PACKSMART
HYD75K-xxV-12cc

User & Maintenance Manual

MASTER DISTRIBUTORS OF WORLD LEADING BRANDS

TRANSPORT HYDRAULIC SPECIALISTS

National Distribution
Technical Support
Customer Service
System Design
Occupational Health & Safety

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RESPONSIBILITIES

THE MANUFACTURERS RESPONSIBILITY

GFR Industries is responsible to provide a product without defect, capable of undertaking the work required as specified by the purchaser. At time of supply, GFR Industries assumes that the compressor system and associated drive system will be correctly installed, operated and maintained in accordance with this manual and any and all associated legislation and work place requirements.

THE INSTALLERS RESPONSIBILITY

The installer is responsible for compliance with all national and state standards that may be associated with mechanical drive systems.

Further consideration must be given to any and all installation information and advise provided by GFR Industries as well as generally accepted engineering practices.

THE OWNER/OPERATOR RESPONSIBILITY

In accordance with WH&S requirements operators must be trained in the safe and correct operation of the compressor and drive system. The owner and operator are responsible for the ongoing identification, reporting and resolution of safety hazards and maintenance issues associated with the compressor and drive systems.

It is the responsibility of the owner/operator to ensure that the compressor system is operated within its published design parameters at all times.

GFR Industries has included in this manual a list of the most common safety warnings relative to a compressor system.

INCORRECT INSTALLATION AND OPERATION

Failure to comply with the responsibilities of application, installation, operation and maintenance may lead to injury to operators and maintainers or the premature failure of the compressor, system ancillaries or the drive system.

SAFETY WARNINGS

1. This equipment is to be operated and maintained only by personnel who have been trained in its use and operation.
2. This equipment produces high pressure compressed air. All precautions applicable to the use of compressed air in the workplace are to be observed and practiced.
3. When the compressor is driven by a high pressure hydraulic system all precautions applicable to the operation of a hydraulic system are to be observed and practiced.
4. When the compressor is driven by a carden shaft or is driven directly from a prime mover all precautions relevant to rotating machinery must be observed.
5. All applicable personal protective clothing and equipment is to be worn at all times when operating this system. PPE must include safety glasses and hearing protection.
6. Always ensure that safety interlocks, emergency stops, protective devices and guards are in position and operating correctly.
7. Be aware that when operating some surfaces are extremely hot, in excess of 100 degrees Celsius, while other surfaces may freeze. Be cautious of touching any surfaces with bare hands after last operation.
8. Do not attempt to disconnect, remove, repair or service any part of the compressor or drive system while the system is operating or before all air pressure has been vented to atmosphere.
9. The compressed air produced by this compressor is ***NOT*** suitable for breathing and must not be used for filling or cleaning any breathing apparatus or similar device.

WARNING	WARNING	WARNING	WARNING
			
Hot parts can cause severe burns Do not touch any internal surfaces during or shortly after operation	All hoses should be connected by a Trained Technician All safety devices should be tested	High Pressure Hydraulic System Use extreme caution when fitting or servicing	Do not remove caps, plugs or other components while running OR with pressure retained in the tank

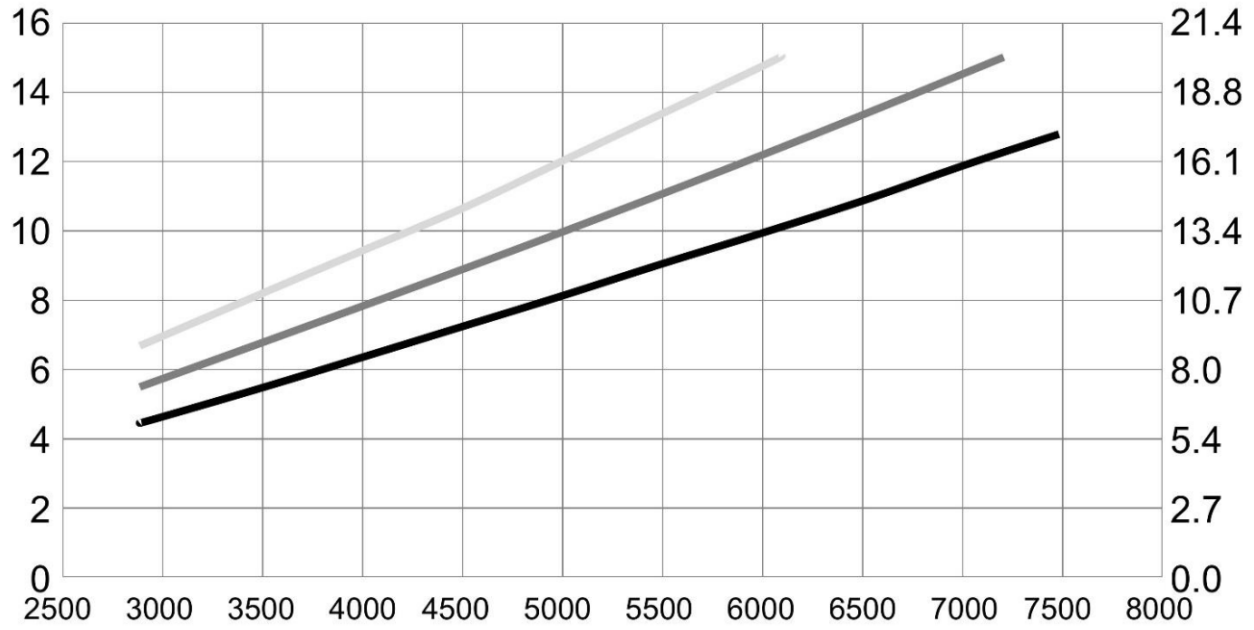
WARNING	DANGER	WARNING
		
Do not use compressed air from this compressor for breathing of for processing consumables	Read this manual in full prior to installation and use Failure to adhere to the instructions may result personal injury	Rotating parts can cause serious injury. Keep body clear of rotating parts while operating the compressor

ENGINEERING DATA

TYPE OF MACHINE	OIL-INJECTED ROTARY SCREW COMPRESSOR			
Drive	Direct			
Rotor dimension: Outside main diameter	73.4	mm	2.9	in
Rotor dimension: L/D	1.65			
Air capacity (ISO 1217 annex B 2009)	0.65-2.1	m^3/min	22.9-74	cfm
Max working pressure	13	bar g	203	psi g
Min working pressure	5	bar g	87	psi g
Oil injected quantity	20-28	l/min	5.3-7.39	gal/min
Max input power	15	kW	20	hp
Max main rotor speed	7500	rpm	7500	rpm
Min main rotor speed	2850	rpm	2850	rpm
Max outlet air/oil temperature	105	^{0}C	221	^{0}F
Environment max. Temperature	45	^{0}C	113	^{0}F
Environment min. Temperature	0	^{0}C	32	^{0}F
Thermostatic temperature	¾ Gas – ¾ 16UNF – 1” 12UNF			
Oil nipple size	M24x195 mm – M22x115 mm			
Separator nipple	8 bar – 10 bar – 13 bar			
Operating pressure	Air-end body: Body valve: Internal parts:	Cast iron; Aluminum; Aluminum galvanized, stainless steel, PTFE, viton,Xylan		
Weight	47	kg	103.6	lb

*When the environment temperature is lower than 15^{0}C it is necessary to choose ISO VG 32 oil

Power [kW] **Power [hp]**

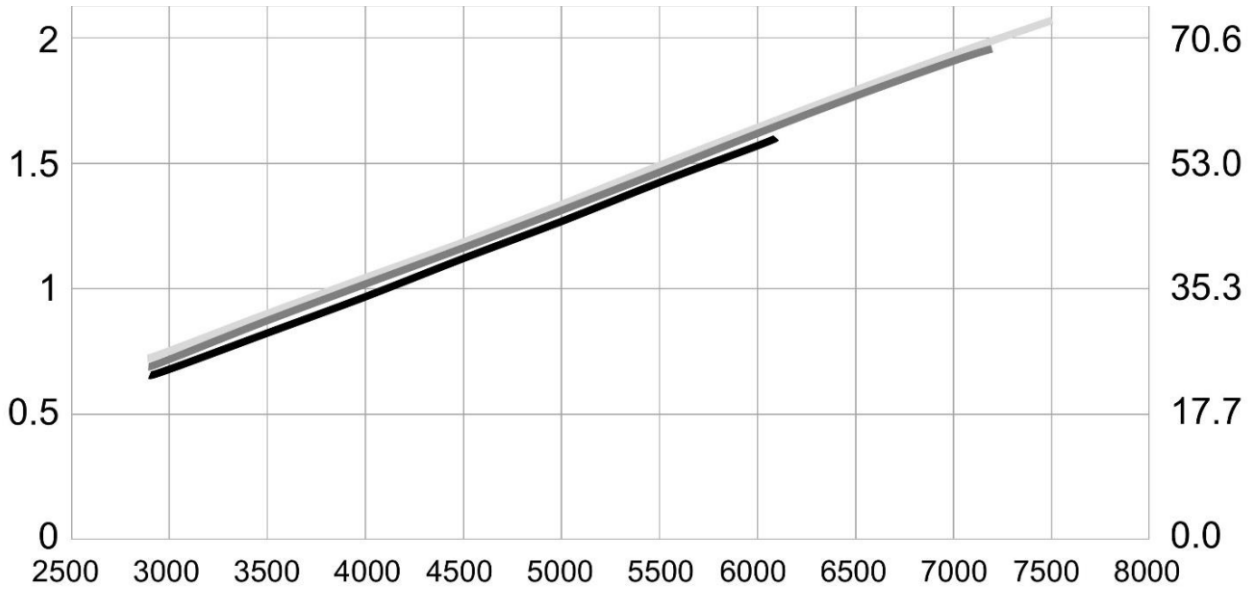


Male Rotor Speed [rpm]

7 bar g (102 psi g) | 10 bar g (145 psi g) | 13 bar g (189 psi g)

Suction Pressure: 1 bar abs (14.5 psi abs)
Suction Temperature: 20^{0}C (68^{0}F)
Relative Humidity: 60%
Air Flow rate related to suction condition according to: ISO 1217 annex B 2009

Capacity [m^3/min] **Capacity [cfm]**

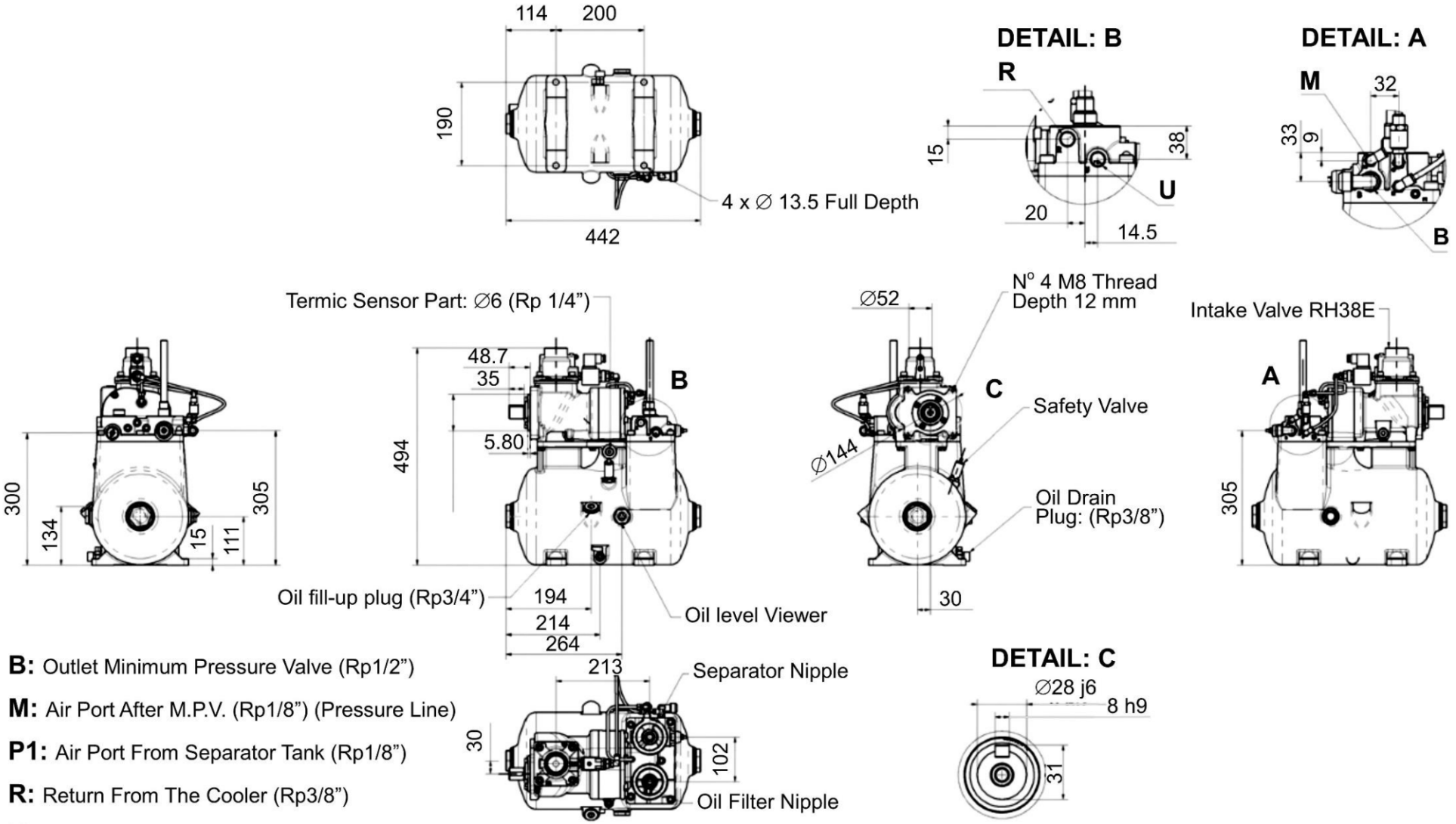


Male Rotor Speed [rpm]

7 bar g (102 psi g) | 10 bar g (145 psi g) | 13 bar g (189 psi g)

Suction Pressure: 1 bar abs (14.5 psi abs)
Suction Temperature: 20^{0}C (68^{0}F)
Relative Humidity: 60%
Air Flow rate related to suction condition according to: ISO 1217 annex B 2009

OVERALL DIMENSIONS



B: Outlet Minimum Pressure Valve (Rp1/2")

M: Air Port After M.P.V. (Rp1/8") (Pressure Line)

P1: Air Port From Separator Tank (Rp1/8")

R: Return From The Cooler (Rp3/8")

U: Outlet Thermostatic Valve (Rp3/8")

PRINCIPAL OF OPERATION

The V75 is an oil filled screw compressor.

In operation the two helical grooved rotors mesh and compress air as they rotate. Only one rotor is driven by an external force and the other rotor is driven by the first. The male rotor, driven by a hydraulic motor, in this application, meshes with the grooves of the female rotor and produce a continuous pumping chamber.

As the inlet air is drawn into the rotor chamber the air is trapped between the rotors and as the air is forced along the length of the rotor it is compressed until it reaches the discharge port in the compressor and is delivered as a smooth, flowing, pulse free compressed air supply to the downstream user.

During the compression cycle oil is injected into the compressor and serves three purposes;

1. Lubricates the rotating parts and bearings
2. Serves as a cooling agent for the compressed air and compressor
3. Seals running clearances

COMPRESSOR OUTPUT VOLUME

The output is variable depending on the rotary speed of the compressor. The faster the compressor turns the more compressed air is produced with the variation being from 0.72 to 2.13 cubic metres per minute (25 to 75 cfm) as the input varies between 2900 and 7550 RPM. The output air pressure is variable between 6 and 13 bar (87 psi and 188 psi). The power and capacity charts included in this manual will demonstrate the relationship between RPM/Volume/Pressure.

OIL SEPARATION

The oil is separated from the air prior to being delivered to the consumer port. As the air leaves the rotor chamber it is laden with oil. The air enters the separation tank below the compressor where the primary air/oil separation occurs. The air leaves the primary separator and is processed through the fine separation filter (white spin-on filter can) where the oil content is finally reduced to the amount of around 3ppm. The separated oil is reinjected into the compressor.

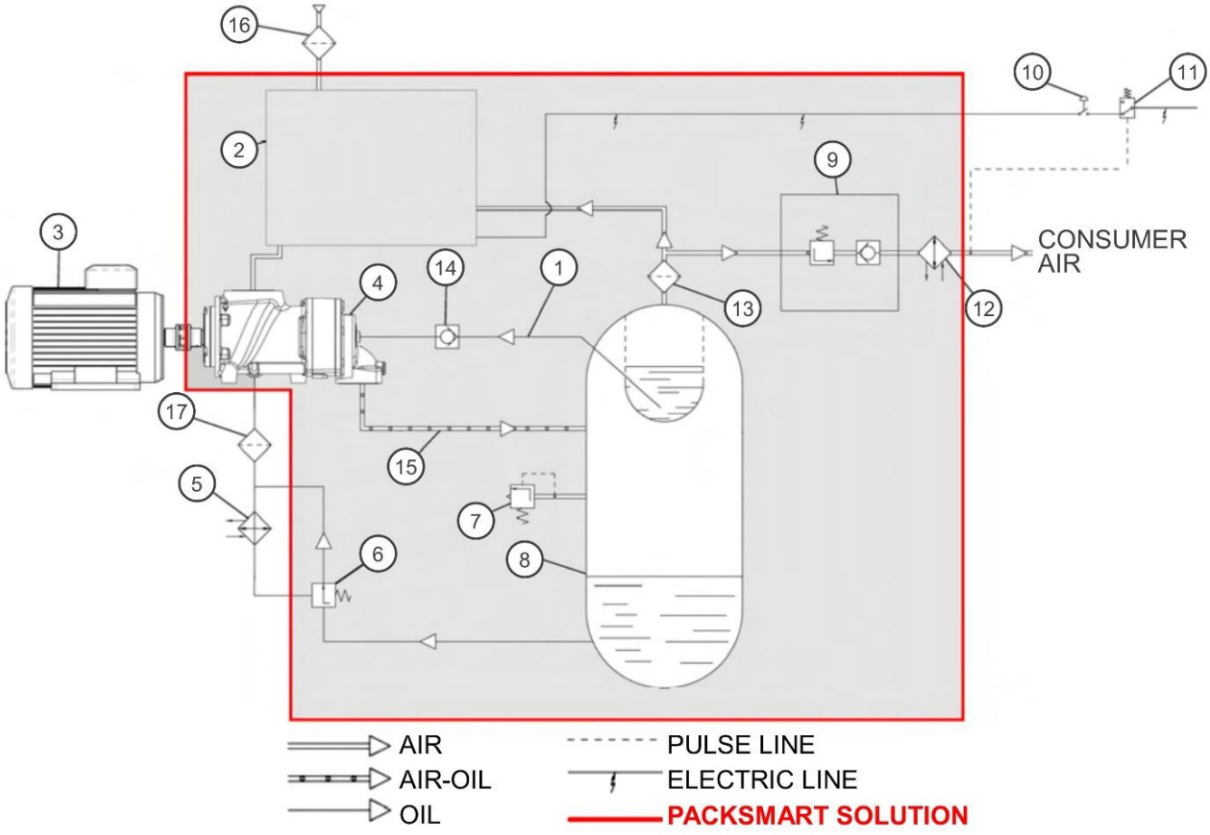
OIL COOLING

The oil that was previously separated from the air is sent through an oil filter and cooler before being returned to the compressor. The flow is controlled by a thermostat that allows oil to start flowing to the cooler when the temperature reaches 83 degrees C and continues until the full flow is reached at 95 degrees C. As the temperature starts to lower the valve starts to close and restrict oil flow.

LOAD/UNLOAD CYCLE

The compressor loads and unloads at pre-set pressures. The maximum desired system pressure is set at the external pressure switch and a differential pressure is also set at this switch, this switch senses air pressure at the consumer air outlet port. Therefore, example, a compressor set at maximum 12 bar with a set pressure differential of 2 bar would cycle on at 10 bar and cycle off at 12 bar. When the compressor is on load air is drawn in through the air intake valve. When the pressure switch senses the output air to be equal to the set pressure the air intake valve locks and no air can enter the pumping chamber – the compressor is unloaded. When the minimum pressure setting is reached the air intake valve is electrically released and air can enter the compressor chamber and the cycle starts again.

ELECTRO-PNEUMATIC CIRCUIT SCHEME



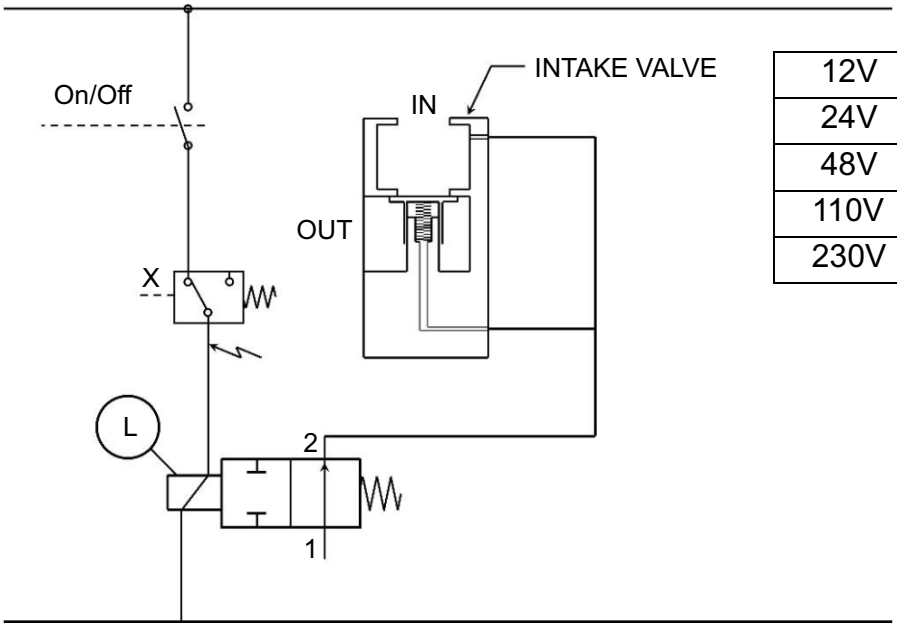
1 Oil return from separator
2 Intake valve*
3 External drive force
4 Screw airend V75
5 Oil cooler
6 Thermostatic valve
7 Safety valve
8 Air/oil separator tank
9 Minimum pressure valve
10 Switch load/no load (only for electric version)
11 Pressure switch controller (only for electric version)
12 Air cooler
13 Separator filter
14 VMC recovery oil viewer
15 Air/oil pip from air end to separator tank
16 Air filter
17 Oil filter

OPERATION OF THE AIR INTAKE VALVE

1. The air intake valve regulates the supply of intake air into the compressor. When the valve is shut, there is no air entering the compressor and the compressor is considered to be OFF load. When the valve is open, air enters the compressor to be compressed and delivered to the consumer, the compressor is considered to be ON load.
2. Note diagram below. When the solenoid valve L is not energised residual air pressure from the compressor is ported through the solenoid valve to the bottom of the mushroom valve in the Air Intake Valve assembly. This closes the valve and prevents intake air being drawn into the compressor.
3. When the solenoid valve is energised the valve spool moves to block the air from the compressor to the valve. The air pressure acting to shut the mushroom valve is bled away and the valve is free to open allowing intake air into the compressor.
4. The operation of the solenoid valve is controlled by the pressure switch X which is set to the desired working pressure. The compressor will run until the set pressure is reached then the pressure switch opens and causes the solenoid valve to de-energise until the system air pressure reaches a previously set low pressure at which time it switches on and the cycle starts again.

RH38E INTAKE VALVE CONNECTION

To connect the coil of solenoid valve in piloting circuit.



12V	10VA	DC/AC
24V	10VA	DC/AC
48V	10VA	AC
110V	10VA	AC
230V	10VA	AC

Legend:

On/Off	Electric circuit switch
X	Pressure switch input
L	NO solenoid valve
1	Pressure from de-oiler
2	Open/Close intake valve pressure

Electrical connections

Pneumatic connections

HYDRAULIC SYSTEM OPERATION

The compressor is directly driven by a bent axis 12cc hydraulic motor. The motor is capable of maximum continuous revolutions and pressure of 8000 prm and 400 bar. The motor torque is rated at 0.19 Nm/bar. The maximum compressor system power requirement is around 20kW.

The hydraulic oil supply is to be sufficient to supply between 35 and 90 L/min depending on the volume of compressed air required. The power and capacity charts included in this manual will enable calculation of oil flow to revolutions.

The hydraulic system pressure is dependent on the compressed air pressure set. The hydraulic system pressure can vary between 75 and 160 bar depending on the load, that is, the required air pressure and air volume.

The rear of the hydraulic motor is fitted with a small manifold into which is fitted a proportional flow control cartridge and a pressure relief cartridge. The flow control acts as a bypass valve until energised by an electrical signal. If the signal supplied is a fixed 24VDC (or 12VDC if optioned) then the valve will act as a normal 2 position valve and switch from fully open to fully closed. If the signal applied is a proper proportional signal the valve will proportionally control the oil flow – this function is rarely required by users. Note that when there is no electrical signal applied to the valve it is fully open and bypasses oil flow around the motor, when power is applied the valve closes and all oil flow is directed through the motor.

The pressure relief valve is the hydraulic system safety device and is pre-set to 160 bar before despatch from GFR Industries. In the event that the load of the compressor or hydraulic motor exceed normal operational loads the system pressure will climb to the relief valve pre-set point which will cause the valve to open and bypass the oil flow to tank.

It is strongly recommended that the hydraulic system is fitted with adequate filtration and cooling to ensure the maximum life from the hydraulic components.

The minimum hose diameter for an input flow of 90 L/min is ¾” or 19mm. The return line hose should be a minimum of 1” internal diameter. A drain line must be fitted to the upper motor drain port – this is MANDATORY.

ELECTRICAL INSTALLATION

Install the compressor control box in accordance with the supplied electrical schematic.

Note that the installer is to supply and fit the fuses for the control and fan circuits.

Electrical circuit will be supplied on request with the purchase of Comp24 (Comp12 compressor control box)

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OPERATORS INSTRUCTIONS

The operator must be fully trained in the operation of this compressor, the tools powered by this compressor as well as all general and site specific safety precautions applicable to operations this compressor.

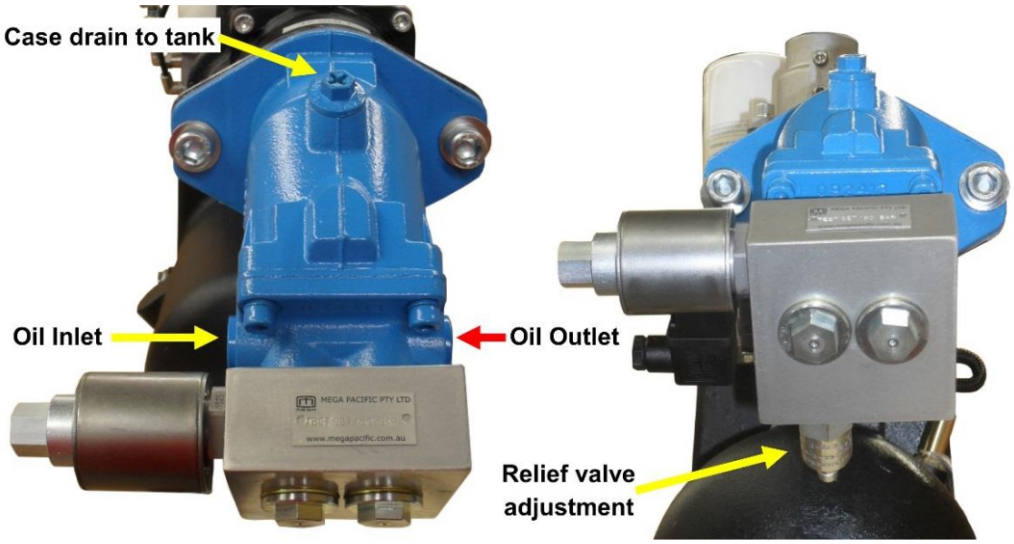
1. Confirm that all attached tools are isolated or disconnected prior to start up.
2. Engage the PTO and, if required, select the compressor hydraulic circuit.
3. Press and release the compressor ‘ON’ push button at the compressor control box. The green running light in the button will illuminate.
4. The compressor is now operating and producing compressed air at the pre-set air pressure. To stop the compressor press the ‘OFF’ button at the compressor control box. There will be a 5 second delay after pressing the ‘OFF’ button before the hydraulic motor unloads.
5. Shut down the hydraulic supply and disengage the PTO.
6. Bleed any residual compressed air from the system to render the attached tools safe.

Note, it is important that the compressor is always switched on and off at the control box. Do not shut down the hydraulic system prior to switching off the compressor.

Factory settings

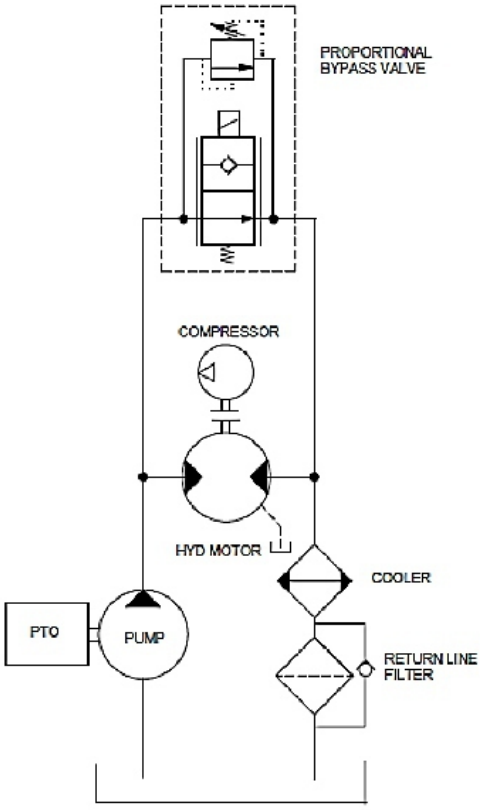
1. Output air pressure – 8 bar
2. Output air differential – 1.5 bar
3. Hydraulic system pressure relief valve – 160 bar
4. Shutdown time delay – approximately 5 seconds

HYDRAULIC MOTOR/VALVE CONNECTIONS



WARNING

Flow direction is critical. Ensure the hydraulic supply hose is connected to the correct port of hydraulic motor as shown.



GFR Industries			
Title: HYDRAULIC CIRCUIT			
Size: A4	Date: 14/6/13	Drawings: C/	Rev: 0.0
Scale: NTS		Drawn by	Sheet: 1

INITIAL SYSTEM START UP

HYDRAULIC SYSTEM

1. Confirm the hose installation is configured correctly to ensure correct direction of rotation of the compressor. Damage will occur if the compressor is rotated in the reverse direction. If you are unsure, remove the hydraulic motor and observe the shaft direction.
2. Ensure motor case is full of hydraulic oil prior to initial start up.
3. At initial start-up of the hydraulics the system should be run in bypass mode – no electrical signal applied to the valve coil.
4. When running confirm the system is leak free.
5. Ensure that any controls fitted to operate the hydraulic system operate correctly and the PTO controls are fully functional.

COMPRESSOR SYSTEM

1. Visually inspect all air hose and lube oil hose connections. Ensure the system is ready to start.
2. Confirm the lube oil level is correct in the separator oil sight gauge. Initial full is approximately 6 litres of Valvoline ETC 46 oil.
3. Open the air outlet valve (if fitted) prior to initial start.
4. Manually depress the air intake valve poppet and pour approximately 0.5 Litres of Valvoline ETC 46 oil into the pumping chamber – ensure the oil brand is correct and that the oil is clean.
5. Close the hydraulic system bypass valve and observe the compressor running. Slowly close the air outlet valve and observe the compressor developing air pressure and cycling on and off.
6. After approximately five minutes of operation shut the system down and inspect for leaks.
7. Confirm lube oil level and top up if necessary.
8. Continue testing by running in short periods until you are satisfied that the compressor system temperature has reached approximately 83 degrees and that oil is being diverted through the oil cooler.
9. Continually monitor the oil level in the compressor through the sight glass. Top up as required.
10. When satisfied that the system is running correctly attach a tool to the air output supply and confirm system operation while completing a real operational task.
11. On completion confirm that the system is leak free, all controls function correctly and that fluid levels are correct in the hydraulic system air system.
12. Record air and hydraulic oil pressures experienced during the initial start- up.

UNPACKING

Unpack your Packsmart carefully: check the integrity of its elements, such as the:

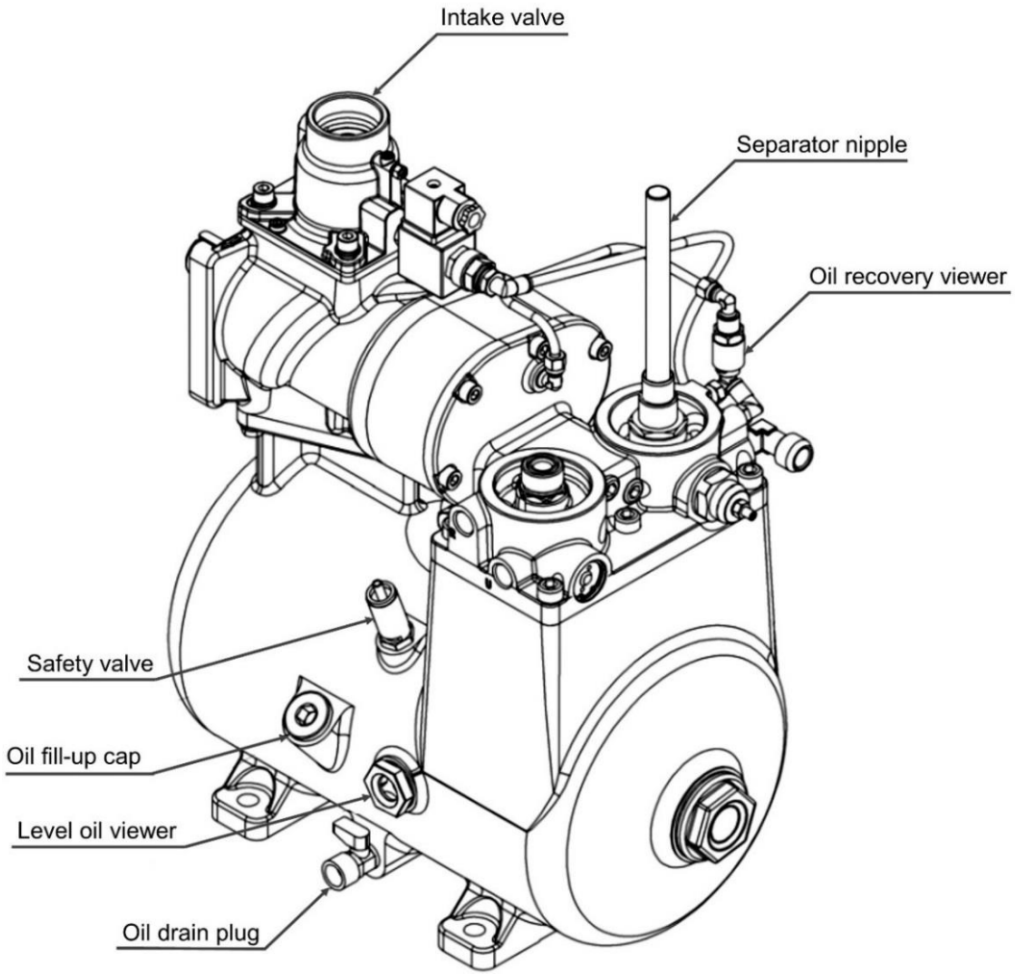
fixing feet
air-end shaft
safety valve
intake valve
oil drain plug
oil recovery viewer
separator nipple

Moreover, check that the packaging contents correspond to the list of components indicated in Picture 1. Dispose of the packaging complying with the current waste disposal regulations

WARNING

Tank contains oil!
Picture 1 shows the correct position of a separator group if you want to avoid oil leakages.

Picture 1



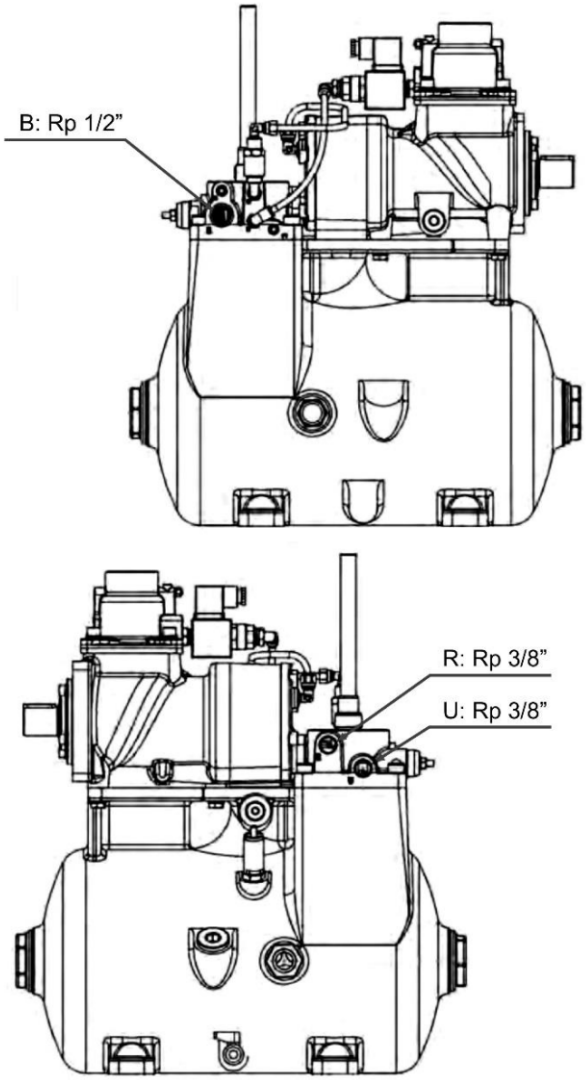
PACKSMART INSTALLATION

When you install a Packsmart, please check that the intake valve is not clogged by unknown particles. Inspect all the Packsmart cables: they have to be linked as Picture 2 shows, so as to avoid air/oil outflows into the environment.

WARNING

A correct heat flow must be guaranteed with a proper radiator setting. You should reduce to the minimum the cooler inside volume in order to avoid damaging oil flows in the tank.

Picture 2



R = Oil return f (cold oil)

U = Oil inlet to the cooler (hot oil)

B = Consumer air

Whenever necessary, clean and lubricate the tip of the air-end shaft. Do not include the separator in this operation, otherwise you may damage it.

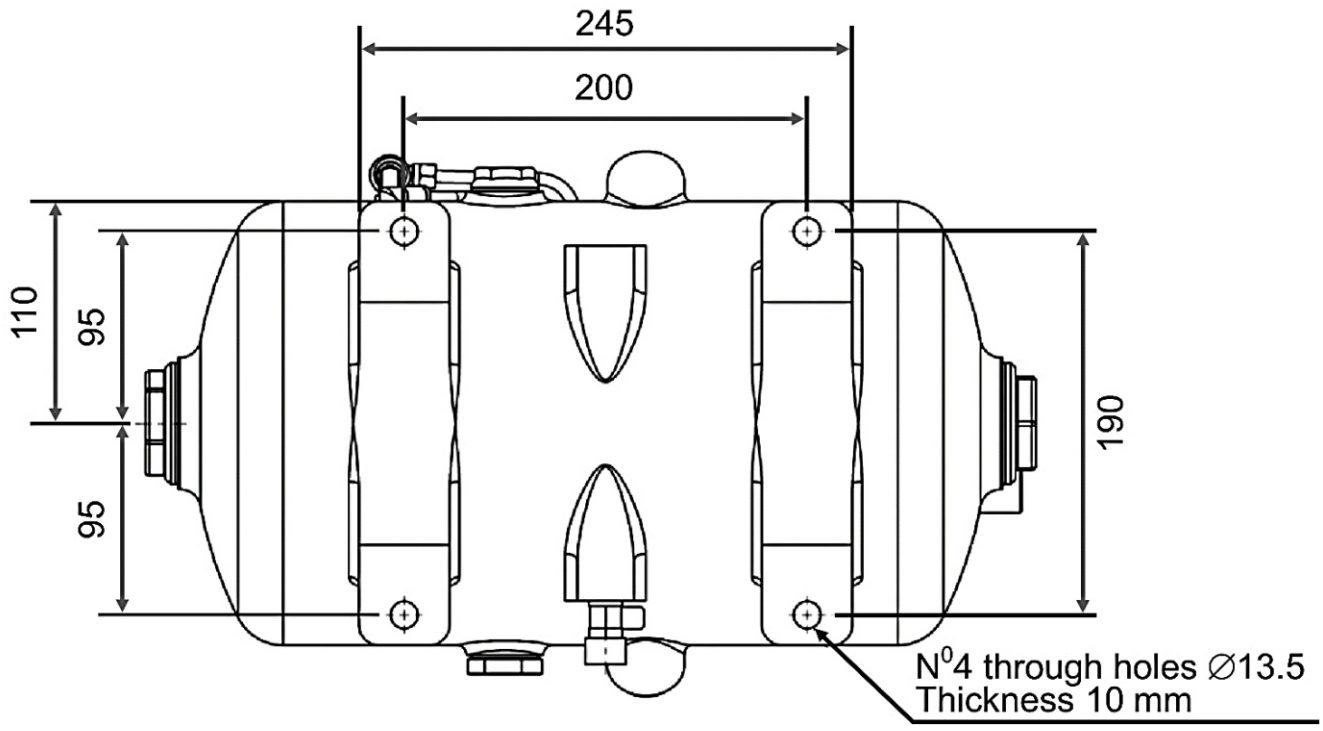
Make sure that the compressor is accurately fixed to the machine base through the use of special fixing holes, as Picture 3 shows.

In case the integrated system has to be varnished, please avoid any contact with solvents or varnishes, protecting nameplate, gaskets, intake holes, external threads and all seal surfaces.

WARNING

Use fittings with a cylinder GAS threading. The use of fittings with a taper GAS threading may damage the Packsmart

Picture 3



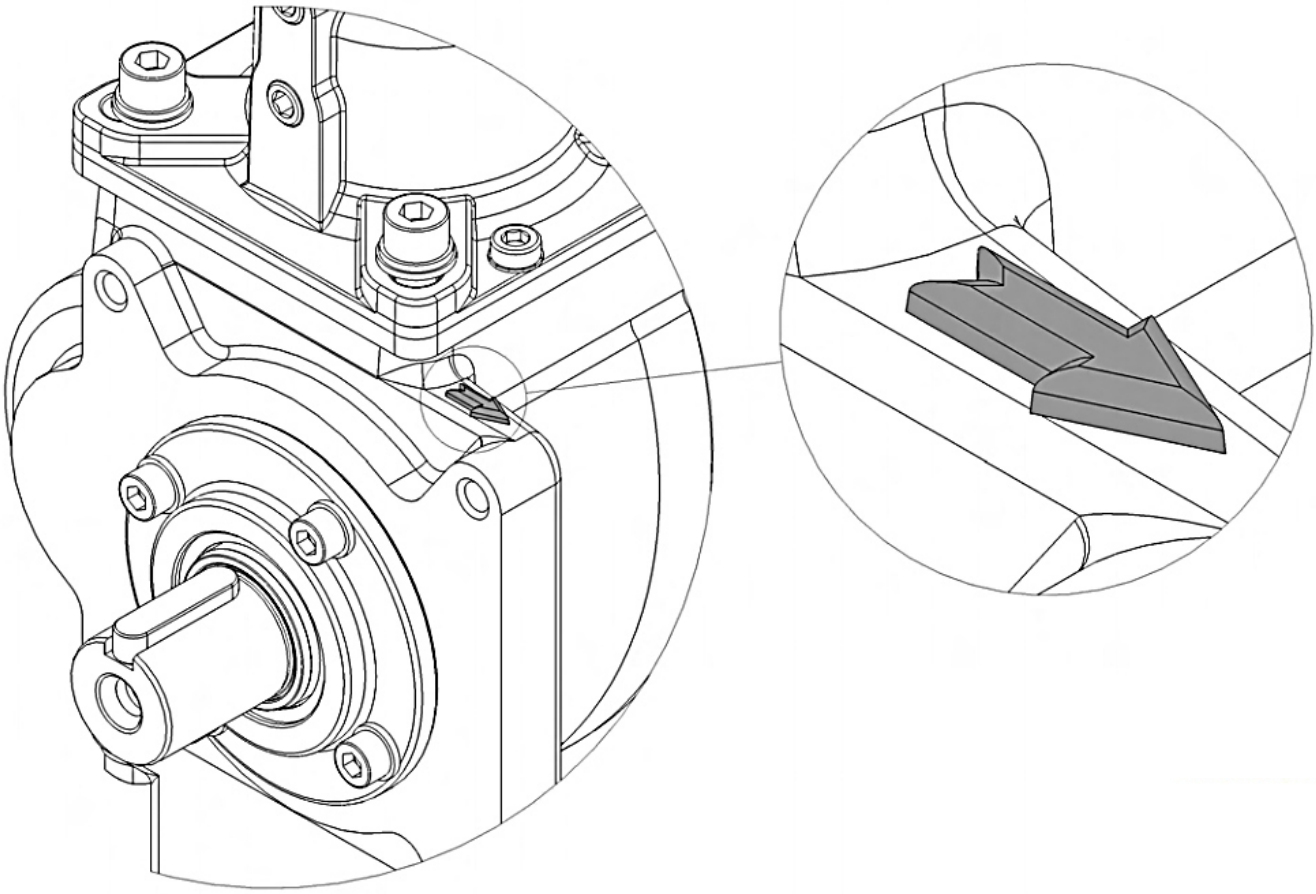
PACKSMART MOTOR CONNECTION

After connecting the hydraulic motor to the air-end, please check that the direction of its rotation corresponds to the one indicated by the arrow on the body of the air-end (see Picture 4)

WARNING

The rotation of the shaft the other way round from the one indicated can damage the air-end!

Picture 4



PACKSMART USE WITH SYNTHETIC OIL

If you want to use synthetic lubricating oils, follow the procedure mentioned here below:

Before switching on the Packsmart and making it work, inject about 0.5 litres of lubricating oil into the intake valve air inlet and press down the throttle while rotating manually in the right direction. Pay attention not to damage the throttle seal O-ring.

Extract the mineral oil contained in the Packsmart through the drain plug (Picture 5 shows the plug position).

Fill the tank with synthetic lubricant up to the level indicated by the viewer (Picture 5).

Start the compressor for about 5 minutes. In this way, the lubricant will begin to flow through the circuit (pipes, radiator, filters etc).

Switch off the compressor and discharge all synthetic oil into the circuit through the plug (Picture 5).

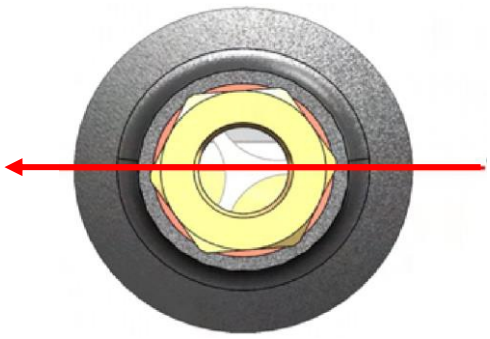
Fill again the tank with new synthetic oil up to the level indicated by the viewer (Picture 5).

Start the compressor for about 5 minutes. In this way, the lubricant will begin to flow through the circuit (pipes, radiator, filters etc).

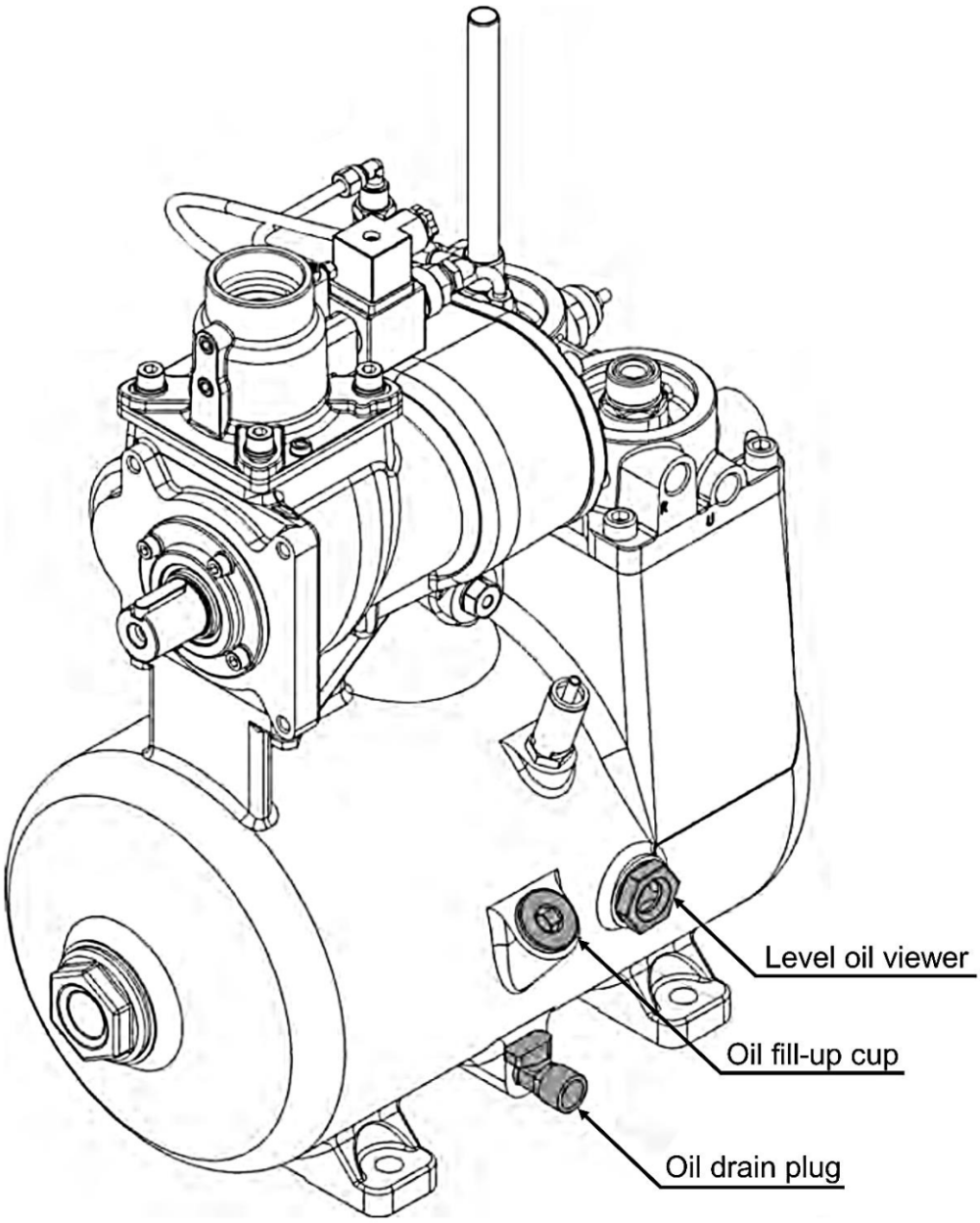
Switch off the compressor. Discharge the pressure and top up the lubricant through the proper fill-up hole, up to the level indicated by the viewer (Picture 5).

WARNING

If you do not carry out a ‘washing cycle’ as described above, lubricating problems may arise due to a lubricant mix incompatibility. Handle the lubricant with proper protection. Dispose of the mineral oil complying with current waste disposal regulations.



Picture 5



TIPS FOR STARTING PHASE

After carrying out the topping-up operations for the Packsmart, start the machine and switch it off after 2 seconds at the least so as to load some air.

The machine will not load air, if the air-end shaft does not turn in the right direction as indicated by the arrow on the case.

If the direction of shaft rotation is not correct, you have to act on it through the hydraulic hose connections.

Start the machine again if you want to check the right direction of rotation.

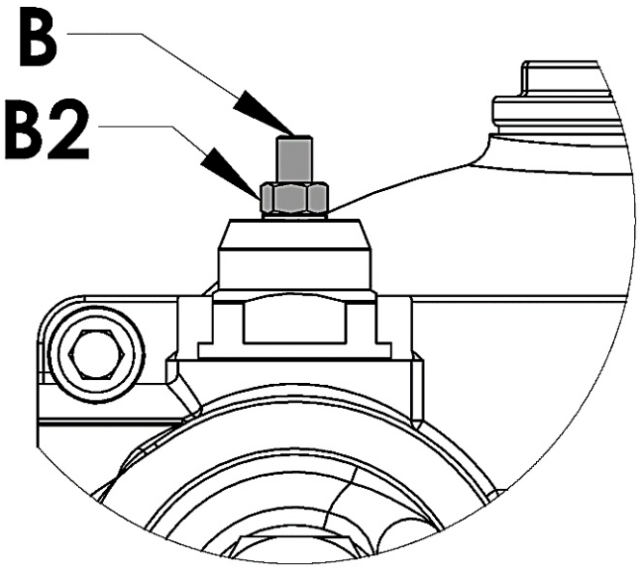
INSTRUCTIONS TO FOR A MINIMUM PRESSURE VALVE CALIBRATION

If you want to increase the calibration of a minimum pressure valve:

Unscrew the stop nut (B2) and screw the pressure control screw slowly (B). When you reach the desired pressure, screw the stop nut (B2) so that the result is fixed.

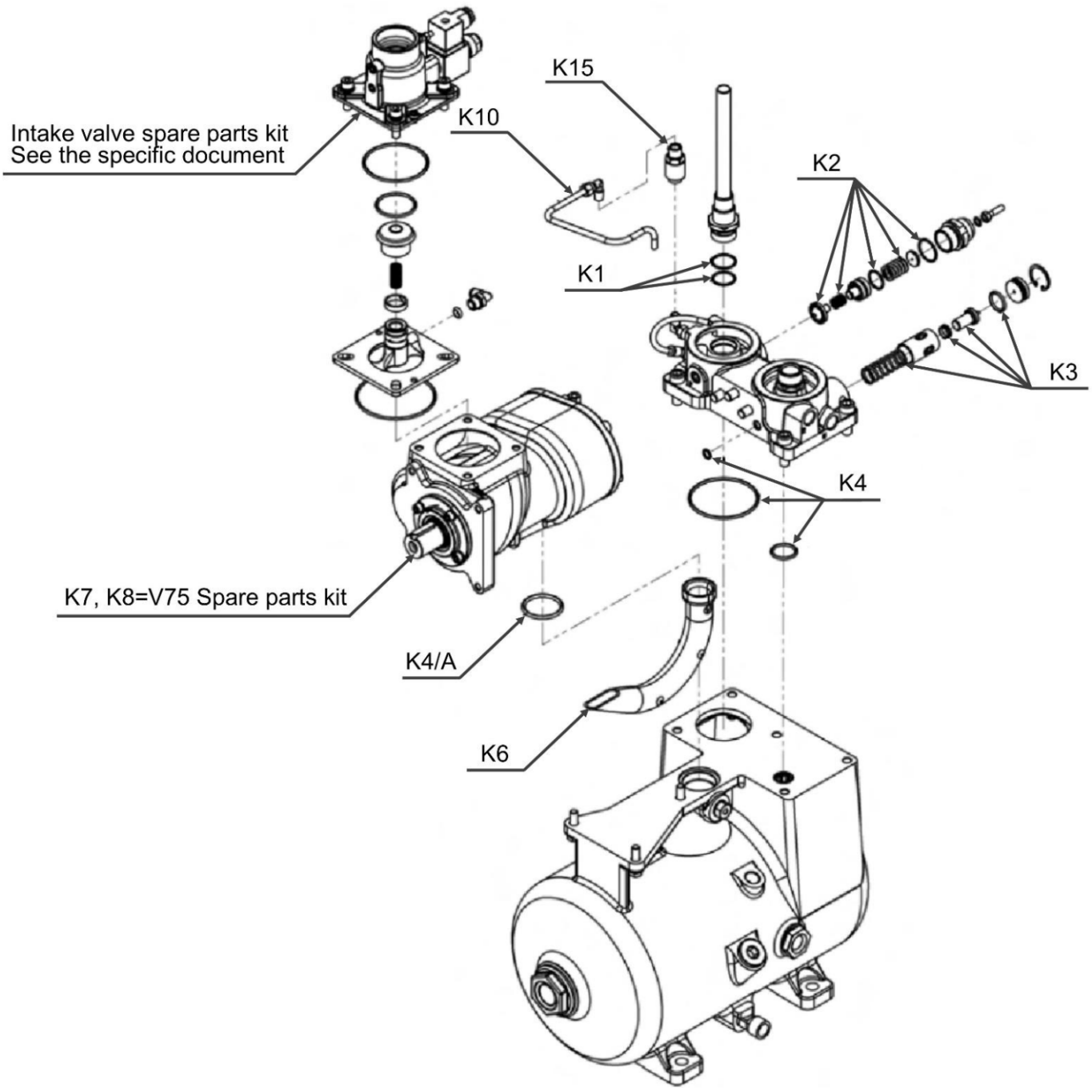
If you want to decrease the calibration of a minimum pressure valve:

Unscrew the stop nut (B2) and unscrew the pressure control screw slowly (B). When you reach the desired pressure, screw the stop nut (B2) so that the result is fixed.



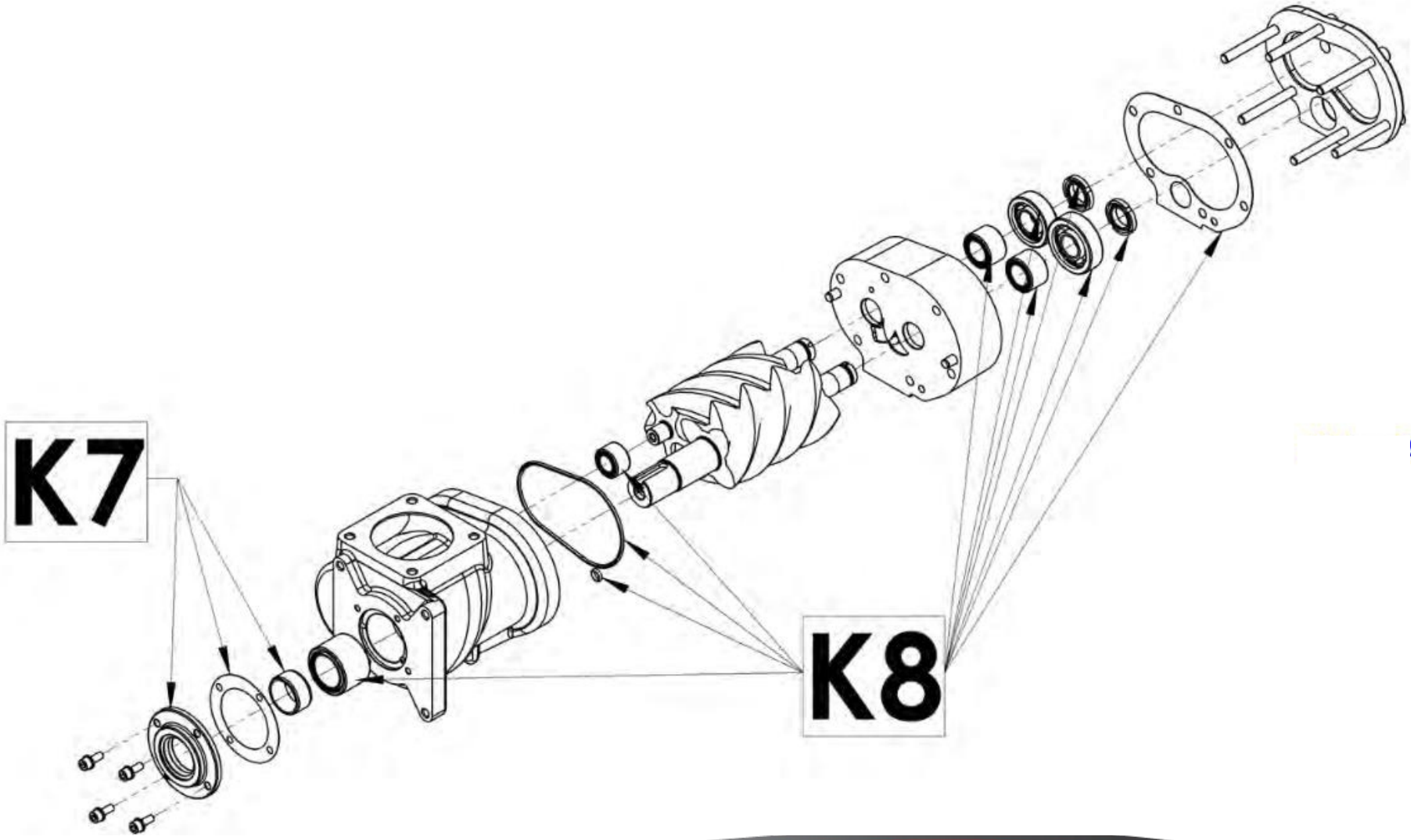
SERVICING

For a correct maintenance of a Packsmart, the spare parts kits shown here below in the Pictures are recommended.



WARNING

Extraordinary maintenance kits and their part numbers with all the instructions needed to carry out an appropriate maintenance are included in the technical specifications of the air-end requested and are available on demand.



SCHEDULED MAINTENANCE

The table shows a schedule for the maintenance of a Packsmart.

The table indicates working hours for a standard machine. These working hours can be modified depending on work environment and cycle numbers.

VMC PART NUMBER		DESCRIPTION	Packsmart V76 55^0	Packsmart V76 71^0	Packsmart V76 83^0	WORKING HOURS
K1	270.0590	M22-M24 separator nipples spare parts kit				Corrective maintenance
K2	220.0010	V.M.P. G10 (1/2 -3/4) spare parts kit				After 8000 hours
K3	700.0020	Thermostatic valve spare parts kit 550				After 8000 hours
	700.0021	Thermostatic valve spare parts kit 710				After 8000 hours
	700.0022	Thermostatic valve spare parts kit 830				After 8000 hours
K4	721.0070	Packsmart base flange O-ring spare parts kit				Corrective maintenance
K4a	00121	Viton O-ring 3125				Corrective maintenance
K6	600011	Outlet pipe V75 spare parts kit				Corrective maintenance
K7	900.5249	V75 air-end oil splashguard spare parts kit				After 10000 hours
K8	900.5248	V75 air-end bearings spare parts kit				After 20000 hours
K10	721.5090	Oil recovery fitting spare parts kit				Corrective maintenance
K15	220.1800	Oil recovery viewer VR019				Corrective maintenance

Maintenance kits of an intake valve and their part numbers are included in its technical specification available on demand.

GFR Industries PART NUMBERS		DESCRIPTION
1.	MA12CK1POU200SVF	Hydraulic motor
2.	LB962/2	Coalescing filter
3.	Q719/5	Oil Filter
4.	69024	Hydraulic valve block complete
5	C11100	Intake filter element

TROUBLE SHOOTING LIST

SYMPTOMS	PROBABLE CAUSE	CORRECTIVE ACTION
The compressor does not load	1. The intake valve remains closed.	1. Check the valve. If necessary, replace the damaged parts with the spare parts kit.
	2. The solenoid valve does not work accurately.	2. Check the solenoid valve. If necessary, replace it.
	3. Losses on the pressure line.	3. Check pipes and cables. If necessary, replace them.
During idling phase, the compressor does not discharge pressure from separator tank	1. The solenoid valve does not work accurately.	1. Check the solenoid valve. If necessary, replace it.
	2. The calibrated nozzle is clogged.	2. Remove the calibrated nozzle. Clean or replace it.
Compressor capacity or pressure lower than usual standard	1. The air filter is clogged.	1. Remove the air filter. Clean or replace it.
	2. The intake valve does not open.	2. Check the valve. If necessary, replace the damaged parts with the spare parts kit.
	3. Air loss from safety valve.	3. Replace the valve.
Compressor keeps on loading over working pressure: safety valve opens	1. The solenoid valve does not work accurately.	1. Check the solenoid valve. If necessary, replace it.
	2. Clogged separator filter.	2. Replace the separator filter.
Compressor overheating	1. Insufficient cooling.	1. Check the cooling system. Check coolant level on tank.
	2. Dirty oil.	2. Replace it with new oil.
	3. Oil level is too low.	3. Check coolant level on tank and if necessary, add oil.
	4. Clogged-up cooler or pipe connection.	4. Clean cooler and pipes.
	5. The thermostatic valve does not work correctly.	5. Check the thermostatic valve. If necessary, replace the damaged parts with K3 spare parts kit.
	6. Clogged oil filter.	6. Replace the oil filter.

SYMPTOMS	PROBABLE CAUSE	CORRECTIVE ACTION
During unloading phase, pressure increases up to safety valve opening	1. The intake valve remains open.	1. Check the valve. If necessary, replace the damaged parts with the spare parts kit.
	2. The calibrated nozzle is closed.	2. Remove the calibrated nozzle. Clean or replace it.
Oil leakage from intake valve only when the machine is switched off: oil soaked-up air filter	1. The intake valve does not work properly (does not close).	1. Check the valve. If necessary, replace the damaged parts with the spare parts kit.
	2. The on-return valve of intake valve does not work correctly.	2. Check it and clean it.
Oil soaked-up air filter during unloading phase	1. Too high level of oil in the tank.	1. Check oil level on separator tank.
	2. Clogged separator filter.	2. Replace the separator filter.
	3. The recovery oil viewer is dirty or does not work appropriately.	3. Clean it or if necessary, replace the damaged parts with the K15 spare parts kit. If separator filter is clogged up, replace it.
The compressor remains under loading phase	1. The intake valve does not work properly (does not close).	1. Check valve. If necessary, replace the damaged parts with the spare parts kit.
Rotor seizure	1. Unknown particles inside.	1. Call GFR Industries technical support
	2. Insufficient lubrication.	2. Call GFR Industries technical support.

WARNING

1. Before starting any operations, read this document carefully. The disregard of the information herein contained can damage and injure people and things.
2. Use cylinder thread connections, unless otherwise indicated. If you do not, malfunctioning of the product can be caused.
3. Installation and maintenance must be carried out only by qualified staff. Always comply with current safety and accident prevention regulation.
4. Use suitable protective clothes during installation and maintenance (for example: overalls, gloves, protective glasses, ear plugs and caps, etc).
5. All installation and maintenance operations must be carried out both when the machine is switched-off (environment pressure) and when the electrical circuit is off.
6. Transmission parts like couplings and pulleys must be safe. Check air/oil pipe seals. Do not touch the mobile elements of the product when the machine is on.
7. Equipment and/or other systems used for motion, installation and maintenance will have to be adequately gauged in terms of weight and geometry. Protruding parts must be sheltered when the machine is on.
8. The manufacturer is not liable for damages to people and/or objects that may be caused by product misuse, non-compliance or partial compliance with safety standards mentioned in this document, changes even small ones, as well as tampering and use of non-original spare parts.
9. The warranty period, unless otherwise stated in written form, is 12 (twelve) months from the date of dispatch from the GFR Industries warehouse. Consumables and wear-and-tear materials are not eligible for warranty. The warranty is not valid if GFR Industries parts and equipment have been:

   Tampered or modified by people who have not been directly au thorized in written form by GFR Industries .

   Damaged by bad use or carelessness in setting-up and/or management by the Customer.

   Returns with non-original and/or unsuitable packaging that does not guarantee their initial conditions.
10. At the end of its lifetime, a product will have to be disposed of, complying with current law rules regarding industrial waste disposal.