Section C4

Interlock and Inhibit systems

Interlock (see Fig. C22)

The interlock circuit prevents the ACU from operating until the car engine is running to allow all battery power to be available to start the car during engine cranking.

Sequence of operations

1. The fan and compressor fuse supplies voltage to contact C2 of the fan and compressor relay at all times.
2. When the ignition is switched on and the ACU function switch is set to LOW, AUTO, HIGH or DEFROST, the coil of the fan and compressor relay is energised, the earth path being provided by the low resistance winding of the starter motor.
3. Contact C2 and C1 are 'made' which connects the live feed from fan and compressor relay to contact C2 of the servo isolation relay and the fan speed module.
4. The servo isolation relay coil is also energised because the oil pressure switch is closed (no oil pressure). Contact C2 is connected to C1 thereby isolating the live feed from the servos and voltage stabiliser.
5. When the starter motor is operated it effectively de-energises the coil of the fan and compressor relay, contact C1 and C2 are broken which disconnect the feed from the fan and compressor fuse. This allows all available battery power to start the car.
6. When the engine has started and the oil pressure has built up, the coil of the fan and compressor relay is again energised, remaking C1/C2 and the coil of the servo isolation relay is de-energised which connects the live feed from C2 to C3 which completes the circuit for the servos and voltage stabiliser.

Note

The fans will not operate until the fan inhibit cycle is completed.

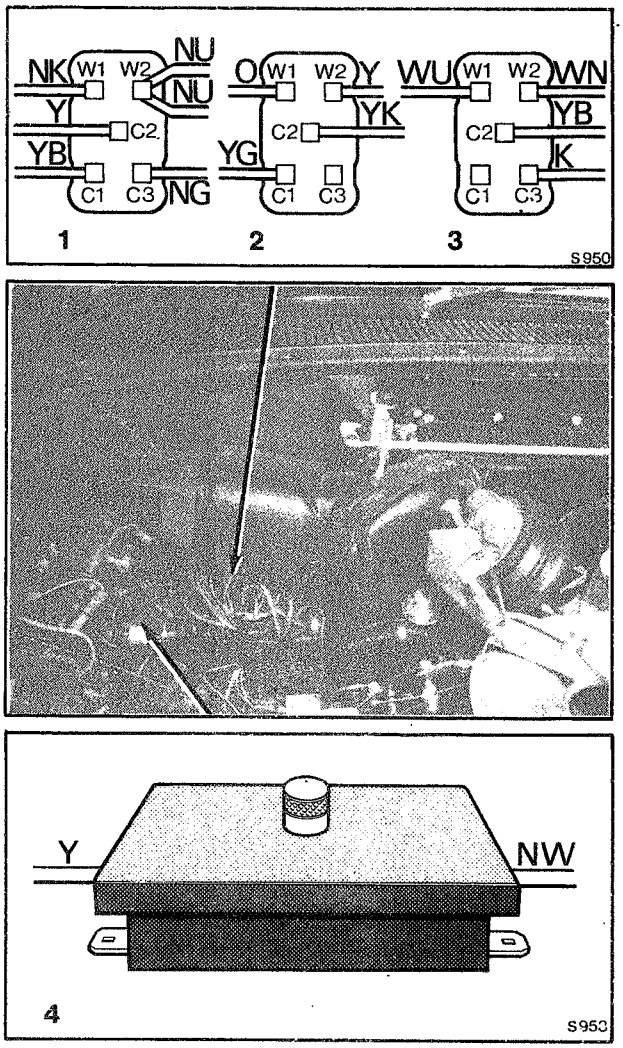

Fig. C17 1. Fan and compressor relay
2. Fan delay relay
3. Servo isolation relay
4. Fan and compressor fuse

Inhibit (see Fig. C23)

The inhibit circuit prevents the compressor and fans from operating under the following circumstances:

1. The compressor is disconnected when the ambient temperature is below 1 °C.
2. The compressor and fans are inhibited when the ACU is operating in the 'screen' mode (except when DEFROST has been selected), until the engine coolant is above 44 °C and the lower quantity flap is fully open. This prevents cold air from being blown into the car when hot air is required and also prevents a sudden surge of air to the screen causing considerable noise which, as well as being undesirable, would also be unexpected.
3. The fans are inhibited for 13 seconds after the starter motor has operated to allow the compressor to freeze any condensed water vapour in the system and so prevent moist air from misting the windscreen in the screen mode.

In (1), the compressor thermostat, which is situated in the evaporator box, 'breaks' below 1 °C and disconnects the live feed from the compressor clutch thereby disconnecting the compressor.

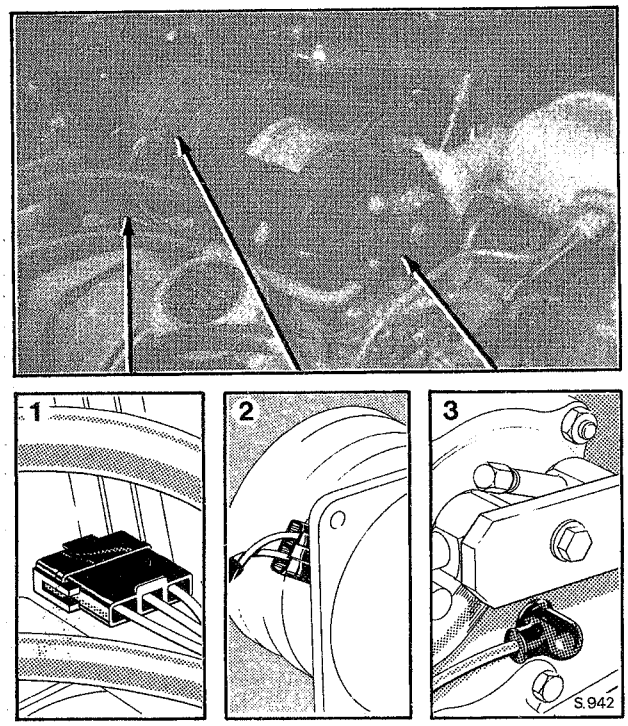

Fig. C18 Compressor protection device
1 Compressor safety fuse
2 Compressor clutch thermostat
3 Compressor temperature sensor

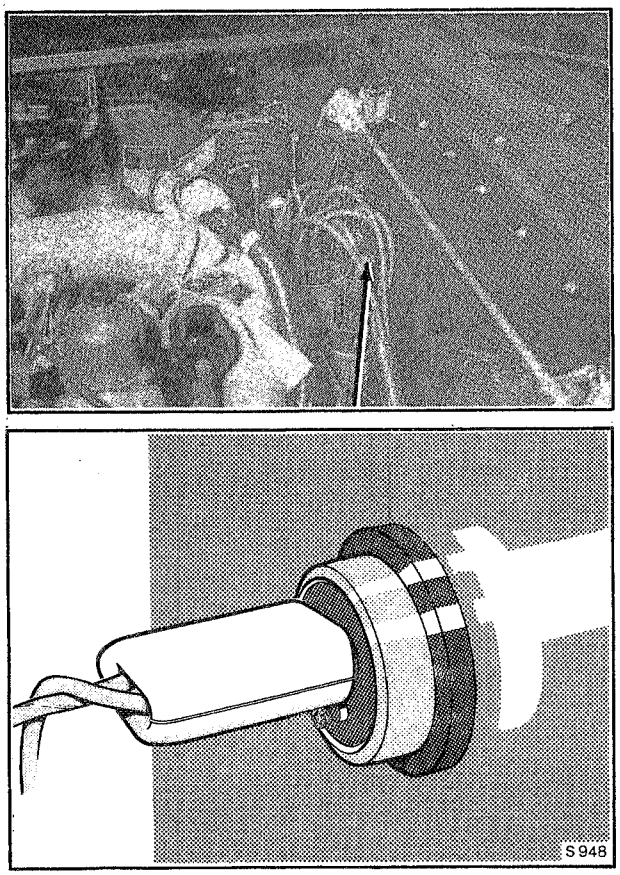

Fig. C19 Compressor ambient thermostat

In (2), the fan speed module and compressor are inoperative whenever the coil of the fan switch-off relay is energised. This is achieved by having the common contact (C2) of the relay connected to earth, when the coil is energised it removes the earth path from the compressor and effectively puts an earth path on the fan speed power circuit therefore preventing the fans from operating. When the relay coil is de-energised the earth path is removed and the compressor earth path is restored.

The coil of the fan switch-off relay has two earth paths, one when the oil pressure switch is closed (ie. no oil pressure) and also when the coil of the fan delay relay is energised with either the fan delay thermostat closed (below 44°C) or the lower quantity flap miscroswitch closed. This second earth path (via the contacts of the fan delay relay) provides the necessary signal to hold off the fans and compressor when the coolant is below 44°C and the mode is to 'screen' and the lower quantity flap is not fully open. It also prevents the fans from being inhibited when DEFROST has been selected.The live feed to energise the coil of the fan delay relay is switched by the 25% mode change microswitch in the upper servo. When the mode is to 'screen' the orange/purple cable from the upper servo is 'live' which feeds the fan delay relay coil via the diode block and yellow cable via toeboard socket D to W2. The earth path for the relay coil is through the ACU switch to the left-hand 'A' post earth (except when DEFROST has been selected).

In addition, the lower quantity flap microswitch initiates a fixed sequence of events when the fan delay thermostat opens. When the coolant tempe-

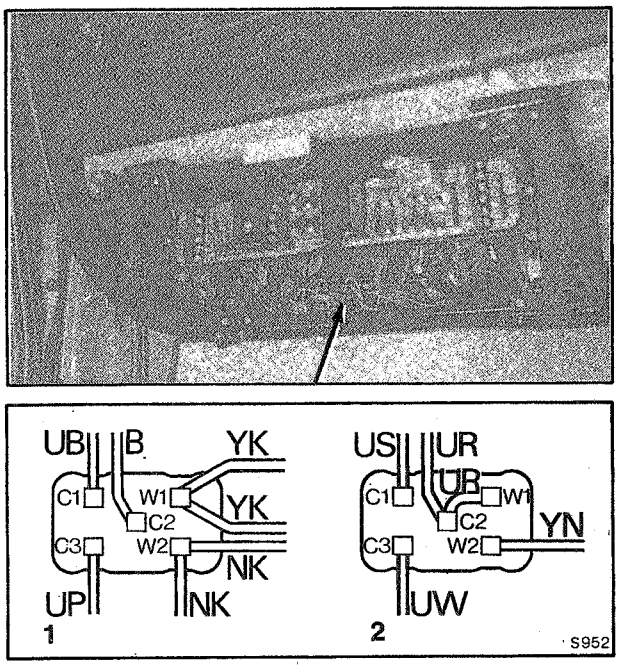

Fig. C20 1. Fan switch-off relay
2. Lower quantity relay
Right-hand drive cars

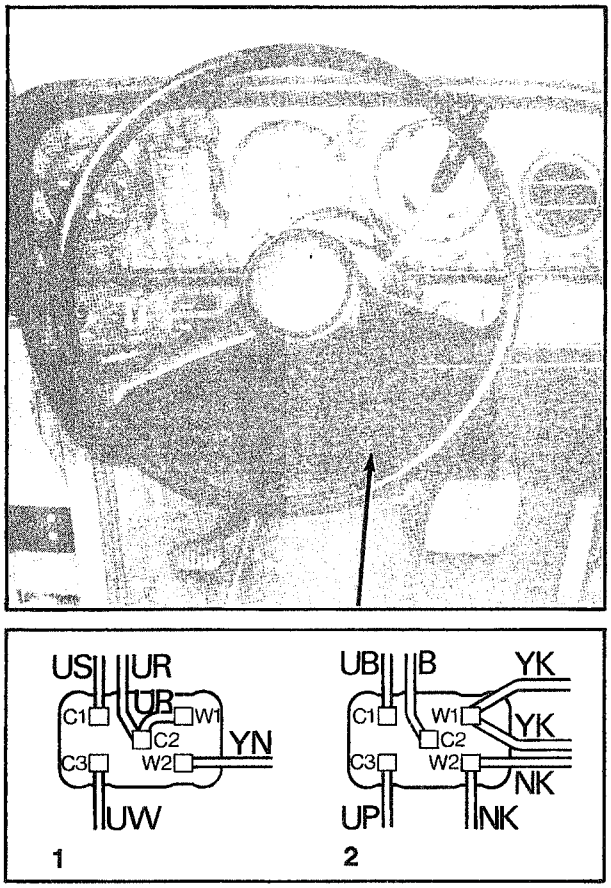

Fig. C21 1. Lower quantity relay
2. Fan switch-off relay
Left-hand drive cars

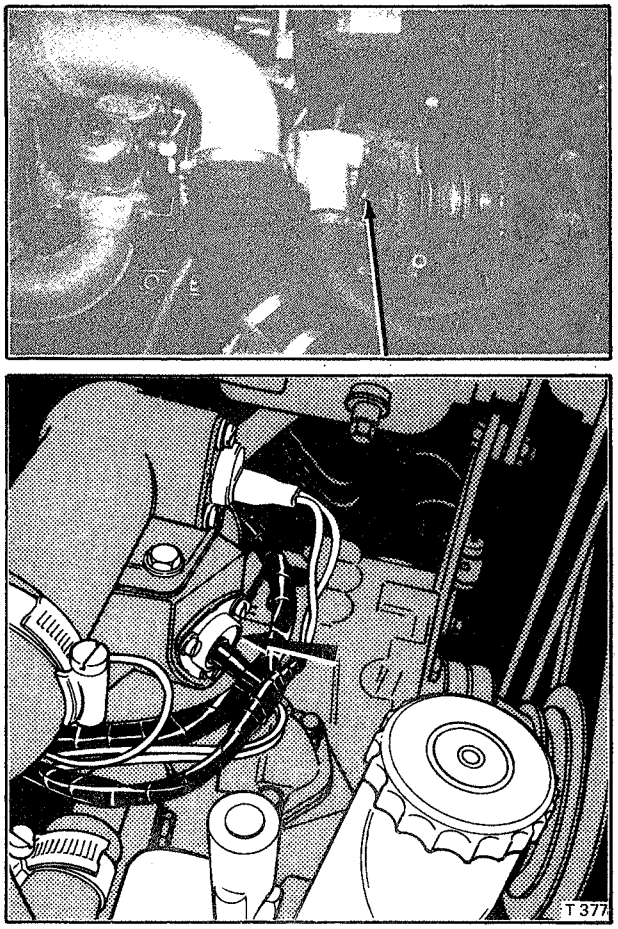

Fig. C22 Fan delay thermostat

rature is below 44 °C, the fan delay thermostat not only inhibits the fans and compressor but also energises the coil of the lower quantity relay which keeps the lower quantity flap closed. As soon as the coolant exceeds 44 °C the thermostat opens which disconnects the earth from the lower quantity relay and allows the lower quantity flap to open, when fully open it opens the lower quantity flap microswitch thereby allowing the fans and compressor to operate. Therefore, the fans do not operate until the lower quantity flap is fully open.

In (3), to prevent the fans operating when the car is started with a 'hot' engine which could cause misting of the windscreen, a 13 second delay is initiated by connecting the fan speed module to the starter motor (brown-blue cable) which activates a 13 second delay circuit in the module each time the starter motor is used. This allows the compressor to freeze any condensed water vapour in the system so preventing any misting of the windscreen.

Note

The diode between the fan switch-off relay coil and oil pressure switch prevents the warning lamp from finding an earth path through the fan switch-off relay coil, fan and compressor relay coil and starter motor. If this diode fails short circuit, the oil pressure warning light would glow dimly with the ACU switched off.

Interlock circuit

Schematic wiring diagram

Fig. C22

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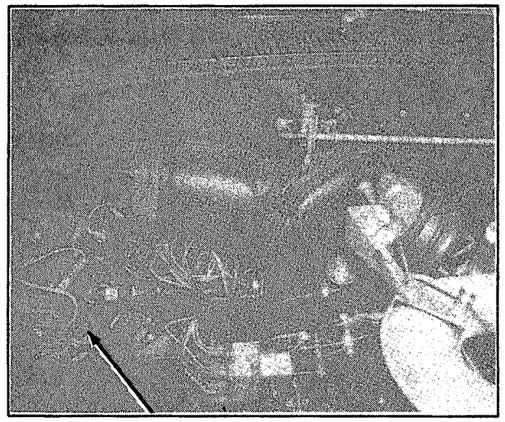
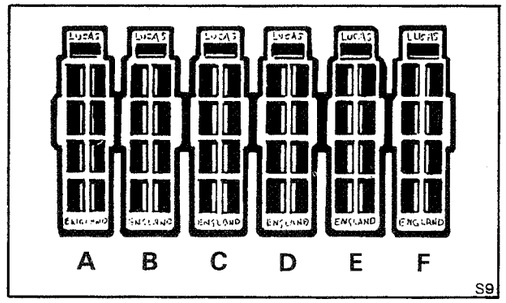
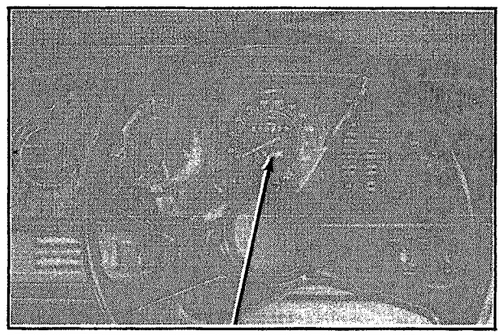
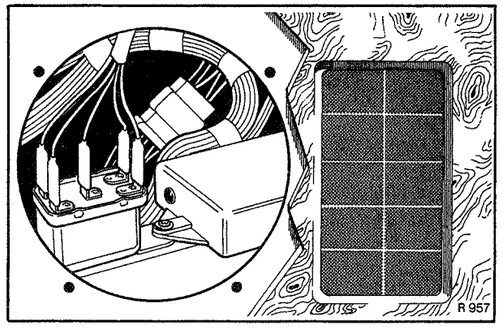


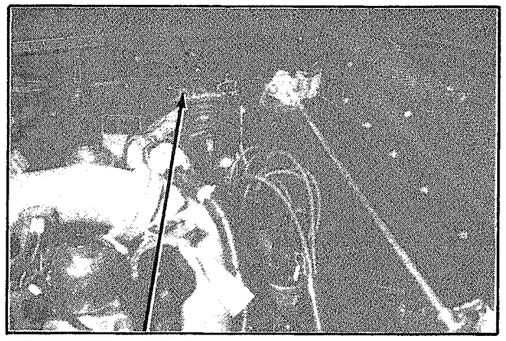


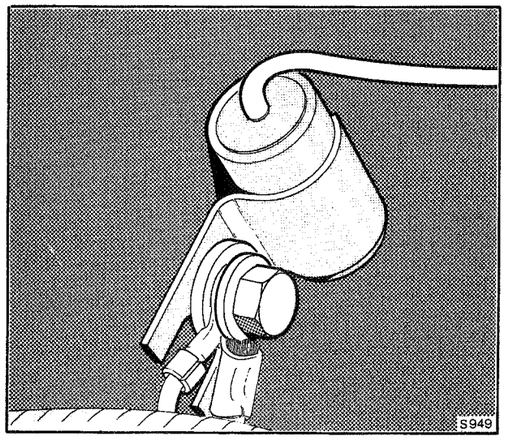
Toeboard sockets



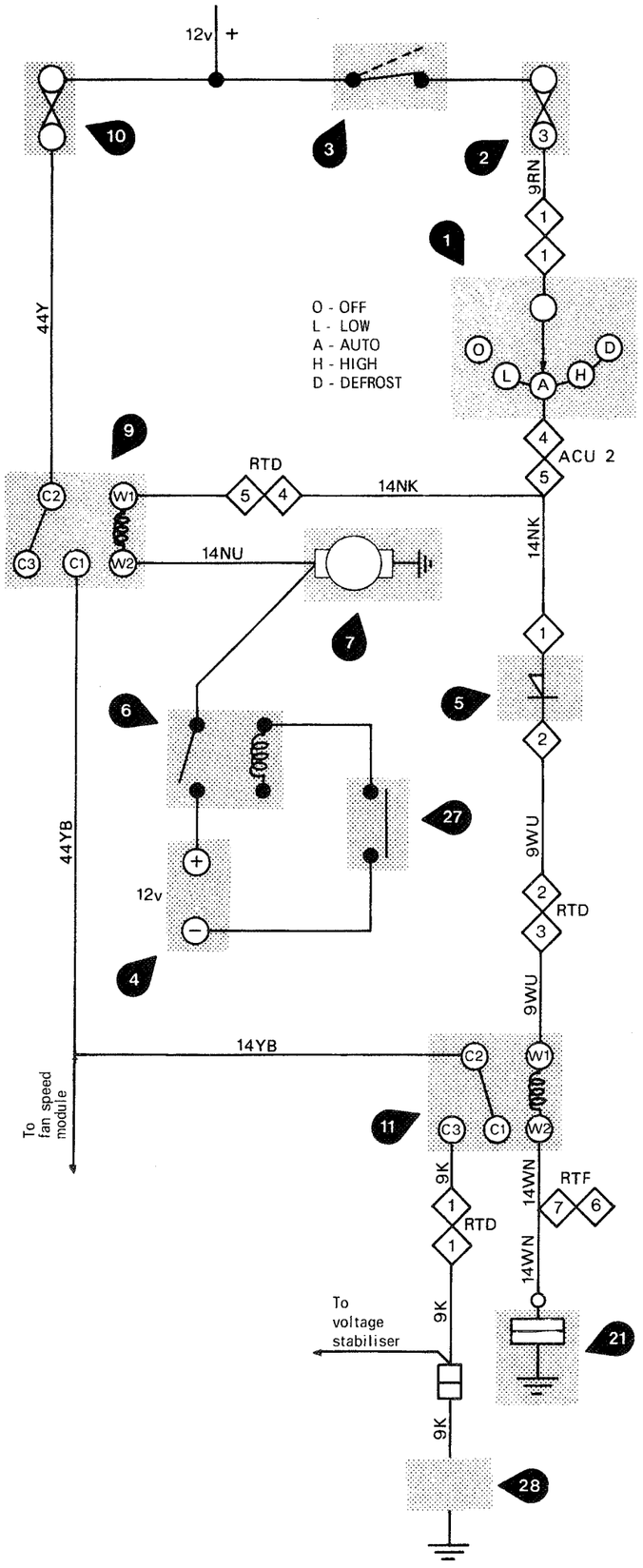


Location of main distribution loom plug (MD)





Right-hand valance earth



Components

1 ACU function switch
2 Fuse number 3
3 Ignition switch
4 Battery
5 ACU diode board
6 Starter relay
7 Starter motor
8 Fan speed module
9 Fan and compressor relay
10 Fan and compressor fuse
11 Servo isolation relay
12 Upper servo microswitches
13 Compressor clutch thermostat
14 Compressor protection unit
15 Compressor clutch
16 Compressor protection sensor
17 Lower quantity actuator
18 Lower quantity flap microswitch
19 Fan switch-off relay
20 Fan delay relay
21 Oil pressure switch
22 Left-hand 'A' post earth
23 Fan delay thermostat
24 Right-hand valance earth
25 Lower quantity relay
26 Right-hand 'A' post earth
27 Starter switch
28 Servos

Inhibit circuit

Schematic wiring diagram
Fig. C23

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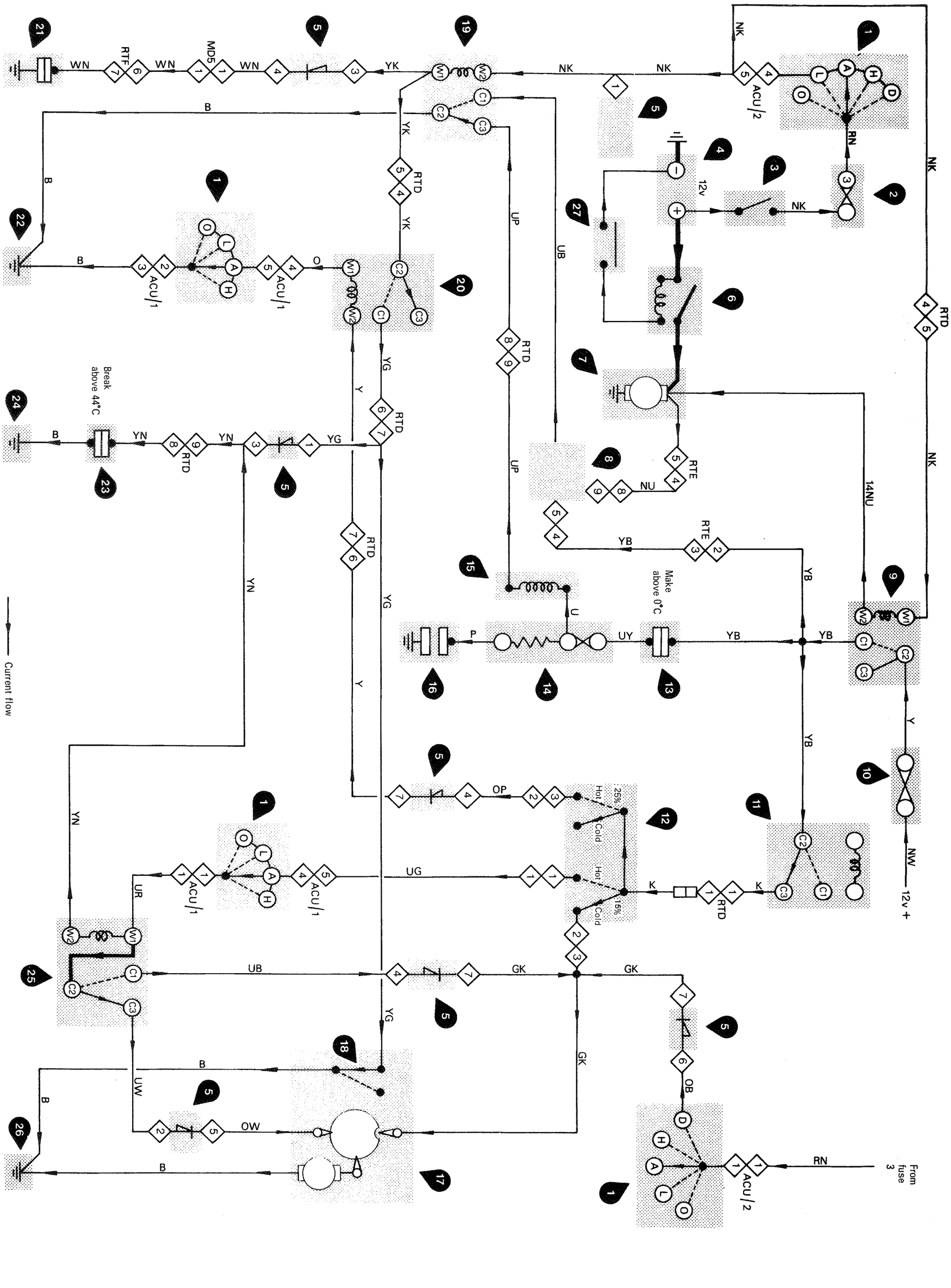

Current flow