 for location of the "C" solenoid).
5. If the gauge shows inadequate pressure being sent to the clutch, the clutch is probably worn, has leaking piston or face seals, or the control module gaskets are damaged. See Appendix B for clutch pressure specification. Drain the fluid, remove the control module and inspect the face seals and valve body gaskets. If the face seals or control module gaskets are not damaged, remove and repair the transmission (refer to the transmission Service Manual for repair procedure).
6. If the gauge shows adequate clutch apply pressure, the problem is with the C3 pressure switch or its wires. Check the C3 pressure switch wires in the transmission harness for opens, shorts, or shorts-to-ground (see code 32 XX). If found, isolate and repair the C3 pressure switch circuit. See Appendix E for connector service information.

NOTE: A leakage problem may be temperature related. Be sure to check pressures at the sump temperature where the problem occurred.

7. If the problem is not in the transmission harness, drain the fluid and remove the control module. Check the feedthrough harness assembly for opens. If wiring problems are found, repair as necessary (refer to Appendix E). If no wiring problems are found, replace the C3 pressure switch (see Figure 6–1 for the location). Refer to the transmission Service Manual for proper procedure.
8. If the condition persists, replace the ECU. If replacing the ECU corrects the problem, reinstall the original (bad) ECU to confirm that the problem is in the ECU. If the original ECU now works, inspect the ECU connectors for any corrosion or damage which may cause an intermittent condition. If the original problem recurs, reinstall the replacement ECU.

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CODE 55 XX — ONCOMING C3 PRESSURE SWITCH (AFTER SHIFT)

3. If fluid level and main pressure are adequate, connect a pressure gauge to the C3 pressure tap on the transmission and make the shift indicated by operating the vehicle using the Pro-Link® diagnostic tool's CLUTCH TEST MODE.

NOTE: When using the CLUTCH TEST MODE on the Pro-Link®, be sure to use the correct pressure specification. If testing is done with the vehicle stopped, the lockup clutch is not applied, so use the clutch pressure specification for converter operation (see Appendix B; pressure in 3C would be the same as in 2C). If testing is done with the vehicle moving, the lockup clutch may be applied depending upon the vehicle speed and throttle position. Be sure to use the clutch pressure specification for lockup operation (see Appendix B).

4. If, when making the shift and producing the code, the C3 clutch does not show any pressure, drain the fluid and remove the control module (refer to the transmission Service Manual). Disassemble, clean, and inspect the control module for stuck or sticky valves (particularly the "C" solenoid second stage valve and C-1 latch valve). If no obvious problems are found, replace the "C" solenoid and reassemble (see Figure 6–1 for location of the "C" solenoid).
5. If the gauge shows inadequate pressure being sent to the clutch, the clutch is probably worn, has leaking piston or face seals, or the control module gaskets are damaged. See Appendix B for clutch pressure specification. Drain the fluid, remove the control module and inspect the face seals and valve body gaskets. If the face seals or control module gaskets are not damaged, remove and repair the transmission (refer to the transmission Service Manual for repair procedure).
6. If the gauge shows adequate clutch apply pressure, the problem is with the C3 pressure switch or its wires. Check the C3 pressure switch wires in the transmission harness for opens, shorts, or shorts-to-ground (see code 32 XX). If found, isolate and repair the C3 pressure switch circuit. See Appendix E for connector service information.

NOTE: A leakage problem may be temperature related. Be sure to check pressures at the sump temperature where the problem occurred.

7. If the problem is not in the transmission harness, drain the fluid and remove the control module. Check the feedthrough harness assembly for opens. If wiring problems are found, repair as necessary (refer to Appendix E). If no wiring problems are found, replace the C3 pressure switch (see Figure 6–1 for the location). Refer to the transmission Service Manual for proper procedure.
8. If the condition persists, replace the ECU. If replacing the ECU corrects the problem, reinstall the original (bad) ECU to confirm that the problem is in the ECU. If the original ECU now works, inspect the ECU connectors for any corrosion or damage which may cause an intermittent condition. If the original problem recurs, reinstall the replacement ECU.

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CODE 56 XX — RANGE VERIFICATION RATIO TEST (BETWEEN SHIFTS)

Main code 56 indicates a failed range verification speed sensor ratio test. The ratio test occurs after a shift and determines if a clutch has lost torque carrying capability. If output speed is above programmed output speed for a range but the correct speed sensor ratio is not present, the **DO NOT SHIFT** response is commanded and a range which can carry the torque without damage is commanded or attempted. Turbine and output speed sensor readings are used to calculate the actual ratio that is compared to the commanded ratio. **Main code 56 can also be caused by the ECU being calibrated for a close ratio transmission and installed with a wide ratio transmission, or vice versa.**

Main Code	Subcode	Meaning
56	00	Range verification ratio test (between shifts) L
56	11	Range verification ratio test (between shifts) 1
56	22	Range verification ratio test (between shifts) 2
56	33	Range verification ratio test (between shifts) 3
56	44	Range verification ratio test (between shifts) 4
56	55	Range verification ratio test (between shifts) 5
56	66	Range verification ratio test (between shifts) 6
56	77	Range verification ratio test (between shifts) R

A. Active Indicator Clearing Procedure:

- Power down
- Manual — subcodes 11, 44, 66, 77 only

NOTE: When a code 22 16 (output speed fault) is also present, follow the troubleshooting sequence for code 22 16 first. After completing the 22 16 sequence, drive the vehicle to see if a code 56 XX recurs.

NOTE: Before troubleshooting, read Paragraph 6–6. Also, check battery and ECU input voltages.

NOTE: Intermittent connections or lack of battery-direct power and ground connections may cause this and other codes.

B. Troubleshooting:

1. After the transmission is at operating temperature, allow vehicle engine to idle on level ground for 3–4 minutes. Check the transmission fluid level. If improper fluid level is found, correct as necessary. Improper fluid level could be the cause of the code. Not enough or too much fluid may produce inadequate clutch pressure.

2. Connect a pressure gauge and check main pressure. If the pressure is not adequate, the pump is probably worn. See Appendix B for main pressure specifications.

3. If main pressure is adequate, check clutch pressure for the range indicated by following the procedure in Appendix B. The transmission range indicated by the trouble code can be found by referring to the solenoid and clutch chart in Appendix C. Drive the vehicle or use the diagnostic tool's clutch test mode and check clutch pressure.

4. If a clutch is leaking pressure, drain the fluid, remove the control module and check for damaged control module gaskets and stuck or sticking valves (see the transmission Service Manual). Also look for damaged or missing face seals. If no problems are found, replace the solenoids for the clutches used in the range indicated by the code.

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CODE 56 XX — RANGE VERIFICATION RATIO TEST (BETWEEN SHIFTS)

5. If replacing solenoids does not correct the pressure problem, a worn clutch or worn piston seals are probably the source of the pressure leak. Remove the transmission and repair or replace as necessary (refer to the transmission Service Manual).
6. This code requires accurate output and turbine speed readings. If there were no transmission problems detected, use the diagnostic tool and check the speed sensor signals for noise (erratic signals) from low speed to high speed in the range indicated by the code.
7. If a noisy sensor is found, check the resistance of the sensor (300 ± 30 Ohms, refer to the code 22 XX temperature variation chart) and its wiring for opens, shorts, and shorts-to-ground (refer to code 22 XX). Carefully check the terminals in the connectors for corrosion, contamination, or damage. Ensure the wiring to the sensors is a properly twisted wire pair. Replace a speed sensor if its resistance is incorrect. Isolate and repair any wiring problems. (Use a twisted-pair if a new speed sensor circuit is needed — Service Harness Twisted Pair P/N 200153 is available from St. Clair Technologies for this purpose.)
8. If no apparent cause for the code can be found, replace the turbine and output speed sensors (refer to the transmission Service Manual for proper procedure).
9. If the condition persists, replace the ECU. If replacing the ECU corrects the problem, reinstall the original (bad) ECU to confirm that the problem is in the ECU. If the original ECU now works, inspect the ECU connectors for any corrosion or damage which may cause an intermittent condition. If the original problem recurs, reinstall the replacement ECU.

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CODE 57 XX — RANGE VERIFICATION C3 PRESSURE TEST (BETWEEN SHIFTS)

Main code 57 indicates failure of the range verification C3 pressure switch test. This test determines if the C3 pressure switch is closed when it should be open. The test occurs when a range is commanded that does not use the C3 clutch (neutral, 1, 2, 4, and 6). The code is set if the C3 pressure switch is closed when it should be open. If C3 clutch comes on when not needed, three clutches are applied and a transmission tie-up occurs. The ECU will command a range which does use the C3 clutch and activate the **DO NOT SHIFT** response.

Main Code	Subcode	Meaning	Replace Solenoid
57	11	Range verification C3 pressure switch while in 1st	B
57	22	Range verification C3 pressure switch while in 2nd	C
57	44	Range verification C3 pressure switch while in 4th	C
57	66	Range verification C3 pressure switch while in 6th	A
57	88	Range verification C3 pressure switch while in N1	C
57	99	Range verification C3 pressure switch while in N2 or N4	C

A. Active Indicator Clearing Procedure:

- Power down
- Manual

NOTE: Before troubleshooting, read Paragraph 6–6. Also, check battery and ECU input voltages.

NOTE: Intermittent connections or lack of battery-direct power and ground connections may cause this and other codes.

B. Troubleshooting:

1. Disconnect the harness from the transmission. Check the C3 pressure switch circuit at the feedthrough harness connector for continuity (refer to code 32 XX).
2. Continuity at the feedthrough harness connector indicates the C3 pressure switch is closed or the C3 circuit is shorted together. Drain the fluid, remove the control module (refer to the transmission Service Manual), and isolate the short. The fault is either a shorted feedthrough harness or stuck C3 pressure switch. Repair or replace as necessary.
3. If there is no continuity at the transmission, disconnect the transmission harness connector from the ECU and check the C3 pressure switch wires in the transmission harness for shorts. Use the system wiring diagram to identify wires which are connected. If a shorted C3 pressure switch circuit in the external harness is found, isolate and repair.
4. If the C3 pressure switch or circuit is not shorted either in the transmission or the external harness, connect a pressure gauge in the C3 pressure tap (refer to Appendix B for pressure tap location). Drive the vehicle in the range indicated by the code or use the diagnostic tool's clutch test mode to attain that range.
5. If the gauge shows C3 pressure is present in the range indicated by the subcode, drain the fluid and remove the control module (refer to the transmission Service Manual). Check for damaged valve body gaskets or stuck or sticking valves. Repair or replace as necessary. If no obvious defects are found, replace the listed solenoid.
6. If the gauge shows C3 pressure is not present in the range indicated by the subcode, drain the fluid and remove the control module (refer to the transmission Service Manual). Replace the C3 pressure switch.
7. If the condition persists, replace the ECU. If replacing the ECU corrects the problem, reinstall the original (bad) ECU to confirm that the problem is in the ECU. If the original ECU now works, inspect the ECU connectors for any corrosion or damage which may cause an intermittent condition. If the original problem reoccurs, reinstall the replacement ECU.

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CODE 61 XX — RETARDER OIL TEMPERATURE HOT

Main code 61 indicates the ECU has detected a hot fluid condition in the output retarder. Table 6–7 shows what actions are taken by the ECU at elevated retarder temperatures.

Possible causes (but not all causes) for hot fluid are:

1. Prolonged retarder use.
2. TID 2 transmission with ECU prior to Version 8A.
3. Low fluid level.
4. High fluid level.
5. A retarder apply system that allows the throttle and retarder to be applied simultaneously.
6. Cooler inadequately sized for retarder.

If the validity of the hot fluid diagnosis is in question, temperature can be checked by using a temperature gauge at the retarder-out port or by reading retarder temperature with the Pro-Link® diagnostic tool. Another method of checking retarder temperature is to remove the "T" connector at the ECU and measure resistance (Ohms) between terminals T28 and T25. Compare the resistance value to the value in Figure 6–21 to see if the result is within the expected operating range. For TID 2 thermistors, see Appendix Q for resistance versus temperature table.

Table 6–7. Transmission Retarder Operation as a Function of Temperature

Description	Version 8*
MD and HD Retarder, Light On MD and HD Retarder, Light Off	166˚C (330˚F) 159˚C (318˚F)
MD and HD Retarder, Set Hot Code (61 00) MD and HD Retarder, Clear Active Indicator	168˚C (335˚F) 162˚C (323˚F)
MD and HD Retarder, Capacity Reduction	149–166˚C (300–330˚F)
MD and HD Retarder, Reduced Capacity (retarder light begins flashing) MD and HD Retarder, Reduced Capacity (retarder light stops flashing)	146˚C (295˚F) 143˚C (289˚F)
MD and HD Retarder, Auto Preselect On (after 12 seconds of retarder apply at retarder temperature shown — range to be preselected is a customer calibratable value). Auto Preselect remains on until retarder is deactivated.	143˚C (289˚F)
MD and HD Retarder, Auto Preselect On (after 12 seconds of retarder apply and engine water temperature shown (actual value is a customer calibratable value which must be approved by the Allison calibration committee)). Auto Preselect remains on until retarder is deactivated.	82–124˚C (180–255˚F)
MD and HD Retarder, Flashing Retarder Temperature Light Begins (shows that preselect downshifts are invoked) MD and HD Retarder, Flashing Retarder Temperature Light Stops (closed throttle downshifts not preselected)	140˚C (284˚F) 137˚C (279˚F)
* Calibration values are subject to change.	

NOTE: Use the Pro-Link® diagnostic tool to determine the software version being used.

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CODE 61 XX — RETARDER OIL TEMPERATURE HOT

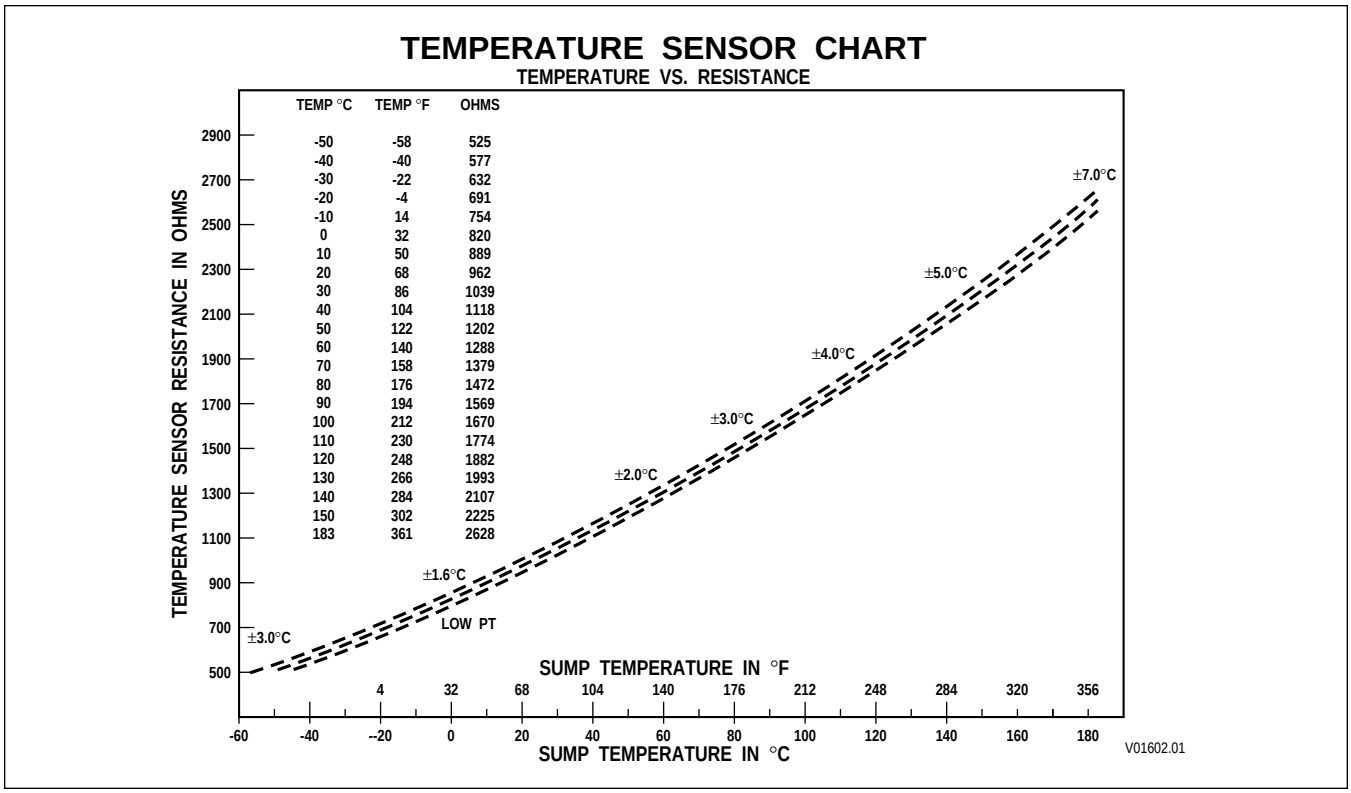

Figure 6–21. Temperature Sensor Chart (Sensors Prior to TID 2)

The retarder temperature sensor is located externally on the HD retarder housing and under the plate on the MD retarder housing. When retarder temperature reaches a preset level, a retarder hot temperature light is illuminated.

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DIAGNOSTIC CODES

NOTES

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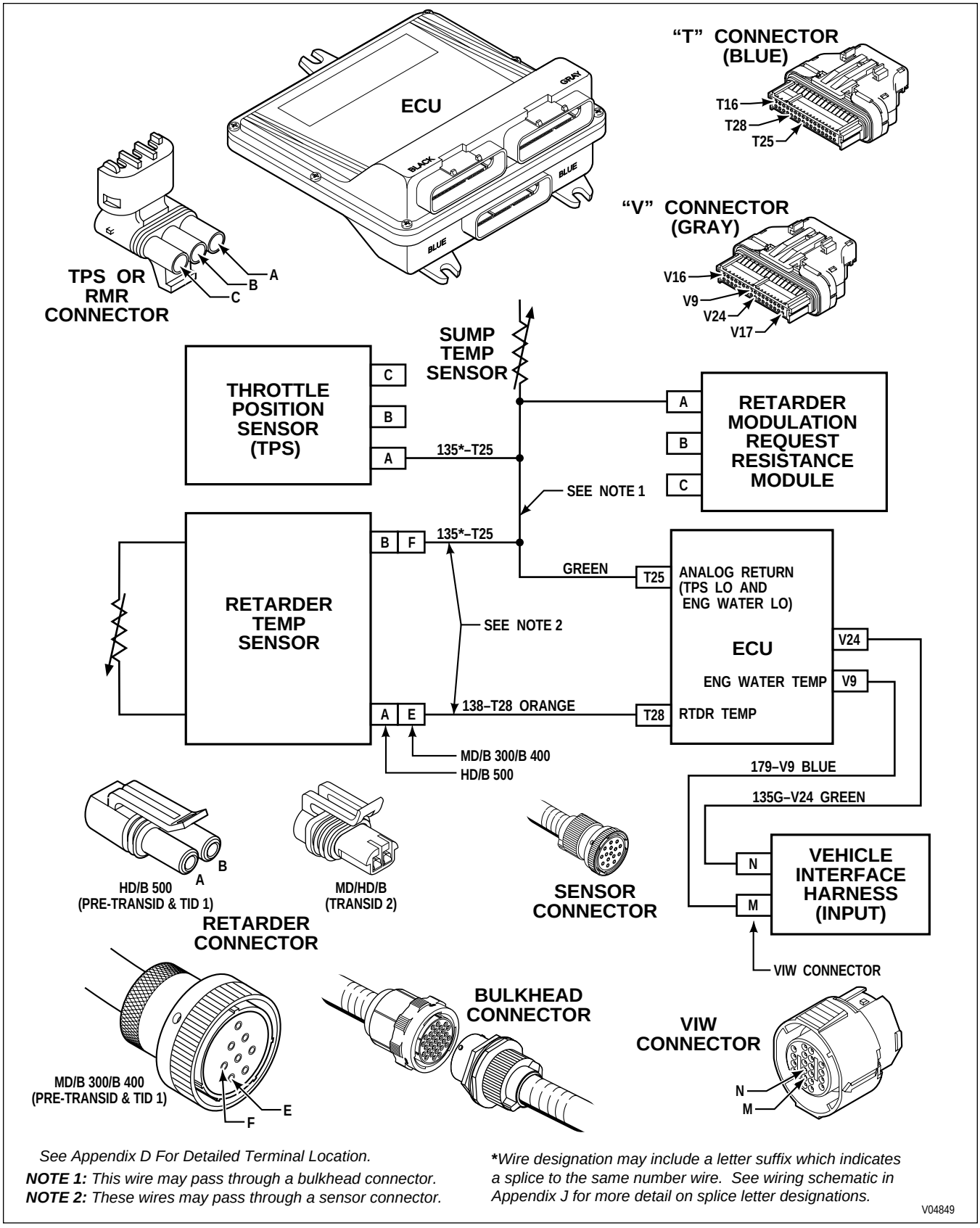
CODE 62 XX — RETARDER TEMPERATURE SENSOR



See Appendix D For Detailed Terminal Location.

NOTE 1: *This wire may pass through a bulkhead connector.*

NOTE 2: *These wires may pass through a sensor connector.*

****Wire designation may include a letter suffix which indicates a splice to the same number wire. See wiring schematic in Appendix J for more detail on splice letter designations.*

V04849

Figure 6–22. Code 62 Schematic Drawing

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CODE 62 XX — RETARDER TEMPERATURE SENSOR *(Figure 6–22)*

NOTE: When an ECU with a version 8 calibration is used with a TransID 2 transmission, 62 XX codes are set because the ECU does not have the proper calibrations for the TID 2 thermistors. The ECU calibration must be updated to version 8A.

TransID (TID) information related to thermistor changes is in Paragraph 1–10 and detailed troubleshooting information for TID 2 thermistors is shown in Appendix Q.

Main code 62 indicates the retarder temperature sensor or engine coolant sensor or circuitry is providing a signal outside the usable range of the ECU. Main code 62 can be the result of a hardware failure or an actual extremely high or low temperature condition.

Main Code	Subcode	Meaning
62	12	Retarder temperature sensor failed low (–45˚C; –49˚F)
62	23	Retarder temperature sensor failed high (178˚C; 352˚F)
62	32	Engine coolant sensor failed low
62	33	Engine coolant sensor failed high

A. Active Indicator Clearing Procedure:

- Power down
- Manual
- Self-clearing

NOTE: Before troubleshooting, read Paragraph 6–6. Also, check the transmission fluid level.

B. Troubleshooting:

NOTE: A combination of codes 62 23, 33 23, and 21 23 indicates a problem with one of the branches of the common ground wire (wire 135) between the throttle and temperature sensors.

NOTE: Code 62 12 can be caused when the +5V power line (wire 124) is shorted to ground or open. Wire 124 also provides power for the OLS, TPS, RMR, sump temperature sensor, and shift selectors and is present in all three ECU connectors.

1. Check the retarder temperature or engine coolant temperature with a DDR. If a DDR is not available, use the shift selector display to determine if the code is active (cycle the ignition on and off at least once since the code was logged to clear the code's active indicator). If a condition that is unreasonable for the current conditions exists, go to Step (3).

2. If Step (1) reveals that the extreme temperature indication is no longer present, the temperature limit could have been reached due to operational or ambient temperature extremes. Proceed cautiously as it is unlikely there is a sensor hardware fault.

3. Remove the connector at the ECU. Measure resistance between harness terminals T25 and T28 or between harness terminals V9 and V24. Compare resistance value to chart (see Figure 6–21) to see if reading is within expected operating range.

4. Disconnect the sensor connector and remove the connector at the ECU. Check the sensor and the ECU terminals for dirt, corrosion, and damage. Clean or replace as necessary (refer to Appendix E).

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CODE 62 XX — RETARDER TEMPERATURE SENSOR *(Figure 6–22)*

5. Check the temperature sensor circuit for opens (code 62 23 or 62 33), shorts between wires, and short-to-ground (code 62 12 or 62 32). If a wiring problem is found, isolate and repair. See Appendix E for connector service information.

6. If no wiring problem is found, replace the retarder or engine coolant temperature sensor (refer to transmission or vehicle Service Manual for proper procedure).

7. If the problem recurs, use a spare wire, if available, or provide a new wire (St. Clair P/N 200153 may be used for this purpose) for the retarder or engine coolant temperature circuit. See Appendix E for connector service information.

8. If the condition continues to recur, replace the ECU. If replacing the ECU corrects the problem, reinstall the original (bad) ECU to confirm that the problem is in the ECU. If the original ECU now works, inspect the ECU connectors for any corrosion or damage which may cause an intermittent condition. If the original problem recurs, reinstall the replacement ECU.

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CODE 63 XX — INPUT FUNCTION FAULT

Code 63 00 is set when one of the two inputs for an input function Auxiliary Function Range Inhibit (Special) is in a different state (on or off) from the other input for longer than two minutes. When this condition is detected, code 63 00 is set. The transmission will not be inhibited in shifting from neutral to range.

Main Code	Subcode	Meaning
63	00	Auxiliary Function Range Inhibit (Special) inputs states are different
63	26	Kickdown input failed on (software version 8 only)
63	40	Service brake status failed on
63	41	Pump/pack and a neutral general purpose input

Subcode 26 is set when this function (Kickdown) is selected by calibration, the calibration designated input is active for a calibration time, and throttle position is less than the calibration value defined. The kickdown shift schedule is inhibited when subcode 26 is active. The service indicator will be turned on if it is selected by the calibration. The kickdown shift schedule is not inhibited, the code is cleared and the service indicator will be turned off if the kickdown input remains inactive for the calibration time period while throttle position is less than the calibration value. This diagnostic and code has been removed from software version 8A.

Subcode 40 is set when this function (Service Brake Status) is selected by calibration, and the specified input remains active for a calibration number of consecutive acceleration events. The service indicator will be turned on if it is selected by the calibration. A vehicle acceleration event is defined as an increase in transmission output speed from 1 rpm to a calibration value. The operation of the Automatic Neutral For Refuse Packer will be limited when this code is active. The active inhibit for this code is self-cleared and the service indicator will be turned off if the designated input for the Service Brake Status function becomes inactive.

Subcode 41 is set when the states of the calibration inputs are different for a calibration number of consecutive updates. The inputs in this case are Pump/Pack Enable and Automatic Neutral For Refuse Packer. The service display will also be turned ON if selected by calibration.

A. Active Indicator Clearing Procedure:

- Power down
- Manual — subcodes 26, 40, and 41
- Self-clearing — subcodes 26 and 40

B. Troubleshooting:

1. Code 63 00

   a. Use the DDR to identify the two input wires programmed with Auxiliary Function Range Inhibit (Special). Inspect the input wiring, connectors, and switches to determine why the input states are different. Correct any problems which are found.

   b. If the condition persists, replace the ECU. If replacing the ECU corrects the problem, reinstall the original (bad) ECU to confirm that the problem is in the ECU. If the original ECU now works, inspect the ECU connectors for any corrosion or damage which may cause an intermittent condition. If the original problem recurs, reinstall the replacement ECU.

2. Code 63 26

   Inspect kickdown switch circuit.

3. Code 63 40

   Inspect service brake status switch circuit.

4. Use the DDR to identify the two wires associated with the input functions for Pump/Pack Enable and Automatic Neutral For Refuse Packer. Inspect the input wiring, connectors, and switches to determine why the input states are different. Correct problems which are found. There is further information on these input functions on pages P–25, P–26, P–29, and P–30.

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CODE 64 XX — RETARDER MODULATION REQUEST DEVICE FAULT

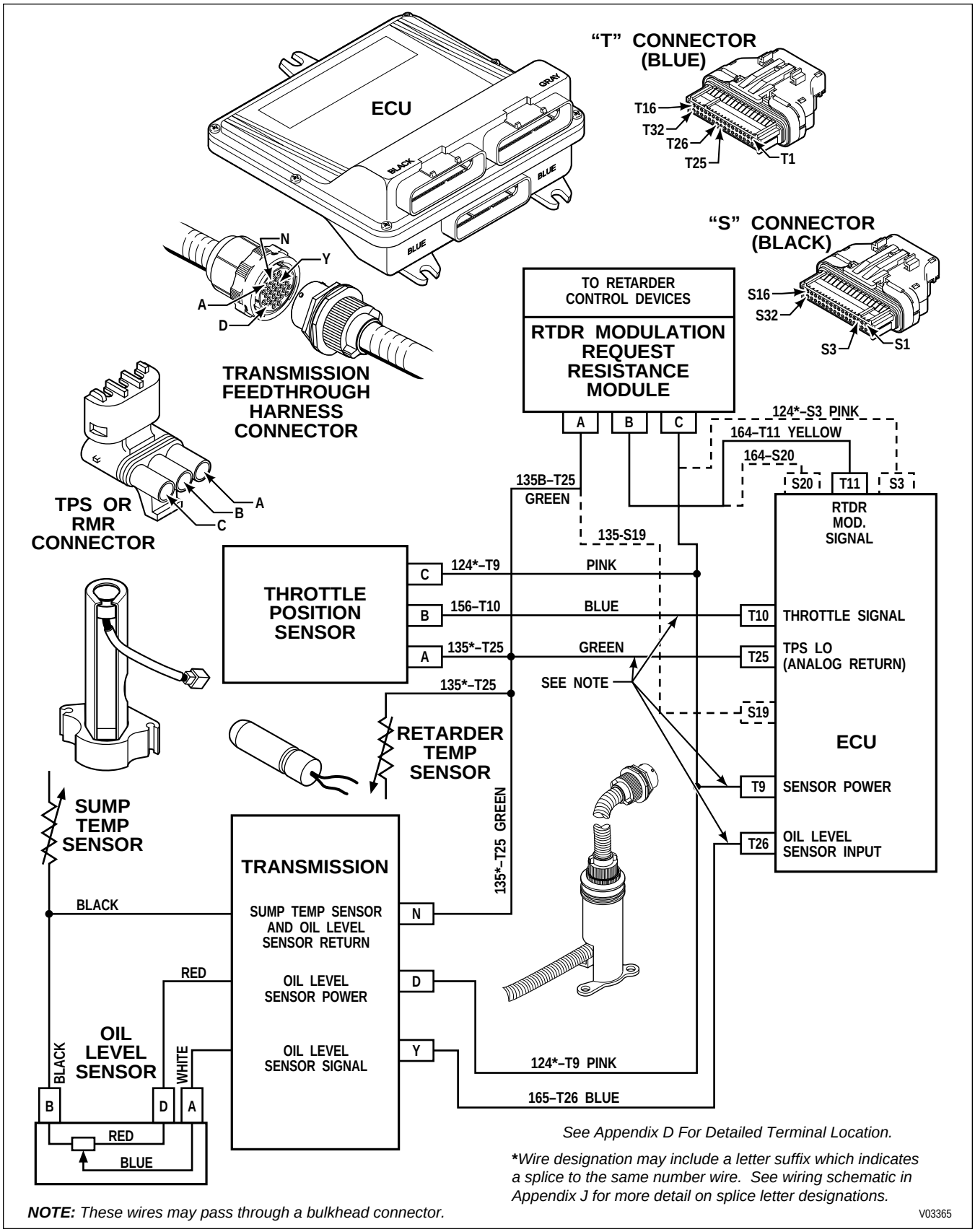

Figure 6–23. Code 64 Schematic Drawing

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CODE 64 XX — RETARDER MODULATION REQUEST DEVICE FAULT *(Figure 6–23)*

Main code 64 indicates the ECU has detected a voltage signal from the retarder modulation request sensor (consisting of a module and a retarder control device) in either the high or low error zone. These codes can be caused by faulty wiring, faulty connections to the resistance module or retarder control device, a faulty resistance module, a faulty retarder control device, or a faulty ECU. Power wire 124 and ground wire 135 for the retarder modulation request sensor are a common power and ground with the TPS and OLS devices. A short-to-ground on the common power wire causes a "sensor failed low" code for the other devices (codes 21 12, and 14 12). An open or a short-to-ground on retarder modulation request sensor signal wire 164 results in a code 64 12 only.

A TPS failure changes the status of the output retarder. The retarder is enabled by the Service Brake Status (wire 137) when a TPS code is active (21 XX). If a code 63 40 is also active, the Service Brake Status (wire 137) is ignored and the retarder will not work. Retarder response problems may not cause retarder modulation request sensor diagnostic codes. If response questions occur, test the retarder control devices for proper voltage signals at each of the percentage of retarder application settings. Table 6–8 contains the voltage measurements for each device's application percentage and resistances measured across terminals A and C of the retarder request sensor. **Use test wiring harness J 41339 when conducting voltage tests.**

Main Code	Subcode	Meaning
64	12	Retarder Modulation Request sensor failed Low (14 counts and below)
64	23	Retarder Modulation Request sensor failed High (232 counts and above)

A. Active Indicator Clearing Procedure:

- Power down

NOTE: ***Before troubleshooting, read Paragraph 6–6. Also, check battery and ECU input voltages.***

NOTE: ***Intermittent connections or lack of battery-direct power and ground connections can cause this and other electronic control codes.***

B. Troubleshooting:

NOTE: ***Code 64 12 can be caused when the +5V power line (wire 124) is shorted to ground or open. Wire 124 also provides power for the OLS, TPS, sump temperature sensor, retarder temperature sensor, and shift selectors and is present in all three ECU connectors..***

1. Plug in the DDR and set to read retarder counts and percent (0 percent will be between 15 and 60 counts and 100 percent will be between 150 and 233 counts). A retarder request sensor failed high code can be caused by a short-to-battery of either signal wire 164 or power wire 124 or an open on ground wire 135. An open in the portion of the ground circuit common to the TPS and OLS devices will also result in a code 21 23 and a high fluid level reading. A retarder request sensor failed low code can be caused by an open or short-to-ground on either signal wire 164 or power wire 124.
2. Isolate and repair any wiring problems found. See Appendix E for connector service information.
3. If no wiring or connector problems are found, check the retarder request sensor voltages for each position on each of the retarder request sensors used on the vehicle. If two resistance modules are used, disconnect one of them when measuring voltage signals from the other. If problems are found, replace the resistance modules or retarder control devices.
4. If the problem persists, replace the ECU. If replacing the ECU corrects the problem, reinstall the original (bad) ECU to confirm that the problem is in the ECU. If the original ECU now works, inspect the ECU connectors for any corrosion or damage which may cause an intermittent condition. If the original problem recurs, reinstall the replacement ECU.

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CODE 64 XX — RETARDER MODULATION REQUEST DEVICE FAULT

Table 6–7. RMR Device Resistance Checks

	Resistance Check in Resistance Module*		Voltage Signal **		Wiring to Control Device
Description	**Terminals**	**Resistance ± 5%**	**% Retarder Application**	**Voltage ± 0.2 v**	**Device Terminal**
Auto Full On	A to C	12K	100	3.6	No connections
Pressure Switch					
Full On	A to C	32K	0	1.1	A
High			100	3.6	B
3-Step E-10R Bendix	A to C	32K	0	1.1	A
Pedal			32	1.9	B
			58	2.8	C
			100	3.6	D
6-Step Hand Lever —	A to C	32K			
Off			0	1.1	+
Position 1			14	1.5	1
Position 2 Position			28	1.9	2
3 Position 4			45	2.3	3
Position 5 Position			65	2.8	4
6			82	3.2	5
			100	3.6	6
Auto ½ On	A to C	12K	50	2.4	No connections
3 Pressure Switches —	A to C	32K	0	1.1	
Low			32	1.9	A
					B
Medium			68	2.8	A
					B
High			100	3.6	A
					B
Auto ⅓ On	A to C	21.4K			
2 Pressure Switches					
Auto			32	1.9	A
Medium			68	2.8	B
High			100	3.6	A
					B
Dedicated Pedal	No Checks	Interface not	0	0.7 – 1.2	A
		a resistance	100	3.4 – 3.5	B
		module			C

* Resistance module must be disconnected from the wiring harness and retarder control devices

** These voltages must be measured between terminals A and B.

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CODE 65 XX — ENGINE RATING HIGH

Main code 65 indicates the vehicle's engine horsepower/governor speed rating is too high. This code is set only when computer-controlled engines are used. Code 65 means the engine computer is able to tell the transmission, the engine horsepower and/or governor speed is beyond the transmission rating or does not match the transmission shift calibration.

When a code 65 is set, no shifts out of neutral are allowed. It is possible the transmission calibration selected for this engine is improper. Contact local Allison Transmission Division distributor for assistance in selecting a proper calibration.

If the engine is beyond transmission ratings, contact the vehicle OEM for correction. The local ATD regional representative may also be contacted for assistance.

This code cannot be cleared until the proper level engine is installed or the transmission is properly calibrated.

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CODE 66 XX — SCI (SERIAL COMMUNICATION INTERFACE) FAULT

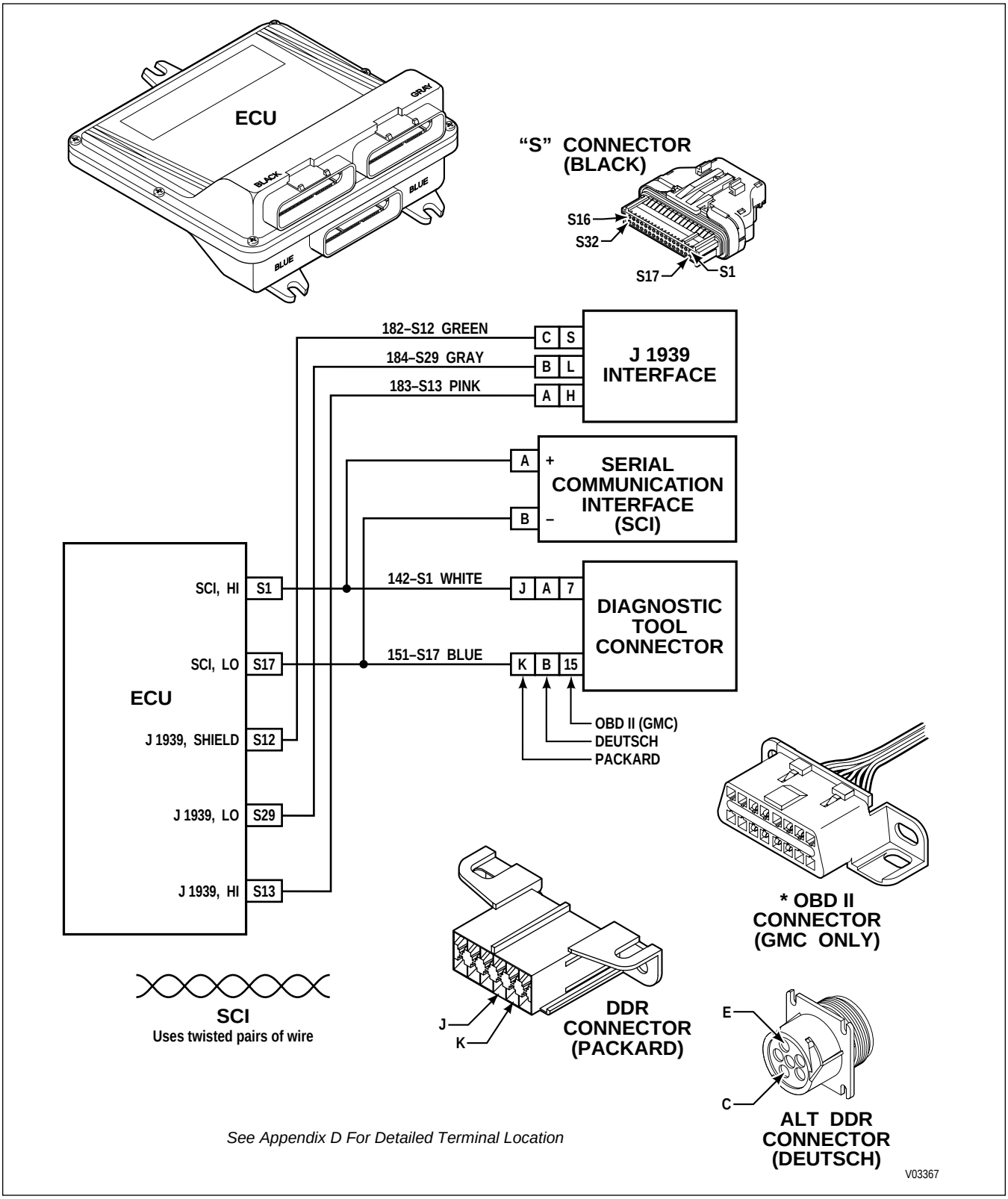

Figure 6–24. Code 66 Schematic Drawing

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CODE 66 XX — SCI (SERIAL COMMUNICATION INTERFACE) FAULT *(Figure 6–24)*

The datalink for throttle sensor or engine coolant temperature must have been recognized by autodetect or manually selected using the Pro-Link® (see WTEC III Pro-Link® Manual) before these codes can be logged. See Paragraph 1–9 for further information.

Main code 66 indicates the ECU is expecting to get its throttle position signal or engine coolant signal across a serial communication interface from a computer-controlled engine. Either the engine computer is not sending the throttle or engine coolant information or the wiring between the engine and transmission computers has failed.

Code 66 00 can occur when the transmission ECU remains powered when the engine ECM is powered down. The transmission sees this as a communication link failure.

Main Code	Subcode	Meaning
66	00	SCI (Serial Communication Interface) fault
66	11	SCI Engine coolant source fault

A. Active Indicator Clearing Procedure:

- Power down
- Manual
- Self-clearing

B. Troubleshooting:

1. Check for a throttle signal or engine coolant signal from the engine to the transmission, an engine computer malfunction, an engine throttle fault, or an engine coolant fault.

NOTE: Throttle position data sent from a computer-controlled engine may register a low number of counts on the DDR, but the counts will not change as throttle percentage is changed.

2. Check wires 142 and 151 between the engine and transmission ECU for an open or short. Check that all connectors are clean and tightly connected.

NOTE: These codes can also be set if J1939 communications fail. Check wires 183-S13, 184-S29, and 182-S12 for opens or shorts.

3. Use the Pro-Link® to see if the ECU is receiving power when it should not.

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CODE 69 XX — ECU MALFUNCTION

Main code 69 indicates a problem which has been identified as being from within the ECU.

A “cateye” display or a blank display may occur with subcode 33.

Main Code	Subcode	Meaning
69	27	ECU, Inoperative A-Hi switch
69	28	ECU, Inoperative F-Hi switch
69	29	ECU, Inoperative N-Hi and H-Hi switch
69	33	ECU, computer operating properly timeout
69	34	ECU, write timeout
69	35	ECU, checksum
69	36	ECU, RAM self-check failure
69	39	Communication chip addressing error
69	41	ECU, I/O ASIC addressing test
69	42	SPI output failure
69	43	SPI input failure

A. Active Indicator Clearing Procedure:

- Power down
- Manual — except subcodes 33, 35, 36, 41, 42, and 43
- Self-clearing — subcode 42 and subcodes 33, 35, 36, and 41; after an ECU reset

NOTE: Subcode 34 cannot be cleared.

B. Troubleshooting:

1. For subcodes 27, 28, and 29, check for shorts to battery before replacing the ECU. Follow the troubleshooting steps for code 42 XX for checking shorts to battery. If no shorts are found, replace the ECU. If replacing the ECU corrects the problem, reinstall the original (bad) ECU to confirm that the problem is in the ECU. If the problem recurs, reinstall the new ECU to complete the repair.
2. For all other subcodes, replace the ECU.

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SECTION 7 — INPUT AND OUTPUT FUNCTIONS

7–1. INPUT FUNCTIONS

Input functions are signals sent into the ECU that prompt the ECU to take action. Input functions are activated and deactivated by switched ignition power or ground (wire 161B) to the ECU (wired through the VIW), or through the **MODE** button on the shift selector. The following input functions can be activated using the **MODE** button:

- Secondary Shift Schedule
- D1 Selection (Available With Pushbutton Selector Only)
- PTO Enable

The wiring schematic in Appendix J illustrates installation requirements for input functions and designates specific wire numbers in the transmission control system to be used for the activation of these input functions. The wiring schematic in Appendix J should be used for reference only. Ask the vehicle manufacturer which input functions are programmed, which wires are used, and whether voltage input was positive or ground. Wiring schematics for input and output functions are shown in Appendix P. The Pro-Link® 9000 can also be utilized to determine which wire was programmed for a particular input function and the wiring schematic can be consulted to find out if input to the ECU is + or – voltage. Refer to the Pro-Link® 9000 diagnostic tool operator's manual for further information regarding special input functions and other inhibits.

NOTE: ***The schematic in Appendix J shows the intended use of the control features specified. These features have only been validated in the configuration shown. ANY USE OF THESE FEATURES WHICH DIFFERS FROM WHAT IS SHOWN IS NOT THE RESPONSIBILITY OF ALLISON TRANSMISSION.***

CAUTION:	Never use chassis ground as an **INPUT FUNCTION** ground. Chassis ground can carry voltage potential of 1 or 2 volts above battery ground. This non-approved input will "confuse" the ECU and cause erroneous input results. Be sure to use wire 161 which is signal ground.

Activating an input function can inhibit transmission operation in the same manner as diagnostic code. Use the Pro-Link® 9000 to verify an active input function or a diagnostic code inhibit. Refer to the Pro-Link® 9000 Diagnostic Tool Operator's Manual for further information regarding special input functions and other inhibits. Also, for more detailed information on input functions, refer to the Sales Tech Data Book "WTEC III Controls and General Information."

The maximum number of input and output functions which may be used in any installation depends upon the transmission model and its features. Refer to Table 7–1.

Table 7–1. Input/Output Function Availability

Transmission Model	Auxiliary Transmission Controls Functions	Number Of Input Functions	Number Of Output Functions
6-Speed Models and HD 4070	Retarder	10 + Mode Button	6
MD 3070 Models	Transfer Case	11 + Mode Button	6

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INPUT AND OUTPUT FUNCTIONS

The following input functions inhibit direction change shifts (forward to reverse or reverse to forward):

- Auxiliary Function Range Inhibit (standard)
- Auxiliary Function Range Inhibit (special)
- Quick to Neutral, Pump Option
- Automatic Neutral for PTO
- Automatic Neutral at Stop
- Reverse Enable
- Automatic Neutral for Refuse Packers
- Automatic Neutral for Refuse Packers with Service Brake Input

The following input functions lock the transmission in fourth range:

- Fire Truck Pump Mode
- Fourth Lockup Pump Mode

The following input functions preselect a lower range:

- Engine Brake and Preselect Request (standard)
- Engine Brake and Preselect Request (special)

The following input functions inhibit upshifts:

- D1 Selection
- Auxiliary Hold

The following input functions inhibit lockup shifts:

- Manual Lockup
- Anti-lock Brake Response

The following input function inhibits range and lockup shifts at high horsepower:

- Shift Enable/Shift in Process (Oil Field Application)

The following functions are general restrictions to normal operation:

- High Input Speed causes neutral to range inhibit
- Medium Cold Oil causes operation confined to **R** (Reverse), **N** (Neutral), and **2**nd range start
- Hot Oil restricts operation to **4**th range maximum (except emergency applications)
- Two Speed Axle Enable permits change only at low output speed and throttle
- Special Pattern Logic monitors **N** or **D** or **N** to **R** shifts. If engine throttle or output speed is too high, the transmission remains in **N**.
- Wheel Lock disengages the lockup clutch and inhibits forward range downshifts and shifts to reverse
- Anti-lock Brake Response deactivates the retarder and disengages the lockup clutch
- High Throttle during **N** (Neutral) to any range shift causes a revised clutch pressure apply rate and turns off shift adaptive
- Power loss to the ECU restricts operation to certain ranges (for exact range see code 13 XX in Section 6)

The following input function limits operation to **1**st Range and **N** (Neutral):

- Refuse Vehicle Step Switch

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INPUT AND OUTPUT FUNCTIONS

7–2. OUTPUT FUNCTIONS

Output functions are signals sent out by the ECU that activate or control devices or mechanisms. These control devices or mechanisms are controlled by relays or direct connection signals from the ECU.

Many input and output functions are closely related. For instance, the PTO Enable option (input function) also includes PTO Output wiring information. When searching for output function information, be sure to check any related input function information references.

The wiring schematics in Appendix J and Appendix P illustrate installation requirements for output functions as well as input functions and designate specific wire numbers in the transmission control system to be used for the activation of these output functions. The wiring schematics in Appendix J should be used for reference only. Ask the vehicle manufacturer which specific output functions are programmed and which wires are used. Output function polarity is not significant when an Allison-supplied VIM is used. The Pro-Link® 9000 can also be utilized to determine which wire was programmed for a particular output function. For more detailed information on output functions, refer to the Sales Tech Data Book “WTEC III Controls and General Information” (the schematics in Appendix P are from the Sales Tech Data Book).

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INPUT AND OUTPUT FUNCTIONS

NOTES

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Click Here to test Named Destination " 2973 TCP10" (Within this document).

SECTION 8 — GENERAL TROUBLESHOOTING OF PERFORMANCE COMPLAINTS

IMPORTANT:

Make the following general checks before beginning specific troubleshooting, removing the transmission, or removing attached components.

- Are there active diagnostic codes?
- Is the lever shift selector lever in **N** (Neutral) to allow starting the engine?
- Is the battery properly connected and charged?
- Is isolated battery properly connected (if used)?
- Have the items on Pages 6–15 and 6–16 in Paragraph 6–5 been checked?
- Is the fluid level correct?
- Is voltage to the ECU correct?
- Is the engine properly tuned?
- Is fuel flow to the engine correct?
- Are wheel chocks in place?
- Is air flow to the cooler and radiator unrestricted?
- Is the driveline properly connected?
- Are there signs of fluid leakage under the vehicle? What is the origination point?
- Are hydraulic connections correctly made and not leaking?
- Is vehicle acceleration from a stop changed?
- Are electrical connections correctly made?
- Are there any other obvious vehicle or transmission problems?

After making these general checks use the various sections of this manual to isolate the listed problems. The following charts address specific vehicle complaints. Some complaints involve diagnostic codes, so all troubleshooting checks should involve checking the system for diagnostic codes.

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GENERAL TROUBLESHOOTING OF PERFORMANCE COMPLAINTS

Table 8–1. Troubleshooting Performance Complaints

Problem	Probable Cause	Suggested Remedy
SHIFT SELECTOR DISPLAYS "CATEYE" AND VEHICLE IS NOT OPERABLE	No communication between the ECU and a remote shift selector	Refer to code 23 XX in Troubleshooting Procedure
SHIFT SELECTOR DISPLAY IS BLANK	VIM Fuse is blown	Replace VIM fuse
	Fuse blown in OEM substitute	Replace fuse for VIM
	Failed SDL (Serial Data Link)	Should change to "cateye" within 12 seconds (see Code 23 16)
SHIFT SELECTOR NOT LIGHTED AT NIGHT (WHEN HEADLIGHTS ARE ON)	Wires 186, 187, or 188 are not connected or are improperly connected.	Find wires 186, 187, and 188 and connect them or install wires, if necessary.
VEHICLE WILL NOT START (ENGINE WILL NOT CRANK)	Lever shift selector not in neutral	Select **N** (Neutral) and restart
	Dead battery	Recharge battery
	Disconnected battery	Reconnect battery
	Faulty starter circuit	Repair vehicle starter circuit
	Faulty neutral start relay	Replace neutral start relay
	Faulty wiring in neutral start circuit	Repair wiring
	Voltage to ECU too low	Check battery and charging system voltage
	Faulty ignition wire (146)	Repair wire 146
	Faulty lever shift selector	Replace lever shift selector
	Lack of battery voltage on Circuit 123 from ECU when in neutral	Repair Circuit 123 or replace ECU
All display segments of display lighted	No calibration installed in ECU Voltage to ECU too low	Load Calibration Check battery and charging system voltage
CHECK TRANS LIGHT WILL NOT GO OUT AT START-UP		
A. Vehicle Drives Normally	Faulty **CHECK TRANS** light, relay, or circuit.	Replace relay or repair circuit
	An LED rather than a lamp is installed for the **CHECK TRANS** light and the LED is partially lighted from leakage current	Install a lamp rather than an LED for the **CHECK TRANS** light

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GENERAL TROUBLESHOOTING OF PERFORMANCE COMPLAINTS

Table 8–1. Troubleshooting Performance Complaints *(cont'd)*

Problem	Probable Cause	Suggested Remedy
B. Vehicle Does Not Drive	Faulty ECU	Replace the ECU
	Engine does not start	Repair engine starting system
	Faulty harness	Repair harness (See Section 4 and Appendix E)
	Faulty interface wiring to vehicle electrical system	Repair wiring (See Appendix E)
	Faulty ECU	Replace the ECU
CHECK TRANS LIGHT FLASHES INTERMITTENTLY	Intermittent power to ECU	Check input power to the ECU and correct if necessary
	Loose wiring to **CHECK TRANS** light	Repair wiring
	Faulty or incorrect ground wire attachment	Repair ground circuit
	Intermittent opening in Circuit 115	Repair Circuit 115
NO **CHECK TRANS** LIGHT AT IGNITION	Faulty light bulb or socket	Replace light bulb or socket
	Incorrect wiring to and from **CHECK TRANS** light bulb	Repair wiring (See Appendix E)
	Faulty wiring harness	Check wiring between ECU and **CHECK TRANS** light, and repair where necessary (See Appendix E)
	Circuit 115 open	Repair Circuit 115
	Faulty ECU	Replace ECU
ECU WILL NOT TURN OFF WHEN IGNITION SWITCH OFF	Faulty ignition switch	Replace ignition switch
	Externally-generated speed sensor signal(s) (refer to Appendix L for detailed inspection)	Find source of false speed sensor signal(s) and correct problem

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GENERAL TROUBLESHOOTING OF PERFORMANCE COMPLAINTS

Table 8–1. Troubleshooting Performance Complaints *(cont'd)*

Problem	Probable Cause	Suggested Remedy
TRANSMISSION WILL NOT SHIFT TO FORWARD OR REVERSE (STAYS IN NEUTRAL)	Engine rpm too high	Reduce engine rpm (it may be necessary to reselect **N**eutral also, and then **D** or **R**)
	Low fluid level	Add fluid to proper level (refer to transmission Mechanic's Tips for proper dipstick calibration)
	Throttle position sensor or linkage is not functioning properly	Refer to throttle position sensor for correct set-up (Appendix F)
	Voltage to ECU too low	Check vehicle battery and charging system
	Shift selector is not functioning properly	Replace shift selector
	Disconnected or dirty connectors	Perform connector checkout (Appendix E)
	Faulty wiring harnesses	Repair harness (Appendix E)
	Speed sensor(s) not functioning properly	Repair or replace speed sensor(s) or circuitry (see transmission Service Manual and Appendix E)
	Faulty ECU	Replace the ECU
	Input function wire open and auxiliary function range inhibit in the calibration	Check input function programming with Pro-Link®. Correct wiring or switch problem which does not allow input function wire to be grounded.
	Auxiliary Function Range Inhibit-Standard — hooked up to brake pressure	Apply brakes with high force
TRANSMISSION WILL NOT STAY IN FORWARD OR REVERSE	Auto-neutral or quick-to-neutral circuit (input function) faulty	Repair quick-to-neutral circuit
	Leaking at solenoid assembly	Rebuild solenoid assembly (see transmission Service Manual)
	Faulty solenoid — leaking	Replace solenoid (see transmission Service Manual)

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GENERAL TROUBLESHOOTING OF PERFORMANCE COMPLAINTS

Table 8–1. Troubleshooting Performance Complaints *(cont'd)*

Problem	Probable Cause	Suggested Remedy
TRANSMISSION WILL NOT MAKE A SPECIFIC SHIFT	Low engine power	Correct engine problem, see Engine Service Manual
	Incorrect fluid level	Correct fluid level (refer to transmission Mechanic's Tips for proper dipstick calibration)
	Extreme fluid temperature	Inspect cooling system and fluid level
	Faulty speed sensor/circuit	Repair circuit or replace speed sensor(s) (see code 22 XX)
	Faulty temperature sensor/circuit	Check for temperature reading which inhibits shifts
	Incorrect calibration	Install proper calibration
	Faulty shift selector	Replace shift selector
	Hydraulic problem	Refer to Range Clutch Troubleshooting section
	Faulty ECU	Replace ECU
TRANSMISSION DOES NOT SHIFT PROPERLY (ROUGH SHIFTS, SHIFTS OCCURRING AT TOO LOW OR TOO HIGH SPEED)	Engine idle speed too fast (neutral to range shift)	Adjust engine idle speed (refer to Vehicle Service Manual)
	Faulty throttle sensor/circuit	Refer to throttle sensor section for installation and operation information (Appendix F)
	ECU input voltage low	Check power, ground, charging system, and battery function
	Incorrect shift calibration for vehicle	Install correct calibration
	Instrument panel tachometer incorrect	Repair or replace tachometer
	Incorrectly calibrated electronic speedometer	Calibrate electronic speedometer
	Faulty speed sensor/circuit	Repair circuit or replace speed sensor (see code 22 XX)
	Loose speed sensor	Tighten speed sensor retaining bracket bolt
	Incorrect fluid level	Correct fluid level (refer to Mechanic's Tips for proper dipstick calibration)

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GENERAL TROUBLESHOOTING OF PERFORMANCE COMPLAINTS

Table 8–1. Troubleshooting Performance Complaints *(cont'd)*

Problem	Probable Cause	Suggested Remedy
TRANSMISSION DOES NOT SHIFT PROPERLY (ROUGH SHIFTS, SHIFTS OCCURRING AT TOO LOW OR TOO HIGH SPEED) *(cont'd)*	Crossed wires in harness	Check for crossed wires and correct
	Intermittent problems	Check wiring harnesses and connectors (Appendix E)
	Loose or damaged speed gear	Replace output bearing nut sensor retainer
	Control spool valve sticking	Overhaul valve body assembly (refer to transmission Service Manual)
	Sticking stage 2 solenoid valve	Overhaul valve body assembly (refer to transmission Service Manual)
	Incorrect calibration	Install correct calibration
RETARDER PERFORMANCE COMPLAINTS		
A. Retarder Does Not Apply	Retarder enable input not activated	Turn on retarder enable switch (if present).
	Retarder enable switch not working	Replace retarder enable switch (if present).
	ABS input is active (if vehicle is equipped with ABS)	None — This is normal. If ABS is active, retarder will not apply.
	Retarder Request below 10.2 percent	Use DDR to determine counts signaled by each RMR device present. At least 15 counts are required for some retarder apply and 150–232 counts are required for full apply. Replace RMR device, based on test results.
	Closed throttle not sensed	Use DDR to check throttle signal. Throttle must be below 9.8 percent before retarder will apply. Readjust or replace TPS. **Exception**: If TPS has failed and Service Brake Status input is sensed by ECU, the retarder will still be applied.
	Active code inhibiting retarder	Correct cause for setting these codes: 42 23, 44 23, 45 23, 46 26, 64 12, 64 23, or 69 29

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GENERAL TROUBLESHOOTING OF PERFORMANCE COMPLAINTS

Table 8–1. Troubleshooting Performance Complaints *(cont'd)*

Problem	Probable Cause	Suggested Remedy
A. Retarder Does Not Apply *(cont'd)*	Transmission output speed below 350 rpm (450 rpm for HD/B 500)	Raise output speed to above 350 rpm (450 rpm for HD/B 500)
	Transmission not in a forward range	Shift to a forward range
B. Reduced Retarder Effect	Retarder accumulator solenoid not being energized	Correct cause for setting these codes: 42 26, 44 26, 45 26, or 69 26.
	ECU sensing false overheat condition	Use DDR or VOM to check retarder temperature sensor. Replace sensor as required.
	Normal response to overheating	See Table 6–7 in Section 6 (Code 61)
C. Less Retarder Effect Than Expected	Transmission fluid aerated due to incorrect level	Check transmission fluid level and correct as required.
	Wrong retarder control regulator valve spring	Check retarder charging pressure. Change retarder control valve regulator spring, if necessary. See SA2831 WT Series Retarder Principles of Operation.
ABNORMAL ACTIVITIES OR RESPONSES		
A. Excessive Creep in First and Reverse Gears	Engine idle speed too high	Adjust to correct idle speed — between 500–800 rpm (refer to Vehicle Service Manual)
B. No Response to Shift Selector	Shift selector not properly connected	Check shift selector response with diagnostic tool. If no response, check remote connection and replace if necessary
	Using wrong selector on dual station equipment	Use other selector
	Faulty shift selector	Replace shift selector
	Incorrect fluid level	Correct fluid level (refer to transmission Mechanic's Tips for proper dipstick calibration)
	Main pressure low	Refer to Low Pressure section
	Control spool valves sticking (C1, C3, or C5 clutch pressure low)	Overhaul valve body assembly (refer to transmission Service Manual)

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GENERAL TROUBLESHOOTING OF PERFORMANCE COMPLAINTS

Table 8–1. Troubleshooting Performance Complaints *(cont'd)*

Problem	Probable Cause	Suggested Remedy
C. Vehicle Moves Forward in Neutral*	C1 clutch failed or not released	Rebuild C1 clutch (refer to transmission Service Manual)
D. Vehicle Moves Backward in Neutral*	C3 clutch failed or not released	Rebuild C3 clutch assembly (refer to transmission Service Manual)
EXCESSIVE FLARE — ENGINE OVERSPEED ON FULL-THROTTLE UPSHIFTS	TPS Adjustment:	
	— Overstroke	— Adjust TPS linkage for proper stroke (see Appendix F)
	— Loose	— Tighten loose bolts or connections
	Incorrect calibration	Correct calibration
	ECU input voltage low	Check electrical system and all connections from battery and ECU
	Incorrect fluid level	Add fluid to proper level (refer to transmission Mechanic's Tips for proper dipstick calibration)
	Low main pressure	See Low Pressure section
	Erratic speed sensor signal	See code 22 XX
	Sticking stage 2 solenoid valve (see Solenoid and Clutch sections)	Clean and repair stage 2 valve (refer to transmission Service Manual)
	Piston seals leaking or clutch plates slipping in range involved (see Range Clutch Troubleshooting section)	Overhaul transmission (refer to transmission Service Manual)
RANGE CLUTCH TROUBLESHOOTING SECTION		
EXCESSIVE SLIPPAGE AND CLUTCH CHATTER	Incorrect calibration	Verify calibration
	ECU input voltage low	Check power, ground, charging system, and battery functions
	Throttle position sensor out of adjustment or failed	Adjust or replace throttle position sensor (refer to Appendix F)
	Incorrect speed sensor readings	See code 22 XX

* See explanation of NVL in Section 2–3.

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GENERAL TROUBLESHOOTING OF PERFORMANCE COMPLAINTS

Table 8–1. Troubleshooting Performance Complaints *(cont'd)*

Problem	Probable Cause	Suggested Remedy
EXCESSIVE SLIPPAGE AND CLUTCH CHATTER *(cont'd)*	Incorrect fluid level	Correct fluid level (refer to Mechanic's Tips for proper dipstick calibration measurements)
	Main pressure low	Refer to the Low Pressure section
	Lockup clutch not applied	Inspect lockup clutch system wiring, pressure, and controls; repair as necessary (refer to transmission Service Manual)*
A. Ranges 1, 2, 3, 4 Only (6-Speed) Ranges 2, 3, 4, 5 only (7-Speed)	C1 clutch slipping, leaks at splitline gasket, leaks at rotating clutch seals, leaks at piston seals, C1 clutch plates worn	Inspect control module gasket, C1 clutch plates, and piston and rotating seals; replace/rebuild as necessary (refer to transmission Service Manual)*
B. Ranges 4, 5, 6 Only (6-Speed) Ranges 5, 6, 7 only (7-Speed)	C2 clutch slipping, leaks at splitline gasket, leaks at rotating clutch seals, leaks at piston seals, C2 clutch plates worn	Inspect control module gasket, C2 clutch plates, and piston and rotating seals; replace/rebuild as necessary (refer to transmission Service Manual)*
C. Ranges 3, 5, R Only (6-Speed) Ranges 1, 4, 6, R only (7-Speed)	C3 clutch slipping, leaks at face seals, leaks at piston seals, C3 clutch plates worn	Inspect control module face seals, C3 clutch plates, and piston seals; replace/rebuild as necessary (refer to transmission Service Manual)*
D. Ranges 2, 6 Only (6-Speed) Ranges 3, 7 only (7-Speed)	C4 clutch slipping, leaks at face seals, leaks at piston seals, C4 clutch plates worn	Inspect control module face seals, C4 clutch plates, and piston seals; replace/rebuild as necessary (refer to transmission Service Manual)*
E. Ranges 1, R Only (6-Speed) Ranges 2, R only (7-Speed)	C5 clutch slipping, leaks at face seals, leaks at piston seals, C5 clutch plates worn	Inspect control module face seals, C5 clutch plates, and piston seals; replace/rebuild as necessary (refer to transmission Service Manual)*
F. Range Lo Only (7-Speed)	C6 clutch slipping, leaks at splitline gasket(s), leaks at piston seals, C6 clutch plates worn	Inspect control module gasket, adapter gasket, T-Case gasket(s) C6 clutch plates, and piston seals; replace/rebuild as necessary (refer to transmission Service Manual)*

* See Appendix B — Check main pressure, clutch pressure, and pressure specifications.

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GENERAL TROUBLESHOOTING OF PERFORMANCE COMPLAINTS

Table 8–1. Troubleshooting Performance Complaints *(cont'd)*

Problem	Probable Cause	Suggested Remedy
	LOW PRESSURE SECTION	
A. Low Main Pressure in All Ranges (Including C6, T-Case)	Incorrect fluid level	Correct fluid level (refer to the Mechanic's Tips Handbook for correct dipstick calibration)*
	Oil filter element clogged or faulty	Replace oil filter (refer to transmission Mechanic's Tips)
	Plugged or faulty suction filter	Clean or replace oil suction filter element and refill the transmission (refer to transmission Mechanic's Tips)
	Main pressure regulator valve sticking	Overhaul control module assembly (refer to transmission Service Manual)
	Main pressure regulator valve spring weak, broken, or missing	Check spring and replace if necessary (refer to transmission Service Manual)
	Control module body leakage (separator plate not flat, separator plate gasket leakage, loose control valve body bolts)	Replace or rebuild control module assembly. Care should be taken when removing and labeling shift springs (refer to transmission Service Manual)
	Faulty or incorrect fluid pressure gauge	Repair or replace gauge
	Oil pump worn or damaged	Replace or rebuild oil pump (refer to transmission Service Manual)
B. Clutch Pressure Low in Specific Ranges, Normal Pressure in Other Ranges		See Range Clutch Troubleshooting section and Appendix B
C. Low Lubrication Pressure	Incorrect fluid level	Correct fluid level (refer to the Mechanic's Tips Handbook for proper dipstick calibration)
	Plugged lube filter	Change filter (refer to Transmission Mechanic's Tips)
	Excessive internal fluid leakage	Check other pressures (above items); also check control module mounting bolts; lubrication valve and spring (refer to transmission Service Manual)

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GENERAL TROUBLESHOOTING OF PERFORMANCE COMPLAINTS

Table 8–1. Troubleshooting Performance Complaints *(cont'd)*

Problem	Probable Cause	Suggested Remedy
C. Low Lubrication Pressure *(cont'd)*	Broken or damaged converter regulator retaining pin	Replace damaged or broken parts (refer to transmission Service Manual)
	Cooler lines restricted or leaking	Check for kinks, leakage; reroute or replace lines as necessary
	Lubrication valve sticking	Replace lubrication valve
	Cooler plugged	Clean or replace cooler
	Faulty gauge	Repair or replace gauge
ABNORMAL STALL SPEEDS (Stall In First Range — 6-Speed) (Stall In Second Range — 7-Speed)		
A. High Stall Speeds	Not in gear	Select **D** (Drive)
	Low fluid level, aerated fluid	Add fluid to proper level (refer to Mechanic's Tips for proper dipstick calibration)
	Incorrect torque converter	Replace torque converter (refer to transmission Service Manual)
	Clutch pressure low	Refer to Low Pressure section and Appendix B
	C1 or C5 clutch slipping. (7-speed, 2nd gear start) (6-speed, 1st gear start) *Note:* Use the diagnostic tool to check turbine speed	Rebuild C1 or C5 clutch (refer to transmission Service Manual)
	Higher power engine	Confirm proper engine match
B. Low Stall Speeds	Engine not performing efficiently (may be due to plugged or restricted injectors, high altitude conditions, dirty air filters, out of time, throttle linkage, electronic engine controls problem)	Refer to Vehicle Engine Manufacturer's Manual or Vehicle Service Manual
	Stall speeds of 66 percent of normal implies freewheeling stator	Replace or rebuild converter assembly (refer to transmission Service Manual)
	Incorrect torque converter	Install correct torque converter (refer to transmission Service Manual)

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GENERAL TROUBLESHOOTING OF PERFORMANCE COMPLAINTS

Table 8–1. Troubleshooting Performance Complaints *(cont'd)*

Problem	Probable Cause	Suggested Remedy
OVERHEATING IN ALL RANGES	Aerated fluid — incorrect fluid level	Adjust fluid to proper level, check for defective pump (refer to Mechanic's Tips and transmission Service Manual)
	Air flow to cooler obstructed	Remove air flow obstruction
	Engine overheat	Correct overheat situation (refer to Vehicle Service Manual)
	Inaccurate temperature gauge or sending unit	Replace gauge and/or sending unit
	Inaccurate sump temperature sensor	Replace temperature sensor or internal harness (refer to transmission Service Manual)
	Transmission cooler lines reversed	Connect cooler lines properly (oil and water should flow in opposite directions)
	Fluid cooler lines restricted	Remove restrictions, clean or replace lines (refer to Vehicle Service Manual)
	Torque converter (wrong converter, no lockup, stuck stator, or slipping stator)	Replace or repair converter assembly. (refer to transmission Service Manual) *Note:* Stuck stator will not allow cool down in neutral
	Cooler flow loss due to internal leakage	Overhaul transmission (refer to transmission Service Manual)
	Inadequate cooler sizing	See vehicle OEM for specifications
	Excessive cooler circuit pressure drop	Check for plugged cooler, lines too small, collapsed hose, too many elbows in circuit
FLUID COMES OUT OF THE FLUID FILL TUBE AND/OR BREATHER	Dipstick loose	Tighten cap, replace if necessary
	Fluid level too high	Drain to proper level (refer to transmission Mechanic's Tips)
	Fluid level too low	Add fluid to proper level
	Breather stopped up — clogged	Clean or replace breather (refer to transmission Service Manual)

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GENERAL TROUBLESHOOTING OF PERFORMANCE COMPLAINTS

Table 8–1. Troubleshooting Performance Complaints *(cont'd)*

Problem	Probable Cause	Suggested Remedy
FLUID COMES OUT OF THE FLUID FILL TUBE AND/OR BREATHER *(cont'd)*	Fluid contaminated with foreign liquid	Drain and replace fluid. Locate and fix source of additional fluid (refer to transmission Service Manual if repair is needed)
	Dipstick or fill tube seal worn	Replace seals or dipstick
	Incorrect dipstick marking	Calibrate dipstick (refer to transmission Mechanic's Tips)
NOISE OCCURRING INTERMITTENTLY (BUZZING)	Low fluid level	Add fluid to proper level (refer to transmission Mechanic's Tips for proper dipstick calibration)
	Air leak in oil suction screen canister	Replace oil suction screen canister (refer to transmission Service Manual)
	Clogged filters	Replace filters (refer to transmission Mechanic's Tips)
	Aerated fluid causes noisy pump	Correct fluid level (refer to transmission Mechanic's Tips for proper dipstick calibration)
	Low main pressure causes main regulator valve to oscillate	See Low Pressure section
LEAKING FLUID (OUTPUT SHAFT)	Faulty or missing seal at output flange	Install new lip-type seal in rear of transmission housing (refer to transmission Service Manual)
	Machine lead on output flange seal surface	Replace flange
	Flange worn at seal surface	Replace flange
	Insufficient seal around seal OD	When replacing seal, apply sealant (refer to transmission Service Manual)
	Damaged, missing, or loose output flange bolts	Replace and/or torque output flange bolts
	Damaged or missing flange button O-ring	Replace flange button O-ring
	Damaged or missing bolt O-rings	Replace O-rings

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GENERAL TROUBLESHOOTING OF PERFORMANCE COMPLAINTS

Table 8–1. Troubleshooting Performance Complaints *(cont'd)*

Problem	Probable Cause	Suggested Remedy
TRANSMISSION INPUT	Front seal leaks	Replace front seal (refer to transmission Service Manual)
	Converter leaks	Check converter seals, cracked converter pump tangs, converter cover, or converter housing porosity; replace parts as required (refer to transmission Service Manual)
	PTO driveline out of specification	Bring driveline into specification
DIRTY FLUID	Failure to change fluid and filters	Change fluid and install new filters (refer to transmission Mechanic's Tips)
	Excessive heat	Refer to Overheating section
	Damaged fluid filter/seals	Replace oil filter/seals (refer to transmission Mechanic's Tips)
	Substandard fluid	Use recommended fluid (refer to transmission Mechanic's Tips)
	Clutch/transmission failure	Overhaul transmission (refer to transmission Service Manual)
	POWER TAKEOFF (PTO)*	
A. Leaks	Damaged or cocked seal	Replace seal
	PTO flange grooved at seal	Replace PTO flange
	Loose flange	Inspect flange and bolts; replace if necessary and properly torque bolts
	Loose bolts or damaged gaskets	Replace gasket and/or properly torque bolts
	Loose or damaged hydraulic lines (clutched drive)	Tighten fittings (replace if necessary)
B. Noisy PTO	Faulty driven component	Replace faulty driven component
	Gears or bearings worn, damaged, or contaminated	Rebuild PTO with new gears or bearings
C. No or Intermittent Operation (Clutched Drive)	Electrical problem (switch, connectors, solenoid, or wires)	Inspect for electrical problem and repair (see Appendix E)

* Contact your nearest Allison dealer/distributor with specific questions relating to PTO repair.

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GENERAL TROUBLESHOOTING OF PERFORMANCE COMPLAINTS

Table 8–1. Troubleshooting Performance Complaints *(cont'd)*

Problem	Probable Cause	Suggested Remedy
C. No or Intermittent Operation (Clutched Drive) *(cont'd)*	Damaged or worn clutch	Rebuild clutch assembly
	Clutch piston seals damaged or missing	Rebuild clutch assembly
	Inadequate fluid pressure to PTO	Inspect and repair fluid pressure supply; line kinked, loose, or plugged; orifice too small
	Engine speed outside operating band	Increase or reduce engine speed to move within operating band
	Drive or driven gear teeth damaged	Replace damaged gears (refer to transmission Service Manual)
	TRANSFER CASE (T-CASE)	
A. Will Not Go Into First Range	TPS adjustment	Properly adjust TPS (refer to Appendix F)
	Engine speed too high	Reduce Engine Speed
	Wrong calibration	Calibrate properly
	Wrong control module (6 speed instead of 7 speed)	Install correct control module
	Faulty wiring, solenoid connectors	Check wiring and connectors in control module (refer to transmission Service Manual)
	Faulty C6 seals	Replace C6 piston seals (refer to transmission Service Manual)
	Worn C6 clutch plates	Rebuild C6 (refer to transmission Service Manual)
B. Makes Excessive Noise	Improperly shimmed bearings	Check all T-case bearings as directed in transmission repair manual. Reshim as necessary.
C. No Front Output Drive	Differential clutch bad (C7 piston seals, C7 rotating seals, C7 clutch plates, C7 check ball)	Rebuild differential clutch (refer to transmission Service Manual)
	C7 electrical (wires, solenoids, terminals, connectors)	Inspect and repair C7 electrical system (refer to Appendix E)
D. Transmission Fluid Leaks	Damaged output seal, output flange seal journal, gasketed mating surfaces, bearing endcaps, electrical connector, oil scavenge line	Determine source of leak and repair (refer to transmission Service Manual)

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GENERAL TROUBLESHOOTING OF PERFORMANCE COMPLAINTS

Table 8–1. Resistance Module Troubleshooting Data

Description	Resistance Check in Resistance Module*		Voltage Signal**		Wiring to Control Device
	Terminals	Resistance — Ohms ± 5%	% Retarder Application	Voltage ± 0.2V	Device Terminal
Auto Full On	A to C	12K	100	3.6	No connections
Pressure Switch Full On High	A to C	32K	0 100	1.1 3.6	A B
3-Step E-10R Bendix Pedal	A to C	32K	0 32 58 100	1.1 1.9 2.8 3.6	A B C D
6-Step Hand Lever — Off Position 1 Position 2 Position 3 Position 4 Position 5 Position 6	A to C	32K	 0 16 28 48 65 84 100	 1.1 1.5 1.9 2.3 2.8 3.2 3.6	 + 1 2 3 4 5 6
Auto 1/2 On	A to C	12K	50	2.4	No connections
3 Pressure Switches — Low Medium High	A to C	32K	0 32 68 100	1.1 1.9 2.3 3.6	 A B A B A B
Auto 1/3 On 2 Pressure Switches Auto Medium High	A to C	21.4K	 32 68 100	 1.9 2.8 3.6	 A B A B
Dedicated Pedal	No Checks	Interface not a resistance module	0 100	0.7–1.2 3.4–3.5	A B C

* Resistance module must be disconnected from the wiring harness and retarder control devices.
** These voltages must be measured between terminals A and B.

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APPENDICES

Appendix A	Identification of Potential Circuit Problems
Appendix B	Checking Clutch and Retarder Pressures
Appendix C	Solenoid and Clutch Chart
Appendix D	Wire/Connector Chart
Appendix E	Connector Part Numbers, Terminal Part Numbers, Tool Part Numbers, and Repair Instructions
Appendix F	Throttle Position Sensor Adjustment
Appendix G	Welding on Vehicle/Vehicle Interface Module
Appendix H	Hydraulic Schematics
Appendix J	WT Wiring Schematic
Appendix K	TransID 1 Temperature Sensor and Solenoid Resistance Charts
Appendix L	Externally-Generated Electronic Interference
Appendix M	Diagnostic Tree — WT Series Hydraulic System
Appendix N	Pro-Link® 9000 Diagnostic Data Reader Information
Appendix P	Input/Output Function Wiring Schematics
Appendix Q	TransID 2 Thermistor Troubleshooting Information

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APPENDICES

NOTES

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APPENDIX A — IDENTIFICATION OF POTENTIAL CIRCUIT PROBLEMS

Intermittent codes are a result of faults that are detected, logged, and then disappear, only to recur later. If, when troubleshooting, a code is cleared in anticipation of it recurring and it does not, check the items in the following list for the fault's source.

A. Circuit Inspection

1. Intermittent power/ground problems — can cause voltage problems during ECU diagnostic checks which can set various codes depending upon where the ECU was in the diagnostic process.
2. Damaged terminals.
3. Dirty or corroded terminals.
4. Terminals not fully seated in the connector. Check indicated wires by uncoupling connector and gently pulling on the wire at the rear of the connector and checking for excessive terminal movement.
5. Connectors not fully mated. Check for missing or damaged locktabs.
6. Screws or other sharp pointed objects pushed into or through one of the harnesses.
7. Harnesses which have rubbed through and may be allowing intermittent electrical contact between two wires or between wires and vehicle frame members.
8. Broken wires within the braiding and insulation.

B. Finding an Intermittent Fault Condition

To find a fault, like one of those listed, examine all connectors and the external wiring harnesses. Harness routing may make it difficult to see or feel the complete harness. However, it is important to thoroughly check each harness for chafed or damaged areas. Road vibrations and bumps can damage a poorly installed harness by moving it against sharp edges and cause some of the faults. If a visual inspection does not identify a cause, move and wiggle the harness by hand until the fault is duplicated.

The next most probable cause of an intermittent code is an electronic part exposed to excessive vibration, heat, or moisture. Examples of this are:

1. Exposed harness wires subjected to moisture.
2. A defective connector seal allows moisture to enter the connector or part.
3. An electronic part (ECU, shift selector, solenoid, or throttle sensor) affected by vibration, heat, or moisture may cause abnormal electrical conditions within the part.

When troubleshooting Item 3, eliminate all other possible causes before replacing any parts.

Another cause of intermittent codes is good parts in an abnormal environment. The abnormal environment will usually include excessive heat, moisture, or voltage. For example, an ECU that receives excessive voltage will generate a diagnostic code as it senses high voltage in a circuit. The code may not be repeated consistently because different circuits may have this condition on each check. The last step in finding an intermittent code is to observe if the code is set during sudden changes in the operating environment.

Troubleshooting an intermittent code requires looking for common conditions that are present whenever the code is diagnosed.

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APPENDIX A — IDENTIFICATION OF POTENTIAL CIRCUIT PROBLEMS

C. Recurring Conditions

A recurring condition might be:

- Rain
- Outside temperature above or below a certain temperature
- Only on right-hand or left-hand turns
- When the vehicle hits a bump, etc.

If such a condition can be related to the code, it is easier to find the cause. If the time between code occurrences is very short, troubleshooting is easier than if it is several weeks or more between code occurrences.

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APPENDIX B — CHECKING CLUTCH AND RETARDER PRESSURES

Checking individual clutch pressures helps to determine if a transmission malfunction is due to a mechanical or an electrical problem. Properly making these pressure checks requires transmission and vehicle (or test stand) preparation, recording of data, and comparing recorded data against specifications provided. These instructions are for all WT Series transmissions.

NOTE: ***Check to see if there are diagnostic codes set which are related to the transmission difficulty you are evaluating. Proceed to make mechanical preparations for checking clutch pressures after codes have first been evaluated.***

A. Transmission and Vehicle Preparation

1. Remove the plugs from the pressure tap locations where measurement is desired (refer to Figure B–1).

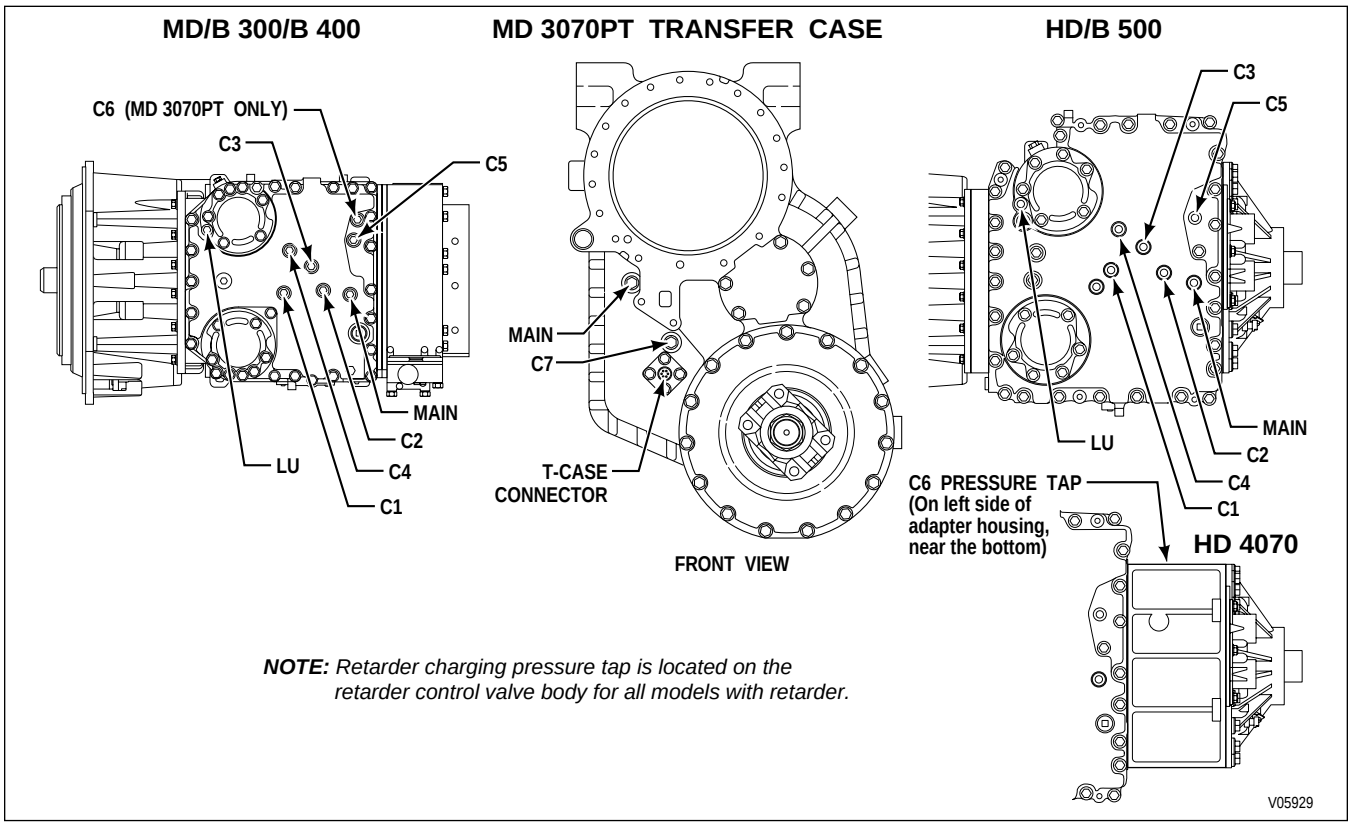

Figure B–1. Clutch Pressure Check Points

CAUTION: Be sure that the hydraulic fittings have the same thread as the plugs removed (7/16-20 UNF-2A). Also please note that these fittings must be straight thread, O-ring style. Failure to do this will result in damage to the control module.

2. Install hydraulic fittings suitable for attaching pressure gauges or transducers.
3. Connect pressure gauges or transducers. Pressure gauge set J 26417-A is available for this purpose. See Table B–2 for pressure levels expected.
4. Check that engine speed can be monitored (Pro-Link® 9000 diagnostic tool may be used for this purpose).

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APPENDIX B — CHECKING CLUTCH AND RETARDER PRESSURES

5. Be sure that transmission sump fluid temperature can be measured (Pro-Link® 9000 diagnostic tool may be used for this purpose).
6. Be sure that the transmission has enough fluid for cold operation until an operating temperature fluid level can be set.
7. Bring the transmission to normal operating temperature of 71–93ºC (160–200ºF). Check for fluid leaks in the added pressure gauge/transducer lines. Repair leaks as needed. Be sure that fluid level is correct.

B. Recording Data

1. Use the Pro-Link® 9000 diagnostic tool, which allows checking of individual range clutch pressures, with the vehicle stationary. Consult Appendix N or the Pro-Link® 9000 operating instructions for Action Request and select Clutch Test Mode. Follow instructions to check clutch pressures in individual ranges.

NOTE: ***Check lockup clutch pressure by driving the vehicle in a range where lockup can be obtained. Record the pressure values at the engine speed and sump fluid temperature values shown in Table B–1. The lockup clutch is functioning correctly when engine speed and turbine speed values are equal as recorded from the Pro-Link® 9000.***

2. Consult Table B–1 and locate the transmission model that you are testing.
3. Operate the transmission at the conditions shown in Table B–1 and record engine speed, transmission sump fluid temperature, main hydraulic pressure, and clutch pressures in the ranges where a problem is suspected.

Table B–1. Clutch Pressure Test Conditions

Transmission Model/ Test Type	Engine rpm	Sump Fluid Temperature	Range	Clutches Pressurized
All (except MD 3070) — Idle Check	580–620	71–93ºC (160–200ºF)	Neutral Reverse 1C 2C (2nd range start)	C5 C3 C5 C1 C5 C1 C4
MD 3070 — Idle Check	580–620	71–93ºC (160–200ºF)	Neutral Reverse LowC 1C	C5 C3 C5 C3 C6 C1 C5
MD (except 3070) B 300/B 400 — High Speed	2080–2120	71–93ºC (160–200ºF)	Reverse Neutral 1C 2C 2L 3L 4L 5L 6L	C3 C5 C5 C1 C5 C1 C4 C1 C4 LU C1 C3 LU C1 C2 LU C2 C3 LU C2 C4 LU

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APPENDIX B — CHECKING CLUTCH AND RETARDER PRESSURES

Table B–1. Clutch Pressure Test Conditions *(cont'd)*

Transmission Model/ Test Type	Engine rpm	Sump Fluid Temperature	Range	Clutches Pressurized
MD 3070 — High Speed	2080–2120	71–93ºC (160–200ºF)	Reverse	C3 C5
			Neutral	C5
			LowC	C3 C6
			1C	C1 C5
			2C	C1 C4
			2L	C1 C4 LU
			3L	C1 C3 LU
			4L	C1 C2 LU
			5L	C2 C3 LU
			6L	C2 C4 LU
HD/B 500 — High Speed	1780–1820	71–93ºC (160–200ºF)	Reverse	C3 C5
			Neutral	C5
			LowC**	C1 C6
			1C	C1 C5
			2C	C1 C4
			2L	C1 C4 LU
			3L	C1 C3 LU
			4L	C1 C2 LU
			5L	C2 C3 LU
			6L	C2 C4 LU
			** Only applies to HD 4070.	

C. Comparing Recorded Data to Specifications

1. Be sure that engine speed and transmission sump fluid temperatures were within the values specified in Table B–1.
2. Compare the main pressure and clutch pressure data, recorded in Step B, with the specifications in Table B–2.
3. If clutch pressures are within specifications, return the transmission and vehicle to their original configuration and proceed with electrical troubleshooting.
4. If clutch pressures are not within specification, take corrective action to replace the internal parts of the transmission necessary to correct the problem. (Refer to the Transmission Service Manual for the model being checked.)
5. Recheck pressure values after the transmission has been repaired.
6. Return the transmission to its original configuration. (Remove instrumentation and reinstall any components removed for the pressure testing.)

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Table B–2. Main Pressure and Clutch Pressure Specifications (Sump Fluid Temperature Same as in Table B–1)

Transmission Model/Test Type	Engine rpm	Range	Clutches Applied	Main Press. Spec kPa [psi]	Range Clutch Press. Spec* kPa [psi]	Conv. Out Press. Spec kPa [psi]	Lube Press. Spec kPa [psi]	LU Clutch Press. Spec* kPa [psi]	D'BOX MAIN Press. Spec* kPa [psi]
MD — Idle (except 3070)	580–620	Neutral	C5	1400–2000 [203–290]	0–40 (C5) [0–5.8]		—		
		Reverse	C3 C5	1400–2000 [203–290]	0–40 (C3 And C5) [0–5.8]		3.5 min. [0.5 min.]		
		1C	C1 C5	1300–1970 [189–286]	0–70 (C1) [0–10] 0–40 (C5) [0–5.8]		3.5 min. [0.5 min.]		
		2C	C1 C4	1300–1970 [189–286]	0–70 (C1) [0–10] 0–40 (C4) [0–5.8]		3.5 min. [0.5 min.]		
MD 3070 — Idle		Neutral	C5	1400–2000 [203–290]	0–40 (C5) [0–5.8]		—		1400–2000 [203–290]
		Reverse	C3 C5	1400–2000 [203–290]	0–40 (C3 And C5) [0–5.8]		3.5 min. [0.5 min.]		1400–2000 [203–290]
		LowC	C3 C6	1300–1970 [189–286]	0–40 (C3 And C6) [0–5.8]		3.5 min. [0.5 min.]		1300–1970 [189–286]
		1C	C1 C5	1300–1970 [189–286]	0–70 (C1) [0–10] 0–40 (C5) [0–5.8]		3.5 min. [0.5 min.]		1300–1970 [189–286]
MD — High Speed (except 3070)	2080–2120	Neutral	C5	1825–1965 [265–285]	0–40 (C5) [0–5.8]	310–410 [45–60]	150–190 [22–28]		
		Reverse	C3 C5	1825–1965 [265–285]	0–40 (C3 And C5) [0–5.8]	310–410 [45–60]	150–190 [22–28]		
		1C	C1 C5	1550–1690 [225–245]	0–70 (C1) [0–10] 0–40 (C5) [0–5.8]	310–410 [45–60]	150–190 [22–28]		

* Subtract clutch pressure from main pressure; the difference must fall within the specifications given (unless a pressure range is supplied).

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Table B–2. Main Pressure and Clutch Pressure Specifications (Sump Fluid Temperature Same as in Table B–1) *(cont'd)*

Transmission Model/Test Type	Engine rpm	Range	Clutches Applied	Main Press. Spec kPa [psi]	Range Clutch Press. Spec* kPa [psi]	Conv. Out Press. Spec kPa [psi]	Lube Press. Spec kPa [psi]	LU Clutch Press. Spec* kPa [psi]	D'BOX MAIN Press. Spec* kPa [psi]
MD — High Speed (except 3070) *(cont'd)*	2080–2120	2C	C1 C4	1550–1690 [225–245]	0–70 (C1) [0–10] 0–40 (C4) [0–5.8]	310–410 [45–60]	150–190 [22–28]		
		2L	C1 C4 LU	1100–1240 [160–180]	0–70 (C1) [0–10] 0–40 (C4) [0–5.8]	310–410 [45–60]	150–190 [22–28]	0–60 [0–8.7]	
		3C	C1 C3	1550–1690 [225–245]	0–70 (C1) [0–10] 0–40 (C3) [0–5.8]	310–410 [45–60]	150–190 [22–28]		
		3L	C1 C3 LU	1100–1240 [160–180]	0–70 (C1) [0–10] 0–40 (C3) [0–5.8]	310–410 [45–60]	150–190 [22–28]	0–60 [0–8.7]	
		4C	C1 C2	1550–1690 [225–245]	0–70 (C1) [0–10] 0–70 (C2) [0–10]	310–410 [45–60]	150–190 [22–28]		
		4L	C1 C2 LU	1100–1240 [160–180]	0–70 (C1) [0–10] 0–70 (C2) [0–10]	310–410 [45–60]	150–190 [22–28]	0–60 [0–8.7]	
		5C	C2 C3	1550–1690 [225–245]	0–70 (C2) [0–10] 0–40 (C3) [0–5.8]	310–410 [45–60]	150–190 [22–28]		
		5L	C2 C3 LU	1100–1240 [160–180]	0–70 (C2) [0–10] 0–40 (C3) [0–5.8]	310–410 [45–60]	150–190 [22–28]	0–60 [0–8.7]	
		6C	C2 C4	1550–1690 [225–245]	0–70 (C2) [0–10] 0–40 (C4) [0–5.8]	310–410 [45–60]	150–190 [22–28]		
		6L	C2 C4 LU	1100–1240 [160–180]	0–70 (C2) [0–10] 0–40 (C4) [0–5.8]	310–410 [45–60]	150–190 [22–28]	0–60 [0–8.7]	

* Subtract clutch pressure from main pressure; the difference must fall within the specifications given (unless a pressure range is supplied).

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Table B–2. Main Pressure and Clutch Pressure Specifications (Sump Fluid Temperature Same as in Table B–1) *(cont'd)*

Transmission Model/Test Type	Engine rpm	Range	Clutches Applied	Main Press. Spec kPa [psi]	Range Clutch Press. Spec* kPa [psi]	Conv. Out Press. Spec kPa [psi]	Lube Press. Spec kPa [psi]	LU Clutch Press. Spec* kPa [psi]	D'BOX MAIN Press. Spec* kPa [psi]
MD 3070 — High Speed	2080–2120	Neutral	C5	1825–1965 [265–285]	0–40 (C5) [0–5.8]	310–410 [45–60]	150–190 [22–28]		1440–1700 [209–247]
		Reverse	C3 C5	1825–1965 [265–285]	0–40 (C3 And C5) [0–5.8]	310–410 [45–60]	150–190 [22–28]		1440–1700 [209–247]
		LowC	C3 C6	1550–1690 [225–245]	0–40 (C3 And C6) [0–5.8]	310–410 [45–60]	150–190 [22–28]		1440–1700 [209–247]
		1C	C1 C5	1550–1690 [225–245]	0–70 (C1) [0–10] 0–40 (C5) [0–5.8]	310–410 [45–60]	150–190 [22–28]		1440–1700 [209–247]
		2C	C1 C4	1550–1690 [225–245]	0–70 (C1) [0–10] 0–40 (C4) [0–5.8]	310–410 [45–60]	150–190 [22–28]		1440–1700 [209–247]
		2L	C1 C4 LU	1100–1240 [160–180]	0–70 (C1) [0–10] 0–40 (C4) [0–5.8]	310–410 [45–60]	150–190 [22–28]	0–60 [0–8.7]	1440–1700 [209–247]
		3C	C1 C3	1550–1690 [225–245]	0–70 (C1) [0–10] 0–40 (C3) [0–5.8]	310–410 [45–60]	150–190 [22–28]		1440–1700 [209–247]
		3L	C1 C3 LU	1100–1240 [160–180]	0–70 (C1) [0–10] 0–40 (C3) [0–5.8]	310–410 [45–60]	150–190 [22–28]	0–60 [0–8.7]	1440–1700 [209–247]
		4C	C1 C2	1550–1690 [225–245]	0–70 (C1 And C2) [0–10]	310–410 [45–60]	150–190 [22–28]		1440–1700 [209–247]
		4L	C1 C2 LU	1100–1240 [160–180]	0–70 (C1 And C2) [0–10]	310–410 [45–60]	150–190 [22–28]	0–60 [0–8.7]	1440–1700 [209–247]
		5C	C2 C3	1550–1690 [225–245]	0–70 (C2) [0–10] 0–40 (C3) [0–5.8]	310–410 [45–60]	150–190 [22–28]		1440–1700 [209–247]

* Subtract clutch pressure from main pressure; the difference must fall within the specifications given (unless a pressure range is supplied).

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Table B–2. Main Pressure and Clutch Pressure Specifications (Sump Fluid Temperature Same as in Table B–1) *(cont'd)*

Transmission Model/Test Type	Engine rpm	Range	Clutches Applied	Main Press. Spec kPa [psi]	Range Clutch Press. Spec* kPa [psi]	Conv. Out Press. Spec kPa [psi]	Lube Press. Spec kPa [psi]	LU Clutch Press. Spec* kPa [psi]	D'BOX MAIN Press. Spec* kPa [psi]
MD 3070 — High Speed *(cont'd)*	2080–2120	5L	C2 C3 LU	1100–1240 [160–180]	0–70 (C2) [0–10] 0–40 (C3) [0–5.8]	310–410 [45–60]	150–190 [22–28]	0–60 [0–8.7]	1440–1700 [209–247]
		6C	C2 C4	1550–1690 [225–245]	0–70 (C2) [0–10] 0–40 (C4) [0–5.8]	310–410 [45–60]	150–190 [22–28]		1440–1700 [209–247]
		6L	C2 C4 LU	1100–1240 [160–180]	0–70 (C2) [0–10] 0–40 (C4) [0–5.8]	310–410 [45–60]	150–190 [22–28]	0–60 [0–8.7]	1440–1700 [209–247]
HD — Idle	580–620	Neutral	C5	1400–2000 [203–290]	0–40 (C5) [0–5.8]		—		
		Reverse	C3 C5	1400–2000 [203–290]	0–40 (C3 And C5) [0–5.8]		3.5 min. [0.5 min.]		
		1C	C1 C5	1300–1970 [189–286]	0–70 (C1) [0–10] 0–40 (C5) [0–5.8]		3.5 min. [0.5 min.]		
		2C	C1 C4	1300–1970 [189–286]	0–70 (C1) [0–10] 0–40 (C4) [0–5.8]		3.5 min. [0.5 min.]		
HD — High Speed	1780–1820	Neutral	C5	1825–1965 [265–285]	0–40 (C5) [0–5.8]	310–410 [45–60]	150–190 [22–28]		
		Reverse	C3 C5	1825–1965 [265–285]	0–40 (C3 And C5) [0–5.8]	310–410 [45–60]	150–190 [22–28]		
		LowC**	C3 C6	1550–1690 [225–245]	0–40 (C3 And C6) [0–5.8]	310–410 [45–60]	150–190 [22–28]		
		1C	C1 C5	1550–1690 [225–245]	0–70 (C1) [0–10] 0–40 (C5) [0–5.8]	310–410 [45–60]	150–190 [22–28]		

* Subtract clutch pressure from main pressure; the difference must fall within the specifications given (unless a pressure range is supplied).

** HD 4070 Only.

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Table B–2. Main Pressure and Clutch Pressure Specifications (Sump Fluid Temperature Same as in Table B–1) *(cont'd)*

Transmission Model/Test Type	Engine rpm	Range	Clutches Applied	Main Press. Spec kPa [psi]	Range Clutch Press. Spec* kPa [psi]	Conv. Out Press. Spec kPa [psi]	Lube Press. Spec kPa [psi]	LU Clutch Press. Spec* kPa [psi]	D'BOX MAIN Press. Spec* kPa [psi]
HD — High Speed *(cont'd)*	1780–1820	2C	C1 C4	1550–1690 [225–245]	0–70 (C1) [0–10] 0–40 (C4) [0–5.8]	310–410 [45–60]	150–190 [22–28]		
		2L	C1 C4 LU	1100–1240 [160–180]	0–70 (C1) [0–10] 0–40 (C4) [0–5.8]	310–410 [45–60]	150–190 [22–28]	0–60 [0–8.7]	
		3C	C1 C3	1550–1690 [225–245]	0–70 (C1) [0–10] 0–40(C3) [0–5.8]	310–410 [45–60]	150–190 [22–28]		
		3L	C1 C3 LU	1100–1240 [160–180]	0–70 (C1) [0–10] 0–40 (C3) [0–5.8]	310–410 [45–60]	150–190 [22–28]	0–60 [0–8.7]	
		4C	C1 C2	1550–1690 [225–245]	0–70 (C1) [0–10] 0–70 (C2) [0–10]	310–410 [45–60]	150–190 [22–28]		
		4L	C1 C2 LU	1100–1240 [160–180]	0–70 (C1) [0–10] 0–70 (C2) [0–10]	310–410 [45–60]	150–190 [22–28]	0–60 [0–8.7]	
		5C	C2 C3	1550–1690 [225–245]	0–70 (C2) [0–10] 0–40 (C3) [0–5.8]	310–410 [45–60]	150–190 [22–28]		
		5L	C2 C3 LU	1100–1240 [160–180]	0–70 (C2) [0–10] 0–40 (C3) [0–5.8]	310–410 [45–60]	150–190 [22–28]	0–60 [0–8.7]	
		6C	C2 C4	1550–1690 [225–245]	0–70 (C2) [0–10] 0–40 (C4) [0–5.8]	310–410 [45–60]	150–190 [22–28]		
		6L	C2 C4 LU	1100–1240 [160–180]	0–70 (C2) [0–10] 0–40 (C4) [0–5.8]	310–410 [45–60]	150–190 [22–28]	0–60 [0–8.7]	

* Subtract clutch pressure from main pressure; the difference must fall within the specifications given (unless a pressure range is supplied).

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APPENDIX B — CHECKING CLUTCH AND RETARDER PRESSURES

D. Retarder Pressure Checks — MD/B 300/B 400 And HD/B 500

1. MD 3060/3066, B 300, B 400 Test Conditions:

   Second Range Lockup, 100 Percent Retarder Apply, Input Speed = 1075–1125 rpm

2. MD 3560 Test Conditions:

   Second Range Lockup, 100 Percent Retarder Apply, Input Speed = 1350–1400 rpm

Table B–3. Retarder Specifications At Above Test Conditions

Parameter To Check	High Capacity	Medium Capacity	Low Capacity
Main Pressure–kPa [psi]	1200–1260 [174–183]	1200–1260 [174–183]	1200–1260 [174–183]
Retarder Charge Pressure–kPa [psi]	250–370 [36–54]	215–280 [31–41]	140–240 [20–35]
Cooler In Pressure–kPa [psi]	250–340 [36–49]	210–300 [30–44]	140–255 [20–37]
Cooler In Temperature–˚C [˚F]	150 [300] Max (Ref)	150 [300] Max (Ref)	150 [300] Max (Ref)

3. HD 4060/4070/B 500 Test Conditions:

   Second Range Lockup, 100 Percent Retarder Apply, Input Speed = 800–850 rpm

4. HD 4560 Test Conditions:

   Second Range Lockup, 100 Percent Retarder Apply, Input Speed = 965–1015 rpm

Table B–4. Retarder Specifications At Above Test Conditions

Parameter To Check	High Capacity	Medium Capacity	Low Capacity
Main Pressure–kPa [psi]	1120–1270 [162–184]	1120–1270 [162–184]	1120–1270 [162–184]
Retarder Charge Pressure–kPa [psi]	375–480 [54–70]	345–450 [50–65]	325–420 [47–61]
Cooler In Pressure–kPa [psi]	360–530 [52–77]	310–510 [45–74]	290–480 [42–70]
Cooler In Temperature–˚C [˚F]	150 [300] Max (Ref)	150 [300] Max (Ref)	150 [300] Max (Ref)

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APPENDIX B — CHECKING CLUTCH AND RETARDER PRESSURES

NOTES

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APPENDIX C — SOLENOID AND CLUTCH CHART

BASIC CONFIGURATION

Range	Solenoid Non-Latching Modulating							Clutches					
	A N/O	B N/O	C N/C	D N/C	E N/C	F N/C	G N/C	C1	C2	C3	C4	C5	LU
6	X			X		0			Y		Y		0
5	X		X			0	X		Y	Y			0
4						0	X	Y	Y				0
3		X	X			0	X	Y		Y			0
2		X		X		0	X	Y			Y		0
1		X			X	0		Y				Y	0
N1	X	X		*	X	0					*	Y	0
NVL	X	X		X	X						Y	Y	
N2	X	X		X							Y		
N3	X	X	X							Y			
N4	X	X		X							Y		
R	X	X	X		X					Y		Y	

NOTE: See Page C–2 for legend.

7-SPEED CONFIGURATION (MD 3070 AND HD 4070)

Range	Solenoid Non-Latching Modulating										Clutches							
	N/O	N/O	N/C	N/C	N/C	N/C	N/C	N/C	N/C	N/C								
	C1	C2	C3	C4	C5	LU	FWD	LOW	C6	DIF								
	A	B	C	D	E	F	G	N	J	H	C1	C2	C3	C4	C5	LU	C6	DIF
6	X			X		0				0		Y		Y		0		0
5	X		X			0	X			0		Y	Y			0		0
4						0	X			0	Y	Y				0		0
3		X	X			0	X			0	Y		Y			0		0
2		X		X		0	X			0	Y			Y		0		0
1		X			X	0				0	Y				Y	0		0
LO	X					0	X	X	X	0			Y			0	Y	0
N1	X	X		*	X					0					Y			0
N2	X	X		X			X			0				Y				0
N3	X	X	X				X			0			Y					0
N4	X	X		X			X			0				Y				0
R	X	X	X		X					0			Y		Y			0

NOTE: See Page C–2 for legend.

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APPENDIX C — SOLENOID AND CLUTCH CHART

LEGEND

X	Indicates solenoid is electrically ON.
Y	Indicates clutch is hydraulically applied.
Blank	Indicates solenoid is electrically OFF or clutch is not hydraulically applied.
0	Optional ON or OFF.
*	See NVL explanation below.
NVL	**As a diagnostic response:** If Turbine Speed is below 150 rpm when Output Speed is below 100 rpm and Engine Speed is above 400 rpm, Neutral Very Low (**NVL**) is commanded when **N1** (Neutral) is the selected range. **NVL** is achieved by turning D solenoid "on" in addition to E solenoid being "on," which locks the output. Otherwise, D solenoid is turned off in **N1** (Neutral). **As a commanded range when shifting to Fire Truck Pump Mode:** While wire 118 is energized before wire 117 is energized when going into Fire Truck Pump Mode, Neutral Very Low (**NVL**) will be commanded to lock the output to assist the shifting of the split-shaft PTO transfer case from road mode to pump mode. While wire 118 is de-energized before wire 117 is de-energized when shifting out of Fire Truck Pump Mode, Neutral Very Low (**NVL**) will be commanded to lock the output to assist the shifting of the split-shaft PTO transfer case from pump mode to road mode.

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APPENDIX D — WIRE/CONNECTOR CHART

The connector information in this appendix is provided for the convenience of the servicing technician. The connector illustration and pin identifications for connection to Allison Transmission components will be accurate. Allison Transmission components are the ECU, speed sensors, retarder connectors, transmission connectors, and shift selectors. Other kinds of connectors for optional or customer-furnished components are provided based on typical past practice for an Allison-designed system.

Contact St. Clair Technologies, Inc. or your vehicle manufacturer for information on connectors not found in this appendix.

NOTE: The following abbreviation guide should be used to locate connector termination points for wires in the WTEC III wiring harness(es).

Table D–1. Appendix D Abbreviation Guide

Termination Point Abbreviation	Connector Name
AGND	Analog Ground
ASOL	Solenoid A — Transmission Control Module
BSOL	Solenoid B — Transmission Control Module
C3PS	C3 Pressure Switch — Control Module
CSOL	Solenoid C — Transmission Control Module
DDRD	Diagnostic Connector — Deutsch
DDRP	Diagnostic Connector — Packard
DSOL	Solenoid D — Transmission Control Module
ECU–S	Electronic Control Unit — Selector (S) Connector
ECU–S	Electronic Control Unit — Vehicle (V) Connector
ECU–T	Electronic Control Unit — Transmission (T) Connector
ESOL	Solenoid E — Transmission Control Module
GSOL	Solenoid F — Transmission Control Module
GSOL	Solenoid G — Transmission Control Module
HSOL	Retarder H Solenoid — Retarder Housing Or Retarder Valve Body
J1939	J1939 Datalink From ECU Selector (S) Harness
JSOL	Solenoid J — Transmission Control Module (7-Speed Only)
NE	Engine Speed Sensor
NO	Output Speed Sensor
NSOL	Retarder Accumulator Solenoid
NSOL	Solenoid N — Transmission Control Module (7-Speed Only)
NT	Turbine Speed Sensor
OBDII	Diagnostic Connector — GMC On Board Diagnostics
OLS	Oil Level Sensor
PSS	Primary Shift Selector
RMOD	Retarder Module (Units Built Prior To 1/98)
RMR	Retarder Modulation Request Device
RNGTRM	Chassis Ground Ring Terminal
RTEMP	Retarder Temperature — Retarder Housing

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APPENDIX D — WIRE/CONNECTOR CHART

Table D–1. Appendix D Abbreviation Guide *(cont'd)*

Termination Point Abbreviation	Connector Name
SCI	Serial Communication Interface
SSS	Secondary Shift Selector
TCASE	MD 3070 Transfer Case
TPS	Throttle Position Sensor
TRANS	Transmission Feedthrough Harness
VIM	Vehicle Interface Module
VIWS	Vehicle Interface Wiring — ECU Selector (S) Harness
VIWV	Vehicle Interface Wiring — ECU Vehicle (V) Harness

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APPENDIX D — WIRE/CONNECTOR CHART

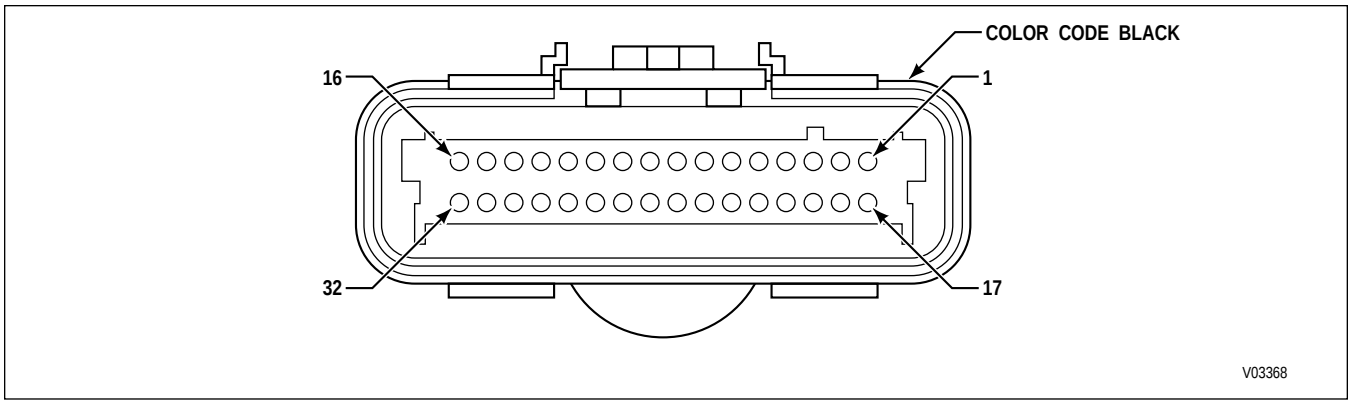

Figure D–1. ECU Connector "S"

ECU CONNECTOR "S" (BLACK)

Terminal No.	Color	Wire No.	Description	Termination Point(s)
1	White	142-S1	Serial Communication Interface, High	DDRP-J, DDRD-A, OBDII-7
2	Tan	159-S2	Diagnostic Communication Link (ISO9141)	VIWS-A
3	Pink	124-S3	Sensor Power	RMR-C, PSS-N, SSS-N
4	Yellow	146-S4	Ignition Sense	VIWS-E, DDRP-H, DDRD-C, OBDII-16
5	Orange	170-S5	Primary Shift Selector, Data Bit 1	PSS-A
6	Green	171-S6	Primary Shift Selector, Data Bit 2	PSS-B
7	Blue	172-S7	Primary Shift Selector, Data Bit 4	PSS-C
8	Yellow	173-S8	Primary Shift Selector, Data Bit 8	PSS-D
9	Tan	174-S9	Primary Shift Selector, Parity	PSS-E
10	Green	175-S10	Shift Selector Mode Input	PSS-M, SSS-M
11	Yellow	119-S11	General Purpose Input 4	VIWS-M
12	Green	182-S12	CAN Controller Shield (J1939)	J1939C
13	Pink	183-S13	CAN Controller, High (J1939)	J1939A
14	Blue	180-S14	Shift Selector Display	PSS-S, SSS-S
15	Orange	176-S15	General Purpose Output 6	PSS-L, SSS-L, VIWS-L
16	Pink	136-S16	Battery Power	PSS-R, SSS-R
17	Blue	151-S17	Serial Communication Interface, Low	DDRP-K, DDRD-B, OBDII-15
18	Tan	166-S18	General Purpose Output 7	VIWS-N
19	Green	135-S19	Analog Ground	RMR-A
20	Yellow	164-S20	Retarder Modulation Request	RMR-B
21	Orange	190-S21	Secondary Shift Selector, Data Bit 1	SSS-A
22	Green	191-S22	Secondary Shift Selector, Data Bit 2	SSS-B
23	Blue	192-S23	Secondary Shift Selector, Data Bit 4	SSS-C
24	Yellow	193-S24	Secondary Shift Selector, Data Bit 8	SSS-D
25	Tan	194-S25	Secondary Shift Selector, Parity	SSS-E
26	Blue	169-S26	General Purpose Input 12	VIWS-S
27	Blue	163-S27	General Purpose Input 6	VIWS-R
28	Yellow	126-S28	General Purpose Input 9	VIWS-C
29	Gray	184-S29	CAN Controller, Low (J1939)	J1939-B
30	Tan	157-S30	Vehicle Speed	VIWS-D
31	Green	115-S31	Check Transmission	VIWS-B
32	Gray	143-S32	Battery Ground	PSS-P, SSS-P, VIWS-P, DDRP-A, DDRD-E, OBDII-5

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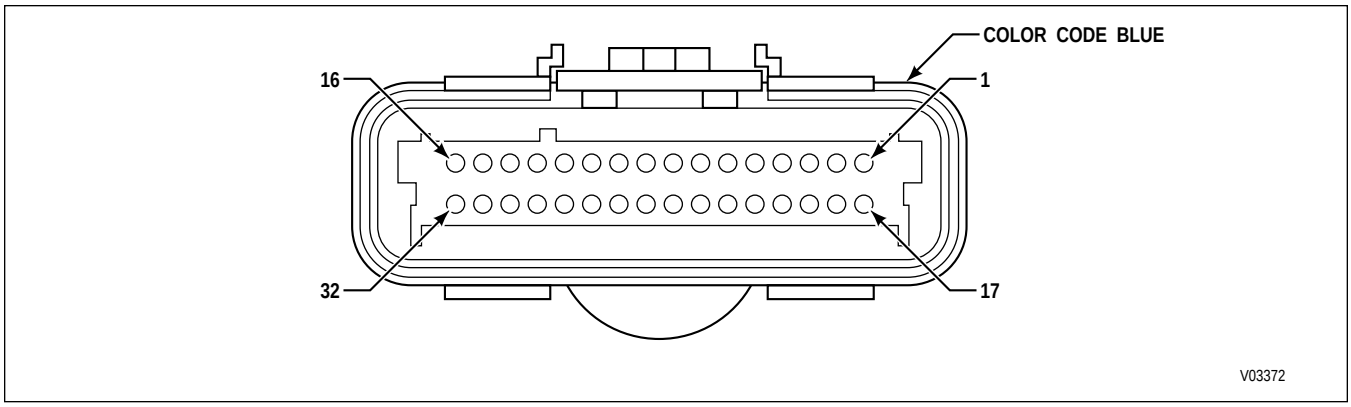

Figure D–2. ECU Connector "T"

ECU CONNECTOR "T" (BLUE)

Terminal No.	Color	Wire No.	Description	Termination Point(s)
1	Orange	102-T1	Solenoid Power, Solenoids A, D, and J (MD 3070 only)	TRANS-A
2	Tan	121-T2	Solenoid Power, Solenoids B and E	TRANS-H
3	Green	107-T3	Solenoid Power, Solenoid F	TRANS-E
4	White	120-T4	A Solenoid, Low	TRANS-G
5	Green	103-T5	C Solenoid, Low	TRANS-B
6	Tan	129-T6	E Solenoid, Low	TRANS-K
7	White	104-T7	G Solenoid, Low	TRANS-C
8	Blue	111-T8	J Solenoid, Low	TRANS-e
9	Pink	124-T9	Sensor Power	TRANS-D, TPS-C, RMR-C
10	Blue	156-T10	Throttle Position Sensor	TPS-B
11	Yellow	164-T11	Retarder Modulation Request	RMR-B
12	White	162-T12	C3 Pressure Switch Input	TRANS-X
13	Yellow	195-T13	Transmission Identification	TRANS-W
14	Tan	141-T14	Engine Speed Sensor, High	NE-A
15	Orange	149-T15	Turbine Speed Sensor, High	NT-A (HD), TRANS-V (MD)
16	Yellow	139-T16	Output Speed Sensor, High	NO-A, TCASE-C (MD 3070), RMOD-C (MDR)
17	Yellow	130-T17	Solenoid Power, Solenoids C and G	TRANS-L
18				
19	Yellow	116-T19	Solenoid Power, Solenoids H and N	HSOL-B, NSOL-B, TRANS-g, TCASE-B (MD 3070), RMOD-B (MDR)
20	Orange	128-T20	B Solenoid, Low	TRANS-J
21	Blue	131-T21	D Solenoid, Low	TRANS-M
22	White	110-T22	F Solenoid, Low	TRANS-F
23	White	127-T23	H Solenoid, Low	HSOL-A (HD), RMOD-A (MDR), TCASE-A (MD 3070)
24	Blue	101-T24	N Solenoid, Low	NSOL-A (HD and MD), TRANS-f (MD 3070)
25	Green	135-T25	Analog Ground	RMR-A, RTEMP-B (HD), RMOD-F (MD)
26	Blue	165-T26	Oil Level Sensor Input	TRANS-Y
27	Tan	147-T27	Sump Temperature Sensor Input	TRANS-P
28	Orange	138-T28	Retarder Temperature Sensor Input	RTEMP-A (HD), RMOD-E (MD)
29				
30	Orange	150-T30	Engine Speed Sensor, Low	NE-B
31	Blue	140-T31	Turbine Speed Sensor, Low	NT-B, TRANS-U (MD)
32	Green	148-T32	Output Speed Sensor, Low	NO-B, TCASE-D (MD 3070), RMOD-D (MDR)

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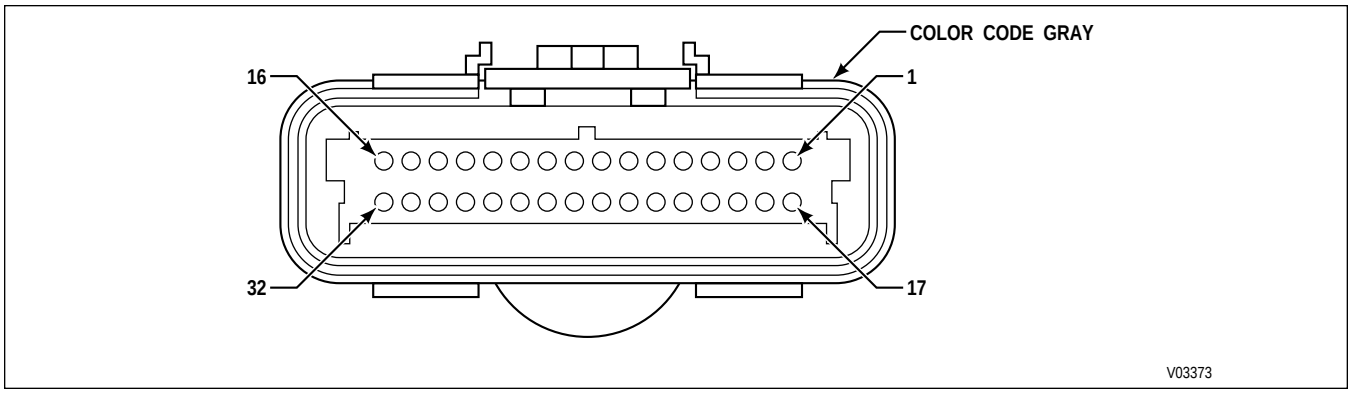

Figure D–3. ECU Connector "V"

ECU CONNECTOR "V" (GRAY)

Terminal No.	Color	Wire No.	Description	Termination Point(s)
1	Pink	136-V1	Battery Power	VIM-E1
2	White	114-V2	General Purpose Output 1	VIM-F3
3	Orange	132-V3	General Purpose Output 2	VIM-B1
4	White	113-V4	Reverse Warning	VIM-F2
5	White	167-V5	General Purpose Output 8	VIWV-V
6	Tan	123-V6	Neutral Start	VIM-D1
7				
8	Pink	124-V8	Sensor Power	TPS-C
9	Blue	179-V9	Engine Water Temperature	VIWV-M
10	Blue	156-V10	Throttle Position Sensor	TPS-B
11	Green	155-V11	General Purpose Input 1	VIWV-A
12	Yellow	153-V12	General Purpose Input 2	VIWV-B
13	Blue	118-V13	General Purpose Input 3	VIWV-C
14	Tan	177-V14	General Purpose Input 10	VIWV-S
15				
16	Pink	136-V16	Battery Power	VIM-E2
17	Gray	143-V17	Battery Ground	VIM-A1
18	White	125-V18	General Purpose Output 4	VIM-C2
19	Green	105-V19	General Purpose Output 5	VIWV-E
20	Tan	157-V20	Vehicle Speed	VIM-B2
21				
22	Tan	112-V22	General Purpose Output 3	VIM-D2
23				
24	Green	135-V24	Analog Ground	TPS-A, VIWV-N
25	Gray	144-V25	Chassis Ground	RNGTRM
26	Yellow	146-V26	Ignition Sense	VIM-F1
27	White	154-V27	General Purpose Input 5	VIWV-D
28	Orange	178-V28	General Purpose Input 11	VIWV-R
29	Orange	137-V29	General Purpose Input 7	VIWV-U
30	Green	117-V30	General Purpose Input 8	VIWV-P
31	Yellow	161-V31	Digital Ground (GPI)	VIWV-L
32	Gray	143-V32	Battery Ground	VIM-A2

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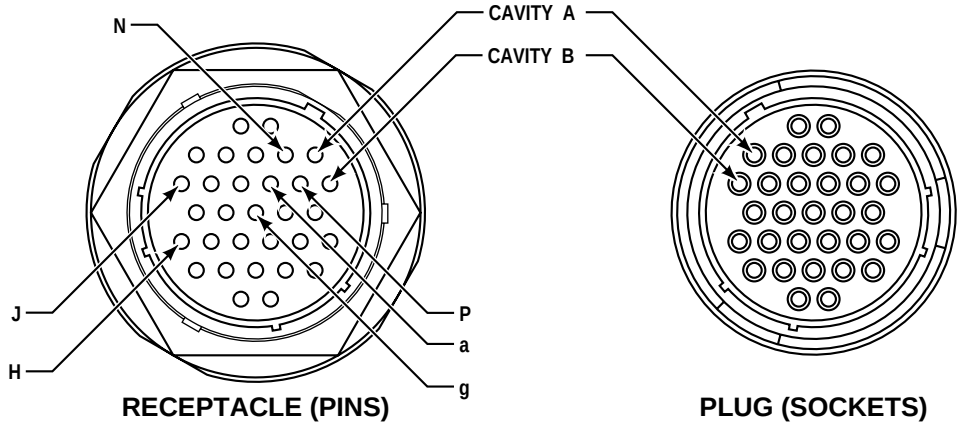

NOTE: 1. Letters I and O are not used.
2. Sockets are lettered counterclockwise. Pins are lettered clockwise.

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Figure D–4. Deutsch Bulkhead Connector, ECD

BULKHEAD CONNECTOR FOR "S" HARNESS (Plug With Sockets, Receptacle With Pins)

Terminal No.*	Color	Wire No.	Description	Termination Points*
A	Tan	159-S2	Diagnostic Communication Link (ISO 9141)	ECU-S2, VIWS-A
B	Green	115-S31	Check Transmission	ECU-S31, VIWS-B
C	Yellow	126-S28	General Purpose Input 9	ECU-S28, VIWS-C
D	Pink	124-S3	Sensor Power	ECU-S3, RMR-C, PSS-N, SSS-N
E	Yellow	146-S4	Ignition Sense	ECU-S4, VIWS-E, DDRP-H, DDRD-C, OBDII-16
F	Orange	170-S5	Primary Shift Selector, Data Bit 1	ECU-S5, PSS-A
G	Pink	136-S16	Battery Power	ECU-S16, PSS-R, SSS-R
H	White	142-S1	Serial Communication Interface, High	ECU-S1, DDRP-J, DDRD-A, OBDII-7, SCI-A
J	Blue	172-S7	Primary Shift Selector, Data Bit 4	ECU-S7, PSS-C
K	Blue	151-S17	Serial Communication Interface, Low	ECU-S17, DDRP-K, DDRD-B, OBDII-15, SCI-B
L	Orange	176-S15	General Purpose Output 6	ECU-S15, PSS-L, SSS-L, VIWS-L
M	Yellow	119-S11	General Purpose Input 4	ECU-S11, VIWS-M
N	Green	135-S19	Analog Ground	ECU-S19, RMR-A
P	Gray	143-S32	Battery Ground	ECU-S32, PSS-P, SSS-P, VIWS-P, DDRP-A, DDRD-E, OBDII-5
Q	Green	171-S6	Primary Shift Selector, Data Bit 2	ECU-S6, PSS-B
R	Blue	163-S27	General Purpose Input 6	ECU-S27, VIWS-R
S	Yellow	173-S8	Primary Shift Selector, Data Bit 8	ECU-S8, PSS-D
T	Tan	174-S9	Primary Shift Selector, Parity	ECU-S9, PSS-E
U	Green	175-S10	Shift Selector Mode Input	ECU-S10, PSS-M, SSS-M
V	Blue	180-S14	Shift Selector Display	ECU-S14, PSS-S, SSS-S
W	Tan	166-S18	General Purpose Output 7	ECU-S18, VIWS-N
X	Blue	169-S26	General Purpose Input 12	ECU-S26, VIWS-S
Y	Orange	190-S21	Secondary Shift Selector, Data Bit 1	ECU-S21, SSS-A

* Terminal number and termination points shown only apply when an Allison Transmission recommended harness configuration and bulkhead connector are used.

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BULKHEAD CONNECTOR FOR "S" HARNESS (Plug With Sockets, Receptacle With Pins) *(cont'd)*

Terminal No.*	Color	Wire No.	Description	Termination Points*
Z				
a	Yellow	164-S20	Retarder Modulation Request	ECU-S20, RMR-B
b	Green	191-S22	Secondary Shift Selector, Data Bit 2	ECU-S22, SSS-B
c	Blue	192-S23	Secondary Shift Selector, Data Bit 4	ECU-S23, SSS-C
d	Tan	157-S30	Vehicle Speed	ECU-S30, VIWS-D
e	Yellow	193-S24	Secondary Shift Selector, Data Bit 8	ECU-S24, SSS-D
f	Tan	194-S25	Secondary Shift Selector, Parity	ECU-S25, SSS-E
g				

BULKHEAD CONNECTOR FOR "T" HARNESS (Receptacle With Sockets, Plug With Pins)

Terminal No.*	Color	Wire No.	Description	Termination Points*
A	Orange	102-T1	Solenoid Power, Solenoids A, D, and J (MD 3070 only)	ECU-T1, TRANS-A
B	Green	103-T5	C Solenoid, Low	ECU-T5, TRANS-B
C	White	104-T7	G Solenoid, Low	ECU-T7, TRANS-C
D	Pink	124-T9	Sensor Power	ECU-T9, TRANS-D, TPS-C, RMR-C
E	Green	107-T3	Solenoid Power, Solenoid F	ECU-T3, TRANS-E
F	White	110-T22	F Solenoid, Low	ECU-T22, TRANS-F
G	White	120-T4	A Solenoid, Low	ECU-T4, TRANS-G
H	Tan	121-T2	Solenoid Power, Solenoids B and E	ECU-T2, TRANS-H
J	Orange	128-T20	B Solenoid, Low	ECU-T20, TRANS-J
K	Tan	129-T6	E Solenoid, Low	ECU-T6, TRANS-K
L	Yellow	130-T17	Solenoid Power, Solenoids C and G	ECU-T17, TRANS-L
M	Blue	131-T21	D Solenoid, Low	ECU-T21, TRANS-M
N	Green	135-T25	Analog Ground	ECU-T25, TRANS-N, TPS-A, RMR-A, RTEMP-B (HD), RMOD-F (MD)
P	Tan	147-T27	Sump Temperature Sensor Input	ECU-T27, TRANS-P
Q	Green	148-T32	Output Speed Sensor, Low	ECU-T32, NO-B, TCASE-D (MD 3070), RMOD-D (MDR)
R	Yellow	139-T16	Output Speed Sensor, High	ECU-T16, NO-A, TCASE-C (MD 3070), RMOD-C (MDR)
S	Orange	150-T30	Engine Speed Sensor, Low	ECU-T30, NE-B
T	Tan	141-T14	Engine Speed Sensor, High	ECU-T14, NE-A
U	Blue	140-T31	Turbine Speed Sensor, Low	ECU-T31, NT-B (HD), TRANS-U (MD)
V	Orange	149-T15	Turbine Speed Sensor, High	ECU-T15, NT-A (HD), TRANS-V (MD)
W	Yellow	195-T13	Transmission Identification	ECU-T13, TRANS-W
X	White	162-T12	C3 Pressure Switch Input	ECU-T12, TRANS-X
Y	Blue	165-T26	Oil Level Sensor Input	ECU-T26, TRANS-Y
Z				
a	Yellow	164-T11	Retarder Modulation Request	ECU-T11, RMR-B
b	Blue	156-T10	Throttle Position Sensor	ECU-T10, TPS-B
c	White	127-T23	H Solenoid, Low	ECU-T23, HSOL-A (HD), RMOD-A (MDR), TCASE-A (MD 3070)

* Terminal number and termination points shown only apply when an Allison Transmission recommended harness configuration and bulkhead connector are used.

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APPENDIX D — WIRE/CONNECTOR CHART

BULKHEAD CONNECTOR FOR "T" HARNESS (Receptacle With Sockets, Plug With Pins) *(cont'd)*

Terminal No.*	Color	Wire No.	Description	Termination Points*
d	Orange	138-T28	Retarder Temperature Sensor Input	ECU-T28, RTEMP-A (HD), RMOD-E (MD)
e	Blue	111-T8	J Solenoid, Low	ECU-T8, TRANS-e
f	Blue	101-T24	N Solenoid, Low	ECU-T24, NSOL-A (HD and MD), TRANS-f (MD 3070)
g	Yellow	116-T19	Solenoid Power, Solenoids H and N	ECU-T19, HSOL-B, NSOL-B, TRANS-g, TCASE-B (MD 3070), RMOD-B (MDR)

BULKHEAD CONNECTOR FOR "V" HARNESS (Receptacle With Sockets, Plug With Pins)

Terminal No.*	Color	Wire No.	Description	Termination Points*
A	Green	155-V11	General Purpose Input 1	ECU-V11, VIWV-A
B	Yellow	153-V12	General Purpose Input 2	ECU-V12, VIWV-B
C	Blue	118-V13	General Purpose Input 3	ECU-V13, VIWV-C
D	Pink	124-V8	Sensor Power	ECU-V8, TPS-C
E	Green	105-V19	General Purpose Output 5	ECU-V19, VIWV-E
F	Gray	143-V32	Battery Ground	ECU-V32, VIM-A2
G	Gray	143-V17	Battery Ground	ECU-V17, VIM-A1
H	Tan	112-V22	General Purpose Output 3	ECU-V22, VIM-D2
J	White	114-V2	General Purpose Output 1	ECU-V2, VIM-F3
K	Tan	123-V6	Neutral Start	ECU-V6, VIM-D1
L	Yellow	161-V31	Digital Ground (GPI)	ECU-V31, VIWV-L
M	Blue	179-V9	Engine Water Temperature	ECU-V9, VIWV-M
N	Green	135-V24	Analog Ground	ECU-V24, TPS-A, VIWV-N
P	Green	117-V30	General Purpose Input 8	ECU-V30, VIWV-P
Q	White	113-V4	Reverse Warning	ECU-V4, VIM-F2
R	Orange	178-V28	General Purpose Input 11	ECU-V28, VIWV-R
S	Tan	177-V14	General Purpose Input 10	ECU-V14, VIWV-S
T				
U	Orange	137-V29	General Purpose Input 7	ECU-V29, VIWV-U
V	White	167-V5	General Purpose Output 8	ECU-V5, VIWV-V
W	Pink	136-V16	Battery Power	ECU-V16, VIM-E2
X	Tan	157-V20	Vehicle Speed	ECU-V20, VIM-B2
Y	White	125-V18	General Purpose Output 4	ECU-V18, VIM-C2
Z				
a				
b	Blue	156-V10	Throttle Position Sensor	ECU-V10, TPS-B
c				
d	White	154-V27	General Purpose Input 5	ECU-V27, VIWV-D
e	Yellow	146-V26	Ignition Sense	ECU-V26, VIM-F1
f	Orange	132-V3	General Purpose Output 2	ECU-V3, VIM-B1
g	Pink	136-V1	Battery Power	ECU-V1, VIM-E1

* Terminal number and termination points shown only apply when an Allison Transmission recommended harness configuration and bulkhead connector are used.

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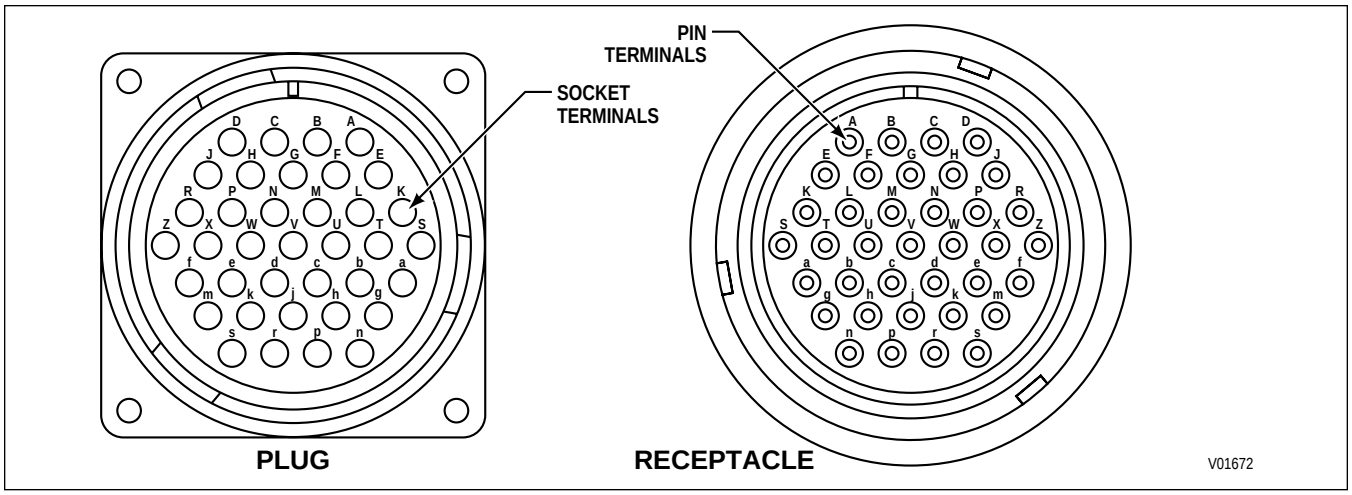

Figure D–5. Cannon 37-Way FMTV Bulkhead Connector

CANNON 37-WAY BULKHEAD CONNECTOR (FMTV ONLY)

Terminal No.	Color	Wire No.	Description	Termination Point(s)
A	Blue	101-T24	N Solenoid Low	Trans-f; ECU-T24
B	Orange	102-T1	A, D, J Solenoid Power	Trans-A; ECU-T1
C	Green	103-T5	C Solenoid Low	Trans-B; ECU-T5
D	White	104-T7	G Solenoid Low	Trans-C; ECU-T7
E	Pink	106	Sensor Power	Trans-D; TPS-C; RMR-C; 124-T9 Splice
F	Green	107-T3	F Solenoid Power	Trans-E; ECU-T3
G				
H	White	110-T22	F Solenoid Low	Trans-F; ECU-T22
J	Green	111-T8	J Solenoid Low	Trans-e; ECU-T8
K	Yellow	116-T19	H, N Solenoid Power	Trans-g; ECU-T19;
L		201	Spare	
M	White	120-T4	A Solenoid Low	Trans-G; ECU-T4
N	Tan	121-T2	B, E Solenoid Power	Trans-H; ECU-T2
P	White	127-T23	H Solenoid Low	T-case-A; ECU-T23
R	Pink	124-T9	Sensor Power	TPS-C; ECU-T9
S	Yellow	127	H Solenoid Power	T-case-B; 116-T19 Splice
T	Orange	128-T20	B Solenoid Low	Trans-J: ECU-T20
U	Tan	129-T6	E Solenoid Low	Trans-K: ECU-T6
V	Yellow	130-T17	C, G Solenoid Power	Trans-L; ECU-T17
W	Blue	131-T21	D Solenoid Low	Trans-M; ECU-T21
X		202	Spare	
Z	Green	135-T25	Analog Ground	TPS-A; ECU-T25
a	Green	135B-T25	Analog Ground	Trans-N; 135-T25 Splice
b				
c				
d	Tan	147-T27	Sump Temp Input	Trans-P; ECU-T27
e		203	Spare	
f	Blue	156-T10	TPS	TPS-B; ECU-T10
g	Green	148-T32	Output Speed-Low	T-case-D; ECU-T32
h(in)	Yellow	195-T13	TransID	ECU-T13

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CANNON 37-WAY BULKHEAD CONNECTOR (FMTV ONLY) *(cont'd)*

Terminal No.	Color	Wire No.	Description	Termination Point(s)
h(out)	Yellow	161A	TransID	Trans-W
j	White	162-T12	C3PS Input	Trans-X; ECU-T12
k	Blue	165-T26	OLS Input	Trans-Y; ECU-T26
m	Tan	141-T14	Engine Speed-High	NE-A; ECU-T14
n	Yellow	139-T16	Output Speed-High	T-case-C; ECU-T16
p	Orange	149-T15	Turbine Speed-High	Trans-V; ECU-T15
r	Blue	140-T31	Turbine Speed-Low	Trans-U; ECU-T31
s	Orange	150-T30	Engine Speed-Low	NE-B; ECU-T30

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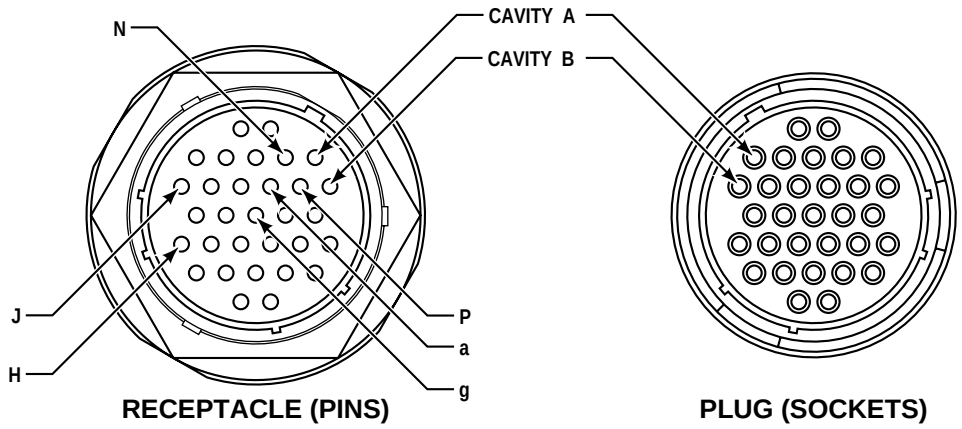

NOTE: 1. Letters I and O are not used.
2. Sockets are lettered counterclockwise. Pins are lettered clockwise.

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Figure D–6. Deutsch Transmission Connector, ECD

DEUTSCH TRANSMISSION CONNECTOR (Plugs With Sockets, Receptacles With Pins)

Terminal No.*	Color	Wire No.	Description	Termination Points*
A	Orange	102-T1	Solenoid Power, Solenoids A, D, and J	ECU-T1, ASOL-B, DSOL-B, JSOL-B
B	Green	103-T5	C Solenoid, Low	ECU-T5, CSOL-A
C	White	104-T7	G Solenoid, Low	ECU-T7, GSOL-A
D	Pink	124-T9	Sensor Power	ECU-T9, TPS-C, RMR-C, OLS-D
E	Green	107-T3	Solenoid Power, Solenoid F	ECU-T3, FSOL-A
F	White	110-T22	F Solenoid, Low	ECU-T22, FSOL-B
G	White	120-T4	A Solenoid, Low	ECU-T4, ASOL-A
H	Tan	121-T2	Solenoid Power, Solenoids B and E	ECU-T2, BSOL-B, ESOL-B
J	Orange	128-T20	B Solenoid, Low	ECU-T20, BSOL-A
K	Tan	129-T6	E Solenoid, Low	ECU-T6, ESOL-A
L	Yellow	130-T17	Solenoid Power, Solenoids C and G	ECU-T17, GSOL-B, CSOL-B
M	Blue	131-T21	D Solenoid, Low	ECU-T21, DSOL-A
N	Green	135-T25	Analog Ground	ECU-T25, TPS-A, RMR-A, RTEMP-B (HD), RMOD-F (MD), C3PS-B, OILT-LO, OLS-B
P	Tan	147-T27	Sump Temperature Sensor Input	ECU-T27, OILT-HI
Q				
R				
S				
T				
U	Blue	140-T31	Turbine Speed Sensor, Low (MD, MD7 only)	ECU-T31, NT-B
V	Orange	149-T15	Turbine Speed Sensor, High (MD, MD7 only)	ECU-T15, NT-A
W	Yellow	195-T13	Transmission Identification (TransID)	ECU-T13, AGND
X	White	162-T12	C3 Pressure Switch Input	ECU-T12, C3PS-A

* Terminal number and termination points shown only apply when an Allison Transmission recommended harness configuration and bulkhead connector are used.

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DEUTSCH TRANSMISSION CONNECTOR (Plugs With Sockets, Receptacles With Pins) *(cont'd)*

Terminal No.*	Color	Wire No.	Description	Termination Points*
Y	Blue	165-T26	Oil Level Sensor Input	ECU-T26, OLS-A
Z				
a				
b				
c				
d				
e	Blue	111-T8	J Solenoid, Low (MD7 or HD7 only)	ECU-T8, JSOL-A
f	Blue	101-T24	N Solenoid, Low (MD7 or HD7 only)	ECU-T24, NSOL-A
g	Yellow	116-T19	Solenoid Power, Solenoids H and N (MD7 only)	ECU-T19, HSOL-B, NSOL-B

* Terminal number and termination points shown only apply when an Allison Transmission recommended harness configuration and bulkhead connector are used.

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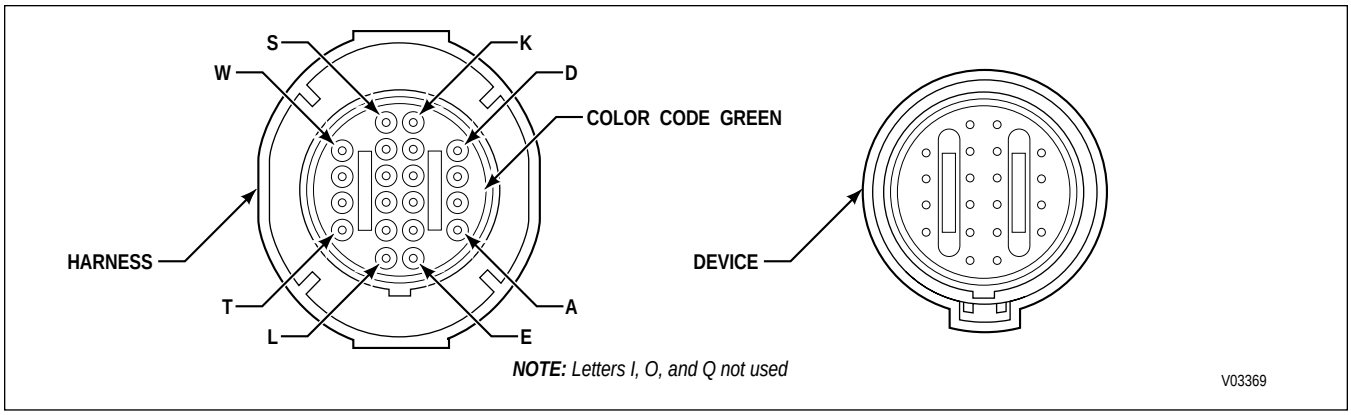

Figure D–7. Remote Selector Connector

REMOTE SHIFT SELECTOR CONNECTOR — PRIMARY SELECTOR

Terminal No.*	Color	Wire No.	Description	Termination Point(s)*
A	Orange	170-S5	Primary Shift Selector, Data Bit 1	ECU, S5
B	Green	171-S6	Primary Shift Selector, Data Bit 2	ECU, S6
C	Blue	172-S7	Primary Shift Selector, Data Bit 4	ECU, S7
D	Yellow	173-S8	Primary Shift Selector, Data Bit 8	ECU, S8
E	Tan	174-S9	Primary Shift Selector, Parity	ECU, S9
F				
G				
H				
J				
K				
L	Orange	176-S15	General Purpose Output 6	VIWS-L, SSS-L
M	Green	175-S10	Shift Selector Mode Output	SSS-M
N	Pink	124-S3	Sensor Power	RMR-C, SSS-N
P	Gray	143-S32	Battery Ground	VIWS-P, SSS-P, DDRP-A, DDRD-E, or OBDII-5
R	Pink	136-S16	Battery Power	SSS-R
S	Blue	180-S14	Shift Selector Display	SSS-S
T	White	186	Dimmer Input A	SSS-T
U	Yellow	187	Dimmer Input B	SSS-U
V	Gray	188	Dimmer Ground	SSS-V
W				

* Terminal number and termination points shown only apply when an Allison Transmission recommended harness configuration and bulkhead connector are used.

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REMOTE SHIFT SELECTOR CONNECTOR — SECONDARY SELECTOR

Terminal No.*	Color	Wire No.	Description	Termination Point(s)*
A	Orange	190-S5	Secondary Shift Selector, Data Bit 1	ECU, S21
B	Green	191-S6	Secondary Shift Selector, Data Bit 2	ECU, S22
C	Blue	192-S7	Secondary Shift Selector, Data Bit 4	ECU, S23
D	Yellow	193-S8	Secondary Shift Selector, Data Bit 8	ECU, S24
E	Tan	194-S9	Secondary Shift Selector, Parity	ECU, S25
F				
G				
H				
J				
K				
L	Orange	176-S15	General Purpose Output 6	VIWS-L, SSS-L
M	Green	175-S10	Shift Selector Mode Output	SSS-M
N	Pink	124-S3	Sensor Power	RMR-C, SSS-N
P	Gray	143-S32	Battery Ground	VIWS-P, SSS-P, DDRP-A, DDRD-E, or OBDII-5
R	Pink	136-S16	Battery Power	SSS-R
S	Blue	180-S14	Shift Selector Display	SSS-S
T	White	186	Dimmer Input A	SSS-T
U	Yellow	187	Dimmer Input B	SSS-U
V	Gray	188	Dimmer Ground	SSS-V
W				

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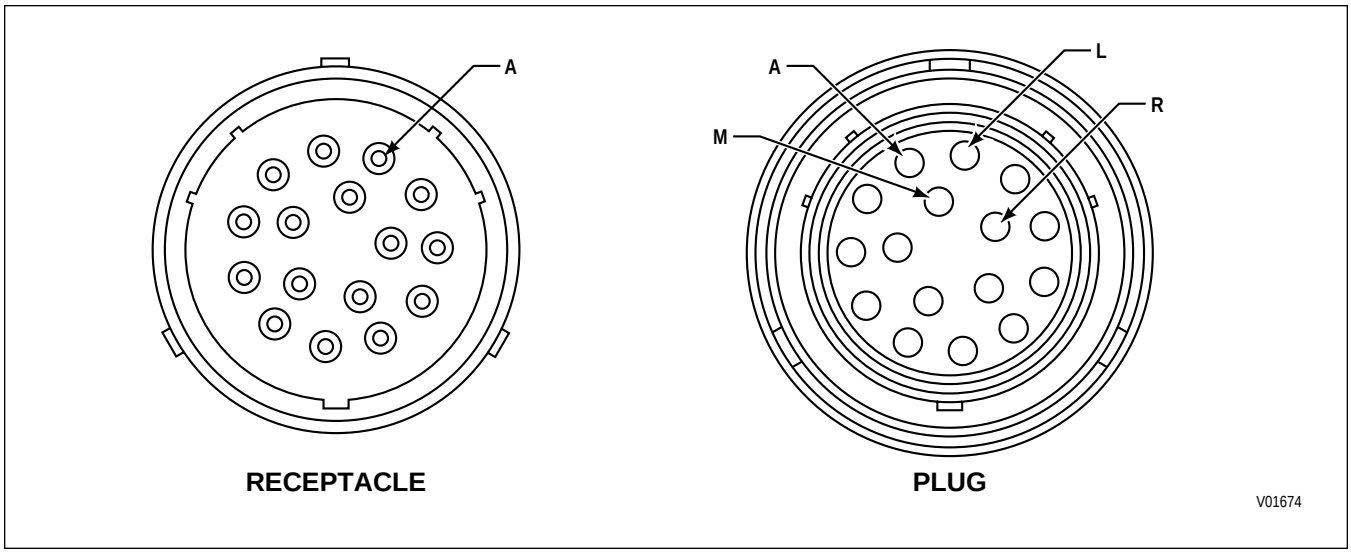

Figure D–8. Optional Deutsch Sensor Harness Connector

OPTIONAL DEUTSCH SENSOR HARNESS CONNECTOR

Terminal No.*	Color	Wire No.	Description	Termination Point(s)*
A				
B				
C	Green	135-T25	Analog Ground	ECU-T25, TRANS-N, RTEMP-B (HD), RMOD-F (MD), TPS-A, RMR-A
D	Orange	138-T28	Retarder Temperature Sensor Input	ECU-T28, RTEMP-A (HD), RMOD-E (MD)
E	Yellow	116-T19	Solenoid Power, Solenoids H and N	ECU-T19, HSOL-B, NSOL-B
F	White	127-T23	H Solenoid, Low	ECU-T23, HSOL-A
G	Yellow	116-T19	Solenoid Power, Solenoids H and N	ECU-T19, HSOL-B, NSOL-B
H	Blue	101-T24	N Solenoid, Low	ECU-T24, NSOL-B
J				
K				
L	Blue	140-T31	Turbine Speed Sensor, Low	ECU-T31, NT-B (HD)
M	Orange	149-T15	Turbine Speed Sensor, High	ECU-T15, NT-A (HD)
N	Orange	150-T30	Engine Speed Sensor, Low	ECU-T30, NE-B
P	Tan	141-T14	Engine Speed Sensor, High	ECU-T14, NE-A
R	Green	148-T32	Output Speed Sensor, Low	ECU-T32, NO-B
S	Yellow	139-T16	Output Speed Sensor, High	ECU-T16, NO-A

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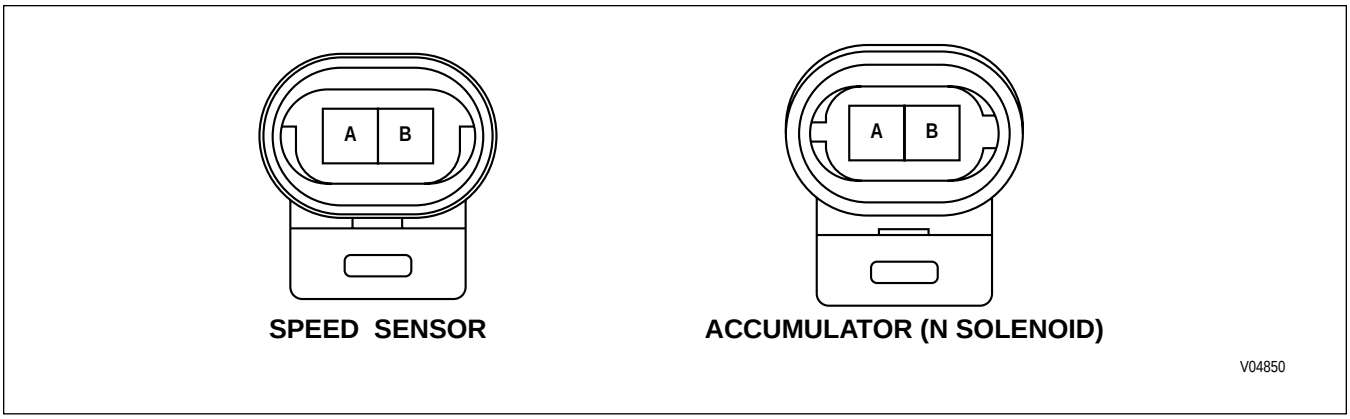

Figure D–9. Speed Sensor Connector

ENGINE SPEED SENSOR CONNECTOR

Terminal No.	Color	Wire No.	Description	Termination Point(s)
A	Tan	141-T14	Engine Speed Sensor Hi	ECU-T14
B	Orange	150-T30	Engine Speed Sensor Lo	ECU-T30

TURBINE SPEED SENSOR CONNECTOR (HD/B 500 ONLY)

Terminal No.	Color	Wire No.	Description	Termination Point(s)
A	Orange	149-T15	Turbine Speed Sensor Hi	ECU-T15
B	Blue	140-T31	Turbine Speed Sensor Lo	ECU-T31

OUTPUT SPEED SENSOR CONNECTOR

Terminal No.	Color	Wire No.	Description	Termination Point(s)
A	Yellow	139-T16	Output Speed Sensor Hi	ECU-T16
B	Green	148-T32	Output Speed Sensor Lo	ECU-T32

ACCUMULATOR (N) SOLENOID

Terminal No.	Color	Wire No.	Description	Termination Point(s)
A	Blue	101-T24	N Solenoid Lo	ECU-T24
B	Yellow	116-T19	N Solenoid Hi	ECU-T19

MD RETARDER (H SOLENOID, TID 2)

Terminal No.	Color	Wire No.	Description	Termination Point(s)
A	White	127-T23	H Solenoid Lo	ECU-T23
B	Yellow	116C-T19	H Solenoid Hi	ECU-T19

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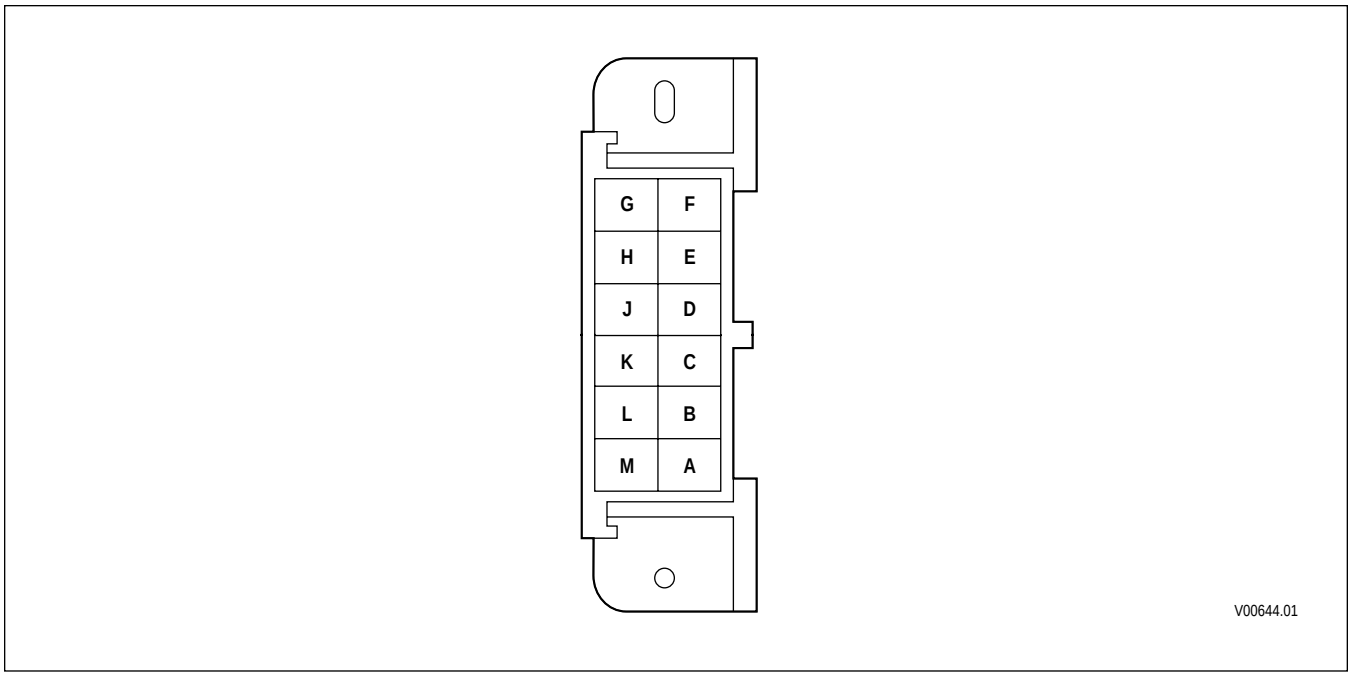

Figure D–10. Diagnostic Connector (Packard)

DIAGNOSTIC CONNECTOR

Terminal No.	Color	Wire No.	Description	Termination Point(s)
A	Gray	143-S32	Battery (–)	ECU-S32, VIWS-P, PSS-P, SSS-P
H	Yellow	146-S4	Ignition Signal (+)	ECU-S4, VIWS-E
J	White	142-S1	Serial Communication (+)	ECU-S1, SCI-A
K	Blue	151-S17	Serial Communication (–)	ECU-S17, SCI-B

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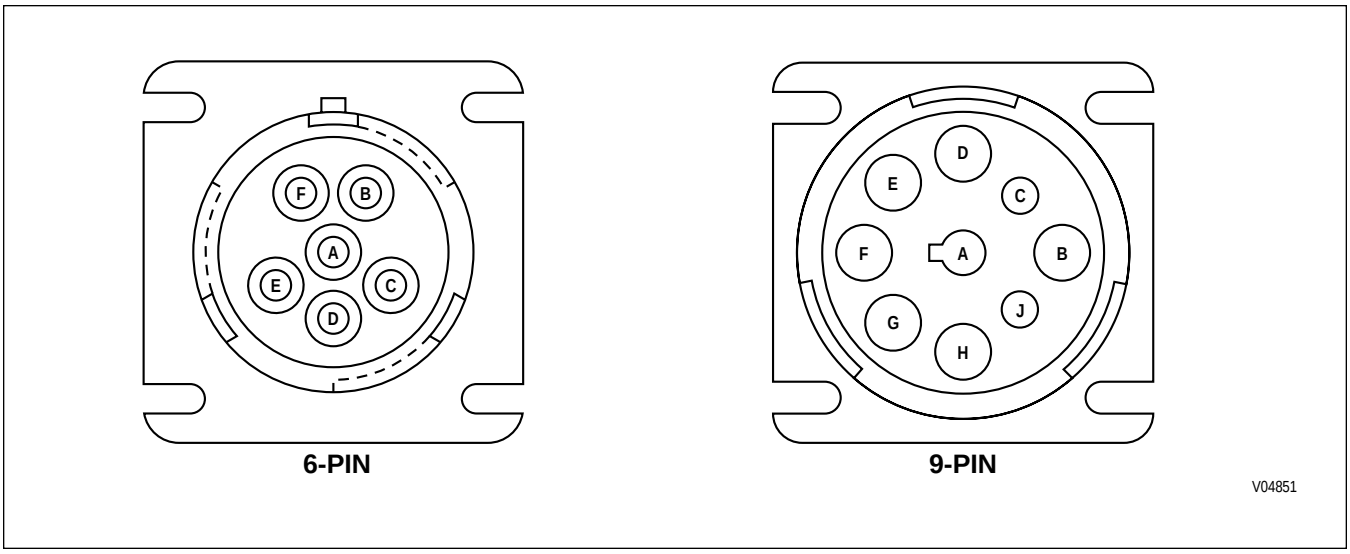

Figure D–11. Optional Deutsch DDR Connectors

OPTIONAL 6-PIN DIAGNOSTIC CONNECTOR

Terminal No.	Color	Wire No.	Description	Termination Point(s)
A	White	142-S1	Serial Communication (+)	ECU-S1, SCI-A
B	Blue	151-S17	Serial Communication (–)	ECU-S17, SCI-B
C	Yellow	146-S4	Ignition Signal (+)	ECU-S4, VIWS-E
D			Open	
E	Gray	143-S32	Battery (–)	ECU-S32, VIWS-P, PSS-P, SSS-P
F			Open	

OPTIONAL 9-PIN DIAGNOSTIC CONNECTOR

Terminal No.	Color	Wire No.	Description	Termination Point(s)
A	Gray	143-S32	Battery Ground (–)	ECU-S32, VIWS-P, PSS-P, SSS-P
B	Yellow	146-S4	Ignition Power (+)	ECU-S4, VIWS-E
B (Optional)	Pink	136-S16	Battery Power (+)	ECU-S16, PSS-R, SSS-R
C	Pink	183-S13	J1939 High	ECU-S13, J1939-A/H
D	Gray	184-S29	J1939 Low	ECU-S29, J1939-B/L
E	Green	182-S12	J1939 Shield/Ground	ECU-S12, J1939-C/S
F	White	142-S1	Serial Communication (+)	ECU-S1, SCI-A
G	Blue	151-S17	Serial Communication (–)	ECU-S17, SCI-B

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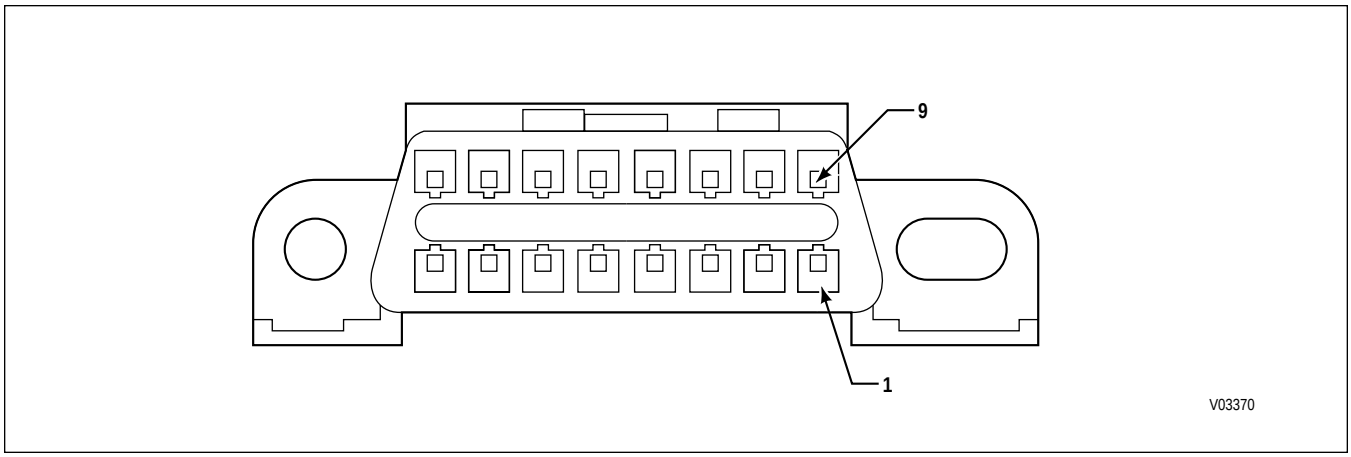

Figure D–12. GMC Connector for OBD-II DDR Adapter

OPTIONAL OBD–II DDR CONNECTOR

Terminal No.*	Color	Wire No.	Description	Termination Point(s)*
1				
2				
3				
4				
5	Gray	143-S32	Battery Ground (–)	ECU-S32, VIWS-P, PSS-P, SSS-P
6				
7	White	142-S1	Serial Communication Interface, Hi	ECU-S1, SCI-A
8				
9				
10				
11				
12				
13				
14				
15	Blue	151-S17	Serial Communication Interface, Lo	ECU-S17, SCI-B
16	Yellow	146-S4	Ignition Sense (+)	ECU-S4, VIWS-E

* Terminal number and termination points shown only apply when an Allison Transmission recommended harness configuration and bulkhead connector are used.

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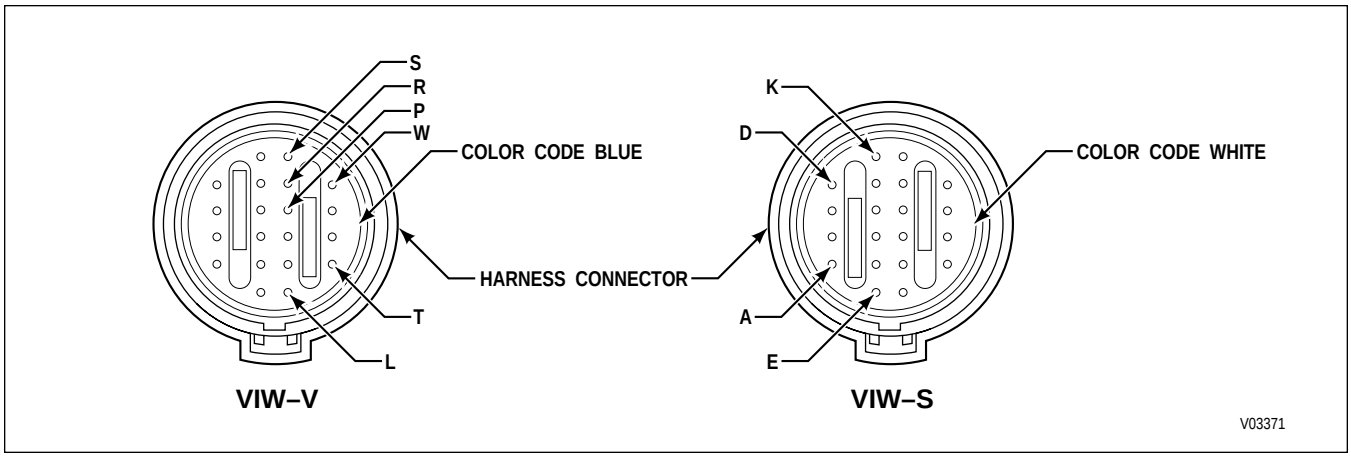

Figure D–13. VIW Connector (Packard Micro Pack)

VIW–V CONNECTOR

Terminal No.*	Color	Wire No.	Description	Termination Point(s)*
A	Green	155-V11	General Purpose Input 1	ECU-V11, VIWV-A
B	Yellow	153-V12	General Purpose Input 2	ECU-V12, VIWV-B
C	Blue	118-V13	General Purpose Input 3	ECU-V13, VIWV-C
D	White	154-V27	General Purpose Input 5	ECU-V27, VIWV-D
E	Green	105-V19	General Purpose Output 5	ECU-V19, VIWV-E
F				
G				
H				
J				
K				
L	Yellow	161-V31	Digital Ground (GPI)	ECU-V31, VIWV-L
M	Blue	179-V9	Engine Water Temperature	ECU-V9, VIWV-M
N	Green	135-V24	Analog Ground	ECU-V24, TPS-A, VIWV-N
P	Green	117-V30	General Purpose Input 8	ECU-V30, VIWV-P
R	Orange	178-V28	General Purpose Input 11	ECU-V28, VIWV-R
S	Tan	177-V14	General Purpose Input 10	ECU-V14, VIWV-S
T				
U	Orange	137-V29	General Purpose Input 7	ECU-V29, VIWV-U
V	White	167-V5	General Purpose Output 8	ECU-V5, VIWV-V
W				

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VIW–S CONNECTOR

Terminal No.*	Color	Wire No.	Description	Termination Point(s) *
A	Tan	159-S2	Diagnostic Communication Link (ISO9141)	ECU-S2, VIWS-A
B	Green	115-S31	Check Transmission	ECU-S31, VIWS-B
C	Yellow	126-S28	General Purpose Input 9	ECU-S28, VIWS-C
D	Tan	157-S30	Vehicle Speed	ECU-S30, VIWS-D
E	Yellow	146-S4	Ignition Sense	ECU-S4, VIWS-E, DDRP-H, DDRD-C
F				
G				
H				
J				
K				
L	Orange	176-S15	General Purpose Output 6	ECU-S15, VIWS-L, PSS-L, SSS-L
M	Yellow	119-S11	General Purpose Input 4	ECU-S11, VIWS-M
N	Tan	166-S18	General Purpose Output 7	ECU-S18, VIWS-N
P	Gray	143-S32	Battery Ground	ECU-S32, VIWS-P, PSS-P, SSS-P, DDRP-A, DDRD-E
R	Blue	163-S27	General Purpose Input 6	ECU-S27, VIWS-R
S	Blue	169-S26	General Purpose Input 12	ECU-S26, VIWS-S
T	White	186	Dimmer Input A	VIWS-T, PSS-T, SSS-T
U	Yellow	187	Dimmer Input B	VIWS-U, PSS-U, SSS-U
V	Gray	188	Dimmer Ground	VIWS-V, PSS-V, SSS-V
W				

* Terminal number and termination points shown only apply when an Allison Transmission recommended harness configuration and bulk-head connector are used.

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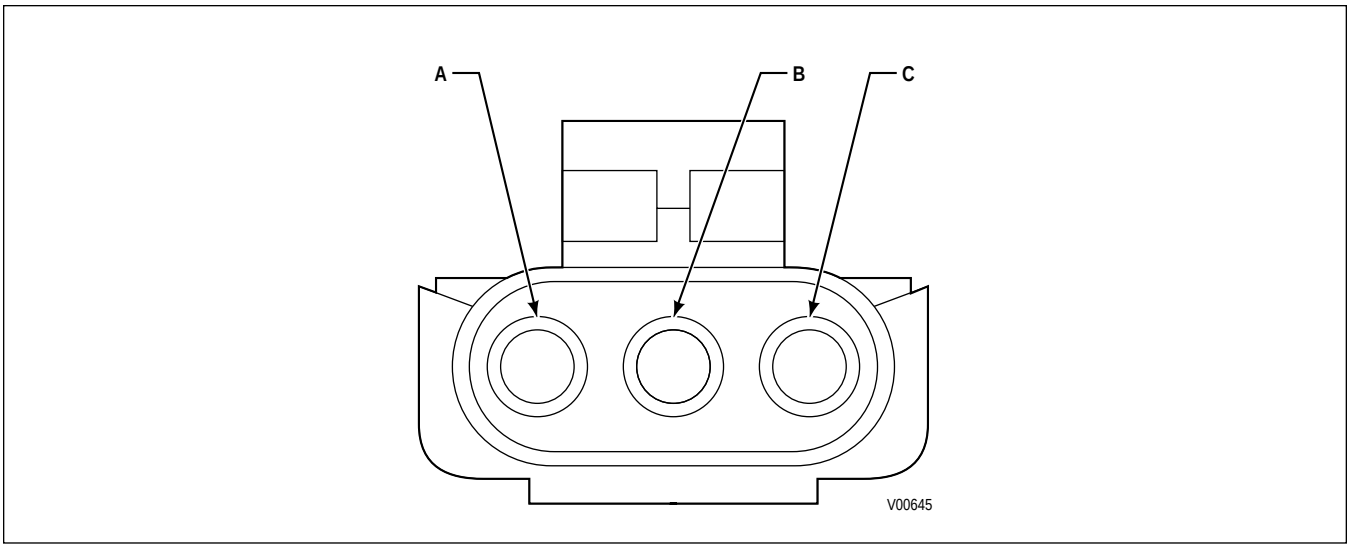

Figure D–14. TPS Connector

THROTTLE POSITION SENSOR CONNECTOR

Terminal No.	Color	Wire No.	Description	Termination Point(s)
A	Green	135-T25 or 135-V24	Analog Ground	ECU-T25 or V24; TRANS-N; RMR-A, RMOD-F or B; VIWV-N
B	Blue	156-T10 or V10	TPS Signal	ECU-T10 or V10
C	Pink	124-T9 or V8	TPS Hi	ECU-T9 or V8; RMR-C

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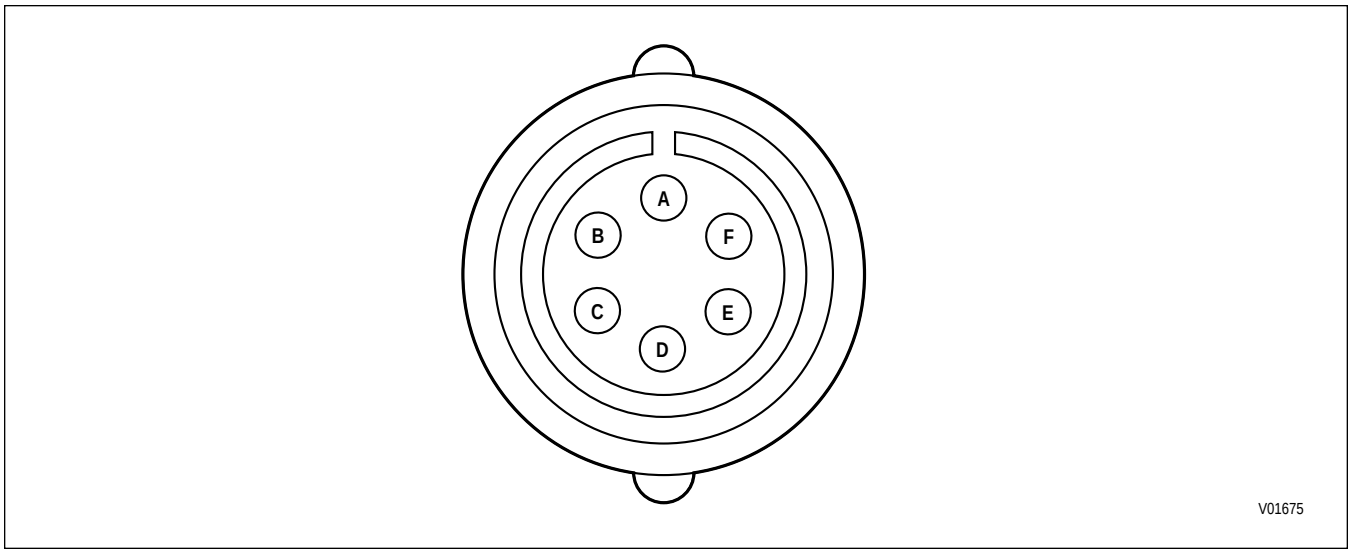

Figure D–15. Transfer Case Connector

TRANSFER CASE CONNECTOR

Terminal No.	Color	Wire No.	Description	Termination Point(s)
A	White	127-T23	H (Diff Lock) Solenoid Lo	ECU-T23
B	Yellow	116N-T19	H (Diff Lock) Solenoid Hi	ECU-T19, TRANS-g
C	Yellow	139-T16	Output Speed Sensor Hi	ECU-T16
D	Green	148-T32	Output Speed Sensor Lo	ECU-T32

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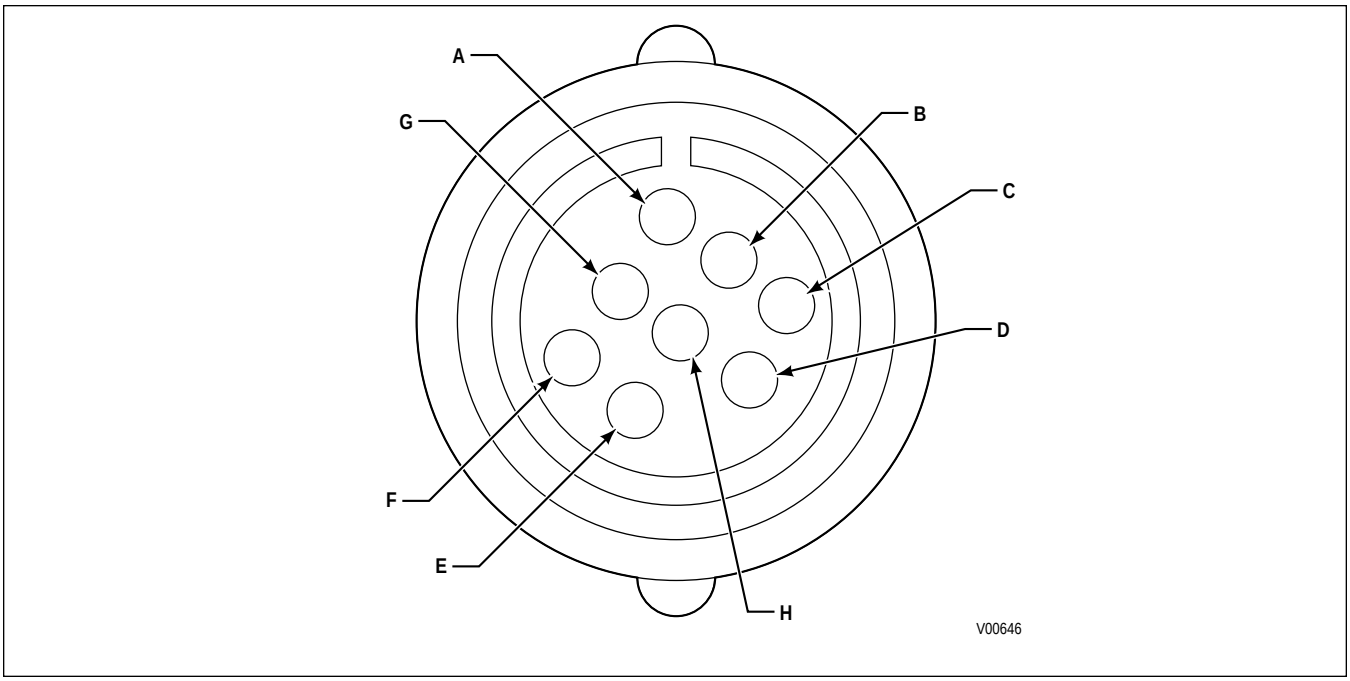

Figure D–16. Retarder Connector (MD/B 300/B 400 Pre-TransID and TID 1)

RETARDER CONNECTOR — MD/B 300/B 400 (Pre-TransID and TID 1)

Terminal No.	Color	Wire No.	Description	Termination Point(s)
A	White	127-T23	H (Rtdr Enable) Solenoid Lo	ECU-T23
B	Yellow	116-T19	H (Rtdr Enable) Solenoid Hi	ECU-T19, NSOL-B
C	Yellow	139-T16	Output Speed Sensor Hi	ECU-T16
D	Green	148-T32	Output Speed Sensor Lo	ECU-T32
E	Orange	138-T28	Retarder Temperature Input	ECU-T28
F	Green	135-T25	Analog Ground	ECU-T25; TRANS-N; TPS-A, RMR-A

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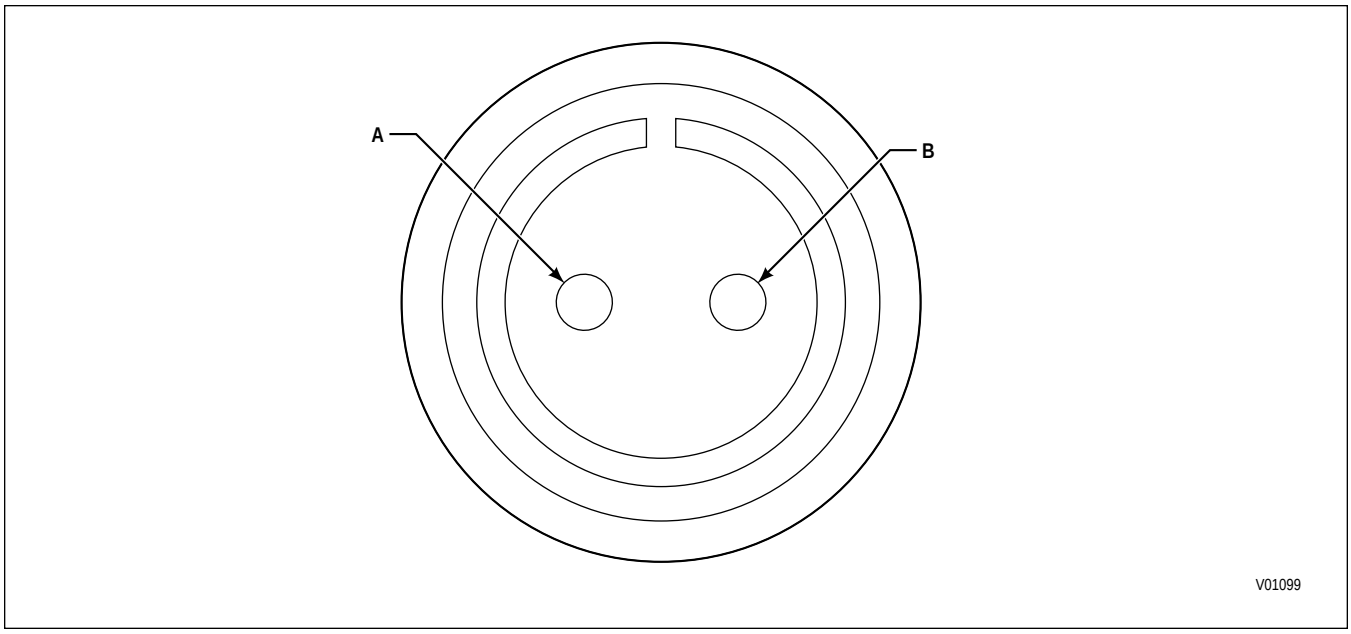

Figure D–17. Retarder Connector (HD/B 500)

RETARDER CONNECTOR — HD/B 500

Terminal No.	Color	Wire No.	Description	Termination Point(s)
A	White	127-T23	H (Retarder Enable) Solenoid Lo	ECU-T23
B	Yellow	116-T19	H (Retarder Enable) Solenoid Hi	ECU-T19, NSOL-B

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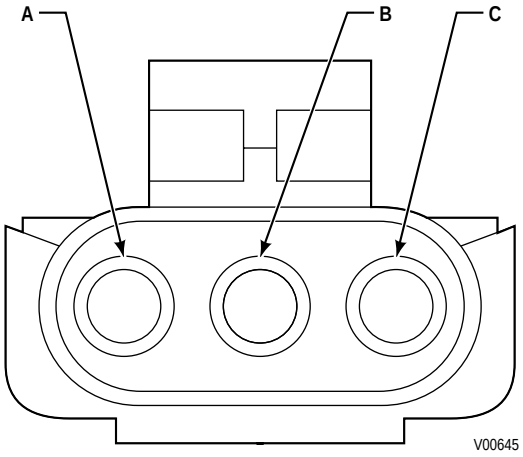

Figure D–18. Retarder Resistance Module/Interface Connector

RETARDER RESISTANCE MODULE/INTERFACE CONNECTOR

Terminal No.	Color	Wire No.	Description	Termination Point(s)
A	Green	135-T25 or S19	Analog Ground	ECU-T25 or S19; TRANS-N, RMOD-F; TPS-A
B	Yellow	164-T11 or S20	Retarder Mod.	ECU-T11 or S20
C	Pink	124-T9 or S3	Retarder Mod. Hi	ECU-T9 or S3; TRANS-D, PSS-N, SSS-N

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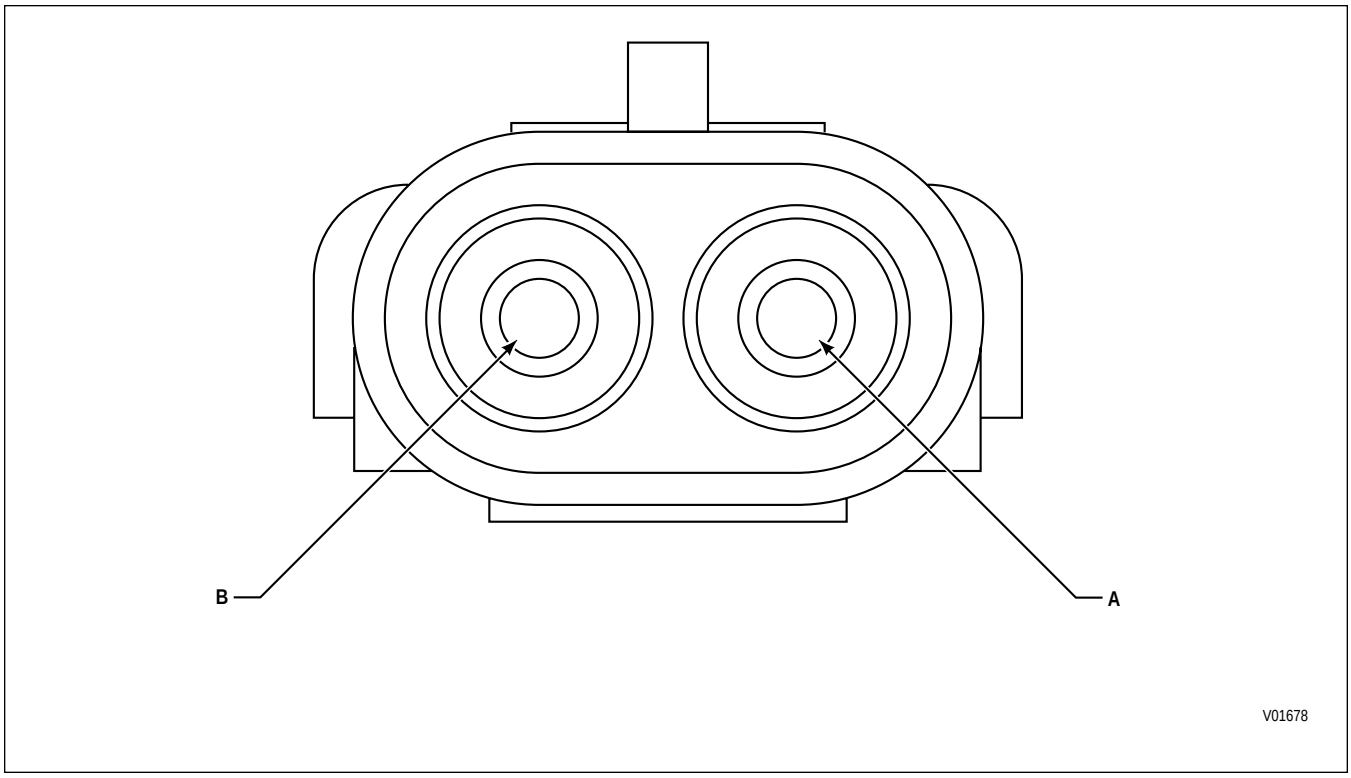

Figure D–19. Retarder Temperature Sensor Connector (HD/B 500 Pre-TransID and TID 1)

RETARDER TEMPERATURE SENSOR CONNECTOR — HD/B 500 (Pre-TransID and TransID 1)

Terminal No.	Color	Wire No.	Description	Termination Point(s)
A	Orange	138-T28	Retarder Temperature Input	ECU-T28
B	Green	135-T25	Analog Ground	ECU-T25; TRANS-N; TPS-A; RMR-A

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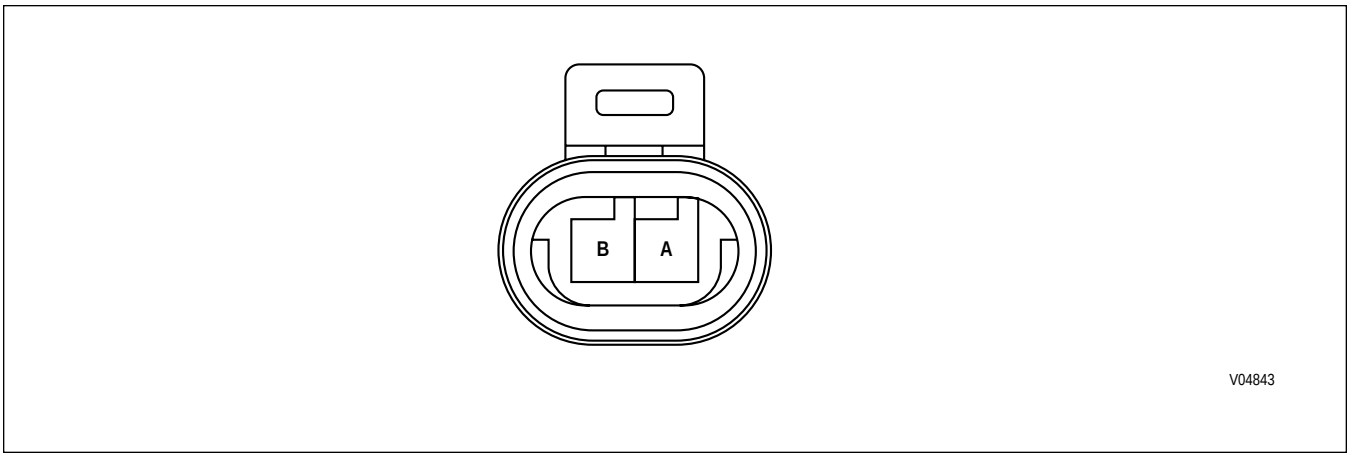

Figure D–20. Retarder Temperature Sensor Connector (MD/HD/B, TID 2)

RETARDER TEMPERATURE SENSOR CONNECTOR — MD/HD/B, TRANSID 2

Terminal No.	Color	Wire No.	Description	Termination Point(s)
A	Orange	138-T28	Retarder Temperature Input	ECU-T28
B	Green	135C-T25	Analog Ground	ECU-T25; TRANS-N; TPS-A

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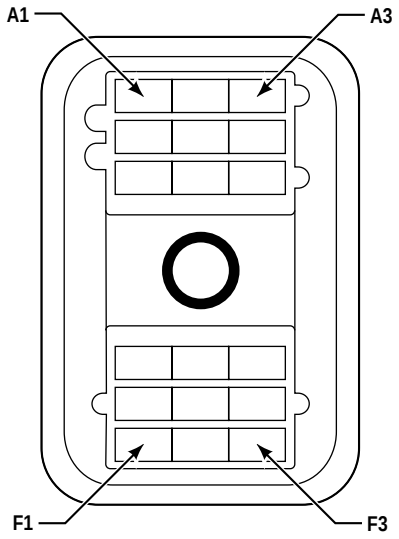

Figure D–21. VIM Connector (Harness)

VIM CONNECTOR (HARNESS)

Terminal No.	Color	Wire No.	Description	Termination Point(s)
A1	Gray	143-V17	Battery (–)	ECU-V17
A2	Gray	143-V32	Battery (–)	ECU-V32
A3			Reserved	
B1	Orange	132-V3	GPO 2	ECU-V3
B2	Tan	157-V20	Speedometer Signal	ECU-V20
B3			Reserved	
C1			Reserved	
C2	White	125-V18	GPO 4	ECU-V18
C3			Reserved	
D1	Tan	123-V6	Neutral Start	ECU-V6
D2	Tan	112-V22	GPO 3	ECU-V22
D3			Reserved	
E1	Pink	136-V1	Battery (+)	ECU-V1
E2	Pink	136-V16	Battery (+)	ECU-V16
E3			Reserved	
F1	Yellow	146-V26	Ignition Sense (+)	ECU-V26
F2	White	113-V4	Reverse Warning	ECU-V4
F3	White	114-V2	GPO 1	ECU-V2

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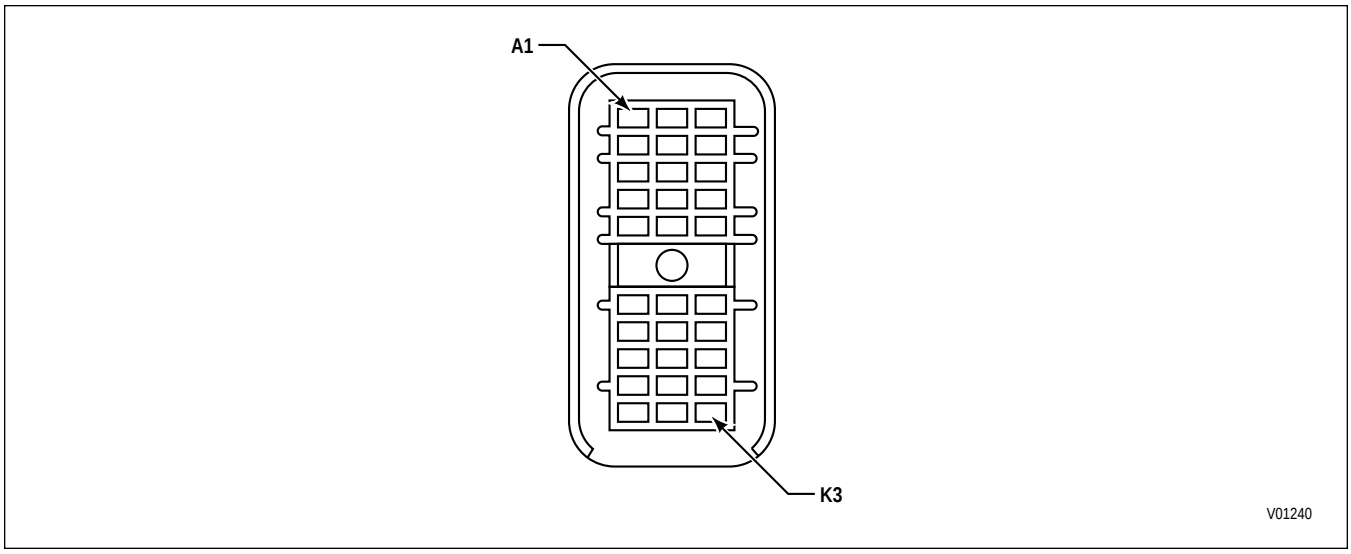

Figure D–22. VIM Connector (Harness)

VIM CONNECTOR (HARNESS 30-WAY)

Terminal No.	Color	Wire No.	Description	Termination Point(s)*
A1	Blue	313NO	Reverse Warning Relay — Normally Open	
A2	Yellow	314CM	Output Wire 114 Relay — Common	
A3	Blue	314NO	Output Wire 114 Relay — Normally Open	
B1	Yellow	313CM	Reverse Warning Relay — Common	
B2	Green	314NC	Output Wire 114 Relay — Normally Closed	
B3			Reserved	
C1	Orange	346	Ignition Power	
C2	Green	312NC	Output Wire 112 Relay — Normally Closed	
C3			Reserved	
D1	Green	325NC	Output Wire 125 Relay — Normally Closed	
D2	Green	332NC	Output Wire 132 Relay — Normally Closed	
D3			Reserved	
E1	Yellow	325CM	Output Wire 125 Relay — Common	
E2	Yellow	332CM	Output Wire 132 Relay — Common	
E3	Blue	332NO	Output Wire 132 Relay — Normally Open	
F1	Blue	323NO	Neutral Start Relay — Normally Open	
F2	Yellow	312CM	Output Wire 112 Relay — Common	
F3	Blue	312NO	Output Wire 112 Relay — Normally Open	
G1	Yellow	323CM	Neutral Start Relay — Common	
G2			Reserved	
G3			Reserved	
H1			Reserved	
H2	White	357UF	Speedometer — Unfiltered	
H3			Reserved	
J1	Pink	336A	Battery Power	
J2	Pink	336C	Battery Power	
J3			Reserved	
K1	Gray	343A	Battery Ground	
K2	Gray	343C	Battery Ground	
K3			Reserved	

* Termination Points are determined by OEM electrical system design.

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APPENDIX D — WIRE/CONNECTOR CHART

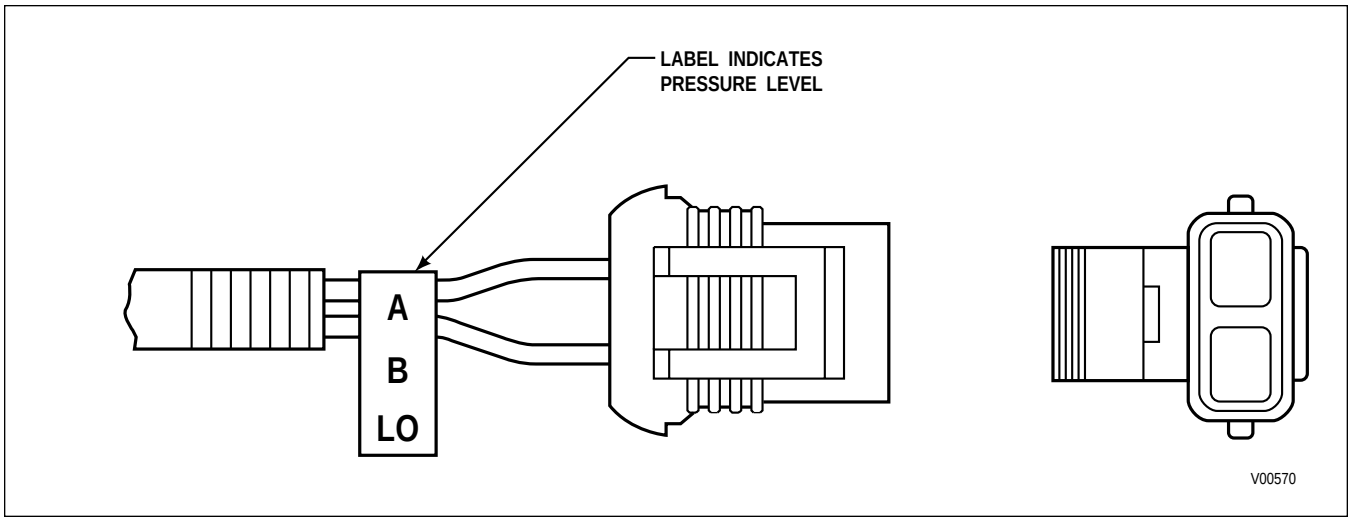

Figure D–23. Resistance Module Type 2 — Single Pressure Switch and SCI Interface

RESISTANCE MODULE TYPE 2

Terminal No.
A
B

SCI INTERFACE CONNECTOR

Terminal No.	Color	Wire No.	Description	Termination Point(s)
A	White	142-S1	Serial Communication Interface, Hi	ECU-S1, DDRP-J, DDRD-A
B	Blue	151-S17	Serial Communication Interface, Lo	ECU-S17, DDRP-K, DDRD-B

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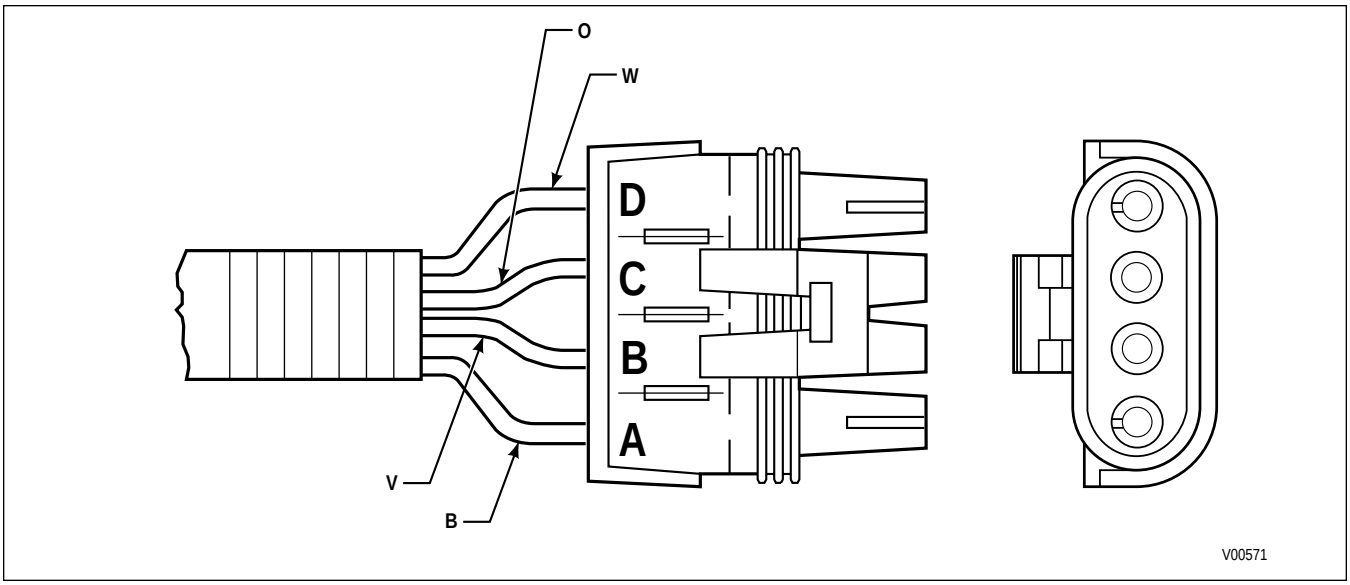

Figure D–24. Resistance Module Type 3 — Bendix E-10R Pedal

RESISTANCE MODULE TYPE 3

Terminal No.	Wire Color
A	Blue
B	Violet
C	Orange
D	White

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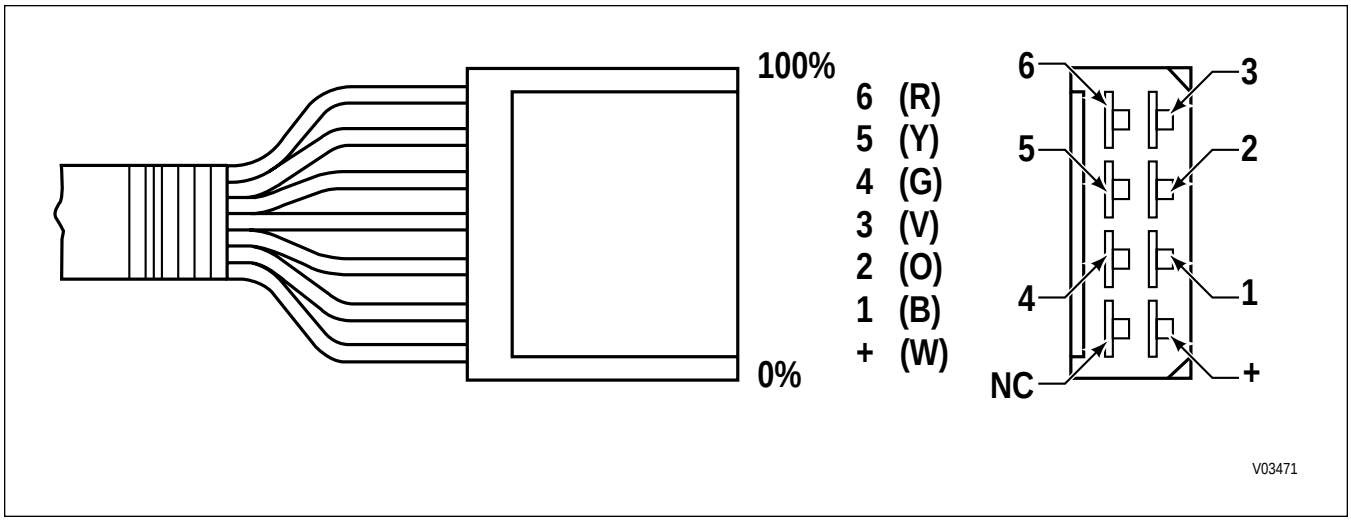

Figure D–25. Resistance Module Type 5 — Hand Lever

RESISTANCE MODULE TYPE 5

Terminal No.	Wire Color
+	White
1	Blue
2	Orange
3	Violet
4	Green
5	Yellow
6	Red

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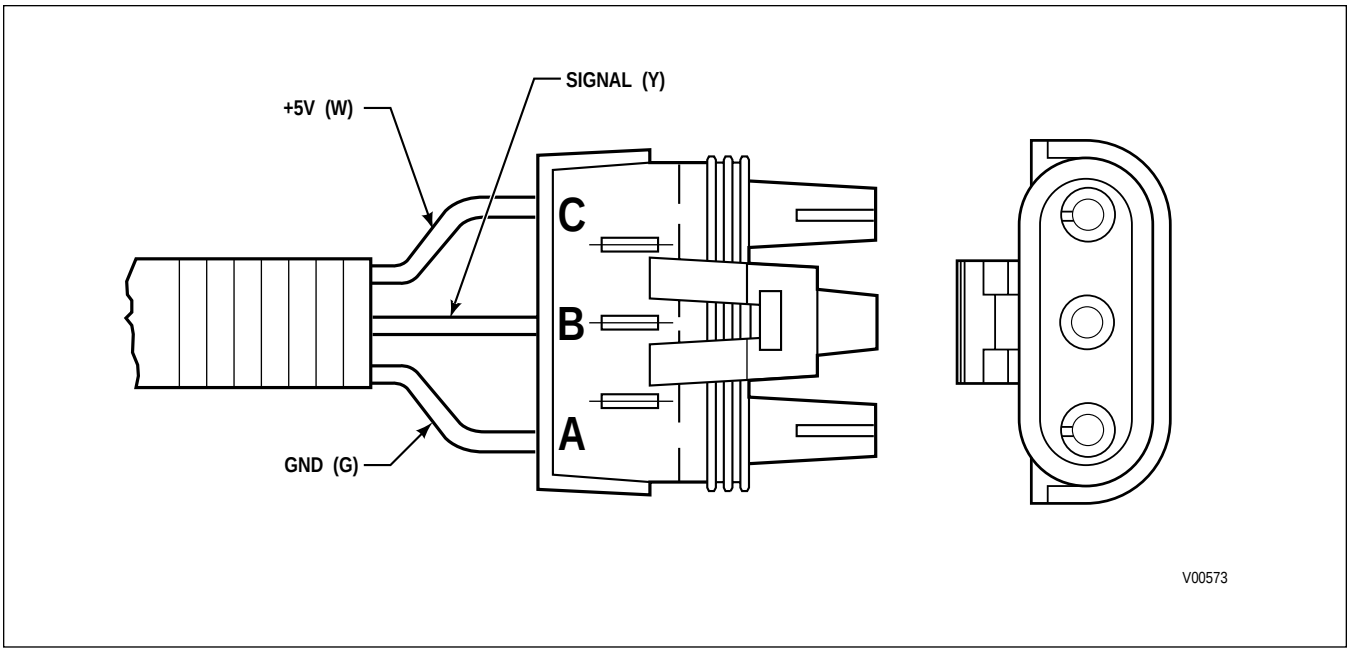

Figure D–26. Resistance Module Type 7 — Dedicated Pedal

RESISTANCE MODULE TYPE 7

Terminal No.	Wire Color
A	Green
B	Yellow
C	White

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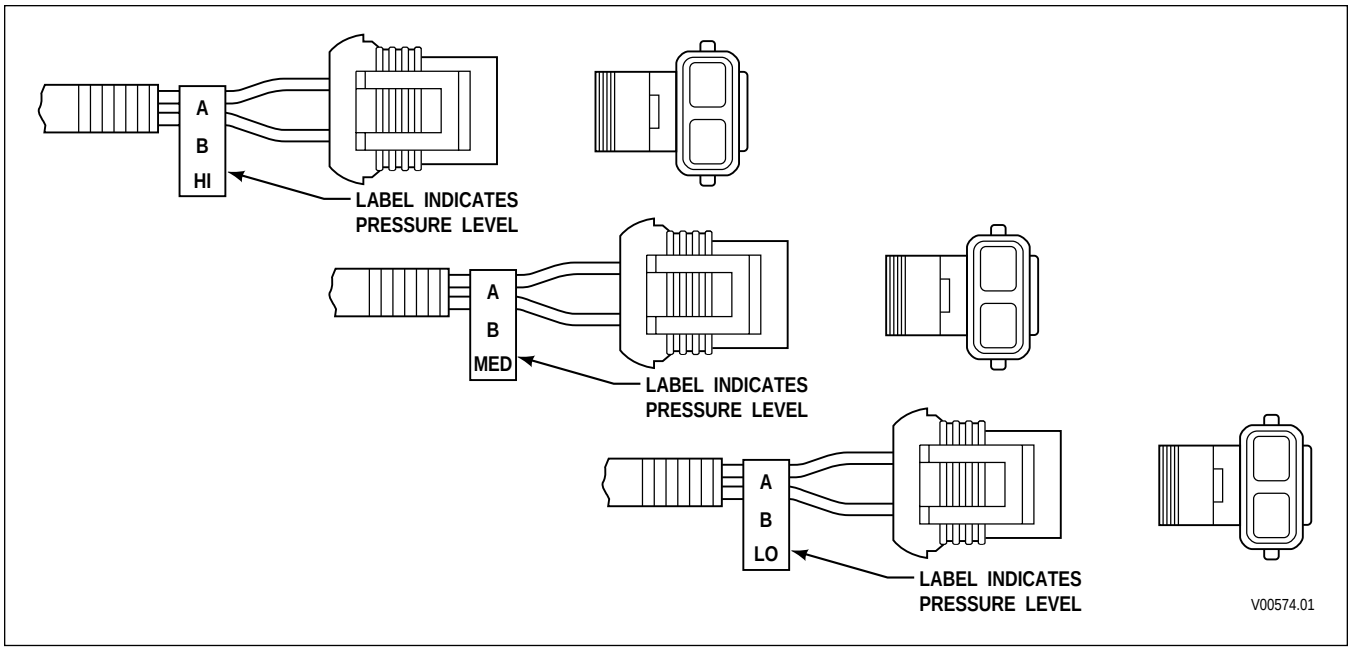

Figure D–27. Resistance Module Type 8 — Three Pressure Switch

RESISTANCE MODULE TYPE 8

LOW PRESSURE

Terminal No.	Wire Color
A	White
B	Blue

MEDIUM PRESSURE

Terminal No.	Wire Color
A	White
B	Orange

HIGH PRESSURE

Terminal No.	Wire Color
A	White
B	Violet

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APPENDIX D — WIRE/CONNECTOR CHART

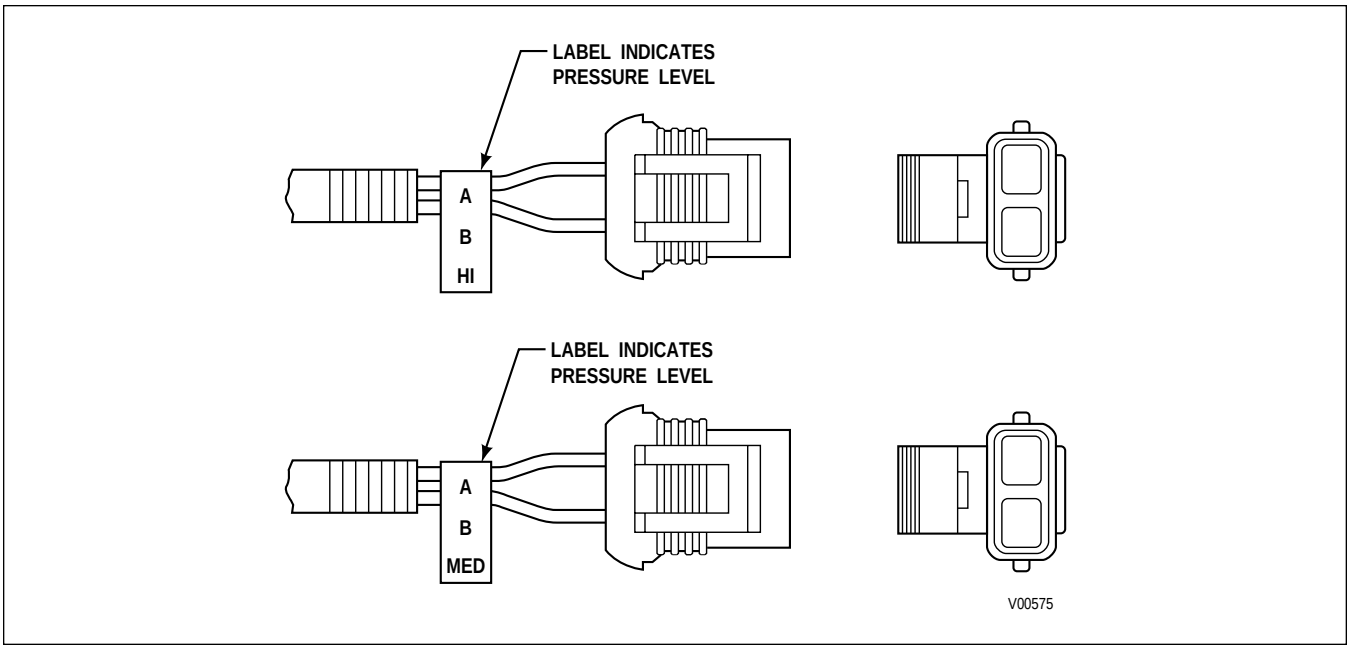

Figure D–28. Resistance Module Type 9 — Two Pressure Switch

RESISTANCE MODULE TYPE 9

MEDIUM PRESSURE

Terminal No.	Wire Color
A	White
B	Orange

HIGH PRESSURE

Terminal No.	Wire Color
A	White
B	Violet

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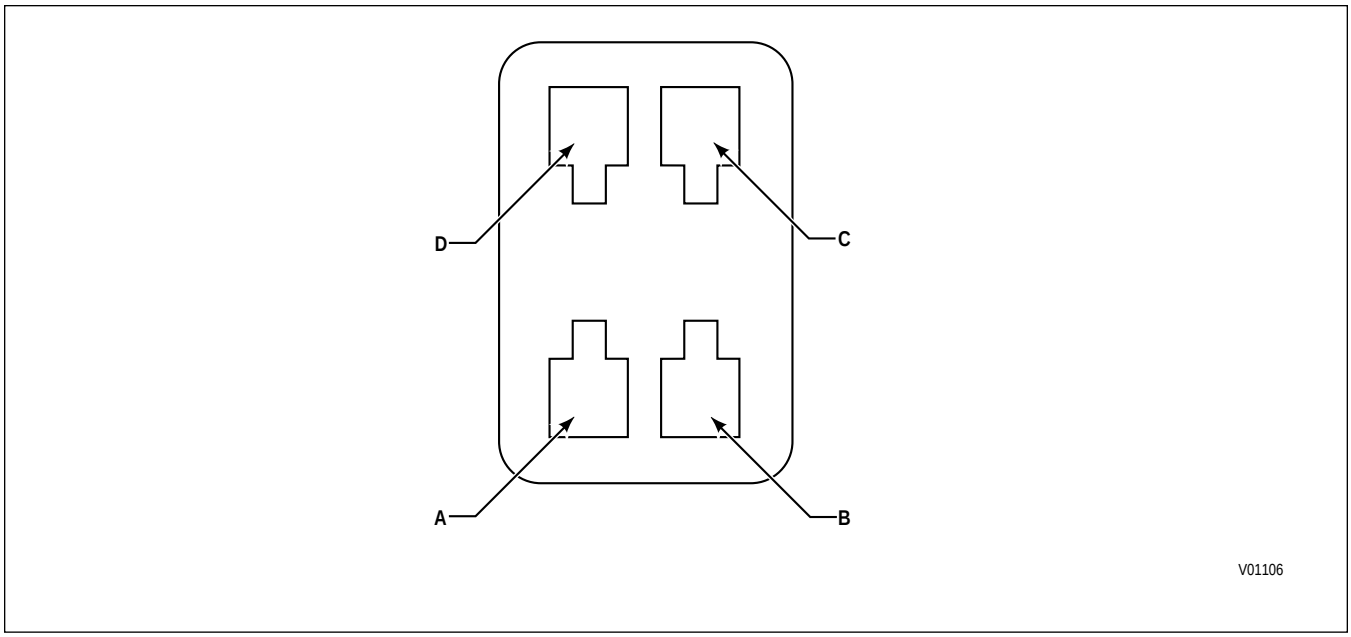

Figure D–29. Oil Level Sensor Plug

OIL LEVEL SENSOR CONNECTOR

Terminal No.	Color	Wire No.	Description	Termination Point(s) 31-Way Feedthrough Harness Connector
A	Blue	165	Oil Level Sensor Input	Trans-Y
B	Green	135	Analog Ground	Trans-N
C				
D	Pink	124	Sensor Power	Trans-D

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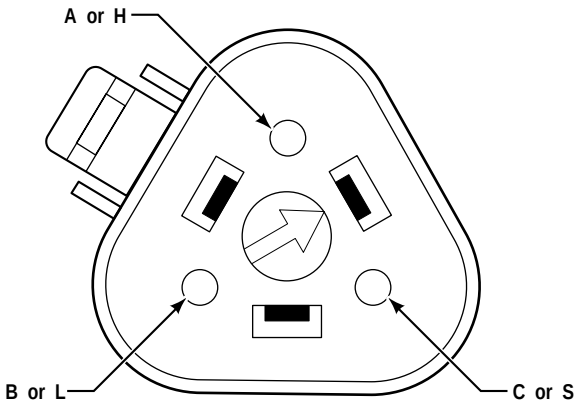

Figure D–30. J1939 Interface Connector

J1939 INTERFACE CONNECTOR

Terminal No.	Color	Wire No.	Description	Termination Point(s)
A or H	Pink	183-S13	J1939 Controller, Hi	ECU-S13
B or L	Gray	184-S29	J1939 Controller, Lo	ECU-S29
C or S	Green	182-S12	J1939 Shield	ECU-S12

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APPENDIX E — CONNECTOR PART NUMBERS, TERMINAL PART NUMBERS, TOOL PART NUMBERS, AND REPAIR INSTRUCTIONS

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NOTE: Allison Transmission is providing for service of wiring harnesses and wiring harness components as follows:

- Repair parts for the internal wiring harness and for wiring harness components attached to the shift selector will be available through the Allison Transmission Parts Distribution Center (PDC). Use the P/N from your appropriate parts catalog or from Appendix E in this manual. Allison Transmission is responsible for warranty on these parts.
- Repair parts for the external harnesses and external harness components must be obtained from St. Clair Technologies Inc. (SCTI). SCTI provides parts to any Allison customer or OEM and is responsible for warranty on these parts. SCTI recognizes ATD, manufacturers, and SCTI part numbers. SCTI provides a technical HELPLINE at 519-627-1673 (Wallaceburg). SCTI will have parts catalogs available. The SCTI addresses and phone numbers for parts outlets are:

St. Clair Technologies, Inc.
1050 Old Glass Road
Wallaceburg, Ontario, Canada, N8A 3T2
Phone: (519) 627-1673
Fax: (519) 627-4227

St. Clair Technologies, Inc.
1111 Mikesell Street
Charlotte, Michigan 48813
Phone: (517) 541-8166
Fax: (517) 541-8167

St. Clair Technologies, Inc.
c/o Mequilas Tetakawi
Carr. Internationale KM 1969
Guadalajara – Nogales, KM2
Empalme, Sonora, Mexico
Phone: 011-52-622-34661
Fax: 011-52-622-34662

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APPENDIX E — CONNECTOR PART NUMBERS, TERMINAL PART NUMBERS, TOOL PART NUMBERS, AND REPAIR INSTRUCTIONS

- St. Clair Technologies, Inc. stocks a WTEC III external harness repair kit, P/N 29532362, as a source for some external harness repair parts. SCTI is the source for external harness repair parts.

List Of Special Tools Required To Service WTEC III Wiring Harnesses

Tool Number	Tool Type	Paragraph Reference
23046604	Splice, Sealed (14–16 AWG)	1–12
23046605	Splice, Sealed (18–22 AWG)	1–12
J 25070	Heat Gun	1–12
J 34182	Crimper 1	1–8, 1–9, 1–11
J 34513	Remover 1	1–8
J 35123	Crimper (Alternate)	1–2
J 35606	Crimper (Alternate)	1–6
J 35615	Wire Stripper 1	1–12
J 35689-A	Remover	1–2
J 38125-10	Remover	1–6
J 38125-13	Remover	1–4, 1–5, 1–7
J 38125-6	Crimper	1–5, 1–6
J 38125-7	Crimper	1–2, 1–3, 1–5, 1–7
J 38125-8	Crimper	1–12
J 38582-3	Remover	1–8
J 38852	Crimper (Alternate)	1–6
J 39227	Remover	1–1
J 39841	Terminal Remover/Installer (MD Retarder)	1–9
J 39842	Terminal Remover/Installer (MD 3070 T-Case)	1–9
J 41193	Connector Repair Kit (FMTV)	1–9
J 41193-1	Guide Pin	1–9
J 41193-2	Insertion Tool	1–9
J 41193-3	Terminal Remover	1–9
J 41194	Extractor/Inserter	1–8
J 42215	Crimper	1–1
None	50–70 Percent Tin Resin Core Solder	1–10
None	Pen-Type Soldering Iron (Max OD = 3.175 mm)	1–10
None	Desoldering Braid	1–10

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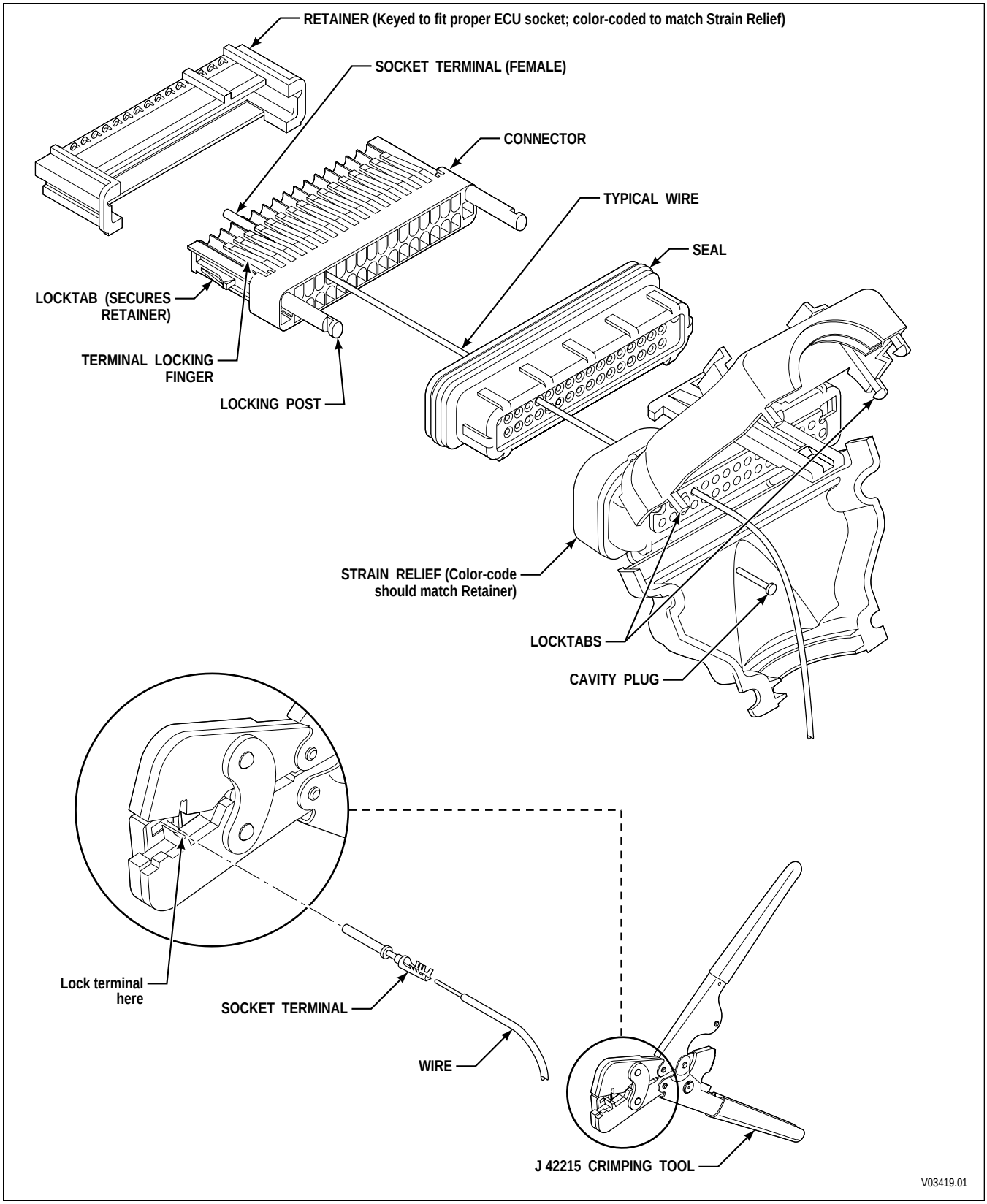

Figure E–1A. Delphi-Packard Micro Pack Connector (ECU)

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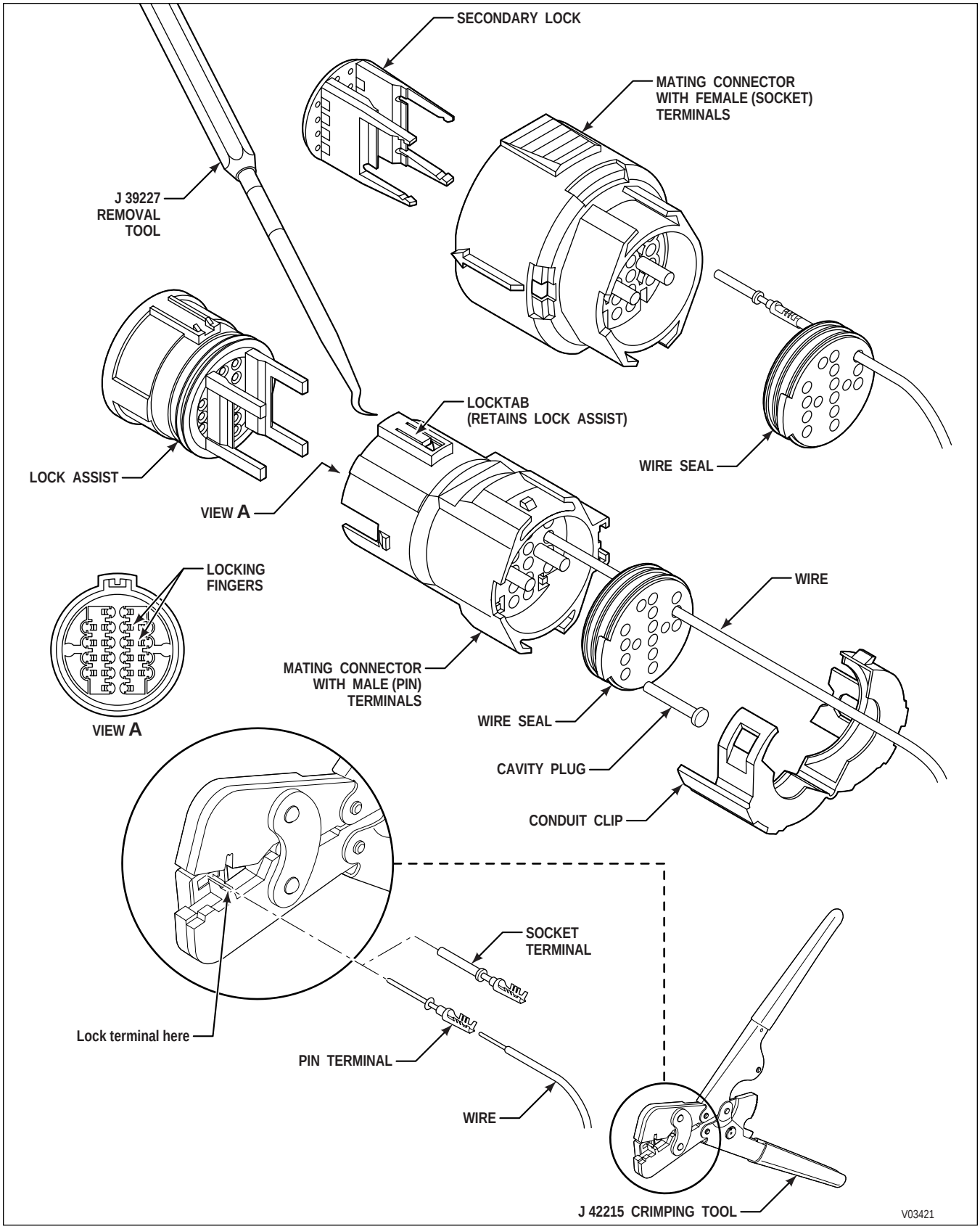

Figure E–1B. Delphi-Packard Micro Pack Connector (VIWV, VIWS, Shift Selector)

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APPENDIX E — CONNECTOR PART NUMBERS, TERMINAL PART NUMBERS, TOOL PART NUMBERS, AND REPAIR INSTRUCTIONS

1–1. DELPHI-PACKARD MICRO PACK 100W CONNECTORS (ECU, VIWV, VIWS, SHIFT SELECTORS)

A. Connector/Terminal Repairs

Crimping Tool	J 42215
Remover Tool	J 39227

Use	Description	Manufacturers P/N
Electronic Control Unit (Harness)	Strain Relief, 32-Way Black	12191001 *
	Seal, 32-Way	15305333 *
	Cavity Plug	12129557 *
	Connector	15305371
	Retainer, Black	12129021 *
	Terminal, Socket	12084912 *
	CPA (Connector Position Assurance)	12177289 *
	Strain Relief, 32-Way Gray	12191002 *
	Retainer, Gray	12129022 *
	Strain Relief, 32-Way Blue	12191003 *
	Retainer, Blue	12129023 *
VIWV and VIWS (Harness)	Connector, Gray	12160542
	Wire Seal, Green	12110693
VIWV Only	Lock Assist, Blue	12191177
	Terminal, Pin	12160551
	Cavity Plug	12129557 *
	Conduit Clip, Black	12176394
VIWS Only	Lock Assist, White	12191178
Shift Selector (Harness)	Connector, Gray	12160280 *
	Wire Seal, Gray	15304882 *
	Secondary Lock, Green	12160494 *
	Terminal, Socket	12084912 *
Shift Selector (Device)	Connector, Gray	12160542
(Kit P/N 29530475)	Wire Seal, Green	12110693
	Lock Assist/Seal, Green	12191176
	Conduit Clip, Black	12176394 *
VIWV and VIWS (Device)	Connector, Gray	12160280
	Wire Seal, Gray	15304882
VIWV Only	Secondary Lock, Blue	12191172
	Terminal, Socket	12084912
VIWS Only	Secondary Lock, White	12191173

* These parts are contained in Allison Kit P/N 29532362.

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APPENDIX E — CONNECTOR PART NUMBERS, TERMINAL PART NUMBERS, TOOL PART NUMBERS, AND REPAIR INSTRUCTIONS

B. Terminal Removal

1. ECU Harness Connectors *(Figure E–1A)*

CAUTION:	The color-code of the strain relief should match the color-code of the retainer. However, cases have been reported where this has not occurred. The retainer color-code and key configuration ensures that the proper wiring harness connector is in the right socket of the ECU. The color-code of the the strain relief is of secondary importance and may not agree with the retainer. Change the strain relief to match the color-code of the retainer (Figure E–1A) when color-code mismatch is found.

   a. Use a small-bladed screwdriver to gently release the locktabs at the splitline of the strain relief.

   b. Spread the strain relief open.

   c. Remove the retainer from the connector by using a small-bladed screwdriver to depress the locktabs on the side of the connector.

   d. Remove a selected terminal by pushing forward on the wire or by lifting the locking finger and pulling the wire and terminal rearward out of the connector.

2. VIWV and VIWS Harness Connectors and Shift Selector (Device) Connectors *(Figure E–1B)*

   a. Lift locktab on the side of the connector and remove the lock assist.

   b. Open the conduit clip on the back of the connector after lifting locktabs on each side and sliding clip back to release it from connector.

   c. Use the J 39227 tool to release the locking finger inside the connector and pull the terminal/wire out the rear of the connector.

3. VIWV and VIWS (Device) Connectors and Shift Selector Harness Connectors *(Figure E–1B)*

   a. Carefully insert a small screwdriver blade between the connector body and the secondary lock. Twist/pry to remove the secondary lock from the connector body.

   b. Open the conduit clip on the back of the connector after lifting locktabs on each side and sliding clip back to release it from connector.

   c. Use the J 39227 tool to release the locking finger inside the connector and pull the terminal/wire out the rear of the connector.

C. Terminal Crimping

1. Carefully strip insulation to leave 5.0 mm ± 0.5 mm (0.20 ± 0.02 inch) of bare wire showing.

2. Insert the new terminal to be crimped in the J 42215 crimping tool. There is a spring-loaded terminal positioner at the front of the tool to hold the terminal in place. Squeeze the crimper handles for a few clicks to start the crimping process but leave room to insert the wire end.

3. Insert the bare wire end into the terminal. Squeeze the crimper handles to complete the crimping process and until the crimper handles open when released to remove the terminal/wire from the tool.

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APPENDIX E — CONNECTOR PART NUMBERS, TERMINAL PART NUMBERS, TOOL PART NUMBERS, AND REPAIR INSTRUCTIONS

C. Terminal Crimping *(cont'd)*

4. Complete terminal installation for VIW and Shift Selector Connectors as follows: *(Figure E–1B)*
   a. Insert the wire seal in the back of the connector.
   b. Push the terminal/wire assembly through the proper hole in the back of the wire seal. Push the wire in until the terminal clicks into position. Gently pull rearward on the wire to be sure that the terminal is fully seated. Install cavity plugs as needed.
   c. Install the lock assist or secondary lock into the connector body.
   d. Close the conduit clip around the conduit and lock the clip into the rear of the connector body.
5. Complete terminal installation of the ECU Connectors as follows: *(Figure E–1A)*
   a. Align the locking posts on the connector with the seal and push the locking posts through the seal into the mating holes in the strain relief (if the connector was removed from the strain relief).
   b. Push the terminal/wire assembly through the proper hole in the back of the seal. Push the wire in until the terminal clicks into position.

NOTE: All terminals must be properly positioned to install the retainer in Step (5c).

   c. Install the retainer on the connector body to lock the terminals in position. Pull rearward on the wire to be sure that the terminal is fully seated. Install cavity plugs as needed.
   d. Position the conduit inside the strain relief and snap the strain relief halves together.

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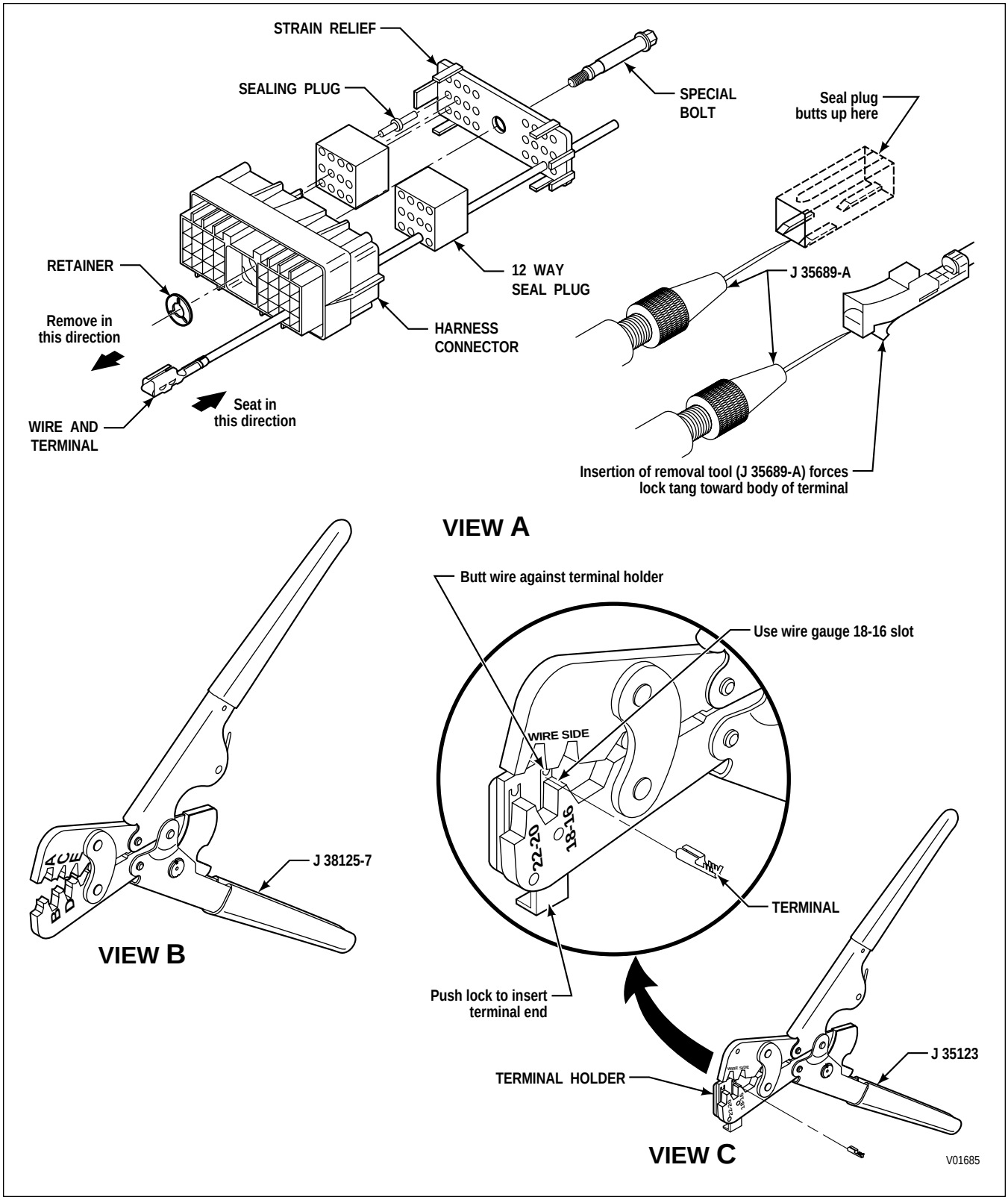

Figure E–2. Delphi-Packard Metri-Pack 150 Series Connectors — Pull-to-Seat (Speed Sensor; Accumulator Solenoid; Retarder Solenoid, TID 2; 30-Way and 18-Way VIM)

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APPENDIX E — CONNECTOR PART NUMBERS, TERMINAL PART NUMBERS, TOOL PART NUMBERS, AND REPAIR INSTRUCTIONS

1–2. DELPHI-PACKARD METRI-PACK 150 SERIES CONNECTORS — PULL-TO-SEAT (SPEED SENSOR; ACCUMULATOR SOLENOID; 30-WAY AND 18-WAY VIM)

A. Connector/Terminal Repairs

Crimping Tool	J 38125-7
Wire Crimp	Anvil “E”
Insulation Crimp	Anvil “C”
Alternate Crimping Tool	J 35123
Remover Tool	J 35689-A

Use	Description	Manufacturers P/N
Turbine Speed (Nt) Sensor (MD/B 300/B 400)	Connector	12162723
	Terminal	12110236
Turbine Speed (Nt) Sensor (HD/B 500)	Connector	12162193
	Terminal	12103881
Engine/Output (All Models) (Ne/No) Speed Sensor	Connector	12162197
	Terminal	12103881
Accumulator (N Solenoid) And Retarder (H Solenoid For TID 2)	Connector	12162197
	Terminal	12103881
Vehicle Interface Module (VIM)	Connector (VIM)	
	Connector Body	12040920
	9-Way Seal (x2)	12040936
	18-Way Strain Relief	12110545
	Special Bolt	12129426
	Bolt Retainer	12034236
	Sealing Plug	12034413
	Terminal	12103881
Vehicle Interface Module (Vehicle)	Connector (OEM)	
	Connector Body	12034397
	15-Way Seal (x2)	12040879
	30-Way Strain Relief	12110546
	Special Bolt	12129426
	Bolt Retainer	12034236
	Sealing Plug	12034413
	Terminal	12103881

B. Terminal Removal

NOTE: Do not solder crimps.

1. Insert needle end of terminal remover J 35689-A into the small notch between the connector and the terminal to be removed (Figure E–2, View A). Push the lock tang toward the terminal.
2. Push the wire and terminal out of the connector (this is a “pull-to-seat” terminal).

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APPENDIX E — CONNECTOR PART NUMBERS, TERMINAL PART NUMBERS, TOOL PART NUMBERS, AND REPAIR INSTRUCTIONS

B. Terminal Removal *(cont'd)*

3. Pull terminal as far as necessary from the connector. This will be limited by the number of other wires inserted into the connector and by the distance between the back side of the connector and the beginning of the harness covering.

4. If terminal is to be replaced, cut the terminal between the core and insulation crimp to minimize wire loss.

C. Terminal Crimping — VIM And Speed Sensor Terminals (Standard Crimping Tool)

1. If a spare wire is used, the wire should be pushed through the proper hole in the strain relief (if used), through the wire seal, and out the other side of the connector before stripping.

2. Carefully strip insulation 4.5 mm ± 0.5 mm (0.18 ± 0.02 inch). Unless insulation crimp is overtight, Automatic Wire Stripper J 35615 will remove insulation and crimp from old terminal without damaging wire.

3. Place core crimp portion of terminal on bed of anvil "E" and squeeze crimper enough to keep terminal from dropping (Figure E–2, View B).

4. Position wire core in terminal and squeeze crimper tool to complete the core crimp. **Be sure to orient the terminal so that it is properly aligned with the terminal cavity in the connector.** The terminal should be positioned so that the lock tang is on the side of the cavity which has the notch in the middle (for the remover tool).

5. Position insulation crimp of terminal on anvil "C" so that the entire insulation crimp area and a portion of the terminal between the core and insulation crimp areas are supported by the anvil. Complete the insulation crimp.

6. Be sure lock tang is lifted to allow proper reseating of the terminal.

7. Pull on the wire to pull the terminal completely into the cavity. (A click will be heard and the terminal should stay in place if the wire is pushed.)

D. Terminal Crimping Using Alternate Tool J 35123

1. If a spare wire is used, the wire should be pushed through the proper hole in the strain relief (if used) and the wire seal, and out the other side of the connector prior to stripping.

2. Insert remover tool in front side of connector to release locktab and push terminal out front of connector. Pull the terminal and wire out the front of the connector to complete Steps (3) through (7).

3. Push open the terminal holder on the crimper tool J 35123 and insert a terminal into the opening marked 18–16 (Figure E–2, View C) so that the crimp ends point up. Release the terminal holder.

4. Slightly close the crimping tool (close until one click is heard) but do not start to crimp the terminal. Place the terminal on the wire so it is in the same position as it will be when pulled back into the connector. The terminal should be positioned so that the lock tang is on the side of the cavity which has the notch in the middle (for the remover tool).

5. Insert the wire into the terminal until the wire contacts the holder. (By doing this, the core and insulation should be properly positioned for the core and insulation crimp wings.)

6. Squeeze the crimper fully until it opens when released.

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APPENDIX E — CONNECTOR PART NUMBERS, TERMINAL PART NUMBERS, TOOL PART NUMBERS, AND REPAIR INSTRUCTIONS

D. Terminal Crimping Using Alternate Tool J 35123 *(cont'd)*

7. Open the terminal holder and remove the wire and terminal from the crimping tool.
8. Pull on the terminal to assure a tight crimp.
9. Be sure lock tang is lifted to allow proper reseating of the terminal.
10. Pull on the wire to pull the terminal completely into the cavity. (A click will be heard and the terminal should stay in place if the wire is pushed.)

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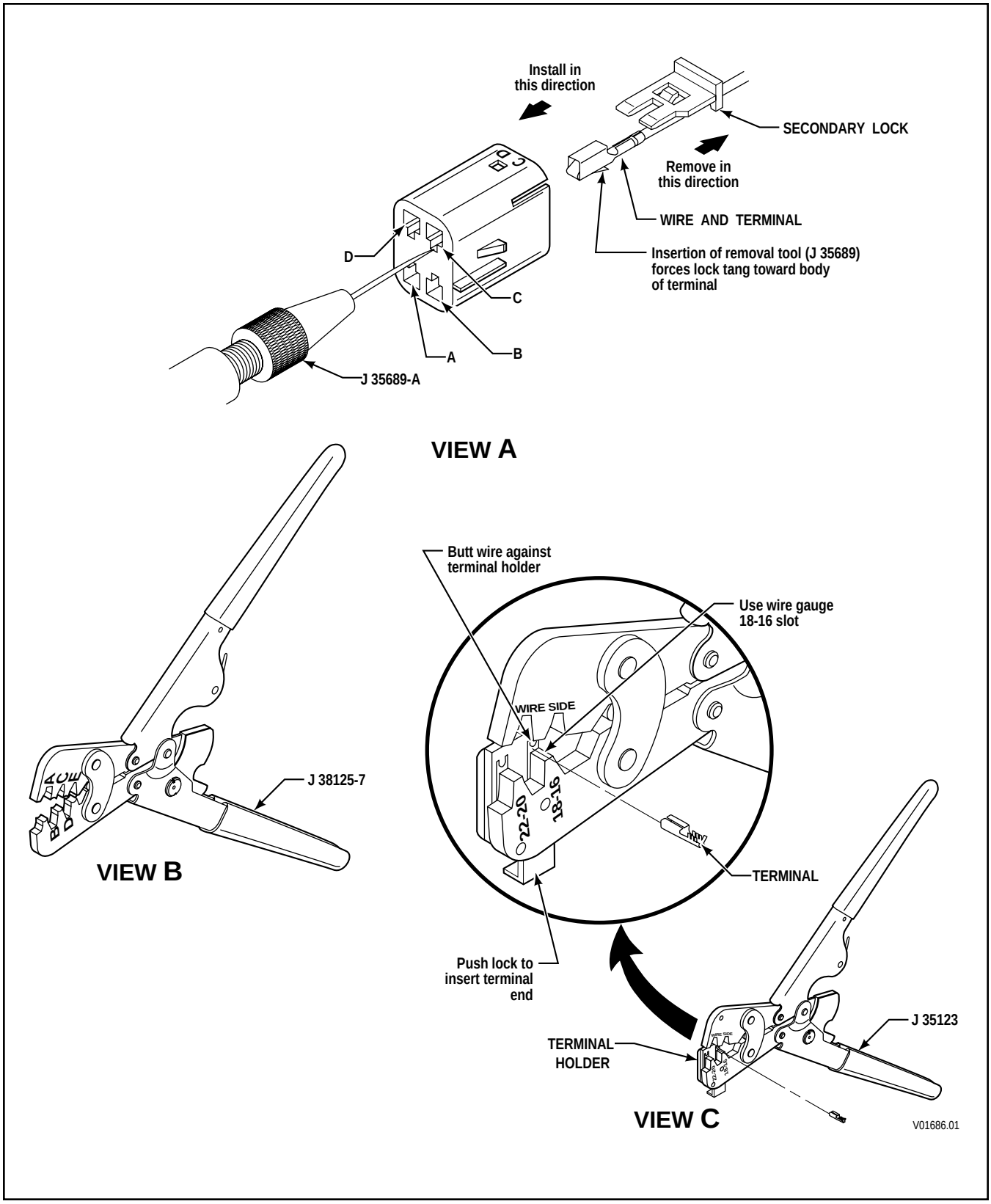

Figure E–3. Delphi-Packard Metri-Pack 150 Series Connectors — Push-to-Seat (Oil Level Sensor)

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APPENDIX E — CONNECTOR PART NUMBERS, TERMINAL PART NUMBERS, TOOL PART NUMBERS, AND REPAIR INSTRUCTIONS

1–3. DELPHI-PACKARD METRI-PACK 150 SERIES CONNECTORS — PUSH-TO-SEAT (OIL LEVEL SENSOR)

A. Connector/Terminal Repairs

Crimping Tool	J 38125
Wire Crimp	Anvil “E”
Insulation Crimp	Anvil “C”
Alternate Crimping Tool	J 35123
Remover Tool	J 35689

Use	Description	Manufacturers P/N
Oil Level Sensor	4-Pin Plug	12047786
	Terminal (Pin)	12047581
	Secondary Lock	12047787
	4-Pin Receptacle	12047785
	Terminal (Socket)	12047767
	Secondary Lock	12047664

B. Terminal Removal

NOTE: Do not solder crimps.

1. Remove the secondary lock.
2. Insert needle end of terminal remover J 35689-A into the small notch between the connector and the terminal to be removed (Figure E–3, View A). Push the lock tang toward the terminal.
3. Pull the wire and terminal out the rear of the connector (this is a “push-to-seat” terminal).
4. Pull terminal as far as necessary from the connector. This will be limited by the number of other wires inserted into the connector and by the distance between the back side of the connector and the beginning of the harness covering.
5. If terminal is to be replaced, cut the terminal between the core and insulation crimp to minimize wire loss.

C. Terminal Crimping

1. Carefully strip insulation 4.5 mm ± 0.5 mm (0.18 ± 0.02 inch). Unless insulation crimp is over-tight, Automatic Wire Stripper J 35615 will remove insulation and crimp from old terminal without damaging wire.
2. Place core crimp portion of terminal on bed of anvil “E” and squeeze crimper enough to keep terminal from dropping (Figure E–3, View B).
3. Position wire core in terminal and squeeze crimper tool to complete the core crimp. **Be sure to orient the terminal so that it is properly aligned with the terminal cavity in the connector.** The terminal should be positioned so that the lock tang is on the side of the cavity which has the notch in the middle (for the remover tool).

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APPENDIX E — CONNECTOR PART NUMBERS, TERMINAL PART NUMBERS, TOOL PART NUMBERS, AND REPAIR INSTRUCTIONS

C. Terminal Crimping *(cont'd)*

4. Position insulation crimp of terminal on anvil "C" so that the entire insulation crimp area and a portion of the terminal between the core and insulation crimp areas are supported by the anvil. Complete the insulation crimp.
5. Be sure lock tang is lifted to allow proper reseating of the terminal.
6. Push on the wire until the terminal is completely into the cavity. (A click will be heard and the terminal should stay in place when the wire is lightly pulled.)

D. Terminal Crimping Using Alternate Tool J 35123

1. Insert remover tool in front side of connector to release locktab and pull terminal out rear of connector. Pull the terminal and wire out the rear of the connector to complete Steps (3) through (7).
2. Push open the terminal holder on the crimper tool J 35123 and insert a terminal into the opening marked 18–16 (Figure E–3, View C) so that the crimp ends point up. Release the terminal holder.
3. Slightly close the crimping tool (close until one click is heard) but do not start to crimp the terminal. Place the terminal on the wire so it is in the same position as it will be when pulled back into the connector. The terminal should be positioned so that the lock tang is on the side of the cavity which has the notch in the middle (for the remover tool).
4. Insert the wire into the terminal until the wire contacts the holder. (By doing this, the core and insulation should be properly positioned for the core and insulation crimp wings.)
5. Squeeze the crimper fully until it opens when released.
6. Open the terminal holder and remove the wire and terminal from the crimping tool.
7. Pull on the terminal to assure a tight crimp.
8. Be sure lock tang is lifted to allow proper reseating of the terminal.
9. Push on the wire until the terminal is completely into the cavity. (A click will be heard and the terminal should stay in place if the wire is lightly pulled.)

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NOTES

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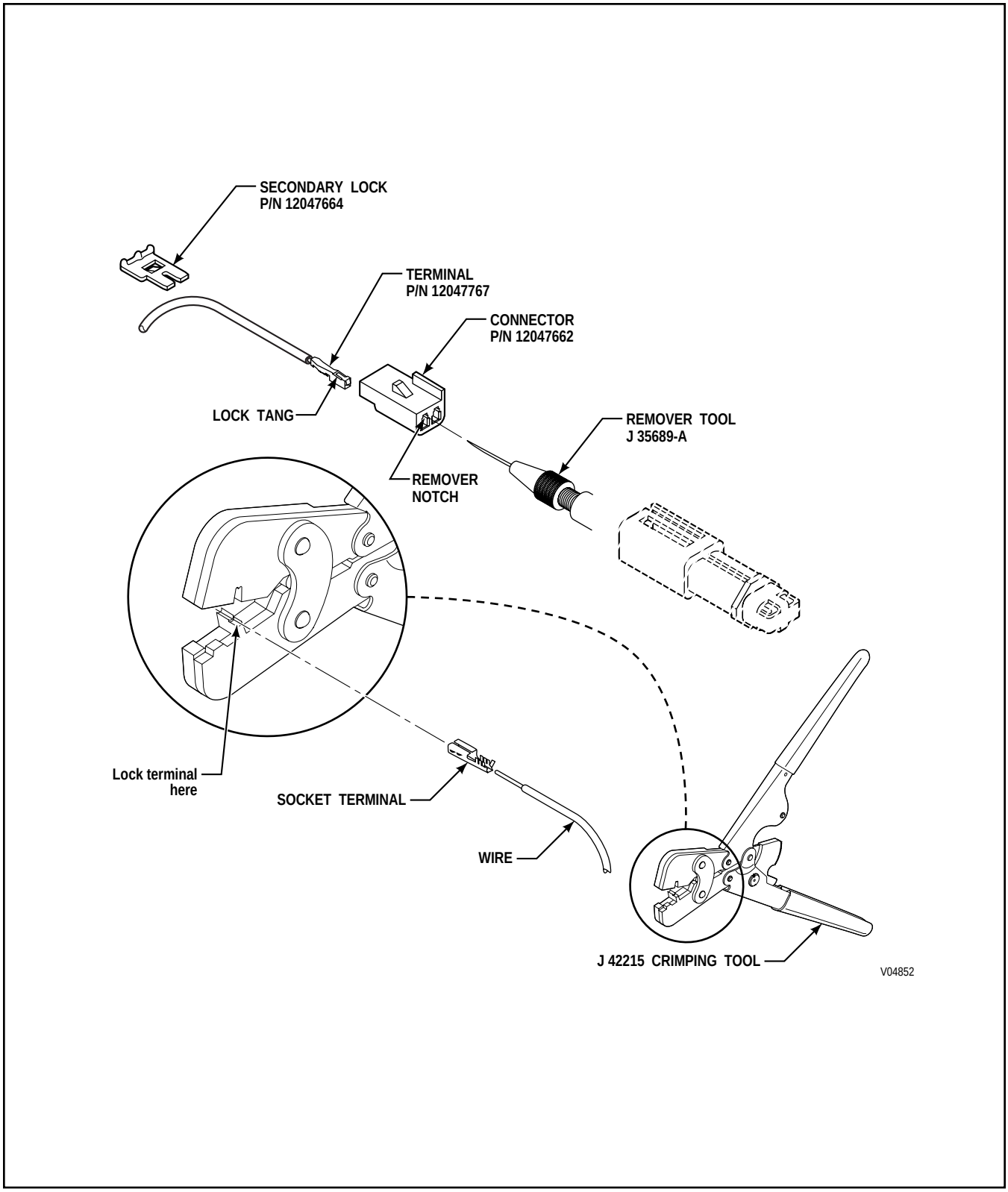

Figure E–4. Delphi-Packard Metri-Pack 150 Series Connector — Push-To-Seat (MD/HD/B TID 2 Sump Temperature Thermistor)

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1–4. DELPHI-PACKARD METRI-PACK 150 SERIES CONNECTORS — PUSH-TO-SEAT (MD/HD/B TID 2 SUMP TEMPERATURE THERMISTOR)

A. Connector/Terminal Repairs:

Crimping Tool	J 42215 (with terminal positioner removed)
Remover Tool	J 35689-A

Use	Description	Manufacturers P/N
MD/HD/B, TransID 2	Sump Temperature Sensor	12129691
Sump Temperature Thermistor	Connector, Black	12047662
	Terminal	12047767
	Secondary Lock	12047664

B. Terminal Removal:

1. Remove the secondary lock from the connector.
2. Insert needle end of terminal remover J 35689-A into the small notch in the front of the connector cavity of the terminal to be removed (refer to Figure 7).
3. Push the lock tang toward the terminal.
4. Pull the wire and terminal out of the connector.
5. Cut the terminal between the core and insulation crimp to minimize wire loss.

C. Terminal Crimping:

1. Strip insulation approximately 4.5 mm (0.18 inch).
2. Remove the spring-loaded terminal positioner from the J 42215 crimping tool.
3. Insert the new terminal to be crimped in the J 42215 crimping tool. Squeeze the crimper handles a couple clicks to start the crimping process but leave room to insert the wire end.
4. Insert the bare wire end into the terminal. Squeeze the crimper handles to complete the crimping process and until the crimper handles open when released to remove the terminal/wire from the tool.
5. Be sure the lock tang is positioned to allow proper retention of the terminal in the connector.
6. Push the terminal completely into the cavity. (A click will be heard and the terminal should stay in place if the wire is pulled.)
7. Install the secondary lock in the connector.

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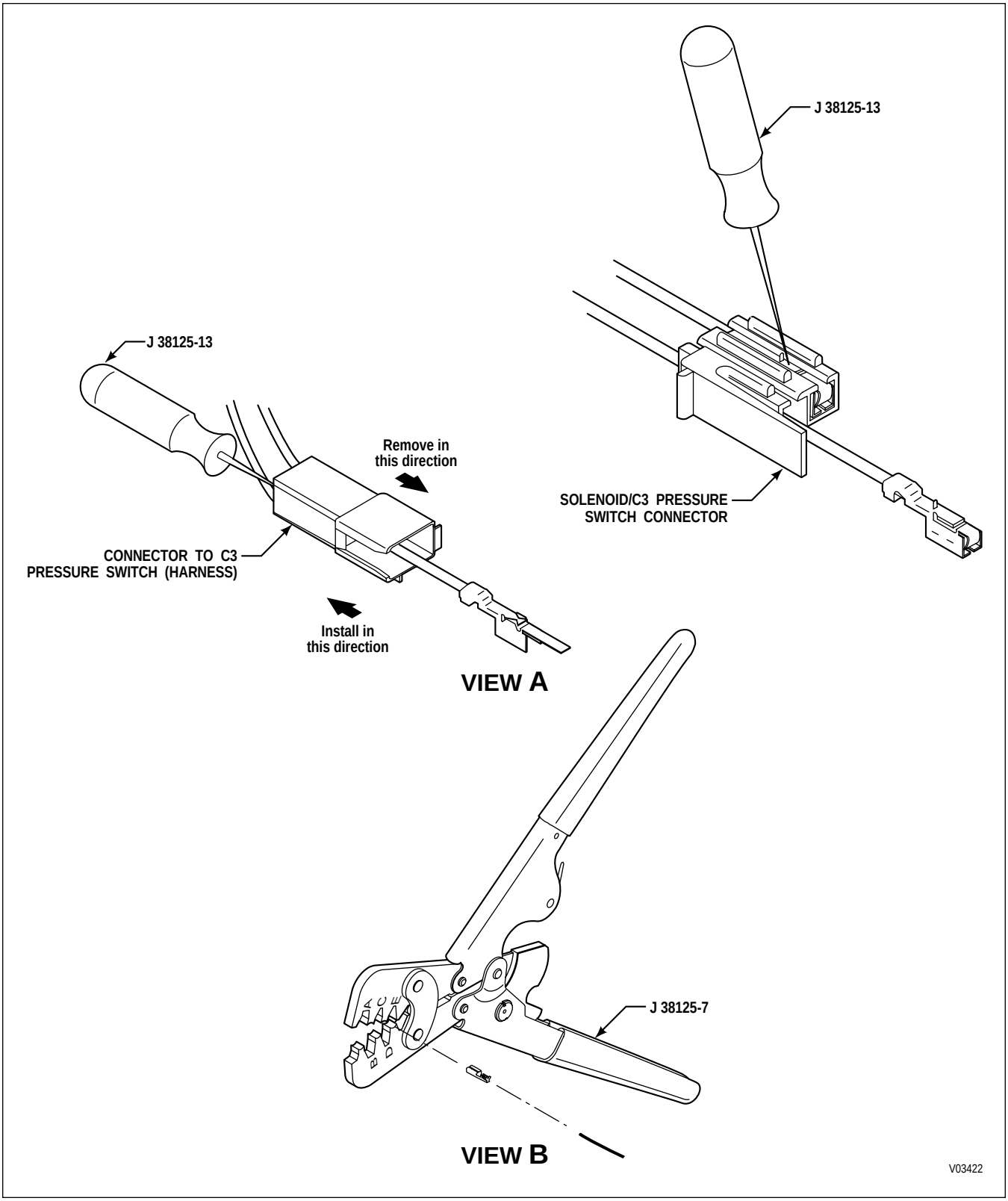

Figure E–5. Delphi-Packard Metri-Pack 280 Series Connectors — Pull-to-Seat (Internal Harness Solenoid and C3 Pressure Switch)

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1–5. DELPHI-PACKARD METRI-PACK 280 SERIES CONNECTORS — PULL-TO-SEAT (INTERNAL HARNESS SOLENOID AND C3 PRESSURE SWITCH)

A. Connector/Terminal Repairs

Crimping Tool J 38125-7

NOTE: ***Crimping anvils will be listed following the terminal part numbers for the various connectors in this section. The anvil for the core crimp is always listed first.***

Remover Tool J 38125-13

Use	Description	Manufacturers P/N
Solenoid/C3 Pressure Switch (Switch)	Connector	12092420
C3 Pressure Switch (Harness)	Connector	12110139
Solenoid/C3 Pressure Switch (Switch)	Terminal (Use crimping anvils “C” and “D”)	12124639
C3 Pressure Switch (Harness)	Terminal (Use crimping anvils “C” and “D”)	12066337
Solenoid (A, B, and G)	Terminal (2 Wire) B (Use crimping anvils “A” and “B”)	12015243

B. Terminal Removal

1. Depress locktab on terminal (accessible in slot of connector) and push terminal out front of connector (Figure E–4, View A).
2. If replacing terminal, cut terminal between core and insulation crimp (to minimize wire loss).

C. Terminal Crimping

1. Carefully strip insulation 6.5 mm ± 0.5 (0.26 ± 0.02 inch). Unless insulation crimp is overtight, Automatic Wire Stripper J 35615 will remove insulation and crimp from old terminal without damaging wire).
2. Place core crimp portion of terminal on bed of anvil indicated and squeeze crimper enough to hold terminal from dropping (Figure E–4, View B).
3. Position wire core in terminal and squeeze crimper tool to complete the core crimp. Be sure to orient the terminal so that it is properly aligned with the terminal cavity in the connector. (When crimping two wires in terminal P/N 12015243, strip and twist cores together before inserting into the terminal.)
4. Position insulation crimp of terminal on anvil indicated so that the entire insulation crimp area and a portion of the terminal between the core and insulation crimp areas are supported by the anvil. Complete the insulation crimp.
5. Slip the wire through the slot in the connector and pull to fully seat the terminal(s).

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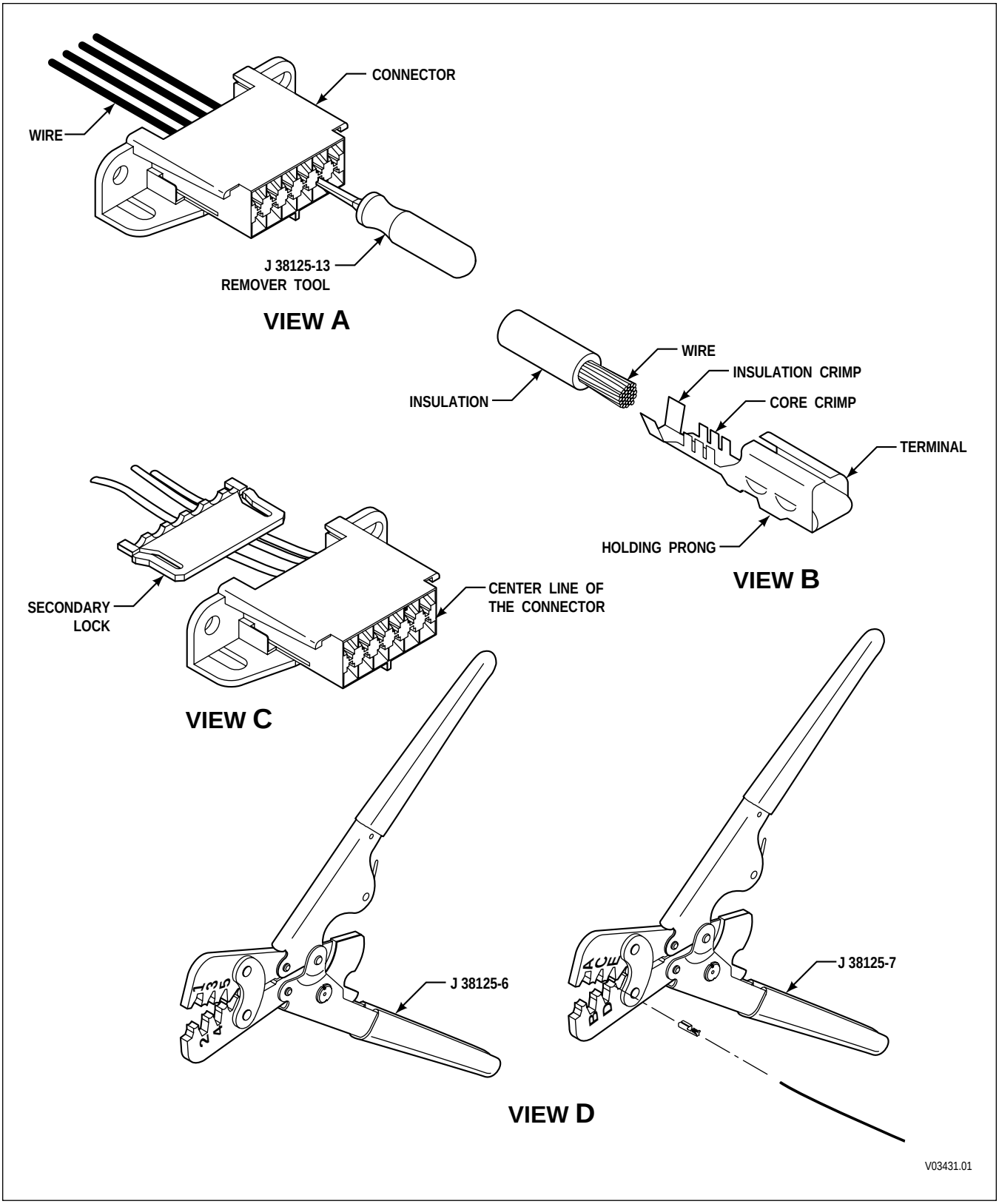

Figure E–6. Delphi-Packard Metri-Pack 280 Series Connectors — Push-to-Seat (DDR)

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1–6. DELPHI-PACKARD METRI-PACK 280 SERIES CONNECTORS — PUSH-TO-SEAT (DDR)

A. Connector/Terminal Repairs

Crimping Tool	J 38125-6 and 7
Wire Crimp	Anvil "2"
Insulation Crimp	Anvil "A"
Remover Tool	J 38125-13

Use	Description	Manufacturers P/N
Diagnostic Connector	Connector	12048105
	Terminal	12034046
	Terminal (2-Wire)	12066214
	Secondary Lock	12020219
	Cover	12048107

B. Terminal Removal

1. Remove secondary lock from back of connector (Figure E–5, View C). (Use a small screwdriver or pick in the slots on each side of the connector.)
2. Insert remover tool J 38125-13 into open (front) end of connector at terminal to be serviced (Figure E–3, View A).
3. Push the lock tang of the terminal straight and pull wire and terminal out the back of connector.
4. If the terminal is to be replaced, cut terminal between core and insulation crimp (this minimizes wire length loss).

C. Terminal Crimping

1. Carefully strip insulation 6.0 ± 0.25 mm (0.24 ± 0.01 inch).
2. Insert terminal into crimping tool (Figure E–5, View D), anvil "2."
3. Slightly close crimping tool to hold the terminal steady.
4. Align the terminal with its position in the connector and insert wire so that the stripped portion of the wire is in the core crimping area and the insulated portion of the wire is in the insulation crimping area (Figure E–5, View B).
5. Crimp the stripped section of the wire (Figure E–5, View D).
6. Remove the terminal from the crimping tool.
7. Use a pair of needle nose pliers, if necessary, to start the bend on the insulation crimp wings (Figure E–5, View D).
8. Crimp the insulated section of wire using anvil "A" of the crimpers shown (Figure E–5, View D).
9. Remove the terminal from the crimping tool.
10. Tug on terminal to make sure the crimp is tight.
11. Insert terminal into connector with the locktab toward the center line of the connector (Figure E–5, View C).
12. The terminal should "click" into place and you should not be able to pull the terminal out by hand.
13. Reinstall the secondary lock.

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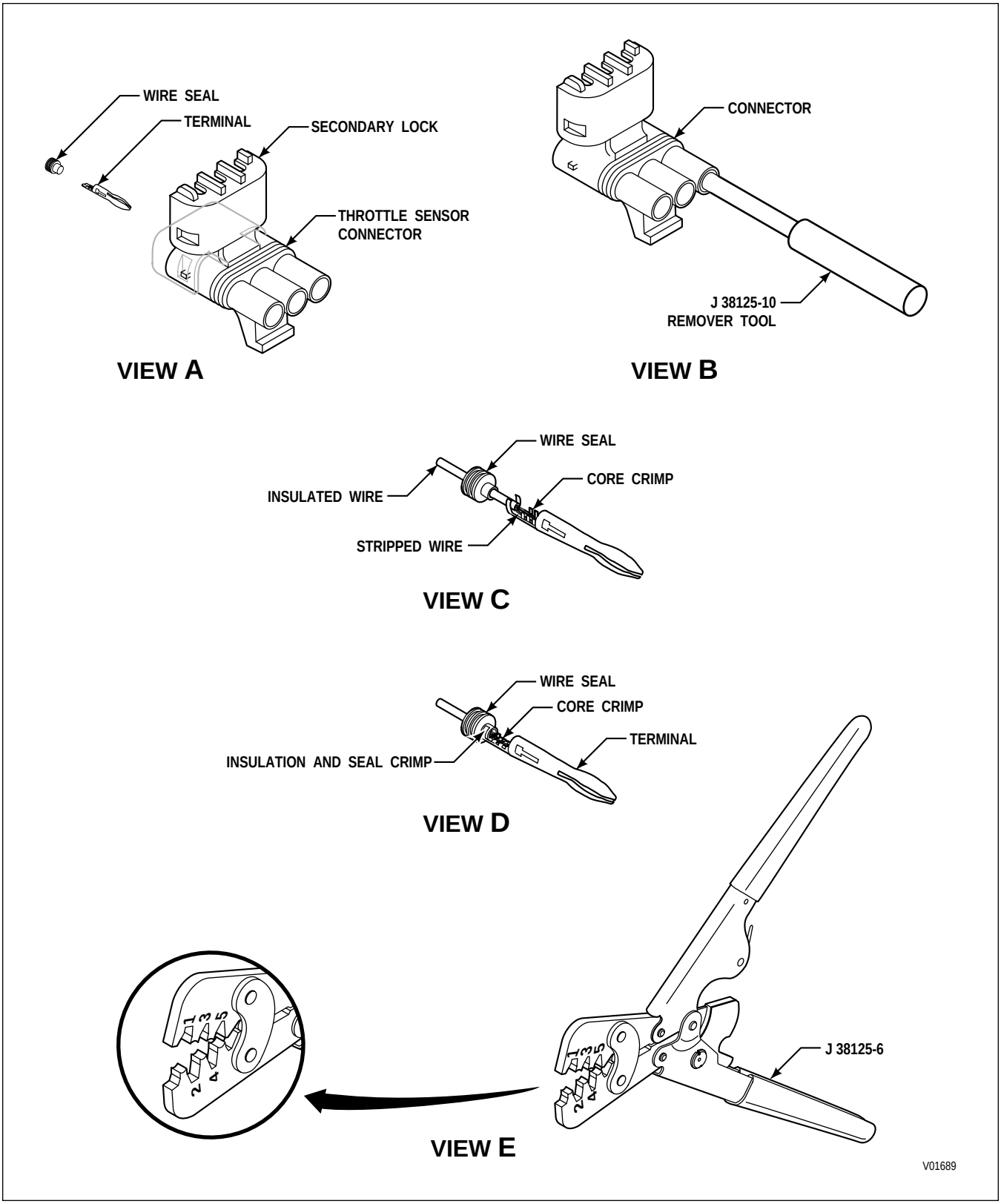

Figure E–7. Delphi-Packard WeatherPack Connectors (TPS; 3-Way RMR Sensor; HD Pre-TID And TID 1 Retarder Temperature; 4-Way RMR Device, Type 3; 3-Way RMR Device (Dedicated Pedal))

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1–7. DELPHI-PACKARD WEATHERPACK CONNECTORS (TPS; 3-WAY RMR SENSOR; HD RETARDER TEMPERATURE; 3-WAY RMR DEVICE (DEDICATED PEDAL))

A. Connector/Terminal Repairs

Crimping Tool	J 38125-6
Wire Crimp	Anvil “2”
Insulation Crimp	Anvil “5”
Alternate Crimping Tool	J 35606 or J 38852
Remover Tool	J 38125-10

Use	Description	Manufacturers P/N
Throttle Position Position (TPS)	Connector	12015793
	Terminal	12089040
	Wire Seal	12089444
RMR Device	Connector	12015795
	Terminal	12089040
	Wire Seal	12089444
Retarder Temperature Sensor	Connector	12010973
	Terminal (Socket)	12089188
	Wire Seal	12089444

B. Terminal Removal

1. Unlatch and open the secondary lock on the connector (Figure E–6, View A).
2. On the front of the connector, insert remover tool J 38125-10 over the terminal. Push the tool over the terminal and pull the terminal out of the back end of the connector (Figure E–6, View B).
3. If terminal is to be replaced, cut terminal between core and insulation crimp (this minimizes wire loss).

NOTE: Two special tools are available for this operation: tool J 38125-6 (Paragraph C); tool J 35606 or J 38852 (Paragraph D).

C. Terminal Crimping Using Crimping Tool J 38125-6

1. Place the wire seal onto the wire before stripping the wire (Figure E–6, View C).
2. Strip wire to 6.0 ± 0.25 mm (0.24 ± 0.01 inch).
3. Place terminal onto crimping tool J 38125-6 (Figure E–6, View E), anvil “2.”
4. Slightly close crimping tool to hold terminal steady.
5. Insert wire so that the stripped portion of wire is in the core crimp area and the insulated portion of the wire is in the insulation crimping area (Figure E–6, View C).
6. Crimp the stripped section of the wire.
7. Remove the terminal from the crimping tool.

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C. Terminal Crimping Using Crimping Tool J 38125-6 *(cont'd)*

8. Push the wire seal into the terminal (Figure E–6, View D). The second crimp will wrap around the wire seal. This will seal the insulated area of wire.
9. Use a pair of needle nose pliers, if necessary, to squeeze the terminal wings together to fit in anvil "5."
10. Crimp wire seal in anvil "5."
11. Tug on terminal and be sure the crimp is tight.
12. Insert the terminal into the connector. The terminal will "click" into place and should not pull out.
13. Secure the secondary lock. Both sides of the connector must be latched.

D. Terminal Crimping Using Alternate Crimper Pliers J 35606 or J 38852

1. Place the wire seal onto the wire before stripping the wire (Figure E–6, View C).
2. Strip wire to 6.0 ± 0.25 mm (0.24 ± 0.01 inch).
3. Insert terminal into crimping tool J 35606 (Figure E–7, View A), opening marked 18–20.
4. Position the terminal so the crimp wings are pointing up from the bottom jaw of the crimper and are properly positioned.
5. Slightly close the crimping tool to hold the terminal steady.
6. Slide the wire seal to the edge of the insulation and insert the wire and seal into the terminal (Figure E–7, View B).
7. Position the wire and seal and squeeze the crimping tool until it opens when released.
8. Tug on terminal to be sure the crimp is tight.
9. Insert terminal into connector. The terminal will "click" into place and should not pull out.
10. Relatch the secondary lock. Both sides of the connector must be latched.

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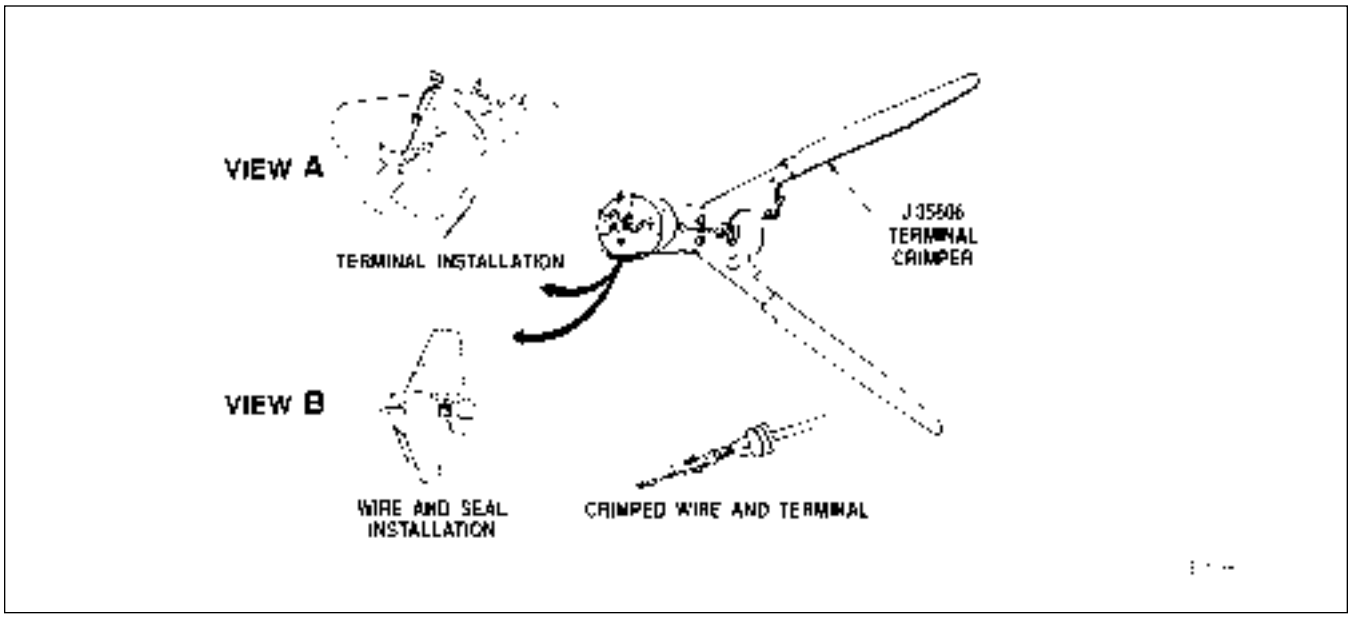

Figure E–8. Terminal Crimping With Tool J 35606

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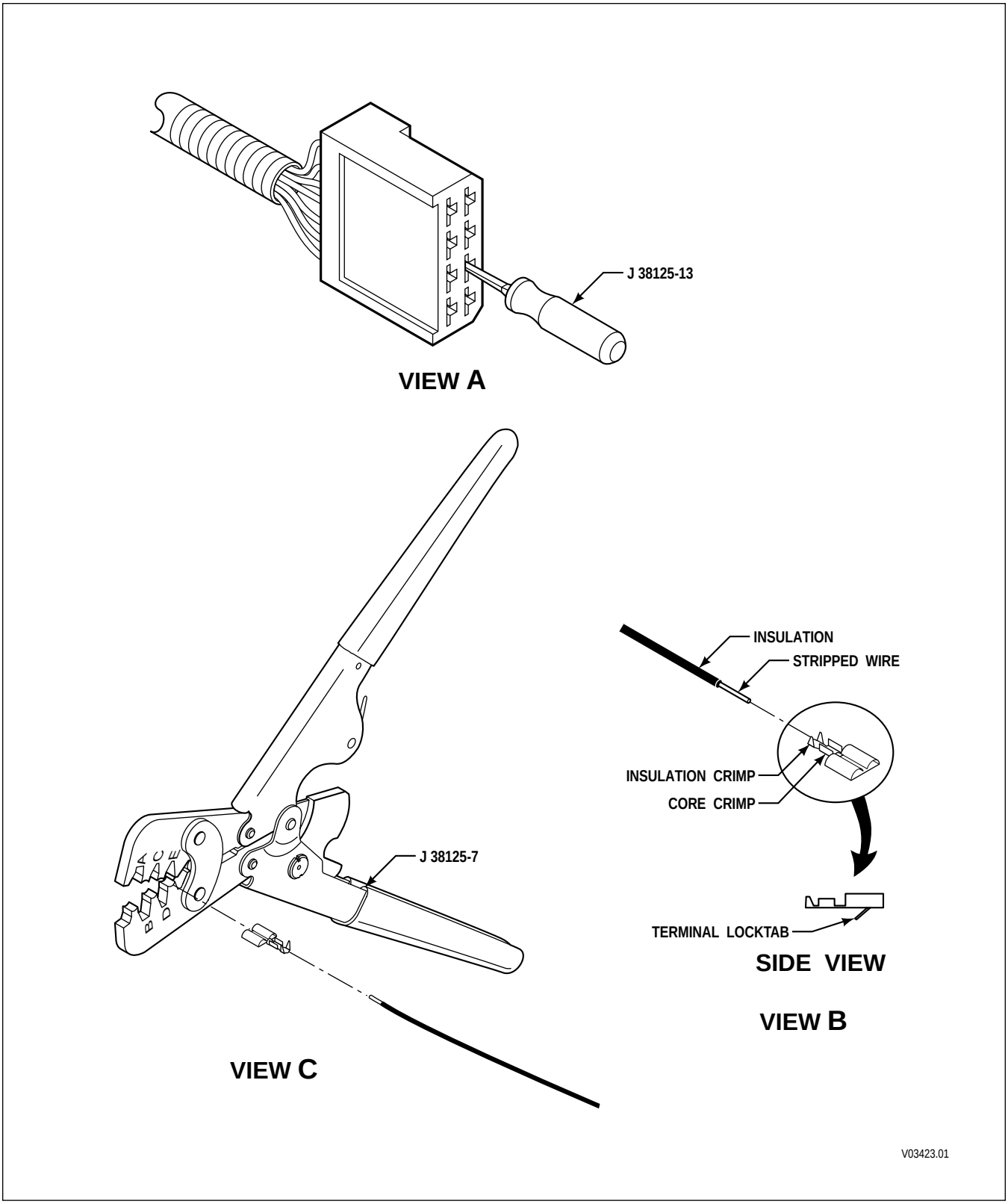

Figure E–9. Amp Products Connectors (8-Way RMR Device (Hand Lever))

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1–8. AMP PRODUCTS CONNECTORS (8-WAY RMR DEVICE (HAND LEVER))

A. Connector/Terminal Repairs

Crimping Tool	J 38125-7
Wire Crimp	Anvil “E”
Insulation Crimp	Anvil “A”
Remover Tool	J 38125-13

Use	Description	Manufacturers P/N
8-Way RMR Device (Hand Lever)	8-Way Receptacle	163007-0
	Terminal (Socket)	42100-2

B. Terminal Removal

1. Insert removal tool J 38125-13 into the small notch at the front of the connector to release the terminal locktab (Figure E–8, View A).
2. Pull the terminal and wire out the back of the connector.
3. If replacing terminal, cut terminal between core and insulation crimp (this minimizes wire loss).

C. Terminal Crimping

1. Strip wire to approximately 4.0 ± 0.25 mm (0.16 ± 0.01 inch) (Figure E–8, View B).
2. Place new terminal onto crimping tool J 38125-7, anvil “E” (Figure E–8, View C).
3. Slightly close the crimping tool to hold the terminal steady.
4. Insert the wire so that the stripped portion of the wire is in the core crimp area and the insulated portion of the wire is in the insulation crimping area.
5. Crimp the stripped section of the wire (Figure E–8, View B).
6. Remove the terminal from the crimping tool.
7. Use a pair of needle nose pliers, if necessary, to start the bend on the insulation crimp wings.
8. Crimp the insulated section of the wire using anvil “A” of the crimpers (Figure E–8, View C).
9. Remove the terminal from the crimping tool.
10. Tug on the terminal to make sure the crimp is tight.
11. Insert the terminal into the connector. The terminal will “click” into place and should not pull out.

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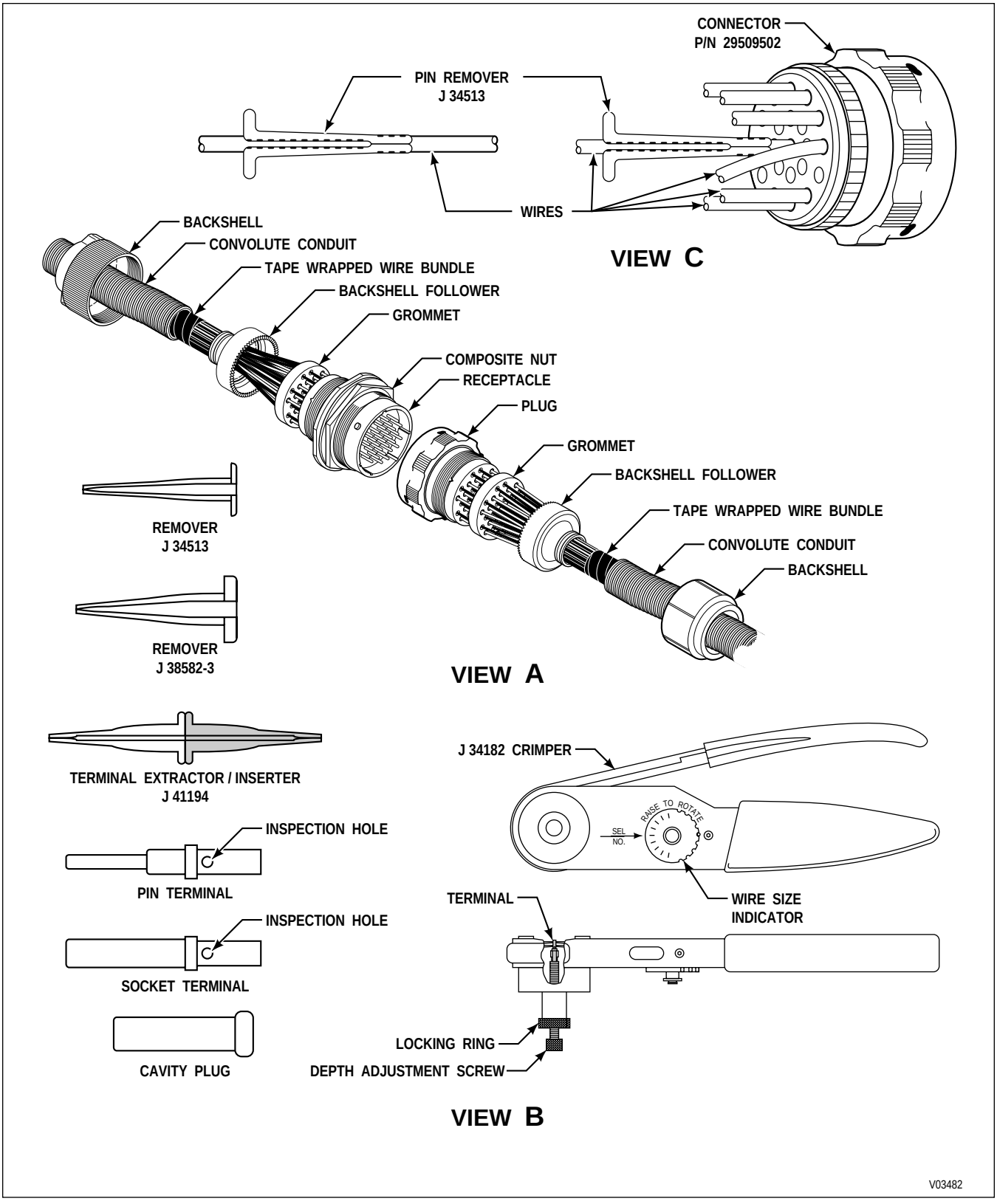

Figure E–10. Deutsch IPD/ECD Connectors (31-Way Bulkhead, 31-Way Feedthrough Harness; 16-Way Optional Sensor Harness; 6-Way Optional DDR)

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1–9. DEUTSCH IPD/ECD CONNECTORS (31-WAY BULKHEAD; 31-WAY FEEDTHROUGH HARNESS; 16-WAY OPTIONAL SENSOR HARNESS; 6-WAY OPTIONAL DDR)

A. Connector/Terminal Repairs

Crimping Tool	J 34182
Remover Tool	J 34513 (18 GA IPD Bulkhead)
Extractor/Inserter Tool	J 41194 (18 GA ECD Bulkhead)
Remover Tool (DDR Connector)	J 38582-3 (12–14 GA)

Use	Description	Manufacturers P/N
Bulkhead Connector/ Transmission Connector — ECD	Connector Plug, 31-Way (Male/Female)	
	31-Pin Plug	WT06B24-31SN
	Terminal (Socket)	3662-204-1690
	Cavity Plug	0613-1-1601
	Backshell Housing	WTA10-24-01/19
	Backshell Follower	WTA10-24-02/19
	Backshell Grommet	WTA10-24-03
	Connector Receptacle, 31-Way	(Female/Male)
	31-Pin Receptacle	WT04B24-31PN
	Terminal (Pin)	3660-201-1690
	Cavity Plug	0613-1-1601
	Panel Nut	0926-208-2401
	O-Ring Seal	9013-3-0402
	Lockwasher	0914-212-2486
	Backshell Housing	WTA10-24-01/19
	Backshell Follower	WTA10-24-02/19
	Backshell Grommet	WTA10-24-03
Bulkhead Connector — ECD	Connector Plug (31-Way) (Male/Male)	
	31-Pin Plug	WT06B24-31PN
	Terminal (Pin)	3660-201-1690
	Cavity Plug	0613-1-1601
	Backshell Housing	WTA10-24-01/19
	Backshell Follower	WTA10-24-02/19
	Backshell Grommet	WTA10-24-03
	Connector Receptacle (31-Way) (Female/Female)	
	31-Pin Receptacle	WT04B24-31SN
	Terminal (Socket)	3662-204-1690
	Cavity Plug	0613-1-1601
	Panel Nut	0926-208-2401
	O-Ring Seal	9013-3-0402
	Lockwasher	0914-212-2486
	Backshell Housing	WTA10-24-01/19
	Backshell Follower	WTA10-24-02/19
	Backshell Grommet	WTA10-24-03

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Use	Description	Manufacturers P/N
16-Way Optional Sensor Harness	16-Way Plug	WT06B20-16SN
	Terminal (Socket)	3662-204-1690
	Cavity Plug	0613-1-1601
	Backshell Housing	WTA10-20-01/16
	Backshell Follower	WTA10-20-02/16
	Backshell Grommet	WTA10-20-03
	16-Way Receptacle	WT04B20-16PN
	Terminal (Pin)	3660-201-1690
	Cavity Plug	0613-1-1601
	Panel Nut	0926-207-2087
	O-Ring Seal	9013-3-0201
	Lockwasher	9014-212-2086
	Backshell Housing	WTA10-20-01/16
	Backshell Follower	WTA10-20-02/16
	Backshell Grommet	WTA10-20-03
6-Way Optional DDR	6-Way Plug	HD10-6-12P
	Terminal (Pin)	0460-256-12233
	Terminal (Pin)	0460-204-0831
	Cavity Plug	114017
	Backshell	HD18-006
	Cover	HDC16-6
9-Way Optional DDR	9-Way Receptacle	HD10-9-1939P

NOTE: ***If difficulty is encountered in removing or installing the plug backshell, insert the plug into the receptacle, do not lock it into place, and loosen the backshell.***

B. Terminal Removal (Refer to Figure E–9, View A)

NOTE: ***When using remover/inserter tool J 41194, take care not to break the tip of the tool. Lay the wire in the widest part of the wire slot and work toward the tool tip.***

1. Loosen and slide the backshell along the convolute conduit.
2. Remove the convolute conduit from the base of the backshell follower. Peel enough conduit from the harness to allow working access.
3. Slide the backshell follower clear of the connector housing.
4. Remove as much tape wrap as necessary to allow working access.
5. Fully insert the proper remover/extractor tool into the back of the connector until it releases the terminal.
6. Pull the terminal, wire, and tool out the back of the connector.
7. If replacing the terminal, cut the wire through the middle of the terminal crimp (this minimizes wire loss).

C. Terminal Crimping (Refer to Figure E–9, View B)

1. Strip approximately 6–8 mm (0.236–0.315 inch) of insulation from the wire.
2. Set the crimping tool wire size to number 18 for the ECD or IPD connector. For the optional DDR connector, set the wire size to number 12. To set the wire size, remove the retainer pin. Lift and rotate the indicator until the correct wire number is aligned with the SEL NO. arrow. Reinstall the retainer pin.

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C. Terminal Crimping (Refer to Figure E–9, View B) *(cont'd)*

3. Insert the contact end of the terminal into crimping tool J 34182. Adjust the crimping tool depth by loosening the locking ring until the depth adjusting screw is free and turning the adjusting screw until the top of the terminal is just above flush with the crimping hole (the crimp jaws will contact the middle of the terminal barrel). Tighten the lock ring to retain the adjustment.
4. Fully insert the wire into the terminal so that the stripped portion of the wire is in the crimp area. A small section (0.5–1.0 mm (0.02–0.04 inch)) of wire will be visible above the terminal barrel.
5. Squeeze the crimping tool handle until it releases. The terminal is now crimped onto the wire.
6. Remove the terminal and wire from the crimping tool.
7. Tug on the terminal to ensure the crimp is tight.
8. For the optional DDR connector, apply a 25 mm (one inch) long piece of heat shrink tubing over the wire insulation just behind the terminal. Apply heat to shrink and lock tubing to the insulation.

D. Terminal Insertion (ECD Bulkhead)

NOTE: ***If replacing an outside grommet (refer to Figure E–9 showing the ECD bulkhead), ensure the grommet is correctly installed. Each grommet hole is marked with the terminal ID of the wire that passes through that hole. The grommet holes match the pattern of either the pins or sockets in the connector. One side of the grommet is marked "PIN" and the other "SKT" or "SOC". "PIN" indicates the pin (receptacle) side of the connector and "SKT" or "SOC" the socket (plug) side. When installing the outer grommet in the receptacle, ensure "PIN" is showing and positioned so that the "A" terminal ID on the outer grommet aligns with the "A" terminal ID on the inner grommet. When installing the outer grommet in the plug, "SKT" or "SOC" must be showing and positioned so that the "A" terminal ID on the outer grommet aligns with the "A" terminal ID on the inner grommet. Reversing "PIN" and "SKT" or "SOC" sides of the grommet will cause the grommet holes to be misaligned with the holes in either the receptacle or plug. Perform Steps (1) and (2) only if the outer grommet has been removed.***

1. Place the correct side of the grommet upwards with the inner and outer grommet "A" terminal ID aligned.
2. Insert two cavity plugs in unused cavities to retain the grommet.

NOTE: ***When using remover/inserter tool J 41194, take care not to break the tip of the tool. Lay the wire in the widest part of the wire slot and work toward the tool tip.***

3. Place the terminal and wire in the end of extractor/inserter tool J 41194.
4. Insert the tool through the grommet, into the back of the connector, and push until the terminal is seated. Remove the remover/inserter tool.
5. Insert cavity plugs into all unused cavities.
6. Wrap plastic electrical tape around the wire bundle.
7. Reassemble the connector in the reverse order of disassembly.

E. Terminal Insertion (all connectors except ECD bulkhead)

1. Insert wire with crimped terminal through the proper hole in the grommet.
2. Keep pushing on wire until the terminal "locks" into position.

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APPENDIX E — CONNECTOR PART NUMBERS, TERMINAL PART NUMBERS, TOOL PART NUMBERS, AND REPAIR INSTRUCTIONS

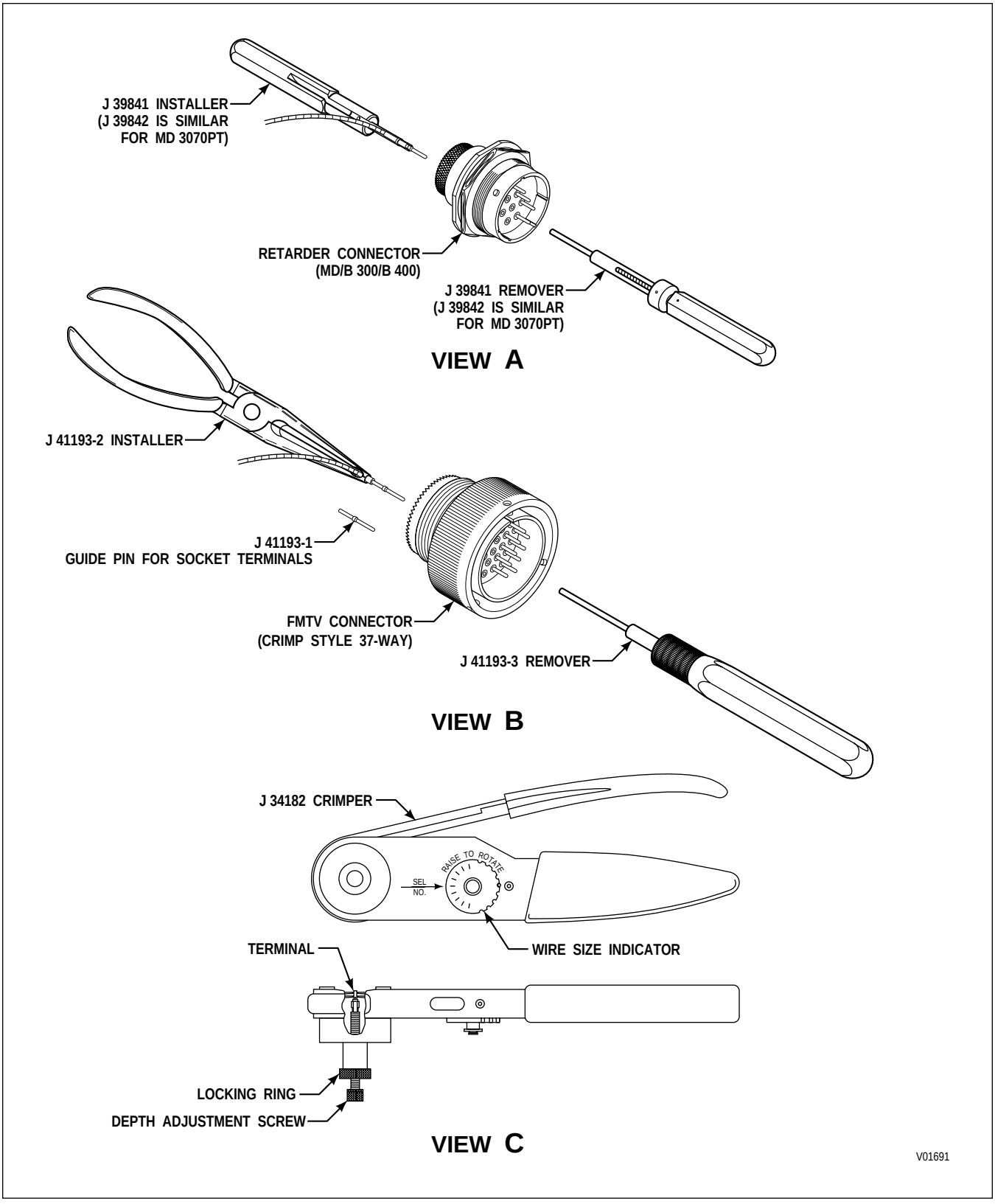

Figure E–11. ITT Cannon Connectors — Crimped (37-Way FMTV Bulkhead; 6-Way Transfer Case; 8-Way MD Retarder)

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APPENDIX E — CONNECTOR PART NUMBERS, TERMINAL PART NUMBERS, TOOL PART NUMBERS, AND REPAIR INSTRUCTIONS

1–10. ITT CANNON CONNECTORS — CRIMPED (37-WAY FMTV BULKHEAD; 6-WAY TRANSFER CASE; 8-WAY MD RETARDER)

A. Connector/Terminal Repair

Crimping Tool	J 34182
Connector Repair Kit (FMTV)	J 41193
Guide Pin	J 41193-1
Insertion Tool	J 41193-2
Terminal Remover	J 41193-3
Terminal Remover/Installer (MD Retarder)	J 39841
Terminal Remover/Installer (MD 3070 T-Case Connector)	J 39842

Use	Description	Manufacturers P/N
MD FMTV	37-Way Plug Assembly	CA3106E28-21P-B
	37-Way Receptacle Assembly	CA3100E28-21S-B
MD Transfer Case	6-Way Plug Assembly	KPSE06E10-6S
	Terminal (Socket)	031-9174-004
	Cavity Plug	225-0070-000
	6-Way Receptacle Assembly	KPSE07E10-6P
	Terminal (Pin)	030-9173-006
	Cavity Plug	225-0070-000
MD Retarder	8-Way Plug	KPSE06E16-8S
	Terminal, Socket	031-9206-006
	Cavity Plug	225-0071-000
	8-Way Receptacle	KPSE07E16-8P
	Terminal (Pin)	030-9205-007
	Cavity Plug	225-0071-000

B. Terminal Removal (Refer to Figure E–10, View A and B)

1. Select the remover tool for the plug or receptacle that is being repaired.
2. For the FMTV connector, choose either the pin or socket terminal remover tip and lock it into the handle.
3. Place the tip of the remover tool over the pin or into the socket and push the contact/terminal out the rear of the connector using slow, even pressure.
4. Pull the wire and terminal out the back of the connector.
5. If replacing the terminal, cut the wire through the middle of the terminal crimp to minimize wire loss.

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C. Terminal Crimping (Refer to Figure E–10, View C)

1. Strip approximately 6–8 mm (0.24–0.31 inch) of insulation from the wire.
2. Set the crimping tool wire size to number 18. To set the wire size, remove the retainer pin. Lift and rotate the indicator until 18 is aligned with the SEL NO. arrow. Reinstall the retainer pin.
3. Insert the contact end of the terminal down into crimping tool J 34182. Adjust the crimping tool depth by loosening the locking ring until the depth adjusting screw is free and turning the adjusting screw until the wire end of the terminal is just above flush with the top of the crimping hole. The crimp jaws will now contact the middle of the terminal barrel. Tighten the lock ring to retain the adjustment.
4. Fully insert the wire into the terminal so that the stripped portion of the wire is in the crimp area. A small section (0.5–1.0 mm (0.020–0.040 inch)) of wire will be visible above the terminal barrel.
5. Squeeze the crimping tool handle until it releases. The terminal is now crimped onto the wire.
6. Remove the terminal and wire from the crimping tool.
7. Tug on the terminal to ensure the crimp is tight.

D. Terminal Insertion

1. Select the proper insertion tool for the connector or receptacle that is being reassembled.
2. Place the terminal and wire in the insertion tool (refer to Figure E–10, View A and B).

NOTE: When installing a socket terminal for the FMTV plug, use the J 41193-1 guide pin.

3. Insert the terminal through the correct hole in the back of the connector and push until the terminal is seated. Remove the insertion tool. Check to see that the terminal is at the same height as other terminals. Tug on the wire at the rear of the connector to ensure that the terminal is locked in place.
4. Insert cavity plugs into all unused cavities.

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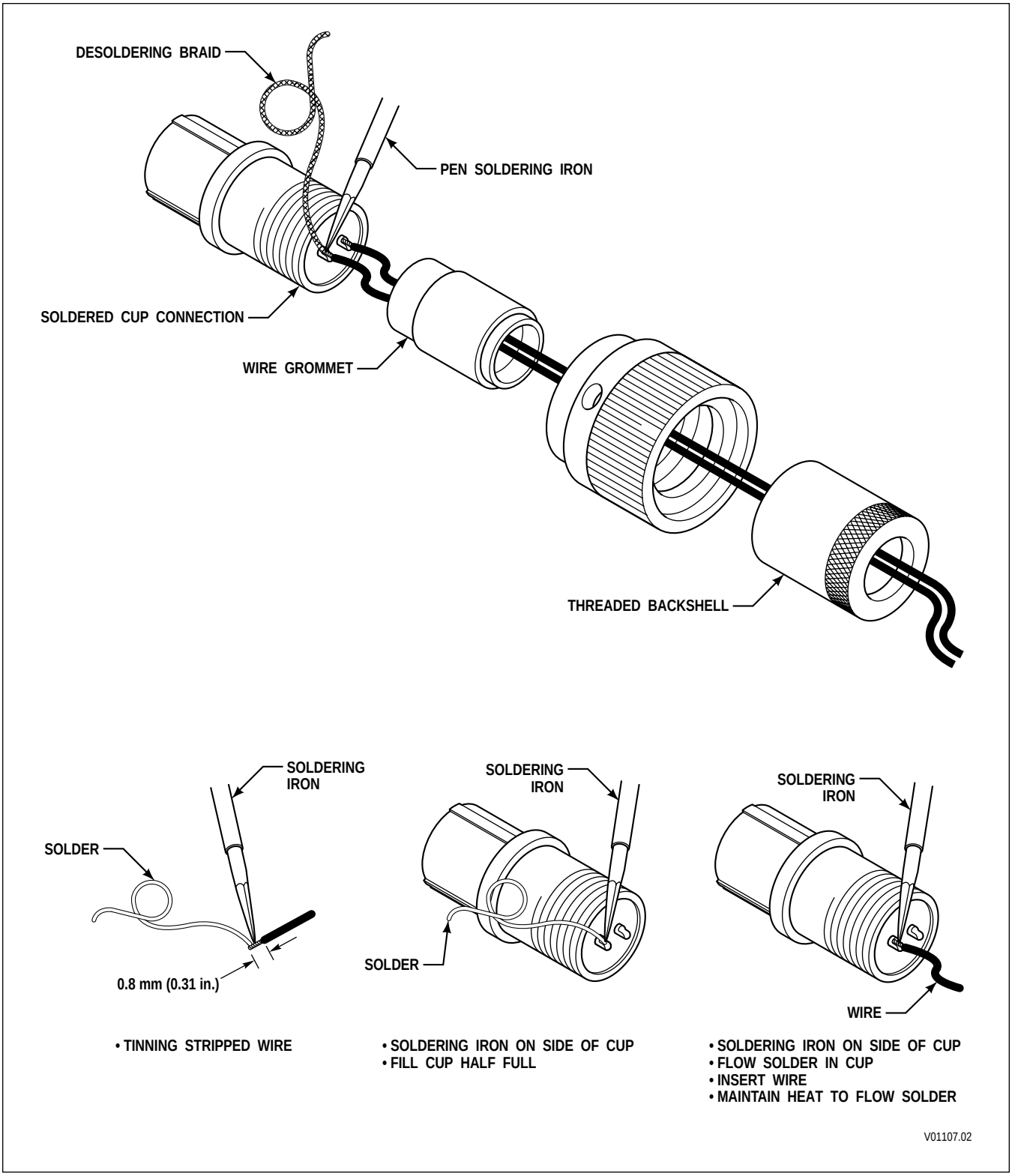

Figure E–12. ITT Cannon Connectors — Soldered (2-Way HD Retarder)

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1–11. ITT CANNON CONNECTORS — SOLDERED (2-WAY HD RETARDER)

A. Connector Terminal Repair (Refer to Figure E–11)

Use	Description	Manufacturers P/N
Retarder Control (K Solenoid) (HD/B 500 Models)	Connector Plug (2-Pin)	KPT06E8-2S
	Terminal (Pin)	031-9074-002
	Connector Receptacle	KPT07E8-2P

B. Special Tools

- 50–70 percent tin resin core solder, 18–20 SWG (0.086–1.0 mm (0.036 to 0.040 inch))
- Pen-type soldering iron (60W maximum) — tip no larger than 3.175 mm (0.125 inch)
- Desoldering braid

NOTE: ***Proper solder, techniques, equipment, and cleanliness are important to achieve a good solder joint. Clean connector and terminals being soldered of all dirt, grease, and oil. Always heat the piece onto which solder is to flow. A cold solder joint can cause intermittent continuity problems. Avoid a cold joint by heating the piece(s) being soldered to melt the solder rather than merely heating the solder until it melts. Excess solder applied to a stranded wire travels up the wire, stiffening it and making it inflexible. The wire can break at the point where the solder stops. Do not use acid core solder.***

C. Wire Removal — Desoldering

1. Unscrew the connector's backshell and slide the backshell away from the connector.
2. Slide the grommet away from the connector. Slide the grommet far enough to allow access to the terminals and wire ends. If the grommet is hard to slide, lubricate the wires with isopropyl alcohol. If necessary, move some of the harness covering. If no solder is present, proceed as in Section 1–9 for crimped terminals.
3. Place the desoldering braid (wick) on top of the soldered terminal cup and wire. Place the hot soldering iron on the desoldering braid and wait until the solder wicks up the braid, remove the wire.
4. If the other terminal is being repaired, repeat the desoldering operation on that terminal. When solder is removed, proceed as in Section 1–9 for crimped terminals.

D. Soldering Wire Into Terminal

NOTE: ***If installing a new connector on a harness, ensure the backshell and grommet are in place before soldering the wires to the terminals. Clean wires and terminals of dirt or grease.***

1. Strip approximately 8 ± 0.8 mm (0.31 ± 0.03 inch) of insulation from the wire.
2. Tin the stripped end of the wire.
3. Insert the wire through the proper hole in the grommet.

NOTE: ***Lubricate the wire(s) with isopropyl alcohol only if the wire(s) will not slide through the grommet. If installing a new connector on the harness, be sure the backshell is in place before inserting the wire(s) through the grommet.***

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D. Soldering Wire Into Terminal *(cont'd)*

4. Mount the connector in a holding fixture at a 45 degree angle. Hold the solder in the terminal cup and apply heat to the side of the cup until the solder flows.
5. Slowly feed solder into the cup until it is half-full. When the cup is half-full, remove the solder supply before removing the soldering iron. Half-fill all cup terminals that are to have wires inserted.

NOTE: Feed solder slowly enough to prevent a flux gas pocket from forming. A gas pocket prevents sufficient solder from flowing into the cup — a false fill. Correct a false fill by re-heating the cup and adding solder.

6. Start at the lowest cup and apply heat to the side of the cup until the solder melts.

NOTE: Do not overheat the connector while soldering. If the connector gets too hot, stop work until it cools.

7. Carefully insert the stripped end of the wire into the cup until the wire bottoms in the cup. The wire's insulation should be approximately 1.59 mm (0.0625 inch) above the solder.
8. Maintain heat until the solder has flowed in the cup and onto the wire. Overheating can cause the solder to wick up the stranded wire.

NOTE: Indications of a good solder connection are:

- ***A minimum amount of solder showing***
- ***Wire strands are clearly outlined in the joint***
- ***The joint is completely covered with solder***
- ***Fillets have a smooth even contour***
- ***Edges are feathered***
- ***The joint is bright, smooth, and appears clean***

Too little solder is better than too much. If the solder wicks up the wire, the wire may break at the point at which the solder stops.

9. After soldering and inspecting all connections, remove flux residue with a contact cleaner.
10. Slide the grommet into place and screw on the backshell.

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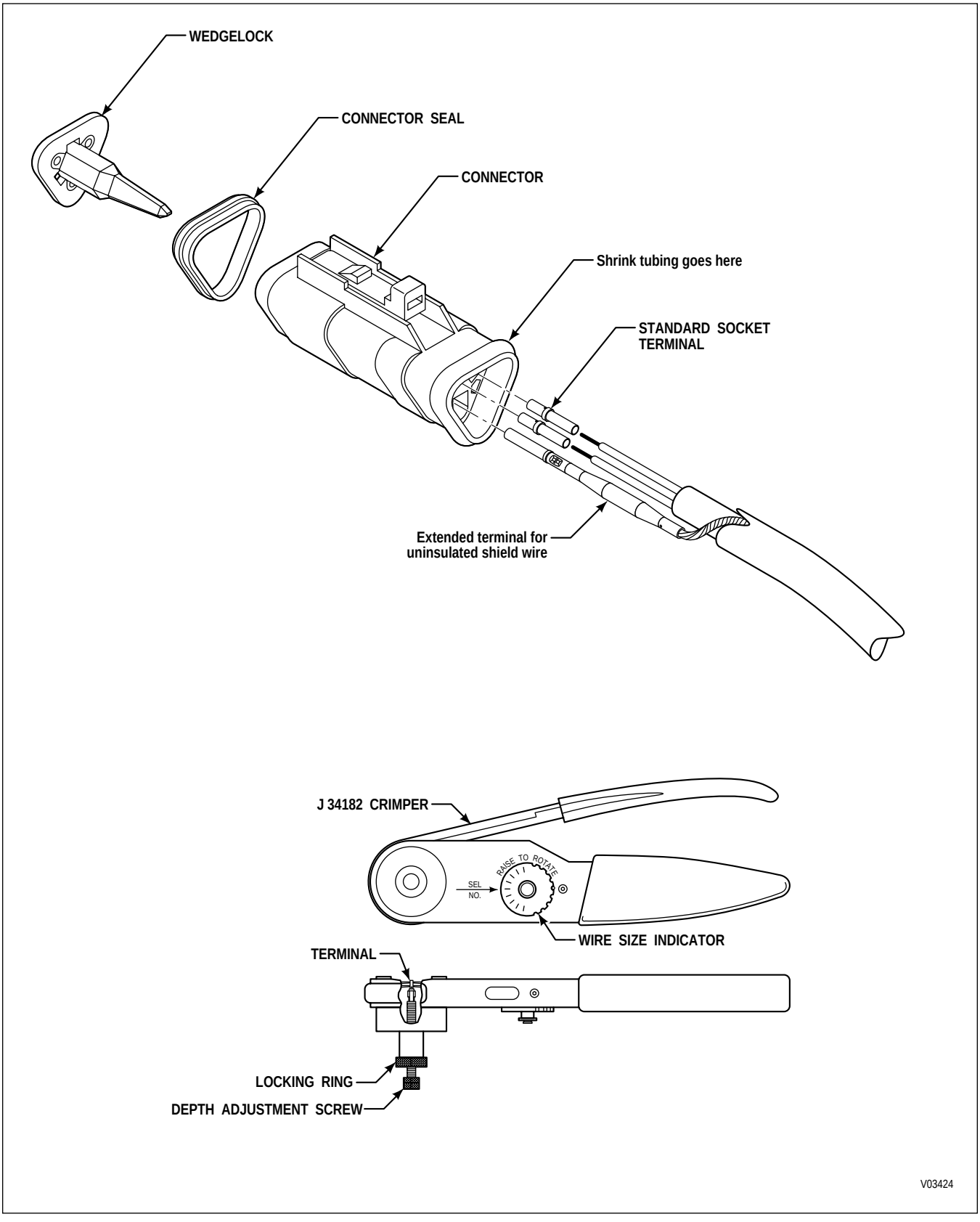

Figure E–13. Deutsch DT Series Connector (3-Way J1939 Interface)

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1–12. DEUTSCH DT SERIES CONNECTORS (3-WAY J1939 INTERFACE)

A. Connector/Terminal Repair

Crimping Tool	J 34182

Use	Description	Manufacturers P/N
J1939 Interface	Connector, Plug, 3-Way	DT06-3S-E008
	Wedgelock, Plug	W3S-1939
	Contact, Socket (Standard)	3662-204-1690
	Contact, Socket (Extended)	0462-221-1631
	Cable, J1939 Databus	23-000-13

B. Terminal Removal (Refer to Figure E–12)

1. Use a small-bladed screwdriver to remove the wedgelock that holds the terminals in place.
2. Use a sharp knife to carefully remove the shrink tubing from the rear of the connector plug.
3. Use a small screwdriver to release the locking lever for all of the terminals. Pull the wire and terminal out the rear of the connector.
4. Slide a new piece of shrink tubing over the removed terminals and onto the cable.
5. If replacing the terminal, cut the wire through the middle of the terminal crimp to minimize wire loss.

C. Terminal Crimping (Refer to Figure E–12)

1. Strip 6–8 mm (0.24–0.31 inch) of insulation from the wire. (There is no insulation on the shield wire.)
2. Set the crimping tool wire size to number 18. To set the wire size, remove the retainer pin. Lift and rotate the indicator until 18 is aligned with the SEL NO. arrow. Reinstall the retainer pin.
3. Insert the contact end of the terminal down into crimping tool J 34182. Adjust the crimping tool depth by loosening the locking ring until the depth adjusting screw is free and turning the adjusting screw until the wire end of the terminal is just above flush with the top of the crimping hole. The depth adjustment screw will need to be backed out a large amount to accept the extended shield terminal. The crimp jaws will now contact the middle of the terminal barrel. Tighten the lock ring to retain the adjustment.
4. Fully insert the wire into the terminal so that the stripped portion of the wire is in the crimp area. A small section (0.5–1.0 mm (0.02–0.04 inch)) of wire will be visible above the terminal barrel.
5. Squeeze the crimping tool handle until it releases. The terminal is now crimped onto the wire.
6. Remove the terminal and wire from the crimping tool.
7. Tug on the terminal to ensure the crimp is tight.

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D. Terminal Insertion

1. Slide the wire with crimped terminal attached into the rear of the connector.
2. Push the terminal and wire into the connector until it locks into position (refer to Figure E–12). Check the front of the connector to see that the terminal is at the same height as other terminals. Tug on the wire at the rear of the connector to ensure that the terminal is locked in place.
3. Insert the wedge lock to hold the terminals in place. Slide the sealing plug back into place at the rear of the connector.
4. Slide the shrink tubing over the raised area at the rear of the connector. Use a heat gun to shrink the tubing into position over the connector and cable.

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1–13. REPAIR OF A BROKEN WIRE WITH IN-LINE BUTT SPLICE

A. Connector Check Before Repair

NOTE: ***Before repairing or replacing wiring harness, sensor, solenoid, switch, or ECU as indicated for a diagnosed problem, follow the procedure below:***

1. Disconnect the connector or connectors associated with the problem and inspect for:
   - Bent terminals
   - Broken terminals
   - Dirty terminals
   - Pushed back terminals
   - Missing terminals
   - Condition of mating tabs
   - Condition of mating terminals

   Ensure that terminals are secure in the connector. Clean, straighten, or replace parts as required.
2. Reconnect all previous unmated connectors. Ensure connectors are fully inserted or twisted until they lock in place. Connectors with locking tabs make an audible “click” when the lock is engaged.
3. If trouble recurs after starting the vehicle, follow proper repair procedures for trouble code or complaint.
4. If trouble does not recur, or if the correct repairs and/or replacements have been made, the problem should be corrected.

B. Special Tools

- Heat Gun, J 25070 or equivalent
- Crimping Tool for Pre-insulated Crimp J 38125-8 (refer to Figure E–13)

NOTE: ***Use crimping anvils “F” and “G.”***

- Wire Strippers, J 35615
- Splices P/N 23046604 14–16 AWG
- Splices P/N 23046605 18–22 AWG

NOTE: ***Each splice must be properly crimped and then heated to shrink the covering to protect and insulate the splice. Insulation piercing splice clips should not be used.***

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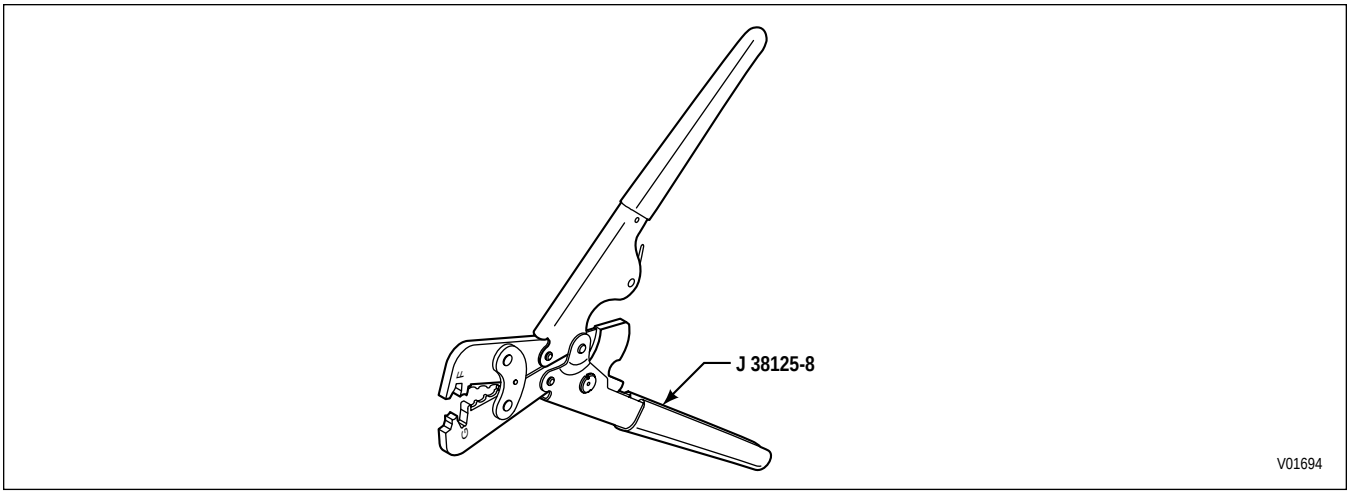

Figure E–14. Crimper J 38125-8

C. Straight Lead Repair Procedure

1. Locate damaged wire.
2. Remove insulation 8.0 mm (0.3 inch).
3. Insert one wire into crimp barrel and crimp.
4. Insert other wire into crimp barrel and crimp.
5. Pull on connection to ensure crimping integrity.
6. Heat splice with heat gun until covering shrinks and adhesive flows from under the covering.
7. The splice is now sealed and insulated. Electrical tape should not be used and is not necessary.

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CONNECTOR	MFG. P/N	PART NAME	MANUFACTURER	CONFIG	MATING P/N	MFG. P/N	MATING PART NAME
ECU S	12191001	STRAIN RELIEF, 32-WAY BLACK	DELPHI-PACKARD	1-PC/ECU S	12186041	12186041	ECU HEADER
ECU S	15305333	SEAL, 32-WAY	DELPHI-PACKARD	1-PC/ECU S			
ECU S	15305371	INNER CONNECT, 32-WAY	DELPHI-PACKARD	1-PC/ECU S			
ECU S	12129021	TPA, 32-WAY BLACK	DELPHI-PACKARD	1-PC/ECU S			
ECU S	12084912	TERMINAL, SOCKET 100W	DELPHI-PACKARD	1-PC/ECU S			
ECU S	12129557	CAVITY PLUG, 100W	DELPHI-PACKARD	1-PC/ECU S			
ECU S	12177289	CPA, 32-WAY RED	DELPHI-PACKARD	1-PC/ECU S			
ECU V	12191002	STRAIN RELIEF, 32-WAY GRAY	DELPHI-PACKARD	1-PC/ECU V	12186043	12186043	ECU HEADER
ECU V	15305333	SEAL, 32-WAY	DELPHI-PACKARD	1-PC/ECU V			
ECU V	15305371	INNER CONNECT, 32-WAY	DELPHI-PACKARD	1-PC/ECU V			
ECU V	12129022	TPA, 32-WAY GRAY	DELPHI-PACKARD	1-PC/ECU V			
ECU V	12084912	TERMINAL, SOCKET 100W	DELPHI-PACKARD	1-PC/ECU V			
ECU V	12129557	CAVITY PLUG, 100W	DELPHI-PACKARD	1-PC/ECU V			
ECU V	12177289	CPA, 32-WAY RED	DELPHI-PACKARD	1-PC/ECU V			
ECU T	12191003	STRAIN RELIEF, 32-WAY BLUE	DELPHI-PACKARD	1-PC/ECU T	12129008	12129008	ECU HEADER
ECU T	15305333	SEAL, 32-WAY	DELPHI-PACKARD	1-PC/ECU T			
ECU T	15305371	INNER CONNECT, 32-WAY	DELPHI-PACKARD	1-PC/ECU T			
ECU T	12129023	TPA, 32-WAY BLUE	DELPHI-PACKARD	1-PC/ECU T			
ECU T	12084912	TERMINAL, SOCKET 100W	DELPHI-PACKARD	1-PC/ECU T			
ECU T	12129557	CAVITY PLUG, 100W	DELPHI-PACKARD	1-PC/ECU T			
ECU T	12177289	CPA, 32-WAY RED	DELPHI-PACKARD	1-PC/ECU T			
PSS/SSS	12160280	CONN 20F MIC/P 100W GRAY	DELPHI-PACKARD	1-PC/COMP S	12160542	12160542	CONN 20M MIC/P 100W GRAY
PSS/SSS	15304882	CABLE SEAL, 14F GRAY	DELPHI-PACKARD	1-PC/COMP S	12110693	12110693	CABLE SEAL, 14M GREEN
PSS/SSS	12160494	LOCK, SECONDARY 20F GREEN	DELPHI-PACKARD	1-PC/COMP S	12191176	12191176	LOCK ASSIST/SEAL, 20M GREEN
PSS/SSS	12084912	TERMINAL, SOCKET 100W	DELPHI-PACKARD	1-PC/COMP S	12160551	12160551	TERMINAL, PIN 100W
PSS/SSS	12129557	CAVITY PLUG, 100W	DELPHI-PACKARD	1-PC/COMP S	12129557	12129557	CAVITY PLUG, 100W
PSS/SSS	12176394	CONDUIT CLIP, 13 mm BLACK	DELPHI-PACKARD	1-PC/COMP S	12176394	12176394	CONDUIT CLIP, 13 mm BLACK
DDR P	12048105	CONNECTOR, 12-WAY	DELPHI-PACKARD	1-PC/COMP S			DIAGNOSTIC DATA READER
DDR P	12048107	COVER, CONNECTOR	DELPHI-PACKARD	1-PC/COMP S			
DDR P	12034046	TERMINAL, 280F SPECIAL	DELPHI-PACKARD	1-PC/COMP S			
DDR P	12066214	TERMINAL, 280F (W/SCI), 2-WIRE	DELPHI-PACKARD	1-PC/COMP S			
DDR P	12020219	LOCK, SECONDARY	DELPHI-PACKARD	1-PC/COMP S			
DDR D	HD10-6-12P	CONNECTOR, REC., 6-WAY	DEUTSCH IPD	1-PC/COMP S			DIAGNOSTIC DATA READER
DDR D	0460-256-12233	CONTACT, PIN #12	DEUTSCH IPD	1-PC/COMP S			
DDR D	0460-204-0831	CONTACT, PIN #8	DEUTSCH IPD	1-PC/COMP S			
DDR D	114017	SEALING PLUG	DEUTSCH IPD	1-PC/COMP S			
DDR D	HD18-006	BACKSHELL - STRAIN RELIEF	DEUTSCH IPD	1-PC/COMP S			
DDR D	HDC16-6	CAP, DDR CONNECTOR	DEUTSCH IPD	1-PC/COMP S			

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SCI	15300027	CONNECTOR, 2-WAY	DELPHI-PACKARD	1-PC/COMP S	15300002	15300002	CONNECTOR, 2-WAY
SCI	12077411	TERMINAL, SOCKET	DELPHI-PACKARD	1-PC/COMP S	12048159	12048159	TERMINAL, PIN
SCI	12089444	SEAL, WIRE TYPE, SILICONE	DELPHI-PACKARD	1-PC/COMP S	12089444	12089444	SEAL, WIRE TYPE, SILICONE
SCI	15300014	LOCK, SECONDARY	DELPHI-PACKARD	1-PC/COMP S	15300014	15300014	LOCK, SECONDARY
J1939	DT06-3S-E008	CONNECTOR, PLUG 3-WAY	DEUTSCH	1-PC/ECU S		DT04-3P-E008	CONNECTOR, REC., 3-WAY
J1939	W3S	WEDGELOCK, PLUG	DEUTSCH	1-PC/ECU S		W3P	WEDGELOCK, RECEPTACLE
J1939	3662-204-1690	CONTACT, SOCKET #16	DEUTSCH	1-PC/ECU S	29511369	3660-201-1690	CONTACT, PIN #16
J1939	0462-221-1631	CONTACT, EXTENDED SOCKET	DEUTSCH	1-PC/ECU S		0460-247-1631	CONTACT, EXTENDED PIN
J1939		CABLE, J1939 DATABUS		1-PC/ECU S			
VIM	12040920	CONNECTOR, BODY, 18-WAY	DELPHI-PACKARD	1-PC/COMP V	12052130	12052130	VIM HEADER ASSEMBLY
VIM	12040936	SEAL, 9-WAY	DELPHI-PACKARD	1-PC/COMP V			
VIM	12110545	STRAIN RELIEF, 18-WAY	DELPHI-PACKARD	1-PC/COMP V			
VIM	12129426	BOLT, 7mm HEAD EXT.	DELPHI-PACKARD	1-PC/COMP V			
VIM	12034236	RETAINER CLIP, BOLT	DELPHI-PACKARD	1-PC/COMP V			
VIM	12103881	TERMINAL, 150F	DELPHI-PACKARD	1-PC/COMP V			
VIM	12034413	CAVITY PLUG, METRI-PACK	DELPHI-PACKARD	1-PC/COMP V			
VIW S	12160542	CONN 20M MIC/P 100W GRAY	DELPHI-PACKARD	1-PC/COMP S	12160280	12160280	CONN 20F MIC/P 100W GRAY
VIW S	12110693	CABLE SEAL, 14M GREEN	DELPHI-PACKARD	1-PC/COMP S	15304882	15304882	CABLE SEAL, 14F GRAY
VIW S	12191178	LOCK ASSIST/SEAL, 20M WHITE	DELPHI-PACKARD	1-PC/COMP S	12191173	12191173	LOCK, SECONDARY 20F WHITE
VIW S	12160551	TERMINAL, PIN 100W	DELPHI-PACKARD	1-PC/COMP S	12084912	12084912	TERMINAL, SOCKET 100W
VIW S	12129557	CAVITY PLUG, 100W	DELPHI-PACKARD	1-PC/COMP S	12129557	12129557	CAVITY PLUG, 100W
VIW S	12176394	CONDUIT CLIP, 13 mm BLACK	DELPHI-PACKARD	1-PC/COMP S	12176394	12176394	CONDUIT CLIP, 13 mm BLACK
VIW V	12160542	CONN 20M MIC/P 100W GRAY	DELPHI-PACKARD	1-PC/COMP V	12160280	12160280	CONN 20F MIC/P 100W GRAY
VIW V	12110693	CABLE SEAL, 14M GREEN	DELPHI-PACKARD	1-PC/COMP V	15304882	15304882	CABLE SEAL, 14F GRAY
VIW V	12191177	LOCK ASSIST/SEAL, 20M BLUE	DELPHI-PACKARD	1-PC/COMP V	12191172	12191172	LOCK, SECONDARY 20F BLUE
VIW V	12160551	TERMINAL, PIN 100W	DELPHI-PACKARD	1-PC/COMP V	12084912	12084912	TERMINAL, SOCKET 100W
VIW V	12129557	CAVITY PLUG, 100W	DELPHI-PACKARD	1-PC/COMP V	12129557	12129557	CAVITY PLUG, 100W
VIW V	12176394	CONDUIT CLIP, 13 mm BLACK	DELPHI-PACKARD	1-PC/COMP V	12176394	12176394	CONDUIT CLIP, 13 mm BLACK
VIW V	12191505	COVER, CONNECTOR	DELPHI-PACKARD	1-PC/COMP V			
RMR	12015795	CONNECTOR, 3-WAY	DELPHI-PACKARD	1-PC/COMP S,T	12015092	12015092	CONNECTOR, SHROUD 3-WAY
RMR	12089040	TERMINAL, PIN	DELPHI-PACKARD	1-PC/COMP S,T	12089188	12089188	TERMINAL, SOCKET
RMR	12089444	SEAL, WIRE TYPE, SILICONE	DELPHI-PACKARD	1-PC/COMP S,T	12089444	12089444	SEAL, WIRE TYPE, SILICONE
NE	12162193	CONNECTOR, 2-WAY	DELPHI-PACKARD	1-PC/COMP T	12066016		ENGINE SPEED SENSOR
NE	12103881	TERMINAL, 150F	DELPHI-PACKARD	1-PC/COMP T	Actual sensor uses molded receptacle similar to 12066016		
NO	12162193	CONNECTOR, 2-WAY	DELPHI-PACKARD	1-PC/COMP T			OUTPUT SPEED SENSOR
NO	12103881	TERMINAL, 150F	DELPHI-PACKARD	1-PC/COMP T	Actual sensor uses molded receptacle similar to 12066016		
NT	12162193	CONNECTOR, 2-WAY	DELPHI-PACKARD	1-PC/COMP T			TURBINE SPEED SENSOR
NT	12103881	TERMINAL, 150F	DELPHI-PACKARD	1-PC/COMP T	Actual sensor uses molded receptacle similar to 12066016		
TPS	12015793	CONNECTOR, 3-WAY	DELPHI-PACKARD	1-PC/COMP V,T			TPS HEADER
TPS	12089040	TERMINAL, PIN	DELPHI-PACKARD	1-PC/COMP V,T	TPS header similar to 12010717 connector with 12089188 sockets molded into the TPS.		
TPS	12089444	SEAL, WIRE TYPE, SILICONE	DELPHI-PACKARD	1-PC/COMP V,T			

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CONNECTOR	MFG. P/N	PART NAME	MANUFACTURER	CONFIG	MATING P/N	MFG. P/N	MATING PART NAME
NSOL	15326143	CONNECTOR, 2-WAY	DELPHI-PACKARD	1-PC/COMP T	12084669		ACCUMULATOR SOLENOID
NSOL	12103881	TERMINAL, 150F	DELPHI-PACKARD	1-PC/COMP T	Actual solenoid uses molded receptacle similar to 12084669		
RTEMP	12010973	CONNECTOR, SHROUD, 2-WAY	DELPHI-PACKARD	1-PC/COMP T	12015792	12015792	CONNECTOR, TOWER, 2-WAY
RTEMP	12089188	TERMINAL, SOCKET	DELPHI-PACKARD	1-PC/COMP T	12089040	12089040	TERMINAL, PIN
RTEMP	12089444	SEAL, WIRE TYPE, SILICONE	DELPHI-PACKARD	1-PC/COMP T	12089444	12089444	SEAL, SILICONE
RTEMP, V8A	12162852	CONNECTOR, 2-WAY	DELPHI-PACKARD	1-PC/COMP T	12015792	12015792	V8A RETARDER TEMPERATURE
RTEMP, V8A	12124075	TERMINAL, 150.2F	DELPHI-PACKARD	1-PC/COMP T			
XFER	KPSE06E10-6S	CONNECTOR ASSY, PLUG 6-WAY	ITT CANNON	1-PC/COMP T(7)		KPSE07E10-6P	TRANSFER CASE
RMOD	KPSE06E16-8S	CONNECTOR ASSY, PLUG 8-WAY	ITT CANNON	1-PC/COMP T	29505513	KPSE07E16-8P	CONNECTOR ASSY, REC 8-WAY
HSOLH	KPT06E8-2S	CONNECTOR ASSY, PLUG 2-WAY	ITT CANNON	1-PC/COMP T, HD	29505515	KPT07E8-2P	RETARDER SOLENOID, HDR
HSOLM	12162197	CONNECTOR, 2-WAY	DELPHI-PACKARD	1-PC/COMP T, MD	12084669		RETARDER SOLENOID, MDR
HSOLM	12103881	TERMINAL, 150F	DELPHI-PACKARD	1-PC/COMP T, MD	Actual solenoid uses molded receptacle similar to 12084669		
TRANS	WT06B24-31SN	CONNECTOR, PLUG, 31-WAY	DEUTSCH	1-PC/COMP T	29511368	WT04B24-31PN	CONNECTOR, REC., 31-WAY
TRANS	3662-204-1690	CONTACT, SOCKET #16	DEUTSCH	1-PC/COMP T	29511369	3660-201-1690	CONTACT, PIN #16
TRANS	0613-1-1601	SEALING PLUG	DEUTSCH	1-PC/COMP T	29511371	0613-1-1601	SEALING PLUG
TRANS	WTA10-24-01/19	HOUSING, BACKSHELL, 24/19	DEUTSCH	1-PC/COMP T	29514041	WTA10-24-01/19	HOUSING, BACKSHELL, 24/19
TRANS	WTA10-24-02/19	FOLLOWER, BACKSHELL, 24/19	DEUTSCH	1-PC/COMP T	29514042	WTA10-24-02/19	FOLLOWER, BACKSHELL, 24/19
TRANS	WTA10-24-03	GROMMET, BACKSHELL #24	DEUTSCH	1-PC/COMP T	29514043	WTA10-24-03	GROMMET, BACKSHELL #24
BLKHD RCS	WT04B24-31SN	CONNECTOR, REC., 31-WAY	DEUTSCH	ECU T/COMP V	29511855	WT06B24-31PN	CONNECTOR, PLUG, 31-WAY
BLKHD RCS	3662-204-1690	CONTACT, SOCKET #16	DEUTSCH	ECU T/COMP V	29511369	3660-201-1690	CONTACT, PIN #16
BLKHD RCS	0613-1-1601	SEALING PLUG	DEUTSCH	ECU T/COMP V	29511371	0613-1-1601	SEALING PLUG
BLKHD RCS	WTA10-24-01/19	HOUSING, BACKSHELL, 24/19	DEUTSCH	ECU T/COMP V	29514041	WTA10-24-01/19	HOUSING, BACKSHELL, 24/19
BLKHD RCS	WTA10-24-02/19	FOLLOWER, BACKSHELL, 24/19	DEUTSCH	ECU T/COMP V	29514042	WTA10-24-02/19	FOLLOWER, BACKSHELL, 24/19
BLKHD RCS	WTA10-24-03	GROMMET, BACKSHELL #24	DEUTSCH	ECU T/COMP V	29514043	WTA10-24-03	GROMMET, BACKSHELL #24
BLKHD RCS	0926-208-2401	NUT, PANEL	DEUTSCH	ECU T/COMP V			
BLKHD RCS	9013-3-0402	O-RING	DEUTSCH	ECU T/COMP V			
BLKHD PGP	WT06B24-31PN	CONNECTOR, PLUG, 31-WAY	DEUTSCH	ECU V/COMP T	29511854	WT04B24-31SN	CONNECTOR, REC., 31-WAY
BLKHD PGP	3660-201-1690	CONTACT, PIN #16	DEUTSCH	ECU V/COMP T	29511366	3662-204-1690	CONTACT, SOCKET #16
BLKHD PGP	0613-1-1601	SEALING PLUG	DEUTSCH	ECU V/COMP T	29511371	0613-1-1601	SEALING PLUG
BLKHD PGP	WTA10-24-01/19	HOUSING, BACKSHELL, 24/19	DEUTSCH	ECU V/COMP T	29514041	WTA10-24-01/19	HOUSING, BACKSHELL, 24/19
BLKHD PGP	WTA10-24-02/19	FOLLOWER, BACKSHELL, 24/19	DEUTSCH	ECU V/COMP T	29514042	WTA10-24-02/19	FOLLOWER, BACKSHELL, 24/19
BLKHD PGP	WTA10-24-03	GROMMET, BACKSHELL #24	DEUTSCH	ECU V/COMP T	29514043	WTA10-24-03	GROMMET, BACKSHELL #24
					29527000	0926-208-2401	NUT, PANEL
					29512839	9013-3-0402	O-RING
BLKHD RCP	WTC04B24-31PN	CONNECTOR, REC., 31-WAY	DEUTSCH	COMP S	29511365	WT06B24-31SN	CONNECTOR, PLUG, 31-WAY
BLKHD RCP	3660-201-1690	CONTACT, PIN #16	DEUTSCH	COMP S	29511366	3662-204-1690	CONTACT, SOCKET #16
BLKHD RCP	0613-1-1601	SEALING PLUG	DEUTSCH	COMP S	29511371	0613-1-1601	SEALING PLUG
BLKHD RCP	WTA10-24-01/19	HOUSING, BACKSHELL, 24/19	DEUTSCH	COMP S	29514041	WTA10-24-01/19	HOUSING, BACKSHELL, 24/19
BLKHD RCP	WTA10-24-02/19	FOLLOWER, BACKSHELL, 24/19	DEUTSCH	COMP S	29514042	WTA10-24-02/19	FOLLOWER, BACKSHELL, 24/19
BLKHD RCP	WTA10-24-03	GROMMET, BACKSHELL #24	DEUTSCH	COMP S	29514043	WTA10-24-03	GROMMET, BACKSHELL #24

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CONNECTOR	MFG. P/N	PART NAME	MANUFACTURER	CONFIG	MATING P/N	MFG. P/N	MATING PART NAME
BLKHD RCP	0926-208-2401	NUT, PANEL	DEUTSCH	COMP S			
BLKHD RCP	9013-3-0402	O-RING	DEUTSCH	COMP S			
BLKHD PGS	WT06B24-31SN	CONNECTOR, PLUG, 31-WAY	DEUTSCH	ECU S	29511368	WT04B24-31PN	CONNECTOR, REC., 31-WAY
BLKHD PGS	3662-204-1690	CONTACT, SOCKET #16	DEUTSCH	ECU S	29511369	3660-201-1690	CONTACT, PIN #16
BLKHD PGS	0613-1-1601	SEALING PLUG	DEUTSCH	ECU S	29511371	0613-1-1601	SEALING PLUG
BLKHD PGS	WTA10-24-01/19	HOUSING, BACKSHELL, 24/19	DEUTSCH	ECU S	29514041	WTA10-24-01/19	HOUSING, BACKSHELL, 24/19
BLKHD PGS	WTA10-24-02/19	FOLLOWER, BACKSHELL, 24/19	DEUTSCH	ECU S	29514042	WTA10-24-02/19	FOLLOWER, BACKSHELL, 24/19
BLKHD PGS	WTA10-24-03	GROMMET, BACKSHELL #24	DEUTSCH	ECU S	29514043	WTA10-24-03	GROMMET, BACKSHELL #24
					29527000	0926-208-2401	NUT, PANEL
					29512839	9013-3-0402	O-RING
SENS	WT06B20-16SN	CONNECTOR, PLUG, 16-WAY	DEUTSCH	1-PC/COMP T (UNIV)	29516988	WT04B20-16PN	CONNECTOR, REC., 16-WAY
SENS	3662-204-1690	CONTACT, SOCKET #16	DEUTSCH	1-PC/COMP T (UNIV)	29511369	3660-201-1690	CONTACT, PIN #16
SENS	0613-1-1601	SEALING PLUG	DEUTSCH	1-PC/COMP T (UNIV)	29511371	0613-1-1601	SEALING PLUG
SENS	WTA10-20-01/16	HOUSING, BACKSHELL, 20/16	DEUTSCH	1-PC/COMP T (UNIV)	29516991	WTA10-20-01/16	HOUSING, BACKSHELL, 20/16
SENS	WTA10-20-02/16	FOLLOWER, BACKSHELL, 20/16	DEUTSCH	1-PC/COMP T (UNIV)	29516992	WTA10-20-02/16	FOLLOWER, BACKSHELL, 20/16
SENS	WTA10-20-03	GROMMET, BACKSHELL #20	DEUTSCH	1-PC/COMP T (UNIV)	29516993	WTA10-20-03	GROMMET, BACKSHELL #20
					29516989	0926-207-2087	NUT, PANEL #20
					29519126	0914-212-2086	LOCKWASHER, #20
SENSX	WT04B20-16PN	CONNECTOR, REC., 16-WAY	DEUTSCH	SENSOR	29516987	WT06B20-16SN	CONNECTOR, PLUG, 16-WAY
SENSX	3660-201-1690	CONTACT, PIN #16	DEUTSCH	SENSOR	29511366	3662-204-1690	CONTACT, SOCKET #16
SENSX	0613-1-1601	SEALING PLUG	DEUTSCH	SENSOR	29511371	0613-1-1601	SEALING PLUG
SENSX	WTA10-20-01/16	HOUSING, BACKSHELL, 20/16	DEUTSCH	SENSOR	29516991	WTA10-20-01/16	HOUSING, BACKSHELL, 20/16
SENSX	WTA10-20-02/16	FOLLOWER, BACKSHELL, 20/16	DEUTSCH	SENSOR	29516992	WTA10-20-02/16	FOLLOWER, BACKSHELL, 20/16
SENSX	WTA10-20-03	GROMMET, BACKSHELL #20	DEUTSCH	SENSOR	29516993	WTA10-20-03	GROMMET, BACKSHELL #20
SENSX	0926-207-2087	NUT, PANEL #20	DEUTSCH	SENSOR			
SENSX	0914-212-2086	LOCKWASHER, #20	DEUTSCH	SENSOR			
RTEMPX	12015792	CONNECTOR, TOWER, 2-WAY	DELPHI-PACKARD	ADAPTER (MDR)	12010973	12010973	CONNECTOR, SHROUD, 2-WAY
RTEMPX	12089040	TERMINAL, PIN	DELPHI-PACKARD	ADAPTER (MDR)	12089188	12089188	TERMINAL, SOCKET
RTEMPX	12089444	SEAL, SILICONE	DELPHI-PACKARD	ADAPTER (MDR)	12089444	12089444	SEAL, WIRE TYPE, SILICONE
NOX	12066016	CONNECTOR, 2-WAY	DELPHI-PACKARD	ADAPTER (MDR)	12162193	12162193	CONNECTOR, 2-WAY
					12103881	12103881	TERMINAL, 150F
HSOLMX		CONNECTOR MOLD, 2-WAY	DELPHI-PACKARD	SOLENOID (MDR)	12162197	12162197	CONNECTOR, 2-WAY
					12103881	12103881	TERMINAL, 150F
HSOLMXA	12084669	CONNECTOR, 2-WAY	DELPHI-PACKARD	ADAPTER (MDR)	12162197	12162197	CONNECTOR, 2-WAY
					12103881	12103881	TERMINAL, 150F
RMRX	12015092	CONNECTOR, SHROUD 3-WAY	DELPHI-PACKARD	RES. MODULE	12015795	12015795	CONNECTOR, 3-WAY
RMRX	12089188	TERMINAL, SOCKET	DELPHI-PACKARD	RES. MODULE	12089040	12089040	TERMINAL, PIN
RMRX	12089444	SEAL, WIRE TYPE, SILICONE	DELPHI-PACKARD	RES. MODULE	12089444	12089444	SEAL, WIRE TYPE, SILICONE

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CONNECTOR	MFG. P/N	PART NAME	MANUFACTURER	CONFIG	MATING P/N	MFG. P/N	MATING PART NAME
SCIX	15300002	CONNECTOR, SHROUD 2-WAY	DELPHI-PACKARD	SCI ADAPTER	15300027	15300027	CONNECTOR, 2-WAY
SCIX	12048159	TERMINAL, PIN	DELPHI-PACKARD	SCI ADAPTER	12077411	12077411	TERMINAL, SOCKET
SCIX	12089444	SEAL, WIRE TYPE, SILICONE	DELPHI-PACKARD	SCI ADAPTER	12089444	12089444	SEAL, WIRE TYPE, SILICONE
SCIX	15300014	LOCK, SECONDARY	DELPHI-PACKARD	SCI ADAPTER	15300014	15300014	LOCK, SECONDARY
TRANSX	WT04B24-31PN	CONNECTOR, REC., 31-WAY	DEUTSCH	INTERNAL	29511365	WT06B24-31SN	CONNECTOR, PLUG, 31-WAY
TRANSX	3660-201-1690	CONTACT, PIN #16	DEUTSCH	INTERNAL	29511366	3662-204-1690	CONTACT, SOCKET #16
TRANSX	0613-1-1601	SEALING PLUG	DEUTSCH	INTERNAL	29511371	0613-1-1601	SEALING PLUG
TRANSX	WTA10-24-01/19	HOUSING, BACKSHELL, 24/19	DEUTSCH	INTERNAL	29514041	WTA10-24-01/19	HOUSING, BACKSHELL, 24/19
TRANSX	WTA10-24-02/19	FOLLOWER, BACKSHELL, 24/19	DEUTSCH	INTERNAL	29514042	WTA10-24-02/19	FOLLOWER, BACKSHELL, 24/19
TRANSX	WTA10-24-03	GROMMET, BACKSHELL #24	DEUTSCH	INTERNAL	29514043	WTA10-24-03	GROMMET, BACKSHELL #24
ASOL	12092420	CONNECTOR, 2-WAY SOLENOID	DELPHI-PACKARD	INTERNAL			SOLENOID A (C1)
ASOL	12124639	TERMINAL, 280 SERIES SOCKET	DELPHI-PACKARD	INTERNAL			
ASOL	12124618	TERMINAL, 280 SERIES SOCKET	DELPHI-PACKARD	INTERNAL			
BSOL	12092420	CONNECTOR, 2-WAY SOLENOID	DELPHI-PACKARD	INTERNAL			SOLENOID B (C2)
BSOL	12124639	TERMINAL, 280 SERIES SOCKET	DELPHI-PACKARD	INTERNAL			
BSOL	12124618	TERMINAL, 280 SERIES SOCKET	DELPHI-PACKARD	INTERNAL			
CSOL	12092420	CONNECTOR, 2-WAY SOLENOID	DELPHI-PACKARD	INTERNAL			SOLENOID C (C3)
CSOL	12124639	TERMINAL, 280 SERIES SOCKET	DELPHI-PACKARD	INTERNAL			
DSOL	12092420	CONNECTOR, 2-WAY SOLENOID	DELPHI-PACKARD	INTERNAL			SOLENOID D (C4)
DSOL	12124639	TERMINAL, 280 SERIES SOCKET	DELPHI-PACKARD	INTERNAL			
ESOL	12092420	CONNECTOR, 2-WAY SOLENOID	DELPHI-PACKARD	INTERNAL			SOLENOID E (C5)
ESOL	12124639	TERMINAL, 280 SERIES SOCKET	DELPHI-PACKARD	INTERNAL			
FSOL	12092420	CONNECTOR, 2-WAY SOLENOID	DELPHI-PACKARD	INTERNAL			SOLENOID F (LOCK-UP)
FSOL	12124639	TERMINAL, 280 SERIES SOCKET	DELPHI-PACKARD	INTERNAL			
GSOL	12092420	CONNECTOR, 2-WAY SOLENOID	DELPHI-PACKARD	INTERNAL			SOLENOID G (FORWARD)
GSOL	12124639	TERMINAL, 280 SERIES SOCKET	DELPHI-PACKARD	INTERNAL			
GSOL	12124618	TERMINAL, 280 SERIES SOCKET	DELPHI-PACKARD	INTERNAL			
JSOL	12092420	CONNECTOR, 2-WAY SOLENOID	DELPHI-PACKARD	INTERNAL (MD7)			SOLENOID J (C6)
JSOL	12124639	TERMINAL, 280 SERIES SOCKET	DELPHI-PACKARD	INTERNAL (MD7)			
NSOLI	12092420	CONNECTOR, 2-WAY SOLENOID	DELPHI-PACKARD	INTERNAL (MD7)			SOLENOID N (LOW SIGNAL)
NSOLI	12124639	TERMINAL, 280 SERIES SOCKET	DELPHI-PACKARD	INTERNAL (MD7)			
C3PS	12110139	CONNECTOR, 2-WAY C3PS	DELPHI-PACKARD	INTERNAL			C3 PRESSURE SWITCH
C3PS	12066337	TERMINAL, 280 SERIES PIN	DELPHI-PACKARD	INTERNAL			
OLS	12047785	CONNECTOR, 4-WAY OLS	DELPHI-PACKARD	INTERNAL			OIL LEVEL SENSOR
OLS	12047767	TERMINAL, 150F	DELPHI-PACKARD	INTERNAL			
OLS	12047664	LOCK, SECONDARY	DELPHI-PACKARD	INTERNAL			
NTI	12162723	CONNECTOR, 2-WAY	DELPHI-PACKARD	INTERNAL			TURBINE SPEED SENSOR
NTI	12110236	TERMINAL, 150F	DELPHI-PACKARD	INTERNAL			
OILT		SENSOR, TEMPERATURE, SUMP	PHILLIPS TECH	INTERNAL			

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CONNECTOR	MFG. P/N	PART NAME	MANUFACTURER	CONFIG	MATING P/N	MFG. P/N	MATING PART NAME
OILT, V8A	12129691	SENSOR, TEMPERATURE, SUMP	PHILLIPS TECH	INTERNAL			
TEMP, V8A	12047662	CONNECTOR, 2-WAY	DELPHI-PACKARD	INTERNAL	12129691	12129691	SENSOR, TEMPERATURE, SUMP
TEMP, V8A	12047664	LOCK, SECONDARY	DELPHI-PACKARD	INTERNAL			
TEMP, V8A	12047767	TERMINAL, SOCKET	DELPHI-PACKARD	INTERNAL			
STNDMD		STANDOFF, WIRING HARNESS		INTERNAL			CONTROL MODULE, MD
STNDMD	WTA01-04-14	GROMMET, STANDOFF 14-BLOCK	DEUTSCH	INTERNAL			
STNDMD	12092195	O-RING, FEEDTHRU ASSEMBLY	DELPHI-PACKARD	INTERNAL			
STNDMD	WTA10-24-01/19	HOUSING, BACKSHELL, 24/19	DEUTSCH	INTERNAL			
STNDMD	WTA10-24-02/19	FOLLOWER, BACKSHELL, 24/19	DEUTSCH	INTERNAL			
STNDMD	WTA10-24-03	GROMMET, BACKSHELL #24	DEUTSCH	INTERNAL			
STNDMD	0810-205-0001	SEAL, FEEDTHRU ASSEMBLY	DEUTSCH	INTERNAL			
STNDMR		STANDOFF, WIRING HARNESS		INTERNAL/OLS			CONTROL MODULE, MD/MDR OLS
STNDMR	WTA01-04-12	GROMMET, STANDOFF 12-BLOCK	DEUTSCH	INTERNAL/OLS			
STNDMR	12092195	O-RING, FEEDTHRU ASSEMBLY	DELPHI-PACKARD	INTERNAL/OLS			
STNDMR	WTA10-24-01/19	HOUSING, BACKSHELL, 24/19	DEUTSCH	INTERNAL/OLS			
STNDMR	WTA10-24-02/19	FOLLOWER, BACKSHELL, 24/19	DEUTSCH	INTERNAL/OLS			
STNDMR	WTA10-24-03	GROMMET, BACKSHELL #24	DEUTSCH	INTERNAL/OLS			
STNDMR	0810-205-0001	SEAL, FEEDTHRU ASSEMBLY	DEUTSCH	INTERNAL/OLS			
STNDM7		STANDOFF, WIRING HARNESS		INTERNAL			CONTROL MODULE, MD7
STNDM7	WTA01-04-11	GROMMET, STANDOFF 11-BLOCK	DEUTSCH	INTERNAL			
STNDM7	12092195	O-RING, FEEDTHRU ASSEMBLY	DELPHI-PACKARD	INTERNAL			
STNDM7	WTA10-24-01/19	HOUSING, BACKSHELL, 24/19	DEUTSCH	INTERNAL			
STNDM7	WTA10-24-02/19	FOLLOWER, BACKSHELL, 24/19	DEUTSCH	INTERNAL			
STNDM7	WTA10-24-03	GROMMET, BACKSHELL #24	DEUTSCH	INTERNAL			
STNDM7	0810-205-0001	SEAL, FEEDTHRU ASSEMBLY	DEUTSCH	INTERNAL			
STNDHD		STANDOFF, WIRING HARNESS		INTERNAL			CONTROL MODULE, HD
STNDHD	WTA01-04-16	GROMMET, STANDOFF 16-BLOCK	DEUTSCH	INTERNAL			
STNDHD	12092195	O-RING, FEEDTHRU ASSEMBLY	DELPHI-PACKARD	INTERNAL			
STNDHD	WTA10-24-01/19	HOUSING, BACKSHELL, 24/19	DEUTSCH	INTERNAL			
STNDHD	WTA10-24-02/19	FOLLOWER, BACKSHELL, 24/19	DEUTSCH	INTERNAL			
STNDHD	WTA10-24-03	GROMMET, BACKSHELL #24	DEUTSCH	INTERNAL			
STNDHD	0810-205-0001	SEAL, FEEDTHRU ASSEMBLY	DEUTSCH	INTERNAL			
STNDHR		STANDOFF, WIRING HARNESS		INTERNAL/OLS			CONTROL MODULE HD/HDR OLS
STNDHR	WTA01-04-14	GROMMET, STANDOFF 14-BLOCK	DEUTSCH	INTERNAL/OLS			
STNDHR	12092195	O-RING, FEEDTHRU ASSEMBLY	DELPHI-PACKARD	INTERNAL/OLS			
STNDHR	WTA10-24-01/19	HOUSING, BACKSHELL, 24/19	DEUTSCH	INTERNAL/OLS			
STNDHR	WTA10-24-02/19	FOLLOWER, BACKSHELL, 24/19	DEUTSCH	INTERNAL/OLS			
STNDHR	WTA10-24-03	GROMMET, BACKSHELL #24	DEUTSCH	INTERNAL/OLS			
STNDHR	0810-205-0001	SEAL, FEEDTHRU ASSEMBLY	DEUTSCH	INTERNAL/OLS			

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CONNECTOR	MFG. P/N	PART NAME	MANUFACTURER	CONFIG	MATING P/N	MFG. P/N	MATING PART NAME
STNDH7		STANDOFF, WIRING HARNESS		INTERNAL			CONTROL MODULE HD7 OLS
STNDH7	WTA01-04-12	GROMMET, STANDOFF 12-BLOCK	DEUTSCH	INTERNAL			
STNDH7	12092195	O-RING, FEEDTHRU ASSEMBLY	DELPHI-PACKARD	INTERNAL			
STNDH7	WTA10-24-01/19	HOUSING, BACKSHELL, 24/19	DEUTSCH	INTERNAL			
STNDH7	WTA10-24-02/19	FOLLOWER, BACKSHELL, 24/19	DEUTSCH	INTERNAL			
STNDH7	WTA10-24-03	GROMMET, BACKSHELL #24	DEUTSCH	INTERNAL			
STNDH7	0810-205-0001	SEAL, FEEDTHRU ASSEMBLY	DEUTSCH	INTERNAL			
STNDH7	0613-1-1601	SEALING PLUG	DEUTSCH	INTERNAL			
VIMX	12034397	CONNECTOR, BODY, 30-WAY	DELPHI-PACKARD	VIM WIRING			VIM HEADER
VIMX	12040879	SEAL, 15-WAY	DELPHI-PACKARD	VIM WIRING			
VIMX	12110546	STRAIN RELIEF, 30-WAY	DELPHI-PACKARD	VIM WIRING			
VIMX	12129426	BOLT, 7 mm HEAD, EXT.	DELPHI-PACKARD	VIM WIRING			
VIMX	12034236	RETAINER CLIP, BOLT	DELPHI-PACKARD	VIM WIRING			
VIMX	12103881	TERMINAL, 150F SERIES	DELPHI-PACKARD	VIM WIRING			
VIMX	12034413	CAVITY PLUG, METRI-PACK	DELPHI-PACKARD	VIM WIRING			
VIW SX	12160280	CONN 20F MIC/P 100W GRAY	DELPHI-PACKARD	VIW S WIRING	12160542	12160542	CONN 20M MIC/P 100W GRAY
VIW SX	15304882	CABLE SEAL, 14F GRAY	DELPHI-PACKARD	VIW S WIRING	12110693	12110693	CABLE SEAL, 14M GREEN
VIW SX	12191173	LOCK, SECONDARY 20F WHITE	DELPHI-PACKARD	VIW S WIRING	12191178	12191178	LOCK ASSIST/SEAL, 20M WHITE
VIW SX	12084912	TERMINAL, SOCKET 100W	DELPHI-PACKARD	VIW S WIRING	12160551	12160551	TERMINAL, PIN 100W
VIW SX	12129557	CAVITY PLUG, 100W	DELPHI-PACKARD	VIW S WIRING	12129557	12129557	CAVITY PLUG, 100W
VIW SX	12176394	CONDUIT CLIP, 13 mm BLACK	DELPHI-PACKARD	VIW S WIRING	12176394	12176394	CONDUIT CLIP, 13 mm BLACK
VIW VX	12160280	CONN 20F MIC/P 100W GRAY	DELPHI-PACKARD	VIW V WIRING	12160542	12160542	CONN 20M MIC/P 100W GRAY
VIW VX	15304882	CABLE SEAL, 14F GRAY	DELPHI-PACKARD	VIW V WIRING	12110693	12110693	CABLE SEAL, 14M GREEN
VIW VX	12191172	LOCK, SECONDARY 20F BLUE	DELPHI-PACKARD	VIW V WIRING	12191177	12191177	LOCK ASSIST/SEAL, 20M BLUE
VIW VX	12084912	TERMINAL, SOCKET 100W	DELPHI-PACKARD	VIW V WIRING	12160551	12160551	TERMINAL, PIN 100W
VIW VX	12129557	CAVITY PLUG, 100W	DELPHI-PACKARD	VIW V WIRING	12129557	12129557	CAVITY PLUG, 100W
VIW VX	12176394	CONDUIT CLIP, 13 mm BLACK	DELPHI-PACKARD	VIW V WIRING	12176394	12176394	CONDUIT CLIP, 13 mm BLACK

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APPENDIX E — CONNECTOR PART NUMBERS, TERMINAL PART NUMBERS, TOOL PART NUMBERS, AND REPAIR INSTRUCTIONS

NOTES

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APPENDIX F — THROTTLE POSITION SENSOR ADJUSTMENT

A. Description of Operation *(Figure F–1)*

1. To properly communicate throttle position to the Electronic Control Unit (ECU), the throttle position sensor must convert its mechanical movement to an electrical form the ECU can understand. To accomplish this, contacts move across a resistive strip inside the sensor which translates position into voltage.

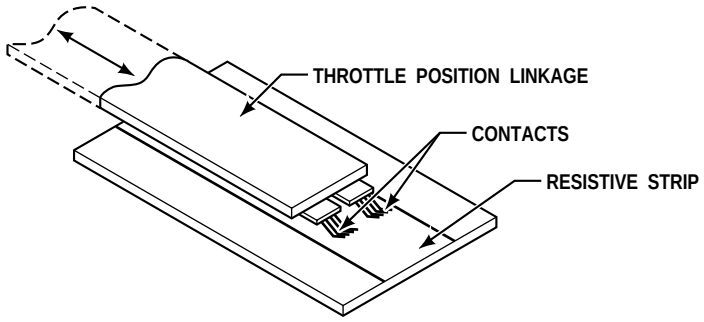

Figure F–1. Throttle Position to Voltage Conversion

2. Each position gives a different voltage. The ECU then converts the voltage to counts. Each count corresponds to approximately 0.179 mm (0.007 inch) of throttle sensor movement. Figure F–2 diagrams the counts and throttle movement relationship.

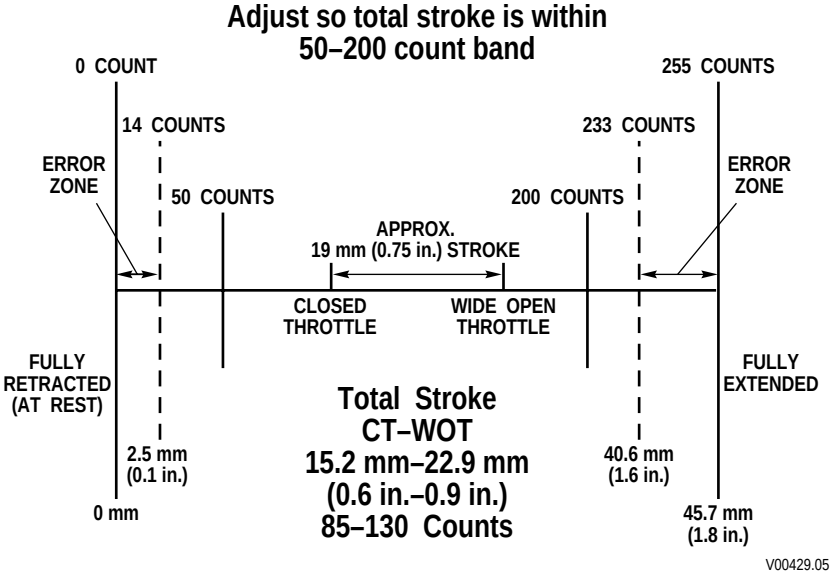

Figure F–2. Throttle Position Determination Diagram

3. Throttle percentage is proportional to counts; low counts correspond to low percent and high counts correspond to high percent (Table F–1, Page F–3).

4. The conversion from counts to percent throttle is performed easily once the idle and full throttle positions are set (see adjustment procedures below). The idle and full throttle positions correspond

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APPENDIX F — THROTTLE POSITION SENSOR ADJUSTMENT

to counts which can be viewed with a diagnostic tool. The ECU determines percent throttle by the equation:

$$\% \text{ Throttle} = \frac{\text{Current Count} — \text{Idle Count}}{\text{Full Throttle Count} — \text{Idle Count}} \times 100$$

Where:

Idle Count = Count on diagnostic tool when engine is idling.

Current Count = Count on diagnostic tool at the present throttle position.

Full Throttle Count = Count on diagnostic tool at wide open throttle.

NOTE: Refer to Appendix N for DDR information.

5. The throttle position sensor is self-calibrating within its normal operating range. Each time the vehicle is started and the ECU is initialized, the idle counts that are used for closed throttle are increased by 15 counts from its previous lowest reading. Also, the wide open throttle counts are reduced by 15 counts from its previous highest reading. Once new counts are read from the current sensor position, the idle and wide open throttle count set points are continually readjusted to the lowest and highest counts, respectively. This compensates for fuel control system wear or previous mechanical adjustment. One area of particular concern is when the throttle sensor extends into the error zone. This indicates a TPS misadjustment to the ECU and 100 percent throttle is assumed until readjustment is performed. Simply clearing the code 21 XX will not resolve the 100 percent (WOT) shifting situation.

NOTE: After replacing or adjusting the throttle position sensor linkage, the technician should use the diagnostic tool to clear the throttle calibration. Go to the DDR selection menu and locate ACTION REQUESTS. Select RESET THROTTLE CALIBRATION and ENTER to set the 0 percent throttle counts. After the idle counts are established, the throttle should be moved to the Full position to establish the full or Wide Open Throttle (WOT) position (100 percent). The full throttle counts will be the same as the idle counts until the throttle is moved. The full throttle counts are set when maximum travel is reached so stopping before actual full throttle will set the 100 percent point artificially low. Refer to Figure F–2 for proper counts and percentage. Refer to Figure F–3 for illustration of throttle position adjustment.

B. Throttle Position Sensor (TPS) Adjustment

When properly installed by the equipment manufacturer, the TPS should not require adjustment. Confirm that the throttle sensor is installed to manufacturer specifications before adjusting the throttle position sensor. The idle count should be 50 or higher and full throttle count 200 or lower. The TPS is self-calibrating meaning there is no optimum closed throttle or wide open throttle count value. As long as the counts are within the 50 to 200 range, the TPS is set properly. Total stroke of 85–130 counts must be maintained. Watch the movement of the throttle sensor as the controls move it through its full stroke. Be sure there is no misalignment or obstruction to smooth movement through the full stroke. Make certain the idle and full throttle positions are not in the error zones (refer to Figure F–2). The error zones occur when the idle position is less than 14 counts, or when the full throttle position is more than 233 counts. When idle or wide open throttle positions are in the error zones, codes 21 12 and 21 23 occur, respectively. These codes cause the transmission to shift as if the throttle is fully depressed (100 percent throttle) affecting shift quality and causing decreased fuel efficiency. Code 21 XX may be caused by a short or open circuit in the chassis harness or by incorrect voltages. If this occurs, refer to code 21 XX chart.

NOTE: Use Test Harness J 41339 for measuring voltages.

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APPENDIX F — THROTTLE POSITION SENSOR ADJUSTMENT

Table F–1. Volts Versus Count for Throttle Sensor Display Reading

CTS	Volts	CTS	Volts	CTS	Volts	CTS	Volts	CTS	Volts	CTS	Volts
0	0	41		81		121		161		201	
1	0.0196	42		82		122		162		202	
2		43		83		123		163		203	
3		44		84		124		164		204	
4		45	0.882	85	1.666	125	2.451	165	3.235	205	4.019
5	0.098	46		86		126		166		206	
6		47		87		127		167		207	
7		48		88		128		168		208	
8		49		89		129		169		209	
9		50	0.98	90	1.764	130	2.549	170	3.333	210	4.117
10	0.196	51		91		131		171		211	
11		52		92		132		172		212	
12		53		93		133		173		213	
13		54		94		134		174		214	
14		55	1.078	95	1.863	135	2.647	175	3.431	215	4.215
15	0.276	56		96		136		176		216	
16		57		97		137		177		217	
17		58		98		138		178		218	
18		59		99		139		179		219	
19		60	1.176	100	1.96	140	2.745	180	3.529	220	4.313
20	0.392	61		101		141		181		221	
21		62		102		142		182		222	
22		63		103		143		183		223	
23		64		104		144		184		224	
24		65	1.274	105	2.058	145	2.843	185	3.627	225	4.411
25	0.49	66		106		146		186		226	
26		67		107		147		187		227	
27		68		108		148		188		228	
28		69		109		149		189		229	
29		70	1.372	110	2.156	150	2.941	190	3.725	230	4.509
30	0.588	71		111		151		191		231	
31		72		112		152		192		232	
32		73		113		153		193		233	
33		74		114		154		194		234	
34		75	1.47	115	2.225	155	3.039	195	3.823	235	4.607
35	0.686	76		116		156		196		236	
36		77		117		157		197		237	
37		78		118		158		198		238	
38		79		119		159		199		239	
39		80	1.568	120	2.353	160	3.137	200	3.921	240	4.705
40	0.784										

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APPENDIX F — THROTTLE POSITION SENSOR ADJUSTMENT

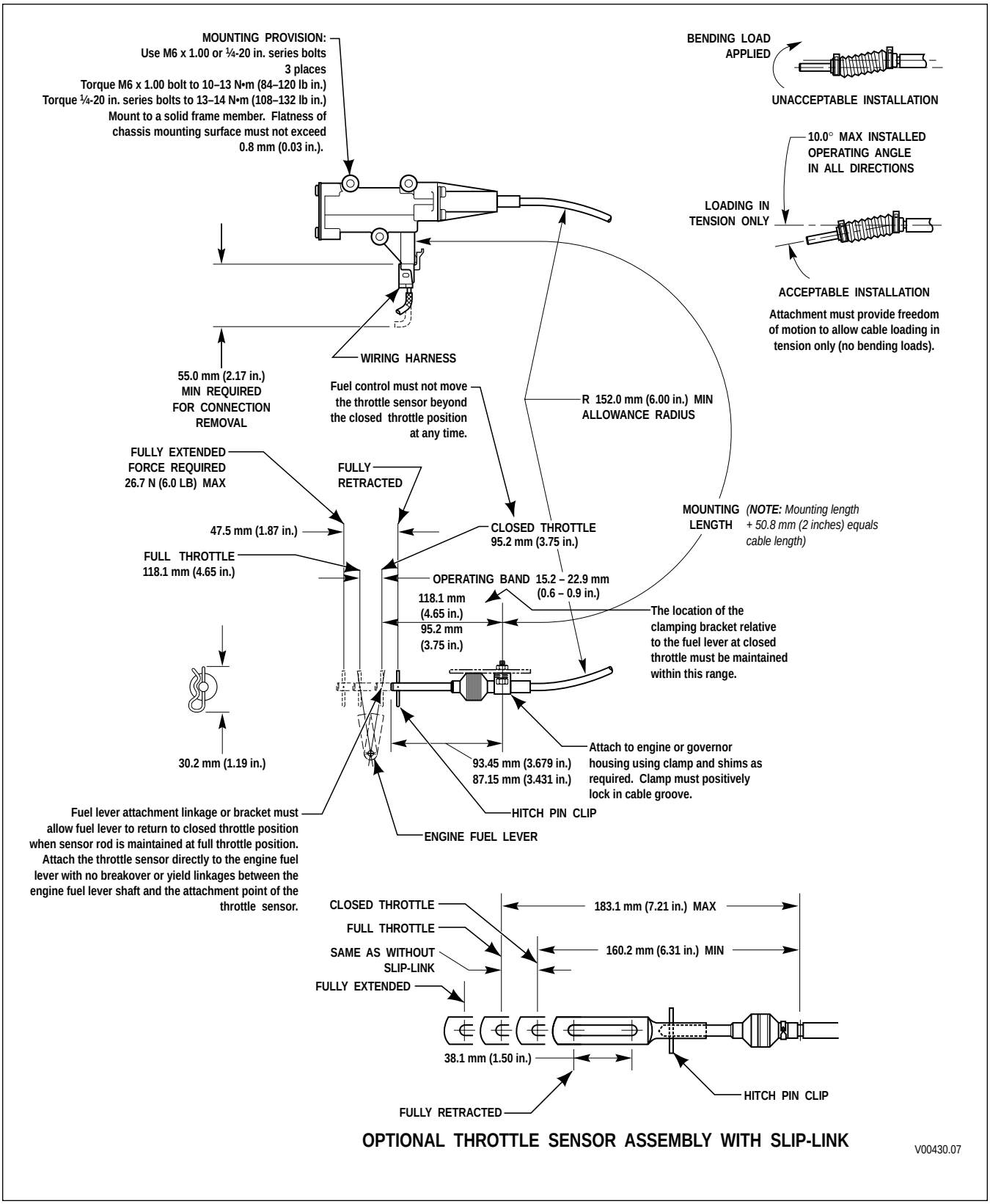

Figure F–3. Throttle Position Sensor Adjustment

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APPENDIX G — WELDING ON VEHICLE/VEHICLE INTERFACE MODULE

1–1. WELDING ON VEHICLE

When frame or other welding is required on the vehicle, take the following precautions to protect the electronic control components:

1. Disconnect the wiring harness connectors at the transmission electronic control unit.
2. Disconnect the positive and negative battery connections, and any electronic control ground wires connected to the frame or chassis.
3. Cover electronic control components and wiring to protect them from hot sparks, etc.
4. Do not connect welding cables to electronic control components.

WARNING! **Do not jump start a vehicle with arc welding equipment. Arc welding equipment's dangerously high currents and voltages cannot be reduced to safe levels.**

1–2. VEHICLE INTERFACE MODULE

The Allison Vehicle Interface Module (VIM) containing all Allison system relays and fuses must be used as the interface to all vehicle wiring. Refer to Figure G–2 for VIM component location and pin-out.To close an open VIM, tighten the bolts in the numerical order shown in Figure G–1 to provide a sealed, water-tight box. Torque the bolts to 5–8 N·m (4–6 lb ft).

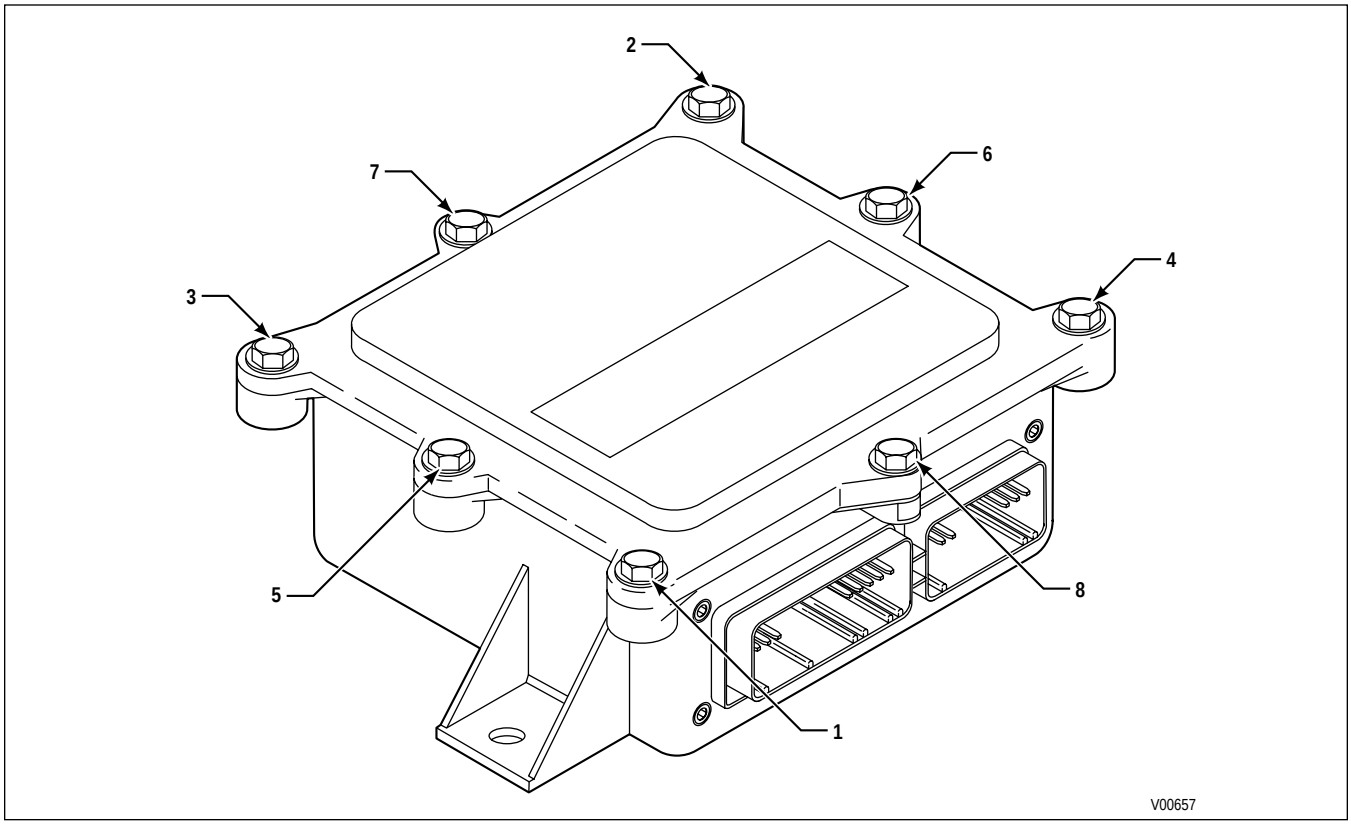

Figure G–1. Vehicle Interface Module

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APPENDIX G — WELDING ON VEHICLE/VEHICLE INTERFACE MODULE

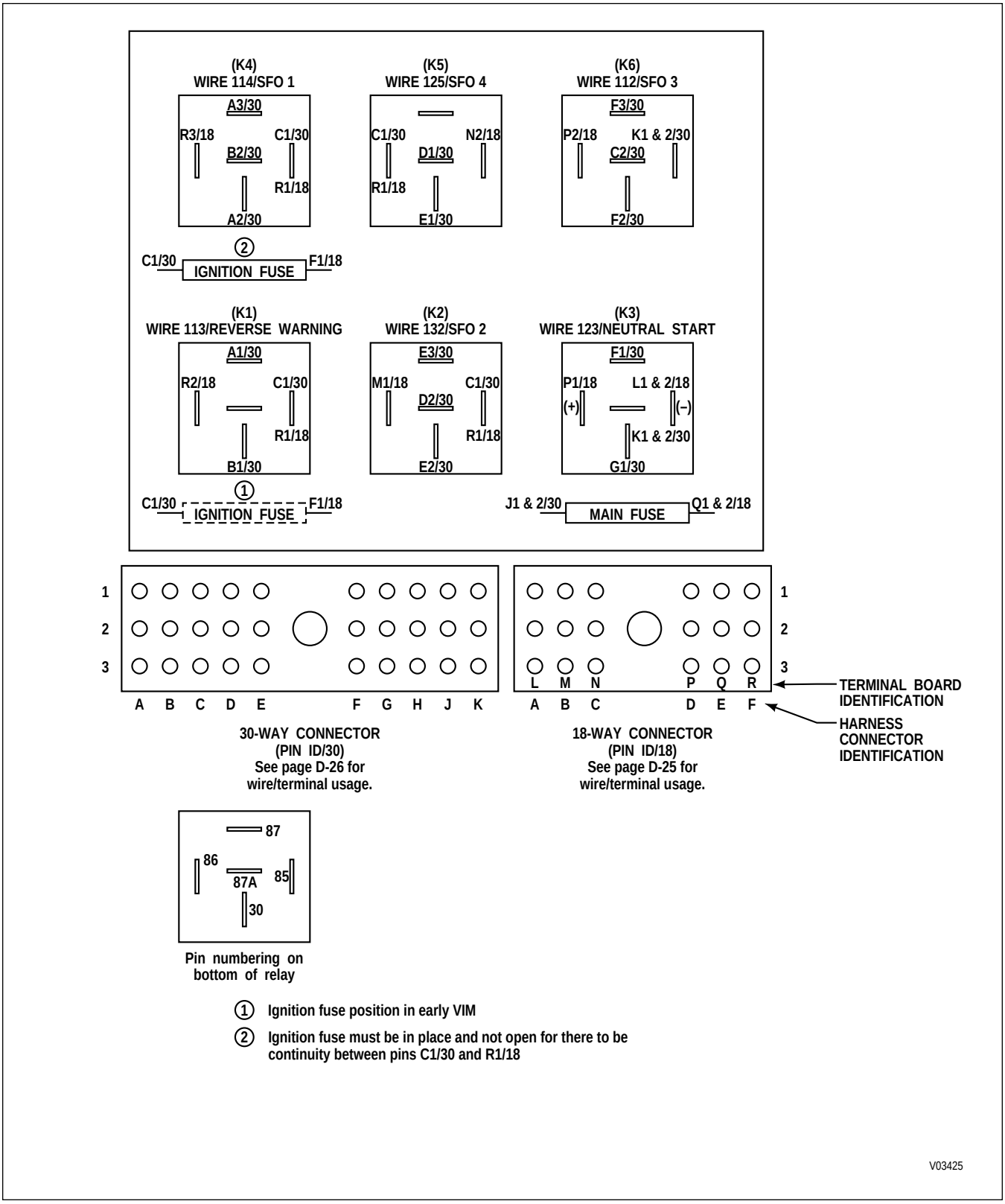

Figure G–2. VIM Components Location and Pin-Out Diagram

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APPENDIX H — HYDRAULIC SCHEMATICS

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H–6	WT Hydraulic Schematic – 2nd Range (3rd Range For HD 4070)	H–8
H–7	WT Hydraulic Schematic – 3rd Range (4th Range For HD 4070)	H–9
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H–9	WT Hydraulic Schematic – 5th Range (6th Range For HD 4070)	H–11
H–10	WT Hydraulic Schematic – 6th Range (7th Range For HD 4070)	H–12
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H–24 and H–25	HD/B 500 Retarder Hydraulic Schematic	H–26 and H–27

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APPENDIX H — THROTTLE POSITION SENSOR ADJUSTMENT

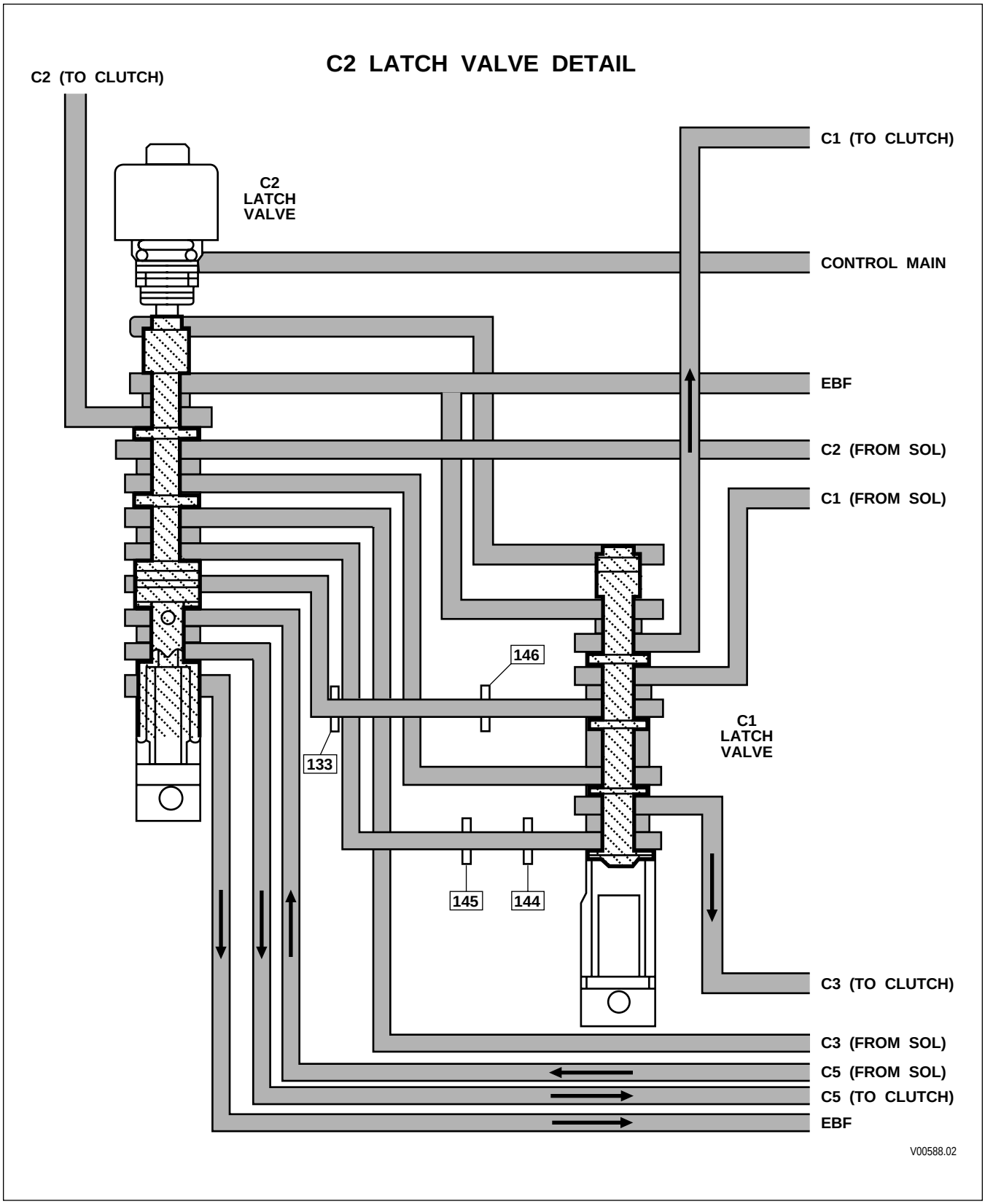

Figure H–1. C2 Latch Valve Detail

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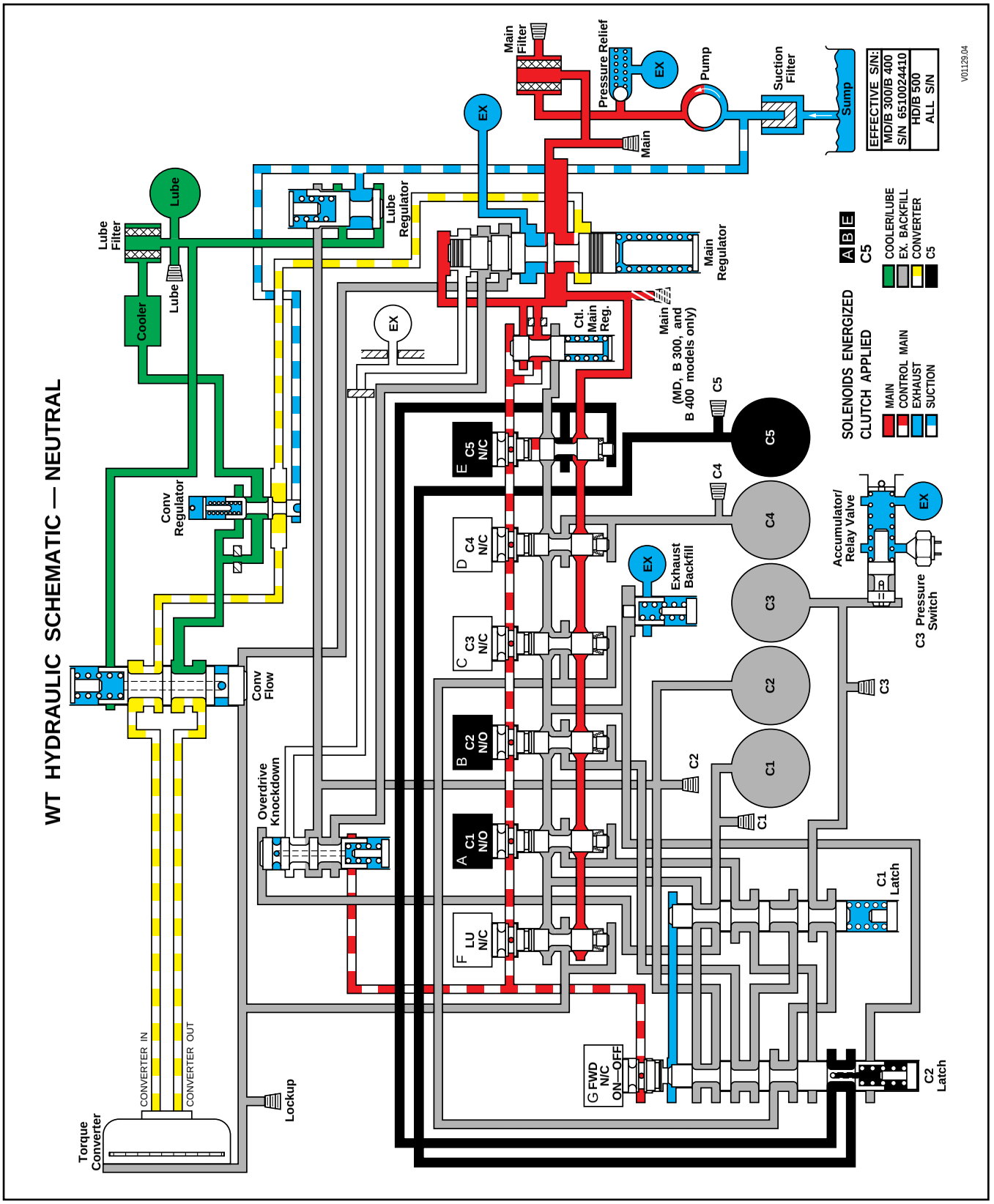

Figure H–2. WT Hydraulic Schematic — Neutral

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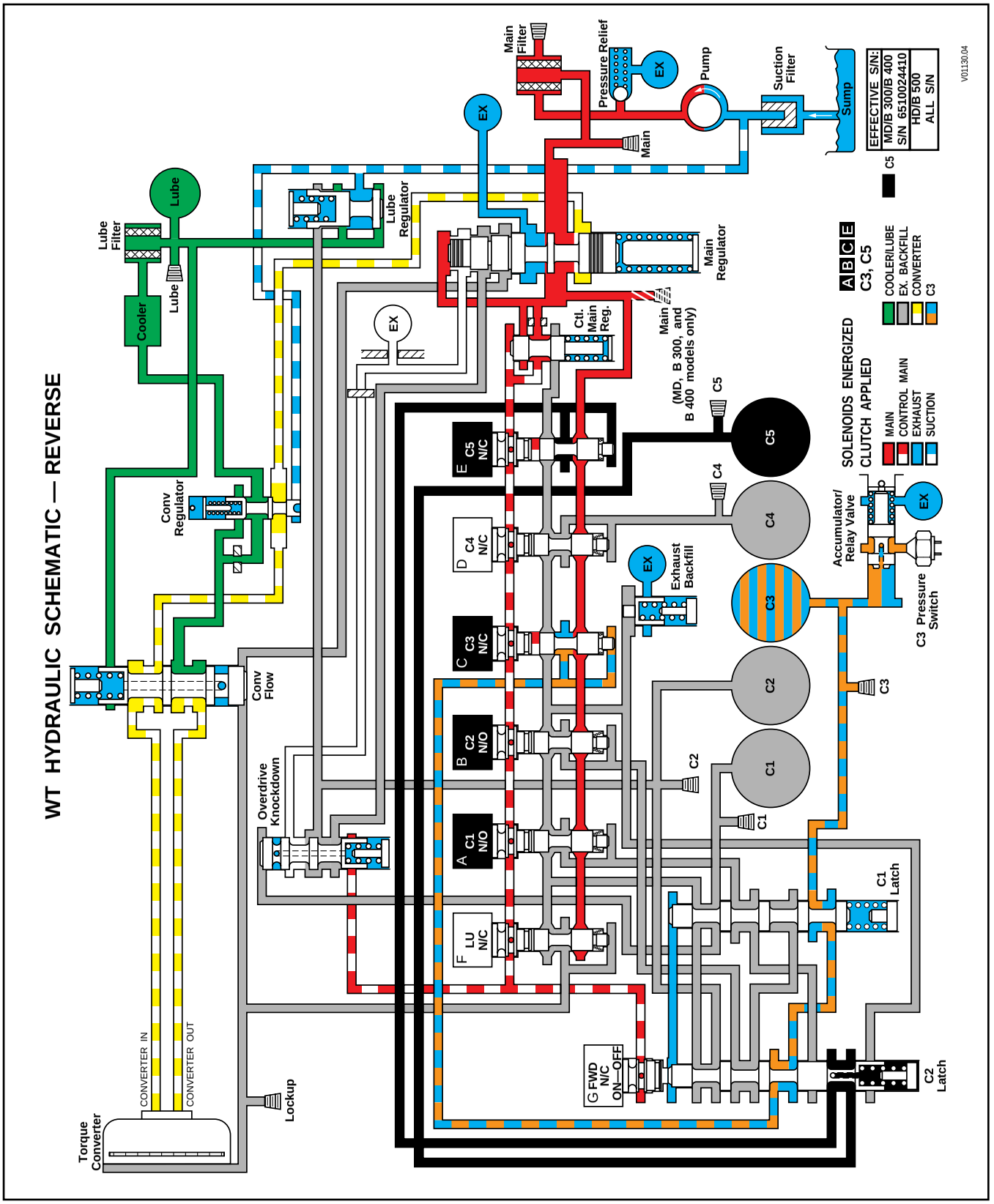

Figure H–3. WT Hydraulic Schematic — Reverse

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APPENDIX H — HYDRAULIC SCHEMATICS

HD 4070 HYDRAULIC SCHEMATIC – FIRST RANGE

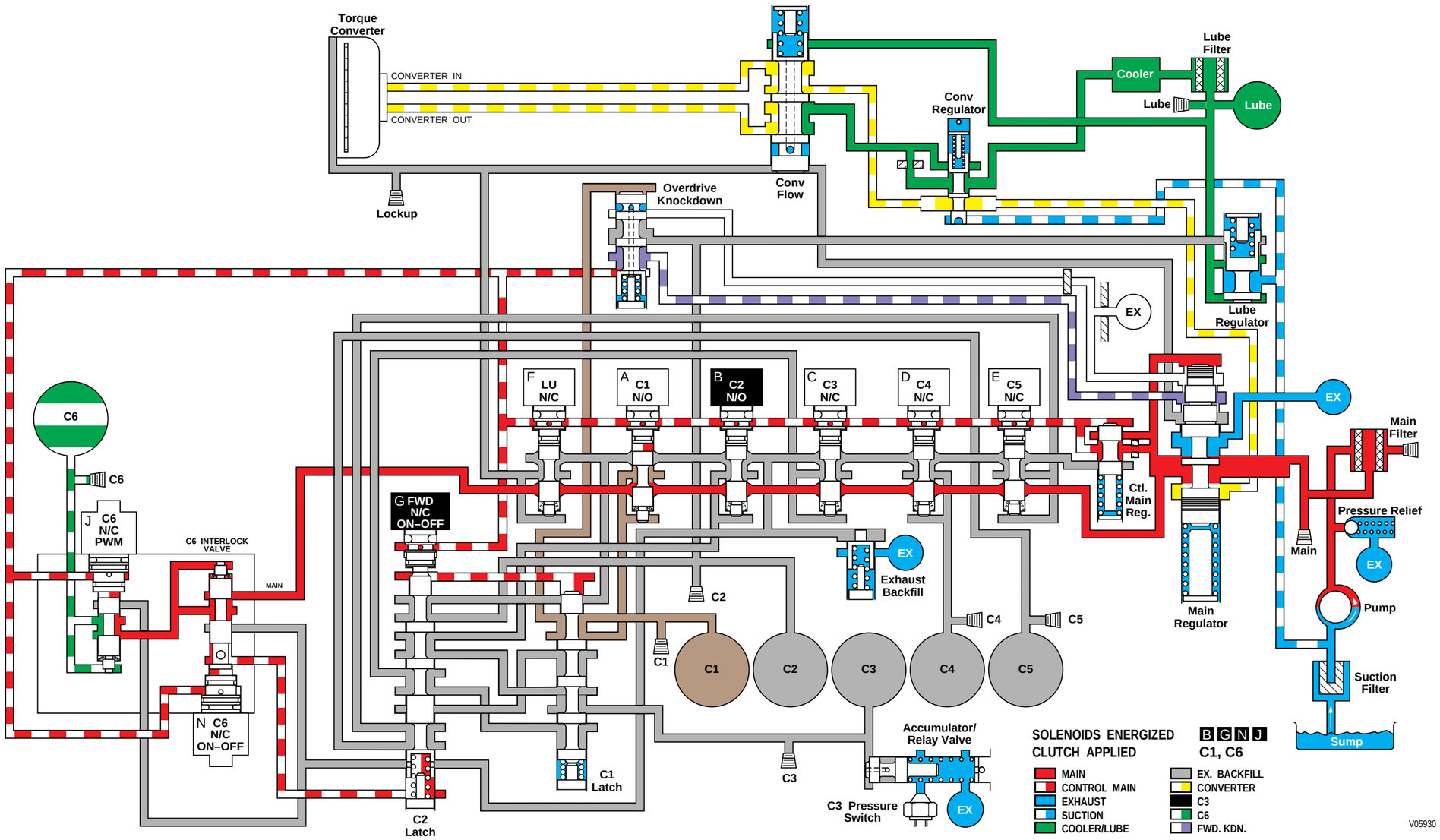

Figure H–4. HD 4070 Hydraulic Schematic — First Range

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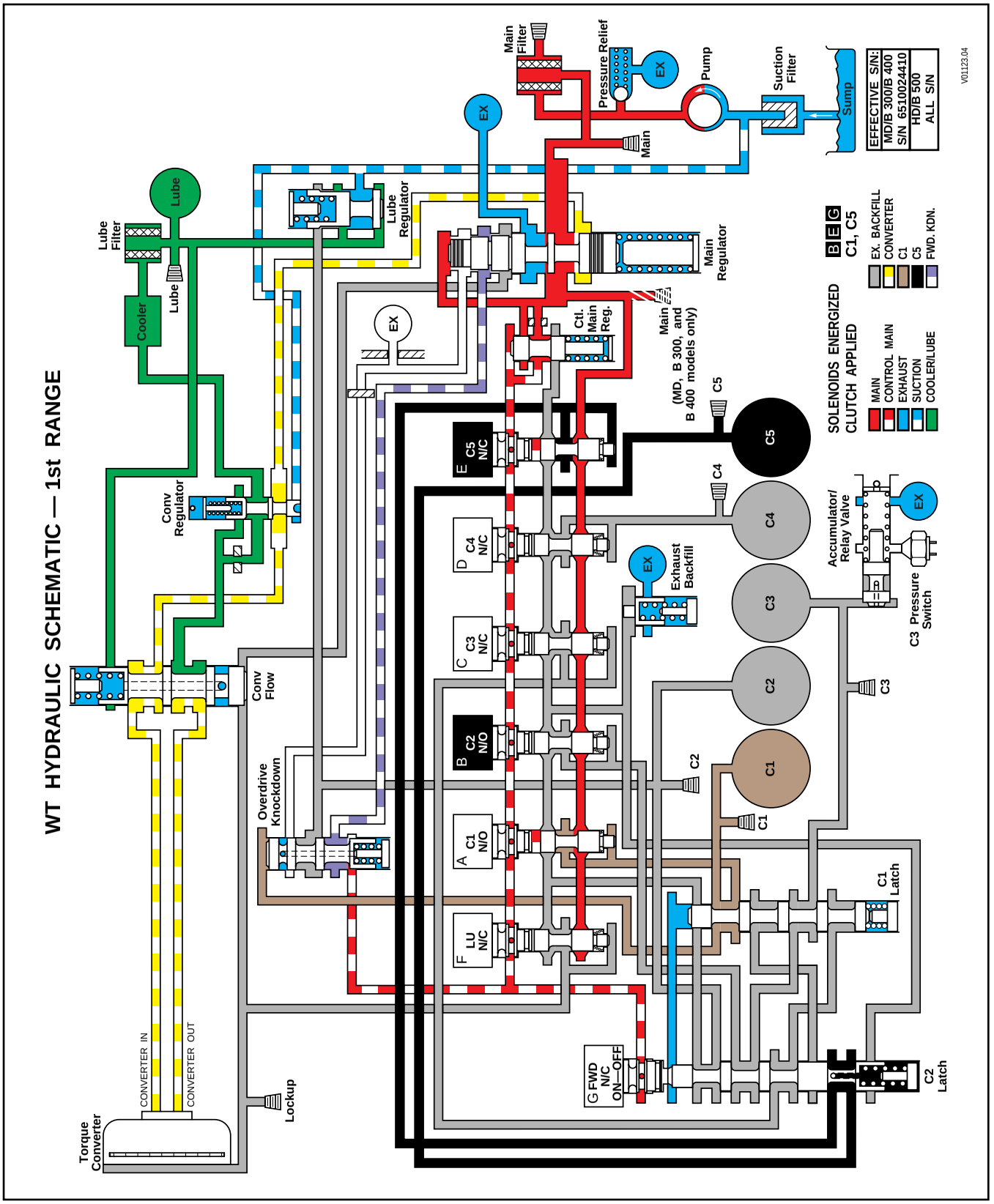

Figure H–5. WT Hydraulic Schematic —1st Range (2nd Range For HD 4070)

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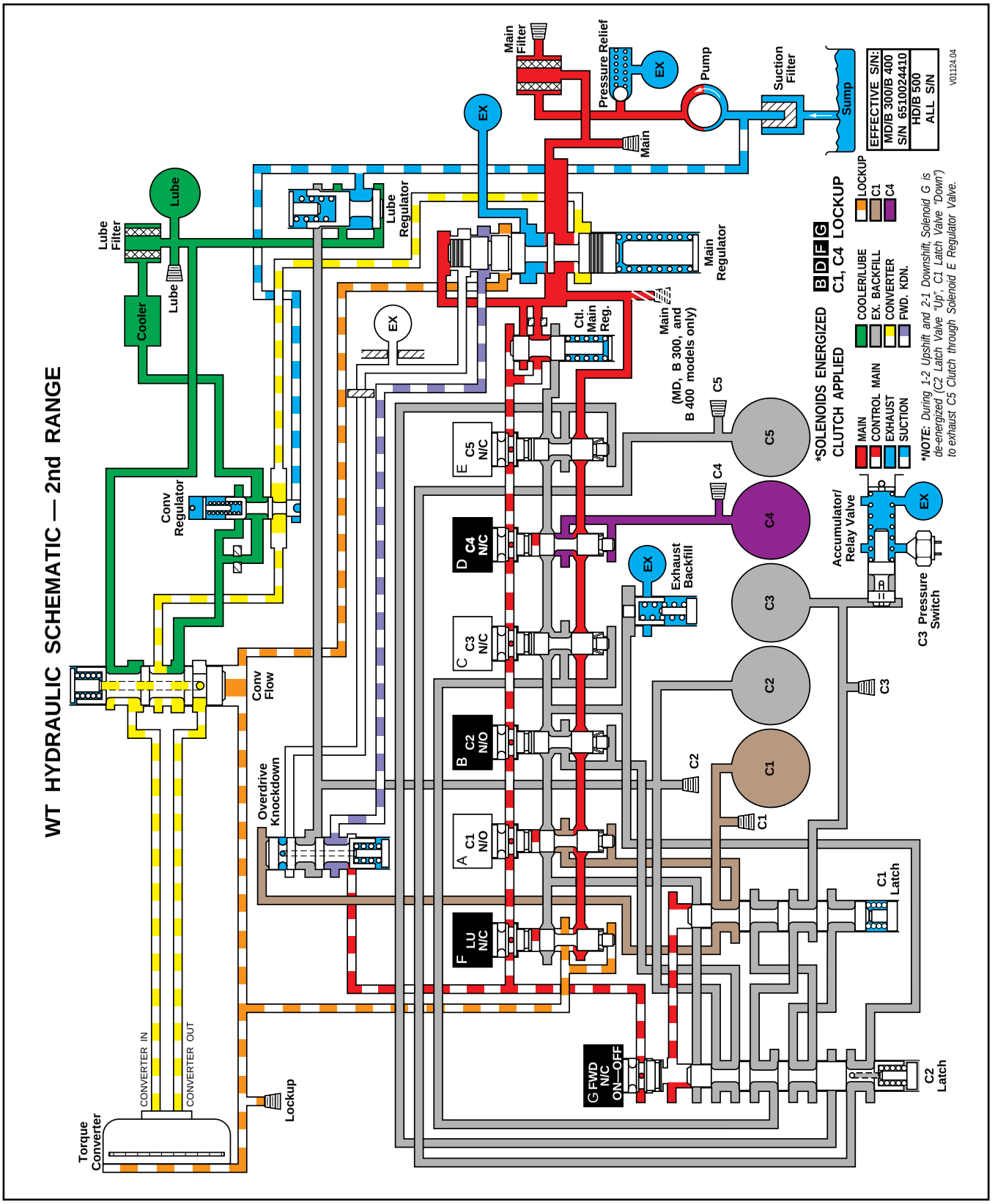

Figure H–6. WT Hydraulic Schematic — 2nd Range (3rd Range For HD 4070)

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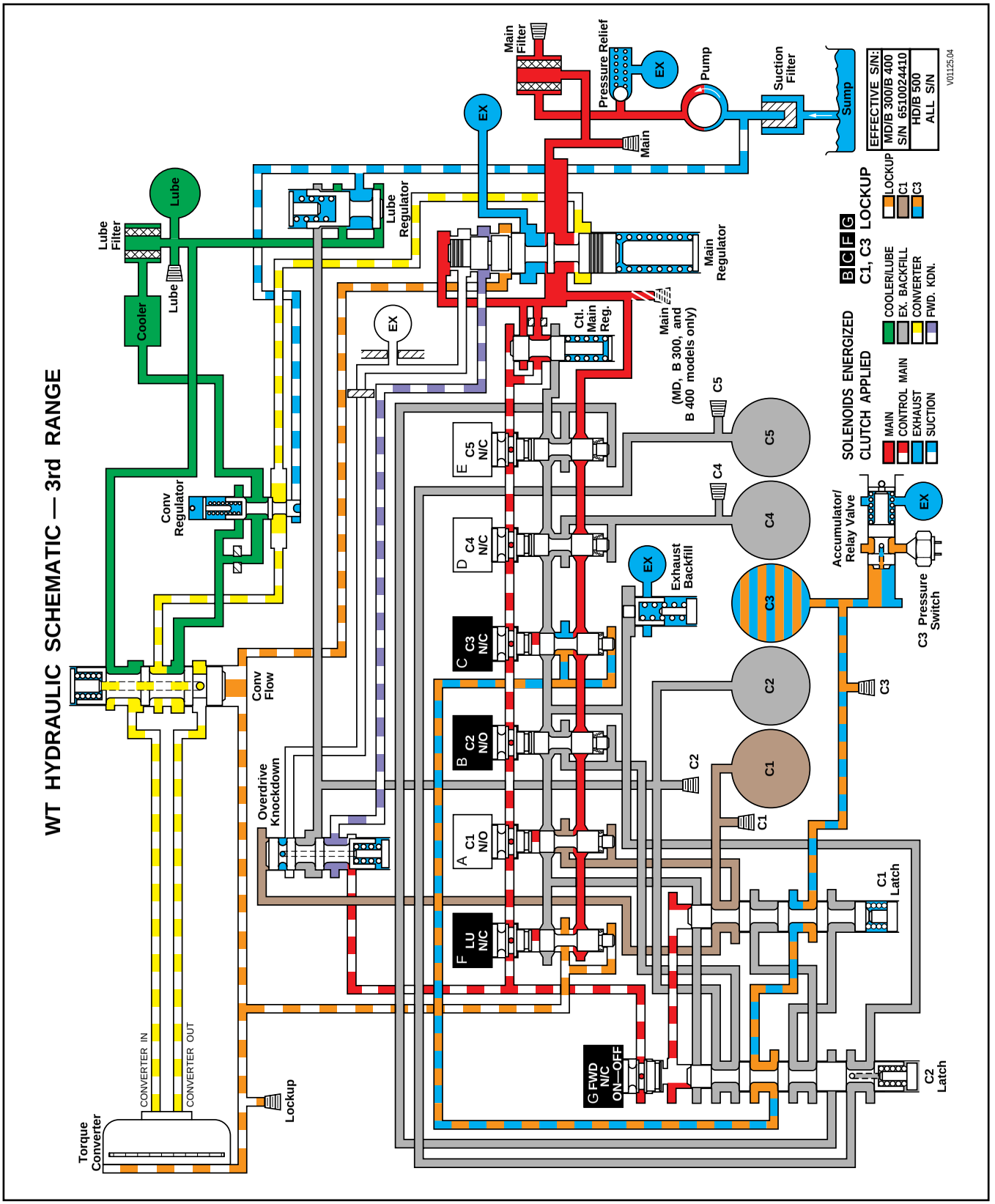

Figure H–7. WT Hydraulic Schematic — 3rd Range (4th Range For HD 4070)

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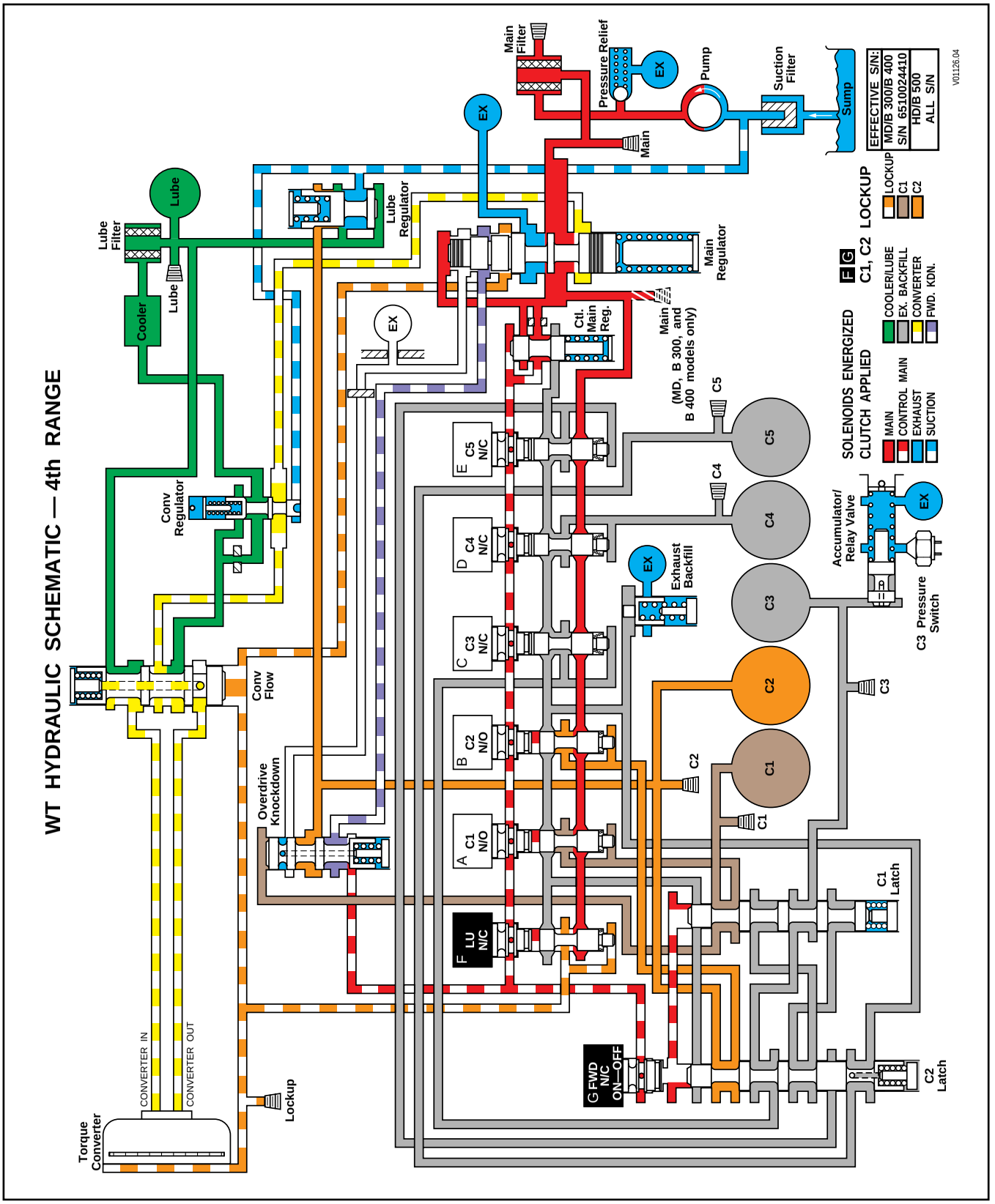

Figure H–8. WT Hydraulic Schematic — 4th Range (5th Range For HD 4070)

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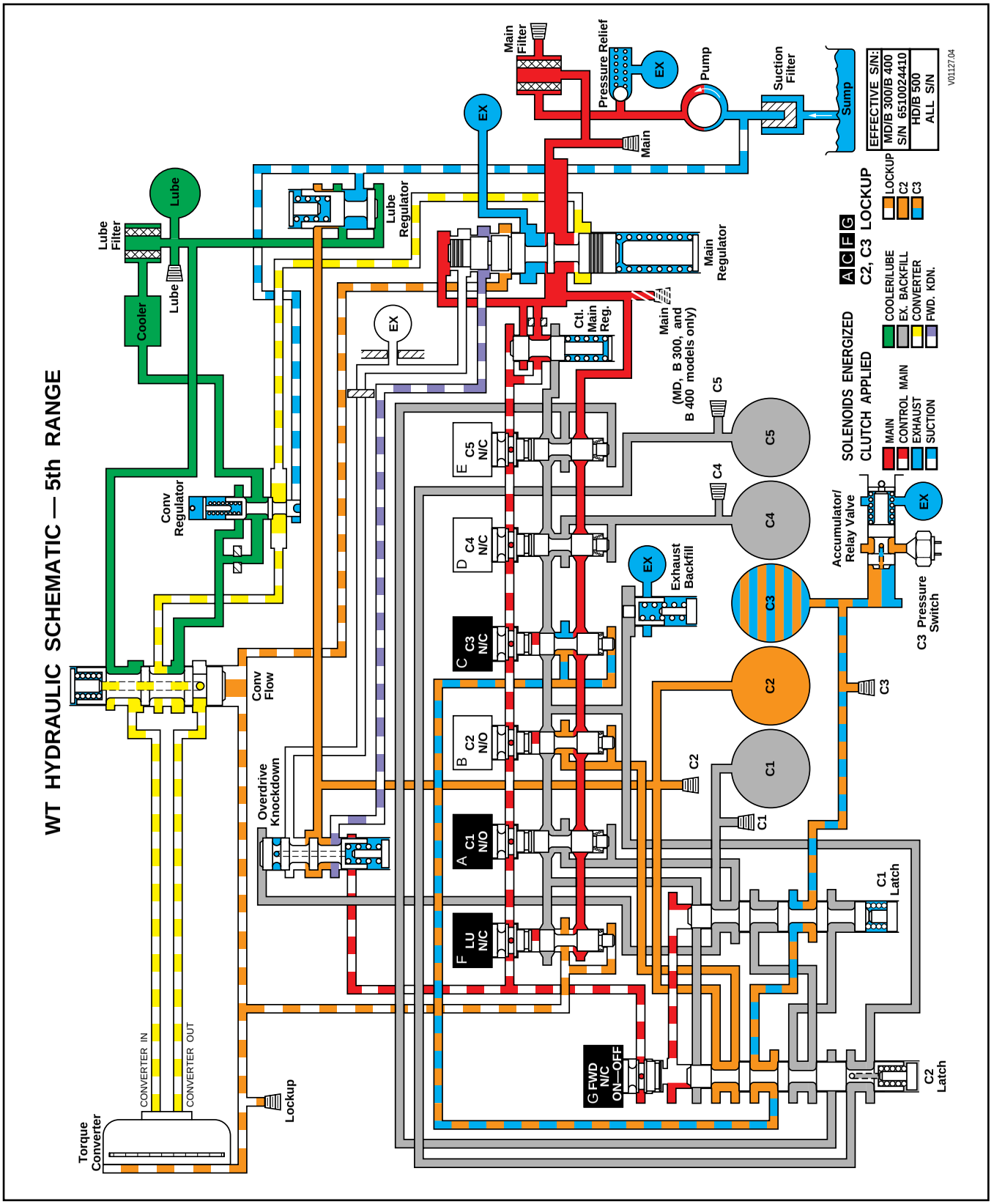

Figure H–9. WT Hydraulic Schematic — 5th Range (6th Range For HD 4070)

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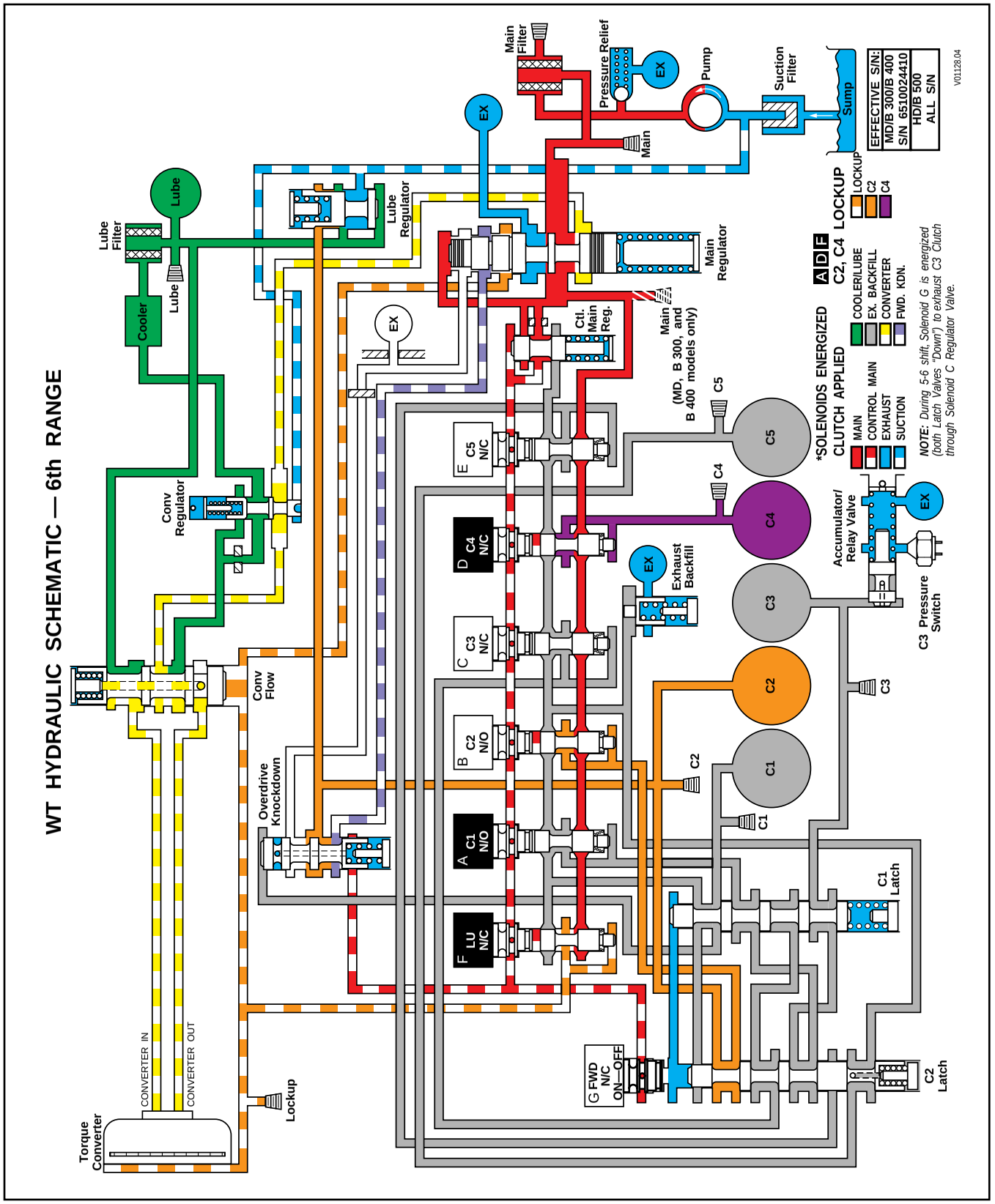

Figure H–10. WT Hydraulic Schematic — 6th Range (7th Range For HD 4070)

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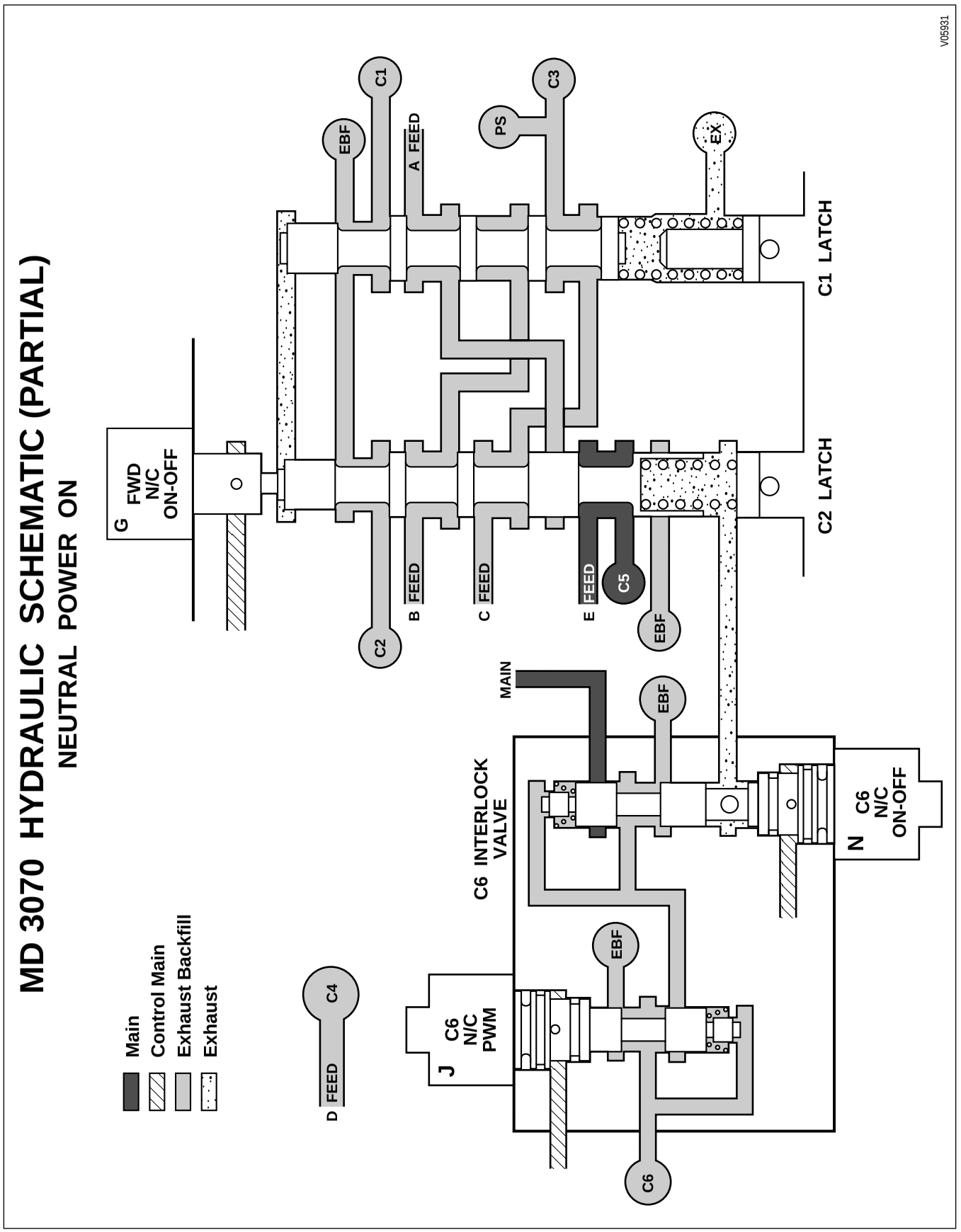

Figure H–11. MD 3070 Hydraulic Schematic — Neutral Power On

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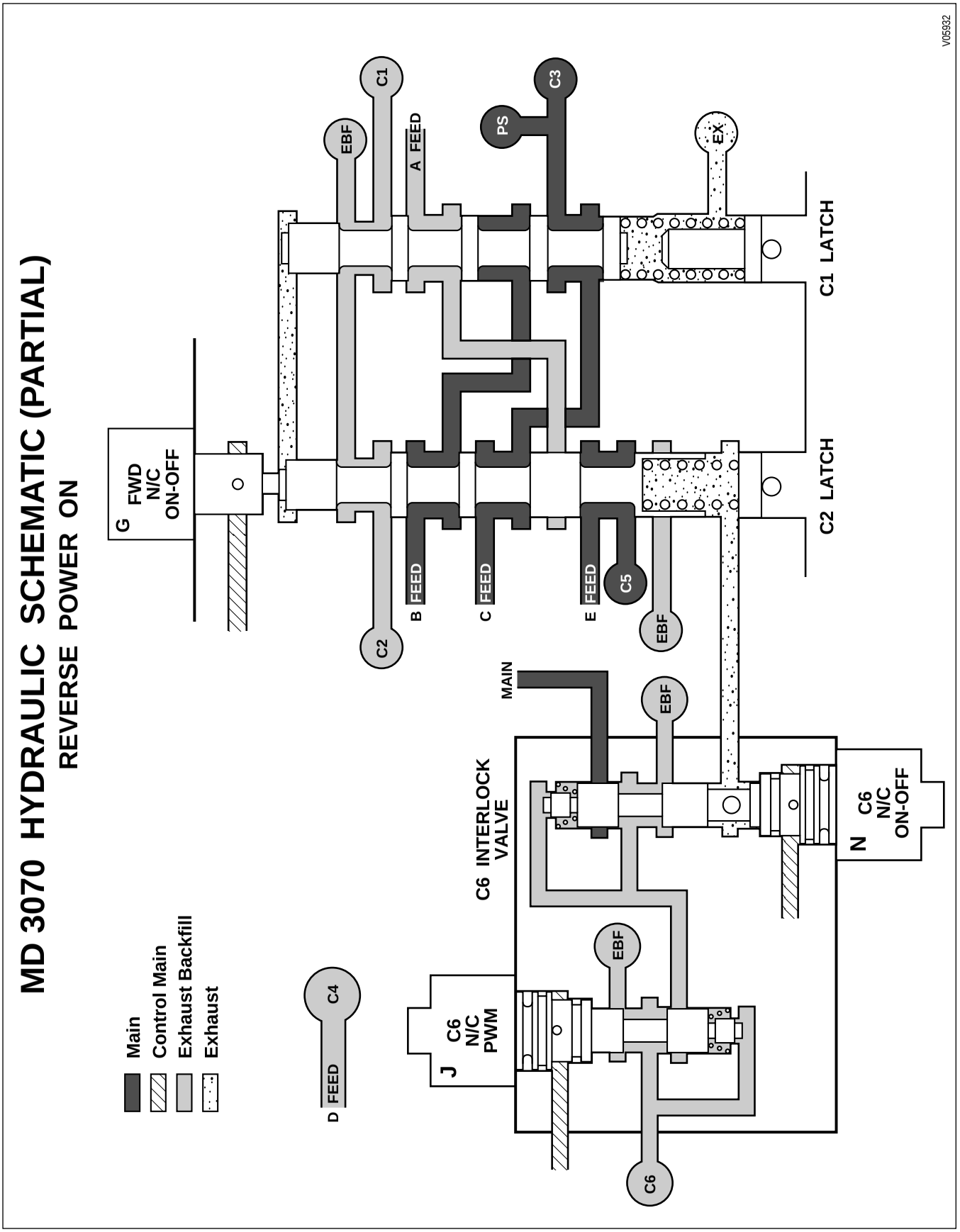

Figure H–12. MD 3070 Hydraulic Schematic — Reverse Power On

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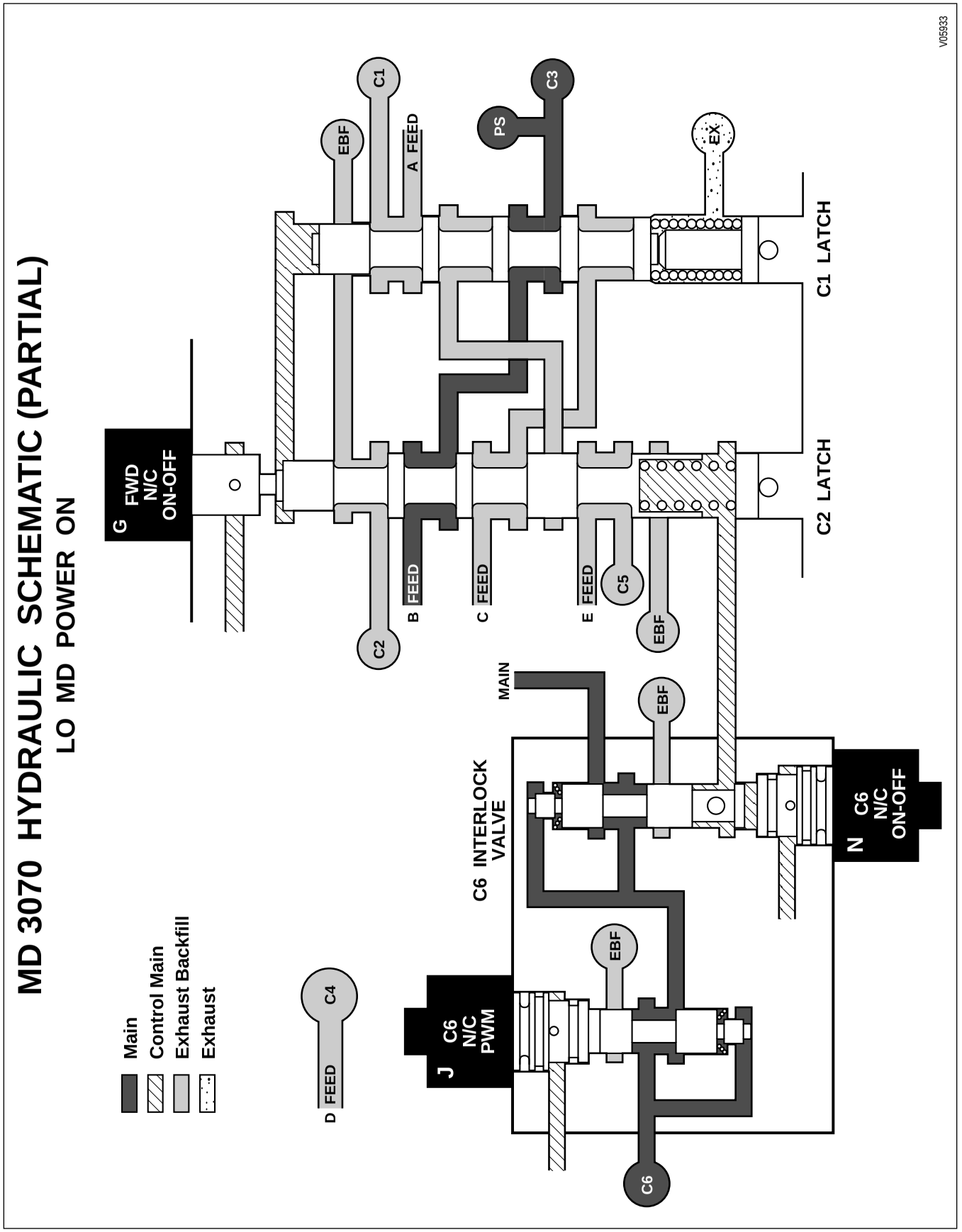

Figure H–13. MD 3070 Hydraulic Schematic — Lo MD Power On

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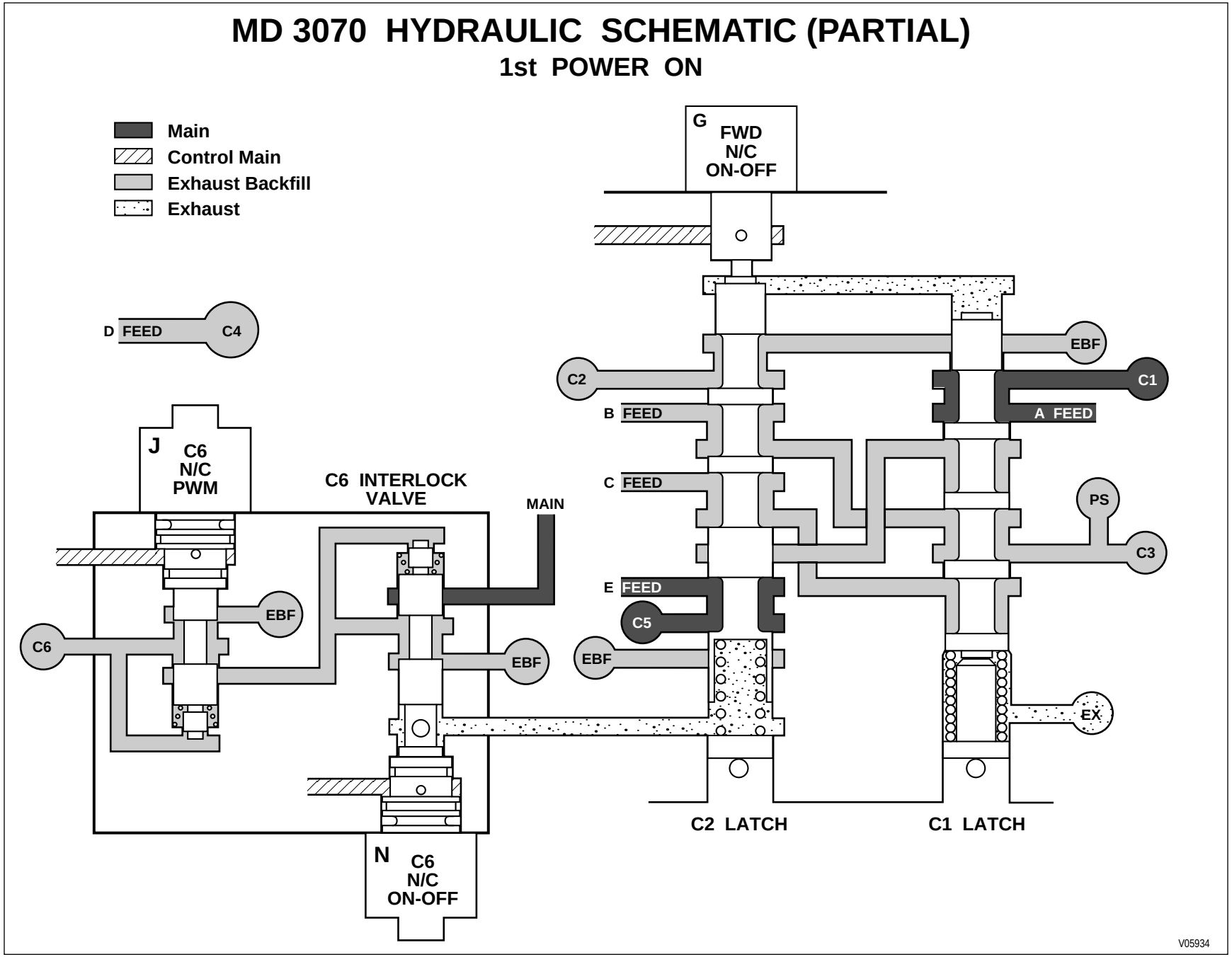

Figure H–14. MD 3070 Hydraulic Schematic — 1st Power On

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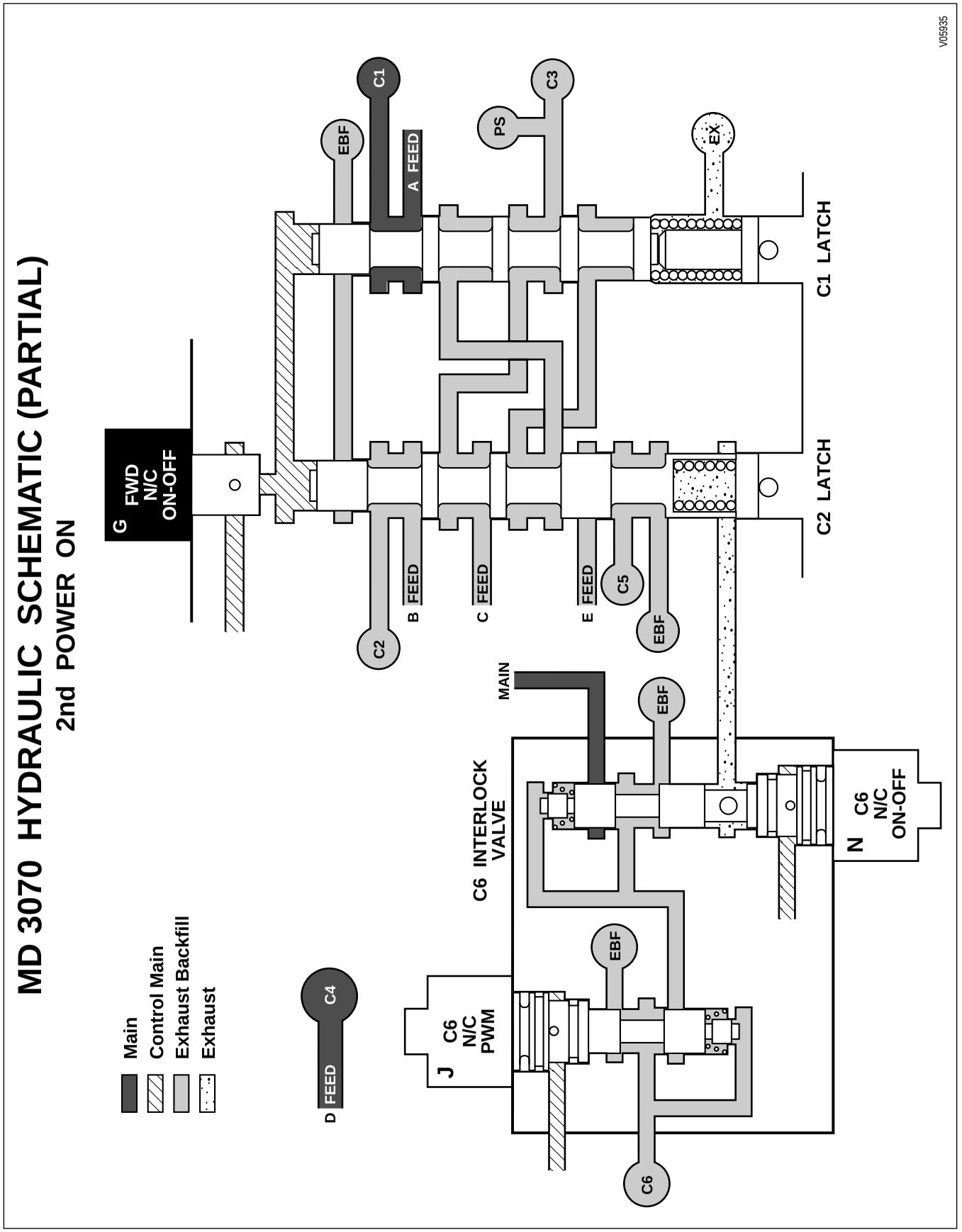

Figure H–15. MD 3070 Hydraulic Schematic — 2nd Power On

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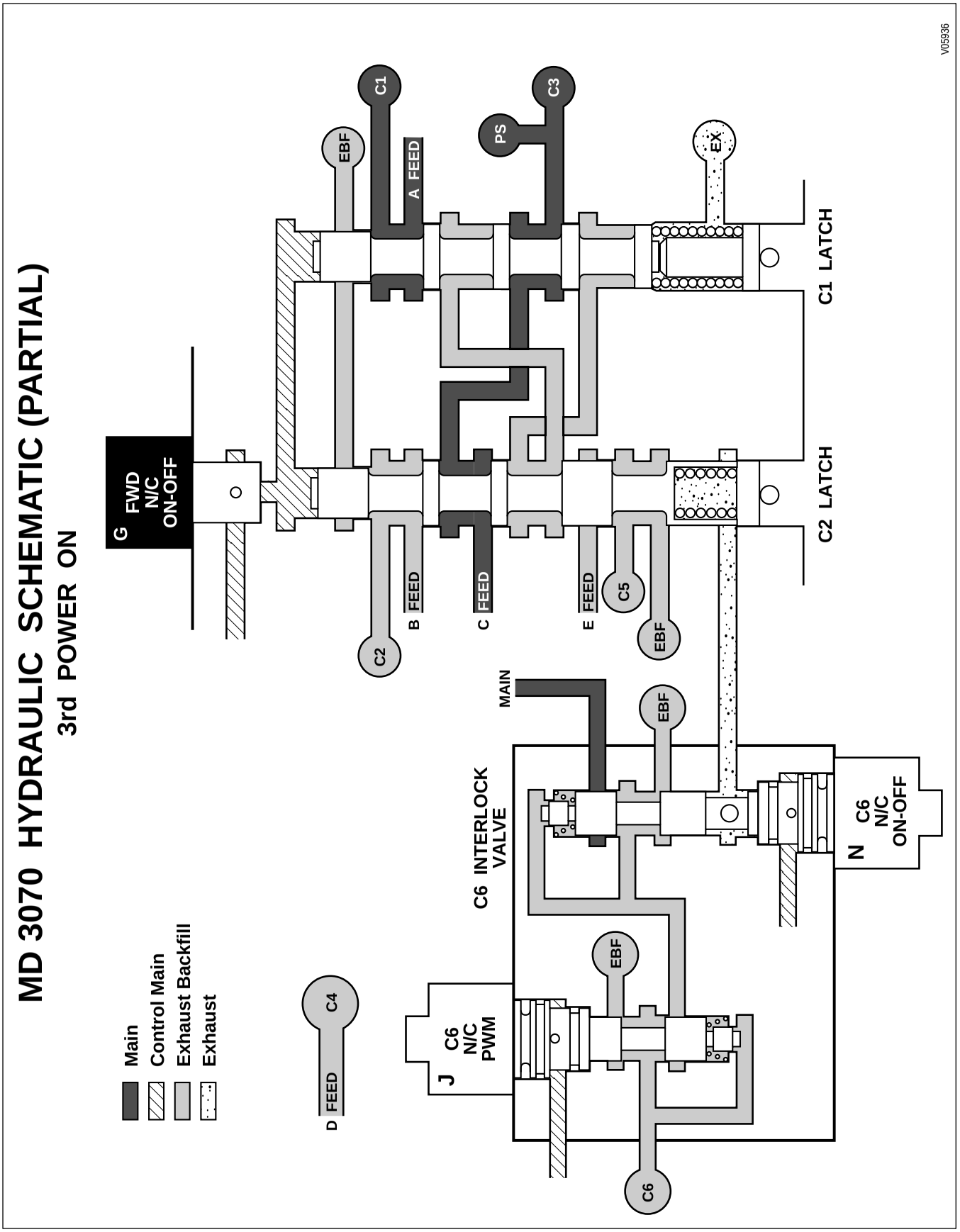

Figure H–16. MD 3070 Hydraulic Schematic — 3rd Power On

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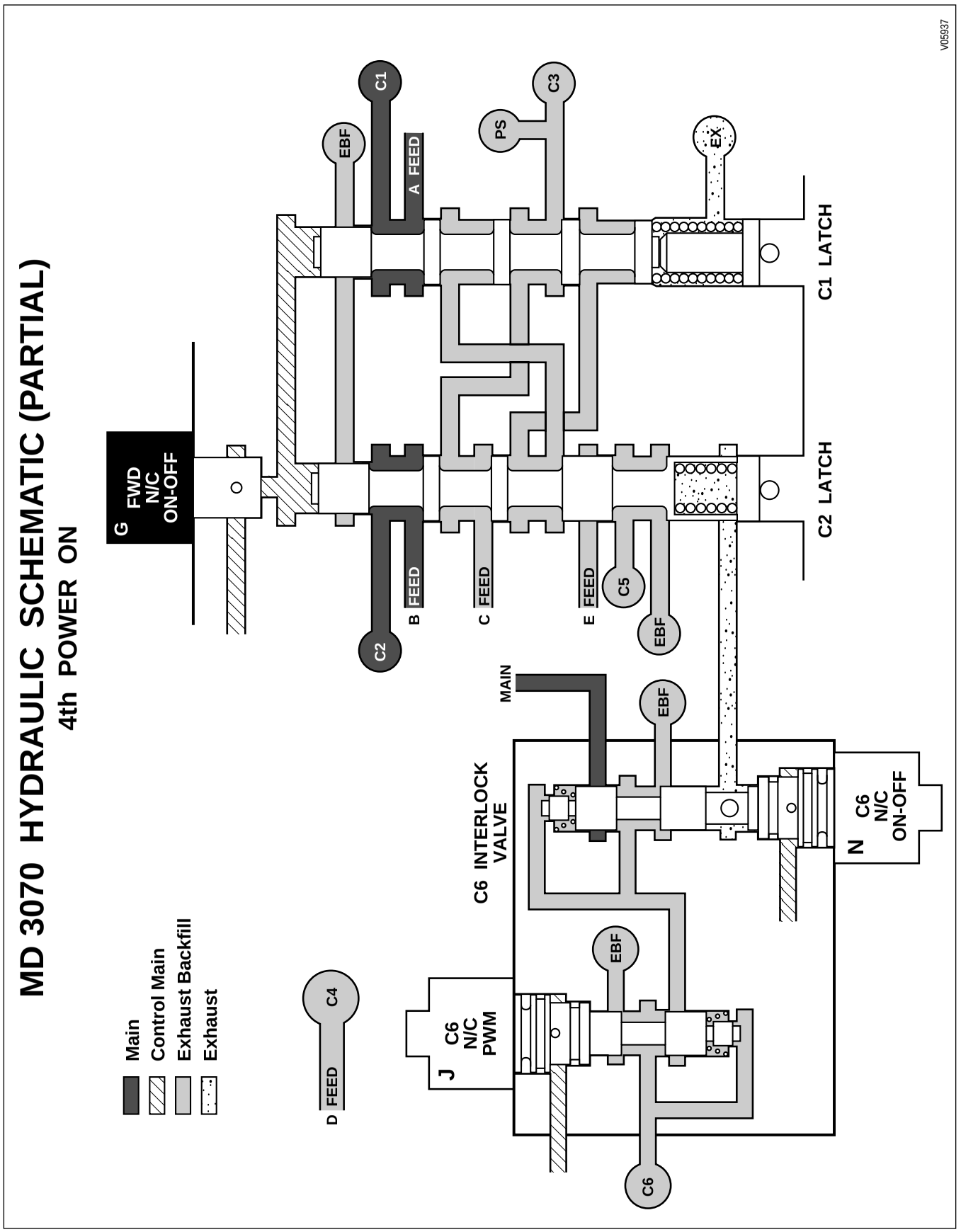

Figure H–17. MD 3070 Hydraulic Schematic — 4th Power On

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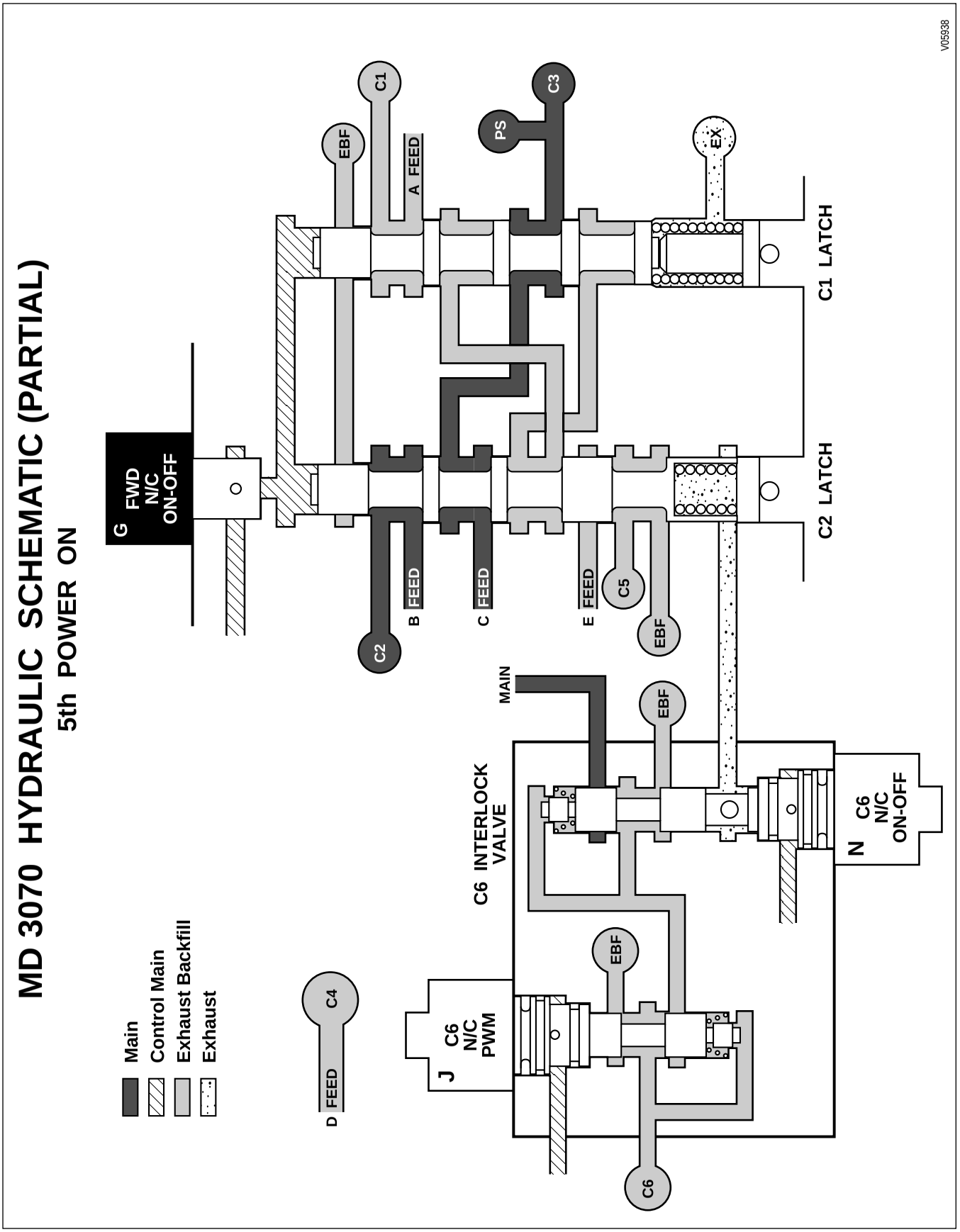

Figure H–18. MD 3070 Hydraulic Schematic — 5th Power On

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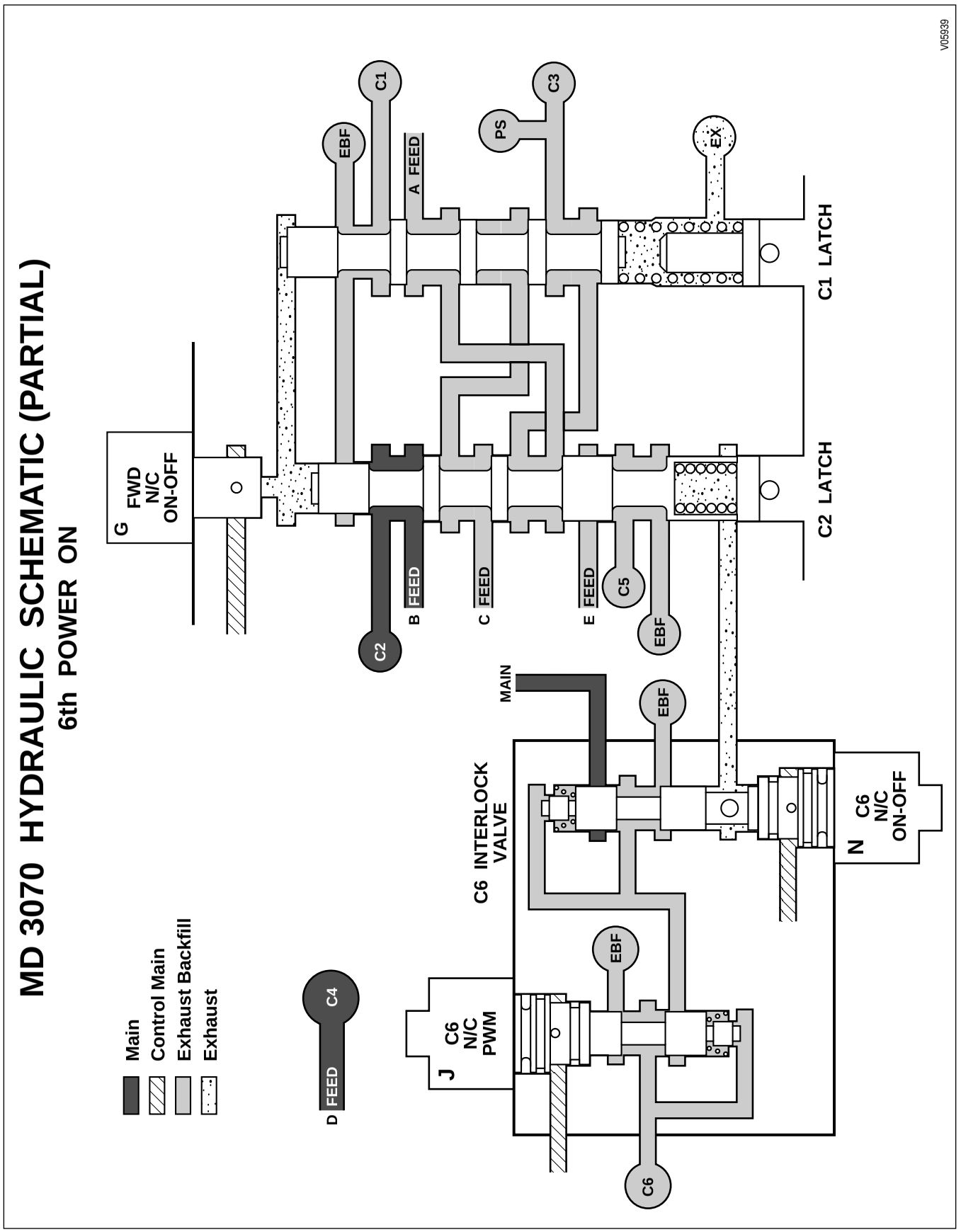

Figure H–19. MD 3070 Hydraulic Schematic — 6th Power On

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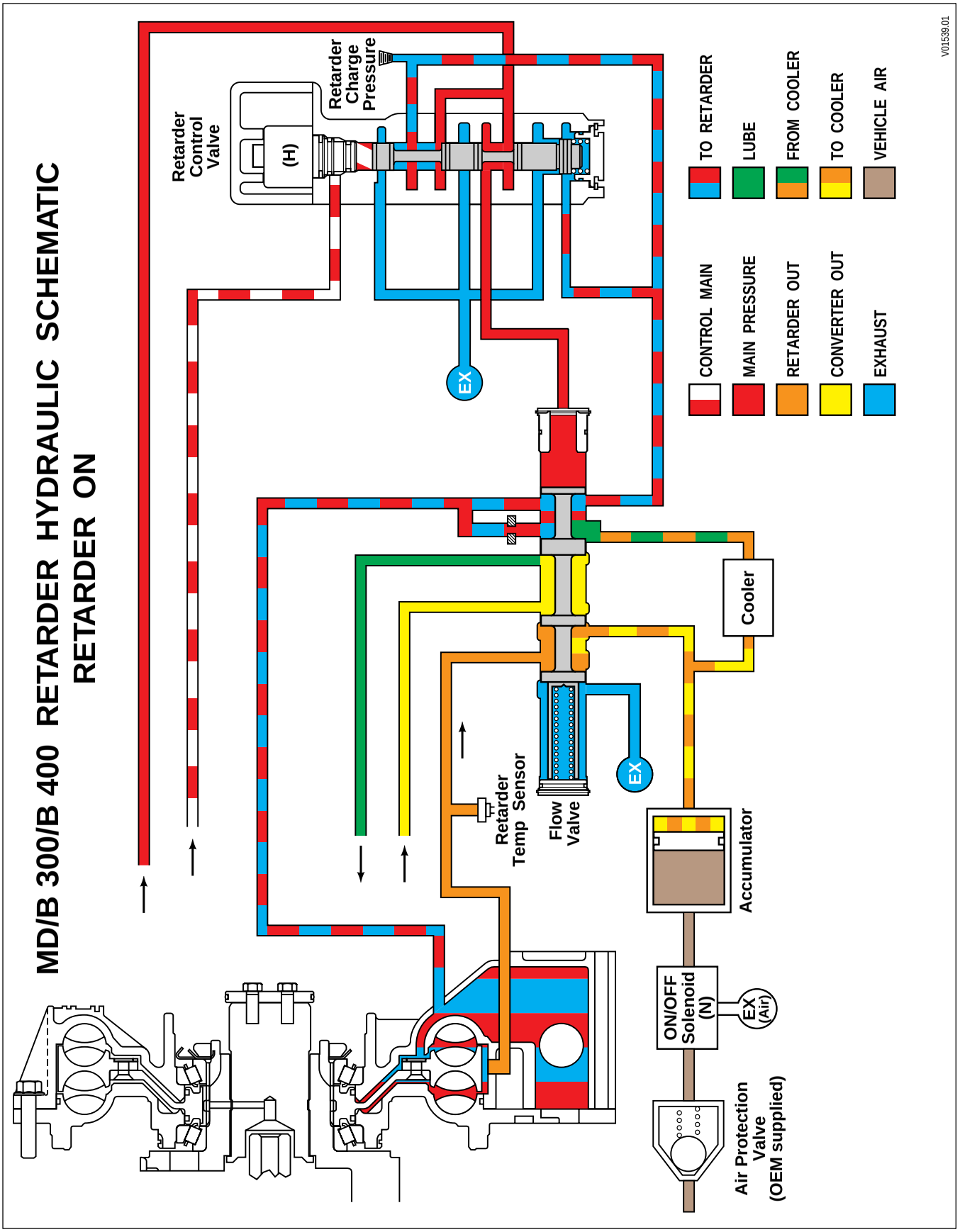

Figure H–20. MD/B 300/B 400 Hydraulic Schematic — Retarder On

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APPENDIX H — HYDRAULIC SCHEMATICS

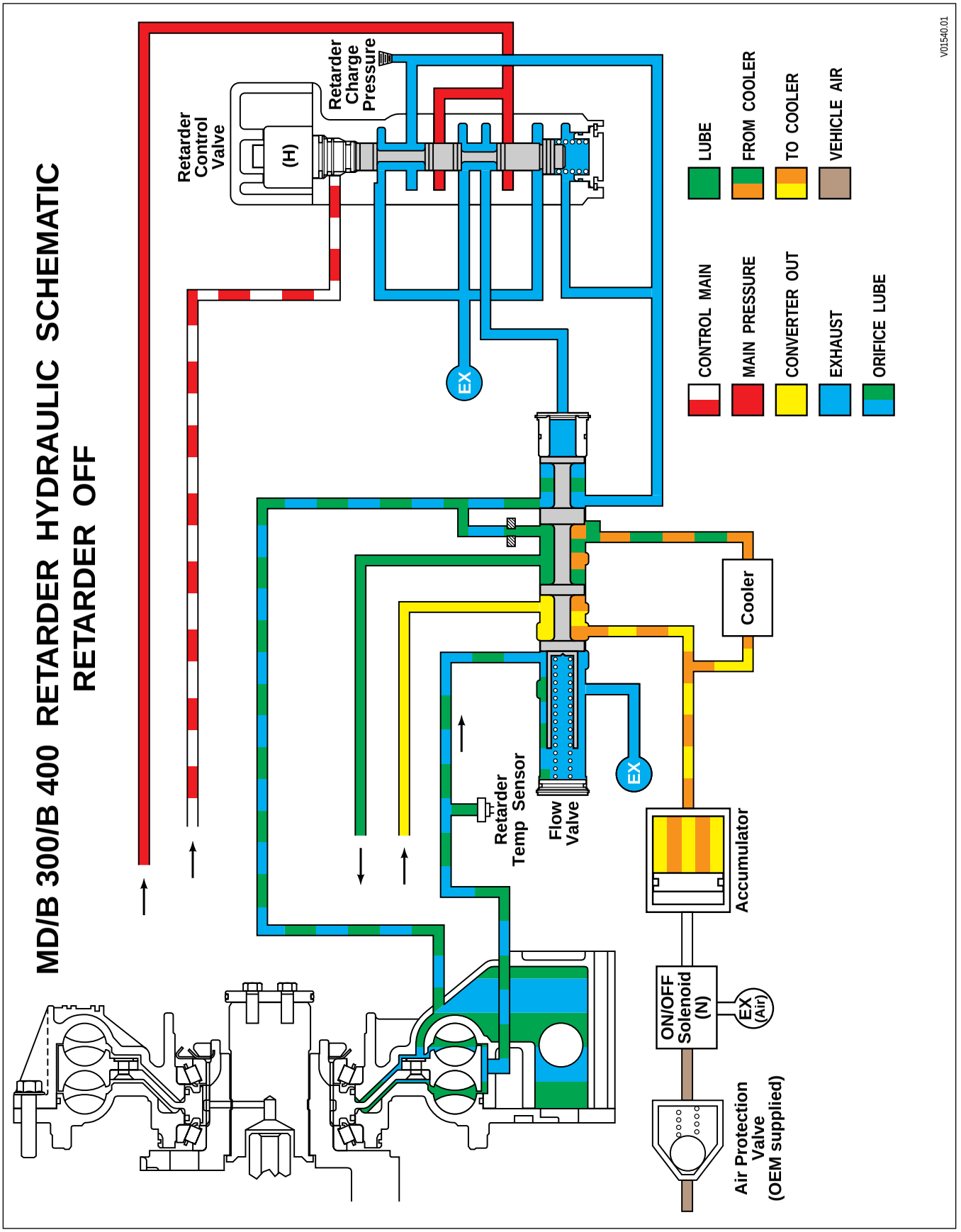

Figure H–21. MD/B 300/B 400 Hydraulic Schematic — Retarder Off

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APPENDIX H — HYDRAULIC SCHEMATICS

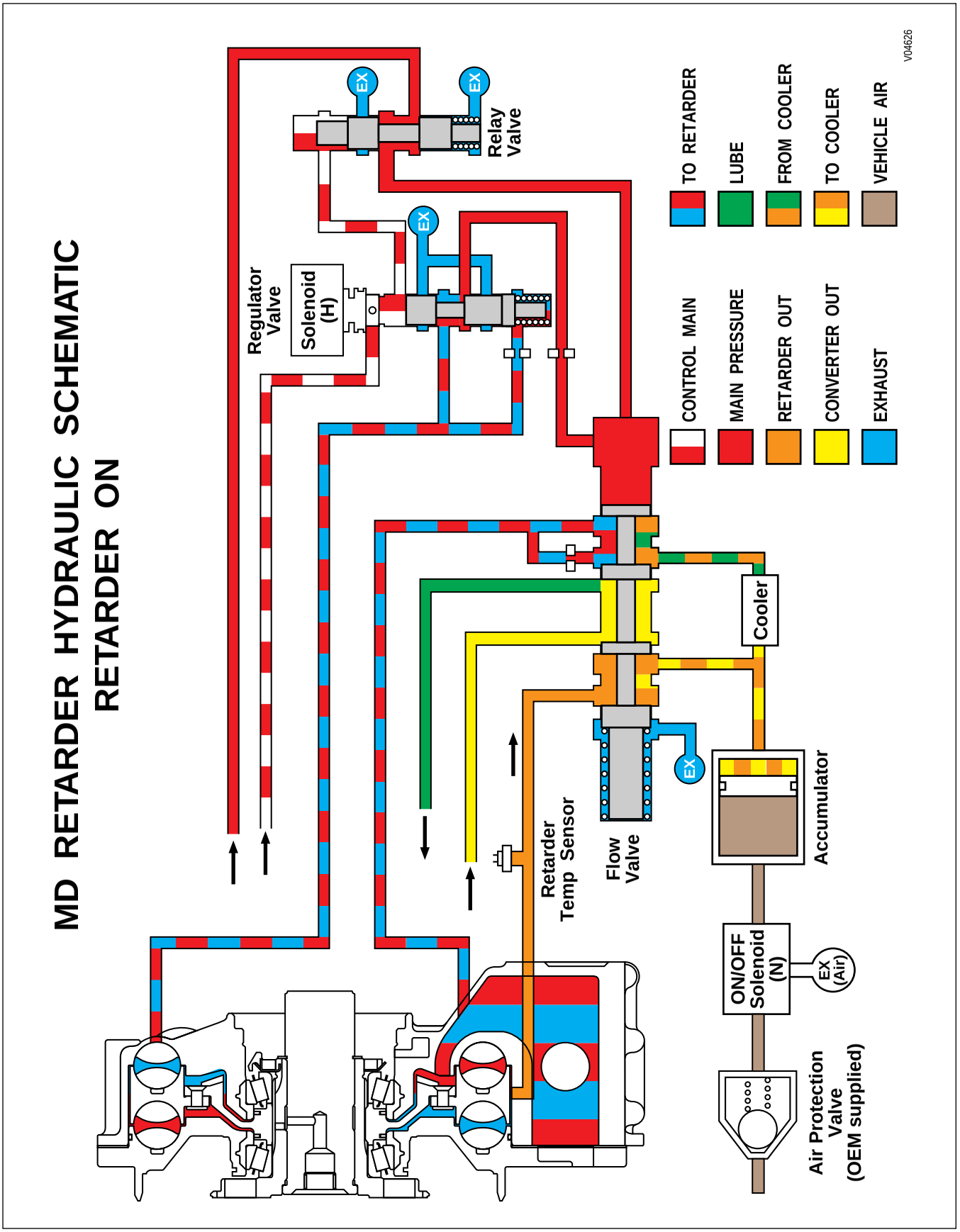

Figure H–22. MD/B 300/B 400 Hydraulic Schematic — Retarder On (Beginning January 1, 1998)

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APPENDIX H — HYDRAULIC SCHEMATICS

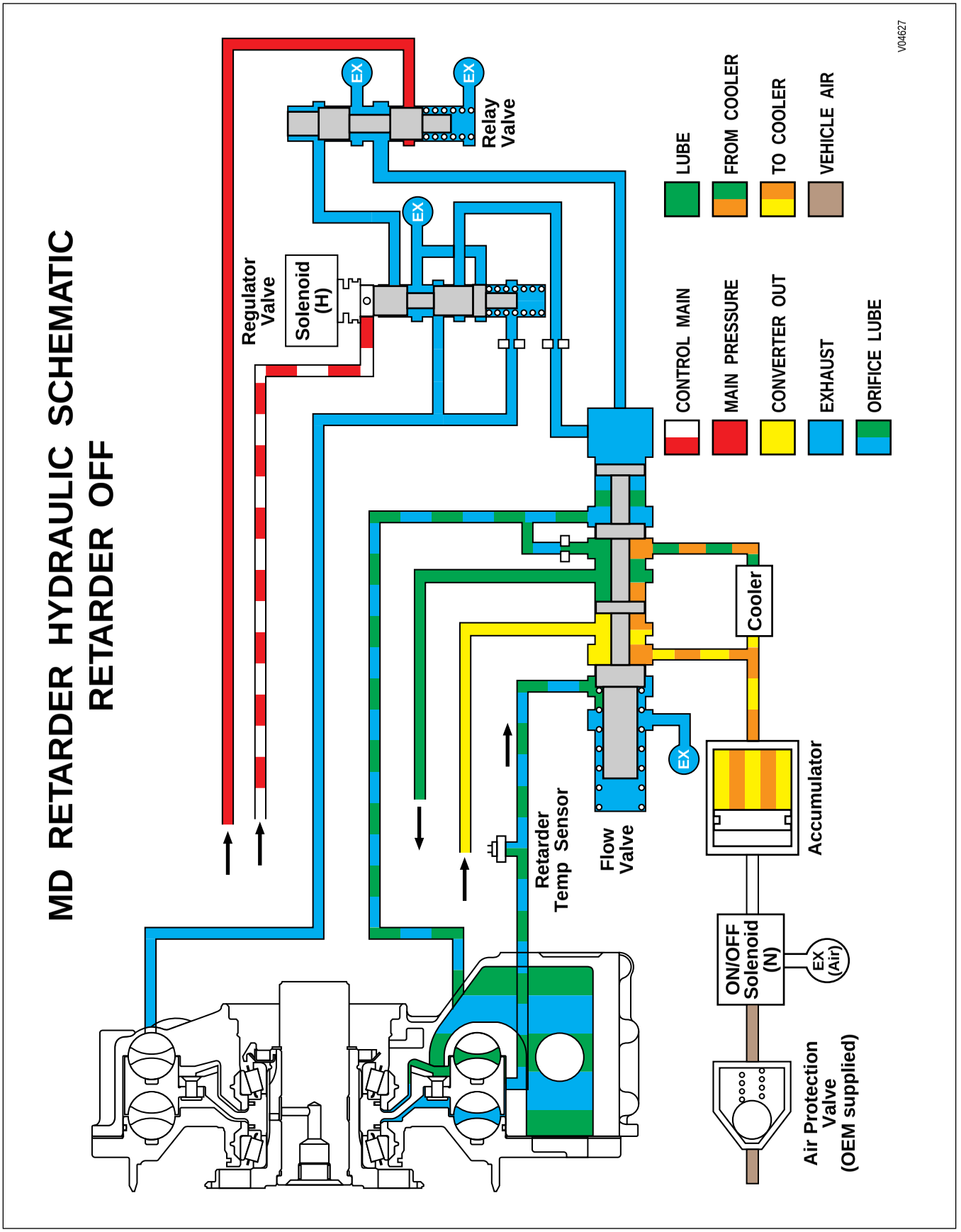

Figure H–23. MD/B 300/B 400 Hydraulic Schematic — Retarder Off (Beginning January 1, 1998)

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APPENDIX H — HYDRAULIC SCHEMATICS

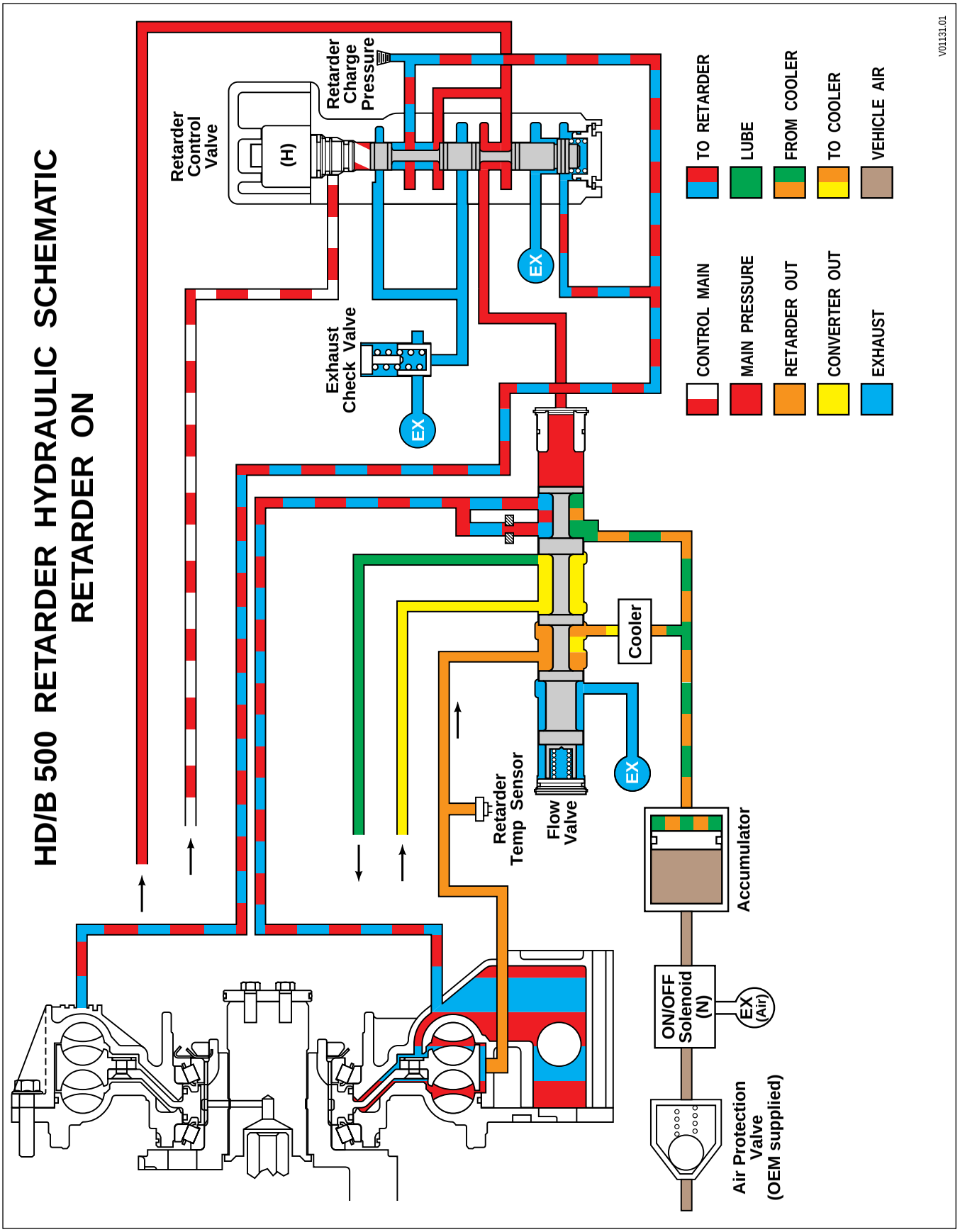

Figure H–24. HD/B 500 Hydraulic Schematic — Retarder On

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APPENDIX H — HYDRAULIC SCHEMATICS

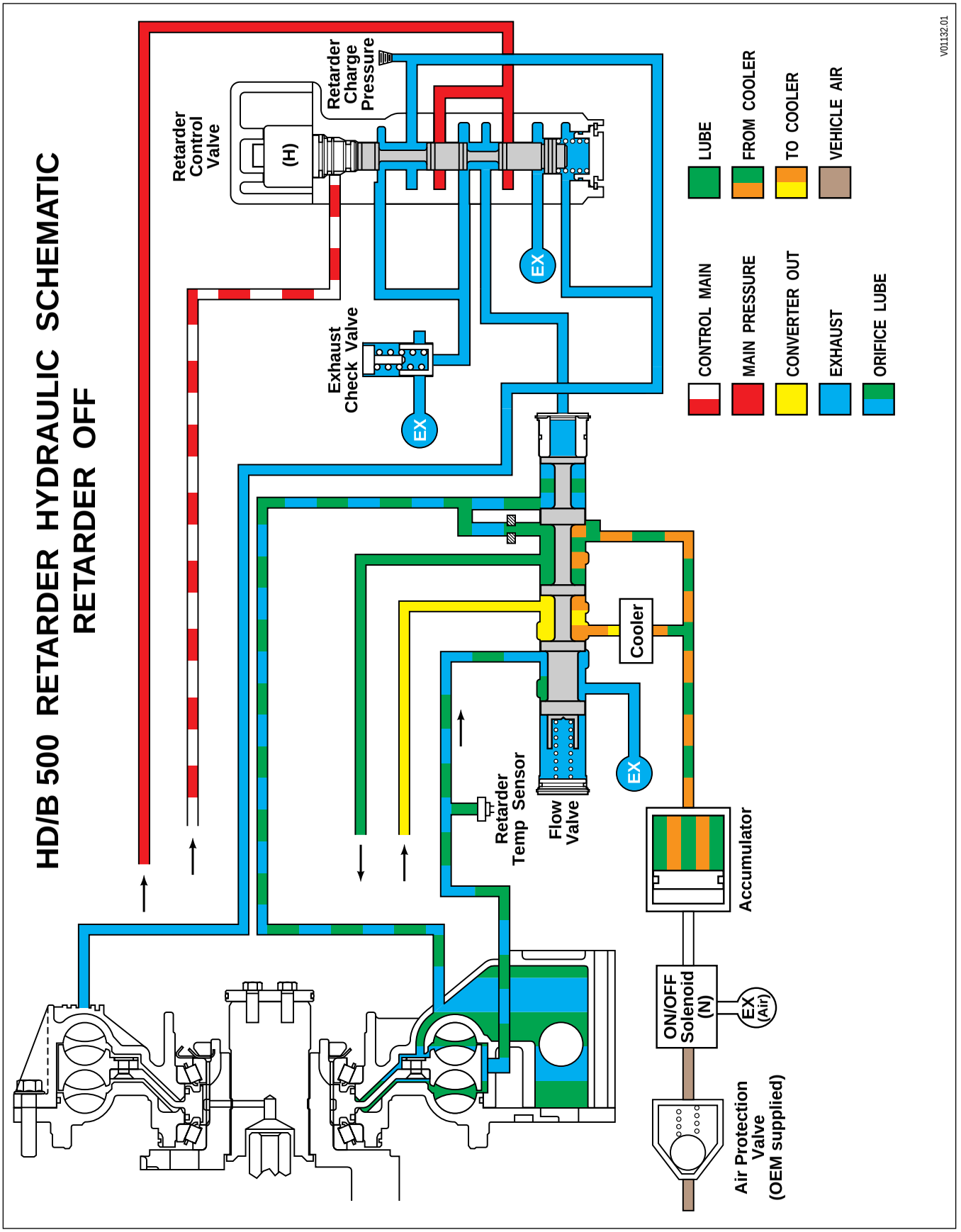

Figure H–25. HD/B 500 Hydraulic Schematic — Retarder Off

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APPENDIX H — HYDRAULIC SCHEMATICS

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APPENDIX J — WT WIRING SCHEMATIC

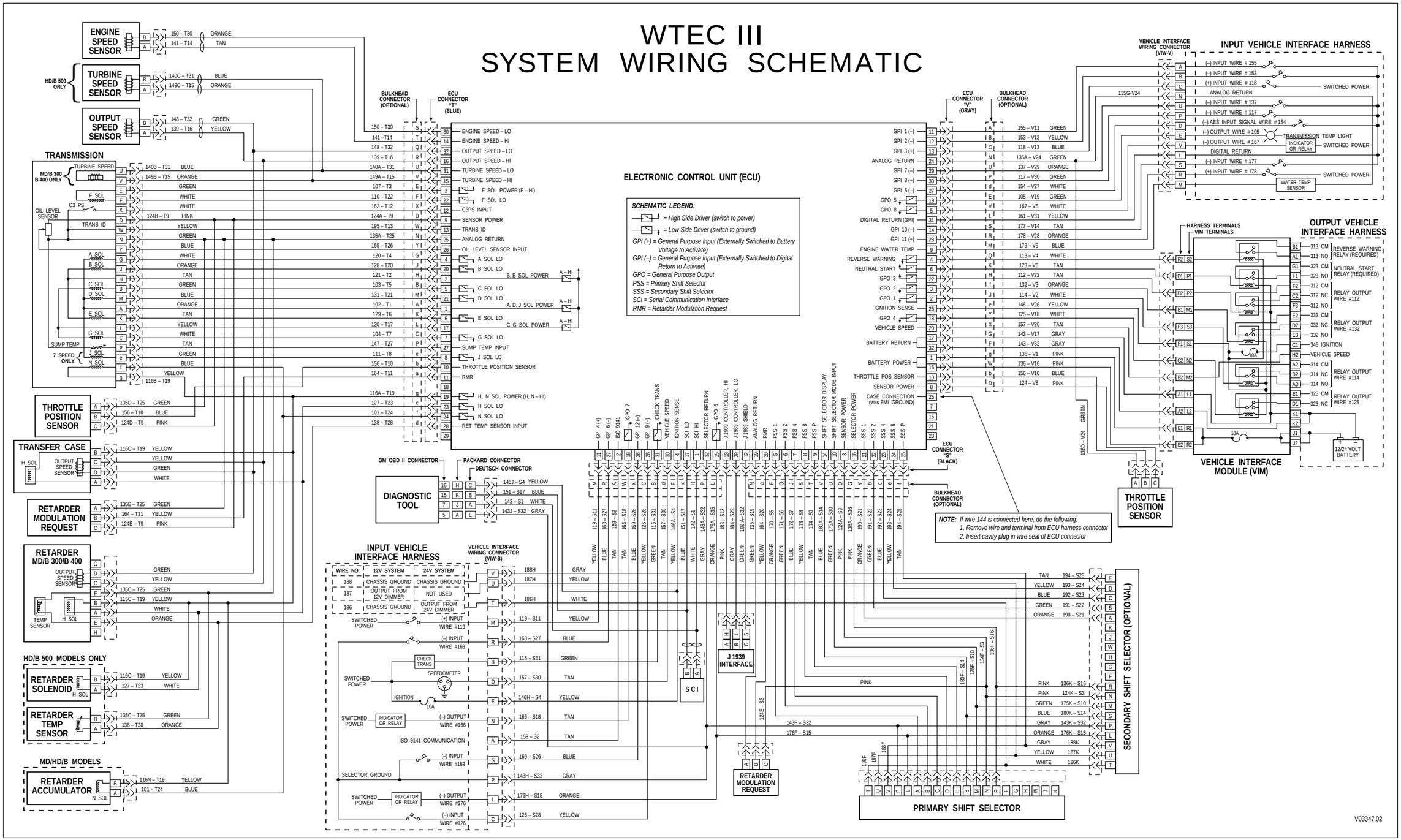

Figure J–1. WT Wiring Schematic (TransID 1)

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APPENDIX J — WT WIRING SCHEMATIC

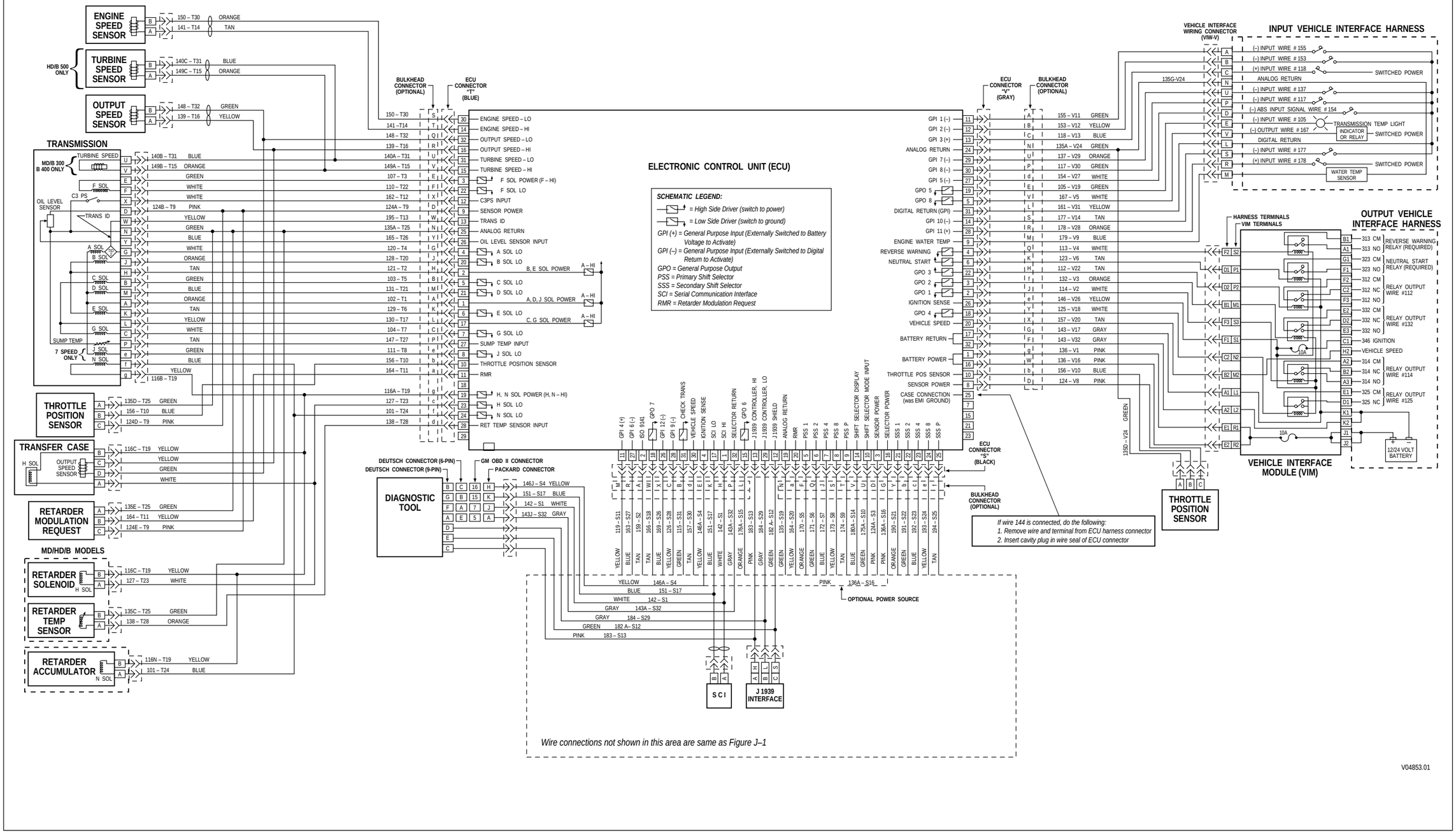

Figure J–2. WT Wiring Schematic (TransID 2)

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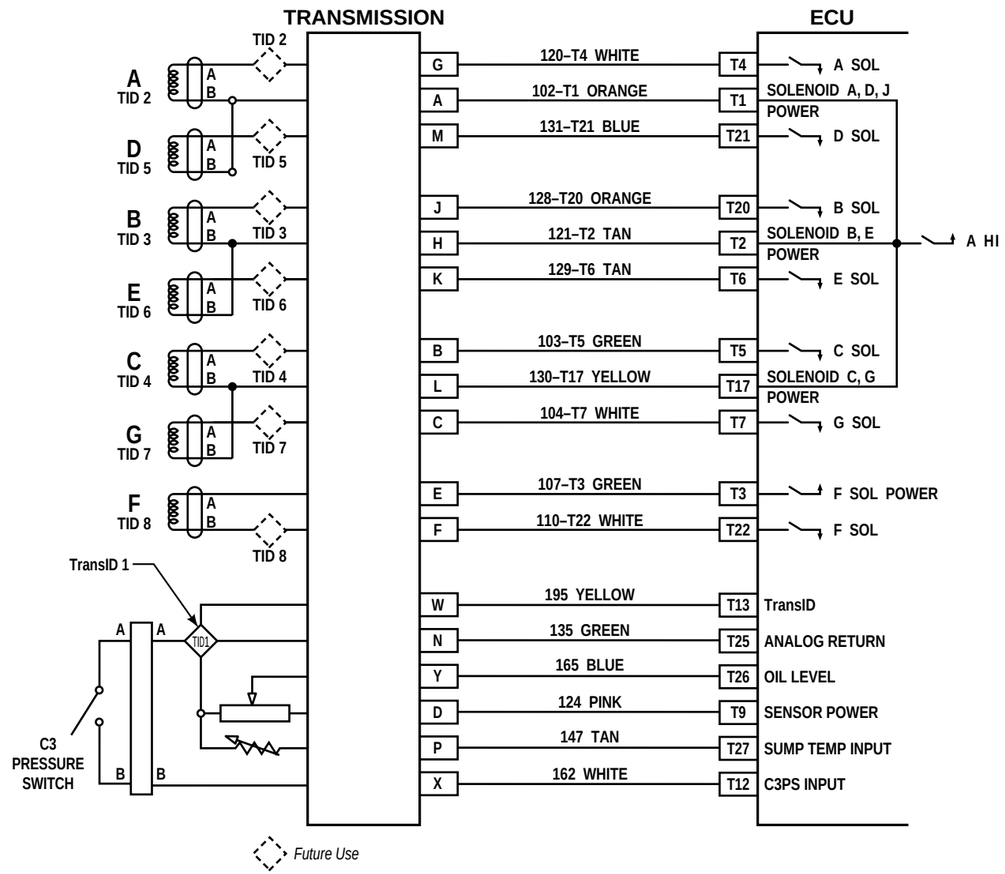
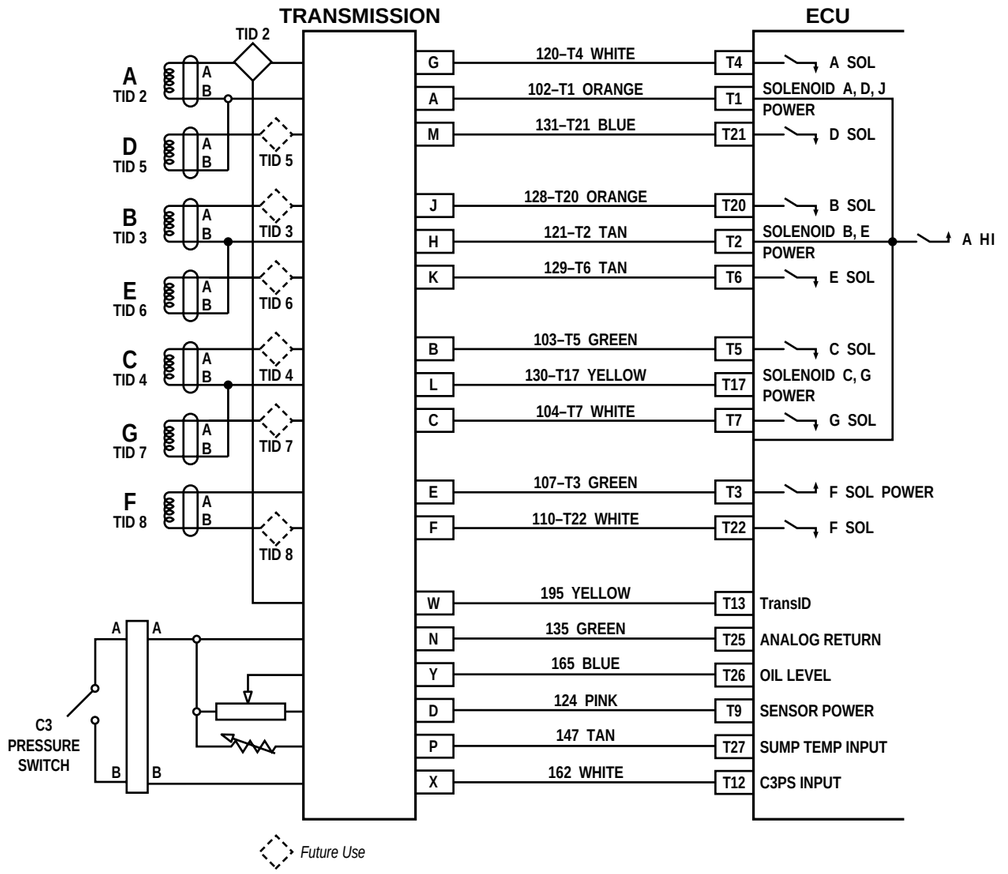
APPENDIX J — WT WIRING SCHEMATIC



TRANSID – 1 (Same as Figure J-1, except as shown)

V04854



TRANSID – 2 AND FUTURE TID PROVISIONS (Same as Figure J-1, except as shown)

V04855

Figure J–3. WT Wiring Schematic (TransID Details)

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APPENDIX K — TRANSID 1 TEMPERATURE SENSOR AND SOLENOID RESISTANCE CHARTS

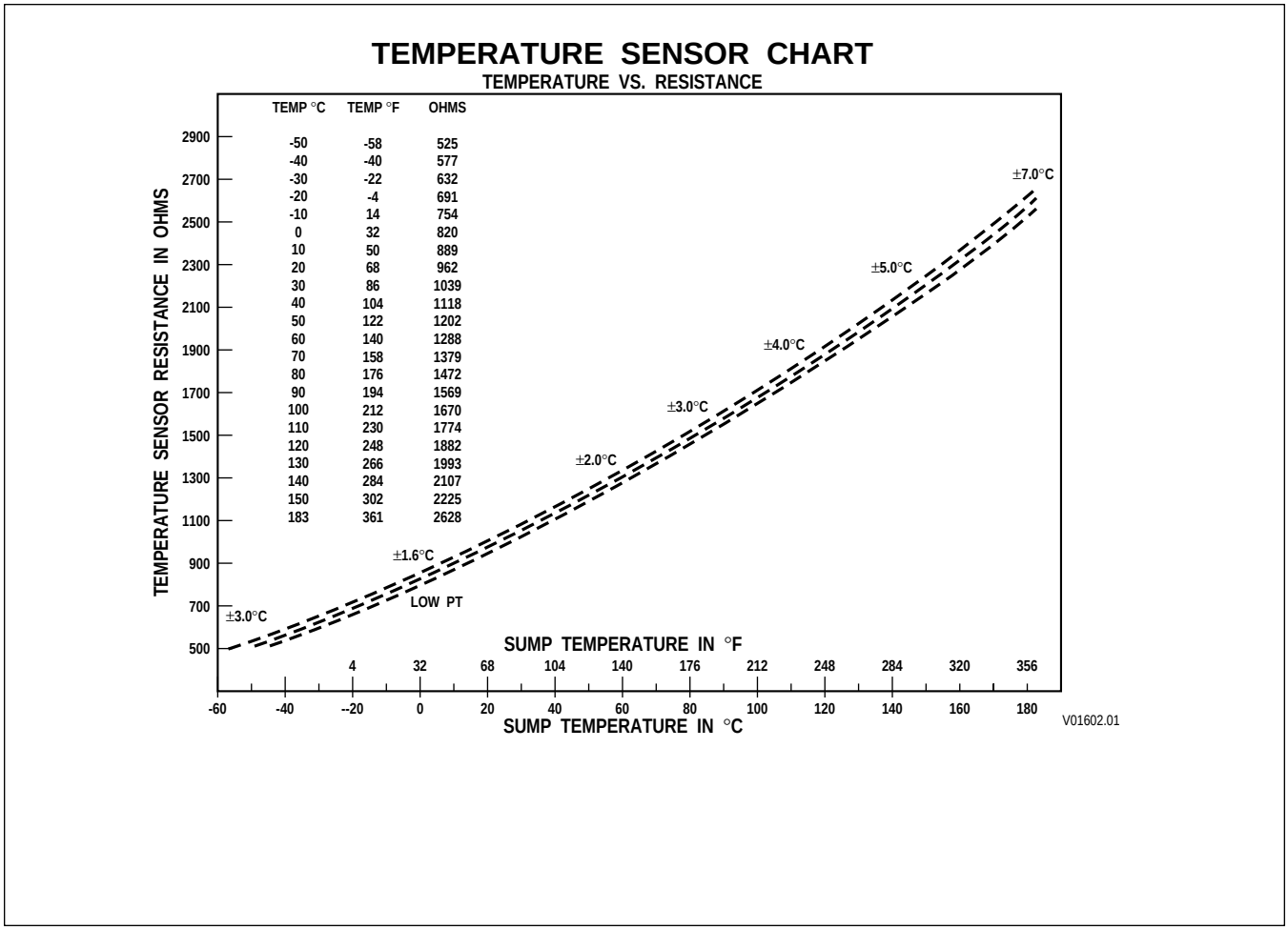

Figure K–1. TransID 1 Temperature Sensor Chart

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APPENDIX K — TRANSID 1 TEMPERATURE SENSOR AND SOLENOID RESISTANCE CHARTS

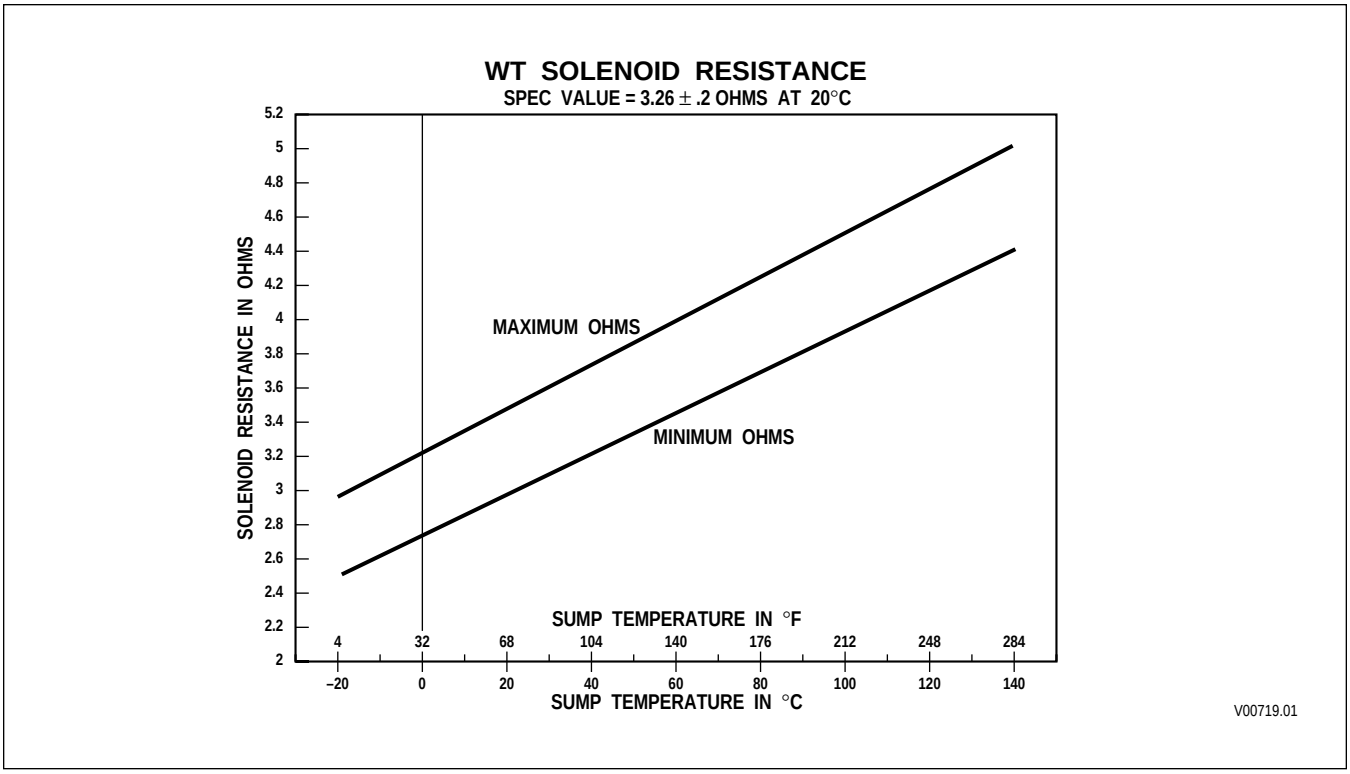

Figure K–2. Solenoid Resistance vs. Temperature Chart

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APPENDIX L — EXTERNALLY-GENERATED ELECTRONIC INTERFERENCE

1–1. ELECTROMAGNETIC/RADIO FREQUENCY INTERFERENCE

Be sure that the ECU for the Allison Transmission Electronic Controls is properly grounded to prevent EMI interference problems. The chassis frame must be connected to the negative post of the vehicle battery. A proper connection to the chassis frame is required. The connection must be free from rust and paint. The electrical integrity of this connection must not deteriorate with the age of the vehicle. If the ECU is cab-mounted, there must be two 1½ to 2 inch braided grounding straps connecting the cab structure to the chassis frame. DO NOT connect wire 144-V25 to a bus bar or to any single terminal carrying other electrical loads.

All electrical and electronic systems generate electromagnetic fields that can interfere with other electronic systems. Allison Transmission electronic transmission controls comply with Federal Communications Commission (FCC) regulations and other guidelines concerning emitted radio frequency interference for transportation electronics. The position of Allison Transmission Division of General Motors is that manufacturers and installers of EMI/RFI emitting equipment are responsible for adhering to FCC regulations and other guidelines concerning emitted radio frequency interference for transportation electronics.

Some radio-telephone or two-way communication radios (land-mobile radio), or the manner in which they are installed, can adversely affect vehicle operation or be affected by other vehicle components. Expenses incurred to protect vehicle-related systems from EMI/RFI emissions by radio-telephone or two-way communications radios (land-mobile radio) or to integrate such devices into vehicles are not the responsibility of Allison Transmission.

1–2. GENERAL GUIDELINES FOR RADIO EQUIPMENT INSTALLATION

The following general guidelines for installing radio-telephone or two-way communications radios (land-mobile radio) in a vehicle supplement, but DO NOT replace, detailed instructions provided by the radio equipment manufacturer. Detailed installation instructions are the sole responsibility of the radio equipment manufacturer.

Experience has shown that most EMI/RFI problems can be prevented or eliminated by following the guidelines. If EMI/RFI problems persist after following the guidelines and after ensuring the installation conforms to the guidelines, contact the vehicle and radio equipment manufacturers for additional installation or equipment operation instructions.

A. Transmitter Installation

1. Locate remote radio transmitters as far away from other electronic devices and as near to the side of the vehicle body as possible.
2. Mount transceivers (transmitter and receiver in one box) under the dash so as not to interfere with vehicle controls or passenger movement.

B. Antenna Installation

Each vehicle and body style react differently to radio frequency energy. When dealing with an unfamiliar vehicle, test various antenna locations by using a magnetic mount antenna and checking for adverse effects. Antenna location is a major factor in EMI/RFI problems.

C. Antenna Cable Routing

1. Use high quality, 95 percent shield coverage, coaxial (coax) cable. Route the coax well away from any electronic components.
2. Route antenna cables as far away from vehicle wiring as possible to reduce the likelihood of the vehicle wiring acting as an antenna for interference.

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APPENDIX L — EXTERNALLY-GENERATED ELECTRONIC INTERFERENCE

D. Radio Wiring and Connector Location

1. Connect transmitter power leads directly to the battery.
2. For transceivers (transmitter and receiver in one box) with ignition control, place a 12V power contactor at the vehicle battery. Drive the contactor coil, through an appropriate in-line fuse, from an ignition circuit not powered during engine cranking.
3. Any negative lead from a handset or control unit must return to battery negative.
4. Connect the positive lead from a handset or control unit directly to battery.
5. Fuse handset or control unit positive and negative leads separately from the transceiver negative and positive leads. Use correctly rated fuses.

E. Power and Ground Wire Routing

Route radio power and ground wires as far away as possible from electronic control modules.

F. Troubleshooting

The following are common causes of EMI/RFI problems:

- Power leads connected to points other than the battery
- Improper antenna location
- Poor shielding or connections to antenna cable
- Transmitter or transceiver wiring too close to vehicle electronics

1–3. EXTERNALLY-GENERATED SPEED SENSOR SIGNALS

A. Checking for Externally-Generated Speed Sensor Signals

Use the following procedures to determine if speed sensor signals generated by a source external to the transmission or wiring harness are present:

1. Turn ignition ON.
2. Keep engine OFF.
3. If the ECU is ON (shift selector display remains illuminated), connect the Pro-Link® Diagnostic tool.

NOTE: If false speed signals were present at the previous shutdown, the ECU might still be "on" even though the ignition is "off." The Pro-Link® is powered by ignition power so the ignition must be "on" to use the Pro-Link® to read the speed signals.

4. Read speed sensor signals.
5. If a speed sensor signal is other than one (1), then there is a short to another circuit that is carrying an AC or PWM signal.
6. Check the resistance of the sensor.
7. Check for shorts to other circuits within the harness or transmission connector.
8. Check to ensure there is no conductive material inside the connector.
9. Check to be sure speed sensor circuit wires are a twisted pair.
10. Check to ensure a properly grounded drain wire.
11. Check for the presence of a strong external AC signal.
12. Repair or replace parts as required.

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APPENDIX M — DIAGNOSTIC TREE — WT HYDRAULIC SYSTEM

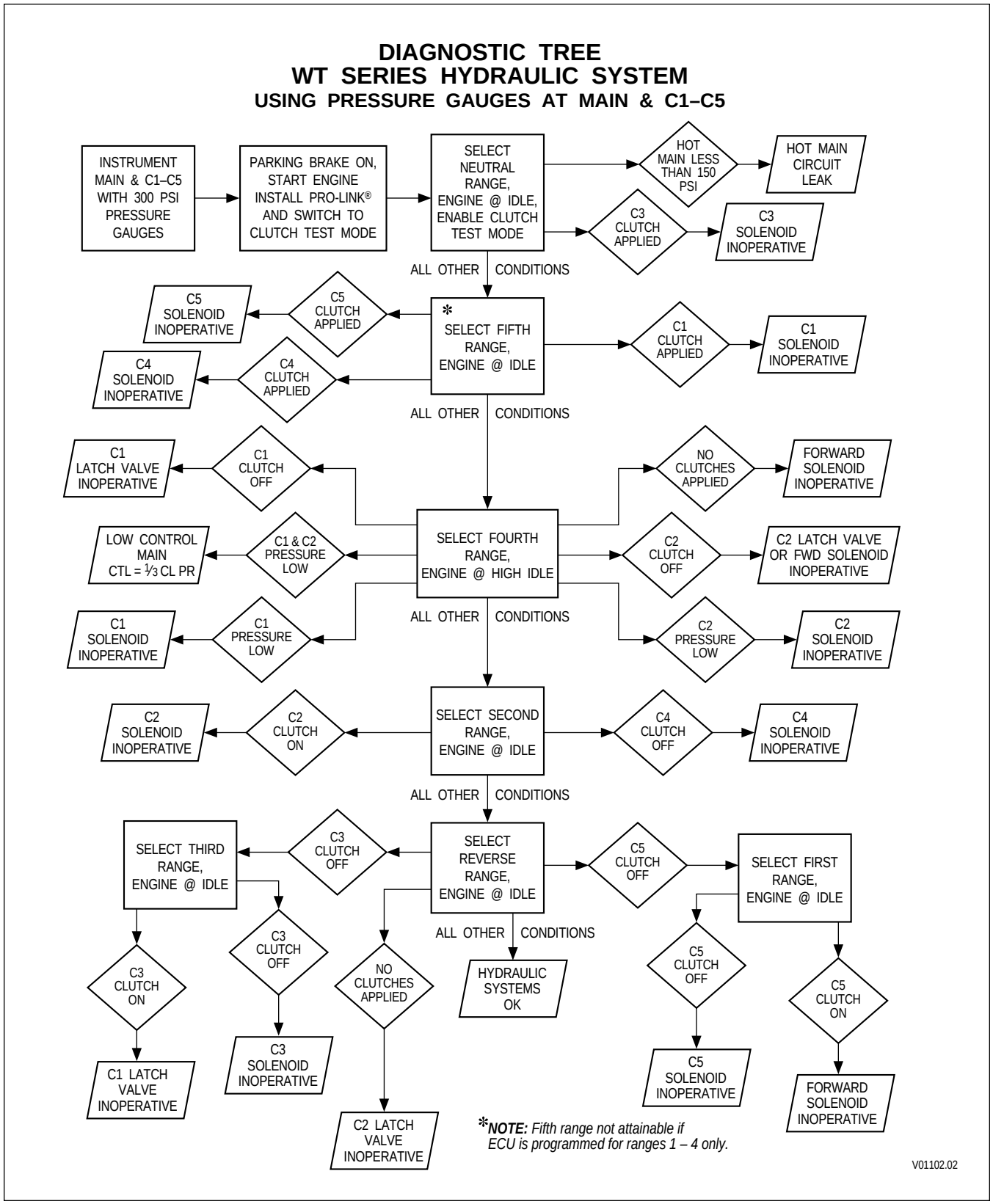

Figure M–1. Diagnostic Tree — WT Series Hydraulic System With Gauges

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APPENDIX M — DIAGNOSTIC TREE — WT HYDRAULIC SYSTEM

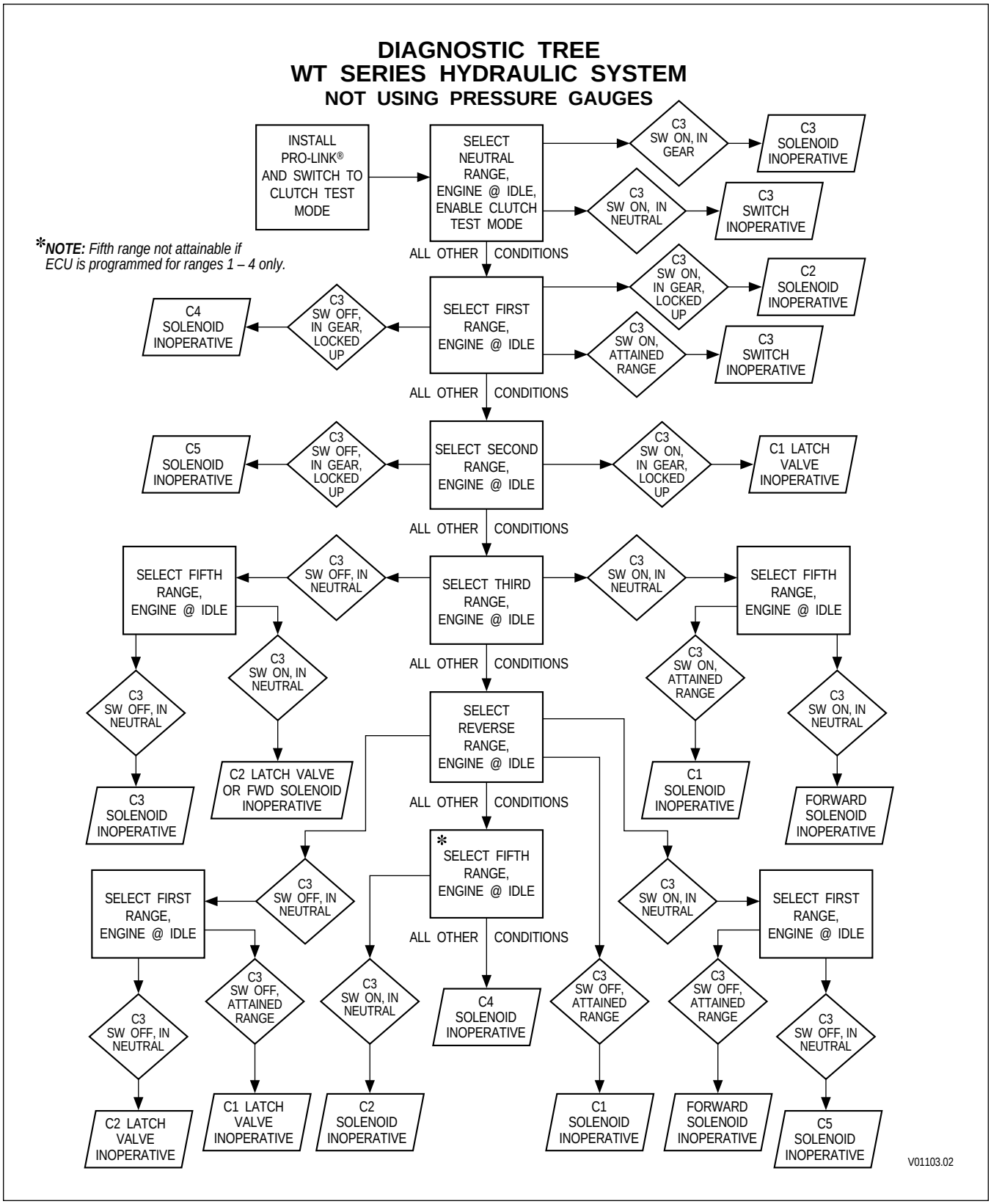

Figure M–2. Diagnostic Tree — WT Series Hydraulic System Without Gauges

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APPENDIX N — PRO-LINK® 9000 DIAGNOSTIC DATA READER INFORMATION

Pro-link® 9000 Diagnostic Tools

The WTEC III system will require new Pro-Link® 9000 hardware for reprogramming and diagnostics. The following is a list of required updates to the current Pro-Link® 9000 hardware:

Hardware	Tool P/N
Diagnostic Cartridge	J38500-303
PROM Update Kit	J38500-313
MultiProtocol Cartridge (MPC)	J38500-1500A
Reprogramming PCMCIA Card*	J38500-1700
Diagnostic Card*	J38500-1800

* Requires J38500-1500A to function

Limited diagnostic information for the WTEC III system can be accessed through the current WTEC II Pro-Link® 9000 hardware. This diagnostic information will however be limited to that information that is common to the WTEC II and WTEC III systems. Access to information described in this SIL can only be accessed through **either** the WTEC III Diagnostic Cartridge or by updating the current WTEC II Diagnostic Cartridge with the PROM update kit or the WTEC III Reprogramming Cartridge.

The MultiProtocol Cartridge (MPC) and the Reprogramming Card are required to modify customer constants and alter Calibration packages within the WTEC III ECU. After completing an ATD-approved training class, those ordering a reprogramming cartridge are required to submit a copy of their completion certificate with their order. This serves as proof of eligibility to purchase these items. Training is available from ATD and ATD distributors.

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APPENDIX N — PRO-LINK® 9000 DIAGNOSTIC DATA READER INFORMATION

NOTES

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APPENDIX P — INPUT/OUTPUT FUNCTIONS

The schematics which follow were taken from the Sales Tech Data Book entitled "WTEC III Controls." These schematics provide detail information needed to correctly perform input and output function connections. For an overview of Input/Output Functions, refer to Section 7 of this manual.

WARNING!

These schematics show the intended use of the specified controls features which have been validated in the configuration shown. Any miswiring or use of these features which differs from that shown could result in damage to equipment or property, personal injury, or loss of life. ALLISON TRANSMISSION IS NOT LIABLE FOR THE CONSEQUENCES ASSOCIATED WITH MISWIRING OR UNINTENDED USE OF THESE FEATURES.

A. SECONDARY SHIFT SCHEDULE

USES: Provides operator selection of dual shift schedules. Can be used for performance/economy, loaded/empty, or other shift schedule combinations.

VARIABLES TO SPECIFY: None

VOCATIONS: Various

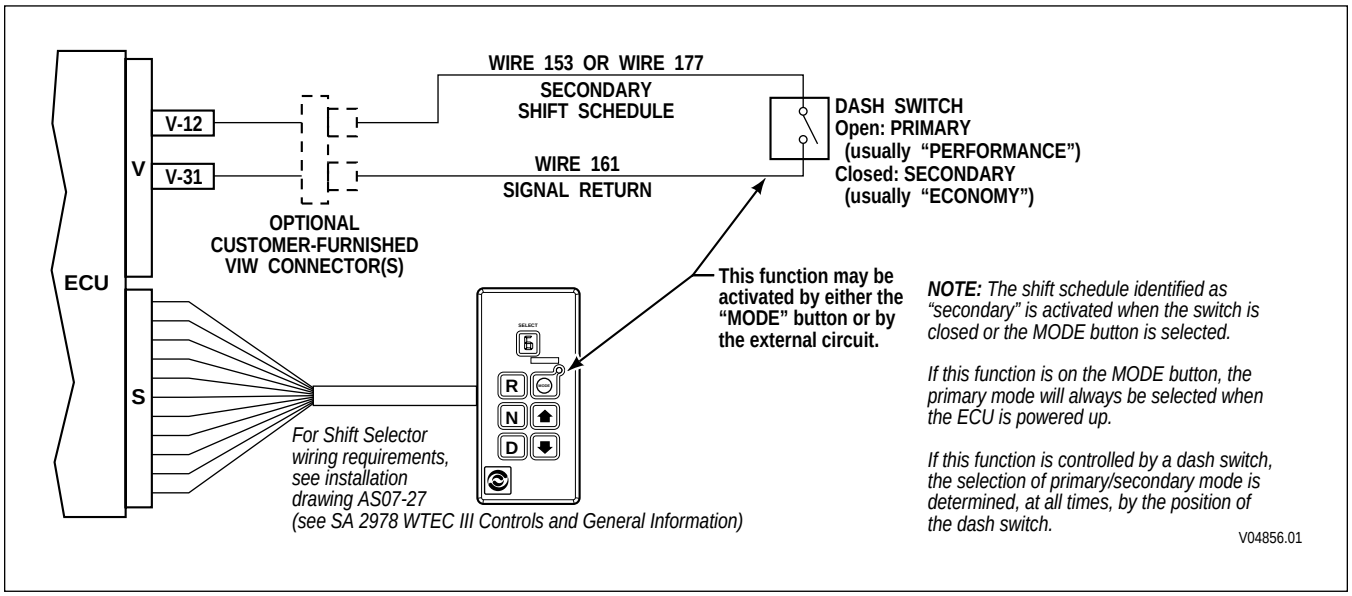

Figure P–1. Secondary Shift Schedule

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APPENDIX P — INPUT/OUTPUT FUNCTIONS

WARNING!

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B. D1 SELECTION

USES: Provides a convenient means of attaining 1st range hold for pushbutton shift selectors. Range to select is programmable for Primary and Secondary modes.

VARIABLES TO SPECIFY: Primary Mode selected range, Secondary Mode selected range (usually 1st range). Can be used only on the MODE button.

VOCATIONS: Various

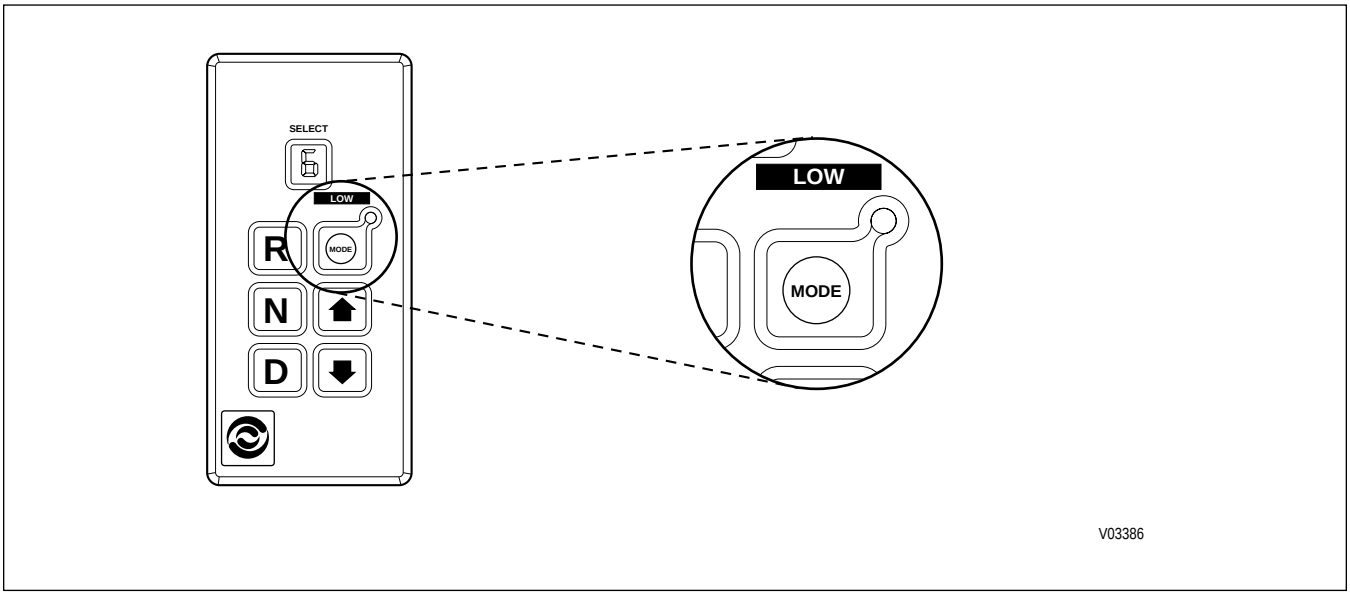

Figure P–2. D1 Selection

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APPENDIX P — INPUT/OUTPUT FUNCTIONS

WARNING!

These schematics show the intended use of the specified controls features which have been validated in the configuration shown. Any miswiring or use of these features which differs from that shown could cause unscheduled operation of the PTO or other unpredictable operation resulting in damage to equipment or property, personal injury, or loss of life. ALLISON TRANSMISSION IS NOT LIABLE FOR THE CONSEQUENCES ASSOCIATED WITH MISWIRING OR UNINTENDED USE OF THESE FEATURES.

C. PTO ENABLE (USING "PTO" SWITCH)

USES: Permits PTO to be engaged only when engine speed and output speed are in allowable range and throttle is low. Also disengages PTO if speeds are exceeded.

VARIABLES TO SPECIFY: Minimum and maximum engine speed for engagement, maximum engine speed for allowable operation, minimum and maximum output speed for engagement, maximum output speed for allowable operation.

VOCATIONS: Various (with usage of PTO)

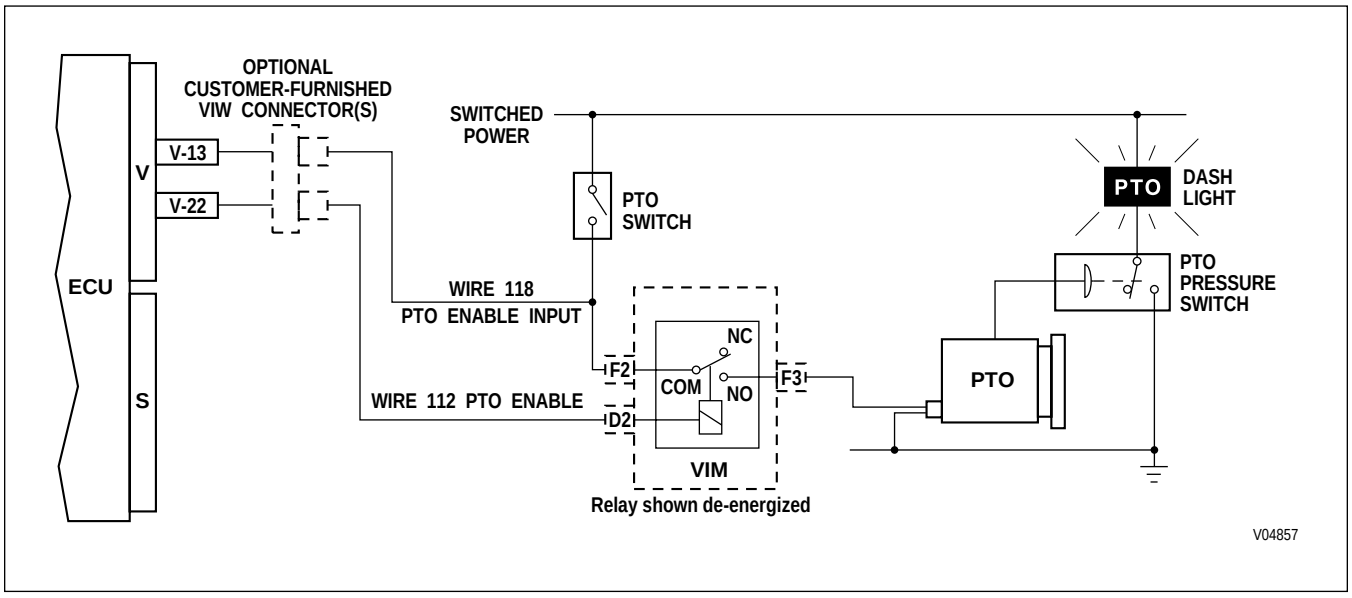

Figure P–3. PTO Enable (Using "PTO" Switch)

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APPENDIX P — INPUT/OUTPUT FUNCTIONS

WARNING!

These schematics show the intended use of the specified controls features which have been validated in the configuration shown. Any miswiring or use of these features which differs from that shown could result in damage to equipment or property, personal injury, or loss of life. ALLISON TRANSMISSION IS NOT LIABLE FOR THE CONSEQUENCES ASSOCIATED WITH MISWIRING OR UNINTENDED USE OF THESE FEATURES.

C. PTO ENABLE (USING "PTO" SWITCH — OPTIONAL)

USES: Permits PTO to be engaged only when engine speed and output speed are in allowable range and throttle is low. Also disengages PTO if speeds are exceeded.

VARIABLES TO SPECIFY: Minimum and maximum engine speed for engagement, maximum engine speed for allowable operation, minimum and maximum output speed for engagement, maximum output speed for allowable operation.

VOCATIONS: Various (with usage of PTO)

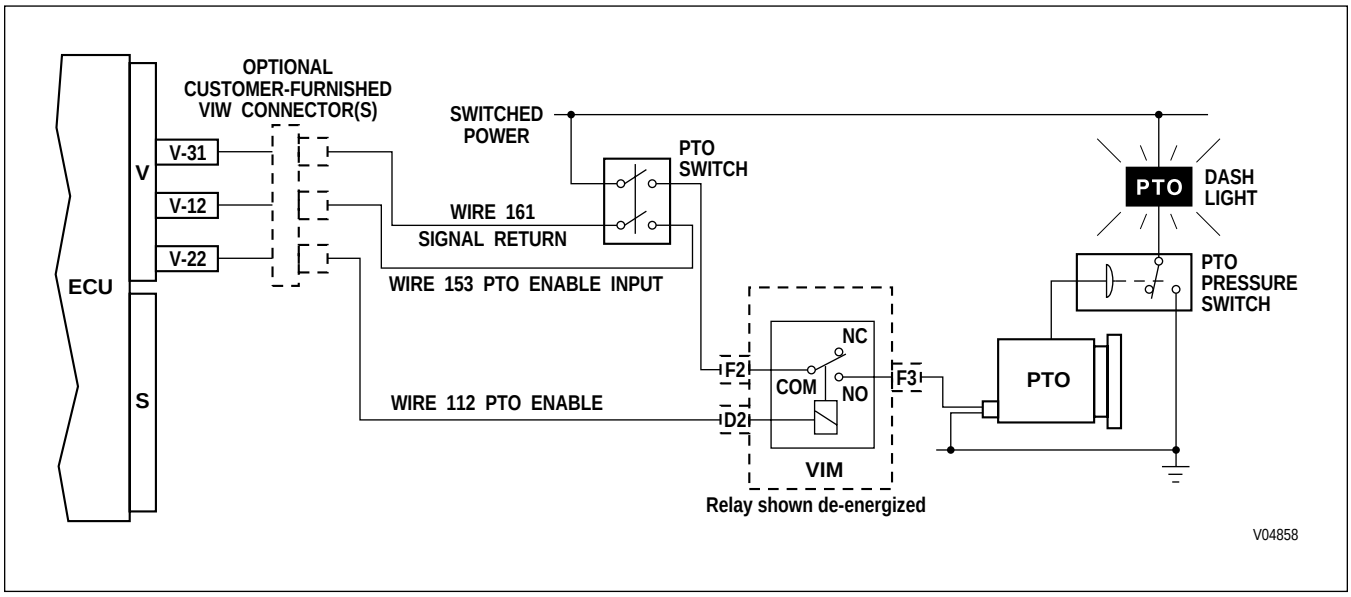

Figure P–4. PTO Enable (Using "PTO" Switch — Optional)

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APPENDIX P — INPUT/OUTPUT FUNCTIONS

WARNING!

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C. PTO ENABLE (USING "MODE" BUTTON)

USES: Permits PTO to be engaged only when engine speed and output speed are in allowable range and throttle is low. Also disengages PTO if speeds are exceeded.

VARIABLES TO SPECIFY: Minimum and maximum engine speed for engagement, maximum engine speed for allowable operation, minimum and maximum output speed for engagement, maximum output speed for allowable operation.

VOCATIONS: Various (with usage of PTO)

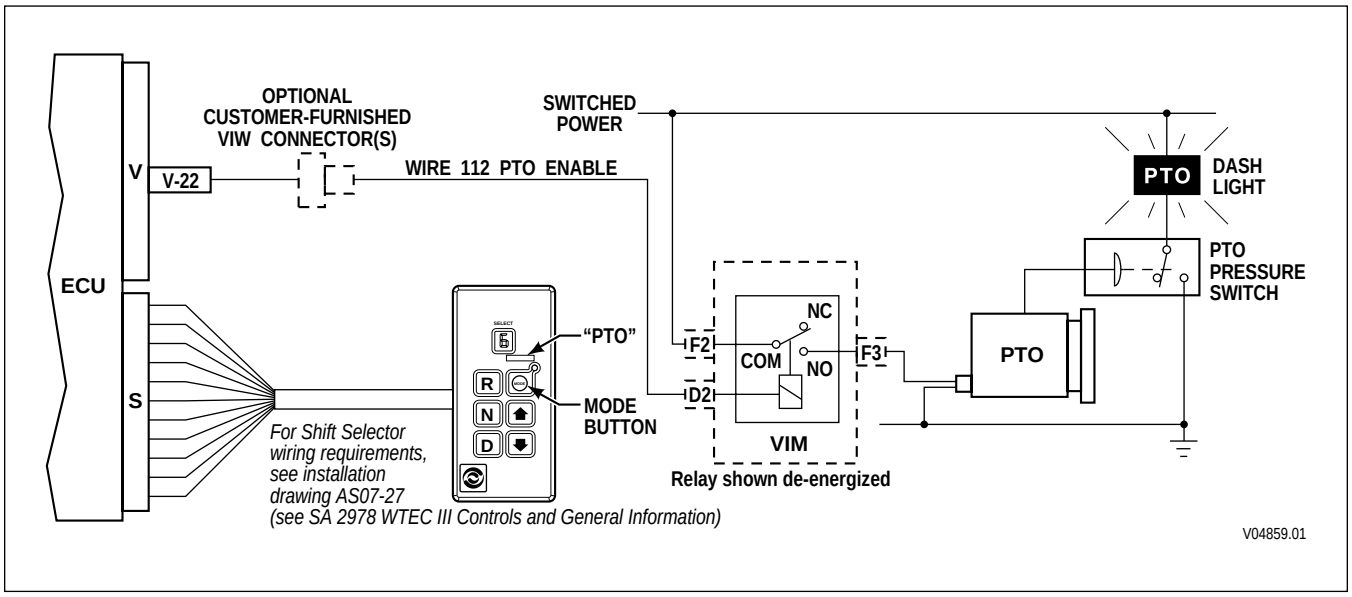

Figure P–5. PTO Enable (Using "MODE" Button)

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APPENDIX P — INPUT/OUTPUT FUNCTIONS

WARNING!

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D. SHIFT SELECTOR TRANSITION

USES: When two shift selectors are used, to select which one is active.

VARIABLES TO SPECIFY: None

VOCATIONS: Various

WARNING!

If this function is enabled in the shift calibration, the function MUST be integrated into the vehicle wiring. If the function is available in the shift calibration but will not be used in the vehicle, it MUST be disabled in the calibration.

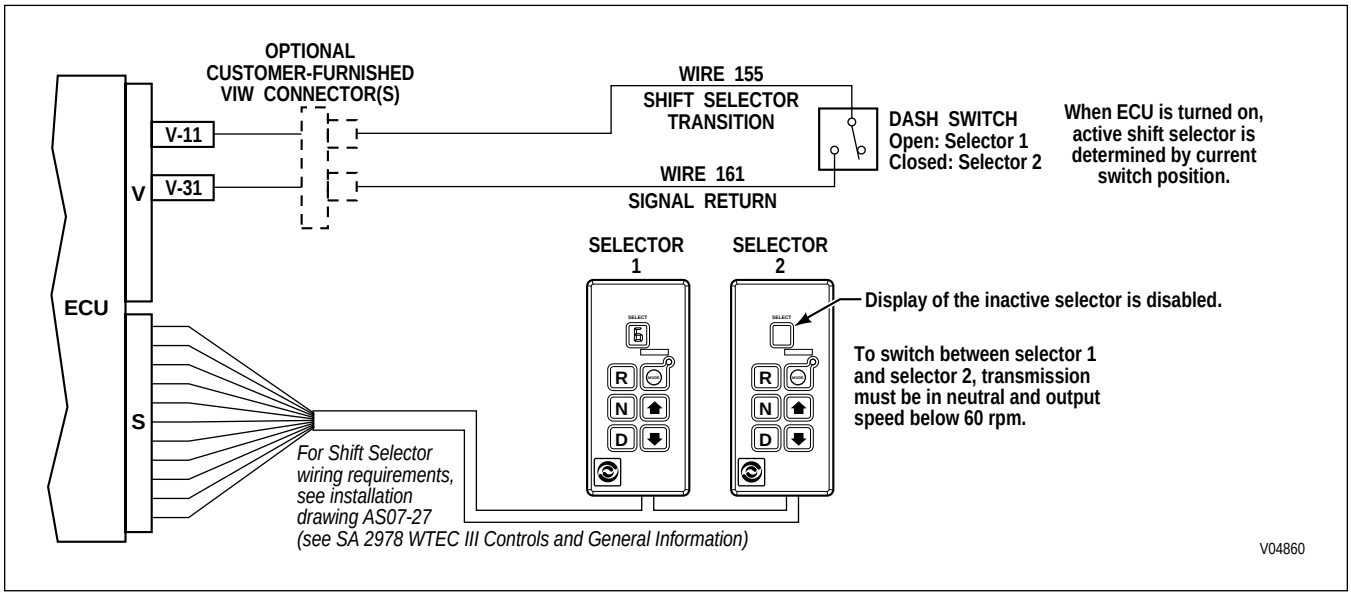

Figure P–6. Shift Selector Transition

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APPENDIX P — INPUT/OUTPUT FUNCTIONS

WARNING!

These schematics show the intended use of the specified controls features which have been validated in the configuration shown. Any miswiring or use of these features which differs from that shown could cause unintended selection of range or other unpredictable operation resulting in damage to equipment or property, personal injury, or loss of life. ALLISON TRANSMISSION IS NOT LIABLE FOR THE CONSEQUENCES ASSOCIATED WITH MISWIRING OR UNINTENDED USE OF THESE FEATURES.

E. AUXILIARY FUNCTION RANGE INHIBIT (STANDARD)

USES: Prevents inadvertent range selection when auxiliary equipment is operating or prevents engagement of the transmission unless brake pedal is depressed.

VARIABLES TO SPECIFY: None

VOCATIONS: Transit bus, school bus — auxiliary equipment input; various (brake pedal input)

WARNING!

If this function is enabled in the shift calibration, the function MUST be integrated into the vehicle wiring. If the function is available in the shift calibration but will not be used in the vehicle, it MUST be disabled in the calibration.

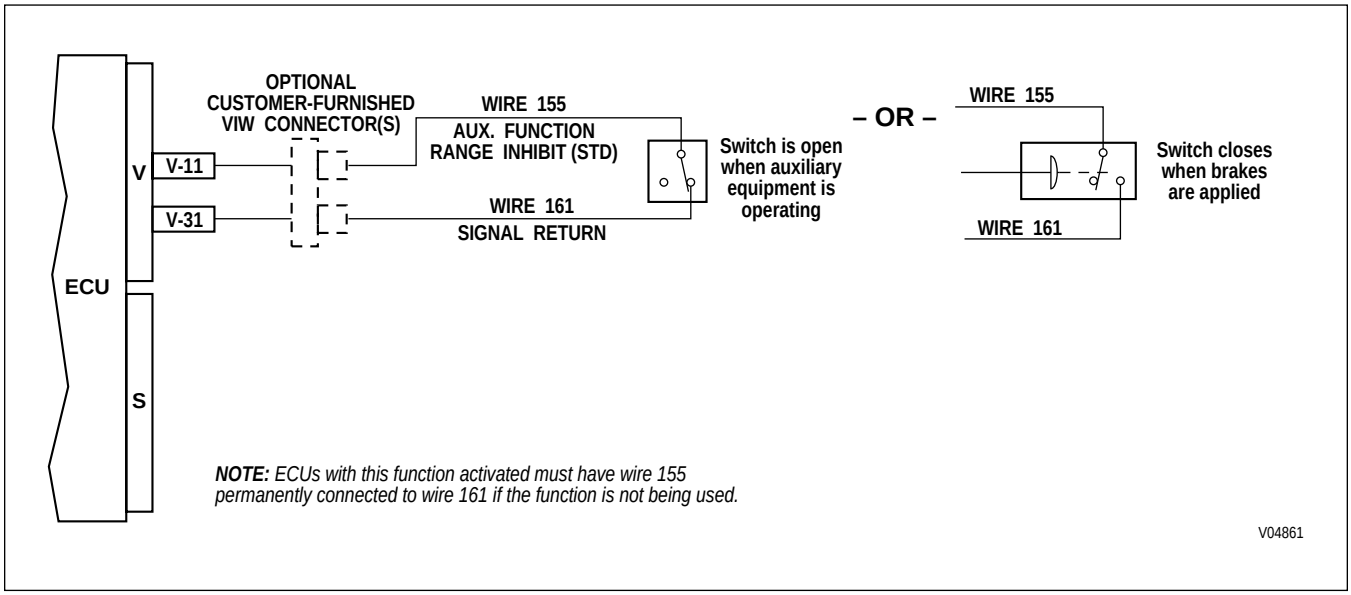

Figure P–7. Auxiliary Function Range Inhibit (Standard)

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APPENDIX P — INPUT/OUTPUT FUNCTIONS

WARNING!

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F. AUXILIARY FUNCTION RANGE INHIBIT (SPECIAL)

USES: Prevents inadvertent range selection when auxiliary equipment is operating. Used in emergency equipment to prevent inadvertent range selection from NEUTRAL.

VARIABLES TO SPECIFY: None

VOCATIONS: Fire trucks, crash trucks

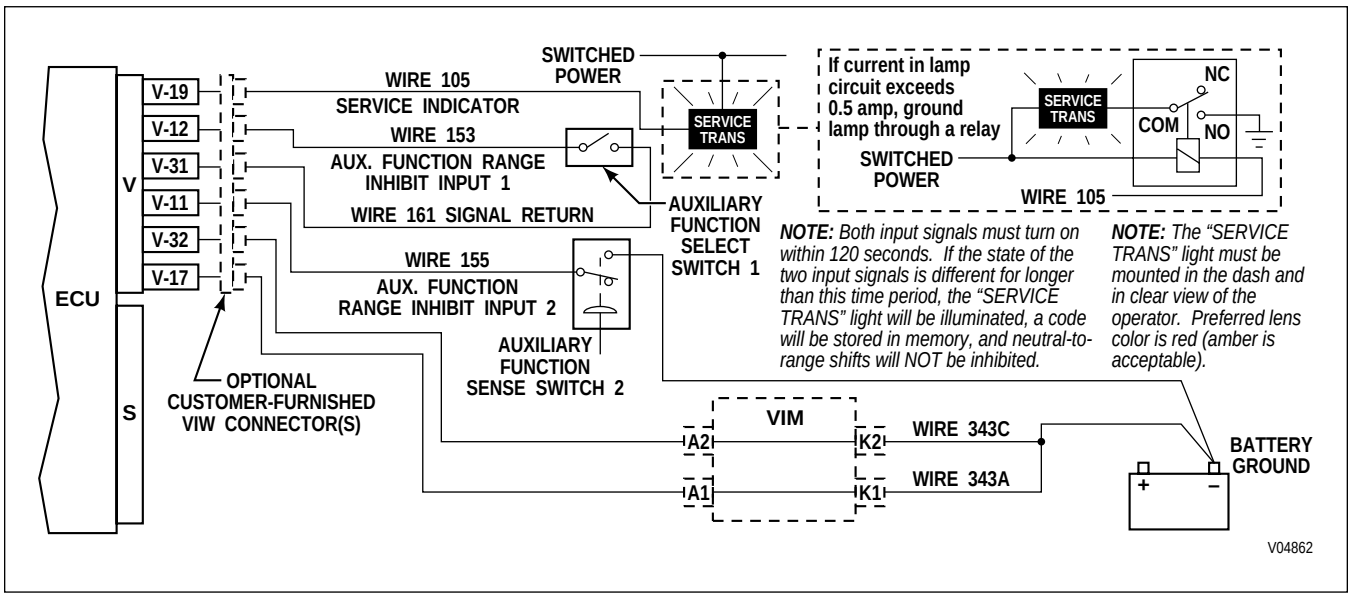

Figure P–8. Auxiliary Function Range Inhibit (Special)

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APPENDIX P — INPUT/OUTPUT FUNCTIONS

WARNING!

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G. AUXILIARY HOLD

USES: Provide a discrete input to hold the transmission in present range.

VARIABLES TO SPECIFY: None

VOCATIONS: Various

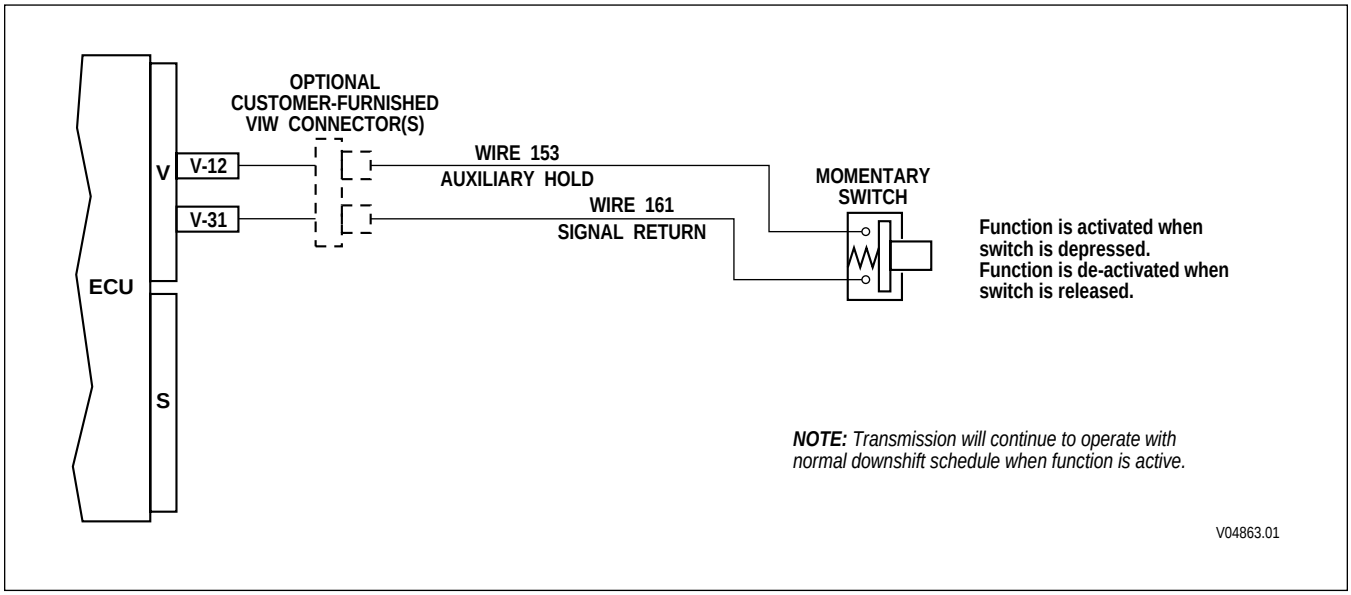

Figure P–9. Auxiliary Hold

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APPENDIX P — INPUT/OUTPUT FUNCTIONS

WARNING!

These schematics show the intended use of the specified controls features which have been validated in the configuration shown. Any miswiring or use of these features which differs from that shown could result in damage to equipment or property, personal injury, or loss of life. ALLISON TRANSMISSION IS NOT LIABLE FOR THE CONSEQUENCES ASSOCIATED WITH MISWIRING OR UNINTENDED USE OF THESE FEATURES.

H. ENGINE BRAKE/PRESELECT REQUEST AND ENGINE BRAKE ENABLE (EXHAUST BRAKE)

USES: Used with engine brakes to signal the ECU that the brake is active and to provide increased braking by preselecting a lower range. Also prevents engagement of engine brake with throttle > 0 or lockup OFF.

VARIABLES TO SPECIFY: Preselect range. Standard value is second range.

VOCATIONS: Various

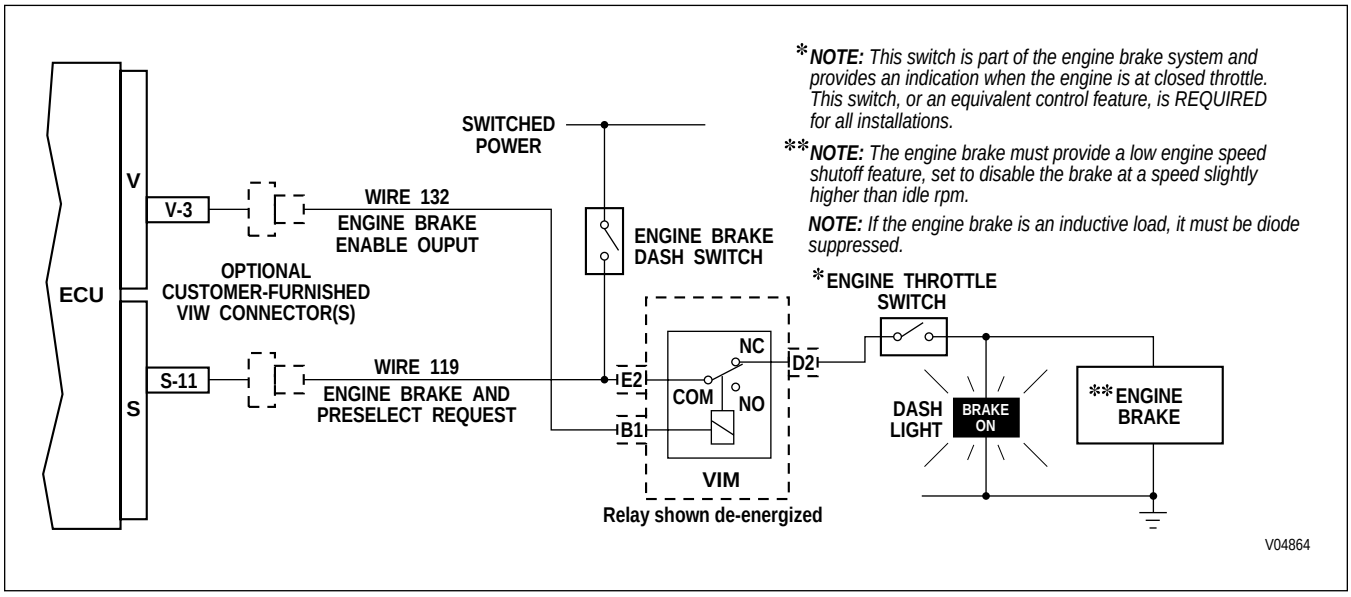

Figure P–10. Engine Brake/Preselect Request and Engine Brake Enable (Exhaust Brake)

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APPENDIX P — INPUT/OUTPUT FUNCTIONS

WARNING!

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H. ENGINE BRAKE/PRESELECT REQUEST AND ENGINE BRAKE ENABLE (EXHAUST BRAKE – OPTIONAL)

USES: Used with engine brakes controlled by electronic engines to signal the ECU that the brake is active and to provide increased braking by preselecting a lower range. Also prevents engagement of engine brake with throttle > 0 or lockup OFF.

VARIABLES TO SPECIFY: Preselect range. Standard value is second range.

VOCATIONS: Various

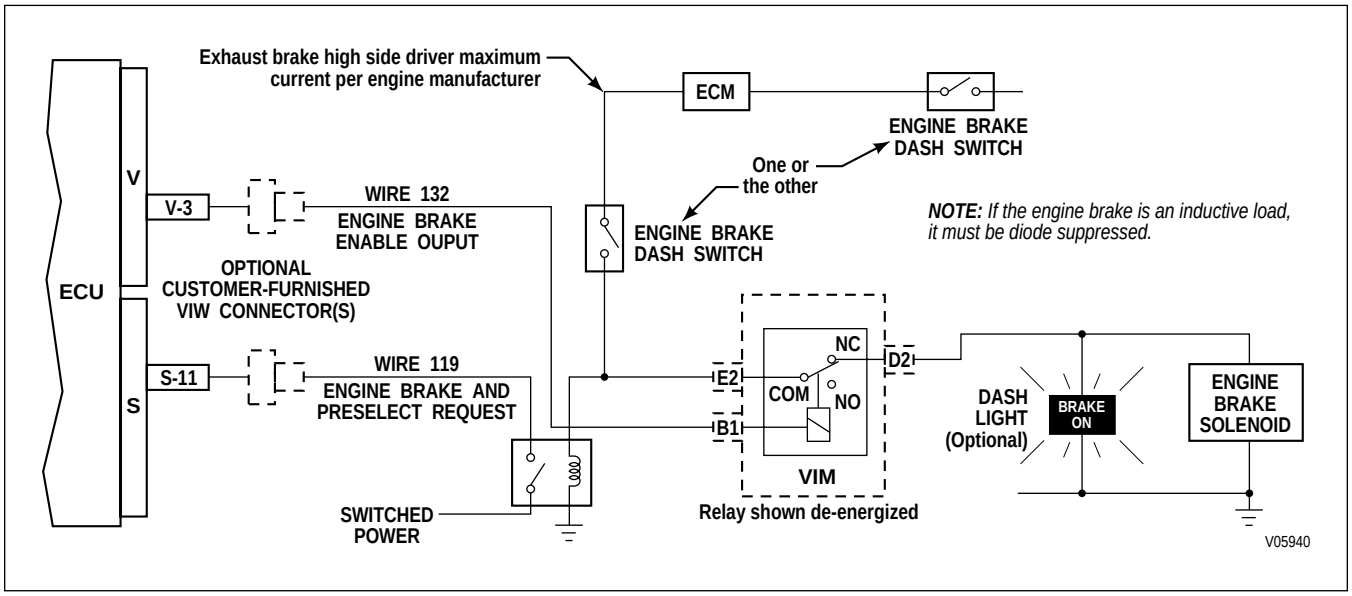

Figure P–11. Engine Brake/Preselect Request and Engine Brake Enable (Exhaust Brake — Optional)

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H. ENGINE BRAKE/PRESELECT REQUEST AND ENGINE BRAKE ENABLE (COMPRESSION BRAKE)

USES: Used with single-level compression brakes to signal the ECU that the brake is active and to provide increased braking by preselecting a lower range. Also prevents engagement of engine brake with throttle > 0 or lockup OFF.

VARIABLES TO SPECIFY: Preselect range. Standard value is fourth range.

VOCATIONS: Various

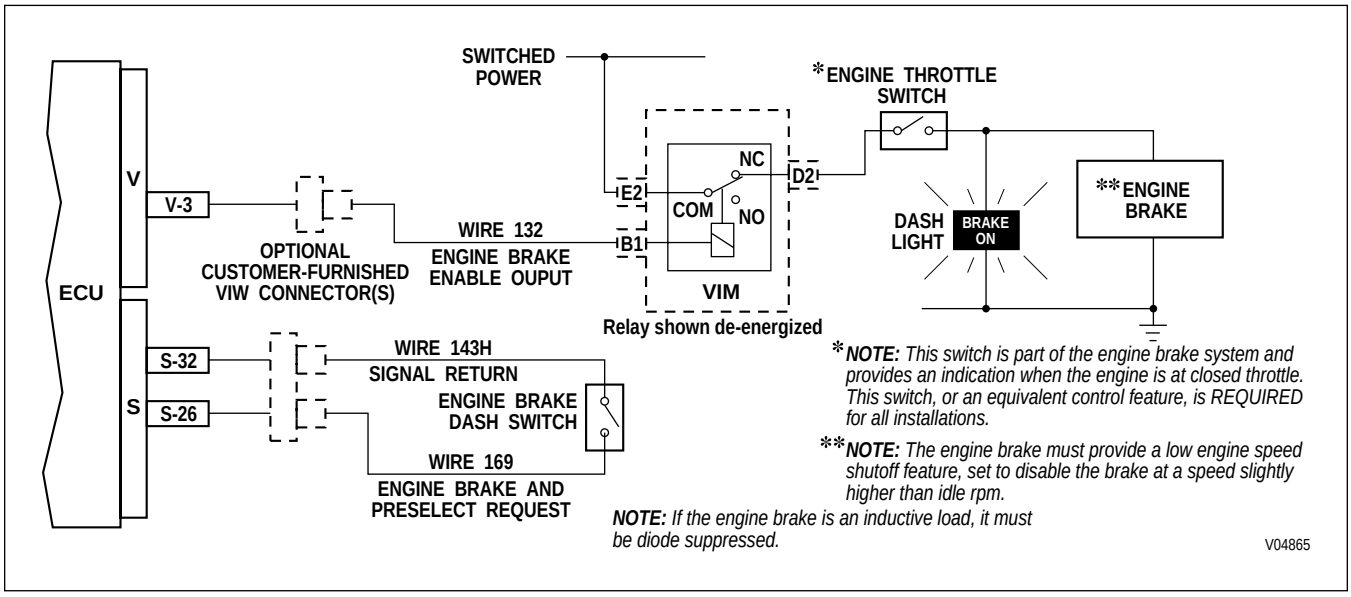

Figure P–12. Engine Brake/Preselect Request and Engine Brake Enable (Compression Brake)

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H. ENGINE BRAKE AND PRESELECT REQUEST AND ENGINE BRAKE ENABLE (MULTIPLE LEVEL COMPRESSION BRAKE)

USES: Used with multiple-level compression brakes to signal the ECU that the brake is active and to provide increased braking by preselecting a lower range. Also prevents engagement of engine brake with throttle > 0 or lockup OFF.

VARIABLES TO SPECIFY: Preselect range. Standard value is fourth range.

VOCATIONS: Various

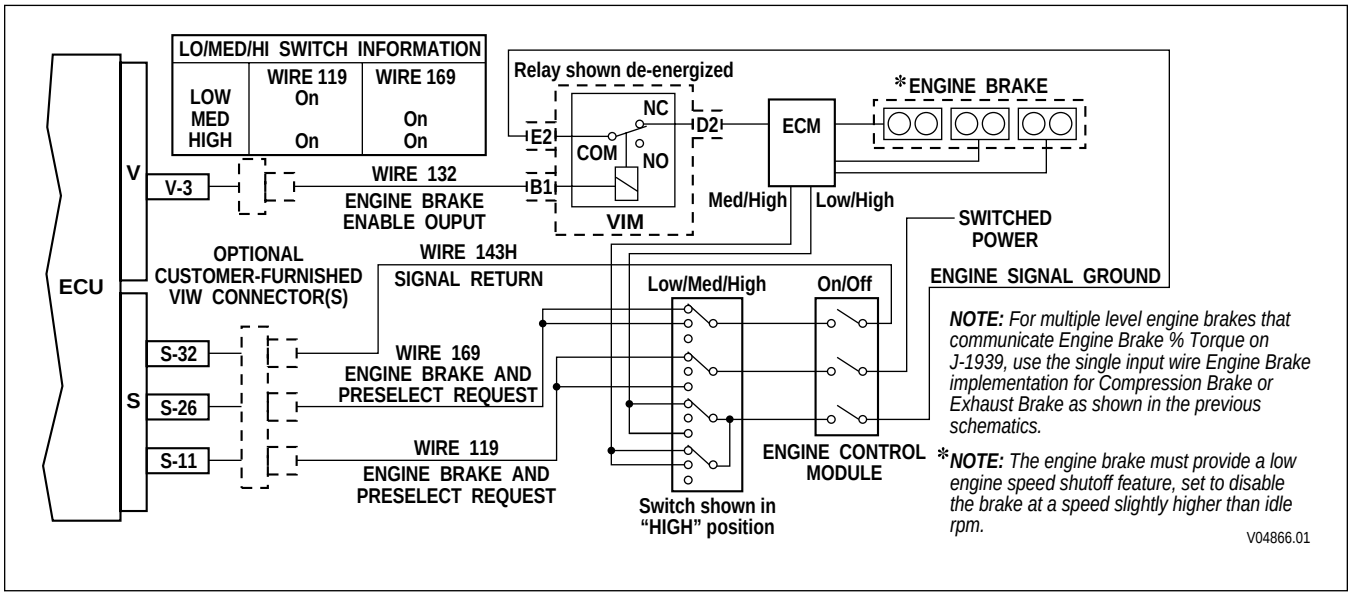

Figure P–13. Engine Brake and Preselect Request and Engine Brake Enable (Multiple Level Compression Brake)

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I. ENGINE BRAKE/PRESELECT REQUEST AND ENGINE BRAKE ENABLE (EXHAUST BRAKE — SPECIAL)

USES: Used with engine brakes to provide a signal to the ECU that the brake is active and to provide increased braking by preselecting a lower range. Also prevents engagement of engine brake with throttle > 0 or lockup OFF.

VARIABLES TO SPECIFY: Preselect range. Standard value is second range.

VOCATIONS: Various

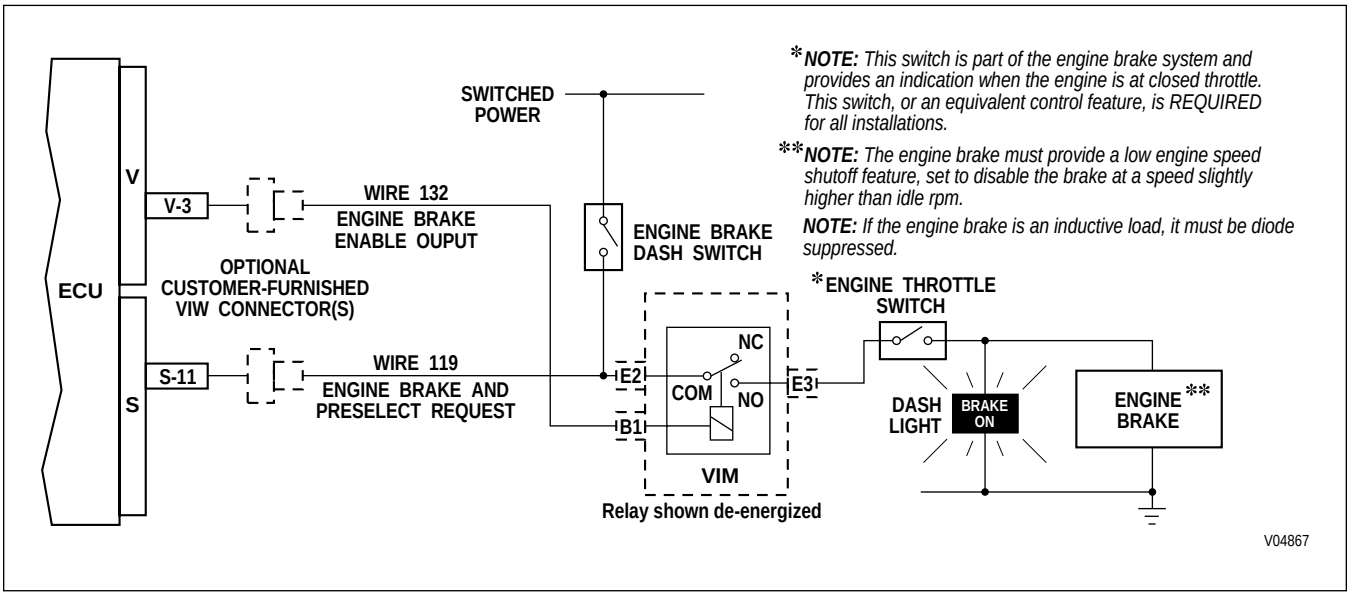

Figure P–14. Engine Brake/Preselect Request and Engine Brake Enable (Exhaust Brake — Special)

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I. ENGINE BRAKE/PRESELECT REQUEST AND ENGINE BRAKE ENABLE (COMPRESSION BRAKE — SPECIAL)

USES: Used with engine brakes to provide a signal to the ECU that the brake is active and to provide increased braking by preselecting a lower range. Also prevents engagement of engine brake with throttle > 0 or lockup off.

VARIABLES TO SPECIFY: Preselect range. Standard value is fourth range.

VOCATIONS: Various

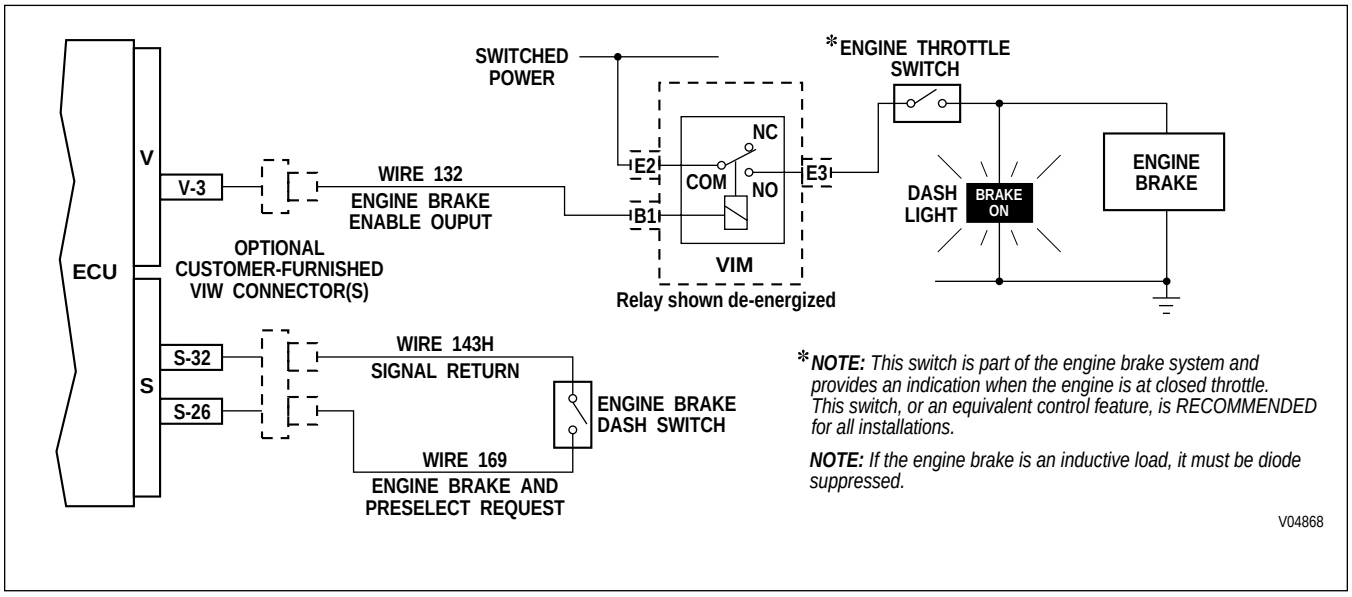

Figure P–15. Engine Brake/Preselect Request and Engine Brake Enable (Compression Brake — Special)

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APPENDIX P — INPUT/OUTPUT FUNCTIONS

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J. FIRE TRUCK PUMP MODE

USES: Facilitates engagement of split shaft PTO and shifts transmission to fourth range lockup.

VARIABLES TO SPECIFY: None

VOCATIONS: Fire Truck Pumpers

WARNING!

If this function is enabled in the shift calibration, the function MUST be integrated into the vehicle wiring. If the function is available in the shift calibration but will not be used in the vehicle, it MUST be disabled in the calibration.

SYSTEM OPERATION

OPERATOR ACTION — System Response

TO ENGAGE:

1. *SELECT NEUTRAL* — Transmission shifts to Neutral.
2. *APPLY PARKING BRAKE* — None
3. *SELECT PUMP* — Turns on "Pump Mode Requested" light. Stops output shaft rotation. When split-shaft engages, PPE signal and "Pump Engaged" light are turned on. Transmission output unlocks.
4. *SELECT DRIVE* — Transmission shifts to fourth lockup. "OK To Pump" light is turned on.

TO DISENGAGE:

1. *SELECT NEUTRAL* — Transmission shifts to Neutral if output rpm < 1000.
2. *SELECT ROAD MODE* — Stops output shaft rotation. PTO disengages. Transmission shifts back to Neutral. If the output shaft rotation continues, press the momentary transmission brake switch before selecting road mode. This will cause the transmission output shaft to stop if transmission is in neutral and shaft rotation is less than 100 rpm.

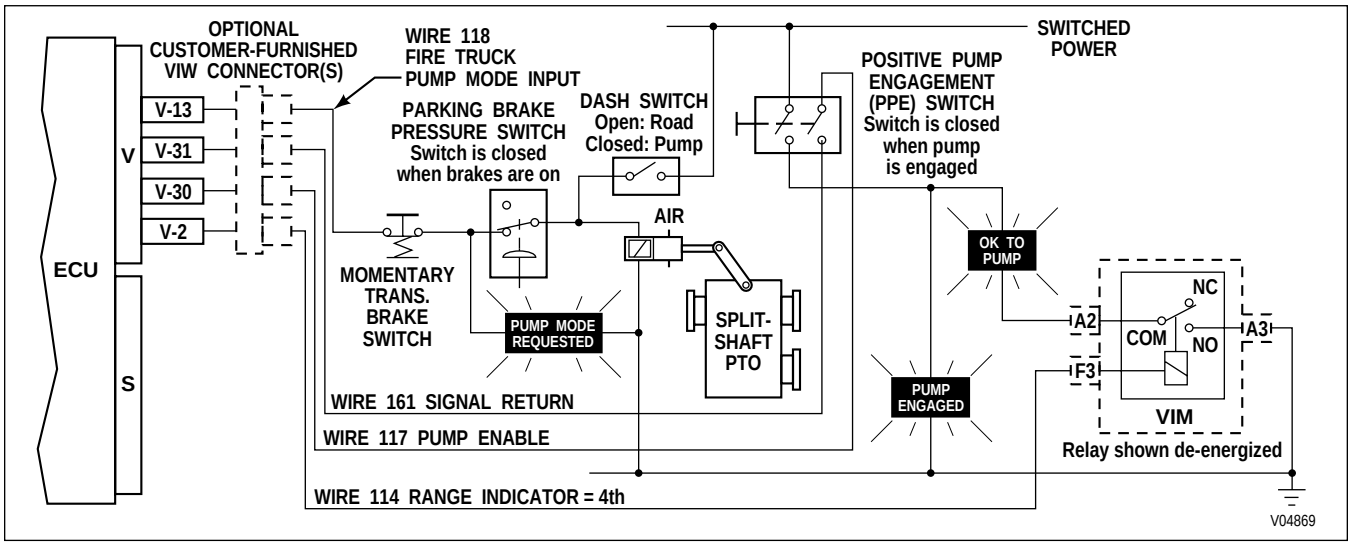

Figure P–16. Fire Truck Pump Mode

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J. FIRE TRUCK PUMP MODE (OPTIONAL)

USES: Facilitates engagement of split shaft PTO and shifts transmission to fourth range lockup.

VARIABLES TO SPECIFY: None

VOCATIONS: Fire Truck Pumpers

WARNING!

If this function is enabled in the shift calibration, the function MUST be integrated into the vehicle wiring. If the function is available in the shift calibration but will not be used in the vehicle, it MUST be disabled in the calibration.

SYSTEM OPERATION

OPERATOR ACTION — System Response

TO ENGAGE:

1. SELECT NEUTRAL — Transmission shifts to Neutral.
2. APPLY PARKING BRAKE — None
3. SELECT PUMP — Turns on “Pump Mode Requested” light. Turns on both input signals to ECU (wires 117 and 118) which activates “fire truck” mode. When split-shaft shifts, “Pump Engaged” light is turned on.
4. SELECT DRIVE — Transmission shifts to fourth lockup. “OK To Pump” light is turned on.

TO DISENGAGE:

1. SELECT NEUTRAL — Transmission shifts to Neutral if output rpm < 1000.
2. SELECT ROAD MODE — PTO disengages. If the output shaft rotation continues, press the momentary transmission brake switch before selecting road mode. This will cause the transmission output shaft to stop if transmission is in neutral and shaft rotation is less than 100 rpm.

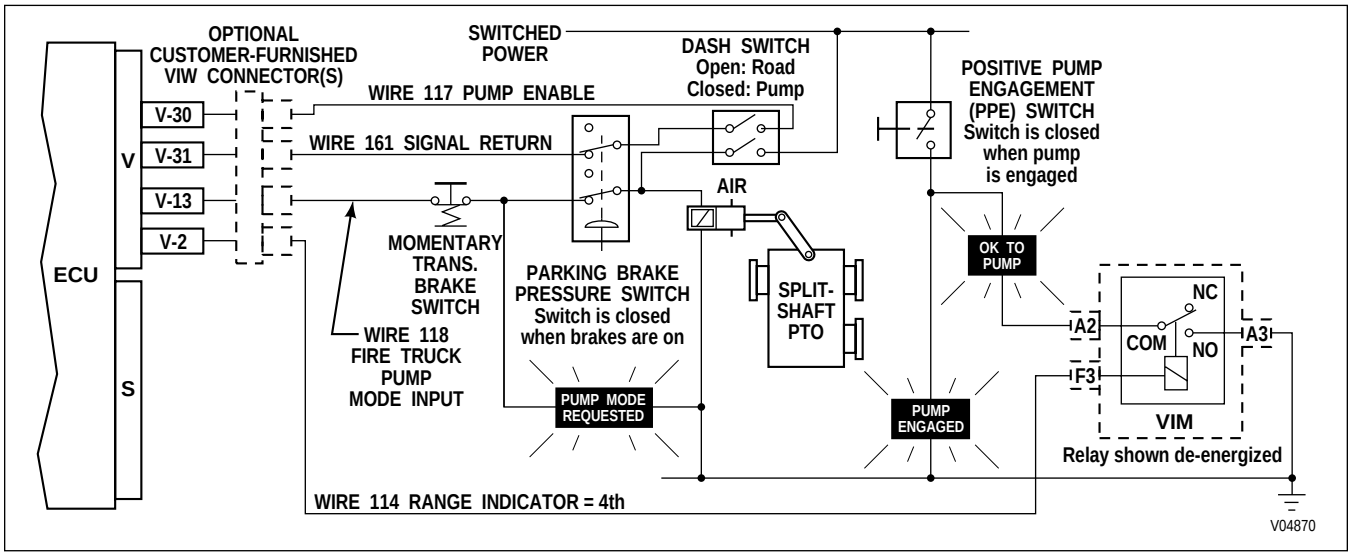

Figure P–17. Fire Truck Pump Mode (Optional)

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K. QUICK-TO-NEUTRAL PUMP

USES: Automatically shifts transmission to NEUTRAL when pumped medium approaches excessive pressure levels.

VARIABLES TO SPECIFY: None

VOCATIONS: Oil field pumping

WARNING!

If this function is enabled in the shift calibration, the function MUST be integrated into the vehicle wiring. If the function is available in the shift calibration but will not be used in the vehicle, it MUST be disabled in the calibration.

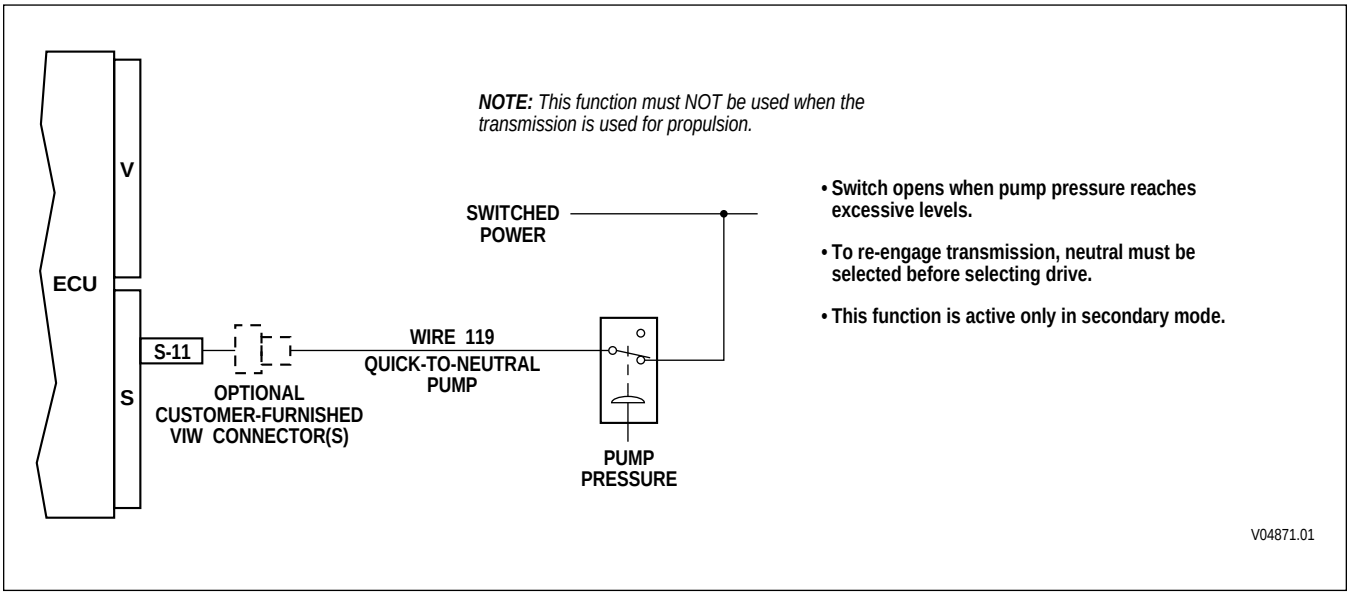

Figure P–18. Quick-To-Neutral Pump

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APPENDIX P — INPUT/OUTPUT FUNCTIONS

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L. AUTOMATIC NEUTRAL FOR PTO (STANDARD)

USES: Provides for automatic selection of NEUTRAL when PTO is operated regardless of range selected. Requires re-selecting range to shift out of NEUTRAL. Shown with range indicator output.

VARIABLES TO SPECIFY: Maximum output speed for activating this function. Range indicator = neutral.

VOCATIONS: Various (with usage of PTO)

WARNING!

If this function is enabled in the shift calibration, the function MUST be integrated into the vehicle wiring. If the function is available in the shift calibration but will not be used in the vehicle, it MUST be disabled in the calibration.

This function must not be used with Neutral Indicator For PTO (Output "S").

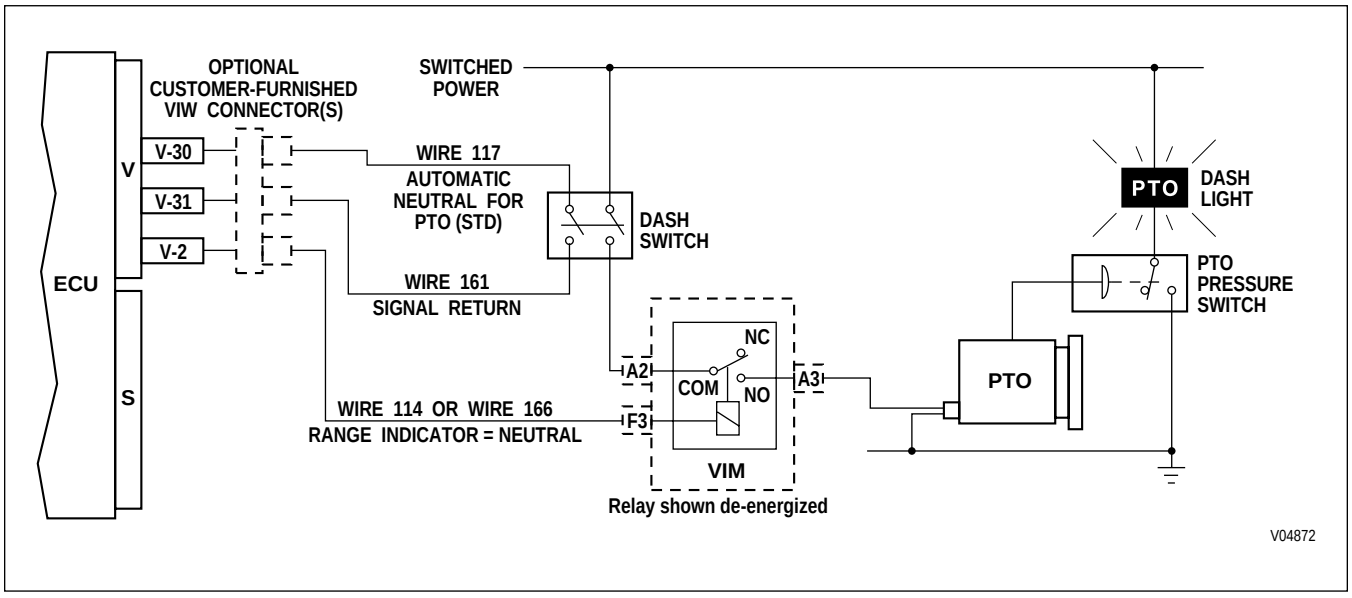

Figure P–19. Automatic Neutral for PTO (Standard)

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APPENDIX P — INPUT/OUTPUT FUNCTIONS

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Q. TWO SPEED AXLE INPUT AND OUTPUT

USES: Provides output speed interlock for axle engagement, input to ECU, and input to speedometer to adjust for axle ratio change.

VARIABLES TO SPECIFY: Output speed to activate, output speed to deactivate

VOCATIONS: Dump truck, refuse packer, cement mixer, two-speed axle equipped vehicles

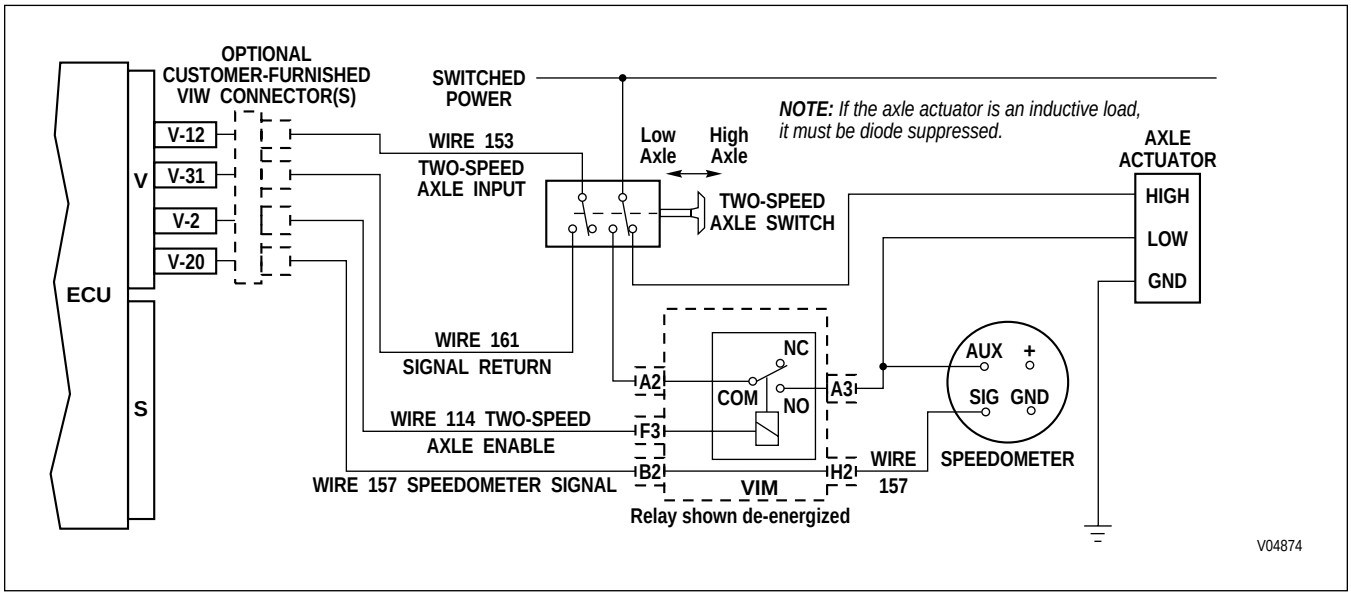

Figure P–20. Two Speed Axle Input and Output

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R. MANUAL LOCKUP

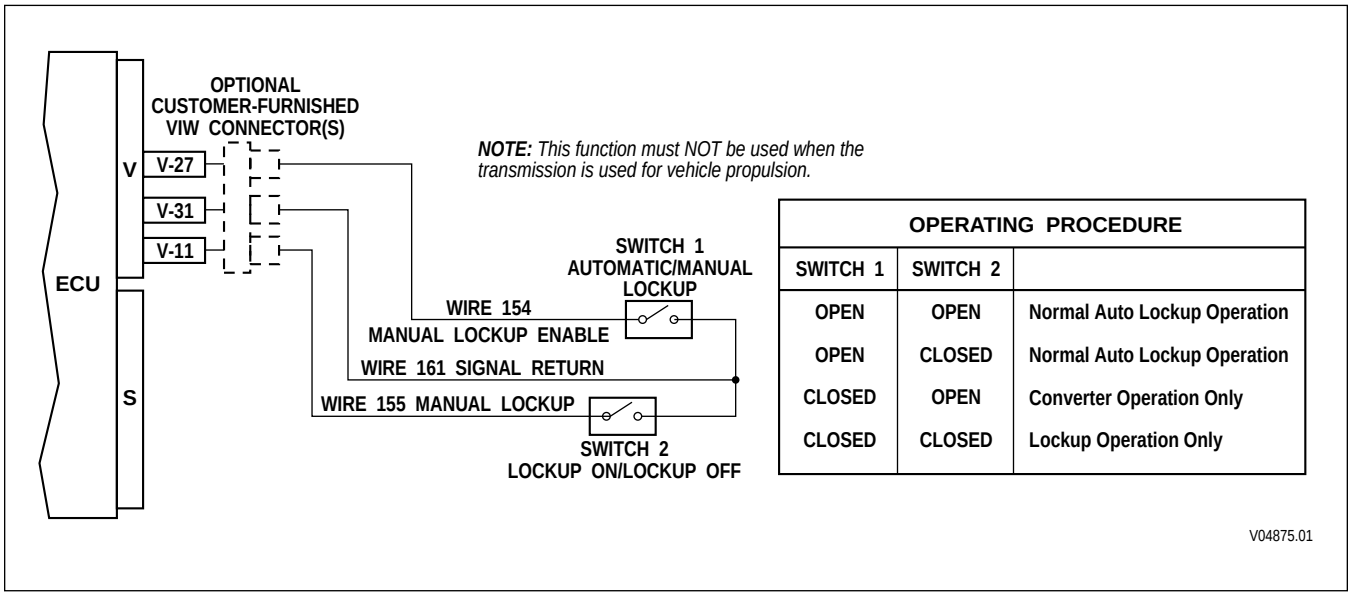
USES: Provides for the manual application of the lockup clutch for non-roading applications. Uses two inputs: one to select manual versus automatic lockup shift mode, and the second as the switching mechanism to command the lockup clutch on and off.

VARIABLES TO SPECIFY: None

VOCATIONS: Oil field pumping, mud pumps, hoists, drilling

WARNING!

If this function is enabled in the shift calibration, the function MUST be integrated into the vehicle wiring. If the function is available in the shift calibration but will not be used in the vehicle, it MUST be disabled in the calibration.



OPERATING PROCEDURE		
SWITCH 1	SWITCH 2	
OPEN	OPEN	Normal Auto Lockup Operation
OPEN	CLOSED	Normal Auto Lockup Operation
CLOSED	OPEN	Converter Operation Only
CLOSED	CLOSED	Lockup Operation Only

Figure P–21. Manual Lockup

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V. REVERSE ENABLE

USES: Provides for a separate instrument panel-mounted switch which must be pressed simultaneously with the REVERSE button to achieve Reverse.

VARIABLES TO SPECIFY: None

VOCATIONS: European transit buses and tour buses

WARNING!

If this function is enabled in the shift calibration, the function MUST be integrated into the vehicle wiring. If the function is available in the shift calibration but will not be used in the vehicle, it MUST be disabled in the calibration.

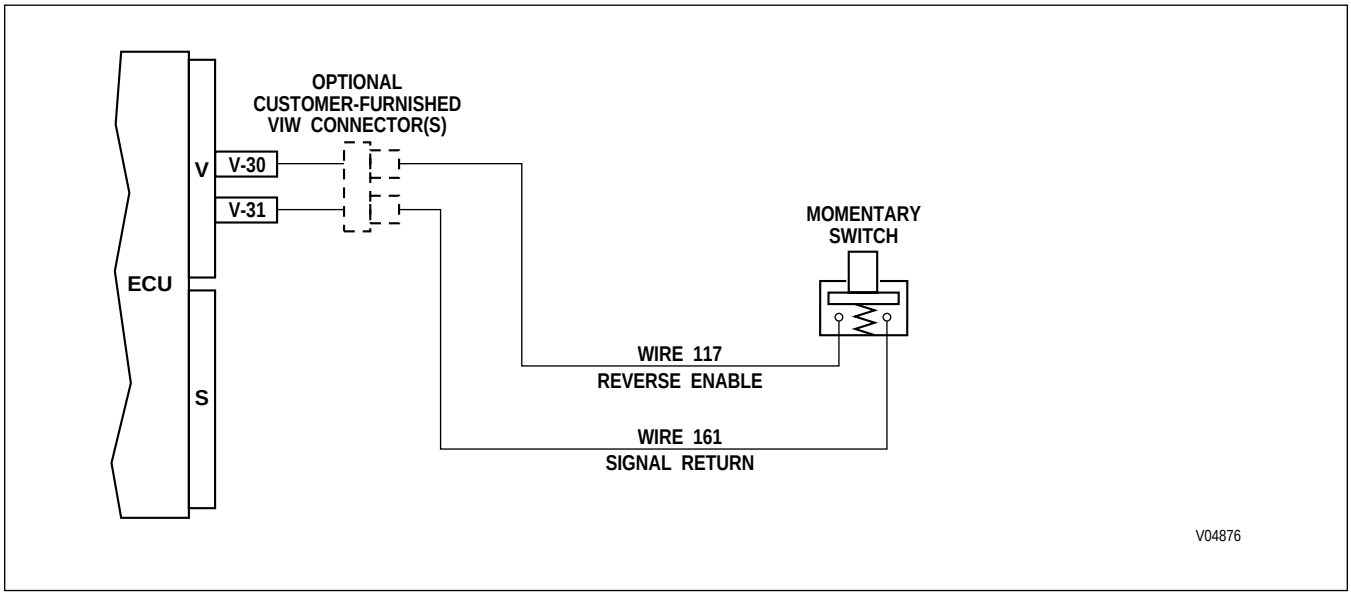

Figure P–22. Reverse Enable

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X. SHIFT IN PROCESS/SHIFT ENABLE

USES: Used to reduce engine power during a shift for high horsepower applications.

VARIABLES TO SPECIFY: None

VOCATIONS: Oil field pumping

WARNING!

If this function is enabled in the shift calibration, the function MUST be integrated into the vehicle wiring. If the function is available in the shift calibration but will not be used in the vehicle, it MUST be disabled in the calibration.

OPERATING PROCEDURE

1. ECU sends signal (“Shift in Process”) to powertrain module that a shift is being requested.
2. Powertrain module reduces engine power and sends a signal to ECU (“Shift Enable”) indicating that it is OK to shift.
3. ECU commands shift. When shift is completed, “Shift in Process” output turns off.
4. Powertrain module turns off the Shift Enable signal.

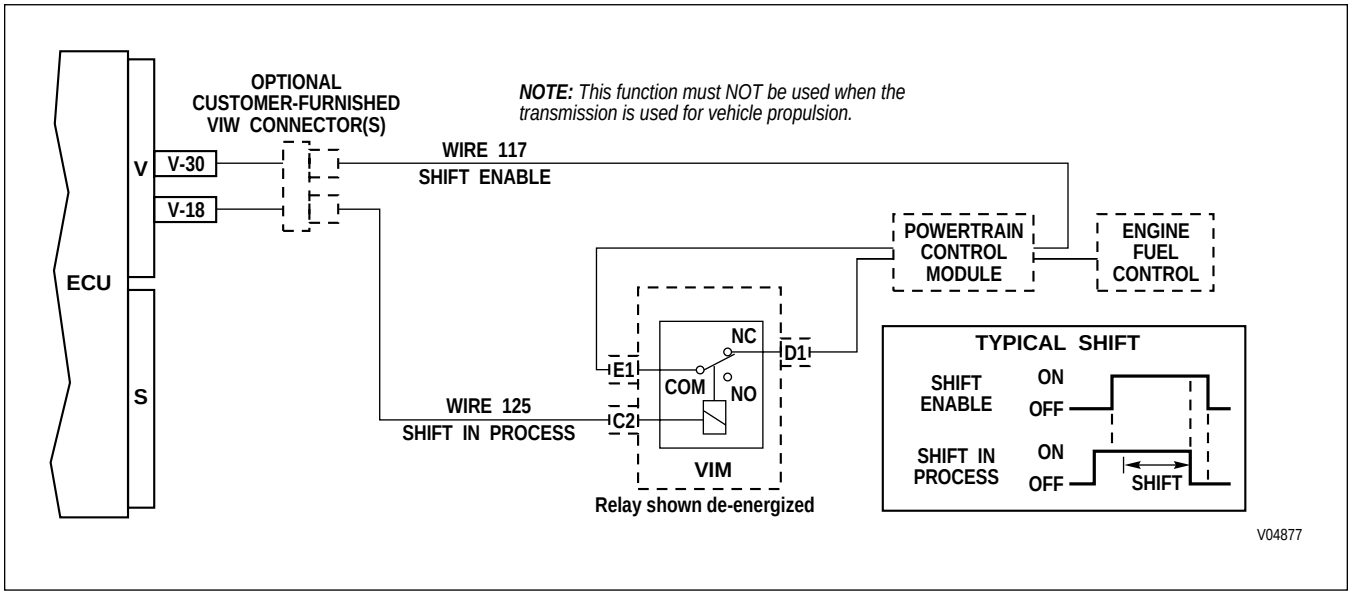

Figure P–23. Shift in Process/Shift Enable

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Y. ANTI-LOCK BRAKE RESPONSE

USES: Signals the ECU when ABS function is active, so that lockup clutch and retarder will be disabled.

VARIABLES TO SPECIFY: None

VOCATIONS: Various

For schematics of this function, see the **ANTI-LOCK BRAKES** section located in Section C: Vehicle Electrical System Interface of SA2978, WTEC III Controls And General Information.

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Y. ANTI-LOCK BRAKE RESPONSE (OPTIONAL)

USES: Provides for enhanced control of lockup and retarder during hard braking conditions. Can be used separately or in conjunction with ABS.

VARIABLES TO SPECIFY: None

VOCATIONS: Various

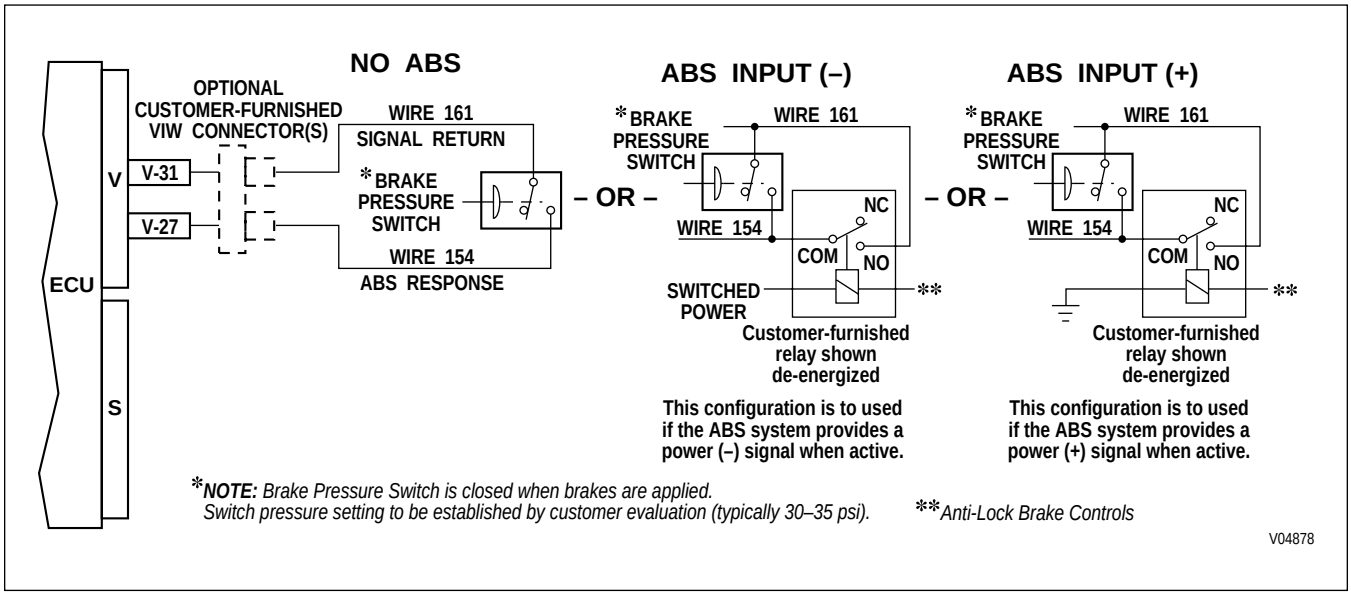

Figure P–24. Anti-Lock Brake Response (Optional)

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Z. RETARDER ENABLE

USES: Provides for operator ON/OFF control of the retarder, transmission temperature indication, and brake lights during retarder operation.

USES: None

VOCATIONS: Various. This function is required for retarder-equipped transmissions.

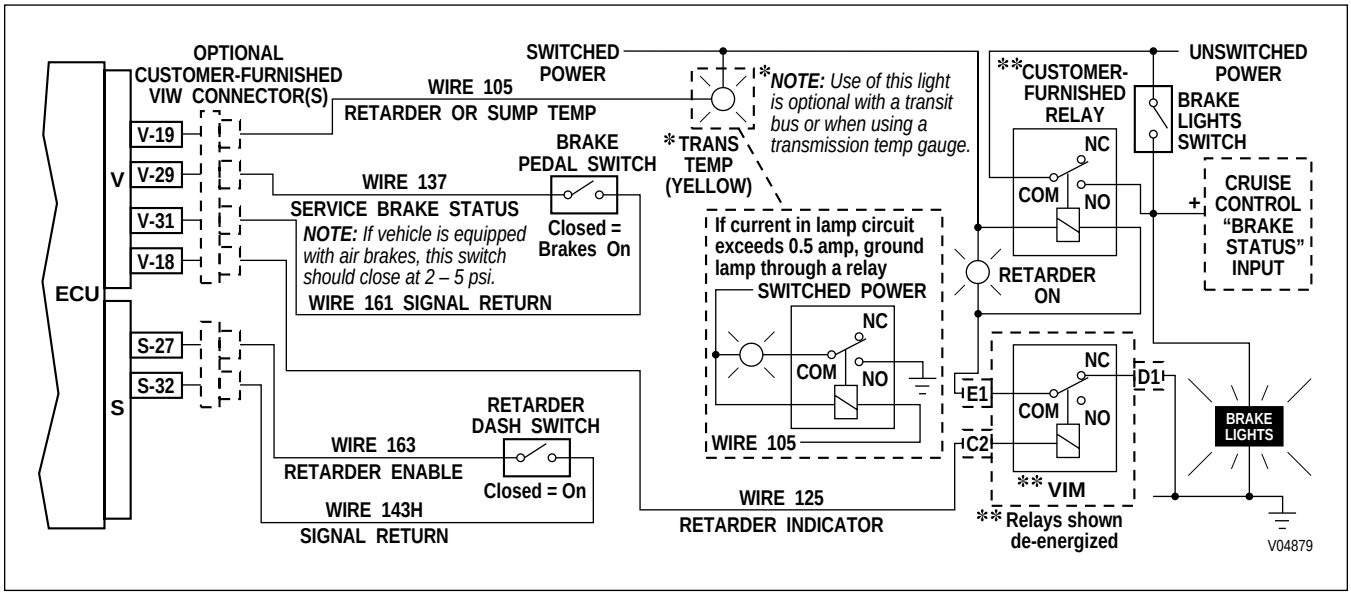

Figure P–25. Retarder Enable

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AA. SERVICE BRAKE STATUS

USES: Indicates to the ECU whether vehicle braking is being provided by the retarder or vehicle brakes, so that the transmission controls can be adapted accordingly.

VARIABLES TO SPECIFY: None

VOCATIONS: Various. This function is **required** for retarder-equipped transmissions.

This function is used in conjunction with Input Function , Retarder Enable. Refer to schematic for Input Function Retarder Enable, noting the use of wire 137.

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AF. DIFFERENTIAL CLUTCH REQUEST

USES: Provides for operator ON/OFF control of the differential locking clutch in the MD 3070PT transmission transfer case.

VARIABLES TO SPECIFY: None

VOCATIONS: Various. This function is **required** for all MD 3070PT transmissions and used only with that model.

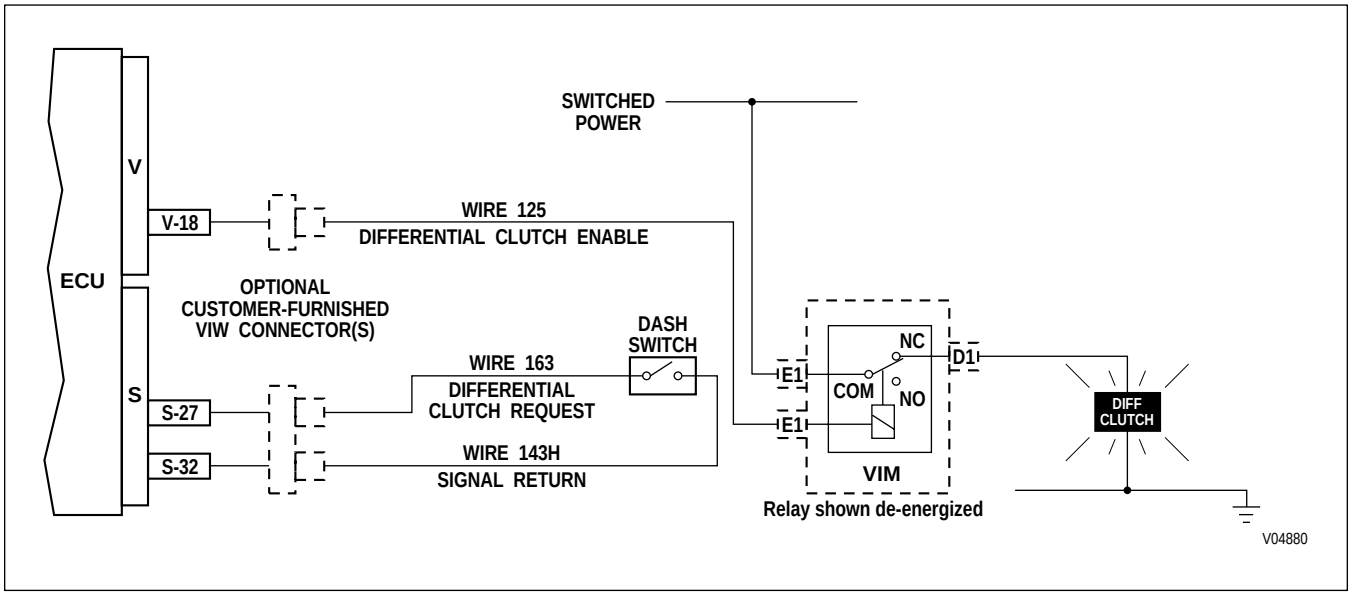

Figure P–26. Differential Clutch Request

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AG. AUTOMATIC NEUTRAL FOR REFUSE PACKER AND PTO ENABLE (OPTION 1)

USES: Provides for automatic selection of NEUTRAL and activation of fast idle when park brake is applied. Automatically re-engages transmission when park brake is released. PTO can be enabled independent of transmission range.

VARIABLES TO SPECIFY: Max output rpm to enable Neutral, max engine rpm for PTO engagement, max engine rpm for PTO operation, max output rpm for PTO engagement, max output rpm for PTO operation.

VOCATIONS: Refuse packer, recycling truck

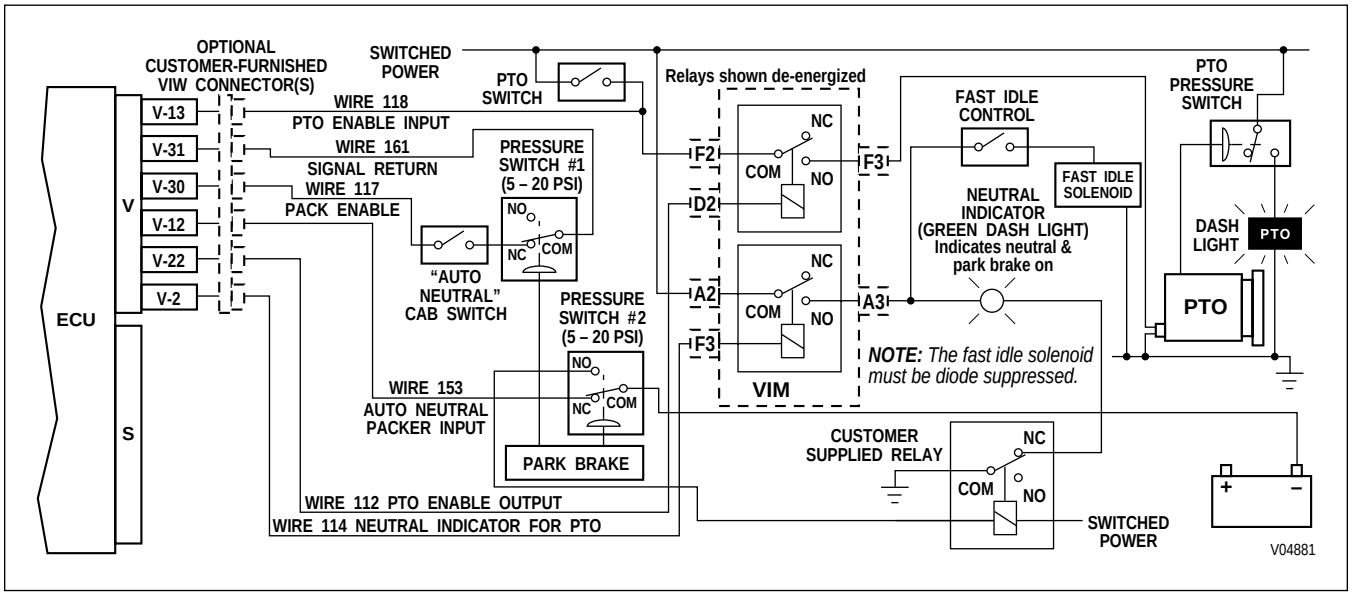

Figure P–27. Automatic Neutral for Refuse Packer and PTO Enable (Option 1)

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AG. AUTOMATIC NEUTRAL FOR REFUSE PACKER AND PTO ENABLE (OPTION 2)

USES: Provides for automatic selection of NEUTRAL and activation of fast idle when work brake is applied. Automatically re-engages transmission when park brake is released. PTO can be enabled independent of transmission range.

VARIABLES TO SPECIFY: Max output rpm to enable Neutral, max engine rpm for PTO engagement, max engine rpm for PTO operation, max output rpm for PTO engagement, max output rpm for PTO operation.

VOCATIONS: Refuse packer, recycling truck

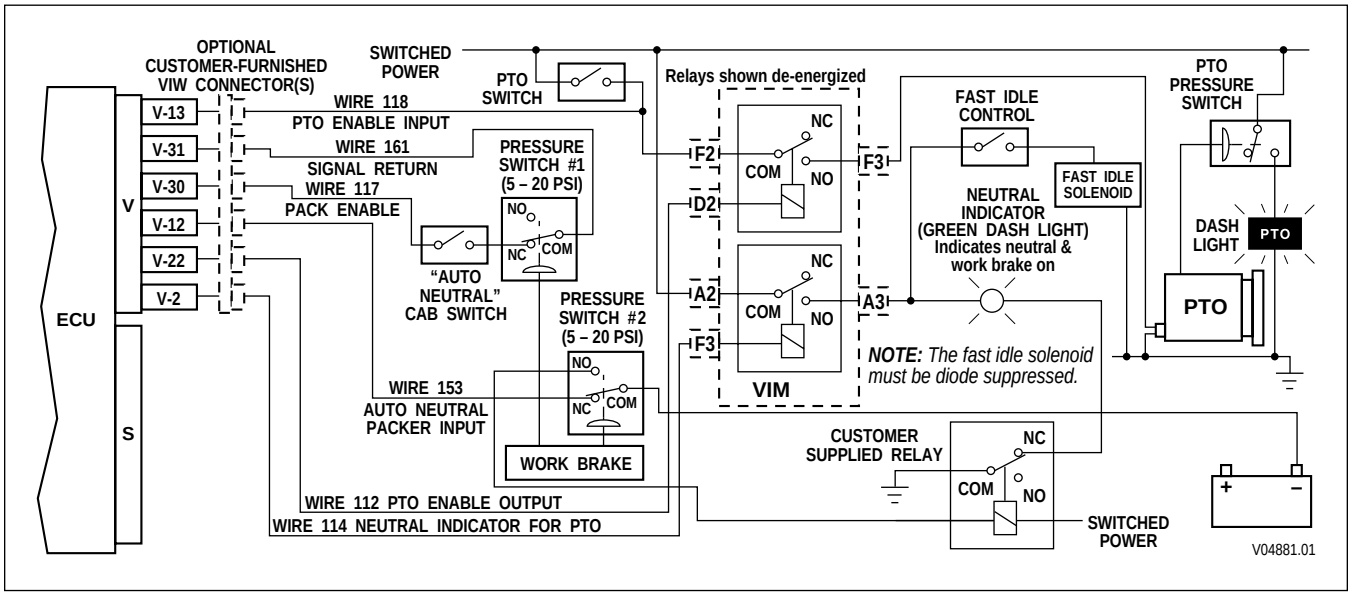

Figure P–28. Automatic Neutral for Refuse Packer and PTO Enable (Option 2)

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APPENDIX P — INPUT/OUTPUT FUNCTIONS

WARNING!

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AH. KICKDOWN

USES: Provides both economy and performance shift points at full throttle. Operator changes from economy to performance by stepping through a detent at the throttle pedal.

VARIABLES TO SPECIFY: None

VOCATIONS: Various

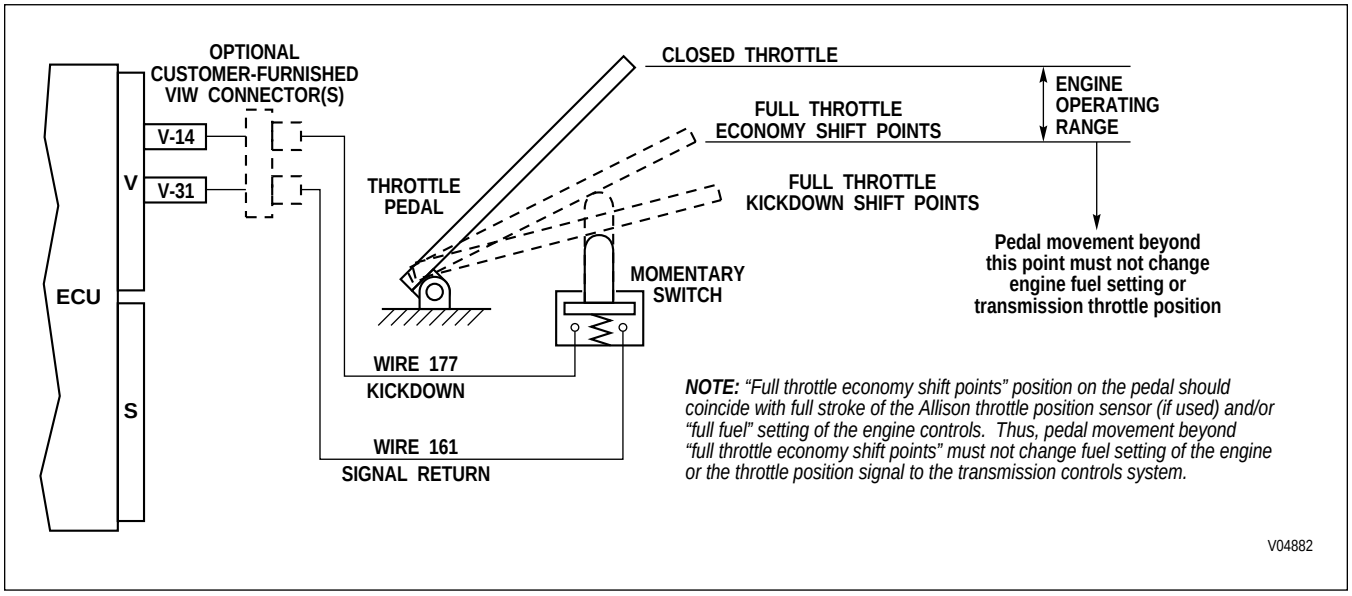

Figure P–29. Kickdown

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APPENDIX P — INPUT/OUTPUT FUNCTIONS

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AI. MILITARY AUXILIARY FUNCTION RANGE INHIBIT (STANDARD)

USES: Prevents inadvertent range selection when auxiliary equipment is operating.

VARIABLES TO SPECIFY: None

VOCATIONS: Military wheeled vehicles

WARNING!

If this function is turned "ON" in the shift calibration, the function MUST be integrated into the vehicle wiring. If the function is available in the shift calibration but will not be used in the vehicle, it MUST be turned "OFF" in the calibration.

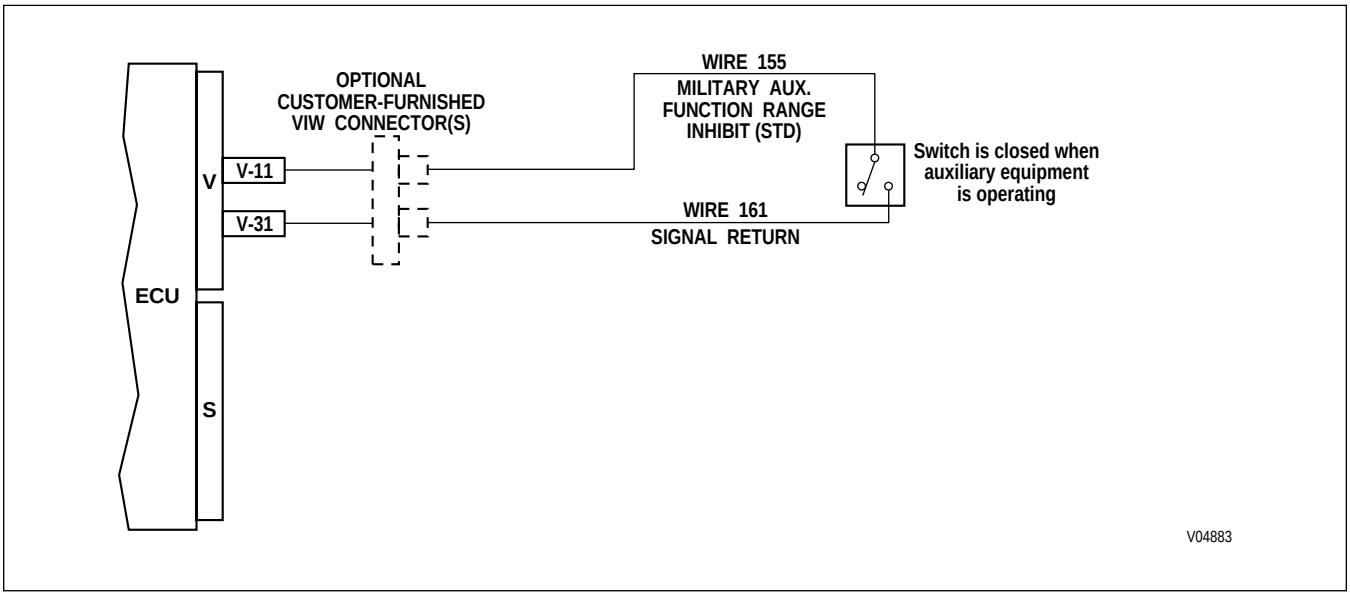

Figure P–30. Military Auxiliary Function Range Inhibit (Standard)

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APPENDIX P — INPUT/OUTPUT FUNCTIONS

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AJ. FOURTH LOCKUP PUMP MODE

USES: Facilitates engagement of split shaft PTO and shifts transmission to fourth range lockup for driving a vehicle-mounted pump.

VARIABLES TO SPECIFY: None

VOCATIONS: Street cleaners, sewer cleaners

WARNING!

If this function is turned "ON" in the shift calibration, the function MUST be integrated into the vehicle wiring. If the function is available in the shift calibration but will not be used in the vehicle, it MUST be turned "OFF" in the calibration.

SYSTEM OPERATION

OPERATOR ACTION — System Response

TO ENGAGE:

1. *SELECT NEUTRAL* — Transmission shifts to Neutral.
2. *APPLY PARKING BRAKE* — None
3. *SELECT PUMP* — Turns on "Pump Mode Requested" light. Turns on both input signals to ECU (wires 117 and 118) which activates "pump" mode. When split-shaft shifts, "Pump Engaged" light is turned on.
4. *SELECT DRIVE* — Transmission shifts to fourth lockup. "OK To Pump" light is turned on.

TO DISENGAGE:

1. *SELECT NEUTRAL* — Transmission shifts to Neutral if output rpm < 1000.
2. *SELECT ROAD MODE* — PTO disengages.

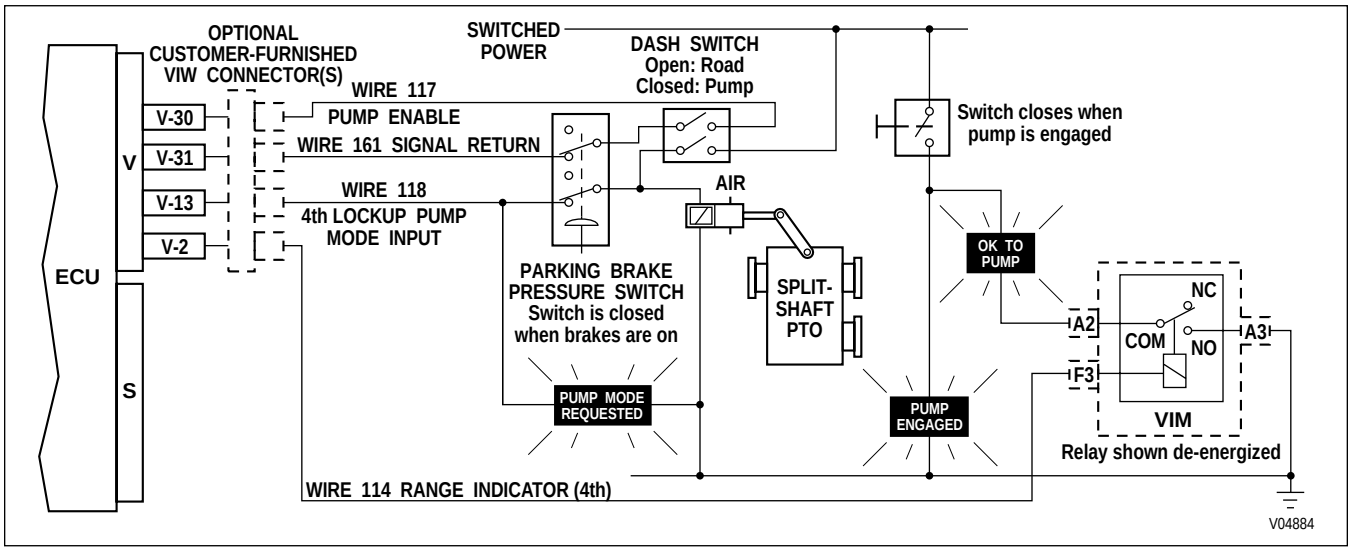

Figure P–31. Fourth Lockup Pump Mode

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APPENDIX P — INPUT/OUTPUT FUNCTIONS

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AK. AUTOMATIC NEUTRAL FOR REFUSE PACKER AND PTO ENABLE WITH SERVICE BRAKE STATUS (OPTION 1)

USES: Provides for automatic selection of NEUTRAL and activation of fast idle when loading arm is activated. Automatically re-engages transmission when loading arm is retracted if service brake is depressed.

VARIABLES TO SPECIFY: Max output rpm to enable Neutral, max engine rpm for PTO engagement, max engine rpm for PTO operation, max output rpm for PTO engagement, max output rpm for PTO operation.

VOCATIONS: Refuse packer, recycling truck

WARNING!

This feature is meant to be used in applications where the vehicle operator remains in the cab. If the operator leaves the vehicle, the park brake must be engaged and Neutral must be selected prior to the operator exiting the cab. In addition, vehicles using this feature must have the following Warning sticker visible in the vehicle cab: "WARNING: Set Park Brake and select Neutral before exiting cab!"

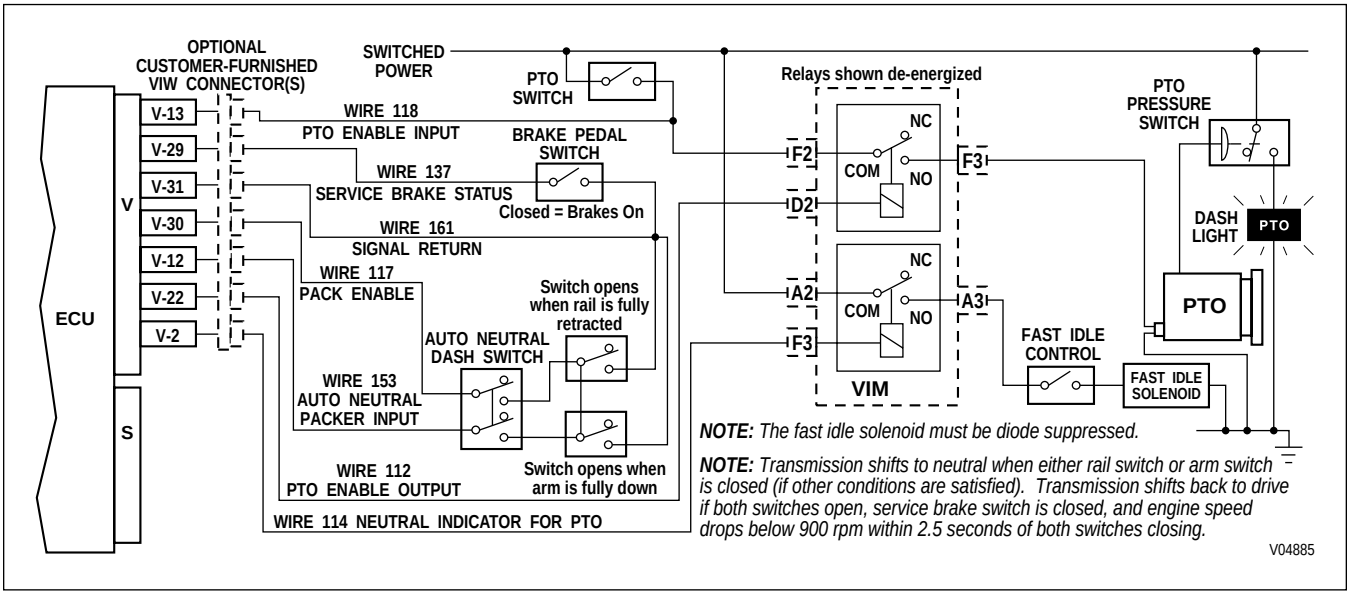

Figure P–32. Automatic Neutral for Refuse Packer and PTO Enable With Service Brake Status (Option 1)

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APPENDIX P — INPUT/OUTPUT FUNCTIONS

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AK. AUTOMATIC NEUTRAL FOR REFUSE PACKER AND PTO ENABLE WITH SERVICE BRAKE STATUS (OPTION 2)

USES: Provides for selection of NEUTRAL and enabling fast idle through activation of a dash mounted switch. Automatically re-engages transmission when switch is opened if service brake is depressed. Only re-engagement of forward is allowed. Reverse is not re-engaged.

VARIABLES TO SPECIFY: Max output rpm to enable Neutral, max engine rpm for PTO engagement, max engine rpm for PTO operation, max output rpm for PTO engagement, max output rpm for PTO operation.

VOCATIONS: Refuse packer, recycling truck

WARNING!

This feature is meant to be used in applications where the vehicle operator remains in the cab. If the operator leaves the vehicle, the park brake must be engaged and Neutral must be selected prior to the operator exiting the cab. In addition, vehicles using this feature must have the following Warning sticker visible in the vehicle cab: "WARNING: Set Park Brake and select Neutral before exiting cab!"

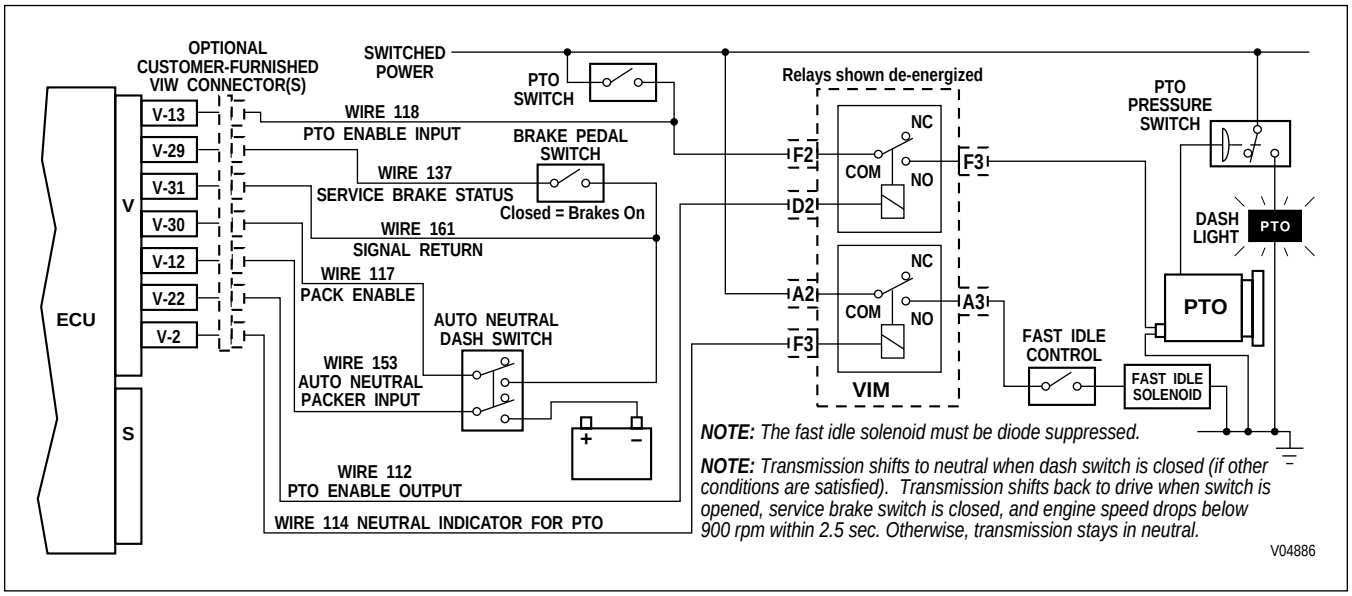

Figure P–33. Automatic Neutral for Refuse Packer and PTO Enable With Service Brake Status (Option 2)

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APPENDIX P — INPUT/OUTPUT FUNCTIONS

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AK. AUTOMATIC NEUTRAL FOR REFUSE PACKER AND PTO ENABLE WITH SERVICE BRAKE STATUS (OPTION 3)

USES: Provides for automatic selection of NEUTRAL and activation of PTO when park brake is applied. Automatically re-engages transmission when park brake is released (if service brake is depressed). Only re-engagement of forward is permitted. Reverse is not re-engaged.

VARIABLES TO SPECIFY: Max output rpm to enable Neutral, max engine rpm for PTO engagement, max engine rpm for PTO operation, max output rpm for PTO engagement, max output rpm for PTO operation.

VOCATIONS: Refuse packer, recycling truck, emergency equipment.

NOTE: This function is also available with emergency equipment calibration features.

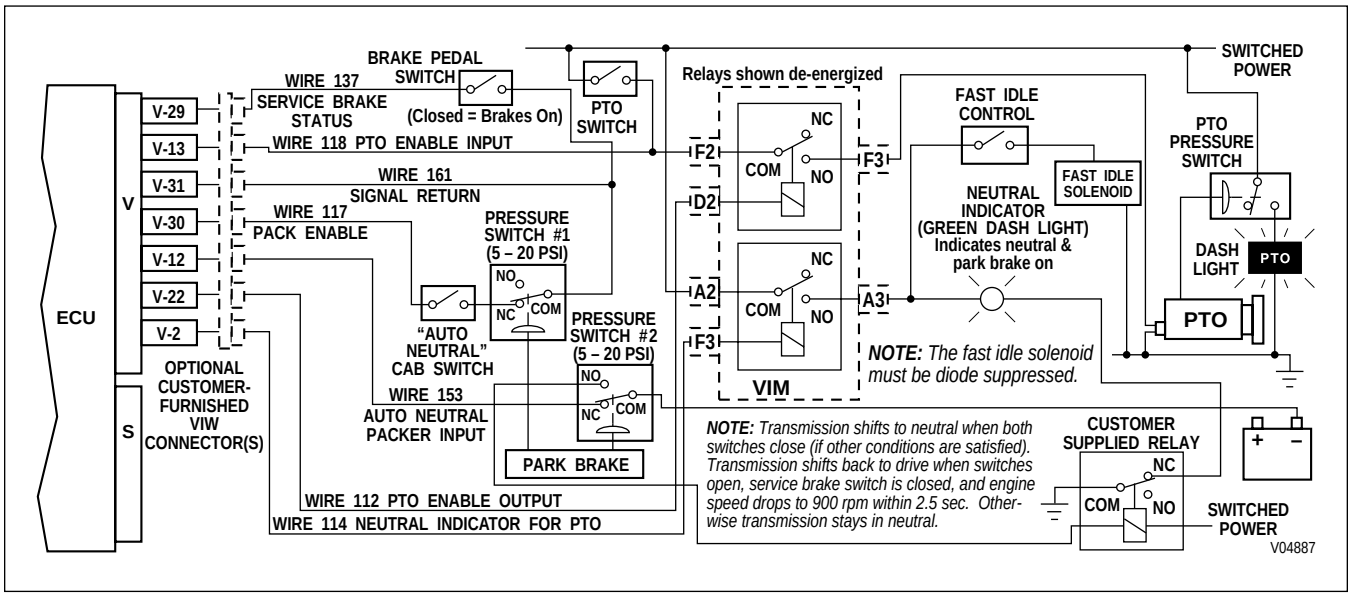

Figure P–34. Automatic Neutral for Refuse Packer and PTO Enable With Service Brake Status (Option 3)

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APPENDIX P — INPUT/OUTPUT FUNCTIONS

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AK. AUTOMATIC NEUTRAL FOR REFUSE PACKER AND PTO ENABLE WITH SERVICE BRAKE STATUS (OPTION 4)

USES: Provides for automatic selection of NEUTRAL and activation of PTO when work brake is applied. Automatically re-engages transmission when work brake is released (if service brake is depressed). Only re-engagement of forward is permitted. Reverse is not re-engaged.

VARIABLES TO SPECIFY: Max output rpm to enable Neutral, max engine rpm for PTO engagement, max engine rpm for PTO operation, max output rpm for PTO engagement, max output rpm for PTO operation.

VOCATIONS: Refuse packer, recycling truck

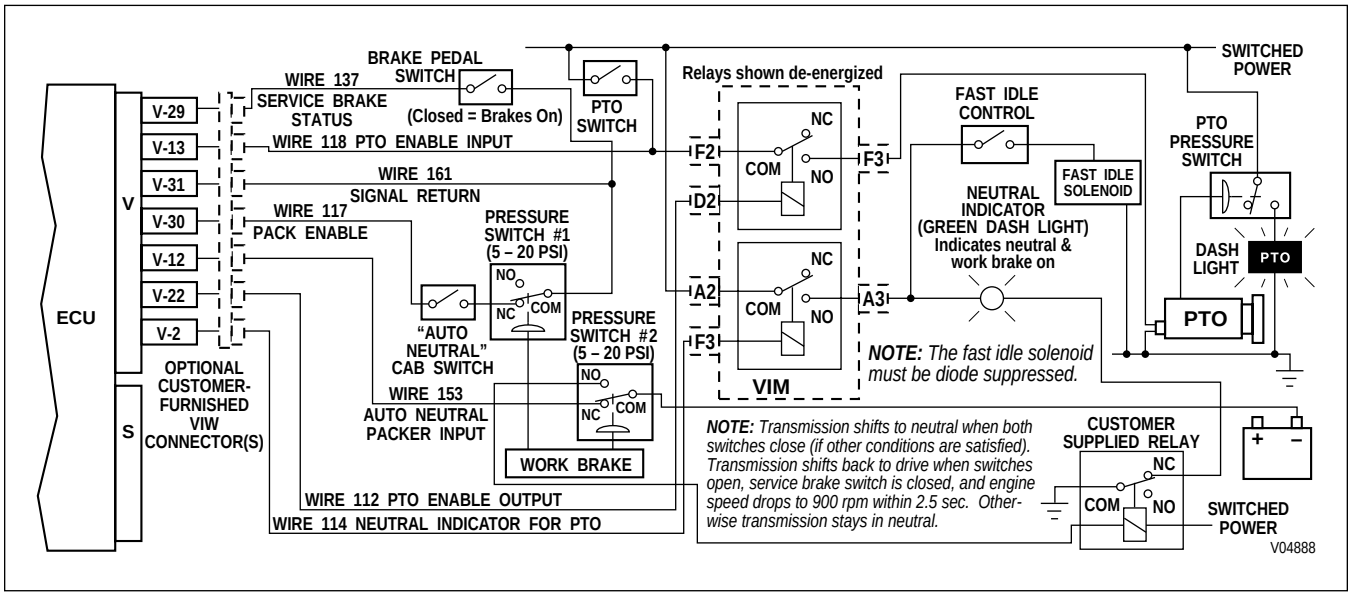

Figure P–35. Automatic Neutral for Refuse Packer and PTO Enable With Service Brake Status (Option 4)

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APPENDIX P — INPUT/OUTPUT FUNCTIONS

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AL. SHIFT SELECTOR TRANSITION AND SECONDARY SHIFT SCHEDULE

USES: Provides for operator selection of dual shift selectors and shift schedules. Primary mode will always be active when shift selector 1 is selected, and secondary mode will always be active when shift selector 2 is selected.

VARIABLES TO SPECIFY: None

VOCATIONS: Dual-station refuse vehicles, crane carrier

WARNING!

If this function is enabled in the shift calibration, the function MUST be integrated into the vehicle wiring. If the function is available in the shift calibration but will not be used in the vehicle, it MUST be disabled in the calibration.

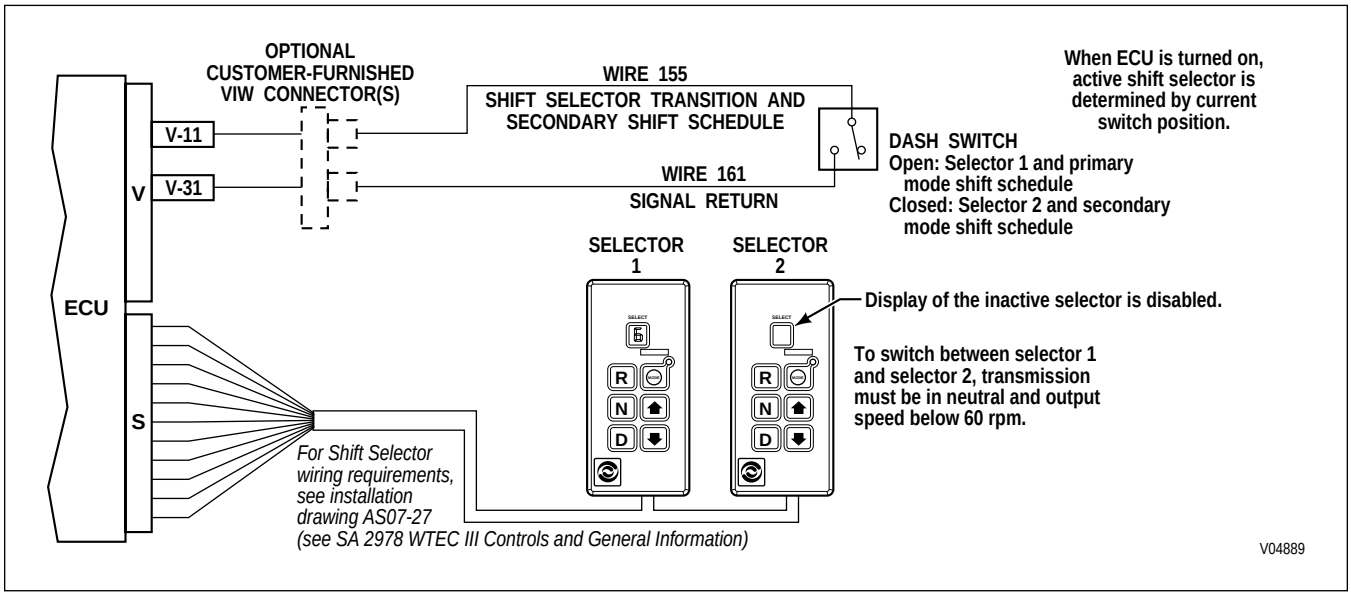

Figure P–36. Shift Selector Transition and Secondary Shift Schedule

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APPENDIX P — INPUT/OUTPUT FUNCTIONS

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AM. REFUSE PACKER STEP SWITCH

USES: Limit operation of transmission to first range and inhibit reverse with presence of personnel on rear of vehicle.

VARIABLES TO SPECIFY: None

VOCATIONS: Refuse

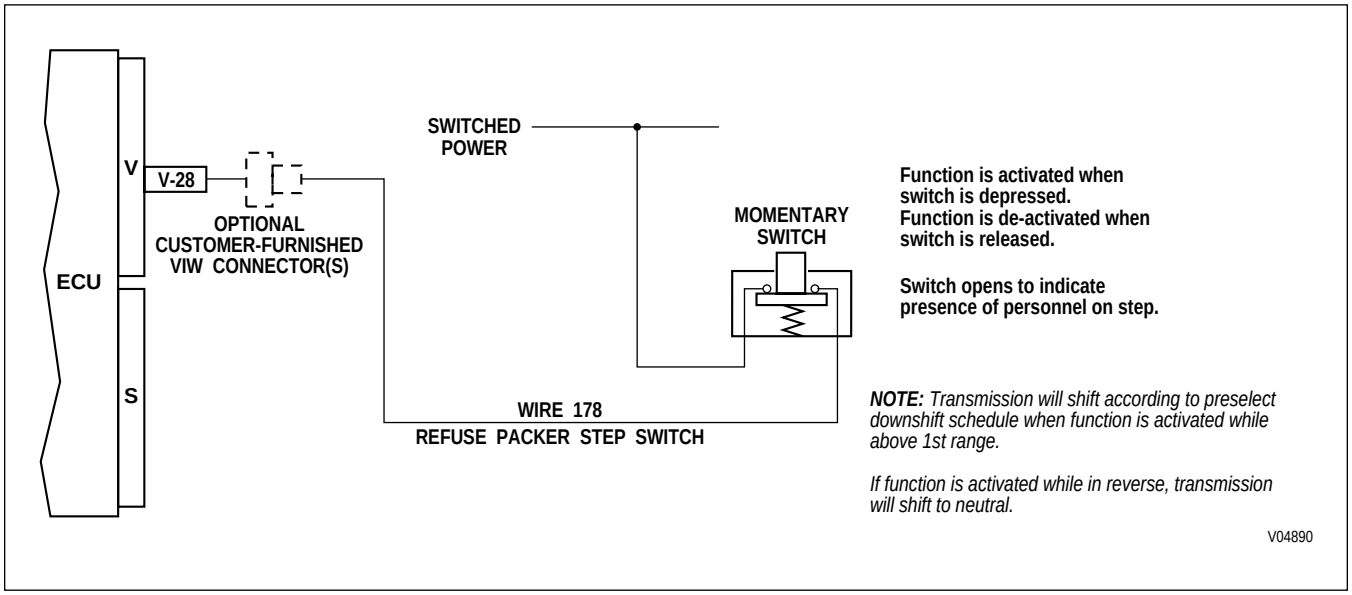

Figure P–37. Refuse Packer Step Switch

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APPENDIX P — INPUT/OUTPUT FUNCTIONS

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AQ. SELECTOR DISPLAY BLANKING

USES: Blanks the digital display and mode on indicator on the lever or pushbutton shift selectors.

VARIABLES TO SPECIFY: None

VOCATIONS: Military wheeled vehicles

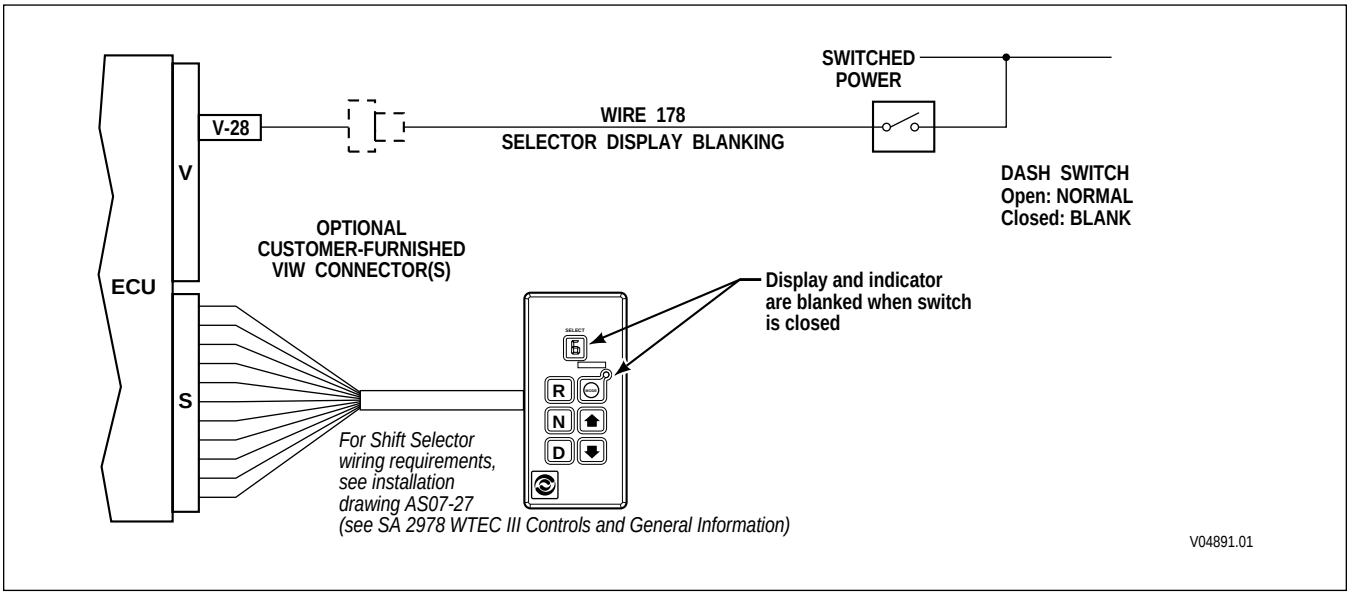

Figure P–38. Selector Display Blanking

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APPENDIX P — INPUT/OUTPUT FUNCTIONS

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B. SUMP/RETARDER TEMPERATURE INDICATOR

USES: Turn on dash indicator when transmission sump or retarder-out temperature has exceeded specified limits.

VARIABLES TO SPECIFY: None

VOCATIONS: Various

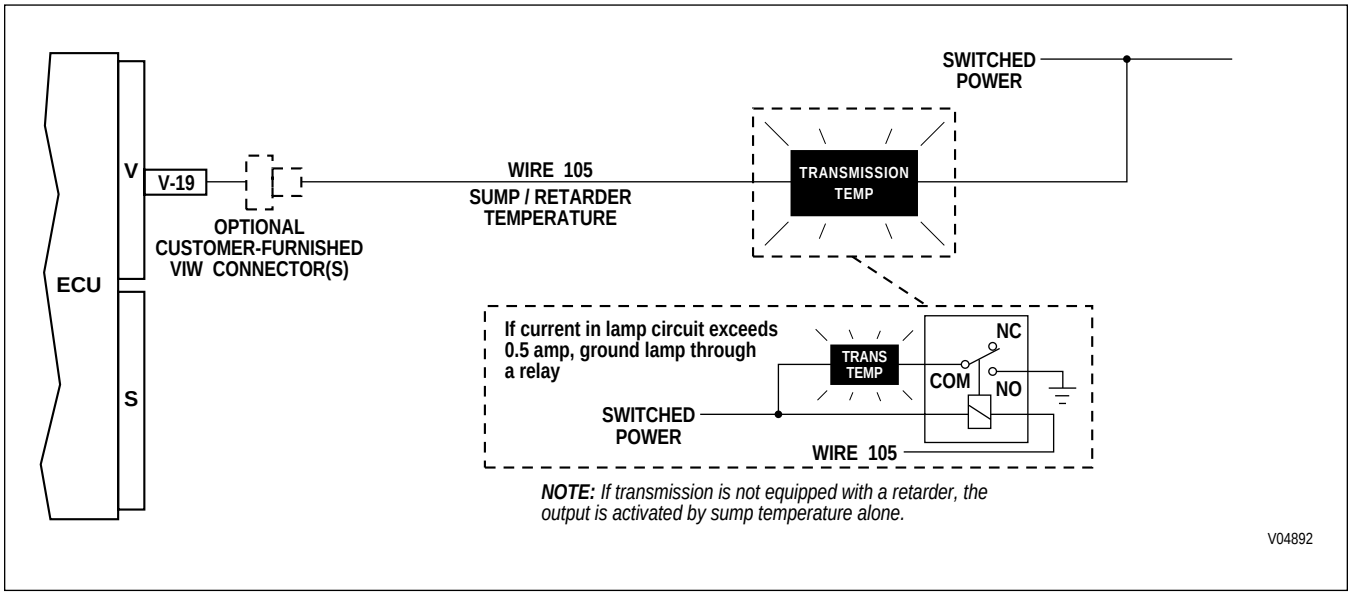

Figure P–39. Sump/Retarder Temperature Indicator

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APPENDIX P — INPUT/OUTPUT FUNCTIONS

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C. RANGE INDICATOR

USES: Used with auxiliary vehicle systems to permit operation only in specified transmission range(s).

VARIABLES TO SPECIFY: Range or ranges to be indicated

VOCATIONS: Various

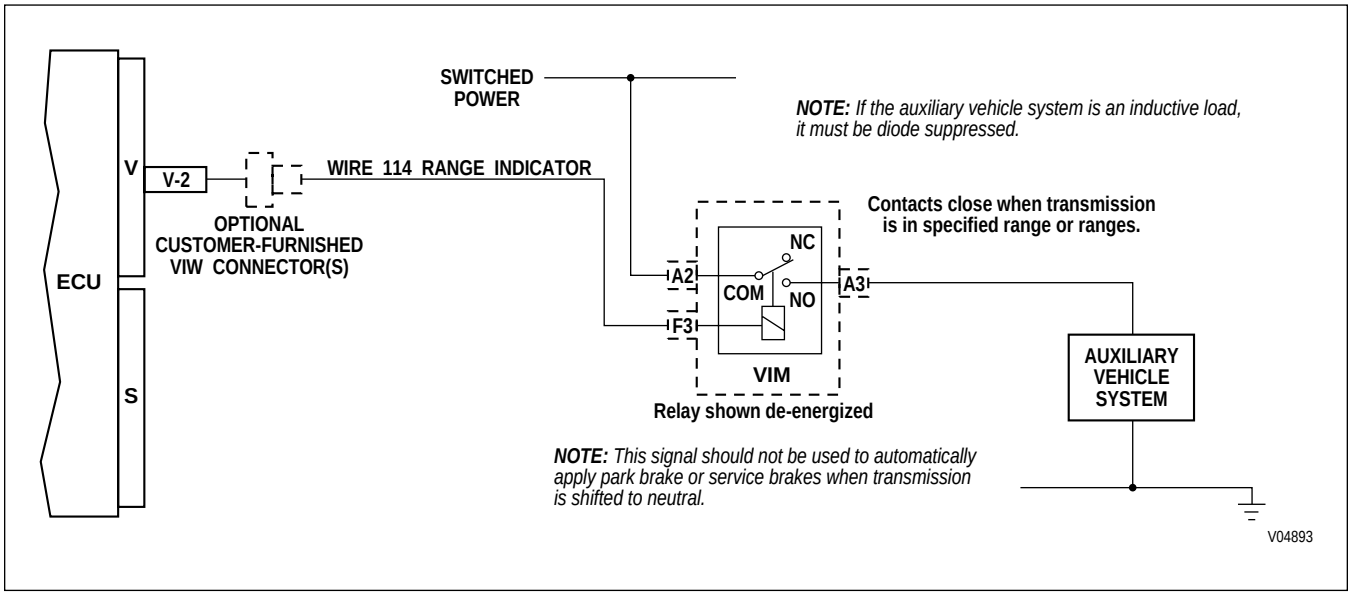

Figure P–40. Range Indicator

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APPENDIX P — INPUT/OUTPUT FUNCTIONS

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D. OUTPUT SPEED INDICATOR — A

USES: To signal that the transmission output shaft has exceeded a specified value.

VARIABLES TO SPECIFY: Rpm to turn output ON and to turn output OFF. The ON value must be higher than the OFF value.

VOCATIONS: Various

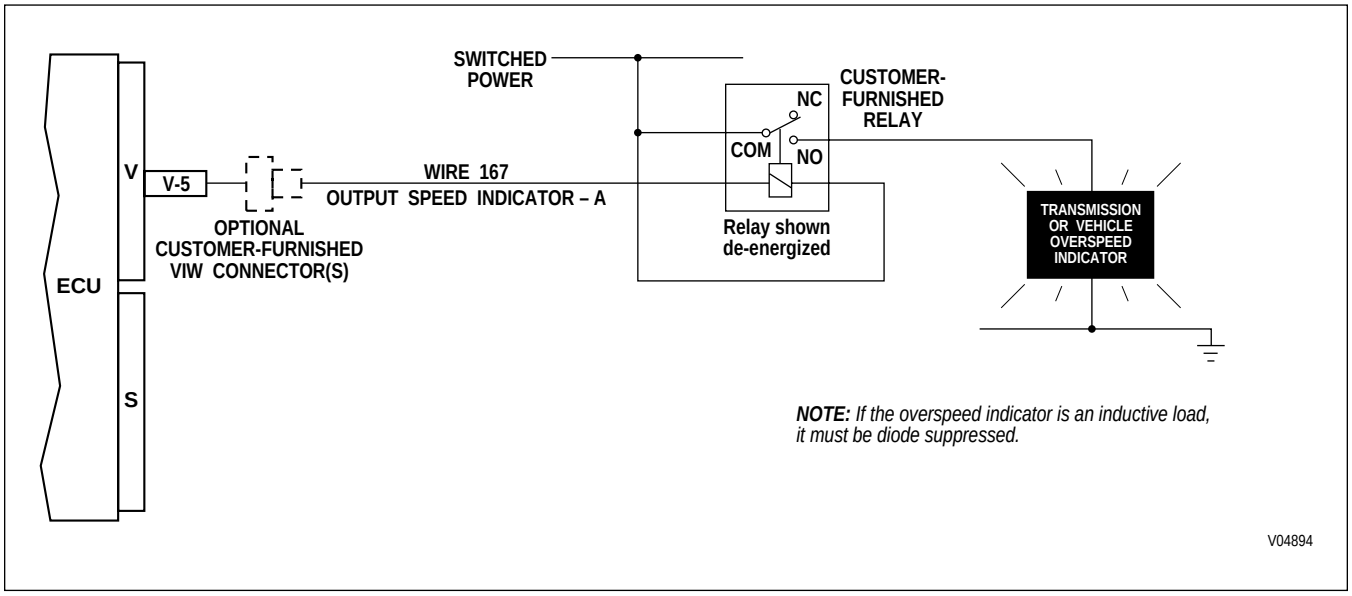

Figure P–41. Output Speed Indicator — A

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APPENDIX P — INPUT/OUTPUT FUNCTIONS

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E. OUTPUT SPEED INDICATOR — B

USES: To signal that the transmission output shaft has exceeded a specified value.

VARIABLES TO SPECIFY: Rpm to turn output ON and to turn output OFF. The ON value must be higher than the OFF value.

VOCATIONS: Various

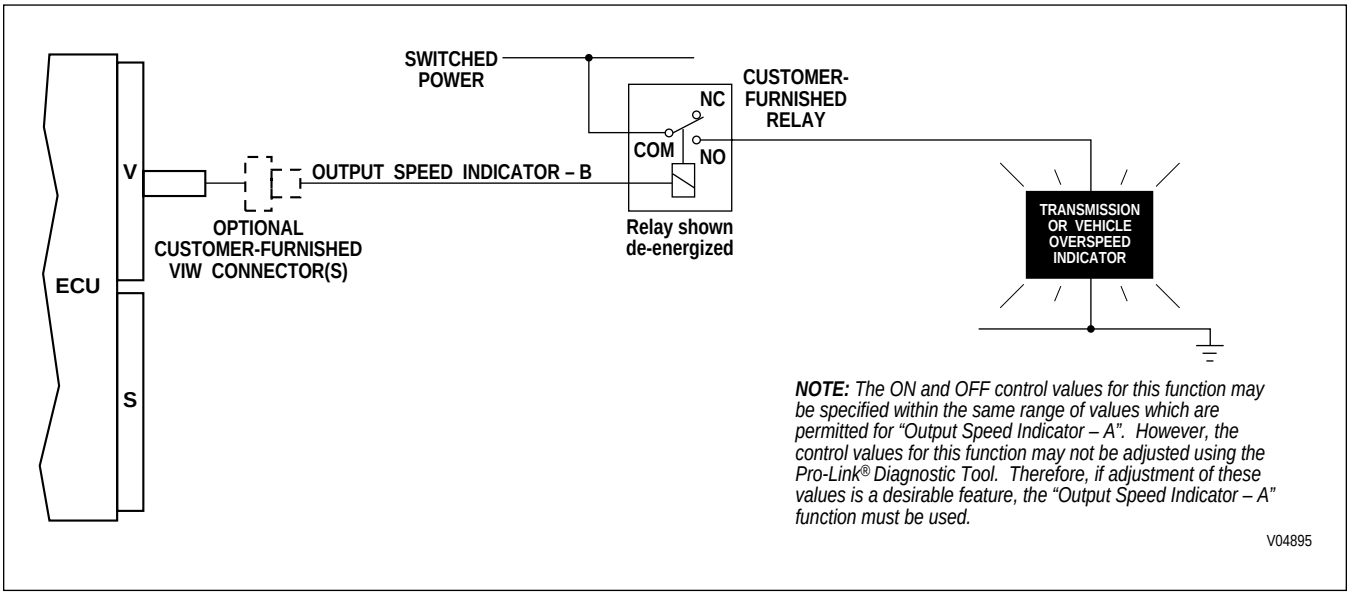

Figure P–42. Output Speed Indicator — B

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APPENDIX P — INPUT/OUTPUT FUNCTIONS

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F. PTO OVERSPEED INDICATOR

USES: Turn on dash light when PTO reaches an overspeed condition.

VARIABLES TO SPECIFY: Rpm to turn ON; rpm to turn OFF.

VOCATIONS: Various

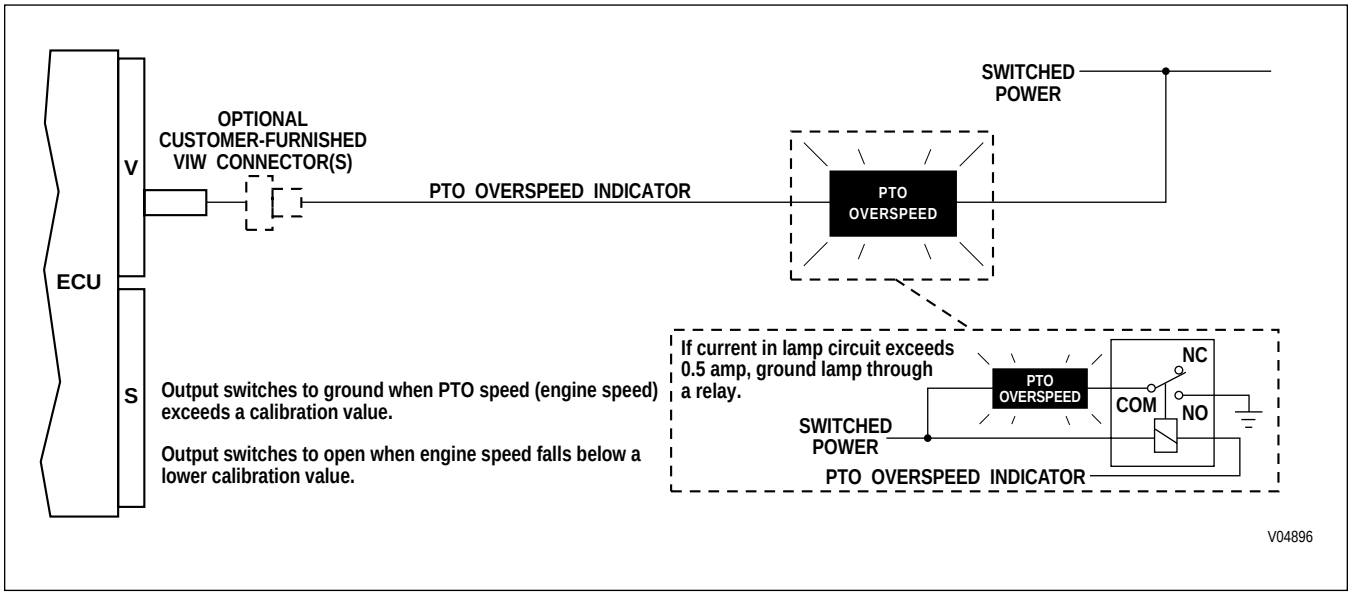

Figure P–43. PTO Overspeed Indicator

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APPENDIX P — INPUT/OUTPUT FUNCTIONS

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I. ENGINE OVERSPEED INDICATOR

USES: To turn on dash light when engine reaches an overspeed condition.

VARIABLES TO SPECIFY: Rpm to turn ON; rpm to turn OFF.

VOCATIONS: Various

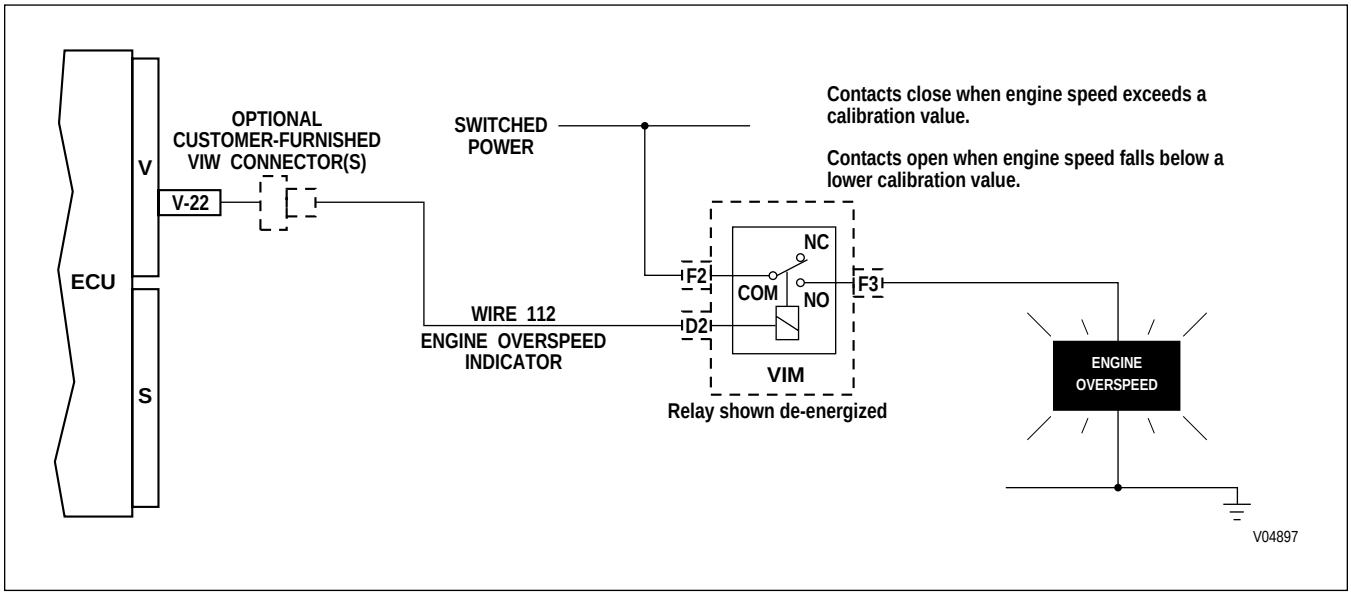

Figure P–44. Engine Overspeed Indicator

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APPENDIX P — INPUT/OUTPUT FUNCTIONS

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I. ENGINE OVERSPEED INDICATOR (OPTIONAL)

USES: To turn on dash light when engine reaches an overspeed condition.

VARIABLES TO SPECIFY: Rpm to turn ON; rpm to turn OFF.

VOCATIONS: Various

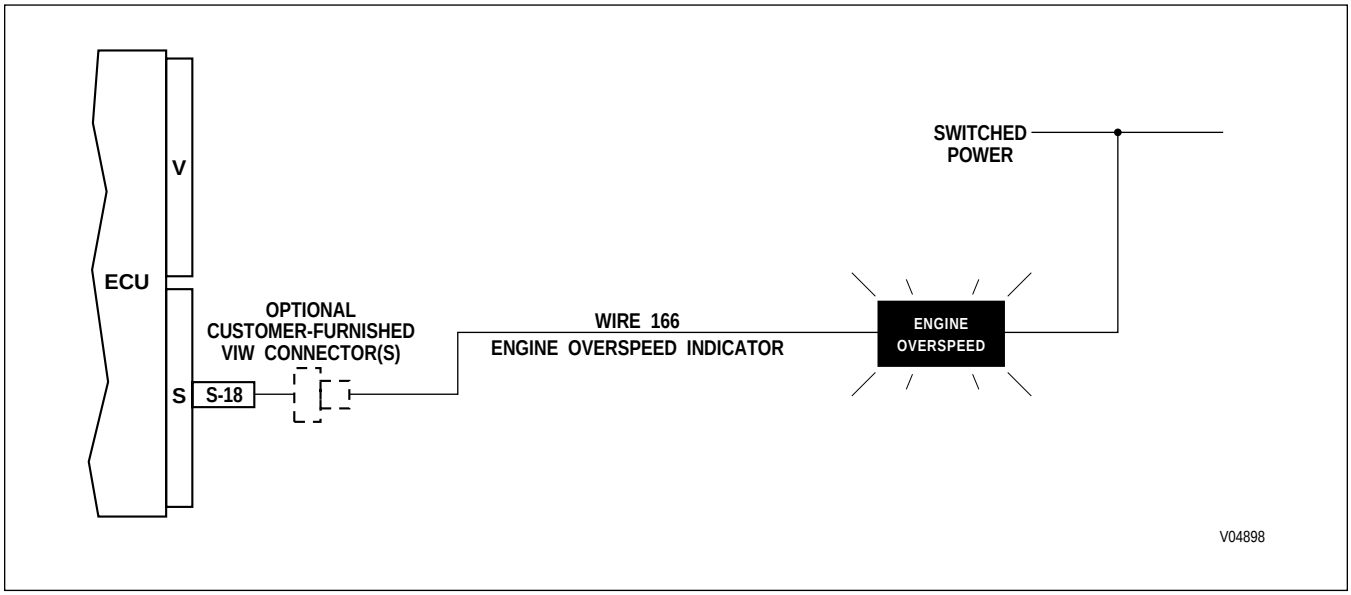

Figure P–45. Engine Overspeed Indicator (Optional)

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APPENDIX P — INPUT/OUTPUT FUNCTIONS

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K. LOCKUP INDICATOR

USES: Turn on dash indicator when transmission lockup clutch is engaged. Used to indicate when maximum engine braking is available.

VARIABLES TO SPECIFY: None

VOCATIONS: Various

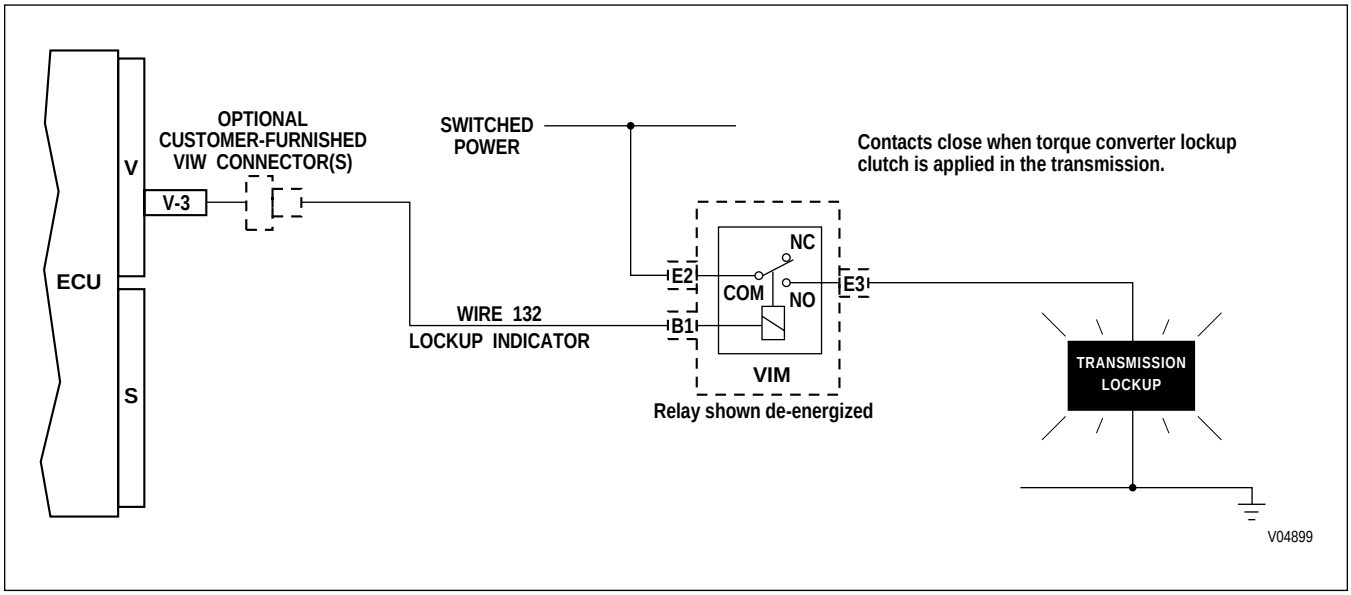

Figure P–46. Lockup Indicator

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N. SECONDARY MODE INDICATOR

USES: To indicate that Secondary Mode is active.

VARIABLES TO SPECIFY: None

VOCATIONS: Various

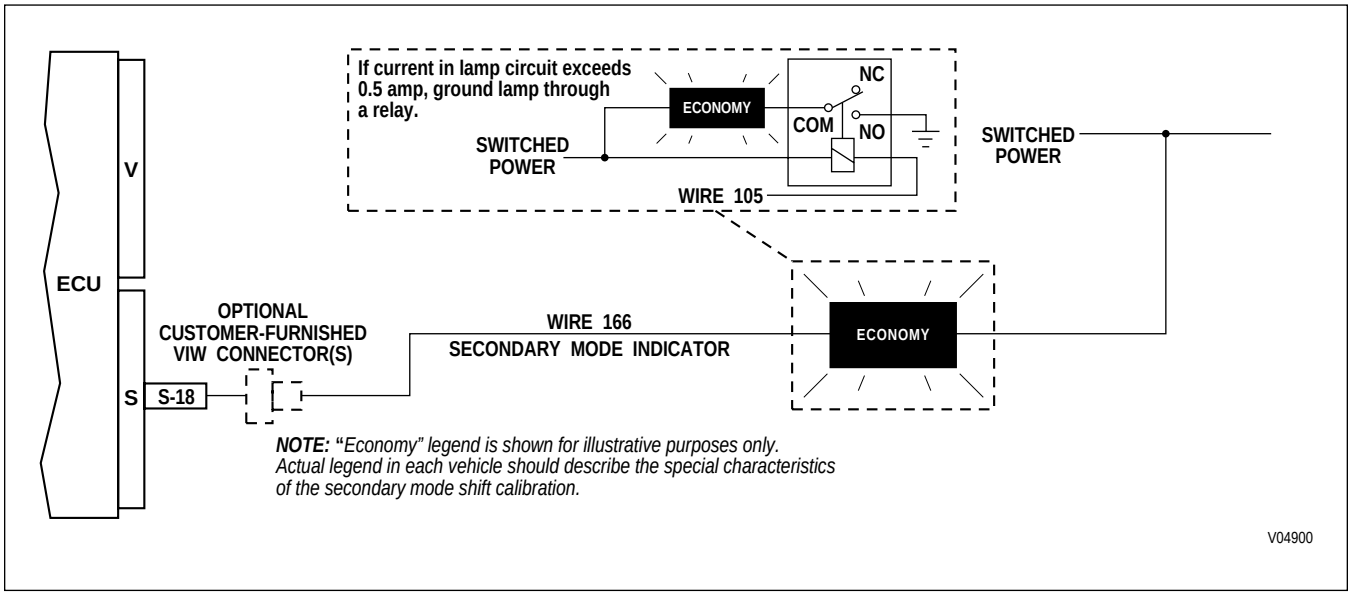

Figure P–47. Secondary Mode Indicator

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APPENDIX P — INPUT/OUTPUT FUNCTIONS

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Q. RETARDER INDICATOR

USES: Signals that the retarder is active. Typically used to turn on the vehicle brake lights when the retarder is in use.

VARIABLES TO SPECIFY: None

VOCATIONS: Various

This function is used in conjunction with Input Function, Retarder Enable. Refer to schematic for Retarder Enable Input Function, noting the use of wire 125.

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APPENDIX P — INPUT/OUTPUT FUNCTIONS

WARNING!

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S. NEUTRAL INDICATOR FOR PTO AND PTO ENABLE

USES: Provides for fast idle operation in neutral, “pack-on-the-fly”, and PTO engagement with overspeed protection.

VARIABLES TO SPECIFY: Max engine rpm for PTO engagement, max engine rpm for PTO operation, max output rpm for PTO engagement, max output rpm for PTO operation.

VOCATIONS: Refuse packer, recycling truck.

SYSTEM OPERATION:

Operator selects NEUTRAL to enable fast idle.

Transmission shifts to neutral if throttle and output speed are low.

When DRIVE is re-selected, fast idle is interrupted and transmission shifts to drive if engine speed drops below 900 rpm within approximately two seconds.

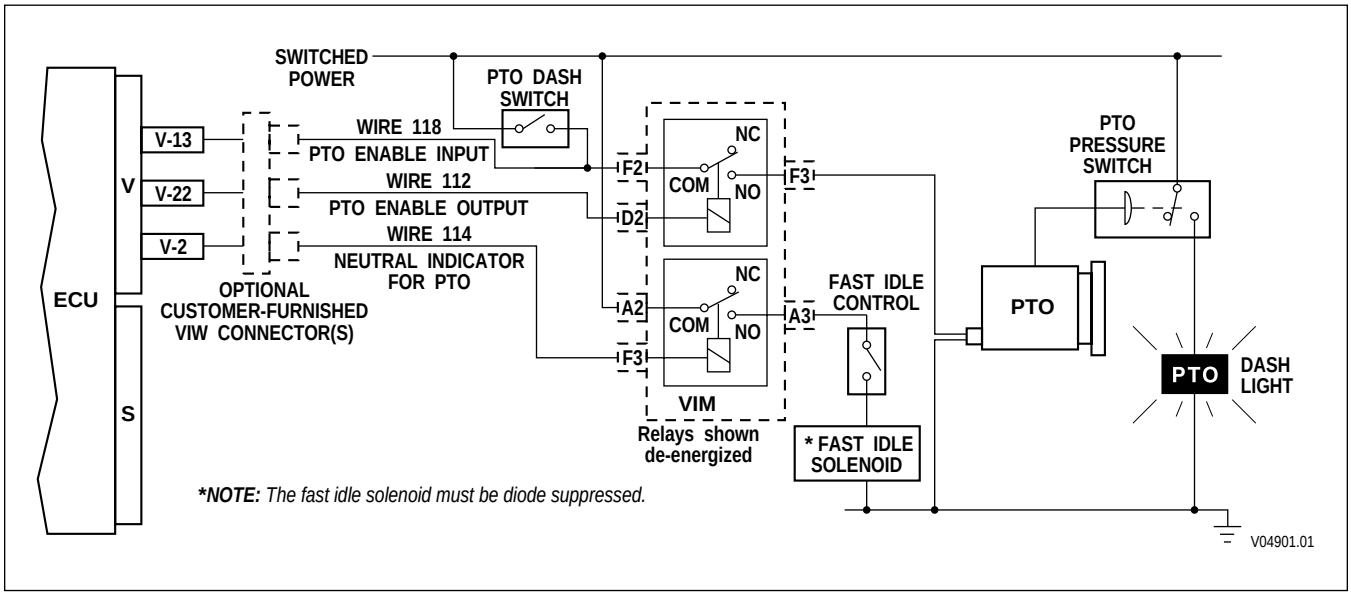

Figure P–48. Neutral Indicator for PTO and PTO Enable

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APPENDIX P — INPUT/OUTPUT FUNCTIONS

NOTES

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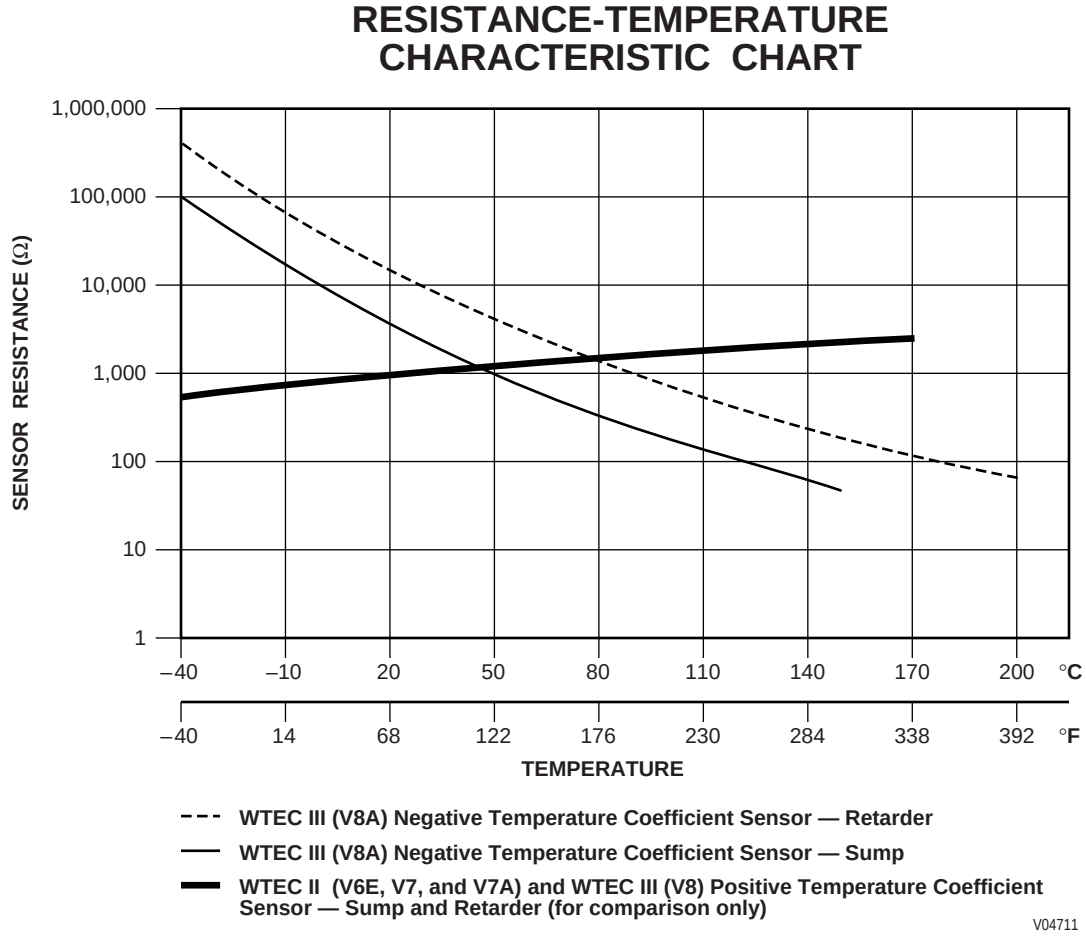
APPENDIX Q — TRANSID 2 THERMISTOR TROUBLESHOOTING INFORMATION

Resistance Vs. Temperature Characteristics

Graph Q–1 is a graph of the temperature indicated by the resistance measured in the new and the old thermistors. The new thermistors have a negative temperature coefficient which means the indicated temperature increases as the measured resistance decreases within a range of about 200,000 Ohms (Ω) down to about 50 Ohms (Ω) for the sump thermistor and about 400,000 Ohms (Ω) down to about 60 Ohms (Ω) for the retarder thermistor. The old thermistors (sump and retarder) have a positive temperature coefficient which means that the indicated temperature increases as the measured resistance increases within a range from about 500 Ohms (Ω) up to about 2500 Ohms (Ω). The two thermistors require different ECU calibrations. Mismatches between the ECU and the transmission can cause performance problems or diagnostic codes to be set. This is why the TID 2 transmission is not compatible with the WTEC II ECU (V6E, V7, or V7A) or with the WTEC III ECU (V8). The proper shift and temperature characteristics for both the TID 1 and the TID 2 transmission are calibrated in the V8A WTEC III ECU and the proper calibration will be activated by the ECU according to the TransID wire (wire 195) connection point in the internal harness.



Graph Q–1.

NOTE: ***Look carefully at the graph. The scale for the resistance {on the left side} is not constant {linear}. It is logarithmic which means it can display a great range of values within a small space. Each section of the graph is ten units, but the units vary from 1 to 100,000 Ohms. The range of resistance for the old thermistor is very small when compared with that of the new thermistors.***

The following table shows the range of resistance values that correspond to either retarder or sump fluid temperature shown in one degree increments over the operating range of the thermistors.

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APPENDIX Q — TRANSID 2 THERMISTOR TROUBLESHOOTING INFORMATION

TRANSID 2 THERMISTORS — RESISTANCE (OHMS) VS. TEMPERATURE

Retarder Thermistor					Sump Thermistor				
Degree C	Degree F	Lo Ohms	Nom Ohms	Hi Ohms	Degree C	Degree F	Lo Ohms	Nom Ohms	Hi Ohms
					–50	–58	202642	182288	226183
					–49	–56.2	188561	169859	210206
					–48	–54.4	175549	158357	195459
					–47	–52.6	163519	147708	181840
					–46	–50.8	152390	137844	169255
					–45	–49	142089	128702	157621
					–44	–47.2	132550	120224	146860
					–43	–45.4	123711	112359	136900
					–42	–43.6	115517	105057	127678
					–41	–41.8	107917	98276	119134
–40	–40	352399	402392	452385	–40	–40	100865	95956	107181
–39	–38.2	329878	376270	422662	–39	–38.2	94317	89769	100181
–38	–36.4	308936	352005	395074	–38	–36.4	88235	84019	93681
–37	–34.6	289453	329454	369456	–37	–34.6	82582	78674	87642
–36	–32.8	271318	308486	345655	–36	–32.8	77326	73701	82030
–35	–31	254431	288981	323531	–35	–31	72437	69073	76811
–34	–29.2	238698	270827	302956	–34	–29.2	67886	64764	71956
–33	–27.4	224033	253923	283814	–33	–27.4	63649	60749	67497
–32	–25.6	210358	238177	265995	–32	–25.6	59702	57008	63228
–31	–23.8	197600	223501	249402	–31	–23.8	56024	53520	59308
–30	–22	185693	209817	233941	–30	–22	52594	50266	55654
–29	–20.2	174574	197053	219531	–29	–20.2	49394	47229	52247
–28	–18.4	164188	185140	206093	–28	–18.4	46408	44394	49069
–27	–16.6	154480	174018	193556	–27	–16.6	43620	41746	46102
–26	–14.8	145404	163630	181856	–26	–14.8	41016	39271	43332
–25	–13	136915	153923	170930	–25	–13	38583	36958	40745
–24	–11.2	128971	144848	160724	–24	–11.2	36308	34794	38328
–23	–9.4	121534.6	136360.5	151188	–23	–9.4	34181	32770	36088
–22	–7.6	114569.9	128419.6	142269.4	–22	–7.6	32190	30875	33954
–21	–5.8	108044.7	120987	133929.3	–21	–5.8	30327	29101	31976
–20	–4	101928.7	114027.2	126125.7	–20	–4	28582	27439	30125
–19	–2.2	96194	107507.5	118821	–19	–2.2	26948	25881	28391
–18	–0.4	90814.8	101397.8	111980.7	–18	–0.4	25417	24420	26767
–17	1.4	85767	95669.8	105572.7	–17	1.4	23981	23051	25245
–16	3.2	81028.5	90297.8	99567.2	–16	3.2	22634	21766	23818
–15	5	76578.5	85257.7	93937	–15	5	21371	20660	22480
–14	6.8	72397.9	80527.1	88656.4	–14	6.8	20185	19427	21225
–13	8.6	68469	76085.4	83701.9	–13	8.6	19072	18363	20046
–12	10.4	64775.3	71913.4	79051.6	–12	10.4	18026	17363	18940

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APPENDIX Q — TRANSID 2 THERMISTOR TROUBLESHOOTING INFORMATION

TRANSID 2 THERMISTORS — RESISTANCE (OHMS) VS. TEMPERATURE *(cont'd)*

Retarder Thermistor					Sump Thermistor				
Degree C	Degree F	Lo Ohms	Nom Ohms	Hi Ohms	Degree C	Degree F	Lo Ohms	Nom Ohms	Hi Ohms
–11	12.2	61301.3	67993.3	74685.3	–11	12.2	17043	16424	17900
–10	14	58033	64308.5	70584	–10	14	16120	15540	16924
–9	15.8	54956.9	60843.6	66730.3	–9	15.8	15251	14709	16006
–8	17.6	52060.8	57584.4	63108	–8	17.6	14434	13927	15143
–7	19.4	49333.13	54517.51	59701.9	–7	19.4	13666	13190	14331
–6	21.2	46763.28	51630.64	56498	–6	21.2	12942	12497	13567
–5	23	44341.27	48912.25	53483.24	–5	23	12261	11844	12848
–4	24.8	42057.81	46351.65	50645.49	–4	24.8	11619	11228	12171
–3	26.6	39904.26	43938.84	47973.42	–3	26.6	11014	10648	11533
–2	28.4	37872.55	41664.54	45456.53	–2	28.4	10444	10101	10932
–1	30.2	35955	39520	43085	–1	30.2	9906	9585	10365
0	32	34145.1	37497.4	40850	0	32	9399	9098	9831
1	33.8	32430	35590	38750	1	33.8	8921	8638	9329
2	35.6	30810	33790	36770	2	35.6	8470	8203	8854
3	37.4	29282	32092	34903	3	37.4	8044	7793	8407
4	39.2	27838	30490	33142	4	39.2	7643	7406	7985
5	41	26474	28976	31479	5	41	7263	7041	7587
6	42.8	25184	27547	29910	6	42.8	6905	6696	7211
7	44.6	23965	26197	28428	7	44.6	6567	6369	6855
8	46.4	22813	24920	27028	8	46.4	6247	6061	6519
9	48.2	21722	23713	25704	9	48.2	5944	5769	6202
10	50	20690	22572	24454	10	50	5658	5493	5902
11	51.8	19712	21492	23271	11	51.8	5387	5231	5618
12	53.6	18787	20469	22152	12	53.6	5131	4984	5349
13	55.4	17910	19502	21093	13	55.4	4888	4750	5095
14	57.2	17079	18585	20091	14	57.2	4659	4528	4854
15	59	16292	17717	19141	15	59	4441	4318	4626
16	60.8	15545	16894	18242	16	60.8	4235	4118	4410
17	62.6	14836.8	16113.8	17391	17	62.6	4039	3929	4205
18	64.4	14164.8	15374.1	16583.5	18	64.4	3854	3750	4011
19	66.2	13527	14672.6	15818.2	19	66.2	3678	3580	3827
20	68	12921.4	14006.9	15092.4	20	68	3511	3418	3653
21	69.8	12346.4	13375.1	14403.8	21	69.8	3353	3265	3487
22	71.6	11800.1	12775.3	13750.5	22	71.6	3202	3120	3330
23	73.4	11281	12205.7	13130.3	23	73.4	3060	2981	3180
24	75.2	10787.6	11664.6	12541	24	75.2	2924	2850	3039
25	77	10318.5	11150.4	11982.3	25	77	2795	2725	2904
26	78.8	9872.4	10661.7	11451	26	78.8	2673	2606	2776
27	80.6	9448	10197.1	10946.1	27	80.6	2556	2493	2655

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APPENDIX Q — TRANSID 2 THERMISTOR TROUBLESHOOTING INFORMATION

TRANSID 2 THERMISTORS — RESISTANCE (OHMS) VS. TEMPERATURE *(cont'd)*

Retarder Thermistor					Sump Thermistor				
Degree C	**Degree F**	**Lo Ohms**	**Nom Ohms**	**Hi Ohms**	**Degree C**	**Degree F**	**Lo Ohms**	**Nom Ohms**	**Hi Ohms**
28	82.4	9755.2	9755.2	10466.2	28	82.4	2445	2385	2540
29	84.2	8659.8	9334.9	10009.9	29	84.2	2340	2282	2430
30	86	8293.8	8934.9	9575.9	30	86	2240	2185	2326
31	87.8	7945.3	8554.2	9163.1	31	87.8	2144	2092	2227
32	89.6	7613.3	8191.7	8770.2	32	89.6	2053	2003	2132
33	91.4	7296.91	7846.57	8396.2	33	91.4	1967	1919	2043
34	93.2	6995.38	7517.77	8040.17	34	93.2	1884	1839	1957
35	95	6707.92	7204.5	7701.07	35	95	1806	1763	1875
36	96.8	6433.8	6905.92	7378.04	36	96.8	1731	1690	1797
37	98.6	6172.32	6621.29	7070.25	37	98.6	1660	1620	1723
38	100.4	5922.86	6349.87	6776.89	38	100.4	1592	1554	1653
39	102.2	5685	6091	6497	39	102.2	1527	1491	1585
40	104	5457.5	5844	6231	40	104	1465	1430	1521
41	105.8	5241	5608	5976	41	105.8	1406	1373	1459
42	107.6	5033	5383	5733	42	107.6	1349	1318	1401
43	109.4	4835	5169	5502	43	109.4	1296	1265	1345
44	111.2	4646	4963	5281	44	111.2	1244	1215	1291
45	113	4465	4768	5070	45	113	1195	1167	1240
46	114.8	4293	4580	4868	46	114.8	1148	1122	1192
47	116.6	4127	4402	4676	47	116.6	1103	1078	1145
48	118.4	3969	4231	4492	48	118.4	1060	1036	1100
49	120.2	3818	4067	4316	49	120.2	1019	996.3	1058
50	122	3673	3911	4148	50	122	980.3	958.1	1017
51	123.8	3535	3761	3988	51	123.8	942.9	921.6	978.4
52	125.6	3403	3619	3835	52	125.6	907.1	886.7	941.4
53	127.4	3276	3482	3688	53	127.4	872.9	853.3	905.9
54	129.2	3155	3352	3548	54	129.2	840.1	821.4	871.9
55	131	3039	3227	3414	55	131	808.8	790.8	839.4
56	132.8	2928	3107	3286	56	132.8	778.8	761.5	808.3
57	134.6	2821	2992	3163	57	134.6	750	733.5	778.5
58	136.4	2718.9	2882.4	3046	58	136.4	722.5	706.6	750
59	138.2	2621.1	2777.3	2933.5	59	138.2	696.2	680.9	722.7
60	140	2527.2	2676.5	2825.7	60	140	670.9	656.2	696.5
61	141.8	2437.3	2579.9	2722.5	61	141.8	646.7	632.6	671.4
62	143.6	2351	2487.3	2623.6	62	143.6	623.5	609.9	647.3
63	145.4	2268.2	2398.5	2528.8	63	145.4	601.2	588.2	624.2
64	147.2	2188.8	2313.4	2438	64	147.2	579.9	567.4	602.1
65	149	2112.5	2231.7	2350.8	65	149	559.4	547.4	580.8
66	150.8	2039.3	2153.3	2267.3	66	150.8	539.8	528.2	560.5

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APPENDIX Q — TRANSID 2 THERMISTOR TROUBLESHOOTING INFORMATION

TRANSID 2 THERMISTORS — RESISTANCE (OHMS) VS. TEMPERATURE *(cont'd)*

Retarder Thermistor					Sump Thermistor				
Degree C	Degree F	Lo Ohms	Nom Ohms	Hi Ohms	Degree C	Degree F	Lo Ohms	Nom Ohms	Hi Ohms
67	152.6	1969.1	2078.1	2187.1	67	152.6	520.9	509.8	540.9
68	154.4	1901.6	2005.9	2110.2	68	154.4	502.8	492.1	522.2
69	156.2	1836.8	1936.6	2036.4	69	156.2	485.4	475.2	504.1
70	158	1774.5	1870	1965.5	70	158	468.7	458.9	486.8
71	159.8	1714.6	1806.1	1897.5	71	159.8	452.7	443.2	470.2
72	161.6	1657.1	1744.6	1832.2	72	161.6	437.3	428.2	454.2
73	163.4	1601.8	1685.6	1769.4	73	163.4	422.5	413.7	438.9
74	165.2	1548.65	1628.89	1709.1	74	165.2	408.3	399.8	424.1
75	167	1497.52	1574.36	1651.21	75	167	394.6	386.5	410
76	168.8	1448.33	1521.94	1595.54	76	168.8	381.5	373.6	396.3
77	170.6	1401.01	1471.52	1542.03	77	170.6	368.9	361.3	383.2
78	172.4	1355.47	1423.03	1490.58	78	172.4	356.7	349.4	370.6
79	174.2	1311.65	1376.38	1441.11	79	174.2	345	338	358.5
80	176	1269	1331	1394	80	176	333.8	327	346.8
81	177.8	1228.3	1288.3	1348	81	177.8	322.9	316.4	335.6
82	179.6	1190	1247	1304	82	179.6	312.5	306.2	324.7
83	181.4	1152	1207	1261	83	181.4	302.5	296.4	314.3
84	183.2	1116	1168	1220	84	183.2	292.8	288.9	304.3
85	185	1081	1131	1181	85	185	283.5	277.8	294.6
86	186.8	1047	1095	1143	86	186.8	274.5	269	285.4
87	188.6	1015	1061	1107	87	188.6	265.9	260.5	276.5
88	190.4	983	1028	1072	88	190.4	257.6	253.3	268
89	192.2	953	996	1038	89	192.2	249.5	244.3	259.7
90	194	924	965	1005	90	194	241.8	236.7	251.7
91	195.8	896	935	974	91	195.8	234.4	229.4	244
92	197.6	869	906	944	92	197.6	227.2	222.3	236.6
93	199.4	843	879	915	93	199.4	220.2	215.5	229.5
94	201.2	817	852	886	94	201.2	213.5	208.9	222.6
95	203	793	826	859	95	203	207.1	202.5	215.9
96	204.8	769	801	833	96	204.8	200.9	196.4	209.5
97	206.6	747	777	808	97	206.6	194.8	190.5	203.3
98	208.4	725	754	784	98	208.4	189	184.8	197.3
99	210.2	703.6	731.8	760	99	210.2	183.4	179.2	191.5
100	212	683.2	710.2	737.3	100	212	178	173.9	185.9
101	213.8	663.4	689.4	715.3	101	213.8	172.8	168.8	180.5
102	215.6	644.4	669.3	694.1	102	215.6	167.8	163.8	175.3
103	217.4	626	649.8	673.7	103	217.4	162.9	159	170.3
104	219.2	608.2	631.1	653.9	104	219.2	158.2	154.4	165.4
105	221	591	612.9	634.9	105	221	159.6	149.9	160.7

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APPENDIX Q — TRANSID 2 THERMISTOR TROUBLESHOOTING INFORMATION

TRANSID 2 THERMISTORS — RESISTANCE (OHMS) VS. TEMPERATURE *(cont'd)*

Retarder Thermistor					Sump Thermistor				
Degree C	Degree F	Lo Ohms	Nom Ohms	Hi Ohms	Degree C	Degree F	Lo Ohms	Nom Ohms	Hi Ohms
106	222.8	574.3	595.4	616.5	106	222.8	149.2	145.6	156.2
107	224.6	558.2	578.4	598.7	107	224.6	145	141.4	151.8
108	226.4	542.6	562.1	581.5	108	226.4	140.9	137.4	147.5
109	228.2	527.6	546.2	564.9	109	228.2	136.9	133.5	143.4
110	230	513	530.9	548.8	110	230	133.1	129.7	139.4
111	231.8	498.8	516.1	533.3	111	231.8	129.4	126.1	135.6
112	233.6	485.2	501.8	518.3	112	233.6	125.8	122.6	131.9
113	235.4	471.9	487.9	503.9	113	235.4	122.3	119.2	128.2
114	237.2	459.1	474.5	489.8	114	237.2	118.9	115.9	124.8
115	239	446.73	461.51	476.3	115	239	115.7	112.7	121.4
116	240.8	434.72	448.95	463.18	116	240.8	112.5	109.6	118.1
117	242.6	423.08	436.79	450.5	117	242.6	109.5	106.6	114.9
118	244.4	411.8	425.02	438.23	118	244.4	106.5	103.7	111.9
119	246.2	400.88	413.61	426.35	119	246.2	103.7	100.91	108.9
120	248	390.29	402.57	414.86	120	248	100.9	98.2	106
121	249.8	380	392	404	121	249.8	98.23	95.58	103.2
122	251.6	370.1	381.5	393	122	251.6	95.63	93.04	100.5
123	253.4	360	371	383	123	253.4	93.12	90.58	97.9
124	255.2	351	362	372	124	255.2	90.68	88.2	95.36
125	257	342	352	363	125	257	88.32	85.89	92.9
126	258.8	333	343	353	126	258.8	86.03	83.65	90.51
127	260.6	325	334	344	127	260.6	83.8	81.49	88.19
128	262.4	316	326	335	128	262.4	81.65	79.38	85.95
129	264.2	308	317	326	129	264.2	79.56	77.35	83.77
130	266	301	309	318	130	266	77.54	75.37	81.65
131	267.8	293	302	310	131	267.8	75.58	73.46	79.6
132	269.6	286	294	302	132	269.6	73.67	71.6	77.61
133	271.4	279	287	294	133	271.4	71.82	69.8	75.68
134	273.2	272	279	287	134	273.2	70.03	68.05	73.8
135	275	265	272	280	135	275	68.29	66.35	71.98
136	276.8	258	266	273	136	276.8	66.6	64.7	70.21
137	278.6	252	259	266	137	278.6	64.96	63.11	68.5
138	280.4	246	253	260	138	280.4	63.37	61.56	66.83
139	282.2	240	247	253	139	282.2	61.82	60.05	65.21
140	284	234.2	240.6	247	140	284	60.32	58.59	63.64
141	285.8	228.6	234.8	241.1	141	285.8	58.86	57.17	62.11
142	287.6	223.1	229.2	235.2	142	287.6	57.45	55.79	60.63
143	289.4	217.8	223.7	229.6	143	289.4	56.07	54.45	59.18
144	291.2	212.6	218.4	224.1	144	291.2	54.73	53.15	57.78

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APPENDIX Q — TRANSID 2 THERMISTOR TROUBLESHOOTING INFORMATION

TRANSID 2 THERMISTORS — RESISTANCE (OHMS) VS. TEMPERATURE *(cont'd)*

Retarder Thermistor					Sump Thermistor				
Degree C	Degree F	Lo Ohms	Nom Ohms	Hi Ohms	Degree C	Degree F	Lo Ohms	Nom Ohms	Hi Ohms
145	293	207.6	213.2	218.8	145	293	53.43	51.89	56.42
146	294.8	202.7	208.1	213.6	146	294.8	52.17	50.66	55.09
147	296.6	197.9	203.2	208.5	147	296.6	50.94	49.47	53.81
148	298.4	193.3	198.5	203.7	148	298.4	49.75	48.31	52.55
149	300.2	188.8	193.9	198.9	149	300.2	48.59	47.18	51.34
150	302	184.4	189.4	194.3	150	302	47.46	46.09	50.15
151	303.8	180.2	185	189.8	—	—	—	—	—
152	305.6	176	180.7	185.4	—	—	—	—	—
153	307.4	172	176.6	181.2	—	—	—	—	—
154	309.2	168.1	172.6	177.1	—	—	—	—	—
155	311	164.3	168.6	173	—	—	—	—	—
156	312.8	160.54	164.84	169.1	—	—	—	—	—
157	314.6	156.93	161.13	165.33	—	—	—	—	—
158	316.4	153.42	157.53	161.63	—	—	—	—	—
159	318.2	150.01	154.01	158.02	—	—	—	—	—
160	320	146.68	150.6	154.51	—	—	—	—	—
161	321.8	143.43	147.27	151.1	—	—	—	—	—
162	323.6	140	144	148	—	—	—	—	—
163	325.4	137.2	140.9	145	—	—	—	—	—
164	327.2	134	138	141	—	—	—	—	—
165	329	131	135	138	—	—	—	—	—
166	330.8	128	132	135	—	—	—	—	—
167	332.6	126	129	132	—	—	—	—	—
168	334.4	123	126	130	—	—	—	—	—
169	336.2	120	124	127	—	—	—	—	—
170	338	118	121	124	—	—	—	—	—
171	339.8	115	118	122	—	—	—	—	—
172	341.6	113	116	119	—	—	—	—	—
173	343.4	10	113	117	—	—	—	—	—
174	345.2	108	111	114	—	—	—	—	—
175	347	106	109	112	—	—	—	—	—
176	348.8	104	107	109	—	—	—	—	—
177	350.6	101	104	107	—	—	—	—	—
178	352.4	99	102	105	—	—	—	—	—
179	354.2	97	100	103	—	—	—	—	—
180	356	95	98	101	—	—	—	—	—
181	357.8	93.4	96.1	99	—	—	—	—	—
182	359.6	91.5	94.1	96.8	—	—	—	—	—
183	361.4	89.6	92.3	94.9	—	—	—	—	—

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APPENDIX Q — TRANSID 2 THERMISTOR TROUBLESHOOTING INFORMATION

TRANSID 2 THERMISTORS — RESISTANCE (OHMS) VS. TEMPERATURE *(cont'd)*

Retarder Thermistor					Sump Thermistor				
Degree C	**Degree F**	**Lo Ohms**	**Nom Ohms**	**Hi Ohms**	**Degree C**	**Degree F**	**Lo Ohms**	**Nom Ohms**	**Hi Ohms**
184	363.2	87.8	90.4	93	—	—	—	—	—
185	365	86.1	88.6	91.1	—	—	—	—	—
186	366.8	84.3	86.8	89.4	—	—	—	—	—
187	368.6	82.7	85.1	87.6	—	—	—	—	—
188	370.4	81	83.4	85.9	—	—	—	—	—
189	372.2	79.4	81.8	84.2	—	—	—	—	—
190	374	77.8	80.2	82.6	—	—	—	—	—
191	375.8	76.3	78.7	81	—	—	—	—	—
192	377.6	74.8	77.1	79.4	—	—	—	—	—
193	379.4	73.4	75.6	77.9	—	—	—	—	—
194	381.2	71.9	74.2	76.4	—	—	—	—	—
195	383	70.5	72.8	75	—	—	—	—	—
196	384.8	69.2	71.4	73.6	—	—	—	—	—
197	386.6	67.84	70.02	72.20	—	—	—	—	—
198	388.4	66.54	68.70	70.86	—	—	—	—	—
199	390.2	65.27	67.41	69.54	—	—	—	—	—
200	392	64.03	66.14	68.25	—	—	—	—	—
201	393.8	62.82	64.91	65.99	—	—	—	—	—
202	395.6	61.64	63.70	65.76	—	—	—	—	—
203	397.4	60.00	63.00	65.00	—	—	—	—	—
204	399.2	59.30	61.40	63.00	—	—	—	—	—

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TROUBLESHOOTING WITH DIAGNOSTIC CODES

(Additional troubleshooting information can be found in the appropriate Allison Troubleshooting Manual.)

CODE LISTINGS AND PROCEDURES

IF CODES READ		RECOMMENDED PROCEDURES
Main Code	Sub Code	
13 **ECU Input Voltage Low** 13 **ECU Input Voltage Low (Medium)** 13 **ECU Input Voltage High**	12 13 23	1. Check: a. Battery direct ground and power connections are tight and clean. b. Vehicle batteries are charged. c. Vehicle charging system is not over- or under-charging. d. VIM fuse is good. e. VIM connections are tight, clean, and undamaged. f. Vehicle manufacturer supplied wiring is correct. g. ECU connectors are tight, clean, and undamaged. 2. If all points check, call distributor.
14 **Oil Level Sensor**	12, 23	1. Check: a. Is transmission equipped with oil level sensor? b. Engine speed sensor, output speed sensor, temperature sensor, and oil level sensor are working correctly. c. Wiring harness has no opens, shorts to ground, or shorts to battery. 2. If all points check, call distributor.
21 **Throttle Position Sensor**	12, 23	1. Check: a. TPS connector is properly connected. b. End of TPS cable is pulled out properly. c. Engine fuel lever is in idle position. d. Engine fuel lever provides proper amount of stroke on TPS cable. e. Wiring harness to TPS has no opens, shorts between wires, or shorts to ground. 2. If able, replace TPS. 3. If all points check, call distributor.
22 **Speed Sensors**	14, 15, 16	1. Check: a. Speed sensor connectors are tight, clean, and undamaged. b. Speed sensor mounting bolts are properly torqued (24–29 N·m (18–21 lb ft)). c. Wiring harness to sensors has no opens, shorts between wires, or shorts to ground. 2. If all points check, call distributor.
23 **Shift Selectors**	12, 13, 14, 15	1. Check: a. ECU connectors are tight, clean, and undamaged. b. Remote shift selector connector is tight and jumper wire is cut. c. Wiring harness on remote has no opens, shorts between wires, or shorts to ground. 2. If able, replace shift selector(s). 3. If all points check, call distributor.
24 **Sump Oil Temperature Cold**	12	1. Check: a. Air temperature is below –32°C (–25°F). 1) If yes, this is a correct response for temperature. 2) If no, check that main transmission connector is tight, clean, and undamaged. b. ECU connectors are tight, clean, and undamaged. 2. If all points check, call distributor.
24 **Sump Oil Temperature Hot**	23	1. Let vehicle idle with parking brake applied, wheels chocked, and vehicle level. Check: a. Correct dipstick is installed. b. Fluid level is correct. 1) If fluid level is incorrect — correct fluid level. 2) If fluid level is correct — check for engine system overheating, causing transmission to overheat. 2. Check if ECU and transmission connectors are tight, clean, and undamaged. 3. If all points check, call distributor.
25 **Output Speed Sensor and Reading**	00, 11, 22, 33, 44, 55, 66, 77	1. Check: a. Speed sensor connector is tight, clean, and undamaged. b. ECU connectors are tight, clean, and undamaged. c. Fluid level is correct. d. Sensor mounting bolt torque is correct (24–29 N·m (18–21 lb ft)). e. Wiring harness to sensor has no opens, shorts between wires, or shorts to ground. 2. If all points check, call distributor.

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32 **C3 Pressure Switch Open**	00, 33, 55, 77	1. Let vehicle idle with parking brake applied, wheels chocked, and vehicle level. Check: a. Correct dipstick is installed. b. Fluid level is correct. 2. Check: a. Main transmission connector is tight, clean, and undamaged. b. ECU connectors are tight, clean, and undamaged. c. Wiring harness has no opens, shorts between wires, or shorts to ground. 3. If all points check, call distributor.
33 **Sump Oil Sensor Failure**	12, 23	1. Check: a. Main transmission connector is tight, clean, and undamaged. b. ECU connectors are tight, clean, and undamaged. c. Wiring harness has no opens, shorts between wires, or shorts to ground. 2. If all points check, call distributor.
34 **EEPROM**	12, 13, 14, 15, 16	1. If able, recalibrate ECU; if not, replace ECU. 2. If cannot replace ECU, call distributor.
35 **Power Interruption EEPROM Write Interruption**	00, 16	1. Check: a. ECU connectors are tight, clean, and undamaged. b. VIM connectors are tight, clean, and undamaged. c. Vehicle manufacturer supplied wiring has correct power and ground connections. d. Power connections are battery direct. e. Ground connections are battery direct. f. Ignition switch connections are correct. 2. If all points check, call distributor.
36 **Hardware/ Software Not Compatible**	00	1. If able, reprogram ECU. 2. If able, replace ECU. 3. If ECU cannot be reprogrammed or replaced, call distributor.
41 **Open or Short to Ground in Solenoid Circuit**	12, 13, 14, 15, 16, 21, 22, 23, 24, 25, 26	1. Check: a. Main transmission connector is tight, clean, and undamaged. b. ECU connectors are tight, clean, and undamaged. c. Wiring harness is not pulled too tight, and there is no damage, chafing, or screws through harness. d. Wiring harness has no opens, shorts between wires, or shorts to ground. 2. Change wiring harness (optional). 3. If all points check, call distributor.
42 **Short to Battery in Solenoid Circuit**	12, 13, 14, 15, 16, 21, 22, 23, 24, 25, 26	1. Check: a. Main transmission connector is tight, clean, and undamaged. b. ECU connectors are tight, clean, and undamaged. c. Wiring harness is not pulled too tight, and there is no damage, chafing, or screws through harness. d. Wiring harness has no opens, shorts between wires, or shorts to ground. e. Unauthorized repairs have not been made. 2. Change harness (optional). 3. If all points check, call distributor.
43 **Solenoid Low Side Circuit, Open Driver, or Wire Shorted to Ground**	21, 25, 26	1. Check: a. Transmission connector is tight, clean, and undamaged. b. ECU connectors are tight, clean, and undamaged. c. Wiring harness has no opens, shorts between wires, or shorts to ground. 2. If able, replace ECU. 3. If all points check, call distributor.
44 **Solenoid Circuit Short to Ground**	12, 13, 14, 15, 16, 21, 22, 23, 24, 25, 26	1. Check: a. Transmission connector is tight, clean, and undamaged. b. ECU connectors are tight, clean, and undamaged. c. Wiring harness has no opens, shorts between wires, or shorts to ground. 2. If all points check, call distributor.

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45	12, 13, 14, 15, 16, 21, 22, 23, 24, 25, 26	1. Check: a. Transmission connector is tight, clean, and undamaged. b. ECU connectors are tight, clean, and undamaged. c. Wiring harness has no opens. 2. If all points check, call distributor.
Solenoid Circuit Open		
51	01, 10, 12, 21, 23, 24, 35, 42, 43, 45, 46, 53, 64, 65	1. Check: a. Output and turbine speed sensor connectors are tight, clean, and undamaged. b. Speed sensor wiring harness has no opens, shorts between wires, or shorts to ground. 2. Let vehicle idle with parking brake applied, wheels chocked, and vehicle level. Check: a. Correct dipstick is installed. b. Fluid level is correct. 3. If all points check, call distributor.
Offgoing Ratio Test (During Shift)		
52	01, 08, 32, 34, 54, 56, 71, 72, 78, 79, 99	1. Check: a. Output and turbine speed sensor connectors are tight, clean, and undamaged. b. Speed sensor wiring harness has no opens, shorts between wires or shorts to ground. c. Main wiring harness to transmission has no shorts between wires or shorts to ground. 2. Let vehicle idle with parking brake applied, wheels chocked, and vehicle level. Check: a. Correct dipstick is installed. b. Fluid level is correct. 3. If all points check, call distributor
Offgoing C3 Pressure Switch (During Shift)		
53	08, 18, 28, 29, 38, 39, 48, 49, 58, 59, 68, 69, 78, 99	1. Check: a. Turbine and engine speed sensor connectors are tight, clean, and undamaged. b. Speed sensor wiring harness has no opens, shorts between wires, or shorts to ground. 2. Let vehicle idle with parking brake applied, wheels chocked, and vehicle level. Check: a. Correct dipstick is installed. b. Fluid level is correct. 3. If all points check, call distributor.
Offgoing Speed Test (During Shift)		
54	01, 07, 10, 12, 17, 21, 23, 24, 27, 32, 34, 35, 42, 43, 45, 46, 53, 54, 56, 64, 65, 70, 71, 72, 80, 81, 82, 83, 85, 86, 92, 93, 95, 96, 97	1. Check: a. Turbine and output speed sensor connectors are tight, clean, and undamaged. b. Speed sensor wiring harness has no opens, shorts between wires, or shorts to ground. 2. Let vehicle idle with parking brake applied, wheels chocked, and vehicle level. Check: a. Correct dipstick is installed. b. Fluid level is correct. 3. EEPROM calibration is correct for the transmission. 4. If all points check, call distributor.
Oncoming Ratio Test (After Shift)		
55	17, 27, 87, 97	1. Let vehicle idle with parking brake applied, wheels chocked, and vehicle level. Check: a. Correct dipstick is installed. b. Fluid level is correct. 2. Check: a. Output and turbine speed sensor connectors are tight, clean, and undamaged. b. Speed sensor wiring harness has no opens, shorts between wires, or shorts to ground. 3. Check: a. Transmission connector is tight, clean, and undamaged. b. ECU connectors are tight, clean, and undamaged. c. C3 pressure switch wiring has no opens, shorts between wires, or shorts to ground. 4. If all points check, call distributor.
Oncoming C3 Pressure Switch (After Shift)		

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56	00, 11, 22, 33, 44, 55, 66, 77 **Range Verification Test (Between Shifts)**	1. Check: a. Turbine and output speed sensor connectors are tight, clean, and undamaged. b. Speed sensor wiring harness has no opens, shorts between wires, or shorts to ground. c. Transmission connector is tight, clean, and undamaged. d. ECU connectors are tight, clean, and undamaged. 2. Let vehicle idle with parking brake applied, wheels chocked, and vehicle level. Check: a. Correct dipstick is installed. b. Fluid level is correct. 3. If all points check, call distributor.
57	11, 22, 44, 66, 88, 99 **Range Verification Test (C3)**	1. Let vehicle idle with parking brake applied, wheels chocked, and vehicle level. Check: a. Correct dipstick is installed. b. Fluid level is correct. 2. Check: a. Output and turbine speed sensor connectors are tight, clean, and undamaged. b. Speed sensor wiring harness has no shorts between wires or shorts to ground. 3. Check: a. Transmission connector is tight, clean, and undamaged. b. ECU connectors are tight, clean, and undamaged. c. C3 pressure switch wiring has no opens, shorts between wires, or shorts to ground. 4. If all points check, call distributor.
61	00 **Retarder Over Temperature**	1. Check: a. Fluid level is correct. b. Retarder apply system is not allowing retarder and throttle to be applied at the same time. c. Fluid cooler is adequately sized for load. 2. If all points check, call distributor.
62	12, 23 **Retarder Temperature Sensor**	1. Check: a. Retarder temperature measured with DDR is consistent with code; or determine if code is active using shift selector. b. Ambient temperature is above 178°C (352°F) or below –45°C (–49°F). c. Sensor connector is tight, clean, and undamaged. d. ECU connectors are tight, clean, and undamaged. e. Temperature sensor circuit has no opens, shorts, or shorts to ground. 2. If all points check, call distributor.
63	00, 26, 40 **Input Function Fault**	1. Check input wiring, switches, and connectors to determine why input states are different. 2. If all points check, call distributor.
64	12, 23 **Retarder Modulation Request Device Fault**	1. Use DDR to read retarder counts and identify problem wires. Check wiring for short to battery, ground wire open, or short to ground. 2. If all points check, call distributor.
65	00 **Engine Rating High (Computer-Controlled Engines Only)**	1. Check if engine rating or governor speed is too high for transmission. 2. If all points check, call distributor.
66	00 **Serial Communications Interface Fault**	1. Check: a. Serial connection to engine computer is tight, clean, and undamaged. b. SCI wiring harness has no opens, shorts, or shorts to ground. c. If DDR is not available, also be sure that transmission ECU connections are tight, clean, and undamaged. 2. If all points check, call distributor.
69	12, 13, 14, 15, 16, 21, 22, 23, 24, 25, 26, 32, 33, 34, 35, 36, 41 **ECU Malfunction**	1. Clear diagnostic code and retry vehicle start. 2. If code recurs, reprogram ECU. 3. If able, replace ECU. 4. If code continues to recur, call distributor.

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DIAGNOSTIC TROUBLE CODES (DTC)

- **SOL**enoid **OFF** (SOL OFF) Response
  - All solenoids are commanded off (turning solenoids PCS1 and PCS2 off electrically causes them to be on hydraulically).
- **R**eturn to **P**revious **R**ange (RPR) Response
  - When the speed sensor ratio or PS1 pressure switch tests associated with a shift are not successful, the TCM commands the same range as commanded before the shift.
- **N**eutral **N**o **C**lutches (NNC) Response
  - When certain speed sensor ratio or PS1 pressure switch tests are not successful, the TCM commands a neutral condition with no clutches applied.

6–4. SHIFT SELECTOR DISPLAYS RELATED TO ACTIVE CODES

- "Cateye"—The forward slash segments and the middle horizontal segments (-\-) may be on under the following conditions:
  - Lost communication between the TCM and shift selector (U0103 or U0291)
  - J1939 CAN problems
  - Invalid data from shift selector (U0592 or U0404)
- All Segments Displayed—All display segments will be illuminated during shift selector initialization. Low supply voltage can cause the shift selector to fail to complete initialization.

6–5. DIAGNOSTIC CODE LIST AND DESCRIPTION

Table 6–2. Diagnostic Troubleshooting Codes (DTC) and Descriptions

DTC	Description	CHECK TRANS Light	Inhibited Operation Description
C1312	Retarder Request Sensor Failed Low	No	May inhibit retarder operation if not using J1939 datalink
C1313	Retarder Request Sensor Failed High	No	May inhibit retarder operation if not using J1939 datalink
P0122	Pedal Position Sensor Low Voltage	No	Use default throttle values. Use brake switch for retarder
P0123	Pedal Position Sensor High Voltage	No	Use default throttle values. Use brake switch for retarder
P0218	Transmission Fluid Over Temperature	No	Use hot mode shift schedule. Inhibits upshift above a calibrated range. Activate sump overtemp indicator
P0602	TCM Not Programmed	Yes	Lock in Neutral
P0610	TCM Vehicle Options (TransID) Error	Yes	None
P0613	TCM Processor	No	None
P0614	Torque Control Data Mismatch—ECM/TCM	Yes	Inhibits some shifts to range
P0634	TCM Internal Temperature Too High	Yes	DNS, SOL OFF (hydraulic default)
P063E	Auto Configuration Throttle Input Not Present	Yes	Use default throttle values

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DIAGNOSTIC TROUBLE CODES (DTC)

Table 6–2. Diagnostic Troubleshooting Codes (DTC) and Descriptions *(cont'd)*

DTC	Description	CHECK TRANS Light	Inhibited Operation Description
P063F	Auto Configuration Engine Coolant Temp Input Not Present	No	Use default throttle values
P0658	Actuator Supply Voltage 1 (HSD1) Low	Yes	DNS, SOL OFF (hydraulic default)
P0659	Actuator Supply Voltage 1 (HSD1) High	Yes	DNS, SOL OFF (hydraulic default)
P0701	Transmission Control System Performance	No	None
P0702	Transmission Control System Electrical (TransID)	Yes	None
P0703	Brake Switch Circuit Malfunction	No	No Neutral to Drive shifts for Auto Neutral for refuse packer
P0708	Transmission Range Sensor Circuit High Input	Yes	Ignore defective strip selector inputs
P070C	Transmission Fluid Level Sensor Circuit—Low Input	No	None
P070D	Transmission Fluid Level Sensor Circuit—High Input	No	None
P0711	Transmission Fluid Temperature Sensor Circuit Performance	Yes	Use default sump temp
P0712	Transmission Fluid Temperature Sensor Circuit Low Input	Yes	Use default sump temp
P0713	Transmission Fluid Temperature Sensor Circuit High Input	Yes	Use default sump temp
P0716	Turbine Speed Sensor Circuit Performance	Yes	DNS, Lock in current range
P0717	Turbine Speed Sensor Circuit No Signal	Yes	DNS, Lock in current range
P0719	Brake Switch ABS Input Low	No	TCM assumes ABS is OFF
P071A	RELS Input Failed On	Yes	Inhibit RELS operation
P071D	General Purpose Input Fault	Yes	None
P0721	Output Speed Sensor Circuit Performance	Yes	DNS, Lock in current range
P0722	Output Speed Sensor Circuit No Signal	Yes	DNS, Lock in current range
P0726	Engine Speed Sensor Circuit Performance	No	Default to turbine speed
P0727	Engine Speed Sensor Circuit No Signal	No	Default to turbine speed
P0729	Incorrect 6th Gear Ratio	Yes	DNS, Attempt 5th then 3rd
P0731	Incorrect 1st Gear Ratio	Yes	DNS, Attempt 2nd, then 5th
P0732	Incorrect 2nd Gear Ratio	Yes	DNS, Attempt 3rd then 5th
P0733	Incorrect 3rd Gear Ratio	Yes	DNS, Attempt 4th then 6th
P0734	Incorrect 4th Gear Ratio	Yes	DNS, Attempt 5th then 3rd
P0735	Incorrect 5th Gear Ratio	Yes	DNS, Attempt 6th, then 3rd, then 2nd
P0736	Incorrect Reverse Gear Ratio	Yes	DNS, Lock in Neutral
P0741	Torque Converter Clutch System Stuck Off	Yes	None
P0776	Pressure Control Solenoid 2 Stuck Off	Yes	DNS, RPR
P0777	Pressure Control Solenoid 2 Stuck On	Yes	DNS, RPR
P0796	Pressure Control Solenoid 3 Stuck Off	Yes	DNS, RPR

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DIAGNOSTIC TROUBLE CODES (DTC)

Table 6–2. Diagnostic Troubleshooting Codes (DTC) and Descriptions *(cont'd)*

DTC	Description	CHECK TRANS Light	Inhibited Operation Description
P0797	Pressure Control Solenoid 3 Stuck On	Yes	DNS, RPR
P0842	Transmission Pressure Switch 1 Circuit Low	Yes	DNS, Lock in current range
P0843	Transmission Pressure Switch 1 Circuit High	Yes	DNS, Lock in current range
P0880	TCM Power Input Signal	No	None
P0881	TCM Power Input Signal Performance	No	None
P0882	TCM Power Input Signal Low	Yes	DNS, Sol OFF (hydraulic default)
P0883	TCM Power Input Signal High	No	None
P0894	Transmission Component Slipping	Yes	DNS, Lock in first
P0960	Pressure Control Solenoid Main Mod Control Circuit Open	Yes	None
P0962	Pressure Control Solenoid Main Mod Control Circuit Low	Yes	DNS, Sol OFF (hydraulic default)
P0963	Pressure Control Solenoid Main Mod Control Circuit High	Yes	None
P0964	Pressure Control Solenoid 2 (PCS2) Control Circuit Open	Yes	DNS, Sol OFF (hydraulic default)
P0966	Pressure Control Solenoid 2 (PCS2) Control Circuit Low	Yes	DNS, Sol OFF (hydraulic default)
P0967	Pressure Control Solenoid 2 (PCS2) Control Circuit High	Yes	DNS, Sol OFF (hydraulic default)
P0968	Pressure Control Solenoid 3 (PCS3) Control Circuit Open	Yes	DNS, Sol OFF (hydraulic default)
P0970	Pressure Control Solenoid 3 (PCS3) Control Circuit Low	Yes	DNS, Sol OFF (hydraulic default)
P0971	Pressure Control Solenoid 3 (PCS3) Control Circuit High	Yes	DNS, Sol OFF (hydraulic default)
P0973	Shift Solenoid 1 (SS1) Control Circuit Low	Yes	DNS, Sol OFF (hydraulic default)
P0974	Shift Solenoid 1 (SS1) Control Circuit High	Yes	DNS, Sol OFF (hydraulic default)
P0975	Shift Solenoid 2 (SS2) Control Circuit Open	Yes	7-speed: Allow 2 through 6, N, R.
P0976	Shift Solenoid 2 (SS2) Control Circuit Low	Yes	Allow 2 through 6, N, R. Inhibit TCC operation
P0977	Shift Solenoid 2 Control Circuit High	Yes	7-speed: Allow 2 through 6, N, R.
P0989	Retarder Pressure Sensor Failed Low	No	None
P0990	Retarder Pressure Sensor Failed High	No	None
P1739	Incorrect Low Gear Ratio	Yes	DNS, command 2nd and allow shifts 2 through 6, N, R
P1891	Throttle Position Sensor PWM Signal Low Input	No	Use default throttle value
P1892	Throttle Position Sensor PWM Signal High Input	No	Use default throttle value
P2184	Engine Coolant Temperature Sensor Circuit Low Input	No	Use default engine coolant value

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DIAGNOSTIC TROUBLE CODES (DTC)

Table 6–2. Diagnostic Troubleshooting Codes (DTC) and Descriptions *(cont'd)*

DTC	Description	CHECK TRANS Light	Inhibited Operation Description
P2185	Engine Coolant Temperature Sensor Circuit High Input	No	Use default engine coolant value
P2637	Torque Management Feedback Signal (SEM)	Yes	Inhibit SEM
P2641	Torque Management Feedback Signal (LRTP)	Yes	Inhibit LRTP
P2670	Actuator Supply Voltage 2 (HSD2) Low	Yes	DNS, SOL OFF (hydraulic default)
P2671	Actuator Supply Voltage 2 (HSD2) High	Yes	DNS, SOL OFF (hydraulic default)
P2685	Actuator Supply Voltage 3 (HSD3) Low	Yes	DNS, SOL OFF (hydraulic default)
P2686	Actuator Supply Voltage 3 (HSD3) High	Yes	DNS, SOL OFF (hydraulic default)
P2714	Pressure Control Solenoid 4 (PCS4) Stuck Off	Yes	DNS, RPR
P2715	Pressure Control Solenoid 4 (PCS4) Stuck On	Yes	DNS, SOL OFF (hydraulic default)
P2718	Pressure Control Solenoid 4 (PCS4) Control Circuit Open	Yes	DNS, SOL OFF (hydraulic default)
P2720	Pressure Control Solenoid 4 (PCS4) Control Circuit Low	Yes	DNS, SOL OFF (hydraulic default)
P2721	Pressure Control Solenoid 4 (PCS4) Control Circuit High	Yes	DNS, SOL OFF (hydraulic default)
P2723	Pressure Control Solenoid 1 (PCS1) Stuck Off	Yes	DNS, RPR
P2724	Pressure Control Solenoid 1 (PCS1) Stuck On	Yes	DNS, RPR
P2727	Pressure Control Solenoid 1 (PCS1) Control Circuit Open	Yes	DNS, SOL OFF (hydraulic default)
P2729	Pressure Control Solenoid 1 (PCS1) Control Circuit Low	Yes	DNS, SOL OFF (hydraulic default)
P2730	Pressure Control Solenoid 1 (PCS1) Control Circuit High	Yes	DNS, SOL OFF (hydraulic default)
P2736	Pressure Control Solenoid 5 (PCS5) Control Circuit Open	Yes	Inhibit retarder operation
P2738	Pressure Control Solenoid 5 (PCS5) Control Circuit Low	Yes	Allow 2 through 6, N, R. Inhibit TCC operation
P2739	Pressure Control Solenoid 5 (PCS5) Control Circuit High	Yes	Inhibit retarder operation
P2740	Retarder Oil Temperature Hot	No	None
P2742	Retarder Oil Temperature Sensor Circuit—Low Input	No	Use default retarder temp values
P2743	Retarder Oil Temperature Sensor Circuit—High Input	No	Use default retarder temp values
P2761	TCC PCS Control Circuit Open	Yes	Inhibit TCC operation
P2763	TCC PCS Control Circuit High	Yes	Inhibit TCC operation
P2764	TCC PCS Control Circuit Low	Yes	Allow 2 through 6, N, R. Inhibit TCC operation
P278A	Kickdown Input Failed ON	No	Inhibit kickdown operation
P2793	Gear Shift Direction Circuit	Yes	None
P2808	Pressure Control Solenoid 6 (PCS6) Stuck Off	Yes	DNS, RPR

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DIAGNOSTIC TROUBLE CODES (DTC)

Table 6–2. Diagnostic Troubleshooting Codes (DTC) and Descriptions *(cont'd)*

DTC	Description	CHECK TRANS Light	Inhibited Operation Description
P2809	Pressure Control Solenoid 6 (PCS6) Stuck On	Yes	DNS, RPR
P2812	Pressure Control Solenoid 6 (PCS6) Control Circuit Open	Yes	DNS, SOL OFF (hydraulic default)
P2814	Pressure Control Solenoid 6 (PCS6) Control Circuit Low	Yes	DNS, SOL OFF (hydraulic default)
P2815	Pressure Control Solenoid 6 (PCS6) Control Circuit High	Yes	DNS, SOL OFF (hydraulic default)
U0001	Hi Speed CAN Bus Reset Counter Overrun (IESCAN)	No	Use default values, inhibit SEM
U0010	CAN BUS Reset Counter Overrun	No	Use default values, inhibit SEM
U0100	Lost Communications with ECM/PCM (J1587)	Yes	use default throttle values
U0103	Lost Communication With Gear Shift Module (Shift Selector) 1	Yes	Maintain range selected, observe gear shift direction circuit
U0115	Lost Communication With ECM	Yes	Uses throttle default values
U0291	Lost Communication With Gear Shift Module (Shift Selector) 2	Yes	Maintain range selected, observe gear shift direction circuit
U0304	Incompatible Gear Shift Module 1 (Shift Selector ID)	Yes	Ignore shift selector inputs
U0333	Incompatible Gear Shift Module 2 (Shift Selector ID)	Yes	Ignore shift selector inputs
U0404	Invalid Data Received From Gear Shift Module (Shift Selector) 1	Yes	Maintain range selected, observe gear shift direction circuit
U0592	Invalid Data Received From Gear Shift Module (Shift Selector) 2	Yes	Maintain range selected, observe gear shift direction circuit

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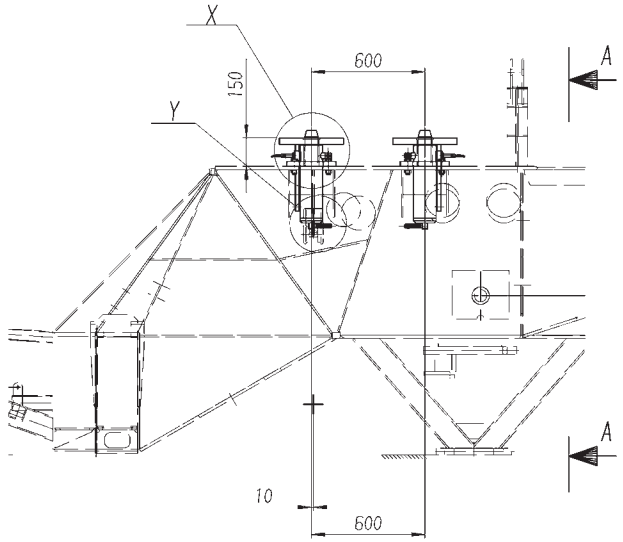
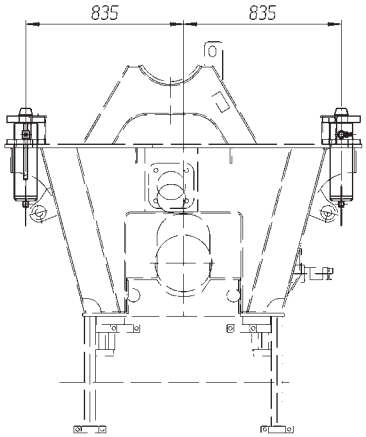
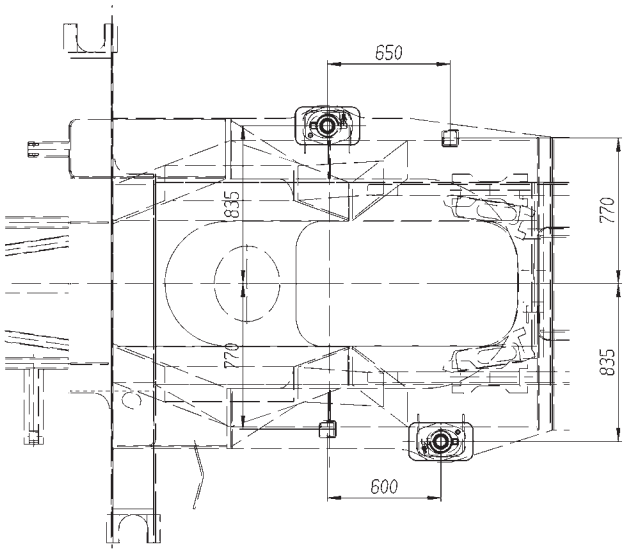


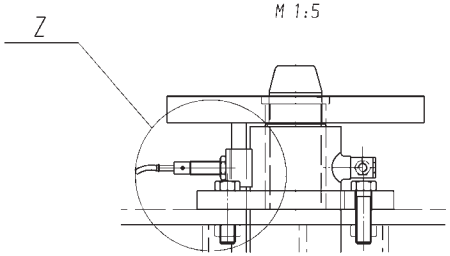
Schnitt A-A





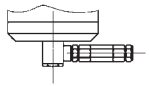
Einzelheit X

M 1:5



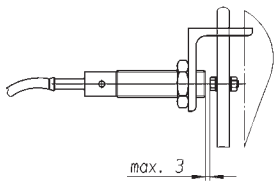
Einzelheit Y

M 1:5



Einzelheit Z

M 1:2.5



Näherungsinitiator auf 2-3 mm zum Schaltkontakt einstellen

SIA	Datum	Änc.-Zustand									
			b	06.12.95	M.Schilling	N 0916					
			a	30.03.94	M.Schilling	N 0467					
			0	Datum	Name	ÄM.-Nr.	Paßmaß	Abmaß	Typ	Wiederholverw. siehe SAP	

zul. Abw. mittel DIN 7168	Oberfl. Reihe 2 DIN 3141	Maßstab: 1 : 20	Gewicht: 112 kg	Lrstverwendung		
		Werkstoff .		Typ K4209/AC205	F	Pos
		Rohteil-Nr. .		Ident-Nr.		
		Modell-Nr. .		.	.	.

	Datum	Name
Bearb.	08.07.93	M.Schilling
Gepr.	23.10.98	ARCHIV
Norm	.	.
Abt.: 8362	Copyright reserved	

Benennung: EM-GGW-Ablage-AC205

Schutzvermerk nach DIN 34 beachten

Plotstatus	Plotersteller	Datum
		.

MANNESMANN DEMAG Baumaschinen

Ident-Nr.	Format	Blatt/Blätter
544500	A2	1 / 1

Entstanden aus:	Ersatz für:	Ersetzt durch:	
.	.	.	CAD

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Counterweight - Axle Loads

Three counterweight variants are possible

1. **5.2 t Counterweight** approx. 11 t axle load

   5.2 t counterweight is fixed to the superstructure frame

   1 x 1.9 t, 1 x 1.7 t and 2 x 0.7 t

2. **8 t Counterweight** approx. 12 t axle load

   6.9 t counterweight is fixed to the superstructure frame

   1 x 1.9 t, 1 x 1.7 t, 2 x 0.7 t and 1 x 1.7 t

   1.2 t pin locked

   When the crane is driven 1.2 t counterweight must be placed on the carrier

3. **18 t Counterweights** approx. 14.5 t axle load

   10.35 t counterweights are fixed to the superstructure frame

   1 x 1.9 t, 1 x 1.7 t, 2 x 0.7 t, 1 x 1.7 t and 1 x 3.45 t

   +7.75 t counterweights pin locked

   1 x 1.2 t, 1 x 2.55 t, 1 x 1.9 t and 1 x 2.1 t

   When the crane is driven 7.75 t counterweight must be placed on the carrier

Fitting and removing of counterweights

If H II is fitted (pin-locked), the two 0.7 t counterweights are not required (2 x 0.7 t is the same as the mass of H II)

The counterweights are placed on the carrier with aid of two hydraulic cylinders from below

The counterweights are pin locked via a spindle drive with 2 electric motors which are actuated from the crane cab

Emergency actuation of pin locking mechanism is possible with hand wheels on the operating device for electric motors - see operating manual.

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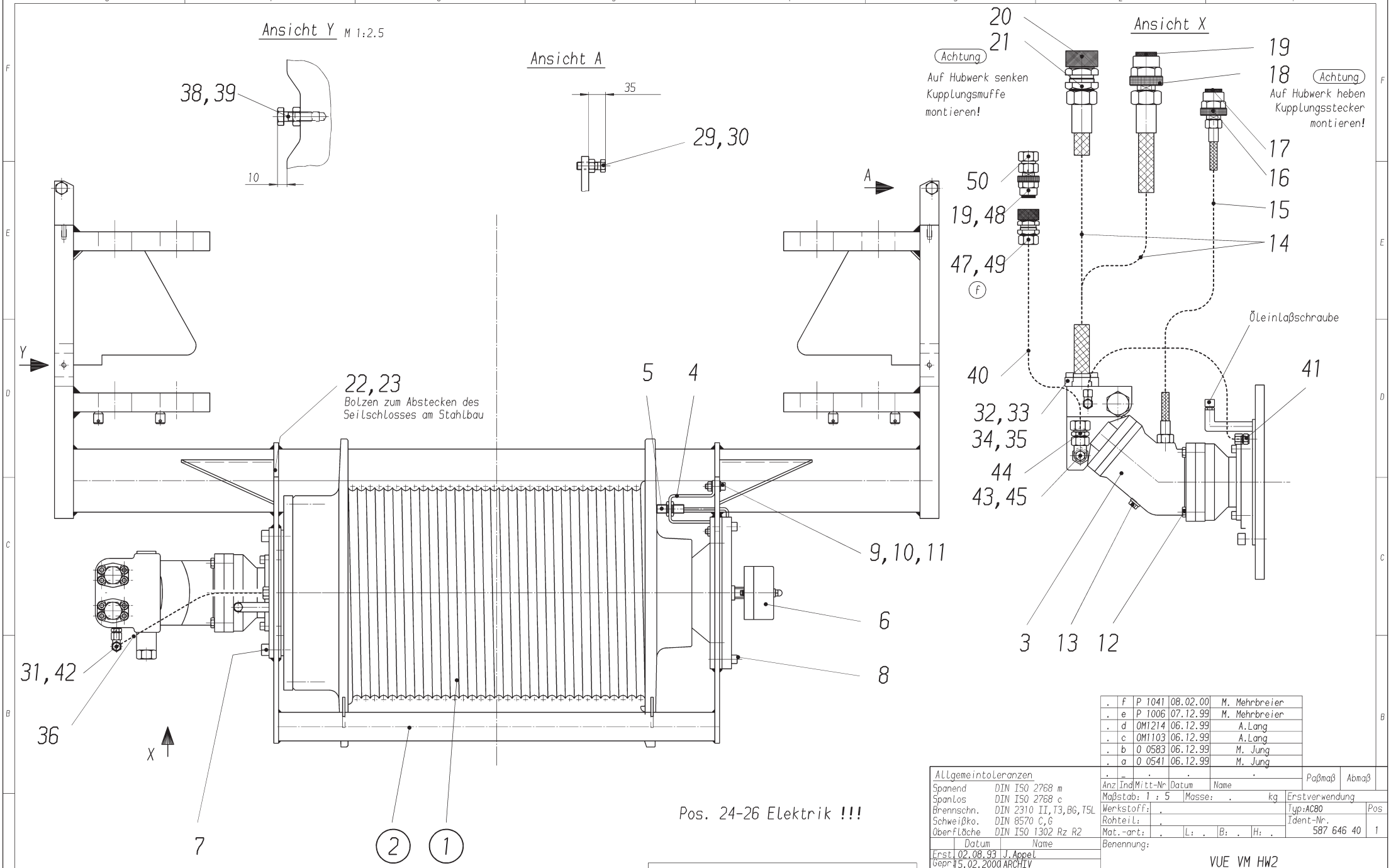

.	f	P 1041	08.02.00	M. Mehrbreier	
.	e	P 1006	07.12.99	M. Mehrbreier	
.	d	0M1214	06.12.99	A.Lang	
.	c	0M1103	06.12.99	A.Lang	
.	b	0 0583	06.12.99	M. Jung	
.	a	0 0541	06.12.99	M. Jung	

Schwerpunkt VM HW2

m = 975 kg x = 3963 mm

Allgemeintoleranzen

Spanend	DIN ISO 2768 m
Spanlos	DIN ISO 2768 c
Brennschn.	DIN 2310 II, T3, BG, T5L
Schweißko.	DIN 8570 C, G
Oberfläche	DIN ISO 1302 Rz R2

	Datum	Name
Erst	02.08.93	J. Appel
Gepr	15.02.2000	ARCHIV
Frei	.	.

Abt.: 8361 Zusatzsprache: .

Schutzvermerk nach DIN 34 beachten
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Anz	Ind	Mitt-Nr	Datum	Name	Paßmaß	Abmaß

Maßstab: 1 : 5 Masse: . kg Erstverwendung

Werkstoff: . Typ: AC80 Pos

Rohteil: . Ident-Nr. 587 646 40 1

Mat.-art: . L: . B: . H: .

Benennung:

VUE VM HW2
AC 80

Plotstatus	Plotersteller	Plotdatum

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Ident-Nr. 587 642 40

Format A2 Bl./Blätter 1 / 1

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(35) Druckaufnehmer

(8) Elektrik Ausleger kpl.

Allgemeintoleranzen
Spanend DIN ISO 2768 m
Spanlos DIN ISO 2768 c
Brennschn. DIN 2310 II,T3,BG,T5L
Schweißko. DIN 8570 C,G
Oberfläche DIN ISO 1302 Rz R2

	Datum	Name
Erst	04.12.01	F. Conrad
Gepr	10.12.2001	ARCHIV
Frei	.	.

Abt.: 8561 Zusatzsprache: .

Schutzvermerk nach DIN 34 beachten
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Anz Ind Mitt-Nr Datum Name — Paßmaß Abmaß

Maßstab: 1 : 7 Masse: . kg — Erstverwendung
Werkstoff: % — Typ: AC 80-2 — Pos
Rohteil: . — Ident-Nr. .
Mat.-art: B-E L: . B: . H: .

Benennung:

VM TELEAUSLEGER KPL

Plotstatus | Plotersteller | Plotdatum

Ident-Nr. 165 737 12 — Format A1 — B./Blätter 1 / 5

Entstanden aus: . Ersatz für: . Ersetzt durch: . CAD

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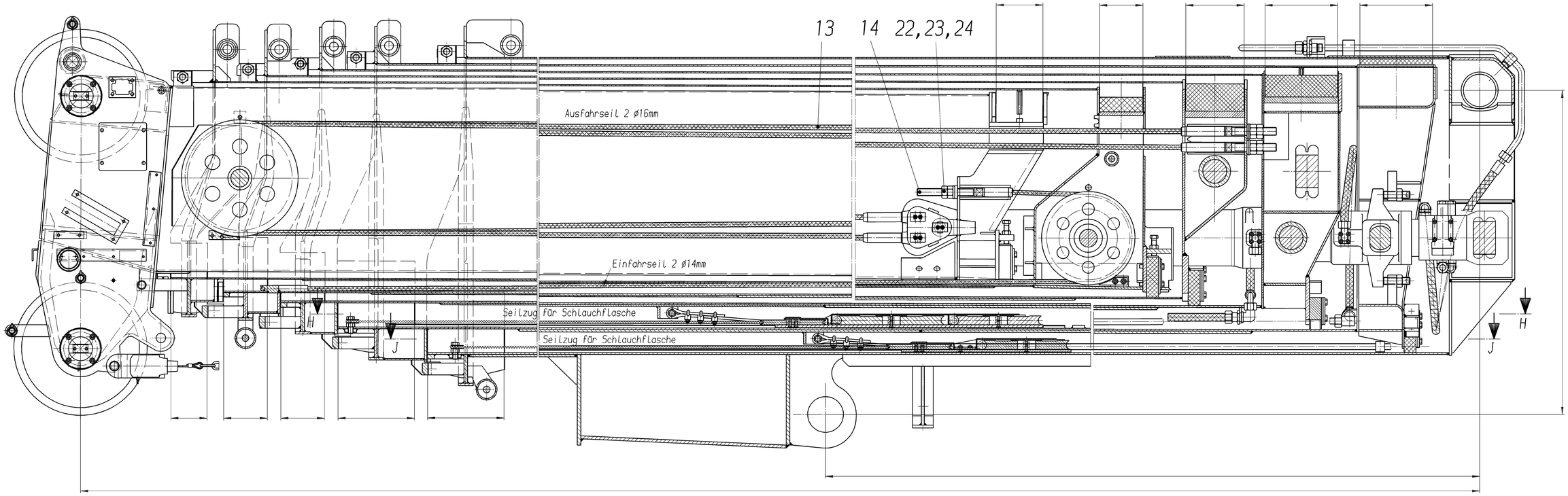
Schnitt K-K



Allgemeintoleranzen	
Spanend	DIN ISO 2768 m
Spanlos	DIN ISO 2768 c
Brennschn.	DIN 2310 II, T3, BG, T5L
Schweißko.	DIN 8570 C, G
Oberfläche	DIN ISO 1302 Rz R2

	Datum	Name
Erst	04.12.01	F. Conrad
Gepr	10.12.2001	ARCHIV
Frei	.	.

Abt.: 8561 | Zusatzsprache: .

Schutzvermerk nach DIN 34 beachten
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Anz	Ind	Mitt-Nr	Datum	Name	Paßmaß	Abmaß

Maßstab: 1 : 7	Masse: . kg	Erstverwendung	
Werkstoff: %		Typ: AC 80-2	Pos
Rohteil: .		Ident-Nr.	
Mat.-art: B-E	L: . B: . H: .	.	.

Benennung:

VM TELEAUSLEGER KPL

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Plotstatus	Ploterersteller	Plotdatum

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Ident-Nr. 165 737 12

Format A1 | Bl./Blätter 2 / 5

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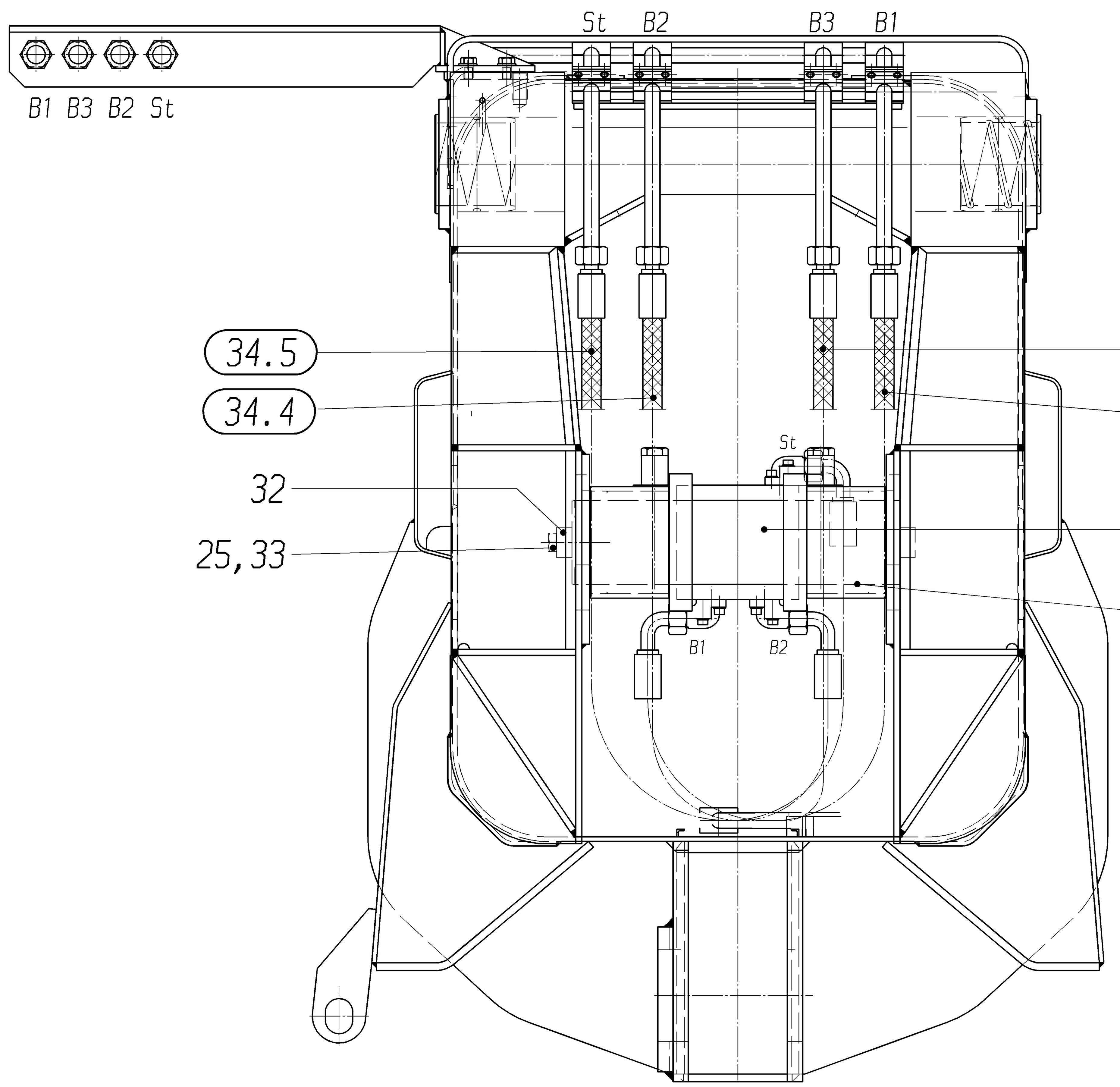
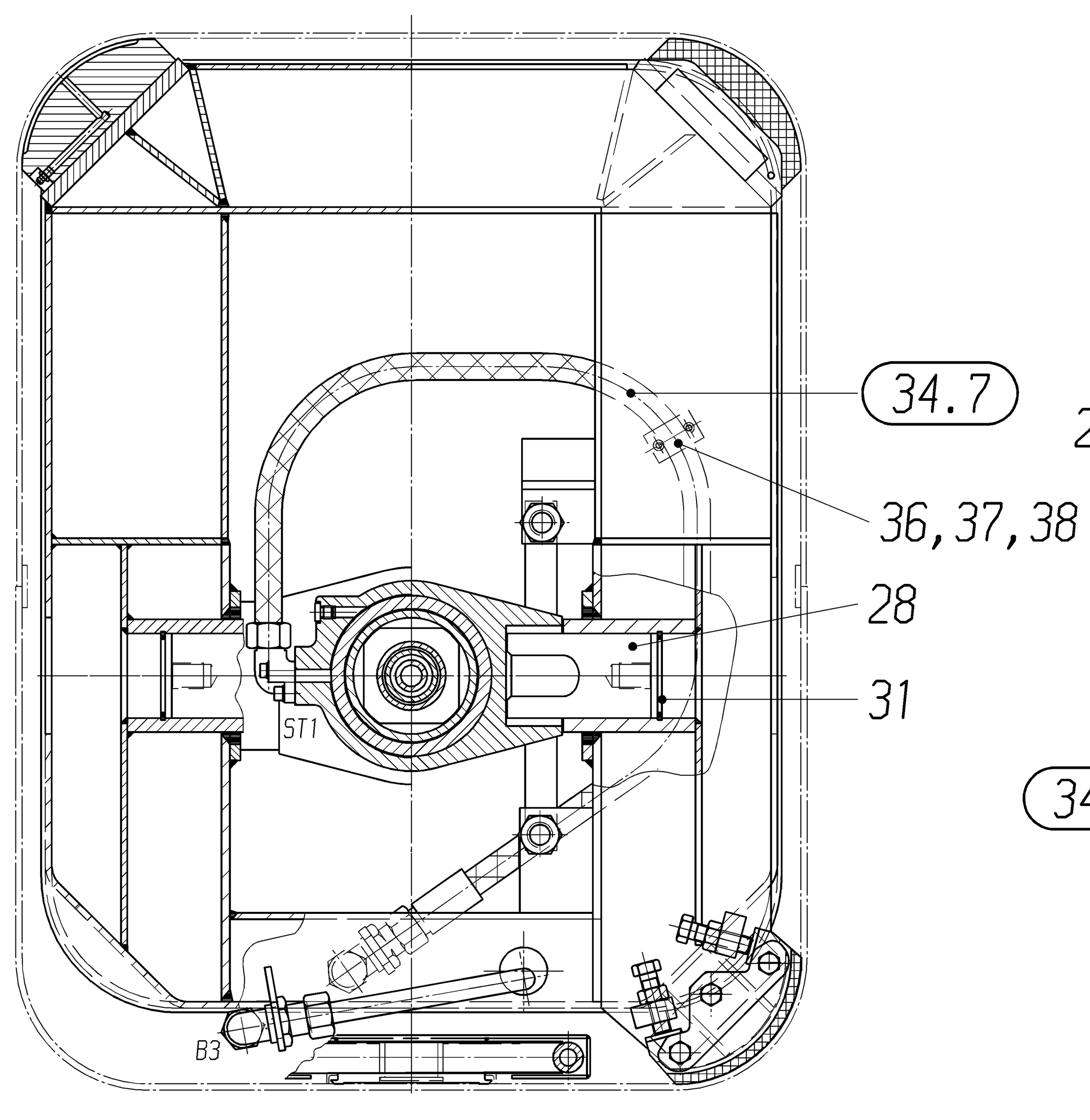
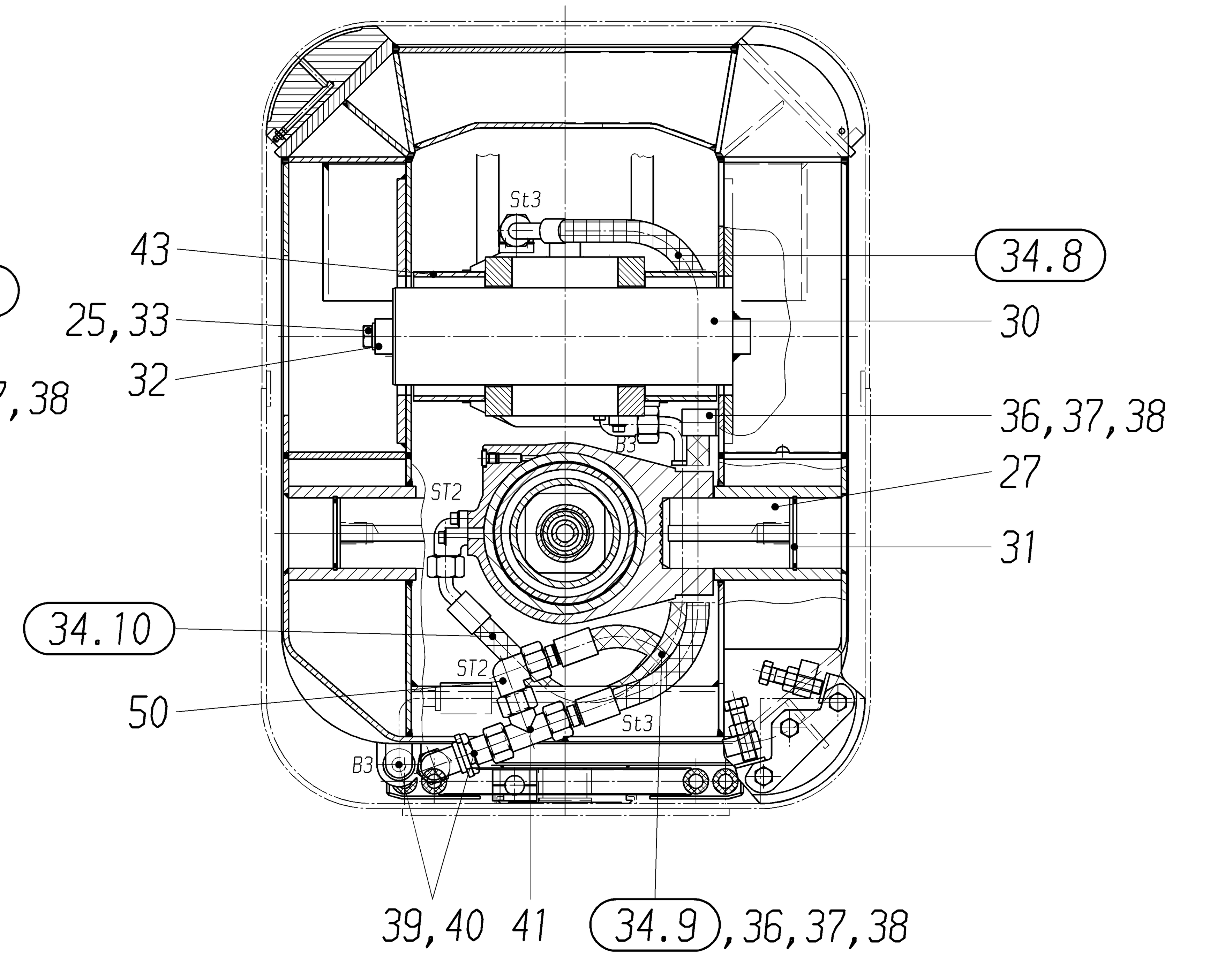
Ansicht X



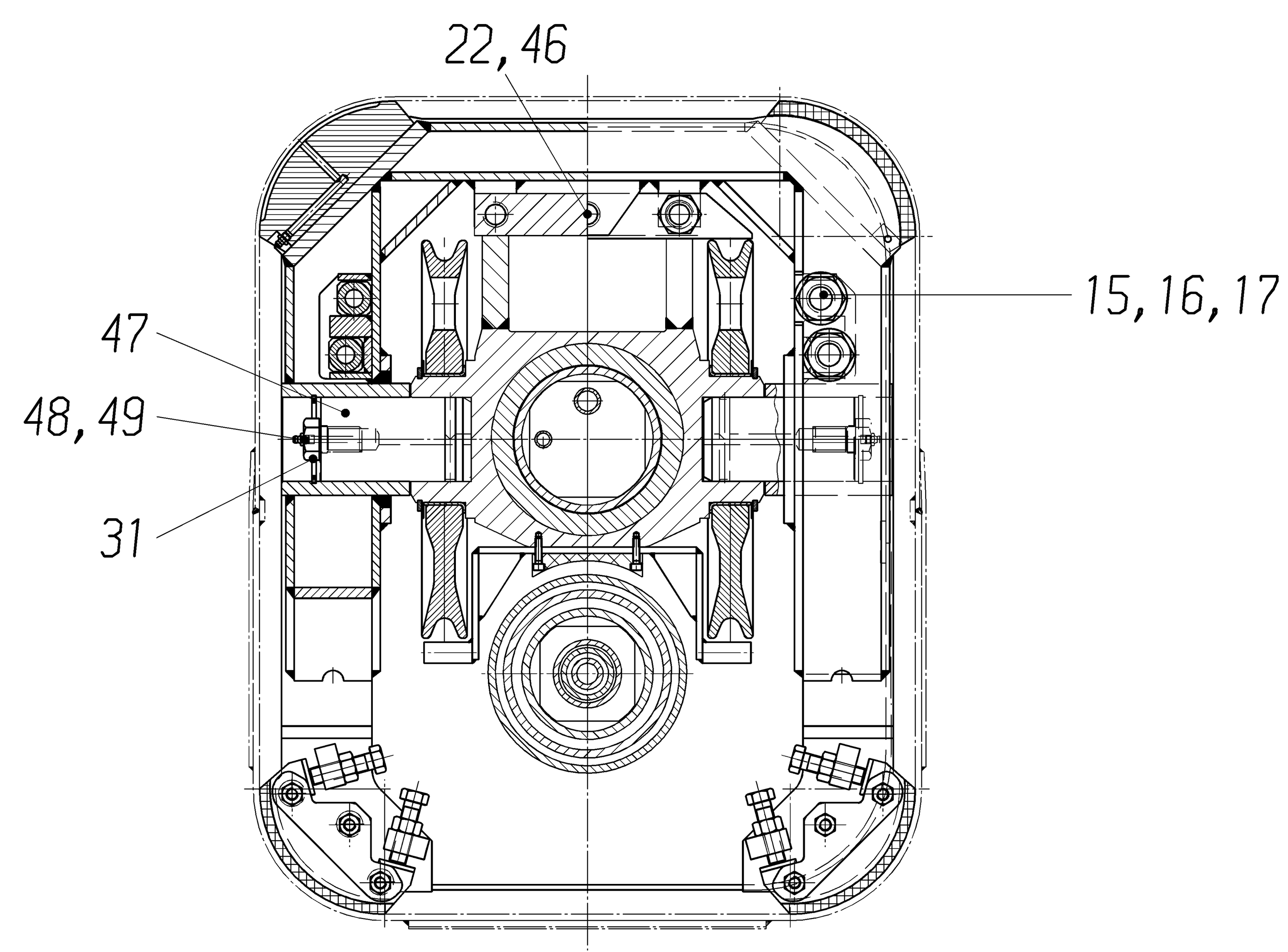
Halbschnitt B-B   Halbschnitt A-A



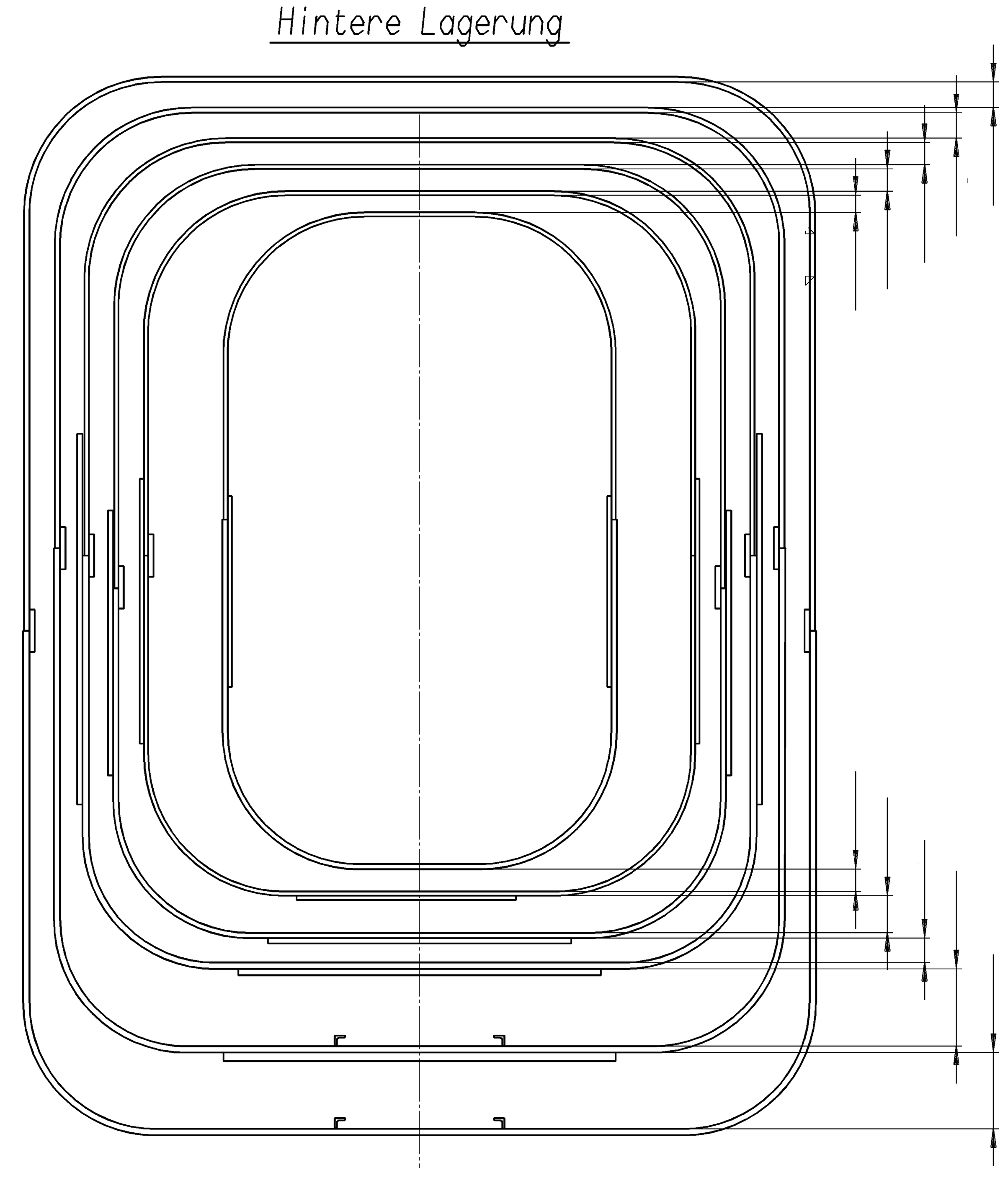
Halbschnitt D-D   Halbschnitt C-C



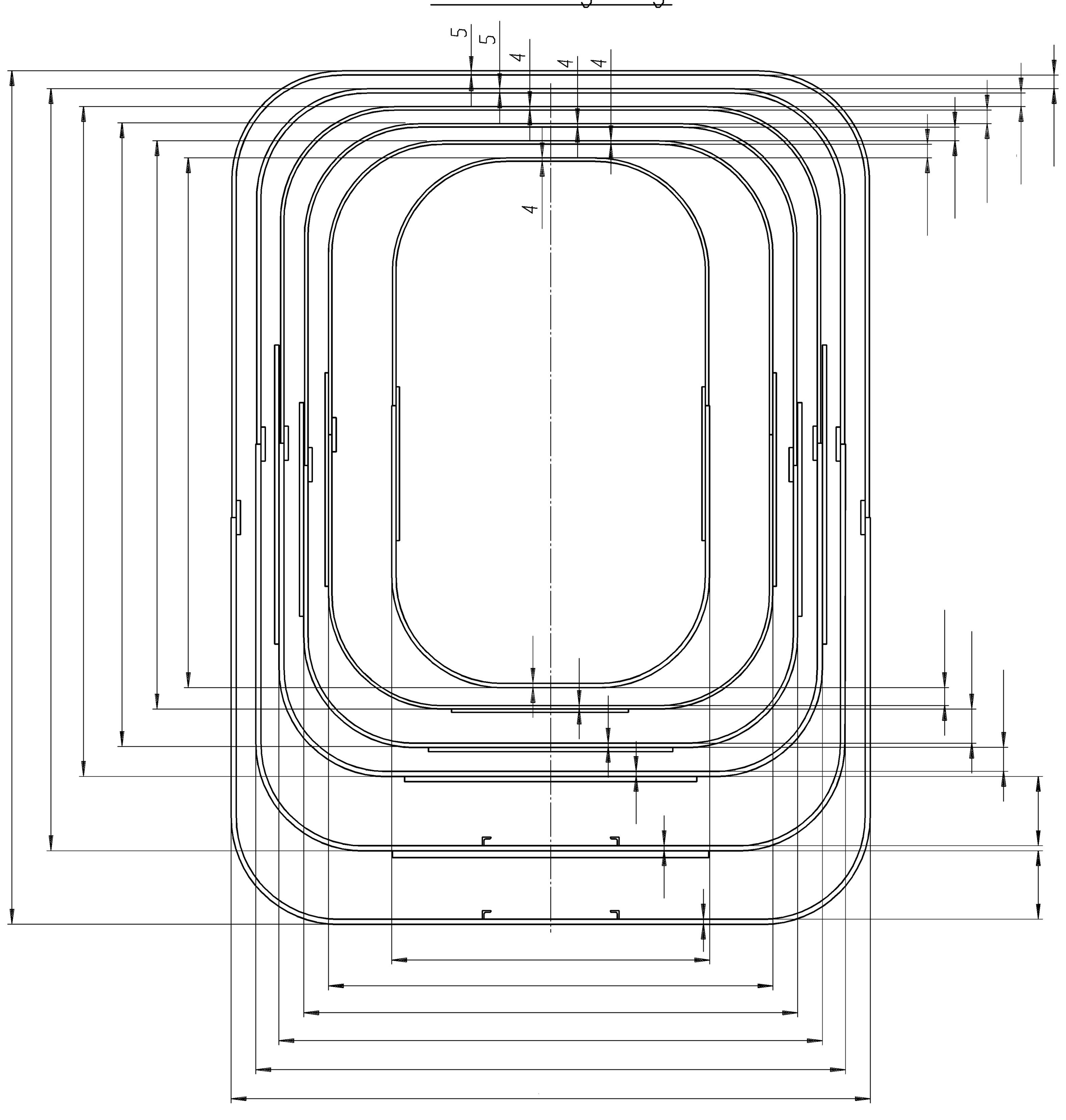
Halbschnitt F-F   Halbschnitt E-E



Hintere Lagerung



Vordere Lagerung



Allgemeintoleranzen	
Spanend	DIN ISO 2768 m
Spanlos	DIN ISO 2768 c
Brennschn.	DIN 2310 II,T3,BG,T5L
Schweißko.	DIN 8570 C,G
Oberfläche	DIN ISO 1302 Rz R2

	Datum	Name
Erst	04.12.01	F. Conrad
Gepr	10.12.2001	ARCHIV
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Anz	Ind	Mitt-Nr	Datum	Name	Paßmaß	Abmaß
.	_	.	.	.		

Maßstab: 1 : 5 | Masse: . kg | Erstverwendung
Werkstoff: % | Typ: AC 80 | Pos
Rohteil: . | Ident-Nr. .
Mat.-art: B-E | L: . | B: . | H: . | .

Benennung:

VM TELEAUSLEGER KPL

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Plotstatus | Plotersteller | Plotdatum

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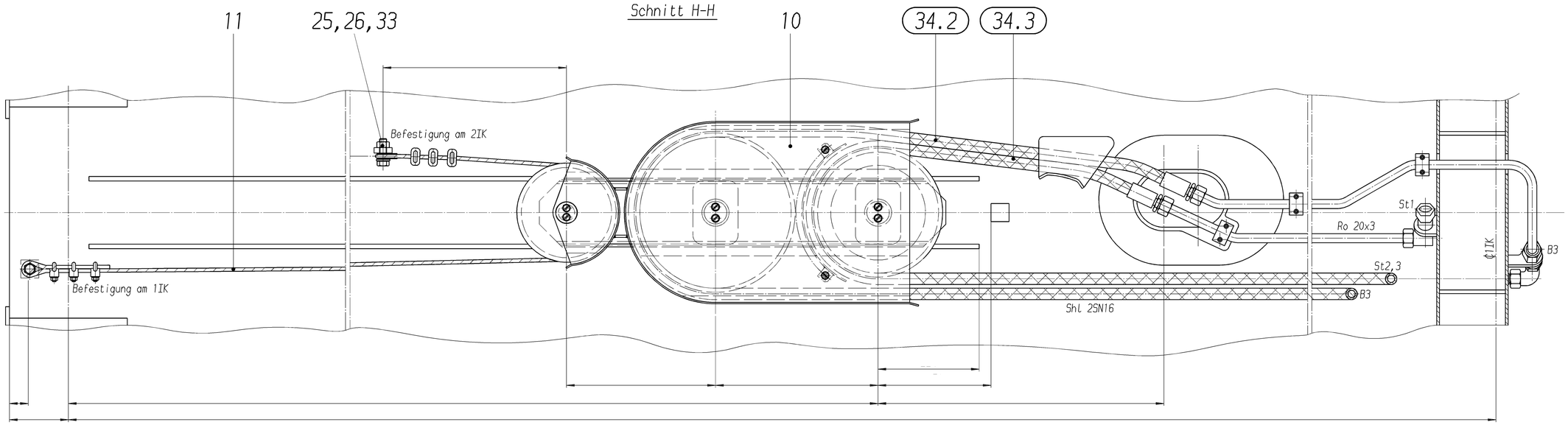
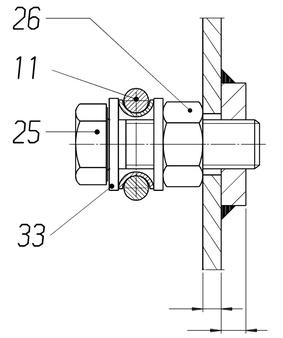
Schnitt H-H

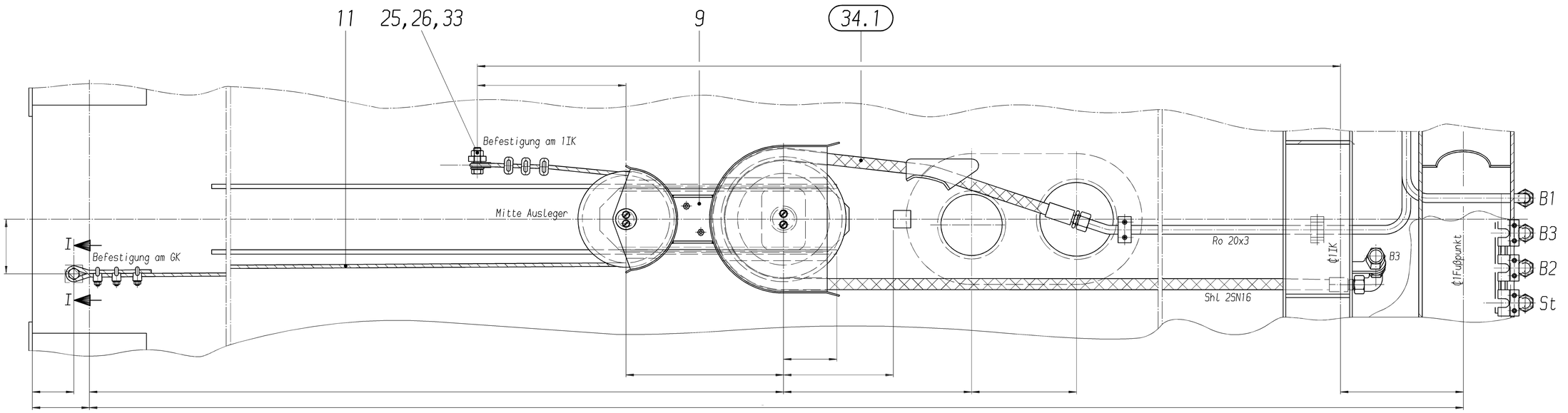


Schnitt I-I

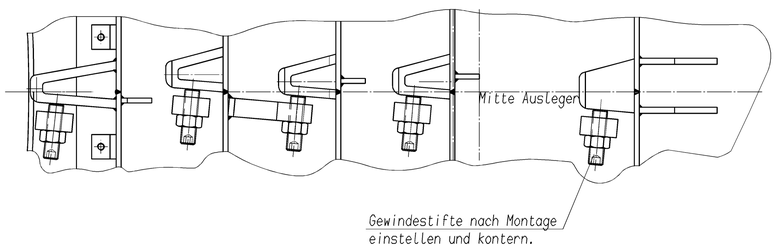
M 1:1



Schnitt J-J



Ansicht Y



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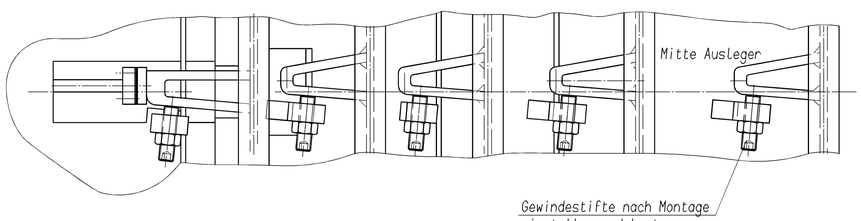

Allgemeintoleranzen		Paßmaß	Abmaß
Spanend	DIN ISO 2768 m		
Spanlos	DIN ISO 2768 c		
Brennschn.	DIN 2310 II, T3, BG, T5L		
Schweißko.	DIN 8570 C,G		
Oberfläche	DIN ISO 1302 Rz R2		

Datum	Name
Erst 04.12.01	F. Conrad
Gepr 10.12.2001	ARCHIV
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Anz	Ind	Mitt-Nr	Datum	Name

Maßstab: 1 : 5 | Masse: . kg | Erstverwendung

Werkstoff: % | Typ: AC 80-2 | Pos

Rohteil: . | Ident-Nr. .

Mat.-art: B-E | L: . | B: . | H: . | .

Benennung:

VM TELEAUSLEGER KPL

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Plotstatus | Plotersteller | Plotdatum

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10.9 m

Ausfahrfolge	[%]	[mm]
1. IK.	0	0
2. IK.	0	0
3. IK.	0	0
4. IK.	0	0
5. IK.	0	0
AF :		6013
AS :		5744
Schwerpkt.(m):		5309
Masse (kg)		11756

16.1 m

Ausfahrfolge	[%]	[mm]
1. IK.	0	0
2. IK.	67	5244
3. IK.	0	0
4. IK.	0	0
5. IK.	0	0
AF :		5860
AS :		5991
Schwerpkt.(m):		8144
Masse (kg)		11852

21.4 m

Ausfahrfolge	[%]	[mm]
1. IK.	67	5244
2. IK.	67	5244
3. IK.	0	0
4. IK.	0	0
5. IK.	0	0
AF :		5164
AS :		6748
Schwerpkt.(m):		12097
Masse (kg)		11912

21.5 m

Ausfahrfolge	[%]	[mm]
1. IK.	0	0
2. IK.	34	2661
3. IK.	34	2661
4. IK.	34	2661
5. IK.	34	2661
AF :		7228
AS :		4613
Schwerpkt.(m):		8381
Masse (kg)		11842

25.0 m

Ausfahrfolge	[%]	[mm]
1. IK.	80	6262
2. IK.	100	7827
3. IK.	0	0
4. IK.	0	0
5. IK.	0	0
AF :		5132
AS :		6838
Schwerpkt.(m):		14256
Masse (kg)		11971

25.0 m

Ausfahrfolge	[%]	[mm]
1. IK.	36	2818
2. IK.	36	2818
3. IK.	36	2818
4. IK.	36	2818
5. IK.	36	2818
AF :		6792
AS :		5087
Schwerpkt.(m):		10676
Masse (kg)		11879

31.3 m

Ausfahrfolge	[%]	[mm]
1. IK.	90	7044
2. IK.	90	7044
3. IK.	27	2113
4. IK.	27	2113
5. IK.	27	2113
AF :		5973
AS :		6022
Schwerpkt.(m):		15711
Masse (kg)		11995

31.1 m

Ausfahrfolge	[%]	[mm]
1. IK.	74	5792
2. IK.	74	5792
3. IK.	37	2896
4. IK.	37	2896
5. IK.	37	2896
AF :		6367
AS :		5602
Schwerpkt.(m):		14573
Masse (kg)		11969

31.4 m

Ausfahrfolge	[%]	[mm]
1. IK.	20	1565
2. IK.	20	1565
3. IK.	74	5792
4. IK.	74	5792
5. IK.	74	5792
AF :		7759
AS :		4125
Schwerpkt.(m):		10889
Masse (kg)		11883

37.1 m

Ausfahrfolge	[%]	[mm]
1. IK.	100	7827
2. IK.	100	7827
3. IK.	45	3522
4. IK.	45	3522
5. IK.	45	3522
AF :		6332
AS :		5705
Schwerpkt.(m):		17577
Masse (kg)		12038

37.1 m

Ausfahrfolge	[%]	[mm]
1. IK.	67	5244
2. IK.	67	5244
3. IK.	67	5244
4. IK.	67	5244
5. IK.	67	5244
AF :		7041
AS :		4944
Schwerpkt.(m):		15299
Masse (kg)		11985

37.2 m

Ausfahrfolge	[%]	[mm]
1. IK.	0	0
2. IK.	84	6575
3. IK.	84	6575
4. IK.	84	6575
5. IK.	84	6575
AF :		7818
AS :		4149
Schwerpkt.(m):		12884
Masse (kg)		11967

42.3 m

Ausfahrfolge	[%]	[mm]
1. IK.	90	7044
2. IK.	90	7044
3. IK.	74	5792
4. IK.	74	5792
5. IK.	74	5792
AF :		6938
AS :		5108
Schwerpkt.(m):		17951
Masse (kg)		12046

42.2 m

Ausfahrfolge	[%]	[mm]
1. IK.	74	5792
2. IK.	74	5792
3. IK.	84	6575
4. IK.	84	6575
5. IK.	84	6575
AF :		7227
AS :		4793
Schwerpkt.(m):		16816
Masse (kg)		12020

42.3 m

Ausfahrfolge	[%]	[mm]
1. IK.	28	2192
2. IK.	74	5792
3. IK.	100	7827
4. IK.	100	7827
5. IK.	100	7827
AF :		7780
AS :		4216
Schwerpkt.(m):		14876
Masse (kg)		11996

46.1 m

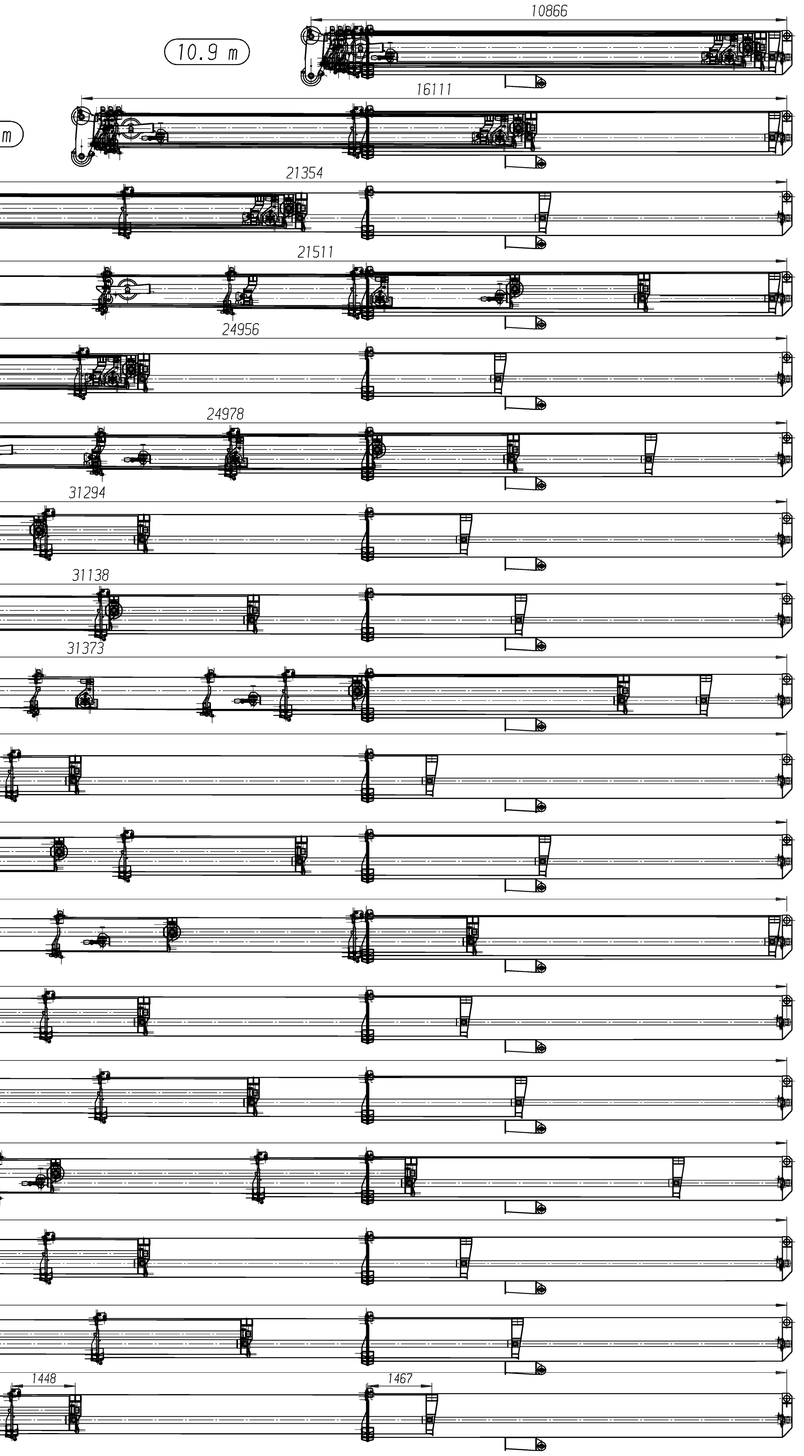
Ausfahrfolge	[%]	[mm]
1. IK.	90	7044
2. IK.	90	7044
3. IK.	90	7044
4. IK.	90	7044
5. IK.	90	7044
AF :		7165
AS :		4898
Schwerpkt.(m):		18713
Masse (kg)		12064

46.1 m

Ausfahrfolge	[%]	[mm]
1. IK.	75	5870
2. IK.	75	5870
3. IK.	100	7827
4. IK.	100	7827
5. IK.	100	7827
AF :		7421
AS :		4619
Schwerpkt.(m):		17680
Masse (kg)		12040

50.0 m

Ausfahrfolge	[%]	[mm]
1. IK.	100	7827
2. IK.	100	7827
3. IK.	100	7827
4. IK.	100	7827
5. IK.	100	7827
AF :		7212
AS :		4886
Schwerpkt.(m):		20195
Masse (kg)		12098



Allgemeintoleranzen												Paßmaß	Abmaß
Spanend	DIN ISO 2768 m												
Spanlos	DIN ISO 2768 c												
Brennschn.	DIN 2310 II,T3,BG,T5L												
Schweißko.	DIN 8570 C,G												
Oberfläche	DIN ISO 1302 Rz R2												
	Datum	Name											
Erst	04.12.01	F. Conrad											
Gepr	10.12.2001	ARCHIV											
Frei	.												
Abt.: 8561		Zusatzsprache: .											

Anz	Ind	Mitt-Nr	Datum	Name

Maßstab: 1 : 70 | Masse: 11762 kg | Erstverwendung

Werkstoff: % | Typ: AC 80-2 | Pos

Rohteil: . | Ident-Nr. .

Mat.-art: B-E | L: . | B: . | H: . | .

Benennung:

VM TELEAUSLEGER KPL

.

Schutzvermerk nach DIN 34 beachten
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Plotstatus	Plotersteller	Plotdatum

engineering Mannesmann Dematic

Ident-Nr. 165 737 12

Format A1 | B./Blätter 5 / 5

Entstanden aus: . | Ersatz für: . | Ersetzt durch: . | CAD

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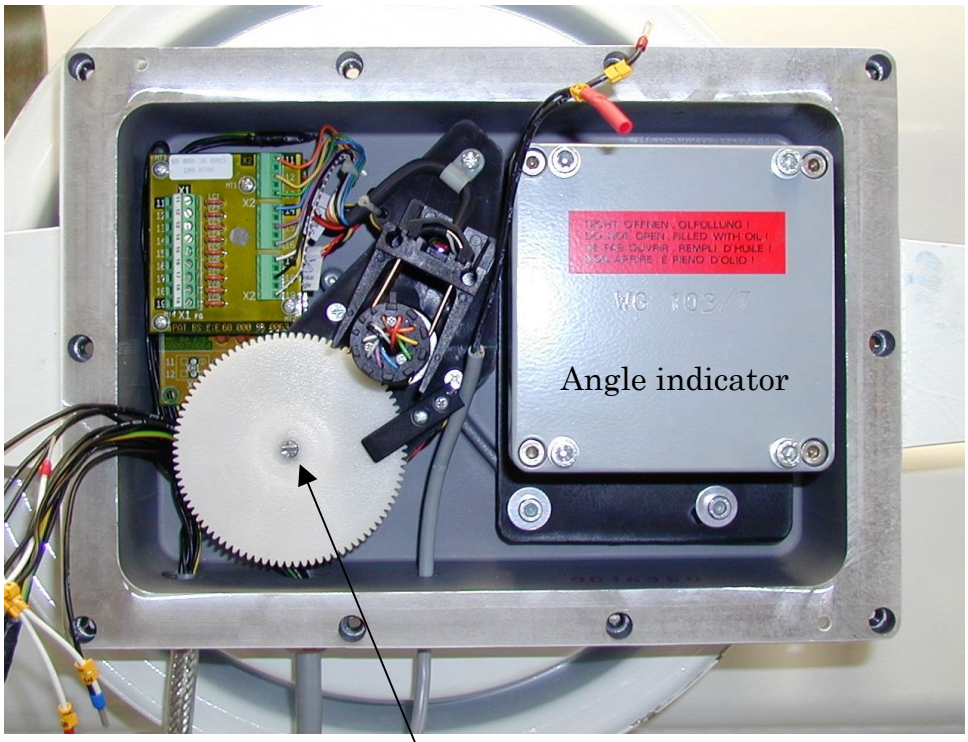
Length angle transmitter



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Drehwerk
Slew Gear

Teleskop
Telescoping Cylinder

Hubwerk 1
Hoist 1

Hubwerk 2
Hoist 2

Wippe
Luffing Gear

OW-KABINENVERSTELLUNG
Tilting the Crane Operator's Cab

Drehbereichsbegrenzung
Opertion Range Limits

Option
beim Kranbetrieb geschlossen
beim Transport mit Dolly geöffnet

Option Freilauf DW
Option free wheeling slew gear

Option Klimaanlage

Option
beim Kranbetrieb geöffnet
beim Transport mit Dolly geschlossen
vor Auslegerdemontage
Kugelhahn schließen

Steuerblock Lenkung

Lüfterantrieb

Pkl L Pdr LS T P

Anordnung Vorsteuerhebel
PILOT CONTROL LEVER

Tele (Hubw.2)
Main Boom (Hoist 2)
Aus (Se)
Extend (Lowering)
Drehwerk
Slew Gear
Li
left
Re
right
Ein (He)
retract (hoisting)

Hubwerk 1
Hoist 1
Se
Lowering
Wippe (Hubw.2)
Boom Elevation (Hoist 2)
Auf (He)
up (hoisting)
Ab (Se)
down (lowering)
He
hoisting

i	004160	22.01.07	Rokhimov	Maßstab:	Masse: kg
h	P10742	19.05.06	Rokhimov		
Ind	MM-NR	Datum	Name	Typ: AC80-2	Werkstoff: % Mat.-gr. UNI.

	Datum	Name
Erst.	25.03.04	Brenner
Gepr.		Brenner

Abteilung: 1141

H-Plan OW AC 80-2

Hydraulic Circuit Diagram Superstructure

Ident-Nr: 16952412

Format: A0 | BL / Blätter: 1/1

Plotdatum: ECSCAD

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Drehwerk
Slew Gear

Teleskop
Telescoping Cylinder

Hubwerk 1
Hoist 1

Hubwerk 2
Hoist 2

Wippe
Luffing Gear

OW-KABINENVERSTELLUNG
Tilting the Crane Operator's Cab

Option
Klimaanlage

Option Freilauf DW
Option free wheeling slew gear

Drehbereichsbegrenzung
Opertion Range Limits

beim Kranbetrieb geschlossen
beim Transport mit Dolly geöffnet

beim Kranbetrieb geöffnet
beim Transport mit Dolly geschlossen
vor Auslegerdemontage
Kugelhahn schließen

Steuerblock
Lenkung

Lüfterantrieb

Pkl L Pdr LS T P

Option

Einstellwerte in separater Tabelle
Setting value in separate list

Anordnung Vorsteuerhebel
PILOT CONTROL LEVER

Tele (Hubw.2)
Main Boom (Hoist 2)
Aus (Se)
Extend (Lowering)
Li
left
Re
right
Ein (He)
retract (hoisting)
He
hoisting

Drehwerk
Slew Gear

Hubwerk 1
Hoist 1
Se
Lowering

Wippe (Hubw.2)
Boom Elevation (Hoist 2)
Auf (He)
up (hoisting)
Ab (Se)
down (lowering)

b	P11342	26.01.2011	Gdelmann	Maßstab:	Masse: kg
a	P11302	19.10.2010	M. Hauch	Typ: AC80-2	Werkstoff: %
Ind	MIR-NR	Datum	Name		Mat.-art: UNTL

	Datum	Name
Erst.	14.10.09	Rakhimov
Gepr.		
Abteilung: 1114 10		

H-Plan OW AC 80-2 EN13000
Hydraulic Circuit Diagram Superstructure

TEREX
Terex Demag GmbH

Ident-Nr: 54418012
Format: A0 | Bl. / Blätter: 1/1
Plotstatus:
ECSCAD

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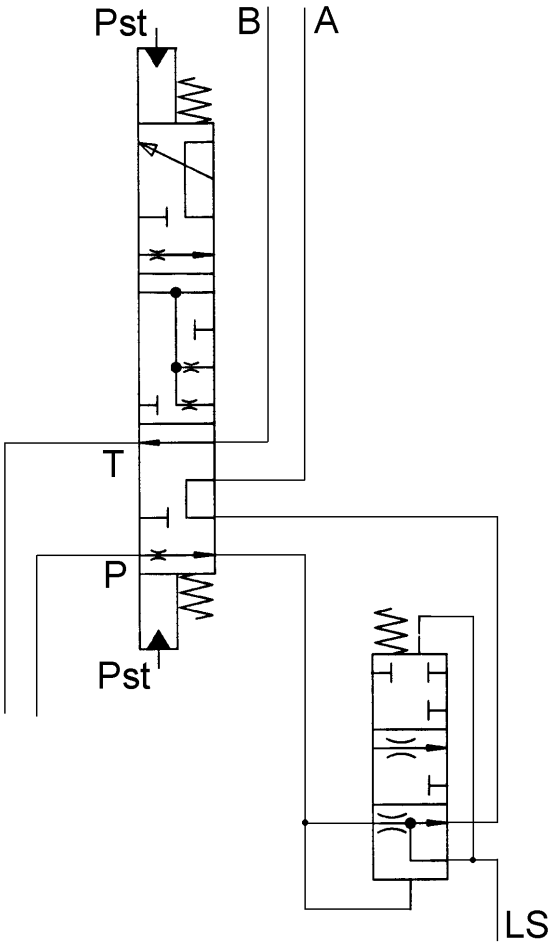
Position of the balancing valve with one movement engaged



If only one movement is engaged the balancing valve is completely opened. The LS-Signal is send to all other balancing valves and the pump.

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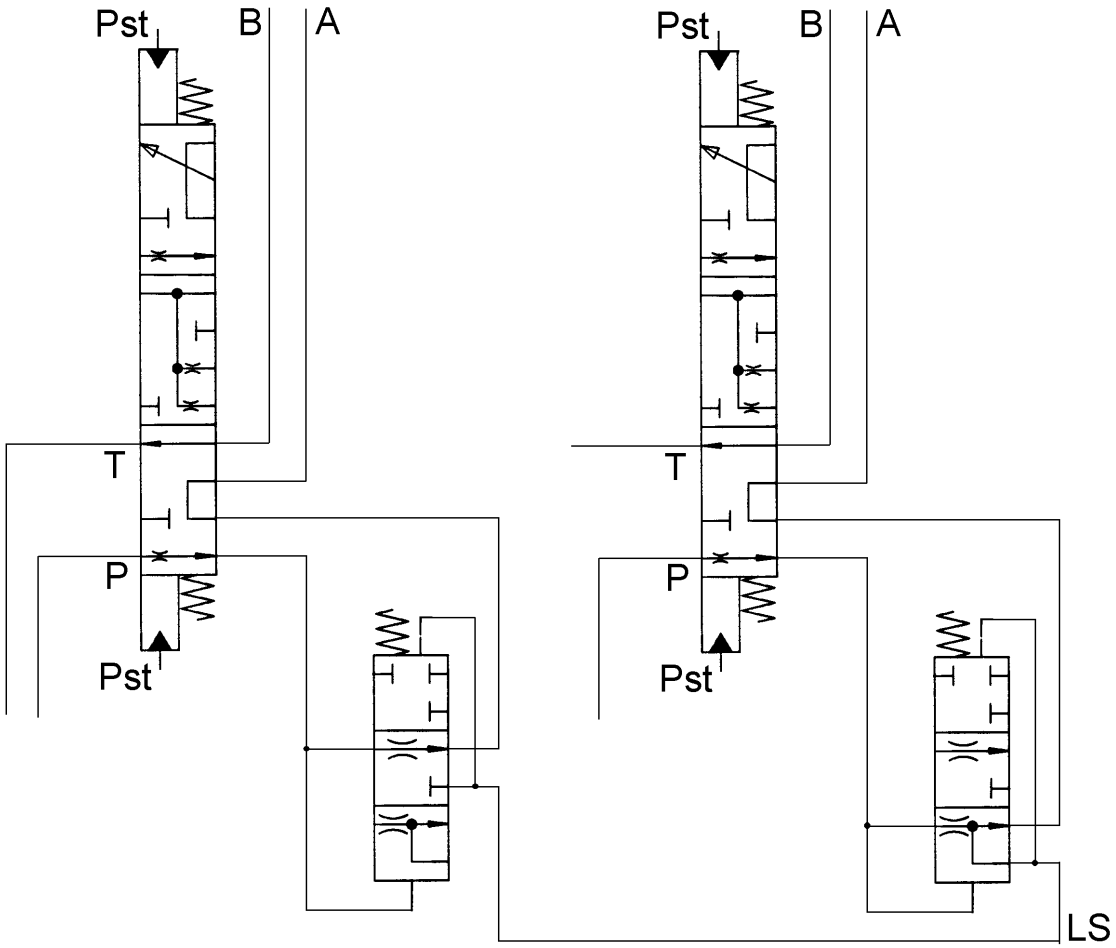
Position of the balancing valve with two movements engaged



With two movements engaged the balancing valve of the movement with the higher pressure opens completely, the balancing valve of the movement with the lower pressure close.

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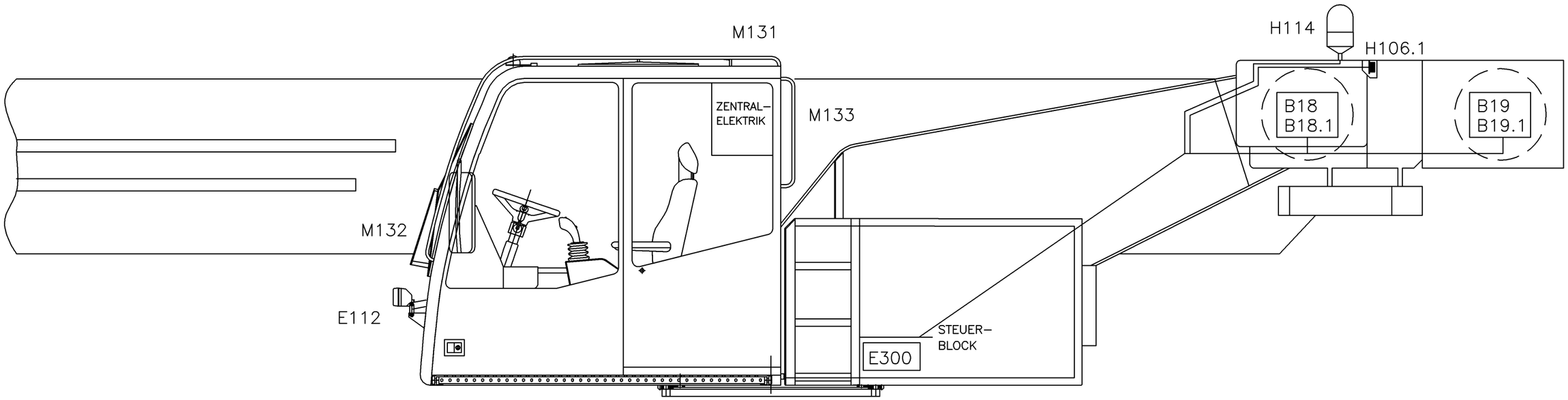

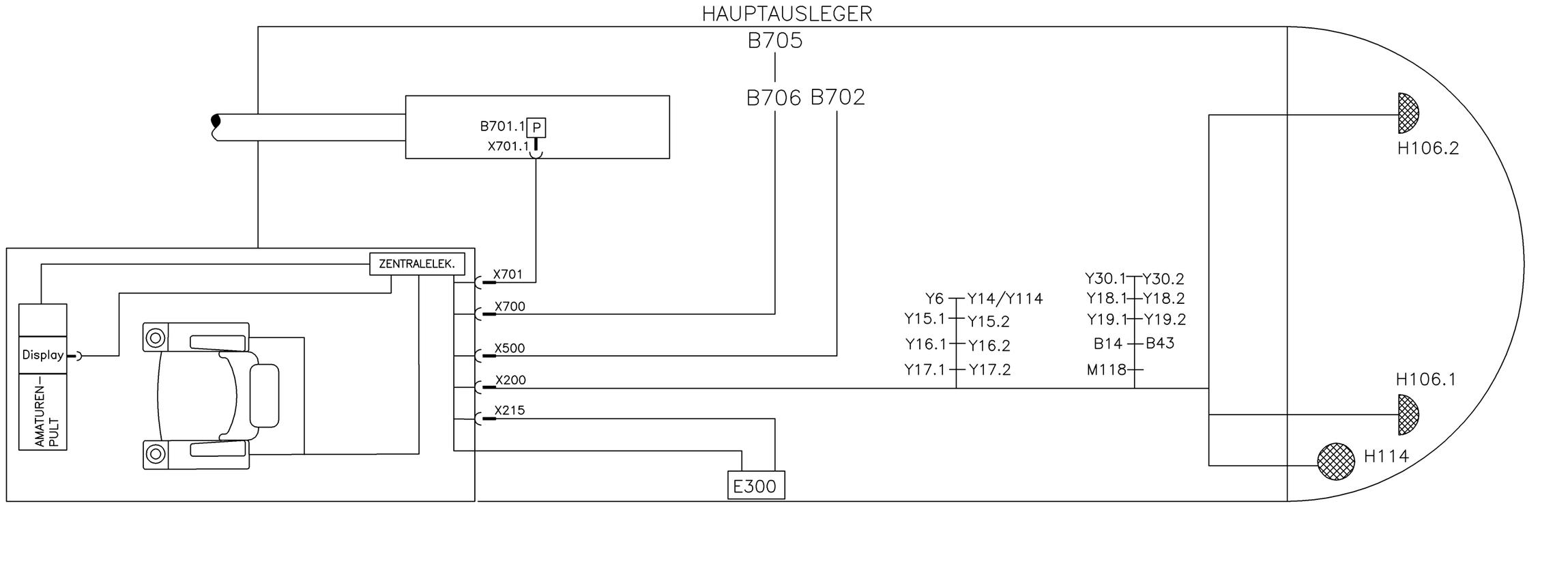

b	P10830	11.04.07	Rosenkranz		Datum	Name
a	P10812	11.12.06	Schlachter	Erst.	06.04.06	Schlachter
Ind	Mitt–NR	Datum	Name	Gepr.		
Abteilung:	1142					

Projektbenennung / project description
E–Plan AC80–2 OW V4.2.2
circuit diag. AC80–2 superstr.

Seitenbenennung / page description
Übersicht Oberwagen

Baunummer.

Anlage:

Ort:

Zeichnungsnr. / drawing no.
28273412

Blatt 1
36 Bl.

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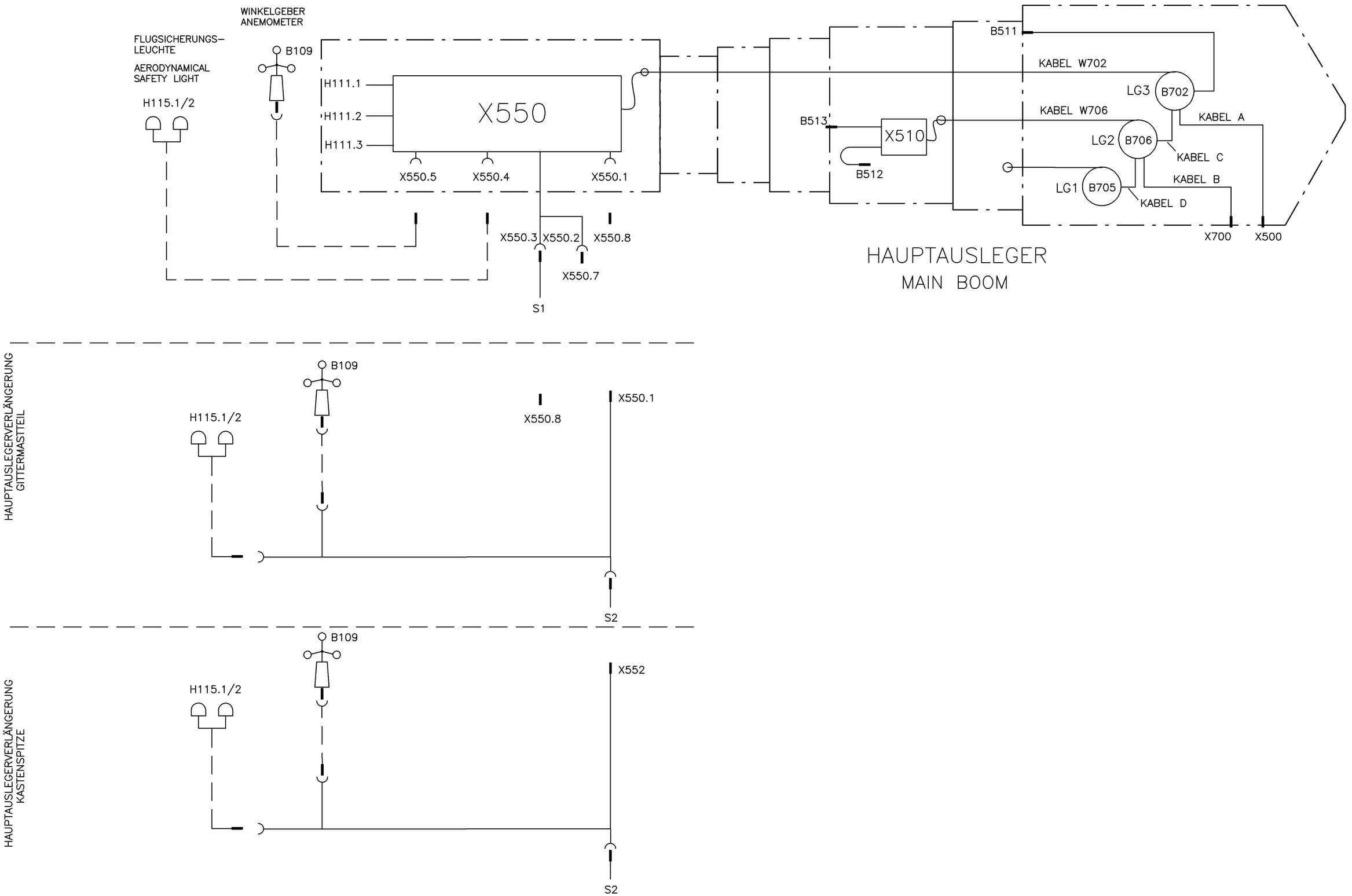

b	P10830	11.04.07	Rosenkranz		Datum	Name
a	P10812	11.12.06	Schlachter	Erst.	06.04.06	Schlachter
Ind	Mitt–NR	Datum	Name	Gepr.		
Abteilung:	1142					

Projektbenennung / project description
E–Plan AC80–2 OW V4.2.2
circuit diag. AC80–2 superstr.

Seitenbenennung / page description
Übersicht Ausleger

Baunummer.

Anlage:

Ort:

Zeichnungsnr. / drawing no.
28273412

Blatt 2
36 Bl.

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1	Übersicht Oberwagen	overview superstructure (ss) electric
2	Übersicht Ausleger	overview boom electric
3	Inhaltsverzeichnis	directory
4	Zündung, Motor Start	ignition, engine start
5	Steckkdosen, Hupe, Beleuchtung	sockets, horn, illumination
6	Verstellscheinwerfer, Umrissleuchten GGW	position lights ccw
7	Scheibenwaschanlage	wipers
8	Windmesser, Hindernisfeuer, HA–Beleuchtung	anemometer, aerodynamic safety light
9	LMB, Überbrückungsschalter, Summer	SLI, override switches, buzzer
10	LMB–Abschaltung, Drehwerkbremse, Wippwerk	SLI switch–off, slew gear brake, derreck. cyl.
11	Teleskop, Hubwerk	telescope, hoist
12	Notsteuerung, Teleskop–Freig., LMB–Warnampel	emergency control, telescope control
13	LMB–Initiatoren, LMB–Längengeber	SLI indicators, SLI warning light
14	HES, LMB–Sensorik	HLS, SLI sensors
15	Drehmelder, SES, OW arretiert, HW–Stunden	hoist rotation ind., SLS, ss pinned, hoist hours
16	Totmann, Lenkung vom OW	dead man handle, steering from ss
17	GGW–Steuerung	ccw control
18	Abstützung	outriggers
19	Fahrschalter, Sitzung, Kabine auf/ab	gear shift unit, seat heater, cab adjustment
20	Ölkühler, Gaspedal, Mototrdrehzahl	oil cooler, throttle, engine speed adjustment
21	Schalterbeleuchtung	switch illumination
22	Schalterbeleuchtung	switch illumination
23	Radio, SCK–Leuchte	radio, SCK light
24	Klimaanlage	air condition
25	Standheizung	water heater
26	LMB–Konsole, Arbeitsbereichsbegrenzung	SLI display, working space limitation
27	Multifunktionsdisplay, Ölfilter–Anzeige	multi functional display, oilfilter
28	Übersicht LMB	overview SLI
29	Übersicht Sicherungen	overview fuse board
30	Übersicht Relaisplatine A0561	overview relay board A0561
31	Übersicht Relaisplatine A0562	overview relay board A0562
32	Übersicht Relaisplatine A0563	overview relay board A0563
33	Übersicht Relaisplatine A0564	overview relay board A0564
34	Übersicht Diodenplatine	overview diode board
35	Übersicht Schleifringkörper u. Kabel	overview slip ring units and cables
36	Übersicht Stecker	overview connectors

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b	P10830	11.04.07	Rosenkranz		Datum	Name
a	P10812	11.12.06	Schlachter	Erst.	12.04.06	Schlachter
Ind	Mitt–NR	Datum	Name	Gepr.		
Abteilung: 1142						

Projektbenennung / project description
E–Plan AC80–2 OW V4.2.2
circuit diag. AC80–2 superstr.

Seitenbenennung / page description

Baunummer.

Anlage:

Ort:

Zeichnungsnr. / drawing no.
28273412

Blatt 3
36 Bl.

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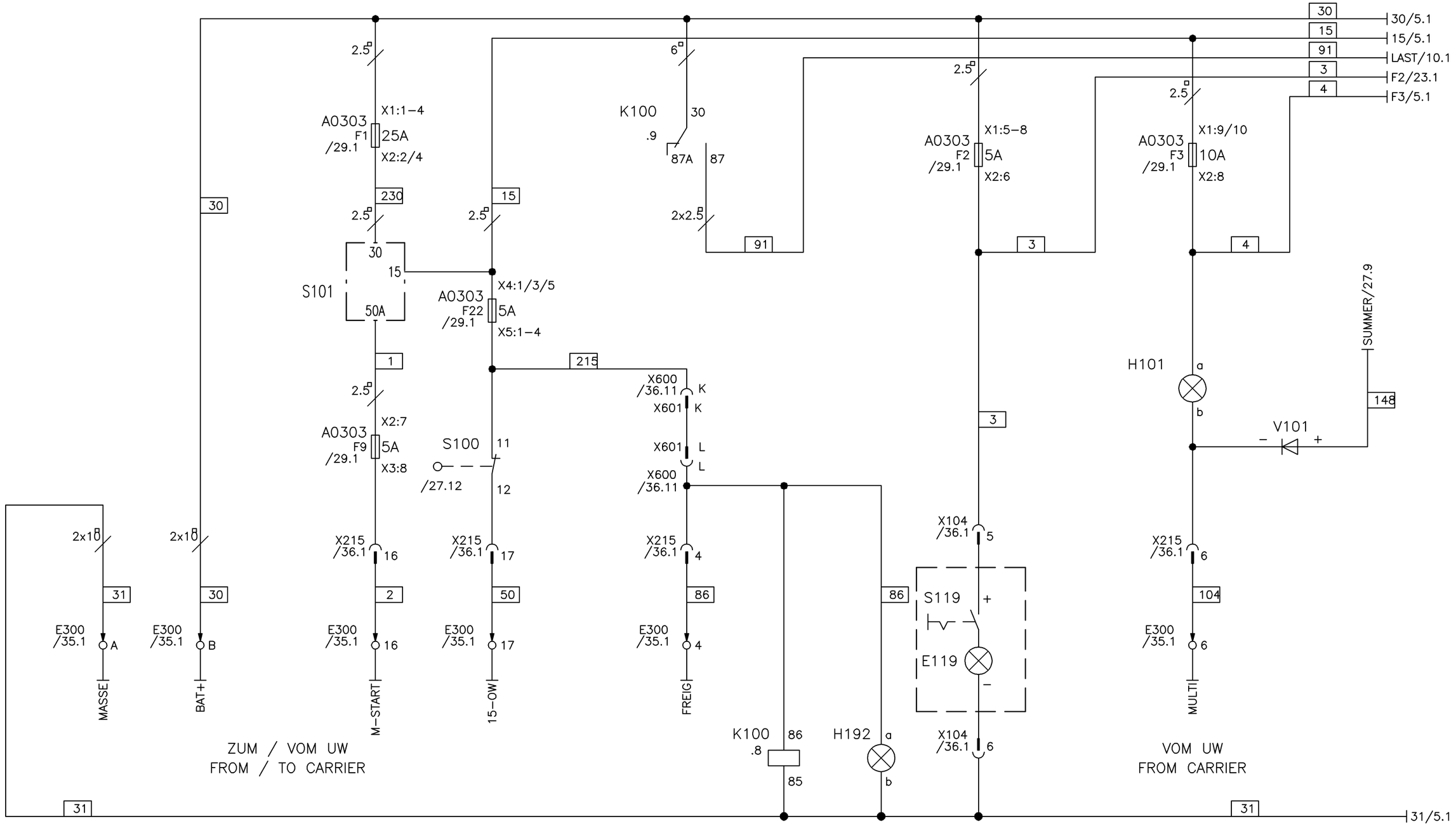

SPANNUNGS–VERSORGUNG	MOTOR START	UMSCHALTUNG UW – OW	STECKER NOTABLASS	FREIGABE OW–BETRIEB	INNEN–BELEUCHTUNG	SAMMELSTÖRUNG MOTOR
POWER SUPPLY	MOTOR START	SWITCH OVER CARRIER – SS	CONNECTOR EMERGENCY DRAIN	CONTROL ENABLE	CABIN LIGHTS	WARNING ENGINE

b	P10830	11.04.07	Rosenkranz		Datum	Name	Projektbenennung / project description: E–Plan AC80–2 OW V4.2.2 circuit diag. AC80–2 superstr.
a	P10812	11.12.06	Schlachter	Erst.	06.04.06	Schlachter	Seitenbenennung / page description: Zündung, Motor Start
Ind	Mitt–NR	Datum	Name	Gepr.			Baunummer. / Anlage: / Ort:
Abteilung:	1142						Zeichnungsnr. / drawing no.: 28273412 — Blatt 4 / 36 Bl.

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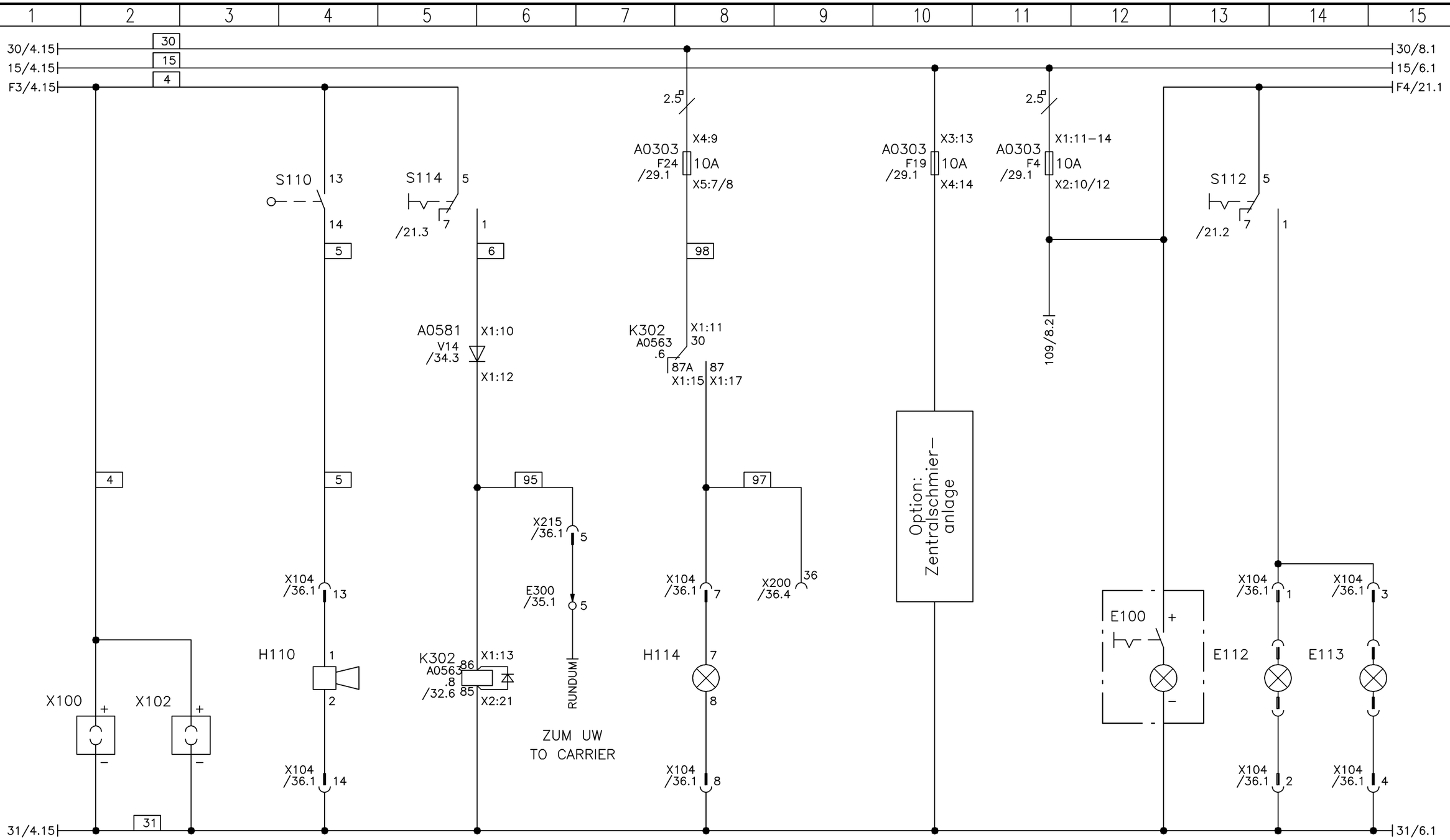

STECKDOSE ZIGARETTEN–ANZÜNDER	HUPE	RUNDUMLEUCHTEN	OPTION: ZENTRALSCHMIERANLAGE	LESELEUCHTE	AUßENBELEUCHTUNG VORNE	AUßENBELEUCHTUNG HINTEN
SOCKET LIGHTER	HORN	ROTAFLARE LIGHTS	OPTION: CENTRAL LUBRICATION	READING LIGHT	OUTSIDE LIGHTING FRONT	OUTSIDE LIGHTING REAR

					Datum	Name
b	P10830	11.04.07	Rosenkranz			
a	P10812	11.12.06	Schlachter	Erst.	06.04.06	Schlachter
Ind	Mitt–NR	Datum	Name	Gepr.		
Abteilung:	1142					

Projektbenennung / project description
E–Plan AC80–2 OW V4.2.2
circuit diag. AC80–2 superstr.

Seitenbenennung / page description
Steckkdosen, Hupe, Beleuchtung

Baunummer.

Anlage:

Ort:

Zeichnungsnr. / drawing no.
28273412

Blatt 5
36 Bl.

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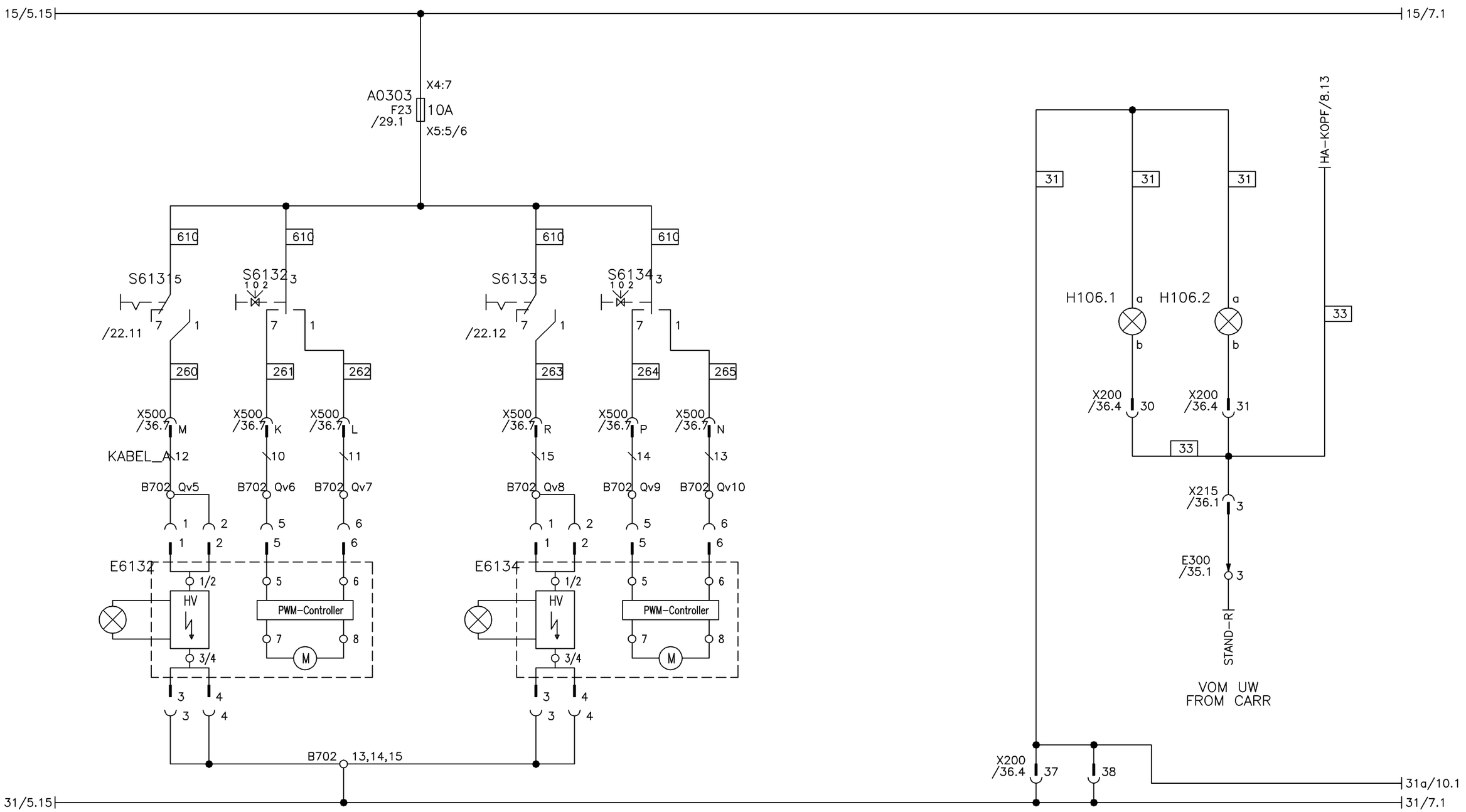

OPTION
VERSTELLSCHEINWERFER

OPTION
ZWEITER VERSTELLSCHEINWERFER

UMRISSLEUCHTE GGW
LINKS RECHTS

OPTION
REMOTE CONTROLLED
SEARCHLIGHT

OPTION
SECOND REMOTE CONTROLLED
SEARCHLIGHT

COUNTERWEIGHT LIGHTING
LEFT H. RIGHTT H.

					Datum	Name
b	P10830	11.04.07	Rosenkranz			
a	P10812	11.12.06	Schlachter	Erst.	06.04.06	Schlachter
Ind	Mitt-NR	Datum	Name	Gepr.		
Abteilung:	1142					

Projektbenennung / project description
E-Plan AC80-2 OW V4.2.2
circuit diag. AC80-2 superstr.

Seitenbenennung / page description
Verstellscheinwerfer, Umrissleuchten GGW

Baunummer.

Anlage:

Ort:

Zeichnungsnr. / drawing no.
28273412

Blatt 6
Bl. 36

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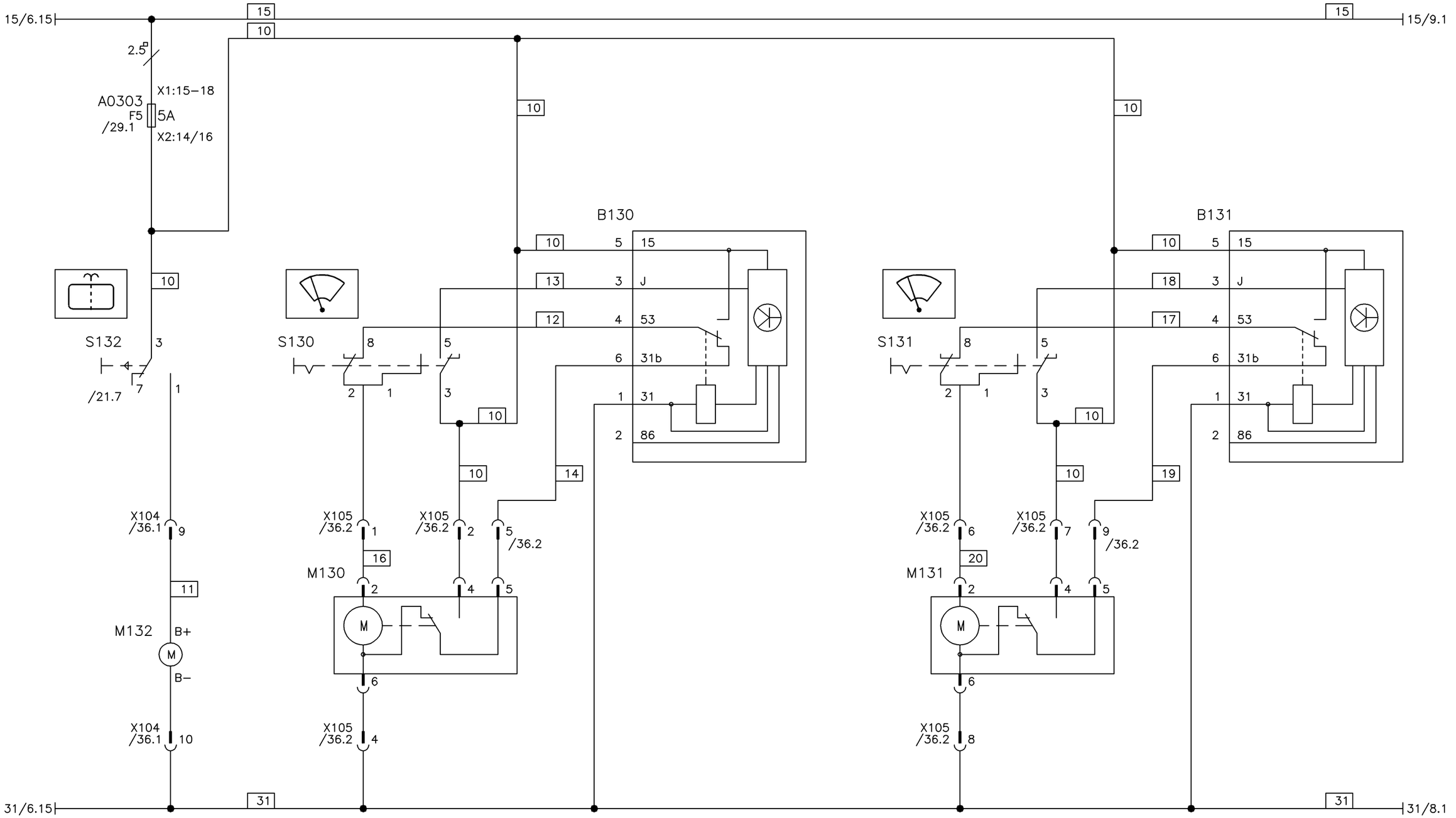

WASCHERPUMPE — SCHEIBENWISCHER FRONTSCHEIBE — SCHEIBENWISCHER DACHSCHEIBE

WASHING PUMP — WIPER FRONTWINDOW — WIPER ROOFWINDOW

b	P10830	11.04.07	Rosenkranz		Datum	Name
a	P10812	11.12.06	Schlachter	Erst.	26.04.04	Schlachter
Ind	Mitt–NR	Datum	Name	Gepr.		
Abteilung:	1142					

Projektbenennung / project description: E–Plan AC80–2 OW V4.2.2 circuit diag. AC80–2 superstr.

Seitenbenennung / page description: Scheibenwaschanlage

Baunummer. | Anlage: | Ort:

Zeichnungsnr. / drawing no.: 28273412

Blatt 7 / 36 Bl.

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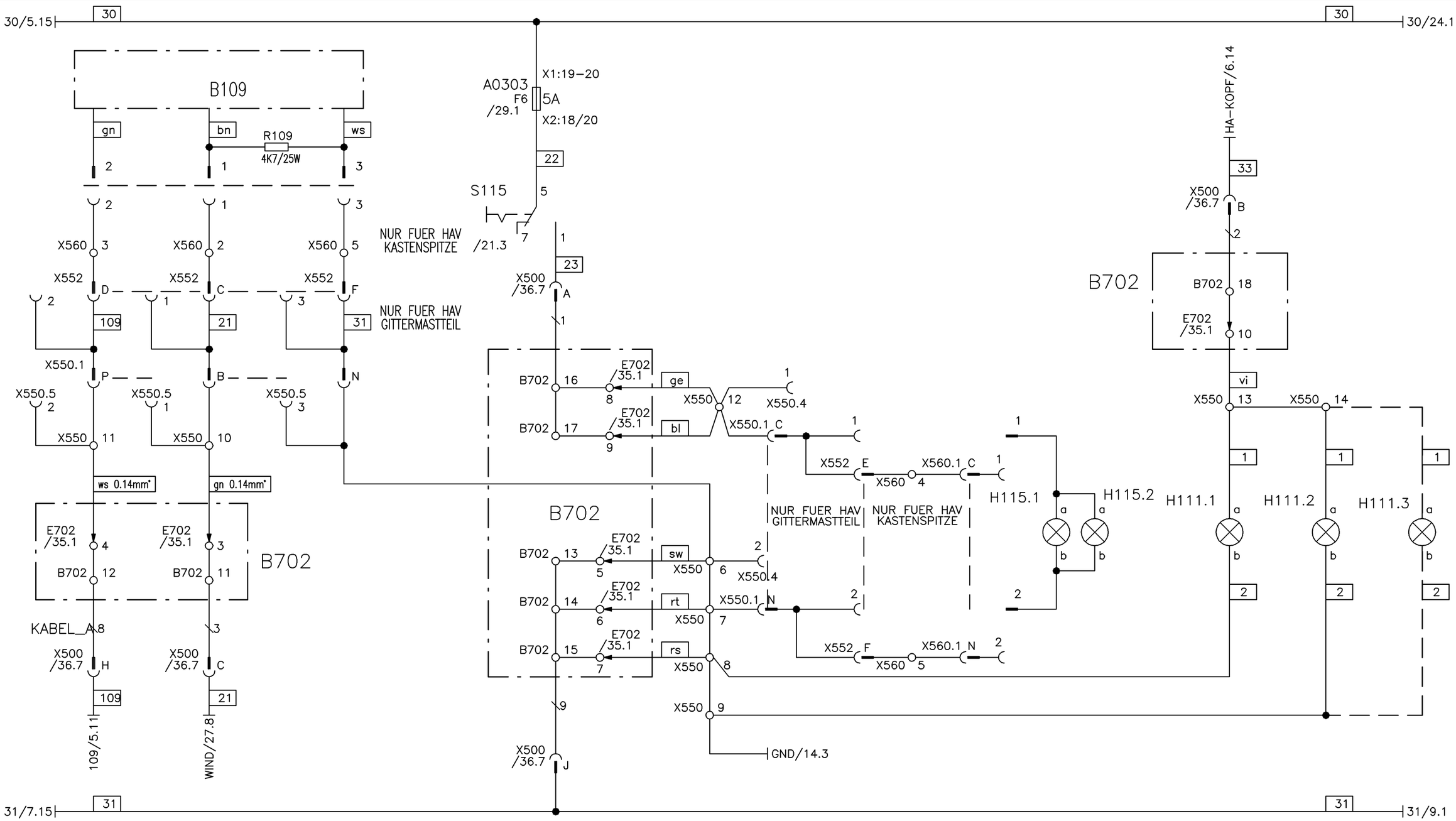

WINDMESSANLAGE | OPTION: DOPPELHINDERNISFEUER | BELEUCHTUNG HA–KOPF

ANEMOMETER | AERODYNAMIC SAFETY LIGHT | MAIN BOOM HEAD LIGHTING

b	P10830	11.04.07	Rosenkranz		Datum	Name
a	P10812	11.12.06	Schlachter	Erst.	06.04.06	Schlachter
Ind	Mitt–NR	Datum	Name	Gepr.		
Abteilung:	1142					

Projektbenennung / project description: E–Plan AC80–2 OW V4.2.2 circuit diag. AC80–2 superstr.

Seitenbenennung / page description: Windmesser, Hindernisfeuer, HA–Beleuchtung

Baunummer. | Anlage: | Ort:

Zeichnungsnr. / drawing no.: 28273412

Blatt 8 / 36 Bl.

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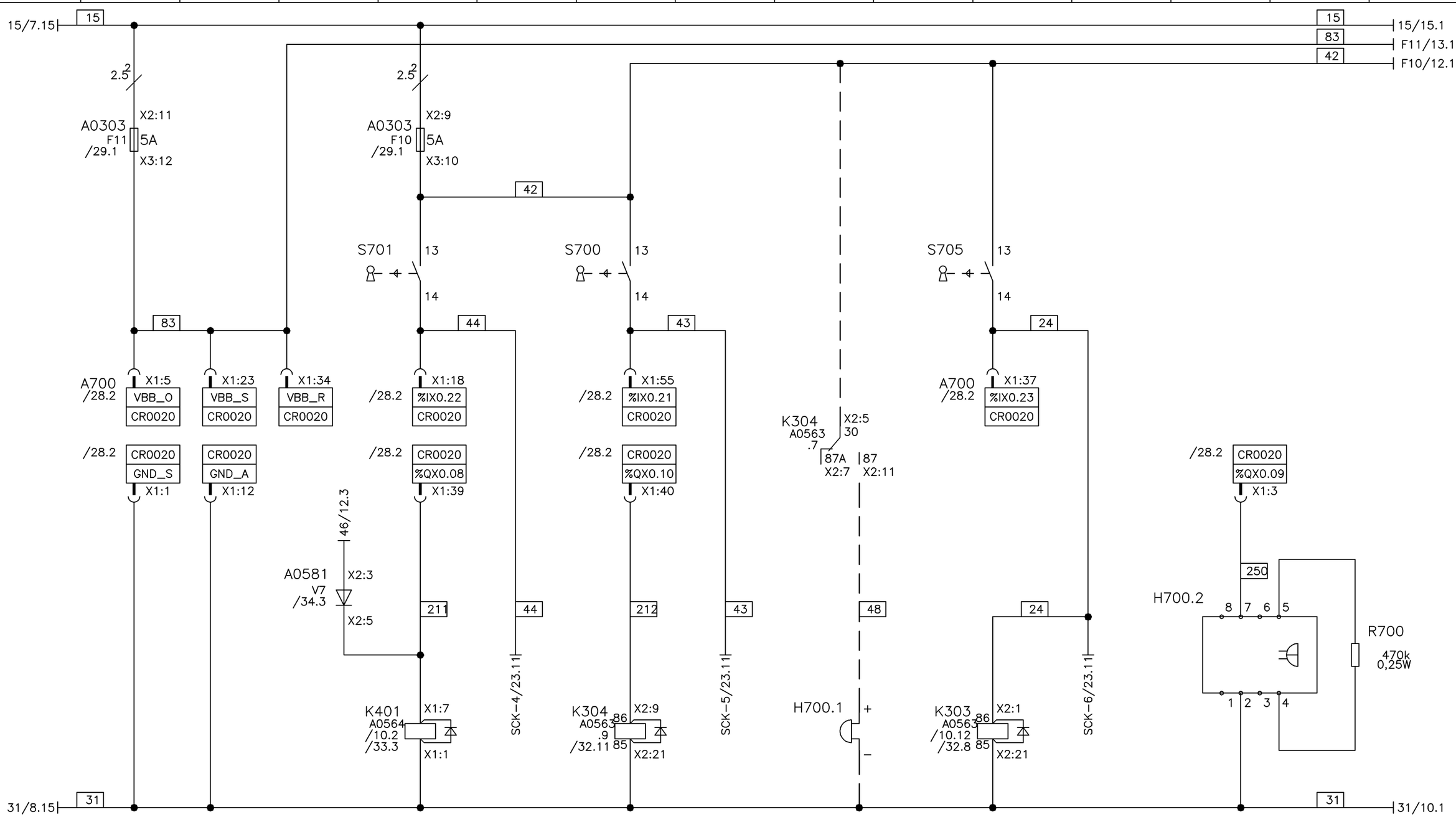

ABSCHALTUNG LMB, HES	HES– ÜBERBR.	LMB–ÜBERBR. K304: FR,NL,GB	ALARMLÄUTWERK NUR GB	ÜBERBRÜCKUNG WIPPWERK HEBEN	SUMMER
SWITCH OFF SLI, HLS	BRIDGE OVER HLS	BRIDGE OVER–SLI K304: FR,NL,GB	SLI–WARNING ONLY GB	BRIDGE OVER DERR. CYL. EXTEND	BUZZER

					Datum	Name
b	P10830	11.04.07	Rosenkranz			
a	P10812	11.12.06	Schlachter	Erst.	06.04.06	Schlachter
Ind	Mitt–NR	Datum	Name	Gepr.		
Abteilung:	1142					

Projektbenennung / project description: E–Plan AC80–2 OW V4.2.2 circuit diag. AC80–2 superstr.

Seitenbenennung / page description: LMB, Überbrückungsschalter, Summer

Baunummer.

Anlage:

Ort:

Zeichnungsnr. / drawing no.: 28273412

Blatt 9 / 36 Bl.

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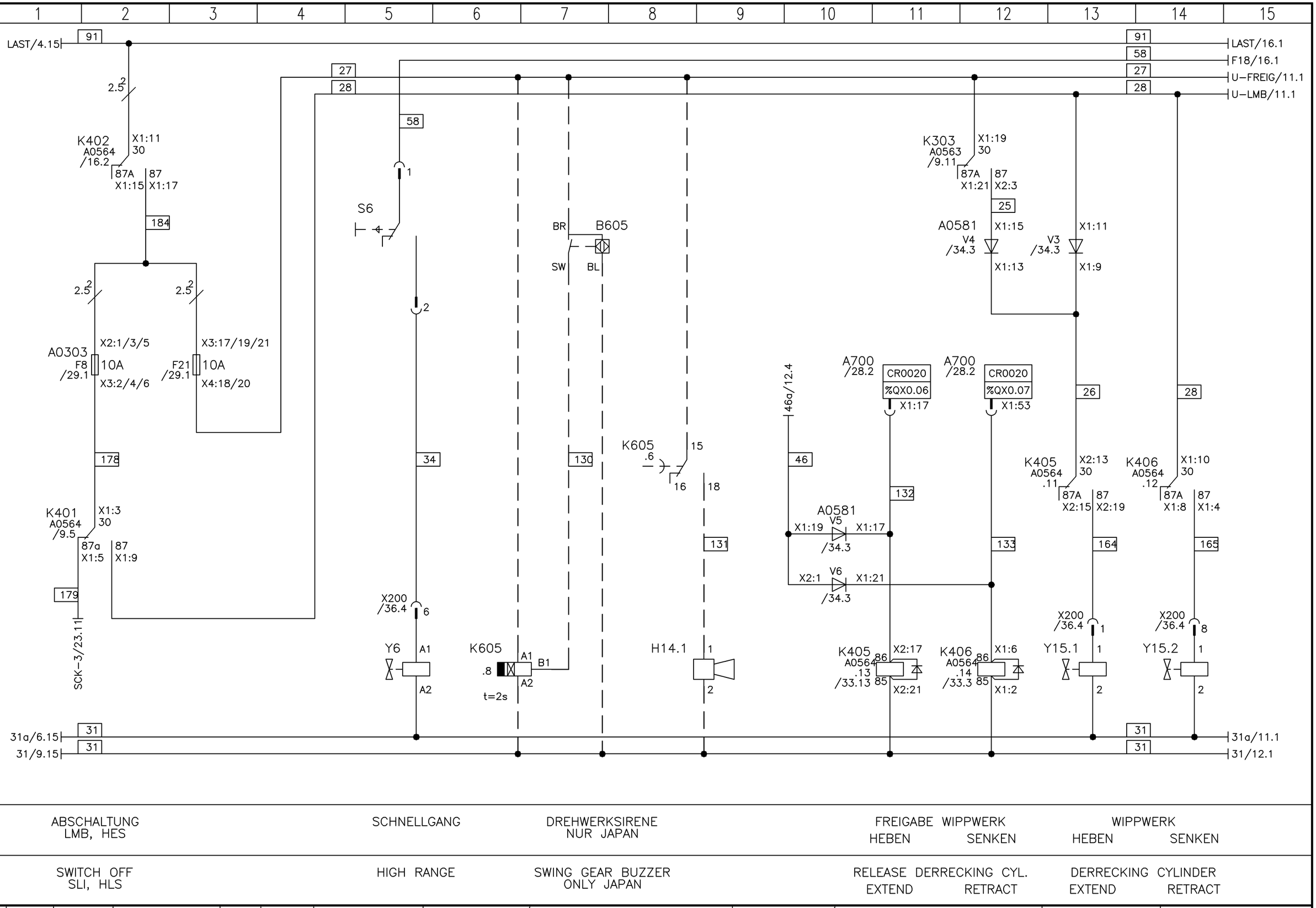

ABSCHALTUNG LMB, HES	SCHNELLGANG	DREHWERKSIRENE NUR JAPAN	FREIGABE WIPPWERK HEBEN SENKEN WIPPWERK HEBEN SENKEN
SWITCH OFF SLI, HLS	HIGH RANGE	SWING GEAR BUZZER ONLY JAPAN	RELEASE DERRECKING CYL. EXTEND RETRACT DERRECKING CYLINDER EXTEND RETRACT

b	P10830	11.04.07	Rosenkranz		Datum	Name
a	P10812	11.12.06	Schlachter	Erst.	06.04.06	Schlachter
Ind	Mitt–NR	Datum	Name	Gepr.		
Abteilung:	1142					

Projektbenennung / project description
E–Plan AC80–2 OW V4.2.2
circuit diag. AC80–2 superstr.

Seitenbenennung / page description
LMB–Abschaltung, Drehwerkbremse, Wippwerk

Baunummer.

Anlage:

Ort:

Zeichnungsnr. / drawing no.
28273412

Blatt 10
36 Bl.

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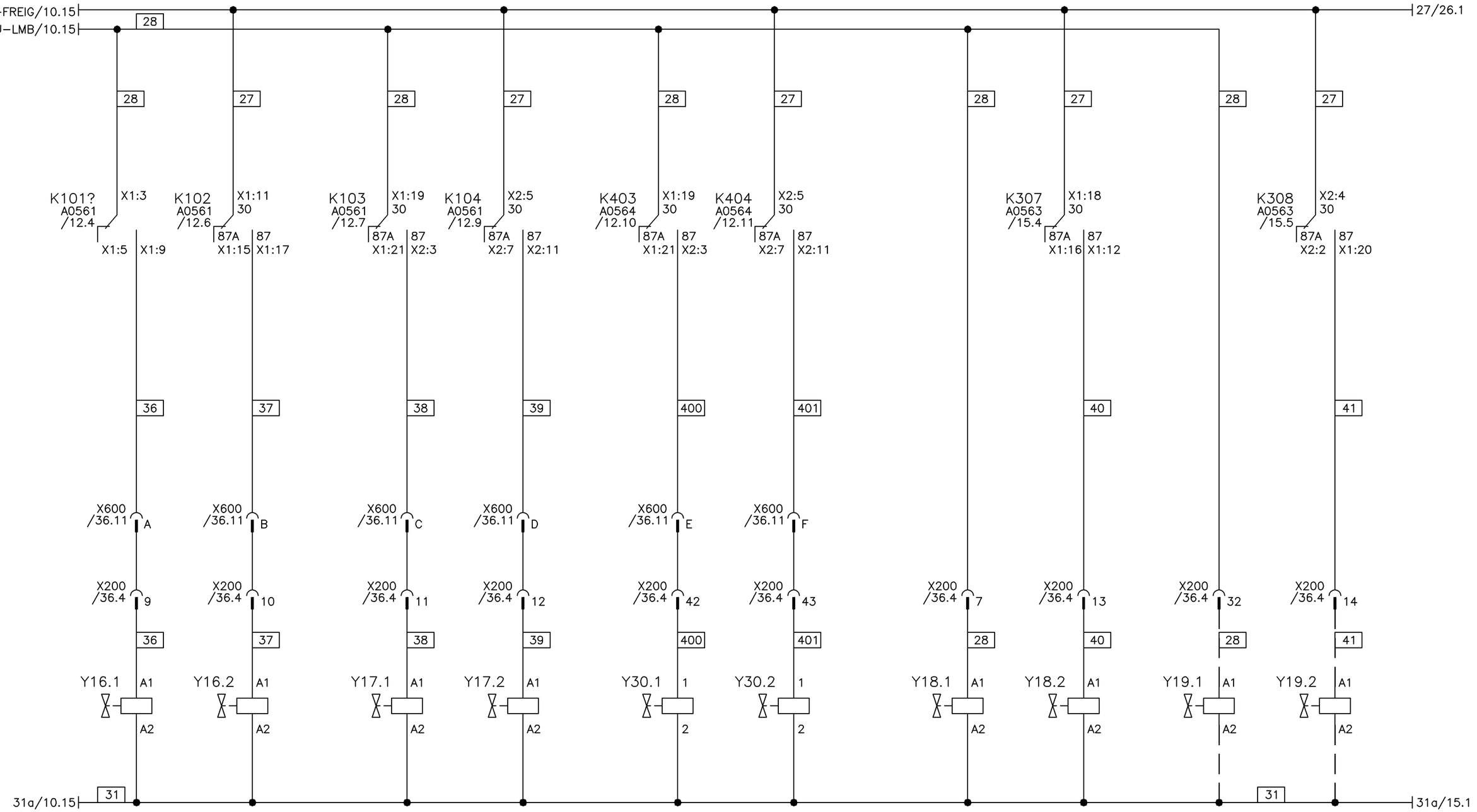

					Datum	Name
b	P10830	11.04.07	Rosenkranz			
a	P10812	11.12.06	Schlachter	Erst.	06.04.06	Schlachter
Ind	Mitt-NR	Datum	Name	Gepr.		
Abteilung:	1142					

Projektbenennung / project description
E-Plan AC80-2 OW V4.2.2
circuit diag. AC80-2 superstr.

Seitenbenennung / page description
Teleskop, Hubwerk

Baunummer.

Anlage:

Ort:

Zeichnungsnr. / drawing no.
28273412

Blatt 11
36 Bl.

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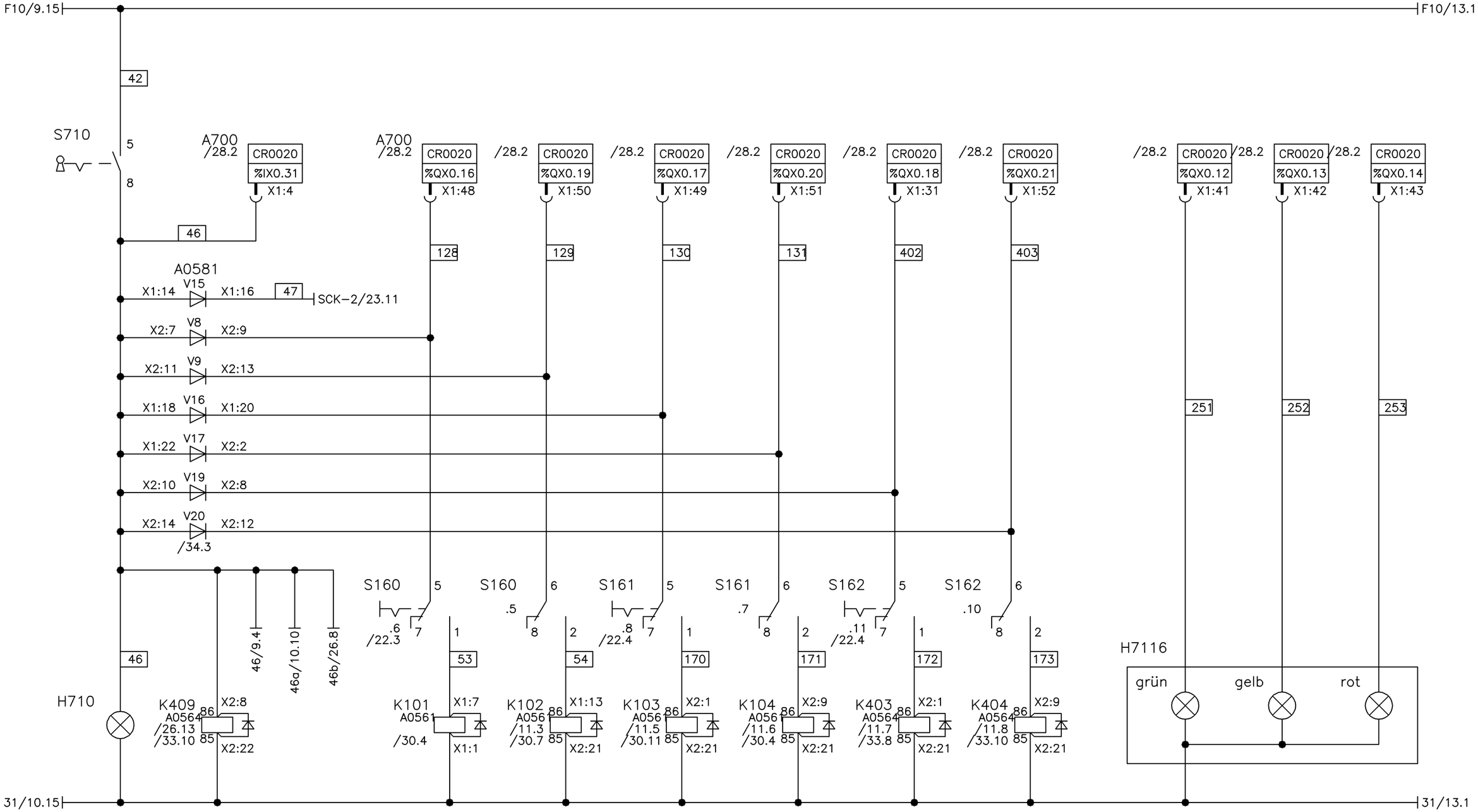

NOTSTEUERUNG	TELEZYL. 1 AUSFAHREN EINFAHREN / TELEZYL. 2 AUSFAHREN EINFAHREN / TELEZYL. 3 AUSFAHREN EINFAHREN	OPTION: LMB–WARNAMPEL
EMERGENCY CONTROL	TELECYL. 1 EXTEND RETRACT / TELECYL. 2 EXTEND RETRACT / TELECYL. 2 EXTEND RETRACT	OPTION: SLI WARNING LIGHT

b	P10830	11.04.07	Rosenkranz		Datum	Name
a	P10812	11.12.06	Schlachter	Erst.	06.04.06	Schlachter
Ind	Mitt–NR	Datum	Name	Gepr.		
Abteilung:	1142					

Projektbenennung / project description: E–Plan AC80–2 OW V4.2.2 circuit diag. AC80–2 superstr.

Seitenbenennung / page description: Notsteuerung, Teleskop–Freig., LMB–Warnampel

Baunummer. | Anlage: | Ort:

Zeichnungsnr. / drawing no.: 28273412

Blatt 12 / Bl. 36

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F11/9.15 — 83 — F11/14.1
F10/12.15 — 42

A700 /28.2 CR0020 %IX0.15 X1:38 — 72 — 0W-NH/15.10

A700 /28.2 CR0020 %IX0.12 X1:20 — 66 — X500 /36.7 F — KABEL_A 6 — QV3 — sw

42 — X500 /36.7 E — 5 — QV2 — ws — B511

/28.2 CR0020 %IX0.13 X1:2 — 67 — X500 /36.7 G — 7 — QV4 — bl — X510 3 — B512 SW — WS — X510 2

/28.2 CR0020 %IX0.14 X1:21 — 404 — X500 /36.7 D — 4 — QV1 — rt — X510 4 — B513 SW — WS — X510 2

B702

KABEL_C 7 — 8 — 9 — tr

B706

/28.2 CR0020 %IW04 X1:27 — X700 /36.12 A — KABEL_B 1 — X1 1 — +UBS/14.1

F — 6 — X1 2

C — 3 — X1 3 — 0V/14.1

/28.2 CR0020 %IW03 X1:8 — B — 2 — X1 16

X1 11 — E706 — 1

X1 12 — E706 — 2

X1 13 — E706 — 3

I R — LG2

KABEL_D SHLD

KABEL_D 1 — 2 — 3

B705

1 — 2 — 3

I R — LG1

31/12.15 — 31 — 31 — 31/14.1

OW NACH HINTEN	TELEZYLINDER EINGEFAHREN ZYLINDER 1 ZYLINDER 2 ZYLINDER 3
LÄNGENGEBER TELE 2	LÄNGENGEBER TELE 1
SS TURNED BACKWARDS	TELECYLINDER RETRACTED CYLINDER 1 CYLINDER 2 CYLINDER 3
LENGTH INDICATOR TELESCOPE 2	LENGTH INDICATOR TELESCOPE 1

Ind	Mitt-NR	Datum	Name		Datum	Name
b	P10830	11.04.07	Rosenkranz			
a	P10812	11.12.06	Schlachter	Erst.	06.04.06	Schlachter
				Gepr.		
Abteilung: 1142						

Projektbenennung / project description: E-Plan AC80-2 OW V4.2.2 circuit diag. AC80-2 superstr.

Seitenbenennung / page description: LMB-Initiatoren, LMB-Längengeber

Baunummer. | Anlage: | Ort:

Zeichnungsnr. / drawing no.: 28273412

Blatt 13 / Bl. 36

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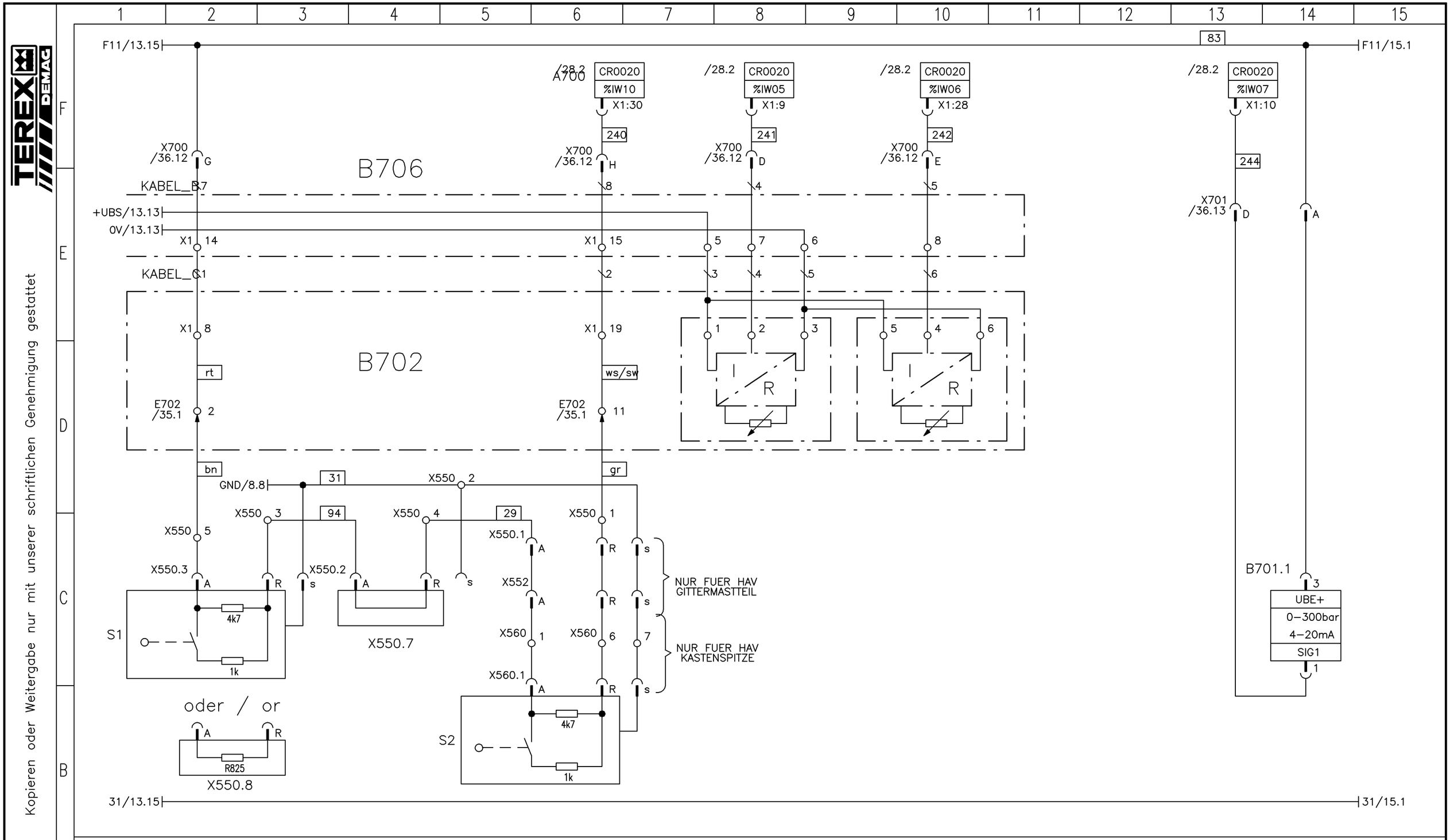

HUBENDSCHALTER HAUPTAUSLEGER	HUBENDSCHALTER HILFSAUSLEGER	LÄNGENGEBER TELE 3	WINKELGEBER HAUPTAUSLEGER	DRUCKAUFNEHMER WIPPZYLINDER BODENSEITE
HOIST LIMIT SWITCH MAIN BOOM	HOIST LIMIT SWITCH FLY JIB	LENGTH INDICATOR TELE 3	ANGLE INDICATOR MAINBOOM	PRESSURE DERRECKING CYLINDER PISTON SIDE

Ind	Mitt-NR	Datum	Name		Datum	Name
b	P10830	11.04.07	Rosenkranz			
a	P10812	11.12.06	Schlachter	Erst.	06.04.06	Schlachter
				Gepr.		

Abteilung: 1142

Projektbenennung / project description
E-Plan AC80-2 OW V4.2.2
circuit diag. AC80-2 superstr.

Seitenbenennung / page description
HES, LMB-Sensorik

Baunummer.
Anlage:
Ort:
Zeichnungsnr. / drawing no.
28273412
Blatt 14
36 Bl.

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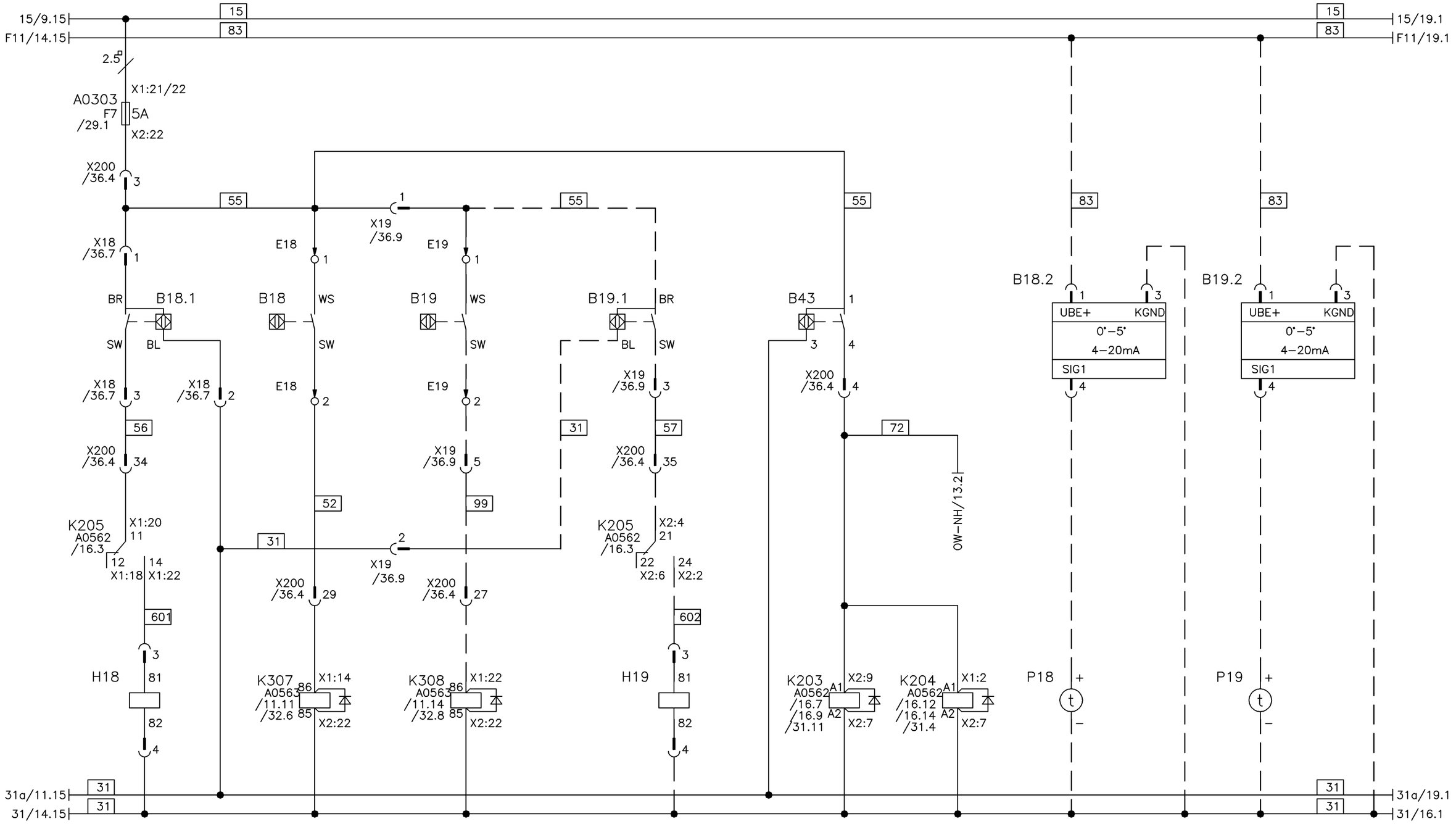

DREHMELDER HW1	SES HW1	SES HW2	DREHMELDER HW2
HOIST ROTATION INDIC. H1	SINK LIMIT SWITCH H1	SINK LIMIT SWITCH H2	HOIST ROTATION INDICATOR H2

OW NACH HINTEN ARRETIERT	OPTION: BETRIEBSSTUNDENZÄHLER HW1 HW2
SS TURNED BACKWARDS	OPTION: HOUR METER HOIST 1 HOIST 2

b	P10830	11.04.07	Rosenkranz		Datum	Name
a	P10812	11.12.06	Schlachter	Erst.	06.04.06	Schlachter
Ind	Mitt-NR	Datum	Name	Gepr.		
Abteilung:	1142					

Projektbenennung / project description
E-Plan AC80-2 OW V4.2.2
circuit diag. AC80-2 superstr.

Seitenbenennung / page description
Drehmelder, SES, OW arretiert
HW-Stunden

Baunummer.

Anlage:

Ort:

Zeichnungsnr. / drawing no.
28273412

Blatt 15
36 Bl.

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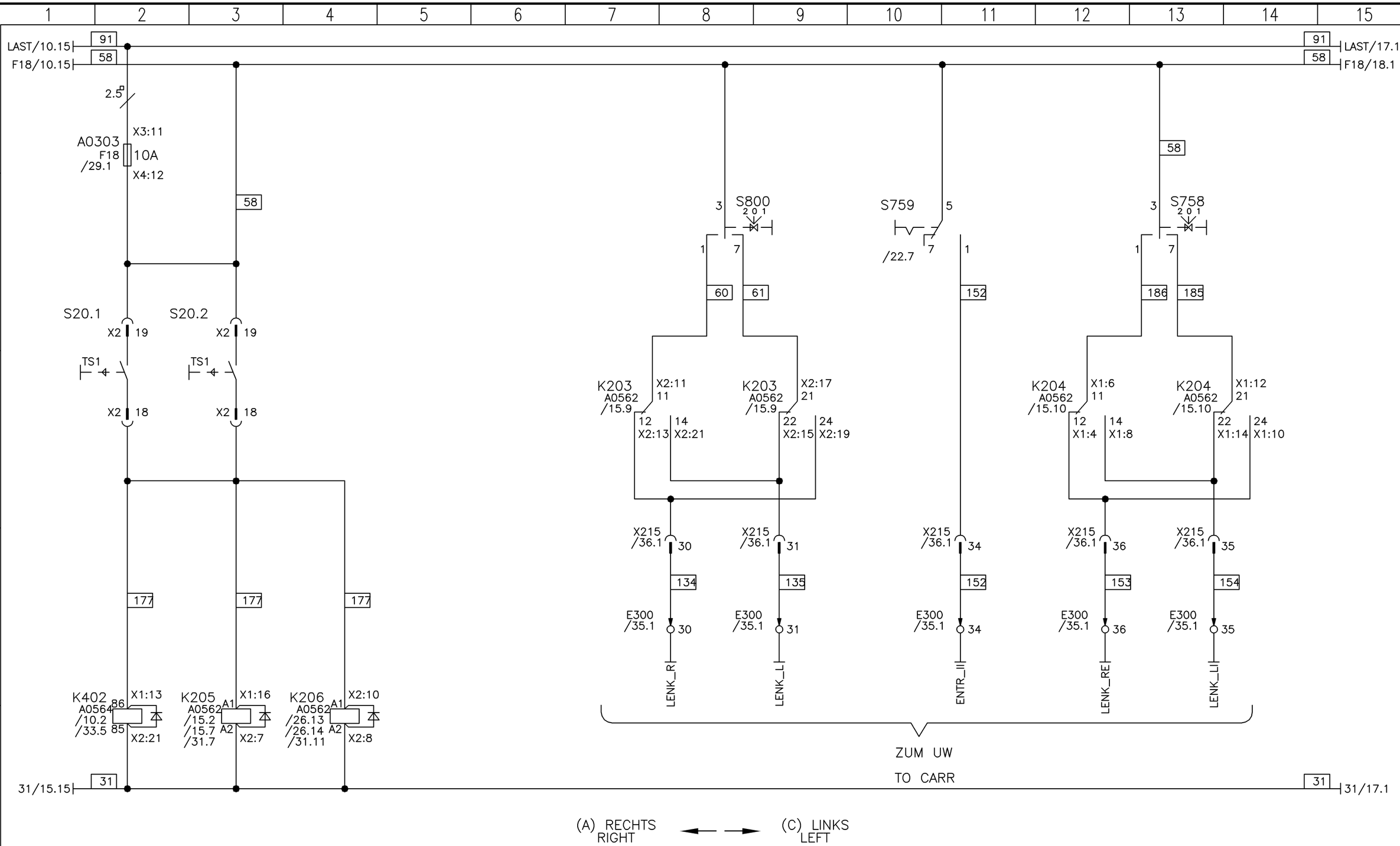

TOTMANN	LENKUNG VERF. VON OBEN	VERRIEGLUNG STRASSE/BAUSTELLE	AUSSCHLAG DER RÄDER RECHTS LINKS HUNDEGANG
DEAD MANS HANDLE	STEERING FROM SS	SS TURNED BACKWARDS	REAR WHEEL POSITION RIGHT LEFT CRABBSTEERING

					Datum	Name
b	P10830	11.04.07	Rosenkranz			
a	P10812	11.12.06	Schlachter	Erst.	06.04.06	Schlachter
Ind	Mitt-NR	Datum	Name	Gepr.		
Abteilung:	1142					

Projektbenennung / project description
E-Plan AC80-2 OW V4.2.2
circuit diag. AC80-2 superstr.

Seitenbenennung / page description
Totmann, Lenkung vom OW

Baunummer.
Anlage:
Ort:
Zeichnungsnr. / drawing no.
28273412
Blatt 16
36 Bl.

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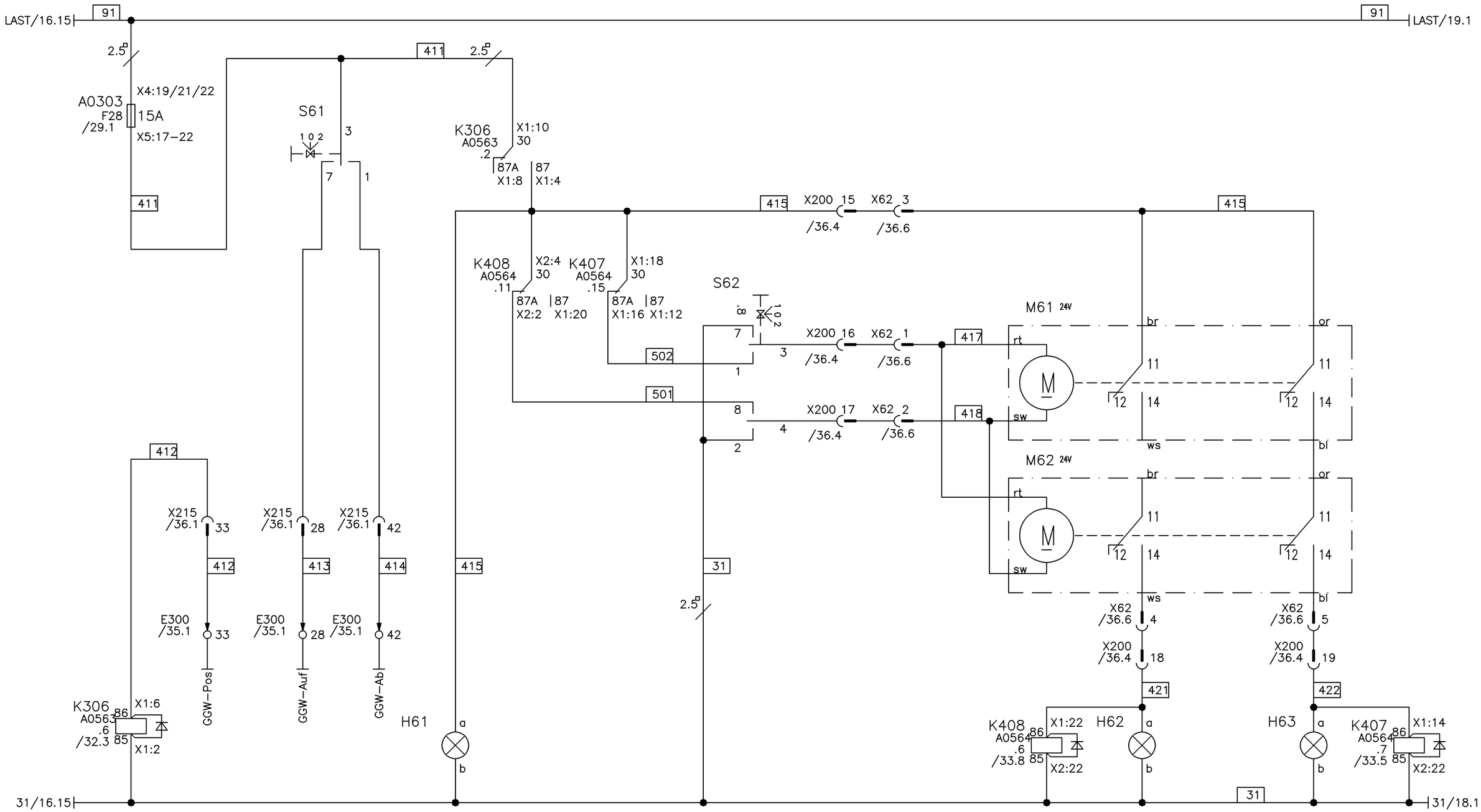

GGW OBEN	GGW AUF AB	GGW ENTBOLZT VERBOLZT
COUNTERWEIGHT UP	COUNERWEIGHT UP DOWN	COUNTERWEIGHT UNLOCKED LOCKED

b	P10830	11.04.07	Rosenkranz		Datum	Name
a	P10812	11.12.06	Schlachter	Erst.	06.04.06	Schlachter
Ind	Mitt–NR	Datum	Name	Gepr.		
Abteilung:	1142					

Projektbenennung / project description
E–Plan AC80–2 OW V4.2.2
circuit diag. AC80–2 superstr.

Seitenbenennung / page description
GGW–Steuerung

Baunummer.

Anlage:

Ort:

Zeichnungsnr. / drawing no.
28273412

Blatt 17
36 Bl.

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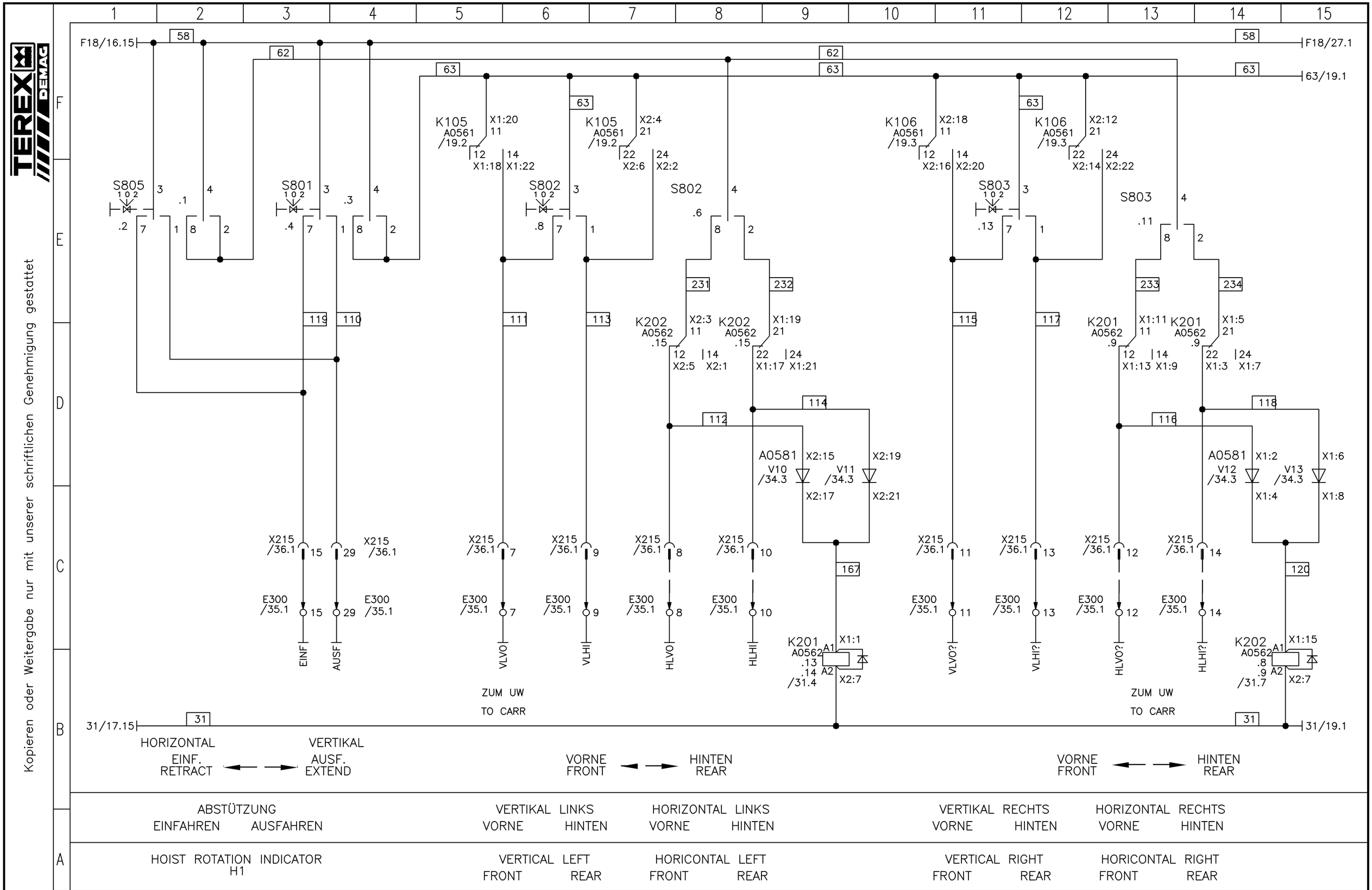

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Ind	Mitt-NR	Datum	Name		Datum	Name
b	P10830	11.04.07	Rosenkranz			
a	P10812	11.12.06	Schlachter	Erst.	06.04.06	Schlachter
				Gepr.		

Abteilung: 1142

Projektbenennung / project description
E-Plan AC80-2 OW V4.2.2
circuit diag. AC80-2 superstr.

Seitenbenennung / page description
Abstützung

Baunummer.

Anlage:

Ort:

Zeichnungsnr. / drawing no.
28273412

Blatt 18
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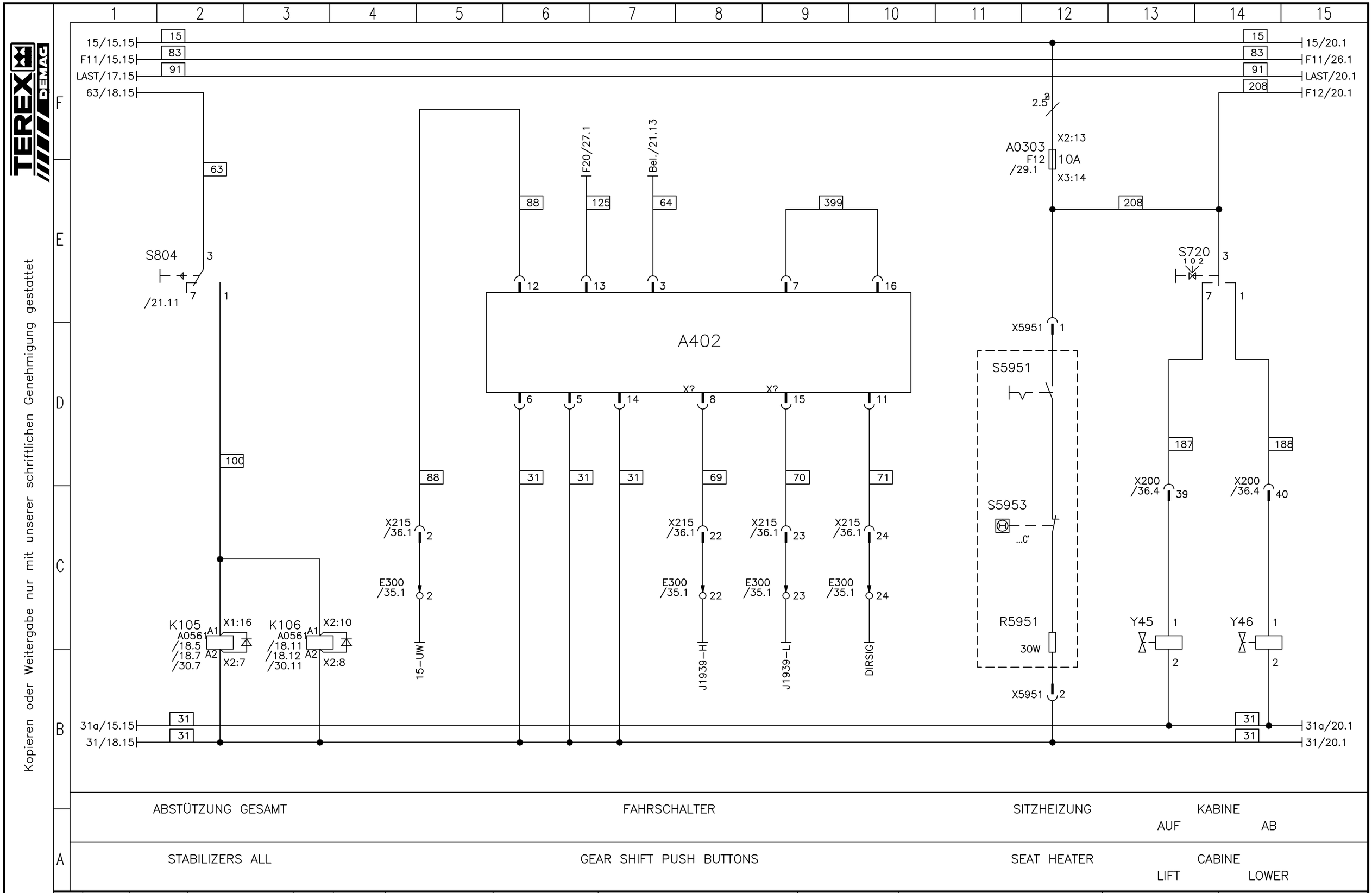

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Ind	Mitt-NR	Datum	Name		Datum	Name
b	P10830	11.04.07	Rosenkranz			
a	P10812	11.12.06	Schlachter	Erst.	06.04.06	Schlachter
				Gepr.		

Abteilung: 1142

Projektbenennung / project description
E-Plan AC80-2 OW V4.2.2
circuit diag. AC80-2 superstr.

Seitenbenennung / page description
Fahrschalter, Sitzung, Kabine auf/ab

Baunummer.

Anlage:

Ort:

Zeichnungsnr. / drawing no.
28273412

Blatt 19
36 Bl.

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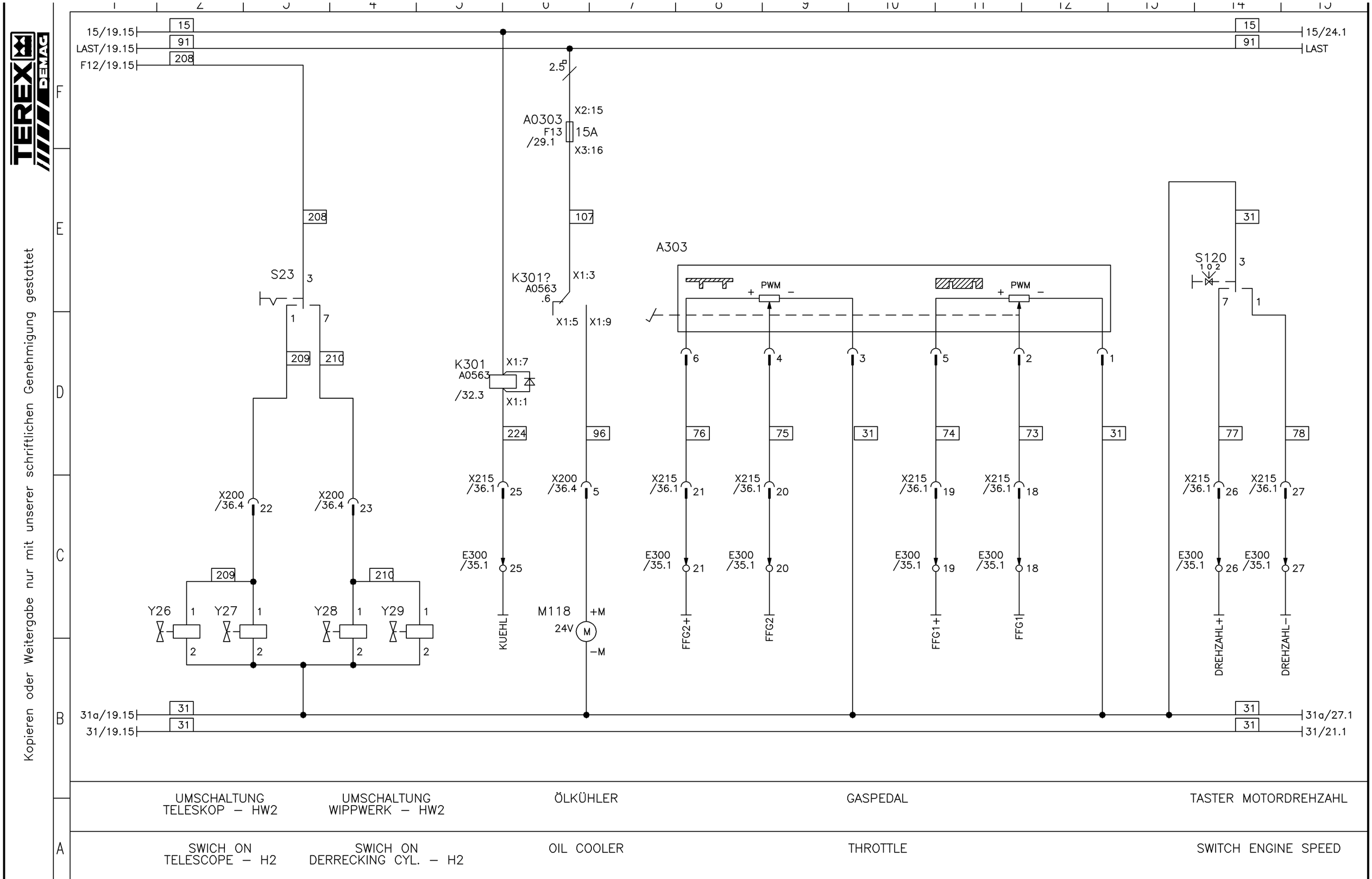

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Ind	Mitt-NR	Datum	Name		Datum	Name
b	P10830	11.04.07	Rosenkranz			
a	P10812	11.12.06	Schlachter	Erst.	06.04.06	Schlachter
				Gepr.		

Abteilung: 1142

Projektbenennung / project description
E-Plan AC80-2 OW V4.2.2
circuit diag. AC80-2 superstr.

Seitenbenennung / page description
Ölkühler, Gaspedal, Mototrdrehzahl

Baunummer.

Anlage:

Ort:

Zeichnungsnr. / drawing no.
28273412

Blatt 20
36 Bl.

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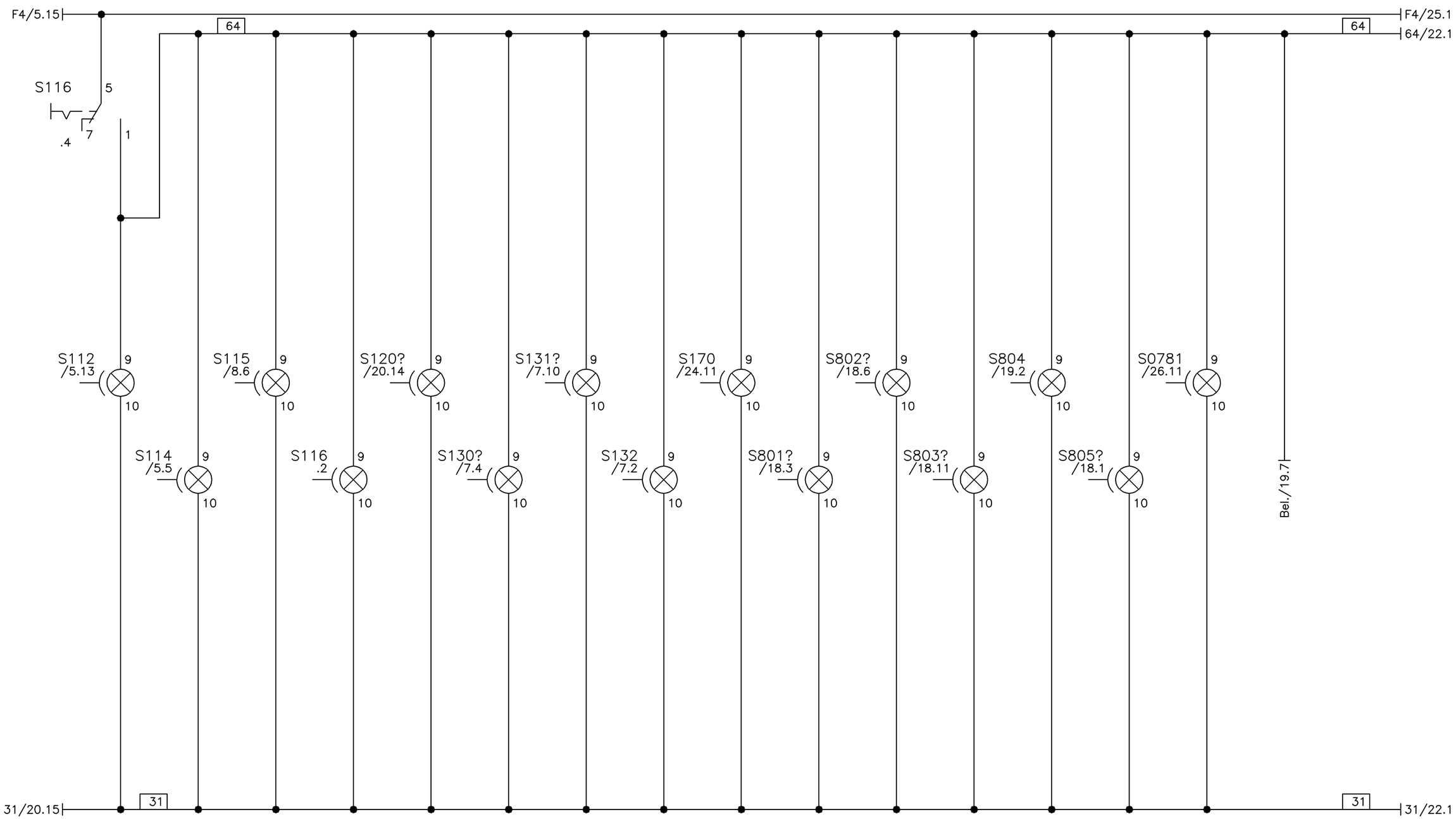

SCHALTERBELEUCHTUNG ARMATURENPULT

SWITCH ILLUMINATION DASH–BOARD

b	P10830	11.04.07	Rosenkranz		Datum	Name
a	P10812	11.12.06	Schlachter	Erst.	06.04.06	Schlachter
Ind	Mitt–NR	Datum	Name	Gepr.		
Abteilung:	1142					

Projektbenennung / project description
E–Plan AC80–2 OW V4.2.2
circuit diag. AC80–2 superstr.

Seitenbenennung / page description
Schalterbeleuchtung

Baunummer.

Anlage:

Ort:

Zeichnungsnr. / drawing no.
28273412

Blatt 21
36 Bl.

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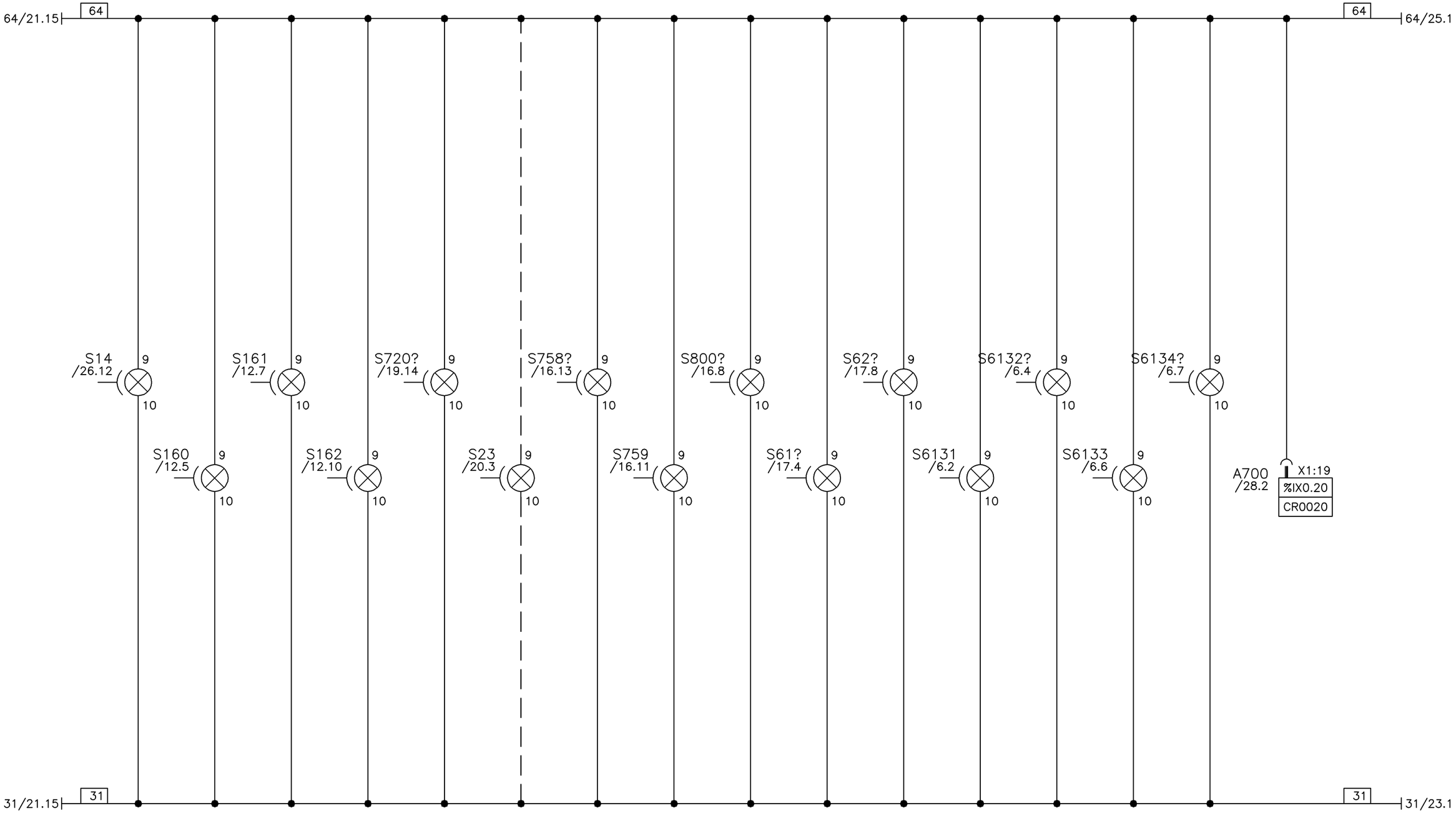

SCHALTERBELEUCHTUNG ARMKONSOLE/ARMATURENBRETT

SWITCH ILLUMINATION DASH-BOARD

b	P10830	11.04.07	Rosenkranz		Datum	Name
a	P10812	11.12.06	Schlachter	Erst.	06.04.06	Schlachter
Ind	Mitt-NR	Datum	Name	Gepr.		
Abteilung:	1142					

Projektbenennung / project description
E-Plan AC80-2 OW V4.2.2
circuit diag. AC80-2 superstr.

Seitenbenennung / page description
Schalterbeleuchtung

Baunummer.

Anlage:

Ort:

Zeichnungsnr. / drawing no.
28273412

Blatt 22
36 Bl.

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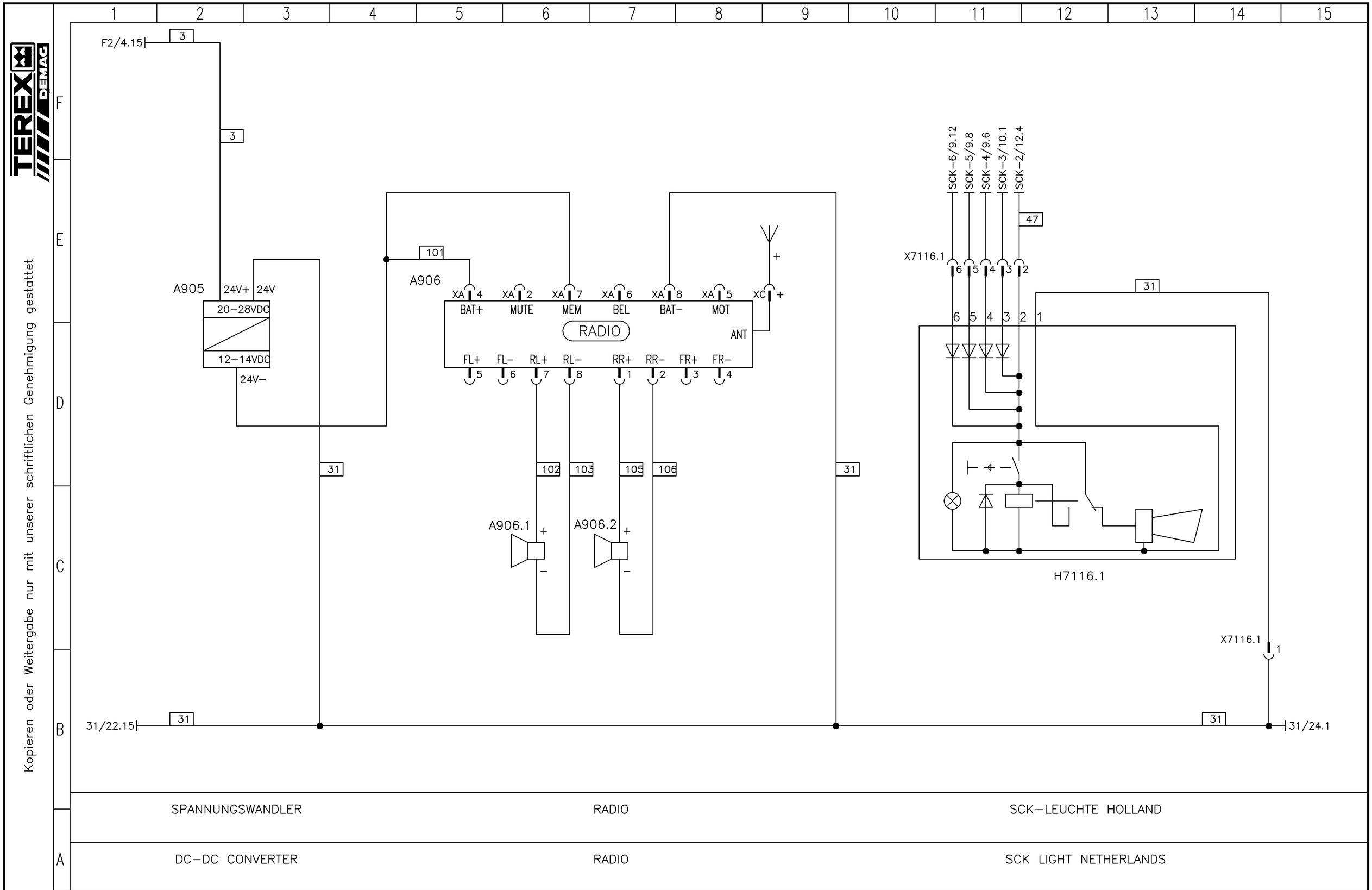

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Ind	Mitt–NR	Datum	Name		Datum	Name
b	P10830	11.04.07	Rosenkranz			
a	P10812	11.12.06	Schlachter	Erst.	06.04.06	Schlachter
				Gepr.		

Abteilung: 1142

Projektbenennung / project description
E–Plan AC80–2 OW V4.2.2
circuit diag. AC80–2 superstr.

Seitenbenennung / page description
Radio, SCK–Leuchte

Baunummer.

Anlage:

Ort:

Zeichnungsnr. / drawing no.
28273412

Blatt 23
36 Bl.

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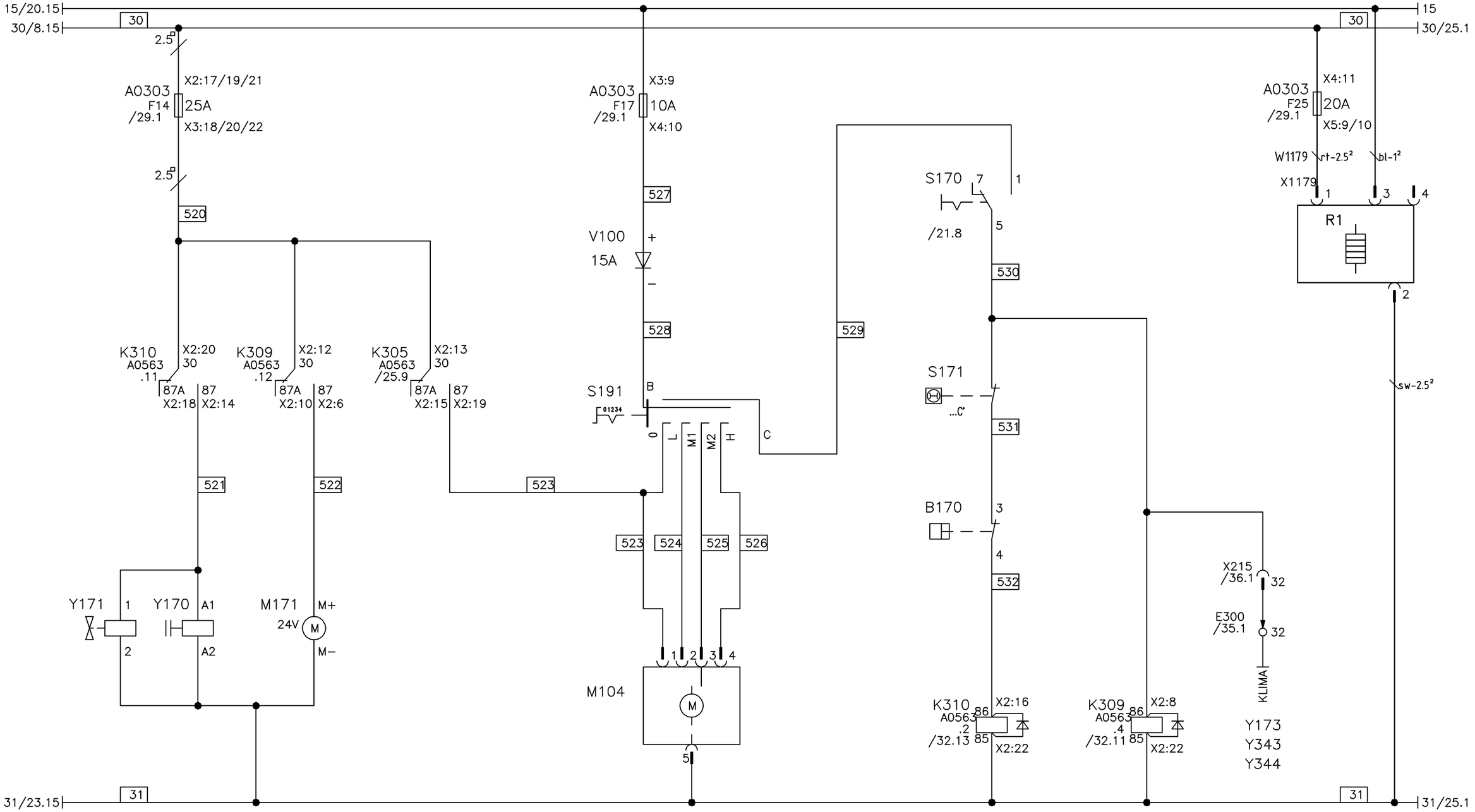

OPTION: KLIMAANLAGE KONDENSATOREINHEIT	GEBLÄSE	RELAIS KOMPRESSOR	RELAIS KONDENSATOR	OPTION Kraftstofffilter Vorwärmung
OPTION: AIR CONDITION CONDENSER UNIT	FAN	RELAY COMPRESSOR	RELAY CONDENSER	OPTIONAL fuel filter cartridge preheating

b	P10830	11.04.07	Rosenkranz		Datum	Name
a	P10812	11.12.06	Schlachter	Erst.	06.04.06	Schlachter
Ind	Mitt-NR	Datum	Name	Gepr.		
Abteilung:	1142					

Projektbenennung / project description
E-Plan AC80-2 OW V4.2.2
circuit diag. AC80-2 superstr.

Seitenbenennung / page description
Klimaanlage

Baunummer.

Anlage:

Ort:

Zeichnungsnr. / drawing no.
28273412

Blatt 24
36 Bl.

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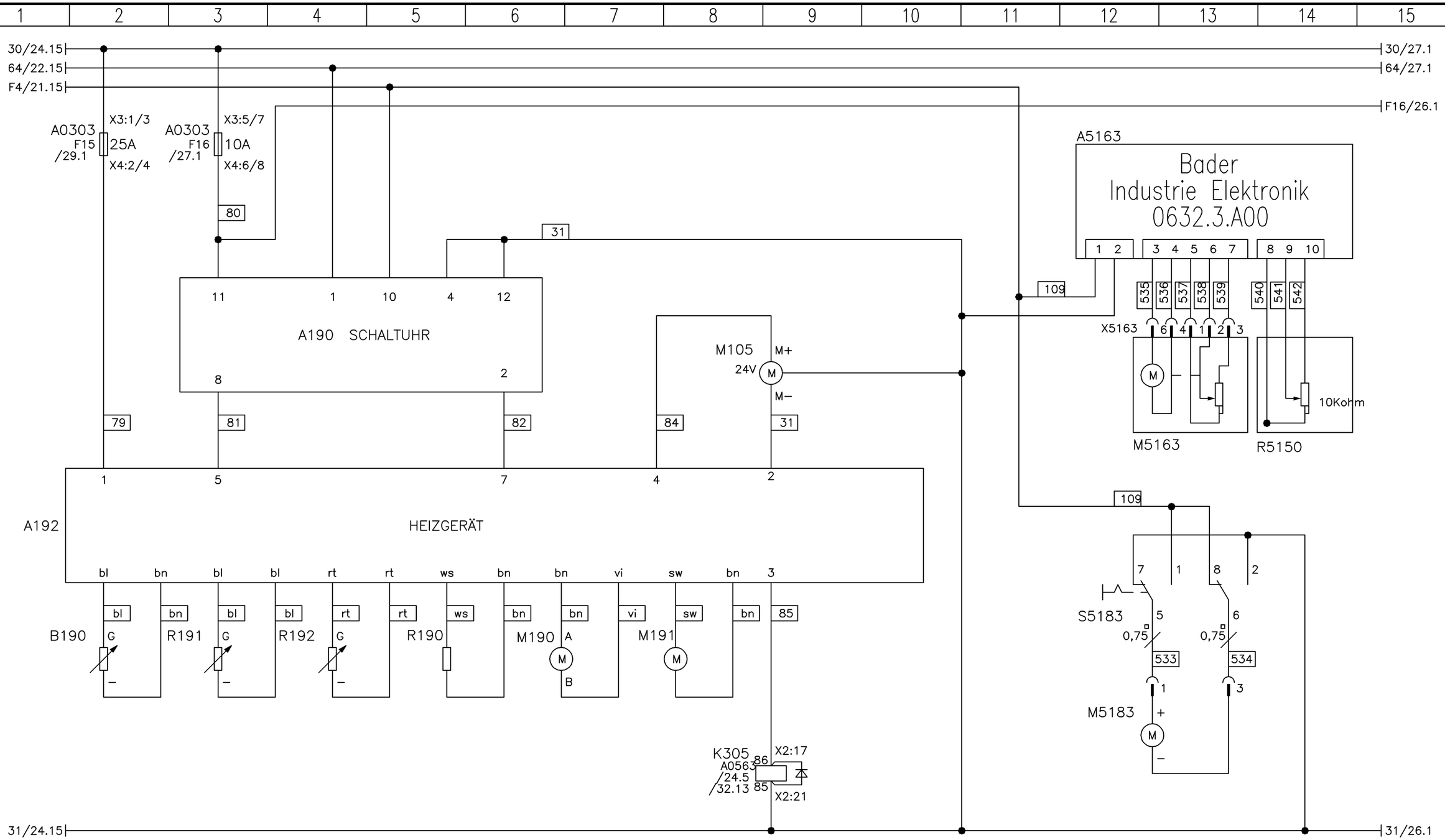

FLAMMFÜHLER	TEMP–FÜHLER	ÜBERHITZUNGS–FÜHLER	GLÜHKERZE	WASSERPUMPE	BRENNER–MOTOR	BRENNSTOFF–DOSIERPUMPE
FLAME SENSOR	TEMP–SENSOR	SAFETY THERMAL SWITCH	GLOW PLUG	WATER PUMP	PLOWER MOTOR	FUEL PUMP

STANDHEIZUNG	STELLVENTIL UND UMLUFT
WATER HEATER	CONTROL VALVE AND CIRCULATING AIR

b	P10830	11.04.07	Rosenkranz		Datum	Name	
a	P10812	11.12.06	Schlachter	Erst.	06.04.06	Schlachter	
Ind	Mitt–NR	Datum	Name	Gepr.			
Abteilung:	1142						

Projektbenennung / project description
E–Plan AC80–2 OW V4.2.2
circuit diag. AC80–2 superstr.

Seitenbenennung / page description
Standheizung

Baunummer.

Anlage:

Ort:

Zeichnungsnr. / drawing no.
28273412

Blatt 25
36 Bl.

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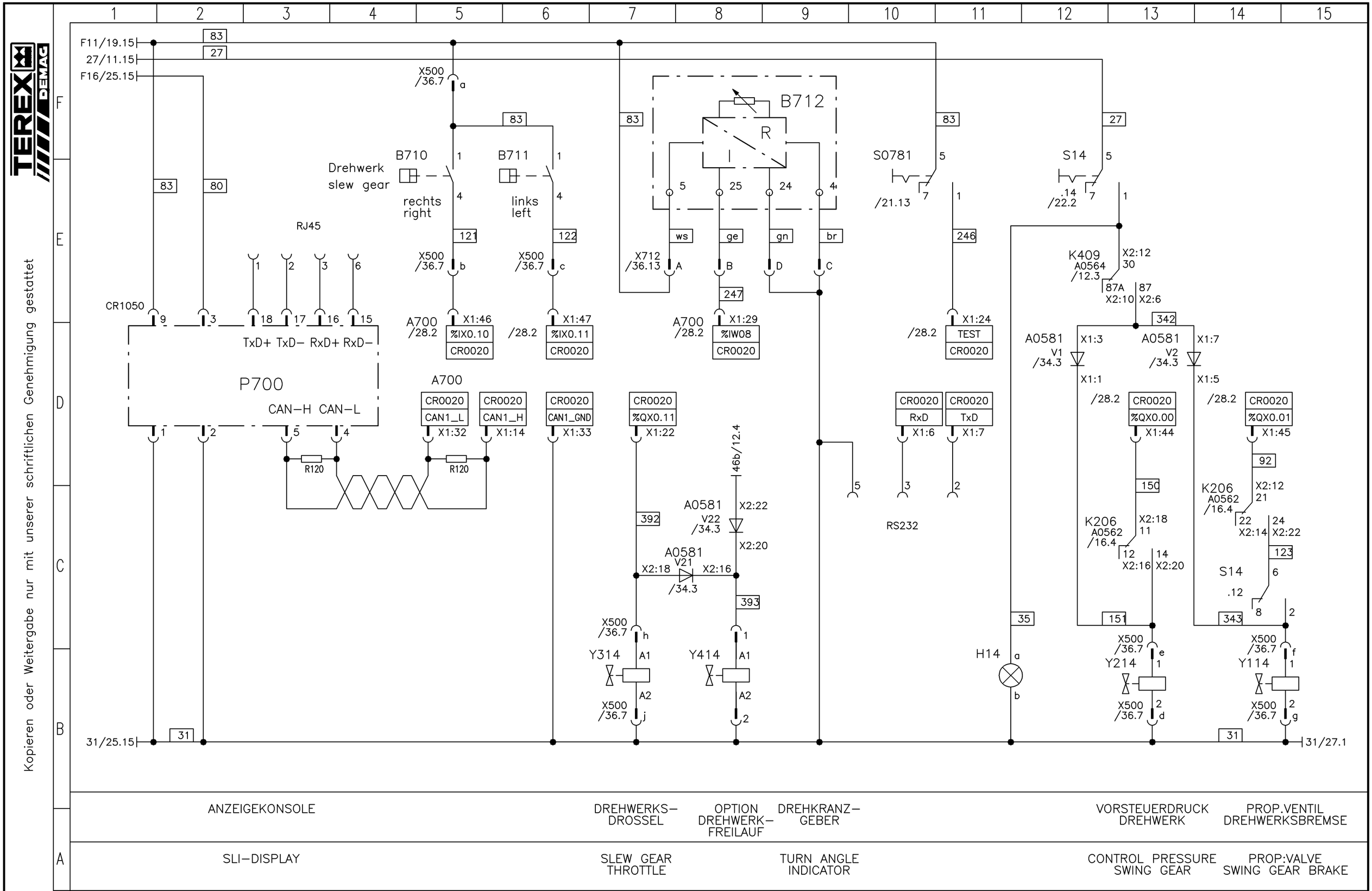

b	P10830	11.04.07	Rosenkranz		Datum	Name	Projektbenennung / project description	Seitenbenennung / page description	Baunummer.	Anlage:
a	P10812	11.12.06	Schlachter	Erst.	06.04.06	Schlachter	E−Plan AC80−2 OW V4.2.2	LMB−Konsole, Arbeitsbereichsbegrenzung		Ort:
Ind	Mitt−NR	Datum	Name	Gepr.			circuit diag. AC80−2 superstr.		Zeichnungsnr. / drawing no. 28273412	Blatt 26 / 36 Bl.
Abteilung: 1142										

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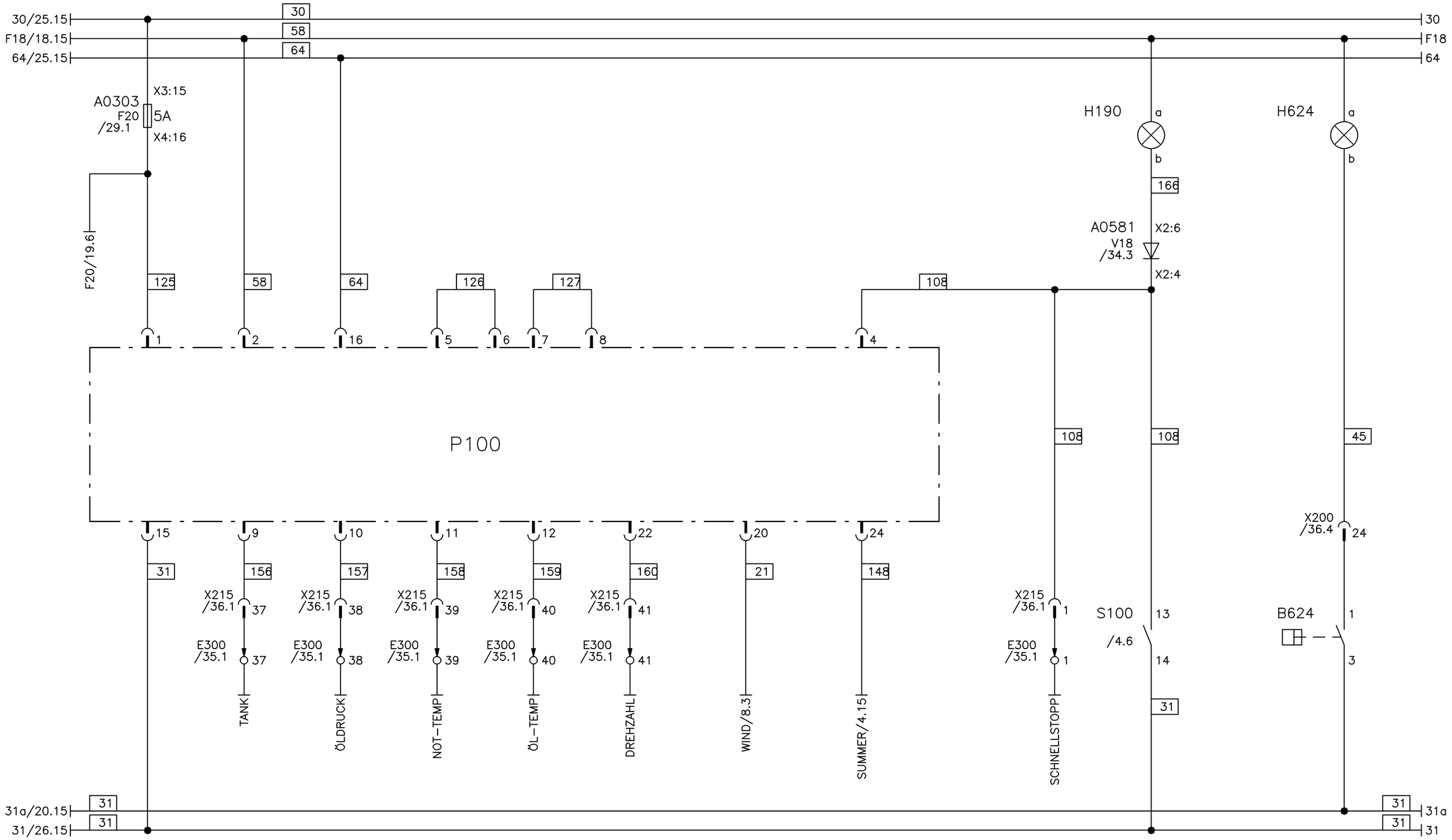

MULTIFUNKTIONS–DISPLAY — OPTION: SCHNELLSTOP — HYDRAULIKOELFILTER

MULTIFUNCTION–DISPLAY — OPTION: QUICK STOP — HYDRAULIC OIL FILTER

b	P10830	11.04.07	Rosenkranz		Datum	Name
a	P10812	11.12.06	Schlachter	Erst.	06.04.06	Schlachter
Ind	Mitt–NR	Datum	Name	Gepr.		
Abteilung:	1142					

Projektbenennung / project description: E–Plan AC80–2 OW V4.2.2; circuit diag. AC80–2 superstr.

Seitenbenennung / page description: Multifunktionsdisplay, Ölfilter–Anzeige

Baunummer.

Anlage:

Ort:

Zeichnungsnr. / drawing no.: 28273412

Blatt 27 / Bl. 36

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A700

IFM
CR0020

1	GND_S	/9.2			17	%IX0.18		%OX0.06	/10.11	33	CAN_GND	/26.6			49	%IX0.33		%OX0.17	/12.7
2	%IX0.13	/13.7			18	%IX0.22	/9.5			34	VBB_R	/9.4			50	%IX0.35		%OX0.19	/12.6
3	%IX0.25		%OX0.09	/9.13	19	%IX0.20	/22.14			35	%IX0.39		%OX0.23		51	%IX0.36		%OX0.20	/12.8
4	%IX0.31	/12.3	%OX0.15		20	%IX0.12	/13.4			36	%IX0.16		%OX0.04		52	%IX0.37		%OX0.21	/12.11
5	VBB_0	/9.2			21	%IX0.14	/13.8			37	%IX0.23	/9.11			53	%IX0.19		%OX0.07	/10.12
6	RxD	/26.10			22	%IX0.27		%OX0.11	/26.7	38	%IX0.15	/13.2			54	%IX0.17		%OX0.05	
7	TxD	/26.11			23	VBB_S	/9.3			39	%IX0.24		%OX0.08	/9.5	55	%IX0.21	/9.7		
8	%IX0.00		%IW03	/13.12	24	TEST	/26.11			40	%IX0.26		%OX0.10	/9.7					
9	%IX0.02		%IW05	/14.8	25	CAN2_L				41	%IX0.28		%OX0.12	/12.12					
10	%IX0.04		%IW07	/14.13	26	CAN2_H				42	%IX0.29		%OX0.13	/12.13					
11	%IX0.06		%IW09		27	%IX0.01		%IW04	/13.10	43	%IX0.30		%OX0.14	/12.14					
12	GND_A	/9.3			28	%IX0.03		%IW06	/14.10	44	%IX0.08		%OX0.00	/26.13					
13	ERROR				29	%IX0.05		%IW08	/26.8	45	%IX0.09		%OX0.01	/26.14					
14	CAN1_H	/26.5			30	%IX0.07		%IW10	/14.6	46	%IX0.10	/26.5	%OX0.02						
15	GND_0				31	%IX0.34		%OX0.18	/12.10	47	%IX0.11	/26.6	%OX0.03						
16	%IX0.38		%OX0.22		32	CAN1_L	/26.5			48	%IX0.32		%OX0.16	/12.5					

b	P10830	11.04.07	Rosenkranz		Datum	Name
a	P10812	11.12.06	Schlachter	Erst.	12.04.06	schlachter_j
Ind	Mitt-NR	Datum	Name	Gepr.		
Abteilung:	1142					

Projektbenennung / project description
E-Plan AC80-2 OW V4.2.2
circuit diag. AC80-2 superstr.

Seitenbenennung / page description

Baunummer.

Anlage:

Ort:

Zeichnungsnr. / drawing no.
28273412

Blatt 28
36 Bl.

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A0303

BMK	Wert/ Value	Seite.Pfad sheet.path	Funktion	Function
F1	25A	/4.5	Zündschloss	ignition
F2	5A	/4.11	Innenbeleuchtung, Radio	cab illumination, radio
F3	10A	/4.13	Steckdosen, Hupe, Rundumleuchten	sockets, horn rotaflare lights
F4	10A	/5.11	Beleuchtung	illumination
F5	5A	/7.2	Scheibenwaschanlage	wipers
F6	5A	/8.6	Hindernisfeuer	aerodynamic safety light
F7	5A	/15.2	Drehmelder, SES	hoist rotation indicator, sink limit switch
F8	10A	/10.2	LMB–Freigabe	SLI release
F9	5A	/4.5	Motor Start	engine start
F10	5A	/9.5	LMB–Überbrückung, LMB–Initiatoren	override switches SLI, HLS, derrecking cyl., SLI indicators
F11	5A	/9.2	LMB	SLI
F12	10A	/19.12	Sitzheizung, Kabinenverstellung	seat heater, cabine adjustment
F13	15A	/20.6	Ölkühler	oil cooler
F14	25A	/24.2	Klimaanlage Kondensatoreinheit, Kompressor	air condition condenser unit, compressor
F15	25A	/25.2	Standheizung	heater
F16	10A	/25.3	Schaltuhr, Farbdisplay	timer module for heater, colour display
F17	10A	/24.7	Klimaanlage–Gebläse	air condition, fan
F18	10A	/16.2	Totmann, Lenkung vom OW	dead man handle, steering from ss
F19	10A	/5.10	Zentralschmieranlage	auto lubrication unit
F20	5A	/27.2	MFA10	multi functional display
F21	10A	/10.3	Magnetventile Vorsteuerung	magnetic valves for precontrol
F22	5A	/4.6	Zündung	ignition
F23	10A	/6.5	Verstellscheinwerfer	main boom search light
F24	10A	/5.8	Rundumleuchten	rotaflare lights
F25	20A	/24.14	Option Kraftstofffiltervorwärmung	optional fuel filter cartridge preheating
F26	/		/	/
F27	/		/	/
F28	15A	/17.2	Gegengewichtssteuerung	ccw control

b	P10830	11.04.07	Rosenkranz		Datum	Name	Projektbenennung / project description	Seitenbenennung / page description	Baunummer. / Anlage:
a	P10812	11.12.06	Schlachter	Erst.	10.04.06	schlachter_j	E–Plan AC80–2 OW V4.2.2	Übersicht Sicherungen	Ort:
Ind	Mitt–NR	Datum	Name	Gepr.			circuit diag. AC80–2 superstr.		Zeichnungsnr. / drawing no. 28273412
Abteilung: 1142									Blatt 29 / Bl. 36

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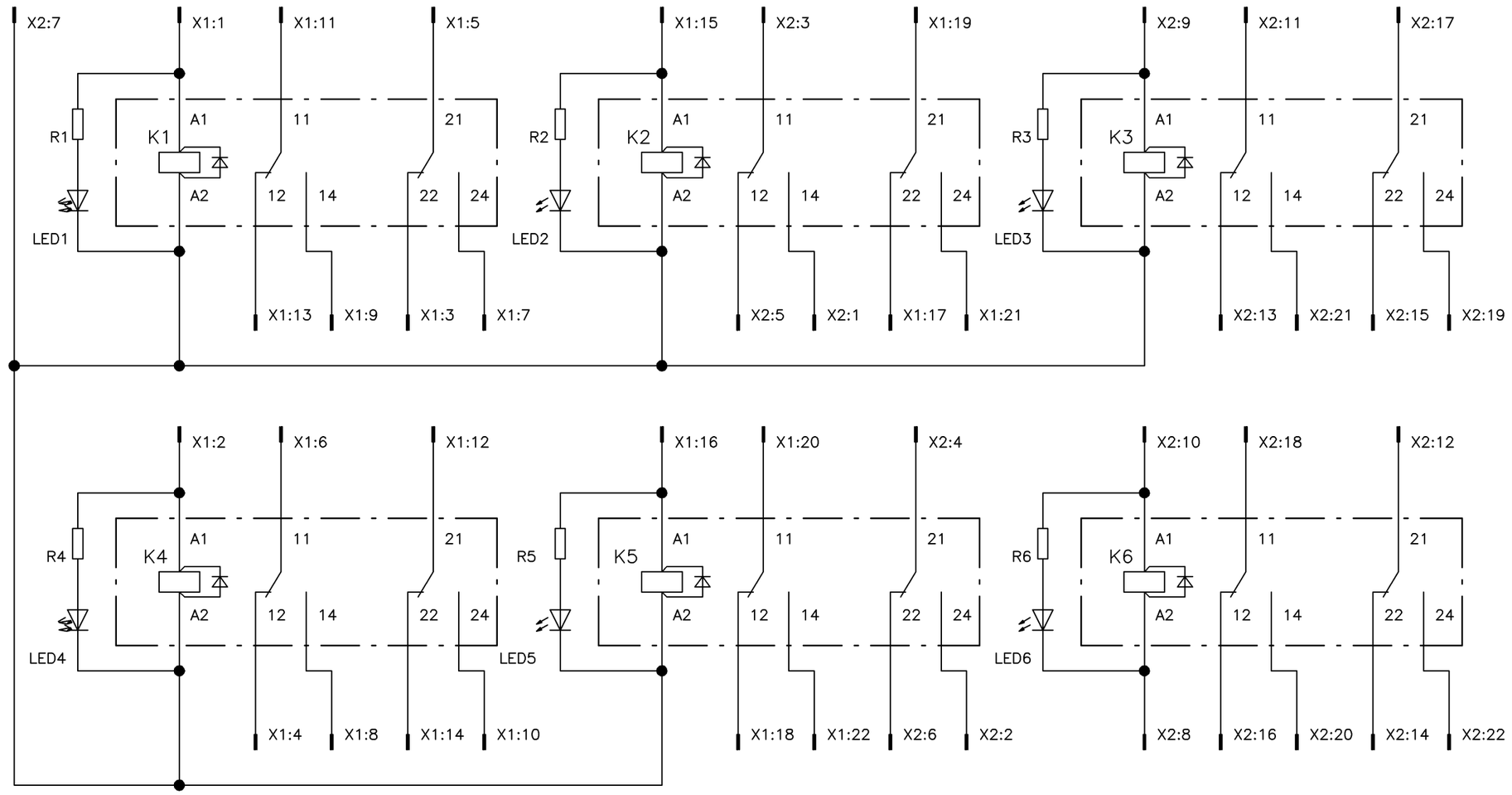
A0561	K101 /12.5	K102 /12.6	K103 /12.7



13008912_	K104 /12.9	K105 /19.2	K106 /19.3

b	P10830	11.04.07	Rosenkranz		Datum	Name	Projektbenennung / project description	Baunummer.
a	P10812	11.12.06	Schlachter	Erst.	10.04.06	schlachter_j	E-Plan AC80-2 OW V4.2.2	Anlage:
Ind	Mitt-NR	Datum	Name	Gepr.			circuit diag. AC80-2 superstr.	Ort:
Abteilung:		1142					Seitenbenennung / page description: Übersicht Relaisplatine A0561	Zeichnungsnr. / drawing no. 28273412

Blatt 30 / Bl. 36

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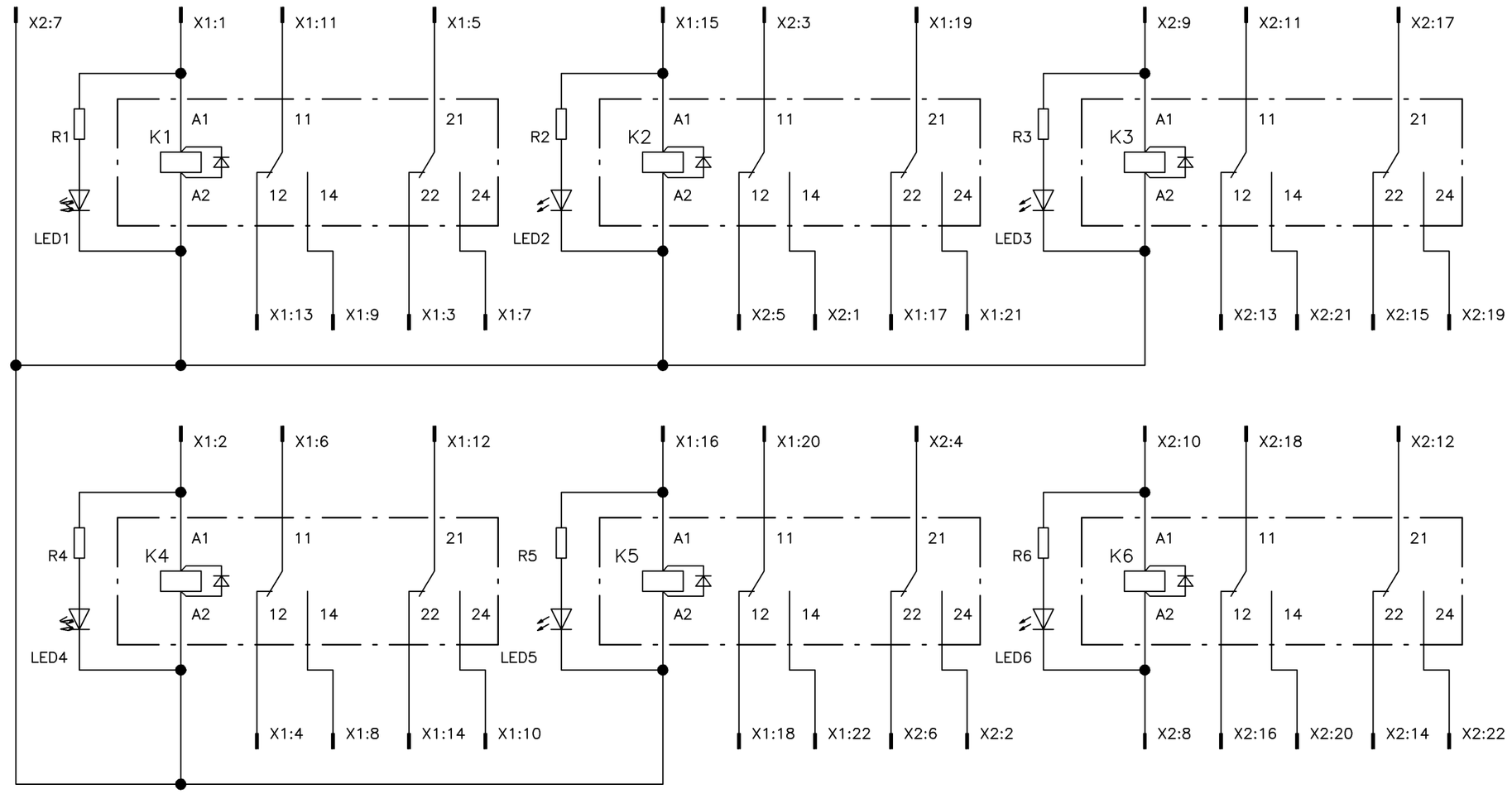
A0562	K201 /18.9	K202 /18.15	K203 /15.9



13008912_	K204 /15.10	K205 /16.3	K206 /16.4

b	P10830	11.04.07	Rosenkranz		Datum	Name	Projektbenennung / project description	Seitenbenennung / page description	Baunummer. / Anlage:
a	P10812	11.12.06	Schlachter	Erst.	10.04.06	schlachter_j	E-Plan AC80-2 OW V4.2.2	Übersicht Relaisplatine A0562	Ort:
Ind	Mitt-NR	Datum	Name	Gepr.			circuit diag. AC80-2 superstr.		Zeichnungsnr. / drawing no. 28273412
Abteilung: 1142									Blatt 31 / Bl. 36

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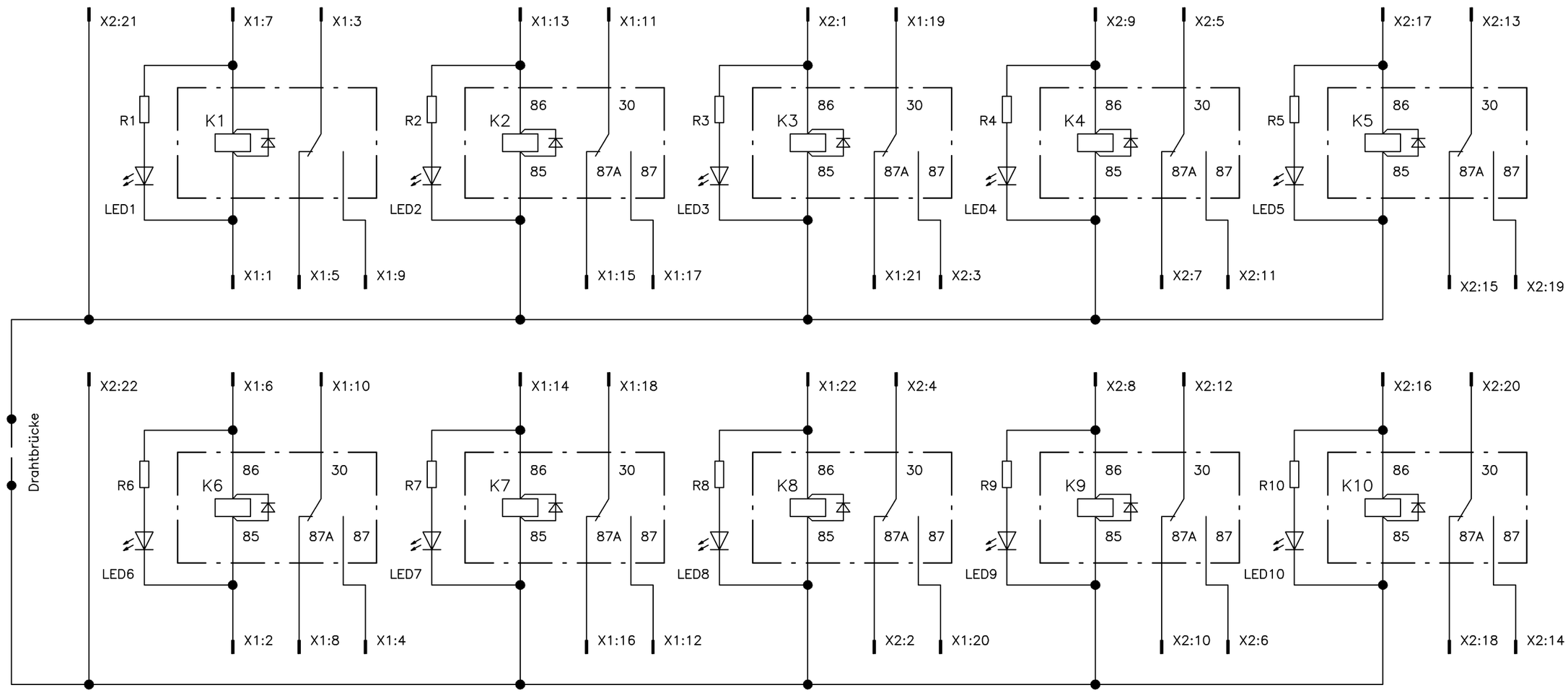
A0563	K301 /20.6	K302 /5.6	K303 /9.11	K304 /9.7	K305 /25.9



13008612_B	K306 /17.2	K307 /15.4	K308 /15.5	K309 /24.12	K310 /24.11

b	P10830	11.04.07	Rosenkranz		Datum	Name
a	P10812	11.12.06	Schlachter	Erst.	10.04.06	Schlachter
Ind	Mitt-NR	Datum	Name	Gepr.		
Abteilung:	1142					

Projektbenennung / project description
E-Plan AC80-2 OW V4.2.2
circuit diag. AC80-2 superstr.

Seitenbenennung / page description
Übersicht Relaisplatine A0563

Baunummer.

Anlage:

Ort:

Zeichnungsnr. / drawing no.
28273412

Blatt 32
36 Bl.

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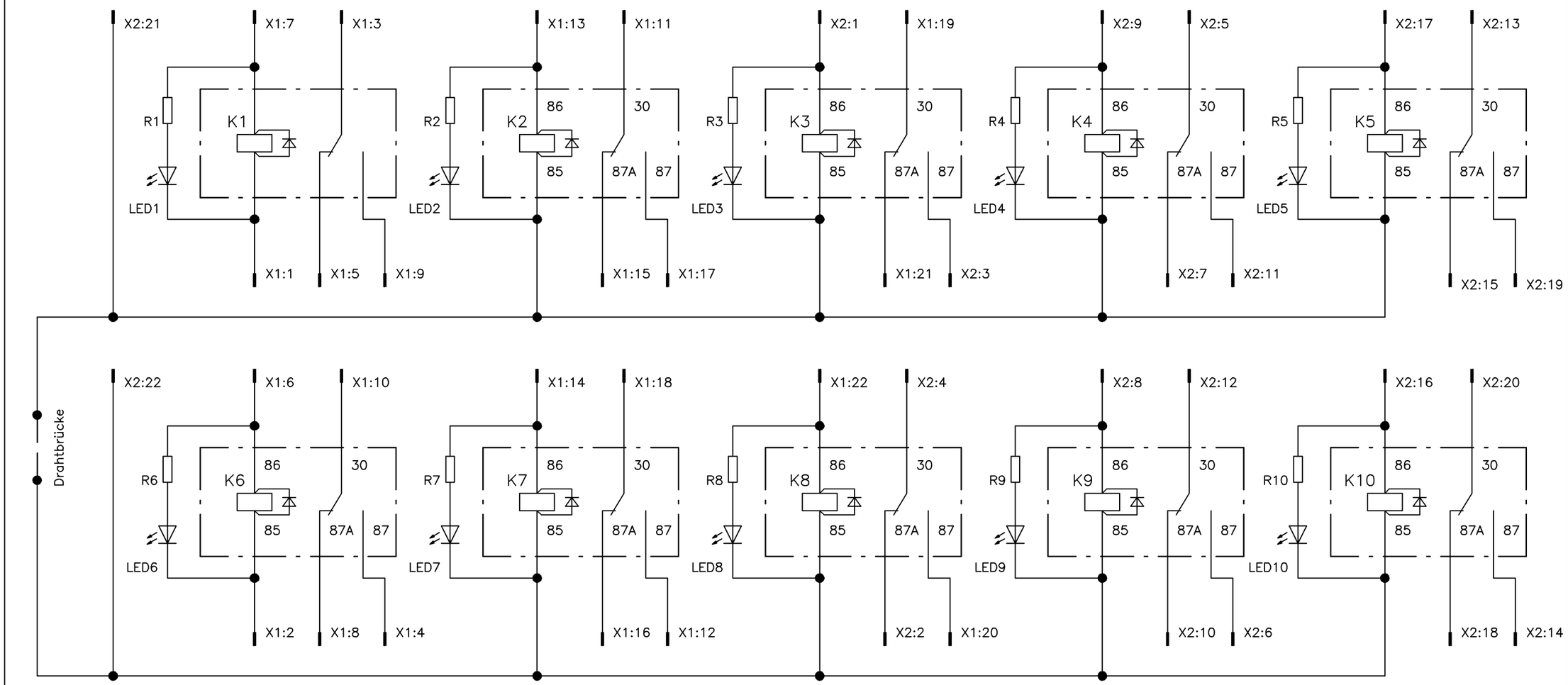
A0564	K401 /9.5	K402 /16.2	K403 /12.10	K404 /12.11	K405 /10.11



13008612_B	K406 /10.12	K407 /17.15	K408 /17.11	K409 /12.3	K410

					Datum	Name
b	P10830	11.04.07	Rosenkranz			
a	P10812	11.12.06	Schlachter	Erst.	10.04.06	Schlachter
Ind	Mitt-NR	Datum	Name	Gepr.		
Abteilung:	1142					

Projektbenennung / project description
E-Plan AC80-2 OW V4.2.2
circuit diag. AC80-2 superstr.

Seitenbenennung / page description
Übersicht Relaisplatine A0564

Baunummer.

Anlage:

Ort:

Zeichnungsnr. / drawing no.
28273412

Blatt 33
36 Bl.

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A0581

/26.12	/26.13	/10.13	/10.12	/10.10	/10.10	/9.4	/12.2	/12.2	/18.9	/18.10
V1	V2	V3	V4	V5	V6	V7	V8	V9	V10	V11
				X1			X2			
V12	V13	V14	V15	V16	V17	V18	V19	V20	V21	V22
/18.14	/18.15	/5.6	/12.2	/12.2	/12.2	/27.12	/12.2	/12.2	/26.7	/26.8

b	P10830	11.04.07	Rosenkranz		Datum	Name
a	P10812	11.12.06	Schlachter	Erst.	11.04.06	Schlachter
Ind	Mitt-NR	Datum	Name	Gepr.		
Abteilung:	1142					

Projektbenennung / project description
E-Plan AC80-2 OW V4.2.2
circuit diag. AC80-2 superstr.

Seitenbenennung / page description
Übersicht Diodenplatine

Baunummer.

Anlage:

Ort:

Zeichnungsnr. / drawing no.
28273412

Blatt 34
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E300

Schleifringkörper 46-polig

1	/27.11	11	/18.11	21	/20.8	31	/16.9	41	/27.7	A	/4.2
2	/19.5	12	/18.13	22	/19.8	32	/24.13	42	/17.4	B	/4.3
3	/6.13	13	/18.12	23	/19.9	33	/17.3	43			
4	/4.8	14	/18.14	24	/19.10	34	/16.11	44			
5	/5.6	15	/18.3	25	/20.6	35	/16.13				
6	/4.13	16	/4.5	26	/20.14	36	/16.12				
7	/18.6	17	/4.6	27	/20.15	37	/27.3				
8	/18.7	18	/20.11	28	/17.4	38	/27.4				
9	/18.6	19	/20.11	29	/18.4	39	/27.5				
10	/18.8	20	/20.9	30	/16.8	40	/27.6				

E702

14-pol
HA-Kabeltrommel

1	
2	/14.2
3	/8.3
4	/8.2
5	/8.7
6	/8.7
7	/8.7
8	/8.7
9	/8.7
10	/8.13
11	/14.6
12	
13	
14	

KABEL_B

Kabeltyp: Oelflex 110CY		Adernzahl/Querschnitt: 12 x 0.5²		Ident-Nr.:
Kabelziel intern		Kabelziel extern		
1	13.10/X700:A	1	13.10/X1:1	
2	13.12/X700:B	2	13.12/X1:16	
3	13.11/X700:C	3	13.11/X1.:3	
4	14.8/X700:D	4	14.8/X:7	
5	14.10/X700:E	5	14.10/X:8	
6	13.10/X700:F	6	13.10/X1.:2	
7	14.2/X700:G	7	14.2/X1:14	
8	14.6/X700:H	8	14.6/X1:15	
9		9		
10		10		
11		11		
12		12		

KABEL_A

Kabeltyp: Oelflex FD-855P		Adernzahl/Querschnitt: 18 x 1.0²		Ident-Nr.:
Kabelziel intern		Kabelziel extern		
1	8.6/X500:A	1	8.6/B702:16	
2	8.13/X500:B	2	8.13/B702:18	
3	8.3/X500:C	3	8.3/B702:11	
4	13.8/X500:D	4	13.8/X:QV1	
5	13.6/X500:E	5	13.6/X:QV2	
6	13.4/X500:F	6	13.4/X:QV3	
7	13.7/X500:G	7	13.7/X:QV4	
8	8.2/X500:H	8	8.2/B702:12	
9	8.6/X500:J	9	8.6/B702:15	
10	6.3/X500:K	10	6.3/B702:Qv6	
11	6.4/X500:L	11	6.4/B702:Qv7	
12	6.2/X500:M	12	6.2/B702:Qv5	
13	6.8/X500:N	13	6.8/B702:Qv10	
14	6.7/X500:P	14	6.7/B702:Qv9	
15	6.6/X500:R	15	6.6/B702:Qv8	
16		16		
17		17		
GE-GN		GE-GN		

KABEL_D

Ziel 1	Ader		Ziel 2
13.10/X1:1	1	1	13.11/X1.:1
13.12/X1:16	2	2	13.12/X1.:2
13.11/X1.:3	3	3	13.13/X1.:3
	4	4	
	SHLD	SHLD	

KABEL_C

Kabeltyp: Oelflex 110CY		Adernzahl/Querschnitt: 12 x 0.5²		Ident-Nr.:
Kabelziel intern		Kabelziel extern		
1	14.2/X1:14	1	14.2/X1:8	
2	14.6/X1:19	2	14.6/X1:15	
3	14.7/X:5	3	14.7/X1:1	
4	14.8/X:7	4	14.8/X1:2	
5	14.8/X:6	5	14.8/X1:3	
6	14.10/X:8	6	14.10/X1:4	
7	13.6/X:QV2	7	13.6/X1:11	
8	13.7/X:QV4	8	13.7/X1:12	
9	13.8/X:QV1	9	13.8/X1:13	
10		10		
11		11		
12		12		

					Datum	Name
b	P10830	11.04.07	Rosenkranz			
a	P10812	11.12.06	Schlachter	Erst.	06.04.06	Schlachter
Ind	Mitt-NR	Datum	Name	Gepr.		
Abteilung:	1142					

Projektbenennung / project description
E-Plan AC80-2 OW V4.2.2
circuit diag. AC80-2 superstr.

Seitenbenennung / page description
Übersicht Schleifringkörper u. Kabel

Baunummer.

Anlage:

Ort:

Zeichnungsnr. / drawing no.
28273412

Blatt 35
36 Bl.

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44–pol Schleifringkörper X215					
1	/27.11	17	/4.6	33	/17.3
2	/19.5	18	/20.11	34	/16.11
3	/6.13	19	/20.11	35	/16.13
4	/4.8	20	/20.9	36	/16.12
5	/5.6	21	/20.8	37	/27.3
6	/4.13	22	/19.8	38	/27.4
7	/18.6	23	/19.9	39	/27.5
8	/18.7	24	/19.10	40	/27.6
9	/18.6	25	/20.6	41	/27.7
10	/18.8	26	/20.14	42	/17.4
11	/18.11	27	/20.15	43	
12	/18.13	28	/17.4	44	
13	/18.12	29	/18.4		
14	/18.14	30	/16.8		
15	/18.3	31	/16.9		
16	/4.5	32	/24.13		

44–pol OW–Steuereinheit X200					
1	/10.13	17	/17.9	33	
2		18	/17.12	34	/15.2
3	/15.2	19	/17.14	35	/15.7
4	/15.9	20		36	/5.9
5	/20.6	21		37	/6.11
6	/10.5	22	/20.3	38	/6.12
7	/11.10	23	/20.4	39	/19.13
8	/10.14	24	/27.14	40	/19.14
9	/11.2	25		41	
10	/11.3	26		42	/11.7
11	/11.5	27	/15.5	43	/11.9
12	/11.6	28		44	
13	/11.11	29	/15.4		
14	/11.14	30	/6.12		
15	/17.9	31	/6.13		
16	/17.9	32	/11.13		

37–pol Hauptausleger X500					
A	/8.6	T		m	
B	/8.13	U		n	
C	/8.3	V		p	
D	/13.8	W		r	
E	/13.6	X		s	
F	/13.4	Z			
G	/13.7	a	/26.5		
H	/8.2	b	/26.5		
J	/8.6	c	/26.6		
K	/6.3	d	/26.13		
L	/6.4	e	/26.13		
M	/6.2	f	/26.15		
N	/6.8	g	/26.15		
P	/6.7	h	/26.7		
R	/6.6	j	/26.7		
S		k			

16–pol X600	
A	/11.2
B	/11.3
C	/11.5
D	/11.6
E	/11.7
F	/11.9
G	
H	
I	
K	/4.8
L	/4.8
M	
N	
O	
P	
R	

14–pol X700	
A	/13.10
B	/13.12
C	/13.11
D	/14.8
E	/14.10
F	/13.10
G	/14.2
H	/14.6
I	
J	
K	
L	
M	
N	

6–pol X701	
A	/14.14
B	
C	
D	/14.13
E	
F	

4–pol X712	
A	/26.7
B	/26.8
C	/26.9
D	/26.9

16–pol X104	
1	/5.14
2	/5.14
3	/5.15
4	/5.15
5	/4.11
6	/4.11
7	/5.8
8	/5.8
9	/7.2
10	/7.2
11	
12	
13	/5.4
14	/5.4
15	
16	
PE	

10–pol X105	
1	/7.4
2	/7.5
3	
4	/7.4
5	/7.6
6	/7.10
7	/7.11
8	/7.10
9	/7.12
10	

12–pol X402	
1	
2	
3	
4	
5	
6	/19.6
7	
8	
9	
10	
11	
12	

5–pol X62	
1	/17.10
2	/17.10
3	/17.10
4	/17.12
5	/17.14

3–pol X18	
1	/15.2
2	/15.3
3	/15.2

5–pol X19	
1	/15.5
2	/15.5
3	/15.7
4	
5	/15.5

b	P10830	11.04.07	Rosenkranz		Datum	Name
a	P10812	11.12.06	Schlachter	Erst.	06.04.06	Schlachter
Ind	Mitt–NR	Datum	Name	Gepr.		
Abteilung: 1142						

Projektbenennung / project description
E–Plan AC80–2 OW V4.2.2
circuit diag. AC80–2 superstr.

Seitenbenennung / page description
Übersicht Stecker

Baunummer.

Anlage:

Ort:

Zeichnungsnr. / drawing no.
28273412

Blatt 36
Bl. 36

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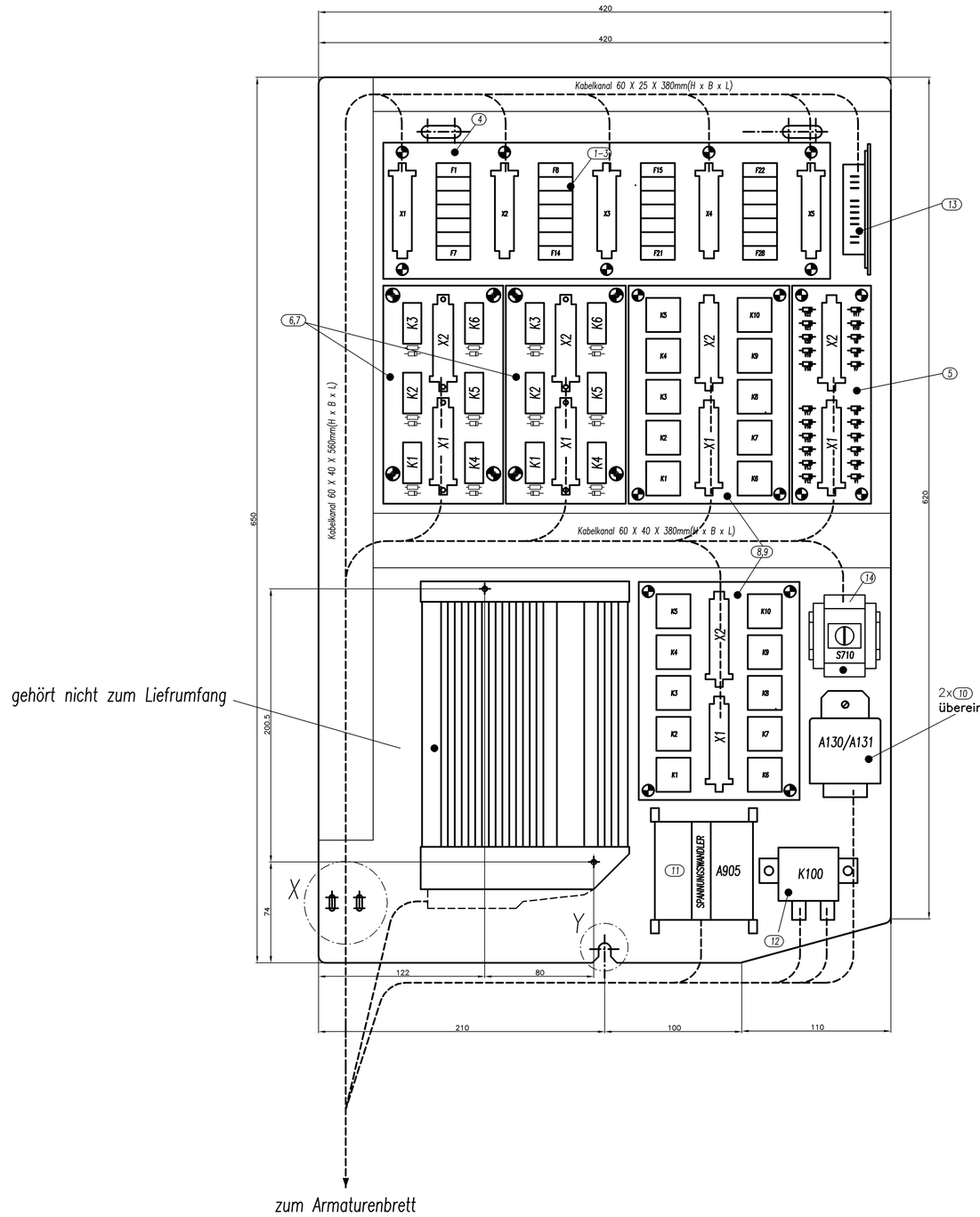
1	Flachsicherung 10A	Pudenz	16161855107
2	Flachsicherung 15A	Pudenz	16161855157
3	Flachsicherung 25A	Pudenz	16161855257
4	Sicherungsplatine F1–F28	DEMAG	13008512
5	Diodenplatine V1–22, 5A	DEMAG	13009012
6	Relaisplatine K1–K6, 2WE	DEMAG	13008912
7	Relais 2–polig	Schrack	RT 424024
8	Relaisplatine K1–K10, 1WE	Würth Electr.	13008612c
9	Würfelrelais	Bosch	0 332 204 204
10	Impulsgeber	SWF	601195
11	Spannungswandler 10A	Sysmotr.	51–497–0468–00
12	Lastrelais 50A,1S	Bosch	0.332.002.256
13	EVKS Stellmotor–Steuerung	Bader	0632.3.A00
14	Schlüsselschalter	Lumitas	400.102.001

Sicherungswerte:

5A: F2, F5, F6, F7, F9, F10, F11, F20, F22
10A: F3, F4, F8, F12, F16, F17, F18, F19, F21, F23, F24
15A: F13, F28
25A: F1, F14, F15

Platinen:

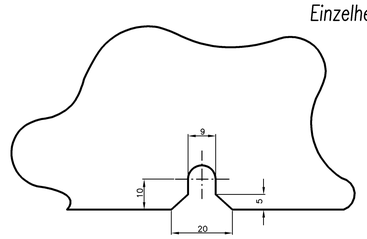
– zusätzliche Gummipuffer zur Abstützung der Platinen vorsehen



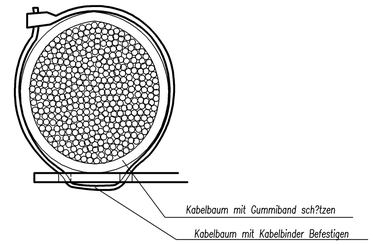
gehört nicht zum Liefrumfang

zum Armaturenbrett

Einzelheit Y

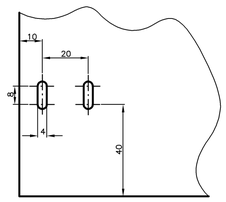


ZUGENTLASTUNG



2x (10) übereinander montiert

Einzelheit X



Bezeichnungsschild mit Identnummer, Krantyp und Baunummer gut sichtbar auf Blech anbringen

Aufbaublech Zentralelektrik: chromatiert
Befestigungsbohrungen gemäß Bohrbildern der Bauteile
Werkstoff: St 1203, Dicke 2mm

b	P10830	11.04.07	Rosenkranz	Maßstab: %	Masse: kg
a	P10812	25.09.06	Schlachter J.	Typ: AC 80–2	Werkstoff: %
Ind	Mitt–NR	Datum	Name		Mat.–art: UNTL

	Datum	Name
Erst.	13.04.06	Schlachter J.
Gepr.		

Abteilung: 1142

KABINENELEKTRIK OW AC 80–2 V3.2.4

ELECTRIC CAB SUPERSTRUCTURE AC 80–2 V3.2.4

TEREX DEMAG

Ident–Nr: 28273612 | Format: A1 | Bl. / Blätter: 1/7

Plotstatus: | ECSCAD

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Kontakt S2 mit Schrumpfschlauch isolieren

Pot 108 und 31g isolieren

außen an Kabelstrang lose anbinden

Busabschluss 120Ohm steckbar Lumberg, Best.Nr. 0939 CTX 101

an Kabelstrang anbinden

weiter auf Seite 3

POSITIONEN X620 BIS X627
QUETSCHVERBINDER MIT SCHRUMPFSCHLAUCH ISOLIEREN

b	P10830	11.04.07	Rosenkranz	Maßstab: %	Masse: kg
a	P10812	25.09.06	Schlachter J.	Typ: AC 80-2	
Ind	Mitt-NR	Datum	Name		Werkstoff: %
					Mat.-art: UNTL

	Datum	Name
Erst.	13.04.06	Schlachter J.
Gepr.		
Abteilung:	1142	

KABINENELEKTRIK OW AC 80-2 V3.2.4

ELECTRIC CAB SUPERSTRUCTURE AC 80-2 V3.2.4

Ident-Nr: 28273612

Format: A1 | Bl. / Blätter: 2/7

Plotstatus:

ECSCAD

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- LEITUNGEN NACH DIN 72551–FLRY–WEISS, POTENTIAL 31 BRAUN
- WEISSE LEITUNGEN ALLE 25 MM MIT POTENTIALNUMMER
  (OHNE ENDBUCHSTABEN BEDRUCKEN)
  KABELBAUMZUBEHOER WIE IN TEILEKATALOG SPEZIFIZIERT !
  ALLE STECKER MIT POSITIONSBEZEICHNUNGEN MARKIEREN !

weiter auf Seite 4

weiter auf Seite 2

	W1	W2	W3	W4	W5
A			1400		
B		100			
C		900			
D		1100			
E		1000			
F		1200			
G		1200			

KONTAKTE IM LIEFERUMFANG

KONTAKTE IM LIEFERUMFANG BG66

aufstecken

ADERN BIS ZU ABZWEIG MIT LACKSCHAUCH ÜBERZIEHEN

ADERN BIS ZU ABZWEIG MIT LACKSCHAUCH ÜBERZIEHEN

Kontakte im Lieferumfang

POSITIONEN X630 BIS X633:
KABELSCHUHE MIT SCHRUMPFSCHLAUCH ISOLIEREN

b	P10830	11.04.07	Rosenkranz	Maßstab: %	Masse: kg
a	P10812	25.09.06	Schlachter J.	Typ: AC 80–2	Werkstoff: %
Ind	Mitt–Nr	Datum	Name		Mat.–art: UNTL

	Datum	Name
Erst.	13.04.06	Schlachter J.
Gepr.		
Abteilung:	1142	

KABINENELEKTRIK OW AC 80–2 V3.2.4

ELECTRIC CAB SUPERSTRUCTURE AC 80–2 V3.2.4

TEREX DEMAG

Ident–Nr: 28273612

Format A1 | Bl. / Blätter 3/7

Prototatus: ECSCAD

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A5163 SG65 SG66 SG64

A0303-X5 A0303-X4 A0303-X3 A0303-X2 A0303-X1 SG33

A0581-X2 A0581-X1 A0563-X2 A0563-X1 A0562-X2 A0562-X1 A0561-X2 A0561-X1 SG33

S710

A131 A130 SG6

SG2 K100 A905

A700

SG50

Alle Kontakte S24 mit Seals D15 versehen

BG102

Busabschluss 120Ohm steckbar
Lumberg, Best.Nr. 0939 CTX 101
– an Kabelstrang anbinden

83/83a/83b/83c QV6 X654
83d/83e/83f/83g
83h/83j/83k

SG1 DB2 FG1 V100 außen an Kabelstrang lose anbinden

30 10²/30a 6² QV10 X650
30b 2.5²/39c 2.5²
30d 2.5²/39e 2.5²
30g 2.5²/39h 2.5²
30j 2.5²/39k 2.5²

27/27a/27b QV5 X651
27c/27d/27e
27f/27g

28/28a/28b QV5 X652
28c/28d/28e
28f/28g

91a 2.5²/91b 2.5² QV7 X653
91c 2.5²/91d 2.5²
91e 2.5²

Res.3 R1 R2 R3 R4 R5 R6 R7 R8 R9 R10

weiter auf Seite 3

– LEITUNGEN NACH DIN 72551–FLRY–WEISS, POTENTIAL 31 BRAUN
– WEISSE LEITUNGEN ALLE 25 MM MIT POTENTIALNUMMER (OHNE ENDBUCHSTABEN BEDRUCKEN)
KABELBAUMZUBEHOER WIE IN TEILEKATALOG SPEZIFIZIERT !
ALLE STECKER MIT POSITIONSBEZEICHNUNGEN MARKIEREN !

POSITIONEN X650 BIS X654:
QUETSCHVERBINDER MIT SCHRUMPFSCHLAUCH ISOLIEREN

b	P10830	11.04.07	Rosenkranz	Maßstab: %	Masse: kg
a	P10812	25.09.06	Schlachter J.	Typ: AC 80–2	Werkstoff: %
Ind	Mitt–NR	Datum	Name		Mat.–art: UNTL

	Datum	Name
Erst.	13.04.06	Schlachter J.
Gepr.		
Abteilung:	1142	

KABINENELEKTRIK OW AC 80–2 V3.2.4

ELECTRIC CAB SUPERSTRUCTURE AC 80–2 V3.2.4

Ident–Nr: 28273612 | Format A1 | Bl. / Blätter 4/7

Plotstatus: ECSCAD

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Potential	Querschnitt [mm²]	Von	Nach
R1	1	Res.3–.	Res.2–.
R2	1	Res.3–.	Res.2–.
R3	1	Res.2–.	Res.3–.
R4	1	Res.3–.	Res.2–.
R5	1	Res.2–.	Res.3–.
R6	1	Res.1–.	Res.3–.
R7	1	Res.1–.	Res.3–.
R8	1	Res.3–.	Res.1–.
R9	1	Res.3–.	Res.1–.
R10	1	Res.1–.	Res.3–.
R11	1	Res.2–.	Res.1–.
R12	1	Res.2–.	Res.1–.
R13	1	Res.2–.	Res.1–.
R14	1	Res.2–.	Res.1–.
R15	1	Res.2–.	Res.1–.
Br1	1	X601–K	X601–L
Br2	1	X600–M	X601–M
RxD	1	RS232–3	A700–6
RxD–	(gn)	P700–15	RJ45–6
RxD+	(ws–gn)	RJ45–3	P700–16
TxD	1	A700–7	RS232–2
TxD–	(or)	P700–17	RJ45–2
TxD+	(ws–or)	P700–18	RJ45–1
bl	1	A700–32	P700–4
ge	1	P700–5	A700–14
1	2.5	S101–8	A0303–X2–7
2	1	A0303–X3–8	X215–16
3	1	X104–5	A0303–X2–6
3a	1	A0303–X2–6	A905–24V
4	1	A0303–X2–8	X622–.
4b	1	X622–.	S114–5
4c	1	X622–.	H101–1
4d	1	X622–.	S110–.
4e	1	X622–.	X100–.
4f	1	X102–.	X622–.
5	1	X104–13	S110–.
6	1	A0581–X1–10	S114–1
7a	1	S112–1	X104–1
7b	1	X104–3	X104–1
10	1	A0303–X2–14	X623–.
10a	1	S132–3	X623–.
10b	1	X623–.	S131–3
10c	1	X623–.	S130–3
10d	1	X105–2	X623–.
10e	1	X623–.	X105–7
10f	1	X623–.	A131–15
10g	1	A130–15	X623–.
11	1	X104–9	S132–1
12	1	A130–53	S130–8
13	1	S130–5	A130–J

Potential	Querschnitt [mm²]	Von	Nach
14	1	X105–5	A130–31b
15	2.5	S101–5	A0303–X1–9
15a	2.5	A0303–X1–10	A0303–X1–11
15b	2.5	A0303–X1–12	A0303–X2–9
15c	2.5	A0303–X1–13	A0303–X2–11
15d	2.5	A0303–X4–1	S101–6
15e	2.5	S101–6	A0303–X1–15
15f	2.5	A0303–X1–21	A0303–X1–16
15g	2.5	A0303–X3–13	A0303–X1–17
15h	2.5	A0303–X4–7	A0303–X1–18
15k	2.5	A0303–X1–22	A0303–X3–9
16	1	X105–1	S130–2
17	1	A131–53	S131–8
18	1	S131–5	A131–J
19	1	A131–31b	X105–9
20	1	S131–2	X105–6
21	1	X500–C	P100–20
22	1	A0303–X2–18	S115–5
23	1	S115–1	X500–A
24	1	S705–4	A0563–X2–1
24a	1	A0563–X2–1	A700–37
24b	1	X7116.1–6	S705–4
25	1	A0581–X1–15	A0563–X2–3
26	1	A0564–X2–13	A0581–X1–9
26a	1	A0581–X1–9	A0581–X1–13
27	1	X651–.	A0303–X4–18
27a	1	X651–.	A0561–X2–3
27b	1	A0561–X1–6	X651–.
27c	1	X651–.	A0563–X1–18
27d	1	A0563–X2–4	X651–.
27e	1	A0563–X1–19	X651–.
27f	1	S14–5	X651–.
27g	1	X651–.	A0564–X2–5
28	1	X652–.	A0564–X1–9
28a	1	X652–.	A0561–X1–11
28b	1	X652–.	A0561–X2–11
28c	1	X652–.	A0564–X1–10
28d	1	X652–.	A0581–X1–11
28e	1	X200–7	X652–.
28f	1	X200–32	X652–.
28g	1	A0564–X1–19	X652–.
30	10	X650–.	X633–.
30a	6	X650–.	K100–30
30b	2.5	X650–.	A0303–X1–19
30c	2.5	A0303–X2–17	X650–.
30d	2.5	A0303–X3–1	X650–.
30e	2.5	X650–.	A0303–X3–5
30g	2.5	A0303–X3–15	X650–.
30h	2.5	X650–.	A0303–X1–1
30j	2.5	X650–.	A0303–X4–9

Potential	Querschnitt [mm²]	Von	Nach
30k	2.5	A0303–X1–5	X650–.
31a	1	P100–15	X620–.
31c	1	X620–.	H192–2
31d	1	H14–2	X620–.
31e	1	H700–2	X620–.
31f	1	H710–.	X620–.
31g	1	X620–.	S100–4
31h	1	X620–.	S120–3
31j	1	S0781–10	X620–.
31k	1	X620–.	A190–4
31l	1	X620–.	A190–12
31n	1	A906–8	X620–.
31p	1	X620–.	X105–4
31r	1	X105–8	X620–.
31s	1	X620–.	X104–2
31t	1	X104–4	X620–.
31u	1	X104–6	X620–.
31v	1	X104–8	X620–.
31w	1	X104–10	X620–.
31x	1	X104–14	X620–.
31y	1	A303–1	X620–.
31z	1	X620–.	A303–3
31aa	1	X620–.	S132–10
31ab	1	S116–10	X620–.
31ac	1	S131–10	X620–.
31ad	1	X620–.	S130–10
31ae	1	X620–.	S120–10
31af	1	S115–10	X620–.
31ag	1	S112–10	X620–.
31ah	1	X620–.	S114–10
31aj	1	X620–.	S801–10
31ak	1	S802–10	X620–.
31al	1	X620–.	S804–10
31am	1	S803–10	X620–.
31an	1	X620–.	S805–10
31ao	1	S5183–2	S5183–7
31ap	1	X620–.	S170–10
31ar	1	S5183–10	X620–.
31as	1	X620–.	S759–10
31at	1	X100–.	X620–.
31au	1	X620–.	X102–.
31av	1	E100–.	X620–.
31aw	1	RS232–5	X620–.
31ax	1	P700–1	X620–.
31ay	1	X620–.	P700–2
31az	1	S5183–2	X620–.
31ba	1	S160–10	X630–.
31bb	1	X630–.	S161–10
31bc	1	S14–10	X630–.
31bd	1	X630–.	S23–10

Potential	Querschnitt [mm²]	Von	Nach
31be	1	X630–.	S800–10
31bf	1	X630–.	S758–10
31bg	1	A0564–X2–22	X630–.
31bh	1	X630–.	H18.1–4
31bj	1	X630–.	H19.1–4
31bk	1	X630–.	X5952–2
31bl	1	H18–4	X630–.
31bm	1	H19–4	X630–.
31bn	2.5	Y170–.	X630–.
31bo	2.5	X630–.	Y171–2
31bp	2.5	X630–.	X190–2
31br	2.5	X630–.	X200–37
31bs	2.5	X630–.	X200–38
31ca	1	X500–J	X630–.
31cb	1	M105–2	X630–.
31cc	1	A0561–X2–7	X630–.
31cd	1	A0561–X2–8	X630–.
31ce	1	A0562–X2–7	X630–.
31cf	1	X630–.	A0562–X2–8
31ch	1	X630–.	A0563–X2–21
31cj	1	X630–.	A0563–X2–22
31ck	2.5	X630–.	M171–1
31cl	1	X630–.	A130–31
31cm	1	A131–31	X630–.
31cn	1	X630–.	K100–85
31co	1	A0563–X1–2	A0563–X2–22
31cp	1	A905––	X630–.
31cr	1	A905––	X630–.
31cs	1	X630–.	A0564–X1–1
31ct	1	A0564–X1–2	X630–.
31cu	1	X630–.	X402–14
31cv	1	X630–.	A700–1
31cx	2.5	X630–.	M104–5
31cy	1	X402–5	X630–.
31cz	1	X630–.	X402–6
31da	4	X620–.	X630–.
31db	1	X630–.	A0564–X2–21
31dc	1	H7116–4	X630–.
31dd	1	X630–.	X712–C
31de	1	S162–10	X630–.
31df	1	S720–10	X630–.
31dg	1	A5163–2	X630–.
31dh	1	X500–d	X630–.
31dj	1	X630–.	X500–f
31dk	1	X500–j	X630–.
31dl	1	X630–.	X700–C
31dm	1	X630–.	A700–12
31dn	1	X630–.	A700–33
31dp	1	X630–.	X712–D
31dr	1	X7116.1–1	X630–.

b	P10830	11.04.07	Rosenkranz	Maßstab: %	Masse: kg
a	P10812	25.09.06	Schlachter J.		
Ind	Mitt–NR	Datum	Name	Typ: AC 80–2	Werkstoff: %
					Mat.–art: UNTL

	Datum	Name
Erst.	03.03.08	burkard
Gepr.		

Abteilung: 1142

KABINENELEKTRIK OW AC 80–2 V3.2.4

ELECTRIC CAB SUPERSTRUCTURE AC 80–2 V3.2.4

Ident–Nr: 28273612

Format: A1 | Bl. / Blätter: 5/7

Plotstatus: ECSCAD

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Potential	Querschnitt [mm²]	Von	Nach
31ds	1	X630–.	Y414–2
31ea	1	S6131–10	X620–.
31eb	1	X620–.	S6132–10
31ec	1	X620–.	S6133–10
31ed	1	S6134–10	X620–.
31ee	1	H61–.	X620–.
31ef	1	X620–.	H62–.
31eg	1	H63–.	X620–.
31eh	1	X620–.	S61–10
31ej	1	S62–10	X620–.
31ek	2.5	S62–2	X620–.
31el	2.5	S62–7	X620–.
33	1	X215–3	X500–B
33a	1	X200–31	X215–3
33b	1	X200–30	X200–31
34	1	X200–6	S6–2
34a	1	X200–6	S6.1–2
35	1	S14–1	A0564–X2–12
35a	1	S14–1	H14–1
36	1	X600–A	A0561–X1–9
36a	1	X200–9	X600–A
37	1	A0561–X2–1	X600–B
37a	1	X200–10	X600–B
38	1	X600–C	A0561–X2–21
38a	1	X600–C	X200–11
39	1	A0561–X1–8	X600–D
39a	1	X600–D	X200–12
40	1	X200–13	A0563–X1–12
41	1	X200–14	A0563–X1–20
42	1	S710–5	A0303–X3–10
42a	1	A0303–X3–10	X624–.
42b	1	X624–.	X500–E
42c	1	S700–3	X624–.
42d	1	S701–3	X624–.
42e	1	X624–.	S705–3
42f	1	A0563–X2–5	X624–.
43	1	A700–55	S700–4
43a	1	X7116.1–5	S700–4
44	1	A700–18	S700–4
44a	1	S700–4	X7116.1–4
45	1	H624–2	X200–24
46	1	A0581–X1–19	S710–8
46a	1	A0581–X2–1	A0581–X1–19
46b	1	A0581–X2–3	A0581–X2–1
46c	1	A0581–X2–7	A0581–X2–3
46d	1	A0581–X2–10	A0581–X2–7
46e	1	A0581–X2–11	A0581–X2–10
46f	1	A0581–X2–14	A0581–X2–11
46g	1	A0581–X2–14	A0581–X1–18
46h	1	A0581–X1–22	A0581–X1–18

Potential	Querschnitt [mm²]	Von	Nach
46k	1	A0581–X1–22	H710–.
46l	1	A0581–X2–22	S710–8
46m	1	A0581–X2–22	A0581–X1–14
46n	1	A0581–X1–14	A0564–X2–8
46p	1	A0564–X2–8	A700–4
47	1	A0581–X1–16	X7116.1–2
48	1	H700.1–.	A0563–X2–11
50	1	S100–2	X215–17
52	1	A0563–X1–14	X200–29
53	1	S160–1	A0561–X1–1
54	1	S160–2	A0561–X1–15
55	1	X200–3	A0303–X2–22
56	1	A0562–X1–20	X200–34
57	1	A0562–X2–4	X200–35
58	1	A0303–X4–12	X626–.
58a	1	X626–.	S801–3
58b	1	S801–4	X626–.
58c	1	X626–.	S805–3
58d	1	S805–4	X626–.
58e	1	S759–5	X626–.
58f	1	P100–2	X626–.
58g	1	X626–.	H624–1
58h	1	X626–.	H190–1
58k	1	X626–.	S800–3
58l	1	S20.1–1	X626–.
58m	1	X626–.	S20.2–1
58n	1	S6–1	X626–.
58p	1	S6.1–1	X626–.
58r	1	S758–3	X626–.
60	1	A0562–X2–11	S800–1
61	1	S800–7	A0562–X2–17
62	1	S802–4	S803–4
62a	1	S803–4	S805–2
62b	1	S805–8	S805–2
63	1	S801–2	S801–8
63a	1	S802–3	S801–8
63b	1	S804–3	S802–3
63c	1	S804–3	S803–3
63d	1	S803–3	A0561–X1–20
63e	1	A0561–X2–4	A0561–X1–20
63f	1	A0561–X2–4	A0561–X2–12
63g	1	A0561–X2–12	A0561–X2–18
64	1	X621–.	S116–1
64a	1	X621–.	P100–16
64b	1	X621–.	A190–1
64c	1	X621–.	A700–19
64aa	1	X621–.	S132–9
64ab	1	S116–9	X621–.
64ac	1	X621–.	S131–9
64ad	1	X621–.	S130–9

Potential	Querschnitt [mm²]	Von	Nach
64ae	1	S120–9	X621–.
64af	1	S115–9	X621–.
64ag	1	X621–.	S112–9
64ah	1	S114–9	X621–.
64aj	1	S801–9	X621–.
64ak	1	X621–.	S802–9
64al	1	X621–.	S804–9
64am	1	S803–9	X621–.
64an	1	X621–.	S805–9
64ap	1	S170–9	X621–.
64ar	1	S5183–9	X621–.
64as	1	S759–9	X621–.
64at	1	S0781–9	X621–.
64ba	1	X621–.	S160–9
64bb	1	X621–.	S161–9
64bc	1	S14–9	X621–.
64bd	1	X621–.	S23–9
64be	1	X621–.	S800–9
64bf	1	X621–.	S758–9
64bg	1	X621–.	S720–9
64bh	1	S6131–9	X621–.
64bj	1	X621–.	S6132–9
64bk	1	X621–.	S6133–9
64bl	1	S6134–9	X621–.
64bm	1	X621–.	S162–9
64bn	1	X621–1	X402–3
64bp	1	S61–9	X621–1
64br	1	S62–9	X621–1
66	1	X500–F	A700–20
67	1	A700–2	X500–G
69	1	X215–22	X402–8
70	1	X215–23	X402–15
71	1	X402–11	X215–24
72	1	X200–4	A700–38
72a	1	X200–4	A0562–X1–2
72b	1	A0562–X1–2	A0562–X2–9
73	1	X215–18	A303–2
74	1	X215–19	A303–5
75	1	X215–20	A303–4
76	1	X215–21	A303–6
77	1	S120–7	X215–26
78	1	X215–27	S120–1
79	2.5	X190–1	A0303–X4–2
80	1	A190–11	A0303–X4–6
80a	1	P700–3	A0303–X4–8
81	1	A190–8	X190–5
82	1	A190–2	X190–7
83	1	X654–.	A0303–X3–12
83a	1	X654–.	A700–5
83b	1	X654–.	A700–23

Potential	Querschnitt [mm²]	Von	Nach
83c	1	X654–.	A700–34
83d	1	X500–a	X654–.
83e	1	S0781–5	X654–.
83f	1	X654–.	P700–9
83g	1	X712–A	X654–.
83h	1	X654–.	X701–A
83j	1	X700–A	X654–.
83k	1	X654–.	X700–G
84	1	M105–1	X190–4
85	1	X190–3	A0563–X2–17
86	1	H192–1	K100–86
86a	1	K100–86	X215–4
86b	1	X600–L	X215–4
88	1	X402–12	X215–2
91	2.5	K100–87	A0564–X1–11
91a	2.5	X653–.	K100–87
91b	2.5	A0303–X3–11	X653–.
91c	2.5	A0303–X2–13	X653–.
91d	2.5	A0303–X2–15	X653–.
91e	2.5	A0303–X4–19	X653–.
92	1	A0562–X2–12	A700–45
95	1	A0563–X1–13	A0581–X1–12
95a	1	X215–5	A0581–X1–12
96	1	A0563–X1–9	X200–5
97	1	X104–7	A0563–X1–17
97a	1	A0563–X1–17	X200–36
98	1	A0303–X5–7	A0563–X1–11
99	1	A0563–X1–22	X200–27
100	1	S804–1	A0561–X1–16
100a	1	S804–1	A0561–X2–10
101	1	A906–4	A905–12V
101a	1	A906–7	A906–4
104	1	V101–1	X215–6
104a	1	H101–2	X215–6
107	1	A0303–X3–16	A0563–X1–3
108	1	S100–3	A0581–X2–4
108a	1	X215–1	A0581–X2–4
108b	1	P100–4	X215–1
109	1	A0303–X2–10	X625–.
109a	1	X625–.	S112–5
109b	1	X625–.	S116–5
109c	1	A190–10	X625–.
109d	1	E100–.	X625–.
109e	1	X625–.	X500–H
109f	1	A5163–1	X625–.
109g	1	S5183–1	X625–.
109h	1	S5183–1	S5183–8
110	1	S801–1	X215–29
110a	1	S805–1	S801–1
111	1	S802–7	X215–7

b	P10830	11.04.07	Rosenkranz	Maßstab: %	Masse: kg
a	P10812	25.09.06	Schlachter J.		
Ind	Mitt–NR	Datum	Name	Typ: AC 80–2	Werkstoff: %
					Mat.–art: UNTL

	Datum	Name
Erst.	03.03.08	burkard
Gepr.		

Abteilung: 1142

KABINENELEKTRIK OW AC 80–2 V3.2.4

ELECTRIC CAB SUPERSTRUCTURE AC 80–2 V3.2.4

TEREX DEMAG

Ident–Nr: 28273612

Format: A1 | Bl. / Blätter: 6/7

Plotstatus: ECSCAD

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Potential	Querschnitt [mm²]	Von	Nach
111a	1	A0561-X1-22	S802-7
112	1	A0562-X2-5	X215-8
112a	1	A0562-X2-5	A0581-X2-15
113	1	X215-9	S802-1
113a	1	S802-1	A0561-X2-2
114	1	A0562-X1-17	X215-10
114a	1	A0562-X1-17	A0581-X2-19
115	1	S803-7	X215-11
115a	1	S803-7	A0561-X2-20
116	1	A0562-X1-13	X215-12
116a	1	A0562-X1-13	A0581-X1-2
117	1	S803-1	X215-13
117a	1	S803-1	A0561-X2-22
118	1	X215-14	A0562-X1-3
118a	1	A0562-X1-3	A0581-X1-6
119	1	X215-15	S801-7
119a	1	S805-7	S801-7
120	1	A0581-X1-4	A0562-X1-15
120a	1	A0581-X1-8	A0581-X1-4
121	1	A700-46	X500-b
122	1	A700-47	X500-c
123	1	A0562-X2-22	S14-6
125	1	P100-1	A0303-X4-16
125a	1	X402-13	A0303-X4-16
126	1	P100-5	P100-6
127	1	P100-7	P100-8
128	1	S160-5	A700-48
128a	1	S160-5	A0581-X2-9
129	1	A700-50	S160-6
129a	1	S160-6	A0581-X2-13
130	1	S161-5	A700-49
130a	1	S161-5	A0581-X1-20
131	1	A700-51	S161-6
131a	1	A0581-X2-2	S161-6
132	1	A700-17	A0564-X2-17
132a	1	A0581-X1-17	A0564-X2-17
133	1	A700-53	A0564-X1-6
133a	1	A0564-X1-6	A0581-X1-21
134	1	X215-30	A0562-X2-13
134a	1	A0562-X2-19	A0562-X2-13
135	1	A0562-X2-21	X215-31
135a	1	A0562-X2-21	A0562-X2-15
148	1	P100-24	V101-2
150	1	A0562-X2-18	A700-44
151	1	X500-e	A0562-X2-20
151a	1	A0581-X1-1	A0562-X2-20
152	1	X215-34	S759-1
153	1	A0562-X1-4	X215-36
153a	1	A0562-X1-10	A0562-X1-4
154	1	X215-35	A0562-X1-8

Potential	Querschnitt [mm²]	Von	Nach
154a	1	A0562-X1-14	A0562-X1-8
156	1	X215-37	P100-9
157	1	X215-38	P100-10
158	1	X215-39	P100-11
159	1	P100-12	X215-40
160	1	P100-22	X215-41
164	1	A0564-X2-19	X200-1
165	1	X200-8	A0564-X1-4
166	1	A0581-X2-6	H190-2
167	1	A0562-X1-1	A0581-X2-17
167a	1	A0581-X2-17	A0581-X2-21
170	1	A0561-X2-9	S161-1
171	1	A0561-X1-2	S161-2
172	1	A0564-X2-1	S162-1
173	1	S162-2	A0564-X2-9
177	1	A0564-X1-13	S20.1-2
177a	1	A0564-X1-13	A0562-X1-16
177b	1	A0562-X2-10	A0562-X1-16
177c	1	A0562-X2-10	S20.2-2
178	1	A0303-X3-2	A0564-X1-3
179	1	X7116.1-3	A0564-X1-5
184	2.5	A0303-X2-1	A0564-X1-17
184a	2.5	A0303-X3-17	A0303-X2-3
185	1	A0562-X1-12	S758-7
186	1	S758-1	A0562-X1-6
187	1	X200-39	S720-7
188	1	S720-1	X200-40
208	1	S23-3	A0303-X3-14
208a	1	S720-3	S23-3
208b	1	S720-3	X5952-1
208c	1	A0563-X1-7	A0303-X3-14
209	1	S23-1	X200-22
210	1	S23-7	X200-23
211	1	A0564-X1-7	A700-39
211a	1	A0564-X1-7	A0581-X2-5
212	1	A0563-X2-9	A700-40
215	1	S100-1	A0303-X5-1
215a	1	X600-K	A0303-X5-2
224	1	A0563-X1-1	X215-25
230	2.5	A0303-X2-2	S101-1
231	1	S802-8	A0562-X2-3
232	1	S802-2	A0562-X1-19
233	1	A0562-X1-11	S803-8
234	1	S803-2	A0562-X1-5
240	1	X700-H	A700-30
241	1	X700-D	A700-9
242	1	A700-28	X700-E
243	1	A700-8	X700-B
244	1	X701-D	A700-10
245	1	A700-27	X700-F

Potential	Querschnitt [mm²]	Von	Nach
246	1	A700-24	S0781-1
247	1	X712-B	A700-29
250	1	H700-1	A700-3
251	1	H7116-1	A700-41
252	1	A700-42	H7116-2
253	1	A700-43	H7116-3
260	1	S6131-1	X500-M
261	1	S6132-7	X500-K
262	1	X500-L	S6132-1
263	1	S6133-1	X500-R
264	1	S6134-7	X500-P
265	1	S6134-1	X500-N
342	1	A0564-X2-6	A0581-X1-3
342a	1	A0581-X1-7	A0564-X2-6
343	1	X500-g	S14-2
343a	1	S14-2	A0581-X1-5
392	1	X500-h	A700-22
392a	1	X500-h	A0581-X2-18
393	1	A0581-X2-16	A0581-X2-20
393a	1	A0581-X2-20	Y414-1
399	1	X402-7	X402-16
400	1	X600-E	A0564-X2-3
400a	1	X600-E	X200-42
401	1	X600-F	A0564-X2-11
401a	1	X600-F	X200-43
402	1	S162-5	A700-31
402a	1	S162-5	A0581-X2-8
403	1	A700-52	S162-6
403a	1	S162-6	A0581-X2-12
404	1	X500-D	A700-21
411	2.5	A0303-X5-17	S61-3
411a	2.5	A0303-X5-18	A0563-X1-10
412	1	A0563-X1-6	X215-33
413	2.5	X215-28	S61-7
414	2.5	X215-42	S61-1
415	1	A0563-X1-4	X200-15
415a	1	A0564-X2-4	A0563-X1-4
415b	1	A0564-X2-4	A0564-X1-18
415c	1	A0564-X1-18	H61-.
417	2.5	X200-16	S62-3
418	2.5	S62-4	X200-17
421	1	X200-18	H62-.
421a	1	A0564-X1-22	X200-18
422	1	H63-.	X200-19
422a	1	X200-19	A0564-X1-14
501	2.5	S62-8	A0564-X2-2
502	2.5	A0564-X1-16	S62-1
520	2.5	A0563-X2-20	A0303-X3-18
520a	2.5	A0563-X2-12	A0303-X3-20
520b	2.5	A0303-X3-22	A0563-X2-19

Potential	Querschnitt [mm²]	Von	Nach
521	2.5	A0563-X2-14	Y170-.
521a	2.5	Y171-1	Y170-.
522	2.5	M171-2	A0563-X2-6
523	2.5	M104-1	S191-L
523a	2.5	A0563-X2-13	S191-L
524	2.5	M104-2	S191-M1
525	2.5	S191-M2	M104-3
526	2.5	S191-H	M104-4
527	1	V100-+	A0303-X4-10
528	1	S191-B	V100--
529	1	S191-C	S170-1
530	1	S170-5	S171-1
530a	1	A0563-X2-8	S170-5
530b	1	X215-32	A0563-X2-8
531	1	S171-2	B170-1
532	1	A0563-X2-16	B170-3
533	0.75	S5183-5	M5183-1
534	0.75	S5183-6	M5183-3
535	0.75	A5163-3	M5163-6
536	0.75	A5163-4	M5163-4
537	0.75	A5163-5	M5163-1
538	0.75	A5163-6	M5163-2
539	0.75	M5163-3	A5163-7
540	1	R5150-1	A5163-8
541	1	R5150-2	A5163-9
542	1	A5163-10	R5150-3
601	1	H18-3	A0562-X1-22
601a	1	H18.1-3	A0562-X1-22
602	1	A0562-X2-2	H19-3
602a	1	H19.1-3	A0562-X2-2
610	1	S6131-5	A0303-X5-5
610a	1	A0303-X5-5	S6132-3
610b	1	S6133-5	A0303-X5-6
610c	1	A0303-X5-6	S6134-3

b	P10830	11.04.07	Rosenkranz	Maßstab: %	Masse: kg
a	P10812	25.09.06	Schlachter J.		
Ind	Mitt-NR	Datum	Name	Typ: AC 80-2	Werkstoff: %
					Mat.-art: UNTL

	Datum	Name
Erst.	03.03.08	burkard
Gepr.		

Abteilung: 1142

KABINENELEKTRIK OW AC 80-2 V3.2.4

ELECTRIC CAB SUPERSTRUCTURE AC 80-2 V3.2.4

Ident-Nr: 28273612

Format: A1 | Bl. / Blätter: 7/1

Plotstatus: ECSCAD

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M131
H114
H106.1
ZENTRAL–
ELEKTRIK
M133
B18
B18.1
B19
B19.1
M132
E112
STEUER–
BLOCK
E300

HAUPTAUSLEGER
B705
B706 B702
B701.1 P
X701.1
H106.2
ZENTRALELEK.
X701
X700
X500
X200
X215
Y6 — Y14/Y114
Y15.1 — Y15.2
Y16.1 — Y16.2
Y17.1 — Y17.2
Y30.1 — Y30.2
Y18.1 — Y18.2
Y19.1 — Y19.2
B14 — B43
M118
H106.1
H114
Display
AMATUREN–
PULT
E300

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C	P11194	29.04.10	Burkard	Erst.	06.04.06	Schlachter
Ind	Mitt–NR	Datum	Name	Gepr.		
Abteilung: 1114 10						

Projektbenennung / project description
E–Plan OW AC 80–2 V5.3 EN 13000
circuit diagram AC 80–2 superstr.

Seitenbenennung / page description
Übersicht Oberwagen

Baunummer.
Anlage:
Ort:
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28684812
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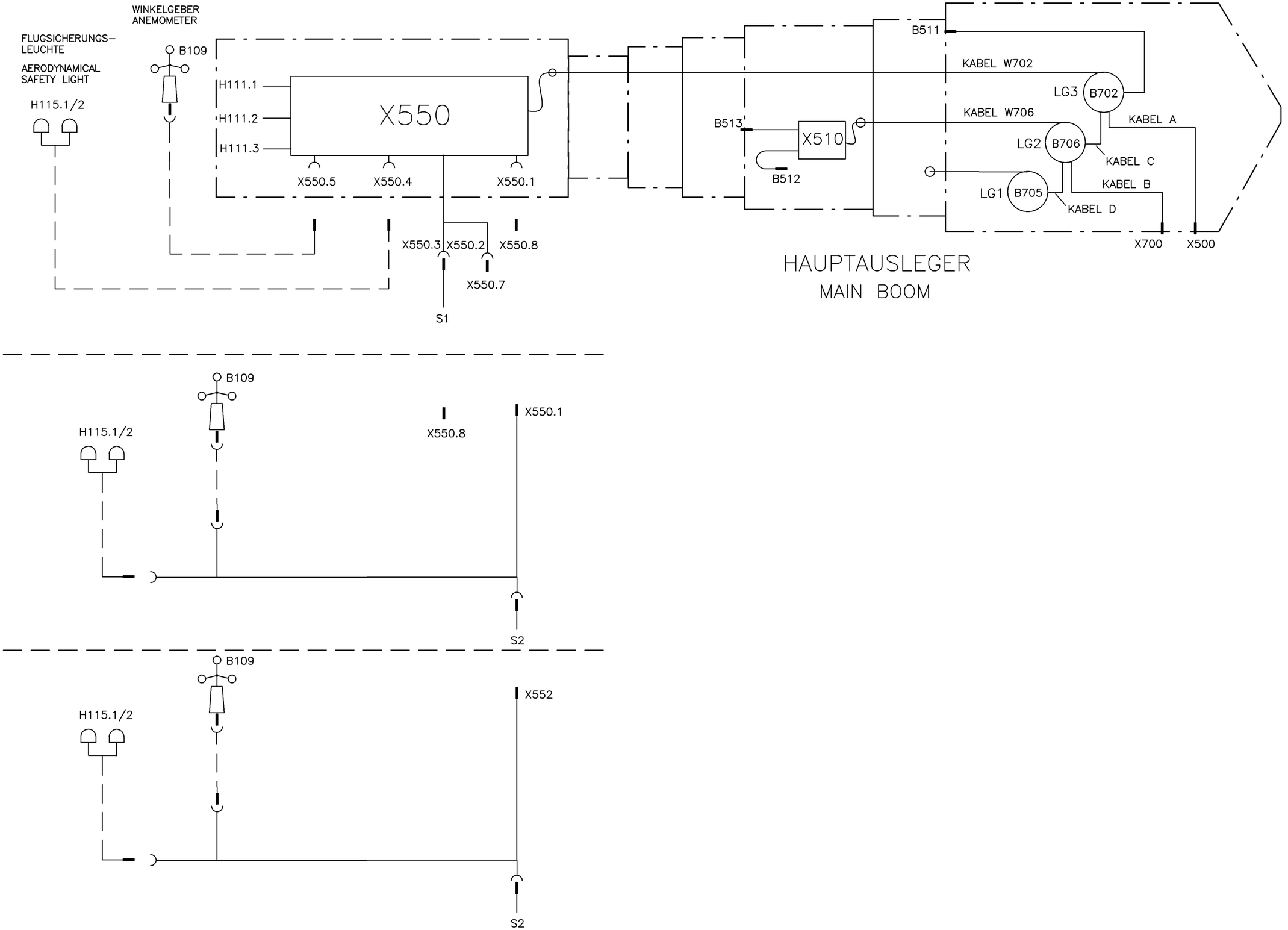

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Ind	Mitt–NR	Datum	Name	Gepr.		
Abteilung: 1114 10						

Projektbenennung / project description
E–Plan OW AC 80–2 V5.3 EN 13000
circuit diagram AC 80–2 superstr.

Seitenbenennung / page description
Übersicht Ausleger

Baunummer.

Anlage:

Ort:

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Seite page	Seitenbenennung	page description
1	Übersicht Oberwagen	
2	Übersicht Ausleger	
3	Inhaltsverzeichnis	
4	Zündung, Motor Start	
5	Steckkdosen, Hupe, Beleuchtung	
6	Verstellscheinwerfer, Umrissleuchten GGW	
7	Scheibenwaschanlage	
8	Windmesser, Hindernisfeuer, HA–Beleuchtung	
9	LMB, Rüsttaster, Summer	
10	LMB–Abschaltung, Drehwerkbremse, Wippwerk	
11	Teleskop, Hubwerk	
12	LMB und Notsteuerung	
13	Notsteuerung, Teleskop–Freig., LMB–Warnampel	
15	LMB–Initiatoren, LMB–Längengeber	
16	HES, LMB–Sensorik	
17	Drehmelder, SES, OW arretiert HW–Stunden	
18	Totmann, Lenkung vom OW	
19	GGW–Steuerung	
20	Abstützung	
21	Fahrschalter, Sitzung, Kabine auf/ab	
22	Ölkühler, Gaspedal, Mototrdrehzahl	
23	Schalterbeleuchtung	
24	Schalterbeleuchtung	
25	Radio, Spannungswandler	
26	Klimaanlage	
27	Standheizung	
28	LMB–Konsole, Arbeitsbereichsbegrenzung	
29	Multifunktionsdisplay, Ölfilter–Anzeige	
30	SPS A700 Belegung	
31	Übersicht Sicherungen	
32	Übersicht Relaisplatine A0561	
33	Übersicht Relaisplatine A0562	
34	Übersicht Relaisplatine A0563	
35	Übersicht Relaisplatine A0564	
36	Übersicht Diodenplatine	
37	Übersicht Schleifringkörper u. Kabel	
38	Übersicht Stecker	

Seite page	Seitenbenennung	page description

Ind	Mitt–NR	Datum	Name		Datum	Name
D	P11529	18.04.12	Burkard			
C	P11194	29.04.10	Burkard	Erst.	28.07.09	Burkard
				Gepr.		

Abteilung: 1114 10

Projektbenennung / project description
E–Plan OW AC 80–2 V5.3 EN 13000
circuit diagram AC 80–2 superstr.

Seitenbenennung / page description
Inhaltsverzeichnis
directory

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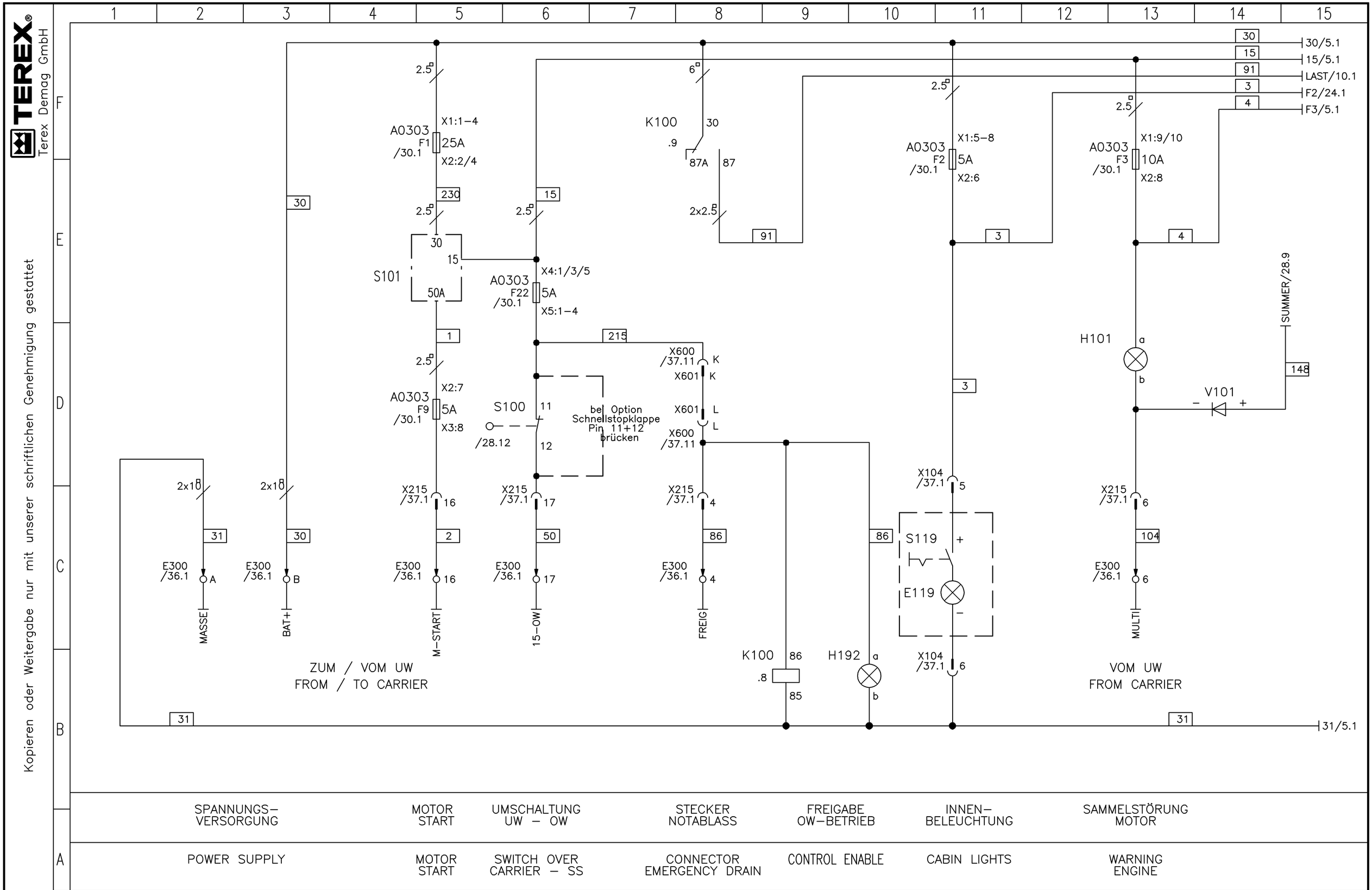

Ind	Mitt–NR	Datum	Name		Datum	Name
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C	P11194	29.04.10	Burkard	Erst.	06.04.06	Schlachter
				Gepr.		

Abteilung: 1114 10

Projektbenennung / project description
E–Plan OW AC 80–2 V5.3 EN 13000
circuit diagram AC 80–2 superstr.

Seitenbenennung / page description
Zündung, Motor Start

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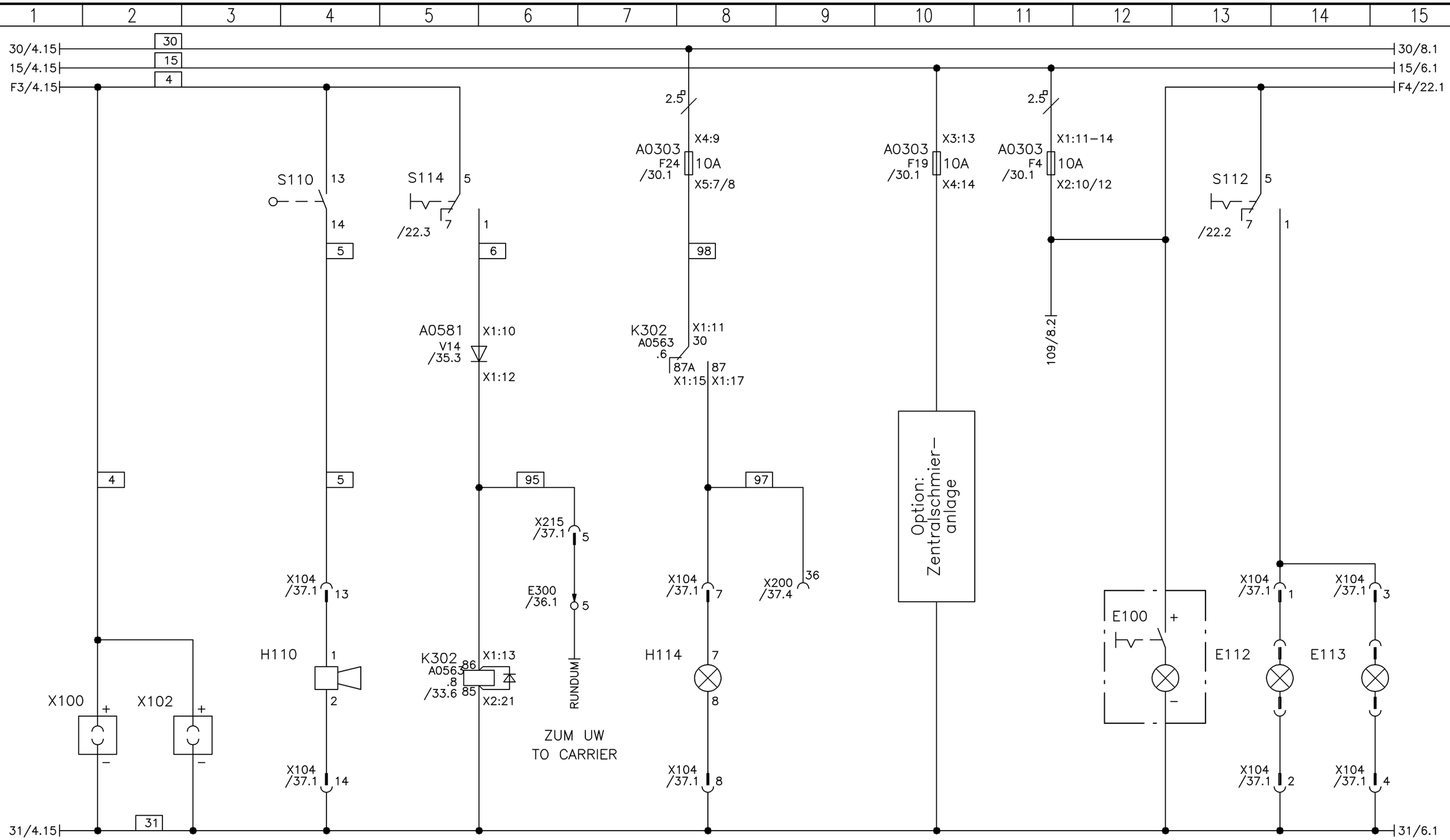

STECKDOSE ZIGARETTEN–ANZÜNDER	HUPE	RUNDUMLEUCHTEN	OPTION: ZENTRALSCHMIERANLAGE
SOCKET LIGHTER	HORN	ROTAFLARE LIGHTS	OPTION: CENTRAL LUBRICATION

LESELEUCHTE		AUßENBELEUCHTUNG VORNE	HINTEN			
READING LIGHT		OUTSIDE LIGHTING FRONT	REAR			

D	P11529	18.04.12	Burkard		Datum	Name
C	P11194	29.04.10	Burkard	Erst.	06.04.06	Schlachter
Ind	Mitt–NR	Datum	Name	Gepr.		
Abteilung: 1114 10						

Projektbenennung / project description
E–Plan OW AC 80–2 V5.3 EN 13000
circuit diagram AC 80–2 superstr.

Seitenbenennung / page description
Steckkdosen, Hupe, Beleuchtung

Baunummer.

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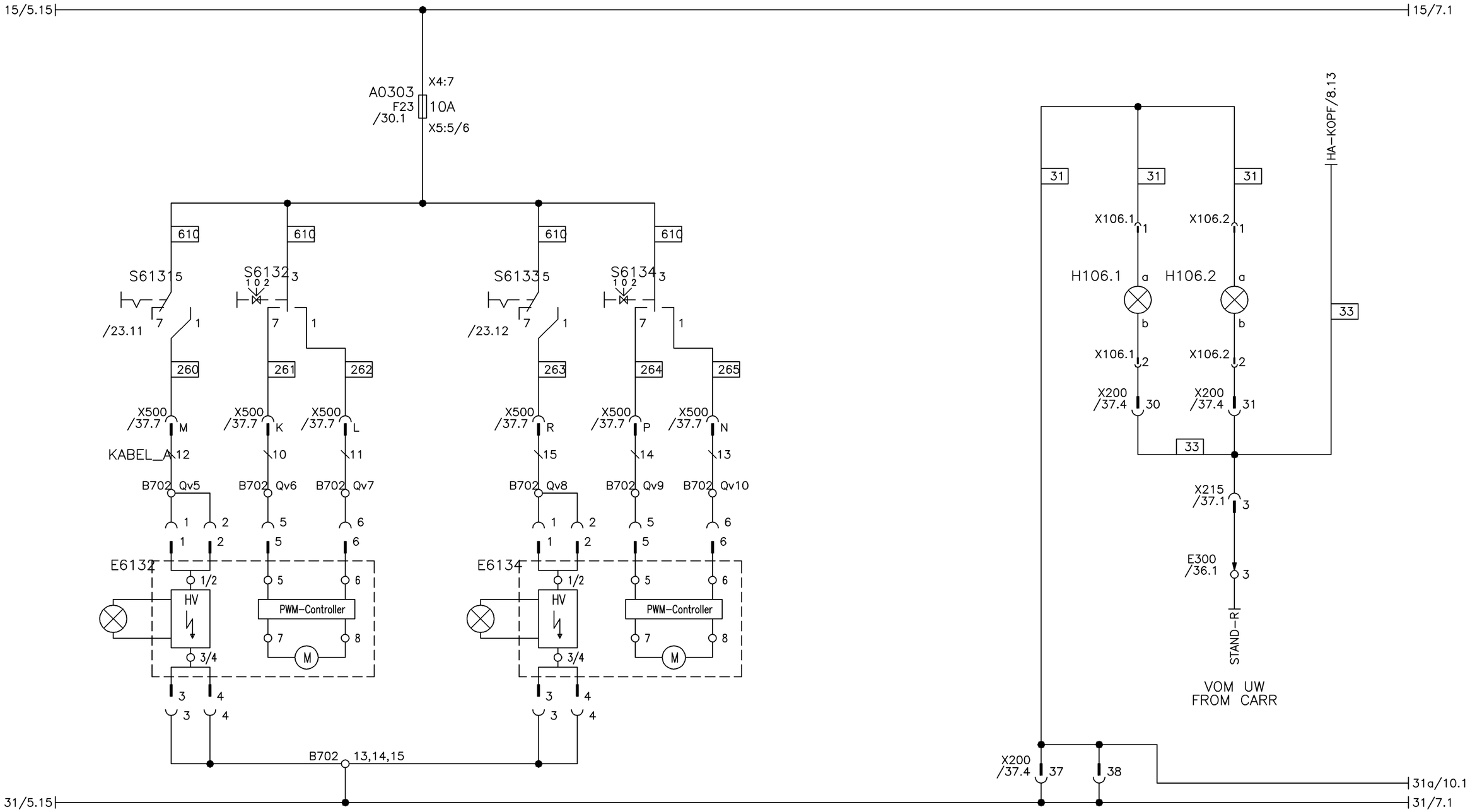

OPTION
VERSTELLSCHEINWERFER

OPTION
ZWEITER VERSTELLSCHEINWERFER

UMRISSLEUCHTE GGW
LINKS RECHTS

OPTION
REMOTE CONTROLLED
SEARCHLIGHT

OPTION
SECOND REMOTE CONTROLLED
SEARCHLIGHT

COUNTERWEIGHT LIGHTING
LEFT H. RIGHTT H.

					Datum	Name
D	P11529	18.04.12	Burkard			
C	P11194	29.04.10	Burkard	Erst.	06.04.06	Schlachter
Ind	Mitt-NR	Datum	Name	Gepr.		
Abteilung: 1114 10						

Projektbenennung / project description
E-Plan OW AC 80-2 V5.3 EN 13000
circuit diagram AC 80-2 superstr.

Seitenbenennung / page description
Verstellscheinwerfer, Umrissleuchten GGW

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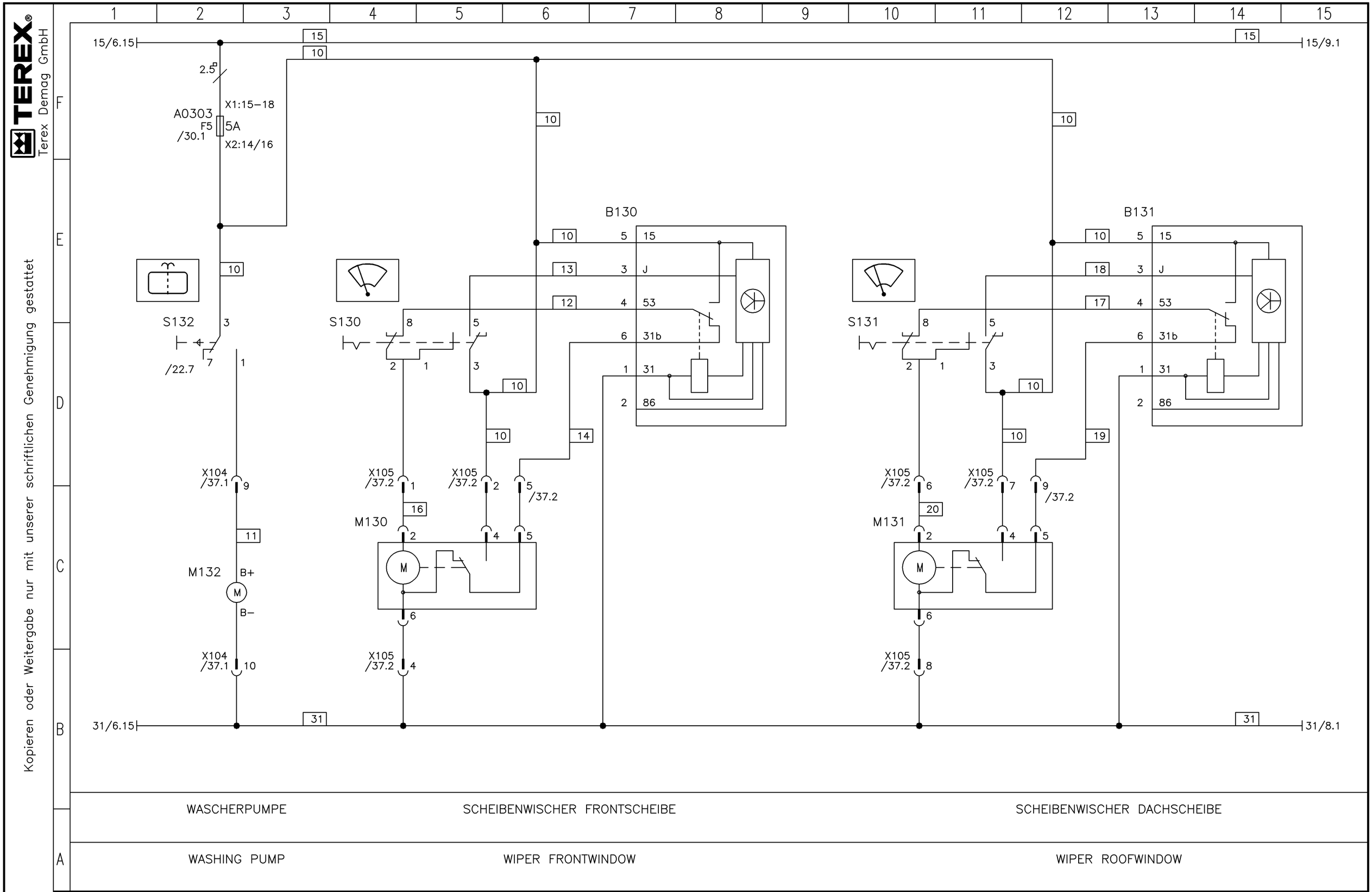

Ind	Mitt-NR	Datum	Name		Datum	Name
D	P11529	18.04.12	Burkard			
C	P11194	29.04.10	Burkard	Erst.	26.04.04	Schlachter
				Gepr.		

Abteilung: 1114 10

Projektbenennung / project description
E-Plan OW AC 80-2 V5.3 EN 13000
circuit diagram AC 80-2 superstr.

Seitenbenennung / page description
Scheibenwaschanlage

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bn — 1
R109 4K7/25W
ws — 3

A0303 F6 /30.1 5A
X1:19–20
X2:18/20
22
S115 /22.3
5
7

NUR FUER HAV KASTENSPITZE
NUR FUER HAV GITTERMASTTEIL

X560 3 — X552 D — 109
X560 2 — X552 C — 21
X560 5 — X552 F — 31

X550.1 P
X550.5 2 — X550 11
X550.5 1 — X550 10
X550.5 3 — B
N

ws 0.14mm²
gn 0.14mm²

E702 /36.1 4 — B702 12
E702 /36.1 3 — B702 11
B702

KABEL_A 8
3
X500 /37.7 H — 109
X500 /37.7 C — 21
109/5.11
WIND/28.8

1 — 23
X500 /37.7 A
1

B702
B702 16 — E702 /36.1 8 — ge — X550 12 — X550.4 1
B702 17 — E702 /36.1 9 — bl — X550.1 C 1
B702 13 — E702 /36.1 5 — sw — X550 6 — X550.4 2
B702 14 — E702 /36.1 6 — rt — X550 7 — X550.1 N 2
B702 15 — E702 /36.1 7 — rs — X550 8
9
X500 /37.7 J

X552 E — X560 4 — X560.1 C 1
X552 F — X560 5 — X560.1 N 2

X550 9
GND/15.3

HA-KOPF/6.14
33
X500 /37.7 B
2

B702
B702 18
E702 /36.1 10

vi
X550 13 — 1 — 2
X550 14 — 1 — 2
1 — 2

H115.1 a b — 2
H115.2 a b
H111.1 a b
H111.2 a b
H111.3 a b

31/7.15 — 31 — 31 — 31/9.1

WINDMESSANLAGE — OPTION: DOPPELHINDERNISFEUER — BELEUCHTUNG HA–KOPF

ANEMOMETER — AERODYNAMIC SAFETY LIGHT — MAIN BOOM HEAD LIGHTING

D	P11529	18.04.12	Burkard		Datum	Name
C	P11194	29.04.10	Burkard	Erst.	06.04.06	Schlachter
Ind	Mitt–NR	Datum	Name	Gepr.		
Abteilung: 1114 10						

Projektbenennung / project description
E–Plan OW AC 80–2 V5.3 EN 13000
circuit diagram AC 80–2 superstr.

Seitenbenennung / page description
Windmesser, Hindernisfeuer,
HA–Beleuchtung

Baunummer. | Anlage: | Ort:

Zeichnungsnr. / drawing no. 28684812 | Blatt 8 | 37 Bl.

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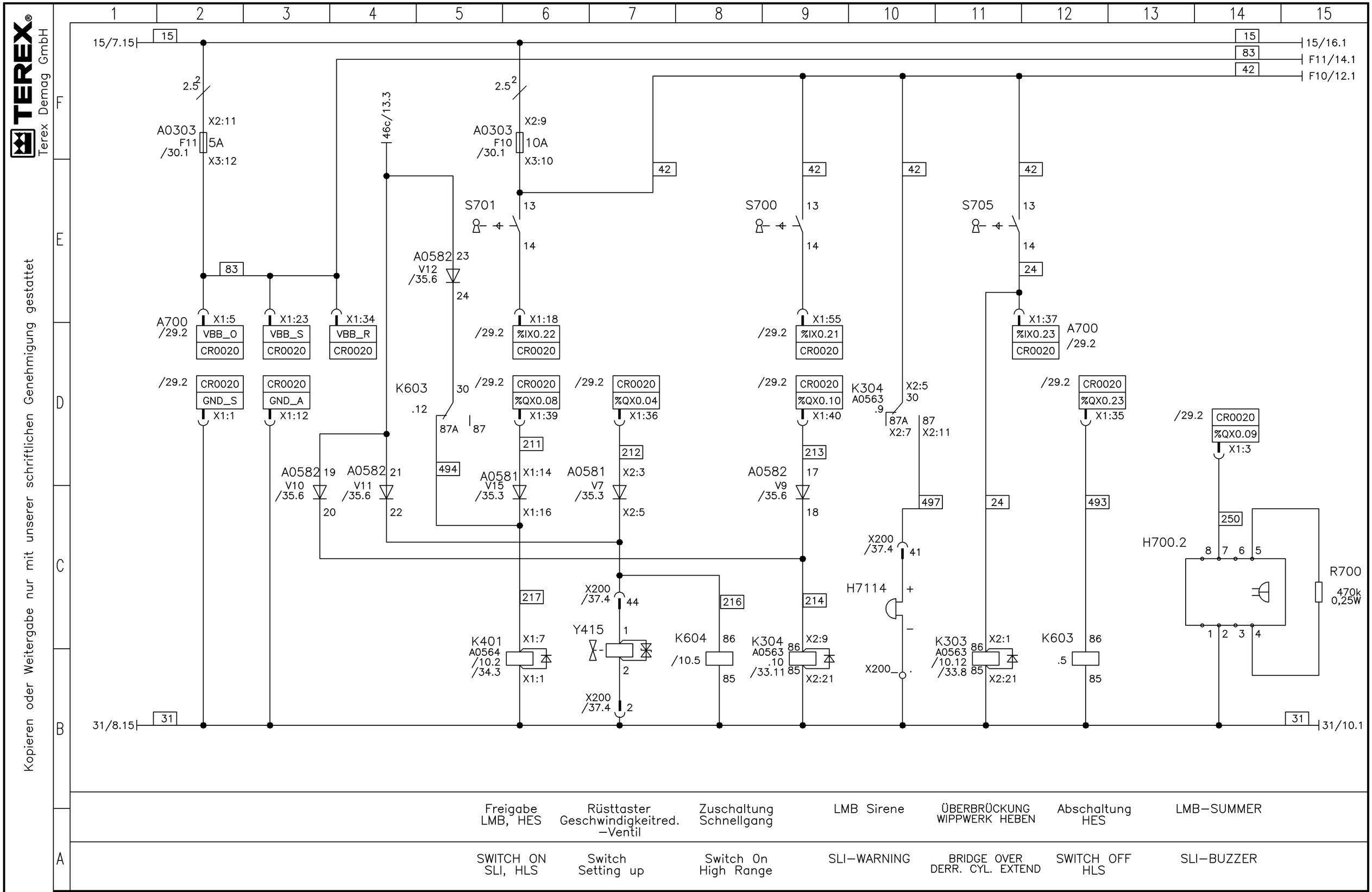

Ind	Mitt-NR	Datum	Name		Datum	Name
D	P11529	18.04.12	Burkard			
C	P11194	29.04.10	Burkard	Erst.	06.04.06	Burkard
				Gepr.		

Abteilung: 1114 10

Projektbenennung / project description
E-Plan OW AC 80-2 V5.3 EN 13000
circuit diagram AC 80-2 superstr.

Seitenbenennung / page description
LMB, Rüsttaster, Summer

Baunummer.

Anlage:

Ort:

Zeichnungsnr. / drawing no.
28684812

Blatt 9
37 Bl.

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1 2 3 4 5 6 7 8 9 10 11 12 13 14 15

F E D C B A

LAST/4.15 91
2.5²
K402 A0564 /17.2 X1:11 30
87A X1:15 87 X1:17
184
2.5² 2.5²
A0303 X2:1/3/5
F8 /30.1 10A X3:2/4/6
F21 /30.1 10A X3:17/19/21 X4:18/20
178
K401 A0564 /9.6 X1:3 30
87a X1:5 87 X1:9
28
27
28
58
S6 58 1
2
34
K604 /9.8 30
87A 87
X200 /37.4 6
Y6 A1 A2
K605 .8 A1 B1 A2 t=2s
BR B605 SW BL
130
K605 .6 15 16 18
131
H14.1 1 2
46a/13.4
46
A700 /29.2 CR0020 %QX0.06 X1:17
132
A0582 V13 /35.6 25 26
A0581 V5 /35.3 X1:19 X1:17
218
V6 /35.3 X2:1 X1:21
A700 /29.2 CR0020 %QX0.07 X1:53
133
A0582 V14 /35.6 27 28
229
K303 A0563 /9.11 X1:19 30
87A X1:21 87 X2:3
25
A0581 V4 /35.3 X1:15 X1:13
V3 /35.3 X1:11 X1:9
26
K405 A0564 .11 X2:13 30
87A X2:15 87 X2:19
164
K406 A0564 .12 X1:10 30
87A X1:8 87 X1:4
165
28
K405 A0564 .13 /34.13 86 X2:17 85 X2:21
K406 A0564 .14 /34.3 86 X1:6 85 X1:2
X200 /37.4 1 2
Y15.1 1 2
X200 /37.4 8 2
Y15.2 1 2
31a/6.15 31
31/9.15 31
91 LAST/17.1
58 F18/17.1
27 U-FREIG/11.1
28 U-LMB/11.1
31 31a/11.1
31 31/12.1

Freigabe LMB, HES	SCHNELLGANG	DREHWERKSIRENE NUR JAPAN	FREIGABE WIPPWERK HEBEN SENKEN / WIPPWERK HEBEN SENKEN
SWITCH ON SLI, HLS	HIGH RANGE	SWING GEAR BUZZER ONLY JAPAN	RELEASE DERRECKING CYL. EXTEND RETRACT / DERRECKING CYLINDER EXTEND RETRACT

					Datum	Name
D	P11529	18.04.12	Burkard			
C	P11194	29.04.10	Burkard	Erst.	06.04.06	
Ind	Mitt-NR	Datum	Name	Gepr.		
Abteilung: 1114 10						

Projektbenennung / project description
E-Plan OW AC 80-2 V5.3 EN 13000
circuit diagram AC 80-2 superstr.

Seitenbenennung / page description
LMB-Abschaltung, Drehwerkbremse, Wippwerk

Baunummer.
Anlage:
Ort:
Zeichnungsnr. / drawing no.
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Blatt 10
Bl. 37

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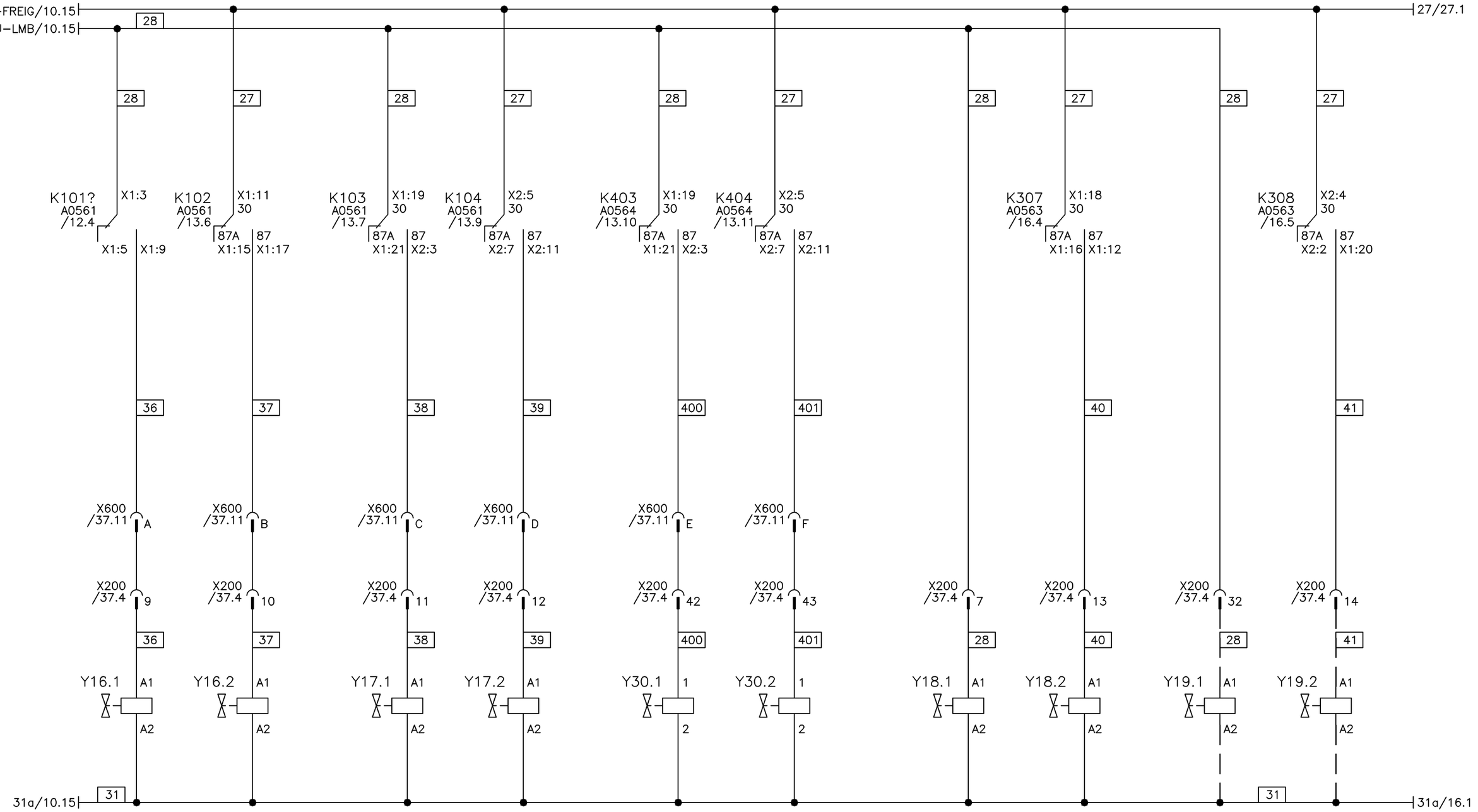

TELEZYL.1		TELEZYL.2		TELEZYL.3		HW1		HW2(OPTION)	
AUSF.	EINF.	AUSF.	EINF.	AUSF.	EINF.	HEBEN	SENKEN	HEBEN	SENKEN
TELECYL.1		**TELECYL.2**		**TELECYL.3**		**H1**		**H2(OPTION)**	
EXTEND	RETRACT	EXTEND	RETRACT	EXTEND	RETRACT	LIFT	SINK	LIFT	SINK

					Datum	Name
D	P11529	18.04.12	Burkard			
C	P11194	29.04.10	Burkard	Erst.	06.04.06	Schlachter
Ind	Mitt-NR	Datum	Name	Gepr.		
Abteilung: 1114 10						

Projektbenennung / project description
E-Plan OW AC 80-2 V5.3 EN 13000
circuit diagram AC 80-2 superstr.

Seitenbenennung / page description
Teleskop, Hubwerk

Baunummer.

Anlage:

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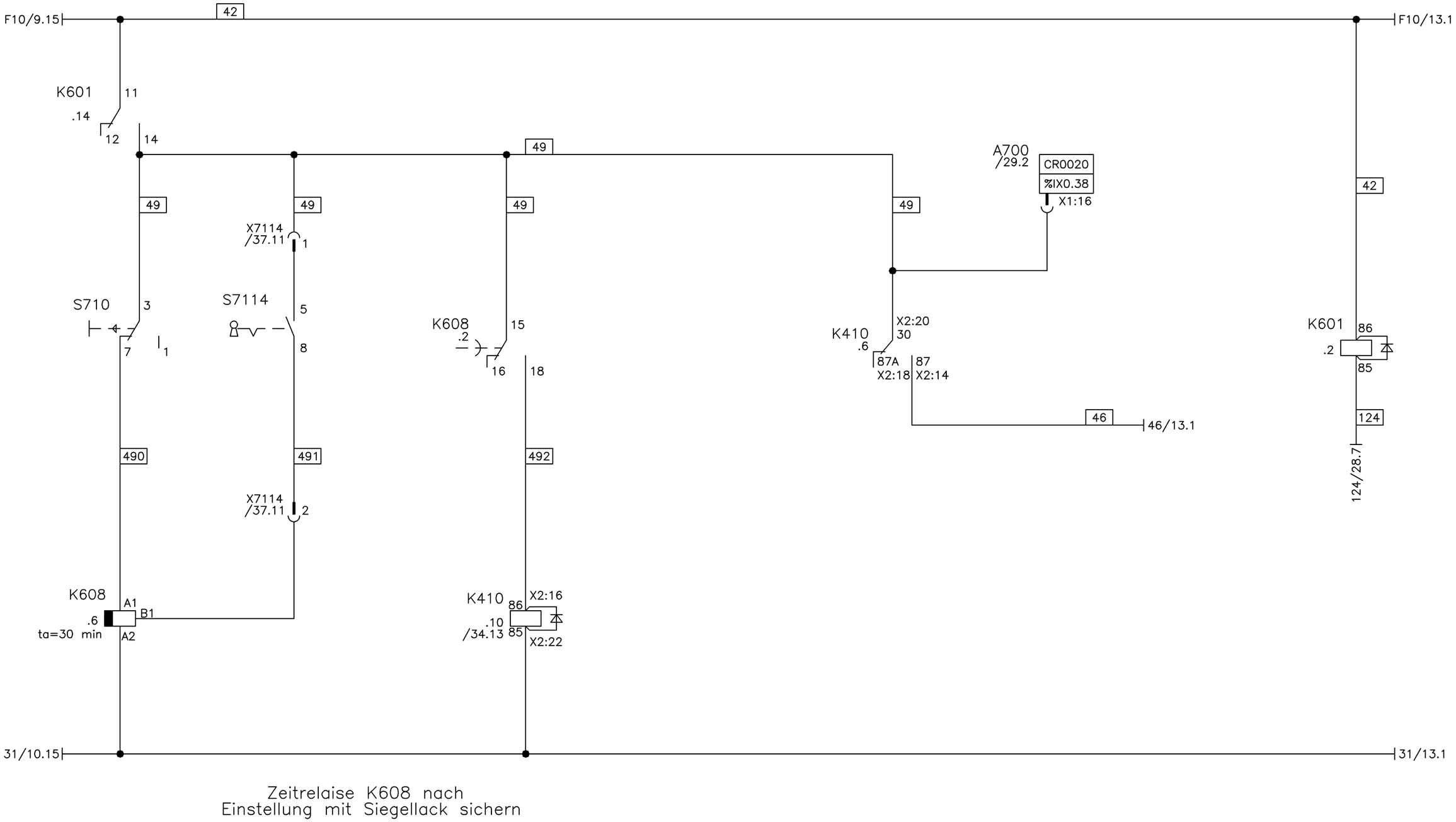

Notsteuerung LMB EN 13000

Motor läuft

Engine run

D	P11529	18.04.12	Burkard		Datum	Name
C	P11194	29.04.10	Burkard	Erst.	28.07.09	Burkard
Ind	Mitt-NR	Datum	Name	Gepr.		
Abteilung: 1114 10						

Projektbenennung / project description: E-Plan OW AC 80-2 V5.3 EN 13000 circuit diagram AC 80-2 superstr.

Seitenbenennung / page description: LMB und Notsteuerung

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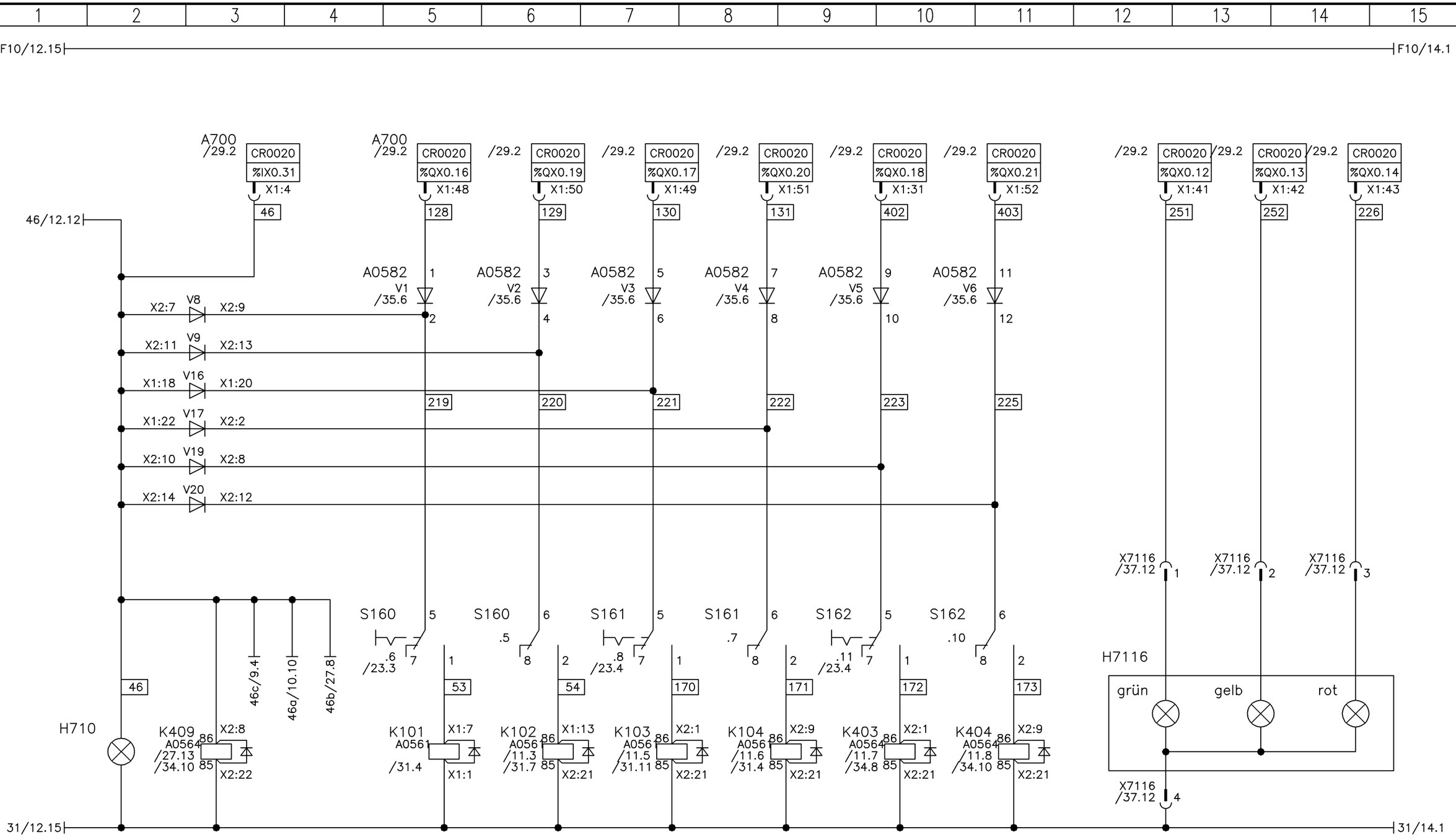

LMB Überbrückung	TELEZYL. 1 AUSFAHREN EINFAHREN; TELEZYL. 2 AUSFAHREN EINFAHREN; TELEZYL. 3 AUSFAHREN EINFAHREN	LMB–WARNAMPEL
LMB Bridge Over	TELECYL. 1 EXTEND RETRACT; TELECYL. 2 EXTEND RETRACT; TELECYL. 2 EXTEND RETRACT	SLI WARNING LIGHT

Ind	Mitt–NR	Datum	Name		Datum	Name
D	P11529	18.04.12	Burkard			
C	P11194	29.04.10	Burkard	Erst.	28.07.09	Burkard
				Gepr.		

Abteilung: 1114 10

Projektbenennung / project description: E–Plan OW AC 80–2 V5.3 EN 13000 circuit diagram AC 80–2 superstr.

Seitenbenennung / page description: Notsteuerung, Teleskop–Freig., LMB–Warnampel

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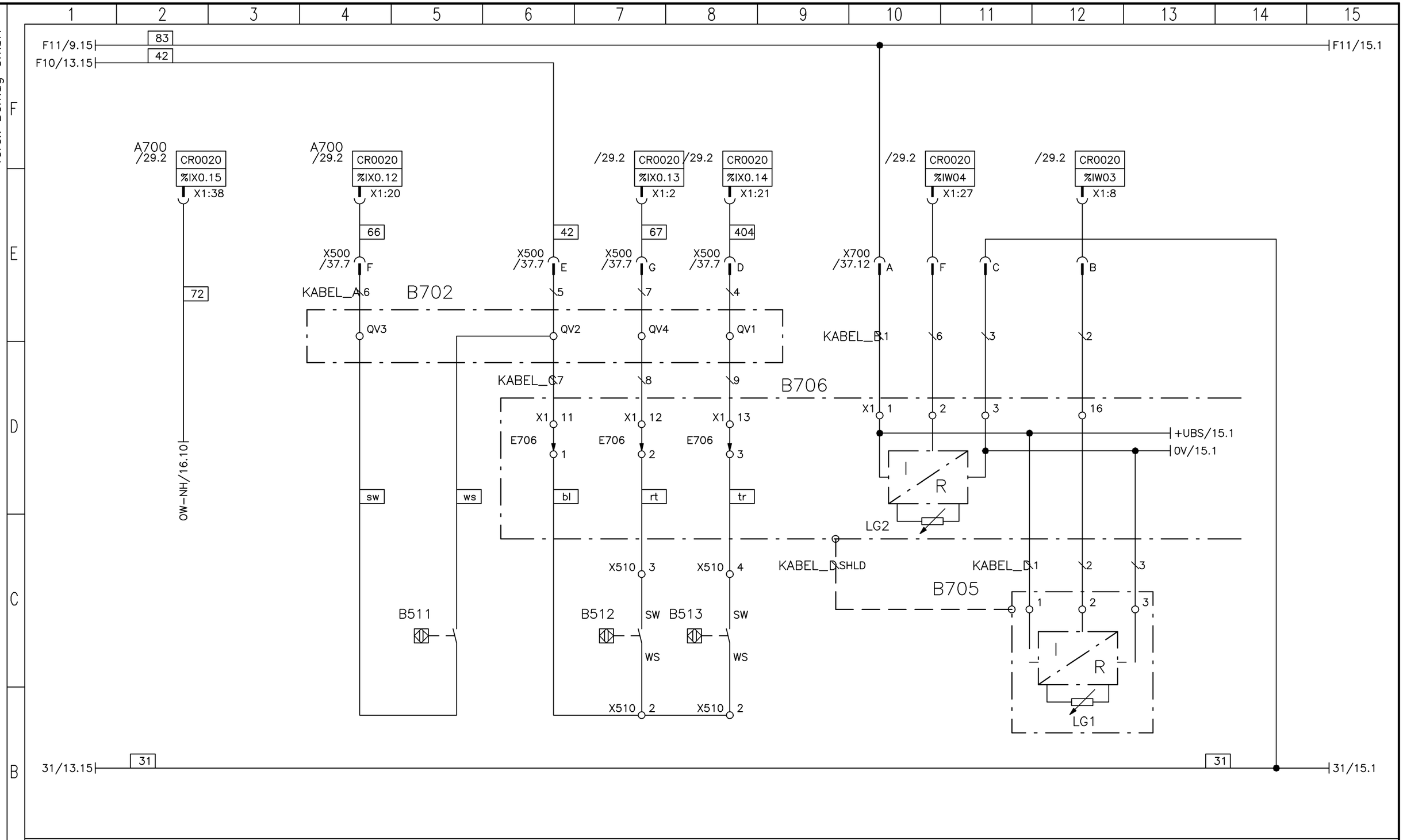

OW NACH HINTEN	TELEZYLINDER EINGEFAHREN ZYLINDER 1 ZYLINDER 2 ZYLINDER 3	LÄNGENGEBER TELE 2	LÄNGENGEBER TELE 1
SS TURNED BACKWARDS	TELECYLINDER RETRACTED CYLINDER 1 CYLINDER 2 CYLINDER 3	LENGTH INDICATOR TELESCOPE 2	LENGTH INDICATOR TELESCOPE 1

Ind	Mitt-NR	Datum	Name		Datum	Name
D	P11529	18.04.12	Burkard			
C	P11194	29.04.10	Burkard	Erst.	06.04.06	Schlachter
				Gepr.		

Abteilung: 1114 10

Projektbenennung / project description
E-Plan OW AC 80-2 V5.3 EN 13000
circuit diagram AC 80-2 superstr.

Seitenbenennung / page description
LMB-Initiatoren, LMB-Längengeber

Baunummer.

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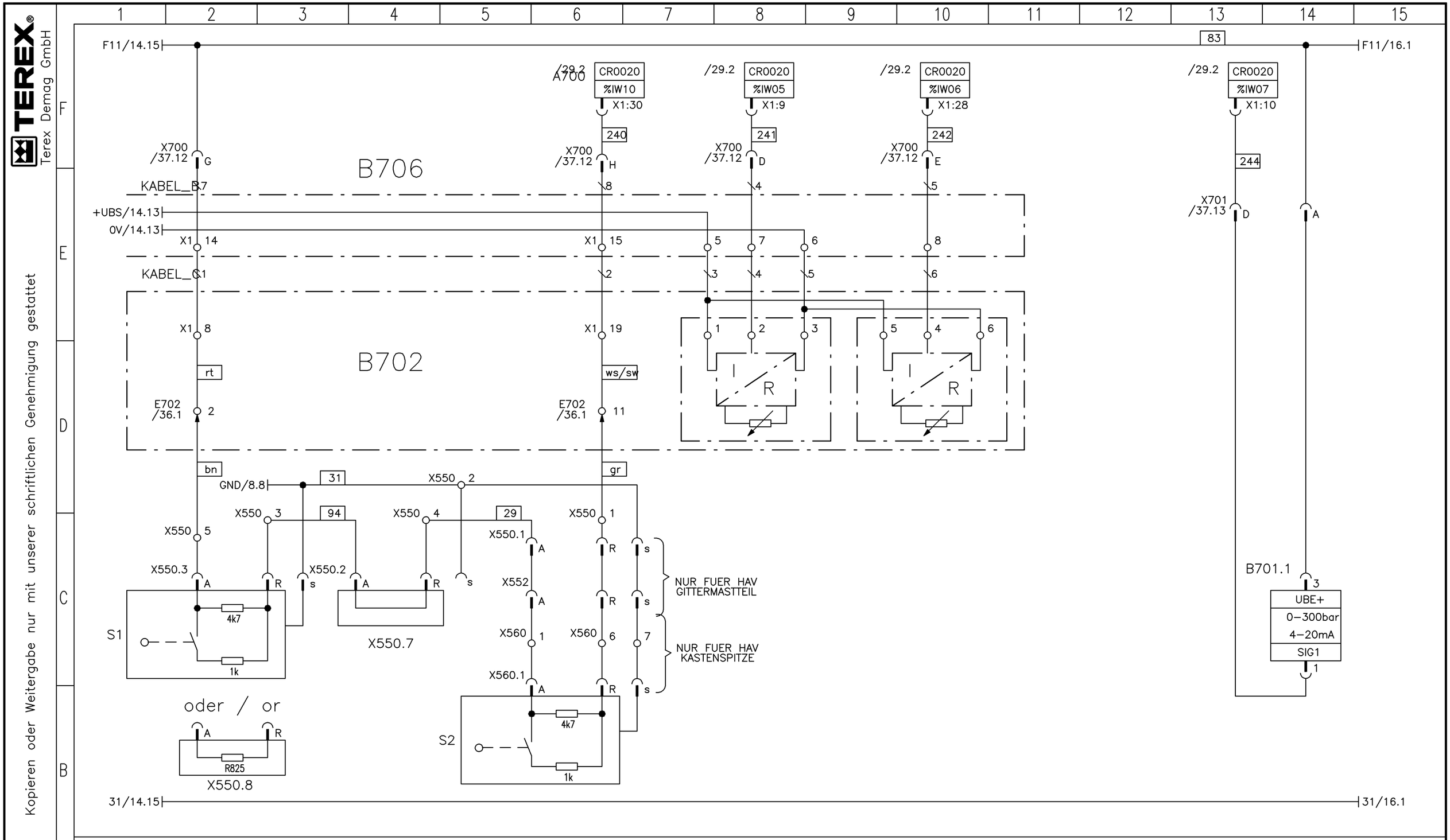

Ind	Mitt-NR	Datum	Name		Datum	Name
D	P11529	18.04.12	Burkard			
C	P11194	29.04.10	Burkard	Erst.	06.04.06	Schlachter
				Gepr.		

Abteilung: 1114 10

Projektbenennung / project description
E-Plan OW AC 80-2 V5.3 EN 13000
circuit diagram AC 80-2 superstr.

Seitenbenennung / page description
HES, LMB-Sensorik

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F E D C B A

15/9.15 — F11/15.15 — 15 — 83 — 15/20.1 — F11/20.1

2.5 — X1:21/22 — A0303 F7 /30.1 5A — X2:22

X200 /37.4 3

55 — 1 — X19 /37.9 — 55 — 55

X18 /37.7 1 — BR — B18.1 — SW — BL

E18 1 — B18 WS — SW — E18 2

E19 1 — B19 WS — SW — E19 2

B19.1 BR — BL SW

B43 1 — 3 4

X18 /37.7 3 — 56 — X200 /37.4 34 — K205 A0562 /17.3 X1:20 11 — 12 14 — X1:18 X1:22

X18 /37.7 2 — 31 — 2 — X19 /37.9 — X200 /37.4 29 — 52 — X200 /37.4 27 — 99

X19 /37.9 3 — 31 — 57 — X200 /37.4 35 — K205 A0562 /17.3 X2:4 21 — 22 24 — X2:6 X2:2

X200 /37.4 4 — 72 — OW–NH/14.2

601 — 3 — H18 — 81 — 82 — 4

602 — 3 — H19 — 81 — 82 — 4

K307 A0563 /11.11 /33.6 86 85 X1:14 X2:22

K308 A0563 /11.14 /33.8 86 85 X1:22 X2:22

K203 A0562 /17.8 /17.10 /32.11 A1 A2 X2:9 X2:7

K204 A0562 /17.13 /17.14 /32.4 A1 A2 X1:2 X2:7

B18.2 — 83 — 1 3 — UBE+ KGND — 0°–5° 4–20mA — SIG1 — 4

B19.2 — 83 — 1 3 — UBE+ KGND — 0°–5° 4–20mA — SIG1 — 4

P18 + t – — P19 + t –

31a/11.15 — 31 — 31 — 31a/20.1

31/15.15 — 31 — 31 — 31/17.1

DREHMELDER HW1	SES HW1	SES HW2	DREHMELDER HW2
HOIST ROTATION INDIC. H1	SINK LIMIT SWITCH H1	SINK LIMIT SWITCH H2	HOIST ROTATION INDICATOR H2

OW NACH HINTEN ARRETIERT	OPTION: BETRIEBSSTUNDENZÄHLER HW1 HW2
SS TURNED BACKWARDS	OPTION: HOUR METER HOIST 1 HOIST 2

D	P11529	18.04.12	Burkard		Datum	Name
C	P11194	29.04.10	Burkard	Erst.	06.04.06	
Ind	Mitt–NR	Datum	Name	Gepr.		
Abteilung: 1114 10						

Projektbenennung / project description
E–Plan OW AC 80–2 V5.3 EN 13000
circuit diagram AC 80–2 superstr.

Seitenbenennung / page description
Drehmelder, SES, OW arretiert
HW–Stunden

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F E D C B A

LAST/10.15 91 58 F18/10.15

91 58 LAST/18.1 F18/19.1

2.5

A0303 F18 /30.1 X3:11 10A X4:12

58

A700 /29.2 CR0020 %IX0.06 X1:11

S20.1 1 2

S20.2 1 2

TS1.1 13 14

TS1.2 13 14

S7202 13 14

V102 1 2

V103 1 2

V104 1 2

177 177 177

K402 A0564 /10.2 /34.5 86 85 X1:13 X2:21

K205 A0562 /16.2 /16.7 /32.7 A1 A2 X1:16 X2:7

K206 A0562 /27.13 /27.14 /32.11 A1 A2 X2:10 X2:8

31/16.15 31

S800 3 1 7 201

60 61

K203 A0562 /16.9 X2:11 11 12 X2:13 14 X2:21

K203 A0562 /16.9 X2:17 21 22 X2:15 24 X2:19

S759 /23.7 5 7 1

152

S758 3 1 7 201

58

186 185

K204 A0562 /16.10 X1:6 11 12 X1:4 14 X1:8

K204 A0562 /16.10 X1:12 21 22 X1:14 24 X1:10

X215 /37.1 30 31 34 36 35

134 135 152 153 154

E300 /36.1 30 31 34 36 35

LENK_R LENK_L ENTR_II LENK_RE LENK_LI

ZUM UW
TO CARR

31 31/18.1

(A) RECHTS RIGHT ⟷ (C) LINKS LEFT

TOTMANN	Sitzkontaktschalter zus. Totmannschalter	LENKUNG VERF. VON OBEN	VERRIEGLUNG STRASSE/BAUSTELLE	AUSSCHLAG DER RÄDER RECHTS	AUSSCHLAG DER RÄDER LINKS	HUNDEGANG
DEAD MANS HANDLE	Seat Switch edit. Dead man	STEERING FROM SS	SS TURNED BACKWARDS	REAR WHEEL POSITION RIGHT	REAR WHEEL POSITION LEFT	CRABBSTEERING

					Datum	Name
D	P11529	18.04.12	Burkard			
C	P11194	29.04.10	Burkard	Erst.	06.04.06	Schlachter
Ind	Mitt-NR	Datum	Name	Gepr.		
Abteilung: 1114 10						

Projektbenennung / project description
E-Plan OW AC 80-2 V5.3 EN 13000
circuit diagram AC 80-2 superstr.

Seitenbenennung / page description
Totmann, Lenkung vom OW

Baunummer.

Anlage:

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1 2 3 4 5 6 7 8 9 10 11 12 13 14 15

F E D C B A

LAST/17.15 — 91 — 91 — LAST/20.1

2.5 — A0303 F28 /30.1 — X4:19/21/22 — 15A — X5:17–22 — 411

411 — 2.5 — S61 — 3 — 7 — 1

K306 A0563 .2 — X1:10 30 — 87A X1:8 — 87 X1:4

K408 A0564 .11 — X2:4 30 — 87A X2:2 — 87 X1:20

K407 A0564 .15 — X1:18 30 — 87A X1:16 — 87 X1:12

S62 .8 — 7 — 3 — 1 — 502

501 — 8 — 4 — 2

415 — X200 15 /37.4 — X62 3 /37.6

417 — X200 16 /37.4 — X62 1 /37.6

418 — X200 17 /37.4 — X62 2 /37.6

M61 24V — rt — M — sw — br — or — 11 — 12 — 14 — ws — bl

M62 24V — rt — M — sw — br — or — 11 — 12 — 14 — ws — bl

X62 /37.6 4 — X200 /37.4 18 — 421

X62 /37.6 5 — X200 /37.4 19 — 422

K408 A0564 .6 /34.8 — X1:22 — 86 — 85 — X2:22

H62 — a — b

H63 — a — b

K407 A0564 .7 /34.5 — X1:14 — 86 — 85 — X2:22

412 — X215 /37.1 33 — 412 — E300 /36.1 33 — GGW–Pos

413 — X215 /37.1 28 — E300 /36.1 28 — GGW–Auf

414 — X215 /37.1 42 — E300 /36.1 42 — GGW–Ab

K306 A0563 .6 /33.3 — X1:6 — 86 — 85 — X1:2

H61 — a — b — 415

31 — 2.5

31/17.15 — 31 — 31/19.1

GGW OBEN — COUNTERWEIGHT UP

GGW AUF AB — COUNERWEIGHT UP DOWN

GGW ENTBOLZT VERBOLZT — COUNTERWEIGHT UNLOCKED LOCKED

D	P11529	18.04.12	Burkard		Datum	Name
C	P11194	29.04.10	Burkard	Erst.	06.04.06	Schlachter
Ind	Mitt–NR	Datum	Name	Gepr.		
Abteilung: 1114 10						

Projektbenennung / project description: E–Plan OW AC 80–2 V5.3 EN 13000 circuit diagram AC 80–2 superstr.

Seitenbenennung / page description: GGW–Steuerung

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1 2 3 4 5 6 7 8 9 10 11 12 13 14 15

F E D C B A

F18/17.15 — 58 — F18/28.1
62 — 62
63 — 63 — 63/20.1

S805 .2 — S801 .4 — S802 .8 — S802 .6 — S803 .13 — S803 .11

K105 A0561 /20.2 X1:20 11 — 12 X1:18 — 14 X1:22
K105 A0561 /20.2 X2:4 21 — 22 X2:6 — 24 X2:2
K106 A0561 /20.3 X2:18 11 — 12 X2:16 — 14 X2:20
K106 A0561 /20.3 X2:12 21 — 22 X2:14 — 24 X2:22

119 — 110 — 111 — 113 — 231 — 232 — 115 — 117 — 233 — 234

K202 A0562 .15 X2:3 11 — 12 X2:5 — 14 X2:1
K202 A0562 .15 X1:19 21 — 22 X1:17 — 24 X1:21
K201 A0562 .9 X1:11 11 — 12 X1:13 — 14 X1:9
K201 A0562 .9 X1:5 21 — 22 X1:3 — 24 X1:7

112 — 114 — 116 — 118

A0581 V10 /35.3 X2:15 — V11 /35.3 X2:17 — X2:19 — X2:21
A0581 V12 /35.3 X1:2 — V13 /35.3 X1:4 — X1:6 — X1:8

X215 /37.1 15 — 29 — X215 /37.1
E300 /36.1 15 — 29 — E300 /36.1
EINF — AUSF

X215 /37.1 7 — E300 /36.1 7 — VLVO
X215 /37.1 9 — E300 /36.1 9 — VLHI
X215 /37.1 8 — E300 /36.1 8 — HLVO
X215 /37.1 10 — E300 /36.1 10 — HLHI

167

K201 A0562 .13 .14 /32.4 A1 X1:1 — A2 X2:7

X215 /37.1 11 — E300 /36.1 11 — VLVO?
X215 /37.1 13 — E300 /36.1 13 — VLHI?
X215 /37.1 12 — E300 /36.1 12 — HLVO?
X215 /37.1 14 — E300 /36.1 14 — HLHI?

120

K202 A0562 .8 .9 /32.7 A1 X1:15 — A2 X2:7

ZUM UW
TO CARR

ZUM UW
TO CARR

31/18.15 — 31 — 31/20.1

HORIZONTAL
EINF. RETRACT ⟷ VERTIKAL AUSF. EXTEND

VORNE FRONT ⟷ HINTEN REAR

VORNE FRONT ⟷ HINTEN REAR

ABSTÜTZUNG
EINFAHREN AUSFAHREN

VERTIKAL LINKS
VORNE HINTEN

HORIZONTAL LINKS
VORNE HINTEN

VERTIKAL RECHTS
VORNE HINTEN

HORIZONTAL RECHTS
VORNE HINTEN

HOIST ROTATION INDICATOR
H1

VERTICAL LEFT
FRONT REAR

HORICONTAL LEFT
FRONT REAR

VERTICAL RIGHT
FRONT REAR

HORICONTAL RIGHT
FRONT REAR

					Datum	Name
D	P11529	18.04.12	Burkard			
C	P11194	29.04.10	Burkard	Erst.	06.04.06	
Ind	Mitt-NR	Datum	Name	Gepr.		
Abteilung: 1114 10						

Projektbenennung / project description
E-Plan OW AC 80-2 V5.3 EN 13000
circuit diagram AC 80-2 superstr.

Seitenbenennung / page description
Abstützung

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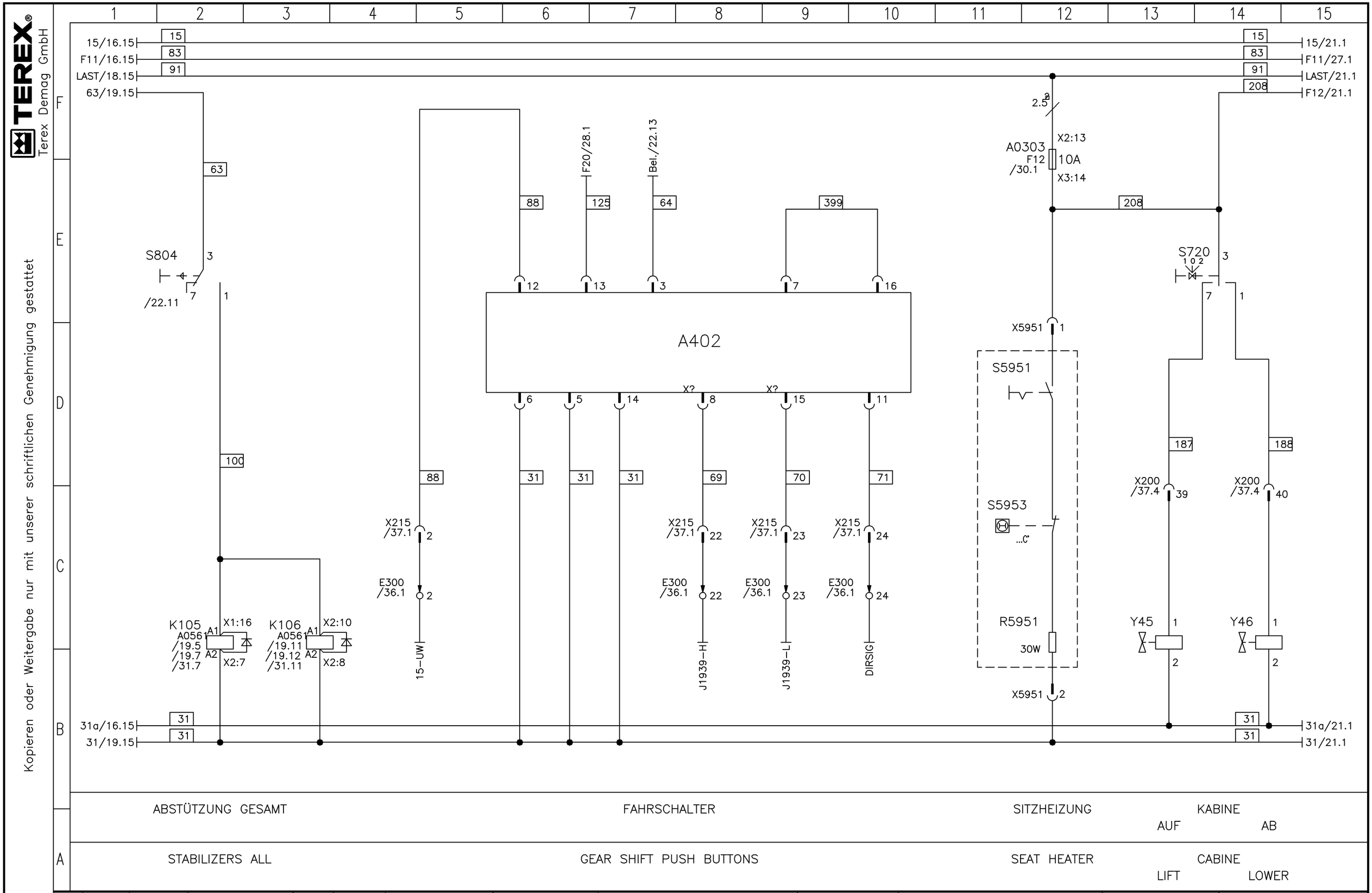

Ind	Mitt-NR	Datum	Name		Datum	Name
D	P11529	18.04.12	Burkard			
C	P11194	29.04.10	Burkard	Erst.	06.04.06	Schlachter
				Gepr.		

Abteilung: 1114 10

Projektbenennung / project description
E-Plan OW AC 80-2 V5.3 EN 13000
circuit diagram AC 80-2 superstr.

Seitenbenennung / page description
Fahrschalter, Sitzung, Kabine auf/ab

Baunummer.

Anlage:

Ort:

Zeichnungsnr. / drawing no.
28684812

Blatt 20
37 Bl.

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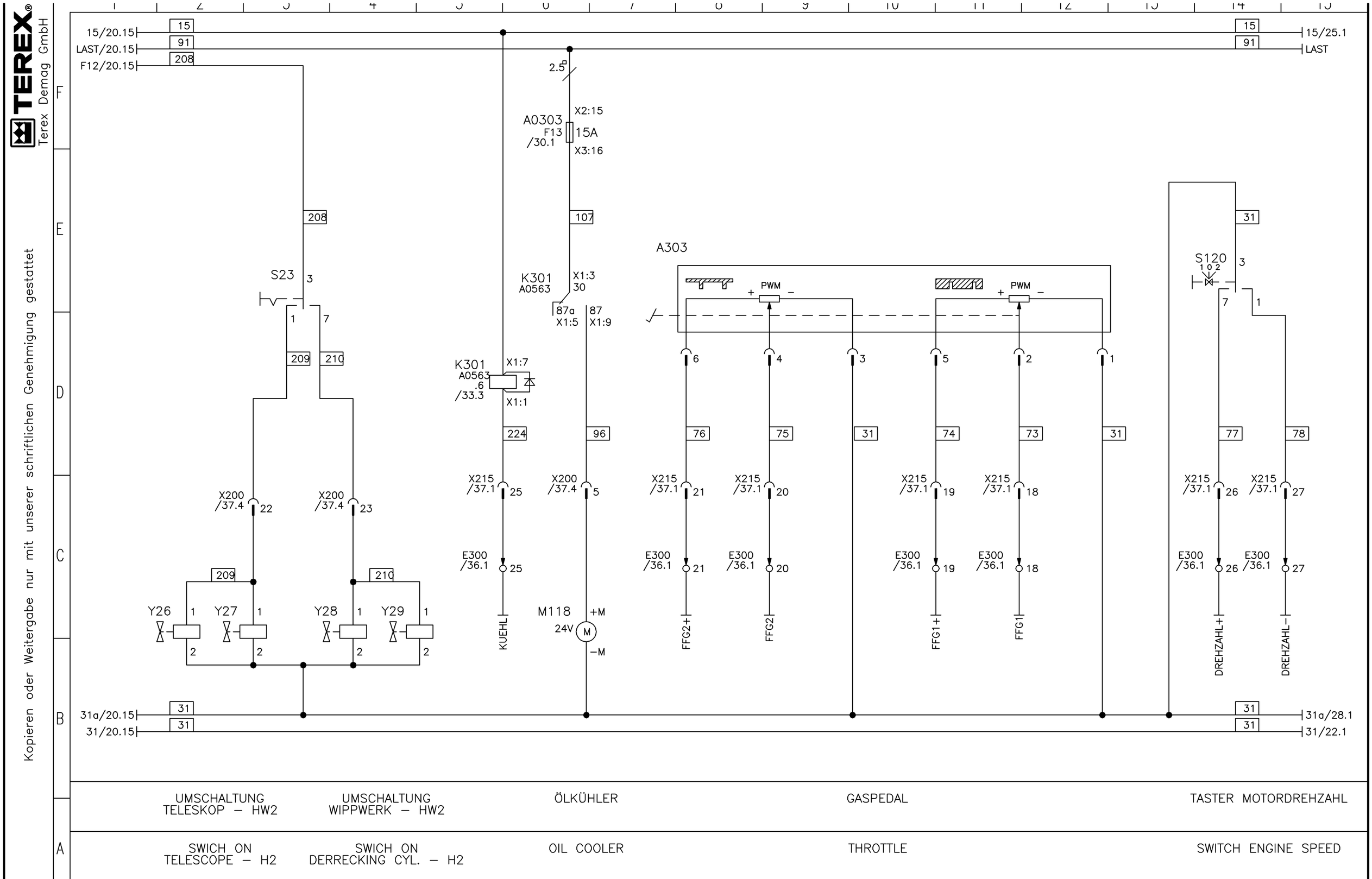

Ind	Mitt-NR	Datum	Name		Datum	Name
D	P11529	18.04.12	Burkard			
C	P11194	29.04.10	Burkard	Erst.	06.04.06	Schlachter
				Gepr.		

Abteilung: 1114 10

Projektbenennung / project description
E-Plan OW AC 80-2 V5.3 EN 13000
circuit diagram AC 80-2 superstr.

Seitenbenennung / page description
Ölkühler, Gaspedal, Mototrdrehzahl

Baunummer.

Anlage:

Ort:

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1 2 3 4 5 6 7 8 9 10 11 12 13 14 15

F
E
D
C
B
A

F4/5.15 — 64 — F4/26.1
64 — 64/24.1

S116 .4 — 5 — 7 — 1

S112 /5.13 — 9 — 10
S115 /8.6 — 9 — 10
S120? /20.14 — 9 — 10
S131? /7.10 — 9 — 10
S170 /25.11 — 9 — 10
S802? /18.6 — 9 — 10
S804 /20.2 — 9 — 10
S0781 /27.11 — 9 — 10

S114 /5.5 — 9 — 10
S116 .2 — 9 — 10
S130? /7.4 — 9 — 10
S132 /7.2 — 9 — 10
S801? /18.3 — 9 — 10
S803? /18.11 — 9 — 10
S805? /18.1 — 9 — 10

Bel./20.7

31/21.15 — 31 — 31 — 31/23.1

SCHALTERBELEUCHTUNG ARMATURENPULT

SWITCH ILLUMINATION DASH–BOARD

					Datum	Name
D	P11529	18.04.12	Burkard			
C	P11194	29.04.10	Burkard	Erst.	06.04.06	Schlachter
Ind	Mitt–NR	Datum	Name	Gepr.		
Abteilung: 1114 10						

Projektbenennung / project description
E–Plan OW AC 80–2 V5.3 EN 13000
circuit diagram AC 80–2 superstr.

Seitenbenennung / page description
Schalterbeleuchtung

Baunummer.

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1 2 3 4 5 6 7 8 9 10 11 12 13 14 15

F E D C B A

64/22.15 — 64 — 64/26.1

S14 /27.12 — 9 — 10
S161 /13.7 — 9 — 10
S720? /19.14 — 9 — 10
S758? /16.13 — 9 — 10
S800? /16.8 — 9 — 10
S62? /17.8 — 9 — 10
S6132? /6.4 — 9 — 10
S6134? /6.7 — 9 — 10

S160 /13.5 — 9 — 10
S162 /13.10 — 9 — 10
S23 /21.3 — 9 — 10
S759 /17.11 — 9 — 10
S61? /17.4 — 9 — 10
S6131 /6.2 — 9 — 10
S6133 /6.6 — 9 — 10

A700 /29.2 — X1:19 — %IX0.20 — CR0020

31/22.15 — 31 — 31 — 31/24.1

SCHALTERBELEUCHTUNG ARMKONSOLE/ARMATURENBRETT

SWITCH ILLUMINATION DASH-BOARD

					Datum	Name
D	P11529	18.04.12	Burkard			
C	P11194	29.04.10	Burkard	Erst.	06.04.06	Schlachter
Ind	Mitt-NR	Datum	Name	Gepr.		
Abteilung: 1114 10						

Projektbenennung / project description
E-Plan OW AC 80-2 V5.3 EN 13000
circuit diagram AC 80-2 superstr.

Seitenbenennung / page description
Schalterbeleuchtung

Baunummer.

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F2/4.15 — 3 — 3 — X905 — 4

A905
Spannungswandler 24V 12V 10A
Fa. Weber
39720412_

X905 — 1

3 6 2 5

31 — 101 — 101a — 31 12V

A906
XA 4 BAT+ | XA 2 MUTE | XA 7 MEM | XA 6 BEL | XA 8 BAT− | XA 5 MOT | XC + ANT
RADIO

FL+ 5 | FL− 6 | RL+ 7 | RL− 8 | RR+ 1 | RR− 2 | FR+ 3 | FR− 4

102 — 103 — 105 — 106

A906.1 + −
A906.2 + −

30/8.15 — 30/25.1

A0303 F26 /30.1 — X4:13 — 5A — X5:11/12

315 — X7180 — 1

Trumatic
zusätzliche Gasheizung

X7180 — 2

31/23.15 — 31 — 31 — 31/25.1

SPANNUNGSWANDLER	RADIO	Option Trumatic zusätzliche Gasheizung
DC−DC CONVERTER	RADIO	Option Trumatic add. heating gas−fired

					Datum	Name
D	P11529	18.04.12	Burkard			
C	P11194	29.04.10	Burkard	Erst.	06.04.06	
Ind	Mitt−NR	Datum	Name	Gepr.		
Abteilung: 1114 10						

Projektbenennung / project description
E−Plan OW AC 80−2 V5.3 EN 13000
circuit diagram AC 80−2 superstr.

Seitenbenennung / page description
Radio,Spannungswandler

Baunummer.
Anlage:
Ort:
Zeichnungsnr. / drawing no.
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Blatt 24
Bl. 37

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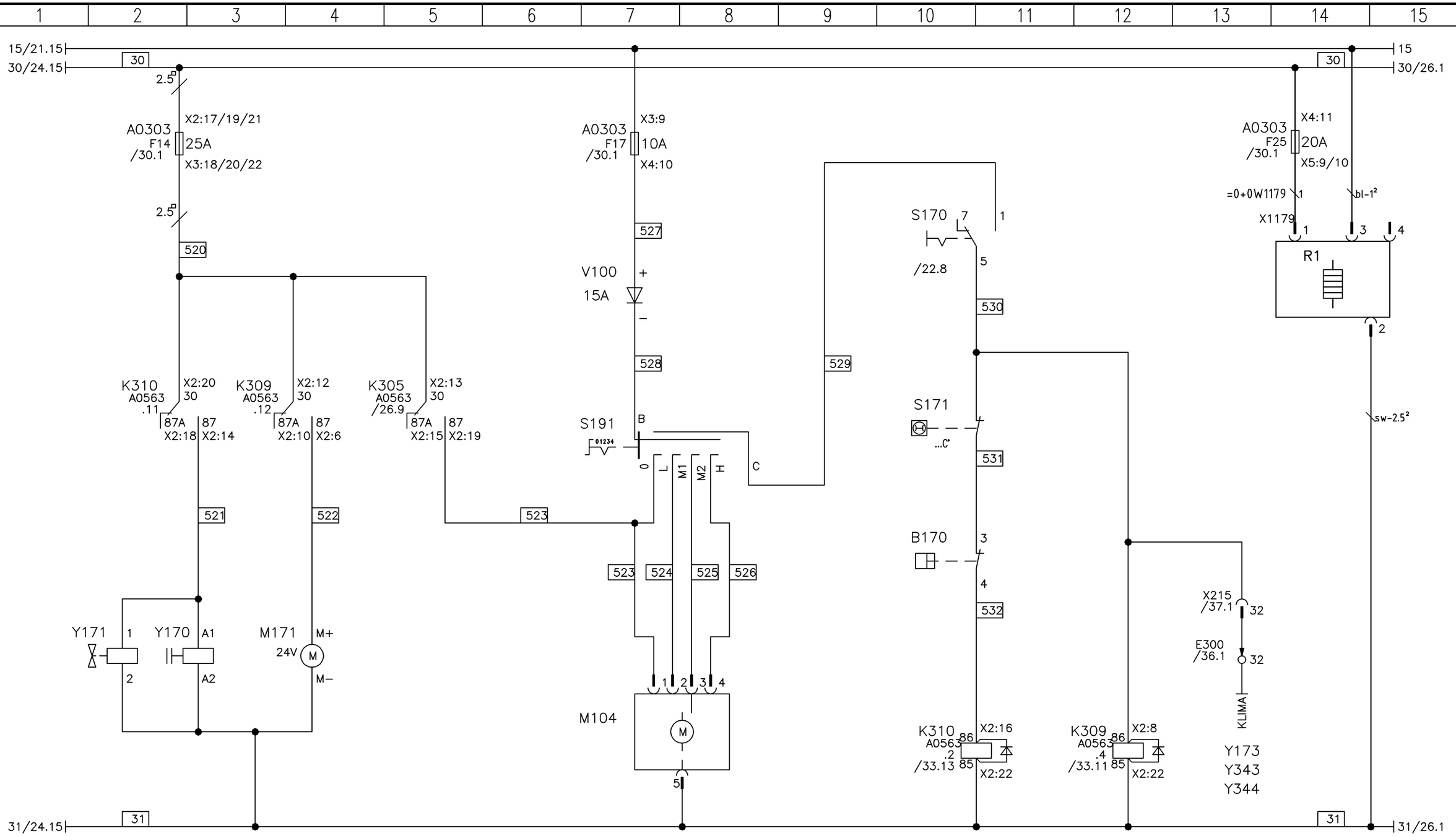

OPTION: KLIMAANLAGE KONDENSATOREINHEIT	GEBLÄSE	RELAIS KOMPRESSOR	RELAIS KONDENSATOR	OPTION Kraftstofffilter Vorwärmung
OPTION: AIR CONDITION CONDENSER UNIT	FAN	RELAY COMPRESSOR	RELAY CONDENSER	OPTIONAL fuel filter cartridge preheating

					Datum	Name
D	P11529	18.04.12	Burkard			
C	P11194	29.04.10	Burkard	Erst.	06.04.06	Schlachter
Ind	Mitt-NR	Datum	Name	Gepr.		
Abteilung: 1114 10						

Projektbenennung / project description
E-Plan OW AC 80-2 V5.3 EN 13000
circuit diagram AC 80-2 superstr.

Seitenbenennung / page description
Klimaanlage

Baunummer.

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37 Bl.

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1 2 3 4 5 6 7 8 9 10 11 12 13 14 15

F E D C B A

30/25.15
64/23.15
F4/22.15

30/28.1
64/28.1
F16/27.1

A0303 F15 /30.1 X3:1/3 25A X4:2/4

A0303 F16 /27.1 X3:5/7 10A X4:6/8

80

31

A190 SCHALTUHR
11 1 10 4 12
8 2

79 81 82 84 31

M105 M+ 24V M M−

1 5 7 4 2

A192 HEIZGERÄT

bl bn bl bl rt rt ws bn bn vi sw bn 3

B190 G R191 G R192 G R190 M190 A B M191 M

bl bn bl bl rt rt ws bn bn vi sw bn 85

K305 A0563 /25.5 /33.13 86 85 X2:17 X2:21

31/25.15

A5163
Bader
Industrie Elektronik
0632.3.A00
1 2 | 3 4 5 6 7 | 8 9 10

109

535 536 537 538 539 540 541 542

X5163 6 4 1 2 3

M5163

R5150 10Kohm

109

7 1 8 2

S5183 5 6 0,75 0,75

533 534

1 3

M5183 + −

31/27.1

FLAMMFÜHLER	TEMP–FÜHLER	ÜBERHITZUNGS–FÜHLER	GLÜHKERZE	WASSERPUMPE	BRENNER–MOTOR	BRENNSTOFF–DOSIERPUMPE
FLAME SENSOR	TEMP–SENSOR	SAFETY THERMAL SWITCH	GLOW PLUG	WATER PUMP	PLOWER MOTOR	FUEL PUMP

STANDHEIZUNG — WATER HEATER

STELLVENTIL UND UMLUFT — CONTROL VALVE AND CIRCULATING AIR

D	P11529	18.04.12	Burkard		Datum	Name	
C	P11194	29.04.10	Burkard	Erst.	06.04.06	Schlachter	
Ind	Mitt–NR	Datum	Name	Gepr.			
Abteilung: 1114 10							

Projektbenennung / project description
E–Plan OW AC 80–2 V5.3 EN 13000
circuit diagram AC 80–2 superstr.

Seitenbenennung / page description
Standheizung

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Anlage:
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37 Bl.

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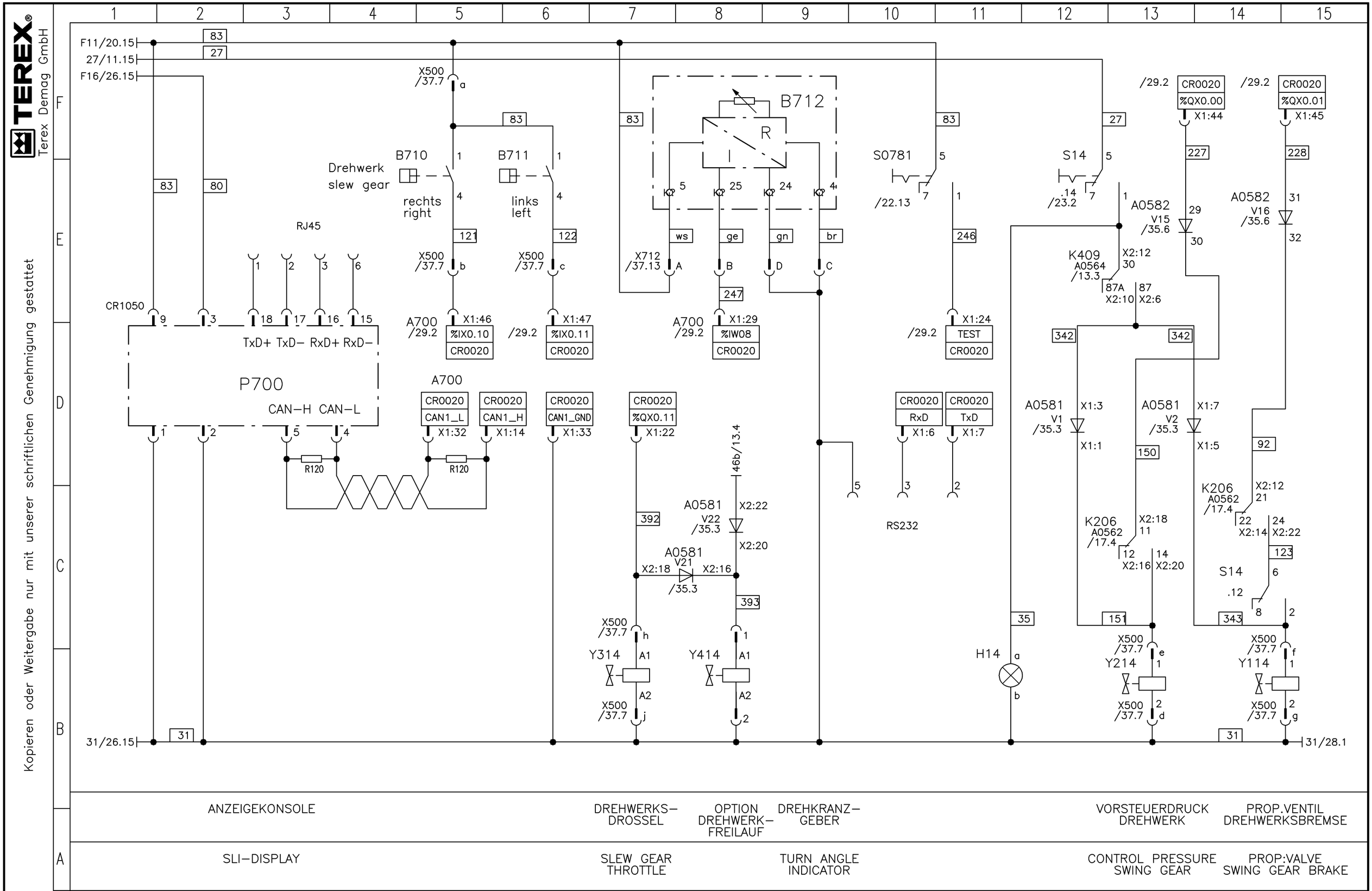

Ind	Mitt−NR	Datum	Name		Datum	Name
D	P11529	18.04.12	Burkard			
C	P11194	29.04.10	Burkard	Erst.	06.04.06	Schlachter
				Gepr.		

Abteilung: 1114 10

Projektbenennung / project description
E−Plan OW AC 80−2 V5.3 EN 13000
circuit diagram AC 80−2 superstr.

Seitenbenennung / page description
LMB−Konsole, Arbeitsbereichsbegrenzung

Baunummer.

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1 2 3 4 5 6 7 8 9 10 11 12 13 14 15

F E D C B A

30/26.15
F18/19.15
64/26.15

30
58
64

30
64

A0303 X3:15
F20 5A
/30.1 X4:16

F20/20.6

Motor läuft Signal

124/12.14

H190 a
b

H624 a
b

166

A0581 X2:6
V18
/35.3 X2:4

125 58 64 126 127 124 108

1 2 16 5 6 7 8 3 4

P100

108 108 45

15 9 10 11 12 22 20 24

31 156 157 158 159 160 21 148

X215 /37.1 37 38 39 40 41

E300 /36.1 37 38 39 40 41

C100
1 2
10F 63V

TANK
ÖLDRUCK
NOT-TEMP
ÖL-TEMP
DREHZAHL
WIND/8.3
SUMMER/4.15

X215 /37.1 1
E300 /36.1 1
SCHNELLSTOPP

S100 /4.6 13 14

31

X200 /37.4 24

B624 1 2

31a/21.15
31/27.15

31 31

31 31a
31 31

MULTIFUNKTIONS–DISPLAY

OPTION: SCHNELLSTOP HYDRAULIKOELFILTER

MULTIFUNCTION–DISPLAY

OPTION: QUICK STOP HYDRAULIC OIL FILTER

D	P11529	18.04.12	Burkard		Datum	Name
C	P11194	29.04.10	Burkard	Erst.	28.07.09	Burkard
Ind	Mitt–NR	Datum	Name	Gepr.		
Abteilung: 1114 10						

Projektbenennung / project description
E–Plan OW AC 80–2 V5.3 EN 13000
circuit diagram AC 80–2 superstr.

Seitenbenennung / page description
Multifunktionsdisplay, Ölfilter–Anzeige

Baunummer.
Anlage:
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Zeichnungsnr. / drawing no.
28684812
Blatt 28
37 Bl.

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A700

IFM
CR0020

1	GND_S	/9.2			17	%IX0.18		%OX0.06	/10.11	33	CAN_GND	/27.6			49	%IX0.33		%OX0.17	/13.7
2	%IX0.13	/14.7			18	%IX0.22	/9.6			34	VBB_R	/9.4			50	%IX0.35		%OX0.19	/13.6
3	%IX0.25		%OX0.09	/9.14	19	%IX0.20	/23.14			35	%IX0.39		%OX0.23	/9.12	51	%IX0.36		%OX0.20	/13.8
4	%IX0.31	/13.3	%OX0.15		20	%IX0.12	/14.4			36	%IX0.16		%OX0.04	/9.7	52	%IX0.37		%OX0.21	/13.11
5	VBB_0	/9.2			21	%IX0.14	/14.8			37	%IX0.23	/9.11			53	%IX0.19		%OX0.07	/10.12
6	RxD	/27.10			22	%IX0.27		%OX0.11	/27.7	38	%IX0.15	/14.2			54	%IX0.17		%OX0.05	
7	TxD	/27.11			23	VBB_S	/9.3			39	%IX0.24		%OX0.08	/9.6	55	%IX0.21	/9.9		
8	%IX0.00		%IW03	/14.12	24	TEST	/27.11			40	%IX0.26		%OX0.10	/9.9					
9	%IX0.02		%IW05	/15.8	25	CAN2_L				41	%IX0.28		%OX0.12	/13.12					
10	%IX0.04		%IW07	/15.13	26	CAN2_H				42	%IX0.29		%OX0.13	/13.13					
11	%IX0.06	/17.4	%IW09		27	%IX0.01		%IW04	/14.10	43	%IX0.30		%OX0.14	/13.14					
12	GND_A	/9.3			28	%IX0.03		%IW06	/15.10	44	%IX0.08		%OX0.00	/27.13					
13	ERROR				29	%IX0.05		%IW08	/27.8	45	%IX0.09		%OX0.01	/27.15					
14	CAN1_H	/27.5			30	%IX0.07		%IW10	/15.6	46	%IX0.10	/27.5	%OX0.02						
15	GND_0				31	%IX0.34		%OX0.18	/13.10	47	%IX0.11	/27.6	%OX0.03						
16	%IX0.38	/12.11	%OX0.22		32	CAN1_L	/27.5			48	%IX0.32		%OX0.16	/13.5					

D	P11529	18.04.12	Burkard		Datum	Name
C	P11194	29.04.10	Burkard	Erst.	12.04.06	schlachter_j
Ind	Mitt-NR	Datum	Name	Gepr.		
Abteilung: 1114 10						

Projektbenennung / project description
E-Plan OW AC 80-2 V5.3 EN 13000
circuit diagram AC 80-2 superstr.

Seitenbenennung / page description
SPS A700 Belegung

Baunummer.

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A0303

BMK	Wert/	Seite.Pfad sheet.path	Funktion	Function
F1	25A	/4.5	Zündschloss	ignition
F2	5A	/4.11	Innenbeleuchtung, Radio	cab illumination, radio
F3	10A	/4.13	Steckdosen, Hupe, Rundumleuchten	sockets, horn rotaflare lights
F4	10A	/5.11	Beleuchtung	illumination
F5	5A	/7.2	Scheibenwaschanlage	wipers
F6	5A	/8.6	Hindernisfeuer	aerodynamic safety light
F7	5A	/16.2	Drehmelder, SES	hoist rotation indicator, sink limit switch
F8	10A	/10.2	LMB–Freigabe	SLI release
F9	5A	/4.5	Motor Start	engine start
F10	5A	/9.6	LMB–Überbrückung, LMB–Initiatoren	override switches SLI, HLS, derrecking cyl., SLI indicators
F11	5A	/9.2	LMB	SLI
F12	10A	/20.12	Sitzheizung, Kabinenverstellung	seat heater, cabine adjustment
F13	15A	/21.6	Ölkühler	oil cooler
F14	25A	/25.2	Klimaanlage Kondensatoreinheit, Kompressor	air condition condenser unit, compressor
F15	25A	/26.2	Standheizung	heater
F16	10A	/26.3	Schaltuhr, Farbdisplay	timer module for heater, colour display
F17	10A	/25.7	Klimaanlage–Gebläse	air condition, fan
F18	10A	/17.2	Totmann, Lenkung vom OW	dead man handle, steering from ss
F19	10A	/5.10	Zentralschmieranlage	auto lubrication unit
F20	5A	/28.2	MFA10	multi functional display
F21	10A	/10.3	Magnetventile Vorsteuerung	magnetic valves for precontrol
F22	5A	/4.6	Zündung	ignition
F23	10A	/6.5	Verstellscheinwerfer	main boom search light
F24	10A	/5.8	Rundumleuchten	rotaflare lights
F25	20A	/25.14	Option Kraftstofffiltervorwärmung	optional fuel filter cartridge preheating
F26	5A	/24.12	Spannungversorgung Trumatic Gasheizung	Voltage Trumaticheating
F27	/		/	/
F28	15A	/18.2	Gegengewichtssteuerung	ccw control

D	P11529	18.04.12	Burkard		Datum	Name
C	P11194	29.04.10	Burkard	Erst.	10.04.06	schlachter_j
Ind	Mitt–NR	Datum	Name	Gepr.		
Abteilung: 1114 10						

Projektbenennung / project description
E–Plan OW AC 80–2 V5.3 EN 13000
circuit diagram AC 80–2 superstr.

Seitenbenennung / page description
Übersicht Sicherungen

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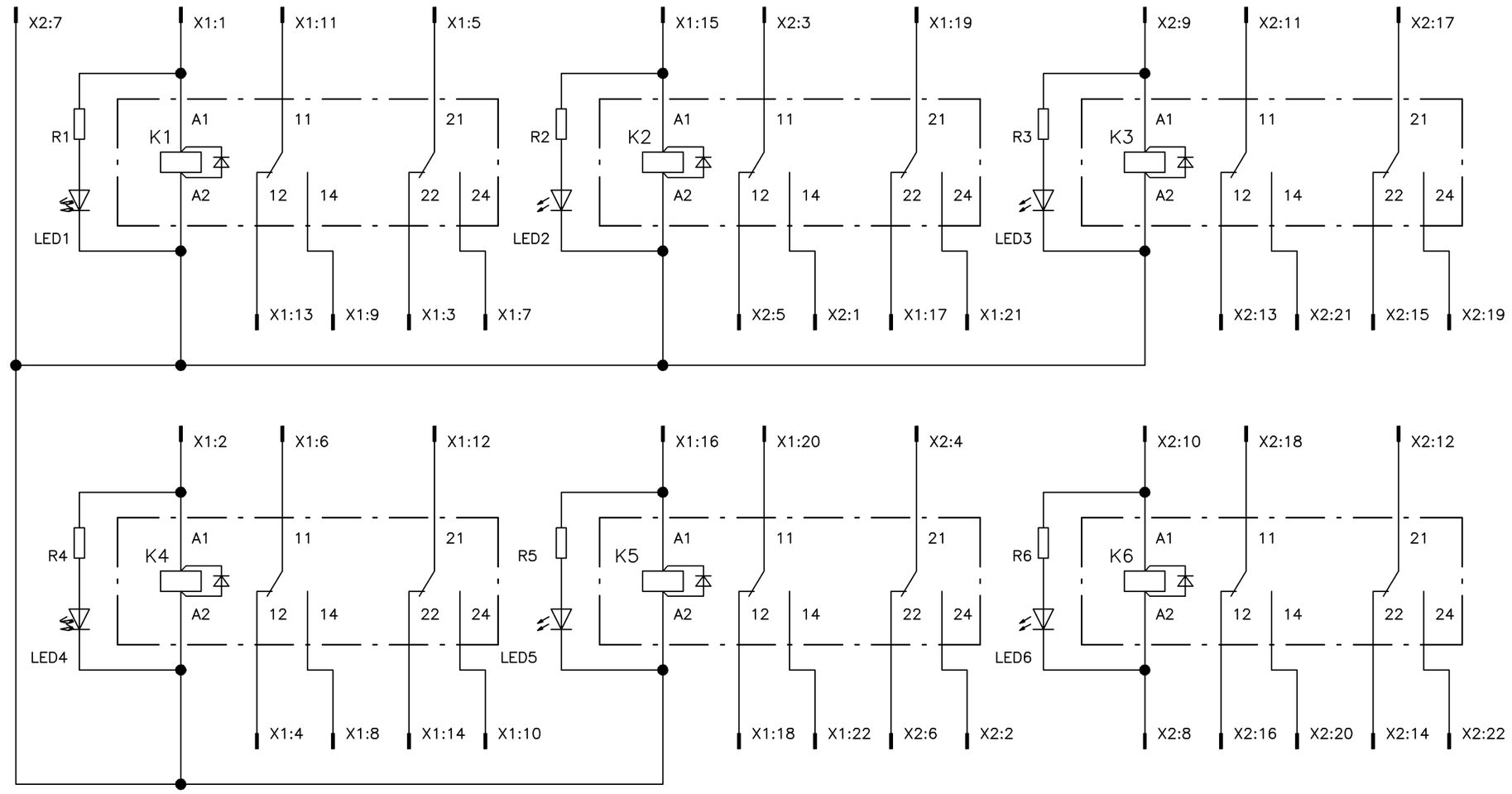

13008912_	K104 /13.9	K105 /20.2	K106 /20.3

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C	P11194	29.04.10	Burkard	Erst.	10.04.06	schlachter_j	E-Plan OW AC 80-2 V5.3 EN 13000 circuit diagram AC 80-2 superstr.	Übersicht Relaisplatine A0561	Ort:
Ind	Mitt-NR	Datum	Name	Gepr.					Zeichnungsnr. / drawing no. 28684812
Abteilung: 1114 10									Blatt 31 / Bl. 37

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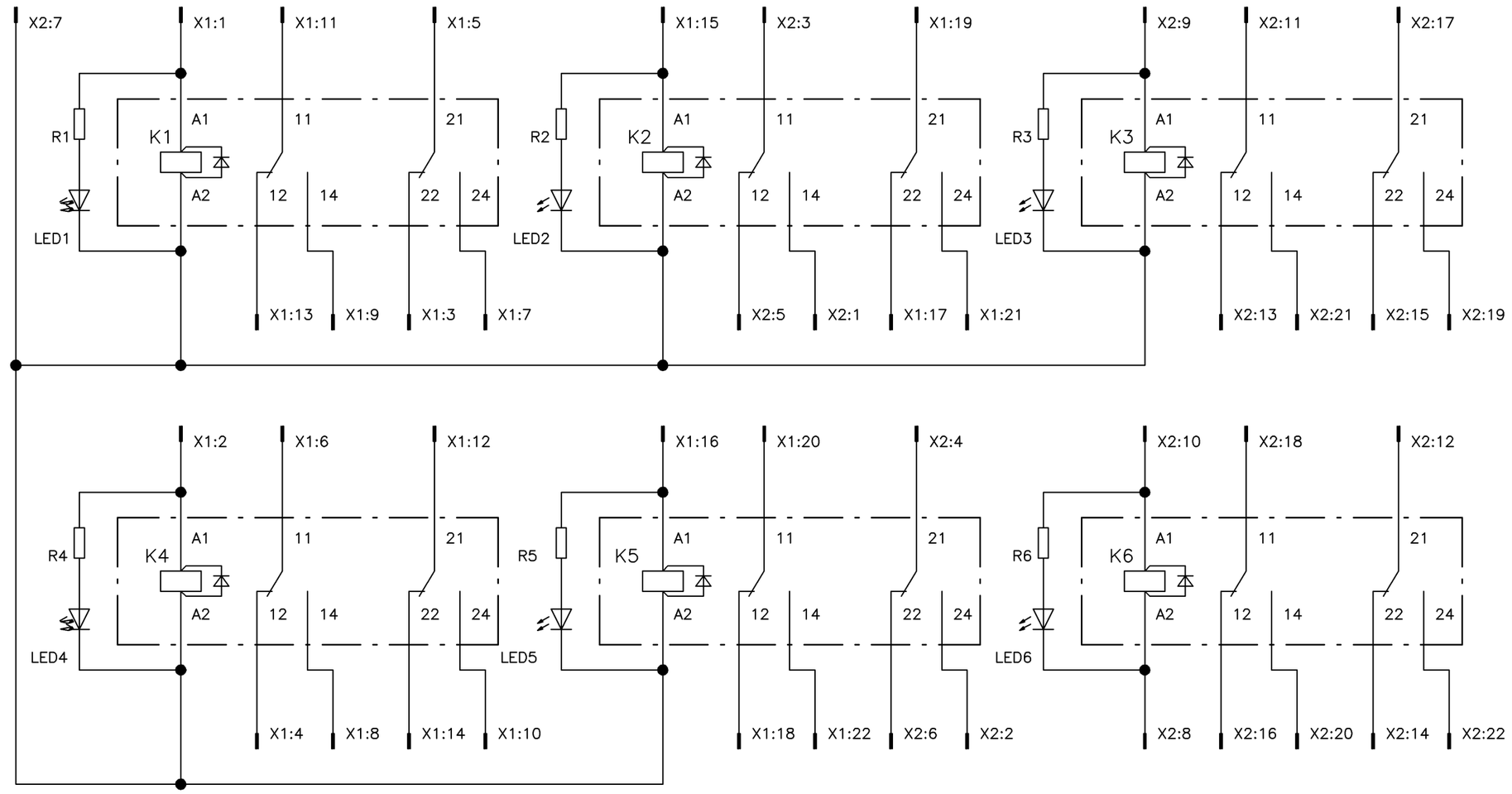

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C	P11194	29.04.10	Burkard	Erst.	10.04.06	schlachter_j
Ind	Mitt-NR	Datum	Name	Gepr.		
Abteilung: 1114 10						

Projektbenennung / project description
E-Plan OW AC 80-2 V5.3 EN 13000
circuit diagram AC 80-2 superstr.

Seitenbenennung / page description
Übersicht Relaisplatine A0562

Baunummer.

Anlage:

Ort:

Zeichnungsnr. / drawing no.
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37 Bl.

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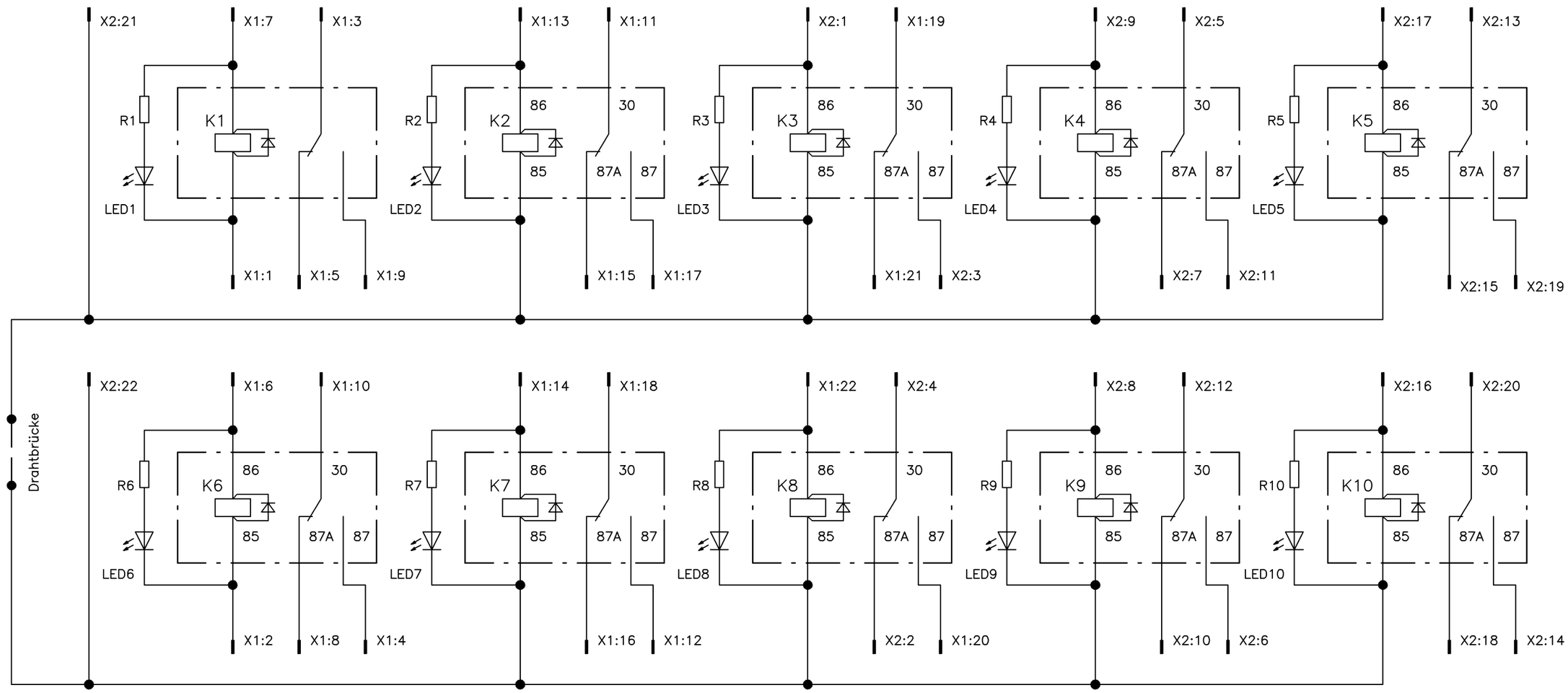

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C	P11194	29.04.10	Burkard	Erst.	10.04.06	
Ind	Mitt-NR	Datum	Name	Gepr.		
Abteilung: 1114 10						

Projektbenennung / project description
E-Plan OW AC 80-2 V5.3 EN 13000
circuit diagram AC 80-2 superstr.

Seitenbenennung / page description
Übersicht Relaisplatine A0563

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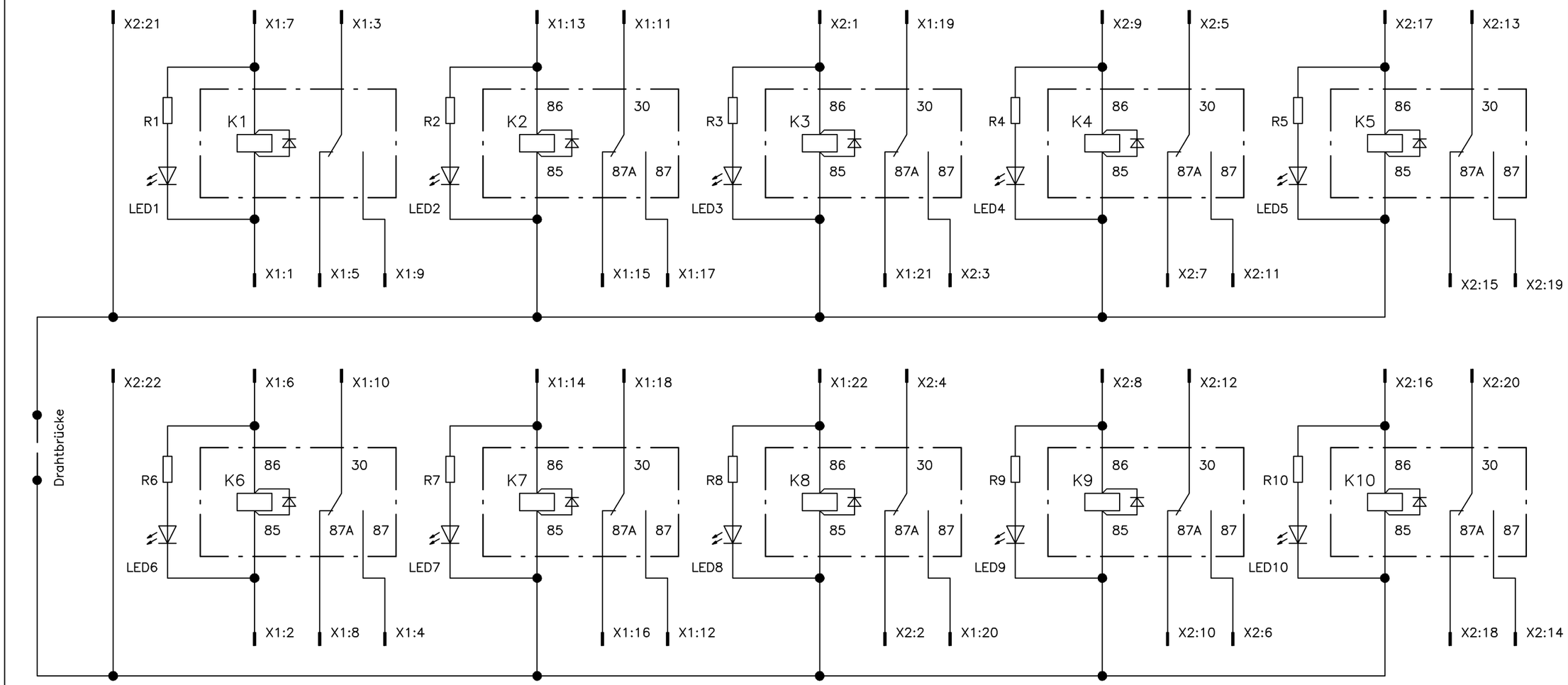

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C	P11194	29.04.10	Burkard	Erst.	10.04.06	
Ind	Mitt-NR	Datum	Name	Gepr.		
Abteilung: 1114 10						

Projektbenennung / project description
E-Plan OW AC 80-2 V5.3 EN 13000
circuit diagram AC 80-2 superstr.

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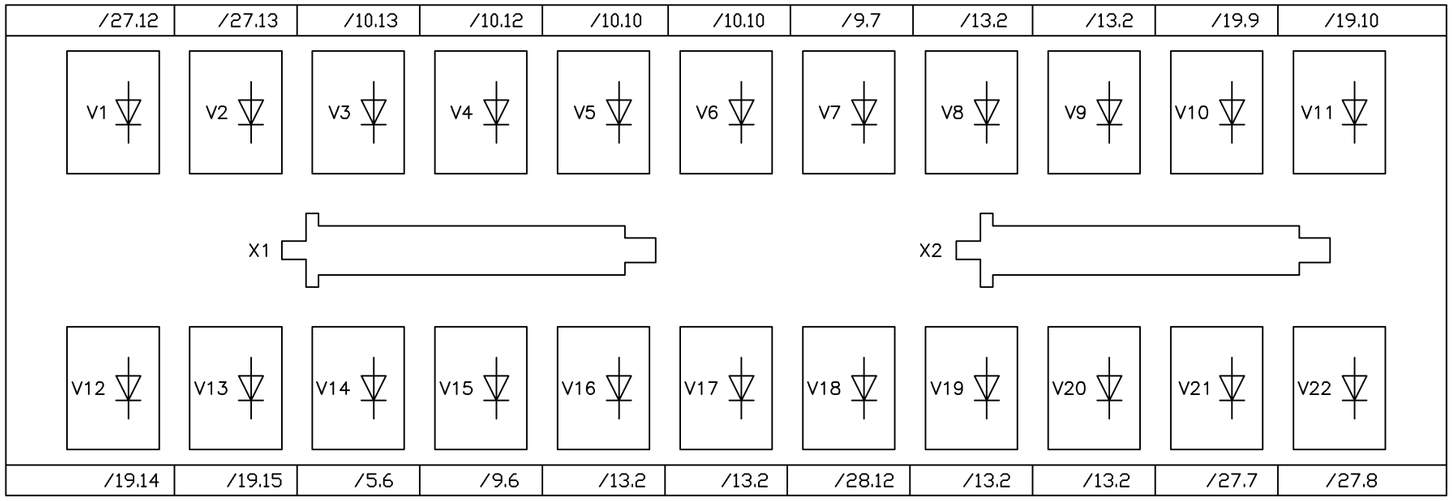
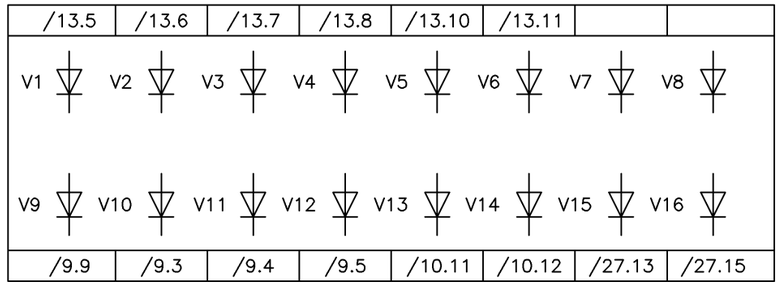
A0581



A0582



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C	P11194	29.04.10	Burkard	Erst.	11.04.06	
Ind	Mitt-NR	Datum	Name	Gepr.		
Abteilung: 1114 10						

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1 2 3 4 5 6 7 8 9 10 11 12 13 14 15

F E D C B A

E300

Schleifringkörper 46-polig

1	/28.11	11	/19.11	21	/21.8	31	/17.9	41	/28.7	A	/4.2
2	/20.5	12	/19.13	22	/20.8	32	/25.13	42	/18.4	B	/4.3
3	/6.13	13	/19.12	23	/20.9	33	/18.3	43			
4	/4.8	14	/19.14	24	/20.10	34	/17.11	44			
5	/5.6	15	/19.3	25	/21.6	35	/17.14				
6	/4.13	16	/4.5	26	/21.14	36	/17.13				
7	/19.6	17	/4.6	27	/21.15	37	/28.3				
8	/19.7	18	/21.11	28	/18.4	38	/28.4				
9	/19.6	19	/21.11	29	/19.4	39	/28.5				
10	/19.8	20	/21.9	30	/17.8	40	/28.6				

E702

14-pol
HA-Kabeltrommel

1	
2	/15.2
3	/8.3
4	/8.2
5	/8.7
6	/8.7
7	/8.7
8	/8.7
9	/8.7
10	/8.13
11	/15.6
12	
13	
14	

KABEL_B

Kabeltyp: Oelflex 110CY		Adernzahl/Querschnitt: 12 x 0.5²		Ident-Nr.:
Kabelziel intern		Kabelziel extern		
1	14.10/X700:A	1	14.10/X1:1	
2	14.12/X700:B	2	14.12/X1:16	
3	14.11/X700:C	3	14.11/X1.:3	
4	15.8/X700:D	4	15.8/X:7	
5	15.10/X700:E	5	15.10/X:8	
6	14.10/X700:F	6	14.10/X1.:2	
7	15.2/X700:G	7	15.2/X1:14	
8	15.6/X700:H	8	15.6/X1:15	
9		9		
10		10		
11		11		
12		12		

KABEL_A

Kabeltyp: Oelflex FD-855P		Adernzahl/Querschnitt: 18 x 1.0²		Ident-Nr.:
Kabelziel intern		Kabelziel extern		
1	8.13/X500:B	1	8.13/B702:18	
2	8.3/X500:C	2	8.3/B702:11	
3	14.8/X500:D	3	14.8/X:QV1	
4	14.6/X500:E	4	14.6/X:QV2	
5	14.4/X500:F	5	14.4/X:QV3	
6	14.7/X500:G	6	14.7/X:QV4	
7	8.2/X500:H	7	8.2/B702:12	
8	8.6/X500:J	8	8.6/B702:15	
9	6.3/X500:K	9	6.3/B702:Qv6	
10	6.4/X500:L	10	6.4/B702:Qv7	
11	6.2/X500:M	11	6.2/B702:Qv5	
12	6.8/X500:N	12	6.8/B702:Qv10	
13	6.7/X500:P	13	6.7/B702:Qv9	
14	6.6/X500:R	14	6.6/B702:Qv8	
15		15		
16		16		
17		17		
GE-GN		GE-GN		

KABEL_D

Ziel 1	Ader		Ziel 2
14.10/X1:1	1	1	14.11/X1.:1
14.12/X1:16	2	2	14.12/X1.:2
15.8/-X:6	3	3	14.13/X1.:3
	4	4	
	SHLD	SHLD	

KABEL_C

Kabeltyp: Oelflex 110CY		Adernzahl/Querschnitt: 12 x 0.5²		Ident-Nr.:
Kabelziel intern		Kabelziel extern		
1	15.2/X1:14	1	15.2/X1:8	
2	15.6/X1:19	2	15.6/X1:15	
3	15.7/X:5	3	15.9/X1:5	
4	15.8/X:7	4	15.8/X1:2	
5	15.8/X:6	5	15.10/X1:6	
6	15.10/X:8	6	15.10/X1:4	
7	14.6/X:QV2	7	14.6/X1:11	
8	14.7/X:QV4	8	14.7/X1:12	
9	14.8/X:QV1	9	14.8/X1:13	
10		10		
11		11		
12		12		

					Datum	Name
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C	P11194	29.04.10	Burkard	Erst.	06.04.06	Schlachter
Ind	Mitt-NR	Datum	Name	Gepr.		
Abteilung: 1114 10						

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E-Plan OW AC 80-2 V5.3 EN 13000
circuit diagram AC 80-2 superstr.

Seitenbenennung / page description
Übersicht Schleifringkörper u. Kabel

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1	2	3	4	5	6	7	8	9	10	11	12	13	14	15

F E D C B A

44–pol Schleifringkörper
X215

1	/28.11	17	/4.6	33	/18.3
2	/20.5	18	/21.11	34	/17.11
3	/6.13	19	/21.11	35	/17.14
4	/4.8	20	/21.9	36	/17.13
5	/5.6	21	/21.8	37	/28.3
6	/4.13	22	/20.8	38	/28.4
7	/19.6	23	/20.9	39	/28.5
8	/19.7	24	/20.10	40	/28.6
9	/19.6	25	/21.6	41	/28.7
10	/19.8	26	/21.14	42	/18.4
11	/19.11	27	/21.15	43	
12	/19.13	28	/18.4	44	
13	/19.12	29	/19.4		
14	/19.14	30	/17.8		
15	/19.3	31	/17.9		
16	/4.5	32	/25.13		

44–pol OW–Steuereinheit
X200

1	/10.13	17	/18.9	33	
2	/9.7	18	/18.12	34	/16.2
3	/16.2	19	/18.14	35	/16.7
4	/16.9	20		36	/5.9
5	/21.6	21		37	/6.11
6	/10.5	22	/21.3	38	/6.12
7	/11.10	23	/21.4	39	/20.13
8	/10.14	24	/28.14	40	/20.14
9	/11.2	25		41	/9.10
10	/11.3	26		42	/11.7
11	/11.5	27	/16.5	43	/11.9
12	/11.6	28		44	/9.7
13	/11.11	29	/16.4		
14	/11.14	30	/6.12		
15	/18.9	31	/6.13		
16	/18.9	32	/11.13		

37–pol Hauptausleger
X500

A	/8.6	T		m	
B	/8.13	U		n	
C	/8.3	V		p	
D	/14.8	W		r	
E	/14.6	X		s	
F	/14.4	Z			
G	/14.7	a	/27.5		
H	/8.2	b	/27.5		
J	/8.6	c	/27.6		
K	/6.3	d	/27.13		
L	/6.4	e	/27.13		
M	/6.2	f	/27.15		
N	/6.8	g	/27.15		
P	/6.7	h	/27.7		
R	/6.6	j	/27.7		
S		k			

16–pol
X600

A	/11.2
B	/11.3
C	/11.5
D	/11.6
E	/11.7
F	/11.9
G	
H	
I	
K	/4.8
L	/4.8
M	
N	
O	
P	
R	

14–pol
X700

A	/14.10
B	/14.12
C	/14.11
D	/15.8
E	/15.10
F	/14.10
G	/15.2
H	/15.6
I	
J	
K	
L	
M	
N	

6–pol
X701

A	/15.14
B	
C	
D	/15.13
E	
F	

4–pol
X712

A	/27.7
B	/27.8
C	/27.9
D	/27.9

16–pol
X104

1	/5.14
2	/5.14
3	/5.15
4	/5.15
5	/4.11
6	/4.11
7	/5.8
8	/5.8
9	/7.2
10	/7.2
11	
12	
13	/5.4
14	/5.4
15	
16	
PE	

10–pol
X105

1	/7.4
2	/7.5
3	
4	/7.4
5	/7.6
6	/7.10
7	/7.11
8	/7.10
9	/7.12
10	

12–pol
X402

1	
2	
3	
4	
5	
6	/20.6
7	
8	
9	
10	
11	
12	

5–pol
X62

1	/18.10
2	/18.10
3	/18.10
4	/18.12
5	/18.14

3–pol
X18

1	/16.2
2	/16.3
3	/16.2

5–pol
X19

1	/16.5
2	/16.5
3	/16.7
4	
5	/16.5

2–pol
X7114

1	/12.4
2	/12.4

4–pol
X7116

1	/13.12
2	/13.13
3	/13.14
4	/13.12

D	P11529	18.04.12	Burkard		Datum	Name
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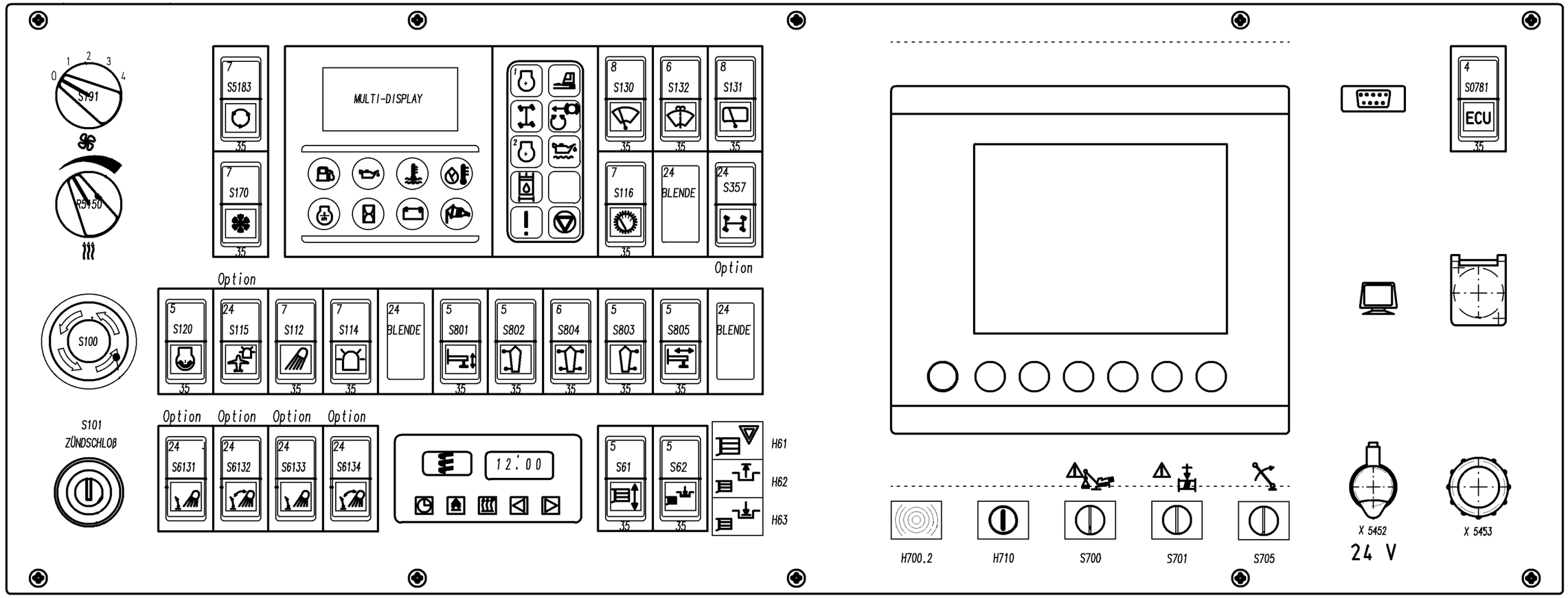

Erstverwendung						
Typ: AC 80-2	Pos					
Ident-Nr. 16903012	1					
		a	P10812	11.12.06	U. Henzelmann	
		_	K00835	24.05.05	U. Henzelmann	
		Anz	Ind	Mitt-NR	Datum	Name

Allg. Toleranz
Spanend DIN ISO 2768 m
Spanlos DIN ISO 2768 c
Brennschn. DIN 2310 II,T3,BG,T5L
Schweißk. DIN EN ISO 13920 C, G
Oberfläche DIN ISO 1302 Rz R2

	Datum	Name
Erst.	08.04.05	H. Henzelmann
Gepr.	-	-
Frei	-	-

Abteilung: 2133

TEREX DEMAG

Paßmaß | Abmaß

Schweißkonstruktion ISO 5817 B

Maßstab 1:2 | Gew. 5,46 kg

Schutzvermerk ISO 16016 beachten
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Werkstoff %

Benennung

Armatureninstallation OW AC 80-2

INSTRUMENT PANEL ARR.

Ident-Nr. 271 928 12

Format A3 | Bl. / Blätter 1/1

Plotstatus: IST FREIGEGEBEN henzelmann 12-12-06 09:50:48 Ver.: 10 | BG-FT | I-DEAS

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HYDRONIC

Troubleshooting and repair instructions

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eberspaecher.de

These Troubleshooting and Repair Instructions apply to the following heater versions:

HYDRONIC B	Cat. No.
B 5 W S — 12 Volts	20 1777 05 00 00
B 5 W S — 12 Volts / fully equipped	20 1778 05 00 00

HYDRONIC	Cat. No.
D 5 W S — 12 Volts	25 2031 05 00 00
D 5 W S — 12 Volts / fully equipped	25 2032 05 00 00
D 5 W S — 24 Volts	25 2009 05 00 00

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Functional diagram D 5 W S 5

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Fault diagnosis with the diagnostic unit 9

Fault code, fault description,
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Faults which the diagnostic system does
not indicate 14

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• Assembly drawing D 5 W S 17

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Fuel quantity measurement 26

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Functional description

The *HYDRONIC* can be wired up to operate as an auxiliary heater only or as a combination of auxiliary heater and add-heater — the latter serving to compensate for a lack of heat dissipation from the vehicle engine.

Auxiliary heater operation

Switching on

The pilot lamp in the operating element (timer module, switch, etc.) comes on when the *HYDRONIC* is switched on.
The water pump starts up, and after a defined pre-rinsing and preglow program has been completed the combustion air blower, glow plug and metering pump come on.
Once a flame has been detected and the combustion process has stabilised, a time control switches the glow plug off.

Heating mode

Depending on heat demand, the *HYDRONIC* alternates between "HIGH" and "LOW" settings.
The temperature thresholds are permanently programmed in the electronic control unit.
If the heat demand in the "LOW" setting is so low that the cooling water reaches a temperature of 85°C, the heater switches to the "OFF" setting, then continues to run for about 130 seconds.
The pilot lamp is also lit while the heater is in the "OFF" setting, and the water pump continues to run until the heater is restarted.

Switching off

When the heater is switched off, the pilot light goes out and fuel feed is shut off. Also in the case of *HYDRONIC* D 5 W S, the glow plug is switched on for 20 seconds.
The combustion air blower and the water pump run on after the heater is switched off (for 50 sec in the case of B 5 W S and for 120 sec in the case of D 5 W S) and are then switched off automatically.

Stationary ventilation

Stationary ventilation means that it is possible to activate the vehicle blower directly via the timer module or via radio wave remote control T4 bypassing heater operation in order to ventilate the vehicle interior — which often becomes extremely hot in the summer — before setting off (separate wiring, see Wiring diagram, pp. 24 and 25).

Diagnosis

If the control unit detects a fault at start-up of the *HYDRONIC* or while the *HYDRONIC* is in operation, it is indicated on the timer module display within 15 seconds in the form of a fault code (F + 2-digit number).
If the heater is operated in conjunction with the "Mini" timer, the fault code can be read out of the control unit by connecting a diagnostic unit (Cat. No. 22 1512 89 00 00). An adapter cable (Cat. No. 22 1000 30 71 00) is required in order to connect the diagnostic unit.

Safety devices

The flame is monitored by the flame sensor and the max. permissible temperature by the overheat sensor.
Both influence the control unit, which shuts down the *HYDRONIC* in the event of faults.

- If the *HYDRONIC* does not ignite within 90 seconds after the start of fuel feed, start-up is repeated.
  If the *HYDRONIC* does not ignite repeatedly within 90 seconds after the start of fuel feed, a fault shutdown takes place.
- If the flame goes out by itself while the heater is in operation, a restart is initially carried out.
  If the *HYDRONIC* does not ignite within 90 seconds after the start of fuel feed, or if it ignites but goes out again, a fault shutdown takes place.
  The fault shutdown can be cancelled by briefly switching the heater off and on again.
- In the event of an overheat (e.g. shortage of water, poorly ventilated coolant circulation system), the overheat sensor is tripped, fuel feed is shut off, then a fault shutdown is activated.
  Once the cause of the overheat has been eliminated, the *HYDRONIC* can be restarted by switching it off and on again (prerequisite: the *HYDRONIC* has cooled down sufficiently).
- If the voltage drops below approx. 10 Volts or 20 Volts or rises above 15 Volts or 30 Volts, a (delayed) fault shutdown is activated.
- If the glow plug is defective or an electrical lead running to the metering unit is broken, the *HYDRONIC* does not start.
- The blower motor speed is monitored continuously.
  If the blower motor does not start or becomes blocked, a fault shutdown is activated.

Please note!

- The *HYDRONIC* must always be switched off when re-fuelling.
- The *HYDRONIC* must not be operated in garages.
- The coolant should contain at least 10% antifreeze all year round as protection against corrosion.
- When performing electric welding work on the vehicle, disconnect the plus terminal of the battery and connect to GND in order to protect the control unit.
- Also switch on the *HYDRONIC* briefly (for approx. 10 sec.) once a month outside the heating period in order to prevent the water pump and burner motor seizing up.
- Before switching on or pre-programming the heating mode, move the heating lever of the vehicle to the "WARM" (maximum) setting and the blower to the "slow setting" (low power consumption).
- Operating instructions for timers and switches are supplied with the operating elements.
- If it is necessary to use other switches as per usual in automotive engineering, they must have a minimum rating of 1 ampere.

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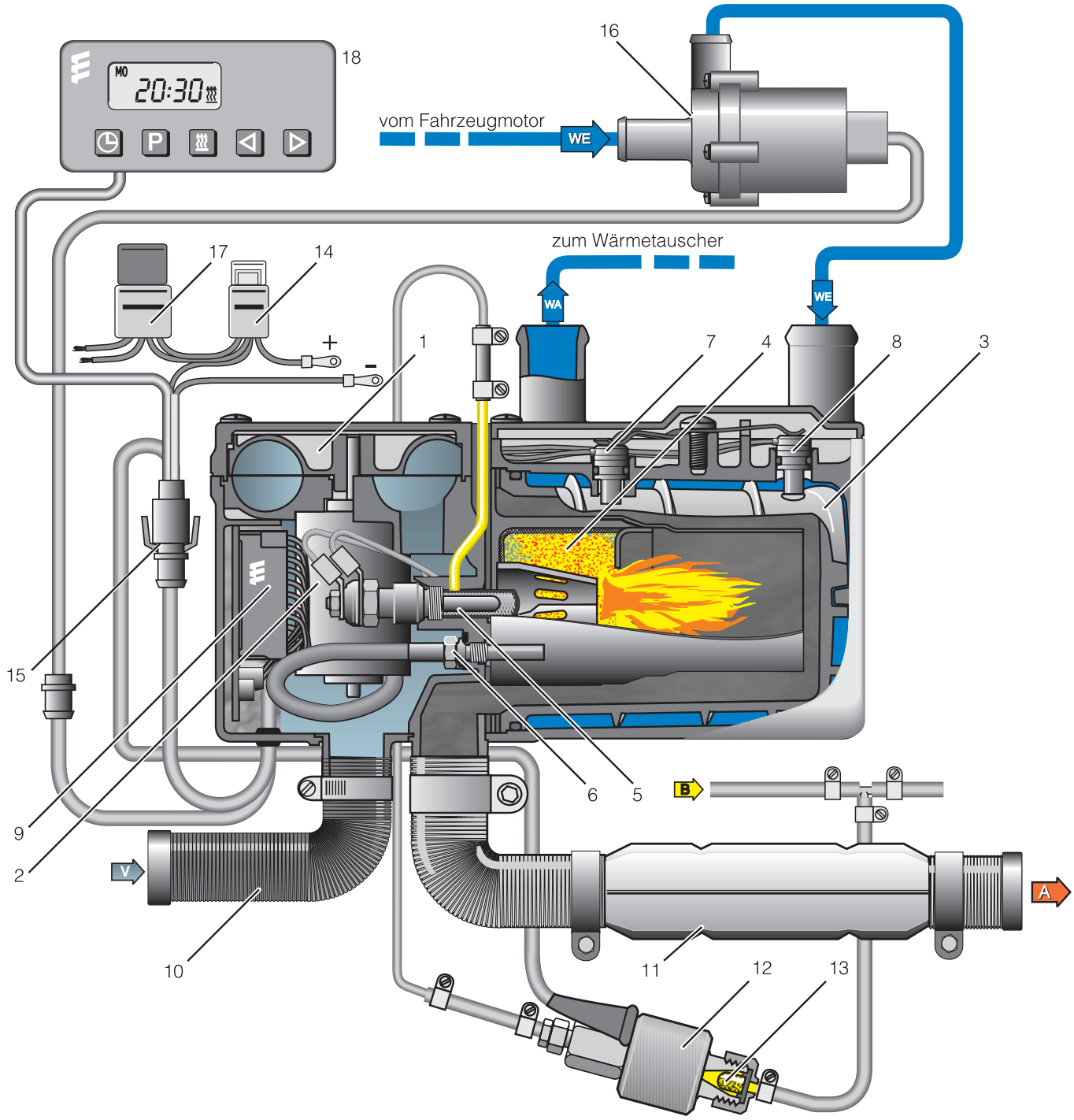
Sectional diagram (heater shown: *HYDRONIC* B 5 W S)



1	Combustion air blower	10	Combustion air hose	A	=	Exhaust gas
2	Electric motor	11	Exhaust pipe with silencer			
3	Heat exchanger	12	Metering pump	B	=	Fuel
4	Combustion chamber	13	Strainer built into metering pump			
5	Glow plug	14	Main fuse	V	=	Combustion air
6	Flame sensor	15	Interface / 8-pin plug			
7	Temperature sensor	16	Water pump	WA	=	Water outlet
8	Overheat sensor	17	Relay, vehicle blower			
9	Control unit	18	Timer module	WE	=	Water inlet

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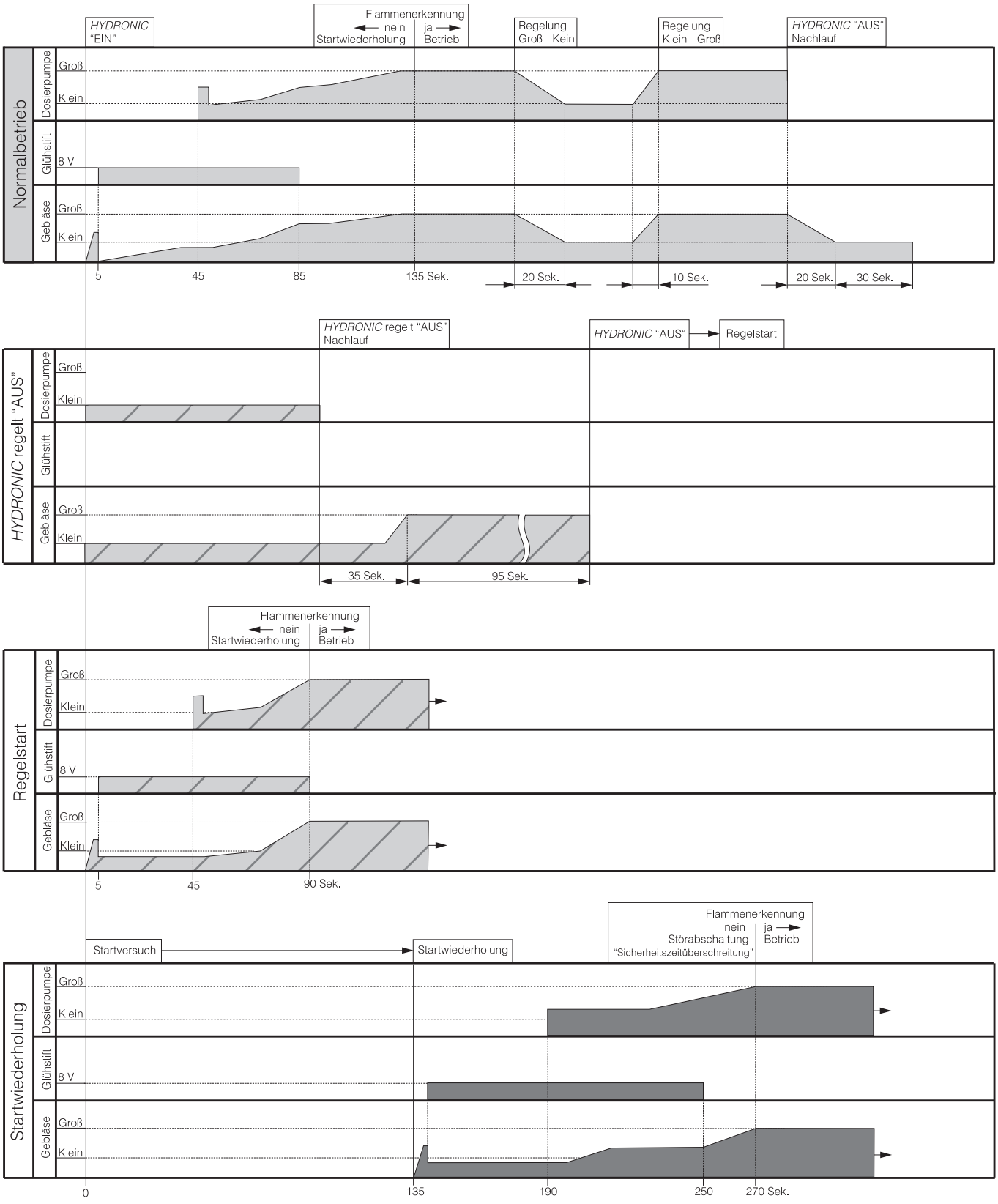
Functional diagram — *HYDRONIC* B 5 W S



Switching temperatures

High — Low	80 °C	Off — On	75 °C	Vehicle blower	
Low — Off	85 °C	Low — High	75 °C	On 30 °C / Off 20 °C	

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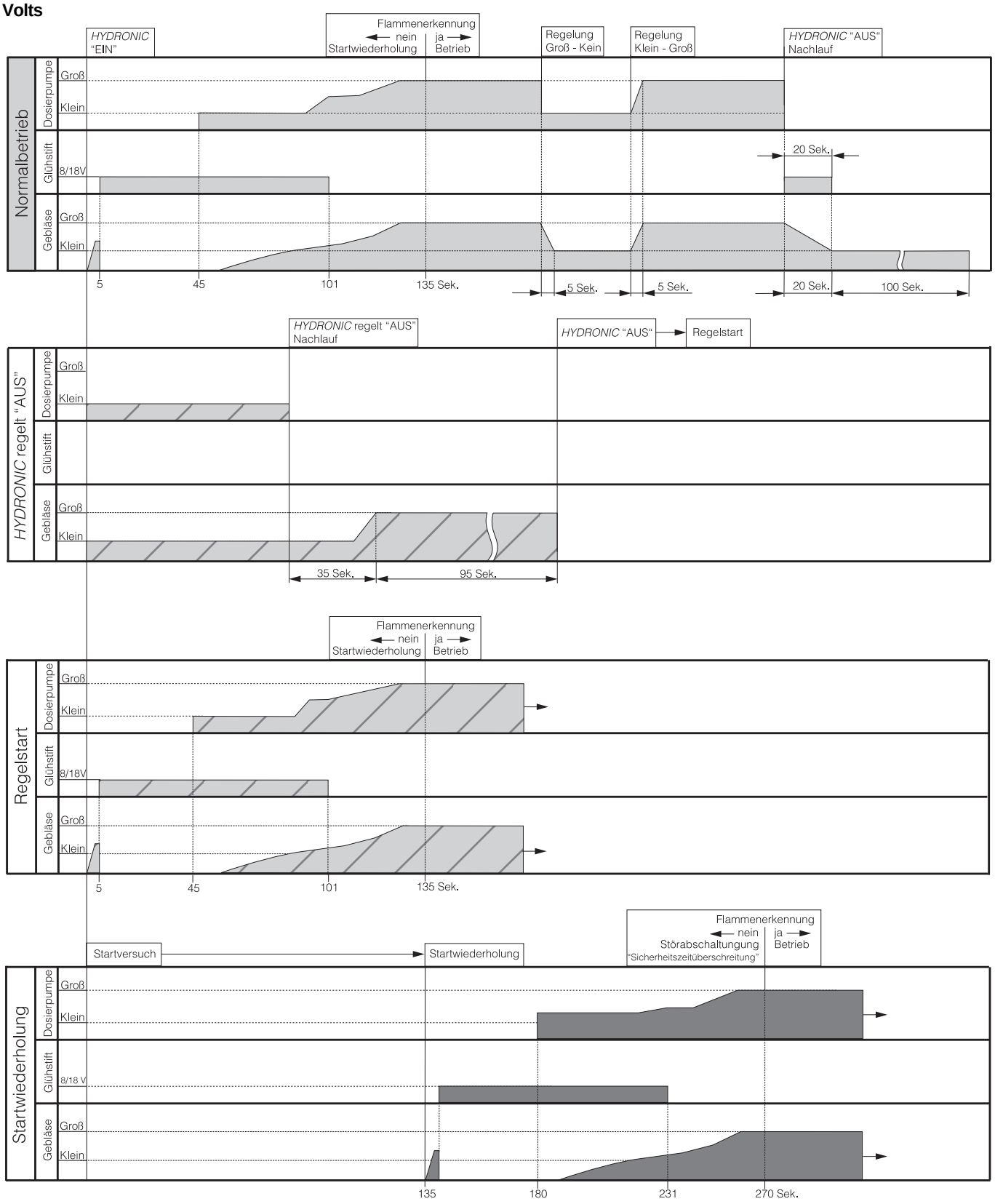
Functional diagram — *HYDRONIC* D 5 W S — 12 Volts / 24 Volts



Switching temperatures

High — Low	80 °C	Off — On	75 °C	Vehicle blower	
Low — Off	85 °C	Low — High	75 °C	On 30 °C / Off 20 °C	

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Specifications

	HYDRONIC B		***HYDRONIC***		
Test code	~~~ S 288		~~~ S 274		
Heating medium	Water, coolant				
Heating capacity control	High / Low				
Fuel	Gasoline (commercially available)		Diesel (commercially available)		
Rated voltage	12 Volts		12 Volts or 24 Volts		
Heating capacity	High	Low	High	Low	
	5000	1500	5000	2200	Watts
Fuel consumption	0,69	0,21	0,62	0,27	l / h
Electric power consumption (excl. wp) • at start-up • in High setting • in Low setting	< 100 37 10		at 12 Volts < 100 37 12	at 24 Volts < 100 37 12	Watts Watts Watts
Operating range • Lower voltage limit An undervoltage safety device built into the control unit switches the heater off at approx. 15 Volts or 28 Volts	10		10	20	Volts
• Upper voltage limit An overvoltage safety device built into the control unit switches the heater off at approx. 15 Volts or 28 Volts	15		15	28	Volts
Permissible operating pressure	up to 2.5 bar overpressure				
Minimum water flow rate	300 l /h				
CO_2 value	10,5 % by vol. $^{+\ 1\ \%\ by\ vol.}_{-\ 2,5\ \%\ by\ vol.}$				
CO in exhaust gas	≤ 0,1 % by vol.				
Smoke spot number acc. to Bacharach	< 4				
Radio interference suppression leve	VHF 3 — SW 4 — MW / LW 5				
Ambient temperature • *HYDRONIC* in operation • Metering pump in operation • *HYDRONIC* and metering pump not in operation	-40 °C to + 80 °C -40 °C to + 20 °C -40 °C to +125 °C		-40 °C to + 80 °C -40 °C to + 80 °C -40 °C to +125 °C		
Weight incl. water pump and metering pump	approx. 2,9 kg				

Specifications — water pump
(the water pump cannot be activated externally)

Water flow rate against 0.1 bar	12 Volts = 800 l / h	24 Volts = 900 l / h
Electric power consumption	12 Volts = 16 Watts	24 Volts = 12 Watts

These specifications include the tolerance
of +10 % of rated voltage standard for heaters
unless otherwise specified.

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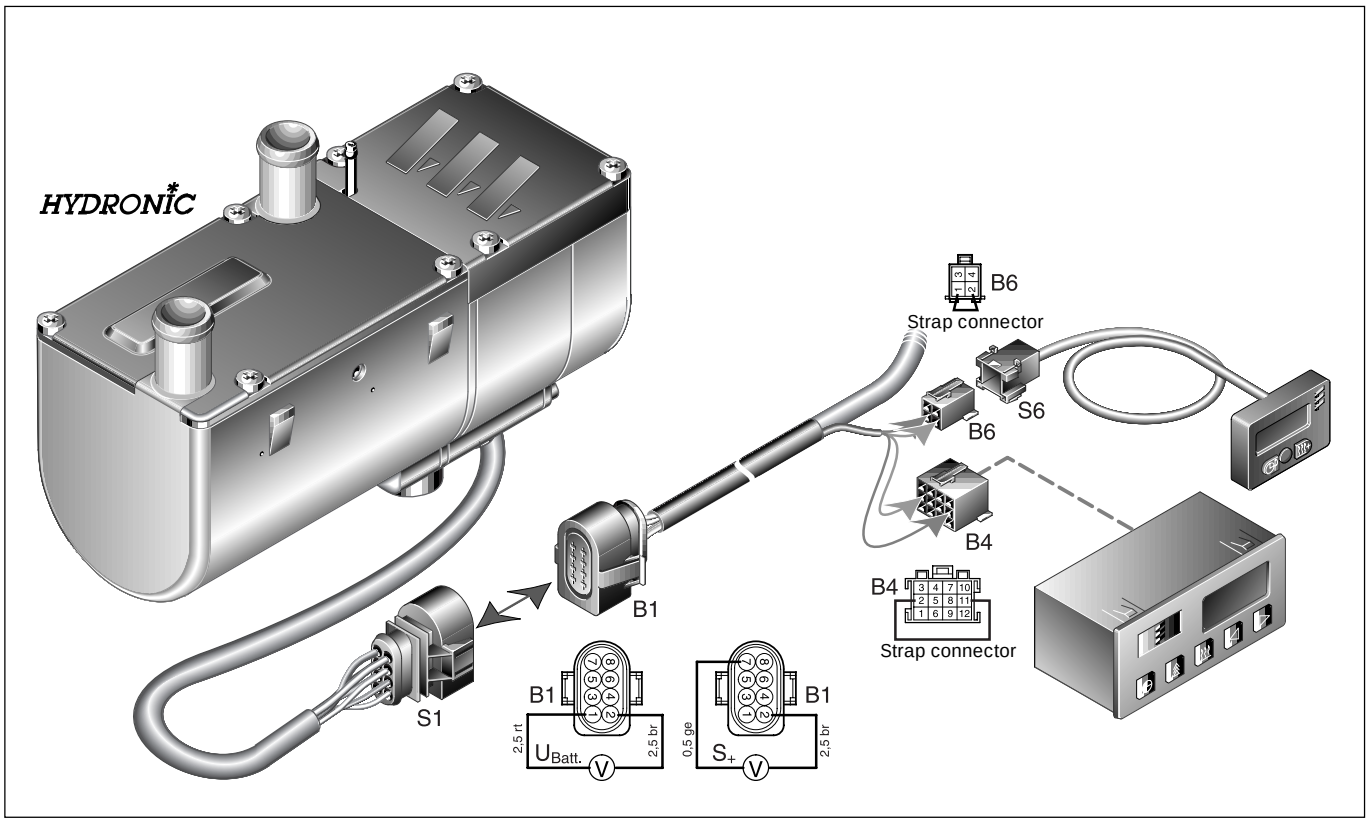
First check for the following if faults occur

- Check the fuel level.
- Mechanical damage of components.
- When making transition to winter operation: Is there still summer diesel in the fuel line?
- Check the exhaust and combustion air pipes.
- Check fuses.

- **Check voltage supply V_{bat} (terminal 30)**
  Disconnect the 8-pin plug S1/B1 and measure the voltage applied to plug B1 between terminal jack 1 (red (rt) 2.5 mm² wire) and terminal jack 2 (brown (br) 2.5 mm² wire).
  In case of deviation of the battery voltage, check the fuses, supply leads, GND connection and the positive terminal on the battery for voltage drop (corrosion, open circuit).

- **Check switch-on signal (S+)**
  Disconnect the 8-pin plug S1/B1 and then press the key on the operating element. Measure the voltage applied to plug B1 between terminal jack 7 (yellow (ge) 0.5 mm² wire) and terminal jack 2 (brown (br) 2.5 mm² wire).
  If no voltage is applied, check the supply lead (yellow (ge) 0.5 mm² wire), the 5A fuse (item 2.7.1 in wiring diagram on pp. 24 and 25) and the operating element.

- **Check operating element (timer module/"Mini" timer)**
  Disconnect the plug from the operating element and bridge the red (rt) 0.5 mm² wire and the yellow (ge) 0.5 mm² wire.
  If no voltage is applied to plug B1 between terminal jack 7 (yellow (ge) 0.5 mm² wire) and terminal jack 2 (brown (br) 2.5 mm² wire), replace the operating element.



Please note!
To carry out additional troubleshooting, the timer module or the diagnostic unit with adapter cable is required to interrogate the fault memory in the control unit and, if need be, to cancel the control unit interlock.
See pages 8 and 9 for Cat. No. and operation.

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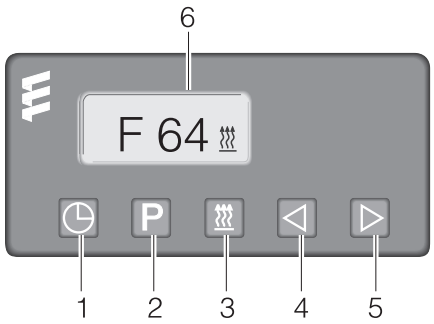
Fault diagnosis with timer module

Timer module display (D) Cat. No. 22 1000 30 34 00
Timer module display (GB) Cat. No. 22 1000 30 36 00

If the control unit detects a fault when the *HYDRONIC* is switched on or while the *HYDRONIC* is in operation, the timer module indicates this using an error code comprising the letter F and as a 2-figure number within 15 sec.

Readout on display, e.g. **F64** (current fault)
+ flashing heating symbol

Fault codes, fault descriptions, remarks/remedial action are described on pages 10 to 14.



1 Time
2 Preselect
3 Heat
4 Back
5 Forward
6 Display

Interrogating the fault memory in the control unit using the timer module

The electronic control unit can store up to 5 faults which can be read out and displayed with the timer module.
The current fault is always written to memory location F1.
Preceding faults are transferred to memory locations F2 — F5.
The content of memory location F5 is overwritten if necessary.

Interrogating the fault memory

Condition: The *HYDRONIC* is switched off.

Press the [heating] — the heater is switched on — then press the [clock], hold it down and then press the [P] key within 2 seconds. The heating symbol flashes and the current error is indicated.

The errors stored in memory locations F1 to F5 can be called up using the [◁] and [▷] keys.

Fault codes, fault descriptions, remarks/remedial action are described on pages 10 to 14.

Please note!

Not only a faulty component but also a faulty current path leads to a fault message being displayed.

See page 14 for faults which the diagnostic system does not indicate.

If the heater is not operated in combination with the timer module, fault diagnosis can be performed using the diagnostic unit (see page 9).

Reasons for interlocking of control unit

- Overheat
  If the *HYDRONIC* overheats 10 times in succession — fault 012 — fault message F15 is displayed, i.e. the control unit is interlocked.
- Too many failed starts
  If the *HYDRONIC* performs 10 unsuccessful attempts in succession — fault 050 — fault message F50 is displayed, i.e. the control unit is interlocked.

Cancelling the control unit interlock by erasing the fault memory

Condition: The electrical connection between the 12-pin plug (terminal jack 10 of the timer module) and terminal 15 (ignition) is in place.

Press key [heating] — the current fault (F15 or F50) is displayed — then press
the [clock] key, hold it down and press the [P] key within 2 seconds.
The timer module is now in the “Interrogate fault memory” program.
Now, proceed as follows:
Turn off the ignition (terminal 15).
Press keys [clock] and [P] simultaneously and hold them down, turn on the ignition (terminal 15) and wait until the following message appears on the display.

Message displayed after turning ignition “ON”

Display flashing, heating symbol not flashing

The control unit interlock is cancelled after 3 seconds, after which the heater starts up.

Message displayed after heater has started

Display flashing
heating symbol not flashing

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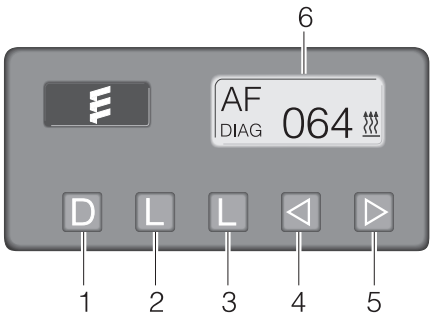
Fault diagnosis using the diagnostic unit

Diagnostic unit Cat. No. 22 1512 89 00 00

Please note!
An adapter cable — Cat. No. 22 1000 30 71 00 — is required to connect the diagnostic unit to the wiring harness of the *HYDRONIC*.



1 Diagnosis — call up fault code
2 Erase stored fault
3 Erase stored fault
4 Back, faults F5 — F1
5 Forward, faults F1 — F5
6 Display

Connecting the diagnostic unit

Lay the wiring from the diagnostic unit to the wiring harness as shown in the diagram and connect.
Connect the 8-pin plug to the diagnostic unit and switch on the *HYDRONIC* with the operating device.

Interrogating the fault memory with the diagnostic unit

The electronic control unit can store up to 5 faults which can be read out and displayed with the diagnostic unit.
The current fault is always indicated as "AF" written to memory location F1.
Preceding faults are transferred to memory locations F2 — F5.
The content of memory location F5 is overwritten if necessary.

Interrogating the fault memory

Press key [D], and the fault will be displayed:
AF = Current fault
3-figure number = Fault code

Fault codes, fault descriptions, remarks/remedial action are described on pages 10 to 14.

Reasons for interlocking of control unit

- Overheat
  If the *HYDRONIC* overheats 10 times in succession — fault 012 — fault message AF 015 is displayed, i.e. the control unit is interlocked.
- Too many failed starts
  If the *HYDRONIC* performs 10 unsuccessful attempts in succession — fault 050 — fault message AF 050 is displayed, i.e. the control unit is interlocked.

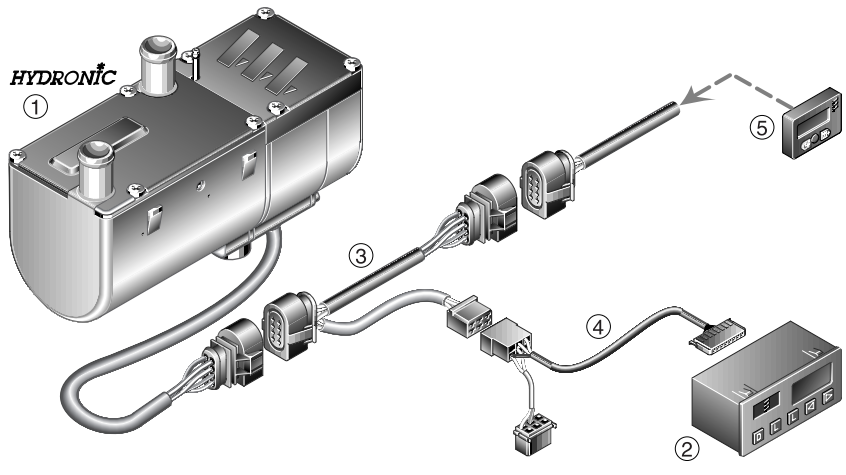
Cancelling the control unit interlock by erasing the fault memory

After eliminating the cause of the fault, press the two keys [L] simultaneously for at least 2 seconds.
The control unit interlock is now released and stored faults F1 to F5 are erased.
Switch the *HYDRONIC* off and on again.

Please note!

Not only a faulty component but also a faulty current path leads to a fault message being displayed.

See page 14 for faults which the diagnostic system does not indicate.



1 *HYDRONIC*
2 Diagnostic unit
3 Adapter cable
4 Cable harness — diagnostic unit
5 Mini timer

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Fault code Fault description	Remarks • Remedial action
010 Overvoltage cut-out	Overvoltage is continuously applied to control unit for at least 20 seconds à *HYDRONIC* is not operational • Disconnect connector B1/S1, start the vehicle engine and measure the voltage applied to plug B1 between terminal jack 1 (red (rt) 2.5 mm² wire) and terminal jack 2 (brown (br) 2.5 mm² wire). If the voltage is > 15 Volts or > 28 Volts, check the alternator controller or the battery.
011 Undervoltage cut-out	Undervoltage is continuously applied to control unit for at least 20 seconds —> *HYDRONIC* is not operational • Disconnect connector B1/S1, switch off the vehicle engine, and measure the voltage applied to plug B1 between terminal jack 1 (red (rt) 2.5 mm² wire) and terminal jack 2 (brown (br) 2.5 mm² wire). If the voltage is < 10 Volts or < 20 Volts, check the fuses, the supply leads, the GND connections and the positive terminal on the battery for voltage drop (corrosion). • Is sufficient voltage present during the engine start-up procedure?
012 Overheat (software threshold value)	Temperature at overheat sensor >125°C • Check water circulation system: - check all hose connections for leaks - is a restrictor fitted in the water circulation system? - was attention paid to the correct direction of flow during installation of thermostat and check valve? - has the water circulation system been bled carefully? - check water pump for function • Check temperature sensor and overheat sensor and replace if necessary. See page 22 for reference values.
014 Possible overheat detected (difference evaluation) **Please note!** The *HYDRONIC* with date of manufacture up to 12.97 has the following values: Difference between temperature values of overheat sensor and temperature sensor > 15K. Water temperature at overheat sensor min. 70°C	Difference between temperature values of overheat sensor and temperature sensor > 25K. The prerequisite for this fault code being indicated is that the *HYDRONIC* is in operation and that the water temperature at the overheat sensor is at least 80°C. • Check water circulation system: - check all hose connections for leaks - is a restrictor fitted in the water circulation system? - was attention paid to the correct direction of flow during installation of thermostat and check valve? - has the water circulation system been bled carefully? - check water pump for function • Check temperature sensor and overheat sensor and replace if necessary. See page 22 for reference values.
015 Equipment disabled — max. permissible number of 10 possible overheats exceeded	The control unit is interlocked. • Release the control unit interlock by erasing the fault memory with the timer module or the diagnostic unit (see pages 8 and 9). • Check the water circulation system: - check all hose connections for leaks - is a restrictor fitted in the water circulation system? - was attention paid to the correct direction of flow during installation of thermostat and check valve? - has the water circulation system been bled carefully? - check water pump for function

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Fault code Fault description	Remarks • Remedial action
017 Overheat detected — EMERGENCY STOP (hardware threshold value)	Temperature at overheat sensor >130°C • Check water circulation system: - check all hose connections for leaks - is a restrictor fitted in the water circulation system? - was attention paid to the correct direction of flow during installation of thermostat and check valve? - has the water circulation system been bled carefully? - check water pump for function • Check temperature sensor and overheat sensor and replace if necessary. See page 22 for reference values.
020 Glow plug interruption 021 Short-circuit, overload or ground fault at glow plug output **Important!** In the case of the *HYDRONIC* — 12 Volts, carry out functional check using max. 8 Volts. In the case of the *HYDRONIC* — 24 Volts, carry out functional check using max. 18 Volts. Exceeding the prescribed voltages will result in irreparable damage to the glow plug. **Pay attention to the short-circuit-proofing of the power supply unit.**	• Carry out a functional check on the glow plug as fitted. For this purpose, unclip the 1.5² white (ws) wire from terminal jack 9 and the 1.5² brown (br) wire out of terminal jack 12 of the 14-pin plug. Apply a voltage of 8 Volts or 18 Volts ±0.1 Volts to the glow plug and measure the current intensity after 25 seconds. The glow plug is OK if the following values are measured. If this is not the case, replace the glow plug. 8 Volt glow plug — current intensity = 8.5A $^{+1A}_{-1,5A}$ 18 Volt glow plug — current intensity = 4.5A ± 1.5A • If the glow plug is OK, check the cable harness from the glow plug for damage and continuity. • If fault code 021 is displayed, also check glow plug for assembly of the connection piece and the corrugated washer. Check cable harness for short circuit.
030 Speed of combustion air blower motor outside permissible range **Important!** In the case of the *HYDRONIC* — 12 Volts, carry out functional check using max. 8.2 Volts + 0.2 Volts. In the case of the *HYDRONIC* — 24 Volts, carry out functional check using max. 15 Volts + 0.2 Volts. Check the positive/negative lines for proper connection. **Pay attention to the short-circuit-proofing of the power supply unit.**	Blower wheel or combustion air blower motor blocked (frozen up, soiled, sluggish, cable harness rubbing against end of shaft, etc.) • Clear blockage • Measure speed of combustion air blower motor using max. 8.2 Volts + 0.2 Volts or 15 Volts + 0.2 Volts. For this purpose, unclip the 0.75² brown (br) wire from terminal jack 14 and the 0.75² black (bk) wire out of terminal jack 13 of the 14-pin plug. Attach a marking on the end of the combustion air blower motor shaft and measure the speed with a contactless tachometer (see page 21). If measured speed < 10,000 rpm, replace the combustion air blower. If measured speed > 10,000 rpm, replace the control unit.
031 Open circuit in combustion air blower motor **Important!** In the case of the *HYDRONIC* — 12 Volts, carry out functional check using max. 8.2 Volts + 0.2 Volts. In the case of the *HYDRONIC* — 24 Volts, carry out functional check using max. 15 Volts + 0.2 Volts. Check the positive/negative lines for proper connection. **Pay attention to the short-circuit-proofing of the power supply unit.**	• Check to see if the combustion air blower motor wiring is laid properly or damaged. • Measure speed of combustion air blower motor using max. 8.2 Volts + 0.2 Volts or 15 Volts + 0.2 Volts. For this purpose, unclip the 0.75² brown (br) wire from terminal jack 14 and the 0.75² black (bk) wire out of terminal jack 13 of the 14-pin plug. Attach a marking on the end of the combustion air blower motor shaft and measure the speed with a contactless tachometer (see page 21). If measured speed < 10,000 rpm, replace the combustion air blower. If measured speed > 10,000 rpm, replace the control unit.

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Fault code Fault description	Remarks • Remedial action
032 Short circuit, overload or ground fault of combustion air blower motor **Important!** In the case of the *HYDRONIC* — 12 Volts, carry out functional check using max. 8.2 Volts + 0.2 Volts. In the case of the *HYDRONIC* — 24 Volts, carry out functional check using max. 15 Volts + 0.2 Volts. Check the positive/negative lines for proper connection. **Pay attention to the short-circuit-proofing of the power supply unit.**	Blower wheel or combustion air blower motor blocked (frozen up, soiled, sluggish, cable harness rubbing against end of shaft, etc.) • Clear blockage • Before proceeding with the functional check on the combustion air blower motor, perform a resistance measurement. If measured resistance is < 2 kΩ, then a ground fault has occurred — replace the combustion air blower. If measured resistance is > 2 kΩ, then a ground fault can be ruled out — measure the speed of the combustion air blower. • Measure speed of combustion air blower motor using max. 8.2 Volts + 0.2 Volts or 15 Volts + 0.2 Volts. For this purpose, unclip the 0.75² brown (br) wire from terminal jack 14 and the 0.75² black (bk) wire out of terminal jack 13 of the 14-pin plug. Attach a marking on the end of the combustion air blower motor shaft and measure the speed with a contactless tachometer (see page 21). If measured speed < 10,000 rpm, replace the combustion air blower. If measured speed > 10,000 rpm, replace the control unit.
038 Open circuit in vehicle blower relay control	• Check electrical lead routed to relay Rectify open circuit. Replace relay if necessary.
039 Short circuit, overload or ground fault in vehicle blower relay control	• Disconnect relay. If fault code 038 is displayed, then the relay is defective — replace relay.
041 Open circuit in water pump	• Check supply lead to water pump for continuity. For this purpose, unclip the 0.5² brown (br) wire from terminal jack 10 and the 0.5² violet (vi) wire out of terminal jack 11 of the 14-pin plug. Rectify open circuit. Replace relay if necessary.
042 Short circuit, overload or ground fault in water pump	• Disconnect connector in the “water pump” line. If fault code 041 is displayed, then the water pump is defective — replace water pump.
047 Short circuit, overload or ground fault in metering pump	• Disconnect connector in the “metering pump” line. If fault code 048 is displayed, then the metering pump is defective — replace metering pump.
048 Open circuit in metering pump	• Check cable harness of metering pump for continuity. Clear open circuit. Replace metering pump if necessary.
050 Equipment has been disabled due to too many failed starts (10 start attempts plus repeat start-up for each start attempt)	Max. permissible number of safety time counters exceeded; the control unit is interlocked. • Release the control unit interlock by erasing the fault memory with the timer module or diagnostic unit. • Check fuel quantity and fuel supply (see page 26).
051 Time overshoot — cold air blowing	At start-up, the flame sensor indicates a temperature of >70°C for longer than 240 sec. • Check exhaust gas and combustion air piping. • Check flame sensor — see page 20 for reference values.

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Fault code Fault description	Remarks • Remedial action
052 Safety time exceeded	The max. permissible number of start attempts has been used up. • Check exhaust gas and combustion air piping. • Check the fuel quantity and fuel supply (see page 26). • In the case of the *HYDRONIC* B 5 W S, clean, and if necessary replace, the strainer in the connection.
053 Flame loss in "High" setting 056 Flame loss in "LOW" setting	**Attention!** In the event of flame loss in the "High" or "Low" settings and if start attempts are still permitted, the *HYDRONIC* performs a restart followed by repeat start-up if necessary. If the restart of repeat start-up was successful, the indicated fault code is cleared. **Fault** (because a new start attempt is no longer permissible) • Check exhaust gas and combustion air piping. • Check the fuel quantity and fuel supply (see page 26). • Check flame sensor — see fault codes 064 and 065.
060 Open circuit in temperature sensor **Please note!** The test can only be performed with a jumper strap fitted in the 14-pin plug if the *HYDRONIC* is still installed in the vehicle or if a test bench is available.	• Remove the control unit and check the connecting cable of the temperature sensor from damage. If the cable harness is OK, then short the temperature sensor — route wire in 14-pin plug from terminal jack 3 to terminal jack 4. Switch on the *HYDRONIC*. - if fault code 061 is displayed, remove and check the temperature sensor (see page 22). - if fault code 060 is displayed, check the control unit and replace if necessary.
061 Short circuit, overload or ground fault in temperature sensor **Please note!** The test can only be performed with a jumper strap fitted in the 14-pin plug if the *HYDRONIC* is still installed in the vehicle or if a test bench is available.	• Remove the control unit and check the connecting cable of the temperature sensor from damage. If the cable harness is OK, then disconnect the 14-pin plug from the control unit and unclip the 0.5 mm² blue (bl) wire from terminal jack 3 and the 0.5 mm² blue (bl) wire from terminal jack 4. Plug the 14-pin plug into the control unit and switch on the *HYDRONIC* - if fault code 060 is displayed, remove and check the temperature sensor (see page 22). - if fault code 061 is displayed, check the control unit and replace if necessary.
064 Open circuit in flame sensor **Please note!** The test can only be performed with a jumper strap fitted in the 14-pin plug if the *HYDRONIC* is still installed in the vehicle or if a test bench is available.	• Remove the control unit and check the connecting cable of the flame sensor from damage. If the cable harness is OK, then short the flame sensor — route wire in 14-pin plug from terminal jack 1 to terminal jack 2. Switch on the *HYDRONIC* - if fault code 065 is displayed, remove and check the flame sensor (see page 20). - if fault code 064 is displayed, check the control unit and replace if necessary.

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Fault code Fault description	Remarks • Remedial action
065 Short circuit, overload or ground fault in flame sensor **Please note!** The test can only be performed if the *HYDRONIC* is still installed in the vehicle or if a test bench is available.	• Remove the control unit and check the connecting cable of the flame sensor from damage. If the cable harness is OK, then disconnect the 14-pin plug from the control unit and unclip the 0.5 mm² blue (bl) wire from terminal jack 1 and the 0.5 mm² brown (br) wire from terminal jack 2. Plug the 14-pin plug into the control unit and switch on the *HYDRONIC* - if fault code 064 is displayed, remove and check the flame sensor (see page 20). - if fault code 065 is displayed, check the control unit and replace if necessary.
071 Open circuit in overheat sensor **Please note!** The test can only be performed if the *HYDRONIC* is still installed in the vehicle or if a test bench is available.	• Remove the control unit and check the connecting cable of the overheat sensor from damage. If the cable harness is OK, then short the overheat sensor — route wire in 14-pin plug from terminal jack 5 to terminal jack 6. Switch on the *HYDRONIC*. - if fault code 072 is displayed, remove and check the overheat sensor (see page 22). - if fault code 071 is displayed, check the control unit and replace if necessary.
072 Short circuit, overload or ground fault in overheat sensor **Please note!** The test can only be performed if the *HYDRONIC* is still installed in the vehicle or if a test bench is available.	• Remove the control unit and check the connecting cable of the overheat sensor from damage. If the cable harness is OK, then disconnect the 14-pin plug from the control unit and unclip the 0.5 mm² red (rt) wire from terminal jack 5 and the 0.5 mm² red (rt) wire from terminal jack 6. Plug the 14-pin plug into the control unit and switch on the *HYDRONIC* - if fault code 071 is displayed, remove and check the overheat sensor (see page 22). - if fault code 072 is displayed, check the control unit and replace if necessary.
090 / 092 — 103 Control unit defective	Replace control unit
091 External interference voltage	Fault in control unit caused by interference voltages radiating from vehicle electrical system. Possible causes: Poor-quality battery, chargers, other sources of interference —> Eliminate interference voltages.

Faults which the diagnostic system does not indicate

Fault description	Remarks • Remedial action
HYDRONIC does not start	The water pump and the vehicle blower start as soon as the *HYDRONIC* is switched on. • Remove temperature sensor and check (see page 22). The vehicle blower starts after the *HYDRONIC* is switched on — "stationary ventilation" function is activated. • Set "stationary ventilation" switch to "OFF" position.

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Repair Instructions Page

Assembly drawing B 5 W S 16

Assembly drawing D 5 W S 17

Removing control unit
Checking control unit 18

Removing glow plug of *HYDRONIC* D 5 W S
Removing cable harness of glow plug 18

Removing glow plug of *HYDRONIC* B 5 W S
Removing cable harness of glow plug 19

Removing strainer and connection of
HYDRONIC B 5 W S 19

Page

Removing and checking flame sensor 20

Measuring speed of combustion air blower motor 21

Removing combustion air blower 21

Removing combustion chamber 21

Removing and checking overheat sensor and
temperature sensor 22

Removing / installing heat exchanger 23

Please note the following during installation!

Carefully check all seals and O-rings. Renew if necessary.

All parts must be cleaned and checked for damage prior to assembly. Renew if necessary.

Note:
The Repair Instructions describe how to repair the *HYDRONIC* in the dismantled state.

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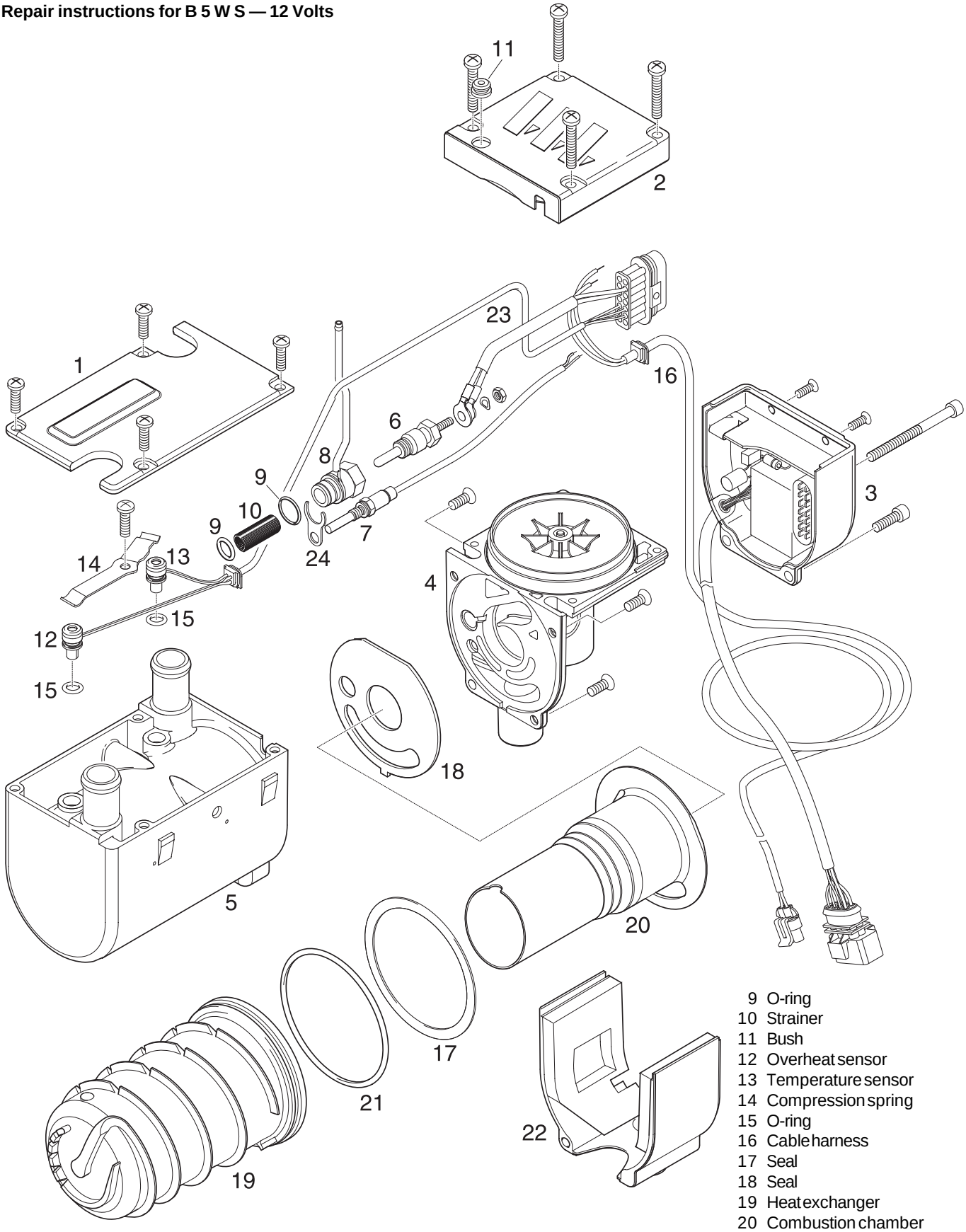
Repair instructions for B 5 W S — 12 Volts



1 Cover — jacket
2 Cover — combustion air blower
3 Control unit
4 Combustion air blower
5 Water cooling jacket
6 Glow plug
7 Flame sensor
8 Connection
9 O-ring
10 Strainer
11 Bush
12 Overheat sensor
13 Temperature sensor
14 Compression spring
15 O-ring
16 Cable harness
17 Seal
18 Seal
19 Heat exchanger
20 Combustion chamber
21 O-ring
22 Engine cover
23 Cable harness — glow plug
24 Support

Sketch 1

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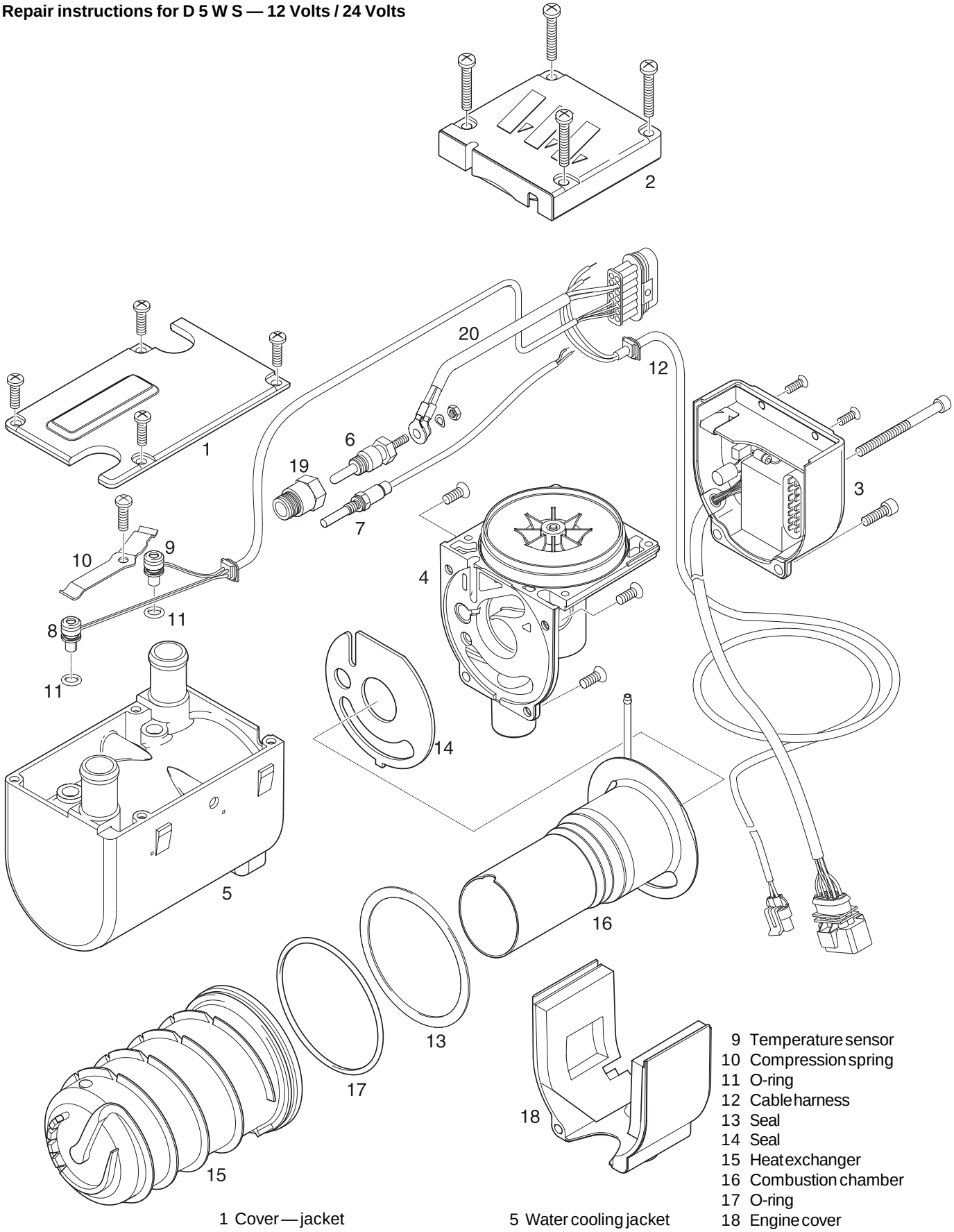
Repair instructions for D 5 W S — 12 Volts / 24 Volts



1 Cover — jacket
2 Cover — combustion air blower
3 Control unit
4 Combustion air blower
5 Water cooling jacket
6 Glow plug
7 Flame sensor
8 Overheat sensor
9 Temperature sensor
10 Compression spring
11 O-ring
12 Cable harness
13 Seal
14 Seal
15 Heat exchanger
16 Combustion chamber
17 O-ring
18 Engine cover
19 Adapter piece (for 24 Volts version only)
20 Cable harness — glow plug

Sketch 2

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Removing control unit (see Fig. 1)

Detach the 4 fastening screws from the blower cover and then remove the 4 fastening screws from the control unit.
Lift up the control unit and detach the engine cover, taking care to avoid damaging the lining.
Remove the control unit and disconnect the 14-pin plug.

For assembly, first of all connect the 14-pin plug to the control unit.
Attach the engine cover to the combustion air blower, taking care to avoid damaging the lining.
Insert the bush of the "water pump" cable harness into the cut-out in the combustion air blower. Lay all electrical leads between the electric motor and housing and then insert the control unit into the guide slot of the combustion air blower.
Insert and tighten the fastening bolts of the blower cover and control unit.

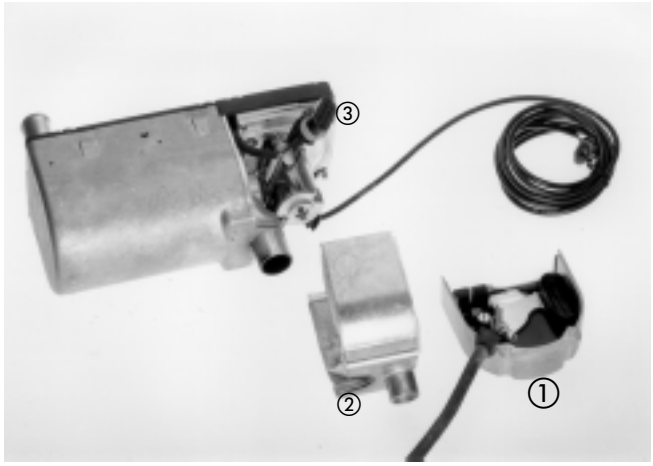

Fig. 1

① Control unit
② Engine cover with lining
③ 14-pin plug

Checking control unit

A basic tester and a control unit adapter are required for checking the control unit. The control unit adapter makes the electrical connection between the control unit and the basic tester.

The basic tester is connected to the PC, and the control unit can be tested by means of an installed test program.

Cat. No. — Basic tester	22 1508 89 00 00
Cat. No. — Control unit adapter	22 1521 89 00 00

Removing the glow plug from the *HYDRONIC* D 5 W S (see Fig. 2)

• Remove control unit
Unscrew the M4 nut from the glow plug and remove the cable harness.
Unscrew the glow plug from the housing.

Please note!
In the case of the *HYDRONIC* D 5 W S — 24 Volts, unscrew the adapter piece from the glow plug and fit onto the new glow plug.

Removing cable harness of glow plug
Using a release tool made by AMP (Cat. No. 726519), unclip the 1.5^2 white (ws) wire from terminal jack 9 and the 1.5^2 brown (br) wire from terminal jack 12 of the 14-pin plug.
For installation, lay the cable harness between the electric motor and housing.

① Glow plug
② Adapter piece for glow plug
(for *HYDRONIC* D 5 W S — 24 Volts only)
③ Glow plug — insert here

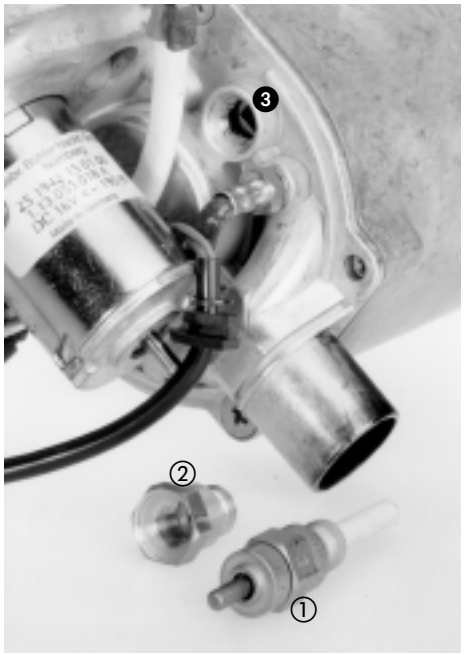

Fig. 2

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Removing glow plug of *HYDRONIC* B 5 W S (see Fig. 3)

• Remove control unit
Unscrew the M4 nut from the glow plug and remove the cable harness.
Unscrew the glow plug from the connection.

Removing cable harness of glow plug
Using a release tool made by AMP (Cat. No. 726519), unclip the 1.5² white (ws) wire from terminal jack 9 and the 1.5² brown (br) wire from terminal jack 12 of the 14-pin plug.
For installation, lay the cable harness between the electric motor and housing.

① Glow plug
② Glow plug — insert here
③ Flame sensor -with support

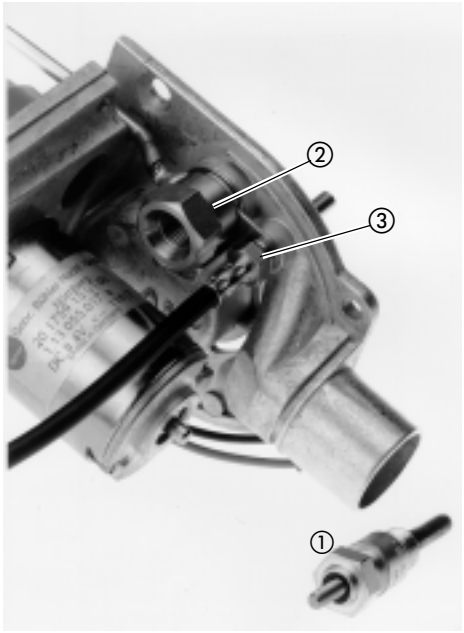


Fig. 3

Removing strainer and connection from *HYDRONIC* B 5 W S (see Fig. 4 and sketch 3)

Removing strainer
• Remove control unit
• Take out combustion air blower
• Remove glow plug
Remove O-ring and pull the strainer out of the connection using round nose pliers.
Check strainer and O-ring. Renew if necessary.

Removing connection
• Remove flame sensor together with the support.
Press the connection out of the housing and then swivel the fuel pipe outwards.
Clean the connection and check the O-ring. Renew if necessary.

Fitting connection and strainer
Insert connection into locating hole.
Swivel the fuel pipe into the initial position and then press the connection into the locating hole.
Insert the support into the slot, and then feed the flame sensor through the hole in the support and insert it into the tapped hole in the housing and screw securely.
Press the strainer into the connection until fully home.
Fit the O-ring on the strainer and insert it into the housing.

Please note!
The welding spots of the strainer must face downwards.
Carefully check the O-rings prior to installation. Renew if necessary.

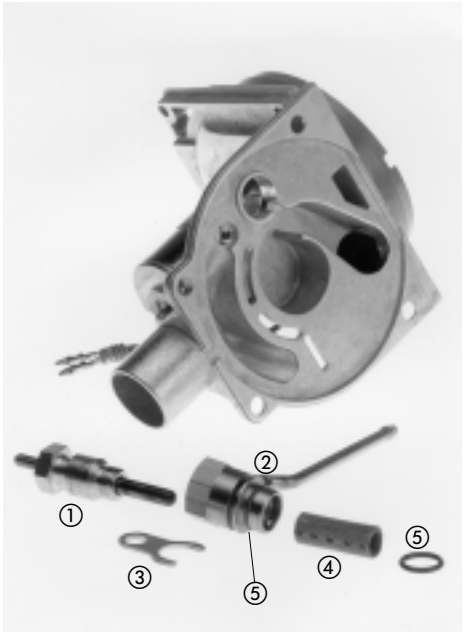
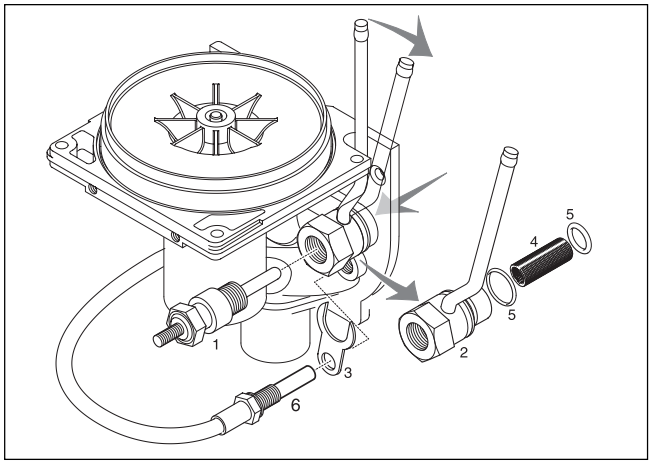


Fig. 4



Sketch 3

① Glow plug
② Connection
③ Support
④ Strainer
⑤ O-ring
⑥ Flame sensor

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Removing flame sensor (see Fig. 5)

• Remove control unit
Using a release tool made by AMP (Cat. No. 726534-1), unclip the 1.5² blue (bl) wire from terminal jack 1 and the 0.5² brown (br) wire from terminal jack 2 of the 14-pin plug.
Unscrew flame sensor from housing.
Check flame sensor. Replace if necessary.
For installation, lay the cable harness of the flame sensor between the electric motor and housing.

① Flame sensor
② Flame sensor — insert here

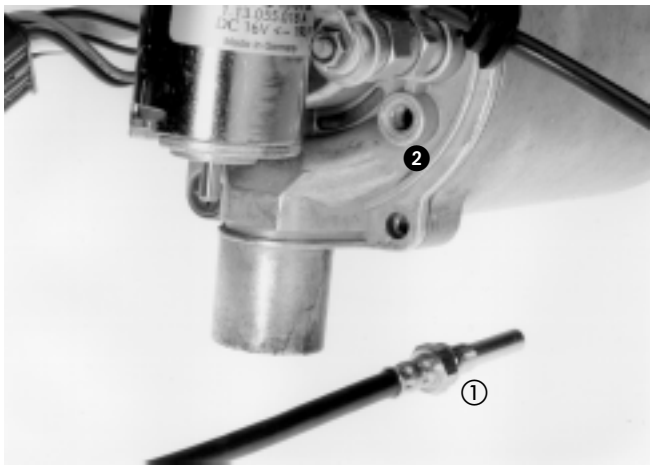
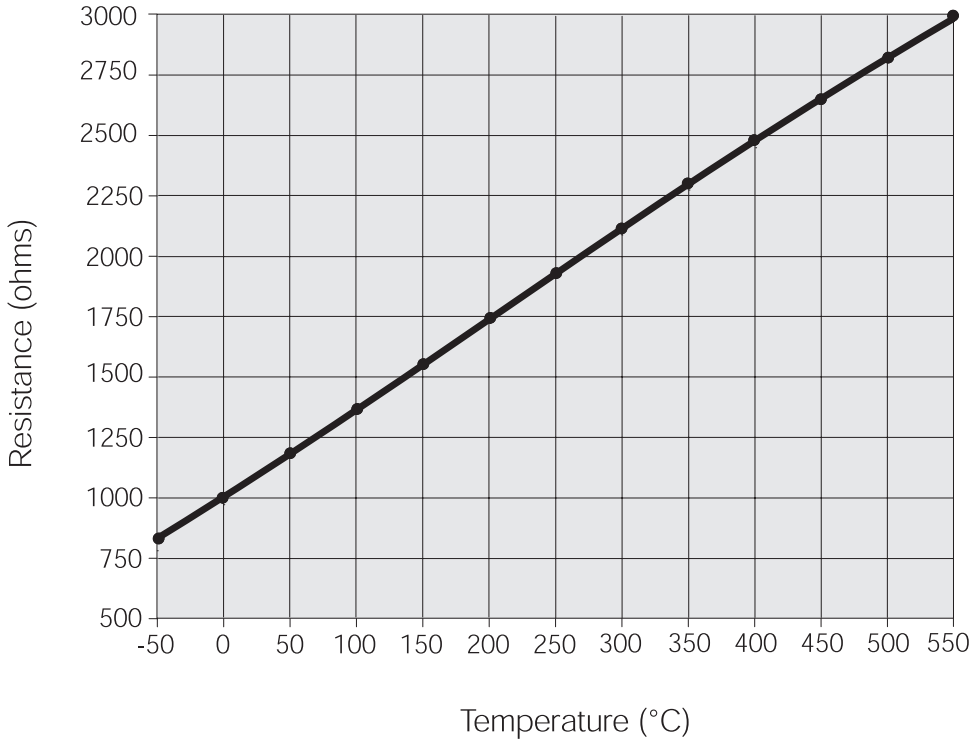


Fig. 5

Checking the flame sensor (see sketch 4)

Check the flame sensor using the Digital Multimeter. If the resistance value of the flame sensor lies **outside** the table of values or the diagram, then replace the flame sensor.



Sketch 4

Table of values

Temp. [°C]	-50	0	10	20	30	50	80	90	100	130	150	200	250	300	350	400
R [Ω]	803	1000	1022	1062	1097	1194	1309	1347	1385	1498	1573	1758	1941	2120	2297	2470
Vref [V]	1,407	1,639	1,661	1,719	1,738	1,840	1,948	1,983	2,016	2,111	2,171	2,308	2,432	2,542	2,642	2,732

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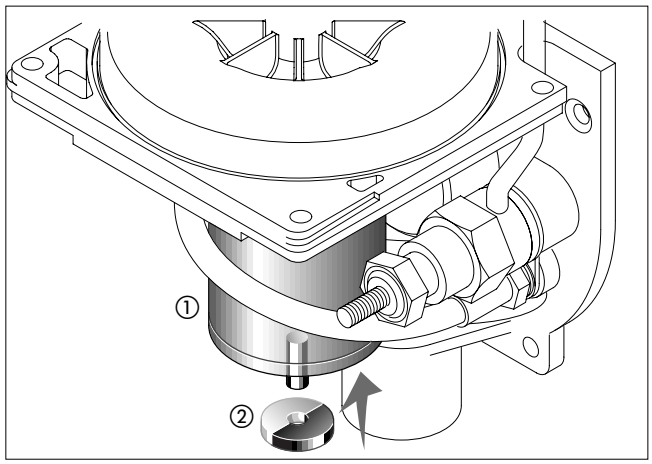
Measuring speed of combustion air blower motor
(see sketch 5)

Measure speed of combustion air blower motor using max. 8.2 Volts + 0.2 Volts or 15 Volts + 0.2 Volts. For this purpose, unclip the 0.75² brown (br) wire from terminal jack 14 and the 0.75² black (bk) wire out of terminal jack 13 of the 14-pin plug. Attach a marking on the end of the combustion air blower motor shaft (for instance a black-and-white disk) and measure the speed with a contactless tachometer.
If measured speed < 10,000 rpm, replace the combustion air blower.
If measured speed > 10,000 rpm, replace the control unit.



Sketch 5

① Electric motor
② Black-and-white plastic disk

Removing the combustion air blower (see Fig. 6)

- Remove control unit
- Remove flame sensor
- Remove glow plug

Using a release tool made by AMP (Cat. No. 726534-1), unclip the 0.75² brown (br) wire from terminal jack 14 and the 0.75² black (bk) wire from terminal jack 13 of the 14-pin plug.
Slacken the 4 fastening bolts in the blower cover and detach the blower cover.
Unscrew the 3 fastening bolts and detach the combustion air blower.

Please note!
Before proceeding with assembly work, carefully check the seal between the combustion air blower and the combustion chamber. Renew if necessary.

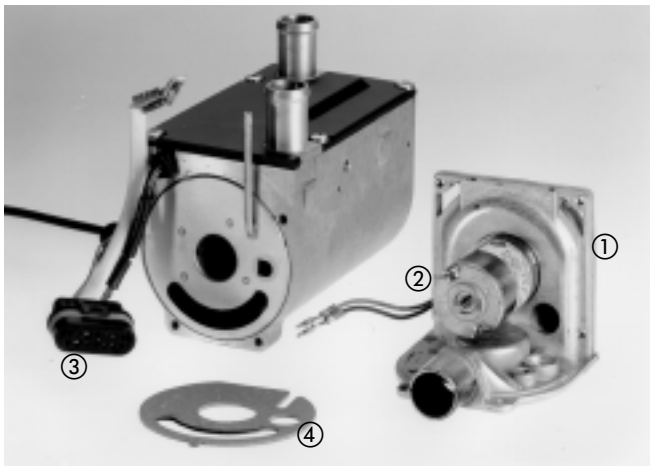


Fig. 6

① Combustion air blower
② Electric motor
③ 14-pin plug
④ Seal

Removing the combustion chamber (see Fig. 7)

- Remove control unit

Slacken the 3 fastening bolts in the combustion air blower.
Lay the combustion air blower aside (the cable harness of overheat sensor and temperature sensor must not be removed).
Remove the combustion chamber from the heat exchanger.

Please note!
Before proceeding with assembly work, carefully check the seals. Renew if necessary.

① Combustion chamber
② Jacket with heat exchanger
③ Combustion air blower
④ Seal — combustion air blower / combustion chamber
④ Seal — combustion chamber / heat exchanger

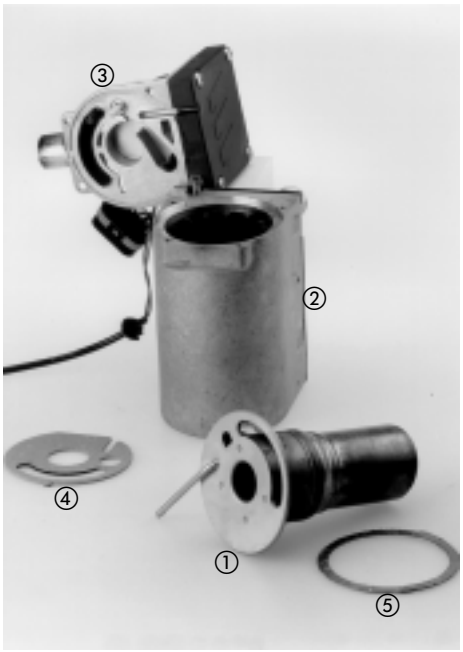


Fig. 7

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Removing the overheat sensor and temperature sensor
(see Fig. 8)

Remove control unit, blower cover and heat exchanger cover. Slacken the compression spring fastening bolt and detach the compression spring. Remove the overheat sensor and temperature sensor from the locating hole in the heat exchanger with flat nose pliers.
Using a release tool made by AMP (Cat. No. 726534-1), unclip the two wires of the temperature sensor (terminal jack 3 0.5² blue (bl) and terminal jack 4 0.5² blue (bl)) and the two cables of the overheat sensor (terminal jack 5 0.5² red (rt) and terminal jack 6 0.5² red (rt)) from the 14-pin plug.

① Overheat sensor
② Temperature sensor
③ Compression spring

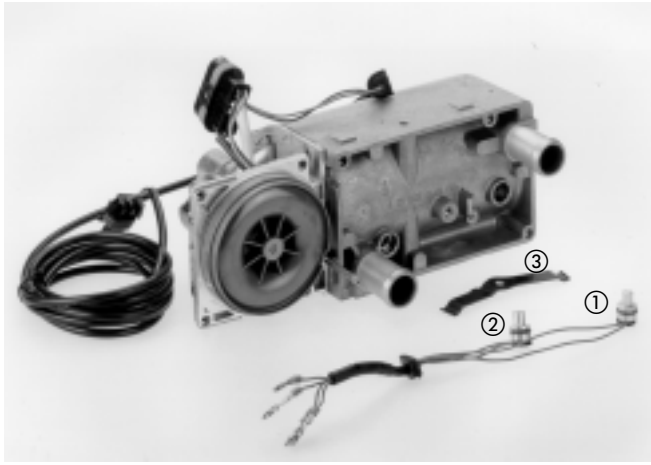
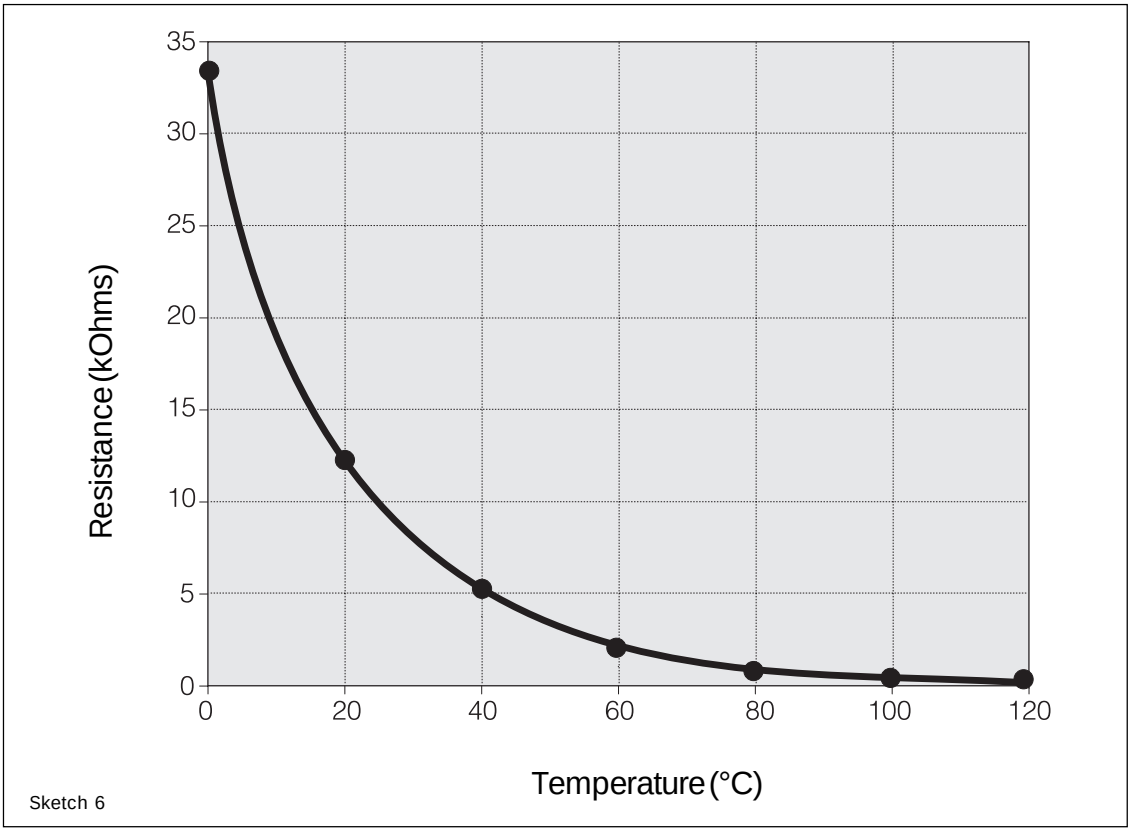


Fig. 8

Checking overheat sensor and temperature sensor
(see page 6)

Check the overheat sensor or temperature sensor using the Digital Multimeter. If the resistance value of the overheat sensor or the temperature sensor lies **outside** the table of values or the diagram, then replace the overheat sensor or temperature sensor.

Please note!
The overheat sensor, temperature sensor and cable harness form a module, which means that they are not available as component parts.
Before installation, coat the O-rings of the overheat sensor and temperature sensor with special-purpose grease, e.g. "Hellerine".



Sketch 6

Table of values

Temp. [°C]	0	10	20	30	40	50	60	70	80	90	100	110	120
R [kΩ]	32,54	19,87	12,48	8,06	5,33	3,60	2,48	1,75	1,25	0,91	0,67	0,50	0,38
Vref [V]	4,275	3,960	3,561	3,100	2,611	2,135	1,705	1,339	1,041	0,805	0,622	0,483	0,376

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Removing the heat exchanger (see Fig. 9)

- Remove control unit
- Remove combustion air blower
- Remove combustion chamber

Pull the overheat sensor and temperature sensor out of the locating hole in the heat exchanger with flat nose pliers.
Press the heat exchanger through the water connection (water inlet) and out of the jacket using a screwdriver.
Perform a visual inspection of the heat exchanger. Clean or renew the heat exchanger if necessary.

① Heat exchanger
② Jacket
③ O-ring
④ Water connection (water inlet)

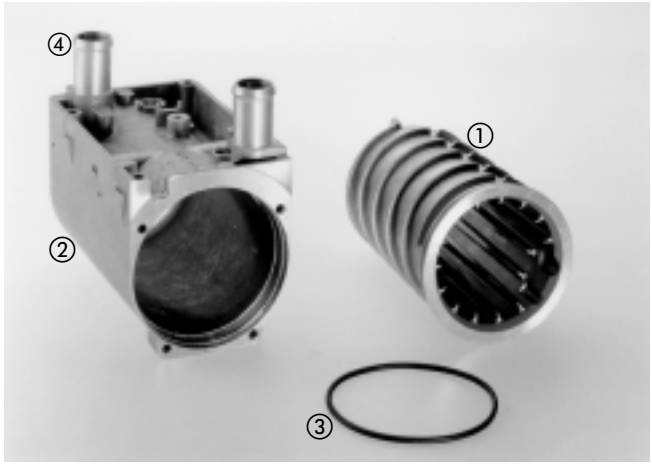

Fig. 9

Installing the heat exchanger (see Fig. 10)

Insert the heat exchanger into the jacket. The heat exchanger must be installed so that the slot in the heat exchanger base catches the detent of the jacket base. As a point of reference, the overheat sensor connection must match up with the locating hole in the jacket.

Please note!
Before proceeding with assembly work, carefully check the seals and the O-ring. Renew if necessary.
Check that the heat exchanger is properly seated in the jacket (the heat exchanger must be pressed firmly into the jacket).
Before installation, coat the O-rings with special-purpose grease, e.g. “Hellerine”.

① Heat exchanger
② Jacket
③ Detent
④ Slot in base of heat exchanger
⑤ Base of overheat sensor

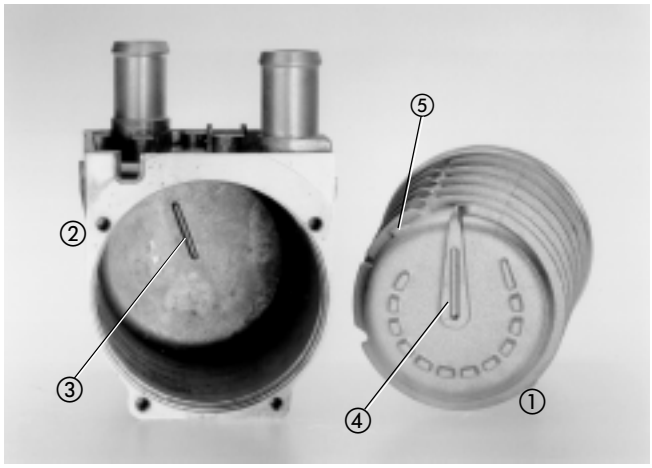

Fig. 10

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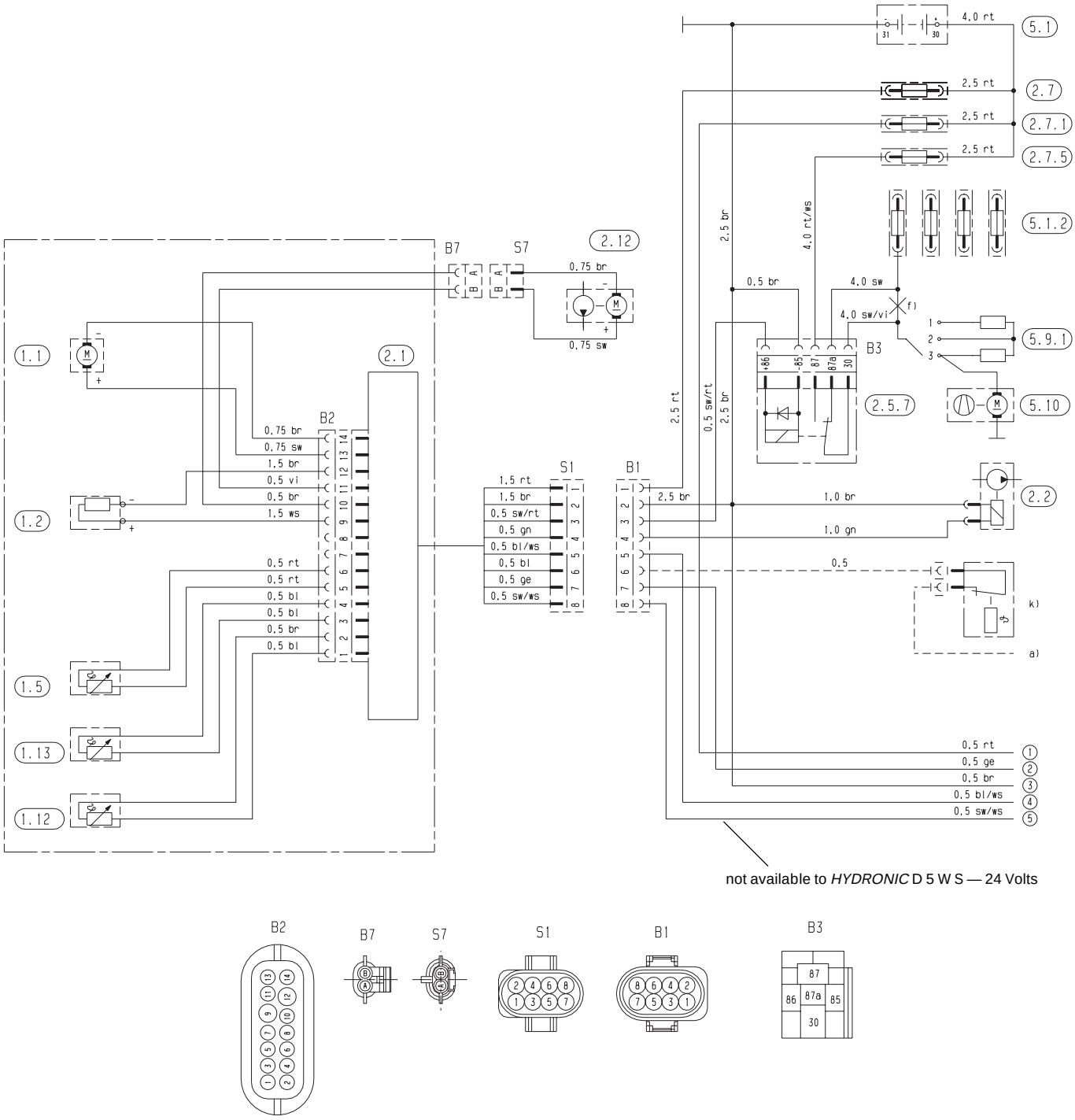
Wiring diagram
***HYDRONIC* B — 12 Volts and *HYDRONIC* — 12 Volts / 24 Volts**



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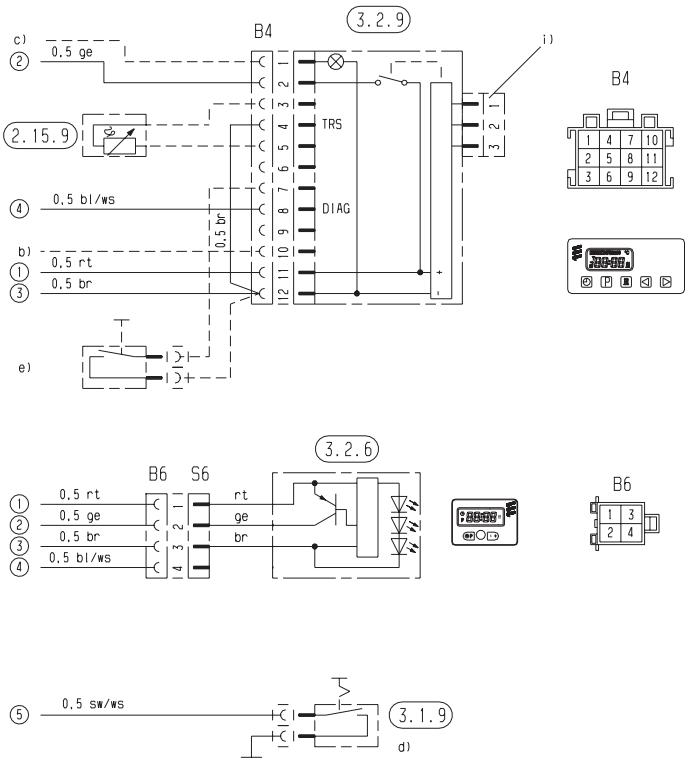

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Parts list

1.1 Burner motor
1.2 Glow plug
1.5 Overheat sensor
1.12 Flame sensor
1.13 Temperature sensor

2.1 Control unit
2.2 Metering pump
2.5.7 Relay, vehicle blower
2.7 Main fuse 20 A /12 V-15 A/24 V
2.7.1 Fuse, actuating element 5 A
2.7.5 Fuse, vehicle blower 25 A
2.12 Water pump
2.15.9 Sensor, outside temperature

3.1.9 Switch, stationary ventilation
3.2.6 Timer, “Mini” version
3.2.9 Timer, rectangular (modular timer)

5.1 Battery
5.1.2 Fuse holder in vehicle
5.9.1 Switch, vehicle blower
5.10 Vehicle blower

a) Connect to D+ for add-heat criterion (optional)
b) connect to +15
c) Lighting terminal “58”
d) Stationary ventilation (optional, see page 15)
e) External ON/OFF key (optional)
f) Cut open cable
i) Radio module connection
k) Switch (additional heating, e.g. <5°C)

Length plus + length minus:
from 3.5 m to 5.5 m ——> cross-section 4 mm²
from 5.5 m to 8.0 m ——> cross-section 6 mm²

Insulate unused cable ends.
The plug and socket housing are shown from the conductor entry side.

Rt = red
bl = blue
ws = white
sw = black
gn = green
gr = grey
ge = yellow
vi = violet

Please note!
In the case of vehicles equipped with heating or air conditioning system, please observe our vehicle-related Workshop Information on the blower control.
If the Workshop Information is unavailable, pay attention to the vehicle manufacturer’s instructions regarding connection or interface for blower control.

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Fuel quantity measurement

Preparations for measurement (see sketch 7)

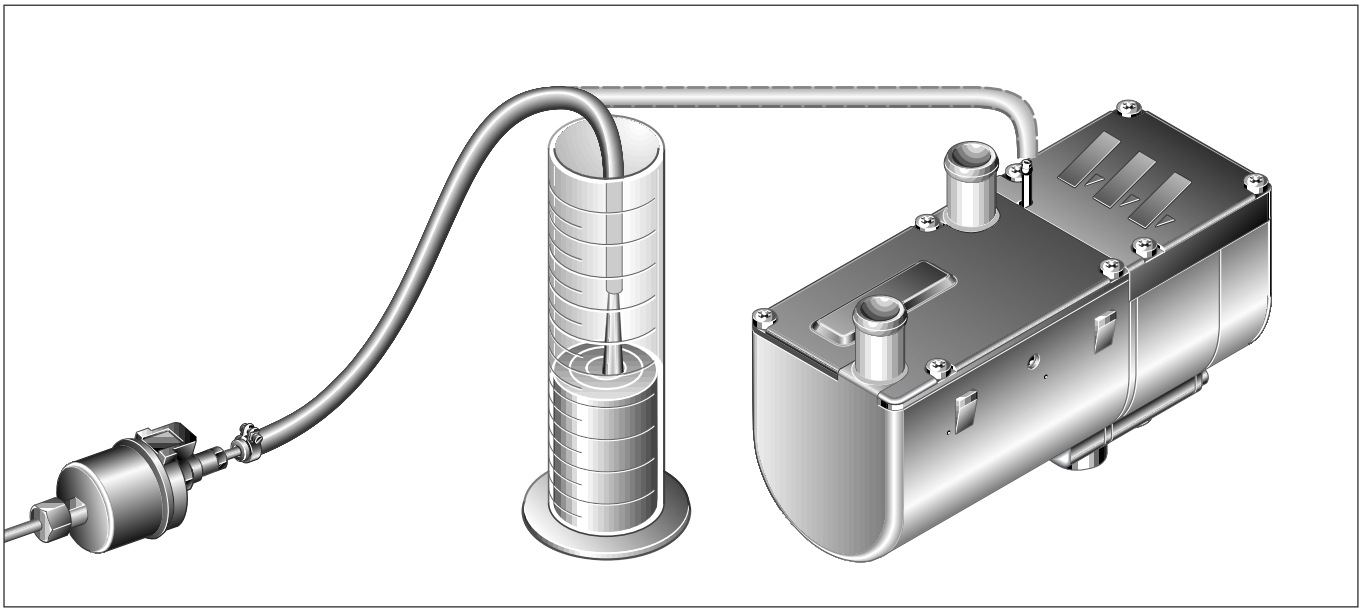
Detach the fuel line from the *HYDRONIC* and place it in a measuring glass (10 cc. capacity).
Switch on the *HYDRONIC*.
After about 45 seconds, the metering pump starts to pump fuel.
When the fuel is coming out smoothly and free of bubbles, the fuel line is filled and bled.
Switch off the heater and empty out the measuring glass.

Please note!

Only perform fuel quantity measurement if the battery is charged sufficiently!
During measurement, the voltage applied to the control unit must be at least 11 Volts/23 Volts and must not exceed 13 Volts/25 Volts.

Measurement

Switch on the heater.
After about 45 seconds, the metering pump starts to pump fuel.
Keep the measuring glass at the level of the *HYDRONIC* during measurement.
After about 90 seconds, fuel pumping is switched off automatically.
Switch off the heater, as otherwise start-up is repeated.
Measure the fuel quantity in the measuring glass.



Sketch 7

Evaluation
Compare the measured fuel quantity with the values specified in the following table.
If the measured fuel quantity is above the max. permissible value or below the min. permissible value, the fuel metering pump must be replaced.

Fuel quantity	*HYDRONIC* B 5 W S	*HYDRONIC* D 5 W S
Nominal fuel quantity	11.5 cm^3/90 sec.	8.0 cm^3/90 sec.
Max. fuel quantity	12.1 cm^3/90 sec.	8.5 cm^3/90 sec.
Min. fuel quantity	10.9 cm^3/90 sec.	7.5 cm^3/90 sec.

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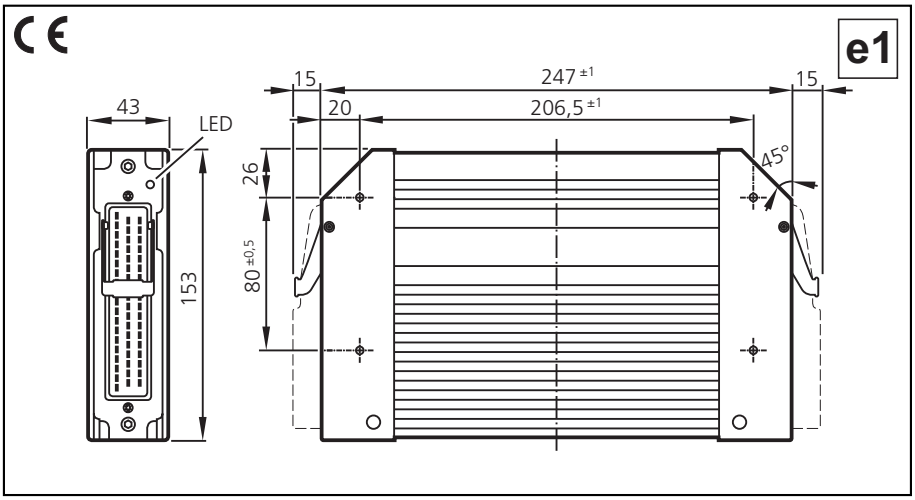
CR0200

Mobile controller
ExtendedController

2 control units
with a total of
80 inputs/outputs

Programming
according to IEC 61131-3

Operating voltage
10...32 V DC



Technical data

Controller as black box system
for the implementation of a central or decentralised system design

Housing	closed, screened metal housing with flange fastening
Dimensions (H x W x D)	153 x 247 x 43 mm
Mounting	screw connection by means of 4 M5xL screws according to DIN 7500 or DIN 7984 mounting position horizontal or vertical to the mounting wall
Connection	2 x 55-pin connector, latched, protected against reverse polarity, type AMP or Framatome, AMP junior timer contacts, crimp connection 0.5/2.5 mm²
Weight	1.6 kg
Housing / storage temperature	–40...85 °C (depending on the load) / –40...85 °C
Protection	IP 67 (protection rating for plug dep. on cable preparation)
Input/output channels total	max. 2 x 40 (the total number which is available depends on the wiring and configuration of the controller)
Inputs	max. 2 x 40 (corr. to 0 outputs)

possible configurations

Number	Signal	Version	
2 x 8 or	digital analogue	for positive sensor signals, with diagnostic capability 0...10/32 V DC, 0/4...20 mA or ratiometric	B_L A
2 x 8	digital	for positive sensor signals	B_L
2 x 4 or	digital frequency	for positive sensor signals, with diagnostic capability max. 50 kHz	B_L I_L
2 x 4 or	digital frequency	for positive/negative sensor signals, with diagnostic capability * max. 1 kHz	$B_{L/H}$ I_L
2 x 8	digital	for positive/negative sensor signals, with diagnostic capability *	$B_{L/H}$
2 x 8	digital	for positive sensor signals, with diagnostic capability	B_L

*) only positive sensor signals
with diagnostic capability

Outputs	max. 2 x 24 (corr. to 2 x 16 inputs)

possible configurations

Number	Signal	Version	
2 x 8 or or	digital PWM current-controlled	positive switching (High Side), with diagnostic capability PWM frequency 20...250 Hz 0,1...4 A	B_H PWM PWM_I
2 x 8	digital	positive switching (High Side), with diagnostic capability	B_H
2 x 4 or	digital PWM	positive switching (High Side), with diagnostic capability PWM frequency 20...250 Hz	B_H PWM
2 x 4	digital	positive/negative switching (High/Low Side) with diagnostic capability (can also be used as H bridge)	$B_{H/L}$ H bridge

Abbreviations

A	= analogue
B_H	= binary High Side
B_L	= binary Low Side
FRQ/CYL	= frequency inputs
I_H	= pulse High Side
I_L	= pulse Low Side
PWM	= pulse width modulation
PWM_I	= current-controlled output
%IWx	= IEC address for analogue input
%IX0.xx	= IEC address for binary input
%QX0.xx	= IEC address for binary output

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CR0200	Technical data (per control unit)
Operating voltage U_B	10...32 V DC
overvoltage undervoltage detection switching-off in case of undervoltage	36 V for t ≤ 10 s for U_B ≤ 10 V for U_B ≤ 8 V
Current consumption	≤ 160 mA (without external load at 24 V DC)
CAN interface 1 Baud rate Communication profile	CAN interface 2.0 B, ISO 11898 50 Kbits/s...1 Mbits/s (default setting 125 Kbits/s) CANopen, CiA DS 301 version 4, CiA DS 401 version 1.4
Node-ID (CANopen)	hex 7F (= dec. 127)
CAN interface 2 Baud rate Communication profile	CAN interface 2.0 A/B, ISO 11898 50 Kbits/s...1 Mbit/s (default setting 125 Kbits/s) SAE J 1939 or free protocol
Serial interface Baud rate Topology Protocol	RS-232 C 9.6 / 19.2 / 28.8 / 38.4 / 57.6 kBit/s (default setting 9.6 Kbits/s) point-to-point (max. 2 participants); master-slave connection predefined ifm protocol (INTELHEX)
Processor	CMOS microcontroller 16 bits C167CS cycle frequency 20/40 MHz
Device monitoring	undervoltage monitoring watchdog function check sum test for program and system excess temperature monitoring
Process monitoring concept	Two relays according to EN 954 monitor two groups of 12 outputs each
Program memory	768 Kbytes Flash can be used by the user (+ 832 Kbytes for extended functions)
Data memory	128 Kbytes SRAM, 128 Kbytes Flash
Data memory (protected in case of power failure)	1024 bytes (retain data), 16 Kbytes (general data)
Status indication	three-colour LED (R/G/B)
Operating states (Status-LED)	

LED colour	Status	Description
–	off	no operating voltage
yellow	1 x on	initialisation or reset checks
green	5 Hz	no operating system loaded
green	2.0 Hz on	Run Stop
red	2.0 Hz on	Run with error fatal error or stop with error

	Test standards and regulations
Climatic test	Damp heat to EN 60068-2-30, test Db (≤ 95% rel. humidity, non-condensing) Salt mist test to EN 60068-2-52, test Kb, severity level 3 Degree of protection to EN 60529
Mechanical resistance	Vibration to EN 60068-2-6, test Fc Shock to EN 60068-2-27, test Ea Bump to EN 60068-2-29, test Eb
Immunity to conducted interference	to ISO 7637-2, pulses 2, 3a, 3b, severity level 4, function state A to ISO 7637-2, pulse 5, severity level 1, function state A to ISO 7637-2, pulse 1, severity level 4, function state C
Immunity to interfering fields	directive 95/54/EC at 100 V/m (e1 type approval) and EN 61000-6-2 :2001 (CE)
Interference emission	directive 95/54/EC (e1 type approval) and EN 61000-6-4 :2001 (CE)
Tests for the approval for railway applications	to BN 411 002 (DIN EN 50155 clause 10.2)

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CR0200	Characteristics of the inputs (per control unit)
Digital/analogue inputs (B_L, A) %IW03...10 %IX0.00...07 can be configured as ...	■ Voltage inputs input voltage 0...10/32 V resolution 12 bits precision ± 1.0% FS input resistance 50/30 kΩ input frequency 50 Hz
	■ Current inputs input current 0/4...20 mA resolution 12 bits precision ± 1.0% FS input resistance 400 Ω input frequency 50 Hz
	■ Digital inputs for positive sensor signals, with diagnostic capability *) switch-on level 0.7 U_B switch-off level 0.4 U_B input resistance 30 kΩ input frequency 50 Hz
Digital inputs (B_L) %IX0.08...11 %IX1.00...03 can be configured as ...	■ Digital inputs for positive sensor signals switch-on level 0.43...0.73 U_B switch-off level 0.29 U_B input resistance 3.21 kΩ input frequency 50 Hz
Digital inputs (B_L, I_L) %IX0.12...15 can be configured as ...	■ Digital inputs for positive sensor signals, with diagnostic capability *) switch-on level 0.7 U_B switch-off level 0.4 U_B input resistance 2.86 kΩ input frequency 50 Hz
	■ Frequency inputs for positive sensor signals with diagnostic capability, evaluation with integrated comparator switch-on level 0.43...0.73 U_B switch-off level 0.29 U_B input resistance 2.86 kΩ input frequency max. 50 kHz
Digital inputs ($B_{L/H}$, I_L) %IX1.04...07 can be configured as ...	■ Digital inputs for positive/negative sensor signals, positive with diagnostic capability* switch-on level 0.7 U_B switch-off level 0.4 U_B input resistance 3.21 kΩ input frequency 50 Hz
	■ Frequency inputs for positive sensor signals with diagnostic capability, evaluation with integrated comparator switch-on level 0.43...0.73 U_B switch-off level 0.29 U_B input resistance 3.21 kΩ input frequency max. 1 kHz
Digital inputs ($B_{L/H}$) %IX1.08...15 can be configured as ...	■ Digital inputs for positive/negative sensor signals, positive with diagnostic capability* switch-on level 0.7 U_B switch-off level 0.4 U_B input resistance 3.21 kΩ input frequency 50 Hz
Digital inputs (B_L) %IX2.00...07 konfigurierbar als...	■ Digital inputs for positive sensor signals, with diagnostic capability *) switch-on level 0.43...0.73 U_B switch-off level 0.29 U_B input resistance 3.21 kΩ input frequency 50 Hz
Test input	During the test mode (e.g. programming) the "TEST" connection must be connected to VBB_S (10...32 V DC). For the "RUN" mode the test input must not be connected. input resistance 3.21 kΩ
*) NAMUR inputs	■ Digital inputs with diagnostic capability can be used as NAMUR inputs when used with an external resistor connection. supply voltage 5...25 V; e.g. ifm NAMUR sensors NT5001...NN5002

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CR0200	Characteristics of the outputs (per control unit)
Outputs (B_H, PWM, PWM_I) %QX0.00...07 can be configured as ...	■ Semiconductor outputs, with diagnostic capability positive switching (high side), short-circuit and overload protected switching voltage 10...32 V DC switching current max. 4 A output frequency max. 100 Hz (depending on the load)
	■ PWM outputs, diagnosis via current feedback PWM frequency max. 250 Hz mark-to-space ratio 1...99 % resolution depends on the PWM frequency load current max. 4 A
	■ Current-controlled outputs, diagnosis via current feedback load current 0,1...4 A load resistance min. 3 Ω (at U_B = 12 V DC) min. 6 Ω (at U_B = 24 V DC) setting resolution 1 mA control resolution 5 mA accuracy ± 2% FS
Outputs (B_H) %QX0.08...15 can be configured as ...	■ Semiconductor outputs, with diagnostic capability positive switching (high side), short-circuit and overload protected switching voltage 10...32 V DC switching current max. 2 A output frequency max. 100 Hz (depending on the load)
Outputs (B_H, PWM) %QX1.00, 03, 04, 07 can be configured as ...	■ Semiconductor outputs, with diagnostic capability positive switching (high side), short-circuit and overload protected switching voltage 10...32 V DC switching current max. 4 A output frequency max. 100 Hz (depending on the load)
	■ PWM outputs PWM frequency max. 250 Hz pulse ratio 1...99 % resolution depends on the PWM frequency load current max. 4 A
Outputs ($B_{L/H}$) %QX1.01, 02, 05, 06 can be configured as ...	■ Semiconductor outputs, with diagnostic capability positive/negative switching (high/low side), short-circuit and overload protected switching voltage 10...32 V DC switching current max. 4 A output frequency max. 100 Hz (depending on the load)
Overload protection (valid for all outputs)	max. 5 minutes (at 100%)
Internal relay outputs for electrically isolated deactivation of the outputs	Normally open contacts in series to 2 groups of 12 semiconductor outputs. Sustained forcing by means of hardware and additional controlling by means of user program.
	The relays must always be switched without load!
	total current max. 12 A per group switching current 0.1...15 A overload current 20 A number of operating cycles ≥ 10^6 (without load) switching-time constant ≤ 3 ms
Output Error	■ Semiconductor output, positive switching (high side) switching voltage 10...32 V DC switching current max. 100 mA overload current 0.5 A switching function OFF (0 V) in case of an error

Abbreviations

A	= analogue
B_H	= binary High Side
B_L	= binary Low Side
FRQ/CYL	= frequency inputs
I_H	= pulse High Side
I_L	= pulse Low Side
PWM	= pulse width modulation
PWM_I	= current-controlled output
%IWx	= IEC address for analogue input
%IX0.xx	= IEC address for binary input
%QX0.xx	= IEC address for binary output

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ANSCHLUSSBELEGUNG / *wiring / branchement*			CPU 1
Pin	**Potential**	**Bezeichnung** / *description*	**Bemerkung** / *note*
23	VBB_S (10...32 V DC)	Versorgung Sensoren und Modul / *supply sensors and module*	
05	VBB_O (10...32 V DC)	Versorgung Ausgänge / *supply outputs*	relaisgeschaltet / *relay switched* (1)
34	VBB_R (10...32 V DC)	Versorgung über Relais / *supply via relay*	relaisgeschaltet / *relay switched* (2)
01	GND_S	Masse Sensoren und Modul / *ground sensors and module*	
15	GND_O	Masse Ausgänge / *ground outputs*	
12	GND_A	Masse Analogeingänge / *ground analogue outputs*	

CAN, RS-232, ERROR, TEST			
Pin	**Potential**	**Bezeichnung** / *description*	**Bemerkung** / *note*
14	CAN1 $_H$	CAN-Interface 1 (High)	
32	CAN1 $_L$	CAN-Interface 1 (Low)	
26	CAN2 $_H$	CAN-Interface 2 (High)	SAE J 1939
25	CAN2 $_L$	CAN-Interface 2 (Low)	SAE J 1939
33	GND	Masse / *ground* (RS-232/CAN)	
06	RxD	RS-232 Interface (Programmierung / *programming*)	Pin 03, PC D-Sub (9 pin)
07	TxD	RS-232 Interface (Programmierung / *programming*)	Pin 02, PC D-Sub (9 pin)
13	ERROR	Fehlerausgang B_H / *error output* B_H	
24	TEST	TEST-Eingang / *test input*	

EIN-/AUSGÄNGE / *inputs/outputs / entrées/sorties*

Pin *pin*	**EINGÄNGE** *INPUTS*	**Konfiguration** *configuration*	**AUSGÄNGE** *OUTPUTS*	**Konfiguration** *configuration*	**diagnosefähig*** *diagnostic capability** *INPUT / OUTPUT*	**relaisgeschaltet** *relay switched*
08	%IX0.00 / %IW03	B_L A	–	–	• / –	
27	%IX0.01 / %IW04	B_L A	–	–	• / –	
09	%IX0.02 / %IW05	B_L A	–	–	• / –	
28	%IX0.03 / %IW06	B_L A	–	–	• / –	
10	%IX0.04 / %IW07	B_L A	–	–	• / –	
29	%IX0.05 / %IW08	B_L A	–	–	• / –	
11	%IX0.06 / %IW09	B_L A	–	–	• / –	
30	%IX0.07 / %IW10	B_L A	–	–	• / –	
44	%IX0.08	B_L	%QX0.00	B_H PWM PWM_I	– / •	VBB_O (1)
45	%IX0.09	B_L	%QX0.01	B_H PWM PWM_I	– / •	VBB_O (1)
46	%IX0.10	B_L	%QX0.02	B_H PWM PWM_I	– / •	VBB_O (1)
47	%IX0.11	B_L	%QX0.03	B_H PWM PWM_I	– / •	VBB_O (1)
20	%IX0.12	B_L I_L (FRQ0)	–	–	• / –	
02	%IX0.13	B_L I_L (FRQ1)	–	–	• / –	
21	%IX0.14	B_L I_L (FRQ2)	–	–	• / –	
38	%IX0.15	B_L I_L (FRQ3)	–	–	• / –	
36	%IX1.00	B_L	%QX0.04	B_H PWM PWM_I	– / •	VBB_R (2)
54	%IX1.01	B_L	%QX0.05	B_H PWM PWM_I	– / •	VBB_R (2)
17	%IX1.02	B_L	%QX0.06	B_H PWM PWM_I	– / •	VBB_R (2)
53	%IX1.03	B_L	%QX0.07	B_H PWM PWM_I	– / •	VBB_R (2)
19	%IX1.04	$B_{L/H}$ I_L (CYL0)	–	–	• / –	
55	%IX1.05	$B_{L/H}$ I_L (CYL1)	–	–	• / –	
18	%IX1.06	$B_{L/H}$ I_L (CYL2)	–	–	• / –	
37	%IX1.07	$B_{L/H}$ I_L (CYL3)	–	–	• / –	
39	%IX1.08	$B_{L/H}$	%QX0.08	B_H	• / •	VBB_O (1)
03	%IX1.09	$B_{L/H}$	%QX0.09	B_H	• / •	VBB_O (1)
40	%IX1.10	$B_{L/H}$	%QX0.10	B_H	• / •	VBB_O (1)
22	%IX1.11	$B_{L/H}$	%QX0.11	B_H	• / •	VBB_O (1)
41	%IX1.12	$B_{L/H}$	%QX0.12	B_H	• / •	VBB_O (1)
42	%IX1.13	$B_{L/H}$	%QX0.13	B_H	• / •	VBB_O (1)
43	%IX1.14	$B_{L/H}$	%QX0.14	B_H	• / •	VBB_O (1)
04	%IX1.15	$B_{L/H}$	%QX0.15	B_H	• / •	VBB_O (1)
48	%IX2.00	B_L	%QX1.00	B_H PWM	• / •	VBB_R (2)
49	%IX2.01	B_L	%QX1.01	$B_{H/L}$ H-Bridge	• / •	VBB_R (2)
31	%IX2.02	B_L	%QX1.02	$B_{H/L}$ H-Bridge	• / •	VBB_R (2)
50	%IX2.03	B_L	%QX1.03	B_H PWM	• / •	VBB_R (2)
51	%IX2.04	B_L	%QX1.04	B_H PWM	• / •	VBB_R (2)
52	%IX2.05	B_L	%QX1.05	$B_{H/L}$ H-Bridge	• / •	VBB_R (2)
16	%IX2.06	B_L	%QX1.06	$B_{H/L}$ H-Bridge	• / •	VBB_R (2)
35	%IX2.07	B_L	%QX1.07	B_H PWM	• / •	VBB_R (2)

Note the double pin connection of inputs/outputs.

*) only positive sensor signals with diagnostic capability

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ANSCHLUSSBELEGUNG / *wiring / branchement*			CPU 2
Pin	**Potential**	**Bezeichnung** / *description*	**Bemerkung** / *note*
23	VBB_S (10...32 V DC)	Versorgung Sensoren und Modul / *supply sensors and module*	
05	VBB_O (10...32 V DC)	Versorgung Ausgänge / *supply outputs*	relaisgeschaltet / *relay switched* (1)
34	VBB_R (10...32 V DC)	Versorgung über Relais / *supply via relay*	relaisgeschaltet / *relay switched* (2)
01	GND_S	Masse Sensoren und Modul / *ground sensors and module*	
15	GND_O	Masse Ausgänge / *ground outputs*	
12	GND_A	Masse Analogeingänge / *ground analogue outputs*	

CAN, RS-232, ERROR, TEST			
Pin	**Potential**	**Bezeichnung** / *description*	**Bemerkung** / *note*
14	CAN1 $_H$	CAN-Interface 1 (High)	
32	CAN1 $_L$	CAN-Interface 1 (Low)	
26	CAN2 $_H$	CAN-Interface 2 (High)	SAE J 1939
25	CAN2 $_L$	CAN-Interface 2 (Low)	SAE J 1939
33	GND	Masse / *ground* (RS-232/CAN)	
06	RxD	RS-232 Interface (Programmierung / *programming*)	Pin 03, PC D-Sub (9 pin)
07	TxD	RS-232 Interface (Programmierung / *programming*)	Pin 02, PC D-Sub (9 pin)
13	ERROR	Fehlerausgang B_H / *error output* B_H	
24	TEST	TEST-Eingang / *test input*	

EIN-/AUSGÄNGE / *inputs/outputs / entrées/sorties*									
Pin *pin*	**EINGÄNGE** *INPUTS*	**Konfiguration** *configuration*		**AUSGÄNGE** *OUTPUTS*	**Konfiguration** *configuration*			**diagnosefähig*** *diagnostic capability** *INPUT / OUTPUT*	**relaisgeschaltet** *relay switched*
08	%IX32.00 / %IW35	B_L A		–	–			• / –	
27	%IX32.01 / %IW36	B_L A		–	–			• / –	
09	%IX32.02 / %IW37	B_L A		–	–			• / –	
28	%IX32.03 / %IW38	B_L A		–	–			• / –	
10	%IX32.04 / %IW39	B_L A		–	–			• / –	
29	%IX32.05 / %IW40	B_L A		–	–			• / –	
11	%IX32.06 / %IW41	B_L A		–	–			• / –	
30	%IX32.07 / %IW42	B_L A		–	–			• / –	
44	%IX32.08	B_L		%QX32.00	B_H	PWM	PWM_I	– / •	VBB_O (1)
45	%IX32.09	B_L		%QX32.01	B_H	PWM	PWM_I	– / •	VBB_O (1)
46	%IX32.10	B_L		%QX32.02	B_H	PWM	PWM_I	– / •	VBB_O (1)
47	%IX32.11	B_L		%QX32.03	B_H	PWM	PWM_I	– / •	VBB_O (1)
20	%IX32.12	B_L I_L (FRQ 0)		–	–			• / –	
02	%IX32.13	B_L I_L (FRQ 1)		–	–			• / –	
21	%IX32.14	B_L I_L (FRQ 2)		–	–			• / –	
38	%IX32.15	B_L I_L (FRQ 3)		–	–			• / –	
36	%IX33.00	B_L		%QX32.04	B_H	PWM	PWM_I	– / •	VBB_R (2)
54	%IX33.01	B_L		%QX32.05	B_H	PWM	PWM_I	– / •	VBB_R (2)
17	%IX33.02	B_L		%QX32.06	B_H	PWM	PWM_I	– / •	VBB_R (2)
53	%IX33.03	B_L		%QX32.07	B_H	PWM	PWM_I	– / •	VBB_R (2)
19	%IX33.04	$B_{L/H}$ I_L (CYL 0)		–	–			• / –	
55	%IX33.05	$B_{L/H}$ I_L (CYL 1)		–	–			• / –	
18	%IX33.06	$B_{L/H}$ I_L (CYL 2)		–	–			• / –	
37	%IX33.07	$B_{L/H}$ I_L (CYL 3)		–	–			• / –	
39	%IX33.08	$B_{L/H}$		%QX32.08	B_H			• / •	VBB_O (1)
03	%IX33.09	$B_{L/H}$		%QX32.09	B_H			• / •	VBB_O (1)
40	%IX33.10	$B_{L/H}$		%QX32.10	B_H			• / •	VBB_O (1)
22	%IX33.11	$B_{L/H}$		%QX32.11	B_H			• / •	VBB_O (1)
41	%IX33.12	$B_{L/H}$		%QX32.12	B_H			• / •	VBB_O (1)
42	%IX33.13	$B_{L/H}$		%QX32.13	B_H			• / •	VBB_O (1)
43	%IX33.14	$B_{L/H}$		%QX32.14	B_H			• / •	VBB_O (1)
04	%IX33.15	$B_{L/H}$		%QX32.15	B_H			• / •	VBB_O (1)
48	%IX34.00	B_L		%QX33.00	B_H	PWM		• / •	VBB_R (2)
49	%IX34.01	B_L		%QX33.01	$B_{H/L}$		H-Bridge	• / •	VBB_R (2)
31	%IX34.02	B_L		%QX33.02	$B_{H/L}$		H-Bridge	• / •	VBB_R (2)
50	%IX34.03	B_L		%QX33.03	B_H	PWM		• / •	VBB_R (2)
51	%IX34.04	B_L		%QX33.04	B_H	PWM		• / •	VBB_R (2)
52	%IX34.05	B_L		%QX33.05	$B_{H/L}$		H-Bridge	• / •	VBB_R (2)
16	%IX34.06	B_L		%QX33.06	$B_{H/L}$		H-Bridge	• / •	VBB_R (2)
35	%IX34.07	B_L		%QX33.07	B_H	PWM		• / •	VBB_R (2)

Note the double pin connection of inputs/outputs.

*) only positive sensor signals with diagnostic capability

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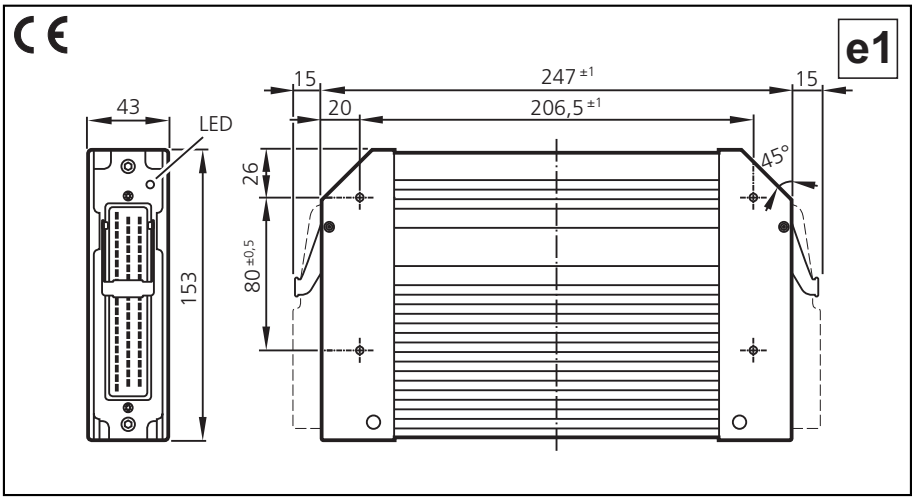
CR0200

Système de commande embarqué ExtendedController

2 unités de contrôle avec 80 entrées /sorties au total

Programmation selon CEI 61131-3

10...32 V DC



Données techniques

Système de commande type boîte noire pour la réalisation d'un système central ou décentralisé

Boîtier	boîtier métallique fermé blindé avec fixation par bride
Dimensions (L x l x H)	153 x 247 x 43 mm
Montage	fixation à vis avec 4 vis M5 x L selon DIN 7500 et DIN 7984 position de montage horizontale ou verticale par rapport à la paroi de montage
Raccordement	2 connecteurs 55 pôles, verrouillé, protégé contre l'inversion de polarité, type AMP ou Framatome, contacts AMP-Junior-Timer, raccordement crimp 0,5/2,5 mm²
Poids	1,6 kg
Température boîtier / stockage	–40...85 °C (en fonction de la charge) / –40...85 °C
Protection	IP 67 (protection pour les connecteurs à réaliser)
Voies d'entrée/de sortie	max. 2 x 40 (le nombre disponible total dépend du raccordement et de la configuration du système de commande)
Entrées	max. 2 x 40 (corr. à 0 sorties)

configurations possibles

Nombre	Signal	Version	
2 x 8 ou	TOR analogique	signaux capteurs positifs, avec possibilité de diagnostic 0...10/32 V DC, 0/4...20 mA ou ratiométrique	B_L A
2 x 8	TOR	signaux capteurs positifs	B_L
2 x 4 ou	TOR fréquence	signaux capteurs positifs, avec possibilité de diagnostic max. 50 kHz	B_L I_L
2 x 4 ou	TOR fréquence	signaux capteurs positifs/négatifs, possibilité de diagnostic max. 1 kHz	$B_{L/H}$ I_L
2 x 8	TOR	signaux capteurs positifs/négatifs, possibilité de diagnostic	$B_{L/H}$
2 x 8	TOR	signaux capteurs positifs, possibilité de diagnostic	B_L

*) seulement signaux capteurs positifs avec possibilité de diagnostic

Sorties	max. 2 x 24 (corr. à 2 x 16 sorties)

configurations possibles

Nombre	Signal	Version	
2 x 8 ou ou	TOR PWM courant régulé	pnp (niveau haut), avec possibilité de diagnostic fréquence PWM 20...250 Hz 0,1...4 A	B_H PWM PWM_I
2 x 8	TOR	pnp (niveau haut), avec possibilité de diagnostic	B_H
2 x 4 ou	TOR PWM	pnp (niveau haut), avec possibilité de diagnostic fréquence PWM 20...250 Hz	B_H PWM
2 x 4	TOR	pnp/npn (niveau haut/bas) avec possibilité de diagnostic (aussi utilisable comme shunt H (H-Bridge))	$B_{H/L}$ H-Bridge

Abréviations

A	= analogique
B_H	= TOR niveau haut
B_L	= TOR niveau bas
FRQ/CYL	= entrées de fréquence
I_H	= impulsion niveau haut
I_L	= impulsion niveau bas
PWM	= modulation par la largeur des impulsions
PWM_I	= sortie de courant régulé
%IWx	= adresse IEC pour entrée analogique
%IX0.xx	= adresse IEC pour entrée TOR
%QX0.xx	= adresse IEC pour sortie TOR

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CR0200	Données techniques (par unité de contrôle)
Tension d'alimentation U_B	10...32 V DC
Surtension détection de sous-tension coupure du circuit en cas de sous-tension	36 V pour t ≤ 10 s pour U_B ≤ 10 V pour U_B ≤ 8 V
Consommation	≤ 160 mA (sans charge externe à 24 V DC)
Interface CAN 1 Débit de transmission Profil de communication	interface CAN 2.0 B, ISO 11898 50 Kbits/s...1 Mbit/s (valeur par défaut 125 Kbits/s) CANopen, CiA DS 301 version 4, CiA DS 401 version 1.4
ID nœud (CANopen)	hexa 7F (= déc. 127)
Interface CAN 2 Débit de transmission Profil de communication	interface CAN 2.0 A/B, ISO 11898 50 Kbits/s...1 Mbit/s (valeur par défaut 125 Kbits/s) SAE J 1939 ou protocole libre
Interface série Débit de transmission Topologie Protocole	RS-232 C 9,6 / 19,2 / 28,8 / 38,4 / 57,6 Kbits/s (valeur par défaut 9,6 Kbits/s) point à point (max. 2 postes); raccordement maître-esclave protocole ifm prédéfini (INTELHEX)
Processeur	microcontrôleur CMOS 16 bits C167CS fréquence d'horloge 20/40 MHz
Surveillance de l'appareil	surveillance de la sous-tension fonction chien de garde test de contrôle (checksum) pour le programme et le système surveillance de surélévation de température
Concept de surveillance du process	2 relais selon EN954 pour contrôle de 2 groupes de 12 sorties chacun par relais de surveillance selon EN 954
Mémoire programme	768 Koctets flash utilisable par le programmateur (+ 832 Koctets pour des fonctions étendues)
Mémoire de données	128 Koctets SRAM, 128 Koctets flash
Mémoire de données (protégée coupure tension)	1024 octets (données auto-sauvegardées), 16 Koctets (données générales)
Indication d'état	LED trois couleurs (R/J/B)
Etats de fonctionnement (LED d'état)	

Couleur	Etat	Description
–	Eteinte	aucune tension d'alimentation
jaune	1 x allumée	initialisation ou test reset
verte	5 Hz	aucun système d'exploitation chargé
verte	2,0 Hz allumée	Run Stop
rouge	2,0 Hz allumée	Run avec erreur erreur fatale ou arrêt avec erreur

	Normes d'essai et réglementations
Test climatique	chaleur humide selon EN 60068-2-30, test Db (≤ 95% humidité de l'air relative, sans condensation) essai de brouillard salin selon EN 60068-2-52, test Kb, niveau de sévérité 3 test de la protection selon EN 60529
Résistance mécanique	vibration selon EN 60068-2-6, test Fc chocs selon EN 60068-2-27, test Ea chocs permanents selon EN 60068-2-29, test Eb
Immunité aux parasites HF conduits	selon ISO 7637-2, impulsions 2, 3a, 3b, niveau de sévérité 4, état fonctionnel A selon ISO 7637-2, impulsion 5, niveau de sévérité 1, état fonctionnel A selon ISO 7637-2, impulsion 1, niveau de sévérité 4, état fonctionnel C
Immunité aux rayonnements parasites	selon la directive 95/54/CE avec 100 V/m (homologation de type e1) et EN 61000-6-2 :2001 (CE)
Emission de rayonnements HF	selon la directive 95/54/CE (homologation de type e1) et EN 61000-6-4 :2001 (CE)
Tests pour l'homologation pour applications ferroviaires	selon BN 411 002 (DIN EN 50155 partie 10.2)

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CR0200	Caractéristiques des entrées (par unité de contrôle)
Entrées TOR/analogiques (B_L, A) %IW03...10 %IX0.00...07 configurables comme...	■ Entrées tension tension d'entrée 0...10/32 V résolution 12 bits précision ±1,0% FS résistance d'entrée 50/30 kΩ fréquence d'entrée 50 Hz
	■ Entrées courant courant d'entrée 0/4...20 mA résolution 12 bits précision ±1,0% FS résistance d'entrée 400 Ω fréquence d'entrée 50 Hz
	■ Entrées TOR pour des signaux capteurs positifs, avec possibilité de diagnostic *) niveau d'enclenchement 0,7 U_B niveau de déclenchement 0,4 U_B résistance d'entrée 30 kΩ fréquence d'entrée 50 Hz
Entrées TOR (B_L) %IX0.08...11 %IX1.00...03 configurables comme...	■ Entrées TOR pour des signaux capteurs positifs niveau d'enclenchement 0,43...0,73 U_B niveau de déclenchement 0,29 U_B résistance d'entrée 3,21 kΩ fréquence d'entrée 50 Hz
Entrées TOR (B_L, I_L) %IX0.12...15 configurables comme...	■ Entrées TOR pour des signaux capteurs positifs, avec possibilité de diagnostic *) niveau d'enclenchement 0,7 U_B niveau de déclenchement 0,4 U_B résistance d'entrée 2,86 kΩ fréquence d'entrée 50 Hz
	■ Entrées de fréquence pour des signaux capteurs positifs avec possibilité de diagnostic, évaluation avec comparateur niveau d'enclenchement 0,43...0,73 U_B niveau de déclenchement 0,29 U_B résistance d'entrée 2,86 kΩ fréquence d'entrée max. 50 kHz
Entrées TOR ($B_{L/H}$, I_L) %IX1.04...07 configurables comme...	■ Entrées TOR pour des signaux capteurs positifs/négatifs, positifs avec possibilité de diagnostic *) niveau d'enclenchement 0,7 U_B niveau de déclenchement 0,4 U_B résistance d'entrée 3,21 kΩ fréquence d'entrée 50 Hz
	■ Entrées de fréquence pour des signaux capteurs positifs avec possibilité de diagnostic, évaluation avec comparateur niveau d'enclenchement 0,43...0,73 U_B niveau de déclenchement 0,29 U_B résistance d'entrée 3,21 kΩ fréquence d'entrée max. 1 kHz
Entrées TOR ($B_{L/H}$) %IX1.08...15 configurables comme...	■ Entrées TOR pour des signaux capteurs positifs/négatifs, positifs avec possibilité de diagnostic *) niveau d'enclenchement 0,7 U_B niveau de déclenchement 0,4 U_B résistance d'entrée 3,21 kΩ fréquence d'entrée 50 Hz
Entrées TOR (B_L) %IX2.00...07 configurables comme...	■ Entrées TOR pour des signaux capteurs positifs, avec possibilité de diagnostic *) niveau d'enclenchement 0,43...0,73 U_B niveau de déclenchement 0,29 U_B résistance d'entrée 3,21 kΩ fréquence d'entrée 50 Hz
Entrée test	Durant le mode test (par ex. programmation) la broche doit être raccordée à VBB_S (10...32 V DC). Pour le mode "RUN" l'état logique de cette entrée doit être 0. résistance d'entrée 3,21 kΩ
*) Entrées NAMUR	■ Des entrées TOR avec possibilité de diagnostic peuvent être utilisées en tant qu'entrées NAMUR en combinaison avec une résistance externe. tension d'alimentation 5...25 V; par ex. détecteurs NAMUR ifm NT5001...NN5002

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CR0200	Caractéristiques des sorties (par unité de contrôle)
Sorties (B_H, PWM, PWM_I) %QX0.00...07 configurables comme...	■ Sorties statiques , avec possibilité de diagnostic pnp (niveau haut), protection courts-circuits et surcharge tension de commutation 10...32 V DC courant de charge par sortie max. 4 A fréquence de sortie max. 100 Hz (dépend de la charge)
	■ Sorties PWM, diagnostic par relecture du courant fréquence PWM max. 250 Hz taux d'impulsion 1...99 % résolution dépend de la fréquence PWM courant de charge par sortie max. 4 A
	■ Sorties courant régulé, diagnostic par relecture du courant courant de charge 0,1...4 A resistance de charge min. 3 Ω (à U_B = 12 V DC) min. 6 Ω (à U_B = 24 V DC) résolution de réglage 1 mA résolution utilisée 5 mA précision ± 2% FS
Sorties (B_H) %QX0.08...15 configurables comme...	■ Sorties statiques , avec possibilité de diagnostic pnp (niveau haut), protection courts-circuits et surcharge tension de commutation 10...32 V DC courant de charge par sortie max. 2 A fréquence de sortie max. 100 Hz (dépend de la charge)
Sorties (B_H, PWM) %QX1.00, 03, 04, 07 configurables comme...	■ Sorties statiques , avec possibilité de diagnostic pnp (niveau haut), protection courts-circuits et surcharge tension de commutation 10...32 V DC courant de charge par sortie max. 4 A fréquence de sortie max. 100 Hz (dépend de la charge)
	■ Sorties PWM fréquence PWM max. 250 Hz taux d'impulsion 1...99 % résolution dépend de la fréquence PWM courant de charge max. 4 A
Sorties ($B_{L/H}$) %QX1.01, 02, 05, 06 configurables comme...	■ Sorties statiques , avec possibilité de diagnostic pnp/npn (niveau haut/bas), protection courts-circuits et surcharge tension de commutation 10...32 V DC courant de charge par sortie max. 4 A fréquence de sortie max. 100 Hz (dépend de la charge)
Protection contre les surcharges (valable pour toutes les sorties)	max. 5 minutes (à 100%)
Sorties relais internes pour la désactivation des sorties avec isolation électrique	Contacts normalement ouvert en série à 2 x 12 sorties semiconducteurs (= 2 groupes). Commande forcée par hardware et commande supplémentaire par programme d'application.
	Les relais doivent toujours être commutés sans charge!
	courant total max. 12 A par groupe courant par sortie 0,1...15 A courant de surcharge 20 A nombre de cycles d'opérations ≥ 10^6 constante commutation-temps ≤ 3 ms
Sortie Error	■ Sortie statiques, pnp (niveau haut) tension de commutation 10...32 V DC courant de charge par sortie max. 100 mA courant de surcharge 0,5 A fonction de commutation OFF (0 V) en cas d'erreur

Abréviations

A	= analogique
B_H	= TOR niveau haut
B_L	= TOR niveau bas
FRQ/CYL	= entrées de fréquence
I_H	= impulsion niveau haut
I_L	= impulsion niveau bas
PWM	= modulation par la largeur des impulsions
PWM_I	= sortie de courant régulé
%IWx	= adresse IEC pour entrée analogique
%IX0.xx	= adresse IEC pour entrée TOR
%QX0.xx	= adresse IEC pour sortie TOR

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ANSCHLUSSBELEGUNG / *wiring / branchement*			**CPU 1**
Pin	**Potential**	**Bezeichnung** / *description*	**Bemerkung** / *note*
23	VBB_S (10...32 V DC)	Versorgung Sensoren und Modul / *supply sensors and module*	
05	VBB_O (10...32 V DC)	Versorgung Ausgänge / *supply outputs*	relaisgeschaltet / *relay switched* (1)
34	VBB_R (10...32 V DC)	Versorgung über Relais / *supply via relay*	relaisgeschaltet / *relay switched* (2)
01	GND_S	Masse Sensoren und Modul / *ground sensors and module*	
15	GND_O	Masse Ausgänge / *ground outputs*	
12	GND_A	Masse Analogeingänge / *ground analogue outputs*	
CAN, RS-232, ERROR, TEST			
Pin	**Potential**	**Bezeichnung** / *description*	**Bemerkung** / *note*
14	CAN1 $_H$	CAN-Interface 1 (High)	
32	CAN1 $_L$	CAN-Interface 1 (Low)	
26	CAN2 $_H$	CAN-Interface 2 (High)	SAE J 1939
25	CAN2 $_L$	CAN-Interface 2 (Low)	SAE J 1939
33	GND	Masse / *ground* (RS-232/CAN)	
06	RxD	RS-232 Interface (Programmierung / *programming*)	Pin 03, PC D-Sub (9 pin)
07	TxD	RS-232 Interface (Programmierung / *programming*)	Pin 02, PC D-Sub (9 pin)
13	ERROR	Fehlerausgang B_H / *error output* B_H	
24	TEST	TEST-Eingang / *test input*	

EIN-/AUSGÄNGE / *inputs/outputs / entrées/sorties*									
Pin *pin*	**EINGÄNGE** *INPUTS*	**Konfiguration** *configuration*	**AUSGÄNGE** *OUTPUTS*	**Konfiguration** *configuration*			**diagnosefähig*** *diagnostic capability** *INPUT / OUTPUT*	**relaisgeschaltet** *relay switched*
08	%IX0.00 / %IW03	B_L A	–	–			• / –	
27	%IX0.01 / %IW04	B_L A	–	–			• / –	
09	%IX0.02 / %IW05	B_L A	–	–			• / –	
28	%IX0.03 / %IW06	B_L A	–	–			• / –	
10	%IX0.04 / %IW07	B_L A	–	–			• / –	
29	%IX0.05 / %IW08	B_L A	–	–			• / –	
11	%IX0.06 / %IW09	B_L A	–	–			• / –	
30	%IX0.07 / %IW10	B_L A	–	–			• / –	
44	%IX0.08	B_L	%QX0.00	B_H	PWM	PWM_I	– / •	VBB_O (1)
45	%IX0.09	B_L	%QX0.01	B_H	PWM	PWM_I	– / •	VBB_O (1)
46	%IX0.10	B_L	%QX0.02	B_H	PWM	PWM_I	– / •	VBB_O (1)
47	%IX0.11	B_L	%QX0.03	B_H	PWM	PWM_I	– / •	VBB_O (1)
20	%IX0.12	B_L I_L (FRQ0)	–	–			• / –	
02	%IX0.13	B_L I_L (FRQ1)	–	–			• / –	
21	%IX0.14	B_L I_L (FRQ2)	–	–			• / –	
38	%IX0.15	B_L I_L (FRQ3)	–	–			• / –	
36	%IX1.00	B_L	%QX0.04	B_H	PWM	PWM_I	– / •	VBB_R (2)
54	%IX1.01	B_L	%QX0.05	B_H	PWM	PWM_I	– / •	VBB_R (2)
17	%IX1.02	B_L	%QX0.06	B_H	PWM	PWM_I	– / •	VBB_R (2)
53	%IX1.03	B_L	%QX0.07	B_H	PWM	PWM_I	– / •	VBB_R (2)
19	%IX1.04	$B_{L/H}$ I_L (CYL0)	–	–			• / –	
55	%IX1.05	$B_{L/H}$ I_L (CYL1)	–	–			• / –	
18	%IX1.06	$B_{L/H}$ I_L (CYL2)	–	–			• / –	
37	%IX1.07	$B_{L/H}$ I_L (CYL3)	–	–			• / –	
39	%IX1.08	$B_{L/H}$	%QX0.08	B_H			• / •	VBB_O (1)
03	%IX1.09	$B_{L/H}$	%QX0.09	B_H			• / •	VBB_O (1)
40	%IX1.10	$B_{L/H}$	%QX0.10	B_H			• / •	VBB_O (1)
22	%IX1.11	$B_{L/H}$	%QX0.11	B_H			• / •	VBB_O (1)
41	%IX1.12	$B_{L/H}$	%QX0.12	B_H			• / •	VBB_O (1)
42	%IX1.13	$B_{L/H}$	%QX0.13	B_H			• / •	VBB_O (1)
43	%IX1.14	$B_{L/H}$	%QX0.14	B_H			• / •	VBB_O (1)
04	%IX1.15	$B_{L/H}$	%QX0.15	B_H			• / •	VBB_O (1)
48	%IX2.00	B_L	%QX1.00	B_H	PWM		• / •	VBB_R (2)
49	%IX2.01	B_L	%QX1.01	$B_{H/L}$		H-Bridge	• / •	VBB_R (2)
31	%IX2.02	B_L	%QX1.02	$B_{H/L}$		H-Bridge	• / •	VBB_R (2)
50	%IX2.03	B_L	%QX1.03	B_H	PWM		• / •	VBB_R (2)
51	%IX2.04	B_L	%QX1.04	B_H	PWM		• / •	VBB_R (2)
52	%IX2.05	B_L	%QX1.05	$B_{H/L}$		H-Bridge	• / •	VBB_R (2)
16	%IX2.06	B_L	%QX1.06	$B_{H/L}$		H-Bridge	• / •	VBB_R (2)
35	%IX2.07	B_L	%QX1.07	B_H	PWM		• / •	VBB_R (2)

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ANSCHLUSSBELEGUNG / *wiring / branchement*			**CPU 2**
Pin	**Potential**	**Bezeichnung** / *description*	**Bemerkung** / *note*
23	VBB_S (10...32 V DC)	Versorgung Sensoren und Modul / *supply sensors and module*	
05	VBB_O (10...32 V DC)	Versorgung Ausgänge / *supply outputs*	relaisgeschaltet / *relay switched* (1)
34	VBB_R (10...32 V DC)	Versorgung über Relais / *supply via relay*	relaisgeschaltet / *relay switched* (2)
01	GND_S	Masse Sensoren und Modul / *ground sensors and module*	
15	GND_O	Masse Ausgänge / *ground outputs*	
12	GND_A	Masse Analogeingänge / *ground analogue outputs*	
CAN, RS-232, ERROR, TEST			
Pin	**Potential**	**Bezeichnung** / *description*	**Bemerkung** / *note*
14	CAN1 $_H$	CAN-Interface 1 (High)	
32	CAN1 $_L$	CAN-Interface 1 (Low)	
26	CAN2 $_H$	CAN-Interface 2 (High)	SAE J 1939
25	CAN2 $_L$	CAN-Interface 2 (Low)	SAE J 1939
33	GND	Masse / *ground* (RS-232/CAN)	
06	RxD	RS-232 Interface (Programmierung / *programming*)	Pin 03, PC D-Sub (9 pin)
07	TxD	RS-232 Interface (Programmierung / *programming*)	Pin 02, PC D-Sub (9 pin)
13	ERROR	Fehlerausgang B_H / *error output* B_H	
24	TEST	TEST-Eingang / *test input*	

EIN-/AUSGÄNGE / *inputs/outputs / entrées/sorties*

Pin *pin*	**EINGÄNGE** *INPUTS*	**Konfiguration** *configuration*	**AUSGÄNGE** *OUTPUTS*	**Konfiguration** *configuration*	**diagnosefähig*** *diagnostic capability** *INPUT / OUTPUT*	**relaisgeschaltet** *relay switched*
08	%IX32.00 / %IW35	B_L A	–	–	• / –	
27	%IX32.01 / %IW36	B_L A	–	–	• / –	
09	%IX32.02 / %IW37	B_L A	–	–	• / –	
28	%IX32.03 / %IW38	B_L A	–	–	• / –	
10	%IX32.04 / %IW39	B_L A	–	–	• / –	
29	%IX32.05 / %IW40	B_L A	–	–	• / –	
11	%IX32.06 / %IW41	B_L A	–	–	• / –	
30	%IX32.07 / %IW42	B_L A	–	–	• / –	
44	%IX32.08	B_L	%QX32.00	B_H PWM PWM_I	– / •	VBB_O (1)
45	%IX32.09	B_L	%QX32.01	B_H PWM PWM_I	– / •	VBB_O (1)
46	%IX32.10	B_L	%QX32.02	B_H PWM PWM_I	– / •	VBB_O (1)
47	%IX32.11	B_L	%QX32.03	B_H PWM PWM_I	– / •	VBB_O (1)
20	%IX32.12	B_L I_L (FRQ0)	–	–	• / –	
02	%IX32.13	B_L I_L (FRQ1)	–	–	• / –	
21	%IX32.14	B_L I_L (FRQ2)	–	–	• / –	
38	%IX32.15	B_L I_L (FRQ3)	–	–	• / –	
36	%IX33.00	B_L	%QX32.04	B_H PWM PWM_I	– / •	VBB_R (2)
54	%IX33.01	B_L	%QX32.05	B_H PWM PWM_I	– / •	VBB_R (2)
17	%IX33.02	B_L	%QX32.06	B_H PWM PWM_I	– / •	VBB_R (2)
53	%IX33.03	B_L	%QX32.07	B_H PWM PWM_I	– / •	VBB_R (2)
19	%IX33.04	$B_{L/H}$ I_L (CYL0)	–	–	• / –	
55	%IX33.05	$B_{L/H}$ I_L (CYL1)	–	–	• / –	
18	%IX33.06	$B_{L/H}$ I_L (CYL2)	–	–	• / –	
37	%IX33.07	$B_{L/H}$ I_L (CYL3)	–	–	• / –	
39	%IX33.08	$B_{L/H}$	%QX32.08	B_H	• / •	VBB_O (1)
03	%IX33.09	$B_{L/H}$	%QX32.09	B_H	• / •	VBB_O (1)
40	%IX33.10	$B_{L/H}$	%QX32.10	B_H	• / •	VBB_O (1)
22	%IX33.11	$B_{L/H}$	%QX32.11	B_H	• / •	VBB_O (1)
41	%IX33.12	$B_{L/H}$	%QX32.12	B_H	• / •	VBB_O (1)
42	%IX33.13	$B_{L/H}$	%QX32.13	B_H	• / •	VBB_O (1)
43	%IX33.14	$B_{L/H}$	%QX32.14	B_H	• / •	VBB_O (1)
04	%IX33.15	$B_{L/H}$	%QX32.15	B_H	• / •	VBB_O (1)
48	%IX34.00	B_L	%QX33.00	B_H PWM	• / •	VBB_R (2)
49	%IX34.01	B_L	%QX33.01	$B_{H/L}$ H-Bridge	• / •	VBB_R (2)
31	%IX34.02	B_L	%QX33.02	$B_{H/L}$ H-Bridge	• / •	VBB_R (2)
50	%IX34.03	B_L	%QX33.03	B_H PWM	• / •	VBB_R (2)
51	%IX34.04	B_L	%QX33.04	B_H PWM	• / •	VBB_R (2)
52	%IX34.05	B_L	%QX33.05	$B_{H/L}$ H-Bridge	• / •	VBB_R (2)
16	%IX34.06	B_L	%QX33.06	$B_{H/L}$ H-Bridge	• / •	VBB_R (2)
35	%IX34.07	B_L	%QX33.07	B_H PWM	• / •	VBB_R (2)

Noter le double raccordement des broches des entrées/sorties.

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Fehlerliste - Error list AC50-1 AC80-2

Erstellt von: Michael Weber, 1430 Stand: 03.01.2008

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Code	DE	UK	ES
Err 1100	Traglasttabellentransfer fehlerhaft	Load table transfer failed	Error transferencia de tabla
Err 1101	Traglasttabelle nicht verfügbar	Load table not available	Tabla de carga no disponible
Err 1102	Traglasttabelle Checksummenfehler	Checksum error load table	Checksum error tabla de carga
Err 1103	Falsche Traglasttabelle	Wrong load table	Tabla de carga erronea
Err 1104	Traglasttabelle fehlerhaft	Load table defective	Tabla de carga defectuosa
Err 1105	Sprachtabelle nicht verfügbar	Language not available	Idioma no disponible
Err 1106	Sprachtabelle fehlerhaft	Language defective	Idioma defectuoso
Err 1107	Retain-Datenkonsistenz Sensorik	Retain data consistency - sensors	Retención consistencia de datos- sensores
Err 1108	Retain-Datenkonsistenz Optionen	Retain data consistency - options	Retención consistencia de datos - opciones
Err 1109	Retain-Datenkonsistenz Eigenschaften	Retain data consistency - properties	Retención consistencia de datos- propiedades
Err 1110	Retain-Datenkonsistenz Korrekturwerte	Retain data consistency - corr. Values	Retención consistencia de datos- valores de corrección
Err 1111	Dataloggerdatei nicht vorhanden	Datalogger file N/A	Archivo datalogger no disponible
Err 1112	Dataloggerdatei kann nicht kopiert werden	Datalogger file can't be copied	Archivo datalogger no puede ser copiado
Err 1113	PCMCIA-Karte nicht verfügbar	PCMCIA-Card N/A	Tarjeta PCMCIA no disponible
Err 1114	Kranparameter nicht verfügbar	Crane parameters N/A	Parámetros de grúa no disponibles
Err 1115	Kranparameter fehlerhaft	Crane parameters defective	Parámetros de grúa defectuosos
Err 1116	Kranparameter schreiben fehlerhaft	Crane parameters write error	Error escritura parámetros de grúa
Err 1117	Baunummer ungültig	Serial no. not valid	Número de serie inválido
Err 1200	Längengeber1 <3mA	Length trans. 1 <3mA	Transmisor longitud 1 <3mA
Err 1201	Längengeber1 >21mA	Length trans. 1 >21mA	Transmisor longitud 1 >21mA
Err 1202	Längengeber2 <3mA	Length trans. 2 <3mA	Transmisor longitud 2 <3mA
Err 1203	Längengeber2 >21mA	Length trans. 2 >21mA	Transmisor longitud 2 >21mA
Err 1204	Längengeber3 <3mA	Length trans. 3 <3mA	Transmisor longitud 3 <3mA
Err 1205	Längengeber3 >21mA	Length trans. 3 >21mA	Transmisor longitud 3 >21mA
Err 1206	WinkelgeberHA <3mA	Anlge trans. MB <3mA	Ángulo de pluma <3mA
Err 1207	WinkelgeberHA >21mA	Anlge trans. MB >21mA	Ángulo de pluma >21mA
Err 1208	P Wippzylinder <3mA	P Luffing cyl.<3mA	Pres. cil. basc. <3mA
Err 1209	P Wippzylinder >21mA	P Luffing cyl.>21mA	Pres. cil. basc. >21mA
Err 1210	Drehwinkelgeber <3mA	Slew angle trans.<3mA	Transmisor ángulo giro <3mA
Err 1211	Drehwinkelgeber >21mA	Slew angle trans.>21mA	Transmisor ángulo giro >21mA
Err 1212	LängengeberHAV <3mA	MBE length trans.<3mA	Transmisor longitud plumin <3mA
Err 1213	LängengeberHAV >21mA	MBE length trans.>21mA	Transmisor longitud plumin >21mA
Err 1214	HES <3mA	A2B <3mA	HES <3mA
Err 1215	HES >21mA	A2B >21mA	HES >21mA

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Code	DE	UK	ES
Err 1216	DW Vorsteuerdruck KS	Slew gear pilot press. short	Corto circuito Presion pilotaje giro
Err 1217	DW Vorsteuerdruck LB	Slew gear pilot press. Open	Circ abierto Presion pilotaje giro
Err 1218	DW Bremse KS	Slew brake short	Corto circuito Freno giro
Err 1219	DW Bremse LB	Slew brake open	Circ. abierto Freno de giro
Err 1220	Wippwerk heben KS	luffing up short	Corto circuito Subir pluma
Err 1221	Wippwerk heben LB	luffing up open	Subir pluma circ. abierto
Err 1222	Wippwerk senken KS	luffing down short	bajar pluma corto circuito
Err 1223	Wippwerk senken LB	luffing down open	Bajar pluma circ. abierto
Err 1224	LMB-Freigabe KS	LMI Release short	Cortocircuito liberar LMB
Err 1225	LMB-Freigabe LB	LMI Release open	Interr. circuito liberar LMB
Err 1226	LMB-Summer KS	LMI Buzzer short	Aviso acust. cerrado
Err 1227	LMB-Summer LB	LMI Buzzer open	Aviso acust. activo
Err 1228	LMB-Summer GB KS	LMI Buzzer GB short	Aviso acust. cerrado GB
Err 1229	LMB-Summer GB LB	LMI Buzzer GB open	Aviso acust. activo GB
Err 1230	Drehwerksdrossel KS	Slew gear reduction short	Pilotaje giro cerrado
Err 1231	Drehwerksdrossel LB	Slew gear reduction open	Pilotaje giro abierto
Err 1232	LMB-Ampel grün KS	LMI Stop Light green short	Cortocircuito semáforo LMB verde
Err 1233	LMB-Ampel grün LB	LMI Stop Light green open	Circ. abierto semáforo LMB verde
Err 1234	LMB-Ampel gelb KS	LMI Stop Light yellwo open	Cortocircuito semáforo LMB amarillo
Err 1235	LMB-Ampel gelb LB	LMI Stop Light yellow short	Circ. abierto semáforo LMB amari.
Err 1236	LMB-Ampel rot KS	LMI Stop Light red open	Cortocircuito semáforo LMB rojo
Err 1237	LMB-Ampel rot LB	LMI Stop Light red short	Circ. abierto semáforo LMB rojo
Err 1238	Tele1 aus KS	Tele 1 extend short	Corto circ.Sacar tramo 1
Err 1239	Tele1 aus LB	Tele 1 extend open	Sacar tramo 1 circ.abierto
Err 1240	Tele2 aus KS	Tele 2 extend short	Corto circuito Sacar tramo 2
Err 1241	Tele2 aus LB	Tele 2 extend open	Sacar tramo 2 circ. abierto
Err 1242	Tele3 aus KS	Tele 3 extend short	Corto circuito Sacar tramo 3
Err 1243	Tele3 aus LB	Tele 3 extend open	Sacar tramo 3 circ.abierto
Err 1244	Tele1 ein KS	Tele 1 retract short	Corto circuito Recoger tramo 1
Err 1245	Tele1 ein LB	Tele 1 retract open	Recoger tramo 1 circ. abierto
Err 1246	Tele2 ein KS	Tele 2 retract short	Corto circuito Recoger tramo 2
Err 1247	Tele2 ein LB	Tele 2 retract open	Recoger tramo 2 circ. abierto
Err 1248	Tele3 ein KS	Tele 3 retract short	Corto circuito Recoger tramo 3
Err 1249	Tele3 ein LB	Tele 3 retract open	Recoger tramo 3 circ. abierto
Err 1250	HAV heben KS	MBE raise short	Cortocircuito elevar plumin
Err 1251	HAV heben LB	MBE raise open	Cicuito abierto elevar plumin
Err 1252	HAV senken KS	MBE lower short	Cortocircuito bajar plumin
Err 1253	HAV senken LB	MBE lower open	Circuito abierto bajar plumin

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Code	FR	NL	IT
Err 1100	erreur transfert capacité charge	draaglast tabellen verzenden fout	Trasf. errato della tabella di carico
Err 1101	capacité charge non disponible	draaglast tabellen niet voorhanden	Tabella di carico non disponibile
Err 1102	erreur checksum capacité charge	draaglast tabellen checksum fout	Somma errori della tabella di carico
Err 1103	mauvaise capacité de charge	verkeerde draaglast tabel	Tabella di carico errata
Err 1104	capacité charge défectueuse	fout in draaglast tabel	Tabella di carico avente errori
Err 1105	langue non disponible	spraak tabel niet voorhanden	Tabella linguistica non disponibile
Err 1106	langue défectueuse	spraak tabel fout	Tabella linguistica con errori
Err 1107	consistance des para. capteur	Retain data consistency - gevers	Sensori mis. consistenza dei dati
Err 1108	consistance des para. Options	Retain data consistency - opties	Opzioni consistenza dei dati
Err 1109	consistance des para. proprieté	Retain data consistency - eigenschappen	Proprietá consistenza dei dati
Err 1110	consistance des valeurs correct.	Retain data consistency - corr. Waarden	Valori di correz. consistenza dei dati
Err 1111	données datalogger non disponible	datalogger datei niet voorhanden	Valori del Data logger non disponibili
Err 1112	données datalogger non copiable	datalogger datei kopieeren niet mogelijk	La file del Datalogger non é copiabile
Err 1113	carte PCMCIA non disponible	PCMCIA kaart niet voorhanden	Carta PCMCIA non disponibile
Err 1114	param. grue non disponible	kraan parameter niet voorhanden	Parametri gru non disponibili
Err 1115	param. grue défectueux	kraan parameter fouttief	Parametri gru difettosi
Err 1116	erreur écrit. Param. grue	kraan parameter fouttief geschreven	Parametri gru scrivono con errori
Err 1117	num. série non valide	bouwnummer fouttief	Numero di serie non valido
Err 1200	trans. longueur 1 <3mA	lengte gever 1 < 3mA	Trasm lunghezza1 <3mA
Err 1201	trans. longueur 1 >21mA	lengte gever 1 > 21mA	Trasm lunghezza1 >21mA
Err 1202	trans. longueur 2 <3mA	lengte gever 2 < 3mA	Trasm lunghezza2 <3mA
Err 1203	trans. longueur 2 >21mA	lengte gever 2 > 21mA	Trasm lunghezza2 >21mA
Err 1204	trans. longueur 3 <3mA	lengte gever 3 < 3mA	Trasm lunghezza3 <3mA
Err 1205	trans. longueur 3 >21mA	lengte gever 3 > 21mA	Trasm lunghezza3 >21mA
Err 1206	trans. angle flèche <3mA	hoek gever HM < 3mA	Trasm angol. Braccio <3mA
Err 1207	trans. angle flèche >21mA	hoek gever HM > 21mA	Trasm angol. Braccio >21mA
Err 1208	press. cyl. relevage <3mA	druk topzylinder < 3mA	Press. Cil brandeggio <3mA
Err 1209	press. cyl. relevage >21mA	druk topzylinder > 21mA	Press. Cil brandeggio >21mA
Err 1210	trans. angle orientation <3mA	zwenk hoek gever < 3mA	Trasm rotaz. <3mA
Err 1211	trans. angle orientation >21mA	zwenk hoek gever > 21mA	Trasm rotaz. >21mA
Err 1212	trans. longueur ral. flèche <3mA	lengte gever jib < 3mA	Trasm lunghezza prolunga <3mA
Err 1213	trans. longueur ral. flèche <3mA	lengte gever jib > 21mA	Trasm lunghezza prolunga >21mA
Err 1214	FDC <3mA	HES <3mA	Finec. Salita <3mA
Err 1215	FDC >21mA	HES >21mA	Finec. Salita >21mA

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Code	FR	NL	IT
Err 1216	court-circ. Pression pilote d´orientation	ZW voorbesturings druk KS	Corto circuito press. pilota rotaz.
Err 1217	circ.ouvert Pression pilote d´orientation	ZW voorbesturings druk LB	Circuito aperto press. pilota rotaz.
Err 1218	court-circ. frein d´orientation	zwenk rem KS	Corto circuito freno rotaz.
Err 1219	circ.ouvert frein d´orientation	zwenk rem LB	Circuito aperto freno rotaz.
Err 1220	court-circ. élever relevage	optoppen KS	Corto circuito sollev. Brandeggio
Err 1221	circ. ouvert èlever relevage	optoppen LB	Circuito aperto sollev. brandeggio
Err 1222	court-circ. abaisser relevage	aftoppen KS	Corto circuito abbass. Brandeggio
Err 1223	circ. ouvert abaisser relevage	aftoppen LB	Circuito aperto abbass. brandeggio
Err 1224	court-circ. déblocage CEC	LMB vrijgave KS	Corto circuito consenso LIM
Err 1225	circ. ouvert déblocage CEC	LMB vrijgave LB	Circuito aperto consenso LIM
Err 1226	court-circ. avertisseur CEC	LMB zoemer KS	Corto circuito sonetta LIM
Err 1227	circ. ouvert avertisseur CEC	LMB zoemer LB	Circuito aperto sonetta LIM
Err 1228	court-circ. avertisseur CEC GB	LMB zoemer GB KS	Corto circuito consenso LIM per GB
Err 1229	circ. ouvert avertisseur CEC GB	LMB zoemer GB LB	Circuito aperto consenso LIM per GB
Err 1230	court-circ.réduction d'orientation	zwenk smoring KS	Corto circuito riduz. rotaz.
Err 1231	circ. ouvert réduction d'orientation	zwenk smoring LB	Circuito aperto riduz. Rotaz.
Err 1232	court-circ. voyant vert CEC	LMB SCK groen KS	Corto circuito semaforo LIM verde
Err 1233	circ. ouvert voyant vert CEC	LMB SCK groen LB	Circuito aperto semaforo LIM verde
Err 1234	court-circ. voyant jaune CEC	LMB SCK geel KS	Corto circuito semaforo LIM giallo
Err 1235	circ. ouvert voyant jaune CEC	LMB SCK geel LB	Circuito aperto semaforo LIM giallo
Err 1236	court-circ. voyant rouge CEC	LMB SCK rood KS	Corto circuito semaforo LIM rosso
Err 1237	circ. ouvert voyant rouge CEC	LMB SCK rood LB	Circuito aperto semaforo LIM rosso
Err 1238	court-circ.sortir télé 1	Tele 1 uit KS	Corto circuito su sfilam. Tele 1
Err 1239	circ. ouvert sortir télé 1	Tele 1 uit LB	Circuito aperto su sfilam. Tele 1
Err 1240	court-circ.sortir télé 2	Tele 2 uit KS	Corto circuito su sfilam. Tele 2
Err 1241	circ. ouvert sortir télé 2	Tele 2 uit LB	Circuito aperto su sfilam. Tele 2
Err 1242	court-circ.sortir télé 3	Tele 3 uit KS	Corto circuito su sfilam. Tele 3
Err 1243	circ. ouvert sortir télé 3	Tele 3 uit LB	Circuito aperto su sfilam. Tele 3
Err 1244	court-circ.rentrer télé 1	Tele 1 in KS	Corto circuito su rientro Tele 1
Err 1245	circ. ouvert rentrer télé 1	Tele 1 in LB	Circuito aperto su rientro Tele 1
Err 1246	court-circ. rentrer télé 2	Tele 2 in KS	Corto circuito su rientro Tele 2
Err 1247	circ. ouvert rentrer télé 2	Tele 2 in LB	Circuito aperto su rientro Tele 2
Err 1248	court-circ. rentrer télé 3	Tele 3 in KS	Corto circuito su rientro Tele 3
Err 1249	circ. ouvert rentrer télé 3	Tele 3 in LB	Circuito aperto su rientro Tele 3
Err 1250	court-circ. élever rallonge de flèche	jib heffen KS	Corto circuito su sollev. Prolunga
Err 1251	circ. ouvert élever rallonge de flèche	jib heffen LB	Circuito aperto su sollev. Prolunga
Err 1252	court-circ. abaisser rallonge de flèche	jib zakken KS	Corto circuito su abbass. Prolunga
Err 1253	circ. ouvert abaisser rallonge de flèche	jib zakken LB	Circuito aperto su abbass. Prolunga

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Code	NO	max. Anzahl Zeichen	Erklärung
Err 1100	Feil tabelloverføring		
Err 1101	Løftetabell ikke tilgjengelig		
Err 1102	Feil checksum for tabell		
Err 1103	Feil løftetabell		
Err 1104	Feil i løftetabell		
Err 1105	Språktabell ikke tilgjengelig		
Err 1106	Feilaktig språktabell		
Err 1107	Retain-datakonsistens sensorik		Retain-Datenkonsistenz Geberwerte
Err 1108	Retain-datakonsistens opsjoner		
Err 1109	Retain-datakonsistens egenskaper		Retain-Datenkonsistenz Einstellungen
Err 1110	Retain-datakonsistens korrekturverdier		
Err 1111	Dataloggerdata ikke tilgjengelige		
Err 1112	Dataloggerdata kan ikke kopieres		
Err 1113	PCMCIA-kort ikke tilgjengelig		
Err 1114	Kranparameter ikke tilgjengelig		
Err 1115	Feilaktig kranparameter		
Err 1116	Feilaktig skriving av kranparameter		
Err 1117	Ugyldig serienummer		
Err 1200	Lengdegiver 1 <3mA	36	Der Längengeber 1 liefert ein Signal kleiner 3 mA
Err 1201	Lengdegiver 1 >21mA	36	Der Längengeber 1 liefert ein Signal grösser 21 mA
Err 1202	Lengdegiver 2 <3mA	36	s.o.
Err 1203	Lengdegiver 2 >21mA	36	s.o.
Err 1204	Lengdegiver 3 <3mA	36	s.o.
Err 1205	Lengdegiver 3 >21mA	36	s.o.
Err 1206	Vinkelgiver HA <3mA	36	s.o.
Err 1207	Vinkelgiver HA >21mA	36	s.o.
Err 1208	Trykkgiver bomløftsylinder <3mA	36	s.o.
Err 1209	Trykkgiver bomløftsylinder >21mA	36	s.o.
Err 1210	Svingvinkelgiver <3mA	36	s.o.
Err 1211	Svingvinkelgiver >21mA	36	s.o.
Err 1212	Lengdegiver HAV <3mA	36	s.o.
Err 1213	Lengdegiver HAV >21mA	36	s.o.
Err 1214	HEB <3mA	36	s.o.
Err 1215	HEB >21mA	36	s.o.

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Code	NO	max. Anzahl Zeichen	Erklärung
Err 1216	Svingverk styretrykk kortslutning	36	elektr. Kurzschluß im Vorsteuerdruckventil Drehwerk
Err 1217	Svingverk styretrykk ledningsbrudd	36	elektr. Leitungsbruch im Vorsteuerdruckventil Drehwerk
Err 1218	Svingverksbremse kortslutning	36	
Err 1219	Svingverksbremse ledningsbrudd	36	
Err 1220	Bomløft opp kortslutning	36	
Err 1221	Bomløft opp ledningsbrudd	36	
Err 1222	Bomløft senk kortslutning	36	
Err 1223	Bomløft senk kabelbrudd	36	
Err 1224	LMB-innkobling kortslutning	36	
Err 1225	LMB-innkobling kabelbrudd	36	
Err 1226	LMB-summer kortslutning	36	
Err 1227	LMB-summer kabelbrudd	36	
Err 1228	LMB-summer GB kortslutning	36	
Err 1229	LMB-summer GB kabelbrudd	36	
Err 1230	Svingverksdrossel kortslutning	36	
Err 1231	Svingverksdrossel kabelbrudd	36	
Err 1232	LMB varsellys grønt kortslutning	36	
Err 1233	LMB varsellys grønt kabelbrudd	36	
Err 1234	LMB varsellys gult kortslutning	36	
Err 1235	LMB varsellys gult kabelbrudd	36	
Err 1236	LMB varsellys rødt kortslutning	36	
Err 1237	LMB varsellys rødt kabelbrudd	36	
Err 1238	Tele 1 ut kortslutning	36	
Err 1239	Tele 1 ut kabelbrudd	36	
Err 1240	Tele 2 ut kortslutning	36	
Err 1241	Tele 2 ut kabelbrudd	36	
Err 1242	Tele 3 ut kortslutning	36	
Err 1243	Tele 3 ut kabelbrudd	36	
Err 1244	Tele 1 inn kortslutning	36	
Err 1245	Tele 1 inn kabelbrudd	36	
Err 1246	Tele 2 inn kortslutning	36	
Err 1247	Tele 2 inn kabelbrudd	36	
Err 1248	Tele 3 inn kortslutning	36	
Err 1249	Tele 3 inn kabelbrudd	36	
Err 1250	HAV oppkortslutning	36	
Err 1251	HAV opp kabelbrudd	36	
Err 1252	HAV senk kortslutning	36	
Err 1253	HAV senk kabelbrudd	36	

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