AB VOLVO, CAR DIVISION
Marketing Admin./Special Vehicles

HAND CONTROLS FOR VOLVO 140 SERIES Disabled Driver's Car

The 1974 model of the Volvo 140 Series Disabled Driver's Car is now available with hand-operated brake and accelerator controls of compressed air type.

Technical description

The pneumatic control system consists of three main component groups:

1 Compressed air unit incl. control valves

2 Control levers on steering wheel

3 Power-assisted handbrake

1 Compressed air unit

A Volvo air conditioning compressor is mounted on the engine by means of a special bracket. It is driven via a magnetic coupling and a Vee-belt from the engine.

On cars fitted with power-steering the power-steering system's oil pump is used as a belt tensioner. Cars with manual steering are fitted with a belt tensioner of the same type as fitted to Volvo's standard air conditioning system. The inlet and outlet valves of the compressor are replaced by flanges. The inlet is fitted with an air cleaner. The outlet is connected to a small air tank. This air tank, which has a capacity of about 1.6 litres, is fitted with a check valve to avoid rapid evacuation of the system should the pipe between the compressor and tank fracture.

Furthermore, the air tank is fitted with the following:

Safety valve, a plugged drain hole for condensation, a connection for a pressure switch with a setting range of between 6.3 and 7 bar, and a connection for a second pressure switch which gives warning of air pressures below 4.5 bar by means of a red flashing lamp which is mounted on the dashboard. The tank also has connections for a separate air tank and extra accessories. A hose from the tank leads to a spirit/alcohol injector which feeds two fine control valves. The throttle mechanism is operated by one of these valves via a double-acting air cylinder Ø 25 mm and influences the power shaft which is designed so that the throttle pedal is not actuated and vice versa.

The service brakes (foot brake) are operated by a second double-acting air cylinder Ø 50 mm which is mounted below the dashboard. This cylinder is governed by the other fine control valve which, operating under full air pressure, can supply the same amount of pressure as needed when braking a fully loaded car with the foot and the vacuum servo-system disconnected.

2 Control levers on steering wheel

These levers or grips are located at angles of 09.00 hrs - 15.00 hrs and cover a 40^{o} sector on each side of the steering wheel. They operate a pull rod which runs through the centre of the steering rod and actuates two rings in a sleeve so that the movement is transferred to the outside of the steering column. From a ball joint, a rod runs down to an achorage and the lever which influences the afore-mentioned fine control valves. The mechanism has been arranged so that pulling one grip towards the driver opens the throttle and pushing the other away from the driver applies the brakes.

3 Power-assisted handbrake

A smaller air tank of approximately 0.8 litres capacity is fed via a check valve from the main tank. This smaller tank is fitted with a solenoid valve.

The handbrake lever is fitted with a small pressure switch which opens the solenoid valve on the tank. Air released through this valve operates an air cylinder Ø 50 mm which, via a pull mechanism, applies the handbrake. When the driver pulls up the handbrake lever to the locking position and then releases the handle, the air cylinder is evacuated and the pawl retains the application of the handbrake.
The system also enables normal use of the handbrake.

The system is designed so that other mechanisms can be utilized to operate the two regulators for the throttle and brakes when this is required by more serious degrees of disability. This work should be carried out by a workshop appointed by the customer.

The unit can also be equipped with other apparatus for disabled driver requirements:

Driving seat adjustment, window winders, apparatus for lifting wheel-chairs and luggage etc. in and out of the boot, opening assistance for rear doors and luggage compartment lid etc.
When these types of equipment are fitted, the outlet from the air tank must be fitted with a check valve which prevents a loss of pressure in the control system should a leakage occur in any of the items fitted or the hoses feeding them.

At present, these items are not available from Volvo and Volvo accepts no responsibility should they be fitted elsewhere.

Pneumatic Control System, Volvo 140 Series
Disabled Drivers' Car