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TOYOTA

REPAIR MANUAL

8FBE10, 13 , 15, 18, 20

VOL. 2

Pub. No. CE208

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FOREWORD

This Manual (Volume 2) contains electrical wiring diagrams, diagnosis and service procedures of electrical controller and display of the TOYOTA ELECTRICAL POWERED FORKLIFT 8FBE10 to 20 series.

For maintenance, specifications and repair procedure for the chassis, body and material handling system, please refer to Volume 1 (Pub. No. CE207) issued simultaneously.

Please use these manuals for providing quick, correct servicing of the corresponding forklift models.

This manual deals with the above models as of November, 2015. Please understand that disagreement can take place between the descriptions in the manual and actual vehicles due to change in design and specifications. Any change or modifications thereafter will be informed by Toyota Industrial Equipment Parts & Service News.

(Reference)
Repair manuals related to this manual are as follows:

TOYOTA INDUSTRIAL EQUIPMENT 8FBE10, 13, 15, 18, 20
NEW MODEL FEATURES (Pub. No. PE203)

TOYOTA INDUSTRIAL EQUIPMENT 8FBE10, 13, 15, 18, 20
REPAIR MANUAL VOL.1 (Pub. No. CE207)

TOYOTA Material Handling Company
A Division of TOYOTA INDUSTRIES CORPORATION

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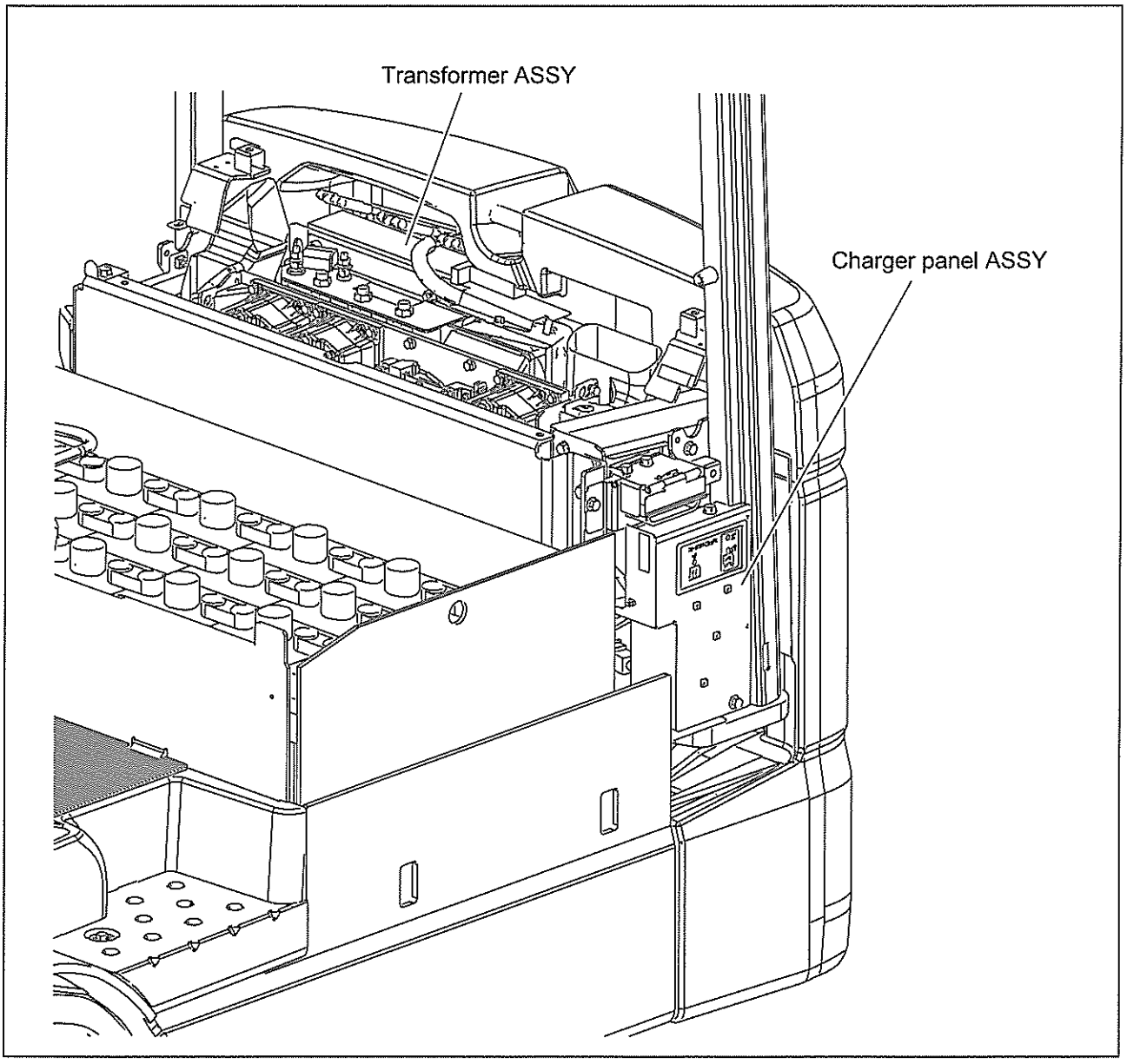
1 CHARGER

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1.1 GENERAL

An on-vehicle fully automatic microcomputer controlled charger (OPT) and an off-vehicle fully automatic microcomputer controlled charger (OPT) are available.
An on-vehicle charger is not available for the cold storage and marine models.
This manual mostly describes an on-vehicle charger.

1.2 ON-VEHICLE CAHRGER



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1.2.1 APPLICABLE CHARGER LIST

○ : OPT

Transformer type	Power voltage (V)	Transformer capacity (kVA) (50/60Hz)	Battery voltage (V)	Applicable capacity (AH/5HR)	Power capacity (A) (50/60Hz)	Applicable vehicle model				
						8FBE 10	8FBE 13	8FBE 15	8FBE 18	8FBE 20
K47-227C048-422	200	4.3/4.5	48	280 to 320	15/15	○	○			
K47-240C048-427	↑	5.7/6.3	↑	370 to 390	20/20	○	○	○	○	○
K47-260C048-415	↑	7.4/7.6	↑	470 to 645	30/30			○	○	○

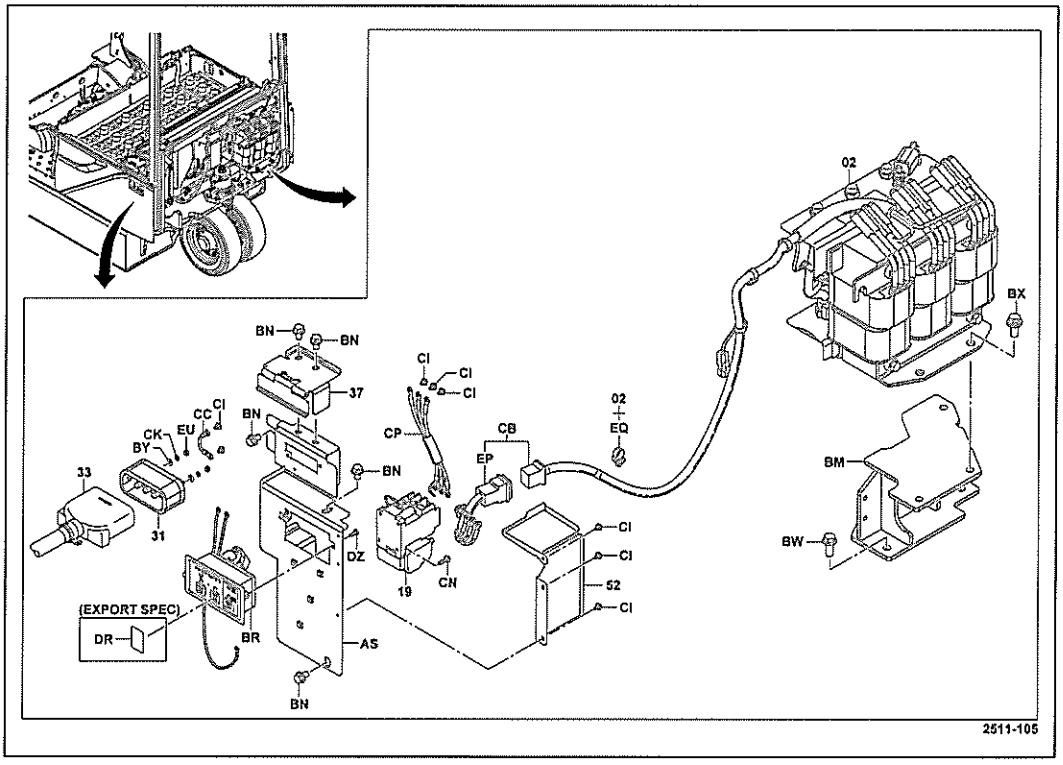
1.2.2 SPECIFICATIONS

Item		Transformer type
		K47-227C048-422
Correct battery voltage / capacity		48V, 280 to 320 Ah
Magnetic switch (MSch)	Type	CLK-20JT-FC
	Rating	20 A
	Thermal set value	18 A
Transformer (TF)	Capacity (50/60Hz)	4.3/4.5 kVA
	Insulation	Type H
	Weight	Approx. 27 kg
Diode (Dch)	Type	SKR71/02、SKN71/02
Fuse (Fch)	Capacity	96 V, 80 A

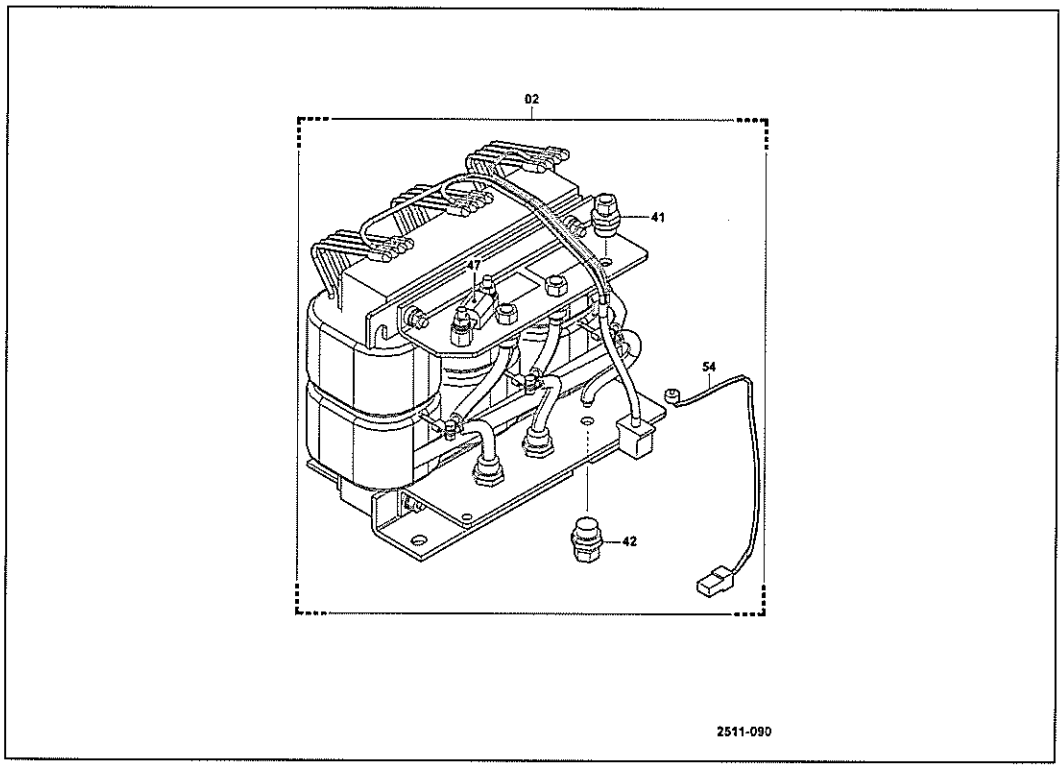
Item		Transformer type
		K47-240C048-427
Correct battery voltage / capacity		48V, 370 to 390 Ah
Magnetic switch (MSch)	Type	FW-1S/3Q
	Rating	26 A
	Thermal set value	26 A
Transformer (TF)	Capacity (50/60Hz)	5.7/6.3 kVA
	Insulation	Type H
	Weight	Approx. 34 kg
Diode (Dch)	Type	SKR71/02, SKN71/02
Fuse (Fch)	Capacity	96 V, 80 A

Item		Transformer type
		K47-260C048-415
Correct battery voltage / capacity		48 V, 470 to 645 Ah
Magnetic switch (MSch)	Type	FW-1S/3Q
	Rating	26 A
	Thermal set value	26 A
Transformer (TF)	Capacity (50/60Hz)	7.4/7.6 kVA
	Insulation	Type H
	Weight	Approx. 39 kg
Diode (Dch)	Type	SKR100/04, SKN100/04
Fuse (Fch)	Capacity	96 V, 100 A

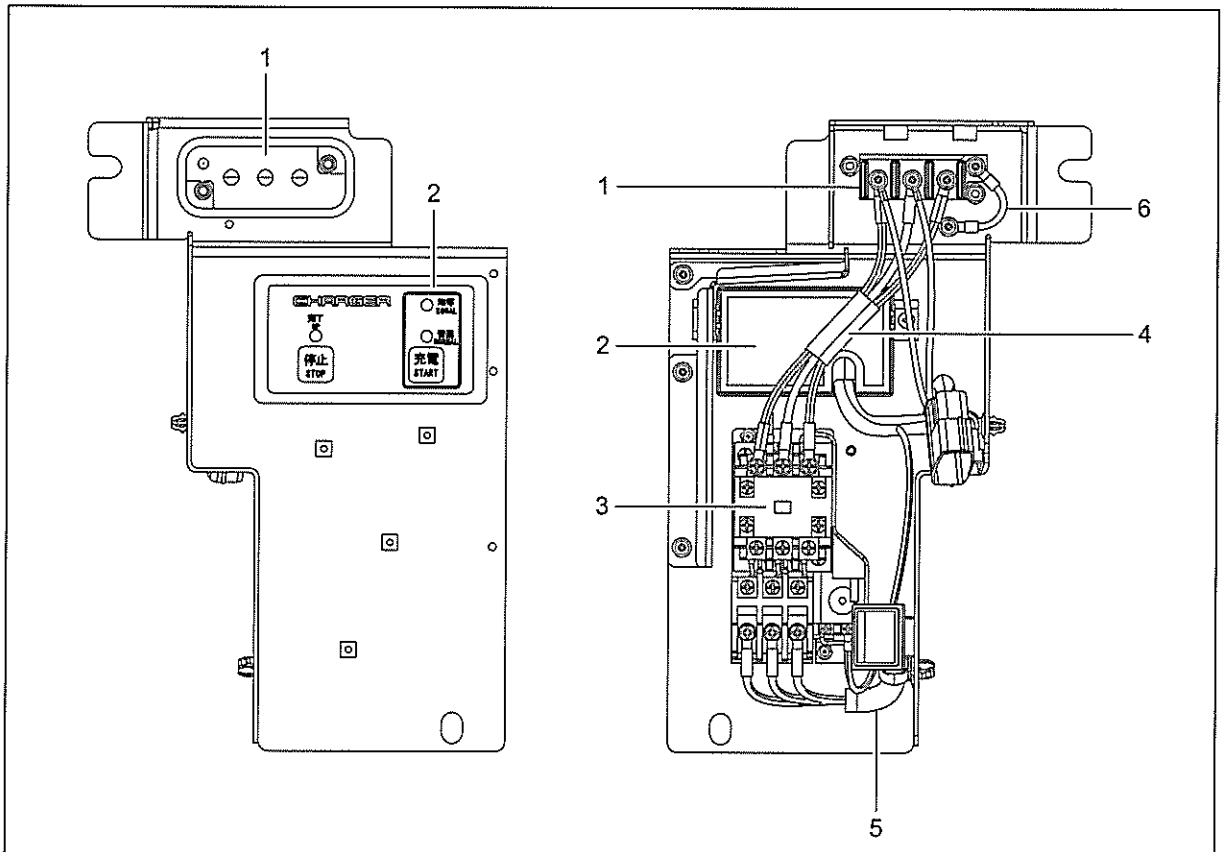
1.2.3 COMPONENTS



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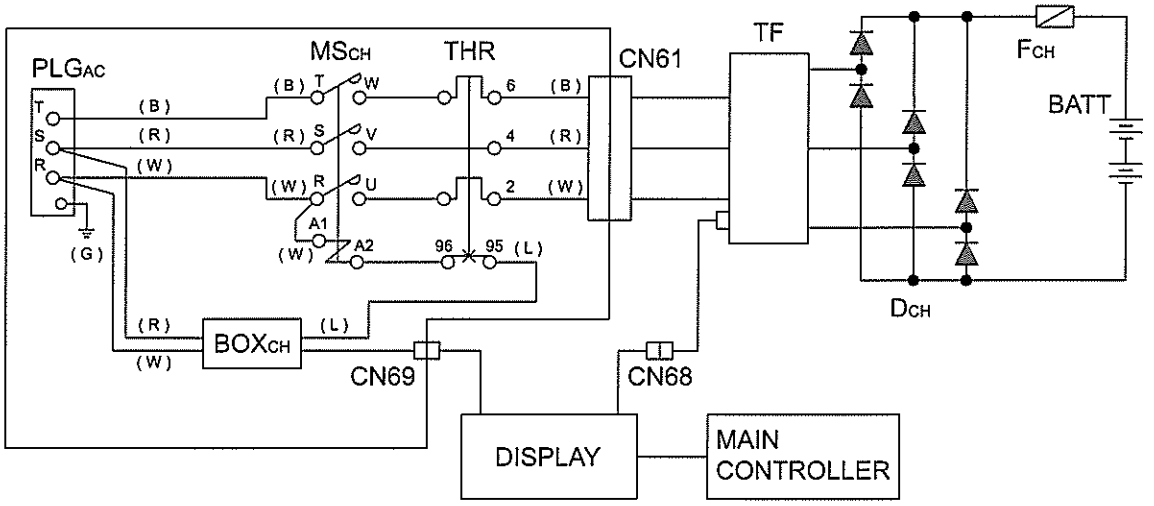


Charger panel ASSY

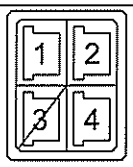


No.	Parts name	No.	Parts name
1	AC power plug	4	Plug harness
2	Operation panel	5	Magnet harness
3	Magnetic switch	6	Wire No.3

1.2.4 CIRCUIT DIAGRAM

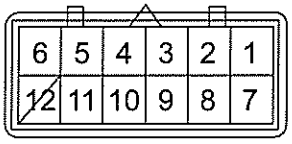


The letter inside the brackets indicates the wiring color.



CN61

No.	Potential	Where the circuit is connected	Wiring color
1	U	TRANS	W
2	V	TRANS	R
3	—	—	—
4	W	TRANS	B

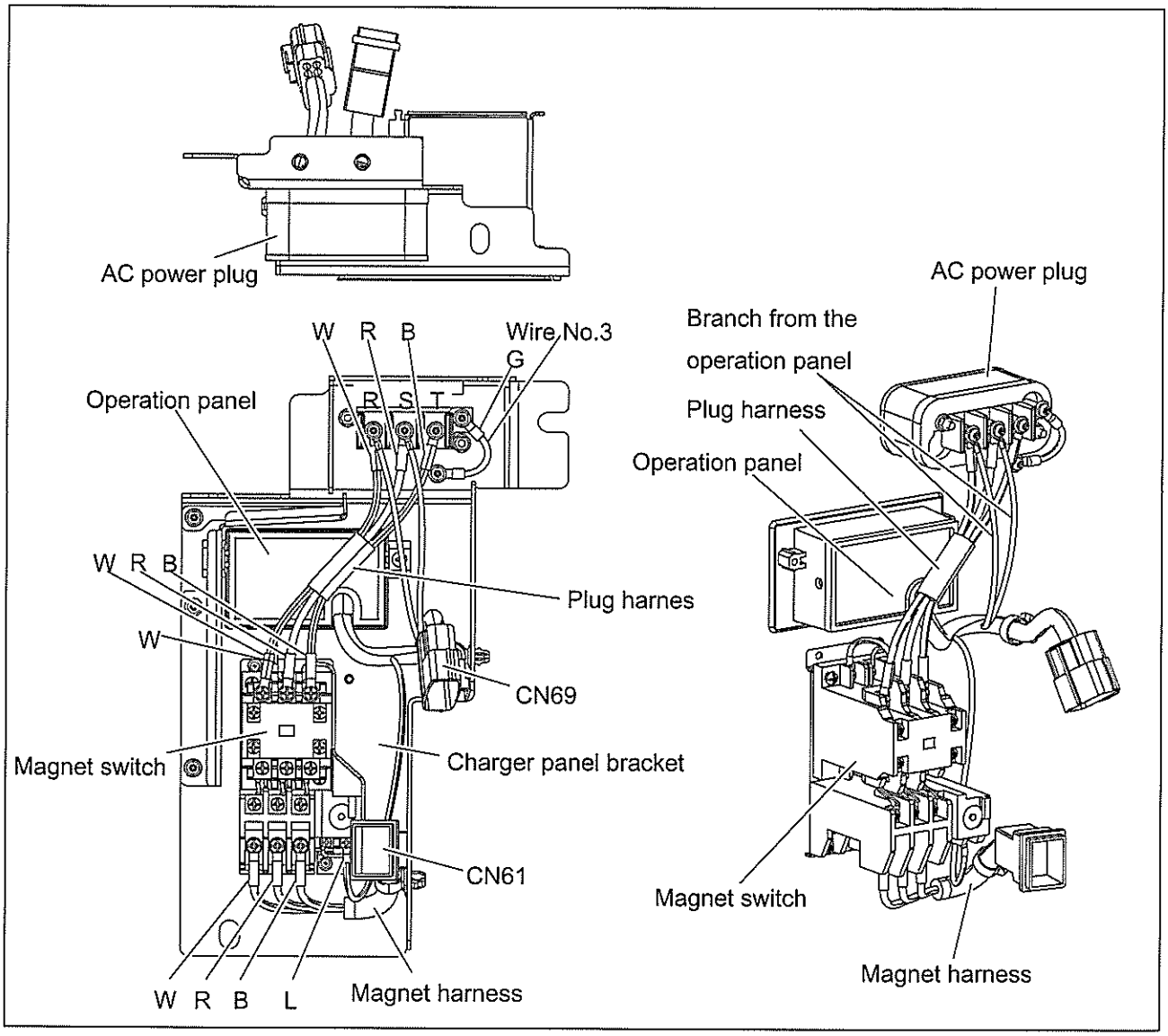


CN69

No.	Potential	Where the circuit is connected	Wiring color
1	132	CHGMS	G-W
2	129	CHGAC	G-R
3	130	CHGGND	BR
4	128	CHG7V	R
5	121	SW3	G
6	122	SW2	Y
7	123	SW1	O
8	124	LED4	Y-W
9	125	LED3	Y-G
10	126	LED2	Y-B
11	127	LED1	Y-R
12	—	—	—

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Charger panel



The following table shows the tightening torque for the installation screw, bolt, and nut.

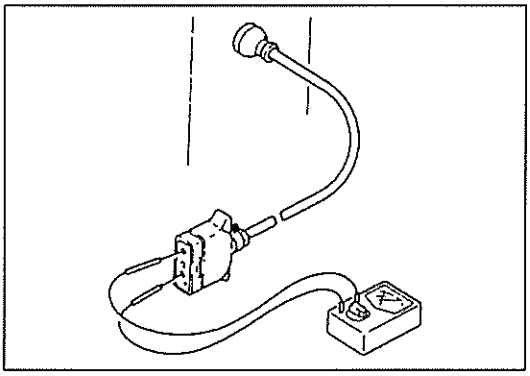
Nominal	Tightening torque T=N m (kgf-cm) [ft-lbf]
M3.5	0.6 to 0.8 (6.1 to 8.2) [0.5 to 0.6]
M4	1.3 to 1.7 (13.3 to 17.3) [1.0 to 1.3]

1.2.5 BEFORE CHARGING

If there is no enough current in a place of battery charge because current is already used by other electrical devices, contact an electrical contractor to install a circuit dedicated for the charger.

For the AC side power capacity, refer to page "APPLICABLE CHARGER LIST".

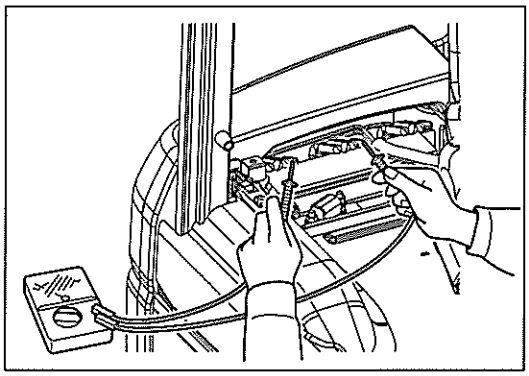
Tap changer



1. Measure power voltage used for charging.

   Tester range: AC (250 or 1000 V)

   NOTICE! Measure power voltage overnight (if not possible, measure during a lunch break when electrical devices stop operating).



2. Set the tap changer.

   (1) Disconnect the battery plug.

   (2) Remove the rear cover and the rear lower cover.

   (3) Remove the tap cover of each phase corresponding to the power voltage measured in step 1.

   (4) Change the tap.

   (5) Connect the charge plug to the AC power plug and press the start switch.

   (6) Check the voltage between the taps that have been set.

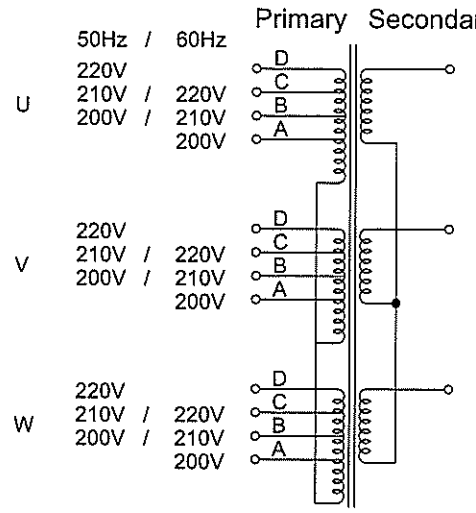
Tap	Measured voltage
200V	191 to 200 V
210V	201 to 210 V
220V	211 to 220 V

NOTICE

- The tap is set to 220 V at the time of shipment.
- Set the tap changer for three phases U, V, and W.
- After setting the tap changer, securely grasp the battery charge state (specific gravity, electrolyte level) for about a week to check if the tap settings are appropriate.

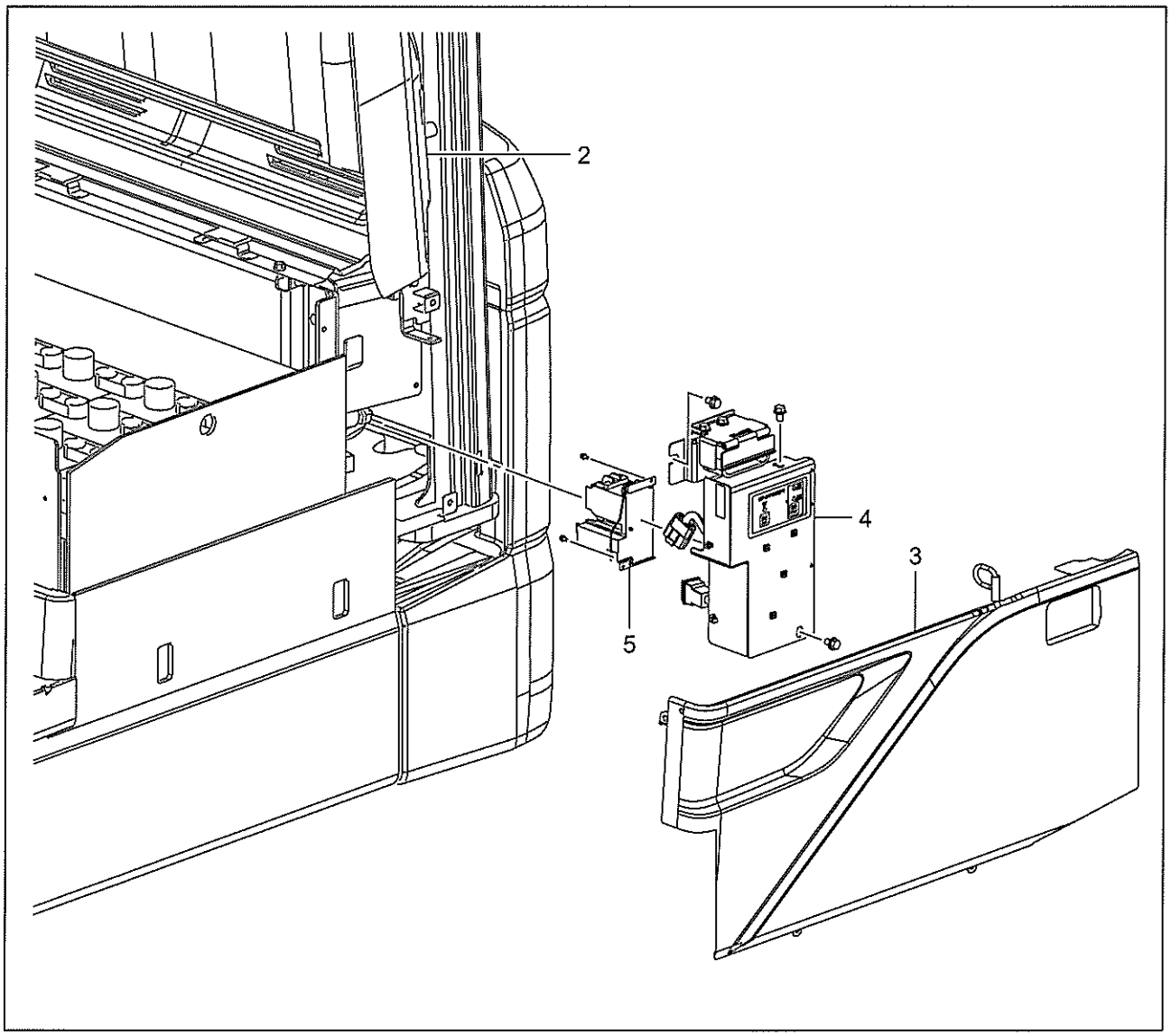
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Tap layout



1.2.6 MAGNET SWITCH ASSY

1.2.6.1 REMOVAL, INSPECTION AND INSTALLATION



REMOVAL PROCEDURE

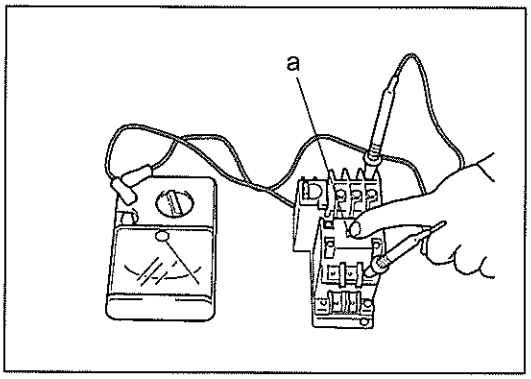
1. Disconnect the battery plug.
2. Open the battery hood.
3. Remove the side hood (LH).
4. Remove the charger panel ASSY while disconnecting the wiring for the panel.
5. Remove the magnet switch ASSY.**[Point 1]**

Installation Procedure

The installation procedure is the reverse of the removal procedure.

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Point Operation



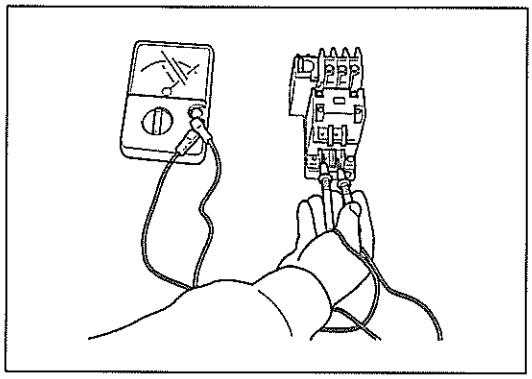
[Point 1]

Inspection:

Inspect the continuity of the magnet switch contact point.

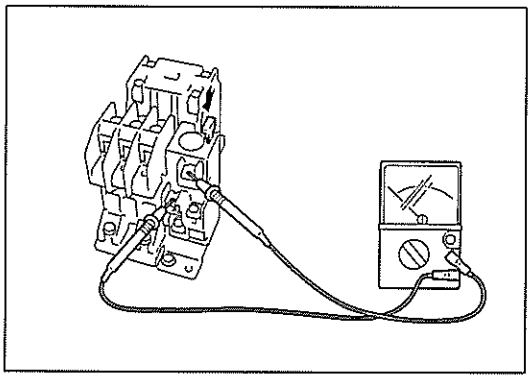
Tester range Ω x 1
Measurement terminal T - W, S - V, R - U
Standard
Msch ON: 0 Ω
Msch OFF: ∞ Ω

a: Press MSch: ON



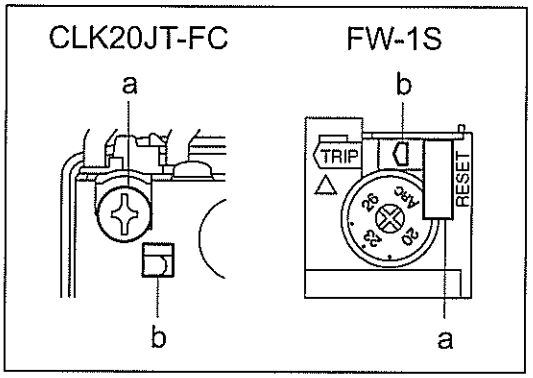
Inspection:
Inspect the continuity of the magnet switch coil.

Tester range Ω x 1
Measurement terminal A1 - A2
Standard
CLK-20JT-FC: 896 Ω ± 10 %
FW-1S: 460 Ω ± 10 %



Inspection:
Inspect the continuity of the thermal relay contact point.

Tester range Ω x 1
Measurement terminal 95 - 96
Standard
When not activated: 0 Ω
When activated: ∞ Ω



Inspection:
Inspect the reset switch.

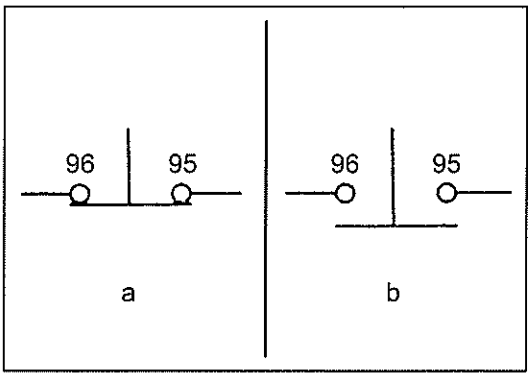
Press the reset switch when the thermal relay is active to inspect if the thermal relay becomes inactive.

Do not adjust the thermal relay operating current.

If the thermal relay is activated when the charger is used and the charge is stopped, be sure to determine why the thermal relay is activated and restore it after solving the problem. To restore the thermal relay, press the reset switch gently.

a: Reset switch

b: Test switch



To test the thermal relay, activate it as follows:

CLK-20JT-FC: Move test switch (b) to the left with a thin screwdriver.

FW-1S: Move test switch (b) to the left with a thin screwdriver.

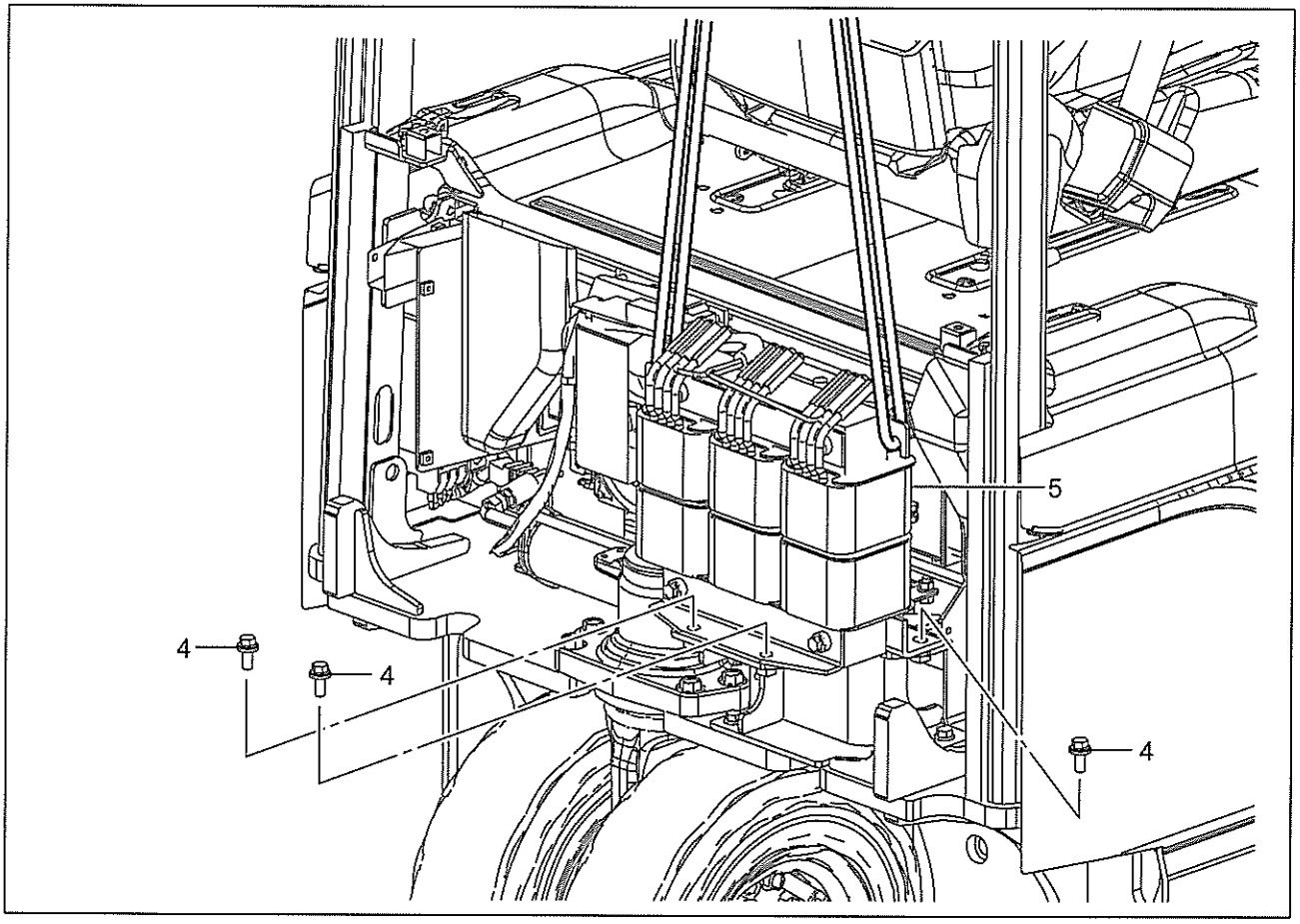
a: When not activated

b: When activated

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1.2.7 TRANSFORMER ASSY

1.2.7.1 REMOVAL, INSPECTION AND INSTALLATION



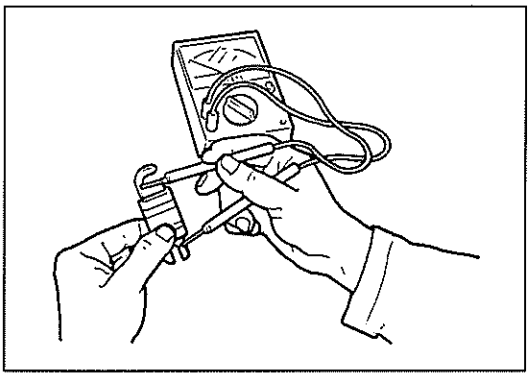
REMOVAL PROCEDURE

1. Disconnect the battery plug.
2. Remove the counterweight. (Refer to page "COUNTERWEIGHT" of Body & frame section)
3. Disconnect the wiring for the transformer ASSY.
4. Remove the transformer ASSY set bolts.
5. Hoist and remove the transformer ASSY.**[Point 1]**

Installation Procedure

The installation procedure is the reverse of the removal procedure.

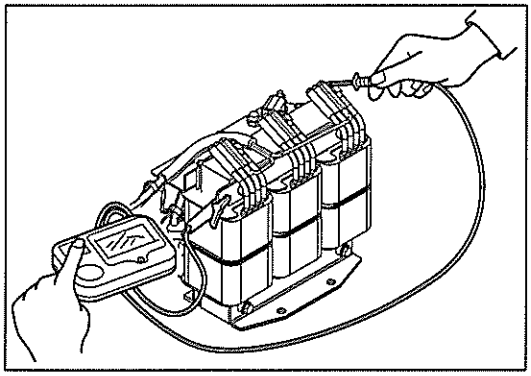
Point Operation



[Point 1]

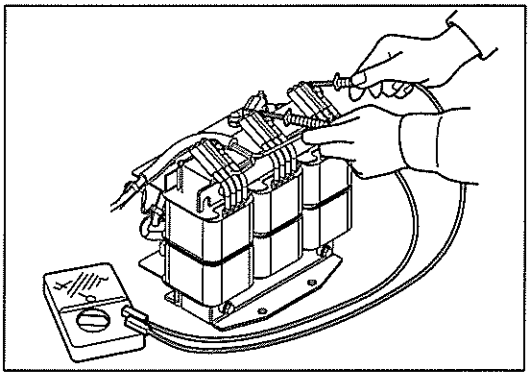
Inspection:
Inspect the fuse.

Standard 0 Ω



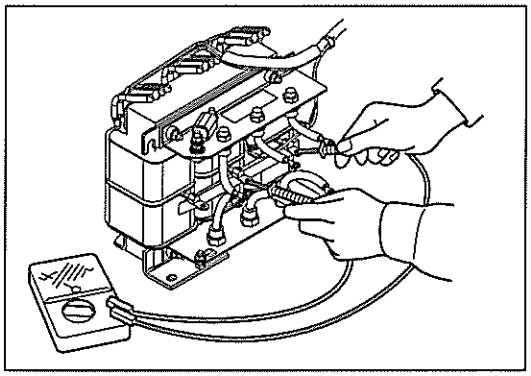
Inspection:
Measure the insulation resistance.

Measuring instrument 500 VDC megohmmeter
Measurement terminal Each coil terminal - Frame
Standard 1 MΩ or more



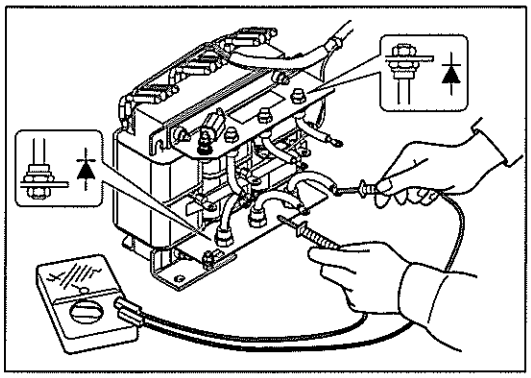
Inspection:
Inspect the continuity of the primary coil.

Tester range Ω x 1
Measurement terminal U_1 - V_1、V_1 - W_1、W_1 - U_1
Standard 0 Ω



Inspection:
Inspect the continuity of the secondary coil.

Tester range Ω x 1
Measurement terminal U_2 - V_2、V_2 - W_2、W_2 - U_2
Standard 0 Ω

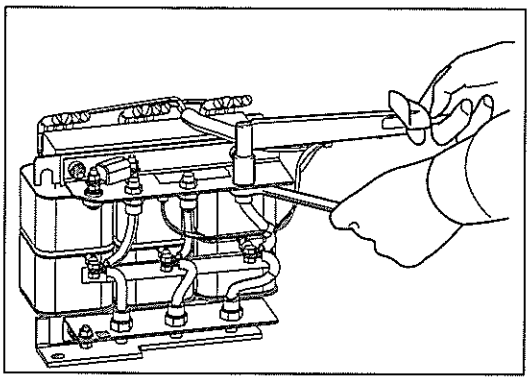


Inspection:
Measure the continuity of the diode.

Inspect the diode when it is installed to the fin, and remove it only when it is found to be abnormal.

Tester range Ω x 1K
Measurement terminal
Forward direction: Anode (-) - Cathode (+)
Reverse direction: Anode (+) - Cathode (-)
Standard
Forward direction: Continuity exists
Reverse direction: ∞ Ω

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Assembly:
Do not assemble wrong because two different polar diodes are used.

Assembly:
Assemble the diode by tightening with the specified torque.

SKR71/02, SKN71/02: 3.8 to 4.0 N m (38.5 to 40.8 kgf-cm) [2.80 to 2.95 ft-lbf]

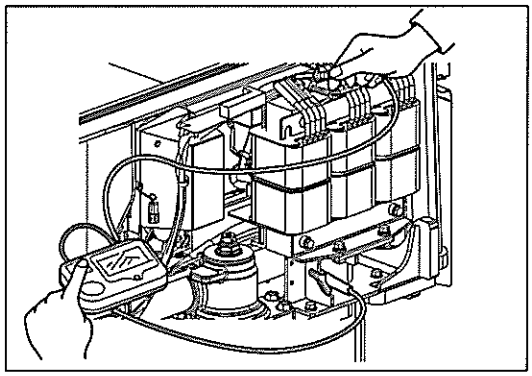
SKR100/04, SKN100/04: 9.5 to 10N m (96.9 to 102.0 kgf-cm) [7.01 to 7.38 ft-lbf]

Inspection After Installation

1. Inspect the connection of each wiring.

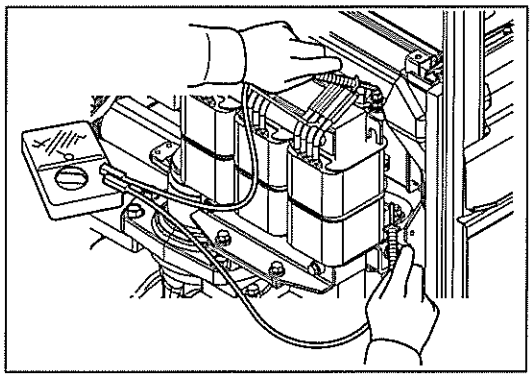
NOTICE

Check the connection status of each wiring by referring to the wiring diagram of the charger.



2. Measure the insulation resistance.

   Measuring instrument 500 VDC megohmmeter
   Measurement terminal Each coil terminal - Frame
   Standard 1 MΩ or more



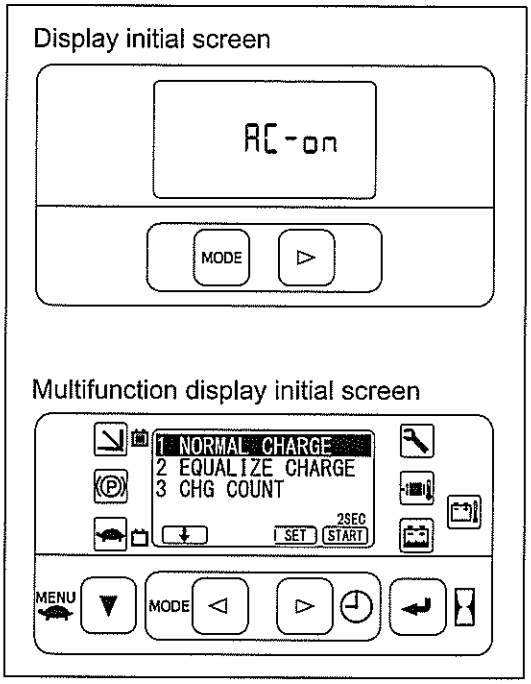
3. Measure no-load secondary voltage.

   With disconnecting battery plug, unable to charge. Disconnect the P2 and N2 terminal cable of transformer, and connect the AC power plug, then inspect the voltage between P2 and N2 terminal of transformer.

   Tester range 250 VDC
   Measurement terminal
   Standard 50/60 (Hz)
   K47-227C048-422 : 72/76 V
   K47-240C048-427 : 71/74 V
   K47-260C048-415 : 73/77 V

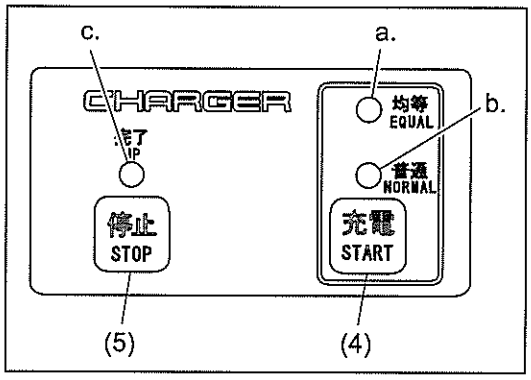
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1.2.8 TIMER TEST



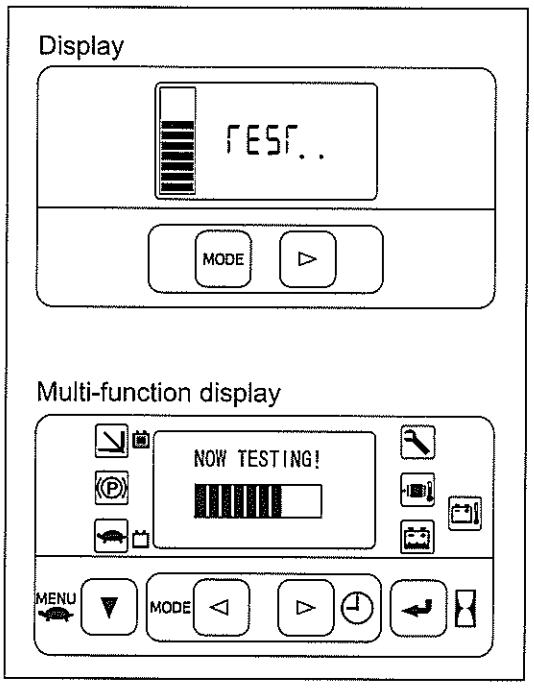
Operating Procedure

1. Connect the charge plug to the AC power plug.
2. Two seconds after connecting the charge plug, the display shows the initial screen.



3. Keep pressing the start switch (4) and stop switch (5) on the operation panel simultaneously until a sound beeps. All LEDs light up, putting the charger in the timer test start wait state.
4. After waiting time for starting timer test, if press the start switch (4) within 5 second, start the timer test and display testing screen.

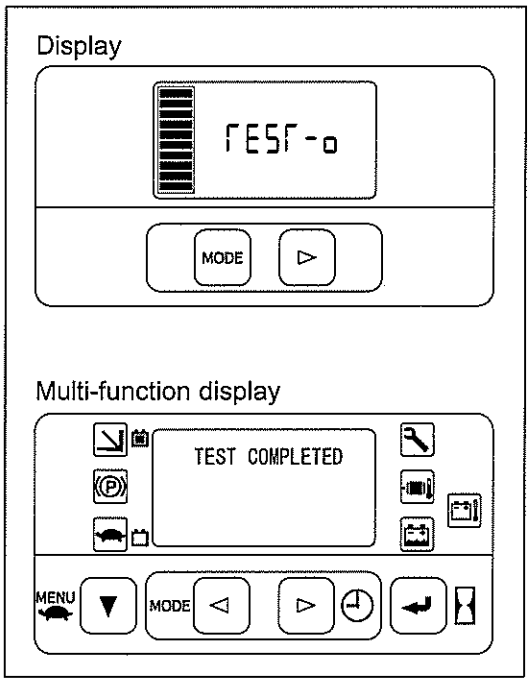
   (If the LED is turned off before starting the test, re-try step 3.)



Inspection item

- Turn on the magnet switch on simultaneously with displaying testing screen .
- One scale of the charge indicator bar on the display appears every time one second passes after the timer test starts.
- Light LED of operation panel in order : a → b → all LED light → c

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- Ten seconds pass after the test.

  Ten scales of the charge indicator bar appear.

  The completion LED is illuminated.

  Turn off the magnet switch on simultaneously with displaying finishing screen.

5. After confirming the conclusion of test, if press determination switch, display is returned to initial screen.

⚠ CAUTION

- If the display screen is turned off during the timer test, press the stop switch, disconnect the charge plug, and check AC200 V power feed to the charge plug.
- If there is no problem with AC200 V power feed, connect the charge plug, and perform inspection from the scratch.
- If the LED does not light up even after retry, the inspection is determined as NG.

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2 CONTROLLER

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2.16 BRAKE SWITCH ADJUSTMENT 71
2.17 OCL MEASUREMENT 72

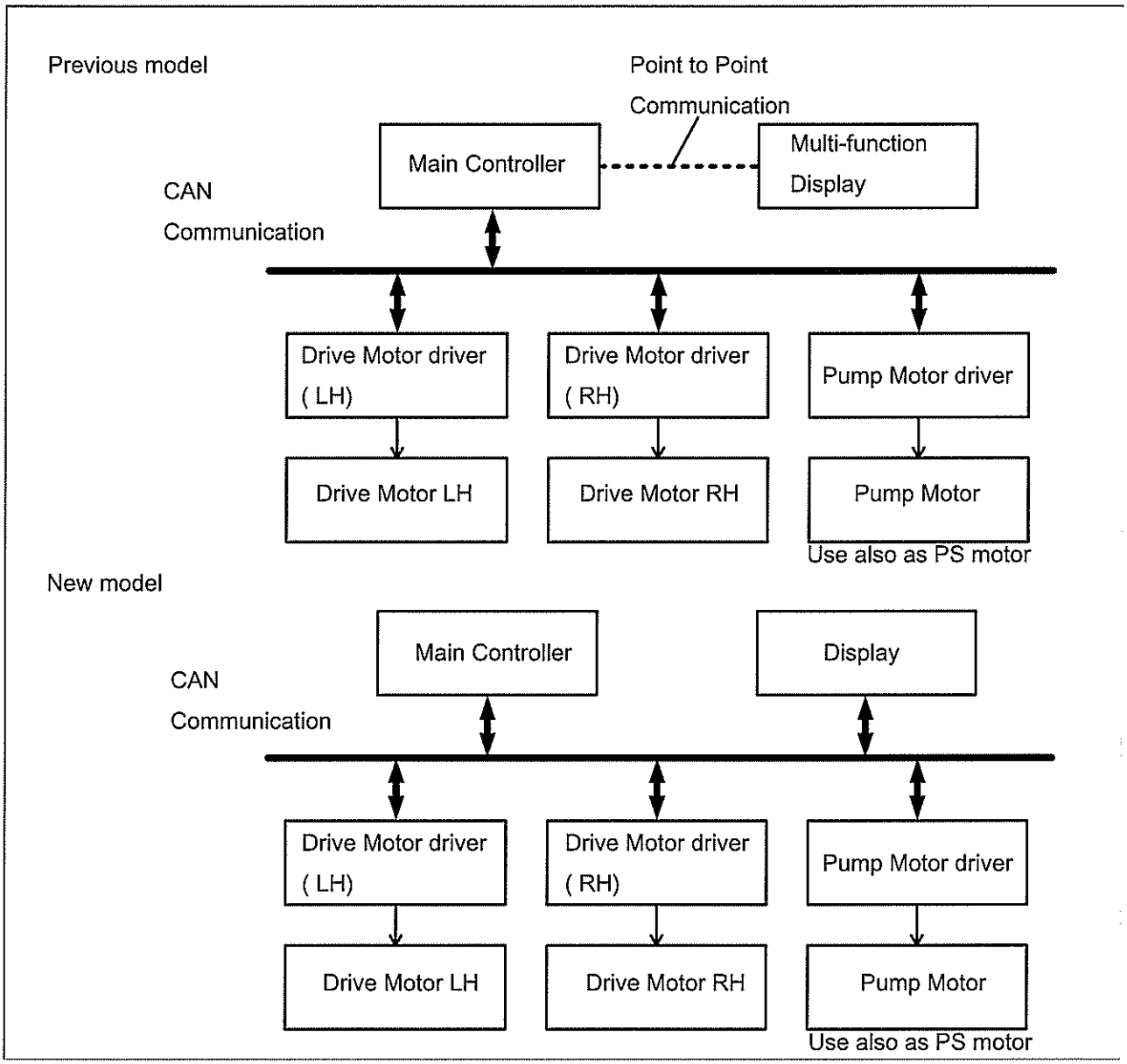
2.1 GENERAL

1. Controller system configuration

The controller system to drive AC motors in this model has

- Microcomputer-assisted inverter control,
- CAN (Controller Area Network) communication function between main controller, drive/pump motor drivers, and display.

This is a multi-functional control system with the advanced electronics technologies.
Same as the previous model, the pump motor driver is also used for the PS (Power Steering) control.
At this model change, the display also has been connected to the CAN communication. Multi-function display has realized new option features such as “PIN Code Entry System” and “SHOCK SENSOR”.
Of course same as the previous model, the controller offers the power select feature and power keep feature that take full advantage of the AC power system.


Previous model
Point to Point
Communication
Main Controller
Multi-function
Display
CAN
Communication
Drive Motor driver
(LH)
Drive Motor driver
(RH)
Pump Motor driver
Drive Motor LH
Drive Motor RH
Pump Motor
Use also as PS motor
New model
Main Controller
Display
CAN
Communication
Drive Motor driver
(LH)
Drive Motor driver
(RH)
Pump Motor driver
Drive Motor LH
Drive Motor RH
Pump Motor
Use also as PS motor

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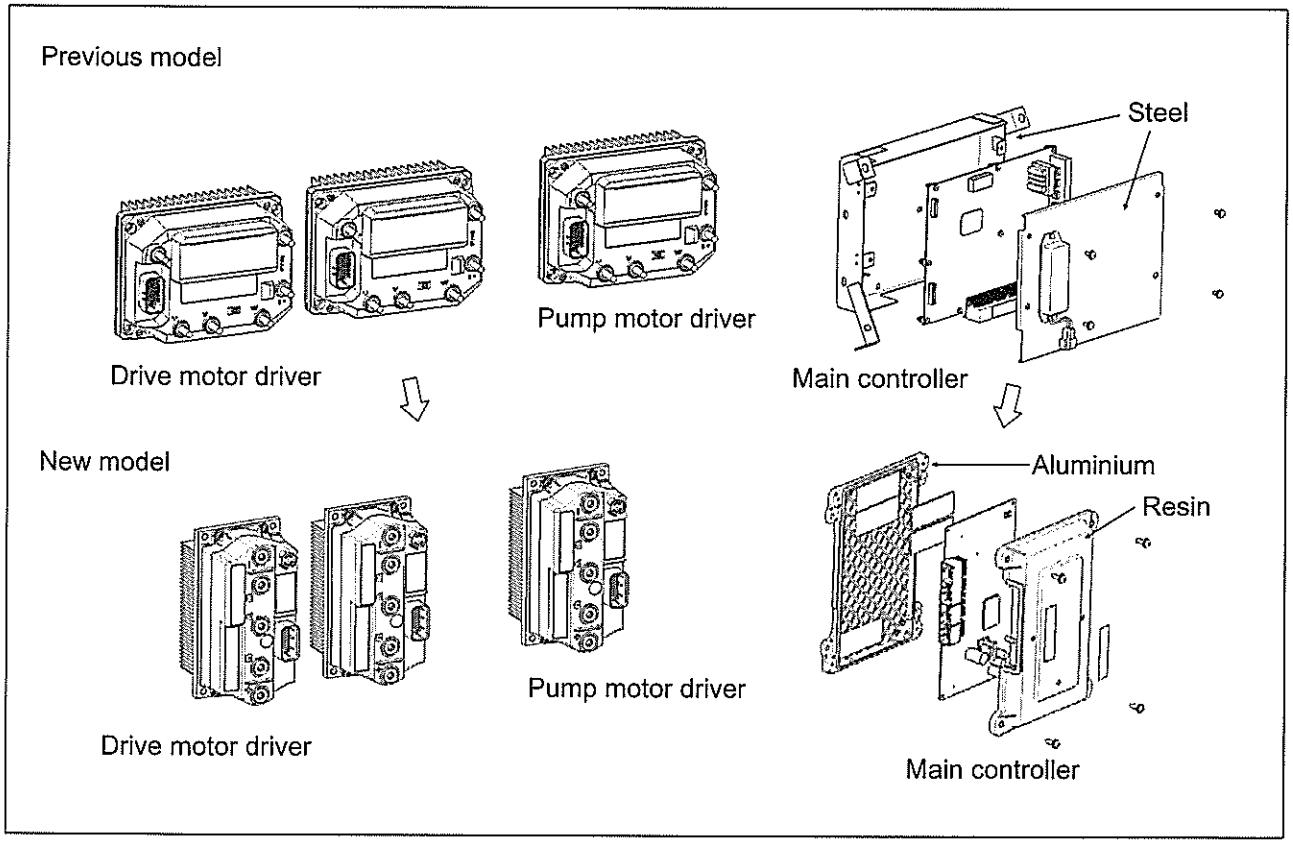
2. Controller configuration

(1) Construction of main controller

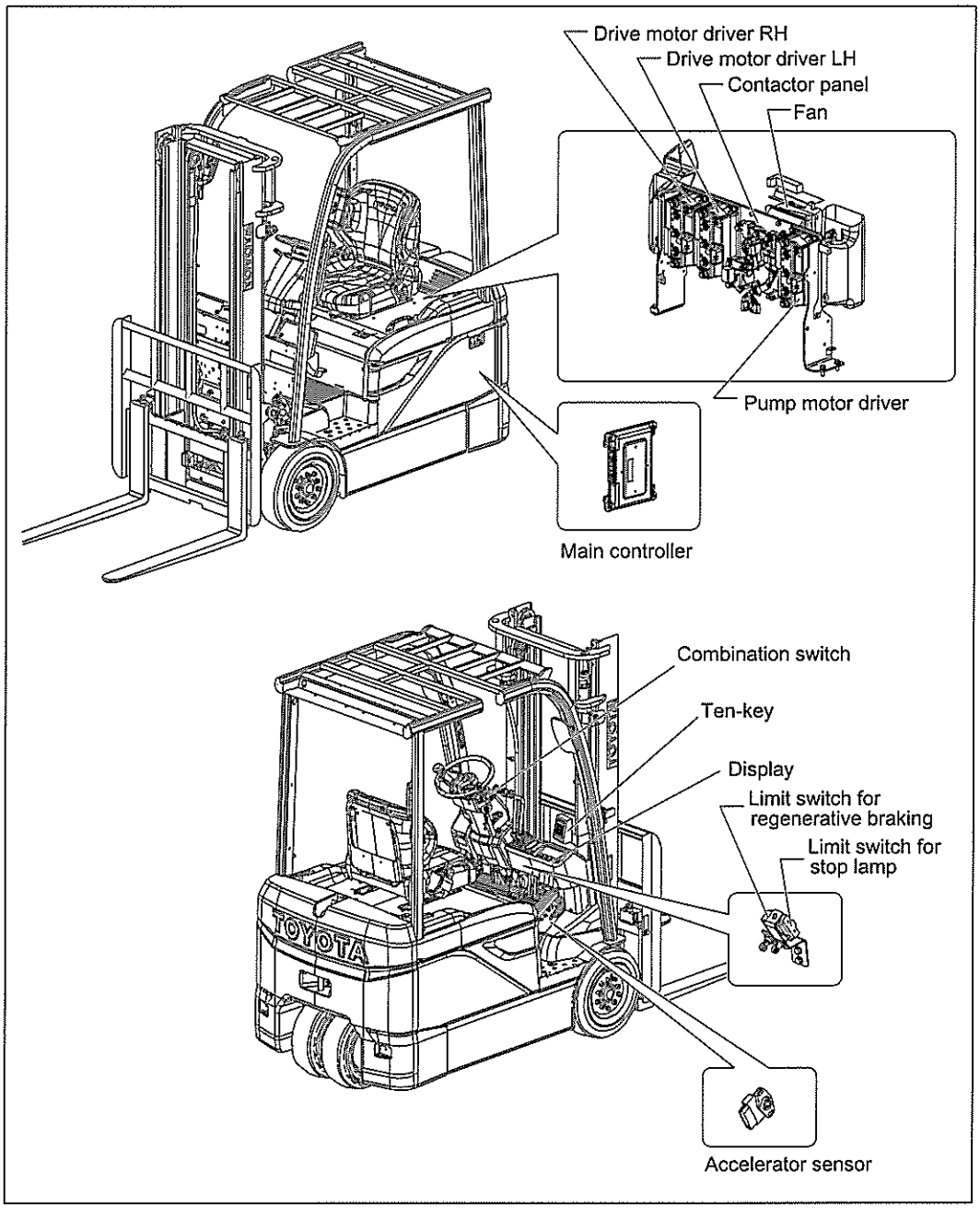
At this model change, the main controller has been downsized by adoption of smaller parts on the printed circuit board and by reconfiguration of the inner construction. In addition, the weight of the controller has been also reduced by changing the case materials from steel plate to aluminum and resin.
The degree of protection provided by enclosures (IP code) is equivalent to IP20.

(2) Construction of motor driver

At this model change, the main circuit device is trench MOS-FET that has less dissipation than previous device.
In addition, on this model, the drive motor driver is the same as the pump motor driver.
The degree of protection provided by enclosures (IP code) is equivalent to IP65.

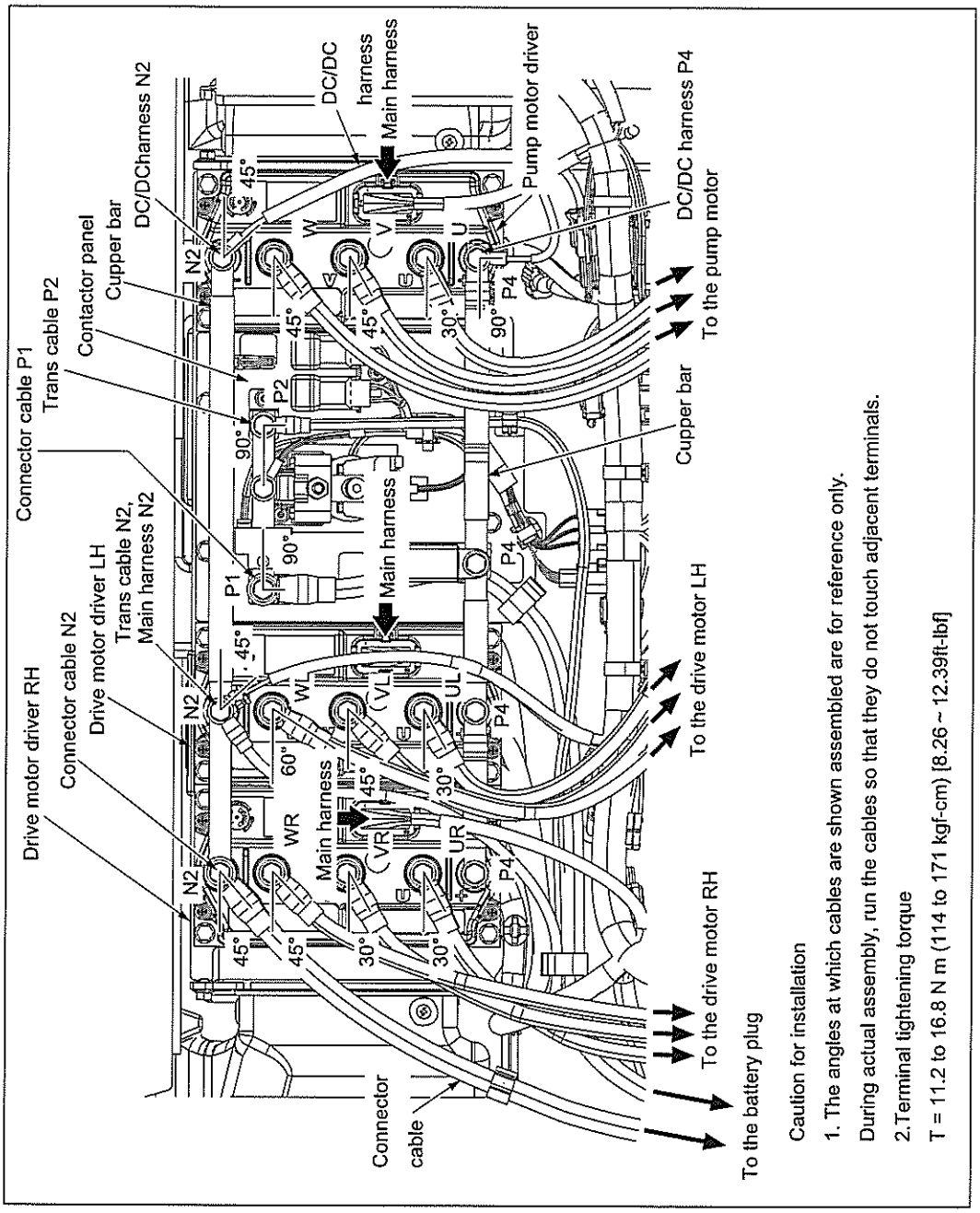


2.2 ELECTRICAL COMPONENTS LAYOUT DRAWING



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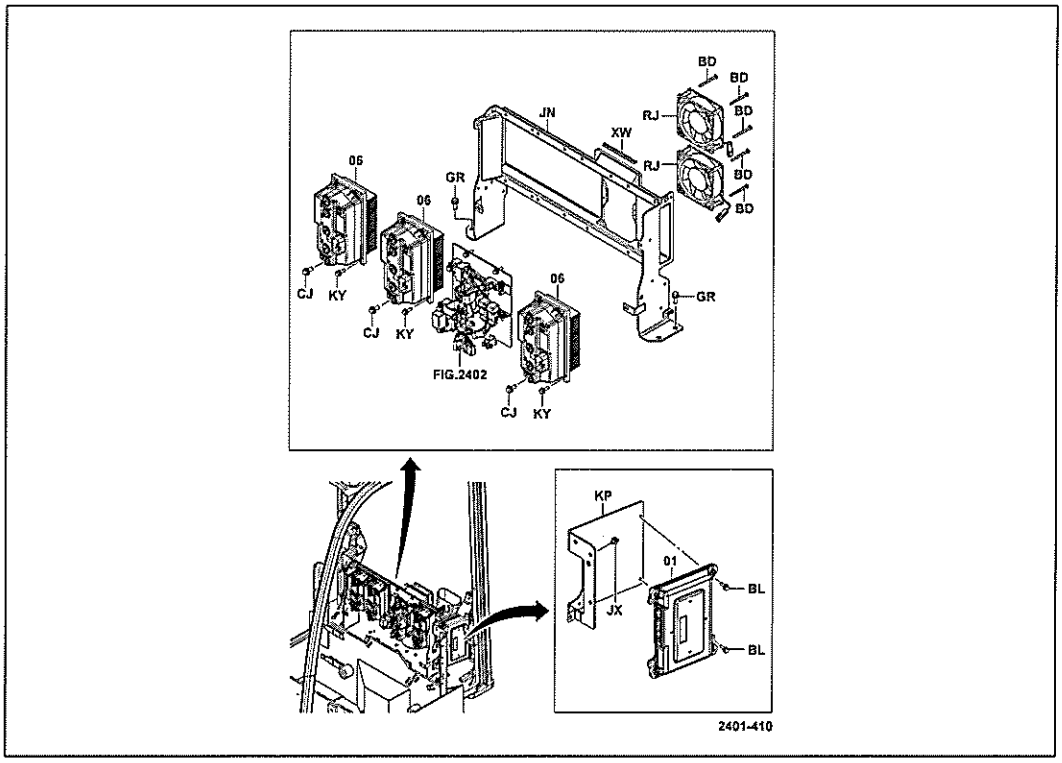
2.3 LAYOUT OF CONTROLLER CABLES

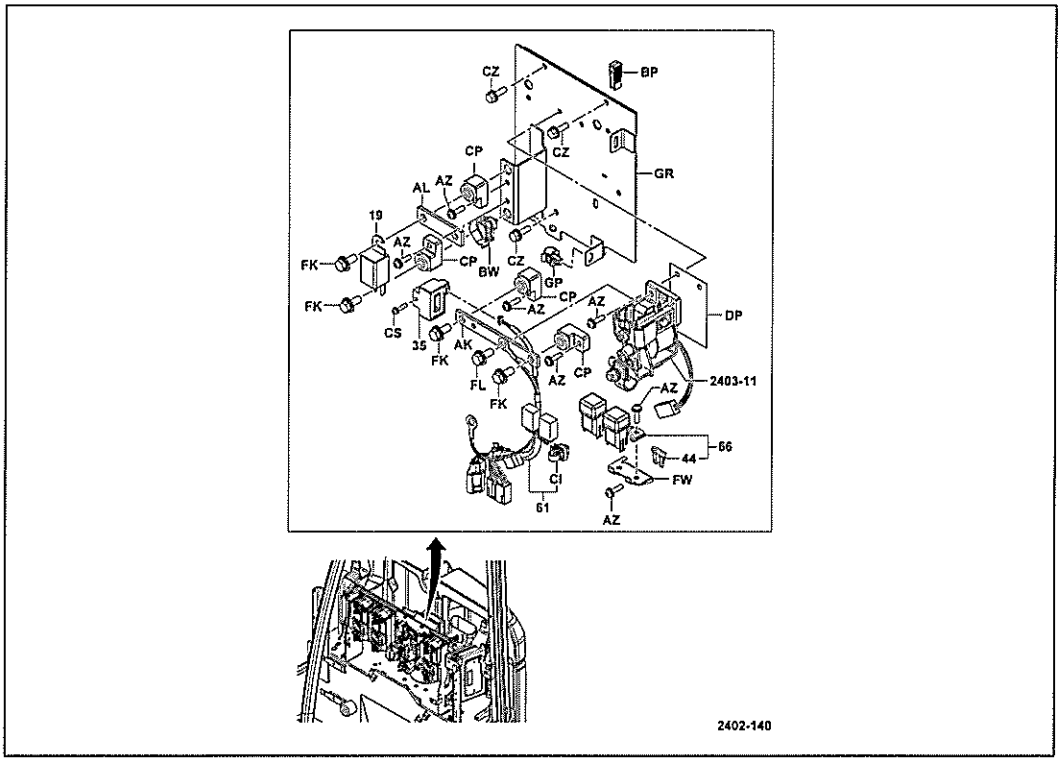


2.4 SPECIFICATIONS

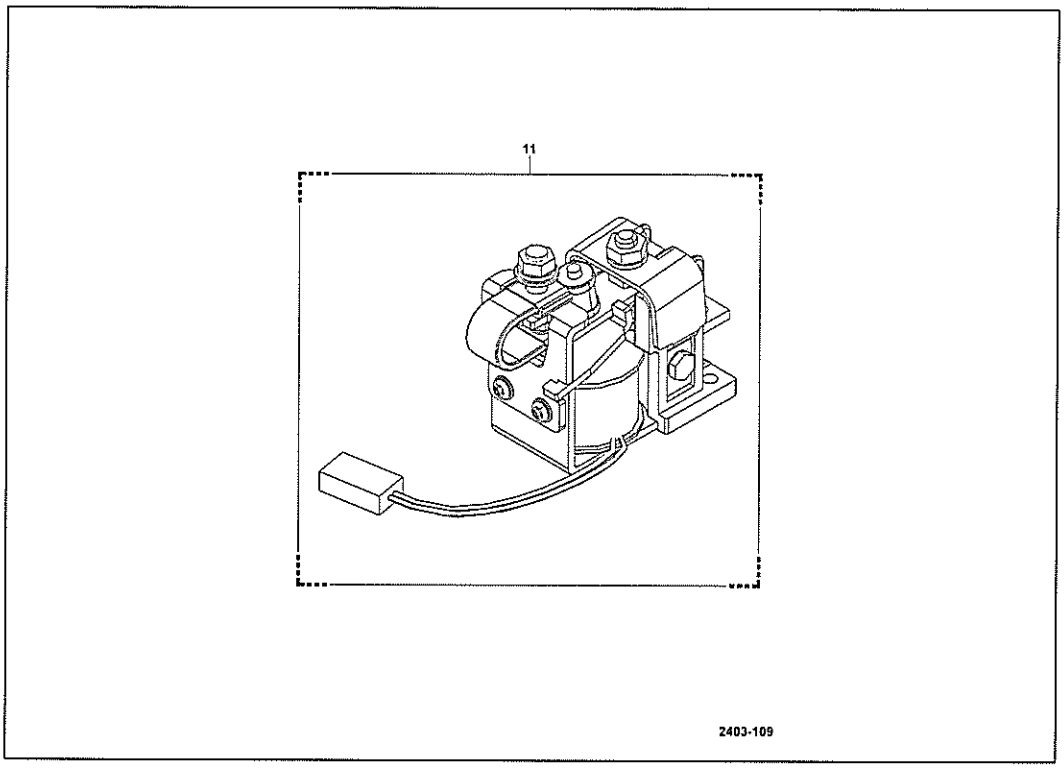
		1.0 to 1.3ton	1.5 to 2.0ton
Fuse	F1 (for drive and pump circuit)	450A	500A
	F4 (for lights)	10A	←
	F5 (for control circuit)	10A	←
	F6 (for controller)	10A	←
	F7 (for controller)	10A	←
Contactor	MB (for power supply)	ME254	←

2.5 COMPONENTS



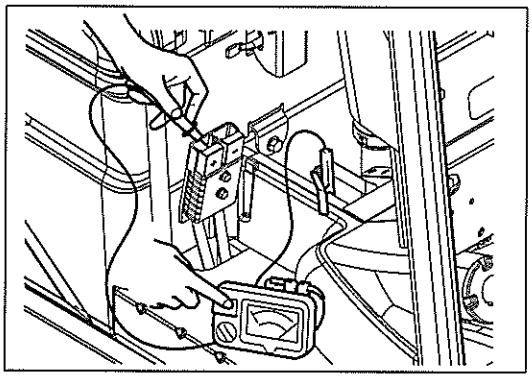


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2.6 BEFORE INSPECTION

Inspection



1. Insulation resistance measurement

NOTICE! Always measure before inspecting the controller.

(1) Disconnect the battery plug and measure the resistance between battery plug and body.

Measurement terminals	Controller side of battery plug-body
Standard:	Resistance value depends greatly on the vehicle operating state, place and weather. (Approx. 1 MΩ or more)

Some components can be inspected after they are removed from the vehicle, while others can only be inspected as installed on the vehicle.

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2.7 CONNECTOR INSPECTION

TO USE SST

Use SSTs for quick and accurate measure on the 8FBE10 to 8FBE20. The check will fail if the connection method is wrong. Since boards may be damaged by incorrect connection, the operation is needed to be careful.

⚠ CAUTION

Always unplug the battery plug before SST connection and disconnection. If the battery plug is still connected, various boards may be damaged.

Part No.	Purpose	Remarks
09230-13240-71	Measure the voltage or resistance for main controller.	For use CN101 to CN104

INSPECTION

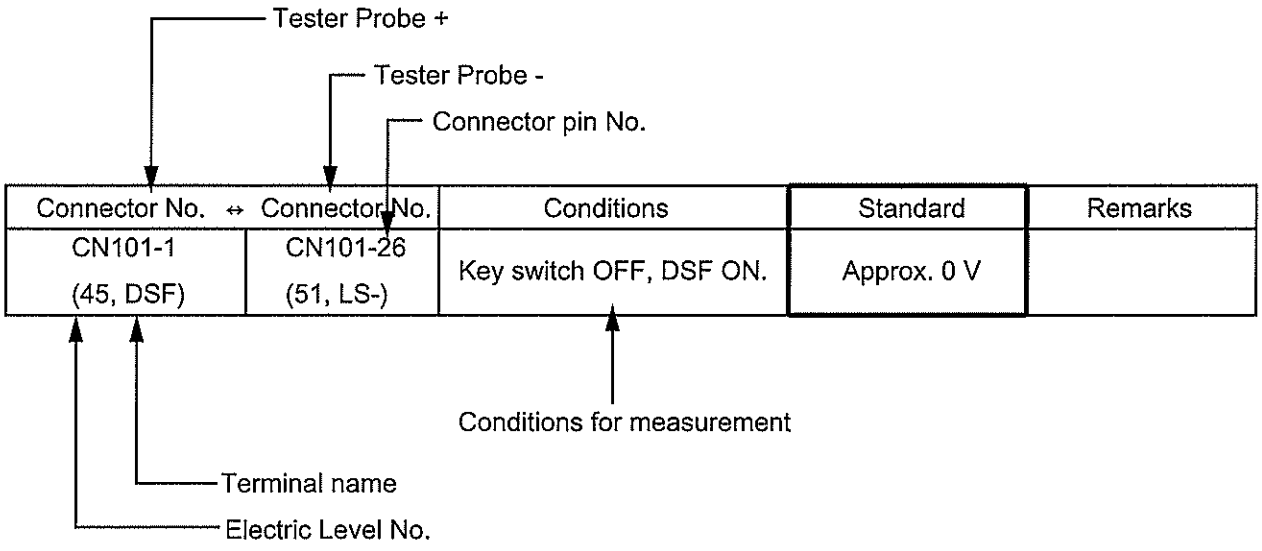
When inspecting each board and the cause of the trouble is found, do not immediately replace the board but check the following items.

- Abnormality in related harnesses
- Looseness of the related connectors
- Bending or damage of connector pin and defective contact of any related connector pin

If any of the above is the cause of the trouble and the board is replaced with a new one, the new board will be damaged.
Always replace the board after careful inspection.

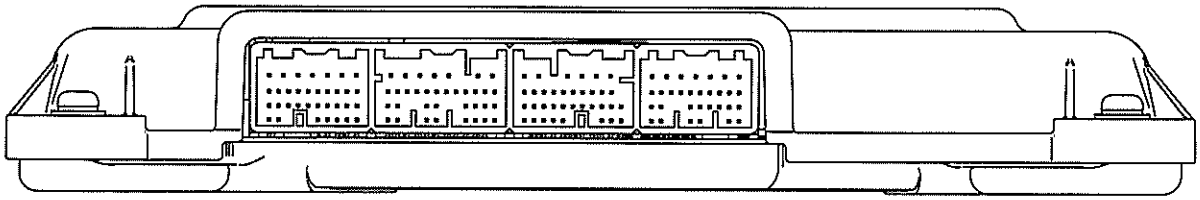
Measurement method and standard list

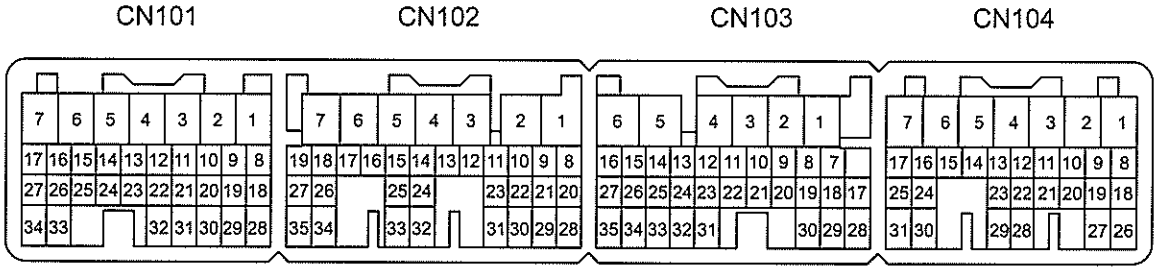
How to read the list



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Main controller





Conventional Lever

CN101 connector basic conditions (battery plug connected, key switch ON)

Connector No. ↔ Connector No.		Conditions	Standard:	Remarks
CN101-1 (3, SOLLU+)	CN102-16 (4, SLLL-)	Lift lock solenoid (OFF operation with ACTIVE TEST)	Approx. 0 V	
		Lift lock solenoid (ON operation with ACTIVE TEST)	Approx. 11 V	
CN101-2 (6, SLTFB+)	CN102-19 (7, SLTFL-)	Tilt forward solenoid (OFF operation with ACTIVE TEST)	Approx. 0 V	
		Tilt forward solenoid (ON operation with ACTIVE TEST)	Approx. 11 V	
CN101-3	-	-	-	
CN101-4 (41, VBBT)	CN104-4 (N2, N2)	-	Battery voltage	
CN101-5	-	-	-	
CN101-6	-	-	-	
CN101-7	-	-	-	
CN101-8	-	-	-	
CN101-9	-	-	-	
CN101-10	-	-	-	
CN101-11	-	-	-	
CN101-12	-	-	-	
CN101-13	-	-	-	
CN101-14	-	-	-	
CN101-15	-	-	-	
CN101-16	-	-	-	
CN101-17	-	-	-	
CN101-18	-	-	-	
CN101-19 (43, VBKY)	CN104-4 (N2, N2)	Key switch OFF	Approx. 0 V	
		Key switch ON	Battery voltage	
CN101-20 (57, VRTA+)	CN101-32 (51, POT-)	-	Approx. 4.8 V	
CN101-21	-	-	-	

Connector No. ↔ Connector No.		Conditions	Standard:	Remarks
CN101-22 (50, VRA-)	-	-	-	
CN101-23 (316, VRTRA+)	CN101-32 (51, POT-)	-	Approx. 4.8 V	
CN101-24	-	-	-	
CN101-25 (28, VRL+)	CN101-32 (51, POT-)	-	Approx. 4.6 V	
CN101-26 (55, VRA2+)	CN101-32 (51, POT-)	-	Approx. 4.8 V	
CN101-27 (53, VRA1+)	CN101-22 (50, VRA-)	-	Approx. 4.8 V	
CN101-28	-	-	-	
CN101-29 (30, VRAT1+)	CN101-32 (51, POT-)	-	Approx. 4.6 V	
CN101-30 (31, VRAT2+)	CN101-32 (51, POT-)	-	Approx. 4.6 V	
CN101-31	-	-	-	
CN101-32 (51, POT-)	-	-	-	
CN101-33	-	-	-	
CN101-34	-	-	-	

CN102 connector basic conditions (battery plug connected, key switch ON)

Connector No. ↔ Connector No.		Conditions	Standard:	Remarks
CN102-1 (98, FNDC1)	CN104-4 (N2, N2)	Fan 1 stop (OFF operation with ACTIVE TEST)	Battery voltage	
		Fan 1 rotate (ON operation with ACTIVE TEST)	Approx. 0 V	
CN102-2 (99, FNDC2)	CN104-4 (N2, N2)	Fan 2 stop (OFF operation with ACTIVE TEST)	Battery voltage	
		Fan 2 rotate (ON operation with ACTIVE TEST)	Approx. 0 V	
CN102-3 (19, VBMBSL)	CN104-4 (N2, N2)	Key switch OFF	Approx. 0 V	
		Key switch ON	Battery voltage	
CN102-4 (19, VBMBSL)	CN104-4 (N2, N2)	Key switch OFF	Approx. 0 V	
		Key switch ON	Battery voltage	
CN102-5	-	-	-	
CN102-6	-	-	-	
CN102-7 (329, SLS+)	CN102-14 (330, SLS-)	Steering synchronizer solenoid (OFF operation with ACTIVE TEST)	Approx. 0 V	
		Steering synchronizer solenoid (ON operation with ACTIVE TEST)	Approx. 11 V	
CN102-8 (333, OACC3)	CN104-4 (N2, N2)	Key switch OFF	Approx. 14 V	Only with operation control
		Key switch ON	Approx. 0 V	
CN102-9 (332, OACC2)	CN104-4 (N2, N2)	Buzzer OFF	Approx. 14 V	
		Buzzer ON	Approx. 0 V	
CN102-10 (51, LS-)	-	-	-	
CN102-11	-	-	-	
CN102-12	-	-	-	
CN102-13	-	-	-	

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Connector No. ↔ Connector No.		Conditions	Standard:	Remarks
CN102-14 (330, SLS-)	CN102-7 (329, SLS+)	Resistance measurement with battery plug disconnected	Approx. 10 Ω	
CN102-15	-	-	-	
CN102-16 (4, SLLL-)	CN101-1 (3, SOLLU+)	Resistance measurement with battery plug disconnected	Approx. 10 Ω	
CN102-17 (5, SLUL-)	CN101-1 (3, SOLLU+)	Resistance measurement with battery plug disconnected	Approx. 10 Ω	
CN102-18	-	-	-	
CN102-19 (7, SLTFL-)	CN101-2 (6, SLTFB+)	Resistance measurement with battery plug disconnected	Approx. 10 Ω	
CN102-20 (25, VRA12)	CN102-26 (51, POT-)	Attachment 1 lever in the neutral position	Approx. 2.3 V	
		Attachment 1 lever in the forward or backward position	Approx. 0.5 V to 4 V	
CN102-21 (24, VRA11)	CN102-26 (51, POT-)	Attachment 1 lever in the neutral position	Approx. 2.3V	
		Attachment 1 lever in the forward or backward position	Approx. 0.5 V to 4 V	
CN102-22 (62, SWTR)	CN102-26 (51, POT-)	Key switch OFF, tilt lever in the neutral position	Approx. 5 V	
		Key switch OFF, tilt lever in the backward position	Approx. 0 V	
CN102-23 (61, SWTF)	CN102-26 (51, POT-)	Key switch OFF, tilt lever in the neutral position	Approx. 5 V	
		Key switch OFF, tilt lever in the forward position	Approx. 0 V	
CN102-24 (304, CSBAT)	CN102-35 (305, CSBAT-)	-	Approx. 2.5 V	
CN102-25	-	-	-	
CN102-26 (51, POT-)	-	-	-	
CN102-27	-	-	-	
CN102-28 (27, VRA22)	CN102-26 (51, POT-)	Attachment 2 lever in the neutral position	Approx. 2.3 V	
		Attachment 2 lever in the forward or backward position	Approx. 0.5 V to 4 V	
CN102-29 (26, VRA21)	CN102-26 (51, POT-)	Attachment 2 lever in the neutral position	Approx. 2.3 V	
		Attachment 2 lever in the forward or backward position	Approx. 0.5 V to 4 V	
CN102-30 (52, VRA1)	CN101-22 (50, VRA-)	Key switch OFF, accelerator pedal depressed	Approx. 0.4 V to 4.7 V	
CN102-31 (317, VRTRA)	CN102-26 (51, POT-)	Tire position in neutral	Approx. 2.5 V	
CN102-32 (54, VRA2)	CN102-26 (51, POT-)	Key switch OFF, accelerator pedal depressed	Approx. 0.7 V to 4.7 V	
CN102-33	-	-	-	
CN102-34	-	-	-	
CN102-35 (305, CSBAT-)	-	-	-	

*1: W/ EZ pedal or motion alarm
*2: W/ ATT1
*3: W/ ATT2

CN103 connector basic conditions (battery plug connected, key switch ON)

Connector No. ↔ Connector No.		Conditions	Standard:	Remarks
CN103-1	-	-	-	
CN103-2	-	-	-	
CN103-3 (14, DGND)	-	-	-	
CN103-4 (42, KYSAT)	CN104-4 (N2, N2)	Key switch OFF	Approx. 0 V	
		Key switch ON	Battery voltage	
CN103-5 (N2, N2)	-	-	-	
CN103-6 (51, LS-)	-	-	-	
CN103-7	-	-	-	
CN103-8 (300, IPL+)	CN102-26 (51, POT-)	-	Approx. 5 V	
CN103-9	-	-	-	
CN103-10	-	-	-	
CN103-11 (145, CAN1H)	-	Immeasurable	-	
CN103-12 (146, CAN1L)	-	Immeasurable	-	
CN103-13 (311, SSTR+)	CN103-6 (51, LS-)	-	Approx. 14 V	
CN103-14 (16, D7V)	CN103-3 (14, DGND)	-	Approx. 6.5 V	
CN103-15	-	-	-	
CN103-16	-	-	-	
CN103-17 (56, VRTA)	CN102-26 (51, POT-)	Variation upon changeover from forward to backward tilting	Approx. 1 V to 4 V	
CN103-18 (21, VRL2)	CN102-26 (51, POT-)	Lift lever in the neutral position	Approx. 2.3 V	
		Lift lever in the forward or backward position	Approx. 0.5 to 4 V	
CN103-19 (302, IPL2)	CN102-26 (51, POT-)	-	Approx. 2 V	
CN103-20	-	-	-	
CN103-21	-	-	-	
CN103-22	-	-	-	
CN103-23	-	-	-	
CN103-24 (91, SH2-1)	CN103-6 (51, LS-)	Key switch OFF, mast height switch 2-1 OFF	Approx. 5 V	
		Key switch OFF, mast height switch 2-1 ON	Approx. 0 V	
CN103-25	-	-	-	
CN103-26 (20, VRL1)	CN102-26 (51, POT-)	Lift lever in the neutral position	Approx. 2.3 V	
		Lift lever in the forward or backward position	Approx. 0.5 to 4 V	
CN103-27	-	-	-	
CN103-28	-	-	-	

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Connector No. ↔ Connector No.		Conditions	Standard:	Remarks
CN103-29 (59, SPLF)	CN102-26 (51, POT-)	Forks on the ground	Approx. 1 V or less	
		Amount of change between raising and lowering on the lift with a load	Approx. 0.5 V to 4.5 V	
CN103-30 (301, IPL1)	CN102-26 (51, POT-)	-	Approx. 2 V	
CN103-31	-	-	-	
CN103-32 (70, STK)	CN103-6 (51, LS-)	Key switch OFF, automatic fork leveling switch OFF	Approx. 5 V	
		Key switch OFF, automatic fork leveling switch ON	Approx. 0 V	
CN103-33 (306, OLM+)	CN104-4 (N2, N2)	Key switch OFF, laser marker OFF	Approx. 5 V	
		Key switch OFF, laser marker ON	Approx. 0 V	
CN103-34 (420, SWH08)	CN103-6 (51, LS-)	Key switch OFF, mast height 800 switch OFF	Approx. 0 V	
		Key switch OFF, mast height 800 switch ON	Approx. 5 V	
CN103-35 (450, SSB)	CN103-6 (51, LS-)	Key switch OFF, seat belt switch OFF	Approx. 5 V	
		Key switch OFF, seat belt switch ON	Approx. 0 V	

CN104 Connector basic conditions (battery plug connected, key switch ON)

Connector No. ↔ Connector No.		Conditions	Standard:	Remarks
CN104-1 (41, B48V)	CN104-4 (N2, N2)	-	Battery voltage	
CN104-2 (44, VBMB)	CN104-4 (N2, N2)	Key switch OFF	Approx. 0 V	
		Key switch ON	Battery voltage	
CN104-3 (1, CBAT+)	CN104-9 (2, CBAT-)	Key switch OFF	Approx. 0 V	
		Key switch ON	Approx. 11 V to 12 V	
CN104-4 (N2, N2)	-	-	-	
CN104-5 (N2, N2)	-	-	-	
CN104-6 (N2, N2)	-	-	-	
CN104-7	-	-	-	
CN104-8	-	-	-	
CN104-9 (2, CBAT-)	CN104-3 (1, CBAT+)	Resistance measurement with battery plug disconnected	Approx. 20 Ω	
CN104-10 (303, CSBAT+)	CN102-35 (305, CSBAT-)	-	Approx. 5 V	
CN104-11	-	-	-	
CN104-12 (58, SPLF+)	CN102-26 (51, POT-)	-	Approx. 5 V	
CN104-13	-	-	-	
CN104-14 (334, PSACC+)	CN104-4 (N2, N2)	-	Approx. 14 V	
CN104-15	-	-	-	
CN104-16	-	-	-	
CN104-17	-	-	-	
CN104-18 (67, SDM)	CN103-6 (51, LS-)	Key switch OFF, seat switch OFF	Approx. 5 V	
		Key switch OFF, seat switch ON	Approx. 0 V	

Connector No. ↔ Connector No.		Conditions	Standard:	Remarks
CN104-19 (46, DSR)	CN103-6 (51, LS-)	Key switch OFF, direction switch neutral	Approx. 5 V	
		Key switch OFF, direction switch backward	Approx. 0 V	
CN104-20 (66, SPB)	CN103-6 (51, LS-)	Key switch OFF, parking brake switch lock	Approx. 5 V	
		Key switch OFF, parking brake switch release	Approx. 0 V	
CN104-21	-	-	-	
CN104-22 (90, SH1)	CN103-6 (51, LS-)	Key switch OFF, mast height switch 1 ON	Approx. 0 V	
		Key switch OFF, mast height switch 1 OFF	Approx. 5 V	
CN104-23 (65, SWBK)	CN103-6 (51, LS-)	Key switch OFF, brake switch release	Approx. 0 V	
		Key switch OFF, brake switch lock	Approx. 5 V	
CN104-24 (314, SSTRC)	CN103-6 (51, LS-)	Steering operation	Approx. 0 V to 5 V	
CN104-25	-	-	-	
CN104-26 (45, DSF)	CN103-6 (51, LS-)	Key switch OFF, direction switch neutral	Approx. 5 V	
		Key switch OFF, direction switch forward	Approx. 0 V	
CN104-27	-	-	-	
CN104-28	-	-	-	
CN104-29	-	-	-	
CN104-30 (312, SSTR1)	CN103-6 (51, LS-)	Steering operation	Approx. 0 V to 5 V	
CN104-31 (313, SSTR2)	CN103-6 (51, LS-)	Steering operation	Approx. 0 V to 5 V	

Mini lever

CN101 connector basic conditions (battery plug connected, key switch ON)

Connector No. ↔ Connector No.		Conditions	Standard:	Remarks
CN101-1 (3, SOLLU+)	CN102-16 (4, SLLL-)	Lift lock solenoid (OFF operation with ACTIVE TEST)	Approx. 0 V	
		Lift lock solenoid (ON operation with ACTIVE TEST)	Approx. 11 V	
CN101-2 (6, SLTFB+)	CN102-19 (7, SLTFL-)	Tilt forward solenoid (OFF operation with ACTIVE TEST)	Approx. 0 V	
		Tilt forward solenoid (ON operation with ACTIVE TEST)	Approx. 11 V	
CN101-3 (97, FAN+)	CN102-13 (335, RY1)	Key switch OFF	Approx. 0 V	
		Key switch ON	Approx. 12 V	
CN101-4 (41, VBBT)	CN104-4 (N2, N2)	-	Battery voltage	
CN101-5 (9, SLLA2+)	CN101-16 (11, SLPS-)	Variation upon changeover from forward to backward lifting	Approx. 0 V to 10 V	
CN101-6 (32, SLTA1+)	CN101-12 (33, STPL-)	Variation upon changeover from forward to backward tilting	Approx. 0 V to 10 V	
CN101-7	-	-	-	
CN101-8	-	-	-	
CN101-9	-	-	-	

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Connector No. ↔ Connector No.		Conditions	Standard:	Remarks
CN101-10 (36, SA1PL-)	CN101-6 (32, SLTA1+)	Resistance measurement with battery plug disconnected	Approx. 7 Ω	
CN101-11 (37, SA1PS-)	CN101-6 (32, SLTA1+)	Resistance measurement with battery plug disconnected	Approx. 7 Ω	
CN101-12 (33, STPL-)	CN101-6 (32, SLTA1+)	Resistance measurement with battery plug disconnected	Approx. 7 Ω	
CN101-13 (34, STPS-)	CN101-6 (32, SLTA1+)	Resistance measurement with battery plug disconnected	Approx. 7 Ω	
CN101-14 (39, SA2PL-)	CN101-5 (9, SLLA2+)	Resistance measurement with battery plug disconnected	Approx. 7 Ω	
CN101-15 (40, SA2PS-)	CN101-5 (9, SLLA2+)	Resistance measurement with battery plug disconnected	Approx. 7 Ω	
CN101-16 (11, SLPS-)	CN101-5 (9, SLLA2+)	Resistance measurement with battery plug disconnected	Approx. 7 Ω	
CN101-17 (10, SLPL-)	CN101-5 (9, SLLA2+)	Resistance measurement with battery plug disconnected	Approx. 7 Ω	
CN101-18	-	-	-	
CN101-19 (43, VBKY)	CN104-4 (N2, N2)	Key switch OFF	Approx. 0 V	
		Key switch ON	Battery voltage	
CN101-20 (57, VRTA+)	CN101-32 (51, POT-)	-	Approx. 4.8 V	
CN101-21	-	-	-	
CN101-22 (50, VRA-)	-	-	-	
CN101-23 (316, VRTRA+)	CN101-32 (51, POT-)	-	Approx. 4.8 V	
CN101-24	-	-	-	
CN101-25 (28, VRL+)	CN101-32 (51, POT-)	-	Approx. 4.6 V	
CN101-26 (55, VRA2+)	CN101-32 (51, POT-)	-	Approx. 4.8 V	
CN101-27 (53, VRA1+)	CN101-32 (50, VRA-)	-	Approx. 4.8 V	
CN101-28 (29, VRT+)	CN101-32 (51, POT-)	-	Approx. 4.6 V	
CN101-29 (30, VRAT1+)	CN101-32 (51, POT-)	-	Approx. 4.6 V	
CN101-30 (31, VRAT2+)	CN101-32 (51, POT-)	-	Approx. 4.6 V	
CN101-31	-	-	-	
CN101-32 (51, POT-)	-	-	-	
CN101-33	-	-	-	
CN101-34	-	-	-	

CN102 connector basic conditions (battery plug connected, key switch ON)

Connector No. ↔ Connector No.		Conditions	Standard:	Remarks
CN102-1 (98, FNDC1)	CN104-4 (N2, N2)	Fan 1 stop (OFF operation with ACTIVE TEST)	Battery voltage	
		Fan 1 rotate (ON operation with ACTIVE TEST)	Approx. 0 V	

Connector No. ↔ Connector No.		Conditions	Standard:	Remarks
CN102-2 (99, FNDC2)	CN104-4 (N2, N2)	Fan 2 stop (OFF operation with ACTIVE TEST)	Battery voltage	
		Fan 2 rotate (ON operation with ACTIVE TEST)	Approx. 0 V	
CN102-3 (19, VBMBSL)	CN104-4 (N2, N2)	Key switch OFF	Approx. 0 V	
		Key switch ON	Battery voltage	
CN102-4 (19, VBMBSL)	CN104-4 (N2, N2)	Key switch OFF	Approx. 0 V	
		Key switch ON	Battery voltage	
CN102-5 (17, SOLCOM)	CN104-4 (N2, N2)	Key switch OFF	Approx. 0 V	
		Key switch ON	Battery voltage	
CN102-6 (17, SOLCOM)	CN104-4 (N2, N2)	Key switch OFF	Approx. 0 V	
		Key switch ON	Battery voltage	
CN102-7 (329, SLS+)	CN102-14 (330, SLS-)	Steering synchronizer solenoid (OFF operation with ACTIVE TEST)	Approx. 0 V	
		Steering synchronizer solenoid (ON operation with ACTIVE TEST)	Approx. 11 V	
CN102-8 (333, OACC3)	CN104-4 (N2, N2)	Key switch OFF	Approx. 14 V	Only with operation control
		Key switch ON	Approx. 0 V	
CN102-9 (332, OACC2)	CN104-4 (N2, N2)	Buzzer OFF	Approx. 14 V	
		Buzzer ON	Approx. 0 V	
CN102-10 (51, LS-)	-	-	-	
CN102-11	-	-	-	
CN102-12	-	-	-	
CN102-13 (335, RY1)	CN104-4 (N2, N2)	Key switch OFF	Battery voltage	
		Key switch ON	Battery voltage - Approx. 12 V	
CN102-14 (330, SLS-)	CN102-7 (329, SLS+)	Resistance measurement with battery plug disconnected	Approx. 10 Ω	
CN102-15	-	-	-	
CN102-16 (4, SLLL-)	CN101-1 (3, SOLLU+)	Resistance measurement with battery plug disconnected	Approx. 10 Ω	
CN102-17	-	-	-	
CN102-18	-	-	-	
CN102-19 (7, SLTFL-)	CN101-2 (6, SLTFB+)	Resistance measurement with battery plug disconnected	Approx. 10 Ω	
CN102-20 (25, VRA12)	CN102-26 (51, POT-)	Attachment 1 lever in the neutral position	Approx. 2.3 V	
		Attachment 1 lever in the forward or backward position	Approx. 0.5 V to 4 V	
CN102-21 (24, VRA11)	CN102-26 (51, POT-)	Attachment 1 lever in the neutral position	Approx. 2.3 V	
		Attachment 1 lever in the forward or backward position	Approx. 0.5 V to 4 V	
CN102-22 (23, VRT2)	CN102-26 (51, POT-)	Key switch OFF, tilt lever in the neutral position	Approx. 2.3 V	
		Key switch OFF, tilt lever in the backward position	Approx. 0.5 V to 4 V	

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Connector No. ↔ Connector No.		Conditions	Standard:	Remarks
CN102-23 (22, VRT1)	CN102-26 (51, POT-)	Key switch OFF, tilt lever in the neutral position	Approx. 2.3 V	
		Key switch OFF, tilt lever in the forward position	Approx. 0.5 V to 4 V	
CN102-24 (304, CSBAT)	CN102-35 (305, CSBAT-)	-	Approx. 2.5 V	
CN102-25	-	-	-	
CN102-26 (51, POT-)	-	-	-	
CN102-27	-	-	-	
CN102-28 (27, VRA22)	CN102-26 (51, POT-)	Attachment 2 lever in the neutral position	Approx. 2.3 V	
		Attachment 2 lever in the forward or backward position	Approx. 0.5 V to 4 V	
CN102-29 (26, VRA21)	CN102-26 (51, POT-)	Attachment 2 lever in the neutral position	Approx. 2.3 V	
		Attachment 2 lever in the forward or backward position	Approx. 0.5 V to 4 V	
CN102-30 (52, VRA1)	CN101-22 (50, VRA-)	Key switch OFF, accelerator pedal depressed	Approx. 0.4 V to 4.7 V	
CN102-31 (317, VRTRA)	CN102-26 (51, POT-)	Tire position in neutral	Approx. 2.5 V	
CN102-32 (54, VRA2)	CN102-26 (51, POT-)	Key switch OFF, accelerator pedal depressed	Approx. 0.5 V to 4.7 V	
CN102-33	-	-	-	
CN102-34	-	-	-	
CN102-35 (305, CSBAT-)	-	-	-	

CN103 connector basic conditions (battery plug connected, key switch ON)

Connector No. ↔ Connector No.		Conditions	Standard:	Remarks
CN103-1	-	-	-	
CN103-2	-	-	-	
CN103-3 (14, DGND)	-	-	-	
CN103-4 (42, KYSAT)	CN104-4 (N2, N2)	Key switch OFF	Approx. 0 V	
		Key switch ON	Battery voltage	
CN103-5 (N2, N2)	-	-	-	
CN103-6 (51, LS-)	-	-	-	
CN103-7	-	-	-	
CN103-8 (300, IPL+)	CN102-26 (51, POT-)	-	Approx. 5 V	
CN103-9	-	-	-	
CN103-10	-	-	-	
CN103-11 (145, CAN1H)	-	Immeasurable	-	
CN103-12 (146, CAN1L)	-	Immeasurable	-	
CN103-13 (311, SSTR+)	CN103-6 (51, LS-)	-	Approx. 14 V	

Connector No. ↔ Connector No.		Conditions	Standard:	Remarks
CN103-14 (16, D7V)	CN103-3 (14, DGND)	-	Approx. 6.5 V	
CN103-15	-	-	-	
CN103-16	-	-	-	
CN103-17 (56, VRTA)	CN102-26 (51, POT-)	Variation upon changeover from forward to backward tilting	Approx. 1 V to 4 V	
CN103-18 (21, VRL2)	CN102-26 (51, POT-)	Lift lever in the neutral position	Approx. 2.3 V	
		Lift lever in the forward or backward position	Approx. 0.5 V to 4 V	
CN103-19 (302, IPL2)	CN102-26 (51, POT-)	-	Approx. 2 V	
CN103-20	-	-	-	
CN103-21	-	-	-	
CN103-22	-	-	-	
CN103-23	-	-	-	
CN103-24 (91, SH2-1)	CN103-6 (51, LS-)	Key switch OFF, mast height switch 2-1 OFF	Approx. 5 V	
		Key switch OFF, mast height switch 2-1 ON	Approx. 0 V	
CN103-25	-	-	-	
CN103-26 (20, VRL1)	CN102-26 (51, POT-)	Lift lever in the neutral position	Approx. 2.3 V	
		Lift lever in the forward or backward position	Approx. 0.5 V to 4 V	
CN103-27	-	-	-	
CN103-28	-	-	-	
CN103-29 (59, SPLF)	CN102-26 (51, POT-)	Forks on the ground	Approx. 1 V or less	
		Amount of change between raising and lowering on the lift with a load	Approx. 0.5 V to 4.5 V	
CN103-30 (301, IPL1)	CN102-26 (51, POT-)	-	Approx. 2 V	
CN103-31	-	-	-	
CN103-32 (70, STK)	CN103-6 (51, LS-)	Key switch OFF, automatic fork leveling switch OFF	Approx. 5 V	
		Key switch OFF, automatic fork leveling switch ON	Approx. 0 V	
CN103-33 (306, OLM+)	CN104-4 (N2, N2)	Key switch OFF, laser marker OFF	Approx. 5 V	
		Key switch OFF, laser marker ON	Approx. 0 V	
CN103-34 (420, SWH08)	CN103-6 (51, LS-)	Key switch OFF, mast height 800 switch OFF	Approx. 0 V	
		Key switch OFF, mast height 800 switch ON	Approx. 5 V	
CN103-35 (450, SSB)	CN103-6 (51, LS-)	Key switch OFF, seat belt switch OFF	Approx. 5 V	
		Key switch OFF, seat belt switch ON	Approx. 0 V	

CN104 Connector basic conditions (battery plug connected, key switch ON)

Connector No. ↔ Connector No.		Conditions	Standard:	Remarks
CN104-1 (41, B48V)	CN104-4 (N2, N2)	-	Battery voltage	
CN104-2 (44, VBMB)	CN104-4 (N2, N2)	Key switch OFF	Approx. 0 V	
		Key switch ON	Battery voltage	

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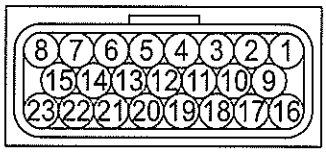
Connector No. ↔ Connector No.		Conditions	Standard:	Remarks
CN104-3 (1, CBAT+)	CN104-9 (2, CBAT-)	Key switch OFF	Approx. 0 V	
		Key switch ON	Approx. 11 V to 12 V	
CN104-4 (N2, N2)	-	-	-	
CN104-5 (N2, N2)	-	-	-	
CN104-6 (N2, N2)	-	-	-	
CN104-7	-	-	-	
CN104-8	-	-	-	
CN104-9 (2, CBAT-)	CN104-3 (1, CBAT+)	Resistance measurement with battery plug disconnected	Approx. 20 Ω	
CN104-10 (303, CSBAT+)	CN102-35 (305, CSBAT-)	-	Approx. 5 V	
CN104-11	-	-	-	
CN104-12 (58, SPLF+)	CN102-26 (51, POT-)	-	Approx. 5 V	
CN104-13	-	-	-	
CN104-14 (334, PSACC+)	CN104-4 (N2, N2)	-	Approx. 14 V	
CN104-15 (60, PSSW+)	CN104-4 (N2, N2)	-	Approx. 14 V	
CN104-16	-	-	-	
CN104-17	-	-	-	
CN104-18 (67, SDM)	CN103-6 (51, LS-)	Key switch OFF, seat switch OFF	Approx. 5 V	
		Key switch OFF, seat switch ON	Approx. 0 V	
CN104-19 (46, DSR)	CN103-6 (51, LS-)	Key switch OFF, direction switch neutral	Approx. 5 V	
		Key switch OFF, direction switch backward	Approx. 0 V	
CN104-20 (66, SPB)	CN103-6 (51, LS-)	Key switch OFF, parking brake switch lock	Approx. 5 V	
		Key switch OFF, parking brake switch release	Approx. 0 V	
CN104-21	-	-	-	
CN104-22 (90, SH1)	CN103-6 (51, LS-)	Key switch OFF, mast height switch 1 ON	Approx. 0 V	
		Key switch OFF, mast height switch 1 OFF	Approx. 5 V	
CN104-23 (65, SWBK)	CN103-6 (51, LS-)	Key switch OFF, brake switch release	Approx. 0 V	
		Key switch OFF, brake switch lock	Approx. 5 V	
CN104-24 (314, SSTRC)	CN103-6 (51, LS-)	Steering operation	Approx. 0 V to 5 V	
CN104-25	-	-	-	
CN104-26 (45, DSF)	CN103-6 (51, LS-)	Key switch OFF, direction switch neutral	Approx. 5 V	
		Key switch OFF, direction switch forward	Approx. 0 V	
CN104-27	-	-	-	

Connector No. ↔ Connector No.		Conditions	Standard:	Remarks
CN104-28 (68, SHS)	CN103-6 (51, LS-)	Key switch OFF, load switch OFF	Approx. 5 V	
		Key switch OFF, load switch ON	Approx. 0 V	
CN104-29	-	-	-	
CN104-30 (312, SSTR1)	CN103-6 (51, LS-)	Steering operation	Approx. 0 V to 5 V	
CN104-31 (313, SSTR2)	CN103-6 (51, LS-)	Steering operation	Approx. 0 V to 5 V	

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Drive motor driver LH

CN109

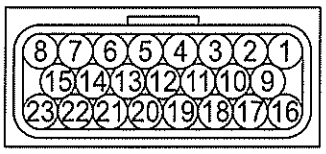


CN109 connector basic conditions (battery plug connected, key switch ON)

Connector No. ↔ Connector No.		Conditions	Standard:	Remarks
CN109-1	-	-	-	
CN109-2	-	-	-	
CN109-3	-	-	-	
CN109-4	-	-	-	
CN109-5	-	-	-	
CN109-6	-	-	-	
CN109-7	-	-	-	
CN109-8 (42, KYSAT)	- (N1, N1)	-	Battery voltage	
CN109-9 (86, STDML+)	- (N1, N1)	-	Approx. 5 V	
CN109-10 (87, STDML)	- (N1, N1)	-	Approx. 1 V to 4 V	
CN109-11	-	-	-	
CN109-12	-	-	-	
CN109-13 (80, SSDL2)	- (N1, N1)	-	L: approx. 0.5 V or H: approx. 1.5 V	
CN109-14 (79, SSDL1)	- (N1, N1)	-	L: approx. 0.5 V or H: approx. 1.5 V	
CN109-15 (78, SSDL+)	- (N1, N1)	-	Approx. 15 V	
CN109-16 (146, CAN1L)	-	Immeasurable	-	
CN109-17 (145, CAN1H)	-	Immeasurable	-	
CN109-18	-	-	-	
CN109-19	-	-	-	
CN109-20	-	-	-	
CN109-21	-	-	-	
CN109-22	-	-	-	
CN109-23	-	-	-	

Drive motor driver RH

CN110



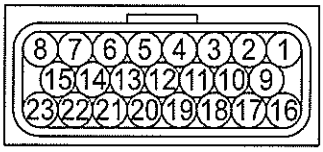
CN110 connector basic conditions (battery plug connected, key switch ON)

Connector No. ↔ Connector No.		Conditions	Standard:	Remarks
CN110-1	-	-	-	
CN110-2	-	-	-	
CN110-3	-	-	-	
CN110-4	-	-	-	
CN110-5	-	-	-	
CN110-6	-	-	-	
CN110-7 (150, SETDR0)	- (N1, N1)	-	Approx. 0 V	
CN110-8 (42, KYSAT)	- (N1, N1)	-	Battery voltage	
CN110-9 (86, STDMR+)	- (N1, N1)	-	Approx. 5 V	
CN110-10 (85, STDMR)	- (N1, N1)	-	Approx. 1 V to 4 V	
CN110-11	-	-	-	
CN110-12	-	-	-	
CN110-13 (77, SSDR2)	- (N1, N1)	-	L: approx. 0.5 V or H: approx. 1.5 V	
CN110-14 (76, SSDR1)	- (N1, N1)	-	L: approx. 0.5 V or H: approx. 1.5 V	
CN110-15 (75, SSDR+)	- (N1, N1)	-	Approx. 15 V	
CN110-16 (146, CAN1L)	-	Immeasurable	-	
CN110-17 (145, CAN1H)	-	Immeasurable	-	
CN110-18	-	-	-	
CN110-19	-	-	-	
CN110-20	-	-	-	
CN110-21	-	-	-	
CN110-22	-	-	-	
CN110-23 (150, SETDR-)	- (N1, N1)	-	Approx. 0 V	

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Pump motor driver

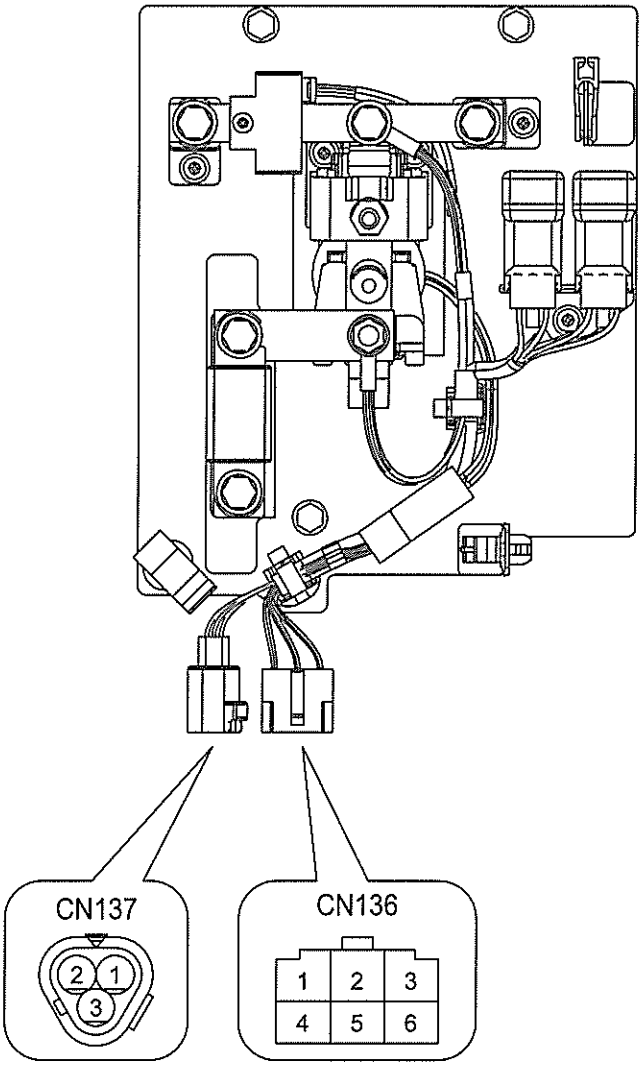
CN111



CN111 connector basic conditions (battery plug connected, key switch ON)

Connector No. ↔ Connector No.		Conditions	Standard:	Remarks
CN111-1	-	-	-	
CN111-2	-	-	-	
CN111-3	-	-	-	
CN111-4	-	-	-	
CN111-5	-	-	-	
CN111-6 (152, SETP1)	- (N1, N1)	-	Approx. 0 V	
CN111-7	-	-	-	
CN111-8 (42, KYSAT)	- (N1, N1)	-	Battery voltage	
CN111-9 (88, STPM+)	- (N1, N1)	-	Approx. 5 V	
CN111-10 (89, STPM)	- (N1, N1)	-	Approx. 1 V to 4 V	
CN111-11	-	-	-	
CN111-12	-	-	-	
CN111-13	-	-	-	
CN111-14 (82, SSP1)	- (N1, N1)	-	L: approx. 0.5 V or H: approx. 1.5 V	
CN111-15 (81, SSP+)	- (N1, N1)	-	Approx. 15 V	
CN111-16 (146, CAN1L)	-	Immeasurable	-	
CN111-17 (145, CAN1H)	-	Immeasurable	-	
CN111-18	-	-	-	
CN111-19	-	-	-	
CN111-20	-	-	-	
CN111-21	-	-	-	
CN111-22	-	-	-	
CN111-23 (152, SETP-)	- (N1, N1)	-	Approx. 0 V	

Contactor panel ASSY



CN136 connector basic conditions (battery plug connected, key switch ON)

Connector No. ↔ Connector No.		Conditions	Standard:	Remarks
CN136-1 (101, FLP)	P2 terminal (P2, P2)	Battery plug disconnected, and the CN136 connector disconnected	Approx. 0 Ω	
CN136-2 (41, VBBT)	P2 terminal (P2, P2)	Battery plug disconnected, and the CN136 connector disconnected	Approx. 0 Ω	
CN136-3 (2, CBAT-)	CN136-4 (1, CBAT+)	Battery plug disconnected, and the CN136 connector disconnected	Approx. 20 Ω	
CN136-4 (1, CBAT+)	CN136-3 (2, CBAT-)	Apply the negative probe to the CN136-3 to measure voltage.	Approx. 11 V	
CN136-5 (44, VBMB)	P3 terminal (P3, P3)	Battery plug disconnected, and the CN136 connector disconnected	Approx. 0 Ω	
CN136-6 (19, VBMBSL)	P3 terminal (P3, P3)	Battery plug disconnected, and the CN136 connector disconnected	Approx. 0 Ω	

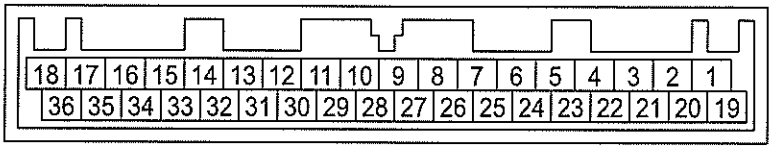
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CN137 connector basic conditions (battery plug connected, key switch ON)

Connector No. ↔ Connector No.		Conditions	Standard:	Remarks
CN137-1 (303, CSBAT+)	CN137-2 (305, CSBAT-)	Apply the negative probe to the CN137-2 to measure voltage.	Approx. 5 V	
CN137-2 (305, CSBAT-)	-	-	-	
CN137-3 (304, CSBAT)	CN137-2 (305, CSBAT-)	Apply the negative probe to the CN137-2 to measure voltage. Drive motor, pump motor, all auxiliary machines OFF	Approx. 2.5 V	

Display

CN70



CN70 connector basic conditions (battery plug connected, key switch ON)

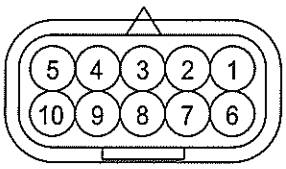
Connector No. ↔ Connector No.		Conditions	Standard:	Remarks
CN70-1 (128, CHG7V)	CN70-2 (130, CHGGND)	-	Approx. 6.3 V	
CN70-2 (130, CHGGND)	-	-	-	
CN70-3 (169, TGND)	-	-	-	
CN70-4 (14, DGND)	-	-	-	
CN70-5 (16, D7V)	CN70-4 (14, DGND)	-	Approx. 6.3 V	
CN70-6 (162, ITKY3)	CN70-3 (169, TGND)	-	Approx. 5 V	*1
CN70-7	-	-	-	
CN70-8 (160, ITKY1)	CN70-3 (169, TGND)	-	Approx. 5 V	*1
CN70-9 (166, OTKY3)	-	Immeasurable	-	
CN70-10 (165, OTKY2)	-	Immeasurable	-	
CN70-11 (164, OTKY1)	-	Immeasurable	-	
CN70-12 (167, LEDTKY1)	CN70-3 (169, TGND)	-	Approx. 0 V	*1
CN70-13	-	-	-	
CN70-14	-	-	-	
CN70-15 (146, CAN1L)	-	Immeasurable	-	
CN70-16 (145, CAN1H)	-	Immeasurable	-	
CN70-17	-	-	-	
CN70-18 (43, VBKY)	CN70-36 (N1, N1)	-	Approx. 48 V	*2
CN70-19 (168, LEDTKY2)	CN70-3 (169, TGND)	-	Approx. 3 V	*1

Connector No. ↔ Connector No.		Conditions	Standard:	Remarks
CN70-20 (161, ITKY2)	CN70-3 (169, TGND)	-	Approx. 5 V	*1
CN70-21 (163, IPSTKY1)	CN70-3 (169, TGND)	-	Approx. 5 V	*1
CN70-22 (123, SW1)	CN70-4 (14, DGND)	-	Approx. 5 V	
CN70-23 (122, SW2)	CN70-4 (14, DGND)	-	Approx. 5 V	
CN70-24 (121, SW3)	CN70-4 (14, DGND)	-	Approx. 5 V	
CN70-25 (129, CHGAC)	CN70-4 (14, DGND)	-	Approx. 5 V	
CN70-26 (140, SLLT)	CN70-4 (14, DGND)	-	L: approx. 1.8 V or H: approx. 2.7 V	
CN70-27	-	-	-	
CN70-28 (139, SWTT)	CN70-4 (14, DGND)	-	Approx. 0 V	
CN70-29 (125, LED3)	CN70-4 (14, DGND)	-	Approx. 0 V	
CN70-30 (126, LED2)	CN70-4 (14, DGND)	-	Approx. 0 V	
CN70-31 (127, LED1)	CN70-4 (14, DGND)	-	Approx. 0 V	
CN70-32 (124, LED4)	CN70-4 (14, DGND)	-	Approx. 0 V	
CN70-33 (132, CHGMS)	CN70-4 (14, DGND)	-	Approx. 0 V	
CN70-34	-	-	-	
CN70-35	-	-	-	
CN70-36 (N1, N1)	-	-	-	*2

*1: W/ PIN code entry system
*2: Cold storage specification only

Ten-key (w/ pin code entry system)

CN33



CN33 connector basic conditions (battery plug connected, key switch ON)

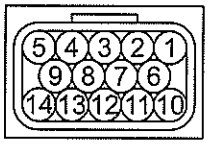
Connector No. ↔ Connector No.		Conditions	Standard:	Remarks
CN33-1 (160, ITKY1)	CN33-7 (169, TGND)	-	Approx. 5 V	
CN33-2 (161, ITKY2)	CN33-7 (169, TGND)	-	Approx. 5 V	
CN33-3 (162, ITKY3)	CN33-7 (169, TGND)	-	Approx. 5 V	
CN33-4 (165, OTKY2)	-	Immeasurable	-	

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Connector No. ↔ Connector No.		Conditions	Standard:	Remarks
CN33-5 (167, LEDTKY1)	CN33-7 (169, TGND)	-	Approx. 0 V	
CN33-6 (163, IPSTKY1)	CN33-7 (169, TGND)	-	Approx. 5 V	
CN33-7 (169, TGND)	-	-	-	
CN33-8 (164, OTKY1)	-	Immeasurable	-	
CN33-9 (166, OTKY3)	-	Immeasurable	-	
CN33-10 (168, LEDTKY2)	CN33-7 (169, TGND)	-	Approx. 3V	

CAN bridge

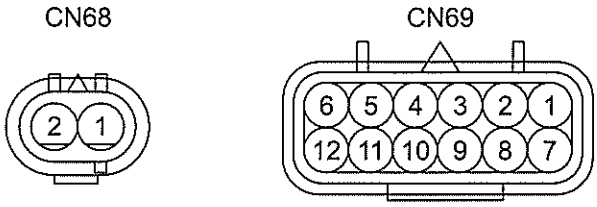
CN100



CN100 connector basic conditions (battery plug connected, key switch ON)

Connector No. ↔ Connector No.		Conditions	Standard:	Remarks
CN100-1 (443, CAN3L)	-	Immeasurable	-	
CN100-2 (443, CAN3L)	-	Immeasurable	-	
CN100-3 (442, CAN3H)	-	Immeasurable	-	
CN100-4 (N2, N2)	-	-	-	
CN100-5 (146, CAN1L)	-	Immeasurable	-	
CN100-6	-	-	-	
CN100-7	-	-	-	
CN100-8	-	-	-	
CN100-9 (145, CAN1H)	-	Immeasurable	-	
CN100-10 (441, SELCB)	CN100-13 (N2, N2)	-	Approx. 0 V	
CN100-11	-	-	-	
CN100-12	-	-	-	
CN100-13 (N2, N2)	-	-	-	
CN100-14 (440, VBRY)	CN100-13 (N2, N2)	-	Battery voltage	

Charger



CN68 connector basic conditions (battery plug connected, key switch ON)

Connector No. ↔ Connector No.		Conditions	Standard:	Remarks
CN68-1 (139, SWTT)	CN68-2 (14, DGND)	-	Approx. 0 V	
CN68-2 (14, DGND)	-	-	-	

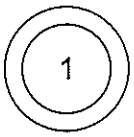
CN69 connector basic conditions (battery plug connected, key switch ON)

Connector No. ↔ Connector No.		Conditions	Standard:	Remarks
CN69-1 (132, CHGMS)	CN69-3 (130, CHGGND)	-	Approx. 6.3 V	
CN69-2 (129, CHGAC)	CN69-3 (130, CHGGND)	-	Approx. 5 V	
CN69-3 (130, CHGGND)	-	-	-	
CN69-4 (128, CHG7V)	CN69-3 (130, CHGGND)	-	Approx. 6.3 V	
CN69-5 (121, SW3)	CN69-3 (130, CHGGND)	-	Approx. 5 V	
CN69-6 (122, SW2)	CN69-3 (130, CHGGND)	-	Approx. 5 V	
CN69-7 (123, SW1)	CN69-3 (130, CHGGND)	-	Approx. 5 V	
CN69-8 (124, LED4)	CN69-3 (130, CHGGND)	-	Approx. 0 V	
CN69-9 (125, LED3)	CN69-3 (130, CHGGND)	-	Approx. 0 V	
CN69-10 (126, LED2)	CN69-3 (130, CHGGND)	-	Approx. 0 V	
CN69-11 (127, LED1)	CN69-3 (130, CHGGND)	-	Approx. 0 V	
CN69-12	-	-	-	

Battery Electrolyte Level / Temperature Sensor

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CN35



CN35 connector basic conditions (battery plug connected, key switch ON)

Connector No. ↔ Connector No.		Conditions	Standard:	Remarks
CN35 (140, SLLT)	CN70-4 (14, DGND)	Connected with display	L: approx. 1.8 V or H: approx. 2.7 V	

2.8 DISASSEMBLY PROCEDURE

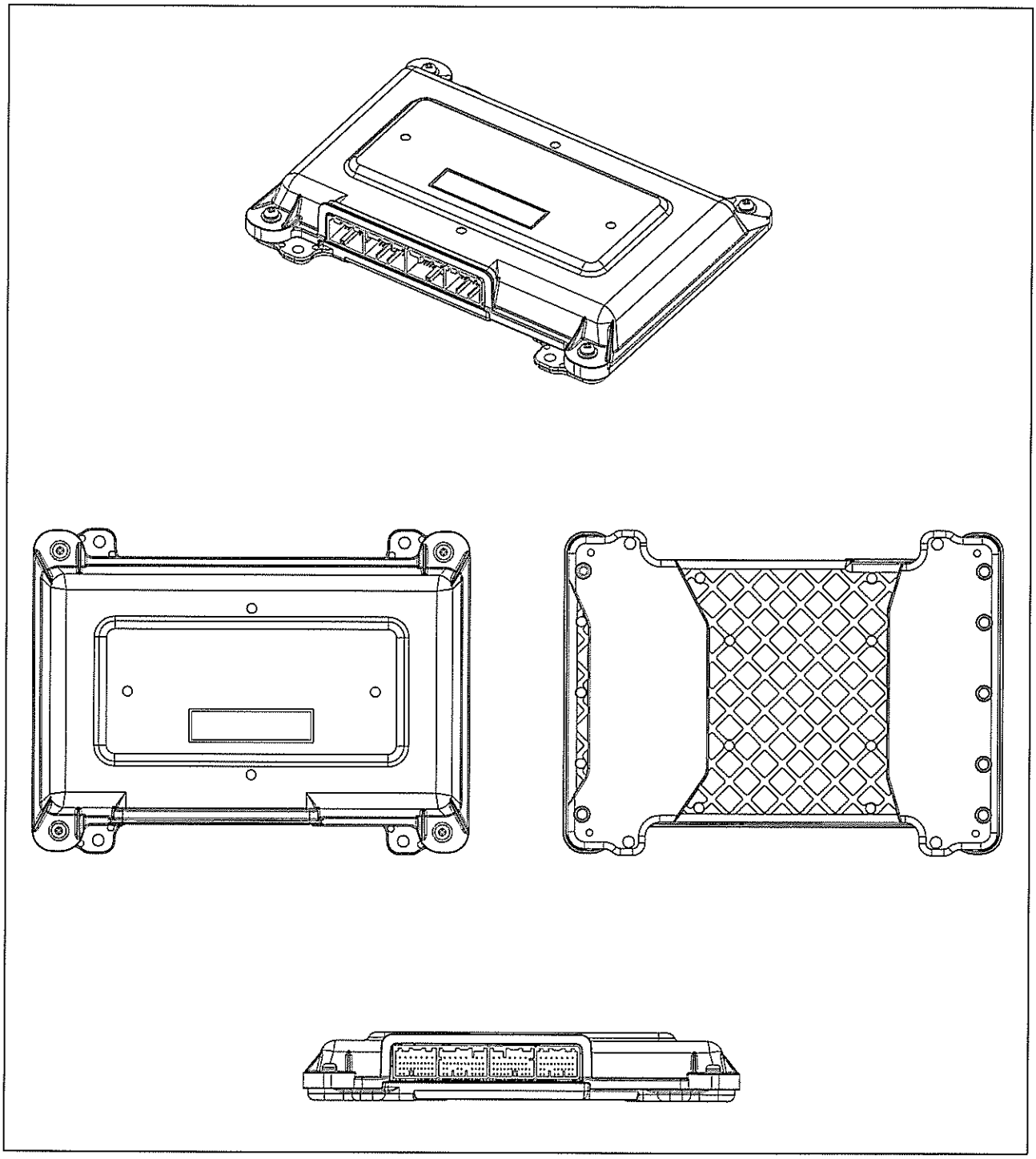
Overhauling the control panel is rarely necessary. In most cases, failed parts is replaced after finding out the cause of the failure from inspection.
Therefore, make sure to repair correctly by referring to the figures of configuration and ASSY.

Caution for Part Replacement

- Observe the specified tightening torque for tightening bolts. Insufficient torque and overlooking of tightening may cause other failure.
- When disconnecting the bars and harness, record the connecting location and place tags. When connecting them again, be sure to confirm with the record and tags to prevent incorrect connection. Incorrect connection may cause other failure.
- Always apply new silicon grease when reassembling parts originally coated with silicon grease. Otherwise, overheating may occur.
- After installation, check that there is no interference of the bar and harness connection with other portion. Additionally, before installation, perform continuity inspection on points by the tester.
  (Refer to page "CONTACTOR PANEL INSULATING RESISTANCE TEST PROCEDURE")

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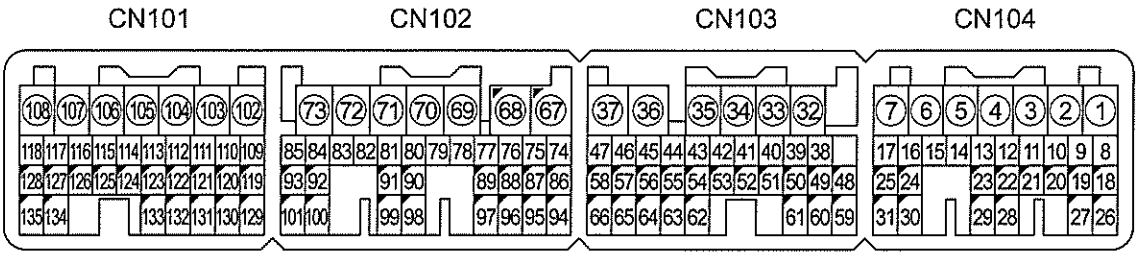
2.9 MAIN CONTROLLER



⚠ CAUTION

When replacing the main controller, always check the part No.

2.9.1 CONNECTOR-PIN ASSIGNMENT



CN101

No.	Terminal name	Circuit mode	Remarks
102	SOLLU+	SOLLU+	UNLOAD, LIFT+
103	SLTFB+	SLTFB+	TILTF, R+
104	FAN+	FAN+	RYR, FAN+
105	VBBT	VBBT	
106	SLLA2+	SOL1, 4+	
107	SLLA1+	SOL2, 3+	
108	---	SOL5+	
109	---	SOL5B	
110	---	SOL5A	
111	SA1PL-	SOL3B	
112	SA1PS-	SOL3A	
113	STPL-	SOL2B	
114	STPS-	SOL2A	
115	SA2PL-	SOL4B	
116	SA2PS-	SOL4A	
117	SLPS-	SOL1A	
118	SLPL-	SOL1B	
119	---	VBBA	
120	VBKY	VBKY	
121	VRTA+	VRTA+	TILT ANGLE SENSOR POWER SUPPLY
122	---	VRS+	SWING ANGLE SENSOR POWER SUPPLY
123	VRA-	VRA-	ACCELERATOR SENSOR GND
124	VRTRA+	VRTRA+	TIRE ANGLE SENSOR POWER SUPPLY
125	---	VRH+	HEIGHT SENSOR POWER SUPPLY
126	VRL+	VRL+	LIFT POT POWER SUPPLY
127	VRA2+	VRA2+	ACCELERATOR SENSOR 2 POWER SUPPLY
128	VRA1+	VRA1+	ACCELERATOR SENSOR 1 POWER SUPPLY
129	VRT+	VRT+	TILT POT POWER SUPPLY
130	VRAT1+	VRAT1+	ATTACHMENT 1 POWER SUPPLY
131	VRAT2+	VRAT2+	ATTACHMENT 2 POWER SUPPLY
132	---	VRAT3+	ATTACHMENT 3 POWER SUPPLY
133	POT-	POT-	GND3
134	VRB2+	VRB2+	BRAKE SENSOR 2 POWER SUPPLY
135	VRB1+	VRB1+	BRAKE SENSOR 1 POWER SUPPLY

CN102

No.	Terminal name	Circuit mode	Remarks
67	FNDC1	FNDC1	FAN1

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No.	Terminal name	Circuit mode	Remarks
68	FNDC2	FNDC2	FAN2
69	VBMBSL	VBMBSL	VBMBSOL
70	VBMBSL	VBMBSL	VBMBSOL
71	SOLCOM	SOLCOM	
72	SOLCOM	SOLCOM	
73	SLS+	SLS+	KNOB, MPS+
74	OACC3	OACC3	ACCESSORY 3 (for FORWARD → FLEET MANAGEMENT)
75	OACC2	OACC2	ACCESSORY 2 (for BACKWARD)
76	LS-	LS-	GND2
77	---	OACC1	ACCESSORY 1 (for BRAKE)
78	---	RY2-	RYR2
79	RY1	RY1-	RYR1
80	SLS-	SLS-	KNOB-
81	---	MPS-	SLDM- (MPS-)
82	SLLL-	SLLL-	LIFT-
83	SLUL-	SLUL-	UNLOAD-
84	SLTBL-	SLTBL-	TILTR-
85	SLTFL-	SLTFL-	TILTF-
86	VRA12	VRA12	ATTACHMENT 12
87	VRA11	VRA11	ATTACHMENT 11
88	VRT2, SWTR	VRT2	TILT LEVER SENSOR 2
89	VRT1 , SWTF	VRT1	TILT LEVER SENSOR 1
90	CSBAT	CSBAT	BATTERY CURRENT SENSOR
91	VRB2	VRB2	BRAKE SENSOR 2
92	POT-	POT-	GND4
93	---	CHK5V	5V POWER SUPPLY for CHECK
94	VRA22	VRA22	ATTACHMENT 22
95	VRA21	VRA21	ATTACHMENT 21
96	VRA1	VRA1	ACCELERATOR SENSOR 1
97	VRTRA	VRTRA	TIRE ANGLE SENSOR
98	VRA2	VRA2	ACCELERATOR SENSOR 2
99	VRB1	VRB1	BRAKE SENSOR 1
100	---	VRS	SWING ANGLE SENSOR
101	CSBAT-	CSBAT-	BATTERY CURRENT SENSOR GND

CN103

No.	Terminal name	Circuit mode	Remarks
32	---	SLSW+	SWING+
33	---	SLSW-	SWING-
34	DGND	DGND	DISPLAY GND
35	KYSAT	KYSAT	KEYSTART
36	N2	N2	
37	LS-	LS-	GND4
38	---	SMTSA	
39	IPL+	IPL+	SHOCK SENSOR POWER SUPPLY
40	---	CAN2H	
41	---	CAN2L	
42	CAN1H	CAN1H	

No.	Terminal name	Circuit mode	Remarks
43	CAN1L	CAN1L	
44	SSTR+	SSTR+	STEERING WHEEL ANGLE SENSOR AND ULTRA SONIC SENSOR POWER SUPPLY (combined use)
45	D7V	D7V	DISPLAY POWER SUPPLY
46	---	CHK15V	15V POWER SUPPLY for CHECK
47	---	CHK33V	3.3V POWER SUPPLY for CHECK
48	VRTA	VRTA	TILT ANGLE SENSOR
49	VRL2	VRL2	LIFT LEVER SENSOR 2
50	IPL2	IPL2	SHOCK SENSOR 2
51	---	SSTMA	
52	---	SMTSK	
53	---	SSTMK	
54	---	OPTSS2	
55	SH2-1	SH2-1	LIFTING HEIGHT SWITCH 2-1
56	---	SHL	LIFTING HEIGHT LIMIT SWITCH
57	VRL1	VRL1	LIFT LEVER SENSOR 1
58	---	SYR	YAW RATE SENSOR
59	---	VRH	HEIGHT SENSOR
60	SPLF	SPLF	PRESSURE SENSOR
61	IPL1	IPL1	SHOCK SENSOR 1
62	---	SH2-2	LIFTING HEIGHT SWITCH 2-2
63	STK	STK	AUTOMATIC FORK LEVELING SWITCH
64	---	OLM+	LASER POINTER POWER SUPPLY
65	---	VRA32	LIFT HEIGHT SWITCH
66	---	VRA31	SEATBELT SWITCH

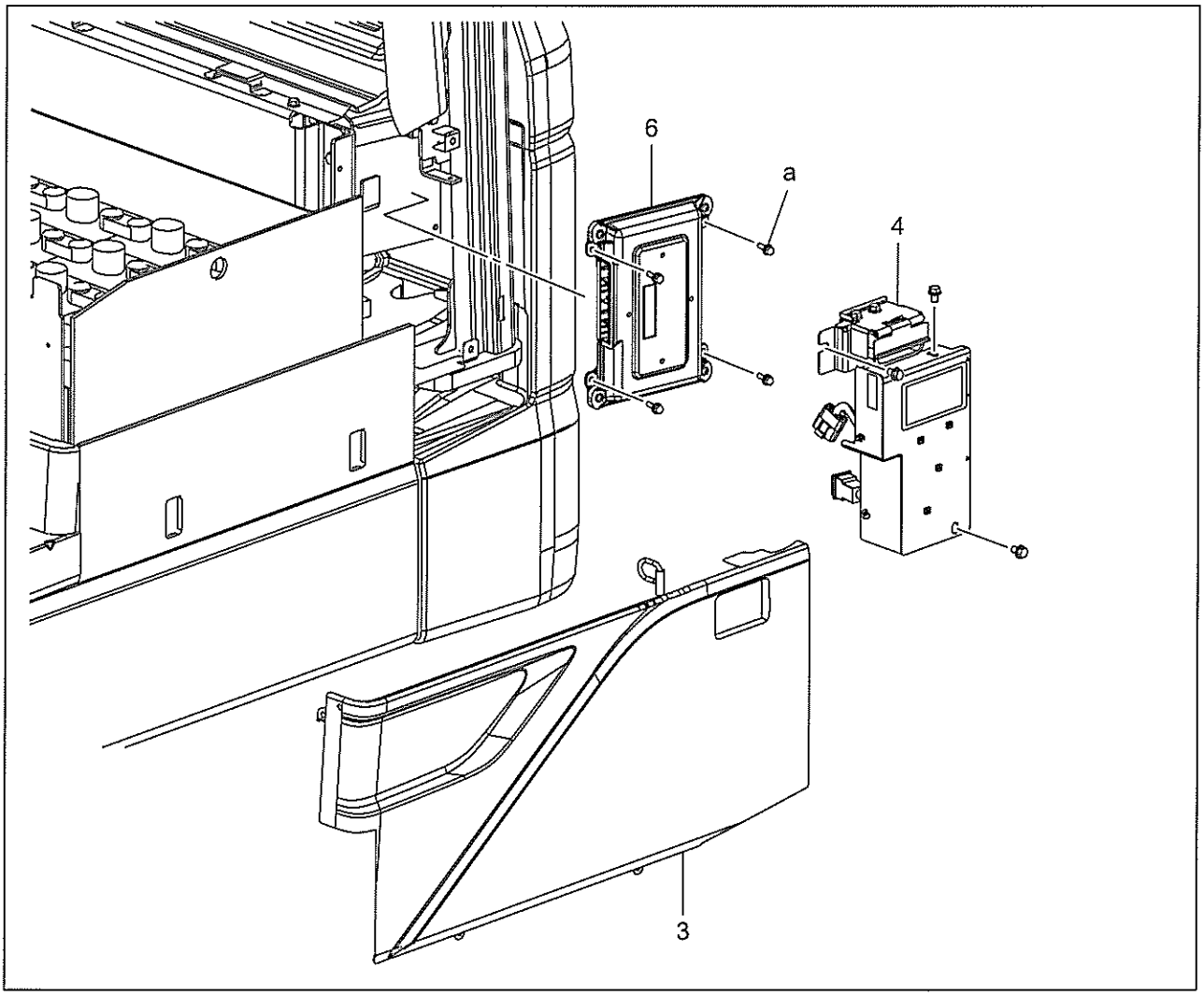
CN104

No.	Terminal name	Circuit mode	Remarks
1	B48V	B48V	B80V
2	VBMB	VBMB	
3	CBAT+	CBAT+	MB, P+
4	N2	N2	
5	N2	N2	
6	N2	N2	
7	---	N2	
8	---	MP-	
9	CBAT-	CBAT-	MB-
10	CSBAT+	CSBAT+	BATTERY CURRENT SENSOR POWER SUPPLY
11	---	SYR-	YAW RATE SENSOR GND
12	SPLF+	SPLF+	PRESSURE SENSOR POWER SUPPLY
13	---	SYR+	YAW RATE SENSOR POWER SUPPLY
14	PSACC+	PSACC+	ACCESSORY POWER SUPPLY
15	PSSW+	PSSW+	POWER SUPPLY for MINI LEVER SWITCH (LOAD METER and AUTOMATIC FORK LEVERING)
16	---	CHKG	
17	---	OPT2	
18	SDM	SDM	SEAT SWITCH

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No.	Terminal name	Circuit mode	Remarks
19	DSR	DSR	DIRECTION SWITCH REVERSE
20	SPB	SPB	PARKING BRAKE
21	----	OPTSSC	
22	SH1	SH1	LIFTING HEIGHT SWITCH 1
23	---	SWA	
24	SSTRC	SSTRC	STEERING WHEEL ANGLE SENSOR 3 (only SSC combined with SW)
25	---	OPTSS1	
26	DSF	DSF	DIRECTION SWITCH FORWARD
27	---	LSOPT1	
28	SHS	SLM	LOAD METER
29	----	BMP	
30	SSTR1	SSTR1	STEERING WHEEL ANGLE SENSOR 1 (only SSC combined with SW)
31	SSTR2	SSTR2	STEERING WHEEL ANGLE SENSOR 2 (only SSC combined with SW)

2.9.2 REMOVAL AND INSTALLATION



a : T=3.9 to 7.2 N m (39.2 to 72.9 kgf-cm) [2.84 to 5.28 ft-lbf]

Removal Procedure

1. Disconnect the battery plug.
2. Open the battery hood.
3. Remove the side hood LH.
4. Remove the charger panel ASSY with disconnecting charger panel ASSY harness.
5. Disconnect the wiring of the main controller.
6. Remove the main controller.

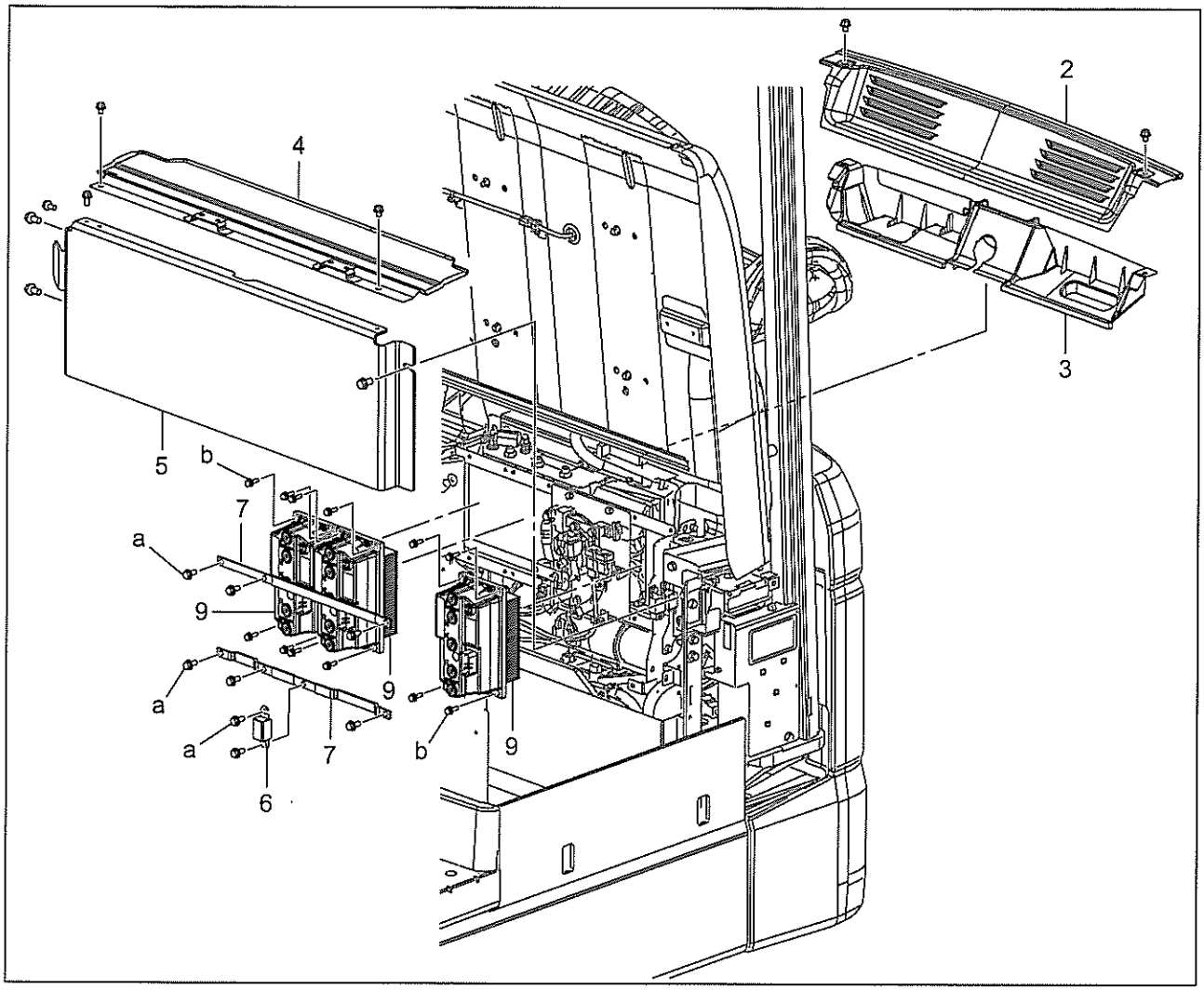
Installation Procedure

The installation procedure is the reverse of the removal procedure.

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2.10 DRIVE AND PUMP MOTOR DRIVER

2.10.1 REMOVAL AND INSTALLATION



a : T=11.2 to 16.8 N m (114 to 171 kgf-cm) [8.26 to 12.39 ft-lbf]
b : T=3.9 to 7.2 N m (39.2 to 72.9 kgf-cm) [2.84 to 5.28 ft-lbf]

Removal Procedure

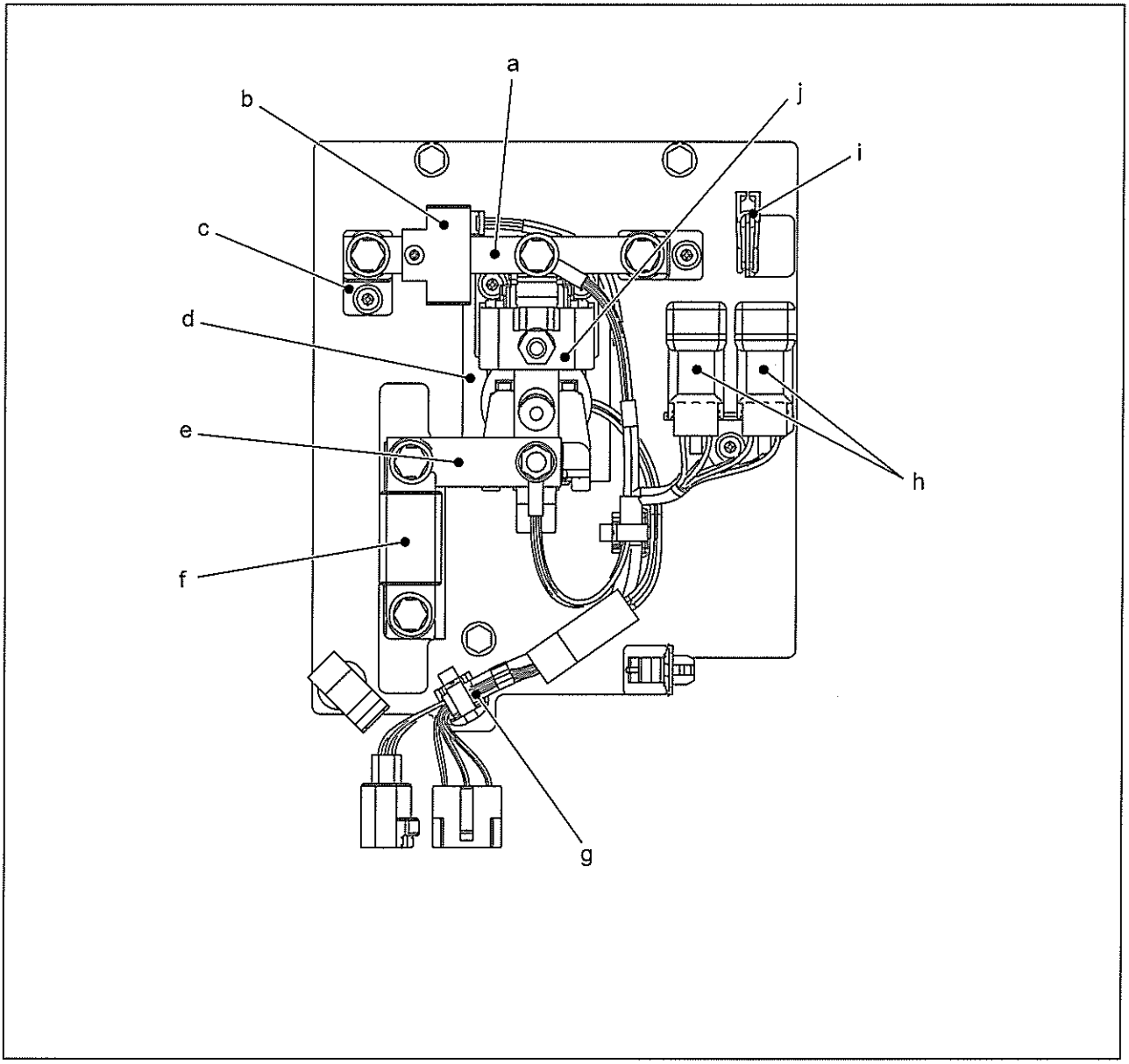
1. Remove the battery. (Refer to page "BATTERY ASSY" of Battery section)
2. Remove the rear cover.
3. Remove the rear lower cover.
4. Remove the upper cover.
5. Remove the battery guard.
6. Remove the F1 fuse.
7. Remove the copper bars.
8. Disconnect the wiring of the drive motor driver LH, the drive motor driver RH and the pump motor driver at the connectors and terminals.
9. Remove the drive motor driver LH, the drive motor driver RH and the pump motor driver

Installation Procedure

The installation procedure is the reverse of the removal procedure.

2.11 CONTACTOR PANEL (STANDARD)

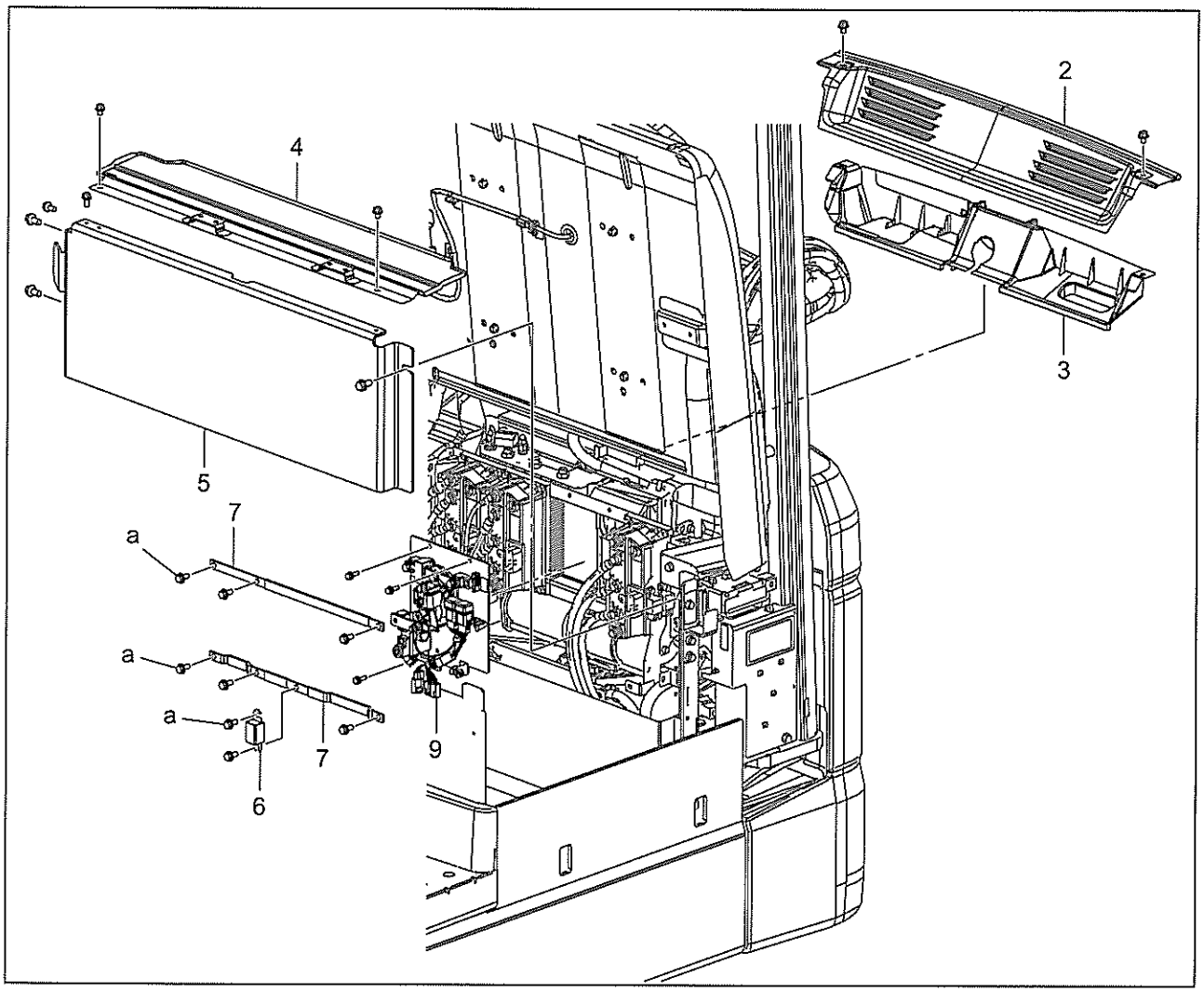
2.11.1 COMPONENTS



a : P1 - P2 Copper bar
b : Current sensor
c : Terminal
d : Insurating sheet
e : P3 Copper bar
f : F1 Fuse
g : Harness
h : Fuse block
i : Fuse clip
j : Contactor ASSY

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2.11.2 REMOVAL AND INSTALLATION



a : T=11.2 to 16.8 N m (114 to 171 kgf-cm) [8.26 to 12.39 ft-lbf]

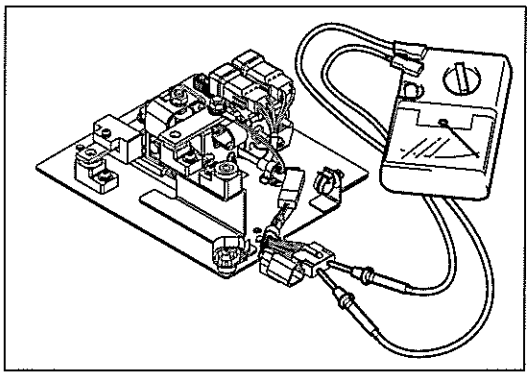
Removal Procedure

1. Remove the battery. (Refer to page "BATTERY ASSY" of Battery section)
2. Remove the rear cover.
3. Remove the rear lower cover.
4. Remove the upper cover.
5. Remove the battery guard.
6. Remove the F1 fuse.
7. Remove the copper bars.
8. Disconnect the wiring of the contactor panel.
9. Remove the contactor panel.**[POINT 1]**

Installation Procedure

The installation procedure is the reverse of the removal procedure.

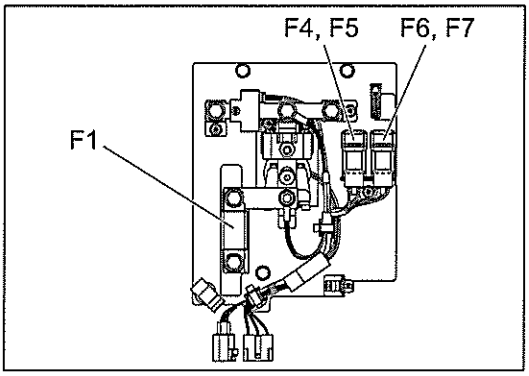
Point Operations



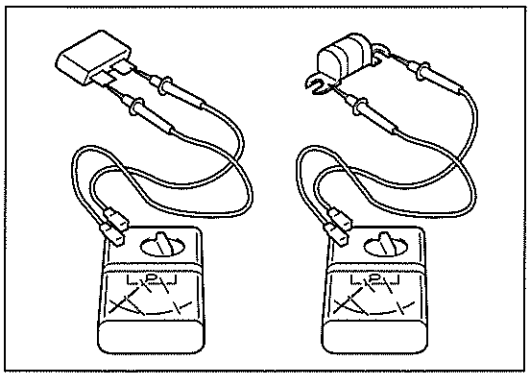
[POINT 1]

Inspection:
Disconnect CN136 connector, and measure the resistance of the MB coil.

Portion to be inspected	Measurement terminals	Standard	Tester range
MB coil	Both terminals of CN136-3 CN136-4	Approx. 20 Ω (at 20 °C)	Ω x 1



Disconnect the fuse and measure the insulation resistance.



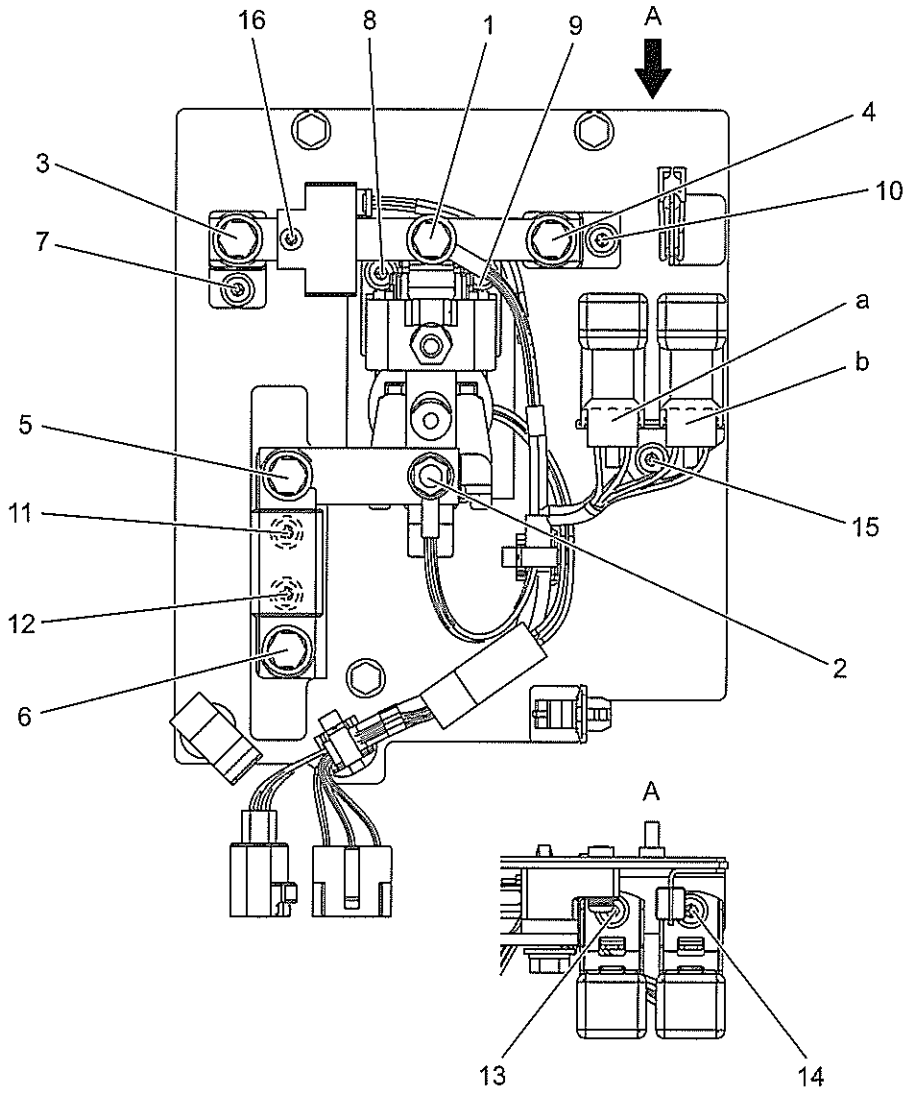
Portion to be inspected	Measurement terminals	Standard	Tester range
Fuse	Both terminals of fuse	0 Ω	Ω x 1

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2.11.3 REASSEMBLY

Contactor Panel Reassembly Drawing

1. Tightening torque view

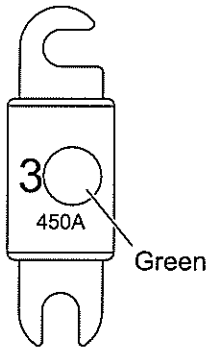
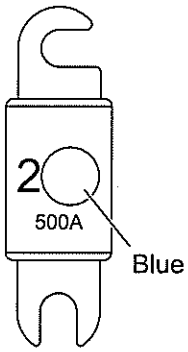


a: Connector color : Natural
b: Connector color : Black

No.	Tightening torque N m (kgf-cm) [ft-lbf]	No.	Tightening torque N m (kgf-cm) [ft-lbf]
1	7.8 to 11.8 (80 to 120) [5.75 to 8.71]	9	2.0 to 3.0 (20 to 31) [1.48 to 2.21]
2	↑	10	↑
3	11.2 to 16.8 (114 to 171) [8.26 to 12.39]	11	↑
4	↑	12	↑
5	↑	13	↑
6	↑	14	↑
7	2.0 to 3.0 (20 to 31) [1.48 to 2.21]	15	↑
8	↑	16	1.3 to 2.1 (13 to 21) [0.96 to 1.55]

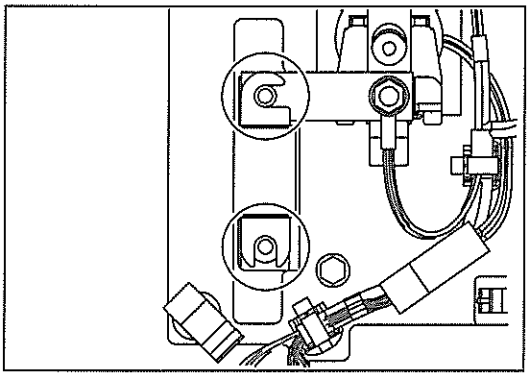
2. How to use the F1 fuse separately

Install the F1 fuse while checking the number and color seal attached on the fuse.

Application models	1.0 to 1.3ton	1.5 to 2.0ton
Outline drawing		
Numeral	3	2
Color seal	Green	Blue
Rated current (A)	450	500

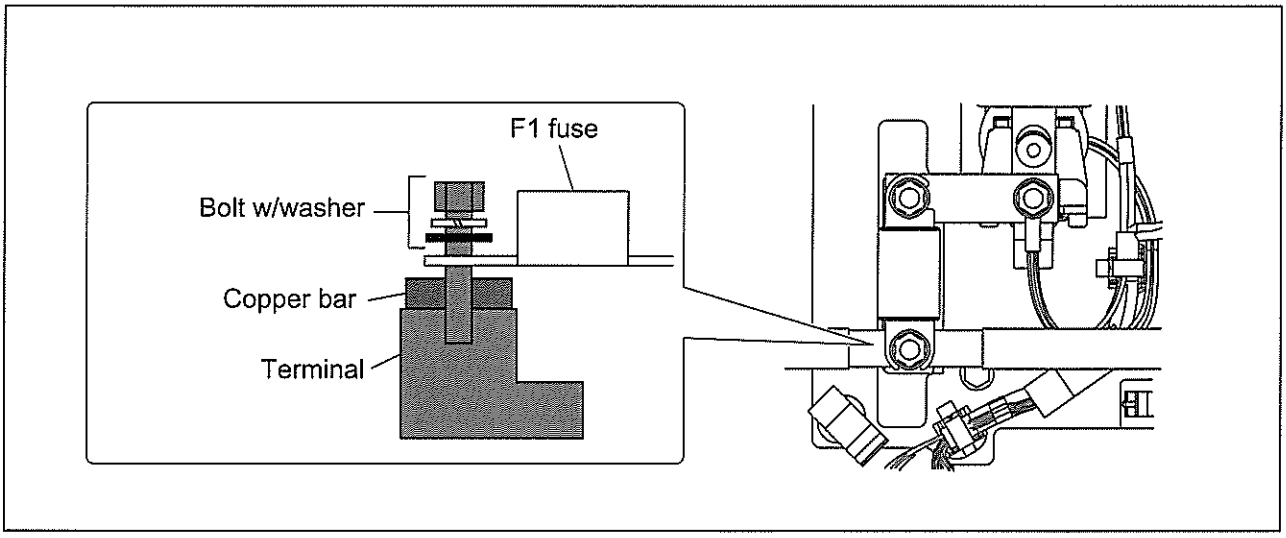
3. F1 fuse installing direction

Install the F1 fuse in direction shown below.



4. Lapping sequence of F1 fuse

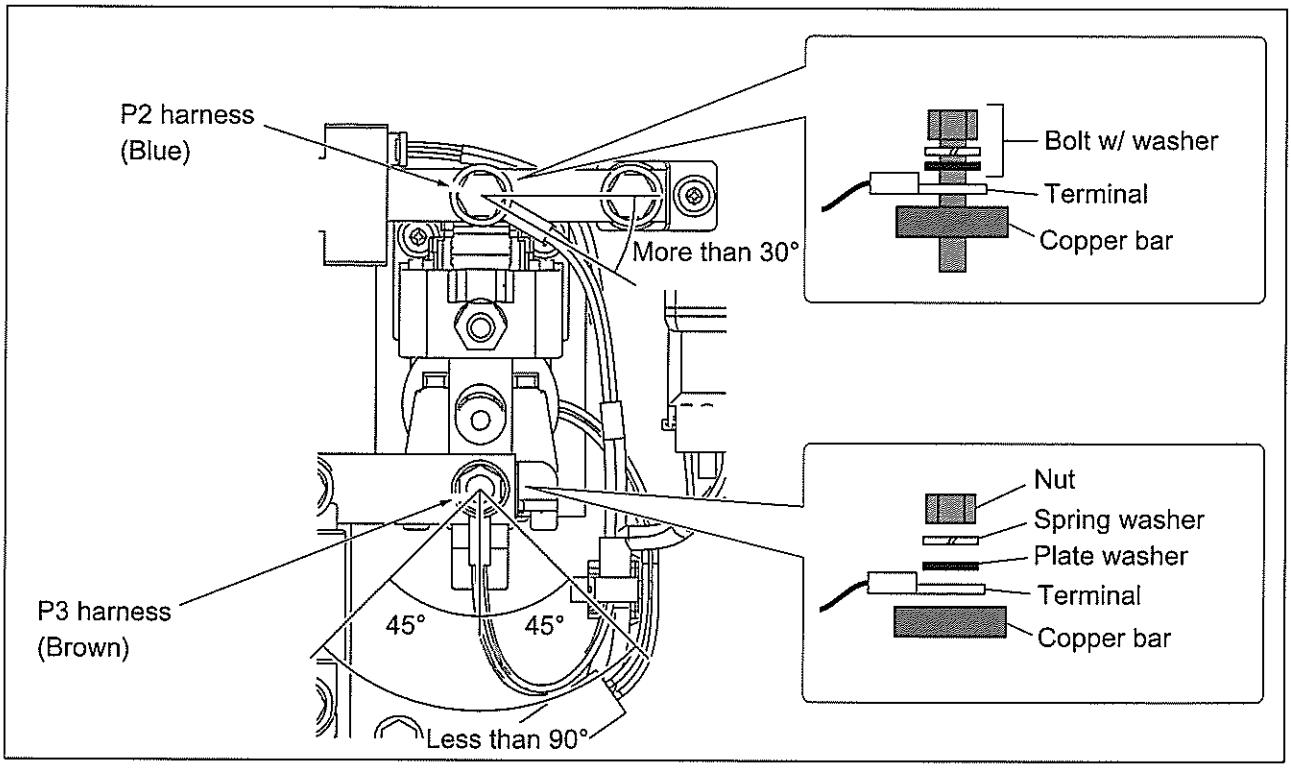
Lapping sequence of the bolt, F1 fuse and copper bar positon as shown below.



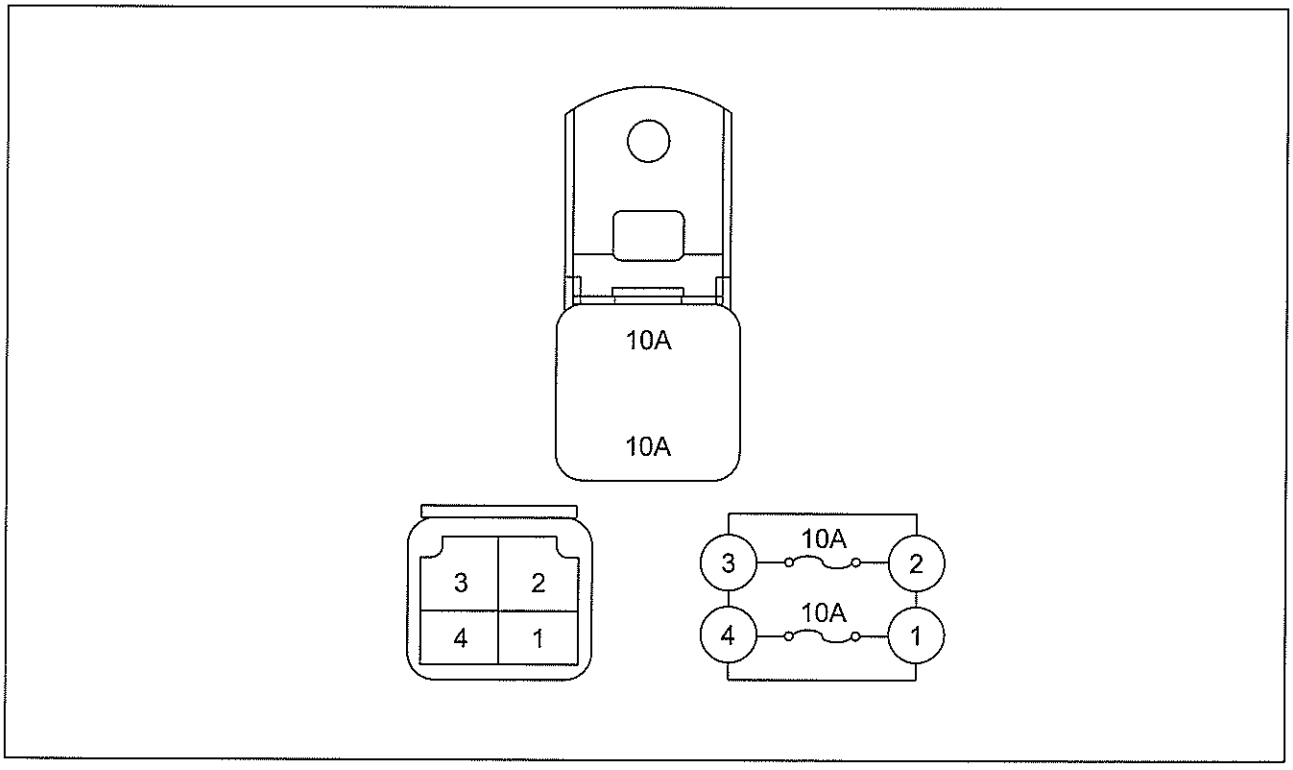
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5. Installing angle of P2 harness and P3 harness, and lapping sequence of P2 harness and P3 harness

Install with angles of P2 harness and P3 harness, and the lapping sequence of the bolt, nut, washer, copper bar and terminal on P2 harness and P3 harness portion as shown below.

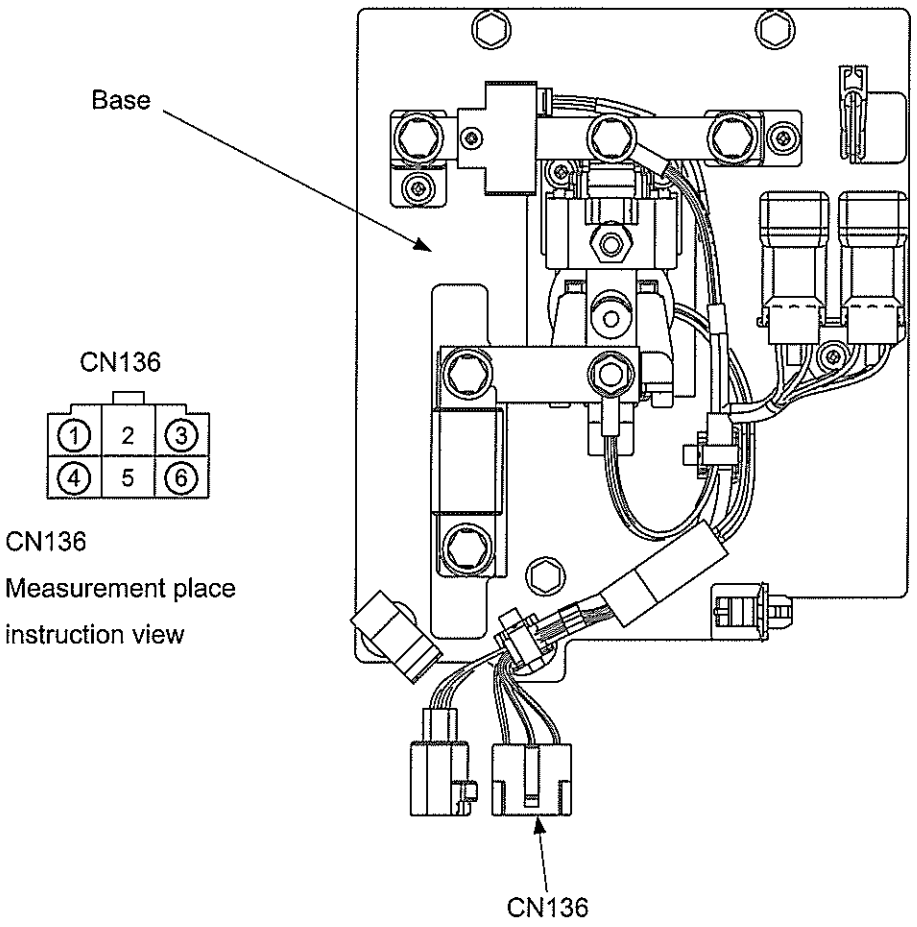


6. Fuse block



2.11.4 CONTACTOR PANEL INSULATING RESISTANCE TEST PROCEDURE

Make sure to perform an insulating resistance test.

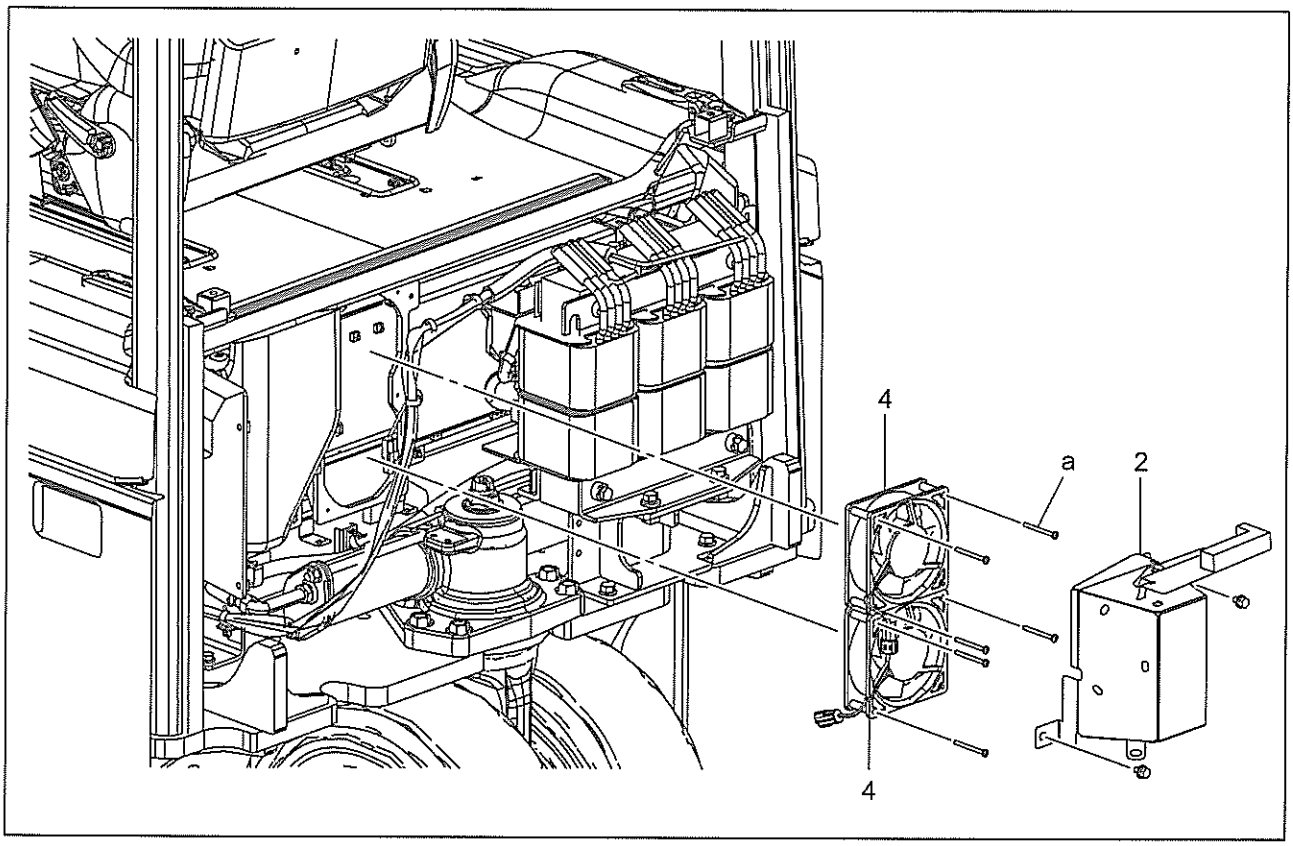


No.	Measurement place (Measure the insulating resistance between A and B.)		Standard	Locator
	A	B		
1	Base	CN136 (Only No.1, 3, 4, 6 Pin: Reference above chart)	DC 500 V applied 10 MΩ more	Insulation resistance tester
2	CN136 (Only No.3, 4 Pin: Reference above chart)	CN136 (Only No.1, 6 Pin: Reference above chart)		

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2.12 COOLING FAN

2.12.1 REMOVAL AND INSTALLATION



a : T=1.3 to 1.7 N m (13 to 17 kgf-cm) [1.0 to 1.3 ft-lbf]

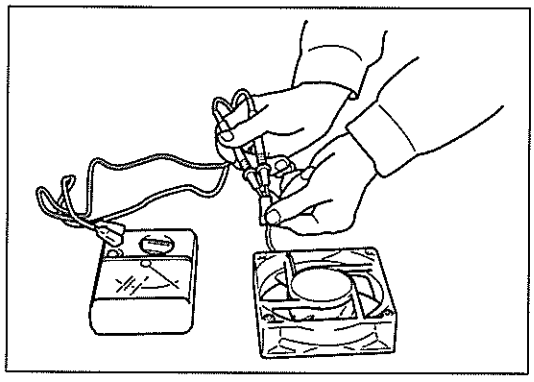
Removal Procedure

1. Remove the counterweight. (Refer to page "COUNTERWEIGHT" of Body & frame section)
2. Remove the fan cover plate.
3. Disconnect the wiring of the fans.
4. Remove the fans.**[Point 1]**

Installation Procedure

The installation procedure is the reverse of the removal procedure.

Point Operations



[POINT 1]

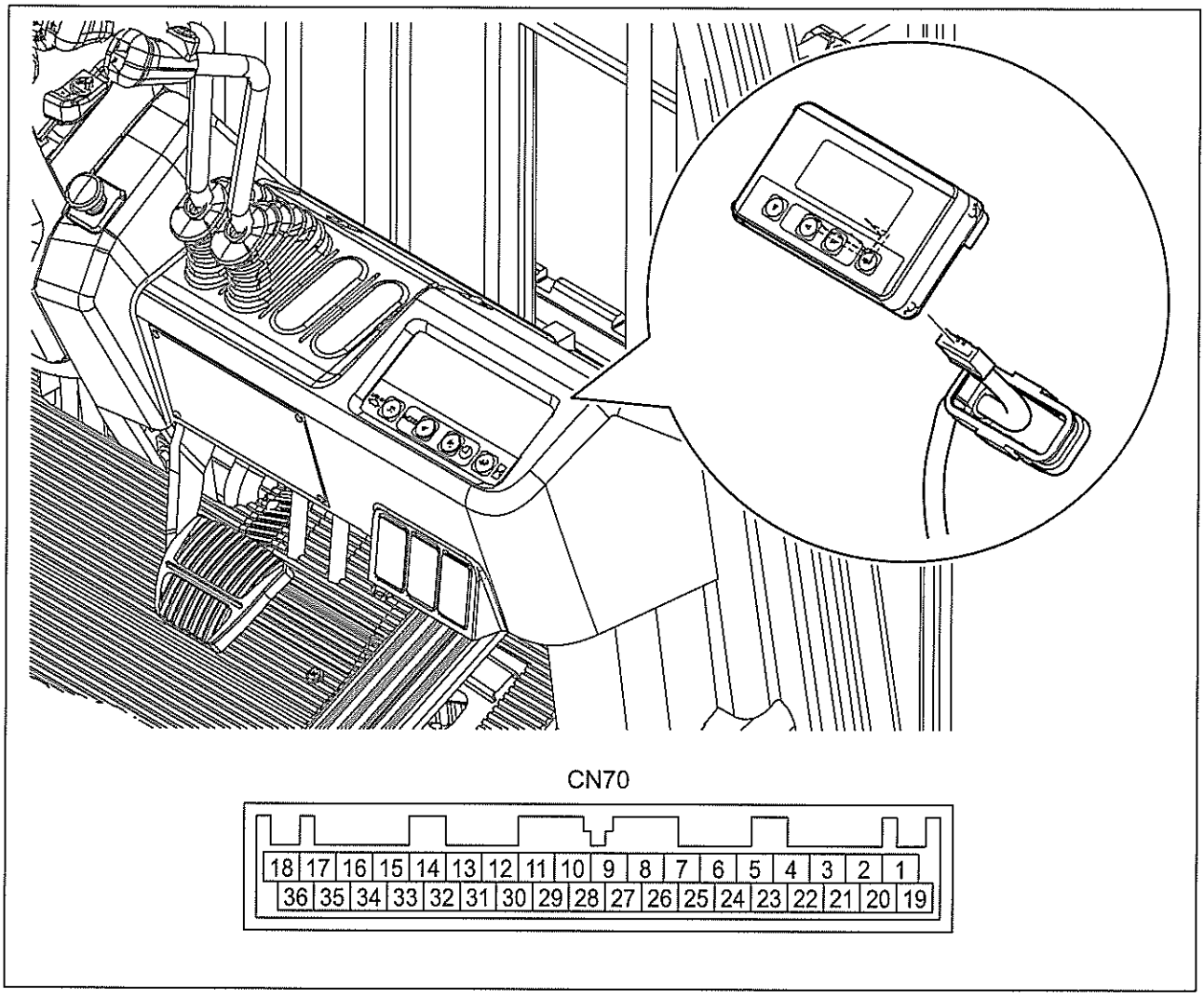
Inspection:
Disconnect the fan connector, and measure the resistance of the fan.

Measurement terminals	Standard	Tester range
CN112-1 (1) - CN112-2 (98)	∞ Ω	Ω x 1
CN113-1 (1) - CN113-2 (98)		

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2.13 DISPLAY

If the cause of trouble is judged to exist in the display, measure the voltage at the connector to which voltage is applied.

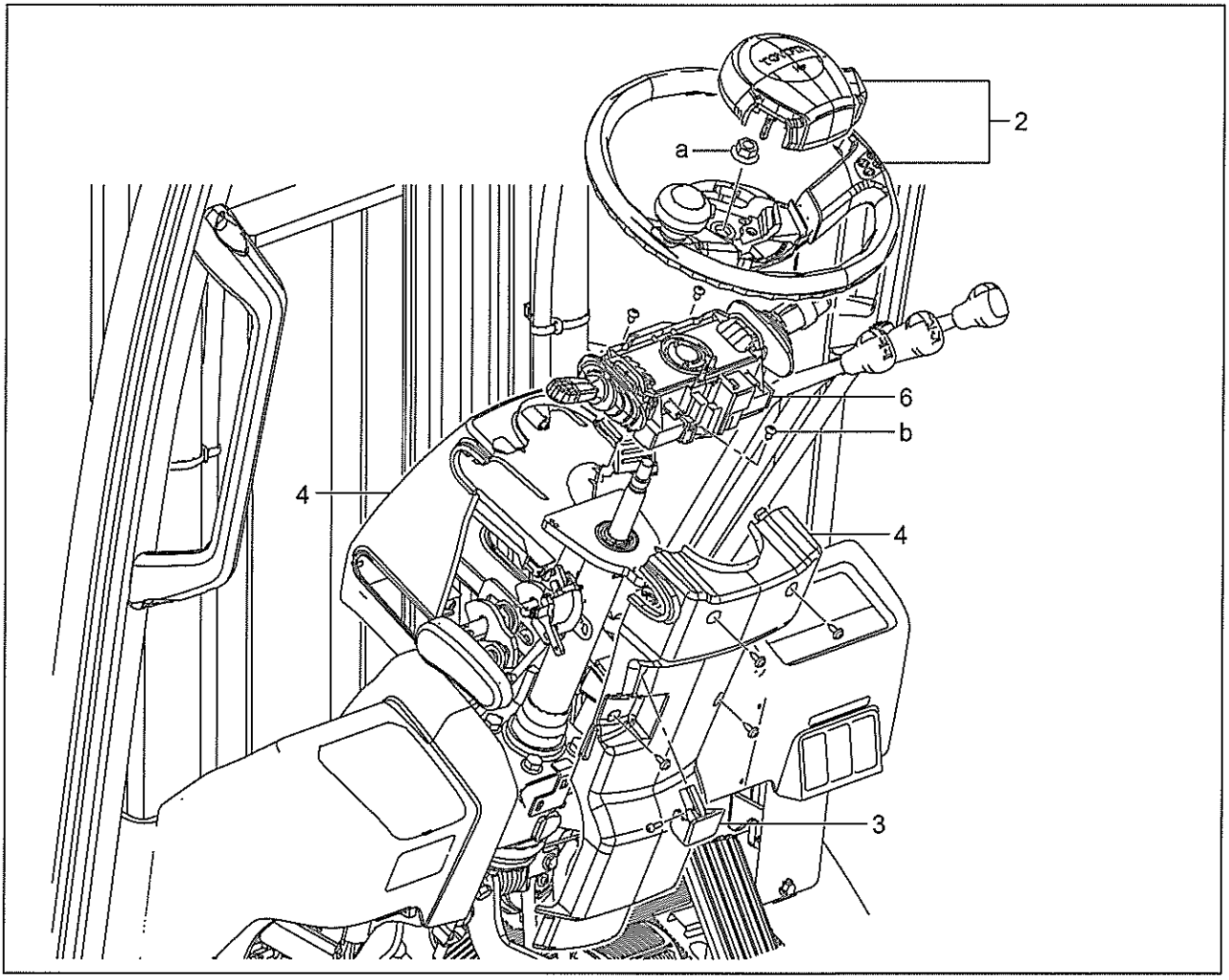


CN70 connector basic condition (Battery plug connected)

Connector No. ⇔ Connector No.		Conditions	Standard:	Remarks
CN70-5 (16, D7V)	CN70-4 (14, DGND)	-	Approx. 6.3 V	

2.14 COMBINATION SWITCH

2.14.1 REMOVAL AND INSTALLATION



a : T = 24.5 to 45.5 N m (250 to 464 kgf-cm) [18.1 to 33.6 ft-lbf]
b : T = 2.0 to 2.5 N m (20 to 25 kgf-cm) [1.5 to 1.8 ft-lbf]

Removal Procedure

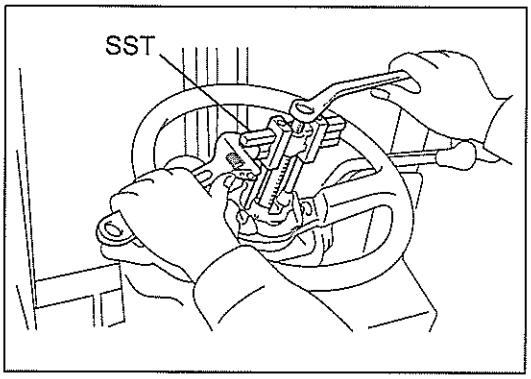
1. Disconnect the battery plug.
2. Remove the steering wheel.**[Point 1]**
3. Remove the hand brake release lever knob.
4. Remove the column cover.
5. Disconnect the wiring of the combination switch.
6. Remove the combination switch ASSY.

Installation Procedure

The installation procedure is the reverse of the removal procedure.

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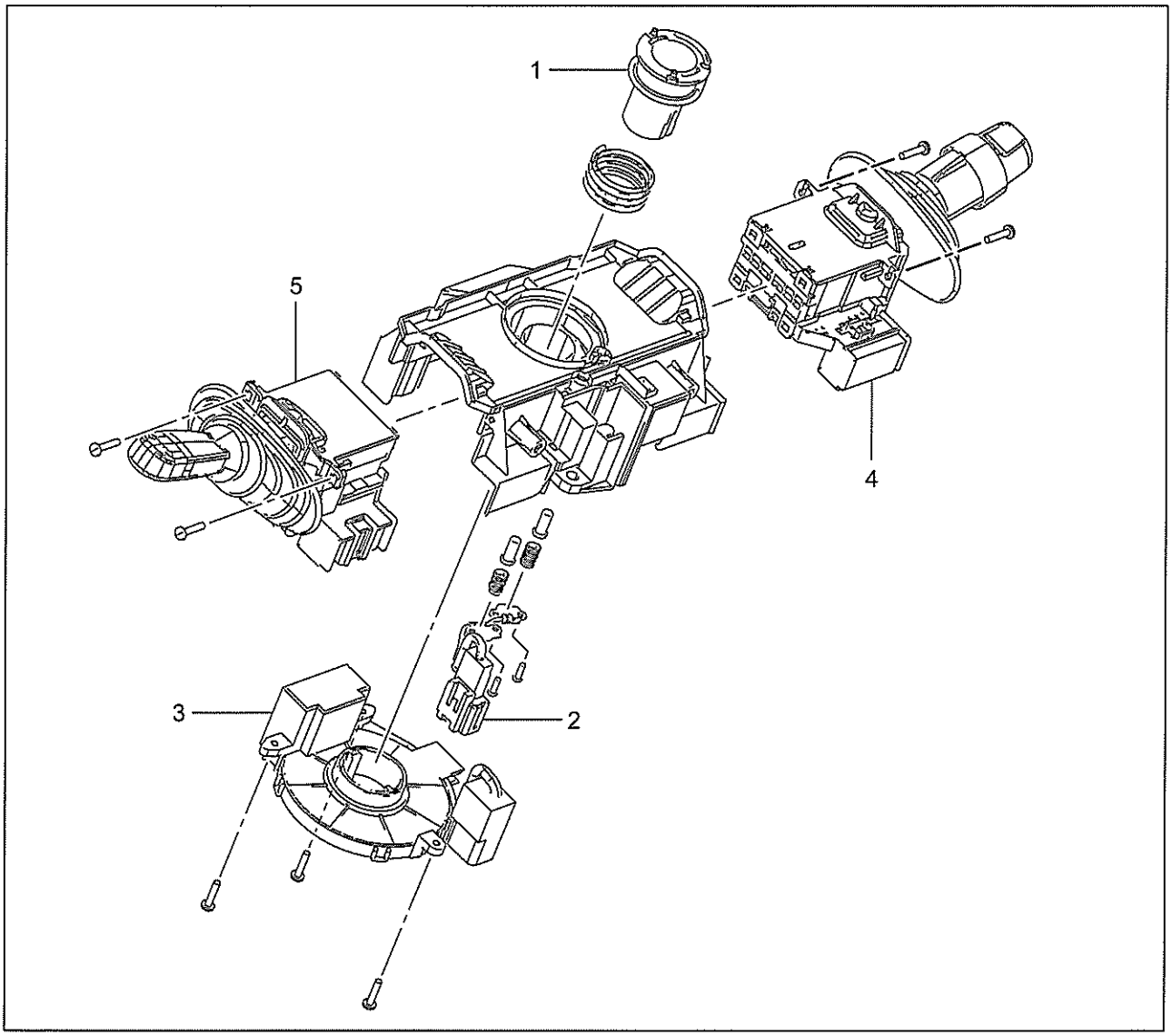
Point Operations



[POINT 1]

Remove:
Use the SST to remove the steering wheel.
SST 09950-76003-71

2.14.2 DISASSEMBLY, INSPECTION AND REASSEMBLY



Disassembly Procedure

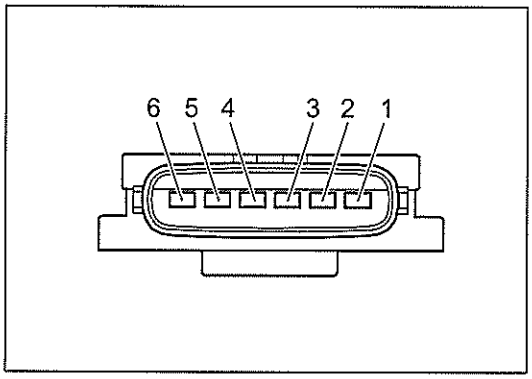
1. Remove the cam.
2. Remove the horn contact.
3. Remove the steering angle sensor.
4. Remove the light control switch ASSY.
5. Remove the direction switch ASSY.

Reassembly Procedure

The reassembly procedure is the reverse of the disassembly procedure.

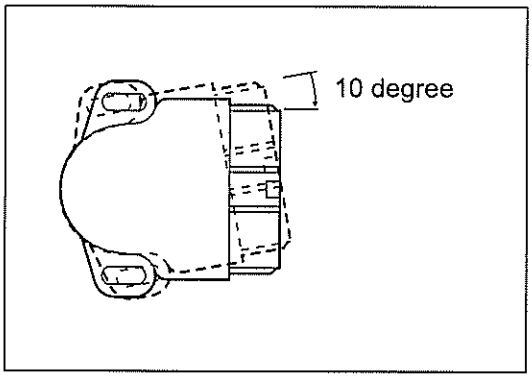
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2.15 ACCELERATOR SENSOR (POTENTIOMETER)



1. Remove the accelerator potentiometer.
2. Check that the resistance between terminals.

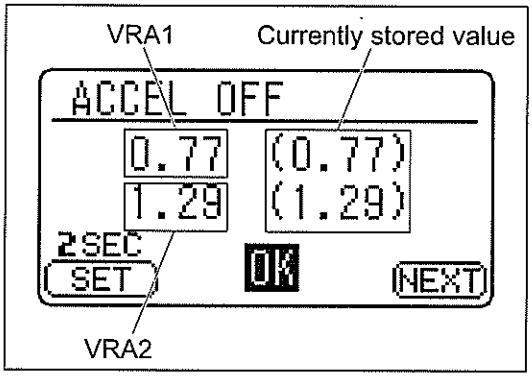
Terminal 5 - 6	1.8 to 3.5 kΩ
Terminal 4 - 6	Changing resistance value with depending the angle of rotation for potentiometer in proportion.
Terminal 1- 2	1.8 to 3.5 kΩ
Terminal 2- 3	Changing resistance value with depending the angle of rotation for potentiometer in proportion.

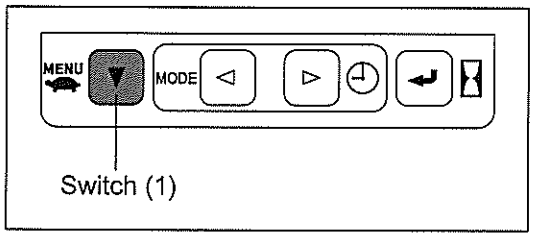


3. Temporarily install the accelerator potentiometer.

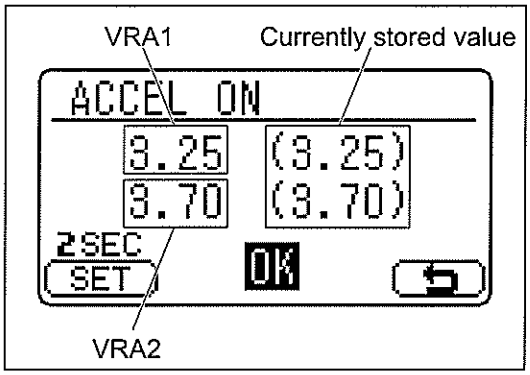
NOTICE!

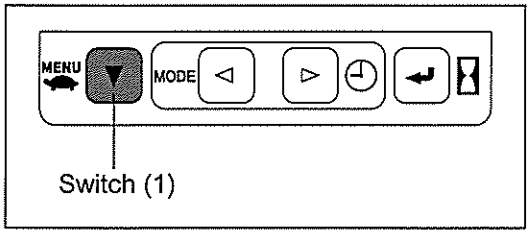
The accelerator potentiometer turns it for an installation hole in about 10 degrees clockwise direction and install it.





4. Display the ACCEL OFF matching screen and check the output voltage of the accelerator potentiometer.
Standard:
VRA1 0.40 to 1.24 V
VRA2 0.65 to 2.31 V
If the voltage is within the standard range:
Press and hold down the switch (1) for more than 2 seconds to perform matching.
If the voltage is outside the standard range:
(1) Loose the screw and adjust the voltage to the standard value while checking the display and rotating the accelerator potentiometer.
(2) Tighten the screw.
(3) Press and hold down the switch (1) for more than 2 seconds to perform matching.





5. Display the ACCEL ON matching screen, fully depress the accelerator pedal and check the voltage at that time.
Standard:
VRA1 2.00 to 4.79 V
VRA2 2.42 to 4.79 V

CAUTION!

Before depressing the accelerator pedal, make sure that the Spanner indicator on the display is blinking.

If the voltage is within the standard range:
Press and hold down the switch (1) for more than 2 seconds to perform matching.
If the voltage is outside the standard range:
Replace the accelerator potentiometer or accelerator pedal.

NOTICE!

Incase of models with EZ pedal option, The accelerator pedal should be stepped on to forward direction side.

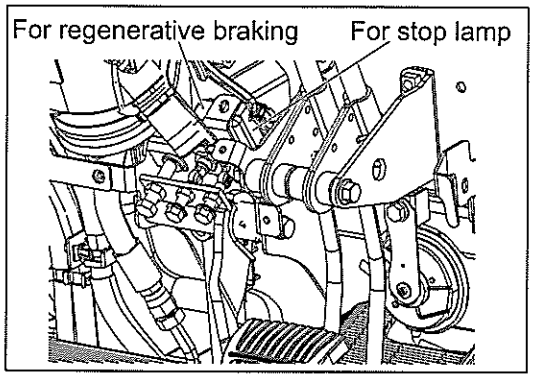
6. Tighten the screw after adjustment and spread "I" mark by paint on the screw head.

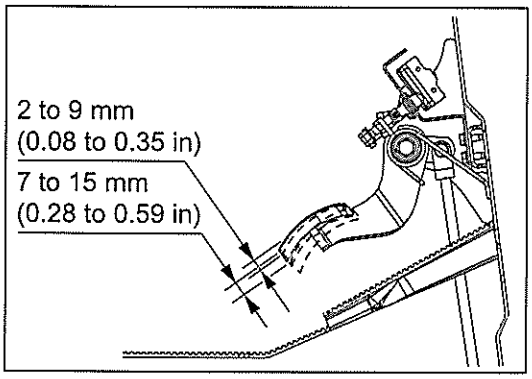
NOTICE!

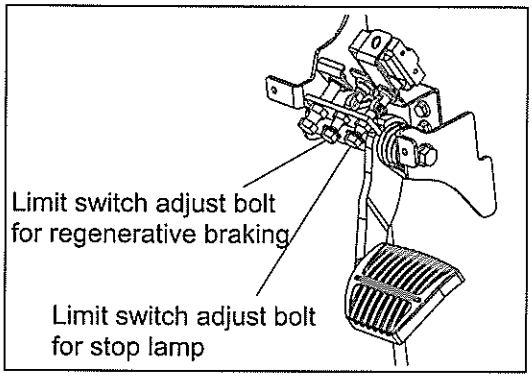
- **After performing the ACCEL OFF matching, be sure to perform ACCEL ON matching.**
- **While the DRIVE is selected on the matching menu, the spanner indicator blinks and driving is disabled.**
- **After entering and exiting the DRIVE on the matching menu, Drive return to neutral is activated. Put the direction lever in neutral and release the accelerator pedal to cancel it.**

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2.16 BRAKE SWITCH ADJUSTMENT







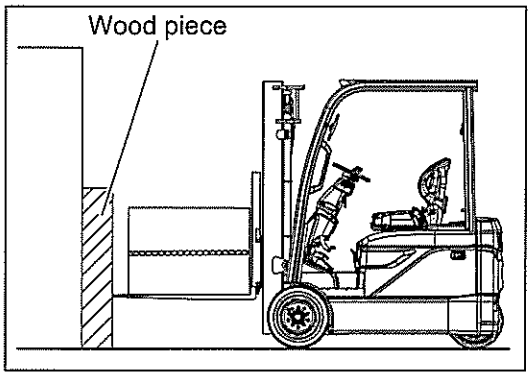
1. Adjust brake pedal play. (Refer to page "PARKING BRAKE INSPECTION AND ADJUSTMENT" of Brake section)
2. Adjust brake pedal height. (Refer to page "BRAKE PEDAL ADJUSTMENT" of Brake section)
3. Check continuity of the limit switch for the stop lamp when pedal stroke from the brake pedal depress operation start is 2 to 9 mm (0.08 to 0.35 in)
Standard:
Not operated: OFF (∞ Ω)
Operated: ON (0 Ω)
4. Check continuity of the limit switch for the regenerative braking when pedal stroke from the brake pedal depress operation start is 7 to 15 mm (0.28 to 0.59 in)
Standard:
Not operated: OFF (∞ Ω)
Operated: ON (0 Ω)

5. If the standard is not met, make adjustment by turning the adjust bolt.

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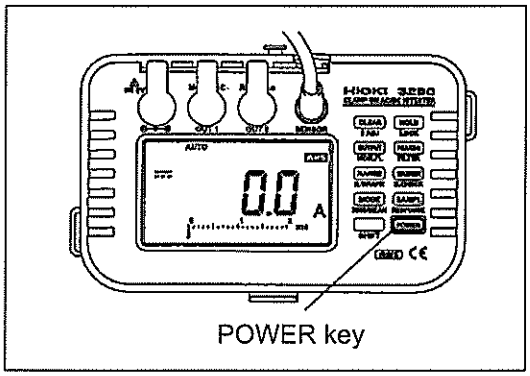
2.17 OCL MEASUREMENT

For drive circuit

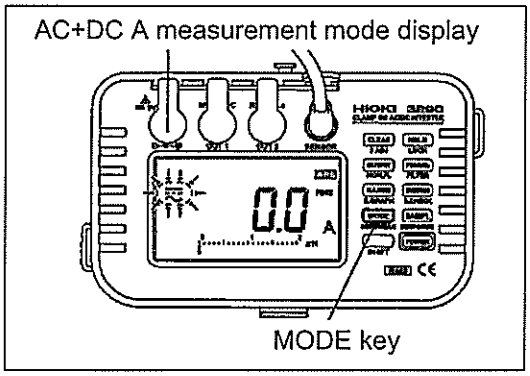


1. Preparation before measurement

(1) Make the fork tips contact a wall or steel pole with a rated load on the forks. Be sure to place a piece of wood between the fork tip and the wall.

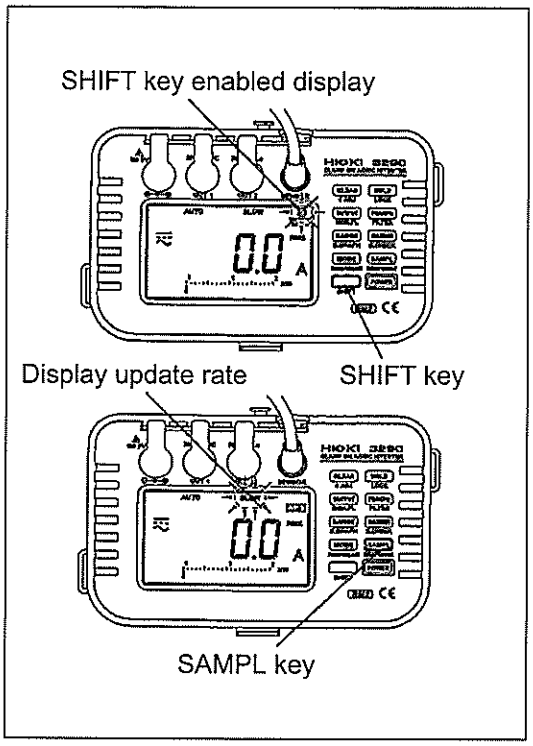


(2) Turn on the SST by pressing the POWER key on the unit.
SST 09140-13130-71

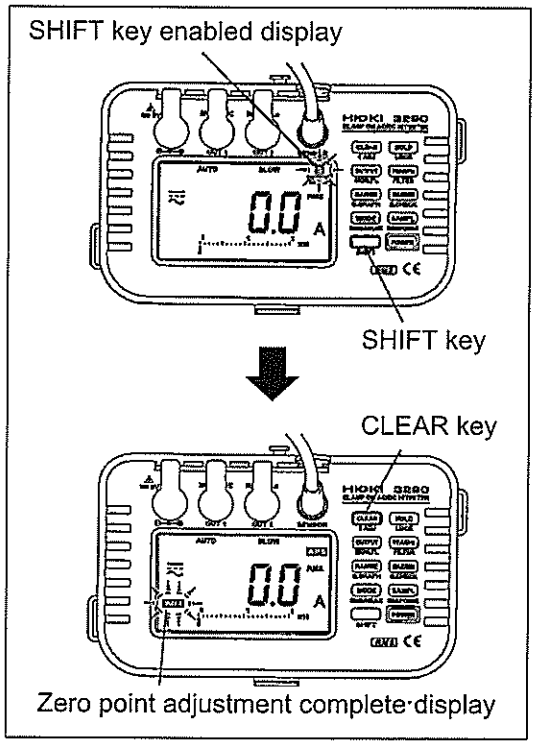


(3) Press the mode key twice to switch to the AC+DC A measurement mode.

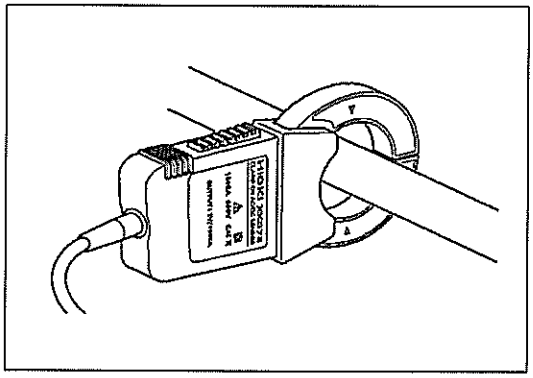
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(4) After pressing the SHIFT key, press the SAMPL key to set the display update rate to "SLOW".



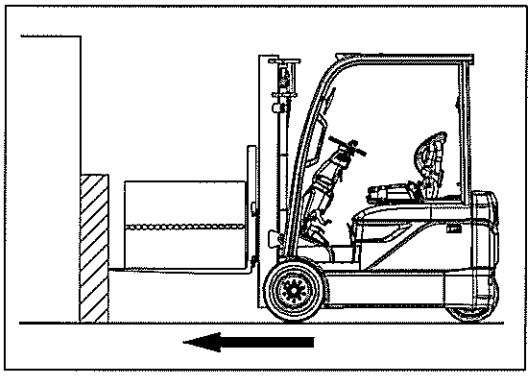
(5) After pressing the SHIFT key, press the CLEAR key to start zero point adjustment. (Pressing the CLEAR key makes the "ADJ" indicator flash and switches the unit to zero point adjustment mode. When the "ADJ" indicator stays on after flashing, zero point adjustment is completed.)

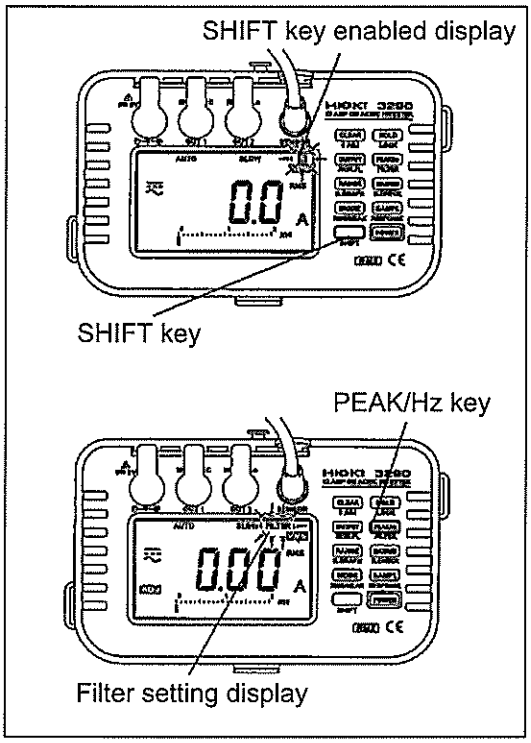


2. Measurement work

(1) Set the clamp sensor of the SST on the motor cable.

NOTICE! Set the clamp sensor so that the cable is positioned in the center of the clamp with the clamp sensor aligned perpendicular to the cable.





(2) Turn on the key switch and set the direction switch to "Forward". Gradually depress the accelerator pedal to full throttle and hold there. The SST will start measurement automatically.

NOTICE!

- **The SST start measurement automatically as soon as forward motion starts. Be sure to wait for approximately 20 seconds before reading the measurement value. "O.L." (Overflow alert) may be displayed during the first 10 seconds, or the displayed value may not be stable for a while.**
- **If the measurement value is not stable after approximately 20 seconds, retry measurement by pressing the SHIFT key down then the PEAK/Hz key to enable filter setting as shown in the illustration.**
- **Measurement can be done in this mode (AC +DC A mode, Display update mode: SLOW) also. However, when using other modes, motor current frequency in forward motion is only 10 Hz or below and current measurement cannot be obtained.**

OCL Standard Value:
189 to 256 A

For pump circuit

The OCL value of the pump circuit cannot be measured because of the following reason:

In the material handling system the relief valve in the control valve operates at the stroke end of each cylinder.

The OCL value for the pump circuit is set at a higher level than the current at the relief valve set pressure.

As relief occurs in the hydraulic circuit before the pump circuit current reaches the OCL value.
OCL value > Lift relief valve value

OCL Standard Value:
314 to 410 A

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3 DISPLAY

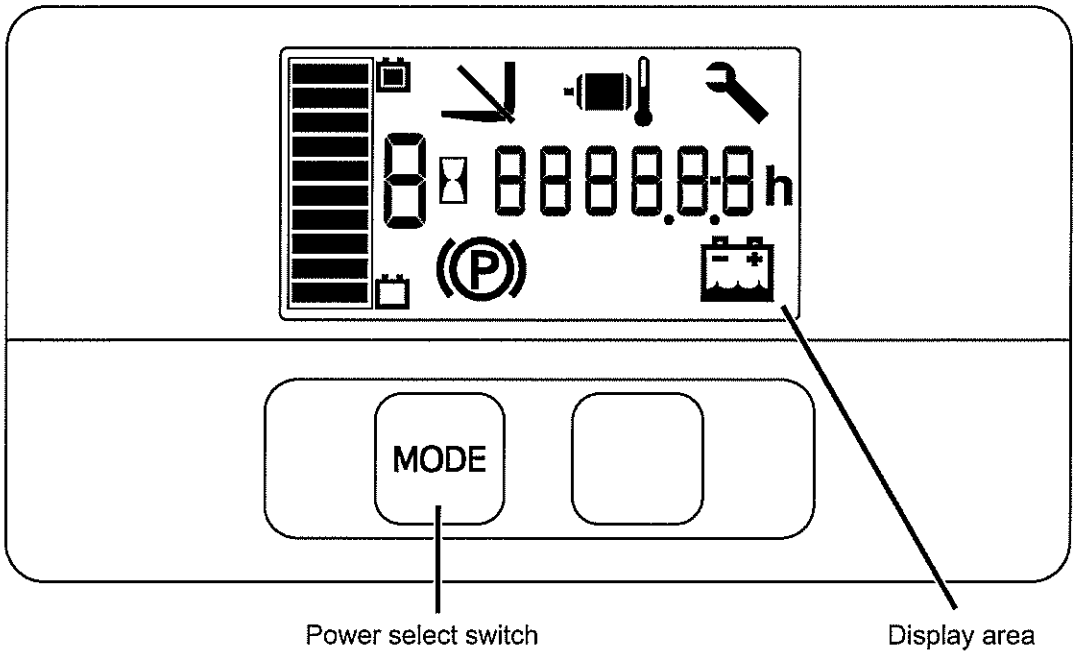
3.1 GENERAL 75
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3.3 DETAIL DESCRIPTION 79
3.4 SETTING FUNCTION 82
3.5 SERVICE FUNCTIONS 83
3.6 PASSWORD 85
3.7 ANALYZER 87
3.8 TUNING 120
3.9 OPTION SET 134
3.10 MATCHING 137
3.11 OTHERS MENU 152

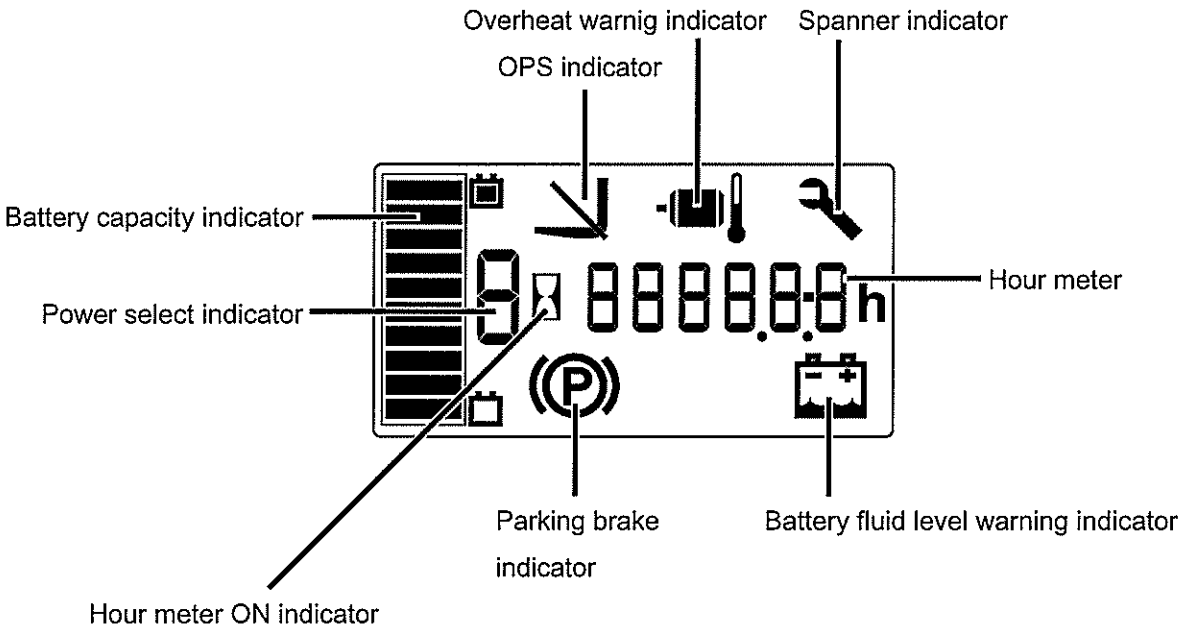
3.1 GENERAL

The display is placed on top of the right instrument panel to improve forward visibility from the operation seat.

An LCD display that displays basic items, such as a battery capacity indicator, an hour meter and various warning lights, has been newly developed and provided as standard. As compared with previous LED indicators, the visibility and ease of recognition of various states have been substantially improved.

In addition, a vehicle maintenance function, a feeling adjustment function and a specification setting function are provided as service functions.


MODE
Power select switch
Display area


Overheat warnig indicator
Spanner indicator
OPS indicator
Battery capacity indicator
Power select indicator
Hour meter
Parking brake indicator
Battery fluid level warning indicator
Hour meter ON indicator

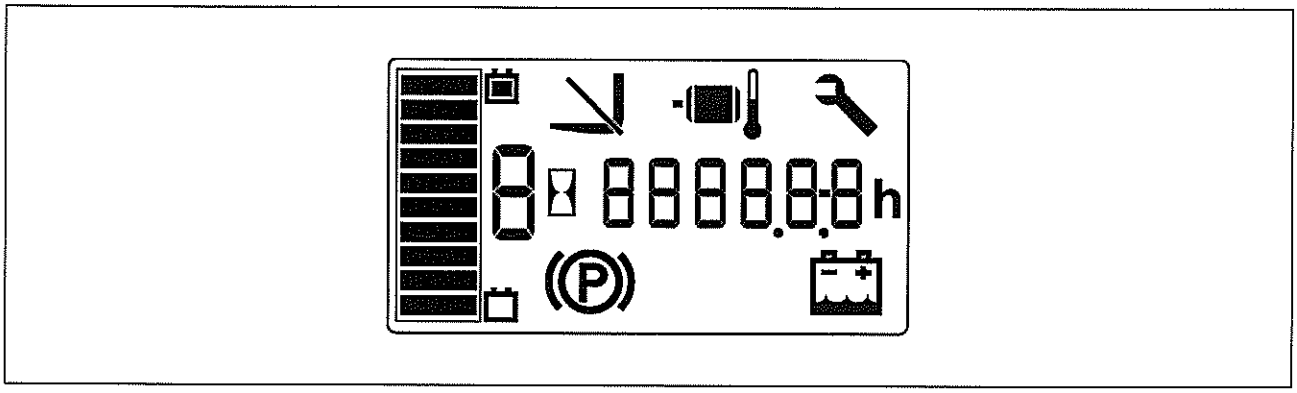
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3.2 SCREEN

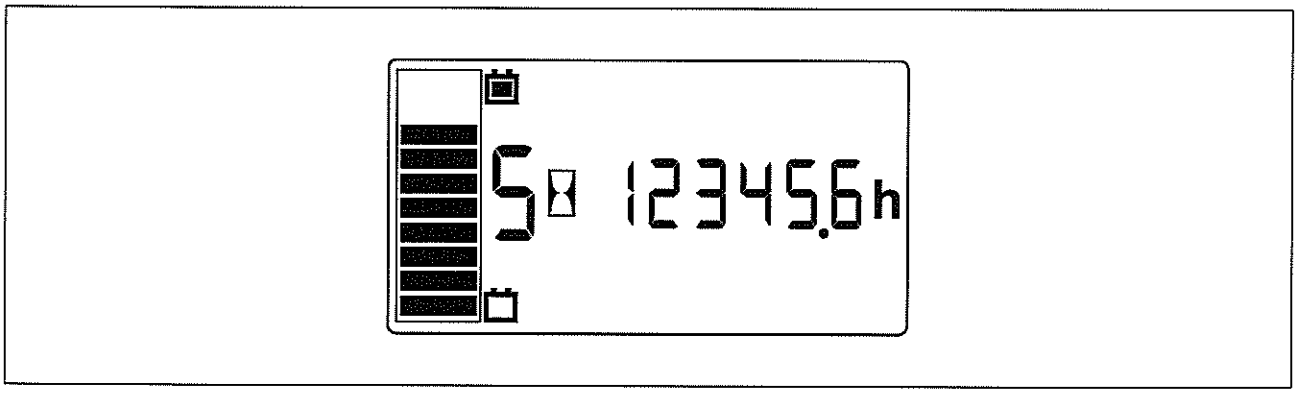
1. Initial screen after Key-On
Initial screen is displayed for two seconds after key-switch is turned on.

NOTICE

The battery fluid level warning indicator is displayed only when a JIS battery is installed.



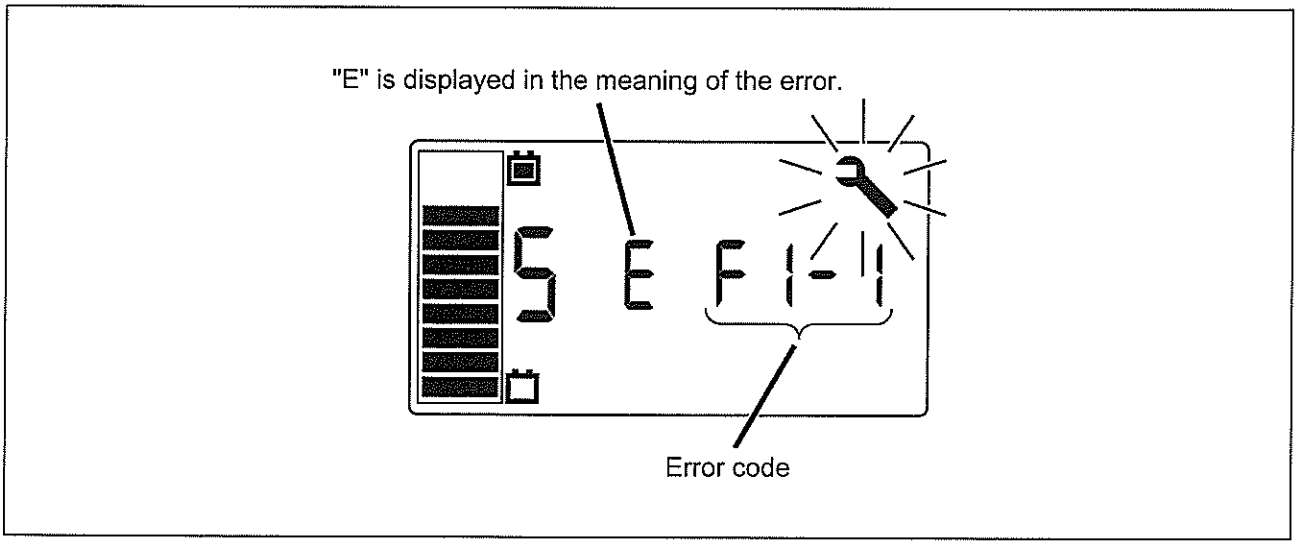
2. Status screen
After the initial screen display, status screen is displayed.



3. Diagnostic code display

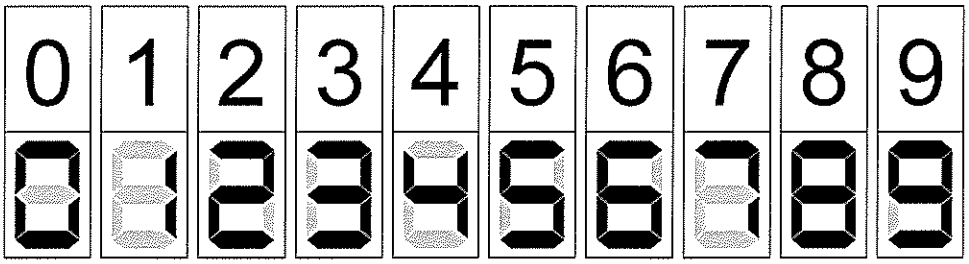
If the diagnostic function is activated, the spanner indicator blinks and a warning sound is emitted to warn the operator of the occurrence of a failure in the vehicle.

At that time, the key ON hour meter and error code indicating where the failure has occurred are displayed alternately in the hour meter area. 6 error codes are displayed at the maximum at intervals of 2 seconds.

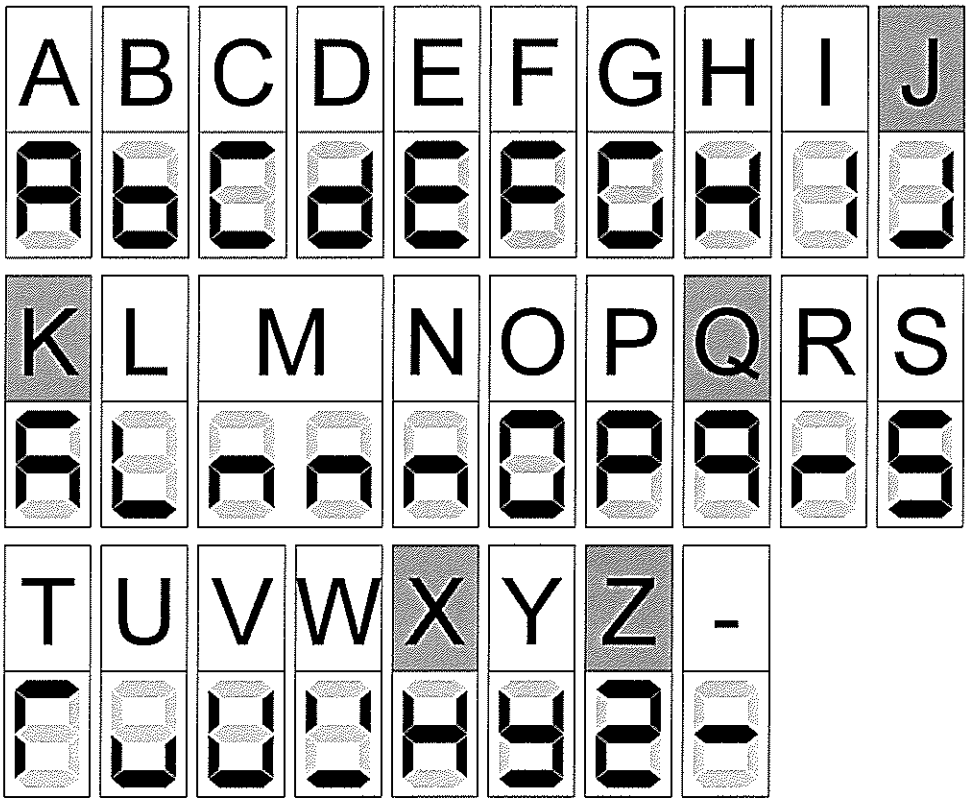


4. Alphabetic characters and numbers in display area

Numbers

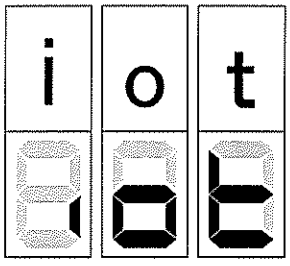


Alphabet



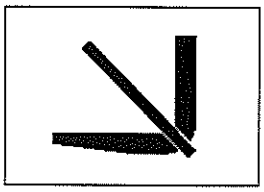
NOTICE

J,K,Q,X and Z are not displayed.

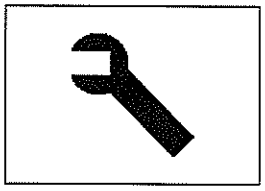


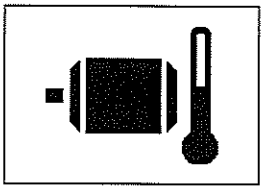
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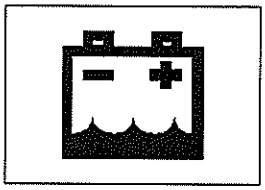
3.3 DETAIL DESCRIPTION

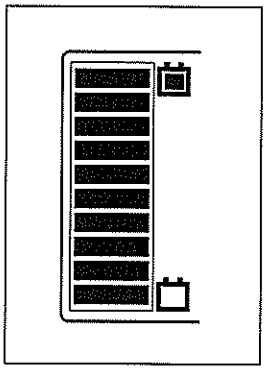












1. Indicator

(1) OPS indicator

When the operator leaves the operation seat, this indicator lights up and the buzzer sounds for 1 second.

(2) Parking brake indicator

This indicator lights while the parking brake is engaged.

(3) Spanner indicator

This indicator blinks and the buzzer sounds if any vehicle's error are detected.
At that time, an error code is displayed in the key ON hour meter area.

(4) Overheat warning indicator

If the temperature of the controller, motor driver or traveling-load handling motor rises to an abnormal level, this indicator lights up, a warning sound is emitted and the output is limited. In the event of overheat, the buzzer sounds for 5 seconds.
In the event of a failure due to overheat, the buzzer continues to sound until recovery from the failure. Also, when the motor driver is cold, the indicator lights up, a warning sound is emitted for 5 seconds and the output is limited in order to protect the devices in the motor driver.

(5) Battery fluid level warning indicator

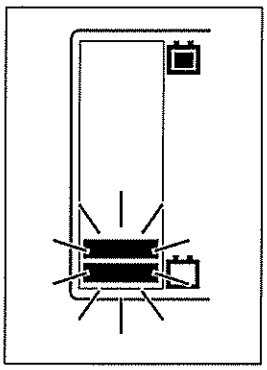
(When a JIS battery is installed)

If it is detected that there is not enough battery fluid left in the battery, this indicator lights up to warn the operator. If the key switch is turned on while there is not enough battery fluid left, the buzzer also sounds for several seconds.
Moreover, even when the key switch is off, this indicator blinks to prompt the operator to add battery fluid.

2. Battery capacity indicator

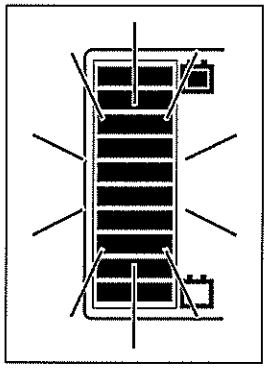
This indicates amount of charge in the battery in 10 stages.

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(1) Low battery level warning

If the remaining amount of battery fluid decreases below the warning level, the battery capacity indicator blinks. Also, when the operator turns the key switch from the OFF to ON position, a warning sound is emitted for 5 seconds.

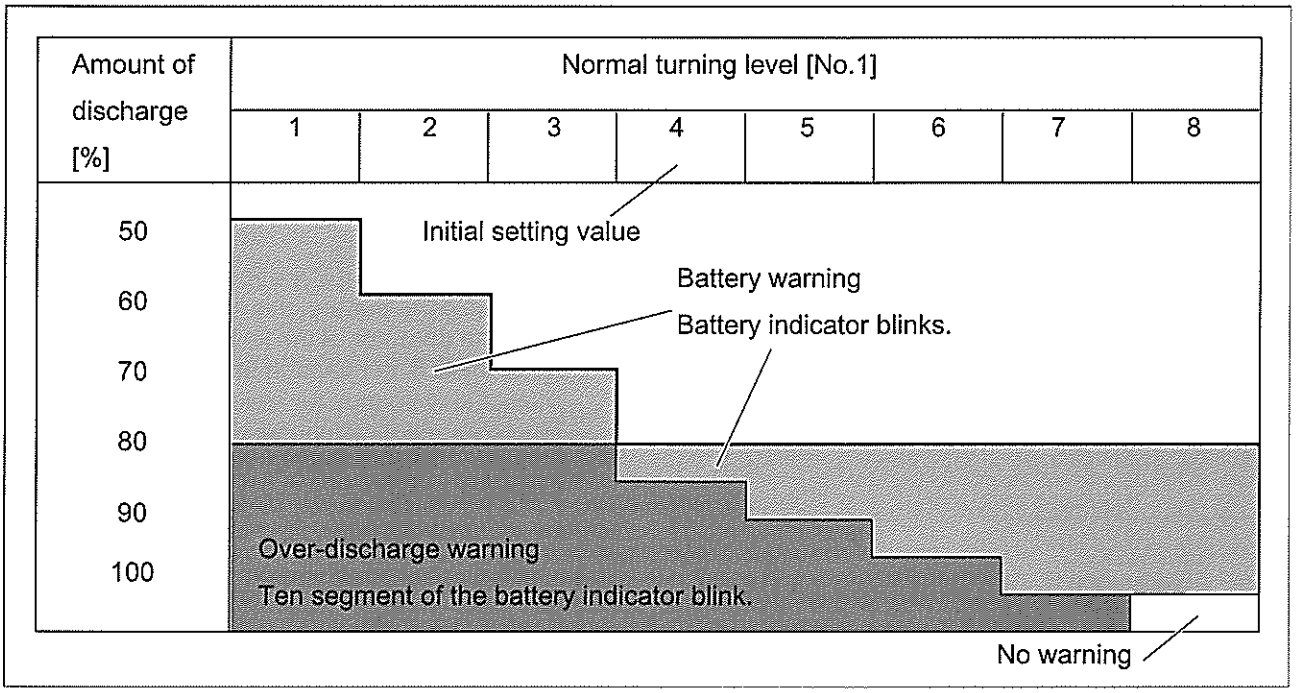


(2) Battery over-discharge warning

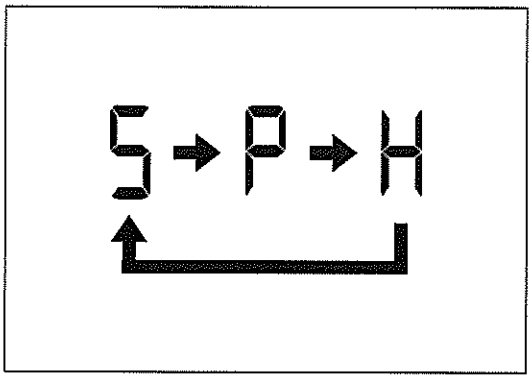
If the traveling or load handling operation is performed while the remaining amount of battery is below the specified value, all the segments of the battery capacity indicator blink and a warning sound is emitted to warn the operator that the battery is over-discharged.

NOTICE

The chart below shows relations of "Battery over-discharge warning", "Low battery level warning" and "Tuning No.1".



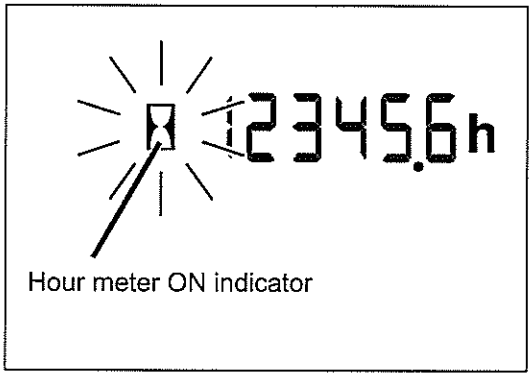
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3. Power select indicator

This indicator indicates the selected power mode (S, P or H).

When "H mode lock" is enabled, H mode cannot be selected. The H mode lock function can be enabled or disabled using a "OPTION SET" provided in the service function.



Hour meter ON indicator

4. Key switch on hour meter

This meter counts up and displays the key switch ON time.

The digit "1" at the right end represents one tenth of an hour (6 minutes). The hour meter ON indicator continues to blink as long as the hour meter is in operation.

5. Warning buzzer

(1) Parking brake ON warning

If the vehicle is started or the opertor tries to drive while the parking brake is not released, the parking brake indicator lights up and a warning sound is emitted.

(2) Parking brake OFF warning

If the key switch is turned off while the parking brake is released, a warning sound is emitted. When the key switch is on, if the operator leaves the operation seat for 2 seconds or more with the parking brake released, a warning sound is emitted. This function does not work before the start of the hour meter.

(3) Return to neutral warning for travel OPS

A warning sound is emitted to inform that the operator should release the accelerator and return the direction switch to neutral in order to start the vehicle. (No warning is displayed on the display.)

(4) Return to neutral warning for load handling OPS

A warning sound is emitted to inform that the operator should return the load handling levers to neutral in order to start the load handling operation. (No warning is displayed on the display.)

(5) Return to neutral warning at key ON

A warning sound is emitted to inform that, the operator should release the accelerator and return the direction switch to neutral in order to start the vehicle, when the key switch is on.(No warning is displayed on the display.)

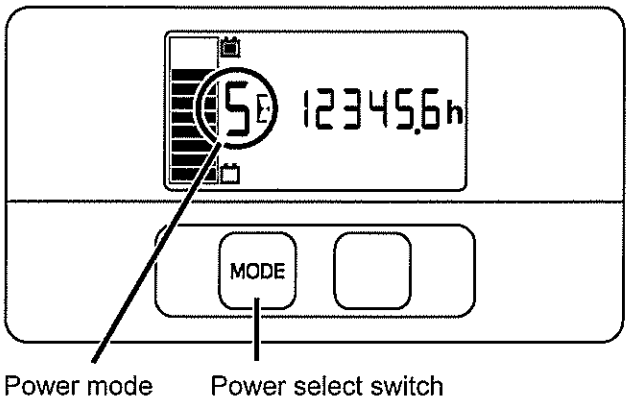
(6) Traveling and load handling warning during charging (For models with an on-vehicle charger) If the accelerator is operated or load handling is performed with the AC plug inserted, a warning sound is emitted to warn the operator, and the traveling or load handling operation is restricted.

3.4 SETTING FUNCTION

3.4.1 Power select function

The power mode (S, P or H) and its indication on the display change each time the power select switch on the status screen is pressed.

When "H mode lock" is enabled, H mode cannot be selected. The H mode lock function can be enabled or disabled using a "OPTION SET" provided in the service function.



NOTICE

Always use a finger to operate the switch.

Pressing a switch with a pointed stick may cause damage to the switch.

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3.5 SERVICE FUNCTIONS

3.5.1 General

In addition to the functions that are described in the Operator's Manual and available to customers, the display has the following built-in functions intended to be used by service staff to perform maintenance of the vehicle or set its specifications. The service functions are password-protected to prevent customers from using them by mistake, causing important internal data to be corrupted.

3.5.2 Service Function List

Function		Description	When used		
			Vehicle delivery	Controller replacement	Others
Analyzer		Displays the electrical system status and reads the error information detected by controllers.	-	-	Upon vehicle abnormality
Tuning		Makes fine adjustment of traveling and load handling functions.	-	○ *2	As requested by customer
Option set	Specification setting	Sets each vehicle option and other specifications. *1	-	○ *2,*3	-
	Each control function enable/ disable	Enables or disables each control function.	-	○ *2,*3	-
Matching	Traveling function Load handling lever	Updates voltage values of sensor signals under the standard vehicle condition.	-	○ *2,*3	- *4, *5, *6, *7
	OCV starting current level	Sets the oil control valve starting current level.	-	○ *2	○ *8
	Tire data	Sets the tire constant.	-	○ *2	○ *7, *9
	Auto power-off time setting	Sets the auto power-off time.	-	○ *2	As requested by customer
	Maximum speed limit setting	Sets the maximum speed limit.	-	○ *2	As requested by customer
Others menu	Meter start	Starts counting the hour meter.	○	○ *3	-
	Demo mode	Enables simultaneous operation of traveling and load handling before starting the hour meter.	-	-	Before starting the hour meter

*1: These functions are used to adjust the controller and display setups to the availability of optional or control features. They do not enable or disable the actual functioning of the optional or control features.

*2: Main controller

*3: Display: Display control board

*4: When the accelerator sensor is replaced, removed/installed, or the pedal height is adjusted.

*5: When the material handling lever is replaced, removed/installed, or adjusted.

*6: When the tire angle sensor is replaced, removed/installed, or adjusted.

*7: When replacing oil control valve (if conventional lever models)

*8: When replacing oil control valve (if minilever / joystick lever models)

*9: When tire size is changed or tires are replaced.

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3.5.3 Before Starting Matching

Before performing matching, you must set the vehicle to “standard vehicle condition”.

For “standard vehicle condition”, refer to page "MATCHING" of SAS functions section.

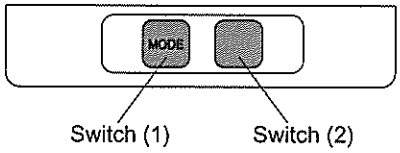
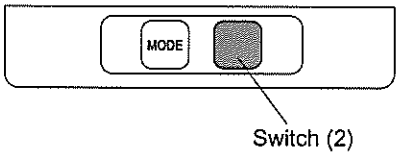
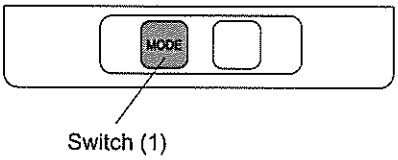
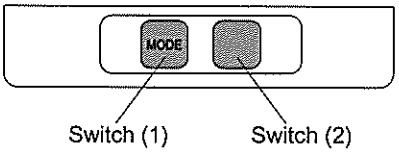
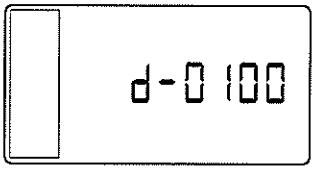
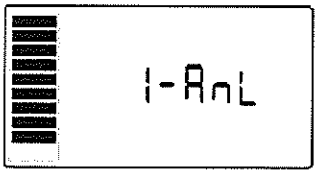
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3.6 PASSWORD

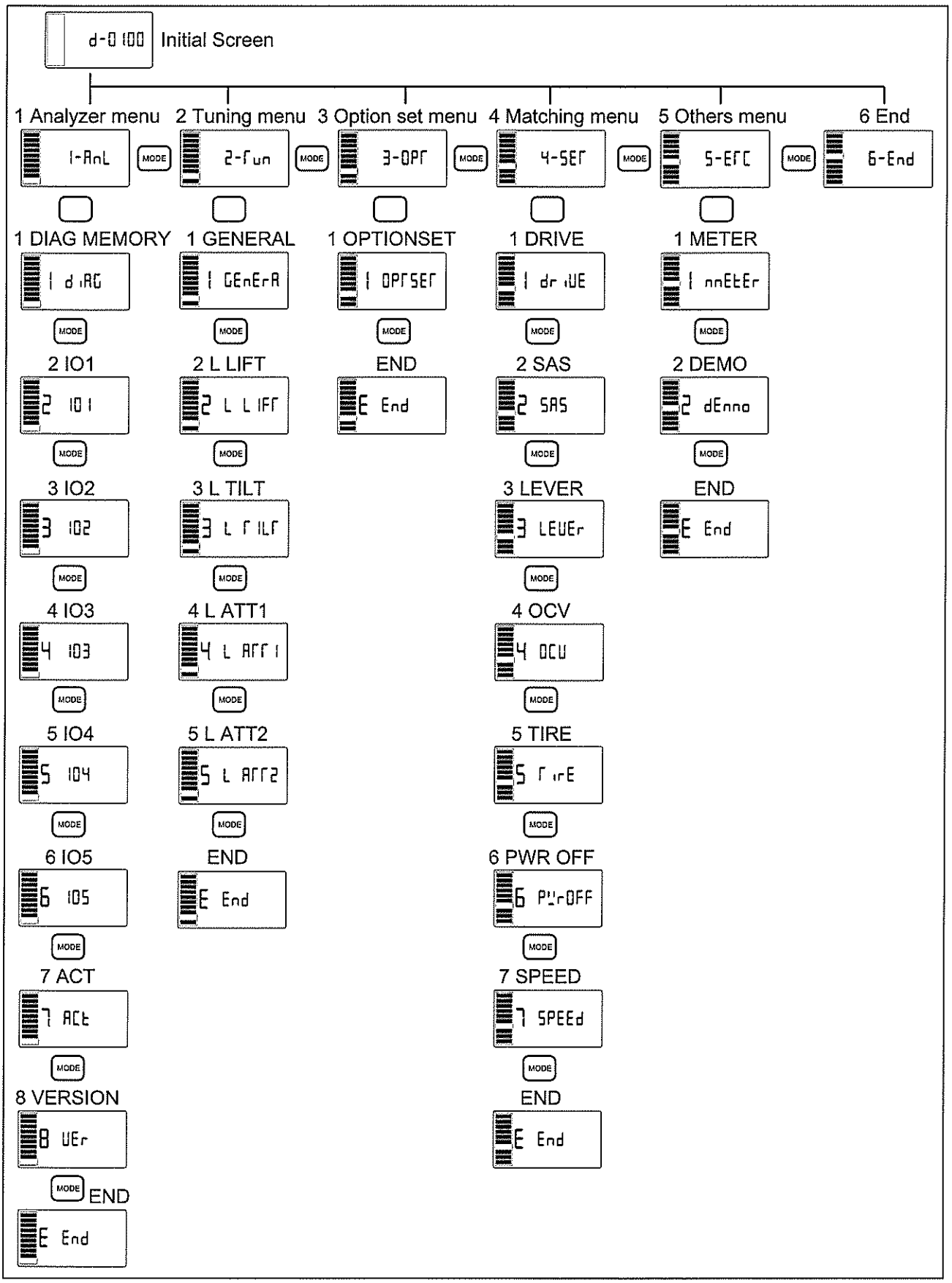
NOTICE

- Always operate the display switches with a finger-tip. If a sharp pointed tool is used, the switch may be damaged.
- If an operation error occurs during entry operation, turn the key switch OFF and re-enter from the beginning. If the SERVICE MENU cannot be displayed after several attempts, the system may be faulty.

3.6.1 Password Entry Procedure

Step	Display	Operation	Vehicle response
1		Press switch (1) and switch (2) at the same time for more than 5 seconds.	When pressing the switches, a short beep sounds, and after 2 seconds another short beep sounds. Hold down the switches for 5 seconds or more.
2		Press switch (2) within 10 seconds.	A short beep sounds.
3		Press switch (1) within 10 seconds.	A short beep sounds.
4		Within 10 seconds, press switch (1) and switch (2) at the same time for more than 2 seconds.	When pressing the switches, a short beep sounds, and after 2 seconds repeated short beeps sound.
5		Service function initial screen is displayed for 5 seconds.	
6		ANALYZER MENU screen is automatically displayed.	

3.6.2 Service Function Display



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3.7 ANALYZER

3.7.1 General

Analyzer function supports operations for inspection/investigating faulty section by displaying the condition of the control system, using communication between each controller and the display.

By switching the display to analyzer mode, operative conditions of the sensors and actuators which are used for traveling, load handling and OPS functions, or the error information detected by the controller can be read.

This is very useful for checking operative condition of each function and saving time for repairing when there is a detect.

The analyzer has the following functions:

1. Diagnostic memory function

   The controller stores up to 10 error codes (diagnostic codes) detected in the electrical system in the past. The diagnostic function reads these error codes and indicates them on the display. Each error code is displayed with its detection time as the key ON hour meter reading.

2. In/Out monitor function

   This function displays switch ON/OFF state and the analog input values from individual sensors and switches in the traveling, load handling, and OPS systems. The circuit or sensor quality can be judged by monitoring the displayed value.

   (1) I/O MONITOR 1

   Displays the temperature of each electrical functional part and the analog input voltage detected by each controller.

   (2) I/O MONITOR 2

   Displays each switch ON/OFF state and analog input voltages from sensors for traveling control.

   (3) I/O MONITOR 3

   Displays the load handling control switch ON/OFF states and analog input voltages from load handling control sensors.

   (4) I/O MONITOR 4

   Displays the ON/OFF states of synchronised steering and the analog input voltages from respective sensors.

   (5) I/O MONITOR 5

   Displays the analog input voltages from battery current sensor.

3. Active test

   In the active test mode, the controller forcibly outputs an activation signal (ON or OFF signal) to the selected item in order to permit operation check of that function.

4. Program version display

   Displays program version of each controller.

3.7.2 Analyzer Screen Item List

Classification	Analyzer menu screen	SPH Display area	Screen No.	Display item	Description
1. DIAG MEMORY	1 DIAG	1	01 to 10	1. to 10.	Indications of errors occurred

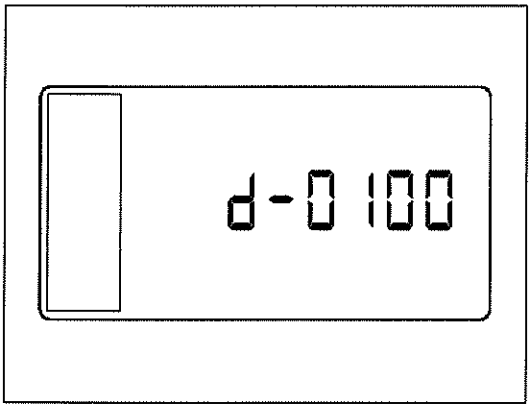
Classification	Analyzer menu screen	SPH Display area	Screen No.	Display item	Description
2. I/O MONITOR 1(Temperature/ Voltage)	2 IO1	2	01	TDM	Drive motor L temperature:°C
			02	TDM	Drive motor R temperature:°C
			03	TDMDH	Drive motor driver L heat sink temperature:°C
			04	TDMDH	Drive motor driver R heat sink temperature: °C
			05	TDMDB	Drive motor driver L board temperature:°C
			06	TDMDB	Drive motor driver R board temperature:°C
			07	TDMDC	Drive motor driver L condenser temperature: °C
			08	TDMDC	Drive motor driver R condenser temperature: °C
			09	TPM	Pump motor temperature:°C
			10	TPMDH	Pump motor driver heat sink temperature:°C
			11	TPMDB	Pump motor driver board temperature:°C
			12	TPMDC	Pump motor driver condenser temperature: °C
			13	TMCB	Main controller board temperature:°C
			14	TSLLT	Battery temperature:°C
			15	TDSP	Display board temperature:°C
			16	B48V	Battery voltage:V
			17	VBKY	Voltage after key switch:V
			18	VBMBSL	Solenoid power source voltage:V
			19	VBMB	Voltage after MB contactor:V
			20	VDMDL	Drive motor driver L main circuit voltage:V
			21	VDMDR	Drive motor driver R main circuit voltage:V
			22	VPMD	Pump motor driver main circuit voltage:V
3. I/O MONITOR 2(Travel Control)	3 IO2	3	01	SPEED	Traveling speed: km/h
			02	VRA	Accelerator sensor1 voltage:V
			03	VRA	Accelerator sensor2 voltage:V
			04	SWBK	Brake switch
			05	SDM, DSF, DSR, SPB	Seat switch, Forward switch, Backward switch, Parking brake switch
			06	SPDDML	Drive motor L rpm:rpm
			07	SPDDML	Target rpm:rpm
			08	SPDDMR	Drive motor R rpm:rpm
			09	SPDDMR	Target rpm:rpm
			10	SSDL	Drive motor L rotation sensor1 voltage:V
			11	SSDL	Drive motor L rotation sensor2 voltage:V
			12	SSDR	Drive motor R rotation sensor1 voltage:V
			13	SSDR	Drive motor R rotation sensor2 voltage:V
			14	CSDML	Drive motor L current sensor1 voltage:V
			15	CSDML	Drive motor L current sensor2 voltage:V
			16	CSDMR	Drive motor R current sensor1 voltage:V
			17	CSDMR	Drive motor R current sensor2 voltage:V

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Classification	Analyzer menu screen	SPH Display area	Screen No.	Display item	Description
4. I/O MONITOR 3(Load handling Control)	4 IO3	4	01	SLUL, SLLL, SLTFL	Unload solenoid, Lift lowering lock solenoid, Tilt forward lock solenoid
			02	SDM	Seat switch
			03	SPDPM	Pump motor rpm: rpm
			04	SPDPM	Target rpm: rpm
			05	SSP	Pump motor driver rotation sensor voltage: V
			06	CSPM	Pump motor driver current sensor1 voltage: V
			07	CSPM	Pump motor driver current sensor2 voltage: V
			Conventinal lever		
			08	VRL	Lift lever angle sensor1 voltage:V
			09	VRL	Lift lever angle sensor2 voltage:V
			10	SLTFL, SWTF, SWTR	Tilt forward lock solenoid Tilt forward switch, Tilt backward switch
			11	VRA1	Attachment (1) lever angle sensor1 voltage:V
			12	VRA1	Attachment (1) lever angle sensor2 voltage:V
			13	VRA2	Attachment (2) lever angle sensor1 voltage:V
			14	VRA2	Attachment (2) lever angle sensor2 voltage:V
			Mini lever / Joy stick		
			08	CSL	Lift proportional valve solenoid current :A
			09	VRL	Lift lever angle sensor1 voltage:V
			10	VRL	Lift lever angle sensor2 voltage:V
			11	CST	Tilt proportional valve solenoid current :A
			12	VRT	Tilt lever angle sensor1 voltage:V
			13	VRT	Tilt lever angle sensor2 voltage:V
			14	CSA1	Attachment (1) proportional valve solenoid current:A
			15	VRA1	Attachment (1) lever angle sensor1 voltage:V
			16	VRA1	Attachment (1) lever angle sensor2 voltage:V
			17	CSA2	Attachment (2) proportional valve solenoid current :A
			18	VRA2	Attachment (2) lever angle sensor1 voltage:V
			19	VRA2	Attachment (2) lever angle sensor2 voltage:V
5. I/O MONITOR 4(Steering control)	5 IO4	5	01	VRTRA	Tire angle sensor voltage:V
			02	SPEED	Traveling speed : km/h
			03	K-POS	Steering angle knob position actual value
			04	K-POS	Steering angle knob position target value
			05	K-POS	Steering synchronizer solenoid
			06	SSTR	Steering angle sensor voltage:V
6. I/O MONITOR 5 (Others)	6 IO5	6	01	CSBAT	Battery current sensor voltage:V
			02	DPOT	(Not used)

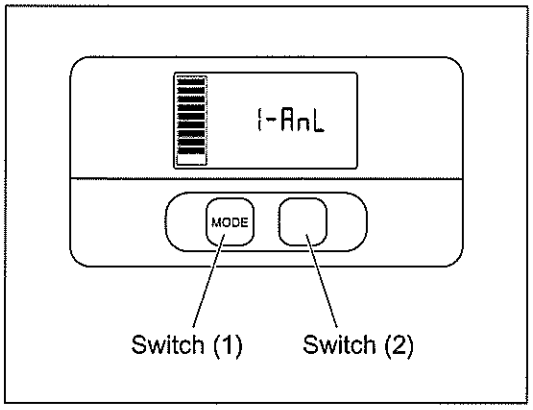
Classification	Analyzer menu screen	SPH Display area	Screen No.	Display item	Description
7. ACTIVE TEST (Active test)	7 ACT	7	01	STEER-ING SOL	Steering synchronizer solenoid forced operation
			02	LIFT LOW SOL	Lift lowering lock solenoid forced operation
			03	TILT SOL	Tilt forward solenoid forced operation
			04	UNLOAD SOL	Unload solenoid forced operation
			05	FAN1	Cooling fan for controller forced operation
			06	FAN2	Cooling fan for motor forced operation
			07	ACC OUT1	(Not used)
			08	ACC OUT2	Accessory output2 forced operation
8. VERSION (Program version)	8 VER	8	d	DISPLAY	Display program version
			c	MAIN C/R	Main controller program version
			TL	DM DRIVER L	Drive Motor Driver L program version
			Tr	DM DRIVER R	Drive Motor Driver R program version
			P	PM DRIVER	Pump Motor Driver program version

3.7.3 ANALYZER MENU screen



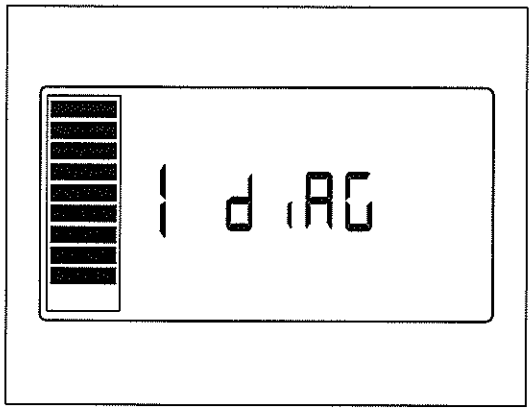
Operation Procedure

1. Enter the password on the status screen to display the service function initial screen.



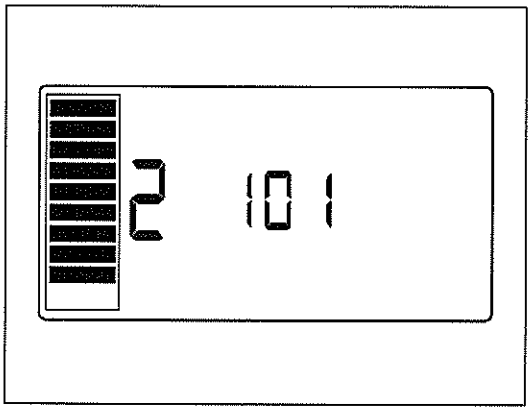
2. The screen where “1-ANL” is displayed is the ANALYZER MENU screen. On this screen, press switch (2) to display the “1 DIAG” (DIAG MEMORY) screen.

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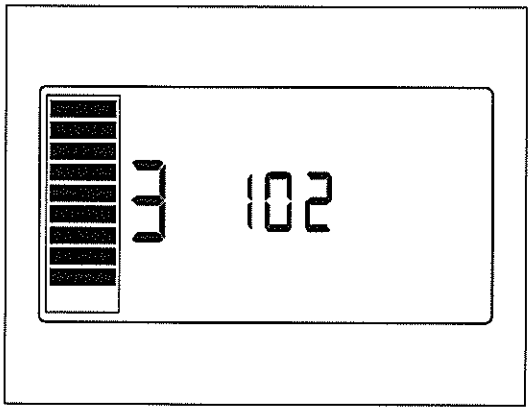
"1 DIAG" (1 DIAG MEMORY)

Switch (1): Switching selection to "2 IO1"
Switch (2): Switching to "1 DIAG" detail screen



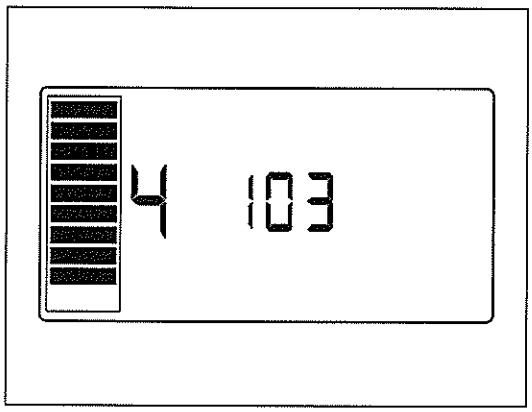
"2 IO1" (2 I/O monitor1 TEMP/VOLT)

Switch (1): Switching selection to "3 IO2"
Switch (2): Switching to "2 IO1" detail screen



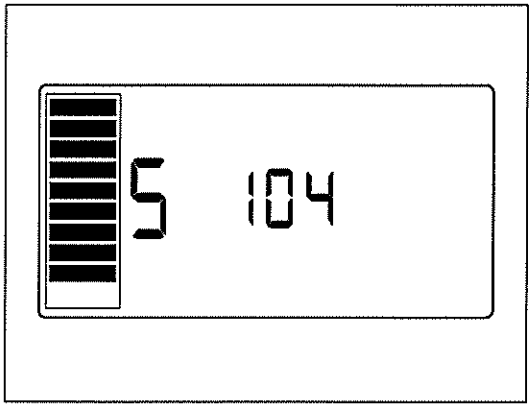
"3 IO2" (3 I/O monitor2 TRAVELING)

Switch (1): Switching selection to "4 IO3"
Switch (2): Switching to "3 IO2" detail screen



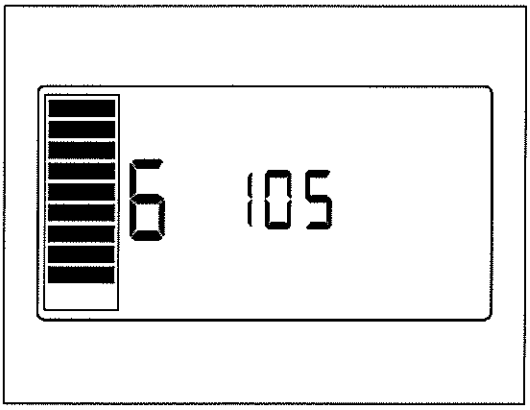
"4 IO3" (4 I/O monitor3 M.HANDLING)

Switch (1): Switching selection to "5 IO4"
Switch (2): Switching to "4 IO3" detail screen



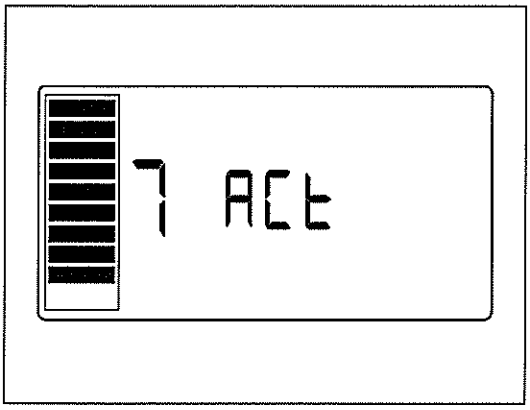
“5 IO4” (5 I/O monitor4 STEERING)

Switch (1): Switching selection to “6 IO5”
Switch (2): Switching to “5 IO4” detail screen



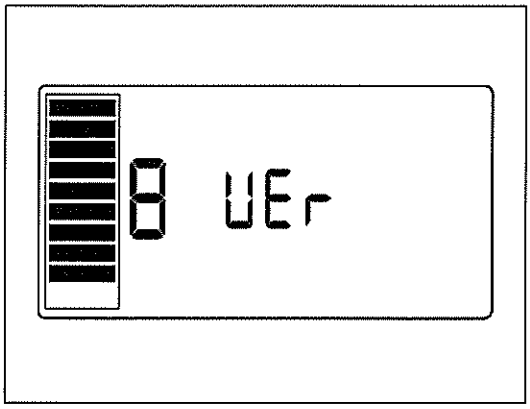
“6 IO5” (6 I/O monitor5 OTHERS)

Switch (1): Switching selection to “7 ACT”
Switch (2): Switching to “6 IO5” detail screen



“7 ACT” (7 ACTIVE TEST)

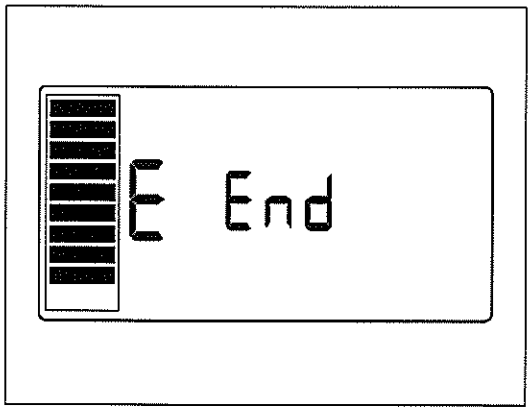
Switch (1): Switching selection to “8 VER”
Switch (2): Switching to “7 ACT” detail screen



“8 VER” (8 VERSION)

Switch (1): Switching selection to “E END”
Switch (2): Switching to “8 VER” detail screen

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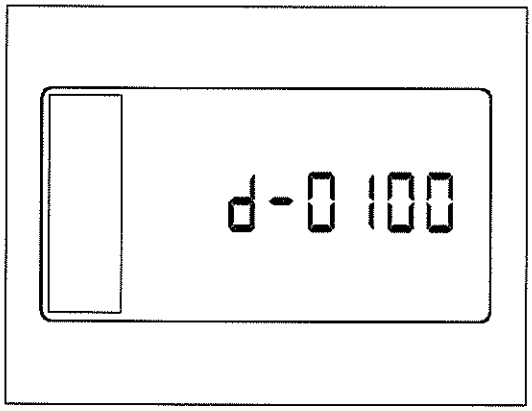
"E END"

Switch (1): Switching selection to "1 DIAG" (DIAG MEMORY)

Switch (2): Returning to the "1-ANL" (ANALYZER MENU) screen

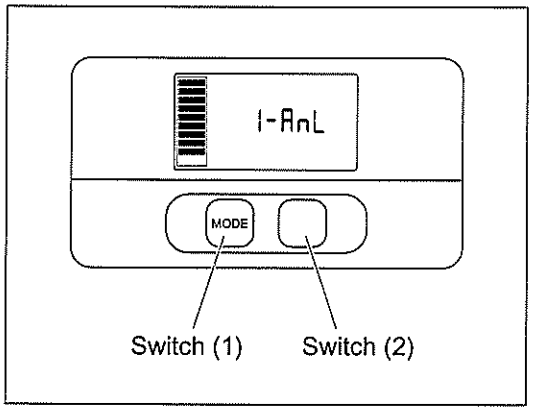
3.7.4 Diagnostic Memory Function (DIAG MEMORY)

The controller stores up to 10 most recent errors. The "1 DIAG" (DIAG MEMORY) screen displays these diagnostic codes with their detection time information (in key ON hour meter reading). The most recent diagnostic code is displayed as 1, followed by 2, 3 and so on to 10.



Operation Procedure

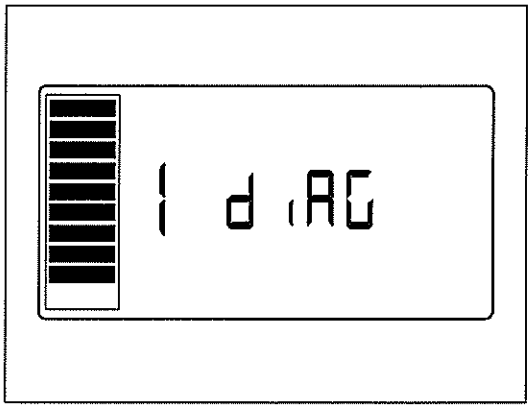
1. Enter the password on the status screen to display the service function initial screen.



2. Press switch (2) once and make sure that "1 DIAG" (DIAG MEMORY) is displayed on the screen. Then, press switch (2) (to confirm) to display the "1 01" screen.

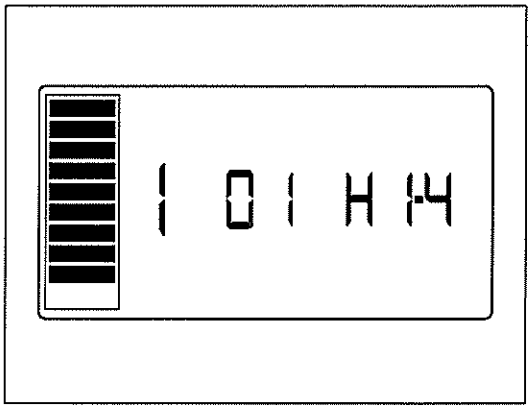
   NOTICE! A diagnostic code and hour meter information are displayed alternately.

3. Press switch (1) to display the next diagnostic code.
4. Press switch (2) on the "1 E" screen to return to the DIAG MEMORY "1 DIAG" screen.



NOTICE!

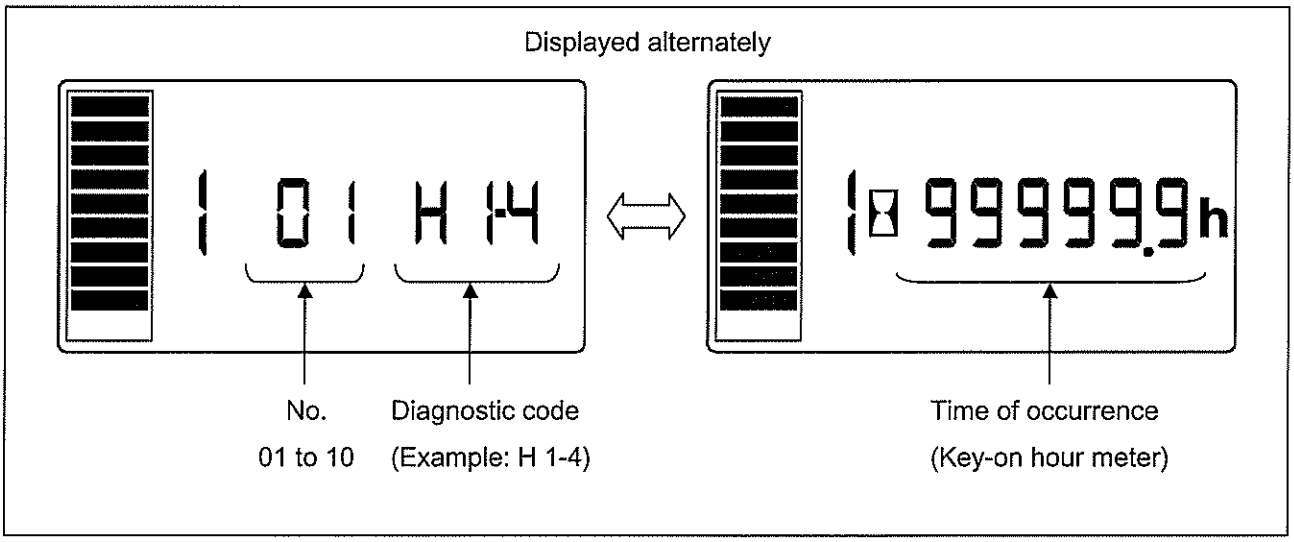
- **When no diagnostic code is displayed on the screen and the hour meter time is 0.0h, it indicates that no errors occurred in the past after that row.**
- **It is impossible to directly jump from the DIAG MEMORY screen to other function screen. Return to the ANALYZER MENU screen.**
- **For details of diagnostic code, refer to page "DIAGNOSIS CODE LIST" of Troubleshooting section.**

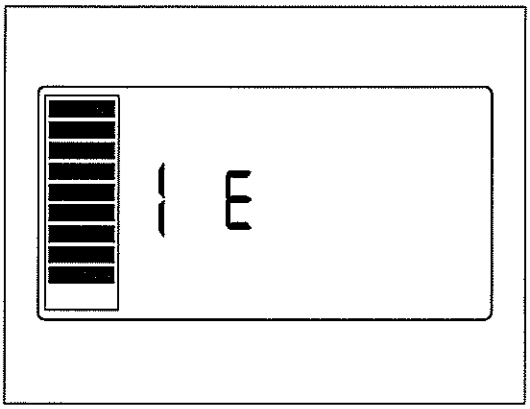


"1 DIAG: 1 01 to 1 10"

Displays diagnostic codes 1 to 10.

Switch (1): Next screen
Switch (2): Not used





"1 DIAG: 1 E"

Switch (1): Switching selection to "1 DIAG: 1 01"
Switch (2): Returning to the DIAG MEMORY "1 DIAG" screen

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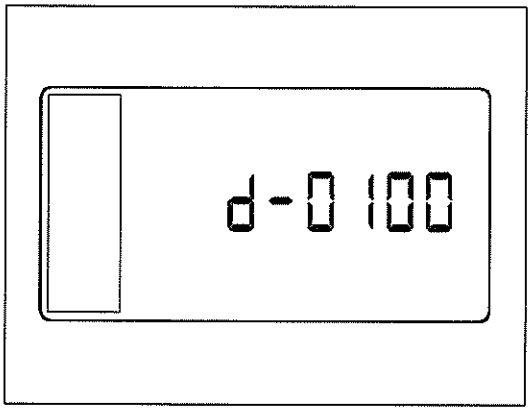
3.7.5 In/Out Monitor Function (I/O MONITOR)

This function displays the analog input voltage and the switch state of each of traveling, material handling, synchronized steering and OPS switches, sensors and actuators.

The circuits or sensors quality can be judged by monitoring the displayed value.

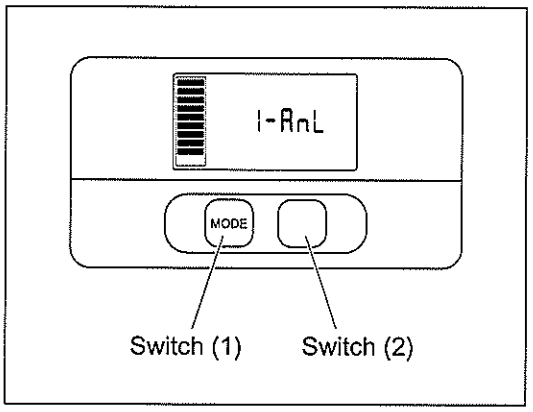
3.7.6 In/Out Monitor (1) (IO1)

Displays the temperature of each electrical functional part and the analog input voltage detected by each controller.



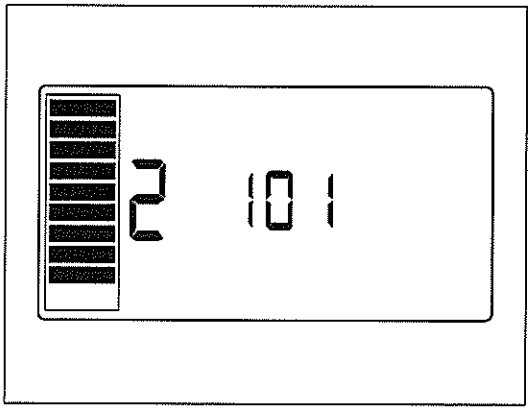
Operation Procedure

1. Enter the password on the status screen to display the service function initial screen.

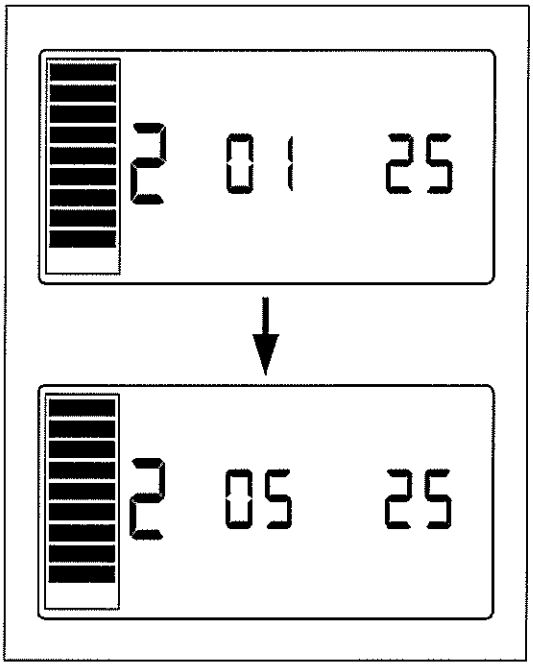


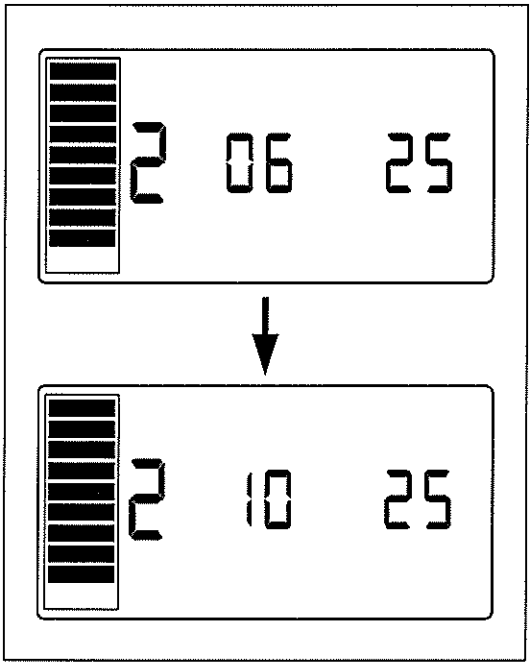
2. Press switch (2) once and switch (1) once, and make sure that "2 IO1" is displayed on the screen. Then, press switch (2) (to confirm) to display the "2 01" screen.
3. From here on, the screen changes in sequence each time switch (1) is pressed. On the "2 E" screen, press switch (2) to return to the IO MONITOR 1 "2 IO1" screen.

NOTICE! You cannot move directly from "2 IO1" screen to the screen of the other items. Return to ANALYZER MENU screen once, then move to screen of each time.



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“2 01”

Drive motor L temperature: °C

Temperature of the drive motor L is displayed.

“2 02”

Drive motor R temperature: °C

Temperature of the drive motor R is displayed.

“2 03”

Drive motor driver L heat sink temperature: °C

Temperature of the drive motor driver L heat sink is displayed.

“2 04”

Drive motor driver R heat sink temperature: °C

Temperature of the drive motor driver R heat sink is displayed.

“2 05”

Drive motor driver L board temperature: °C

Temperature of the drive motor driver L board is displayed.

“2 06”

Drive motor driver R board temperature: °C

Temperature of the drive motor driver R board is displayed.

“2 07”

Drive motor driver L condenser temperature： °C

Temperature of the drive motor driver L condenser is displayed.

“2 08”

Drive motor driver R condenser temperature： °C

Temperature of the drive motor driver R condenser is displayed.

“2 09”

Pump motor temperature： °C

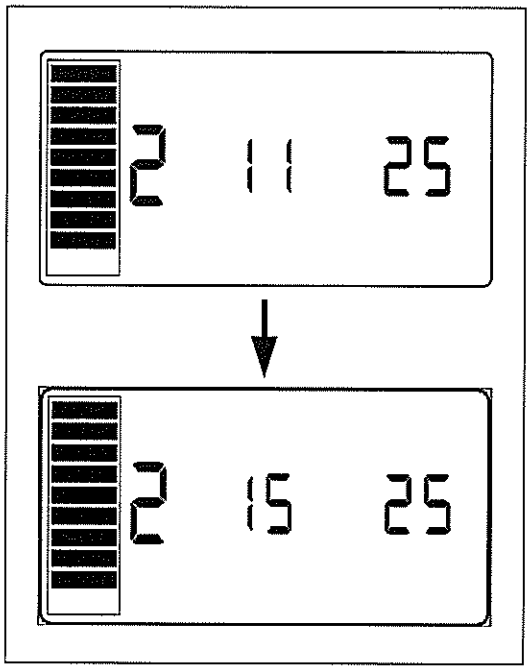
Temperature of pump motor is displayed.

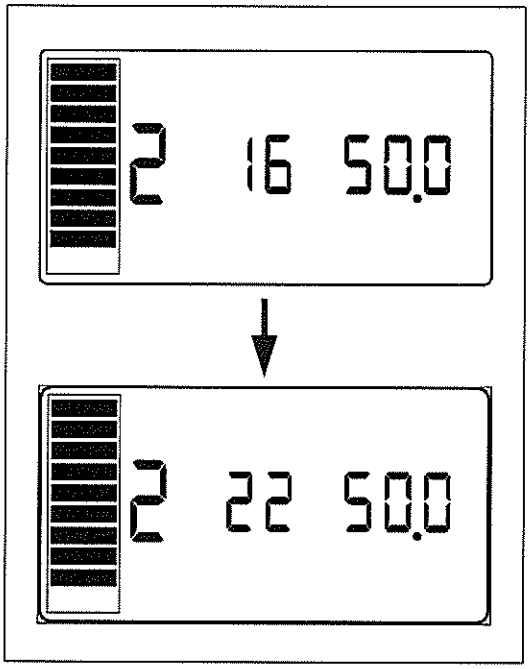
“2 10”

Pump motor driver heat sink temperature： °C

Temperature of the pump motor driver heat sink is displayed.

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“2 11”

Pump motor driver board temperature : °C

Temperature of the pump motor driver board is displayed.

“2 12”

Pump motor driver condenser temperature : °C

Temperature of the pump motor driver condenser is displayed.

“2 13”

Main controller board temperature : °C

Temperature of main controller board is displayed.

“2 14”

Battery temperature : °C

Battery temperature is displayed.

“2 15”

Display board temperature : °C

Display board temperature is displayed.

Switch (1): Next screen
Switch (2): Not used

“2 16”

Battery voltage : V

Battery voltage is displayed.

“2 17”

Voltage after key switch : V

Voltage after key switch is displayed.

“2 18”

Solenoid power source voltage : V

Voltage of solenoid power source is displayed.

“2 19”

Voltage after MB contactor : V

Voltage of after MB contactor is displayed.

“2 20”

Drive motor driver L main circuit voltage : V

Voltage of drive motor driver L main circuit is displayed.

“2 21”

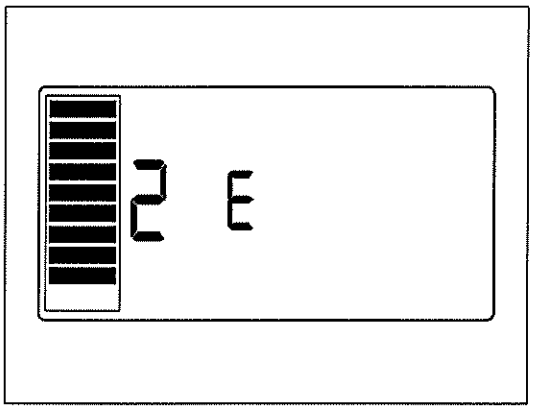
Drive motor driver R main circuit voltage : V

Voltage of drive motor driver R main circuit is displayed.

“2 22”

Pump motor driver main circuit voltage : V

Voltage of pump motor driver main circuit is displayed.

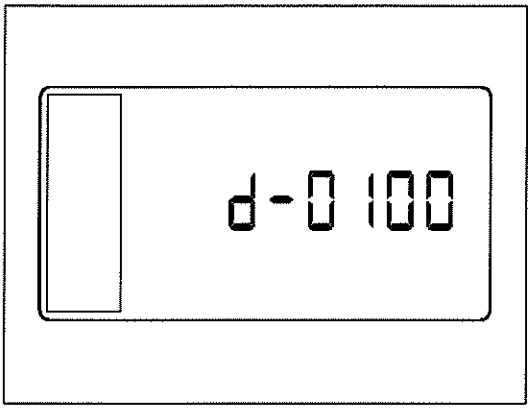


"2 IO1: 2 E"

Switch (1): Switching selection to "2 IO1: 2 01"
Switch (2): Returning to the IO MONITOR 1 "2 IO1" screen

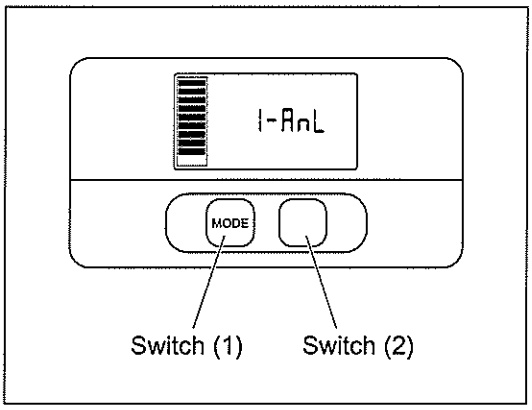
3.7.7 In/Out Monitor (2) (IO2)

Displays each switch ON/OFF state and analog input voltages from sensors for traveling and swing control.

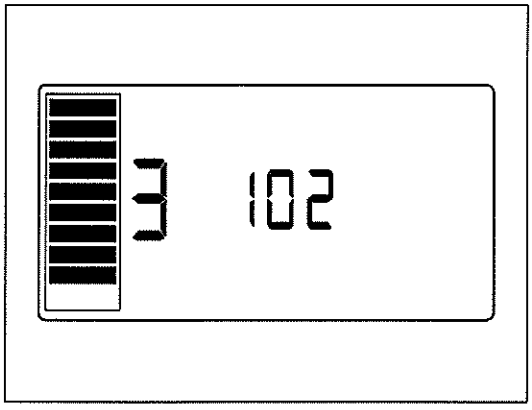


Operation Procedure

1. Enter the password on the status screen to display the service function initial screen.

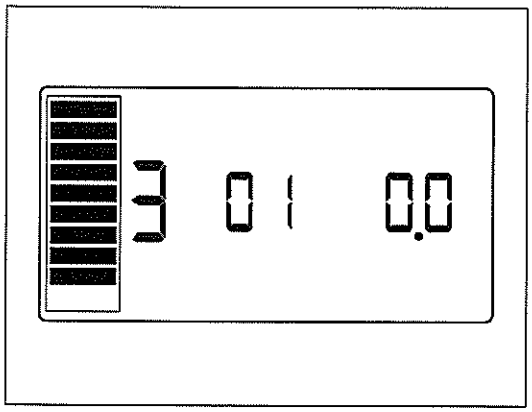


2. Press switch (2) once and switch (1) twice, and make sure that "3 IO2" is displayed on the screen. Then, press switch (2) (to confirm) to display the "3 01" screen.
3. From here on, the screen changes in sequence each time switch (1) is pressed. On the "3 E" screen, press switch (2) to return to the IO MONITOR 2 "3 IO2" screen.



NOTICE! You cannot move directly from "3 IO2" screen to the screen of the other items. Return to ANALYZER MENU screen once, then move to screen of each time.

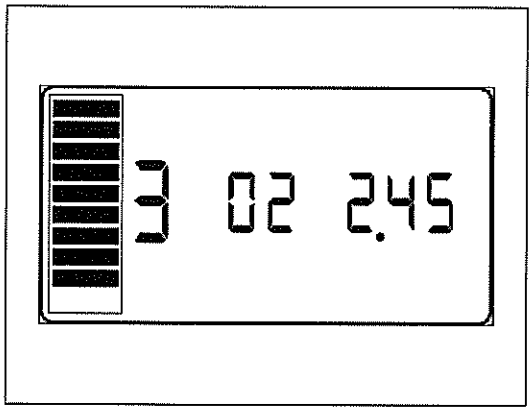
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"3 01"

Traveling speed: km/h

Displays the traveling speed



"3 02"

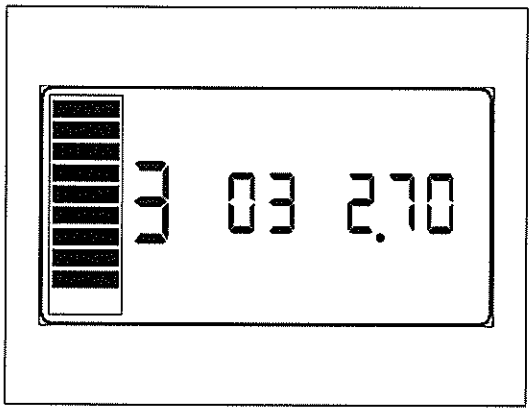
Accelerator sensor 1 voltage: V

Displays input voltage from the accelerator sensor to the controller.

Standard:

When accelerator is not operated: 0.40 to 1.24 V

When accelerator pedal is fully depressed: 2.00 to 4.79 V



"3 03"

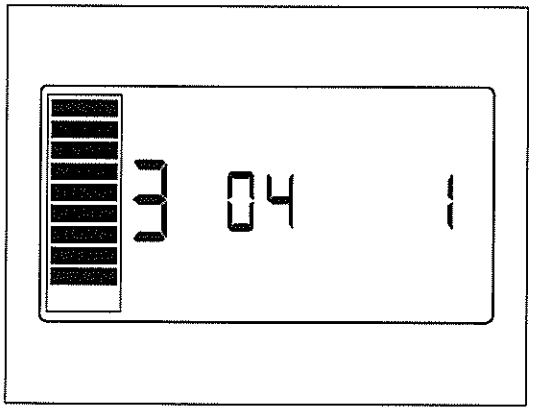
Accelerator sensor 2 voltage: V

Displays input voltage from the accelerator sensor to the controller.

Standard:

When accelerator is not operated: 0.65 to 2.31 V

When accelerator pedal is fully depressed: 2.42 to 4.79 V



"3 04"

Brake switch

Displays the status of the brake switch.

SWBK: 0=OFF (Brake is operated)

SWBK: 1=ON (Brake is not operated)

"3 05 (1)"

Seat switch

Switch ON/OFF quality judgment by sitting on and leaving the operator's seat

1 = ON when sitting on the seat

0 = OFF when leaving the seat

"3 05 (2)"

Forward switch (DSF)

"3 05 (3)"

Reverse switch (DSR)

Switch ON/OFF quality judgment by operating the direction lever

"3 05 (4)"

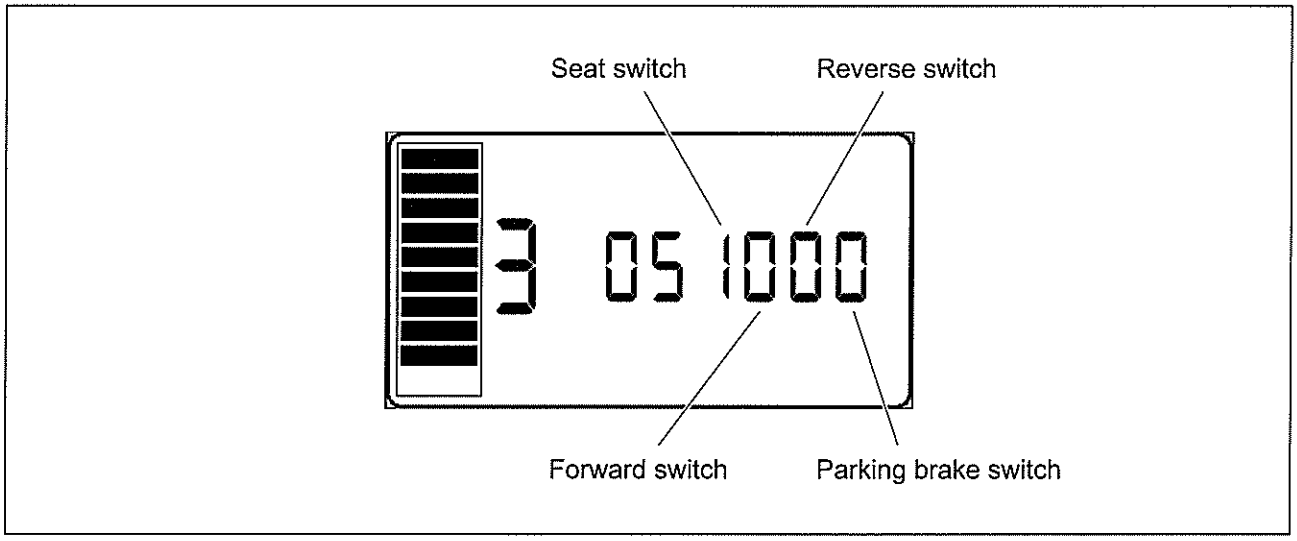
Parking brake switch

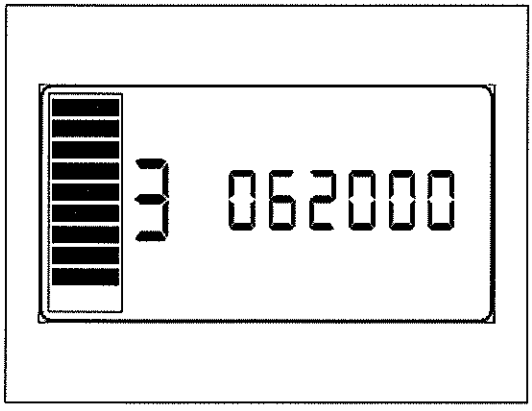
Switch ON/OFF quality judgment by operating the parking brake lever.

0 = OFF (in a state of parking brake being operated)

1 = ON (in a state of parking brake being released)

Direction lever	Display	
	DSF :	DSR :
Forward	1 (= ON)	0 (= OFF)
Neutral	0 (= OFF)	0 (= OFF)
Reverse	0 (= OFF)	1 (= ON)





"3 06"

Drive motor L revolution: rpm

This screen indicates the measured revolution of the drive motor L.

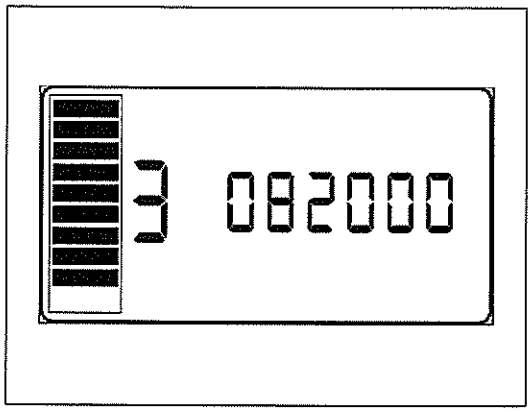
The rotation sensor is checked by actually running the vehicle. The number of revolution of the drive motor increases with an increase in the traveling speed.

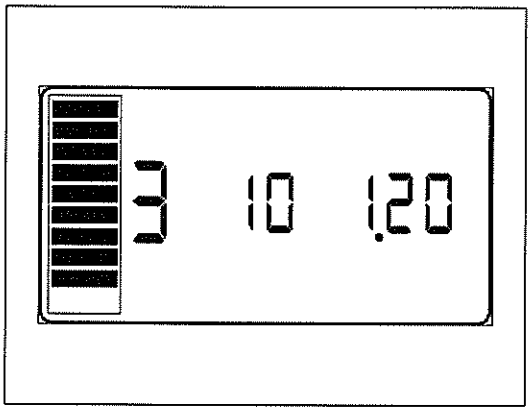
"3 07"

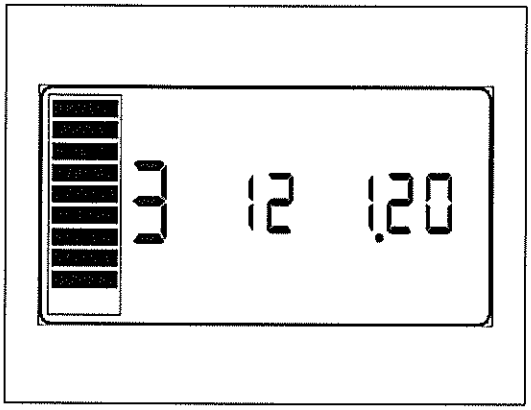
Drive motor L target revolution: rpm

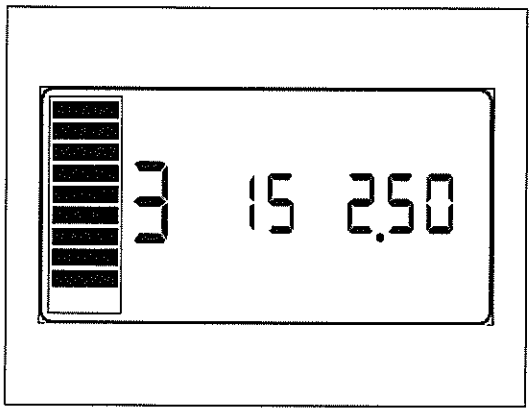
This screen indicates the target number revolution of the drive motor L.

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"3 08"

Drive motor R revolution: rpm

This screen indicates the measured revolution of the drive motor R.

The rotation sensor is checked by actually running the vehicle. The number of revolution of the drive motor increases with an increase in the traveling speed.

"3 09"

Drive motor R target revolution: rpm

This screen indicates the target number revolution of the drive motor R.

"3 10"

Drive motor L rotation sensor 1 voltage: V

"3 11"

Drive motor L rotation sensor 2 voltage: V

This screen indicates the voltages of the drive motor rotation sensors.

Standard:

When motor is stopped: Constant, either 0.30 to 0.70 V or 0.90 to 1.40 V

When motor is rotating: Variable between approx. 0.30 to 1.40 V

"3 12"

Drive motor R rotation sensor 1 voltage: V

"3 13"

Drive motor R rotation sensor 2 voltage: V

This screen indicates the voltages of the drive motor rotation sensors.

Standard:

When motor is stopped: Constant, either 0.30 to 0.70 V or 0.90 to 1.40 V

When motor is rotating: Variable between approx. 0.30 to 1.40 V

"3 14"

Drive motor L current sensor 1 voltage: V

"3 15"

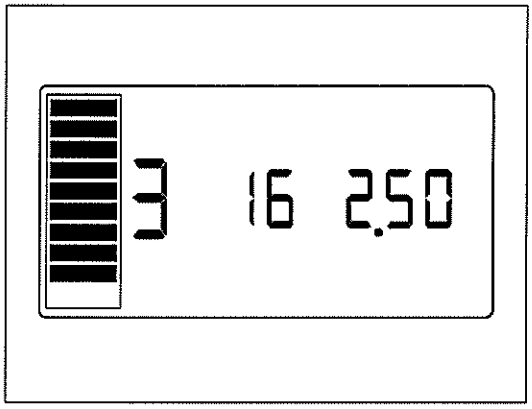
Drive motor L current sensor 2 voltage: V

This screen indicates the voltages of the drive motor current sensors.

Standard:

When vehicle is stopped: Approx. 2.50 V

When vehicle is running: 0.40 to 4.50 V



"3 16"

Drive motor R current sensor 1 voltage: V

"3 17"

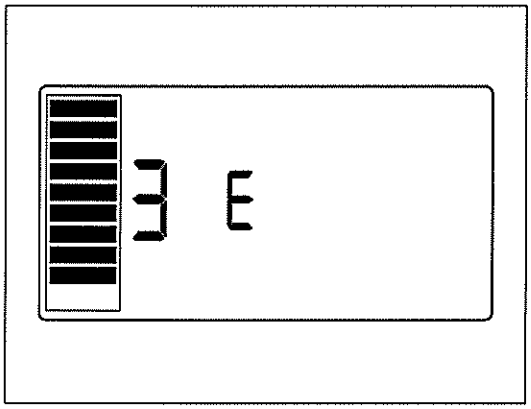
Drive motor R current sensor 2 voltage: V

This screen indicates the voltages of the drive motor current sensors.

Standard:

When vehicle is stopped: Approx. 2.50 V

When vehicle is running: 0.40 to 4.50 V



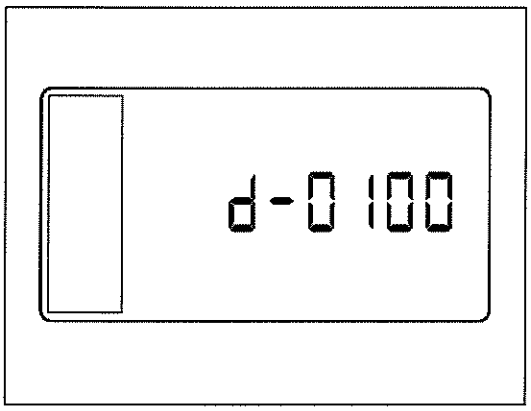
"3 IO2: 3 E"

Switch (1): Switching selection to "3 IO2: 3 01"

Switch (2): Returning to the IO MONITOR 2 "3 IO2" screen

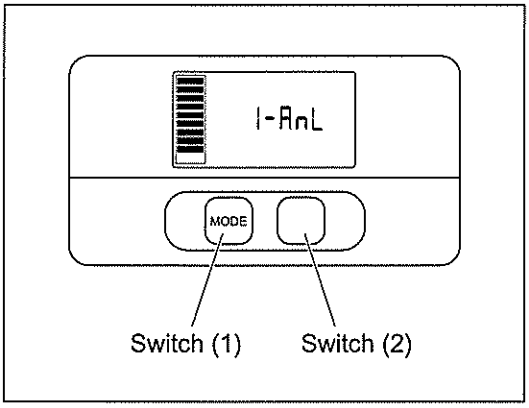
3.7.8 In/Out Monitor (3) (IO3)

Displays the load handling control switch ON/OFF states and analog input voltages from load handling control sensors.



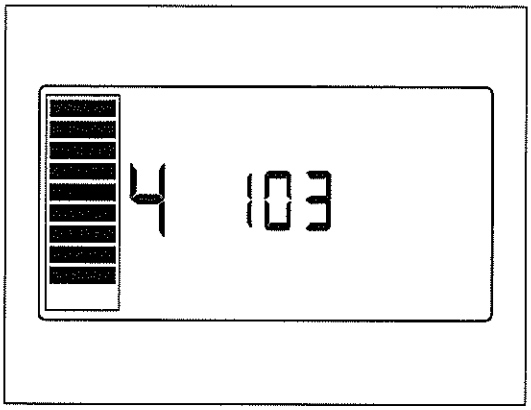
Operation Procedure

1. Enter the password on the status screen to display the service function initial screen.

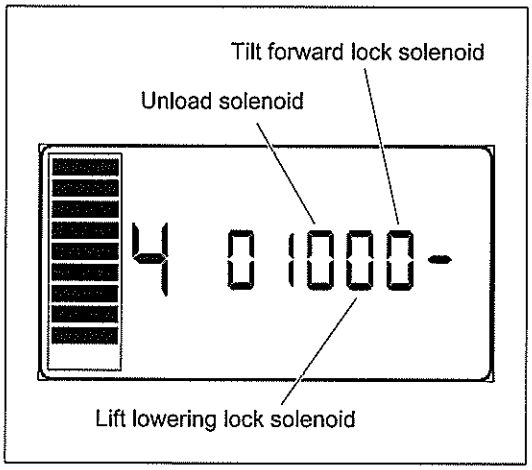


2. Press switch (2) once and switch (1) three times, and make sure that "4 IO3" is displayed on the screen. Then, press switch (2) (to confirm) to display the "4 01" screen.
3. From here on, the screen changes in sequence each time switch (1) is pressed. On the "4 E" screen, press switch (2) to return to the IO MONITOR 3 "4 IO3" screen.

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NOTICE! You cannot move directly from "4 IO3" screen to the screen of the other items. Return to ANALYZER MENU screen once, then move to screen of each time.



"4 01 (1)"

Unload solenoid

(Conventional Lever)

Displays output signal to the unload solenoid.

"4 01 (2)"

Lift lowering lock solenoid

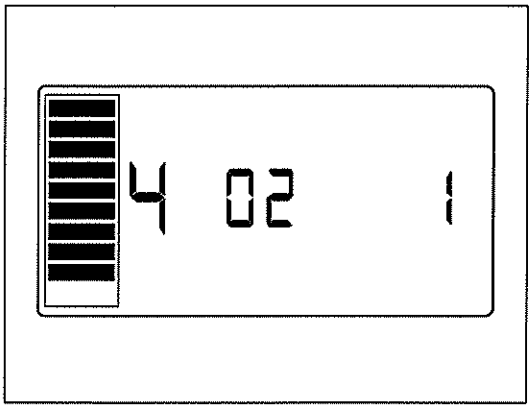
Displays output signal to the lift lowering lock solenoid.

"4 01 (3)"

Tilt forward lock solenoid

Displays output signal to the tilt forward lock solenoid.

Seat condition		Sitting on seat					Leaving seat
Lever condition		Not operated	Lift lever		Tilt lever		
			Raising	Lowering	Forward tilt	Backward tilt	
Conventional Lever	Unload solenoid	0 (=OFF)	0 (=OFF)	0 (=OFF)	0 (=OFF)	0 (=OFF)	1 (=ON)
	Lift lowering lock solenoid	0 (=OFF)	0 (=OFF)	1 (=ON)	0 (=OFF)	0 (=OFF)	0 (=OFF)
	Tilt forward lock solenoid	0 (=OFF)	0 (=OFF)	0 (=OFF)	1 (=ON)	0 (=OFF)	0 (=OFF)
Mini Lever / Joy stick	Unload solenoid	-	-	-	-	-	-
	Lift lowering lock solenoid	0 (=OFF)	0 (=OFF)	1 (=ON)	0 (=OFF)	0 (=OFF)	0 (=OFF)
	Tilt forward lock solenoid	0 (=OFF)	0 (=OFF)	0 (=OFF)	1 (=ON)	0 (=OFF)	0 (=OFF)



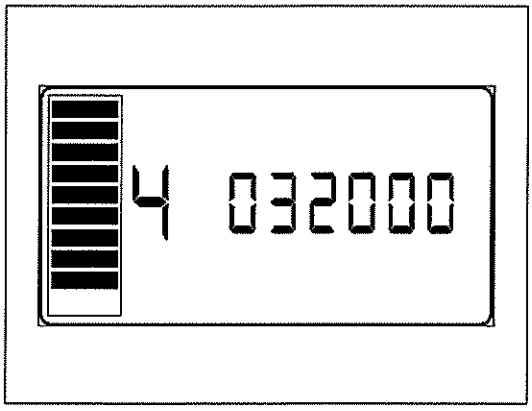
"4 02"

Seat switch

Switch ON/OFF quality judgment by sitting on and leaving the operator's seat

1 = ON when sitting on the seat

0 = OFF when leaving the seat



"4 03"

Pump motor revolution: rpm

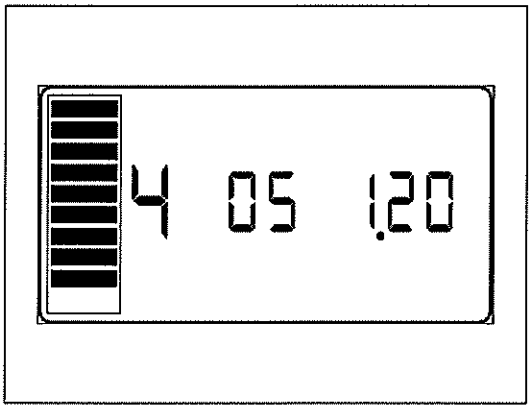
This screen indicates the measured revolution of the pump motor.

The rotation sensor is checked by actually running the vehicle. The number of revolution of the pump motor increases with an increase in the load handling speed.

"4 04"

Pump motor target revolution: rpm

This screen indicates the target number revolution of the pump motor.



"4 05"

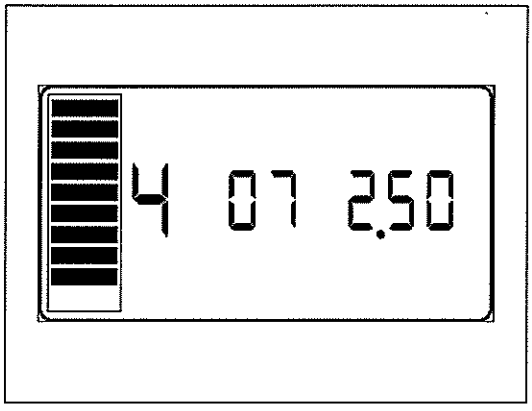
Pump motor driver rotation sensor voltage: V

Displays the voltage from the pump motor driver rotation sensor.

Standard:

When motor is stopped: Constant, either 0.30 to 0.70 V or 0.90 to 1.40 V

When motor is rotating: Variable between approx. 0.30 to 1.40 V



"4 06"

Pump motor current sensor 1 voltage: V

"4 07"

Pump motor current sensor 2 voltage: V

This screen indicates the voltages of the pump motor current sensors.

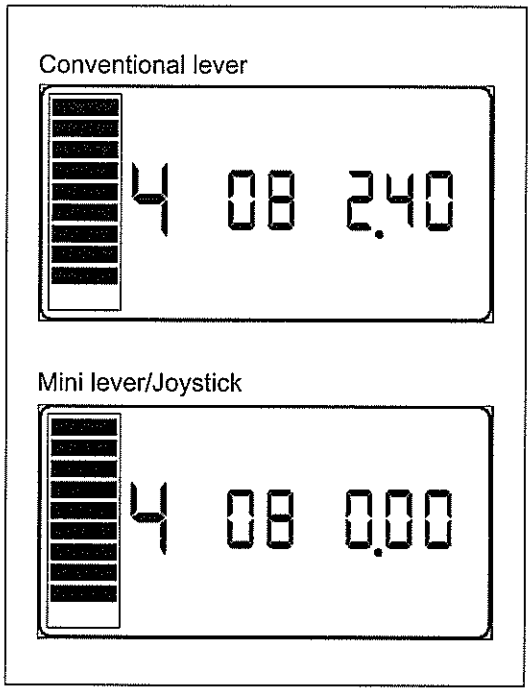
Standard:

Standard value when vehicle is stopped: Approx. 2.50 V

(When load handling lever, steering wheel, and forward/backward switch are in neutral)

Other than the above: 0.40 to 4.50 V

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"4 08"

Conventional lever

Lift lever angle sensor 1 voltage: V

Displays input voltage from lift lever angle sensor 1 to the controller.

Standard:

During uppermost raising operation: 1.65 to 4.50 V

During lowermost lowering operation: 1.65 to 4.50 V

When lever is neutral: 1.65 to 2.87 V

The input voltage decreases during lift-up operation, while it increases during lift-down operation.

Mini lever/Joystick

Lift proportional valve solenoid current: A

Displays the current from the lift proportional solenoid.

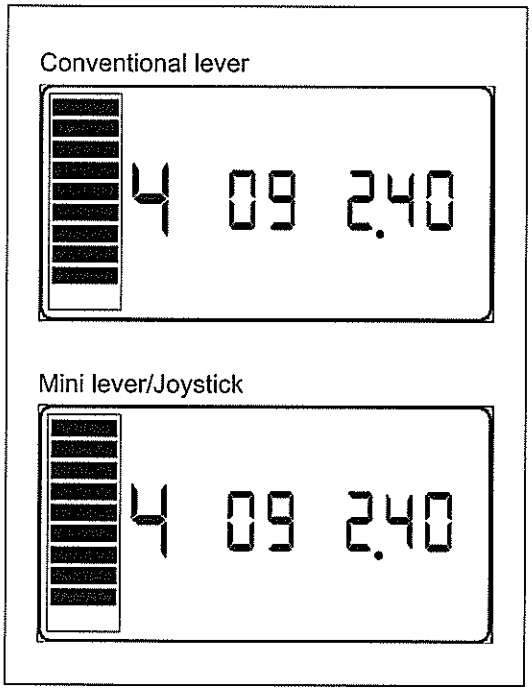
Standard:

During uppermost raising operation: 0.25 to 0.85 A

During lowermost lowering operation: 0.25 to 0.85 A

When lever is neutral: 0.00 A

The current increases according to the amount of operation of the lift lever.



"4 09"

Conventional lever

Lift lever angle sensor 2 voltage: V

Displays input voltage from lift lever angle sensor 2 to the controller.

Standard:

During uppermost raising operation: 1.52 to 4.50 V

During lowermost lowering operation: 0.30 to 3.01 V

When lever is neutral: 1.52 to 3.01 V

The input voltage increases during lift-up operation, while it decreases during lift-down operation.

Mini lever/Joystick

Lift lever angle sensor 1 voltage: V

Displays input voltage from lift lever angle sensor 1 to the controller.

Standard:

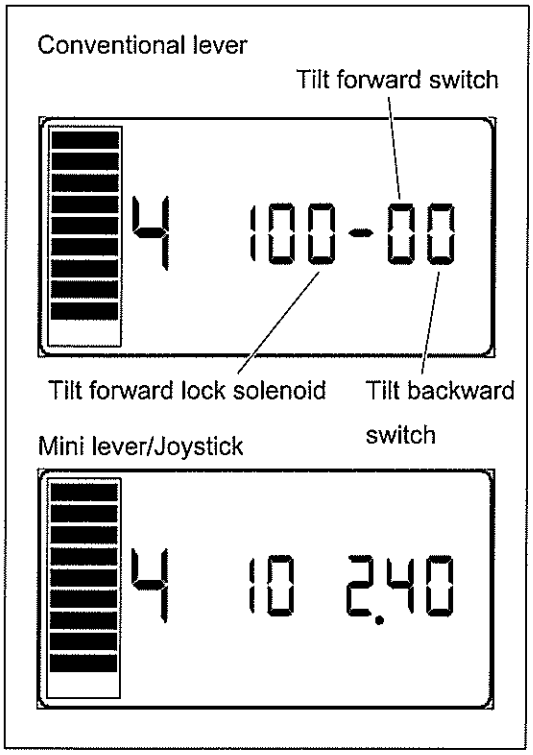
During uppermost raising operation: 1.78 to 4.50 V

During lowermost lowering operation: 0.30 to 2.75 V

When lever is neutral: 1.78 to 2.75 V

The input voltage increases during lift-up operation, while it decreases during lift-down operation.

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"4 10 (1)"

Conventional lever

Tilt forward lock solenoid

See "4 01 (3)"

"4 10 (2)"

Tilt forward switch

Switch ON/OFF quality judgment by operating the tilt forward switch.

"4 10 (3)"

Tilt backward switch

Switch ON/OFF quality judgment by operating the tilt backward switch.

Mini lever/Joystick

Lift lever angle sensor 2 voltage: V

Displays input voltage from lift lever angle sensor 2 to the controller.

Standard:

During uppermost raising operation: 0.30 to 2.75 V

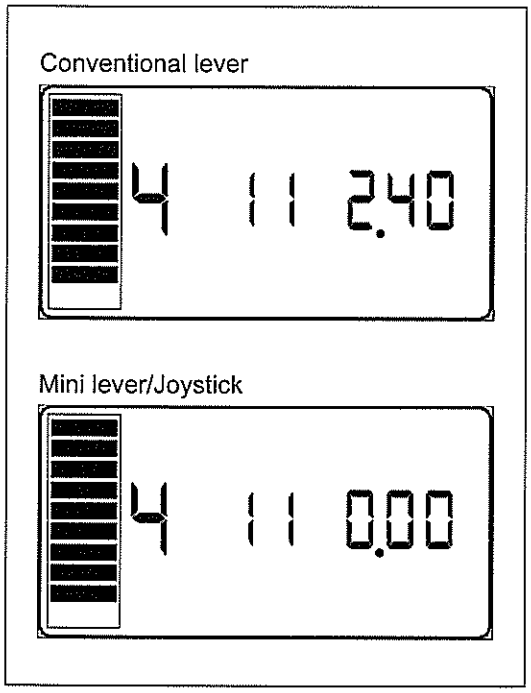
During lowermost lowering operation: 1.78 to 4.50 V

When lever is neutral: 1.78 to 2.75 V

The input voltage decreases during lift-up operation, while it increases during lift-down operation.

Tilt lever	Forward switch	Backward switch
Forward tilt position	1 (=ON)	0 (=OFF)
Neutral position	0 (=OFF)	0 (=OFF)
Reverse tilt position	0 (=OFF)	1 (=ON)

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"4 11"

Conventional lever

Attachment 1 lever angle sensor 1 voltage: V

Displays input voltage from attachment 1 lever angle sensor 1 to the controller.

Standard:

During uppermost forward operation: 1.65 to 4.50 V

During lowermost backward operation: 0.30 to 2.87 V

When lever is neutral: 1.65 to 2.87 V

The input voltage decreases during backward tilting operation, while it increases during forward tilting operation.

Mini lever/Joystick

Tilt proportional valve solenoid current: A

Displays the current from the tilt proportional solenoid.

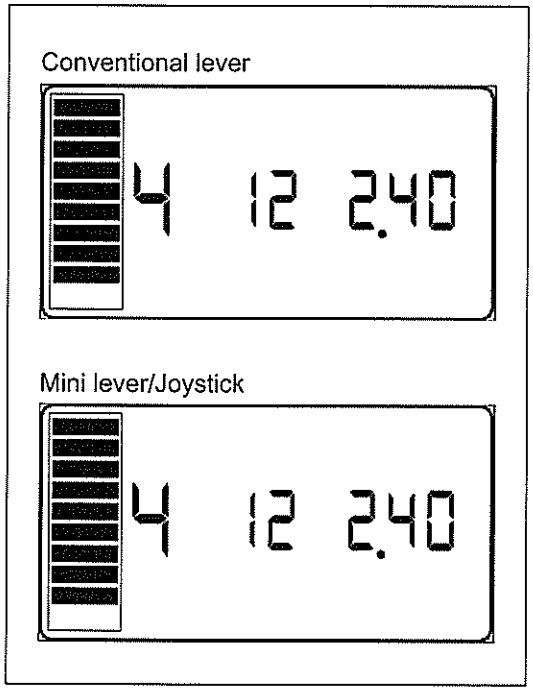
Standard:

During uppermost forward operation: 0.25 to 0.85 A

During lowermost backward operation: 0.25 to 0.85 A

When lever is neutral: 0.00 A

The current increases according to amount of operation of the tilt lever.



"4 12"

Conventional lever

Attachment 1 lever angle sensor 2 voltage: V

Displays input voltage from attachment 1 lever angle sensor 2 to the controller.

Standard:

During uppermost forward operation: 0.30 to 3.01 V

During lowermost backward operation: 1.52 to 4.50 V

When lever is neutral: 1.52 to 3.01 V

The input voltage increases during backward tilting operation, while it decreases during forward tilting operation.

Mini lever/Joystick

Tilt lever angle sensor 1 voltage: V

Displays input voltage from tilt lever angle sensor 1 to the controller.

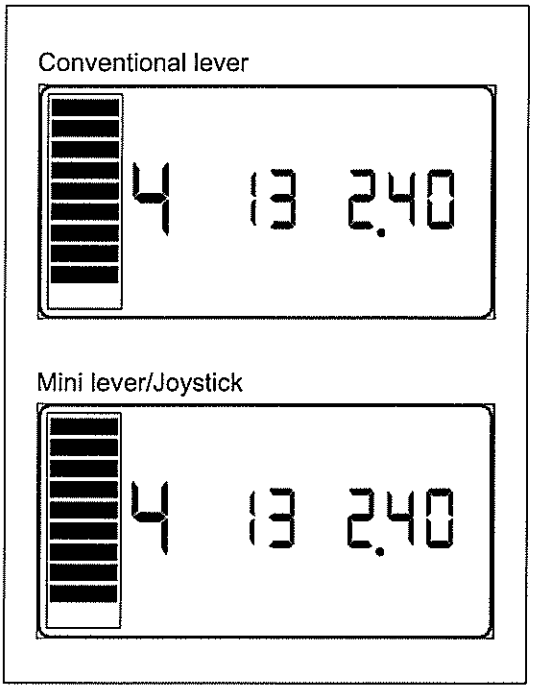
Standard:

During uppermost forward operation: 0.30 to 2.75 V

During lowermost backward operation: 1.78 to 4.50 V

When lever is neutral: 1.78 to 2.75 V

The input voltage increases during backward tilting operation, while it decreases during forward tilting operation.



"4 13"

Conventional lever

Attachment 2 lever angle sensor 1 voltage: V

Displays input voltage from attachment 2 lever angle sensor 1 to the controller.

Standard:

During uppermost forward operation: 1.65 to 4.50 V

During lowermost backward operation: 0.30 to 2.87 V

When lever is neutral: 1.65 to 2.87 V

The input voltage decreases during backward tilting operation, while it increases during forward tilting operation.

Mini lever/Joystick

Tilt lever angle sensor 2 voltage: V

Displays input voltage from tilt lever angle sensor 2 to the controller.

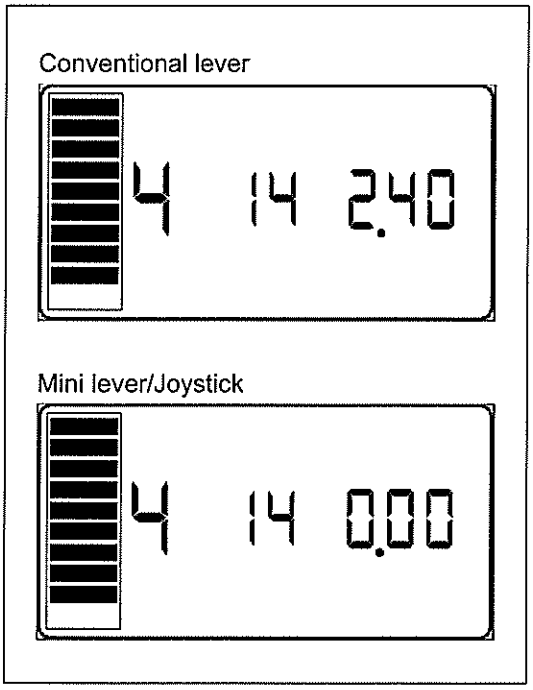
Standard:

During uppermost forward operation: 1.78 to 4.50 V

During lowermost backward operation: 0.30 to 2.75 V

When lever is neutral: 1.78 to 2.75 V

The input voltage decreases during backward tilting operation, while it increases during forward tilting operation.



"4 14"

Conventional lever

Attachment 2 lever angle sensor 2 voltage: V

Displays input voltage from attachment 2 lever angle sensor 2 to the controller.

Standard:

During uppermost forward operation: 0.30 to 3.01 V

During lowermost backward operation: 1.52 to 4.50 V

When lever is neutral: 1.52 to 3.01 V

The input voltage increases during backward tilting operation, while it decreases during forward tilting operation.

Mini lever/Joystick

Attachment 1 proportional valve solenoid current: A

Displays the current from the attachment 1 proportional solenoid.

Standard:

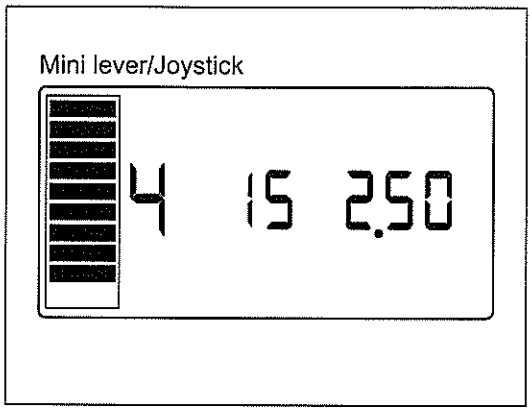
During uppermost backward operation: 0.25 to 0.85 A

During lowermost forward operation: 0.25 to 0.85 A

When lever is neutral: 0.00 A

The current increases according to amount of operation of the attachment 1 lever.

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"4 15"

Mini lever/Joystick

Attachment 1 lever angle sensor 1 voltage: V

Displays input voltage from attachment 1 lever angle sensor 1 to the controller.

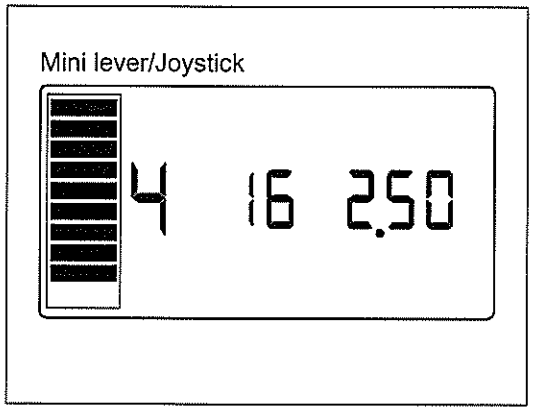
Standard:

During uppermost backward operation: 1.78 to 4.50 V

During lowermost forward operation: 0.30 to 2.75 V

When lever is neutral: 1.78 to 2.75 V

The input voltage increases during backward tilting operation, while it decreases during forward tilting operation.



"4 16"

Mini lever/Joystick

Attachment 1 lever angle sensor 2 voltage: V

Displays input voltage from attachment 1 lever angle sensor 2 to the controller.

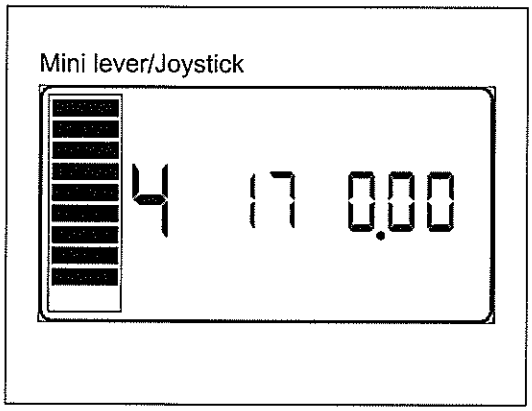
Standard:

During uppermost backward operation: 0.30 to 2.75 V

During lowermost forward operation: 1.78 to 4.50 V

When lever is neutral: 1.78 to 2.75 V

The input voltage decreases during backward tilting operation, while it increases during forward tilting operation.



"4 17"

Mini lever/Joystick

Attachment 2 proportional valve solenoid current: A

Displays the current from the attachment 2 proportional solenoid.

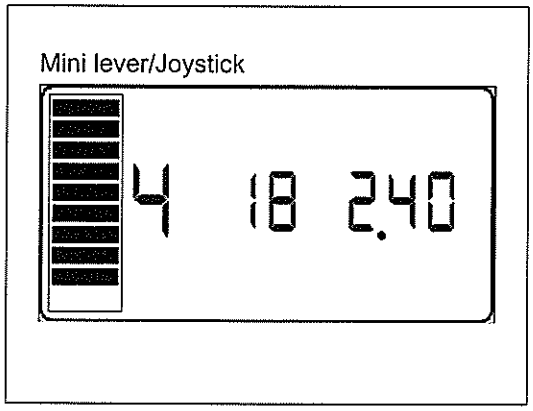
Standard:

During uppermost forward operation: 0.25 to 0.85 A

During lowermost backward operation: 0.25 to 0.85 A

When lever is neutral: 0.00 A

The current increases according to amount of operation of the attachment 2 lever.



"4 18"

Mini lever/Joystick

Attachment 2 lever angle sensor 1 voltage: V

Displays input voltage from attachment 2 lever angle sensor 1 to the controller.

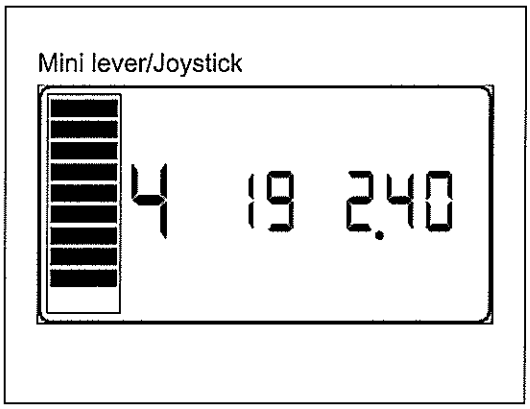
Standard:

During uppermost backward operation: 1.78 to 4.50 V

During lowermost forward operation: 0.30 to 2.75 V

When lever is neutral: 1.78 to 2.75 V

The input voltage increases during backward tilting operation, while it decreases during forward tilting operation.



"4 19"

Mini lever/Joystick

Attachment 2 lever angle sensor 2 voltage: V

Displays input voltage from attachment 2 lever angle sensor 2 to the controller.

Standard:

During uppermost backward operation: 0.30 to 2.75 V

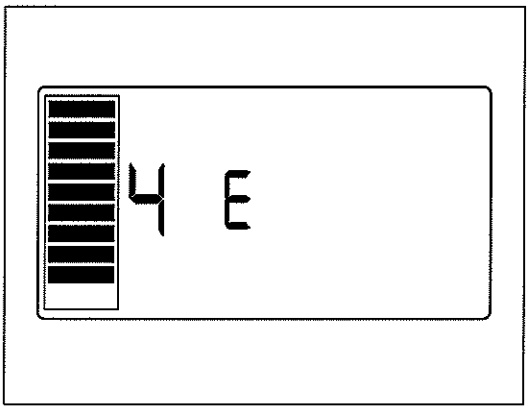
During lowermost forward operation: 1.78 to 4.50 V

When lever is neutral: 1.78 to 2.75 V

The input voltage decreases during backward tilting operation, while it increases during forward tilting operation.

Switch (1): Next screen

Switch (2): Not used



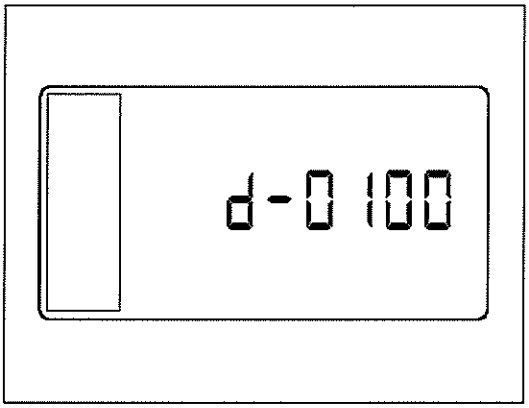
"4 IO3: 4 E"

Switch (1): Switching selection to "4 IO3: 4 01"

Switch (2): Returning to the IO MONITOR 3 "4 IO3" screen

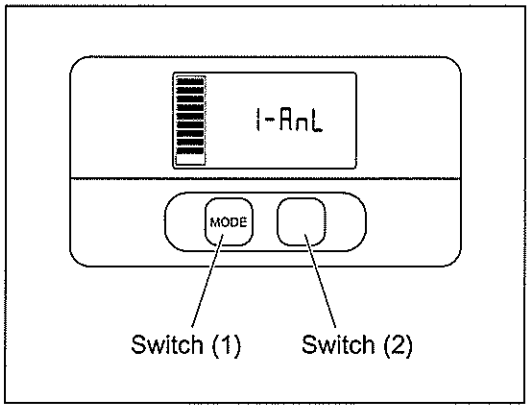
3.7.9 In/Out Monitor (4) (IO4)

Displays the ON/OFF states of synchronised steering and the analog input voltages from respective sensors.



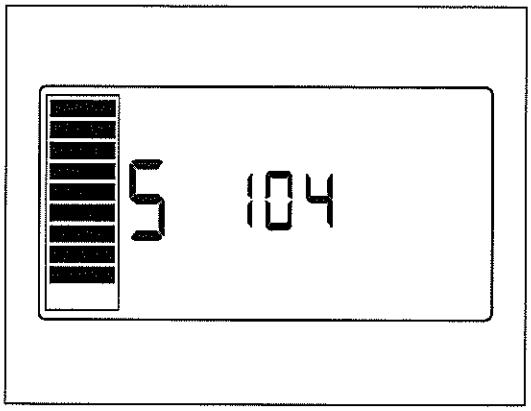
Operation Procedure

1. Enter the password on the status screen to display the service function initial screen.

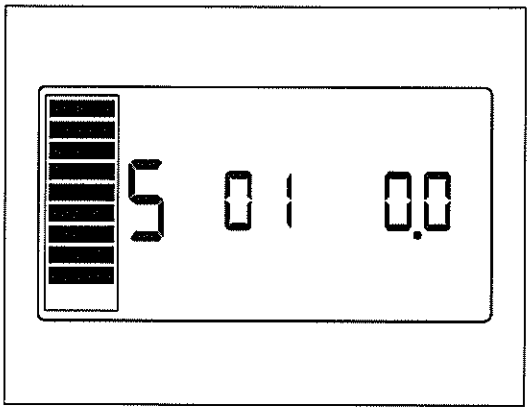


2. Press switch (2) once and switch (1) four times, and make sure that "5 IO4" is displayed on the screen. Then, press switch (2) (to confirm) to display the "5 01" screen.
3. From here on, the screen changes in sequence each time switch (1) is pressed. On the "5 E" screen, press switch (2) to return to the IO MONITOR 4 "5 IO4" screen.

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NOTICE! You cannot move directly from "5 IO4" screen to the screen of the other items. Return to ANALYZER MENU screen once, then move to screen of each time.



"5 01"

Tire angle sensor voltage: V

Displays input voltage from the tire angle sensor to the controller.

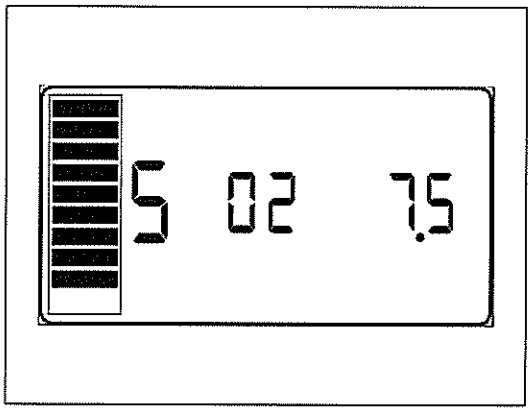
Standard:

Standard when tires are in straight ahead position:

2.11 to 2.81 V

The input voltage increases when the steering wheel is turned clockwise to turn right.

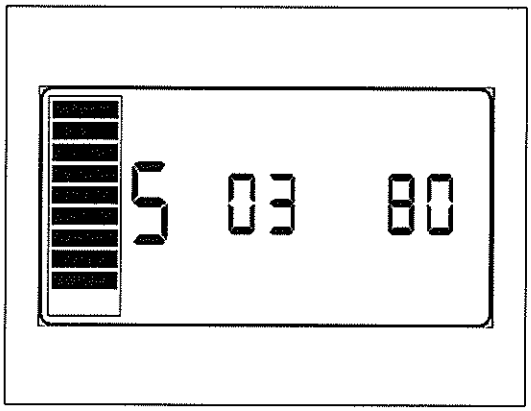
The input voltage decreases when the steering wheel is turned counterclockwise to turn left.



"5 02"

Traveling speed: km/h

Displays the traveling speed



"5 03"

Steering angle knob position actual value

The knob position calculated and recognized by the controller from the steering angle sensor signal.

"5 04"

Steering angle knob position target value

The knob position calculated and recognized by the controller from the tire angle sensor signal.

Standard:

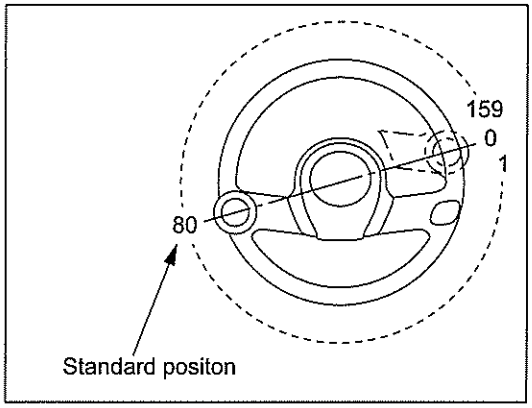
(Vehicle with synchronised steering)

The value shall increases during right turn, and it shall decrease during left turn.

Display range: 0 to 159

(Vehicle without synchronised steering:)

Fixed at 80



"5 05"

Switch ON/OFF quality judgment by operating the steering synchronizer solenoid.

(Vehicle with synchronised steering)

0 = OFF non-energized state (Position compensation disabled)

1 = ON energized state (Position compensation enabled)

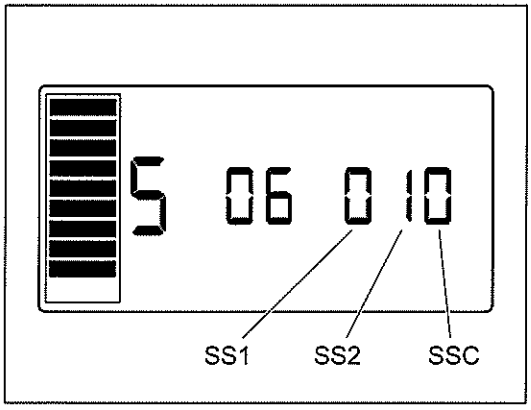
(Vehicle without synchronised steering:)

One rotation (360°) of the steering wheel is divided by 160, and the value is set to "80" when the knob is in the position as indicated in the illustration.

Clockwise turn of the steering wheel: Increase in value

Counterclockwise turn of the steering wheel: Decrease in value

Display range: 0 to 159



"5 06"

Steering angle sensor signal

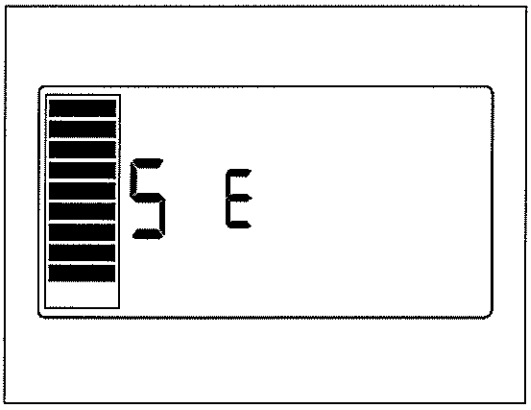
When the steering wheel is rotated once, SS1 and SS2 repeat ON and OFF. SSC only turns on when the knob is in the standard position.

1 = ON

0 = OFF

Switch (1): Next screen

Switch (2): Not used



"5 IO4: 5 E"

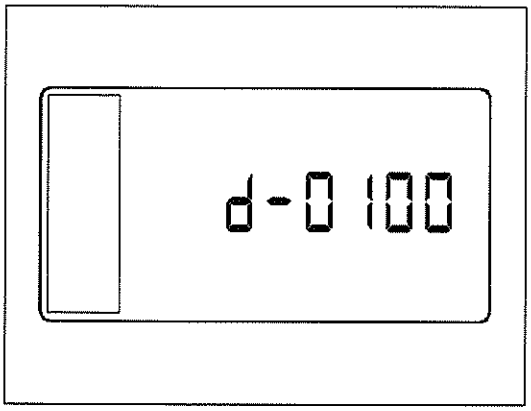
Switch (1): Switching selection to "5 IO4: 5 01"

Switch (2): Returning to the IO MONITOR 4 "5 IO4" screen

3.7.10 In/Out Monitor (5) (IO5)

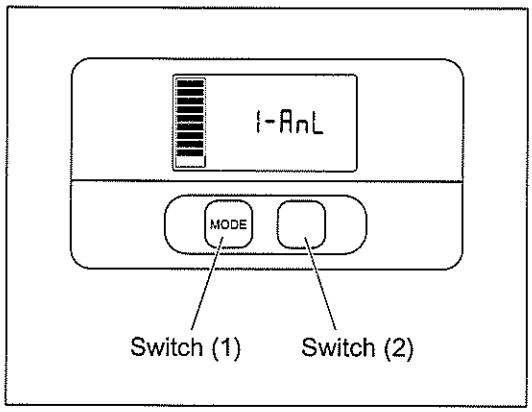
Displays the analog input voltages from battery current sensor.

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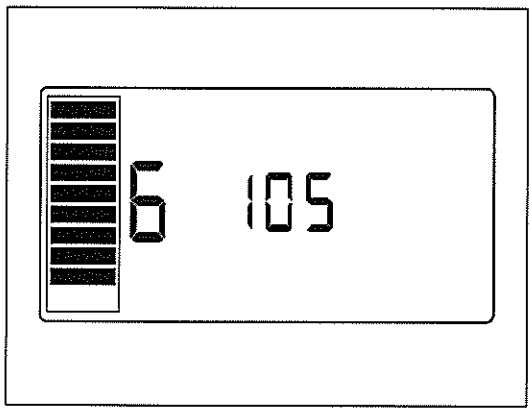


Operation Procedure

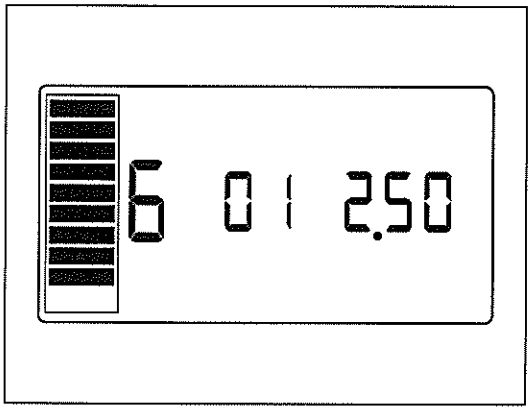
1. Enter the password on the status screen to display the service function initial screen.



2. Press switch (2) once and switch (1) five times, and make sure that "6 IO5" is displayed on the screen. Then, press switch (2) (to confirm) to display the "6 01" screen.
3. From here on, the screen changes in sequence each time switch (1) is pressed. On the "6 E" screen, press switch (2) to return to the IO MONITOR 5 "6 IO5" (ANALYZER MENU) screen.



NOTICE! You cannot move directly from "6 IO5" screen to the screen of the other items. Return to ANALYZER MENU screen once, then move to screen of each time.



"6 01"

Battery current sensor voltage: V

Displays input voltage from the battery current sensor to the controller.

Standard value when vehicle is stopped: Approx. 2.50 V

(When load handling lever, steering wheel, and forward/backward switch are in neutral)

Other than the above: 2.30 to 2.70 V

Switch (1): Next screen

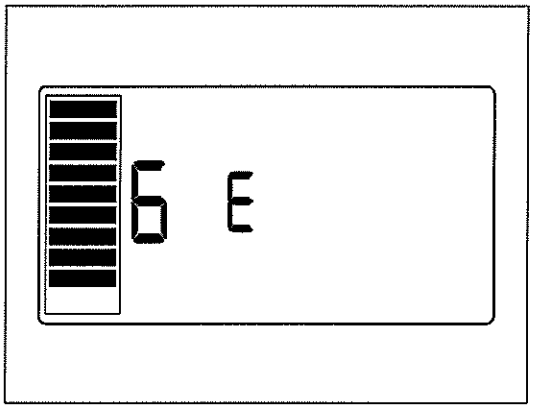
Switch (2): Not used

"6 02"

Not used

Switch (1): Next screen

Switch (2): Not used



"6 IO5: 6 E"

Switch (1): Switching selection to "6 IO5: 6 01"

Switch (2): Returning to the IO MONITOR 5 "6 IO5" screen

3.7.11 ACTIVE TEST (Active Test)

In the active test mode, the controller forcibly outputs an activation signal (ON or OFF signal) to the selected item in order to permit operation check of that function.

3.7.12 Active Test Item List

Item	Description	Selection Item			
		Signal	Content of operation	Signal	Content of operation
7 01 *1 (STEERING SOL)	Steering synchronizer solenoid forced operation	OFF	Tires move	ON	Tire do not move match
7 02 (LIFT LWR SOL)	Lift lowering lock solenoid forced operation	OFF	Lowering not possible	ON	Lowering possible
7 03 (TILT SOL)	Tilt forward solenoid forced operation	OFF	Forward tilt not possible	ON	Forward tilt possible
7 04 *2 (UNLOAD SOL)	Unload solenoid forced operation	OFF	Material handling operation possible	ON	Material handling operation not possible (Except lowering)*3
7 05 (FAN1)	Cooling fan for controller forced operation	OFF	Fan stops	ON	Fan rotates
7 06 *4 (FAN2)	Cooling fan for motor forced operation	OFF	Fan stops	ON	Fan rotates
7 07 (ACC OUT1)	Not used	OFF	-	ON	-
7 08 *5 (ACC OUT2)	Accessory output 2 forced operation	OFF	Back buzzer stop Motion alarm stop	ON	Back buzzer sound Motion alarm sound

*1: With synchronized steering only

*2: Conventional lever vehicle only

*3: Depending on the attachment, 3rd to 4th way operation may be possible.
It may slowly tilt forward according to load condition, but this is not a fault.

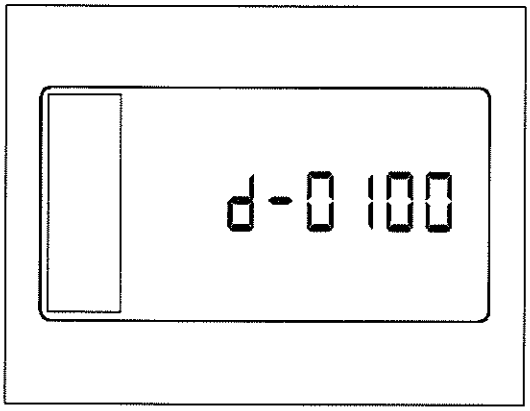
*4: With cooling fan for motor only

*5: With EZ pedal only

- On the ACTIVE TEST screen, an ON or an OFF is always displayed next to each item.
- If the selected item is forcibly turned off or on by pressing the switch (2) and it is switched over to another item by pressing the switch (1), forced operation is canceled (and switches over to normal operation).
- The displayed character string indicates whether or not the selected item is forcibly operated. (Refer to below)

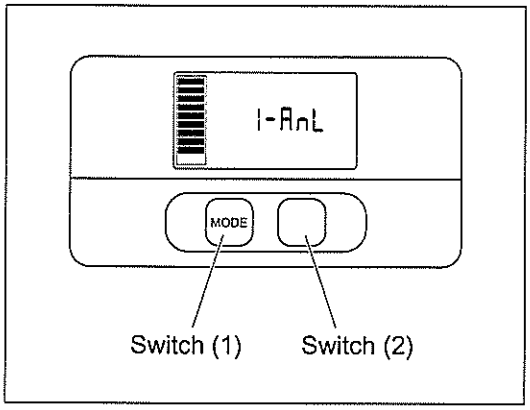
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Display	Condition
on, off (Light)	Selected item not forcibly operated
on, off (Blink)	Selected item forcibly operated

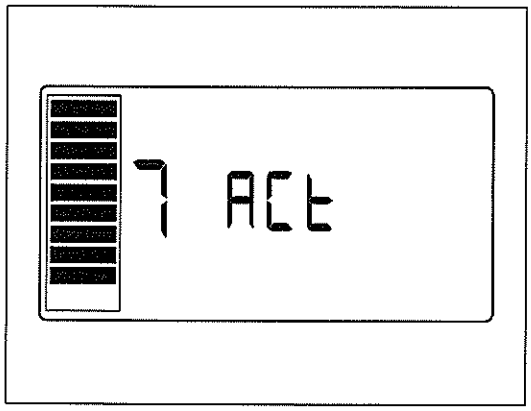


Operation Procedure

1. Enter the password on the status screen to display the service function initial screen.

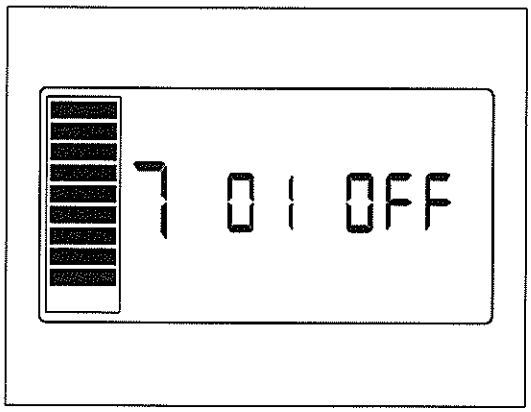


2. Press switch (2) once and switch (1) six times, and make sure that "7 ACT" (ACTIVE TEST) is displayed on the screen. Then, press switch (2) (to confirm) to display the "7 01" screen.



3. From here on, the screen changes in sequence each time switch (1) is pressed. On the "7 E" screen, press switch (2) to return to the ACTIVE TEST "7 ACT" screen.

NOTICE! You cannot move directly from "7 ACT" (ACTIVE TEST) screen to the screen of the other items. Return to ANALYZER MENU screen once, then move to screen of each time.



"7 01"

Steering synchroizer

(W/O Knob position correcting solenoid)

Not used.

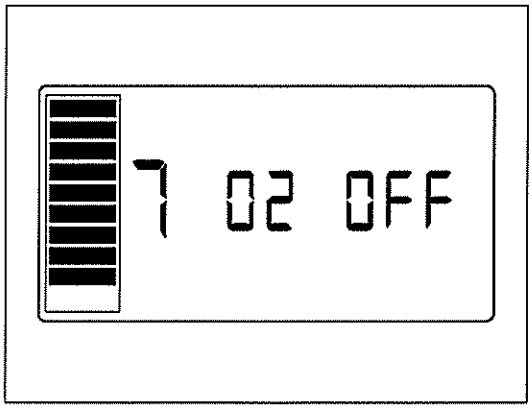
(W/ Knob position correcting solenoid)

Slowly turn the steering wheel, and check the difference of the rear tire movement.

ON (By-pass open): Tires do not move match

OFF (By-pass close): Tires move (normal operation)

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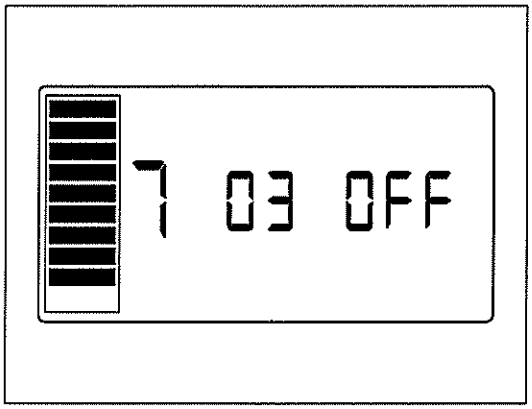
"7 02"

Lift lowering lock solenoid

Check the quality of lowering action by lift lowering operation.

ON (Solenoid ON): Lowering possible (normal operation)

OFF (Solenoid OFF): Lowering not possible



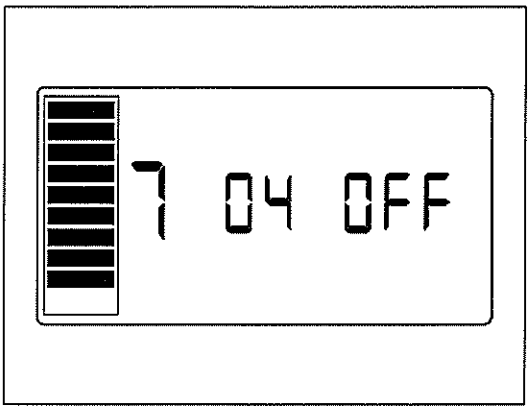
"7 03"

Tilt forward solenoid

Check the quality of mast forward tilt operation by forward tilt operation.

ON (Solenoid ON): Forward tilt possible

OFF (Solenoid OFF): Forward tilt not possible



"7 04"

Unload solenoid

Check the quality of material handling operation.

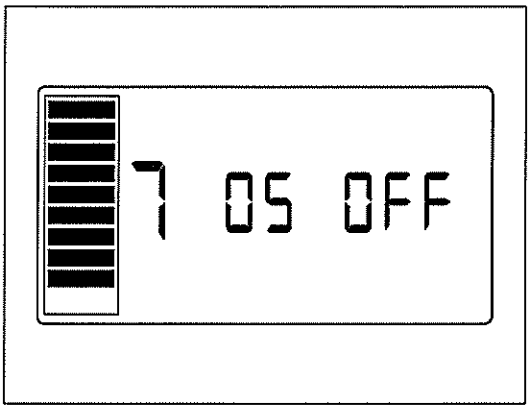
(Conventional lever)

ON (Solenoid ON): Material handling operation not possible (except lowering)

OFF (Solenoid PFF): Material handling operation possible

(Mini lever/Joystick)

Not used.



"7 05"

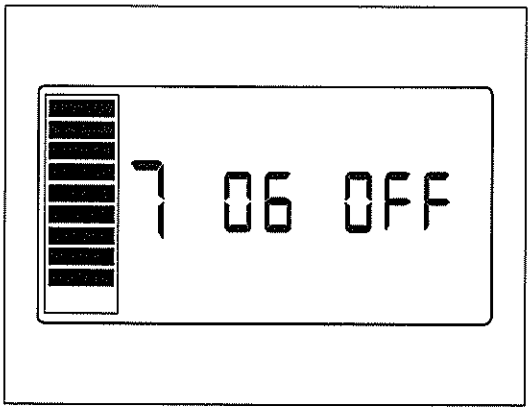
Cooling fan for controller

Forcibly output the ON/OFF signal to check the fan operation

ON: Fan rotates

OFF: Fan stops

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"7 06"

Cooling fan for motor

Forcibly output the ON/OFF signal to check the fan operation.

(With cooling fan for motor)

ON: Fan rotates

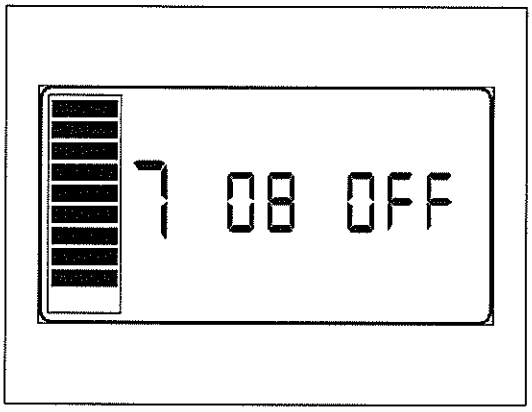
OFF: Fan stops

(Without cooling fan for motor)

Not used.

"7 07"

Not used



"7 08"

Accessory output 2

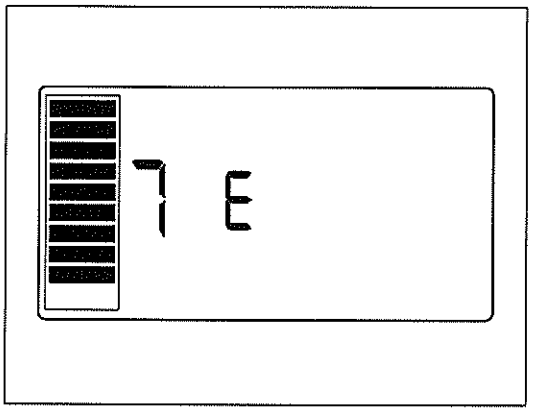
(With EZ pedal)

ON: Back buzzer sound/Back-up lamp light

OFF: Back buzzer stop/Back-up lamp not light

Switch (1): Moving to the next item

Switch (2): Forcibly turning on or off the selected item



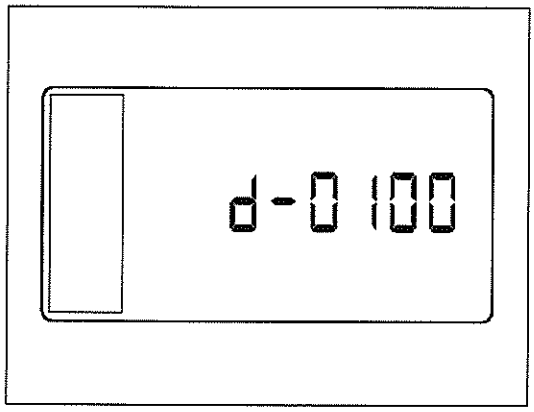
"7 ACT: 7 E"

Switch (1): Switching selection to "7 ACT: 7 01"

Switch (2): Returning to the ACTIVE TEST "7 ACT" screen

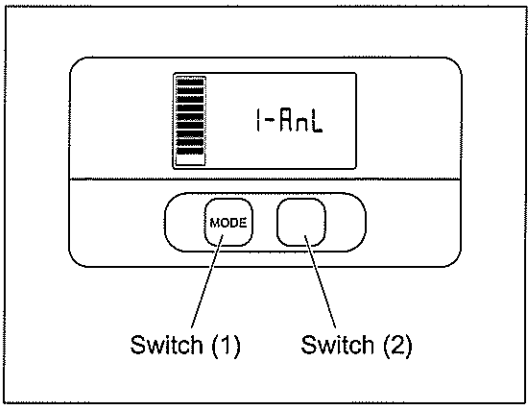
3.7.13 VERSION (Program Version)

Displays program version of each controller.

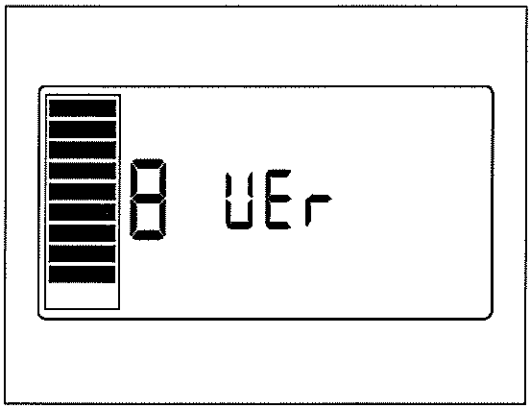


Operation Procedure

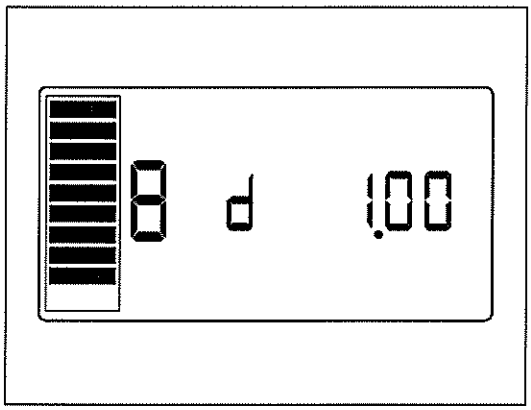
1. Enter the password on the status screen to display the service function initial screen.



2. Press switch (2) once and switch (1) seven times, and make sure that “8 VER” (VERSION) is displayed on the screen. Then, press switch (2) (to confirm) to display the “8d” screen.
3. From here on, the screen changes in sequence each time switch (1) is pressed. On the “8E” screen, press switch (2) to return to the PROGRAM VERSION “8 VER” screen.

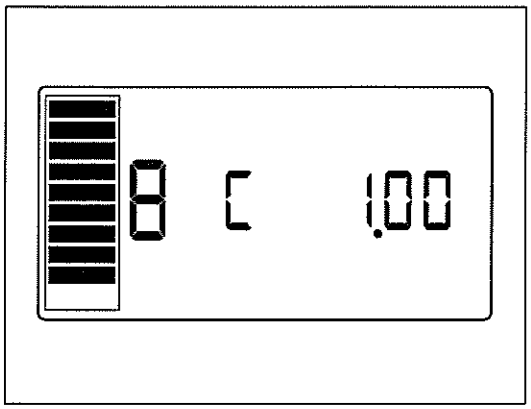


NOTICE! You cannot move directly from “8 VER” (VERSION) screen to the screen of the other items. Return to ANALYZER MENU screen once, then move to screen of each time.



“8 d”

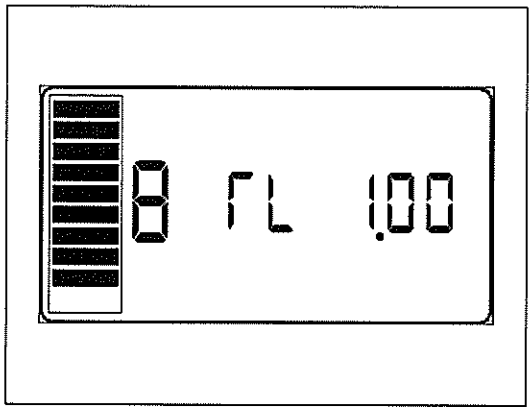
Program version of the display



“8 c”

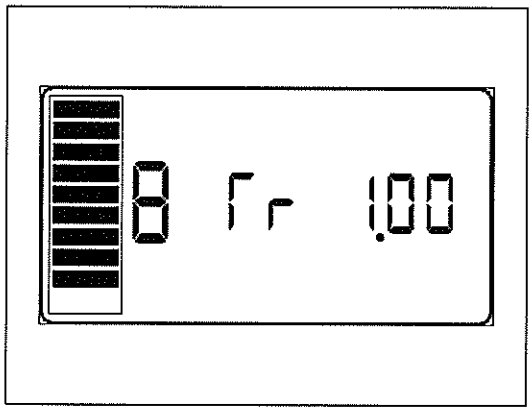
Program version of the main controller

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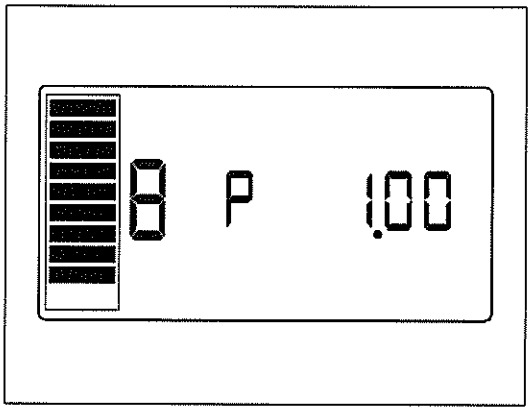
"8 TL"

Program version of the drive motor driver L



"8 Tr"

Program version of the drive motor driver R

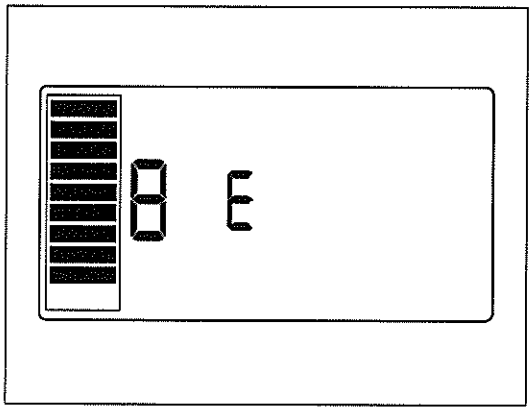


"8 P"

Program version of the pump motor driver

Switch (1): Next screen

Switch (2): Not used



"8 E"

Switch (1): Switching selection to "8 VER: 8 d"

Switch (2): Returning to the PROGRAM VERSION "8 VER" screen

3.8 TUNING

3.8.1 General

This feature performs fine adjustment of traveling and load handling controls.

When receiving requests from the customer such as the request to weaken the accelerator-off regenerative braking force, various settings levels can be adjusted on the tuning screens.

Tuning functions has 75 items. (included spare items)

3.8.2 Tuning Item List

Display		Multi-function display/ DX		Item	Level (*: Initial setting value)							
Menu	No.	Menu	No.		1	2	3	4	5	6	7	8

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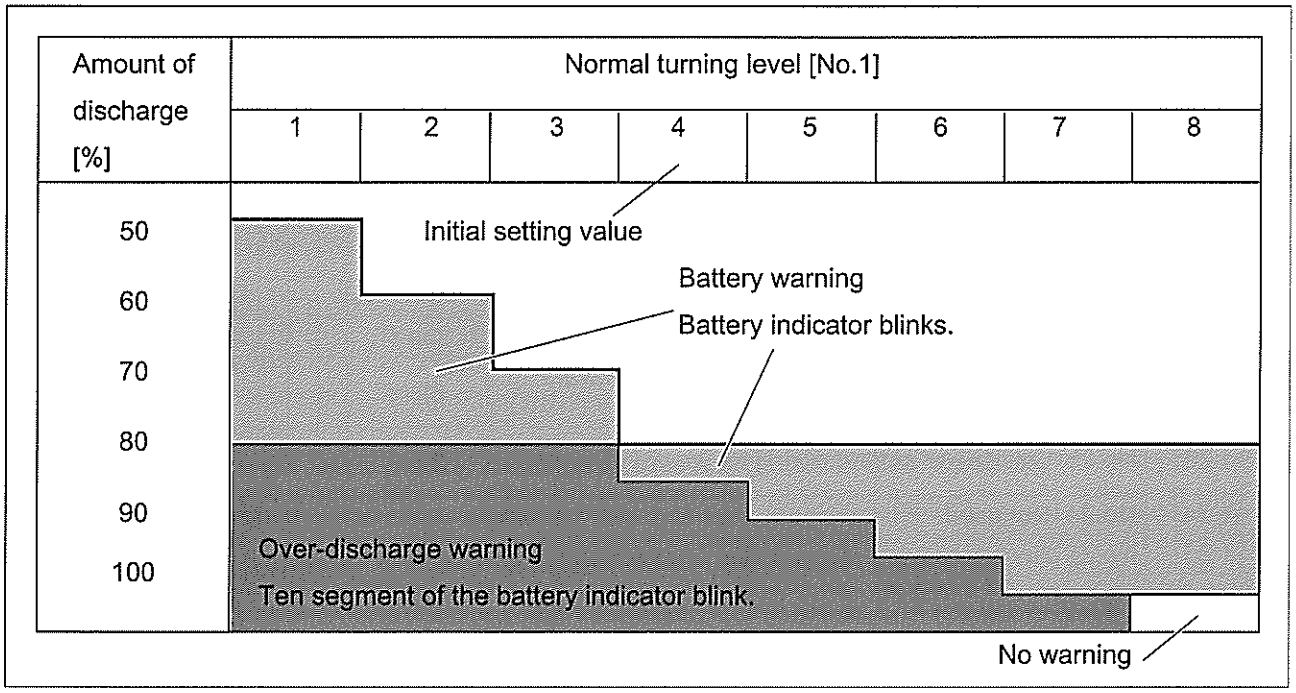
1 GEN-ERA	1 01	TUNEGEN	No.1	Activation timing of low battery capacity warning and battery over-discharge warning.	Fast			*			Slow	Disabled
	1 02		No.2	Battery charge indicator calibration No.1	Slow decrease					*		Fast decrease
	1 03		No.3	Battery charge indicator calibration No.2	Sensitive				*			Insensitive
	1 04		No.4	Motor torque when the battery discharge has proceeded	Power down				*			Power keep
	1 05		No.5	Not used					*			
	1 06		No.6	Accelerator pedal sensitivity	Insensitive				*			Sensitive
	1 07		No.7	Acceleration torque	Weak				*			Strong
	1 08		No.8	Acceleration soft-start	Slow				*			Quick
	1 09		No.9	Regenerative braking torque at accelerator-off	Weak				*			Strong
	1 10		No.10	Regenerative braking soft-start at accelerator-off	Slow				*			Quick
	1 11		No.11	Acceleration torque at switch-back	Weak				*			Strong
	1 12		No.12	Acceleration soft-start at switch-back	Slow				*			Quick
	1 13		No.13	Regenerative braking torque at switch-back	Weak				*			Strong
	1 14		No.14	Regenerative braking soft-start at switch-back	Slow				*			Quick
	1 15		No.15	Regenerative braking soft-stop at switch-back	Slow				*			Quick
	1 16		No.16	Accelerator traction torque	Weak				*			Strong
	1 17		No.17	Accelerator and brake traction torque	Weak							Strong *
	1 18		No.18	Rollback speed when the travelling direction is opposite to the direction lever	Slow*							Fast
	1 19		No.19	Rollback speed when the travelling direction is the same as the direction lever	Slow*							Fast
	1 20		No.20	Not used					*			
	1 21		No.21	Stop time befor rollback *1	Short*							Long
	1 22		No.22	Maximum speed limitation during backward travelling	Slow							Fast *
	1 23		No.23	Low speed setting during backward travelling	Slow							Fast *
	1 24		No.24	Not used					*			
	1 25		No.25	Regenerative braking torque at brake on	Weak				*			Strong

Display		Multi-function display/ DX		Item	Level (*: Initial setting value)							
Menu	No.	Menu	No.		1	2	3	4	5	6	7	8

1 GEN-ERA	1 26	TUNEGEN	No.26	Pump motor output during lift up operation	Slow								Fast *
	1 27		No.27	Pump motor output during tilt forward and backward operation	Slow					*			Fast
	1 28		No.28	Pump motor output during the attachment (1) lever push and pull operation	Slow				*				Fast
	1 29		No.29	Pump motor output during the attachment (2) lever push and pull operation	Slow				*				Fast
	1 30		No.30	Not used				*					
	1 31		No.31	Not used						*			
	1 32		No.32	Load meter display time	Short				*				Long
	1 33		No.33	Temperature at which the battery temperature protection function limits the vehicle performance in the maximum	Low *								High
	1 34		No.34	Temperrature at battery overheat	Low					*			High
	1 35		No.35	Not used						*			

*1: The stop time of vehicle become longer at sloping road if increase the setting leve. Operate the parking brake in case of leaving the seat.

Low battery capacity warning and battery over-discharge warning Amount

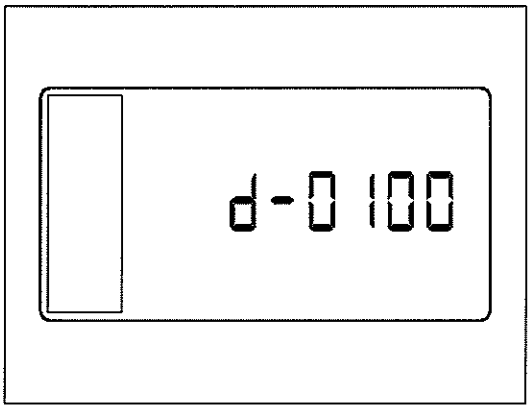


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Display		Multi-function display/ DX		Item	Level (*: Initial setting value)							
Menu	No.	Menu	No.		1	2	3	4	5	6	7	8
2 LIFT	2 01	LIFT DOWN	START	Play at the beginning of lift down operation	Wide				*			Narrow
	2 02		INCH	Inching speed during lift down operation	Slow				*			Fast
	2 03		MAX	Maximum speed during lift down operation	Slow				*			Fast
	2 04		ACC	Acceleration speed during lift down operation	Weak				*			Strong
	2 05		DEC	Deceleration speed during lift down operation	Weak				*			Strong
	2 06	LIFT UP	START	Play at the beginning of lift up operation	Wide				*			Narrow
	2 07		INCH	Inching speed during lift up operation	Slow				*			Fast
	2 08		MAX	Maximum speed during lift up operation	Slow				*			Fast
	2 09		ACC	Acceleration speed during lift up operation	Weak				*			Strong
	2 10		DEC	Deceleration speed during lift up operation	Weak				*			Strong
3 TILT	3 01	TILT FWD	START	Play at the beginning of tilt forward operation	Wide				*			Narrow
	3 02		INCH	Inching speed during tilt forward operation	Slow				*			Fast
	3 03		MAX	Maximum speed during tilt forward operation	Slow				*			Fast
	3 04		ACC	Acceleration speed during tilt forward operation	Weak				*			Strong
	3 05		DEC	Deceleration speed during tilt forward operation	Weak				*			Strong
	3 06	TILT BWD	START	Play at the beginning of tilt backward operation	Wide				*			Narrow
	3 07		INCH	Inching speed during tilt backward operation	Slow				*			Fast
	3 08		MAX	Maximum speed during tilt backward operation	Slow				*			Fast
	3 09		ACC	Acceleration speed during tilt backward operation	Weak				*			Strong
	3 10		DEC	Deceleration speed during tilt backward operation	Weak				*			Strong

4 LATT1	4 01	ATT1PUSH	START	Play at the beginning of the attachment (1) lever push operation	Wide				*			Narrow
	4 02		INCH	Inching speed during the attachment (1) lever push operation	Slow				*			Fast
	4 03		MAX	Maximum speed during the attachment (1) lever push operation	Slow				*			Fast
	4 04		ACC	Acceleration speed during the attachment (1) lever push operation	Weak				*			Strong
	4 05		DEC	Deceleration speed during the attachment (1) lever push operation	Weak				*			Strong
	4 06	ATT1PULL	START	Play at the beginning of the attachment (1) lever pull operation	Wide				*			Narrow
	4 07		INCH	Inching speed during the attachment (1) lever pull operation	Slow				*			Fast
	4 08		MAX	Maximum speed during the attachment (1) lever pull operation	Slow				*			Fast
	4 09		ACC	Acceleration speed during the attachment (1) lever pull operation	Weak				*			Strong
	4 10		DEC	Deceleration speed during the attachment (1) lever pull operation	Weak				*			Strong
5 LATT2	5 01	ATT2PUSH	START	Play at the beginning of the attachment (2) lever push operation	Wide				*			Narrow
	5 02		INCH	Inching speed during the attachment (2) lever push operation	Slow				*			Fast
	5 03		MAX	Maximum speed during the attachment (2) lever push operation	Slow				*			Fast
	5 04		ACC	Acceleration speed during the attachment (2) lever push operation	Weak				*			Strong
	5 05		DEC	Deceleration speed during the attachment (2) lever push operation	Weak				*			Strong
	5 06	ATT2PULL	START	Play at the beginning of the attachment (2) lever pull operation	Wide				*			Narrow
	5 07		INCH	Inching speed during the attachment (2) lever pull operation	Slow				*			Fast
	5 08		MAX	Maximum speed during the attachment (2) lever pull operation	Slow				*			Fast
	5 09		ACC	Acceleration speed during the attachment (2) lever pull operation	Weak				*			Strong
	5 10		DEC	Deceleration speed during the attachment (2) lever pull operation	Weak				*			Strong

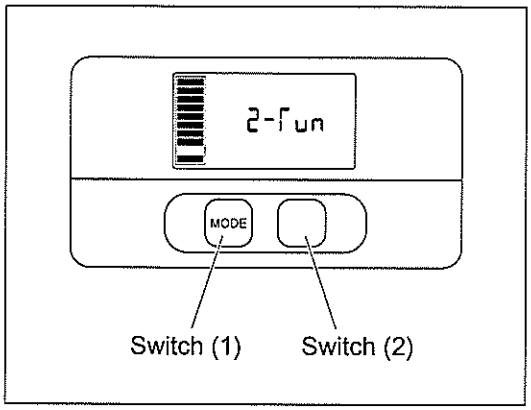
3.8.3 TUNING MENU screen



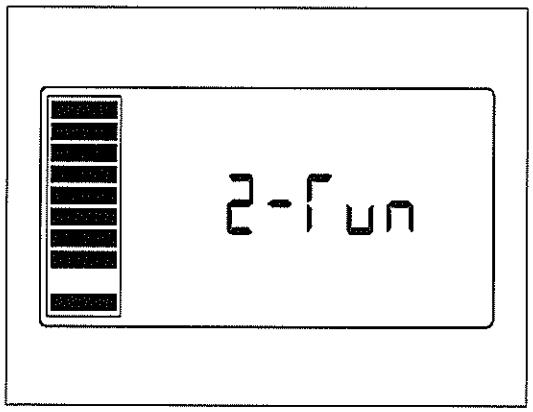
Operation Procedure

1. Enter the password on the status screen to display the service menu screen.

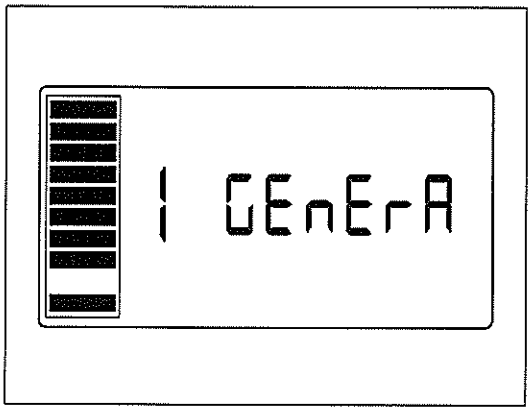
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2. "1-ANL" (ANALYZER MENU) is initially displayed on the SERVICE MENU screen. On this screen, press switch (1) once to move to the TUNING MENU screen where "2-TUN" is displayed.Press switch (1) to move to the OPTION MENU "3-OPT" screen, or switch (2) to move to the "1 GENERA" (GENERAL) screen.



NOTICE! The number of tuning menu items displayed varies according to the number of spools of the conventional handling lever.

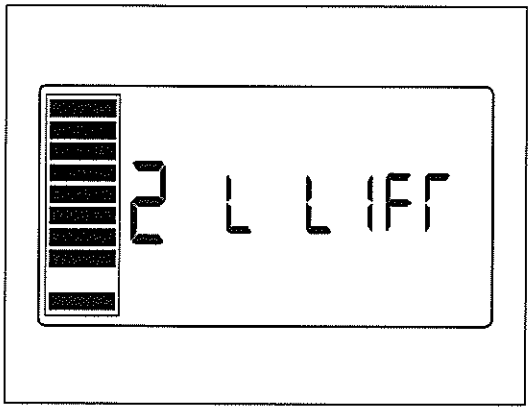


"1 GENERA" (GENERAL)

General Tuning

Switch (1): Next screen

Switch (2): To TUNING LEVEL setting screen

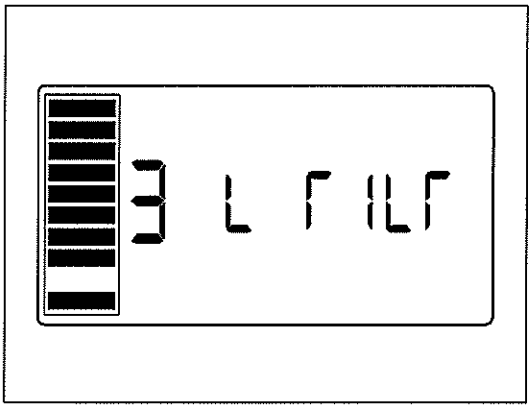


"2 L LIFT"

Lift Lever Tuning

Switch (1): Next screen

Switch (2): To TUNING LEVEL setting screen

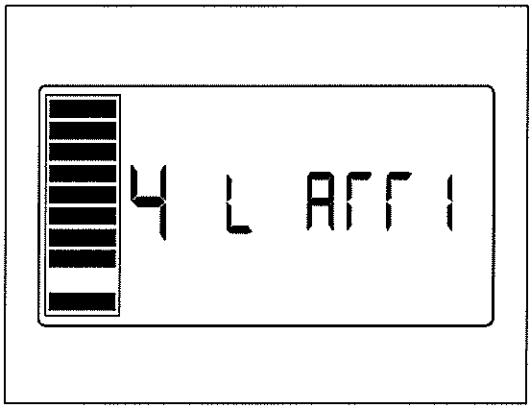


"3 L TILT"

Tilt Lever Tuning

Switch (1): Next screen

Switch (2): To TUNING LEVEL setting screen

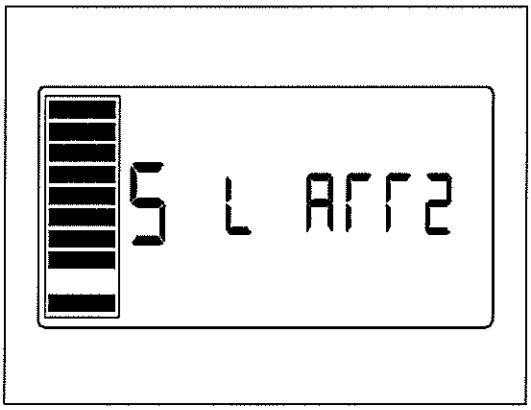


"4 L ATT1"

Attachment 1 Lever Tuning

Switch (1): Next screen

Switch (2): To TUNING LEVEL setting screen

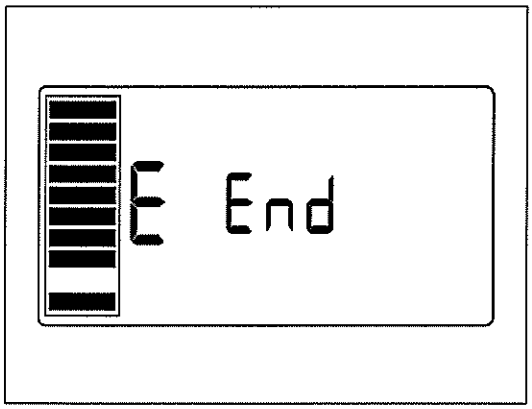


"5 L ATT2"

Attachment 2 Lever Tuning

Switch (1): Next screen

Switch (2): To TUNING LEVEL setting screen



"E END"

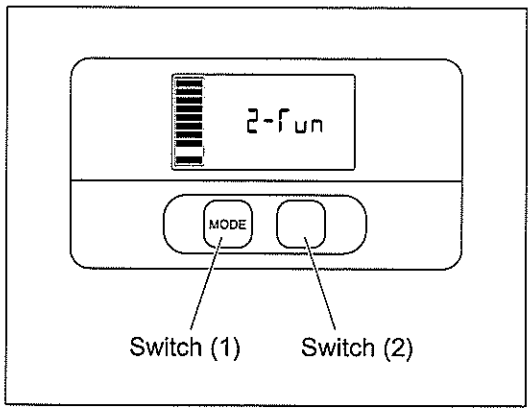
Switch (1): Switching selection to "1 GENERA" (GENERAL)

Switch (2): Returning to the "2 TUN" (TUNING MENU) screen

3.8.4 TUNING (GENERAL)

Used to fine adjust settings related to traveling, load handling, and so on (except for settings related to the load handling levers).

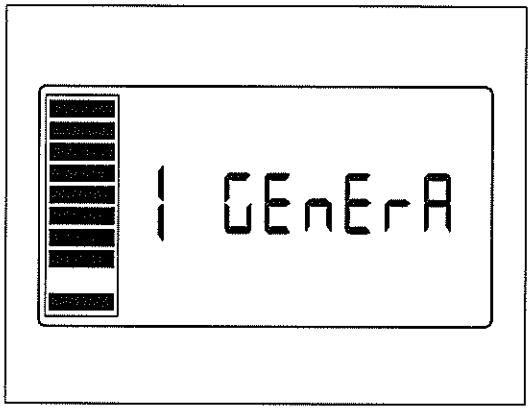
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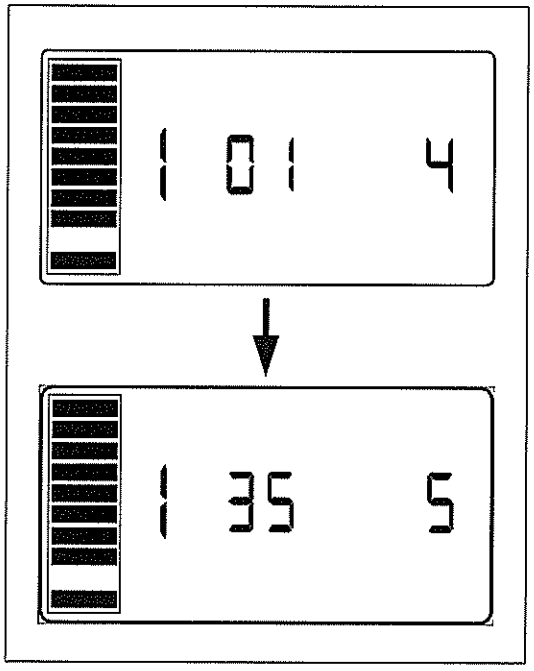


Operation Procedure

1. Display the TUNING MENU screen.
2. Check that "1. GENERA" (GENERAL) is selected, and press the switch (2) to display "1 01" setting screen.
3. From here on, the screen changes in sequence each time switch (1) is pressed. On the "1E" screen, press switch (2) to return to the GENERAL "1 GENERA" screen.

NOTICE! You cannot move directly from "1 GENERA" (GENERAL) screen to the screen of the other items. Return to TUNING MENU screen once, then move to screen of each time.





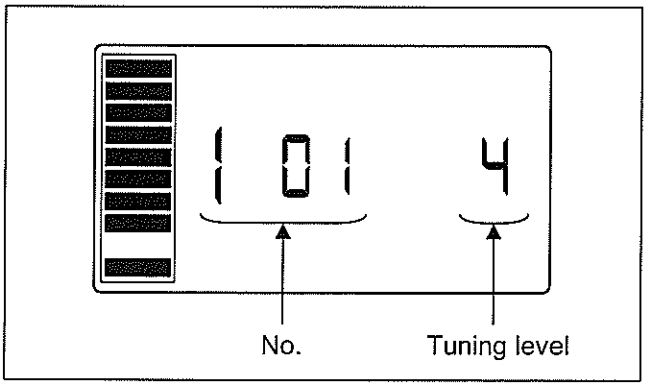
"1 01 to 1 35"

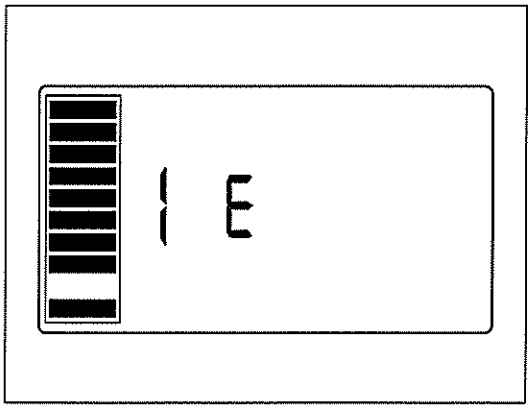
General Tuning

For correspondence between numbers and items, see the tuning item list.

Switch (1): Switching selection to next screen

Switch (2): Increasing the tuning level (After level 8, the tuning level returns to level 1.)





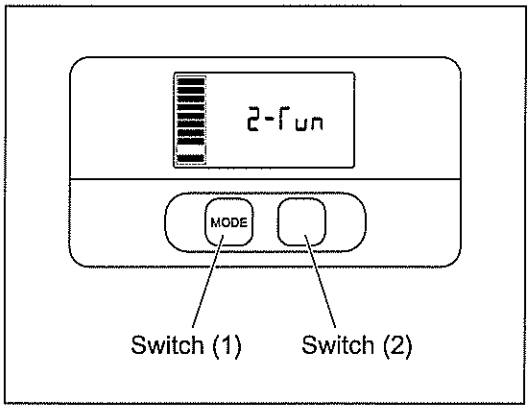
"1 E"

Switch (1): Switching selection to "1 01

Switch (2): Returning to the GENERAL "1 GENERA" screen

3.8.5 TUNING (2 L LIFT)

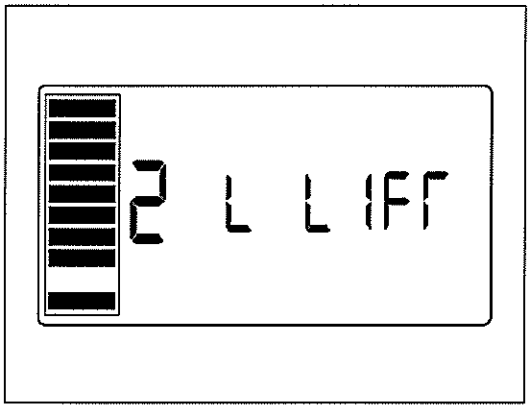
Sets tuning levels for the lift lever.



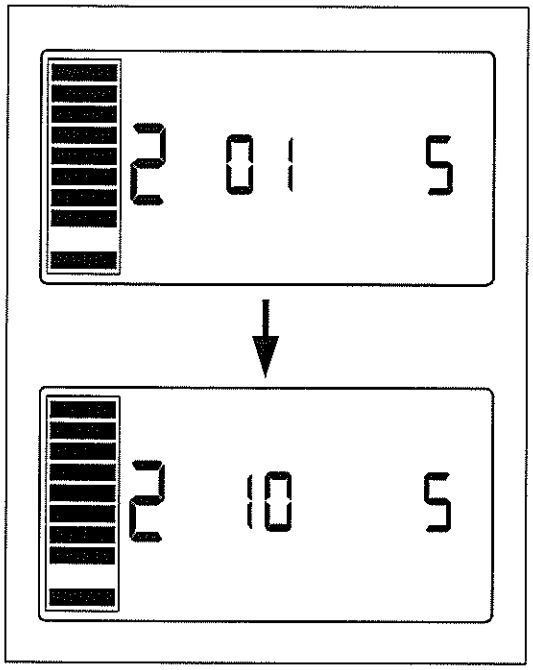
Operation Procedure

1. Display the TUNING MENU screen.
2. Press switch (2) once and switch (1) once, and make sure that "2 L LIFT" is displayed on the screen. Then, press switch (2) (to confirm) to display the "2 01" screen.
3. From here on, the screen changes in sequence each time switch (1) is pressed. On the "2 E" screen, press switch (2) to return to the LEVER LIFT "2 L LIFT" screen.

NOTICE! You cannot move directly from "2 L LIFT" screen to the screen of the other items. Return to TUNING MENU screen once, then move to screen of each time.



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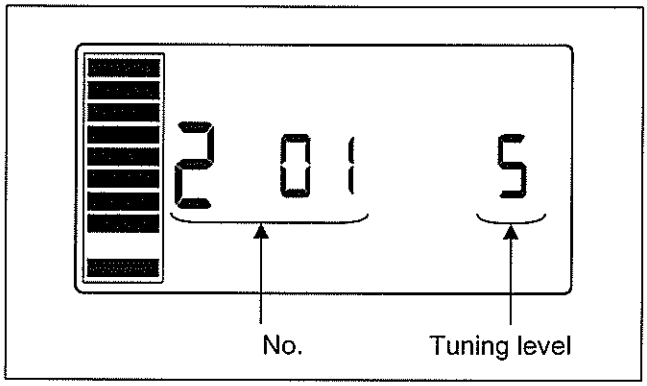
"2 01 to 2 10"

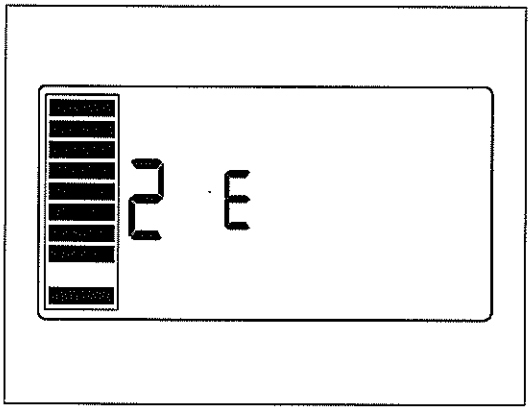
Lift Lever Tuning

For correspondence between numbers and items, see the tuning item list.

Switch (1): Switching selection to next screen

Switch (2): Increasing the tuning level (After level 8, the tuning level returns to level 1.)





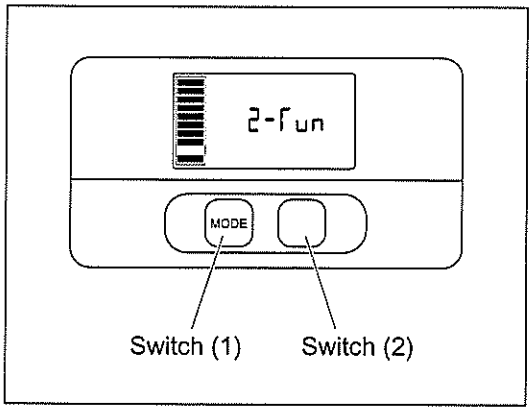
"2 E"

Switch (1): Switching selection to "2 01"

Switch (2): Returning to the LEVER LIFT "2 L LIFT" screen

3.8.6 TUNING (3 L TILT)

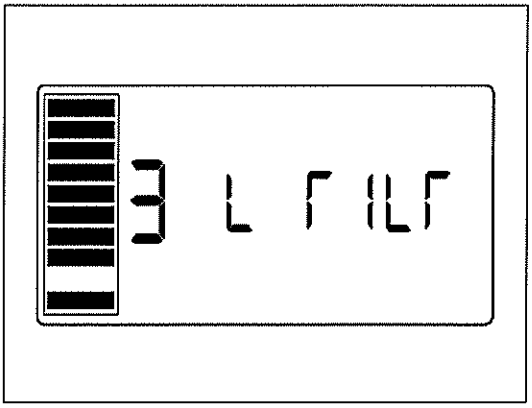
Sets tuning levels for the tilt lever.

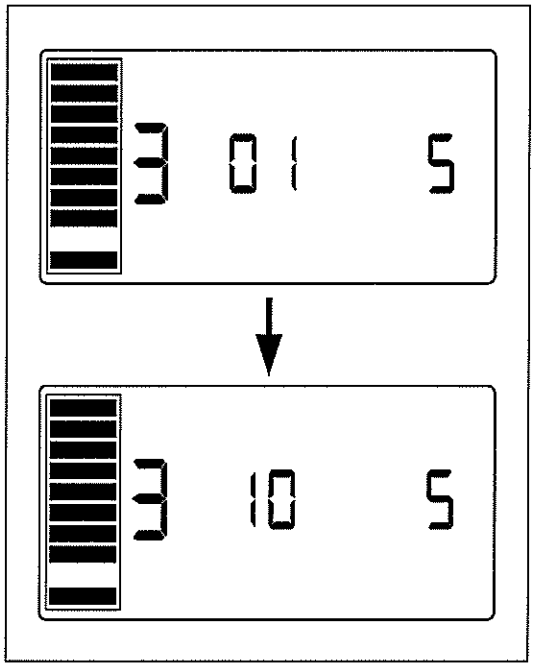


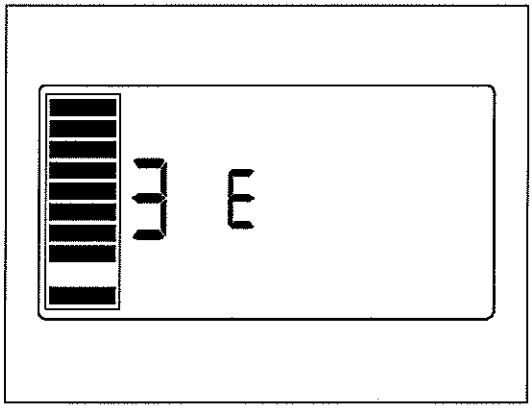
Operation Procedure

1. Display the tuning menu screen.
2. Press switch (2) once and switch (1) twice, and make sure that "3 L TILT" is displayed on the screen. Then, press switch (2) (to confirm) to display the "3 01" screen.
3. From here on, the screen changes in sequence each time switch (1) is pressed. On the "3 E" screen, press switch (2) to return to the "3 L TILT" screen.

NOTICE! You cannot move directly from "3 L TILT" screen to the screen of the other items. Return to TUNING MENU screen once, then move to screen of each time.







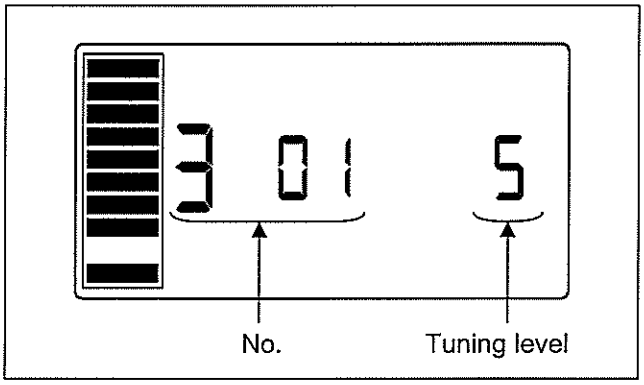
"3 01 to 3 10"

Tilt Lever Tuning

For correspondence between numbers and items, see the tuning item list.

Switch (1): Switching selection to next screen

Switch (2): Increasing the tuning level (After level 8, the tuning level returns to level 1.)



"3 E"

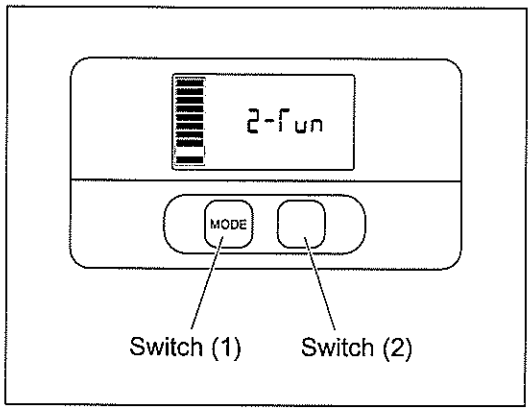
Switch (1): Switching selection to "3 01"

Switch (2): Returning to the LEVER TILT "3 L TILT" screen

3.8.7 TUNING (4 L ATT1)

Sets tuning levels for the attachment 1 lever.

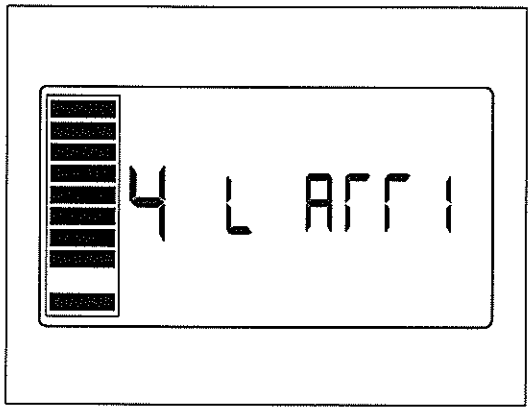
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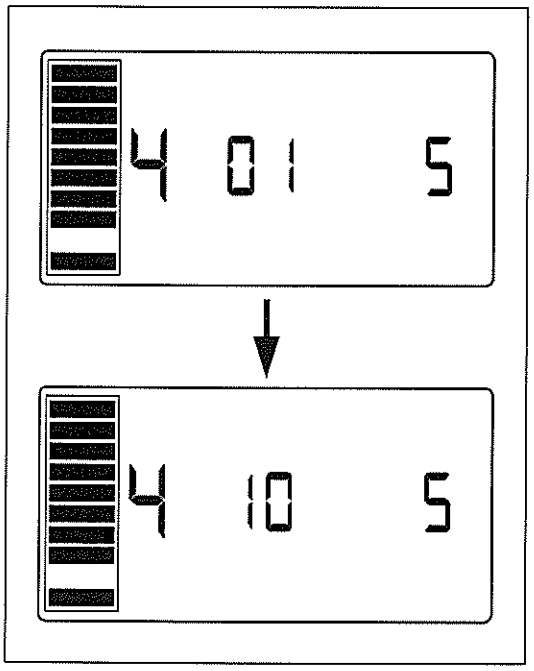


Operation Procedure

1. Display the tuning menu screen.
2. Press switch (2) once and switch (1) three times, and make sure that "4 L ATT1" is displayed on the screen. Then, press switch (2) (to confirm) to display the "4 01" screen.
3. From here on, the screen changes in sequence each time switch (1) is pressed. On the "4 E" screen, press switch (2) to return to the LEVER ATT1 "4 L ATT1" screen.

NOTICE! You cannot move directly from "4 L ATT1" screen to the screen of the other items. Return to TUNING MENU screen once, then move to screen of each time.





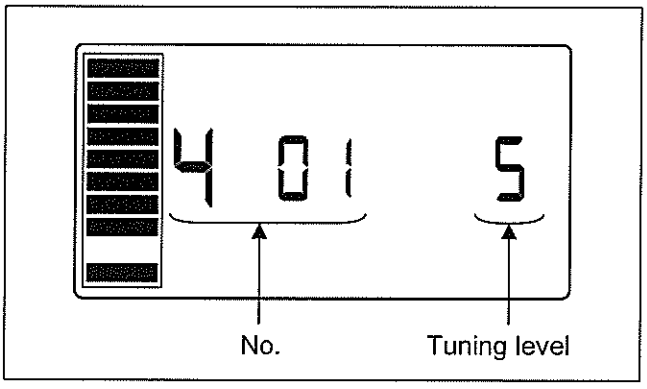
"4 01 to 4 10"

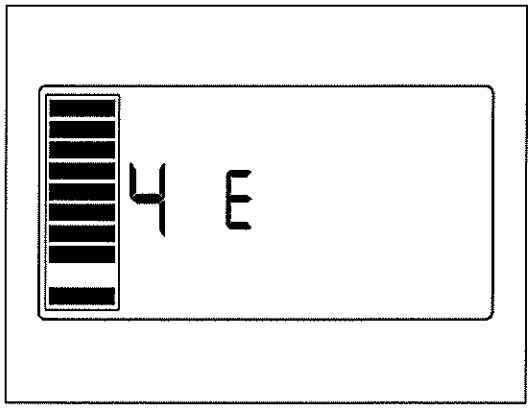
Attachment 1 Lever Tuning

For correspondence between numbers and items, see the tuning item list.

Switch (1): Switching selection to next screen

Switch (2): Increasing the tuning level (After level 8, the tuning level returns to level 1.)





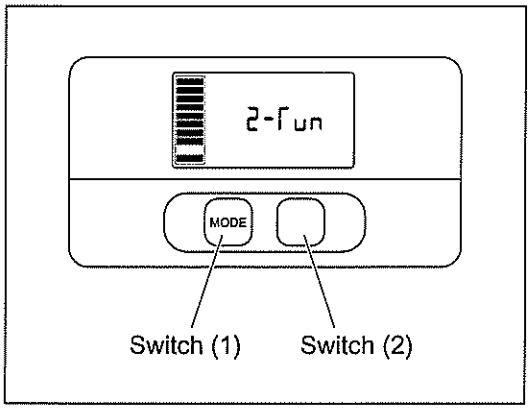
"4 E"

Switch (1): Switching selection to "4 01"

Switch (2): Returning to the LEVER ATT1 "4 L ATT1" screen

3.8.8 TUNING (5 L ATT2)

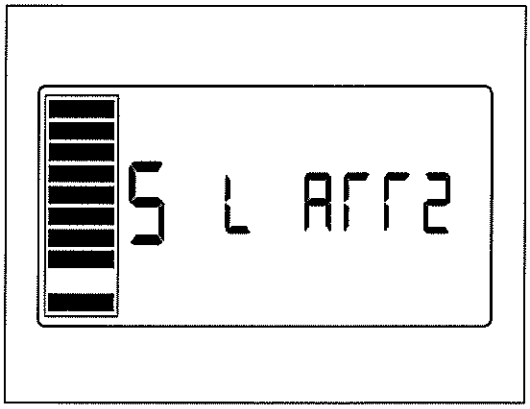
Sets tuning levels for the attachment 2.



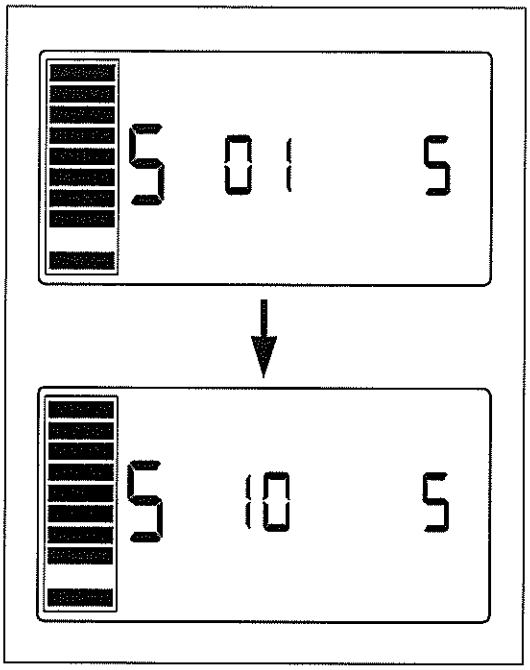
Operation Procedure

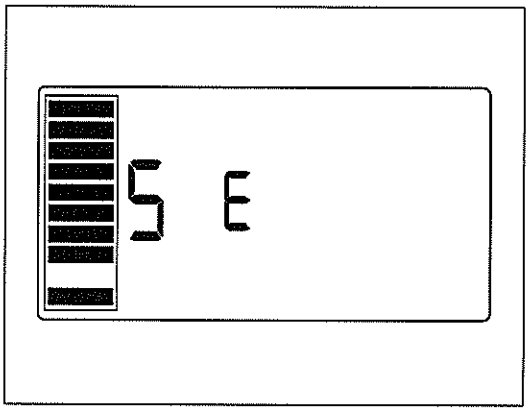
1. Display the tuning menu screen.
2. Press switch (2) once and switch (1) four times, and make sure that "5 L ATT2" is displayed on the screen. Then, press switch (2) (to confirm) to display the "5 01" screen.
3. From here on, the screen changes in sequence each time switch (1) is pressed. On the "5 E" screen, press switch (2) to return to the LEVER ATT2 "5 L ATT2" screen.

NOTICE! You cannot move directly from "5 L ATT2" screen to the screen of the other items. Return to TUNING MENU screen once, then move to screen of each time.



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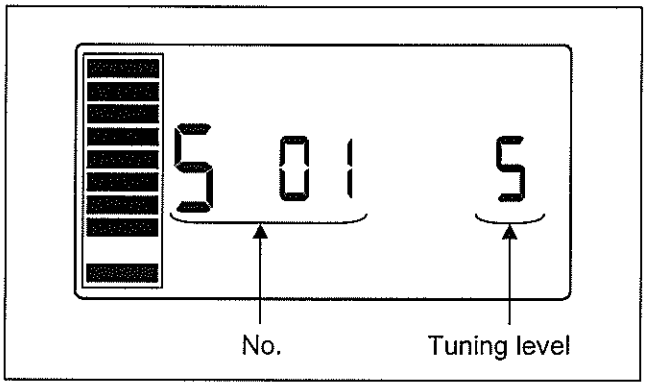
“5 01 to 5 10”

Attachment 2 Lever Tuning

For correspondence between numbers and items, see the tuning item list.

Switch (1): Switching selection to next screen

Switch (2): Increasing the tuning level (After level 8, the tuning level returns to level 1.)



“5 E”

Switch (1): Switching selection to “5 01”

Switch (2): Returning to the LEVER ATT2 “5 L ATT2” screen

3.9 OPTION SET

3.9.1 General

1. The option set function is used to fit the specifications of the controller and the multi-function display to the options actually equipped on the vehicle. It does not enable or disable the itself.
2. When main controller or multi-function display is replaced, it is necessary to reset them according to the vehicle specifications.

3.9.2 Option Set Item List

Indication	Description	Switching settings			
		Indication	Setting content	Indication	Setting content
1 01 *1	Adjust the battery capacity indicator calculation	A1: Not used, A2: Locally on-board battery, B1: JIS battery, B2: Not used			
1 02 *1	Battery fluid level and temperature unit	A: Not provided, B: Previous type (fluid level unit), C: Fluid and temperature unit			
1 03 *1	Fluid level warning	YES	Enabled	NO	Disabled
1 04	Setting to enable/ disable H mode lock	YES	Enabled	NO	Disabled
1 05	Setting of priority between accelerator and brake	A	Accelerator priority	B	Brake priority
1 06 *2	Drive motor output setting after the pushing operation finished	A	The drive motor output gradually stops after the operation finished	B	The drive motor output stops just after the operation finished
1 07 *3	Setting of the regenerative braking with the accelerator pedal off	YES	Enabled	NO	Disabled
1 08 *1	Setting the number of ways for oil control valve	2/3/4/5 “5” is no used this model			
1 09 *1	Setting CLAMP RELEASE INTERLOCK 3rd VALVE	A: Disable, B: Enable PUSH, C: Enable PULL, D: Enable Both			
1 10 *1	Setting CLAMP RELEASE INTERLOCK 4th VALVE	A: Disable, B: Enable PUSH, C: Enable PULL, D: Enable Both			
1 11	Not used	A / B / C / D			
1 12	Setting the mode of buzzer sound when OPS and return-to-neutral operate	A / B / C			
1 13	Setting to enable/ disable buzzer sound when OPS operate	YES	Enabled	NO	Disabled
1 14	Setting to enable/disable parking brake off warning	YES	Enabled	NO	Disabled
1 15	Not used	YES	Not used	NO	Not used
1 16	Setting the traction limitation mode at over-discharge warning	A	Traction restrictions regardless of discharge level	B	Traction restrictions according to discharge level
1 17	Setting the load handling limitation mode at over-discharge warning	A	Lift interrupt	B	Lift interrupt while traveling
1 18 *1	Setting to enable/disable the steering knob synchronizer	YES	Enabled	NO	Disabled
1 19	Power keep	YES	Enabled	NO	Disabled

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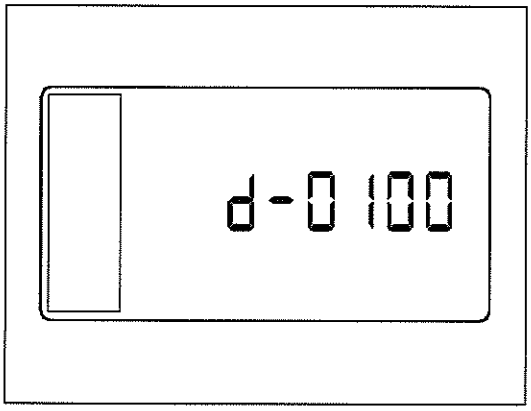
Indication	Description	Switching settings			
		Indication	Setting content	Indication	Setting content
1 20 *1	Model with on-vehicle charger	YES	Enabled	NO	Disabled
1 21	Not used	A/B/C/D			
1 22	Not used	A/B/C/D			
1 23	Not used	A	Not used	B	Not used

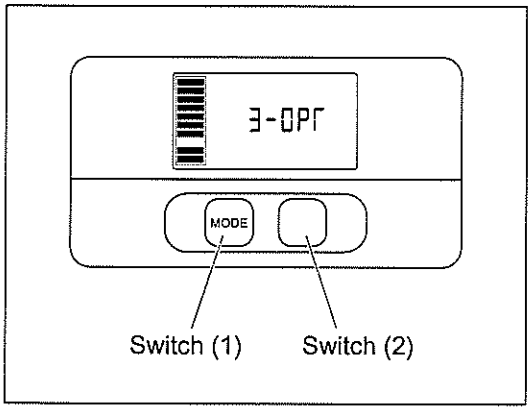
*1: These items are set according to the type of each vehicle before shipment from the factory.

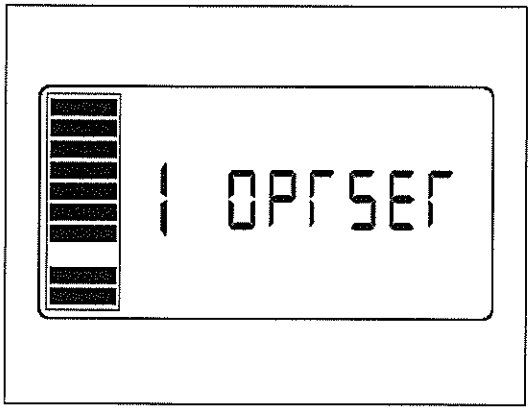
*2: In case of setting "B", when turn the accelerator pedal off at a steep slope, the truck may move back for only a moment.

*3: In case of setting "YES", if turn the accelerator pedal off at going down a slope, anti-roll back function becomes invalid.

3.9.3 OPTION SET MENU screen







Operation Procedure

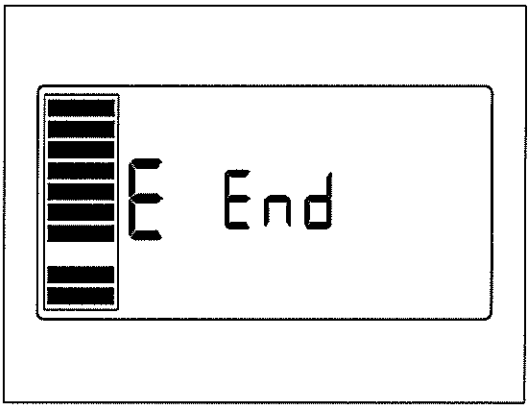
1. Enter the password on the status screen to display the service menu screen.
2. "1-ANL" (ANALYZER MENU) is initially displayed on the SERVICE MENU screen. On this screen, press switch (1) twice to move to the OPTION SET MENU screen where the "3-OPT" is displayed. Press switch (2) once and make sure that "1 OPTSET" is displayed. Then, press switch (2) again (to confirm) to display the OPTION SET MENU screen.
3. From here on, the screen changes in sequence each time switch (1) is pressed, and it returns to the OPTION SET MENU screen.

NOTICE! You cannot move directly from "1 OPTSET" screen to the screen of the other items. Return to OPTION SET MENU screen once, then move to screen of each time.

"1 OPTSET"

Switch (1): Switching selection to "E" END

Switch (2): Switching the selected option set items



"E END"

Switch (2): Returning to the "1 OPTSET" (option set menu) screen

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3.10 MATCHING

3.10.1 General

- Each function is controlled by using the sensors and each signal voltage at standard vehicle condition stored in the controller at the time of shipment. Therefore, a matching (updating of the signal voltage of a sensor at standard vehicle condition) is required when performing maintenance on a section or replacing parts related to the sensor.
- For the accelerator sensor used for drive functions, the signal voltage values at accelerator fully released and accelerator fully closed positions are stored, respectively, in the controller to control based on these values. When servicing these sensors or replacing related parts, MATCHING (updating the sensor signal voltage value in the standard vehicle condition) is necessary.
- For tire angle sensor used for synchronized steering, the signal voltage value at tire straight is stored respectigely, in the controller to control based on this value. When servicing or replacing tire angle sensor, matching (updating the sensor signal voltage value in the standard vehicle condition) is necessary.
- Each lever angle sensor for load-handling lever function is controlled based on the memory of signal voltage values in the neutral position stored in the controller at the time of shipment. When servicing these sensors or replacing related parts, MATCHING (updating the sensor signal voltage value in the standard vehicle condition) is necessary.
- The oil control valve (OCV) for mini lever / joystick models starting current level is set at the factory for all the control valves together, and the settings are stored in the main controller memory. Therefore, the settings must be matched following maintenance or replacement of related parts.
- It is necessary to input the tire data to the controller according to the tire size, for optimizing the spped-meter reading. Although the tire data is set to the value of new tires at the time of shipment, adjust it whenever the tire size or type is changed according to “TIRE DATA List”.
- If leaving the vehicle, Auto power-off function turn off the key switch automatically in given time. So it can prevent the wrong operation and save the energy.
- Maximum speed limiter function can limit the speed if setting the maximum speed in advance. The operator doesn't need to operate the accelerator delicately to keep the speed limit.

3.10.2 Matching Items and Prerequisite for Implementation

1. DRIVE

No.	Indication	Description	Prerequisite for implementation
1	1 01	Accelerator sensor output value with fully opened accelerator position to the controller.	*1,*2
2	1 02	Accelerator sensor output value with fully stepped accelerator position to the controller.	*1,*2

2. SAS

No.	Indication	Description	Prerequisite for implementation
1	2 01	Tire angle sensor output value while the vehicle is traveling straight to the controller.	*1, *3

3. LEVER

No.	Indication	Description	Prerequisite for implementation
1	3 01	Lift lever angle sensor output value in the lift lever neutral position is stored in the controller.	*1, *4, *8
2	3 02	Tilt lever angle sensor output value in the tilt lever neutral condition is stored in the controller.	*1, *5
3	3 03	Attachment (1) lever angle sensor output value in the attachment (1) lever neutral position is stored in the controller.	*1, *6 *8

4	3 04	Attachment (2) lever angle sensor output value in the attachment (2) lever neutral position is stored in the controller.	*1, *7 *8

4. OCV *11

No.	Indication	Description	Prerequisite for implementation
1	4 A1	Control valve A01 starting current level	*1, *9
	4 A2	Control valve A02 starting current level	*1, *9
	4 A3	Control valve A03 starting current level	*1, *9
	4 A4	Control valve A04 starting current level	*1, *9
2	4 B1	Control valve B01 starting current level	*1, *9
	4 B2	Control valve B02 starting current level	*1, *9
	4 B3	Control valve B03 starting current level	*1, *9
	4 B4	Control valve B04 starting current level	*1, *9

5. TIRE DATA

No.	Indication	Description	Prerequisite for implementation
1	5 01	The tire data according to the tire size is stored.	*1, *10

6. AUTO POWER-OFF SETTING

No.	Indication	Description	Prerequisite for implementation
1	6 01	Auto power-off time	When it is necessary

7. MAXIMUM SPEED LIMIT SETTING

No.	Indication	Description	Prerequisite for implementation
1	7 01	Maximum speed limit setting	When it is necessary

Prerequisite content for implementation

*1: When main controller replacement

*2: When removing/installing or replacing accelerator sensor

*3: When removing/installing or replacing tire angle sensor or sensor cover

*4: When replacing lift lever angle sensor

*5: When replacing tilt lever angle sensor

*6: When replacing attachment (1) lever angle sensor

*7: When replacing attachment (2) lever angle sensor

*8: When replacing oil control valve. (if conventional lever models)

*9: When replacing oil control valve (if minilever/joystick models).

*10: When the tire size or type is changed.

*11: Mini lever/Joystick models only

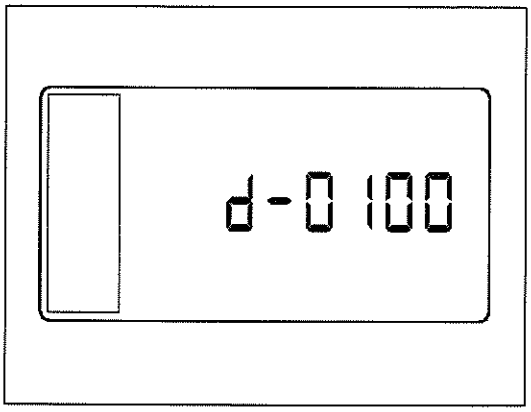
3.10.3 Before Starting Matching

Before performing matching, you must set the vehicle to “standard vehicle condition”.

For “standard vehicle condition”, refer to page "MATCHING" of SAS functions section.

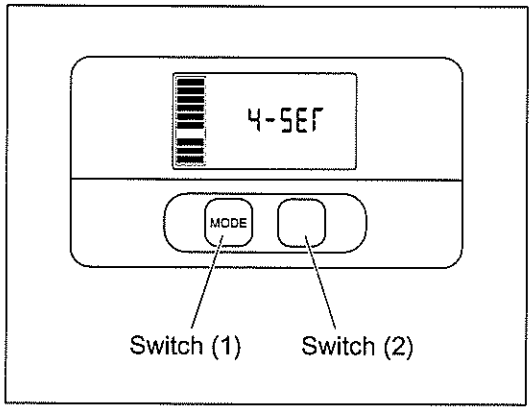
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3.10.4 MATCHING MENU screen

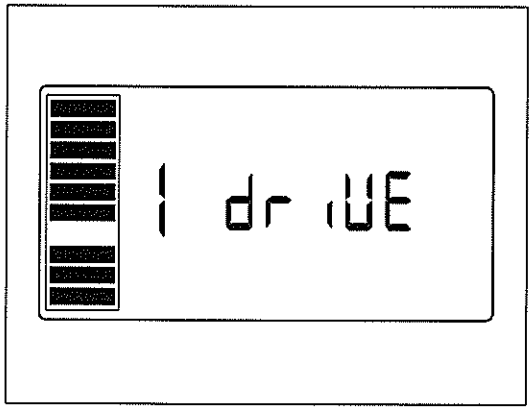


Operation Procedure

1. Enter the password on the status screen to display the service menu screen.



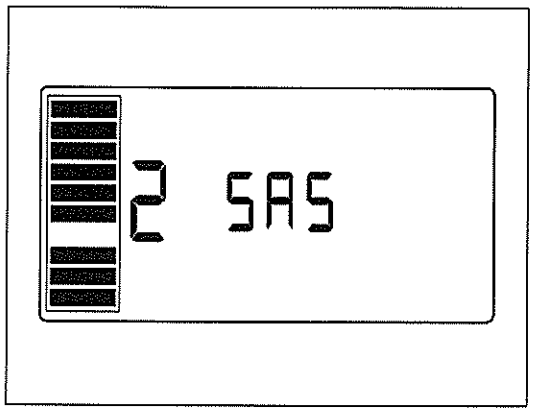
2. "1-ANL" (ANALYZER MENU) is initially displayed on the SERVICE MENU screen. On this screen, press switch (1) three times to move to the MATCHING MENU screen where "4-SET" is displayed. Press switch (1) once to move to the OTHER SERVICE FUNCTION MENU screen where "5-ETC" is displayed. Then, press switch (2) to move to the MATCHING MENU screen where "1 DRIVE" is displayed.



"1 DRIVE"

Switch (1): Switching selection to next item

Switch (2): Switching to "1 DRIVE" detail setting menu

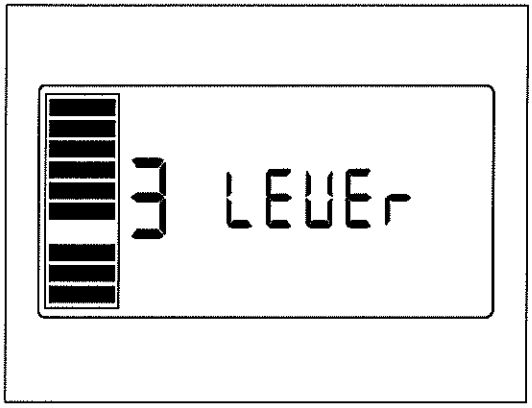


"2 SAS"

Switch (1): Switching selection to next item

Switch (2): Switching to "2 SAS" detail setting menu

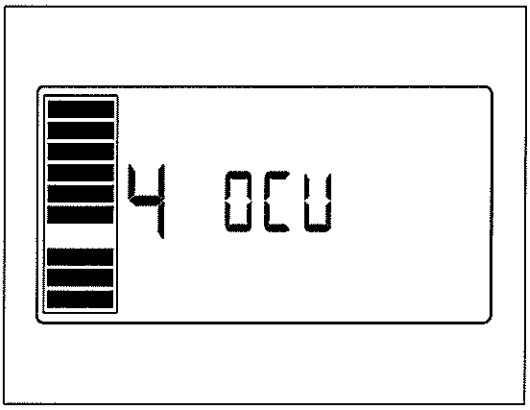
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“3 LEVER”

Switch (1): Switching selection to next item

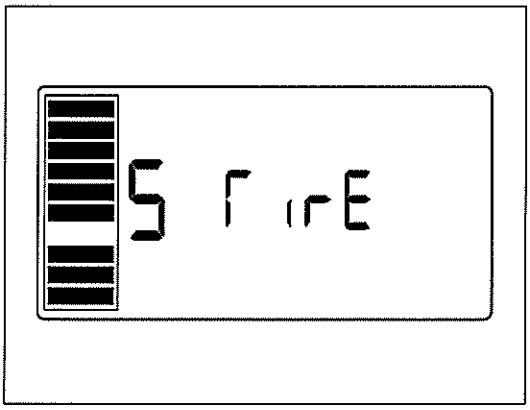
Switch (2): Switching to “3 LEVER” detail setting menu



“4 OCV”

Switch (1): Switching selection to next item

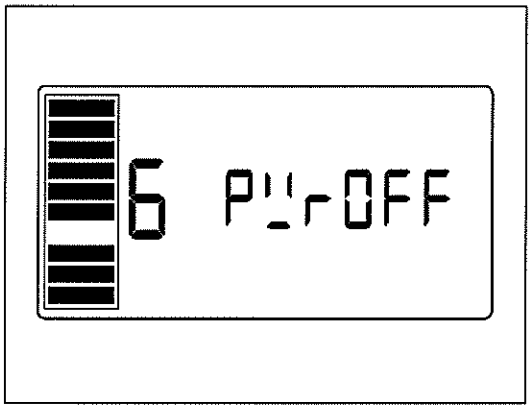
Switch (2): Switching to “4 OCV” detail setting menu



“5 TIRE”

Switch (1): Switching selection to next item

Switch (2): Switching to “5 TIRE” detail setting menu

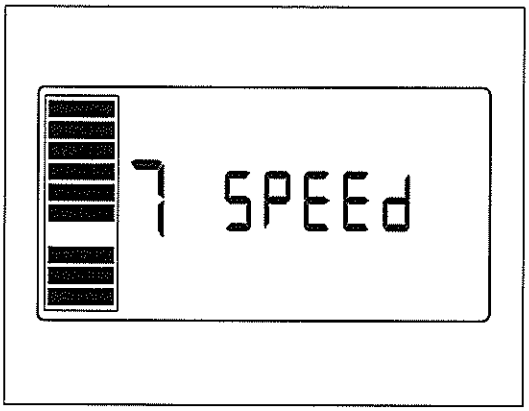


“6 PWR OFF”

Switch (1): Switching selection to next item

Switch (2): Switching to “6 PWR OFF” detail setting menu

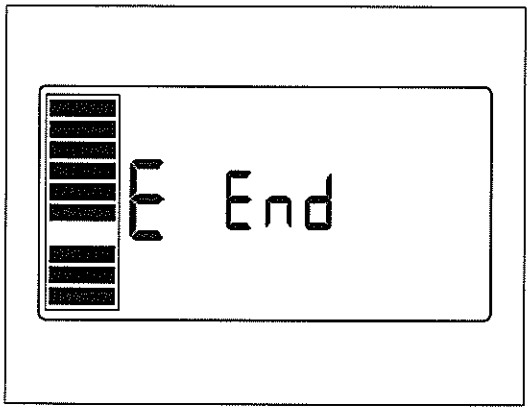
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"7 SPEED"

Switch (1): Switching selection to next item

Switch (2): Switching to "7 SPEED" detail setting menu



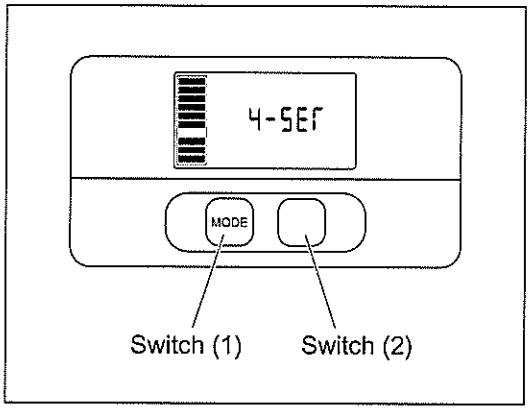
"E End"

Switch (1): Switching selection to "1 DRIVE"

Switch (2): Returning to the "4-SET" screen

3.10.5 MATCHING (1 DRIVE)

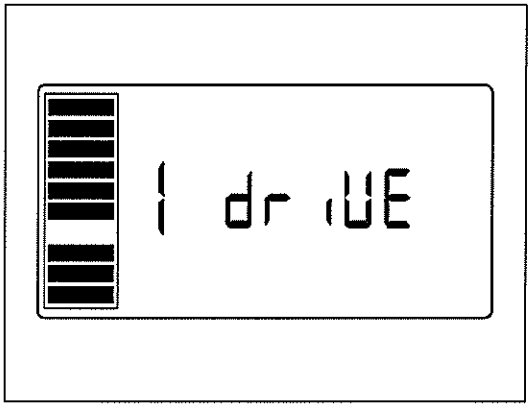
Matching is performed for drive function.

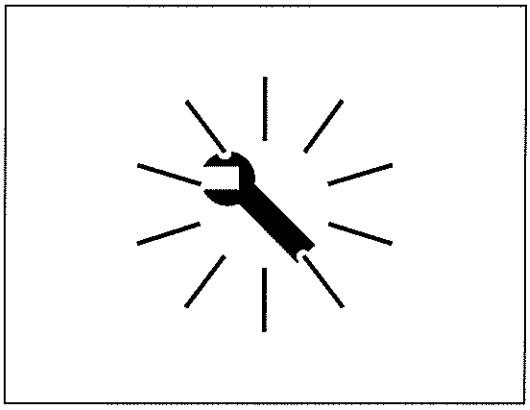


1. Display the MATCHING MENU screen.
2. Press switch (2) once and make sure that "1 DRIVE" is displayed on the screen. Then, press switch (2) (to confirm) to display the "1 01" screen.
3. From here on, the screen changes in sequence each time switch (1) is pressed. On the "1 E" screen, press switch (2) to return to the "1 DRIVE" screen.

NOTICE!

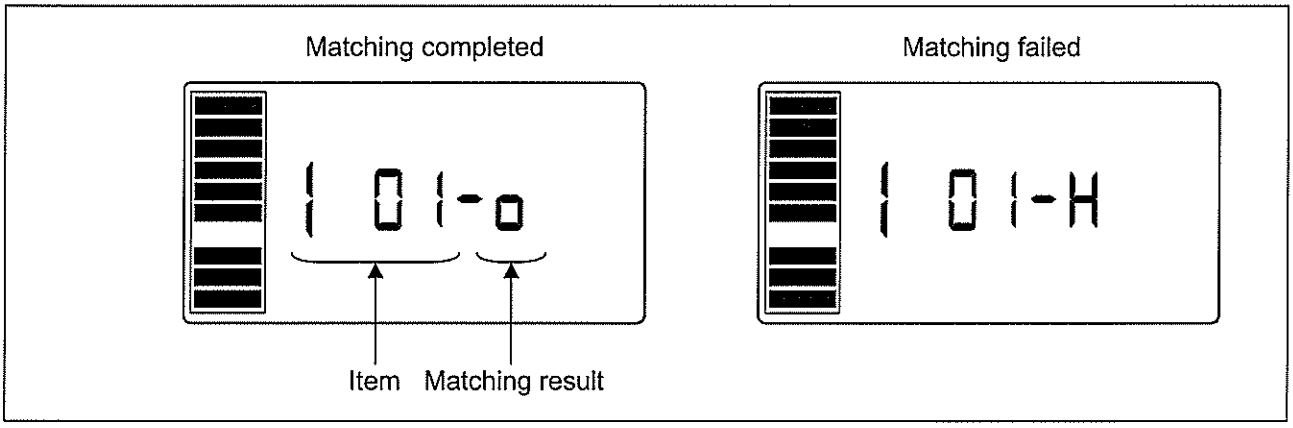
- **The MATCHING SET screen displays a numeric value that represents the current state of the vehicle.**
- **During traveling matching operation, the spanner indicator blinks to indicate that the vehicle is in a state where it does not move even if the accelerator pedal is depressed.**
- **On completion of the matching operation, an "O" is displayed on the display.**
- **You cannot move directly from "MATCHING" screen to the screen of the other items. Return to MATCHING MENU screen once, then move to screen of each time.**

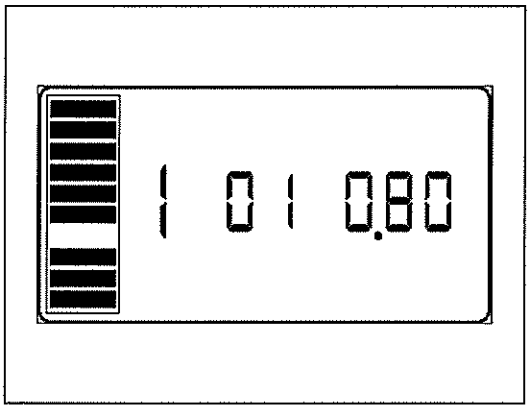




4. Make sure that the Spanner indicator on the display is blinking.

   CAUTION! During drive matching, the Spanner indicator blinks, informing that the vehicle does not run even if the accelerator pedal depressed.





"1 01"

Acceleration Sensor OFF Matching

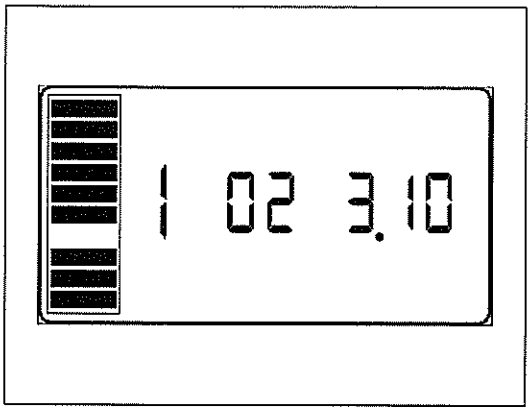
Switch (1): Switching selection to next screen

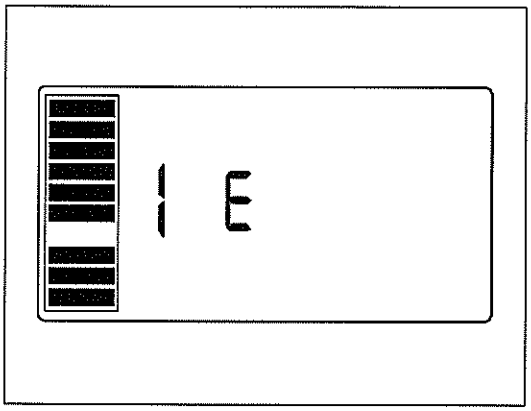
Switch (2): Pressing this for more than 2 seconds will perform matching

Vehicle condition

- All parts related to the accelerator pedal should be formally mounted.
- The accelerator pedal should be fully released.

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"1 02"

Acceleration Sensor ON Matching

Switch (1): Switching selection to next screen

Switch (2): Pressing this for more than 2 seconds will perform matching

Vehicle condition

- All parts related to the accelerator pedal should be formally mounted.
- The accelerator pedal should be fully stepped on.
- In case of models with EZ pedal option, The accelerator pedal should be stepped on to forward direction side.

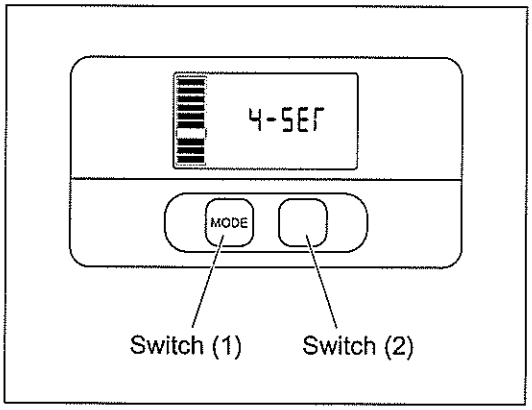
"1 E"

Switch (1): Switching selection to "1 01" screen

Switch (2): Returning to the "1 DRIVE" screen

3.10.6 MATCHING (2 SAS)

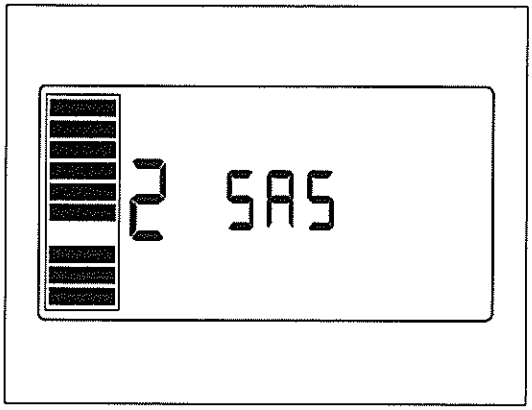
Matching is performed for synchronized steering.

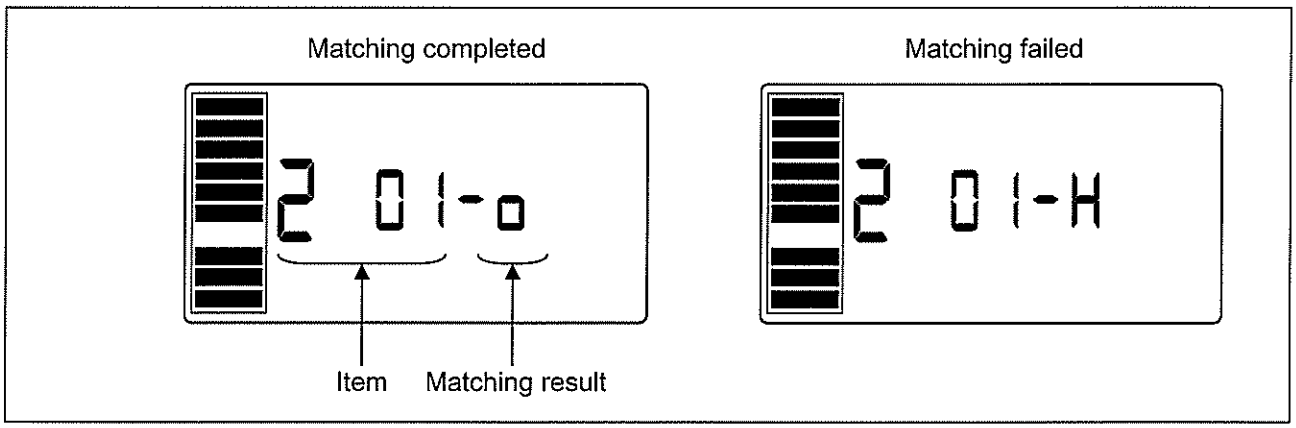


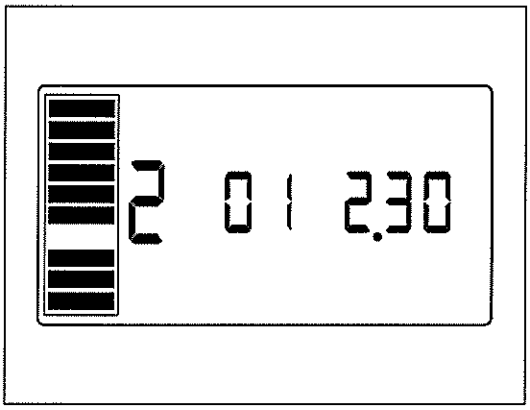
1. Display the MATCHING MENU screen.
2. Press switch (2) once and switch (1) once, and make sure that "2 SAS" is displayed on the screen. Then, press switch (2) (to confirm) to display the "2 01" screen.
3. From here on, the screen changes in sequence each time switch (1) is pressed. On the "2 E" screen, press switch (2) to return to the "2 SAS" screen.

NOTICE!

- **The MATCHING MENU screen displays a numeric value that represents the current state of the vehicle.**
- **On completion of the matching operation, an "O" is displayed on the display.**
- **You cannot move directly from "MATCHING" screen to the screen of the other items. Return to MATCHING MENU screen once, then move to screen of each time.**







“2 01”

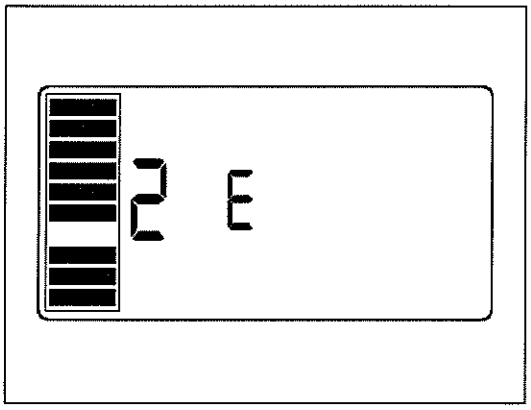
Tire Angle Sensor Matching

Switch (1): Switching selection to next screen

Switch (2): Pressing this for more than 2 seconds will perform matching

Vehicle condition

- This procedure should be done in condition that all equipments including forks or attachment are mounted as specified. However, it is acceptable to do this proccdure in condition of no forks only for the fork-less specification.
- Vehicle should be with no load on the level ground.
- Forks or attachments should be lowered as low as possible so that the vehicle direction can be checked easily.
- The mast should be approximately vertical to the ground. (The visual observation is acceptable.)
- The tire angpe should be adjusted to the straight position.



“2 E”

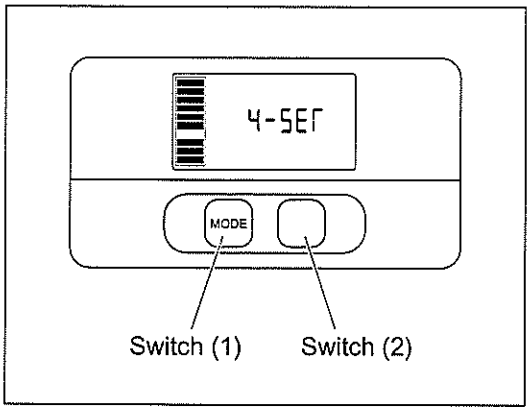
Switch (1): Switching selection to “2 01” screen

Switch (2): Returning to the “2 SAS” screen

3.10.7 MATCHING (3 LEVER)

Matching is performed for lever function.

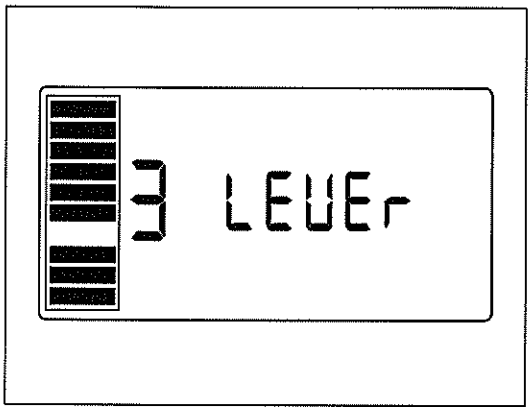
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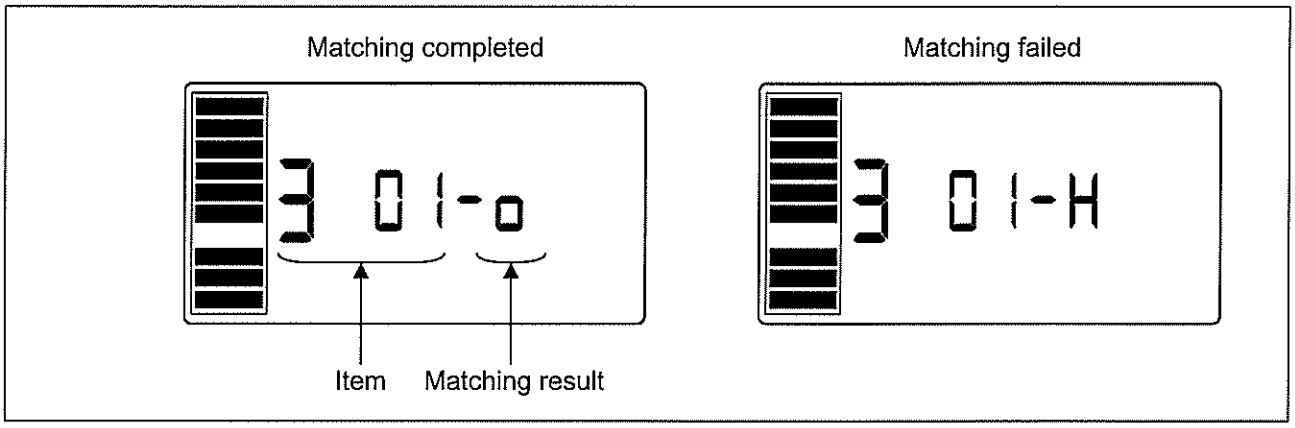


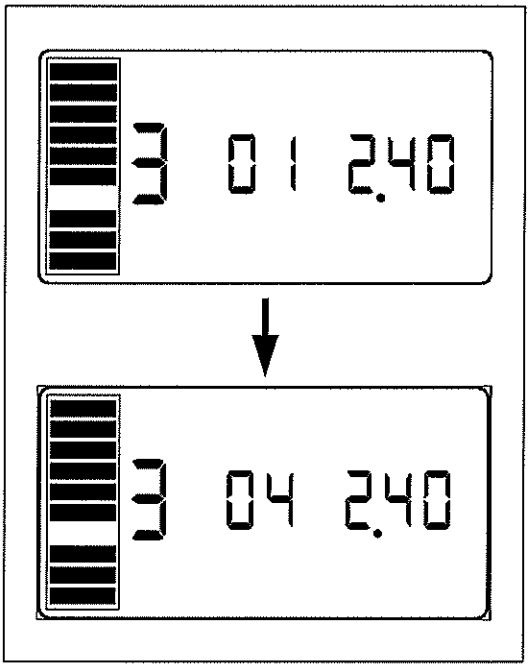
1. Display the MATCHING MENU screen.
2. Press switch (2) once and switch (1) twice, and make sure that "3 LEVER" is displayed on the screen. Then, press switch (2) (to confirm) to display the "3 01" screen.
3. From here on, the screen changes in sequence each time switch (1) is pressed. On the "3 E" screen, press switch (2) to return to the "3 LEVER" screen.

NOTICE!

- **The number of the displayed lever matching items varies according to the number of levers.**
- **After completion of the matching operation, fully tilt each lever to both the push and pull sides in order to learn the full-stroke voltage automatically.**
- **On completion of the matching operation, an "O" is displayed on the display.**







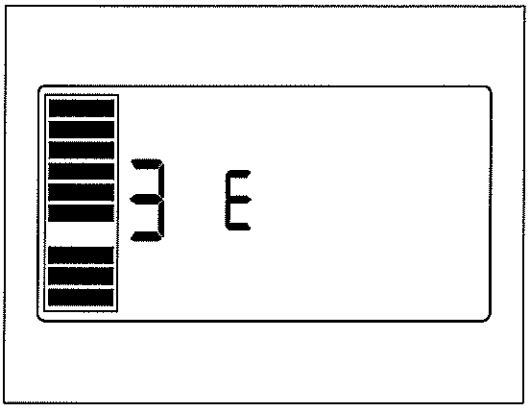
"3 01 to 3 04"

Switch (1): Switching selection to next screen

Switch (2): Pressing this for more than 2 seconds will perform matching

Vehicle condition

- Inputting data of the number of ways of the oil control valve into the main controller should be completed.
- All the material handling levers should be at the nuetral positions.
- In case of models with mini lever option, the battery hood should be closed, and the armrest should be horizontal. (The visual observation is acceptable.)



"3 E"

Switch (1): Switching selection to "3 01" screen

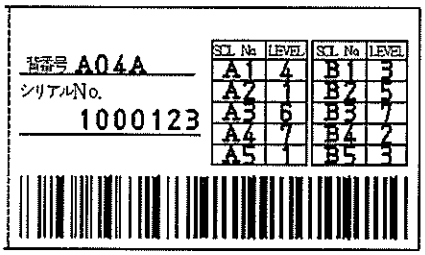
Switch (2): Returning to the "3 LEVER" screen

3.10.8 MATCHING (4 OCV)

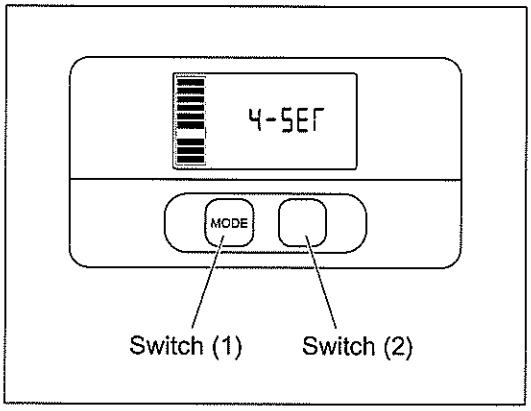
Used to set the control valve starting current level.

The starting current level is set according to the type of the mounted control valve before shipment from the factory. However, if the control valve or the main controller is changed, the starting current should be set again according to the value printed on or attached to the new control valve.

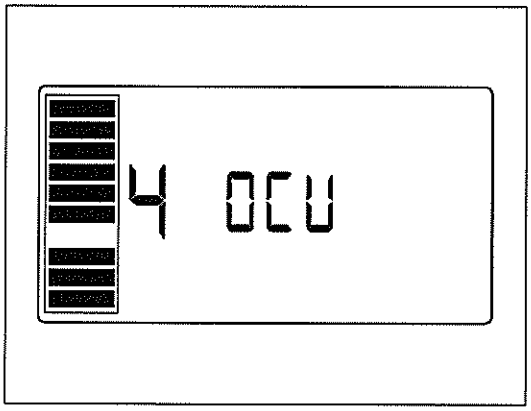
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Reference: name plate

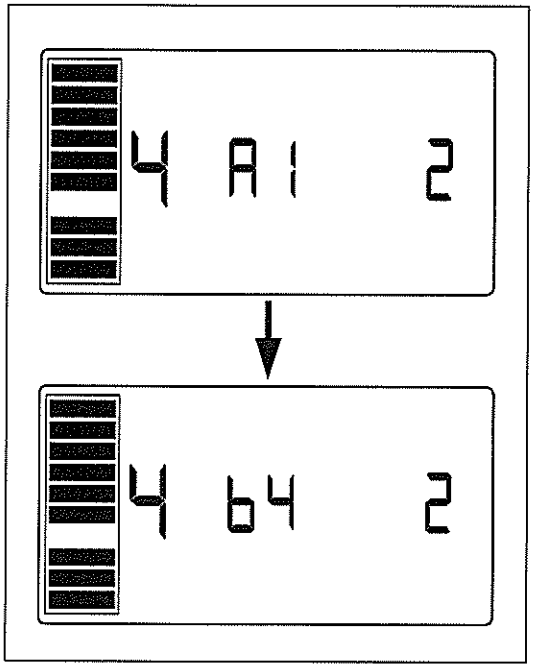


1. Display the MATCHING MENU screen.
2. Press switch (2) once and switch (1) three times, and make sure that “4 OCV” is displayed on the screen. Then, press switch (2) (to confirm) to display the “4 A1” screen.
3. From here on, the screen changes in sequence each time switch (1) is pressed. On the “4 E” screen, press switch (2) to return to the "4 OCV" screen.



NOTICE!

- **You cannot move directly from “MATCHING” screen to the screen of the other items. Return to MATCHING MENU screen once, then move to screen of each time.**



“4 A1 to 4 B4”

Control valve starting current level setting screen

4 A1: Control valve A01 starting current level

4 A2: Control valve A02 starting current level

4 A3: Control valve A03 starting current level

4 A4: Control valve A04 starting current level

4 B1: Control valve B01 starting current level

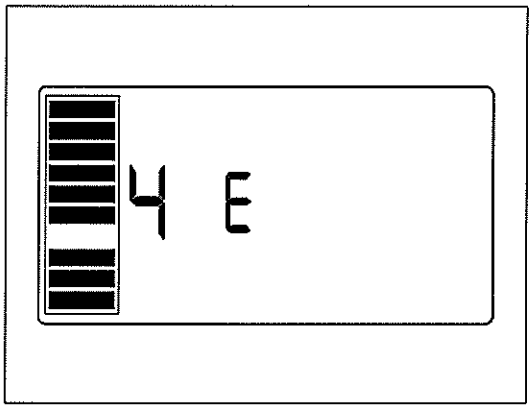
4 B2: Control valve B02 starting current level

4 B3: Control valve B03 starting current level

4 B4: Control valve B04 starting current level

Switch (1): Switching selection to next screen

Switch (2): Increasing the starting current level (After level 8, the return to level 1.) the current level



"4 E"

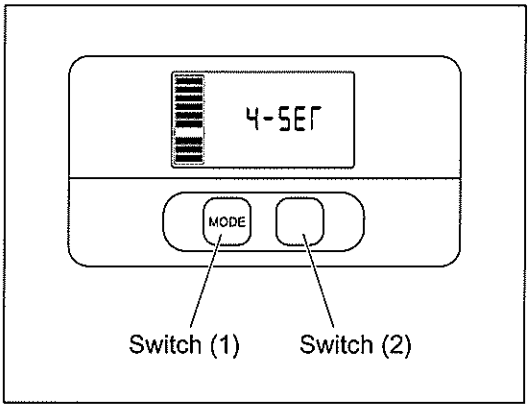
Switch (1): Switching selection to "4 A1"

Switch (2): Returning to the "4 OCV" screen

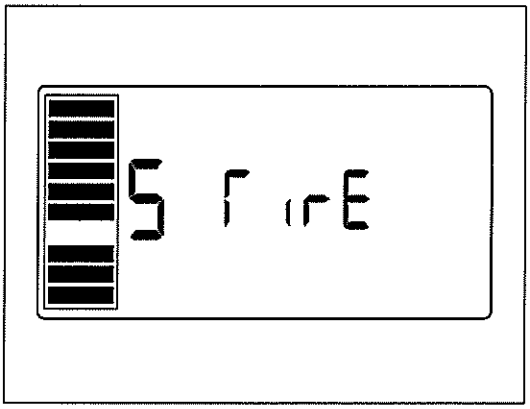
3.10.9 TIRE DATA (5 TIRE)

Used to set the tire data.

The tire data is set according to the type of the mounted tires before shipment from the factory. If the type or size of tire is changed, the tire data should be set again according to the "Tire Data List".

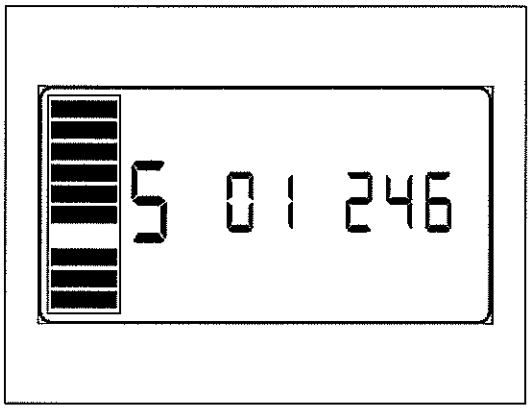


1. Display the MATCHING MENU screen.
2. Press switch (2) once and switch (1) four times, and make sure that "5 TIRE" is displayed on the screen. Then, press switch (2) (to confirm) to display the "5 01" screen.
3. From here on, the screen changes in sequence each time switch (1) is pressed. On the "5 E" screen, press switch (2) to return to the "5 TIRE" screen.



NOTICE!

- **You cannot move directly from "MATCHING" screen to the screen of the other items. Return to MATCHING MENU screen once, then move to screen of each time.**



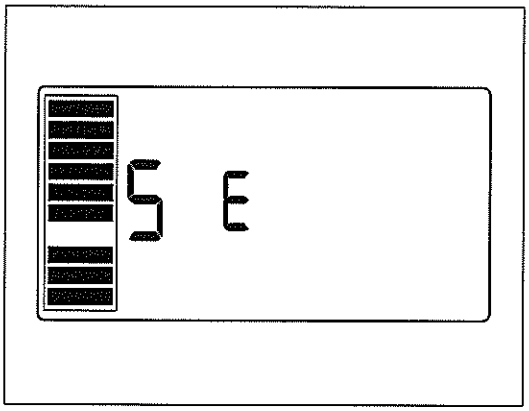
"5 01"

Tire Data Setting

Switch (1): Switching selection to next screen

Switch (2): Increasing the tire constant

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"5 E"

Switch (1): Switching selection to "5 01" screen

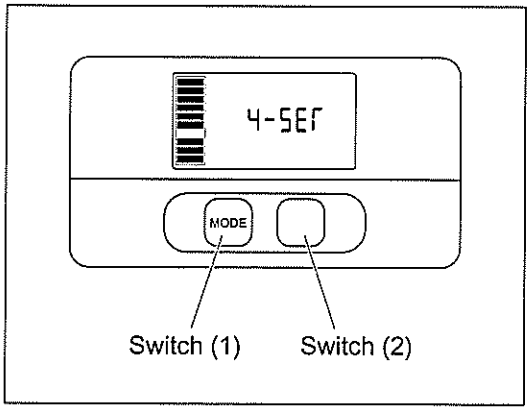
Switch (2): Returning to the "5 TIRE" screen

3.10.10 Tire Data List

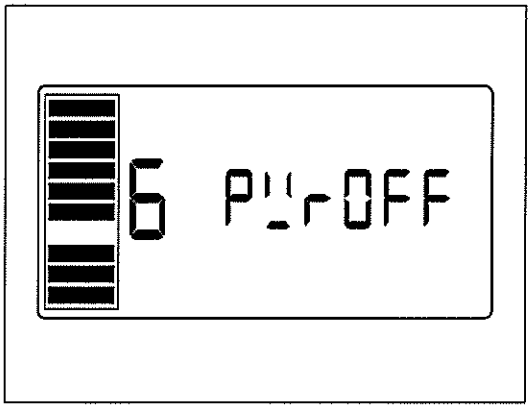
Spec. of front tire	Option name	Applied models				
		1.0t	1.3t	1.5t	1.8t	2.0t
18X7-8-10PR	RIB-LUG PNEU-MATIC	250	-	-	-	-
18X7-8-14PR		-	246		-	-
18X7-8-16PR		-	-	-	247	-
18X7-8	U-LUG NON PUNC	245				
18X7-8-10PR	J-LUG PNEU-MATIC	249	-	-	-	-
18X7-8-14PR		-	244		-	-
18X7-8-16PR		-	-	-	248	-
18X7-8	J-LUG NON PUNC	247				
	WHITE NON PUNC					
	GREEN NON PUNC					
18X7-8-10PR	SNOW TIRE	241	-	-	-	-
18X7-8-14PR		-	236		-	-
18X7-8-16PR		-	-	-	237	-

3.10.11 POWER OFF (6 PWR OFF)

Used to set the auto power off time.

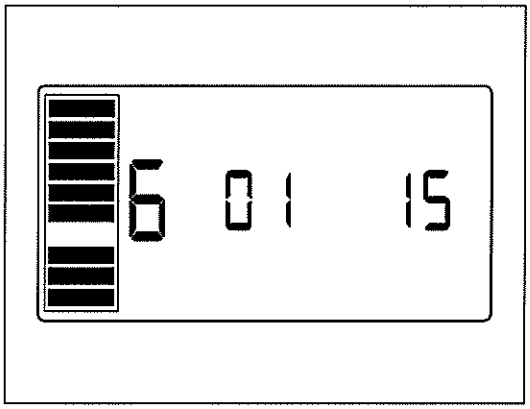


1. Display the MATCHING MENU screen.
2. Press switch (2) once and switch (1) five times, and make sure that "6 PWR OFF" is displayed on the screen. Then, press switch (2) (to confirm) to display the "6 01" screen.
3. From here on, the screen changes in sequence each time switch (1) is pressed. On the "6 E" screen, press switch (2) to return to the "6 PW OFF" screen.



NOTICE!

- **You cannot move directly from "MATCHING" screen to the screen of the other items. Return to MATCHING MENU screen once, then move to screen of each time.**



"6 01"

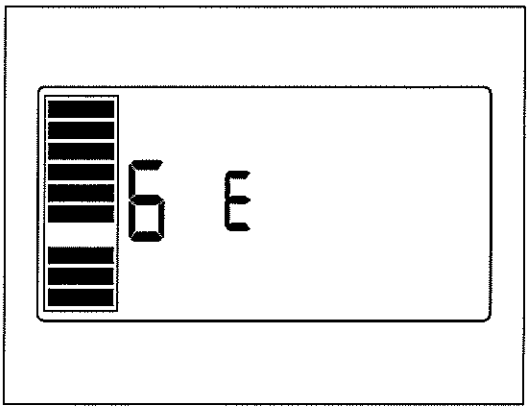
Auto power off time setting

The auto power off time can be set in a range of 2 to 60 minutes in steps of 1 minute.

It is displayed in the following sequence: 2 → 3 → 4 · · · 60 → OFF → 2.

Switch (1): Switching selection to next screen

Switch (2): Changing the auto power off time



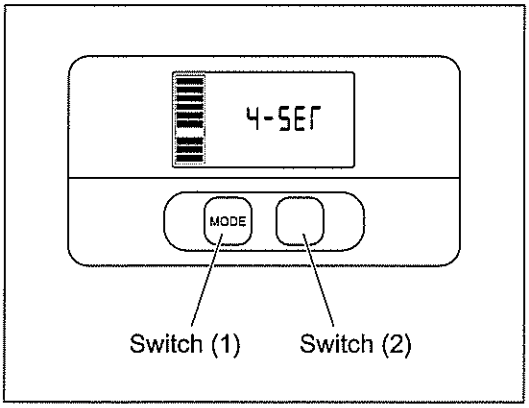
"6 E"

Switch (1): Switching selection to "6 01" screen

Switch (2): Returning to the "6 PWR OFF" screen

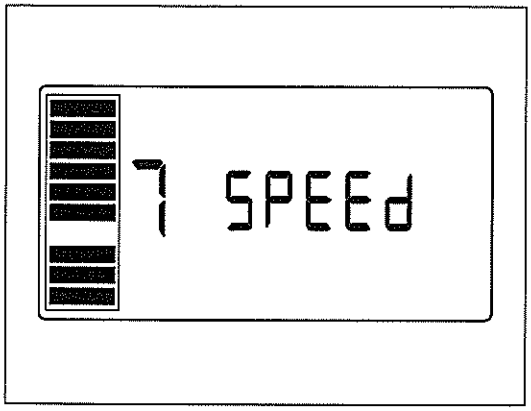
3.10.12 SPEED (7 SPEED)

Used to set the maximum speed limit.



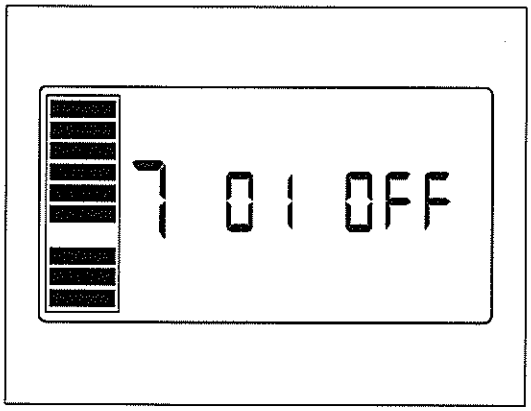
1. Display the MATCHING MENU screen.
2. Press switch (2) once and switch (1) six times, and make sure that "7 SPEED" is displayed on the screen. Then, press switch (2) (to confirm) to display the "7 01" screen.
3. From here on, the screen changes in sequence each time switch (1) is pressed. On the "7 E" screen, press switch (2) to return to the "7 SPEED" screen.

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NOTICE!

- **You cannot move directly from "MATCHING" screen to the screen of the other items. Return to MATCHING MENU screen once, then move to screen of each time.**



"7 01"

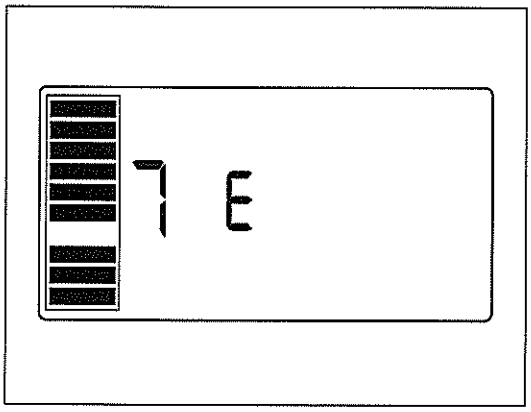
Maximum speed limit setting screen

The maximum speed limit can be set in a range of 2 to 20 km/h in steps of 1 km/h.

It is displayed in the following sequence: 2 → 3 → 4 · · · 20 → OFF → 2.

Switch (1): Switching selection to next screen

Switch (2): Changing the maximum speed limit



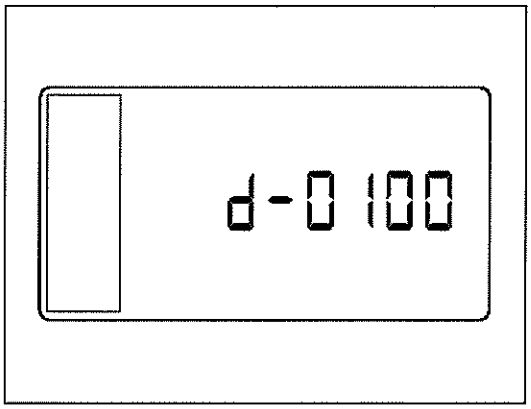
"7 E"

Switch (1): Switching selection to "7 01" screen

Switch (2): Returning to the "7 SPEED" screen
MODE Switch (1) Switch (2)

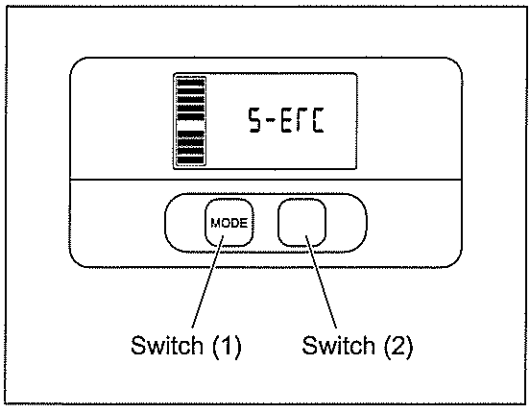
3.11 OTHERS MENU

3.11.1 OTHERS MENU screen



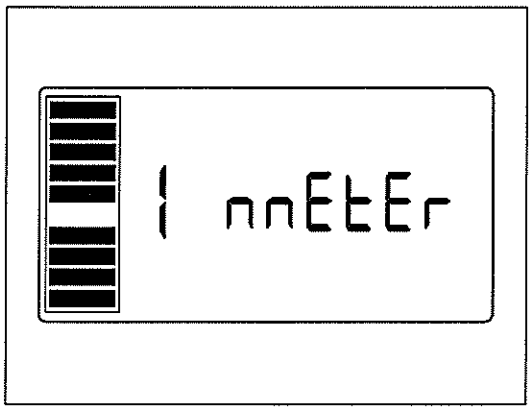
Operation Procedure

1. Enter the password on the status screen to display the service menu screen.



2. "1-ANL" (ANALYZER MENU) is initially displayed on the SERVICE MENU screen. On this screen, press switch (1) four times to move to the OTHERS MENU screen where "5-ETC" is displayed.

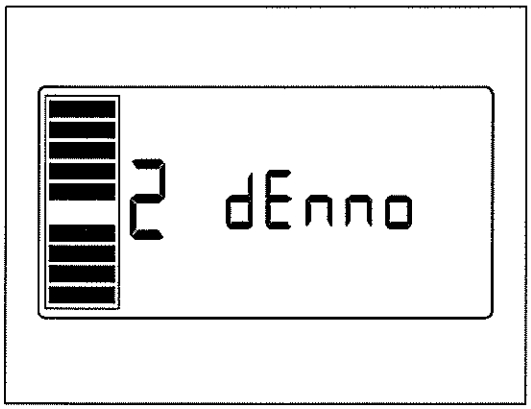
   NOTICE! After completion of the hour meter start operation, OTHERS MENU screen is not displayed any more.



"1 METER"

Switch (1): Switching selection to next screen

Switch (2): Switching to the meter start operation screen

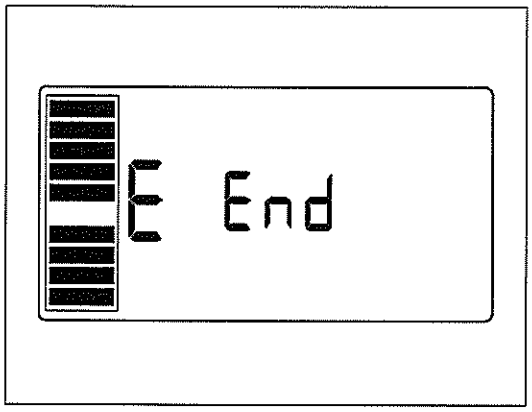


"2 DEMO"

Switch (1): Switching selection to next screen

Switch (2): Switching to the demo mode operation screen

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"E END"

Switch (1): Switching selection to "1 METER"

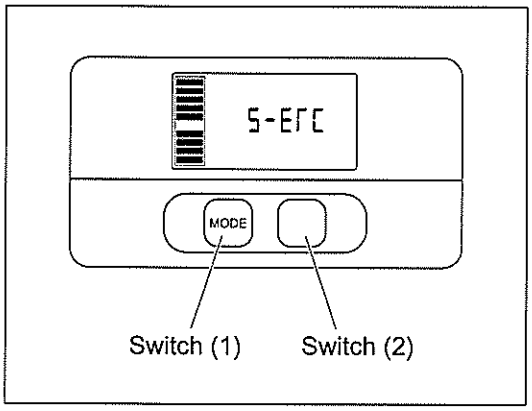
Switch (2): Returning to the "5-ETC" screen

3.11.2 HOUR METER START (1 METER)

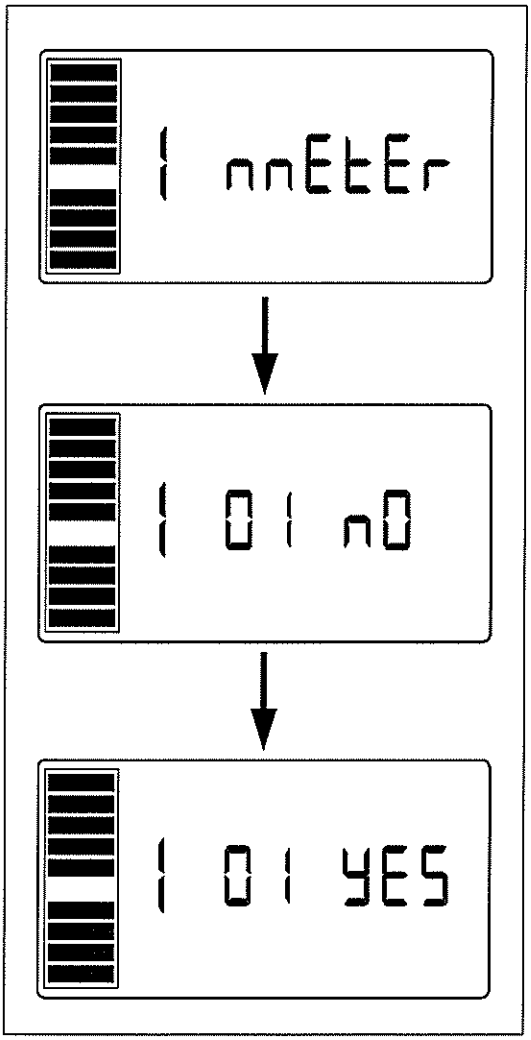
Used to make the hour meter start to count up.

This function also enables the following functions, regardless of whether the demo mode is enabled or disabled.

- Enables the load handling operation during traveling.
- Enables the parking brake OFF warning function.



1. Display the OTHERS MENU screen.
2. Press switch (2) once and make sure that "1 METER" is displayed on the screen. Then, press (2) (to confirm) to display the "1 01" screen.

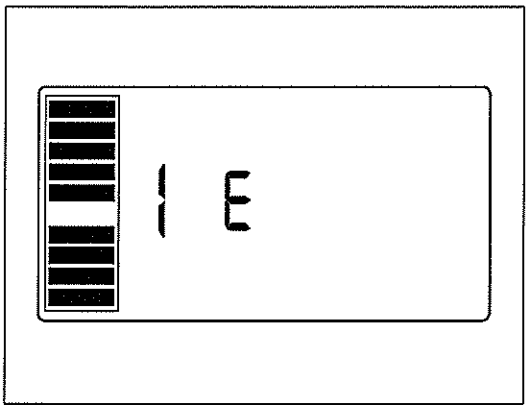


"1 01"

1. While holding down switch (2) for 2 seconds or more, press (1) (to switch to YES).
2. Press switch (1) to move to the "1 E" screen.

   Switch (1): Switching selection to "1 E" screen.

   Switch (2): Used only for the start operation



"1 E"

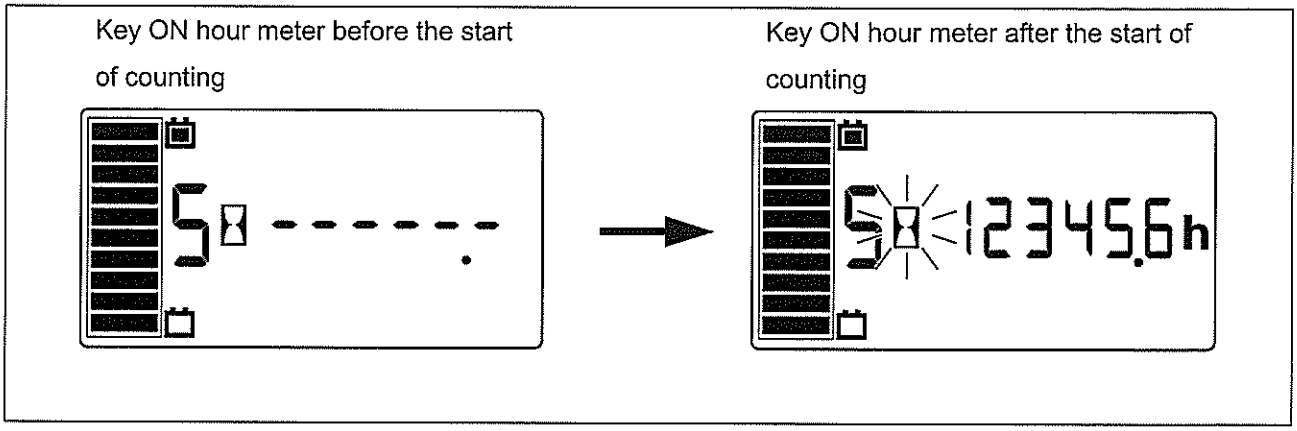
Switch (1): Switching selection to "1 01" screen

Switch (2): Returning to the "1 METER" screen

NOTICE

After completion of the hour meter start operation, the hourglass icon on the key ON hour meter blinks to indicate that the counting has started.

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3.11.3 DEMO MODE (2 DEMO)

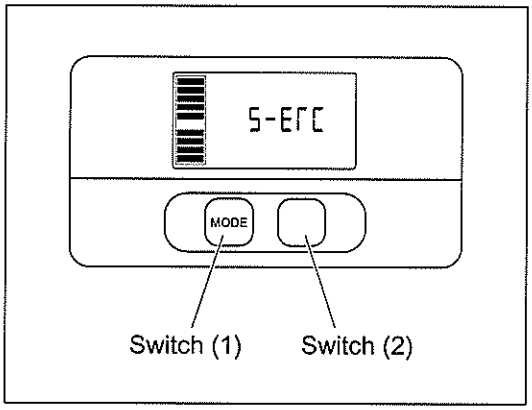
This menu item is used to enable or disable the demo mode.

Before starting the hour meter, you can enable the following functions temporarily in the demo mode.

Demo mode	Yes (enabled)	No (disabled)
Load handling during traveling	Allowed	Not allowed
Parking brake OFF warning	Enabled	Disabled

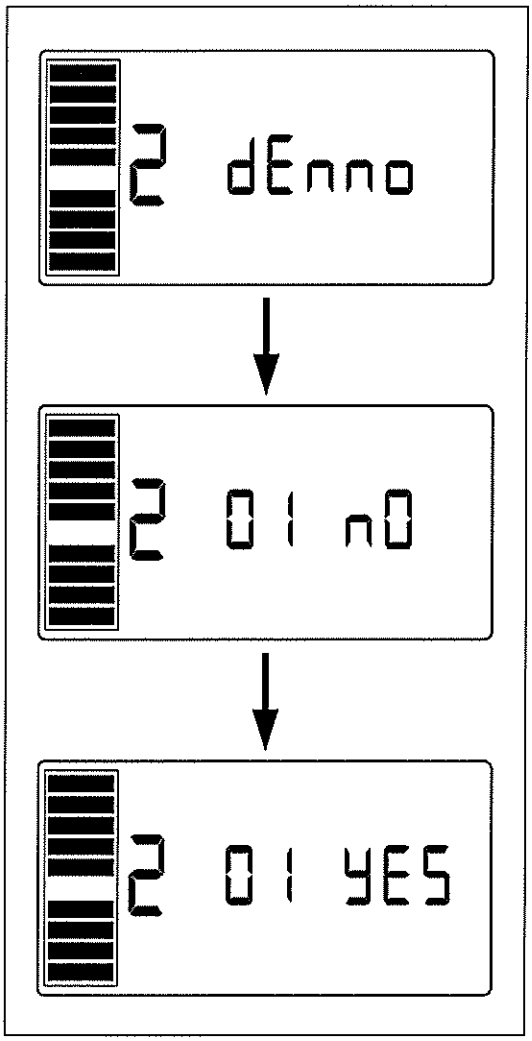
NOTICE

Even after the demo mode has been disabled, the data recorded and the settings made during the demo mode are all retained.



1. Display the OTHERS MENU screen.
2. Press switch (2) once and switch (1) once, and make sure that "2 DEMO" is displayed on the screen. Then, press (2) (to confirm) to display the "2 01" screen.

   NOTICE! After completion of the hour meter start operation, the other service function menu is not displayed any more.



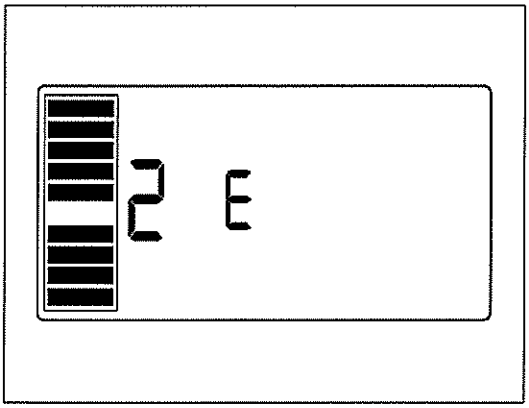
"2 01"

1. Press switch (2) to switch to YES.
2. Press switch (1) to move to the "2 E" screen.

Switch (1): Switching selection to "2 E"

Switch (2): Switching between YES and NO

NOTICE! While demo mode is selected, "DEMO" is displayed on the key ON hour meter screen.

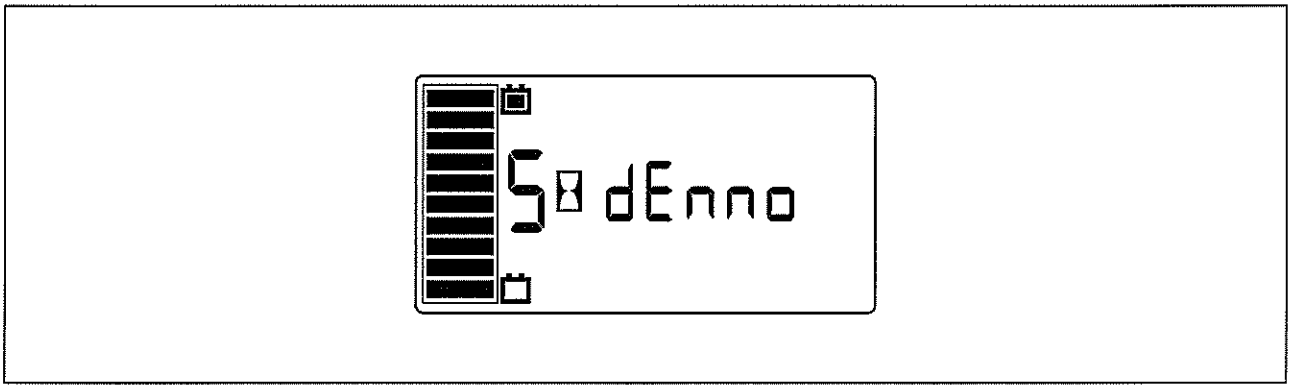


"2 E"

Switch (1): Switching selection to "2 01" screen

Switch (2): Returning to the "2 DEMO" screen

Hour meter screen in demo mode



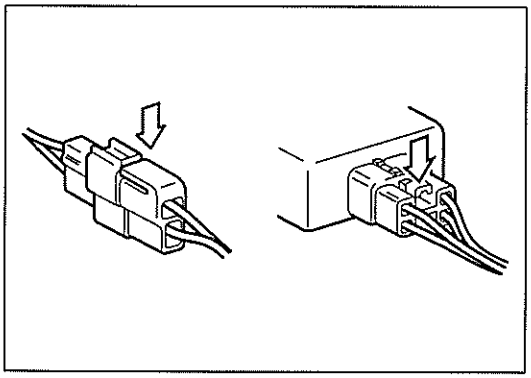
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4 TROUBLESHOOTING

4.1 BEFORE TROUBLESHOOTING 157
4.2 SST 160
4.3 DIAGNOSIS CODE LIST 161
4.4 WHEN ERROR CODE IS DISPLAYED 175
4.5 WHEN NO ERROR CODE IS DISPLAYED 625

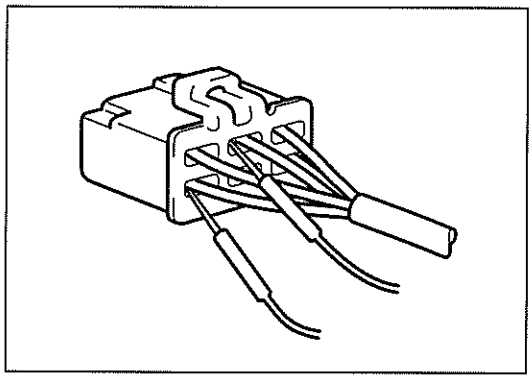
4.1 BEFORE TROUBLESHOOTING

4.1.1 CONNECTOR HANDLING



1. Disconnect the battery plug before connecting or disconnecting each connector or terminal.

2. When disconnecting a connector, do not pull it at the harness but hold the connector itself and pull it after unlocking it.
To connect, push the connector fully until it is locked in position.



3. Bring a tester probe into contact with a connector terminal from the rear side of the coupler (harness side).

4. If insertion from the rear side is impossible, as in the case of a waterproof connector, bring the tester probe carefully into contact with the terminal so as not to cause deformation of the connector terminal.

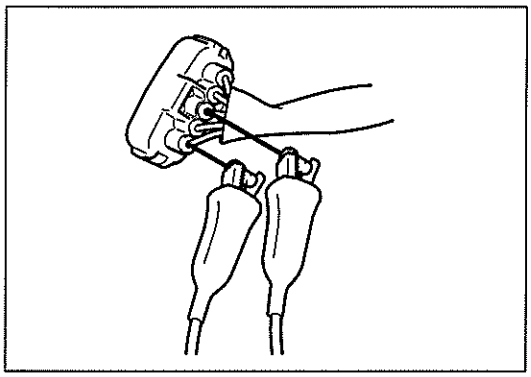
5. Do not touch connector terminals directly with your hand.

6. When bringing tester probes into contact with live terminals, prevent two tester probes from coming into contact with each other.

4.1.2 WIRE HARNESS AND CONNECTOR INSPECTION PROCEDURE

When any trouble occurs, first inspect the connectors and wire harness of the related circuit according to the following procedure

Continuity check

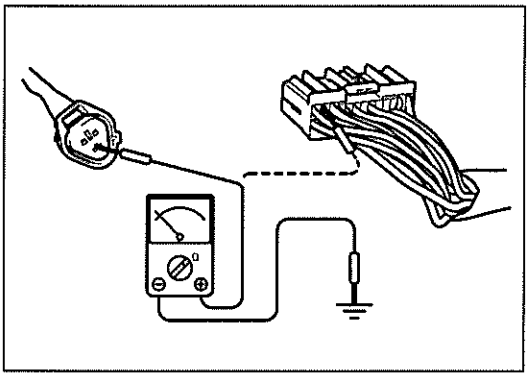


1. Disconnect the connectors at both ends of the corresponding harness.
2. Measure the resistance between corresponding terminals of the connectors at both ends.
Standard: 10 Ω or less

NOTICE!

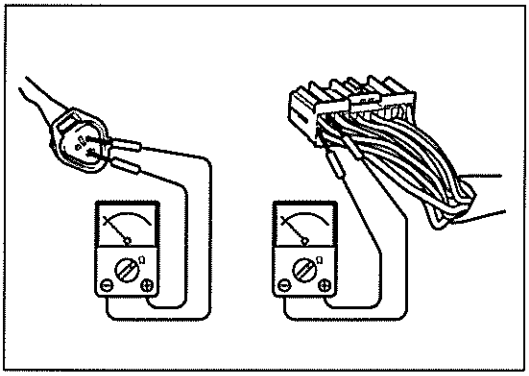
- **Measure while lightly shaking the wire harness up and down and sideways.**
- **Open circuit at the wire harness occurs rarely partway through a vehicle wiring but mostly at connectors. Inspect especially the sensor connectors with sufficient care.**

Short circuit check



1. Disconnect the connectors at both ends of the corresponding harness.
2. Measure the resistance between the corresponding connector terminal and N1. Always inspect the connectors at both ends.
Standard: 1 MΩ or above

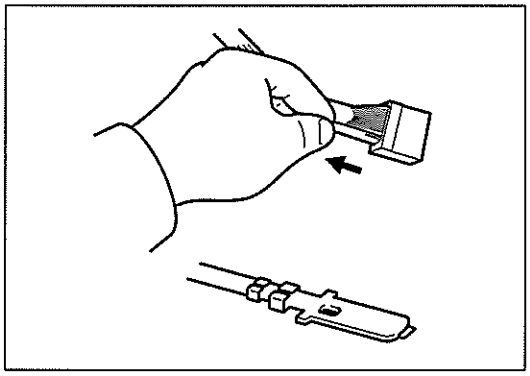
NOTICE! : Measure while lightly shaking the wire harness up and down and sideways.



3. Measure the resistance between a terminal corresponding to the connector terminal and N1. Always inspect the connectors at both ends.
Standard: 1 MΩ or above

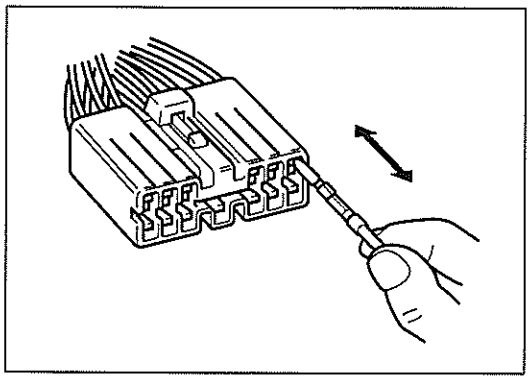
CAUTION! : The wiring may short-circuit due to pinching by the body or defective clamping.

Visual and contact pressure checks



- Disconnect the connectors at both ends of the corresponding harness.
- Visually inspect that there is neither rust nor foreign matter trapped at connector terminals.
- Inspect that there is no loosening or damage at the locked portion. Also, lightly pull the wire harness from the connector to check that it does not come off.

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- Insert a male terminal same as that of the terminal to a female connector and check the extracting force. Defective contact may exist at a terminal where the extracting force is less than that of other terminals.

NOTICE! : Even if there is rust or foreign matter trapped at the terminal, or the contact pressure between male and female terminals is low, abnormal contact condition may be changed to normal by disconnecting and reconnecting the connector. In that case, repeat connector connection and disconnection several times. If defect is perceived even once, terminal contact may be defective.

4.2 SST

Use SSTs for quick, accurate troubleshooting of the 8FBE series electrical system.
Correct check will fail if the connection method is wrong. Since boards may be damaged by incorrect connection, careful operation is necessary.

SST No.	SST name
09230-13700-71 (SST)	Shorting harness (for CN91 connector)
09232-13130-71 (SST2)	Shorting harness (for CN19, CN26, CN52, CN53, CN54, CN55, CN56, CN68, CN86, CN97, CN101, CN102, CN115, CN119, CN120, CN121, CN122,CN123, CN129, CN130, CN163, CN260 connectors)

⚠ CAUTION

Always disconnect the battery plug before SST connection and disconnection.
If the battery plug is kept connected, various boards may be damaged.

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4.3 DIAGNOSIS CODE LIST

Indication: Diagnosis code will be indicated on the display when vehicle trouble occurs.

Memory: Diagnosis code will be recorded on the main controller when vehicle trouble occurs. Use this indicated diagnosis code that can be checked on the display when using the service function DIAG MEMORY.

Indicator:

Spanner 

Overheat warning (O/H) 

Battery overheat warning (BT O/H) 

UP LED on the charger operation panel (UP LED) ○

Indication	Memory	Indicator	Detection ECU	Failure mode	Phenomenon on vehicle	Page
Display: - Multi-function display: DCR	A0-1	O/H lighting	Drive motor driver (LH) (RH)	Drive motor driver power-circuit abnormality	Traveling stop	176
Display: - Multi-function display: PCR	A0-2	O/H lighting	Pump motor driver	Pump motor driver power-circuit abnormality	Load handling stop. Steering become stiff.	180
A1-1	A1-1	Spanner blinking	Main controller	Main controller high voltage	Unable to traveling and load handling Steering become stiff.	184
A1-2	A1-2	Spanner blinking	Drive motor driver (LH)	Drive motor driver LH high voltage	Traveling speed become slow	186
A1-3	A1-3	Spanner blinking	Drive motor driver (RH)	Drive motor driver RH high voltage	Traveling speed become slow	188
A1-4	A1-4	Spanner blinking	Pump motor driver	Pump motor driver high voltage	Load handling stop. Steering become stiff.	190
Display: - Multi-function display: C/R	A2-1	O/H lighting	Main controller	Main controller overheating abnormality	Traveling speed become slow	192
Display: - Multi-function display: DCR	A2-2	O/H lighting	Drive motor driver (LH) (RH)	Drive motor driver circuit board / the condenser overheating abnormality	Traveling stop	194
Display: - Multi-function display: PCR	A2-3	O/H lighting	Pump motor driver	Pump motor driver circuit board / the condenser overheating abnormality	Load handling stop. Steering become stiff.	198

Indication	Memory	Indicator	Detection ECU	Failure mode	Phenomenon on vehicle	Page
A3-1	A3-1	Spanner blinking	Main controller	Battery connection incorrect	Unable to traveling and load handling Steering become stiff.	202
A5-1	A5-1	Spanner blinking	Main controller	Seat switch short abnormality	OPS function invalidity Auto power-off function invalidity Parking brake reminder alarm disable.	203
A6-3	A6-3	Spanner blinking	Main controller	Tilt lever switch short abnormality	Tilt stop	205
A8-1	A8-1	Spanner blinking	Main controller	F1 fuse open abnormality	Unable to traveling and load handling Steering become stiff.	207
A8-2	A8-2	Spanner blinking	Main controller	F6 fuse open abnormality	Unable to traveling and load handling Steering become stiff.	210
A9-2	A9-2	Spanner blinking	Main controller	F7 fuse / solenoid power supply line open abnormality	Material handling disabled	213
AA-1	AA-1	Spanner blinking	Main controller	Main controller temperature sensor (open/ short) abnormality	Traveling speed become slow	216
AA-2	AA-2	Spanner blinking	Drive motor driver (LH)	Drive motor driver LH board temperature sensor (open/ short) abnormality	Depression of maximum speed Speed-up become slow.	217
AA-3	AA-3	Spanner blinking	Drive motor driver (RH)	Drive motor driver RH board temperature sensor (open/ short) abnormality	Depression of maximum speed Speed-up become slow.	218
AA-4	AA-4	Spanner blinking	Pump motor driver	Pump motor driver board temperature sensor (open/short) abnormality	Upward lift speed is limited.	219
AB-1	AB-1	Spanner blinking	Main controller	Cooling fan overcurrent	Traveling speed become slow	220
AC-1	AC-1	Spanner blinking	Main controller	Motor driver power delivery abnormality	Unable to traveling and load handling Steering become stiff.	224
AD-1	AD-1	Spanner blinking	Main controller	Drive motor driver LH to Main controller : communication abnormality	Traveling speed become slow Knob position correcting stop	227
AD-2	AD-2	Spanner blinking	Main controller	Drive motor driver LH to Main controller : communication abnormality	Traveling speed become slow Knob position correcting stop	228
AD-3	AD-3	Spanner blinking	Main controller	Drive motor driver RH to Main controller : communication abnormality	Traveling speed become slow Knob position correcting stop	237

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Indication	Memory	Indicator	Detection ECU	Failure mode	Phenomenon on vehicle	Page
AD-4	AD-4	Spanner blinking	Main controller	Drive motor driver RH to Main controller : communication abnormality	Traveling speed become slow Knob position correcting stop	238
AD-5	AD-5	Spanner blinking	Main controller	Pump motor driver to Main controller : communication abnormality	Load handling stop. Steering become stiff.	241
AD-6	AD-6	Spanner blinking	Main controller	Pump motor driver to Main controller : communication abnormality	Load handling stop. Steering become stiff.	242
AF-1	AF-1	Spanner blinking	Main controller	Main controller CPU error	Unable to traveling and load handling Steering become stiff.	245
AF-2	AF-2	Spanner blinking	Main controller	Main controller CPU error	Unable to traveling and load handling Steering become stiff.	245
AF-3	AF-3	Spanner blinking	Main controller	Main controller CPU error	Unable to traveling and load handling Steering become stiff.	245
AF-4	AF-4	Spanner blinking	Main controller	Main controller CPU error	Unable to traveling and load handling Steering become stiff.	245
AF-5	AF-5	Spanner blinking	Main controller	Main controller CPU error	Various control operations not stable	245
AF-6	AF-6	Spanner blinking	Main controller	Main controller CPU error	Various control operations not stable	245
AF-7	AF-7	Spanner blinking	Main controller	Main controller CPU error	Various control operations not stable	245
AF-8	AF-8	Spanner blinking	Main controller	Main controller CPU error	Various control operations not stable	245
C0-2	C0-2	Spanner blinking	Drive motor driver (LH)	Drive motor driver LH power-circuit abnormality	Traveling speed become slow	246
C0-4	C0-4	Spanner blinking	Drive motor driver (RH)	Drive motor driver RH power-circuit abnormality	Traveling speed become slow	249
C1-1	C1-1	Spanner blinking	Drive motor driver (LH)	Drive motor driver LH current sensor neutral voltage error	Traveling speed become slow	252
C1-2	C1-2	Spanner blinking	Drive motor driver (LH)	Drive motor driver LH current sensor over current abnormality	Traveling speed become slow	253
C1-3	C1-3	Spanner blinking	Drive motor driver (RH)	Drive motor driver RH current sensor neutral voltage error	Traveling speed become slow	256
C1-4	C1-4	Spanner blinking	Drive motor driver (RH)	Drive motor driver RH current sensor over current abnormality	Traveling speed become slow	257

Indication	Memory	Indicator	Detection ECU	Failure mode	Phenomenon on vehicle	Page
Display: - Multi-function display: DM	C2-1	O/H lighting	Drive motor driver (LH) (RH)	Drive motor overheating abnormality	Depression of maximum speed Speed-up become slow.	260
C2-2	C2-2	Spanner blinking	Drive motor driver (LH)	Drive motor LH temperature sensor (open/short) abnormality	Depression of maximum speed Speed-up become slow.	262
C2-3	C2-3	Spanner blinking	Drive motor driver (RH)	Drive motor RH temperature sensor (open/short) abnormality	Depression of maximum speed Speed-up become slow.	264
C3-1	C3-1	Spanner blinking	Drive motor driver (LH)	Drive motor driver LH main circuit temperature sensor (open/short) abnormality	Depression of maximum speed Speed-up become slow.	266
C3-2	C3-2	Spanner blinking	Drive motor driver (RH)	Drive motor driver RH main circuit temperature sensor (open/short) abnormality	Depression of maximum speed Speed-up become slow.	267
C4-1	C4-1	Spanner blinking	Main controller	Accelerator potentiometer POT1 open abnormality	Display error code but able to operate correctly.	268
C4-2	C4-2	Spanner blinking	Main controller	Accelerator potentiometer POT2 open abnormality	Display error code but able to operate correctly.	271
C4-3	C4-3	Spanner blinking	Main controller	Accelerator potentiometer POT1VCC short circuit abnormality	Display error code but able to operate correctly.	274
C4-4	C4-4	Spanner blinking	Main controller	Accelerator potentiometer POT2VCC short circuit abnormality	Display error code but able to operate correctly.	277
C4-5	C4-5	Spanner blinking	Main controller	Accelerator potentiometer offset abnormality	Traveling stop	279
C4-6	C4-6	Spanner blinking	Main controller	Accelerator potentiometer matching value abnormality	Accelerator play increases and maximum speed is limited.	282
C8-1	C8-1	Spanner blinking	Drive motor driver (LH)	Drive motor LH rotation sensor open abnormality	Traveling speed become slow	284
C8-2	C8-2	Spanner blinking	Drive motor driver (LH)	Drive motor LH rotation sensor short abnormality	Traveling speed become slow	288
C8-3	C8-3	Spanner blinking	Drive motor driver (RH)	Drive motor RH rotation sensor open abnormality	Traveling speed become slow	292
C8-4	C8-4	Spanner blinking	Drive motor driver (RH)	Drive motor RH rotation sensor short abnormality	Traveling speed become slow	296
CB-1	CB-1	Spanner blinking	Main controller	MB contactor open abnormality	Unable to traveling and load handling Steering become stiff.	300

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Indication	Memory	Indicator	Detection ECU	Failure mode	Phenomenon on vehicle	Page
CB-2	CB-2	Spanner blinking	Main controller	MB contactor short abnormality	Display error code but able to operate correctly.	304
CB-3	CB-3	Spanner blinking	Main controller	MB contactor (coil side) open abnormality	Unable to traveling and load handling Steering become stiff.	306
CB-4	CB-4	Spanner blinking	Main controller	MB contactor traveling circuit abnormality	Unable to traveling and load handling Steering become stiff.	308
CB-5	CB-5	Spanner blinking	Main controller	MB contactor (coil side) short abnormality	Unable to traveling and load handling Steering become stiff.	310
CC-1	CC-1	Spanner blinking	Drive motor driver (LH)	Drive motor driver LH CPU abnormality	Traveling speed become slow	312
CC-2	CC-2	Spanner blinking	Drive motor driver (LH)	Drive motor driver LH CPU abnormality	Traveling speed become slow	312
CC-3	CC-3	Spanner blinking	Drive motor driver (LH)	Drive motor driver LH CPU abnormality	Traveling speed become slow	312
CC-4	CC-4	Spanner blinking	Drive motor driver (LH)	Drive motor driver LH CPU abnormality	Traveling speed become slow	312
CC-6	CC-6	Spanner blinking	Drive motor driver (LH)	Drive motor driver LH CPU abnormality	Display error code but able to operate correctly.	312
CD-1	CD-1	Spanner blinking	Drive motor driver (RH)	Drive motor driver RH CPU abnormality	Traveling speed become slow	313
CD-2	CD-2	Spanner blinking	Drive motor driver (RH)	Drive motor driver RH CPU abnormality	Traveling speed become slow	313
CD-3	CD-3	Spanner blinking	Drive motor driver (RH)	Drive motor driver RH CPU abnormality	Traveling speed become slow	313
CD-4	CD-4	Spanner blinking	Drive motor driver (RH)	Drive motor driver RH CPU abnormality	Traveling speed become slow	313
CD-6	CD-6	Spanner blinking	Drive motor driver (RH)	Drive motor driver RH CPU abnormality	Display error code but able to operate correctly.	313
E0-2	E0-2	Spanner blinking	Pump motor driver	Pump motor driver power-circuit abnormality	Load handling stop. Steering become stiff.	314
E1-1	E1-1	Spanner blinking	Pump motor driver	Pump motor driver current sensor neutral voltage error	Load handling stop. Steering become stiff.	317
E1-2	E1-2	Spanner blinking	Pump motor driver	Pump motor driver current sensor over current error	Load handling stop. Steering become stiff.	318
Display: - Multi-function display: PM	E2-1	O/H lighting	Pump motor driver	Pump motor overheating abnormality	Upward lift speed is limited.	321
E2-2	E2-2	Spanner blinking	Pump motor driver	Pump motor temperature sensor (open/short) abnormality	Upward lift speed is limited.	325

Indication	Memory	Indicator	Detection ECU	Failure mode	Phenomenon on vehicle	Page
E3-1	E3-1	Spanner blinking	Pump motor driver	Pump motor driver main circuit temperature sensor (open/short) abnormality	Upward lift speed is limited.	327
E8-1	E8-1	Spanner blinking	Pump motor driver	Pump motor rotation sensor open abnormality	Load handling stop. Steering become stiff.	328
E8-2	E8-2	Spanner blinking	Pump motor driver	Pump motor rotation sensor short abnormality	Load handling stop. Steering become stiff.	331
EC-1	EC-1	Spanner blinking	Pump motor driver	Pump motor driver CPU abnormality	Load handling stop. Steering become stiff.	334
EC-2	EC-2	Spanner blinking	Pump motor driver	Pump motor driver CPU abnormality	Load handling stop. Steering become stiff.	334
EC-3	EC-3	Spanner blinking	Pump motor driver	Pump motor driver CPU abnormality	Load handling stop. Steering become stiff.	334
EC-4	EC-4	Spanner blinking	Pump motor driver	Pump motor driver CPU abnormality	Load handling stop. Steering become stiff.	334
EC-6	EC-6	Spanner blinking	Pump motor driver	Pump motor driver CPU abnormality	Display error code but able to operate correctly.	334
ED-1	ED-1	Spanner blinking	Main controller	CAN bridge communication stopped	Recognition unable	335
ED-4	ED-4	Spanner blinking	CAN bridge controller	CAN bridge controller to operation control device : communication stopped	Recognition unable	339
EE-1	EE-1	Spanner blinking	Main controller	Communication line abnormality : Display to main controller	Display error The function partially disable.	342
EE-2	EE-2	Spanner blinking	Main controller	Communication line abnormality : Display to main controller	Display error The function partially disable.	342
F1-1	F1-1	Spanner blinking	display	Communication line abnormality : Main controller to display	Display error The function partially disable.	343
F1-2	F1-2	Spanner blinking	display	Communication line abnormality : Main controller to display	Display error The function partially disable.	344
F4-1	F4-1	Spanner blinking	display	Display CPU defect	Traveling and load handling cannot be performed simultaneously. Recognition unable in case of PIN code entry spec.	347
F4-2	F4-2	Spanner blinking	display	Display CPU defect	Traveling and load handling cannot be performed simultaneously. Recognition unable in case of PIN code entry spec.	347

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Indication	Memory	Indicator	Detection ECU	Failure mode	Phenomenon on vehicle	Page
F4-3	F4-3	Spanner blinking	display	Display CPU defect	Traveling and load handling cannot be performed simultaneously. Recognition unable in case of PIN code entry spec.	347
F4-4	F4-4	Spanner blinking	display	Display CPU defect	Display only	347
F4-5	F4-5	Spanner blinking	display	Display CPU defect	Display function not stable	347
F4-6	F4-6	Spanner blinking	display	Display CPU defect	Various control operations not stable	347
F4-7	F4-7	Spanner blinking	display	Display CPU defect	Various control operations not stable	347
F4-8	F4-8	Spanner blinking	display	Display CPU defect	Various control operations not stable	347
F5-1	F5-1	Spanner blinking	display	Battery electrolyte level/ temperature sensor harness open abnormality	Battery protective function disabled Battery data log function partially disable	348
F5-2	F5-2	Spanner blinking	display	Battery electrolyte level/ temperature sensor harness short abnormality	Battery protective function disabled Battery data log function partially disable	352
F5-3	F5-3	Spanner blinking	display	Battery electrolyte temperature sensor open abnormality	Battery protective function disabled Battery data log function partially disable	356
F5-4	F5-4	Spanner blinking	display	Battery electrolyte temperature sensor overheating abnormality	Battery protective function disabled Battery data log function partially disable	358
F6-1	F6-1	UP LED blinking Spanner blinking	display	Charging abnormality (safety timer activated)	Charging stop	360
F6-2	F6-2	UP LED blinking Spanner blinking	display	Charger Transformer overheating (charge can not start)	Charging stop	364
F7-1	F7-1	Spanner blinking	display	Charger start abnormality (charge can not complete)	Unable to charge	370
F8-1	F8-1	UP LED blinking Spanner blinking	display	Charging completion abnormality	Not finish charging	376
FA-1	FA-1	Spanner blinking	CAN bridge controller	CAN bridge controller CPU abnormality	Recognition unable	381
FA-2	FA-2	Spanner blinking	CAN bridge controller	CAN bridge controller CPU abnormality	Recognition unable	381

Indication	Memory	Indicator	Detection ECU	Failure mode	Phenomenon on vehicle	Page
FA-3	FA-3	Spanner blinking	CAN bridge controller	CAN bridge controller CPU abnormality	Recognition unable	381
FB-1	FB-1	Spanner blinking	Main controller	Battery current sensor neutral voltage error	Power meter function disable Electrical power quantity survey function disable Battery data log function partly disable Accident error of battery capacity display increases	382
FB-2	FB-2	Spanner blinking	Main controller	Battery current sensor overcurrernt	Power meter function disable Electrical power quantity survey function disable Battery data log function partly disable Accident error of battery capacity display increases	385
-	FC-1	BT O/H lighting Spanner blinking	Main controller	Battery electrolyte overheating abnormality	Depression of traveling function Speed-up become slow.	388
FF-1	FF-1	Spanner blinking	Main controller	Power supply circuit for display over current	Display turning off	390
FF-2	FF-2	Spanner blinking	Main controller	Steering sensor power-supply circuit over current	Steering become stiff Knob position correcting stop	391
32-1	32-1	Spanner blinking	Drive motor driver (LH)	Drive motor driver LH : controller ID abnormality	Display error code but able to operate correctly.	393
32-2	32-2	Spanner blinking	Drive motor driver (RH)	Drive motor driver RH : controller ID abnormality	Display error code but able to operate correctly.	395
32-3	32-3	Spanner blinking	Pump motor driver	Pump motor driver : controller ID abnormality	Display error code but able to operate correctly.	397
33-1	33-1	Spanner blinking	Drive motor driver (LH)	Main controller to Drive motor driver LH : communication abnormality	Traveling speed become slow	399
33-2	33-2	Spanner blinking	Drive motor driver (RH)	Main controller to Drive motor driver RH : communication abnormality	Traveling speed become slow	401
33-3	33-3	Spanner blinking	Pump motor driver	Main controller to Pump motor driver : communication abnormality	Load handling stop. Steering become stiff.	403

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Indication	Memory	Indicator	Detection ECU	Failure mode	Phenomenon on vehicle	Page
61-1	61-1	Spanner blinking	Main controller	Load sensor open abnormality	Partial limitation of mast control function. Partial limitation of traveling control function. Partial limitation of height and load sensing swing speed control function.	405
61-2	61-2	Spanner blinking	Main controller	Load sensor short abnormality	Partial limitation of mast control function. Partial limitation of traveling control function. Partial limitation of height and load sensing swing speed control function.	407
62-1	62-1	Spanner blinking	Main controller	Tilt angle sensor open abnormality	Partial limitation of mast control function	409
62-2	62-2	Spanner blinking	Main controller	Tilt angle sensor short abnormality	Partial limitation of mast control function	411
63-1	63-1	Spanner blinking	Main controller	Tilt switch forward / backward tilt switch simultaneously short abnormality	Partial limitation of mast control function	413
63-2	63-2	Spanner blinking	Main controller	Tilt switch forward tilt switch continuously short abnormality	Partial limitation of mast control function	415
63-3	63-3	Spanner blinking	Main controller	Tilt switch backward tilt switch continuously short abnormality	Partial limitation of mast control function	417
64-1	64-1	Spanner blinking	Main controller	Lift lock solenoid open abnormality	Lift lowering stop	419
64-2	64-2	Spanner blinking	Main controller	Lift solenoid short abnormality	Lift lowering stop	422
64-3	64-3	Spanner blinking	Main controller	Lift lock solenoid drive circuit abnormality	Lift lowering may operate while OPS is operating (STD lever spec.) Lift lowering may stop (Mini lever spec.)	425
64-4	64-4	Spanner blinking	Main controller	Lift solenoid (open / short) abnormality	Lift lowering may operate while OPS is operating (STD lever spec.) Lift lowering may stop (Mini lever spec.)	427
65-1	65-1	Spanner blinking	Main controller	Tilt solenoid open abnormality	Forward tilt stop	430

Indication	Memory	Indicator	Detection ECU	Failure mode	Phenomenon on vehicle	Page
65-2	65-2	Spanner blinking	Main controller	Tilt solenoid short abnormality	Forward tilt stop	433
65-3	65-3	Spanner blinking	Main controller	Tilt solenoid: traveling circuit abnormality	Tilt forward may operate while OPS is operating (STD lever spec.) Tilt forward may stop (Mini lever spec.)	436
65-4	65-4	Spanner blinking	Main controller	Tilt solenoid (open / short) abnormality	Tilt forward may operate while OPS is operating (STD lever spec.) Tilt forward may stop (Mini lever spec.)	438
66-1	66-1	Spanner blinking	Main controller	Tilt matching: matching value abnormality	Partial limitation of mast control function	441
67-1	67-1	Spanner blinking	Main controller	Lifting height switch open / short abnormality	Partial limitation of mast control function. Partial limitation of traveling control function. Partial limitation of height and load sensing swing speed control function.	443
67-5	67-5	Spanner blinking	Main controller	Height 800m switch short abnormality	Traveling speed become slow	447
71-1	71-1	Spanner blinking	Main controller	Tire angle sensor open abnormality	Traveling speed become slow Knob position correcting stop	450
71-2	71-2	Spanner blinking	Main controller	Tire angle sensor short abnormality	Traveling speed become slow Knob position correcting stop	452
71-3	71-3	Spanner blinking	Main controller	Tire angle sensor anchoring abnormality	Steering knob position correcting disable	454
72-1	72-1	Spanner blinking	Main controller	Steering-wheel angle sensor SS1 open abnormality	Steering knob position correcting disable Steering become little stiff.	456
72-2	72-2	Spanner blinking	Main controller	Steering-wheel angle sensor SS2 open abnormality	Steering knob position correcting disable Steering become little stiff.	460
72-3	72-3	Spanner blinking	Main controller	Steering-wheel angle sensor SSC open abnormality	Steering knob position correcting disable	464

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Indication	Memory	Indicator	Detection ECU	Failure mode	Phenomenon on vehicle	Page
72-4	72-4	Spanner blinking	Main controller	Steering angle sensor power circuit open abnormality	Steering knob position correcting disable Steering become little stiff.	468
73-1	73-1	Spanner blinking	Main controller	Steering knob synchronizer solenoid open abnormality	Steering knob position correcting disable	470
73-2	73-2	Spanner blinking	Main controller	Knob solenoid short abnormality	Steering knob position correcting disable	473
73-3	73-3	Spanner blinking	Main controller	Knob solenoid: traveling circuit abnormality	Steering knob position correcting disable	476
73-4	73-4	Spanner blinking	Main controller	Knob solenoid (open / short) abnormality	Steering knob position correcting disable	478
74-1	74-1	Spanner blinking	Main controller	Tire angle matching value abnormality	Traveling speed become slow Knob position correcting stop	481
G5-1	G5-1	Spanner blinking	Main controller	Shock sensor 1 open abnormality	Shock sensor disabled.	483
G5-2	G5-2	Spanner blinking	Main controller	Shock sensor 1 short abnormally	Shock sensor disabled.	485
G5-3	G5-3	Spanner blinking	Main controller	Shock sensor 1 : neutral voltage error	Shock sensor disabled.	487
G5-4	G5-4	Spanner blinking	Main controller	Shock sensor 2 open abnormality	Shock sensor disabled.	489
G5-5	G5-5	Spanner blinking	Main controller	Shock sensor 2 short abnormally	Shock sensor disabled.	491
G5-6	G5-6	Spanner blinking	Main controller	Shock sensor 2 : neutral voltage error	Shock sensor disabled.	493
H1-1	H1-1	Spanner blinking	Main controller	Lift lever potentiometer open abnormality	Lift lowering and upward stop	495
H1-2	H1-2	Spanner blinking	Main controller	Lift lever potentiometer short abnormality	Lift lowering and upward stop	498
H1-3	H1-3	Spanner blinking	Main controller	Lift lever potentiometer : sensor output declination abnormality	Lift lowering and upward stop	500
H1-4	H1-4	Spanner blinking	Main controller	Lift lever potentiometer neutral abnormality	Lift lowering and upward stop (STD lever spec.) Unable to load handling (Mini lever spec.)	503
H1-5	H1-5	Spanner blinking	Main controller	Lift lever potentiometer matching value abnormality	Lift lowering and upward stop	505
H2-1	H2-1	Spanner blinking	Main controller	Tilt lever potentiometer open abnormality	Forward and backward tilt stop	507
H2-2	H2-2	Spanner blinking	Main controller	Tilt lever potentiometer short abnormality	Forward and backward tilt stop	509
H2-3	H2-3	Spanner blinking	Main controller	Tilt lever potentiometer : sensor output declination abnormality	Forward and backward tilt stop	511

Indication	Memory	Indicator	Detection ECU	Failure mode	Phenomenon on vehicle	Page
H2-4	H2-4	Spanner blinking	Main controller	Tilt lever potentiometer neutral error abnormality	Material handling disabled	514
H2-5	H2-5	Spanner blinking	Main controller	Tilt lever potentiometer matching value abnormality	Forward and backward tilt stop	516
H3-1	H3-1	Spanner blinking	Main controller	Attachment 1 lever potentiometer open abnormality	Attachment 1 stop	518
H3-2	H3-2	Spanner blinking	Main controller	Attachment 1 lever potentiometer short abnormality	Attachment 1 stop	520
H3-3	H3-3	Spanner blinking	Main controller	Attachment 1 lever potentiometer : sensor output declination abnormality	Attachment 1 stop	522
H3-4	H3-4	Spanner blinking	Main controller	Attachment 1 lever potentiometer neutral abnormality	Material handling disabled	525
H3-5	H3-5	Spanner blinking	Main controller	Attachment 1 lever potentiometer matching value abnormality	Attachment 1 stop	527
H4-1	H4-1	Spanner blinking	Main controller	Attachment 2 lever potentiometer open abnormality	Attachment 2 stop	529
H4-2	H4-2	Spanner blinking	Main controller	Attachment 2 lever potentiometer short abnormality	Attachment 2 stop	531
H4-3	H4-3	Spanner blinking	Main controller	Attachment 2 lever potentiometer : sensor output declination abnormality	Attachment 2 stop	533
H4-4	H4-4	Spanner blinking	Main controller	Attachment 2 lever potentiometer neutral abnormality	Material handling disabled	536
H4-5	H4-5	Spanner blinking	Main controller	Attachment 2 lever potentiometer matching value abnormality	Attachment 2 stop	538
H5-1	H5-1	Spanner blinking	Main controller	Lift proportional valve solenoid open abnormality (lever pull side)	Lift upward stop	540
H5-2	H5-2	Spanner blinking	Main controller	Lift proportional valve solenoid short abnormality (lever pull side)	Lift upward stop	543
H5-3	H5-3	Spanner blinking	Main controller	Lift proportional valve solenoid open abnormality (lever push side)	Lift lowering stop	546
H5-4	H5-4	Spanner blinking	Main controller	Lift proportional valve solenoid short abnormality (lever push side)	Lift lowering stop	549
H5-5	H5-5	Spanner blinking	Main controller	Lift proportional valve solenoid drive circuit abnormality	Material handling disabled	552
H5-6	H5-6	Spanner blinking	Main controller	Lift proportional valve solenoid (open / short) abnormality	Material handling disabled	554

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Indication	Memory	Indicator	Detection ECU	Failure mode	Phenomenon on vehicle	Page
H6-1	H6-1	Spanner blinking	Main controller	Tilt proportional valve solenoid open abnormality (lever pull side)	Backward tilt stop	557
H6-2	H6-2	Spanner blinking	Main controller	Tilt proportional valve solenoid short abnormality (lever pull side)	Backward tilt stop	560
H6-3	H6-3	Spanner blinking	Main controller	Tilt proportional valve solenoid open abnormality (lever push side)	Forward tilt stop	563
H6-4	H6-4	Spanner blinking	Main controller	Tilt proportional valve solenoid short abnormality (lever push side)	Forward tilt stop	566
H6-5	H6-5	Spanner blinking	Main controller	Tilt proportional valve solenoid drive circuit abnormality	Material handling disabled	569
H6-6	H6-6	Spanner blinking	Main controller	Tilt proportional valve solenoid (open / short) abnormality	Material handling disabled	571
H7-1	H7-1	Spanner blinking	Main controller	Attachment 1 proportional valve solenoid open abnormality (lever pull side)	Attachment 1 stop	574
H7-2	H7-2	Spanner blinking	Main controller	Attachment 1 proportional valve solenoid short abnormality (lever pull side)	Attachment 1 stop	577
H7-3	H7-3	Spanner blinking	Main controller	Attachment 1 proportional valve solenoid open abnormality (lever push side)	Attachment 1 stop	580
H7-4	H7-4	Spanner blinking	Main controller	Attachment 1 proportional valve solenoid short abnormality (lever push side)	Attachment 1 stop	583
H7-5	H7-5	Spanner blinking	Main controller	Attachment 1 proportional valve solenoid : traveling circuit abnormality	Material handling disabled	586
H7-6	H7-6	Spanner blinking	Main controller	Attachment 1 proportional valve solenoid (open / short) abnormality	Material handling disabled	588
H8-1	H8-1	Spanner blinking	Main controller	Attachment 2 proportional valve solenoid open abnormality (lever pull side)	Attachment 2 stop	591
H8-2	H8-2	Spanner blinking	Main controller	Attachment 2 proportional valve solenoid short abnormality (lever pull side)	Attachment 2 stop	594
H8-3	H8-3	Spanner blinking	Main controller	Attachment 2 proportional valve solenoid open abnormality (lever push side)	Attachment 2 stop	597

Indication	Memory	Indicator	Detection ECU	Failure mode	Phenomenon on vehicle	Page
H8-4	H8-4	Spanner blinking	Main controller	Attachment 2 proportional valve solenoid short abnormality (lever push side)	Attachment 2 stop	600
H8-5	H8-5	Spanner blinking	Main controller	Attachment 2 proportional valve solenoid : traveling circuit abnormality	Material handling disabled	603
H8-6	H8-6	Spanner blinking	Main controller	Attachment 2 proportional valve solenoid (open / short) abnormality	Material handling disabled	605
HB-1	HB-1	Spanner blinking	Main controller	Proportional valve solenoid power supply : RY1 contact open abnormality	Material handling disabled	608
HB-2	HB-2	Spanner blinking	Main controller	Proportional valve solenoid load-short abnormality	Material handling disabled	610
HB-3	HB-3	Spanner blinking	Main controller	Proportional valve solenoid power supply : RY1 over current abnormality	Material handling disabled	612
HC-1	HC-1	Spanner blinking	Main controller	Unload solenoid open abnormality	Lift upward or tilt backward may operate while OPS is operating.	614
HC-2	HC-2	Spanner blinking	Main controller	Unload solenoid short abnormality	Lift upward or tilt backward may operate while OPS is operating.	617
HC-3	HC-3	Spanner blinking	Main controller	Unload solenoid: traveling circuit abnormality	Loading operations other than lower may not operate.	620
HC-4	HC-4	Spanner blinking	Main controller	Unload solenoid (open / short) abnormality	Lift upward or tilt backward may operate while OPS is operating.	622
Display: - Multi-function display: COLD DCR	-	O/H lighting *	Drive motor driver (LH) (RH)	Drive motor driver low temperature	Depression of maximum speed Speed-up become slow.	624
Display: - Multi-function display: COLD PCR	-	O/H lighting *	Pump motor driver	Pump motor driver low temperature	Depression of maximum speed Speed-up become slow.	624

*: Multi-function display shows only the each portion and doesn't indicate O/H light.

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4.4 WHEN ERROR CODE IS DISPLAYED

Error Code: A0-1

Failure mode: Drive motor driver power-circuit abnormality

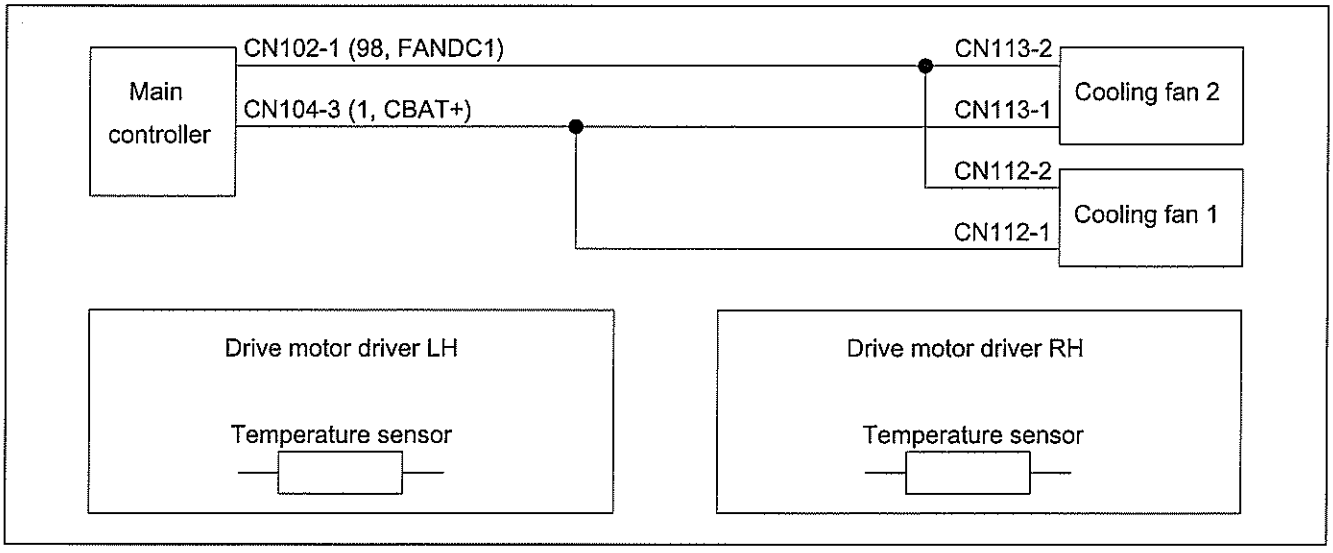
⚠ CAUTION

- **If AB-1 occurs at same time, perform troubleshooting for AB-1 first.**
- **Disconnect the battery plug, and confirm whether is in the conclusion part of the power cable and motor cable loosen.**
- **Do not leave the vehicle standing in a hot place.**

Probable cause

- The power cable and motor cable tightening is defective.
- Connector contact defect
- Harness defect
- Cooling fan clogging
- Cooling fan defect
- Overheating (continuous overload operation)
- Drive motor driver LH defect
- Drive motor driver RH defect
- Main controller defect

Related portion



STEP1

Apply the cooling fan compulsorily by using Active Test and check the rotary condition.

STD
[ANL] 7 ACT (7 05)
Multi-function display
[ANL] ACTIVE TEST 2/3
FAN1 : OFF → ON

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Judgment

Result	Procedure
Not running	Go to step 5
Running	Go to step 2

STEP2

Inspection :

Reconfirm the error

Turn on the key switch and check the error occurs.

Judgment

Result	Procedure
"DCR" occurs.	Go to step 3
"DCR" does not occur.	**Overheating (continuous overload operation)** **After falling temperature of drive motor driver, "DCR" is disappeared and the truck can be operated as usual. It is estimated that the continuously running in overloaded condition cause this error. So check the usage condition of the truck and hold back the continuously running in a overloaded condition.**

STEP3

Inspection :

Check the temperature and reconfirm the error.

STD
[ANL] 2 IO1 (2 03, 2 04)
Multi-function display
[ANL] I/O TEMP/VOLT 1/6

TDMDH

Record the temperature of the drive motor driver power-circuit.

Turn off the key switch and leave the truck for approximately for fifteen minutes. Then turn on the key switch and check the error occurs.

Judgment

Result	Procedure
"DCR" occurs.	Go to step 4
"DCR" does not occur.	**Overheating (continuous overload operation)** **After falling temperature of drive motor driver, "DCR" is disappeared and the truck can be operated as usual. It is estimated that the continuously running in overloaded condition cause this error. So check the usage condition of the truck and hold back the continuously running in a overloaded condition.**

STEP4

Inspection :

Reconfirm of the temperature

STD
[ANL] 2 IO1 (2 03, 2 04)
Multi-function display
[ANL] I/O TEMP/VOLT 1/6

TDMDH

Check the drive motor driver power-circuit temperature and compare to the recorded value.

Judgment

Result	Procedure
All temperatures has lowered by 5°C or more.	Go to step 3
Drive motor power-circuit board temperature LH has not lowered by 5°C or more.	**Drive motor driver LH defect**
Drive motor power-circuit board temperature RH has not lowered by 5°C or more.	**Drive motor driver RH defect**

STEP5

Turn off the key switch and disconnect the battery plug.

Check the inside of connector CN112,113 and the caulked portion of wire whether it has defect or not by visual confirm. (Refer to BEFORE TROUBLESHOOTING)

After joint the connector, connect the battery plug and turn on the key switch. Then apply the cooling fan compulsorily by using Active Test and check the rotary condition.

STD
[ANL] 7 ACT (7 05)
Multi-function display
[ANL] ACTIVE TEST 2/3

FAN1 : OFF → ON

Judgment

Result	Procedure
Running	**Connector contact defect**
Not running	Go to step 6

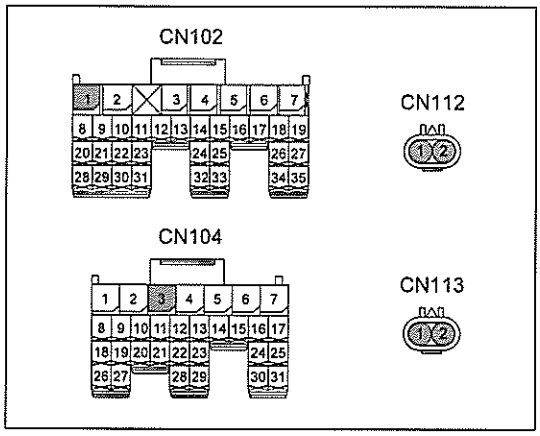
STEP6

Inspection : Harness

Turn off the key switch and disconnect the battery plug.

Disconnect the CN102, CN104, CN112 and CN113 connectors and check the harnesses.

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[Inspection procedure and standard]

Inspect for continuity and short circuiting of the harness.

Perform this check with the battery plug and the CN102, CN104, CN112 and CN113 connectors disconnected, and visually check inside the connector and the caulked portion of its wire for defects.

Refer to BEFORE TROUBLESHOOTING

Portion to be inspected	Standard:
CN102-1 to CN112-2	Continuity
CN102-1 to CN113-2	Continuity
CN104-3 to CN112-1	Continuity
CN104-3 to CN113-1	Continuity
CN102-1 to CN104-3	No continuity

Judgment

Result	Procedure
NG	**Harness defect**
OK	Go to step 7

STEP7

Inspection : Cooling fan

Disconnect the battery plug, then connect the CN102, CN104, CN112 and CN113 connectors. Reconnect the battery plug and turn on the key switch.

Apply the cooling fan compulsorily by using Active Test and check the rotary condition.

STD
[ANL] 7 ACT (7 05)
Multi-function display
[ANL] ACTIVE TEST 2/3

FAN1 : OFF → ON

Judgment

Result	Procedure
Running	**Connector contact defect**
Not running	**Cooling fan defect** **After replacing cooling fan, if the fan is not running by applying the cooling fan compulsorily by using Active Test and, it is possible of other defect. So replace the main controller.**

Error Code: A0-2

Failure mode: Pump motor driver power-circuit abnormality

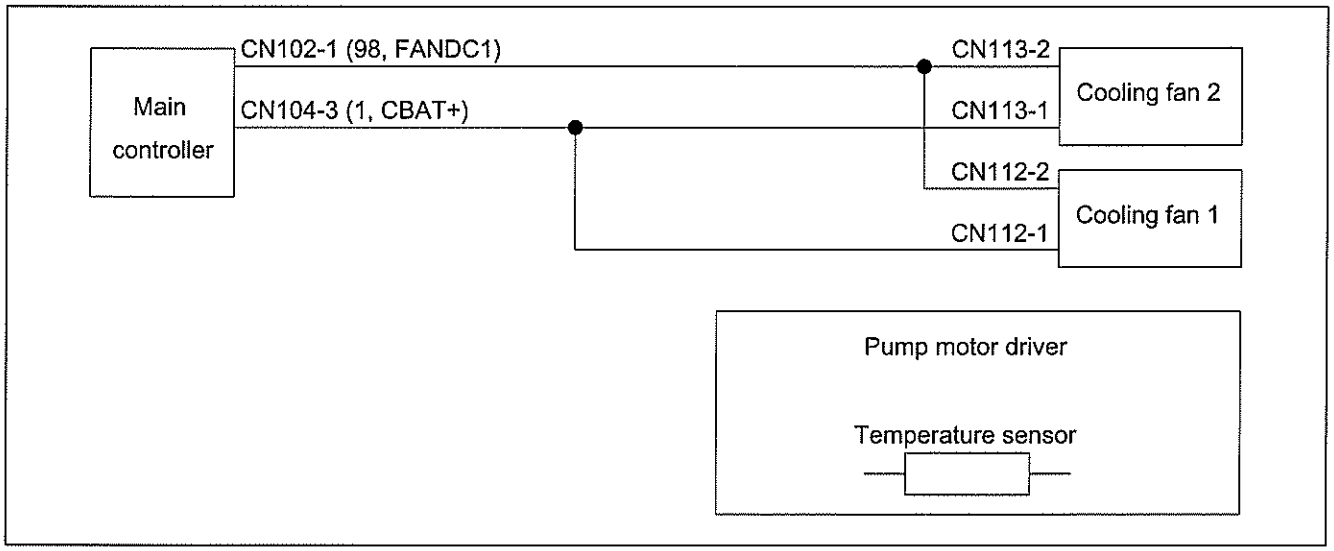
⚠ CAUTION

- **If AB-1 occurs at same time, perform troubleshooting for AB-1 first.**
- **Disconnect the battery plug, and confirm whether is in the conclusion part of the power cable and motor cable loosen.**
- **Do not leave the vehicle standing in a hot place.**

Probable cause

- The power cable and motor cable tightening is defective.
- Connector contact defect
- Harness defect
- Cooling fan clogging
- Cooling fan defect
- Overheating (continuous overload operation)
- Pump motor driver defect
- Main controller defect

Related portion



STEP1

Apply the cooling fan compulsorily by using Active Test and check the rotary condition.

STD
[ANL] 7 ACT (7 05)
Multi-function display
[ANL] ACTIVE TEST 2/3
FAN1 : OFF → ON

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Judgment

Result	Procedure
Not running	Go to step 5
Running	Go to step 2

STEP2

Inspection :

Reconfirm the error

Turn on the key switch and check the error occurs.

Judgment

Result	Procedure
"PCR" occurs.	Go to step 3
"PCR" does not occur.	**Overheating (continuous overload operation)** **After falling temperature of pump motor driver, "PCR" is disappeared and the truck can be operated as usual. It is estimated that the continuously running in overloaded condition cause this error. So check the usage condition of the truck and hold back the continuously running in a overloaded condition.**

STEP3

Inspection :

Check the temperature and reconfirm the error.

STD
[ANL] 2 IO1 (2 10)
Multi-function display
[ANL] I/O TEMP/VOLT 3/6
TPMDH

Record the temperature of the pump motor driver power-circuit.

Turn off the key switch and leave the truck for approximately for fifteen minutes. Then turn on the key switch and check the error occurs.

Judgment

Result	Procedure
"PCR" occurs.	Go to step 4
"PCR" does not occur.	**Overheating (continuous overload operation)** **After falling temperature of pump motor driver, "PCR" is disappeared and the truck can be operated as usual. It is estimated that the continuously running in overloaded condition cause this error. So check the usage condition of the truck and hold back the continuously running in a overloaded condition.**

STEP4

Inspection :

Reconfirm the temperature

STD
[ANL] 2 IO1 (2 10)
Multi-function display
[ANL] I/O TEMP/VOLT 3/6

TPMDH

Check the pump motor driver power-circuit temperature and compare to the recorded value.

Judgment

Result	Procedure
It has lowered by 5°C or more.	Go to step 3
It has not lowered by 5°C or more.	**Pump motor driver defect**

STEP5

Turn off the key switch and disconnect the battery plug.

Check the inside of connector CN112,113 and the caulked portion of wire whether it has defect or not by visual confirm. (Refer to BEFORE TROUBLESHOOTING)

After joint the connector, connect the battery plug and turn on the key switch. Then apply the cooling fan compulsorily by using Active Test and check the rotary condition.

STD
[ANL] 7 ACT (7 05)
Multi-function display
[ANL] ACTIVE TEST 2/3

FAN1 : OFF → ON

Judgment

Result	Procedure
Running	**Connector contact defect**
Not running	Go to step 6

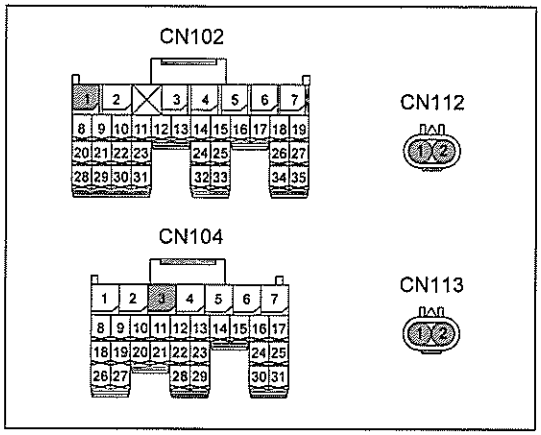
STEP6

Inspection : Harness

Turn off the key switch and disconnect the battery plug.

Disconnect the CN102, CN104, CN112 and CN113 connectors and check the harnesses.

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[Inspection procedure and standard]

Inspect for continuity and short circuiting of the harness.

Perform this check with the battery plug and the CN102, CN104, CN112 and CN113 connectors disconnected, and visually check inside the connector and the caulked portion of its wire for defects.

Refer to BEFORE TROUBLESHOOTING

Measurement terminals	Standard:
CN102-1 to CN112-2	Continuity
CN102-1 to CN113-2	Continuity
CN104-3 to CN112-1	Continuity
CN104-3 to CN113-1	Continuity
CN102-1 to CN104-3	No continuity

Judgment

Result	Procedure
NG	**Harness defect**
OK	Go to step 7

STEP7

Inspection : Cooling fan

Disconnect the battery plug, then connect the CN102, CN104, CN112 and CN113 connectors. Reconnect the battery plug and turn on the key switch.

Apply the cooling fan compulsorily by using Active Test and check the rotary condition.

STD
[ANL] 7 ACT (7 05)
Multi-function display
[ANL] ACTIVE TEST 2/3
FAN1 : OFF → ON

Judgment

Result	Procedure
Running	**Connector contact defect**
Not running	**Cooling fan defect** **After replacing cooling fan, if the fan is not running by applying the cooling fan compulsorily by using Active Test and, it is possible of other defect. So replace the main controller.**

Error Code: A1-1

Failure mode: Main controller high voltage

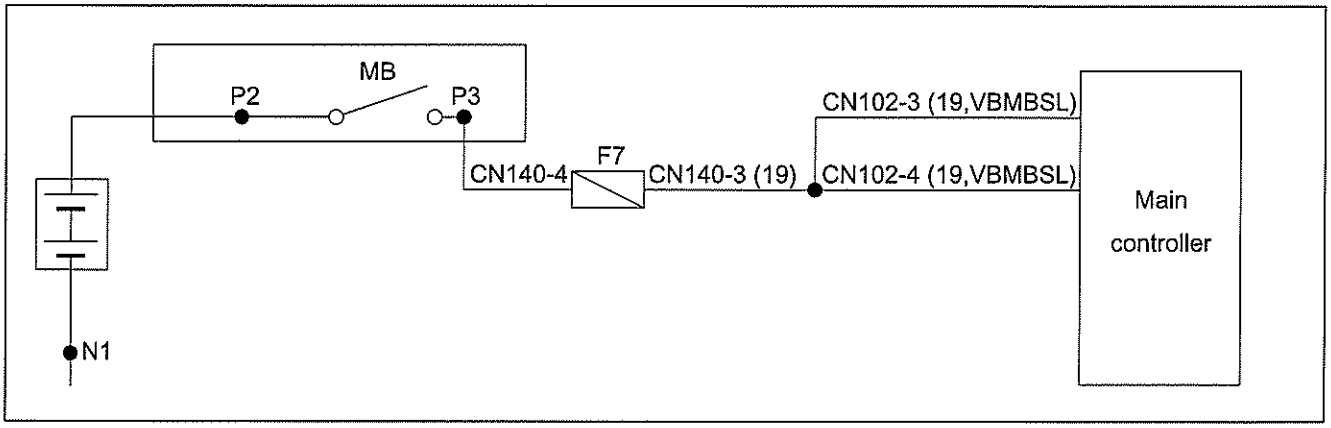
⚠ CAUTION

- **If CB-1,CB-3 or CB-5 occurs at same time A1-1, perform troubleshooting for CB-1,CB-3 or CB-5 first.**

Probable cause

- Battery defect
- Out of battery electrolyte
- Battery plug defect
- Battery overvoltage
- The battery plug was disconnected during traveling / load handling
- Main controller defect

Related portion



STEP1

Turn off the key switch and disconnect the battery plug , then leave over 2 minutes.

Reconnect the battery plug and turn on the key switch to confirm error.

Judgment

Result	Procedure
A1-1 error occurs.	Go to step 3
A3-1 error occurs.	**Perform troubleshooting for A3-1.**
A1-1, A3-1 error does not occur.	Go to step 2

STEP2

Check if disconnect the battery plug during traveling or load handling.

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Judgment

Result	Procedure
YES	**Do not disconnect the battery plug during traveling or load handling.**
NO	**Check the battery.**

STEP3

Inspection : Battery voltage check

1 . Turn the key switch OFF and disconnect the battery plug.

2 . Measure the voltage between both ends of the battery plug with a circuit tester.

Judgment

Result	Procedure
64V or more	**Check the battery.**
Less than 64V	**Main controller defect**

Error Code: A1-2

Failure mode: Drive motor driver LH high voltage

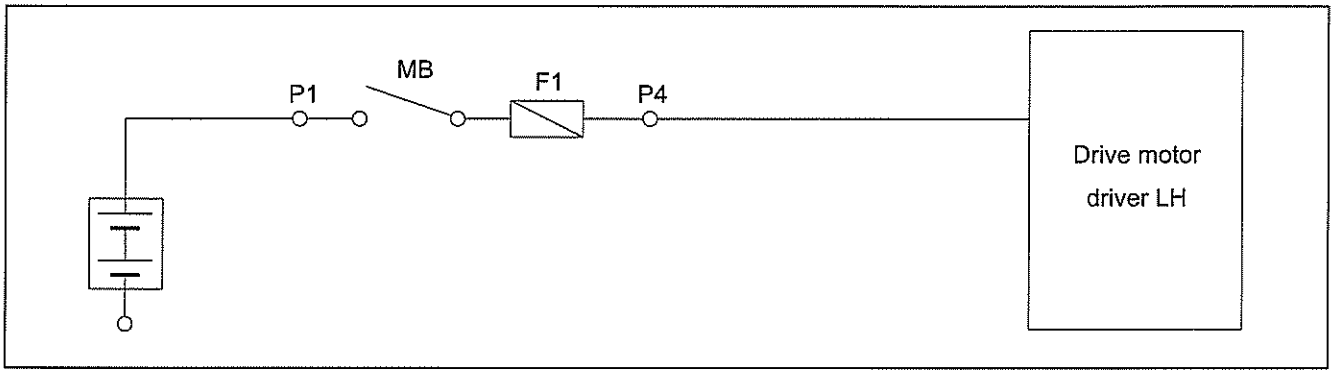
⚠ CAUTION

- **If CB-1,CB-3 or CB-5 occurs at same time A1-2, perform troubleshooting for CB-1,CB-3 or CB-5 first.**

Probable cause

- Battery defect
- Out of battery electrolyte
- Battery plug defect
- Battery overvoltage
- The battery plug was disconnected during traveling / load handling
- Drive motor driver LH defect

Related portion



STEP1

Turn off the key switch and disconnect the battery plug , then leave over 2 minutes.

Reconnect the battery plug and turn on the key switch to confirm error.

Judgment

Result	Procedure
A1-2 error occurs.	Go to step 3
A3-1 error occurs.	**Perform troubleshooting for A3-1.**
A1-2, A3-1 error does not occur.	Go to step 2

STEP2

Check if disconnect the battery plug during traveling or load handling.

Judgment

Result	Procedure
YES	**Do not disconnect the battery plug during traveling or load handling.**
NO	**Check the battery.**

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STEP3

Inspection : Battery voltage check

1 . Turn the key switch OFF and disconnect the battery plug.

2 . Measure the voltage between both ends of the battery plug with a circuit tester.

Judgment

Result	Procedure
64V or more	**Check the battery.**
Less than 64V	**Drive motor driver LH defect**

Error Code: A1-3

Failure mode: Drive motor driver RH high voltage

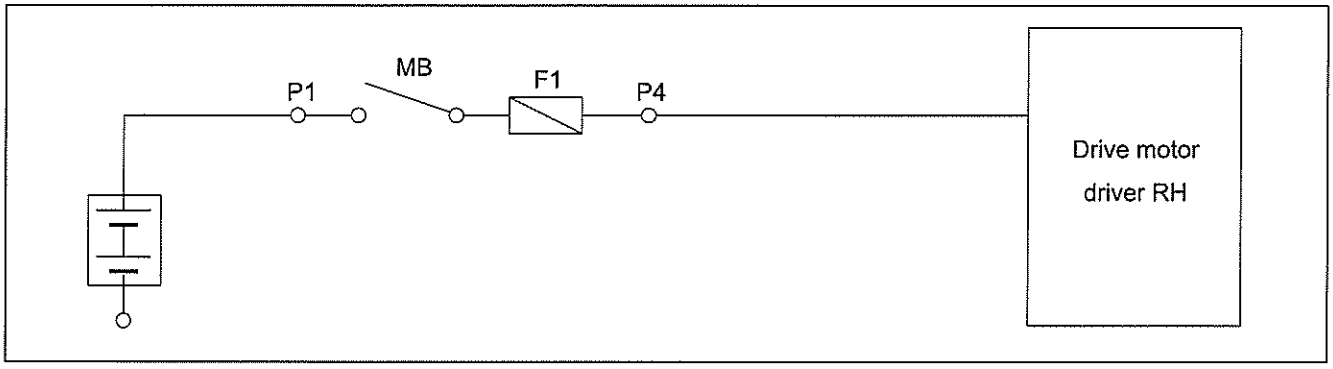
⚠ CAUTION

- **If CB-1,CB-3 or CB-5 occurs at same time A1-3, perform troubleshooting for CB-1,CB-3 or CB-5 first.**

Probable cause

- Battery defect
- Out of battery electrolyte
- Battery plug defect
- Battery overvoltage
- The battery plug was disconnected during traveling / load handling
- Drive motor driver RH defect

Related portion



STEP1

Turn off the key switch and disconnect the battery plug , then leave over 2 minutes.

Reconnect the battery plug and turn on the key switch to confirm error.

Judgment

Result	Procedure
A1-3 error occurs.	Go to step 3
A3-1 error occurs.	**Perform troubleshooting for A3-1.**
A1-3, A3-1 error does not occur.	Go to step 2

STEP2

Check if disconnect the battery plug during traveling or load handling.

Judgment

Result	Procedure
YES	**Do not disconnect the battery plug during traveling or load handling.**
NO	**Check the battery.**

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STEP3

Inspection : Battery voltage check

1 . Turn the key switch OFF and disconnect the battery plug.

2 . Measure the voltage between both ends of the battery plug with a circuit tester.

Judgment

Result	Procedure
64V or more	**Check the battery.**
Less than 64V	**Drive motor driver RH defect**

Error Code: A1-4

Failure mode: Pump motor driver high voltage

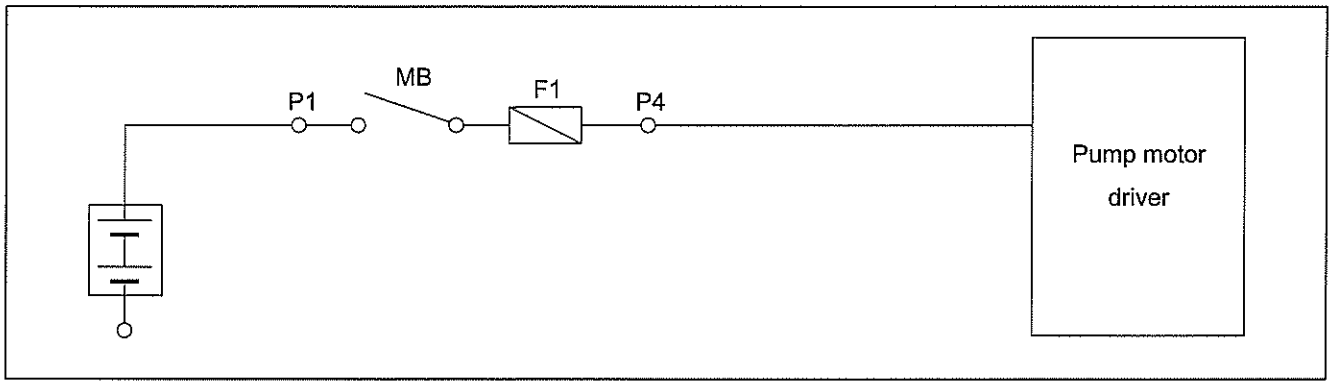
⚠ CAUTION

- **If CB-1,CB-3 or CB-5 occurs at same time A1-4, perform troubleshooting for CB-1,CB-3 or CB-5 first.**

Probable cause

- Battery defect
- Out of battery electrolyte
- Battery plug defect
- Battery overvoltage
- The battery plug was disconnected during traveling / load handling
- Pump motor driver defect

Related portion



STEP1

Turn off the key switch and disconnect the battery plug , then leave over 2 minutes.

Reconnect the battery plug and turn on the key switch to confirm error.

Judgment

Result	Procedure
A1-4 error occurs.	Go to step 3
A3-1 error occurs.	**Perform troubleshooting for A3-1.**
A1-4, A3-1 error does not occur.	Go to step 2

STEP2

Check if disconnect the battery plug during traveling or load handling.

Judgment

Result	Procedure
YES	**Do not disconnect the battery plug during traveling or load handling.**
NO	**Check the battery.**

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STEP3

Inspection : Battery voltage check

1 . Turn the key switch OFF and
disconnect the battery plug.

2 . Measure the voltage between both ends of the battery plug with a circuit tester.

Judgment

Result	Procedure
64V or more	**Check the battery.**
Less than 64V	**Pump motor driver defect**

Error Code: A2-1

Failure mode: Main controller overheating abnormality

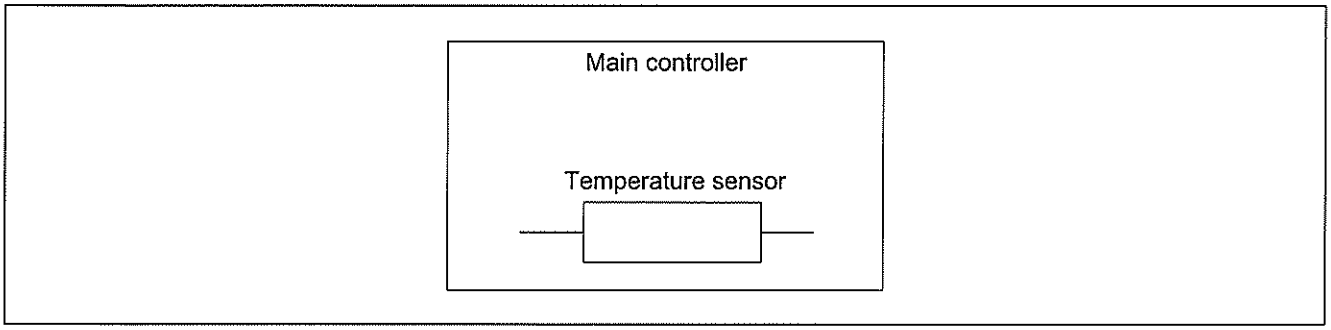
⚠ CAUTION

- **Do not leave the vehicle standing in a hot place.**

Probable cause

- Overheating (continuous overload operation)
- Temperature sensor defect (Main controller defect)

Related portion



STEP1

Inspection :

Reconfirm the error

Turn on the key switch and check the error occurs.

Judgment

Result	Procedure
"C/R" occurs.	Go to step 2
"C/R" does not occur.	**Overheating (continuous overload operation)** **After falling temperature of main controller, "C/R" is disappeared and the truck can be operated as usual. It is estimated that the continuously running in overloaded condition cause this error. So check the usage condition of the truck and hold back the continuously running in a overloaded condition.**

STEP2

Inspection :

Check the main controller board temperature and reconfirm the error.

STD
[ANL] 2 IO1 (2 13)
Multi-function display
[ANL] I/O TEMP/VOLT 4/6

TMCB

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Record the main controller board temperature.

Turn off the key switch and leave the truck for approximately for thirty minutes. Then turn on the key switch and check the error occurs.

Judgment

Result	Procedure
"C/R" occurs.	Go to step 3
"C/R" does not occur.	**Overheating (continuous overload operation)** **After falling temperature of main controller, "C/R" is disappeared and the truck can be operated as usual. It is estimated that the continuously running in overloaded condition cause this error. So check the usage condition of the truck and hold back the continuously running in a overloaded condition.**

STEP3

Inspection :

Reconfirm the the main controller board temperature.

STD
[ANL] 2 IO1 (2 13)
Multi-function display
[ANL] I/O TEMP/VOLT 4/6

TMCB

Check the main controller board temperature and compare to the recorded value.

Judgment

Result	Procedure
It has lowered by 5°C or more.	Go to step 2
It has not lowered by 5°C or more.	**Temperature sensor defect (Main controller defect)**

Error Code: A2-2

Failure mode: Drive motor driver circuit board / the condenser overheating abnormality.

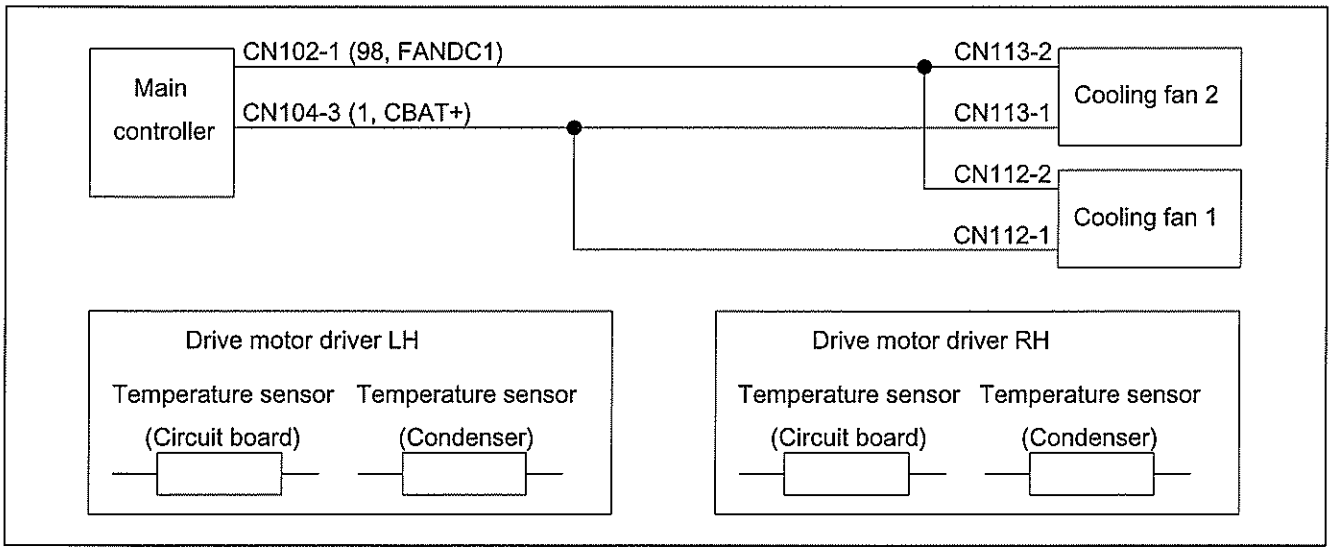
⚠ CAUTION

- **If AB-1 occurs at same time, perform troubleshooting for AB-1 first.**
- **Disconnect the battery plug, and confirm whether is in the conclusion part of the power cable and motor cable loosen.**
- **Do not leave the vehicle standing in a hot place.**

Probable cause

- The power cable and motor cable tightening is defective.
- Connector contact defect
- Harness defect
- Cooling fan clogging
- Cooling fan defect
- Overheating (continuous overload operation)
- Drive motor driver LH defect
- Drive motor driver RH defect
- Main controller defect

Related portion



STEP1

Apply the cooling fan compulsorily by using Active Test and check the rotary condition.

STD
[ANL] 7 ACT (7 05)
Multi-function display
[ANL] ACTIVE TEST 2/3
FAN1 : OFF → ON

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Judgment

Result	Procedure
Not running	Go to step 5
Running	Go to step 2

STEP2

Inspection :

Reconfirm the error

Turn on the key switch and check the error occurs.

Judgment

Result	Procedure
"DCR" occurs.	Go to step 3
"DCR" does not occur.	**Overheating (continuous overload operation)** **After falling temperature of drive motor driver, "DCR" is disappeared and the truck can be operated as usual. It is estimated that the continuously running in overloaded condition cause this error. So check the usage condition of the truck and hold back the continuously running in a overloaded condition.**

STEP3

Inspection :

Check the temperature and reconfirm the error.

STD
[ANL] 2 IO1 (2 05, 2 06, 2 07, 2 08)
Multi-function display
[ANL] I/O TEMP/VOLT 2/6

TDMDB, TDMDC

Record the temperature of drive motor driver circuit board and drive motor driver condenser.

Turn off the key switch and leave the truck for approximately for thirty minutes. Then turn on the key switch and check the error occurs.

Judgment

Result	Procedure
"DCR" occurs.	Go to step 4
"DCR" does not occur.	**Overheating (continuous overload operation)** **After falling temperature of drive motor driver, "DCR" is disappeared and the truck can be operated as usual. It is estimated that the continuously running in overloaded condition cause this error. So check the usage condition of the truck and hold back the continuously running in a overloaded condition.**

STEP4

Inspection :

Reconfirm the temperature

STD
[ANL] 2 IO1 (2 05, 2 06, 2 07, 2 08)
Multi-function display
[ANL] I/O TEMP/VOLT 2/6

TDMDB, TDMDC

Check the the temperature of drive motor driver circuit board and drive motor driver condenser. Then compare to the recorded value.

Judgment

Result	Procedure
All temperatures has lowered by 5°C or more.	Go to step 3
Either drive motor driver circuit board temperature, (drive motor driver) condenser LH or both has lowered by 5°C or more.	**Drive motor driver LH defect**
Either drive motor driver circuit board temperature, (drive motor driver) condenser RH or both has lowered by 5°C or more.	**Drive motor driver RH defect**

STEP5

Turn off the key switch and disconnect the battery plug.

Check the inside of connector CN112,113 and the caulked portion of wire whether it has defect or not by visual confirm. (Refer to BEFORE TROUBLESHOOTING)

After joint the connector, connect the battery plug and turn on the key switch. Then apply the cooling fan compulsorily by using Active Test and check the rotary condition.

STD
[ANL] 7 ACT (7 05)
Multi-function display
[ANL] ACTIVE TEST 2/3

FAN1 : OFF → ON

Judgment

Result	Procedure
Running	**Connector contact defect**
Not running	Go to step 6

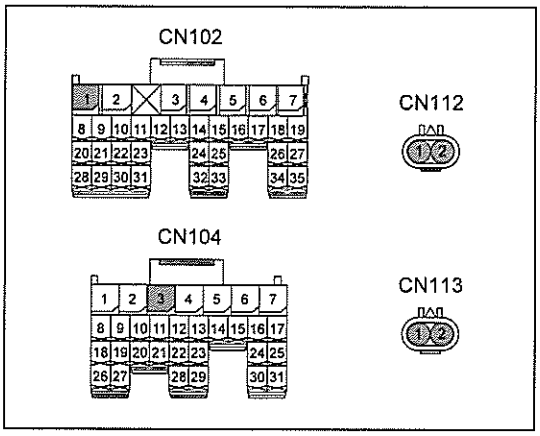
STEP6

Inspection : Harness

Turn off the key switch and disconnect the battery plug.

Disconnect the CN102, CN104, CN112 and CN113 connectors and check the harnesses.

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[Inspection procedure and standard]

Inspect for continuity and short circuiting of the harness.

Perform this check with the battery plug and the CN102, CN104, CN112 and CN113 connectors disconnected, and visually check inside the connector and the caulked portion of its wire for defects.

Refer to BEFORE TROUBLESHOOTING

Portion to be inspected	Standard:
CN102-1 to CN112-2	Continuity
CN102-1 to CN113-2	Continuity
CN104-3 to CN112-1	Continuity
CN104-3 to CN113-1	Continuity
CN102-1 to CN104-3	No continuity

Judgment

Result	Procedure
NG	**Harness defect**
OK	Go to step 7

STEP7

Inspection : Cooling fan

Disconnect the battery plug, then connect the CN102, CN104, CN112 and CN113 connectors. Reconnect the battery plug and turn on the key switch.

Apply the cooling fan compulsorily by using Active Test and check the rotary condition.

STD
[ANL] 7 ACT (7 05)
Multi-function display
[ANL] ACTIVE TEST 2/3

FAN1 : OFF → ON

Judgment

Result	Procedure
Running	**Connector contact defect**
Not running	**Cooling fan defect** **After replacing cooling fan, if the fan is not running by applying the cooling fan compulsorily by using Active Test and, it is possible of other defect. So replace the main controller.**

Error Code: A2-3

Failure mode: Pump motor driver circuit board / the condenser overheating abnormality.

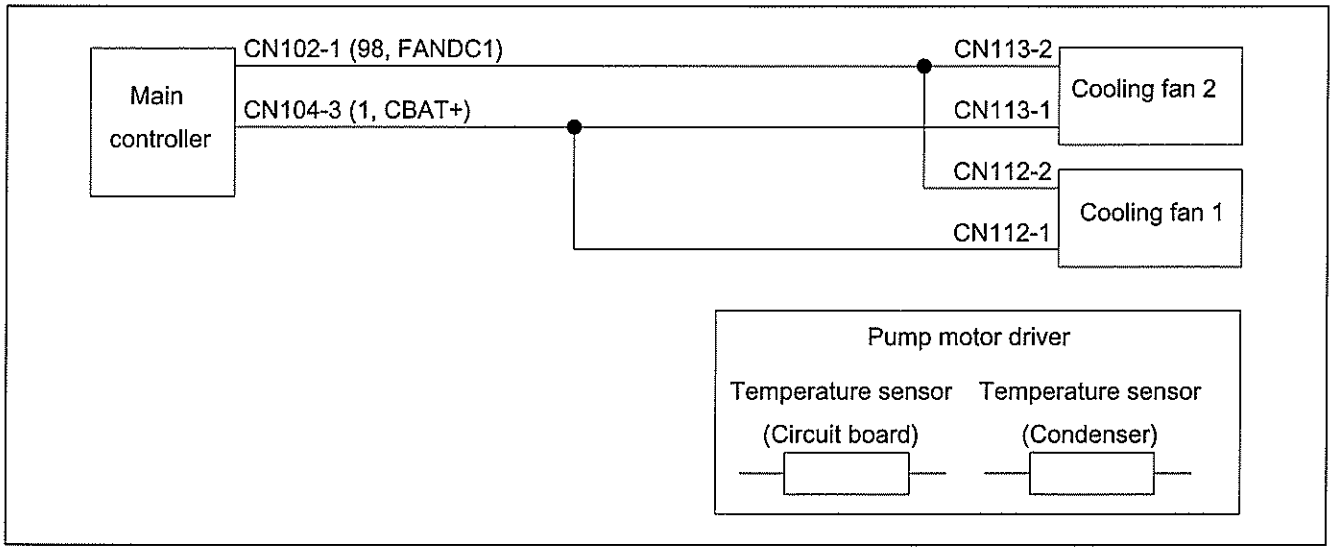
⚠ CAUTION

- **If AB-1 occurs at same time, perform troubleshooting for AB-1 first.**
- **Disconnect the battery plug, and confirm whether is in the conclusion part of the power cable motor and cable loosen.**
- **Do not leave the vehicle standing in a hot place.**

Probable cause

- The power cable and motor cable tightening is defective.
- Connector contact defect
- Harness defect
- Cooling fan clogging
- Cooling fan defect
- Overheating (continuous overload operation)
- Pump motor driver defect
- Main controller defect

Related portion



STEP1

Apply the cooling fan compulsorily by using Active Test and check the rotary condition.

STD
[ANL] 7 ACT (7 05)
Multi-function display
[ANL] ACTIVE TEST 2/3

FAN1 : OFF → ON

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Judgment

Result	Procedure
Not running	Go to step 5
Running	Go to step 2

STEP2

Inspection :

Reconfirm the error

Turn on the key switch and check the error occurs.

Judgment

Result	Procedure
"PCR" occurs.	Go to step 3
"PCR" does not occur.	**Overheating (continuous overload operation)** **After falling temperature of pump motor driver, "PCR" is disappeared and the truck can be operated as usual. It is estimated that the continuously running in overloaded condition cause this error. So check the usage condition of the truck and hold back the continuously running in a overloaded condition.**

STEP3

Inspection :

Check the temperature and reconfirm the error.

STD
[ANL] 2 IO1 (2 11, 2 12)
Multi-function display
[ANL] I/O TEMP/VOLT 3/6

TPMDB, TPMDC

Record the temperature of pump motor driver circuit board and pump motor driver condenser.

Turn off the key switch and leave the truck for approximately for thirty minutes. Then turn on the key switch and check the error occurs.

Judgment

Result	Procedure
"PCR" occurs.	Go to step 4
"PCR" does not occur.	**Overheating (continuous overload operation)** **After falling temperature of pump motor driver, "PCR" is disappeared and the truck can be operated as usual. It is estimated that the continuously running in overloaded condition cause this error. So check the usage condition of the truck and hold back the continuously running in a overloaded condition.**

STEP4

Inspection :

Reconfirm the temperature

STD
[ANL] 2 IO1 (2 11, 2 12)
Multi-function display
[ANL] I/O TEMP/VOLT 3/6

TPMDB, TPMDC

Check the the temperature of pump motor driver circuit board and pump motor driver condenser. Then compare to the recorded value.

Judgment

Result	Procedure
All temperature has lowered by 5°C or more.	Go to step 3
Either pump motor driver circuit board temperature, (pump motor driver) condenser or both has lowered by 5°C or more.	**Pump motor driver defect**

STEP5

Turn off the key switch and disconnect the battery plug.

Check the inside of connector CN112,113 and the caulked portion of wire whether it has defect or not by visual confirm. (Refer to BEFORE TROUBLESHOOTING)

After joint the connector, connect the battery plug and turn on the key switch. Then apply the cooling fan compulsorily by using Active Test and check the rotary condition.

STD
[ANL] 7 ACT (7 05)
Multi-function display
[ANL] ACTIVE TEST 2/3

FAN1 : OFF → ON

Judgment

Result	Procedure
Running	**Connector contact defect**
Not running	Go to step 6

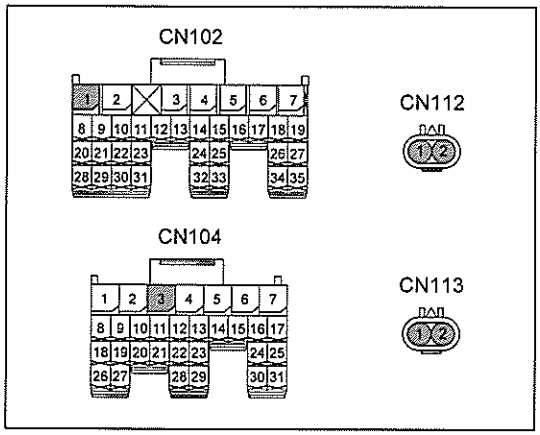
STEP6

Inspection : Harness

Turn off the key switch and disconnect the battery plug.

Disconnect the CN102, CN104, CN112 and CN113 connectors and check the harnesses.

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[Inspection procedure and standard]

Inspect for continuity and short circuiting of the harness.

Perform this check with the battery plug and the CN102, CN104, CN112 and CN113 connectors disconnected, and visually check inside the connector and the caulked portion of its wire for defects.

Refer to BEFORE TROUBLESHOOTING

Portion to be inspected	Standard:
CN102-1 to CN112-2	Continuity
CN102-1 to CN113-2	Continuity
CN104-3 to CN112-1	Continuity
CN104-3 to CN113-1	Continuity
CN102-1 to CN104-3	No continuity

Judgment

Result	Procedure
NG	**Harness defect**
OK	Go to step 7

STEP7

Inspection : Cooling fan

Disconnect the battery plug, then connect the CN102, CN104, CN112 and CN113 connectors. Reconnect the battery plug and turn on the key switch.

Apply the cooling fan compulsorily by using Active Test and check the rotary condition.

STD
[ANL] 7 ACT (7 05)
Multi-function display
[ANL] ACTIVE TEST 2/3

FAN1 : OFF → ON

Judgment

Result	Procedure
Running	**Connector contact defect**
Not running	**Cooling fan defect** **After replacing cooling fan, if the fan is not running by applying the cooling fan compulsorily by using Active Test and, it is possible of other defect. So replace the main controller.**

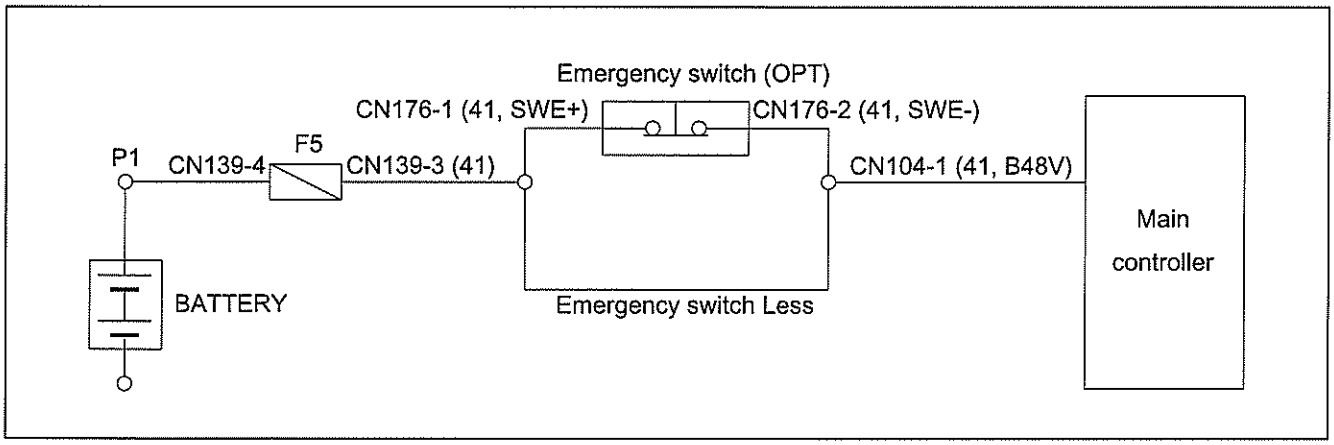
Error Code: A3-1

Failure mode: Battery connection incorrect

Probable cause

- Battery plug connection defect
- Battery connection incorrect
- Battery defect
- Main controller defect

Related portion



STEP1

Turn off the key switch and disconnect the battery plug.

Reconnect the battery plug correctly and turn on the key switch.

Judgment

Result	Procedure
A3-1 error does not occur.	**Battery plug connection defect or battery connection incorrect**
A3-1 error occurs.	Go to step 2

STEP2

Inspection : Battery voltage check

1 . Turn the key switch OFF and disconnect the battery plug.

2 . Measure the voltage between both ends of the battery plug with a circuit tester.

Judgment

Result	Procedure
64V or more	**Check the battery.**
Less than 64V	**Main controller defect**

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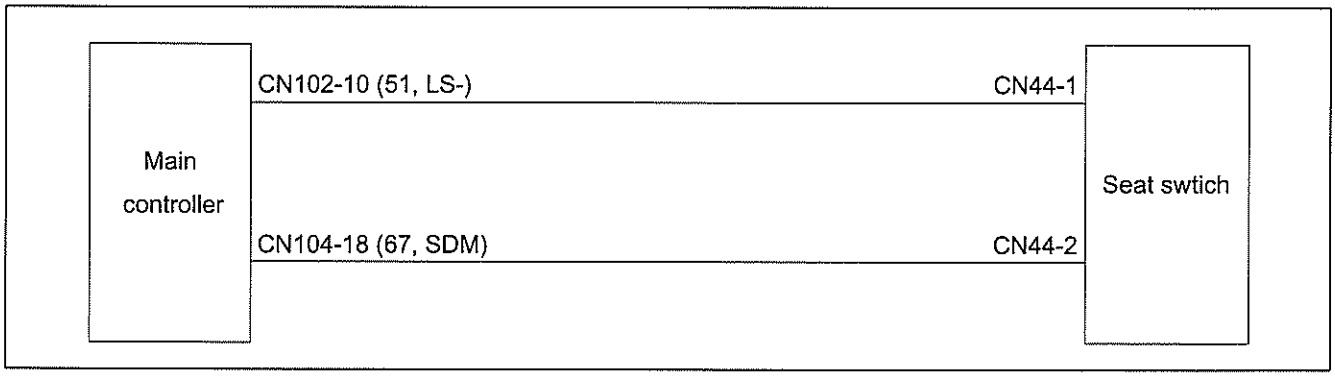
Error Code: A5-1

Failure mode: Seat switch short abnormality

Probable cause

- Connector contact defect
- Seat switch defect
- Harness defect
- Main controller defect

Related portion



STEP1

Inspection :

Check of seat switch condition

Turn off the key switch and disconnect the battery plug, disconnect the CN44 connector, and visually check inside the connector and the caulked portion of its wire for defects. Refer to BEFORE TROUBLESHOOTING

Connect the connector, connect the battery plug, and then turn on the key switch without sitting in the seat.

STD
[ANL] 4 IO3 (4 02)
Multi-function display
[ANL] I/O M.HANDLING 1/8

SDM

Judgment

Result	Procedure
"0 " occurs.	**Connector contact defect**
"1 " occurs.	Go to step 2

STEP2

Inspection :

Check of seat switch condition

Turn off the key switch and disconnect the battery plug.

Disconnect the CN44 connector, connect the battery plug, and turn on the key switch.

STD
[ANL] 4 IO3 (4 02)
Multi-function display
[ANL] I/O M.HANDLING 1/8
SDM

Judgment

Result	Procedure
"0 " occurs.	**Seat switch defect**
"1 " occurs.	Go to step 3

STEP3

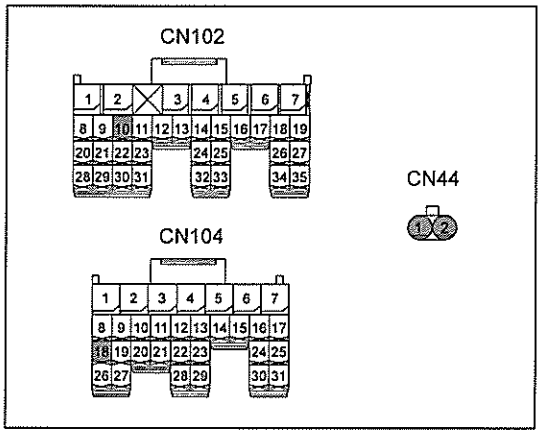
Inspection : Harness

Turn off the key switch and disconnect the battery plug.

Disconnect the CN102, CN104 and CN44 connectors and check the harnesses.

[Inspection procedure and standard]

Inspect for continuity and short circuiting of the harness.



Perform this check with the battery plug and the CN102, CN104 and CN44 connectors disconnected, and visually check inside the connector and the caulked portion of its wire for defects.

Refer to BEFORE TROUBLESHOOTING

Portion to be inspected	Standard:
CN102-10(51) to CN44-1(51)	Continuity
CN104-18(67) to CN44-2(67)	Continuity
CN44-1(51) to CN44-2(67)	No continuity

Judgment

Result	Procedure
NG	**Harness defect**
OK	**Main controller defect**

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Error Code: A6-3

Failure mode: Tilt lever switch short abnormality

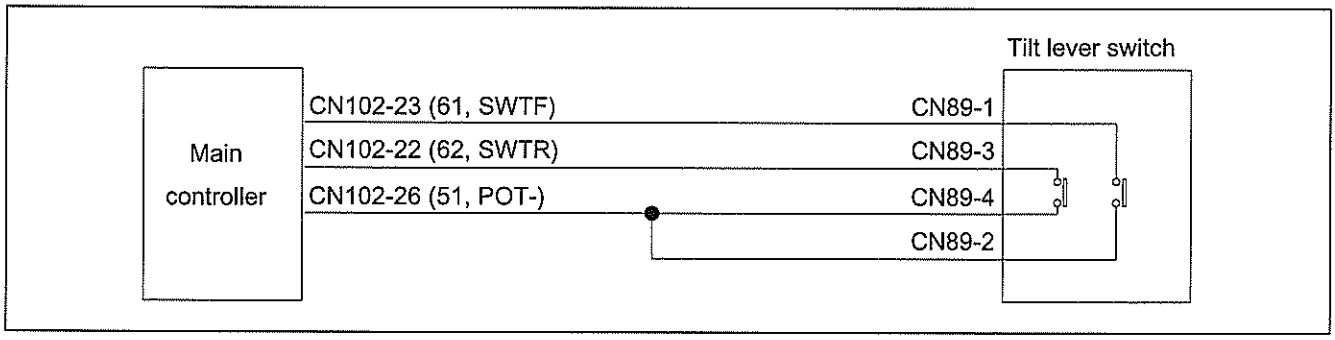
⚠ CAUTION

- **The error may occur if the battery plug is connected and turn on the key switch while the tilt lever is being operated. But if the error does not occur after stopping the tilt lever operation, it is normal.**

Probable cause

- The battery plug is connected while the tilt lever is being operated.
- Connector contact defect
- Tilt lever switch defect
- Tilt lever switch installation defect.
- Harness defect
- Main controller defect

Related portion



STEP1

Connector contact inspection :

Turn off the key switch and disconnect the battery plug.

After disconnection the CN89 connector, check the inside of connector and the caulked portion of wire whether it has defect or not by visual confirm. (Refer to BEFORE TROUBLESHOOTING)

Connect the CN89 connector, connect the battery plug.

Turn on the key switch to see if an error occurs.

Judgment

Result	Procedure
A6-3 error does not occur.	**Connector contact defect**
A6-3 error occurs.	Go to step 2

STEP2

Inspection : Tilt switch

Turn off the key switch and disconnect the battery plug.

Disconnect the CN89 connector.

Reconnect the battery plug and turn on the key switch.

Check if an error occurs.

Judgment

Result	Procedure
A6-3 error does not occur.	**Tilt lever switch defect .** **Tilt lever switch installation defect.**
A6-3 error occurs.	Go to step 3

STEP3

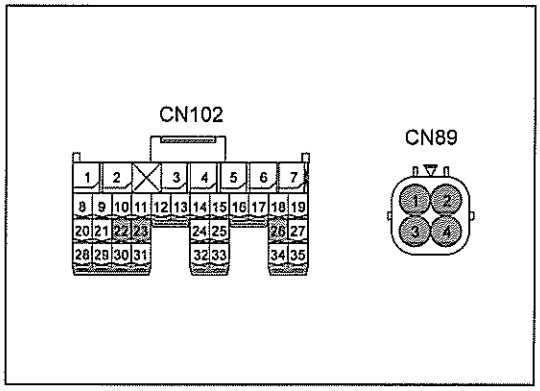
Inspection : Harness

Turn off the key switch and disconnect the battery plug.

Disconnect the CN89 and CN102 connectors and check the harnesses for their continuities.

[Inspection procedure and standard]

Inspect for continuity and short circuiting of the harness.



Perform this check with the battery plug and the CN89 and CN102 connectors disconnected, and visually check inside the connector and the caulked portion of its wire for defects.

Refer to BEFORE TROUBLESHOOTING

Portion to be inspected	Standard:
CN102-23(61) to CN89-1(61)	Continuity
CN102-22(62) to CN89-3(62)	Continuity
CN102-26(51) to CN89-4(51)	Continuity
CN102-26(51) to CN89-2(51)	Continuity
CN102-23(61) to CN102-26(51)	No continuity
CN102-22(62) to CN102-26(51)	No continuity
CN102-23(61) to CN102-22(62)	No continuity

Judgment

Result	Procedure
NG	**Harness defect**
OK	**Main controller defect**

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Error Code: A8-1

Failure mode: F1 fuse open abnormality

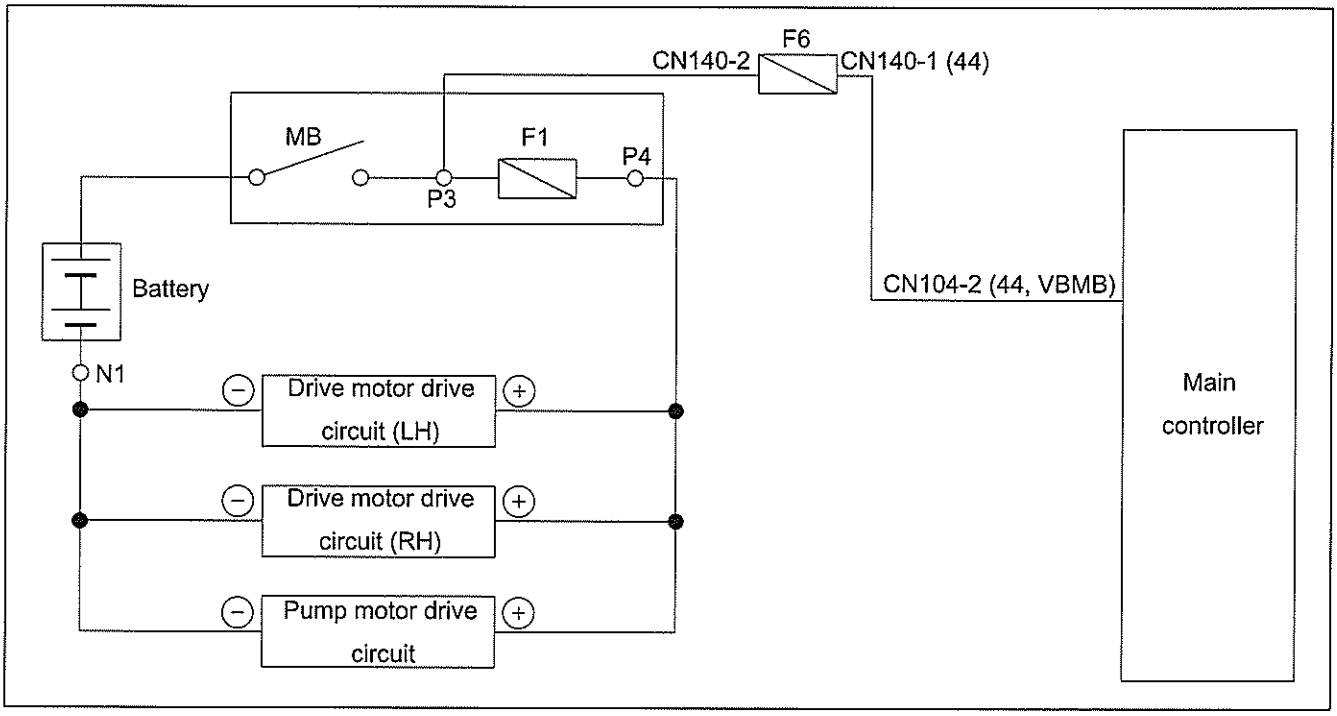
⚠ CAUTION

- **If CB-1, CB-3, CB-5, A8-2 or A9-2 occurs, perform troubleshooting with priority given to CB-1, CB-3, CB-5, A8-2 or A9-2.**

Probable cause

- Tightening the terminal defect
- Motor driver defect
- F1 fuse installation defect
- F1 fuse defect
- Cable defect

Related portion



STEP1

Inspection of tightening the terminal :

Turn off the key switch and disconnect the battery plug.

Visually check each terminal for loose bolts (positive terminal, negative terminal, P4 terminal and N1 terminal of each motor driver).

Connect the battery plug and turn on the key switch to confirm error.

Judgment

Result	Procedure
A8-1 error occurs.	Go to step 2
A8-1 error does not occur.	**Tightening the terminal defect**

STEP2

Check the voltage of power supply for motor driver :

Connect the battery plug, and turn on key switch, then measure the voltage between the positive and negative terminals of motor driver (LH)

[Inspection procedure and standard]

Turn off the key switch, and disconnect the battery plug, then visually check if there is any abnormality of the copper bar for connecting positive terminal and negative terminal. (e.g. break, crack and so on)

Judgment

Result	Procedure
0 V	Go to step 3
Approx. 48 V	**All motor driver defect**

STEP3

F1 fuse installation check

Turn off the key switch and disconnect the battery plug.

Check the mounting F1 fuse it has defect or not by visual confirm.

Connect the battery plug and turn on the key switch to confirm error.

Judgment

Result	Procedure
A8-1 error occurs.	Go to step 4
A8-1 error does not occur.	**F1 fuse installation defect**

STEP4

Inspection : F1 fuse

Turn off the key switch and disconnect the battery plug.

After removing F1 fuse, measure the resistance for both ends of F1 fuse.

[Inspection procedure and standard]

* : Motor driver defect

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Turn off the key switch, and disconnect the battery plug, then remove the copper bar for the connecting positive terminal of motor driver.

Measure the resistance between positive terminal and negative terminal of motor driver.

When using analog tester, apply the black prove for positive terminal and red prove for negative terminal.

Motor drivers are defective if their resistance measured is 10 Ω or less.

Judgment

Result	Procedure
0 Ω	**Motor driver defect ***
∞Ω	**F1 fuse defect** **or motor driver defect, or short between P4 and N1.**

Error Code: A8-2

Failure mode: F6 fuse open abnormality

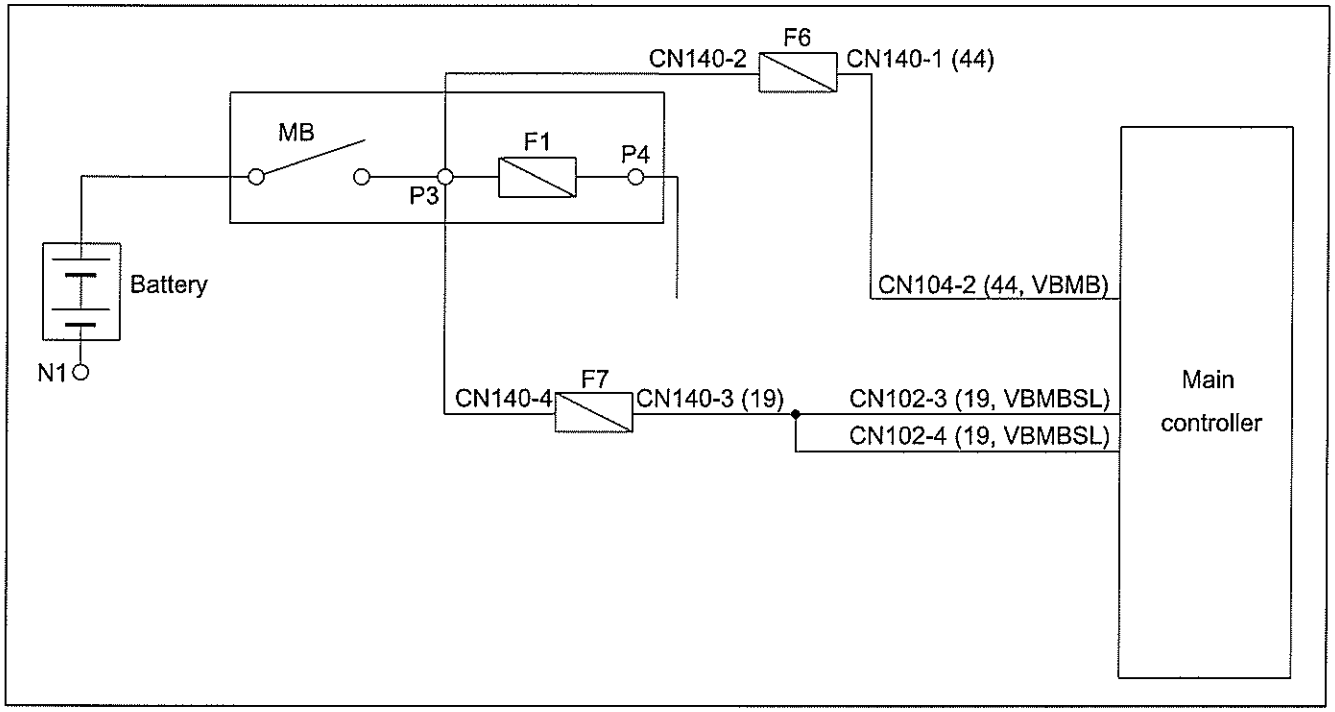
⚠ CAUTION

- **If CB-1, CB-3 or CB-5 occurs, perform troubleshooting with priority given to CB-1, CB-3 or CB-5.**

Probable cause

- Connector contact defect
- F6 fuse installation defect
- F6 fuse defect
- F6 fuse box defect
- Harness defect
- Main controller defect

Related portion



STEP1

Connector contact inspection :

Turn off the key switch and disconnect the battery plug.

After disconnection the CN104 and CN140 connector, check the inside of connector and the caulked portion of wire whether it has defect or not by visual confirm. (Refer to BEFORE TROUBLESHOOTING)

Connect the CN104 and CN140 connector, connect the battery plug.

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Turn on the key switch to see if an error occurs.

Judgment

Result	Procedure
A8-2 error occurs.	Go to step 2
A8-2 error does not occur.	**Connector contact defect**

STEP2

VBMBSL voltage inspection:

Reconnect the battery plug and turn on the key switch.

STD
[ANL] 2 IO1 (2 18)
Multi-function display
[ANL] I/O TEMP/VOLT 5/6
VBMBSL

Judgment

Result	Procedure
25V or more	Go to step 3
Less than 25 V	**Perform CB-1 troubleshooting**

STEP3

Check fuse installation:

Turn off the key switch and disconnect the battery plug.

Check the mounting F6 fuse it has defect or not by visual confirm.

Reconnect the battery plug and turn on the key switch.

Judgment

Result	Procedure
A8-2 error occurs.	Go to step 4
A8-2 error does not occur.	**F6 fuse installation defect**

STEP4

Inspection : F6 fuse

Turn off the key switch and disconnect the battery plug.

After removing F6 fuse, measure the resistance for both ends of F6 fuse.

Judgment

Result	Procedure
0 Ω	Go to step 5

Result	Procedure
∞Ω	**F6 fuse defect** **After replacing F6 fuse, go to STEP6**

STEP5

Inspection : Fuse box

Connect the F6 fuse, and disconnect the connector of F6 fuse box.

Measure the resistance for both ends of the connector for F6 fuse box.

Judgment

Result	Procedure
0 Ω	Go to step 6
∞Ω	**F6 fuse box defect**

STEP6

Inspection : Harness

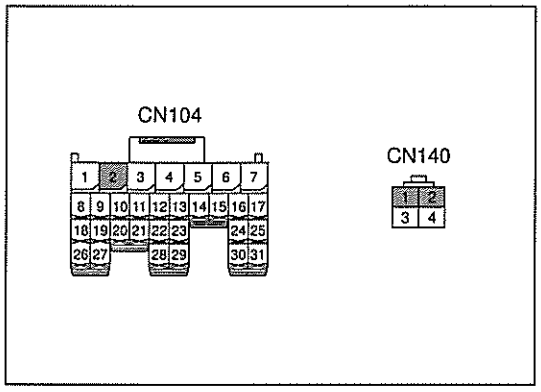
Turn off the key switch and disconnect the battery plug.

If disconnect the F6 fuse box connector in the former step, connect the connector.

Disconnect the CN104 and CN140 connector and check the harnesses.

[Inspection procedure and standard]

Inspect for continuity and short circuiting of the harness.



Perform this check with the battery plug and the CN104 and CN140 connector disconnected, and visually check inside the connector and the caulked portion of its wire for defects.

Refer to BEFORE TROUBLESHOOTING

Portion to be inspected	Standard:
CN104-2(44) to CN140-1(44)	Continuity
CN140-2(44, fuse side) to P3	Continuity
CN104-2(44) to N1	No continuity
CN140-2(44) to N1	No continuity

Judgment

Result	Procedure
OK	**Main controller defect**
NG	**Harness defect**

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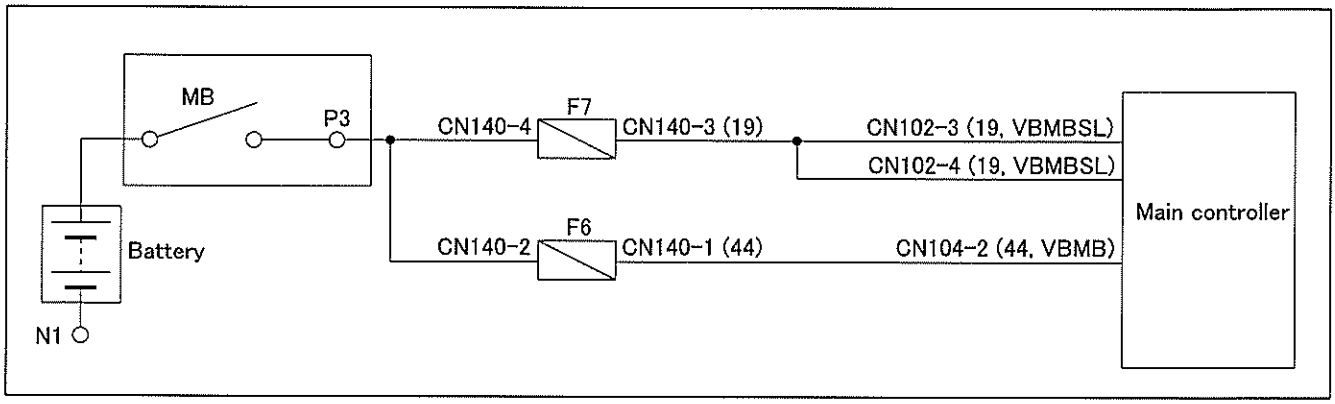
Error Code: A9-2

Failure mode: F7 fuse / solenoid power supply line open abnormality

Probable cause

- Connector contact defect
- F7 fuse installation defect
- F7 fuse defect
- F7 fuse box defect
- Harness defect
- Main controller defect

Related portion



STEP1

Connector contact inspection :

Turn off the key switch and disconnect the battery plug.

After disconnection the CN102 and CN140 connector, check the inside of connector and the caulked portion of wire whether it has defect or not by visual confirm. (Refer to BEFORE TROUBLESHOOTING)

Connect the CN102 and CN140 connector, connect the battery plug.

Turn on the key switch to see if an error occurs.

Judgment

Result	Procedure
No A9-2 error is displayed.	**Connector contact defect**
An A9-2 error is displayed.	Go to step 2

STEP2

VBMB voltage inspection:

Reconnect the battery plug and turn key switch ON.

STD
[ANL] 2 IO1 (2 19)
Multi-function display
[ANL] I/O TEMP/VOLT 5/6
VBMB

Judgment

Result	Procedure
Less than 25V	**Perform CB-1 troubleshooting**
25V or more	Go to step 3

STEP3

Check fuse installation:

Turn off the key switch and disconnect the battery plug.

Check the mounting F7 fuse it has defect or not by visual confirm.

Reconnect the battery plug and turn key switch ON.

Judgment

Result	Procedure
No A9-2 error is displayed.	**F7 fuse installation defect**
An A9-2 error is displayed.	Go to step 4

STEP4

F7 fuse inspection:

Turn off the key switch and disconnect the battery plug.

After removing F7 fuse, measure the resistance for both ends of F7 fuse.

Judgment

Result	Procedure
∞Ω	**F7 fuse defect** **After replacing F7 fuse, go to STEP6**
0Ω	Go to step 5

STEP5

F7 fuse box inspection:

Connect the F7 fuse, and disconnect the connector of fuse box.

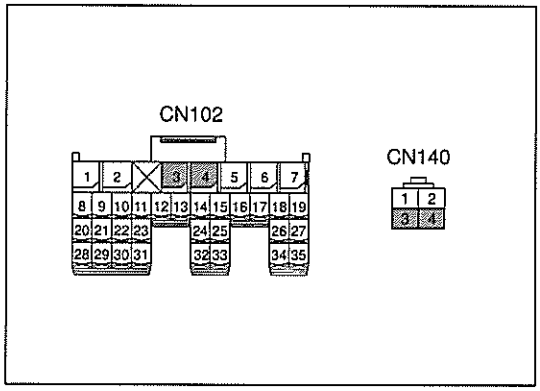
Measure the resistance for both ends of the connector for F7 fuse box.

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Judgment

Result	Procedure
∞Ω	**F7 fuse box defect**
0Ω	Go to step 6

STEP6



Inspect harness :

Turn off the key switch and disconnect the battery plug.

Disconnect the CN102, CN140 connectors and check the harnesses.

[Inspection procedure and standard]

Inspect for continuity and short circuiting of the harness.

Perform this check with the battery plug and the CN102,CN140 connectors disconnected, and visually check inside the connector and the caulked portion of its wire for defects.

Refer to BEFORE TROUBLESHOOTING

Portion to be inspected	Standard:
CN102-3(19) to CN140-3(19)	Continuity
CN102-4(19) to CN140-3(19)	Continuity
CN140-4 to P3	Continuity
CN140-3 (19) to N1	No continuity
CN140-4 to N1	No continuity

Judgment

Result	Procedure
NG	**Harness defect**
OK	**Main controller defect**

Error Code: AA-1

Failure mode: Main controller temperature sensor (open/short) abnormality

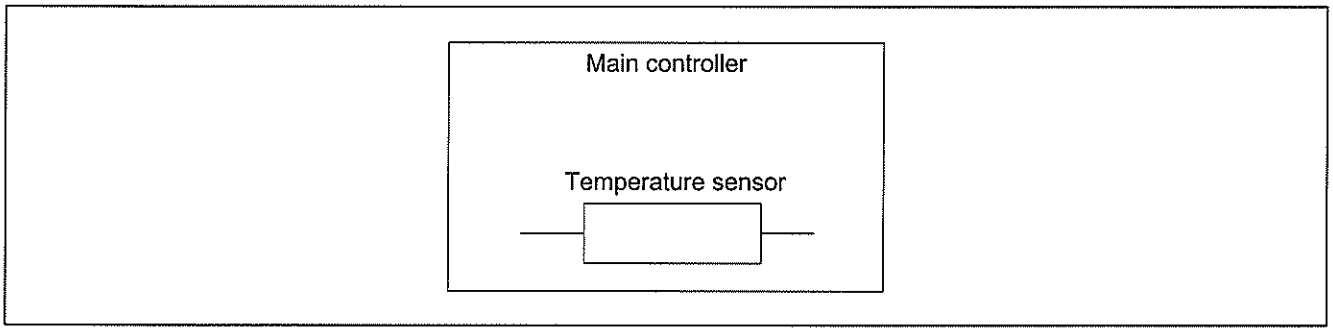
⚠ CAUTION

- **If AA-1 occurs, the Main controller is defective, so replace it.**

Probable cause

- Main controller defect

Related portion



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Error Code: AA-2

Failure mode: Drive motor driver LH board temperature sensor (open/short) abnormality

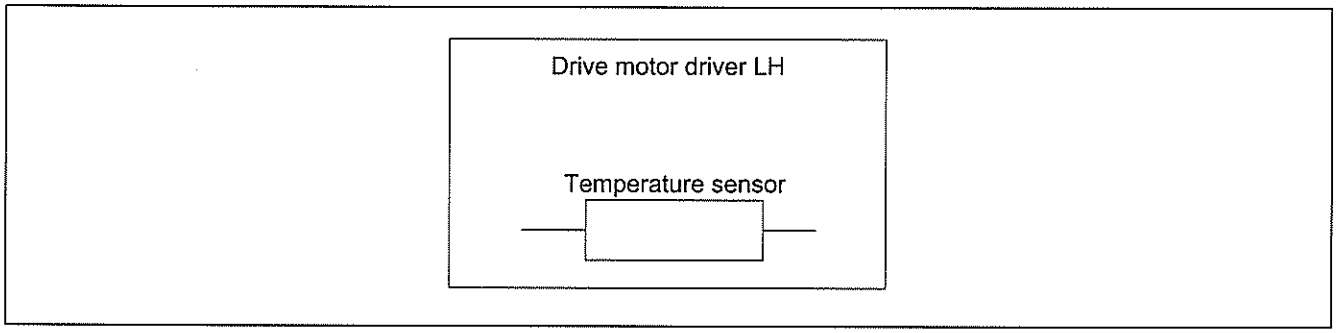
⚠ CAUTION

- **If AA-2 occurs, the drive motor driver circuit is defective, so replace it.**

Probable cause

- Drive motor driver LH defect

Related portion



Error Code: AA-3

Failure mode: Drive motor driver RH board temperature sensor (open/short) abnormality

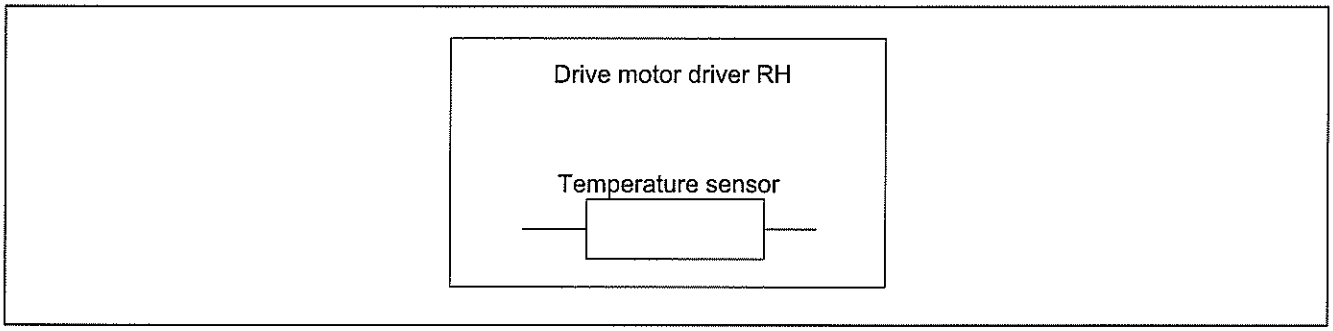
⚠ CAUTION

- **If AA-3 occurs, the drive motor driver circuit is defective, so replace it.**

Probable cause

- Drive motor driver RH defect

Related portion



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Error Code: AA-4

Failure mode: Pump motor driver board temperature sensor (open/short) abnormality

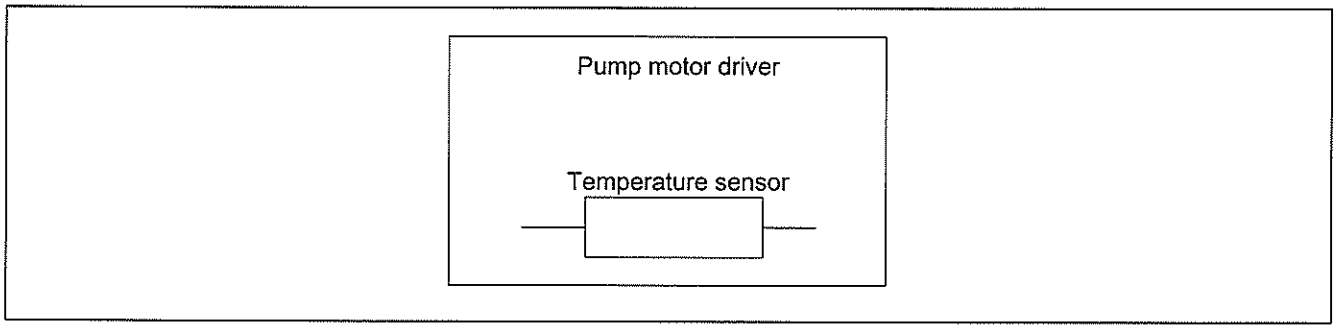
⚠ CAUTION

- **If AA-4 occurs, the pump motor driver circuit is defective, so replace it.**

Probable cause

- Pump motor driver defect

Related portion



Error Code: AB-1

Failure mode: Cooling fan overcurrent

⚠ CAUTION

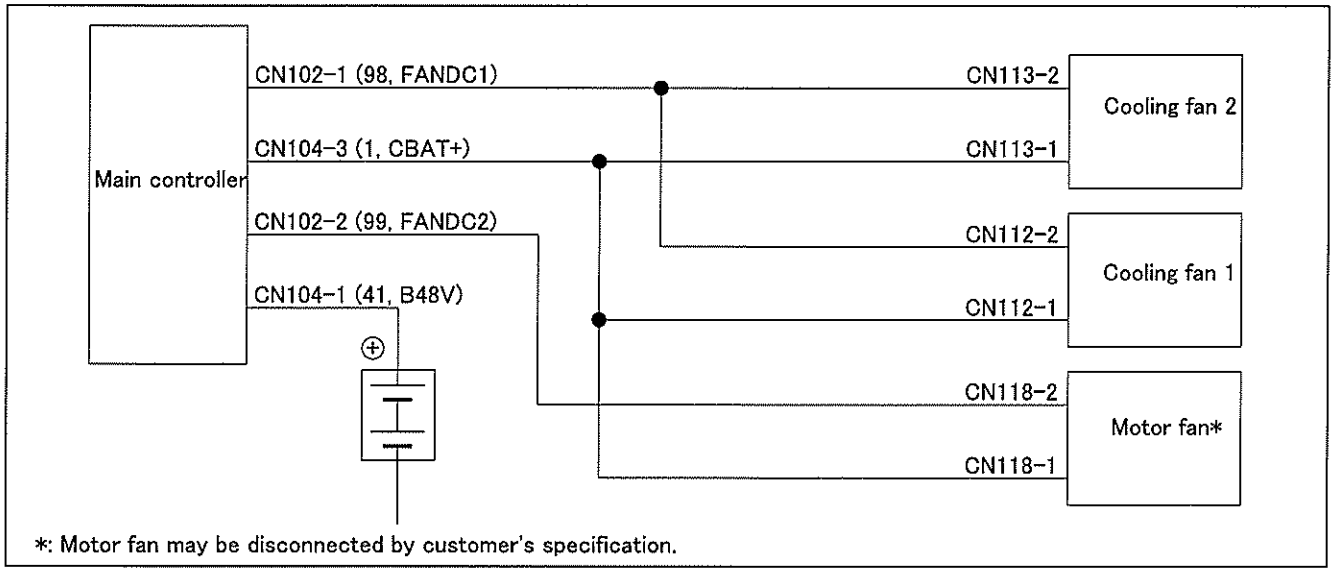
- **When check if AB-1 error occurs, wait 100 seconds after turning on the FAN1, FAN2 by using Active Test.**

(It takes 100 second by confirming the error AB-1)

Probable cause

- Connector contact defect
- Motor driver cooling fan 1 defect
- Motor driver cooling fan 2 defect
- Motor cooling fan defect
- Harness defect
- Main controller defect

Related portion



STEP1

Inspection :

Connector contact inspection :

Turn off the key switch and disconnect the battery plug.

Check the inside of connector CN112,113, CN118 and the caulked portion of wire whether it has defect or not by visual confirm. (Refer to BEFORE TROUBLESHOOTING)

After joint the connector, connect the battery plug and turn on the key switch. Then apply the cooling fan compulsorily by using Active Test and check if an error occurs.

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STD
[ANL] 7 ACT (7 05, 7 06)
Multi-function display
[ANL] ACTIVE TEST 2/3

FAN1 : OFF → ON

FAN2 : OFF → ON

Judgment

Result	Procedure
No AB-1 error is displayed.	**Connector contact defect**
An AB-1 error is displayed.	Go to step 2

STEP2

Inspection :

Check the cooling fan circuit.

Turn off the key switch and disconnect the battery plug.

After disconnect the CN112, CN113, CN118 connector, connect the battery plug and turn on the key switch. Then apply the cooling fan compulsorily by using Active Test and check if an error occurs.

STD
[ANL] 7 ACT (7 05, 7 06)
Multi-function display
[ANL] ACTIVE TEST 2/3

FAN1 : OFF → ON

FAN2 : OFF → ON

Judgment

Result	Procedure
No AB-1 error is displayed.	Go to step 3
An AB-1 error is displayed.	Go to step5

STEP3

Inspection :

Check of motor driver cooling fan 1

Turn off the key switch and disconnect the battery plug.

After connecting A112 and disconnecting the CN113, CN118 connector, connect the battery plug and turn on the key switch. Then apply the cooling fan compulsorily by using Active Test and check if an error occurs.

STD
[ANL] 7 ACT (7 05, 7 06)
Multi-function display
[ANL] ACTIVE TEST 2/3

FAN1 : OFF → ON

FAN2 : OFF → ON

Judgment

Result	Procedure
No AB-1 error is displayed.	Go to step 4
An AB-1 error is displayed.	**Motor driver cooling fan 1 defect**

STEP4

Inspection :

Check of motor driver cooling fan 2

Turn off the key switch and disconnect the battery plug.

After connecting A113 and disconnecting the CN112, CN118 connector, connect the battery plug and turn on the key switch. Then apply the cooling fan compulsorily by using Active Test and check if an error occurs.

STD
[ANL] 7 ACT (7 05, 7 06)
Multi-function display
[ANL] ACTIVE TEST 2/3

FAN1 : OFF → ON

FAN2 : OFF → ON

Judgment

Result	Procedure
No AB-1 error is displayed.	**Motor cooling fan defect**
An AB-1 error is displayed.	**Motor driver cooling fan 2 defect**

STEP5

Inspection :

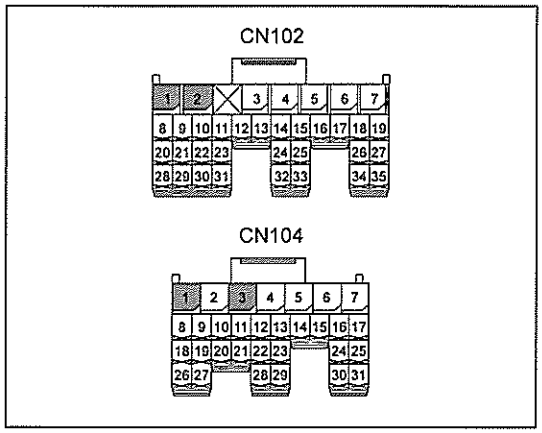
Inspect harness

Turn off the key switch and disconnect the battery plug.

Disconnect the CN102, CN104, CN112, CN113, CN118 connectors and check the harnesses.

[Inspection procedure and standard]

Inspect for continuity and short circuiting of the harness.



Perform this check with the battery plug and the CN102, CN104, CN112, CN113, CN118 connectors disconnected, and visually check inside the connector and the caulked portion of its wire for defects.

Refer to BEFORE TROUBLESHOOTING

Portion to be inspected	Standard:
CN104-3 to CN102-1	No continuity
CN104-3 to CN102-2	No continuity
CN104-1 to CN102-1	No continuity
CN104-1 to CN102-2	No continuity

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Judgment

Result	Procedure
NG	Harness defect
OK	Main controller defect

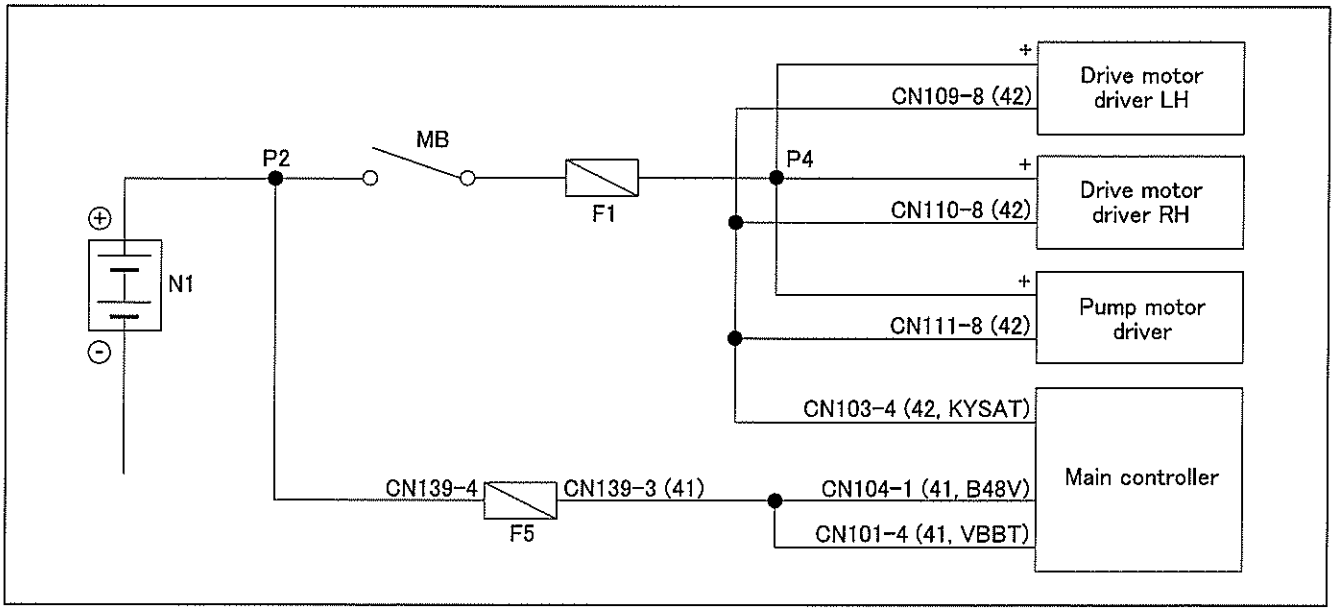
Error Code: AC-1

Failure mode: Motor driver power delivery abnormality

Probable cause

- Harness defect
- Drive motor driver LH defect
- Drive motor driver RH defect
- Pump motor driver defect
- Main controller defect

Related portion



STEP1

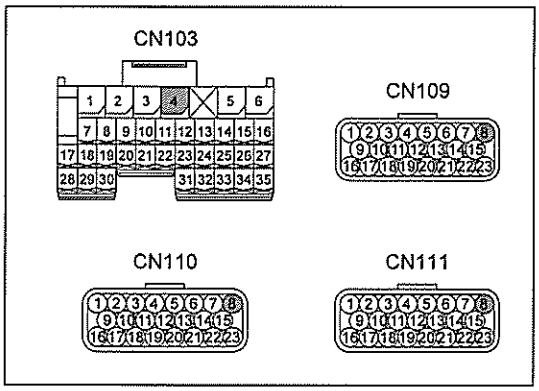
Inspection : Harness

Turn off the key switch and disconnect the battery plug.

Disconnect the CN101, CN103, CN104, CN109, CN110, CN111 connectors and check the harness.

[Inspection procedure and standard]

Inspect for continuity and short circuiting of the harness.



Perform the continuity check of CN103 to CN109, CN110, CN111 connectors with the battery plug and the CN101, CN103, CN104, CN109, CN110, CN111 connectors disconnected, and visually check inside the connector and the caulked portion of its wire for defects.

Inspect for continuity between the harness and N1.

Refer to BEFORE TROUBLESHOOTING

Portion to be inspected	Standard:
CN103-4 (42) to N1	No continuity
CN103-4 (42) to CN109-8 (42)	Continuity
CN103-4 (42) to CN110-8 (42)	Continuity

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Portion to be inspected	Standard:
CN103-4 (42) to CN111-8 (42)	Continuity

Judgment

Result	Procedure
NG	**Harness defect**
OK	Go to step 2

STEP2

Inspection : Main controller

Turn off the key switch and disconnect the battery plug.

Disconnect the CN109, CN110, CN111 connectors, then connect the CN101, CN103, CN104 connectors.

Connect the battery plug and turn on the key switch to confirm error.

Judgment

Result	Procedure
AC-1 error occurs.	**Main controller defect**
AC-1 error does not occur.	Go to step 3

STEP3

Inspection : Drive motor driver LH

Turn off the key switch and disconnect the battery plug.

Disconnect the CN110, CN111 connectors, then connect the CN101, CN103, CN104, and CN109 connectors.

Connect the battery plug and turn on the key switch to confirm error.

Judgment

Result	Procedure
AC-1 error occurs or not.	Go to step 4

STEP4

Inspection : Drive motor driver RH

Turn off the key switch and disconnect the battery plug.

Disconnect the CN109, CN111 connectors, then connect the CN101, CN103, CN104, and CN110 connectors.

Connect the battery plug and turn on the key switch to confirm error.

Judgment

Result	Procedure
AC-1 error occurs or not.	Go to step 5

STEP5

Inspection : Pump motor driver

Turn off the key switch and disconnect the battery plug.

Disconnect the CN109, CN110 connectors, then connect the CN101, CN103, CN104, and CN111 connectors.

Connect the battery plug and turn on the key switch to confirm error.

Judgment

Result	Procedure
AC-1 error occurs at STEP3	**Drive motor driver LH defect**
AC-1 error occurs at STEP4	**Drive motor driver RH defect**
AC-1 error occurs at STEP5	**Pump motor driver defect**

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Error Code: AD-1

Failure mode: Drive motor driver LH to Main controller : communication abnormality

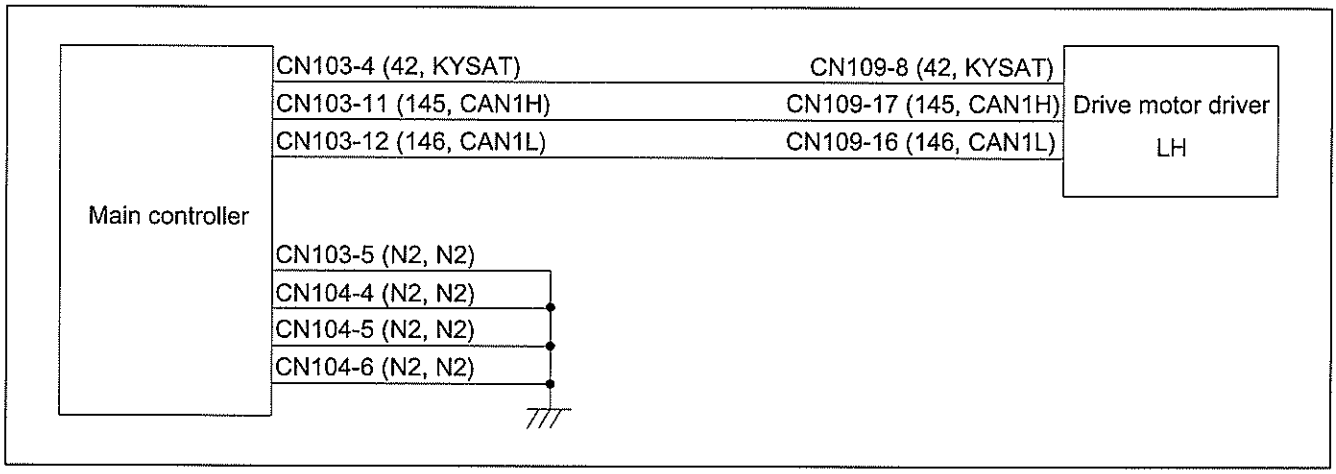
⚠ CAUTION

- **If AC-1 occurs at same time, perform troubleshooting for AC-1 first.**
- **If AD-2 occurs at same time, perform troubleshooting for AD-2 first.**

Probable cause

- Connector contact defect

Related portion



STEP1

Turn off the key switch and disconnect the battery plug, disconnect the CN103, CN109 connector, and visually check inside the connector and the caulked portion of its wire for defects. (Refer to BEFORE TROUBLESHOOTING)

After connecting the connector, connect the battery plug and turn on the key switch to confirm error.

Judgment

Result	Procedure
AD-1 or AD-2 error occurs.	**Perform troubleshooting for AD-2**
AD-1 or AD-2 error does not occur.	**Connector contact defect**

Error Code: AD-2

Failure mode: Drive motor driver LH to Main controller : communication abnormality

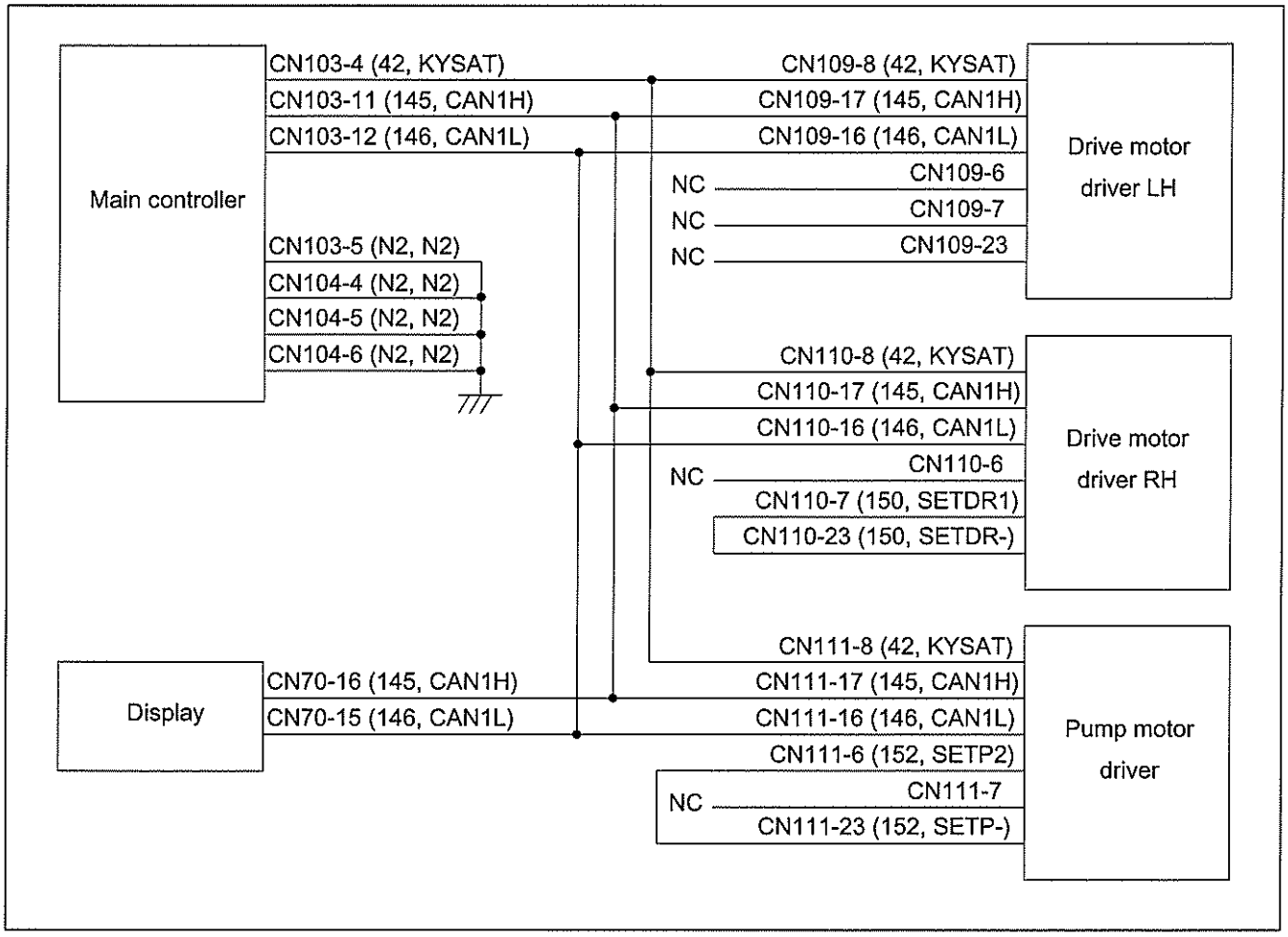
⚠ CAUTION

- **If AC-1 occurs at same time, perform troubleshooting for AC-1 first.**

Probable cause

- Wrong motor driver type
- Connector contact defect
- Harness defect
- Drive motor driver LH defect
- Main controller defect
- Pump motor driver defect
- Drive motor driver RH defect

Related portion



STEP1

Turn off the key switch, and disconnect the battery plug, then check if the part number of motor driver is correct.

Especially if the motor driver has just been replaced, check that a different model motor driver hasn't been installed.

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Judgment

Result	Procedure
Wrong part number	**Wrong motor driver type**
Correct part number	Go to step 2

STEP2

Turn off the key switch and disconnect the battery plug, disconnect the CN103, CN104, CN109, CN110, CN111, CN70 connector, and visually check inside the connector and the caulked portion of its wire for defects. (Refer to BEFORE TROUBLESHOOTING)

After connecting the connector, connect the battery plug and turn on the key switch to confirm error.

Especially if the motor driver has just been replaced, check if the connector is connected correctly.

Judgment

Result	Procedure
(1) No error code "with AD"	**Connector contact defect**
(2). The all following items occur ▪ AD-1 or AD-2 error occurs. ▪ AD-3 or AD-4 error occurs. ▪ AD-5 or AD-6 error occurs.	Go to step 8
The other cases of (1) and (2)	Go to step 3

STEP3

Inspection :

Reconfirm the occured error

Reconfirm the error at STEP2

Judgment

Result	Procedure
AD-2 error occurs.	Go to step 4 **Record the error code (with starting form "AD")**
AD-2 error does not occur.	**Perform the troubleshooting of the occured error**

STEP4

Inspection :

1 . Confirm the identification of drive motor driver LH

Turn off the key switch and disconnect the battery plug.

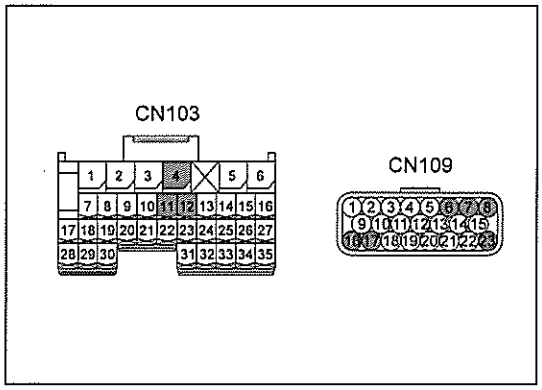
Disconnect the CN110 and CN111 connector.

Reconnect the battery plug and turn on the key switch. Record the occured error.

2 . Check the harness

Turn off the key switch and disconnect the battery plug.

Connect the CN110, CN111 connector, and disconnect the CN103, CN109 connector.



Inspect the harness by the error recorded at STEP4.

[Inspection procedure and standard]

1 . Check with disconnecting the drive motor driver RH and pump motor driver to confirm if drive motor driver LH isn't operated as drive motor driver RH or pump motor driver.

2 . Inspect for continuity and short circuiting of the harness.

Perform this check with the battery plug and the CN103,CN109 connectors disconnected, and visually check inside the connector and the caulked portion of its wire for defects. Refer to BEFORE TROUBLESHOOTING

*1 : Perform in case of "AD-4 error does not occur and AD-6 error occurs" or "AD-4 error occurs and AD-6 error does not occur".

*2 : Perform in case of "AD-4 and AD-6 error occur".

Portion to be inspected	Standard:	Remarks
CN109-7 to CN109-23	No continuity	*1
CN109-6 to CN109-23	No continuity	*1
CN109-7 to N2	No continuity	*1
CN109-6 to N2	No continuity	*1
CN103-4 to CN109-8	Continuity	*2
CN103-11 to CN109-17	Continuity	*2
CN103-12 to CN109-16	Continuity	*2

Judgment

Result	Procedure
NG	Go to step 5 **Harness defect**
OK	Go to step 5 **Drive motor driver LH defect**

STEP5

Confirm the error recorded at STEP3

Judgment

Result	Procedure
Only AD-2 error occurs.	**Replace the defective portion in the STEP4.**
AD-2 and AD-4 error occur.	Go to step 6
AD-2 and AD-6 error occur.	Go to step 7

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STEP6

Inspection :

1 . Confirm the identification of drive motor driver RH

Turn off the key switch and disconnect the battery plug.

Disconnect the CN109 and CN111 connector.

Reconnect the battery plug and turn on the key switch. Record the occured error.

2 . Inspect harness

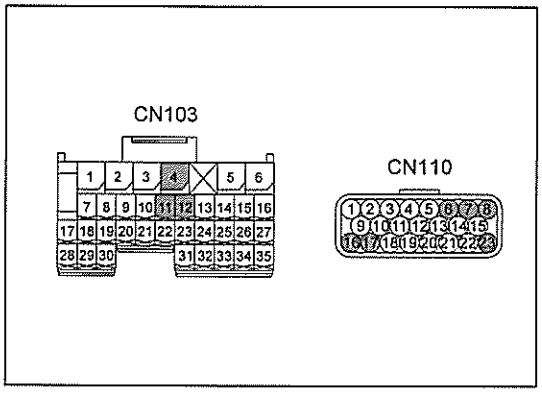
Turn off the key switch and disconnect the battery plug.

Connect the CN109, CN111 connector, and disconnect the CN103, CN110 connector.

Inspect the harness by the error recorded at STEP6.

[Inspection procedure and standard]

1 . Check with disconnecting the drive motor driver LH and pump motor driver to confirm if drive motor driver RH isn't operated as drive motor driver LH or pump motor driver.



2 . Inspect for continuity and short circuiting of the harness.

Perform this check with the battery plug and the CN103,CN110 connectors disconnected, and visually check inside the connector and the caulked portion of its wire for defects. Refer to BEFORE TROUBLESHOOTING

*1 : Perform in case of "AD-2 error does not occur and AD-6 error occurs" or "AD-2 error occurs and AD-6 error does not occur".

*2 : Perform in case of "AD-2 and AD-6 error occur".

Portion to be inspected	Standard:	Remarks
CN110-7 to CN110-23	Continuity	*1
CN110-6 to CN110-23	No continuity	*1
CN110-6 to N2	No continuity	*1
CN103-4 to CN110-8	Continuity	*2
CN103-11 to CN110-17	Continuity	*2
CN103-12 to CN110-16	Continuity	*2

Judgment

Result	Procedure
NG	**Harness defect** **In addition to the harness, replace the defective portion in the STEP4.**
OK	**Drive motor driver RH defect** **In addition to drive motor driver RH, replace the defective portion in the STEP4.**

STEP7

Inspection :

1 . Confirm the identification of pump motor driver

Turn off the key switch and disconnect the battery plug.

Disconnect the CN109 and CN110 connector.

Reconnect the battery plug and turn on the key switch. Record the occured error.

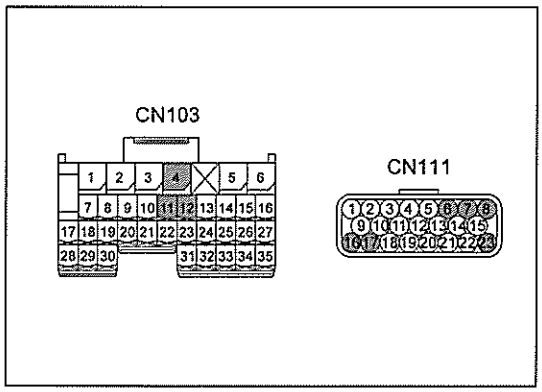
2 . Inspect harness

Turn off the key switch and disconnect the battery plug.

Connect the CN109, CN110 connector, and disconnect the CN103, CN111 connector.

Inspect the harness by the error recorded at STEP7.

[Inspection procedure and standard]



1 . Check with disconnecting the drive motor driver LH and RH to confirm if pump motor driver isn't operated as drive motor driver LH or RH.

2 . Inspect for continuity and short circuiting of the harness.

Perform this check with the battery plug and the CN103,CN111 connectors disconnected, and visually check inside the connector and the caulked portion of its wire for defects. Refer to BEFORE TROUBLESHOOTING

*1 : Perform in case of "AD-2 error does not occur and AD-4 error occurs" or "AD-2 error occurs and AD-4 error does not occur".

*2 : Perform in case of "AD-2 and AD-4 error occur".

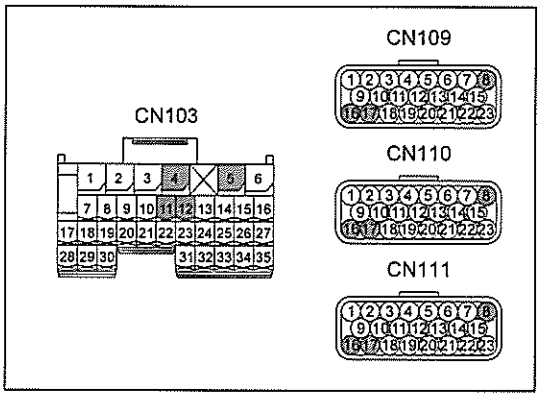
Portion to be inspected	Standard:	Remarks
CN111-6 to CN111-23	Continuity	*1
CN111-7 to CN111-23	No continuity	*1
CN111-7 to N2	No continuity	*1
CN103-4 to CN111-8	Continuity	*2
CN103-11 to CN111-17	Continuity	*2
CN103-12 to CN111-16	Continuity	*2

Judgment

Result	Procedure
NG	**Harness defect** **In addition to the harness, replace the defective portion in the STEP4.**
OK	**Pump motor driver defect** **In addition to pump motor driver, replace the defective portion in the STEP4.**

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STEP8



Inspection : Harness

Turn off the key switch and disconnect the battery plug.

Disconnect the CN103, CN104, CN109, CN110, CN111 and CN70 connectors and check the harnesses.

[Inspection procedure and standard]

Inspect for continuity and short circuiting of the harness.

Perform this check with the battery plug and the CN103, CN104, CN109, CN110, CN111 and CN70 connectors disconnected, and visually check inside the connector and the caulked portion of its wire for defects. Refer to BEFORE TROUBLESHOOTING

Portion to be inspected	Standard:
CN103-4 to CN109-8	Continuity
CN103-11 to CN109-17	Continuity
CN103-12 to CN109-16	Continuity
CN103-4 to CN110-8	Continuity
CN103-11 to CN110-17	Continuity
CN103-12 to CN110-16	Continuity
CN103-4 to CN111-8	Continuity
CN103-11 to CN111-17	Continuity
CN103-12 to CN111-16	Continuity
CN103-4 to CN103-5	No continuity

Judgment

Result	Procedure
NG	**Harness defect**
OK	Go to step 9

STEP9

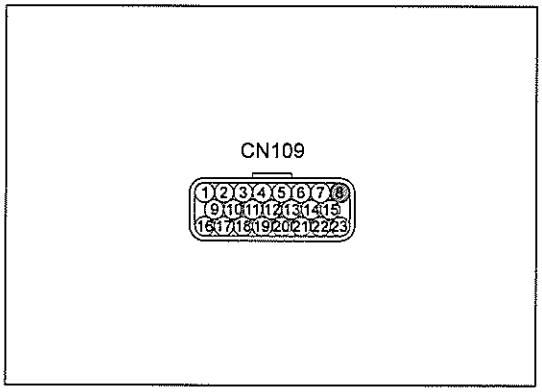
Inspection: Check the voltage of main controller power supply

Turn off the key switch and disconnect the battery plug.

Connect the CN103, CN104, CN70 connector, and disconnect the CN109, CN110, CN111 connector.

Reconnect the battery plug and turn on the key switch. Inspect the voltage of power supply for motor driver.

Check the voltage between CN109-8 and N2



Judgment

Result	Procedure
Less than 15V	**Main controller defect**
15V or more	Go to step 10

STEP10

Inspection : Drive motor driver LH

Turn off the key switch and disconnect the battery plug.

Connect the CN103, CN104, CN109 connector, and disconnect the CN110, CN111 connector.

Reconnect the battery plug and turn on the key switch. Inspect the voltage of power supply for motor driver and check if an error occurs

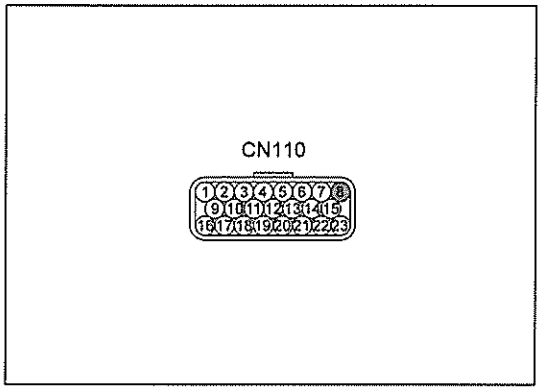
Check the voltage between CN110-8 and N2

Check if an error occurs.

[Inspection procedure and standard]

Check with disconnecting drive motor driver RH and pump motor driver, and connecting main controller and drive motor driver LH.

At voltage measurement, check by using the disconnected drive motor driver RH harness.



Judgment

Result	Procedure
Voltage : less than 15V	Go to step 11 **Record the result**
Voltage : 15V or more AD-2 error occurs	Go to step 11 **Record the result**
Voltage : 15V or more AD-2 error does not occur	Go to step 11 **Record the result**

STEP11

Inspection : Drive motor driver RH

Turn off the key switch and disconnect the battery plug.

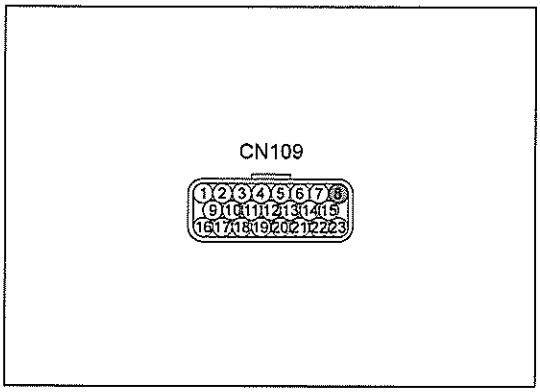
Connect the CN103, CN104, CN110 connector, and disconnect the CN109, CN111 connector.

Reconnect the battery plug and turn on the key switch. Inspect the voltage of power supply for motor driver and check if an error occurs

Check the voltage between CN109-8 and N2

Check if an error occurs.

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[Inspection procedure and standard]

Check with disconnecting drive motor driver LH and pump motor driver, and connecting main controller and drive motor driver RH.

At voltage measurement, check by using the disconnected drive motor driver LH harness.

Judgment

Result	Procedure
Voltage : less than 15V	Go to step 12 **Record the result**
Voltage : 15V or more AD-4 error occurs	Go to step 12 **Record the result**
Voltage : 15V or more AD-4 error does not occur	Go to step 12 **Record the result**

STEP12

Inspection : Pump motor driver

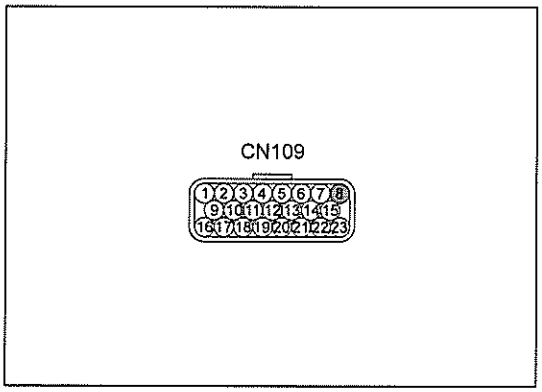
Turn off the key switch and disconnect the battery plug.

Connect the CN103, CN104, CN111 connector, and disconnect the CN109, CN110 connector.

Reconnect the battery plug and turn on the key switch. Inspect the voltage of power supply for motor driver and check if an error occurs

Check the voltage between CN109-8 and N2

Check if an error occurs.



[Inspection procedure and standard]

Check with disconnecting drive motor driver LH and RH, and connecting main controller and pump motor driver.

At voltage measurement, check by using the disconnected drive motor driver LH harness.

Judgment

Result	Procedure
Voltage : less than 15V	Go to step 13 **Record the result**
Voltage : 15V or more AD-6 error occurs	Go to step 13 **Record the result**
Voltage : 15V or more AD-6 error does not occur	Go to step 13 **Record the result**

STEP13

Confirm the STEP10, 11, 12

Judgment

Result	Procedure
Any voltage : less than 15V	**Defect for inspection item of less than 15V (Drive motor driver LH, Drive motor driver RH, Pump motor driver)**
All voltage : 15V or more All error occurs	**Main controller defect** **If the symptom persists after replacement of the main controller, there should be any other problems, so replace all of the drive motor driver LH, drive motor driver RH, and pump motor driver.**
All voltage : 15V or more At least one error is not displayed	**Defect for inspection item of the occured error (Drive motor driver LH, Drive motor driver RH, Pump motor driver)**

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Error Code: AD-3

Failure mode: Drive motor driver RH to Main controller : communication abnormality

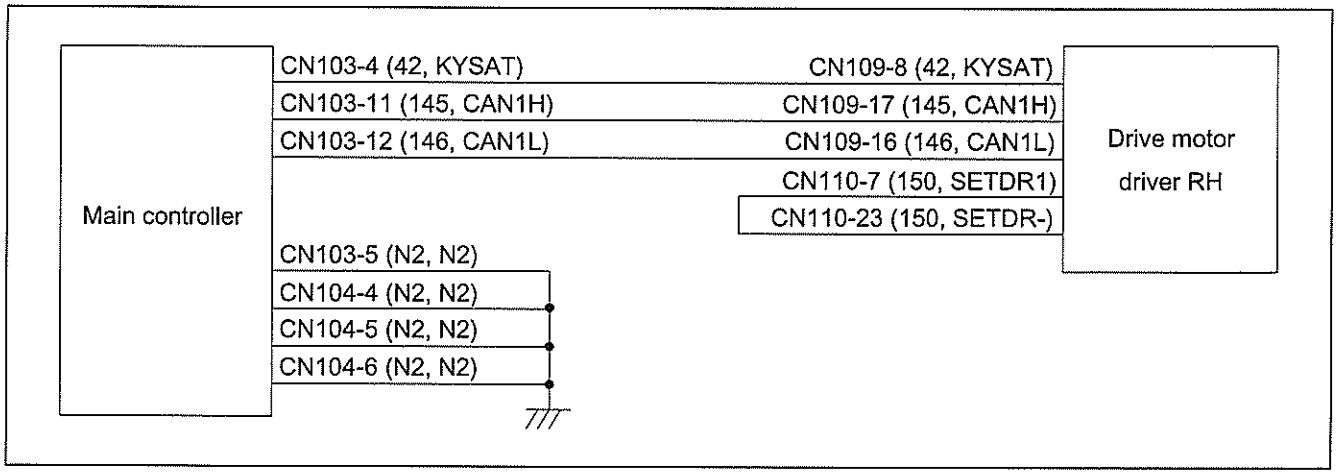
⚠ CAUTION

- **If AC-1 occurs at same time, perform troubleshooting for AC-1 first.**
- **If AD-1 or AD-2 occurs at same time, perform troubleshooting for AD-2 first.**
- **If AD-4 occurs at same time, perform troubleshooting for AD-4 first.**

Probable cause

- Connector contact defect

Related portion



STEP1

Turn off the key switch and disconnect the battery plug, disconnect the CN103, CN110 connector, and visually check inside the connector and the caulked portion of its wire for defects. (Refer to BEFORE TROUBLESHOOTING)

After connecting the connector, connect the battery plug and turn on the key switch to confirm error.

Judgment

Result	Procedure
AD-3 or AD-4 error occurs.	**Perform troubleshooting for AD-4**
AD-3 or AD-4 error does not occur.	**Connector contact defect**

Error Code: AD-4

Failure mode: Drive motor driver RH to Main controller : communication abnormality

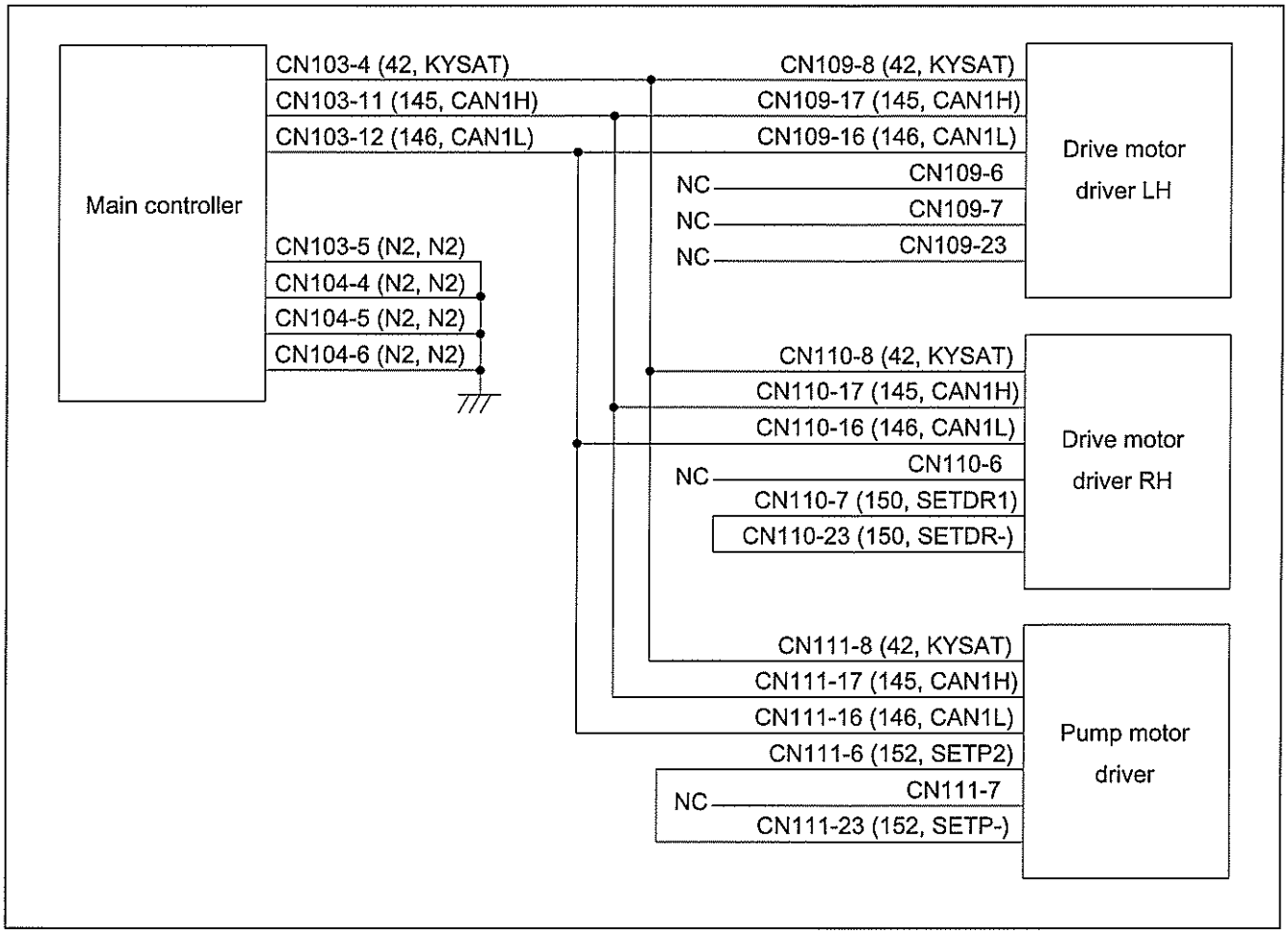
⚠ CAUTION

- **If AC-1 occurs at same time, perform troubleshooting for AC-1 first.**
- **If AD-1 or AD-2 occurs at same time, perform troubleshooting for AD-2 first.**

Probable cause

- Wrong motor driver type
- Connector contact defect
- Harness defect
- Drive motor driver RH defect

Related portion



STEP1

Turn off the key switch, and disconnect the battery plug, then check if the part number of motor driver is correct.

Especially if the motor driver has just been replaced, check that a different model motor driver hasn't been installed.

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Judgment

Result	Procedure
Wrong part number	**Wrong motor driver type**
Correct part number	Go to step 2

STEP2

Turn off the key switch and disconnect the battery plug, disconnect the CN110 connector, and visually check inside the connector and the caulked portion of its wire for defects. (Refer to BEFORE TROUBLESHOOTING)

After connecting the connector, connect the battery plug and turn on the key switch to confirm error.

Especially if the motor driver has just been replaced, check if the connector is connected correctly.

Judgment

Result	Procedure
AD-3 or AD-4 error does not occur.	**Connector contact defect**
AD-3 or AD-4 error occurs.	Go to step 3

STEP3

Inspection :

Confirm the identification of drive motor driver RH

Turn off the key switch and disconnect the battery plug.

Disconnect the CN109 and CN111 connector.

Reconnect the battery plug and turn on the key switch. Confirm the occured error.

[Inspection procedure and standard]

Check with disconnecting the drive motor driver LH and pump motor driver to confirm if drive motor driver RH isn't operated as drive motor driver LH or pump motor driver.

Judgment

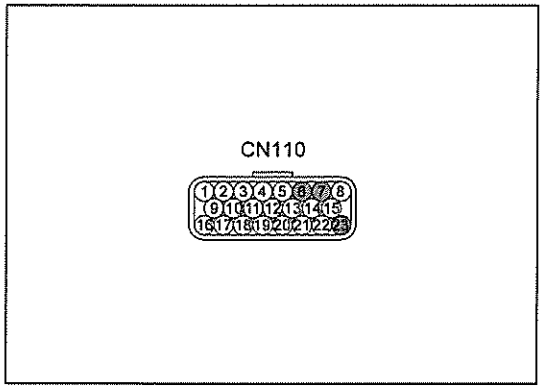
Result	Procedure
"AD-2 error does not occur and AD-6 error occurs" or "AD-2 error occurs and AD-6 error does not occur".	Go to step 4
AD-2 and AD-6 error occur.	Go to step 5

STEP4

IInspection : Harness

Turn off the key switch and disconnect the battery plug.

Disconnect the CN110 connectors and check the harnesses.



[Inspection procedure and standard]

Inspect for continuity and short circuiting of the harness.

Perform this check with the battery plug and the CN110 connectors disconnected, and visually check inside the connector and the caulked portion of its wire for defects.

Refer to BEFORE TROUBLESHOOTING

Portion to be inspected	Standard:
CN110-7(150) to CN110-23	Continuity
CN110-6 to CN110-23	No continuity
CN110-6 to N2(N2)	No continuity

Judgment

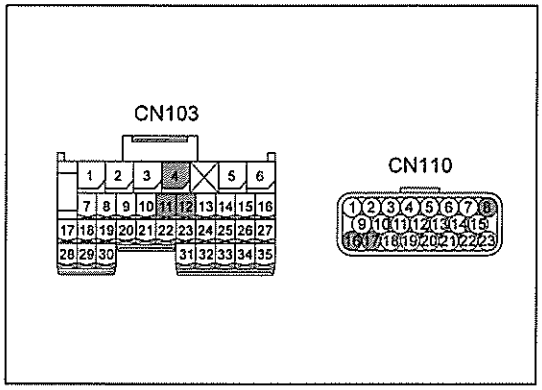
Result	Procedure
NG	**Harness defect**
OK	**Drive motor driver RH defect**

STEP5

Inspection : Harness

Turn off the key switch and disconnect the battery plug.

Disconnect the CN103, CN110 connectors and check the harnesses.



[Inspection procedure and standard]

Inspect for continuity and short circuiting of the harness.

Perform this check with the battery plug and the CN103,CN110 connectors disconnected, and visually check inside the connector and the caulked portion of its wire for defects.

Refer to BEFORE TROUBLESHOOTING

Portion to be inspected	Standard:
CN103-4(42) to CN110-8	Continuity
CN103-11(145) to CN110-17	Continuity
CN103-12(146) to CN110-16	Continuity

Judgment

Result	Procedure
NG	**Harness defect**
OK	**Drive motor driver RH defect**

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Error Code: AD-5

Failure mode: Pump motor driver to Main controller : communication abnormality

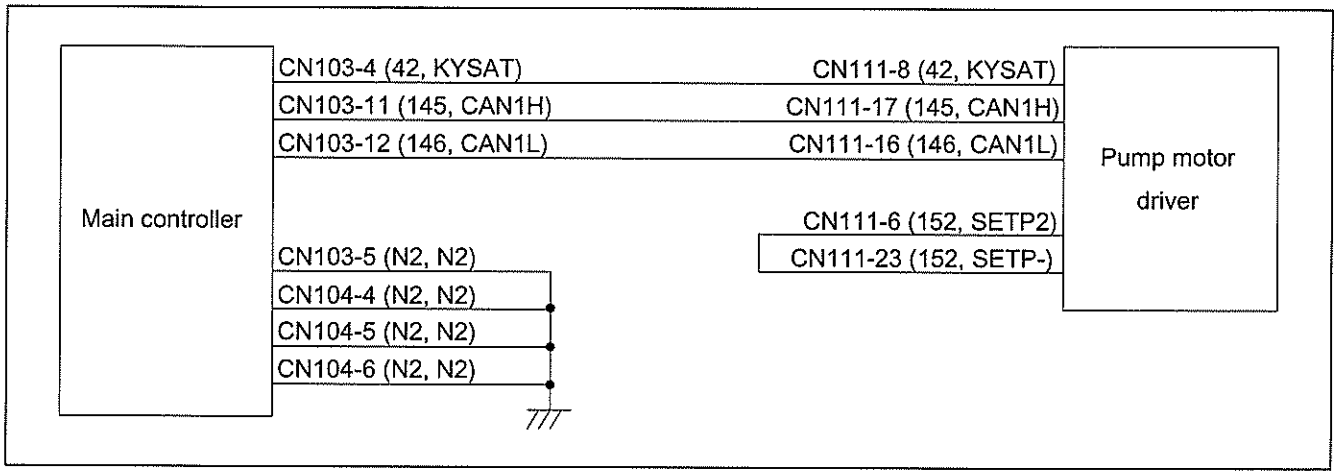
⚠ CAUTION

- **If AC-1 occurs at same time, perform troubleshooting for AC-1 first.**
- **If AD-1 or AD-2 occurs at same time, perform troubleshooting for AD-2 first.**
- **If AD-6 occurs at same time, perform troubleshooting for AD-6 first.**

Probable cause

- Connector contact defect

Related portion



STEP1

Turn off the key switch and disconnect the battery plug, disconnect the CN103, CN111 connector, and visually check inside the connector and the caulked portion of its wire for defects. (Refer to BEFORE TROUBLESHOOTING)

After connecting the connector, connect the battery plug and turn on the key switch to confirm error.

Judgment

Result	Procedure
AD-5 or AD-6 error occurs.	**Perform troubleshooting for AD-6**
AD-5 or AD-6 error does not occur.	**Connector contact defect**

Error Code: AD-6

Failure mode: Pump motor driver to Main controller : communication abnormality

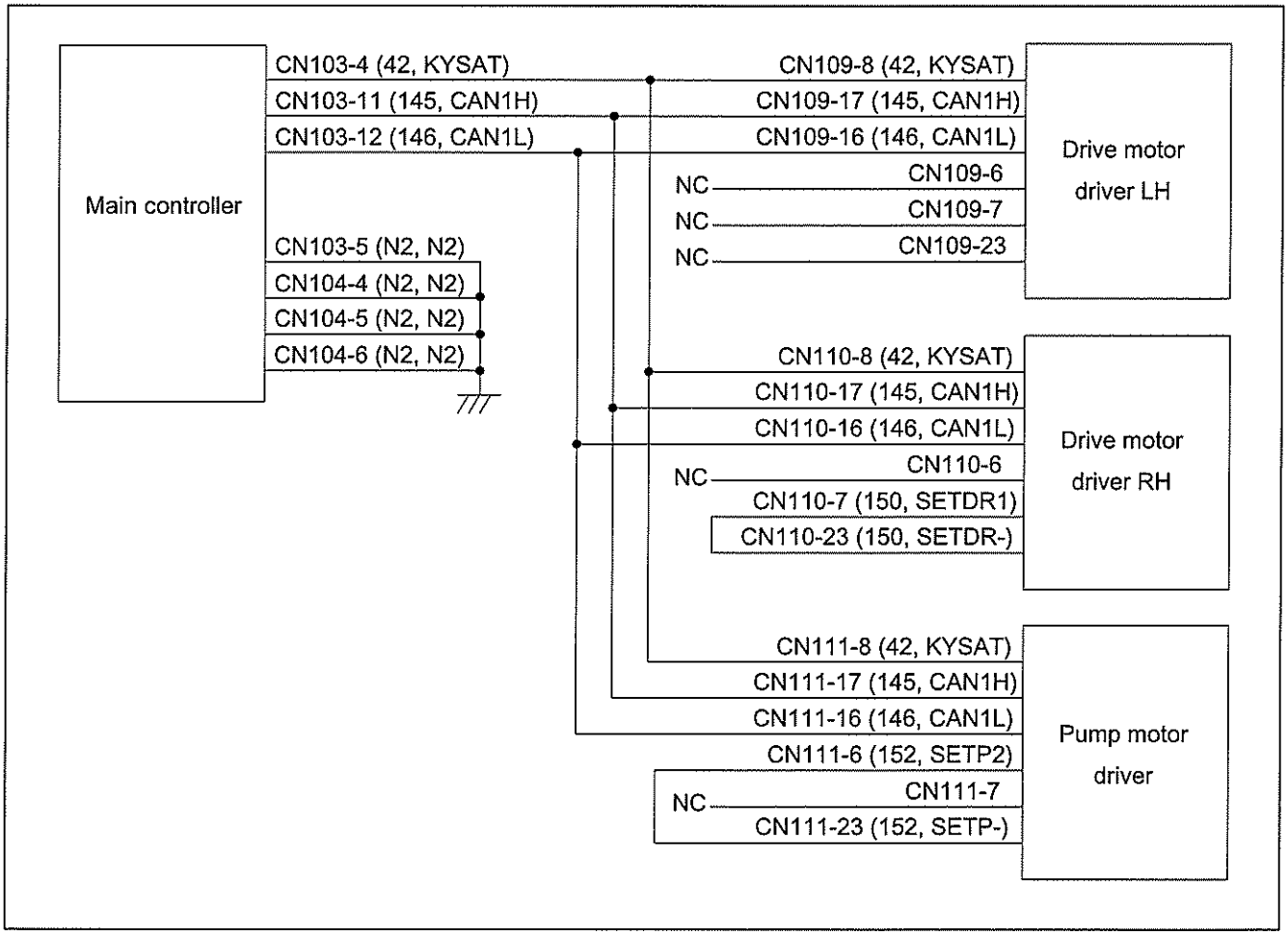
⚠ CAUTION

- **If AC-1 occurs at same time, perform troubleshooting for AC-1 first.**
- **If AD-1 or AD-2 occurs at same time, perform troubleshooting for AD-2 first.**

Probable cause

- Wrong motor driver type
- Connector contact defect
- Harness defect
- Pump motor driver defect

Related portion



STEP1

Turn off the key switch, and disconnect the battery plug, then check if the part number of motor driver is correct.

Especially if the motor driver has just been replaced, check that a different model motor driver hasn't been installed.

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Judgment

Result	Procedure
Wrong part number	**Wrong motor driver type**
Correct part number	Go to step 2

STEP2

Turn off the key switch and disconnect the battery plug, disconnect the CN111 connector, and visually check inside the connector and the caulked portion of its wire for defects. (Refer to BEFORE TROUBLESHOOTING)

After connecting the connector, connect the battery plug and turn on the key switch to confirm error.

Especially if the motor driver has just been replaced, check if the connector is connected correctly.

Judgment

Result	Procedure
AD-5 or AD-6 error does not occur.	**Connector contact defect**
AD-5 or AD-6 error occurs.	Go to step 3

STEP3

Inspection :

Confirm the identification of pump motor driver

Turn off the key switch and disconnect the battery plug. Disconnect the CN109 and CN110 connector.

Reconnect the battery plug and turn on the key switch. Confirm the occured error.

[Inspection procedure and standard]

Check with disconnecting the drive motor driver LH and RH to confirm if pump motor driver isn't operated as drive motor driver LH or RH.

Judgment

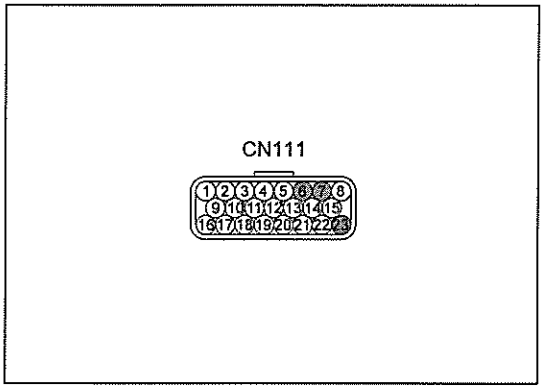
Result	Procedure
"AD-2 error does not occur and AD-4 error occurs" or "AD-2 error occurs and AD-4 error does not occur".	Go to step 4
AD-2 and AD-4 error occur	Go to step 5

STEP4

Inspection : Harness

Turn off the key switch and disconnect the battery plug.

Disconnect the CN111 connectors and check the harness.



[Inspection procedure and standard]

Inspect for continuity and short circuiting of the harness.

Perform this check with the battery plug and the CN111 connectors disconnected, and visually check inside the connector and the caulked portion of its wire for defects.

Refer to BEFORE TROUBLESHOOTING

Portion to be inspected	Standard:
CN111-6(152) to CN111-23	Continuity
CN111-7 to CN111-23	No continuity
CN111-7 to N2(N2)	No continuity

Judgment

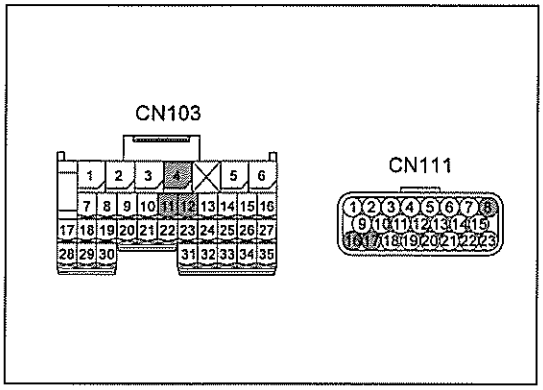
Result	Procedure
NG	**Harness defect**
OK	**Pump motor driver defect**

STEP5

Inspection : Harness

Turn off the key switch and disconnect the battery plug.

Disconnect the CN103, CN111 connectors and check the harnesses.



[Inspection procedure and standard]

Inspect for continuity and short circuiting of the harness.

Perform this check with the battery plug and the CN103,CN111 connectors disconnected, and visually check inside the connector and the caulked portion of its wire for defects.

Refer to BEFORE TROUBLESHOOTING

Portion to be inspected	Standard:
CN103-4(42) to CN111-8	Continuity
CN103-11(145) to CN111-17	Continuity
CN103-12(146) to CN111-16	Continuity

Judgment

Result	Procedure
NG	**Harness defect**
OK	**Pump motor driver defect**

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Error Code: AF-1, AF-2, AF-3, AF-4, AF-5, AF-6, AF-7, AF-8

Failure mode: Main controller CPU error

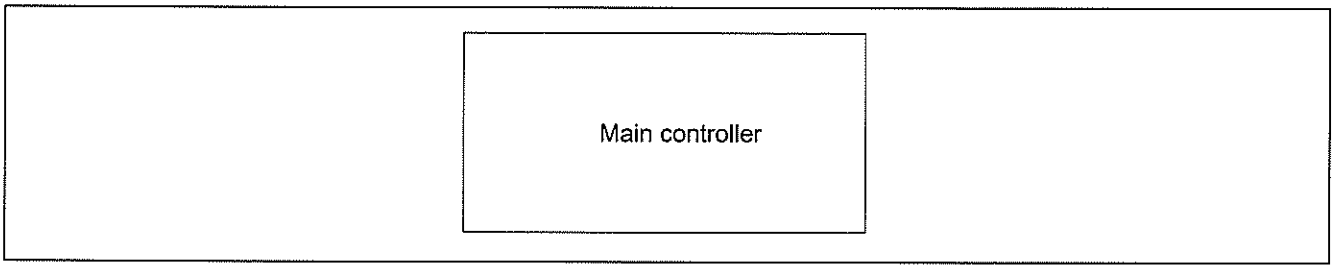
⚠ CAUTION

- **If AF-1, AF-2, AF-3, AF-4, AF-5, AF-6, AF-7 or AF-8 occurs, the Main controller is defective, so replace it.**

Probable cause

- Main controller defect

Related portion



Error Code: C0-2

Failure mode: Drive motor driver LH power-circuit abnormality

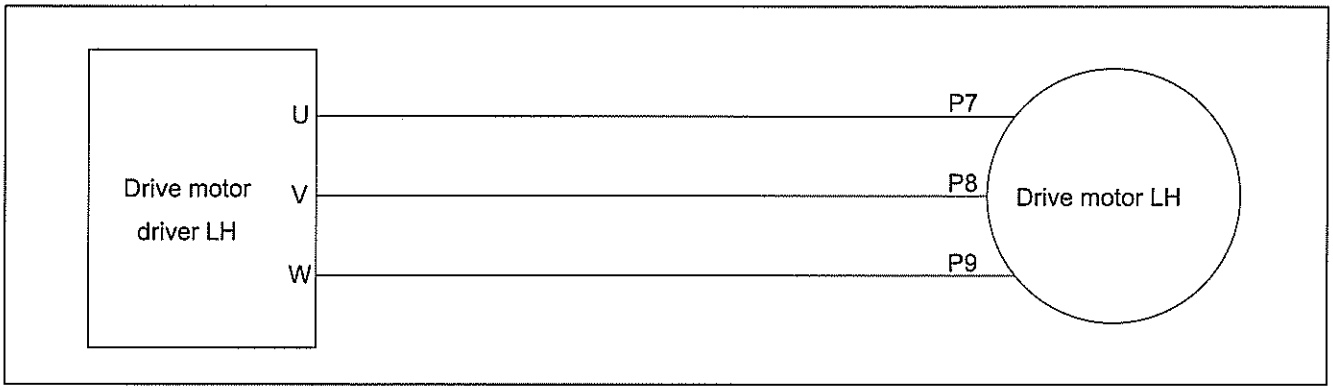
⚠ CAUTION

- **If CB-3 occurs at same time, perform troubleshooting for CB-3 first.**
- **Jack up the vehicle until drive wheels leave the ground and support the frame with wooden blocks before starting troubleshooting.**

Probable cause

- Drive motor cable tightening is defective
- Drive motor LH defect
- Drive motor cable defect
- Drive motor driver LH defect

Related portion



STEP1

Turn off the key switch and disconnect the battery plug, visually check the fastened and caulked portions of the motor cables for defects. Refer to BEFORE TROUBLESHOOTING

Connect the drive motor cables, connect the battery plug, and then turn on the key switch.

Operate the direction lever with forward or backward, and check for errors.

Judgment

Result	Procedure
C0-2 error occurs.	Go to step 2 **Record the occured error code.**
C0-2 error does not occur.	**Drive motor cable tightening is defective**

STEP2

Inspection : Drive motor driver LH

Return the direction lever neutral, turn off the key switch, and disconnect the battery plug.

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Disconnect the three motor cables from the drive motor driver LH and insulate the terminals of the cables disconnected.

Connect the battery plug and turn on the key switch to check if C0-2 error occurs.

Judgment

Result	Procedure
C0-2 error does not occur.	Go to step 3
C0-2 error occurs.	**Drive motor driver LH defect**

STEP3

Inspection : Drive motor cable

Turn off the key switch and disconnect the battery plug.

Disconnect the motor cables from both the motor and the motor driver.

Drive motor cable inspection

[Inspection procedure and standard]

Check each drive motor cable for its continuity and short.

Turn off the key switch and disconnect the battery plug, disconnect the three motor cables, visually check each terminal and the caulked portion and coating of each cable for defects, and then check the P7, P8 and P9 cables.

Refer to BEFORE TROUBLESHOOTING

Portion to be inspected	Standard:
Both ends of P7 cable	Continuity
Both ends of P8 cable	Continuity
Both ends of P9 cable	Continuity
P7 cable and P8 cable	No continuity
P8 cable and P9 cable	No continuity
P9 cable and P7 cable	No continuity

Judgment

Result	Procedure
OK (E0-2 does not occur at the same time on STEP1)	Go to step 4
OK (E0-2 occurs at the same time on STEP1)	Go to step 5
NG	**Drive motor cable defect**

STEP4

Inspection : Drive motor driver

Replace the drive motor driver LH with the pump motor driver.

Reconnect the battery plug and turn on the key switch.

Operate the direction lever with forward or backward, and check for errors. (Ignore the error codes 32-1 and 32-3.)

Judgment

Result	Procedure
C0-2 error occurs.	**Drive motor LH defect**
E0-2 error occurs.	**Drive motor driver LH defect** **The motor driver that is drive motor driver LH before replacement is defect.**

STEP5

Inspection : Drive motor

Return the direction lever neutral, turn off the key switch, and disconnect the battery plug.

Check the drive motor.

Judgment

Result	Procedure
NG	**Drive motor LH defect**
OK	**Drive motor driver LH defect**

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Error Code: C0-4

Failure mode: Drive motor driver RH power-circuit abnormality

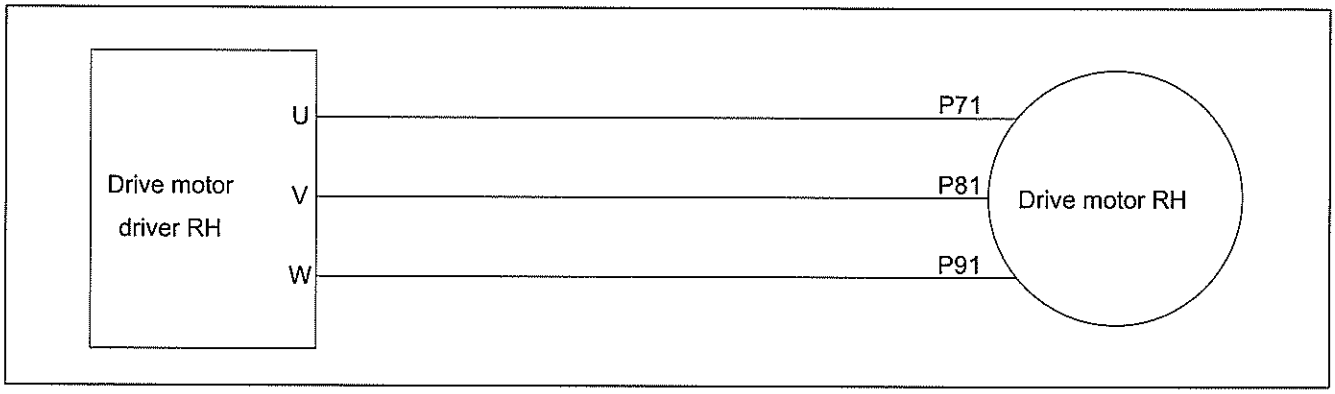
⚠ CAUTION

- **If CB-3 occurs at same time, perform troubleshooting for CB-3 first.**
- **Jack up the vehicle until drive wheels leave the ground and support the frame with wooden blocks before starting troubleshooting.**

Probable cause

- Drive motor cable tightening is defective
- Drive motor RH defect
- Drive motor cable defect
- Drive motor driver RH defect

Related portion



STEP1

Turn off the key switch and disconnect the battery plug, visually check the fastened and caulked portions of the motor cables for defects. Refer to BEFORE TROUBLESHOOTING

Connect the drive motor cables, connect the battery plug, and then turn on the key switch.

Operate the direction lever with forward or backward, and check for errors.

Judgment

Result	Procedure
C0-4 error occurs.	Go to step 2 **Record the occured error code.**
C0-4 error does not occur.	**Drive motor cable tightening is defective**

STEP2

Inspection : Drive motor driver RH

Return the direction lever neutral, turn off the key switch, and disconnect the battery plug.

Disconnect the three motor cables from the drive motor driver RH and insulate the terminals of the cables disconnected.

Connect the battery plug and turn on the key switch to check if C0-4 error occurs.

Judgment

Result	Procedure
C0-4 error does not occur.	Go to step 3
C0-4 error occurs.	**Drive motor driver RH defect**

STEP3

Inspection : Drive motor cable

Turn off the key switch and disconnect the battery plug.

Disconnect the motor cables from both the motor and the motor driver.

Drive motor cable inspection

[Inspection procedure and standard]

Check each drive motor cable for its continuity and short.

Turn off the key switch and disconnect the battery plug, disconnect the three motor cables, visually check each terminal and the caulked portion and coating of each cable for defects, and then check the P71, P81 and P91 cables.

Refer to BEFORE TROUBLESHOOTING

Portion to be inspected	Standard:
Both ends of P71 cable	Continuity
Both ends of P81 cable	Continuity
Both ends of P91 cable	Continuity
P71 cable and P81 cable	No continuity
P81 cable and P91 cable	No continuity
P91 cable and P71 cable	No continuity

Judgment

Result	Procedure
OK (E0-2 does not occur at the same time on STEP1)	Go to step 4
OK (E0-2 occurs at the same time on STEP1)	Go to step 5
NG	**Drive motor cable defect**

STEP4

Inspection : Drive motor driver

Replace the drive motor driver RH with the pump motor driver.

Reconnect the battery plug and turn on the key switch.

Operate the direction lever with forward or backward, and check for errors. (Ignore the error codes 32-2 and 32-3.)

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Judgment

Result	Procedure
C0-4 error occurs.	**Drive motor RH defect**
E0-2 error occurs.	**Drive motor driver RH defect** **The motor driver that is drive motor driver RH before replacement is defect.**

STEP5

Inspection : Drive motor

Return the direction lever neutral, turn off the key switch, and disconnect the battery plug.

Check the drive motor.

Judgment

Result	Procedure
NG	**Drive motor RH defect**
OK	**Drive motor driver RH defect**

Error Code: C1-1

Failure mode: Drive motor driver LH current sensor neutral voltage error

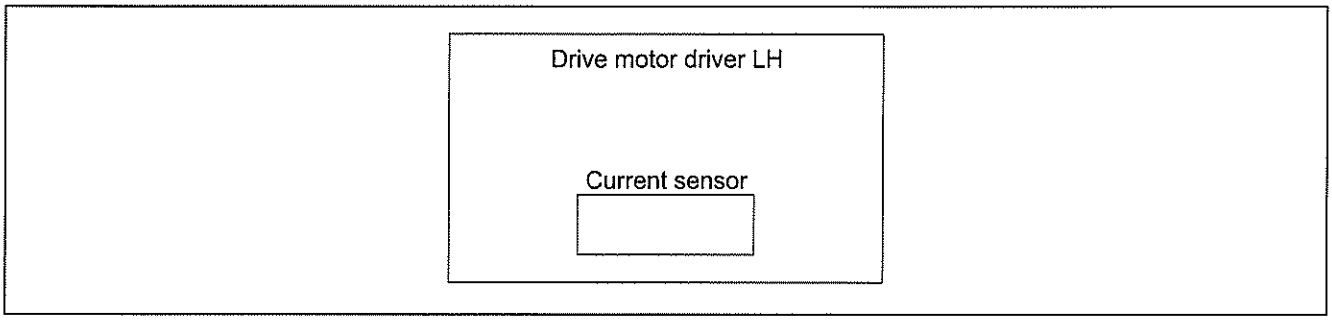
⚠ CAUTION

- **If C1-1 occurs, the drive motor driver LH is defective, so replace it.**

Probable cause

- Drive motor driver LH defect

Related portion



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Error Code: C1-2

Failure mode: Drive motor driver LH current sensor over current abnormality

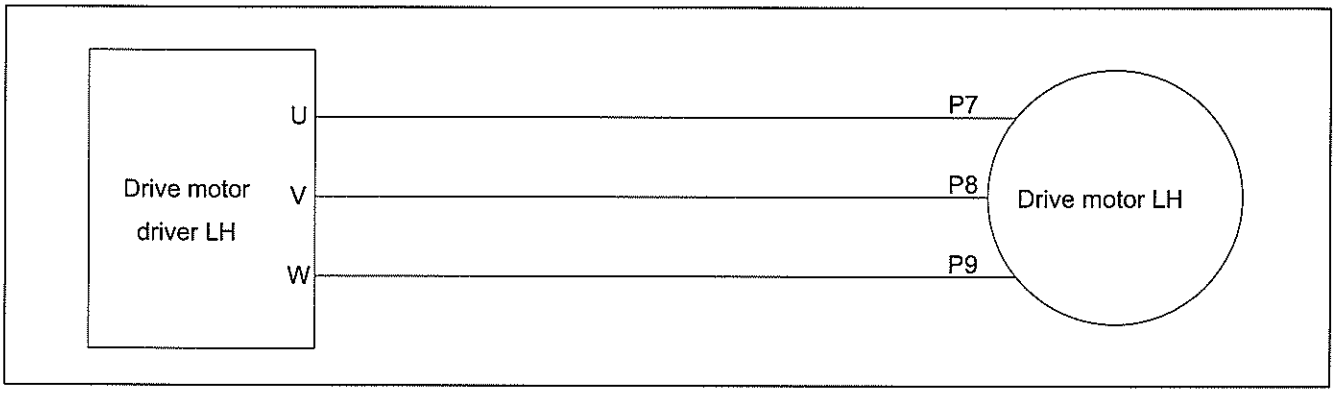
⚠ CAUTION

- **If C8-1 or C8-2 occurs at same time C1-2, perform troubleshooting for C8-1 or C8-2 first.**
- **Jack up the vehicle until drive wheels leave the ground and support the frame with wooden blocks before starting troubleshooting.**

Probable cause

- Drive motor LH cable tightening is defective
- Drive motor LH defect
- Drive motor LH cable defect
- Drive motor driver LH defect
- Drive motor LH rotation sensor defect

Related portion



STEP1

Turn off / on the key switch, and check if C0-2 error occurs.

Judgment

Result	Procedure
C0-2 error does not occur.	Go to step 2
C0-2 error occurs.	**Perform troubleshooting for C0-2**

STEP2

Turn off the key switch and disconnect the battery plug, visually check the assembled and caulked portions of the motor cables for defects. (Refer to BEFORE TROUBLESHOOTING)

Connect the drive motor cables, connect the battery plug, and then turn on the key switch.

Sit in the seat and perform a direction lever operation (forward or backward), checking for errors with pushing the accelerator pedal.

Judgment

Result	Procedure
C1-2 error does not occur.	**Drive motor LH cable tightening is defective**
C1-2 error occurs.	Go to step 3 **Record the occurs errored code.**

STEP3

Inspection : Drive motor cable LH

Turn off the key switch and disconnect the battery plug.

Inspect with disconnecting drive motor cable (drive side and motor side).

[Inspection procedure and standard]

Check each drive motor cable for its continuity and short.

Turn off the key switch and disconnect the battery plug, disconnect the three motor cables, visually check each terminal and the caulked portion and coating of each cable for defects, and then check the P7, P8 and P9 cables.

Refer to BEFORE TROUBLESHOOTING

Portion to be inspected	Standard:
Both ends of P7 cable	Continuity
Both ends of P8 cable	Continuity
Both ends of P9 cable	Continuity
P7 cable and P8 cable	No continuity
P8 cable and P9 cable	No continuity
P9 cable and P7 cable	No continuity

Judgment

Result	Procedure
OK (E1-2 does not occur at the same time on STEP2)	Go to step 4
OK (E1-2 occurs at the same time on STEP2)	Go to step 5
NG	**Drive motor LH cable defect**

STEP4

Inspection : Drive motor driver LH

Replace the drive motor driver LH with the pump motor driver.

Reconnect the battery plug and turn on the key switch.

Sit in the seat and perform a direction lever operation (forward or backward), checking for errors with pushing the accelerator pedal. (Ignore the error codes 32-1 and 32-3.)

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Judgment

Result	Procedure
C1-2 error occurs.	**Drive motor LH defect**
E1-2 error occurs.	**Drive motor driver LH defect** **The motor driver that is drive motor driver LH before replacement is defect.**

STEP5

Inspection : Drive motor LH

Turn off the key switch and disconnect the battery plug, and inspect the drive motor.

Judgment

Result	Procedure
NG	**Drive motor LH defect**
OK	**Drive motor driver LH defect**

Error Code: C1-3

Failure mode: Drive motor driver RH current sensor neutral voltage error

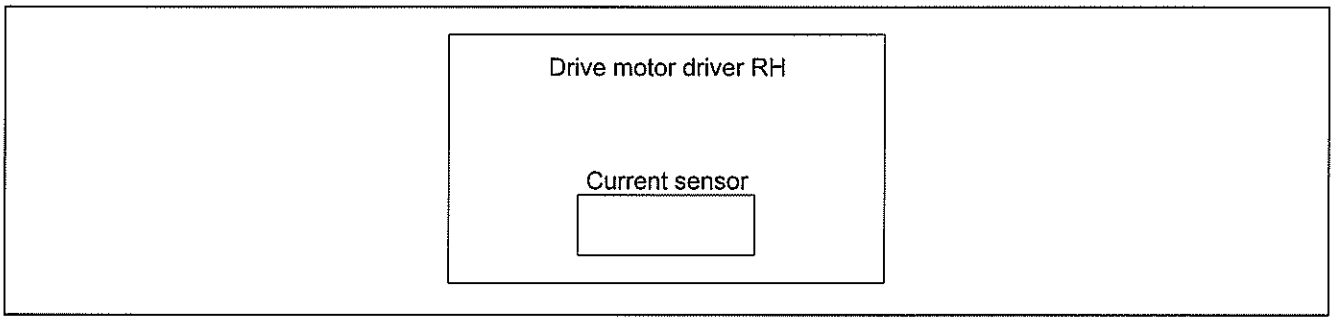
⚠ CAUTION

- **If C1-3 occurs, the drive motor driver RH is defective, so replace it.**

Probable cause

- Drive motor driver RH defect

Related portion



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Error Code: C1-4

Failure mode: Drive motor driver RH current sensor over current abnormality

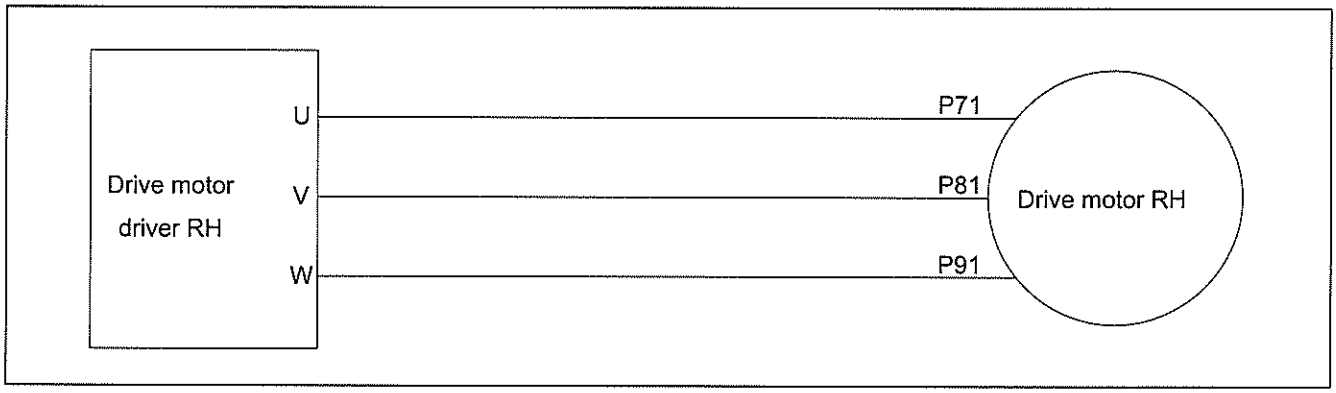
⚠ CAUTION

- **If C8-3 or C8-4 occurs at same time C1-4, perform troubleshooting for C8-3 or C8-4 first.**
- **Jack up the vehicle until drive wheels leave the ground and support the frame with wooden blocks before starting troubleshooting.**

Probable cause

- Drive motor RH cable tightening is defective
- Drive motor RH defect
- Drive motor RH cable defect
- Drive motor driver RH defect
- Drive motor RH rotation sensor defect

Related portion



STEP1

Turn off / on the key switch, and check if C0-4 error occurs.

Judgment

Result	Procedure
C0-4 error does not occur.	Go to step 2
C0-4 error occurs.	**Perform troubleshooting for C0-4**

STEP2

Turn off the key switch and disconnect the battery plug, visually check the assembled and caulked portions of the motor cables for defects. (Refer to BEFORE TROUBLESHOOTING)

Connect the drive motor cables, connect the battery plug, and then turn on the key switch.

Sit in the seat and perform a direction lever operation (forward or backward), checking for errors with pushing the accelerator pedal.

Judgment

Result	Procedure
C1-4 error does not occur.	**Drive motor RH cable tightening is defective**
C1-4 error occurs.	Go to step 3 **Record the occured error code.**

STEP3

Inspection : Drive motor cable RH

Turn off the key switch and disconnect the battery plug.

Inspect with disconnecting drive motor cable (drive side and motor side).

[Inspection procedure and standard]

Check each drive motor cable for its continuity and short.

Turn off the key switch and disconnect the battery plug, disconnect the three motor cables, visually check each terminal and the caulked portion and coating of each cable for defects, and then check the P71, P81 and P91 cables.

Refer to BEFORE TROUBLESHOOTING

Portion to be inspected	Standard:
Both ends of P71 cable	Continuity
Both ends of P81 cable	Continuity
Both ends of P91 cable	Continuity
P71 cable and P81 cable	No continuity
P81 cable and P91 cable	No continuity
P91 cable and P71 cable	No continuity

Judgment

Result	Procedure
OK (E1-2 does not occur at the same time on STEP2)	Go to step 4
OK (E1-2 occurs at the same time on STEP2)	Go to step 5
NG	**Drive motor RH cable defect**

STEP4

Inspection : Drive motor driver RH

Replace the drive motor driver RH with the pump motor driver.

Reconnect the battery plug and turn on the key switch.

Sit in the seat and perform a direction lever operation (forward or backward), checking for errors with pushing the accelerator pedal. (Ignore the error codes 32-2 and 32-3.)

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Judgment

Result	Procedure
C1-4 error occurs.	**Drive motor RH defect**
E1-2 error occurs.	**Drive motor driver RH defect** **The motor driver that is drive motor driver RH before replacement is defect.**

STEP5

Inspection : Drive motor RH

Turn off the key switch and disconnect the battery plug, and inspect the drive motor.

Judgment

Result	Procedure
NG	**Drive motor RH defect**
OK	**Drive motor driver RH defect**

Error Code: C2-1

Failure mode: Drive motor overheating abnormality

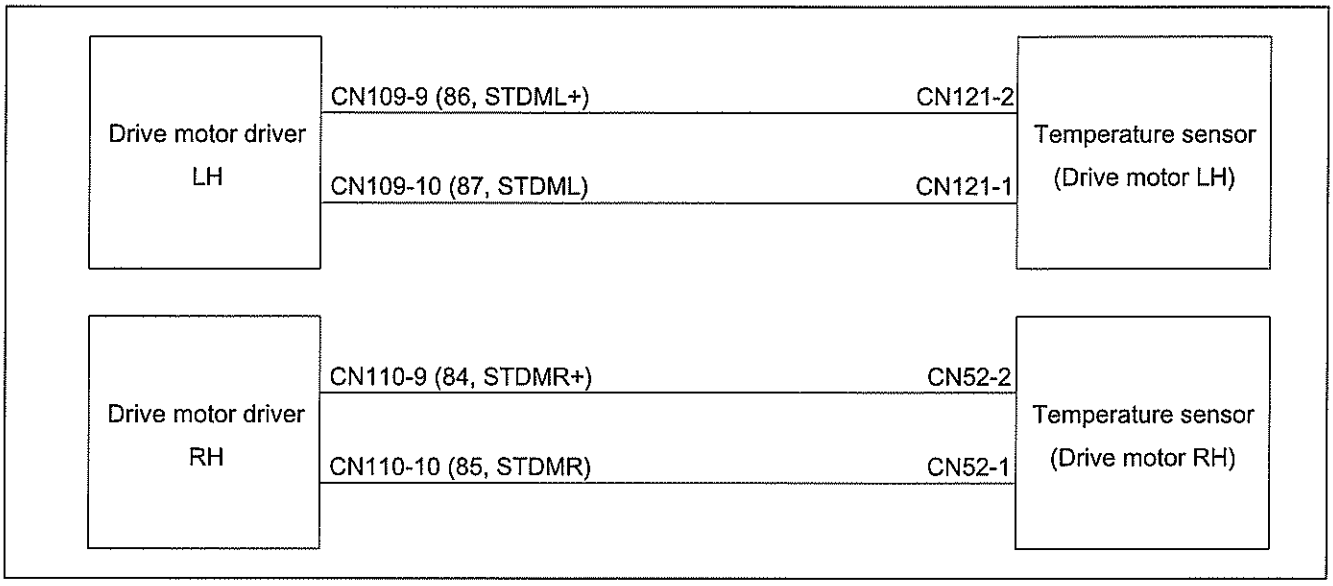
⚠ CAUTION

- **Do not leave the vehicle standing in a hot place.**

Probable cause

- Overheating (continuous overload operation)

Related portion



STEP1

Inspection :

Reconfirm the displayed error.

Turn on the key switch and check the error occurs.

Judgment

Result	Procedure
"DM" occurs.	Go to step 2
"DM" does not occur.	**Overheating (continuous overload operation)** **After falling temperature of drive motor, "DM" is disappeared and the truck can be operated as usual. It is estimated that the continuously running in overloaded condition cause this error. So check the usage condition of the truck and hold back the continuously running in a overloaded condition.**

STEP2

Inspection :

Confirm the temperature of the drive motor and Reconfirm the error

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STD
[ANL] 2 IO1 (2 01, 2 02)
Multi-function display
[ANL] I/O TEMP/VOLT 1/6

TDM

Record the temperature of the drive motor.

Turn off the key switch and leave the truck for approximately for thirty minutes. Then turn on the key switch and check the error occurs.

Judgment

Result	Procedure
"DM" occurs.	Go to step 3
"DM" does not occur.	**Overheating (continuous overload operation)** **After falling temperature of drive motor, "DM" is disappeared and the truck can be operated as usual. It is estimated that the continuously running in overloaded condition cause this error. So check the usage condition of the truck and hold back the continuously running in a overloaded condition.**

STEP3

Inspection :

Reconfirm the temperature of drive motor

STD
[ANL] 2 IO1 (2 01, 2 02)
Multi-function display
[ANL] I/O TEMP/VOLT 1/6

TDM

Check the temperature of drive motor and compare to the recorded value.

Judgment

Result	Procedure
All temperatures has lowered by 5°C or more.	Go to step 2
Temperature of drive motor LH has not lowered by 5°C or more.	**C2-2 Perform troubleshooting from STEP2.**
Temperature of drive motor RH has not lowered by 5°C or more.	**C2-3 Perform troubleshooting from STEP2.**

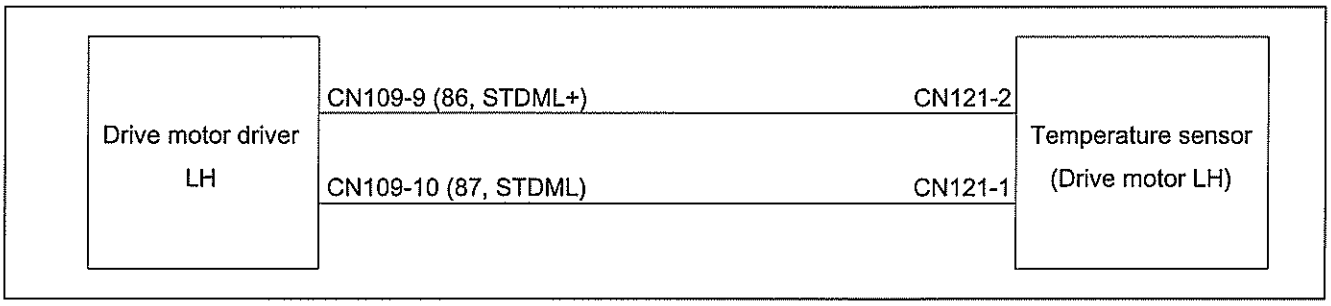
Error Code: C2-2

Failure mode: Drive motor LH temperature sensor (open/short) abnormality

Probable cause

- Connector contact defect
- Drive motor LH temperature sensor defect
- Drive motor LH temperature sensor harness defect
- Drive motor driver LH defect

Related portion



STEP1

Disconnect the battery plug, and visually check inside the CN121 connector and the caulked portion of its wire for defects. Refer to BEFORE TROUBLESHOOTING

After connecting the connector, connect the battery plug and turn on the key switch to confirm error.

Judgment

Result	Procedure
C2-2 error occurs.	Go to step 2
C2-2 error does not occur.	**Connector contact defect**

STEP2

Inspection :

Temperature sensor individual inspection

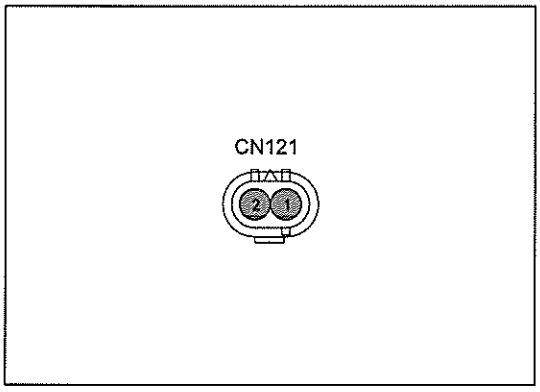
Turn off the key switch and disconnect the battery plug.

Disconnect the CN121 connector, and perform the temperature sensor individual inspection.

[Inspection procedure and standard]

Carry out temperature sensor individual inspection.

Measure the temperature sensor resistance between CN121-2 and CN121-1 (sensor side of CN121)



Standard: Approx. 245 Ω to 600 kΩ

* The resistance is changed with depending on temperature. So refer to the below table about rough standard value.

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· Temperature	Temperature sensor resistance (between CN121-2 and CN121-1)
20°C	Approx. 13 kΩ
80°C	Approx. 1.75 kΩ
100°C	Approx. 1 kΩ

Judgment

Result	Procedure
OK	Go to step 3
NG	**Drive motor LH temperature sensor defect**

STEP3

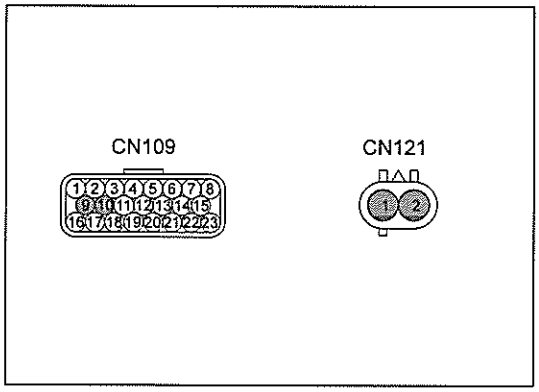
Inspection : Harness

Turn off the key switch and disconnect the battery plug.

Disconnect the CN109 and CN121 connectors and check the harnesses.

[Inspection procedure and standard]

Inspect for continuity and short circuiting of the harness.



Perform this check with the battery plug and the CN109, and CN121 connectors disconnected, and visually check inside the connector and the caulked portion of its wire for defects with disconnecting SST.

Refer to BEFORE TROUBLESHOOTING

*1 : It is OK to connect CN121-1 to CN121-2 through SST2 (09232-13130-71) and check if there is continuity between CN109-9 and CN109-10.

Portion to be inspected	Standard:	Remarks
CN109-9 to CN121-2	Continuity	*1
CN109-10 to CN121-1	Continuity	*1
CN121-1 to CN121-2	No continuity	

Judgment

Result	Procedure
OK	**Drive motor driver LH defect**
NG	**Drive motor LH temperature sensor harness defect**

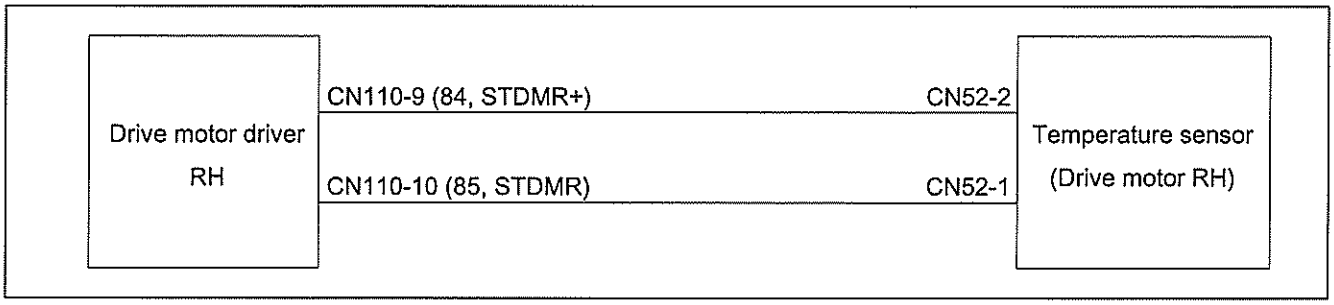
Error Code: C2-3

Failure mode: Drive motor RH temperature sensor (open/short) abnormality

Probable cause

- Connector contact defect
- Drive motor RH temperature sensor defect
- Drive motor RH temperature sensor harness defect
- Drive motor driver RH defect

Related portion



STEP1

Disconnect the battery plug, and visually check inside the CN52 connector and the caulked portion of its wire for defects. Refer to BEFORE TROUBLESHOOTING

After connecting the connector, connect the battery plug and turn on the key switch to confirm error.

Judgment

Result	Procedure
C2-3 error occurs.	Go to step 2
C2-3 error does not occur.	**Connector contact defect**

STEP2

Inspection :

Temperature sensor individual inspection

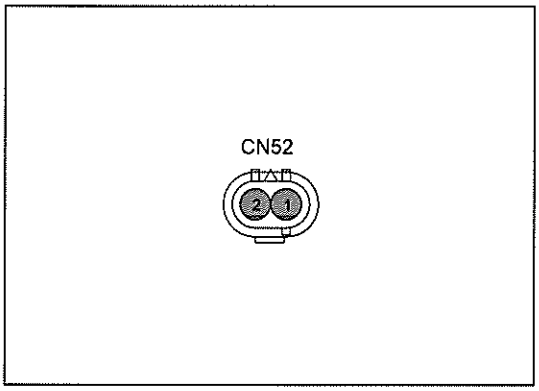
Turn off the key switch and disconnect the battery plug.

Disconnect the CN52 connector, and perform the temperature sensor individual inspection.

[Inspection procedure and standard]

Carry out temperature sensor individual inspection.

Measure the temperature sensor resistance between CN52-2 and CN52-1 (sensor side of CN52)



Standard: Approx. 245 to 600 kΩ

* The resistance is changed with depending on temperature. So refer to the below table about rough standard value.

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Temperature	Temperature sensor resistance (between CN52-2 and CN52-1)
20°C	Approx. 13 kΩ
80°C	Approx. 1.75 kΩ
100°C	Approx. 1 kΩ

Judgment

Result	Procedure
OK	Go to step 3
NG	**Drive motor RH temperature sensor defect**

STEP3

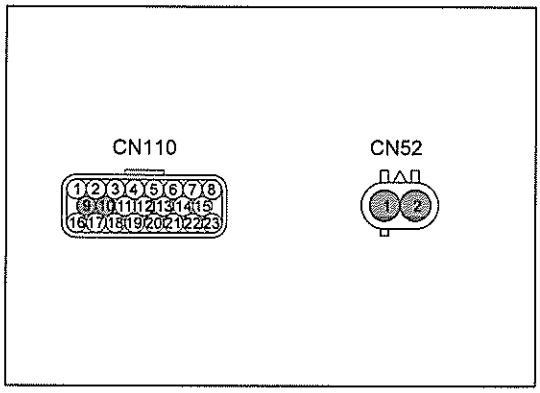
Inspection : Harness

Turn off the key switch and disconnect the battery plug.

Disconnect the CN110 and CN52 connectors and check the harnesses.

[Inspection procedure and standard]

Inspect for continuity and short circuiting of the harness.



Perform this check with the battery plug and the CN110, and CN52 connectors disconnected, and visually check inside the connector and the caulked portion of its wire for defects with disconnecting SST.

Refer to BEFORE TROUBLESHOOTING

*1 : It is OK to connect CN52-1 to CN52-2 through SST2 (09232-13130-71) and check if there is continuity between CN110-9 and CN110-10.

Portion to be inspected	Standard:	Remarks
CN110-9 to CN52-2	Continuity	*1
CN110-10 to CN52-1	Continuity	*1
CN52-1 to CN52-2	No continuity	

Judgment

Result	Procedure
OK	**Drive motor driver RH defect**
NG	**Drive motor RH temperature sensor harness defect**

Error Code: C3-1

Failure mode: Drive motor driver LH power-circuit temperature sensor (open/short) abnormality

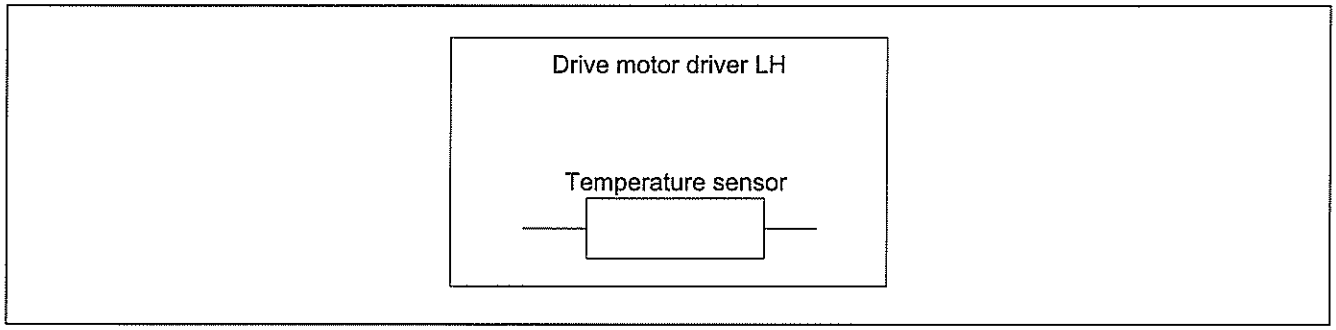
⚠ CAUTION

- **If C3-1 occurs, the drive motor driver LH is defective, so replace it.**

Probable cause

- Drive motor driver LH defect

Related portion



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Error Code: C3-2

Failure mode: Drive motor driver RH power-circuit temperature sensor (open/short) abnormality

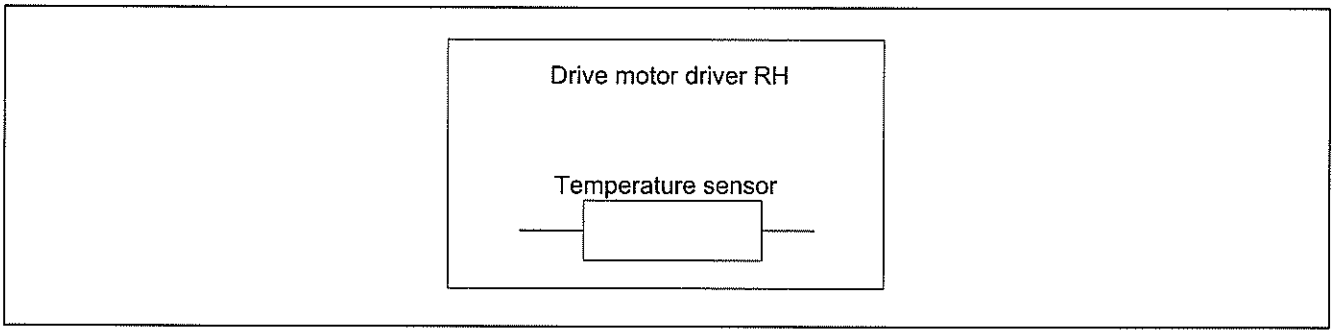
⚠ CAUTION

- **If C3-2 occurs, the drive motor driver RH is defective, so replace it.**

Probable cause

- Drive motor driver RH defect

Related portion



Error Code: C4-1

Failure mode: Accelerator potentiometer POT1 open abnormality

⚠ CAUTION

- **Be sure to do the matching after reassembly if performed the removing and inspection of accelerator potentiometer**

Probable cause

- Connector contact defect
- Harness defect
- Accelerator sensor defect
- Main controller defect

Related portion

Main controller			Accelerator sensor
	CN101-27 (53, VRA1+)	CN26-5	
	CN102-30 (52, VRA1)	CN26-4	
	CN101-22 (50, VRA-)	CN26-6	
	CN101-26 (55, VRA2+)	CN26-1	
	CN102-32 (54, VRA2)	CN26-3	
	CN101-32 (51, POT-)	CN26-2	

STEP1

Turn off the key switch and disconnect the battery plug.

After disconnection the CN26 connector, check the inside of connector and the caulked portion of wire whether it has defect or not by visual confirm. (Refer to BEFORE TROUBLESHOOTING)

Connect the CN26 connector, connect the battery plug.

Turn on the key switch to see if an error occurs.

Judgment

Result	Procedure
C4-1 error does not occur.	**Connector contact defect**
C4-1 error occurs.	Go to step 2

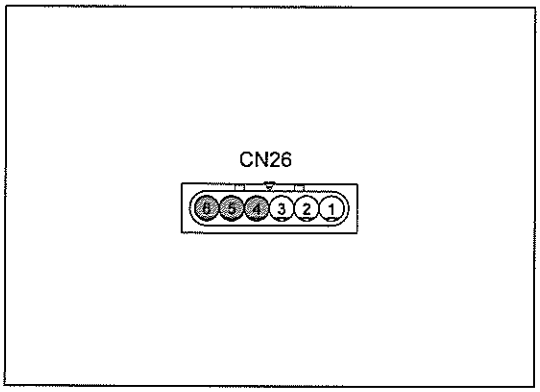
STEP2

Inspection : Accelerator sensor

Turn off the key switch and disconnect the battery plug.

Disconnect the CN26 connector and check the accelerator sensor resistance.

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[Inspection procedure and standard]

Inspect accelerator sensor resistance.

Turn off the key switch and disconnect the battery plug, disconnect the CN26 connector, visually check each terminal and the caulked portion and coating of each cable for defects. (Refer to BEFORE TROUBLESHOOTING)

And check the following both ends of connector resistance for sensor. Then confirm the changing value with operating the portion of sensor.

CN26-4(52) to CN26-6(50)

Portion to be inspected	Standard:
CN26-5(53) to CN26-6(50)	1.8 to 3.5 kΩ

Judgment

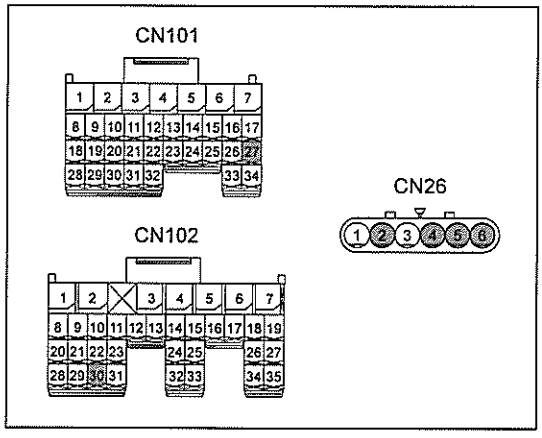
Result	Procedure
NG	**Accelerator sensor defect**
OK	Go to step 3

STEP3

Inspection : Harness

Turn off the key switch and disconnect the battery plug.

Disconnect the CN101, CN102, CN26 connectors and check continuity of the harness.



[Inspection procedure and standard]

Inspect for continuity of the harness.

Perform this check with the battery plug and the CN101, CN102, and CN26 connectors disconnected, and visually check inside the connector and the caulked portion of its wire for defects.

Refer to BEFORE TROUBLESHOOTING

*1 : It is OK to connect CN26-5 to CN26-4 through SST2 (09232-13130-71) and check if there is continuity between CN101-27 and CN102-30.

Portion to be inspected	Standard:
CN101-27(53) to CN26-5	Continuity *1
CN102-30(52) to CN26-4	Continuity *1
CN26-5(53) to CN26-6(50)	No continuity
CN26-5(53) to CN26-2(51)	No continuity
CN26-4(52) to CN26-6(50)	No continuity
CN26-4(52) to CN26-2(51)	No continuity

Judgment

Result	Procedure
NG	**Harness defect**
OK	**Main controller defect**

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Error Code: C4-2

Failure mode: Accelerator potentiometer POT2 open abnormality

⚠ CAUTION

- **Be sure to do the matching after reassembly if performed the removing and inspection of accelerator potentiometer**

Probable cause

- Connector contact defect
- Harness defect
- Accelerator sensor defect
- Main controller defect

Related portion

Main controller			Accelerator sensor
	CN101-27 (53, VRA1+)	CN26-5	
	CN102-30 (52, VRA1)	CN26-4	
	CN101-22 (50, VRA-)	CN26-6	
	CN101-26 (55, VRA2+)	CN26-1	
	CN102-32 (54, VRA2)	CN26-3	
	CN101-32 (51, POT-)	CN26-2	

STEP1

Turn off the key switch and disconnect the battery plug.

After disconnection the CN26 connector, check the inside of connector and the caulked portion of wire whether it has defect or not by visual confirm. (Refer to BEFORE TROUBLESHOOTING)

Connect the CN26 connector, connect the battery plug.

Turn on the key switch to see if an error occurs.

Judgment

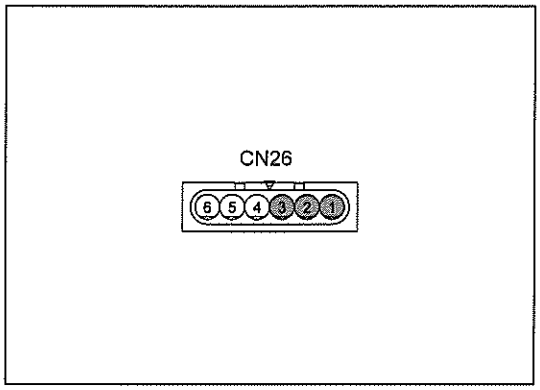
Result	Procedure
C4-2 error does not occur.	**Connector contact defect**
C4-2 error occurs.	Go to step 2

STEP2

Inspection : Accelerator sensor

Turn off the key switch and disconnect the battery plug.

Disconnect the CN26 connector and check the accelerator sensor resistance.



[Inspection procedure and standard]

Inspect accelerator sensor resistance.

Turn off the key switch and disconnect the battery plug, disconnect the CN26 connector, visually check each terminal and the caulked portion and coating of each cable for defects. (Refer to BEFORE TROUBLESHOOTING)

And check the following both ends of connector resistance for sensor. Then confirm the changing value with operating the portion of sensor.

CN26-3(54) to CN26-2(51)

Portion to be inspected	Standard:
CN26-1(55) to CN26-2(51)	1.8 to 3.5 kΩ

Judgment

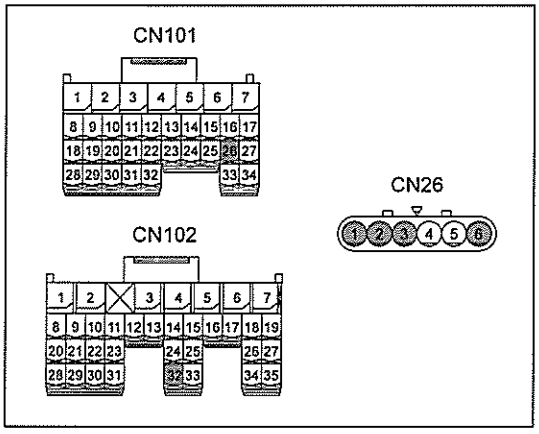
Result	Procedure
NG	**Accelerator sensor defect**
OK	Go to step 3

STEP3

Inspection : Harness

Turn off the key switch and disconnect the battery plug.

Disconnect the CN101, CN102, CN26 connectors and check continuity of the harness.



[Inspection procedure and standard]

Inspect for continuity of the harness.

Perform this check with the battery plug and the CN101, CN102, and CN26 connectors disconnected, and visually check inside the connector and the caulked portion of its wire for defects.

Refer to BEFORE TROUBLESHOOTING

*1 : It is OK to connect CN26-1 to CN26-3 through SST2 (09232-13130-71) and check if there is continuity between CN101-26 and CN102-32.

Portion to be inspected	Standard:
CN101-26(55) to CN26-1	Continuity *1
CN102-32(54) to CN26-3	Continuity *1
CN26-1(55) to CN26-6(50)	No continuity
CN26-1(55) to CN26-2(51)	No continuity
CN26-3(54) to CN26-6(50)	No continuity
CN26-3(54) to CN26-2(51)	No continuity

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Judgment

Result	Procedure
NG	Harness defect
OK	Main controller defect

Error Code: C4-3

Failure mode: Accelerator potentiometer POT1VCC short circuit abnormality

⚠ CAUTION

- **Be sure to do the matching after reassembly if performed the removing and inspection of accelerator potentiometer**

Probable cause

- Connector contact defect
- Harness defect
- Accelerator sensor defect
- Main controller defect

Related portion

Main controller			Accelerator sensor
	CN101-27 (53, VRA1+)	CN26-5	
	CN102-30 (52, VRA1)	CN26-4	
	CN101-22 (50, VRA-)	CN26-6	
	CN101-26 (55, VRA2+)	CN26-1	
	CN102-32 (54, VRA2)	CN26-3	
	CN101-32 (51, POT-)	CN26-2	

STEP1

Turn off the key switch and disconnect the battery plug.

After disconnection the CN26 connector, check the inside of connector and the caulked portion of wire whether it has defect or not by visual confirm. (Refer to BEFORE TROUBLESHOOTING)

Connect the CN26 connector, connect the battery plug.

Turn on the key switch to see if an error occurs.

Judgment

Result	Procedure
C4-3 error does not occur.	**Connector contact defect**
C4-3 error occurs.	Go to step 2

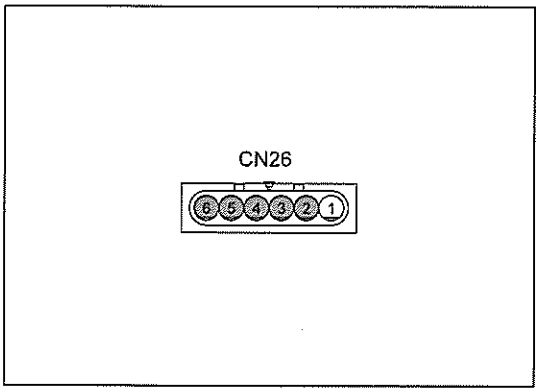
STEP2

Inspection : Accelerator sensor

Turn off the key switch and disconnect the battery plug.

Disconnect the CN26 connector and check the accelerator sensor resistance.

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[Inspection procedure and standard]

Inspect accelerator sensor resistance.

Turn off the key switch and disconnect the battery plug, disconnect the CN26 connector, visually check each terminal and the caulked portion and coating of each cable for defects. (Refer to BEFORE TROUBLESHOOTING)

And check the following both ends of connector resistance for sensor. Then confirm the changing value with operating the portion of sensor.

CN26-4(52) to CN26-6(50)

CN26-3(54) to CN26-2(51)

Portion to be inspected	Standard:
CN26-5(53) to CN26-6(50)	1.8 to 3.5 kΩ
CN26-1(55) to CN26-2(51)	1.8 to 3.5 kΩ

Judgment

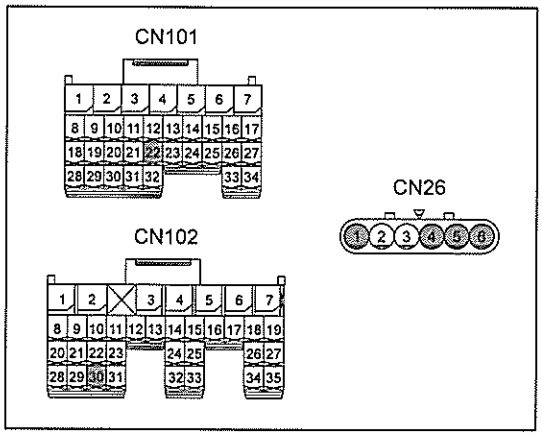
Result	Procedure
NG	**Accelerator sensor defect**
OK	Go to step 3

STEP3

Inspection : Harness

Turn off the key switch and disconnect the battery plug.

Disconnect the CN101, CN102, CN26 connectors and check continuity of the harness.



[Inspection procedure and standard]

Inspect for continuity of the harness.

Perform this check with the battery plug and the CN101, CN102, and CN26 connectors disconnected, and visually check inside the connector and the caulked portion of its wire for defects.

Refer to BEFORE TROUBLESHOOTING

*1 : It is OK to connect CN26-6 to CN26-4 through SST2 (09232-13130-71) and check if there is continuity between CN101-22 and CN102-30.

Portion to be inspected	Standard:
CN101-22(50) to CN26-6	Continuity *1
CN26-4(52) to CN26-5(53)	No continuity
CN26-4(52) to CN26-1(55)	No continuity

Judgment

Result	Procedure
NG	**Harness defect**
OK	**Main controller defect**

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Error Code: C4-4

Failure mode: Accelerator potentiometer POT2VCC short circuit abnormality

⚠ CAUTION

- **Be sure to do the matching after reassembly if performed the removing and inspection of accelerator potentiometer**

Probable cause

- Connector contact defect
- Harness defect
- Accelerator sensor defect
- Main controller defect

Related portion

Main controller			Accelerator sensor
	CN101-27 (53, VRA1+)	CN26-5	
	CN102-30 (52, VRA1)	CN26-4	
	CN101-22 (50, VRA-)	CN26-6	
	CN101-26 (55, VRA2+)	CN26-1	
	CN102-32 (54, VRA2)	CN26-3	
	CN101-32 (51, POT-)	CN26-2	

STEP1

Turn off the key switch and disconnect the battery plug.

After disconnection the CN26 connector, check the inside of connector and the caulked portion of wire whether it has defect or not by visual confirm. (Refer to BEFORE TROUBLESHOOTING)

Connect the CN26 connector, connect the battery plug.

Turn on the key switch to see if an error occurs.

Judgment

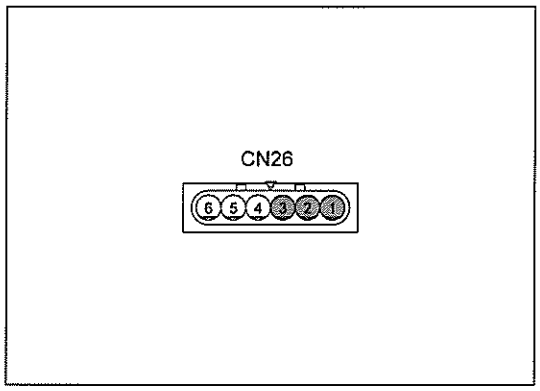
Result	Procedure
C4-4 error does not occur.	**Connector contact defect**
C4-4 error occurs.	Go to step 2

STEP2

Inspection : Accelerator sensor

Turn off the key switch and disconnect the battery plug.

Disconnect the CN26 connector and check the accelerator sensor resistance.



[Inspection procedure and standard]

Inspect accelerator sensor resistance.

Turn off the key switch and disconnect the battery plug, disconnect the CN26 connector, visually check each terminal and the caulked portion and coating of each cable for defects. (Refer to BEFORE TROUBLESHOOTING)

And check the following both ends of connector resistance for sensor. Then confirm the changing value with operating the portion of sensor.

CN26-3(54) to CN26-2(51)

Portion to be inspected	Standard:
CN26-1(55) to CN26-2(51)	1.8 to 3.5 kΩ

Judgment

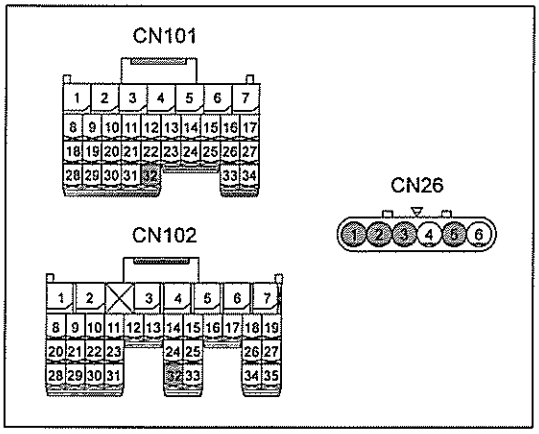
Result	Procedure
NG	**Accelerator sensor defect**
OK	Go to step 3

STEP3

Inspection : Harness

Turn off the key switch and disconnect the battery plug.

Disconnect the CN101, CN102, CN26 connectors and check continuity of the harness.



[Inspection procedure and standard]

Inspect for continuity of the harness.

Perform this check with the battery plug and the CN101, CN102, and CN26 connectors disconnected, and visually check inside the connector and the caulked portion of its wire for defects.

Refer to BEFORE TROUBLESHOOTING

*1 : It is OK to connect CN26-2 to CN26-3 through SST2 (09232-13130-71) and check if there is continuity between CN101-32 and CN102-32.

Portion to be inspected	Standard:
CN101-32(51) to CN26-2	Continuity *1
CN26-3(54) to CN26-5(53)	No continuity
CN26-3(54) to CN26-1(55)	No continuity

Judgment

Result	Procedure
NG	**Harness defect**
OK	**Main controller defect**

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Error Code: C4-5

Failure mode: Accelerator potentiometer offset abnormality

⚠ CAUTION

- **Be sure to do the matching after reassembly if performed the removing and inspection of accelerator potentiometer**

Probable cause

- Connector contact defect
- Harness defect
- Accelerator sensor defect
- Main controller defect

Related portion

Main controller			Accelerator sensor
	CN101-27 (53, VRA1+)	CN26-5	
	CN102-30 (52, VRA1)	CN26-4	
	CN101-22 (50, VRA-)	CN26-6	
	CN101-26 (55, VRA2+)	CN26-1	
	CN102-32 (54, VRA2)	CN26-3	
	CN101-32 (51, POT-)	CN26-2	

STEP1

Turn off the key switch and disconnect the battery plug.

After disconnection the CN26 connector, check the inside of connector and the caulked portion of wire whether it has defect or not by visual confirm. (Refer to BEFORE TROUBLESHOOTING)

Connect the CN26 connector, connect the battery plug.

Turn on the key switch to see if an error occurs.

Judgment

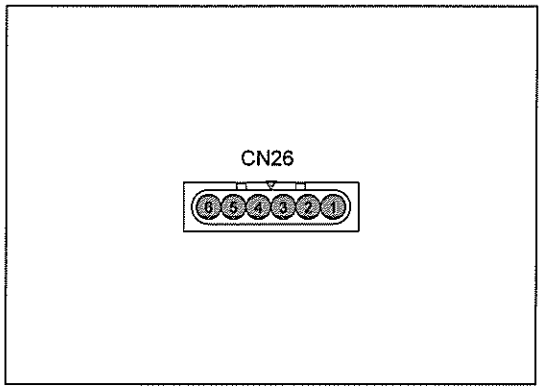
Result	Procedure
C4-5 error does not occur.	**Connector contact defect**
C4-5 error occurs.	Go to step 2

STEP2

Inspection : Accelerator sensor

Turn off the key switch and disconnect the battery plug.

Disconnect the CN26 connector and check the accelerator sensor resistance.



[Inspection procedure and standard]

Inspect accelerator sensor resistance.

Turn off the key switch and disconnect the battery plug, disconnect the CN26 connector, visually check each terminal and the caulked portion and coating of each cable for defects. (Refer to BEFORE TROUBLESHOOTING)

And check the following both ends of connector resistance for sensor. Then confirm the changing value with operating the portion of sensor.

CN26-4(52) to CN26-6(50)

CN26-3(54) to CN26-2(51)

Portion to be inspected	Standard:
CN26-5(53) to CN26-6(50)	1.8 to 3.5 kΩ
CN26-1(55) to CN26-2(51)	1.8 to 3.5 kΩ

Judgment

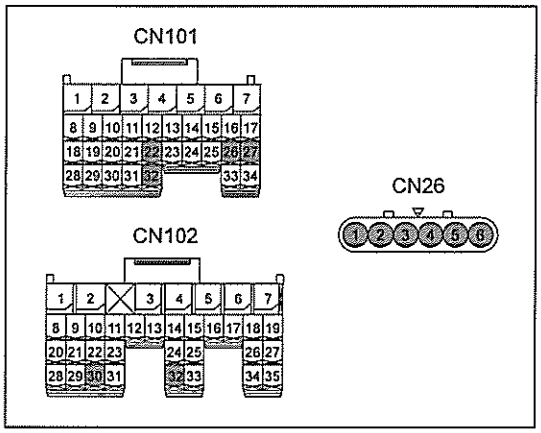
Result	Procedure
NG	**Accelerator sensor defect**
OK	Go to step 3

STEP3

Inspection : Harness

Turn off the key switch and disconnect the battery plug.

Disconnect the CN101, CN102, CN26 connectors and check continuity of the harness.



[Inspection procedure and standard]

Inspect for continuity of the harness.

Perform this check with the battery plug and the CN101, CN102, and CN26 connectors disconnected, and visually check inside the connector and the caulked portion of its wire for defects.

Refer to BEFORE TROUBLESHOOTING

It is OK to connect the following portion by using SST2 (09232-13130-71) and check if there is continuity between CN101 and CN102.

Portions to connect SST2 / Continuity check point

*1 : CN26-5 to CN26-4 / CN101-27 to CN102-30

*2 : CN26-6 to CN26-3 / CN101-22 to CN102-30

*3 : CN26-1 to CN26-3 / CN101-26 to CN102-32

*4 : CN26-2 to CN26-3 / CN101-32 to CN102-32

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Portion to be inspected	Standard:
CN101-27(53) to CN26-5	Continuity *1
CN101-22(50) to CN26-6	Continuity *2
CN101-26(55) to CN26-1	Continuity *3
CN101-32(51) to CN26-2	Continuity *4
CN26-4(52) to CN26-6(50)	No continuity
CN26-4(52) to CN26-2(51)	No continuity
CN26-4(52) to CN26-5(53)	No continuity
CN26-4(52) to CN26-1(55)	No continuity
CN26-3(54) to CN26-6(50)	No continuity
CN26-3(54) to CN26-2(51)	No continuity
CN26-3(54) to CN26-5(53)	No continuity
CN26-3(54) to CN26-1(55)	No continuity
CN102-30(52) to CN102-32(54)	No continuity

Judgment

Result	Procedure
NG	**Harness defect**
OK	**Main controller defect**

Error Code: C4-6

Failure mode: Accelerator potentiometer matching value abnormality

⚠ CAUTION

- **If C4-1,2,3,4,5 occurs, give priority to troubleshooting for C4-1,2,3,4,5.**
- **Be sure to do the matching after reassembly if performed the removing and inspection of accelerator potentiometer**

Probable cause

- Main controller defect
- Accelerator potentiometer matching defect
- Accelerator potentiometer assembly defect

Related portion

Main controller	CN101-27 (53, VRA1+)	CN26-5	Accelerator sensor
	CN102-30 (52, VRA1)	CN26-4	
	CN101-22 (50, VRA-)	CN26-6	
	CN101-26 (55, VRA2+)	CN26-1	
	CN102-32 (54, VRA2)	CN26-3	
	CN101-32 (51, POT-)	CN26-2	

STEP1

Perform the accelerator potentiometer matching.

(Refer to page "MATCHING" of Display section)

Judgment

Result	Procedure
NG matching	Go to step 2
OK matching	Go to step 3

STEP2

Check the accelerator potentiometer voltage.

Accelerator sensor 1/2 voltage

STD
[ANL] 3 IO2 (3 02, 3 03)
Multi-function display
[ANL] I/O TRAVELING 1/5
VRA

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[Inspection procedure and standard]

Check if the voltage of accelerator is within the standard range of the below table when accelerator is not operated and during maximum pressing of accelerator.

Position of accelerator pedal	sensor 1	sensor 2
When accelerator is not operated	0.40V to 1.24V	0.65V to 2.31V
During maximum pressing of accelerator	2.00V to 4.79V	2.42V to 4.79V

Judgment

Result	Procedure
Within standard range	**Main controller defect**
Outside standard range	Go to step 3 **Accelerator potentiometer assembly defect** **Perform the matching after reassemble.**

STEP3

Turn off key switch and disconnect the battery plug. Connect the battery plug again after 30 seconds and turn on the key switch.

Judgment

Result	Procedure
C4-6 error occurs.	**Main controller defect**
C4-6 error does not occur.	**Accelerator potentiometer matching defect** **Use as it is.**

Error Code: C8-1

Failure mode: Drive motor LH rotation sensor open abnormality

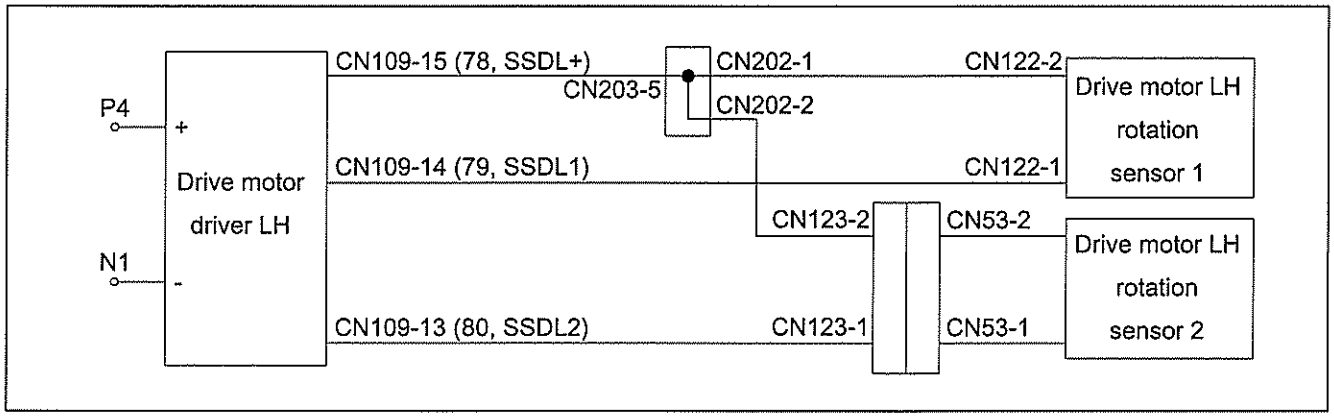
⚠ CAUTION

- **Jack up the vehicle until drive wheels leave the ground and support the frame with wooden blocks before starting troubleshooting.**

Probable cause

- Connector contact defect
- Drive motor LH rotation sensor 1/2 harness defect
- Drive motor LH rotation sensor 1 defect
- Drive motor LH rotation sensor 2 defect
- Drive motor LH rotation sensor 1/2 defect
- Drive motor driver LH defect

Related portion



STEP1

Disconnect the battery plug, and visually check inside the connector between CN109, CN122, CN123 and CN202 and the caulked portion of its wire for defects. Refer to BEFORE TROUBLESHOOTING

After connecting the connector, connect the battery plug and turn on the key switch to confirm error.

Judgment

Result	Procedure
C8-1 error does not occur.	**Connector contact defect**
C8-1 error occurs.	Go to step 2

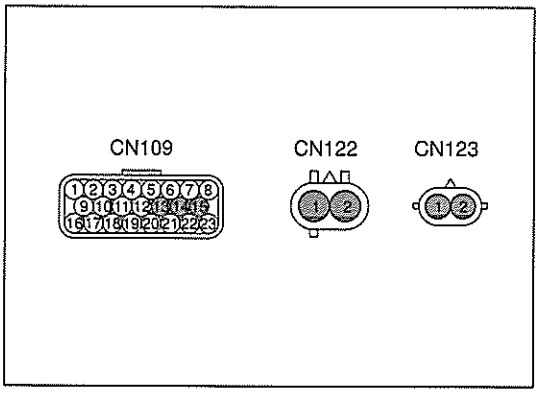
STEP2

Inspection : Harness

Turn off the key switch and disconnect the battery plug.

Disconnect the CN109, CN122 and CN123 connectors and check the harnesses.

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[Inspection procedure and standard]

Inspect for continuity and short circuiting of the harness.

Perform this check with the battery plug and the CN109, CN122 and CN123 connectors disconnected, and visually check inside the connector and the caulked portion of its wire for defects.

Refer to BEFORE TROUBLESHOOTING

*1 : It is OK to connect CN122-1 to CN122-2 (CN109 side) through SST2 (09232-13130-71) and check if there is continuity between CN109-15 and CN109-14.

*2 : It is OK to connect CN123-1 to CN123-2 (CN109 side) through SST2 (09232-13130-71) and check if there is continuity between CN109-15 and CN109-13.

Measurement terminals	Standard:	Remarks
CN109-15 to CN122-2	Continuity	*1
CN109-15 to CN123-2	Continuity	*2
CN109-14 to CN122-1	Continuity	*1
CN109-13 to CN123-1	Continuity	*2
CN109-15 to CN109-13	No continuity	
CN109-15 to CN109-14	No continuity	
CN109-13 to CN109-14	No continuity	

Judgment

Result	Procedure
OK	Go to step 3
NG	**Drive motor LH rotation sensor 1/2 harness defect** **Harness defect between CN109 and CN122, between CN109 and CN123.**

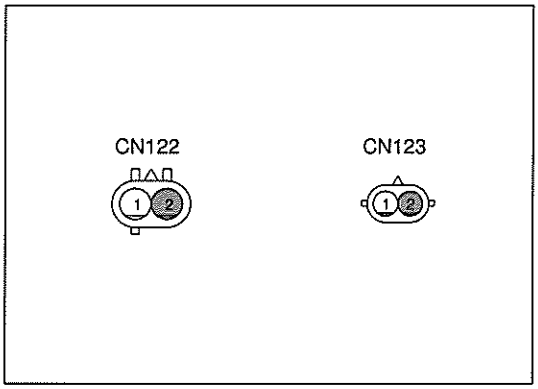
STEP3

Inspection : Drive motor driver

Turn off the key switch and disconnect the battery plug.

Connect the CN109 connector, then connect the battery plug and turn on the key switch with disconnecting CN122 and CN123 connector.

Measure the voltage between CN122-2 and N1, and between CN123-2 and N1.



Judgment

Result	Procedure
12 ~ 16V	Go to step 4
Other than 12 to 16V	**Drive motor driver LH defect**

STEP4

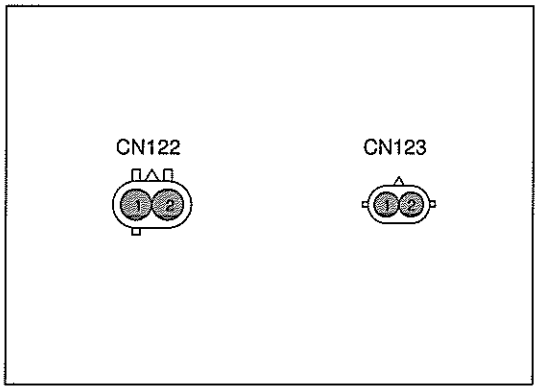
Inspection :

Check the error code

Turn off the key switch and disconnect the battery plug.

Connect between CN122-1 and CN122-2, and between CN123-1 and CN123-2 by using SST2 with connecting CN109 and disconnecting CN122, CN123.

Connect the battery plug and turn on the key switch to confirm the error occurs.



Judgment

Result	Procedure
C8-2 error occurs	Go to step 5
C8-1 error occurs, or error does not occur	**Drive motor driver LH defect**

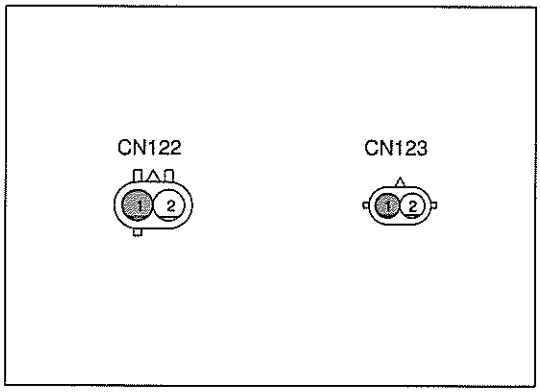
STEP5

Inspection : Drive motor driver

Turn off the key switch and disconnect the battery plug.

Disconnect the SST2, and measure the resistance between CN122-1 (CN109 side) and N1, and between CN123-2 (CN109 side) and N1 with connecting CN109 and disconnecting CN122, CN123.

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Judgment

Result	Procedure
Both resistance is Approx. 100 Ω	Go to step 6
Either resistance is not Approx. 100 Ω	**Drive motor driver LH defect**

STEP6

Inspection : Drive motor LH rotation sensor

Turn off the key switch and disconnect the battery plug.

Reconnect the CN122 and CN123 connector.

Connect the battery plug and turn on the key switch to occurs C8-1 error.

·Drive motor LH rotation sensor : sensor 1 / sensor 2

STD
[ANL] 3 IO2 (3 10, 3 11)
Multi-function display
[ANL] I/O TRAVELING 5/5

SSDL

Judgment

Result	Procedure
Drive motor LH rotation sensor 1 voltage : 0.3 or less Drive motor LH rotation sensor 2 voltage : 0.4 to 1.9	**Drive motor LH rotation sensor 1 defect**
Drive motor LH rotation sensor 1 voltage : 0.4 to 1.9 Drive motor LH rotation sensor 2 voltage : 0.3 or less	**Drive motor LH rotation sensor 2 defect**
Drive motor LH rotation sensor 1 voltage : 0.3 or less Drive motor LH rotation sensor 2 voltage : 0.3 or less	**Drive motor LH rotation sensor 1/2 defect**

Error Code: C8-2

Failure mode: Drive motor LH rotation sensor short abnormality

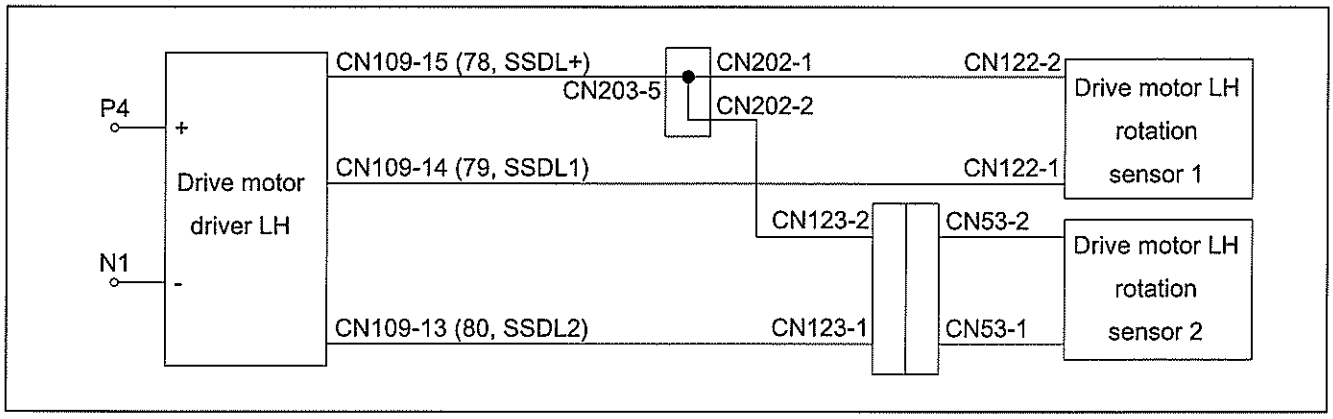
⚠ CAUTION

- **Jack up the vehicle until drive wheels leave the ground and support the frame with wooden blocks before starting troubleshooting.**

Probable cause

- Connector contact defect
- Drive motor LH rotation sensor 1/2 harness defect
- Drive motor LH rotation sensor 1 defect
- Drive motor LH rotation sensor 2 defect
- Drive motor LH rotation sensor 1/2 defect
- Drive motor driver LH defect

Related portion



STEP1

Disconnect the battery plug, and visually check inside the connector between CN109, CN122, CN123 and CN202 and the caulked portion of its wire for defects. Refer to BEFORE TROUBLESHOOTING

After connecting the connector, connect the battery plug and turn on the key switch to confirm error.

Judgment

Result	Procedure
C8-2 error does not occur.	**Connector contact defect**
C8-2 error occurs.	Go to step 2

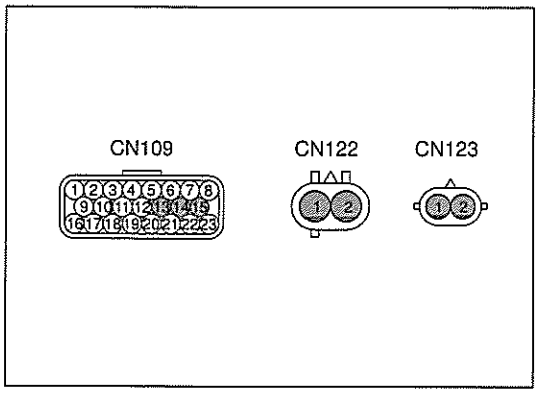
STEP2

Inspection : Harness

Turn off the key switch and disconnect the battery plug.

Disconnect the CN109, CN122 and CN123 connectors and check the harnesses.

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[Inspection procedure and standard]

Inspect for continuity and short circuiting of the harness.

Perform this check with the battery plug and the CN109, CN122 and CN123 connectors disconnected, and visually check inside the connector and the caulked portion of its wire for defects.

Refer to BEFORE TROUBLESHOOTING

*1 : It is OK to connect CN122-1 to CN122-2 (CN109 side) through SST2 (09232-13130-71) and check if there is continuity between CN109-15 and CN109-14.

*2 : It is OK to connect CN123-1 to CN123-2 (CN109 side) through SST2 (09232-13130-71) and check if there is continuity between CN109-15 and CN109-13.

Measurement terminals	Standard:	Remarks
CN109-15 to CN122-2	Continuity	*1
CN109-15 to CN123-2	Continuity	*2
CN109-14 to CN122-1	Continuity	*1
CN109-13 to CN123-1	Continuity	*2
CN109-15 to CN109-13	No continu-ity	
CN109-15 to CN109-14	No continu-ity	
CN109-13 to CN109-14	No continu-ity	

Judgment

Result	Procedure
OK	Go to step 3
NG	**Drive motor LH rotation sensor 1/2 harness defect** **Harness defect between CN109 and CN122, between CN109 and CN123.**

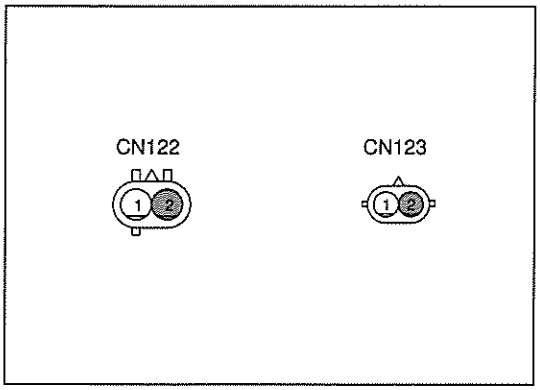
STEP3

Inspection : Drive motor driver

Turn off the key switch and disconnect the battery plug.

Connect the CN109 connector, then connect the battery plug and turn on the key switch with disconnecting CN122 and CN123 connector.

Measure the voltage between CN122-2 and N1, and between CN123-2 and N1.



Judgment

Result	Procedure
12 ~ 16V	Go to step 4
Other than 12 to 16V	**Drive motor driver LH defect**

STEP4

Inspection :

Check the error code

Turn off the key switch and disconnect the battery plug.

Connect the CN109 connector, then connect the battery plug and turn on the key switch with disconnecting CN122 and CN123 connector. And check the occured error.

Judgment

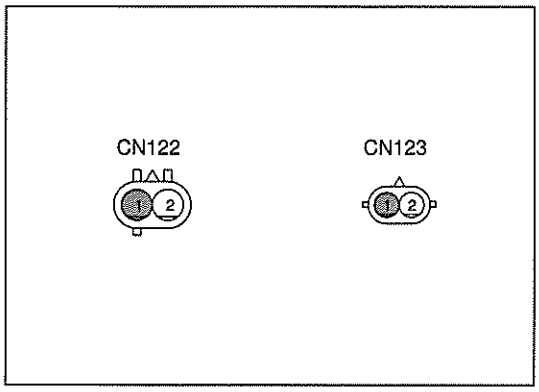
Result	Procedure
C8-1 error occurs	Go to step 5
C8-2 error occurs, or error does not occur	**Drive motor driver LH defect**

STEP5

Inspection : Drive motor driver

Turn off the key switch and disconnect the battery plug.

Measure the resistance between CN122-1 (CN109 side) and N1, and between CN123-2 (CN109 side) and N1 with connecting CN109 and disconnecting CN122, CN123.



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Judgment

Result	Procedure
Both resistance is Approx.100 Ω	Go to step 6
Either resistance is not Approx.100 Ω	**Drive motor driver LH defect**

STEP6

Inspection : Drive motor LH rotation sensor

Turn off the key switch and disconnect the battery plug.

Reconnect the CN122 and CN123 connector.

Connect the battery plug and turn on the key switch to occurs C8-1 error.

·Drive motor LH rotation sensor : sensor 1 / sensor 2

STD
[ANL] 3 IO2 (3 10, 3 11)
Multi-function display
[ANL] I/O TRAVELING 5/5

SSDL

Judgment

Result	Procedure
Drive motor LH rotation sensor 1 voltage : 2.0 or more Drive motor LH rotation sensor 2 voltage : 0.4 to 1.9	**Drive motor LH rotation sensor 1 defect**
Drive motor LH rotation sensor 1 voltage : 0.4 to 1.9 Drive motor LH rotation sensor 2 voltage : 2.0 or more	**Drive motor LH rotation sensor 2 defect**
Drive motor LH rotation sensor 1 voltage : 2.0 or more Drive motor LH rotation sensor 2 voltage : 2.0 or more	**Drive motor LH rotation sensor 1/2 defect**

Error Code: C8-3

Failure mode: Drive motor RH rotation sensor open abnormality

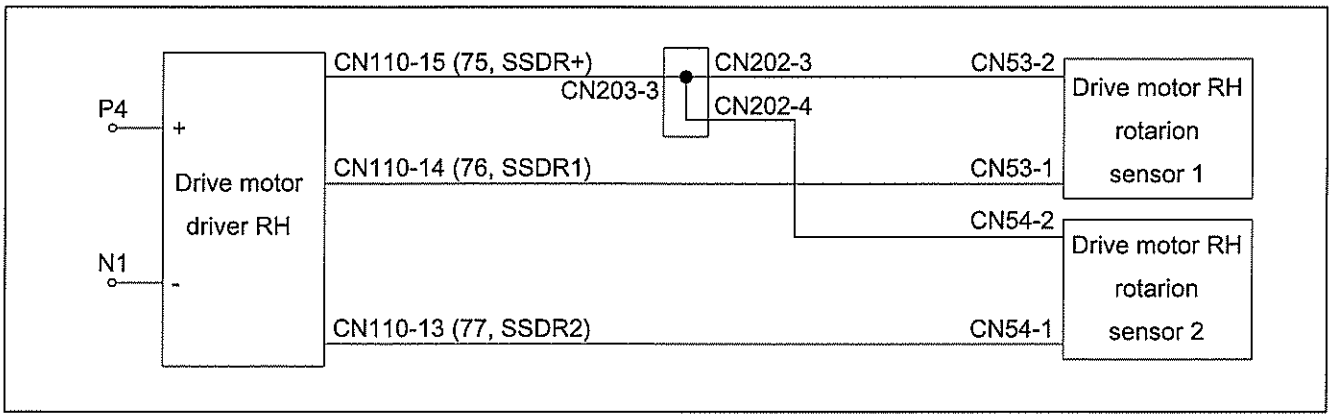
⚠ CAUTION

- **Jack up the vehicle until drive wheels leave the ground and support the frame with wooden blocks before starting troubleshooting.**

Probable cause

- Connector contact defect
- Drive motor RH rotation sensor 1/2 harness defect
- Drive motor RH rotation sensor 1 defect
- Drive motor RH rotation sensor 2 defect
- Drive motor RH rotation sensor 1/2 defect
- Drive motor driver RH defect

Related portion



STEP1

Disconnect the battery plug, and visually check inside the connector between CN110, CN53, CN54 and CN202 and the caulked portion of its wire for defects. Refer to BEFORE TROUBLESHOOTING

After connecting the connector, connect the battery plug and turn on the key switch to confirm error.

Judgment

Result	Procedure
C8-3 error does not occur.	**Connector contact defect**
C8-3 error occurs.	Go to step 2

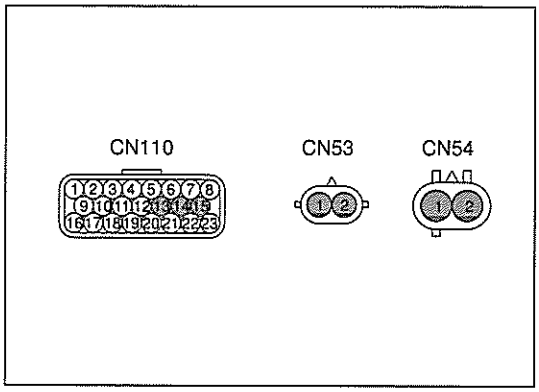
STEP2

Inspection : Harness

Turn off the key switch and disconnect the battery plug.

Disconnect the CN110, CN53 and CN54 connectors and check the harnesses.

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[Inspection procedure and standard]

Inspect for continuity and short circuiting of the harness.

Perform this check with the battery plug and the CN110, CN53, and CN54 connectors disconnected, and visually check inside the connector and the caulked portion of its wire for defects.

Refer to BEFORE TROUBLESHOOTING

*1 : It is OK to connect CN53-1 to CN53-2 through SST2 (09232-13130-71) and check if there is continuity between CN110-15 and CN110-14.

*2 : It is OK to connect CN54-1 to CN54-2 through SST2 (09232-13130-71) and check if there is continuity between CN110-15 and CN110-13.

Measurement terminals	Standard:	Remarks
CN110-15 to CN53-2	Continuity	*1
CN110-15 to CN54-2	Continuity	*2
CN110-14 to CN53-1	Continuity	*1
CN110-13 to CN54-1	Continuity	*2
CN110-15 to CN110-13	No continuity	
CN110-15 to CN110-14	No continuity	
CN110-13 to CN110-14	No continuity	

Judgment

Result	Procedure
OK	Go to step 3
NG	**Drive motor RH rotation sensor 1/2 harness defect** **Harness between CN110 and CN53, between CN110 and CN54 defect**

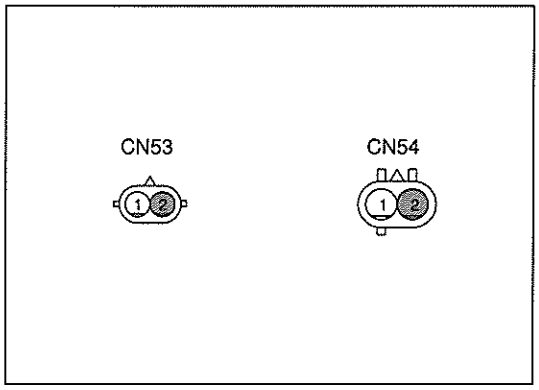
STEP3

Inspection : Drive motor driver

Turn off the key switch and disconnect the battery plug.

Connect the CN110 connector, then connect the battery plug and turn on the key switch with disconnecting CN53 and CN54 connector.

Measure the voltage between CN53-2 and N1, and between CN54-2 and N1.



Judgment

Result	Procedure
12 ~ 16V	Go to step 4
Other than 12 to 16V	**Drive motor driver RH defect**

STEP4

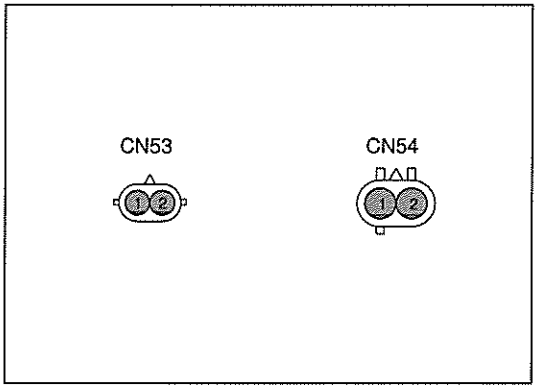
Inspection :

Check the error code

Turn off the key switch and disconnect the battery plug.

Connect between CN53-1 and CN53-2, and between CN54-1 and CN54-2 by using SST2 with connecting CN110 and disconnecting CN53, CN54.

Connect the battery plug and turn on the key switch to confirm the error occurs.



Judgment

Result	Procedure
C8-4 error occurs	Go to step 5
C8-3 error occurs, or error does not occur	**Drive motor driver RH defect**

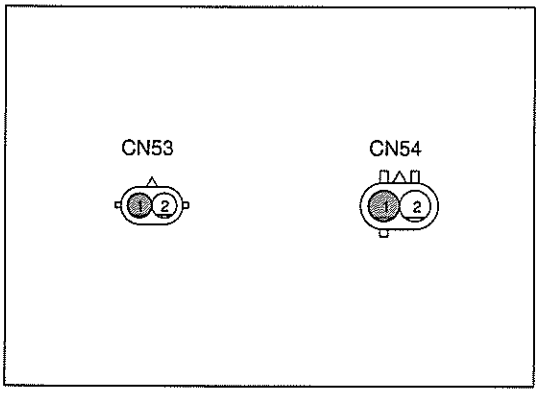
STEP5

Inspection : Drive motor driver

Turn off the key switch and disconnect the battery plug.

Disconnect the SST2, and measure the resistance between CN53-1 (CN110 side) and N1, and between CN54-1 (CN110 side) and N1 with connecting CN110 and disconnecting CN53, CN54.

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Judgment

Result	Procedure
Both resistance is Approx.100 Ω	Go to step 6
Either resistance is not Approx.100 Ω	**Drive motor driver RH defect**

STEP6

Inspection : Drive motor RH rotation sensor

Turn off the key switch and disconnect the battery plug.

Reconnect the CN53 and CN54 connector.

Connect the battery plug and turn on the key switch to occurs C8-3 error.

·Drive motor RH rotation sensor : sensor 1 / sensor 2

STD
[ANL] 3 IO2 (3 12, 3 13)
Multi-function display
[ANL] I/O TRAVELING 5/5

SSDR

Judgment

Result	Procedure
Drive motor RH rotation sensor 1 voltage : 0.3 or less Drive motor RH rotation sensor 2 voltage : 0.4 to 1.9	**Drive motor RH rotation sensor 1 defect**
Drive motor RH rotation sensor 1 voltage : 0.4 to 1.9 Drive motor RH rotation sensor 2 voltage : 0.3 or less	**Drive motor RH rotation sensor 2 defect**
Drive motor RH rotation sensor 1 voltage : 0.3 or less Drive motor RH rotation sensor 2 voltage : 0.3 or less	**Drive motor RH rotation sensor 1/2 defect**

Error Code: C8-4

Failure mode: Drive motor RH rotation sensor short abnormality

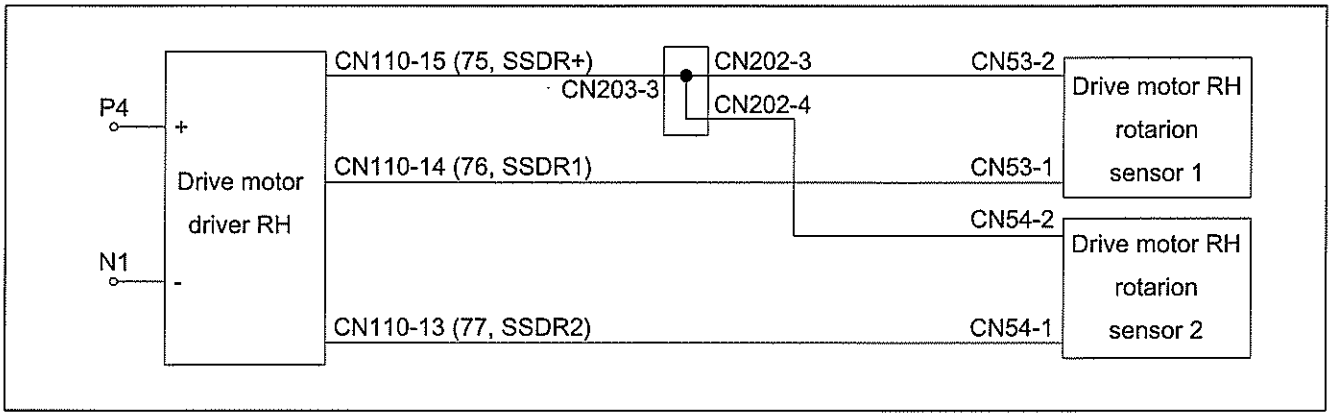
⚠ CAUTION

- **Jack up the vehicle until drive wheels leave the ground and support the frame with wooden blocks before starting troubleshooting.**

Probable cause

- Connector contact defect
- Drive motor RH rotation sensor 1/2 harness defect
- Drive motor RH rotation sensor 1 defect
- Drive motor RH rotation sensor 2 defect
- Drive motor RH rotation sensor 1/2 defect
- Drive motor driver RH defect

Related portion



STEP1

Disconnect the battery plug, and visually check inside the connector between CN110, CN53, CN54 and CN202 and the caulked portion of its wire for defects. Refer to BEFORE TROUBLESHOOTING

After connecting the connector, connect the battery plug and turn on the key switch to confirm error.

Judgment

Result	Procedure
C8-3 error does not occur.	**Connector contact defect**
C8-3 error occurs.	Go to step 2

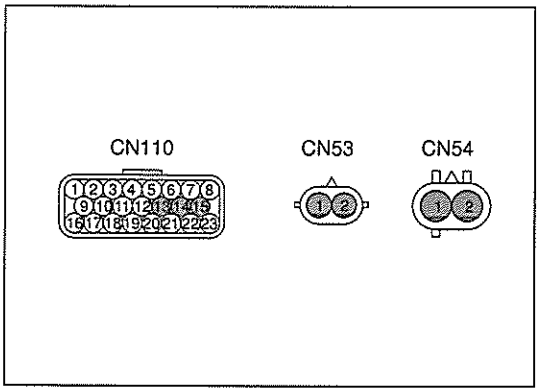
STEP2

Inspection : Harness

Turn off the key switch and disconnect the battery plug.

Disconnect the CN110, CN53 and CN54 connectors and check the harnesses.

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[Inspection procedure and standard]

Inspect for continuity and short circuiting of the harness.

Perform this check with the battery plug and the CN110, CN53, and CN54 connectors disconnected, and visually check inside the connector and the caulked portion of its wire for defects.

Refer to BEFORE TROUBLESHOOTING

*1 : It is OK to connect CN53-1 to CN53-2 through SST2 (09232-13130-71) and check if there is continuity between CN110-15 and CN110-14.

*2 : It is OK to connect CN54-1 to CN54-2 through SST2 (09232-13130-71) and check if there is continuity between CN110-15 and CN110-13.

Measurement terminals	Standard:	Remarks
CN110-15 to CN53-2	Continuity	*1
CN110-15 to CN54-2	Continuity	*2
CN110-14 to CN53-1	Continuity	*1
CN110-13 to CN54-1	Continuity	*2
CN110-15 to CN110-13	No continu-ity	
CN110-15 to CN110-14	No continu-ity	
CN110-13 to CN110-14	No continu-ity	

Judgment

Result	Procedure
OK	Go to step 3
NG	**Drive motor RH rotation sensor 1/2 harness defect** **Harness between CN110 and CN53, between CN110 and CN54 defect**

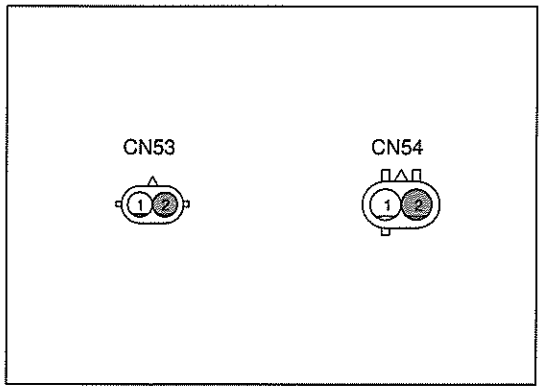
STEP3

Inspection : Drive motor driver

Turn off the key switch and disconnect the battery plug.

Connect the CN110 connector, then connect the battery plug and turn on the key switch with disconnecting CN53 and CN54 connector.

Measure the voltage between CN53-2 and N1, and between CN54-2 and N1.



Judgment

Result	Procedure
12 to 16V	Go to step 4
Other than 12 to 16V	**Drive motor driver RH defect**

STEP4

Inspection :

Check the error code

Turn off the key switch and disconnect the battery plug.

Connect the CN110 connector, then connect the battery plug and turn on the key switch with disconnecting CN53 and CN54 connector. And check the occured error.

Judgment

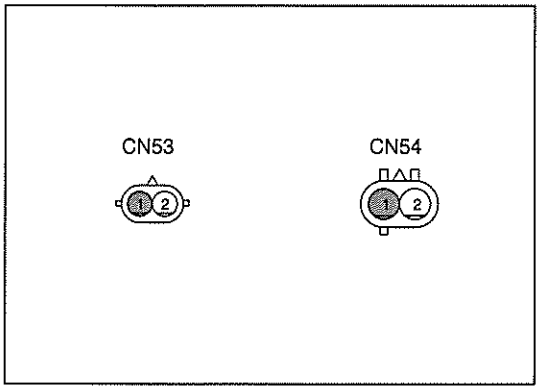
Result	Procedure
C8-3 error occurs	Go to step 5
C8-4 error occurs, or error does not occur	**Drive motor driver RH defect**

STEP5

Inspection : Drive motor driver

Turn off the key switch and disconnect the battery plug.

Measure the resistance between CN53-1 (CN110 side) and N1, and between CN54-1 (CN110 side) and N1 with connecting CN110 and disconnecting CN53, CN54.



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Judgment

Result	Procedure
Both resistance is Approx.100 Ω	Go to step 6
Either resistance is not Approx.100 Ω	**Drive motor driver RH defect**

STEP6

Inspection : Drive motor RH rotation sensor

Turn off the key switch and disconnect the battery plug.

Reconnect the CN53 and CN54 connector.

Connect the battery plug and turn on the key switch to occurs C8-3 error.

·Drive motor RH rotation sensor : sensor 1 / sensor 2

STD
[ANL] 3 IO2 (3 12, 3 13)
Multi-function display
[ANL] I/O TRAVELING 5/5

SSDR

Judgment

Result	Procedure
Drive motor RH rotation sensor 1 voltage : 2.0 or more Drive motor RH rotation sensor 2 voltage : 0.4 to 1.9	**Drive motor RH rotation sensor 1 defect**
Drive motor RH rotation sensor 1 voltage : 0.4 to 1.9 Drive motor RH rotation sensor 2 voltage : 2.0 or more	**Drive motor RH rotation sensor 2 defect**
Drive motor RH rotation sensor 1 voltage : 2.0 or more Drive motor RH rotation sensor 2 voltage : 2.0 or more	**Drive motor RH rotation sensor 1/2 defect**

Error Code: CB-1

Failure mode: MB contactor open abnormality

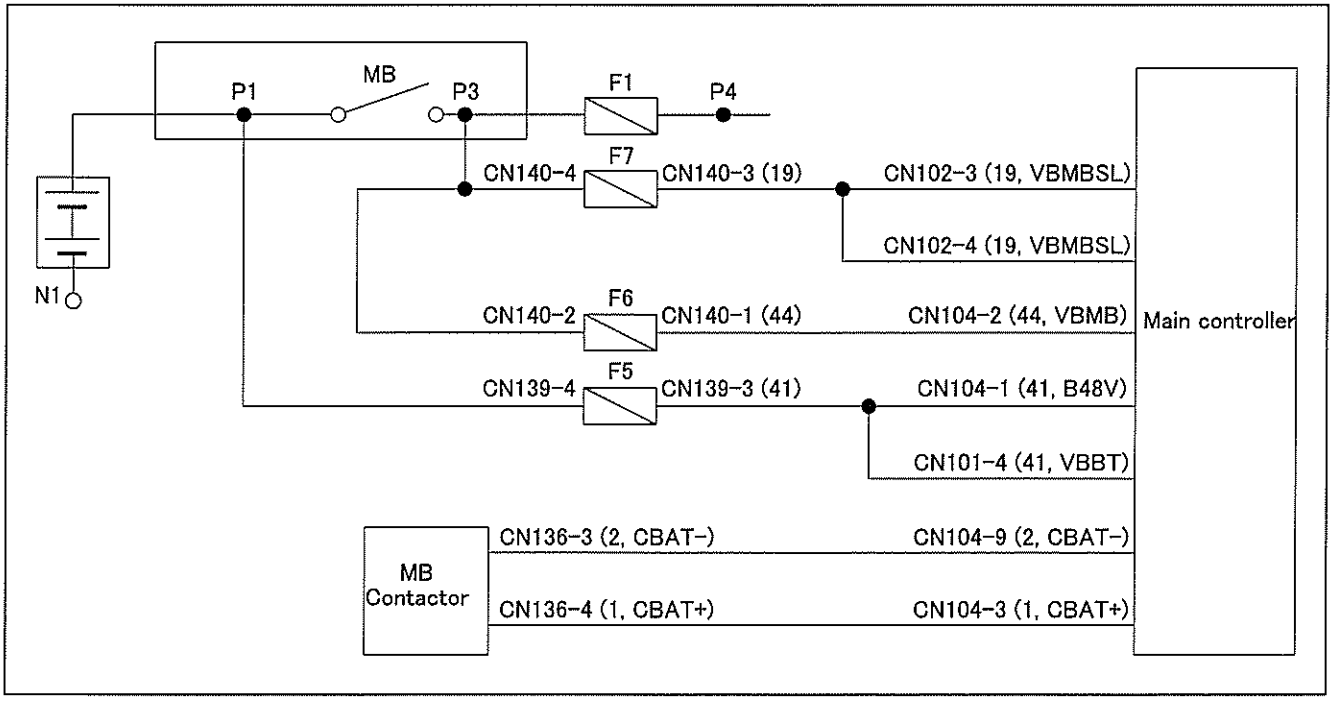
⚠ CAUTION

- **If CB-3 or CB-5 occurs, perform troubleshooting for that first.**

Probable cause

- Connector contact defect
- MB contactor defect
- Harness defect
- F6/F7 fuse defect
- F7 fuse box defect
- Main controller defect

Related portion



STEP1

Connector contact inspection :

Turn off the key switch and disconnect the battery plug.

After disconnection the CN140 connector, check the inside of connector and the caulked portion of wire whether it has defect or not by visual confirm. (Refer to BEFORE TROUBLESHOOTING)

Connect the CN140 connector, connect the battery plug.

Turn on the key switch to see if an error occurs.

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Judgment

Result	Procedure
No CB-1 error is displayed.	**Connector contact defect**
An CB-1 error is displayed.	Go to step 2

STEP2

Check the operation of MB contactor :

Check if MB condactor can be operated when turn on the key switch.

Judgment

Result	Procedure
OK	Go to step 4
NG	Go to step 3

STEP3

Check the contact of MB contactor :

Turn off the key switch and disconnect the battery plug, then visually check contact of MB contactor (contamination, freeze and so on)

Judgment

Result	Procedure
NG	**MB contactor defect** **after repairing NG items. Use truck as it is.**
OK	**Perform troubleshooting for CB-3.**

STEP4

Fuse inspection:

Turn off the key switch and disconnect the battery plug.

After removing F6/F7 fuse, measure the resistance for both ends of F6/F7 fuse.

Judgment

Result	Procedure
∞Ω	**F6/F7 fuse defect** **After replacing defect fuse, go to STEP6**
0Ω	Go to step 5

STEP5

Fuse box inspection:

Connect the F6/F7 fuse, and disconnect the connector of fuse box.

Measure the resistance for both ends of F6/F7 fuse box.

Judgment

Result	Procedure
∞Ω	**F6/F7 fuse box defect**
0Ω	Go to step 6

STEP6

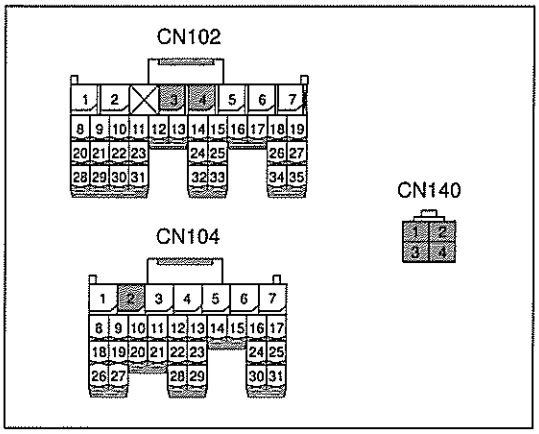
Inspection :

Inspect harness

Disconnect the CN102, CN104 and CN140 connectors and check the harnesses for their continuities.

[Inspection procedure and standard]

Inspect for continuity and short circuiting of the harness.



Perform this check with the battery plug and the CN102,CN104,CN140 connectors disconnected, and visually check inside the connector and the caulked portion of its wire for defects.

Refer to BEFORE TROUBLESHOOTING

Portion to be inspected	Standard:
CN140-4 to P3	Continuity
CN140-2 to P3	Continuity
CN140-3(19) to CN102-3(19)	Continuity
CN140-3(19) to CN102-4(19)	Continuity
CN140-1(44) to CN104-2(44)	Continuity
CN140-3(19) to N1	No continuity
CN140-1(44) to N1	No continuity
CN140-4 to N1	No continuity
CN140-2 to N1	No continuity

Judgment

Result	Procedure
NG	**Harness defect**
OK	Go to step 7

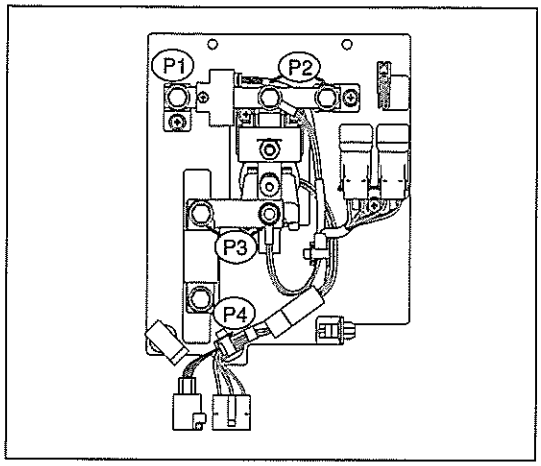
STEP7

Voltage inspection

After connecting the connector, connect the battery plug, and turn on the key switch.

Measure the both ends of voltage for the contactor (contact side).

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[Inspection procedure and standard]

Refer to the left figure, and measure the both ends of voltage for the contactor (contact side).

Judgment

Result	Procedure
30V or more	**MB contactor defect**
Less than 30V	**Main controller defect**

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Error Code: CB-2

Failure mode: MB contactor short abnormality

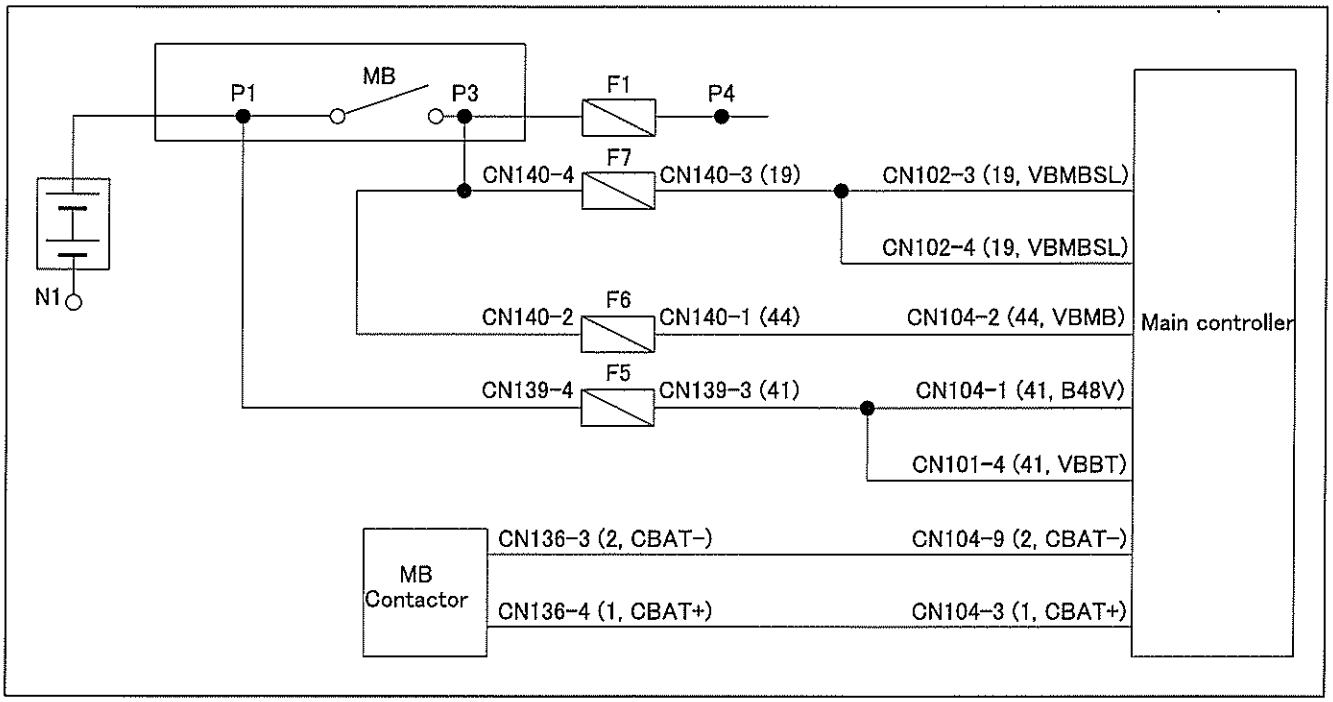
⚠ CAUTION

- **If AD-5, AD-6, E1-1, E1-2, E0-2, E8-1, E8-2, EC-1, EC-2 or EC-3 occurs at same time CB-2, perform troubleshooting for AD-5, AD-6, E1-1, E1-2, E0-2, E8-1, E8-2, EC-1, EC-2 or EC-3 first.**
- **If CB-2 error occurs, electric charge remains in the pump motor and drive motor driver after the battery plug is disconnected, so measure the voltage between P4 and N1 and start operation after it has lowered below 3 V.**

Probable cause

- MB contactor defect
- Main controller defect
- Pump motor driver defect

Related portion



STEP1

Turn off the key switch, disconnect the battery plug, then reconnect battery plug and turn on the key switch, and wait 5 seconds or more.

Turn off the key switch and 5 seconds or more after that, check if error occurs.

Judgment

Result	Procedure
CB-2 error occurs.	Go to step 2
CB-2 error does not occur.	**No abnormality. Use truck as it is.**

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STEP2

Check if the MB contactor opens when turn off the key switch.

Judgment

Result	Procedure
The contactor opens	Go to step 3
The contactor does not open.	Go to step 4

STEP3

Inspection :

Voltage inspection

Turn off key switch and disconnect the battery plug. Connect the battery plug again and turn on the key switch.

Turn off the key switch and 5 seconds or more after that, measure the voltage between P4 and N1.

Judgment

Result	Procedure
Less than 15 V	**Main controller defect**
15V or more	**Pump motor driver defect**

STEP4

Inspection : MB contactor

Turn off the key switch and disconnect the battery plug.

Measure the voltage between P4 and N1 of the contactor to see that it is 3 V or less.

Visually check the conditions of the contacts of the MB contactor.

Judgment

Result	Procedure
The contactor does not open.	**MB contactor defect**
The contactor opens	**Perform troubleshooting for CB-3.**

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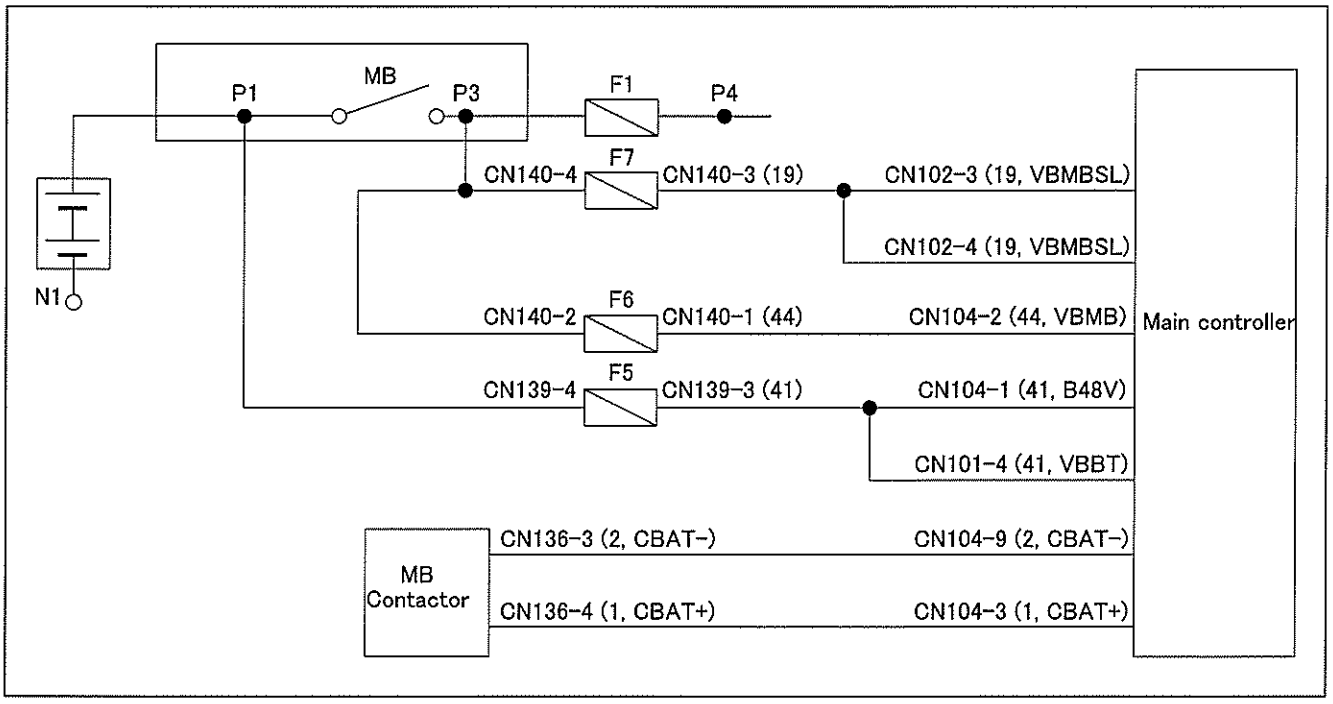
Error Code: CB-3

Failure mode: MB contactor (coil side) open abnormality

Probable cause

- Connector contact defect
- MB contactor defect
- Harness defect
- Main controller defect

Related portion



STEP1

Connector contact inspection :

Turn off the key switch and disconnect the battery plug.

After disconnection the CN136 connector, check the inside of connector and the caulked portion of wire whether it has defect or not by visual confirm. (Refer to BEFORE TROUBLESHOOTING)

Connect the CN136 connector, connect the battery plug.

Turn on the key switch to see if an error occurs.

Judgment

Result	Procedure
CB-3 error occurs.	Go to step 2
CB-3 error does not occur.	**Connector contact defect**

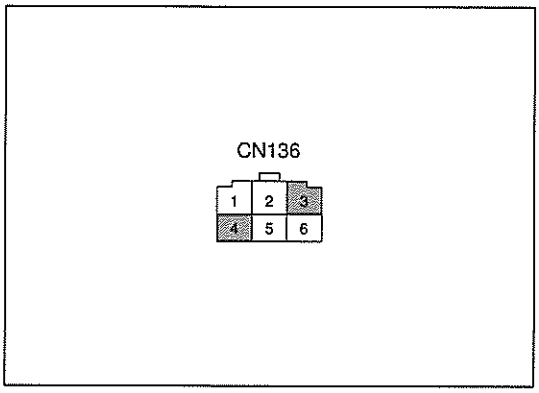
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STEP2

Inspection : MB contactor coil

Turn off the key switch and disconnect the battery plug.

Disconnect the CN136 connector, and measure th resistance of MB contactor coil.



[Inspection procedure and standard]

Check the resistance of MB contactor coil.

Portion to be inspected	Standard:
CN136-3 to CN136-4	15 to 30 Ω (Approx. 20 Ω : 20 °C)

Judgment

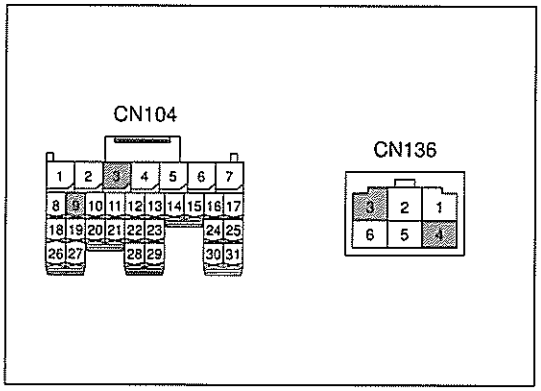
Result	Procedure
OK	Go to step 3
NG	**MB contactor defect**

STEP3

Inspection : Harness

Turn off the key switch and disconnect the battery plug.

Disconnect the CN104, CN136 connectors and check the harnesses.



[Inspection procedure and standard]

Inspect for continuity and short circuiting of the harness.

Perform this check with the battery plug and the CN104,CN136 connectors disconnected, and visually check inside the connector and the caulked portion of its wire for defects.

Refer to BEFORE TROUBLESHOOTING

Portion to be inspected	Standard:
CN136-3(2) to CN104-9(2)	Continuity
CN136-4(1) to CN104-3(1)	Continuity
CN136-3(2) to N1	No continuity
CN136-4(1) to N1	No continuity

Judgment

Result	Procedure
OK	**Main controller defect**
NG	**Harness defect**

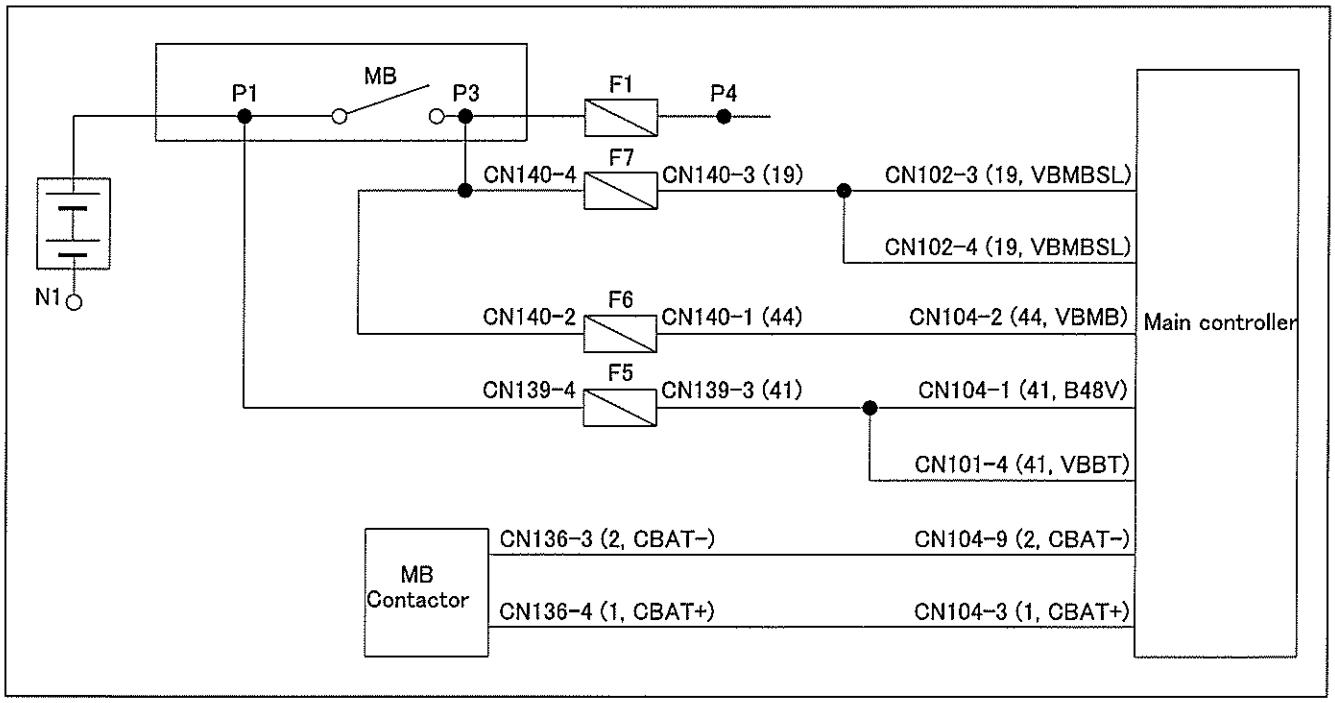
Error Code: CB-4

Failure mode: MB contactor drive circuit abnormality

Probable cause

- Connector contact defect
- MB contactor defect
- Harness defect
- Main controller defect

Related portion



STEP1

Connector contact inspection :

Turn off the key switch and disconnect the battery plug.

After disconnection the CN136 connector, check the inside of connector and the caulked portion of wire whether it has defect or not by visual confirm. (Refer to BEFORE TROUBLESHOOTING)

Connect the CN136 connector, connect the battery plug.

Turn on the key switch to see if an error occurs.

Judgment

Result	Procedure
CB-4 error occurs.	Go to step 2
CB-4 error does not occur.	**Connector contact defect**

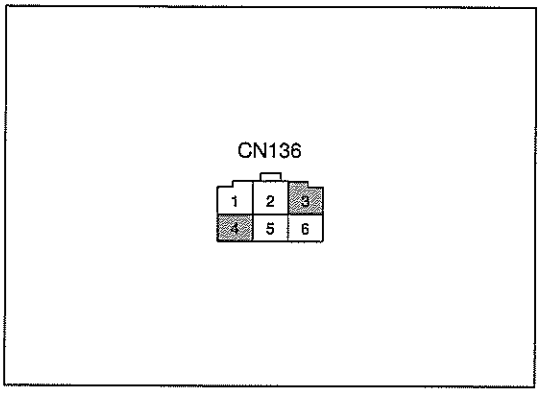
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STEP2

Inspection : MB contactor coil

Turn off the key switch and disconnect the battery plug.

Disconnect the CN136 connector, and measure th resistance of MB contactor coil.



[Inspection procedure and standard]

Check the resistance of MB contactor coil.

Portion to be inspected	Standard:
CN136-3 to CN136-4	15 to 30 Ω (Approx. 20 Ω : 20 °C)

Judgment

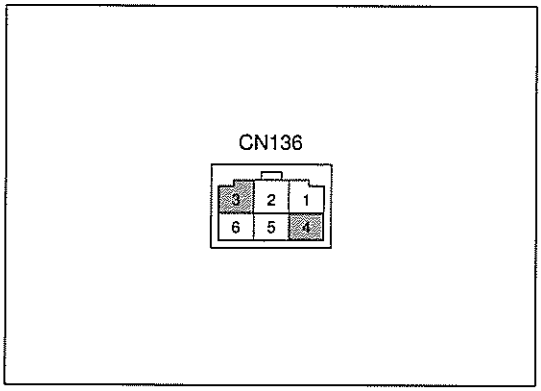
Result	Procedure
OK	Go to step 3
NG	**MB contactor defect**

STEP3

Inspection : Harness

Turn off the key switch and disconnect the battery plug.

Disconnect the CN104, CN136 connectors and check the harnesses.



[Inspection procedure and standard]

Inspect for continuity and short circuiting of the harness.

Perform this check with the battery plug and the CN104,CN136 connectors disconnected, and visually check inside the connector and the caulked portion of its wire for defects.

Refer to BEFORE TROUBLESHOOTING

Portion to be inspected	Standard:
CN136-3(2) to CN136-4(1)	No continuity
CN136-3(2) to P1	No continuity
CN136-3(2) to P4	No continuity

Judgment

Result	Procedure
OK	**Main controller defect**
NG	**Harness defect**

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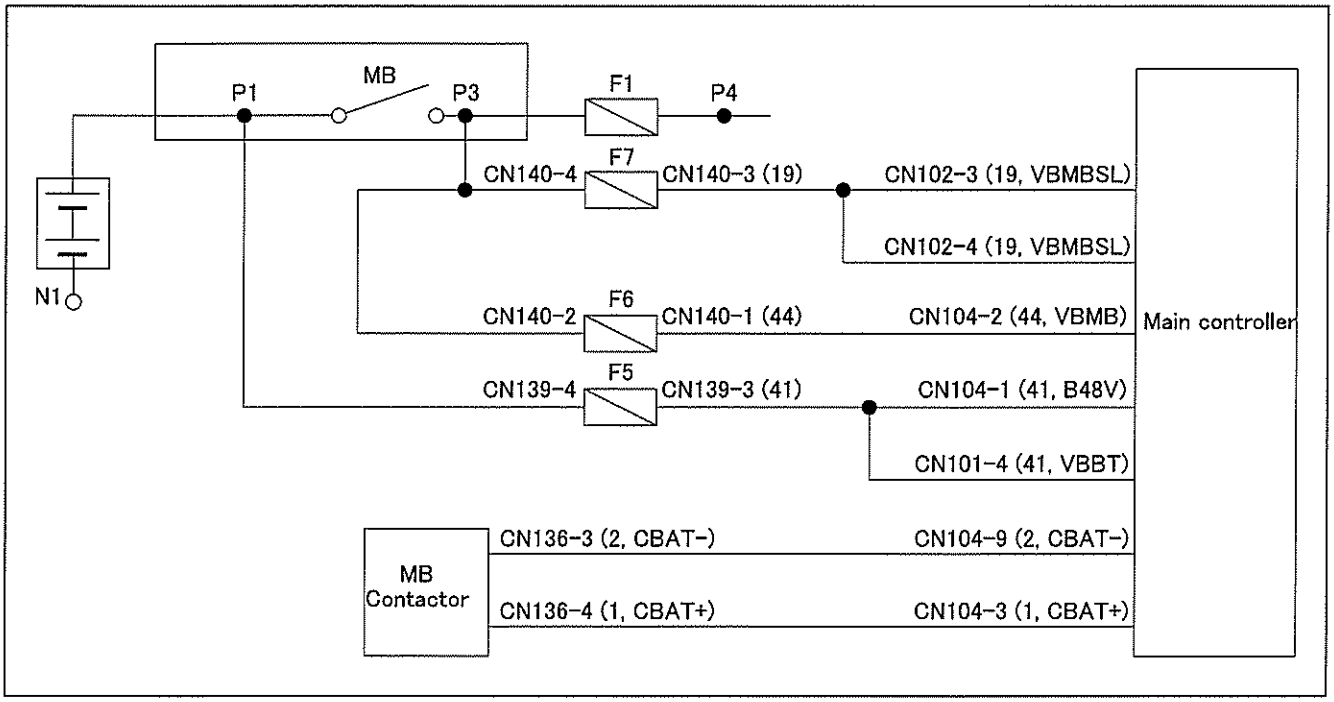
Error Code: CB-5

Failure mode: MB contactor (coil side) short abnormality

Probable cause

- Connector contact defect
- MB contactor defect
- Harness defect
- Main controller defect

Related portion



STEP1

Connector contact inspection :

Turn off the key switch and disconnect the battery plug.

After disconnection the CN136 connector, check the inside of connector and the caulked portion of wire whether it has defect or not by visual confirm. (Refer to BEFORE TROUBLESHOOTING)

Connect the CN136 connector, connect the battery plug.

Turn on the key switch to see if an error occurs.

Judgment

Result	Procedure
CB-5 error occurs.	Go to step 2
CB-5 error does not occur.	**Connector contact defect**

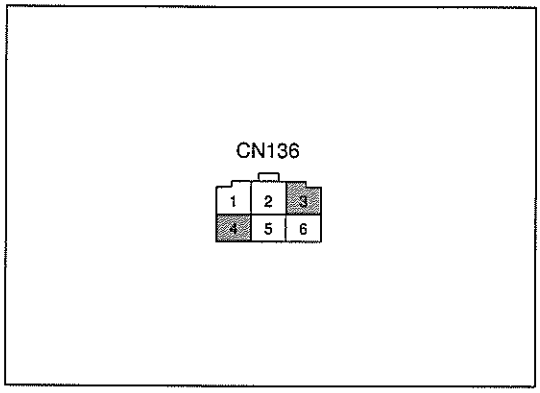
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STEP2

Inspection : MB contactor coil

Turn off the key switch and disconnect the battery plug.

Disconnect the CN136 connector, and measure th resistance of MB contactor coil.



[Inspection procedure and standard]

Check the resistance of MB contactor coil.

Portion to be inspected	Standard:
CN136-3 to CN136-4	15 to 30 Ω (Approx. 20 Ω : 20 °C)

Judgment

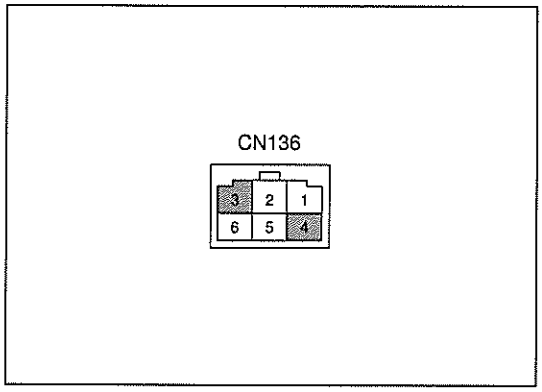
Result	Procedure
OK	Go to step 3
NG	**MB contactor defect**

STEP3

Inspection : Harness

Turn off the key switch and disconnect the battery plug.

Disconnect the CN104, CN136 connectors and check the harnesses.



[Inspection procedure and standard]

Inspect for continuity and short circuiting of the harness.

Perform this check with the battery plug and the CN104,CN136 connectors disconnected, and visually check inside the connector and the caulked portion of its wire for defects.

Refer to BEFORE TROUBLESHOOTING

Portion to be inspected	Standard:
CN136-3(2) to CN1136-4(1)	No continuity
CN136-3(2) to P1	No continuity
CN136-3(2) to P4	No continuity

Judgment

Result	Procedure
OK	**Main controller defect**
NG	**Harness defect**

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Error Code: CC-1, CC-2, CC-3, CC-4, CC-6

Failure mode: Drive motor driver LH CPU abnormality

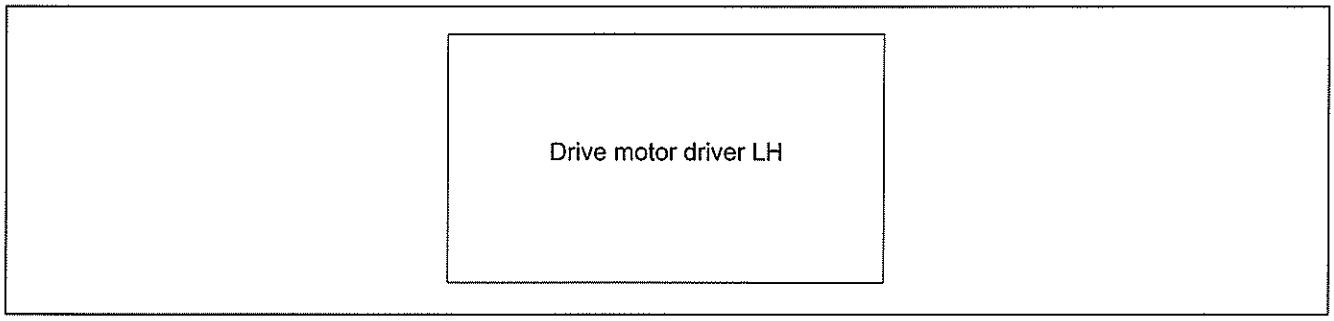
⚠ CAUTION

- **If CC-1, CC-2, CC-3, CC-4 or CC-6 occurs, the drive motor driver LH is defective, so replace it.**

Probable cause

- Drive motor driver LH defect

Related portion



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Error Code: CD-1, CD-2, CD-3, CD-4, CD-6

Failure mode: Drive motor driver RH CPU abnormality

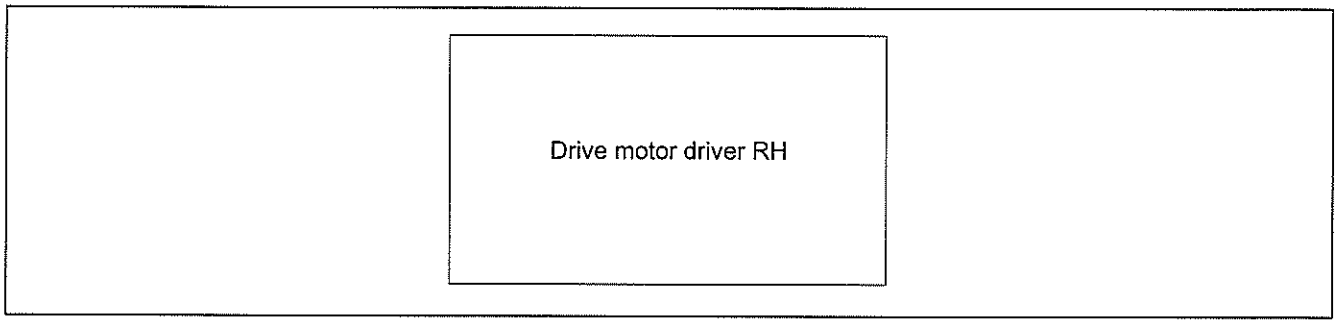
⚠ CAUTION

- **If CD-1, CD-2, CD-3, CD-4 or CD-6 occurs, the drive motor driver RH is defective, so replace it.**

Probable cause

- Drive motor driver RH defect

Related portion



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Error Code: E0-2

Failure mode: Pump motor driver power-circuit abnormality

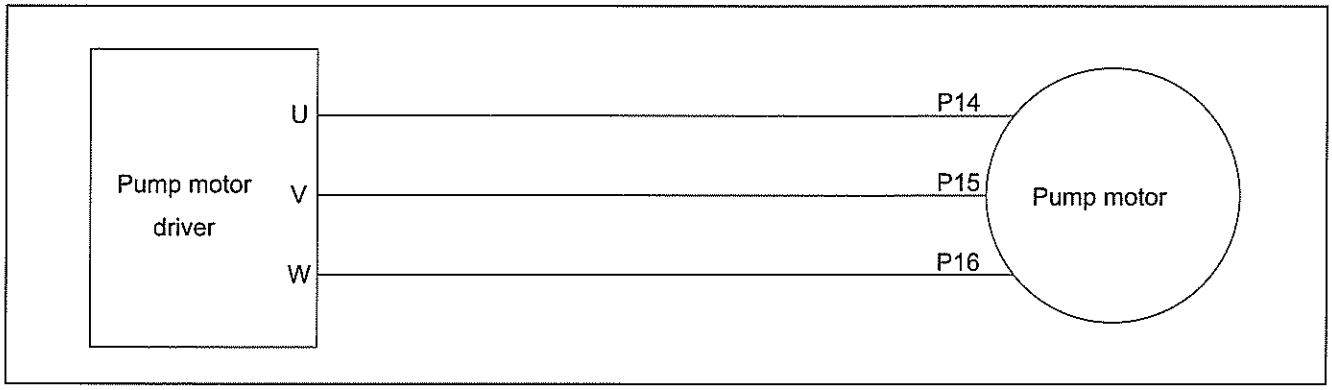
⚠ CAUTION

- **If CB-3 occurs at same time, perform troubleshooting for CB-3 first.**
- **If E0-2 error occurs, electric charge remains in the pump motor and drive motor driver after the battery plug is disconnected, so measure the voltage between P4 and N1 and start operation after it has lowered below 3 V.**

Probable cause

- Pump motor cable tightening is defective
- Pump motor defect
- Pump motor cable defect
- Pump motor driver defect

Related portion



STEP1

Turn off the key switch and disconnect the battery plug, visually check the fastened and caulked portions of the pump motor cables for defects. Refer to BEFORE TROUBLESHOOTING

Connect the pump motor cables, connect the battery plug, and then turn on the key switch.

Operate the direction lever with forward or backward, and check for errors.

Judgment

Result	Procedure
E0-2 error occurs.	Go to step 2 **Record the occured error code.**
E0-2 error does not occur.	**Pump motor cable tightening is defective**

STEP2

Inspection : Pump motor driver

Return the direction lever neutral, turn off the key switch, and disconnect the battery plug.

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Disconnect the three motor cables from the pump motor driver and insulate the terminals of the cables disconnected.

Reconnect the battery plug and turn on the key switch.

Operate the direction lever with forward or backward, and check if occur error E0-2.

Judgment

Result	Procedure
E0-2 error does not occur.	Go to step 3
E0-2 error occurs.	**Pump motor driver defect**

STEP3

Inspection : Pump motor cable

Return the direction lever neutral, turn off the key switch, and disconnect the battery plug.

Disconnect the pump motor cables from both the motor and the motor driver.

Pump motor cable inspection

[Inspection procedure and standard]

Check each pump motor cable for its continuity and short.

Turn off the key switch and disconnect the battery plug, disconnect the pump motor cables, visually check each terminal and the caulked portion and coating of each cable for defects, and then check the P14, P15 and P16 cables.

Refer to BEFORE TROUBLESHOOTING

Portion to be inspected	Standard:
Both ends of P14 cable	Continuity
Both ends of P15 cable	Continuity
Both ends of P16 cable	Continuity
P14 cable to P15 cable	No continuity
P15 cable to P16 cable	No continuity
P16 cable to P14 cable	No continuity

Judgment

Result	Procedure
OK (C0-2 does not occur at the same time on STEP1)	Go to step 4
OK (C0-2 occurs at the same time on STEP1)	Go to step 5
NG	**Pump motor cable defect**

STEP4

Inspection : Pump motor driver

Replace the pump motor driver with the drive motor driver LH.

Reconnect the battery plug and turn on the key switch.

Operate the direction lever with forward or backward, and check for errors. (Ignore the error codes 32-1 and 32-3.)

Judgment

Result	Procedure
C0-2 error occurs.	**Pump motor driver defect** **The motor driver that is pump motor driver before replacement is defect.**
E0-2 error occurs.	**Pump motor defect**

STEP5

Inspection : Pump motor

Return the direction lever neutral, turn off the key switch, and disconnect the battery plug.

Check the pump motor

Judgment

Result	Procedure
OK	**Pump motor driver defect**
NG	**Pump motor defect**

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Error Code: E1-1

Failure mode: Pump motor driver current sensor neutral voltage error

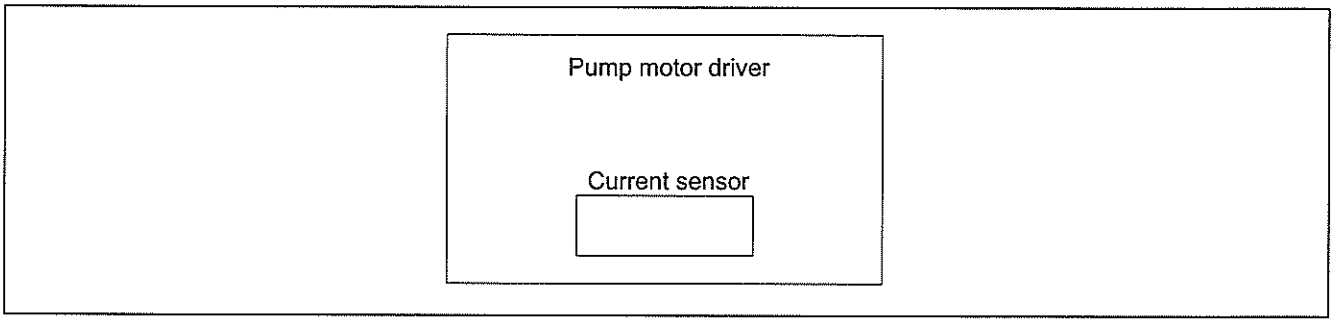
⚠ CAUTION

- **If E1-1 occurs, the pump motor driver circuit is defective, so replace it.**

Probable cause

- Pump motor driver defect

Related portion



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Error Code: E1-2

Failure mode: Pump motor driver current sensor over current error

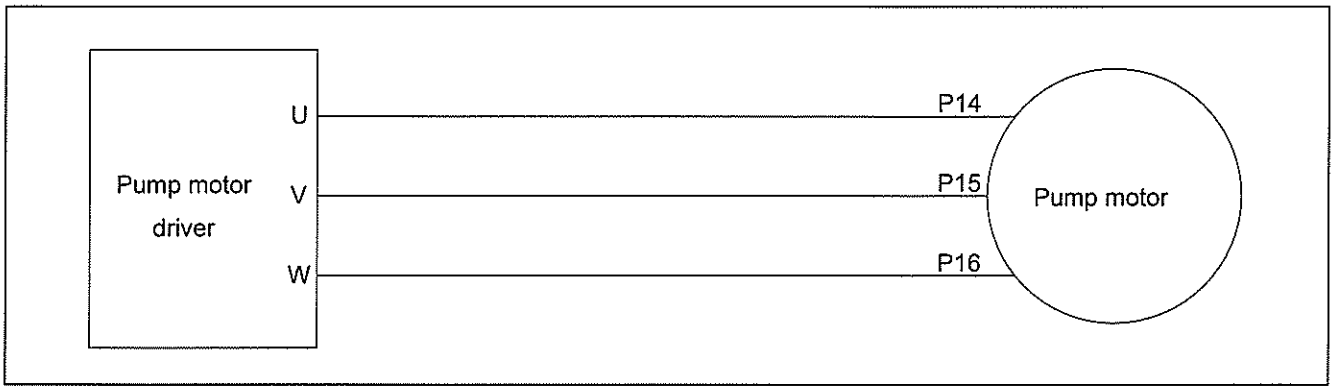
⚠ CAUTION

- **If E1-2 error occurs, electric charge remains in the pump motor and drive motor driver after the battery plug is disconnected, so measure the voltage between P4 and N1 and start operation after it has lowered below 3 V.**

Probable cause

- Pump motor cable tightening is defective
- Pump motor defect
- Pump motor cable defect
- Pump motor driver defect

Related portion



STEP1

Turn on / off the key switch, and operate the direction lever with forward or backward, and check if occurs E0-2 error.

Judgment

Result	Procedure
E0-2 error does not occur.	Go to step 2
E0-2 error occurs.	**Perform troubleshooting for E0-2.**

STEP2

Turn off the key switch and disconnect the battery plug, visually check the assembled and caulked portions of the pump motor cables for defects. Refer to BEFORE TROUBLESHOOTING

Connect the pump motor cables, connect the battery plug, and then turn on the key switch.

Operate the direction lever with forward or backward, and check for errors.

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Judgment

Result	Procedure
E1-2 error occurs.	Go to step 3 **Record the occured error code.**
E1-2 error does not occur.	**Pump motor cable tightening is defective**

STEP3

Inspection : Pump motor cable

Turn off the key switch and disconnect the battery plug.

Disconnect the pump motor cables from both the motor and the motor driver.

Pump motor cable inspection

[Inspection procedure and standard]

Check each pump motor cable for its continuity and short.

Turn off the key switch and disconnect the battery plug, disconnect the pump motor cables, visually check each terminal and the caulked portion and coating of each cable for defects, and then check the P14, P15 and P16 cables.

Refer to BEFORE TROUBLESHOOTING

Portion to be inspected	Standard:
Both ends of P14 cable	Continuity
Both ends of P15 cable	Continuity
Both ends of P16 cable	Continuity
P14 cable to P15 cable	No continuity
P15 cable to P16 cable	No continuity
P16 cable to P14 cable	No continuity

Judgment

Result	Procedure
OK (C1-2 does not occur at the same time on STEP2)	Go to step 4
OK (C1-2 occurs at the same time on STEP2)	Go to step 5
NG	**Pump motor cable defect**

STEP4

Inspection : Pump motor driver

Replace the pump motor driver with the drive motor driver LH.

Reconnect the battery plug and turn on the key switch.

Operate the direction lever with forward or backward, and check for errors. (Ignore the error codes 32-1 and 32-3.)

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Judgment

Result	Procedure
C1-2 error occurs.	**Pump motor driver defect** **The motor driver that is pump motor driver before replacement is defect.**
E1-2 error occurs.	**Pump motor defect**

STEP5

Inspection : Pump motor

Turn off the key switch and disconnect the battery plug.

Check the pump motor

Judgment

Result	Procedure
OK	**Pump motor driver defect**
NG	**Pump motor defect**

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Error Code: E2-1

Failure mode: Pump motor overheating abnormality

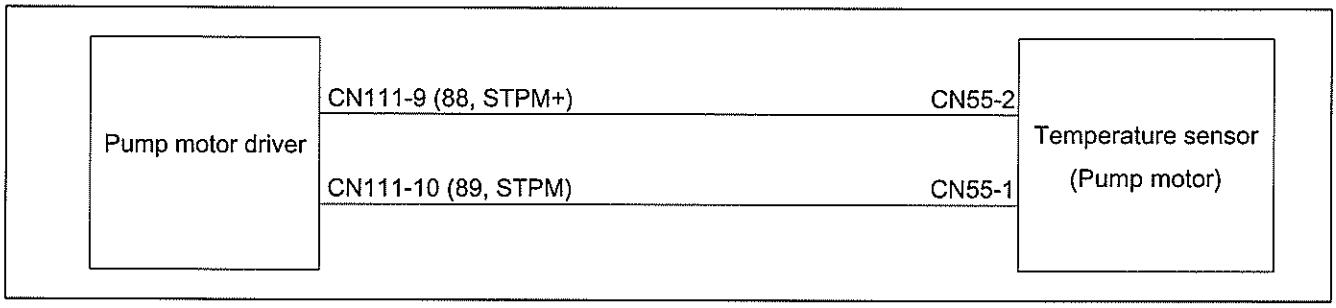
⚠ CAUTION

- **Do not leave the vehicle standing in a hot place.**

Probable cause

- Overheating (continuous overload operation)
- Connector contact defect
- Harness defect
- Cooling fan clogging
- Cooling fan defect
- Main controller defect

Related portion



STEP1

Apply the cooling fan compulsorily by using Active Test and check the rotary condition.

STD
[ANL] 7 ACT (7 06)
Multi-function display
[ANL] ACTIVE TEST 2/3
FAN2 : OFF → ON

* If the cooling fan is nothing, start troubleshooting from STEP2.

Judgment

Result	Procedure
Not running	Go to step 5
Running	Go to step 2

STEP2

Inspection :
Reconfirm the error

Turn key switch ON and check the error displayed.

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Judgment

Result	Procedure
An "PM" is displayed.	Go to step 3
No "PM" is displayed.	**Overheating (continuous overload operation)** **After falling temperature of pump motor, "PM" is disappeared and the truck can be operated as usual. It is estimated that the continuously running in overloaded condition cause this error. So check the usage condition of the truck and hold back the continuously running in a overloaded condition.**

STEP3

Inspection :

Confirm the temperature of the pump motor and recheck the error

STD
[ANL] 2 IO1 (2 09)
Multi-function display
[ANL] I/O TEMP/VOLT 3/6

TPM

Record the temperature of the pump motor.

Turn off the key switch and leave the truck for approximately for thirty minutes. Then turn key switch ON and check the error displayed.

Judgment

Result	Procedure
An "PM" is displayed.	Go to step 4
No "PM" is displayed.	**Overheating (continuous overload operation)** **After falling temperature of pump motor, "PM" is disappeared and the truck can be operated as usual. It is estimated that the continuously running in overloaded condition cause this error. So check the usage condition of the truck and hold back the continuously running in a overloaded condition.**

STEP4

Inspection :

Recheck the temperature of pump motor

STD
[ANL] 2 IO1 (2 09)
Multi-function display
[ANL] I/O TEMP/VOLT 3/6

TPM

Check the pump motor temperature, and compare to the recorded value.

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Judgment

Result	Procedure
It has lowered by 5°C or more.	Go to step 3
It has not lowered by 5°C or more.	**E2-2 Perform troubleshooting from STEP2.**

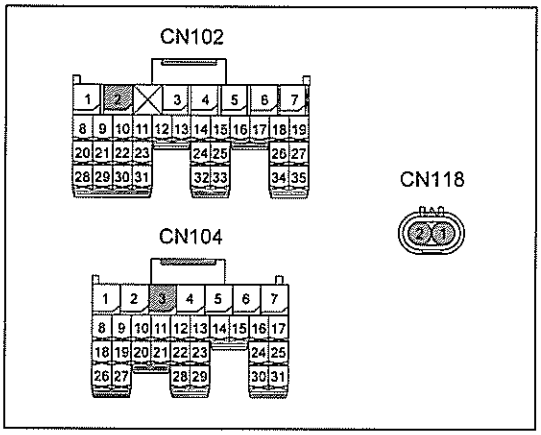
STEP5

Inspection :

Inspect harness

Turn off the key switch and disconnect the battery plug.

Disconnect the CN102, CN104 and CN118 connectors and check the harnesses.



Portion to be inspected	Standard:
CN102-2 to CN118-2	Continuity
CN104-3 to CN118-1	Continuity
CN102-2 to CN104-3	No continuity

Judgment

Result	Procedure
NG	**Harness defect**
OK	Go to step 6

STEP6

Inspection :

Inspect cooling fan.

Disconnect the battery plug, then connect the CN102, CN104, CN112 and CN113 connectors. Reconnect the battery plug and turn key switch ON.

Apply the cooling fan compulsorily by using Active Test and check the rotary condition.

STD
[ANL] 7 ACT (7 06)
Multi-function display
[ANL] ACTIVE TEST 2/3

FAN2 : OFF → ON

Judgment

Result	Procedure
Running	**Connector contact defect**

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Result	Procedure
Not running	**Cooling fan defect** **After replacing cooling fan, if the fan is not running by applying the cooling fan compulsorily by using Active Test and, it is possible of other defect. So replace the main controller.**

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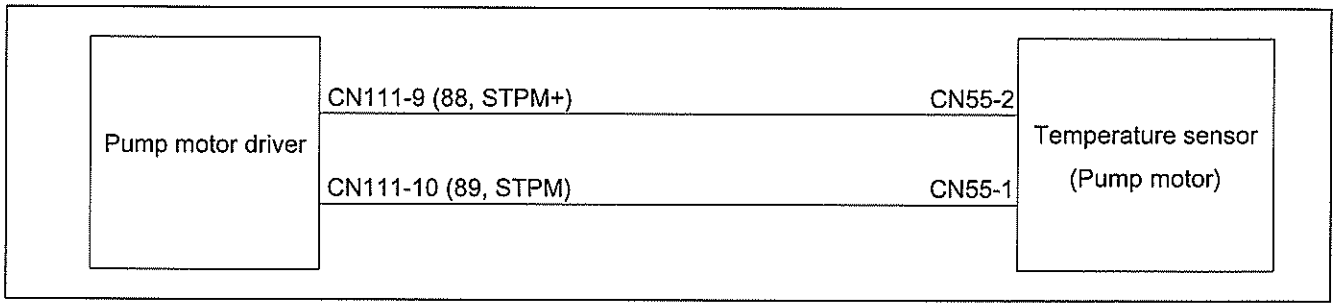
Error Code: E2-2

Failure mode: Pump motor temperature sensor (open/short) abnormality

Probable cause

- Connector contact defect
- Pump motor temperature sensor defect
- Pump motor temperature sensor harness defect
- Pump motor driver defect

Related portion



STEP1

Disconnect the battery plug, and visually check inside the connector between CN55 and the caulked portion of its wire for defects. Refer to BEFORE TROUBLESHOOTING

After connecting the connector, connect the battery plug and turn on the key switch to confirm error.

Judgment

Result	Procedure
E2-2 error occurs.	Go to step 2
E2-2 error does not occur.	**Connector contact defect**

STEP2

Inspection :

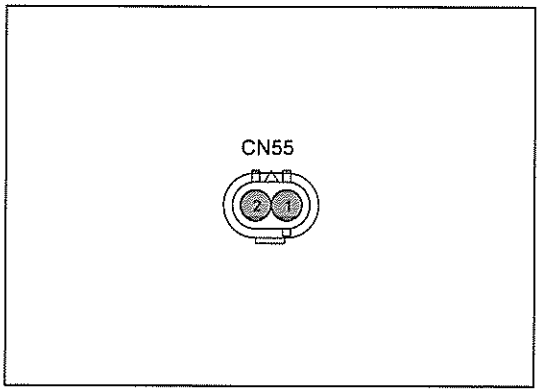
Pump motor temperature sensor individual inspection

Turn off the key switch and disconnect the battery plug.

Disconnect the CN55 connector, and perform the sensor individual inspection.

[Inspection procedure and standard]

Carry out temperature sensor individual inspection.



Measure the temperature sensor resistance between CN55-1 and CN55-2 (sensor side of CN55)

Standard: Approx. 245 Ω to 600 kΩ

* The resistance is changed with depending on temperature. So refer to the below table about rough standard value.

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Temperature	Temperature sensor resistance (between CN55-2 and CN55-1)
20 °C	Approx. 13 kΩ
80 °C	Approx. 1.75 kΩ
100 °C	Approx. 1 kΩ

Judgment

Result	Procedure
OK	Go to step 3
NG	**Pump motor temperature sensor defect**

STEP3

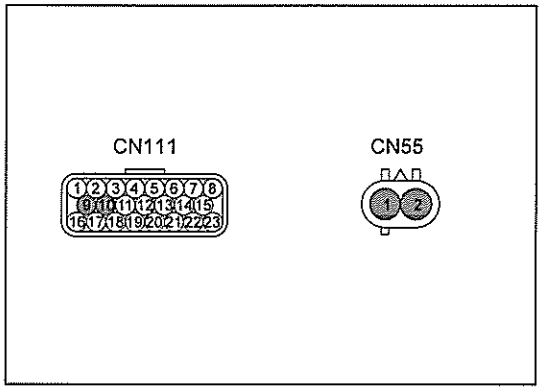
Inspection : Harness

Turn off the key switch and disconnect the battery plug.

Disconnect the CN111 and CN55 connectors and check the harnesses.

[Inspection procedure and standard]

Inspect for continuity and short circuiting of the harness.



Perform this check with the battery plug and the CN111, and CN55 connectors disconnected, and visually check inside the connector and the caulked portion of its wire for defects with disconnecting SST.

Refer to BEFORE TROUBLESHOOTING

*1 : It is OK to connect CN55-1 to CN55-2 through SST2 (09232-13130-71) and check if there is continuity between CN111-9 and CN111-10.

Portion to be inspected	Standard:	Remarks
CN111-9 to CN55-2	Continuity	*1
CN111-10 to CN55-1	Continuity	*1
CN55-1 to CN55-2	No continuity	

Judgment

Result	Procedure
OK	**Pump motor driver defect**
NG	**Pump motor temperature sensor harness defect**

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Error Code: E3-1

Failure mode: Pump motor driver power-circuit temperature sensor (open/short) abnormality

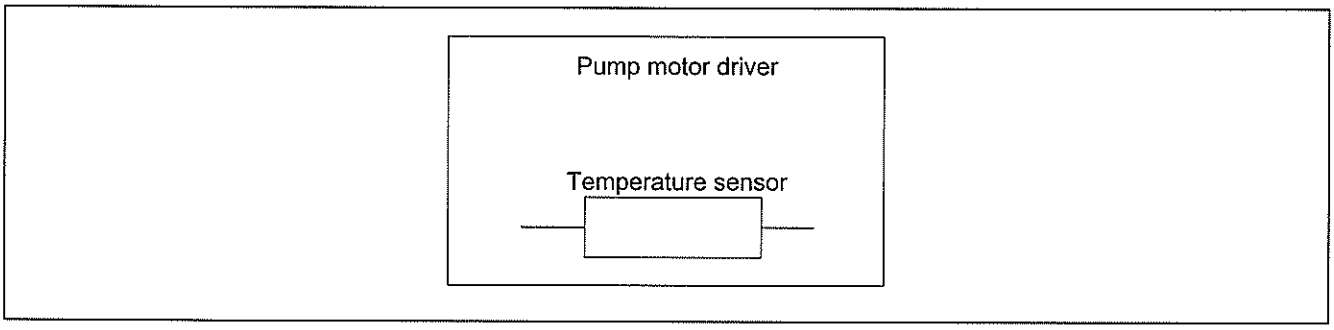
⚠ CAUTION

- **If E3-1 occurs, the pump motor driver circuit is defective, so replace it.**

Probable cause

- Pump motor driver defect

Related portion



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Error Code: E8-1

Failure mode: Pump motor rotation sensor open abnormality

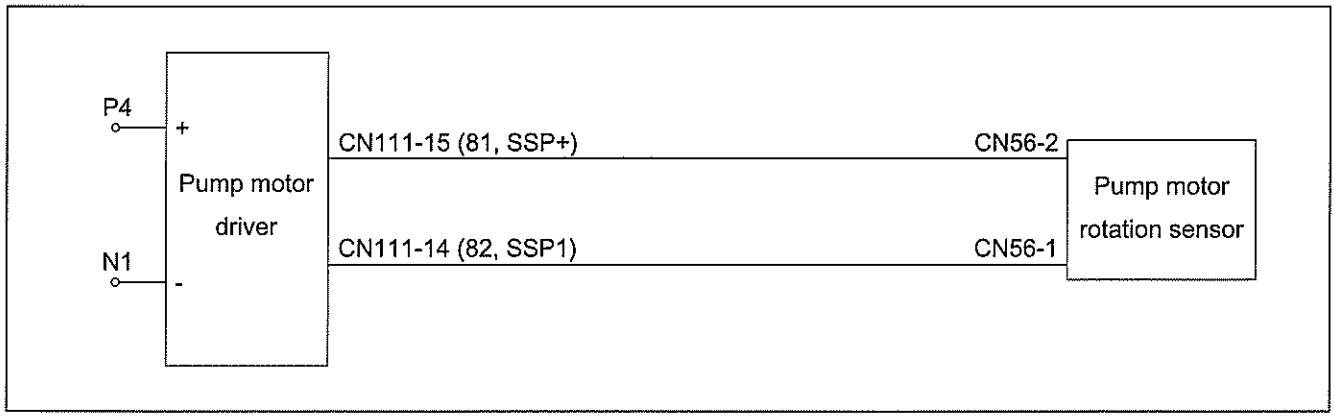
⚠ CAUTION

- **If E8-1 error occurs, electric charge remains in the pump motor and drive motor driver after the battery plug is disconnected, so measure the voltage between P4 and N1 and start operation after it has lowered below 3 V.**

Probable cause

- Connector contact defect
- Pump motor rotation sensor harness defect
- Pump motor rotation sensor defect
- Pump motor driver defect

Related portion



STEP1

Disconnect the battery plug, and visually check inside the connector between CN56 and CN111 and the caulked portion of its wire for defects. Refer to BEFORE TROUBLESHOOTING

After connecting the connector, connect the battery plug and turn on the key switch to confirm error.

Judgment

Result	Procedure
E8-1 error occurs.	Go to step 2
E8-1 error does not occur.	**Connector contact defect**

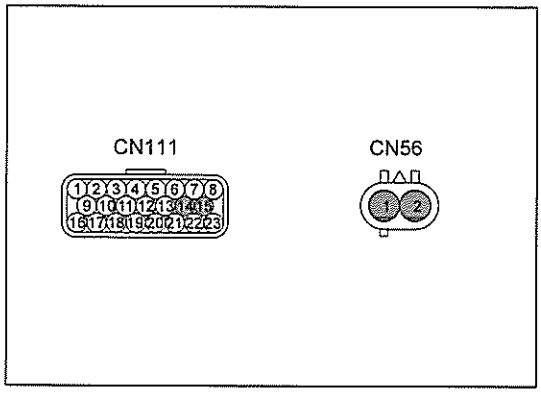
STEP2

Inspection : Harness

Turn off the key switch and disconnect the battery plug.

Disconnect the CN111 and CN56 connectors and check the harnesses.

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[Inspection procedure and standard]

Inspect for continuity and short circuiting of the harness.

Perform this check with the battery plug and the CN111, and CN56 connectors disconnected, and visually check inside the connector and the caulked portion of its wire for defects with disconnecting SST.

Refer to BEFORE TROUBLESHOOTING

*1 : It is OK to connect CN56-1 to CN56-2 through SST2 (09232-13130-71) and check if there is continuity between CN111-15 and CN111-14.

Portion to be inspected	Standard:	Remarks
CN111-15 to CN56-2	Continuity	*1
CN111-14 to CN56-1	Continuity	*1
CN111-15 to CN111-14	No continu-ity	

Judgment

Result	Procedure
OK	Go to step 3
NG	**Pump motor rotation sensor harness defect**

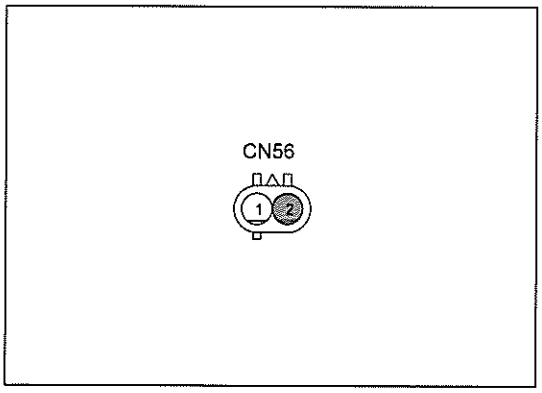
STEP3

Inspection : Pump motor driver

Turn off the key switch and disconnect the battery plug.

Connect the CN111 connector, then connect the battery plug and turn on the key switch with disconnecting CN56 connector.

Measure the voltage between CN56-2 (CN111 side) and N2.



Judgment

Result	Procedure
12 ~ 16V	Go to step 4
Other than 12 to 16V	**Pump motor driver defect**

STEP4

Inspection :

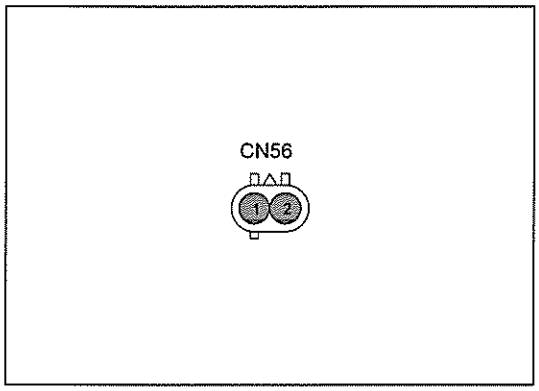
Check the error code

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Turn off the key switch and disconnect the battery plug.

Connect between CM56-1 and CN56-2 on the CN111 side by using SST2 with disconnecting CN56 connector.

Connect the battery plug and turn on the key switch to confirm the error occurs.



Judgment

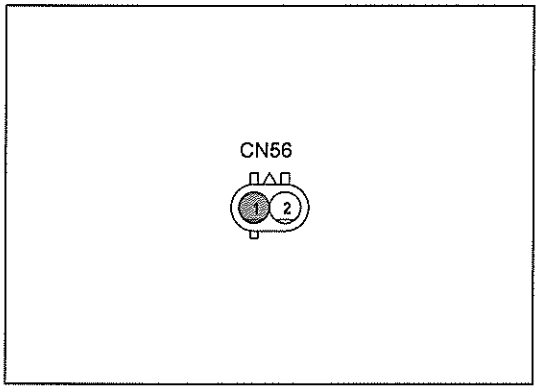
Result	Procedure
E8-2 error occurs.	Go to step 5
E8-1 error occurs, or error does not occur.	**Pump motor driver defect**

STEP5

Inspection : Pump motor driver

Turn off the key switch and disconnect the battery plug.

Disconnecting SST2, and measure the resistance between CN56-1 (CN111 side) and N2 with disconnecting CN56 connector.



Judgment

Result	Procedure
Approx. 100 Ω	**Pump motor rotation sensor defect**
Outside Approx. 100 Ω	**Pump motor driver defect**

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Error Code: E8-2

Failure mode: Pump motor rotation sensor short abnormality

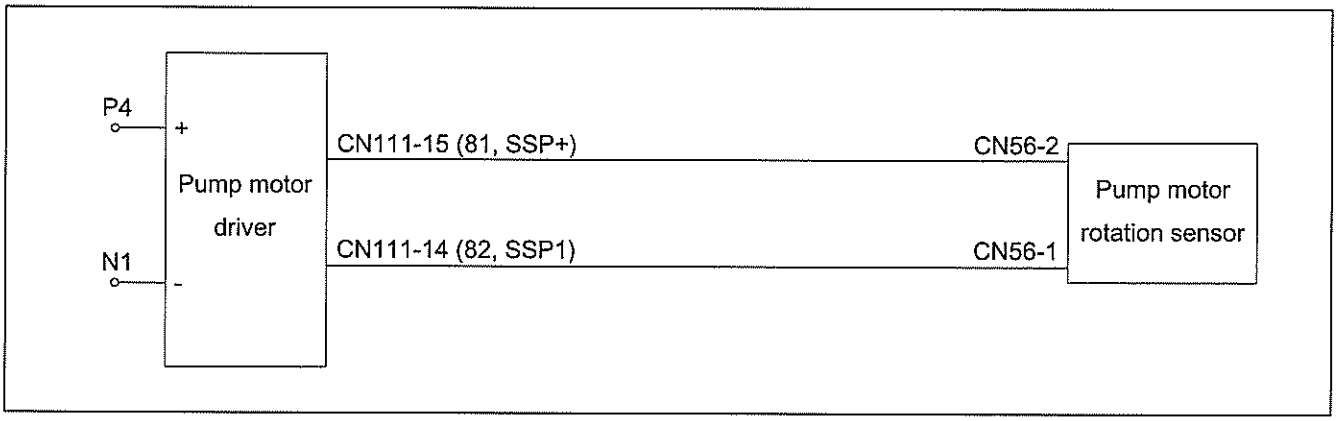
⚠ CAUTION

- **If E8-2 error occurs, electric charge remains in the pump motor and drive motor driver after the battery plug is disconnected, so measure the voltage between P4 and N1 and start operation after it has lowered below 3 V.**

Probable cause

- Connector contact defect
- Pump motor rotation sensor harness defect
- Pump motor rotation sensor defect
- Pump motor driver defect

Related portion



STEP1

Disconnect the battery plug, and visually check inside the connector between CN56 and CN111 and the caulked portion of its wire for defects. Refer to BEFORE TROUBLESHOOTING

After connecting the connector, connect the battery plug and turn on the key switch to confirm error.

Judgment

Result	Procedure
E8-2 error occurs.	Go to step 2
E8-2 error does not occur.	**Connector contact defect**

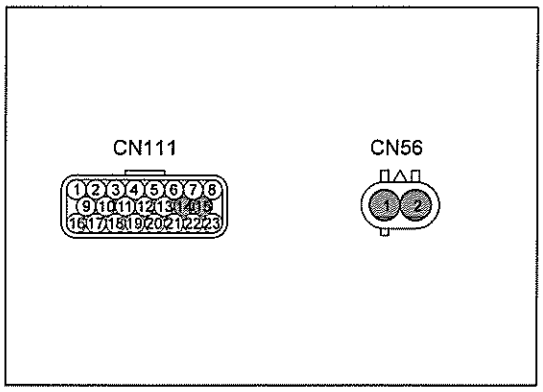
STEP2

Inspection : Harness

Turn off the key switch and disconnect the battery plug.

Disconnect the CN111 and CN56 connectors and check the harnesses.

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[Inspection procedure and standard]

Inspect for continuity and short circuiting of the harness.

Perform this check with the battery plug and the CN111, and CN56 connectors disconnected, and visually check inside the connector and the caulked portion of its wire for defects with disconnecting SST.

Refer to BEFORE TROUBLESHOOTING

*1 : It is OK to connect CN56-1 to CN56-2 through SST2 (09232-13130-71) and check if there is continuity between CN111-15 and CN111-14.

Portion to be inspected	Standard:	Remarks
CN111-15 to CN56-2	Continuity	*1
CN111-14 to CN56-1	Continuity	*1
CN111-15 to CN111-14	No continu-ity	

Judgment

Result	Procedure
OK	Go to step 3
NG	**Pump motor rotation sensor harness defect**

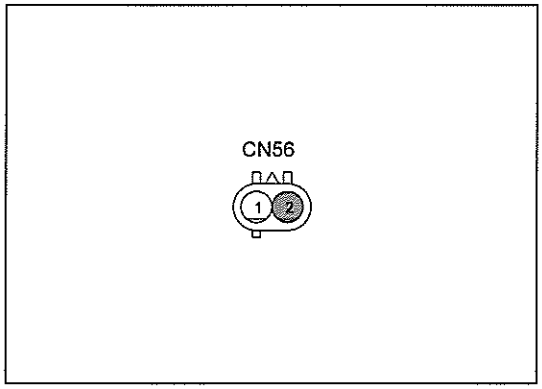
STEP3

Inspection : Pump motor driver

Turn off the key switch and disconnect the battery plug.

Connect the CN111 connector, then connect the battery plug and turn on the key switch with disconnecting CN56 connector.

Measure the voltage between CN56-2 (CN111 side) and N2.



Judgment

Result	Procedure
12 to 16V	Go to step 4
Other than 12 to 16V	**Pump motor driver defect**

STEP4

Inspection :

Check the error code

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Turn off the key switch and disconnect the battery plug.

Connect the battery plug and turn on the key switch with disconnecting CN56 connector. And check the occured error.

Judgment

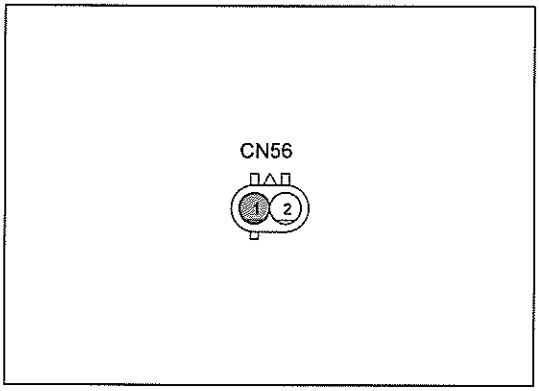
Result	Procedure
E8-1 error occurs.	Go to step 5
E8-2 error occurs, or error does not occur.	**Pump motor driver defect**

STEP5

Inspection : Pump motor driver

Turn off the key switch and disconnect the battery plug.

Measure the resistance between CN56-1 (CN111 side) and N2 with disconnecting CN56 connector.



Judgment

Result	Procedure
Approx. 100 Ω	**Pump motor rotation sensor defect**
Outside Approx. 100 Ω	**Pump motor driver defect**

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Error Code: EC-1, EC-2, EC-3, EC-4, EC-6

Failure mode: Pump motor driver CPU abnormality

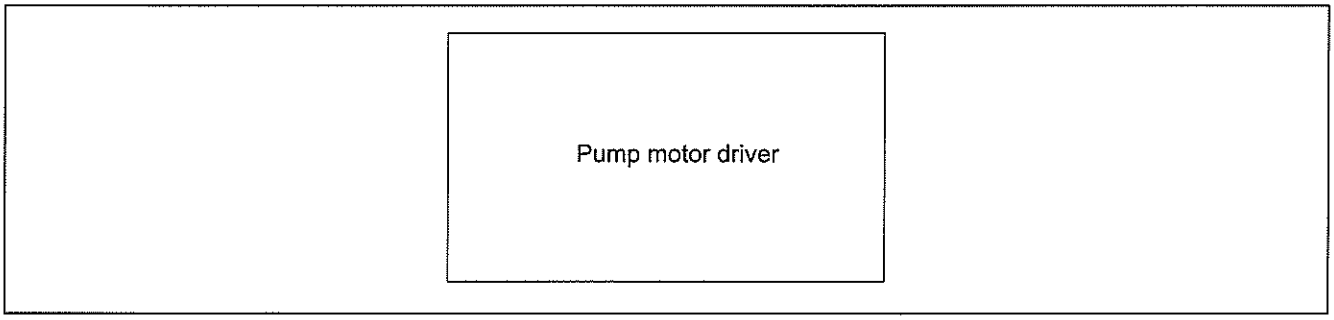
⚠ CAUTION

- **If EC-1, EC-2, EC-3, EC-4 or EC-6 occurs, the pump motor driver circuit is defective, so replace it.**

Probable cause

- Pump motor driver defect

Related portion



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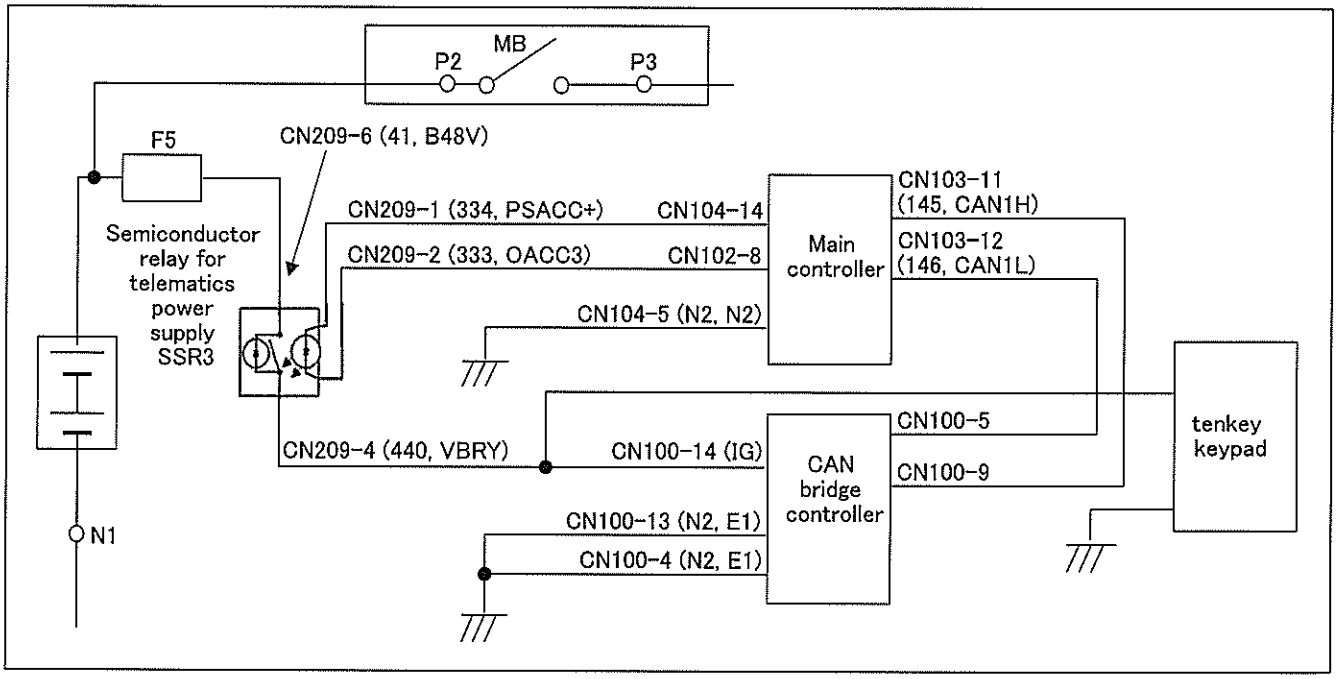
Error Code: ED-1

CAN bridge communication stopped

Probable cause

- Connector contact defect
- Harness defect
- Semiconductor relay for telematics power supply defect
- Main controller defect
- CAN bridge controller defect

Related portion



STEP1

Inspection : telematics power supply

1.Connecting the battery plug and turn key switch ON with sitting the seat.

2.Pushing the log off button of tenkey keypad (red "○" button), check if the red lamp of tenkey keypad light or not.

Judgment

Result	Procedure
Not light at all	Go to step 2
Light a lamp	Go to step 6

STEP2

Inspection : Connector inspection

1.Turn off the key switch and disconnect the battery plug.

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2.Check the inside of connector CN100, CN102, CN104 and CN209, and the caulked portion of wire whether it has defect or not by visual confirm.

3.After connecting CN100, CN102, CN104 and CN209, connect the battery plug and turn key switch ON , then confirm error 10 seconds later.

Judgment

Result	Procedure
ED-1 error does not occur.	**Connector contact defect**
ED-1 error occurs.	Go to step 3

STEP3

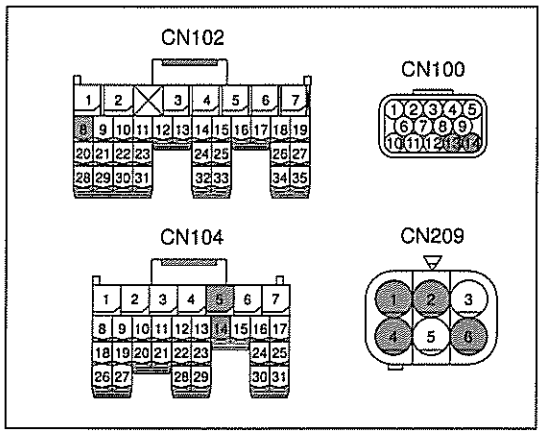
Inspection : Sub-harness inspection

1.Turn off the key switch and disconnect the battery plug.

2.Disconnect the CN100, CN102, CN104 and CN209 connector, then check the harness.

[Inspection procedure and standard]

Inspect for continuity and short circuiting of the harness.



Perform this check with the battery plug and the CN100, CN102, CN104, CN209 connectors disconnected, and visually check inside the connector and the caulked portion of its wire for defects.

Portion to be inspected	Standard
CN209-1[334] to CN104-14	Continuity
CN209-2[333] to CN102-8	Continuity
CN209-4[440] to CN100-14	Continuity
CN209-6[41] to P2	Continuity
CN104-5[N2] to CN100-13	Continuity
CN104-14[334] to CN102-8[333]	No continuity
CN104-14[334] to N1[N1]	No continuity

Judgment

Result	Procedure
NG	**Harness defect**
OK	Go to step 4

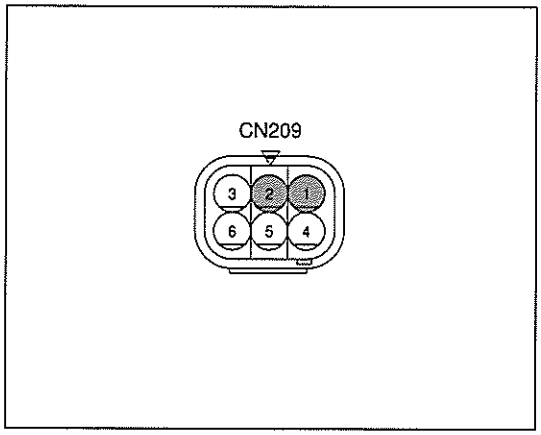
STEP4

Inspection : Semiconductor relay

1.Turn off the key switch and disconnect the battery plug.

2.Disconnect CN209, and check the resistance for relay side.

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[Inspection procedure and standard]

The following CN209-2[333] (+) to CN209-1[334] (-) is the measurement method for analog tester.

* Because of the connecting diode in the relay, the measurement method may depend on the tester type. (Refer to CIRCUIT TESTER)

Portion to be inspected	Standard	Tester range
CN209-2[333] to CN209-1[334]	Approx. 750 Ω	Ω×10

Judgment

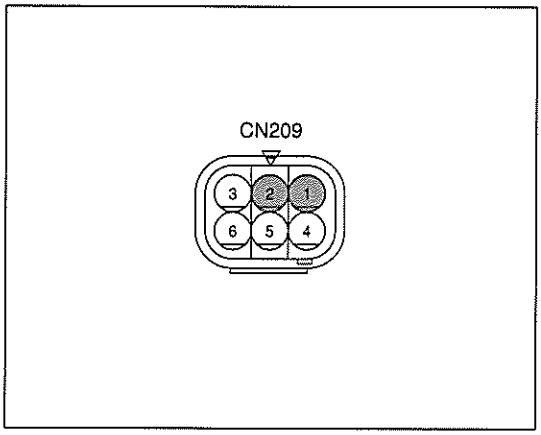
Result	Procedure
NG	**Semiconductor relay for telematics power supply defect**
OK	Go to step 5

STEP5

Inspection : Main controller

1.Turn on the key switch, then turn on the seat switch

2.Check the voltage between both ends of the relay.



Portion to be inspected	Standard
CN209-1[334] to CN209-2[333]	Approx. 15V

Judgment

Result	Procedure
NG	**Semiconductor relay for telematics power supply defect**
OK	**Main controller defect**

STEP6

Inspection : Connector inspection

1.Turn off the key switch and disconnect the battery plug.

2.Check the inside of connector CN100, CN103 and CN104, and the caulked portion of wire whether it has defect or not by visual confirm.

3.After connecting CN100, CN103 and CN104, connect the battery plug and turn key switch ON , then confirm error 10 seconds later.

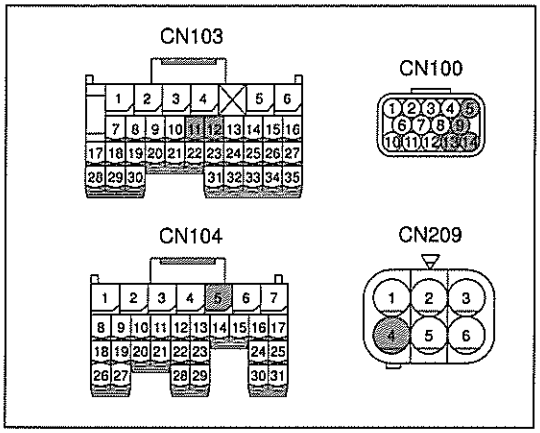
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Judgment

Result	Procedure
ED-1 error does not occur.	**Connector contact defect**
ED-1 error occurs.	Go to step 7

STEP7

Inspection : Sub-harness inspection



1.Turn off the key switch and disconnect the battery plug.

2.Disconnect the CN100, CN103 and CN104 connector, then check the harness.

[Inspection procedure and standard]

Inspect for continuity and short circuiting of the harness.

Perform this check with the battery plug and the CN100, CN103, CN104 connectors disconnected, and visually check inside the connector and the caulked portion of its wire for defects.

Portion to be inspected	Standard
CN103-11[145] to CN100-9	Continuity
CN103-12[146] to CN100-5	Continuity
CN104-5[N2] to CN100-13	Continuity
CN209-4[440] to CN100-14	Continuity

Judgment

Result	Procedure
NG	**Harness defect**
OK	**CAN bridge controller defect**

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Error Code: ED-4

Failure mode: CAN bridge controller to operation control device : communication stopped

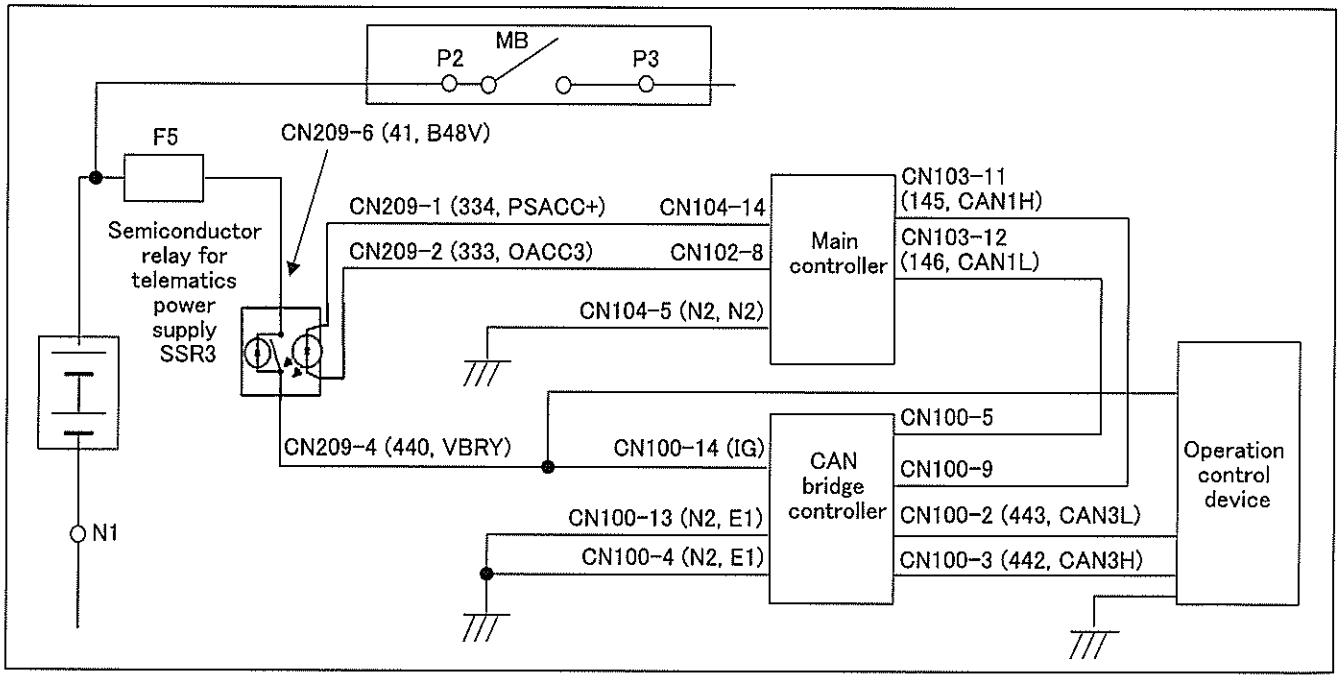
⚠ CAUTION

- **If ED-1 occurs at same time, perform troubleshooting for ED-1 first.**

Probable cause

- Connector contact defect
- Harness defect
- Operation control device defect

Related portion



STEP1

Inspection : telematics power supply

1.Connecting the battery plug and turn key switch ON with sitting the seat.

2.Pushing the log off button of tenkey keypad (red "o" button), check if the red lamp of tenkey keypad light or not.

Judgment

Result	Procedure
Not light at all	Go to step 2
Light a lamp	Go to step 4

STEP2

Inspection : Connector inspection

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1.Turn off the key switch and disconnect the battery plug.

2.Check the inside of connector CN100 and CN209, and the caulked portion of wire whether it has defect or not by visual confirm.

3.After connecting CN100 and CN209, connect the battery plug and turn key switch ON , then confirm error 10 seconds later.

Judgment

Result	Procedure
ED-4 error does not occur.	**Connector contact defect**
ED-4 error occurs.	Go to step 3

STEP3

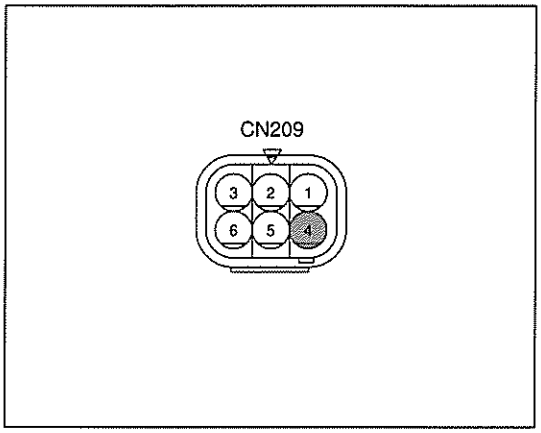
Inspection : Sub-harness inspection

1.Turn off the key switch and disconnect the battery plug.

2.Disconnect the CN100 and CN209 connector, then check the harness.

[Inspection procedure and standard]

Inspect for continuity and short circuiting of the harness.



Perform this check with the battery plug and the CN100, CN209 connectors disconnected, and visually check inside the connector and the caulked portion of its wire for defects.

Portion to be inspected	Standard
CN209-4[440] to operation control device connector for power supply	Continuity
Operation control device connector for GND to N1[N1]	Continuity

Judgment

Result	Procedure
NG	**Harness defect**
OK	**Operation control device defect**

STEP4

Inspection : Connector inspection

1.Turn off the key switch and disconnect the battery plug.

2.Check the inside of connector CN100 and operation control device connector, and the caulked portion of wire whether it has defect or not by visual confirm.

3.After connecting CN100 and operation control device, connect the battery plug and turn key switch ON , then confirm error 10 seconds later.

Judgment

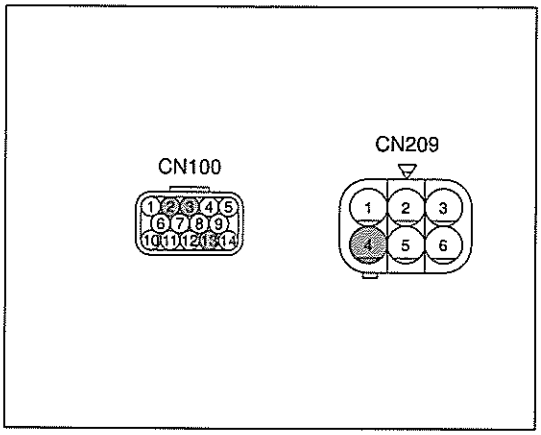
Result	Procedure
ED-4 error does not occur.	**Connector contact defect**

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Result	Procedure
ED-4 error occurs.	Go to step 5

STEP5

Inspection : Sub-harness inspection



1.Turn off the key switch and disconnect the battery plug.

2.Disconnect the CN100 and operation control device connectors and check the harnesses.

[Inspection procedure and standard]

Inspect for continuity and short circuiting of the harness.

Perform this check with the battery plug and the CN100 and operation control device connectors disconnected, and visually check inside the connector and the caulked portion of its wire for defects.

Portion to be inspected	Standard
CN100-2[443] to operation control device connector CANL	Continuity
CN100-3[442] to operation control device connector CANL	Continuity
CN100-13 to N1[N1]	Continuity
CN100-2[443] to CN100-13[N1]	No continuity
CN100-3[442] to CN100-13[N1]	No continuity
CN209-4[440] to operation control device connector for power supply	Continuity

Judgment

Result	Procedure
NG	**Harness defect**
OK	**Operation control device defect**

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Error Code: EE-1, EE-2

Failure mode: Communication line abnormality : Display to main controller

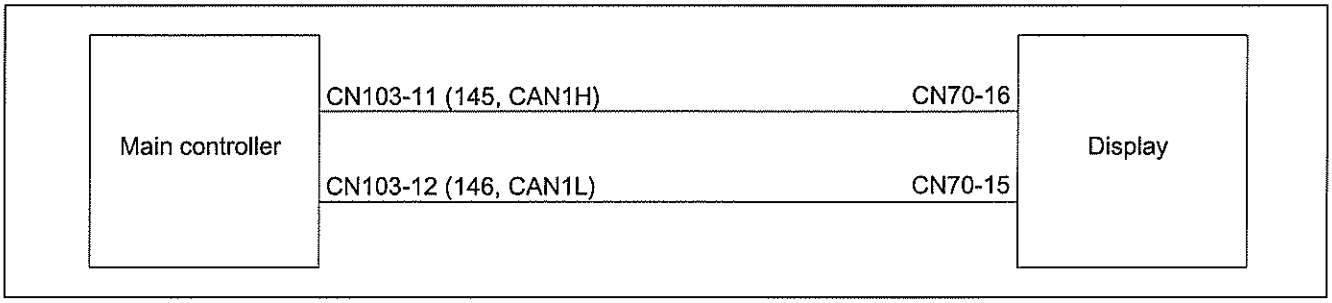
⚠ CAUTION

- **In case of confirming the memory of EE-1 or EE2 at display, communication for display is recovered, so use as it is.**

Probable cause

- Display defect
- Main controller defect

Related portion



STEP1

Confirming error occurrence:

Check if error F1-1 or F1-2 is occurring at display.

Judgment

Result	Procedure
Under occurrence	**To troubleshooting for F1-1, F1-2**
No occurrence	**Display or main controller defect**

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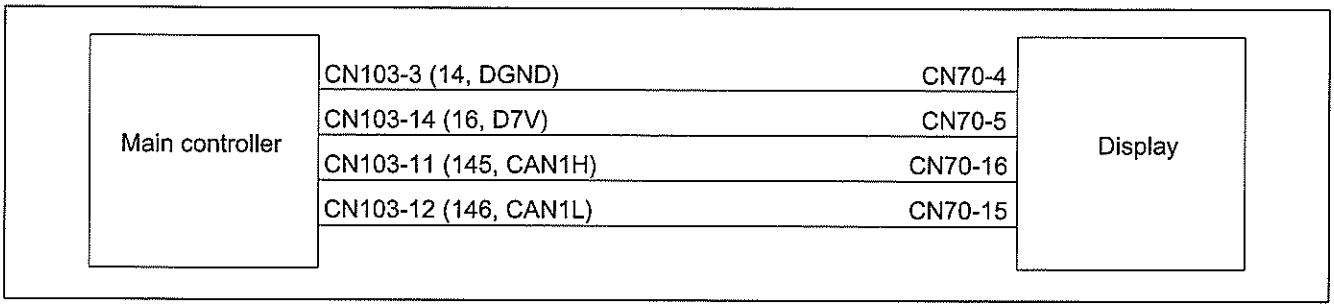
Error Code: F1-1

Failure mode: Communication line abnormality between main controller and display

Probable cause

- Connector contact defect

Related portion



STEP1

Inspection: Reconfirm the error

Disconnect the battery plug, and visually check inside the connector between CN103 and CN70 and the caulked portion of its wire for defects. (Refer to BEFORE TROUBLESHOOTING)

After connecting the connector, connect the battery plug and turn key switch ON to confirm error.

Judgment

Result	Procedure
F1-1 or F1-2 occurs	**Perform troubleshooting for F1-2.**
F1-1 and F1-2 does not occur	**Connector contact defect** **Use truck as it is.**

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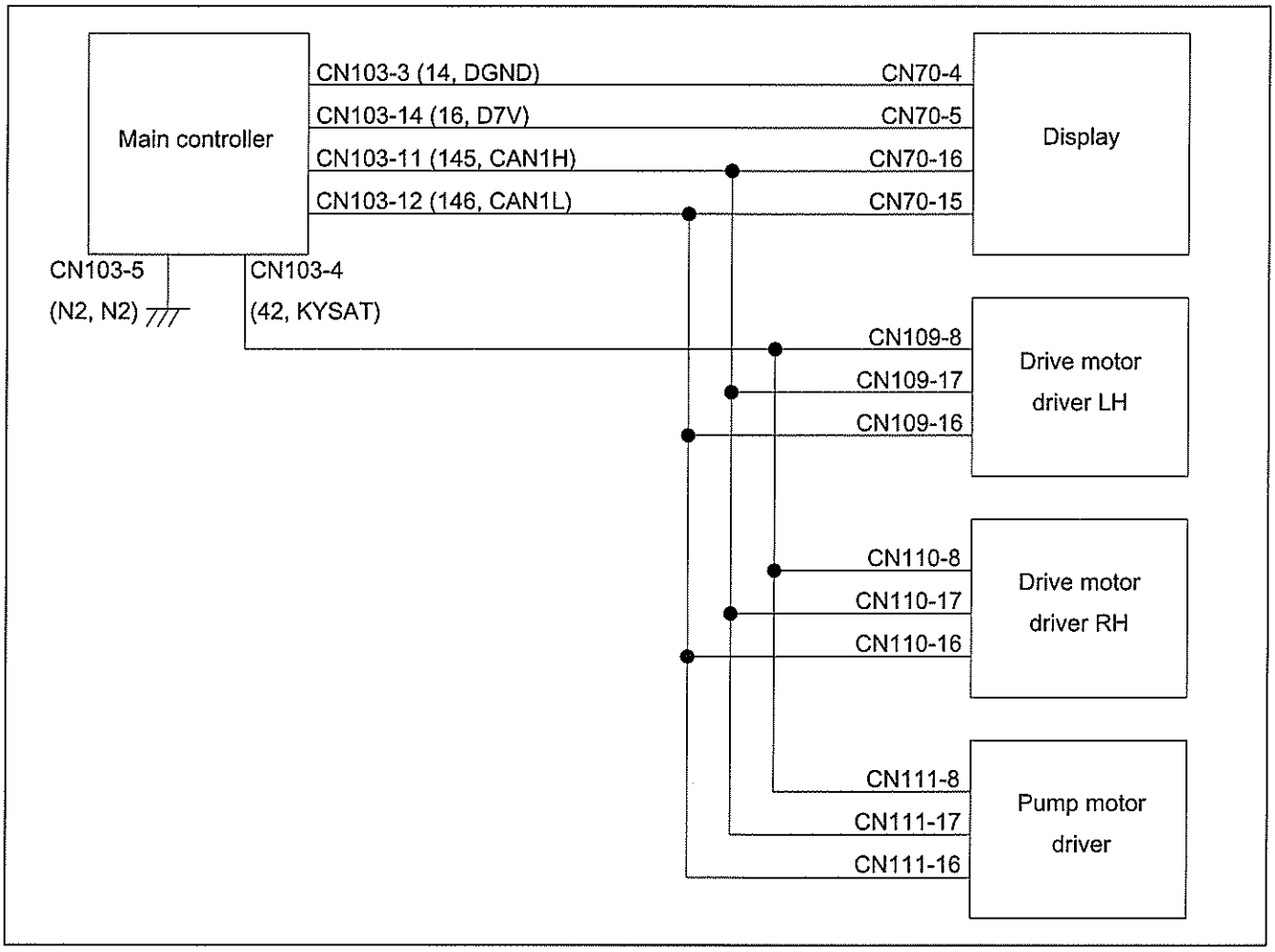
Error Code: F1-2

Failure mode: Communication line abnormality between main controller and display

Probable cause

- Connector contact defect
- Harness defect
- Display defect
- Main controller defect

Related portion



STEP1

Disconnect the battery plug, and visually check inside the connector CN103 and CN70 and the caulked portion of its wire for defects. (Refer to BEFORE TROUBLESHOOTING)

After connecting the connector, connect the battery plug and turn on the key switch to confirm error.

Judgment

Result	Procedure
F1-2 error occurs.	Go to step 2
F1-2 error does not occur.	**Connector contact defect**

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STEP2

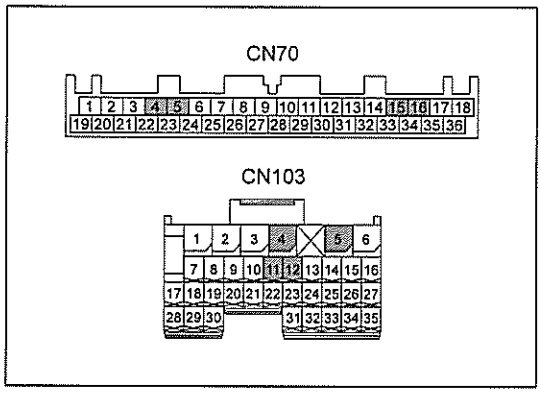
Inspection : Harness

Turn off the key switch and disconnect the battery plug.

Disconnect the CN70 and CN103 connectors and check the harnesses.

[Inspection procedure and standard]

Inspect for continuity and short circuiting of the harness.



Portion to be inspected	Standard:
CN103-11 to CN70-16	Continuity (Approx. 0Ω)
CN103-12 to CN70-15	Continuity (Approx. 0Ω)
CN70-15 to CN70-16	No continuity (Except 0Ω)
CN70-15 to CN70-4	No continuity (Except 0Ω)
CN70-15 to CN70-5	No continuity (Except 0Ω)
CN70-16 to CN70-4	No continuity (Except 0Ω)
CN70-16 to CN70-5	No continuity (Except 0Ω)
CN103-11 to CN103-4	No continuity (Except 0Ω)
CN103-12 to CN103-5	No continuity (Except 0Ω)
CN103-11 to CN103-5	No continuity (Except 0Ω)
CN103-12 to CN103-4	No continuity (Except 0Ω)

Judgment

Result	Procedure
NG	**Harness defect**
OK	Go to step 3

STEP3

Turn off the key switch and disconnect the battery plug.

After connecting CN70 and CN103 connector, connect the battery plug and turn on the key switch, and check the operation to drive and material handling .

Judgment

Result	Procedure
The traveling and load handling operation can be performed.	**Display defect** **If the symptom persists after replacement of the display, there should be any other problems, so replace the main controller.**

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Result	Procedure
The traveling and load handling operation cannot be performed.	**Main controller defect** **If the symptom persists after replacement of the main controller, there should be any other problems, so replace the display.**

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Error Code: F4-1, F4-2, F4-3, F4-4, F4-5, F4-6, F4-7, F4-8

Failure mode: Display CPU defect

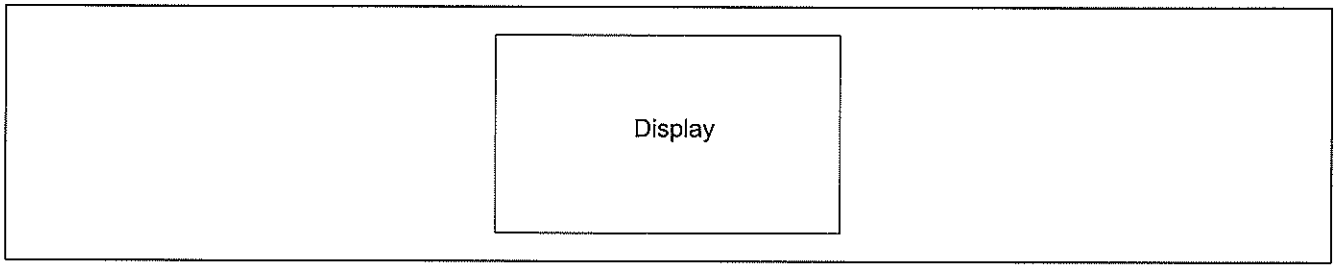
⚠ CAUTION

- **If F4-1, F4-2, F4-3, F4-4, F4-5, F4-6, F4-7 or F4-8 occurs, the display is defective, so replace it.**

Probable cause

- Display defect

Related portion



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Error Code: F5-1

Failure mode: Battery electrolyte level/temperature sensor harness open abnormality

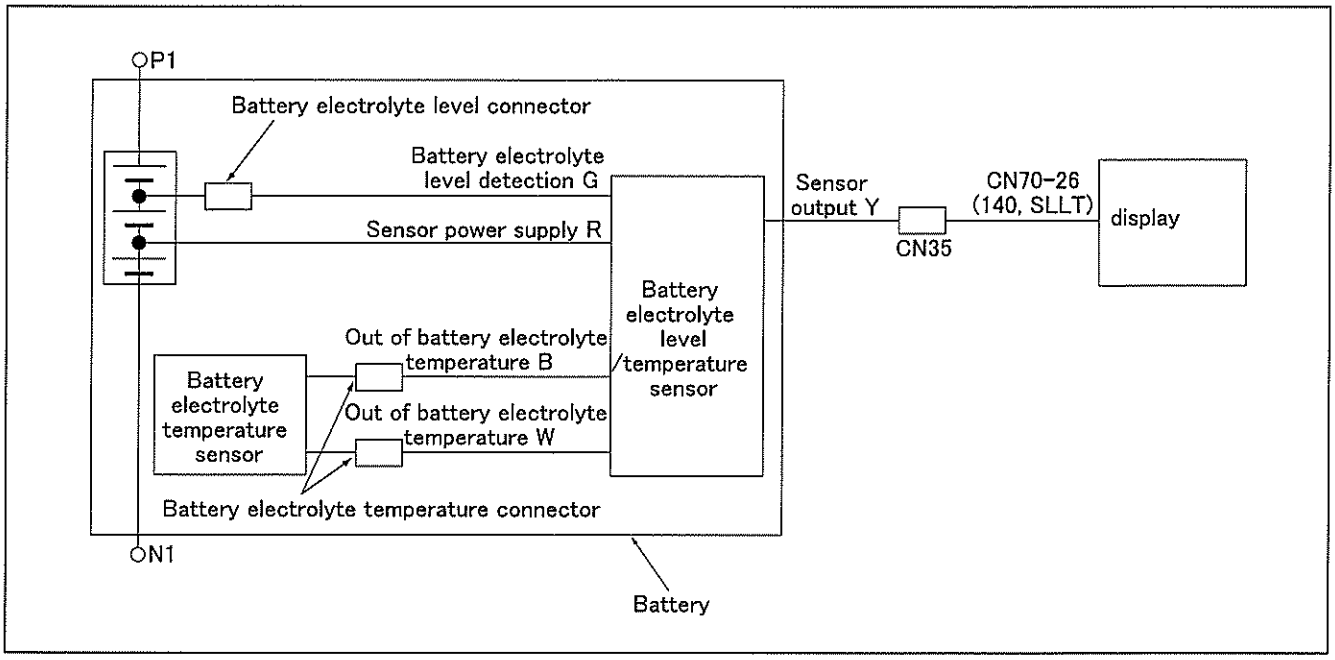
⚠ CAUTION

- **Be sure to connect the battery plug after connecting the CN35 connector, otherwise, an error may occur.**
  Normally, even if the error occurs when connecting the battery plug before connecting the CN35 connector, it will disappear after about 1 minute.

Probable cause

- Connector contact defect
- Incorrect connection of battery electrolyte level/temperature sensor
- Harness defect
- Battery electrolyte level/temperature sensor defect
- Display defect
- Battery electrolyte temperature sensor defect

Related portion



STEP1

Check that the sensor mounted on the battery is the battery electrolyte level/temperature sensor.

Judgment

Result	Procedure
OK	Go to step 2
NG	**Change the setting of the battery unit. (STD [OPT] 3 OPT (1 12)/Multi-function display [OPT] B UNIT)**

STEP2

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Disconnect the battery plug, and visually check if the CN35 connector on the vehicle side and the electrolyte level/temperature sensor are connected.

After connecting the connector, connect the battery plug and turn key switch ON to confirm error.

Judgment

Result	Procedure
F5-1 error occurs.	Go to step 3
F5-1 error does not occur.	**Connector contact defect**

STEP3

Inspection :

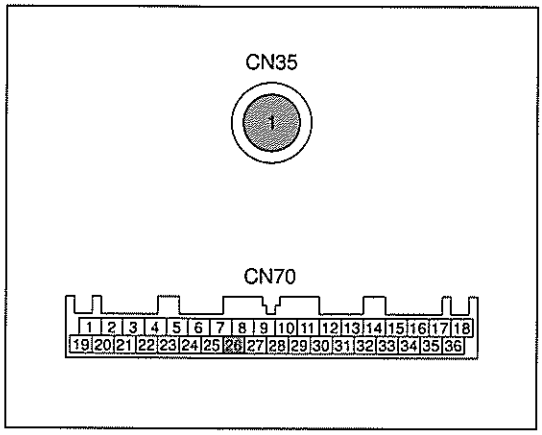
Inspect harness

Turn off the key switch and disconnect the battery plug.

Disconnect the CN35 and CN70 connectors and check the harnesses.

[Inspection procedure and standard]

Inspect for continuity and short circuiting of the harness.



Perform this check with the battery plug and the CN35, and CN70 connectors disconnected, and visually check inside the connector and the caulked portion of its wire for defects.

Refer to BEFORE TROUBLESHOOTING

Portion to be inspected	Standard:
CN35 connector to CN70-26	Continuity

Judgment

Result	Procedure
OK	Go to step 4
NG	**Harness defect**

STEP4

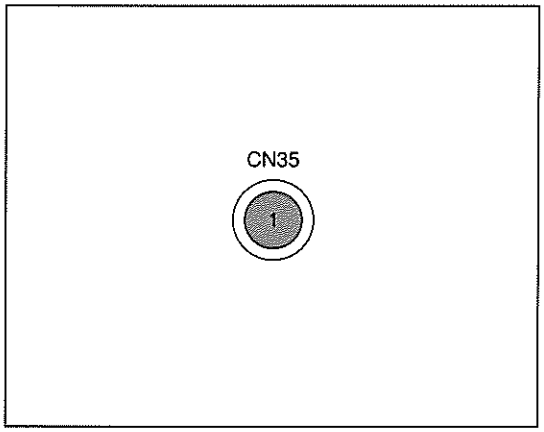
Inspection :

Output current of the battery electrolyte level/temperature sensor check

Disconnect the CN35 connector.

Connect the battery plug, turn off the key switch and then check the output current of the battery electrolyte level/temperature sensor.

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[Inspection procedure and standard]

Check the output current of the battery electrolyte level/temperature sensor.

Disconnect the CN35 connector and connect the battery plug. Turn off the key switch and check the output current of the battery electrolyte level/temperature sensor between the CN35 connector (sensor side) and N1 terminal.

When using analog tester, apply the red prove for CN35 connector and black prove for N1 terminal.

Portion to be inspected	Standard:
CN35 connector to N1 terminal	Current H, Current L: approx. 2 mA to 15 mA

Judgment

Result	Procedure
OK	Go to step 5
NG	**Battery electrolyte level/temperature sensor defect**

STEP5

Inspection :

Battery electrolyte temperature sensor individual inspection

Turn off the key switch and disconnect the battery plug.

Disconnect the electrolyte temperature sensor connector, and perform the battery electrolyte temperature sensor individual inspection.

[Inspection procedure and standard]

Carry out battery electrolyte temperature sensor individual inspection.

Measure the resistance of the battery electrolyte temperature sensor (Electrolyte temperature sensor side: electrolyte temperature B to W)

Standard: Approx. 330 kΩ to 35 kΩ

(When temperature of electrolyte is 0°C to 50 °C)

* The resistance is changed with depending on atmosphere temperature. So refer to the below table about rough standard value.

Battery electrolyte temperature	Battery electrolyte temperature sensor resistance
0 °C	Approx. 330 kΩ
20 °C	Approx. 124 kΩ
50 °C	Approx. 35 kΩ

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Judgment

Result	Procedure
OK	Display defect
NG	Battery electrolyte temperature sensor defect

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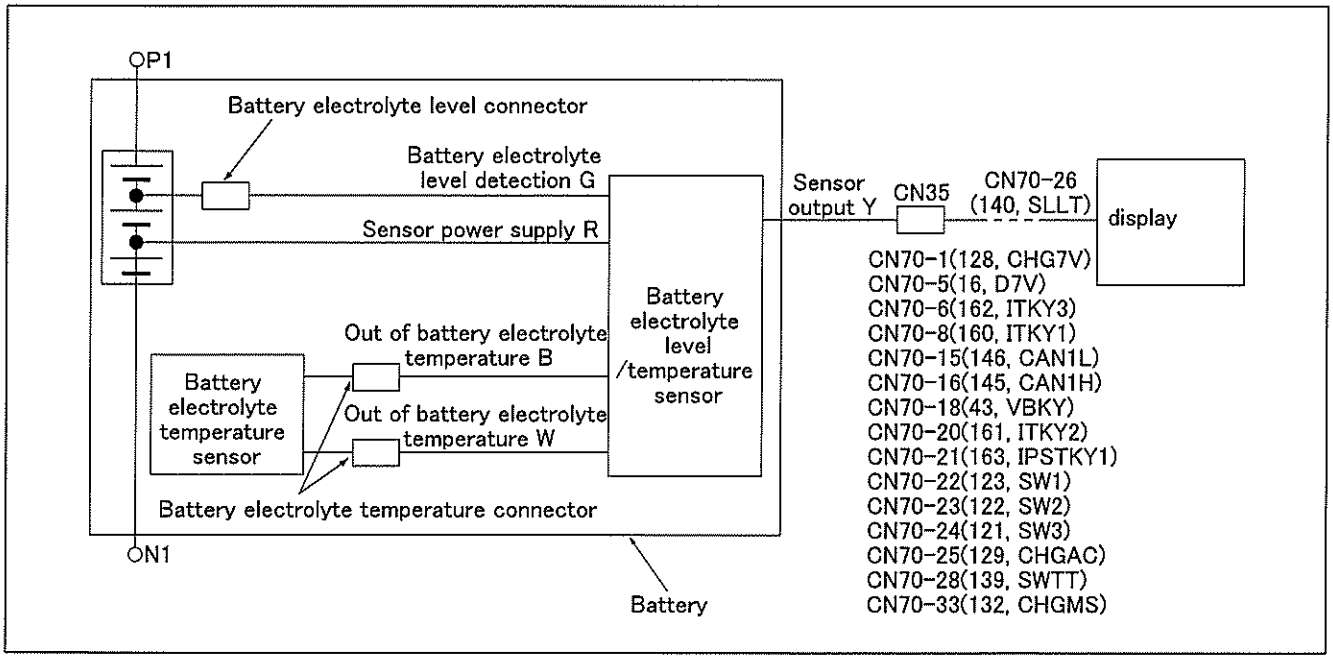
Error Code: F5-2

Failure mode: Battery electrolyte level/temperature sensor harness short abnormality

Probable cause

- Connector contact defect
- Harness defect
- Battery electrolyte level/temperature sensor defect
- Display defect
- Battery electrolyte temperature sensor defect

Related portion



STEP1

Disconnect the battery plug, and visually check inside the connector between CN35 and CN70 and the caulked portion of its wire for defects.

(Refer to BEFORE TROUBLESHOOTING)

After connecting the connector, connect the battery plug and turn key switch ON to confirm error.

Judgment

Result	Procedure
F5-2 error occurs.	Go to step 2
F5-2 error does not occur.	**Connector contact defect**

STEP2

Inspection :

Display voltage check

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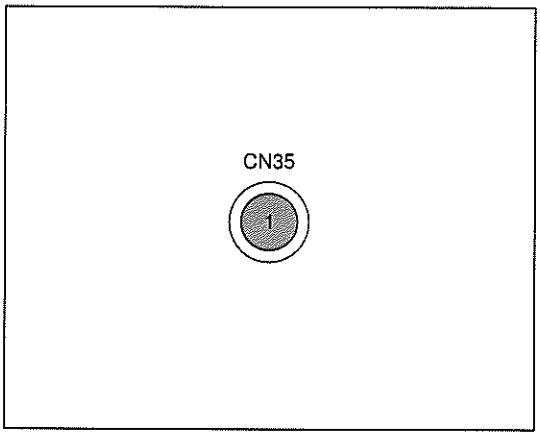
Turn off the key switch and disconnect the battery plug.

Disconnect the CN35 connector.

Connect the battery plug, turn on the key switch and then check the voltage of the display.

[Inspection procedure and standard]

Check the voltage of the display.



Disconnect the CN35 connector, connect the battery plug and then turn on the key switch to check the voltage between CN35 connector and N1 terminal.

Portion to be inspected	Standard:
CN35 connector (main harness side) to N1 terminal	0V

Judgment

Result	Procedure
NG (other than 0V)	Go to step 3
OK (0V)	Go to step 5

STEP3

Inspection :

Harness voltage check

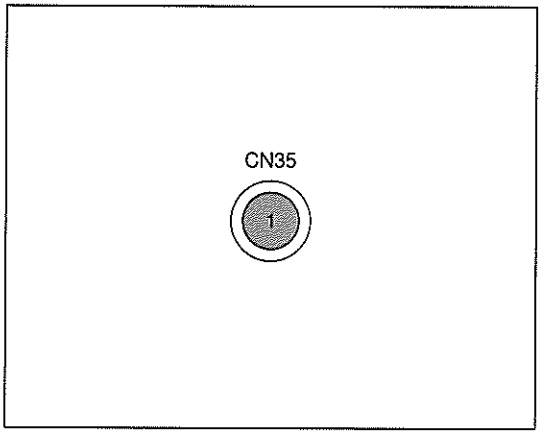
Turn off the key switch and disconnect the battery plug.

Disconnect the CN35 and CN70 connector.

Connect the battery plug, turn on the key switch and then check the voltage of harness.

[Inspection procedure and standard]

Check the voltage of the harness.



Disconnect the CN35 and CN70 connector, connect the battery plug and then turn on the key switch to check the voltage between CN35 connector and N1 terminal.

Portion to be inspected	Standard:
CN35 connector (main harness side) to N1 terminal	0V

Judgment

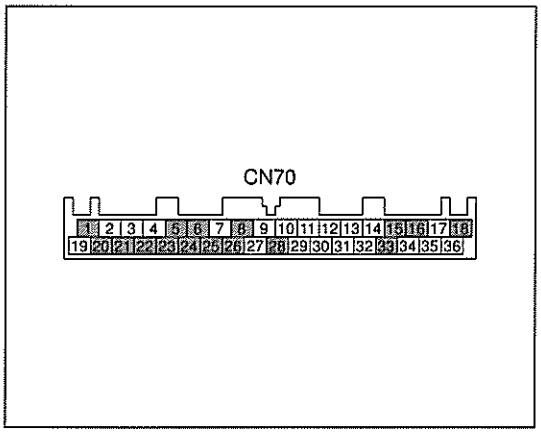
Result	Procedure
OK (0V)	Go to step 4
NG (other than 0V)	**Harness defect**

STEP4

Inspection :

Inspect harness

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Turn off the key switch and disconnect the battery plug.

Disconnect the CN35 and CN70 connectors and check the harnesses.

[Inspection procedure and standard]

Inspect for continuity and short circuiting of the harness.

Perform this check with the battery plug and the CN35, and CN70 connectors disconnected, and visually check inside the connector and the caulked portion of its wire for defects.

Refer to BEFORE TROUBLESHOOTING

Portion to be inspected	Standard:
CN70-26 to CN70-1	No continuity
CN70-26 to CN70-5	No continuity
CN70-26 to CN70-6	No continuity
CN70-26 to CN70-8	No continuity
CN70-26 to CN70-15	No continuity
CN70-26 to CN70-16	No continuity
CN70-26 to CN70-18	No continuity
CN70-26 to CN70-20	No continuity
CN70-26 to CN70-21	No continuity
CN70-26 to CN70-22	No continuity
CN70-26 to CN70-23	No continuity
CN70-26 to CN70-24	No continuity
CN70-26 to CN70-25	No continuity
CN70-26 to CN70-28	No continuity
CN70-26 to CN70-33	No continuity

Judgment

Result	Procedure
OK	**Display defect**
NG	**Harness defect**

STEP5

Inspection :

Battery electrolyte temperature sensor individual inspection

Turn off the key switch and disconnect the battery plug.

Disconnect the electrolyte temperature sensor connector, and perform the battery electrolyte temperature sensor individual inspection.

[Inspection procedure and standard]

Carry out battery electrolyte temperature sensor individual inspection.

Measure the resistance of the battery electrolyte temperature sensor (Electrolyte temperature sensor side: electrolyte temperature B to W)

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Standard: Approx. 330 kΩ to 35 kΩ

(When temperature of electrolyte is 0°C to 50 °C)

* The resistance is changed with depending on atmosphere temperature. So refer to the below table about rough standard value.

Battery electrolyte temperature	Battery electrolyte temperature sensor resistance
0 °C	Approx. 330 kΩ
20 °C	Approx. 124 kΩ
50 °C	Approx. 35 kΩ

Judgment

Result	Procedure
OK	**Battery electrolyte level/temperature sensor defect**
NG	**Battery electrolyte temperature sensor defect**

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Error Code: F5-3

Failure mode: Battery electrolyte temperature sensor open abnormality

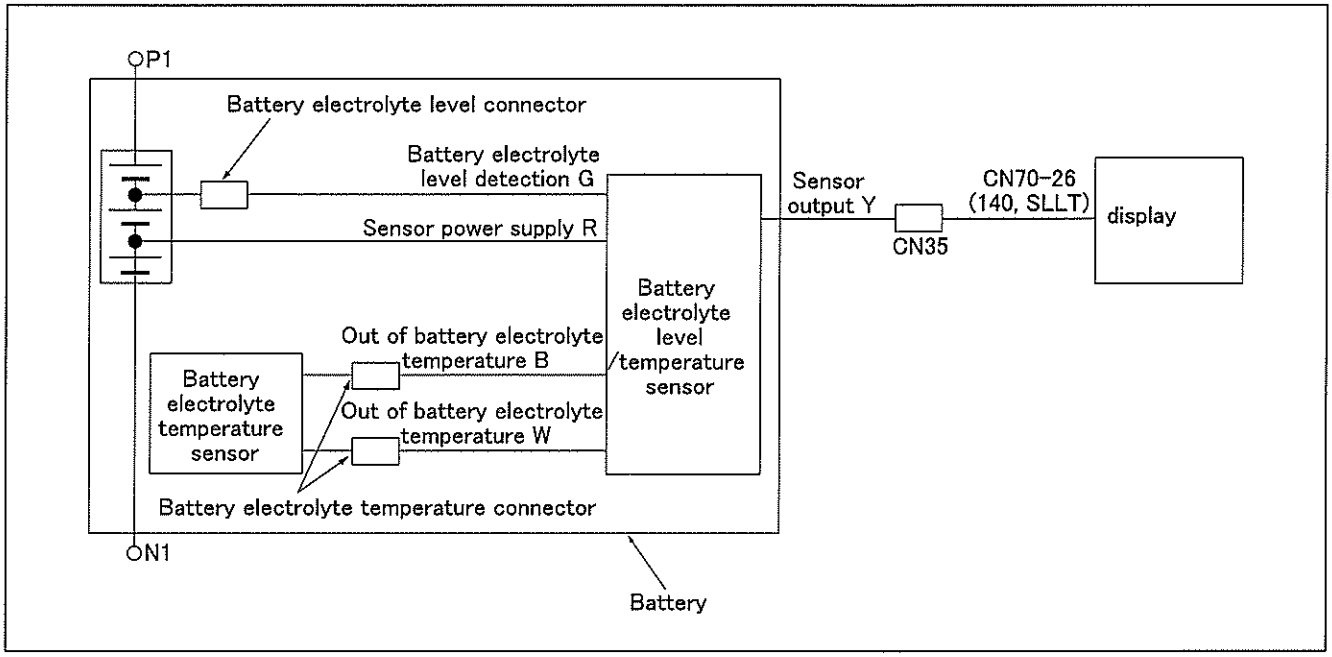
⚠ CAUTION

- **An error may occur when leaving the vehicle standing under a low temperature (less than -20 °C). So park the vehicle under a normal temperature.**
  The vehicle can be used even with an error occurs due to being left standing under a low temperature for a long time.
  Normally, the error will disappear when the battery electrolyte temperature is above -20 °C.
  (The battery electrolyte temperature can be checked with STD [ANL] 2 IO1 (2 14)/Multi-function display [ANL] I/O TEMP/ VOLT 4/6 TSLLT, and it will be displayed as -20 even if it gets lower than -20 °C.)
  Since the error may occur frequently when customers usually work under a low temperature, setting STD [OPT] 3 OPT (1 12)/Multi-function display [OPT] B UNIT to A can prevent it from occurring. At that time, note that the battery electrolyte level and temperature sensing function is invalid.

Probable cause

- Connector contact defect
- Usage of the battery electrolyte under low temperature (less than -20 °C)
- Battery electrolyte temperature sensor defect
- Battery electrolyte level/temperature sensor defect

Related portion



STEP1

Disconnect the battery plug, and visually check inside the battery electrolyte temperature sensor connectors and the caulked portion of each wire for defects.

Refer to BEFORE TROUBLESHOOTING

After connecting the connector, connect the battery plug and turn key switch ON to confirm error.

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Judgment

Result	Procedure
F5-3 error occurs.	Go to step 2
F5-3 error does not occur.	**Connector contact defect**

STEP2

Inspection :

Battery electrolyte temperature sensor individual inspection

Turn off the key switch and disconnect the battery plug.

Disconnect the electrolyte temperature sensor connector, and perform the battery electrolyte temperature sensor individual inspection.

[Inspection procedure and standard]

Carry out battery electrolyte temperature sensor individual inspection.

Measure the resistance of the battery electrolyte temperature sensor (Electrolyte temperature sensor side: electrolyte temperature B to W)

Standard: Approx. 330 kΩ to 35 kΩ

(When temperature of electrolyte is 0°C to 50 °C)

* The resistance is changed with depending on atmosphere temperature. So refer to the below table about rough standard value.

Battery electrolyte temperature	Battery electrolyte temperature sensor resistance
0 °C	Approx. 330 kΩ
20 °C	Approx. 124 kΩ
50 °C	Approx. 35 kΩ

Judgment

Result	Procedure
OK	**Battery electrolyte level/temperature sensor defect**
NG	**Battery electrolyte temperature sensor defect**

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Error Code: F5-4

Failure mode: Battery electrolyte temperature sensor overheating abnormality

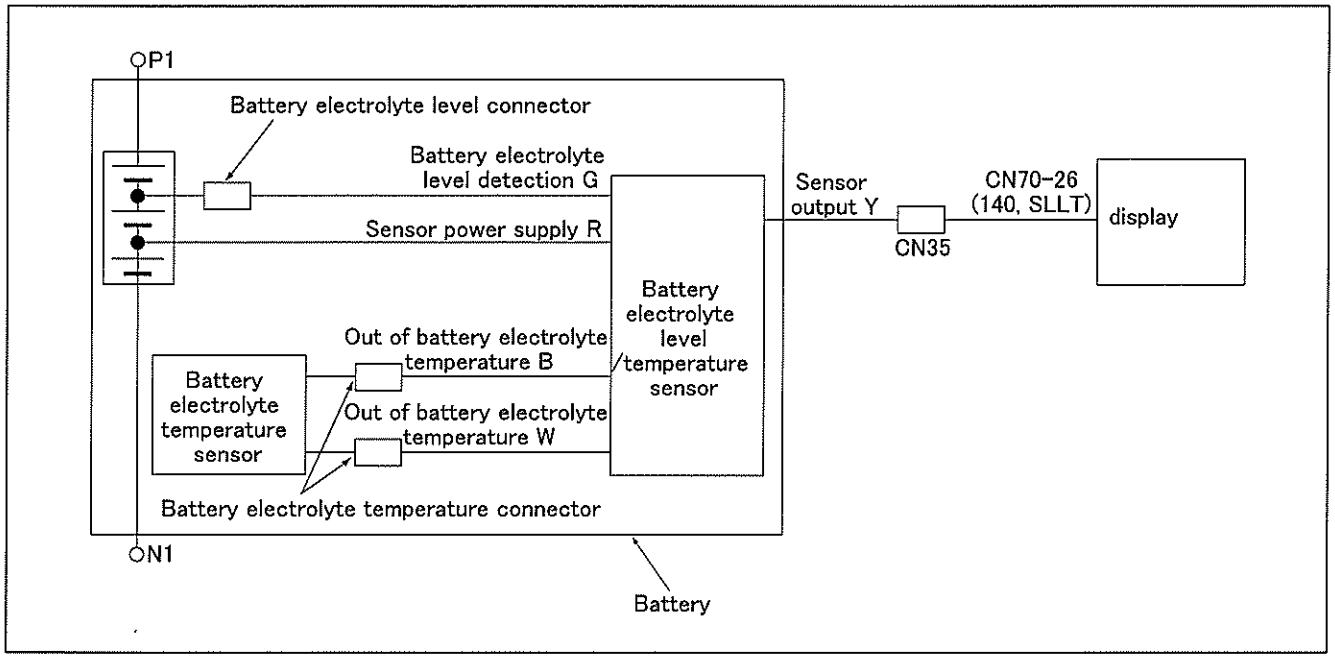
⚠ CAUTION

- **If F5-1 occurs at same time, perform troubleshooting for F5-1 first.**
  Be sure to connect the battery plug after connecting the CN35 connector, otherwise, an error may occur.
  Normally, even if the error occurs when connecting the battery plug before connecting the CN35 connector, it will disappear after about 1 minute.

Probable cause

- Connector contact defect
- Incorrect connection of battery electrolyte level/temperature sensor
- Battery electrolyte temperature sensor defect
- Battery electrolyte level/temperature sensor defect

Related portion



STEP1

Check that the sensor mounted on the battery is the battery electrolyte level/temperature sensor.

Judgment

Result	Procedure
OK	Go to step 2
NG	**Change the setting of the battery unit. (STD [OPT] 3 OPT (1 12)/Multi-function display [OPT] B UNIT)**

STEP2

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Disconnect the battery plug, and visually check inside the battery electrolyte temperature sensor connectors and the caulked portion of each wire for defects.

Refer to BEFORE TROUBLESHOOTING

After connecting the connector, connect the battery plug and turn key switch ON to confirm error.

Judgment

Result	Procedure
F5-4 error occurs.	Go to step 3
F5-4 error does not occur.	**Connector contact defect**

STEP3

Inspection :

Battery electrolyte temperature sensor individual inspection

Turn off the key switch and disconnect the battery plug.

Disconnect the electrolyte temperature sensor connector, and perform the battery electrolyte temperature sensor individual inspection.

[Inspection procedure and standard]

Carry out battery electrolyte temperature sensor individual inspection.

Measure the resistance of the battery electrolyte temperature sensor (Electrolyte temperature sensor side: electrolyte temperature B to W)

Standard: Abnormality when the resistance value is below approx. 6 kΩ.

Judgment

Result	Procedure
OK	**Battery electrolyte level/temperature sensor defect**
NG	**Battery electrolyte temperature sensor defect**

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Error Code: F6-1

Failure mode: Charging abnormality (Safety timer activated)

⚠ CAUTION

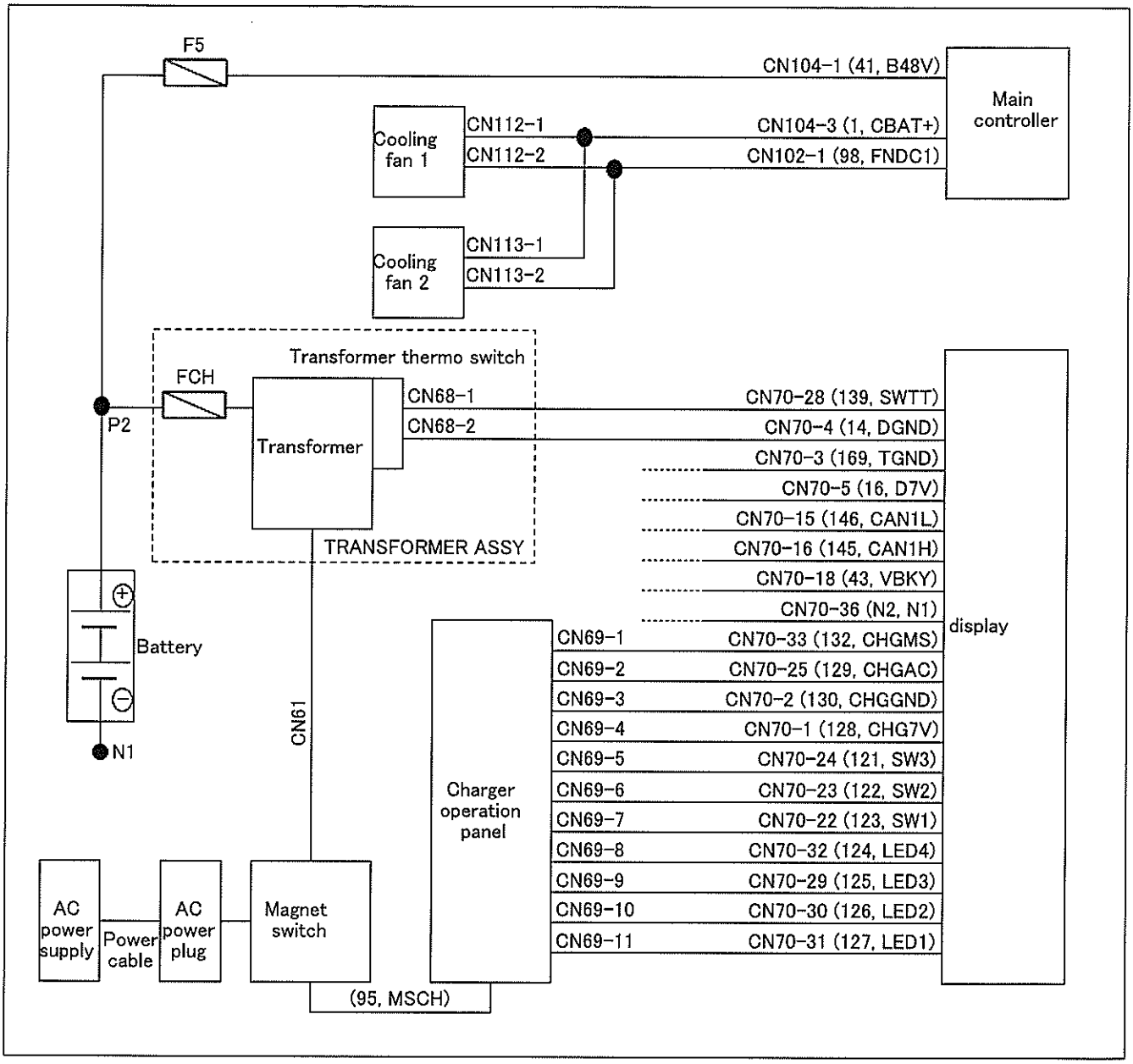
- **Before performing troubleshooting of F6-1 error, turn on the key switch and check if any other error code will be indicated.**
  If displayed, perform troubleshooting with priority given to that error.
- **Before perform troubleshooting, inspect the magnet switch and confirm thermal relay is not operated. If thermal relay is operated, perform the component (magnet switch, transformer ASSY) inspection before.**
- **For causes other than listed above, refer to "Although the charging is complete, the battery is not fully charged" or "Charging does not start when the START button is pressed (even though charging screen appears on the display)**

Probable cause

- AC power supply voltage defect
- Power code defect.
- Display defect

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Related portion



STEP1

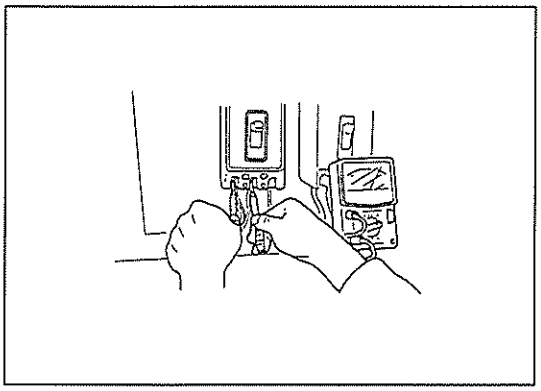
Inspection :

Power supply voltage inspection

Turn off the key switch and disconnect the AC power plug.

Check voltage of each AC power supply terminal.

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[Inspection procedure and standard]

Check voltage of each AC power supply terminal.

Portion to be inspected	Standard:
Each power supply terminal	AC191 to 220 V

Judgment

Result	Procedure
OK (AC191 to 220 V)	Go to step 2
NG (0 V or abnormal voltage reduction,phase interruption)	**AC power supply voltage defect**

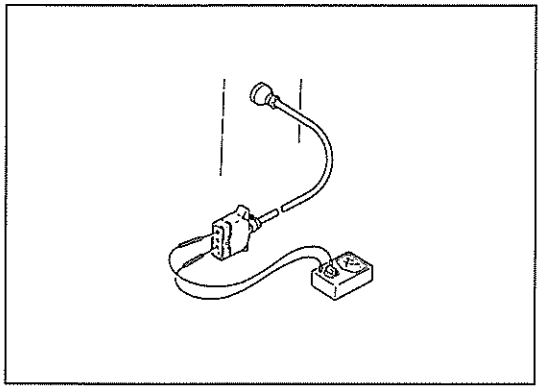
STEP2

Inspection :

AC power supply voltage defect

Turn off the key switch and disconnect the AC power plug.

AC power plug terminal voltage check



[Inspection procedure and standard]

AC power plug terminal voltage check

Portion to be inspected	Standard:
Each power plug terminal	AC191 to 220 V

Judgment

Result	Procedure
OK (AC191 to 220 V)	Go to step 3
NG (0 V or abnormal voltage reduction,phase interruption)	**Power code defect.**

STEP3

Inspection :

Charger timer test

(Refer to page "TIMER TEST" of Charger section)

* If unable to start the timer test, perform "Charging does not start when the START button is pressed" or "Charging does not stop when the STOP button is pressed" on [WHEN NO ERROR CODE IS DISPLAYED].

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Judgment

Result	Procedure
OK (Finish normally)	**Perform "Although the charging is complete, the battery is not fully charged " on [WHEN NO ERROR CODE IS DISPLAYED].**
Error code is displayed	**Perform troubleshooting for the displayed error code.**
Not all 10 charging progress indicator come on in 10 seconds after starting the test	**Display defect**

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Error Code: F6-2

Failure mode:Charger transformer overheating (charge can not start)

⚠ CAUTION

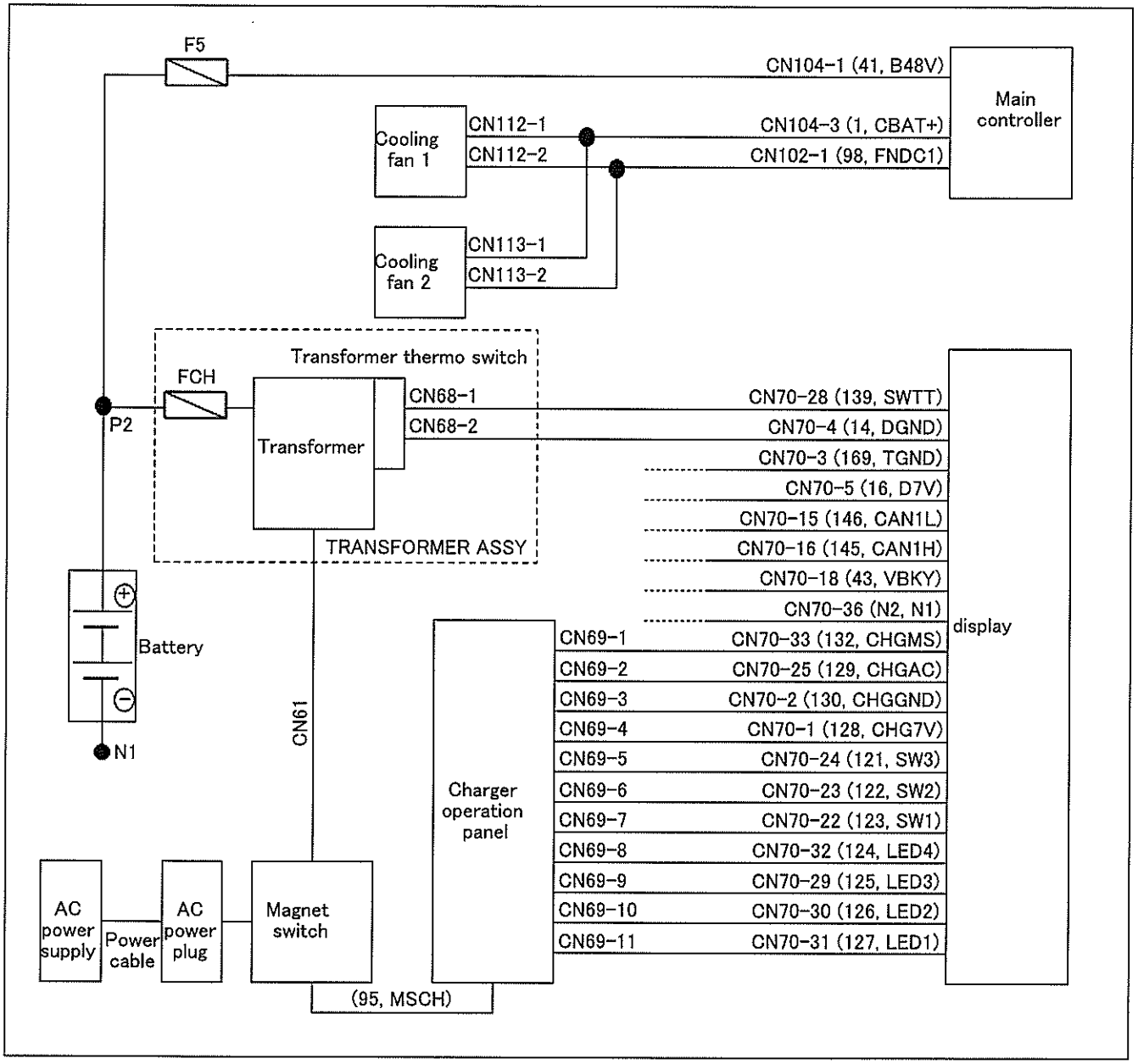
- *** If AB-1 occurs at same time, perform troubleshooting for AB-1 first.**

Probable cause

- Transformer ASSY defect
- Tap adjustment defect
- Transformer thermo switch defect
- Harness defect
- Connector contact defect
- Cooling fan defect
- Display defect

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Related portion



STEP1

Inspection :

Transformer ASSY check

(Refer to page "TRANSFORMER ASSY" of Charger section)

Judgment

Result	Procedure
OK	Go to step 2
NG	**Transformer ASSY defect** **In case of transformer ASSY defect, it may have the other cause. So perform the check of following step2 after transformer replacing.**

STEP2

Inspection :

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Tap changer check

(Refer to page "BEFORE CHARGING" of Charger section)

Judgment

Result	Procedure
OK	Go to step 3
NG	**Tap adjustment defect**

STEP3

Inspection :

Check with or without of error

Turn off the key switch and connect the battery plug and AC power plug.

Check with or without of the F6-2 error when connect AC power plug.

Judgment

Result	Procedure
OK (No error occurred)	Go to step 6
NG (F6-2 error occurs after connecting AC power plug)	Go to step 4

STEP4

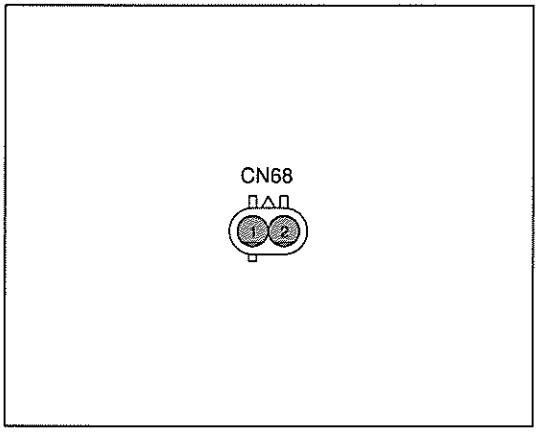
Inspection :

Check the overheating detect function

Turn off the key switch, and disconnect the AC power plug and the battery plug.

Disconnect CN68 connector, and connect the CN68-1 (main harness side) to CN68-2 by using SST2.

Check with or without of the F6-2 error after connecting AC power plug and battery plug.



[Inspection procedure and standard]

Check the thermo switch for continuity.

Disconnect CN68 connector, and connect the CN68-1 (main harness side) to CN68-2 by using SST2.

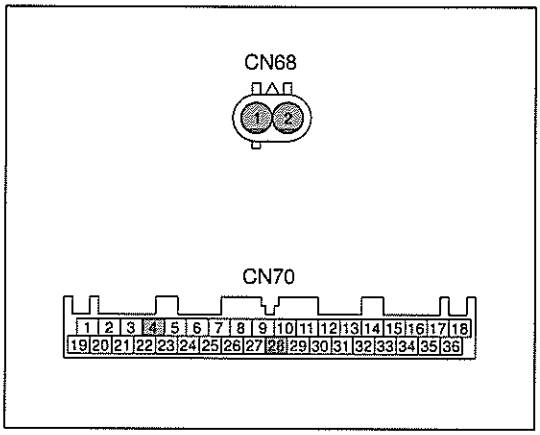
Check with or without of the F6-2 error after connecting AC power plug and battery plug.

Judgment

Result	Procedure
OK (F6-2 error is not occurred)	**Transformer thermo switch defect**
NG(F6-2 error is occurred)	Go to step 5

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STEP5



Inspection :

Inspect harness

Turn off the key switch, and disconnect the AC power plug and the battery plug.

Disconnect the CN68 and CN70 connectors and check the harnesses.

[Inspection procedure and standard]

Check the harness.

Disconnect the CN68 and CN70 connectors and check the inside of connector and the caulked portion of wire whether it has defect or not by visual confirm. Then check the connector for main harness side.

Refer to BEFORE TROUBLESHOOTING

*1 : It is OK to connect CN68-1 to CN68-2 through SST2 and check if there is continuity between CN70-28 and CN70-4.

Portion to be inspected	Standard:
CN68-1 to CN70-28 (Main harness side)	Continuity *1
CN68-2 to CN70- 4 (Main harness side)	Continuity *1
CN68-1 to CN68- 2 (Main harness side)	No continuity

Judgment

Result	Procedure
OK	**Display defect**
NG	**Harness defect**

STEP6

Inspection :

Check the cooling fan operation

Reconnect the AC power plug and turn on the key switch.

Apply the cooling fan compulsorily by using Active Test and check the rotary condition.

(Check the cooling fan 1 and 2)

STD
[ANL] 7 ACT (7 05)
Multi-function display
[ANL] ACTIVE TEST 2/3

FAN1 OFF → ON

Judgment

Result	Procedure
OK (Cooling fan is operated)	**No abnormality**
NG (Cooling fan is not operated)	Go to step 7

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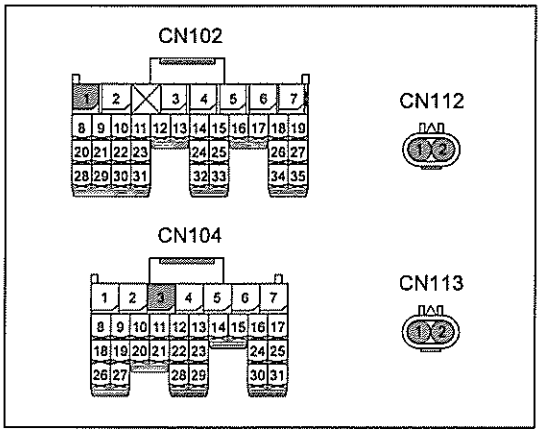
STEP7

Inspection :

Inspect harness

Turn off the key switch, and disconnect the AC power plug and the battery plug.

Disconnect the CN102, 104, 112 and CN113 connectors and check the harnesses.



[Inspection procedure and standard]

Check the harness.

Disconnect the CN102, 104, 112 and CN113 connectors and check the inside of connector and the caulked portion of wire whether it has defect or not by visual confirm. Then check the connector for main harness side.

Refer to BEFORE TROUBLESHOOTING

Portion to be inspected	Standard:
CN104-3 to CN112-1	Continuity
CN104-3 to CN113-1	Continuity
CN102-1 to CN112-2	Continuity
CN102-1 to CN113-2	Continuity
CN104-3 to CN102-1	No continuity

Judgment

Result	Procedure
OK	Go to step 8
NG	**Harness defect**

STEP8

Inspection :

Check the cooling fan operation

Turn off the key switch, and disconnect the AC power plug and the battery plug, then connect the CN102, 104, 112 and CN113 connector.

Reconnect the battery plug and turn key switch ON.

Apply the cooling fan compulsorily by using Active Test and check the rotary condition.

(Check the cooling fan 1 and 2)

STD
[ANL] 7 ACT (7 05)
Multi-function display
[ANL] ACTIVE TEST 2/3

FAN1 OFF → ON

Judgment

Result	Procedure
OK (Cooling fan is operated)	**Connector contact defect**

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Result	Procedure
NG (Cooling fan is not operated)	**Cooling fan defect** **After replacing cooling fan, if the fan is not running by applying the cooling fan compulsorily by using Active Test and, it is possible of other defect. So replace the main controller.**

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Error Code: F7-1

Failure mode: Charger start abnormality

⚠ CAUTION

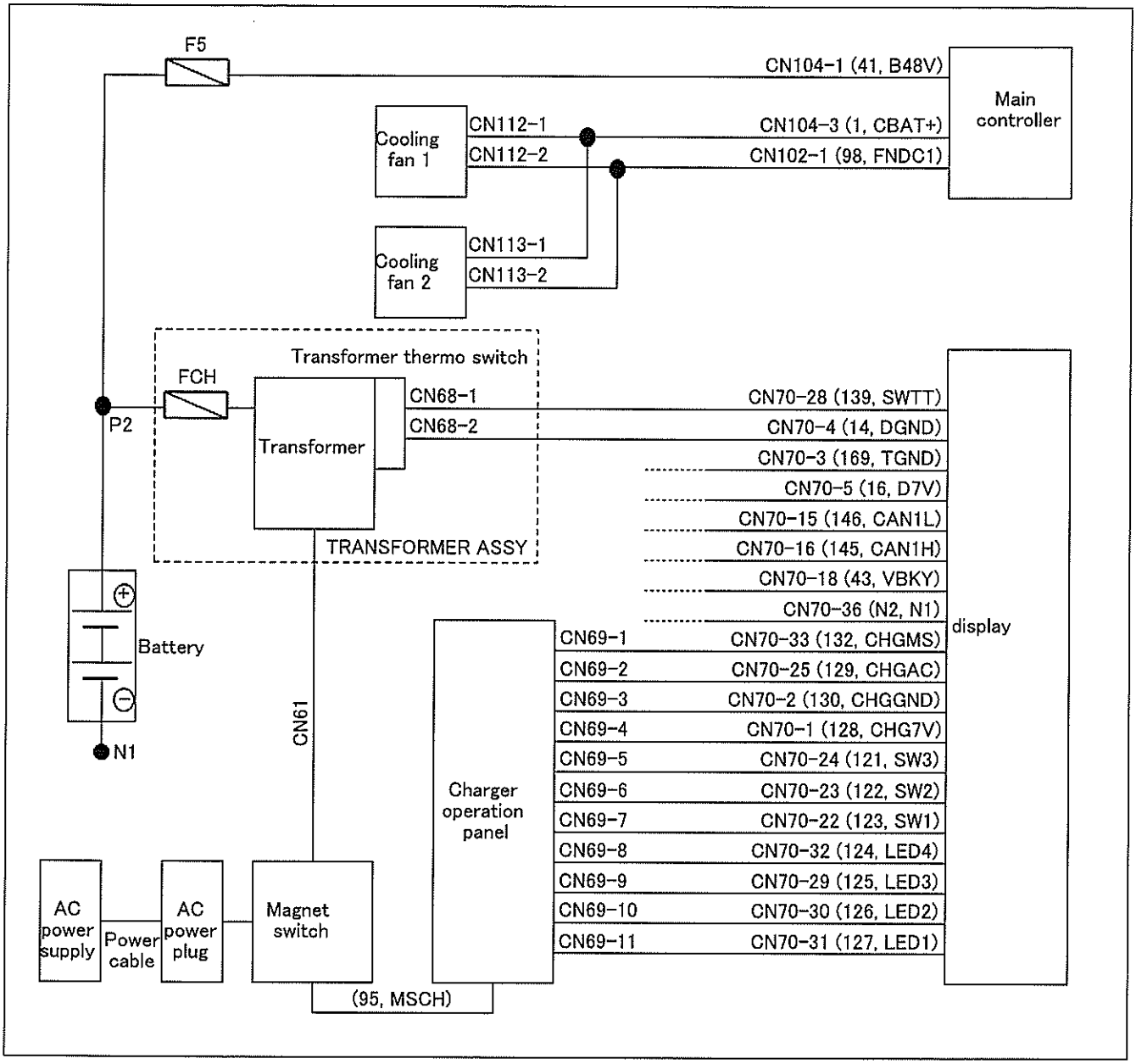
- **If F6-1 occurs at same time, perform troubleshooting for F6-1 first.**
- **Before perform troubleshooting, inspect the magnet switch and confirm thermal relay is not operated. If thermal relay is operated, perform the component (magnet switch, transformer ASSY) inspection before.**

Probable cause

- Main controller defect
- Connection defect
- Incompatible
- Tap adjustment defect
- FCH fuse defect
- Transformer ASSY defect
- Magnet switch defect
- Harness defect
- Operation panel defect
- Display defect

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Related portion



STEP1

Inspection :

Battery voltage check

STD
[ANL] 2 IO1 (2 16)
Multi-function display
[ANL] I/O TEMP/VOLT 5/6

B48V

Compare the indicated value on the display and the actual measured value (between P2 and N1).

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Judgment

Result	Procedure
OK (Displayed value is in the range of ±10% of actual measured value)	Go to step 2
NG (Displayed value is outside the range of ±10% of actual measured value)	**Main controller defect**

STEP2

Inspection :

Connection check

Turn off the key switch, and disconnect the AC power plug and the battery plug.

Check the wire connection.

[Inspection procedure and standard]

Check the wire connection.

Check if the P2 and N charger cables are correctly connected and there is no looseness.

Check if the CN69, CN70 and CN61 connectors are correctly connected.

Check if there is no loose connection at the battery plug and the AC power plug. (Also check if terminal is in good condition and there is no heat generation at the time of power distribution)

Check if there is no damage on the power cable.

Judgment

Result	Procedure
OK	Go to step 3
NG	**Connection defect**

STEP3

Inspection :

Check the power distribution of the transformer ASSY

Turn off the key switch, and connect the battery plug and the AC power plug.

Press “START” button of the charger. Check the transformer ASSY operating sound.

* After the check, press “STOP” button to stop charging.

Judgment

Result	Procedure
OK (heard)	Go to step 4
NG (Not heard)	Go to step 6

STEP4

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Inspection :

Check the compatibility of the capacity of the battery and the transformer ASSY.

(Refer to page "APPLICABLE CHARGER LIST" of Charger section)

Judgment

Result	Procedure
OK	Go to step 5
NG	**Incompatible**

STEP5

Inspection :

Tap changer check

(Refer to page "BEFORE CHARGING" of Charger section)

Judgment

Result	Procedure
OK	**Transformer ASSY defect**
NG	**Tap adjustment defect**

STEP6

Inspection :

FCH fuse check

Turn off the key switch and disconnect the battery plug and AC power plug.

Remove the FCH fuse and check.

[Inspection procedure and standard]

Check the FCH fuse.

Remove the FCH fuse and check for its continuity.

Judgment

Result	Procedure
OK (continuity)	Go to step 7
NG (No continuity)	**FCH fuse defect**

STEP7

Inspection :

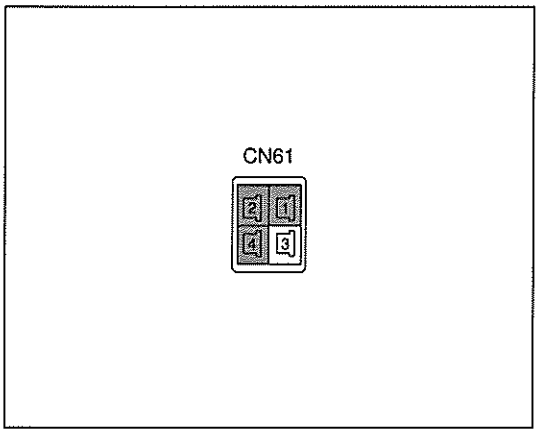
Primary voltage of transformer ASSY check

Turn off the key switch, and disconnect the AC power plug and the battery plug.

Install the FCH fuse and disconnect the CN61 connector.

Connect the AC power plug and battery plug and press “START” button to perform the check.

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[Inspection procedure and standard]

Check primary voltage of transformer ASSY

Disconnect the CN61 connector, and after connecting the AC power plug and pressing "START" button, perform for the connector of charger panel side.

Portion to be inspected	Standard:
CN61-1(U) to CN61-2(V) (REC side)	AC191 to 220 V
CN61-2(V) to CN61-4(W) (REC side)	AC191 to 220 V
CN61-4(W) to CN61-1(U) (REC side)	AC191 to 220 V

Judgment

Result	Procedure
OK	**Transformer ASSY defect**
NG	Go to step 8

STEP8

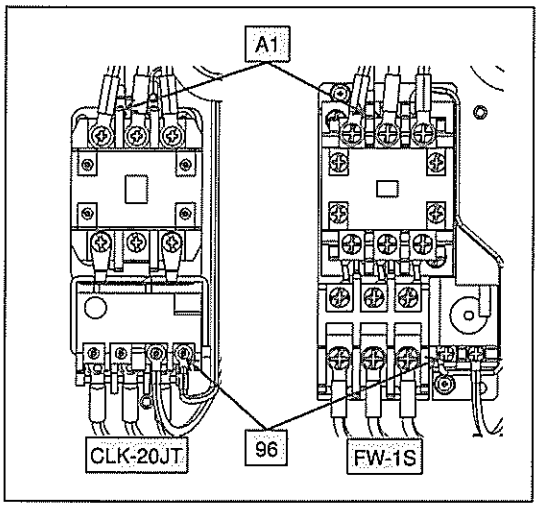
Inspection :

Magnetic switch voltage check

Turn off the key switch, and disconnect the AC power plug and the battery plug.

Disconnect the CN61 connector.

Connect the AC power plug and battery plug and press "START" button to perform the check.



[Inspection procedure and standard]

Check voltage of magnet switch

Disconnect the CN61 connector, connect the AC power plug and press "START" button.

Portion to be inspected	Operation	Standard:
A1 to 96 terminal	press "START" button	AC191 to 220 V
A1 to 96 terminal	Press "STOP" button	AC0V

Judgment

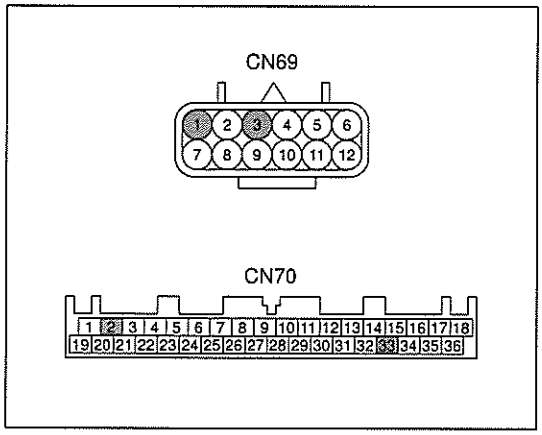
Result	Procedure
NG	Go to step 9
OK	**Magnet switch defect**

STEP9

Inspection :

Inspect harness

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Turn off the key switch, and disconnect the AC power plug and the battery plug.

Disconnect the CN61 connectors, then connect the CN69 and CN70 connectors, and inspect.

[Inspection procedure and standard]

Check the harness.

Disconnect the CN69 and CN70 connectors and check the inside of connector and the caulked portion of wire whether it has defect or not by visual confirm. Then check the connector for main harness side.

Refer to BEFORE TROUBLESHOOTING

Portion to be inspected	Standard:
CN69-1 to CN70-33	Continuity
CN69-3 to CN70-2	Continuity

Judgment

Result	Procedure
OK	**Operation panel defect** **If there is no improvement in symptom after replacing the operation panel, there might be other defected part, so replace the display.**
NG	**Harness defect**

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Error Code: F8-1

Failure mode: Charging completion abnormality (charge can not complete)

⚠ CAUTION

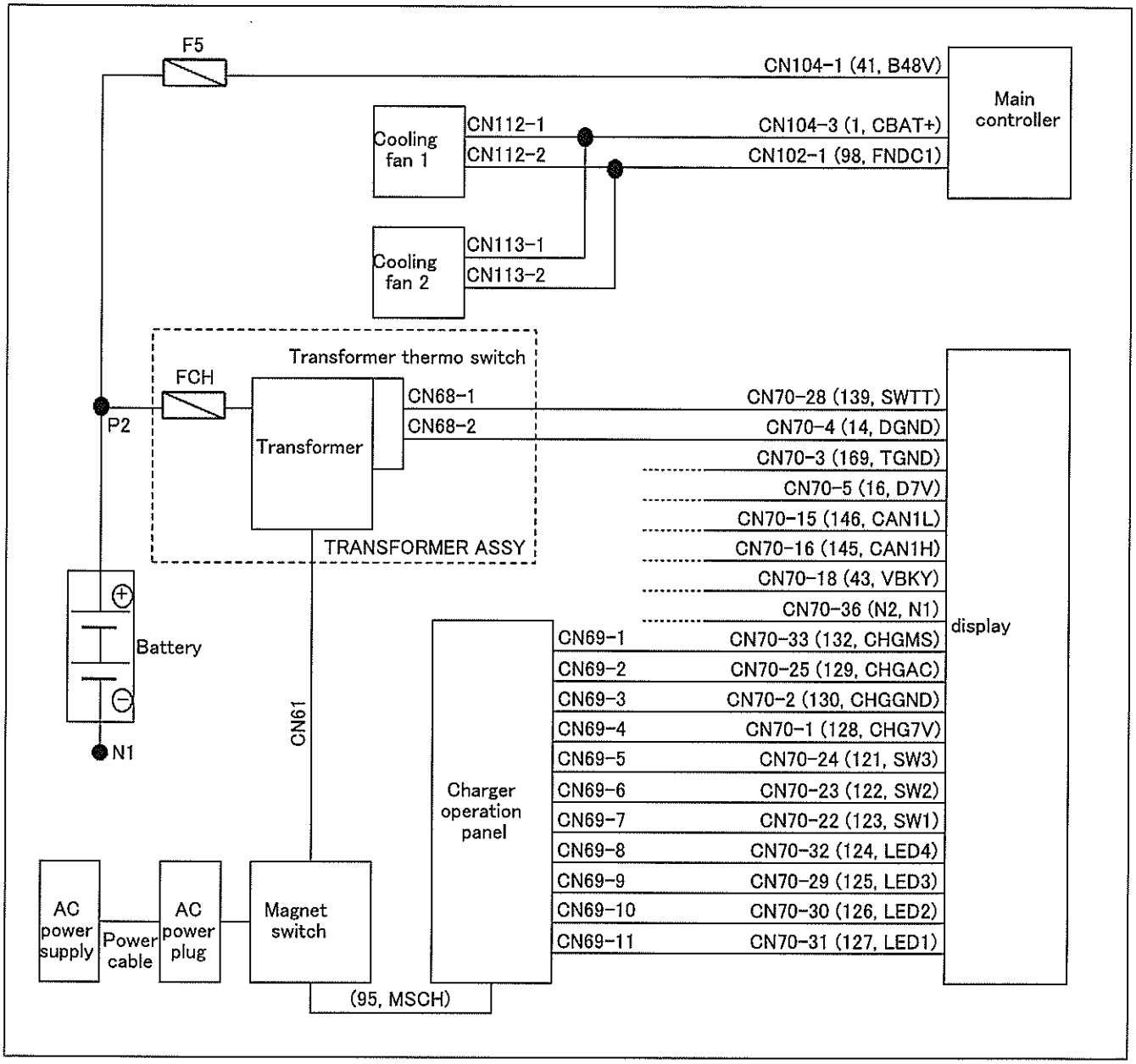
- **Turn off the breaker and stop AC220 power supply for AC power plug, then inspect.**
- **Before perform troubleshooting, inspect the magnet switch and confirm thermal relay is not operated. If thermal relay is operated, perform the component (magnet switch, transformer ASSY) inspection before.**

Probable cause

- Main controller defect
- Magnet switch defect
- Operation panel defect
- Harness defect
- Display defect

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Related portion



STEP1

Inspection :

Battery voltage check

STD
[ANL] 2 IO1 (2 16)
Multi-function display
[ANL] I/O TEMP/VOLT 5/6

B48V

Compare the indicated value on the display and the actual measured value (between P2 and N1).

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Judgment

Result	Procedure
OK (Displayed value is in the range of ±10% of actual measured value)	Go to step 2
NG (Displayed value is outside the range of ±10% of actual measured value)	**Main controller defect**

STEP2

Inspection :

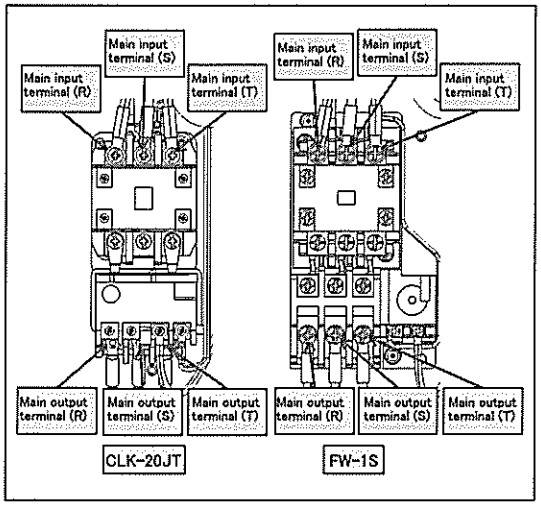
Magnet switch check

Turn off the key switch, and disconnect the AC power plug and the battery plug.

Disconnect the CN61 connectors and check the harnesses.

[Inspection procedure and standard]

Magnet switch check



Disconnect the CN61 connector and make sure that the magnet switch is turned off.

Portion to be inspected	Standard:
Main input terminal (R) to main output terminal (R)	No continuity
Main input terminal (S) to main output terminal (S)	No continuity
Main input terminal (T) to main output terminal (T)	No continuity

Judgment

Result	Procedure
OK (No continuity)	Go to step 3
NG (continuity)	**Magnet switch defect**

STEP3

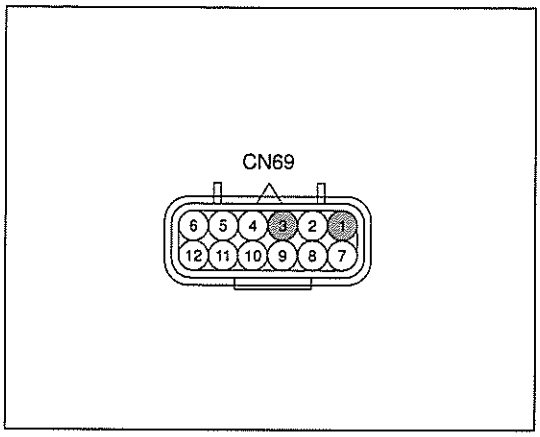
Inspection :

Operation panel check

Turn off the key switch, and disconnect the AC power plug and the battery plug.

Disconnect the CN61 connectors, then connect the CN69 connectors, and inspect.

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[Inspection procedure and standard]

Check the operation panel.

Disconnect the CN69 connectors and check the inside of connector and the caulked portion of wire whether it has defect or not by visual confirm. Then check the connector for operation panel side CN69 connector.

Refer to BEFORE TROUBLESHOOTING

Portion to be inspected	Standard:
CN69-1 to CN69-3	No continuity

Judgment

Result	Procedure
OK	Go to step 4
NG	**Operation panel defect**

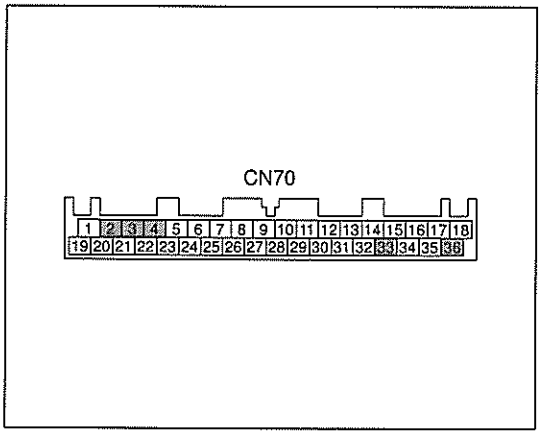
STEP4

Inspection :

Inspect harness

Turn off the key switch, and disconnect the AC power plug and the battery plug.

Disconnect the CN69 and CN70 connectors and perform the check.



[Inspection procedure and standard]

Check the harness.

Disconnect the CN69 and CN70 connectors and check the inside of connector and the caulked portion of wire whether it has defect or not by visual confirm. Then check the connector for harness side.

Refer to BEFORE TROUBLESHOOTING

Portion to be inspected	Standard:
CN70-33 to CN70-2	No continuity
CN70-33 to CN70-3	No continuity
CN70-33 to CN70-4	No continuity
CN70-33 to CN70-36	No continuity

Judgment

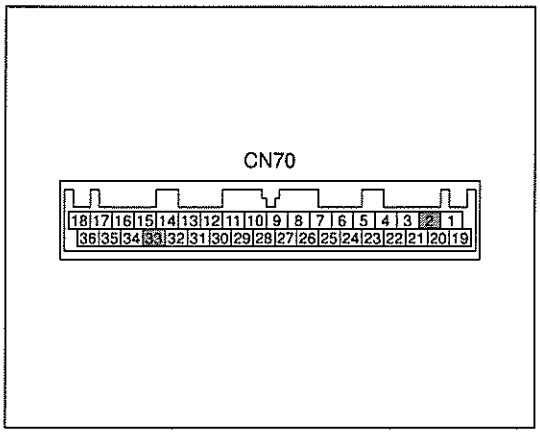
Result	Procedure
OK	Go to step 5
NG	**Harness defect**

STEP5

Inspection :

Magnet switch signal check

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Turn off the key switch, and disconnect the AC power plug and the battery plug.

Disconnect the CN69 connectors, then connect the CN70 connectors, and inspect.

[Inspection procedure and standard]

Check magnet switch signal

Disconnect the CN70 connector, and inspect the CN70 connector of display side.

Portion to be inspected	Standard:
CN70-33 to CN70-2	No continuity

Judgment

Result	Procedure
OK (No continuity)	**Operation panel defect**
NG (continuity)	**Display defect**

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Error Code: FA-1, FA-2, FA-3

Failure mode: CAN bridge controller CPU abnormality

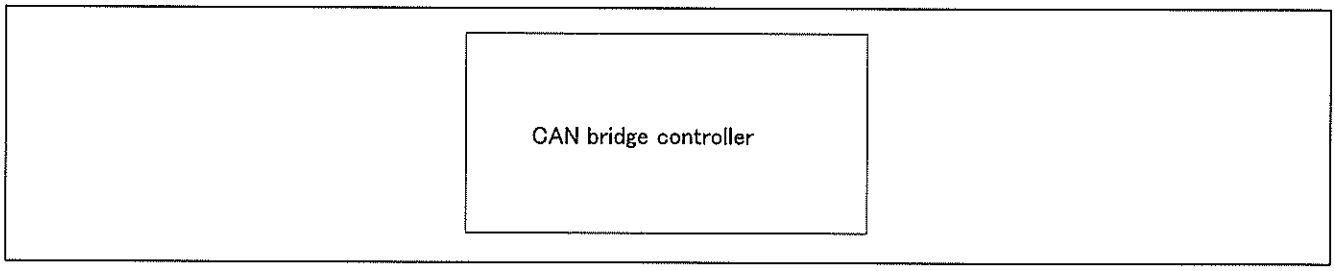
⚠ CAUTION

- **If FA-1, FA-2 or FA-3 occurs, the CAN bridge controller is defective, so replace it.**

Probable cause

- CAN bridge controller defect

Related portion



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Error Code: FB-1

Failure mode: Battery current sensor neutral voltage error

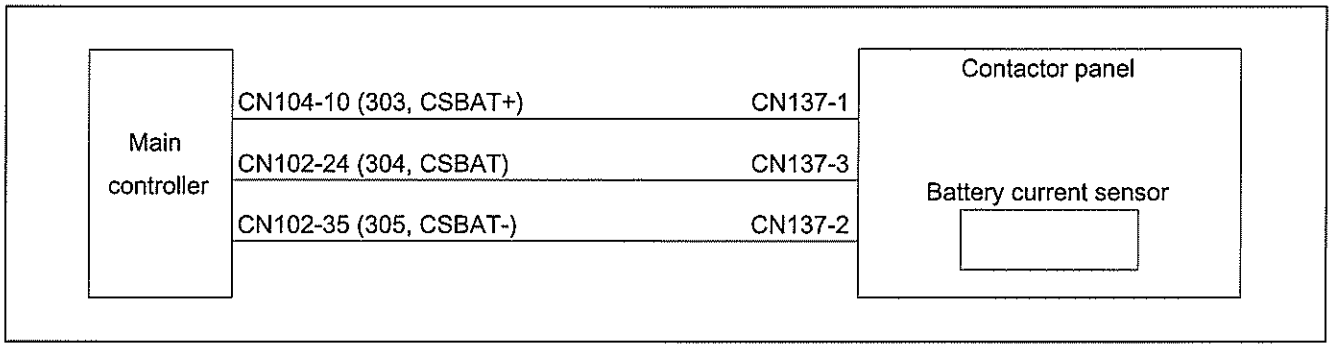
⚠ CAUTION

- **If the symptom persists after replacement of the current sensor, there should be any other problems, so replace the Main controller.**

Probable cause

- Connector contact defect
- Harness defect
- Battery current sensor defect
- Main controller defect

Related portion



STEP1

Turn off the key switch and disconnect the battery plug.

After disconnection the CN137 connector, check the inside of connector and the caulked portion of wire whether it has defect or not by visual confirm. Refer to BEFORE TROUBLESHOOTING

After connecting the connector, connect the battery plug and turn on the key switch to confirm error.

Judgment

Result	Procedure
FB-1 error occurs.	Go to step 2
FB-1 error does not occur.	**Connector contact defect**

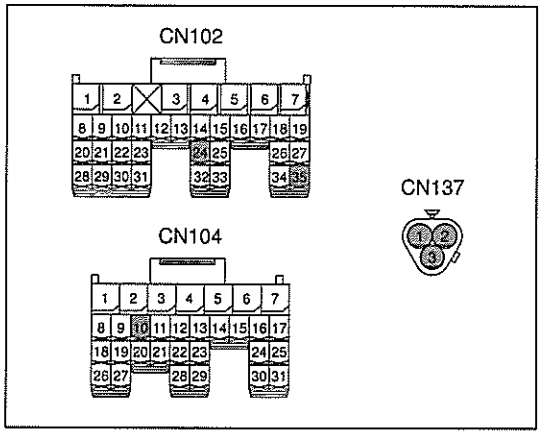
STEP2

Inspection : Harness

Turn off the key switch and disconnect the battery plug.

Disconnect the CN102, CN104 and CN137 connectors and check the harnesses.

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[Inspection procedure and standard]

Check the harness.

Perform this check with the battery plug and the CN102, CN104 and CN137 connectors disconnected, and visually check inside the connector and the caulked portion of its wire for defects. (Note : Inspect in the state of disconnecting SST)

*1 : Connect CN137-1 and CN137-3 on the harness side through SST2 and check if there is continuity between CN104-10 and CN102-24.

*2 : Connect CN137-2 and CN137-3 on the harness side through SST2 and check if there is continuity between CN102-24 and CN102-35.

Portion to be inspected	Standard:	Remarks
CN104-10(303) to CN137-1(303)	Continuity	*1
CN102-24(304) to CN137-3(304)	Continuity	*1
CN102-35(305) to CN137-2(305)	Continuity	*2
CN137-1(303) to CN137-2(305)	No continu-ity	
CN137-3(304) to CN137-1(303)	No continu-ity	
CN137-3(304) to CN137-2(305)	No continu-ity	

Judgment

Result	Procedure
OK	Go to step 3
NG	**Harness defect**

STEP3

Inspection : Battery current sensor

Turn off the key switch and disconnect the battery plug.

Disconnect the CN137 connector, connect the battery plug, and turn on the key switch.

Check the value of battery current sensor using the Analyzer menu.

STD
[ANL] 6 IO5 (6 01)
Multi-function display
[ANL] I/O OTHERS 1/1
CSBAT

Judgment

Result	Procedure
Approx. 0.00	Go to step 4
Except 0.00	**Main controller defect**

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STEP4

Inspection : Battery current sensor

Turn off the key switch and disconnect the battery plug.

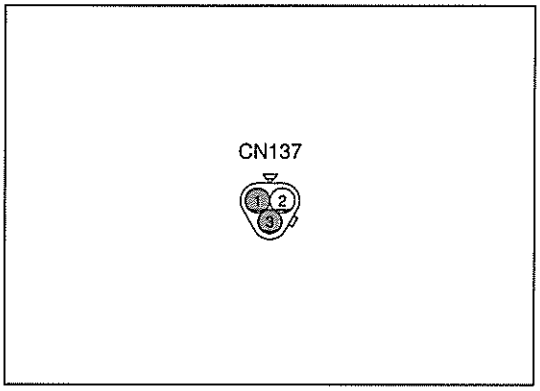
Disconnect CN137 and connect CN137-1 to CN137-3 on the harness side through SST2.

Reconnect the battery plug and turn on the key switch.

Check the value of battery current sensor using the Analyzer menu.

STD
[ANL] 6 IO5 (6 01)
Multi-function display
[ANL] I/O OTHERS 1/1

CSBAT



Judgment

Result	Procedure
Approx. 5.00	**Battery current sensor defect**
Except 5.00	**Main controller defect**

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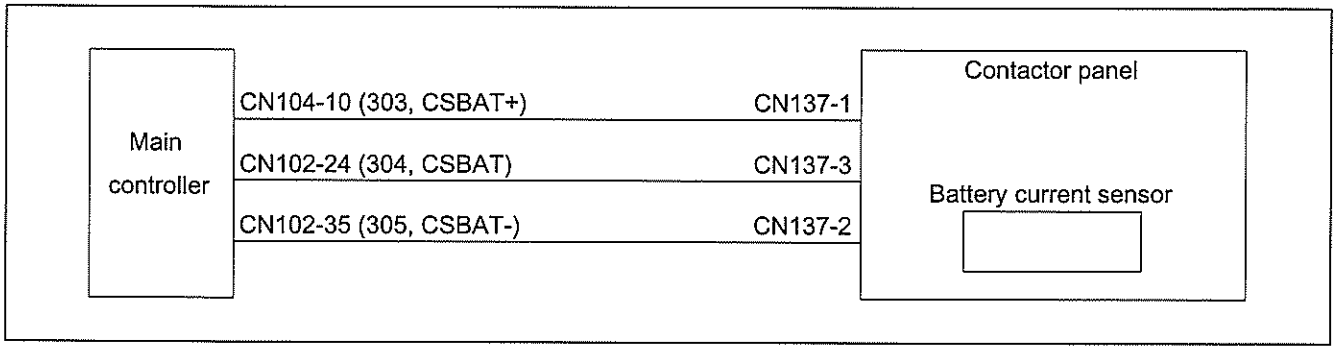
Error Code: FB-2

Failure mode: Battery current sensor overcurrent

Probable cause

- Connector contact defect
- Harness defect
- Battery current sensor defect
- Main controller defect

Related portion



STEP1

Turn off the key switch and disconnect the battery plug.

After disconnection the CN137 connector, check the inside of connector and the caulked portion of wire whether it has defect or not by visual confirm. (Refer to BEFORE TROUBLESHOOTING)

After connecting the connector, connect the battery plug and turn on the key switch to confirm error.

Judgment

Result	Procedure
FB-2 error occurs.	Go to step 2
FB-2 error does not occur.	**Connector contact defect**

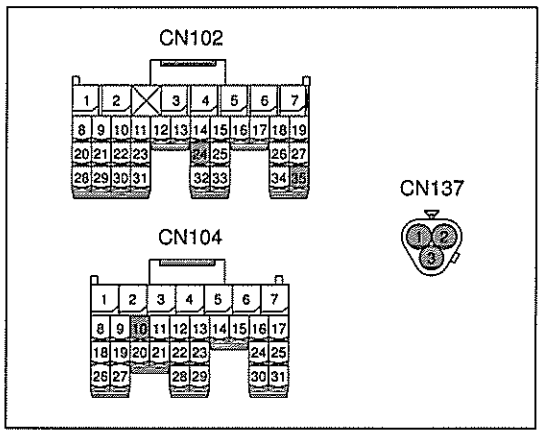
STEP2

Inspection : Harness

Turn off the key switch and disconnect the battery plug.

Disconnect the CN102, CN104 and CN137 connectors and check the harnesses.

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[Inspection procedure and standard]

Check the harness.

Perform this check with the battery plug and the CN102, CN104 and CN137 connectors disconnected, and visually check inside the connector and the caulked portion of its wire for defects. (Note : Inspect in the state of disconnecting SST)

*1 : Connect CN137-1 and CN137-3 on the harness side through SST2 and check if there is continuity between CN104-10 and CN102-24.

*2 : Connect CN137-2 and CN137-3 on the harness side through SST2 and check if there is continuity between CN102-24 and CN102-35.

Portion to be inspected	Standard:	Remarks
CN104-10(303) to CN137-1(303)	Continuity	*1
CN102-24(304) to CN137-3(304)	Continuity	*1
CN102-35(305) to CN137-2(305)	Continuity	*2
CN137-1(303) to CN137-2(305)	No continu-ity	
CN137-3(304) to CN137-1(303)	No continu-ity	
CN137-3(304) to CN137-2(305)	No continu-ity	

Judgment

Result	Procedure
OK	Go to step 3
NG	**Harness defect**

STEP3

Inspection : Battery current sensor

Turn off the key switch and disconnect the battery plug.

Disconnect the CN137 connector, connect the battery plug, and turn on the key switch.

Check the value of battery current sensor using the Analyzer menu.

STD
[ANL] 6 IO5 (6 01)
Multi-function display
[ANL] I/O OTHERS 1/1

CSBAT

Judgment

Result	Procedure
Approx. 0.00	Go to step 4
Except 0.00	**Main controller defect**

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STEP4

Inspection : Battery current sensor

Turn off the key switch and disconnect the battery plug.

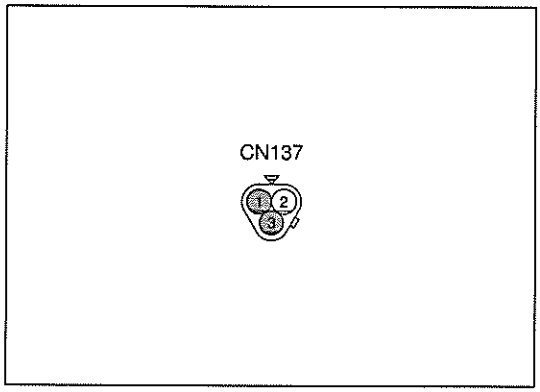
Disconnect CN137 and connect CN137-1 to CN137-3 on the harness side through SST2.

Reconnect the battery plug and turn on the key switch.

Check the value of battery current sensor using the Analyzer menu.

SST
[ANL] 6 IO5 (6 01)
Multi-function display
[ANL] I/O OTHERS 1/1

CSBAT



Judgment

Result	Procedure
Approx. 5.00	**Battery current sensor defect**
Except 5.00	**Main controller defect**

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Error Code: FC-1

Failure mode: Battery electrolyte overheating abnormality

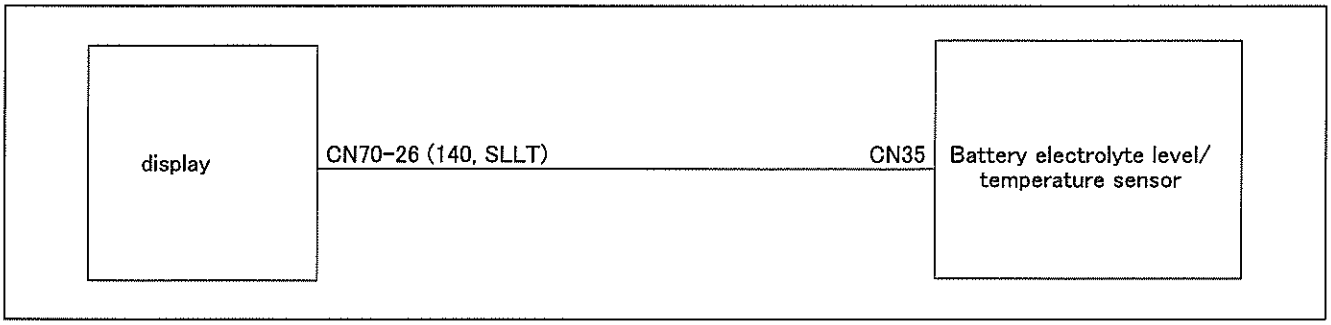
⚠ CAUTION

- **Do not leave the vehicle standing in a hot place.**

Probable cause

- The ambient temperature around the battery is high.
- Overheating (continuous overload operation)
- Battery electrolyte level/temperature sensor defect

Related portion



STEP1

Inspection :

Check the error

Turn on the key switch and check the battery overheat warning indicator of display.

Judgment

Result	Procedure
Indicator extinction	**The warning indicator turns off when the battery electrolyte temperature gets lower, and the vehicle can still be used as it is. However, the problem seems to be caused by continuous overload operation. So check how the vehicle was operated and avoid a continuous overload operation.**
Indicator displayed	Go to step 2

STEP2

Inspection :

Check the battery electrolyte temperature, and reconfirmation the error.

Confirm and record the value of battery electrolyte temperature on analyzer screen.

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STD
[ANL] 2 IO1 (2 14)
Multi-function display
[ANL] I/O TEMP/VOLT 4/6

TSLLT

After turning off the key switch and leaving the truck over 12 hours, turn on the key switch and confirm the battery overheat indicator of display.

Judgment

Result	Procedure
Indicator extinction	**The warning indicator turns off when the battery electrolyte temperature gets lower, and the vehicle can still be used as it is. However, the problem seems to be caused by continuous overload operation. So check how the vehicle was operated and avoid a continuous overload operation.**
Indicator displayed	Go to step 3

STEP3

Inspection :

Reconfirm battery electrolyte temperature

Confirm the value of battery electrolyte temperature on analyzer screen, and compare to previous recorded value.

STD
[ANL] 2 IO1 (2 14)
Multi-function display
[ANL] I/O TEMP/VOLT 4/6

TSLLT

Judgment

Result	Procedure
It has not lowered by 5°C or more.	**Proceed to identify the cause of F5-3 and F5-4.**
It has lowered by 5°C or more.	Go to step 2

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Error Code: FF-1

Failure mode: Power supply circuit for display over current

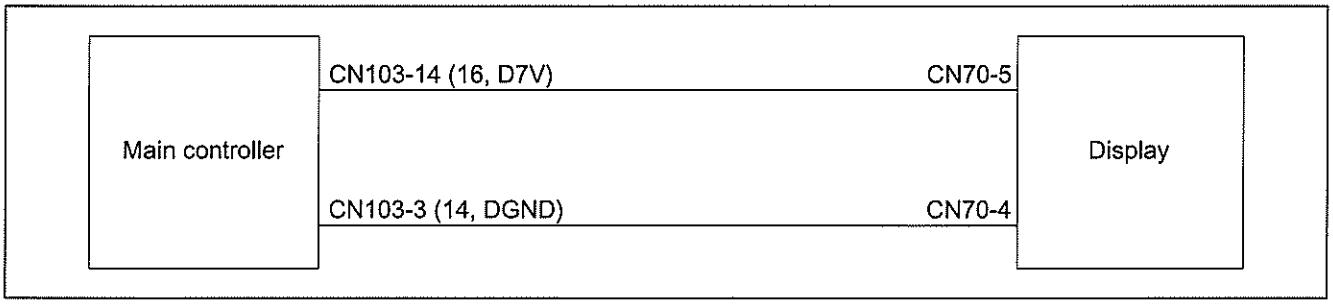
⚠ CAUTION

- **When FF-1 error occurs, error codes can't be checked on the display. Perform inspection and repair while conducting troubleshooting at where no error is detected.**

Probable cause

- Connector contact defect
- Display defect
- Harness defect
- Main controller defect

Related portion



STEP1

Turn off the key switch and disconnect the battery plug. Check the inside of connector CN103, CN70 and the caulked portion of wire whether it has defect or not by visual confirm. (Refer to BEFORE TROUBLESHOOTING)

After connecting the connector, connect the battery plug and turn on the key switch to confirm the display.

Judgment

Result	Procedure
Screen is displayed and FF-1 error does not occur.	**Connector contact defect**
Screen isn't displayed.	Go to step 2

STEP2

Perform inspection and repair while conducting troubleshooting at when no error code is displayed.

Troubleshooting at WHEN NO ERROR CODE IS DISPLAYED.

[Classification of Control], errors related to power source and [Phenomenon occurs on vehicle] are not indicated on the display while the vehicle runs.

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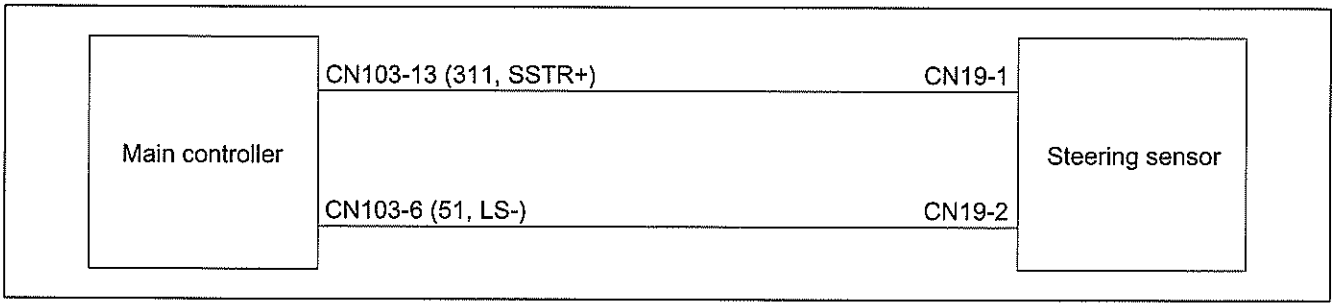
Error Code: FF-2

Failure mode: Steering sensor power-supply circuit over current

Probable cause

- Connector contact defect
- Steering sensor defect
- Harness defect
- Main controller defect

Related portion



STEP1

Disconnect the battery plug, and visually check inside the connector CN19 and the caulked portion of its wire for defects. (Refer to BEFORE TROUBLESHOOTING)

After connecting the connector, connect the battery plug and turn on the key switch to confirm the display.

Judgment

Result	Procedure
FF-2 error occurs.	Go to step 2
FF-2 error does not occur.	**Connector contact defect**

STEP2

Inspection :

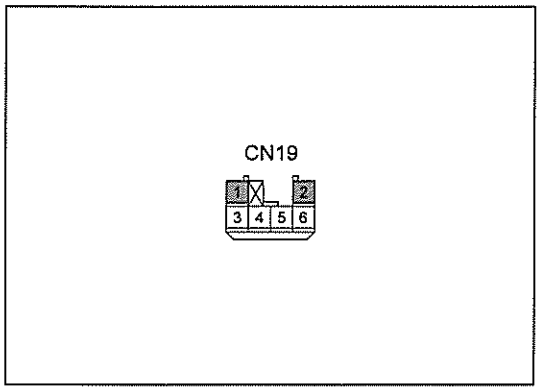
Steering sensor power supply inspection.

Turn off the key switch and disconnect the battery plug.

Disconnect the CN19 connector, connect the battery plug, and turn on the key switch.

Measure the votage between the CN19-1 and CN19-2 connectors on the harness side.

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[Inspection procedure and standard]

Inspect the steering sensor power supply.

Turn off the key switch and disconnect the battery plug, disconnect the CN19 connector, visually check each terminal and the caulked portion and coating of each cable for defects. (Refer to BEFORE TROUBLESHOOTING)

Portion to be inspected	Standard:
CN19-1 (311) to CN19-2 (51)	Approx. 15V

Judgment

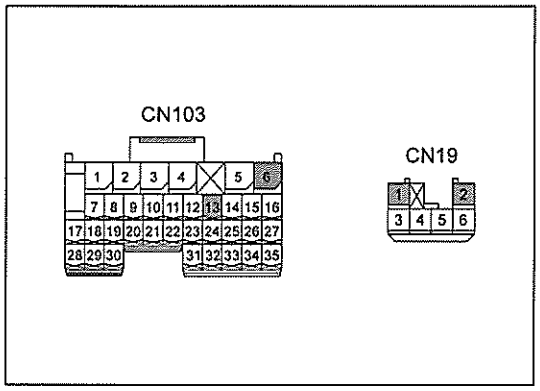
Result	Procedure
NG	Go to step 3
OK	**Steering sensor defect**

STEP3

Inspection : Harness

Turn off the key switch and disconnect the battery plug.

Disconnect the CN19 and CN103 connectors and check the harnesses.



[Inspection procedure and standard]

Inspect for continuity and short circuiting of the harness.

Perform this check with the battery plug and the CN19 and CN103 connectors disconnected, and visually check inside the connector and the caulked portion of its wire for defects.

Refer to BEFORE TROUBLESHOOTING

Portion to be inspected	Standard:
CN103-13(311) to CN19-1(311)	Continuity
CN103-6(51) to CN19-2(51)	Continuity
CN19-1 (311) to CN19-2 (51)	No continuity

Judgment

Result	Procedure
OK	**Main controller defect**
NG	**Harness defect**

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Error Code: 32-1

Failure mode: Drive motor driver LH : controller ID abnormality

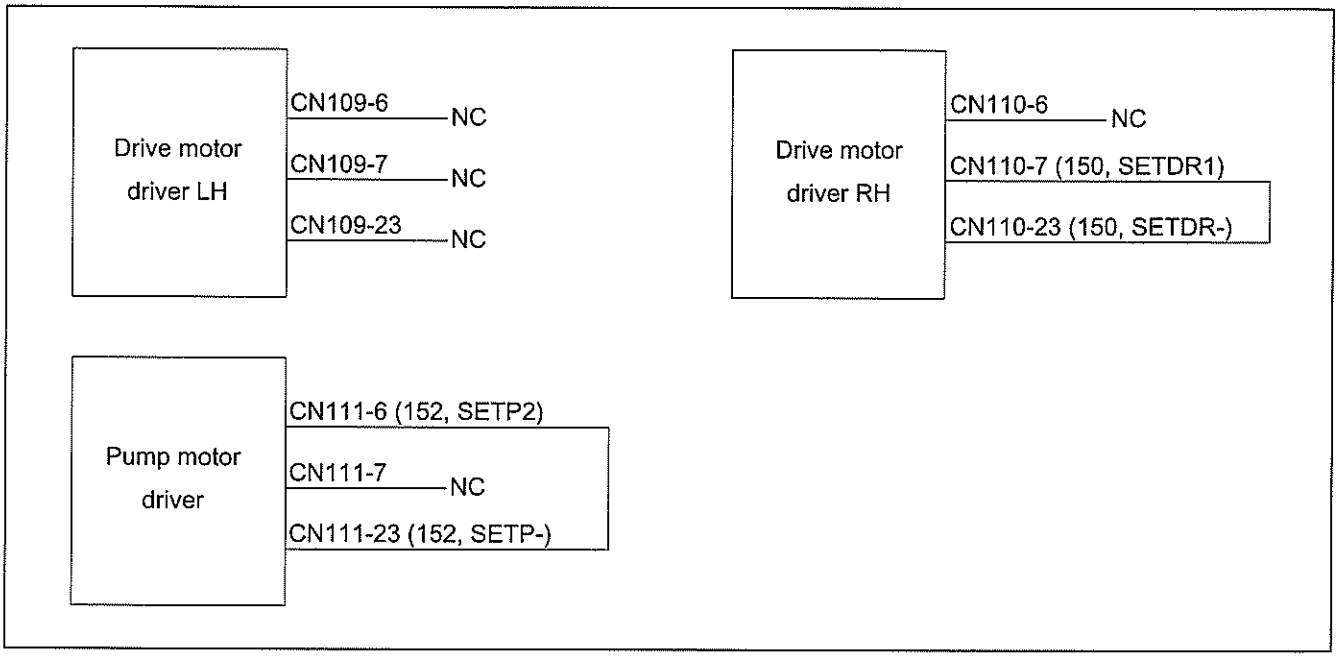
⚠ CAUTION

- **When a driver as using a pump motor driver or drive motor driver RH is installed as derive motor driver LH on the vehicle, the 32-1 error always occurs. But it is not abnormality.**
- **If AD-3, AD-4 or AD-5 AD-6 occurs, perform troubleshooting for that first.**

Probable cause

- Connector contact defect
- Drive motor driver LH defect

Related portion



STEP1

Connector contact inspection :

Turn off the key switch and disconnect the battery plug.

After disconnection the CN109, CN110, CN111 connector, check the inside of connector and the caulked portion of wire whether it has defect or not by visual confirm. (Refer to BEFORE TROUBLESHOOTING)

Connect the CN109, CN110, CN111 connector, connect the battery plug.

Turn on the key switch to see if an error occurs.

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Judgment

Result	Procedure
32-1 error occurs.	**Drive motor driver LH defect**
32-1 error does not occur.	**Connector contact defect**

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Error Code: 32-2

Failure mode: Drive motor driver (RH) : controller ID abnormality

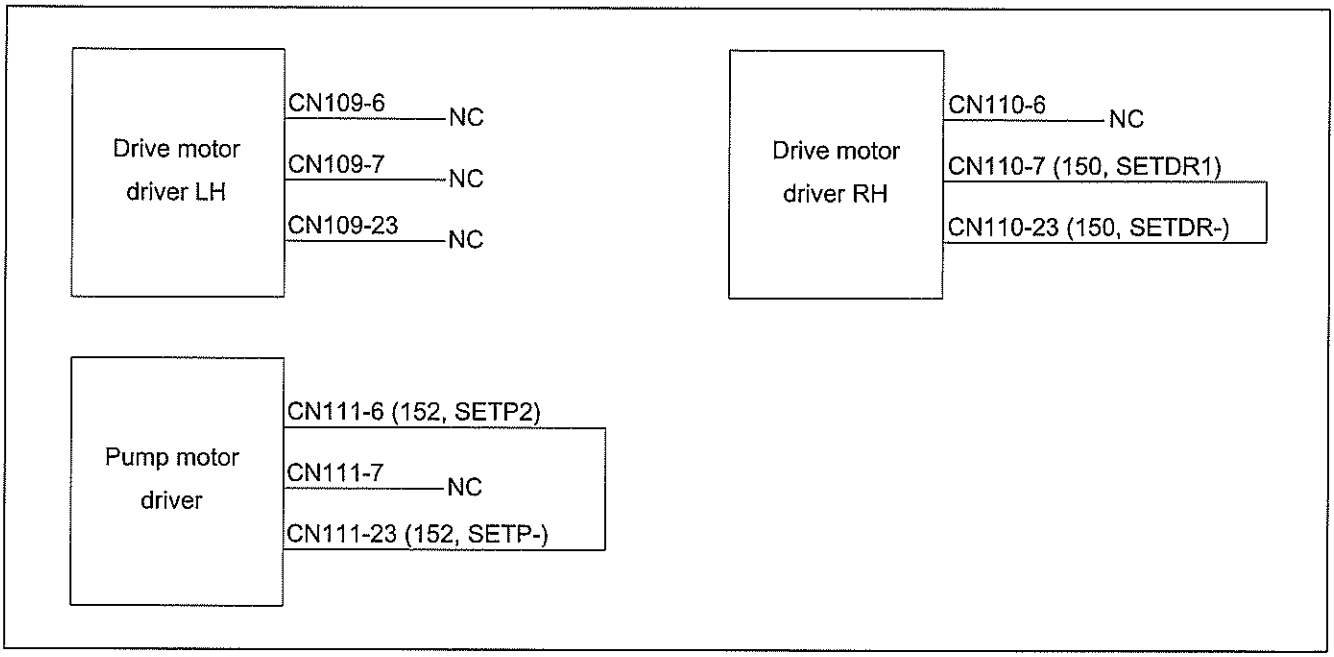
⚠ CAUTION

- **When a new motor driver or a driver as using a pump motor driver or drive motor driver LH is installed as derive motor driver RH on the vehicle, the 32-2 error always occurs. But it is not abnormality.**
- **If AD-1, AD-2 or AD-5, AD-6 occurs, perform troubleshooting for that first.**

Probable cause

- Connector contact defect
- Drive motor driver RH defect

Related portion



STEP1

Connector contact inspection :

Turn off the key switch and disconnect the battery plug.

After disconnection the CN109, CN110, CN111 connector, check the inside of connector and the caulked portion of wire whether it has defect or not by visual confirm. (Refer to BEFORE TROUBLESHOOTING)

Connect the CN109, CN110, CN111 connector, connect the battery plug.

Turn on the key switch to see if an error occurs.

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Judgment

Result	Procedure
32-2 error occurs.	**Drive motor driver RH defect**
32-2 error does not occur.	**Connector contact defect**

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Error Code: 32-3

Failure mode: Pump motor driver : controller ID abnormality

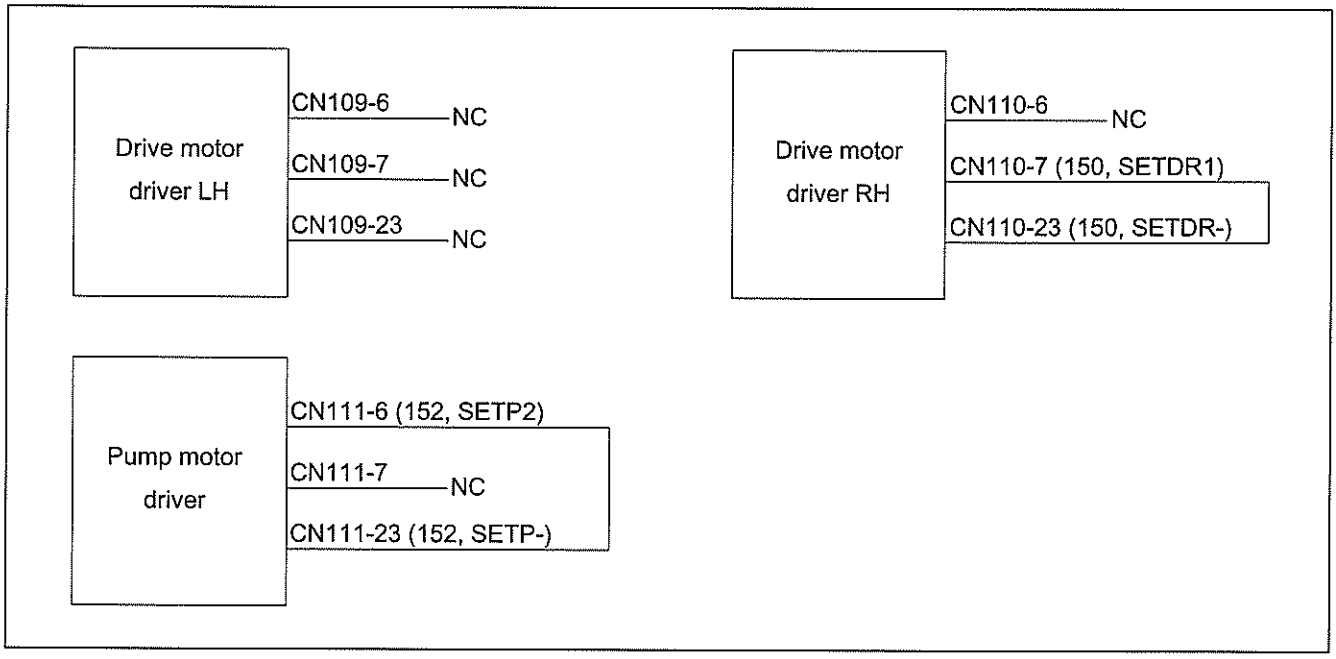
⚠ CAUTION

- **When a new motor driver or a driver as using drive motor driver LH or RH is installed as pump motor driver on the vehicle, the 32-1 error always occurs. But it is not abnormality.**
- **If AD-1, AD-2 or AD-3, AD-4 occurs, perform troubleshooting for that first.**

Probable cause

- Connector contact defect
- Pump motor driver defect

Related portion



STEP1

Connector contact inspection :

Turn off the key switch and disconnect the battery plug.

After disconnection the CN109, CN110, CN111 connector, check the inside of connector and the caulked portion of wire whether it has defect or not by visual confirm. (Refer to BEFORE TROUBLESHOOTING)

Connect the CN109, CN110, CN111 connector, connect the battery plug.

Turn on the key switch to see if an error occurs.

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Judgment

Result	Procedure
32-3 error occurs.	**Pump motor driver defect**
32-3 error does not occur.	**Connector contact defect**

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Error Code: 33-1

Failure mode: Main controller to Drive motor driver LH : communication abnormality

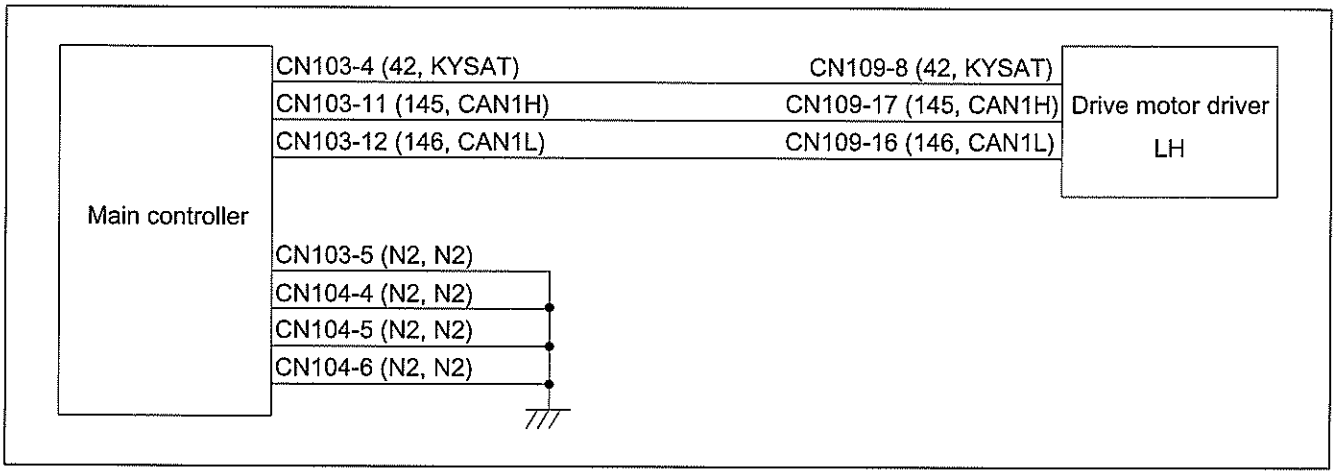
⚠ CAUTION

- **If AD-1 or AD-2 occurs, perform troubleshooting for AD-1 or AD-2 first.**

Probable cause

- Connector contact defect
- Harness defect
- Drive motor driver LH defect
- Main controller defect

Related portion



STEP1

Connector contact inspection :

Turn off the key switch and disconnect the battery plug.

After disconnection the CN103, CN104 and CN109 connector, check the inside of connector and the caulked portion of wire whether it has defect or not by visual confirm. (Refer to BEFORE TROUBLESHOOTING)

Connect the CN103, CN104 and CN109 connector, connect the battery plug.

Turn on the key switch to see if an error occurs.

Especially if the drive motor driver LH has just been replaced, check if the connector is connected correctly.

Judgment

Result	Procedure
33-1 error occurs.	Go to step 2
33-1 error does not occur.	**Connector contact defect**

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STEP2

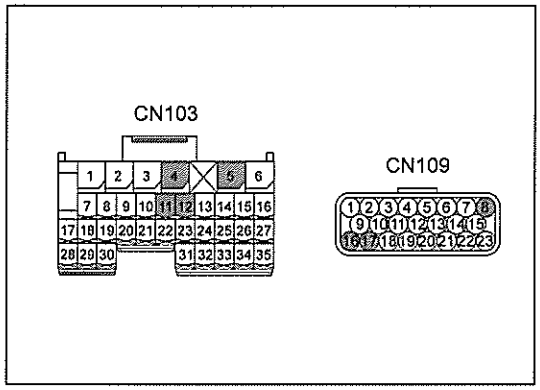
Inspection : Harness

Turn off the key switch and disconnect the battery plug.

Disconnect the CN103, CN104 and CN109 connectors and check the harnesses for their continuities.

[Inspection procedure and standard]

Inspect for continuity of the harness.



Perform this check with the battery plug and the CN103, CN104, CN109 connectors disconnected, and visually check inside the connector and the caulked portion of its wire for defects.

Refer to BEFORE TROUBLESHOOTING

Portion to be inspected	Standard:
CN103-4 (42) to CN109-8 (42)	Continuity
CN103-11(145) to CN109-17(145)	Continuity
CN103-12(146) to CN109-16(146)	Continuity
CN109-8(42) to CN109-17(145)	No continuity
CN109-8(42) to CN109-16(146)	No continuity
CN109-17(145) to CN109-16(146)	No continuity
CN103-4(42) to CN103-5(N2)	No continuity
CN103-11(145) to CN103-5(N2)	No continuity
CN103-12(146) to CN103-5(N2)	No continuity

Judgment

Result	Procedure
OK	Go to step 3
NG	**Harness defect**

STEP3

Inspection : Motor driver

Replace the drive motor driver LH with the pump motor driver.

Connect the battery plug and turn on the key switch to confirm the error occurs.

(Ignore the error codes 32-1 and 32-3.)

Judgment

Result	Procedure
33-3 error occurs.	**Drive motor driver LH defect** **The motor driver that is drive motor driver LH before replacement is defect.**
33-1 error occurs.	**Main controller defect**

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Error Code: 33-2

Failure mode: Main controller to Drive motor driver RH : communication abnormality

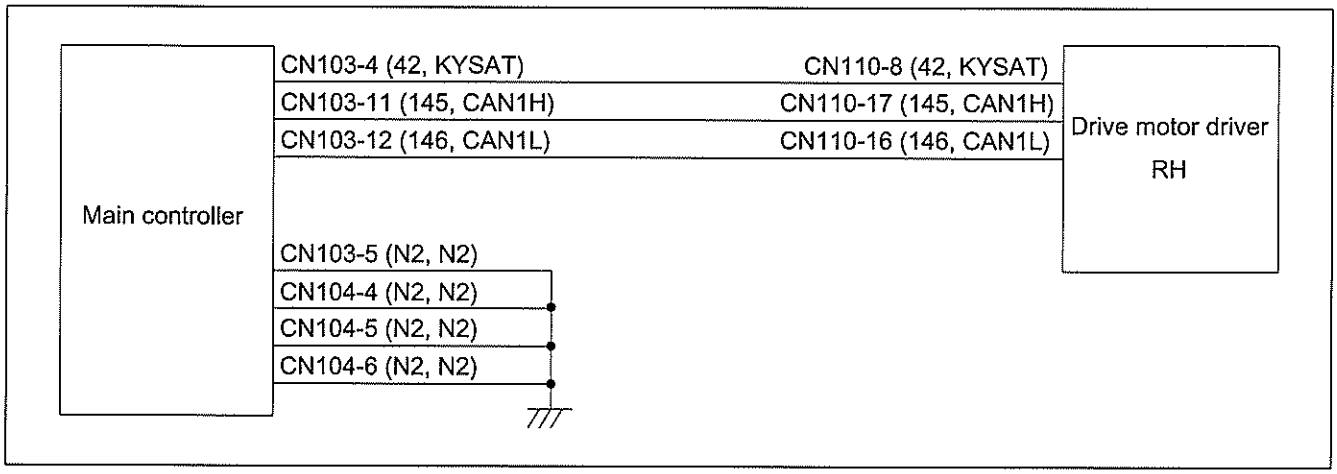
⚠ CAUTION

- **If AD-3 or AD-4 occurs, perform troubleshooting for AD-3 or AD-4 first.**

Probable cause

- Connector contact defect
- Harness defect
- Drive motor driver RH defect
- Main controller defect

Related portion



STEP1

Connector contact inspection :

Turn off the key switch and disconnect the battery plug.

After disconnection the CN103, CN104, CN110 connector, check the inside of connector and the caulked portion of wire whether it has defect or not by visual confirm. (Refer to BEFORE TROUBLESHOOTING)

Connect the CN103, CN104, CN110 connector, connect the battery plug.

Turn on the key switch to see if an error occurs.

Especially if the drive motor driver RH has just been replaced, check if the connector is connected correctly.

Judgment

Result	Procedure
33-2 error occurs.	Go to step 2
33-2 error does not occur.	**Connector contact defect**

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STEP2

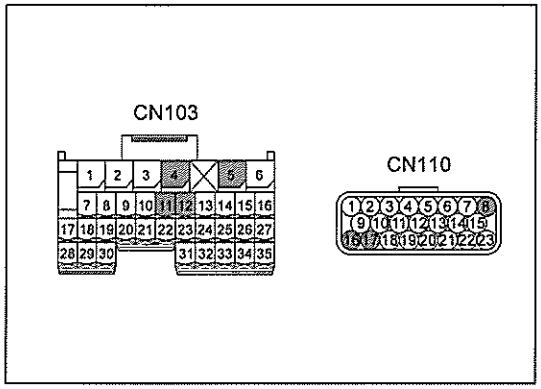
Inspection : Harness

Turn off the key switch and disconnect the battery plug.

Disconnect the CN103, CN104 and CN110 connectors and check the harnesses for their continuities.

[Inspection procedure and standard]

Inspect for continuity of the harness.



Perform this check with the battery plug and the CN103, CN104, CN110 connectors disconnected, and visually check inside the connector and the caulked portion of its wire for defects.

Refer to BEFORE TROUBLESHOOTING

Portion to be inspected	Standard:
CN103-4 (42) to CN110-8 (42)	Continuity
CN103-11(145) to CN110-17(145)	Continuity
CN103-12(146) to CN110-16(146)	Continuity
CN110-8(42) to CN110-17(145)	No continuity
CN110-8(42) to CN110-16(146)	No continuity
CN110-17(145) to CN110-16(146)	No continuity
CN103-4(42) to CN103-5(N2)	No continuity
CN103-11(145) to CN103-5(N2)	No continuity
CN103-12(146) to CN103-5(N2)	No continuity

Judgment

Result	Procedure
OK	Go to step 3
NG	**Harness defect**

STEP3

Inspection : Motor driver

Replace the drive motor driver RH with the pump motor driver.

Connect the battery plug and turn on the key switch to confirm the error occurs.

(Ignore the error codes 32-2 and 32-3.)

Judgment

Result	Procedure
33-3 error occurs.	**Drive motor driver RH defect** **The motor driver that is drive motor driver RH before replacement is defect.**
33-2 error occurs.	**Main controller defect**

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Error Code: 33-3

Failure mode: Main controller to Pump motor driver : communication abnormality

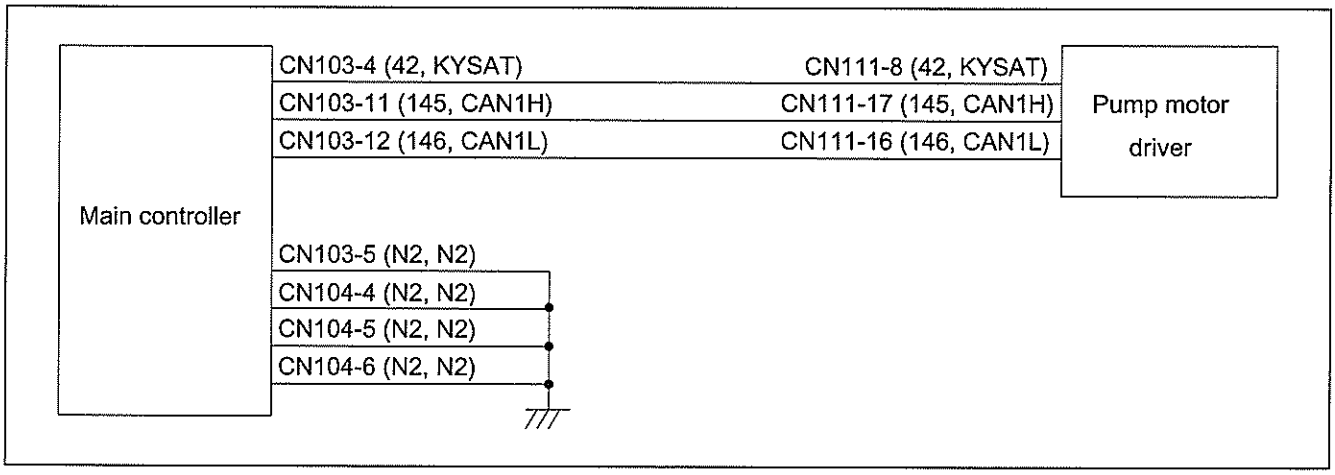
⚠ CAUTION

- **If AD-5 or AD-6 occurs, perform troubleshooting for AD-5 or AD-6 first.**

Probable cause

- Connector contact defect
- Harness defect
- Pump motor driver defect
- Main controller defect

Related portion



STEP1

Connector contact inspection :

Turn off the key switch and disconnect the battery plug.

After disconnection the CN103, CN104, CN111 connector, check the inside of connector and the caulked portion of wire whether it has defect or not by visual confirm. (Refer to BEFORE TROUBLESHOOTING)

Connect the CN103, CN104, CN111 connector, connect the battery plug.

Turn on the key switch to see if an error occurs.

Especially if the pump motor driver has just been replaced, check if the connector is connected correctly.

Judgment

Result	Procedure
33-3 error occurs.	Go to step 2
33-3 error does not occur.	**Connector contact defect**

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STEP2

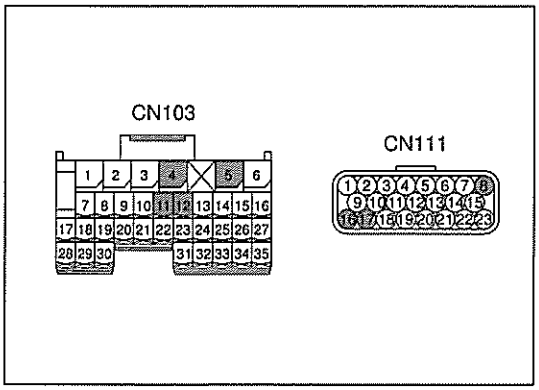
Inspect harness :

Turn off the key switch and disconnect the battery plug.

Disconnect the CN103, CN104 and CN111 connectors and check the harnesses for their continuities.

[Inspection procedure and standard]

Inspect for continuity of the harness.



Perform this check with the battery plug and the CN103, CN104, CN111 connectors disconnected, and visually check inside the connector and the caulked portion of its wire for defects.

Refer to BEFORE TROUBLESHOOTING

Portion to be inspected	Standard:
CN103-4 (42) to CN111-8 (42)	Continuity
CN103-11(145) to CN111-17(145)	Continuity
CN103-12(146) to CN111-16(146)	Continuity
CN111-8(42) to CN111-17(145)	No continuity
CN111-8(42) to CN111-16(146)	No continuity
CN111-17(145) to CN111-16(146)	No continuity
CN103-4(42) to CN103-5(N2)	No continuity
CN103-11(145) to CN103-5(N2)	No continuity
CN103-12(146) to CN103-5(N2)	No continuity

Judgment

Result	Procedure
OK	Go to step 3
NG	**Harness defect**

STEP3

Inspection : Motor driver

Replace the drive motor driver LH with the pump motor driver.

Connect the battery plug and turn on the key switch to confirm the error occurs.

(Ignore the error codes 32-1 and 32-3.)

Judgment

Result	Procedure
33-1 error occurs.	**Pump motor driver defect** **The motor driver that is pump motor driver before replacement is defect.**
33-3 error occurs.	**Main controller defect**

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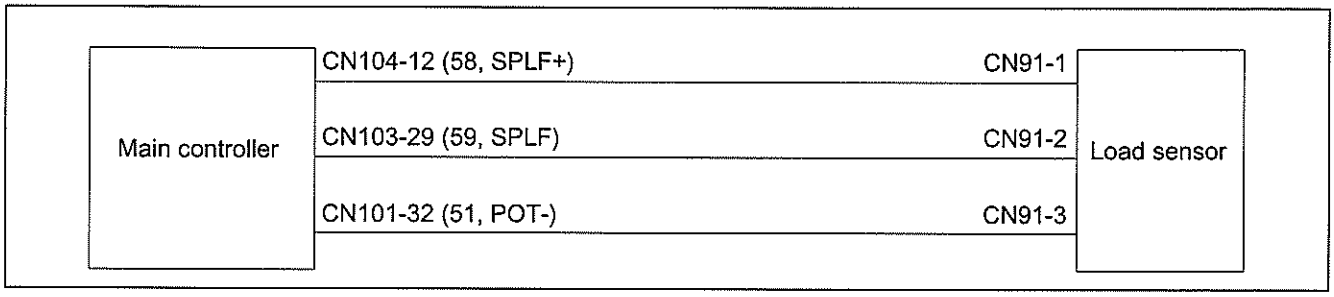
Error Code: 61-1

Failure mode: Load sensor open abnormality

Probable cause

- Connector contact defect
- Harness defect
- Load sensor defect
- Main controller defect

Related portion



STEP1

Connector contact inspection :

Turn off the key switch and disconnect the battery plug.

After disconnection the CN91 connector, check the inside of connector and the caulked portion of wire whether it has defect or not by visual confirm. (Refer to BEFORE TROUBLESHOOTING)

Connect the CN91 connector, connect the battery plug.

Turn on the key switch to see if an error occurs.

Judgment

Result	Procedure
61-1 error occurs.	Go to step 2
61-1 error does not occur.	**Connector contact defect**

STEP2

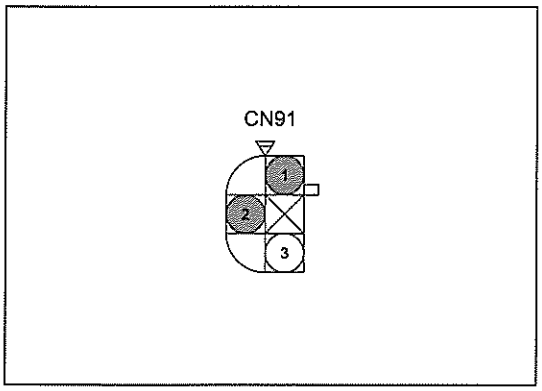
Inspection : Load sensor

Turn off the key switch and disconnect the battery plug.

Disconnect the CN91 connector and connect CN91-1 to CN91-2 on the harness side through SST (09230-13700-71).

Connect the battery plug and turn on the key switch to confirm error.

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Judgment

Result	Procedure
61-2 error occurs.	**Load sensor defect**
61-2 error does not occur.	Go to step 3

STEP3

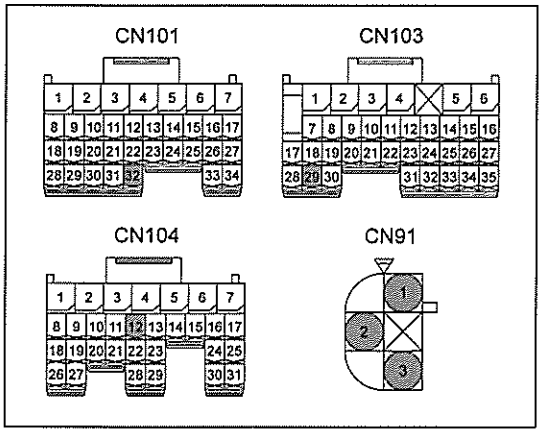
Inspection : Harness

Turn off the key switch and disconnect the battery plug.

Disconnect the CN91, CN101, CN103, CN104 connectors and check the harnesses for their continuities.

[Inspection procedure and standard]

Inspect for continuity of the harness.



Perform this check with the battery plug and the CN91, CN101, CN103, CN104 connectors disconnected, and visually check inside the connector and the caulked portion of its wire for defects.

Refer to BEFORE TROUBLESHOOTING

Portion to be inspected	Standard:
CN104-12(58) to CN91-1(58)	Continuity
CN103-29(59) to CN91-2(59)	Continuity
CN101-32(51) to CN91-3(51)	Continuity
CN91-1(58) to CN91-2(59)	No continuity
CN91-1(58) to CN91-3(51)	No continuity

Judgment

Result	Procedure
NG	**Harness defect**
OK	**Main controller defect**

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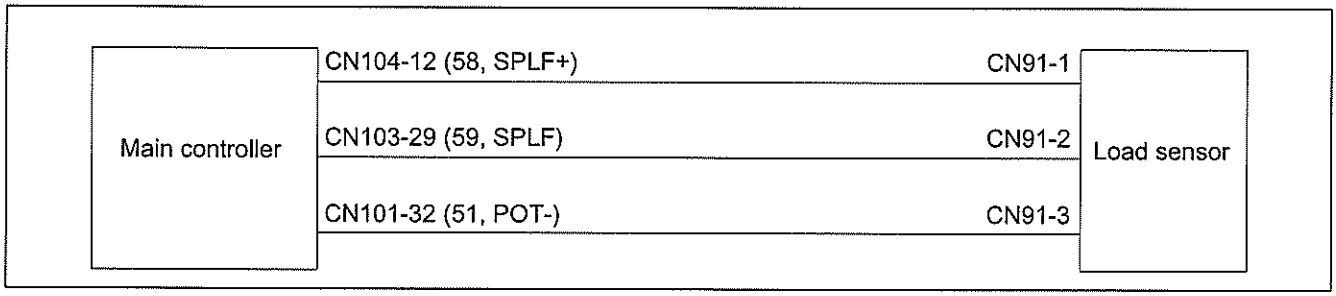
Error Code: 61-2

Failure mode: Load sensor short abnormality

Probable cause

- Connector contact defect
- Load sensor defect
- Harness defect
- Main controller defect

Related portion



STEP1

Connector contact inspection :

Turn off the key switch and disconnect the battery plug.

After disconnection the CN91 connector, check the inside of connector and the caulked portion of wire whether it has defect or not by visual confirm. (Refer to BEFORE TROUBLESHOOTING)

Connect the CN91 connector, connect the battery plug.

Turn on the key switch to see if an error occurs.

Judgment

Result	Procedure
61-2 error occurs.	Go to step 2
61-2 error does not occur.	**Connector contact defect**

STEP2

Inspection : Load sensor

Turn off the key switch and disconnect the battery plug.

Disconnect the CN91 connector.

Reconnect the battery plug and turn on the key switch.

Check if an error occurs.

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Judgment

Result	Procedure
61-1 error occurs.	**Load sensor defect**
61-1 error does not occur.	Go to step 3

STEP3

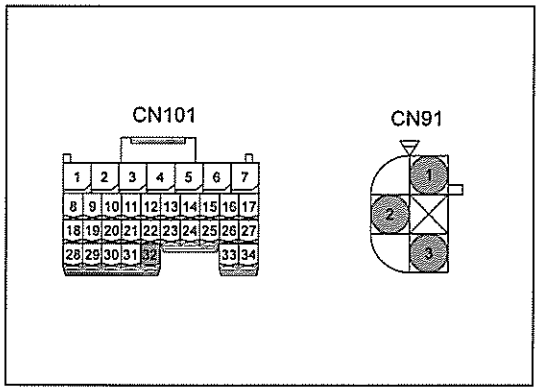
Inspection : Harness

Turn off the key switch and disconnect the battery plug.

Disconnect the CN91, CN101, CN103 and CN104 connectors and check the harnesses for their continuities.

[Inspection procedure and standard]

Inspect for continuity of the harness.



Perform this check with the battery plug and the CN91, CN101, CN103, CN104connectors disconnected, and visually check inside the connector and the caulked portion of its wire for defects.

Refer to BEFORE TROUBLESHOOTING

Portion to be inspected	Standard:
CN91-1(58) to CN91-2(59)	No continuity
CN101-32(51) to CN91-3(51)	Continuity

Judgment

Result	Procedure
NG	**Harness defect**
OK	**Main controller defect**

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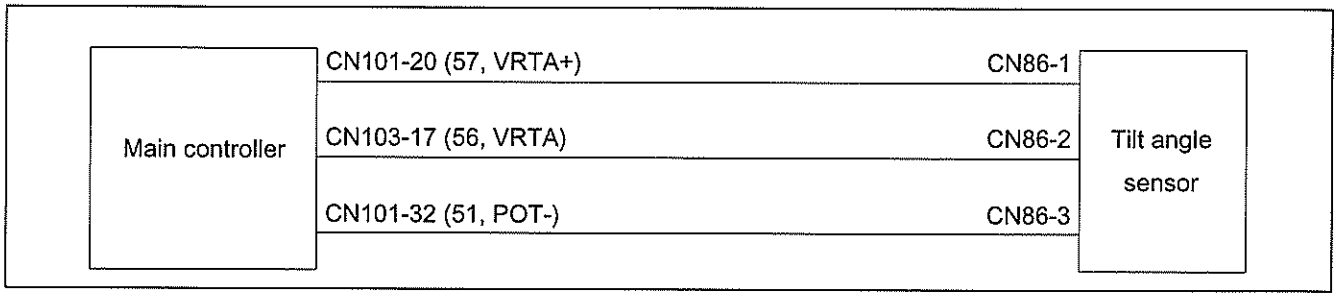
Error Code: 62-1

Failure mode: Tilt angle sensor open abnormality

Probable cause

- Connector contact defect
- Tilt angle sensor defect
- Harness defect
- Main controller defect

Related portion



STEP1

Connector contact inspection :

Turn off the key switch and disconnect the battery plug.

After disconnection the CN86 connector, check the inside of connector and the caulked portion of wire whether it has defect or not by visual confirm. (Refer to BEFORE TROUBLESHOOTING)

Connect the CN86 connector, connect the battery plug.

Turn on the key switch to see if an error occurs.

Judgment

Result	Procedure
62-1 error occurs.	Go to step 2
62-1 error does not occur.	**Connector contact defect**

STEP2

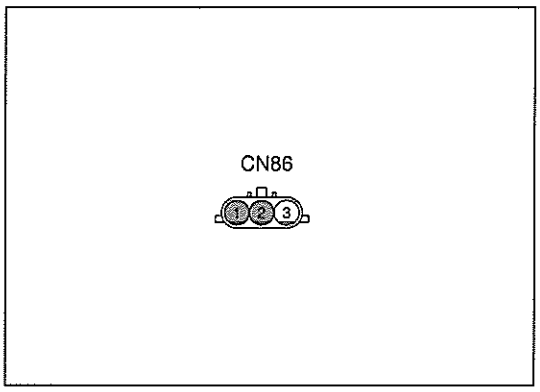
Inspection : Tilt angle sensor

Turn off the key switch and disconnect the battery plug.

Disconnect the CN86 connector and connect CN86-1 to CN86-2 on the harness side through SST2 (09232-13130-71).

Connect the battery plug and turn on the key switch to confirm error.

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Judgment

Result	Procedure
62-2 error does not occur.	Go to step 3
62-2 error occurs.	**Tilt angle sensor defect**

STEP3

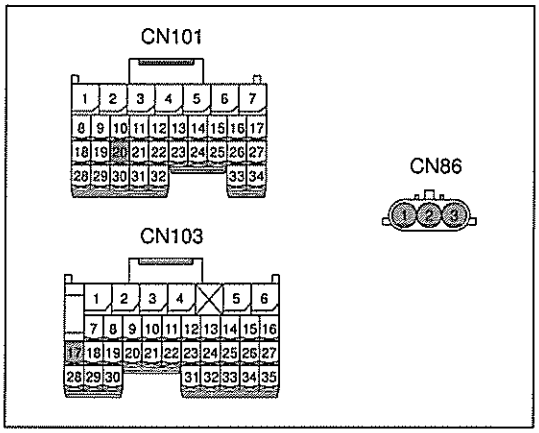
Inspection : Harness

Turn off the key switch and disconnect the battery plug.

Disconnect the CN101, CN103 connectors and check the harnesses for their continuities.

[Inspection procedure and standard]

Inspect for continuity of the harness.



Perform this check with the battery plug and the CN101, CN103 connectors disconnected, and visually check inside the connector and the caulked portion of its wire for defects.

Refer to BEFORE TROUBLESHOOTING

* : It is OK to connect CN86-1 to CN86-2 through SST2 (09232-13130-71) and check if there is continuity between CN101-20 and CN102-17.

Portion to be inspected	Standard:
CN101-20(57) to CN86-1(57) *	Continuity
CN103-17(56) to CN86-2(56) *	Continuity
CN86-3(51) to CN86-2(56)	No continuity
CN86-3(51) to CN86-1(57)	No continuity

Judgment

Result	Procedure
OK	**Main controller defect**
NG	**Harness defect**

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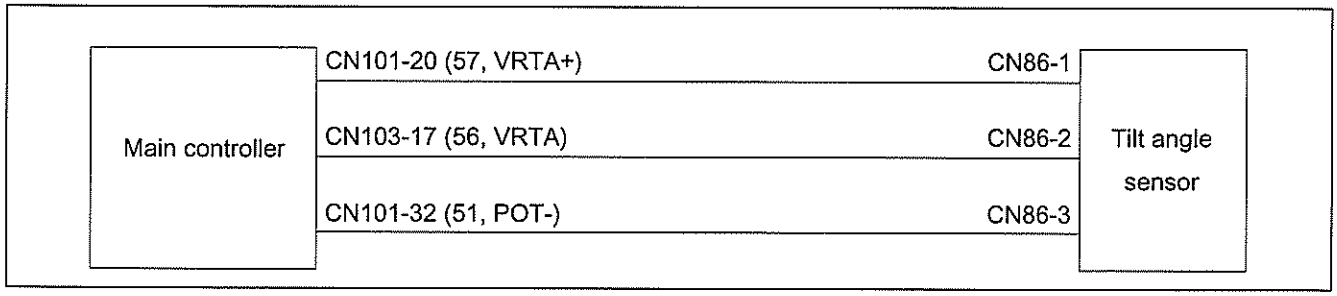
Error Code: 62-2

Failure mode: Tilt angle sensor short abnormality

Probable cause

- Connector contact defect
- Tilt angle sensor defect
- Harness defect
- Main controller defect

Related portion



STEP1

Connector contact inspection :

Turn off the key switch and disconnect the battery plug.

After disconnection the CN86 connector, check the inside of connector and the caulked portion of wire whether it has defect or not by visual confirm. (Refer to BEFORE TROUBLESHOOTING)

Connect the CN86 connector, connect the battery plug.

Turn on the key switch to see if an error occurs.

Judgment

Result	Procedure
62-2 error occurs.	Go to step 2
62-2 error does not occur.	**Connector contact defect**

STEP2

Inspection : Tilt angle sensor

Turn off the key switch and disconnect the battery plug.

Disconnect the CN86 connector.

Connect the battery plug and turn on the key switch to confirm error.

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Judgment

Result	Procedure
62-1 error does not occur.	Go to step 3
62-1 error occurs.	**Tilt angle sensor defect**

STEP3

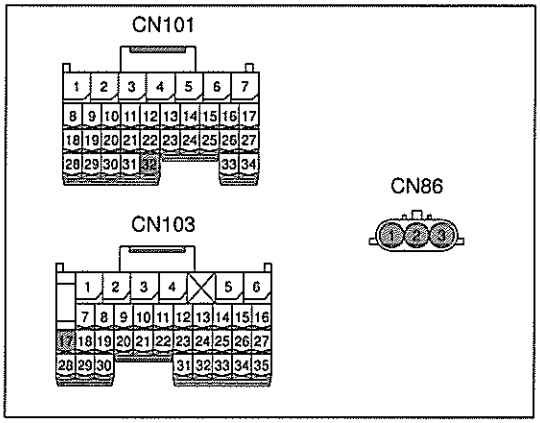
Inspection : Harness

Turn off the key switch and disconnect the battery plug.

Disconnect the CN86 and CN101 connectors and check the harnesses for their continuities.

[Inspection procedure and standard]

Inspect for continuity of the harness.



Perform this check with the battery plug and the CN86, CN101-connectors disconnected, and visually check inside the connector and the caulked portion of its wire for defects.

Refer to BEFORE TROUBLESHOOTING

* : It is OK to connect CN86-2 to CN86-3 through SST2 (09232-13130-71) and check if there is continuity between CN103-17 and CN101-32.

Portion to be inspected	Standard:
CN101-32(51) to CN86-3(51) *	Continuity
CN86-2(56) to CN86-1(57)	No continuity

Judgment

Result	Procedure
OK	**Main controller defect**
NG	**Harness defect**

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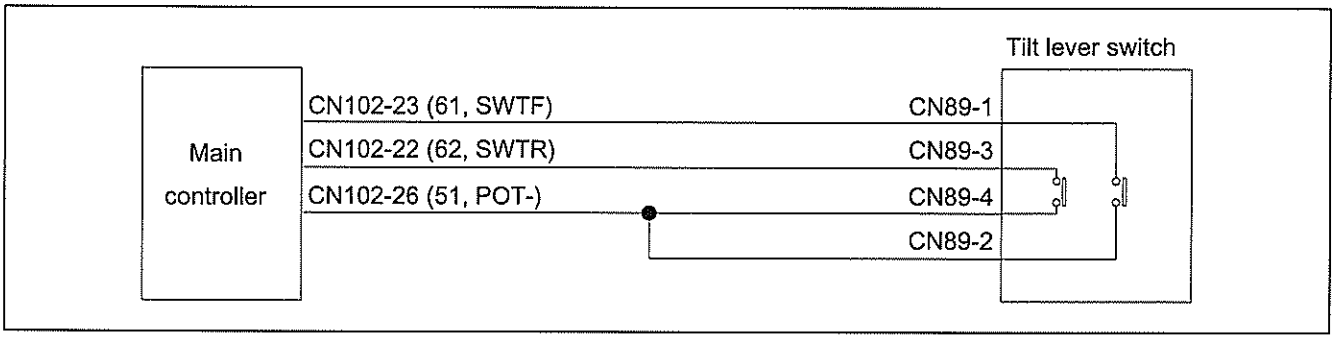
Error Code: 63-1

Failure mode: Tilt switch forward / backward tilt switch simultaneously short abnormality

Probable cause

- Tilt lever switch installation defect.
- Tilt lever switch defect
- Harness defect

Related portion



STEP1

Connector contact inspection :

Turn off the key switch and disconnect the battery plug.

After disconnection the CN89 connector, check the inside of connector and the caulked portion of wire whether it has defect or not by visual confirm. (Refer to BEFORE TROUBLESHOOTING)

Connect the CN89 connector, connect the battery plug.

Turn on the key switch to see if an error occurs.

Judgment

Result	Procedure
A6-3 error does not occur.	Go to step 2
A6-3 error occurs.	**To troubleshooting for A6-3**

STEP2

Inspection : Tilt lever switch

Operate the tilt lever in either direction to confirm 63-1 error.

Judgment

Result	Procedure
63-1 error does not occur.	**The forward and backward tilt lever switches turned ON at the same time in the past. (Check and adjustment of each switch installation)**
63-1 error occurs.	Go to step 3

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STEP3

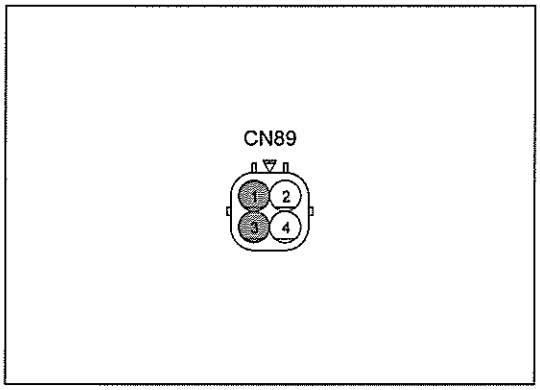
Inspection : Harness

Turn off the key switch and disconnect the battery plug.

Disconnect the CN89 and CN102 connectors and check the main harnesses for their continuities.

[Inspection procedure and standard]

Inspect for continuity and short circuiting of the harness.



Perform this check with the battery plug and the CN89 and CN102 connectors disconnected, and visually check inside the connector and the caulked portion of its wire for defects.

Refer to BEFORE TROUBLESHOOTING

Portion to be inspected	Standard:
CN89-1(61) to CN89-3(62)	No continuity

Judgment

Result	Procedure
OK	**Tilt lever switch installation defect.** **Tilt lever switch defect**
NG	**Harness defect**

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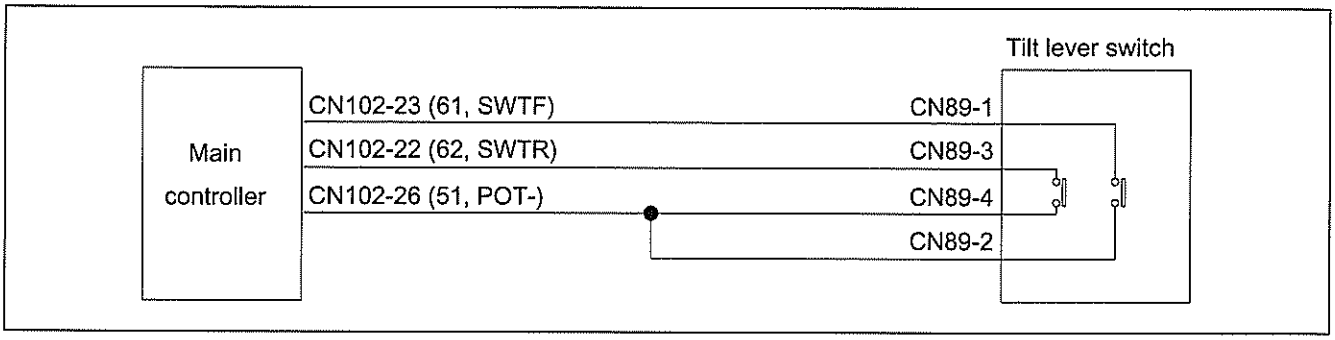
Error Code: 63-2

Failure mode: Tilt switch forward tilt switch continuously short abnormality

Probable cause

- Tilt lever switch installation defect.
- Tilt lever switch defect

Related portion



STEP1

Connector contact inspection :

Turn off the key switch and disconnect the battery plug.

After disconnection the CN89 connector, check the inside of connector and the caulked portion of wire whether it has defect or not by visual confirm. (Refer to BEFORE TROUBLESHOOTING)

Connect the CN89 connector, connect the battery plug.

Turn on the key switch to see if an error occurs.

Judgment

Result	Procedure
A6-3 error does not occur.	Go to step 2
A6-3 error occurs.	**To troubleshooting for A6-3**

STEP2

Inspection : Tilt lever switch

Check the status of the switches when the tilt lever is operated in forward direction and returned to center repetitively.

STD
[ANL] 4 IO3 (4 10)
Multi-function display
[ANL] I/O M.HANDLING 6/8

SWTF

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Judgment

Result	Procedure
"0" occurs after operation repeated many times.	**Detect the error for operating in forward direction over 2 minutes. Use as it is.**
It may be "1" occurs after operation repeated several times.	**Tilt lever switch installation defect.** **Tilt lever switch defect**

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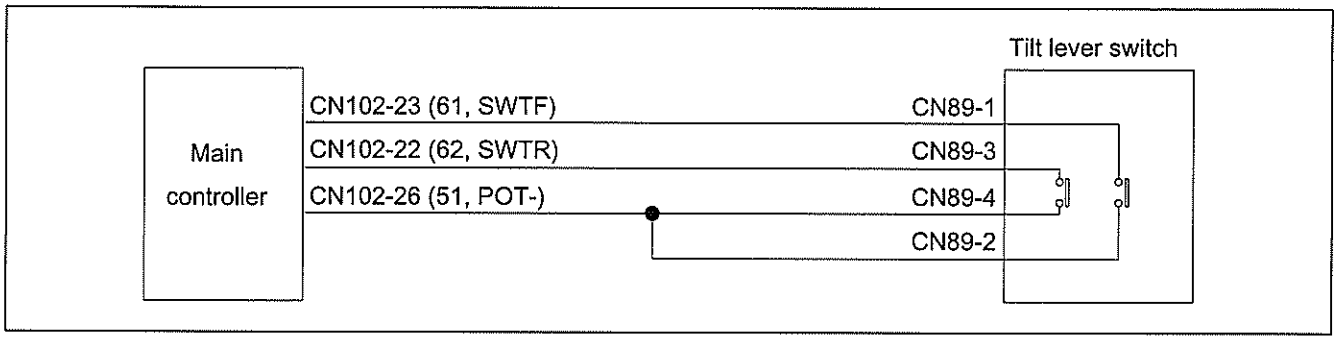
Error Code: 63-3

Failure mode: Tilt switch backward tilt switch continuously short abnormality

Probable cause

- Tilt lever switch installation defect.
- Tilt lever switch defect

Related portion



STEP1

Connector contact inspection :

Turn off the key switch and disconnect the battery plug.

After disconnection the CN89 connector, check the inside of connector and the caulked portion of wire whether it has defect or not by visual confirm. (Refer to BEFORE TROUBLESHOOTING)

Connect the CN89 connector, connect the battery plug.

Turn on the key switch to see if an error occurs.

Judgment

Result	Procedure
A6-3 error does not occur.	Go to step 2
A6-3 error occurs.	**To troubleshooting for A6-3**

STEP2

Inspection : Tilt lever switch

Check the status of the switches when the tilt lever is operated in backward direction and returned to center repetitively.

STD
[ANL] 4 IO3 (4 10)
Multi-function display
[ANL] I/O M.HANDLING 6/8

SWTR

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Judgment

Result	Procedure
"0" occurs after operation repeated several times.	**Detect the error for operating in backward direction over 2 minutes. Use as it is.**
It may be "1" occurs after operation repeated several times.	**Tilt lever switch installation defect.** **Tilt lever switch defect**

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Error Code: 64-1

Failure mode: Lift lock solenoid open abnormality

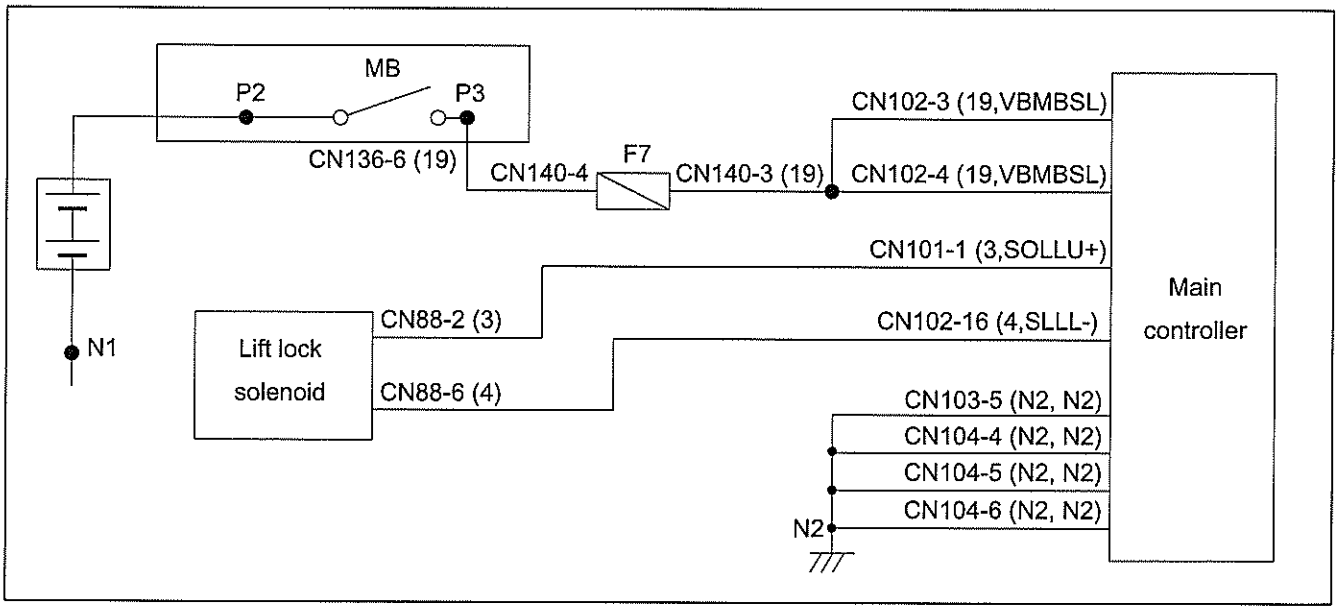
⚠ CAUTION

- **If 64-3 also occurs, disconnect the battery plug at once, perform troubleshooting with priority given to 64-3.**
- **If A9-2 occurs at same time, perform troubleshooting for A9-2 first.**
- **In case of mini lever spec. , replace CN88-6 with CN88-5.**

Probable cause

- Connector contact defect
- Lift lock solenoid defect
- Harness defect
- Main controller defect

Related portion



STEP1

1 . Turn off the key switch and disconnect the battery plug. Check the inside of connector CN88 and the caulked portion of wire whether it has defect or not by visual confirm. (Refer to BEFORE TROUBLESHOOTING)

2 . After connecting CN88, connect the battery plug and turn on the key switch to confirm error.

Judgment

Result	Procedure
64-4 error occurs.	**Perform troubleshooting for 64-4.**
64-4 error does not occur.	Go to step 2

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STEP2

Apply the lift solenoid compulsorily by using Active Test and check if an error occurs.

STD
[ANL] 7 ACT (7 02)
Multi-function display
[ANL] ACTIVE TEST 1/3
LIFT LWR SOL : OFF to ON

Judgment

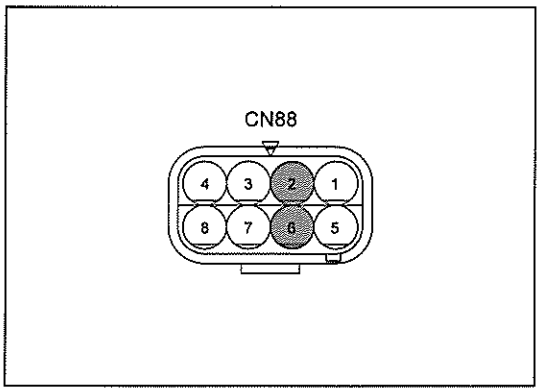
Result	Procedure
64-1 error does not occur.	**Connector contact defect**
64-1 error occurs.	Go to step 3

STEP3

Inspection : Lift lock solenoid individual inspection

1 . Turn off the key switch and disconnect the battery plug.

2 . Disconnect the CN88 connector, and check the resistance of lift lock solenoid.



[Inspection procedure and standard]

Check the resistance of lift lock solenoid.

Turn off the key switch and disconnect the battery plug, disconnect the CN88 connector, visually check each terminal and the caulked portion and coating of each cable for defects. (Refer to BEFORE TROUBLESHOOTING)

Portion to be inspected	Standard:
CN88-2 to CN88-6	Approx. 10 Ω

Judgment

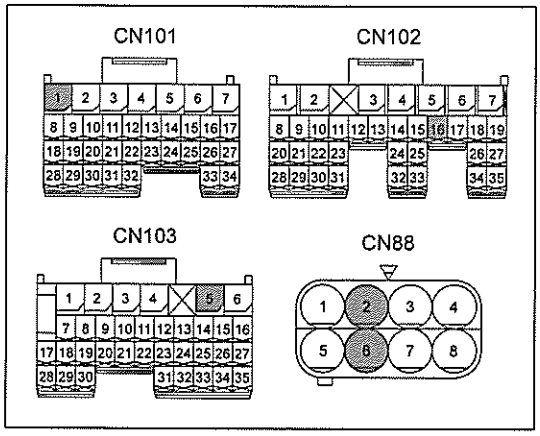
Result	Procedure
NG	**Lift lock solenoid defect**
OK	Go to step 4

STEP4

Inspection : Harness

Disconnect the CN101, CN102, CN103, CN104 and CN88 connector, then check the harness.

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[Inspection procedure and standard]

Inspect for continuity and short circuiting of the harness.

Perform this check with the battery plug and the CN101, CN102, CN103, CN104, CN88 connectors disconnected, and visually check inside the connector and the caulked portion of its wire for defects. Refer to BEFORE TROUBLESHOOTING

*1: Connect the CN88 connector and measure the resistance between CN101-1(3)and CN102-16(4). And it is OK if this resistance is approx.10 Ω.

Portion to be inspected	Standard:
CN101-1(3) to CN88-2(3)	Continuously *1
CN102-16(4) to CN88-6	Continuously *1
CN101-1(3) to CN103-5(N2)	No continuity
CN102-16(4) to CN103-5(N2)	No continuity

Judgment

Result	Procedure
NG	**Harness defect**
OK	**Main controller defect**

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Error Code: 64-2

Failure mode: Lift lock solenoid short abnormality

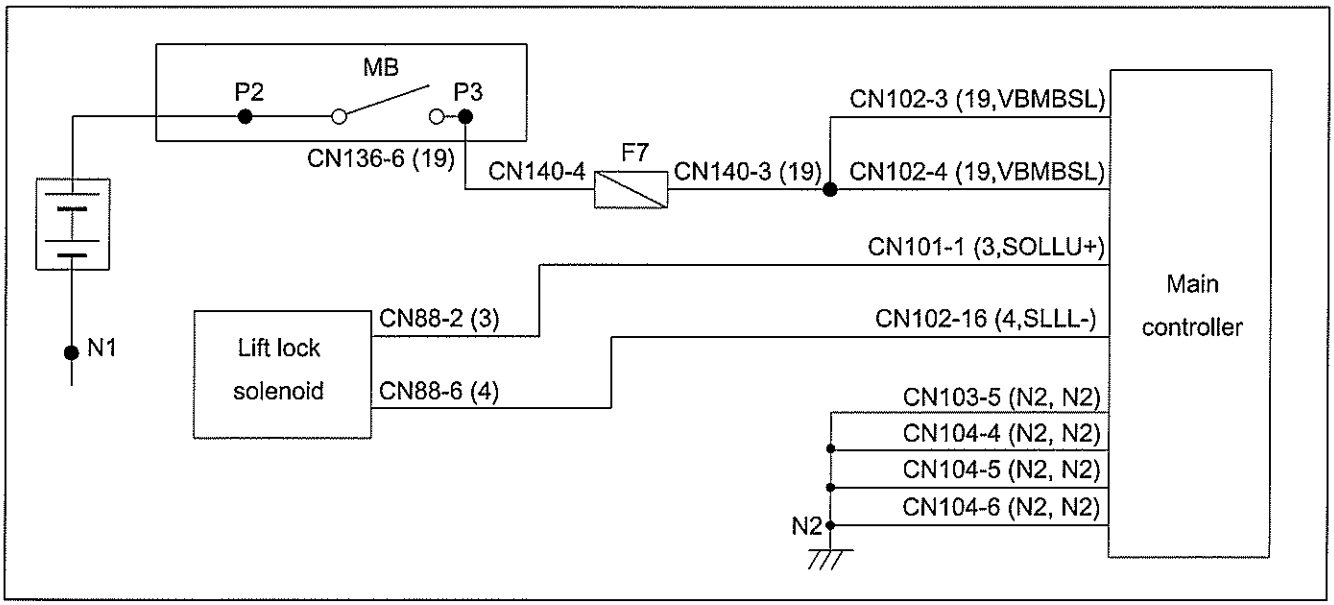
⚠ CAUTION

- **If 64-3 also occurs, disconnect the battery plug at once, perform troubleshooting with priority given to 64-3.**
- **In case of mini lever spec. , replace CN88-6 with CN88-5.**

Probable cause

- Connector contact defect
- Lift lock solenoid defect
- Harness defect
- Main controller defect

Related portion



STEP1

Turn off the key switch and disconnect the battery plug, disconnect the CN88 connector, visually check each terminal and the caulked portion and coating of each cable for defects. (Refer to BEFORE TROUBLESHOOTING)

After connecting the connector, connect the battery plug and turn on the key switch to confirm error.

Judgment

Result	Procedure
64-4 error occurs.	**Perform troubleshooting for 64-4.**
64-4 error does not occur.	Go to step 2

STEP2

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Apply the lift solenoid compulsorily by using Active Test and check if an error occurs.

STD
[ANL] 7 ACT (7 02)
Multi-function display
[ANL] ACTIVE TEST 1/3
LIFT LWR SOL : OFF to ON

Judgment

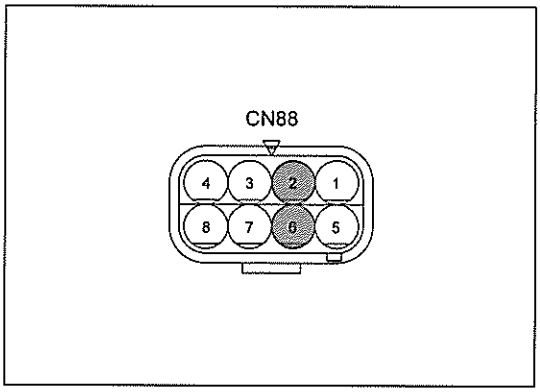
Result	Procedure
64-2 error occurs.	Go to step 3
64-2 error does not occur.	**Connector contact defect**

STEP3

Inspection : Lift lock solenoid individual inspection

1 . Turn off the key switch and disconnect the battery plug.

2 . Disconnect the CN88 connector, and check the resistance of lift lock solenoid.



[Inspection procedure and standard]

Check the resistance of lift lock solenoid.

Turn off the key switch and disconnect the battery plug, disconnect the CN88 connector, visually check each terminal and the caulked portion and coating of each cable for defects. (Refer to BEFORE TROUBLESHOOTING)

Portion to be inspected	Standard:
CN88-2(3) to A88-6(4)	Approx. 10 Ω

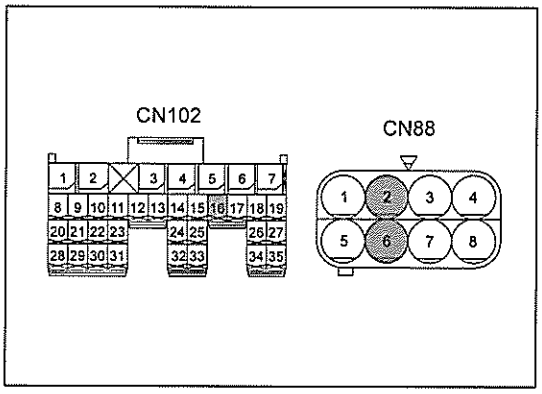
Judgment

Result	Procedure
NG	**Lift lock solenoid defect**
OK	Go to step 4

STEP4

Inspection : Harness

Disconnect the CN101, CN102 and CN88 connector, then check the harness.



[Inspection procedure and standard]

Inspect for continuity and short circuiting of the harness.

Perform this check with the battery plug and the CN101, CN102, CN88 connectors disconnected, and visually check inside the connector and the caulked portion of its wire for defects. Refer to BEFORE TROUBLESHOOTING

Portion to be inspected	Standard:
CN88-2(3) to CN88-6(4)	No continuity
CN102-16(4) to P2	No continuity
CN102-16(4) to P3	No continuity

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Judgment

Result	Procedure
NG	**Harness defect**
OK	**Main controller defect**

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Error Code: 64-3

Failure mode: Lift lock solenoid drive circuit abnormality

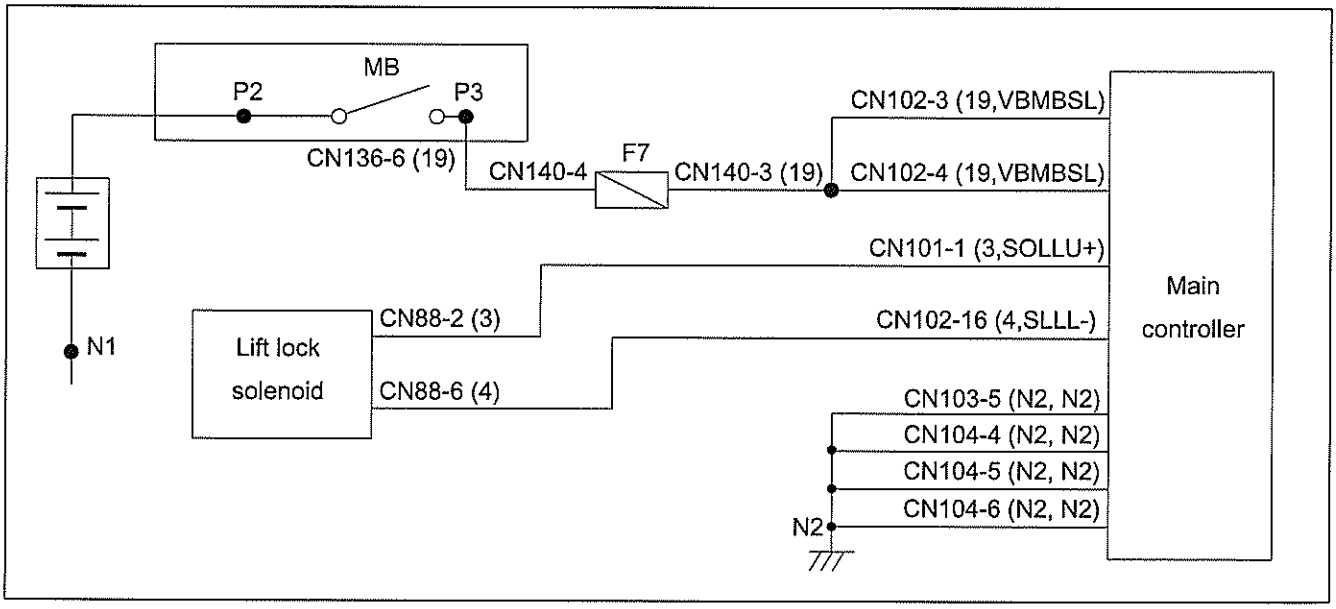
⚠ CAUTION

- **In case of mini lever spec. , replace CN88-6 with CN88-5.**

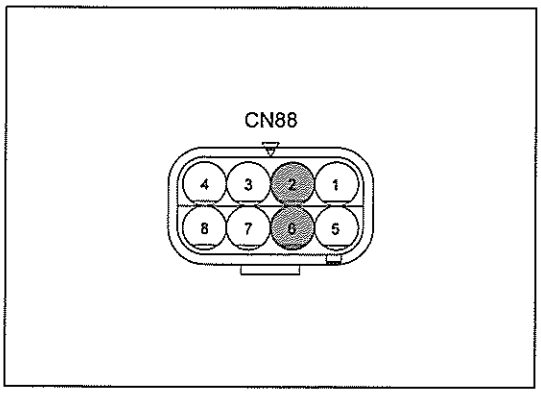
Probable cause

- Lift lock solenoid defect
- Harness defect
- Main controller defect

Related portion



STEP1



Inspection : Lift lock solenoid

1 . Turn off the key switch and disconnect the battery plug.

2 . Disconnect the CN88 connector, and check the resistance of lift lock solenoid.

[Inspection procedure and standard]

Check the resistance of lift lock solenoid.

Turn off the key switch and disconnect the battery plug, disconnect the CN88 connector, visually check each terminal and the caulked portion and coating of each cable for defects. (Refer to BEFORE TROUBLESHOOTING)

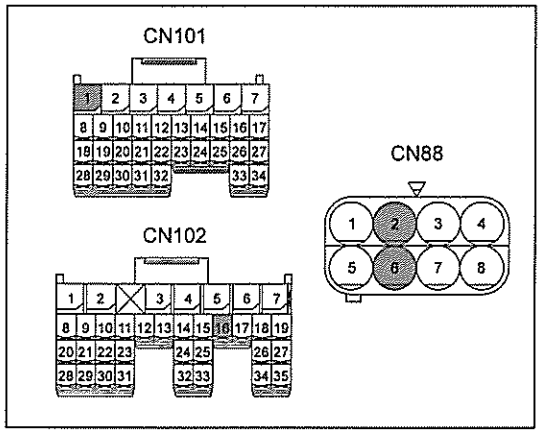
Portion to be inspected	Standard:
CN88-2(3) to CN88-6(4)	Approx. 10 Ω

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Judgment

Result	Procedure
NG	**Lift lock solenoid defect** **Go to step 2**
OK	Go to step 2

STEP2



Inspection : Harness

Disconnect the CN101, CN102 and CN88 connector, then check the harness.

[Inspection procedure and standard]

Inspect for continuity and short circuiting of the harness.

Turn off the key switch and disconnect the battery plug, disconnect the CN101, CN102 and CN88 connector, visually check each terminal and the caulked portion and coating of each cable for defects. (Refer to BEFORE TROUBLESHOOTING)

Portion to be inspected	Standard:
CN88-2(3) to CN88-6(4)	No continuity
CN101-1(3) to CN102-16(4)	No continuity
CN102-16(4) to P2	No continuity
CN102-16(4) to P3	No continuity

Judgment

Result	Procedure
NG	**Harness defect** **Main controller defect**
OK	**Main controller defect**

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Error Code: 64-4

Failure mode: Lift lock solenoid (open / short) abnormality

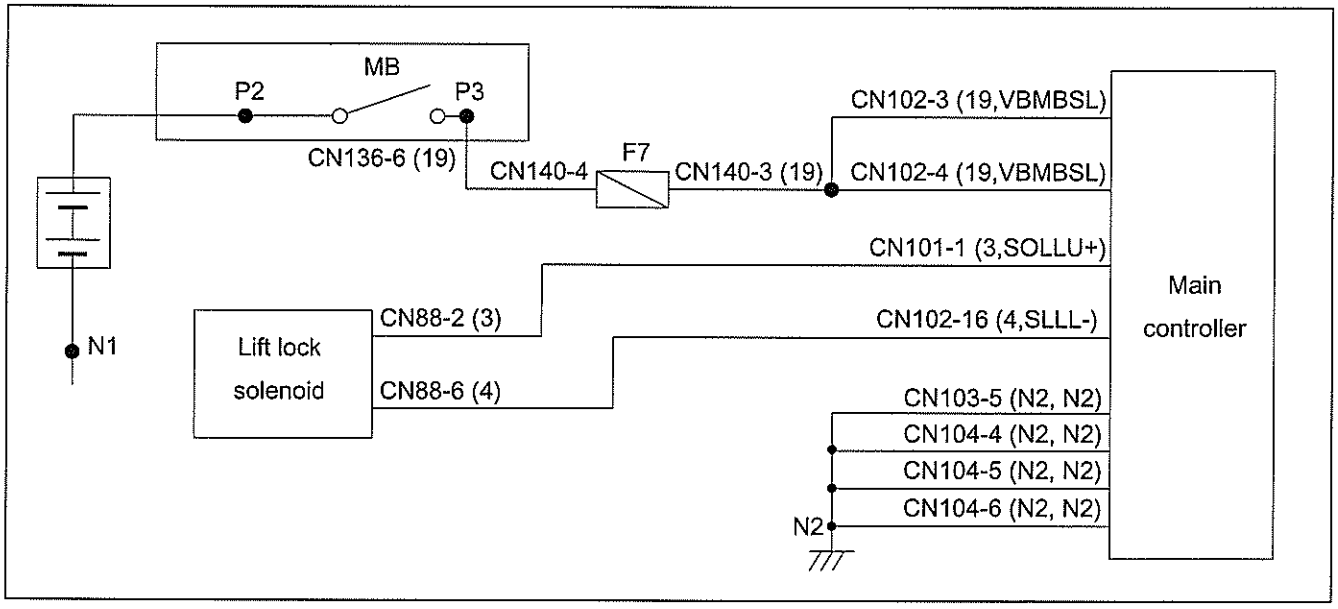
⚠ CAUTION

- **If 64-3 also occurs, disconnect the battery plug at once, perform troubleshooting with priority given to 64-3.**
- **If A9-2 occurs at same time, perform troubleshooting for A9-2 first.**
- **In case of mini lever spec. , replace CN88-6 with CN88-5.**

Probable cause

- Connector contact defect
- Lift lock solenoid defect
- Harness defect
- Main controller defect

Related portion



STEP1

Turn off the key switch and disconnect the battery plug, disconnect the CN88 connector, visually check each terminal and the caulked portion and coating of each cable for defects. (Refer to BEFORE TROUBLESHOOTING)

After connecting the connector, connect the battery plug and turn on the key switch to confirm error.

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Judgment

Result	Procedure
64-4 error occurs.	Go to step 2
64-4 error does not occur.	**Connector contact defect**

STEP2

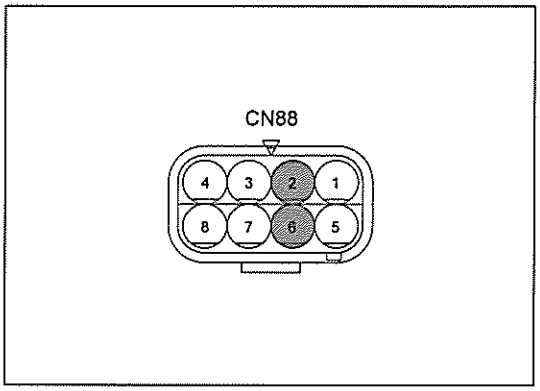
Inspection : Lift lock solenoid individual inspection

1 . Turn off the key switch and disconnect the battery plug.

2 . Disconnect the CN88 connector, and check the resistance of lift lock solenoid.

[Inspection procedure and standard]

Check the resistance of lift lock solenoid.



Turn off the key switch and disconnect the battery plug, disconnect the CN88 connector, visually check each terminal and the caulked portion and coating of each cable for defects. (Refer to BEFORE TROUBLESHOOTING)

Portion to be inspected	Standard:
CN88-2(3) to CN88-6(4)	Approx. 10 Ω

Judgment

Result	Procedure
NG	**Lift lock solenoid defect**
OK	Go to step 3

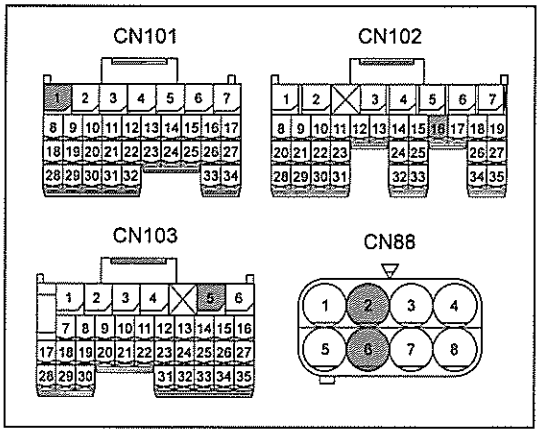
STEP3

Inspection : Harness

Disconnect the CN101, CN102, CN103 and CN88 connector, then check the harness.

[Inspection procedure and standard]

Inspect for continuity and short circuiting of the harness.



Perform this check with the battery plug and the CN101, CN102, CN103, CN88 connectors disconnected, and visually check inside the connector and the caulked portion of its wire for defects. Refer to BEFORE TROUBLESHOOTING

*1: Connect the CN88 connector and measure the resistance between CN101-1(3)and CN102-16(4). And it is OK if this resistance is approx.10 Ω.

Portion to be inspected	Standard:
CN101-1(3) to CN88-2(3)	Continuously *1
CN102-16(4) to CN88-6(4)	Continuously *1
CN88-2(3) to CN88-6(4)	No continuity *1
CN101-1(3) to CN103-5(N2)	No continuity
CN102-16(4) to CN103-5(N2)	No continuity

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Judgment

Result	Procedure
NG	**Harness defect**
OK	**Main controller defect**

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Error Code: 65-1

Failure mode: Tilt solenoid open abnormality

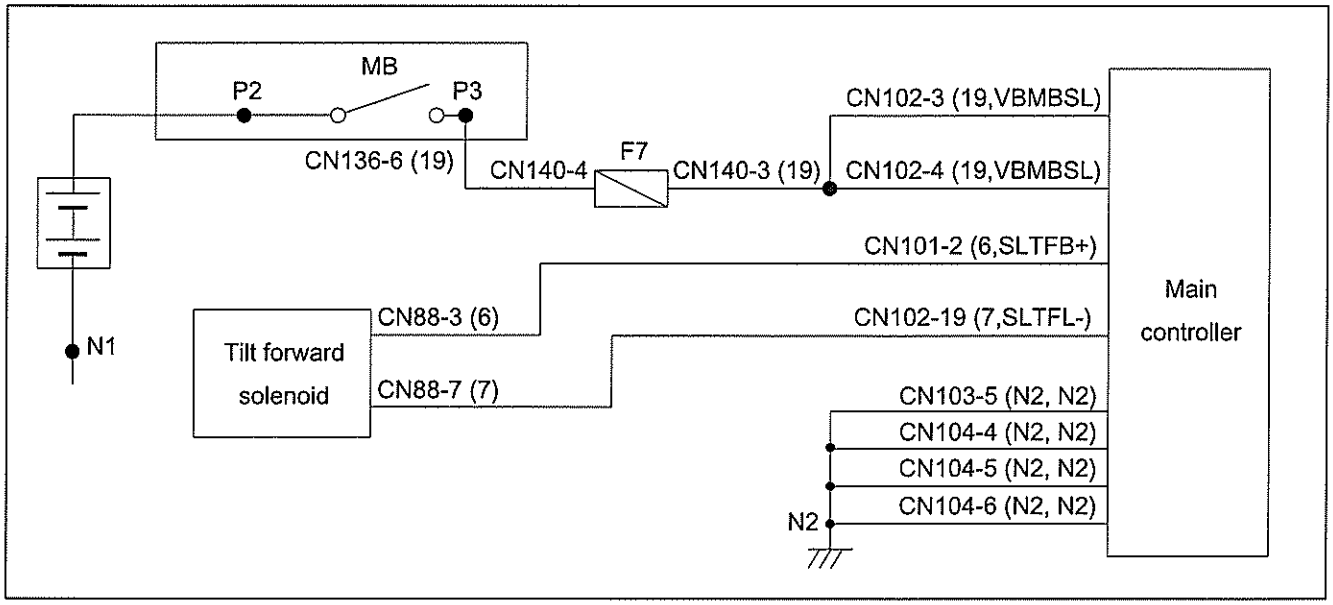
⚠ CAUTION

- **If 65-3 also occurs, disconnect the battery plug at once, perform troubleshooting with priority given to 65-3.**
- **If A9-2 occurs at same time, perform troubleshooting for A9-2 first.**
- **In case of mini lever spec. , replace CN88-7 with CN88-6.**

Probable cause

- Connector contact defect
- Tilt solenoid defect
- Harness defect
- Main controller defect

Related portion



STEP1

1 . Turn off the key switch and disconnect the battery plug. Check the inside of connector CN88 and the caulked portion of wire whether it has defect or not by visual confirm. (Refer to BEFORE TROUBLESHOOTING)

2 . After connecting CN88, connect the battery plug and turn on the key switch to confirm error.

Judgment

Result	Procedure
65-4 error occurs.	**Perform troubleshooting for 65-4.**
65-4 error does not occur.	Go to step 2

STEP2

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Apply the tilt solenoid compulsorily by using Active Test and check if an error occurs.

STD
[ANL] 7 ACT (7 03)
Multi-function display
[ANL] ACTIVE TEST 1/3
TILT SOL : OFF to ON

Judgment

Result	Procedure
65-1 error does not occur.	**Connector contact defect**
65-1 error occurs.	Go to step 3

STEP3

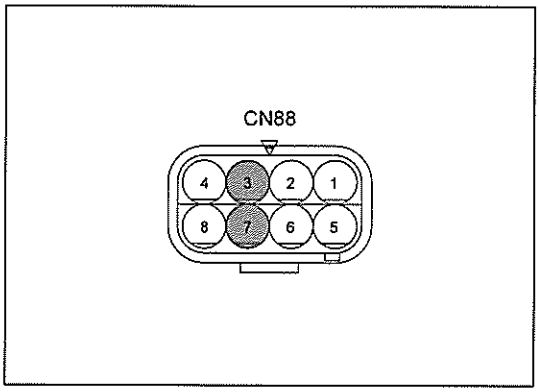
Inspection : Tilt solenoid individual inspection

1 . Turn off the key switch and disconnect the battery plug.

2 . Disconnect the CN88 connector, and check the resistance of tilt solenoid.

[Inspection procedure and standard]

Check the resistance of tilt solenoid.



Turn off the key switch and disconnect the battery plug, disconnect the CN88 connector, visually check each terminal and the caulked portion and coating of each cable for defects. (Refer to BEFORE TROUBLESHOOTING)

Portion to be inspected	Standard:
CN88-3 (6) to CN88-7 (7)	Approx. 10 Ω

Judgment

Result	Procedure
NG	**Tilt solenoid defect**
OK	Go to step 4

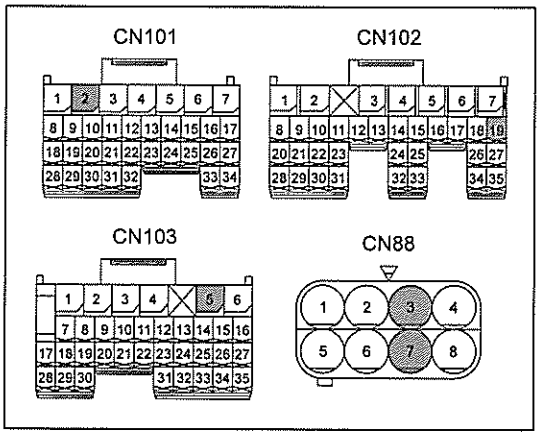
STEP4

Inspection : Harness

Disconnect the CN101, CN102, CN103 and CN88 connector, then check the harness.

[Inspection procedure and standard]

Inspect for continuity and short circuiting of the harness.



Perform this check with the battery plug and the CN101, CN102, CN103, CN88 connectors disconnected, and visually check inside the connector and the caulked portion of its wire for defects. Refer to BEFORE TROUBLESHOOTING

*: Connect the CN88 connector and measure the resistance between CN101-2 and CN102-19. And it is OK if this resistance is approx.10 Ω.

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Portion to be inspected	Standard:
CN101-2 (6) to CN88-3 (6)	Continuity *
CN102-19 (7) to CN88-7 (7)	Continuity *
CN101-2 (6) to CN103-5 (N2)	No continuity
CN102-19 (7) to CN103-5 (N2)	No continuity

Judgment

Result	Procedure
NG	**Harness defect**
OK	**Main controller defect**

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Error Code: 65-2

Failure mode: Tilt solenoid short abnormality

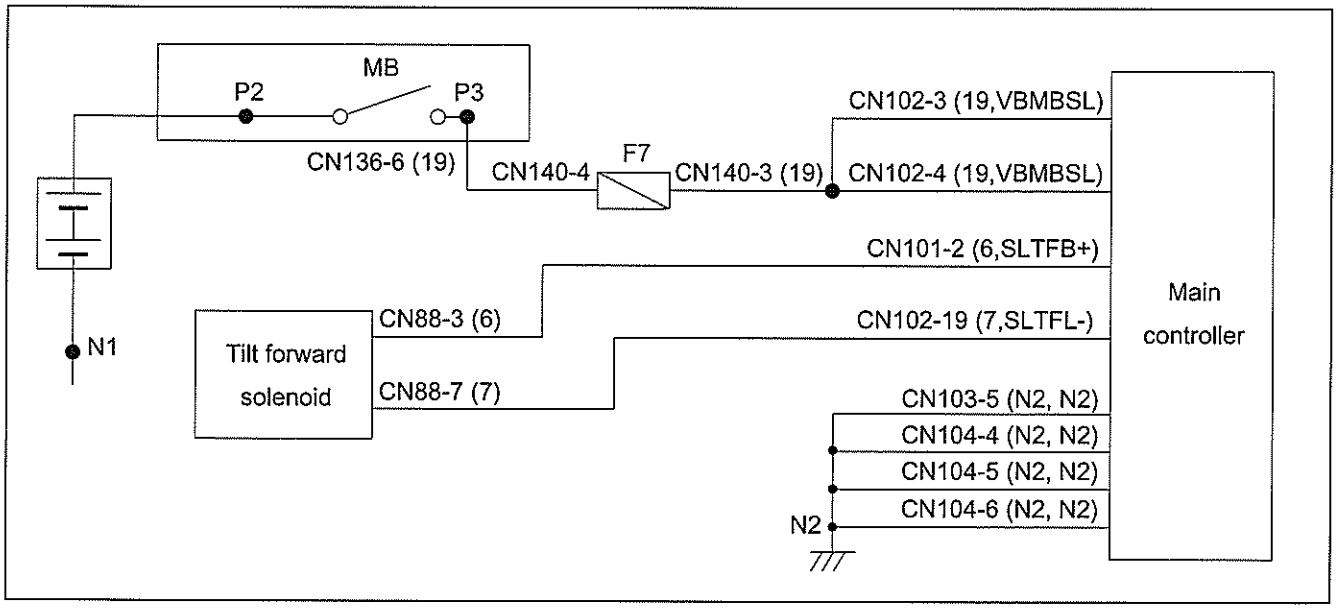
⚠ CAUTION

- **If 65-3 also occurs, disconnect the battery plug at once, perform troubleshooting with priority given to 65-3.**
- **In case of mini lever spec. , replace CN88-7 with CN88-6.**

Probable cause

- Connector contact defect
- Tilt solenoid defect
- Harness defect
- Main controller defect

Related portion



STEP1

1 . Turn off the key switch and disconnect the battery plug. Check the inside of connector CN88 and the caulked portion of wire whether it has defect or not by visual confirm. (Refer to BEFORE TROUBLESHOOTING)

2 . After connecting CN88, connect the battery plug and turn on the key switch to confirm error.

Judgment

Result	Procedure
65-4 error occurs .	**Perform troubleshooting for 65-4.**
65-4 error does not occur.	Go to step 2

STEP2

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Apply the tilt solenoid compulsorily by using Active Test and check if if an error occurs.

STD
[ANL] 7 ACT (7 03)
Multi-function display
[ANL] ACTIVE TEST 1/3
TILT SOL : OFF to ON

Judgment

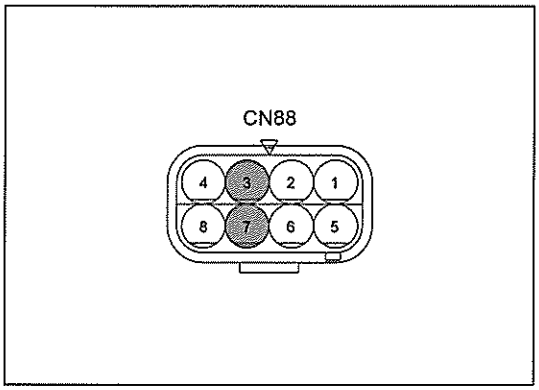
Result	Procedure
65-2 error does not occur.	**Connector contact defect**
65-2 error occurs.	Go to step 3

STEP3

Inspection : Tilt solenoid individual inspection

1 . Turn off the key switch and disconnect the battery plug.

2 . Disconnect the CN88 connector, and check the resistance of tilt solenoid.



[Inspection procedure and standard]

Check the resistance of tilt solenoid.

Turn off the key switch and disconnect the battery plug, disconnect the CN88 connector, visually check each terminal and the caulked portion and coating of each cable for defects. (Refer to BEFORE TROUBLESHOOTING)

Portion to be inspected	Standard:
CN88-3 (6) to CN88-7 (7)	Approx. 10 Ω

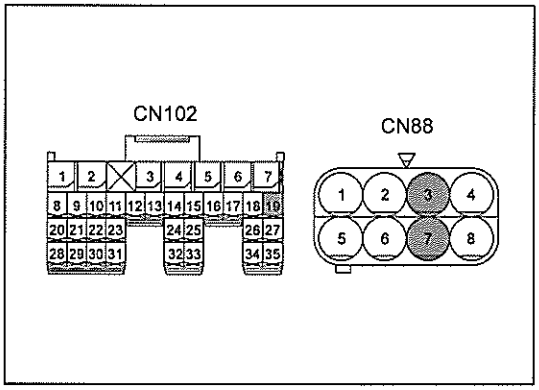
Judgment

Result	Procedure
NG	**Tilt solenoid defect**
OK	Go to step 4

STEP4

Inspection : Harness

Disconnect theCN102 and CN88 connector, then check the harness.



[Inspection procedure and standard]

Inspect for continuity and short circuiting of the harness.

Perform this check with the battery plug and the CN102, CN88 connectors disconnected, and visually check inside the connector and the caulked portion of its wire for defects. Refer to BEFORE TROUBLESHOOTING

Portion to be inspected	Standard:
CN88-3 (6) to CN88-7 (7)	No continuity
CN102-19 (7) to P2	No continuity
CN102-19 (7) to P3	No continuity

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Judgment

Result	Procedure
NG	**Harness defect**
OK	**Main controller defect**

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Error Code: 65-3

Failure mode: Tilt solenoid drive circuit abnormality

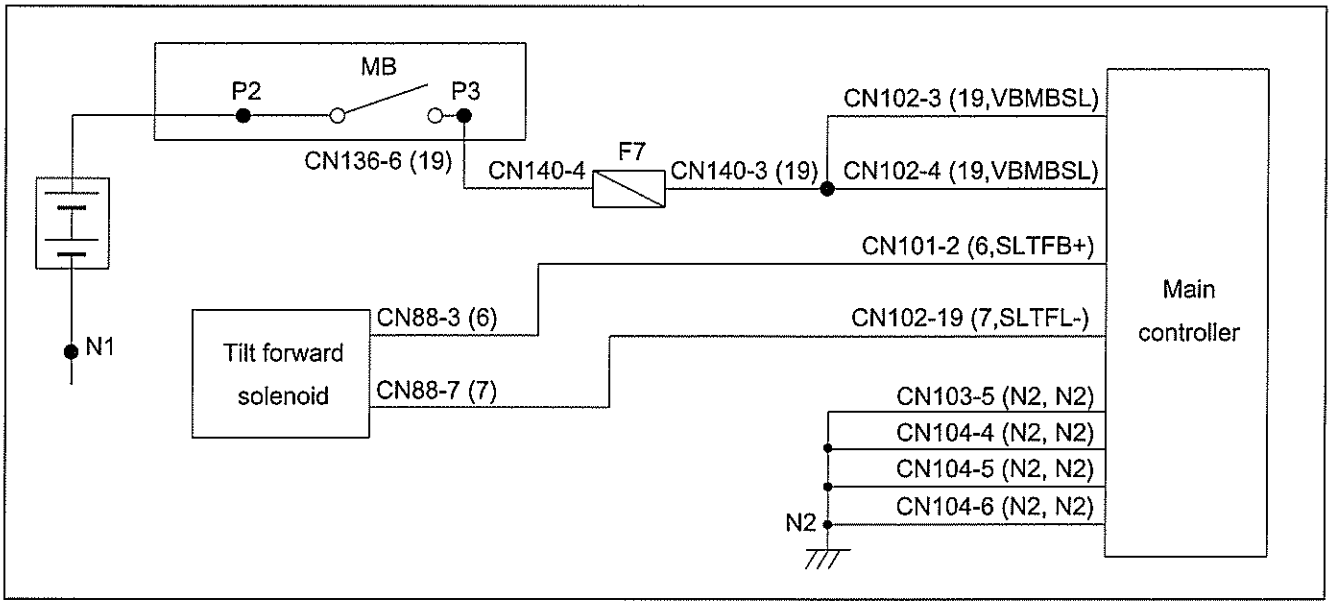
⚠ CAUTION

- **In case of mini lever spec. , replace CN88-7 with CN88-6.**

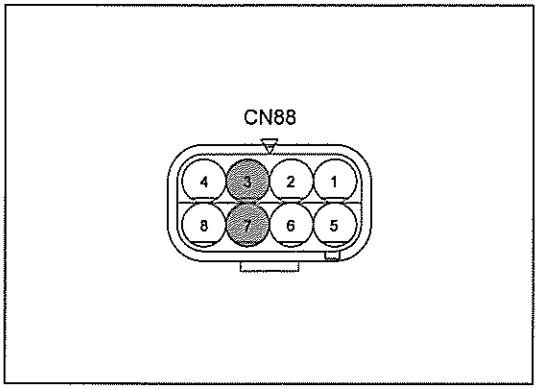
Probable cause

- Tilt solenoid defect
- Harness defect
- Main controller defect

Related portion



STEP1



Inspection : Tilt solenoid

1 . Turn off the key switch and disconnect the battery plug.

2 . Disconnect the CN88 connector, and check the resistance of tilt solenoid.

[Inspection procedure and standard]

Check the resistance of tilt solenoid.

Turn off the key switch and disconnect the battery plug, disconnect the CN88 connector, visually check each terminal and the caulked portion and coating of each cable for defects. (Refer to BEFORE TROUBLESHOOTING)

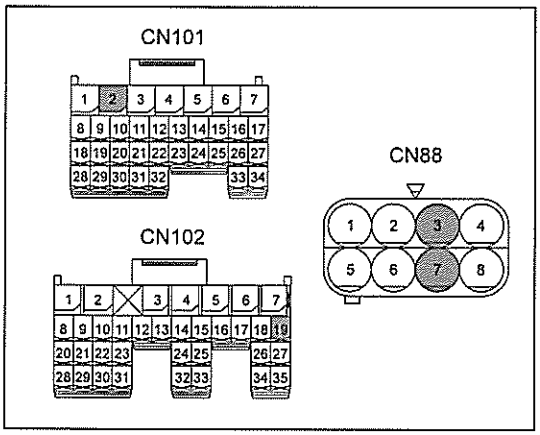
Portion to be inspected	Standard:
CN88-3 (6) to CN88-7 (7)	Approx. 10 Ω

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Judgment

Result	Procedure
NG	Go to step 2 **Tilt solenoid defect**
OK	Go to step 2

STEP2



Inspection : Harness

Disconnect the CN101, CN102 and CN88 connector, then check the harness.

[Inspection procedure and standard]

Inspect for continuity and short circuiting of the harness.

Perform this check with the battery plug and the CN101, CN102, CN88 connectors disconnected, and visually check inside the connector and the caulked portion of its wire for defects. Refer to BEFORE TROUBLESHOOTING

Portion to be inspected	Standard:
CN88-3 (6) to CN88-7 (7)	No continuity
CN101-2(6) to CN102-19(7)	No continuity
CN102-19 (7) to P2	No continuity
CN102-19 (7) to P3	No continuity

Judgment

Result	Procedure
NG	**Harness defect** **Main controller defect**
OK	**Main controller defect**

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Error Code: 65-4

Failure mode: Tilt solenoid (open / short) abnormality

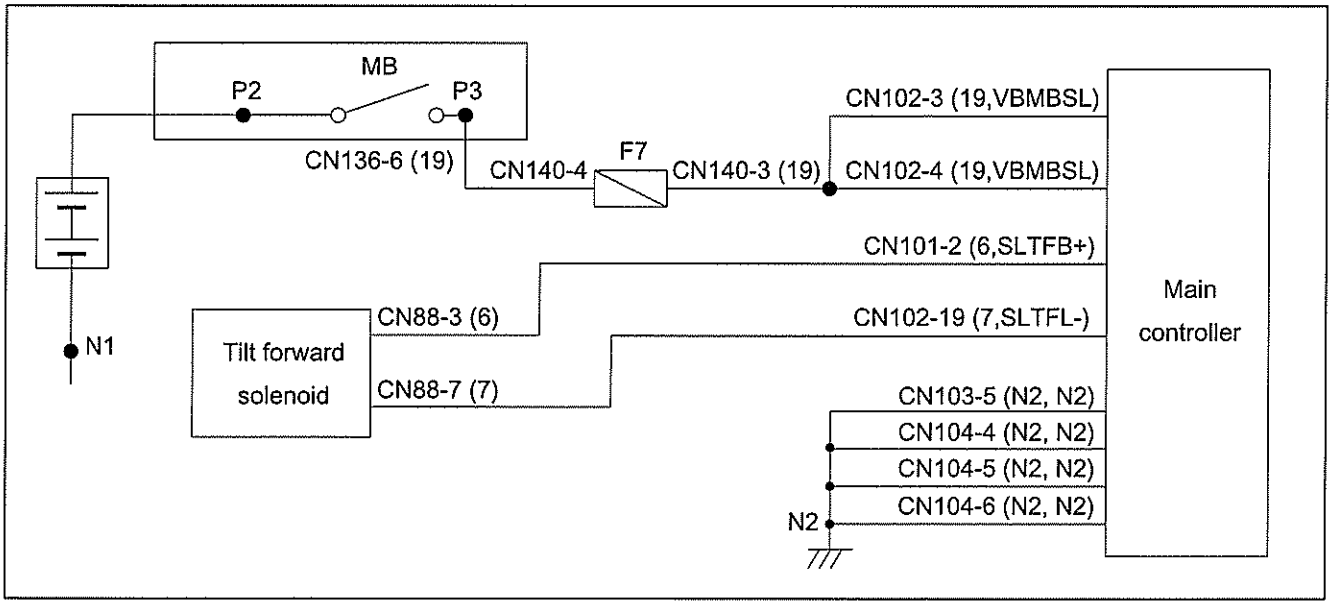
⚠ CAUTION

- **If 65-3 also occurs, disconnect the battery plug at once, perform troubleshooting with priority given to 65-3.**
- **If A9-2 occurs at same time, perform troubleshooting for A9-2 first.**
- **In case of mini lever spec. , replace CN88-7 with CN88-6.**

Probable cause

- Connector contact defect
- Tilt solenoid defect
- Harness defect
- Main controller defect

Related portion



STEP1

1 . Turn off the key switch and disconnect the battery plug. Check the inside of connector CN88 and the caulked portion of wire whether it has defect or not by visual confirm. (Refer to BEFORE TROUBLESHOOTING)

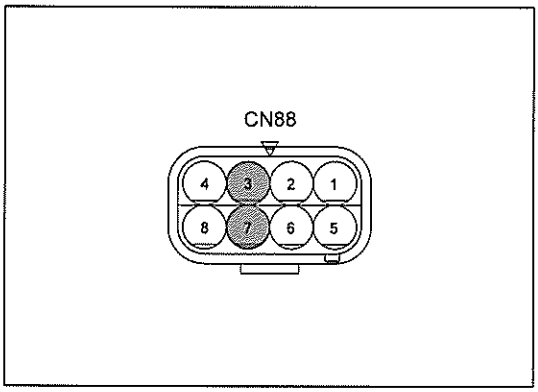
2 . After connecting CN88, connect the battery plug and turn on the key switch to confirm error.

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Judgment

Result	Procedure
65-4 error occurs.	Go to step 2
65-4 error does not occur.	**Connector contact defect**

STEP2



Inspection : Tilt solenoid individual inspection

1 . Turn off the key switch and disconnect the battery plug.

2 . Disconnect the CN88 connector, and check the resistance of tilt solenoid.

[Inspection procedure and standard]

Check the resistance of tilt solenoid.

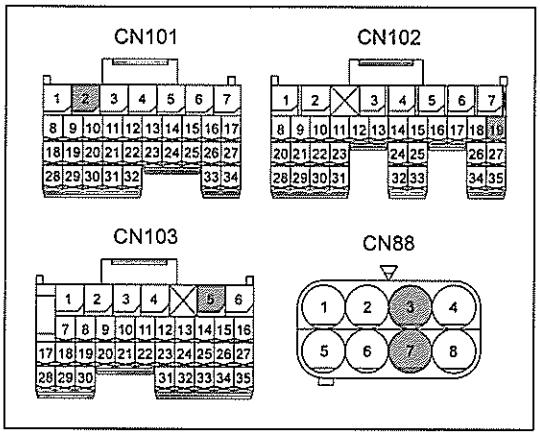
Turn off the key switch and disconnect the battery plug, disconnect the CN88 connector, visually check each terminal and the caulked portion and coating of each cable for defects. (Refer to BEFORE TROUBLESHOOTING)

Portion to be inspected	Standard:
CN88-3 (6) to CN88-7 (7)	Approx. 10 Ω

Judgment

Result	Procedure
NG	**Tilt solenoid defect**
OK	Go to step 3

STEP3



Inspection : Harness

Disconnect the CN101, CN102, CN103 and CN88 connector, then check the harness.

[Inspection procedure and standard]

Inspect for continuity and short circuiting of the harness.

Perform this check with the battery plug and the CN101, CN102, CN103, CN88 connectors disconnected, and visually check inside the connector and the caulked portion of its wire for defects. Refer to BEFORE TROUBLESHOOTING

*: In case of the OK in the former step, connect the CN88 connector and measure the resistance between CN101-2 and CN102-19. And it is OK if this resistance is approx.10 Ω.

Portion to be inspected	Standard:
CN101-2 (6) to CN88-3 (6)	Continuity *
CN102-19 (7) to CN88-7 (7)	Continuity *
CN88-3 (6) to CN88-7 (7)	No continuity *
CN101-2 (6) to CN103-5 (N2)	No continuity
CN102-19 (7) to CN103-5 (N2)	No continuity

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Judgment

Result	Procedure
NG	**Harness defect**
OK	**Main controller defect**

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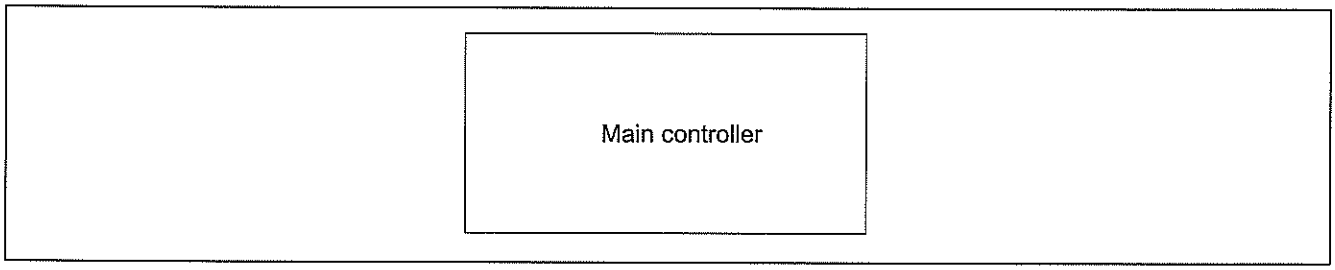
Error Code: 66-1

Failure mode: Outside matching value range for tilt angle sensor

Probable cause

- Main controller defect
- Tilt sensor matching defect

Related portion



STEP1

MATCHING :

Perform matching of the tilt horizontal angle and the forward tilt angle. (Refer to page "MATCHING" of Display section)

Judgment

Result	Procedure
NG matching	Go to step 2
OK matching	Go to step 3

STEP2

Tilt sensor voltage inspection:

Check the tilt sensor voltage.

·Tilt sensor voltage inspection:

[ANL] I/O M.HANDRING 2/8

VRTA

Position of tilt angle	Voltage
When horizontal position	0.86V to 3.99V

Judgment

Result	Procedure
Outside standard value	Go to step 3 **Tilt sensor assembly defect.** **After reassemble, perform matching and STEP3.**
Within standard value	**Main controller defect**

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STEP3

Check the error :

Turn off the key switch and disconnect the battery plug.

After 30 seconds, reconnect the battery plug and turn on the key switch.

Judgment

Result	Procedure
66-1 error occurs.	**Main controller defect**
66-1 error does not occur.	**Tilt sensor matching defect** **Use as it is.**

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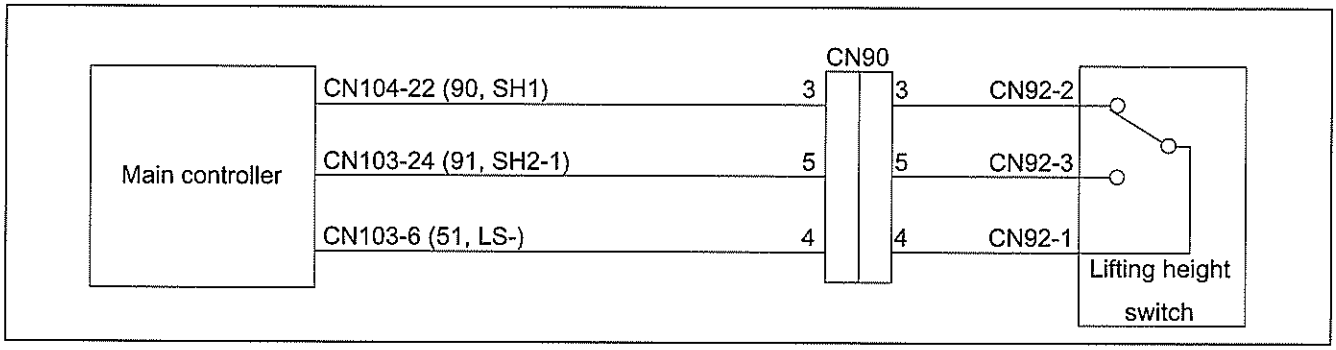
Error Code: 67-1

Failure mode: Lifting height switch open / short abnormality

Probable cause

- Connector contact defect
- Harness defect
- Lifting height switch defect
- Main controller defect

Related portion



STEP1

Connector contact inspection :

Turn off the key switch and disconnect the battery plug at lift lowermost position.

Disconnect the CN90, CN92 connectors, visually check inside the connector of CN90 and CN92, and the caulked portion of its wire for defects. (Refer to BEFORE TROUBLESHOOTING)

Connect the CN90 and CN92 connector, connect the battery plug.

Turn on the key switch to see if an error occurs.

Lifting height switch arm is released, check if an error occurs.

[Inspection procedure and standard]

In case of being height switch in the truck, lifting height switch arm is released, check if an error occurs.

Judgment

Result	Procedure
67-1 error occurs.	Go to step 2
67-1 error does not occur.	**Connector contact defect**

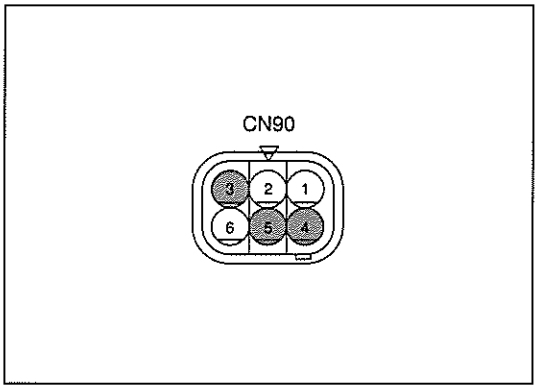
STEP2

Inspection : Harness

Turn off the key switch and disconnect the battery plug at keeping the condition under the error occurs.

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Disconnect the CN90 connectors and check the height switch for their continuities.



[Inspection procedure and standard]

Check the harness for continuity.

Perform this check with the battery plug and the CN90 connectors disconnected, and visually check inside the connector and the caulked portion of its wire for defects.

Refer to BEFORE TROUBLESHOOTING

Give attention to the inspection contents. These are different standard by the condition of height switch lever.

Height switch lever condition	Portion to be inspected	Standard
Pushed (low height)	CN90-4(51) to CN90-5(90)	Continuity
Pushed (low height)	CN90-4(51) to CN90-3(91)	No continuity
Pushed (low height)	CN90-5(90) to CN90-3(91)	No continuity
Released (high height)	CN90-4(51) to CN90-5(90)	No continuity
Released (high height)	CN90-4(51) to CN90-3(91)	Continuity
Released (high height)	CN90-5(90) to CN90-3(91)	No continuity

Judgment

Result	Procedure
OK	Go to step 3
NG	Go to step 4

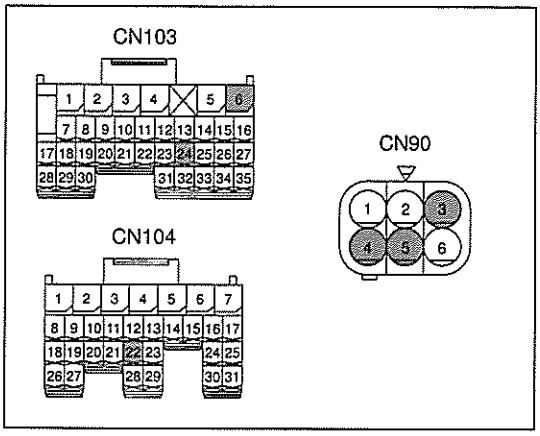
STEP3

Inspection : Harness

Turn off the key switch and disconnect the battery plug.

Disconnect the CN90, CN103 and CN104 connectors and check the harnesses for their continuities.

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[Inspection procedure and standard]

Inspect for continuity of the harness.

Perform this check with the battery plug and the CN90, CN102, CN103 and CN104 connectors disconnected, and visually check inside the connector and the caulked portion of its wire for defects.

Refer to BEFORE TROUBLESHOOTING

Portion to be inspected	Standard
CN104-22(90) to CN90-5(90)	Continuity
CN103-24(91) to CN90-3(91)	Continuity
CN103-6(51) to CN90-4(51)	Continuity
CN90-4(51) to CN90-5(90)	No continuity
CN90-4(51) to CN90-3(91)	No continuity
CN90-5(90) to CN90-3(91)	No continuity

Judgment

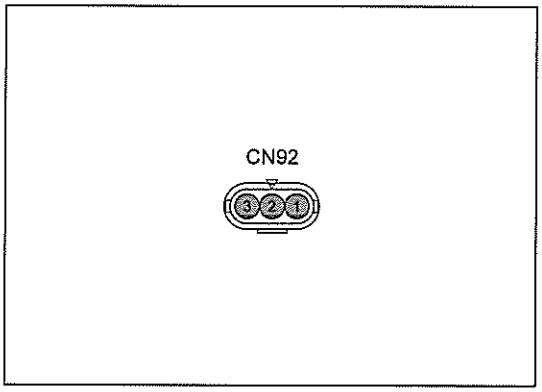
Result	Procedure
OK	**Main controller defect**
NG	**Harness defect**

STEP4

Inspection : Lifting height switch

Turn off the key switch and disconnect the battery plug at keeping the condition under the error occurs.

Disconnect the CN92 connectors and check the height switch for their continuities.



[Inspection procedure and standard]

Check the switch for continuity.

Perform this check with the battery plug and the CN92 connectors disconnected, and visually check inside the connector and the caulked portion of its wire for defects.

Refer to BEFORE TROUBLESHOOTING

Give attention to the inspection contents. These are different standard by the condition of height switch lever.

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Height switch lever condition	Portion to be inspected	Standard
Pushed (low height)	CN92-1(51) to CN92-2(90)	Continuity
Pushed (low height)	CN92-1(51) to CN92-3(91)	No continuity
Pushed (low height)	CN92-2(90) to CN92-3(91)	No continuity
Released (high height)	CN92-1(51) to CN92-2(90)	No continuity
Released (high height)	CN92-1(51) to CN92-3(91)	Continuity
Released (high height)	CN92-2(90) to CN92-3(91)	No continuity

Judgment

Result	Procedure
OK	**Harness defect**
NG	**Lifting height switch defect**

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Error Code: 67-5

Failure mode: Lifting height 800mm switch short abnormality

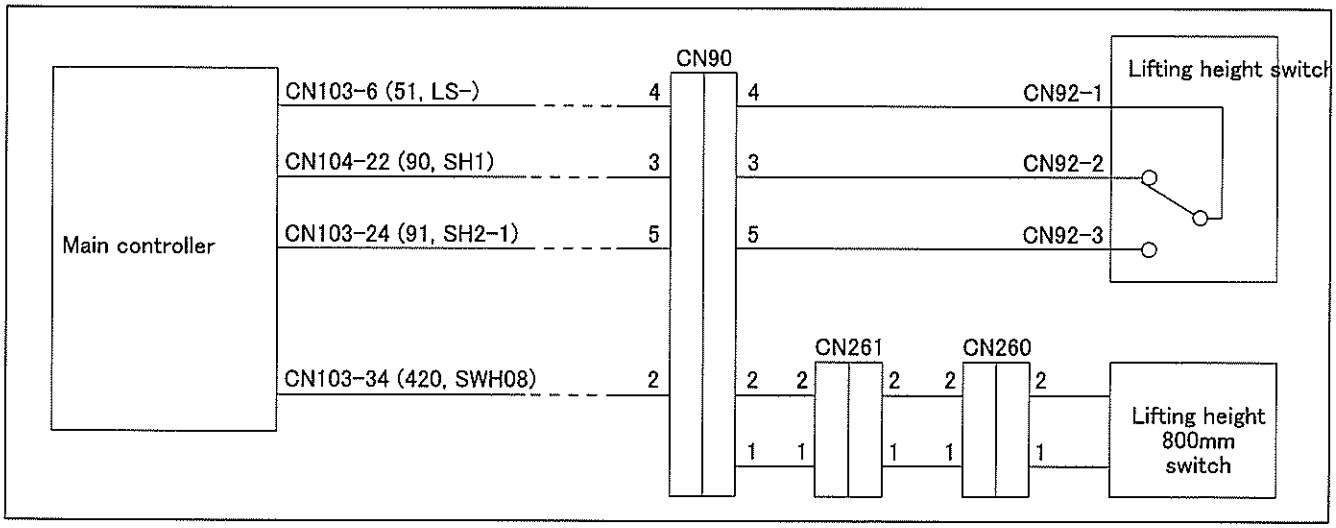
⚠ CAUTION

- **With lifting upward from lowest to highest position, if error 67-1 is occurred, perform the troubleshooting for 67-1 at the beginning.**

Probable cause

- Connector contact defect
- Lifting height 800mm switch defect
- Harness defect
- Main controller defect

Related portion



STEP1

Connector contact inspection :

Turn off the key switch and disconnect the battery plug at lift lowermost position.

Visually check inside the connector of CN90, CN206 and CN261, and the caulked portion of its wire for defects. (Refer to BEFORE TROUBLESHOOTING)

Connect the CN90, CN206 and CN261 connector, then connect the battery plug, and turn on the key switch. With lifting upward by release both lifting height 800mm switch lever and lifting height switch lever, check with or without of error.

[Inspection procedure and standard]

Give attention to the inspection contents. These are different standard by the condition of height switch lever and lifting height 800mm switch lever.

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Judgment

Result	Procedure
67-5 error does not occur.	**Connector contact defect**
67-5 error occurs.	Go to step 2

STEP2

Inspection : Lifting height 800mm switch

Turn off the key switch and disconnect the battery plug at lift lowermost position.

Disconnect the CN260 connector, connect the battery plug, and turn on the key switch. With lifting upward by release both lifting height 800mm switch lever and lifting height switch lever, check with or without of error.

[Inspection procedure and standard]

Give attention to the inspection contents. These are different standard by the condition of height switch lever and lifting height 800mm switch lever.

Judgment

Result	Procedure
67-5 error does not occur.	**Lifting height 800mm switch defect**
67-5 error occurs.	Go to step 3

STEP3

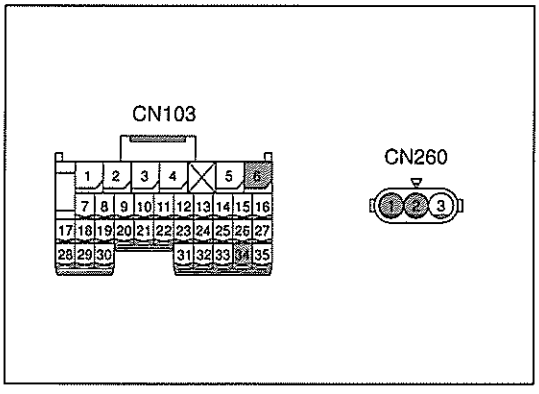
Inspect harness :

Turn off the key switch and disconnect the battery plug at lift lowermost position.

Disconnect the CN103 and CN260 connectors and check the harnesses for their continuities.

[Inspection procedure and standard]

Inspect for continuity of the harness.



Perform this check with the battery plug and the CN103 and CN260 connectors disconnected, and visually check inside the connector and the caulked portion of its wire for defects.

Refer to BEFORE TROUBLESHOOTING

* : It is OK to connect CN260-1 to CN260-2 through SST2 (09232-13130-71) and check if there is continuity between CN103-6 and CN103-34.

Portion to be inspected	Standard
CN103-34 (420) to CN260-2 (420) *1	Continuity
CN103-6 (51) to CN260-1 (51) *1	Continuity
CN260-1 (51) to CN260-2 (420)	No continuity

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Judgment

Result	Procedure
OK	Main controller defect
NG	Harness defect

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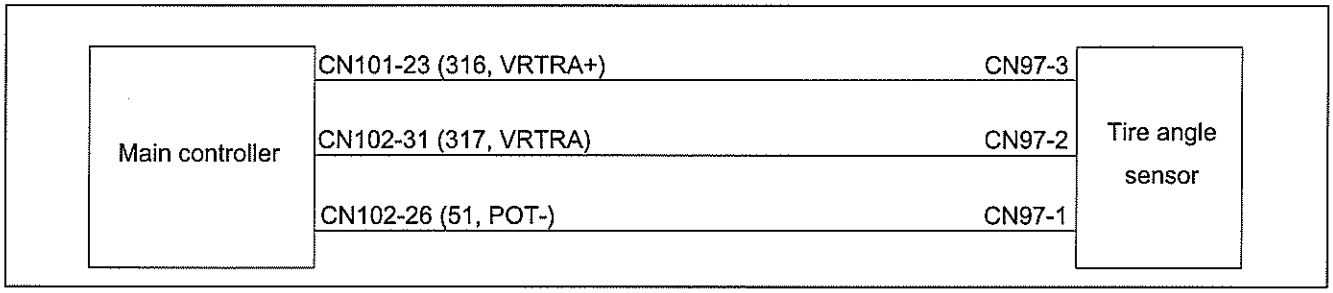
Error Code: 71-1

Failure mode: Tire angle sensor open abnormality

Probable cause

- Connector contact defect
- Tire angle sensor defect
- Harness defect
- Main controller defect

Related portion



STEP1

Connector inspection

1 . Turn off the key switch and disconnect the battery plug.

2 . Visually check inside the connector of CN97, and the caulked portion of its wire for defects. (Refer to BEFORE TROUBLESHOOTING)

3 . After connecting the CN97 connector, connect the battery plug and turn key switch ON to confirm error.

Judgment

Result	Procedure
71-1 errors.	Go to step 2
71-1 error does not occur.	**Connector contact defect**

STEP2

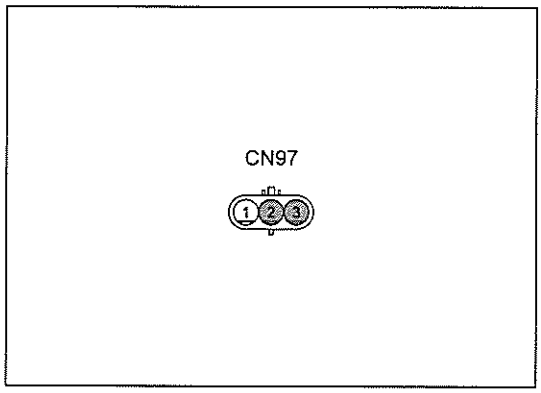
Inspection : Tire angle sensor

1 . Turn off the key switch and disconnect the battery plug.

2 . Disconnect the CN97 connector, and connect between CN97-3 and CN97-2 with SST2.

3 . Reconnect the battery plug and turn on the key switch, and check the error code.

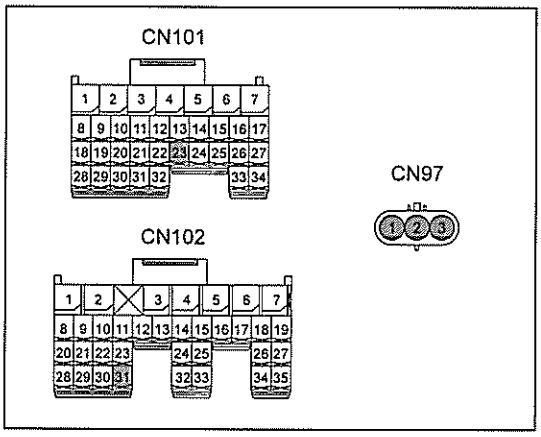
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Judgment

Result	Procedure
71-1 error occurs.	Go to step 3
71-2 error occurs.	**Tire angle sensor defect**

STEP3



Inspection : Harness

1 . Turn off the key switch and disconnect the battery plug.

2 . Disconnect the CN101, CN102, and CN97 connector, and inspect harness with SST disconnected.

[Inspection procedure and standard]

Inspect for continuity and short circuiting of the harness.

Turn off the key switch and disconnect the battery plug and the CN101, CN102 and CN97 connectors and with SST disconnected visually check inside each connector and the caulked portion of each wire for defects.

Refer to BEFORE TROUBLESHOOTING

Portion to be inspected	Standard
CN101-23(316) to CN97-3(316)	Continuity
CN102-31(317) to CN97-2(317)	Continuity
CN97-1(51) to CN97-3(316)	No continuity
CN97-1(51) to CN97-2(317)	No continuity

Judgment

Result	Procedure
OK	**Main controller defect**
NG	**Harness defect**

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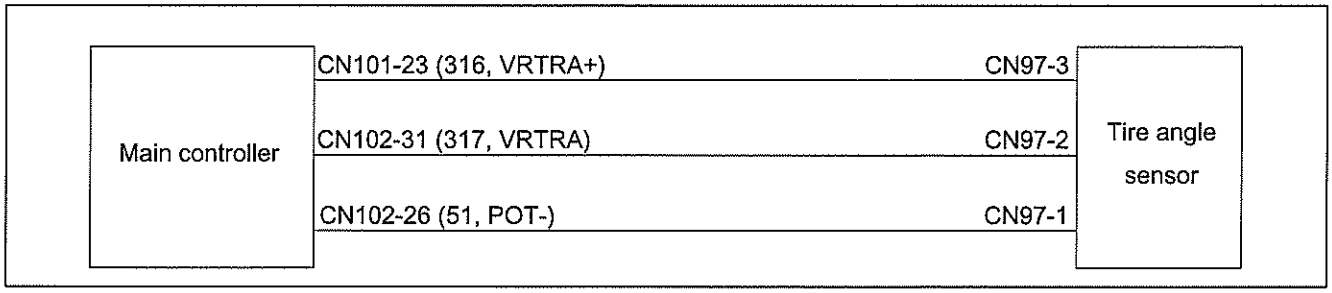
Error Code: 71-2

Failure mode: Tire angle sensor short abnormality

Probable cause

- Connector contact defect
- Tire angle sensor defect
- Harness defect
- Main controller defect

Related portion



STEP1

Connector inspection

1 . Turn off the key switch and disconnect the battery plug.

2 . Visually check inside the connector of CN97, and the caulked portion of its wire for defects. (Refer to BEFORE TROUBLESHOOTING)

3 . After connecting the CN97 connector, connect the battery plug and turn key switch ON to confirm error.

Judgment

Result	Procedure
71-2 error occurs.	Go to step 2
71-2 error does not occur.	**Connector contact defect**

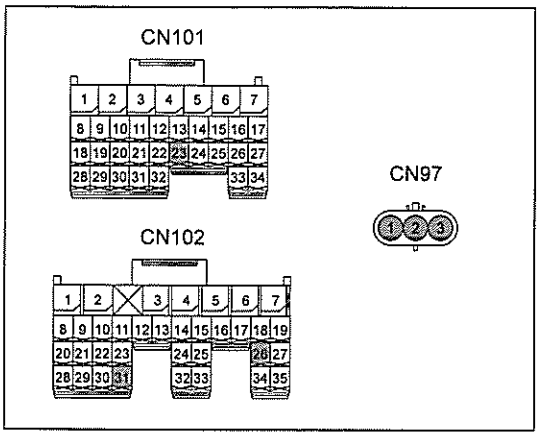
STEP2

Inspection : Harness

1 . Turn off the key switch and disconnect the battery plug.

2 . Disconnect the CN101, CN102 and CN97 connectors and check the harnesses.

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[Inspection procedure and standard]

Inspect for continuity and short circuiting of the harness.

Turn off the key switch and disconnect the battery plug and the CN101, CN102 and CN97 connectors and visually check inside each connector and the caulked portion of each wire for defects.

Refer to BEFORE TROUBLESHOOTING

Portion to be inspected	Standard
CN97-2(317) to CN97-3(316)	No continuity
CN102-26(51) to CN97-1(51)	Continuity
CN101-23(316) to CN102-31(317)	No continuity

Judgment

Result	Procedure
OK	Go to step 3
NG	**Harness defect**

STEP3

Inspection : Tire angle sensor

1 . Turn off the key switch and disconnect the battery plug.

2 . Disconnect the CN97 connector, then connect the CN101 and CN102 connectors.

3 . Reconnect the battery plug and turn on the key switch.

ON, and check the error code.

Judgment

Result	Procedure
71-2 error occurs.	**Main controller defect**
71-1 error occurs.	**Tire angle sensor defect**

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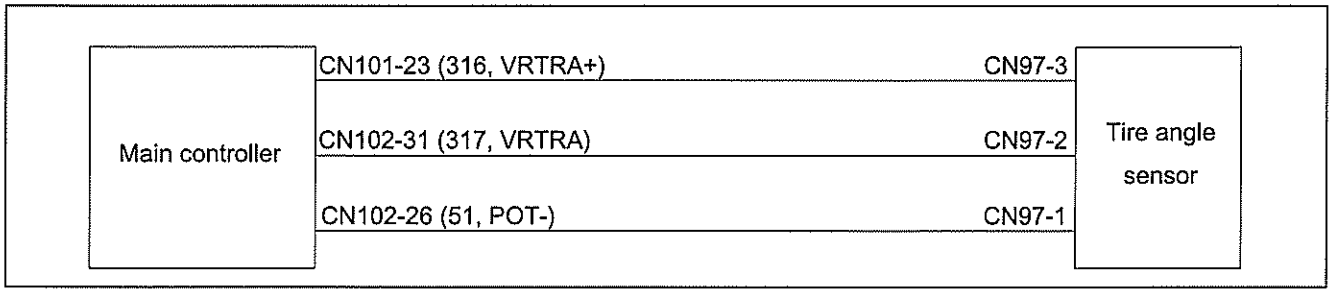
Error Code: 71-3

Failure mode: Tire angle sensor anchoring abnormality

Probable cause

- Connector contact defect
- Tire angle sensor defect
- Harness defect
- Main controller defect

Related portion



STEP1

Connector inspection

1 . Turn off the key switch and disconnect the battery plug.

2 . Visually check inside the connector of CN97, and the caulked portion of its wire for defects. (Refer to BEFORE TROUBLESHOOTING)

3 . After connecting the CN97 connector, connect the battery plug and turn on the key switch to confirm error with turning steering wheel.

Judgment

Result	Procedure
71-3 error occurs.	Go to step 2
71-3 error does not occur.	**Connector contact defect**

STEP2

Inspection : Tire angle sensor

1 . Turn off the key switch and disconnect the battery plug.

2 . Disconnect the CN97 connector, then connect the CN101 and CN102 connectors.

3 . Reconnect the battery plug and turn on the key switch, and check the error code.

Judgment

Result	Procedure
71-1 error occurs.	Go to step 3
71-1 error does not occur.	Go to step 4

STEP3

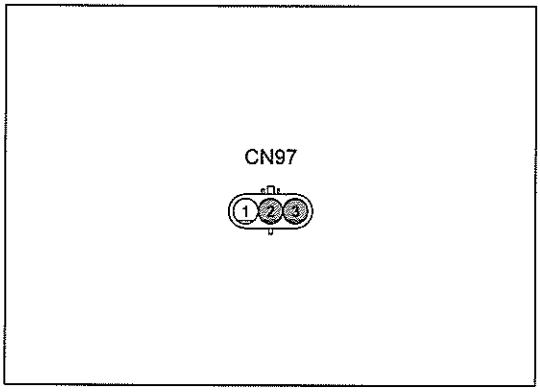
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Tire angle sensor inspection

1 . Turn off the key switch and disconnect the battery plug.

2 . Disconnect the CN97 connector, then connect the CN101 and CN102 connectors. Connect between CN97-3 and CN 97-2 for harness side with SST2 connected.

3 . Reconnect the battery plug and turn on the key switch, and check the error code.



Judgment

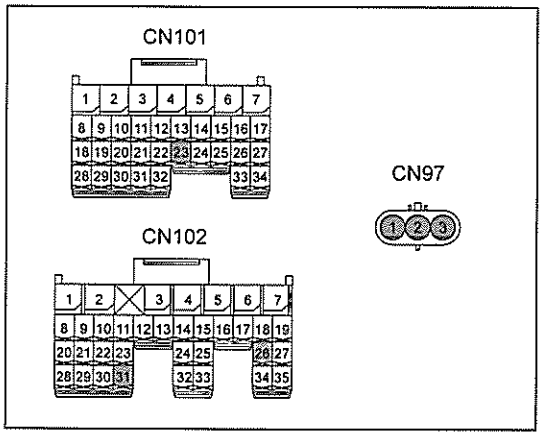
Result	Procedure
71-2 error occurs.	**Tire angle sensor defect**
71-2 error does not occur.	Go to step 4

STEP4

Inspection : Harness

1 . Turn off the key switch and disconnect the battery plug.

2 . Disconnect the CN101, CN102 and CN97 connectors and check the harnesses.



[Inspection procedure and standard]

Inspect for continuity and short circuiting of the harness.

Turn off the key switch and disconnect the battery plug and the CN101, CN102 and CN97 connectors and visually check inside each connector and the caulked portion of each wire for defects.

Refer to BEFORE TROUBLESHOOTING

Portion to be inspected	Standard
CN101-23(316) to CN97-3(316)	Continuity
CN102-31(317) to CN97-2(317)	Continuity
CN102-26(51) to CN97-1(51)	Continuity
CN97-1(51) to CN97-3(316)	No continuity
CN97-1(51) to CN97-2(317)	No continuity
CN97-2(317) to CN97-3(316)	No continuity

Judgment

Result	Procedure
OK	**Main controller defect**
NG	**Harness defect**

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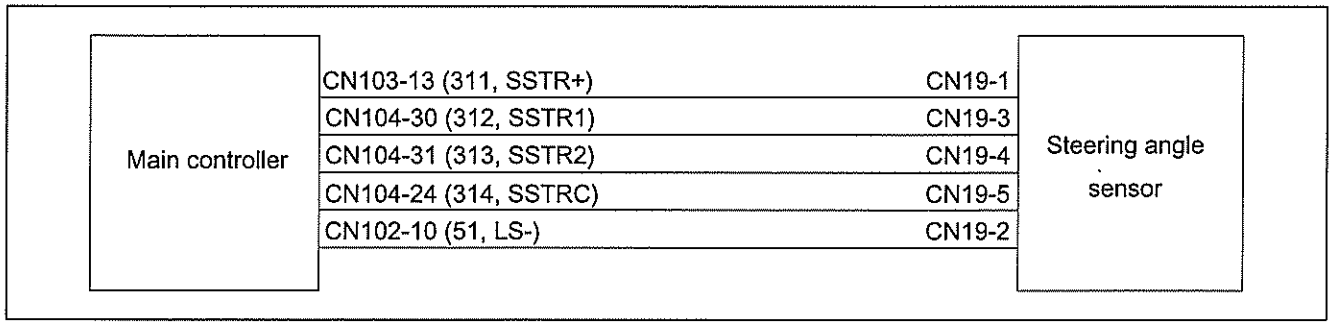
Error Code: 72-1

Failure mode: Steering-wheel angle sensor SS1 open abnormality

Probable cause

- Connector contact defect
- Harness defect
- Steering angle sensor defect
- Main controller defect

Related portion



STEP1

Connector contact inspection :

Turn off the key switch and disconnect the battery plug.

After disconnection the CN19 connector, check the inside of connector and the caulked portion of wire whether it has defect or not by visual confirm. (Refer to BEFORE TROUBLESHOOTING)

Connect the CN19 connector, connect the battery plug.

Turn on the key switch, and check if error occurs with turning steering wheel.

Judgment

Result	Procedure
72-1 error occurs.	Go to step 2
72-1 error does not occur.	**Connector contact defect**

STEP2

Inspection : Steering angle sensor

Check the condition of the sensor with operating steering wheel.

SST
[ANL] 5 IO4 (5 06)
Multi-function display
[ANL] I/O STEERING 1/1

SSTR

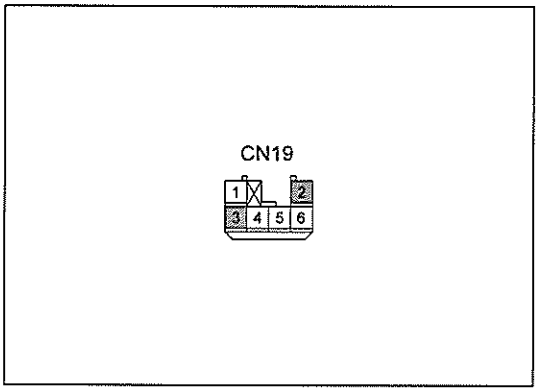
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Judgment

Result	Procedure
0** (* represents either 0 or 1.)	Go to step 3
1** (* represents either 0 or 1.)	Go to step 5

STEP3

Inspection : Steering angle sensor



Turn off the key switch and disconnect the battery plug.

Disconnect the CN19 connector and connect CN19-2 to CN19-3 on the harness side through SST2 (09232-13130-71).

Reconnect the battery plug and turn on the key switch.

Check the condition of the sensor with operating steering wheel.

STD
[ANL] 5 IO4 (5 06)
Multi-function display
[ANL] I/O STEERING 1/1

SSTR

Judgment

Result	Procedure
0** (* represents either 0 or 1.)	Go to step 4
1** (* represents either 0 or 1.)	**Steering angle sensor defect**

STEP4

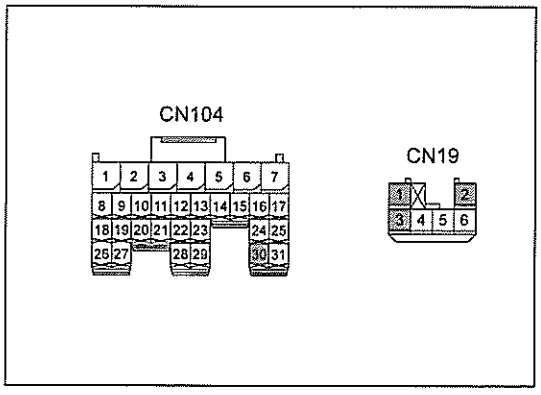
Inspection : Harness

Turn off the key switch and disconnect the battery plug.

Disconnect the CN19, CN101, CN103, CN104 connectors and check the harnesses for their continuities.

[Inspection procedure and standard]

Inspect for continuity of the harness.



Perform this check with the battery plug and the CN19, CN101, CN103, CN104 connectors disconnected, and visually check inside the connector and the caulked portion of its wire for defects.

Refer to BEFORE TROUBLESHOOTING

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Portion to be inspected	Standard:
CN104-30(312) to CN19-3(312)	Continuity
CN19-1(311) to CN19-3(312)	No continuity
CN19-2(51) to CN19-3(312)	No continuity
CN19-1(311) to CN19-2(51)	No continuity

Judgment

Result	Procedure
OK	**Main controller defect**
NG	**Harness defect**

STEP5

Inspection : Steering angle sensor

Turn off the key switch and disconnect the battery plug.

Disconnect the CN19 connector.

Reconnect the battery plug and turn on the key switch.

Check the condition of the sensor with operating steering wheel.

STD
[ANL] 5 IO4 (5 06)
Multi-function display
[ANL] I/O STEERING 1/1

SSTR

Judgment

Result	Procedure
1** (* represents either 0 or 1.)	Go to step 6
0** (* represents either 0 or 1.)	**Steering angle sensor defect**

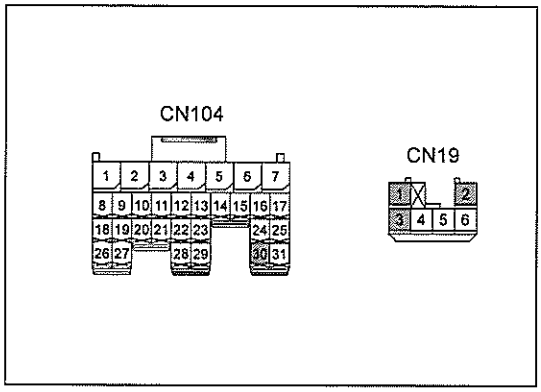
STEP6

Inspection : Harness

Turn off the key switch and disconnect the battery plug.

Disconnect the CN19, CN101, CN103 and CN104 connectors and check the harnesses for their continuities.

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[Inspection procedure and standard]

Inspect for continuity of the harness.

Perform this check with the battery plug and the CN19, CN101, CN103 and CN104 connectors disconnected, and visually check inside the connector and the caulked portion of its wire for defects.

Refer to BEFORE TROUBLESHOOTING

Portion to be inspected	Standard:
CN104-30(312) to CN19-3(312)	Continuity
CN19-1(311) to CN19-3(312)	No continuity
CN19-2(51) to CN19-3(312)	No continuity
CN19-1(311) to CN19-2(51)	No continuity

Judgment

Result	Procedure
OK	**Main controller defect**
NG	**Harness defect**

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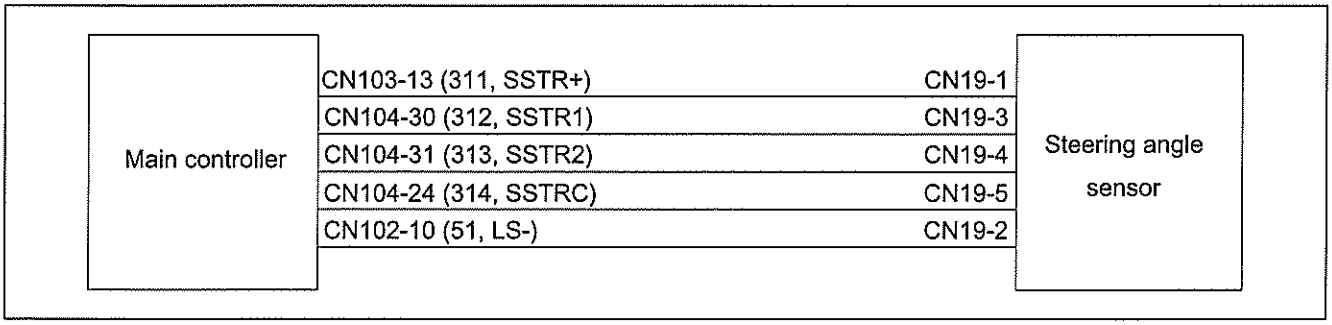
Error Code: 72-2

Failure mode: Steering-wheel angle sensor SS2 open abnormality

Probable cause

- Connector contact defect
- Harness defect
- Steering angle sensor defect
- Main controller defect

Related portion



STEP1

Connector contact inspection :

Turn off the key switch and disconnect the battery plug.

After disconnection the CN19 connector, check the inside of connector and the caulked portion of wire whether it has defect or not by visual confirm. (Refer to BEFORE TROUBLESHOOTING)

Connect the CN19 connector, connect the battery plug.

Turn on the key switch, and check if error occurs with turning steering wheel.

Judgment

Result	Procedure
72-2 error occurs.	Go to step 2
72-2 error does not occur.	**Connector contact defect**

STEP2

Inspection : Steering angle sensor

Check the condition of the sensor with operating steering wheel.

STD
[ANL] 5 IO4 (5 06)
Multi-function display
[ANL] I/O STEERING 1/1

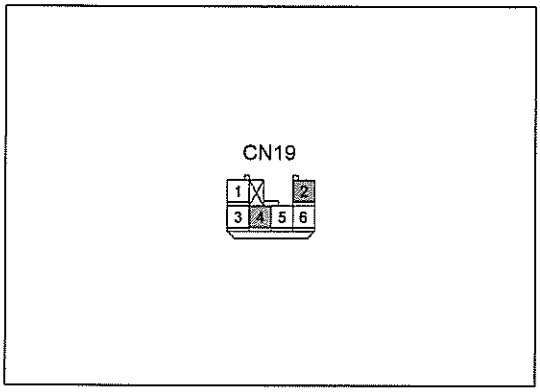
SSTR

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Judgment

Result	Procedure
0 (* represents either 0 or 1.)	Go to step 3
1 (* represents either 0 or 1.)	Go to step 5

STEP3



Inspection : Steering angle sensor

Turn off the key switch and disconnect the battery plug.

Disconnect the CN19 connector and connect CN19-2 to CN19-4 on the harness side through SST2 (09232-13130-71).

Reconnect the battery plug and turn on the key switch.

Check the condition of the sensor with operating steering wheel.

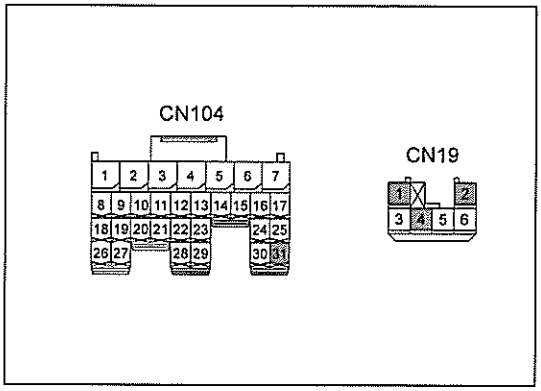
STD
[ANL] 5 IO4 (5 06)
Multi-function display
[ANL] I/O STEERING 1/1

SSTR

Judgment

Result	Procedure
0 (* represents either 0 or 1.)	Go to step 4
1 (* represents either 0 or 1.)	**Steering angle sensor defect**

STEP4



Inspection : Harness

Turn off the key switch and disconnect the battery plug.

Disconnect the CN19, CN102, CN103, CN104 connectors and check the harnesses for their continuities.

[Inspection procedure and standard]

Inspect for continuity of the harness.

Perform this check with the battery plug and the CN19, CN102, CN103, CN104 connectors disconnected, and visually check inside the connector and the caulked portion of its wire for defects.

Refer to BEFORE TROUBLESHOOTING

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Portion to be inspected	Standard:
CN104-31(313) to CN19-4(313)	Continuity
CN19-1(311) to CN19-4(313)	No continuity
CN19-2(51) to CN19-4(313)	No continuity
CN19-1(311) to CN19-2(51)	No continuity

Judgment

Result	Procedure
OK	**Main controller defect**
NG	**Harness defect**

STEP5

Inspection : Steering angle sensor

Turn off the key switch and disconnect the battery plug.

Disconnect the CN19 connector.

Reconnect the battery plug and turn on the key switch.

Check the condition of the sensor with operating steering wheel.

STD
[ANL] 5 IO4 (5 06)
Multi-function display
[ANL] I/O STEERING 1/1

SSTR

Judgment

Result	Procedure
1 (* represents either 0 or 1.)	Go to step 6
0 (* represents either 0 or 1.)	**Steering angle sensor defect**

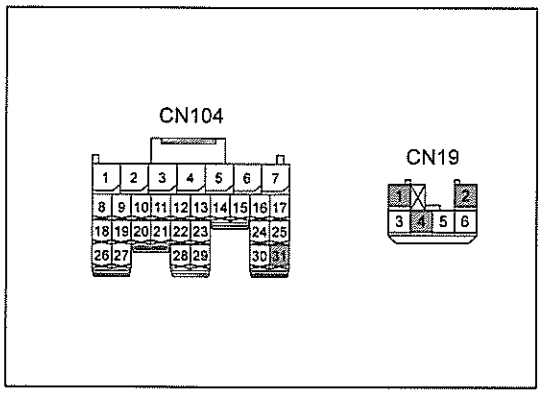
STEP6

Inspection : Harness

Turn off the key switch and disconnect the battery plug.

Disconnect the CN19, CN102, CN103 and CN104 connectors and check the harnesses for their continuities.

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[Inspection procedure and standard]

Inspect for continuity of the harness.

Perform this check with the battery plug and the CN19, CN102, CN103 and CN104 connectors disconnected, and visually check inside the connector and the caulked portion of its wire for defects.

Refer to BEFORE TROUBLESHOOTING

Portion to be inspected	Standard:
CN104-31(313) to CN19-4(313)	Continuity
CN19-1(311) to CN19-4(313)	No continuity
CN19-2(51) to CN19-4(313)	No continuity
CN19-1(311) to CN19-2(51)	No continuity

Judgment

Result	Procedure
OK	**Main controller defect**
NG	**Harness defect**

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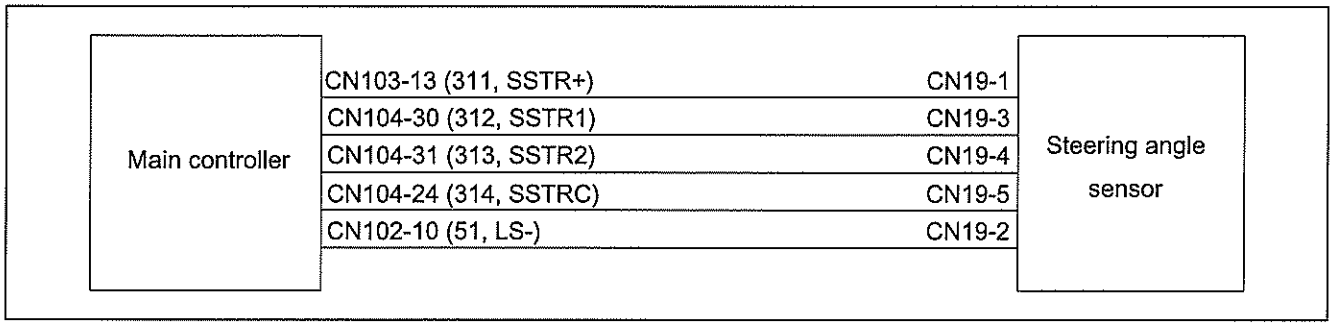
Error Code: 72-3

Failure mode: Steering-wheel angle sensor SSC open abnormality

Probable cause

- Connector contact defect
- Harness defect
- Steering angle sensor defect
- Main controller defect

Related portion



STEP1

Connector contact inspection :

Turn off the key switch and disconnect the battery plug.

After disconnection the CN19 connector, check the inside of connector and the caulked portion of wire whether it has defect or not by visual confirm. (Refer to BEFORE TROUBLESHOOTING)

Connect the CN19 connector, connect the battery plug.

Turn on the key switch, and check if error occurs with turning steering wheel (over one revolution).

Judgment

Result	Procedure
72-2 error occurs.	Go to step 2
72-2 error does not occur.	**Connector contact defect**

STEP2

Inspection : Steering angle sensor

Check the condition of the sensor with operating steering wheel.

STD
[ANL] 5 IO4 (5 06)
Multi-function display
[ANL] I/O STEERING 1/1

SSTR

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Judgment

Result	Procedure
0 (* represents either 0 or 1.)	Go to step 3
1 (* represents either 0 or 1.)	Go to step 5

STEP3

Inspection : Steering angle sensor

Turn off the key switch and disconnect the battery plug.

Disconnect the CN19 connector and connect CN19-2 to CN19-5 on the harness side through SST2 (09232-13130-71).

Reconnect the battery plug and turn on the key switch.

Check the condition of the sensor with operating steering wheel.

STD
[ANL] 5 IO4 (5 06)
Multi-function display
[ANL] I/O STEERING 1/1

SSTR

Judgment

Result	Procedure
0 (* represents either 0 or 1.)	Go to step 4
1 (* represents either 0 or 1.)	**Steering angle sensor defect**

STEP4

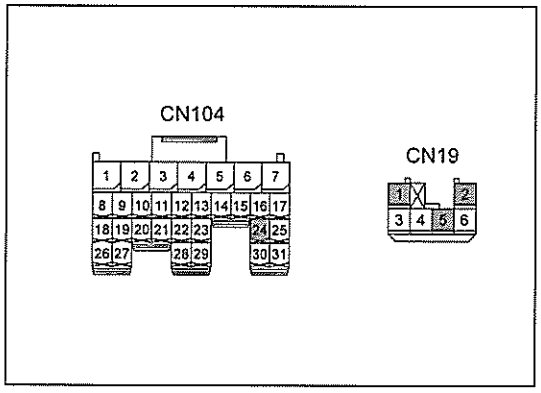
Inspection : Harness

Turn off the key switch and disconnect the battery plug.

Disconnect the CN19, CN102, CN103, CN104 connectors and check the harnesses for their continuities.

[Inspection procedure and standard]

Inspect for continuity of the harness.



Perform this check with the battery plug and the CN19, CN102, CN103, CN104 connectors disconnected, and visually check inside the connector and the caulked portion of its wire for defects.

Refer to BEFORE TROUBLESHOOTING

Portion to be inspected	Standard:
CN104-24(314) to CN19-5(314)	Continuity
CN19-1(311) to CN19-5(314)	No continuity
CN19-2(51) to CN19-5(314)	No continuity

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Portion to be inspected	Standard:
CN19-1(311) to CN19-2(51)	No continuity

Judgment

Result	Procedure
OK	**Main controller defect**
NG	**Harness defect**

STEP5

Inspection : Steering angle sensor

Turn off the key switch and disconnect the battery plug.

Disconnect the CN19 connector.

Reconnect the battery plug and turn on the key switch.

Check the condition of the sensor with operating steering wheel.

STD
[ANL] 5 IO4 (5 06)
Multi-function display
[ANL] I/O STEERING 1/1

SSTR

Judgment

Result	Procedure
1 (* represents either 0 or 1.)	Go to step 6
0 (* represents either 0 or 1.)	**Steering angle sensor defect**

STEP6

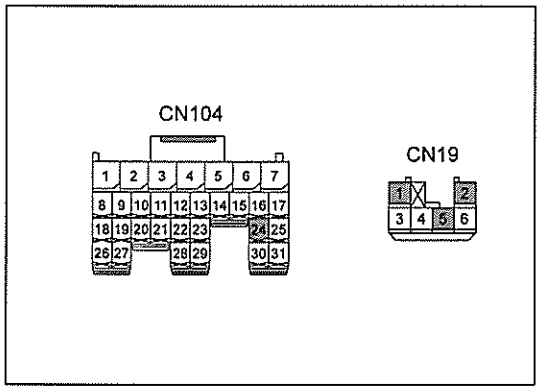
Inspection : Harness

Turn off the key switch and disconnect the battery plug.

Disconnect the CN104 and CN19 connector and check the harnesses for their continuities.

[Inspection procedure and standard]

Inspect for continuity of the harness.



Perform this check with the battery plug and the CN101, CN103, CN104 and CN19 connectors disconnected, and visually check inside the connector and the caulked portion of its wire for defects.

Refer to BEFORE TROUBLESHOOTING

Portion to be inspected	Standard:
CN104-24(314) to CN19-5(314)	Continuity
CN19-1(311) to CN19-5(314)	No continuity

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Portion to be inspected	Standard:
CN19-2(51) to CN19-5(314)	No continuity
CN19-1(311) to CN19-2(51)	No continuity

Judgment

Result	Procedure
OK	**Main controller defect**
NG	**Harness defect**

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Error Code: 72-4

Failure mode: Steering-wheel angle sensor : sensor power source open abnormality

⚠ CAUTION

- **Turning the steering angle sensor without turning the steering wheel may cause error code 72-4 to be set.**

Probable cause

- Connector contact defect
- Harness defect
- Steering angle sensor defect
- Main controller defect

Related portion

Main controller			Steering angle sensor
	CN103-13 (311, SSTR+)	CN19-1	
	CN104-30 (312, SSTR1)	CN19-3	
	CN104-31 (313, SSTR2)	CN19-4	
	CN104-24 (314, SSTRC)	CN19-5	
	CN102-10 (51, LS-)	CN19-2	

STEP1

Connector contact inspection :

Turn off the key switch and disconnect the battery plug.

After disconnection the CN19 connector, check the inside of connector and the caulked portion of wire whether it has defect or not by visual confirm. (Refer to BEFORE TROUBLESHOOTING)

Connect the CN19 connector, connect the battery plug.

Turn on the key switch, and turn the steering wheel to see if an error occurs. (If the steering wheel cannot be turned easily, perform this check with the direction switch in the Forward or Reverse position.)

Judgment

Result	Procedure
72-4 error occurs.	Go to step 2
72-4 error does not occur.	**Connector contact defect**

STEP2

Check of sensor supply voltage:

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Turn off the key switch and disconnect the battery plug.

Disconnect the CN19 connector.

Reconnect the battery plug and turn on the key switch.

Check the supply voltage to the sensor.
CN19-1 to CN19-2

Judgment

Result	Procedure
Approx. 0 V	Go to step 3
Approx. 15V	Go to step 4

STEP3

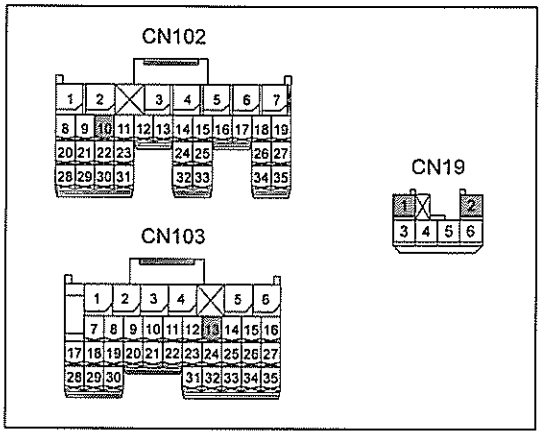
Inspection : Harness

Turn off the key switch and disconnect the battery plug.

Disconnect the CN19, CN102, CN103 and CN104 connectors and check the harnesses for their continuities.

[Inspection procedure and standard]

Inspect for continuity of the harness.



Perform this check with the battery plug and the CN19, CN102, CN103 and CN104 connectors disconnected, and visually check inside the connector and the caulked portion of its wire for defects.

Refer to BEFORE TROUBLESHOOTING

Portion to be inspected	Standard:
CN103-13(311) to CN19-1(311)	Continuity
CN102-10(51) to CN19-2(51)	Continuity
CN19-1(311) to CN19-2(51)	No continuity

Judgment

Result	Procedure
OK	**Main controller defect**
NG	**Harness defect**

STEP4

Turn off the key switch and disconnect the battery plug.

Reconnect the CN19 connector.

Reconnect the battery plug and turn on the key switch.

Perform troubleshooting for 72-1 (SSTR1).
Perform troubleshooting for 72-2 (SSTR2).

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Error Code: 73-1

Failure mode: Steering knob position synchronizer solenoid open abnormality

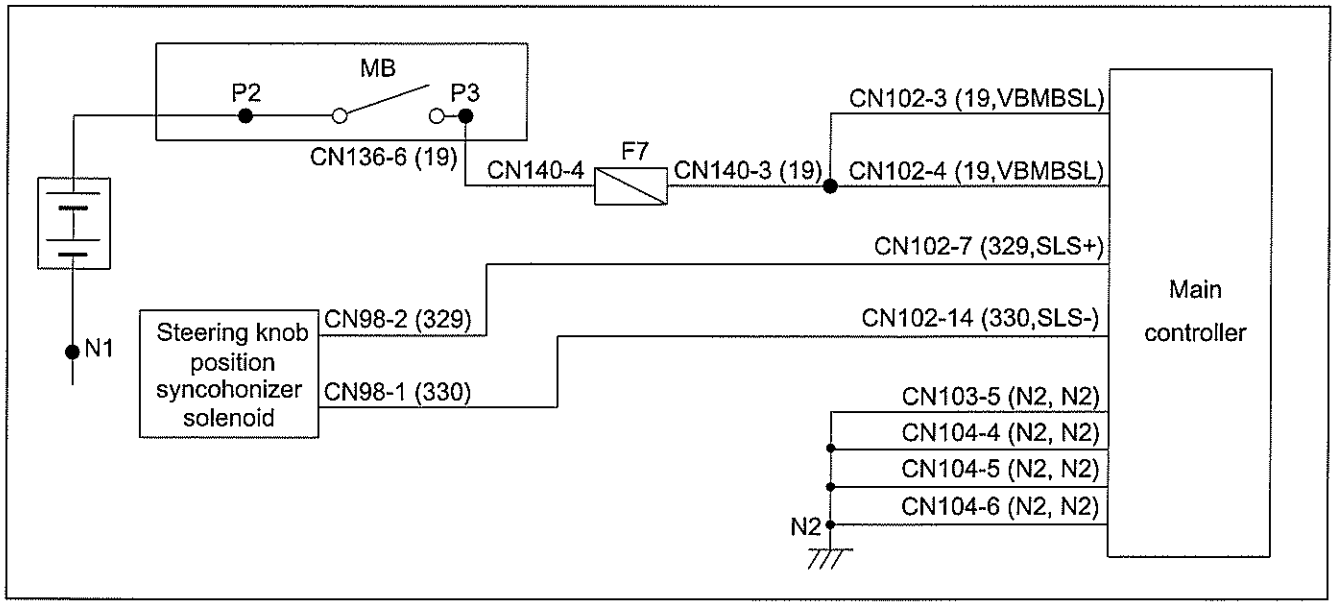
⚠ CAUTION

- **If 73-3 also occurs, disconnect the battery plug at once, perform troubleshooting with priority given to 73-3.**
- **If A9-2 occurs at same time, perform troubleshooting for A9-2 first.**

Probable cause

- Connector contact defect
- Steering knob position synchronizer solenoid defect
- Harness defect
- Main controller defect

Related portion



STEP1

Connector contact inspection :

Turn off the key switch and disconnect the battery plug.

After disconnection the CN98 connector, check the inside of connector and the caulked portion of wire whether it has defect or not by visual confirm. (Refer to BEFORE TROUBLESHOOTING)

Connect the CN98 connector, connect the battery plug.

Turn on the key switch to see if an error occurs.

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Judgment

Result	Procedure
73-4 error occurs.	**Perform troubleshooting for 73-4.**
73-4 error does not occur.	Go to step 2

STEP2

Connector contact inspection :

Using Active Test, forcibly turn on the output of the steering knob position synchronizer solenoid to see if an error occurs.

STD
[ANL] 7 ACT (7 01)
Multi-function display
[ANL] ACTIVE TEST 1/3
STEERING SOL : OFF to ON

Judgment

Result	Procedure
73-1 error does not occur.	**Connector contact defect**
73-1 error occurs.	Go to step 3

STEP3

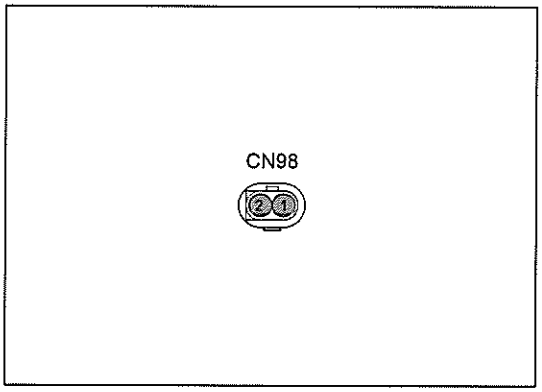
Inspection : Steering knob position synchronizer solenoid

Turn off the key switch and disconnect the battery plug.

Disconnect the CN98 connector, and check the resistance of the steering knob position synchronizer solenoid.

[Inspection procedure and standard]

Inspect the solenoid resistance.



Perform this check with the battery plug and the CN98 connector disconnected, and visually check inside the connector and the caulked portion of its wire for defects.

Refer to BEFORE TROUBLESHOOTING

Portion to be inspected	Standard:
CN98-2(329) to CN98-1(329)	between 7 and 17 Ω (approx. 10 Ω at 20°C)

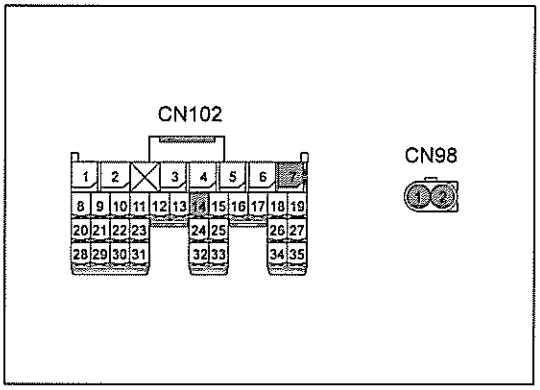
Judgment

Result	Procedure
NG	**Steering knob position synchronizer solenoid defect**
OK	Go to step 4

STEP4

Inspection : Harness

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Turn off the key switch and disconnect the battery plug.

Disconnect the CN98, CN101, CN102, CN103 and CN104 connectors and check the harnesses for their continuities.

[Inspection procedure and standard]

Inspect for continuity of the harness.

Perform this check with the battery plug and the CN98, CN101, CN102, CN103 and CN104 connectors disconnected, and visually check inside the connector and the caulked portion of its wire for defects.

Refer to BEFORE TROUBLESHOOTING

*: In case of the OK in the steering knob position synchronizer solenoid, connect the CN98 connector and measure the resistance between CN102-7 and CN102-14. And it is OK if this resistance is between 7 and 17 Ω (approx. 10 Ω at 20°C).

Portion to be inspected	Standard:
CN102-7(329) to CN98-2(329) *	Continuity
CN102-14(330) to CN98-1(330) *	Continuity
CN98-2(329) to N2	No continuity
CN98-1(330) to N2	No continuity

Judgment

Result	Procedure
NG	**Harness defect**
OK	**Main controller defect**

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Error Code: 73-2

Failure mode: Steering knob position synchronizer solenoid short abnormality

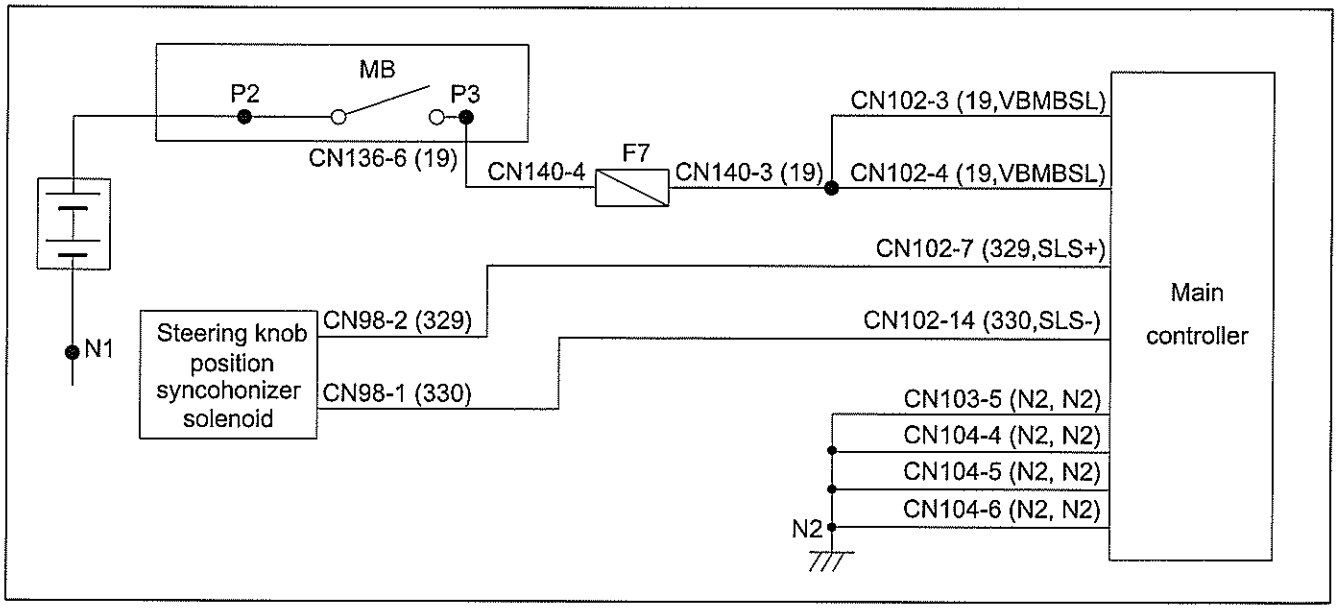
⚠ CAUTION

- **If 73-3 also occurs, disconnect the battery plug at once, perform troubleshooting with priority given to 73-3.**

Probable cause

- Connector contact defect
- Harness defect
- Steering knob position synchronizer solenoid defect
- Main controller defect

Related portion



STEP1

Connector contact inspection :

Turn off the key switch and disconnect the battery plug.

After disconnection the CN98 connector, check the inside of connector and the caulked portion of wire whether it has defect or not by visual confirm. (Refer to BEFORE TROUBLESHOOTING)

Connect the CN98 connector, connect the battery plug.

Turn on the key switch to see if an error occurs.

Judgment

Result	Procedure
73-4 error occurs.	**Perform troubleshooting for 73-4.**
73-4 error does not occur.	Go to step 2

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STEP2

Connector contact inspection :

Using Active Test, forcibly turn on the output of the steering knob position synchronizer solenoid to see if an error occurs.

STD
[ANL] 7 ACT (7 01)
Multi-function display
[ANL] ACTIVE TEST 1/3
STEERING SOL : OFF to ON

Judgment

Result	Procedure
73-2 error does not occur.	**Connector contact defect**
73-2 error occurs.	Go to step 3

STEP3

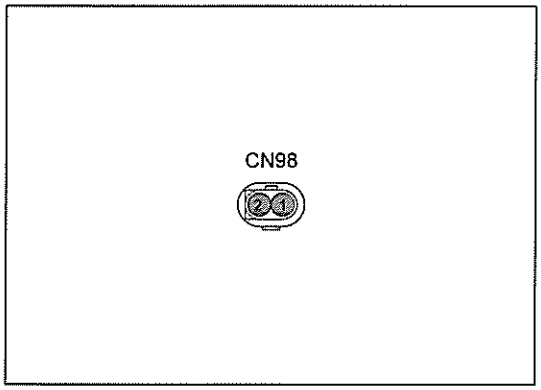
Inspection : Steering knob position synchronizer solenoid

Turn off the key switch and disconnect the battery plug.

Disconnect the CN98 connector, and check the resistance of steering knob position synchronizer solenoid.

[Inspection procedure and standard]

Inspect the solenoid resistance.



Perform this check with the battery plug and the CN98 connector disconnected, and visually check inside the connector and the caulked portion of its wire for defects.

Refer to BEFORE TROUBLESHOOTING

Portion to be inspected	Standard:
CN98-2(329) to CN98-1(330)	between 7 and 17 Ω (approx. 10 Ω at 20°C)

Judgment

Result	Procedure
NG	**Steering knob position synchronizer solenoid defect**
OK	Go to step 4

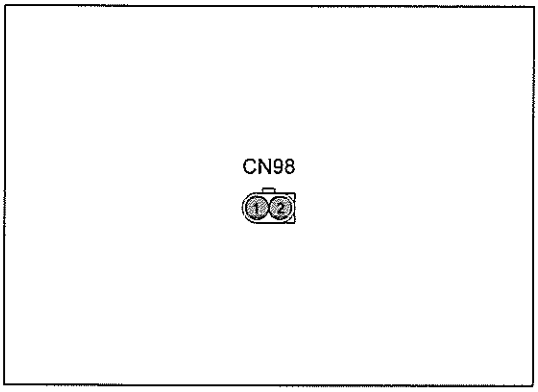
STEP4

Inspection : Harness

Turn off the key switch and disconnect the battery plug.

Disconnect the CN98, CN101, CN103 and CN104 connectors and check the harnesses for their continuities.

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[Inspection procedure and standard]

Inspect for continuity of the harness.

Perform this check with the battery plug and the CN98, CN101, CN103 and CN104 connectors disconnected, and visually check inside the connector and the caulked portion of its wire for defects.

Refer to BEFORE TROUBLESHOOTING

Portion to be inspected	Standard:
CN98-2(329) to CN98-1(330)	No continuity
CN98-1(330) to P2	No continuity
CN98-1(330) to P3	No continuity

Judgment

Result	Procedure
OK	**Main controller defect**
NG	**Harness defect**

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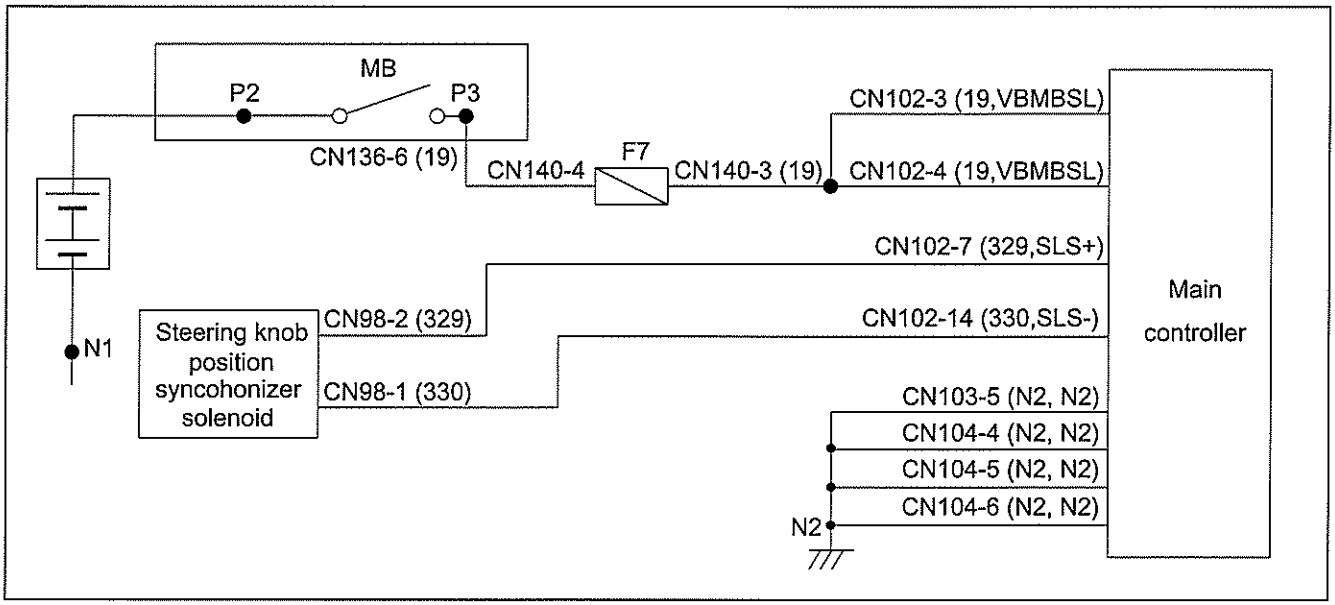
Error Code: 73-3

Failure mode: Steering knob position synchronizer solenoid power-circuit abnormality

Probable cause

- Harness defect
- Steering knob position synchronizer solenoid defect
- Main controller defect

Related portion



STEP1

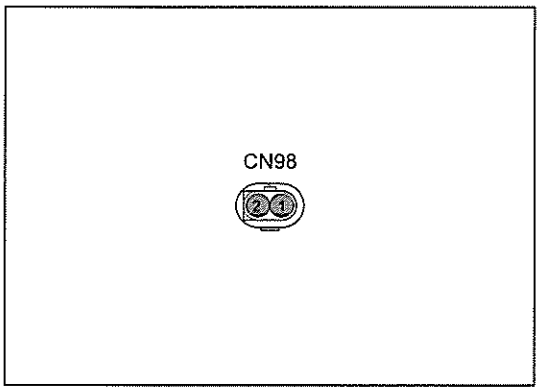
Inspection : Steering knob position synchronizer solenoid

Turn off the key switch and disconnect the battery plug.

Disconnect the CN98 connector, and check the resistance of steering knob position synchronizer solenoid.

[Inspection procedure and standard]

Inspect the solenoid resistance.



Perform this check with the battery plug and the CN98 connector disconnected, and visually check inside the connector and the caulked portion of its wire for defects.

Refer to BEFORE TROUBLESHOOTING

Portion to be inspected	Standard:
CN98-2(329) to CN98-1(330)	between 7 and 17 Ω (approx. 10 Ω at 20°C)

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Judgment

Result	Procedure
NG	Go to step 2 **Steering knob position synchronizer solenoid defect**
OK	Go to step 2

STEP2

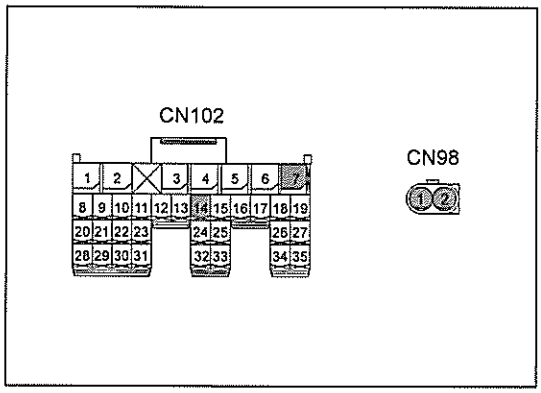
Inspection : Harness

Turn off the key switch and disconnect the battery plug.

Disconnect the CN98, CN101, CN102, CN103 and CN104 connectors and check the harnesses for their continuities.

[Inspection procedure and standard]

Inspect for continuity of the harness.



Perform this check with the battery plug and the CN98, CN101, CN102, CN103 and CN104 connectors disconnected, and visually check inside the connector and the caulked portion of its wire for defects.

Refer to BEFORE TROUBLESHOOTING

Portion to be inspected	Standard:
CN98-2(329) to CN98-1(330)	No continuity
CN102-7(329) to CN102-14(330)	No continuity
CN98-1(330) to P2	No continuity
CN98-1(330) to P3	No continuity

Judgment

Result	Procedure
NG	**Harness and main controller defect.**
OK	**Main controller defect.**

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Error Code: 73-4

Failure mode: Steering knob position synchronizer solenoid (open / short) abnormality

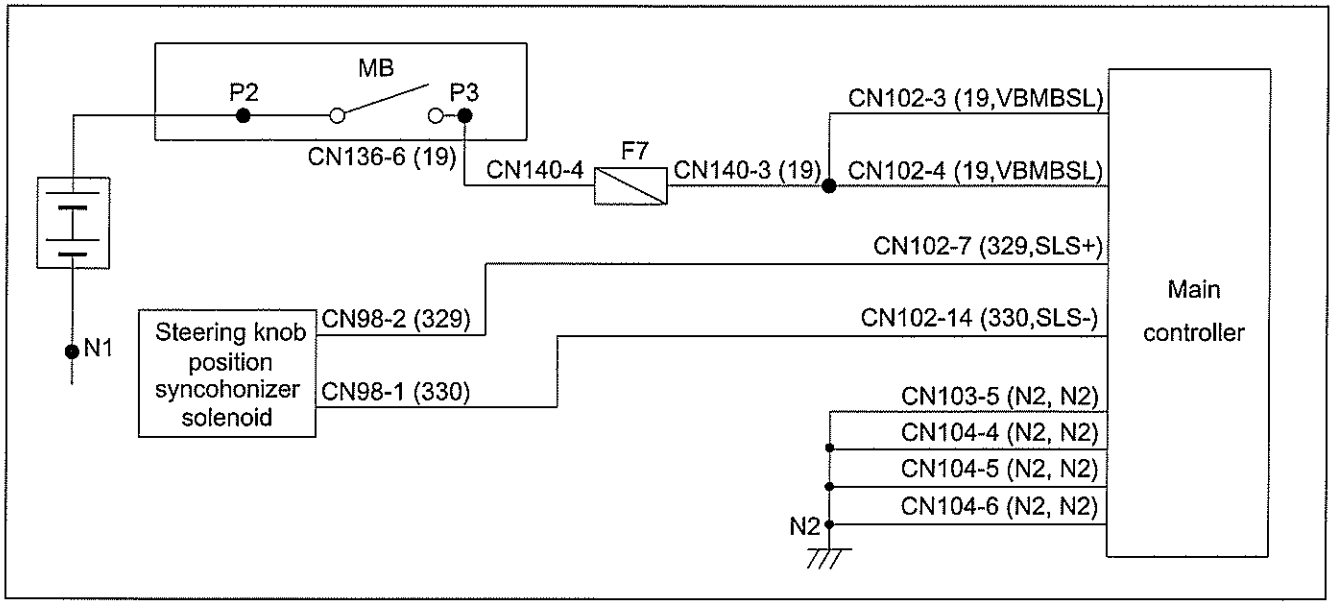
⚠ CAUTION

- **If 73-3 also occurs, disconnect the battery plug at once, perform troubleshooting with priority given to 73-3.**
- **If A9-2 occurs at same time, perform troubleshooting for A9-2 first.**

Probable cause

- Connector contact defect
- Tilt solenoid defect
- Harness defect
- Main controller defect

Related portion



STEP1

Connector contact inspection :

Turn off the key switch and disconnect the battery plug.

After disconnection the CN98 connector, check the inside of connector and the caulked portion of wire whether it has defect or not by visual confirm. (Refer to BEFORE TROUBLESHOOTING)

Connect the CN98 connector, connect the battery plug.

Turn on the key switch to see if an error occurs.

Judgment

Result	Procedure
73-4 error occurs.	Go to step 2

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Result	Procedure
73-4 error does not occur.	**Connector contact defect**

STEP2

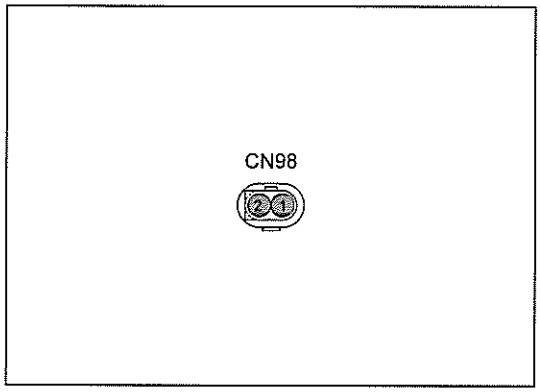
Inspection : Steering knob position synchronizer solenoid

Turn off the key switch and disconnect the battery plug.

Disconnect the CN98 connector, and check the resistance of steering knob position synchronizer solenoid.

[Inspection procedure and standard]

Inspect the solenoid resistance.



Perform this check with the battery plug and the CN98 connector disconnected, and visually check inside the connector and the caulked portion of its wire for defects.

Refer to BEFORE TROUBLESHOOTING

Portion to be inspected	Standard:
CN98-2(329) to CN98-1(330)	between 7 and 17 Ω (approx. 10 Ω at 20°C)

Judgment

Result	Procedure
NG	**Tilt solenoid defect**
OK	Go to step 3

STEP3

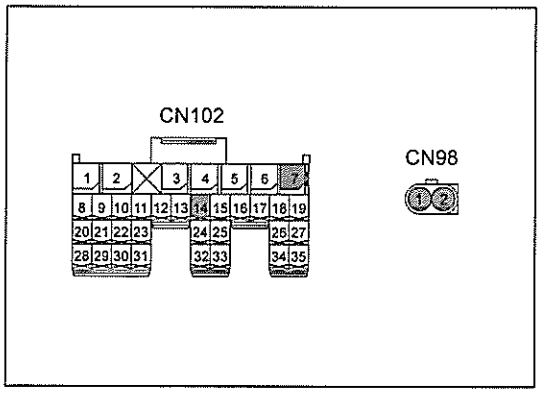
Inspection : Harness

Turn off the key switch and disconnect the battery plug.

Disconnect the CN98, CN101, CN102, CN103 and CN104 connectors and check the harnesses for their continuities.

[Inspection procedure and standard]

Inspect for continuity of the harness.



Perform this check with the battery plug and the CN98, CN101, CN102, CN103 and CN104 connectors disconnected, and visually check inside the connector and the caulked portion of its wire for defects.

Refer to BEFORE TROUBLESHOOTING

*: Connect the CN98 connector and measure the resistance between CN102-7 and CN102-14. And it is OK if this resistance is between 7 and 17 Ω (approx. 10 Ω at 20°C).

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Portion to be inspected	Standard:
CN102-7(329) to CN98-2(329) *	Continuity
CN102-14(330) to CN98-1(330) *	Continuity
CN102-7(329) to CN102-14(330) *	No continuity
CN98-2(329) to N2	No continuity
CN98-1(330) to N2	No continuity

Judgment

Result	Procedure
NG	**Harness defect**
OK	**Main controller defect**

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Error Code: 74-1

Failure mode: Tire angle matching: matching value abnormality

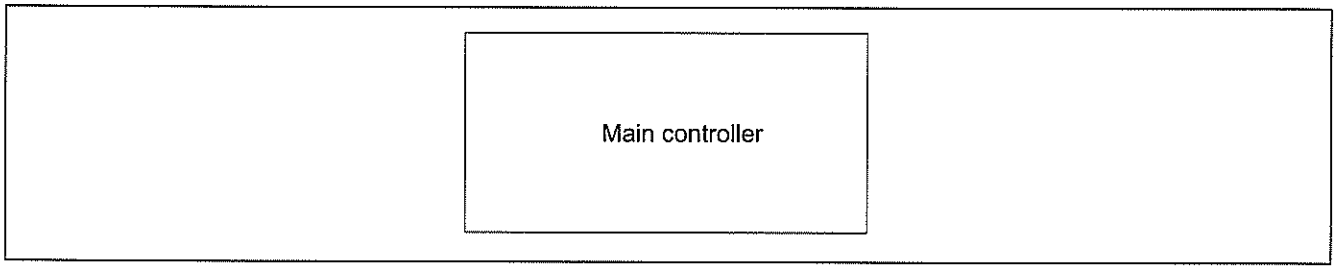
⚠ CAUTION

- **If 71-1,71-2,71-3 occurs, give priority to troubleshooting for 71-1,71-2,71-3. After that, perform the following.**

Probable cause

- Main controller defect
- Tire angle matching defect

Related portion



STEP1

MATCHING :

Perform tire angle matching. (Refer to page "MATCHING" of Display section)

Judgment

Result	Procedure
NG matching	Go to step 2
OK matching	Go to step 3

STEP2

Tire angle sensor voltage inspection :

Check the tire angle sensor voltage.

STD
[ANL] 5 IO4 (5 01)
Multi-function display
[ANL] I/O STEERING 1/1
VRTRA

[Inspection procedure and standard]

Tire angle position	Voltage
When straight running condition	2.11V to 2.81V

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Judgment

Result	Procedure
Outside standard value	Go to step 3 **Tire angle sensor assembly defect. After reassemble, perform matching and STEP3.**
Within standard value	**Main controller defect**

STEP3

Check the error :

Turn off the key switch and disconnect the battery plug.

After 30 seconds, reconnect the battery plug and turn on the key switch.

Judgment

Result	Procedure
74-1 error occurs.	**Main controller defect**
74-1 error does not occur.	**Tire angle matching defect**

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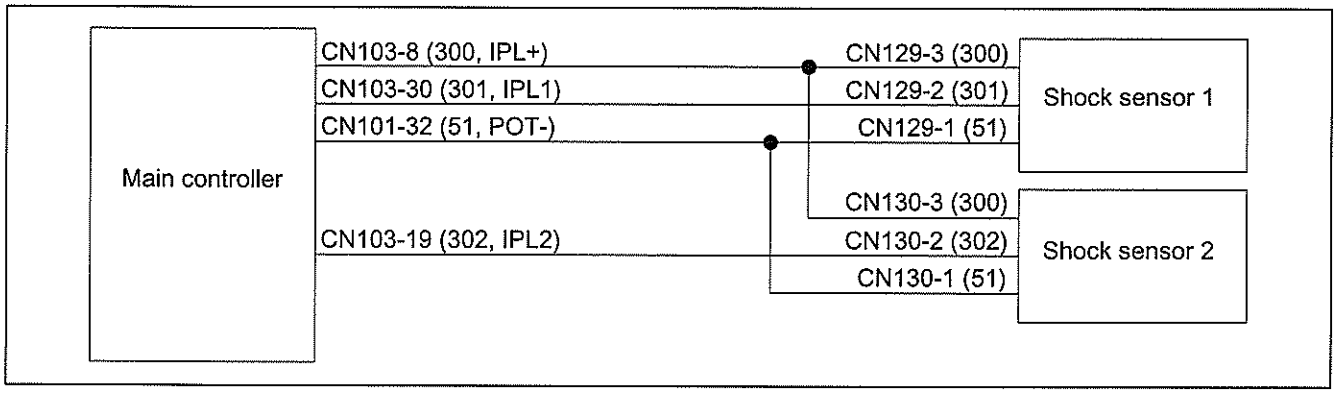
Error Code: G5-1

Failure mode: Shock sensor 1 open abnormality

Probable cause

- Connector contact defect
- Shock sensor defect
- Harness defect
- Main controller defect

Related portion



STEP1

1 . Turn off the key switch and disconnect the battery plug. Check the inside of connector CN129 and the caulked portion of wire whether it has defect or not by visual confirm. (Refer to BEFORE TROUBLESHOOTING)

2 . After connecting CN129, connect the battery plug and turn on the key switch to confirm error.

Judgment

Result	Procedure
G5-1 error does not occur.	**Connector contact defect**
G5-1 error occurs.	Go to step 2

STEP2

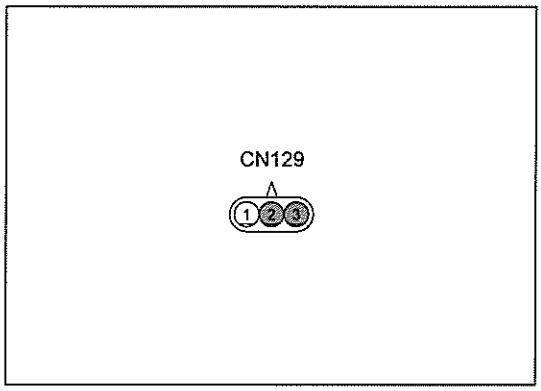
Inspection : Shock sensor 1

1 . Turn off the key switch and disconnect the battery plug.

2 . Disconnect the CN129 connector and connect the CN129-3 to CN129-2 on the harness side through SST2 (09232-13130-71).

3 . Connect the battery plug and turn on the key switch to confirm the error code.

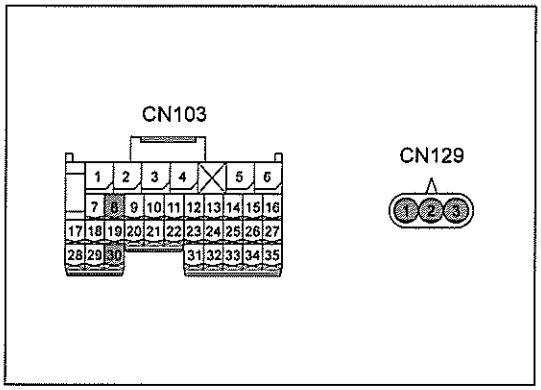
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Judgment

Result	Procedure
G5-1 error occurs.	Go to step 3
G5-2 error occurs.	**Shock sensor defect**

STEP3



Inspection : Harness

1 . Turn off the key switch and disconnect the battery plug.

2 . Disconnect the CN129, CN101 and CN103 connector, then check the harness.

[Inspection procedure and standard]

Inspect for continuity and short circuiting of the harness.

Turn off the key switch and disconnect the battery plug, disconnect CN129, CN101 and CN103, and perform the check without connecting SST2 (09232-13130-71).

Refer to BEFORE TROUBLESHOOTING

* : It is OK to connect CN129-2 to CN129-3 through SST2 (09232-13130-71) and check if there is continuity between CN103-30 and CN103-8.

Portions to be checked	Standard
CN103-8 (300) to CN129-3 (300)	Continuity *
CN103-30 (301) to CN129-2 (301)	Continuity *
CN129-2 (301) to CN129-1 (51)	No continuity
CN129-3 (300) to CN129-1 (51)	No continuity

Judgment

Result	Procedure
NG	**Harness defect**
OK	**Main controller defect**

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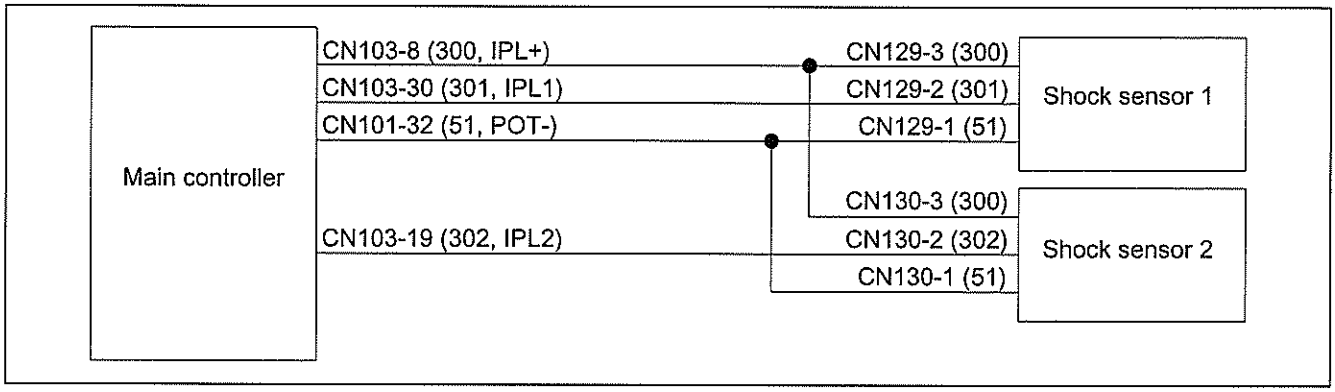
Error Code: G5-2

Failure mode: Shock sensor 1 short abnormally

Probable cause

- Connector contact defect
- Shock sensor defect
- Harness defect
- Main controller defect

Related portion



STEP1

1 . Turn off the key switch and disconnect the battery plug. Check the inside of connector CN129 and the caulked portion of wire whether it has defect or not by visual confirm. (Refer to BEFORE TROUBLESHOOTING)

2 . After connecting CN129, connect the battery plug and turn on the key switch to confirm error.

Judgment

Result	Procedure
G5-2 error does not occur.	**Connector contact defect**
G5-2 error occurs.	Go to step 2

STEP2

Inspection : Shock sensor 1

1 . Turn off the key switch and disconnect the battery plug.

2 . Disconnect CN129.

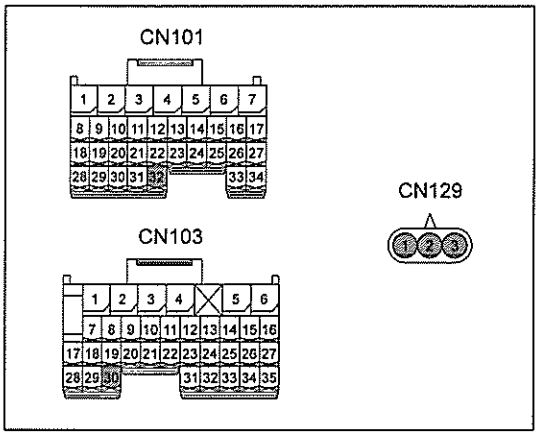
3 . Connect the battery plug and turn on the key switch to confirm the error code.

Judgment

Result	Procedure
G5-1 error occurs.	**Shock sensor defect**
G5-2 error occurs.	Go to step 3

STEP3

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Inspection : Harness

1 . Turn off the key switch and disconnect the battery plug.

2 . Disconnect the CN129, CN101 and CN103 connector, then check the harness.

[Inspection procedure and standard]

Inspect for continuity and short circuiting of the harness.

Turn off the key switch and disconnect the battery plug, disconnect CN129, CN101 and CN103, and perform the check.

Refer to BEFORE TROUBLESHOOTING

* : It is OK to connect CN129-1 to CN129-2 through SST2 (09232-13130-71) and check if there is continuity between CN101-32 and CN103-30.

Portions to be checked	Standard
CN101-32 (51) to CN129-1 (51)	Continuity *
CN129-3 (300) to CN129-2 (301)	No continuity

Judgment

Result	Procedure
NG	**Harness defect**
OK	**Main controller defect**

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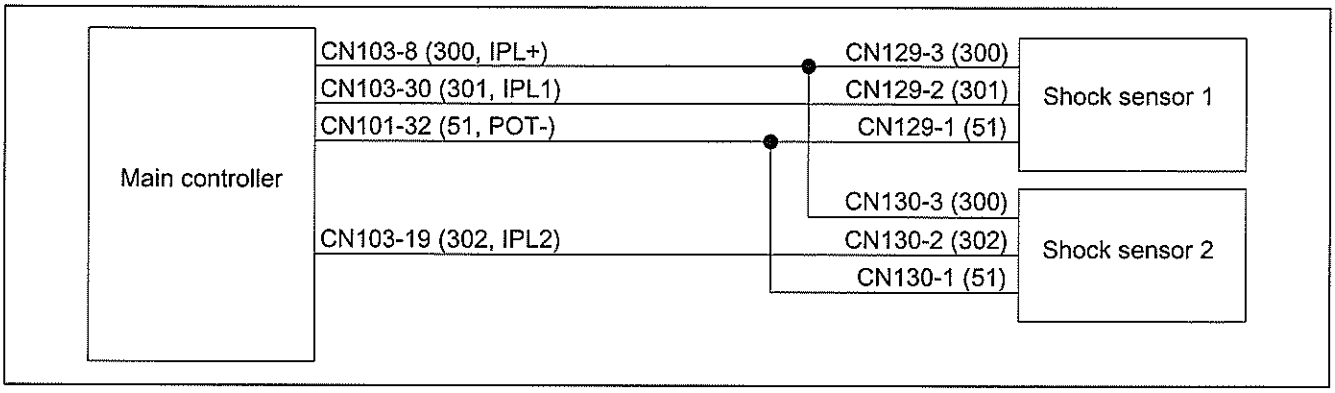
Error Code: G5-3

Failure mode: Shock sensor 1 : neutral voltage error

Probable cause

- Connector contact defect
- Shock sensor defect
- Harness defect
- Main controller defect

Related portion



STEP1

1 . Turn off the key switch and disconnect the battery plug. Check the inside of connector CN129 and the caulked portion of wire whether it has defect or not by visual confirm. (Refer to BEFORE TROUBLESHOOTING)

2 . After connecting CN129, connect the battery plug and turn on the key switch to confirm error (one minute later).

Judgment

Result	Procedure
G5-3 error does not occur.	**Connector contact defect**
G5-3 error .	Go to step 2

STEP2

Inspection : Shock sensor 1

1 . Turn off the key switch and disconnect the battery plug.

2 . Disconnect CN129.

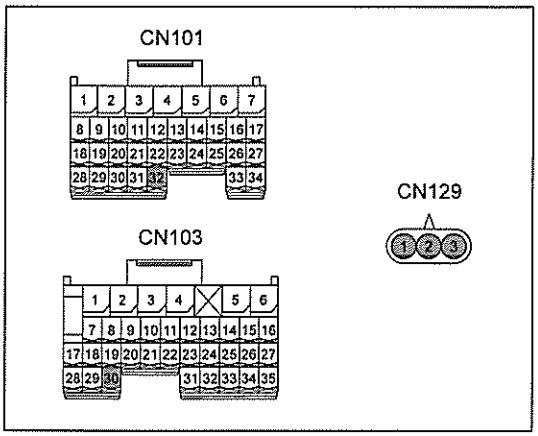
3 . Connect the battery plug and turn on the key switch to confirm the error code.

Judgment

Result	Procedure
G5-1 error occurs.	**Shock sensor defect**
G5-1 error does not occur.	Go to step 3

STEP3

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Inspection : Harness

1 . Turn off the key switch and disconnect the battery plug.

2 . Disconnect the CN129, CN101 and CN103 connector, then check the harness.

[Inspection procedure and standard]

Inspect for continuity and short circuiting of the harness.

Turn off the key switch and disconnect the battery plug, disconnect CN129, CN101 and CN103, and perform the check.

Refer to BEFORE TROUBLESHOOTING

* : It is OK to connect CN129-1 to CN129-2 through SST2 (09232-13130-71) and check if there is continuity between CN101-32 and CN103-30.

Portions to be checked	Standard
CN101-32 (51) to CN129-1 (51)	Continuity *
CN129-3 (300) to CN129-2 (301)	No continuity

Judgment

Result	Procedure
NG	**Harness defect**
OK	**Main controller defect**

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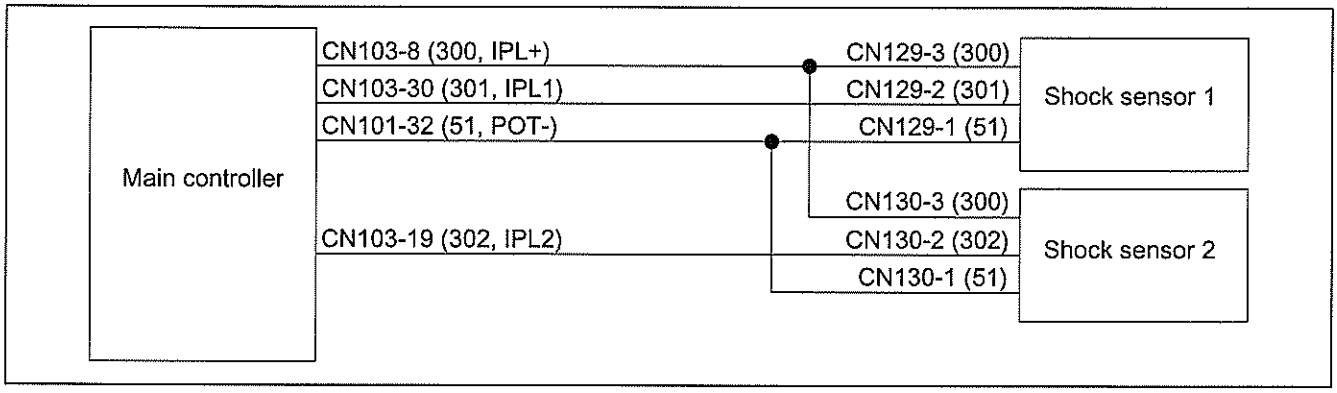
Error Code: G5-4

Failure mode: Shock sensor 2 open abnormality

Probable cause

- Connector contact defect
- Shock sensor defect
- Harness defect
- Main controller defect

Related portion



STEP1

1 . Turn off the key switch and disconnect the battery plug. Check the inside of connector CN130 and the caulked portion of wire whether it has defect or not by visual confirm. (Refer to BEFORE TROUBLESHOOTING)

2 . After connecting CN130, connect the battery plug and turn on the key switch to confirm error.

Judgment

Result	Procedure
G5-4 error does not occur.	**Connector contact defect**
G5-4 error occurs.	Go to step 2

STEP2

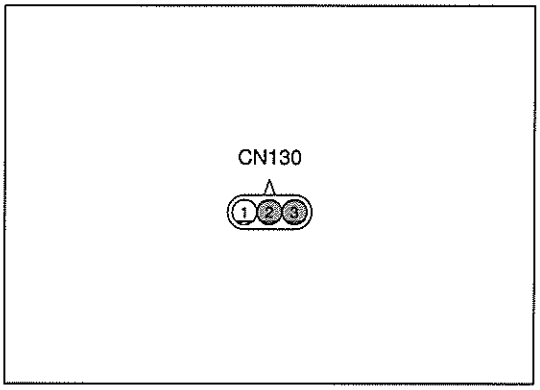
Inspection : Shock sensor 2

1 . Turn off the key switch and disconnect the battery plug.

2 . Disconnect the CN130 connector and connect the CN130-3 to CN130-2 on the harness side through SST2 (09232-13130-71).

3 . Connect the battery plug and turn on the key switch to confirm the error code.

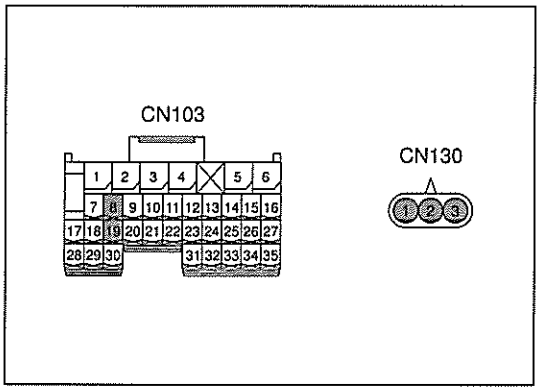
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Judgment

Result	Procedure
G5-4 error occurs.	Go to step 3
G5-5 error occurs.	**Shock sensor defect**

STEP3



Inspection : Harness

1 . Turn off the key switch and disconnect the battery plug.

2 . Disconnect the CN130, CN101 and CN103 connector, then check the harness.

[Inspection procedure and standard]

Inspect for continuity and short circuiting of the harness.

Turn off the key switch and disconnect the battery plug, disconnect CN130, CN101 and CN103, and perform the check without connecting SST2 (09232-13130-71).

Refer to BEFORE TROUBLESHOOTING

* : It is OK to connect CN130-2 to CN130-3 through SST2 (09232-13130-71) and check if there is continuity between CN103-19 and CN103-8.

Portions to be checked	Standard
CN103-8 (300) to CN130-3 (300)	Continuity *
CN103-19 (302) to CN130-2 (302)	Continuity *
CN130-2 (302) to CN130-1 (51)	No continuity
CN130-3 (300) to CN130-1 (51)	No continuity

Judgment

Result	Procedure
NG	**Harness defect**
OK	**Main controller defect**

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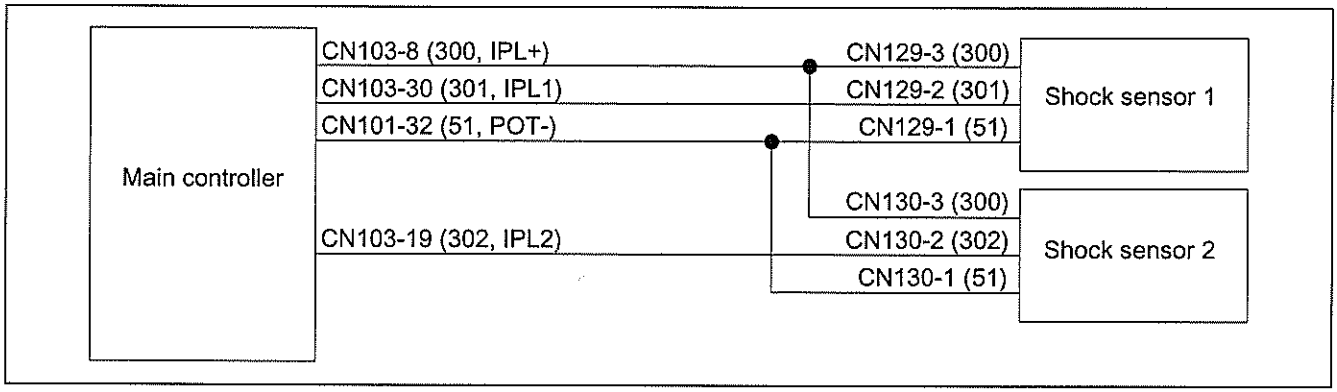
Error Code: G5-5

Failure mode: Shock sensor 2 short abnormally

Probable cause

- Connector contact defect
- Shock sensor defect
- Harness defect
- Main controller defect

Related portion



STEP1

1 . Turn off the key switch and disconnect the battery plug. Check the inside of connector CN130 and the caulked portion of wire whether it has defect or not by visual confirm. (Refer to BEFORE TROUBLESHOOTING)

2 . After connecting CN130, connect the battery plug and turn on the key switch to confirm error.

Judgment

Result	Procedure
G5-5 error does not occur.	**Connector contact defect**
G5-5 error occurs.	Go to step 2

STEP2

Inspection : Shock sensor 2

1 . Turn off the key switch and disconnect the battery plug.

2 . Disconnect CN130.

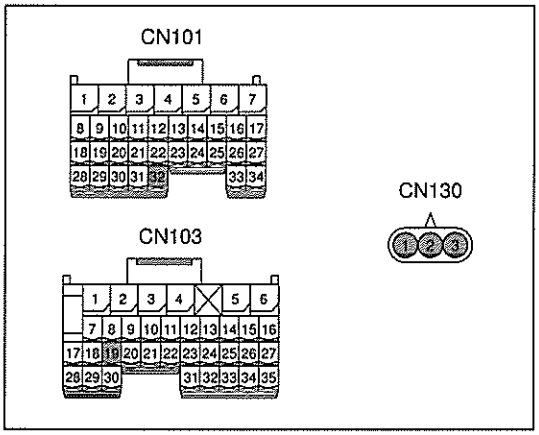
3 . Connect the battery plug and turn on the key switch to confirm the error code.

Judgment

Result	Procedure
G5-4 error occurs.	**Shock sensor defect**
G5-5 error occurs.	Go to step 3

STEP3

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Inspection : Harness

1 . Turn off the key switch and disconnect the battery plug.

2 . Disconnect the CN130, CN101 and CN103 connector, then check the harness.

[Inspection procedure and standard]

Inspect for continuity and short circuiting of the harness.

Turn off the key switch and disconnect the battery plug, disconnect CN130, CN101 and CN103, and perform the check.

Refer to BEFORE TROUBLESHOOTING

* : It is OK to connect CN130-1 to CN130-2 through SST2 (09232-13130-71) and check if there is continuity between CN101-32 and CN103-19.

Portions to be checked	Standard
CN101-32 (51) to CN130-1 (51)	Continuity *
CN130-3 (300) to CN130-2 (302)	No continuity

Judgment

Result	Procedure
NG	**Harness defect**
OK	**Main controller defect**

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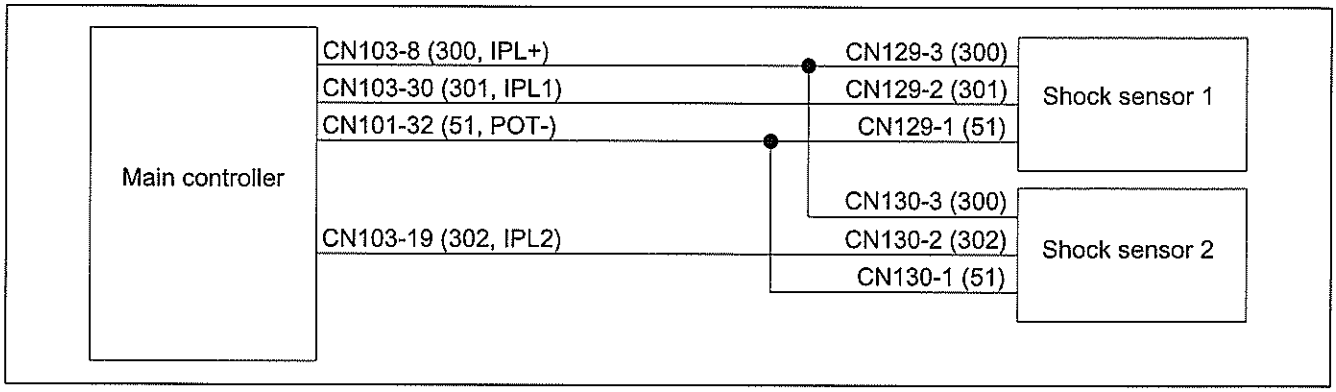
Error Code: G5-6

Failure mode: Shock sensor 2 : neutral voltage error

Probable cause

- Connector contact defect
- Shock sensor defect
- Harness defect
- Main controller defect

Related portion



STEP1

1 . Turn off the key switch and disconnect the battery plug. Check the inside of connector CN130 and the caulked portion of wire whether it has defect or not by visual confirm. (Refer to BEFORE TROUBLESHOOTING)

2 . After connecting CN130, connect the battery plug and turn on the key switch to confirm error (one minute later).

Judgment

Result	Procedure
G5-6 error does not occur.	**Connector contact defect**
G5-6 error occurs .	Go to step 2

STEP2

Inspection : Shock sensor 2

1 . Turn off the key switch and disconnect the battery plug.

2 . Disconnect CN130.

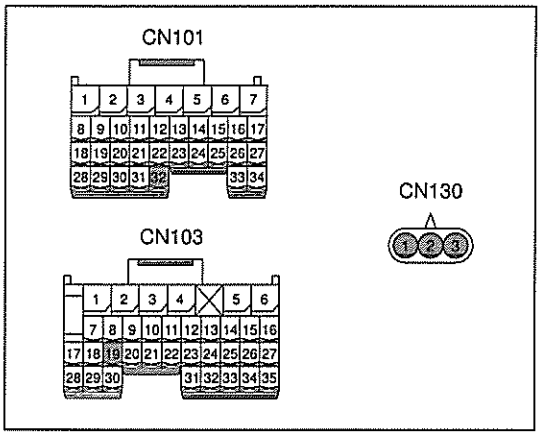
3 . Connect the battery plug and turn on the key switch to confirm the error code.

Judgment

Result	Procedure
G5-4 error occurs.	**Shock sensor defect**
G5-4 error does not occur.	Go to step 3

STEP3

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Inspection : Harness

1 . Turn off the key switch and disconnect the battery plug.

2 . Disconnect the CN130, CN101 and CN103 connector, then check the harness.

[Inspection procedure and standard]

Inspect for continuity and short circuiting of the harness.

Turn off the key switch and disconnect the battery plug, disconnect CN130, CN101 and CN103, and perform the check.

Refer to BEFORE TROUBLESHOOTING

* : It is OK to connect CN130-1 to CN130-2 through SST2 (09232-13130-71) and check if there is continuity between CN101-32 and CN103-19.

Portions to be checked	Standard
CN101-32 (51) to CN130-1 (51)	Continuity *
CN130-3 (300) to CN130-2 (302)	No continuity

Judgment

Result	Procedure
NG	**Harness defect**
OK	**Main controller defect**

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Error Code: H1-1

Failure mode: Lift lever potentiometer open abnormality

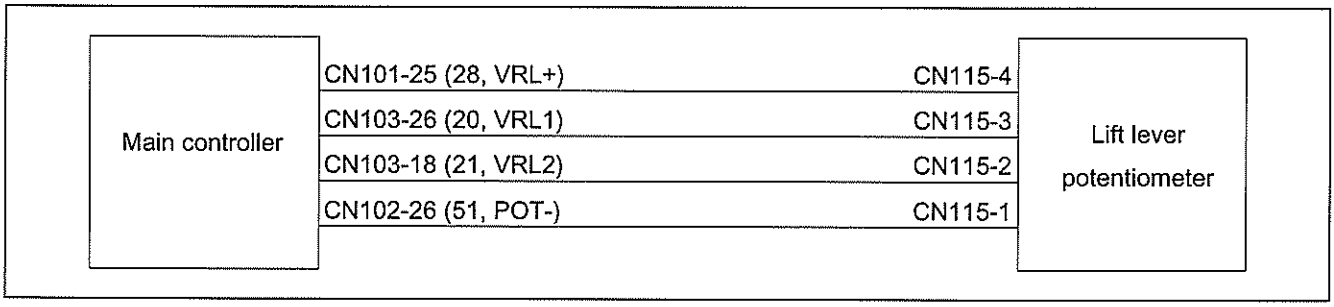
⚠ CAUTION

- **Be sure to do the matching after reassembly if performed the removing and inspection of the lever.**
- **In case of mini lever spec. , replace CN115 with CN162.**

Probable cause

- Connector contact defect
- Harness defect
- Lift lever potentiometer defect
- Main controller defect

Related portion



STEP1

Turn off the key switch and disconnect the battery plug.

After disconnection the CN115 connector, check the inside of connector and the caulked portion of wire whether it has defect or not by visual confirm. (Refer to BEFORE TROUBLESHOOTING)

Connect the CN115 connector, connect the battery plug.

Turn on the key switch to check the error occurs.

Judgment

Result	Procedure
H1-1 error does not occur.	**Connector contact defect**
H1-1 error occurs.	Go to step 2

STEP2

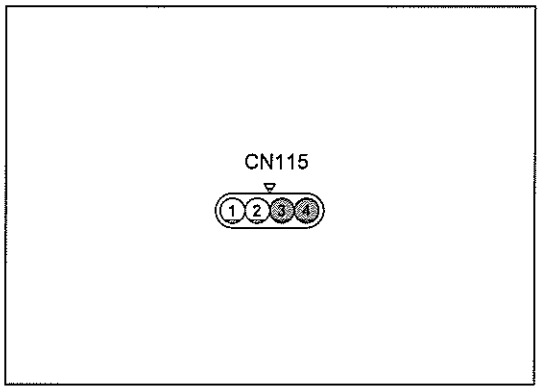
Inspection: Lift lever potentiometer

Turn off the key switch and disconnect the battery plug.

Disconnect the CN115 connector.

Connect between CN115-3 and CN 115-4 for harness side with SST2 connected.

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Connect the battery plug and turn on the key switch to confirm the error occurs.

Judgment

Result	Procedure
H1-2 error occurs.	Go to step 3
H1-2 error does not occur.	Go to step 4

STEP3

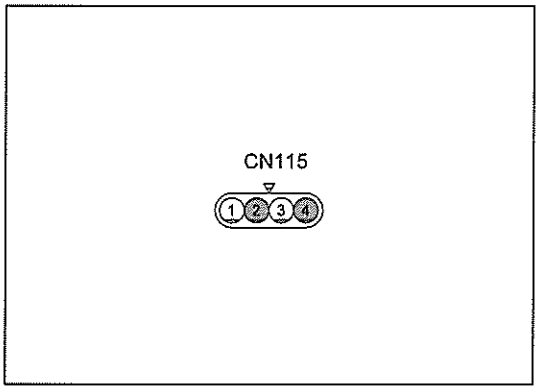
Inspection: Lift lever potentiometer

Turn off the key switch and disconnect the battery plug.

Disconnect the CN115 connector.

Connect between CN115-2 and CN 115-4 for harness side with SST2 connected.

Connect the battery plug and turn on the key switch to confirm the error occurs.



Judgment

Result	Procedure
H1-2 error occurs.	**Lift lever potentiometer defect**
H1-2 error does not occur.	Go to step 4

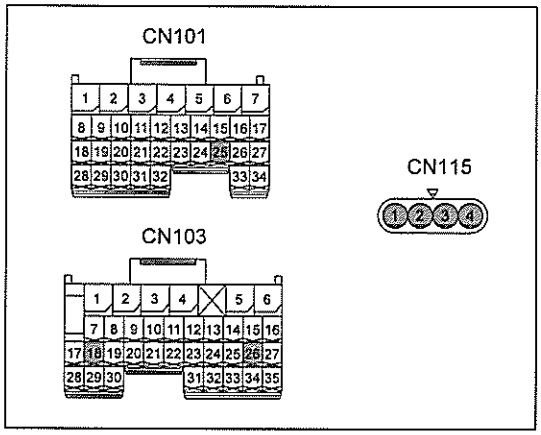
STEP4

Inspection : Harness

Turn off the key switch and disconnect the battery plug.

Disconnect the CN101, CN103 and CN115 connectors and check the harnesses for their continuities.

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[Inspection procedure and standard]

Inspect for continuity of the harness.

Perform this check with the battery plug and the CN101, CN103, and CN115 connectors disconnected, and visually check inside the connector and the caulked portion of its wire for defects.

Refer to BEFORE TROUBLESHOOTING

Portion to be inspected	Standard:
CN101-25(28) to CN115-4	Continuity
CN103-26(20) to CN115-3	Continuity
CN103-18(21) to CN115-2	Continuity
CN115-3(20) to CN115-1(51)	No continuity
CN115-2(21) to CN115-1(51)	No continuity
CN115-4(28) to CN115-1(51)	No continuity

Judgment

Result	Procedure
NG	**Harness defect**
OK	**Main controller defect**

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Error Code: H1-2

Failure mode: Lift lever potentiometer short abnormality

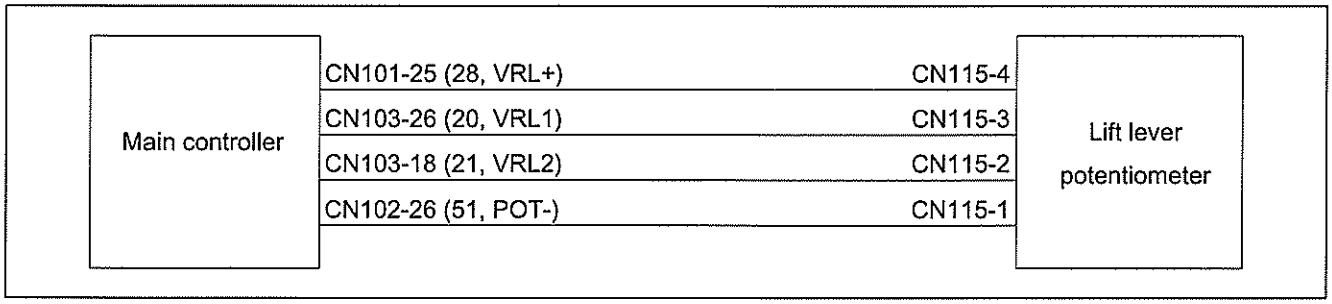
⚠ CAUTION

- **Be sure to do the matching after reassembly if performed the removing and inspection of the lever.**
- **In case of mini lever spec. , replace CN115 with CN162.**

Probable cause

- Connector contact defect
- Harness defect
- Lift lever potentiometer defect
- Main controller defect

Related portion



STEP1

Turn off the key switch and disconnect the battery plug.

After disconnection the CN115 connector, check the inside of connector and the caulked portion of wire whether it has defect or not by visual confirm. (Refer to BEFORE TROUBLESHOOTING)

Connect the CN115 connector, connect the battery plug.

Turn on the key switch to check the error occurs.

Judgment

Result	Procedure
H1-2 error does not occur.	**Connector contact defect**
H1-2 error occurs.	Go to step 2

STEP2

Inspection: Lift lever potentiometer

Turn off the key switch and disconnect the battery plug.

Disconnect the CN115 connector.

Connect the battery plug and turn on the key switch to confirm the error occurs.

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Judgment

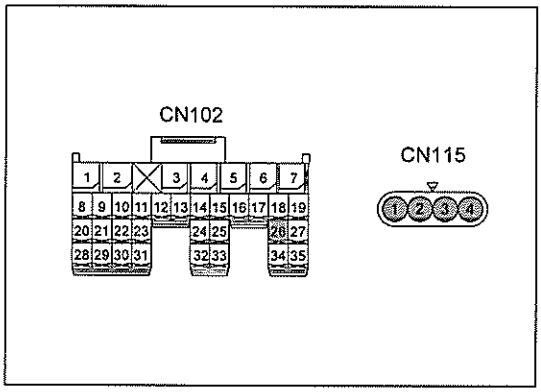
Result	Procedure
H1-1 error occurs.	**Lift lever potentiometer defect**
H1-1 error does not occur.	Go to step 3

STEP3

Inspection : Harness

Turn off the key switch and disconnect the battery plug.

Disconnect the CN102, CN103 and CN115 connectors and check the harnesses for their continuities.



[Inspection procedure and standard]

Inspect for continuity of the harness.

Perform this check with the battery plug and the CN102, CN103, and CN115 connectors disconnected, and visually check inside the connector and the caulked portion of its wire for defects.

Refer to BEFORE TROUBLESHOOTING

Portion to be inspected	Standard:
CN102-26(51) to CN115-1	Continuity
CN115-3(20) to CN115-4(28)	No continuity
CN115-2(21) to CN115-4(28)	No continuity

Judgment

Result	Procedure
NG	**Harness defect**
OK	**Main controller defect**

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Error Code: H1-3

Failure mode: Lift lever potentiometer : sensor output declination abnormality

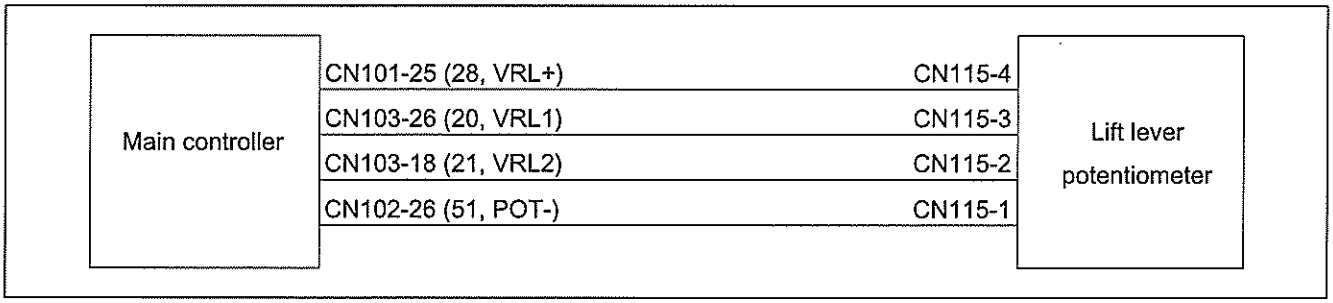
⚠ CAUTION

- **Be sure to do the matching after reassembly if performed the removing and inspection of the lever.**
- **In case of mini lever spec. , replace CN115 with CN162.**

Probable cause

- Connector contact defect
- Harness defect
- Lift lever potentiometer defect
- Main controller defect

Related portion



STEP1

Turn off the key switch and disconnect the battery plug.

After disconnection the CN115 connector, check the inside of connector and the caulked portion of wire whether it has defect or not by visual confirm. (Refer to BEFORE TROUBLESHOOTING)

Connect the CN115 connector, connect the battery plug.

Turn on the key switch to check the error occurs.

Judgment

Result	Procedure
H1-3 error does not occur.	**Connector contact defect**
H1-3 error occurs.	Go to step 2

STEP2

Inspection : Lift lever potentiometer

Turn off the key switch and disconnect the battery plug.

Disconnect the CN115 connector.

Connect the battery plug and turn on the key switch to confirm the error occurs.

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Judgment

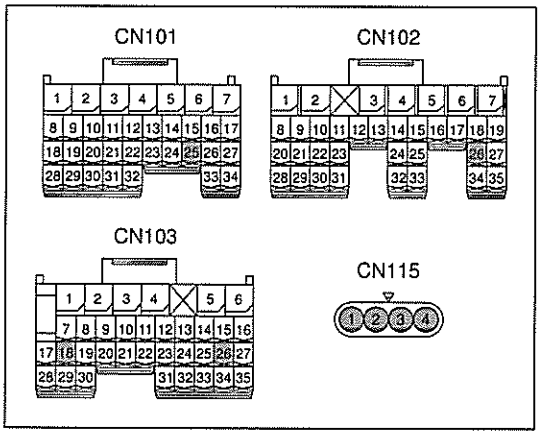
Result	Procedure
H1-1 error does not occur.	Go to step 3
H1-1 error occurs.	Go to step 4

STEP3

Inspection : Harness

Turn off the key switch and disconnect the battery plug.

Disconnect the CN101, CN102, CN103 and CN115 connectors and check the harnesses for their continuities.



[Inspection procedure and standard]

Inspect for continuity of the harness.

Perform this check with the battery plug and the CN101, CN102, CN103 and CN115 connectors disconnected, and visually check inside the connector and the caulked portion of its wire for defects.

Refer to BEFORE TROUBLESHOOTING

Portion to be inspected	Standard:
CN101-25(28) to CN115-4	Continuity
CN103-26(20) to CN115-3	Continuity
CN103-18(21) to CN115-2	Continuity
CN102-26(51) to CN115-1	Continuity
CN115-3(20) to CN115-4(28)	No continuity
CN115-2(21) to CN115-4(28)	No continuity
CN115-3(20) to CN115-1(51)	No continuity
CN115-2(21) to CN115-1(51)	No continuity

Judgment

Result	Procedure
NG	**Harness defect**
OK	**Main controller defect**

STEP4

Inspection : Lift lever potentiometer

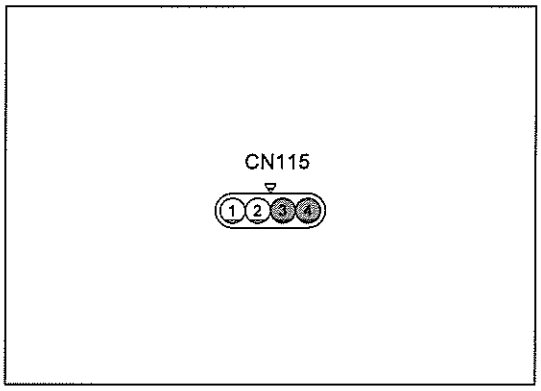
Turn off the key switch and disconnect the battery plug.

Disconnect the CN115 connector.

Connect between CN115-4 and CN 115-3 for harness side with SST2 connected.

Connect the battery plug and turn on the key switch to confirm the error occurs.

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Judgment

Result	Procedure
H1-2 error occurs.	Go to step 5
H1-2 error does not occur.	Go to step 3

STEP5

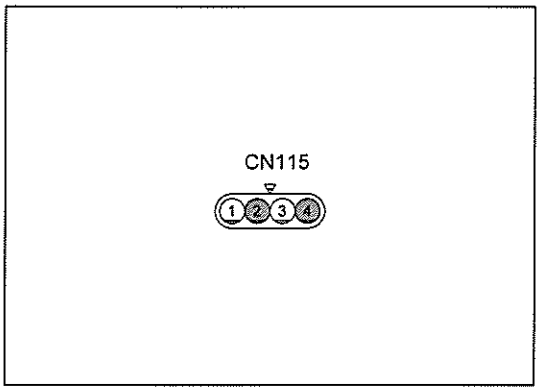
Inspection : Lift lever potentiometer

Turn off the key switch and disconnect the battery plug.

Disconnect the CN115 connector.

Connect between CN115-4 and CN 115-2 for harness side with SST2 connected.

Connect the battery plug and turn on the key switch to confirm the error occurs.



Judgment

Result	Procedure
H1-2 error occurs.	**Lift lever potentiometer defect**
H1-2 error does not occur.	Go to step 3

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Error Code: H1-4

Failure mode: Lift lever potentiometer neutral abnormality

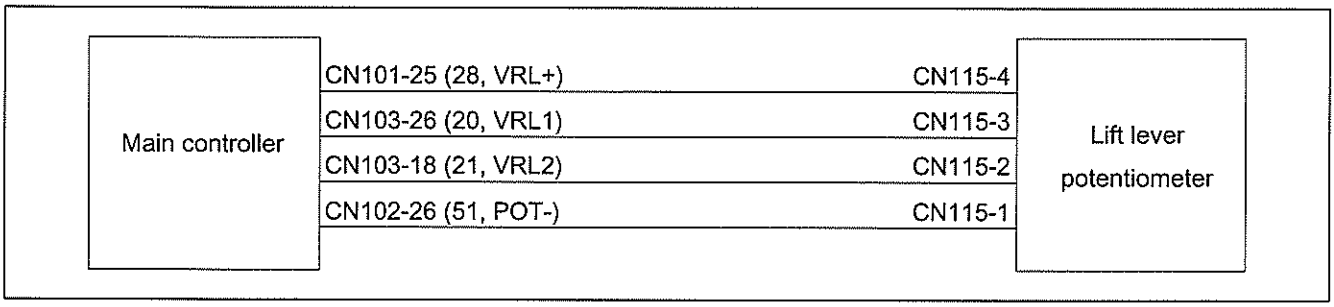
⚠ CAUTION

- **Be sure to do the matching after reassembly if performed the removing and inspection of the lever.**
- **H1-4 error occurs if turn on the key switch or release the emergency stop button with operating lift lever.**
- **In case of mini lever spec. , replace CN115 with CN162.**

Probable cause

- Connector contact defect
- Lift lever potentiometer defect
- Lift lever potentiometer assembly defect

Related portion



STEP1

Turn off the key switch and disconnect the battery plug.

After disconnection the CN115 connector, check the inside of connector and the caulked portion of wire whether it has defect or not by visual confirm. (Refer to BEFORE TROUBLESHOOTING)

Connect the CN115 connector, connect the battery plug.

Turn on the key switch to check the error occurs.

Judgment

Result	Procedure
H1-4 error does not occur.	**Connector contact defect**
H1-4 error occurs.	Go to step 2

STEP2

Inspection : Lift lever potentiometer

Turn off the key switch and disconnect the battery plug.

Check if the lift lever potentiometer is installed correctly.

Connect the battery plug and turn on the key switch to confirm the error occurs.

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Perform matching the lift lever potentiometer. (Refer to page "MATCHING" of Display section)

Judgment

Result	Procedure
NG matching	**Lift lever potentiometer defect**
OK matching	**Lift lever potentiometer assembly defect**

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Error Code: H1-5

Failure mode: Lift lever potentiometer matching value abnormality

⚠ CAUTION

- **If H1-1,2,3,4 occurs, give priority to troubleshooting for H1-1,2,3,4.**
- **Be sure to do the matching after reassembly if performed the removing and inspection of the lever.**
- **In case of mini lever spec. , replace CN115 with CN162.**

Probable cause

- Main controller defect
- Lift lever potentiometer matching value defect
- Lift lever potentiometer assembly defect

Related portion

Main controller			Lift lever potentiometer
	CN101-25 (28, VRL+)	CN115-4	
	CN103-26 (20, VRL1)	CN115-3	
	CN103-18 (21, VRL2)	CN115-2	
	CN102-26 (51, POT-)	CN115-1	

STEP1

Perform matching the lift lever potentiometer.
(Refer to page "MATCHING" of Display section)

Judgment

Result	Procedure
NG matching	Go to step 2
OK matching	Go to step 3

STEP2

Check the lift lever potentiometer voltage.

Lift lever angle sensor (1/2) voltage
STD
[ANL] 4 IO3
(Conventional lever: 4 08, 4 09)
(Mini lever: 4 09, 4 10)
Multi-function display
[ANL] I/O M. HANDLING 5/8
VRL

[Inspection procedure and standard]

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In case of uppermost / lowermost, be sure to confirm the range is within the following table and the difference of the sensor neutral matching voltage is over 0.79V.

Position of lift lever	Standard lever spec.		Mini lever spec.	
	sensor 1	sensor 2	sensor 1	sensor 2
Neutral	1.65 to 2.87V	1.52 to 3.01V	1.78 to 2.75V	1.78 to 2.75V
When Uppermost position	0.30 to 2.87V	1.52 to 4.50V	1.78 to 4.50V	0.30 to 2.75V
When Lowermost position	1.65 to 4.50V	0.30 to 3.01V	0.30 to 2.75V	1.78 to 4.50V

Judgment

Result	Procedure
Within standard value	**Main controller defect**
Outside standard value	Go to step 3 **Lift lever potentiometer assembly defect** **Perform the matching after reassemble.**

STEP3

Turn off key switch and disconnect the battery plug. Connect the battery plug again after 30 seconds and turn on the key switch.

Judgment

Result	Procedure
H1-5 error does not occur.	**Lift lever potentiometer matching value defect** **Use as it is.**
H1-5 error occurs.	**Main controller defect**

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Error Code: H2-1

Failure mode: Tilt lever potentiometer open abnormality

⚠ CAUTION

- **Be sure to do the matching after reassembly if performed the removing and inspection of the lever.**

Probable cause

- Connector contact defect
- Harness defect
- Tilt lever potentiometer defect
- Main controller defect

Related portion

Main controller			Tilt lever potentiometer
	CN101-28 (29, VRT+)	CN163-4 (29)	
	CN102-23 (22, VRT1)	CN163-3 (22)	
	CN102-22 (23, VRT2)	CN163-2 (23)	
	CN102-26 (51, POT-)	CN163-1 (51)	

STEP1

1 . Turn off the key switch and disconnect the battery plug. Check the inside of connector CN163 and the caulked portion of wire whether it has defect or not by visual confirm. (Refer to BEFORE TROUBLESHOOTING)

2 . After connecting CN163, connect the battery plug and turn on the key switch to confirm error.

Judgment

Result	Procedure
H2-1 error does not occur.	**Connector contact defect**
H2-1 error occurs.	Go to step 2

STEP2

Inspection : Tilt lever potentiometer

1 . Turn off the key switch and disconnect the battery plug.

2 . Replace CN163 with CN162 (connector of tilt lever potentiometer and lift lever potentiometer).

3 . Connect the battery plug and turn on the key switch to confirm the error code.

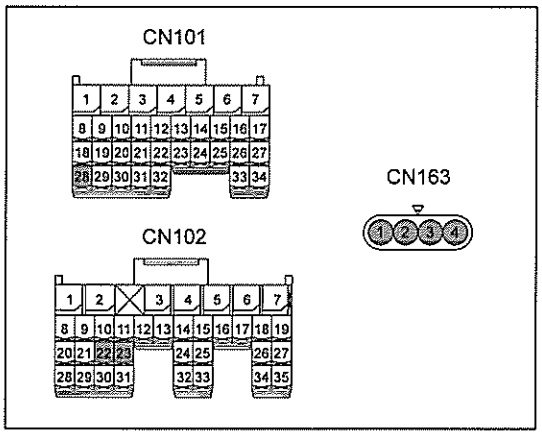
H1-4, H2-4 can be ignored.

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Judgment

Result	Procedure
H2-1 error occurs.	Go to step 3
H1-1 error occurs.	**Tilt lever potentiometer defect**

STEP3



Inspection : Harness

1 . Turn off the key switch and disconnect the battery plug.

2 . Disconnect the CN101, CN102 and CN163 connector, then check the harness.

[Inspection procedure and standard]

Inspect for continuity and short circuiting of the harness.

Perform this check with the battery plug and the CN101, CN102, CN163 connectors disconnected, and visually check inside the connector and the caulked portion of its wire for defects. Refer to BEFORE TROUBLESHOOTING

* : It is OK "to connect CN163-3 to CN163-4 through SST2 (09232-13130-71) and check if there is continuity between CN101-28 and CN102-23", and "to connect CN163-2 to CN163-4 through SST2 (09232-13130-71) and check if there is continuity between CN101-28 and CN102-22".

Portions to be checked	Standard:
CN101-28 (29) to CN163-4 (29)	Continuity *
CN102-23 (22) to CN163-3 (22)	Continuity *
CN102-22 (23) to CN163-2 (23)	Continuity *
CN163-2 (23) to CN163-1 (51)	No continuity
CN163-3 (22) to CN163-1 (51)	No continuity
CN163-4 (29) to CN163-1 (51)	No continuity

Judgment

Result	Procedure
OK	**Main controller defect**
NG	**Harness defect**

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Error Code: H2-2

Failure mode: Tilt lever potentiometer short abnormality

⚠ CAUTION

- **Be sure to do the matching after reassembly if performed the removing and inspection of the lever.**

Probable cause

- Connector contact defect
- Harness defect
- Tilt lever potentiometer defect
- Main controller defect

Related portion

Main controller			Tilt lever potentiometer
	CN101-28 (29, VRT+)	CN163-4 (29)	
	CN102-23 (22, VRT1)	CN163-3 (22)	
	CN102-22 (23, VRT2)	CN163-2 (23)	
	CN102-26 (51, POT-)	CN163-1 (51)	

STEP1

1 . Turn off the key switch and disconnect the battery plug. Check the inside of connector CN163 and the caulked portion of wire whether it has defect or not by visual confirm. (Refer to BEFORE TROUBLESHOOTING)

2 . After connecting CN163, connect the battery plug and turn on the key switch to confirm error.

Judgment

Result	Procedure
H2-2 error does not occur.	**Connector contact defect**
H2-2 error occurs.	Go to step 2

STEP2

Inspection : Tilt lever potentiometer

1 . Turn off the key switch and disconnect the battery plug.

2 . Replace CN163 with CN162 (connector of tilt lever potentiometer and left lever potentiometer).

3 . Connect the battery plug and turn on the key switch to confirm the error code.

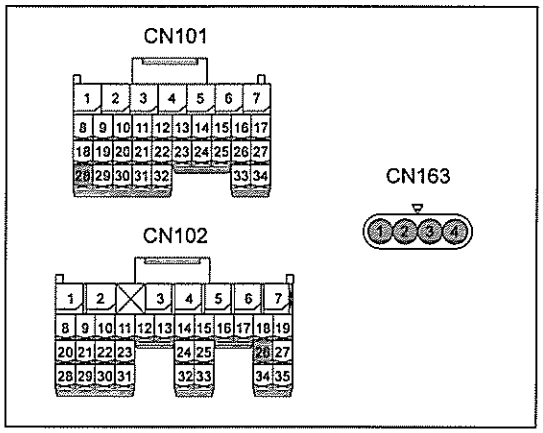
H1-4, H2-4 can be ignored.

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Judgment

Result	Procedure
H2-2 error occurs.	Go to step 3
H1-2 error occurs.	**Tilt lever potentiometer defect**

STEP3



Inspection : Harness

1 . Turn off the key switch and disconnect the battery plug.

2 . Disconnect the CN102 and CN163 connector, then check the harness.

[Inspection procedure and standard]

Inspect for continuity and short circuiting of the harness.

Perform this check with the battery plug and the CN102, CN163 connectors disconnected, and visually check inside the connector and the caulked portion of its wire for defects. Refer to BEFORE TROUBLESHOOTING

* : It is OK to connect CN163-1 to CN163-4 through SST2 (09232-13130-71) and check if there is continuity between CN102-26 and CN101-28.

Portions to be checked	Standard:
CN102-26 (51) to CN163-1 (51)	Continuity *
CN163-2 (23) to CN163-4 (29)	No continuity
CN163-3 (22) to CN163-4 (29)	No continuity

Judgment

Result	Procedure
OK	**Main controller defect**
NG	**Harness defect**

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Error Code: H2-3

Failure mode: Tilt lever potentiometer : sensor output declination abnormality

⚠ CAUTION

- **Be sure to do the matching after reassembly if performed the removing and inspection of the lever.**

Probable cause

- Connector contact defect
- Harness defect
- Tilt lever potentiometer defect
- Main controller defect

Related portion

Main controller			Tilt lever potentiometer
	CN101-28 (29, VRT+)	CN163-4 (29)	
	CN102-23 (22, VRT1)	CN163-3 (22)	
	CN102-22 (23, VRT2)	CN163-2 (23)	
	CN102-26 (51, POT-)	CN163-1 (51)	

STEP1

Turn off the key switch and disconnect the battery plug.

After disconnection the CN163 connector, check the inside of connector and the caulked portion of wire whether it has defect or not by visual confirm. (Refer to BEFORE TROUBLESHOOTING)

Connect the CN163 connector, connect the battery plug.

Turn on the key switch to check the error occurs.

Judgment

Result	Procedure
H2-3 error does not occur.	**Connector contact defect**
H2-3 error occurs.	Go to step 2

STEP2

Inspection : Tilt lever potentiometer

Turn off the key switch and disconnect the battery plug.

Disconnect the CN163 connector.

Connect the battery plug and turn on the key switch to confirm the error occurs.

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Judgment

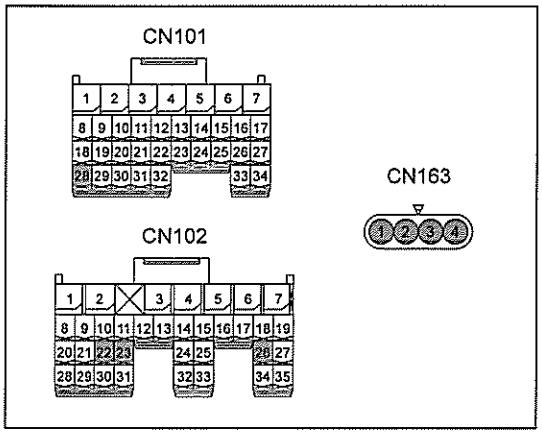
Result	Procedure
H2-1 error does not occur.	Go to step 3
H2-1 error occurs.	Go to step 4

STEP3

Inspection : Harness

Turn off the key switch and disconnect the battery plug.

Disconnect the CN101, CN102 and CN163 connectors and check the harnesses for their continuities.



[Inspection procedure and standard]

Inspect for continuity of the harness.

Perform this check with the battery plug and the CN101, CN102 and CN163 connectors disconnected, and visually check inside the connector and the caulked portion of its wire for defects.

Refer to BEFORE TROUBLESHOOTING

Portions to be checked	Standard:
CN101-28(29) to CN163-4(29)	Continuity
CN102-23(22) to CN163-3(22)	Continuity
CN102-22(23) to CN163-2(23)	Continuity
CN102-26(51) to CN163-1(51)	Continuity
CN163-3(22) to CN163-4(29)	No continuity
CN163-2(23) to CN163-4(29)	No continuity
CN163-3 (22) to CN163-1 (51)	No continuity
CN163-2 (23) to CN163-1 (51)	No continuity

Judgment

Result	Procedure
NG	**Harness defect**
OK	**Main controller defect**

STEP4

Inspection : Tilt lever potentiometer

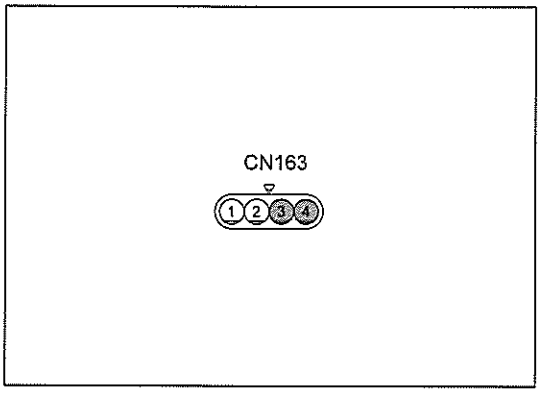
Turn off the key switch and disconnect the battery plug.

Disconnect the CN163 connector.

Connect between CN163-4 and CN 163-3 for harness side with SST2 connected.

Connect the battery plug and turn on the key switch to confirm the error occurs.

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Judgment

Result	Procedure
H2-2 error occurs.	Go to step 5
H2-2 error does not occur.	Go to step 3

STEP5

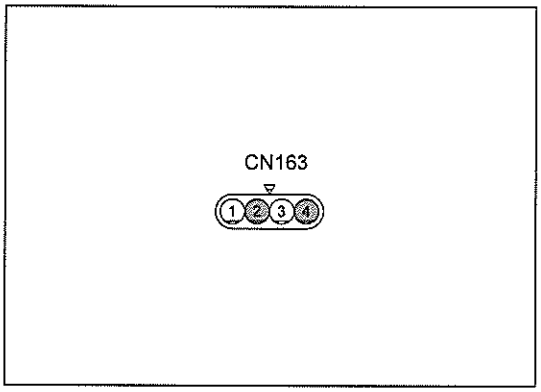
Check the tilt lever potentiometer

Turn off the key switch and disconnect the battery plug.

Disconnect the CN163 connector.

Connect between CN163-4 and CN 163-2 for harness side with SST2 connected.

Connect the battery plug and turn on the key switch to confirm the error occurs.



Judgment

Result	Procedure
H2-2 error occurs.	**Tilt lever potentiometer defect**
H2-2 error does not occur.	Go to step 3

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Error Code: H2-4

Failure mode: Tilt lever potentiometer neutral error abnormality

⚠ CAUTION

- **Be sure to do the matching after reassembly if performed the removing and inspection of the lever.**
- **H2-4 error occurs if turn on the key switch or release the emergency stop button with operating tilt lever.**

Probable cause

- Connector contact defect
- Tilt lever potentiometer defect
- Tilt lever potentiometer assembly defect

Related portion

Main controller			Tilt lever potentiometer
	CN101-28 (29, VRT+)	CN163-4 (29)	
	CN102-23 (22, VRT1)	CN163-3 (22)	
	CN102-22 (23, VRT2)	CN163-2 (23)	
	CN102-26 (51, POT-)	CN163-1 (51)	

STEP1

1 . Turn off the key switch and disconnect the battery plug. Check the inside of connector CN163 and the caulked portion of wire whether it has defect or not by visual confirm. (Refer to BEFORE TROUBLESHOOTING)

2 . After connecting CN163, connect the battery plug and turn on the key switch to confirm error.

Judgment

Result	Procedure
H2-4error does not occur.	**Connector contact defect**
H2-4 error occurs.	Go to step 2

STEP2

Inspection : Tilt lever potentiometer

1 . Turn off the key switch and disconnect the battery plug.

2 . Check if the tilt lever potentiometer is installed correctly.

3 . Reconnect the battery plug and turn on the key switch.

4 . Perform matching the tilt lever potentiometer. (Refer to page "MATCHING" of Display section)

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Judgment

Result	Procedure
NG matching	**Tilt lever potentiometer defect**
OK matching	**Tilt lever potentiometer assembly defect**

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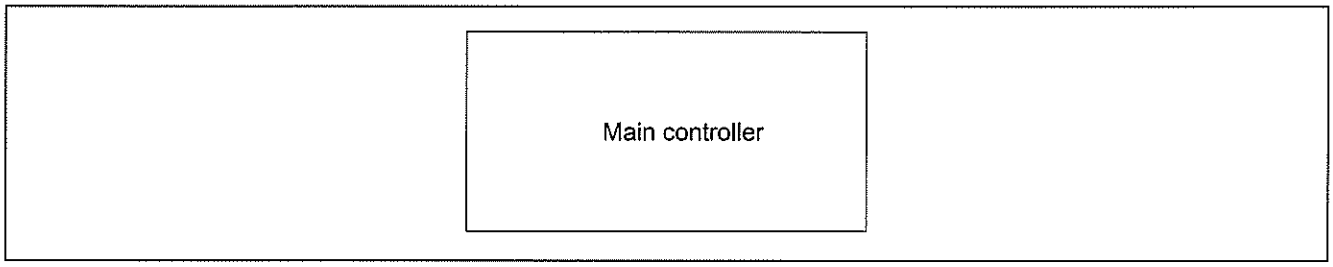
Error Code: H2-5

Failure mode: Tilt lever potentiometer matching value abnormality

Probable cause

- Main controller defect
- Tilt lever potentiometer matching defect

Related portion



STEP1

MATCHING :

Perform matching of the tilt lever.
(Refer to page "MATCHING" of Display section)

Judgment

Result	Procedure
NG matching	Go to step 2
OK matching	Go to step 3

STEP2

Tilt lever potentiometer voltage inspection:

Check the tilt lever voltage.

・Tilt lever potentiometer voltage

STD
[ANL] 4 IO3 (4 12, 4 13)
Multi-function display
[ANL] I/O M.HANDRING 6/8
VRT

Position of tilt lever	sensor 1	sensor 2
When neutral position	1.78V to 2.75V	1.78V to 2.75V

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Judgment

Result	Procedure
Outside standard value	Go to step 3 **Tilt lever assembly defect After reassemble, perform matching and STEP3.**
Within standard value	**Main controller defect**

STEP3

Check the error :

Turn off the key switch and disconnect the battery plug.

After 30 seconds, reconnect the battery plug and turn on the key switch.

Judgment

Result	Procedure
H2-5 error occurs.	**Main controller defect**
H2-5 error does not occur.	**Tilt lever potentiometer matching defect** **Use as it is.**

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Error Code: H3-1

Failure mode: Attachment 1 lever potentiometer open abnormality

⚠ CAUTION

- **Be sure to do the matching after reassembly if performed the removing and inspection of the lever.**
- **In case of mini lever spec. , replace CN119 with CN164, and CN115 with CN162.**

Probable cause

- Connector contact defect
- Harness defect
- Attachment 1 lever potentiometer defect
- Main controller defect

Related portion

Main controller			Attachment 1 lever potentiometer
	CN101-29 (30, VRAT1+)	CN119-4 (30)	
	CN102-21 (24, VRA11)	CN119-3 (24)	
	CN102-20 (25, VRA12)	CN119-2 (25)	
	CN102-26 (51, POT-)	CN119-1 (51)	

STEP1

1 . Turn off the key switch and disconnect the battery plug. Check the inside of connector CN119 and the caulked portion of wire whether it has defect or not by visual confirm. (Refer to BEFORE TROUBLESHOOTING)

2 . After connecting CN119, connect the battery plug and turn on the key switch to confirm error.

Judgment

Result	Procedure
H3-1 error does not occur.	**Connector contact defect**
H3-1 error occurs.	Go to step 2

STEP2

Inspection : Attachment 1 lever potentiometer

1 . Turn off the key switch and disconnect the battery plug.

2 . Replace CN119 with CN115 (connector of attachment lever 1 potentiometer and lift lever potentiometer).

3 . Connect the battery plug and turn on the key switch to confirm the error code.

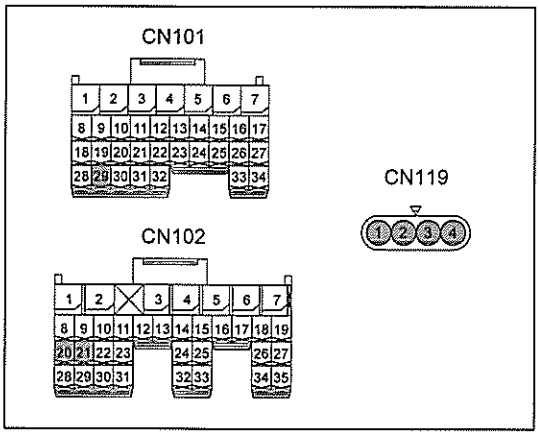
H1-4, H3-4 can be ignored.

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Judgment

Result	Procedure
H3-1 error occurs.	Go to step 3
H1-1 error occurs.	**Attachment 1 lever potentiometer defect**

STEP3



Inspection : Harness

1 . Turn off the key switch and disconnect the battery plug.

2 . Disconnect the CN101, CN102 and CN119 connector, then check the harness.

[Inspection procedure and standard]

Inspect for continuity and short circuiting of the harness.

Perform this check with the battery plug and the CN101, CN102, CN119 connectors disconnected, and visually check inside the connector and the caulked portion of its wire for defects. Refer to BEFORE TROUBLESHOOTING

* : It is OK "to connect CN119-3 to CN119-4 through SST2 (09232-13130-71) and check if there is continuity between CN101-29 and CN102-21", and "to connect CN119-2 to CN119-4 through SST2 (09232-13130-71) and check if there is continuity between CN101-29 and CN102-20".

Portions to be checked	Standard:
CN101-29 (30) to CN119-4 (30)	Continuity *
CN102-21 (24) to CN119-3 (24)	Continuity *
CN102-20 (25) to CN119-2 (25)	Continuity *
CN119-2 (25) to CN119-1 (51)	No continuity
CN119-3 (24) to CN119-1 (51)	No continuity
CN119-4 (30) to CN119-1 (51)	No continuity

Judgment

Result	Procedure
OK	**Main controller defect**
NG	**Harness defect**

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Error Code: H3-2

Failure mode: Attachment 1 lever potentiometer short abnormality

⚠ CAUTION

- **Be sure to do the matching after reassembly if performed the removing and inspection of the lever.**
- **In case of mini lever spec. , replace CN119 with CN164, and CN115 with CN162.**

Probable cause

- Connector contact defect
- Harness defect
- Attachment 1 lever potentiometer defect
- Main controller defect

Related portion

Main controller			Attachment 1 lever potentiometer
	CN101-29 (30, VRAT1+)	CN119-4 (30)	
	CN102-21 (24, VRA11)	CN119-3 (24)	
	CN102-20 (25, VRA12)	CN119-2 (25)	
	CN102-26 (51, POT-)	CN119-1 (51)	

STEP1

1 . Turn off the key switch and disconnect the battery plug. Check the inside of connector CN119 and the caulked portion of wire whether it has defect or not by visual confirm. (Refer to BEFORE TROUBLESHOOTING)

2 . After connecting CN119, connect the battery plug and turn on the key switch to confirm error.

Judgment

Result	Procedure
H3-2 error does not occur.	**Connector contact defect**
H3-2 error occurs.	Go to step 2

STEP2

Inspection : Attachment 1 lever potentiometer

1 . Turn off the key switch and disconnect the battery plug.

2 . Replace CN119 with CN115 (connector of attachment lever 1 potentiometer and lift lever potentiometer).

3 . Connect the battery plug and turn on the key switch to confirm the error code.

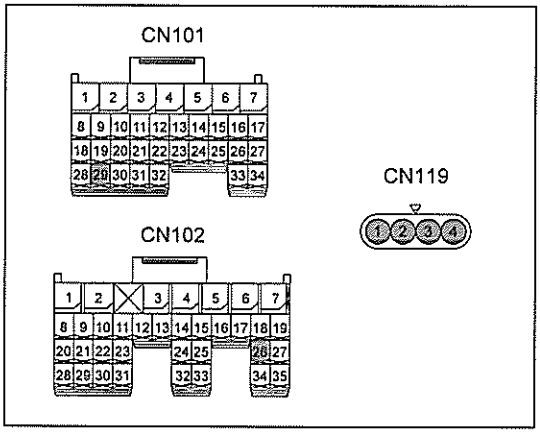
H1-4, H3-4 can be ignored.

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Judgment

Result	Procedure
H3-2 error occurs.	Go to step 3
H1-2 error occurs.	**Attachment 1 lever potentiometer defect**

STEP3



Inspection : Harness

1 . Turn off the key switch and disconnect the battery plug.

2 . Disconnect the CN102 and CN119 connector, then check the harness.

[Inspection procedure and standard]

Inspect for continuity and short circuiting of the harness.

Perform this check with the battery plug and the CN102, CN119 connectors disconnected, and visually check inside the connector and the caulked portion of its wire for defects. Refer to BEFORE TROUBLESHOOTING

* : It is OK to connect CN119-1 to CN119-4 through SST2 (09232-13130-71) and check if there is continuity between CN102-26 and CN101-29.

Portions to be checked	Standard:
CN102-26 (51) to CN119-1 (51)	Continuity *
CN119-2 (25) to CN119-4 (30)	No continuity
CN119-3 (24) to CN119-4 (30)	No continuity

Judgment

Result	Procedure
OK	**Main controller defect**
NG	**Harness defect**

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Error Code: H3-3

Failure mode: Attachment 1 lever potentiometer : sensor output declination abnormality

⚠ CAUTION

- **Be sure to do the matching after reassembly if performed the removing and inspection of the lever.**
- **In case of mini lever spec. , replace CN119 with CN164.**

Probable cause

- Connector contact defect
- Harness defect
- Attachment 1 lever potentiometer defect
- Main controller defect

Related portion

Main controller			Attachment 1 lever potentiometer
	CN101-29 (30, VRAT1+)	CN119-4 (30)	
	CN102-21 (24, VRA11)	CN119-3 (24)	
	CN102-20 (25, VRA12)	CN119-2 (25)	
	CN102-26 (51, POT-)	CN119-1 (51)	

STEP1

Turn off the key switch and disconnect the battery plug.

After disconnection the CN119 connector, check the inside of connector and the caulked portion of wire whether it has defect or not by visual confirm. (Refer to BEFORE TROUBLESHOOTING)

Connect the CN119 connector, connect the battery plug.

Turn on the key switch to check the error occurs.

Judgment

Result	Procedure
H3-3 error does not occur.	**Connector contact defect**
H3-3 error occurs.	Go to step 2

STEP2

Inspection : Attachment 1 potentiometer

Turn off the key switch and disconnect the battery plug.

Disconnect the CN119 connector.

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Connect the battery plug and turn on the key switch to confirm the error occurs.

Judgment

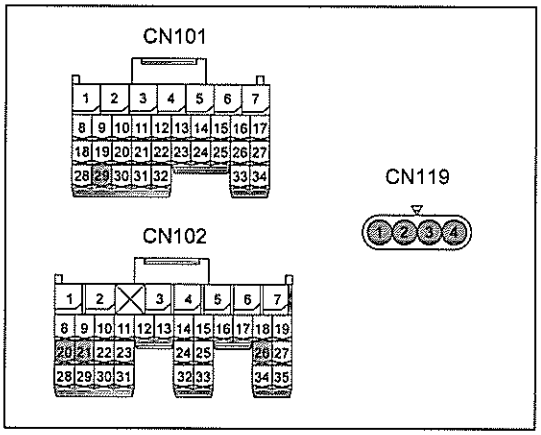
Result	Procedure
H3-1 error does not occur.	Go to step 3
H3-1 error occurs.	Go to step 4

STEP3

Inspection : Harness

Turn off the key switch and disconnect the battery plug.

Disconnect the CN101, CN102 and CN119 connectors and check the harnesses for their continuities.



[Inspection procedure and standard]

Inspect for continuity of the harness.

Perform this check with the battery plug and the CN101, CN102 and CN119 connectors disconnected, and visually check inside the connector and the caulked portion of its wire for defects.

Refer to BEFORE TROUBLESHOOTING

Portions to be checked	Standard:
CN101-29(30) to CN119-4(30)	Continuity
CN102-21(24) to CN119-3(24)	Continuity
CN102-20(25) to CN119-2(25)	Continuity
CN102-26(51) to CN119-1(51)	Continuity
CN119-3(24) to CN119-4(30)	No continuity
CN119-2 (25) to CN119-4 (30)	No continuity
CN119-3(24) to CN119-1(51)	No continuity
CN119-2 (25) to CN119-1 (51)	No continuity

Judgment

Result	Procedure
NG	**Harness defect**
OK	**Main controller defect**

STEP4

Inspection : Attachment 1 potentiometer

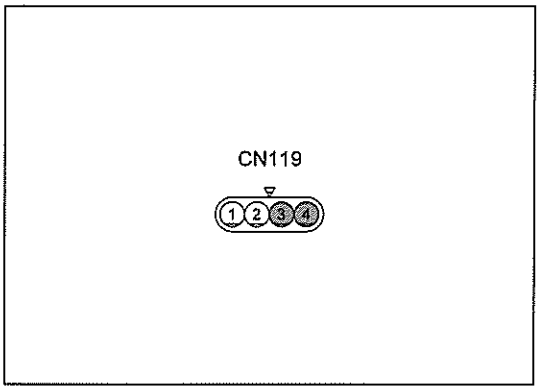
Turn off the key switch and disconnect the battery plug.

Disconnect the CN119 connector.

Connect between CN119-4 and CN 119-3 for harness side with SST2 connected.

Connect the battery plug and turn on the key switch to confirm the error occurs.

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Judgment

Result	Procedure
H3-2 error occurs.	Go to step 5
H3-2 error does not occur.	Go to step 3

STEP5

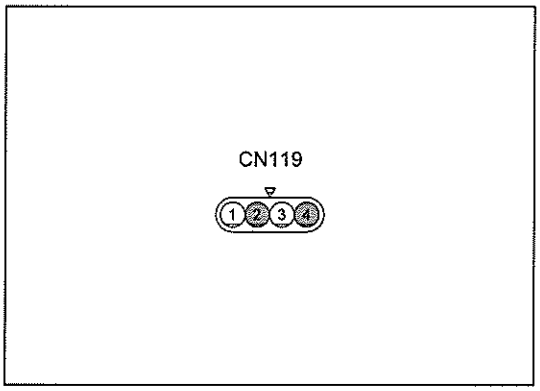
Inspection : Attachment 1 lever potentiometer

Turn off the key switch and disconnect the battery plug.

Disconnect the CN119 connector.

Connect between CN119-4 and CN 119-2 for harness side with SST2 connected.

Connect the battery plug and turn on the key switch to confirm the error occurs.



Judgment

Result	Procedure
H3-2 error occurs.	**Attachment 1 lever potentiometer defect**
H3-2 error does not occur.	Go to step 3

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Error Code: H3-4

Failure mode: Attachment 1 lever potentiometer neutral abnormality

⚠ CAUTION

- **Be sure to do the matching after reassembly if performed the removing and inspection of the lever.**
- **H3-4 error occurs if turn on the key switch or release the emergency stop button with operating attachment 1 lever.**
- **In case of mini lever spec. , replace CN119 with CN164.**

Probable cause

- Connector contact defect
- Attachment 1 lever potentiometer defect
- Attachment 1 lever potentiometer assembly defect

Related portion

Main controller			Attachment 1 lever potentiometer
	CN101-29 (30, VRAT1+)	CN119-4 (30)	
	CN102-21 (24, VRA11)	CN119-3 (24)	
	CN102-20 (25, VRA12)	CN119-2 (25)	
	CN102-26 (51, POT-)	CN119-1 (51)	

STEP1

1 . Turn off the key switch and disconnect the battery plug. Check the inside of connector CN119 and the caulked portion of wire whether it has defect or not by visual confirm. (Refer to BEFORE TROUBLESHOOTING)

2 . After connecting CN119, connect the battery plug and turn on the key switch to confirm error.

Judgment

Result	Procedure
H3-4 error does not occur.	**Connector contact defect**
H3-4 error occurs.	Go to step 2

STEP2

Inspection : Attachment 1 lever potentiometer

1 . Turn off the key switch and disconnect the battery plug.

2 . Check if the attachment 1 lever potentiometer is installed correctly.

3 . Reconnect the battery plug and turn on the key switch.

4 . Perform matching the attachment 1 lever potentiometer. (Refer to page "MATCHING" of Display section)

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Judgment

Result	Procedure
NG matching	**Attachment 1 lever potentiometer defect**
OK matching	**Attachment 1 lever potentiometer assembly defect**

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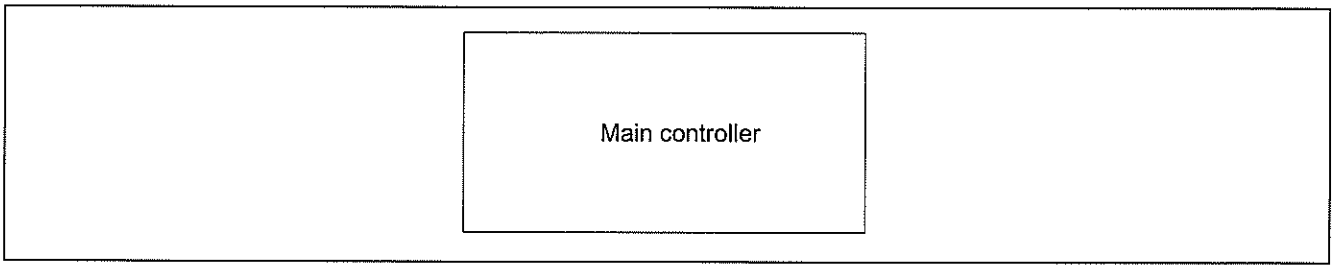
Error Code: H3-5

Failure mode: Attachment 1 lever potentiometer matching value abnormality

Probable cause

- Main controller defect
- Attachment 1 lever potentiometer matching defect

Related portion



STEP1

MATCHING :

Perform matching the attachment 1 lever.
(Refer to page "MATCHING" of Display section)

Judgment

Result	Procedure
NG matching	Go to step 2
OK matching	Go to step 3

STEP2

Attachment 1 lever potentiometer voltage inspection :

Check the attachment 1 lever voltage.

Attachment 1 lever potentiometer voltage.

STD
[ANL] 4 IO3
(Conventional lever: 4 11, 4 12)
(Mini lever: 4 15, 4 16)
Multi-function display
[ANL] I/O M.HANDRING 7/8

VRA1

Position of attachment 1 lever	sensor 1	sensor 2
When the neutral position (Standard lever spec.)	1.65V to 2.87V	1.52V to 3.01V
When the neutral position (Mini lever spec.)	1.78V to 2.75V	1.78V to 2.75V

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Judgment

Result	Procedure
Outside standard value	Go to step 3 **Attachment 1 lever assembly defect After reassemble, perform matching and STEP3.**
Within standard value	**Main controller defect**

STEP3

Check the error :

Turn off the key switch and disconnect the battery plug.

After 30 seconds, reconnect the battery plug and turn on the key switch.

Judgment

Result	Procedure
H3-5 error occurs.	**Main controller defect**
H3-5 error does not occur.	**Attachment 1 lever potentiometer matching defect** **Use as it is.**

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Error Code: H4-1

Failure mode: Attachment 2 lever potentiometer open abnormality

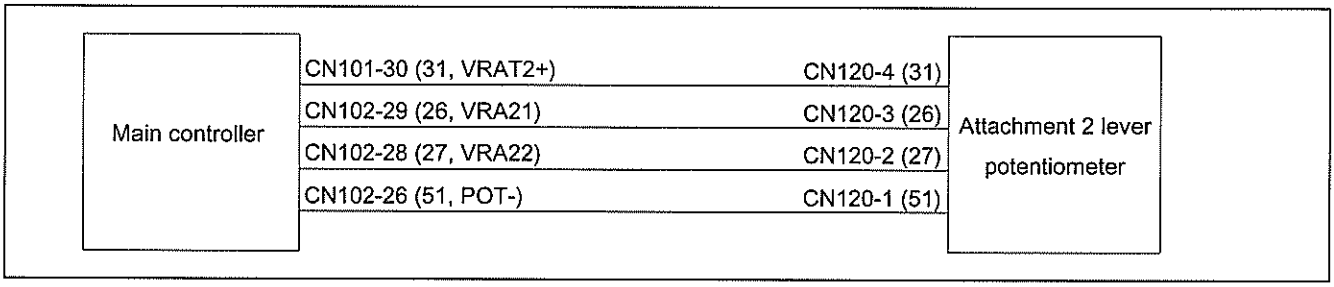
⚠ CAUTION

- **Be sure to do the matching after reassembly if performed the removing and inspection of the lever.**
- **In case of mini lever spec. , replace CN120 with CN165, and CN115 with CN162.**

Probable cause

- Connector contact defect
- Harness defect
- Attachment 2 lever potentiometer defect
- Main controller defect

Related portion



STEP1

1 . Turn off the key switch and disconnect the battery plug. Check the inside of connector CN120 and the caulked portion of wire whether it has defect or not by visual confirm. (Refer to BEFORE TROUBLESHOOTING)

2 . After connecting CN120, connect the battery plug and turn on the key switch to confirm error.

Judgment

Result	Procedure
H4-1 error does not occur.	**Connector contact defect**
H4-1 error occurs.	Go to step 2

STEP2

Inspection : Attachment 2 lever potentiometer

1 . Turn off the key switch and disconnect the battery plug.

2 . Replace CN120 with CN115 (connector of attachment lever 2 potentiometer and lift lever potentiometer).

3 . Connect the battery plug and turn on the key switch to confirm the error code.

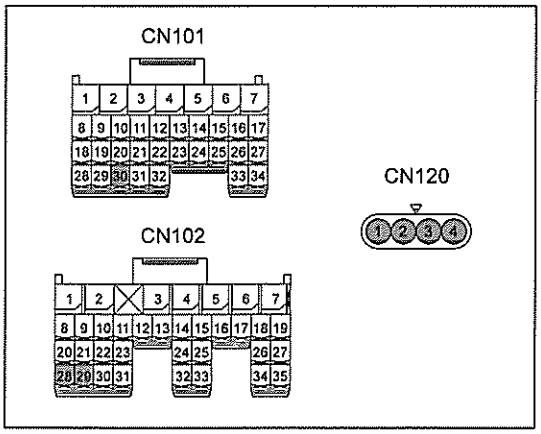
H1-4, H4-4 can be ignored.

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Judgment

Result	Procedure
H4-1 error occurs.	Go to step 3
H1-1 error occurs.	**Attachment 2 lever potentiometer defect**

STEP3



Inspection : Harness

1 . Turn off the key switch and disconnect the battery plug.

2 . Disconnect the CN101, CN102 and CN120 connector, then check the harness.

[Inspection procedure and standard]

Inspect for continuity and short circuiting of the harness.

Perform this check with the battery plug and the CN101, CN102, CN120 connectors disconnected, and visually check inside the connector and the caulked portion of its wire for defects. Refer to BEFORE TROUBLESHOOTING

* : It is OK "to connect CN120-3 to CN120-4 through SST2 (09232-13130-71) and check if there is continuity between CN101-30 and CN102-29", and "to connect CN120-2 to CN120-4 through SST2 (09232-13130-71) and check if there is continuity between CN101-30 and CN102-28".

Portions to be checked	Standard:
CN101-30 (31) to CN120-4 (31)	Continuity *
CN102-29 (26) to CN120-3 (26)	Continuity *
CN102-28 (27) to CN120-2 (27)	Continuity *
CN120-2 (27) to CN120-1 (51)	No continuity
CN120-3 (26) to CN120-1 (51)	No continuity
CN120-4 (31) to CN120-1 (51)	No continuity

Judgment

Result	Procedure
OK	**Main controller defect**
NG	**Harness defect**

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Error Code: H4-2

Failure mode: Attachment 2 lever potentiometer short abnormality

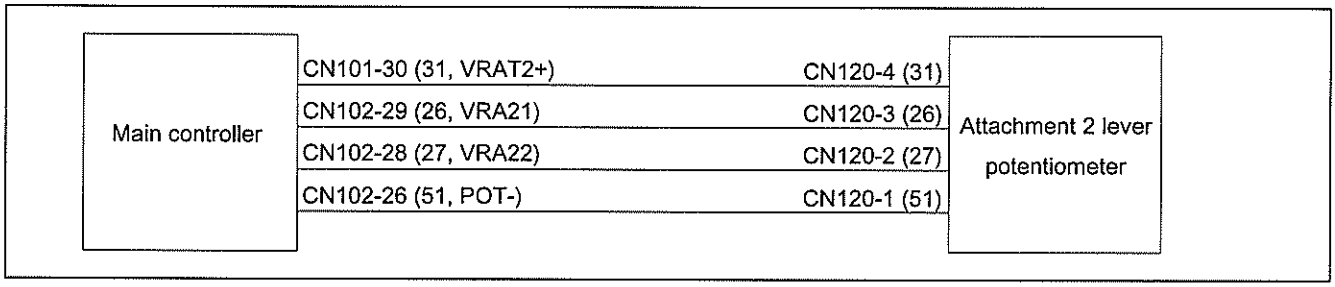
⚠ CAUTION

- **Be sure to do the matching after reassembly if performed the removing and inspection of the lever.**
- **In case of mini lever spec. , replace CN120 with CN165, and CN115 with CN162.**

Probable cause

- Connector contact defect
- Harness defect
- Attachment 2 lever potentiometer defect
- Main controller defect

Related portion



STEP1

1 . Turn off the key switch and disconnect the battery plug. Check the inside of connector CN120 and the caulked portion of wire whether it has defect or not by visual confirm. (Refer to BEFORE TROUBLESHOOTING)

2 . After connecting CN120, connect the battery plug and turn on the key switch to confirm error.

Judgment

Result	Procedure
H4-2 error does not occur.	**Connector contact defect**
H4-2 error occurs.	Go to step 2

STEP2

Inspection : Attachment 2 lever potentiometer

1 . Turn off the key switch and disconnect the battery plug.

2 . Replace CN120 with CN115 (connector of attachment lever 2 potentiometer and lift lever potentiometer).

3 . Connect the battery plug and turn on the key switch to confirm the error code.

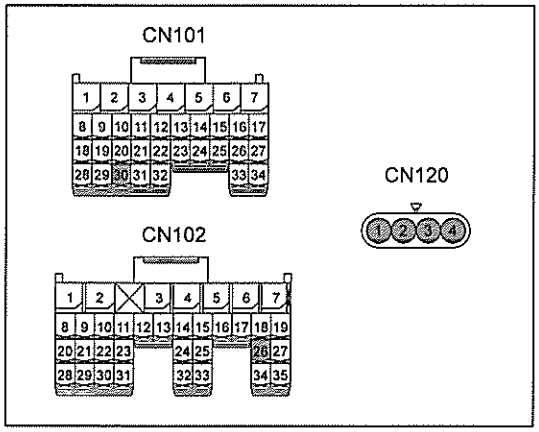
H1-4, H4-4 can be ignored.

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Judgment

Result	Procedure
H4-2 error occurs.	Go to step 3
H1-2 error occurs.	**Attachment 2 lever potentiometer defect**

STEP3



Inspection : Harness

1 . Turn off the key switch and disconnect the battery plug.

2 . Disconnect the CN102 and CN120 connector, then check the harness.

[Inspection procedure and standard]

Inspect for continuity and short circuiting of the harness.

Perform this check with the battery plug and the CN102, CN120 connectors disconnected, and visually check inside the connector and the caulked portion of its wire for defects. Refer to BEFORE TROUBLESHOOTING

* : It is OK to connect CN120-1 to CN120-4 through SST2 (09232-13130-71) and check if there is continuity between CN102-26 and CN101-30.

Portions to be checked	Standard:
CN102-26 (51) to CN120-1 (51)	Continuity *
CN120-2 (27) to CN120-4 (31)	No continuity
CN120-3 (26) to CN120-4 (31)	No continuity

Judgment

Result	Procedure
OK	**Main controller defect**
NG	**Harness defect**

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Error Code: H4-3

Failure mode: Attachment 2 lever potentiometer : sensor output declination abnormality

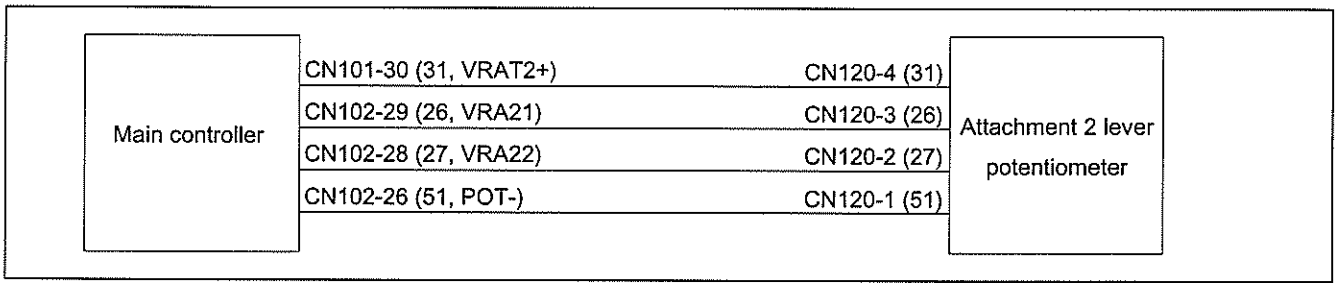
⚠ CAUTION

- **Be sure to do the matching after reassembly if performed the removing and inspection of the lever.**
- **In case of mini lever spec. , replace CN120 with CN165.**

Probable cause

- Connector contact defect
- Harness defect
- Attachment 2 lever potentiometer defect
- Main controller defect

Related portion



STEP1

Turn off the key switch and disconnect the battery plug.

After disconnection the CN120 connector, check the inside of connector and the caulked portion of wire whether it has defect or not by visual confirm. (Refer to BEFORE TROUBLESHOOTING)

Connect the CN120 connector, connect the battery plug.

Turn on the key switch to check the error occurs.

Judgment

Result	Procedure
H4-3 error does not occur.	**Connector contact defect**
H4-3 error occurs.	Go to step 2

STEP2

Inspection : Attachment 2 lever potentiometer

Turn off the key switch and disconnect the battery plug.

Disconnect the CN120 connector.

Connect the battery plug and turn on the key switch to confirm the error occurs.

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Judgment

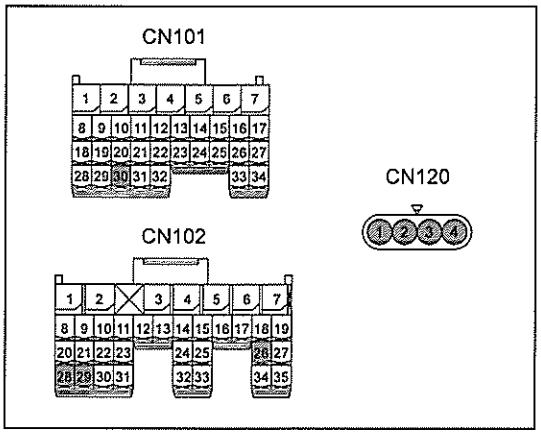
Result	Procedure
H4-1 error occurs.	Go to step 3
H4-1 error does not occur.	Go to step 4

STEP3

Inspection : Harness

Turn off the key switch and disconnect the battery plug.

Disconnect the CN101, CN102 and CN120 connectors and check the harnesses for their continuities.



[Inspection procedure and standard]

Inspect for continuity of the harness.

Perform this check with the battery plug and the CN101, CN102 and CN120 connectors disconnected, and visually check inside the connector and the caulked portion of its wire for defects.

Refer to BEFORE TROUBLESHOOTING

Portions to be checked	Standard:
CN101-30(31) to CN120-4(31)	Continuity
CN102-29(26) to CN120-3(26)	Continuity
CN102-28(27) to CN120-2(27)	Continuity
CN102-26(51) to CN120-1(51)	Continuity
CN120-3(26) to CN120-4(31)	No continuity
CN120-2 (27) to CN120-4 (31)	No continuity
CN120-3 (26) to CN120-1 (51)	No continuity
CN120-2 (27) to CN120-1 (51)	No continuity

Judgment

Result	Procedure
NG	**Harness defect**
OK	**Main controller defect**

STEP4

Inspection : Attachment 2 lever potentiometer

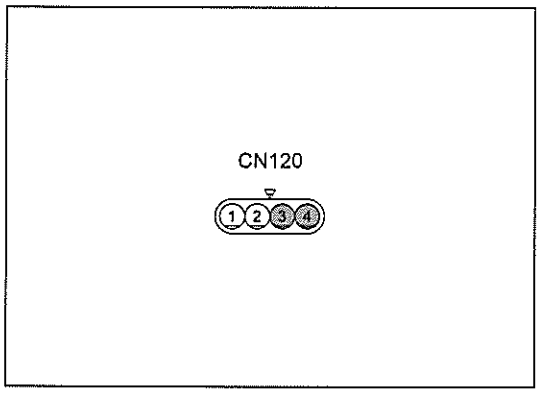
Turn off the key switch and disconnect the battery plug.

Disconnect the CN120 connector.

Connect between CN120-4 and CN 120-3 for harness side with SST2 connected.

Connect the battery plug and turn on the key switch to confirm the error occurs.

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Judgment

Result	Procedure
H4-2 error occurs.	Go to step 5
H4-2 error does not occur.	Go to step 3

STEP5

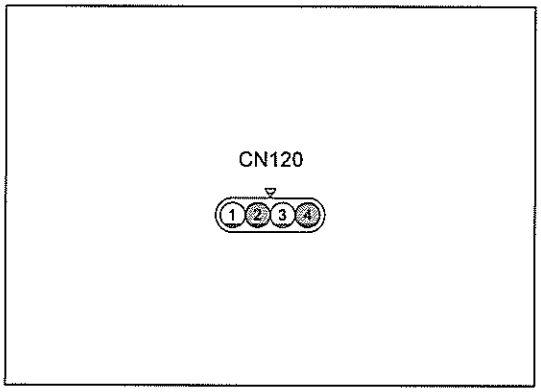
Inspection : Attachment 2 lever potentiometer

Turn off the key switch and disconnect the battery plug.

Disconnect the CN120 connector.

Connect between CN120-4 and CN 120-2 for harness side with SST2 connected.

Connect the battery plug and turn on the key switch to confirm the error occurs.



Judgment

Result	Procedure
H4-2 error occurs.	**Attachment 2 lever potentiometer defect**
H4-2 error does not occur.	Go to step 3

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Error Code: H4-4

Failure mode: Attachment 2 lever potentiometer neutral abnormality

⚠ CAUTION

- **Be sure to do the matching after reassembly if performed the removing and inspection of the lever.**
- **H4-4 error occurs if turn on the key switch or release the emergency stop button with operating attachment 2 lever.**
- **In case of mini lever spec. , replace CN120 with CN165.**

Probable cause

- Connector contact defect
- Attachment 2 lever potentiometer defect
- Attachment 2 lever potentiometer assembly defect

Related portion

Main controller	CN101-30 (31, VRAT2+)	CN120-4 (31)	Attachment 2 lever potentiometer
	CN102-29 (26, VRA21)	CN120-3 (26)	
	CN102-28 (27, VRA22)	CN120-2 (27)	
	CN102-26 (51, POT-)	CN120-1 (51)	

STEP1

1 . Turn off the key switch and disconnect the battery plug. Check the inside of connector CN120 and the caulked portion of wire whether it has defect or not by visual confirm. (Refer to BEFORE TROUBLESHOOTING)

2 . After connecting CN120, connect the battery plug and turn on the key switch to confirm error.

Judgment

Result	Procedure
H4-4 error does not occur.	**Connector contact defect**
H4-4 error occurs.	Go to step 2

STEP2

Inspection : Attachment 2 lever potentiometer

1 . Turn off the key switch and disconnect the battery plug.

2 . Check if the attachment 2 lever potentiometer is installed correctly.

3 . Reconnect the battery plug and turn on the key switch.

4 . Perform matching the attachment 2 lever potentiometer. (Refer to page "MATCHING" of Display section)

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Judgment

Result	Procedure
NG matching	**Attachment 2 lever potentiometer defect**
OK matching	**Attachment 2 lever potentiometer assembly defect**

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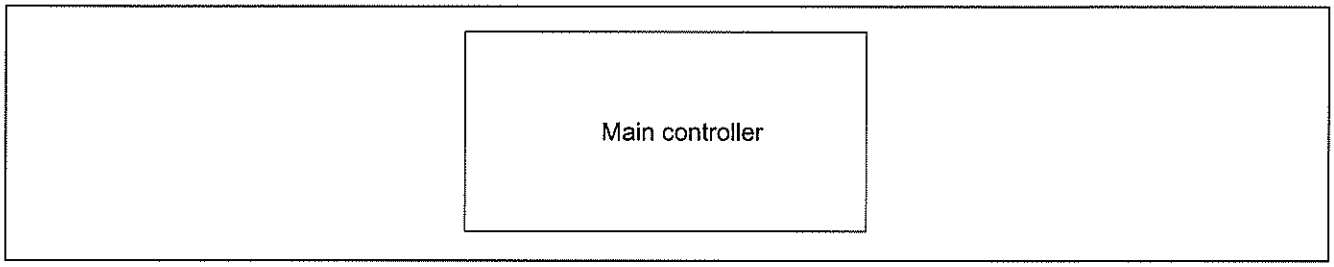
Error Code: H4-5

Failure mode: Attachment 2 lever potentiometer matching value abnormality

Probable cause

- Main controller defect
- Attachment 2 lever potentiometer matching defect

Related portion



STEP1

MATCHING :

Perform matching the attachment 2 lever.
(Refer to page "MATCHING" of Display section)

Judgment

Result	Procedure
NG matching	Go to step 2
OK matching	Go to step 3

STEP2

Attachment 2 lever potentiometer voltage inspection :

Check the attachment 2 lever voltage.

Attachment 2 lever potentiometer voltage.

STD
[ANL] 4 IO3
(Conventional lever: 4 13, 4 14)
(Mini lever: 4 18, 4 19)
Multi-function display
[ANL] I/O M.HANDRING 8/8
VRA2

Position of attachment 2 lever	sensor 1	sensor 2
When the neutral position (Standard lever spec.)	1.65V to 2.87V	1.52V to 3.01V
When the neutral position (Mini lever spec.)	1.78V to 2.75V	1.78V to 2.75V

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Judgment

Result	Procedure
Outside standard value	Go to step 3 **Attachment 2 lever assembly defect After reassemble, perform matching and STEP3.**
Within standard value	**Main controller defect**

STEP3

Check the error :

Turn off the key switch and disconnect the battery plug.

After 30 seconds, reconnect the battery plug and turn on the key switch.

Judgment

Result	Procedure
H4-5 error occurs.	**Main controller defect**
H4-5 error does not occur.	**Attachment 2 lever potentiometer matching defect** **Use as it is.**

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Error Code: H5-1

Failure mode: Lift proportional valve solenoid open abnormality (lever pull side)

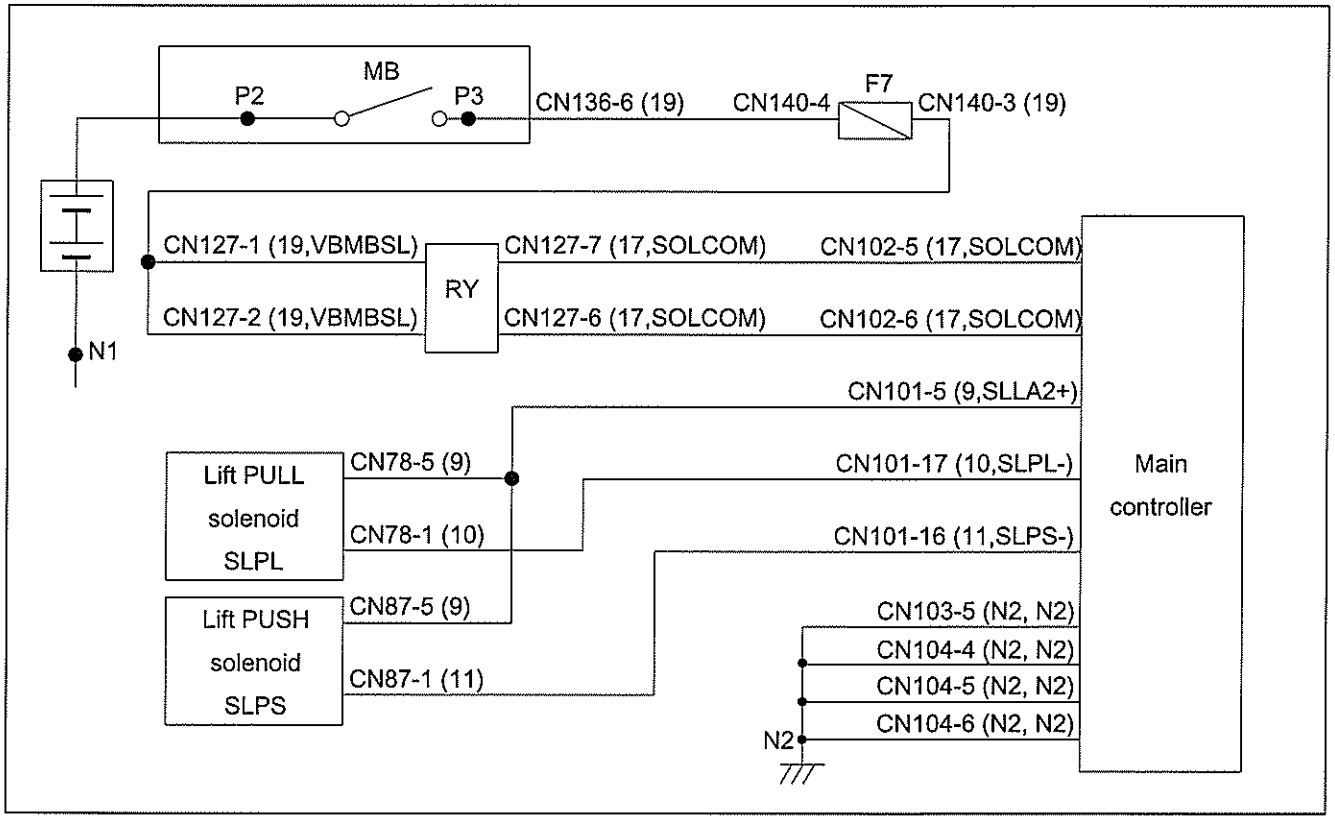
⚠ CAUTION

- **If H5-5 also occurs, disconnect the battery plug at once, perform troubleshooting with priority given to H5-5.**
- **If A9-2, HB-1 or HB-3 occurs at same time, perform troubleshooting for A9-2, HB-1, HB-3 first.**

Probable cause

- Connector contact defect
- Lift proportional valve solenoid (PULL) defect
- Harness defect
- Main controller defect

Related portion



STEP1

1 . Turn off the key switch and disconnect the battery plug. Check the inside of connector CN78 and the caulked portion of wire whether it has defect or not by visual confirm. (Refer to BEFORE TROUBLESHOOTING)

2 . After connecting CN78, connect the battery plug and turn on the key switch to confirm error.

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Judgment

Result	Procedure
H5-6 error occurs.	**Perform troubleshooting for H5-6.**
H5-6 error does not occur.	Go to step 2

STEP2

Operate the pull side of lift lever more than 1 second to check if an error occurs.

Judgment

Result	Procedure
H5-1 error does not occur.	**Connector contact defect**
H5-1 error occurs.	Go to step 3

STEP3

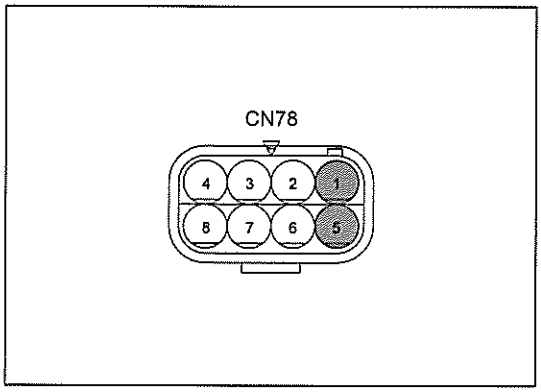
Inspection : Lift proportional valve solenoid (PULL) individual inspection

1 . Turn off the key switch and disconnect the battery plug.

2 . Disconnect the CN78 connector, and check the resistance of lift proportional valve solenoid (PULL).

[Inspection procedure and standard]

Check the resistance of lift proportional valve solenoid (PULL).



Turn off the key switch and disconnect the battery plug, disconnect the CN78 connector, visually check each terminal and the caulked portion and coating of each cable for defects. (Refer to BEFORE TROUBLESHOOTING)

Portion to be inspected	Standard:
CN78-5(9) to CN78-1(10)	Approx. 8 Ω

Judgment

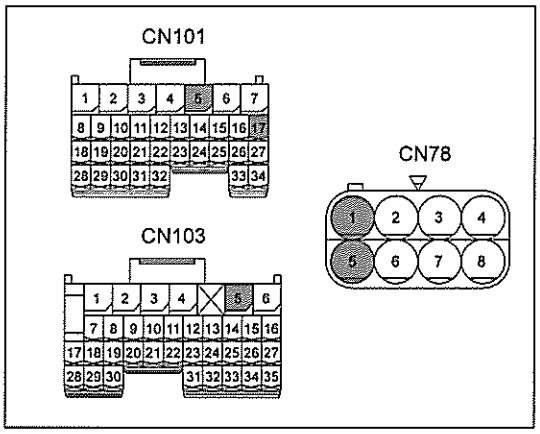
Result	Procedure
NG	**Lift proportional valve solenoid (PULL) defect**
OK	Go to step 4

STEP4

Inspection : Harness

Disconnect the CN101, CN103 and CN78 connector, then check the harness.

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[Inspection procedure and standard]

Inspect for continuity and short circuiting of the harness.

Perform this check with the battery plug and the CN101, CN103, CN78 connectors disconnected, and visually check inside the connector and the caulked portion of its wire for defects. Refer to BEFORE TROUBLESHOOTING

*1: Connect the CN78 connector and measure the resistance between CN101-5(9) and CN101-17(10). And it is OK if this resistance is approx.8 Ω.

Portion to be inspected	Standard:
CN101-5(9) to CN78-5(9)	Continuously *1
CN101-17(10) to CN78-1	Continuously *1
CN101-5(9) to CN103-5(N2)	No continuity
CN101-17(10) to CN103-5(N2)	No continuity

Judgment

Result	Procedure
NG	**Harness defect**
OK	**Main controller defect**

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Error Code: H5-2

Failure mode: Lift proportional valve solenoid short abnormality (lever pull side)

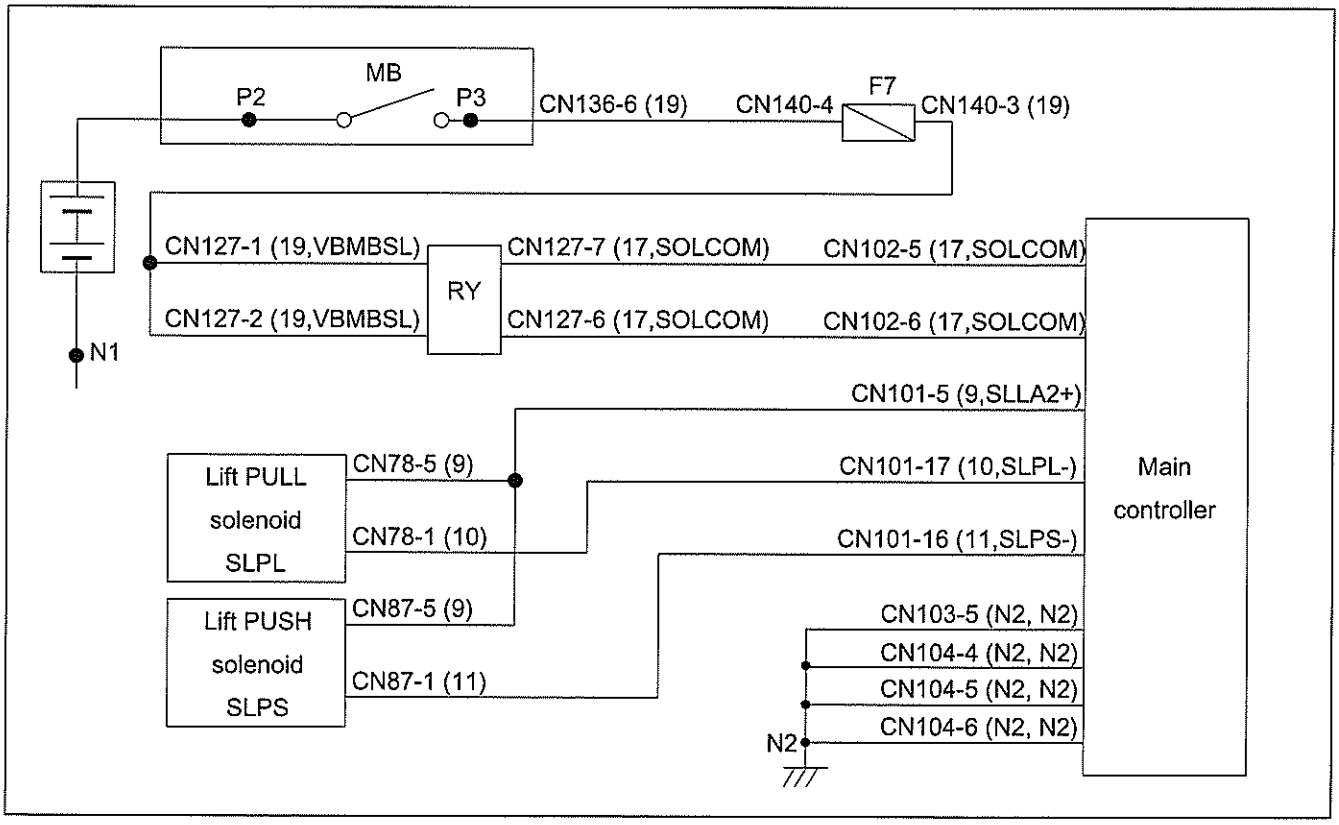
⚠ CAUTION

- **If H5-5 also occurs, disconnect the battery plug at once, perform troubleshooting with priority given to H5-5.**

Probable cause

- Connector contact defect
- Lift proportional valve solenoid (PULL) defect
- Harness defect
- Main controller defect

Related portion



STEP1

1 . Turn off the key switch and disconnect the battery plug, disconnect the CN78 connector, visually check each terminal and the caulked portion and coating of each cable for defects. (Refer to BEFORE TROUBLESHOOTING)

2 . After connecting the connector, connect the battery plug and turn on the key switch to confirm error.

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Judgment

Result	Procedure
H5-6 error occurs.	**Perform troubleshooting for H5-6.**
H5-6 error does not occur.	Go to step 2

STEP2

Operate the pull side of lift lever more than 1 second to check if an error occurs.

Judgment

Result	Procedure
H5-2 error does not occur.	**Connector contact defect**
H5-2 error occurs.	Go to step 3

STEP3

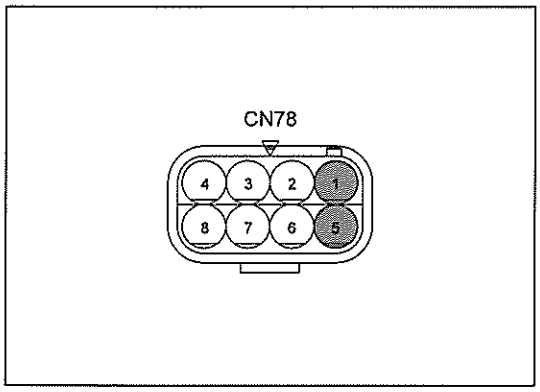
Inspection : Lift proportional valve solenoid (PULL) individual inspection

1 . Turn off the key switch and disconnect the battery plug.

2 . Disconnect the CN78 connector, and check the resistance of lift proportional valve solenoid (PULL).

[Inspection procedure and standard]

Check the resistance of lift proportional valve solenoid (PULL).



Turn off the key switch and disconnect the battery plug, disconnect the CN78 connector, visually check each terminal and the caulked portion and coating of each cable for defects. (Refer to BEFORE TROUBLESHOOTING)

Portion to be inspected	Standard:
CN78-5(9) to CN78-1(10)	Approx. 8 Ω

Judgment

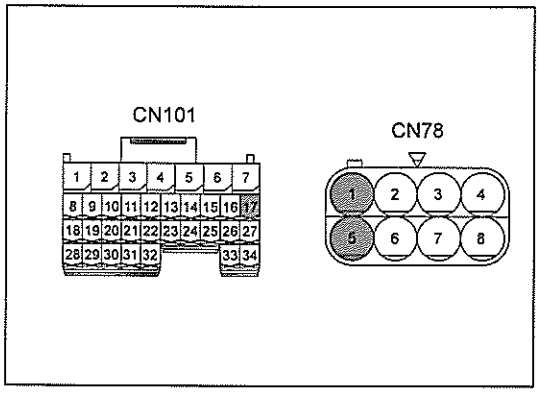
Result	Procedure
NG	**Lift proportional valve solenoid (PULL) defect**
OK	Go to step 4

STEP4

Inspection : Harness

Disconnect the CN101 and CN78 connector, then check the harness.

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[Inspection procedure and standard]

Inspect for continuity and short circuiting of the harness.

Perform this check with the battery plug and the CN101, CN78 connectors disconnected, and visually check inside the connector and the caulked portion of its wire for defects. Refer to BEFORE TROUBLESHOOTING

Portion to be inspected	Standard:
CN78-5(9) to CN78-1(10)	No continuity
CN101-17(10) to P2	No continuity
CN101-17(10) to P3	No continuity

Judgment

Result	Procedure
NG	**Harness defect**
OK	**Main controller defect**

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Error Code: H5-3

Failure mode: Lift proportional valve solenoid open abnormality (lever push side)

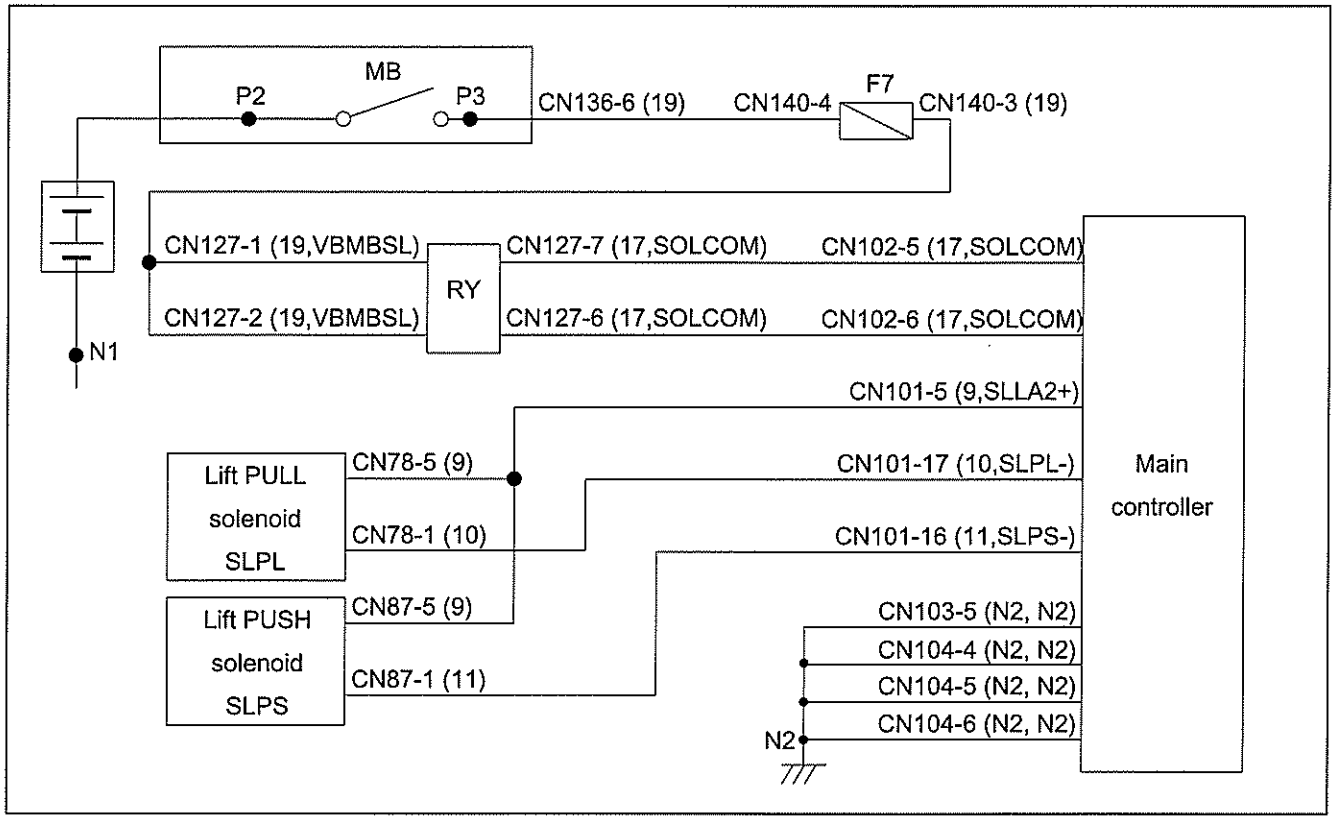
⚠ CAUTION

- **If H5-5 also occurs, disconnect the battery plug at once, perform troubleshooting with priority given to H5-5.**
- **If A9-2, HB-1 or HB-3 occurs at same time, perform troubleshooting for A9-2, HB-1, HB-3 first.**

Probable cause

- Connector contact defect
- Lift proportional valve solenoid (PUSH) defect
- Harness defect
- Main controller defect

Related portion



STEP1

1 . Turn off the key switch and disconnect the battery plug. Check the inside of connector CN87 and the caulked portion of wire whether it has defect or not by visual confirm. (Refer to BEFORE TROUBLESHOOTING)

2 . After connecting CN87, connect the battery plug and turn on the key switch to confirm error.

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Judgment

Result	Procedure
H5-6 error occurs.	**Perform troubleshooting for H5-6.**
H5-6 error does not occur.	Go to step 2

STEP2

Operate the push side of lift lever more than 1 second to check if an error occurs.

Judgment

Result	Procedure
H5-3 error does not occur.	**Connector contact defect**
H5-3 error occurs.	Go to step 3

STEP3

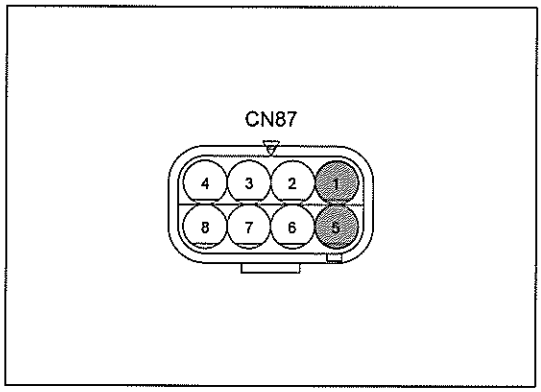
Inspection : Lift proportional valve solenoid (PUSH) individual inspection

1 . Turn off the key switch and disconnect the battery plug.

2 . Disconnect the CN87 connector, and check the resistance of lift proportional valve solenoid (PUSH).

[Inspection procedure and standard]

Check the resistance of lift proportional valve solenoid (PUSH).



Turn off the key switch and disconnect the battery plug, disconnect the CN87 connector, and visually check inside each connector and the caulked portion of each wire for defects. (Refer to BEFORE TROUBLESHOOTING)

Portion to be inspected	Standard:
CN87-5(9) to CN87-1(11)	Approx. 8 Ω

Judgment

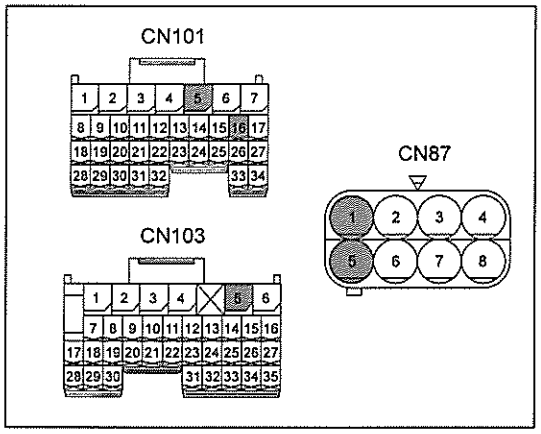
Result	Procedure
NG	**Lift proportional valve solenoid (PUSH) defect**
OK	Go to step 4

STEP4

Inspection : Harness

Disconnect the CN101, CN103 and CN87 connector, then check the harness.

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[Inspection procedure and standard]

Inspect for continuity and short circuiting of the harness.

Perform this check with the battery plug and the CN101, CN103, CN87 connectors disconnected, and visually check inside the connector and the caulked portion of its wire for defects. Refer to BEFORE TROUBLESHOOTING

*1: Connect the CN87 connector and measure the resistance between CN101-5(9) and CN101-16(11). And it is OK if this resistance is approx.8 Ω.

Portion to be inspected	Standard:
CN101-5(9) to CN87-5(9)	Continuously *1
CN101-16(11) to CN87-1	Continuously *1
CN101-5(9) to CN103-5(N2)	No continuity
CN101-16(11) to CN103-5(N2)	No continuity

Judgment

Result	Procedure
NG	**Harness defect**
OK	**Main controller defect**

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Error Code: H5-4

Failure mode: Lift proportional valve solenoid short abnormality (lever push side)

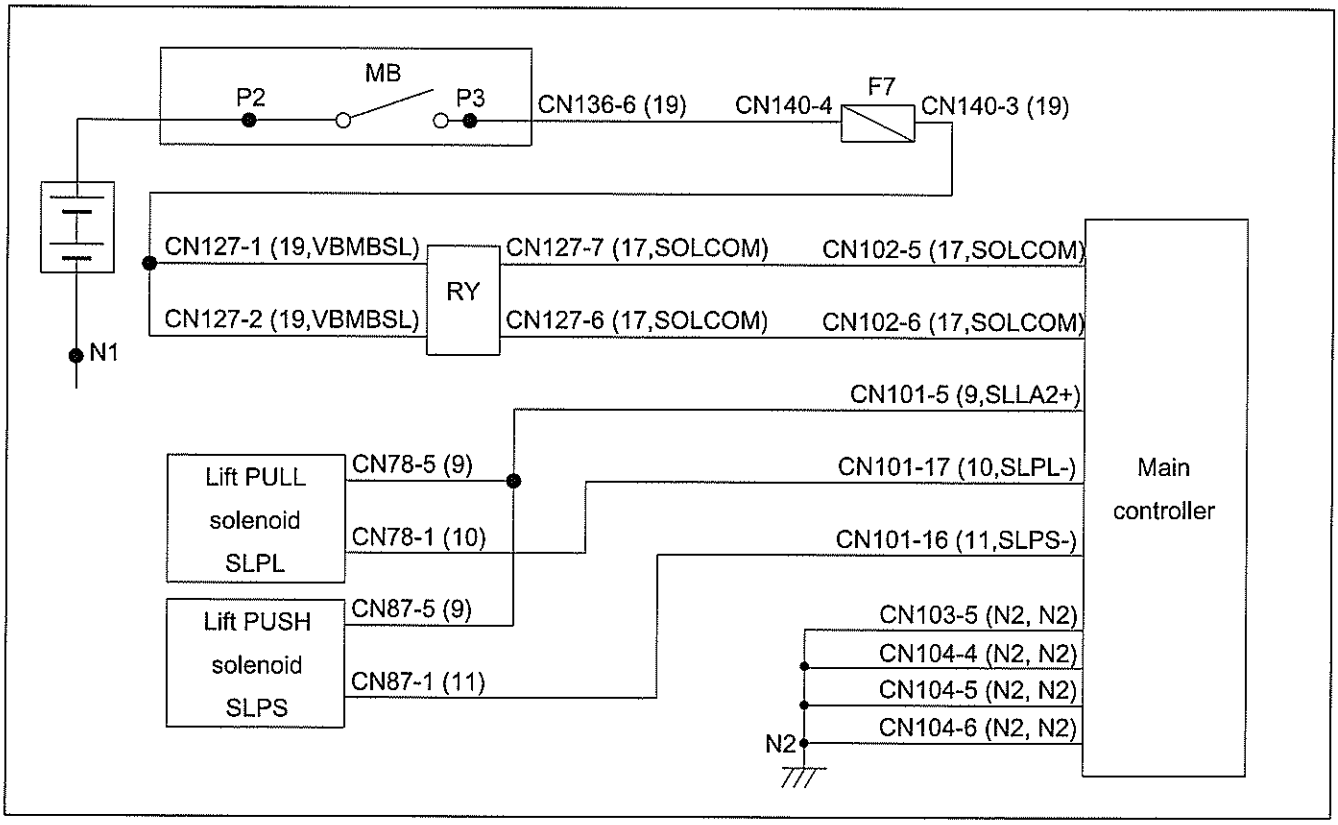
⚠ CAUTION

- **If H5-5 also occurs, disconnect the battery plug at once, perform troubleshooting with priority given to H5-5.**

Probable cause

- Connector contact defect
- Lift proportional valve solenoid (PUSH) defect
- Harness defect
- Main controller defect

Related portion



STEP1

1 . Turn off the key switch and disconnect the battery plug, disconnect the CN87 connector, and visually check inside each connector and the caulked portion of each wire for defects. (Refer to BEFORE TROUBLESHOOTING)

2 . After connecting the connector, connect the battery plug and turn on the key switch to confirm error.

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Judgment

Result	Procedure
H5-6 error occurs.	**Perform troubleshooting for H5-6.**
H5-6 error does not occur.	Go to step 2

STEP2

Operate the push side of lift lever more than 1 second to check if an error occurs.

Judgment

Result	Procedure
H5-4 error does not occur.	**Connector contact defect**
H5-4 error occurs.	Go to step 3

STEP3

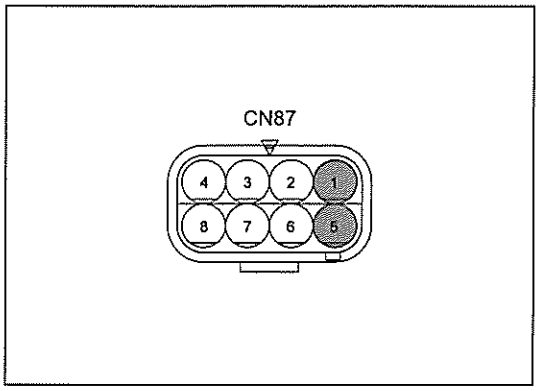
Inspection : Lift proportional valve solenoid (PUSH) individual inspection

1 . Turn off the key switch and disconnect the battery plug.

2 . Disconnect the CN87 connector, and check the resistance of lift proportional valve solenoid (PUSH).

[Inspection procedure and standard]

Check the resistance of lift proportional valve solenoid (PUSH).



Turn off the key switch and disconnect the battery plug, disconnect the CN87 connector, and visually check inside each connector and the caulked portion of each wire for defects. (Refer to BEFORE TROUBLESHOOTING)

Portion to be inspected	Standard:
CN87-5(9) to CN87-1(11)	Approx. 8 Ω

Judgment

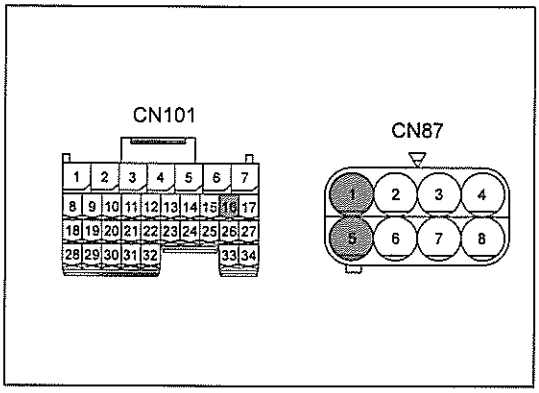
Result	Procedure
NG	**Lift proportional valve solenoid (PUSH) defect**
OK	Go to step 4

STEP4

Inspection : Harness

Disconnect the CN101 and CN87 connector, then check the harness.

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[Inspection procedure and standard]

Inspect for continuity and short circuiting of the harness.

Perform this check with the battery plug and the CN101, CN87 connectors disconnected, and visually check inside the connector and the caulked portion of its wire for defects. Refer to BEFORE TROUBLESHOOTING

Portion to be inspected	Standard:
CN87-5(9) to CN87-1(11)	No continuity
CN101-16(11) to P2	No continuity
CN101-16(11) to P3	No continuity

Judgment

Result	Procedure
NG	**Harness defect**
OK	**Main controller defect**

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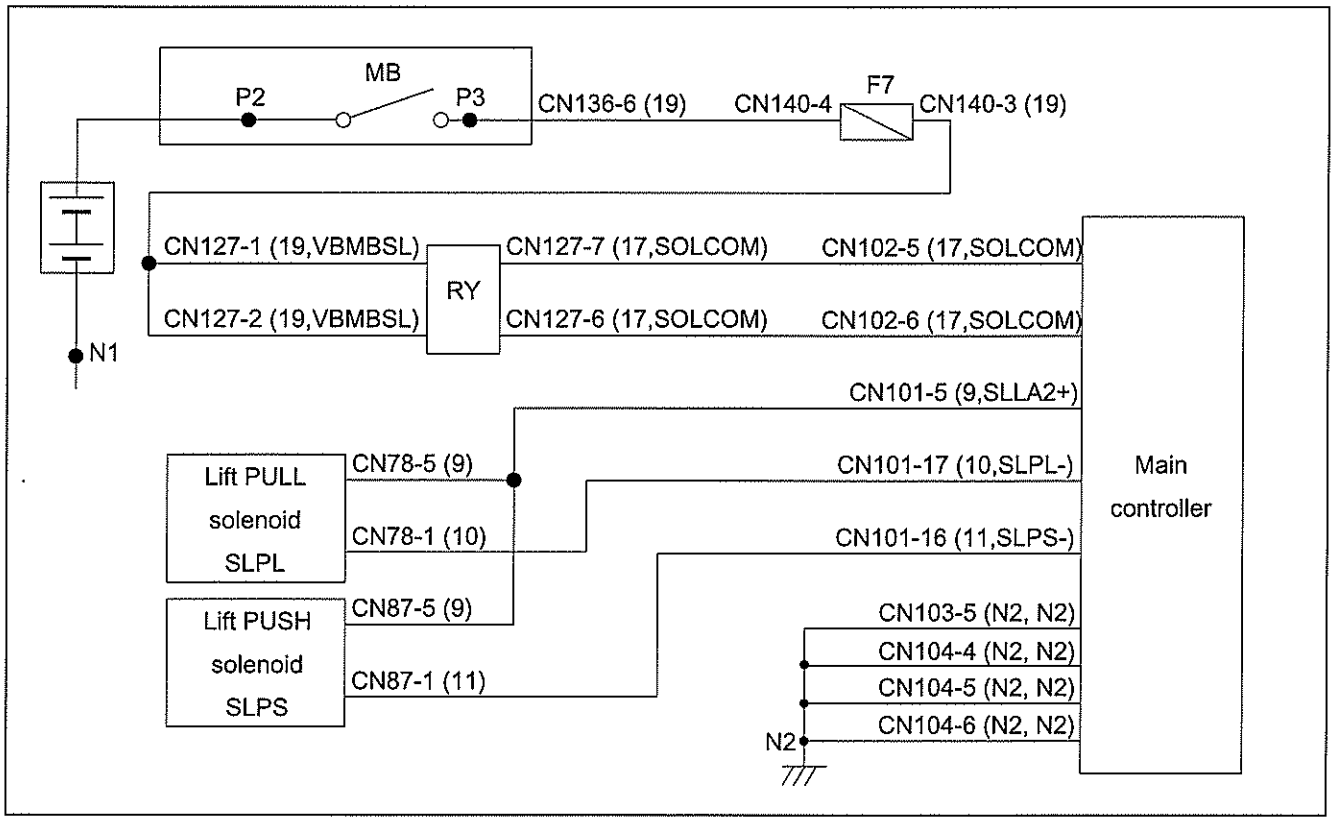
Error Code: H5-5

Failure mode: Lift proportional valve solenoid drive circuit abnormality

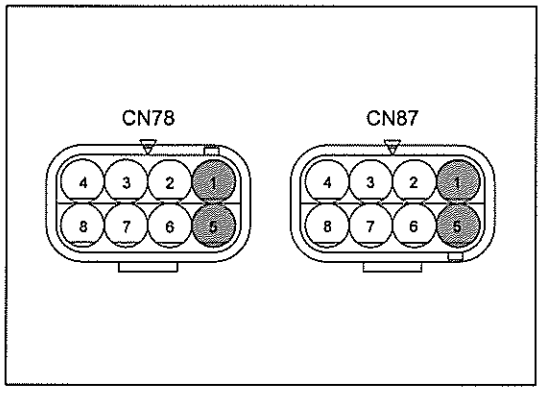
Probable cause

- Lift proportional valve solenoid defect
- Harness defect
- Main controller defect
- F76 fuse defect

Related portion



STEP1



Inspection : Lift proportional valve solenoid individual inspection

1 . Turn off the key switch and disconnect the battery plug.

2 . Disconnect the CN78 and CN87 connector, and check the resistance of lift proportional valve solenoid.

[Inspection procedure and standard]

Check the resistance of lift proportional valve solenoid.

Turn off the key switch and disconnect the battery plug, disconnect the CN78 and CN87 connector, visually check each terminal and the caulked portion and coating of each cable for defects. (Refer to BEFORE TROUBLESHOOTING)

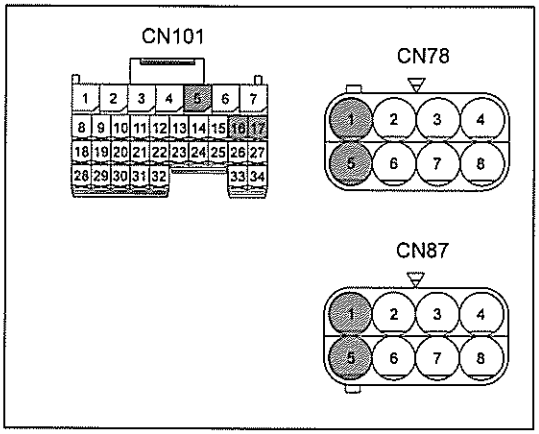
Portion to be inspected	Standard:
CN78-5(9) to CN78-1(10)	Approx. 8 Ω
CN87-5(9) to CN87-1(11)	Approx. 8 Ω

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Judgment

Result	Procedure
NG	**Lift proportional valve solenoid defect** **Go to step 2**
OK	Go to step 2

STEP2



Inspection : Harness

Disconnect the CN101, CN78 and CN87 connector, then check the harness.

[Inspection procedure and standard]

Inspect for continuity and short circuiting of the harness.

Perform this check with the battery plug and the CN101, CN78 connectors disconnected, and visually check inside the connector and the caulked portion of its wire for defects. Refer to BEFORE TROUBLESHOOTING

Portion to be inspected	Standard:
CN78-5(9) to CN78-1(10)	No continuity
CN101-5(9) to CN101-17(10)	No continuity
CN101-17(10) to P2	No continuity
CN101-17(10) to P3	No continuity
CN87-5(9) to CN87-1(11)	No continuity
CN101-5(9) to CN101-16(11)	No continuity
CN101-16(11) to P2	No continuity
CN101-16(11) to P3	No continuity

Judgment

Result	Procedure
NG	**Harness defect** **Main controller defect Replace the main controller with the defective portion in the former step.**
OK	**Main controller defect Replace the main controller with the defective portion in the former step.**

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Error Code: H5-6

Failure mode: Lift proportional valve solenoid (open / short) abnormality

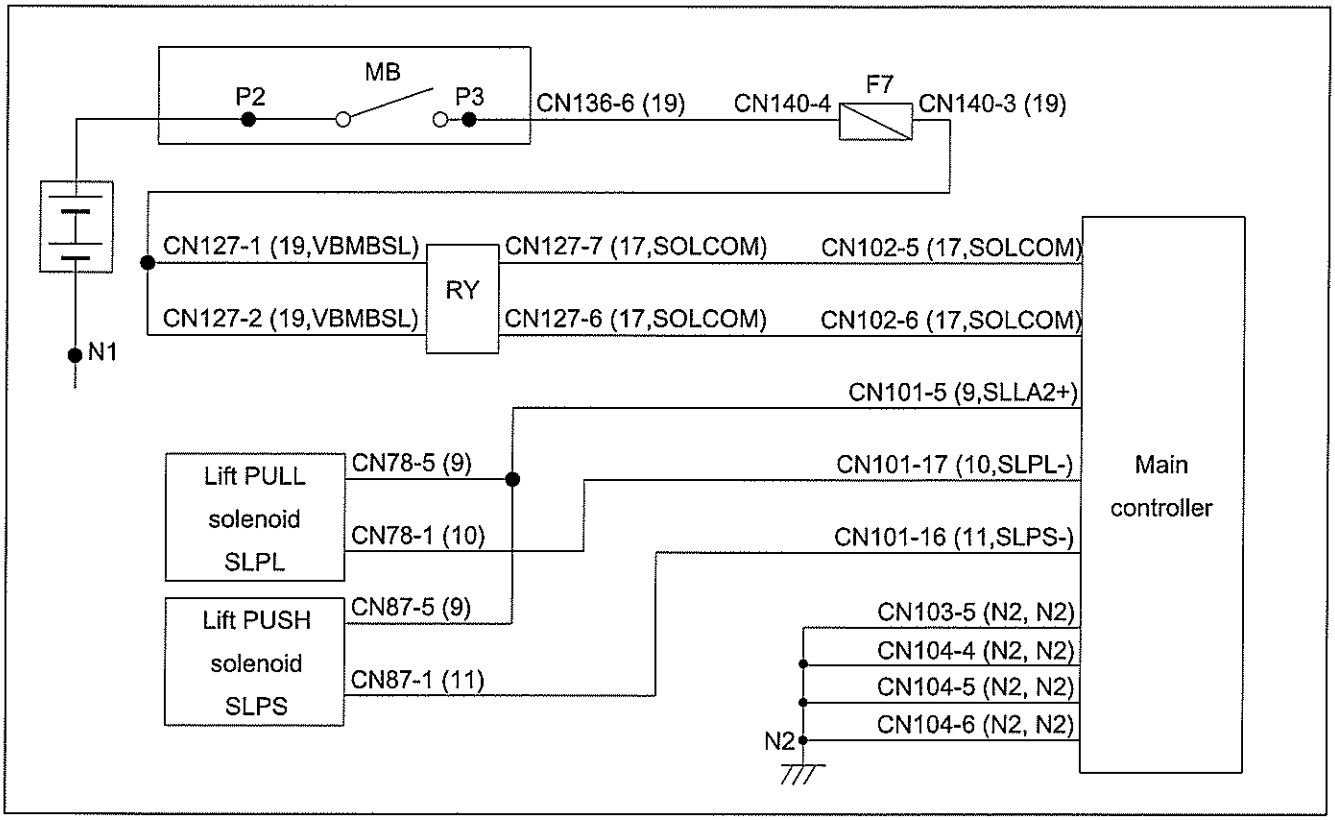
⚠ CAUTION

- **If H5-5 also occurs, disconnect the battery plug at once, perform troubleshooting with priority given to H5-5.**
- **If A9-2, HB-1, HB-2, or HB-3 occurs at same time, perform troubleshooting for A9-2, HB-1, HB-2, HB-3 first.**

Probable cause

- Connector contact defect
- Lift proportional valve solenoid defect
- Harness defect
- Main controller defect

Related portion



STEP1

1 . Turn off the key switch and disconnect the battery plug. Check the inside of connector CN78 and CN87, and the caulked portion of wire whether it has defect or not by visual confirm. (Refer to BEFORE TROUBLESHOOTING)

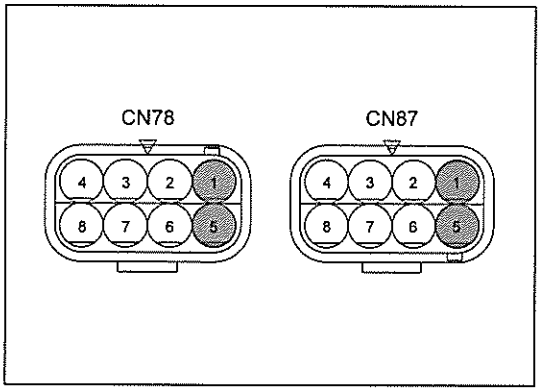
2 . After connecting CN78 and87, connect the battery plug and turn on the key switch to confirm error.

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Judgment

Result	Procedure
H5-6 error does not occur.	**Connector contact defect**
H5-6 error occurs.	Go to step 2

STEP2



Inspection : Lift proportional valve solenoid individual inspection

1 . Turn off the key switch and disconnect the battery plug.

2 . Disconnect the CN78 and CN87 connector, and check the resistance of lift proportional valve solenoid.

[Inspection procedure and standard]

Check the resistance of lift proportional valve solenoid.

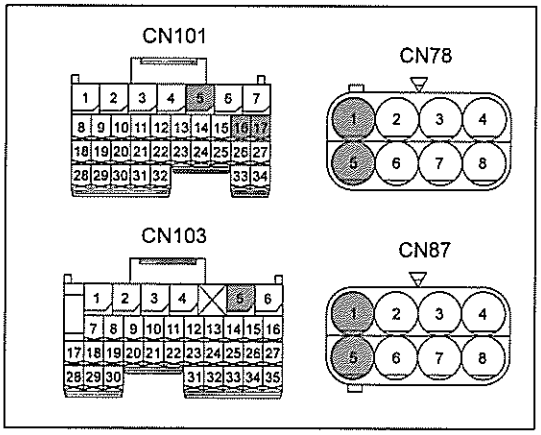
Turn off the key switch and disconnect the battery plug, disconnect the CN78 and CN87 connector, visually check each terminal and the caulked portion and coating of each cable for defects. (Refer to BEFORE TROUBLESHOOTING)

Portion to be inspected	Standard:
CN78-5(9) to CN78-1(10)	Approx. 8 Ω
CN87-5(9) to CN87-1(11)	Approx. 8 Ω

Judgment

Result	Procedure
NG	**Lift proportional valve solenoid defect**
OK	Go to step 3

STEP3



Inspection : Harness

Disconnect the CN101, CN103 CN78 and CN87 connector, then check the harness.

[Inspection procedure and standard]

Inspect for continuity and short circuiting of the harness.

Perform this check with the battery plug and the CN101, CN103, CN78, CN87 connectors disconnected, and visually check inside the connector and the caulked portion of its wire for defects. Refer to BEFORE TROUBLESHOOTING

*1: Connect the CN78 connector and measure the resistance between CN101-5(9)and CN101-17(10). And it is OK if this resistance is approx.8 Ω.

*2: Connect the CN87 connector and measure the resistance between CN101-5(9)and CN101-16(11). And it is OK if this resistance is approx.8 Ω.

Portion to be inspected	Standard:
CN101-5(9) to CN78-5(9)	Continuously *1
CN101-17(10) to CN78-1	Continuously *1
CN78-5(9) to CN78-1(10)	No continuity *1

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Portion to be inspected	Standard:
CN101-5(9) to CN103-5(N2)	No continuity
CN101-17(10) to CN103-5(N2)	No continuity
CN101-5(9) to CN87-5(9)	Continuously *2
CN101-16(11) to CN87-1	Continuously *2
CN87-5(9) to CN87-1(11)	No continuity *2
CN101-16(11) to CN103-5(N2)	No continuity

Judgment

Result	Procedure
NG	**Harness defect**
OK	**Main controller defect**

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Error Code: H6-1

Failure mode: Tilt proportional valve solenoid open abnormality (lever pull side)

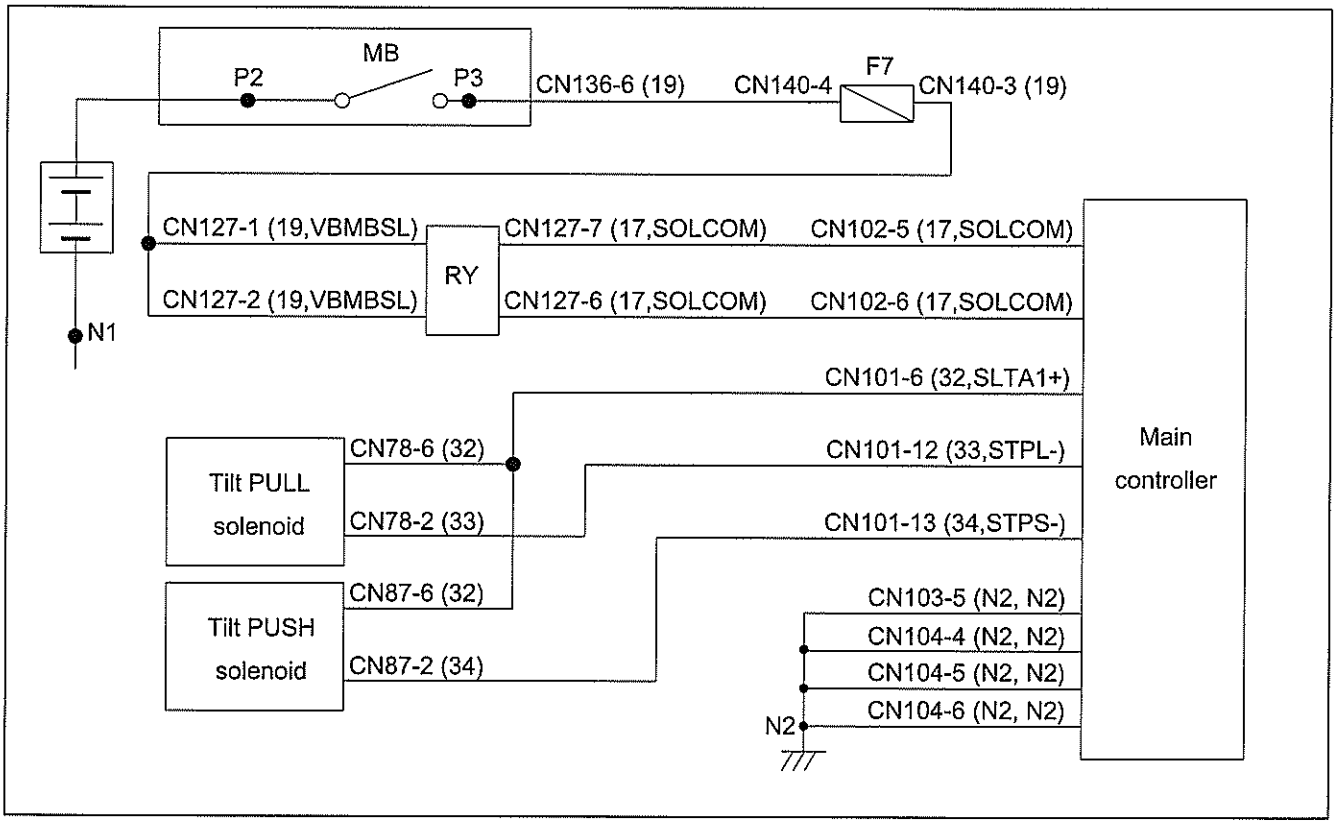
⚠ CAUTION

- **If H6-5 also occurs, disconnect the battery plug at once, perform troubleshooting with priority given to H6-5.**
- **If A9-2, HB-1 or HB-3 occurs at same time, perform troubleshooting for A9-2, HB-1, HB-3 first.**

Probable cause

- Connector contact defect
- Tilt proportional valve solenoid (PULL) defect
- Harness defect
- Main controller defect

Related portion



STEP1

1 . Turn off the key switch and disconnect the battery plug. Check the inside of connector CN78 and the caulked portion of wire whether it has defect or not by visual confirm. (Refer to BEFORE TROUBLESHOOTING)

2 . After connecting CN78, connect the battery plug and turn on the key switch to confirm error.

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Judgment

Result	Procedure
H6-6 error occurs.	**Perform troubleshooting for H6-6.**
H6-6 error does not occur.	Go to step 2

STEP2

Operate the pull side of tilt lever more than 1 second to check if an error occurs.

Judgment

Result	Procedure
H6-1 error does not occur.	**Connector contact defect**
H6-1 error occurs.	Go to step 3

STEP3

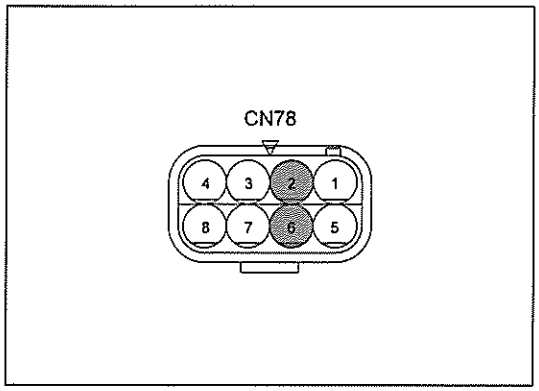
Inspection : Tilt proportional valve solenoid (PULL) individual inspection

1 . Turn off the key switch and disconnect the battery plug.

2 . Disconnect the CN78 connector, and check the resistance of tilt proportional valve solenoid (PULL).

[Inspection procedure and standard]

Check the resistance of tilt proportional valve solenoid (PULL).



Turn off the key switch and disconnect the battery plug, disconnect the CN78 connector, visually check each terminal and the caulked portion and coating of each cable for defects. (Refer to BEFORE TROUBLESHOOTING)

Portion to be inspected	Standard:
CN78-6 (32) to CN78-2 (33)	Approx. 8 Ω

Judgment

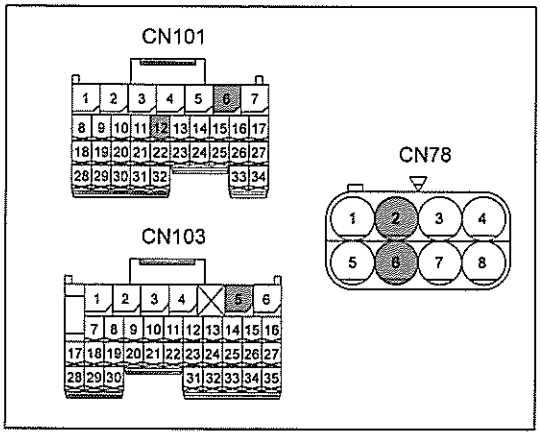
Result	Procedure
NG	**Tilt proportional valve solenoid (PULL) defect**
OK	Go to step 4

STEP4

Inspection : Harness

Disconnect the CN101, CN103 and CN78 connector, then check the harness.

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[Inspection procedure and standard]

Inspect for continuity and short circuiting of the harness.

Perform this check with the battery plug and the CN101, CN103, CN78 connectors disconnected, and visually check inside the connector and the caulked portion of its wire for defects. Refer to BEFORE TROUBLESHOOTING

*: Connect the CN78 connector and measure the resistance between CN101-6 and CN101-12. And it is OK if this resistance is approx.8 Ω.

Portion to be inspected	Standard:
CN101-6 (32) to CN78-6 (32)	Continuously *1
CN101-12 (33) to CN78-2 (33)	Continuously *1
CN101-6 (32) to CN103-5 (N2)	No continuity
CN101-12 (33) to CN103-5 (N2)	No continuity

Judgment

Result	Procedure
NG	**Harness defect**
OK	**Main controller defect**

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Error Code: H6-2

Failure mode: Tilt proportional valve solenoid short abnormality (lever pull side)

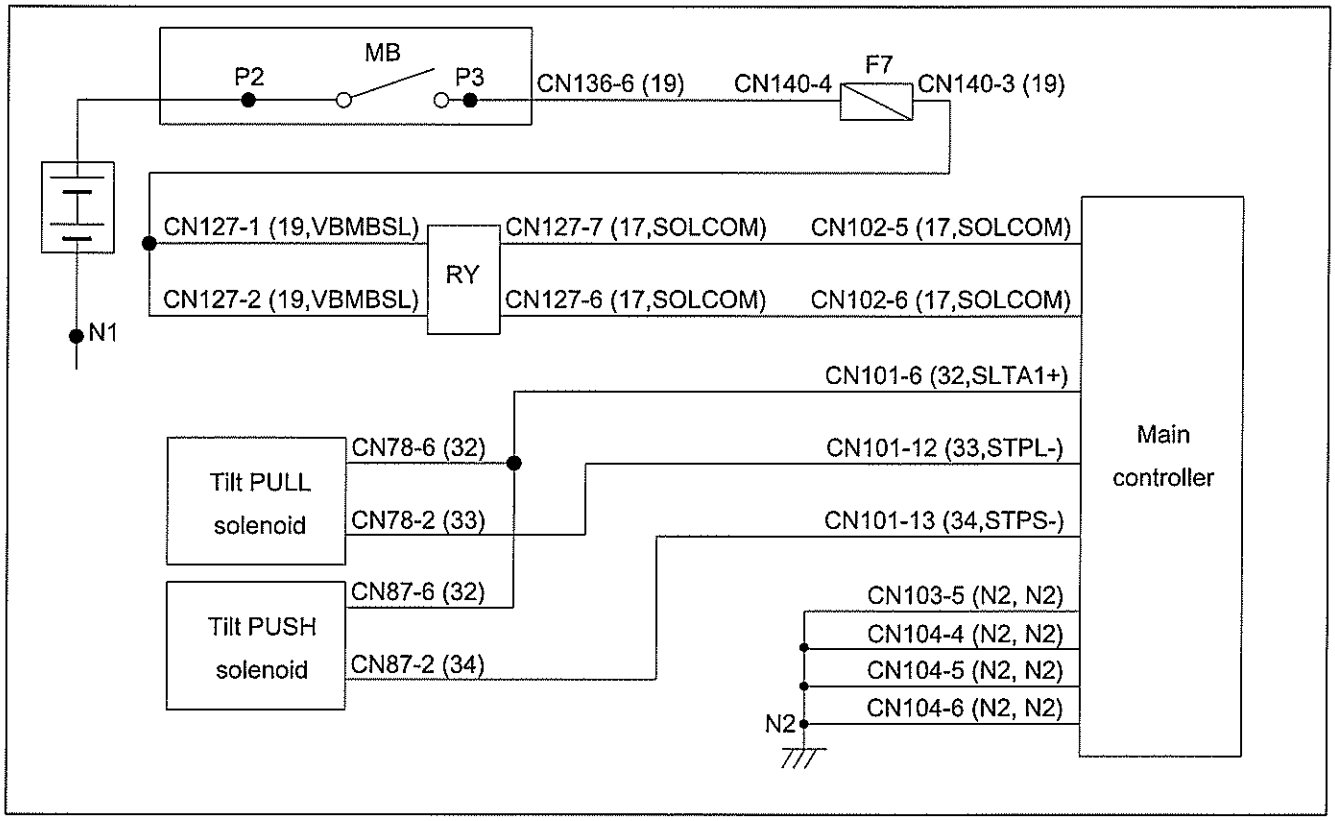
⚠ CAUTION

- **If H6-5 also occurs, disconnect the battery plug at once, perform troubleshooting with priority given to H6-5.**

Probable cause

- Connector contact defect
- Tilt proportional valve solenoid (PULL) defect
- Harness defect
- Main controller defect

Related portion



STEP1

1 . Turn off the key switch and disconnect the battery plug. Check the inside of connector CN78 and the caulked portion of wire whether it has defect or not by visual confirm. (Refer to BEFORE TROUBLESHOOTING)

2 . After connecting CN78, connect the battery plug and turn on the key switch to confirm error.

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Judgment

Result	Procedure
H6-6 error occurs.	**Perform troubleshooting for H6-6.**
H6-6 error does not occur.	Go to step 2

STEP2

Operate the pull side of tilt lever more than 1 second to check if an error occurs.

Judgment

Result	Procedure
H6-2 error does not occur.	**Connector contact defect**
H6-2 error occurs.	Go to step 3

STEP3

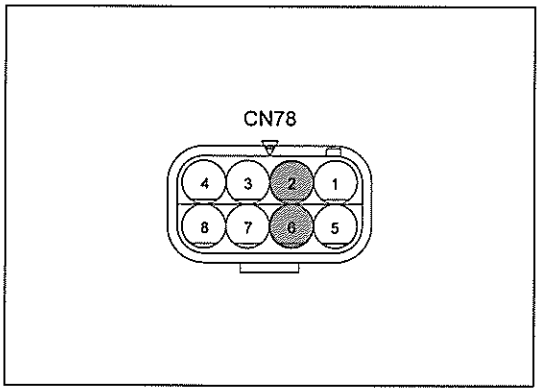
Inspection : Tilt proportional valve solenoid (PULL) indivisual inspection

1 . Turn off the key switch and disconnect the battery plug.

2 . Disconnect the CN78 connector, and check the resistance of tilt proportional valve solenoid (PULL).

[Inspection procedure and standard]

Check the resistance of tilt proportional valve solenoid (PULL).



Turn off the key switch and disconnect the battery plug, disconnect the CN78 connector, visually check each terminal and the caulked portion and coating of each cable for defects. (Refer to BEFORE TROUBLESHOOTING)

Portion to be inspected	Standard:
CN78-6 (32) to CN78-2 (33)	Approx. 8 Ω

Judgment

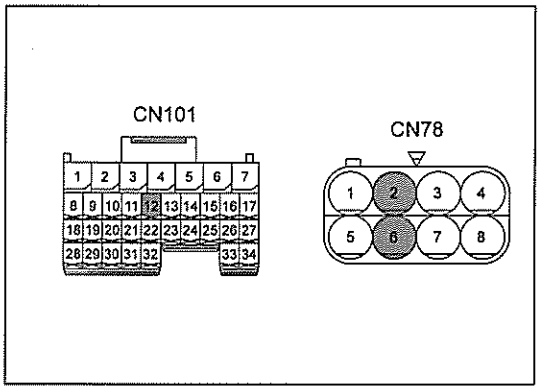
Result	Procedure
NG	**Tilt proportional valve solenoid (PULL) defect**
OK	Go to step 4

STEP4

Inspection : Harness

Disconnect theCN101 and CN78 connector, then check the harness.

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[Inspection procedure and standard]

Inspect for continuity and short circuiting of the harness.

Perform this check with the battery plug and the CN101, CN78 connectors disconnected, and visually check inside the connector and the caulked portion of its wire for defects. Refer to BEFORE TROUBLESHOOTING

Portion to be inspected	Standard:
CN78-6 (32) to CN78-2 (33)	No continuity
CN101-12(33) to P2	No continuity
CN101-12(33) to P3	No continuity

Judgment

Result	Procedure
NG	**Harness defect**
OK	**Main controller defect**

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Error Code: H6-3

Failure mode: Tilt proportional valve solenoid open abnormality (lever push side)

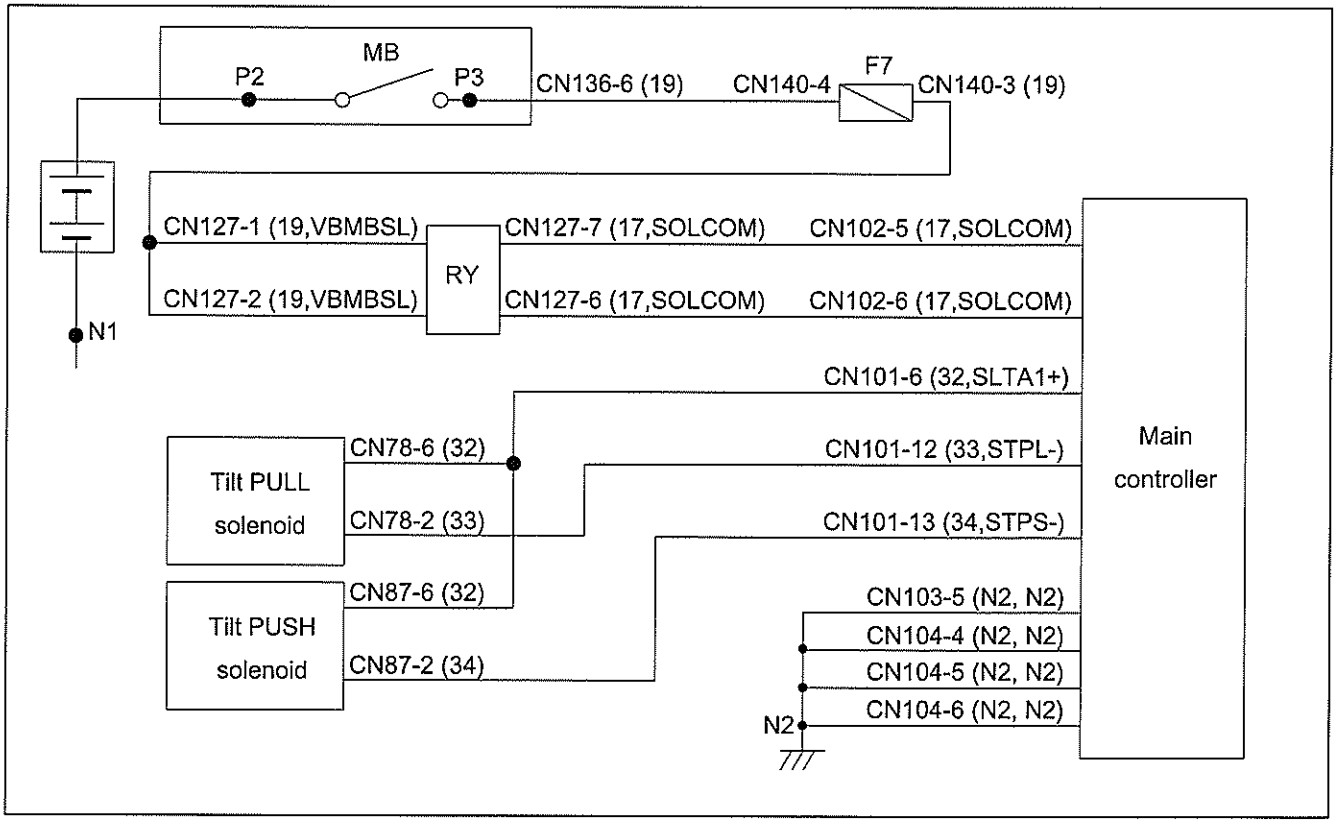
⚠ CAUTION

- **If H6-5 also occurs, disconnect the battery plug at once, perform troubleshooting with priority given to H6-5.**
- **If A9-2, HB-1 or HB-3 occurs at same time, perform troubleshooting for A9-2, HB-1, HB-3 first.**

Probable cause

- Connector contact defect
- Tilt proportional valve solenoid (PUSH) defect
- Harness defect
- Main controller defect

Related portion



STEP1

1 . Turn off the key switch and disconnect the battery plug. Check the inside of connector CN87 and the caulked portion of wire whether it has defect or not by visual confirm. (Refer to BEFORE TROUBLESHOOTING)

2 . After connecting CN87, connect the battery plug and turn on the key switch to confirm error.

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Judgment

Result	Procedure
H6-6 error occurs.	**Perform troubleshooting for H6-6.**
H6-6 error does not occur.	Go to step 2

STEP2

Operate the push side of tilt lever more than 1 second to check if an error occurs.

Judgment

Result	Procedure
H6-3 error does not occur.	**Connector contact defect**
H6-3 error occurs.	Go to step 3

STEP3

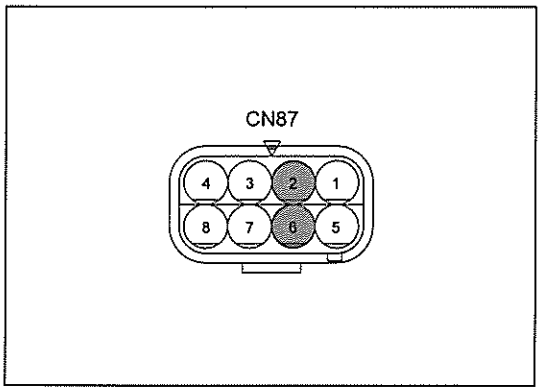
Inspection : Tilt proportional valve solenoid (PUSH) individual inspection

1 . Turn off the key switch and disconnect the battery plug.

2 . Disconnect the CN87 connector, and check the resistance of tilt proportional valve solenoid (PUSH).

[Inspection procedure and standard]

Check the resistance of tilt proportional valve solenoid (PUSH).



Turn off the key switch and disconnect the battery plug, disconnect the CN87 connectors, and visually check inside each connector and the caulked portion of each wire for defects. (Refer to BEFORE TROUBLESHOOTING)

Portion to be inspected	Standard:
CN87-6 (32) to CN87-2 (34)	Approx. 8 Ω

Judgment

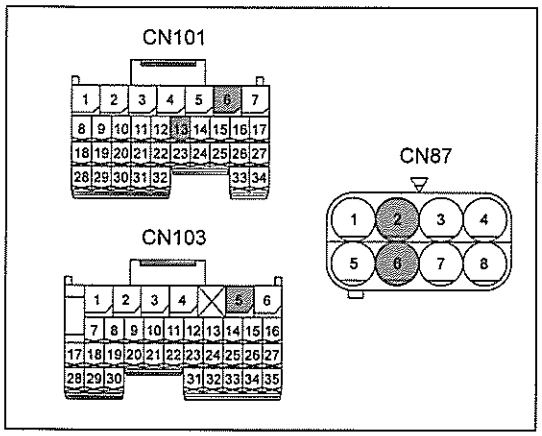
Result	Procedure
NG	**Tilt proportional valve solenoid (PUSH) defect**
OK	Go to step 4

STEP4

Inspection : Harness

Disconnect the CN101, CN103 and CN87 connector, then check the harness.

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[Inspection procedure and standard]

Inspect for continuity and short circuiting of the harness.

Perform this check with the battery plug and the CN101, CN103, CN87 connectors disconnected, and visually check inside the connector and the caulked portion of its wire for defects. Refer to BEFORE TROUBLESHOOTING

*: Connect the CN87 connector and measure the resistance between CN101-6 and CN101-13. And it is OK if this resistance is approx.8 Ω.

Portion to be inspected	Standard:
CN101-6 (32) to CN87-6 (32)	Continuously *1
CN101-13 (34) to CN87-2 (34)	Continuously *1
CN101-6 (32) to CN103-5 (N2)	No continuity
CN101-13 (34) to CN103-5 (N2)	No continuity

Judgment

Result	Procedure
NG	**Harness defect**
OK	**Main controller defect**

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Error Code: H6-4

Failure mode: Tilt proportional valve solenoid short abnormality (lever push side)

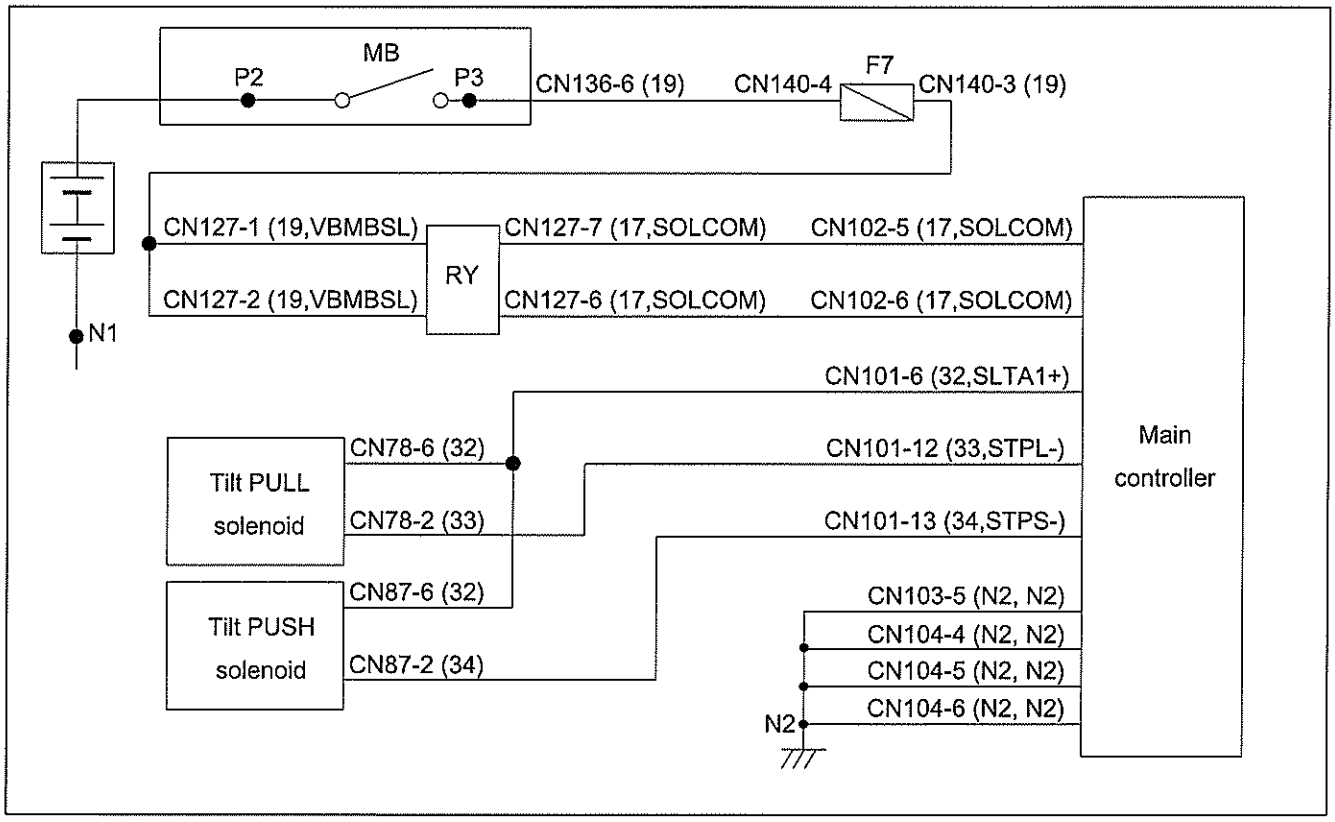
⚠ CAUTION

- **If H6-5 also occurs, disconnect the battery plug at once, perform troubleshooting with priority given to H6-5.**

Probable cause

- Connector contact defect
- Tilt proportional valve solenoid (PUSH) defect
- Harness defect
- Main controller defect

Related portion



STEP1

1 . Turn off the key switch and disconnect the battery plug. Check the inside of connector CN87 and the caulked portion of wire whether it has defect or not by visual confirm. (Refer to BEFORE TROUBLESHOOTING)

2 . After connecting CN87, connect the battery plug and turn on the key switch to confirm error.

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Judgment

Result	Procedure
H6-6 error occurs.	**Perform troubleshooting for H6-6.**
H6-6 error does not occur.	Go to step 2

STEP2

Operate the push side of tilt lever more than 1 second to check if an error occurs.

Judgment

Result	Procedure
H6-4 error does not occur.	**Connector contact defect**
H6-4 error occurs.	Go to step 3

STEP3

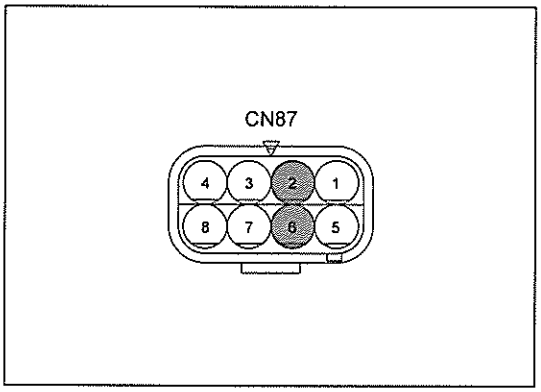
Inspection : Tilt proportional valve solenoid (PUSH) indivisual inspection

1 . Turn off the key switch and disconnect the battery plug.

2 . Disconnect the CN87 connector, and check the resistance of tilt proportional valve solenoid (PUSH).

[Inspection procedure and standard]

Check the resistance of tilt proportional valve solenoid (PUSH).



Turn off the key switch and disconnect the battery plug, disconnect the CN87 connectors, and visually check inside each connector and the caulked portion of each wire for defects. (Refer to BEFORE TROUBLESHOOTING)

Portion to be inspected	Standard:
CN87-6 (32) to CN87-2 (34)	Approx. 8 Ω

Judgment

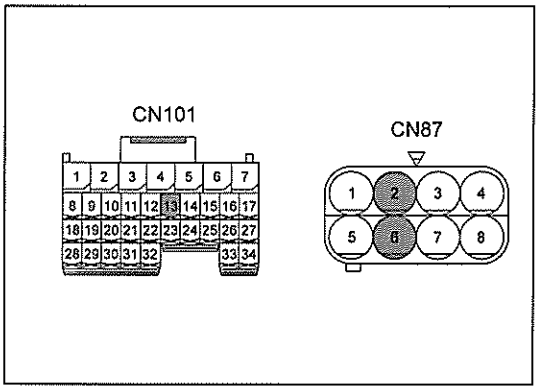
Result	Procedure
NG	**Tilt proportional valve solenoid (PUSH) defect**
OK	Go to step 4

STEP4

Inspection : Harness

Disconnect theCN101 and CN87 connector, then check the harness.

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[Inspection procedure and standard]

Inspect for continuity and short circuiting of the harness.

Perform this check with the battery plug and the CN101, CN87 connectors disconnected, and visually check inside the connector and the caulked portion of its wire for defects. Refer to BEFORE TROUBLESHOOTING

Portion to be inspected	Standard:
CN87-6 (32) to CN87-2 (34)	No continuity
CN101-13(34) to P2	No continuity
CN101-13(34) to P3	No continuity

Judgment

Result	Procedure
NG	**Harness defect**
OK	**Main controller defect**

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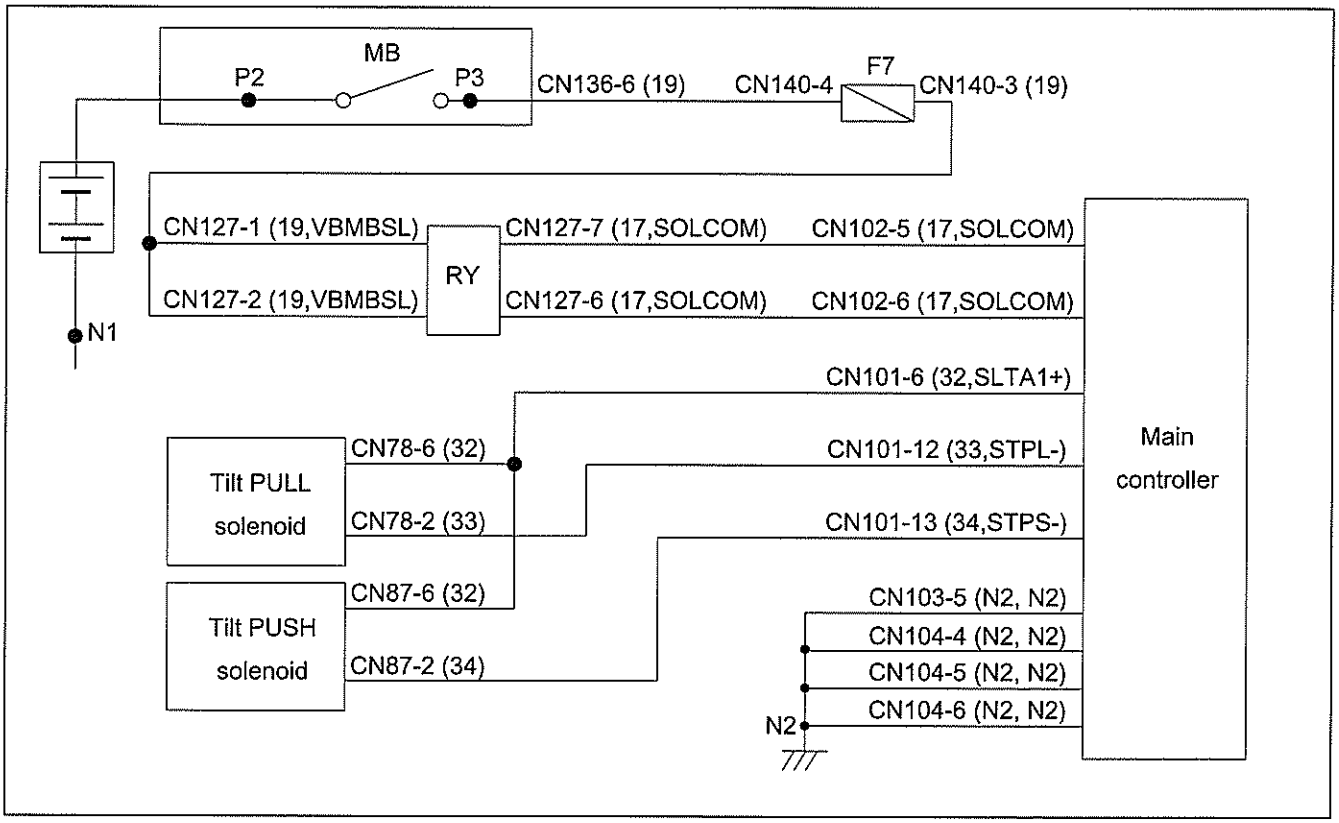
Error Code: H6-5

Failure mode: Tilt proportional valve solenoid drive circuit abnormality

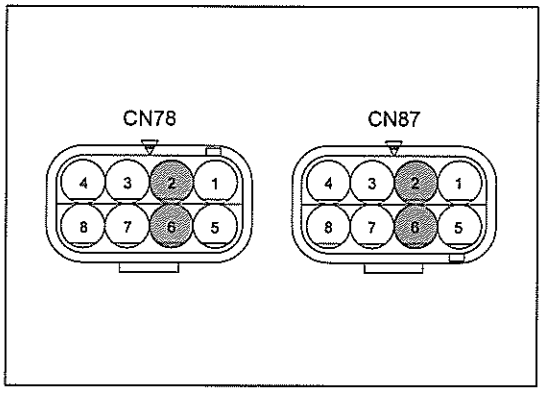
Probable cause

- Tilt proportional valve solenoid defect
- Harness defect
- Main controller defect

Related portion



STEP1



Inspection : Tilt proportional valve solenoid indivisual inspection

1 . Turn off the key switch and disconnect the battery plug.

2 . Disconnect the CN78 and CN87 connector, and check the resistance of tilt proportional valve solenoid.

[Inspection procedure and standard]

Check the resistance of tilt proportional valve solenoid.

Turn off the key switch and disconnect the battery plug, disconnect the CN78 and CN87 connector, visually check each terminal and the caulked portion and coating of each cable for defects. (Refer to BEFORE TROUBLESHOOTING)

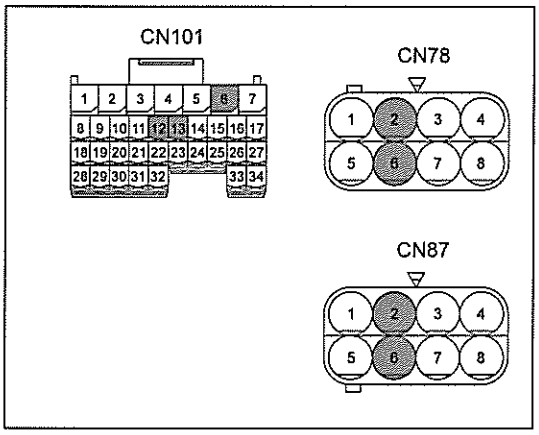
Portion to be inspected	Standard:
CN78-6 (32) to CN78-2 (33)	Approx. 8 Ω
CN87-6 (32) to CN87-2 (34)	Approx. 8 Ω

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Judgment

Result	Procedure
NG	**Tilt proportional valve solenoid defect** **Go to step 2**
OK	Go to step 2

STEP2



Inspection : Harness

Disconnect theCN101, CN78 and CN87 connector, then check the harness.

[Inspection procedure and standard]

Inspect for continuity and short circuiting of the harness.

Perform this check with the battery plug and the CN101, CN78, CN87 connectors disconnected, and visually check inside the connector and the caulked portion of its wire for defects. Refer to BEFORE TROUBLESHOOTING

Portion to be inspected	Standard:
CN78-6 (32) to CN78-2 (33)	No continuity
CN101-6(32) to CN101-12(33)	No continuity
CN101-12(33) to P2	No continuity
CN101-12(33) to P3	No continuity
CN87-6 (32) to CN87-2 (34)	No continuity
CN101-6(32) to CN101-13(34)	No continuity
CN101-13(34) to P2	No continuity
CN101-13(34) to P3	No continuity

Judgment

Result	Procedure
NG	**Harness defect** **Main controller defect Replace the main controller with the defective portion in the former step.**
OK	**Main controller defect Replace the main controller with the defective portion in the former step.**

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Error Code: H6-6

Failure mode: Tilt proportional valve solenoid (open / short) abnormality

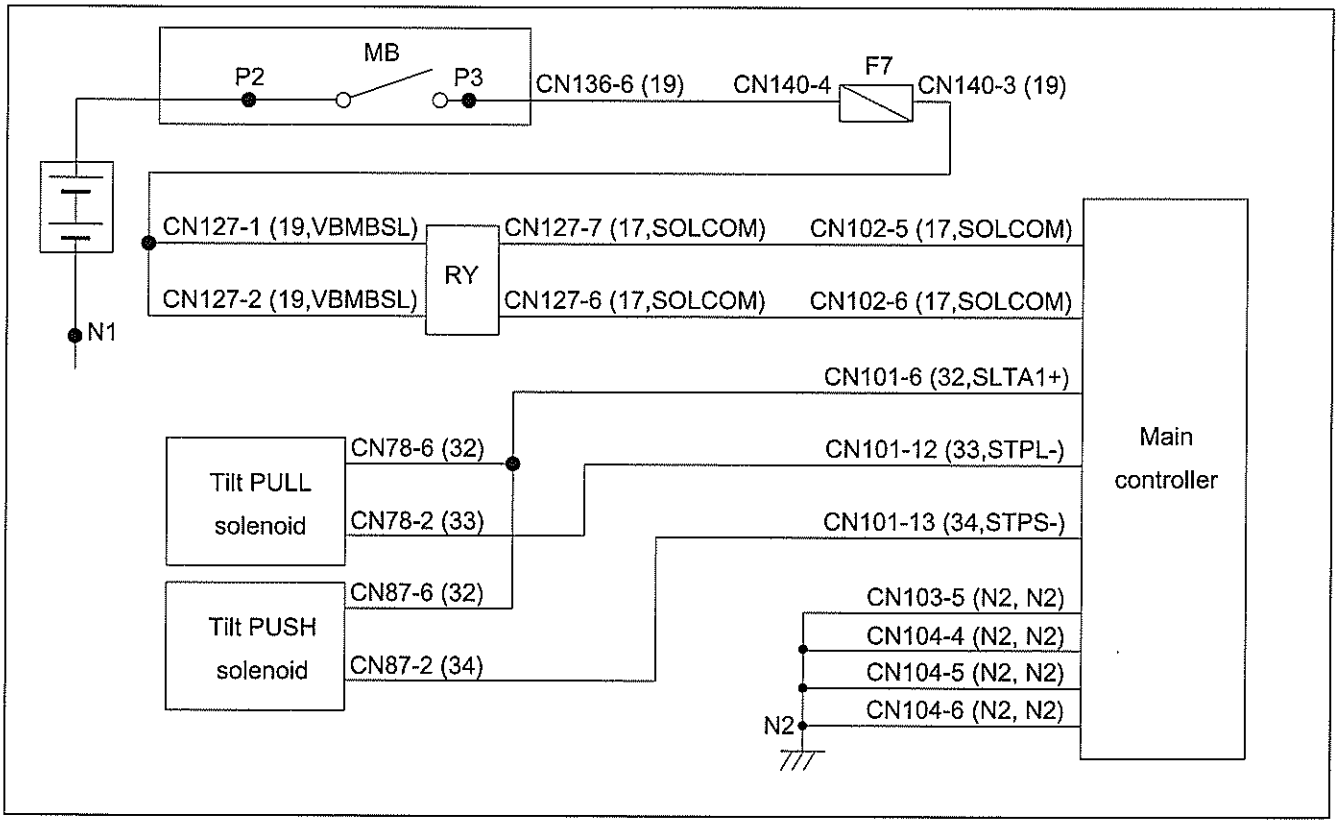
⚠ CAUTION

- **If H6-5 also occurs, disconnect the battery plug at once, perform troubleshooting with priority given to H6-5.**
- **If A9-2, HB-1, HB-2, or HB-3 occurs at same time, perform troubleshooting for A9-2, HB-1, HB-2, HB-3 first.**

Probable cause

- Connector contact defect
- Tilt proportional valve solenoid defect
- Harness defect
- Main controller defect

Related portion



STEP1

1 . Turn off the key switch and disconnect the battery plug. Check the inside of connector CN78, CN87 and the caulked portion of wire whether it has defect or not by visual confirm. (Refer to BEFORE TROUBLESHOOTING)

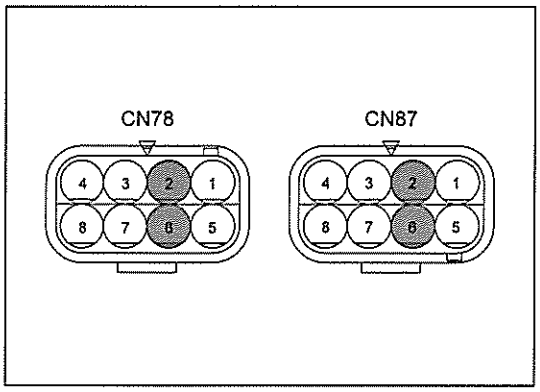
2 . After connecting CN78, CN87, connect the battery plug and turn on the key switch to confirm error.

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Judgment

Result	Procedure
H6-6 error occurs.	Go to step 2
H6-6 error does not occur.	**Connector contact defect**

STEP2



Inspection : Tilt proportional valve solenoid individual inspection

1 . Turn off the key switch and disconnect the battery plug.

2 . Disconnect the CN87 connector, and check the resistance of tilt proportional valve solenoid.

[Inspection procedure and standard]

Check the resistance of tilt proportional valve solenoid.

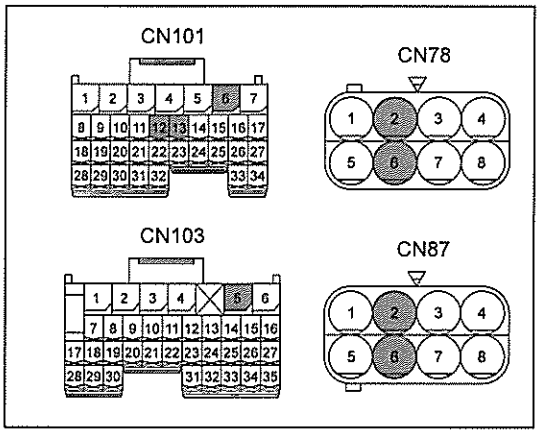
Turn off the key switch and disconnect the battery plug, disconnect the CN78, CN87 connectors, and visually check inside each connector and the caulked portion of each wire for defects. (Refer to BEFORE TROUBLESHOOTING)

Portion to be inspected	Standard:
CN78-6 (32) to CN78-2 (33)	Approx. 8 Ω
CN87-6 (32) to CN87-2 (34)	Approx. 8 Ω

Judgment

Result	Procedure
NG	**Tilt proportional valve solenoid defect**
OK	Go to step 3

STEP3



Inspection : Harness

Disconnect the CN101, CN103, CN78 and CN87 connector, then check the harness.

[Inspection procedure and standard]

Inspect for continuity and short circuiting of the harness.

Perform this check with the battery plug and the CN101, CN103, CN78, CN87 connectors disconnected, and visually check inside the connector and the caulked portion of its wire for defects. Refer to BEFORE TROUBLESHOOTING

*1 : Connect the CN78 connector and measure the resistance between CN101-6 and CN101-12. And it is OK if this resistance is approx.8 Ω.

*2 : Connect the CN87 connector and measure the resistance between CN101-6 and CN101-13. And it is OK if this resistance is approx.8 Ω.

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Portion to be inspected	Standard:
CN101-6 (32) to CN78-6 (32)	Continuously *1
CN101-12 (33) to CN78-2 (33)	Continuously *1
CN78-6 (32) to CN78-2 (33)	No continuity *1
CN101-6 (32) to CN103-5 (N2)	No continuity
CN101-12 (33) to CN103-5 (N2)	No continuity
CN101-6 (32) to CN87-6 (32)	Continuously *2
CN101-13 (34) to CN87-2 (34)	Continuously *2
CN87-6 (32) to CN87-2 (34)	No continuity *2
CN101-13 (34) to CN103-5 (N2)	No continuity

Judgment

Result	Procedure
NG	**Harness defect**
OK	**Main controller defect**

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Error Code: H7-1

Failure mode: Attachment 1 proportional valve solenoid open abnormality (lever pull side)

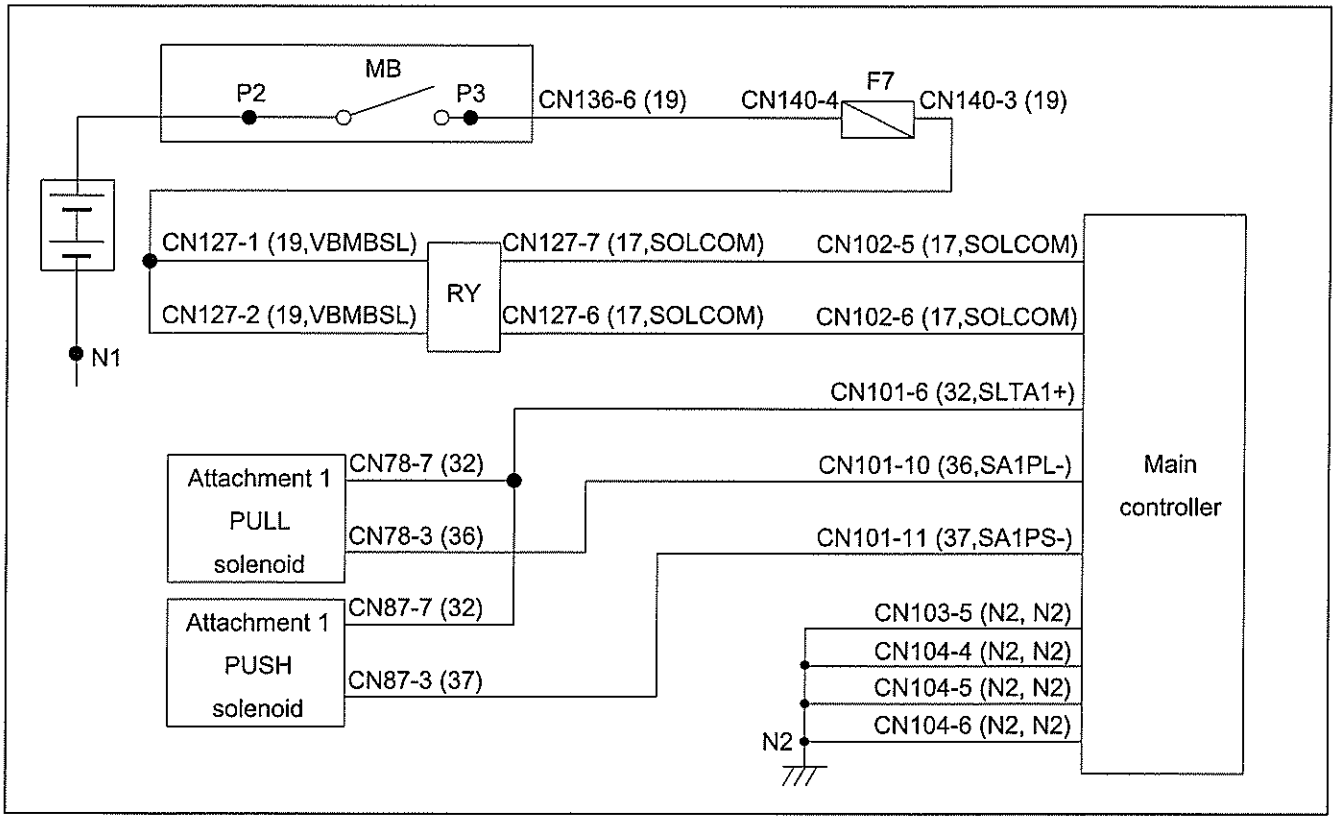
⚠ CAUTION

- **If H7-5 also occurs, disconnect the battery plug at once, perform troubleshooting with priority given to H7-5.**
- **If A9-2, HB-1 or HB-3 occurs at same time, perform troubleshooting for A9-2, HB-1, HB-3 first.**

Probable cause

- Connector contact defect
- Attachment 1 proportional valve solenoid (PULL) defect
- Harness defect
- Main controller defect

Related portion



STEP1

1 . Turn off the key switch and disconnect the battery plug. Check the inside of connector CN78 and the caulked portion of wire whether it has defect or not by visual confirm. (Refer to BEFORE TROUBLESHOOTING)

2 . After connecting CN78, connect the battery plug and turn on the key switch to confirm error.

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Judgment

Result	Procedure
H7-6 error occurs.	**Perform troubleshooting for H7-6.**
H7-6 error does not occur.	Go to step 2

STEP2

Operate the pull side of attachment 1 lever more than 1 second to check if an error occurs.

Judgment

Result	Procedure
H7-1 error does not occur.	**Connector contact defect**
H7-1 error occurs.	Go to step 3

STEP3

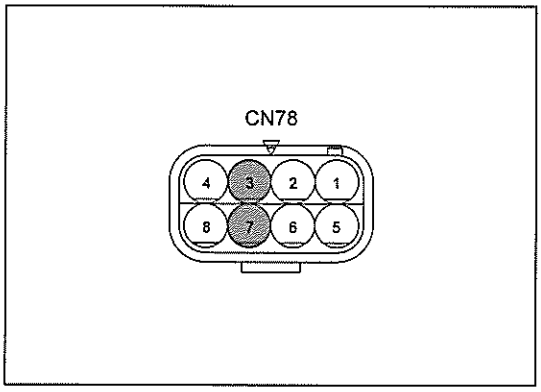
Inspection : Attachment 1 proportional valve solenoid (PULL) individual inspection

1 . Turn off the key switch and disconnect the battery plug.

2 . Disconnect the CN78 connector, and check the resistance of attachment 1 proportional valve solenoid (PULL).

[Inspection procedure and standard]

Check the resistance of attachment 1 proportional valve solenoid (PULL).



Turn off the key switch and disconnect the battery plug, disconnect the CN78 connector, visually check each terminal and the caulked portion and coating of each cable for defects. (Refer to BEFORE TROUBLESHOOTING)

Portion to be inspected	Standard:
CN78-7 (32) to CN78-3 (36)	Approx. 8 Ω

Judgment

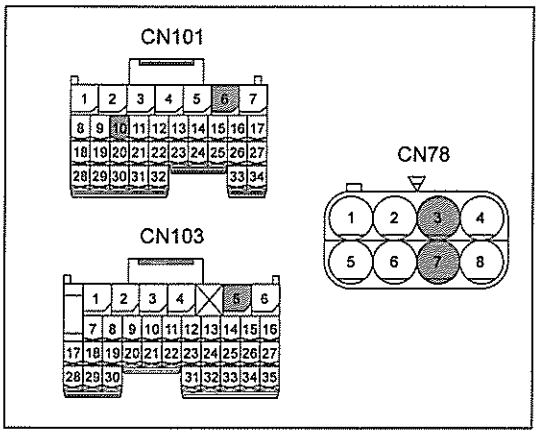
Result	Procedure
NG	**Attachment 1 proportional valve solenoid (PULL) defect**
OK	Go to step 4

STEP4

Inspection : Harness

Disconnect the CN101, CN103 and CN78 connector, then check the harness.

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[Inspection procedure and standard]

Inspect for continuity and short circuiting of the harness.

Perform this check with the battery plug and the CN101, CN103, CN78 connectors disconnected, and visually check inside the connector and the caulked portion of its wire for defects. Refer to BEFORE TROUBLESHOOTING

*: Connect the CN78 connector and measure the resistance between CN101-6 and CN101-10. And it is OK if this resistance is approx.8 Ω.

Portion to be inspected	Standard:
CN101-6 (32) to CN78-7 (32)	Continuity *
CN101-10 (36) to CN78-3 (36)	Continuity *
CN101-6 (32) to CN103-5 (N2)	No continuity
CN101-10 (36) to CN103-5 (N2)	No continuity

Judgment

Result	Procedure
NG	**Harness defect**
OK	**Main controller defect**

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Error Code: H7-2

Failure mode: Attachment 1 proportional valve solenoid short abnormality (lever pull side)

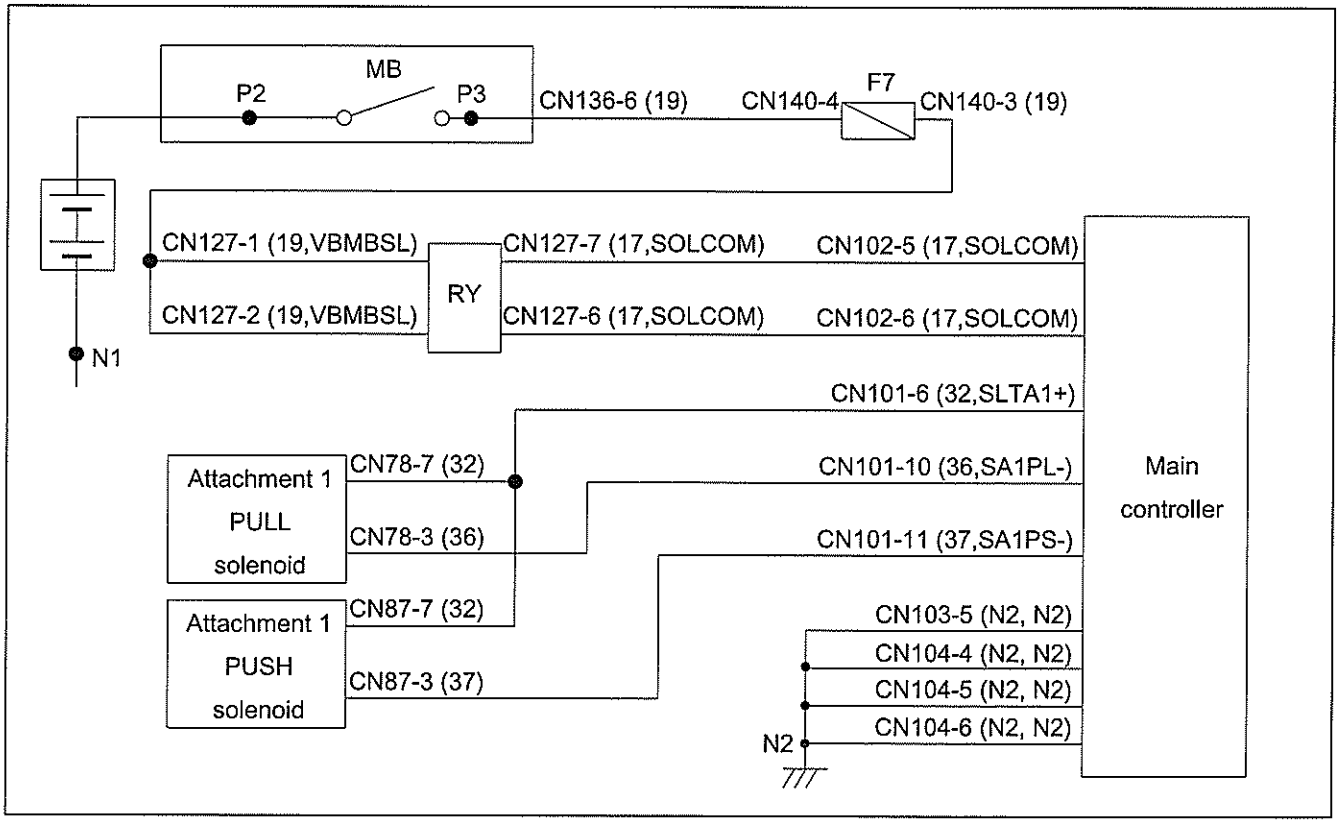
⚠ CAUTION

- **If H7-5 also occurs, disconnect the battery plug at once, perform troubleshooting with priority given to H7-5.**

Probable cause

- Connector contact defect
- Attachment 1 proportional valve solenoid (PULL) defect
- Harness defect
- Main controller defect

Related portion



STEP1

1 . Turn off the key switch and disconnect the battery plug. Check the inside of connector CN78 and the caulked portion of wire whether it has defect or not by visual confirm. (Refer to BEFORE TROUBLESHOOTING)

2 . After connecting CN78, connect the battery plug and turn on the key switch to confirm error.

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Judgment

Result	Procedure
H7-6 error occurs.	**Perform troubleshooting for H7-6.**
H7-6 error does not occur.	Go to step 2

STEP2

Operate the pull side of attachment 1 lever more than 1 second to check if an error occurs.

Judgment

Result	Procedure
H7-2 error does not occur.	**Connector contact defect**
H7-2 error occurs.	Go to step 3

STEP3

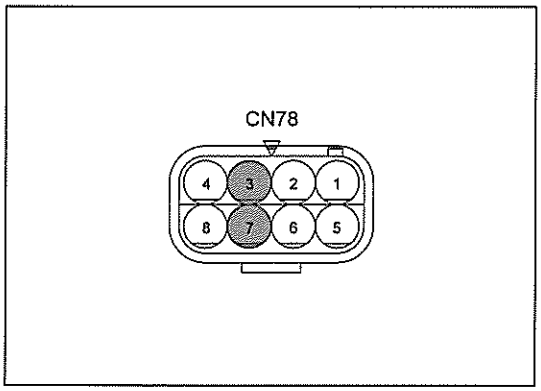
Inspection : Attachment 1 proportional valve solenoid (PULL) indivisual inspection

1 . Turn off the key switch and disconnect the battery plug.

2 . Disconnect the CN78 connector, and check the resistance of attachment 1 proportional valve solenoid (PULL).

[Inspection procedure and standard]

Check the resistance of attachment 1 proportional valve solenoid (PULL).



Turn off the key switch and disconnect the battery plug, disconnect the CN78 connector, visually check each terminal and the caulked portion and coating of each cable for defects. (Refer to BEFORE TROUBLESHOOTING)

Portion to be inspected	Standard:
CN78-7 (32) to CN78-3 (36)	Approx. 8 Ω

Judgment

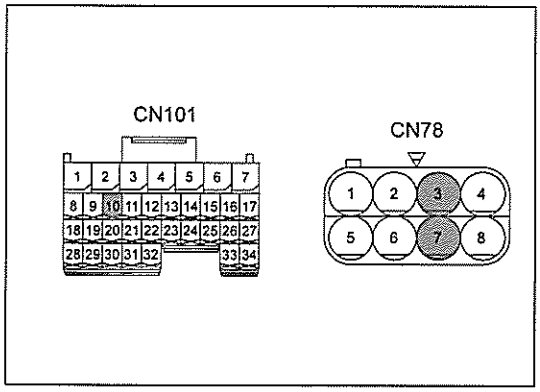
Result	Procedure
NG	**Attachment 1 proportional valve solenoid (PULL) defect**
OK	Go to step 4

STEP4

Inspection : Harness

Disconnect theCN101 and CN78 connector, then check the harness.

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[Inspection procedure and standard]

Inspect for continuity and short circuiting of the harness.

Perform this check with the battery plug and the CN101, CN78 connectors disconnected, and visually check inside the connector and the caulked portion of its wire for defects. Refer to BEFORE TROUBLESHOOTING

Portion to be inspected	Standard:
CN78-7 (32) to CN78-3 (36)	No continuity
CN101-10(36) to P2	No continuity
CN101-10(36) to P3	No continuity

Judgment

Result	Procedure
NG	**Harness defect**
OK	**Main controller defect**

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Error Code: H7-3

Failure mode: Attachment 1 proportional valve solenoid open abnormality (lever push side)

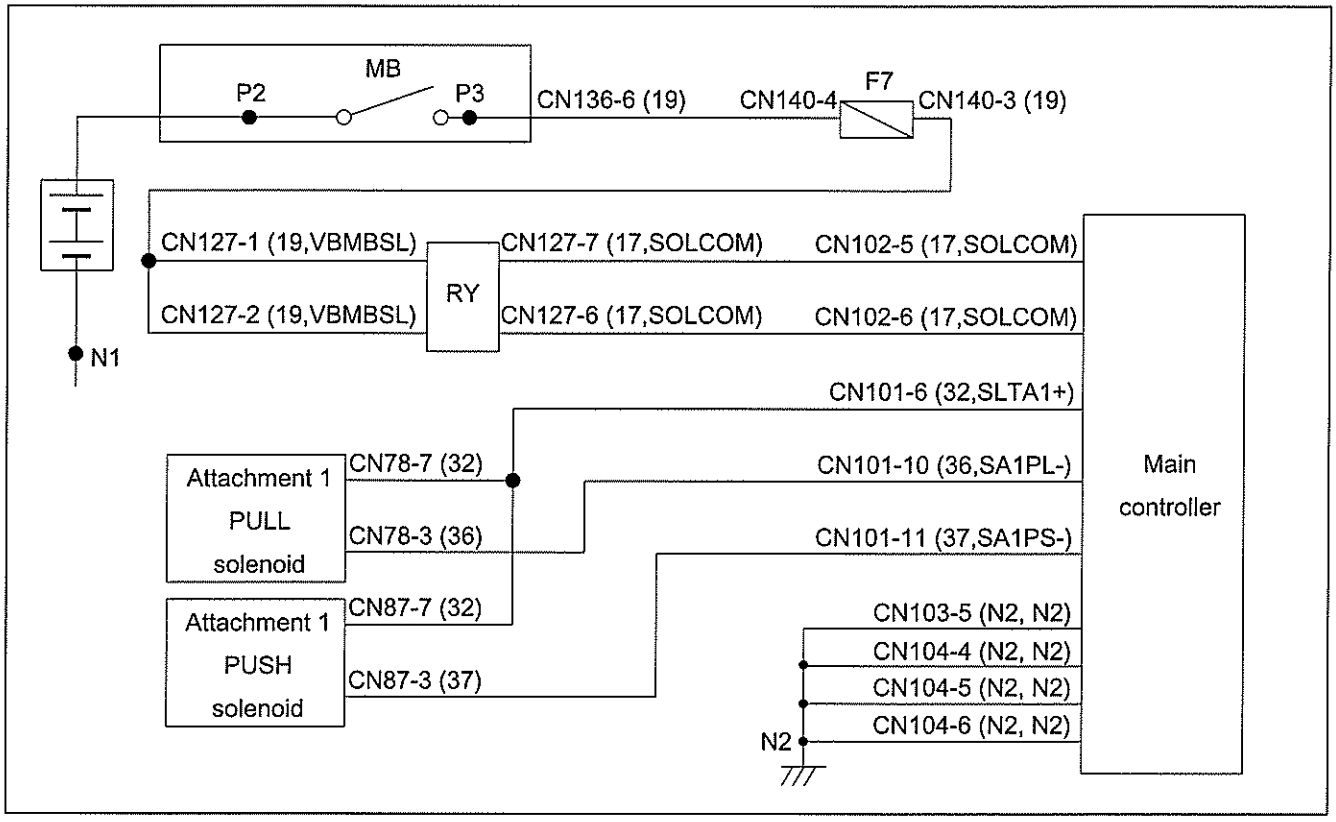
⚠ CAUTION

- **If H7-5 also occurs, disconnect the battery plug at once, perform troubleshooting with priority given to H7-5.**
- **If A9-2, HB-1 or HB-3 occurs at same time, perform troubleshooting for A9-2, HB-1, HB-3 first.**

Probable cause

- Connector contact defect
- Attachment 1 proportional valve solenoid (PUSH) defect
- Harness defect
- Main controller defect

Related portion



STEP1

1 . Turn off the key switch and disconnect the battery plug. Check the inside of connector CN87 and the caulked portion of wire whether it has defect or not by visual confirm. (Refer to BEFORE TROUBLESHOOTING)

2 . After connecting CN87, connect the battery plug and turn on the key switch to confirm error.

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Judgment

Result	Procedure
H7-6 error occurs.	**Perform troubleshooting for H7-6.**
H7-6 error does not occur.	Go to step 2

STEP2

Operate the push side of attachment 1 lever more than 1 second to check if an error occurs.

Judgment

Result	Procedure
H7-3 error does not occur.	**Connector contact defect**
H7-3 error occurs.	Go to step 3

STEP3

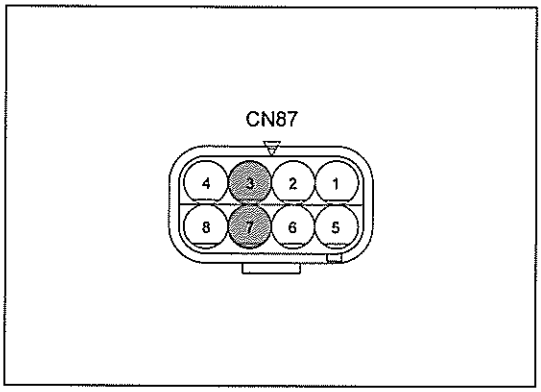
Inspection : Attachment 1 proportional valve solenoid (PUSH) individual inspection

1 . Turn off the key switch and disconnect the battery plug.

2 . Disconnect the CN87 connector, and check the resistance of attachment 1 proportional valve solenoid (PUSH).

[Inspection procedure and standard]

Check the resistance of attachment 1 proportional valve solenoid (PUSH).



Turn off the key switch and disconnect the battery plug, disconnect the CN87 connectors, and visually check inside each connector and the caulked portion of each wire for defects. (Refer to BEFORE TROUBLESHOOTING)

Portion to be inspected	Standard:
CN87-7 (32) to CN87-3 (37)	Approx. 8 Ω

Judgment

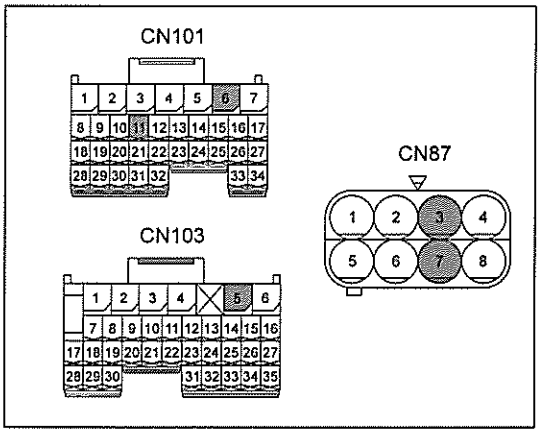
Result	Procedure
NG	**Attachment 1 proportional valve solenoid (PUSH) defect**
OK	Go to step 4

STEP4

Inspection : Harness

Disconnect the CN101, CN103 and CN87 connector, then check the harness.

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[Inspection procedure and standard]

Inspect for continuity and short circuiting of the harness.

Perform this check with the battery plug and the CN101, CN103, CN87 connectors disconnected, and visually check inside the connector and the caulked portion of its wire for defects. Refer to BEFORE TROUBLESHOOTING

*: Connect the CN87 connector and measure the resistance between CN101-6 and CN101-11. And it is OK if this resistance is approx.8 Ω.

Portion to be inspected	Standard:
CN101-6 (32) to CN87-7 (32)	Continuously *1
CN101-11 (37) to CN87-3 (37)	Continuously *1
CN101-6 (32) to CN103-5 (N2)	No continuity
CN101-11 (37) to CN103-5 (N2)	No continuity

Judgment

Result	Procedure
NG	**Harness defect**
OK	**Main controller defect**

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Error Code: H7-4

Failure mode: Attachment 1 proportional valve solenoid short abnormality (lever push side)

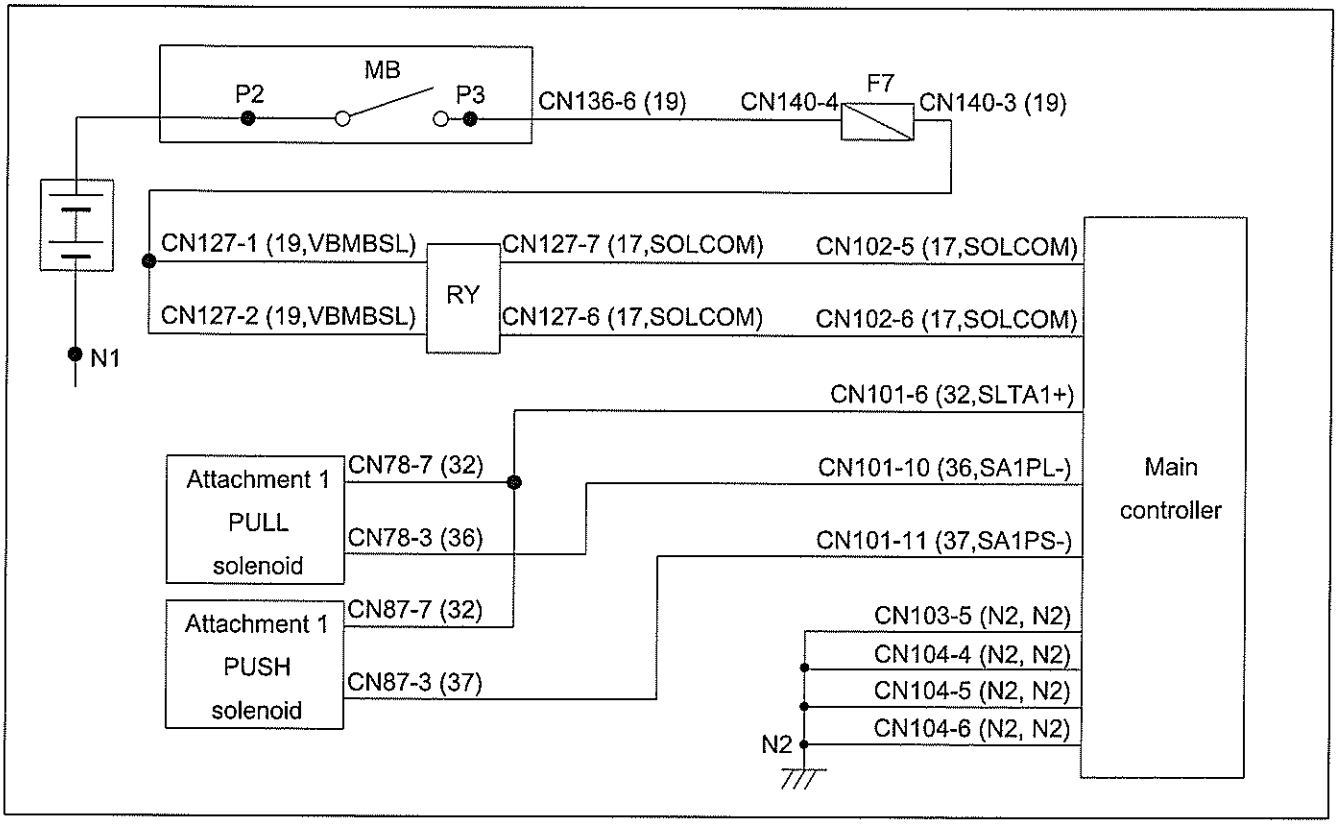
⚠ CAUTION

- **If H7-5 also occurs, disconnect the battery plug at once, perform troubleshooting with priority given to H7-5.**

Probable cause

- Connector contact defect
- Attachment 1 proportional valve solenoid (PUSH) defect
- Harness defect
- Main controller defect

Related portion



STEP1

1 . Turn off the key switch and disconnect the battery plug. Check the inside of connector CN87 and the caulked portion of wire whether it has defect or not by visual confirm. (Refer to BEFORE TROUBLESHOOTING)

2 . After connecting CN87, connect the battery plug and turn on the key switch to confirm error.

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Judgment

Result	Procedure
H7-6 error occurs.	**Perform troubleshooting for H7-6.**
H7-6 error does not occur.	Go to step 2

STEP2

Operate the push side of attachment 1 lever more than 1 second to check if an error occurs.

Judgment

Result	Procedure
H7-4 error does not occur.	**Connector contact defect**
H7-4 error occurs.	Go to step 3

STEP3

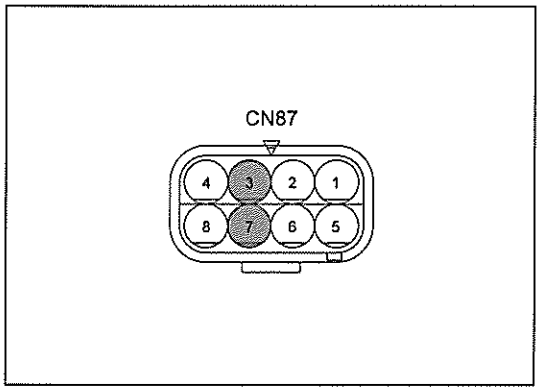
Inspection : Attachment 1 proportional valve solenoid (PUSH) indivisual inspection

1 . Turn off the key switch and disconnect the battery plug.

2 . Disconnect the CN87 connector, and check the resistance of attachment 1 proportional valve solenoid (PUSH).

[Inspection procedure and standard]

Check the resistance of attachment 1 proportional valve solenoid (PUSH).



Turn off the key switch and disconnect the battery plug, disconnect the CN87 connectors, and visually check inside each connector and the caulked portion of each wire for defects. (Refer to BEFORE TROUBLESHOOTING)

Portion to be inspected	Standard:
CN87-7 (32) to CN87-3 (37)	Approx. 8 Ω

Judgment

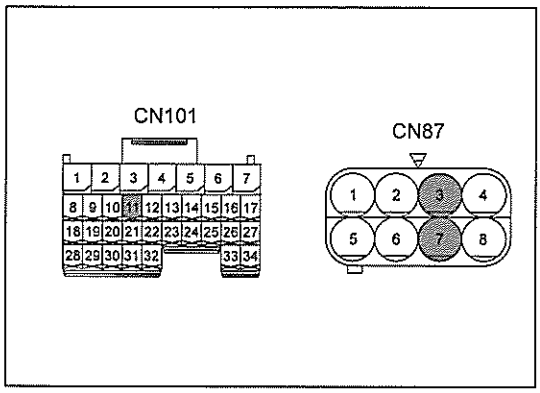
Result	Procedure
NG	**Attachment 1 proportional valve solenoid (PUSH) defect**
OK	Go to step 4

STEP4

Inspection : Harness

Disconnect theCN101 and CN87 connector, then check the harness.

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[Inspection procedure and standard]

Inspect for continuity and short circuiting of the harness.

Perform this check with the battery plug and the CN101, CN87 connectors disconnected, and visually check inside the connector and the caulked portion of its wire for defects. Refer to BEFORE TROUBLESHOOTING

Portion to be inspected	Standard:
CN87-7 (32) to CN87-3 (37)	No continuity
CN101-11(37) to P2	No continuity
CN101-11(37) to P3	No continuity

Judgment

Result	Procedure
NG	**Harness defect**
OK	**Main controller defect**

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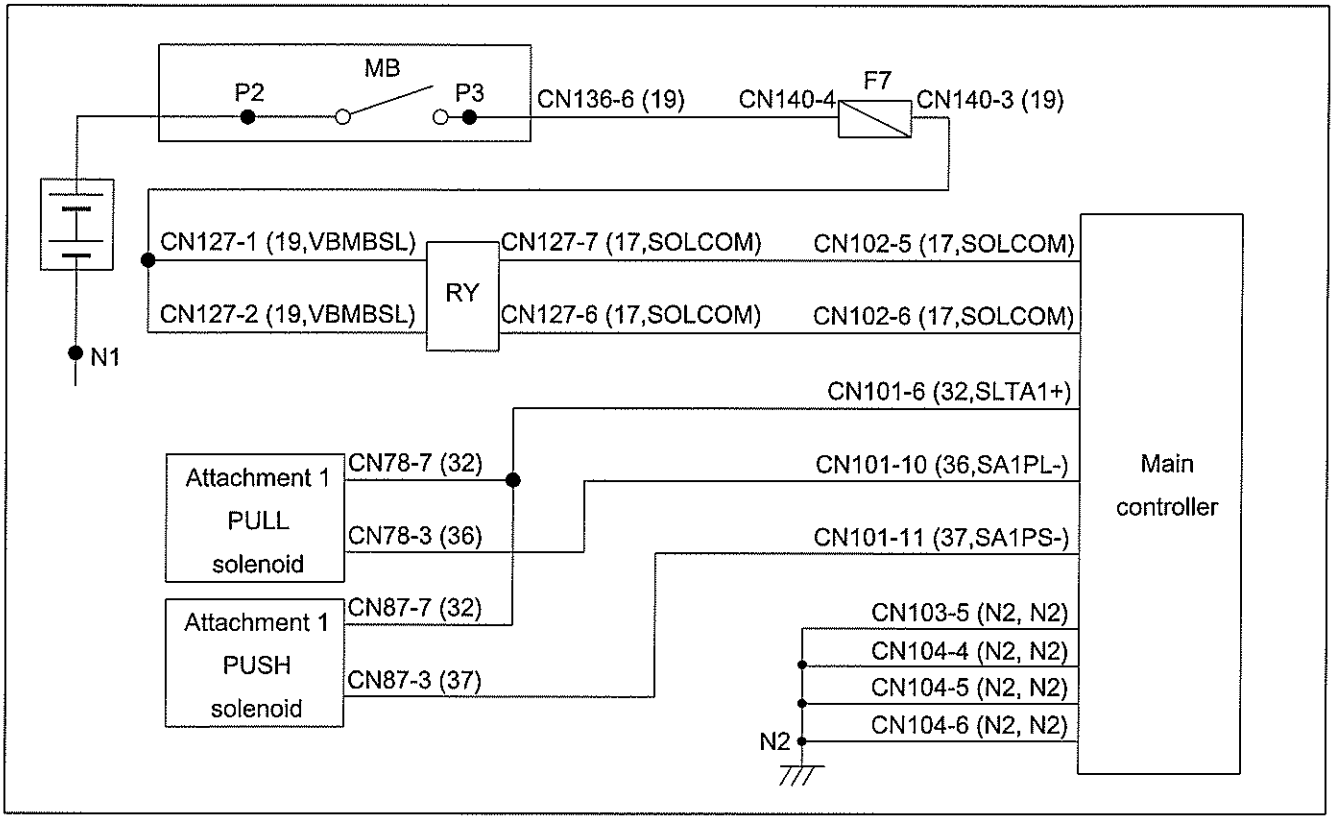
Error Code: H7-5

Failure mode: Attachment 1 proportional valve solenoid drive circuit abnormality

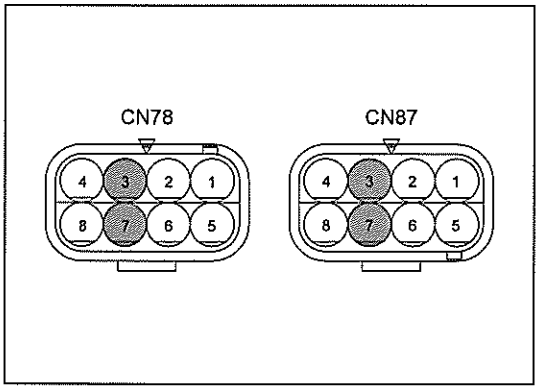
Probable cause

- Attachment 1 proportional valve solenoid defect
- Harness defect
- Main controller defect

Related portion



STEP1



Inspection : Attachment 1 proportional valve solenoid indivisual inspection

1 . Turn off the key switch and disconnect the battery plug.

2 . Disconnect the CN78 and CN87 connector, and check the resistance of attachment 1 proportional valve solenoid.

[Inspection procedure and standard]

Check the resistance of attachment 1 proportional valve solenoid.

Turn off the key switch and disconnect the battery plug, disconnect the CN78 and CN87 connector, visually check each terminal and the caulked portion and coating of each cable for defects. (Refer to BEFORE TROUBLESHOOTING)

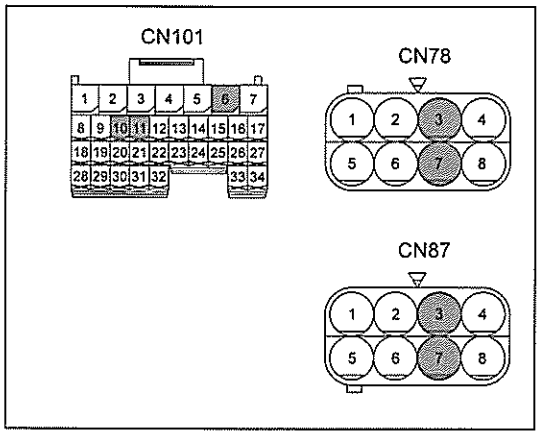
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Portion to be inspected	Standard:
CN78-7 (32) to CN78-3 (36)	Approx. 8 Ω
CN87-7 (32) to CN87-3 (37)	Approx. 8 Ω

Judgment

Result	Procedure
NG	**Attachment 1 proportional valve solenoid defect** **Go to step 2**
OK	Go to step 2

STEP2



Inspection : Harness

Disconnect theCN101, CN78 and CN87 connector, then check the harness.

[Inspection procedure and standard]

Inspect for continuity and short circuiting of the harness.

Perform this check with the battery plug and the CN101, CN78, CN87 connectors disconnected, and visually check inside the connector and the caulked portion of its wire for defects. Refer to BEFORE TROUBLESHOOTING

Portion to be inspected	Standard:
CN78-7 (32) to CN78-3 (36)	No continuity
CN101-6(32) to CN101-10(36)	No continuity
CN101-10(36) to P2	No continuity
CN101-10(36) to P3	No continuity
CN87-7 (32) to CN87-3 (37)	No continuity
CN101-6(32) to CN101-11(37)	No continuity
CN101-11(37) to P2	No continuity
CN101-11(37) to P3	No continuity

Judgment

Result	Procedure
NG	**Harness defect** **Main controller defect Replace the main controller with the defective portion in the former step.**
OK	**Main controller defect Replace the main controller with the defective portion in the former step.**

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Error Code: H7-6

Failure mode: Attachment 1 proportional valve solenoid (open / short) abnormality

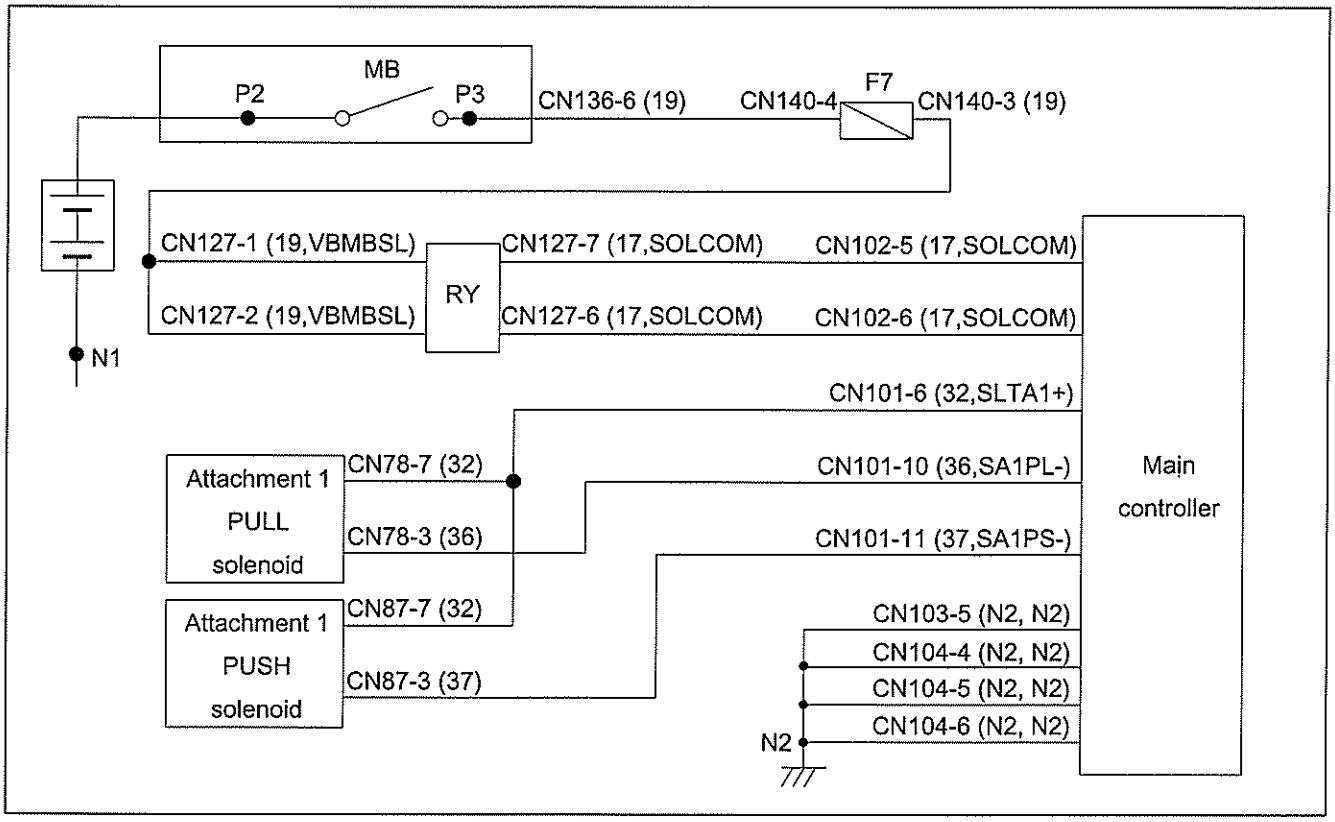
⚠ CAUTION

- **If H7-5 also occurs, disconnect the battery plug at once, perform troubleshooting with priority given to H7-5.**
- **If A9-2, HB-1, HB-2, or HB-3 occurs at same time, perform troubleshooting for A9-2, HB-1, HB-2, HB-3 first.**

Probable cause

- Connector contact defect
- Attachment 1 proportional valve solenoid defect
- Harness defect
- Main controller defect

Related portion



STEP1

1 . Turn off the key switch and disconnect the battery plug. Check the inside of connector CN78, CN87 and the caulked portion of wire whether it has defect or not by visual confirm. (Refer to BEFORE TROUBLESHOOTING)

2 . After connecting CN78, CN87, connect the battery plug and turn on the key switch to confirm error.

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Judgment

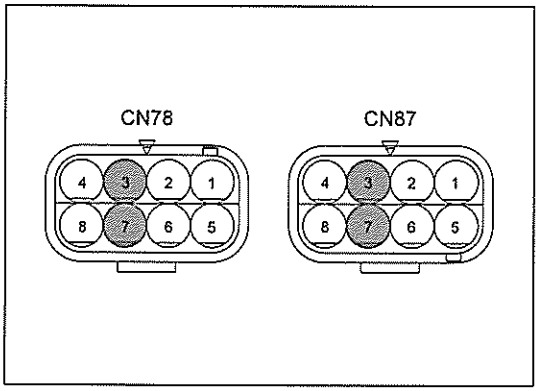
Result	Procedure
H7-6 error occurs.	Go to step 2
H7-6 error does not occur.	**Connector contact defect**

STEP2

Inspection : Attachment 1 proportional valve solenoid individual inspection

1 . Turn off the key switch and disconnect the battery plug.

2 . Disconnect the CN78, CN87 connector, and check the resistance of attachment 1 proportional valve solenoid.



[Inspection procedure and standard]

Check the resistance of attachment 1 proportional valve solenoid.

Turn off the key switch and disconnect the battery plug, disconnect the CN78, CN87 connectors, and visually check inside each connector and the caulked portion of each wire for defects. (Refer to BEFORE TROUBLESHOOTING)

Portion to be inspected	Standard:
CN78-7 (32) to CN78-3 (36)	Approx. 8 Ω
CN87-7 (32) to CN87-3 (37)	Approx. 8 Ω

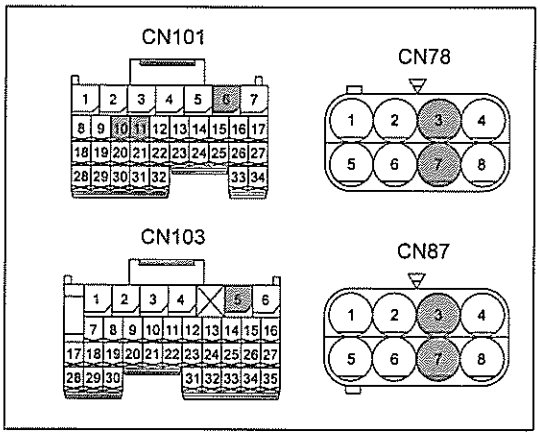
Judgment

Result	Procedure
NG	**Attachment 1 proportional valve solenoid defect**
OK	Go to step 3

STEP3

Inspection : Harness

Disconnect the CN101, CN103, CN78 and CN87 connector, then check the harness.



[Inspection procedure and standard]

Inspect for continuity and short circuiting of the harness.

Perform this check with the battery plug and the CN101, CN103, CN78, CN87 connectors disconnected, and visually check inside the connector and the caulked portion of its wire for defects. Refer to BEFORE TROUBLESHOOTING

*1 : Connect the CN78 connector and measure the resistance between CN101-6 and CN101-10. And it is OK if this resistance is approx.8 Ω.

*2 : Connect the CN87 connector and measure the resistance between CN101-6 and CN101-11. And it is OK if this resistance is approx.8 Ω.

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Portion to be inspected	Standard:
CN101-6 (32) to CN78-7 (32)	Continuously *1
CN101-10 (36) to CN78-3 (36)	Continuously *1
CN78-7 (32) to CN78-3 (36)	No continuity *1
CN101-6 (32) to CN103-5 (N2)	No continuity
CN101-10 (36) to CN103-5 (N2)	No continuity
CN101-6 (32) to CN87-7 (32)	Continuously *2
CN101-11 (37) to CN87-3 (37)	Continuously *2
CN87-7 (32) to CN87-3 (37)	No continuity *2
CN101-11 (37) to CN103-5 (N2)	No continuity

Judgment

Result	Procedure
NG	**Harness defect**
OK	**Main controller defect**

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Error Code: H8-1

Failure mode: Attachment 2 proportional valve solenoid open abnormality (lever pull side)

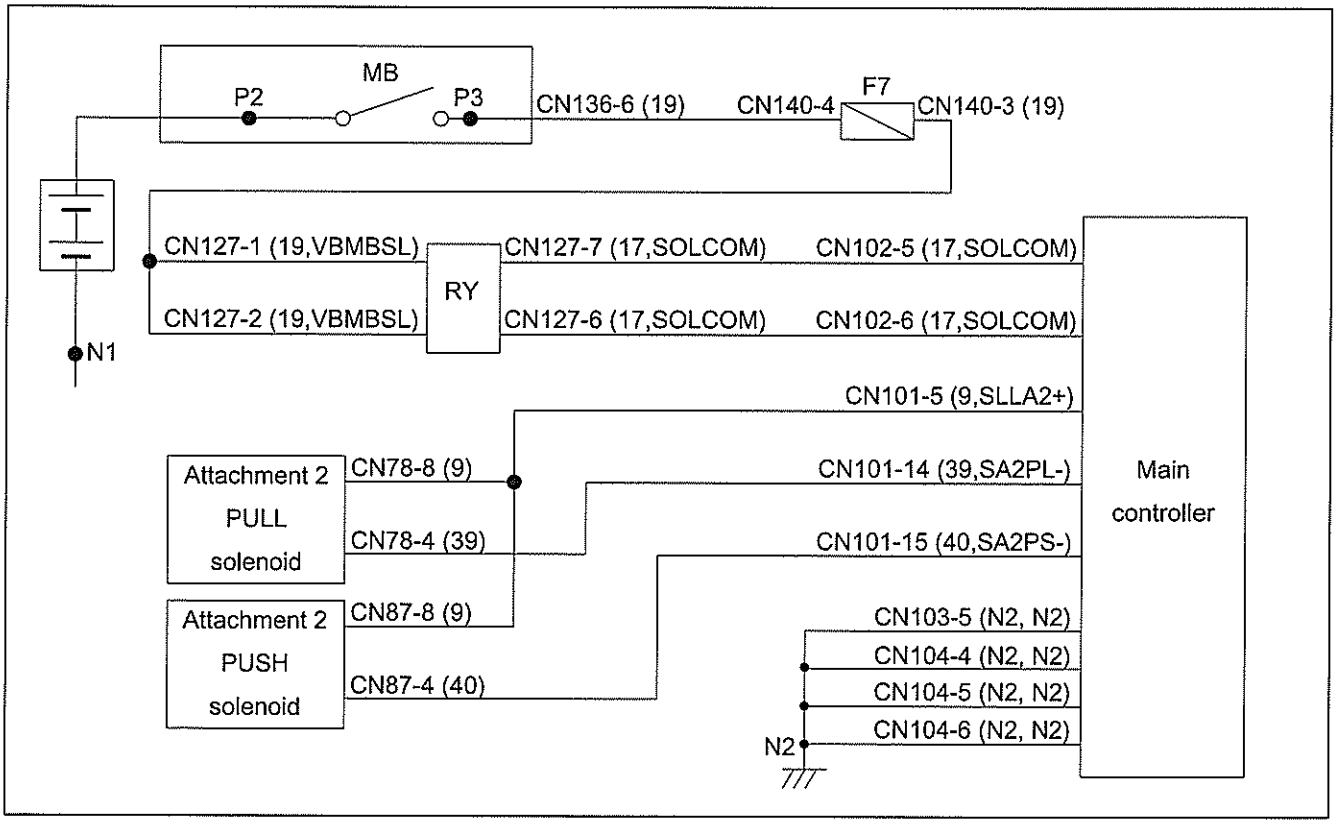
⚠ CAUTION

- **If H8-5 also occurs, disconnect the battery plug at once, perform troubleshooting with priority given to H8-5.**
- **If A9-2, HB-1 or HB-3 occurs at same time, perform troubleshooting for A9-2, HB-1, HB-3 first.**

Probable cause

- Connector contact defect
- Attachment 2 proportional valve solenoid (PULL) defect
- Harness defect
- Main controller defect

Related portion



STEP1

1 . Turn off the key switch and disconnect the battery plug. Check the inside of connector CN78 and the caulked portion of wire whether it has defect or not by visual confirm. (Refer to BEFORE TROUBLESHOOTING)

2 . After connecting CN78, connect the battery plug and turn on the key switch to confirm error.

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Judgment

Result	Procedure
H8-6 error occurs.	**Perform troubleshooting for H8-6.**
H8-6 error does not occur.	Go to step 2

STEP2

Operate the pull side of attachment 2 lever more than 1 second to check if an error occurs.

Judgment

Result	Procedure
H8-1 error does not occur.	**Connector contact defect**
H8-1 error occurs.	Go to step 3

STEP3

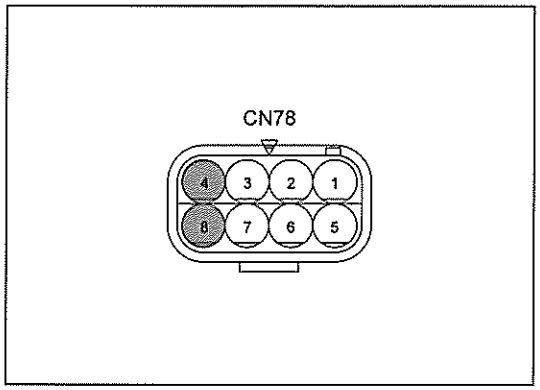
Inspection : Attachment 2 proportional valve solenoid (PULL) individual inspection

1 . Turn off the key switch and disconnect the battery plug.

2 . Disconnect the CN78 connector, and check the resistance of attachment 2 proportional valve solenoid (PULL).

[Inspection procedure and standard]

Check the resistance of attachment 2 proportional valve solenoid (PULL).



Turn off the key switch and disconnect the battery plug, disconnect the CN78 connector, visually check each terminal and the caulked portion and coating of each cable for defects. (Refer to BEFORE TROUBLESHOOTING)

Portion to be inspected	Standard:
CN78-8 (9) to CN78-4 (39)	Approx. 8 Ω

Judgment

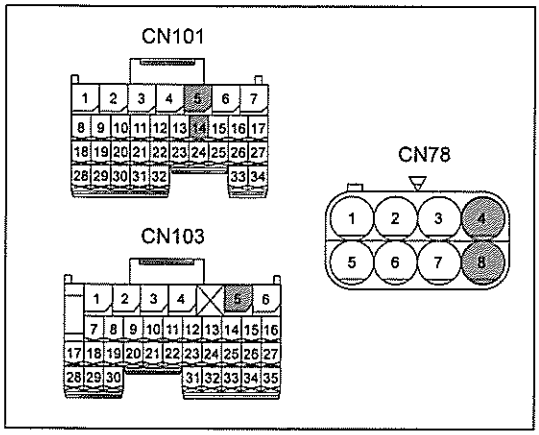
Result	Procedure
NG	**Attachment 2 proportional valve solenoid (PULL) defect**
OK	Go to step 4

STEP4

Inspection : Harness

Disconnect the CN101, CN103 and CN78 connector, then check the harness.

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[Inspection procedure and standard]

Inspect for continuity and short circuiting of the harness.

Perform this check with the battery plug and the CN101, CN103, CN78 connectors disconnected, and visually check inside the connector and the caulked portion of its wire for defects. Refer to BEFORE TROUBLESHOOTING

*: Connect the CN78 connector and measure the resistance between CN101-5 and CN101-14. And it is OK if this resistance is approx.8 Ω.

Portion to be inspected	Standard:
CN101-5 (9) to CN78-8 (9)	Continuity *
CN101-14 (39) to CN78-4 (39)	Continuity *
CN101-5(9) to CN103-5(N2)	No continuity
CN101-14 (39) to CN103-5 (N2)	No continuity

Judgment

Result	Procedure
NG	**Harness defect**
OK	**Main controller defect**

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Error Code: H8-2

Failure mode: Attachment 2 proportional valve solenoid short abnormality (lever pull side)

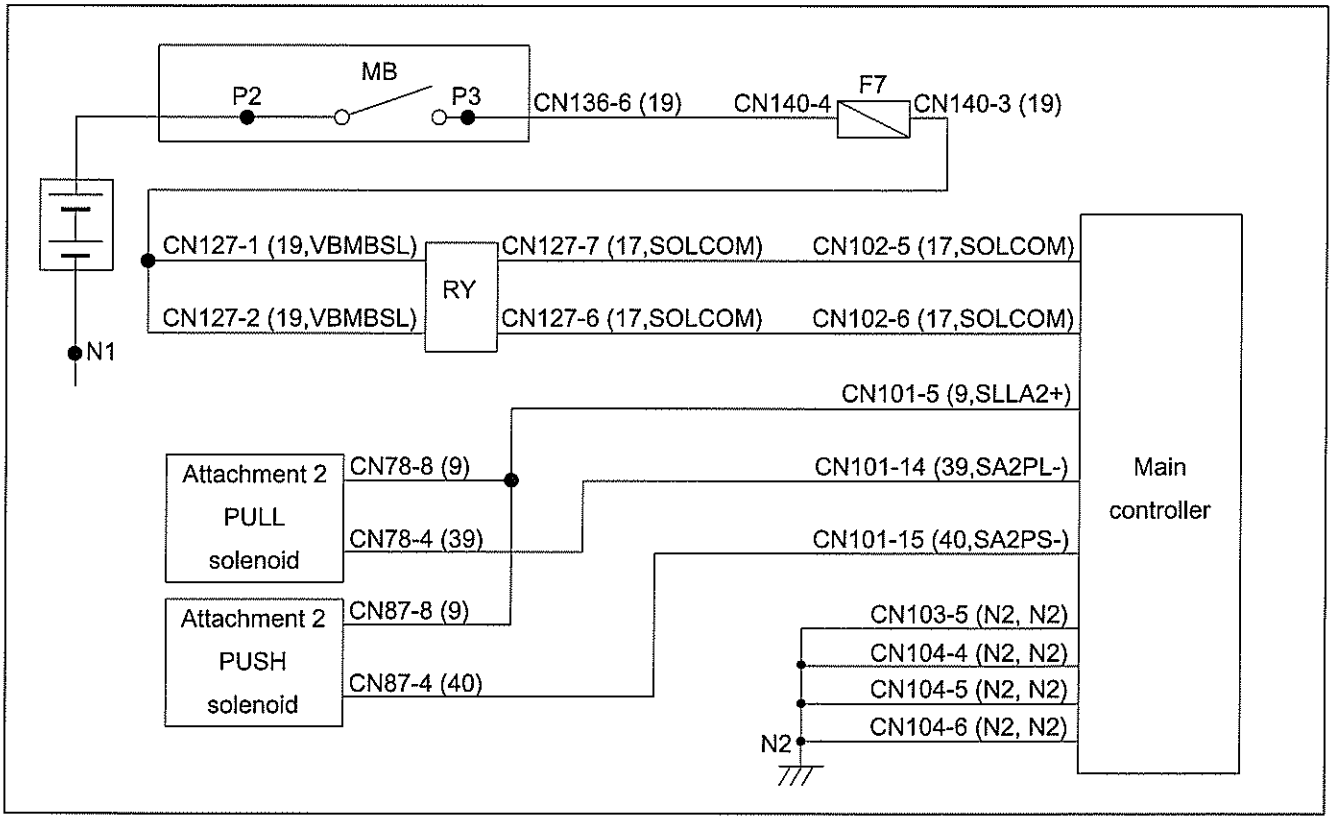
⚠ CAUTION

- **If H8-5 also occurs, disconnect the battery plug at once, perform troubleshooting with priority given to H8-5.**

Probable cause

- Connector contact defect
- Attachment 2 proportional valve solenoid (PULL) defect
- Harness defect
- Main controller defect

Related portion



STEP1

1 . Turn off the key switch and disconnect the battery plug. Check the inside of connector CN78 and the caulked portion of wire whether it has defect or not by visual confirm. (Refer to BEFORE TROUBLESHOOTING)

2 . After connecting CN78, connect the battery plug and turn on the key switch to confirm error.

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Judgment

Result	Procedure
H8-6 error occurs.	**Perform troubleshooting for H8-6.**
H8-6 error does not occur.	Go to step 2

STEP2

Operate the pull side of attachment 2 lever more than 1 second to check if an error occurs.

Judgment

Result	Procedure
H8-2 error does not occur.	**Connector contact defect**
H8-2 error occurs.	Go to step 3

STEP3

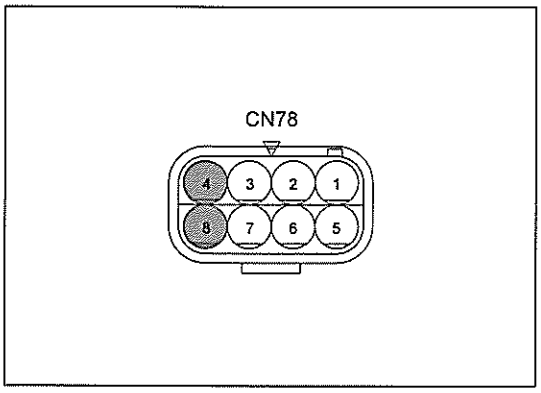
Inspection : Attachment 2 proportional valve solenoid (PULL) individual inspection

1 . Turn off the key switch and disconnect the battery plug.

2 . Disconnect the CN78 connector, and check the resistance of attachment 2 proportional valve solenoid (PULL).

[Inspection procedure and standard]

Check the resistance of attachment 2 proportional valve solenoid (PULL).



Turn off the key switch and disconnect the battery plug, disconnect the CN78 connector, visually check each terminal and the caulked portion and coating of each cable for defects. (Refer to BEFORE TROUBLESHOOTING)

Portion to be inspected	Standard:
CN78-8 (9) to CN78-4 (39)	Approx. 8 Ω

Judgment

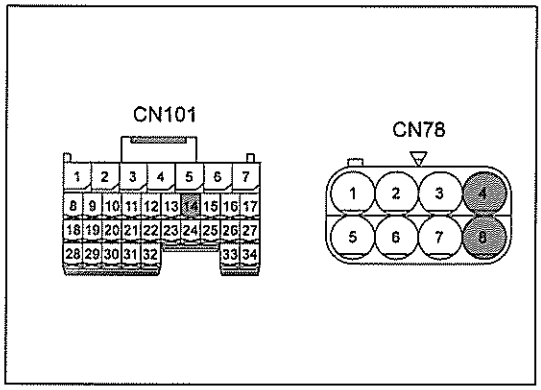
Result	Procedure
NG	**Attachment 2 proportional valve solenoid (PULL) defect**
OK	Go to step 4

STEP4

Inspection : Harness

Disconnect theCN101 and CN78 connector, then check the harness.

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[Inspection procedure and standard]

Inspect for continuity and short circuiting of the harness.

Perform this check with the battery plug and the CN101, CN78 connectors disconnected, and visually check inside the connector and the caulked portion of its wire for defects. Refer to BEFORE TROUBLESHOOTING

Portion to be inspected	Standard:
CN78-8 (9) to CN78-4 (39)	No continuity
CN101-14(39) to P2	No continuity
CN101-14(39) to P3	No continuity

Judgment

Result	Procedure
NG	**Harness defect**
OK	**Main controller defect**

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Error Code: H8-3

Failure mode: Attachment 2 proportional valve solenoid open abnormality (lever push side)

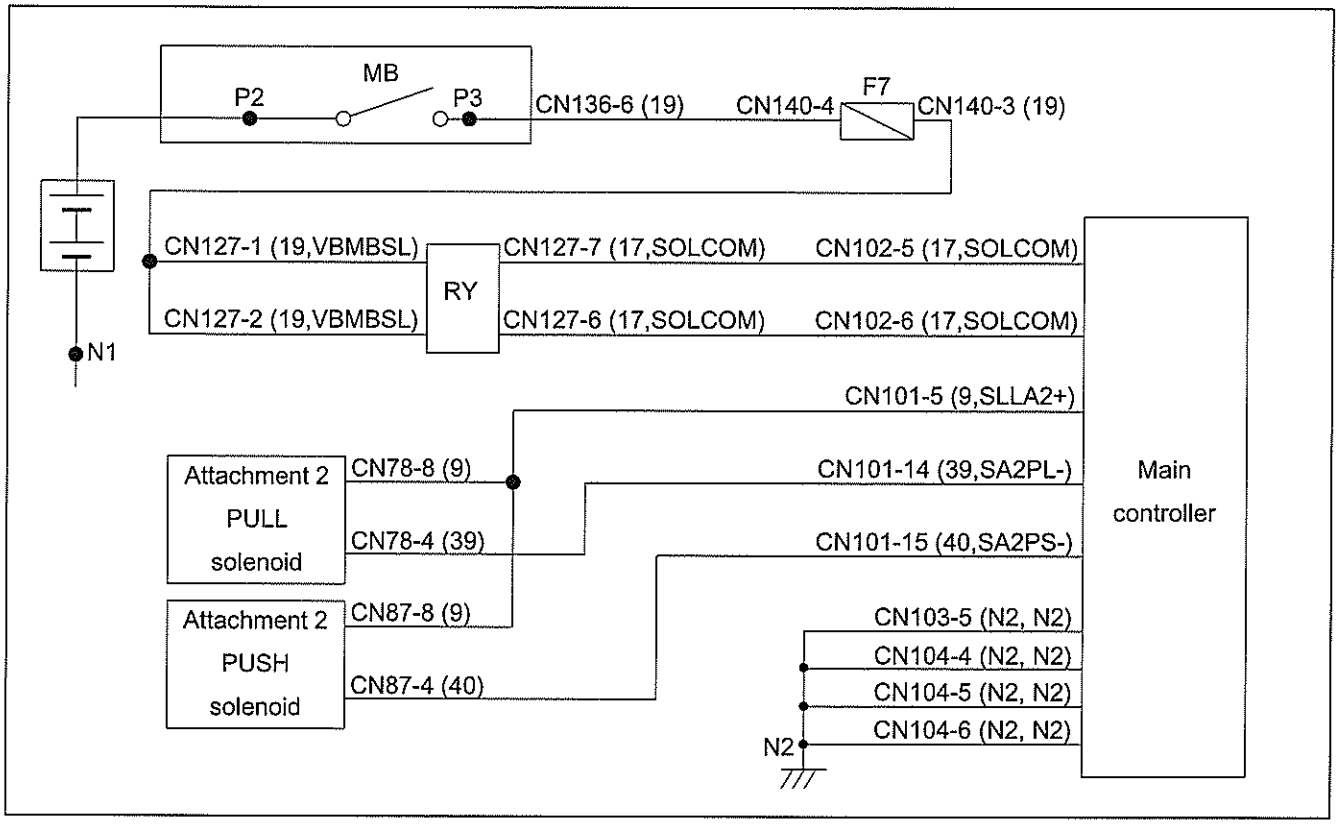
⚠ CAUTION

- **If H8-5 also occurs, disconnect the battery plug at once, perform troubleshooting with priority given to H8-5.**
- **If A9-2, HB-1 or HB-3 occurs at same time, perform troubleshooting for A9-2, HB-1, HB-3 first.**

Probable cause

- Connector contact defect
- Attachment 2 proportional valve solenoid (PUSH) defect
- Harness defect
- Main controller defect

Related portion



STEP1

1 . Turn off the key switch and disconnect the battery plug. Check the inside of connector CN87 and the caulked portion of wire whether it has defect or not by visual confirm. (Refer to BEFORE TROUBLESHOOTING)

2 . After connecting CN87, connect the battery plug and turn on the key switch to confirm error.

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Judgment

Result	Procedure
H8-6 error occurs.	**Perform troubleshooting for H8-6.**
H8-6 error does not occur.	Go to step 2

STEP2

Operate the push side of attachment 2 lever more than 1 second to check if an error occurs.

Judgment

Result	Procedure
H8-3 error does not occur.	**Connector contact defect**
H8-3 error occurs.	Go to step 3

STEP3

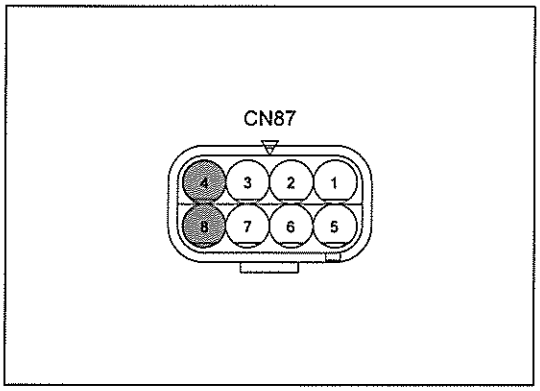
Inspection : Attachment 2 proportional valve solenoid (PUSH) individual inspection

1 . Turn off the key switch and disconnect the battery plug.

2 . Disconnect the CN87 connector, and check the resistance of attachment 2 proportional valve solenoid (PUSH).

[Inspection procedure and standard]

Check the resistance of attachment 2 proportional valve solenoid (PUSH).



Turn off the key switch and disconnect the battery plug, disconnect the CN87 connectors, and visually check inside each connector and the caulked portion of each wire for defects. (Refer to BEFORE TROUBLESHOOTING)

Portion to be inspected	Standard:
CN87-8 (9) to CN87-4 (40)	Approx. 8 Ω

Judgment

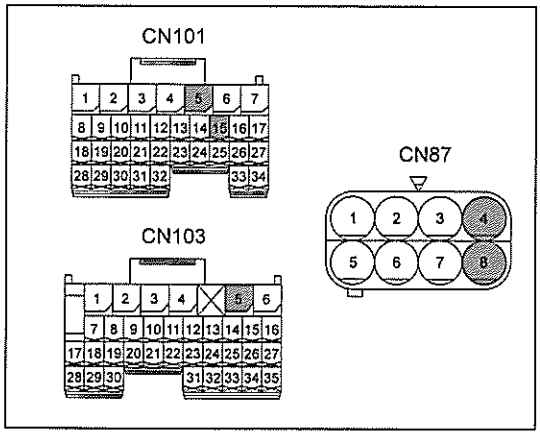
Result	Procedure
NG	**Attachment 2 proportional valve solenoid (PUSH) defect**
OK	Go to step 4

STEP4

Inspection : Harness

Disconnect the CN101, CN103 and CN87 connector, then check the harness.

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[Inspection procedure and standard]

Inspect for continuity and short circuiting of the harness.

Perform this check with the battery plug and the CN101, CN103, CN87 connectors disconnected, and visually check inside the connector and the caulked portion of its wire for defects. Refer to BEFORE TROUBLESHOOTING

*: Connect the CN87 connector and measure the resistance between CN101-5 and CN101-15. And it is OK if this resistance is approx.8 Ω.

Portion to be inspected	Standard:
CN101-5 (9) to CN87-8 (9)	Continuity *
CN101-15 (40) to CN87-4 (40)	Continuity *
CN101-5(9) to CN103-5(N2)	No continuity
CN101-15 (40) to CN103-5 (N2)	No continuity

Judgment

Result	Procedure
NG	**Harness defect**
OK	**Main controller defect**

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Error Code: H8-4

Failure mode: Attachment 2 proportional valve solenoid short abnormality (lever push side)

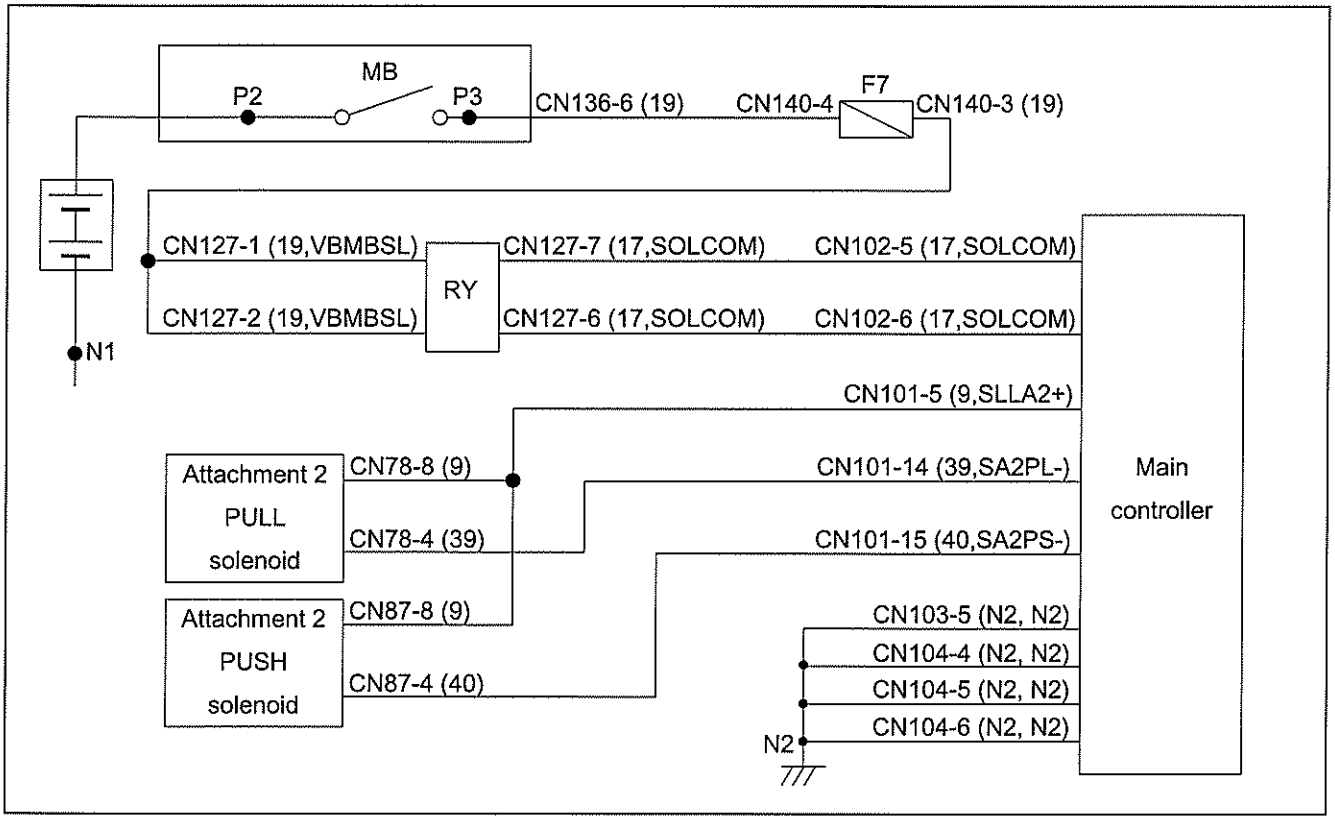
⚠ CAUTION

- **If H8-5 also occurs, disconnect the battery plug at once, perform troubleshooting with priority given to H8-5.**

Probable cause

- Connector contact defect
- Attachment 2 proportional valve solenoid (PUSH) defect
- Harness defect
- Main controller defect

Related portion



STEP1

1 . Turn off the key switch and disconnect the battery plug. Check the inside of connector CN87 and the caulked portion of wire whether it has defect or not by visual confirm. (Refer to BEFORE TROUBLESHOOTING)

2 . After connecting CN87, connect the battery plug and turn on the key switch to confirm error.

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Judgment

Result	Procedure
H8-6 error occurs.	**Perform troubleshooting for H8-6.**
H8-6 error does not occur.	Go to step 2

STEP2

Operate the push side of attachment 2 lever more than 1 second to check if an error occurs.

Judgment

Result	Procedure
H8-4 error does not occur.	**Connector contact defect**
H8-4 error occurs.	Go to step 3

STEP3

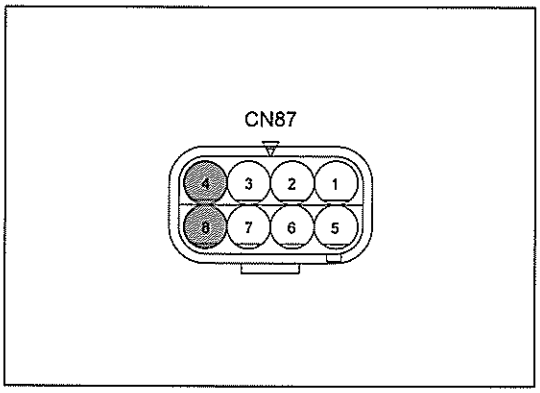
Inspection : Attachment 2 proportional valve solenoid (PUSH) indivisual inspection

1 . Turn off the key switch and disconnect the battery plug.

2 . Disconnect the CN87 connector, and check the resistance of attachment 2 proportional valve solenoid (PUSH).

[Inspection procedure and standard]

Check the resistance of attachment 2 proportional valve solenoid (PUSH).



Turn off the key switch and disconnect the battery plug, disconnect the CN78 connector, visually check each terminal and the caulked portion and coating of each cable for defects. (Refer to BEFORE TROUBLESHOOTING)

Portion to be inspected	Standard:
CN87-8 (9) to CN87-4 (40)	Approx. 8 Ω

Judgment

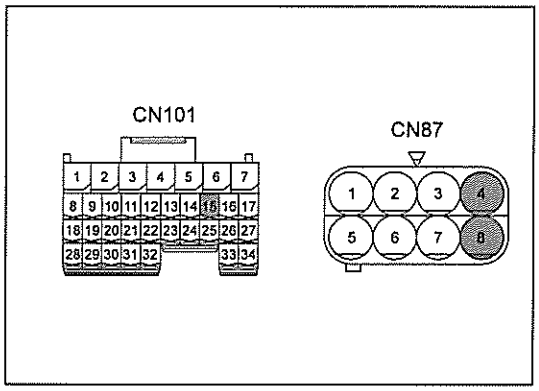
Result	Procedure
NG	**Attachment 2 proportional valve solenoid (PUSH) defect**
OK	Go to step 4

STEP4

Inspection : Harness

Disconnect theCN101 and CN87 connector, then check the harness.

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[Inspection procedure and standard]

Inspect for continuity and short circuiting of the harness.

Perform this check with the battery plug and the CN101, CN87 connectors disconnected, and visually check inside the connector and the caulked portion of its wire for defects. Refer to BEFORE TROUBLESHOOTING

Portion to be inspected	Standard:
CN87-8 (9) to CN87-4 (40)	No continuity
CN101-15(40) to P2	No continuity
CN101-15(40) to P3	No continuity

Judgment

Result	Procedure
NG	**Harness defect**
OK	**Main controller defect**

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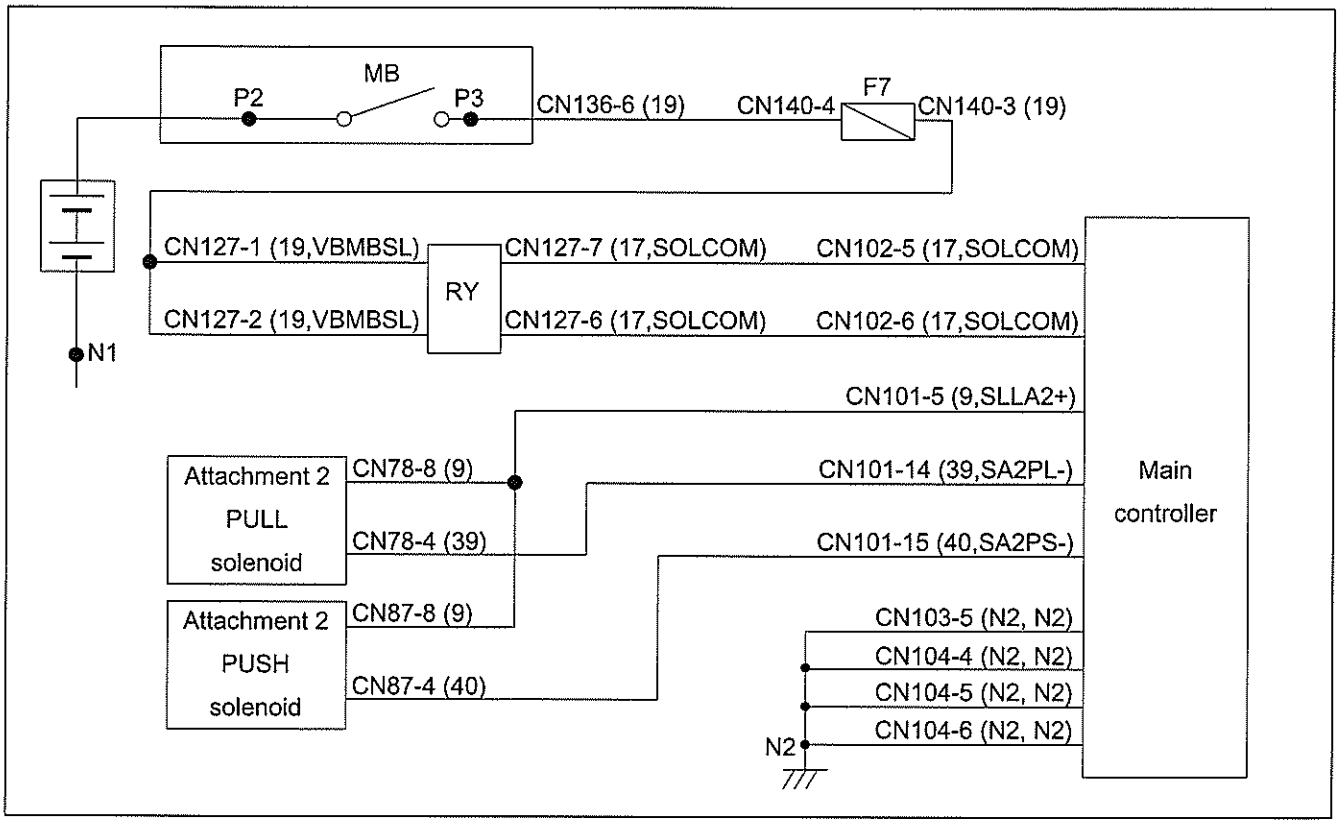
Error Code: H8-5

Failure mode: Attachment 2 proportional valve solenoid drive circuit abnormality

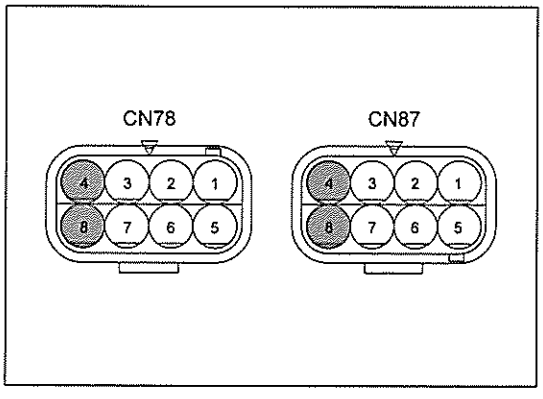
Probable cause

- Attachment 2 proportional valve solenoid defect
- Harness defect
- Main controller defect

Related portion



STEP1



Inspection : Attachment 2 proportional valve solenoid indivisual inspection

1 . Turn off the key switch and disconnect the battery plug.

2 . Disconnect the CN78 and CN87 connector, and check the resistance of attachment 2 proportional valve solenoid.

[Inspection procedure and standard]

Check the resistance of attachment 2 proportional valve solenoid.

Turn off the key switch and disconnect the battery plug, disconnect the CN78 and CN87 connector, visually check each terminal and the caulked portion and coating of each cable for defects. (Refer to BEFORE TROUBLESHOOTING)

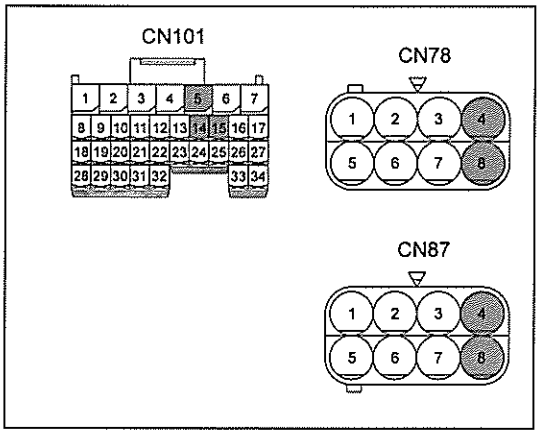
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Portion to be inspected	Standard:
CN78-8 (9) to CN78-4 (39)	Approx. 8 Ω
CN87-8 (9) to CN87-4 (40)	Approx. 8 Ω

Judgment

Result	Procedure
NG	**Attachment 2 proportional valve solenoid defect** **Go to step 2**
OK	Go to step 2

STEP2



Inspection : Harness

Disconnect theCN101, CN78 and CN87 connector, then check the harness.

[Inspection procedure and standard]

Inspect for continuity and short circuiting of the harness.

Perform this check with the battery plug and the CN101, CN78, CN87 connectors disconnected, and visually check inside the connector and the caulked portion of its wire for defects. Refer to BEFORE TROUBLESHOOTING

Portion to be inspected	Standard:
CN78-8 (9) to CN78-4 (39)	No continuity
CN101-5(9) to CN101-14(39)	No continuity
CN101-14(39) to P2	No continuity
CN101-14(39) to P3	No continuity
CN87-8 (9) to CN87-4 (40)	No continuity
CN101-5(9) to CN101-15(40)	No continuity
CN101-15(40) to P2	No continuity
CN101-15(40) to P3	No continuity

Judgment

Result	Procedure
NG	**Harness defect** **Main controller defect Replace the main controller with the defective portion in the former step.**
OK	**Main controller defectReplace the main controller with the defective portion in the former step.**

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Error Code: H8-6

Failure mode: Attachment 2 proportional valve solenoid (open / short) abnormality

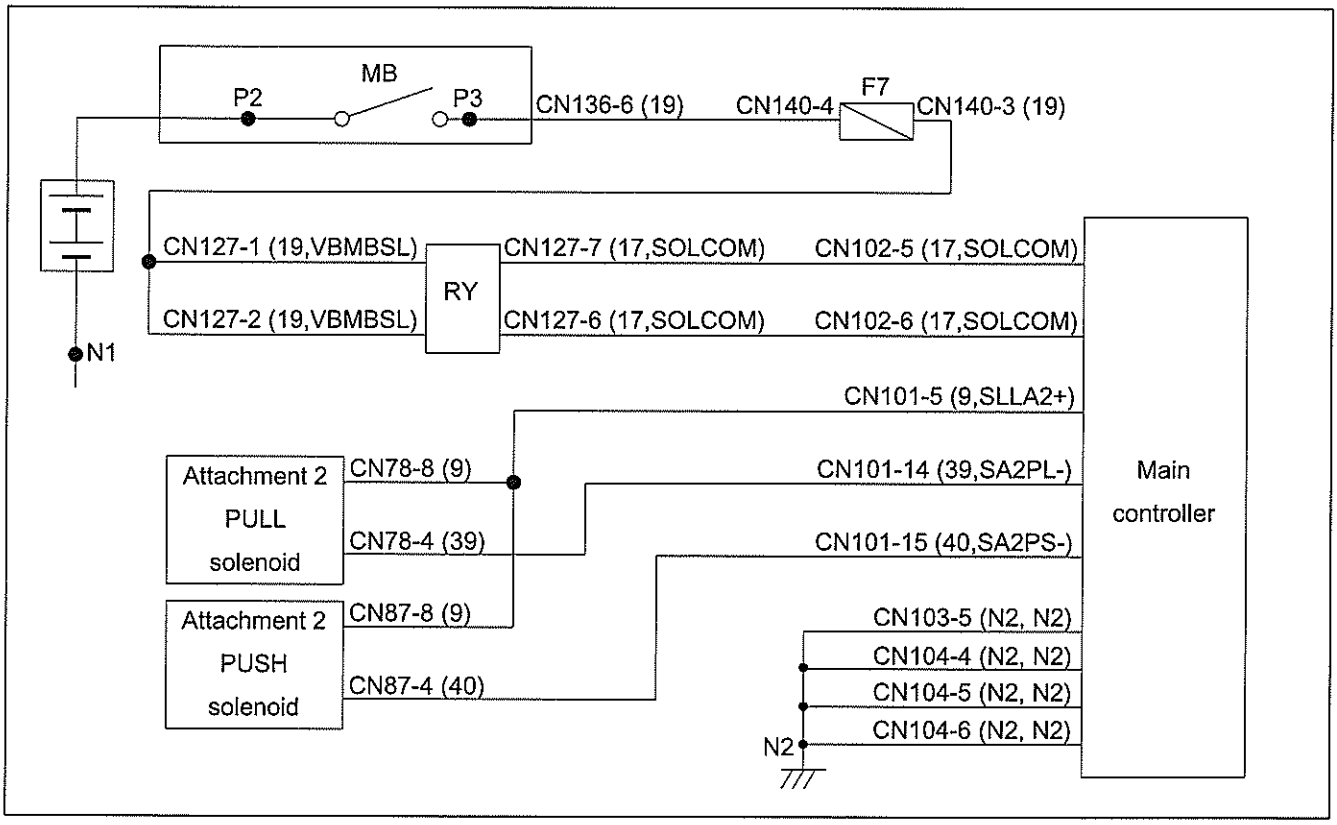
⚠ CAUTION

- **If H8-5 also occurs, disconnect the battery plug at once, perform troubleshooting with priority given to H8-5.**
- **If A9-2, HB-1, HB-2, or HB-3 occurs at same time, perform troubleshooting for A9-2, HB-1, HB-2, HB-3 first.**

Probable cause

- Connector contact defect
- Attachment 2 proportional valve solenoid defect
- Harness defect
- Main controller defect

Related portion



STEP1

1 . Turn off the key switch and disconnect the battery plug. Check the inside of connector CN78, CN87 and the caulked portion of wire whether it has defect or not by visual confirm. (Refer to BEFORE TROUBLESHOOTING)

2 . After connecting CN78, CN87, connect the battery plug and turn on the key switch to confirm error.

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Judgment

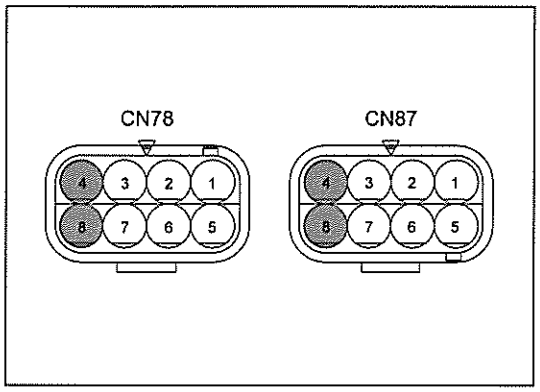
Result	Procedure
H8-6 error occurs.	Go to step 2
H8-6 error does not occur.	**Connector contact defect**

STEP2

Inspection : Attachment 2 proportional valve solenoid individual inspection

1 . Turn off the key switch and disconnect the battery plug.

2 . Disconnect the CN78, CN87 connector, and check the resistance of attachment 2 proportional valve solenoid.



[Inspection procedure and standard]

Check the resistance of attachment 2 proportional valve solenoid.

Turn off the key switch and disconnect the battery plug, disconnect the CN78, CN87 connectors, and visually check inside each connector and the caulked portion of each wire for defects. (Refer to BEFORE TROUBLESHOOTING)

Portion to be inspected	Standard:
CN78-8 (9) to CN78-4 (39)	Approx. 8 Ω
CN87-8 (9) to CN87-4 (40)	Approx. 8 Ω

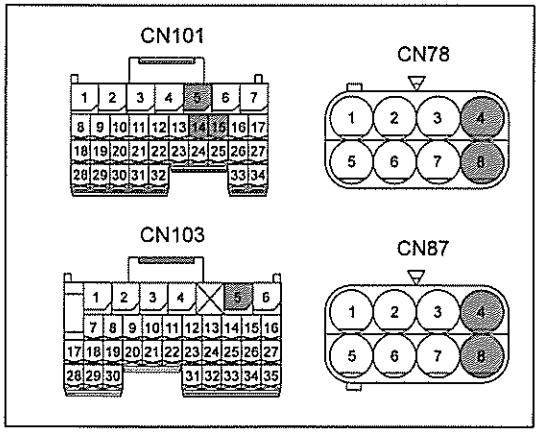
Judgment

Result	Procedure
NG	**Attachment 2 proportional valve solenoid defect**
OK	Go to step 3

STEP3

Inspection : Harness

Disconnect the CN101, CN103, CN78 and CN87 connector, then check the harness.



[Inspection procedure and standard]

Inspect for continuity and short circuiting of the harness.

Perform this check with the battery plug and the CN101, CN103, CN78, CN87 connectors disconnected, and visually check inside the connector and the caulked portion of its wire for defects. Refer to BEFORE TROUBLESHOOTING

*1 : Connect the CN78 connector and measure the resistance between CN101-5 and CN101-14. And it is OK if this resistance is approx.8 Ω.

*2 : Connect the CN87 connector and measure the resistance between CN101-5 and CN101-15. And it is OK if this resistance is approx.8 Ω.

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Portion to be inspected	Standard:
CN101-5 (9) to CN78-8 (9)	Continuously *1
CN101-14 (39) to CN78-4 (39)	Continuously *1
CN78-8 (9) to CN78-4 (39)	No continuity *1
CN101-5(9) to CN103-5(N2)	No continuity
CN101-14 (39) to CN103-5 (N2)	No continuity
CN101-5 (9) to CN87-8 (9)	Continuously *2
CN101-15 (40) to CN87-4 (40)	Continuously *2
CN87-8 (9) to CN87-4 (40)	No continuity *2
CN101-15 (40) to CN103-5 (N2)	No continuity

Judgment

Result	Procedure
NG	**Harness defect**
OK	**Main controller defect**

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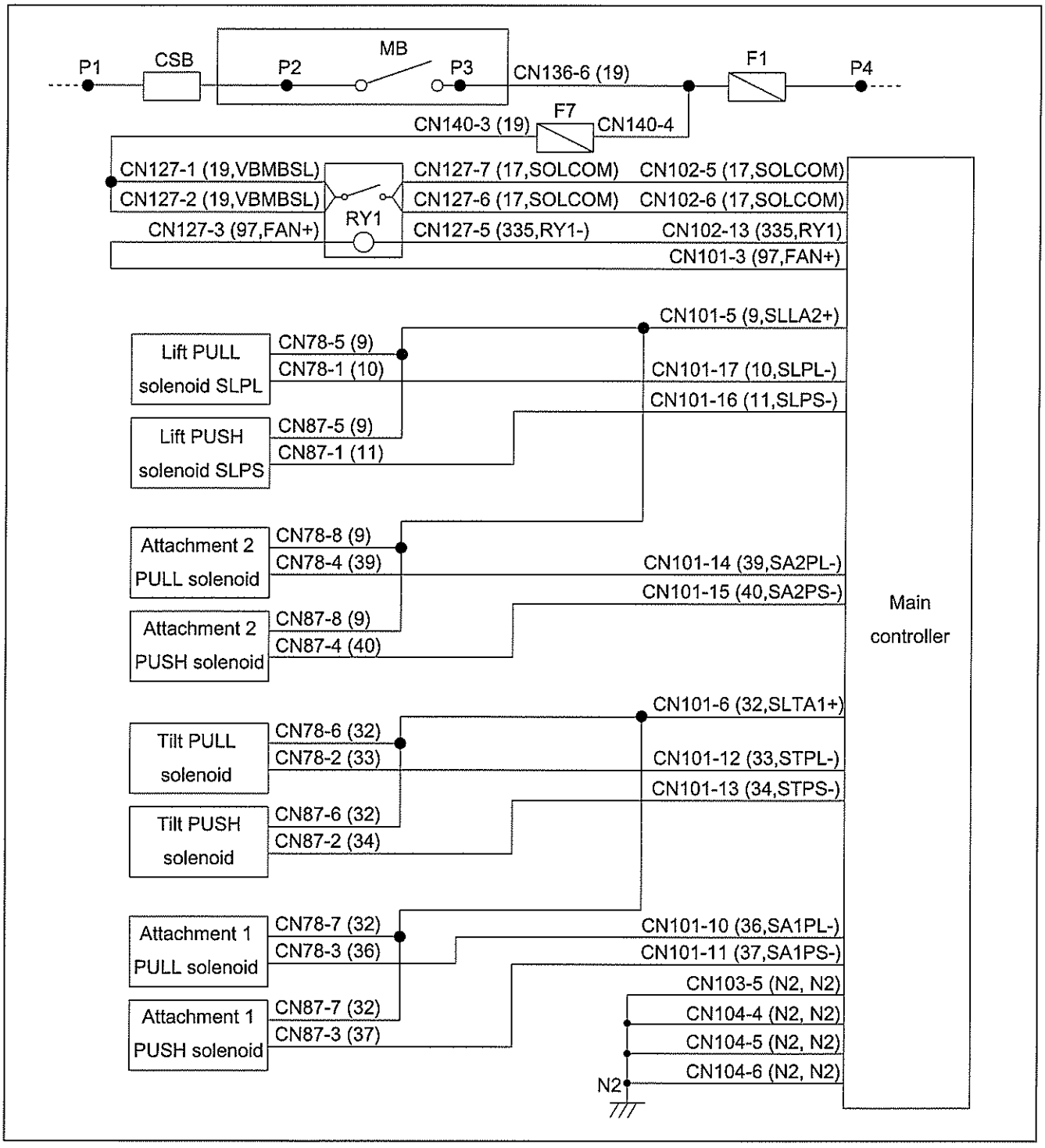
Error Code: HB-1

Failure mode: Proportional valve solenoid power supply : RY1 contact open abnormality

Probable cause

- Connector contact defect
- Harness defect
- RY1 defect
- Main controller defect

Related portion



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STEP1

1 . Turn off the key switch and disconnect the battery plug. Check the inside of connector CN127 and the caulked portion of wire whether it has defect or not by visual confirm. (Refer to BEFORE TROUBLESHOOTING)

2 . After connecting CN127, connect the battery plug and turn on the key switch to confirm error.

Judgment

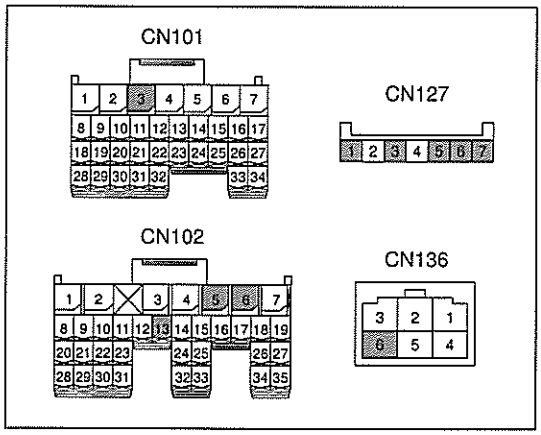
Result	Procedure
HB-1 error does not occur.	**Connector contact defect**
HB-1 error occurs.	Go to step 2

STEP2

Inspection : Harness

1 . Turn off the key switch and disconnect the battery plug.

2 . Disconnect the CN101, CN102, CN127 and CN136 connector, then check the harness.



[Inspection procedure and standard]

Inspect for continuity and short circuiting of the harness.

Perform this check with the battery plug and the CN101, CN102, CN127, CN136 connectors disconnected, and visually check inside the connector and the caulked portion of its wire for defects. Refer to BEFORE TROUBLESHOOTING

Portions to be checked	Standard:
CN102-13 (335) to CN127-5 (335)	Continuity
CN101-3 (97) to CN127-3 (97)	Continuity
CN102-5 (17) to CN127-7 (17)	Continuity
CN102-6 (17) to CN127-6 (17)	Continuity
CN127-1 (19) to CN136-6 (19)	Continuity

Judgment

Result	Procedure
NG	**Harness defect**
OK	**RY1 defect** **If the symptom persists after replacement of the relay, there should be any other problems, so replace the Main controller.**

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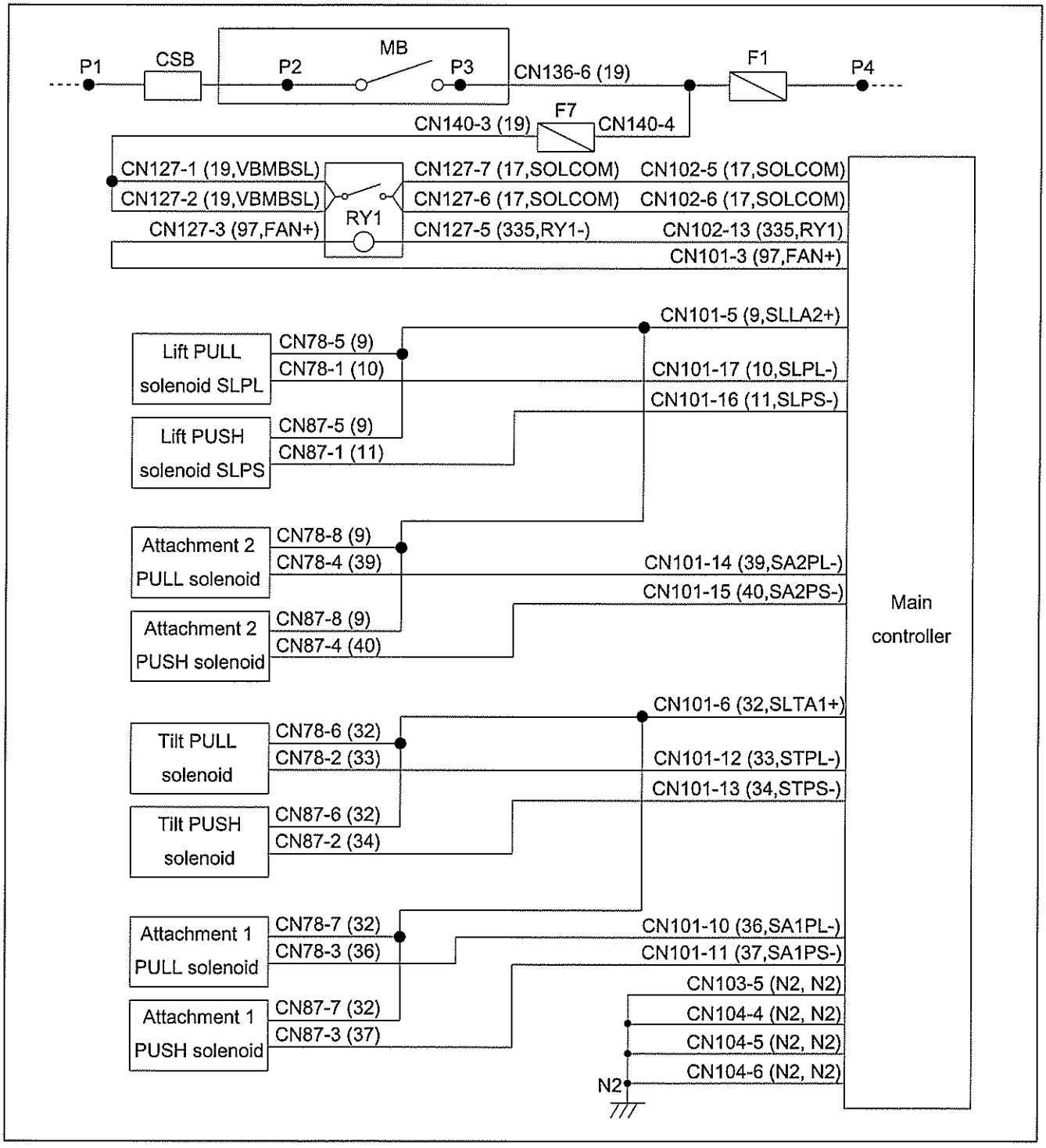
Error Code: HB-2

Failure mode: Proportional valve solenoid load-short abnormality

Probable cause

- Connector contact defect
- Harness defect
- Main controller defect

Related portion



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STEP1

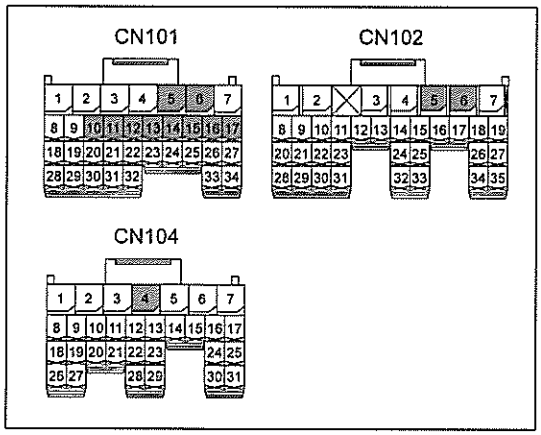
1 . Turn off the key switch and disconnect the battery plug. Check the inside of connector CN127, CN78, CN87 and the caulked portion of wire whether it has defect or not by visual confirm. (Refer to BEFORE TROUBLESHOOTING)

2 . After connecting CN127, CN78 and CN87, connect the battery plug and turn on the key switch to confirm error.

Judgment

Result	Procedure
HB-2 error does not occur.	**Connector contact defect**
HB-2 error occurs.	Go to step 2

STEP2



Inspection : Harness

1 . Turn off the key switch and disconnect the battery plug.

2 . Disconnect the CN101, CN102, CN103, CN104, CN78 and CN87 connector, then check the harness.

[Inspection procedure and standard]

Inspect for continuity and short circuiting of the harness.

Perform this check with the battery plug and the CN101, CN102, CN103, CN104, CN78, CN87 connectors disconnected, and visually check inside the connector and the caulked portion of its wire for defects. Refer to BEFORE TROUBLESHOOTING

Portions to be checked	Standard
CN102-5 (17) to CN104-4 (N2)	No continuity
CN102-6 (17) to CN104-4 (N2)	No continuity
CN101-5(9) to CN104-4(N2)	No continuity
CN101-6 (32) to CN104-4 (N2)	No continuity
CN101-16(11) to CN104-4(N2)	No continuity
CN101-17(10) to CN104-4(N2)	No continuity
CN101-13 (34) to CN104-4 (N2)	No continuity
CN101-12 (33) to CN104-4 (N2)	No continuity
CN101-11 (37) to CN104-4 (N2)	No continuity
CN101-10 (36) to CN104-4 (N2)	No continuity
CN101-15 (40) to CN104-4 (N2)	No continuity
CN101-14 (39) to CN104-4 (N2)	No continuity

Judgment

Result	Procedure
NG	**Harness defect**
OK	**Main controller defect**

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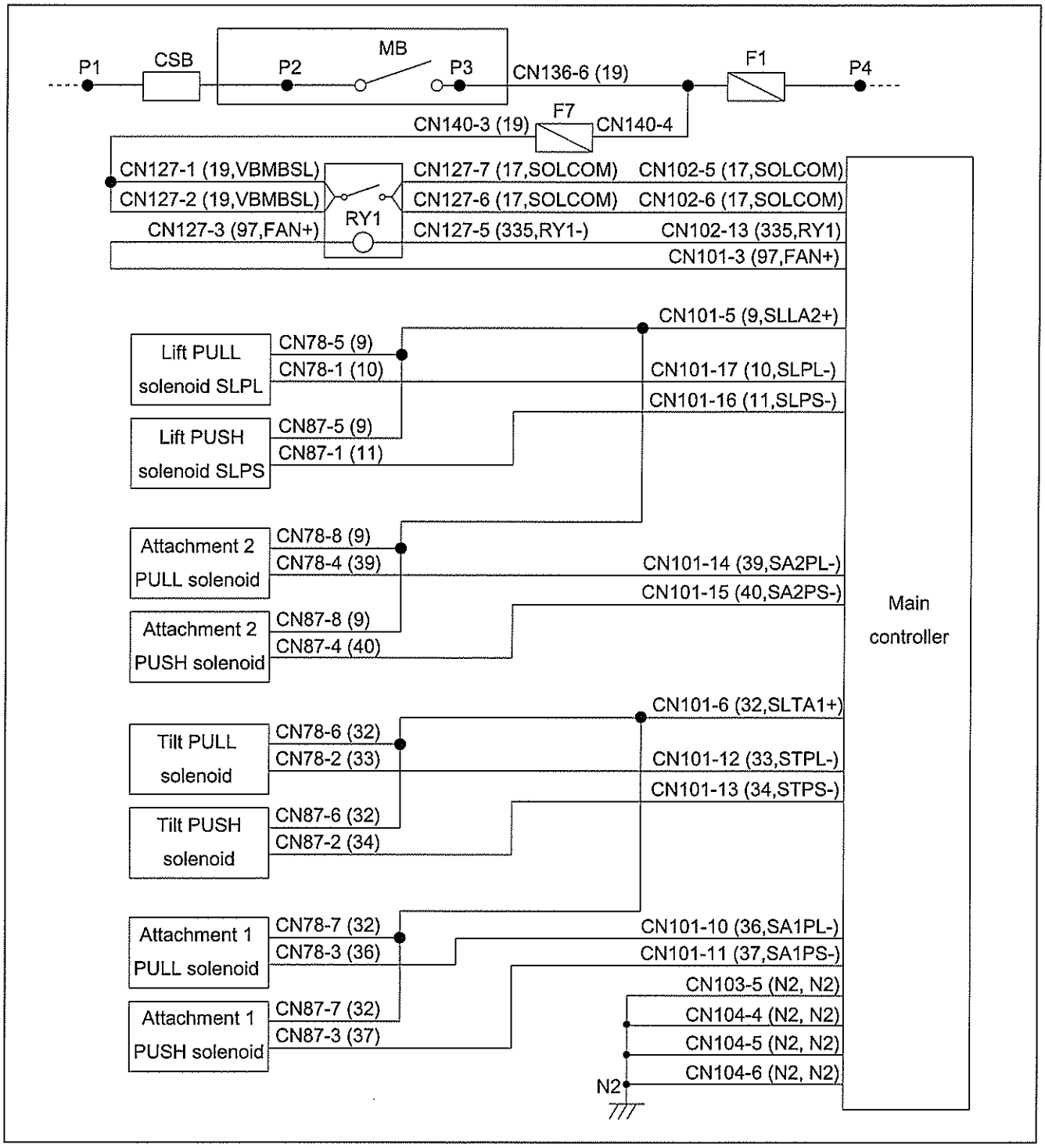
Error Code: HB-3

Failure mode: Proportional valve solenoid power supply : RY1 over current abnormality

Probable cause

- Connector contact defect
- Harness defect
- RY1 defect
- Main controller defect

Related portion



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STEP1

1 . Turn off the key switch and disconnect the battery plug. Check the inside of connector CN127 and the caulked portion of wire whether it has defect or not by visual confirm. (Refer to BEFORE TROUBLESHOOTING)

2 . After connecting CN127, connect the battery plug and turn on the key switch to confirm error.

Judgment

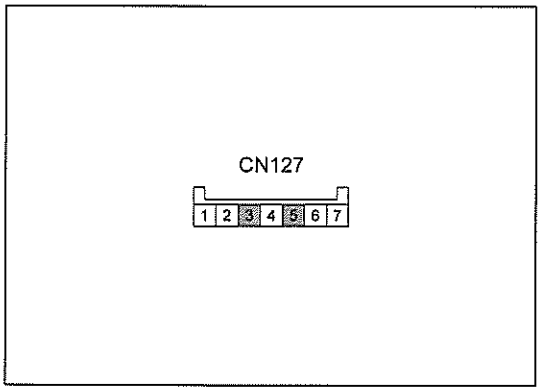
Result	Procedure
HB-3 error does not occur.	**Connector contact defect**
HB-3 error occurs.	Go to step 2

STEP2

Inspection : Harness

1 . Turn off the key switch and disconnect the battery plug.

2 . Disconnect the CN102 and CN127 connector, then check the harness.



[Inspection procedure and standard]

Inspect for continuity and short circuiting of the harness.

Perform this check with the battery plug and the CN102, CN127 connectors disconnected, and visually check inside the connector and the caulked portion of its wire for defects. Refer to BEFORE TROUBLESHOOTING

Portions to be checked	Standard
CN127-5 (335) to P1	No continuity
CN127-5 (335) to P4	No continuity
CN127-5 (335) to CN127-3 (97)	No continuity

Judgment

Result	Procedure
NG	**Harness defect**
OK	**RY1 defect** **If the symptom persists after replacement of the relay, there should be any other problems, so replace the Main controller.**

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Error Code: HC-1

Failure mode: Unload solenoid open abnormality

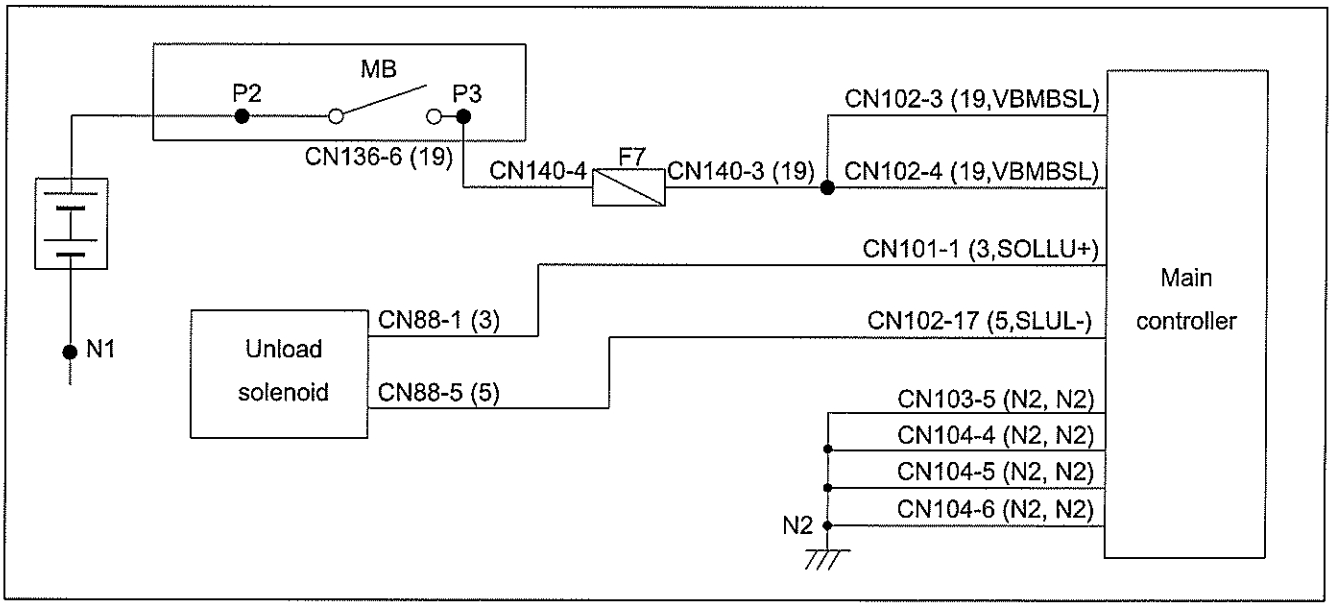
⚠ CAUTION

- **If HC-3 also occurs, disconnect the battery plug at once, perform troubleshooting with priority given to HC-3.**
- **If A9-2 occurs at same time, perform troubleshooting for A9-2 first.**

Probable cause

- Connector contact defect
- Unload solenoid defect
- Harness defect
- Main controller defect

Related portion



STEP1

1 . Turn off the key switch and disconnect the battery plug. Check the inside of connector CN88 and the caulked portion of wire whether it has defect or not by visual confirm. (Refer to BEFORE TROUBLESHOOTING)

2 . After connecting CN88, connect the battery plug and turn on the key switch to confirm error.

Judgment

Result	Procedure
HC-4 error occurs.	**Perform troubleshooting for HC-4.**
HC-4 error does not occur.	Go to step 2

STEP2

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Apply the unload solenoid compulsorily by using Active Test and check if an error occurs.

STD
[ANL] 7 ACT (7 04)
Multi-function display
[ANL] ACTIVE TEST 2/3
UNLOAD SOL : OFF to ON

Judgment

Result	Procedure
HC-1 error does not occur.	**Connector contact defect**
HC-1 error occurs.	Go to step 3

STEP3

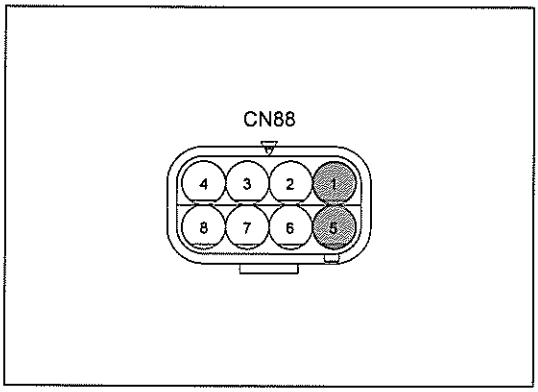
Inspection: Unload solenoid individual inspection

1 . Turn off the key switch and disconnect the battery plug.

2 . Disconnect the CN88 connector, and check the resistance of unload solenoid.

[Inspection procedure and standard]

Check the resistance of unload solenoid.



Turn off the key switch and disconnect the battery plug, disconnect the CN88 connector, visually check each terminal and the caulked portion and coating of each cable for defects. (Refer to BEFORE TROUBLESHOOTING)

Portion to be inspected	Standard:
CN88-1 (3) to CN88-5 (5)	Approx. 10 Ω

Judgment

Result	Procedure
NG	**Unload solenoid defect**
OK	Go to step 4

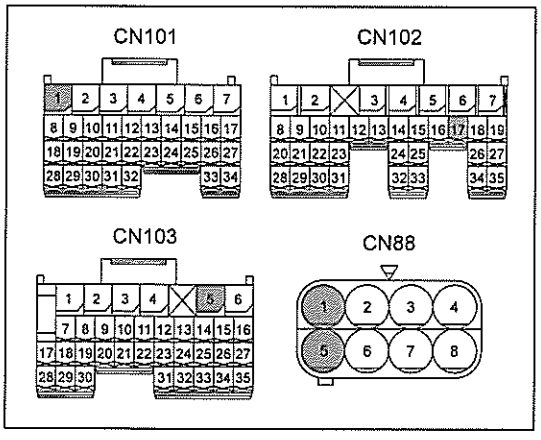
STEP4

Inspection : Harness

Disconnect the CN101, CN102, CN103 and CN88 connector, then check the harness.

[Inspection procedure and standard]

Inspect for continuity and short circuiting of the harness.



Perform this check with the battery plug and the CN101, CN102, CN103, CN88 connectors disconnected, and visually check inside the connector and the caulked portion of its wire for defects. Refer to BEFORE TROUBLESHOOTING

*: Connect the CN88 connector and measure the resistance between CN101-1 and CN102-17. And it is OK if this resistance is approx.10 Ω.

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Portion to be inspected	Standard:
CN101-1 (3) to CN88-1 (3)	Continuity *
CN102-17 (5) to CN88-5 (5)	Continuity *
CN101-1 (3) to CN103-5 (N2)	No continuity
CN102-17 (5) to CN103-5 (N2)	No continuity

Judgment

Result	Procedure
NG	**Harness defect**
OK	**Main controller defect**

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Error Code: HC-2

Failure mode: Unload solenoid short abnormality

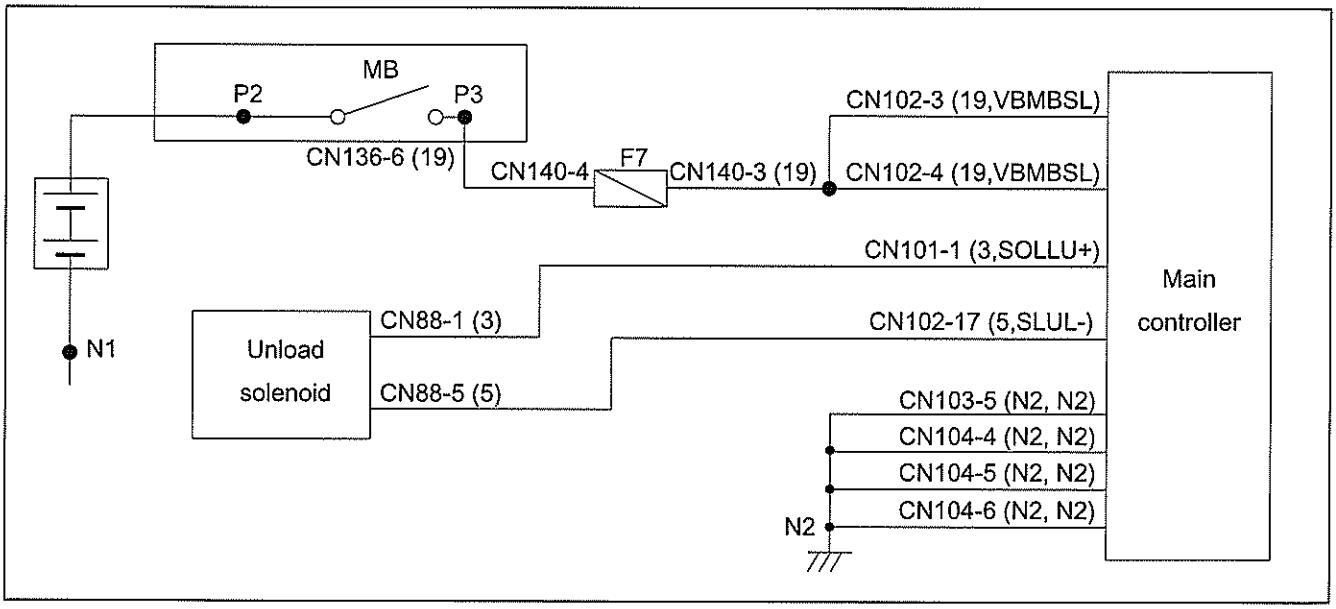
⚠ CAUTION

- **If HC-3 also occurs, disconnect the battery plug at once, perform troubleshooting with priority given to HC-3.**

Probable cause

- Connector contact defect
- Unload solenoid defect
- Harness defect
- Main controller defect

Related portion



STEP1

1 . Turn off the key switch and disconnect the battery plug. Check the inside of connector CN88 and the caulked portion of wire whether it has defect or not by visual confirm. (Refer to BEFORE TROUBLESHOOTING)

2 . After connecting CN88, connect the battery plug and turn on the key switch to confirm error.

Judgment

Result	Procedure
HC-4 error occurs.	**Perform troubleshooting for HC-4.**
HC-4 error does not occur.	Go to step 2

STEP2

Apply the unload solenoid compulsorily by using Active Test and check if an error occurs.

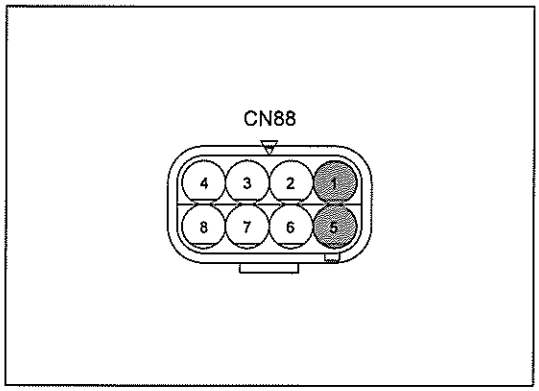
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STD
[ANL] 7 ACT (7 04)
Multi-function display
[ANL] ACTIVE TEST 2/3
UNLOAD SOL : OFF to ON

Judgment

Result	Procedure
HC-2 error does not occur.	**Connector contact defect**
HC-2 error occurs.	Go to step 3

STEP3



Inspection: Unload solenoid individual inspection

1 . Turn off the key switch and disconnect the battery plug.

2 . Disconnect the CN88 connector, and check the resistance of unload solenoid.

[Inspection procedure and standard]

Check the resistance of unload solenoid.

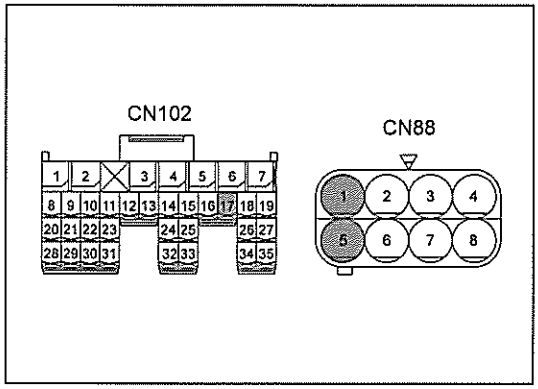
Turn off the key switch and disconnect the battery plug, disconnect the CN88 connector, visually check each terminal and the caulked portion and coating of each cable for defects. (Refer to BEFORE TROUBLESHOOTING)

Portion to be inspected	Standard:
CN88-1 (3) to CN88-5 (5)	Approx. 10 Ω

Judgment

Result	Procedure
NG	**Unload solenoid defect**
OK	Go to step 4

STEP4



Inspection : Harness

Disconnect theCN102 and CN88 connector, then check the harness.

[Inspection procedure and standard]

Inspect for continuity and short circuiting of the harness.

Perform this check with the battery plug and the CN102, CN88 connectors disconnected, and visually check inside the connector and the caulked portion of its wire for defects. Refer to BEFORE TROUBLESHOOTING

Portion to be inspected	Standard:
CN88-1 (3) to CN88-5 (5)	No continuity
CN102-17 (5) to P2	No continuity
CN102-17 (5) to P3	No continuity

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Judgment

Result	Procedure
NG	Harness defect
OK	Main controller defect

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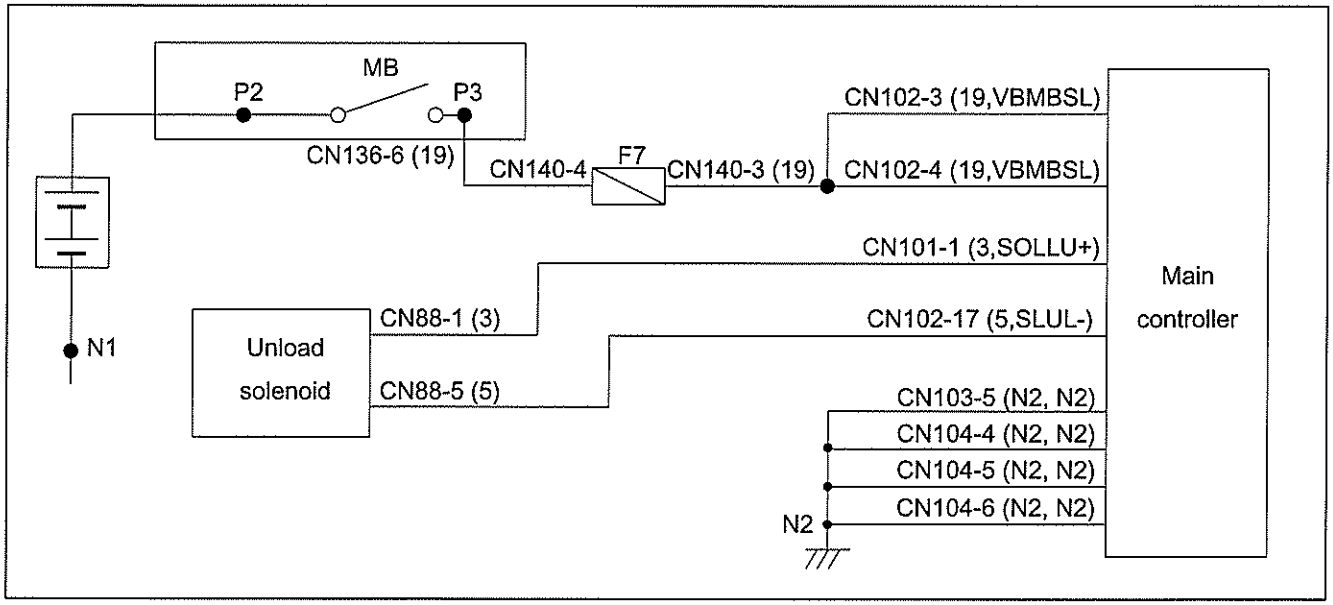
Error Code: HC-3

Failure mode: Unload solenoid drive circuit abnormality

Probable cause

- Unload solenoid defect
- Harness defect
- Main controller defect

Related portion



STEP1

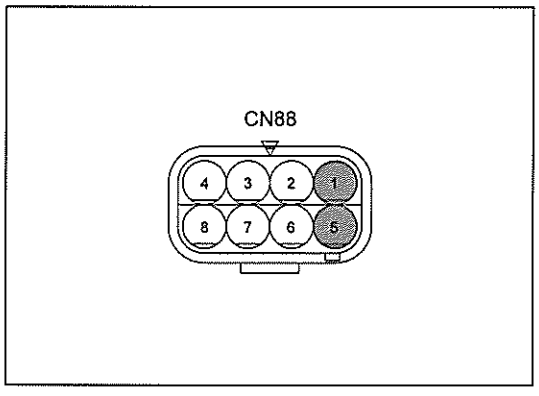
Inspection : Unload solenoid indivisual inspection

1 . Turn off the key switch and disconnect the battery plug.

2 . Disconnect the CN88 connector, and check the resistance of unload solenoid.

[Inspection procedure and standard]

Check the resistance of unload solenoid.



Turn off the key switch and disconnect the battery plug, disconnect the CN88 connector, visually check each terminal and the caulked portion and coating of each cable for defects. (Refer to BEFORE TROUBLESHOOTING)

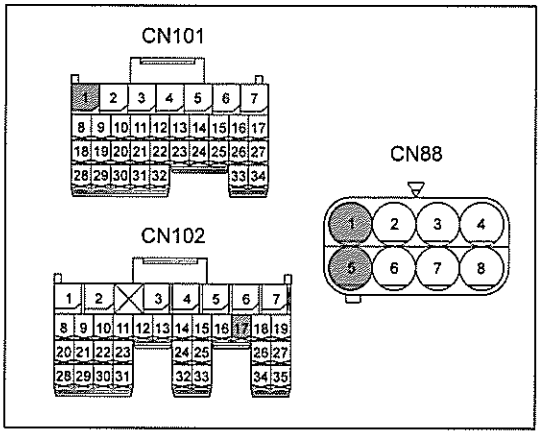
Portion to be inspected	Standard:
CN88-1 (3) to CN88-5 (5)	Approx. 10 Ω

Judgment

Result	Procedure
NG	Go to step 2 **Unload solenoid defect**
OK	Go to step 2

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STEP2



Inspection : Harness

Disconnect the CN101, CN102 and CN88 connector, then check the harness.

[Inspection procedure and standard]

Inspect for continuity and short circuiting of the harness.

Perform this check with the battery plug and the CN101, CN102, CN88 connectors disconnected, and visually check inside the connector and the caulked portion of its wire for defects. Refer to BEFORE TROUBLESHOOTING

Portion to be inspected	Standard:
CN88-1 (3) to CN88-5 (5)	No continuity
CN101-1(3) to CN102-17(5)	No continuity
CN102-17 (5) to P2	No continuity
CN102-17 (5) to P3	No continuity

Judgment

Result	Procedure
NG	**Harness defect** **Main controller defect Replace the main controller with the defective portion in the former step.**
OK	**Main controller defect Replace the main controller with the defective portion in the former step.**

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Error Code: HC-4

Failure mode: Unload solenoid (open / short) abnormality

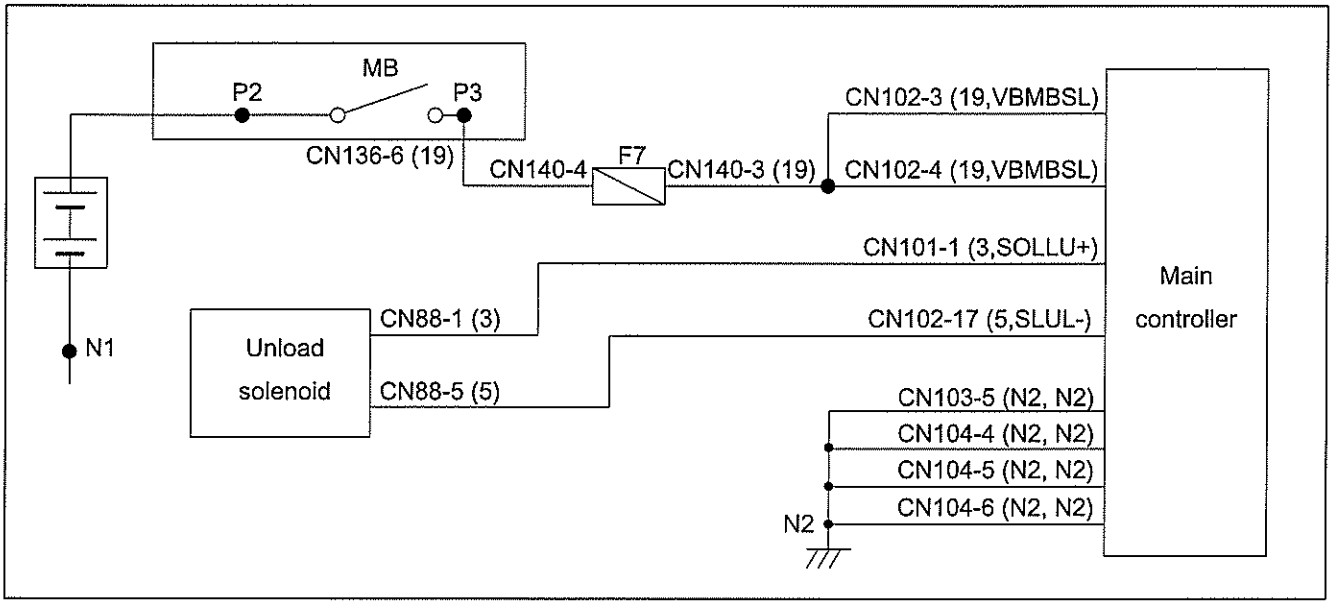
⚠ CAUTION

- **If HC-3 also occurs, disconnect the battery plug at once, perform troubleshooting with priority given to HC-3.**
- **If A9-2 occurs at same time, perform troubleshooting for A9-2 first.**

Probable cause

- Connector contact defect
- Unload solenoid defect
- Harness defect
- Main controller defect

Related portion



STEP1

1 . Turn off the key switch and disconnect the battery plug. Check the inside of connector CN88 and the caulked portion of wire whether it has defect or not by visual confirm. (Refer to BEFORE TROUBLESHOOTING)

2 . After connecting CN88, connect the battery plug and turn on the key switch to confirm error.

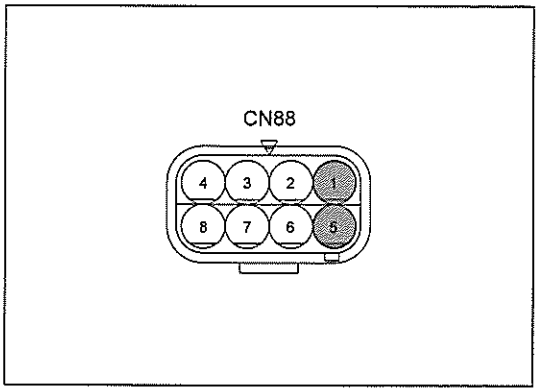
Judgment

Result	Procedure
HC-4 error occurs.	Go to step 2
HC-4 error does not occur.	**Connector contact defect**

STEP2

Inspection: Unload solenoid individual inspection

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1 . Turn off the key switch and disconnect the battery plug.

2 . Disconnect the CN88 connector, and check the resistance of unload solenoid.

[Inspection procedure and standard]

Check the resistance of unload solenoid.

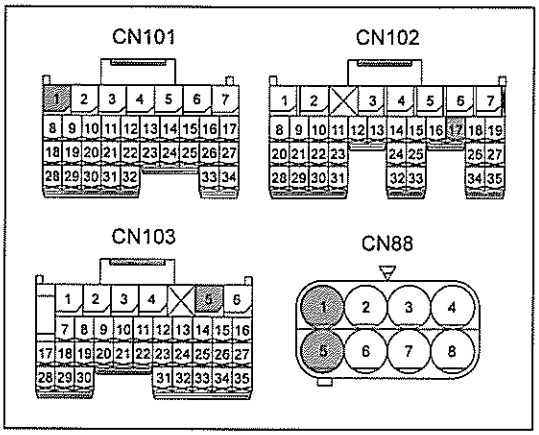
Turn off the key switch and disconnect the battery plug, disconnect the CN88 connector, visually check each terminal and the caulked portion and coating of each cable for defects. (Refer to BEFORE TROUBLESHOOTING)

Portion to be inspected	Standard:
CN88-1 (3) to CN88-5 (5)	Approx. 10 Ω

Judgment

Result	Procedure
NG	**Unload solenoid defect**
OK	Go to step 3

STEP3



Inspection : Harness

Disconnect the CN101, CN102, CN103 and CN88 connector, then check the harness.

[Inspection procedure and standard]

Inspect for continuity and short circuiting of the harness.

Perform this check with the battery plug and the CN101, CN102, CN103, CN88 connectors disconnected, and visually check inside the connector and the caulked portion of its wire for defects. Refer to BEFORE TROUBLESHOOTING

*: Connect the CN88 connector and measure the resistance between CN101-1 and CN102-17. And it is OK if this resistance is approx.10 Ω.

Portion to be inspected	Standard:
CN101-1 (3) to CN88-1 (3)	Continuity *
CN102-17 (5) to CN88-5 (5)	Continuity *
CN88-1 (3) to CN88-5 (5)	No continuity *
CN101-1 (3) to CN103-5 (N2)	No continuity
CN102-17 (5) to CN103-5 (N2)	No continuity

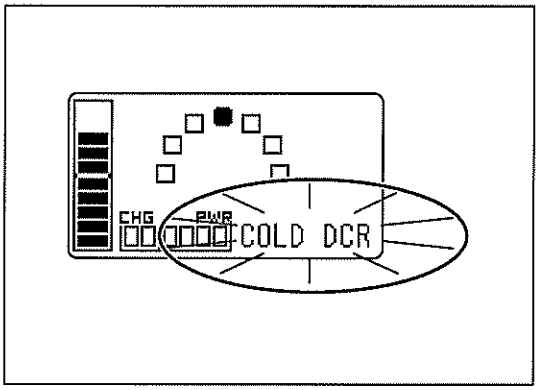
Judgment

Result	Procedure
NG	**Harness defect**
OK	**Main controller defect**

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Error Code: SAFETY MONITOR

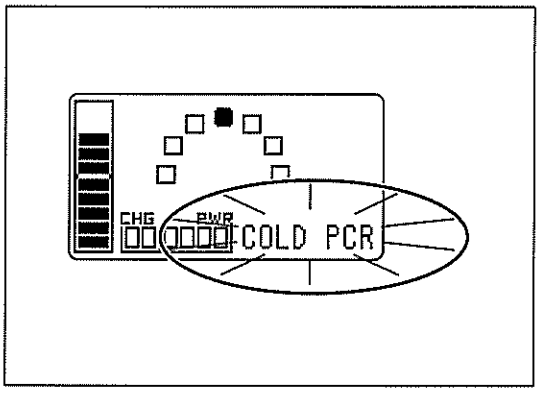
Failure mode: Drive motor driver low temperature



If caution indicator occurs, turn on the key switch, and leave 20 to 30 minutes at normal temperature (0 to 40 °C).

Error Code: SAFETY MONITOR

Failure mode: Pump motor driver low temperature



If caution indicator occurs, turn on the key switch, and leave 20 to 30 minutes at normal temperature (0 to 40 °C).

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4.5 WHEN NO ERROR CODE IS DISPLAYED

Probable causes of problems for which no error code is displayed.
If an error code is displayed or the spanner indicator blinks, be sure to perform checks with priority given to it.

Control systems	Phenomena on the vehicle	Failed portions and failure modes	How to check	Action and remedies
Power-supply related control	Although the key switch or ten-key operation is turned on, power is not supplied. (The display does not appear, and the vehicle does not move, either.)	Emergency switch main body (with Emergency switch) : Switch is held down.	-	▪ Release the emergency switch.
		Battery : Low voltage	Check the battery voltage. : Battery plug is disconnected. Check the battery voltage.	▪ Charge the Battery
		Key switch main body : Open failure Emergency switch main body (with Emergency switch) : Open failure Key switch harness :Wire breakage, short circuit or leakage (harness, connector or F5 fuse)	-	▪ Check the switch, and replace it if necessary ▪ Check the harness and repair or replace it if necessary. ▪ Replace the F5 fuse.
		Numeric keypad harness (with PIN code entry) : Open failure	-	▪ Check the harness and repair or replace it if necessary.
		Numeric keypad main body (with PIN code entry) : Switch failure	Check the operation of each switch. : Check if a response (lighting of LED or sounding of buzzer) is given only to a particular switch. If there are two types of switches: switch to which a response is given and switch to which no response is given in the combination of (1, 2 and 3), (4, 5 and 6), (7, 8 and 9) or (OFF, 0 and ON), it is certain that there is a defective switch.	▪ Replace the numeric keypad.
		Display (with PIN code entry) : PIN not registered	Using the Administrator menu, check if PIN has been registered.	▪ Register PIN using the Administrator menu.

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Control systems	Phenomena on the vehicle	Failed portions and failure modes	How to check	Action and remedies
Power-supply related control	Although the key switch or ten-key operation is turned on, power is not supplied. (The display does not appear, and the vehicle does not move, either.)	Display power supply and ground harness (with PIN code entry) :Wire breakage, short circuit, leakage (harness or connector) Display (with PIN code entry) : Internal failure Main controller : Internal failure (D7V, DGND)	-	▪ Check the harness and repair or replace it if necessary. ▪ Replace the display. ▪ Replace the main controller.
	The display does not appear. (The vehicle runs normally.)	Display power supply and ground harness :Wire breakage, short circuit, leakage (harness or connector) Display : Internal failure Main controller : Internal failure	-	▪ Check the harness and repair or replace it if necessary. ▪ Replace the display. ▪ Replace the main controller.
Traveling	The vehicle does not run (the drive motor does not rotate) or can't run at slope suddenly.	Warm-up operation with running cold protect function.	Confirm the caution indicator and warning tone on the display *Caution indicator is displayed with warning tone and awake to customers in case of running the warm-up operation by used for customer. (e.g. leave long time under low temperature)	*It is not abnormality. Warm-up function may be operated for several seconds when turn on the key switch. Operate after disappeared the warning tone because traveling and handling function can not be operated under warm-up function.
		After the key switch was turned on, the accelerator was not released or the direction switch was not returned to neutral.	-	After the key switch was turned on, release the accelerator and operate neutral for the direction switch once, then operate traveling function. Traveling function can not be operated after detecting the accelerator released and neutral for the direction switch.

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Control systems	Phenomena on the vehicle	Failed portions and failure modes	How to check	Action and remedies
Traveling	The vehicle does not run (the drive motor does not rotate) or can't run at slope suddenly.	Direction switch main body : Open failure Direction switch harness :Wire breakage, short circuit (harness or connector)	Check the direction switch, using Analyzer. : Accelerator is fully closed. Operate the direction switch to see if it turns on and off normally. (The vehicle does not run if the forward and reverse switches are turned on simultaneously.)	▪ Check the switch, and replace it if necessary ▪ Check the harness and repair or replace it if necessary.
		Direction switch installation portions (EZ pedal) : One of the installation portions is broken or damaged or does not operate normally.	Check the operation of the direction switch (microswitch).	▪ Repair or replace the part that does not operate normally.
		Accelerator sensor main body : Internal failure Accelerator sensor installation portion : The link or the installation portion is broken or damaged. Accelerator sensor harness :Wire breakage, short circuit, leakage (harness or connector)	Check the accelerator sensor voltage,using Analyzer. : Direction switch is in neutral. Fully open and close the accelerator pedal to check the change in the input signal.	▪ Check the sensor and replace it if necessary. ▪ Check the harness and repair or replace it if necessary.
		Accelerator fully closed/fully open matching value : No agreement with the vehicle state	Check the matching value on the Matching screen.	▪ Perform matching again.
		Brake switch main body : Internal failure Brake switch installation portion: The link or the installation portion is broken or damaged. Brake switch harness :Wire breakage, short circuit, leakage (harness or connector)	Check the brake sensor voltage,using Analyzer. : Direction switch is in neutral. Fully open and close the brake pedal to check the change in voltage at that time.	▪ Check the switch, and replace it if necessary ▪ Check the harness and repair or replace it if necessary.

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Control systems	Phenomena on the vehicle	Failed portions and failure modes	How to check	Action and remedies
Traveling	The vehicle does not run (the drive motor does not rotate) or can't run at slope suddenly.	Tire angle sensor main body : Internal failure Tire angle sensor installation : The installation portion is broken or damaged. Tire angle sensor harness :Wire breakage, short circuit, leakage (harness or connector)	Check the sensor voltage,using Analyzer. : Direction switch is in neutral. Fully close the accelerator pedal and operate steering wheel to check the change in voltage at that time.	▪ Check the sensor and replace it if necessary. ▪ Check the harness and repair or replace it if necessary.
		Tire angle sensor straight running matching value : No agreement with the vehicle state	Check the matching value on the Matching screen.	▪ Perform matching again.
		Seat switch main body : Open failure Seat switch harness :Wire breakage, (harness or connector)	Seat switch inspection by OPS indicator or Analyzer. With direction lever neutral and accelerator fully open Check ON/OFF by seating or leaving. In case of inspection by OPS indicator, confirm OPS indicator lamp is not burned-out bulb before inspection when turn key off / on.	▪ Check the seat and replace it if necessary. ▪ Check the harness and repair or replace it if necessary.
		Brake : Dragging (internal failure) Drive motor : Seizure or dragging of drive motor (internal failure)	Check the brake and the drive motor. :With the battery plug disconnected, the parking brake released and the front wheels off the ground, rotate each tire to see if it rotates smoothly.	▪ Check the brake, and repair or replace it if necessary. ▪ Check the drive motor, and repair or replace it if necessary.

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Control systems	Phenomena on the vehicle	Failed portions and failure modes	How to check	Action and remedies
Traveling	The vehicle does not run (the drive motor does not rotate) or can't run at slope suddenly.	Main body of drive motor rotation sensor : Internal failure Drive motor rotation sensor installation portion : Gap improperly adjusted Drive motor harness :Wire breakage, short circuit, leakage (harness or connector)	Check the voltage of the drive motor rotation sensor, using Analyzer. : Seated in seat, direction switch in forward position, brake released Operate the accelerator and check the change in the rotation sensor voltage.	▪ Check the drive motor rotation sensor, and adjust or replace it if necessary. ▪ Check the harness and repair or replace it if necessary.
		Drive motor drive circuit : Internal failure Motor cables :Wire breakage, short circuit or leakage (cable or terminal board)	Check the voltage of the drive motor current sensor, using Analyzer. : Seated in seat, direction switch in forward position, brake released Operate the accelerator and check the change in the current sensor voltage.	▪ Check the cable and repair or replace it if necessary. ▪ Replace the drive motor drive circuit.
		Main controller : Internal failure	-	▪ Replace the main controller.

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Control systems	Phenomena on the vehicle	Failed portions and failure modes	How to check	Action and remedies
Traveling control (OPT)	Speed limit applies at high lifting height despite not being loaded	Load sensor main body : Internal damage Load sensor harness :Wire breakage, short circuit, leakage (harness or connector)	Check the load sensor voltage, using Analyzer. : In NL Raise and lower the lift to its uppermost (relief) and lowermost positions to check the change in the voltage.	▪ Check the sensor and replace it if necessary. ▪ Check the harness and repair or replace it if necessary.
		Display setting : The setting of tire diameter data is not in agreement with that of the vehicle state.	Check the matching value on the tire diameter data screen.	▪ Correct the setting
		Heavy attachment, mast with a high lifting height.	-	▪ In traveling control, the attachment weight and the mast weight are treated as part of the load weight, because they affect the longitudinal stability of the vehicle. For a very heavy mast or an FSV or FV mast with a high lifting height, if its inner middle mast is rather heavy, a limit may sometimes be placed on the speed even under noload conditions.

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Control systems	Phenomena on the vehicle	Failed portions and failure modes	How to check	Action and remedies
Traveling control (OPT)	Speed limit applies at high lifting height despite not being loaded	Lift relief pressure detected.	-	When the lift is raised to its uppermost position, the load sensor cannot distinguish this situation from a situation in which a heavy load is carried, because, in that situation, a relief pressure remains in the lift cylinder pressure that the load sensor senses. After a lift relief, however, it becomes possible to perform operation because the relief pressure is discharged when the lift is lowered even a little.
		Main controller : Internal failure	-	▪ Replace the main controller.
	Although a load is carried, the speed is not limited when the lift is raised high.	Load sensor main body : Internal damage Load sensor harness :Wire breakage, short circuit, leakage (harness or connector)	Check the lifting height switch, using Analyzer. : In NL Raise and lower the lift to its uppermost (relief) and lowermost positions to check the change in the voltage.	▪ Check the sensor and replace it if necessary. ▪ Check the harness and repair or replace it if necessary.
		Lifting height switch main body : Low lifting height is always detected. Lifting switch harness :Wire breakage, short circuit (harness or connector)	Check the lifting height switch, using Analyzer. : In NL Raise and lower the lift to its uppermost and lowermost positions to see if the switch turns on and off normally.	▪ Check the switch, and replace it if necessary ▪ Check the harness and repair or replace it if necessary.
		Display setting : Height / load sensing traveling control : "NO" (invalidity) setting Speed limit of height / load sensing traveling control : "A" (invalidity) setting (option set ASC W/ LOAD, MODE)	Check the set value on the Option Set screen.	▪ Change the setting. : Height / load sensing traveling control : "YES" (valid) setting Speed limit of height / load sensing traveling control : "S" (valid) setting

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Control systems	Phenomena on the vehicle	Failed portions and failure modes	How to check	Action and remedies
Traveling control (OPT)	Although a load is carried, the speed is not limited when the lift is raised high.	Display setting : The setting of tire diameter data is not in agreement with that of the vehicle state.	Check the matching value on the tire diameter data screen.	▪ Correct the setting
		Main controller : Internal failure	-	▪ Replace the main controller.
Traveling control (OPT)	Speed limit applies when loaded despite being at a low lifting height	Lifting height switch main body : Low lifting height is always detected. Lifting switch harness :Wire breakage, short circuit (harness or connector)	Check the lifting height switch, using Analyzer. : In NL Raise and lower the lift to its uppermost and lowermost positions to see if the switch turns on and off normally.	▪ Check the switch, and replace it if necessary ▪ Check the harness and repair or replace it if necessary.
		Main controller : Internal failure	-	▪ Replace the main controller.
	A limit is always placed on the speed regardless of whether a load is carried or not.	Display setting :Maximum speed limit is set very low.	Check the setting value by the screen of speed limit, low speed setting.	▪ Correct the setting
		Display setting : The setting of tire diameter data is not in agreement with that of the vehicle state.	Check the matching value on the tire diameter data screen.	▪ Correct the setting
		Main controller : Internal failure	-	▪ Replace the main controller.

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Control systems	Phenomena on the vehicle	Failed portions and failure modes	How to check	Action and remedies
Turn speed control	The vehicle lacks stability during traveling. (The speed limit does not activate easily or at all during turning.)	Tire specification : Type, diameter, tire pressure	-	▪ Check the tires and replace them if necessary ▪ Check the pressure of each tire and repair tires if necessary.
		Load sensor main body : Internal damage Load sensor harness :Wire breakage, short circuit, leakage (harness or connector)	Check the load sensor voltage, using Analyzer. : In NL Raise and lower the lift to its uppermost (relief) and lowermost positions to check the change in the voltage.	▪ Check the sensor and replace it if necessary. ▪ Check the harness and repair or replace it if necessary.
		Load sensor no-load matching value : No agreement with the vehicle state	Check the matching value on the Matching screen.	▪ Perform matching again.
		Lifting height switch main body : Low lifting height is always detected. Lifting switch harness :Wire breakage, short circuit (harness or connector)	Check the lifting height switch, using Analyzer. : In NL Raise and lower the lift to its uppermost and lowermost positions to see if the switch turns on and off normally.	▪ Check the switch, and replace it if necessary ▪ Check the harness and repair or replace it if necessary.
		Tire angle sensor main body : Internal failure Tire angle sensor installation : The installation portion is broken or damaged. Tire angle sensor harness :Wire breakage, short circuit, leakage (harness or connector)	Check the sensor voltage,using Analyzer. : Direction switch is in neutral. Fully close the accelerator pedal and operate steering wheel to check the change in voltage at that time.	▪ Check the sensor and replace it if necessary. ▪ Check the harness and repair or replace it if necessary.

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Control systems	Phenomena on the vehicle	Failed portions and failure modes	How to check	Action and remedies
Turn speed control	The vehicle lacks stability during traveling. (The speed limit does not activate easily or at all during turning.)	Tire angle sensor straight running matching value : No agreement with the vehicle state	Check the matching value on the Matching screen.	▪ Perform matching again.
		Main body of drive motor rotation sensor : Internal failure Drive motor rotation sensor harness :Wire breakage, short circuit, leakage (harness or connector) Drive motor drive circuit : Internal failure	-	▪ Check the sensor and replace it if necessary. ▪ Check the harness and repair or replace it if necessary. ▪ Replace the drive motor drive circuit.
		Display setting : The setting of tire diameter data is not in agreement with that of the vehicle state.	Check the matching value on the tire diameter data screen.	▪ Correct the setting
		Main controller : Internal failure	-	▪ Replace the main controller.
Load handling and power steering	Load handling cannot be performed and the steering is heavy. (The pump motor does not work for material handling operation, steering operation and direction switch operation.)	Warm-up operation with running cold protect function.	Confirm the caution indicator and warning tone on the display *Caution indicator is displayed with warning tone and awake to customers in case of running the warmup operation by used for customer. (e.g. leave long time under low temperature)	*It is not abnormality. Warm-up function may be operated for several seconds when turn on the key switch. Operate after disappeared the warning tone because traveling and handling function can not be operated under warm-up function.

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Control systems	Phenomena on the vehicle	Failed portions and failure modes	How to check	Action and remedies
Load handling and power steering	Load handling cannot be performed and the steering is heavy. (The pump motor does not work for material handling operation, steering operation and direction switch operation.)	Main body of pump motor rotation sensor : Internal failure Pump motor rotation sensor installation portion : Gap improperly adjusted Pump motor harness :Wire breakage, short circuit, leakage (harness or connector)	Check the voltage of the pump motor rotation sensor, using Analyzer. : Seated in the seat Operate the direction switch and check the change in the rotation sensor voltage.	▪ Check the pump motor rotation sensor, and adjust or replace it if necessary. ▪ Check the harness and repair or replace it if necessary.
		Pump motor drive circuit : Internal failure Motor cables :Wire breakage, short circuit or leakage (cable or terminal board)	Check the voltage of the pump motor current sensor, using Analyzer. : Seated in the seat Operate the direction switch and check the change in the current sensor voltage.	▪ Check the motor cables, and repair or replace them if necessary. ▪ Replace the pump motor drive circuit.
		Pump : Seizure Pump motor : Seizure	-	▪ Check the pump, and repair or replace it if necessary. ▪ Check the pump motor, and repair or replace it if necessary.
Load handling and power steering	Load handling cannot be performed and the steering is heavy. (The pump motor does not work for material handling operation, steering operation and direction switch operation.)	Main controller : Internal failure	-	▪ Replace the main controller.

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Control systems	Phenomena on the vehicle	Failed portions and failure modes	How to check	Action and remedies
Load handling and power steering	Only load handling cannot be performed. (The pump motor operates normally during steering operation and direction switch operation.)	Main body of load handling lever potentiometer : Internal failure Installation of load handling lever potentiometer : Installation portion is broken or damaged. Load handling lever potentiometer harness :Wire breakage, short circuit, leakage (harness or connector)	Measure the voltage of the load handling lever potentiometer, using Analyzer. : Leave the seat Tilt the load handling lever forward and backward to check the change in voltage.	▪ Check the sensor and replace it if necessary. ▪ Check the harness and repair or replace it if necessary.
		Main body of tilt forward/ backward switch (Conventional lever) : Internal failure Installation of tilt forward/ backward switch (Conventional lever) : Installation portion is broken or damaged. Tilt forward/backward switch harness (Conventional lever) :Wire breakage, short circuit, leakage (harness or connector)	Check the tilt forward/ backward switch, using Analyzer. : Leave the seat Operate the tilt lever forward to backward position to check the switch turns on and off normally.	▪ Check the switch, and replace it if necessary ▪ Check the harness and repair or replace it if necessary.
		Seat switch main body : Open failure Seat switch harness :Wire breakage, (harness or connector)	Seat switch inspection by OPS indicator or Analyzer. :Material handing lever neutral Confirm ON/OFF by sitting / leaving seat In case of inspection by OPS indicator, confirm OPS indicator lamp is not burned-out bulb before inspection when turn key off / on.	▪ Check the seat and replace it if necessary. ▪ Check the harness and repair or replace it if necessary.

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Control systems	Phenomena on the vehicle	Failed portions and failure modes	How to check	Action and remedies
Load handling and power steering	Only load handling cannot be performed. (The pump motor operates normally during steering operation and direction switch operation.)	Oil control valve (Conventional lever) : Seizure of or leakage from unload valve Harness of unload valve solenoid (Conventional lever) :Wire breakage, short circuit, leakage (harness or connector)	-	▪ Check the oil control valve, and repair or replace it if necessary. Refer to repair manual vol.1 "TROUBLESHOOTING" of oil control valve ▪ Check the unload valve solenoid and replace it if necessary. ▪ Check the harness and repair or replace it if necessary.
		Pump : Leak Priority valve : Leak, seizure	-	▪ Check the pump, and repair or replace it if necessary. ▪ Check the priority valve, and repair or replace it if necessary. Refer to repair manual vol.1 "TROUBLESHOOTING" of oil control valve.
		Main controller : Internal failure	-	▪ Replace the main controller.
	Only lowering is impossible. (Other load handling operations,including raising, are possible.)	Lowering lock valve : Seizure (internal damage)	If a current flows, turn on the lowering lock solenoid using Active Test to lower the fork.	▪ Check the lowering lock valve, and repair or replace it if necessary.
	Only forward tilting is impossible. (Other load handling operations,including backward tilting, are possible.)	Tilt control valve : Seizure (internal damage)	If a current flows, turn on the tilt control solenoid using Active Test to forward the fork.	▪ Check the tilt control valve, and repair or replace it if necessary.
	Delay of moving load handling Or the play of load handling lever is large until moving (Mini lever / Joy stick spec.)	Display setting : The setting of OCV activation current is not in agreement with that of the vehicle state.	Check the OCV activation current value on the Matching screen.	▪ After modify the setting value, perform re-matching. Adjust activation current of turning after setting the OCV activation current.

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Control systems	Phenomena on the vehicle	Failed portions and failure modes	How to check	Action and remedies
Load handling and power steering	The steering is heavy. (The pump motor operates normally during material handling.)	Direction switch : Open failure Direction switch harness :Wire breakage (harness or connector)	Check the direction switch, using Analyzer . : Accelerator is fully closed. Operate the directions witch to see if it turns on and off normally.	▪ Check the switch, and replace it if necessary ▪ Check the harness and repair or replace it if necessary.
		Main body of steering angle sensor : Internal damage Installation of steering angle sensor : Cam or steering wheel is defective. Steering angle sensor harness :Wire breakage, short circuit, leakage (harness or connector)	Check the steering angle sensor, using Analyzer. : Turn the steering wheel to check the input signal.	▪ Check the sensor and replace it if necessary. ▪ Check the harness and repair or replace it if necessary.
		Pump : Leak Priority valve : Leak, seizure PS valve : Leak, seizure	-	▪ Check the pump, and repair or replace it if necessary. ▪ Check the priority valve, and repair or replace it if necessary. Refer to repair manual vol.1 "TROUBLESHOOTING" of oil control valve. ▪ Check the PS valve, and repair or replace it if necessary. Refer to repair manual vol.1 "TROUBLESHOOTING" of steering.
		Main controller : Internal failure	-	▪ Replace the main controller.
	Although ATT1 (ATT2) is operated, no operation is performed. (Pump motor is not rotated at ATT operation)	Display setting : The serial number setting is not in agreement with that of the vehicle. (OCV WAY)	Check the set value on the Option Set screen.	Set the setting for the truck specification

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Control systems	Phenomena on the vehicle	Failed portions and failure modes	How to check	Action and remedies
Tilt control	When tilted forward for leveling, the fork does not stop automatically in a horizontal position. (The fork tilts to its forward tilt limit without stopping in a horizontal position.)	Main body of tilt angle sensor : Internal damage Tilt angle sensor installation : The link or the installation portion is broken or damaged. Tilt angle sensor harness :Wire breakage, short circuit, leakage (harness or connector)	Check the tilt angle sensor voltage, using Analyzer. : In NL Tilt the mast to its forward and backward tilt limits to check the change in voltage.	▪ Check the sensor, and adjust or replace it if necessary. ▪ Check the harness and repair or replace it if necessary.
		Tilt angle sensor horizontal matching value : No agreement with the vehicle state	Check the matching value on the Matching screen.	▪ Perform matching again.
		Main body of automatic fork leveling switch : Open failure Mechanical detection unit of automatic fork leveling switch : Gap in detection unit is improperly adjusted. Automatic fork leveling switch harness :Wire breakage, short circuit (harness or connector)	Check the automatic fork leveling switch, using Analyzer. : Load handling lever in neutral Operate the automatic fork leveling switch to see if it turns on and off normally.	▪ Check the switch, and replace it if necessary ▪ Check the harness and repair or replace it if necessary.
		Oil control valve : Seizure of or leakage from tilt control valve Tilt solenoid harness :Short circuit, leakage (harness or connector)	Check the tilt control valve, using Active Test. : Tilt forward solenoid forcibly turned off (forward tilting stopped) Tilt the fork forward to check the operation.	▪ Check the oil control valve, and repair or replace it if necessary. Refer to repair manual vol.1 "TROUBLESHOOTING" of oil control valve ▪ Check the solenoid and replace it if necessary. ▪ Check the harness and repair or replace it if necessary.
		Main controller : Internal failure	-	▪ Replace the main controller.

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Control systems	Phenomena on the vehicle	Failed portions and failure modes	How to check	Action and remedies
Tilt control	When the fork tilted forward for leveling, it does not stop automatically in a horizontal position. (The fork does not stop in a horizontal position.)	Main body of tilt angle sensor : Internal damage Tilt angle sensor installation : The link or the installation portion is broken or damaged. Tilt angle sensor harness :Wire breakage, short circuit, leakage (harness or connector)	Check the tilt angle sensor voltage, using Analyzer. : In NL Tilt the mast to its forward and backward tilt limits to check the change in voltage.	▪ Check the sensor, and adjust or replace it if necessary. ▪ Check the harness and repair or replace it if necessary.
		Tilt angle sensor horizontal matching value : No agreement with the vehicle state	Check the matching value on the Matching screen.	▪ Perform matching again.
		Load sensor main body : Internal damage Load sensor harness :Wire breakage, short circuit, leakage (harness or connector)	Check the load sensor voltage, using Analyzer. : In NL Raise and lower the lift to its uppermost (relief) and lowermost positions to check the change in the voltage.	▪ Check the sensor and replace it if necessary. ▪ Check the harness and repair or replace it if necessary.
		Load sensor no-load matching value : No agreement with the vehicle state	Check the matching value on the Matching screen.	▪ Perform matching again.
		Main controller : Internal failure	-	▪ Replace the main controller.

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Control systems	Phenomena on the vehicle	Failed portions and failure modes	How to check	Action and remedies
Tilt control	When the fork tilted forward for leveling, it does not stop automatically in a horizontal position. (The fork does not stop in a horizontal position.)	Main body of tilt angle sensor : Internal damage Tilt angle sensor installation : The link or the installation portion is broken or damaged. Tilt angle sensor harness :Wire breakage, short circuit, leakage (harness or connector)	Check the tilt angle sensor voltage, using Analyzer. : In NL Tilt the mast to its forward and backward tilt limits to check the change in voltage.	▪ Check the sensor, and adjust or replace it if necessary. ▪ Check the harness and repair or replace it if necessary.
		Tilt angle sensor horizontal matching value : No agreement with the vehicle state	Check the matching value on the Matching screen.	▪ Perform matching again.
		Load sensor main body : Internal damage Load sensor harness :Wire breakage, short circuit, leakage (harness or connector)	Check the load sensor voltage, using Analyzer. : In NL Raise and lower the lift to its uppermost (relief) and lowermost positions to check the change in the voltage.	▪ Check the sensor and replace it if necessary. ▪ Check the harness and repair or replace it if necessary.

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Control systems	Phenomena on the vehicle	Failed portions and failure modes	How to check	Action and remedies
Tilt control	When the fork tilted forward for leveling, it does not stop automatically in a horizontal position. (The fork does not stop in a horizontal position.)	Load sensor no-load matching value : No agreement with the vehicle state	Check the matching value on the Matching screen.	▪ Perform matching again.
		Lifting height switch main body : High lifting height is always detected. Lifting switch harness :Wire breakage, short circuit (harness or connector)	Check the lifting height switch, using Analyzer. : In NL Raise and lower the lift to its uppermost and lowermost positions to see if the switch turns on and off normally.	▪ Check the switch, and replace it if necessary ▪ Check the harness and repair or replace it if necessary.
		Main controller : Internal failure	-	▪ Replace the main controller.
	When tilted backward for leveling, the fork does not stop automatically in a horizontal position. (The fork tilts to its backward tilt limit without stopping in a horizontal position.) (Mini lever / Joy stick lever spec.)	Main body of tilt angle sensor : Internal damage Tilt angle sensor installation : The link or the installation portion is broken or damaged. Tilt angle sensor harness :Wire breakage, short circuit, leakage (harness or connector)	Check the tilt angle sensor voltage, using Analyzer. : In NL Tilt the mast to its forward and backward tilt limits to check the change in voltage.	▪ Check the sensor, and adjust or replace it if necessary. ▪ Check the harness and repair or replace it if necessary.
		Tilt angle sensor horizontal matching value : No agreement with the vehicle state	Check the matching value on the Matching screen.	▪ Perform matching again.
Tilt control	When tilted backward for leveling, the fork does not stop automatically in a horizontal position. (The fork tilts to its backward tilt limit without stopping in a horizontal position.) (Mini lever / Joy stick lever spec.)	Main body of automatic fork leveling switch : Open failure Mechanical detection unit of automatic fork leveling switch : Gap in detection unit is improperly adjusted. Automatic fork leveling switch harness :Wire breakage, short circuit (harness or connector)	Check the automatic fork leveling switch, using Analyzer. : Load handling lever in neutral Operate the automatic fork leveling switch to see if it turns on and off normally.	▪ Check the sensor and replace it if necessary. ▪ Check the harness and repair or replace it if necessary.
		Main controller : Internal failure	-	▪ Replace the main controller.

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Control systems	Phenomena on the vehicle	Failed portions and failure modes	How to check	Action and remedies
Tilt control	When the fork tilted backward for leveling, it does not stop automatically in a horizontal position. (The fork does not stop in a horizontal position.) (Mini lever / Joy stick lever spec.)	Refer to "When the fork tilted forward for leveling, it does not stop automatically in a horizontal position. (The fork does not stop in a horizontal position.)"	-	-
		Main body of tilt angle sensor : Internal damage Tilt angle sensor installation : The link or the installation portion is broken or damaged. Tilt angle sensor harness :Wire breakage, short circuit, leakage (harness or connector)	Check the tilt angle sensor voltage, using Analyzer. : In NL Tilt the mast to its forward and backward tilt limits to check the change in voltage.	▪ Check the sensor, and adjust or replace it if necessary. ▪ Check the harness and repair or replace it if necessary.
		Tilt angle sensor horizontal matching value : No agreement with the vehicle state	Check the matching value on the Matching screen.	▪ Perform matching again.
		Main controller : Internal failure	-	▪ Replace the main controller.
	The mast backward tilting speed is not limited.	Main body of automatic fork leveling switch : Open failure Mechanical detection unit of automatic fork leveling switch : Gap in detection unit is improperly adjusted. Automatic fork leveling switch harness :Wire breakage, short circuit (harness or connector)	Check the automatic fork leveling switch, using Analyzer. : Load handling lever in neutral Operate the automatic fork leveling switch to see if it turns on and off normally.	▪ Check the sensor and replace it if necessary. ▪ Check the harness and repair or replace it if necessary.
		Lifting height switch main body : High lifting height is always detected. Lifting switch harness :Wire breakage, short circuit (harness or connector)	Check the lifting height switch, using Analyzer. : In NL Raise and lower the lift to its uppermost and lowermost positions to see if the switch turns on and off normally.	▪ Check the switch, and replace it if necessary ▪ Check the harness and repair or replace it if necessary.
		Main controller : Internal failure	-	▪ Replace the main controller.

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Control systems	Phenomena on the vehicle	Failed portions and failure modes	How to check	Action and remedies
Tilt control	The mast backward tilting speed is always slow.	Main body of automatic fork leveling switch : Short circuit Mechanical detection unit of automatic fork leveling switch : Gap in detection unit is improperly adjusted. Automatic fork leveling switch harness :Short circuit (harness or connector)	Check the automatic fork leveling switch, using Analyzer. : Load handling lever in neutral Operate the automatic fork leveling switch to see if it turns on and off normally.	▪ Check the switch, and replace it if necessary ▪ Check the harness and repair or replace it if necessary.
		Oil control valve : Seizure of or leakage from tilt control valve Tilt control solenoid harness :Short circuit, leakage (harness or connector)	Check the tilt control lock valve, using Active Test. : Tilt control solenoid forcibly turned off (No backward tilting speed limit) Tilt the fork backward to check the operation.	▪ Check the oil control valve, and repair or replace it if necessary. Refer to repair manual vol.1 "TROUBLESHOOTING" of oil control valve ▪ Check the solenoid and replace it if necessary. ▪ Check the harness and repair or replace it if necessary.
		Lifting height switch main body : High lifting height is always detected. Lifting switch harness :Wire breakage, short circuit (harness or connector)	Check the lifting height switch, using Analyzer. : In NL Raise and lower the lift to its uppermost and lowermost positions to see if the switch turns on and off normally.	▪ Check the switch, and replace it if necessary ▪ Check the harness and repair or replace it if necessary.
		Main controller : Internal failure	-	▪ Replace the main controller.

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Control systems	Phenomena on the vehicle	Failed portions and failure modes	How to check	Action and remedies
Tilt control	Although the load is lifted high, the mast forward tilting speed is not limited.	Display setting : Forward tilting speed setting (T F-SPD LIM)	Check the set value on the Option Set screen.	▪ Change the setting. :Forward speed limit control : "YES" (valid) setting
		Lifting height switch main body : Low lifting height is always detected. Lifting switch harness :Wire breakage, short circuit (harness or connector)	Check the lifting height switch, using Analyzer. : In NL Raise and lower the lift to its uppermost and lowermost positions to see if the switch turns on and off normally.	▪ Check the switch, and replace it if necessary ▪ Check the harness and repair or replace it if necessary.
		Main controller : Internal failure	-	▪ Replace the main controller.
Tilt control	The mast forward tilting speed is always slow.	Lifting height switch main body : High lifting height is always detected. Lifting switch harness :Wire breakage, short circuit (harness or connector)	Check the lifting height switch, using Analyzer. : In NL Raise and lower the lift to its uppermost and lowermost positions to see if the switch turns on and off normally.	▪ Check the switch, and replace it if necessary ▪ Check the harness and repair or replace it if necessary.
		Oil control valve : Seizure of or leakage from tilt control valve Tilt control solenoid harness :Short circuit, leakage (harness or connector)	Check the tilt control valve, using Active Test. : Tilt control solenoid forcibly turned off (No backward tilting speed limit) Tilt the fork backward to check the operation.	▪ Check the oil control valve, and repair or replace it if necessary. Refer to repair manual vol.1 "TROUBLESHOOTING" of oil control valve ▪ Check the solenoid and replace it if necessary. ▪ Check the harness and repair or replace it if necessary.
		Main controller : Internal failure	-	▪ Replace the main controller.

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Control systems	Phenomena on the vehicle	Failed portions and failure modes	How to check	Action and remedies
Knob position compensation control (OPT)	The knob is displaced from its normal position to a certain position. (10° or more from the straight running position)	Tire angle sensor main body : Internal failure Tire angle sensor installation : The installation portion is broken or damaged. Tire angle sensor harness :Wire breakage, short circuit, leakage (harness or connector)	Check the sensor voltage,using Analyzer. : Direction switch is in neutral. Fully close the accelerator pedal and operate steering wheel to check the change in voltage at that time.	▪ Check the sensor and replace it if necessary. ▪ Check the harness and repair or replace it if necessary.
		Tire angle sensor straight running matching value : No agreement with the vehicle state	Check the matching value on the Matching screen.	▪ Perform matching again.
		Main body of steering angle sensor : Internal damage Installation of steering angle sensor : Cam or steering wheel is defective. Steering angle sensor harness :Wire breakage, short circuit, leakage (harness or connector)	Check the steering angle sensor, using Analyzer. : Turn the steering wheel to check the input signal.	▪ Check the sensor and replace it if necessary. ▪ Check the harness and repair or replace it if necessary.

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Control systems	Phenomena on the vehicle	Failed portions and failure modes	How to check	Action and remedies
Knob position compensation control (OPT)	The knob is displaced from its normal position to a certain position. (10° or more from the straight running position)	Knob position compensation valve main body : Leakage, seizure (internal damage) Harness of knob position compensation solenoid :Wire breakage, short circuit, leakage (harness or connector)	Check the knob position compensation valve, using Active Test. : Tire end Forcibly turn on (bypass) and off (no bypass) the knob position compensation solenoid to check how the steering system operates. Forcibly ON ... Steering idles (light). Forcibly OFF ... Steering does not idles (heavy).	▪ Check the the knob position compensation valve, and repair or replace it if necessary. ▪ Check the solenoid and replace it if necessary. ▪ Check the harness and repair or replace it if necessary.
		The road surface is inclined.	-	If run on the road surface inclined to right and left, the knob position to run straight is different from it at the horizontal surface.
		Main controller : Internal failure	-	▪ Replace the main controller.
	The knob is displaced from its normal position. (The knob position is not constant during straight running.)	Tire angle sensor main body : Internal failure Tire angle sensor installation : The installation portion is broken or damaged. Tire angle sensor harness :Wire breakage, short circuit, leakage (harness or connector)	Check the sensor voltage,using Analyzer. : Direction switch is in neutral. Fully close the accelerator pedal and operate steering wheel to check the change in voltage at that time.	▪ Check the sensor and replace it if necessary. ▪ Check the harness and repair or replace it if necessary.
		Tire angle sensor straight running matching value : No agreement with the vehicle state	Check the matching value on the Matching screen.	▪ Perform matching again.
		Main body of steering angle sensor : Internal damage Installation of steering angle sensor : Cam or steering wheel is defective. Steering angle sensor harness :Wire breakage, short circuit, leakage (harness or connector)	Check the steering angle sensor, using Analyzer. : Turn the steering wheel to check the input signal.	▪ Check the sensor and replace it if necessary. ▪ Check the harness and repair or replace it if necessary.

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Control systems	Phenomena on the vehicle	Failed portions and failure modes	How to check	Action and remedies
Knob position compensation control (OPT)	The knob is displaced from its normal position. (The knob position is not constant during straight running.)	Knob position compensation valve main body : Leakage, seizure (internal damage) Harness of knob position compensation solenoid :Wire breakage, short circuit, leakage (harness or connector)	Check the knob position compensation valve, using Active Test. : Tire end Forcibly turn on (bypass) and off (no bypass) the knob position compensation solenoid to check how the steering system operates. Forcibly ON ... Steering idles (light). Forcibly OFF ... Steering does not idles (heavy).	▪ Check the the knob position compensation valve, and repair or replace it if necessary. ▪ Check the solenoid and replace it if necessary. ▪ Check the harness and repair or replace it if necessary.
		PS cylinder system link is defective. : Eccentric pin or kingpin is defective	-	▪ Check the cylinder, and repair or replace it if necessary.
		Main controller : Internal failure	-	▪ Replace the main controller.

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Control systems	Phenomena on the vehicle	Failed portions and failure modes	How to check	Action and remedies
OPS	Neither traveling OPS nor load handling OPS operates.	Seat switch main body : Short failure Seat switch harness :Short circuit (harness or connector)	Seat switch inspection by OPS indicator or Analyzer. With direction lever neutral and accelerator fully open Check ON/OFF by seating or leaving. In case of inspection by OPS indicator, confirm OPS indicator lamp is not burned-out bulb before inspection when turn key off / on.	▪ Check the switch, and replace it if necessary ▪ Check the harness and repair or replace it if necessary.
		Main controller : Internal failure	-	▪ Replace the main controller.
	Only traveling OPS does not operate.	Drive motor drive circuit : Internal failure	-	▪ Replace the drive motor drive circuit.
		Main controller : Internal failure	-	▪ Replace the main controller.
	Only load handling OPS does not operate.	Oil control valve : Seizure of or leakage from tilt control valve Tilt control solenoid harness :Short circuit, leakage (harness or connector)	Check the tilt control valve, using Active Test. : Tilt control solenoid forcibly turned off (forward tilting stopped) Tilt the fork forward to check the operation.	▪ Check the oil control valve, and repair or replace it if necessary. Refer to repair manual vol.1 "TROUBLESHOOTING" of oil control valve ▪ Check the solenoid and replace it if necessary. ▪ Check the harness and repair or replace it if necessary.

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Control systems	Phenomena on the vehicle	Failed portions and failure modes	How to check	Action and remedies
OPS	Only load handling OPS does not operate.	Oil control valve : Seizure of or leakage from lift lower lock valve Lift lock solenoid harness :Short circuit, leakage (harness or connector)	Check the lift lower lock valve, using Active Test. : Lift lower lock solenoid forcibly turned off (lifting stopped) Lower the lift to check the operation.	▪ Check the oil control valve, and repair or replace it if necessary. Refer to repair manual vol.1 "TROUBLESHOOTING" of oil control valve ▪ Check the solenoid and replace it if necessary. ▪ Check the harness and repair or replace it if necessary.
		Oil control valve (Conventional lever) : Seizure or leakage from unload valve Harness of unload valve solenoid (Conventional lever) :Wire breakage, short circuit, leakage (harness or connector)	Check the unload valve, using Active Test. : Unload solenoid forcibly turned on (lifting stopped) Lower the lift to check the operation.	▪ Check the oil control valve, and repair or replace it if necessary. Refer to repair manual vol.1 "TROUBLESHOOTING" of oil control valve ▪ Check the solenoid and replace it if necessary. ▪ Check the harness and repair or replace it if necessary.
		Main controller : Internal failure	-	▪ Replace the main controller.

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Control systems	Phenomena on the vehicle	Failed portions and failure modes	How to check	Action and remedies
Display / Multifunction display DX(OPT)	[Diagnostic mode indicator] Although no error code is displayed, the spanner indicator is left on.	One of the following matching operations is not performed. ▪ Tire straight running angle matching ▪ Forward tilt limit angle matching ▪ Tilt horizontal angle matching ▪ Tilt no-load matching ▪ Mast type data matching ▪ Accelerator pedal fully open matching ▪ Accelerator pedal fully closed matching ▪ Each load handling lever: neutral voltage matching ▪ Tire diameter data	Check the matching value on the Matching screen.	▪ Perform the re-matching with correct condition * If accelerator pedal fully closed and fully open matching is finished by simply performing fully closed matching and fully open matching in this order, the setting will not be saved.
Multifunction display DX(OPT)	[Speedometer] Speed is not displayed	Display setting : Wheel indicator displayed : "C" (displaying all the time) setting (option set WHEEL IND)	Check the set value on the Option Set screen.	▪ Change the setting. : Wheel indicator displayed "B" (displaying when speed 0km/h) setting

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Control systems	Phenomena on the vehicle	Failed portions and failure modes	How to check	Action and remedies
Multifunction display DX(OPT)	[Wheel indicator] Not displayed despite stopping.	Display setting :Wheel indicator displayed "A" (Nothing) setting (Option set WHEEL IND)	Check the set value on the Option Set screen.	▪ Change the setting. : Wheel indicator displayed "B" (displaying when speed 0km/h) setting
	[Wheel indicator] Wheel indicator don't display the straight line after traveling straight.	Tire :Type, diameter, air pressure	-	▪ Check the tires and replace them if necessary ▪ Check the pressure of each tire and repair tires if necessary.
		Tire angle sensor main body : Internal failure Tire angle sensor installation : The installation portion is broken or damaged. Tire angle sensor harness :Wire breakage, short circuit, leakage (harness or connector)	Check the sensor voltage,using Analyzer. : Direction switch is in neutral. Fully close the accelerator pedal and operate steering wheel to check the change in voltage at that time.	▪ Check the sensor and replace it if necessary. ▪ Check the harness and repair or replace it if necessary.
		Tire angle sensor straight running matching value : No agreement with the vehicle state	Check the matching value on the Matching screen.	▪ Perform matching again.
	[Power meter] Power meter is not displayed	Display setting Power meter display mode : "NO" (invalidity) setting (Option set POWER METER)	Check the set value on the Option Set screen.	▪ Change the setting. : Power meter display mode : "YES" (valid) setting
	[Menu lock] The key is locked with operating OFF to ON despite releasing menu lock setting.	Display setting :Menu lock releasing specification : "A" (lock release by turning key off) setting (Option set MENU-LOCK SPEC)	Check the set value on the Option Set screen.	▪ Change the setting. :Menu lock releasing specification : "B" (lock release by setting "YES") setting
Multifunction display DX(OPT)	[Load sensing meter] Load meter is not displayed	Lift lever is no neutral	-	Load meter is not displayed with operating lift lever. Return lift lever to neutral
		Traveling	-	Load meter is not displayed with traveling. Stop traveling

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Control systems	Phenomena on the vehicle	Failed portions and failure modes	How to check	Action and remedies
Multifunction display DX(OPT)	[Load sensing meter] Load meter is not displayed	Display setting Load meter display mode : "NO" (invalidity) setting (Option set LOAD METER) :Cylinder diameter, mast type, correction 0 point	Confirm the each setting is correct on the setting screen of display	Change the setting. : Load meter display : "ton" (valid ton unit), or "kg" (valid kg unit) setting :set the cylinder diameter, mast type, correction 0 point for truck specification
		Main controller : Internal failure	-	▪ Replace the main controller.
	[Load sensing meter] Displaying "load meter" during parking	Main controller : Internal failure	-	▪ Replace the main controller.
	[Load sensing meter] Load meter value is not correct	Load sensor main body : Internal damage Load sensor harness :Wire breakage, short circuit, leakage (harness or connector)	Check the load sensor voltage, using Analyzer. : In NL Raise and lower the lift to its uppermost (relief) and lowermost positions to check the change in the voltage.	▪ Check the sensor and replace it if necessary. ▪ Check the harness and repair or replace it if necessary.
		Display setting : Cylinder diameter, mast type, correction 0 point, calibration	Confirm the each setting is correct on the setting screen of display	▪ Change the setting.

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Control systems	Phenomena on the vehicle	Failed portions and failure modes	How to check	Action and remedies
Multifunction display DX(OPT)	[Load sensing meter] Load meter value is not correct	Condition of measurement is not correct	-	▪ To measure correct load value, turn the mast vertically for height approx.500 position, and perform with stopping material handling and traveling. * Load meter in this truck is calculated by measuring the pressure for lift cylinder. So the value may have some dispersion for same pickup with depending mast height, tilt condition, hydraulic oil temperature, condition of parking truck, mechanical loss of mast, oil control valve leak and so on. This load meter is a rough indication, so precision can't be guaranteed for using scale.
		Main controller : Internal failure	-	▪ Replace the main controller.

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Control systems	Phenomena on the vehicle	Failed portions and failure modes	How to check	Action and remedies
Buzzer-related control	OPS operation warning does not sound. (Export spec. except for OPS buzzer less spec.)	Display setting : OPS operating alert and buzzer mode : "B" or "C" setting (Option set 1 12/ BUZEER SPEC) : OPS operating alert : "NO" (invalidity) setting (Option set 1 13/ SEAT BUZZER)	Check the set value on the Option Set screen.	▪ Change the setting. : OPS operating alert and buzzer mode : "A" setting : OPS operating alert : "YES" (valid) setting
		Display : Built-in buzzer is broken.	Check that the builtin buzzer sounds a short beep when the display switch (microswitch) is pressed.	▪ If the buzzer does not sound, replace the display.
	The traveling OPS return-to-neutral warning does not sound.	Display setting : OPS operating alert and buzzer mode : "B" setting (Option set 1 12/ BUZEER SPEC)	Check the set value on the Option Set screen.	▪ Change the setting. : OPS operating alert and buzzer mode : "A" setting:
		Display : Built-in buzzer is broken.	Check that the builtin buzzer sounds a short beep when the display switch (microswitch) is pressed.	▪ If the buzzer does not sound, replace the display.

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Control systems	Phenomena on the vehicle	Failed portions and failure modes	How to check	Action and remedies
Buzzer-related control	The load handling OPS return-to neutral warning does not sound. (Export spec. except for OPS buzzer less spec.)	Display setting : OPS operating alert and buzzer mode : "B" or "C" setting (Option set 1 12/ BUZEER SPEC)	Check the set value on the Option Set screen.	▪ Change the setting. : OPS operating alert and buzzer mode : "A" setting:
		Display : Built-in buzzer is broken.	Check that the builtin buzzer sounds a short beep when the display switch (microswitch) is pressed.	▪ If the buzzer does not sound, replace the display.
	The parking brake release reminder does not sound.	Parking brake switch main body : Short circuit Installation of parking brake switch : Switch is held down. Parking brake switch harness : Short circuit (harness or connector)	Check the parking brake switch, using Analyzer. (The switch can also be checked by checking if the parking indicator on the display goes on and out.) :Direction switch is in neutral. Operate the parking brake to see if the switch turns on and off normally.	▪ Check the switch, and adjust or replace it if necessary. ▪ Check the harness and repair or replace it if necessary.

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Control systems	Phenomena on the vehicle	Failed portions and failure modes	How to check	Action and remedies
Buzzer-related control	The parking brake release reminder does not sound.	Display : Built-in buzzer is broken.	Check that the builtin buzzer sounds a short beep when the display switch (microswitch) is pressed.	▪ If the buzzer does not sound, replace the display.
		Main controller : Internal failure	-	▪ Replace the main controller.
	When the vehicle runs with the parking brake released, the parking brake release reminder sounds.	Parking brake switch main body : Open failure Installation of parking brake switch : Switch is off. Parking brake switch harness : Wire breakage (harness or connector)	Check the parking brake switch, using Analyzer. (The switch can also be checked by checking if the parking indicator on the display goes on and out.) :Direction switch is in neutral. Operate the parking brake to see if the switch turns on and off normally.	▪ Check the switch, and adjust or replace it if necessary. ▪ Check the harness and repair or replace it if necessary.
		Main controller : Internal failure	-	▪ Replace the main controller.
	The parking brake reminder does not sound.	Display setting : Parking brake reminder buzzer disabled (PKB BUZZER)	Check the set value on the Option Set screen.	▪ Change the setting. :Parking brake reminder alarm : "YES" (valid) setting
		Parking brake switch main body : Open failure Installation of parking brake switch : Switch is off. Parking brake switch harness : Wire breakage (harness or connector)	Check the parking brake switch, using Analyzer. (The switch can also be checked by checking if the parking indicator on the display goes on and out.) :Direction switch is in neutral. Operate the parking brake to see if the switch turns on and off normally.	▪ Check the switch, and adjust or replace it if necessary. ▪ Check the harness and repair or replace it if necessary.
		Seat switch main body : Short failure Seat switch harness :Short circuit (harness or connector)	Seat switch inspection by OPS indicator or Analyzer. : Check if the switch turns on and off normally, sitting in the seat or standing beside it. In case of inspection by OPS indicator, confirm OPS indicator lamp is not burned-out bulb before inspection when turn key off / on.	▪ Check the seat and replace it if necessary. ▪ Check the harness and repair or replace it if necessary.

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Control systems	Phenomena on the vehicle	Failed portions and failure modes	How to check	Action and remedies
Buzzer-related control	The parking brake reminder does not sound.	Display : Built-in buzzer is broken.	Check that the builtin buzzer sounds a short beep when the display switch (microswitch) is pressed.	▪ If the buzzer does not sound, replace the display.
		Main controller : Internal failure	-	▪ Replace the main controller.
	Although the parking brake is pushing, the parking brake reminder does not stop sounding.	Parking brake switch main body : Short circuit Installation of parking brake switch : Switch is on. Parking brake switch harness : Short circuit (harness or connector)	Check the parking brake switch, using Analyzer. :Direction switch is in neutral. Operate the parking brake to see if the switch turns on and off normally.	▪ Check the switch, and adjust or replace it if necessary. ▪ Check the harness and repair or replace it if necessary.
		Main controller : Internal failure	-	▪ Replace the main controller.
Auxiliary equipment	The backup buzzer does not sound. (EZ pedal spec.)	Backup buzzer main body : Internal damage Backup buzzer harness :Wire breakage, short circuit, leakage (harness or connector)	-	▪ Check the backup buzzer and replace it if necessary. ▪ Check the harness and repair or replace it if necessary.
		Auxiliary equipment relay main body : Open failure Auxiliary equipment relay harness :Wire breakage, short circuit, leakage (harness or connector)	-	▪ Check the auxiliary equipment relay and replace it if necessary. ▪ Check the harness and repair or replace it if necessary.
		Backup relay main body : Open failure Backup relay harness :Wire breakage, short circuit, leakage (harness or connector)	-	▪ Check the backup relay and replace it if necessary. ▪ Check the harness and repair or replace it if necessary.
		Display setting : Motion alarm : "OFF" setting (Option set 1 21/ OTION ALM)	Check the set value on the Option Set screen.	▪ Change the setting. : Motion alarm : "R" setting
		Main controller : Internal failure	-	▪ Replace the main controller.

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Control systems	Phenomena on the vehicle	Failed portions and failure modes	How to check	Action and remedies
Auxiliary equipment	The backup buzzer does not stop sounding. (EZ pedal spec.)	Backup buzzer main body : Internal damage Backup buzzer harness :Short circuit, leakage (harness or connector)	-	▪ Check the backup buzzer and replace it if necessary. ▪ Check the harness and repair or replace it if necessary.
		Auxiliary equipment relay main body : Short circuit Auxiliary equipment relay harness :Short circuit, leakage (harness or connector)	-	▪ Check the auxiliary equipment relay and replace it if necessary. ▪ Check the harness and repair or replace it if necessary.
		Backup relay main body : Short circuit Backup relay harness :Short circuit, leakage (harness or connector)	-	▪ Check the backup relay and replace it if necessary. ▪ Check the harness and repair or replace it if necessary.
		Main controller : Internal failure	-	▪ Replace the main controller.
	The backup light does not go on. (EZ pedal spec.)	Backup lamp or light main body : Open failure, light bulb blow-out. Backup light harness :Wire breakage, short circuit, leakage (harness or connector)	-	▪ Check the backup light and replace it if necessary. ▪ Check the harness and repair or replace it if necessary.
		Auxiliary equipment relay main body : Open failure Auxiliary equipment relay harness :Wire breakage, short circuit, leakage (harness or connector)	-	▪ Check the auxiliary equipment relay and replace it if necessary. ▪ Check the harness and repair or replace it if necessary.

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Control systems	Phenomena on the vehicle	Failed portions and failure modes	How to check	Action and remedies
Auxiliary equipment	The backup light does not go on. (EZ pedal spec.)	Backup relay main body : Open failure Backup relay harness :Wire breakage, short circuit, leakage (harness or connector)	-	▪ Check the backup relay and replace it if necessary. ▪ Check the harness and repair or replace it if necessary.
		Display setting : Motion alarm : "OFF" setting (Option set 1 21/ OTION ALM)	Check the set value on the Option Set screen.	▪ Change the setting. : Motion alarm : "R" setting
		Main controller : Internal failure	-	▪ Replace the main controller.
Auxiliary equipment	The backup light does not stop go out. (EZ pedal spec.)	Backup light or lamp main body : Open failure Backup light harness :Wire breakage, short circuit, leakage (harness or connector)	-	▪ Check the backup light and replace it if necessary. ▪ Check the harness and repair or replace it if necessary.
		Auxiliary equipment relay main body : Short circuit Auxiliary equipment relay harness :Short circuit, leakage (harness or connector)	-	▪ Check the auxiliary equipment relay and replace it if necessary. ▪ Check the harness and repair or replace it if necessary.
		Backup relay main body : Short circuit Backup relay harness :Short circuit, leakage (harness or connector)	-	▪ Check the backup relay and replace it if necessary. ▪ Check the harness and repair or replace it if necessary.
		Main controller : Internal failure	-	▪ Replace the main controller.

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Control systems	Phenomena on the vehicle	Failed portions and failure modes	How to check	Action and remedies
Battery protection function (OPT)	Battery electrolyte level alarm indicator is not turned off (Battery electrolyte is refilled)	Display setting : Battery electrolyte level / temperature unit : "A" (Nothing) setting (Option set 1 02/B UNIT)	Check the set value on the Option Set screen.	Set the setting for the battery specification "B" old type (electrolyte level unit with LED displaying) "C" with electrolyte level/temperature unit
		Electrolyte level/temperature unit harness Connector uncoupling	-	▪ Check the CN35 connector condition (Connect if uncoupled)
		Electrolyte level/temperature unit Internal failure (internal electrolyte level harness breaking, electrolyte level sensor failure)	-	▪ Electrolyte level/temperature unit replace
	Integrated electric power meter is not displayed	Integrated electric power meter is displayed by on-vehicle charger spec. The value is not correct for other than those above.	-	-
		Display setting :Integrated electric power meter display : "NO" (invalidity) setting (Option set CHARGE REC)	Check the set value on the Option Set screen.	▪ Change the setting. : Integrated electric power meter display : "YES" (valid) setting
Battery protection function (OPT)	CO2 amount of emission is not displayed	Display setting : CO2 amount of emission factor setting	Confirm the setting is correct on the operator function screen of display	▪ Change the setting.

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Control systems	Phenomena on the vehicle	Failed portions and failure modes	How to check	Action and remedies
The shock detection function (OPT)	The shock detection function setting screen does not appear.	Display setting : Shock detection function disabled (SHOCK SENSOR)	Check the set value on the Option Set screen.	▪ Change the setting. : Basic damage detecting function : "YES" (valid) setting
	Although shock is applied, the shock detection alarm does not go on.	Way in which the vehicle collides : The degree of shock that the shock sensor receives vary depending on the way and direction in which the vehicle collides and the object with which it collides. The shock sensor does not necessarily detect all kinds of shock.	-	-
		Display setting : A too large (improper) value is set for shock detection.	-	▪ Change the setting. (Set a value that corresponds to shock unlikely to be applied during normal operation.)
		Shock sensor main body : Sensitivity reduced Installation of shock sensor : Improper installation (loosening), interference Shock sensor harness :Wire breakage, short circuit, leakage (harness or connector)	Check the voltages of shock sensors 1 and 2, using Analyzer. : Vehicle stopped 2.0 ± 0.21 V Apply shock to each sensor to see if its voltage changes. (Compare the voltages of sensors 1 and 2.)	▪ Check the sensor and replace it if necessary. ▪ Check the harness and repair or replace it if necessary.
		Main controller : Internal failure	-	▪ Replace the main controller.
	Although no shock is applied, the shock detection alarm sets off.	Display setting : A too small (improper) value is set for shock detection.	-	▪ Change the setting. (Set a value that corresponds to shock unlikely to be applied during normal operation.)

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Control systems	Phenomena on the vehicle	Failed portions and failure modes	How to check	Action and remedies
The shock detection function (OPT)	Although no shock is applied, the shock detection alarm sets off.	Shock sensor main body : Internal damage (excessive response) Installation of shock sensor : Improper installation (loosening), interference Shock sensor harness :Wire breakage, short circuit, leakage (harness or connector) (Especially if there are half-broken wires in the harness, shock may be detected frequently.)	Check the voltages of shock sensors 1 and 2, using Analyzer. : Vehicle stopped 2.0 ± 0.21 V Apply shock to each sensor to see if its voltage does not change excessively. (Compare the voltages of sensors 1 and 2.)	▪ Check the sensor and replace it if necessary. ▪ Check the harness and repair or replace it if necessary.
		Main controller : Internal failure	-	▪ Replace the main controller.
Operator recognition equipment (OPT)	Unable to recognize with operating numeric keypad (The operating tone is played, but unable to login)	display : PIN is not registered	Log in by beginning registered number, and check if registered PIN or not at the operator recognition menu of operator function.	▪ Register the PIN at the operator recognition menu of operator function.
	Possible to recognize without pressing PIN	display : Meter start is not setting	Confirm the meter start is valid or not by service function	▪ Perform the meter start
		display : Internal defect	-	▪ Replace the display.

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4.5.1 Battery charge screen is not displayed despite connecting the AC power plug.

⚠ CAUTION

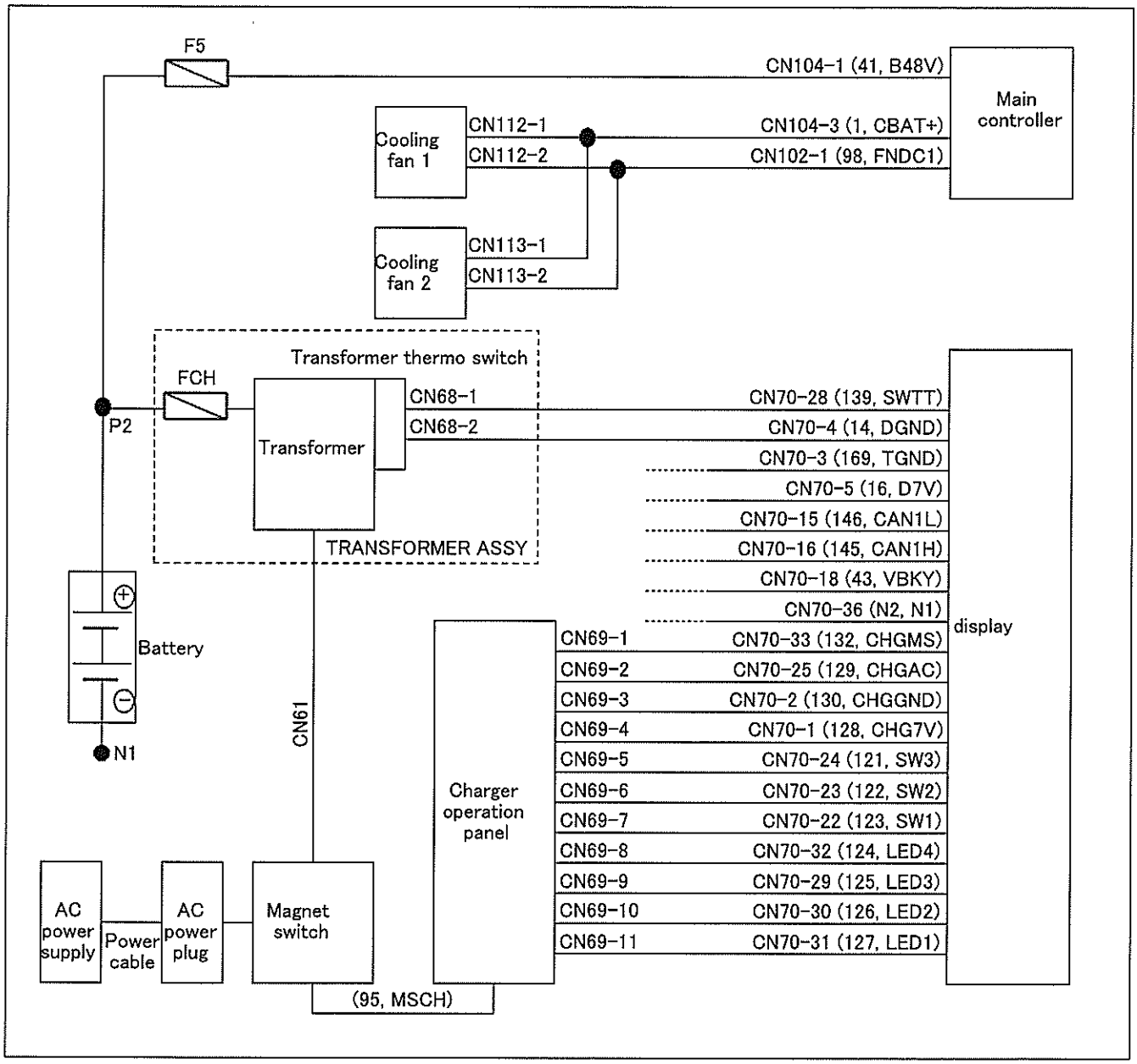
- **If the charging screen is not displayed with disconnecting AC power plug and turning ON key switch, perform troubleshooting of "Control system : Power-supply related control" of "WHEN NO ERROR CODE IS DISPLAYED".**

Probable cause

- Wrong setting of charger unit
- AC power supply defect or electricity failure
- Power code defect.
- Connection defect
- Harness defect
- Operation panel defect
- Display defect

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Related portion



4.5.1.1 STEP1

Inspection :

Check of the charger unit setting

STD
[OPT] 3 OPT (1 20)
Multi-function display
[OPT] CHARGER UNIT

Judgment

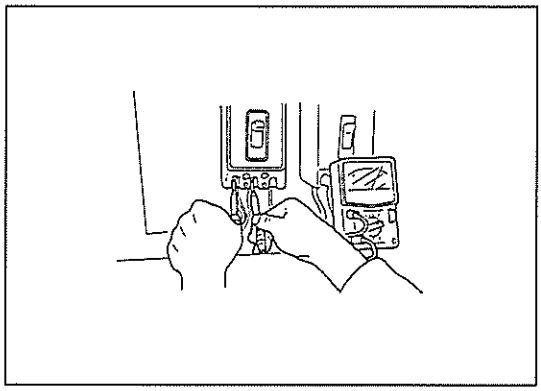
Result	Procedure
YES	Go to step 2
NO	**Wrong setting of charger unit** **Set "YES"**

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4.5.1.2 STEP2

Inspection :

AC input voltage check on the power supply side



Turn off the key switch and disconnect the AC power plug.

Check voltage of each AC power supply terminal.

[Inspection procedure and standard]

Check voltage of each AC power supply terminal.

Portion to be inspected	Standard:
Each power supply terminal	AC191 to 220 V

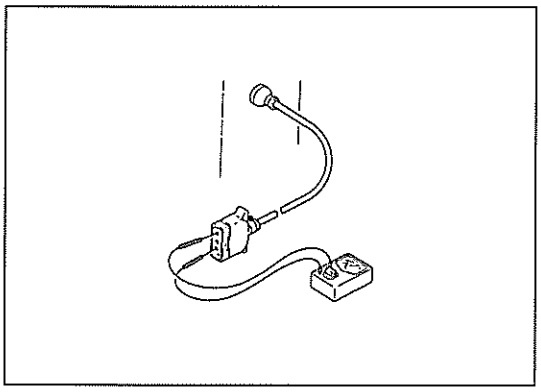
Judgment

Result	Procedure
OK	Go to step 3
NG	**AC power supply defect or electricity failure**

4.5.1.3 STEP3

Inspection :

Check of AC power supply voltage



Turn off the key switch and disconnect the AC power plug.

AC power plug terminal voltage check

[Inspection procedure and standard]

AC power plug terminal voltage check

Portion to be inspected	Standard:
Each power plug terminal	AC191 to 220 V

Judgment

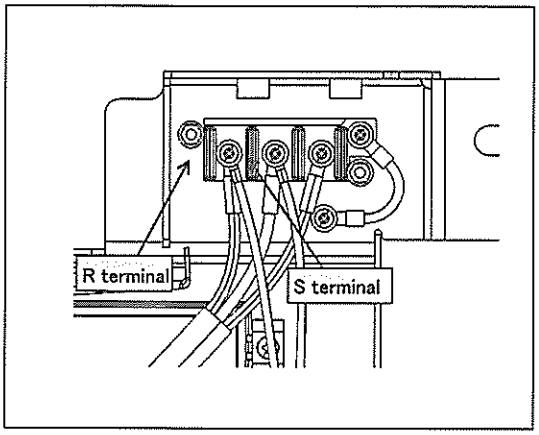
Result	Procedure
OK	Go to step 4
NG	**Power code defect.**

4.5.1.4 STEP4

Inspection :

Connection check

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Turn off the key switch, and disconnect the AC power plug and the battery plug.

Check the wire connection.

[Inspection procedure and standard]

Check the wire connection.

Check if the CN69 and CN70 connectors are correctly connected.

Check the connecting of R terminal (line color : white) and S terminal (line color : red) at AC power plug outlet reverse side.

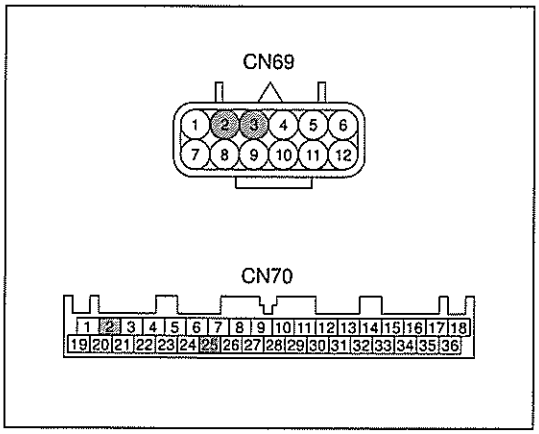
Judgment

Result	Procedure
OK	Go to step 5
NG	**Connection defect**

4.5.1.5 STEP5

Inspection :

Inspect harness



Turn off the key switch, and disconnect the AC power plug and the battery plug.

Disconnect the CN69 and CN70 connectors and check the harnesses.

[Inspection procedure and standard]

Check the harness.

Disconnect the CN69 and CN70 connectors and visually check inside each connector and the caulked portion of each wire for defects and then check each harness.

Refer to BEFORE TROUBLESHOOTING

Portion to be inspected	Standard:
CN69-2 to CN70-25	Continuity
CN69-3 to CN70-2	Continuity

Judgment

Result	Procedure
OK	Go to step 6
NG	**Harness defect**

4.5.1.6 STEP6

Inspection :

Check of display function of the charging screen

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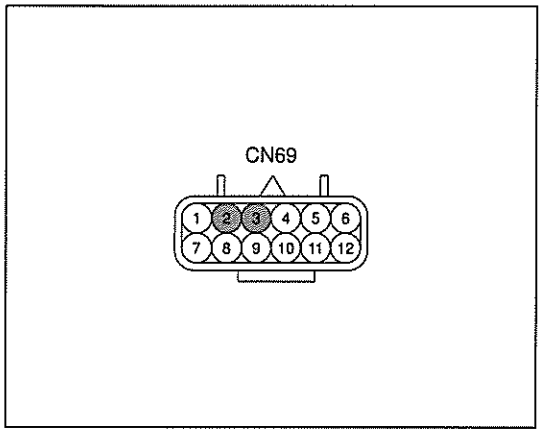
Turn off the key switch, and disconnect the AC power plug and the battery plug.

Disconnect the CN69 connectors, then connect the CN70 connectors.

Short the CN69-2 to CN69-3 for harness side, and remain turning key switch off, then inspect after connecting battery plug.

[Inspection procedure and standard]

Check the display function of the charging screen.



Disconnect the CN69 connector and short-circuit the CN69-2 and CN69-3 connectors on the wire harness side. Check if the charging screen appears on the display.

Judgment

Result	Procedure
The charging screen does not appear	**Display defect**
The charging screen appears	**Operation panel defect**

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4.5.2 Although the AC power plug is disconnected, the charging screen appears on the display

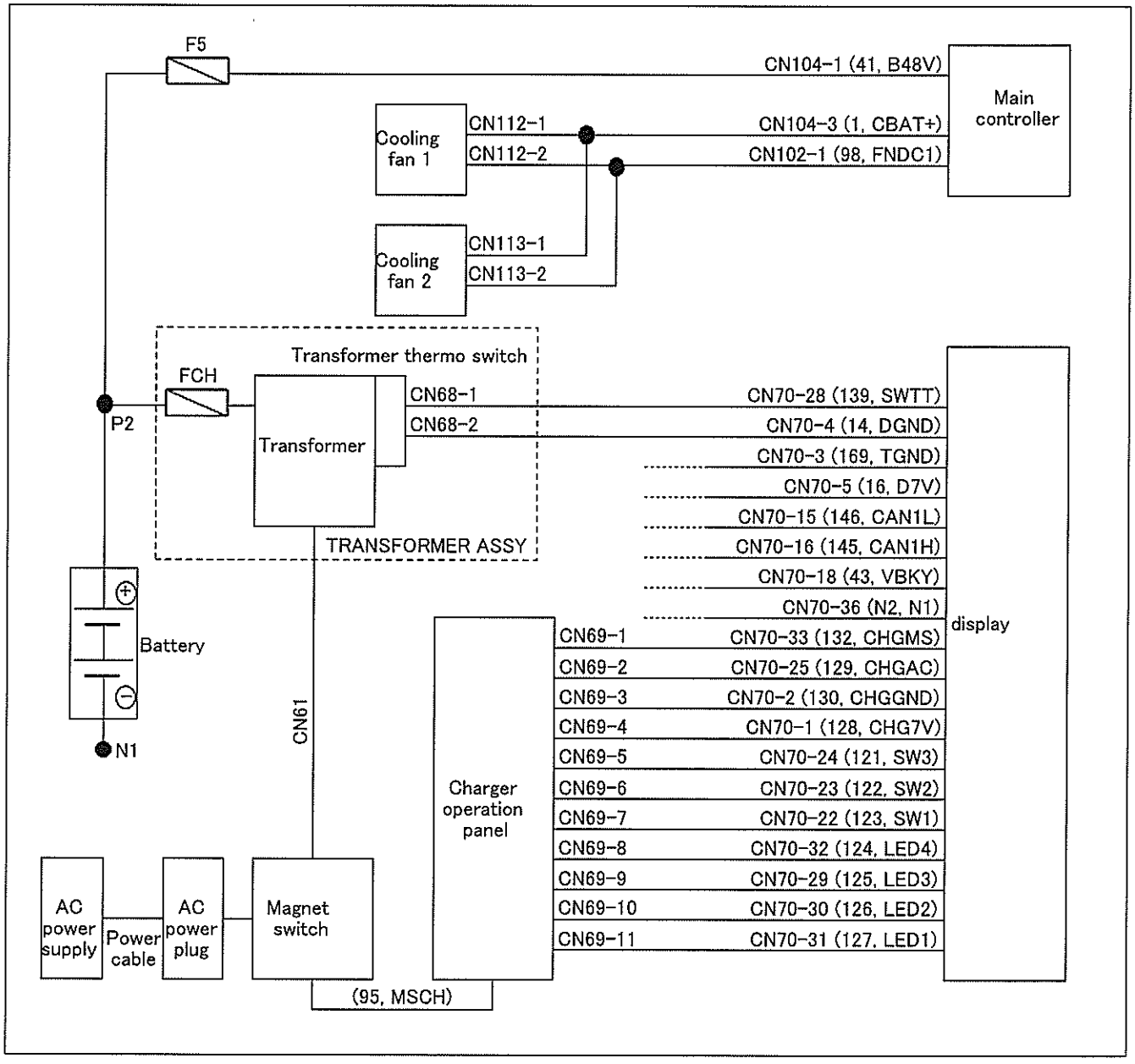
⚠ CAUTION

- **In case of multifunction display, battery charge screen is displayed with disconnecting AC power plug and turning key switch off when press over 2 second for the "switch 1 : low speed setting switch". So confirm with disconnecting AC power plug and without operating.**

Probable cause

- Connection defect
- Operation panel defect
- Harness defect
- Display defect

Related portion



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4.5.2.1 STEP1

Inspection :

Connection check

Turn off the key switch and disconnect the battery plug.

Check the wire connection.

[Inspection procedure and standard]

Check the wire connection.

Check if the CN69 and CN70 connectors are correctly connected.

Judgment

Result	Procedure
OK	Go to step 2
NG	**Connection defect**

4.5.2.2 STEP2

Inspection :

Check of AC 200V detection

Turn off the key switch, and disconnect the AC power plug and the battery plug.

Disconnect the CN69 connector, and connect the battery plug.

Check the display screen.

Judgment

Result	Procedure
Charging screen does not disappear	Go to step 3
Charging screen disappears	**Operation panel defect**

4.5.2.3 STEP3

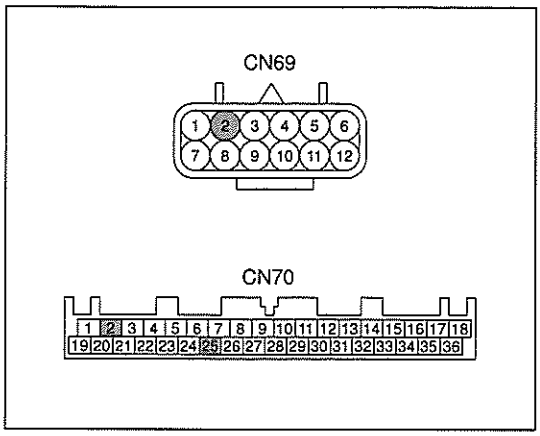
Inspection :

Inspect harness

Turn off the key switch, and disconnect the AC power plug and the battery plug.

Disconnect the CN69 and CN70 connectors and perform the check.

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[Inspection procedure and standard]

Check the harness.

Disconnect the CN69 and CN70 connectors and visually check inside each connector and the caulked portion of each wire for defects and then check each harness.

Refer to BEFORE TROUBLESHOOTING

Portion to be inspected	Standard:
CN69-2 to CN70-25	Continuity
CN70-2 to CN70-25	No continuity

Judgment

Result	Procedure
OK	**Display defect**
NG	**Harness defect**

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4.5.3 Charging does not start when the START button is pressed (even though charging screen appears on the display) (even though charging screen appears on the display)

Probable cause

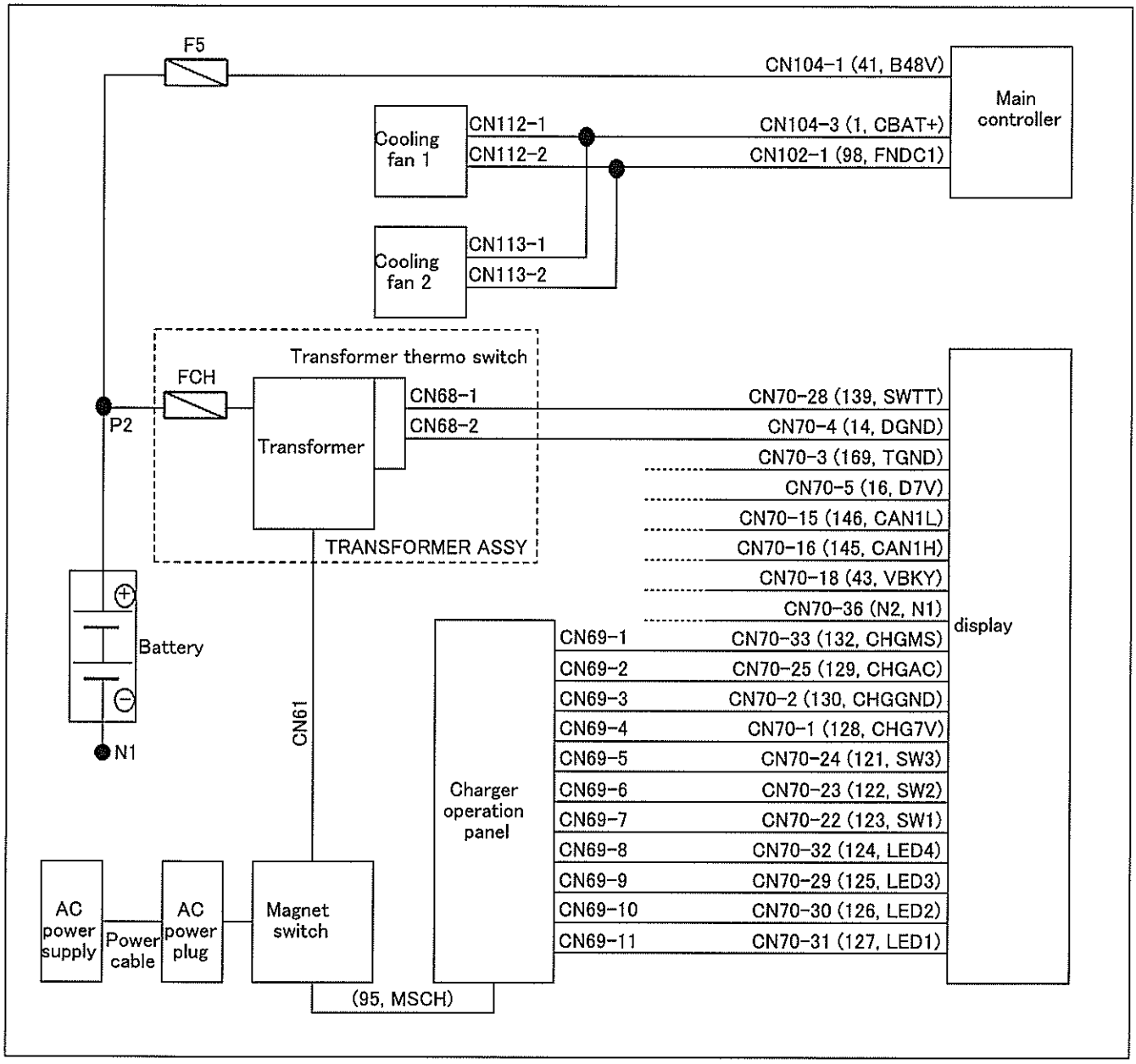
⚠ CAUTION

- **If the multifunction display is set "I (International)" for display setting "DISP.MODE", reservation button is invalidity. If only the multifunction display is set "J (Japan)" for display setting "DISP.MODE", "RESERVATION" button is valid.**
- **Before perform troubleshooting, inspect the magnet switch and confirm thermal relay is not operated. If thermal relay is operated, perform the component (magnet switch, transformer ASSY) inspection before.**

- Connection defect
- Operation panel defect
- Harness defect
- Display defect
- Magnet switch defect

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Related portion



4.5.3.1 STEP1

Inspection :

Connection check

Turn off the key switch, and disconnect the AC power plug and the battery plug.

Check the wire connection.

[Inspection procedure and standard]

Check the wire connection.

Check if the CN69 and CN70 connectors are correctly connected.

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Judgment

Result	Procedure
OK	Go to step 2
NG	**Connection defect**

4.5.3.2 STEP2

Inspection :

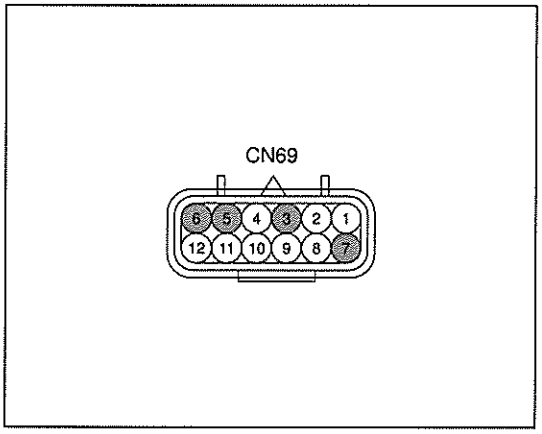
Operation panel check

Turn off the key switch, and disconnect the AC power plug and the battery plug.

Disconnect the CN69 connectors and check the harnesses.

[Inspection procedure and standard]

Check the operation panel.



Disconnect the CN69 connectors and check the inside of connector and the caulked portion of wire whether it has defect or not by visual confirm. Then check the connector for operation panel side.

Refer to BEFORE TROUBLESHOOTING

Portion to be inspected	Operation	Standard:
CN69-5 to CN69-3	Hold down the "STOP" button	Continuity
CN69-7 to CN69-3	Hold down the "START" button	Continuity
CN69-5 to CN69-3	Release "STOP" button	No continuity
CN69-7 to CN69-3	Release "START" button	No continuity

Judgment

Result	Procedure
OK	Go to step 3
NG	**Operation panel defect**

4.5.3.3 STEP3

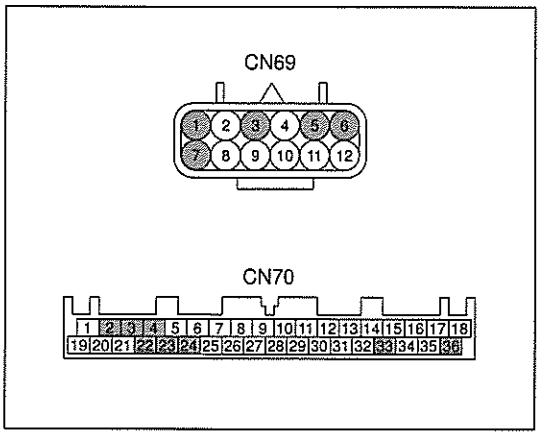
Inspection :

Inspect harness

Turn off the key switch, and disconnect the AC power plug and the battery plug.

Disconnect the CN69 and CN70 connectors and perform the check.

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[Inspection procedure and standard]

Check the harness.

Disconnect the CN69 and CN70 connectors and check the inside of connector and the caulked portion of wire whether it has defect or not by visual confirm. Then check the connector for main harness side.

Refer to BEFORE TROUBLESHOOTING

Portion to be inspected	Standard:
CN69-7 to CN70-22	Continuity
CN69-6 to CN70-23	Continuity
CN69-5 to CN70-24	Continuity
CN70-22 to CN70-23	No continuity
CN70-22 to CN70-24	No continuity
CN70-23 to CN70-24	No continuity
CN70-22 to CN70-2	No continuity
CN70-22 to CN70-23	No continuity
CN70-22 to CN70-4	No continuity
CN70-22 to CN70-36	No continuity
CN70-23 to CN70-2	No continuity
CN70-23 to CN70-3	No continuity
CN70-23 to CN70-4	No continuity
CN70-23 to CN70-36	No continuity
CN70-24 to CN70-2	No continuity
CN70-24 to CN70-3	No continuity
CN70-24 to CN70-4	No continuity
CN70-24 to CN70-36	No continuity
CN69-1 to CN70-33	Continuity
CN69-1 to CN69-3	No continuity

Judgment

Result	Procedure
OK	Go to step 4
NG	**Harness defect**

4.5.3.4 STEP4

Inspection :

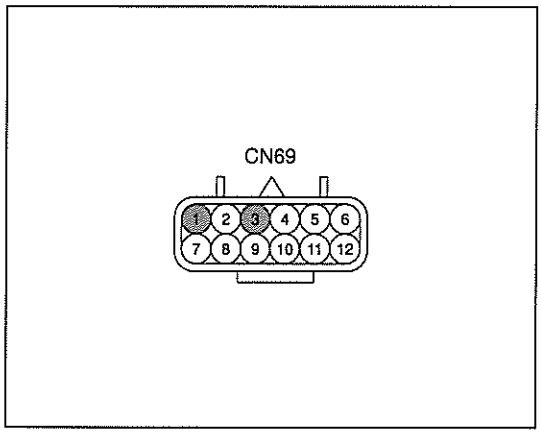
Magnet switch signal check

Turn off the key switch, and disconnect the AC power plug and the battery plug.

Reconnect the CN69 and CN70 connector.

Turn off the key switch, and connect the battery plug and the AC power plug, then inspect.

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[Inspection procedure and standard]

Check magnet switch signal

Connect the AC power plug and press "START" button, and confirm displaying the battery charge screen, then inspect.

Portion to be inspected	Standard:
CN69-1 to CN69-3	0 V

Judgment

Result	Procedure
OK	Go to step 5
NG	**Display defect**

4.5.3.5 STEP5

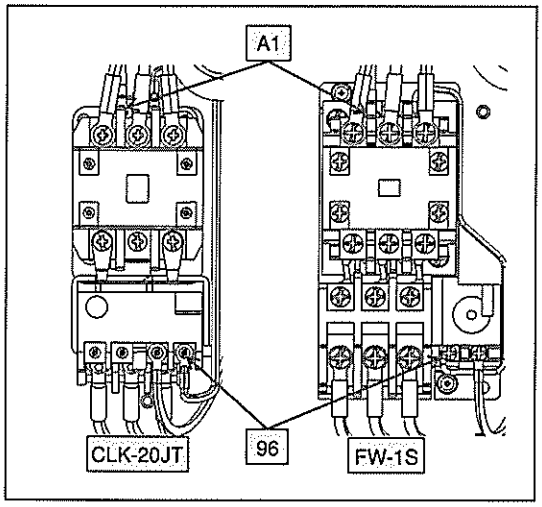
Inspection :

Magnetic switch voltage check

Turn off the key switch, and disconnect the AC power plug and the battery plug.

Disconnect the CN61 connector.

Connect the AC power plug and battery plug, and perform the check.



[Inspection procedure and standard]

Check voltage of magnet switch

Disconnect the CN61 connector, connect the AC power plug and press "START" button.

Portion to be inspected	Operation	Standard:
A1 to 96 terminal	press "START" button	AC191 to 220 V
A1 to 96 terminal	Press "STOP" button	AC0V

Judgment

Result	Procedure
OK	**Magnet switch defect**
NG	**Operation panel defect**

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4.5.4 Charging does not stop when the STOP button is pressed (able to start charging))

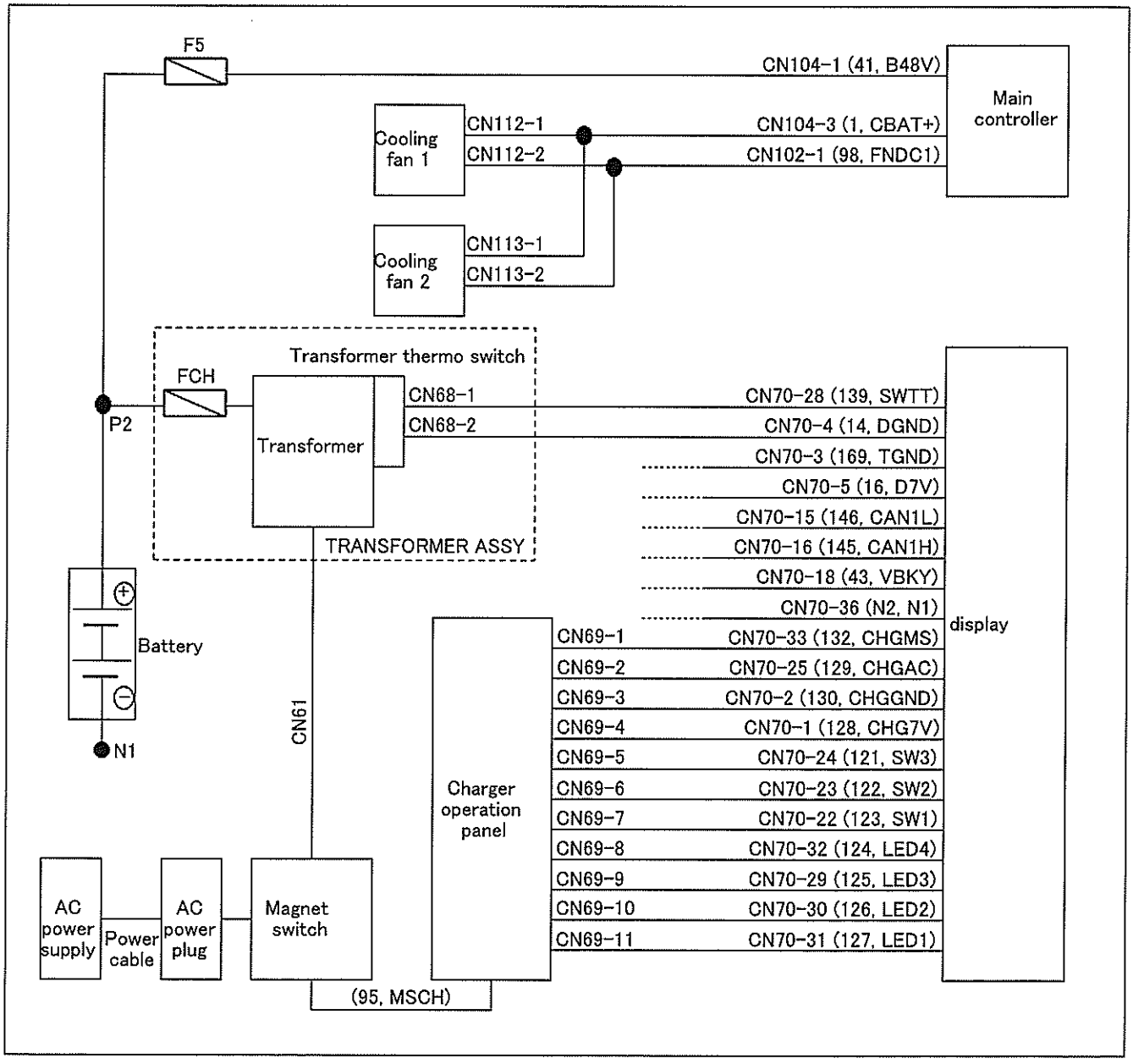
Probable cause

⚠ CAUTION

- **Press STOP button, and if magnet switch is not cut off with displaying charging stop on the screen, perform troubleshooting "F8-1: Charging completion abnormality"**
  Turn off the breaker and stop AC220 power supply for AC power plug, then inspect.

- Connection defect
- Operation panel defect
- Harness defect
- Display defect

Related portion



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4.5.4.1 STEP1

Inspection :

Connection check

Turn off the key switch, and disconnect the AC power plug and the battery plug.

Check the wire connection.

[Inspection procedure and standard]

Check the wire connection.

Check if the CN69 and CN70 connectors are correctly connected.

Judgment

Result	Procedure
OK	Go to step 2
NG	**Connection defect**

4.5.4.2 STEP2

Inspection :

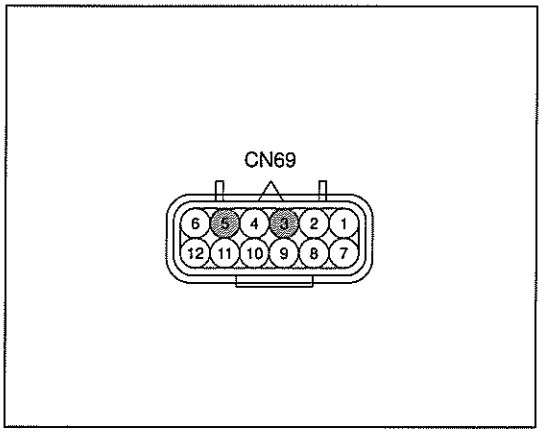
Operation panel check

Turn off the key switch, and disconnect the AC power plug and the battery plug.

Disconnect the CN69 connectors and check the harnesses.

[Inspection procedure and standard]

Check the operation panel.



Disconnect the CN69 connectors and check the inside of connector and the caulked portion of wire whether it has defect or not by visual confirm. Then check the connector for operation panel side.

Refer to BEFORE TROUBLESHOOTING

Portion to be inspected	Operation	Standard:
CN69-5 to CN69-3	Hold down the "STOP" button	Continuity
CN69-5 to CN69-3	Release "STOP" button	No continuity

Judgment

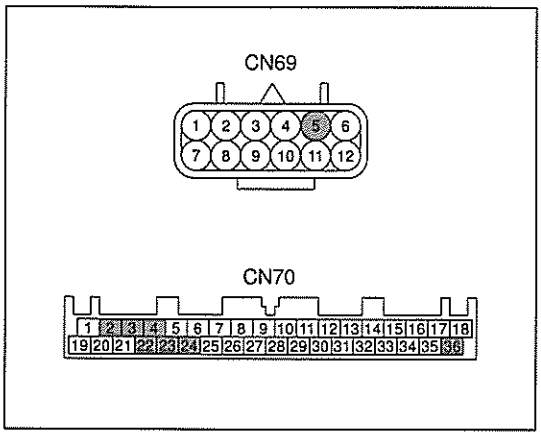
Result	Procedure
OK	Go to step 3
NG	**Operation panel defect**

4.5.4.3 STEP3

Inspection :

Inspect harness

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Turn off the key switch, and disconnect the AC power plug and the battery plug.

Disconnect the CN69 and CN70 connectors and perform the check.

[Inspection procedure and standard]

Check the harness.

Disconnect the CN69 and CN70 connectors and check the inside of connector and the caulked portion of wire whether it has defect or not by visual confirm. Then check the connector for main harness side.

Refer to BEFORE TROUBLESHOOTING

Portion to be inspected	Standard:
CN69-5 to CN70-24	Continuity
CN70-22 to CN70-24	No continuity
CN70-23 to CN70-24	No continuity
CN70-24 to CN70-2	No continuity
CN70-24 to CN70-3	No continuity
CN70-24 to CN70-4	No continuity
CN70-24 to CN70-36	No continuity

Judgment

Result	Procedure
OK	**No abnormality Perform charging again, if the charging does not complete even when pressing "STOP" button, there should be any other problems, so replace the display.**
NG	**Harness defect**

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4.5.5 Charging completes normally but the charge is insufficient

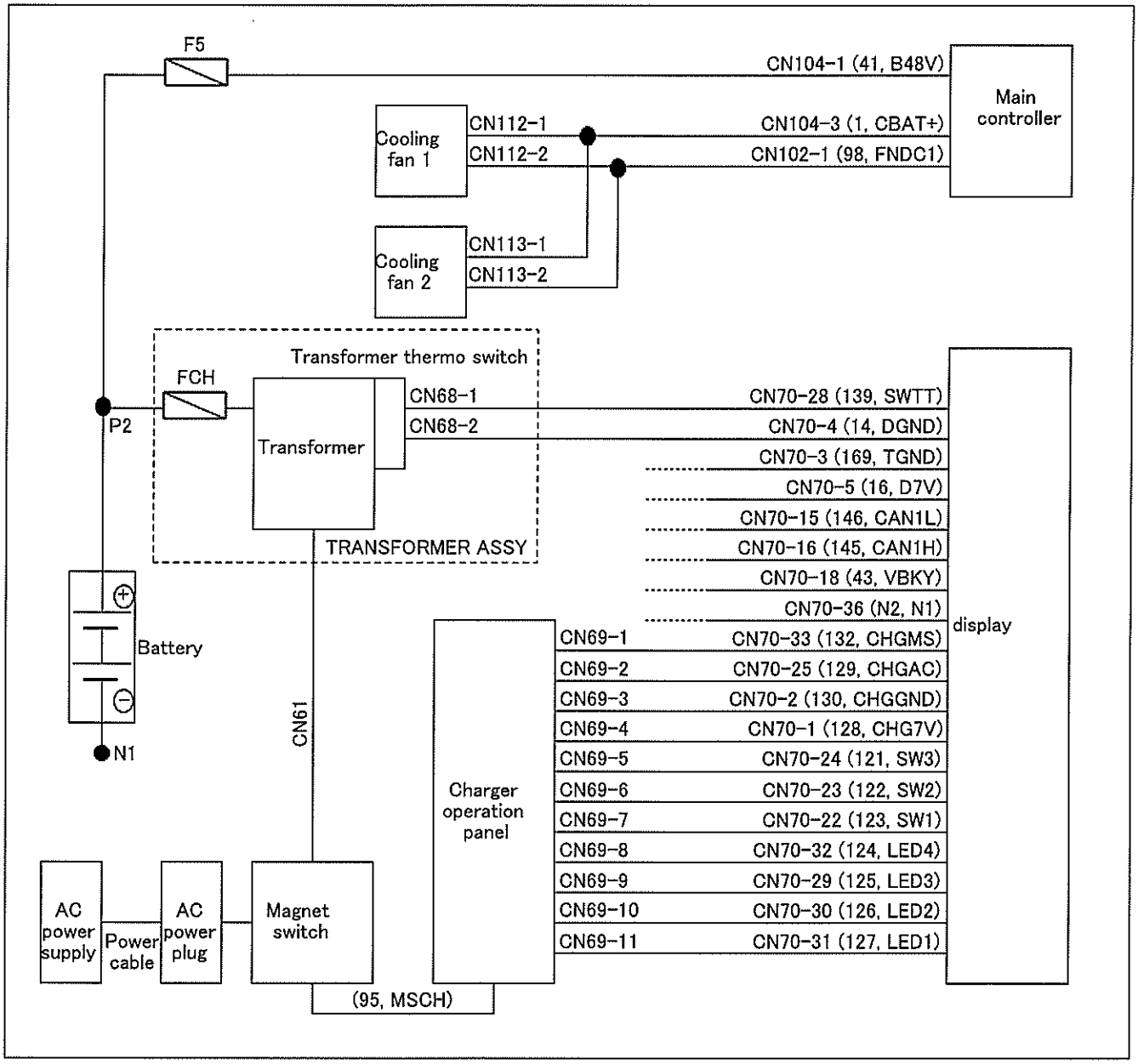
⚠ CAUTION

- **・Before perform troubleshooting, inspect the magnet switch and confirm thermal relay is not operated. If thermal relay is operated, perform the component (magnet switch, transformer ASSY) inspection before.**

Probable cause

- Capacity incompatibility
- Tap adjustment defect
- Transformer ASSY defect
- Main controller defect
- Decline of battery capacity due to a decrease in temperature of the electrolyte
- Battery defect

Related portion



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4.5.5.1 STEP1

Inspection :

Check the compatibility of the capacity of the battery and the transformer ASSY.

(Refer to page "APPLICABLE CHARGER LIST" of Charger section)

Judgment

Result	Procedure
OK	Go to step 2
NG	**Capacity incompatibility**

4.5.5.2 STEP2

Inspection :

Tap changer check

(Refer to page "BEFORE CHARGING" of Charger section)

Judgment

Result	Procedure
OK	Go to step 3
NG	**Tap adjustment defect**

4.5.5.3 STEP3

Inspection :

Transformer ASSY individual inspection

(Refer to page "TRANSFORMER ASSY" of Charger section)

Judgment

Result	Procedure
OK	Go to step 4
NG	**Transformer ASSY defect**

4.5.5.4 STEP4

Inspection :

Battery voltage check

STD
[ANL] 2 IO1 (2 16)
Multi-function display
[ANL] I/O TEMP/VOLT 5/6

B48V

Compare the indicated value on the display and the actual measured value (between P2 and N1).

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Judgment

Result	Procedure
Displayed value is outside the range of ±10% of actual measured value.	Go to step 5
Displayed value is in the range of ±10% of actual measured value.	**Main controller defect**

4.5.5.5 STEP5

Inspection :

Check of the specific gravity and temperature of battery electrolyte after charging completes

(Refer to page "BATTERY ASSY" of Battery section)

Judgment

Result	Procedure
OK	**Decline of battery capacity due to a decrease in temperature of the electrolyte**
NG	**Battery defect** **Check if the battery revives by equalization charging**

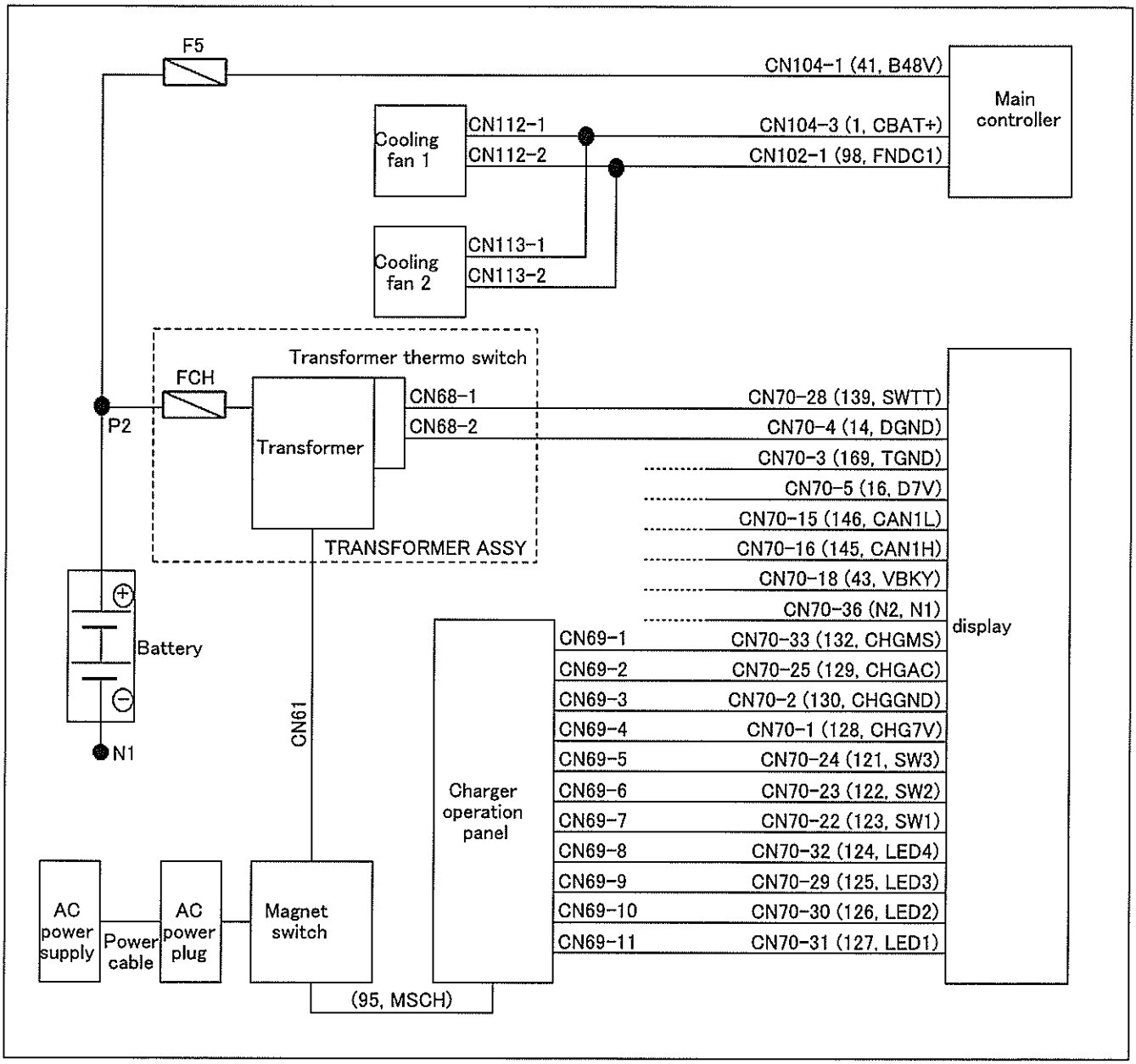
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4.5.6 LED lamp on operation panel does not light on (able to start charging)

Probable cause

- Operation panel defect
- Display defect
- Harness defect

Related portion



4.5.6.1 STEP1

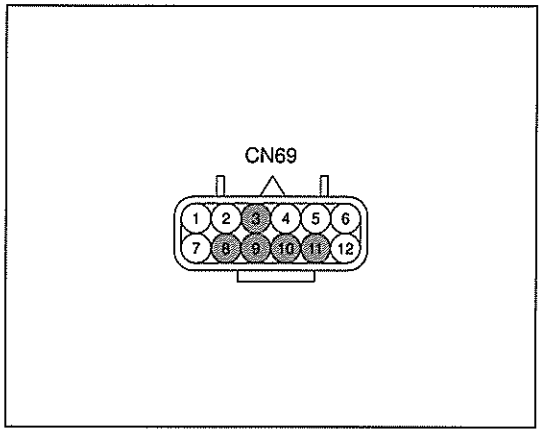
Inspection :

Applied voltage check of LED

Turn off the key switch, and disconnect the AC power plug and the battery plug.

Disconnect the CN69 connector.

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Short between CN69-2 and CN69-3 connector, and connecting battery plug, then perform applied voltage check of LED.

[Inspection procedure and standard]

Perform applied voltage check of LED

Disconnect CN69 connector, and short between CN69-2 and CN69-3 for harness side.

For the LED not lighted, check the a applied voltage for the connector of main harness side within 2 second from connecting battery plug.

Refer to BEFORE TROUBLESHOOTING

(If check for a number of LED, perform with reconnecting battery plug in each case.)

Portion to be inspected	Standard:	Target LED
CN69-10 to CN69-3	5V	NORMAL LED
CN69-9 to CN69-3	5V	EQUAL LED
CN69-8 to CN69-3	5V	UP LED

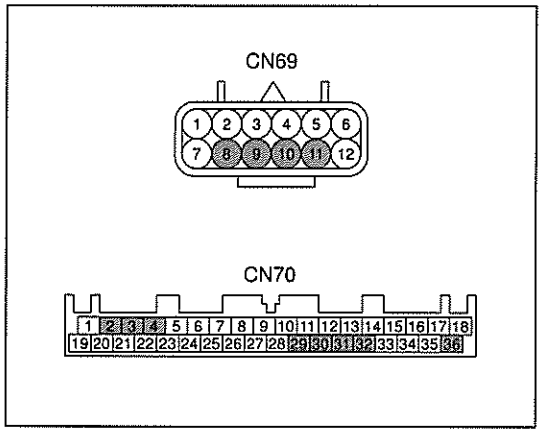
Judgment

Result	Procedure
NG	Go to step 2
OK	**Operation panel defect**

4.5.6.2 STEP2

Inspection :

Inspect harness



Turn off the key switch, and disconnect the AC power plug and the battery plug.

Disconnect the CN69 and CN70 connectors and perform the check.

[Inspection procedure and standard]

Check the harness.

Disconnect the CN69 and CN70 connectors and check the inside of connector and the caulked portion of wire whether it has defect or not by visual confirm. Then check the connector for main harness side.

Refer to BEFORE TROUBLESHOOTING

Portion to be inspected	Standard:	Target LED
CN69-10 to CN70-30	Continuity	NORMAL LED
CN69-10 to CN70-2	No continuity	NORMAL LED
CN69-10 to CN70-4	No continuity	NORMAL LED
CN69-10 to CN70-3	No continuity	NORMAL LED
CN69-10 to CN70-36	No continuity	NORMAL LED

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Portion to be inspected	Standard:	Target LED
CN69-9 to CN70-29	Continuity	EQUAL LED
CN69-9 to CN70-2	No continuity	EQUAL LED
CN69-9 to CN70-4	No continuity	EQUAL LED
CN69-9 to CN70-3	No continuity	EQUAL LED
CN69-9 to CN70-36	No continuity	EQUAL LED
CN69-8 to CN70-32	Continuity	UP LED
CN69-8 to CN70-2	No continuity	UP LED
CN69-8 to CN70-4	No continuity	UP LED
CN69-8 to CN70-3	No continuity	UP LED
CN69-8 to CN70-36	No continuity	UP LED

Judgment

Result	Procedure
NG	**Harness defect**
OK	**Display defect**

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4.5.7 Although the START button is not pressed, the magnet switch closes

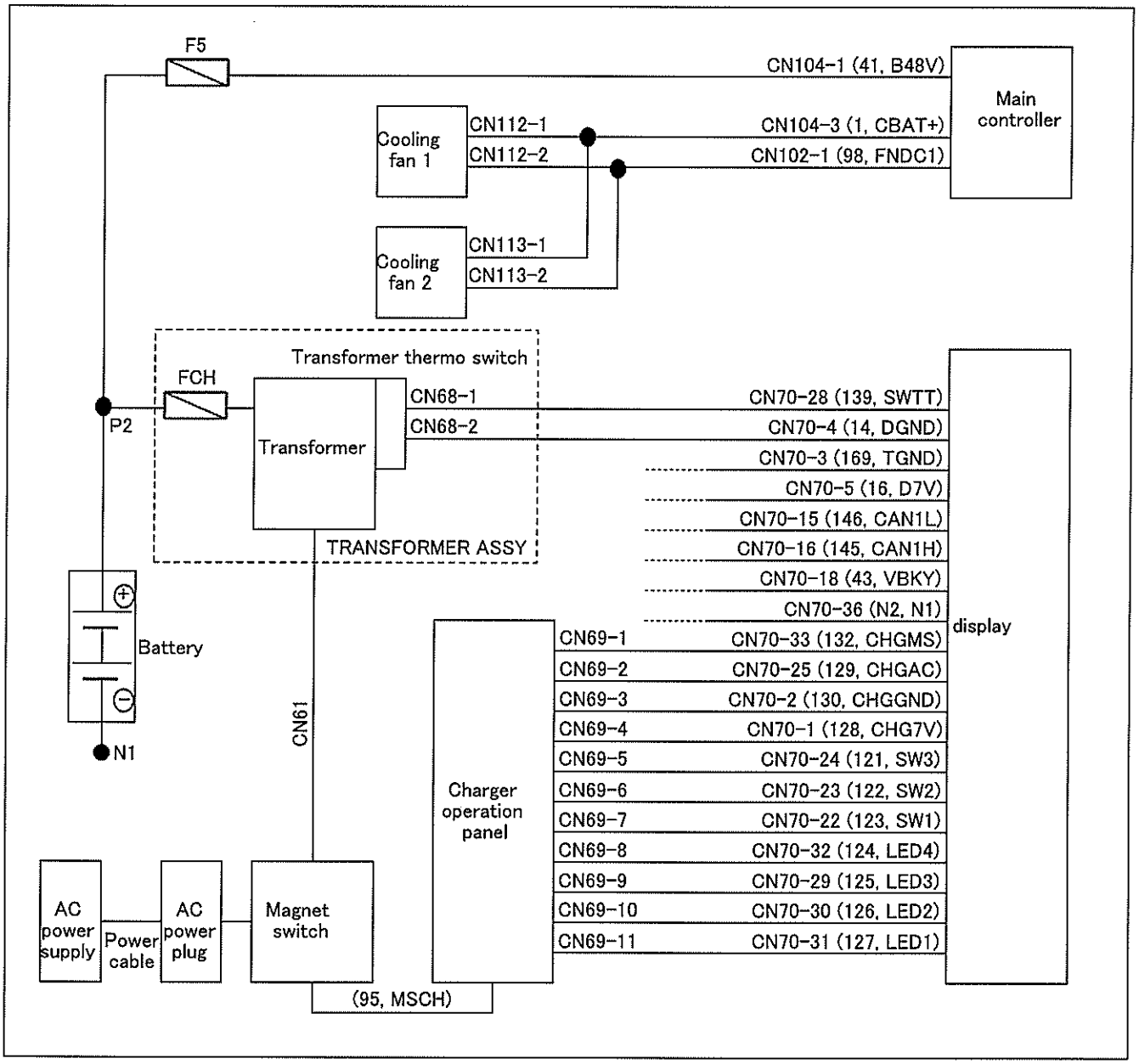
⚠ CAUTION

- **Turn off the breaker and stop AC220 power supply for AC power plug, then inspect.**

Probable cause

- Magnet switch defect
- Operation panel defect
- Harness defect
- Display defect

Related portion



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4.5.7.1 STEP1

Inspection :

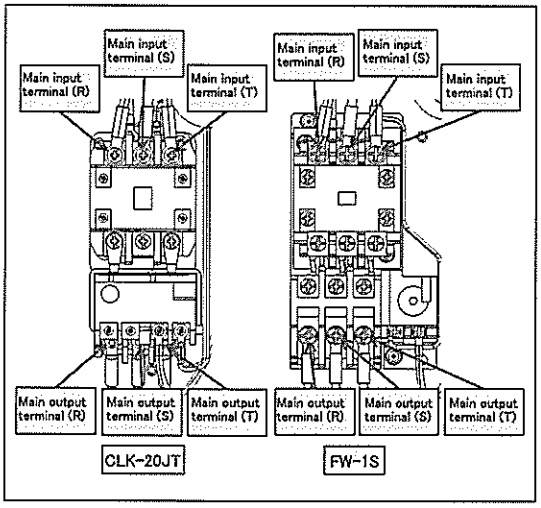
Magnet switch check

Turn off the key switch, and disconnect the AC power plug and the battery plug.

Disconnect the CN61 connectors and check the harnesses.

[Inspection procedure and standard]

Magnet switch inspection



Disconnect the CN61 connector and make sure that the magnet switch is turned off.

Portion to be inspected	Standard:
Main input terminal (R) to main output terminal (R)	No continuity
Main input terminal (S) to main output terminal (S)	No continuity
Main input terminal (T) to main output terminal (T)	No continuity

Judgment

Result	Procedure
OK	Go to step 2
NG	**Magnet switch defect**

4.5.7.2 STEP2

Inspection :

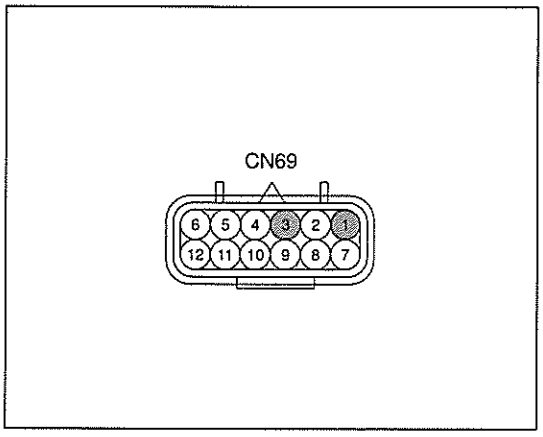
Operation panel check

Turn off the key switch, and disconnect the AC power plug and the battery plug.

Disconnect the CN61 connectors, then connect the CN69 connectors, and inspect.

[Inspection procedure and standard]

Check the operation panel.



Disconnect the CN69 connectors and check the inside of connector and the caulked portion of wire whether it has defect or not by visual confirm. Then check the connector for operation panel side connector.

Refer to BEFORE TROUBLESHOOTING

Portion to be inspected	Standard:
CN69-1 to CN69-3	No continuity

Judgment

Result	Procedure
OK	Go to step 3

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Result	Procedure
NG	**Operation panel defect**

4.5.7.3 STEP3

Inspection :

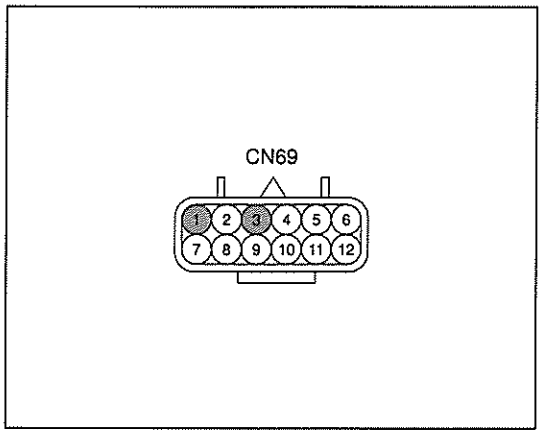
Inspect harness

Turn off the key switch, and disconnect the AC power plug and the battery plug.

Disconnect the CN69 and CN70 connectors and perform the check.

[Inspection procedure and standard]

Check the harness.



Disconnect the CN69 and CN70 connectors and check the inside of connector and the caulked portion of wire whether it has defect or not by visual confirm. Then check for main harness side.

Refer to BEFORE TROUBLESHOOTING

Portion to be inspected	Standard:
CN69-1 to CN69-3	No continuity

Judgment

Result	Procedure
OK	Go to step 4
NG	**Harness defect**

4.5.7.4 STEP4

Inspection :

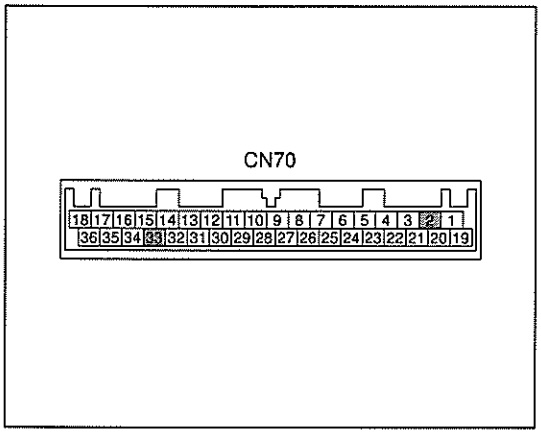
Magnet switch signal check

Turn off the key switch, and disconnect the AC power plug and the battery plug.

Disconnect the CN69 connectors, then connect the CN70 connectors, and inspect.

[Inspection procedure and standard]

Check magnet switch signal



Disconnect the CN70 connector, and inspect the connector of display side.

Portion to be inspected	Standard:
CN70-2 to CN70-33	No continuity

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Judgment

Result	Procedure
OK	Operation panel defect
NG	Display defect

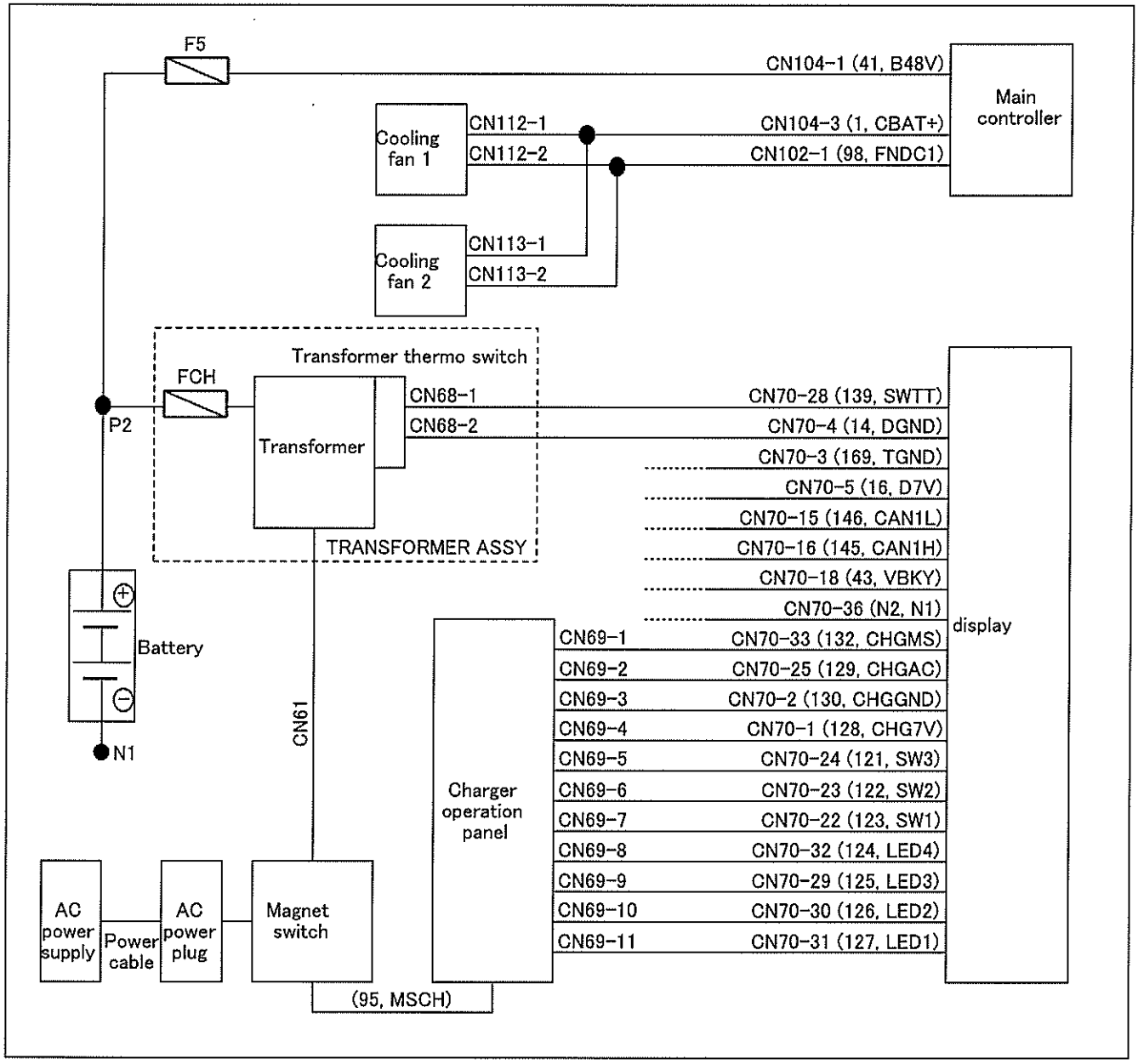
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4.5.8 Although the AC power plug is not connected, LED lamps on operation panel light on/ blink

Probable cause

- Operation panel defect
- Harness defect
- Display defect

Related portion



4.5.8.1 STEP1

Inspection :

Lighting/ blinking LED check

Turn the key switch to OFF.

Check the LED whether it is lighting or blinking without connecting the AC power plug and only with the battery plug connected.

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Judgment

Result	Procedure
"UP" LED is blinking.	Go to step 2
"UP" LED is lighting.	Go to step 3
LED other than "UP" is lighting/blinking.	Go to step 4

4.5.8.2 STEP2

Inspection :

Error check

Turn off the key switch, and connect the battery plug and the AC power plug.

Check the error code indicated on the display.

* If the charging screen is not displayed with connecting AC power plug, confirm the power supply breaker turn on and supply the voltage AC 191 to 200 V for each terminal, then connect the AC power plug.

Judgment

Result	Procedure
None of the error codes above are displayed	Go to step 4
Error code is displayed	**Perform troubleshooting of that error**

4.5.8.3 STEP3

Inspection :

Display screen check

Check if the screen indicates that charging is complete.

Judgment

Result	Procedure
Not charging complete screen	Go to step 4
Charging complete screen	**No abnormality This is not a defect, so press the "STOP" button to turn off the display and use the devise as it is. * If the AC power plug is disconnected without any button pressed after charging completes, the "UP" LED keeps lighting.**

4.5.8.4 STEP4

Inspection :

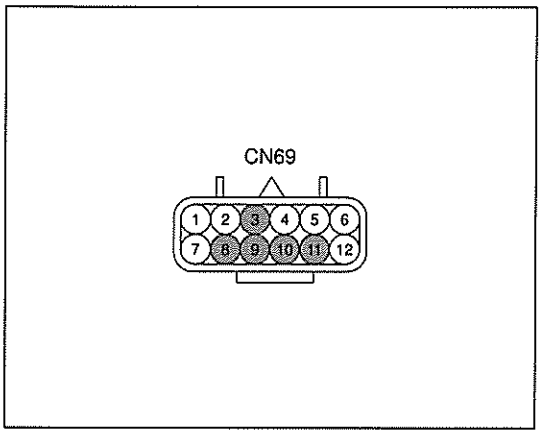
Applied voltage check of LED

Turn off the key switch, and disconnect the AC power plug and the battery plug.

Disconnect the CN69 connector.

Connect the battery plug and check the applied voltage of LED without connecting the AC power plug.

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[Inspection procedure and standard]

Perform applied voltage check of LED

Disconnect the CN69 connector without connecting the AC power plug, perform check of applied voltage to each LED on the main harness side.

Portion to be inspected	Standard:	Target LED
CN69-10 to CN69-3	0V	NORMAL LED
CN69-9 to CN69-3	0V	EQUAL LED
CN69-8 to CN69-3	0V	UP LED

Judgment

Result	Procedure
NG	Go to step 5
OK	**Operation panel defect**

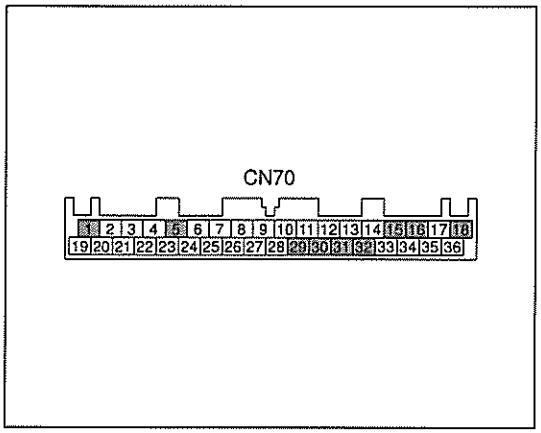
4.5.8.5 STEP5

Inspection :

Inspect harness

Turn off the key switch, and disconnect the AC power plug and the battery plug.

Disconnect the CN69 and CN70 connectors and perform the check.



[Inspection procedure and standard]

Inspect for short of the harness.

Disconnect the CN69 and CN70 connectors and check the inside of connector and the caulked portion of wire whether it has defect or not by visual confirm. Then check the connector for main harness side.

Refer to BEFORE TROUBLESHOOTING

Portion to be inspected	Standard:	Target LED
CN70-30 to CN70-1	No continuity	NORMAL LED
CN70-30 to CN70-5	No continuity	NORMAL LED
CN70-30 to CN70-15	No continuity	NORMAL LED
CN70-30 to CN70-16	No continuity	NORMAL LED
CN70-30 to CN70-18	No continuity	NORMAL LED
CN70-29 to CN70-1	No continuity	EQUAL LED
CN70-29 to CN70-5	No continuity	EQUAL LED
CN70-29 to CN70-15	No continuity	EQUAL LED

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Portion to be inspected	Standard:	Target LED
CN70-29 to CN70-16	No continuity	EQUAL LED
CN70-29 to CN70-18	No continuity	EQUAL LED
CN70-32 to CN70-1	No continuity	UP LED
CN70-32 to CN70-5	No continuity	UP LED
CN70-32 to CN70-15	No continuity	UP LED
CN70-32 to CN70-16	No continuity	UP LED
CN70-32 to CN70-18	No continuity	UP LED

Judgment

Result	Procedure
OK	**Display defect**
NG	**Harness defect**

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4.5.9 Although operation days setting has been made, equalizing charging is activated on operation day

Probable cause

- Wrong setting of operation days
- Wrong setting of clock

4.5.9.1 STEP1

Inspection :

Check operation days setting

Check setting with “OPERATION DAYS” in the Vehicle management setting menu of the Administrator function.

Judgment

Result	Procedure
OK	Go to step 2
NG	**Wrong setting of operation days**

4.5.9.2 STEP2

Inspection :

Check clock setting

Check the year, month, day, time on the clock set screen.

* The follows can be thought of as the causes.

Equalizing charge may be activated automatically on operation day due to charging frequency by customers.

Judgment

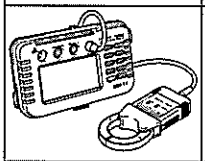
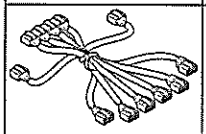
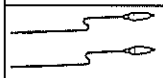
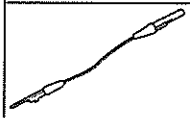
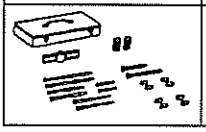
Result	Procedure
OK	**No abnormality Normal. No error is found on the charger, so use it as usual**
NG	**Wrong setting of clock**

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5 APPENDIX

5.1 SST LIST 695
5.2 SERVICE STANDARDS 695
5.3 CONNECTOR DRAWING 697
5.4 CONNECTOR LOCATION 723

5.1 SST LIST

Illust	Part number	Part name	1	2	3	4
	09140-13130-71	AC/DC tester		○		
	09230-13240-71	Sub harness		○		
	09230-13700-71	IC check pin				○
	09232-13130-71	Sub harness				○
	09950-76003-71	Puller C set		○		

5.2 SERVICE STANDARDS

5.2.1 CHARGER

Item			
Magnet switch			
Magnet switch contact point continuity	Ω	Msch ON	0
		Msch OFF	∞
Magnet switch coil resistance	Ω	CLK-20JT-FC	896±10%
		FW-1S	460±10%
Thermal relay contact point continuity	Ω	When not activate	0
		When activate	∞
Transformer ASSY			
Insulation resistance	MΩ	1 or more	

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Fuse	A/96V	K47-227C04 8-422	80
		K47-240C04 8-427	80
		K47-260C04 8-415	100
Primary coil continuity	Ω	0	
Secondary coil continuity	Ω	0	
Diode continuity	Ω	Forward	Continuity
		Backward	∞
Diode tighting torque N m (kgf-cm) [ft-lbf]		SKR71/02, SKN71/02	3.8 to 4.0 (38.8 to 40.8) [2.8 to 3.0]
		SKR100/04, SKN100/04	9.5 to 10.0 (96.9 to 102.0) [7.0 to 7.4]
No load secondary voltage (DC) (50/60Hz)	V	K47-227C04 8-422	72/76
		K47-240C04 8-427	71/74
		K47-260C04 8-415	73/77

5.2.2 CONTROLLER

Item		
F1 (fuse for drive and pump circuits)	A	450 [1.0 to 1.3 ton] 500 [1.5 to 2.0 ton]
F4 (fuse for lights)	A	10
F5 (fuse for control cuicuit)	A	10
F6 (fuse for controller)	A	10
F7 (fuse for controller)	A	10
Contactor panel insulation resistance		DC 500 V applied 10 MΩ or more
MB coil resistance	Ω	Approx. 20 (at 20 °C)
OCL standard value	A	189 to 256
Tightening torque: N m (kgf-cm) [ft-lbf]		
Main controller set bolt		3.9 to 7.2 (39.2 to 72.9) [2.84 to 5.28]
Drive motor set bolt		3.9 to 7.2 (39.2 to 72.9) [2.84 to 5.28]
Pump motor set bolt		3.9 to 7.2 (39.2 to 72.9) [2.84 to 5.28]
Copper bar		11.2 to 16.8 (114 to 171) [8.26 to 12.39]
Steering wheel set nut		24.5 to 45.5 (250 to 464) [18.1 to 33.6]

5.2.3 ACCELERATOR SENSOR (POTENTIOMETER)

Item			
Output voltage (Fulley release the accelerator pedal)	V	VRA1	0.40 to 1.24
		VRA2	0.65 to 2.31
Output voltage (Fulley depress the accelerator pedal)	V	VRA1	2.00 to 4.79
		VRA2	2.42 to 4.79

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5.3 CONNECTOR DRAWING

CN2 BRAKE SW



TAB

NO	P	C	J
1	65	-	SWBK
2	51	-	LS-

REC

NO	P	C	J
1	65	Y	CN5-1
2	51	B	CN5-3

CN3 HORN SW



TAB

NO	P	C	J
1	41	-	HO+
2	48	-	HO-

REC

NO	P	C	J
1	41	G-R	J10
2	48	L-O	CN40-4

CN4 KEY SW



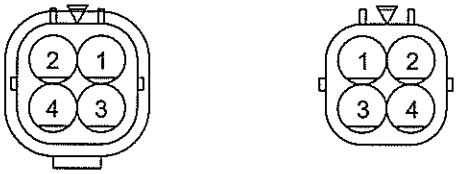
TAB

NO	P	C	J
1	41	-	AM
2	-	-	-
3	-	-	-
4	43	-	IG

REC

NO	P	C	J
1	41	G	J5
2	-	-	-
3	-	-	-
4	43	B-Y	J16

CN5 PEDAL SW SUB



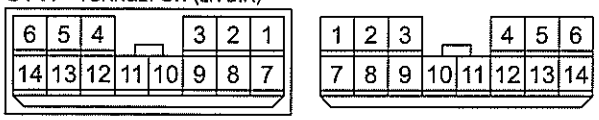
TAB

NO	P	C	J
1	65	Y	CN191,CN2-1
2	101	GR	CN29
3	51	B	CN192,CN2-2
4	111	R-L	CN30

REC

NO	P	C	J
1	65	Y	CN104-23
2	101	GR	J6
3	51	BR	J14
4	101	R-L	CN37-6

CN7 TURN&LT SW (LH DIR)



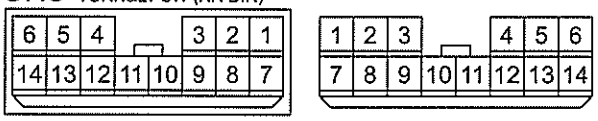
TAB

NO	P	C	J
1	-	-	-
2	-	-	-
3	-	-	-
4	-	-	-
5	-	-	-
6	-	-	-
7	116	-	BT
8	115	-	BH
9	N2	-	T
10	-	-	-
11	N2	-	EL
12	109	-	TL
13	110	-	TB
14	108	-	TR

REC

NO	P	C	J
1	-	-	-
2	-	-	-
3	-	-	-
4	-	-	-
5	-	-	-
6	-	-	-
7	116	LG	CN46-3
8	115	P	CN210-3
9	N2	W-B	J7
10	-	-	-
11	N2	W-B	J7
12	109	G-Y	J28
13	110	L-O	CN12-2
14	108	R-Y	J26

CN8 TURN&LT SW (RH DIR)



TAB

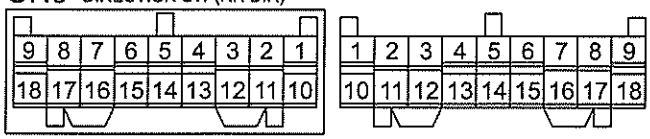
NO	P	C	J
1	-	-	-
2	-	-	-
3	-	-	-
4	108	-	TR
5	-	-	-
6	109	-	TL
7	116	-	BT
8	115	-	BH
9	N2	-	T
10	-	-	-
11	N2	-	EL
12	-	-	-
13	110	-	TB
14	-	-	-

REC

NO	P	C	J
1	-	-	-
2	-	-	-
3	-	-	-
4	108	R-Y	J26
5	-	-	-
6	109	G-Y	J28
7	116	LG	CN46-3
8	115	P	CN210-3
9	N2	W-B	J7
10	-	-	-
11	N2	W-B	J7
12	-	-	-
13	110	L-O	CN12-2
14	-	-	-

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CN9 DIRECTION SW (RH DIR)



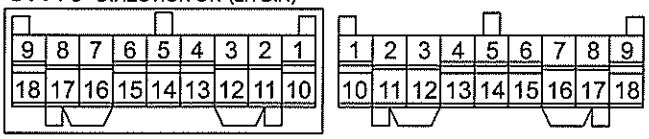
TAB

NO	P	C	J
1	-	-	-
2	105	-	VBKY
3	105	-	VBKY
4	51	-	LS-
5	45	-	DSF
6	46	-	DSR
7	120	-	DSFO
8	103	-	DSBU
9	-	-	-
10	-	-	-
11	-	-	-
12	-	-	-
13	-	-	-
14	-	-	-
15	-	-	-
16	-	-	-
17	-	-	-
18	-	-	-

REC

NO	P	C	J
1	-	-	-
2	105	B-Y	J11
3	105	B-Y	J11
4	51	BR	J12
5	45	GR-R	CN104-26
6	46	B-O	CN104-19
7	120	Y-R	CN24-1
8	103	R-W	J15
9	-	-	-
10	-	-	-
11	-	-	-
12	-	-	-
13	-	-	-
14	-	-	-
15	-	-	-
16	-	-	-
17	-	-	-
18	-	-	-

CN10 DIRECTION SW (LH DIR)



TAB

NO	P	C	J
1	-	-	-
2	103	-	DSBU
3	120	-	DSFO
4	46	-	DSR
5	45	-	DSF
6	51	-	LS-
7	105	-	VBKY
8	105	-	VBKY
9	-	-	-
10	-	-	-
11	-	-	-
12	-	-	-
13	-	-	-
14	-	-	-
15	-	-	-
16	-	-	-
17	-	-	-
18	-	-	-

REC

NO	P	C	J
1	-	-	-
2	103	R-W	J15
3	120	Y-R	CN24-1
4	46	B-O	CN104-19
5	45	GR-R	CN104-26
6	51	BR	J12
7	105	B-Y	J11
8	105	B-Y	J11
9	-	-	-
10	-	-	-
11	-	-	-
12	-	-	-
13	-	-	-
14	-	-	-
15	-	-	-
16	-	-	-
17	-	-	-
18	-	-	-

CN12 FLASHER RELAY



TAB

NO	P	C	J
1	N2	-	FRY-
2	110	-	FRY
3	-	-	-
4	105	-	FRY+

REC

NO	P	C	J
1	N2	W-B	J9
2	110	L-O	CN7-13,CN8-13
3	-	-	-
4	105	B-Y	J11

CN14 FR COMBI (LED H/L)



TAB

NO	P	C	J
1	108	-	LF
2	104	-	LC
3	N2	-	GND
4	N2	-	GND

REC

NO	P	C	J
1	108	R-Y	CN172-2
2	104	G-R	CN173-1
3	N2	W-B	CN173-2
4	N2	W-B	CN173-3

CN14 FR COMBI



TAB

NO	P	C	J
1	N2	-	GND
2	104	-	LC
3	102	-	LH
4	108	-	LF
5	N2	-	GND
6	-	-	-

REC

NO	P	C	J
1	N2	W-B	CN173-3
2	104	G-R	CN173-1
3	102	R-G	CN172-1
4	108	R-Y	CN172-2
5	N2	W-B	CN172-3
6	-	-	-

CN15 PKB SW



TAB

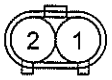
NO	P	C	J
1	66	R	NO
2	-	-	-
3	51	B	COM

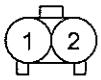
REC

NO	P	C	J
1	66	G-W	CN177-1
2	-	-	-
3	51	B	CN177-5

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CN16 HEAD LAMP





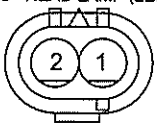
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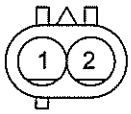
NO	P	C	J
1	102	-	LH+
2	N2	-	LH-

REC

NO	P	C	J
1	102	R-G	CN172-1
2	N2	W-B	CN172-3

CN16 HEAD LAMP (LED)





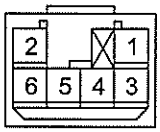
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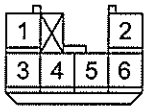
NO	P	C	J
1	102	-	LH+
2	N2	-	LH-

REC

NO	P	C	J
1	102	R-G	CN172-1
2	N2	W-B	CN172-3

CN19 STEERING SSR





TAB

NO	P	C	J
1	311	-	SSTR+
2	51	-	LS-
3	312	-	SSTR1
4	313	-	SSTR2
5	314	-	SSTRC
6	-	-	-

REC

NO	P	C	J
1	311	P-L	CN103-13
2	51	BR	J14
3	312	B-Y	CN104-30
4	313	L-W	CN104-31
5	314	G-Y	CN104-24
6	-	-	-

CN23 BACK BUZZER





TAB

NO	P	C	J
1	103	-	BZ+
2	N2	-	BZ-

REC

NO	P	C	J
1	103	R-W	CN81-4
2	N2	W-B	J8

CN23 ONRYO KIRIKAE BUZZER





TAB

NO	P	C	J
1	191	R-W	CN80-1,CN83-2
2	N2	W-B	CN80-2,CN82-3

REC

NO	P	C	J
1	191	R-W	CN81-4
2	N2	W-B	J8

CN24 FWD CHIME





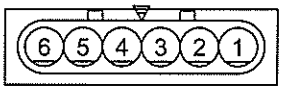
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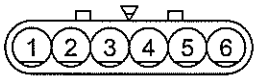
NO	P	C	J
1	120	-	CHI+
2	N2	-	CHI-

REC

NO	P	C	J
1	120	Y-R	CN9-7,CN10-3,CN37-3,CN75-2
2	N2	W-B	J8

CN26 ACCEL SSR





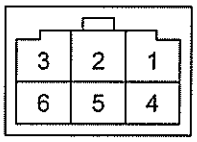
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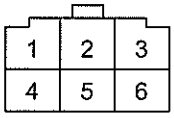
NO	P	C	J
1	55	-	VRA2+
2	51	-	POT-
3	54	-	VRA2
4	52	-	VRA1
5	53	-	VRA1+
6	50	-	VRA-

REC

NO	P	C	J
1	55	GR-R	CN101-26
2	51	G	J20
3	54	BR-Y	CN102-32
4	52	BR-R	CN102-30
5	53	BR-W	CN101-27
6	50	B-O	CN101-22

CN31 RR COMBI LH





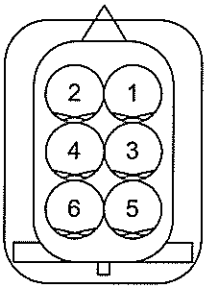
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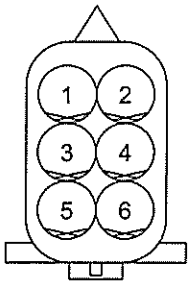
NO	P	C	J
1	104	-	TL
2	-	-	-
3	111	-	STL+
4	-	-	-
5	109	-	TRN
6	N2	-	E

REC

NO	P	C	J
1	104	G-R	J55
2	-	-	-
3	111	R-L	J56
4	-	-	-
5	109	G-Y	CN37-9
6	N2	W-B	J50

CN31 LED RR COMBI LH





TAB

NO	P	C	J
1	203	-	DSBU
2	211	-	STL+
3	204	-	TL
4	-	-	-
5	209	-	TRN
6	N2	-	E

REC

NO	P	C	J
1	203	R-W	J51
2	211	R-L	J52
3	204	G-R	J53
4	-	-	-
5	209	G-Y	CN37-12
6	N2	W-B	J50

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CN32 RR HORN SW



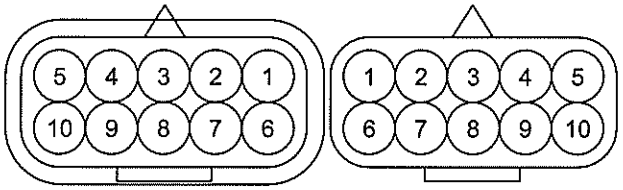
TAB

NO	P	C	J
1	N2	W-B	J50
2	118	L-Y	CN37-5,CN37-6

REC

NO	P	C	J
1	N2	-	HRS-
2	118	-	HRS+

CN33 TEN KEY



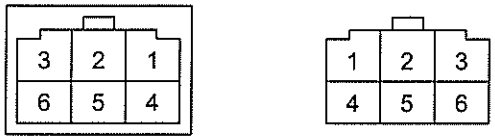
TAB

NO	P	C	J
1	160	-	ITKY1
2	161	-	ITKY2
3	162	-	ITKY3
4	165	-	OTKY2
5	167	-	LEDTKY1
6	163	-	IPSTKY1
7	169	-	TGND
8	164	-	OTKY1
9	166	-	OTKY3
10	168	-	LEDTKY2

REC

NO	P	C	J
1	160	B-Y	CN178-5
2	161	R-B	CN178-4
3	162	G	CN178-3
4	165	R-Y	CN178-2
5	167	G-Y	CN178-1
6	163	W-L	CN178-10
7	169	GR-R	CN178-9
8	164	L-O	CN178-8
9	166	GR-L	CN178-7
10	168	L-B	CN178-6

CN34 RR COMBI RH



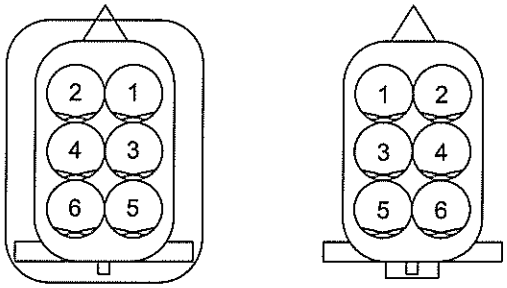
TAB

NO	P	C	J
1	104	-	TL
2	-	-	-
3	111	-	STL+
4	103	-	DSBU
5	108	-	TRN
6	N2	-	E

REC

NO	P	C	J
1	104	G-R	J55
2	-	-	-
3	111	R-L	J56
4	103	R-W	J57
5	108	R-Y	CN37-8
6	N2	W-B	J50

CN34 LED RR COMBI RH



TAB

NO	P	C	J
1	203	-	DSBU
2	211	-	STL+
3	204	-	TL
4	-	-	-
5	208	-	TRN
6	N2	-	E

REC

NO	P	C	J
1	203	R-W	J51
2	211	R-L	J52
3	204	G-R	J53
4	-	-	-
5	208	R-Y	CN37-11
6	N2	W-B	J50

CN35 LQD LVL SSR



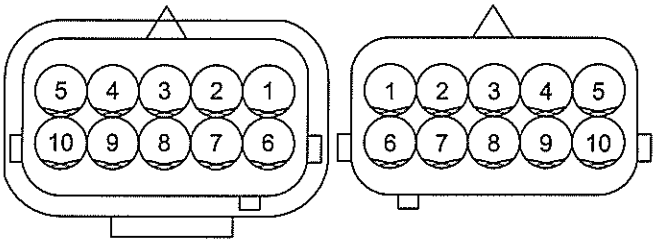
TAB

NO	P	C	J
1	140	V-Y	CN70-26

REC

NO	P	C	J
1	140	-	SLLT

CN37 RR UPR MAIN



TAB

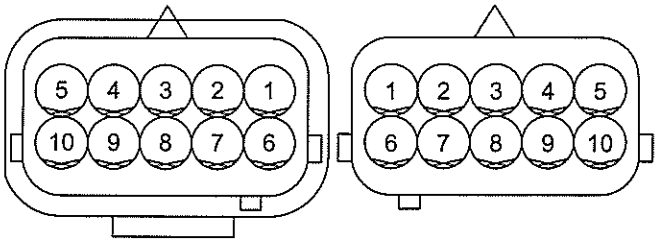
NO	P	C	J
1	107	Y-G	CN185-1
2	105	B-Y	CN303-2
3	120	Y-R	CN59-1
4	103	R-W	J57
5	118	L-Y	CN32-2
6	111	R-L	J56
7	104	G-R	J55
8	108	R-Y	CN34-5
9	109	G-Y	CN31-5
10	N2	W-B	J50

REC

NO	P	C	J
1	107	Y-G	J3
2	105	B-Y	J11
3	120	Y-R	CN24-1
4	103	R-W	CN48-1
5	118	L-Y	J2
6	111	R-L	CN5-4
7	104	G-R	J27
8	108	R-Y	J26
9	109	G-Y	J28
10	N2	W-B	J8

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CN37 DC/DC FOR LED RR COMBI



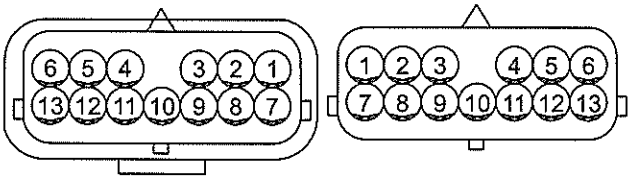
TAB

NO	P	C	J
1	107	Y-G	CN38-1
2	105	B-Y	CN38-2
3	120	Y-R	CN38-4
4	103	R-W	J60
5	118	L-Y	CN38-6
6	111	R-L	CN237-2
7	104	G-R	CN237-3
8	108	R-Y	CN237-5
9	109	G-Y	CN237-4
10	N2	W-B	CN237-6

REC

NO	P	C	J
1	107	Y-G	J3
2	105	B-Y	J11
3	120	Y-R	CN24-1
4	103	R-W	CN48-1
5	118	L-Y	J2
6	111	R-L	CN5-4
7	104	G-R	J27
8	108	R-Y	J26
9	109	G-Y	J28
10	N2	W-B	J8

CN37 DC/DC FOR LED RR COMBI CN38



TAB

NO	P	C	J
1	107	Y-G	J54
2	105	B-Y	CN303-2
3	103	R-W	CN60-1
4	120	Y-R	CN59-1
5	203	R-W	J51
6	118	L-Y	CN32-2
7	211	R-L	J52
8	204	G-R	J53
9	-	-	-
10	-	-	-
11	208	R-Y	CN34-5
12	209	G-Y	CN31-5
13	N2	W-B	J50

REC

NO	P	C	J
1	107	Y-G	CN37-1
2	105	B-Y	CN37-2
3	103	R-W	J60
4	120	Y-R	CN37-2
5	203	R-W	CN238-1
6	118	L-Y	CN37-5
7	211	R-L	CN238-2
8	204	G-R	CN238-3
9	-	-	-
10	-	-	-
11	208	R-Y	CN238-5
12	209	G-Y	CN238-4
13	N2	W-B	CN238-6

CN40 HORN RELAY



TAB

NO	P	C	J
1	41	-	COIL+
2	41	-	SW+
3	118	-	COIL-
4	48	-	SW-

REC

NO	P	C	J
1	41	G-R	J10
2	41	G-R	J10
3	118	L-Y	J2
4	48	L-O	CN3-2

CN43 HOOD SUB



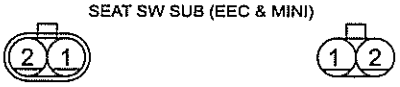
TAB

NO	P	C	J
1	67	L-O	J29
2	51	BR	J12
3	450	P	CN103-35

REC

NO	P	C	J
1	67	L-O	CN44-2
2	51	BR	CN44-1,J66
3	450	P	CN196-2

CN43 SEAT SW SUB (EEC & MINI) CN168



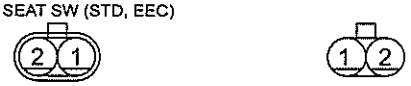
TAB

NO	P	C	J
1	51	B	CN44-1
2	67	B	CN44-2

REC

NO	P	C	J
1	51	BR	J62
2	67	L-O	CN76-5

CN44 SEAT SW (STD, EEC)



TAB

NO	P	C	J
1	51	-	SDM-
2	67	-	SDM+

REC

NO	P	C	J
1	51	BR,B	CN43-2,J66
2	67	L-O,B	CN43-1

CN44 SEAT SW (EEC & MINI)



TAB

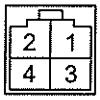
NO	P	C	J
1	51	-	SDM-
2	67	-	SDM+

REC

NO	P	C	J
1	51	B	CN43-1
2	67	B	CN43-2

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CN46 TAIL LP RELAY





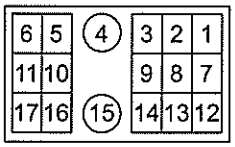
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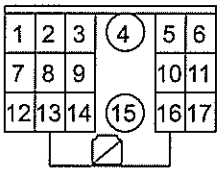
NO	P	C	J
1	101	-	COIL+
2	101	-	SW+
3	116	-	COIL-
4	104	-	SW-

REC

NO	P	C	J
1	101	GR	J6
2	101	GR	J6
3	116	LG	CN7-7,CN8-7
4	104	G-R	J27

CN47 DIAGNOSIS





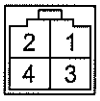
TAB

NO	P	C	J
1	-	-	-
2	-	-	-
3	N2	-	GND
4	43	-	FLP
5	-	-	-
6	-	-	-
7	-	-	-
8	145	-	CAN1H
9	146	-	CAN1L
10	-	-	-
11	-	-	-
12	334	-	PSACC+
13	-	-	-
14	-	-	-
15	-	-	-
16	-	-	-
17	-	-	-

REC

NO	P	C	J
1	-	-	-
2	-	-	-
3	N2	W-B	J9
4	43	B-Y	J16
5	-	-	-
6	-	-	-
7	-	-	-
8	145	R-L	CN200-8
9	146	L-Y	CN200-11
10	-	-	-
11	-	-	-
12	334	L-O	CN201-1
13	-	-	-
14	-	-	-
15	-	-	-
16	-	-	-
17	-	-	-

CN48 RR WORKING LAMP RLY





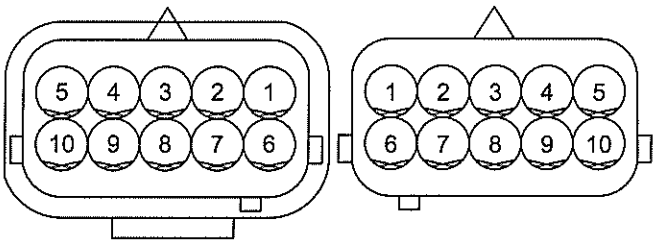
TAB

NO	P	C	J
1	103	-	COIL+
2	101	-	SW+
3	N2	-	COIL-
4	196	-	SW-

REC

NO	P	C	J
1	103	R-W	J15
2	101	GR	J6
3	N2	W-B	J8
4	196	B	CN73-2

CN49 WIPER



TAB

NO	P	C	J
1	105	B-Y	J11
2	186	L	CN183-1
3	440	R-B	J17
4	443	LG	CN291-2
5	442	L	CN291-1
6	185	G-Y	CN183-2
7	-	-	-
8	N2	W-B	J18
9	443	R	CN183-13
10	442	L	CN183-12

REC

NO	P	C	J
1	105	B-Y	CN151-2
2	186	L	CN180-1
3	440	-	VBRY
4	443	-	CAN3L
5	442	-	CAN3H
6	185	G-Y	CN154-3
7	-	-	-
8	N2	-	N2
9	443	-	CAN3L
10	442	-	CAN3H

CN52 DM TEMP SSR RH



TAB

NO	P	C	J
1	85	-	STDMR
2	84	-	STDMR+

REC

NO	P	C	J
1	85	R-W	CN110-10
2	84	GR	CN110-9

CN53 DM SPD SSR SUB



TAB

NO	P	C	J
1	76	LG	SSD
2	75	L	SSD

REC

NO	P	C	J
1	76	Y	CN110-14
2	75	L	CN202-3

CN54 DM SPD SSR2 RH



TAB

NO	P	C	J
1	77	-	SSDR2
2	75	-	SSDR+

REC

NO	P	C	J
1	77	LG	CN110-13
2	75	L	CN202-4

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CN55 PM TEMP SSR



TAB

NO	P	C	J
1	89	-	STPM
2	88	-	STPM+

REC

NO	P	C	J
1	89	R-W	CN111-10
2	88	GR	CN111-9

CN56 PM SPD SSR



TAB

NO	P	C	J
1	82	-	SSP1
2	81	-	SSP+

REC

NO	P	C	J
1	82	G	CN111-14
2	81	R-L	CN111-15

CN58 ROTARY LAMP



TAB

NO	P	C	J
1	105,215	-	LS+
2	N2	-	LS-

REC

NO	P	C	J
1	105,215	B-Y	CN60-2
2	N2	W-B	J50

CN59 DIODE (FWD)



TAB

NO	P	C	J
1	120	-	DIODE+
2	215	-	DIODE-

REC

NO	P	C	J
1	120	Y-R	CN37-3,CN37-4
2	105,215	B-Y	CN60-2,CN303-1

CN60 DIODE (BWD)



TAB

NO	P	C	J
1	103	-	DIODE+
2	215	-	DIODE-

REC

NO	P	C	J
1	103	R-W	CN37-3,J57
2	105,215	B-Y	CN58-1,CN59-2

CN61 TRANSFORMER



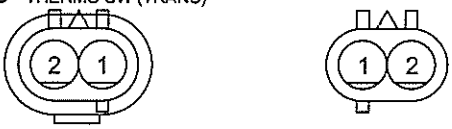
TAB

NO	P	C	J
1	U	W	MSCHR
2	V	R	MSCHS
3	-	-	-
4	W	B	MSCHT

REC

NO	P	C	J
1	U	-	TF
2	V	-	TF
3	-	-	-
4	W	-	TF

CN68 THERMO SW (TRANS)



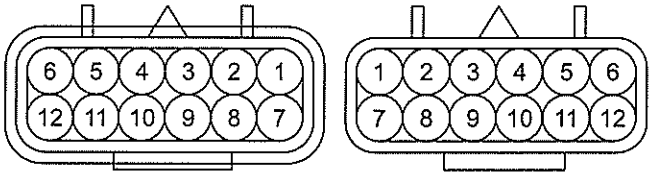
TAB

NO	P	C	J
1	139	-	SWTT
2	14	-	DGND

REC

NO	P	C	J
1	139	P	CN70-28
2	14	W-G	J19

CN69 CHG SW BOX



TAB

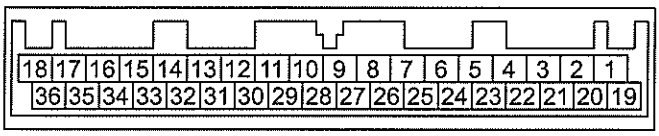
NO	P	C	J
1	132	G-W	CHGMS
2	129	G-R	CHGAC
3	130	BR	CHGGND
4	128	R	CHG7V
5	121	G	SW3
6	122	Y	SW2
7	123	O	SW1
8	124	Y-W	LED4
9	125	Y-G	LED3
10	126	Y-B	LED2
11	127	Y-R	LED1
12	-	-	-

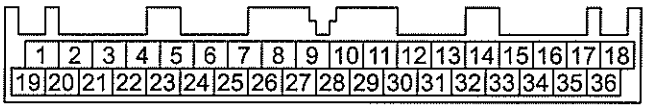
REC

NO	P	C	J
1	132	G-W	CN70-33
2	129	G-R	CN70-25
3	130	BR	CN70-2
4	128	R	CN70-1
5	121	G	CN70-24
6	122	Y	CN70-23
7	123	O	CN70-22
8	124	R-G	CN70-32
9	125	Y-G	CN70-29
10	126	Y-B	CN70-30
11	127	Y-R	CN70-31
12	-	-	-

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CN70 DISPLAY





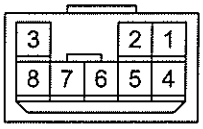
TAB

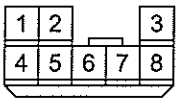
NO	P	C	J
1	128	-	CHG7V
2	130	-	CHGGND
3	169	-	TGND
4	14	-	DGND
5	16	-	D7V
6	162	-	ITKY3
7	-	-	-
8	160	-	ITKY1
9	166	-	OTKY3
10	165	-	OTKY2
11	164	-	OTKY1
12	167	-	LEDTKY1
13	-	-	-
14	-	-	-
15	146	-	CAN1L
16	145	-	CAN1H
17	-	-	-
18	43	-	VBKY
19	168	-	LEDTKY2
20	161	-	ITKY2
21	163	-	IPSTKY1
22	123	-	SW1
23	122	-	SW2
24	121	-	SW3
25	129	-	CHGAC
26	140	-	SLLT
27	-	-	-
28	139	-	SWTT
29	125	-	LED3
30	126	-	LED2
31	127	-	LED1
32	124	-	LED4
33	132	-	CHGMS
34	-	-	-
35	-	-	-
36	N2	-	N1

REC

NO	P	C	J
1	128	R	CN69-4
2	130	BR	CN69-3
3	169	GR-R	CN178-9
4	14	W-G	J19
5	16	Y-B	CN103-14
6	162	G	CN178-3
7	-	-	-
8	160	B-Y	CN178-5
9	166	GR-L	CN178-7
10	165	R-Y	CM178-2
11	164	L-O	CN178-8
12	167	G-Y	CN178-1
13	-	-	-
14	-	-	-
15	146	W	CN200-12
16	145	L	CN200-9
17	-	-	-
18	43	B-Y	J16
19	168	L-B	CN178-6
20	161	R-B	CN178-4
21	163	W-L	CN178-10
22	123	O	CN69-7
23	122	Y	CN69-6
24	121	G	CN69-5
25	129	G-R	CN69-2
26	140	V-Y	CN35-1
27	-	-	-
28	139	P	CN68-1
29	125	Y-G	CN69-9
30	126	Y-B	CN69-10
31	127	Y-R	CN69-11
32	124	P-G	CN69-8
33	132	G-W	CN69-1
34	-	-	-
35	-	-	-
36	N2	W-B	J7

CN73 WORKING LAMP SW





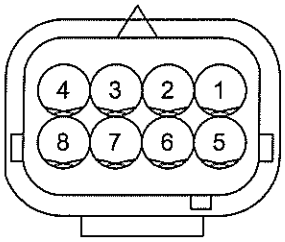
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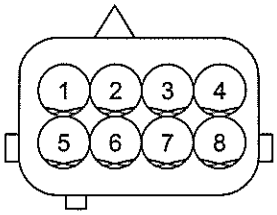
NO	P	C	J
1	107	-	DIR SW-
2	196	-	DIR SW+
3	107	-	PILOT LP+
4	101	-	LP SW+
5	107	-	LP SW-
6	-	-	-
7	-	-	-
8	N2	-	PILOT LP-

REC

NO	P	C	J
1	107	Y-G	J3
2	196	B	CN48-4
3	107	Y-G	J3
4	101	GR	J6
5	107	Y-G	J3
6	-	-	-
7	-	-	-
8	N2	W-B	J7

CN75 HOOD (MINI LEVER)





TAB

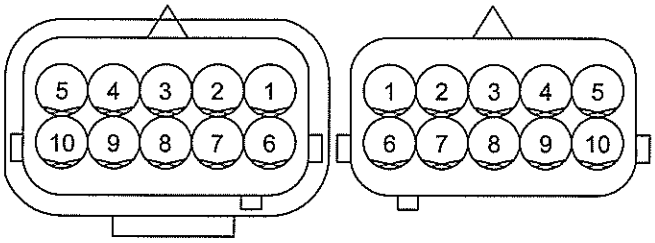
NO	P	C	J
1	105	B-Y	J11
2	120	Y-R	CN24-1
3	45	GR-R	J37
4	-	-	-
5	105	B-Y	J11
6	103	R-W	J15
7	46	B-O	J38
8	-	-	-

REC

NO	P	C	J
1	105	B-Y	CN166-8
2	120	Y-R	CN166-3
3	45	GR-R	CN166-5
4	-	-	-
5	105	B-Y	CN166-7
6	103	R-W	CN166-2
7	46	B-O	CN166-4
8	-	-	-

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CN76 HOOD (MINI LEVER)



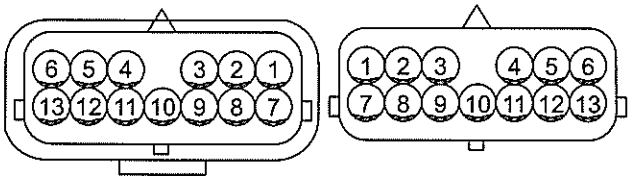
TAB

NO	P	C	J
1	60	P-L	CN104-15
2	N2	W-B	J8
3	-	-	-
4	-	-	-
5	67	L-O	CN104-18
6	68	B-R	CN104-28
7	118	L-Y	J2
8	70	B-L	CN103-32
9	51	BR	J12
10	450	P	CN103-35

REC

NO	P	C	J
1	60	P-L	J63
2	N2	W-B	CN171-1
3	-	-	-
4	-	-	-
5	67	L-O	CN168-2
6	68	B-R	CN170-3
7	118	L-Y	CN171-2
8	70	B-L	CN161-3
9	51	BR	J62
10	450	P	CN197-2

CN77 HOOD (MINI LEVER)



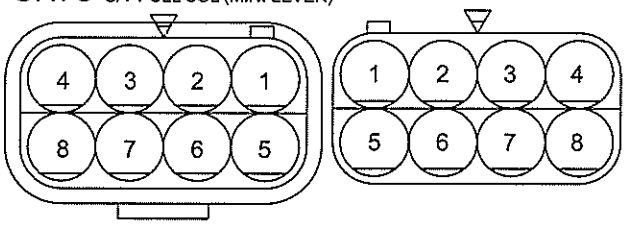
TAB

NO	P	C	J
1	28	V-W	CN101-25
2	20	V-R	CN103-26
3	21	V-G	CN103-18
4	51	GR	CN102-26
5	29	R-Y	CN101-28
6	22	R-W	CN102-23
7	23	R-L	CN102-22
8	30	R-G	CN101-29
9	24	R-B	CN102-21
10	25	P-L	CN102-20
11	31	P-G	CN101-30
12	26	P-B	CN102-29
13	27	L-Y	CN102-28

REC

NO	P	C	J
1	28	V-W	CN162-4
2	20	V-R	CN162-3
3	21	V-G	CN162-2
4	51	GR	J61
5	29	R-Y	CN163-4
6	22	R-W	CN163-3
7	23	R-L	CN163-2
8	30	R-G	CN164-4
9	24	R-B	CN164-3
10	25	P-L	CN164-2
11	31	P-G	CN165-4
12	26	P-B	CN165-3
13	27	L-Y	CN165-2

CN78 C/V PULL SOL (MINI LEVER)



TAB

NO	P	C	J
1	10	B-Y	CN101-17
2	33	W-G	CN101-12
3	36	W-R	CN101-10
4	39	Y-B	CN101-14
5	9	G-W	J39
6	32	L	J36
7	32	L	J36
8	9	G-W	J39

REC

NO	P	C	J
1	10	-	SLPL-
2	33	-	STPL-
3	36	-	SA1PL-
4	39	-	SA2PL-
5	9	-	SLPL+
6	32	-	STPL+
7	32	-	SA1PL+
8	9	-	SA2PL+

CN80 ONRYO KIRIKAE BUZZER



TAB

NO	P	C	J
1	191	-	BZ+
2	N2	-	BZ-
3	193	-	SW+
4	194	-	SW-

REC

NO	P	C	J
1	191	R-W	CN23-1
2	N2	W-B	CN23-2
3	193	L-B	CN82-2
4	194	G-R	CN82-4

CN81 ONRYO KIRIKAE SW



TAB

NO	P	C	J
1	195	-	HIGH SW-
2	103	-	SW+
3	-	-	-
4	103,191	-	LOW SW-

REC

NO	P	C	J
1	195	G-R	CN186-1
2	103	R-W	J15
3	-	-	-
4	103,191	R-W	CN23-1

CN82 KIRIKAE RLY



TAB

NO	P	C	J
1	195	-	COIL+
2	193	-	SW+
3	N2	-	COIL-
4	194	-	SW-

REC

NO	P	C	J
1	195	G-R	CN83-1,CN186-1
2	193	L-B	CN80-3
3	N2	W-B	CN23-2
4	194	G-R	CN80-4

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CN85 NTRL TILT SW



TAB

NO	P	C	J
1	51	BR	J12
2	70	B-L	CN103-32

REC

NO	P	C	J
1	51	-	LS-
2	70	-	STK

CN86 TILT ANG SSR



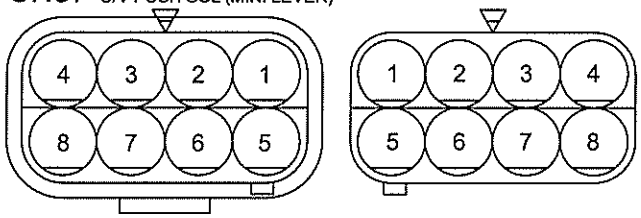
TAB

NO	P	C	J
1	57	-	VRTA+
2	56	-	VRTA
3	51	-	POT-

REC

NO	P	C	J
1	57	L-Y	CN101-20
2	56	Y-R	CN103-17
3	51	G	J20

CN87 C/V PUSH SOL (MINI LEVER)



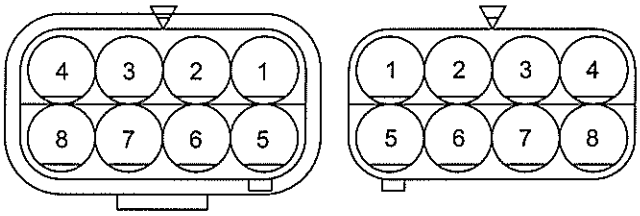
TAB

NO	P	C	J
1	11	B-W	CN101-16
2	34	W-L	CN101-13
3	37	G-B	CN101-11
4	40	B-R	CN101-15
5	9	G-W	J39
6	32	L	J36
7	32	L	J36
8	9	G-W	J39

REC

NO	P	C	J
1	11	-	SLPS-
2	34	-	STPS-
3	37	-	SA1PS-
4	40	-	SA2PS-
5	9	-	SLPS+
6	32	-	STPS+
7	32	-	SA1PS+
8	9	-	SA2PS+

CN88 C/V SOL



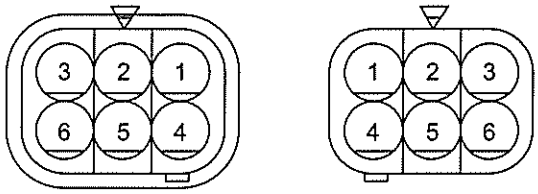
TAB

NO	P	C	J
1	3	V	J21
2	3	V	J21
3	6	Y-R	CN101-2
4	-	-	-
5	5	W-L	CN102-17
6	4	B-Y	CN102-16
7	7	W	CN102-19
8	-	-	-

REC

NO	P	C	J
1	3	-	SLUL+
2	3	-	SLLL+
3	6	-	SLTFL+
4	-	-	-
5	5	-	SLUL-
6	4	-	SLLL-
7	7	-	SLTFL-
8	-	-	-

CN88 C/V SOL <MINI LEVER>



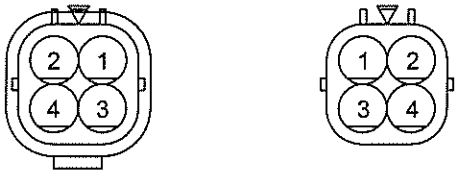
TAB

NO	P	C	J
1	-	-	-
2	3	V	CN101-1
3	6	Y-R	CN101-2
4	-	-	-
5	4	B-Y	CN102-16
6	7	W	CN102-19

REC

NO	P	C	J
1	-	-	-
2	3	-	SLLL+
3	6	-	SLTFL+
4	-	-	-
5	4	-	SLLL-
6	7	-	SLTFL-

CN89 TILT SW



TAB

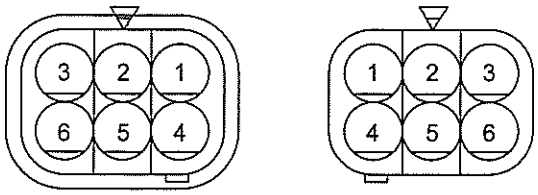
NO	P	C	J
1	61	R-W	CN102-23
2	51	GR	J22
3	62	R-L	CN102-22
4	51	GR	J22

REC

NO	P	C	J
1	61	-	VRT1
2	51	-	LS-
3	62	-	VRT2
4	51	-	LS-

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CN90 MAST



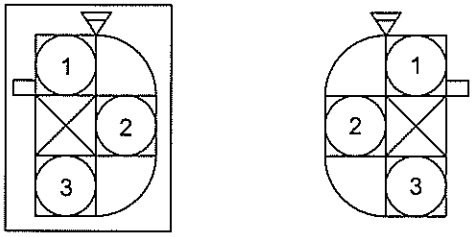
TAB

NO	P	C	J
1	51	BR	CN261-1
2	420	G	CN261-2
3	90	L	CN92-2
4	51	BR	CN92-1
5	91	L-B	CN92-3
6	-	-	-

REC

NO	P	C	J
1	51	BR	J14
2	420	G	CN103-34
3	90	L	CN104-22
4	51	BR	J14
5	91	L-B	CN103-24
6	-	-	-

CN91 PRESS SSR



TAB

NO	P	C	J
1	58	-	SPLF+
2	59	-	SPLF
3	51	-	POT-

REC

NO	P	C	J
1	58	Y-R	CN104-12
2	59	Y-G	CN103-29
3	51	G	J20

CN92 HEIGHT SW



TAB

NO	P	C	J
1	51	BR	CN90-4
2	90	L	CN90-3
3	91	L-B	CN90-5

REC

NO	P	C	J
1	51	-	LS-
2	90	-	SH1
3	91	-	SH2-1

CN97 TIRE ANGLE SSR



TAB

NO	P	C	J
1	51	-	POT-
2	317	-	VRTRA
3	316	-	VRTRA+

REC

NO	P	C	J
1	51	GR	J22
2	317	L-R	CN102-31
3	316	L-W	CN101-23

CN98 STEERING SOL



TAB

NO	P	C	J
1	330	-	SLS-
2	329	-	SLS+

REC

NO	P	C	J
1	330	W-L	CN102-14
2	329	R	CN102-7

CN99 CLAMP LOCK VALVE



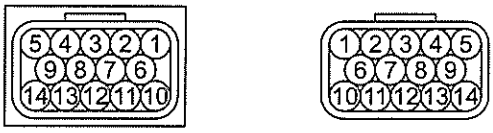
TAB

NO	P	C	J
1	113	G-W	CN179-1
2	N2	W-B	CN179-2

REC

NO	P	C	J
1	113	-	SLIL+
2	N2	-	SLIL-

CN100 CAN BRIDGE



TAB

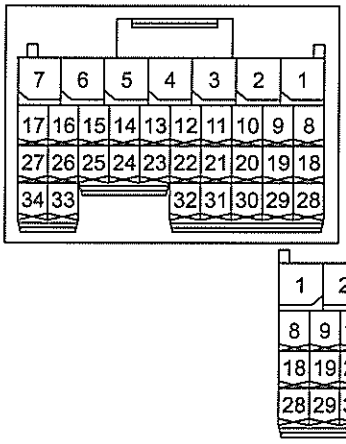
NO	P	C	J
1	443	-	CAN3R
2	443	-	CAN3L
3	442	-	CAN3H
4	N2	-	E2
5	146	-	CAN1L
6	-	-	-
7	-	-	-
8	-	-	-
9	145	-	CAN1H
10	N2	-	SELCB
11	-	-	-
12	-	-	-
13	N2	-	E1
14	440	-	IG

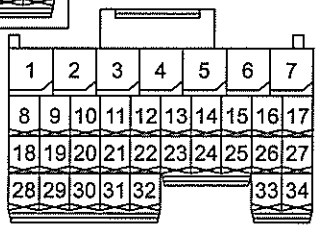
REC

NO	P	C	J
1	443	GR	CN603-3
2	443	BR	CN603-1
3	442	Y-G	CN603-4
4	N2	W-B	J75
5	146	BR	CN183-6
6	-	-	-
7	-	-	-
8	-	-	-
9	145	BR-W	CN183-5
10	N2	W-B	J75
11	-	-	-
12	-	-	-
13	N2	W-B	J75
14	440	R-B	CN183-4

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CN101 CPU1





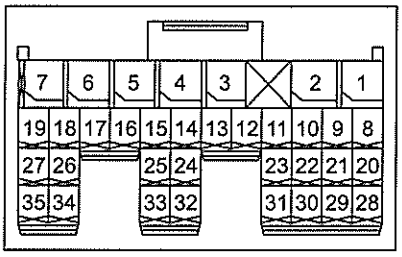
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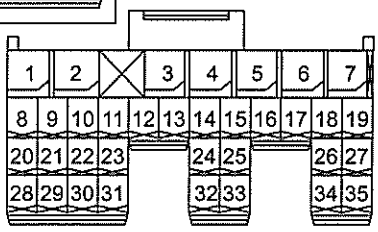
NO	P	C	J
1	3	-	SOLLU+
2	6	-	SLTFB+
3	97	-	FAN+
4	41	-	VBBT
5	9	-	SLLA2+
6	32	-	SLTA1+
7	-	-	-
8	-	-	-
9	-	-	-
10	36	-	SA1PL-
11	37	-	SA1PS-
12	33	-	STPL-
13	34	-	STPS-
14	39	-	SA2PL-
15	40	-	SA2PS-
16	11	-	SLPS-
17	10	-	SLPL-
18	-	-	-
19	43	-	VBKY
20	57	-	VRTA+
21	-	-	-
22	50	-	VRA-
23	316	-	VRTRA+
24	-	-	-
25	28	-	VRL+
26	55	-	VRA2+
27	53	-	VRA1+
28	29	-	VRT+
29	30	-	VRAT1+
30	31	-	VRAT2+
31	-	-	-
32	51	-	POT-
33	-	-	-
34	-	-	-

REC

NO	P	C	J
1	3	V	CN88-2,J21
2	6	Y-R	CN88-3
3	97	R-W	CN127-3
4	41	G	J5
5	9	G-W	J39
6	32	L	J36
7	-	-	-
8	-	-	-
9	-	-	-
10	36	W-R	CN78-3
11	37	G-B	CN87-3
12	33	W-G	CN78-2
13	34	W-L	CN87-2
14	39	Y-B	CN78-4
15	40	B-R	CN87-4
16	11	B-W	CN87-1
17	10	B-Y	CN78-1
18	-	-	-
19	43	B-Y	J16
20	57	L-Y	CN86-1
21	-	-	-
22	50	B-O	CN26-6
23	316	L-W	CN97-3
24	-	-	-
25	28	V-W	CN117-1,CN77-1
26	55	GR-R	CN26-1
27	53	BR-W	CN26-5
28	29	R-Y	CN77-5
29	30	R-G	CN117-4,CN77-8
30	31	P-G	CN117-3,CN77-11
31	-	-	-
32	51	G	J20
33	-	-	-
34	-	-	-

CN102 CPU2





TAB

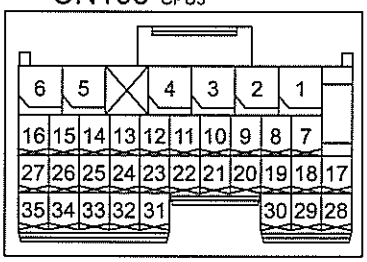
NO	P	C	J
1	98	-	FNDC1
2	99	-	FNDC2
3	19	-	VBMBSL
4	19	-	VBMBSL
5	17	-	SOLCOM
6	17	-	SOLCOM
7	329	-	SLS+
8	333	-	OACC3
9	332	-	OACC2
10	51	-	LS-
11	-	-	-
12	-	-	-
13	335	-	RY1
14	330	-	SLS-
15	-	-	-
16	4	-	SLLL-
17	5	-	SLUL-
18	-	-	-
19	7	-	SLTFL-
20	25	-	VRA12
21	24	-	VRA11
22	23,62	-	VRT2,SWTR
23	22,61	-	VRT1,SWTF
24	304	-	CSBAT
25	-	-	-
26	51	-	POT-
27	-	-	-
28	27	-	VRA22
29	26	-	VRA21
30	52	-	VRA1
31	317	-	VRTRA
32	54	-	VRA2
33	-	-	-
34	-	-	-
35	305	-	CSBAT-

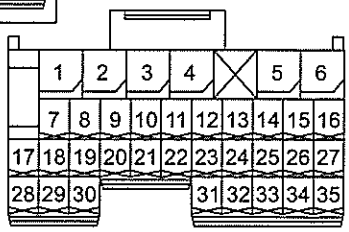
REC

NO	P	C	J
1	98	V-Y	J25
2	99	G-R	CN118-2
3	19	Y-B	J23,J35
4	19	Y-B	J23,J35
5	17	G-W	CN127-7
6	17	G-W	CN127-6
7	329	R	CN98-2
8	333	G	CN209-2
9	332	R	CN208-2
10	51	BR	J12
11	-	-	-
12	-	-	-
13	335	LG	CN127-5
14	330	W-L	CN98-1
15	-	-	-
16	4	B-Y	CN88-6,CN88-5
17	5	W-L	CN88-5
18	-	-	-
19	7	W	CN88-7,CN88-6
20	25	P-L	CN117-10,CN77-10
21	24	R-B	CN117-5,CN77-9
22	23,62	R-L	CN89-3,CN77-7
23	22,61	R-W	CN89-1,CN77-6
24	304	L-O	CN137-3
25	-	-	-
26	51	GR	CN77-4,J22
27	-	-	-
28	27	L-Y	CN117-9,CN77-13
29	26	P-B	CN117-8,CN77-12
30	52	BR-R	CN26-4
31	317	L-R	CN97-2
32	54	BR-Y	CN26-3
33	-	-	-
34	-	-	-
35	305	B-O	CN137-2

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CN103 CPU3





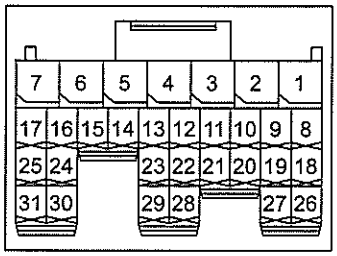
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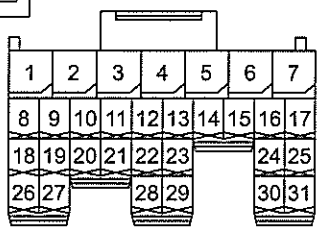
NO	P	C	J
1	-	-	-
2	-	-	-
3	14	-	DGND
4	42	-	KYSAT
5	N2	-	N2
6	51	-	LS-
7	-	-	-
8	300	-	IPL+
9	-	-	-
10	-	-	-
11	145	-	CAN1H
12	146	-	CAN1L
13	311	-	SSTR+
14	16	-	D7V
15	-	-	-
16	-	-	-
17	56	-	VRTA
18	21	-	VRL2
19	302	-	IPL2
20	-	-	-
21	-	-	-
22	-	-	-
23	-	-	-
24	91	-	SH2-1
25	-	-	-
26	20	-	VRL1
27	-	-	-
28	-	-	-
29	59	-	SPLF
30	301	-	IPL1
31	-	-	-
32	70	-	STK
33	306	-	OLM+
34	420	-	SWH08
35	450	-	SSB

REC

NO	P	C	J
1	-	-	-
2	-	-	-
3	14	W-G	J19
4	42	R-Y	J24
5	N2	W-B	CN200-1
6	51	BR	J14
7	-	-	-
8	300	L-B	CN203-1
9	-	-	-
10	-	-	-
11	145	GR-R	CN200-7
12	146	P-B	CN200-10
13	311	P-L	CN19-1
14	16	Y-B	CN70-5
15	-	-	-
16	-	-	-
17	56	Y-R	CN86-2
18	21	V-G	CN117-6,CN77-3
19	302	V-Y	CN130-2
20	-	-	-
21	-	-	-
22	-	-	-
23	-	-	-
24	91	L-B	CN90-5
25	-	-	-
26	20	V-R	CN117-2,CN77-2
27	-	-	-
28	-	-	-
29	59	Y-G	CN91-2
30	301	W-L	CN129-2
31	-	-	-
32	70	B-L	CN85-2,CN76-8
33	306	R-G	CN220-1
34	420	G	CN90-2
35	450	P	CN43-3,CN76-10

CN104 CPU4





TAB

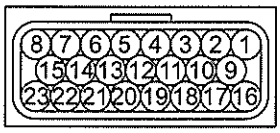
NO	P	C	J
1	41	-	B48V
2	44	-	VBMB
3	1	-	CBAT+
4	N2	-	N2
5	N2	-	N2
6	N2	-	N2
7	-	-	-
8	-	-	-
9	2	-	CBAT-
10	303	-	CSBAT+
11	-	-	-
12	58	-	SPLF+
13	-	-	-
14	334	-	PSACC+
15	60	-	PSSW+
16	-	-	-
17	-	-	-
18	67	-	SDM
19	46	-	DSR
20	66	-	SPB
21	-	-	-
22	90	-	SH1
23	65	-	SWA
24	314	-	SSTRC
25	-	-	-
26	45	-	DSF
27	-	-	-
28	68	-	SHS
29	-	-	-
30	312	-	SSTR1
31	313	-	SSTR2

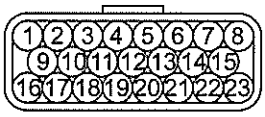
REC

NO	P	C	J
1	41	G	J5
2	44	R-B	CN212-1
3	1	G-B	J13
4	N2	W-B	CN200-2
5	N2	W-B	CN200-3
6	N2	W-B	CN200-4
7	-	-	-
8	-	-	-
9	2	LG-B	CN136-3
10	303	GR-L	CN137-1
11	-	-	-
12	58	Y-R	CN91-1
13	-	-	-
14	334	L-O	CN200-5
15	60	P-L	CN76-1
16	-	-	-
17	-	-	-
18	67	L-O	CN76-5,J29
19	46	B-O	CN9-6,J38
20	66	G-W	CN177-1
21	-	-	-
22	90	L	CN90-3
23	65	Y	CN5-1
24	314	G-Y	CN19-5
25	-	-	-
26	45	GR-R	CN9-5,CN10-5,CN133-2,J37
27	-	-	-
28	68	B-R	CN76-6
29	-	-	-
30	312	B-Y	CN19-3
31	313	L-W	CN19-4

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CN109 DRIVE INV LH





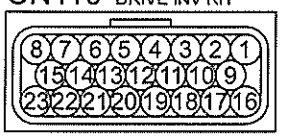
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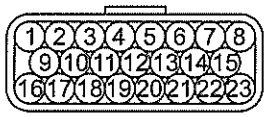
NO	P	C	J
1	-	-	-
2	-	-	-
3	-	-	-
4	-	-	-
5	-	-	-
6	-	-	-
7	-	-	-
8	42	-	KYSAT
9	86	-	STDML+
10	87	-	STDML-
11	-	-	-
12	-	-	-
13	80	-	SSDL2
14	79	-	SSDL1
15	78	-	SSDL+
16	146	-	CAN1L
17	145	-	CAN1H
18	-	-	-
19	-	-	-
20	-	-	-
21	-	-	-
22	-	-	-
23	-	-	-

REC

NO	P	C	J
1	-	-	-
2	-	-	-
3	-	-	-
4	-	-	-
5	-	-	-
6	-	-	-
7	-	-	-
8	42	R-Y	J24
9	86	GR	CN121-2
10	87	R-W	CN121-1
11	-	-	-
12	-	-	-
13	80	R	CN123-1
14	79	R-B	CN122-1
15	78	LG	CN203-5
16	146	G	CN203-7
17	145	GR	CN203-10
18	-	-	-
19	-	-	-
20	-	-	-
21	-	-	-
22	-	-	-
23	-	-	-

CN110 DRIVE INV RH





TAB

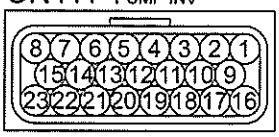
NO	P	C	J
1	-	-	-
2	-	-	-
3	-	-	-
4	-	-	-
5	-	-	-
6	-	-	-
7	150	-	SETDR0
8	42	-	KYSAT
9	84	-	STDMR+
10	85	-	STDMR-
11	-	-	-
12	-	-	-
13	77	-	SSDR2
14	76	-	SSDR1
15	75	-	SSDR+
16	146	-	CAN1L
17	145	-	CAN1H
18	-	-	-
19	-	-	-
20	-	-	-
21	-	-	-
22	-	-	-
23	150	-	SETDR-

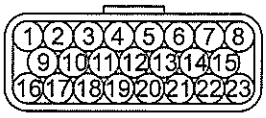
REC

NO	P	C	J
1	-	-	-
2	-	-	-
3	-	-	-
4	-	-	-
5	-	-	-
6	-	-	-
7	150	G-R	CN110-23
8	42	R-Y	J24
9	84	GR	CN52-2
10	85	R-W	CN52-1
11	-	-	-
12	-	-	-
13	77	LG	CN54-1
14	76	Y	CN53-1
15	75	LG	CN203-3
16	146	L	CN203-8
17	145	W	CN203-11
18	-	-	-
19	-	-	-
20	-	-	-
21	-	-	-
22	-	-	-
23	150	G-R	CN110-7

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CN111 PUMP INV





TAB

NO	P	C	J
1	-	-	-
2	-	-	-
3	-	-	-
4	-	-	-
5	-	-	-
6	152	-	SETP1
7	-	-	-
8	42	-	KYSAT
9	88	-	STPM+
10	89	-	STPM
11	-	-	-
12	-	-	-
13	-	-	-
14	82	-	SSP1
15	81	-	SSP+
16	146	-	CAN1L
17	145	-	CAN1H
18	-	-	-
19	-	-	-
20	-	-	-
21	-	-	-
22	-	-	-
23	152	-	SETP-

REC

NO	P	C	J
1	-	-	-
2	-	-	-
3	-	-	-
4	-	-	-
5	-	-	-
6	152	G-R	CN111-23
7	-	-	-
8	42	R-Y	J24
9	88	GR	CN55-2
10	89	R-W	CN55-1
11	-	-	-
12	-	-	-
13	-	-	-
14	82	G	CN56-1
15	81	R-L	CN56-2
16	146	V	CN202-11
17	145	P	CN202-8
18	-	-	-
19	-	-	-
20	-	-	-
21	-	-	-
22	-	-	-
23	152	G-R	CN111-6

CN112 INV FAN1





TAB

NO	P	C	J
1	1	R	CBAT+
2	98	B	FNDC1

REC

NO	P	C	J
1	1	G-B	J13
2	98	V-Y	J25

CN113 INV FAN2





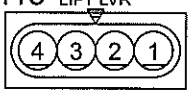
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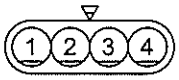
NO	P	C	J
1	1	R	CBAT+
2	98	B	FNDC1

REC

NO	P	C	J
1	1	G-B	J13
2	98	V-Y	J25

CN115 LIFT LVR





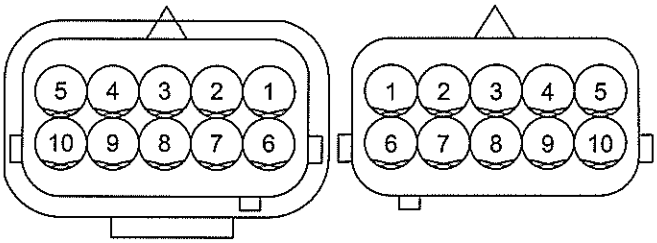
TAB

NO	P	C	J
1	51	-	POT-
2	21	-	VRL2
3	20	-	VRL1
4	28	-	VRL+

REC

NO	P	C	J
1	51	GR	J47
2	21	V-G	CN117-6
3	20	V-R	CN117-2
4	28	V-W	CN117-1

CN117 C/V SSR SUB



TAB

NO	P	C	J
1	28	V-W	CN101-25
2	20	V-R	CN103-26
3	31	P-G	CN101-30
4	30	R-G	CN101-29
5	24	R-B	CN102-21
6	21	V-G	CN103-18
7	51	GR	J22
8	26	P-B	CN102-29
9	27	L-Y	CN102-28
10	25	P-L	CN102-20

REC

NO	P	C	J
1	28	V-W	CN115-4
2	20	V-R	CN115-3
3	31	P-G	CN120-4
4	30	R-G	CN119-4
5	24	R-B	CN119-3
6	21	V-G	CN115-2
7	51	GR	J47
8	26	P-B	CN120-3
9	27	L-Y	CN120-2
10	25	P-L	CN119-2

CN118 MOTOR FAN





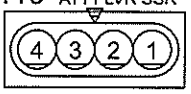
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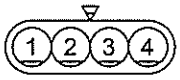
NO	P	C	J
1	1	-	CBAT+
2	99	-	FNDC2

REC

NO	P	C	J
1	1	G-B	J13
2	99	G-R	CN102-2

CN119 ATT1 LVR SSR





TAB

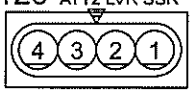
NO	P	C	J
1	51	-	POT-
2	25	-	VRAT12
3	24	-	VRAT11
4	30	-	VRAT1+

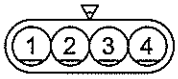
REC

NO	P	C	J
1	51	GR	J47
2	25	P-L	CN117-10
3	24	R-B	CN117-5
4	30	R-G	CN117-4

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CN120 ATT2 LVR SSR





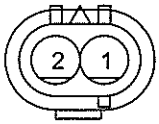
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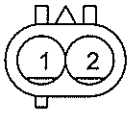
NO	P	C	J
1	51	-	POT-
2	27	-	VRAT22
3	26	-	VRAT21
4	31	-	VRAT2+

REC

NO	P	C	J
1	51	GR	J47
2	27	L-Y	CN117-9
3	26	P-B	CN117-8
4	31	P-G	CN117-3

CN121 DM TEMP SSR LH





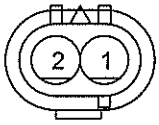
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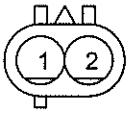
NO	P	C	J
1	87	-	STDML
2	86	-	STDML+

REC

NO	P	C	J
1	87	R-W	CN109-10
2	86	GR	CN109-9

CN122 DM SPD SSR1 LH





TAB

NO	P	C	J
1	79	-	SSDL1
2	78	-	SSDL+

REC

NO	P	C	J
1	79	R-B	CN109-14
2	78	G	CN202-1

CN53 DM SPD SSR SUB CN123





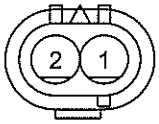
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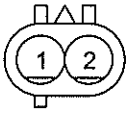
NO	P	C	J
1	80	-	SSDR2
2	78	-	SSDR+

REC

NO	P	C	J
1	80	R	CN109-13
2	78	G	CN202-2

CN125 WORKING LP





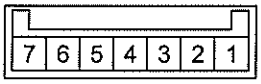
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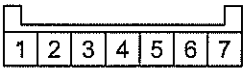
NO	P	C	J
1	107	-	LW+
2	N2	-	LW-

REC

NO	P	C	J
1	107	Y-G	J54
2	N2	W-B	J50

CN127 MINI LEVER SOL RLY





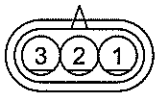
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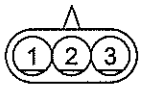
NO	P	C	J
1	19	-	VBMBSL
2	19	-	VBMBSL
3	97	-	RY1+
4	-	-	-
5	335	-	RY1-
6	17	-	SOLCOM
7	17	-	SOLCOM

REC

NO	P	C	J
1	19	Y-B	J35
2	19	Y-B	J35
3	97	R-W	CN101-3
4	-	-	-
5	335	LG	CN102-13
6	17	G-W	CN102-6
7	17	G-W	CN102-5

CN129 IMPACT SSR1





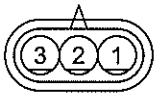
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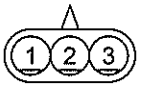
NO	P	C	J
1	51	-	POT-
2	301	-	IPL1
3	300	-	IPL+

REC

NO	P	C	J
1	51	G	J20
2	301	W-L	CN103-30
3	300	L-B	CN202-6

CN130 IMPACT SSR2





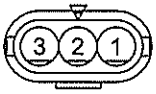
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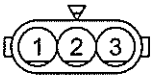
NO	P	C	J
1	51	-	POT-
2	302	-	IPL2
3	300	-	IPL+

REC

NO	P	C	J
1	51	G	J20
2	302	V-Y	CN103-19
3	300	L-B	CN202-5

CN133 EZ PEDAL





TAB

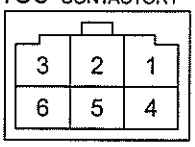
NO	P	C	J
1	51	R	NC
2	45	W	NO
3	46	W	NO

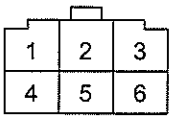
REC

NO	P	C	J
1	51	BR	J12
2	45	GR-R	CN104-26,J37
3	46	B-O	CN104-19,J38

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CN136 CONTACTOR1





TAB

NO	P	C	J
1	101	GR	J6
2	41	G-R	J10
3	2	LG-B	CN104-9
4	1	G-B	J13
5	44	R-B	CN212-1
6	19	Y-B	J23

REC

NO	P	C	J
1	101	G	FLP
2	41	Y	VBBT
3	2	B	CBAT-
4	1	R	CBAT+
5	44	L	VBMB
6	19	GR	VBMBSL

CN137 CONTACTOR2





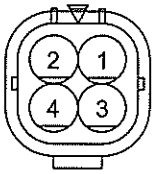
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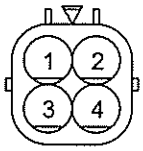
NO	P	C	J
1	303	R	CSBAT+
2	305	B	CSBAT-
3	304	W	CSBAT

REC

NO	P	C	J
1	303	GR-L	CN104-10
2	305	B-O	CN102-35
3	304	L-O	CN102-24

CN144 DC/DC





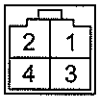
TAB

NO	P	C	J
1	233	-	IN-
2	232	-	IN+
3	235	-	OUT-
4	234	-	OUT+

REC

NO	P	C	J
1	233	W-R	CN147-1
2	232	L-R	CN145-2
3	235	B	CN146-1
4	234	R-W	CN145-3

CN145 F8 & F9 FUSE





TAB

NO	P	C	J
1	231	-	F8
2	232	-	F8
3	234	-	F9
4	236	-	F9

REC

NO	P	C	J
1	231	Y-R	CN147-2
2	232	L-R	CN144-2
3	234	R-W	CN144-4
4	236	R	CN146-2

CN146 12V PWR SUPPLY





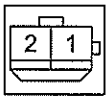
TAB

NO	P	C	J
1	235	B	CN144-3
2	236	R	CN145-4

REC

NO	P	C	J
1	235	-	-
2	236	-	-

CN147 DC/DC





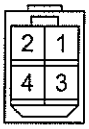
TAB

NO	P	C	J
1	233	W-R	CN144-1
2	231	Y-R	CN145-1

REC

NO	P	C	J
1	233	W-R	CN149
2	231	Y-R	CN148

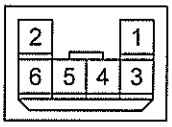
CN148 SHORT PIN

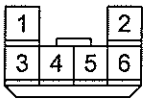


TAB

NO	P	C	J
1	-	-	-
2	103	R-W	CN148-4
3	-	-	-
4	103	R-W	CN148-2

CN150 WIP & WSH SW





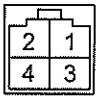
TAB

NO	P	C	J
1	-	-	-
2	188	-	WIP SW
3	-	-	-
4	187	-	+B
5	-	-	-
6	189	-	WSH SW

REC

NO	P	C	J
1	-	-	-
2	188	R-L	J71
3	-	-	-
4	187	L-W	J70
5	-	-	-
6	189	Y	J72

CN154 WIPER MOTOR





TAB

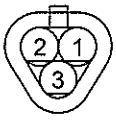
NO	P	C	J
1	-	-	-
2	188	-	+
3	185	-	N2
4	187	-	+

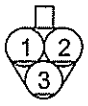
REC

NO	P	C	J
1	-	-	-
2	188	R-L	J71
3	185	G-Y	CN49-6
4	187	L-W	CN151-1

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CN161 NTRL TILT SW





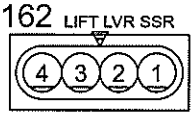
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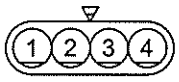
NO	P	C	J
1	60	-	PSSW+
2	51	-	LS-
3	70	-	STK

REC

NO	P	C	J
1	60	P-L	J63
2	51	BR	J62
3	70	B-L	CN76-8

CN162 LIFT LVR SSR





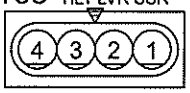
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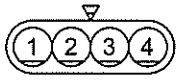
NO	P	C	J
1	51	-	POT-
2	21	-	VRL2
3	20	-	VRL1
4	28	-	VRL+

REC

NO	P	C	J
1	51	GR	J61
2	21	V-G	CN77-3
3	20	V-R	CN77-2
4	28	V-W	CN77-1

CN163 TILT LVR SSR





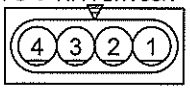
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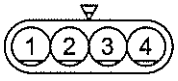
NO	P	C	J
1	51	-	POT-
2	23	-	VRT2
3	22	-	VRT1
4	29	-	VRT+

REC

NO	P	C	J
1	51	GR	J61
2	23	R-L	CN77-7
3	22	R-W	CN77-6
4	29	R-Y	CN77-5

CN164 ATT1 LVR SSR





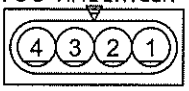
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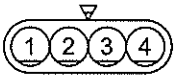
NO	P	C	J
1	51	-	POT-
2	25	-	VRAT12
3	24	-	VRAT11
4	30	-	VRAT1+

REC

NO	P	C	J
1	51	GR	J61
2	25	P-L	CN77-10
3	24	R-B	CN77-9
4	30	R-G	CN77-8

CN165 ATT2 LVR SSR





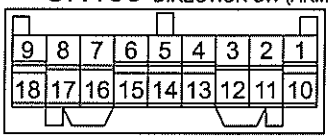
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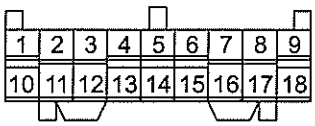
NO	P	C	J
1	51	-	POT-
2	27	-	VRAT22
3	26	-	VRAT21
4	31	-	VRAT2+

REC

NO	P	C	J
1	51	GR	J61
2	27	L-Y	CN77-13
3	26	P-B	CN77-12
4	31	P-G	CN77-11

CN166 DIRECTION SW (ARM DIR)





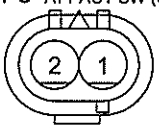
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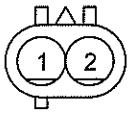
NO	P	C	J
1	-	-	-
2	103	-	DSBU
3	120	-	DSFO
4	46	-	DSR
5	45	-	DSF
6	51	-	LS-
7	105	-	VBKY
8	105	-	VBKY
9	-	-	-
10	-	-	-
11	-	-	-
12	-	-	-
13	-	-	-
14	-	-	-
15	-	-	-
16	-	-	-
17	-	-	-
18	-	-	-

REC

NO	P	C	J
1	-	-	-
2	103	R-W	CN75-6
3	120	Y-R	CN75-2
4	46	B-O	CN75-7
5	45	GR-R	CN75-3
6	51	BR	J62
7	105	B-Y	CN75-5
8	105	B-Y	CN75-1
9	-	-	-
10	-	-	-
11	-	-	-
12	-	-	-
13	-	-	-
14	-	-	-
15	-	-	-
16	-	-	-
17	-	-	-
18	-	-	-

CN170 ATT ACT SW (COWL)





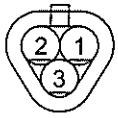
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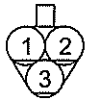
NO	P	C	J
1	105	B-R	CN213-2
2	114	BR	CN213-1

REC

NO	P	C	J
1	105	-	SW+
2	114	-	SW-

CN170 ATT ACT SW (MINI)





TAB

NO	P	C	J
1	60	-	IG
2	51	-	E
3	68	-	+

REC

NO	P	C	J
1	60	P-L	J63
2	51	BR	J62
3	68	B-R	CN76-6

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CN171 ARMREST HORN SW



TAB

NO	P	C	J
1	N2	W-B	CN76-2
2	118	L-Y	CN76-7

REC

NO	P	C	J
1	N2	-	SW-
2	118	-	SW+

CN172 FR STAY RH1



TAB

NO	P	C	J
1	102	R-G	CN14-3,CN16-1
2	108	R-Y	CN14-4
3	N2	W-B	CN14-5,CN16-2

REC

NO	P	C	J
1	102	R-G	CN210-4
2	108	R-Y	J26
3	N2	W-B	J7

CN173 FR STAY RH2



TAB

NO	P	C	J
1	104	G-R	J27
2	N2	W-B	J7
3	N2	W-B	J7

REC

NO	P	C	J
1	104	G-R	CN14-2
2	N2	W-B	CN14-3
3	N2	W-B	CN14-1,CN14-4

CN172 FR STAY LH1 CN174



TAB

NO	P	C	J
1	102	R-G	CN14-3,CN16-1
2	109	R-Y	CN14-4
3	N2	W-B	CN14-5,CN16-2

REC

NO	P	C	J
1	102	R-G	CN177-4
2	109	G-Y	CN177-2
3	N2	W-B	J46

CN175 FR STAY LH2 CN173



TAB

NO	P	C	J
1	104	G-R	CN177-6
2	N2	W-B	J46
3	N2	W-B	J46

REC

NO	P	C	J
1	104	G-R	CN14-2
2	N2	W-B	CN14-3
3	N2	W-B	CN14-1,CN14-4

CN176 EMERGENCY SW



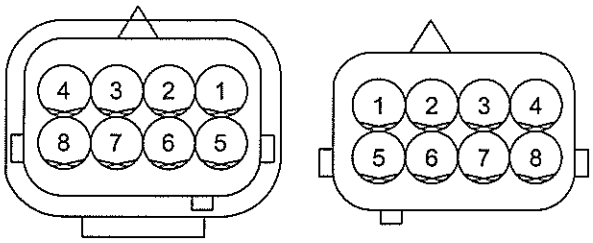
TAB

NO	P	C	J
1	41	B	SWE+
2	41	W	SWE-

REC

NO	P	C	J
1	41	G-R	J10
2	41	G	J5

CN177 BODY SUB



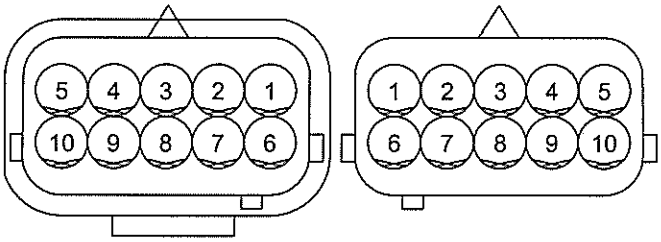
TAB

NO	P	C	J
1	66	G-W	CN15-1
2	109	G-Y	CN174-2
3	-	-	-
4	102	R-G	CN174-1
5	51	B	CN15-3
6	104	G-R	CN175-1
7	-	-	-
8	N2	W-B	J46

REC

NO	P	C	J
1	66	G-W	CN104-20
2	109	G-Y	J28
3	-	-	-
4	102	R-G	CN210-4
5	51	B	J14
6	104	G-R	J27
7	-	-	-
8	N2	W-B	J7

CN178 TEN KEY



TAB

NO	P	C	J
1	167	G-Y	CN70-12
2	165	R-Y	CN70-10
3	162	G	CN70-6
4	161	R-B	CN70-20
5	160	B-Y	CN70-8
6	168	L-B	CN70-19
7	166	GR-L	CN70-9
8	164	L-O	CN70-11
9	169	GR-R	CN70-3
10	163	W-L	CN70-21

REC

NO	P	C	J
1	167	G-Y	CN33-5
2	165	R-Y	CN33-4
3	162	G	CN33-3
4	161	R-B	CN33-2
5	160	B-Y	CN33-1
6	168	L-B	CN33-10
7	166	GR-L	CN33-9
8	164	L-O	CN33-8
9	169	GR-R	CN33-7
10	163	W-L	CN33-6

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CN179 INTERLOCK SOL





TAB

NO	P	C	J
1	113	G-W	CN213-4
2	N2	W-B	J9

REC

NO	P	C	J
1	113	G-W	CN99-1
2	N2	W-B	CN99-2

CN180 WSH MTR





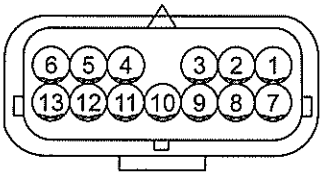
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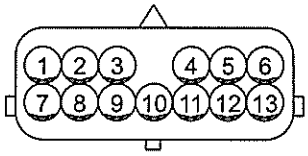
NO	P	C	J
1	186	-	WSR-
2	189	-	WSR+

REC

NO	P	C	J
1	186	L	CN49-2
2	189	Y	J72

CN183 WIPER





TAB

NO	P	C	J
1	186	L	CN49-2
2	185	G-Y	CN49-6
3	443	B-R	CN293-2
4	440	R-B	J17
5	145	BR-W	CN201-11
6	146	BR	CN201-8
7	N2	W-B	J7
8	-	-	-
9	442	W-R	CN293-4
10	N2	W-B	J18
11	N2	W-B	J30
12	442	L	CN49-10
13	443	R	CN49-9

REC

NO	P	C	J
1	186	L	CN158
2	185	G-Y	CN156
3	443	B-R	CN603-6
4	440	R-B	CN100-14
5	145	BR-W	CN100-9
6	146	BR	CN100-5
7	N2	L,W-B	CN157,CN158
8	-	-	-
9	442	W-R	CN603-8
10	N2	W-B	J75
11	N2	W-B	J75
12	442	L	CN603-7
13	443	R	CN603-5

CN185 BLUE LIGHT





TAB

NO	P	C	J
1	107	-	LB+
2	N2	-	LB-

REC

NO	P	C	J
1	107	Y-G	CN37-1,J54
2	N2	W-B	J50

CN186 ONRYO KIRIKAE BUZZER





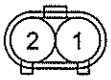
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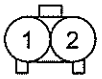
NO	P	C	J
1	195	G-R	CN82-1

REC

NO	P	C	J
1	195	G-R	CN81-1

CN196 SEAT BELT SW (MANUAL)





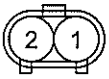
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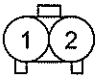
NO	P	C	J
1	51	-	LS-
2	450	-	SSB

REC

NO	P	C	J
1	51	BR	J66
2	450	P	CN43-3

CN197 SEAT BELT SW (MINI)





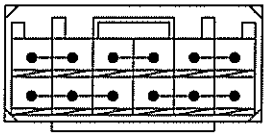
TAB

NO	P	C	J
1	51	-	LS-
2	450	-	SSB

REC

NO	P	C	J
1	51	BR	J62
2	450	P	CN76-10

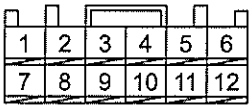
TAB



CN200

CAN J/C1

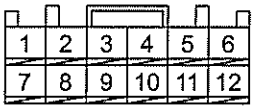
REC



NO	P	C	J
1	N2	W-B	CN103-5
2	N2	W-B	CN104-4
3	N2	W-B	CN104-5
4	N2	W-B	CN104-6
5	334	L-O	CN104-14
6	334	L-O	CN208-1
7	145	GR-R	CN103-11
8	145	R-L	CN47-8
9	145	L	CN70-16
10	146	P-B	CN103-12
11	146	L-Y	CN47-9
12	146	W	CN70-15

CN201

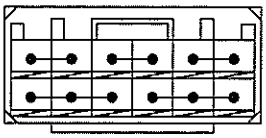
CAN J/C2



NO	P	C	J
1	334	L-O	CN47-12
2	334	L-O	CN209-1
3	N2	W-B	CN20-1
4	N2	W-B	J30
5	N2	W-B	CN20-2
6	N2	W-B	J18
7	146	LG-B	CN202-10
8	146	BR	CN183-6
9	146	-	-
10	145	LG-R	CN202-7
11	145	BR-W	CN183-5
12	145	-	-

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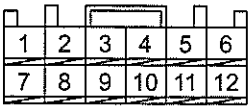
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CN202

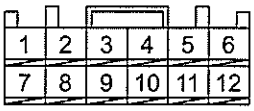
CAN J/C3

REC



CN203

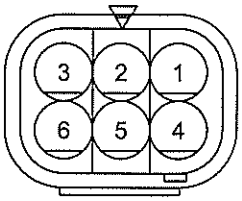
CAN J/C4

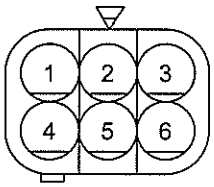


NO	P	C	J
1	78	G	CN122-2
2	78	G	CN123-2
3	75	L	CN53-2
4	75	L	CN54-2
5	300	L-B	CN130-3
6	300	L-B	CN129-3
7	145	LG-R	CN201-10
8	145	P	CN111-17
9	-	-	-
10	146	LG-B	CN201-7
11	146	V	CN111-16
12	-	-	-

NO	P	C	J
1	300	L-B	CN103-8
2	-	-	-
3	75	LG	CN110-15
4	-	-	-
5	78	LG	CN109-15
6	-	-	-
7	146	G	CN109-16
8	146	L	CN110-16
9	-	-	-
10	145	GR	CN109-17
11	145	W	CN110-17
12	-	-	-

CN208 SOLID STATE RLY1





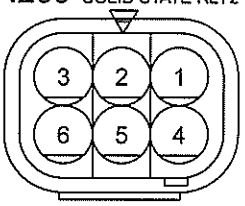
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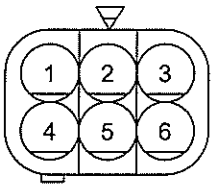
NO	P	C	J
1	334	-	PSACC+
2	332	-	OACC2
3	-	-	-
4	198	-	LBU+
5	-	-	-
6	41	-	B48V

REC

NO	P	C	J
1	334	L-O	CN200-6
2	332	R	CN102-9
3	-	-	-
4	198	R-W	J15
5	-	-	-
6	41	G-R	J10

CN209 SOLID STATE RLY2





TAB

NO	P	C	J
1	334	-	PSACC+
2	333	-	OACC3
3	-	-	-
4	440	-	VBRY
5	-	-	-
6	41	-	B48V

REC

NO	P	C	J
1	334	L-O	CN201-2
2	333	G	CN102-8
3	-	-	-
4	440	R-B	J17
5	-	-	-
6	41	G-R	J10

CN210 HEAD LP RLY





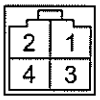
TAB

NO	P	C	J
1	101	-	COIL+
2	101	-	SW+
3	115	-	COIL-
4	102	-	SW-

REC

NO	P	C	J
1	101	GR	J6
2	101	GR	J6
3	115	P	CN7-8,CN8-8
4	102	R-G	CN172-1,CN177-4

CN212 ACCESSARY RELAY





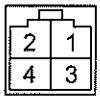
TAB

NO	P	C	J
1	44	-	COIL+
2	41	-	SW+
3	N2	-	COIL-
4	105	-	SW-

REC

NO	P	C	J
1	44	R-B	CN104-2,CN136-5
2	41	G-R	J10
3	N2	W-B	J8
4	105	B-Y	J11

CN213 INTERLOCK RLY (COWL)





TAB

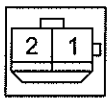
NO	P	C	J
1	114	-	COIL+
2	105	-	SW+
3	N2	-	COIL-
4	113	-	SW-

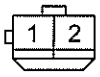
REC

NO	P	C	J
1	114	BR	CN170-2
2	105	B-Y	CN170-1,J11
3	N2	W-B	J9
4	113	G-W	CN179-1

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CN218 SURGE KILLER CN217





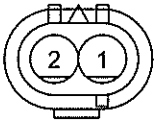
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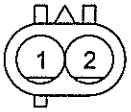
NO	P	C	J
1	48	B	CN219-2
2	41	B	CN219-1

REC

NO	P	C	J
1	48	L-O	CN21-1
2	41	G-Y	J10

CN220 LASER MARKER





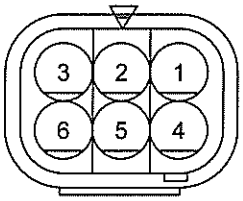
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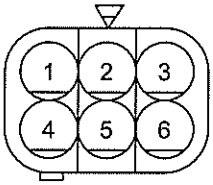
NO	P	C	J
1	306	-	OLM+
2	N2	-	N2

REC

NO	P	C	J
1	306	R-G	CN103-33
2	N2	W-B	J9

CN237 DC/DC FOR LED RR COMBI





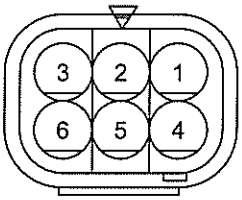
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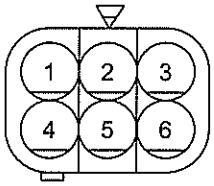
NO	P	C	J
1	103	-	BUIN
2	111	-	STLIN
3	104	-	TLIN
4	109	-	TRNLIN
5	108	-	TRNRIN
6	N2	-	GNDIN

REC

NO	P	C	J
1	103	R-W	J60
2	111	R-L	CN37-6
3	104	G-R	CN37-7
4	109	G-Y	CN37-9
5	108	R-Y	CN37-8
6	N2	W-B	CN37-10

CN238 DC/DC FOR LED RR COMBI





TAB

NO	P	C	J
1	203	R-W	CN38-5
2	211	R-L	CN38-7
3	204	G-R	CN38-8
4	209	G-Y	CN38-12
5	208	R-Y	CN38-11
6	N2	W-B	CN38-13

REC

NO	P	C	J
1	203	-	BUOUT
2	211	-	STLOUT
3	204	-	TLOUT
4	209	-	TRNLOUT
5	208	-	TRNROUT
6	N2	-	GNDOUT

CN243 HOOD SUB (EEC) CN43





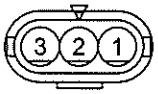
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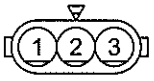
NO	P	C	J
1	67	L-O	J29
2	51	BR	J12
3	-	-	-

REC

NO	P	C	J
1	67	B	CN44-2
2	51	B	CN44-1
3	-	-	-

CN260 HEIGHT 800 SW





TAB

NO	P	C	J
1	51	BR	CN261-1
2	420	G	CN261-2
3	-	-	-

REC

NO	P	C	J
1	51	-	LS-
2	420	-	SWH081
3	-	-	-

CN261 MAST SSR SUB





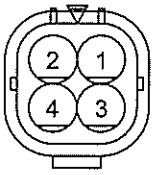
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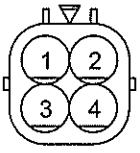
NO	P	C	J
1	51	BR	CN90-1
2	420	G	CN90-2

REC

NO	P	C	J
1	51	BR	CN260-1
2	420	G	CN260-2

CN291 TELEMATICS





TAB

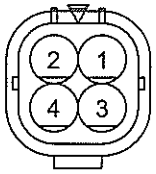
NO	P	C	J
1	442	L	CN49-5
2	443	LG	CN49-4
3	N2	W-B	J30
4	440	R-B	J17

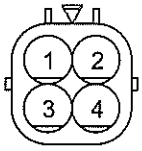
REC

NO	P	C	J
1	442	L	CN292-1
2	443	LG	CN292-2
3	N2	W-B	CN292-3
4	440	R-B	CN292-4

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CN292 TELEMATICS





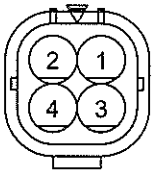
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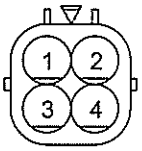
NO	P	C	J
1	442	L	CN291-1
2	443	LG	CN291-2
3	N2	W-B	CN291-3
4	440	R-B	CN291-4

REC

NO	P	C	J
1	442	-	CAN3H
2	443	-	CAN3L
3	N2	-	GND
4	440	-	VBRY

CN293 TELEMATICS





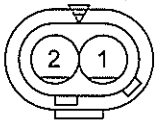
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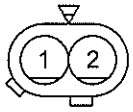
NO	P	C	J
1	N2	-	GND
2	443	-	CAN3L
3	440	-	VBRY
4	442	-	CAN3H

REC

NO	P	C	J
1	N2	W-B	J30
2	443	B-R	CN183-3
3	440	R-B	J17
4	442	W-R	CN183-9

CN303 SHORT CONN (KEY)





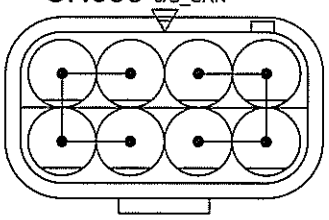
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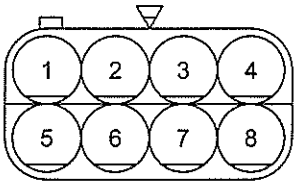
NO	P	C	J
1	105	-	CN303-2
2	105	-	CN303-1

REC

NO	P	C	J
1	105	B-Y	CN59-2
2	105	B-Y	CN37-2

CN603 J/C_CAN





TAB

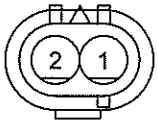
NO	P	C	J
1	146	-	CAN3L
2	146	-	CAN3L
3	-	-	-
4	145	-	CAN3H
5	146	-	CAN3L
6	146	-	CAN3L
7	145	-	CAN3H
8	145	-	CAN3H

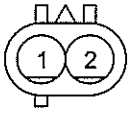
REC

NO	P	C	J
1	443	BR	CN100-2
2	443	GR	CN100-1
3	-	-	-
4	442	Y-G	CN100-3
5	443	R	CN183-13
6	443	B-R	CN183-3
7	442	L	CN183-12
8	442	W-R	CN183-9

SSD

DM SPD SSR1 RH





TAB

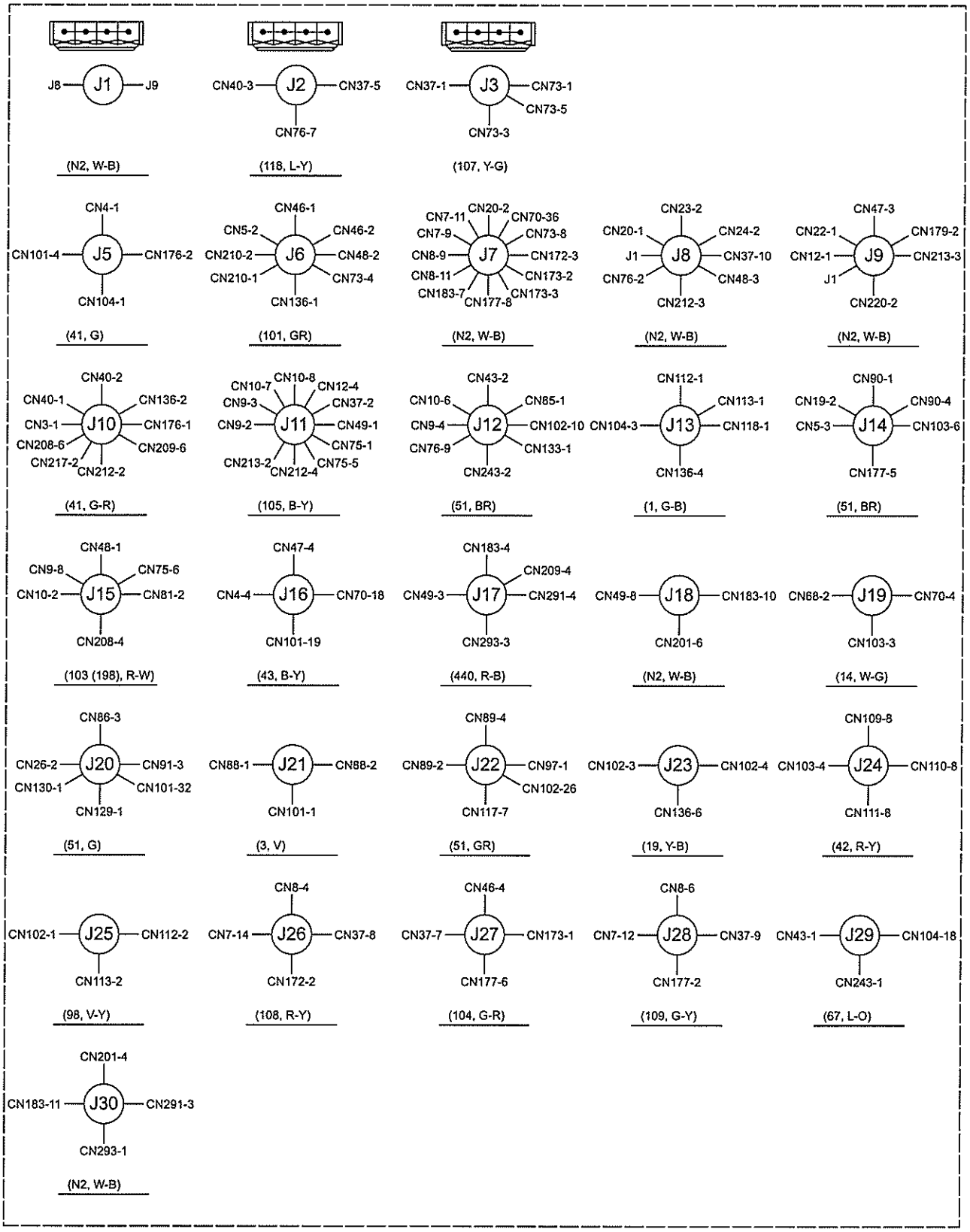
NO	P	C	J
1	76	-	SSDR1
2	75	-	SSDR+

REC

NO	P	C	J
1	76	LG	CN53-1
2	75	L	CN53-2

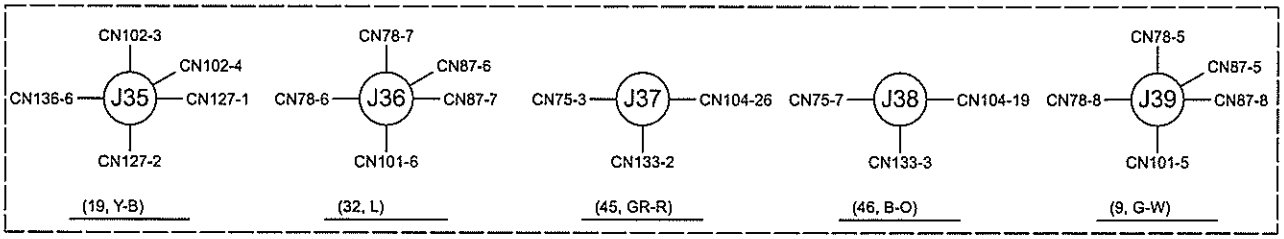
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BODY MAIN

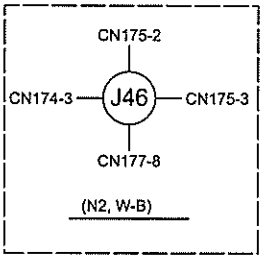


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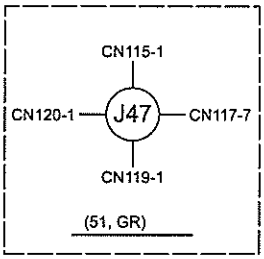
BODY MAIN



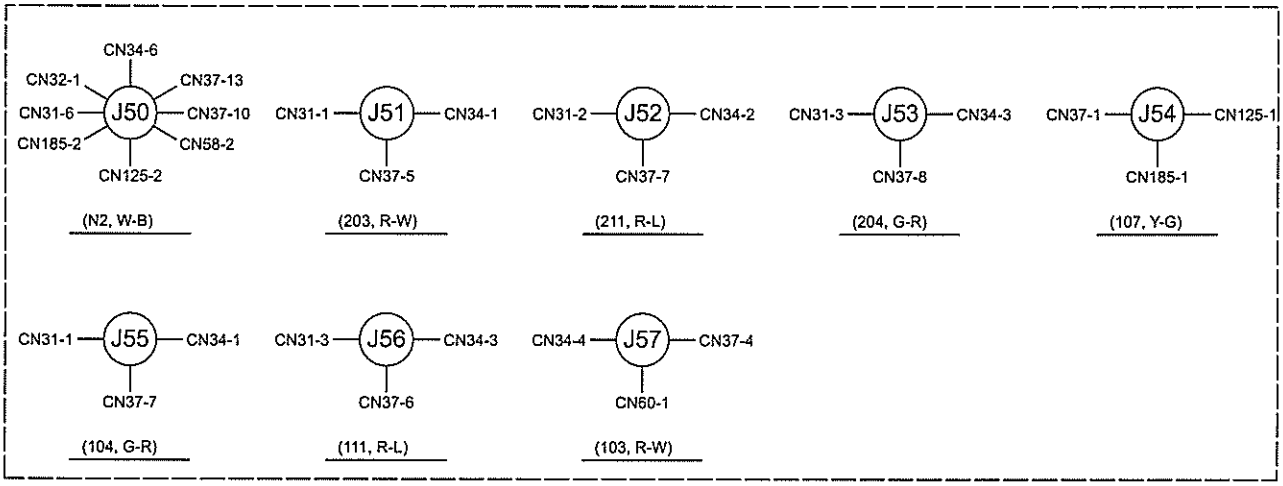
BODY SUB



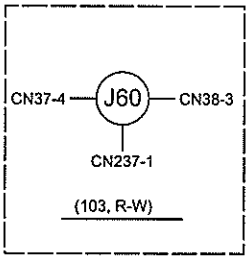
C/V SSR



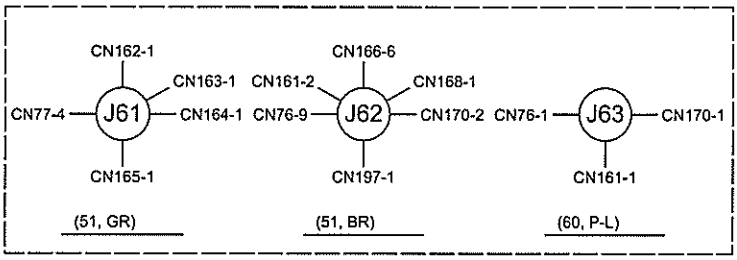
RR UPR MAIN



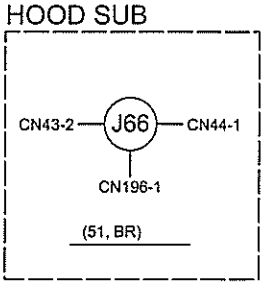
RR UPR SUB



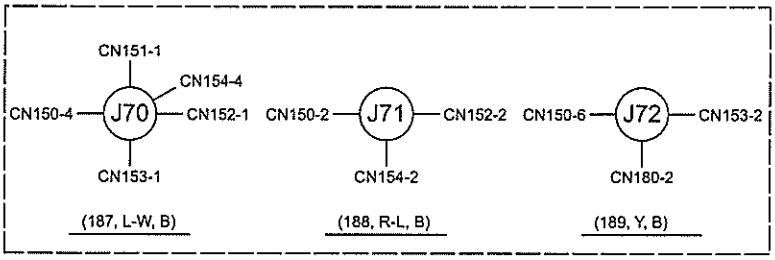
HOOD



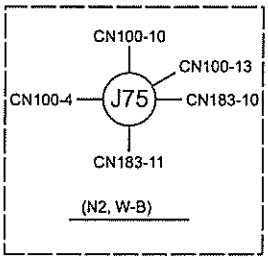
HOOD SUB



WIPER SUB



TELEMATICS SUB



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5.4 CONNECTOR LOCATION

- FR STAY and MAST
- CABLES
- INSTRUMENT PANEL
- TOE BOARD No.1
- TOE BOARD No.2
- RR BODY No.1
- RR BODY No.2

SYMBOLS	WIRE NAME
A	BODY MAIN WIRE
B	FR STAY WIRE
C	MAST WIRE
D	MAST SENSOR SUB WIRE
E	WIPER SUB NO.1 WIRE
F	TEN KEY WIRE
G	BODY SUB NO.1 WIRE
H	STOP LAMP SWITCH WIRE
I	TELAMATICS SUB NO.1
J	WIPER SUB NO.2 WIRE
K	C/V WIRE
L	RR UPR WIRE
M	HOOD WIRE (MINI LEVER)
N	HOOD WIRE (EEC)
O	HOOD SUB WIRE
P	BUZZER WIRE
Q	TELEMATICS SUB NO.3 WIRE
R	DC/DC WIRE

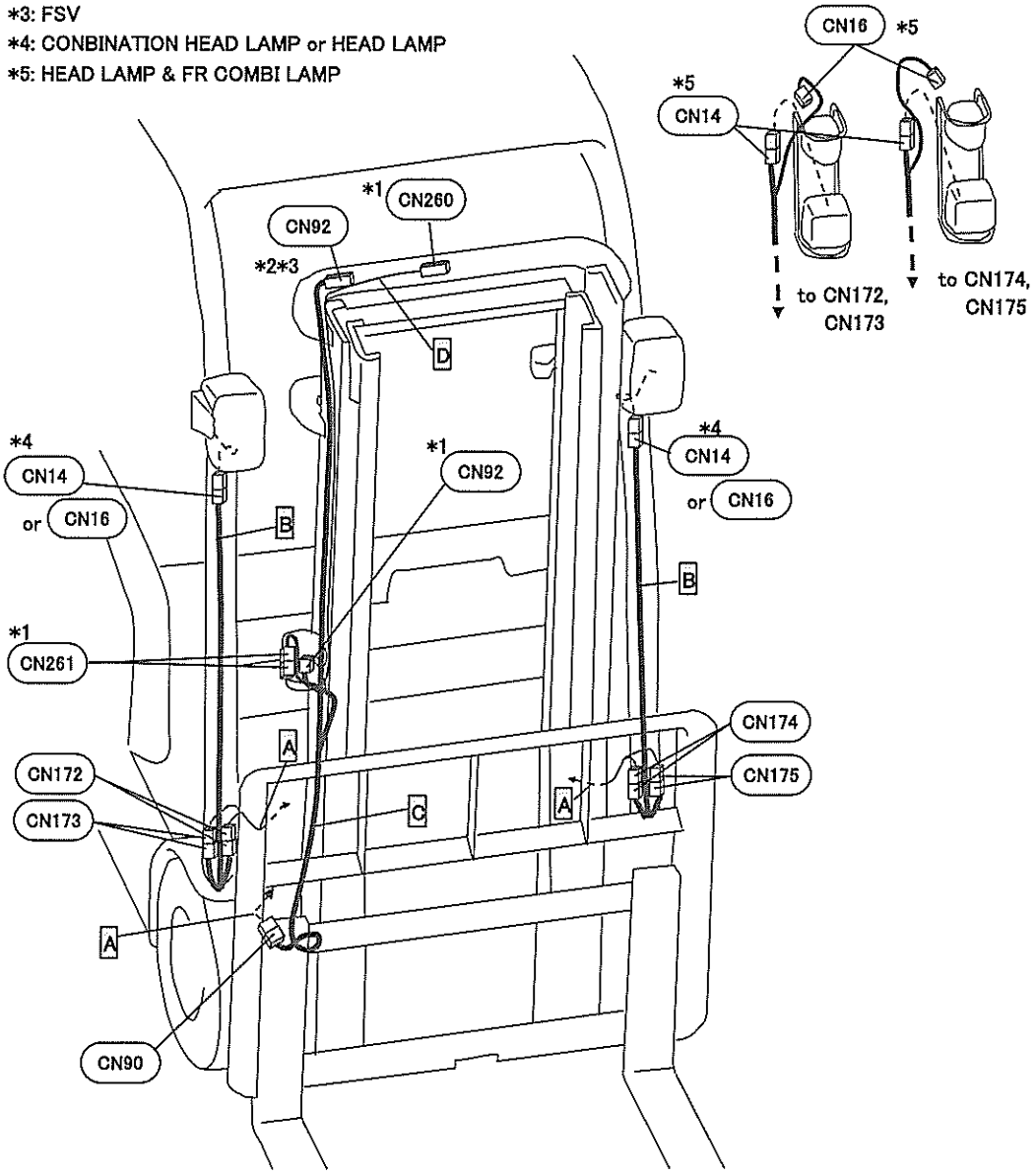
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5.4.1 FR STAY and MAST

FR STAY and MAST

A BODY MAIN WIRE B FR STAY WIRE
C MAST WIRE D MAST SENSOR SUB WIRE

*1: V
*2: FV
*3: FSV
*4: CONBINATION HEAD LAMP or HEAD LAMP
*5: HEAD LAMP & FR COMBI LAMP



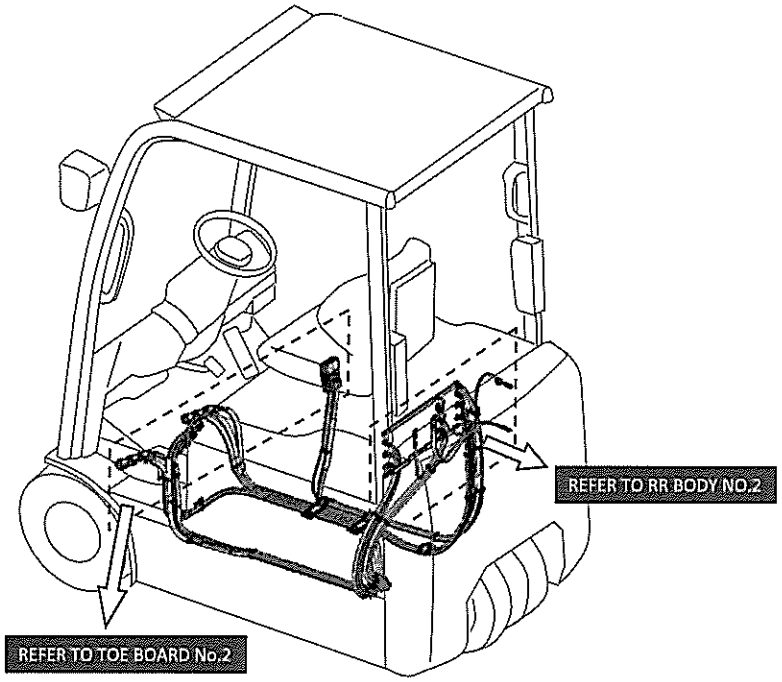
www.truck-freeworkshop.com

CN14	FR COMBI
CN16	HEAD LAMP
CN90	MAST
CN92	HEIGHT SW
CN172	FR STAY RH1
CN173	FR STAY RH2
CN174	FR STAY LH1
CN175	FR STAY LH2
CN261	MAST SSR SUB
CN260	HEIGHT 800 SW

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5.4.2 CABLES

CABLES



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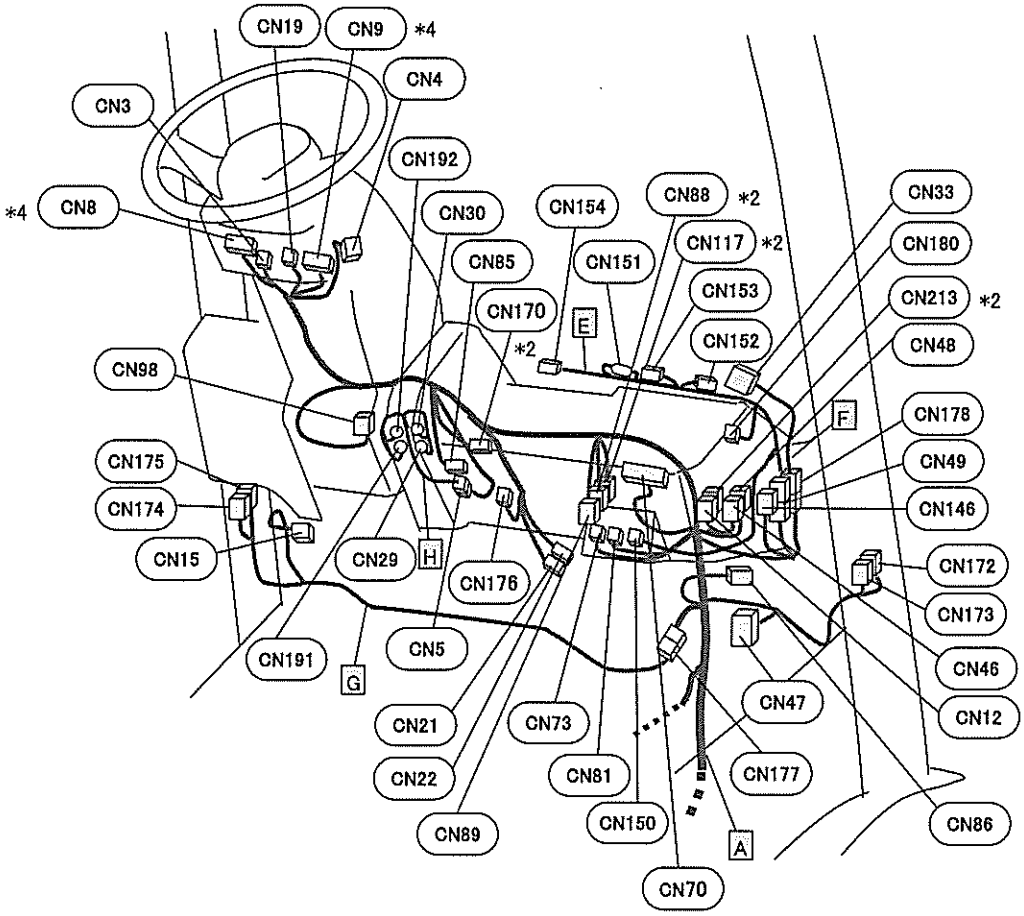
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5.4.3 INSTRUMENT PANEL

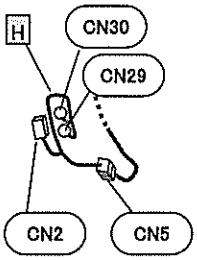
INSTRUMENT PANEL

[A] BODY MAIN WIRE [E] WIPER SUB NO.1 WIRE [F] TEN KEY WIRE
[G] BODY SUB NO.1 WIRE [H] STOP LAMP SWITCH WIRE

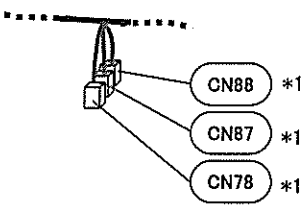
*1 MINI LEVER/JOY STICK
*2 COWL LEVER
*3 LH DIRECTION
*4 RH DIRECTION



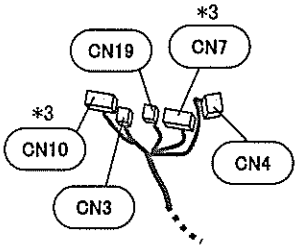
[COLD STORAGE]



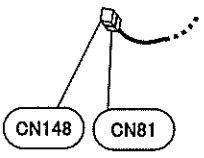
[MINI LEVER/JOY STICK]



[LH DIRECTION]



[W/O ONRYO KIRIKAE BUZZER]



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- CN2 BRAKE SW
- CN3 HORN SW
- CN4 KEY SW
- CN5 PEDAL SW SUB
- CN7 TURN&LT SW(LH DIR)
- CN8 TURN&LT SW(RH DIR)
- CN9 DIRECTION SW(RH DIR)
- CN10 DIRECTION SW(LH DIR)
- CN12 FLASHER RELAY
- CN15 PKB SW
- CN19 STEERING SSR
- CN21 HORN +
- CN22 HORN –
- CN29 STOP LP SW(+)
- CN30 STOP LP SW(–)
- CN33 TEN KEY
- CN46 TAIL LP RELAY
- CN47 DIAGNOSIS
- CN48 RR WORKING LAMP RLY
- CN49 WIPER
- CN70 DISPLAY
- CN73 WORKING LAMP SW
- CN78 C/V PULL SOL(MINI LEVER)
- CN81 ONRYO KIRIKAE SW
- CN85 NTRL TILT SW
- CN86 TILT ANG SSR
- CN87 C/V PUSH SOL(MINI LEVER)
- CN88 C/V SOL
- CN89 TILT SW
- CN98 STEERING SOL
- CN117 C/V SSR SUB
- CN146 12V PWR SUPPLY
- CN148 SHORT PIN
- CN150 WIP & WSH SW
- CN151 WIPER FUSE
- CN152 WIP SRG KILLER
- CN153 WSH SRG KILLER
- CN154 WIPER MOTOR
- CN170 ATT ACT SW (COWL)
- CN172 FR STAY RH1
- CN173 FR STAY RH2
- CN174 FR STAY LH1
- CN175 FR STAY LH2
- CN176 EMERGENCY SW
- CN177 BODY SUB
- CN178 TEN KEY
- CN180 WSH MTR
- CN191 BRAKE SW(+)
- CN192 BRAKE SW(–)
- CN213 INTERLOCK RLY (COWL)

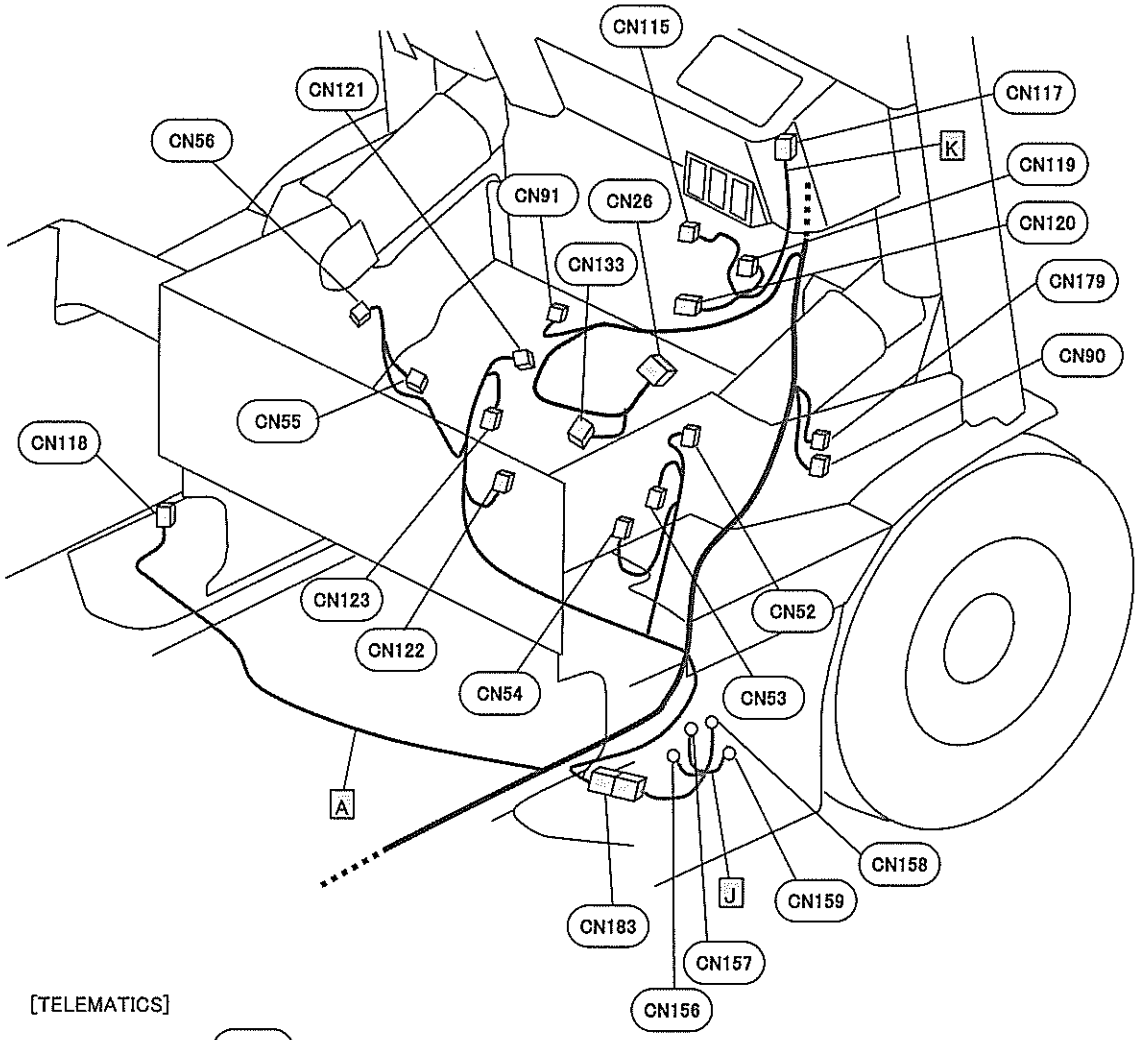
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5.4.4 TOE BOARD No.1

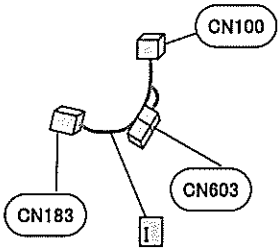
TOE BOARD No.1

A BODY MAIN WIRE T TELEMATICS SUB NO.1 WIRE

J WIPER SUB NO.2 WIRE K C/V WIRE



[TELEMATICS]



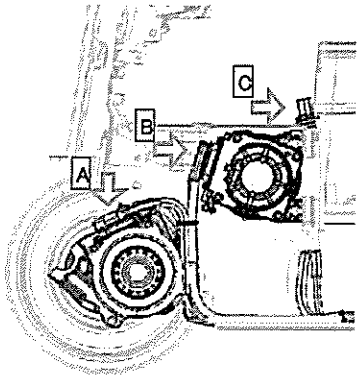
www.truck-freeworkshop.com

- CN26 ACCEL SSR
- CN52 DM TEMP SSR RH
- CN53 DM SPD SSR SUB
- CN54 DM SPD SSR2 RH
- CN55 PM TEMP SSR
- CN56 PM SPD SSR
- CN90 MAST
- CN91 PRESS SSR
- CN100 CAN BRIDGE
- CN115 LIFT LVR
- CN117 C/V SSR SUB
- CN118 MOTOR FAN
- CN119 ATT1 LVR SSR
- CN120 ATT2 LVR SSR
- CN121 DM TEMP SSR LH
- CN122 DM SPD SSR1 LH
- CN123 DM SPD SSR SUB
- CN133 EZ PEDAL
- CN156 WIP RESISTOR +
- CN157 WIP RESISTOR –
- CN158 WSH RESISTOR +
- CN159 WSH RESISTOR –
- CN179 INTERLOCK SOL
- CN183 WIPER
- CN603 J/C CAN

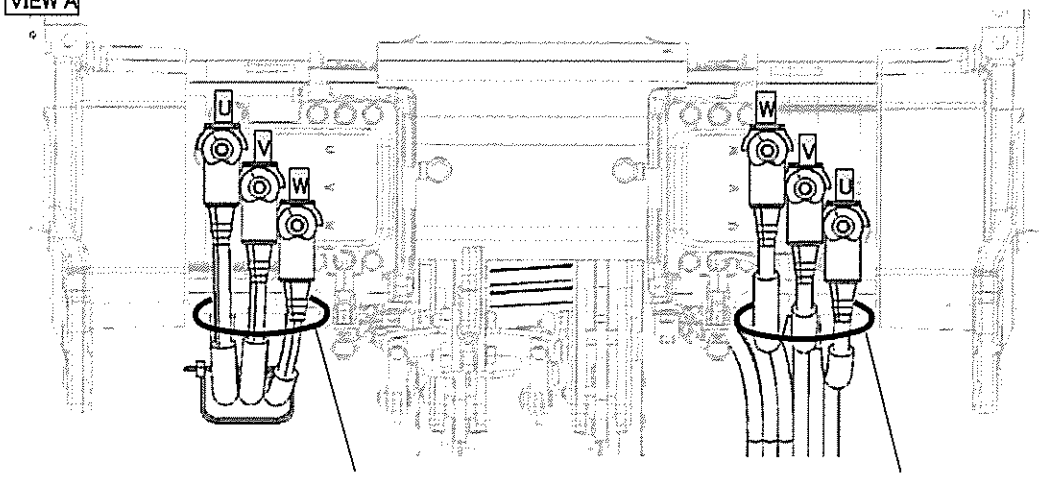
www.truck-freeworkshop.com

5.4.5 TOE BOARD No.2

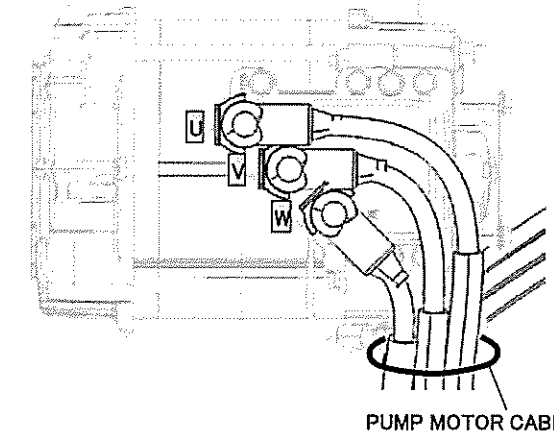
TOE BOARD No.2



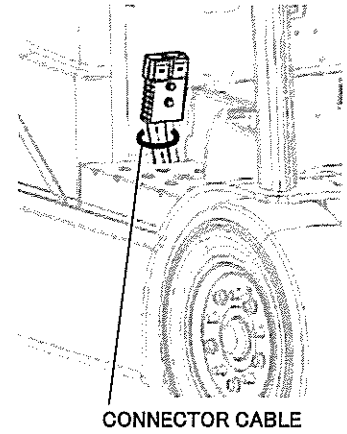
VIEW A



VIEW B



VIEW C



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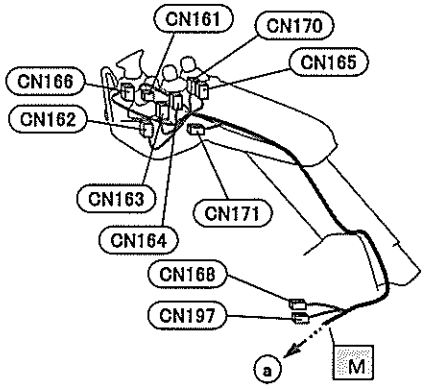
5.4.6 RR BODY No.1

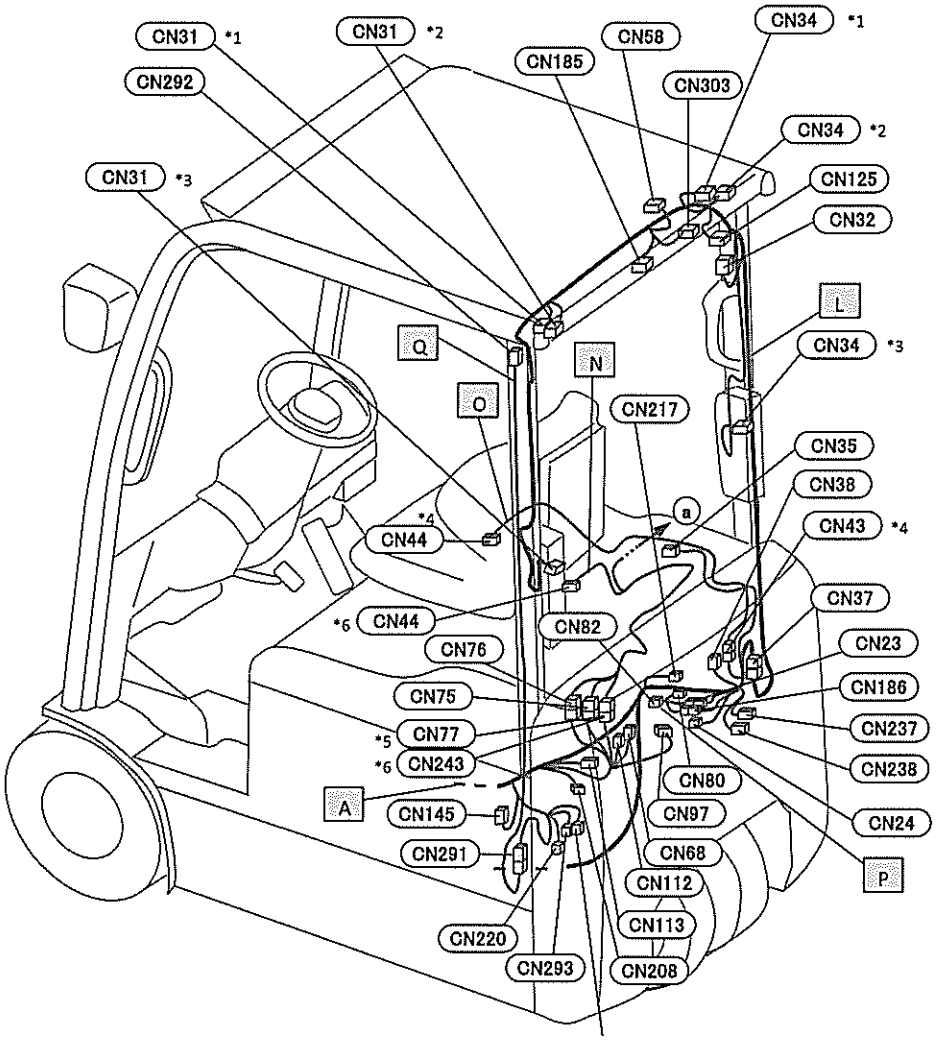
RR BODY No.1

A	BODY MAIN WIRE	L	RR UPR WIRE
M	HOOD WIRE(MINI LEVER)	N	HOOD WIRE(EEC)
O	HOOD SUB WIRE	P	BUZZER WIRE
Q	TELEMATICS SUB NO.3 WIRE		

*1 L/LED, L/vehicle inspection system spec.
*2 LED
*3 Vehicle inspection system spec.
*4 L/EEC, L/MINI LEVER
*5 MINI LEVER
*6 EEC

[MINI LEVER/JOY STICK LEVER]





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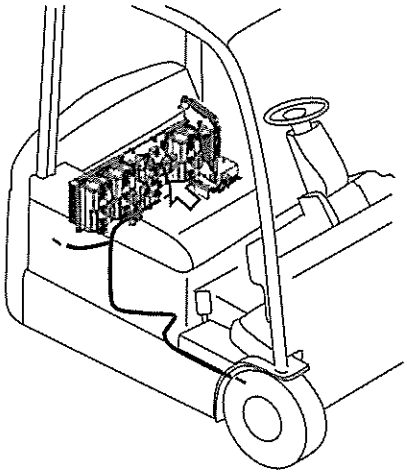
CN23	BACK BUZZER
CN24	FWD CHIME
CN31	RR COMBI LH / LED RR COMBI LH
CN32	RR HORN SW
CN34	RR COMBI RH / LED RR COMBI RH
CN35	LQD LVL SSR
CN37	RR UPR MAIN
CN38	DC/DC FOR LED RR COMBI
CN43	HOOD SUB
CN44	SEAT SW
CN58	ROTARY LAMP
CN68	THERMO SW(TRANS)
CN75	HOOD(MINI LEVER)
CN76	HOOD(MINI LEVER)
CN77	HOOD(MINI LEVER)
CN80	ONRYO KIRIKAE BUZZER
CN82	ONRYO KIRIKAE RLY
CN97	TIRE ANGLE SSR
CN112	INV FAN1
CN113	INV FAN2
CN125	WORKING LP
CN144	DC/DC
CN145	F8&F9 FUSE
CN161	NTRL TILT SW
CN162	LIFT LVR SSR
CN163	TILT LVR SSR
CN164	ATT1 LVR SSR
CN165	ATT2 LVR SSR
CN166	DIRECTION SW(ARM DIR)
CN168	SEAT SW
CN170	ATT ACT SW(MINI)
CN171	ARMREST HORN SW
CN185	BLUE LIGHT
CN186	ONRYO KIRIKAE BUZZER
CN197	SEAT BELT SW(MINI)
CN208	SOLID STATE RELAY 1
CN217	SURGE KILLER
CN220	LASER MARKER
CN237	DC/DC FOR LED RR COMBI
CN238	DC/DC FOR LED RR COMBI
CN243	HOOD SUB(EEC)
CN291	TELEMATICS
CN292	TELEMATICS
CN293	TELEMATICS
CN303	SHORT CONNECTOR(KEY)

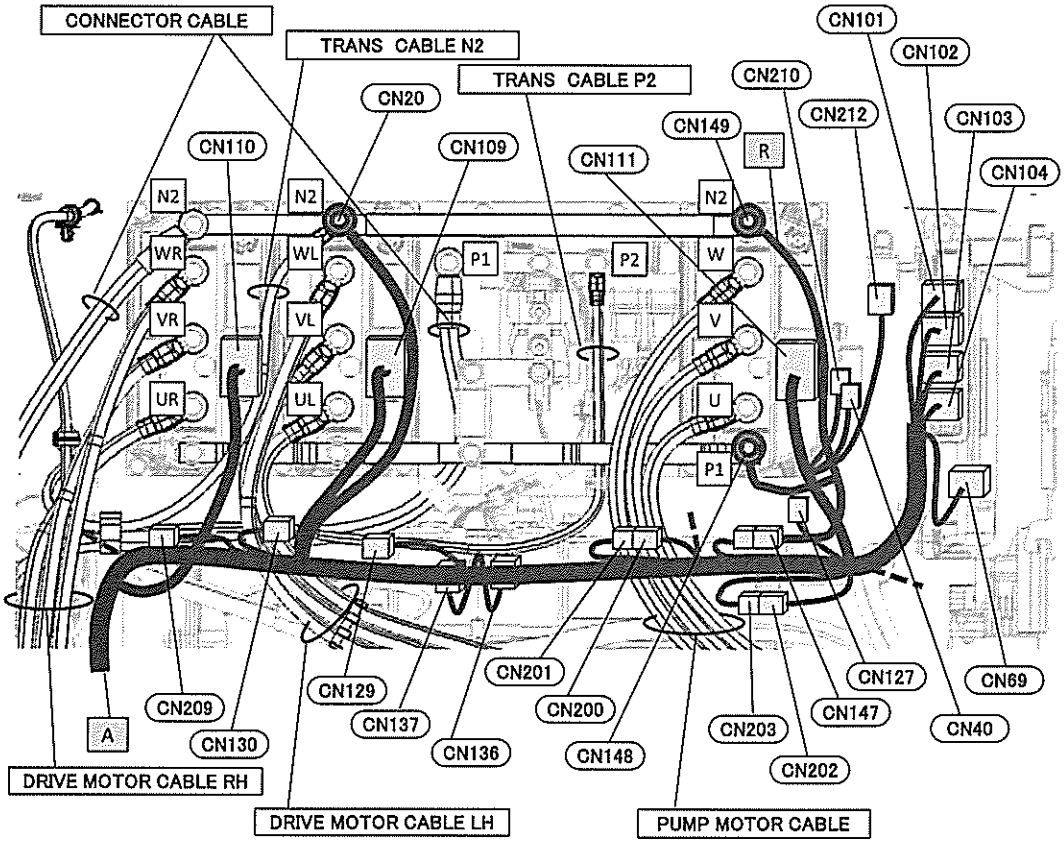
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5.4.7 RR BODY No.2

RR BODY No.2

A BODY MAIN WIRE R DC/DC WIRE





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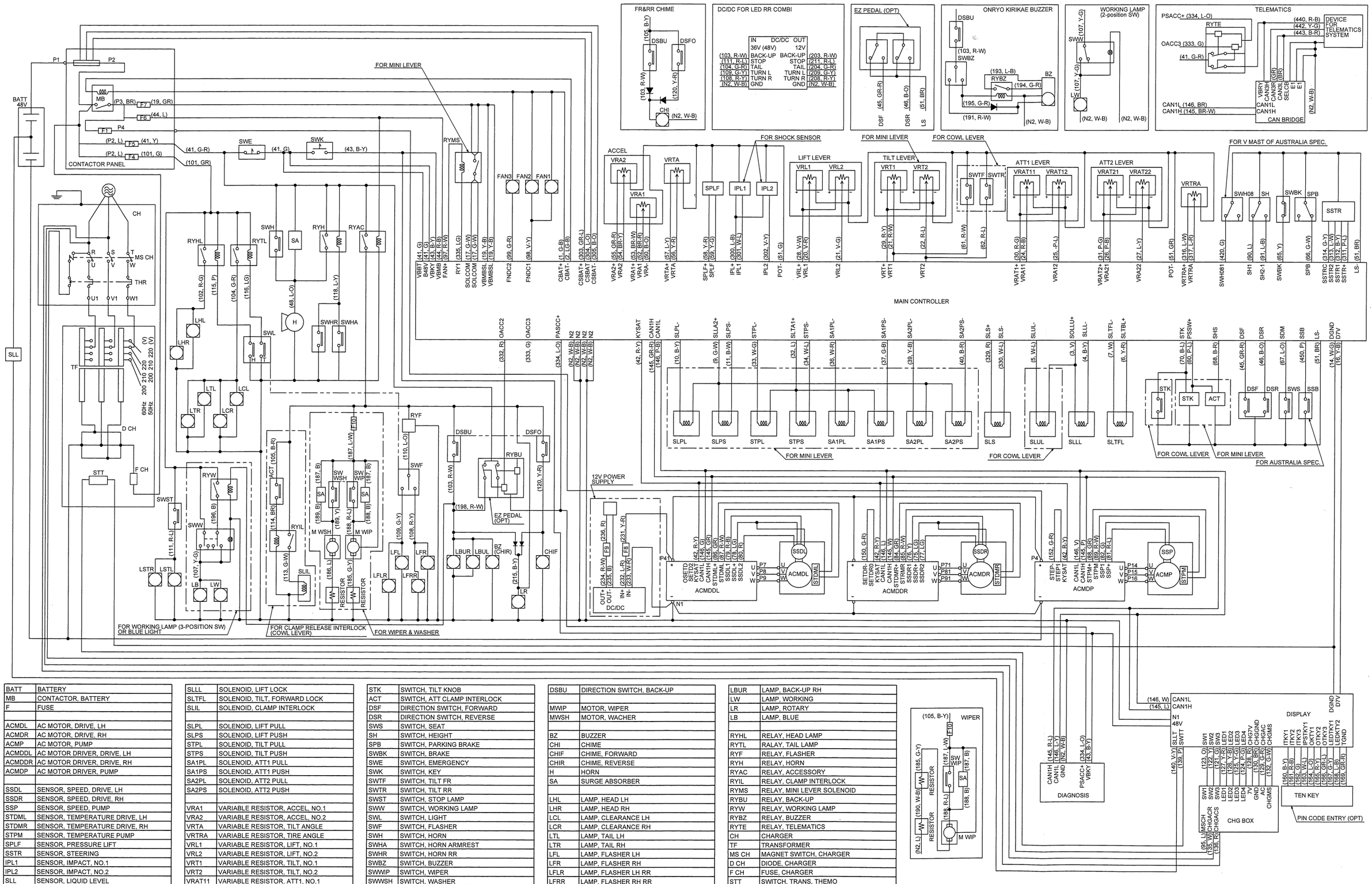
CN20	EARTH
CN40	HORN RELAY
CN69	CHG SW BOX
CN101	CPU 1
CN102	CPU 2
CN103	CPU 3
CN104	CPU 4
CN109	DRIVE INV LH
CN110	DRIVE INV RH
CN111	PUMP INV
CN127	RY1
CN129	IMPACT SSR 1
CN130	IMPACT SSR 2
CN136	CONTACTOR 1
CN137	CONTACTOR 2
CN147	DC/DC
CN148	P2
CN149	N2
CN200	CAN J/C 1
CN201	CAN J/C 2
CN202	CAN J/C 3
CN203	CAN J/C 4
CN209	SOLID STATE RELAY 2
CN210	HEAD LP RLY
CN212	ACCESSARY RELAY

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CONNECTING DIAGRAM

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ELECTRIC WIRING DIAGRAM



BATT	BATTERY
MB	CONTACTOR, BATTERY
F	FUSE
ACMDL	AC MOTOR, DRIVE, LH
ACMDR	AC MOTOR, DRIVE, RH
ACMP	AC MOTOR, PUMP
ACMDDL	AC MOTOR DRIVER, DRIVE, LH
ACMDDR	AC MOTOR DRIVER, DRIVE, RH
ACMDP	AC MOTOR DRIVER, PUMP
SSDL	SENSOR, SPEED, DRIVE, LH
SSDR	SENSOR, SPEED, DRIVE, RH
SSP	SENSOR, SPEED, PUMP
STDML	SENSOR, TEMPERATURE DRIVE, LH
STDMR	SENSOR, TEMPERATURE DRIVE, RH
STPM	SENSOR, TEMPERATURE PUMP
SPLF	SENSOR, PRESSURE LIFT
SSTR	SENSOR, STEERING
IPL1	SENSOR, IMPACT, NO.1
IPL2	SENSOR, IMPACT, NO.2
SLL	SENSOR, LIQUID LEVEL
SLS	SOLENOID, STEERING
SLUL	SOLENOID, UNLOAD

SLLL	SOLENOID, LIFT LOCK
SLTFL	SOLENOID, TILT, FORWARD LOCK
SLIL	SOLENOID, CLAMP INTERLOCK
SLPL	SOLENOID, LIFT PULL
SLPS	SOLENOID, LIFT PUSH
STPL	SOLENOID, TILT PULL
STPS	SOLENOID, TILT PUSH
SA1PL	SOLENOID, ATT1 PULL
SA1PS	SOLENOID, ATT1 PUSH
SA2PL	SOLENOID, ATT2 PULL
SA2PS	SOLENOID, ATT2 PUSH
VRA1	VARIABLE RESISTOR, ACCEL, NO.1
VRA2	VARIABLE RESISTOR, ACCEL, NO.2
VRTA	VARIABLE RESISTOR, TILT ANGLE
VRTRA	VARIABLE RESISTOR, TIRE ANGLE
VRL1	VARIABLE RESISTOR, LIFT, NO.1
VRL2	VARIABLE RESISTOR, LIFT, NO.2
VRT1	VARIABLE RESISTOR, TILT, NO.1
VRT2	VARIABLE RESISTOR, TILT, NO.2
VRAT11	VARIABLE RESISTOR, ATT1, NO.1
VRAT12	VARIABLE RESISTOR, ATT1, NO.2
VRAT21	VARIABLE RESISTOR, ATT2, NO.1
VRAT22	VARIABLE RESISTOR, ATT2, NO.2

STK	SWITCH, TILT KNOB
ACT	SWITCH, ATT CLAMP INTERLOCK
DSF	DIRECTION SWITCH, FORWARD
DSR	DIRECTION SWITCH, REVERSE
SWS	SWITCH, SEAT
SH	SWITCH, HEIGHT
SPB	SWITCH, PARKING BRAKE
SWBK	SWITCH, BRAKE
SWE	SWITCH, EMERGENCY
SWK	SWITCH, KEY
SWTF	SWITCH, TILT FR
SWTR	SWITCH, TILT RR
SWST	SWITCH, STOP LAMP
SWW	SWITCH, WORKING LAMP
SWL	SWITCH, LIGHT
SWF	SWITCH, FLASHER
SWH	SWITCH, HORN
SWHA	SWITCH, HORN ARMREST
SWHR	SWITCH, HORN RR
SWBZ	SWITCH, BUZZER
SWWIP	SWITCH, WIPER
SWWSH	SWITCH, WASHER
SWH08	SWITCH, HEIGHT 800
SSB	SWITCH, SEAT BELT
DSFO	DIRECTION SWITCH, FORWARD OPT

DSBU	DIRECTION SWITCH, BACK-UP
MWIP	MOTOR, WIPER
MWSH	MOTOR, WACHER
BZ	BUZZER
CHI	CHIME
CHIF	CHIME, FORWARD
CHIR	CHIME, REVERSE
H	HORN
SA	SURGE ABSORBER
LHL	LAMP, HEAD LH
LHR	LAMP, HEAD RH
LCL	LAMP, CLEARANCE LH
LCR	LAMP, CLEARANCE RH
LTL	LAMP, TAIL LH
LTR	LAMP, TAIL RH
LFL	LAMP, FLASHER LH
LFR	LAMP, FLASHER RH
LFLR	LAMP, FLASHER LH RR
LFRR	LAMP, FLASHER RH RR
LSTL	LAMP,STOP LH
LSTR	LAMP,STOP RH
LBUL	LAMP, BACK-UP LH

LBUR	LAMP, BACK-UP RH
LW	LAMP, WORKING
LR	LAMP, ROTARY
LB	LAMP, BLUE
RYHL	RELAY, HEAD LAMP
RYTL	RALAY, TAIL LAMP
RYF	RELAY, FLASHER
RYH	RELAY, HORN
RYAC	RELAY, ACCESSORY
RYIL	RELAY, CLAMP INTERLOCK
RYMS	RELAY, MINI LEVER SOLENOID
RYBU	RELAY, BACK-UP
RYW	RELAY, WORKING LAMP
RYBZ	RELAY, BUZZER
RYTE	RELAY, TELEMATICS
CH	CHARGER
TF	TRANSFORMER
MS CH	MAGNET SWITCH, CHARGER
D CH	DIODE, CHARGER
F CH	FUSE, CHARGER
STT	SWITCH, TRANS, THEMO

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