

Power Distribution Module

54.04

General Information

WARNING

Do not leave Power Distribution Modules connected to battery power if the PDM needs to be repaired or replaced. If the PDM needs to be repaired or replaced, immediately disconnect it from battery power until the repair is completed or the PDM is replaced. Failure to do so could result in fire, bodily injury, or death.

General Information

Circuits requiring protection are routed through circuit breakers mounted in a power distribution module. There are two power distribution modules. The main power distribution module ([Fig. 1](#)) is the electrical power center of the vehicle and is mounted underneath the electrical cover inside the upper dash assembly (right-hand panel).

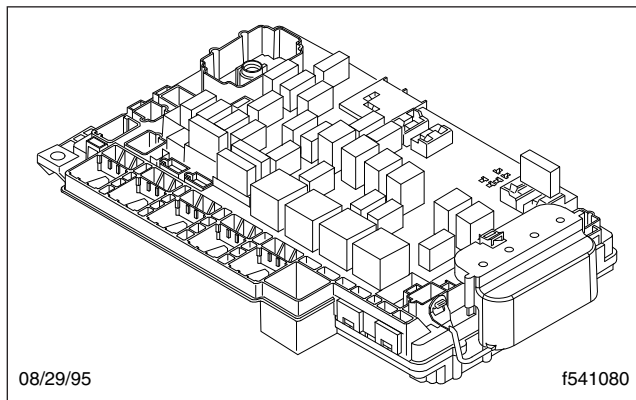


Fig. 1, Main Power Distribution Module

There is also an auxiliary power distribution module mounted on the inside of the electrical compartment door located on the B-pillar on the left-hand side behind the seat. See [Fig. 2](#).

The auxiliary power module has three horizontal rows:

- The top row contains several fuses for the sleeper lighting and one sleeper HVAC circuit breaker.
- The middle row contains three relays for the sleeper HVAC.
- The bottom row contains ignition and battery power for the ABS and data logging unit (DLU).

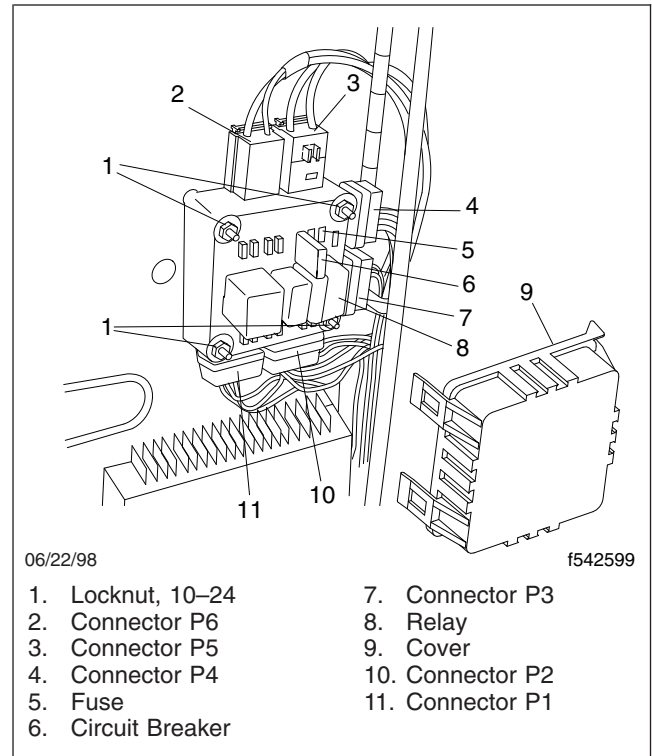


Fig. 2, Auxiliary Power Distribution Module

The new auxiliary power module on the Columbia also has six plug-in connectors for easy disconnection of circuits during troubleshooting.

Power Distribution Module

54.04

Main Power Distribution Module Removal and Installation

WARNING

Do not leave the Main Power Distribution Module connected to battery power if the PDM needs to be repaired or replaced. If the PDM needs to be repaired or replaced, immediately disconnect it from battery power until the repair is completed or the PDM is replaced. Failure to do so could result in fire, bodily injury, or death.

Removal

1. Apply the parking brakes and chock the rear tires. Disconnect the batteries.
2. Push the button to remove the electrical cover.
3. Remove the HVAC ducting.
 - 3.1 Remove the horizontal piece of ducting on top of the main power distribution module (PDM).
 - 3.2 Remove the two fasteners holding the vertical piece of ducting along the kick panel. Remove the ducting.
4. Remove the cover from the four PDM ring terminals on the right-hand side of the main PDM. Remove the ground connector from the right-hand aft corner of the PDM.
5. Remove the four ring connectors from their terminals. See [Fig. 1](#). Mark with a paint pen for ease in installation.
6. Remove the PDM from the vehicle.
 - 6.1 Remove the two hold-down nuts and washers from the aft edge of the PDM.
 - 6.2 Remove the eight electrical connectors B through J from the top of the PDM by inserting a flat-blade screwdriver on the side of the plug to unfasten the clips. See [Fig. 2](#). Remove the 7-mm capscrew attaching 46-pin connector A to the PDM.
 - 6.3 Unfasten the locking clips on the relays on the aft edge of the PDM. Push the relays through the holes in the PDM. Mark with a paint pen.
 - 6.4 Disconnect the accessory (ACC) and ignition (IGN) relays (the two relays fastened to the PDM with spade connectors). Then detach the clips from the PDM with care.

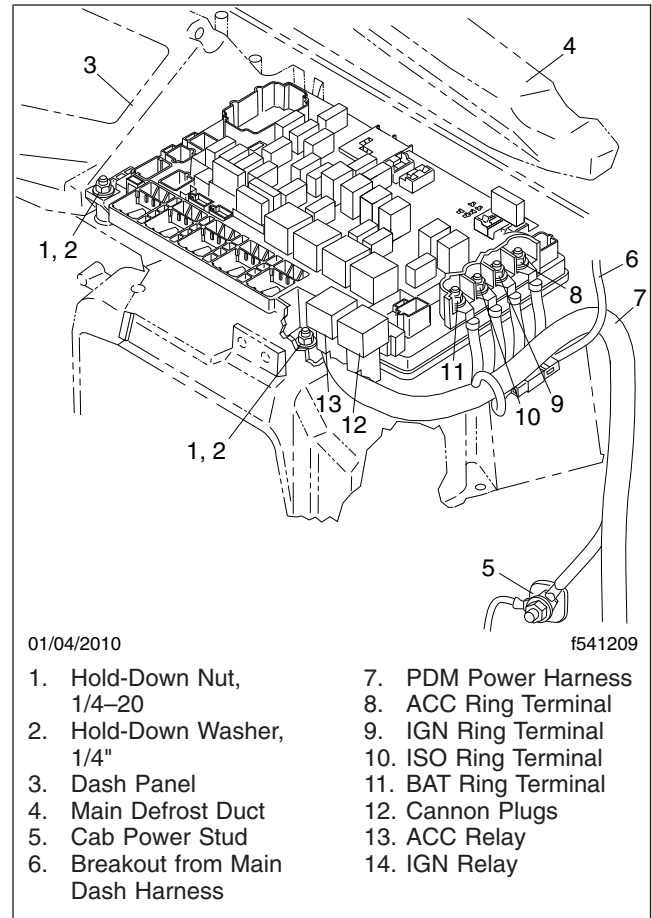


Fig. 1, Main Power Distribution Module

IMPORTANT: Do not break the clip off the spade connector.

- 6.5 Rotate the PDM to an angle of about 60° from vertical to expose the bottom of the PDM. If the PDM will not rotate that far because of binding from the electrical harness, disconnect the three main junction connectors and cut tie straps as needed to gain enough flexibility. See [Fig. 3](#).

NOTE: To disconnect the junction connectors, first disconnect, from the engine side, the cannon plugs leading to the junction connectors. Both the cannon plugs and the junction connectors fasten with clips on their top edges.

54.04

Power Distribution Module

Main Power Distribution Module Removal and Installation

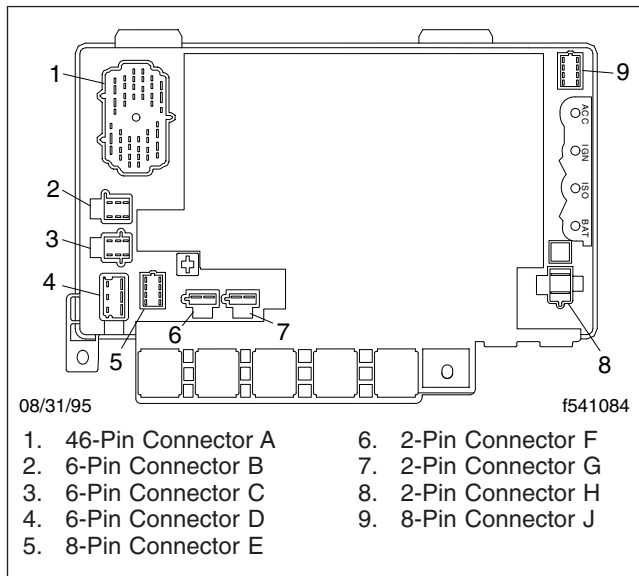


Fig. 2, Pin Connectors (top view)

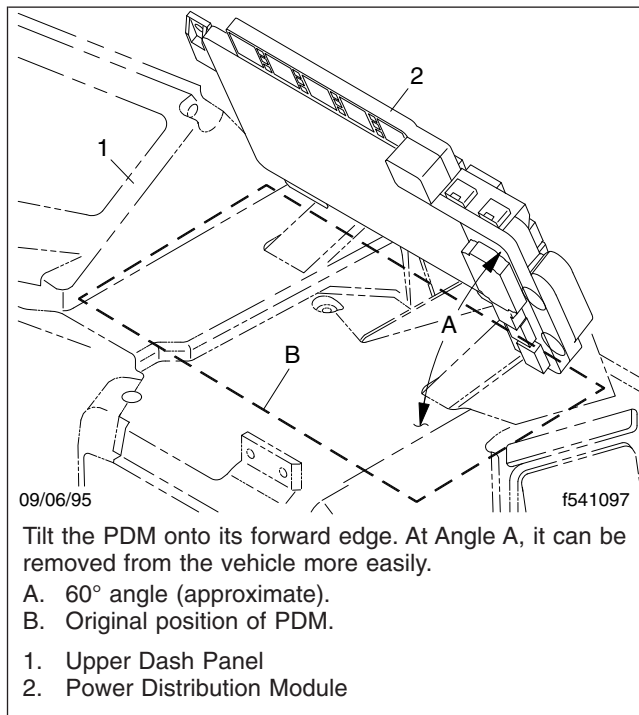


Fig. 3, Tilting the Power Distribution Module

- 6.6 Remove the electrical pins and connectors from the four terminals at the bottom of the PDM, including the large 46-pin connector N. See [Fig. 4](#).

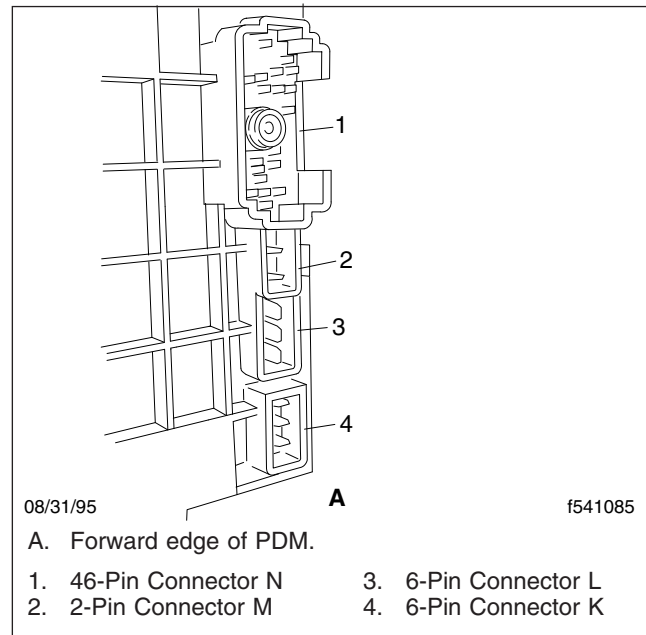


Fig. 4, Pin Connectors (bottom view)

NOTE: There is a 7-mm capscrew attaching 46-pin connector N to the PDM.

- 6.7 After all the plugs and connectors have been removed, remove the PDM from the vehicle.

Installation

- With the PDM tilted upwards, install the connectors to the bottom of the PDM. Attach the 7-mm capscrew to 46-pin connector N. See [Fig. 4](#).
- Place the PDM over the two attaching studs with the holes lined up. Make sure the ground wire and all ring terminals, harnesses and electrical connectors are clear. See [Fig. 1](#).
- Install the PDM on the vehicle.
 - Install the ground connector to the lower right-hand receptacle.
 - Install the ring connectors using the markings made on removal. Install the attaching nuts and washers.
 - Attach the 7-mm capscrew to the 46-pin connector and install it to the top of the PDM. See [Fig. 2](#).

Power Distribution Module

54.04

Main Power Distribution Module Removal and Installation

- 3.4 Attach all relays and electrical connectors to the top of the PDM, using the markings made on removal. Attach all locking clips and make sure the connections are firm.

IMPORTANT: Do not break the clip off the spade connector.

- 3.5 Fasten the PDM to the cab with the hold-down nuts and washers.
4. Install the HVAC ducting on the vehicle.
 - 4.1 Install the vertical piece of ducting along the right-hand kick panel, using the two fasteners removed earlier.
 - 4.2 Install the horizontal piece of ducting over the PDM.
5. If removed, install the junction connectors on the frontwall. Attach tie straps as needed and reroute the electrical harness to its correct position.
6. Install the electrical cover.
7. Connect the batteries. Remove the chocks from the tires.

Power Distribution Module

54.04

Auxiliary Power Distribution Module Removal and Installation

WARNING

Do not leave the Auxiliary Power Distribution Module connected to battery power if the PDM needs to be repaired or replaced. If the PDM needs to be repaired or replaced, immediately disconnect it from battery power until the repair is completed or the PDM is replaced. Failure to do so could result in fire, bodily injury, or death.

Removal

1. Apply the parking brakes and chock the rear tires. Disconnect the batteries.
2. Open the electrical compartment door on the left-hand B-pillar, behind the seat. The auxiliary power distribution module is installed on the inside of the door.

NOTE: For a list of individual relays and circuit breakers installed on the auxiliary power module and their plug-in positions, see [Troubleshooting, 300](#).

3. Remove the auxiliary power distribution module. See [Fig. 1](#).
 - 3.1 Unplug the six electrical connectors (top, right-hand side, and bottom) and mark them for later installation.
 - 3.2 Remove the four 10–24 locknuts and washers attaching the auxiliary power module to the B-pillar access door.
 - 3.3 Remove the auxiliary power module from the electrical compartment door.

Installation

1. Install the auxiliary power distribution module onto the left-hand B-pillar electrical compartment door. See [Fig. 1](#).
 - 1.1 Install the four mounting locknuts and washers attaching the auxiliary power module to the B-pillar access door.
 - 1.2 Attach the six electrical connectors, as removed.
2. Close the electrical compartment door on the left-hand B-pillar.

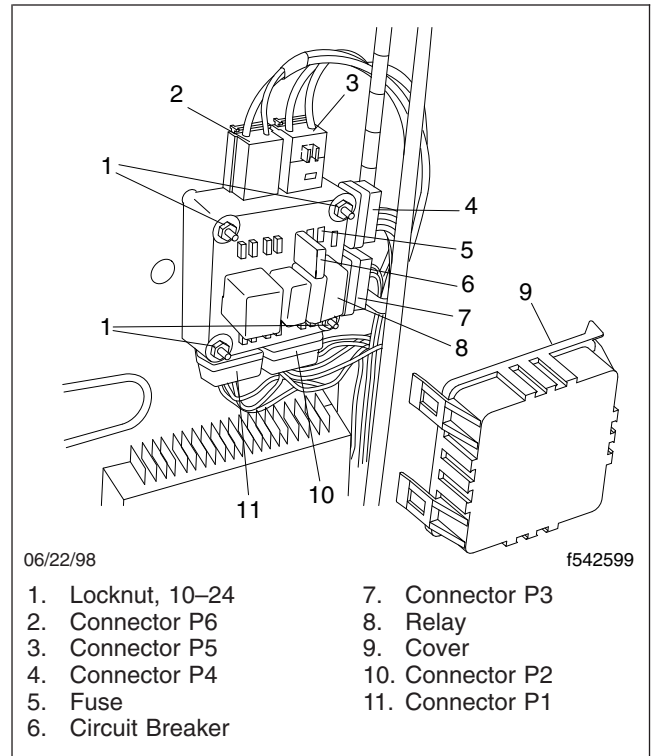


Fig. 1, Auxiliary Power Distribution Module

3. Connect the batteries. Then remove the chocks from the tires.

Power Distribution Module

54.04

Troubleshooting

⚠ WARNING

Do not leave Power Distribution Modules connected to battery power if the PDM needs to be repaired or replaced. If the PDM needs to be repaired or replaced, immediately disconnect it from battery power until the repair is completed or the PDM is replaced. Failure to do so could result in fire, bodily injury, or death.

Main PDM

To troubleshoot malfunctioning circuit breakers (C/Bs) and relays, do the following:

1. Check the circuit breaker/relay location on the applicable figure.
2. Check the applicable table to find the breaker or relay size and note the pin (or plug) positions.
3. Replace the C/B or relay.
4. Find the pinouts (or plug-ins) on the applicable figure and check the circuit again.

For circuit breaker and relay locations on the main power distribution module (PDM), see [Fig. 1](#).

For a list of standard component circuit breakers and relays installed in the main PDM, see [Table 1](#). For a list of optional component circuit breakers and relays installed in the main PDM, see [Table 2](#).

For location of pin connectors on the top of the main PDM, see [Fig. 2](#). For position of individual pinouts on pin connectors A through G (main PDM—left-hand side), see [Fig. 3](#). For position of individual pinouts on pin connectors H and J (main PDM—right-hand side), see [Fig. 4](#).

For location of pin connectors on the bottom of the main PDM, see [Fig. 5](#).

Circuit Breaker/Relay ID (standard components)			
Pos.	Pin No.	Component	Description
02	AF5	10-Amp C/B	A/C Clutch
04	AF2	Flasher	Turn Signal Flasher
08	AB8 AE6 AE7	Micro Relay	Starter Lock-Out (not used at this time)
09	MB	40-Amp Fuse	Cab Wiring

Circuit Breaker/Relay ID (standard components)			
Pos.	Pin No.	Component	Description
11	AF2	20-Amp C/B	Turn Signals
12	AB7 AF4 AD6	15-Amp C/B	Panel Lights
13	AB4 AB3 BD BE BF	10-Amp C/B	ICU Optional Gauges
16	AA3 AA4 AA7 BB	10-Amp C/B	ICU Battery Power
17	DE NC1 JD	15-Amp C/B	Ignition-Powered Options
26	AF1 AE2	10-Amp C/B	ICU Ignition Power
28	AE1	15-Amp C/B	Left Headlight
29	AD4	15-Amp C/B	Right Headlight
30	AB7 AF4 AD6	Micro Relay	Panel Lights
31	AE1 *	Micro Relay	Left Headlight
32	AD4 *	Micro Relay	Right Headlight
33	AE3 * AD3 *	Micro Relay	Tractor Tail & Marker Lights
35	AE8 * NE8 *	Micro Relay	High-Speed Wipers
36	AD8 * NB5 *	Micro Relay	Low-Speed Wipers
38	AA6	10-Amp C/B	Ignition Switch
39	AE3 * AD3 *	15-Amp C/B	Tractor Taillights
40	AA5	25-Amp C/B	Stop Lights

54.04

Power Distribution Module

Troubleshooting

Circuit Breaker/Relay ID (standard components)			
Pos.	Pin No.	Component	Description
41	AF3 DD	15-Amp C/B	Cigar Lighter
43	AC6 *	15-Amp C/B	Dome Light
45	EC JH	15-Amp C/B	Accessory-Powered Options
48	NF5	10-Amp C/B	Back-Up Lights
49	AD5 *	15-Amp C/B	Windshield Wipers
52	ND8	15-Amp C/B	Horn
53	NF8	30-Amp C/B	Trailer Taillights
54	NA2	30-Amp C/B	Trailer Marker Lights
55	AA2 *	30-Amp C/B	HVAC
56	AA1 * NF2 * NF7 *	Mini Relay	HVAC High-Speed
57	AA2 * KA *	Mini Relay	HVAC Regular-Speed
58	NF6 *	Mini Relay	Trailer Taillights
59	NA2 *	Mini Relay	Trailer Marker Lights

* Pin assignments may vary.

Table 1, Main PDM Circuit Breaker/Relay ID (standard components)

Circuit Breaker/Relay ID (optional components)			
Pos.	Pin No.	Component	Description
01	AE5	10-Amp C/B	Engine Fan
03	BC FA GA KC	10-Amp C/B	Power Door Locks
05	LB	30-Amp C/B	Fuel Heater
06	KB	30-Amp C/B	Trailer Aux
07	LB	Mini Relay	Fuel Heater
10	MA	60-Amp Fuse	Sleeper Cab Wiring
14	ED JB	10-Amp C/B	Radio (ACC Bus)
15	AB1 BA	15-Amp C/B	Utility Lights

Circuit Breaker/Relay ID (optional components)			
Pos.	Pin No.	Component	Description
18	CE LA	15-Amp C/B	Right-Hand Power Window
19	JA	10-Amp C/B	Windshield Fan
20	NE7 NE6 AE4	20-Amp C/B	Road Lights
21	DF JF	10-Amp C/B	CB Radio (ACC Bus)
22	LE	10-Amp C/B	Daytime Running Lights
23	JC	10-Amp C/B	Spotlight
24	LC	30-Amp C/B	Trailer ABS
25	CC	15-Amp C/B	Left-Hand Power Window
27	CB DB LF	30-Amp C/B	IGN Accessory-Powered Options
34	NE7 NE6 AE4	Micro Relay	Road Lights
37	AB2 CD	15-Amp C/B	Heated Mirror
42	AC1	10-Amp C/B	Engine ECM
44	EE LD	15-Amp C/B	Optional Switch Power (1)
46	DC	30-Amp C/B	Power Seat
47	EF JG	15-Amp C/B	Optional Switch Power (2)
50	ND6	15-Amp C/B	Air Dryer
51	FB DA	30-Amp C/B	Ignition-Powered Options
60	—	Mini Relay	Optimized Idle
61	—	Mini Relay	Optimized Idle
62	—	Mini Relay	Optimized Idle
63	—	10-Amp Fuse	Optimized Idle
64	—	10-Amp C/B	BAT Isolator (IGN Switch)

Power Distribution Module

54.04

Troubleshooting

Circuit Breaker/Relay ID (optional components)			
Pos.	Pin No.	Component	Description
64X	—	10-Amp C/B (15-Amp with Caterpillar engines)	BAT Isolator (Engine ECM)

Table 2, Main PDM Circuit Breaker/Relay ID (optional components)

NOTE: To locate pinouts, use this key: The first letter indicates the connector in which the pin is located. The second letter indicates the row of the connector. The number indicates the number of the pin in the row, if there is more than one. If there is only one pin in a row, this number is missing.

Examples: Pin number AF5 means connector A, row F, pin 5. Pin number BC means connector B, pin C.

On the auxiliary power module itself, there are three rows:

- Row A, the top row, contains 6 fuses and one 30-amp HVAC circuit breaker.
- Row D, the middle row, contains 3 HVAC relays.
- Row G, the bottom row, contains between 3 and 8 fuses, depending on options installed.

For circuit breaker and relay locations on the auxiliary power module, see [Fig. 6](#).

For lists of all component fuses (standard and optional), circuit breakers, and relays installed in the auxiliary power module, together with the connector and pin number of each circuit, see [Table 3](#) for Row A, [Table 4](#) for Row D, and [Table 5](#) for Row G.

Auxiliary Power Module

The Columbia has an auxiliary power module with six plug-in connectors (two each on the top, right-hand side, and bottom of the module case).

Circuit Breaker/Fuse ID (Row A), Auxiliary Power Module						
Pos.	Plug No.	Circuit	Connector	Pin No.	Component	Description
A1	A1	14E	P6	A	15-Amp Fuse	ABS BAT #1
	B1	376A	P1	F		
A2	A2	14E	P6	A	10-Amp Fuse	Diagnostic BAT
	B2	331	P1	G		
A3	A3	14S	P5	A	15-Amp Fuse	Reading/Baggage Light
	B3	41R	P4	H		
A4	A4	14S	P5	A	15-Amp Fuse	L/H Power Receptacle
	B4	57B	P4	G		
A6	A6	14S	P5	A	30-Amp C/B	Sleeper HVAC
	B6	+12V *	—	—		
A7	A7	14S	P5	A	15-Amp Fuse	Dome Light
	B7	41S	P4	C		

54.04

Power Distribution Module

Troubleshooting

Circuit Breaker/Fuse ID (Row A), Auxiliary Power Module						
Pos.	Plug No.	Circuit	Connector	Pin No.	Component	Description
A8	A8	14S	P5	A	15-Amp Fuse	RH Power Receptacle
	B8	57A	P4	B		

* The +12V circuit is internal to the auxiliary power module.

Table 3, Circuit Breaker/Fuse ID (Row A), Auxiliary Power Module

Relay ID (Row D), Auxiliary Power Module						
Pos.	Plug No.	Circuit	Connector	Pin No.	Component	Description
D1	D1	+12V *	—	—	Mini Relay	Sleeper HVAC Power
	D2	GND	P5	C		
	F1	98Y	P1	E		
	F2	98S	P3	A		
D4	D4	+12V *	—	—	Mini Relay	Sleeper HVAC Low-Speed
	D5	GND	P5	C		
	E4	98R	P4	F		
	F4	97A	P1	H		
	F5	98L	P3	H		
D7	D7	+12V *	—	—	Mini Relay	Sleeper HVAC Remote High-Speed
	D8	GND	P5	C		
	F7	98Z	P2	G		
	F8	98H	P3	G		

* The +12V circuit is internal to the auxiliary power module.

Table 4, Relay ID (Row D), Auxiliary Power Module

Fuse ID (Row G), Auxiliary Power Module						
Pos.	Plug No.	Circuit	Connector	Pin No.	Component	Description
G1	G1	14E	P6	A	15-Amp Fuse	ABS BAT #2
	H1	376B	P1	D		
G2	G2	14E	P6	A	10-Amp Fuse	DLU BAT Power *
	H2	442	P1	C		
G3	G3	52R	P6	C	10-Amp Fuse	ABS IGN Power
	H3	376C	P1	B		
G4	G4	52R	P6	C	10-Amp Fuse	Communications System *
	H4	434R	P1	A		
G5	G5	52R	P6	C	10-Amp Fuse	DLU IGN Power *
	H5	442A	P2	D		
G6	G6	14S	P5	A	15-Amp Fuse	Optional BAT Power *
	H6	OPT+	P2	C		

Power Distribution Module

54.04

Troubleshooting

Fuse ID (Row G), Auxiliary Power Module						
Pos.	Plug No.	Circuit	Connector	Pin No.	Component	Description
G7	G7	14S	P5	A	15-Amp Fuse	Panel Power Receptacle
	H7	57C	P3	C		
G8	G8	ACC+	P2	H	10-Amp Fuse	Optional Accessory Power *
	H8	52K	P2	A		

* Optional; not installed on all vehicles

Table 5, Fuse ID (Row G), Auxiliary Power Module

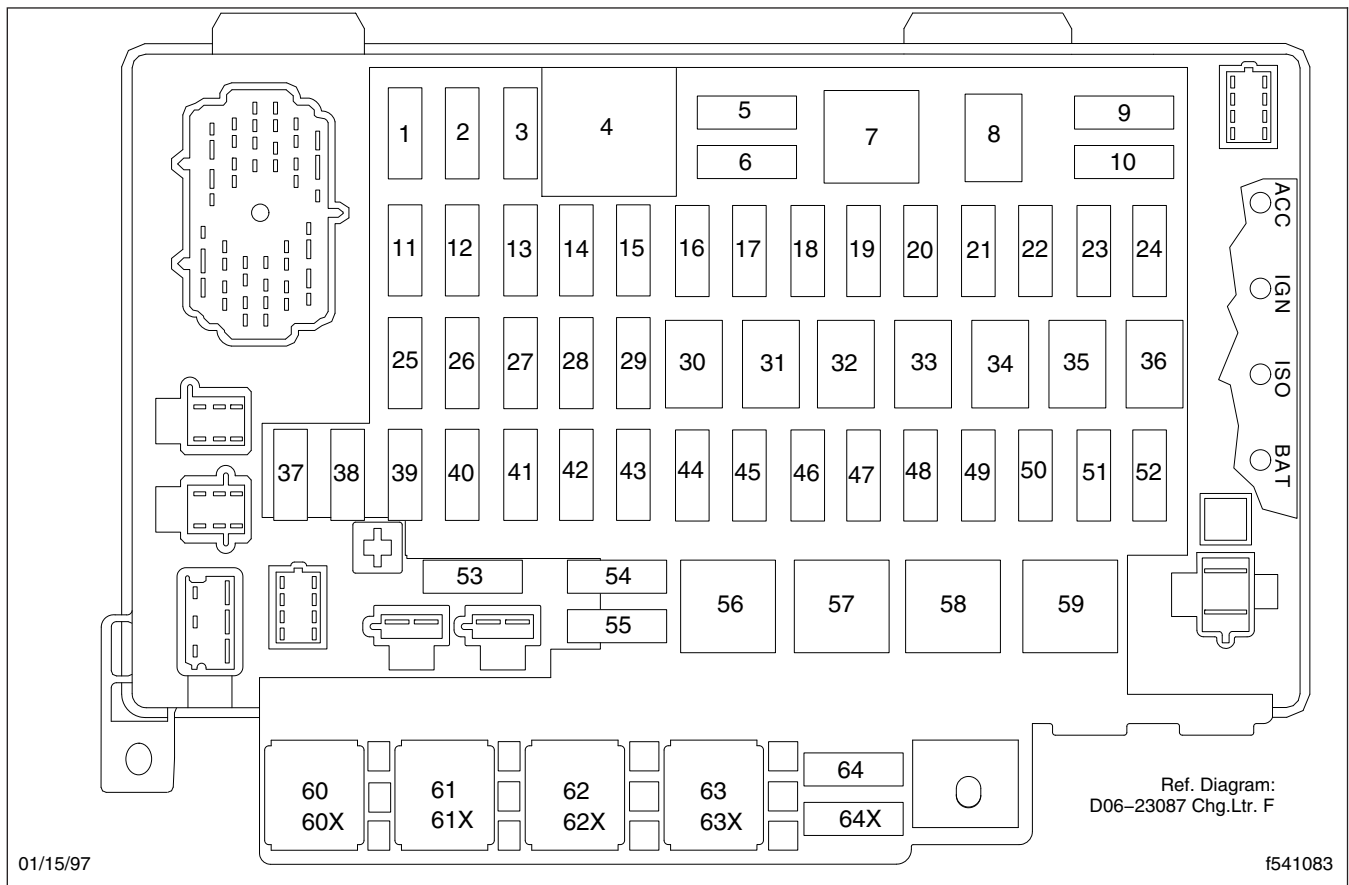


Fig. 1, Main PDM Circuit Breaker/Relay Locations

54.04

Power Distribution Module

Troubleshooting

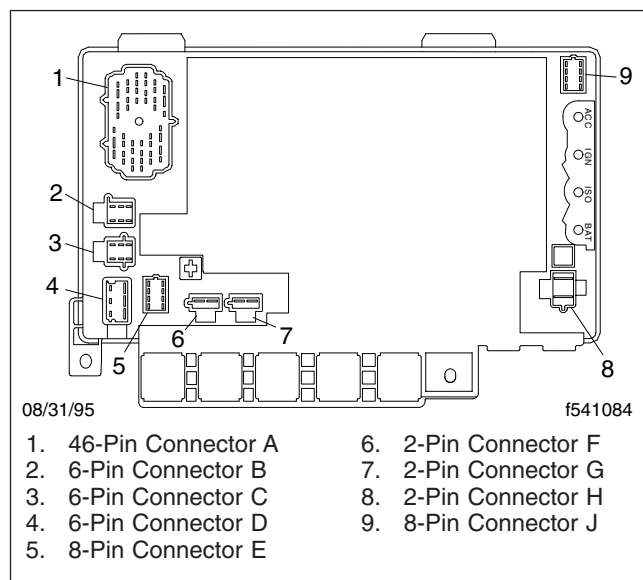


Fig. 2, Main PDM Pin Connectors (top view)

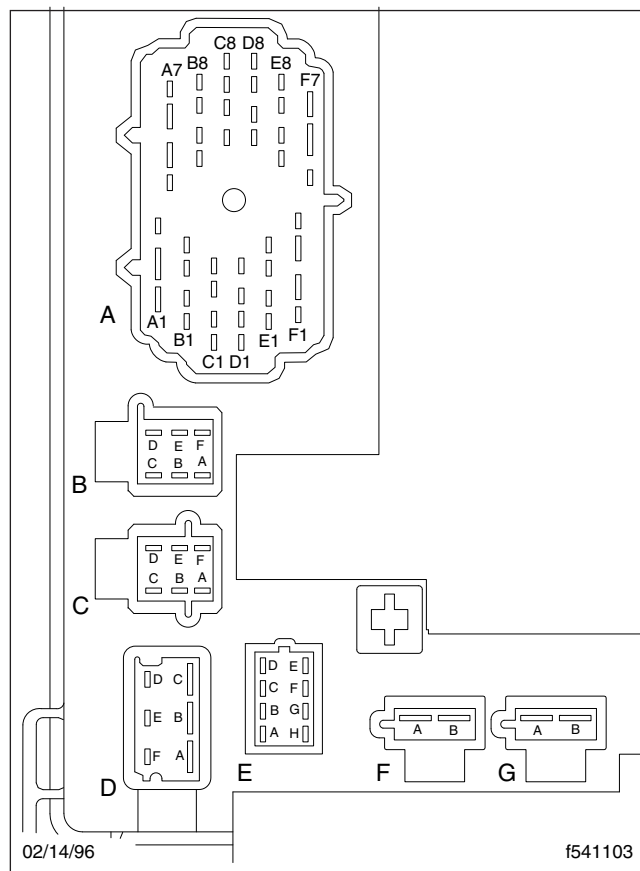


Fig. 3, Main PDM Pinout Positions (left side, top)

Power Distribution Module

54.04

Troubleshooting

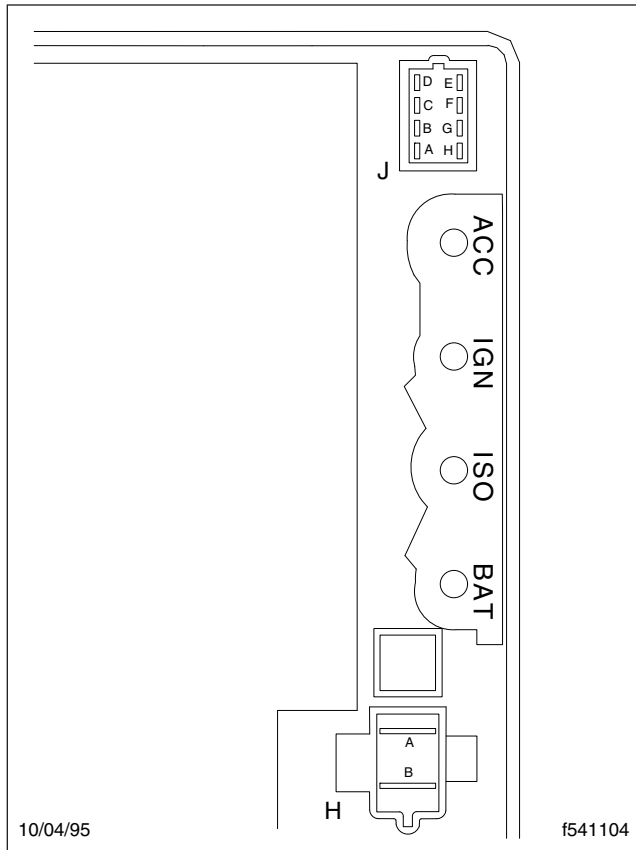


Fig. 4, Main PDM Pinout Positions (right side, top)

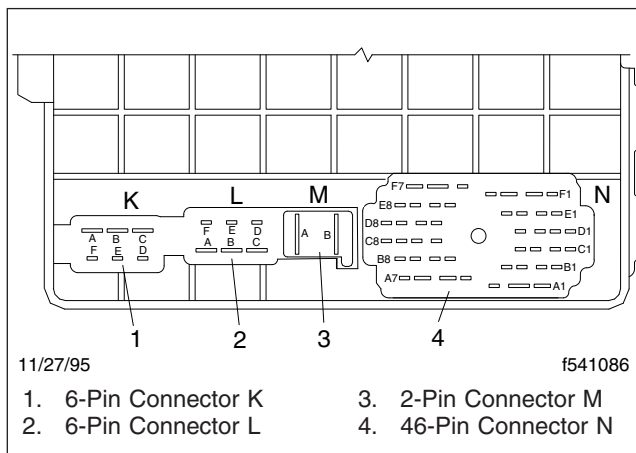


Fig. 5, Main PDM Pin Connectors (bottom view)

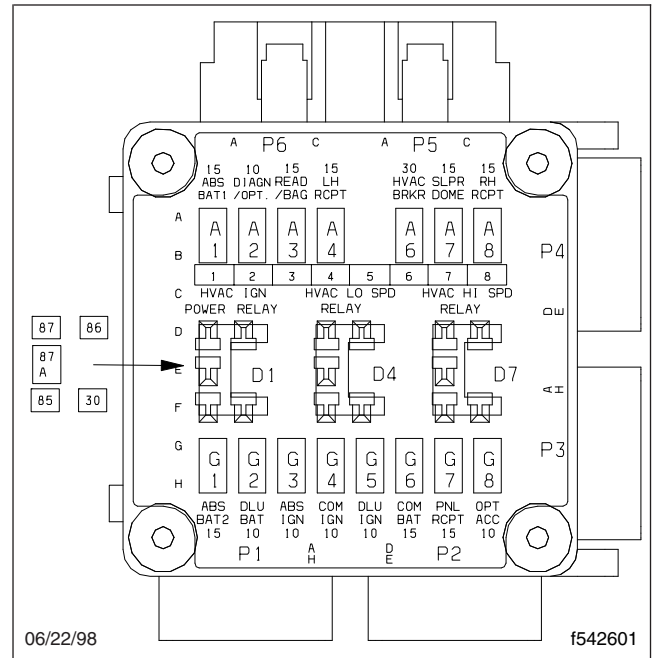


Fig. 6, Circuit Breaker/Relay Locations, Auxiliary Power Module

Power Distribution Module

54.04

Specifications

For pin connector locations on the top of the main PDM, see [Fig. 1](#).

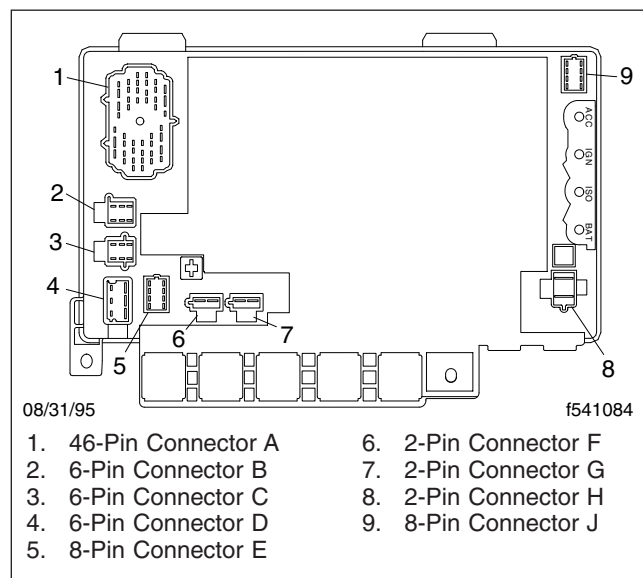


Fig. 1, Main PDM Pin Connectors (top view)

For positions of individual pinouts on the top of the main PDM, see [Fig. 2](#) for connectors A through G (left-hand side), and [Fig. 3](#) for connectors H and J (right-hand side).

For location of pin connectors and individual pin positions on the bottom of the PDM, see [Fig. 4](#).

NOTE: To locate pinouts, use this key: The first letter indicates the connector in which the pin is located. The second letter indicates the row of the connector. The third number, if present, indicates the number of the pin in the row, if there is more than one. If there is only one pin in a row, this number is missing.

Examples: Pin number AF5 means connector A, row F, pin 5. Pin number BC means connector B, pin C.

For a list of circuit breakers and relays installed in the main and auxiliary power distribution modules, see [Troubleshooting, 300](#).

For a full schematic view of the PDM wiring, see [Fig. 5](#). For a detailed (partial) view of the PDM wiring schematic, see [Fig. 6](#) and [Fig. 7](#).

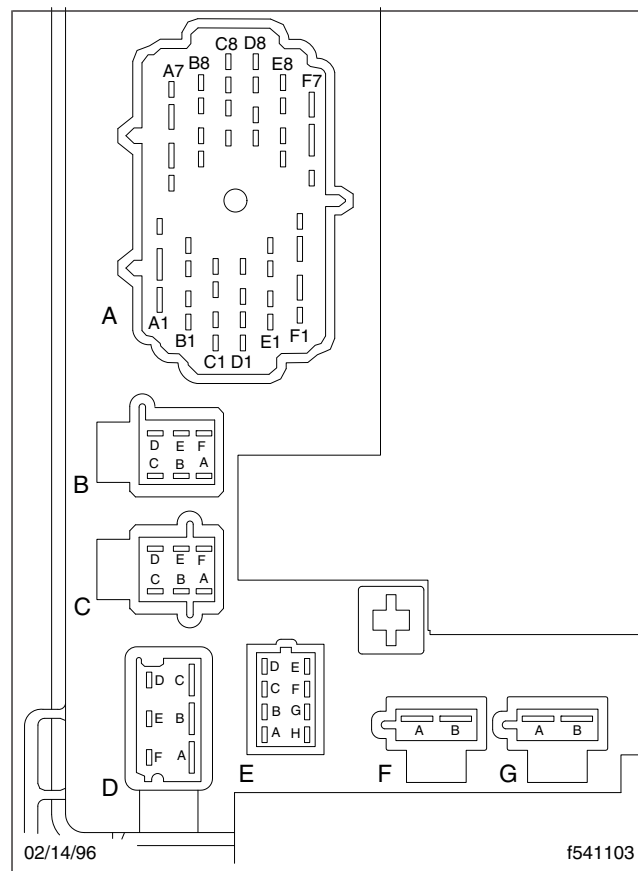


Fig. 2, Main PDM Pinout Positions (left side, top)

To identify relay terminals, first check the type of relay. On micro relays, the terminals are numbered 1 through 5, corresponding to the position numbers on the schematic. On all other relays, the terminals are numbered 30 through 87A, corresponding to positions 1 through 5 as shown in [Table 1](#).

Mini Relay Terminal Numbers	
Position	Terminal Number
1	86
2	85
3	30
4	87A
5	87

Table 1, Mini Relay Terminal Numbers

For a full schematic view of the "B" block auxiliary power module wiring, see [Fig. 8](#). For a detailed (par-

54.04

Power Distribution Module

Specifications

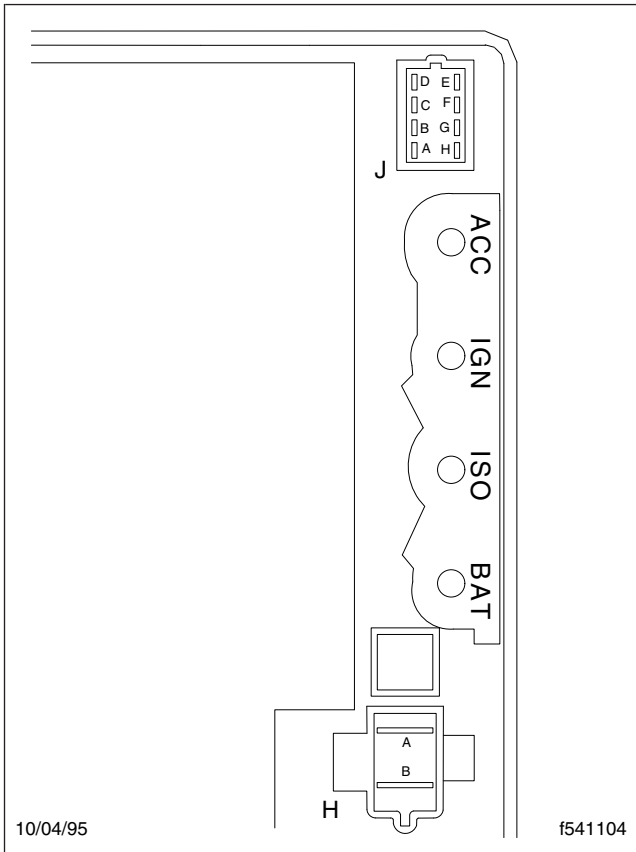


Fig. 3, Main PDM Pinout Positions (right side, top)

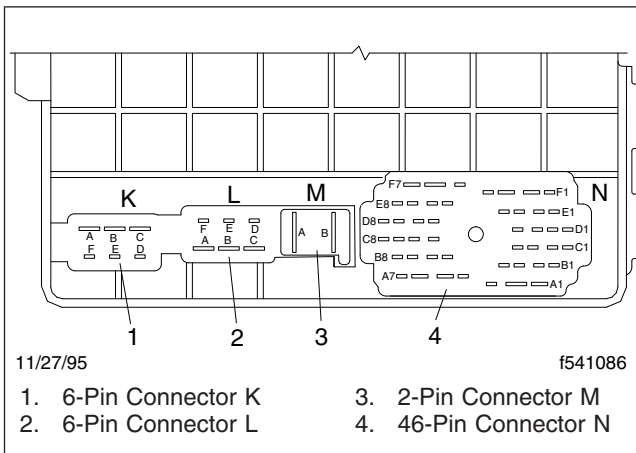


Fig. 4, Main PDM Pin Connectors (bottom view)

tial) view of the "B" block auxiliary power module wiring, see [Fig. 9](#) and [Fig. 10](#).

54.04

Power Distribution Module

Specifications

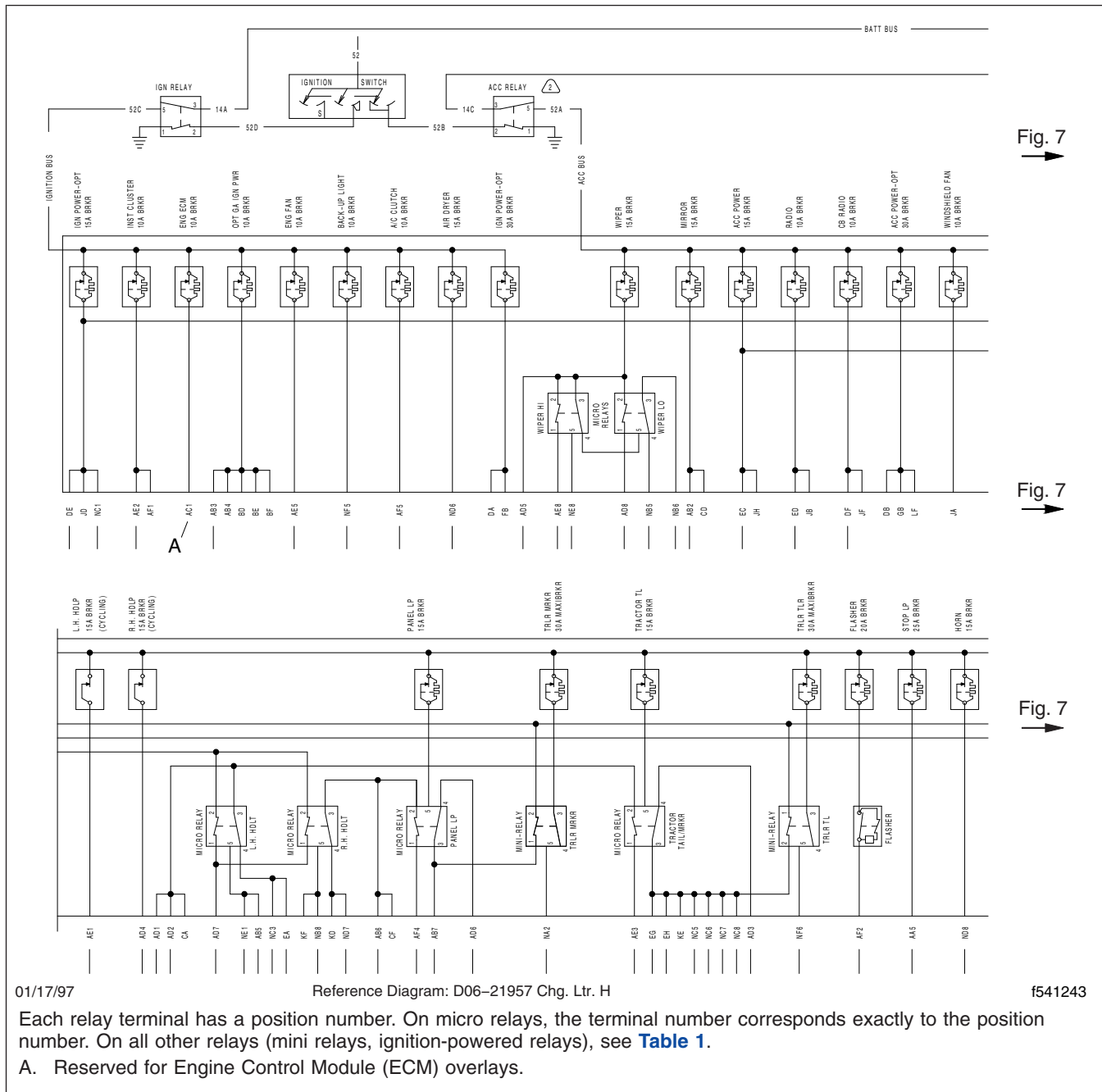


Fig. 6, Main PDM Wiring Schematic (partial view)

Power Distribution Module

54.04

Specifications

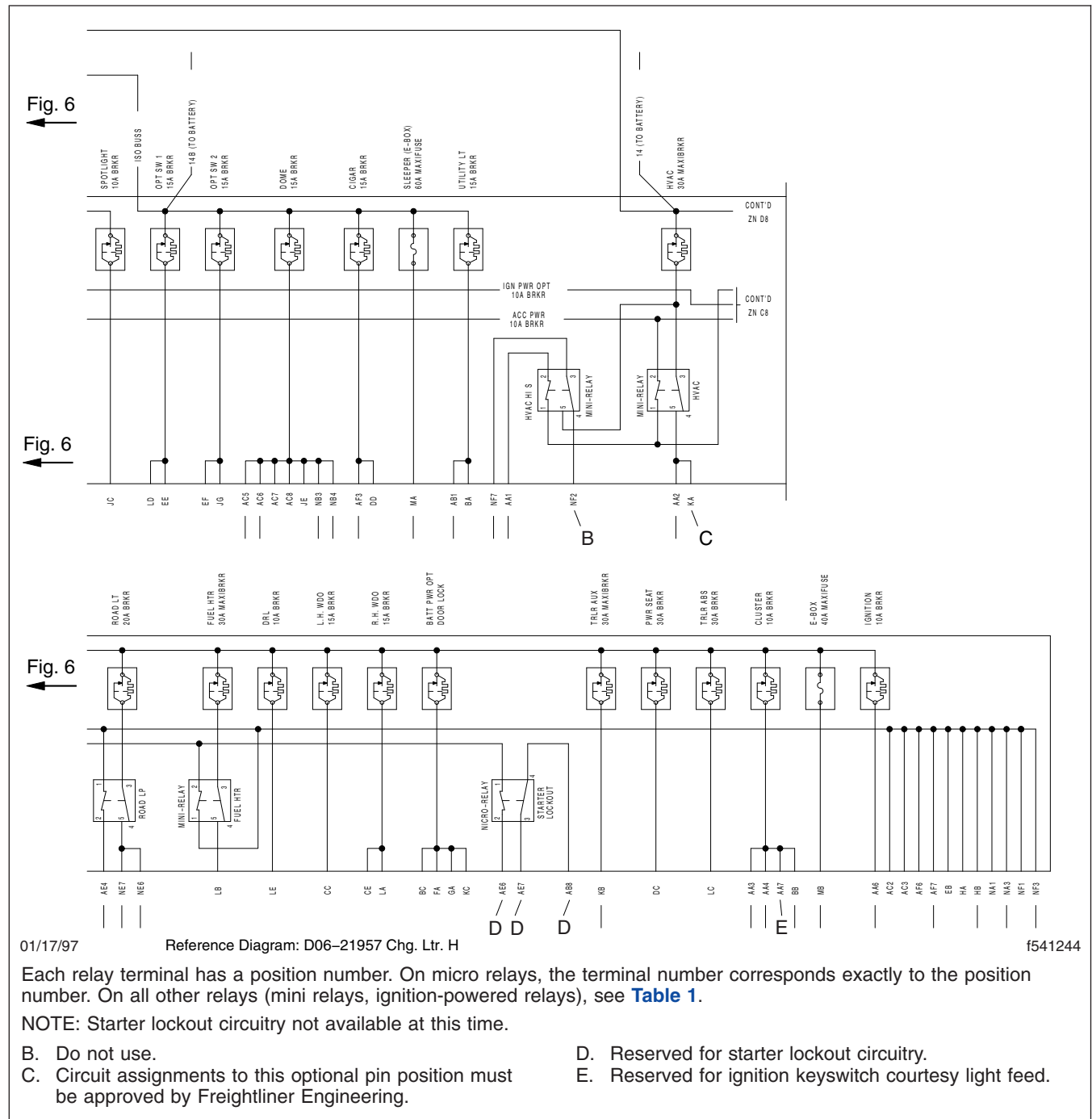


Fig. 7, Main PDM Wiring Schematic (partial view)

54.04

Power Distribution Module

Specifications

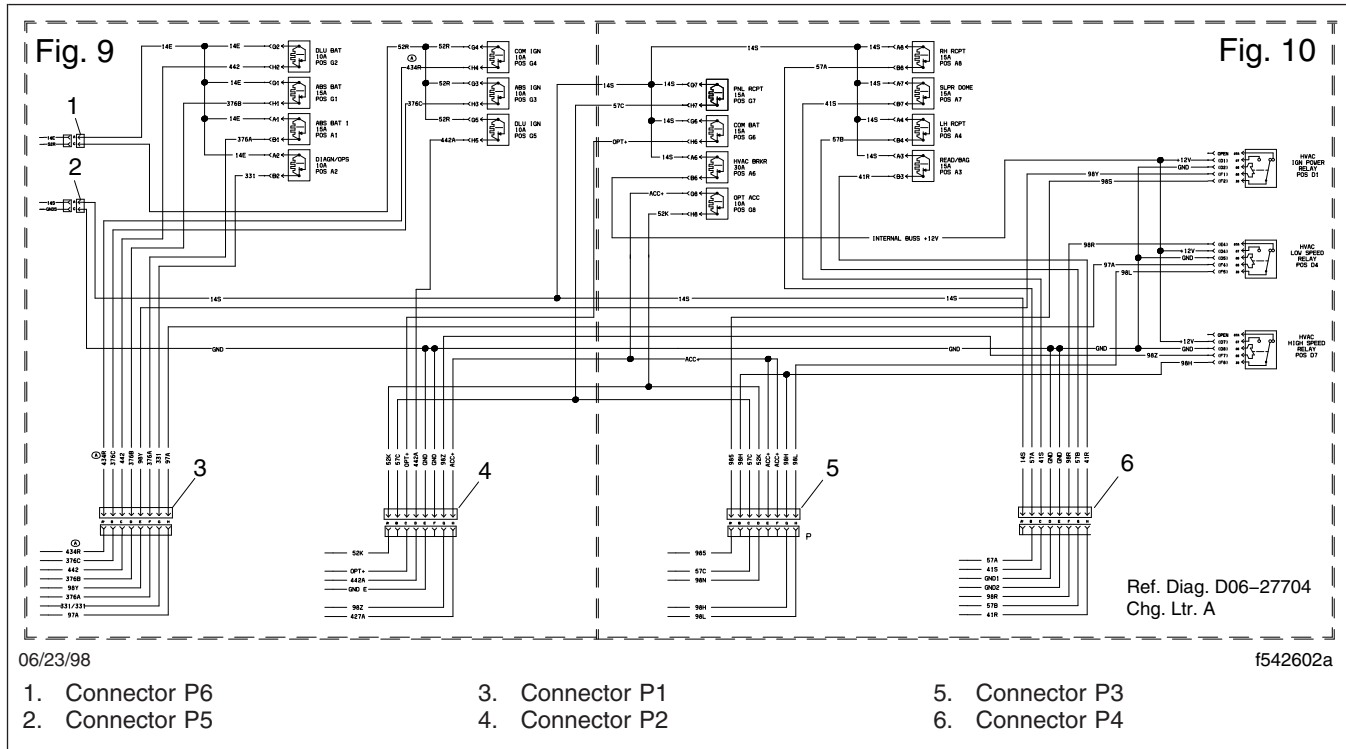


Fig. 8, Auxiliary Power Module Wiring Schematic (full view)

Power Distribution Module

54.04

Specifications

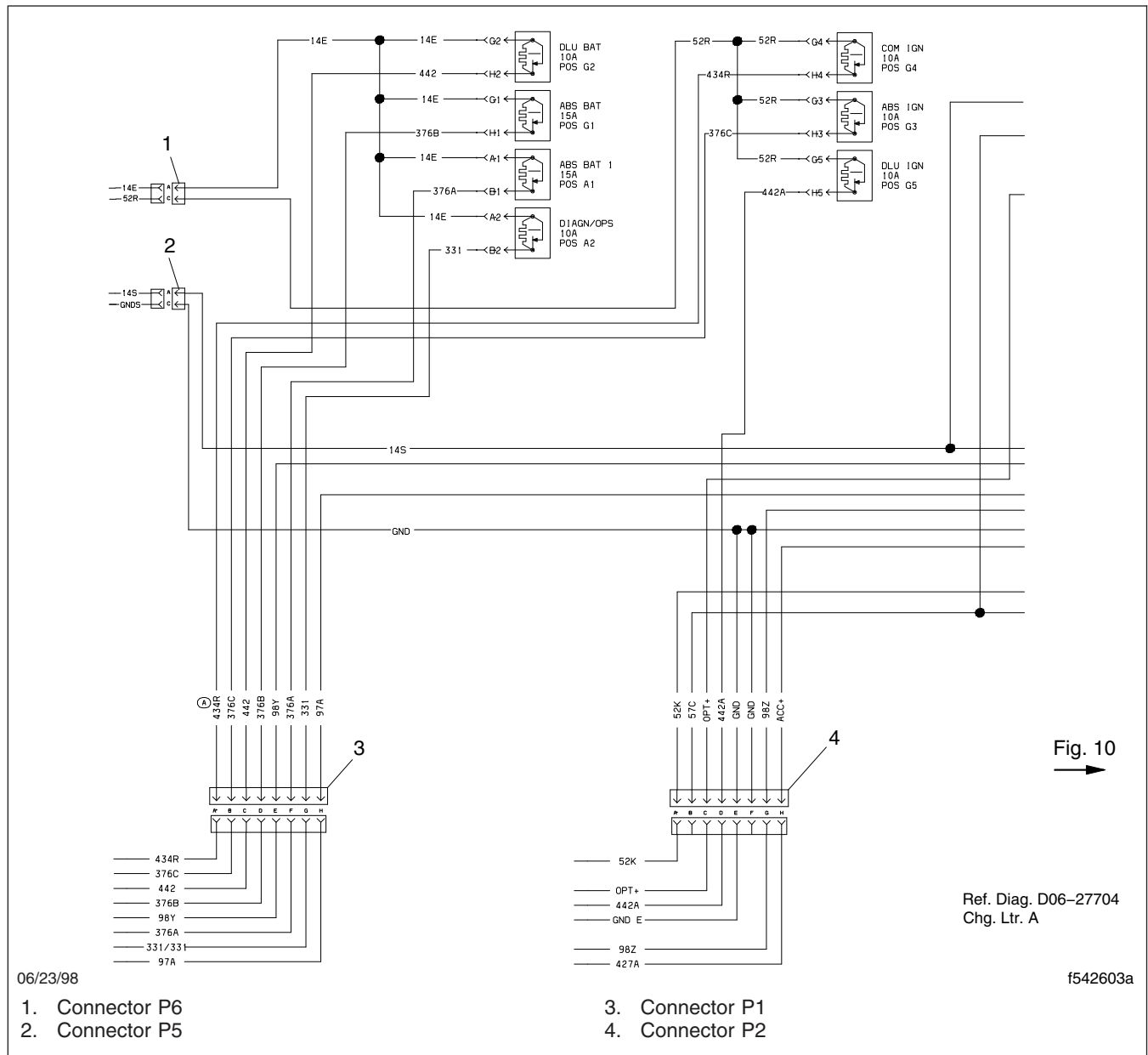


Fig. 9, Auxiliary Power Module Wiring Schematic (partial view)

54.04

Power Distribution Module

Specifications

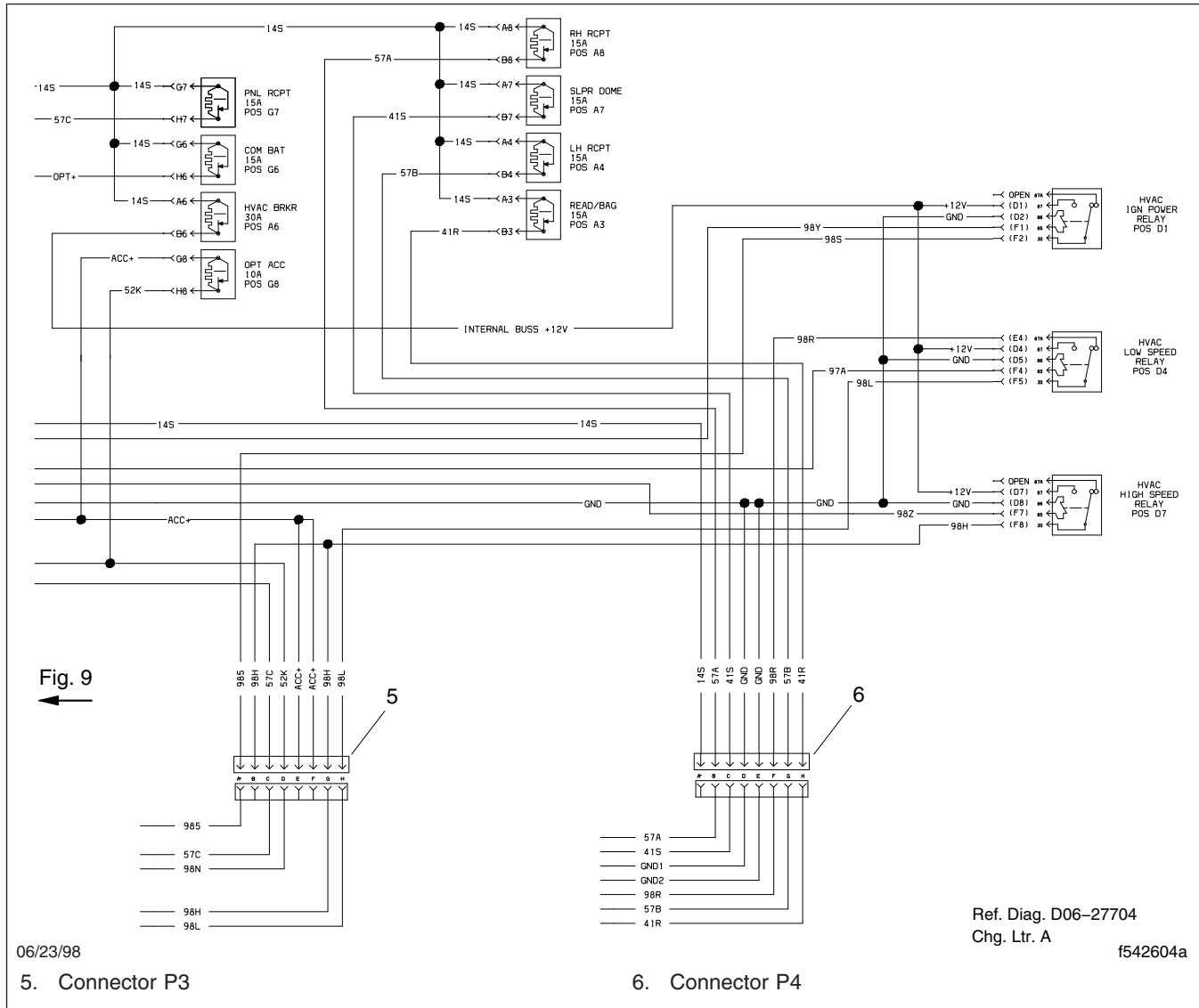


Fig. 10, Auxiliary Power Module Wiring Schematic (partial view)