Section C3

# Component description (excluding refrigeration) Contents


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Section C3

# Component description (excluding refrigeration)

### Function switch (see Fig. C7)

The switch has five positions marked OFF, LOW, AUTO, HIGH and DEF. The function of the switch in each position is as follows:

**OFF**

Everything concerning the A.C.U. is off and fresh air is prevented from entering the car because the recirculation flaps are in the recirculation position. When OFF is selected from any other position, the recirculation flaps move to the recirculation position, all other flaps are immediately immobilised and the fans are switched off.

**Note**

When the recirculation flaps are in the recirculation position there is a small bleed of fresh air into the car.

**AUTO**

The A.C.U. operates fully automatically with variable fan speed which is dependent upon servo position.

**LOW**

The A.C.U. operates automically but the fans rotate at a fixed minimum speed.

**HIGH**

The A.C.U. operates automatically but the fans rotate at a fixed maximum speed.

**DEF (Defrost)**

The upper and lower temperature flaps move to full hot, the lower quantity flap is closed, the fans rotate at maximum speed even if the coolant is cold and the mode flap directs all air, hot or cold, to the windscreen.

### Temperature selectors (see Fig. C7)

These are two infinitely variable control knobs which control the upper car temperature and lower car temperature. Each knob operates a potentiometer which is connected as a variable resistance such that the current flow through it varies with angular position. This current signal is used in conjunction with the current signal from temperature sensors to determine the required temperature flap position. The two potentiometers are dissimilar and are therefore not interchangeable.

### Temperature sensors (see Figs. C8, C9 and C10)

There are two sets of these, termed sensor chains, and are devices that vary in resistance very predictably as the temperature varies, therefore the current through them is related to temperature.

The sensor chain for the upper system air comprises three sensors, one in the centre of the top roll to measure the heat radiated by the sun in the car, one under the right-hand side of the rear bumper to measure outside air temperature and one on the left-hand cantrail to measure upper car temperature.

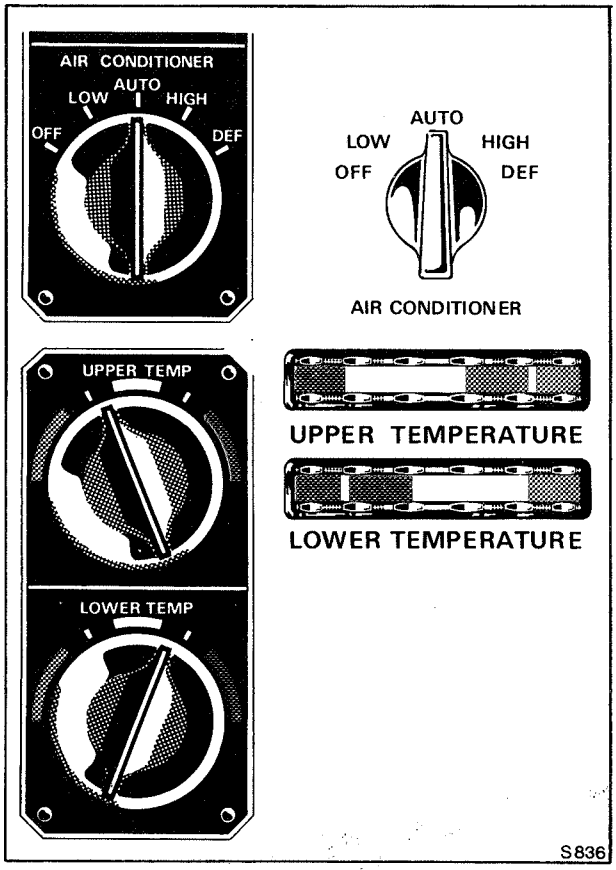



**Fig. C7 Function switches and preferred temperature settings**

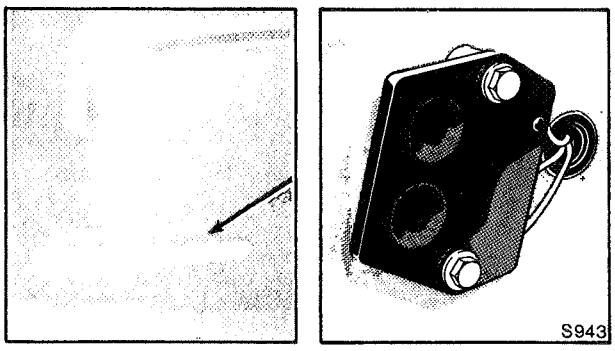



**Fig. C8 Outside air temperature sensor**

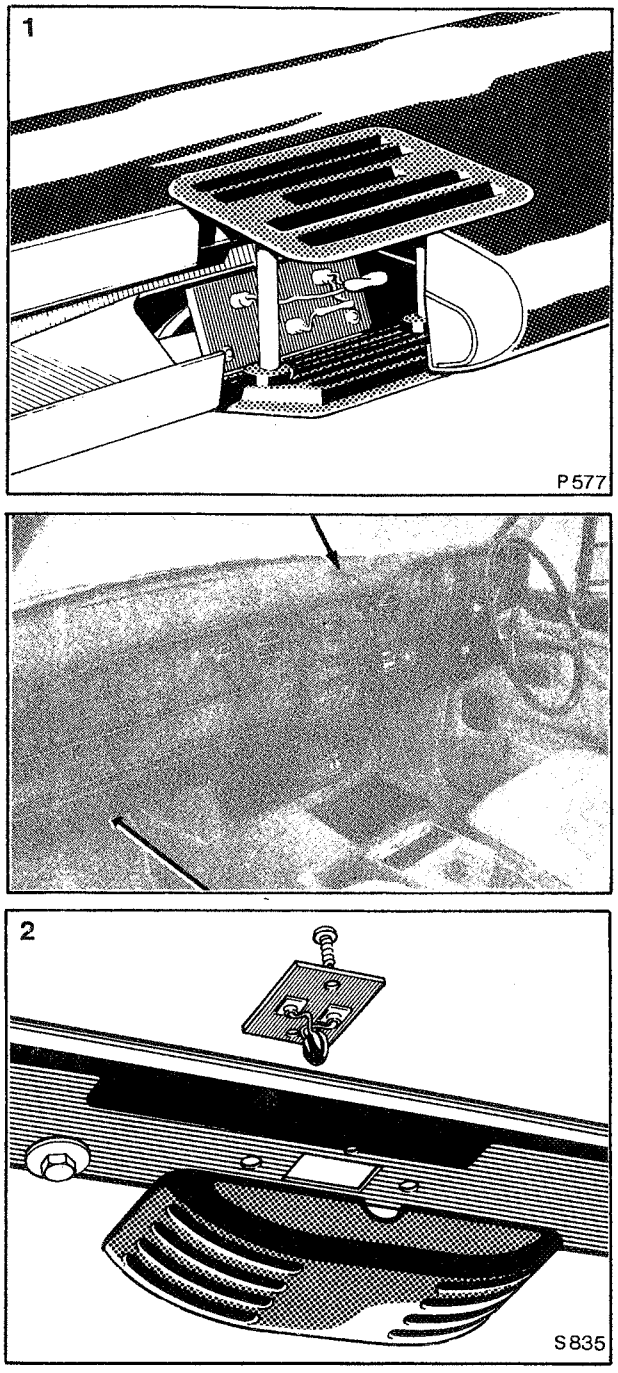



Fig. C9 1. Solar sensor 2. Knee-roll sensor

The sensor chain for the lower system air comprises two sensors, one on the front passenger's knee roll to measure lower car temperature and one under the right-hand rear bumper to measure outside air temperature.

The current signal from each sensor chain is used in conjunction with the current signal from the respective temperature selector to determine the required temperature flap position by the servo module.

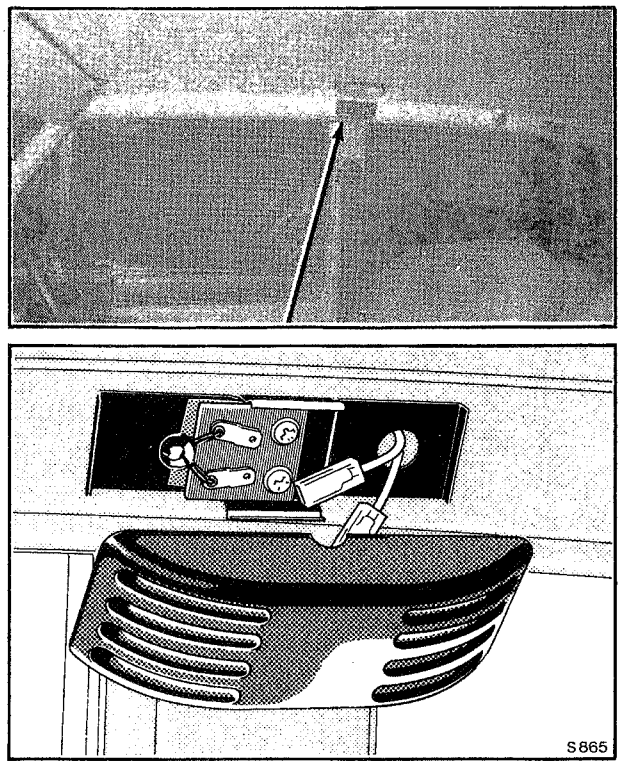



Fig. C10 Cantrail sensor

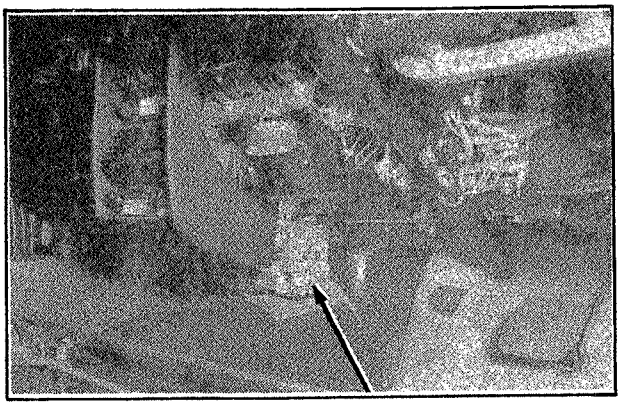
**Servo modules** (Upper and lower system. Fig. C11)
The modules convert the temperature-related current signals obtained from the temperature selectors and sensors into switching signals which are used to operate relays that are mounted on the modules.

There are two relays for each servo, one of which makes the temperature blend flap move in the 'cold' direction and the other makes the blend flap move in the 'hot' direction. Signals, which are related to blend flap servo position, are fed back to the servo module from the servo and are used to switch off the relays and thereby stop the blend flap in a position determined by the module. The servo modules are identical and are therefore interchangeable, they are mounted on the blend flap servos. If the modules are interchanged, the system must be recalibrated.

**Temperature blend flap servos** (Upper and lower systems see Fig. C11)
The servos drive the temperature blend flaps and also provide most of the signals to activate the other automatic functions within the A.C.U. There are two servos, one for the lower system air and one for the upper system air. Both are located on the transmission tunnel beneath the instrument panel.

The upper servo controls the temperature and quantity of air from the windscreen and facia outlets, the lower servo controls the temperature and quantity of the air from the front and rear foot wells.

The systems controlled by the upper servo are: recirculation actuators, lower quantity actuator, mode flap actuator, upper temperature blend flap,



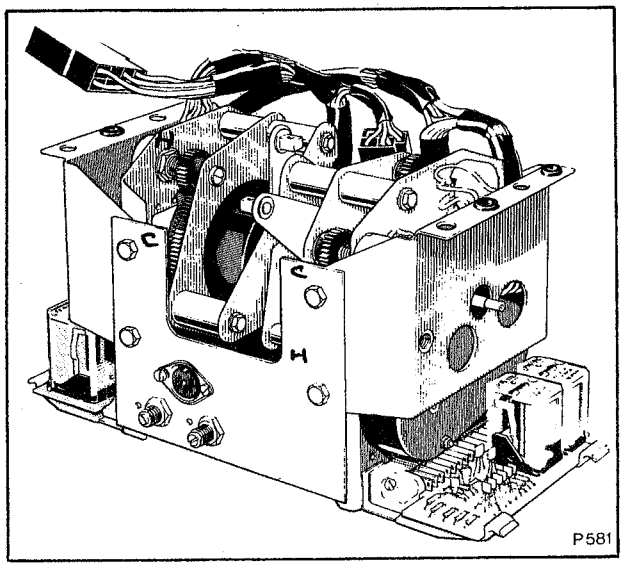
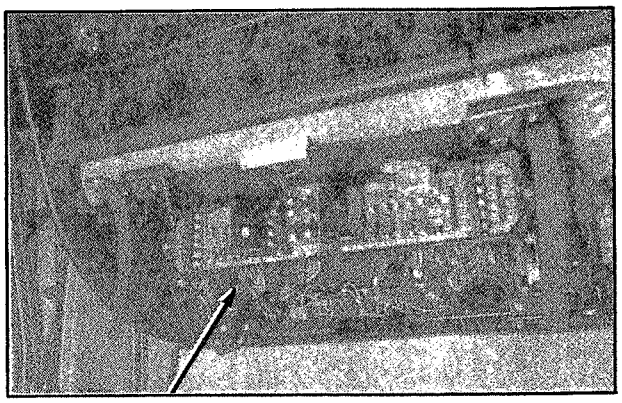



Fig. C11 Servo assembly



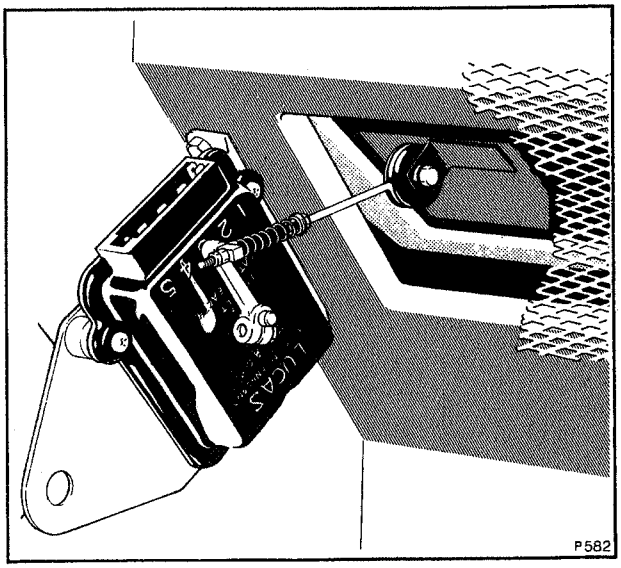



Fig. C12 Recirculation actuator

fan speed and rear window demister. The systems operated by the lower servo are: lower temperature blend flap, water tap and fan speed.

**Recirculation actuators and flaps** (see Fig. C12)
There are two of these, one on each side of the car beneath the instrument panel. Each actuator has two positions, one of which directs fresh air from outside the car through the A.C.U. and the other position recirculates air from within the car.

The actuators are activated by a micro-switch in the upper servo which signals full recirculation when the servo is at the full cold position and full fresh air when the servo is in any position except full cold. This system is overridden when the A.C.U. is switched off, the recirculation actuators then move the flaps to the full recirculation position.

**Lower quantity flap and actuator** (see Fig. C13)
The actuator has two positions which either opens or closes the lower quantity flap. The flap is closed when the upper servo position is between the 'full cold' and 10% towards the 'full hot' position. If DEFROST has been selected on the function switch, this is overridden and the flap is closed to enable all available air to be directed to the upper system. (The flap is also closed whenever the coolant temperature is below 50 °C).

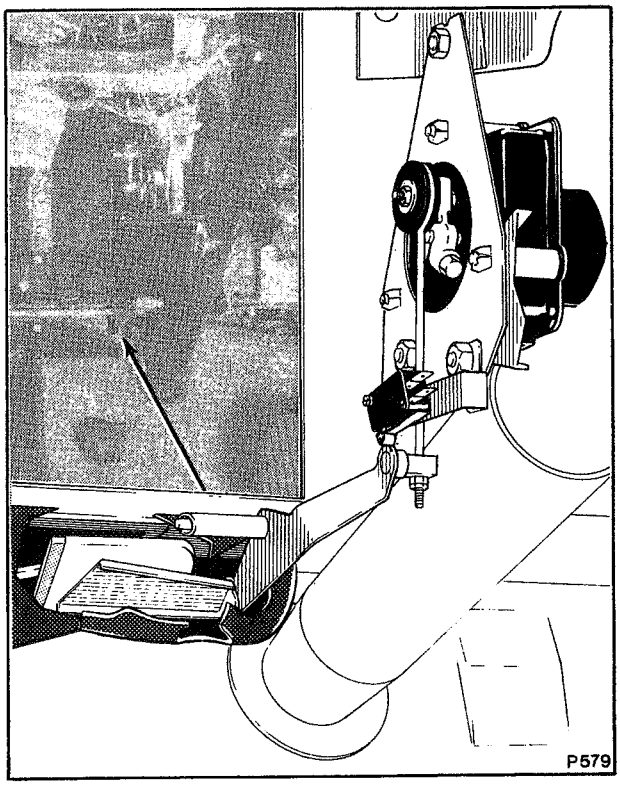



Fig. C13 Lower quantity flap and actuator

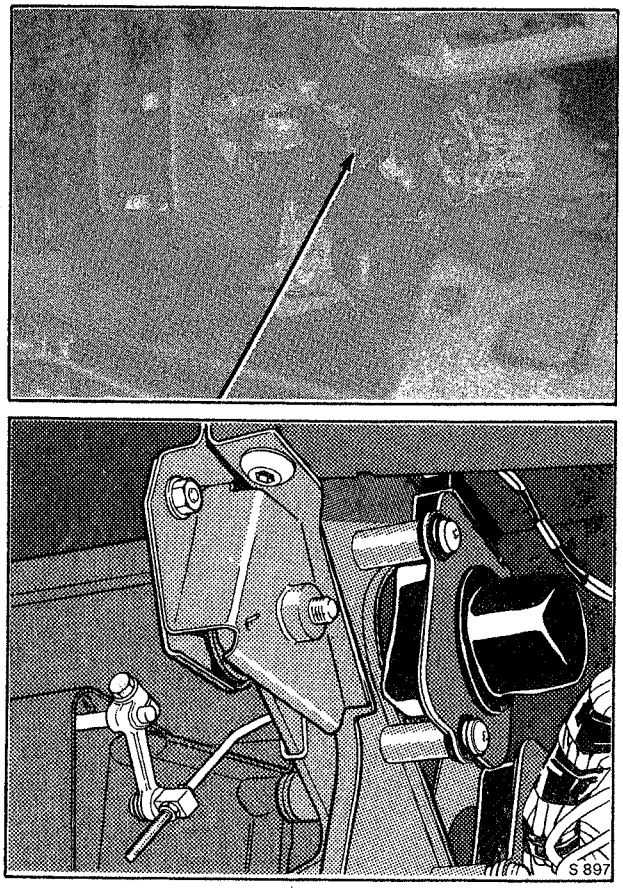



Fig. C14 Mode flap and actuator (Right-hand drive)

## Mode flap and actuator (see Fig. C14)

The actuator is mounted on the heater box behind the instrument panel. It operates the mode flap which has two positions, one which directs all the upper system air to the windscreen outlets and the other position directs all the upper system air to the facia outlets.

With an upper servo travel from 'full cold' to 25% hot, the airflow is directed to the facia outlets, from 25% to 'full hot' the airflow is to the screen outlets. A microswitch on the upper servo senses the 25% position and signals the mode actuator accordingly.

## Water tap (see Fig. C15)

The water tap is in the engine cooling system and is connected to a crank on the lower servo by a bowden cable. The tap opens progressively as the lower servo moves from the 'cold' position to the 'hot' position.

## Interlock and Inhibit systems

The interlock system is a system of relays and diodes that prevents the ACU from operating until the car engine is running to allow all available battery power towards starting the car during engine cranking.

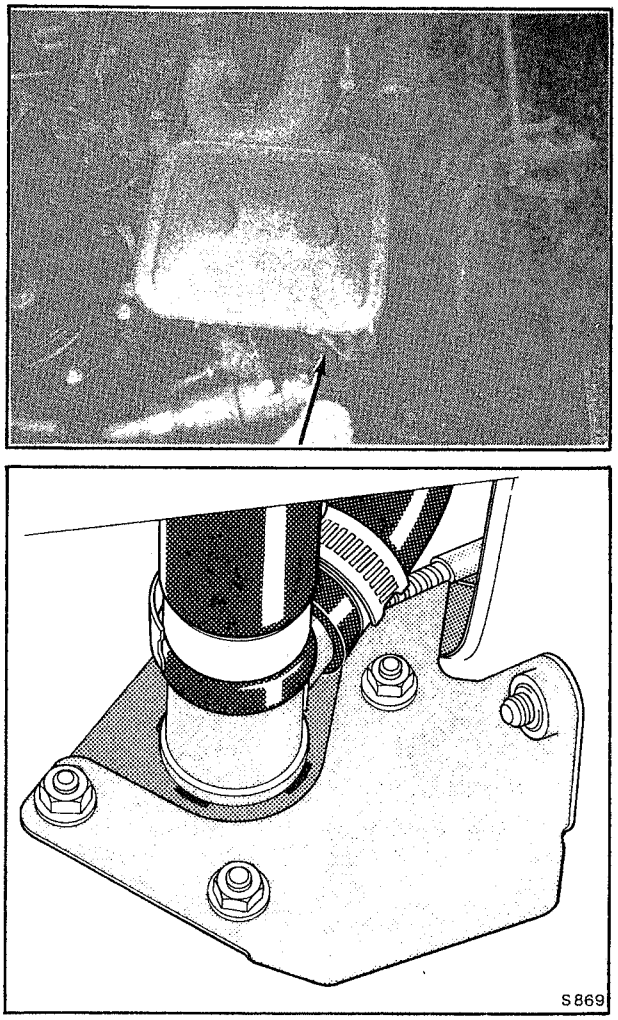



Fig. C15 Water tap

The inhibit system prevents the fans from operating until the engine coolant temperature has reached 44 °C except when the mode flap is in the 'facia' position or DEFROST has been selected. Coolant temperature is sensed by the fan delay thermostat which is situated in the coolant thermostat housing.

## Fan speed module (see Fig. C16)

The fan speed module infinitely varies the fan speed by switching the supply voltage on and off 150 times per second, the speed of the fan is determined by the ratio of 'time on' to 'time off'.

Fan speed is related to servo position, with both servos in the mid-position the fans run at minimum speed but as either or both servos move towards the 'full hot' or 'full cold' position the fan speed increases progressively.

## Voltage stabiliser (see Fig. C16)

The voltage stabiliser supplies the servos with three stabilised voltages, two 7.0v supplies to the servo motors and a 9.1v supply to the servo modules to make them insensitive to car system voltage.

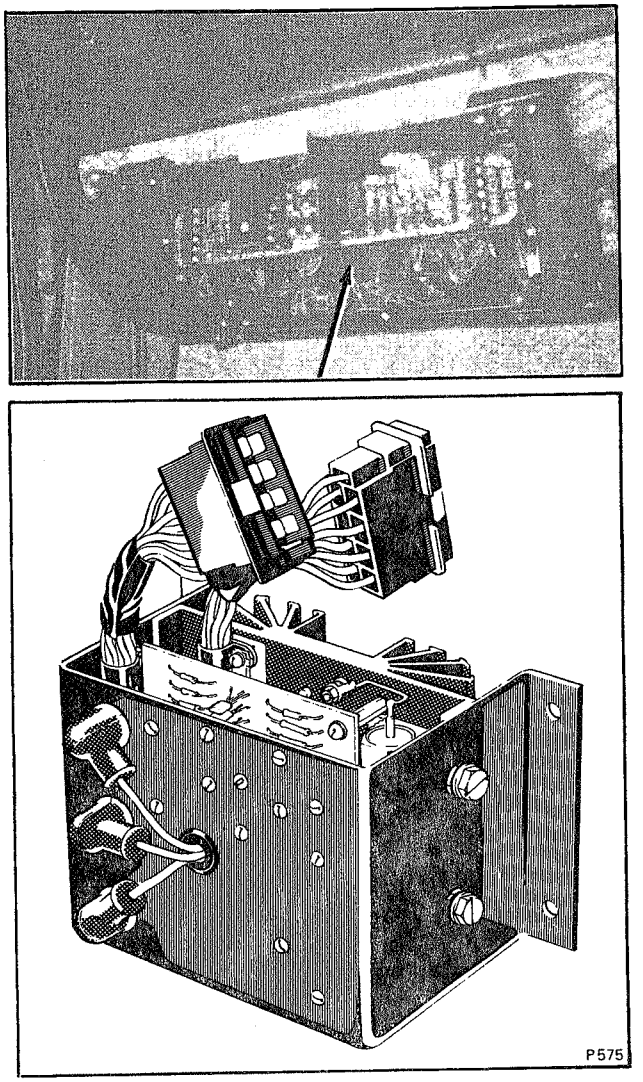



**Fig. C16 Fan speed module and voltage stabiliser**
**Upper-right-hand drive**
**Lower-left-hand drive**

The voltage stabiliser is assembled with the fan speed module to form one unit but they are independent of each other and may be easily separated and replaced as individual units.