

SECTION 5

ENGINE OIL SYSTEM

5.1 OIL SYSTEM

5.2 OIL PUMPS

5.3 OIL SYSTEM SERVICING
AND ADJUSTMENTS

AERO ENGINE SCHOOL

5.1 OIL SYSTEM

The engine embodies the complete oil system, including the oil tank and fuel cooled oil cooler.

Oil Tank

The oil tank consists of a stainless steel cylinder located within the nose fairing.

Capacity

Total Capacity	6 Gallons
Engine Oil	4½ Gallons
Air Space	1½ Gallons
Consumable Engine Oil	3⅛ Gallons

A float type mechanism in the tank is connected to an oil contents gauge positioned on the port side of the air intake casing.

The tank is pressure filled through an Avery quick release and self sealing coupling located on the suction filter casing which is positioned at the lower port side of the engine behind the front bulkhead.

The tank is vented to the breather system via a

centrifugal oil separator, attached to the L.P. compressor front shaft. Incorporated in the vent is a spring loaded non-return valve, lightly loaded, which ensures pressurisation of the tank.

Oil Circulation

Oil from the tank is conveyed through Vane No.3 of the Intake Casing, then, by external pipe through the front bulkhead to the suction filter and Pressure Pump.

From the pump, via the pressure filter, the oil is directed to various sections of the engine through thread type filters and jets.

An external pipe from Vane No.3 of the Intermediate Casings directs oil to Vane No.2 of the Air Intake casing to provide lubrication for the L.P. compressor front bearing. Internal passages in the Intermediate casing front and rear diaphragms accommodate oil jets to lubricate the L.P. compressor rear and the H.P. compressor. front bearings....

front bearings.

An external pipe from the intermediate casing connects to a two way union on Vane No.4 of the Delivery casing. One way through the vane to lubricate by jets the H.P. Compressor rear and H.P. Turbine Bearings, the other way rearward to Vane No.4 of the exhaust annulus and through the vane to the centre jet.

This centre jet comprises two discharges, one radial to lubricate the L.P. Turbine bearing, the other an axial jet directing the oil through the centre tube to lubricate the inter-shaft bearing.

Scavenge System

Four auxiliary scavenge pumps, on the rear face of the oil sump, drain oil from the following:-

- (a) L.P. compressor front bearing.
- (b) L.P. turbine rear bearing.
- (c) The coupling chamber, which includes the inter-shaft bearing and the H.P. compressor bearing.

- (d) H.P. turbine bearing. Each pump accommodates a filter. The oil from these four scavenge pumps together with the oil from the fifth scavenge pump, situated in the intermediate casing, is returned by common pipe, via the fuel cooled oil cooler, to the oil tank.

Fuel Cooled Oil Cooler

A fuel cooled oil cooler is mounted below the H.P. compressor casing and comprises a cylinder with a series of internal baffles around which the engine oil circulates. Continuous tube units run through the Baffles conveying engine fuel as the coolant, the oil and fuel are contra-circulating in the cooler.

A spring loaded by pass valve is embodied in the cooler to prevent damage to it when starting the engine under cold conditions. The valve, operated by the initial high pressure in the scavenge system permits the oil to flow across the end of the cooler direct to the tank until the oil temperature rises and the pressure falls.

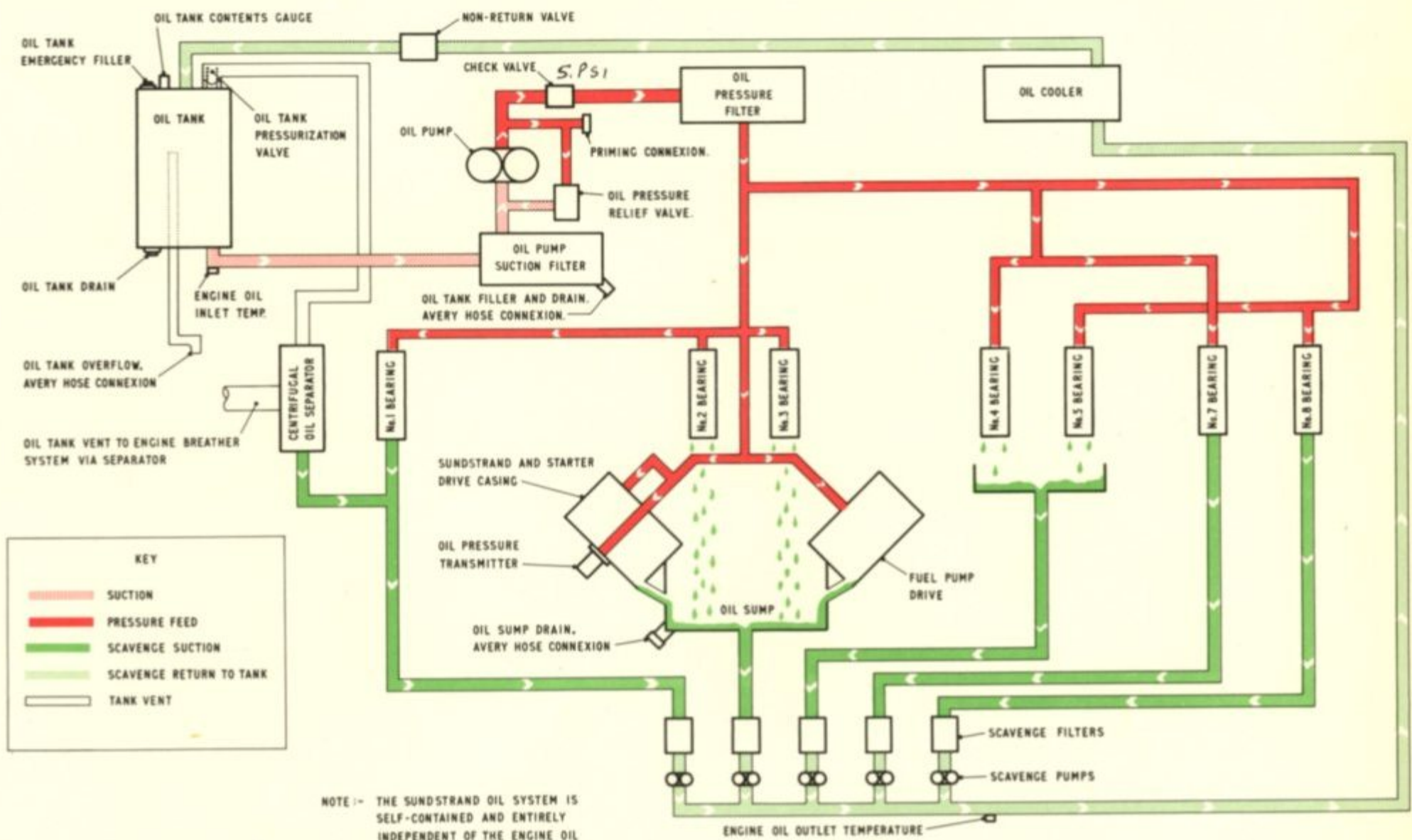
To prevent oil flowing back from the tank to the cooler.....

AERO ENGINE SCHOOL

cooler and sump when the engine is shut down, a non-return valve is fitted on the front bulkhead in the return pipe line from the cooler to the tank.

PRESS. 55-60 P.S.I.

Scavenge Pumps maintain 3 P.S.I. in Tank



KEY	
	SUCTION
	PRESSURE FEED
	SCAVENGE SUCTION
	SCAVENGE RETURN TO TANK
	TANK VENT

NOTE :- THE SUNDRAND OIL SYSTEM IS SELF-CONTAINED AND ENTIRELY INDEPENDENT OF THE ENGINE OIL SYSTEM.

OLYMPUS 200
DIAGRAMMATIC LAYOUT OF ENGINE OIL SYSTEM

AERO ENGINE SCHOOL

5.2 OIL PUMPS

The oil pump is secured to the front face of the oil sump, is of the spur gear type, and comprises the pressure pump and intermediate casing scavenge pumps. The latter, which is of greater capacity, is inserted within the oil sump casing, and the pressure pump projects from it.

The pumps are driven by spur and bevel gears from the front end of the H.P. compressor rotor.

Between the pressure pump gears and filter a pressure chamber is formed, which accommodates the pressure relief and check valve. The relief valve which is adjustable controls the system operating pressure, the excess pressure being returned to the inlet side of the pressure pump. The check valve, which is lightly spring loaded, prevents oil from the tank flowing into and flooding the engine when stationary.

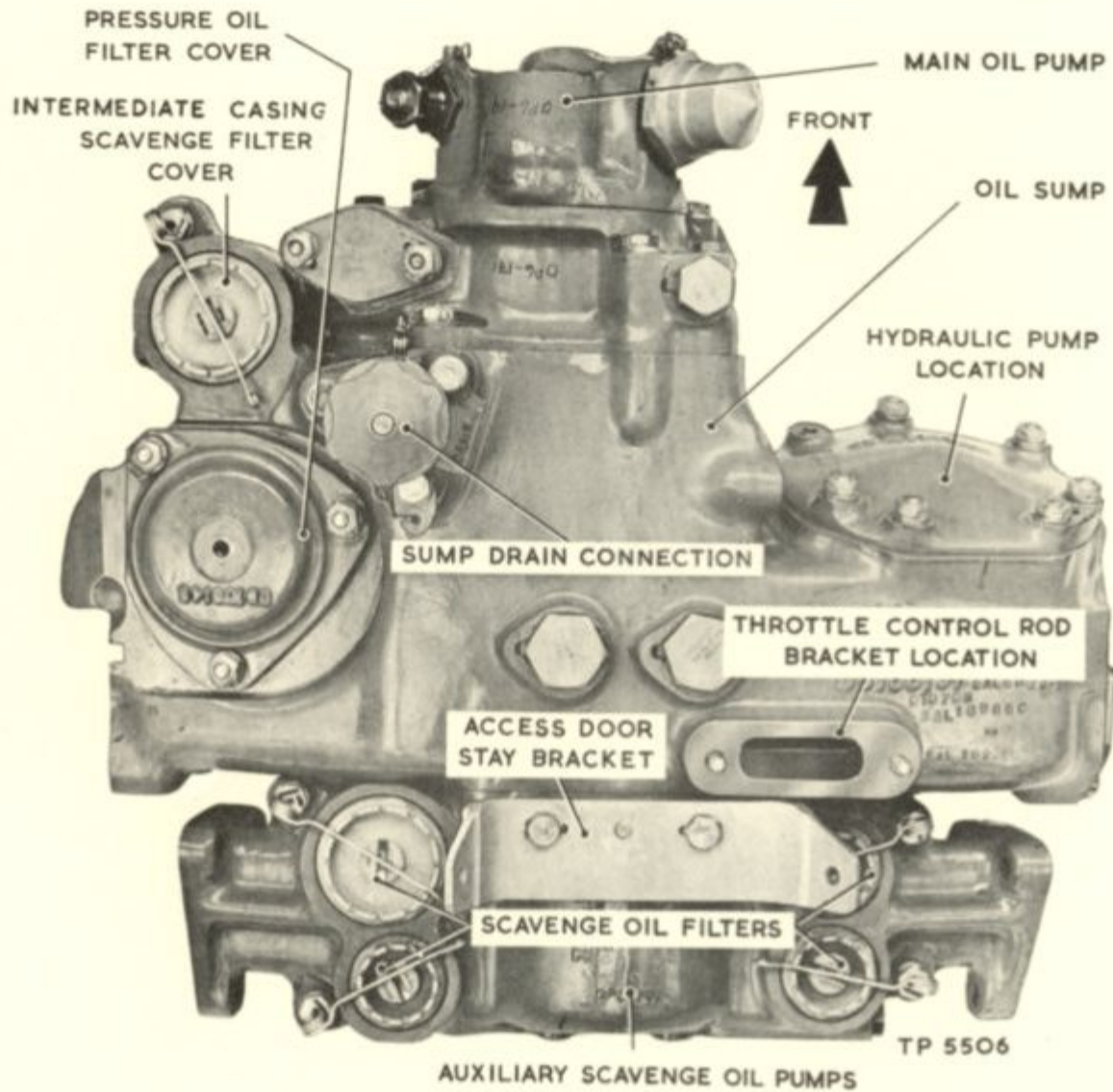
The scavenge pump inlet port is fed via the sump scavenge oil filter and the outlet port returns the

oil through an internal passage in the sump, and through an external connection via the oil cooler to the tank.

Auxiliary Scavenge Pumps

The four auxiliary scavenge pumps are mounted on a common driving shaft and driven through gearing from the front end of the H.P. compressor. Each pump having a driving and driven gear enclosed within a separate casing.

The pumps are provided with individual filters which are located in the pump casing and retained by separate filter caps.



OIL PUMP DRIVE OUTER CASING
(UNDERSIDE VIEW)

AERO ENGINE SCHOOL

5.3 OIL SYSTEM SERVICING & ADJUSTMENTSPressure oil filter

It is normally only necessary to service the pressure oil filter at overhaul periods, but if it is found to be necessary at an interim period, proceed as follows :-

Remove the filter cover.

Notes: The cover is secured with nuts, spring and plain washers.

Extraction threads are provided in the cover.

Discard the 'O' seal.

Withdraw the filter

Examine the filter for foreign material (e.g. metal)

Note: If the metal is found, do not clean the filter, but refit it as found, then reject the engine.

Wash the filter unit in clean gasoline and examine it for damage and the security of the gauze.

Note: Use a soft bristle brush, then dry the filter thoroughly with an air blast.

Caution: Never use rag for cleaning purposes.

Refit the filter

Note: Make sure the filter is fitted correctly

Fit the filter cover

Notes: (1) Fit a new 'O' seal.

(2) Secure the cover with nuts, spring and plain washers.

Intermediate casing scavenge filter

Service this filter as follows :-

Release the filter capnut lockspring

Remove the filter and spring

Examine the filter for foreign material

(e.g. bearing metal)

Note: If metal is found, do not clean the filter, but refit it as found, then reject the engine. Refitting the filters without cleaning will enable the particles to be identified and minimise the time spent in investigation.

If the filter

If the filter is satisfactory, wash the unit in clean gasoline and examine it for damage and the security of the gauze.

Note: Use a soft bristle brush, then dry thoroughly with an air blast.

Caution: Never use rag for cleaning purposes.

Examine the filter capnut 'O' seal for condition and replace as necessary.

Refit the spring followed by the filter and nut.

Tighten the filter capnut and secure it with the lockspring.

Scavenge filters (auxiliary)

To service the four filters, carry out the procedure detailed in Intermediate Casing Scavenge Filter.

Prolonged engine stand-by

When the e.c.u. has been standing idle for a prolonged period, i.e. two weeks or more, oil may drain from the oil tank via the check valve into

the engine sump with the result that a low or zero indicator reading is obtained. To prevent overfilling of the oil tank, carry out the following:-

If the contents gauge indicates a very low or zero reading, drain the sump and top up the tank to at least $4\frac{1}{2}$ gallons.

Draining engine oil tank

Remove the blanking cap from the FILL and DRAIN connection coupling.

Position a suitable receptacle to receive the drain oil.

Plug the drain self-sealing equipment into the FILL and DRAIN connection.

At the conclusion of the draining operation, remove the draining equipment and refit the blanking cap.

Refilling or

AERO ENGINE SCHOOL

Refilling or replenishing engine oil tank

Remove the blanking cap from the FILL and DRAIN connection.

Plug the self sealing equipment into the FILL and DRAIN connection.

Note: The self sealing filling equipment is incorporated in the mobile tank pump unit.

Fill the engine oil tank with approved oil by operating the mobile tank unit until the oil tank indicator shows full.

After refilling the oil tank, remove the blanking cap from the OVERFLOW connection and plug in the drain equipment. Allow any oil in the overflow pipe to drain away.

If approximately one pint flows from the drain pipe, again top up the oil tank until oil flows from the overflow pipe. When the flow stops, remove the drain equipment and replacing the blanking cap.

If considerably more than one pint of oil drains from the overflow pipe, check the reading of the oil tank indicator when the drainage stops. Note and record any error.

When replenishing the oil tank on all future occasions, use the oil tank contents gauge to indicate when the tank is full unless the indicator is known to be faulty. If faulty, use the overflow method.

Remove the filling equipment and refit the blanking cap.

Oil pressure adjustment.

Remove the relief valve capnut.

Note: The capnut is lock-wired.

Release the adjuster locknut.

Note: Hold the relief valve adjuster with a screwdriver during this operation.

Adjust the

Adjust the relief valve to give the oil pressure required, i.e. one turn of the adjuster equals 5 lb/in².

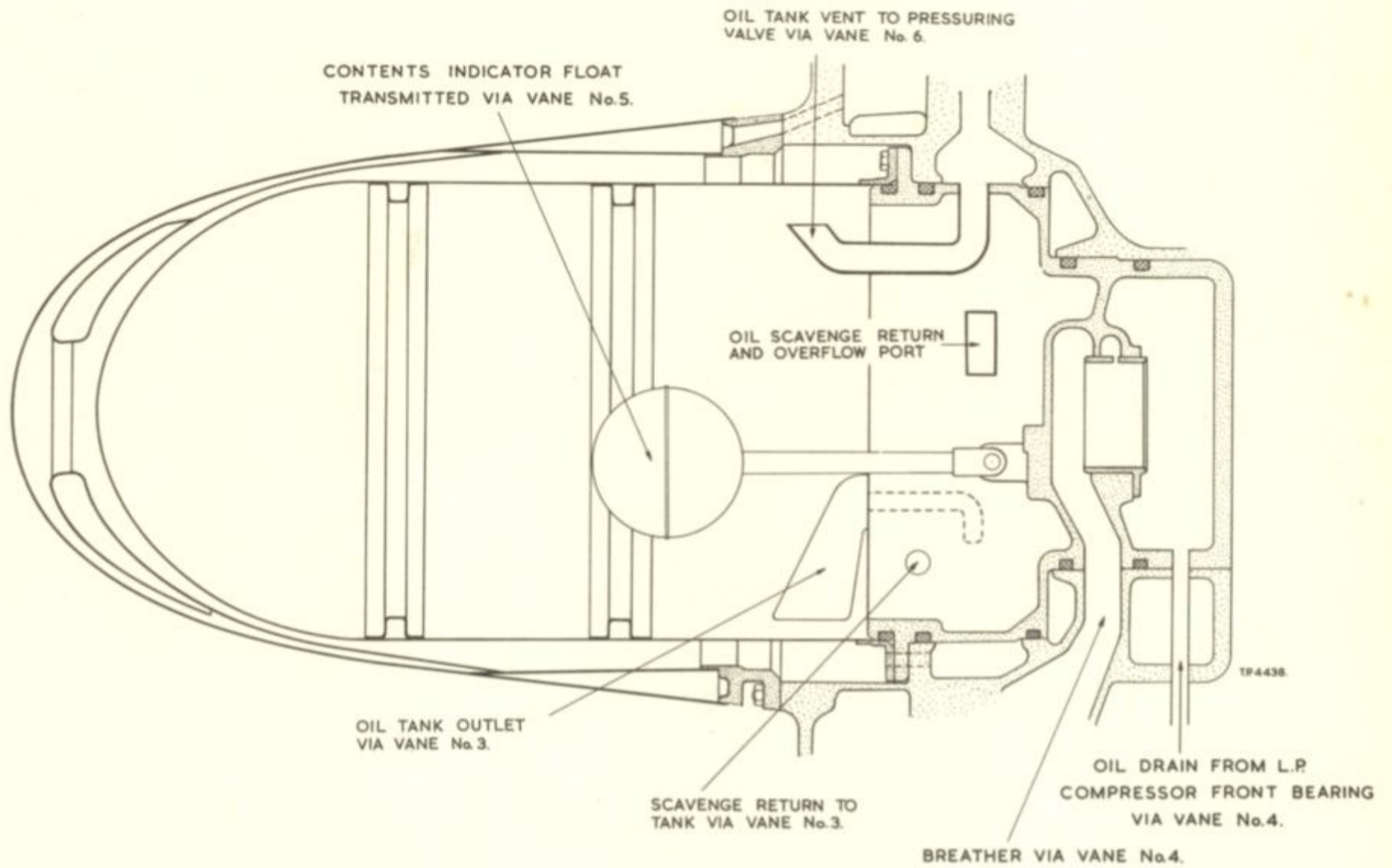
Note: Use a screwdriver for this operation.

Secure the adjuster locknut.

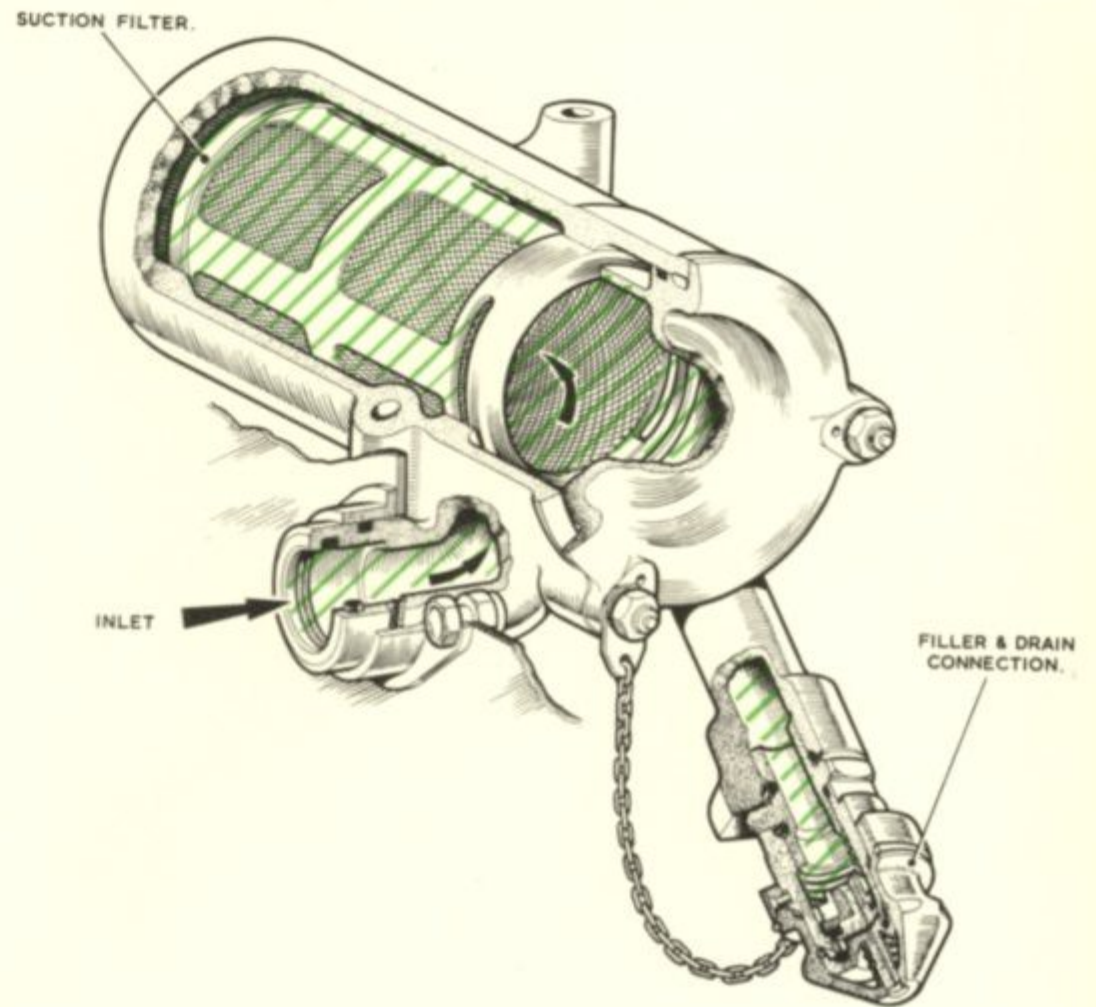
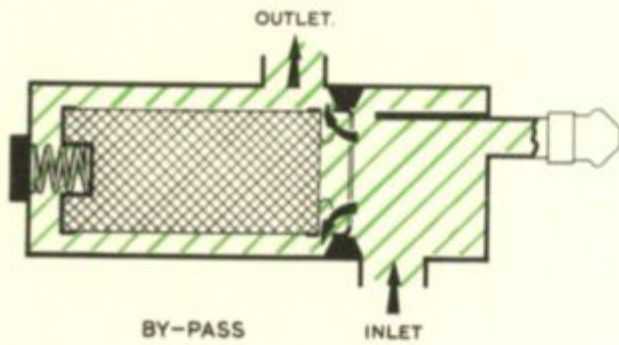
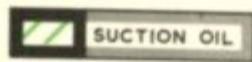
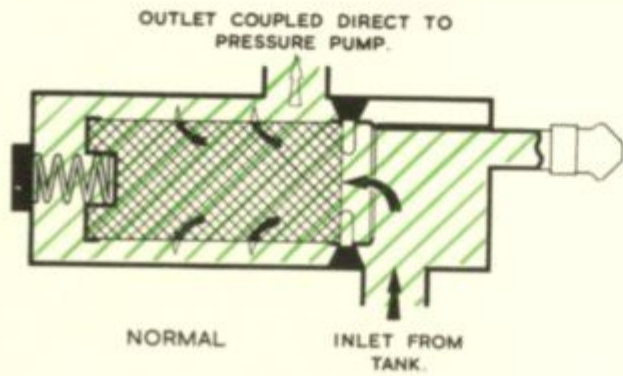
Note: Hold the relief valve adjuster firmly with a screwdriver while securing the locknut.

Verify that the oil pressure is now correct, then fit the relief valve capnut.

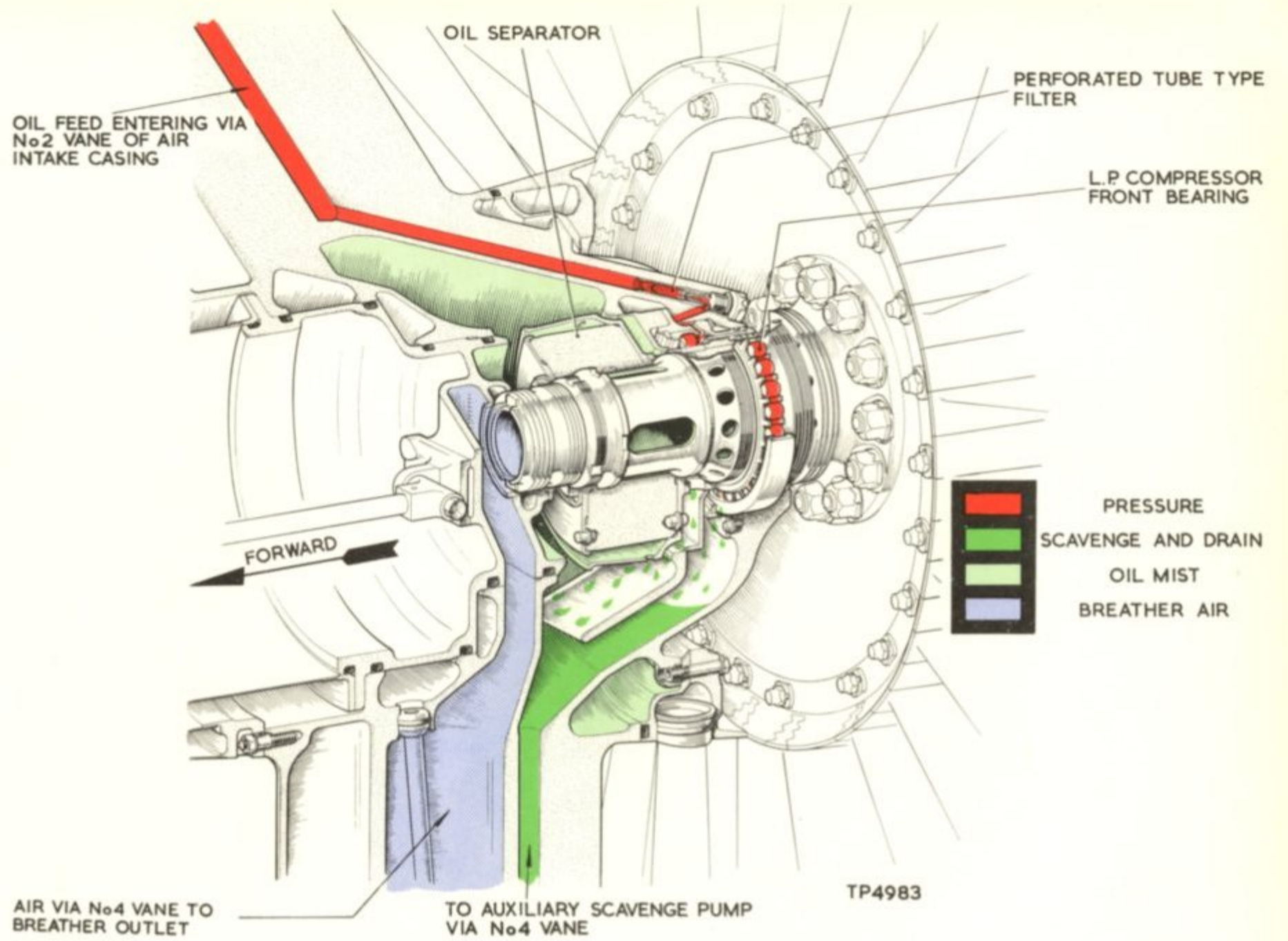
Note: Torque tighten the capnut to 15 lb/ft and secure with lock-wire.



OIL TANK.



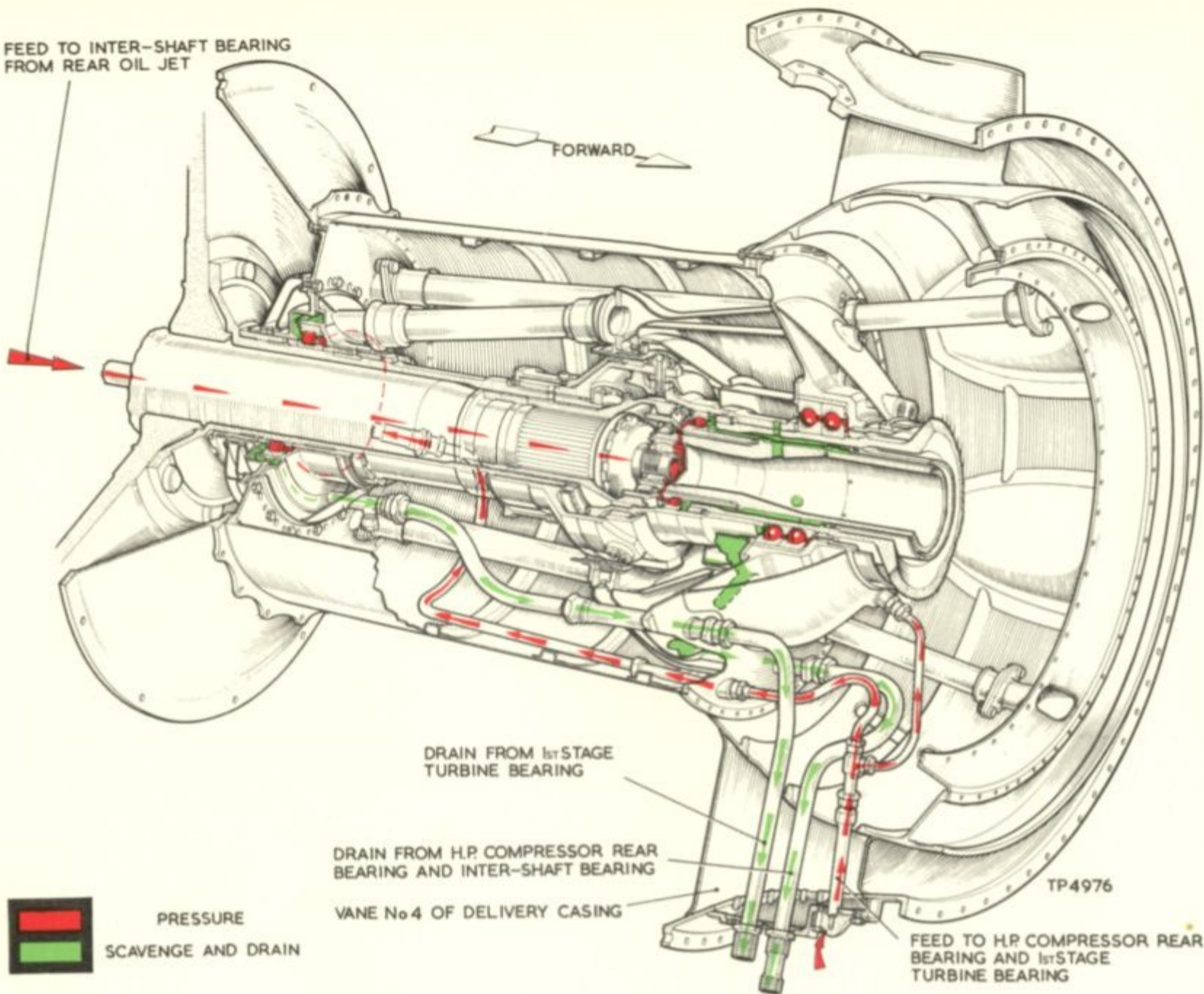
MAIN OIL FILLER & DRAIN



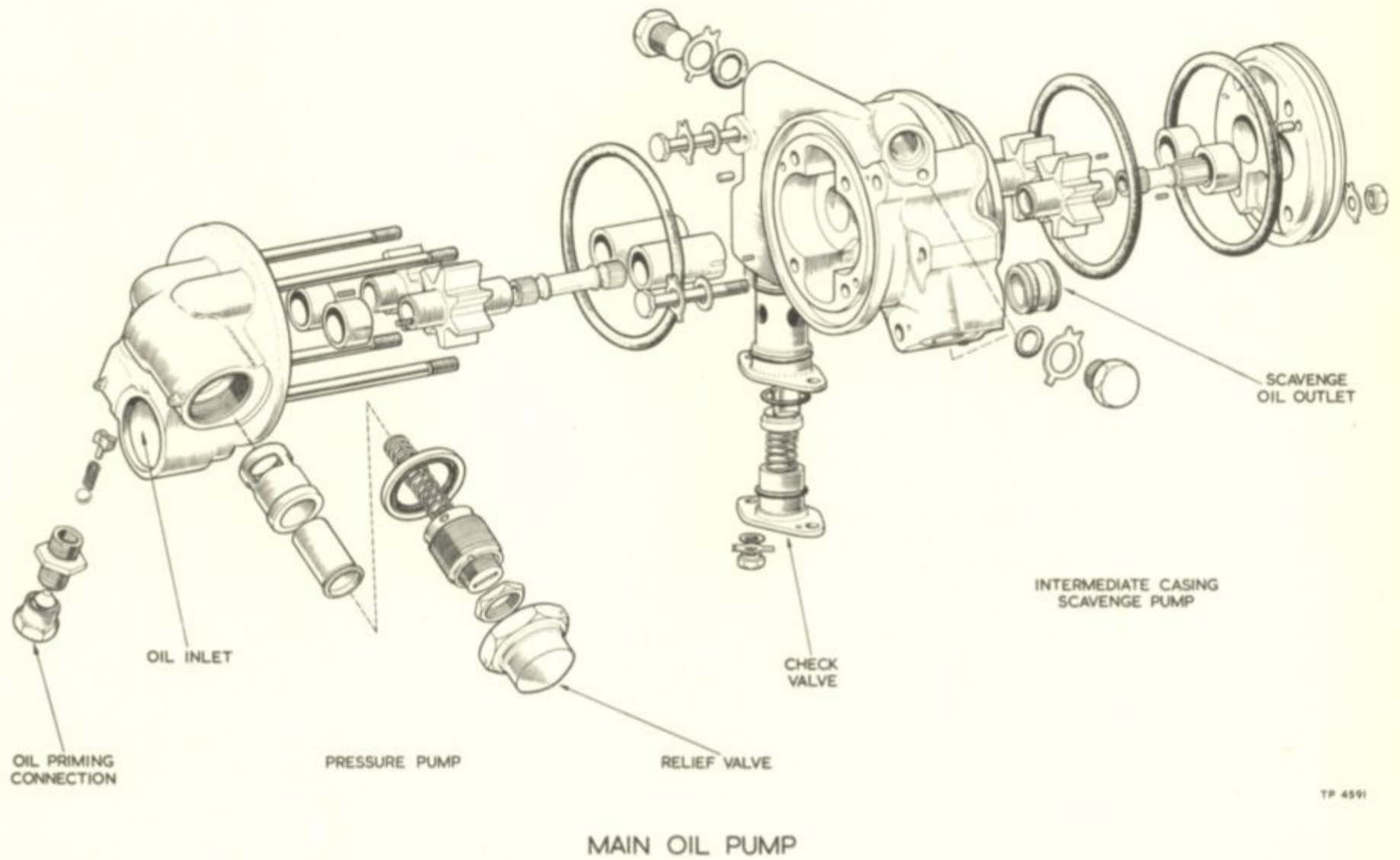
OIL FEED TO L.P. COMPRESSOR FRONT BEARING

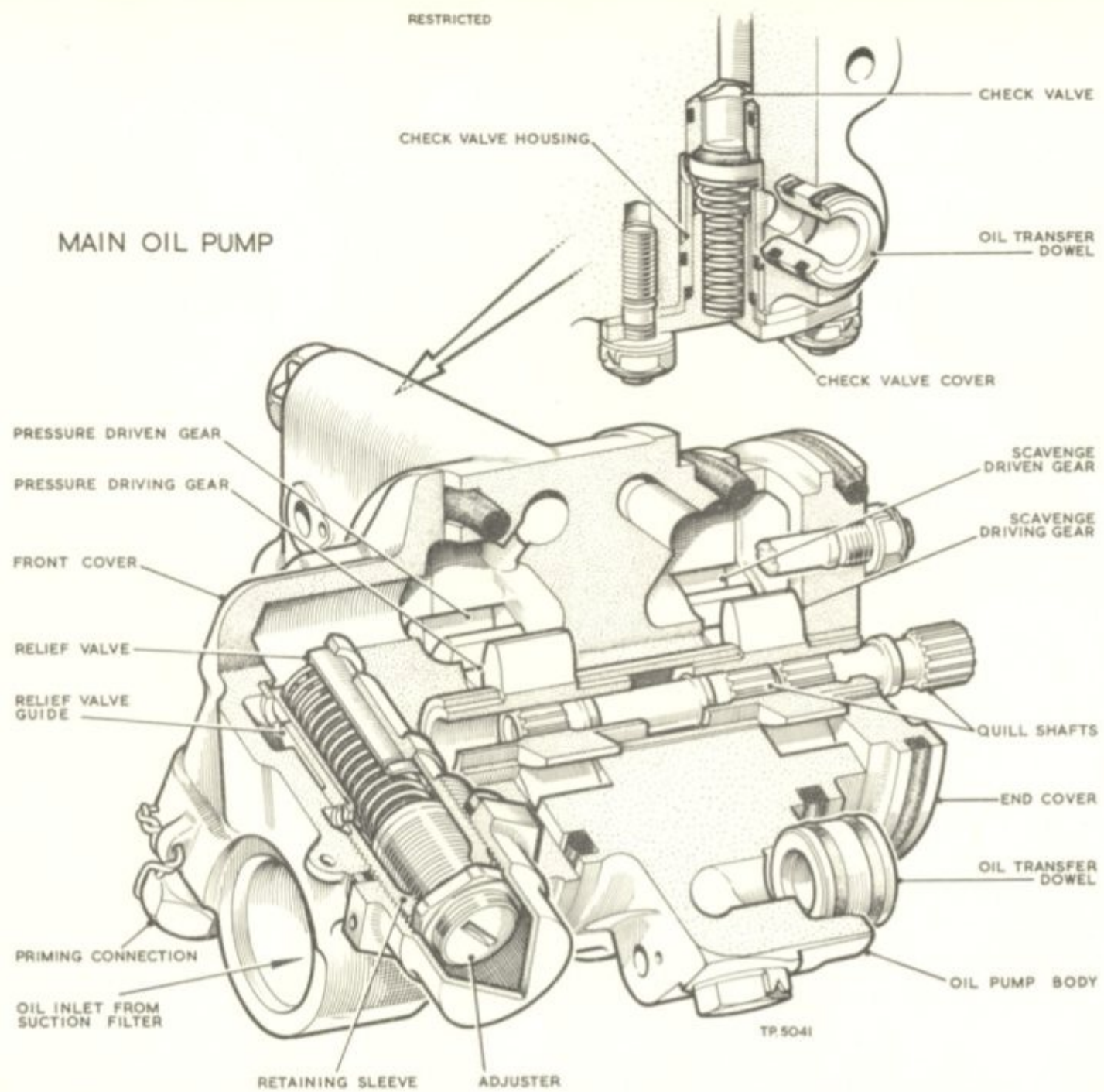
FEED TO INTER-SHAFT BEARING
FROM REAR OIL JET

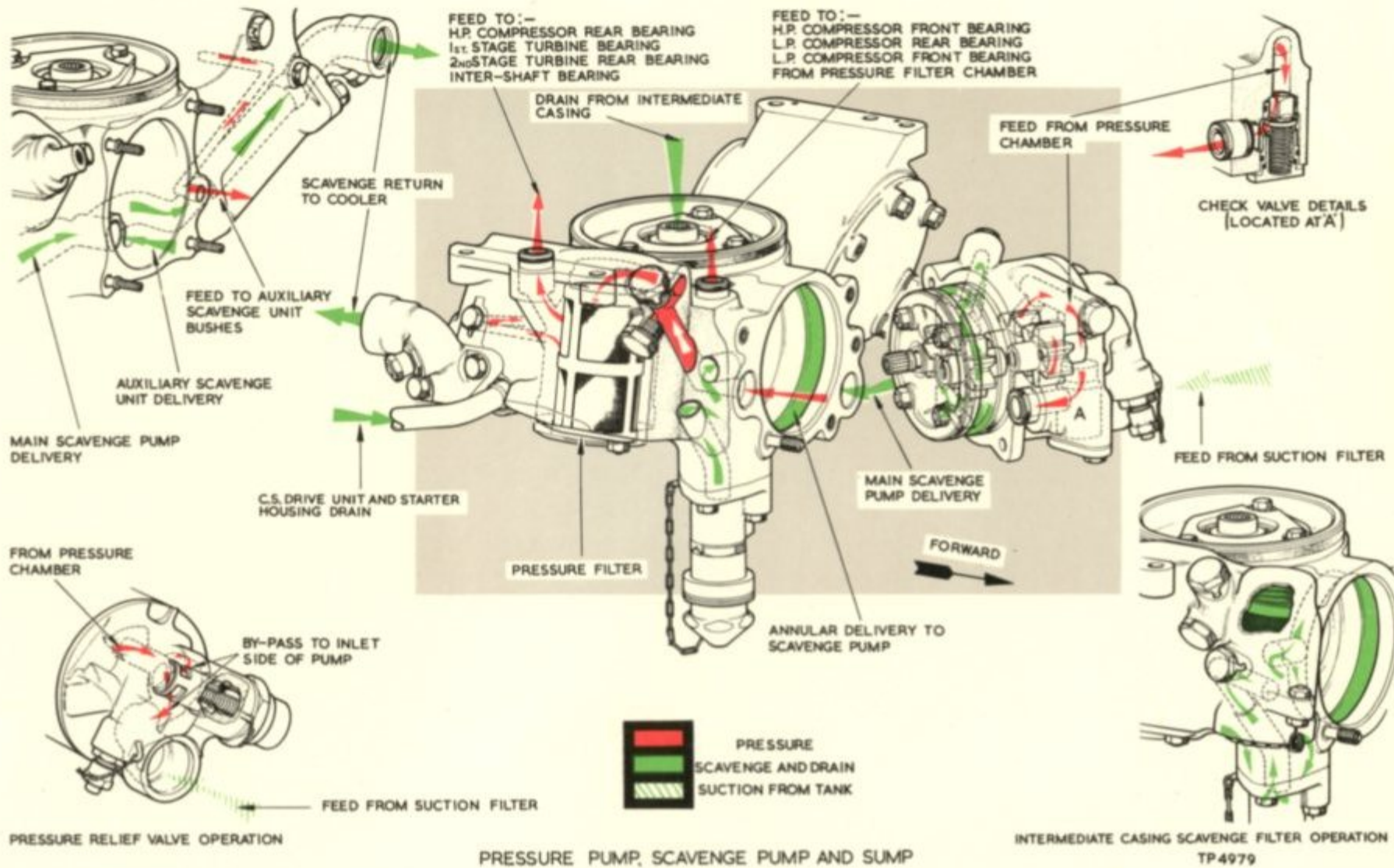
FORWARD



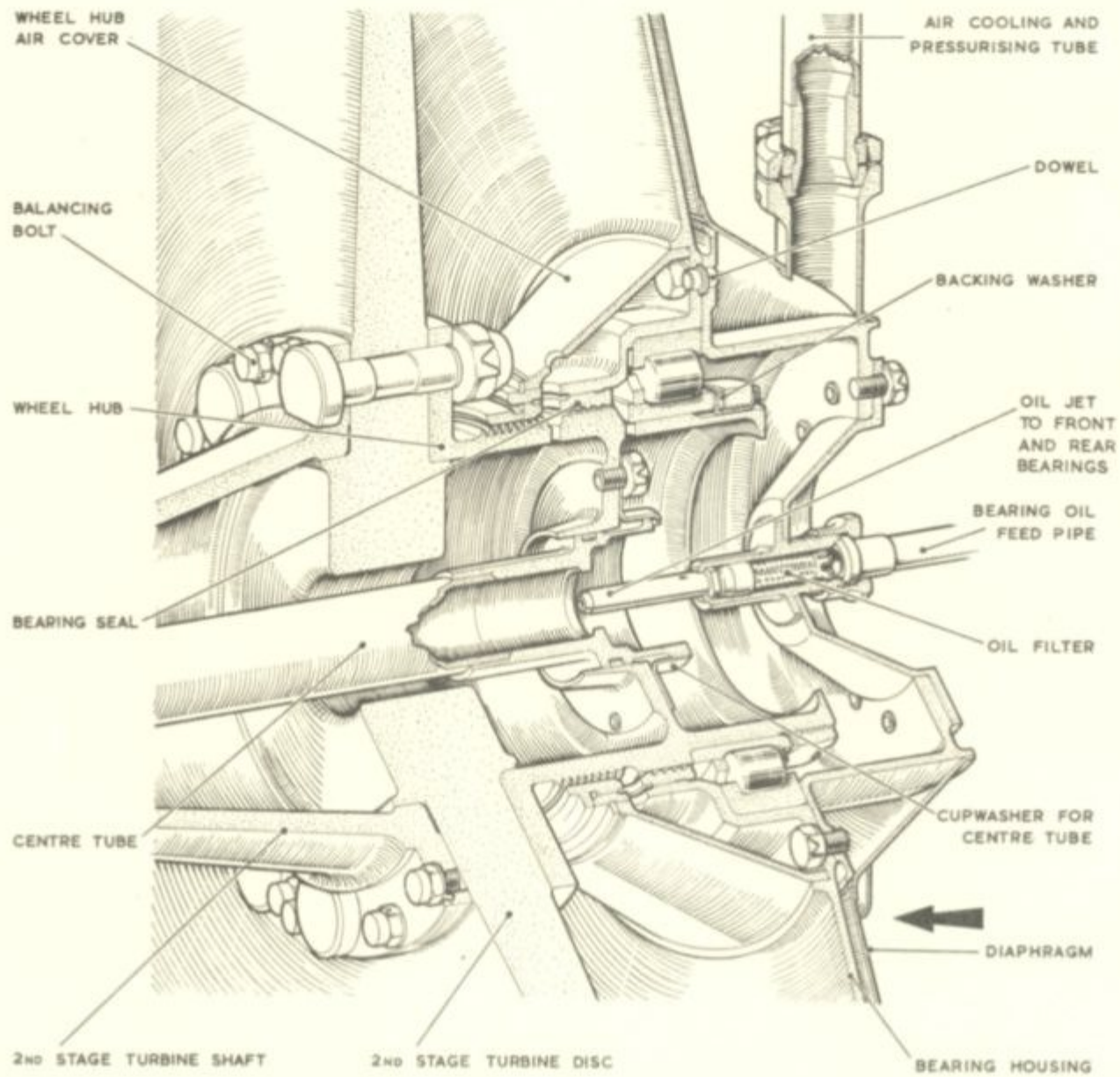
OIL FEED AND DRAIN IN DELIVERY CASING AND TURBINE MOUNTING



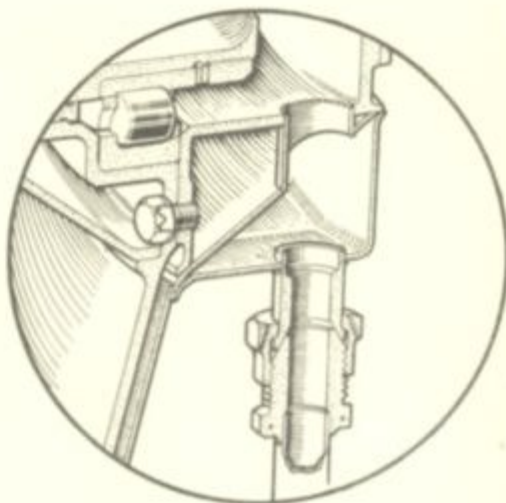




PRESSURE PUMP, SCAVENGE PUMP AND SUMP



RESTRICTED



VIEW OF OIL DRAIN LOCATED AT ARROW.

2ND STAGE TURBINE REAR BEARING HOUSING

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