SERVICE MANUAL USE

Screw Compressor

Model: M 57

GL–Nr.: 1_9982_00010–00 08

Serial No.: .....

KAESER COMPRESSORS

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1 Technical Specification

1.1 Compressor Unit

Model	M 57	
Maximum gauge working pressure	100	psig
Free air delivery at max. gauge working pressure	210	cfm
Temperature at the air end discharge port (at 50°F ambient)	194	°F
Temperature at the air end discharge port (at 77°F ambient)	140	°F
Total weight	2508	lbs
Maximum gross weight (axle load)	2866	lbs
Tongue weight	165	lbs
Tires	205/75D14	
Recommended tire pressure	50	psi
Wheel bolts	Wheel Stud 1/2” x 2” Fine	
Torque see chapter 1.8.		
Air outlet valves	2x G 3/4	

Drawings:

Dimensional diagram	T 10418.00
P & I flow diagram (Pipework and instrument flow diagram)	FFMM57ST–00445.02
Compressed air option	FFMM57DLAO–00516.00
Electrical diagram	SFA57.KU–01057.02
Lighting and signalling system connection diagram	SFAUSA.BEL–00909.00
Fuel circulation schematic diagram	KFMM57K–00034.00

1.2 Compressor

Single stage screw compressor with oil injection		Sigma 270
Total volume of oil in circulation	3.96	gal
Oil carryover in the air at the discharge port	approx. ca. 5	ppm

1.3 Motor

Make/Model	Kubota V2403M–iDi	
Rated power	47.2	HP
Speed under full–load running	2400	rpm
Speed under idle running	1800	rpm
Fuel consumption under full–load running	2.67	gal/h
Oil consumption	ca. 1.0% of the consumed fuel volume	
Diesel fuel tank capacity	27.74	gal
Quantity of coolant in the motor cooling system	2.5	gal

1.4 Battery

Voltage . . . . . 12 V

Capacity . . . . . 80 Ah

Cold test current . . . . . 380 A

1.5 Setting Value of the Safety Relief Valve(s)

Blow–off pressure . . . . . 130 psig

1.6 Installation Requirements

Max. altitude above sea level of the place of use . . . . . 3000 ft.

Min. ambient temperature* . . . . . 14 ˚F

Max. ambient temperature . . . . . 122 ˚F

*When operating the compressor at temperatures generally below 32 ˚F, observe the points detailed in chapter 8.5!

1.7 Recommended Oils

Assembly	Contents	For ambient temperatures from	Product / Make
Motor	2.38 gal	68˚F to 122˚F 32˚F to 68˚F –4˚F to 122˚F 5˚F to 32˚F –4˚F to 86˚F	SAE 40 SAE 20 W Synthetic SAE 10W/40 SAE 10 W Synthetic SAE 5W/30
Compressor	3.96 gal	5˚F to 32˚F 32˚F to 122˚F	KAESER SIGMA S–320 Compressor Oil KAESER SIGMA S–460 Compressor Oil
Preserving oil for long term compressor shutdown			Shell ENSIS Motor oil 30
Chassis			lithium enriched multi–purpose grease non–corroding oil

Note regarding motor oil:

The above oils are recommended in addition to the oils recommended in the motor service manual.

The motor is filled with SAE 10W/40 synthetic oil at the factory before delivery.

Check the motor oil level and the oil separator oil level daily.

Recommended cooling oil:

Ordering: see 'Service parts and expendable parts' chapter 10.1.

A sticker showing the type of oil filled is to be found near the oil separator filling port.

	SIGMA S–460 / FLUID PLUS
Description	Synthetic oil
Application:	Standard oil for all applications except in connection with foodstuff.
Authorization	—
Viscosity at 104 ˚F	0.23 ft/s^2 (DIN 51562–1) / 0.15 ft/s^2 (D 445; ASTM test)
Viscosity at 212 ˚F	0.035 ft/s^2 (DIN 51562–1) / 0.024 ft/s^2 (D 445; ASTM test)
Flash point	500 ˚F (ISO 2592) / 460.4 ˚F (D 92; ASTM test)
Density at 59 ˚F	52.63 / 53.94 lb/ft^3 (ISO 12185)
Pour point	–38.2 ˚F (ISO 3016) / –50.8 ˚F (D 97; ASTM test)
Demulsibility at 129.2 ˚F	30 min (ISO 6614) / 40/40/0/10 min (D1401; ASTM–Test)
Ambient temperature	-4 – 122 ˚F

This oil is also recommended for unsuitable operating conditions such as minor gaseous contamination of the inlet air and for high ambient temperatures.

Topping off the oil:

Always use the same manufacture and type of oil (see label on the oil separator tank).

Oil change and changing type of oil:

The compressor unit must be completely drained of all oil before an oil change or changing the type of oil. Remove all scale and deposits by hand. For hard to reach areas, an appropriate compressor flush is recommended. It is possible that the oil separator cartridge will need to be changed soon after changing the oil. This is due to the new oil's ability to clean up existing oil deposits.

A Material Safety Data Sheet covering this cooling oil can be requested from KAESER.

1.8 Torque

Tightening torque for wheel fixing:

USA	**Wheel Stud Size**	**Thread**	**Socket size**	**Torque [lbs ft]**
Wheel bolts	1/2” x 2”	1/2” fine thread	13/16”	75

Europe	**Thread**	**Socket size**	**Torque [lbf ft]**
Wheel bolts	M12 x 1,5	SW 17	75
Wheel bolts	M14 x 1,5	SW 19	111
Wheel nuts	M16 x 1,5	SW 22	178
Wheel nuts	M18 x 1,5	SW 24	221

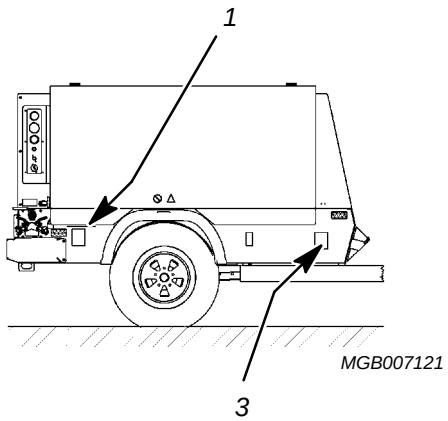
Standard values for hexagon bolts with a strenght factor of 8.8:

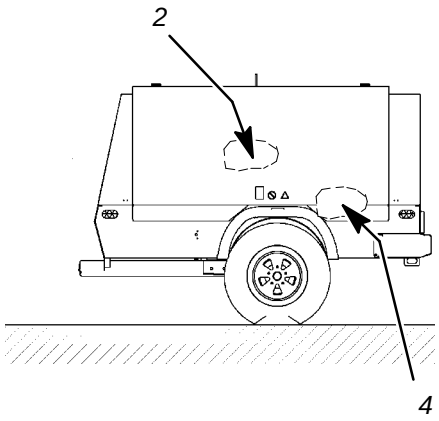
Thread size	M6	M8	M10	M12	M14	M16	M18
Torque value (lbf ft)	7	17	34	59	92	151	177

1.9 Sound Pressure Level

Noise level to US EPA at 23 ft distance . . . . . 76 dB (A)

1.10 Identification



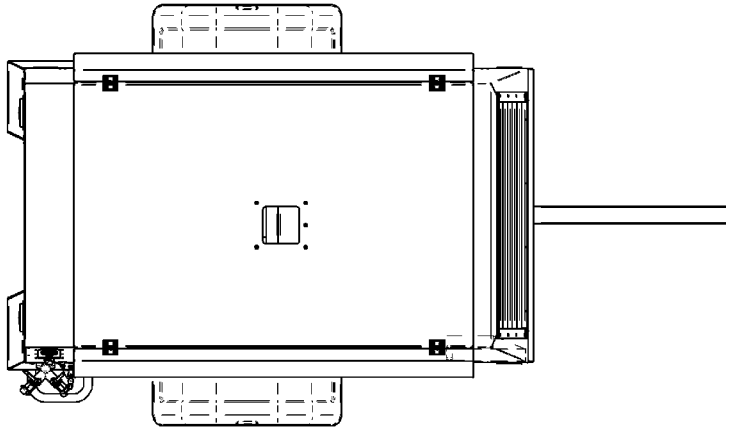


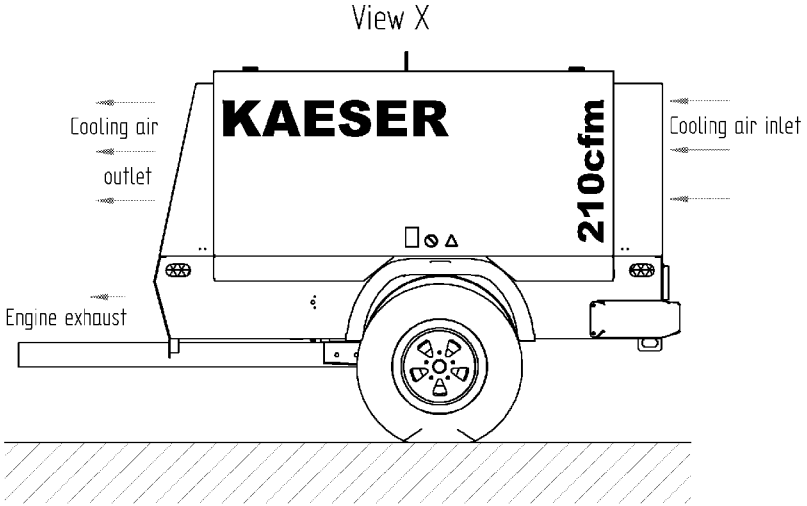
1 Vehicle ID number ⁎)
(stamped in bodywork)
3 Unit number
(see nameplate)
⁎) vehicle–identification

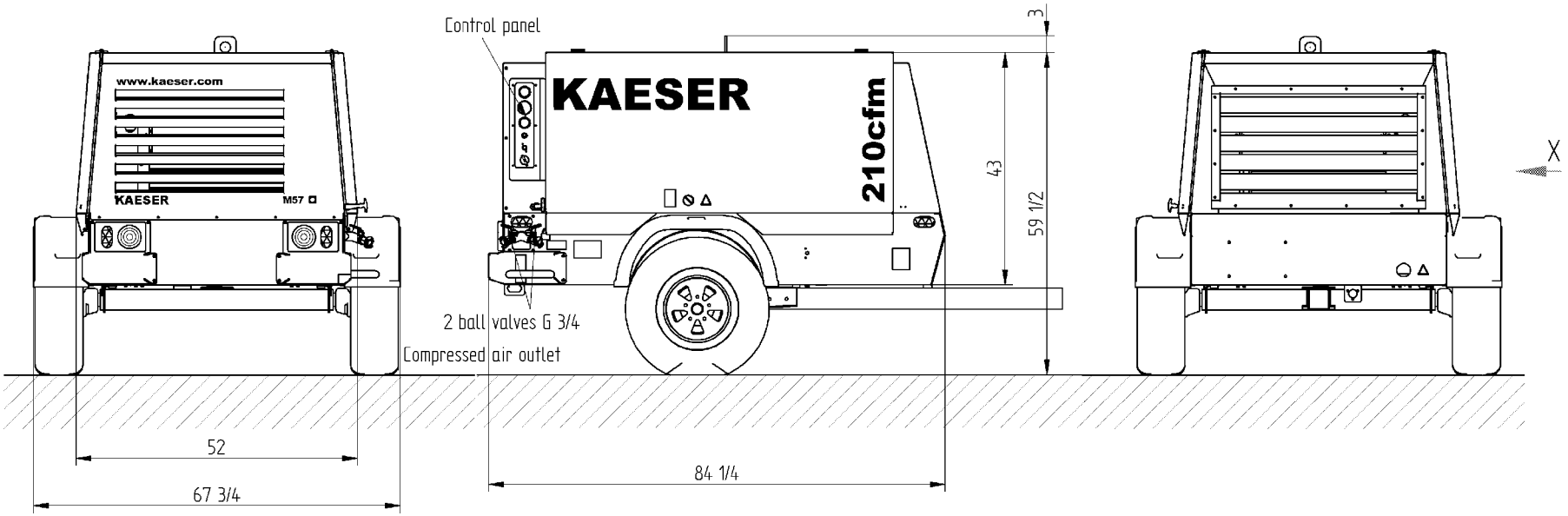
2 Engine number
(see nameplate on the engine block)
4 Compressor number
(see nameplate on the air end)

1.11 Dimensional Diagram

(see following page)







2004	Tag	Name
Gez.	30.09.	Sonnenberg
Gepr.		
Freigeg.		Sonnenberg
Maßstab		

Portable compressor
M 57 USA

Ersatz für T 10418 vom 06.05.2004

KAESER KOMPRESSOREN

T 10418 USE

10036807_02

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2 Safety Regulations

Disregarding this notice can result in serious injury

Read this service manual and the engine service manual carefully and observe cautionary references before putting this mobile compressor unit into operation and before carrying out any maintenance on the unit.

Before starting work the compressor operating personnel must have read and understand the Service Manual, particularly the instructions dealing with safety.
This applies only to persons continually working with the machine.
Faults that affect safety must be rectified immediately.

2.1 Explanation of Symbols and References

This symbol is placed before all references to safety where danger to life and limb can occur during work . It is especially important that these rules are observed and that extreme care is taken in these cases. For their own protection, inform all other users of these safety rules. Observe all general safety and accident prevention regulations as well as the safety rules laid down in this service manual.

Attention! **This symbol identifies recommendations, regulations, references and correct sequence of work to prevent damage and/or destruction of the compressor unit and/or other equipment.**

This symbol identifies environmental care measures.

☞ **This symbol indicates operations and actions to be carried out by the operator or service technician.**

- **This bullet identifies listings.**

Explanation of prohibiting and warning notices on the compressor unit:

Prohibiting:
Do not operate the portable compressor unit with the canopy or panels open.

Beware of rotating parts. Do not touch rotating parts as this can cause pinching/injury.

Warning:
Hot or damaging gases exhaust into the normal area of work.

Beware of hot surface. Do not touch surface; danger of burning.

Optional:


WARNING
DEATH OR SERIOUS INJURY CAN OCCUR FROM INHALING COMPRESSED AIR WITHOUT USING PROPER SAFETY EQUIPMENT.
SEE OSHA STANDARDS ON SAFETY EQUIPMENT.


WARNING
CONNECT AIR HOSES ONLY IN FULL COMPLIANCE WITH OSHA STANDARD 29 CFR 1926,302 (bX7).
THE REQUIRED SAFETY DEVICES SHOULD BE TESTED IN ACCORDANCE WITH THEIR MANUFACTURER'S RECOMMENDATIONS TO VERIFY THAT THEY REDUCE PRESSURE IN CASE OF HOSE FAILURE AND WILL NOT NUISANCE TRIP WITH THE HOSE AND TOOL COMBINATIONS IN USE.


WARNING
Do not operate without fan guard in place.


WARNING
Keep clear of unguarded moving parts.

2.2 General Safety Precautions

Work on power–driven equipment may only be carried out or supervised by persons trained in that particular equipment or by a specialist.

Work on the electrical equipment of the compressor unit may only be carried out by a qualified electrician or trained personnel under the supervision of a qualified electrician according to the NEC and any applicable local codes.

☞ Unauthorised persons should be kept away from the compressor.

☞ Check that operating personnel are familiar with the instructions in the Service Manual concerning safety and hazardous work.

The following actions must be carried out in the order given before working on any pressurised parts or enclosures (e.g. pipes, vessels, valves).

1. Shut off and depressurize all pressurized components and enclosures

2. Secure them in the depressurized state

3. Check that they are indeed de–pressurized

No welding, heat–treatment or mechanical modifications may be carried out on pressurised components such as. pipework, air receivers, etc.

Inspect the electrical equipment of the compressor unit every three to four weeks. Defects, such as loose connections and/or overheated cable should be repaired immediately.
Carry out the following precautions before working on the electrical system:

Disconnect the battery, the ground cable first and then the positive cable.
When reconnecting the battery, attach the positive cable first, then the ground cable.

☞ Check all screw connections and cables of the electrical system. Repair any faults, such as loose connections and/or overheated cable immediately.

Splashing oil can cause injuries and fires.

☞ Check all pipes, hoses and screw fittings for leaks and visible damage every three to four weeks. Repair any damage immediately!

The following points must be observed when handling fuel, oil, lubricating and cooling materials:

Avoid contact with skin and eyes.
Do not inhale vapours and oil mist.
Do not eat or drink when handling such materials.
Fire, open flame and smoking are strictly forbidden.

Scalding hazard
The engine cooling system is under pressure.
For this reason, the engine must be allowed to cool down before the pressure cap is removed.

Attention! **Safety devices may not be modified or deactivated.**

Signs and labels of reference may not be removed or rendered unreadable.

Attention! **Any alterations or reconstruction performed without the previous written consent of KAESER COMPRESSORS may void the warranty.**

During installation, operation, maintenance and repair of the compressor unit, OSHA Standards or any applicable Federal, State and Local codes, standards and regulations must be complied with.

Users of compressor units are obliged to comply with the safety and accident prevention regulations concerning the compressor unit that are valid in the country of use. If necessary, corresponding measures must be taken to ensure compliance with these national regulations before the compressor unit is put into operation.

The following instructions must also be observed:

- Never operate the portable compressor in enclosed spaces because exhaust gases contain carbon monoxide, a deadly gas! If, for exceptional reasons, the compressor must be operated in an enclosed space then the exhaust gases must be fed to the open air through a pipe of suitable diameter (at least 4" dia.)!
- Fire hazard! –
  Never refuel the portable compressor with the motor running!
  Keep diesel fuel away from hot components such as air outlet pipes or motor exhaust pipes. If the compressor is refilled with an automatic pump, a ground cable must be connected to the portable compressor to discharge static electricity. Never allow fuel, oil, coolant or cleaning fluids to overflow or leave the remains in the compressor unit.
- Allow no open flames and flying sparks at the place of installation.
- While welding on or near the compressor unit, ensure that sparks, open flames, or high temperatures cannot cause fire or explosion.
- Ensure that the compressor unit is fed with clean intake air. Operation of the unit in environments containing ammonia or other harmful gases may damage the unit and should be avoided.
- Do not operate the unit in ambient temperatures exceeding those outlined in chapter 1.6. For operation in higher ambient temperatures, please consult the manufacturer.
- Ensure that the compressor unit cannot be inadvertently started before carrying out any repair work. Remove the starter battery or place insulating caps over the battery terminals. A notice with the words *''This machine is under repair, do not start!''* must be attached to the compressor unit.
- Change the oil at the recommended interval (see chapter 9.3) or once a year, whichever occurs first.
- Do not mix cooling oils of different types. Be careful not to accidentally add compressor oil to the motor, or motor oil to the compressor.
- During operation, maintain the proper operating temperature as stipulated in the manufacturer's specifications to avoid build–up of condensate in the oil circulation (because low or high operating temperatures can cause damage to the unit).
- Use only cooling oils as recommended by the manufacturer.
- If maintenance work is carried out on any part of the oil circulation system, remember to refill the oil in the separator tank to the maximum level. Run the compressor and keep it under constant observation for a short period. Re–check the oil level again and add oil if necessary.
- Re–use of the filter cartridge located inside the oil separator tank is permitted as long as the pressure drop across the filter is below 15 psi. Check the pressure drop regularly.
- To reduce strain at the compressor outlet valves, do not connect accessories such as lubricators, water separators, etc. to the outlet valves. Do not pull on the air hoses when they are connected to the outlet valves.
- This unit is not explosion–protected and may not be operated in hazardous areas.

2.3 Regular Check of Hoisting gear

Attention! **It is recommended that the hoisting gear on the compressor package is checked at least annually.**

2.4 Road Traffic Act Regulations

Attention!

Observe all Federal, State, and Local laws while towing this equipment.

The maximum permissible trailer weight for the towing vehicle and the maximum permissible weight at the trailer coupling may not be exceeded! See rated limit in tow vehicle Operator's Manual and review its instructions and other requirements for safe towing.

The speed limit for towed vehicles as prescribed by Federal, State, and Local laws shall not be exceeded.

Use wheel chocks to secure the compressor unit against possible movement before uncoupling from the towing vehicle.

This equipment may be tongue heavy.
DO NOT attempt to raise or lower the drawbar by hand if the weight is more than you can safely handle.

2.5 Environmental Protection

Maintenance materials/wear items/replacement parts

Ensure that all wear items,maintenance and replacement parts accumulating during operation of the compressor unit are disposed of according to environmental regulations!

2.6 Spare Parts

Safe and reliable operation of the compressor unit is guaranteed only with KAESER original spare parts and KAESER SIGMA compressor oil.

Attention!

Use only original parts in assemblies subject to pressure.

3 General

Attention! **The service manual must always be available where the compressor package is being used.**

This Service Manual applies only to rotary screw compressors for use in the construction sector.

The right is reserved to make technical changes and improvements to equipment which may then result in discrepancies in the details of that equipment contained in this manual.

If the compressor package is operated in an air distribution network, the maximum network pressure may not exceed 232 psig.

3.1 Operation According to Regulations

This compressor unit is intended solely for the purpose of generating compressed air.
Any further use outside of this purpose is considered incompatible to regulations.
The manufacturer cannot accept liability for any damage caused by such incorrect use; the user alone is liable for any risks incurred.

Use of the compressor according to regulations also encompasses adherence to the installation, removal, commissioning, operational and maintenance conditions laid down by the manufacturer.

Attention! **The equipment may only be used or serviced by authorized and trained personnel.**

3.2 Incorrect Use

Never direct compressed air toward persons. Compressed air is a concentrated form of energy and as such is dangerous to life.

Attention! **Inlet air may not contain any explosive or chemically unstable gas or vapour.**

3.2.1 Temperature – dependent operation of the compressor

Attention! **The compressor is designed for an ambient temperature range from 14˚ F to 122˚ F.**
The compressor may not be operated in ambient temperatures outside this range.

3.3 Compressed Air Treatment

Never use compressed air from oil injected compressor units for breathing purposes and production methods where the air has direct contact with food, without subjecting the compressed air to additional treatment.

3.4 Copyright

4 Transport

4.1 Towing the Portable Compressor Unit:

Riding on or in a compressor package is strictly forbidden.

Attention! **When towing the compressor unit with a towing vehicle observe the road traffic regulations (see chapter 2.4).**

Precautions to be taken before towing the compressor

☞ Check that the compressor is shut down and secured against accidental restarting. If necessary, carry out the following:

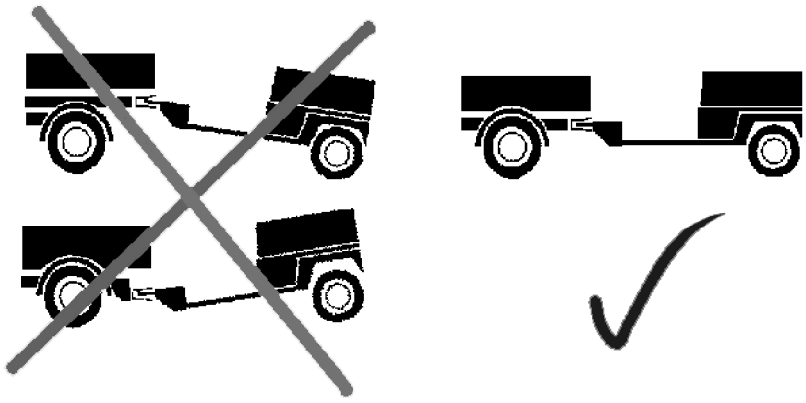
☞ Loosen and remove all connecting lines to the compressor.

☞ Check for unsecured tools on or in the compressor package and remove any found.

☞ Close and lock the access panels.

Attention! **Check that the towing vehicle coupling is compatible with the compressor towing eye or coupling.**
The compressor drawbar must be horizontal when towing.
If the compressor tilts forward or backward the dynamics of towing can lead to damage.

☞ Place the compressor drawbar in horizontal position to the towing vehicle coupling.



☞ Hook up the compressor unit to the towing vehicle.

Attention! **After hooking up the mobile compressor unit, check that the safety locking device on the tow–bar coupling is engaged.**

☞ Lift the jack support and secure with the clamp.

☞ Check that the wheel nuts are tight and the tyres are in good condition.

☞ Check the tyre pressures.

☞ Install the lighting and indicator systems.

Attention! **The portable compressors are designed for a maximum road speed of 55 mph.**
The regulations of the road traffic act specific to the country of use must be observed.

4.2 Removing the Compressor Unit from Towing Vehicle

Work to be done after transporting the mobile compressor unit as a towed vehicle on the road:

☞ Lower and secure the support.

Attention! **When uncoupling on a slope or hill secure the compressor unit against movement.**

☞ Uncouple the compressor unit from the towing vehicle.

☞ Remove the lighting and indicator systems.

4.3 Transporting with a crane

Attention! **Always comply with the safety regulations concerning load suspension devices and lifting appliances when transporting a portable compressor unit by means of a crane.**

Do not stand beneath a hanging load.

Do not exceed the maximum permissible compressor weight (see chapter 1.1).

Do not lift or lower the compressor unit with a jerk because of the danger of damage to components.

Do not tamper with the fixing points of the lifting eye.

All loose, hinged parts such as doors must be secured before lifting the compressor package. Never affix wire cable, chain or slings directly to the lifting eye, always use a regulation crane hook or shackle!

A lifting eye is provided for transport with a crane.

This lifting eye is located on top of the compressor.

(see illustration for the lifting eye in chapter 5.3).

☞ Check that the compressor is shut down and secured against accidental restarting. Carry out this measure, if necessary.

Attention! **Do not pull the compressor along with the compressed air supply hoses.**

☞ Release and remove all connection lines from the uncoupled compressor unit.

☞ Close and lock the access panels.

Attention! **Lifting hooks and lifting eye shackles, etc, must never be deformed and must always be in line with the load axis.**
For maximum safety and efficiency the load applied to all lifting points should be as near to vertical as possible.

☞ Hook the crane hook into the lifting eye.

4.4 Packaging and shipping as freight

The transport route is a deciding factor for the type of packaging and for securing. KAESER KOMPRESSOREN always tries to transport goods directly to the customer. Our packaging and securing methods are always selected such that, assuming proper handling, the goods arrive in perfect condition at the customer's premises.

Always observe valid accident and safety regulations when transporting equipment!

Attention! **The freight is to be secured against rolling, tipping and slipping.**

Dispose of the packaging according to environmental regulations and where possible, recycle.

Chocks, restraints or squared timber must be used for securing freight. If required, guys should be tightened across the chassis and the towbar. It is not permitted to tighten guys or straps across the bodywork!

On rented, hired or trade fair packages the transport restraints should be used again for the return journey.

KAESER KOMPRESSOREN will be pleased to answer any queries with regard to transport and securing of equipment. KAESER KOMPRESSOREN can accept no liability whatsoever for damages arising through incorrect transport methods or insufficient or wrong securing of freight.

Observe before shipping by air:

The machine has a internal combustion motor.

- Which may contain a residual amount of fuel and fuel vapor.
- They also contain wet cell battery(s).
- The motor and airend both contain lubricants.

☞ Be aware that all hazardous materials regulations must be adhered to when shipping these units including the requirements in the US–Code of Federal Regulations CFR Title 49 – Transportation.

The machine are considered dangerous goods when shipped by air and failure to follow the appropriate regulations could result in steep fines!

☞ Remove all hazardous materials.

5 Construction and Operation

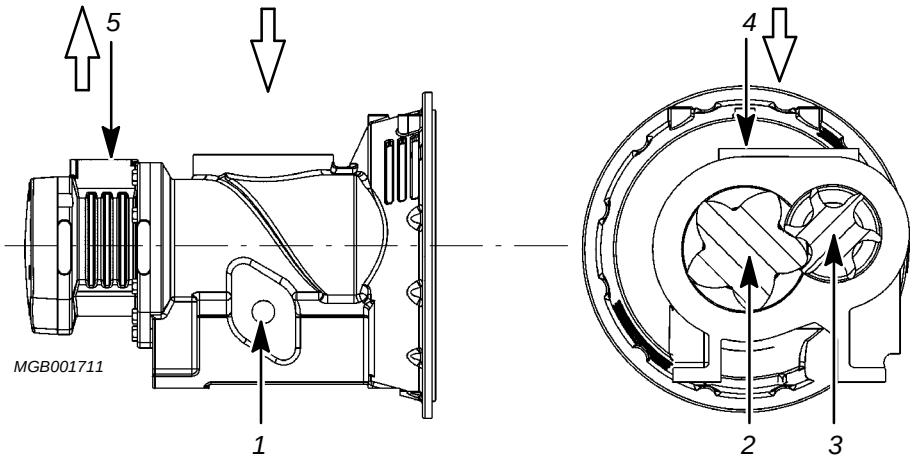
5.1 Principle of Compression

The compressor unit is fitted with a single stage, oil injected air end.

Two rotors, the driven male rotor and the female rotor, both mounted in roller bearings, are fitted into the airend. As the rotors rotate, air is drawn into the upper side through the inlet and is compressed on the lower side.

The oil that is injected into the lower side absorbs heat generated by compression, prevents metallic contact between the rotors, seals the rotors and the housing from each other and also lubricates the roller bearings.

The compressed airand oil mixture leaves the airend via the discharge outlet.



1 Oil injection
2 Male rotor
3 Female rotor
4 Inlet ports
5 Discharge port

5.2 Brief Description

The rotary screw compressor airend is directly driven through a coupling by a liquid–cooled four cylinder diesel motor (see chapter 1.3).

An oil separator cartridge providing practically oil–free compressed air is built into the oil separator tank.

The compressor oil is unsuitable for the lubrication of tools connected to the compressor. If necessary, a tool lubricator should be fitted for this purpose.

The compressor control ensures that the compressed air generated is matched to the actual compressed air demand.

A fully automatic combination valve registers the ambient temperature and regulates the compressor temperature accordingly.

A safety shut–down system protects the motor, compressor and the unit by automatically stopping the motor if important systems fail.

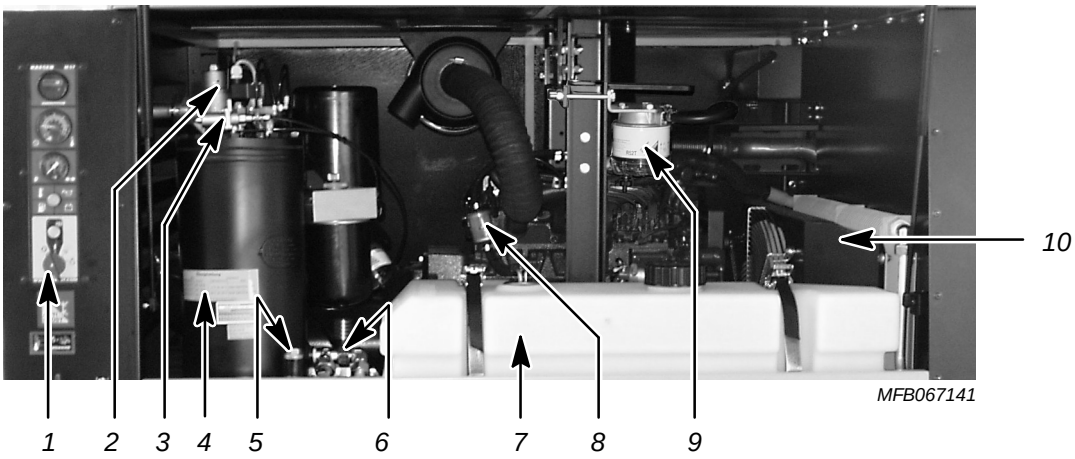
The built in air fan provides optimum cooling of all components with the body work closed.

The chassis is fitted with flexible rubber element torsion axle suspension.

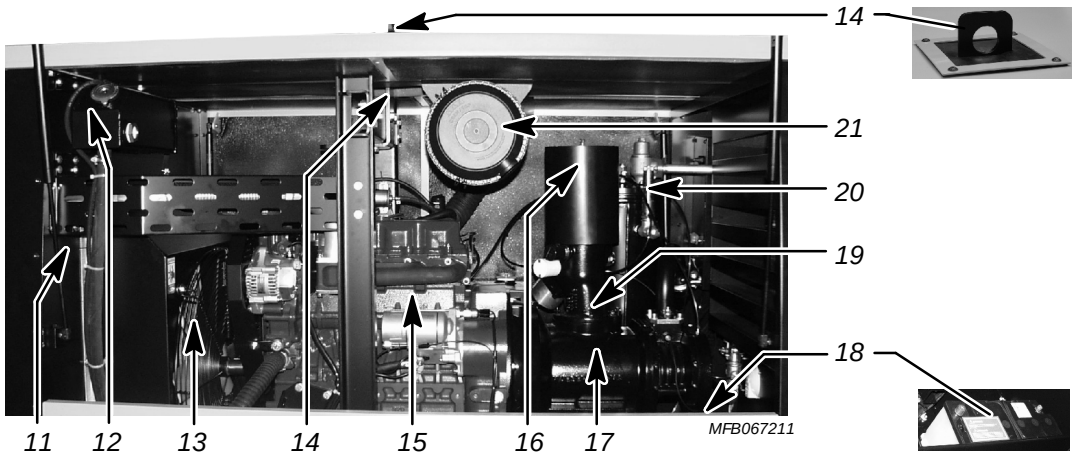
A lifting eye is provided for transport using a crane (see chapter 4.3).

5.3 Identification of the Components

Position details in ( ) correspond with the Pipe and Instrument Flow Diagram (P & I Diagram).



1 *Instrument panel*
2 *Minimum pressure/check valve (37)*
3 *Proportional controller (23)*
4 *Oil separator tank (5)*
5 *Oil filler with plug (11)*
6 *Combination valve (19)*
7 *Fuel tank*
8 *Fuel prefilter*
9 *Fuel filter with water separator*
10 *Oil cooler (20)*



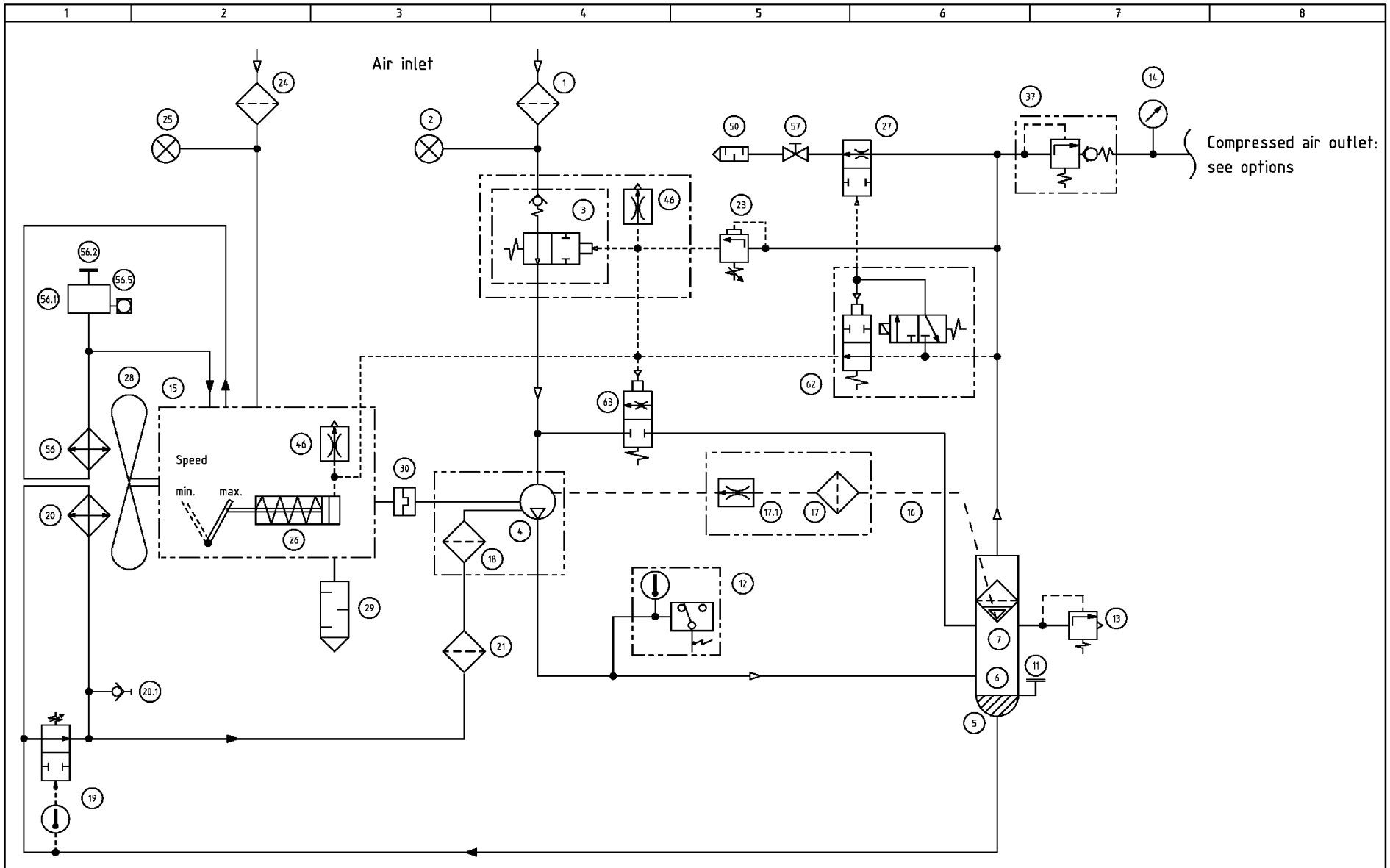
11 *Water cooler (56)*
12 *Cooling fluid expansion tank (56.1)*
13 *Fan (28)*
14 *Lifting eye*
15 *Motor*
16 *Compressor air filter (1)*
17 *Airend*
18 *Batterie*
19 *Inlet valve (3)*
20 *Pressure relief valve (13)*
21 *Motor air filter (24)*

5.4 Piping and Instrument Flow Diagram (P & I Diagram)

(see following pages)

1. P & I Diagram, machine

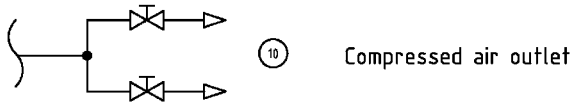
2. P & I Diagram, compressed air outlet



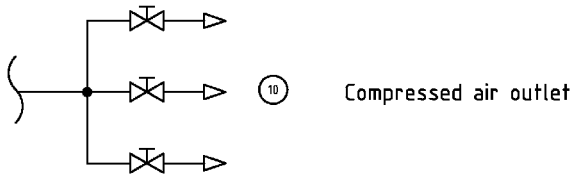
c				Datum	06.04.2005		KAESER KOMPRESSOREN	P&I Diagram	
b				Bearb.	Plau			Mobilair	
a				Gepr.	Grimm			M 57	
	Änderung	Datum	Name	Norm		Ersatz durch:	Ersatz für:	Ursprung: FFMM64ST-00530.00	FFMM57ST-00445.02	Blatt 1 E

1	Compressor - Air filter
1.1	Vacuum switch
2	Filter maintenance indicator, Compressor -Air filter
3	Inlet valve
4	Airend
5	Oil separator tank
6	Oil reserve
7	Oil separator cartridge
11	Oil filler with screw plug
12	Temperature gauge switch + Indication
13	Pressure relief valve
14	Pressure gauge - Control panel
15	Diesel engine
16	Oil return line
17	Dirt trap
17.1	Nozzle
18	Strainer
19	Combination valve - Oil temperature controller
20	Oil cooler
20.1	Hose coupling - Oil drain
21	Oil filter
23	Proportional controller (option: adjustable)
24	Motor - Air filter
25	Filter maintenance indicator, Motor - Air filter
26	Engine speed adjusting piston
27	Venting valve
28	Fan
29	Exhaust silencer
30	Coupling
37	Minimum pressure check valve
46	Nozzle (Secondary end Proportional controller)
50	Silencer
56	Water cooler
56.1	Cooling water expansion tank
56.2	Water filler with plug
56.5	Cooling water sight glass
57	Shut-off valve - Venting line
62	Combined control valve
63	Control valve (Air circulation valve)

c				Datum	06.04.2005		KAESER KOMPRESSOREN	P&I Diagram legend Mobilair M 57	
b				Bearb.	Plau				
a				Gepr.	Grimm				
	Änderung	Datum	Name	Norm		Ersatz durch: / Ersatz für:	Ursprung: FFMM64ST-00530.00		FFMM57ST-00445.02 Blatt 2 E

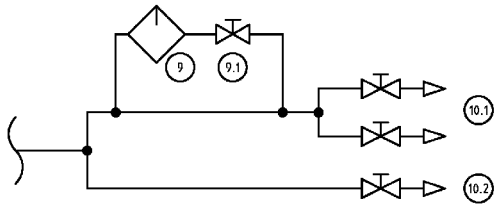


Compressed air outlet

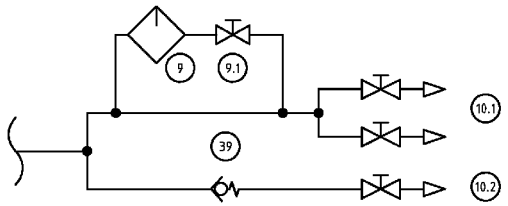


Compressed air outlet

Standard



Compressed air outlet



Compressed air outlet

Secondary line lubricator

9	Tool lubricator
9.1	Shut-off valve
10	Compressed air distributor
10.1	Compressed air distributor, lubricated
10.2	Compressed air distributor, non-lubricated
39	Check valve

c				Datum	27.07.2004		KAESER KOMPRESSOREN	P&I Diagram M 57	
b				Bearb.	Plau				
a				Gepr.	Grimm				
	Änderung	Datum	Name	Norm		Ersatz durch:	Ersatz für:	Ursprung:FFMM3176DLA0-00493.00	Compressed air outlet-options	FFMM57DLA0-00516.00	Blatt 1 USE

5.5 Description of the Piping and Instrument Flow Diagram

Details in ( ) correspond to the component identification number on the P & I Diagram.

5.5.1 Air Circulation

The air drawn in from the atmosphere flows through the inlet air filter (1) of the compressor, the inlet valve (3) and is compressed in the airend (4).

The oil injected into the compression chamber absorbs the heat generated during compression, seals the gap between the rotors and the air end housing and simultaneously lubricates the bearings of the rotors.

The air and oil mixture is forced into centrifugal movement by a 90° deflector in the oil separator tank (5). A preliminary separation of oil and air takes place under the influence of the centrifugal force and the force of gravity. The remaining oil carry–over in the compressed air is filtered out by the oil separator cartridge (7). The oil accumulating in the oil separator tank (5) through these measures is returned to the compressor airend (4).

The compressed air then passes to the compressed air distributor (10) via the minimum pressure/check valve (37). The minimum pressure/check valve also ensures the necessary minimum pressure in the oil separator (5) required to guarantee the oil supply to the compressor air end.

The compressed air then passes to the compressed air distributor (10) from where it is supplied to the consumers.

5.5.2 Oil Circulation

The oil flows from the oil separating tank (5) to the combination valve (19).

Combination valve with ambient temperature acquisition

When ambient temperatuers are low the combination valve (19) bypasses the cooler (20) and directs the still cold compressor oil directly back to the airend (4) so the airend discharge temperature* reaches the ideal 194° F as quickly as possible. The whole machine is warmed through and brought quickly to operating temperature. The combination valve works automatically to hold the temperature level steady.

When the ambient temperature exceeds 50° F* the combination valve directs oil through the cooler, which reaches its full cooling capacity from 77° F. This allows the airend discharge temperature to be regulated at about 140° F.

This ambient temperature dependent control offers the user beneficial operating conditions.

- Winter operation – a higher airend discharge temperatures is reached quickly in cold weather.
- Summer operation – unpleasantly high surface temperatures of air tools is avoided in hot weather.

* Airend discharge temperature – ambient–dependant temperature measured at the airend discharge port.

* Between the ambient temperature values 50° F.....77° F there is an airend discharge temperature transition zone.

Oil Circulation to be continued

Contaminants in the oil are filtered out by the oil filter (21) and the screen filter (18) of the compressor air end. Subsequently, the oil is injected into the air end again.

The oil accumulating in the oil separating cartridge (7) is returned to the compressor air end via the oil return line (16) and the dirt trap with jet (17). The oil circulation system functions under the influence of the natural pressure gradient and requires no oil circulation pump.

5.5.3 Safety Chain

Safety Relief Valve:

It is forbidden to alter the setting!

The overall air circulation system is protected against excess pressure by a safety relief valve.
If a defect causes the pressure to increase above the maximum gauge working pressure (see chapter 1.1 for values), then the compressed air is blown off via the safety relief valve.
The activation pressure (see chapter 1.5) is preset at the safety relief valve.
It is forbidden to alter the setting!

Temperature gauge switch:

The temperature gauge switch switches and shuts down the compressor unit if the maximum allowed compressor discharge temperature.

Oil – Pressure Switch – Motor:

If the oil pressure in the diesel motor sinks below the permissible minimum pressure, the compressor shuts down.

Cooling water thermostat:

The compressor shuts down if the temperature of the coolant in the motor exceeds the maximum allowed value.

5.5.4 Partial Load Control

Description of the operating modes

Full Load:

If the gauge working pressure lies approximately 0.5 psig below the maximum gauge working pressure (see chapter 1.1 for the value) the compressor runs under full load. The pressure in the control line to the inlet valve (3) downstream of the proportional controller (23) corresponds to the final pressure and holds the inlet valve (3) open.

If the air demand is higher than the maximum air delivery of the compressor, the compressor settles at a working pressure that is less than the working pressure mentioned above. However, the minimum pressure/check valve (37) ensures that even if the outlet valves are fully opened, the pressure in the oil separator tank (5) cannot fall below the minimum pressure. This minimum pressure is necessary to ensure sufficient lubrication of the airend (4).

On load

- Inlet valve [3] open.
- Motor speed control lever (26) in the ”Maximum speed” position.
- The compressor airend (4) delivers compressed air to the connected consumers.

The minimum pressure/check valve (37) ensures that pressure in the oil separator tank (5) does not fall below the minimum. The minimum pressure ensures continuous circulation of cooling oil through the machine.

Partial load:

- The proportional controller (23) continuously varies the degree of opening of the inlet valve (3), and thereby the delivery rate of the compressor, in response and in proportion to the air demand.
- Motor speed is also varied accordingly by the control lever (26).
- The compressor airend (4) delivers compressed air to the connected consumers.

This type control ensures minimum fuel consumption during times of partial loading. The load and fuel consumption of the motor rises and falls with the air demand.

Off–load / idle running:

- Motor speed control lever (26) in the "Minimum speed" position.
- Inlet valve (3) closed.
- The minimum pressure/check valve (37) isolates the oil separator tank from the compressed air outlet.

The control valve (63) opens to let compressed air from the oil separator tank flow back to the inlet of the airend (4) again.

Starting sequence:

- The "Load" button (70) is in the idle running position.
- The motor speed control lever (26) moves to the "Minimum speed" position.
- The inlet valve (3) closes.

When the motor has reached idling speed (depending on ambient temperature) the load button (70) is pressed in and the machine is ready to deliver compressed air.

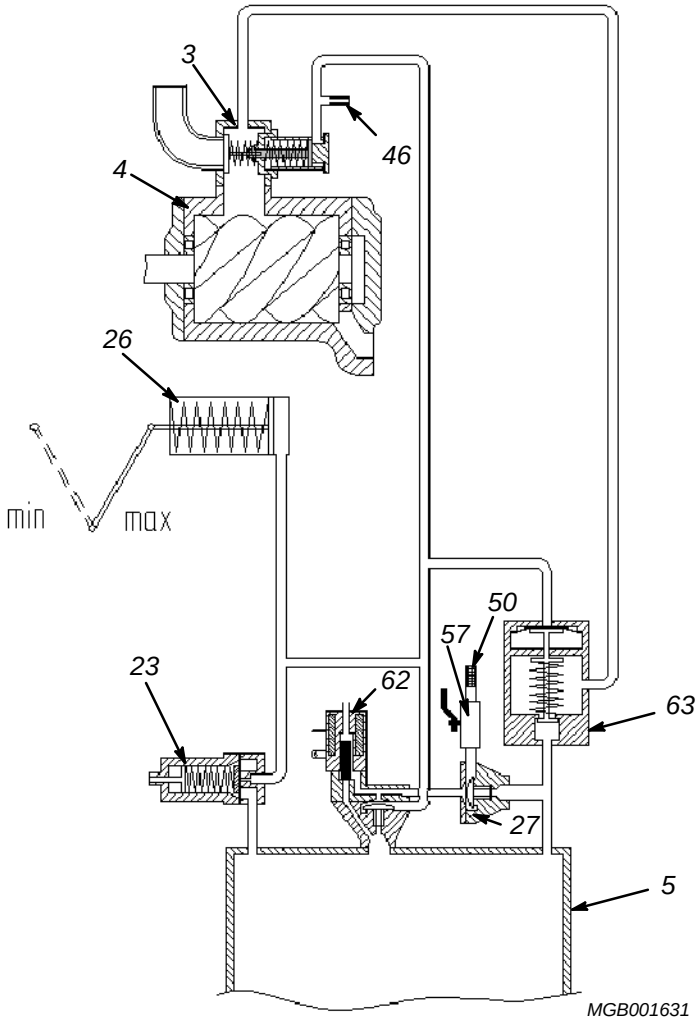
- The motor speed control lever (26) moves to the "Maximum speed" position.
- The inlet valve (3) opens and the venting valve (27) closes.

Stopping sequence:

- The motor speed control lever (26) moves to the "Minimum speed" position.
- The inlet valve (3) closes.

The venting valve (27) opens to vent the machine and the motor comes to a stop.
The "Load" button (70) moves automatically back to the idle running position.

Modulating control (Standstill)



3	*Inlet valve*	*46*	*Nozzle*
4	*Screw compressor*	*50*	*Silencer*
5	*Oil separator tank*	*57*	*Venting line shut–off valve*
23	*Proportional controler*	*62*	*Combined control valve (changeover valve)*
26	*Engine speed control cylinder*	*63*	*Control valve*
27	*Venting valve*		

6 Installation

6.1 Installation Instructions

Observe the following instructions when setting up the compressor unit:

- Maintain sufficient distance (at least 60 inch) to building trenches, banks, ramps, etc.
- Locate the compressor unit on a flat, horizontal surface (max. 15° slope in the longitudinal or cross direction!).
- Do not set up the compressor unit so that the wind should blows in the direction of the cooling air outlet.
- Do not allow exhaust gases and heated cooling air to be sucked into the compressor.

Attention! **Do not place the compressor directly in front of a wall.**

Make sure that there is sufficient space for ventilation and exhaust gases when selecting the compressor's place of use.

The drive motor's exhaust system becomes very hot during operation.
If there is only a short distance between the compressor and a wall the compressor can overheat and damage can be caused.

- Always locate the compressor at the longest distance possible from a wall.
- Make sure there is sufficient space around and over the compressor.

See chapter 1.6 for ambient temperatures required for operation of the compressor unit.

See chapter 4.2 for setting up instructions after transport of the compressor unit.

7 Putting into Operation

7.1 Points to be Observed before Putting into Operation

Every compressor unit is given a test run in the factory and carefully checked before shipment.

The test run confirms that the compressor unit conforms to the specification data and runs perfectly.

However, independent of the checks made at the factory, the compressor unit could be damaged during transport.

For this reason, we recommend that the compressor unit is examined for such possible damage.

Observe the compressor unit carefully during the first hours of operation for any possible malfunction.

Attention!

Important functional components in the compressor unit (such as safety relief valve and inlet valve) are adjusted and fitted to factory standards and specifications.
Alterations to these components are not allowed without previous written consultation with the manufacturer.

Do not make alterations to the safety relief valve or inlet valve without first consulting the manufacturer.
The safety relief valve and inlet valve are spring loaded.

7.2 Points to be Observed before Starting the Compressor Unit:

ANY NON – OBSERVANCE OF THIS OR OTHER REFERENCES (WARNING; ATTENTION) CAN LEAD TO ACCIDENTS CAUSING INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

It is not allowed to operate the compressor within an enclosed space because of the danger of toxic exhaust gases.

It is not allowed to operate the compressor with open access doors because of the dangers associated with hot surfaces, rotating parts, electrical shock hazards.
Open doors will also adversely affect the compressor's cooling system.

☞ Remove all packing material, tools and transport securing devices on and in the compressor unit.

- It is expected that the operator employs safe working techniques and that all lawful operating and safety regulations are followed when operating this compressor unit.
- The user of this compressor unit is responsible for its safe operating condition.
- Do not operate this compressor unit in areas where heavy dust conditions, poisonous or inflammable gases could exist.

Before putting into operation carry out the following:

☞ Check the oil level in the oil separating tank (see chapter 9.3.1).

☞ Check the oil level in the motor (see motor service manual).

☞ Check the motor coolant level (see chapter 9.3.10).

☞ Check the fuel level in the fuel tank (see motor service manual for details).

7.3 Shutdown – Putting into Operation after a Long Period of Shutdown

7.3.1 Temporary storage (up to approximately four months)

- ☞ Disconnect the battery (first the negative cable and then the positive cable).
- ☞ Seal the air intake openings of the motor, the air intake openings of the compressor and the motor exhaust with plastic foil and moisture resistant adhesive tape.
- ☞ Secure a warning notice on the instrument panel informing of the shutdown measures taken.

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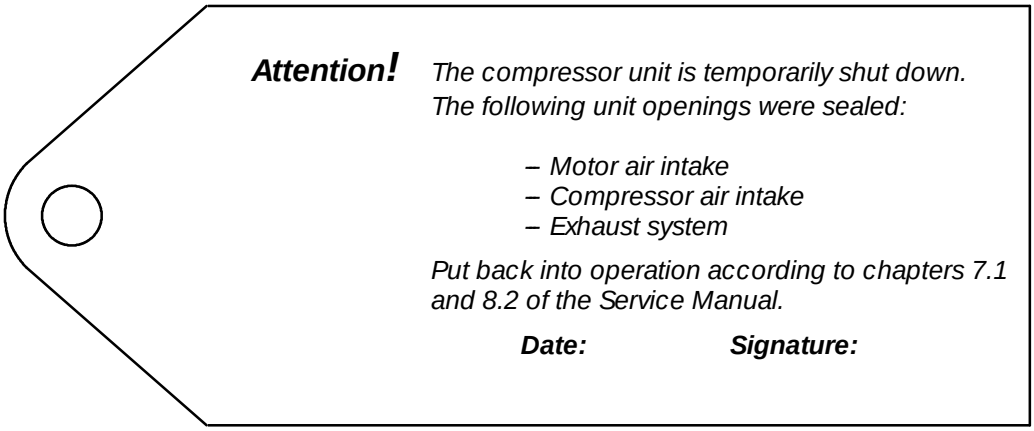

Example of a warning notice informing of temporary shutdown measures

7.3.2 Long term storage (longer than five months)

- ☞ Check the motor coolant level (see chapter 9.3.10).
- ☞ Drain the motor oil, the oil in the oil separator tank and the oil in the oil cooler with the compressor unit at operating temperature (see chapter 9.3.2 and the motor service manual).
- ☞ Fill the motor and the oil separating tank with preserving oil (see motor service manual and chapter 1.7, ”Oil Recommendations”).
- ☞ Run the compressor unit for approximately 10 minutes to distribute a film of oil (see chapter 8.2 for starting and stopping the compressor unit).
- ☞ Disconnect the battery (first the negative cable and then the positive cable).
- ☞ Check the level of electrolyte in the battery (see chapter 9.3.9 for battery maintenance).
- ☞ Check the battery charge monthly and recharge if necessary otherwise there is danger of the electrolyte freezing under cold conditions.
- ☞ Clean the battery connections and grease with acid resistant grease.
- ☞ Close the ball valve at the air discharge.
- ☞ Place a bag of desiccant (silica gel) in the air inlet filter opening and affix with adhesive tape if necessary.
- ☞ Close the air inlet openings of the motor, the air inlet openings of the compressor and the motor exhaust with plastic foil and moisture resistant adhesive tape.

- ☞ Seal the air intake openings of the motor, the air intake openings of the compressor and the motor exhaust with plastic foil and moisture resistant adhesive tape.
- ☞ Clean the bodywork and then treat with a preservative.
- ☞ Secure a warning notice on the instrument panel informing of the shutdown measures taken.

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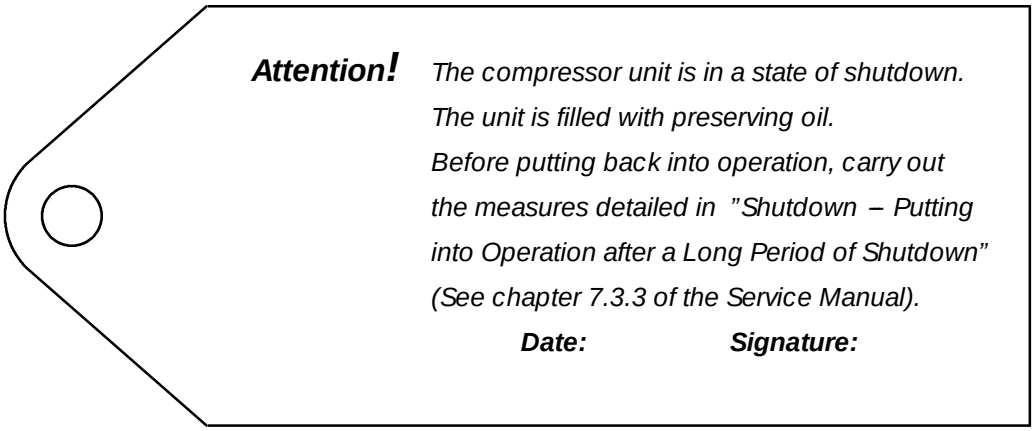


Example of a warning notice informing of shutdown measures

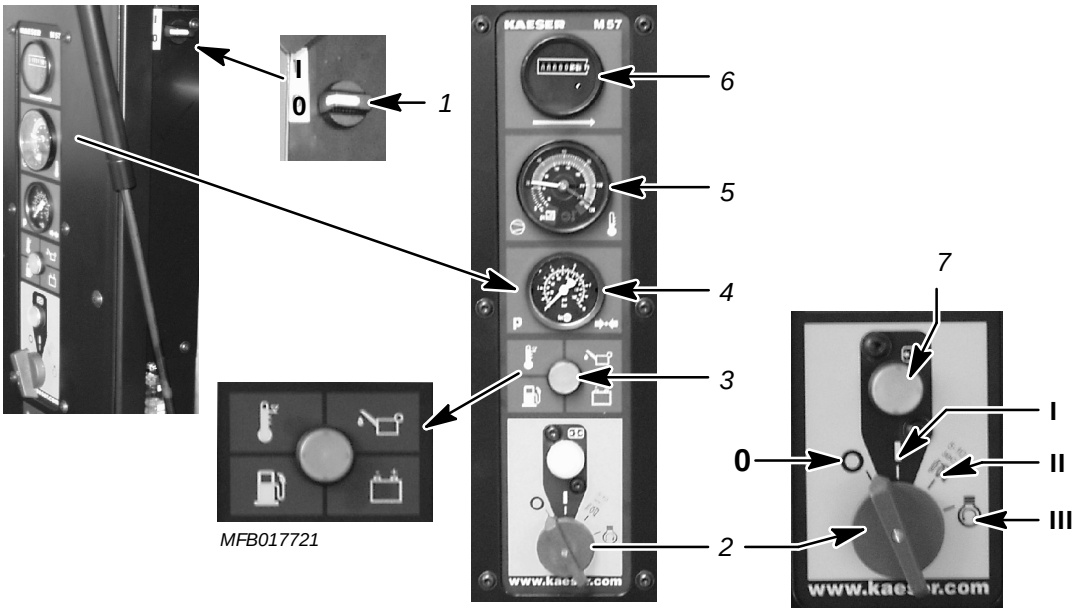
Store the compressor unit in a dry environment subject to consistent temperatures.

7.3.3 Start up after long term storage

- ☞ Check the tire pressures (see chapter 1.1 for tire pressures).
- ☞ Clean the bodywork with a grease and dirt cleaning solvent.
- ☞ Remove the plastic foil and adhesive tape from the inlet air opening of the engine, air inlet opening of the compressor and the engine exhaust.
- ☞ Remove the desiccant (silica gel) bag from the opening of the air filters of motor and compressor.
- ☞ Drain the preserving oil from the engine (see engine service manual) and the oil separating tank (see chapter 9.3.2).
- ☞ Carry out a visual inspection of the air and oil filters.
  Replace, if necessary (see motor service manual and chapters 9.3.5 and 9.3.3).
- ☞ Fill with motor oil (see motor service manual).
- ☞ Fill with compressor oil (see chapter 9.3.2).
- ☞ Check the motor coolant level (see chapter 9.3.10).
- ☞ Check the state of battery charge.
  Recharge, if necessary (see chapter 9.3.9).
- ☞ Reconnect the battery / batteries (first the positive cable, then the negative cable).
- ☞ Check all fuel lines, motor oil lines and compressor oil lines for leaks, loose connections, wear and damage.
- ☞ Immediately repair any faults found!
- ☞ Put the compressor unit into operation according to chapter 7.1 and 8.2.
- ☞ Check the function of the lights and direction indicators.

8 Operation

8.1 Operating Controls



1 *"Control ON" switch*

2 *Ignition switch*
- ***0*** *STOP / off*
- ***I*** *ON*
- ***II*** *Preheating*
- ***III*** *Start*

3 *Charging lamp (group alarm lamp)*

4 *Compressed air outlet pressure gauge*

5 *Temperature gauge switch*

6 *Operating hours counter*

7 *"Load on" pushbutton with integrated On Load control lamp*

8.2 Starting and Stopping the Compressor Unit

8.2.1 Starting

☞ Open the right–hand access door.

☞ Turn the "Controller ON" switch, within the compressor canopy, clockwise to the "ON" position.

☞ Close the access door again.

☞ Turn the starter switch to the "1" position.
The charging lamp must illuminate (red).

Preheating:

☞ Turn the ignition switch to the "II" position and hold.

The glow plugs in the diesel motor are switched on and the motor is preheated. Dependent to the ambient temperature, the preheating time shall be amount between min. 5 seconds and max. 10 seconds – low ambient temperatures demand long preheating times!

Attention! **Max. preheating time appropriate 10 seconds.**

The electrical fuel pump is automatic started during the preheating phase. Therefore the fuel pipes are bleeded before the motor is started.

Further starting instructions:

☞ Turn the ignition switch to the ”III” position and hold.

The starter is energised.

Attention! **Never turn the switch to the start position when the motor is running. Do not hold the switch in the starting” position (III) longer than 20 seconds.**
Wait 30 seconds after an unsuccessful start before trying again.

Starting is inhibited when the motor is already turning to prevent damage to the starter.

☞ Release the ignitian switch as soon as the motor catches and runs at a constant speed.

The ignition switch returns to position I”under spring pressure.

When the motor starts and runs normally, the charging indicator lamp should extinguish after a few seconds.

Attention! **If the lamp does not extinguish, there is a fault. (see chapter 8.6.7)**

The motor runs at idling speed.

The portable compressor isn’t operational for the compressed air removal yet!

Full load mode:

When the engine runs smoothly at constant speed, which can take from a few seconds up to two minutes depending on ambient temperature, the compressor can be switched to full load mode (air delivery) by means of the ”Load on” pushbutton.

Danger of injury
If the air outlet shut–off valves are open when the “Load on” pushbutton is pressed a dangerously strong jet of air will be momentarily discharged.

☞ Check that the compressed air outlet valves are closed, if not, close them.

☞ Push the ”Load on” pushbutton when the engine reaches constant speed.

The portable compressor is operational and compressed air is available.

8.2.2 Stopping

☞ Turn the ignition switch to the ”0” position.

Complete shutdown:

☞ Open the right–hand access door.

☞ Secure the compressor against unauthorised starting by turning the ”Control On” switch inside the compressor unit to the ”0” position.

☞ Close the access door again.

8.3 Function of the safety device

If one of the “motor oil pressure”, “airend discharge temperature” or “cooling water temperature” contacts open during operation, the fuel shut–off device closes.
The motor runs down to a standstill and the pneumatic venting valve vents the compressor package.

8.4 Checks during Operation

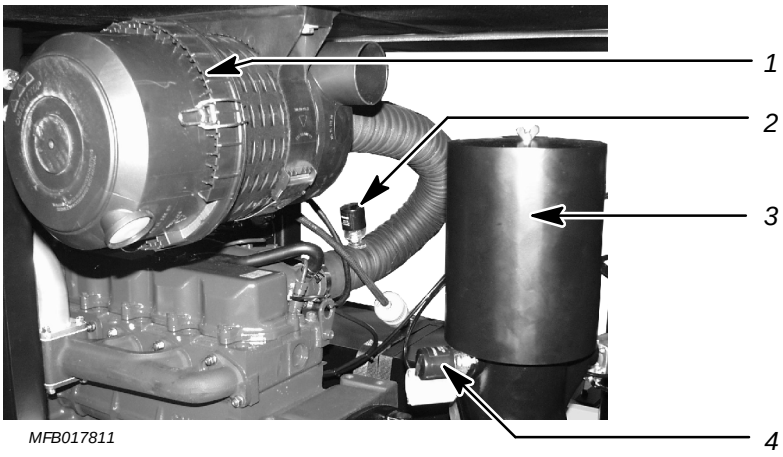
Open the access panels during operation for a short period only, e.g. to carry out checks.

There is danger of injury to personnel through heated, rotating and electrically live components!

Soundproofing measures are ineffective if the doors are open. Protective ear muffs must be worn.

☞ Check the air intake filter maintenance indicator.

If the red cylinder is visible in the window, clean or renew the filter cartridge (see chapter 9.3.5 and 9.3.6).



1 Motor air filter
2 Maintenance indicator for motor air filter
3 Compressor air filter
4 Maintenance indicator for compressor air filter

8.5 Measures for Freezing Conditions (Winter Operation)

The electrical system starts the unit without problem at temperatures down to 14° F.

Attention! **If the compressor is operated at ambient temperatures below 32° F, then the following points must be observed:**

- Use winter motor oil (see service manual for the motor).
- Use low viscosity compressor oil (see chapter 1.7).
- Use winter diesel fuel.
- Fit a heavy duty winter battery (see chapter 9.3.9).

Attention! **The pneumatic control of the compressor unit can defect under ambient temperatures below 32° F.**
This could be caused by small particles of ice forming in the control and regulation devices.

Attention! **To ensure faultless regulation allow the compressor to run up to operational temperature with the discharge valves open.**

8.5.1 Temperature – dependent operation of the compressor

Attention! **The compressor is designed for an ambient temperature range from 14° F to 122° F.**
The compressor may not be operated in ambient temperatures outside this range.

8.5.2 Starting help (starter battery discharged)

If the starter battery is discharged, the compressor unit can be started with the help of the starter battery in another vehicle or another portable compressor.

Attention! **Pay attention to safety requirements of batteries**

Connect batteries of the same voltage only. (see chapter 1.4 for the voltage).

Only use standardized battery jumper cables of sufficient cross – sectional area and with insulated pole clamps.

Pay attention to instructions for use of battery jumper cables.

Arrange the jumper cables so that they cannot be caught up by rotating parts of the compressor unit or the assisting vehicle.

Connecting the battery jumper cables:

☞ Park the assisting vehicle as near to the battery in the portable compressor as possible.

☞ Stop the motor.

☞ Switch off all unnecessary power consumers.

☞ Connect the first jumper cable to the "+" terminal of the discharged battery and the "+" terminal of the battery in the assisting vehicle.

Attention! **Do not connect the jumper cable to the "–" terminal of the discharged battery as well as the body of the portable compressor.**

☞ Connect one end of the second jumper cable to the "–" terminal of the battery in the assisting vehicle and the other end to the earth rail of the motor in the portable compressor.

Starting the motor:

☞ Start the motor of the assisting vehicle and run at high speed.

☞ Start the motor of the portable compressor.

When the portable compressor has successfully started, allow both the portable compressor and the assisting vehicle to run with the jumper cables still connected for approximately 3 minutes.

Removing the jumper cables:

☞ Remove the jumper cable from the "–" terminal of the battery in the assisting vehicle and from the metal part of the motor in the portable compressor.

☞ Remove the jumper cable from the "+" terminal of the battery in the portable compressor and the "+" terminal of the battery in the assisting vehicle.

8.6 Faults

When attempting to remove faults, the instructions in the 'Safety' chapter and the appropriate local safety regulations (see chapter 2) must be complied with!

Re–starting after a fault:

See chapter 7.2 'Putting into Operation' and chapter 8.2.1 'Starting'.

Explanation of symbols for the following fault finding help:

✳1 – have checked by a specialist.

✳2 – check at KAESER after sales service.

✳3 – see motor service manual.

8.6.1 Motor refuses to start or remains stationary

See also motor service manual.

Possible cause:	Fault removal:
Defective starter.	Replace; ✳1.
Fuel shut–off device has not opened.	Check the solenoid and electrics, replace if necessary; ✳1.
Fuel tank empty.	Refill.
Airlock in the pipe between the tank and injection pump.	Bleed the fuel pipe; ✳3.
Fuel filter blocked.	Clean or replace.
Fuel line defective.	Replace; ✳1.
Control fuse or relay defective.	Replace; ✳1 or ✳2.
Discharge temperature too high	✳1 or ✳2.
Defective remote contact thermometer providing no enable signal.	Replace; ✳2.
Coolant temperature too high	✳1 or ✳3
Defective cooling water temperature sensor providing no enable signal.	Replace; ✳2.
Start switch defective.	Replace; ✳1 or ✳3.
Connections and/or cable in the electrical wiring loose or open circuit.	Tighten, if necessary, replace; ✳1.
Battery voltage too low.	Carry out battery maintenance, see chapter 9.3.9.
Battery defective or charge too low.	Carry out battery maintenance, see chapter 9.3.9.
Defective motor generator.	Replace if necessary; ✳3 oder ✳1.
Defective motor generator regulator.	Replace if necessary; ✳3 oder ✳1.
Insufficient oil pressure	Refill; ✳3 oder ✳1.
Oil pressure switch indicating insufficient oil pressure.	Check the motor oil pressure. Replace the oil pressure switch, if necessary, have the motor repaired; ✳3 or ✳1.

8.6.2 Motor does not reach full speed

See also motor service manual.

Possible cause:	Fault removal:
Airlock in the pipe between the tank and injection pump.	Bleed the fuel pipe; ⁎3.
Fuel filter blocked.	Clean or replace.
Fuel line defective.	Replace; ⁎1.
Speed adjustment cylinder maladjusted or defective.	Repair, replace if necessary; ⁎2.

8.6.3 Working pressure too high

Possible cause:	Fault removal:
Proportional controller misadjusted or defective.	Check the diaphragm, clean the nozzle, replace proportional controller if necessary; ⁎2.
Inlet valve not closing.	Check the controller, control line and inlet valve, replace if necessary; ⁎2.
Pressure gauge indicating false pressure.	Replace; ⁎2.
Venting valve does not blowing off.	Check the connections and function, repair or replace as necessary ⁎2.

8.6.4 Working pressure too low

Possible cause:	Fault removal:
Proportional controller misadjusted or defective.	Check the diaphragm, clean the nozzle, replace proportional controller if necessary; ⁎2.
Inlet valve not opening or only opening partially.	Repair, replace if necessary; ⁎2.
Pressure gauge indicating false pressure.	Replace; ⁎2.
Safety relief valve venting.	Leaky or maladjusted, replace if necessary; ⁎2.
Venting valve venting.	Check the connections and function, if necessary, repair or replace; ⁎2.
Motor not running at full speed.	See chapter 8.6.2.
Motor air filter contaminated.	Clean or replace, see chapter 9.3.6.
Compressor air filter contaminated.	Clean or replace, see chapter 9.3.5.
Motor air filter and/or compressor air filter clogged.	Clean or replace, see chapter 9.3.5.
Oil separator cartridge contaminated.	Replace, see chapter 9.3.4.

8.6.5 Safety relief valve blowing

Possible cause:	Fault removal:
Oil separator cartridge contaminated.	Replace, see chapter 9.3.4.
Inlet valve not closing.	Check the controller, control line and inlet valve, replace if necessary; ⁎2.
Safety relief valve maladjusted or leaky.	Replace; ⁎2.

8.6.6 The compressor unit overheats

Possible cause:	Fault removal:
Compressor unit fan wheel damaged or malfunctioning.	Replace blades or the complete fan wheel; ⁎2.
Compressor oil cooler surface contaminated.	Clean the surface, see chapter 9.3.7.
Working element of the combination valve faulty.	Replace; ⁎2.
Working pressure too high (proportional controller maladjusted).	Reset to the permissible value or replace; ⁎2.
Oil separator cartridge contaminated.	Measure the differential pressure and if greater than 15 psi, replace. See chapter 9.3.4 for replacement.
Compressor oil filter cartridge contaminated.	Replace, see chapter 9.3.3.
Oil level too low.	Top up, see chapter 9.3.1.
Leaky oil pipes.	Seal or replace the oil pipes; ⁎1 or ⁎2.
Motor water cooling system or cooling fan defective.	Repair; ⁎3 or ⁎1.
Ambient temperature too high.	See installation conditions chapter 1.6.

8.6.7 Charging control lamp does not extinguish

Possible cause:	Fault removal:
Connections and/or cable in the electrical wiring loose or open circuit.	Tighten, if necessary, replace; ⁎1.
Defective motor generator.	Replace if necessary; ⁎3 oder ⁎1.
Motor oil pressure too low.	⁎3 or ⁎1.

8.6.8 High concentration of oil in the compressed air

Possible cause:	Fault removal:
Oil return line of the oil separating cartridge blocked.	Clean the filter screen in the dirt trap of the oil separating cartridge, replace if necessary (see chapter 9.3.4); otherwise ⁎2
Oil separating cartridge of the compressor fractured.	Replace, see chapter 9.3.4.
Compressor oil level too high.	Reduce to max. level, see chapter 9.3.1.

8.6.9 Oil runs out of the compressor air filter after switching off

Possible cause:	Fault removal:
Non return function of the inlet valve defective.	Repair, replace if necessary; ⁎2

9 Maintenance

9.1 Observe the following rules during all maintenance and servicing:

Only specialised or trained personnel may work on power driven equipment.

Before starting the compressor unit, ensure that:

1. No maintenance personnel are working on the compressor unit.

2. All protective guards and cover panels are screwed back on.

3. All tools are removed from the compressor unit.

The following points must be observed when handling fuel, oil, lubricating and cooling materials:

Avoid contact with skin and eyes.
Do not inhale vapours and oil mist.
Do not eat or drink when handling such materials.
Fire, open flame and smoking are strictly forbidden.

Before starting work, disconnect the negative cable of the battery / batteries to prevent an inadvertent start of the compressor unit.

☞ See chapter 8.2 to start the compressor unit.

9.2 Maintenance Instructions

The maintenance instructions for the motor are found in the motor service manual!

☞ Before starting repair work or maintenance clean the compressor unit, especially connections and screw joints of all oil or protective agents.

☞ Do not use aggressive cleaning materials!
Use non–fibrous cloth!

Attention! **Always tighten down any screw connections that have been loosened during maintenance work.**

Ensure that all lubricants, consumable materials and replacement parts accumulating during operation and servicing of the compressor package are disposed of according to environmental regulations.

9.3 Regular Maintenance

Compressor maintenance:		
Interval	**Maintenance tasks**	**see chapter**
Daily	Check inlet air filter maintenance indicator.	8.4
	Check the oil level.	9.3.1
50h after initial start–up	Replace the compressor oil filter.	9.3.3
Six–monthly (every 200 – 250h)	Clean or replace the air filter*.	9.3.5
	Clean the oil cooler*.	9.3.7
Additional annual tasks (every 400 – 500h)	Have the pressure relief valve checked.	9.3.15
Every 1000h	Change compressor oil*.	9.3.2
	Replace the compressor oil filter*.	9.3.3
Every 2 years	Change the oil separator cartridge in the oil separator tank*.	9.3.4

h = operating hours

* The maintenance intervals given are recommended intervals and could shorten considerably under unsuitable ambient or operational conditions.

Motor maintenance:		
Interval	**Maintenance tasks**	**see chapter**
Daily	Check the oil level.	motor SM
	Check inlet air filter maintenance indicator.	8.4
50h after initial start–up	Change the motor oil*.	9.3.12, motor SM
	Change the motor oil filter*.	motor SM
Every 100h	Check V–belt tension, if necessary, adjust the tension.	9.3.14, motor SM
Six–monthly (every 200 – 250h)	Clean the air filter*.	9.3.6
	Change the motor oil*.	9.3.12, motor SM
	Change the motor oil filter*.	motor SM
Additional annual tasks (every 400 – 500h)	Replace the air filter*.	9.3.6
	Replace the V–belts.	9.3.14, motor SM
	Adjust the valve clearance.	motor SM, specialist workshop
Every 1500h	Have the fuel injectors checked.	specialist workshop
Every 3000h	Have the fuel injection pump checked.	

h = operating hours

* The maintenance intervals given are recommended intervals and could shorten considerably under unsuitable ambient or operational conditions.

motor SM ⇒ refers to motor service manual.
See this manual for further maintenance instructions.

Motor radiator maintenance:		
Interval	**Maintenance tasks**	**see chapter**
Daily	Check the motor coolant level.	9.3.10 , motor SM
Six–monthly (every 200 – 250h)	Clean the radiator*	9.3.7
	Check the antifreeze.	9.3.10
	Check the radiator hoses and hose clamps.	motor SM
Every 3 years	Check the antifreeze protection, change the motor coolant if necessary.	9.3.10

h = operating hours

* The maintenance intervals given are recommended intervals and could shorten considerably under unsuitable ambient or operational conditions.

motor SM ⇒ refers to motor service manual.
See this manual for further maintenance instructions.

Fuel system maintenance:		
Interval	**Maintenance tasks**	**see chapter**
Daily	Fill up the fuel tank.	
Every 50 h	check the fuel hoses and hose clamps, replace if necessary	motor SM
Every 100h	Clean the fuel filter.	motor SM
annually (every 400 – 500h)	Clean the tank fuel strainer.	
	Clean the tank.	
	Replace the fuel filter.	motor SM

h = operating hours

motor SM ⇒ refers to motor service manual.
See this manual for further maintenance instructions.

Fuel water separator maintenance:		
Interval	**Maintenance tasks**	**see chapter**
Daily	Check the fuel water separator.	9.3.11
annually (every 400 – 500h	Change the water separator filter.	

h = operating hours

Battery maintenance:		
Interval	**Maintenance tasks**	**see chapter**
annually (every 400 – 500h)	Check the terminals and the electrolyte level in the batterie.	9.3.9

h = operating hours

Chassis maintenance:		
Interval	**Maintenance tasks**	**see chapter**
Daily	Check the tyre pressures.	9.3.13, CM–SM
50h after initial start–up	Retighten the wheel bolts.	
Six–monthly (every 200 – 250h)	Retighten the wheel bolts.	

h = operating hours

CH SM ⇒ refers to separate manual for “Chassis Maintenance”

Lifting eye inspection:		
Interval	**Maintenance tasks**	**see chapter**
annually (every 400 – 500h)	Have the lifting eye inspected.	specialist workshop

h = operating hours

Door maintenance:		
Interval	**Maintenance tasks**	**see chapter**
annually (every 400 – 500h)	Grease the door hinges.	
	Carry out rubber sealing strip maintenance.	9.3.8

h = operating hours

General maintenance tasks		
Interval	**Maintenance tasks**	**see chapter**
annually (every 400 – 500h)	Check all accessible fittings, screw connections, pipes and clamps for wear and tightness.	
	Check hoses for air–tightness and wear.	

h = operating hours

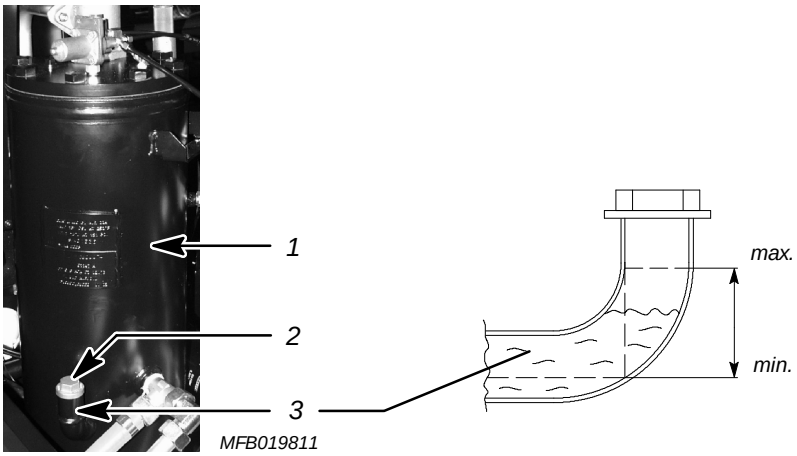
We urgently recommend that a record is kept of all maintenance carried out.
A sample maintenance record form is shown in chapter 11.4.

9.3.1 Check/top up the oil in the oil separator tank

Carry out the check with the compressor unit standing horizontally, with the compressor unit switched off and with the oil separator tank vented.

Oil level check:

- ☞ Shut down the compressor unit (see chapter 8.2).
- ☞ Wait until the compressor has automatically vented (check that the pressure gauge indicates zero psig)!
- ☞ Open the right–hand access door.
- ☞ Disconnect the minus pole of the battery.
- ☞ Uncouple all consumers and open the discharge valve.



1 Oil separator tank
2 Plug
3 Oil filler
max. – maximum oil level
min. – minimum oil level

☞ Unscrew the oil filler cap.

☞ Check that oil is visible.

☞ If none can be seen, top up.

Top off the oil:

Attention! **The oil should never exceed the normal quantity otherwise operational malfunctions could occur. If too much oil is added, oil will enter the air control valve upon restarting, cause malfunctioning regulation and enrichment of the compressed air with excess oil.**

Attention! **Always use the same type of oil (see label on the oil separator tank, or chapter 1.7).**
Contrary to the diesel motor, a mixture of different oils for compressor lubrication may never be used!

☞ Top off with oil to the maximum mark using an oil funnel.

☞ Check the oil level again.

☞ Check the sealing ring of the oil filler plug and then screw in tightly.

☞ Connect the negative cable of the battery again.

Exact check of oil level and for leaks:

There is a danger of injury through contact with:
– very hot surfaces.
– rotating parts.
– electrically conductive components.

The sound proofing measures are ineffective when the maintenance panels are open!
Hearing protection should be worn.

☞ Start the compressor unit and allow to run until the operating temperature (see chapter 1.1) is reached (the oil circulation is then in operation).

Check the oil level again as follows:

☞ Run the compressor in ‘off load’ (with no consumers connected) and close the outlet valves (maximum system pressure).

☞ Shut down the compressor (see chapter 8.2).

☞ Wait until the compressor has automatically vented (check that the pressure gauge reads zero psig).

Check the oil level (see ‘Oil Level Check’, chapter 9.3.1).

☞ Top off the oil if necessary.

☞ Carry out a visual test for leaks.

☞ Close the maintenance panel.

9.3.2 Compressor oil change (oil separator tank and oil cooler)

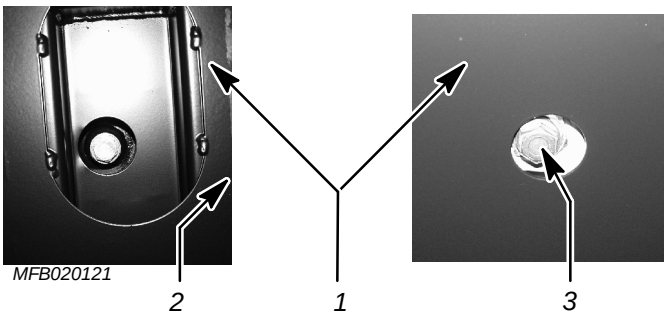
Change the oil with the compressor unit at operational temperature.

The cooling oil can get very hot, beware of scalding!

- ☞ Shut down the compressor unit (see chapter 8.2).
- ☞ Wait until the compressor has automatically vented (check that the pressure gauge indicates zero psig)!
- ☞ Open the right–hand access door.
- ☞ Disconnect the minus pole of the battery.
- ☞ Uncouple all consumers and open the discharge valve.
- ☞ Unscrew the oil filler stud.

Capture the used oil in a suitable container and dispose according to environmental care regulations!

- ☞ Drain the oil separator tank by unscrewing the oil drain plug, located on the underside of the tank (accessible from underneath through the access hole in the floor panel).
- ☞ Drain the oil cooler by unscrewing the separate drain plug, located on the bottom of the oil collection box (accessible from underneath through the access hole in the floor panel).



1 Underside of flor pan
2 Oil drain port with screw plug on the oil separator tank
3 Oil cooler drain plug

Attention! **Drain the oil from the oil separator tank, oil cooler and the oil pipelines completely.**

- ☞ Change the oil filter cartridge if necessary (see chapter 9.3.3).
- ☞ Fit new ring seals on both drain plugs and screw them back in again.
- ☞ Top off with new oil using a funnel (see label on the oil separator tank or chapter 1.7 for the type of oil used).

Attention! **Never exceed the maximum oil quantity, otherwise damage may occur.**

- ☞ Check the oil level (see chapter 9.3.1).
- ☞ Screw in the oil filler plug again and tighten down.
- ☞ Reconnect the negative cable of the battery.

Exact check of oil level and for leaks:

There is a danger of injury through contact with:
– very hot surfaces.
– rotating parts.
– electrically conductive components.

The sound proofing measures are ineffective when the maintenance panels are open!
Hearing protection should be worn.

☞ Start the compressor unit and allow to run until the operating temperature (see chapter 1.1) is reached (the oil circulation is then in operation).

Check the oil level again as follows:

☞ Run the compressor in 'off load' (with no consumers connected) and close the outlet valves (maximum system pressure).

☞ Shut down the compressor (see chapter 8.2).

☞ Wait until the compressor has automatically vented (check that the pressure gauge reads zero psig).

Check the oil level (see 'Oil Level Check', chapter 9.3.1).

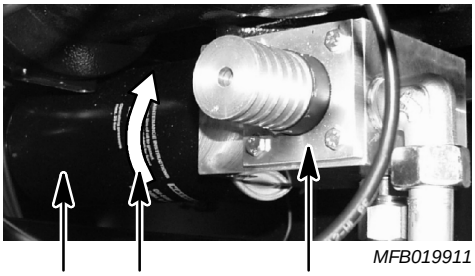
☞ Top off the oil if necessary.

☞ Carry out a visual test for leaks.

☞ Close the maintenance panel.

9.3.3 Compressor oil filter cartridge change

The cooling oil can get very hot, beware of scalding!



1 Oil filter
2 Direction of spin to remove oil filter
3 Combination valve

☞ Shut down the compressor unit (see chapter 8.2).

☞ Wait until the compressor has automatically vented (check that the pressure gauge indicates zero psig)!

☞ Open the right–hand access door.

☞ Disconnect the minus pole of the battery.

☞ Uncouple all consumers and open the discharge valve.

Dispose of the old oil filter and any used, accumulated oil according to environmental regulations!

☞ Unscrew the contaminated oil filter cartridge counter–clockwise and dispose of (if the filter cartridge is seized, use an appropriate tool to remove).

☞ Capture and dispose of any leaking oil.

☞ Carefully clean sealing surfaces using non–fibrous cloth.

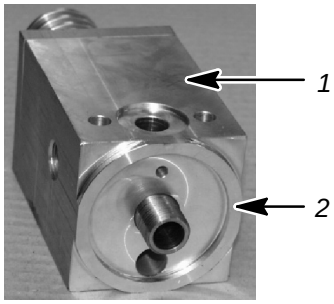
Lightly oil the sealing gasket of the new oil filter cartridge, using fresh oil.

☞ Use your fingers to apply a light coat of fresh oil to the seal of the new cartridge.

Attention! **Do not use a filter wrench when installing a new oil filter cartridge. Hand–tighten only!**

☞ Screw on the new oil filter cartridge by hand until the gasket is firmly seated.

☞ Firmly hand–tighten the new cartridge.



1 Combination valve
2 Sealing face

☞ Check the oil level in the oil separator tank (see chapter 9.3.1).

☞ Reconnect the negative cable of the battery.

Exact check of oil level and for leaks:

There is a danger of injury through contact with:
– very hot surfaces.
– rotating parts.
– electrically conductive components.

The sound proofing measures are ineffective when the maintenance panels are open!
Hearing protection should be worn.

☞ Start the compressor unit and allow to run until the operating temperature (see chapter 1.1) is reached (the oil circulation is then in operation).

Check the oil level again as follows:

☞ Run the compressor in ‘off load’ (with no consumers connected) and close the outlet valves (maximum system pressure).

☞ Shut down the compressor (see chapter 8.2).

☞ Wait until the compressor has automatically vented (check that the pressure gauge reads zero psig).

Check the oil level (see ‘Oil Level Check’, chapter 9.3.1).

☞ Top off the oil if necessary.

☞ Carry out a visual test for leaks.

☞ Close the maintenance panel.

9.3.4 Oil separator cartridge change

References to numbers in ( ) refer to the numbers in the following illustration.

The differential pressure across the cartridge may not exceed 15 psi.

☞ Shut down the compressor unit (see chapter 8.2).

☞ Wait until the compressor has automatically vented (check that the pressure gauge indicates zero psig)!

☞ Open the right–hand access door.

☞ Disconnect the minus pole of the battery.

☞ Uncouple all consumers and open the discharge valve.

Changing

☞ Unscrew the fittings (1 + 4) and carefully put the parts to one side; pull out the copper pipe (3) from position (2).

☞ Loosen the plug to the solenoid valve (15) and carefully withdraw the cable.

☞ Loosen the fitting (7) and carefully push the air pipe on the minimum pressure/check valve to one side.

☞ Remove the oil separating tank cover retaining screws (9), carefully lift the cover (8) and place to one side.

The oil separator element cannot be cleaned.
Dispose of parts and materials contaminated with oil in accordance with local environment protection regulations.

☞ Take out the old oil separator cartridge(14) together with the gaskets (12) and dispose of according to environmental regulations.

Attention!

When cleaning the sealing surfaces take care that no foreign bodies (dirt particles) fall into the oil separator tank.

☞ Wipe all sealing faces with a cleaning rag.

The metal parts of the oil separator cartridge must be at ground potential, which means that electrically conductive gaskets are needed.
The gaskets (12) are fitted with metal clips (13) that fulfil this requirement and provide an electrical path to the oil separator tank and to the frame of the machine.
Do not remove the metal clips!

☞ Insert the new oil separator cartridge with gaskets and re–fix the cover.

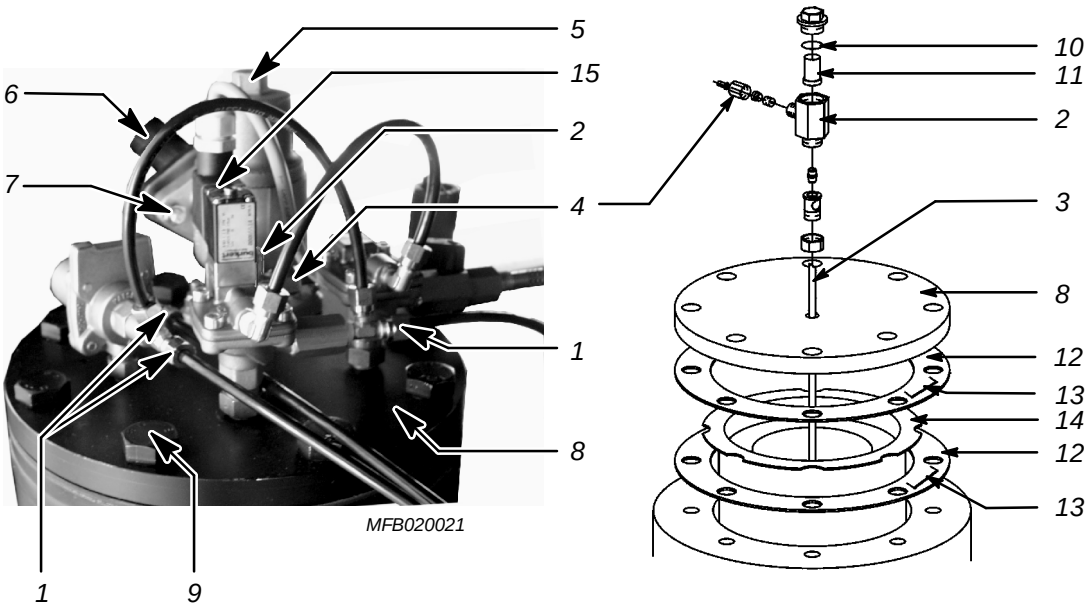
☞ Renew the dirt trap (2) strainer and O–ring.

☞ Connect the air pipe to the minimum pressure/check valve.

☞ Replace and tighten all fittings.

☞ Check the oil level in the separator tank.

☞ Reconnect the battery negative terminal.



1 *Union nut for control air line*
2 *Dirt trap*
3 *Oil return line*
4 *Union nut for oil return line*
5 *Minimum pressure/check valve*
6 *Air pipe*
7 *Pipe union*
8 *Cover*
9 *Cover bolts*
10 *O–ring*
11 *Strainer*
12 *Gasket*
13 *Metal clips*
14 *Oil separator cartridge*
15 *Solenoid valve*

Exact check of oil level and for leaks:

There is a danger of injury through contact with:
– very hot surfaces.
– rotating parts.
– electrically conductive components.

The sound proofing measures are ineffective when the maintenance panels are open!
Hearing protection should be worn.

☞ Start the compressor unit and allow to run until the operating temperature (see chapter 1.1) is reached (the oil circulation is then in operation).

Check the oil level again as follows:

☞ Run the compressor in ‘off load’ (with no consumers connected) and close the outlet valves (maximum system pressure).

☞ Shut down the compressor (see chapter 8.2).

☞ Wait until the compressor has automatically vented (check that the pressure gauge reads zero psig).

Check the oil level (see ‘Oil Level Check’, chapter 9.3.1).

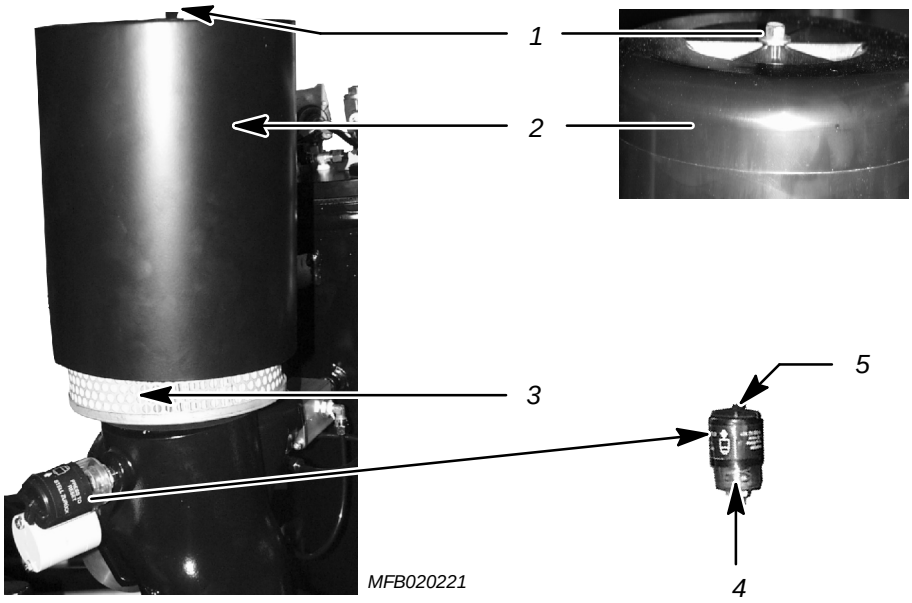
☞ Top off the oil if necessary.

☞ Carry out a visual test for leaks.

☞ Close the maintenance panel.

9.3.5 Clean / replace the compressor air intake filter

Clean the compressor air intake filter at the latest when the maintenance indicator activates (see chapter 8.4).



1 *Screw connection (hexagon bolt)*
2 *Filter housing, open*
3 *Air filter element*
4 *Maintenance indicator*
5 *Reset knob for the maintenance indicator*

☞ Shut down the compressor (see chapter 8.2.2).

☞ Open the left–hand door.

To open the filter housing:

☞ Unscrew the screw connection on the cover assembly.

☞ Remove the cover assembly and gently pull out the air filter cartridge.

☞ Clean the filter housing, cover assembly and sealing surfaces.

Cleaning the air filter cartridge by tapping:

Attention! **Do not use force, otherwise the the air filter cartridge may be damaged.**

☞ Tap the air filter cartridge several times on the front with the ball of the hand so that the dust falls out.

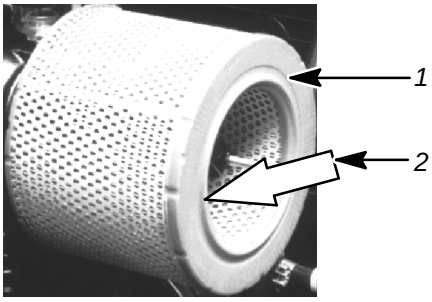
☞ Clean all seating surfaces.

Cleaning the air filter cartridge with compressed air:

Do not direct compressed air toward any person.
Compressed air is contained energy and as such, dangerous to life.

Attention! **Do not clean the air filter cartridge with fluids.**
If the air filter cartridge is heavily contaminated or has been cleaned several times (max. five times, at the latest after a period of one year) then it must be renewed.

☞ Blow dry compressed air at a pressure of not more than 72.5 psig at a slant from the inside to the outside of the air filter cartridge surfaces.



1 Air intake filter cartridge
2 Direction of blow out (from the inside to the outside!)

Reassembling the air filter:

☞ Insert the cleaned or new filter cartridge in the filter housing.

☞ Replace the cover assembly and screw the screw connection on the cover assembly.

Resetting the maintenance indicator:

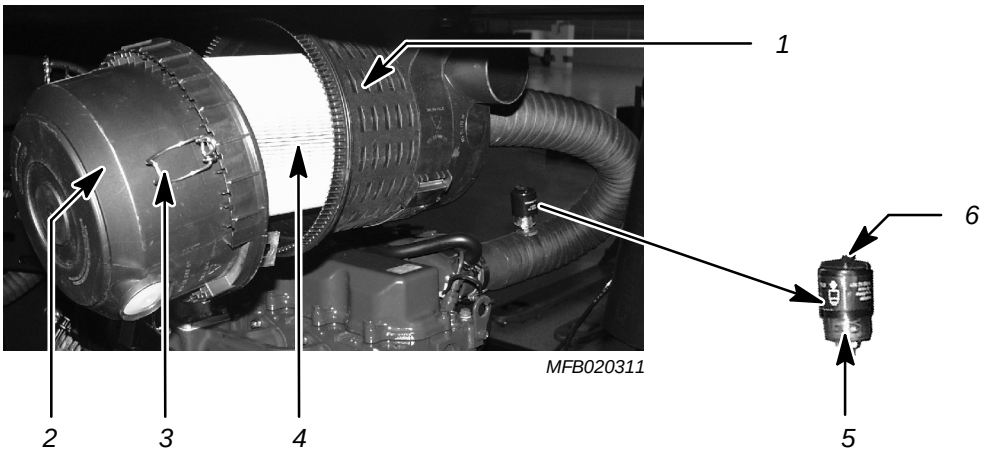
☞ When filter maintenance is finished, press the reset button of the maintenance indicator.

The maintenance indicator is ready for operation again.

☞ Close the access door.

9.3.6 Clean/replace the motor air filter

Clean the motor air filter at the latest when the maintenance indicator activates (see chapter 8.4).



1 Filter housing, open
2 Filter cap
3 Retaining clamp
4 Air filter element
5 Maintenance indicator
6 Reset knob for the maintenance indicator

☞ Shut down the compressor (see chapter 8.2.2).

☞ Open the left–hand door.

To open the filter housing:

☞ Undo the spring clamp on the cap. Remove the cap and gently pull out the air filter cartridge.

☞ Clean the filter housing, cap and sealing surfaces.

Cleaning the air filter cartridge by tapping:

Attention! **Do not use force, otherwise the the air filter cartridge may be damaged.**

☞ Tap the air filter cartridge several times on the front with the ball of the hand so that the dust falls out.

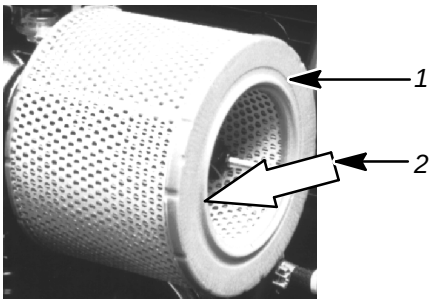
☞ Clean all seating surfaces.

Cleaning the air filter cartridge with compressed air:

Do not direct compressed air toward any person.
Compressed air is contained energy and as such, dangerous to life.

Attention! **Do not clean the air filter cartridge with fluids.**
If the air filter cartridge is heavily contaminated or has been cleaned several times (max. five times, at the latest after a period of one year) then it must be renewed.

☞ Blow dry compressed air at a pressure of not more than 72.5 psig at a slant from the inside to the outside of the air filter cartridge surfaces.



1 Air intake filter cartridge
2 Direction of blow out (from the inside to the outside!)

Reassembling the air filter:

☞ Insert the cleaned or new filter cartridge in the filter housing.

☞ Replace the filter cap and affix with the spring clamps.

Resetting the maintenance indicator:

☞ When filter maintenance is finished, press the reset button of the maintenance indicator.

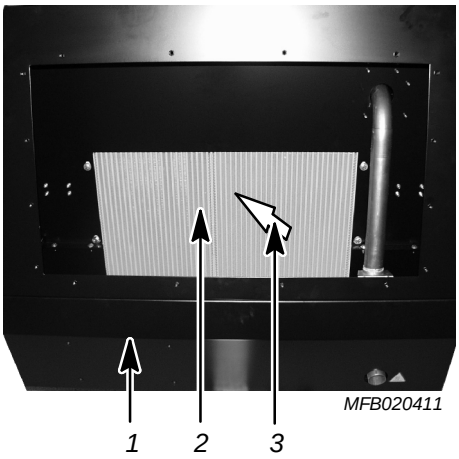
The maintenance indicator is ready for operation again.

☞ Close the access door.

9.3.7 Cleaning the cooler

Check the oil and coolant radiator according to maintenance schedule (see chapter 9.3) as heavy clogging of the radiator grill and cells can cause overheating of the oil circulation system and the motor.

- ☞ Shut down the compressor unit (see chapter 8.2.2) and allow to cool.
- ☞ Open the left–hand door.
- ☞ Disconnect the battery / batteries (see chapter 9.3.9).
- ☞ Close the air intakes of the motor and compressor air filters (see chapter 7.3.1).
- ☞ Cover electrical components such as the generator, starter or instruments.
- ☞ Unscrew and remove the sound proofing from the cooler grill air outlet.



1 Rear panel of compressor, sound insulation (radiator grill) removed
2 Cooler air outlet
3 Cleansing direction of the impacting water or steam jet (from outside to inside)

Do not direct compressed air, water or steam jets toward any person. These represent contained energy and as such, are dangerous to life.

The soiled cooler grill may be cleaned with water or steam jet at cleaning points with oil separators suited for such purpose only!

Attention! **Do not direct water or steam jets directly at sensitive components such as the generator, starter or the instruments.**

- ☞ Clean the cooler grill with compressed air, water or steam jet in the opposite direction to the cooling air flow.
- ☞ Screw on the soundproofing again.
- ☞ Open the inlets of the air filters again.
- ☞ Reconnect the battery / batteries.
- ☞ Close the access door.
- ☞ Put the compressor into operation (see chapter 8.2.1) and run up to operating temperature so that any accumulated water evaporates.

9.3.8 Rubber sealing strip maintenance

The rubber sealing strips between the lower body and the access panels serve both as a soundproofing measure and the prevention of rain water ingress.

Care of the rubber sealing strips is especially necessary during the winter months to prevent the strips from sticking and thus tearing when the access panels are opened.

- ☞ Grease the rubber sealing strips regularly with silicon oil or Vaseline.

9.3.9 Battery maintenance

When working on the batteries, observe the following points:

1. **Fire, sparks, open flames and smoking are forbidden.**
2. **Eye protection must be worn.**
3. **Keep children well away from batteries or acid.**
4. **Batteries contain corrosive acid.**

   Wear appropriate protective clothing including acid–proof rubber gloves.
   Do not tip the batteries as acid can escape from vent holes.
5. **Observe the battery manufacturer's instructions.**
6. **Explosion hazard.**

   Take particular care when the battery has been in service for a long time or has just been charged as highly explosive gas is emitted.
   Ensure adequate ventilation.

Do not remove battery terminal covers unnecessarily.
Do not lay tools on the battery if the terminals are uncovered because of the danger of a short circuit resulting in heat build–up and battery explosion.

Danger sticker on battery

Winter operation:

Be advised that the available battery power is lower during the winter. Only a fraction of the original starting energy is available at low temperatures.

Attention! **A discharged battery is endangered by freezing temperatures and could freeze at a temperature of 14 ° F.**

☞ Check the battery charge with a hydrometer before the start of the cold season and recharge, if required. At the same time, clean and grease the poles with acid–proof grease, if necessary.

In extreme cases, the use of a high performance cold–start battery or an additional battery is recommended.

Shutdown of the compressor unit for several weeks under freezing conditions:

☞ Remove the battery and store in a warm place to prevent the battery freezing!

Battery removal:

Never short circuit the battery (e.g. with a tool) because the battery heats excessively under short circuit conditions and could explode.

Attention! **Do not disconnect the battery with the motor running otherwise the regulator and the generator diodes could be destroyed.**
If the battery discharges for no apparent reason, check the charging system.

☞ First disconnect the negative cable and then the positive cable, then unscrew the battery clamping system.

☞ Reassemble in the reverse order.

Battery replacement:

If the battery must be replaced, fit a new battery of equal capacity, current rating and shape as the original battery.

Dispose of the old battery according to environmental regulations!

9.3.10 Checking the Motor Coolant

Check the motor coolant daily before putting the compressor into operation.

The coolant is a mixture of water, antifreeze and corrosion inhibitor.
Because of the need for the corrosion inhibitor and need to raise the boiling point, the coolant must remain in the cooling system throughout the whole year.

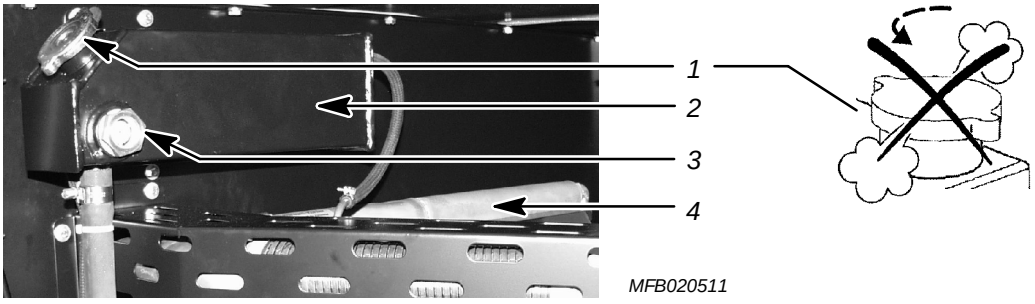
Attention! **The coolant must be renewed every two years because of degradation of the corrosion inhibitor.**

☞ Shut down the compressor (see chapter 8.2).

☞ Wait until the compressor has automatically vented.
(The pressure gauge must show zero psig!)

See chapter 1.3 for the quantity of coolant.

The expansion tank is located directly above the radiator.



1 Filler cap
2 Coolant expansion tank
3 Coolant level eye glass
4 Cooler

☞ Open the left–hand door.

Attention! **Danger of scalding! Open the filler cap of the motor cooling system only when the coolant temperature has fallen below 194 ° F.**

Danger of acid burns! Do not allow coolant to come into contact with the eyes or skin. If the coolant comes into contact with the eyes rinse immediately with running water.

☞ Turn the filler cap on the coolant filler neck to the first stop, allow pressure to escape.

☞ Remove the filler cap.

Checking the coolant level / topping up:

The component of antifreeze/corrosion inhibitor agent in the coolant should not fall below 40 vol.–% (corresponds to antifreeze protection down to approx. –13˚F).

When topping up (after loss of coolant) an antifreeze/corrosion inhibitor component of at least 50 vol.–% (corresponds to antifreeze protection down to approx. –34.6˚F) must be ensured.

The component should not exceed 55 vol.–% (corresponds to antifreeze protection down to approx.–49˚F = max. antifreeze protection), because below this ratio the antifreeze properties are reduced and heat dissipation worsens.

Make sure that there is sufficient room for expansion when the coolant is hot.
The coolant must be visible in the level glass, but should not be higher than 1,2 inch below the below the filler neck.

☞ Check the level of the coolant.

☞ Mix a quantity of antifreeze and top up to the mark.

☞ Screw on the filler cap.

☞ Start the motor and run for approx. one minute.

☞ Stop the motor.

☞ Turn the filler cap to the first stop, allow pressure to escape

☞ Remove the filler cap.

☞ Top up the coolant to the mark again.

Checking the antifreeze/corrosion inhibitor in the coolant:

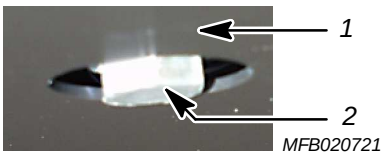
The antifreeze protection must be –34.6˚F throughout the whole year.

☞ Check the component of antifreeze agent in the coolant with an antifreeze tester.

If the antifreeze component is below 40% then top up with pure antifreeze agent or change the coolant.

☞ To drain the coolant see motor service manual.

The drain plug is located at the bottom left of the radiator.



1 Underside of floor pan
2 Water cooler drain plug

☞ Close the access door.

9.3.11 Maintaining the fuel de–watering filter unit

A combined fuel de–watering and filter unit is installed between the fuel tank and the pump.

A check should be made daily for accumulated water and dirt.
The de–watering filter unit should be emptied as required.

Water trap emptying:

☞ Switch off the compressor unit (see chapter 8.2).

☞ Wait until the compressor has automatically vented .
(Check that the pressure gauge indicates zero psig!)

☞ Open the left–hand door.

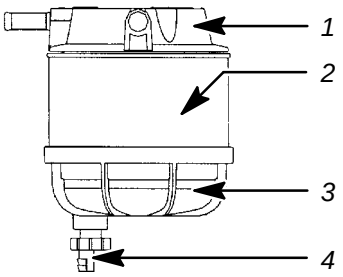
Water, being denser than diesel fuel, sinks to the bottom of the separator. The presence of water can be detected by the colour of the fuel.

☞ Place a collecting container under the drain plug.

☞ Loosen the drain screw in the underside of the separator and allow separated water and dirt particles to run out.

☞ Re–tighten drain plug

☞ Close the access door.



1 Filter head
2 Filter element
3 Separator tank
4 Drain plug

Changing the filter element

The filter element of the fuel de–watering unit should be changed:

- at least every 500 operating hours,
- if the motor cannot draw in enough fuel and loses power,
- when changing the motor fuel filter.

The interval between filter element changes is dependent on fuel quality and cleanliness.

Attention! **The fuel tank should be nearly empty when the filter element is changed.**

☞ Switch off the compressor unit (see chapter 8.2).

☞ Wait until the compressor has automatically vented .
(Check that the pressure gauge indicates zero psig!)

☞ Open the left–hand door.

Any contaminated fuel must be collected and disposed of, along with the old filter element, in accordance with local environmental regulations.

☞ Place a collecting container under the drain plug.

☞ Open the drain screw on the underside of the separator bowl and drain the unit.

☞ Unscrew the filter element from the filter head (anti–clockwise).

- ☞ Unscrew the separator bowl from the filter element and clean the bowl.
- ☞ Check the gasket and replace if damaged, lightly smear the gasket with clean fuel and check that it is positioned correctly.
- ☞ Screw the separator bowl onto a new filter element.
- ☞ Check the filter head gasket and replace if damaged, lightly smear the gasket with clean fuel and check that it is positioned correctly.
- ☞ Check that the drain screw on the underside of the unit is closed and fill the filter element with clean fuel.
- ☞ Screw the filter element carefully into the filter head.
- ☞ Close the access door.

9.3.12 Motor oil change

Change the motor oil, depending upon the contamination of the intake air, according to maintenance schedule (see chapter 9.3), but at least annually.

Carry out the first oil change see maintenance schedule (see chapter 9.3) too.

Always change the oil with the motor at operational temperature.

Scalding hazard
Motor oil can get very hot.

- ☞ Shut down the compressor unit (see chapter 8.2.2).
- ☞ Open the doors.
- ☞ Disconnect the minus pole of the battery / batteries.

Catch the drained oil in a suitable container and dispose of according to environmental care regulations!

An opening is located in the floor panel directly below the oil drain plug.
Place a suitable container underneath this opening to catch the used oil.

- ☞ Position the container.
- ☞ Carry out the oil change as described in the motor service manual.
- ☞ Reconnect the minus pole of the battery / batteries.
- ☞ Close the access doors.

9.3.13 Chassis maintenance

Further instructions are given in the separate manuals:

- ”Chassis maintenance”,
- Manufacturer’s service manual(s).

All repairs , adjustments and modifications must be performed by authorized specialist workshop.

Wheels:

Check the wheels after the first stress run and after each wheel change.
Check the wheels for tightness, condition and tire pressures every 200 service hours.

- ☞ Check the tightness of the wheel nuts and the condition of the tires.
- ☞ Check the tire pressures with a tire pressure gauge (see chapter 1.1 for the tire pressure values).

The chassis is maintenance–free.

9.3.14 Checking motor fan belt tension

Check the belt tension according to maintenance schedule (see chapter 9.3).

Stop the motor before checking, tensioning or changing motor V–belts. Do not tension or loosen the belts as long as they are hot.

- ☞ Shut down the compressor (see chapter 8.2).
- ☞ Wait until the compressor has automatically vented.
  (The pressure gauge must read zero psig)
- ☞ Open the doors.
- ☞ Remove the belt guard, if necessary. See motor service manual for removal.
- ☞ Check the belts thoroughly for cracks, fraying or stretching.

Replace damaged belts. See motor service manual for removal and replacement.

Checking the tension of the V–belts:

Check belt tension when they are hot.

The belts should allow themselves to be pushed in by between 0.28 and 0.35 inches under a pressure of approximately 22 lb.

- ☞ Press with the thumb on the the belt midway between the pulleys.

See motor service manual for tensioning the V–belts.

- ☞ Reassemble the belt guard.
- ☞ Close the access doors.

9.3.15 Checking the safety relief valve

To check the operating pressure of the safety relief valve / valves the final pressure of the compressor package must be increased above the adjusted maximum working pressure.

See chapter 1.5 for the operating pressure.

Attention! **The safety relief valve must be checked by an authorized KAESER service agency when the interval quoted in the regular maintenance table (see chapter 9.3) has expired.**

10 Spare Parts and After Sales Service

10.1 Service parts and expendable parts

Description	Quantity	Order No.
Compressor parts:		
Air filter cartridge	1	6.4566.0
Oil filter cartridge	1	6.3464.1
Oil separator cartridge complete	1	6.4579.0
Oil separator cartridge	1	6.4541.0
Flat gasket	2	5.5524.0
O–Ring 18,0 x 2,00	1	5.1517.0
Dirt trap strainer	1	2.8699.0
Sealing ring for the oil filler	1	5.1522.0
Fuse 50 [A]	1	7.6411.0
Fuse 25 [A]	1	7.6411.00070
Fuse 20 [A]	1	7.6411.00080
Fuse 15 [A]	1	7.6411.00060
Compressor oil:		
KAESER SIGMA FLUID S–460	5 gal	9.5409.00010
Motor oil:		
SAE 10W–40	5.3 gal	8.7817.00020
Kubota motor parts:		
Air filter cartridge	1	6.3540.0
Fuel filter	1	8.7766.0
Fuel filter change element	1	6.4550.0
Oil filter	1	8.7769.0
Injector sealing ring	1	8.7764.0
Injector, complete	1	8.7763.0
V–belt	1	8.7773.0
Glow plug	4	8.7774.0

Please state the following data for all inqueries and spare parts orders (see also the nameplate):

- Compressor unit, model
- Serial number of the compressor unit
- Name of the part
- Order number of the part

In case of warranty, state the following information:

- Date of first putting into operation
- Serial number of the compressor unit
- Serial number of the motor

Important: Enter the data on the nameplate on the unit in the following illustrated nameplate!

KAESER COMPRESSORS

Package type: . . . . . .
Serial no.: . . . . . .
Part no.: . . . . . .
Vehicle ID no.: . . . . . .
Total weight: . . . . . . **lbs**
Permissible axle loading: . . . . . **lbs**
Working pressure (g): . . . . . **psi**
Vessel capacity: . . . . . **gal**
Motor speed: . . . . . **rpm**
Constr. year: . . . . . .

Attention! **Do not use inferior parts. Always order original spare parts from the compressor manufacturer to avoid lower quality spare parts in your own compressor unit.**

We must point out that service parts not delivered by Kaeser Compressors, Inc. are also not tested and cleared by us. The fitting and/or use of such products can, under certain circumstances, change constructional and conditional characteristics of the compressor unit negatively and therefore affect the active and/or passive safety of the unit.

KAESER COMPRESSORS is released from all liabilities and warranties for damages caused by the use of non–original KAESER COMPRESSORS parts and accessories.

10.2 Motor Servicing

A booklet giving the addresses and telephone numbers of authorized dealers providing service and spare parts is enclosed with the technical documents for the motor.

11 Appendix

11.1 Wiring Diagram

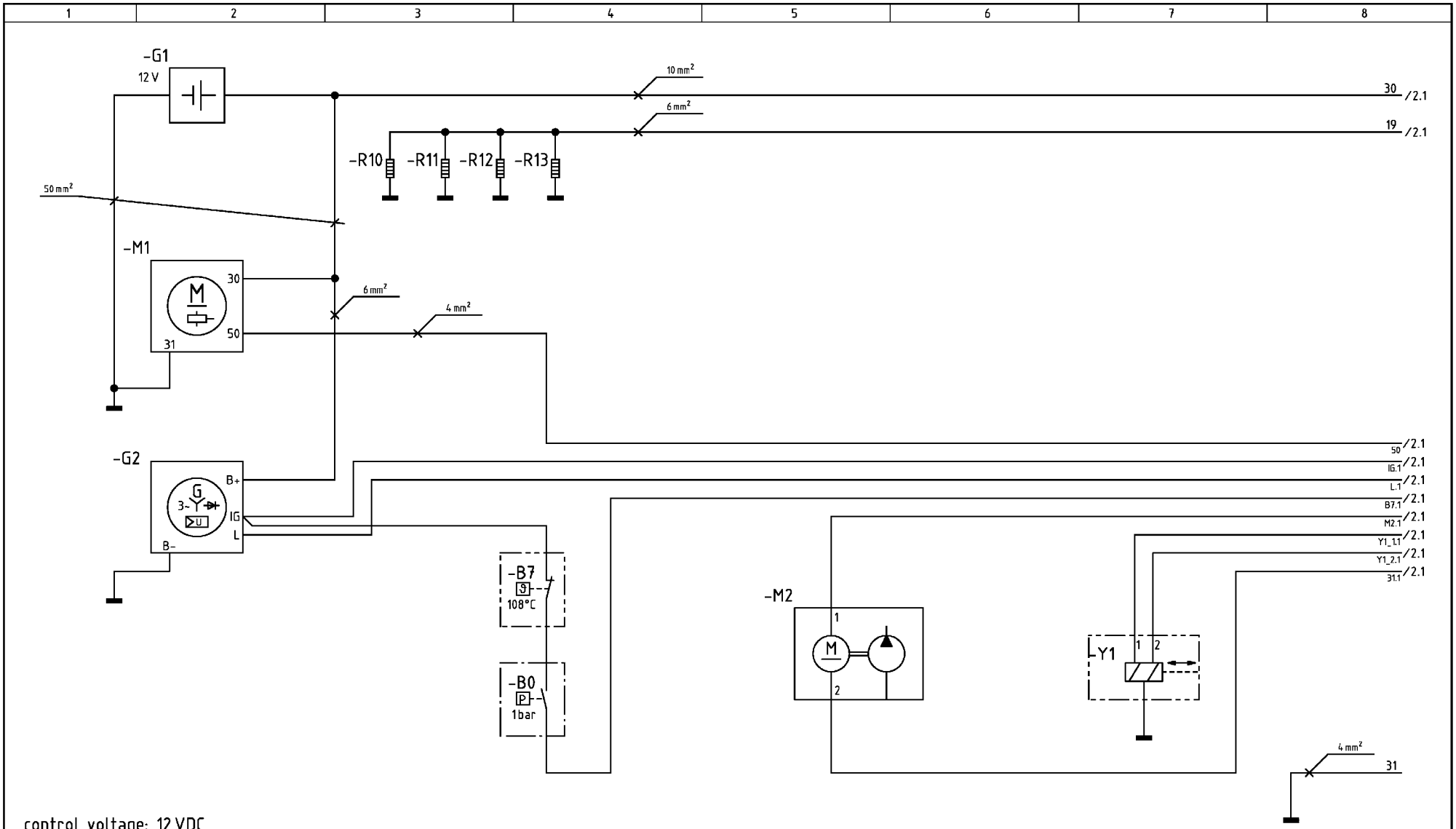
Wiring Diagram

MOBILAIR M57

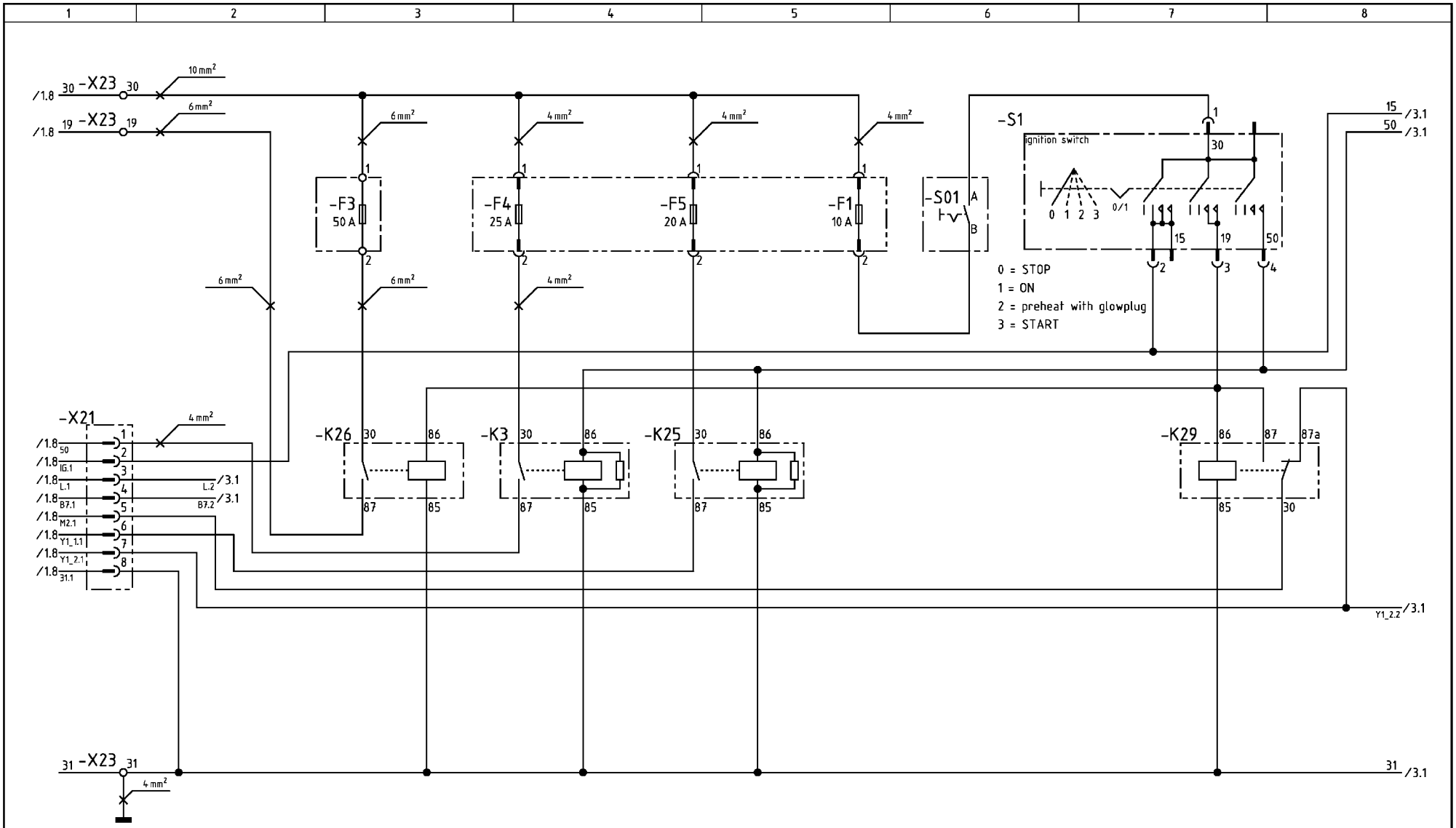
KUBOTA-motor

manufacturer: Kaeser Kompressoren GmbH
Postfach 2143
96410 Coburg

c				Datum	16.06.2005 USE		KAESER KOMPRESSOREN	cover page MOBILAIR M57	=
b				Bearb.	Weid				+
a				Gepr.	Weid				
A	Änderung	Datum	Name	Norm		Ersatz durch: / Ersatz für:	Ursprung: AFA01057_01	DFA57.KU-01057.02	Blatt 1 Bl.



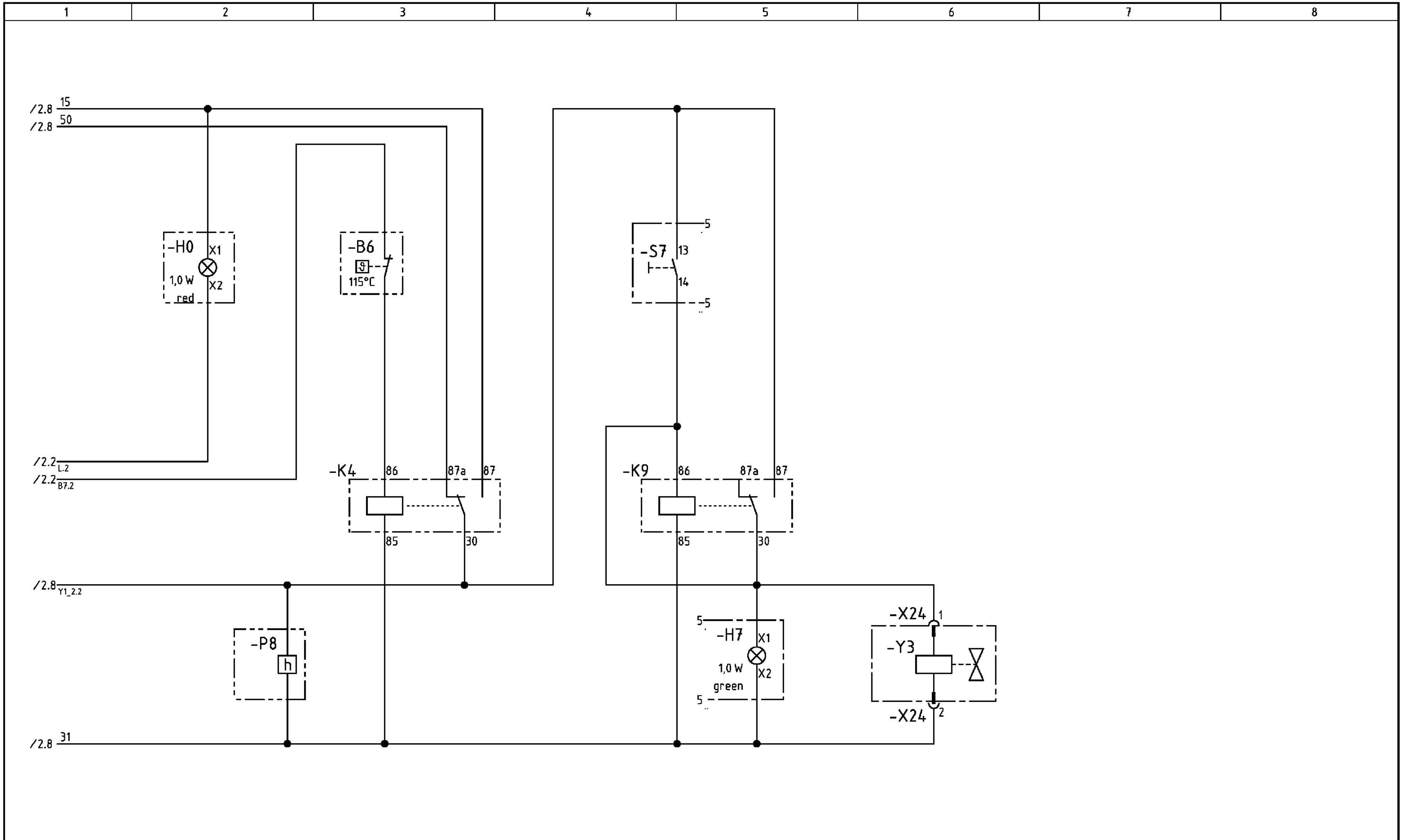
Function:			battery		glowplug	cooling water-temperature		fuel pump	fuel shut off valve
Function:			starter / generator			oil pressure			
Group of function:						components			
c				Datum	16.06.2005		KAESER KOMPRESSOREN	wiring diagram MOBILAIR M57 compressor - unit	=
b				Bearb.	Weid				+
a				Gepr.	Weid				
D	Änderung	Datum	Name	Norm		Ersatz durch:	Ersatz für:	Ursprung: AFA01057_01	SFA57.KU-01057.02 Blatt 1 Bl.



Function:	fuses		Relay	control ON	ignition switch
Function:	glow relay	starter - Relay	fuel shut off valve		Relay fuel pump
Group of function:					starting electrics

c				Datum	16.06.2005		KAESER KOMPRESSOREN	wiring diagram MOBILAIR M57 control
b				Bearb.	Weid			
a				Gepr.	Weid			
D	Änderung	Datum	Name	Norm		Ersatz durch:	Ersatz für:	Ursprung: AFA01057_01

SFA57.KU-01057.02 Blatt 2 Bl.



Function: charge control lamp | airend temperature | preselection full load operation | valve

Function: hour meter | safety chain | full load operation, venting

Group of function: control safety chain | control full load operation

c			Datum	16.06.2005
b			Bearb.	Weid
a			Gepr.	Weid
D Änderung	Datum	Name	Norm	

Ersatz durch: | Ersatz für:

KAESER KOMPRESSOREN

Ursprung: AFA01057_01

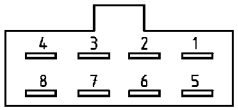
wiring diagram
MOBILAIR M57
control

=
+

SFA57.KU-01057.02

Blatt 3
Bl.

-X21



rear view
plug-connector, instrument panel,
sockets

-M2

rear view
plug-connector
fuel pump

-Y1

rear view
plug-connector
fuel shut off valve

-X24

rear view
plug-connector, instrument panel
valve full load operation, venting
sockets

c				Datum	16.06.2005		KAESER KOMPRESSOREN	component legend MOBILAIR M57	=
b				Bearb.	Weid				+
a				Gepr.	Weid				
E	Änderung	Datum	Name	Norm		Ersatz durch: / Ersatz für:	Ursprung: AFA01057_01	SFA57.KU-01057.02	Blatt 01 Bl.

-B0	oil pressure switch motor
-B6	temperature gauge with switch airend
-B7	cooling water-thermostat
-F1	control fuse
-F3	fuse glowplug
-F4	fuse starter
-F5	fuse fuel shut off valve
-G1	battery
-G2	alternator
-H0	charge control lamp
-K3	starter - Relay
-K4	Relay safety chain
-K9	Relay full load operation
-K25	Relay fuel shut-off valve
-K26	glow relay
-K29	Relay fuel pump
-M1	starter-motor
-M2	fuel pump
-P8	hour meter
-R10...-R13	glowplug

-S01	switch "control ON"
-S1	ignition switch 0 = STOP 1 = ON 2 = preheat with glowplug 3 = START
-S7/-H7	Illuminated pushbutton preselection full load operation
-Y1	fuel shut off valve
-Y3	valve full load operation, venting
-X21	plug-connector, instrument panel
-X23	terminals: terminal strip, instrument panel
-X24	plug-connector: valve full load operation, venting
15	negative earth (unit ON)
30	+ terminal (battery)
31	- terminal (battery), earth
50	starter-control

c				Datum	16.06.2005		KAESER KOMPRESSOREN	component legend MOBILAIR M57		=	
b				Bearb.	Weid					+	
a				Gepr.	Weid					SFA57.KU-01057.02	Blatt 02
E	Änderung	Datum	Name	Norm		Ersatz durch:	Ersatz für:	Ursprung: AFA01057_01			Bl.

11.2 Lighting and signalling system diagram

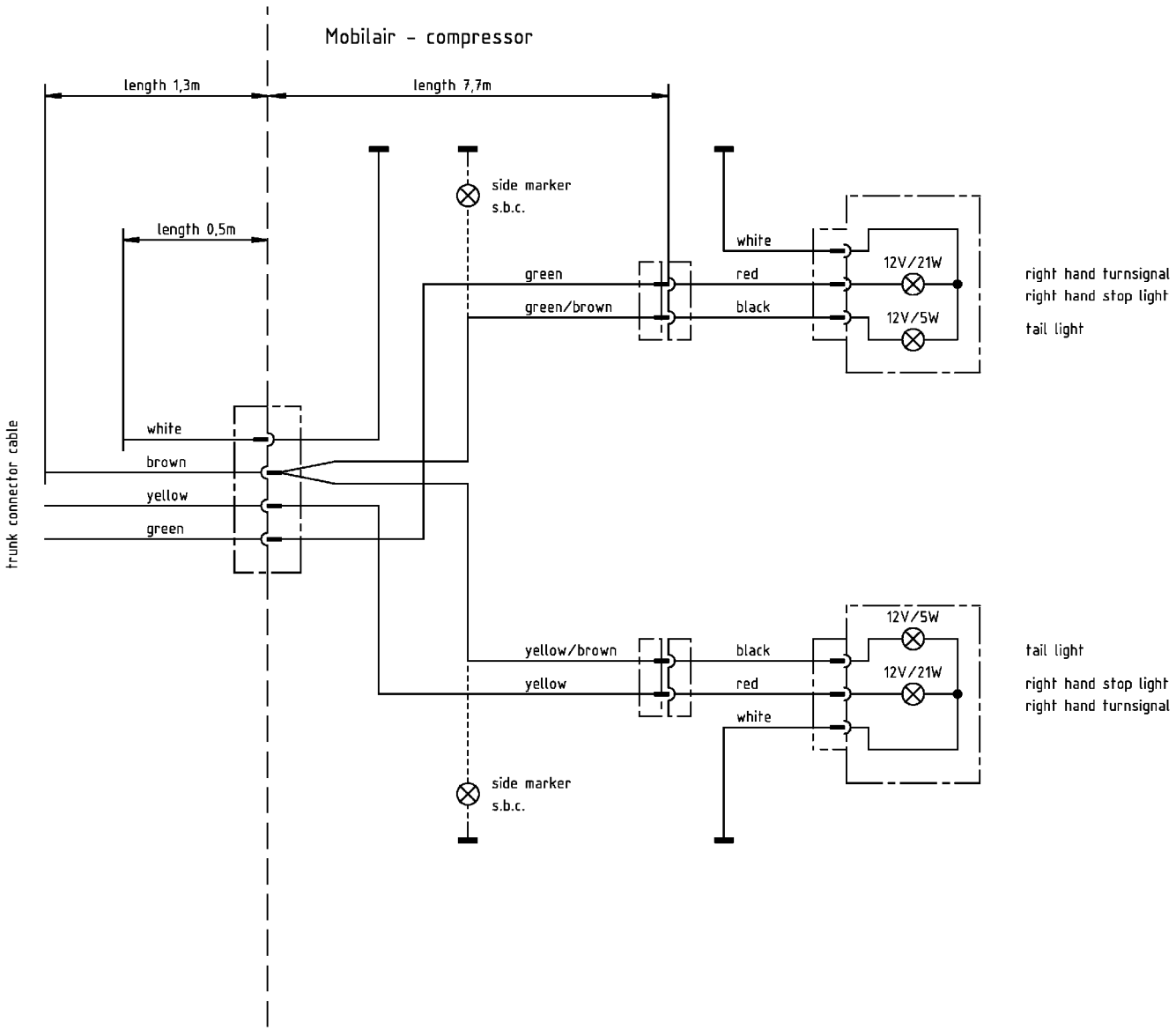
Wiring Diagram

Mobilair

US trailer light kit

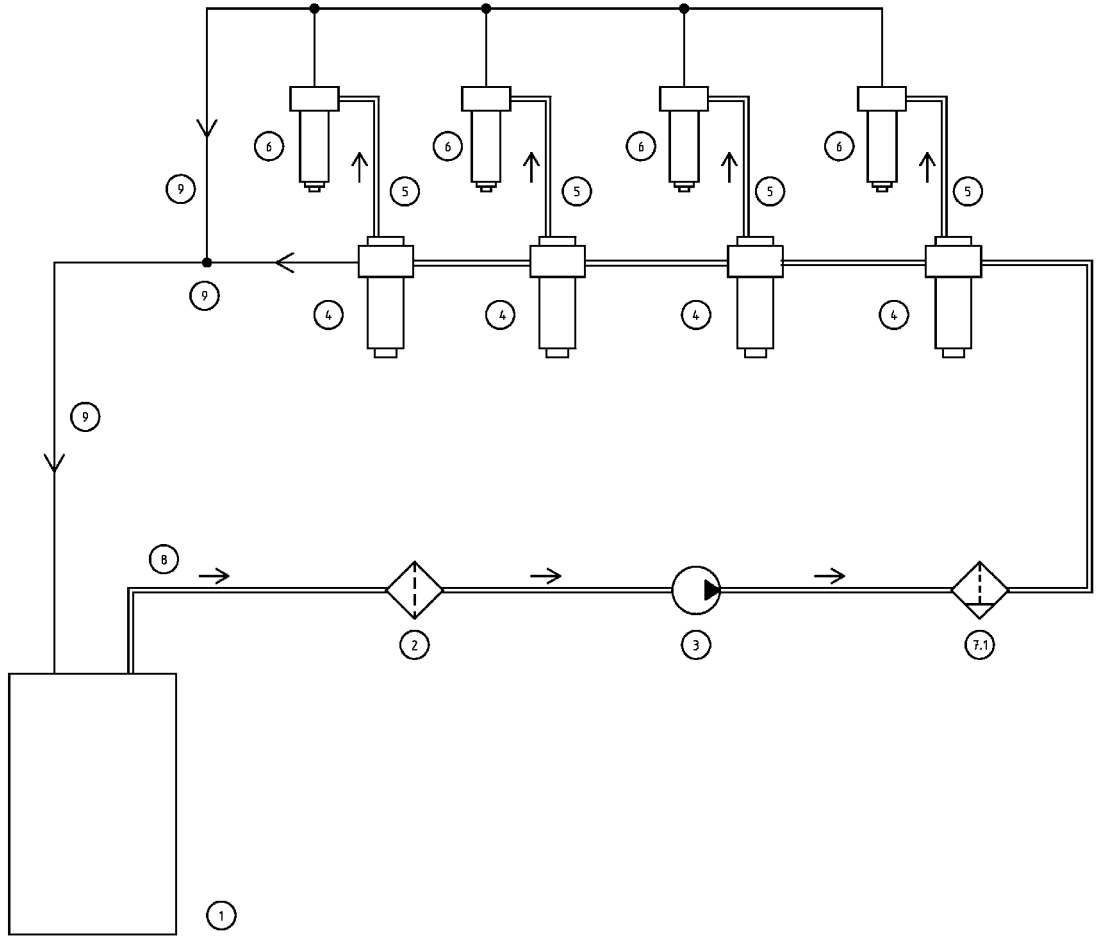
manufacturer: Kaeser Kompressoren GmbH
Postfach 2143
96410 Coburg

c				Datum	10.08.1999 USE		KAESER KOMPRESSOREN	cover page Mobilair US trailer light kit		=
b				Bearb.	Reuß					+
a				Gepr.	Schmidt				8.6514.0	DFAUSA.BEL-00909.00 Blatt 1
D	Änderung	Datum	Name	Norm		Ersatz durch: / Ersatz für:	Ursprung:			Bl.



c				Datum	10.08.1999		KAESER KOMPRESSOREN	wiring diagram Mobilair US trailer light kit	=
b				Bearb.	Reuß				+
a				Gepr.	Schmidt				
D	Änderung	Datum	Name	Norm		Ersatz durch: / Ersatz für:	Ursprung:	8.6514.0	SFAUSA.BEL-00909.00	Blatt 1 Bl.

11.3 Fuel circulation schematic diagram



c				Datum	07.01.2004		KAESER KOMPRESSOREN	P&I Diagram 4-Cylinder-diesel engine Mobilair M 57 (Kubota)	
b				Bearb.	Plau				
a				Gepr.	Grimm				
	Änderung	Datum	Name	Norm		Ersatz durch:	Ersatz für:	Ursprung: KFMM26K-00028.00	KFMM57K-00034.00 Blatt 1 USE

1	2	3	4	5	6	7	8

1	Fuel tank	
2	Fuel prefilter	
3	Fuel feed pump	
4	Injection pump	
5	Injection pipe	
6	Injection nozzle	
7.1	Fuel filter (with optional water separator)	
8	Fuel supply line	
9	Fuel return line	

c				Datum	07.01.2004		KAESER KOMPRESSOREN	P&I Diagram legend		
b				Bearb.	Plau			4-Cylinder-diesel engine		
a				Gepr.	Grimm			Mobilair M 57 (Kubota)	KFMM57K-00034.00	Blatt 2
	Änderung	Datum	Name	Norm		Ersatz durch:	Ersatz für:	Ursprung: KFMM26K-00028.00		USE

11.4 Maintenance Schedule

Model: **Serial number of the compressor unit:**			
Date	Description of work	Service hours	Signature