

COMPRESSOR REGULATING SYSTEM

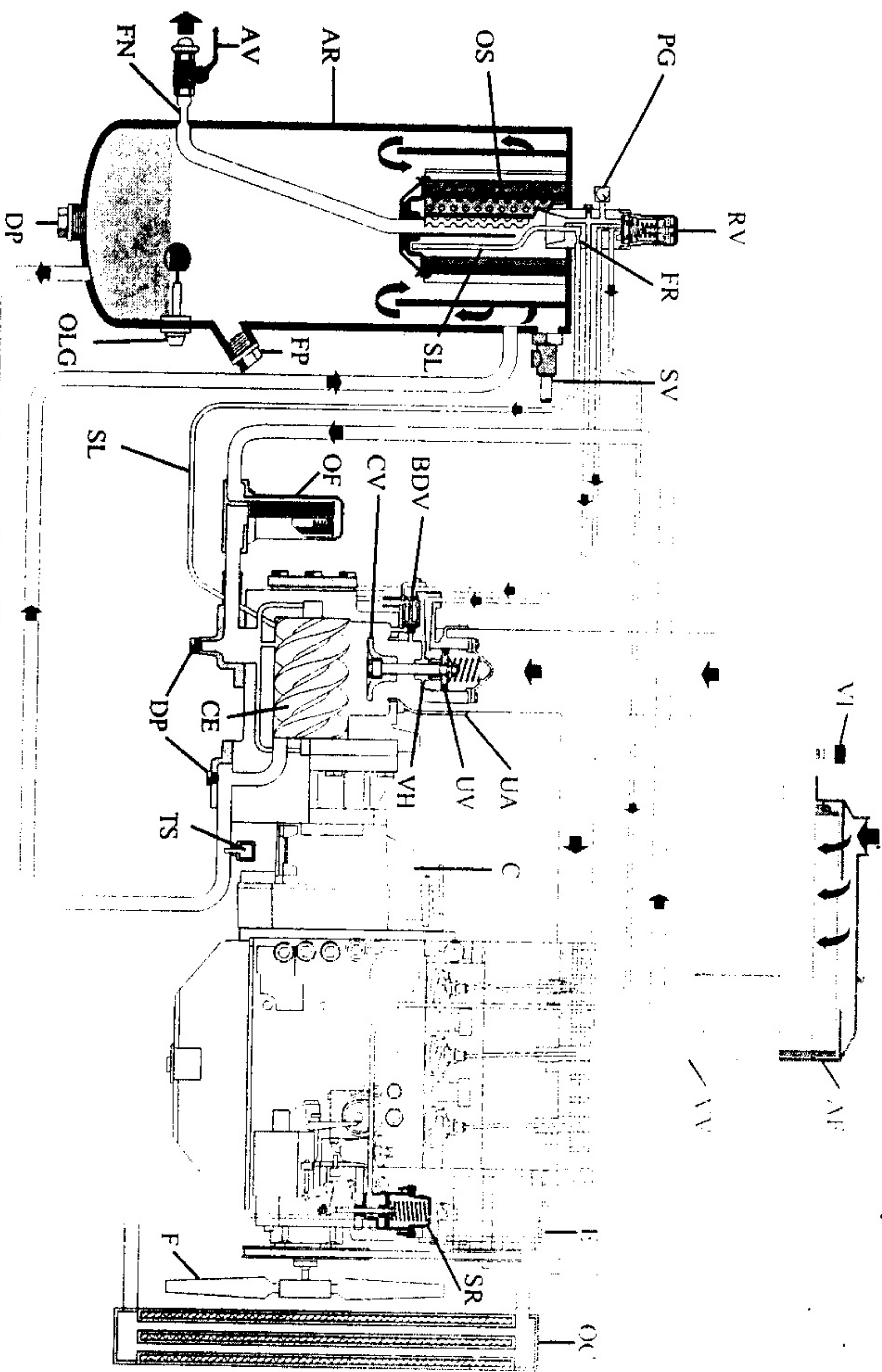


Fig. 2.3

| | | | | | | | |
|-----|--------------------|----|-----------------|-----|------------------|----|--------------------|
| AF | Air filter | DP | Drain Plug | OF | Oil Filter | SV | Safety Valve |
| AR | Air Receiver | E | Engine | OLG | Oil Level Gauge | TS | Temperature Switch |
| AV | Air Outlet Valves | F | Fan | OS | Oil Separator | UA | Unloader Assembly |
| BDV | Blow Down Valve | FN | Flow Nozzle | PG | Pressure Gauge | UV | Unloader Valve |
| C | Coupling | FP | Filling Plug | RV | Regulating Valve | VH | Vent Hole |
| CE | Compressor Element | FR | Flow Restrictor | SL | Scavenge Line | VI | Vacuum Indicator |
| CV | Check Valve | OC | Oil Cooler | SR | Speed Regulator | VV | Vacuator Valve |

2.5 AIR FLOW (SEE FIG. 2.3)

The system comprises:

| | |
|-------|---------------------------------------|
| AF | Air filter |
| AR/OS | Air receiver/oil separator |
| CE | Compressor element |
| UA/UV | Unloader assembly with unloader valve |
| BDV | Blow-down valve |
| FN | Flow nozzle |

Air drawn through the airfilter (AF) into the compressor element (CE) is compressed. At the element outlet, compressed air and oil pass into the air receiver/oil separator (AR/OS).

The check valve (CV) prevents blow-back of compressed air when the compressor is stopped. In the air receiver/oil separator (AR/OS), most of the oil is removed from the air/oil mixture; the remaining oil is removed by the separator element.

2.6 OIL SYSTEM (SEE FIG. 2.3)

The system comprises:

| | |
|-------|----------------------------|
| AR/OS | Air receiver/oil separator |
| OC | Oil cooler |
| OF | Oil filter |

The lower part of the air receiver (AR) serves as oil tank.

Air pressure forces the oil from the air receiver/oil separator (AR/OS) through the oil cooler (OC) and oil filter (OF) to the compressor element (CE).

The compressor element has an oil gallery in the bottom of its casing. The oil for rotor lubrication, cooling and sealing is injected through holes in the gallery.

Lubrication of the bearings is ensured by oil injected into the bearing housings.

The injected oil, mixed with the compressed air, leaves the compressor element and re-enters the air receiver, where it is separated from the air as described in section 2.5. The oil that collects in the bottom of the oil separator element is returned to the system through scavenging line (SL), which is provided with a flow restrictor (FR).

The oil filter by-pass valve opens when the pressure drop over the filter is above normal because of a clogged filter. The oil then by-passes the filter without being filtered. For this reason, the oil filter must be replaced at regular intervals (see section 4.2).

2.7 CONTINUOUS REGULATING SYSTEM (SEE FIG. 2.3)

The system comprises:

| | |
|----|-------------------|
| RV | Regulating valve |
| UA | Unloader assembly |
| SR | Speed regulator |

The compressor is provided with a continuous regulating system.

This system is provided with a blow-down valve which is integrated in the unloader assembly (UA). The valve is closed during operation by outlet pressure of the compressor element and opens by air receiver pressure when the compressor is stopped.

When the air consumption increases, the air receiver pressure will decrease and vice versa. This receiver pressure variation is sensed by the regulating valve which, by means of control air to the unloader, matches the air output to the air consumption. The air receiver pressure is maintained between the pre-selected working pressure and the corresponding unloading pressure.

When starting the compressor, the unloader valve (UV) is kept open by spring force, the engine runs at maximum speed. The compressor element (CE) takes in air and pressure builds up in the receiver.

The air output is controlled from maximum output (100%) to no output (0%) by:

1. Speed control of the engine between maximum load speed and unloading speed (the output of a screw compressor is proportional to the rotating speed).
2. Air inlet throttling:

If the air consumption is equal to or exceeds the maximum air output, the engine speed is held at maximum load speed and the unloading valve is fully open.

If the air consumption is less than the maximum air output, the regulating valve supplies control air to unloader valve (UV) to reduce the air output and holds air receiver pressure between the normal working pressure and the corresponding unloading pressure of approx. 1.5 bar above the normal working pressure.

When the air consumption is resumed, the unloader valve gradually opens the air intake and the speed regulator increases the engine speed.

The construction of the regulating valve is such that any increase (decrease) of the air receiver pressure above the pre-set valve opening pressure results in a proportional increase (decrease) of the control pressure to the unloading valve and speed regulator.

Part of the control air is vented to atmosphere, and any condensate discharged, through the vent holes (VH).

The oil collects in the receiver and on the bottom of the separator element.

The air leaves the receiver via a flow nozzle (FN) which prevents the receiver pressure from dropping below the minimum working pressure (specified in section 9.3), even when the air outlet valves are open. This ensures adequate oil injection and prevents oil consumption.

A temperature switch (TS) and a working pressure gauge (PG) are comprised in the system.

A blow-down valve (BDV) is fitted in the unloader assembly to automatically depressurise the air receiver (AR) when the compressor is stopped.

3. OPERATING INSTRUCTIONS

3.1 PARKING, TOWING AND LIFTING INSTRUCTIONS

3.1.1 PARKING INSTRUCTIONS

Safety precautions

! The operator is expected to apply all relevant safety precautions, including those mentioned on the pages 5 - 8 of this book.

Attention:

Before putting the compressor in to use, check the brake system as described in section 5.6.

After the first 100 km travel:

Check and retighten the wheel nuts and towbar bolts to the specified torque. See section 9.1.

Check the brake adjustment. See section 5.6.

3.1.1.1 PARKING INSTRUCTIONS

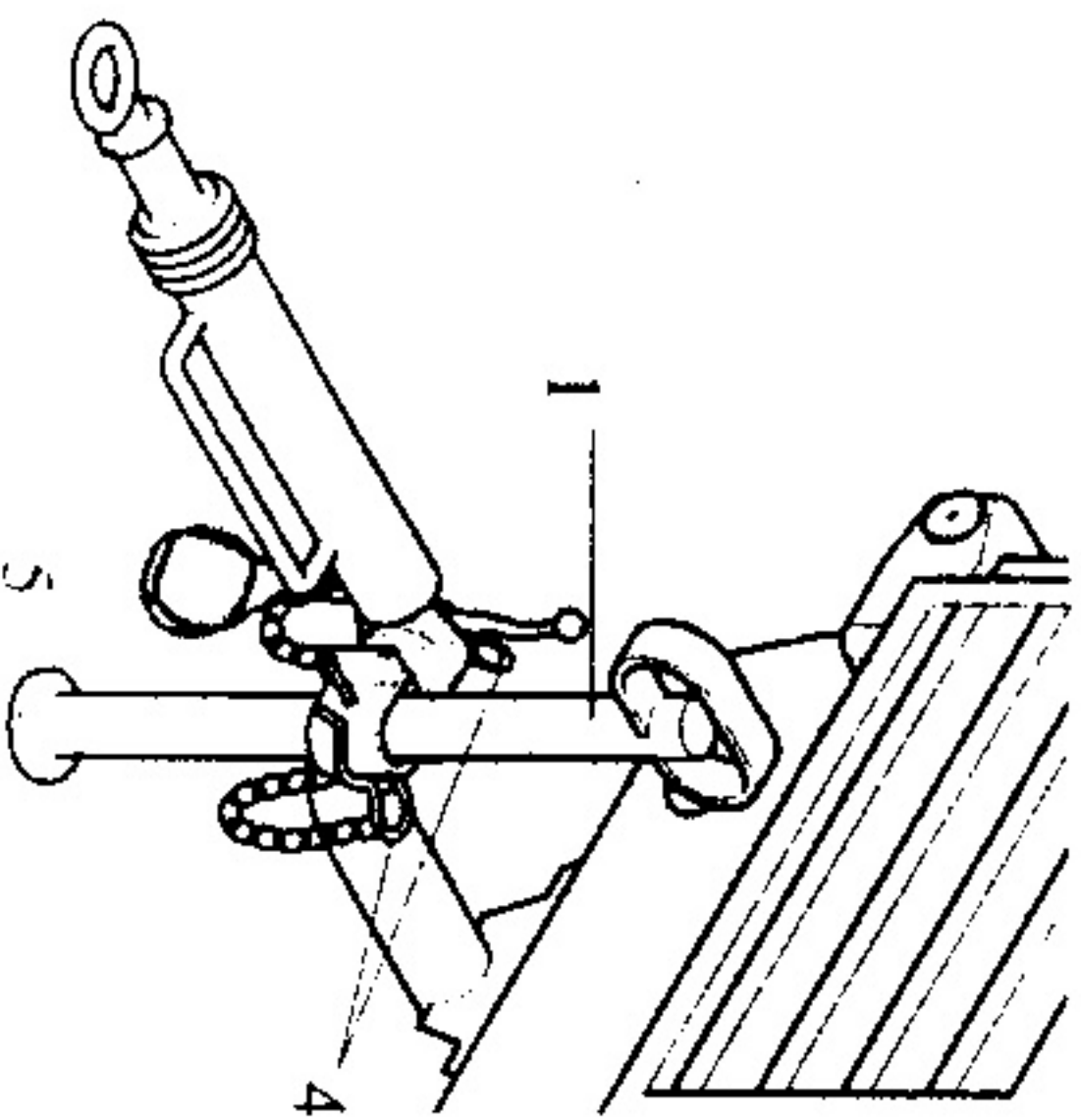


Fig. 3.1 Non-adjustable towbar with standard prop without brakes

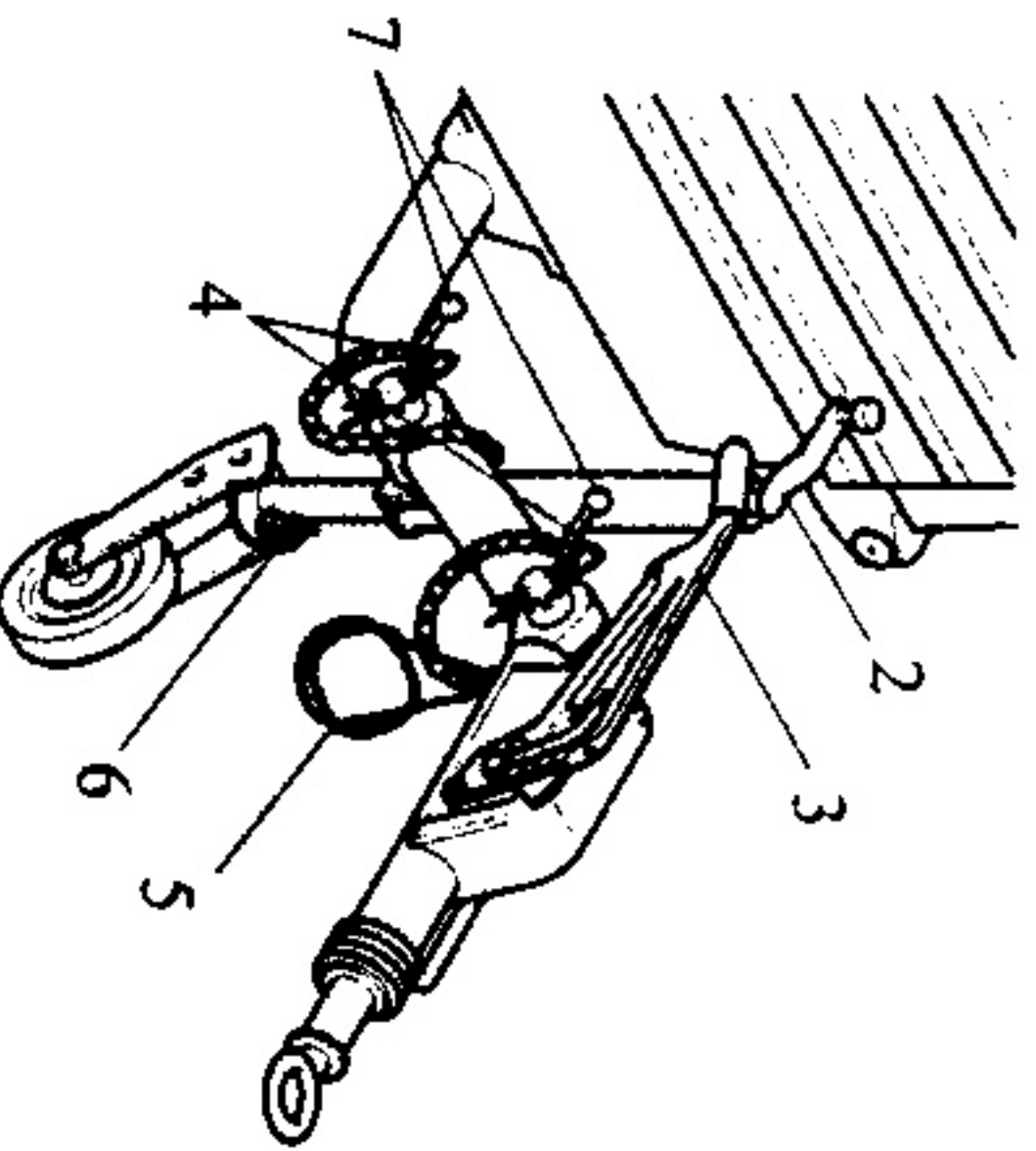


Fig. 3.2 Adjustable towbar with jockey wheel and brakes

When parking a compressor, secure prop (1) or jockey wheel (2) to support the compressor in a level position. Be sure that the jockey wheel (2) is blocked by the blocking pin (6).

Apply parking brake by pulling parking brake handle (3) upwards. Place the compressor as level as possible; however, it can be operated temporarily in an out-of-level position not exceeding 15°. If the compressor is parked on sloping ground, immobilise the compressor by placing wheel chocks (available as option) in front of or behind the wheels. Locate the rear-end of the compressor upwind, (see Fig. 3.4), away from contaminated wind-streams and walls. Avoid recirculation of exhaust air from the engine. This causes overheating and engine power decrease.

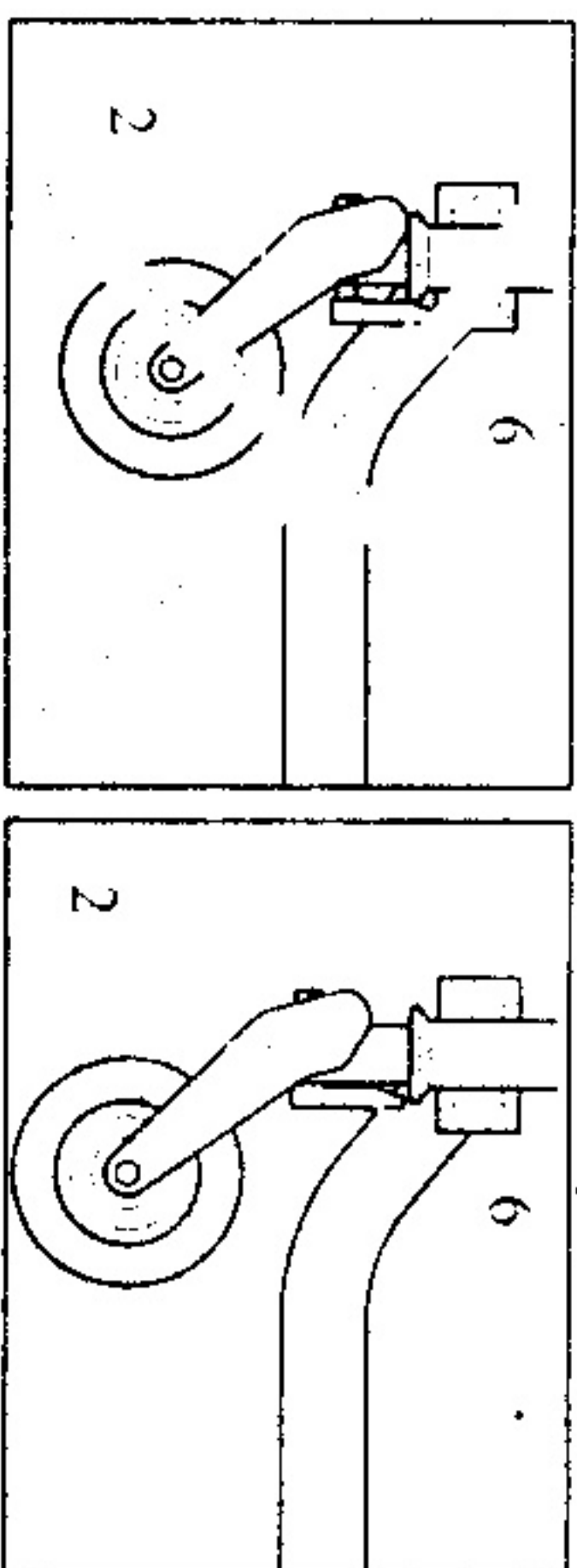


Fig. 3.3 Parking position of jockey wheel

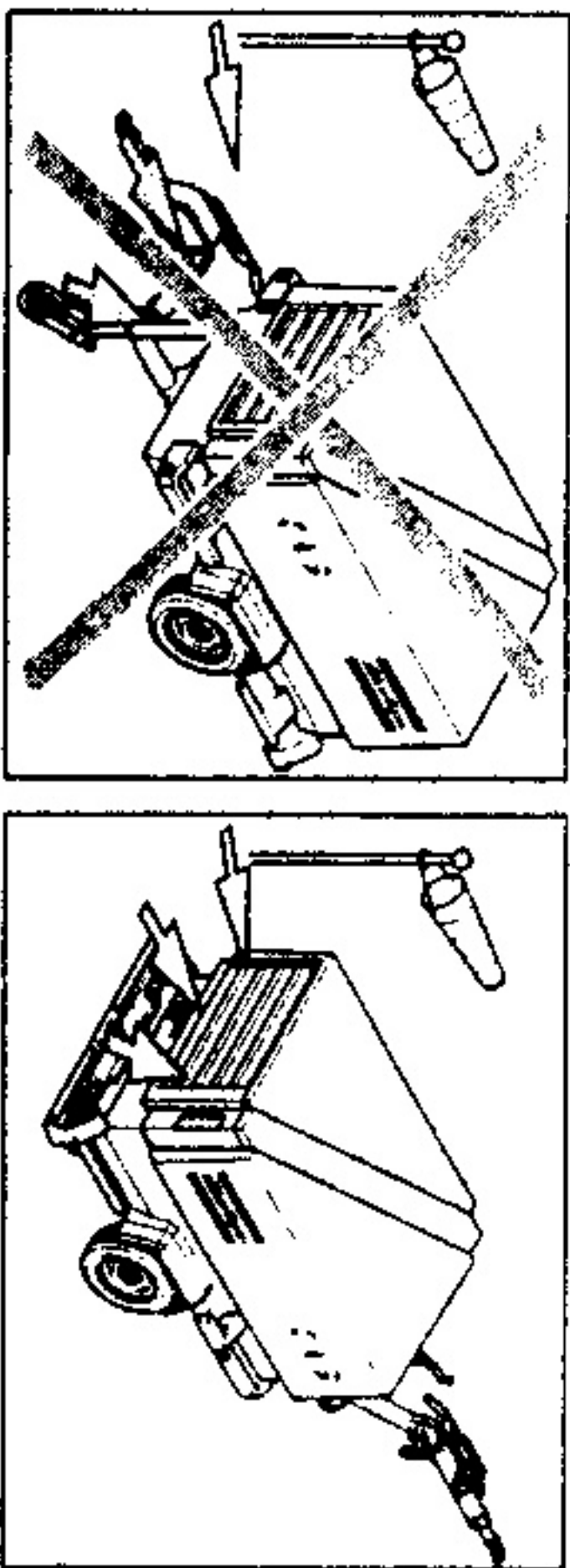


Fig. 3.4 Rear-end of compressor upwind

3.1.2 TOWING INSTRUCTIONS

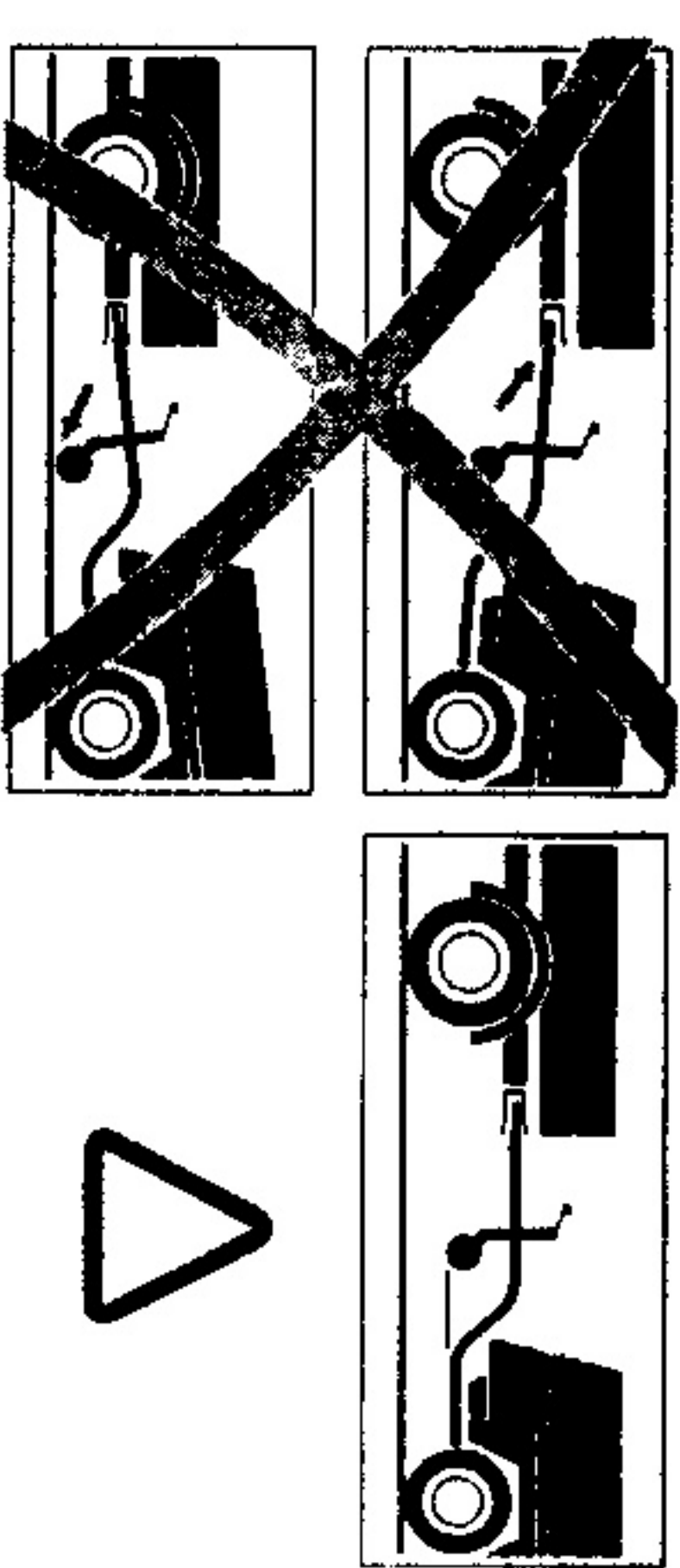


Fig. 3.5 Label on towbar, towing instructions

! Before towing the compressor, make sure that the towing equipment of the vehicle matches the towing eye or ball connector.

For both non-adjustable - and adjustable towbar, the towbar should be as level as possible and the compressor and towing eye end in a level position. Turn the locking handles (7) in such a way that there is no clearance between the teeth of the joints; this can be checked by moving the towbar up and down at the towing eye. Mount safety pins (4). Push hand brake lever (3) completely downwards and connect breakaway cable (5) to the vehicle. Secure jockey wheel (2) or prop (1) in the highest possible position. The jockey wheel is prevented from turning.

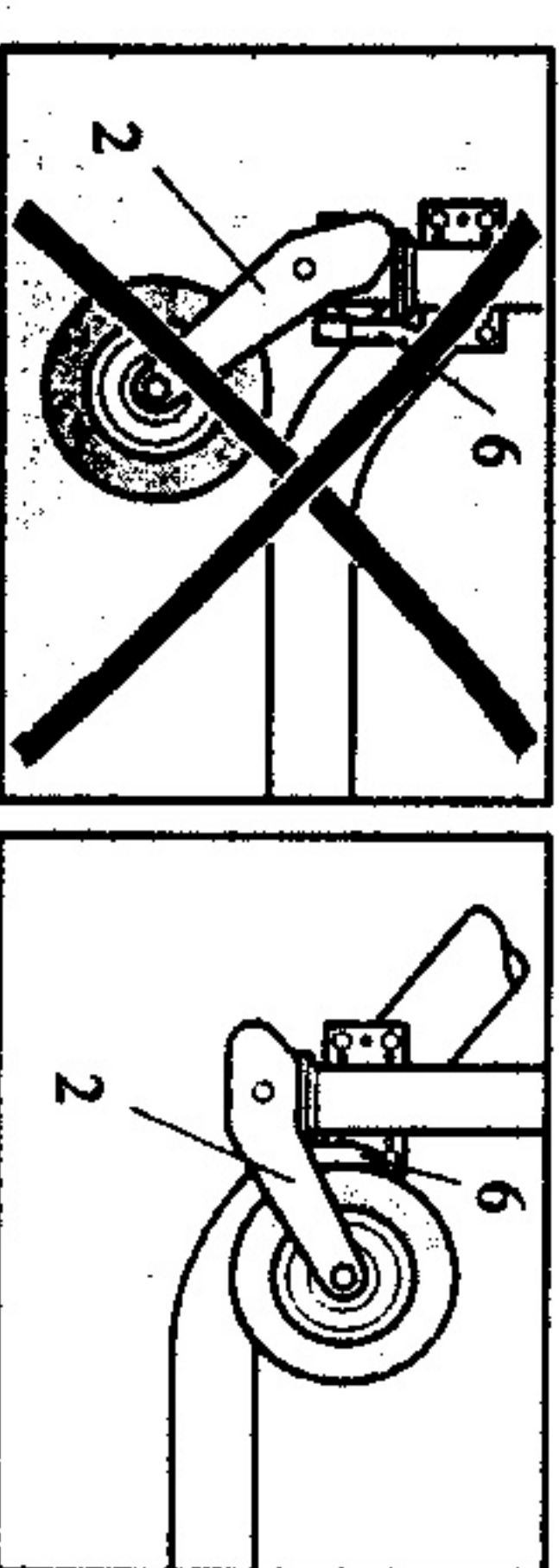


Fig. 3.6 Towing position of jockey wheel

3.1.3 LIFTING INSTRUCTIONS

3.2 BEFORE STARTING

! If the compressor is to be used for sand-blasting or will be connected to a common compressed air system, fit an appropriate check valve between compressor outlet and the connected sand-blasting or compressed-air system. See Atlas Copco option "Non-Return Valve".

Observe the right mounting position/direction!

1. Before initial start-up, prepare battery for operation if not already done. See section 4.7.
2. With the compressor standing level, check the level of the engine oil. Add oil, if necessary, to the upper mark on the dipstick. Consult the Engine Operation Manual for the type and viscosity grade of the engine oil.
3. Check the level of the compressor oil. The pointer of oil level gauge (OLG - Fig. 2.3) should register in the green range. Add oil if necessary. See section 4.3 for the oil to be used.

! Before removing oil filler plug (FP - Fig. 2.3), ensure that the pressure is released by opening an air outlet valve.

4. Check that the fuel tank contains sufficient fuel. Top up, if necessary. Consult the Engine Operation Manual for the type of fuel.
5. Drain any water and sediment from the fuel filter until clean fuel flows from the drain cock.
6. Press vacuumator valve (VV - Fig. 2.3) of the air filter to remove dust.
7. Check the air filter service indicator (VI - Fig. 2.3). If the yellow piston reaches the red marked service range, replace the filter element. Reset the indicator by pushing the reset button.
8. Open an air outlet valve to allow air flow to the atmosphere.

! Lifting acceleration and retardation must be kept within safe limits (max. 45g). Helicopter lifting is not allowed.

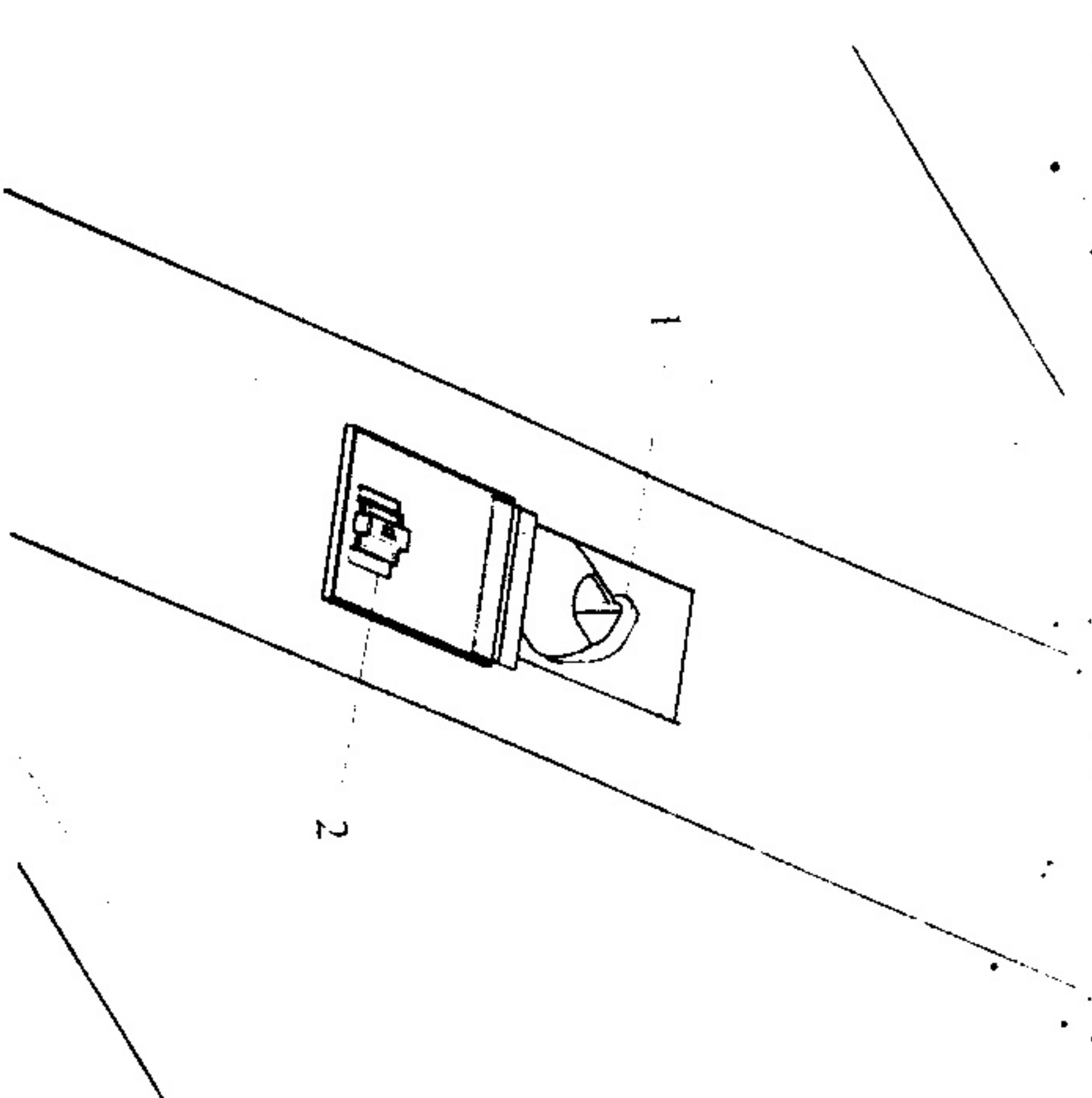


Fig. 3.7 Lifting eye

When lifting the compressor, the hoist has to be placed in such a way that the compressor, which must be placed level, will be lifted vertically.

Preferably use the lifting eye (1) after opening the small door (2).

3.3 STARTING/STOPPING

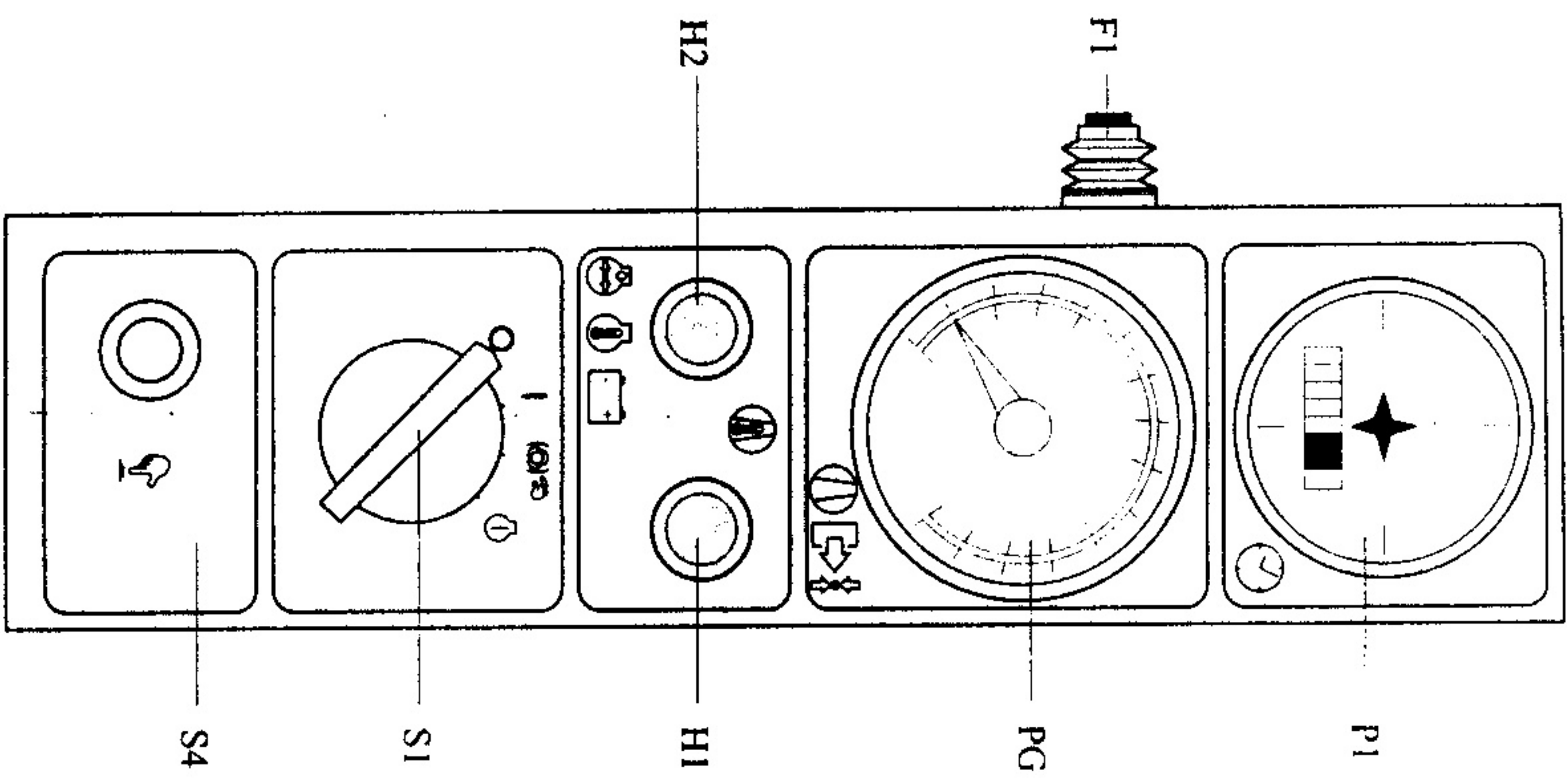


Fig. 3.8 Control panel

- P1 Hourmeter
- F1 Circuit breaker button
- PG Working pressure gauge
- H1 Temperature alarm lamp (red)
- H2 General alarm lamp (red)
- S1 Contact switch
- S4 Lamp test

Before starting first operate the circuit breaker button (F1) at the left side of the control panel (open left-hand service door first).

To start, the start button is turned clockwise to position 1. Lamp H2 (general alarm) will go on. When the button is turned further to position 3, the starter motor will set the engine in motion. Lamp H2 will go out as soon as the engine has been started. The start button automatically springs back to position 1. Lamp H1 only produces a signal when the compressor outlet temperature is too high. Correct operation of the lamp itself can be checked by operating the lamp test button S4 located on the control panel.

When the start button is in position 1 and the engine is not running, the lamp test can be used. Lamp H1 will go on and will automatically go out when the group is started.

Shutting-down is simply done by turning the start button anti-clockwise to position 0 (with valves closed).

The control panel in addition indicates receiver pressure (PG) and accumulated operating hours (P1).

Fault situations and protective devices:

- The starter motor is protected against prolonged starting or against attempts to start when the group is already running.
- A fault which occurs with the engine, either: oil pressure (too low), oil temperature (too high) or alternator voltage (too low) will always and immediately cause the engine to cut out and the control lamp H2 will light up. By doing some simple checks, it can be determined what it was that caused the engine to fail: low oil level, clogged-up cooler, slack alternator belt tension or broken belt.
- When the outlet temperature of the element becomes too high, a thermocouple will also switch off the group immediately. Both control lamps H1 and H2 will light up. Both control lamps will remain on until the group has been restarted (start button to position 3) or the contact is turned off (start button to position 0); also when, due to cooling off, the thermocouple has closed again (= memory function).

3.4 DURING OPERATION

⚠ The doors must be closed during operation and may be opened for short periods only.

Regularly carry out following checks:

1. That regulating valve (RV) is correctly adjusted, i.e. starts decreasing the engine speed when reaching the preset working pressure in the receiver.
2. Check the air filter vacuum indicator (VI - Fig. 2.3). If the yellow piston reaches the red marked service range, replace the filter element. Reset the indicator by pushing the reset button.
3. On compressors with aftercooler, check that the automatic drain of the water separator is operative without air leakage.

4 MAINTENANCE

4.1 USE OF SERVICE PAKS

Service Paks include all genuine parts needed for normal maintenance of both compressor and engine.

Service Paks minimise downtime and keep your maintenance programme low.

Order Service Paks at your local Atlas Copco dealer.

4.2 PREVENTIVE MAINTENANCE SCHEDULE FOR THE COMPRESSOR

The schedule contains a summary of the maintenance instructions. Read the respective section before taking maintenance measures.

When servicing, replace all disassembled packings, gaskets, O-rings, washers.

For engine maintenance refer to Engine Operation Manual.

The maintenance schedule has to be seen as a guideline for units operating in a duty environment typical to compressor applications. Maintenance schedule can be adapted depending on application environment and quality of maintenance.

| Maintenance schedule | Daily | Initially <i>around 50 hours</i> | Normal <i>or every 500 hours</i> | Yearly <i>or every 1000 hours</i> | Remarks |
|---|--------------|-------------------------------------|-------------------------------------|--------------------------------------|----------|
| Service pak | Check | supplied with unit | 2912 4199 02 | 2912 4275 06 | |
| Engine oil level | Check | | | | |
| Compressor oil level | Check | | | | |
| Air filter vacuumator valve | Empty | | | | |
| Fuel filter water drain | Drain | | | | |
| Air intake vacuum indicator | Check | | | | |
| Electrolyte level and terminals of battery | Check | | | | |
| Tyre pressure | Check | | | | |
| Leaks in air-, oil- or fuel system | Check | | | | |
| Oil cooler package | Check | | | | |
| Engine minimum and maximum speeds | Check | | | | |
| Torque of wheel nuts | Check | | | | |
| Brake system (if installed) | Check/Adjust | | | | |
| Safety valve | Check/Adjust | | | | |
| Door Hinges | | | | | Grease |
| Towing eye shaft or ball coupling and its shaft | | | | | Grease |
| Shut-down switches | | | | | Check |
| Pressure drop over separator element (2) | | | Measure | Replace | |
| Fan v-belt (3) | | Adjust | Adjust | Adjust | |
| Fuel tank | | | Clean | Clean | |
| Compressor oil | | | | | Change |
| Compressor oil filter | | Replace | | | Replace |
| Air filter element (1) | | | Replace | | Replace |
| Engine oil (3) (4) (6) | | Change | Change | Change | |
| Engine oil filter (3) | | Replace | Replace | Replace | |
| Fuel filter (3) | | Replace | Replace | Replace | |
| Engine inlet and outlet valves (3) | | | | Adjust | |
| Inspection by Atlas Copco Service technician | | | | | ⚠ |

- (1) More frequently when operating in a dusty environment.
- (2) Replace the element when the pressure drop exceeds 0.8 bar.
- (3) Refer to the Deutz operation manual.
- (4) 500 hours only valid when using PAROIL SAE 15 W 40.
- (5) The valves need to be adjusted for the first time before 500 running hours. The rocker cover gasket is not included in the 500 hours kit. They are to be ordered separately: for 3 cyl.: PN 2914 8054 00
- (6) Also drain engine oil from engine oil cooler (see Fig. 2.2: Dpec = Drain plug engine oil cooler)



Keep the bolts of the housing, the lifting eye, the towbar and the axle securely tightened. Refer to 'Technical specifications' for the torque values.