

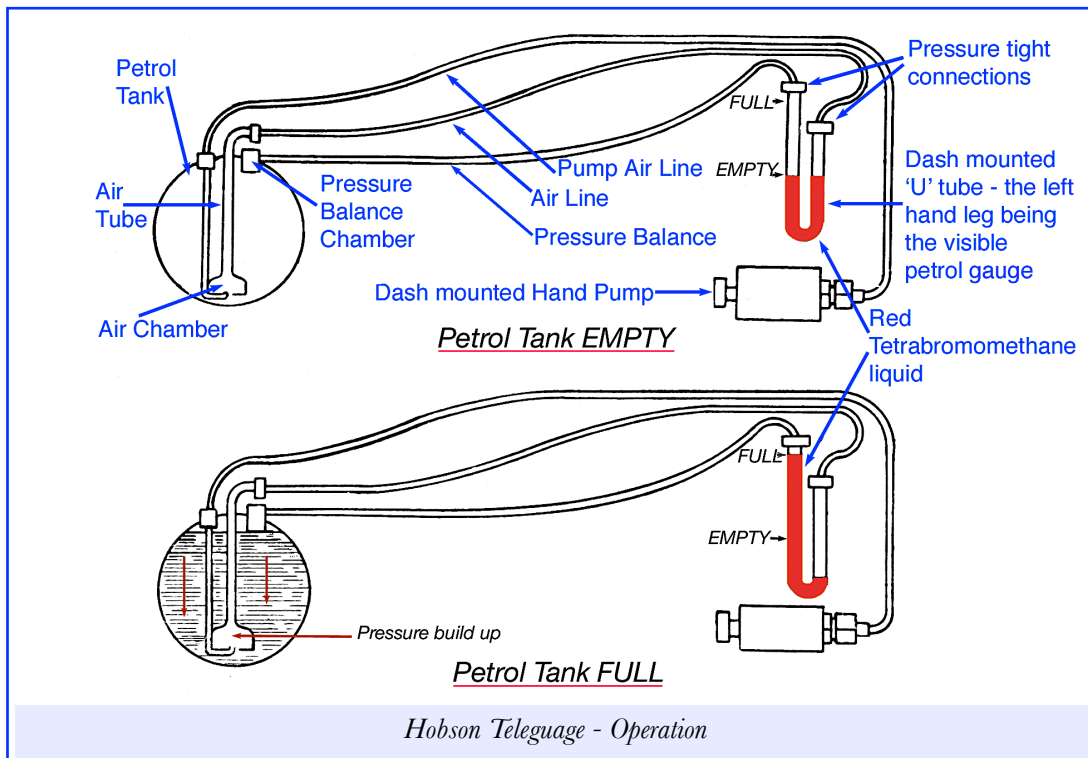
## Hobson Fuel Gauge - principles and repair

The Hobson designed hydrostatic fuel gauge, utilises the pressure resulting from the height of the fuel in the petrol tank, to activate a column of red high specific gravity fluid (SG 2.966 or 2.94-2.97), in a

brass tube used to initially adjust the instrument. The glass and the brass tube are connected at the base by a length of copper tube.

Operation of the gauge commences

when pressure from the petrol in the tank is built up in an air chamber situated near the bottom of the petrol tank. Petrol flows into the air chamber through the hole "C". When the car is on the move, petrol and trapped air bubbles flows through the hole "D" and down the air delivery tube. The air bubbles are released at the bottom of the tube



tube indicator mounted on the instrument panel. The basic principle of this type of early fuel gauge, is that the pressure exerted by the height of the fuel in the petrol tank, is transmitted through a fine bored tube to the dash mounted sight gauge. At the gauge, it is balanced by the pressure exerted on a column of Tetrabromoethane liquid. This extremely toxic liquid is almost three times heavier than water and circa four and a half times as heavy as petrol. Therefore the change in pressure of [say] a standing height of ten inches of petrol in the fuel tank, would result in circa two and a quarter inches height in the dash sight gauge. The dash unit is basically a 'U' tube manometer with one leg of the 'U' forming the sight gauge and the other leg a hidden

under the air chamber, again entering through hole "C" and so displacing any petrol which may be present in the air chamber. When the air chamber is full of air, further air passing down the tube is released back into the petrol tank. To allow for any leakage in the connecting line between petrol tank and gauge and to maintain a constant height of fuel within the air chamber, provision is made to maintain pressure within the air chamber, proportional to the height of fuel in the petrol tank. When the car is at rest, this tube is full of petrol and is at the same level as the petrol within the tank. When the car is moving, petrol is splashed into one of the cups that are formed around the pipe. It then runs down the air delivery tube

carrying with it, trapped air in the form of bubbles. The bubbles then rise and are trapped in the air chamber. The pressure balance line is arranged so that it does not allow air to escape, but serves as a vent, if excess pressure from heat or other causes is developed in the petrol tank. If the car is stationery, then three or four strokes on the dash mounted air pump, will simulate the splash of fuel and produce air bubbles at the bottom of the air chamber, resulting in an accurate reading being obtained in the sight glass.

A non working gauge is usually due to evaporation of either the Tetrabromoethane liquid or a leak of air pressure in the line between gauge and the petrol tank unit; in practice any leaks are usually at the connections. The petrol tank end is self explanatory; check tightness of the coupling and it is recommended to use a thin film of sealant on the threads. Be careful with the dash instrument connections. If possible remove the instrument from the dash, before attempting to remove the pipe connections. Be careful not to kink the tubes when removing and under no circumstances put any stress on the die cast body of the instrument, as it will probably break.

If the gauge has been empty of fluid for some time, it is likely that the pipes are blocked with sediment at the sight gauge unit. Slacken off the union nuts and gently break the seal of the tapered fitting on the end of the pipes. Use a drill bit rotated by the fingers to clear the pipes of sediment. *For brass union - use No 54 or 1.4mm drill. For copper pipe - use 3/64" or 1.2mm drill.*

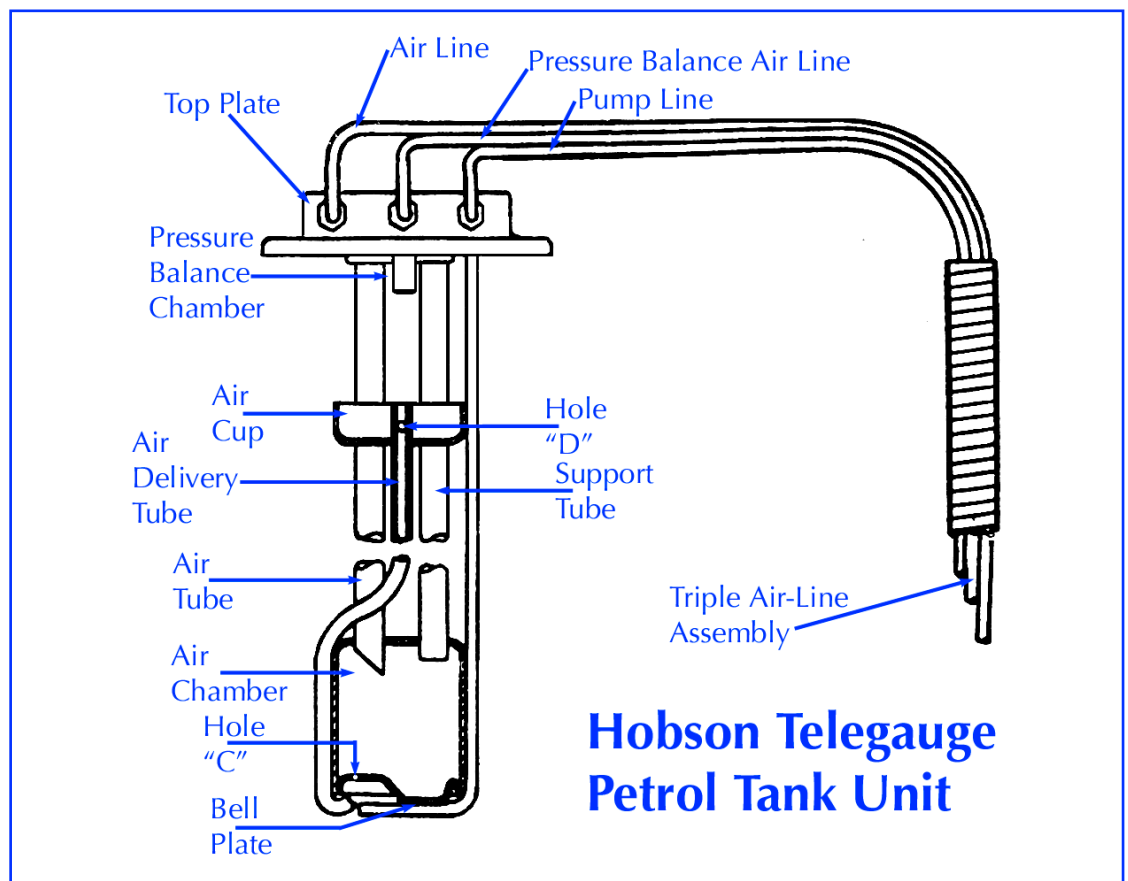
For cleaning the pipe between the brass reservoir and the glass tube, use a piece of cheese cutting springy wire or similar.

**Main Air Line** - thickest pipe and largest union.

**Pressure Balance Line** - medium sized pipe.

**Air Pump Line** - thinnest pipe, smallest union.

When both tank and instrument ends of the fine bored delivery tube are clear,



plug one end and suck on the other. The vacuum so created should hold the tongue stuck firmly to the tube end. Then clear the tube of all moisture, by blowing compressed air through it. It is essential that the line is clear and dry - don't blow through it as your breath will condense and leave a film of moisture. Do not use an air compressor as the pipe-work is too delicate. Use a bicycle pump and cut off the connector from the delivery hose. Push the hose over the air line at the gauge end and give at least 50 full strokes; some petrol may be expelled from the Pressure Balance line.

Reconnect the line to the petrol tank and pump more air through, while someone listens for bubbling at the filler neck of the petrol tank. This will prove that the line is clear. If the line is kinked or broken, it is possible to repair it, by bridging a broken pipe with a piece of

suitably sized electrical cable. First pull the wiring out of the cable sleeve and discard; use the now empty plastic sleeve, to bridge the broken pipe. Strengthen by splinting with stiff wire and then wrap the whole repair tightly with Duck Tape. Refill the instrument (with the air-line disconnected at the instrument end) by pouring Tetrabromoethane with an eye dropper into the 'U' tube, until the liquid level reads "zero". The air-line is then re-connected to the gauge and the accuracy checked against a known quantity of fuel in the petrol tank. The gauge reading is adjusted by adding or removing one or more of the calibrating wires.

