AUXILIARY BATTERY WITH ISOLATION RELAY INSTALL

Work Instructions:

SUBJECT: Retrofitting an auxiliary battery (code E28) with isolation relay (code E36).

DESCRIPTION: This retrofit consists of installing an auxiliary 12V/100Ah deep cycle battery (code E28) for running additional electrical equipment, and an isolation relay (code E36) to separate it from the starter battery circuit. The isolation relay prevents electrical equipment connected to the auxiliary battery from discharging the starter battery. When the engine is running, the relay allows the battery to be charged. The additional battery (code E28) is located under the passenger seat.

PARTS REQUIRED:
Following is the list of parts from EPC. Some parts will have to be purchased locally.

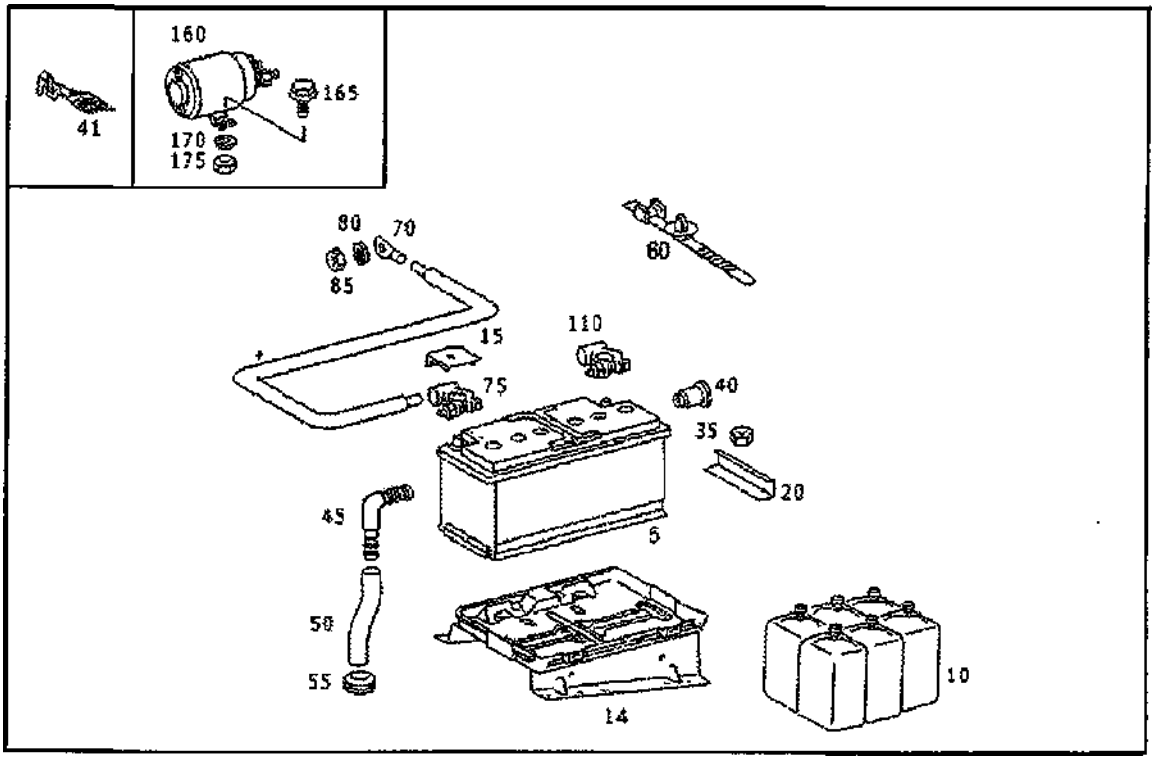

Fig 1, Parts breakdown

	Part Number	Description	Qty.	
5	A 005 541 1801	100 Ah deep cycle battery	1	
10	A 000 989 14 15	Battery electrolyte set	as	required
14	A 901 6600431	Battery tray, code E28	1	
15	A 001 5460835	Boot, battery positive pole	1	
20	A 1236260242	Rail, battery mounting	2	
35	N 913017 006000	Nut, battery mounting	2	
40	A 002 997 24 86	Plug	1	
41	A 008 5457926	Fuse contact spring, unipolar, 2.5 - 4.0 mm		
45	A 000 990 38 72	Distributor (elbow), battery venting	1	
50	A 024 997 49 82	Hose, battery venting	by	meter
55	A 1869970681	Grommet, drain hose through vehicle floor	1	
60	A 901 9970090	Tie strap clip	1	
70	N 046234 008001	Cable shoe, positive cable	6	
75	A 601 5460044	Clamping piece, battery positive pole	1	
80	N 912004 008102	Lock washer	2	
85	N910112 006003	NutM6	2	
110	A 001 546 1044	Clamping piece, negative pole	1	
110	N 072332 008200	Soldering terminal, negative pole	as	required
160	A 000 545 17 67	Isolation relay (contactor)	1	
165	N 914129 005001	Screw, isolation relay to seat box	2	
170	N 912004 005103	Lock washer, isolation relay to seat box	2	
175	N 304032 005005	Nut, isolation relay to seat box	2	
-	purchase locally	15 A fuse	1	
-	«	3/8 SAE bolts, grade 8 with locknuts	8	
-	"	Stainless steel washers 1" O.D.	16	
-	*n*	Battery cable, red, 25 mm2 cross section *	as	required
-	*"*	Battery cable, black, 25 mm2 cross section *	"	
-	*H*	Electrical wire, brown, 1 mm2 cross section *	"	
-	*«*	Electrical wire, red w/black, 1 mm2 cross section *	"	
-	*"*	Electrical wire, red w/green & violet, 1 mm2. *	"	
-	*"*	Convoluted tubing and cable tie straps	u	
	"	Heat shrink tubing	"	

* It is strongly recommended to adhere to the color coding of the wires. This simplifies the servicing and troubleshooting of the electrical system, and agrees with shop documentation and electrical wiring schematics. Color identifiers can be applied with paint. AWG wire sizes are acceptable, as long as a minimum gauge of 16 AWG is used instead of the 1 mm2 cross section and a minimum gauge of 4 AWG is used instead of the 25 mm2 cable.

PROCEDURE:

1. Disconnect the cable from the negative battery post.

2. Remove front seats. To do so, remove the black plastic cap (1) from seat belt bolt. Using a 17 mm socket, remove bolt from seat belt on seat frame. **See fig.2.**

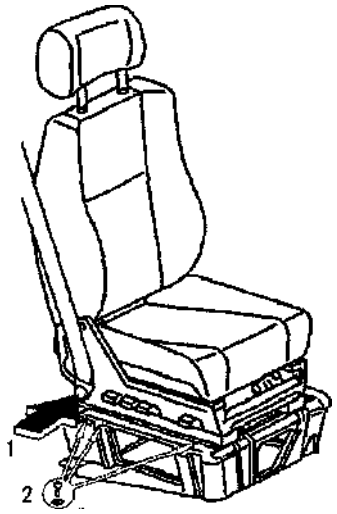

Fig 2, Front seat removal (passenger seat shown)

3. Move both seats towards the front and back to gain access to the sliding rail bolts (2). Remove the bolts using a 6 mm Alien wrench. **See fig.2.** If the passenger seat is non-adjustable (standard seat), use a 13 mm socket to remove the seat base bolts. Unplug the seat belt electrical connector from behind the driver's seat. The front seats can now be removed from the vehicle.

4. Using a 13 mm socket, remove the passenger side seat base bolts. See **fig.3.** Remove the passenger seat base from the floor.

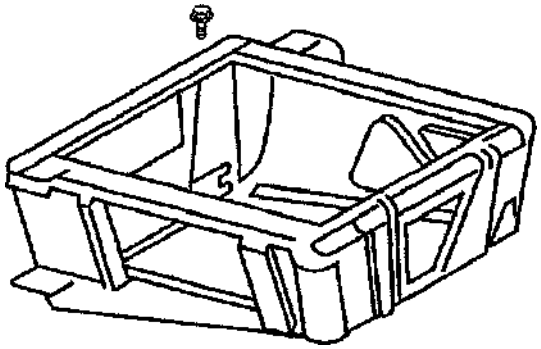

Fig 3, Seat base removal

5. The battery tray (A 901 660 04 31) does not have any mounting holes, since it is designed to be welded to the floor. Modify the tray by drilling four holes on both flanges (eight holes total), and mount it to the floor using eight 3/8" SAE (grade 8) bolts and 1" O.D. washers. See **fig.4.** Remove

a!! metal filings to avoid corrosion damage. The additional battery is grounded through the tray, so the mating surfaces to the floor must be stripped from paint to provide a good electrical path. Treat exposed metal surfaces with a corrosion protection agent, e.g. zinc dust paint.

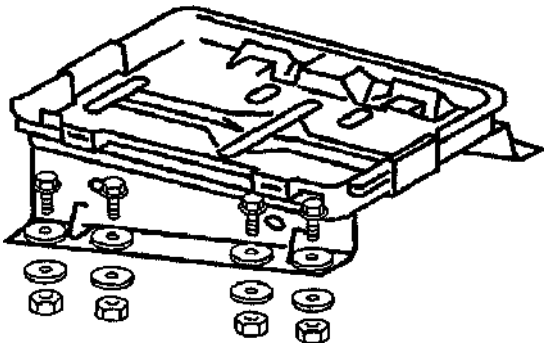

Fig 4, Battery tray installation

6. Drill a hole on the floor to install the vent tube for the battery case. See **fig.5.** Install the grom-met A 186 997 06 81 in the hole.

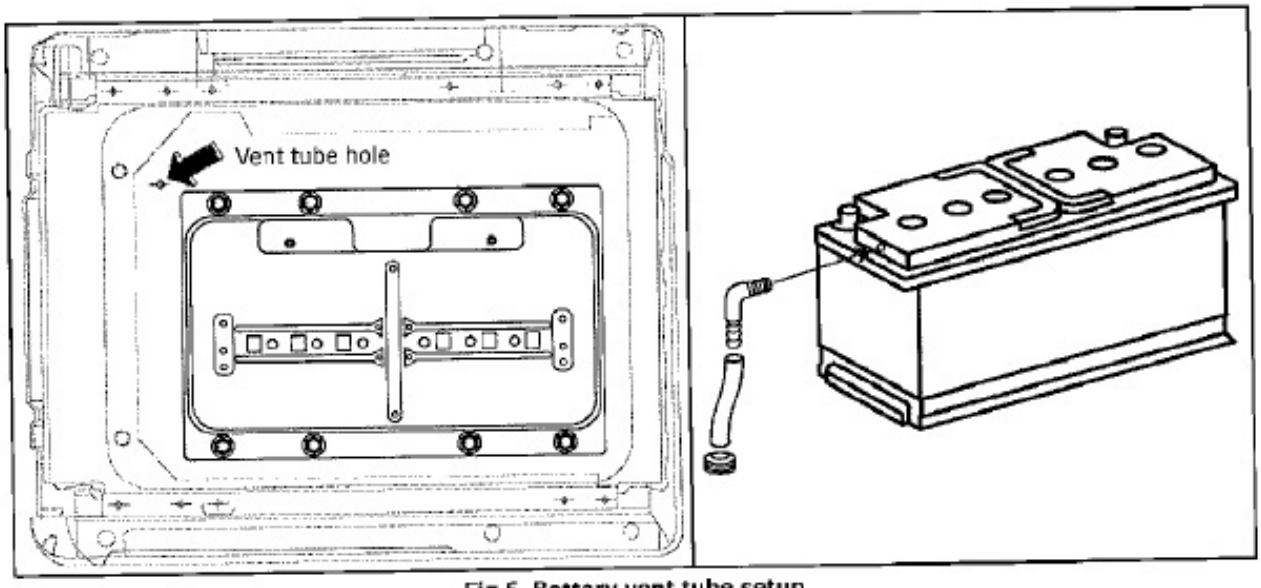

Fig 5, Battery vent tube setup

7. Fill the 100 Ah deep cycle battery A 005 541 18 01. Pour in battery electrolyte A 000 989 14 15 up to inner level marking with a filling device. Let the battery sit for approximately 20 minutes. Check the level and correct if necessary.

Danger. When working with the battery, there is a risk of explosion from explosive gas, risk of poisoning and caustic burns from swallowing battery electrolyte, risk of injury from caustic burns to eyes and skin from battery electrolyte or from handling damaged lead acid batteries. No fire, sparks, open flames or smoking should be present when working in the battery area. Wear acid-protective gloves, clothing and eye protection when working with the battery. Pour battery electrolyte only into suitable and appropriately marked containers.

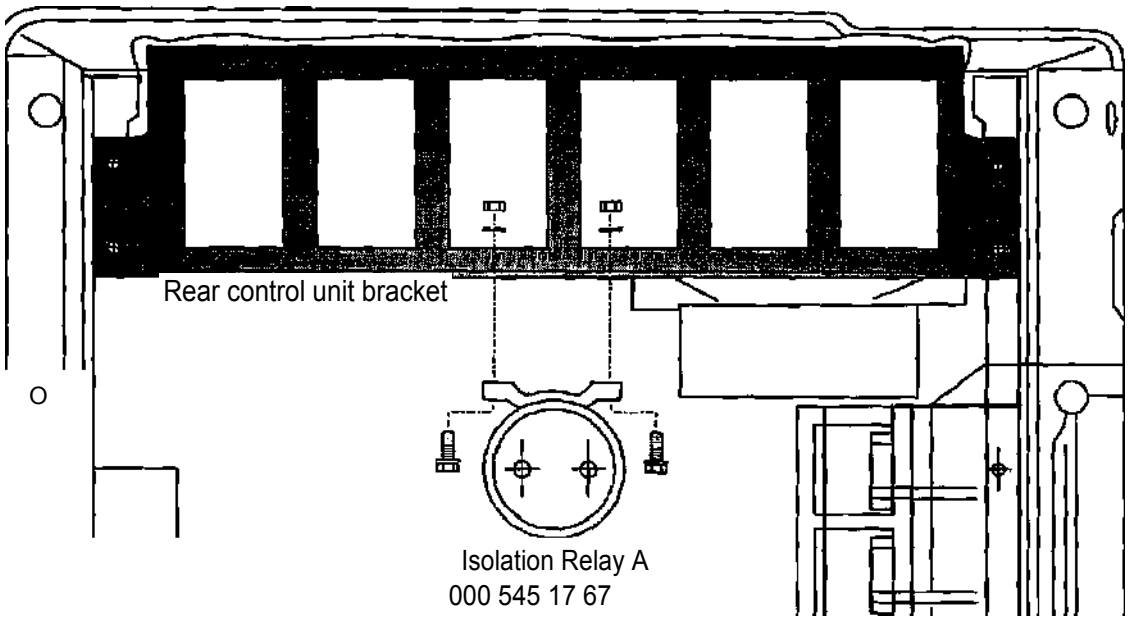

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Fig 8, Isolation relay installation

11. Route the battery cables. See **fig-9.** Beginning at the passenger seat base, determine the proper length of cable required to connect the negative battery terminal to the battery tray ground stud. Cut the black battery cable and assemble with clamping piece A 001 546 10 44/sol-dering terminal N072332 008200 and ring terminal N 046234 008001. Temporarily connect the assembled cable to the negative battery post. Connect the other end to the battery tray ground stud and tighten the nut. **As a safety precaution, disconnect the negative battery terminal and leave it disconnected during the installation procedure.**

12. Determine the proper length of cable required to connect the positive battery terminal to the isolation relay. Cut the red battery cable and assemble with clamping piece A 601 546 00 44 and ring terminal N072332 008300. Cover the crimped end of the ring terminal with heat shrink tubing. Connect the cable to the positive battery post and install the post cover A 001 546 08 35, Cover the side section of the auxiliary battery's positive cable with convoluted tubing and fasten it to the battery tray with the tie strap clip A 901 997 00 90. See **fig.9.**

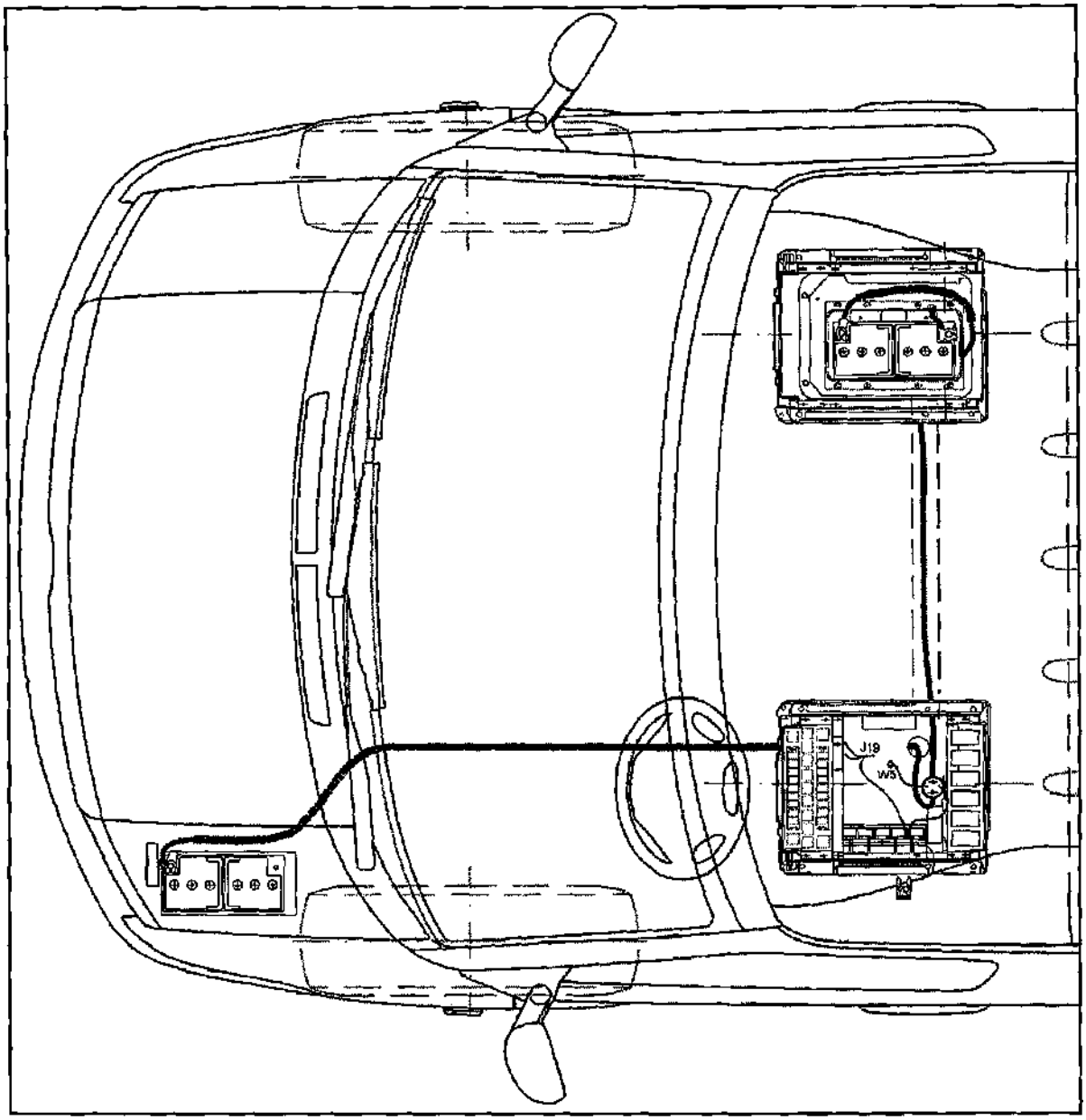

Fig 10, Auxiliary battery wiring layout

15. Remove the nut that holds the high current fuse box bracket to the main battery positive terminal. See. **fig.10.** Install a ring terminal N 046234 008001 on the end of the battery cable. Cover the crimped end of the ring terminal with heat shrink tubing. Connect the cable to the bracket and reinstall the nut.

16. Find an empty fuse position on the driver's seat base electrical center for installing the auxiliary battery circuit fuse (15 A). Gently lift the locking tabs to remove the fuse block from the adapter frame mounting. Release the appropriate terminal lock (red clip) by pushing it upwards and removing it from the fuse block. See **fig.11.**

17. Crimp an electrical terminal A 008 545 79 26 on the end of the red/black 1 mm2 wire. Crimp another electrical terminal A 008 545 79 26 on the end of the red/green/violet 1 mm2 wire. See **fig.11.** Insert the red/black wire terminal into the top cavity of the selected fuse location and push until it clicks in place. Insert the red/green/violet wire terminal into the middle row cavity of the same fuse location and push until it clicks in place. Install the terminal lock (red clip) and place the fuse block back into the adapter frame mounting. Install a 15 A fuse and note its description, e.g. cut-off relay, aux. battery, 15 A, on the fuse assignment decal on the fuse cover (use permanent ink).

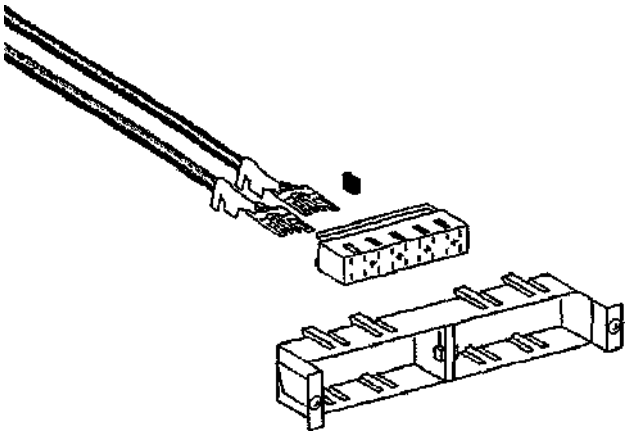

Fig 11, Fuse installation

18. Route the red/green/violet wire from the fuse middle row cavity to the isolation relay. Crimp a ring terminal on the other end of the wire and connect it to the positive coil terminal of the relay. See **fig.12.** The isolation relay has a reversed-biased clamping diode connected in parallel to the coil circuit. This diode supresses the voltage peaks generated during the collapse of the coil's magnetic field (e.g. when interrupting the power to the relay). Proper polarity must be observed to avoid damage to the diode (do not forward bias the diode).

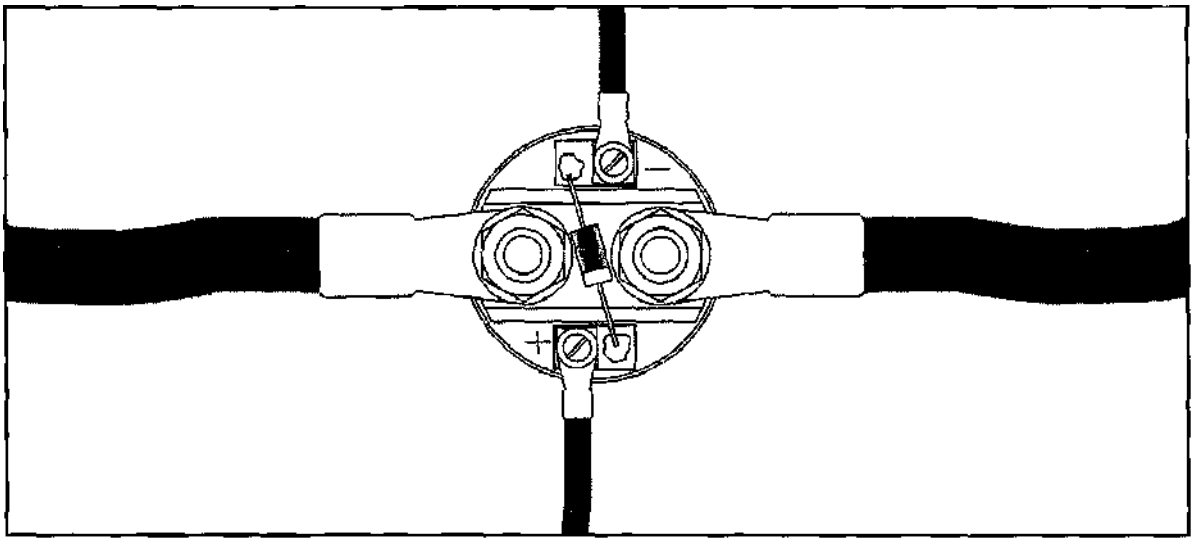

Fig 12, Isolation relay wiring

19. Crimp a ring terminal on one end of the brown 1 mm2 wire and connect it to the negative coil terminal of the isolation relay. Route the wire to the ground stud (W5) on the seat base. See **fig.13.** Crimp *a* ring terminal on the other end of the wire and connect it to the ground stud (W5).

20. Locate the J connector pack. This is a bundle of spliced wires wrapped in black cloth tape located close to the W5 ground stud. Carefully unwrap the tape and find a splice with red/black 1 mm2 wires. This is the J19 circuit splice. Remove the heat shrink cap from the splice and verify the circuit with a digital voltmeter. With the engine off and igniton on you should read 0 volts. With the engine running you should read charging system voltage. If this is correct, cut the crimp connector. Route the red/black wire from the fuse top row cavity to the J19 splice. Crimp the wires together with a new crimp connector and cover it with new heat shrink tubing. See **fig.13.**

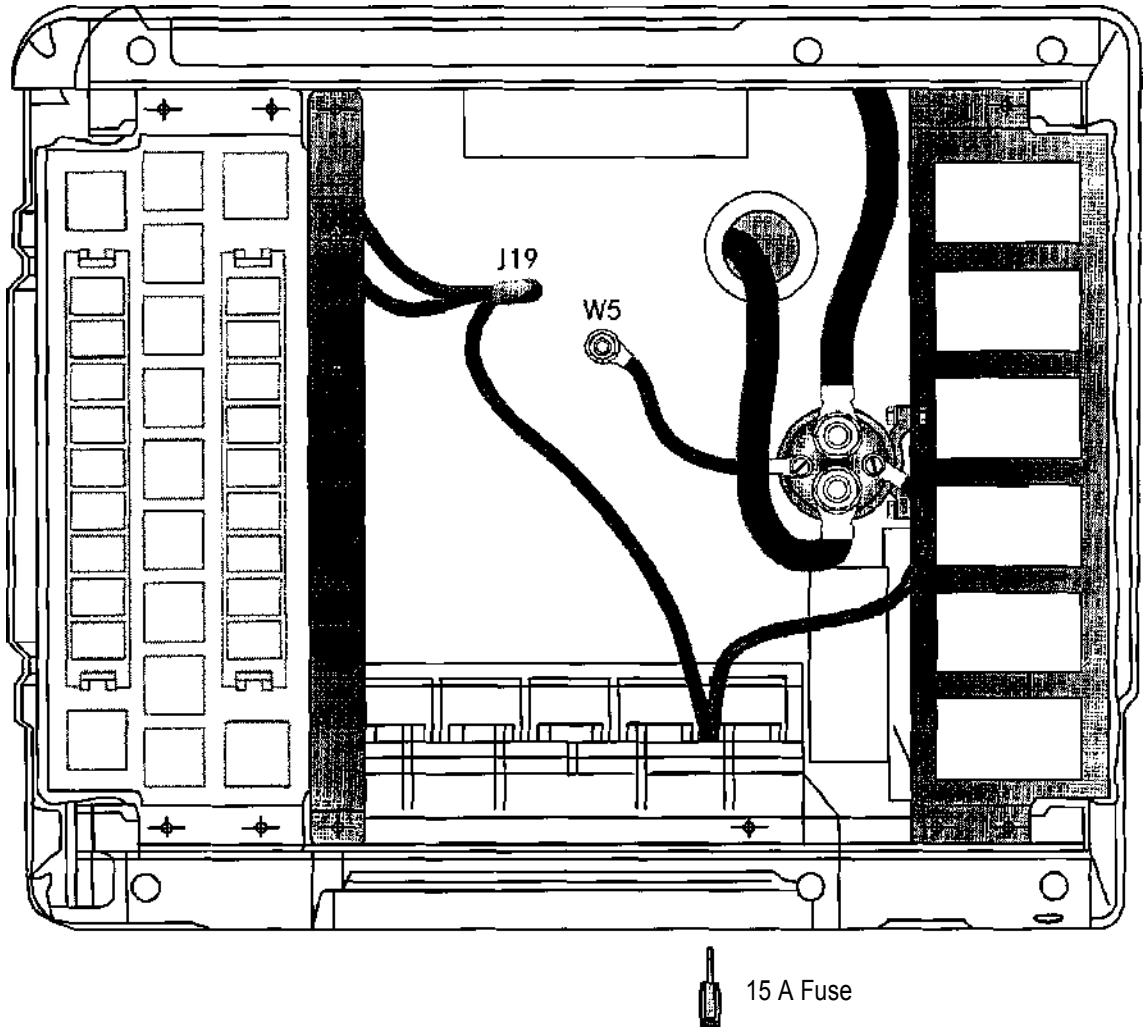

Fig 13, Wiring layout, driver's seat base

21. Check the routing of the wires and connections with the wiring schematic. See **fig.14.** Ensure the wiring matches the schematic before proceeding with step 22.

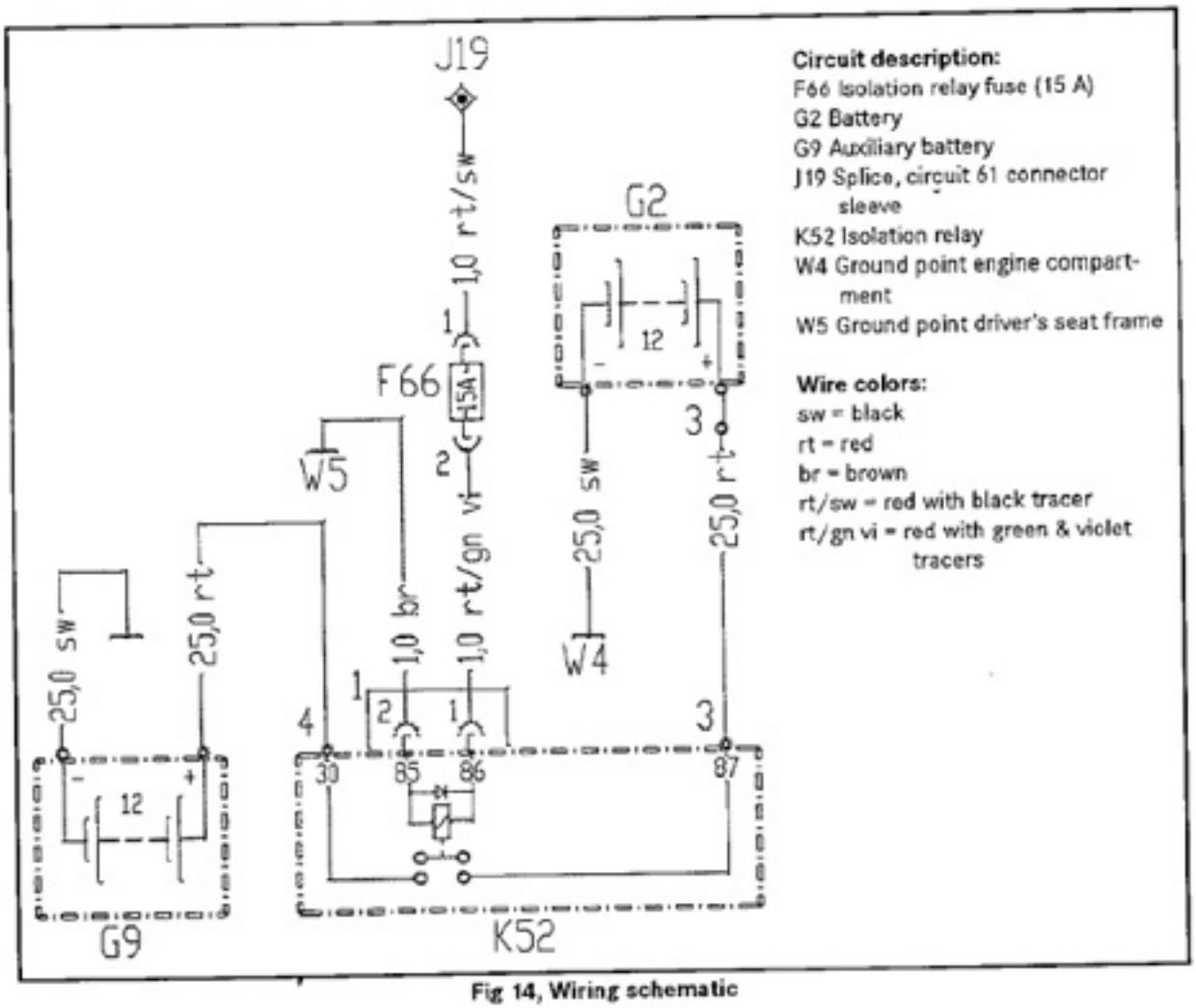

Fig 14, Wiring schematic

22. Reconnect the negative terminal of the auxiliary battery.

23. Reinstall the front seats

24. reconnect the negative terminal of the main battery.