



WINTON ENGINEERING LTD

UTILITY ONBOARD COMPRESSOR/GENERATOR

OPERATING AND MAINTENANCE

INSTRUCTIONS

UPDATED 15TH OCTOBER 2009 M.I.C

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GENERAL NOTES

The operation and routine servicing of your on-board power installation are covered in this handbook. The installation should be serviced in accordance with the service schedule using the appropriate parts and lubricants.

Some installations will vary in the exact layout to that shown but the general procedures are still applicable. A complete set of operating instructions are included in each vehicle fitted.

Substitution of parts with items not manufactured or approved by Winton Engineering Ltd could damage the installation and will invalidate the warranty.

Winton Engineering Ltd reserve the right to alter the contents of this handbook without notice.

Before undertaking any work on the installation ensure that;

VEHICLE ENGINE IS SWITCHED OFF

HANDBRAKE IS PROPERLY APPLIED

VEHICLE IS COMPLETELY STATIONARY AND SUITABLY IMMOBILISED

If raising the vehicle, it must be properly supported with a vehicle lift or axle stands, using wheel chocks if necessary.

Discarded oil and materials should be properly disposed of. Protective gloves should be worn when handling dirty or contaminated oil.

Before working on the compressor ensure all pressure is relieved from the compressor. Wait until the separator gauge reads zero and release any pressure at the air outlets.

Correct Health and Safety procedures should be observed at all times.

WINTON OBP SYSTEM OVERVIEW

Note: This overview relates specifically to the "Full Spec" Utility installation fitted to Ford Transits.
Installations on other vehicles will share most items and procedures but differences in location of
parts on the vehicles and operating instructions will occur.

This is a typical installation comprising of three main components: the Power Take-Off unit often referred to as the PTO, secondly we have an Mattei M86 Vane Air Compressor and finally on the nearside of the vehicle is a Generator. This generator is a 110/55 volt version of the Meccalte MR1.

All three units along with their associated belts and guards are fitted to a frame, which is hung below the vehicle on four 10mm bolts, secured in turn by four rubber suspension units held to the floor through strengthening plates.

The PTO (power take-off) unit is basically a gearbox which along with two shorter prop-shafts replaces the original drive from the vehicle's gearbox to differential connection on rear wheel drive vehicles.

The PTO gearbox has two selections; the first is a straight through connection that delivers power to the vehicle wheels for normal operation. The second PTO gearbox position diverts the engine power via belt drives to ancillary equipment such as the compressor or generator shown earlier. In the second ancillary PTO position the rear prop shaft is disengaged from the engine so there is no drive to the vehicle's rear wheels.

When operating in the second ancillary mode, the engine is usually run, depending on the vehicle and its configuration, between 1200 and 1900 rpm, in usually the vehicles highest direct drive gear this is typically 4th for a 5 speed gearbox or 5th if the vehicle is fitted with a six speed gearbox.

Always check the operating instructions posted in the vehicle for the correct gear and engagement procedure as variations do exist.

Depending on which units are fitted the vehicle will also have either air and or power outlets usually fitted at the rear of the vehicle and an internal control distribution panel.

POWER TAKE OFF

The power take off unit receives power from the vehicles engine and gearbox and either distributes it to the rear wheels or the ancillary equipment depending upon the position of the PTO lever. The PTO lever is usually fitted on the floor near the handbrake or between the front seats.

The PTO lever operates a cable, which is provided with two adjusters at the PTO gearbox selector end. The selector has two locations that are regulated by a ball and spring which are tensioned by a screw and locknut arrangement. The main maintenance operation required with the PTO is to change the oil every 12 months. The correct oil level is to the bottom of either of the filler plugs on the sides of the unit, the recommended oil is a good quality engine oil, not gearbox oil. The drain plug is on the bottom of the unit and contains a magnetic swarf collector.

COMPRESSOR

The compressor is an Italian Mattei design. It is usually configured to supply around 110 psi although it will supply more for specialist applications such as tyre fitting. However the higher the air pressure the lower the volume produced.

The compressors in this system circulate an oil / air mixture the oil is used to lubricate and cool the compressor

Externally the compressor is fairly simple; it has an air filter cover at the rear, which is held on with a single nut and fibre washer. Inset in the side of the unit is the oil filler / level plug, (24mm hexagon) the oil level for these is to the bottom of the hole.

Below the sight glass can be seen the oil inlet block which also contains an oil filter. Directly opposite this connection on the other side of the compressor is the oil outlet containing a wax thermostat that feeds the system once the correct minimum compressor operating temperature has been reached. Oil is circulated from the Compressor to a combined oil cooling radiator and fan assembly mounted at the rear of the vehicle.

On top of the compressor is fitted an Over-temperature switch, if this is activated the system will shut down.

Behind the air cleaner cover is fitted a standard round air-filter this should be changed whenever the system is serviced. The air-filter sits on this cover, which protects the servo valve unit. On the top of this control valve assembly is a servo valve, which controls the overall system pressure.

The autodrain fitted on the separator will vent once every minute to allow any build up of oil in the rear cover to be returned to the compressor. This is especially important if the system is being run off-load for a long time, for example when fusion welding pipes. It also vents air and moisture from the system.

Inside the Compressor the air is mixed with oil this helps cool and lubricate the Compressor. This air/oil mixture is then fed to the Separator Filter.

SEPARATOR UNIT

The compressors in this system circulate an oil / air mixture. The oil is used to lubricate and cool the compressor. Before the air can be fed to the air outlets this circulated oil needs to be removed, this is the job of the separator filter. This is a ceramic filter that has a relatively long life of 3000hrs and only needs changing when there is evidence of oil carry over into the output air supply. The Separator filter may be mounted next to the PTO on the offside of the vehicle or at the rear just in front of the oil cooler. Any oil that is extracted from the oil/air mixture by the filter is fed back to the compressor by a 6mm pipe fitted to a M5 brass banjo bolt in front of the compressor air cleaner cover.

Another 6mm pipe from the separator feeds pressure into the throttle control pressure switch. When the air supply is being used the drop in air-pressure in this pipe causes the engine speed to rise. A third 6mm pipe from the Separator also feeds the air pressure gauge in the control box

The clean air is then fed to a moisture trap where any excess water is extracted, The sight glass shows the water level. Draining the air pressure to zero with the system switched off will drain the water away. The bottom bowl can be unscrewed to empty the water and clean the inside of the trap.

Depending on the configuration of the vehicle the air supply may now be split into two, one going directly to the non-lubricated outlet tap and the other supply going to an oil lubrication reservoir. This unit is fitted in the back of the vehicle and filled with tool oil which mixes with the air supply and is then fed to the lubricated air outlet. The oil can be re-filled by unscrewing the bowl (when the system is empty of air) taking care to hold on the lugs at each end of the sight glass and not the sight glass its-self.

GENERATOR OUTPUT

The electrics can be split into two main parts, the PTO system control and, where a generator is fitted the generator output power. The output from a generator is fed into this distribution box, which contains various trips and switches. This box maybe fitted in different positions in the vehicle depending on the vehicle layout.

The 110 volts from the generator is fed via this Main Isolating switch to this trip assembly where it is distributed to different sockets usually mounted at the rear and on the inside of the vehicle. The various sockets have different amp ratings controlled by these different trips to ensure that the overall generator current rating is not exceeded.

Always start and shutdown the generator with no load applied.

There are few serviceable components on the generator, the main problem with generators are usually as a result of contamination or standing water either corroding wiring or shorting out the capacitors or the diodes failing.

The capacitors are also quite easy to replace, but note that they do come in different sizes for the same generators as they match the generator windings resistance, which can vary. Usually they are 14, 16, 18, 20, 25, 31.5 or 35 micro Farad. Please remember that capacitors can hold a charge therefore shorting out the pins or earthing the pins through your fingers or a tool can be a safety hazard.

Another problem that you might encounter is that even though the problem might be due to a capacitor, replacing it with a new one may occasionally not work if the capacitor has been on the shelf sometime. The accepted method of re-energising the capacitor is to connect the two terminals to a 12V battery for a couple of minutes before fitting.

As part of the annual check the operation of the main trip button and the earth leakage between the 110 volt inputs and the earth strip will need to be tested.

SYSTEM ELECTRICS

Basically the system electrics work by establishing that the vehicle is in PTO mode and that no drive is being transferred to the rear wheels then it takes control of the throttle so that the engine revs can be raised to a programmed level that ensures sufficient revolutions to provide the required air pressure or voltage. It also then monitors compressor temperature, pressure and other interlocks such as the handbrake position and allows the ignition key to be removed (on later models).

This Siemens unit PI2 or Pedal Interface 2 is based upon a cruise control unit and plugs into the existing wiring harness with white plugs in the throttle pedal area and is also usually combined with a CAN interface.

These units are programmed so that they react correctly to different inputs that the different installations require and are also programmed to raise the engine speed to the required level. This programming either requires an appropriate programming unit or a laptop with the correct software and dongle.

The vehicles will have a distribution and fuse/relay panel associated with the system electrics. In Transits these panels are located in the drivers step toolbox.

WINTON OBP OPERATING INSTRUCTIONS

(NEW 5&6 SPEED TRANSIT WITH P12)

Before Engaging PTO ensure that:-

- 1)The engine is running and up to normal operating temperature.
- 2)The main gearbox is in neutral, the clutch pedal is released and the handbrake firmly applied.
- 3)The air outlet cocks are closed and the generator (or isolator) switch on the main warning panel is off.

To Engage PTO / Compressor:

1)Move PTO lever to the side, out of the lower gate position and pull upwards until it is located in the upper gate position. If it will not go beyond halfway return to the lower position and try again. The dashboard mounted LED will illuminate and the engine speed will rise to system high speed.

2)Select **4th** gear (5 SPEED MODELS) or **5th** gear (6 SPEED MODELS)and smoothly release the clutch. The engine will run up to charge the air system then will reduce to system idle speed. When using air from the system the engine will speed up to maintain 100 psi.

To Engage the Generator:

1)With the system running as above, turn the generator isolator switch to on. The engine will speed up to give correct voltage and frequency at the generator until the switch is returned to off. 110V Electricity can now be used by itself or with air.

IGNITION LOCK OPERATION

TO ENGAGE

WHEN STATIONARY WITH THE HANDBRAKE APPLIED, PRESS THE BLACK "IGN LOCK" BUTTON ON THE RIGHT-HAND DASH BOARD SECTION NEXT TO THE COMPRESSOR PTO GREEN LED. THE IGNITION KEY CAN NOW BE ROTATED TO OFF AND REMOVED.THE CAB AND LOADSPACE DOORS CAN NOW BE SECURED.

TO DISENGAGE

INSERT THE IGNITION KEY AND ROTATE TO THE RUN POSITION. THE IGNITION LOCK WILL DISENGAGE WHEN THE PTO IS DISENGAGED. IF THE PTO IS DISENGAGED WITH THE KEY OUT THE ENGINE WILL STOP.

To Disengage PTO / Compressor:

- 1)Ensure that the air cocks are shut and that the generator (or isolator) switch is off.
- 2)Depress clutch, select neutral in the main gear box and release the clutch, the engine will stay at system high speed.
- 3)Disengage the PTO by moving the PTO lever sideways out of the upper gate position and downwards to the lower gate position. The engine will return to normal idle speed.
- 4)Open each air cock slowly to vent any residual pressure. The vehicle is now ready for road use.

Shut Downs and Warnings on Rear Warning Panel:

Overspeed	-	System shut down to idle
Compressor overtemperature	-	System shut down
High engine temperature	-	System shut down to idle
Low engine oil pressure	-	System shut down to idle



PTO AND COMPRESSOR OILS FOR WINTON OBP INSTALLATIONS

PTO; ANY 15W/40 OR 20/50 ENGINE OIL

VANE COMPRESSOR; TOTAL COTUSA 100

MOBIL RARUS 427

CASTROL AIRCOL PD100

SHELL CORENA S100

MORRIS TEMPO 100

TEXACO EP VDL 100

MATTEI ROTOROIL 3000

HYDROVANE 2000

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SPECIFIC MAINTENANCE PROCEDURES (FIGS 1-4 REFER)

Check/change compressor oil.

CHECK;

Ensure that there is no pressure in the system, this can be checked at the separator gauge (1). Also open the air cocks to vent any residual pressure.

Check the oil by removing the filler/level plug (2) on the right-hand side of the compressor body viewed from the rear. Top up if necessary until oil flows out of the filler/level hole.

CHANGE;

Remove the oil filler/level plug as above. Remove the drain plug (3) on the side of the compressor and drain the oil into a suitable container. Re-fit the plug and fill with oil as above. Capacity is approx 4 litres.

Compressor air filter.

To remove the air filter release the M8 nut on the black cover (4) and withdraw the cover and filter. Blow filter clean or replace as necessary.

PTO oil.

The PTO has two filler/level plugs (5), one each side on the pto centre-line. Remove one of these to check the oil level, it should be up to the bottom of the hole. There is a drain plug (6) with magnet in the bottom of the PTO case. Oil capacity 1 litre.

Propshaft joints.

Ensure that the propshaft joints are greased every 6 months and that the bolts are checked as they will not be on any dealer service schedule.

Belt tension.

Remove the propshaft guard (if fitted) and the M8 hex screws which retain the belt cover.

There should be just enough free-play in each belt to permit it to be twisted 90 degrees.

The generator belt can be tensioned by slackening the four pto securing cap-heads around the pulley and levering the pto across, the four M10 compressor securing bolts will need to be slackened off first.

After re-tensioning the belt(s) turn the pulleys 2-3 turns clockwise by hand and re-check.

Re-fit the cover.

Oil return valves.

To remove the orv`s unscrew the banjo screws (15) and remove the unions (16) taking care not to loose the washers (16a). The orv`s (17) can now be unscrewed and cleaned or replaced. Do not over tighten the banjo bolts as they are aluminium and will break easily.

Separator element.

Remove the oil return pipe as above, the air input (7) and delivery (8) hoses and the autodrain plug (9). Undo the two M8 screws and drop the separator assy down. Remove the orv`s as above, then unscrew the air bolt noting it`s orientation. The separator element can be levered out of the housing using two suitable levers. The element can be replaced as necessary and re-assembled. Do not over-tighten the element clamp nut as the element can be easily cracked.

Electrical components.

TRANSIT; These can be found in the tool compartment in the drivers door-step.

Airline tool oiler.

This is mounted in the racking on the nearside rear of the vehicle. The oil level is visible in the sight glass on the side of the bowl. To top up, ensure there is no air in the system by opening one of the air cocks. Carefully unscrew the bowl by holding the lug at the bottom of the sight glass tube. Refill with appropriate tool oil and replace the bowl.

THE SIGHT GLASS WILL BREAK IF USED AS A MEANS TO UNSCREW THE BOWL.

FIG 1

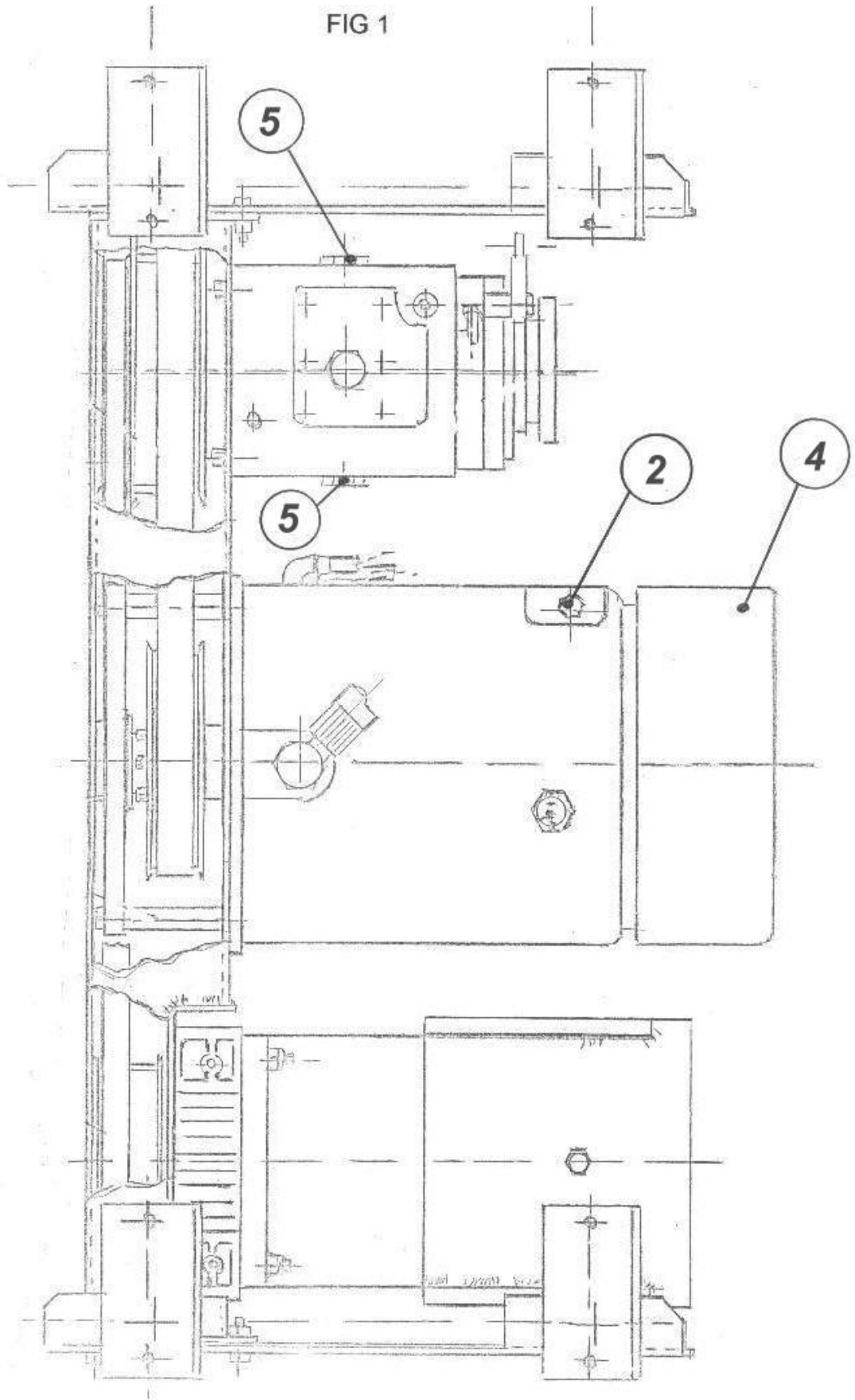


FIG 2

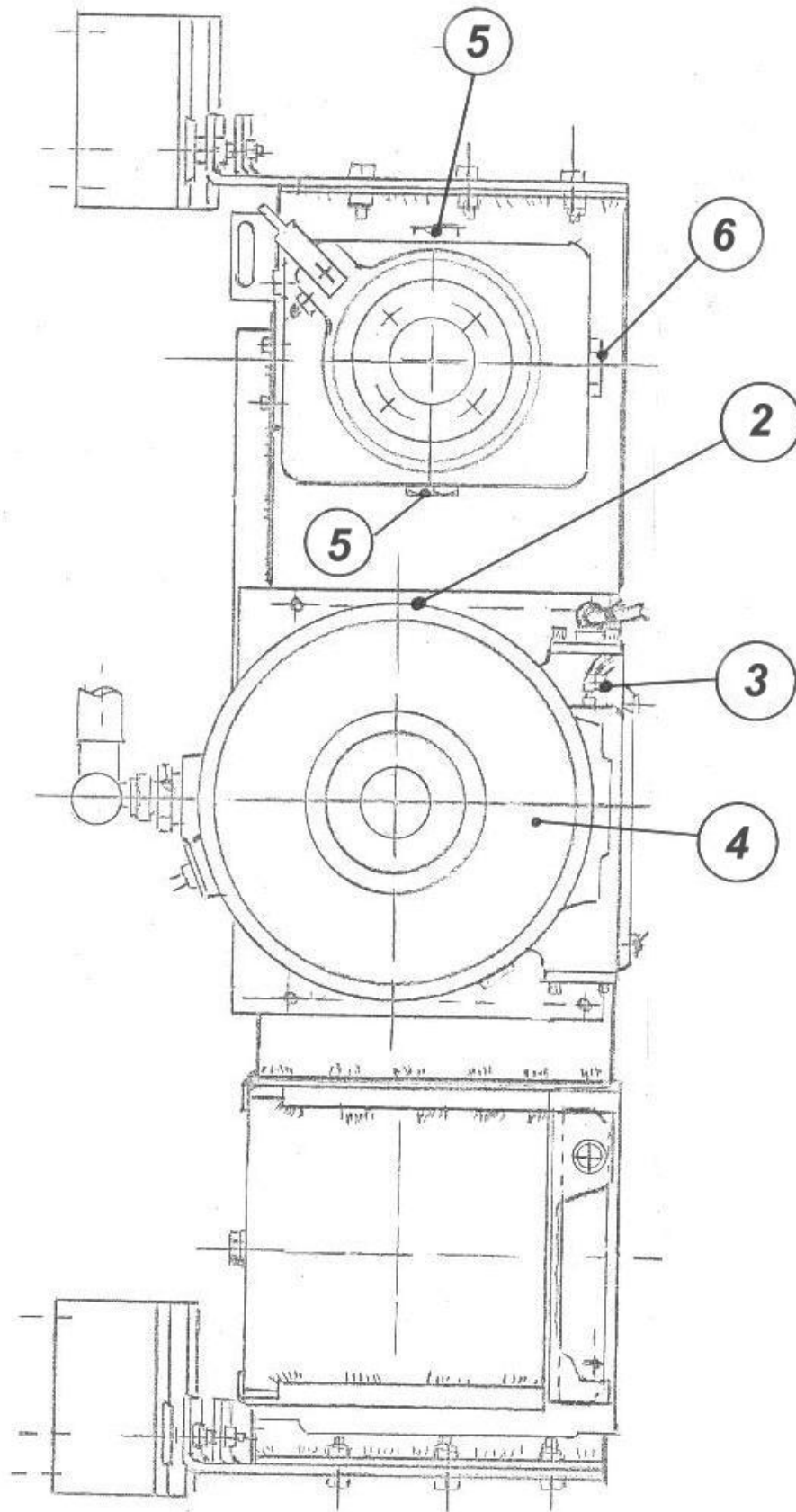


FIG 3

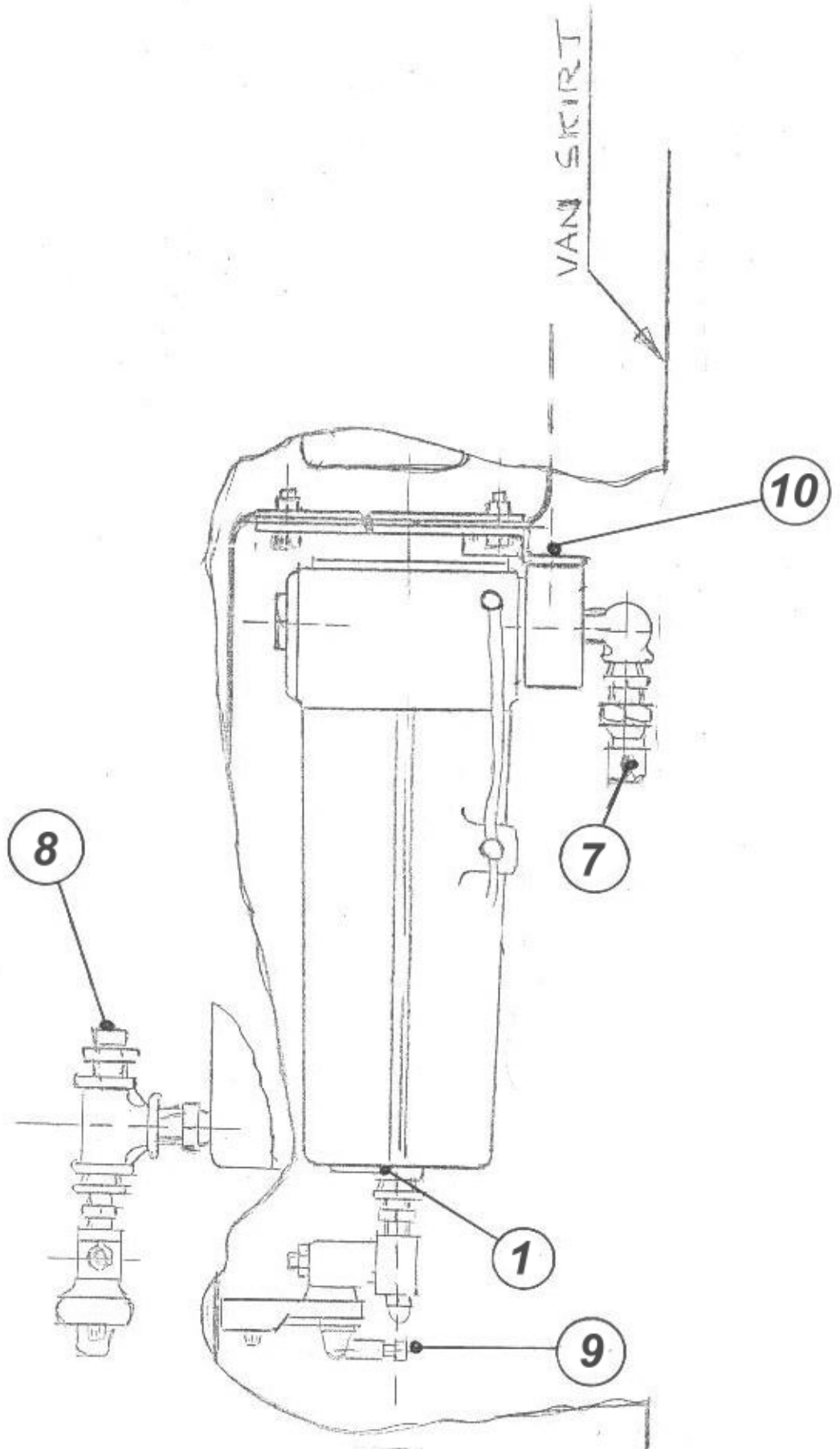


FIG 4

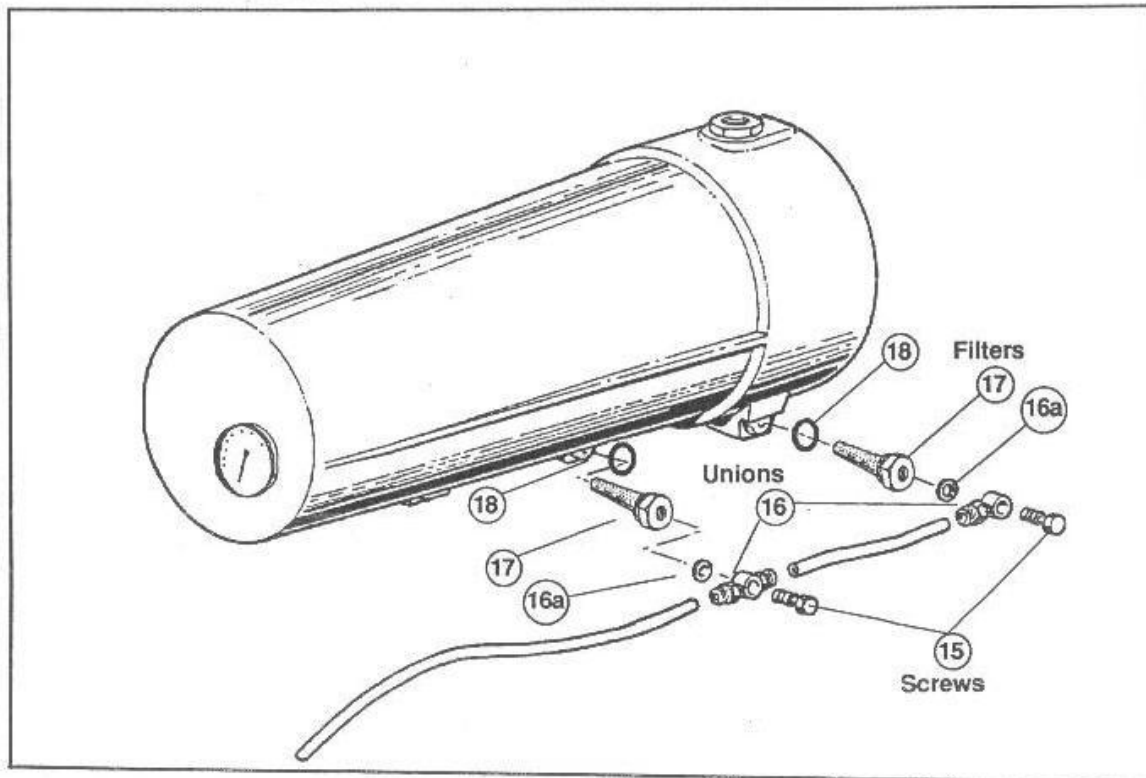


FIG 5. COMPRESSOR PARTS

