KENWORTH
A DIVISION OF PACCAR

Service Manual

Department	Customer Service
Category	Service Manual
Section	Electrical
Title	Power Distribution Box (for chassis built after 12/03/01)
Number	KM815055
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Model	W900, T800, T600, C500 (excluding T800 City Cab and T800 Work Cab)
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Power Distribution Box

(for W900, T600, T800 C500 chassis built after 12/03/01)

Component Location

Figure 15-1

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Manufacturing Start Dates

This information applies to W900, T600, T800 and C500 (excluding T800 City Cab & T800 Work Cab) chassis built from:

- 12/03/01 - Renton
- 12/10/01 - Chillicothe
- 1/14/02 - KenMex

Diagrams

NOTE: The following diagrams are provided as an introduction to this product. Future diagrams will be added to ServiceNet but will not be added to this list. The procedure to determine the proper diagram for a chassis is to start with the diagrams link in ECAT (Refer to Web ECAT - Diagrams).

Wiring

Instrument Panel Harness, Cat and Cummins Engines P92-2040 - 01

Instrument Panel Harness, DDEC Engines P92-2041 - 01

Trailer ABS P94-1311 01

Fog Lamps P94-1338 A 01

Trailer ABS P94-1349 01

Trailer ABS P94-1353 01

Trailer ABS P94-1355 01

Trailer ABS P94-1356 01

Trailer ABS P94-1357 01

Trailer ABS P94-1358 01

Trailer ABS P94-1359 01

Trailer ABS P94-1360 01

Trailer ABS P94-1361 01

Trailer ABS P94-1362 01

Headlamps P94-1379 01

Headlamps, w/ MUX Wheel P94-1380 01

Headlamps, w/DRL P94-1381 01

Headlamps, w/MUX & DRL P94-1382 01

Park and Tail Lamps P94-1384 A 01

Charge and Start P94-1385 A 01

Ether Start P94-1390 A 01

Cummins Engine Fan Interlock Instructions P95-1576 01

Cat/DDEC Engine Fan Interlock Instructions P95-1577 01

Windshield Wipe & Wash P94-1331 - 01

Cab HVAC P94-1391 - 01

Accessory Power, 38-in Sleeper P94-1392 - 01

Accessory Power, 62-in/72-in Sleeper P94-1393 - 01

Accessory Power, 86-in Sleeper P94-1394 - 01

Power Windows P94-1396 A 01

Stop and Turn Lamps P94-1399 - 01

Radio or CB Radio P94-1400 A 01

Clearance and ID Lamps P94-1413 A 01

Interior Lighting P94-1414 A 01

Routing

Instrument Panel Harness R414-1260 A 01

Chassis Harness - Cab Section & PD Box Power R414-1261 A 01

Trailer Harness Options R414-1262 A 01

Headlight Harness, T800H R414-1274 01

Firewall - Wire & Cable Entry Locations R414-1275 01

Headlamp Harness, T6 w/SMC Hood R414-1265 A 01

Headlamp Harness Routing R414-1266 - 01

Air Dryer Harness, RH Front Mounted R414-1278 - 01

System Description

The new Power Distribution Box includes the box housing, instrument panel harness and 20 separate fuse and relay modules locked together to form the Central Electrical Panel (CEP). The system was designed to improve overall system reliability, simplify power distribution wiring and connections, and make servicing easier. The CEP is the heart of the vehicle electrical system, providing 72 circuits (twice as many as the previous PD box design) to meet today's electrical system demands and those of the future.

Central Electrical Panel (CEP) Fuse Layout

All circuits are protected with fuses and/or circuit breakers and relays are used to carry most high amperage current loads. A 135 amp circuit breaker in the battery box provides circuit protection for the CEP. Each electrical circuit is color coded and identified with a circuit number. Wiring and routing diagrams applicable to the new PD box design are available in ServiceNet. See "Manufacturing Start Dates" on page 4 and "Routing" on page 5.

WARNING! *Several circuits in the Central Electrical Panel are designated as "Fuse Only" circuits.* ***Do not install a circuit breaker in place of a fuse for the following circuits:***

- RADIO M
- RADIO P
- CB PWR
- SLPR ACC
- FOG LPS
- and whenever a spare circuit is used to supply power for an additional cigar lighter and/or ACC power well.

Electrical: Power Distribution Box (after 12/01)

View Rotated 90° From Actual Installation

Bottom (near floor) — Top (near dash)

Engine Brake Relay	Batt	Fog Lps 30A	A/C Clutch Relay	Ign	RH Win 25A	Park Lamp Relay	Batt	Low Beam 15A R	Ign	Spare Ign 34A	Batt	Spare Batt 1A	Batt	Spare Batt 5	Gnd * Pwr	
Flood Lamp Relay	Batt	Flood Lp 15A		Ign	LH Win 10A		Batt	Low Beam 15A L	Ign	Spare Ign 34B	Batt	Spare Batt 1B	Batt	Spare Batt 6	Gnd * Pwr	CAT Only
Horn Relay	Batt	Prk Lps 30A	Acc Bus Relay	Ign	Mirr Mot 10A	Ign Bus Relay	Batt	Drl Low 20A	Ign	Drl Ign 10A	Batt	Spare Batt 2A	Batt/Lvd	Spare Batt 7		
	Batt	Air Tank 10A		Ign	Eng Rtd 5A		Batt	Drl High 5A	Batt	Drl Bat 20A	Batt	Spare Batt 2B	Acc	Spare Acc 22A		
Sign Lamp Relay	Batt	Sign LPS 10A	Cab Mrkr Lp Relay	Batt	Hot Line 30A	Dimmer Switch Relay	Batt	Hi Beam 15A R	Batt	Spot Lmps 15A	Batt	Spare Batt 3A	Acc	Spare Acc 22B		
DDEC Only — Engine Fan Relay	Batt	Mirr HT 30A			Not Used		Batt	Hi Beam 15A L	Batt	Cab Mkr 20A	Batt	Spare Batt 3B	Acc	Spare Acc 23A		
Spare Relay #1	Batt	Key Sw 10A	Mirror Heat Relay	Ign	Warn Lps 10A	Head Lamp Relay	Batt	Trlr Stop 30A	Batt/Lvd	Radio P 10A	Acc	Spare Acc 19A	Acc	Spare Acc 23B		
	Acc	HVAC Con 10A		Ign	Acc Feed 10A		Batt	Cab Stop 30A	Batt/Lvd	Cab Pwr 10A	Acc	Spare Acc 19B	Batt	Spare Batt 4A		
Spare Relay #2	Acc	W Wiper 25A	Fog Lamp Relay	Ign	Bu Lps 10A	Trailer Stop Lp Relay	Batt	Radio M 5A	Batt/Lvd	Cab Acc 20A	Acc	Spare Acc 20	Batt/Lvd	Spare Batt 4B		
	Acc	Slpr Ht 20A		Ign	Eng Sd 15A		Batt	Diag #1 15A	Batt/Lvd	Slpr Acc 30A	Acc	Spare Acc 21	Ign	Spare Ign 36	Gnd * Pwr	
Spare Relay #3	Acc	HVAC Mot 30A	Trailer Mrkr Lp Relay	Ign	Cab Abs 5A	Trailer Abs Relay	Batt	Diag #2 15A	Batt/Lvd	Dome Lps 15A	Ign	Spare Ign 33A	Acc	Spare Acc 24	Gnd * Pwr	
	Acc	Rly Pwr 15A		Ign	Trlr Abs 25A		Batt	Horn 15A	Batt	Trlr Mkr 30A	Ign	Spare Ign 33B	Acc	Spare Acc 25	Gnd * Pwr	

This section of Central Electrical panel Behind Instrument Panel

70 Amp Relays
Ignition Bus
Accessory Bus

Iso Relays
Park Lamps
Dimmer Switch
Headlamp
Trailer Stop Lamp
Trailer Abs
A/C Clutch
Cab Marker Lamp
Mirror Heat
Fog Lamp
Trailer Marker Lamp
Spare # 1
Spare # 2
Spare # 3

Micro Relays
Engine Brake
Flood Lamp
Horn
Sign Lamp
Engine Fan
(DDEC Engine Only)

Batt- Battery Bus
Ign- Ignition Bus
Acc- Accessory Bus
Lvd- Low Voltage Disconnect Bus (option)

*Spare 5, 6, 7, 36, 24 & 25 Use P92-1969-1 Jumper

Figure 15-2 CEP Fuse Cover Decal

CEP Circuit Identification

Figure 15-3 CEP Circuit Identification

PD Box Connectors - Pinout Locations

PD Box Deutsch Connectors
(mates with chassis harness)

Wire Number	Circuit	Term	Function
WREO425	L7HBR	1	High Beam Lamp Right
WREO517	P79BL	2	Backup Lamps
WREO204	C2AX	3	Stop Lamps
WREO580	L7HBL	4	High Beam Lamp Left
WREO316	L6LBL	5	Low Beam Lamp Left
WREO315	L6LBR	6	Low Beam Lamp Right
WREO496	L9FG	7	LH Fog Lamp
WREO537	L33LT	8	Left Front Directional Turn Signal & Trailer
WREO538	L34RT	9	Right Front Directional Turn Signal & Trailer
WREO161	L35LT	10	Left Turn
WREO162	L36RT	11	Right Turn
WREO510	L1PL	12	Tail & Park Lamps
WREO446	L3ML	13	Marker Lamps
WREO503	L14FL	14	Flood Lamp
WREO518	P118SK	15	Engine Shutdown
WREO641	C102FC	16	Air Conditioner Clutch Control
WREO521	H90AT	17	Air Tank
WREO427	G278U	18	Aux Trans Oil Temp
WREO117	C20WW	19	Windshield Washer Motor
WREO426	G28SU	20	FF or Single Rear Axle Temp
WREO489	C53HN	21	Horn Relay To Horn
WREO190	C71HI	22	Windshield Wiper High
WREO429	G29SU	23	RR Axle Temp
WREO430	G72SU	24	Fuel Gauge Sender
WREO191	C71LW	25	Windshield Wiper Low
WREO397	P20WW	26	Windshield Washer Motor
WREO192	C71WM	27	Windshield Wiper Motor
WREO		28	Plug
WREO		29	Plug

Chassis and Trailer Harness Connectors Located Behind Windshield Washer Reservoir

P20-1134-29-5-0 (chas)

PD Box Deutsch Connectors
(mates with trailer harness)

Wire Number	Circuit	Term	Function
WREO447	P181TR	R	Aux Battery see note 10
WREO452	L2TR	S	Stop Lamp Trailer
WREO539	P4TR	T	Hot Wire For Aux Devices On Trailer
WREO454	P154TR	U	Trailer ABS Power
WREO509	L1PL	V	Park Lamp
WREO536	L34RT	W	Right Front Directional Signal Lamp
WREO540	L155TR	X	ABS Trailer Warn Lamp
WREO535	L33LT	Y	Left Front Directional Signal Lamp
WREO559	L3TR	Z	Marker Lamps Trailer

P20-1134-29-5-0 (ABS01)

Figure 15-4

Spare Circuits

The CEP has a total of 26 spare circuits (3 of which can be connected to spare relays on the CEP).

They include:

- 11 spare battery circuits
- 10 spare accessory circuits
- 5 spare ignition circuits

Adding Spare Circuits

The CEP has 3 different options available for tapping into spare BATT, ACC or IGN power.

Option # 1: PD Box Spare PWR/GND Sockets

1. Remove 3 fasteners securing the courtesy lamp mounting plate under the dash.
2. Allow plate to hang loose. See Figure 15-5.

Figure 15-5

3. From under the dash, install a P92-1969-1 power jumper wire into one of the top row of 6 spare BATT, ACC, or IGN sockets not currently being used. See Figure 15-6.

Installing P92-1969-1 Power Jumper Wire

Figure 15-6

Option # 1: PD Box Spare PWR/GND Sockets (continued)

1. Connect the other end of the jumper wire positive (+) and negative (-) leads to the accessory. If the accessory is to be controlled by a dash switch, connect the negative (-) lead to a spare dash switch, then to the accessory.
2. Install the correct rated fuse, or circuit breaker, into the fuse socket directly below the jumper harness installed in step 3.

Option # 2: Spare Circuit Bullet Connectors

1. Remove the LH gauge panel above ignition key switch.
2. From behind the gauge panel, locate one of the 20 spare BATT, ACC, or IGN bullet connectors not currently being used. See Figure 15-7.

Spare Bullet Connectors

Figure 15-7

3. Plug one end of a K333-127-2 pigtail harness into the appropriate spare circuit bullet connector. See Figure 15-8.

Figure 15-8

4. Connect the other end of the pigtail harness to the accessory. If the accessory is to be controlled by a dash switch, connect a ground wire to the switch, then to the accessory.
5. Install the correct rated fuse, or circuit breaker, into the fuse socket that corresponds to the spare circuit selected in step 2.

Option # 3: Spare Circuit Relays (For loads exceeding 20 amps)

1. Remove the LH gauge panel above ignition key switch.
2. From behind the gauge panel, locate one of the 3 spare relay connectors not currently used. See Figure 15-9.

Spare Relay Connectors

Figure 15-9

3. Plug one end of a spare relay harness (PN P92-1947-X) into the appropriate spare relay circuit connector. See Figure 15-10 on page 13.

NOTE: Use a P92-1947-1 or -3 harness for a Normally Open (NO) spare relay circuit. Use a P92-1947-2 or -4 harness for a Normally Closed (NC) spare relay circuit.

Option # 3: Spare Circuit Relays (For loads exceeding 20 amps) (continued)

TERM	CIRCUIT	WIRE NO.
A	R105CM	WIRE0002
C	R104NO	WIRE0003
D	R107RY	WIRE0001

TERM	CIRCUIT	WIRE NO.
A	R105CM	WIRE0006
B	R103NC	WIRE0004
D	R107RY	WIRE0005

TERM	CIRCUIT	WIRE NO.
A	R105CM	WIRE0007
C	R104NO	WIRE0008
D	R107RY	WIRE0009

TERM	CIRCUIT	WIRE NO.
A	R105CM	WIRE0012
B	R103NC	WIRE0011
D	R107RY	WIRE0010

Figure 15-10

Option # 3: Spare Circuit Relays (For loads exceeding 20 amps) (continued)

4. Connect the spare relay harness end labeled NORMALLY OPEN or NORMALLY CLOSED to the accessory.

5. Connect the spare relay harness end labeled SWITCH (a ground wire) to a spare dash switch. Ensure the switch is properly grounded. Next, ground the accessory to a known good ground source (i.e. cab, engine, frame).

6. To provide power to the relay, connect a power source to the spare relay harness end labeled COMMON. To accomplish this, follow the procedure below:

   a. Locate one of the spare IGN, ACC, or BATT “bullet” connectors located behind the LH gauge panel. See Figure 15-7 on page 12.

   b. Using a K333-127-2 jumper harness, plug one end of the jumper harness into one of the spare “bullet” connectors. Connect the other end of the jumper harness to the spare relay jumper harness end labeled COMMON.

   c. Install the correct amperage fuse in the appropriate spare fuse socket. Install a K301-179 or VF4-15F11-S01 relay into the socket that corresponds to the spare relay circuit selected in step 2.

Servicing

Power Distribution Box And Fuse/Relay Module Removal

The new P D Box includes:

- housing
- instrument panel harness
- 20 separate fuse and relay modules

The modules lock together to form the Central Electrical Panel. Each fuse and relay module can be replaced separately by releasing the “locking wedges” that fasten each module together.

Figure 15-11

Tips for Easier PD Box Servicing

- Replace damaged P20-1000-040 yellow module locking wedges before reassembly.
- Double-check each terminal wire removed during disassembly to assure it is re-installed and locked in the correct pin-out location on the new module.
- Inspect for possible loose terminals on the backside of other modules.
- Check the power feed cable and stud inside the PD box housing to assure it is properly tight (10 to12 ft/lb.) and free of corrosion.
- During CEP reinstallation, make sure none of the harness wires are pinched behind or around the sides of the PD box housing. Secure the harness wires with plastic ties to minimize potential pinching.
- Assure that the threaded thumbscrew inserts remain attached to the housing during disassembly.
- Before reinstalling the upper PD box cover, position the pinchweld strip to prevent the harness from chafing on the cover edges.
- Replace the reusable housing gasket only if it is damaged.
- Torque values:
  - PD box housing firewall fasteners = 5 to 7 ft/lbs.
  - Battery power feed cable outside the PD box housing = 8 to 13 ft/lbs.
  - Battery power feed cable inside the PD box housing = 10 to 12 ft/lbs.
- The CEP can be disassembled from inside the cab, but workspace is limited. For this reason, Kenworth recommends removing the PD box housing from the engine side of the firewall to service the CEP as described in the next section.

Power Distribution Box Removal

1. Disconnect the batteries.
2. If applicable, remove any air intake piping blocking access to the PD box on the engine side of the firewall.
3. Remove the windshield washer reservoir attached to the PD box. See Figure 15-12.

PD box shown with windshield washer reservoir removed.

Figure 15-12

4. Remove the battery power feed cable at the PD box. See Figure 15-12.
5. Remove the chassis and trailer harness Deutsch connectors at the bottom of the PD box. See Figure 15-12.

Power Distribution Box Removal (continued)

6. Remove 12 fasteners securing the PD box housing to the firewall. See Figure 15-13.

Figure 15-13

7. Unseat the PD box housing from the firewall and allow the box to hang free.
8. Rotate the PD box housing enough to remove the lower PD box cover. The cover is held with a thumbscrew at the bottom and a flange at the top. See Figure 15-14.

Figure 15-14

9. Remove 4 thumbscrews securing the upper PD box cover, then remove the cover. See Figure 15-14.
10. Using a pair of needle-nosed pliers, compress the two lower lock fingers that secure the CEP inside the box housing. See Figure 15-15. At the same time, pull the bottom of the CEP out slightly to ensure the lock fingers stay released.

Figure 15-15

11. Apply slight downward pressure to the CEP while continuing to angle the bottom of the CEP out and down. This will disengage the upper lock fingers from the housing and allow the CEP to be removed.
12. Move the housing to the side so that access to the CEP is unobstructed. See Figure 15-16.

Figure 15-16

13. Carefully pull the CEP out of the PD box housing.

NOTE: It is not necessary to remove the power feed cable or the two Deutsch connectors inside the PD box housing in order to separate the CEP from the housing.

Steps 1 through 13 above make the CEP accessible enough to allow replacement of individual fuse or relay modules.

Fuse/Relay Module Replacement

Single module replacement is easier when a section of the CEP is separated first, freeing one side of the damaged module from the CEP and then releasing the locking wedges on the opposite side and end of the module being replaced.

The following example describes the replacement of a high current relay module, but the same procedure applies to all 20 modules. The only difference is the size or type of terminal connectors used with some modules.

1. With a small screwdriver, pry the red cover (if applicable) off the defective module. See Figure 15-17.

Use A Screwdriver To Pry Cover Off

Figure 15-17

NOTE: In steps 2a and 2b next, apply downward pressure to the modules at the same time as the tabs are released. This will assure the tabs stay released and allow the modules to be separated.

2. To separate a section of the CEP:
   a. With a 3mm screwdriver, release the 6 yellow locking wedge tabs on one side of the defective module and the module next to it. See Figure 15-18.
   b. Release the 4 remaining lock wedge tabs on the module being replaced. See Figure 15-19 and Figure 15-20 on page 19.

Use a 3mm screwdriver to release the module locking wedge tabs. At the same time, apply downward pressure to the module to ensure the locking tabs stay released.

Figure 15-18

Module To Be Replaced

Figure 15-19

Fuse/Relay Module Replacement (continued)

Figure 15-20

NOTE: Before performing steps 3 through 5 next, assure proper reassembly by writing down each wire's circuit number and location.

3. When replacing a fuse module, remove the red spacer between the lock fingers before releasing the terminal lock fingers. See Figure 15-21.

Fuse modules only: The terminal lock spacer must be removed prior to releasing the terminal lock fingers.

Figure 15-21

4. Using a terminal extraction tool, release each terminal wire lock finger. See Figure 15-22 and Figure 15-23.

Use a terminal extraction tool to release each terminal lock finger (relay module shown).

Figure 15-22

Use a terminal extraction tool to release each terminal lock finger (fuse module shown).

Figure 15-23

Fuse/Relay Module Replacement (continued)

5. Pull each wire out from the backside of the module. See Figure 15-24.

Figure 15-24

6. The defective module can now be replaced.
7. For reassembly, follow the R & R procedures in reverse order.