SERVICE MANUAL

Screw Compressor
Model: AS 31

Part No.: BA–AS31.L–1.7840.10030–00

Serial No.: .....

●	..... 230/460 ..... Volt	○	Cabinet heaters
○	Wye–Delta Start	○	115 V receptacle
●	D.O.L. Start	○	Outdoor modification
●	..... 110 ..... psig	○	Rainhoods
○	.....	○	Switchable Modulation
○	.....	●	Synthetic lubricant
●	Wiring Diagram: 0697/U0001	○	Food Grade Lubricant:

Index: 070501

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Table of Contents

KAESER COMPRESSORS

Chapter – Page

Table of Contents

KAESER COMPRESSORS

1 Technical Specification

1.1 Compressor Unit

Model	AS 31	
Maximum gauge working pressure	110/125/145/190	psig
Minimum gauge working pressure	80	psig
Free air delivery at max. gauge working pressure	115/109/100/85	cfm
Operating temperature approx. (Varies with ambient temperature and operating conditions)	167–200	°F
Weight	1080	lbs
Noise level to CAGI–Pneurop at 1 m distance (free sound field measurement)	70	dB(A)

Drawings:

Dimensional drawing	T 8720
P & I flow chart (Pipework and instrument flow chart)	FCAS36STL–0295/00001
Electrical diagram	AS36–0697/U0001

For settings of idle and start timer refer to electrical diagram in chapter 11.

1.2 Motor

Compressor motor:

Rated power	25	hp
Rated speed	1800	rpm
Specification class	TEFC	
Max. starts per hour	15	times

V–belt set for:

110 psig Compressor unit – Part number	6.2770.0
125 psig Compressor unit – Part number	6. 2770.0
145 psig Compressor unit – Part number	6.2770.0
190 psig Compressor unit – Part number	6.2771.0

1.3 Electrical Connection

Main voltage	230	V 3–phase
Full load current FLA	59	A
Frequency	60	Hz
Recommended main disconnect fuses (Dual element or time–delay)	90	A
Recommended power supply cable (CU multi–stranded) cross–section	2	AWG

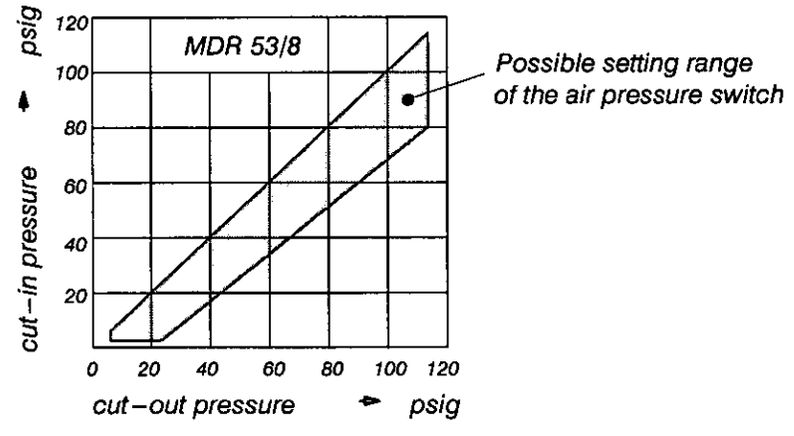
Mains voltage	460	V 3–phase
Full load current FLA	32	A
Frequency	60	Hz
Recommended main disconnect fuses (Dual element or time–delay)	60	A
Recommended power supply cable (CU multi–stranded) cross–section	4	AWG

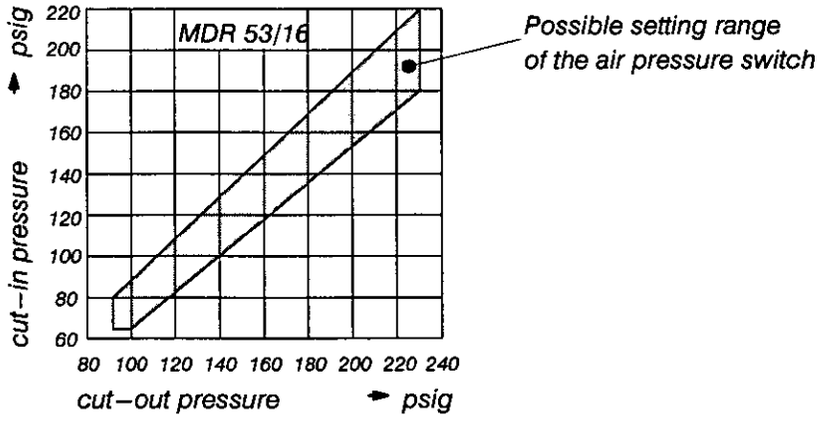
Attention! **Maximum dual element time–delay fuses are selected according to 1996 N.E.C. Article 240–6, 430–52 and Tables 430–148 & 150.**

Select multi–strand copper core wire at 40°C ambient temperature according to 1996 N.E.C. 110–14(c), 220–3, 310–15, Table 310–16, 430–6, 430–22 and Tables 430–148 & 150.

For electrical power supply please refer to chapter 2.4 and 6.3.

1.4 Pressure Switch Adjustment





Factory settings for compressor set at 110/125/145/190 psig

Cut–in pressure	100/115/135/180	psig
Cut–out pressure	110/125/145/190	psig
Differential pressure Δp	10/ 10/ 10/ 10	psi

1.5 Set Point of the Safety Relief Valve

Compressor Unit 110 psig – Activating pressure ..... 140 psig

Compressor Unit 125 psig – Activating pressure ..... 155 psig

Compressor Unit 145 psig – Activating pressure ..... 175 psig

Compressor Unit 190 psig – Activating pressure ..... 230 psig

1.6 Installation Requirements

Max. height above sea level of the place of installation .. 3000 ft.
(for all heights above please contact authorized KAESER distributor)

Min. ambient temperature ..... 40 °F

Max. ambient temperature ..... 105 °F

Min. cooling air/inlet air temperature ..... 40 °F

Max. cooling air/inlet air temperature ..... 105 °F

Air inlet opening ..... 3.8 sq.ft.

Exhaust air for solution A (see chapter 6.1):

Forced ventilation with exhaust ventilator ..... 3000 cfm at static pressure of 0.4 inches water column

Exhaust air for solution B (see chapter 6.1):

Exhaust air used for space heating:
Heating duct w x h ..... 20 5/8" x 21 5/8"

1.7 Oil Capacities

Total oil capacities ..... 4 gal

After oil change or after long period of storage

Quantity required for prelubrication of the airend ..... 1 quart

(Refer to chapter 7.9)

1.8 Greasing the Electrical Motor

Relubricate the compressor motor bearings:

Under normal operating conditions, after ..... 12,000 h*
(ambient temperature up to 77°F)

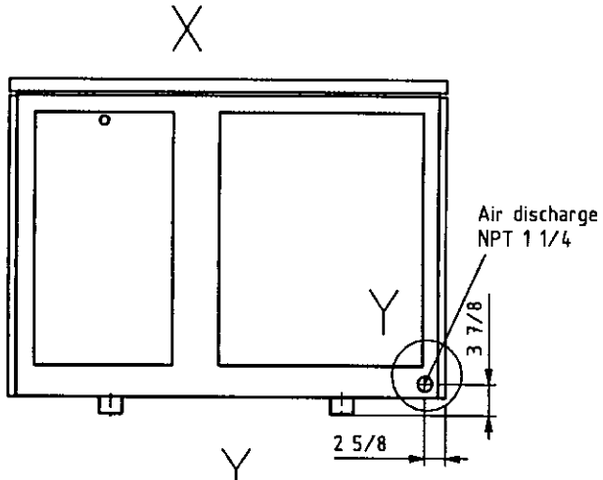
Under unsuitable conditions, after ..... 6,000 h*
(ambient temperature up to 105°F)

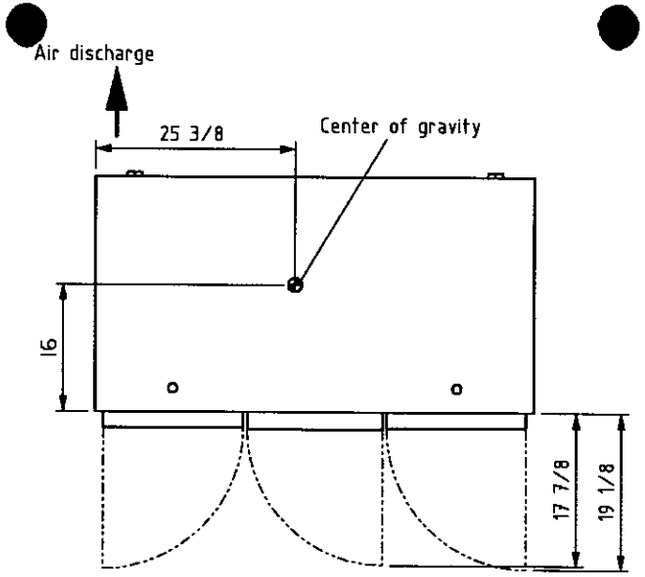
but no later than ..... 3 Years

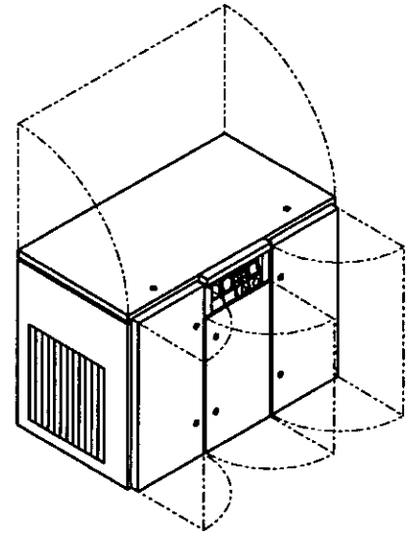
*operating hours

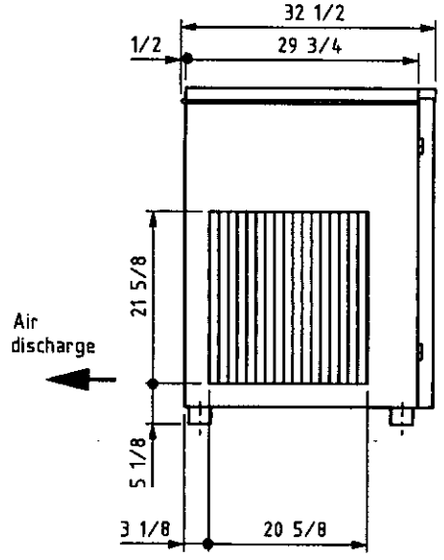
1.9 Dimensional Drawing

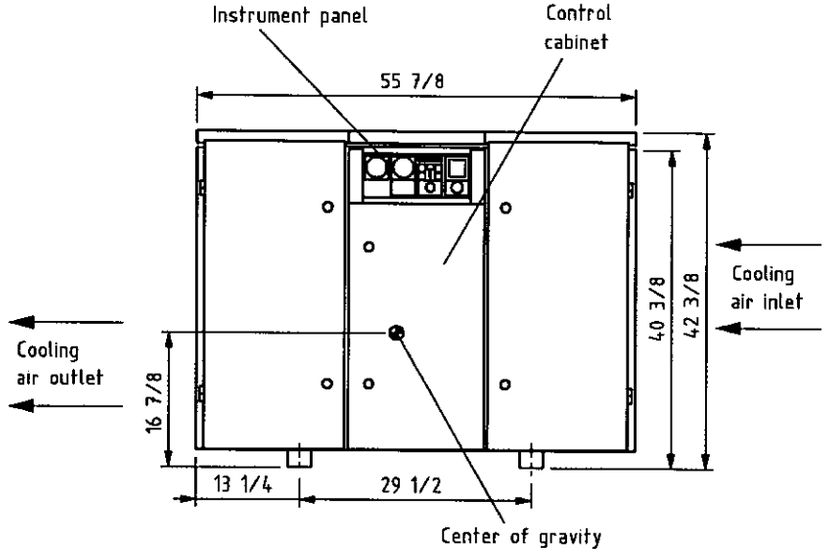
(see following page)

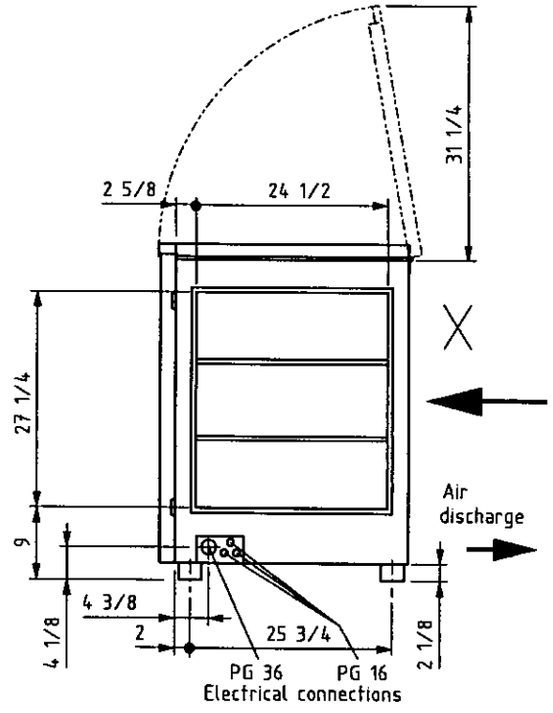












ATTENTION!
Allow 4" clearance in narrow passages and doorways
Crating has not been considered

All
dimensions
are in inches

1996	DATUM	NAME
Gez.	05.09.	Großer
Gepr.	27.02.98	Hackler
Massstab		
DATEI		

AS 31/36/44

Ersatz f. T8720 use vom 04.06.96

KAESER KOMPRESSOREN

T8720 use A-Index 001

2 Safety Regulations

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

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 general safety and accident prevention regulations as well as the safety rules laid down in this service manual.

Attention!

This symbol is placed by text where considerable attention must be paid to recommendations, regulations, references and correct sequence so that damage and/or destruction of the compressor and/or other equipment is prevented.

This symbol identifies environmental care measures.

☞

This symbol indicates operations to be carried out by the operator or service technician.

•

This bullet identifies listings.

2.2 General References

Work on power driven systems may only be carried out by trained or specialized personnel.

Prior to working on electrical systems of the compressor always perform the following steps in the sequence shown.

1. Lock the main disconnect in the "off" position in accordance with applicable lock out/ tag out procedures (example: OSHA CFR 29 § 1910.147) to ensure the compressor does not restart.

2. Ensure the unit cannot be switched on again

3. Check that no voltage is present

4. Lock the isolation shut–off valve in the "closed" position and vent all compressed air trapped between the compressor and the isolation shut–off valve in accordance with applicable lock out/ tag out procedures (example: OSHA CFR 29 § 1910.147).

Attention!

Any alterations or reconstruction carried out without the prior written authorization of KAESER COMPRESSORS Inc. will invalidate the warranty.

2.3 Additional Safety Precautions

Attention! **Comply with the following:**

- Do not allow open flame and flying sparks at the installation site.
- Take necessary precaution when welding on or near the compressor unit to ensure that sparks or high temperatures cannot cause fire or explosion.
- Ensure that the compressor unit is supplied only with clean uncontaminated air.
- Do not allow the maximum ambient temperature to be exceeded (see chapter 1.6), unless special measures have been agreed upon between the manufacturer and the customer.
- Perform oil changes according to the service manual or at least once annually (see chapter 9.7).
- Do not mix cooling oils of different types.
- Maintain and monitor the operating temperature according to the manufacturer's specifications to avoid build–up of condensate or varnish in the oil circuit (see chapter 1.1).
- Use only cooling oils recommended by the manufacturer (see chapter 9.8).
- If maintenance work is carried out on any part of the oil circulation system, top off the oil in the oil separator tank to the maximum level, run the compressor and keep it under constant observation for a short period. Check the oil level again and top off with oil to replace the oil taken up by the piping and the cooling system.
- Operation of the compressor unit is not recommended if the differential pressure across the separator cartridge is greater than 14.5 psi. Have the differential pressure checked by your local KAESER distributor in accordance to the maintenance schedule for the oil separator cartridge (see chapter 9.2).

2.4 Electrical Power Supply

Attention! **The main power supply and overcurrent protection must be installed by a qualified electrician in accordance with NEC, OSHA and any applicable local codes.**

Compressor units must be installed with a lockable main disconnect and fuses or other short–circuit and ground fault protection device.

For fuse and wire recommendations, see chapter 1.3

Please note that the conductors, fuses and procedure are Kaeser's recommendations. These recommendations do not supersede other applicable codes.

2.5 Spare Parts

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

2.6 Compressed Air System

If a compressed air system is extended or changed, verify that the blowoff pressure and capacities of the safety relief valves on the air receiver tanks and in the system match the rating of all the compressor units installed.

2.7 Environmental Protection

Condensate drainage

The condensate accumulating during compression must be fed via a suitable drainage system, collected in special canisters and disposed of according to environmental regulations.

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.

3 General

The service manual must always be available for use at the location of the compressor unit.

3.1 Proper use of the Compressor

The compressor unit is intended solely for the purpose of generating compressed air. Any further use outside of this purpose is considered improper. The manufacturer cannot accept liability for any damage caused by such improper use; the user alone is liable for any risks incurred.
Proper use of the compressor also includes adherence to the installation, removal, application, operational and maintenance instructions laid down by the manufacturer.

3.2 Improper use

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

3.3 Compressed Air Treatment

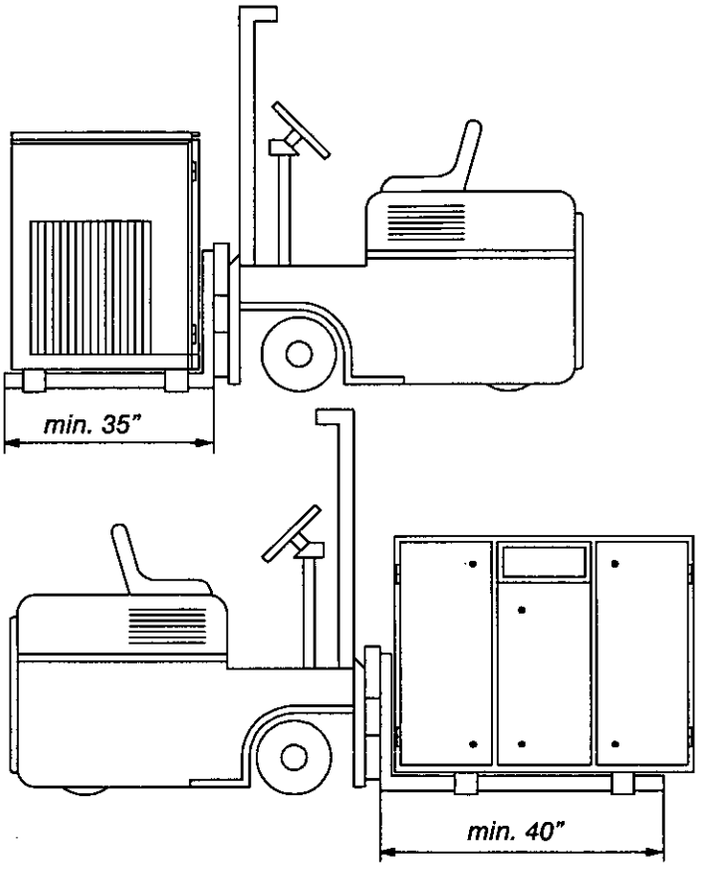
Never use compressed air from oil injected compressor packages for breathing purposes and production methods where the air has direct contact with food, without subjecting the compressed air to additional treatment.

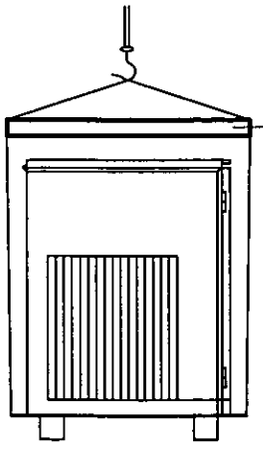
3.4 Copyright

4 Transport

4.1 Transport Instructions

We recommend a fork lift truck or lifting equipment for transporting the compressor unit to avoid damage to the cabinet and framework.





Spreader bar

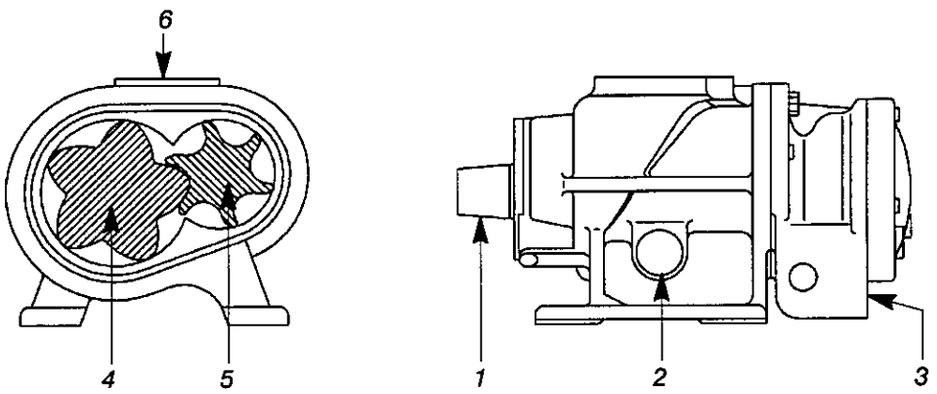
Attention !

Do not exert any side forces on the compressor unit when transporting with lifting equipment !

5 Construction and Operation

5.1 Principle of Compression

The stationary compressor unit is fitted with a single stage, oil–injected airend. The two rotors, the driven male rotor and the female rotor, both mounted in antifriction bearings, are fitted into the airend. As the rotors rotate, air is drawn into the upper side through the inlet port and is compressed on the lower side. The oil that is injected into the lower side absorbs heat generated by compression, prevents metal to metal contact between the rotors, seals the rotors and the housing from each other and also lubricates the antifriction bearings. The compressed air and oil mixture leaves the airend via the discharge port.



1 Drive shaft
2 Oil injection
3 Discharge port
4 Male rotor
5 Female rotor
6 Air inlet port

5.2 Brief Description

The compressor block is driven by an electric motor via V–belts.

An oil separator cartridge is fitted into the oil separator tank allowing practically oil free compressed air supply.

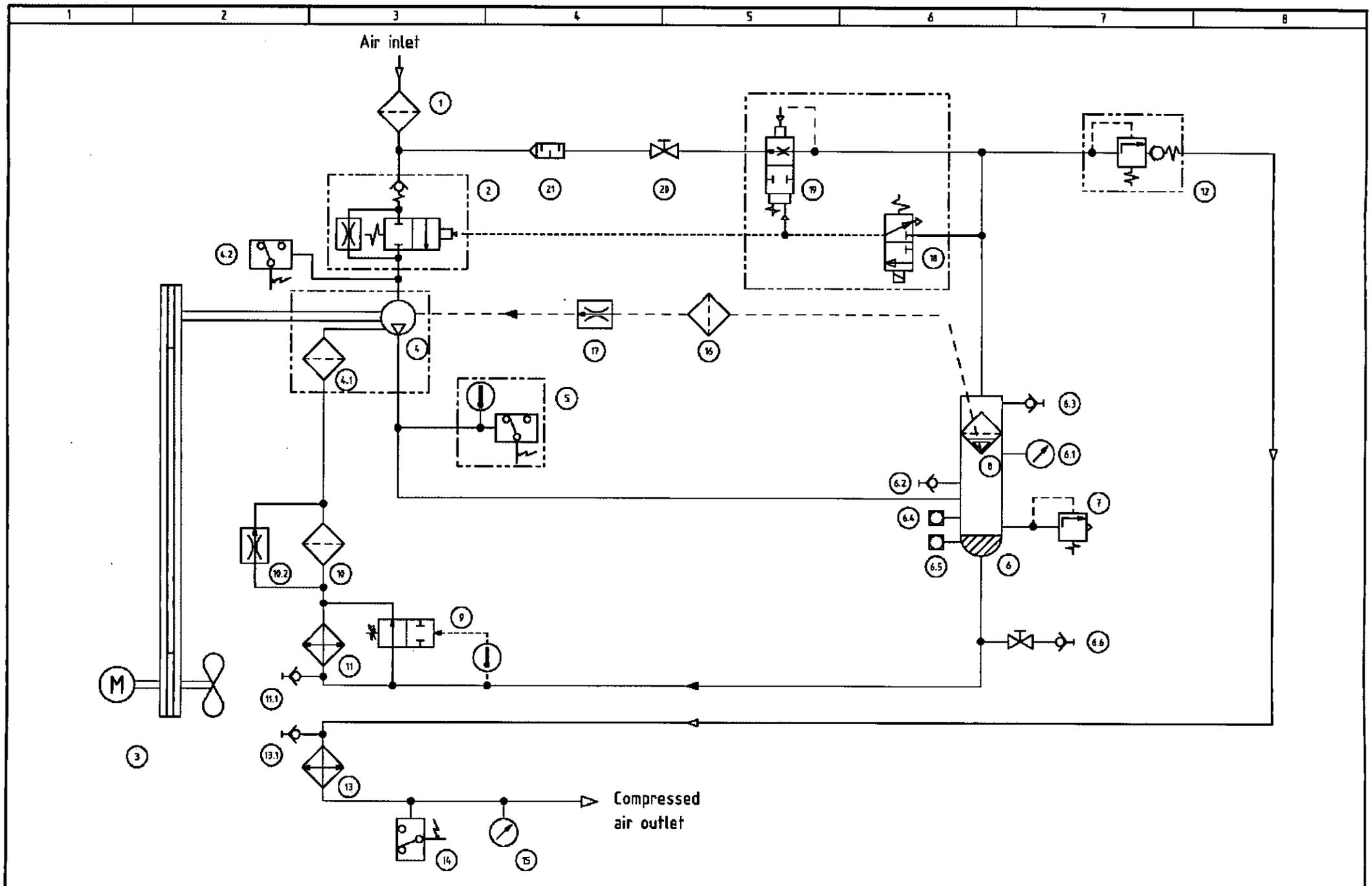
The control system of the compressor unit ensures that compressed air is generated within the set pressure limits.

Safety devices protect the compressor unit against failure of important systems through automatic shut–down.

The fan ensures ventilation of the compressor unit and sufficient cooling air for the air–cooled oil cooler and air aftercooler.

5.3 Pipe and Instrument Flow Diagram (P & I Diagram)

(see following pages)

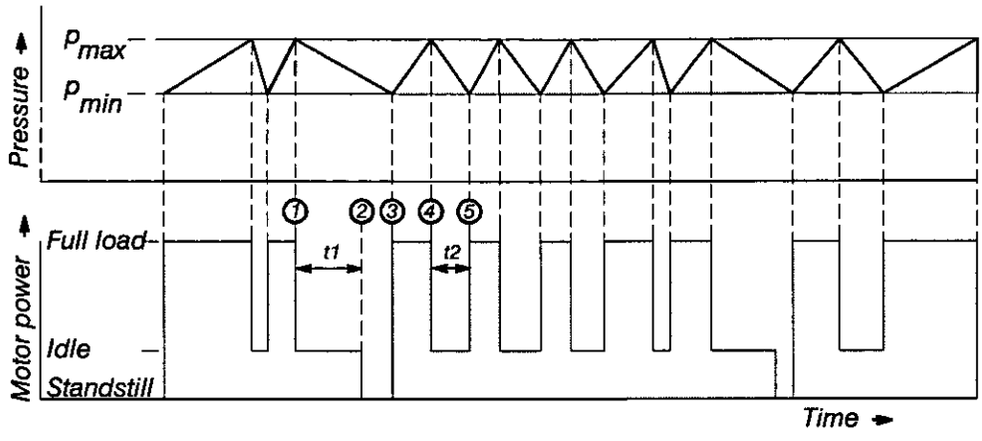


c				Datum	15.12.1993		KAESER KOMPRESSOREN	P&I Diagram AS 31	
b				Bearb.	Plau				
a				Gepr.	Wiatha				
	Änderung	Datum	Name	Norm		Ersatz durch:	Ursprung:		FAS31STL - 0295/00001 Blatt 1 USE

1	Air filter
2	Inlet valve
3	Drive motor
4	Airend
4.1	Strainer
4.2	Pressure switch - Wrong direction of rotation
5	Temperature gauge switch + Indication
6	Oil separator tank
6.1	Pressure gauge
6.2	Hose coupling (oil end)
6.3	Hose coupling (air end)
6.4	Oil sight glass: oil level maximum
6.5	Oil sight glass: oil level minimum
6.6	Shut-off valve with hose coupling - Oil drain
7	Pressure relief valve
8	Oil separator cartridge
9	Oil temperature controller
10	Oil filter
10.2	Main flow nozzle
11	Oil cooler
11.1	Hose coupling - Oil drain
12	Minimum pressure check valve
13	Air cooler
13.1	Hose coupling
14	Air main pressure switch (Full load/idle)
15	Pressure gauge - Control panel
16	Dirt trap
17	Nozzle
18/19	Combined control/vent valve
18	Control valve
19	Vent valve
20	Shut-off valve - Vent line
21	Silencer

c				Datum	15.12.1999		KAESER KOMPRESSOREN	P+I Diagram legend AS 31	
b				Bearb.	Plau				
a				Gepr.	Wiethe				
	Änderung	Datum	Name	Norm		Ersatz durch:	Ersatz für:	Ursprung:	FAS31STL - 0295/00001	Blatt 2 USE

5.4 DUAL Control



In DUAL Control the compressor normally runs at **full–load**, **idle,** or **standstill**.

Operation is controlled by a pressure switch within set limits (see chapter 1.4) between **full–load** and **idle**.

If the compressor runs for longer than a preset time period, (1) to (2) e.g. t_1 = 6 min, in idle, the electric motor switches off completely (2). When the cut–in point p_{min} (3) is reached the motor will restart automatically. The pressure now rises to the cut–out point p_{max} (4) and the compressor runs in idle. Should, however, the pressure drop within a shorter time period (4) to (5) e.g. t_2 = 3 min again to p_{min} (5), the compressor will automatically switch from idle to full–load.

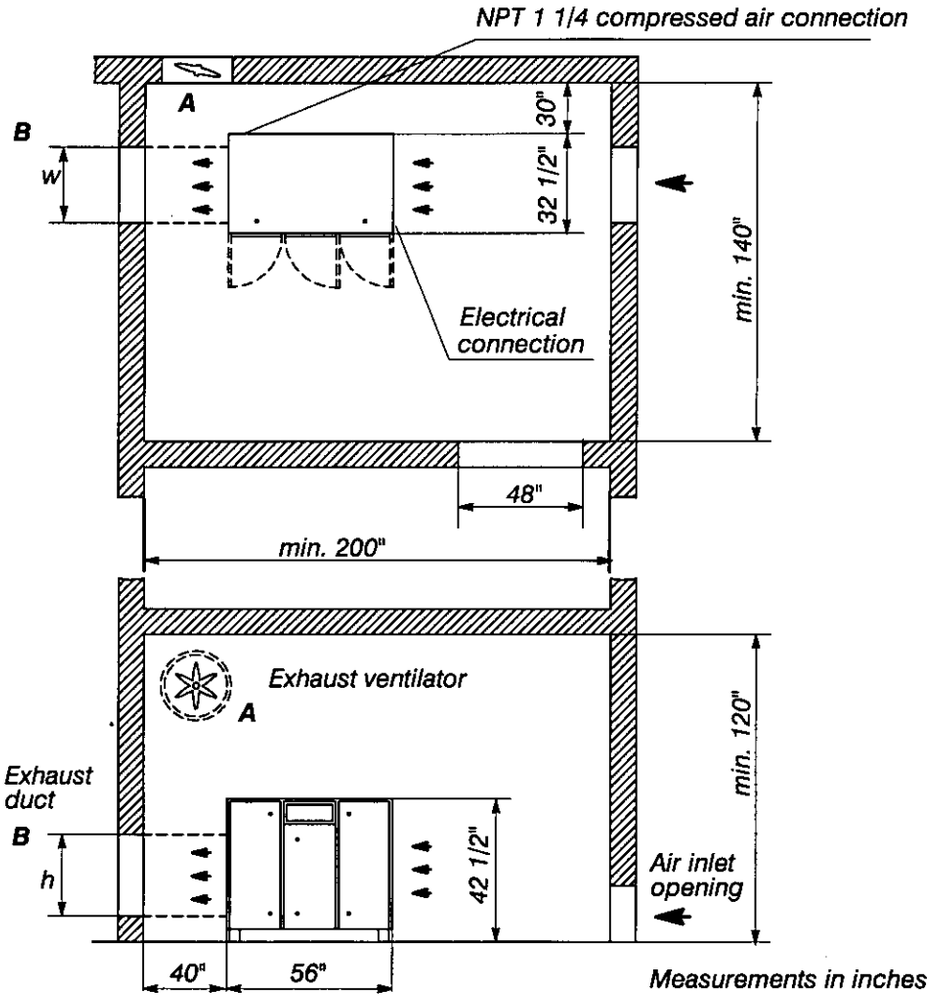
6 Installation

6.1 Installation Requirements

Attention! **The compressor should be mounted on level surface. For any special application please consult with the manufacturer.**

Install the compressor according to the following diagram. Adhere to the minimum distances shown to allow free access to the compressor unit.

Adequate ventilation of the compressor space is ensured only if the minimum values (see chapter 1.6) are adhered to.



Measurements in inches

Solution A: Forced Ventilation

The ventilator intended for the compressor room must provide adequate ventilation in relation to the size of the compressor unit (see chapter 1.6).

Solution B: Exhaust Air used for Space Heating

The hot air is forced through a conduit (see chapter 1.6) into the room to be heated.

Attention! **Consult the manufacturer with regard to length of conduit and for maximum allowable pressure drop for this compressor unit.**

Safe operation of the compressor unit is guaranteed only if the temperature limits (see chapter 1.6) of the cooling air are adhered to.

6.2 Connection of the Compressed Air Supply

Attention! **The unit is set up ready to operate. Connect the discharge outlet to the user pipework using a flexible hose line and isolation shut–off valve with drain.**

6.3 Electrical Connection

The main power supply and overcurrent protection must be installed by a qualified electrician in accordance with NEC, OSHA and any applicable local codes.

For fuse and wire recommendations, see chapter 1.3

The compressor is wired ready for connection to the main supplies. Feed the supply cable with cores marked L1, L2, L3 and PE through the cable inlet in the base frame into the control box and connect to the terminals marked L1, L2, L3 and PE in this box.

Attention! **Maximum dual element time–delay fuses are selected according to 1996 N.E.C. Article 240–6, 430–52 and Tables 430–148 & 150.**

Select multi–strand copper core wire at 40°C ambient temperature according to 1996 N.E.C. 110–14(c), 220–3, 310–15, Table 310–16, 430–6, 430–22 and Tables 430–148 & 150.

Wire temperature rating:

1.25 x FLA (see chapter 1.3)	wire temperature rating	correction factor for 40°C
≤ 100A	60°C	0.82
> 100A	75°C	0.88

7 Putting into Operation

7.1 Points to be Observed before Putting into Operation

Every compressor unit is given a test run at 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 minimum pressure check valve, safety relief valve, inlet valve and combination valve) are adjusted and fitted to factory standards and specifications. Alterations to these components are not allowed without prior written authorization with the manufacturer.**

Do not disassemble the minimum pressure check valve, safety relief valve, inlet valve and V-belt tensioning devices. They are heavily spring loaded.

7.2 Points to be Observed before Starting the Compressor Unit

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

The compressor unit starts automatically after a power failure providing the line pressure is lower than the setting on the air pressure switch.

Do not operate the compressor with open maintenance doors as injury to persons could occur from the drive belts and electrical equipment.

☞ Remove all packaging materials, tools and transport securing devices on and in the compressor unit.

- It is expected that the user employs safe working techniques and that all lawful operating and safety regulations are followed when operating this compressor unit.
- The operator of this compressor unit is responsible for its safe operating condition.
- Do not operate this compressor unit in locations where heavy dust conditions, poisonous, or inflammable gases could exist.
- Do not connect the compressor unit to a supply voltage other than that stated on the nameplate.
- Install the compressor unit in a location not subject to freezing temperatures. The air temperature requirements at the air intake must be complied with (see chapter 1.6).
- If exhaust ducting is provided, this must be at least the cross section of the cooler exhaust area in size and may not exceed the max. allowed pressure drop defined by the manufacturer.
- During installation of the compressor unit, ensure that a distance of at least 40" is kept between the air intake of the unit and any wall.

☞ Check the oil level in the oil separator tank (see chapter 9.7).

☞ Check the tension of the drive belts (see chapter 9.3).

☞ The ball valve (6.6, see chapter 5.3) must be closed.

☞ The ball valve (20, see chapter 5.3) in the vent line must be open.

Lock the main disconnect in the OFF position in accordance with applicable lockout/tagout procedures (example: OSHA CFR 29 § 1910.147) to ensure the compressor does not restart.

Check all screws on the electrical connections for tightness and tighten if necessary (carry out this check again after 50 hours of operation).

☞ Check that the airend rotates in the correct direction (see chapter 7.4).

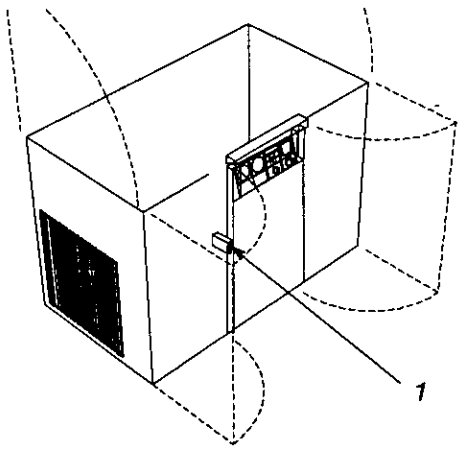
Attention! **Do not switch the compressor unit off with the main disconnect switch when running under load (see chapter 8.2).**

☞ This compressor is fitted with a run-in oil filter cartridge. Replace the filter cartridge after the run-in period of 200 hours (see chapter 9.6).

7.3 Functional Check of the Door Interlock Switch

Do not operate the compressor unit with a malfunctioning door interlock switch.

☞ Carry out a visual and functional check of the door interlock switch. (see chapter 8.3.3).



1 Door interlock switch

7.4 Direction of Rotation Check

Attention! **The compressor is wired for connection to a clockwise phase sequence power supply.**

A check of the direction of rotation can be made by testing the phase sequence.

Arrows showing the direction of proper rotation are located on the motor and on the airend housing.

☞ On your initial start, "bump" the unit and verify the direction of rotation.

If the direction of rotation is incorrect, change over the supply conductors L1 and L2.

Attention! **If the airend rotates in the wrong direction, the compressor is automatically shut down by the safety air pressure switch (4.2, see chapter 5.3).**

7.5 Motor Overload Relay Adjustment

⚠ **Lock the main disconnect in the OFF position in accordance with applicable lockout/tagout procedures (example: OSHA CFR 29 § 1910.147) to ensure the compressor does not restart. See chapter 2.4 for the main disconnect switch.**

The relay is set to the standard adjustment at the factory.

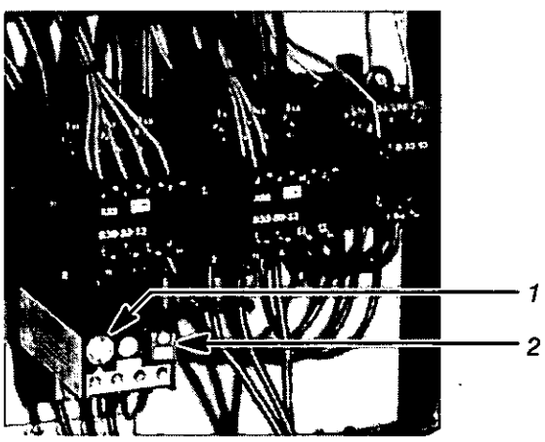
Compressor motor: Wye-delta start

In the Wye-delta configuration the phase current is fed through the motor overload relay. This phase current is 0.58 times the nominal motor current.

For the nominal motor current see motor nameplate.

Adjustment:

The value can be set to a maximum of 10% higher than the calculated phase current to prevent the overload relay from tripping under voltage fluctuations.



1 Motor overload adjustment
2 Reset button

7.6 Procedure for Initial Start–up of the Compressor Unit

Lock the main disconnect in the OFF position in accordance with applicable lockout/tagout procedures (example: OSHA CFR 29 § 1910.147) to ensure the compressor does not restart. See chapter 2.4 for the main disconnect switch.

Increase the unloaded start time during the initial start-up

☞ Increase the time period of the start timer to 20 seconds when starting the compressor for the first time. This prevents compression of the intake air during the start procedure. Shortly before the end of the 20 second period, switch off the compressor unit (see chapter 8.2).

☞ Set the start timer back to the normal time of 6 seconds before operating the compressor any further.

This procedure ensures that the oil cooler and all oil pipes are filled with oil without endangering the compressor airend.

The compressor unit starts automatically after a power failure providing the line pressure is lower than the setting on the air pressure switch.

7.7 Setting the Idle Timer Relay for Dual Control

Lock the main disconnect in the OFF position in accordance with applicable lockout/tagout procedures (example: OSHA CFR 29 § 1910.147) to ensure the compressor does not restart. See chapter 2.4 for the main disconnect switch.

The idle timer is situated in the control cabinet (range of adjustment 1.5 to 30 minutes). The idle time interval should be set so that the maximum number of starts of the motor (see chapter 1.2) is not exceeded.

7.8 Setting the Air Pressure Switch

Lock the main disconnect in the OFF position in accordance with applicable lockout/tagout procedures (example: OSHA CFR 29 § 1910.147) to ensure the compressor does not restart. See chapter 2.4 for the main disconnect switch.

Setting the switching differential of the air pressure switch to limitit the cycle rate.

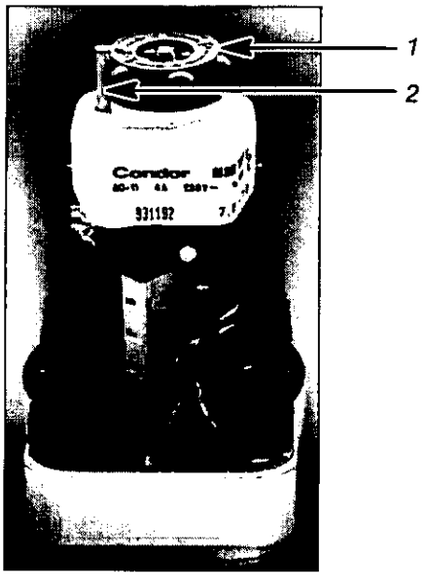
The cycle rate from load to idle is limited to max. twice per minute.

The cycle rate can be reduced to a limited degree by increasing the switching differential.

If this measure is insufficient, install a larger air receiver to provide more buffer capacity and remove flow restriction in discharge piping.

See chapter 1.4 for the factory setting of the air pressure switch and the possible setting range.

Attention! **Do not adjust pressure switch unless it is mounted and pressurized.**



1 Handwheel
2 Locking pin

Increase cut-out pressure:

☞ Turn handwheel clockwise

Decrease cut-out pressure:

☞ Turn handwheel counter clockwise

To increase the pressure differential between cut-in and cut-out:

☞ Remove locking pin

☞ Depress handwheel and turn counter clockwise

☞ Insert locking pin

To decrease the pressure differential between cut-in and cut-out:

☞ Remove locking pin

☞ Depress handwheel and turn clockwise

☞ Insert the locking pin

⚠ **Reinstall the air pressure switch cover after every adjustment of the air pressure switch and before switching on the compressor.**

7.9 Start-up after an Oil Change or Temporary Storage

Lock the main disconnect in the OFF position in accordance with applicable lockout/tagout procedures (example: OSHA CFR 29 § 1910.147) to ensure the compressor does not restart.

Carry out the following measures after an oil change or a non-operative period of three months or longer before starting the compressor:

Pour the recommended quantity of oil into the air inlet connection

The oil may only be added when the compressor unit is in a non-pressurized state.

- When the compressor unit is at standstill, pour the recommended quantity of oil (see chapter 1.7) into the air intake port of the airend and manually rotate the airend in a counter clockwise direction with the drive belts.
- To pour in the oil, unscrew the inlet valve above the airend and then pour the prescribed quantity of oil into the airend.
- Screw the inlet valve back on.

Attention!

This oil must be of the same type as the oil used to operate the compressor (see label near the oil filler plug on the oil separator tank).

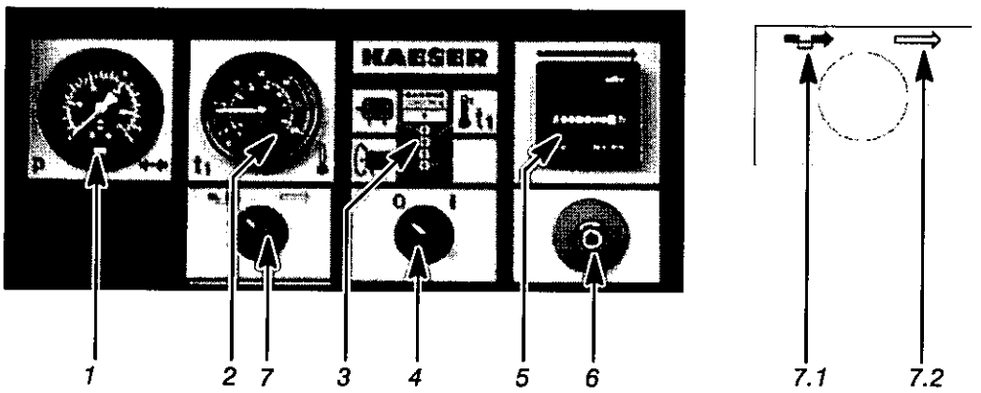
If no additional oil is available, remove required amount of oil from the oil separator tank. See chapter 9.1 for this procedure.

If the compressor unit was at standstill for more than 12 months, additional precautionary steps have to be taken before putting the unit back into operation. In this case, first consult the manufacturer.

To start the compressor unit follow the procedures in chapter 7.6.

8 Operation

8.1 Instrument Panel



1 *Pressure gauge*
2 *Temperature gauge with switch*
3 *KAESER–CONTROL*
4 *Control switch "0 / 1" (Stop / Start)*
5 *Service hours meter*
6 *EMERGENCY STOP pushbutton*
7 *Selector switch "Normal/Unload"*
7.1 *Normal*
7.2 *Unload*

8.2 Starting and Stopping the Compressor Unit

Starting:

Attention! **The compressor will start only if the system pressure is lower than the pressure set on the air pressure switch.**

☞ Switch on the main disconnect switch.

☞ Turn the selector switch (7) to position "Normal".

☞ Turn the control switch (4) to the "I" position.

Stopping:

Attention! **Do not stop the compressor unit with the main disconnect switch. Always start and stop the compressor unit principally with the control switch (4).**

☞ Turn the selector switch (7) to position "Unload".

☞ Turn the control switch (4) to the "0" position.

☞ Lock the main disconnect in the "off" position in accordance with applicable lock out/ tag out procedures (example: OSHA CFR 29 § 1910.147) to ensure the compressor does not restart.

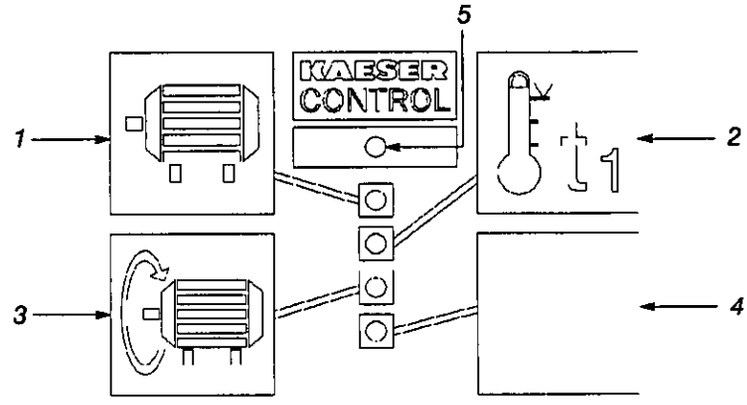
See chapter 2.4 for the main disconnect switch.

8.3 Safety System:

8.3.1 KAESER CONTROL

The green light emitting diode (LED 5) directly underneath the "KAESER CONTROL" logo is illuminated if the compressor unit is running or ready for operation. It is "off" if a malfunction is detected.

A malfunction detected by the control functions 1, 2, 3 and 4 will shut down the compressor unit immediately, accompanied by an appropriate malfunction light.



1 The overload relay of the compressor motor shuts down with excessive motor current.When the fault is corrected, press the overload relay reset button.

2 Temperature gauge with switch for detection of excess discharge temperature (5, see chapter 5.3).

The compressor unit is shut down if a discharge temperature of 230°F is reached.

3 The pressure switch shuts down the compressor unit if the drive belts slip off the pulley or break or with incorrect direction of rotation (4.2, see chapter 5.3).

4 Provided for additional shut down function.

8.3.2 "EMERGENCY STOP Pushbutton"

If the EMERGENCY STOP pushbutton is pressed, the compressor unit is shut down and all LED's on the KAESER CONTROL except for the green "on" light are illuminated (see chapter 11.1).

Reset the compressor unit after the malfunction is corrected.

☞ Reset the EMERGENCY STOP pushbutton by turning the latched pushbutton in the direction of the arrows.

☞ Reset the compressor by turning the control switch (see chapter 8.1) from "I" to "0".

The compressor unit is now ready to restart.

8.3.3 Door interlock switches with shut–down function when maintenance doors are opened

If a maintenance door is opened during compressor operation the compressor is shut down by its corresponding door interlock switch.

If the door is closed again, the contact in the door interlock switch closes. After the compressor is reset by turning the control switch (see chapter 8.1) from "I" to "0", it can be re-started again.

See chapter 7.3 for the location of the door interlock switches.

8.3.4 Temperature gauge with switch

The compressed air temperature is sensed directly at the discharge port of the airend. If it reaches 230 °F, the switch inside the temperature gauge (5, see chapter 5.3) will cause the indicator light at the KAESER CONTROL (see chapter 8.3) to come on and also shut the compressor down.

☞ Search for and correct the malfunction (see chapter 11.2.1).

Possible malfunctions:

- Low oil
- Cooling system fault
- Ambient temperature too high or too low
- Clogged filter mat, oil filter or cooler

☞ When the malfunction is corrected, reset the compressor unit by turning the control switch (see chapter 8.1) from "I" to "0".

Then restart the compressor unit (see chapter 8.2).

9 Maintenance

9.1 Observe the following rules during all maintenance and servicing work:

Work on power driven equipment may only be carried out by trained or specialized personnel. Follow all applicable OSHA and local safety regulations.

The compressor unit restarts automatically after a power failure if the line pressure is lower than the pressure setting on the air pressure switch.

Lock the main disconnect switch in the OFF position in accordance with applicable lockout/tagout procedures to ensure the compressor does not restart (see chapter 2.4 for main disconnect switch).

Ensure that no maintenance personnel is working on the compressor unit, that all panels are latched back on again and all maintenance doors are closed before restarting the compressor unit.

To start the compressor unit see chapter 8.2.

The venting nozzle required to vent the oil separator tank (for mainte nancework such as topping off the oil, oil change and filter change) is fitted to the hose coupling (2, see chapter 9.7).

Attention!

Always tighten down all screw connections that have been loosened during maintenance work.

Ensure that waste operational and maintenance materials, replaced parts, etc. are disposed of according to environmental regulations!

Carry out a visual and functional check of the door interlock switches after any maintenance and servicing work.

See chapter 7.3 and 8.3 for details.

9.2 Regular Maintenance

Period	Work to be done	see chapter
2 and 24 hours after first putting into operation	Check the v–belt tension	9.3
50 hours after first putting into operation	Check all electrical screw connections for tightness and tighten if necessary	7.2
100 to 300 hours	Clean the filter mats*	9.5
200 hours after first putting into operation	Change the run in oil filter	9.6
Weekly	Check the oil level	9.7
500 hours	Check the V–belt tension	9.3
	Clean or change the air filter*	9.13
1000 hours	Check the oil cooler and after cooler for contamination	9.9
1000 to 2000 hours	Change the oil filter*	9.6
2000 to 3000 hours	Change the oil separator cartridge*	9.14
Proper interval varies. See chapter 9.8	Change the oil*	9.11
Annually	Check all electrical screw connections for tightness and tighten if necessary	7.2
	Have the safety relief valve checked by authorized KAESER distributor	9.12
	Check the oil cooler and after cooler for leaks	9.9
6000/12000 hours or at least within three years	Have the compressor motor bearings relubricated by authorized KAESER distributors*	9.10

* The maintenance period can vary depending on the cycle rate and environmental conditions.

** Not to exceed 2000 service hours.

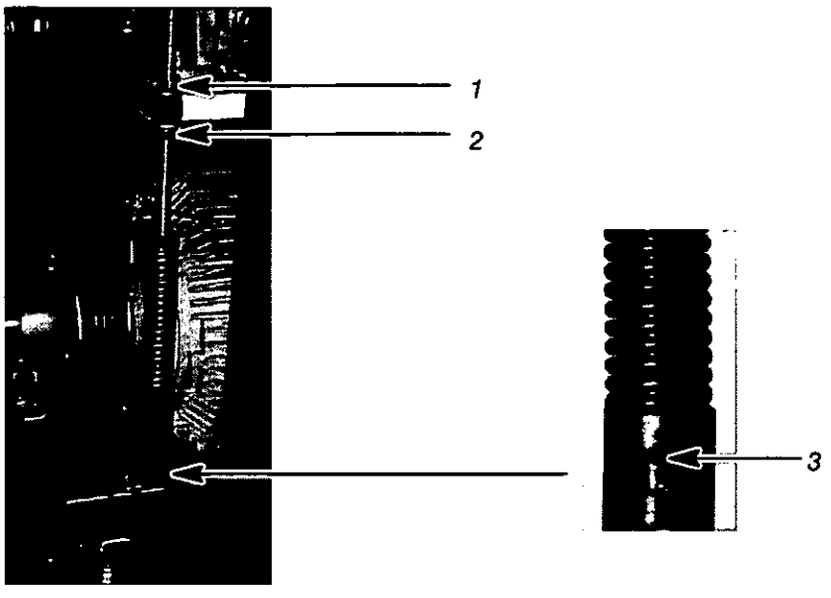
We urgently recommend that a record is kept of the maintenance work done (see chapter 9.15).

9.3 Checking the Drive Belt Tension

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

⚠ **Lock the main disconnect switch in the "off" position in accordance with applicable lockout/tagout procedures to ensure the compressor does not restart.**

Check the tension of the belt drive after the first 2 and 24 hours of operation and thereafter every 500 hours of operation.



1 Hexagonal nut
2 Hexagonal nut
3 Marking pin

The belt drive tension is automatically adjusted within a limited range by the pressure spring of the belt tensioning device.

Re–tension the belt drive if the belts have stretched to the point where the indicator pin (3) is situated at the **top end of its indicator slot.**

If this is the case, proceed as follows:

☞ Open the left–hand maintenance and drive access doors.

☞ Loosen the hexagonal nut (1).

☞ Tension the belt drive with the hexagonal nut (2) by turning counter clockwise until the marking pin (3) is situated at the **bottom end of its indicating slot.**

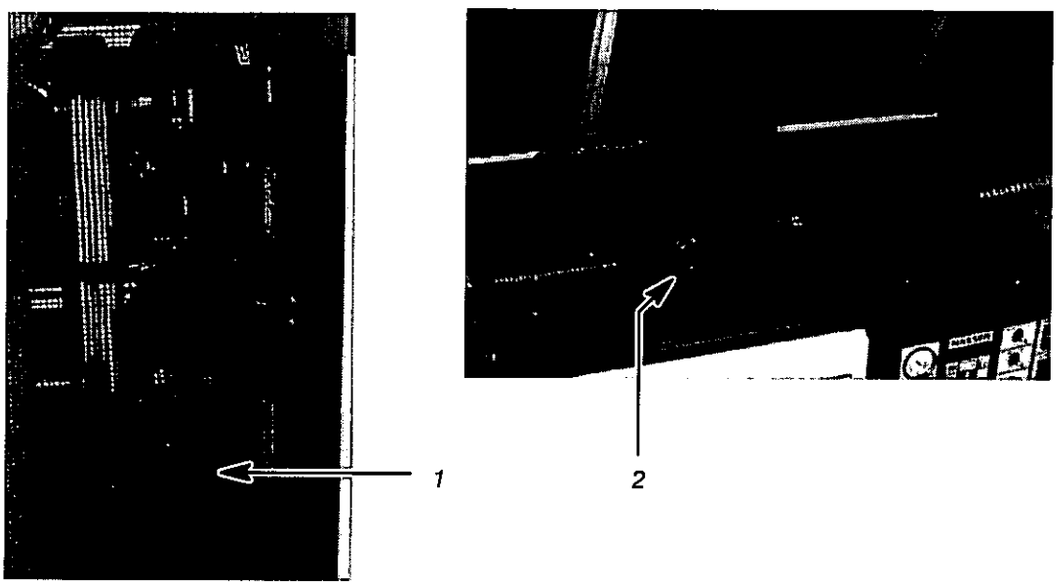
☞ Tighten the hexagonal nut (1).

☞ Close the left–hand drive access and maintenance doors.

9.4 Drive Belt Change

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

⚠ **Lock the main disconnect switch in the "off" position in accordance with applicable lockout/tagout procedures to ensure the compressor does not restart.**



1 Drive access door
2 Drive guard

☞ Open the left–hand maintenance and drive access doors.

☞ Open the upper maintenance door and the drive guard.

☞ Loosen the hexagonal nut (1, see chapter 9.3) counter clockwise.

☞ Screw the hexagonal nut (2, see chapter 9.3) clockwise until the V–belts are loose.

☞ Remove the V–belts.

☞ Place the new V–belts over the fan blade, turn the fan and guide the belts over the remaining fan blades.

☞ Lay the new belts over the motor pulley and compressor pulley without straining them.

☞ Set the belt drive tension (see chapter 9.3).

☞ Fix the drive guard with the screws and close the upper maintenance door.

☞ Close the left–hand drive access and maintenance doors.

☞ Check the belt drive tension after two hours of operation and then again after 24 hours of operation, as experience shows that the belts stretch the most during this time period.

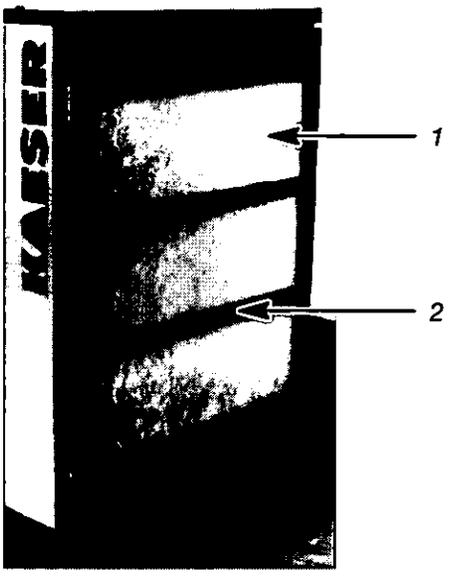
Attention! **It is essential that all replacement belts are precisely the same length (as a set) and absolutely oil–proof. For this reason we recommend that only original KAESER drive belts are used.**

9.5 Cleaning or Replacing the Filter Mat

Clean the filter mat every 100 to 300 service hours depending on the dust content of the intake air.

☞ Switch off the compressor (see chapter 8.2).

⚠ **Lock the main disconnect switch in the "off" position in accordance with applicable lock out/tag out procedures to ensure the compressor does not restart.**



1 Filter mat
2 Holding frame

Removal and fitting:

☞ Open the snap fasteners (turn the flat–head screw with a screwdriver counter clockwise 90°) and remove the holding frame.

☞ Fit the holding frame and close the snap fasteners (turn the flat–head screw with a screwdriver clockwise 90° then press until the fasteners snap in).

Cleaning:

Rinse the mat in warm water (approximately 105°F), if necessary, use a mild detergent soap to rinse out oily dust. The mat can also be tapped, vacuum cleaned or blown out with compressed air (not in excess of 30 psig).

Attention! **If the mat is heavily soiled or has been cleaned often (maximum five times), replace it.**

9.6 Oil Filter Change

Hot oil; beware of scalding.

Attention! **Replace the run–in oil filter cartridge with a standard oil filter cartridge (supplied with the compressor) after approximately 200 operating hours.**

It is recommended that the oil filter cartridge is replaced every 1000 to 2000 operating hours and always when the oil is changed.

Removal and replacement of the oil filter cartridge:

☞ Switch off the compressor with the control switch (see chapter 8.2).

Lock the main disconnect in the "off" position in accordance with applicable lock out/tag out procedures to ensure the compressor does not restart.

Lock the isolation shut–off valve in the "closed" position and vent all compressed air trapped between the compressor and the isolation shut–off valve in accordance with applicable lock out/ tag out procedures.

The oil circulation system of the compressor vents automatically.

☞ Open the upper maintenance and door and the drive guard.

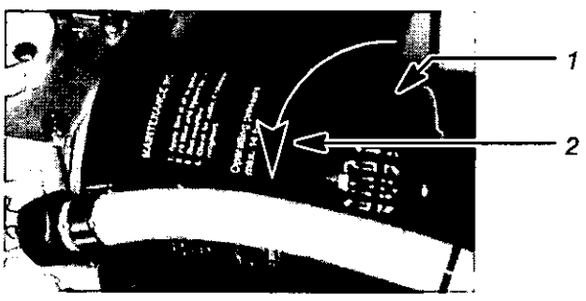
☞ Open the right–hand maintenance door.

☞ The pressure gauge on the oil separator tank must indicate zero psig.

Oil mist can escape when venting the oil separator tank.

☞ Insert the maintenance hose – **with the ball valve closed** – (see chapter 9.7) in the hose coupling (1, see chapter 9.7) on the oil separator tank.

☞ Slowly open the ball valve (8, see chapter 9.7). The residual pressure in the oil separator tank escapes.



1 Oil filter cartridge
2 Turn counter clockwise to unscrew the cartridge

☞ Twist the used or contaminated oil filter cartridge counter clockwise to remove and catch escaping oil in a suitable container.

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

- ☞ Clean the face of the combination block with a lint free cloth.
- ☞ Lightly oil the gasket of the new filter cartridge before screwing into position.
- ☞ Screw in the new filter cartridge clockwise by hand until the gasket fits tightly.

Attention! **Do not use a tool as this may cause damage to the oil filter cartridge and the gasket.**

- ☞ Check the oil level (see chapter 9.7).
- ☞ Remove the maintenance hose from the hose coupling on the oil separator tank.
- ☞ Fix the drive guard with the screws and close the upper maintenance door.
- ☞ Close the right hand maintenance door.
- ☞ Open the isolation shut–off valve between the compressor and the main air system.

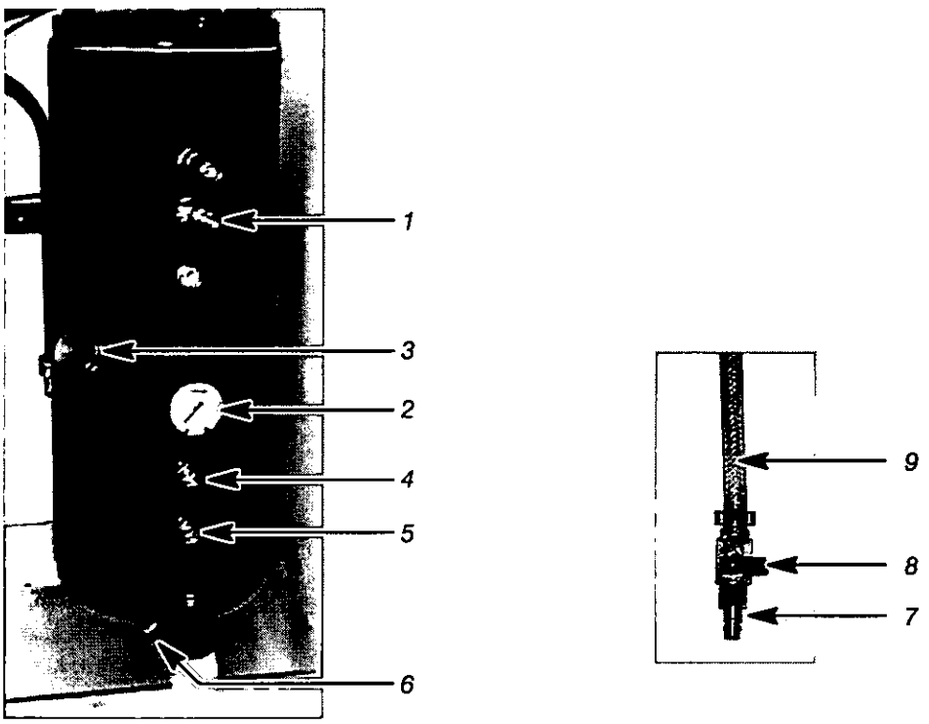
⚠ **Carry out a test run**

When the operating temperature is reached (see chapter 1.1), shut down the compressor unit (see chapter 8.2) and lock the main disconnect in the "off" position in accordance with applicable lock out/tag out procedures (example: OSHA CFR 29 § 1910.147) to ensure the compressor does not restart.

Afterwards, carry out a visual check for leaks.

9.7 Oil Top–Off

Check the oil level weekly through the oil sight glass when the compressor is shut down. If necessary, top off the oil to the maximum level. Do not exceed the maximum level (center of the oil sight glass).



1 Hose coupling
2 Pressure gauge
3 Oil filler plug
4 Max.oil level
5 Min.oil level
7,8,9 Maintenance hose

Venting the Compressor Unit:

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

Lock the main disconnect in the "off" position in accordance with applicable lock out/tag out procedures to ensure the compressor does not restart.

Lock the isolation shut–off valve in the "closed" position and vent all compressed air trapped between the compressor and the isolation shut–off valve in accordance with applicable lock out/ tag out procedures.

The oil circulation system of the compressor unit vents automatically.

☞ Open the right–hand maintenance door.

☞ The pressure gauge on the oil separator tank must indicate zero psig.

Oil mist can escape during venting of the oil separator tank.

☞ Insert the maintenance hose – **with the ball valve closed** – into the hose coupling (1) on the oil separator tank

☞ Slowly open the ball valve (8). The residual pressure in the oil separator tank escapes.

Oil top off:

Before opening the oil filler plug (3) on the oil separator tank, the compressor unit must be vented.

☞ Unscrew the oil filler plug (3) on the oil separator tank.

Attention!

Always use the same brand and type of oil when topping off the oil. (see label on the oil separator tank).

During an oil change, drain the old oil completely and always replace the oil filter.

Never mix different oil types or brands.

Oil recommendations see chapter 9.8

☞ Top off the oil to the maximum mark, center of top oil sight glass (4).

☞ Check the gasket ring of the filler plug (3) for damage and then screw in the filler plug.

☞ Remove the maintenance hose from the hose coupling (1) on the oil separator tank.

☞ Close the right–hand maintenance door.

☞ Open the isolation shut–off valve between the compressor and the main air system.

Attention!

After carrying out the oil change or oil cooler cleaning procedures run the compressor unit up to operating temperature to ensure that the thermostatic valve opens and that the oil cooler is flooded with oil.

Subsequently vent the compressor unit and top off the oil.

9.8 Oil recommendations

Lubrication of an air compressor is essential to reliable operation. Carbon and varnish can form in compressor oils. These deposits block the flow of lubricant and cause excessive wear and failure of moving parts. Contamination of the oil can allow the formation of acids, causing extensive internal corrosion. Water may be condensed decreasing the oil's lubricity.

Oil in rotary compressors does much more than lubricate. During the compression process, it acts as a sealant in the airend which is important for maximum efficiency. The lubricant also absorbs much of the heat of compression to cool the airend and reduce the temperature of the compressed air. It's not enough that a compressor fluid lubricates well, it must stand up to the heat, pressure and contaminants that are present in every air compressor.

KAESER COMPRESSORS has several lubricants available that are specially formulated to match these demands. They feature excellent lubricity, outstanding demulsibility (ability to separate from water), and long life.

RECOMMENDED KAESER LUBRICANTS			
SIGMA LUBRICANT	DESCRIPTION	MAXIMUM RECOMMENDED CHANGE INTERVAL*	
		First Oil Change	Subsequent Oil Change
M–460	ISO 46 Semi–Synthetic Lubricant	2,000 Hours	4,000 Hours
S–460	ISO 46 Synthetic Lubricant	6,000 Hours	8,000 Hours

* Oil changes may need to be more frequent depending on ambient conditions. When high ambient temperatures or dirty conditions are present, oil changes may be necessary every 1,000 hours (4,000 hours for synthetic) or even shorter intervals. Oil change intervals required should be determined through periodic oil analysis.

M–SERIES SEMI–SYNTHETIC LUBRICANTS

- M–Series SIGMA compressor fluids are the highest quality petroleum lubricants. M–460 is specially blended to provide reliable performance in KAESER screw compressors.

S–SERIES SYNTHETIC LUBRICANTS

- S–Series SIGMA compressor oils are formulated from the most advanced synthetic lubricants. These "synthetic" lubricants begin as high quality petroleum feed stock. They are then refined, processed and purified into fluids with very consistent molecular structure. These oils are carefully blended to produce extremely consistant lubricants with superior properties. SIGMA synthetic lubricants feature all the advantages of both PAO and diester fluids.
- S–460 lubricant is recommended for compressors operating in ambient temperatures between 40°F and 105°F.

Specialty KAESER LUBRICANTS

- S–680 lubricant may be used when ambient temperatures are always between 70°F and 105°F.
- FG–460 synthetic hydrocarbon based food grade lubricant is designed for use in rotary screw compressors in the application where incidental food contact may occur with the discharge air. This lubricant meets the requirements of the FDA Regulation 21 CRF §178.3570 and is USDA H–1 approved. FG–460 is approved for canning, food packing, meat and poultry processing and other applications where incidental food contact may occur.

SPECIALTY KAESER LUBRICANTS (Refer to product information to determine suitability.)			
SIGMA LUBRICANT	DESCRIPTION	MAXIMUM RECOMMENDED CHANGE INTERVAL*	
		First Oil Change	Subsequent Oil Change
S–680	ISO 68 Synthetic Lubricant	6,000 Hours	8,000 Hours
FG–460	ISO 46 Food Grade Synthetic Lubricant	3,000 Hours	4,000 Hours

* Oil changes may need to be more frequent depending on ambient conditions. When high ambient temperatures or dirty conditions are present, oil changes may be necessary every 1,000 hours (4,000 hours for synthetic) or even shorter intervals. Oil change intervals required should be determined through periodic oil analysis.

General Information

KAESER synthetic lubricant should be stored in a protected location to prevent contamination. Do not re–use drums; flush and send to reconditioner.

Although the KAESER synthetic is not highly flammable, it will burn. While KAESER synthetic compressor oil is less flammable than equal viscosity mineral oils, it cannot be classified as a fire–resistant fluid. It has a flash point above 460°F. Since the user has total control over the conditions of the compressor lubricant, he assumes total responsibility for its safe usage.

Material Safety Data Sheets are available for each lubricant from your KAESER authorized distributors.

Regardless of the lubricant selected, the KAESER Sigma lubricants will separate readily from water. If condensate occurs it can easily be remove. Let the compressor sit so that any water can drain back to the separator tank and separate to the bottom. See chapter 1.11 proper draining procedure.

Compatibility of KAESER Sigma Lubricants

All the above listed KAESER Sigma lubricants are similar to mineral oil in its compatibility with paints, seals, gaskets and hoses. The typical precautions are required when changing over from mineral oil to KAESER synthetic hydrocarbon based lubricant.
Never mix lubricants of different types or brands.

When switching from mineral oil to a synthetic oil, the plant's system materials must be re–evaluated. Certain plastics are not compatible with synthetic oils. The following is a partial list of acceptable and not recommended materials:

ACCEPTABLE		NOT RECOMMENDED
Viton	Celcon	PVC
High Nitrile Buna N	Neoprene	ABS
Teflon	SBR Rubber	
Epoxy Paint	Low Nitrile Buna N	
Oil Resistant Alkyd	Acrylic Paint	
Nylon	Lacquer	
Delrin	Polystyrene	

Attention! **Polycarbonate bowls can be etched by any synthetic lubricant. We recommend replacement with metal bowls, or the addition of metal guards.**

9.9 Cleaning the After/Oil Cooler

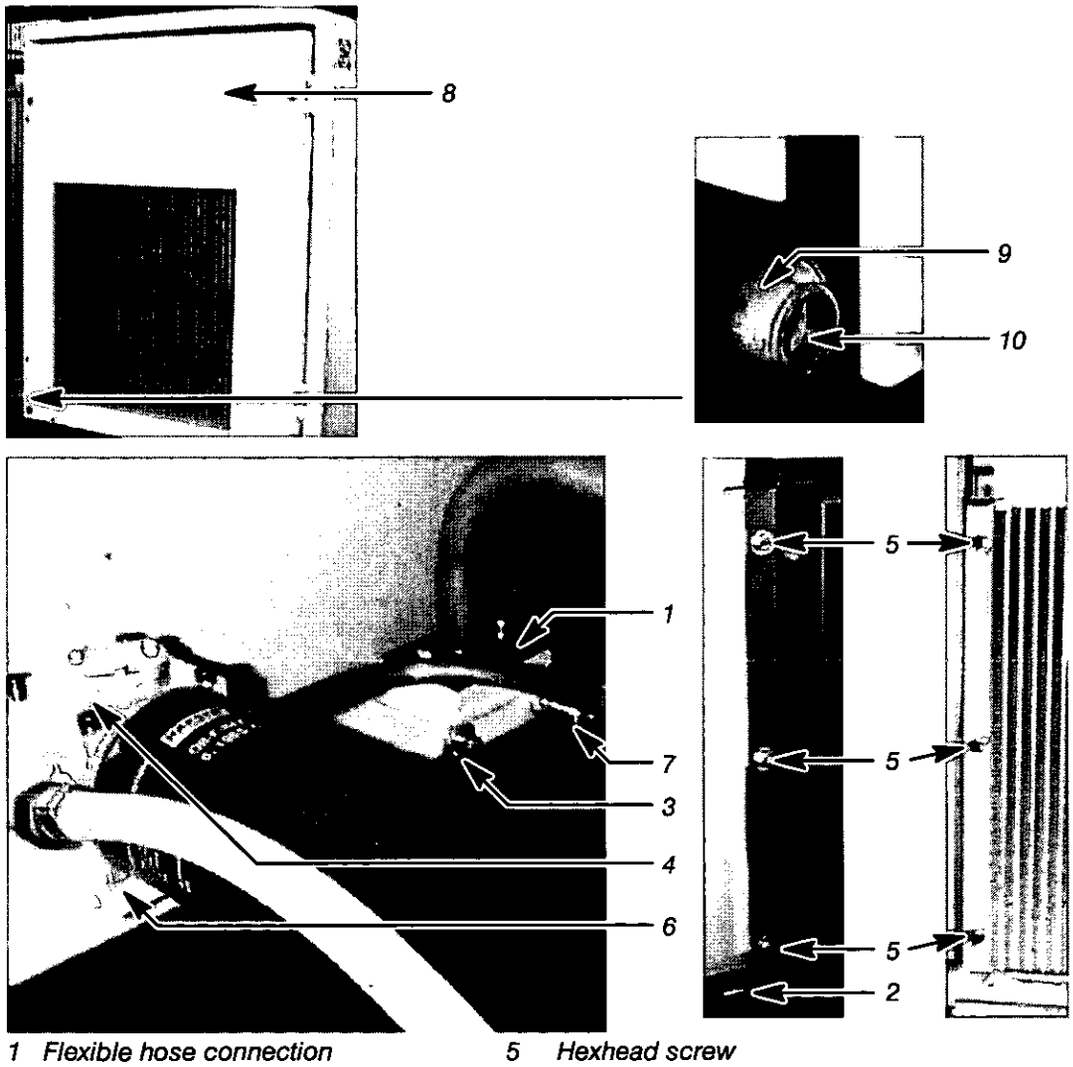
Check the after/oil cooler for contamination at least every 1000 operating hours. Heavy contamination could lead to excessive temperature in the oil circulation system.

Removal and cleaning of the after/oil cooler:

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

Lock the main disconnect in the "off" position in accordance with applicable lock out/tag out procedures to ensure the compressor does not restart.

☞ Vent the compressor unit (see chapter 9.7).



1 *Flexible hose connection (aftercooler inlet)*
2 *Hose coupling for oil draining*
3 *Pipe screw fitting*
4 *Combination valve with oil filter*
5 *Hexhead screw*
6 *Connecting flange*
7 *Hose coupling to depressurize air line*
8 *Cover panel*
9 *Elbow* 10 *Compressed air connection*

☞ Open the left-hand maintenance and drive access doors.

☞ Open the upper maintenance door and the drive guard.

☞ Unscrew the cover panel (8).

When the compressor unit is vented, pressure is still present in the aftercooler and the pipework up to the minimum pressure check valve. For this reason, the compressor must be isolated from the compressed air system by closing the isolation shut–off valve between the compressor unit and the main air system. Afterwards, insert the maintenance hose - *with the ball valve closed* - (see chapter 9.7) into the hose coupling (7) on the aftercooler. Slowly open the ball valve (8, see chapter 9.7), and the aftercooler vents. Remove the nozzle with the maintenance hose from the hose coupling (7) on the aftercooler. If isolation shut-off valve is not available, vent the compressed air system completely. The pressure gauge on the instrument panel must indicate zero psig.

☞ Unscrew the pressure line of the pipework from the compressed air connection (10) and, if necessary, the elbow (9) from the aftercooler.

☞ Loosen the flexible pipe connection (1) at the aftercooler inlet and the hose connector (3).

☞ Unscrew the combination valve (4) from the connecting flange (6) on the oil cooler, lift slightly, catch any escaping oil with a cloth.

Capture escaped oil and dispose according to environmental regulations.

☞ Remove and check the O-rings from the combination valve (4).

☞ Close up the pipes and the openings on the combination valve, aftercooler and the oil cooler.

Attention! **Support the oil/air aftercooler before unscrewing the hexagonal bolts (5).**

☞ Unscrew the hexagonal bolts (5) and carefully lift out the air/oil cooler.

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 laminations may be cleaned with water or steam jet only in designated cleaning areas with oil separators suited for such purpose.

☞ Clean the cooler laminations with compressed air, water or steam jet.

☞ Reassemble in the reverse order.

Attention! **Seat the O–rings correctly in the connecting flange (6) when fitting the combination valve (4).**

☞ Fix the drive guard with the screws and close the upper maintenance door.

☞ Close the left–hand drive access and maintenance doors.

☞ See chapter 9.7 for oil top off.

Perform a test run.

When the operating temperature is reached (see chapter 1.1), shut down the compressor unit (see chapter 8.2) and lock the main disconnect in the "off" position in accordance with applicable lock out/tag out procedures (example: OSHA CFR 29 § 1910.147) to ensure the compressor does not restart.

Afterwards, carry out a visual check for leaks.

☞ Open the isolation shut-off valve between the compressor unit and the main air system.

9.10 Greasing the Electric Motor

Compressor motor:

The electrical motor bearings are permanently greased.

Attention! **Have the motor bearings replaced by authorized KAESER distributors in accordance with the maintenance schedule (see chapter 1.8).**

9.11 Oil Change (Oil Separator Tank and Oil Cooler)

For type of oil and frequency of oil change see chapter 9.8

Oil change must be carried out with warm to the touch condition of the compressor unit (Oil temperature approx. 104°F).

Danger of scalding with hot oil.

When inserting the maintenance hose into the compressor's hose couplings, always have the ball valve closed and the hose end secured before slowly opening the ball valve. Beware of air/oil mist that could blow out of the hose. Unrestricted air/oil flow through the hose end will result in a whipping action which could cause severe injury or death.

If the compressor unit operates in ambient temperatures close to the maximum ambient temperature (see chapter 1.6), change the oil more often (e.g. 1/2 or 1/4 of recommended interval).

Attention! **Drain the oil out of the oil separator tank, cooler and the oil pipes completely. See chapter 8.6 for putting back into operation.**

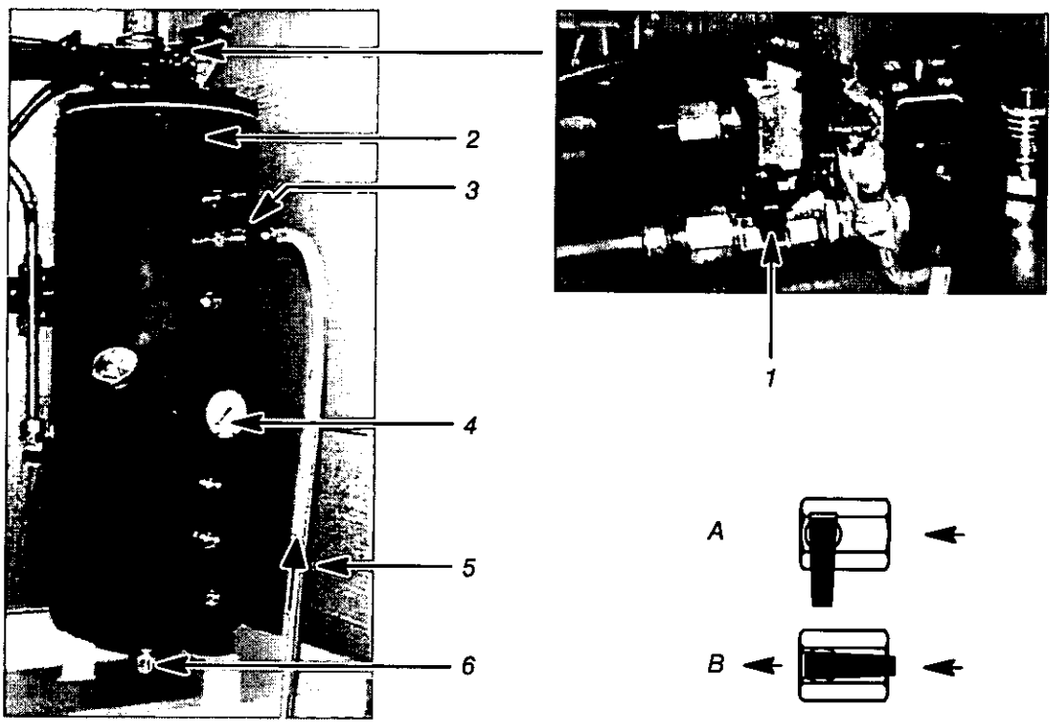
Oil change using external pressure source:

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

Lock the main disconnect in the "off" position in accordance with applicable lockout/tagout procedures to ensure the compressor does not restart.

Lock the isolation shut–off valve in the "closed" position and vent all compressed air trapped between the compressor and the isolation shut–off valve in accordance with applicable lock out/ tag out procedures.

The oil circulation system of the compressor unit vents automatically.



1 Ball valve
A closed
B open
2 Oil separator tank
3 Hose coupling
4 Pressure gauge
5 External pressure sources
6 Oil drain hose coupling
7 Ball valve (oil drain)

☞ Open the left–hand maintenance and drive access doors.

☞ Open the right–hand manitenance door.

☞ The pressure gauge (4) on the oil separator tank (2) must indicate zero psig.

☞ Close the ball valve (1).

⚠ **Oil mist can escape when venting the oil separator tank.**

☞ Insert the maintenance hose – **with the ball valve closed** – (see chapter 9.7) into the hose coupling (3) on the oil separator tank (2).

☞ Pressurize the oil separator tank via the attached hose using a separate pressure source. Slowly open the ball valve (8, see chapter 9.7) until the pressure gauge (4) on the oil separator tank (2) indicates approximately 40 psig.

☞ Remove the maintenance hose from the hose coupling (3) on the oil separator tank (2).

☞ Prepare a container to catch the escaping oil.

Attention! **The total oil capacity of the compressor unit must be taken into account (see chapter 1.7).**

☞ Insert the maintenance hose – **with the ball valve closed** – into the hose coupling (6) on the oil separator tank (2).

☞ Hang the hose in the catch container and secure.

- ☞ Open the ball valve (7).
- ☞ Slowly open the ball valve (8, see chapter 9.7). The remaining pressure in the tank forces out the oil. When air escapes, close the ball valve immediately.
- ☞ Close the ball valve (7).
- ☞ Remove the maintenance hose from the hose coupling (6) on the oil separator tank (2).
- ☞ Prepare a catch container for the oil cooler.
- ☞ Insert the maintenance hose – **with the ball valve closed** – into the hose coupling (2, chapter 9.9) on the oil cooler.
- ☞ Hang the hose in the catch container and secure.
- ☞ Slowly open the ball valve (8, see chapter 9.7). The remaining pressure in the oil cooler forces out the oil.
- ☞ Remove the air supply hose from the hose coupling (2, chapter 9.9) on the oil cooler.
- ☞ Open the ball valve (1).

See chapter 9.7 for oil top off.

See chapter 1.7 for oil capacity.

- ☞ Close left–hand drive access and both maintenance doors.
- ☞ Open the isolation shut-off valve between the compressor unit and the main air system.

Dispose of the used oil according to environmental regulations.

Perform a test run.

When the operating temperature is reached (see chapter 1.1) shut down the compressor unit (see chapter 8.2) and lock the main disconnect in the "off" position in accordance with applicable lock out/tag out procedures (example: OSHA CFR 29 § 1910.147) to ensure the compressor does not restart.

Afterwards, carry out a visual check for leaks.

Oil Change using own compressed air:

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

Lock the main disconnect in the "off" position in accordance with applicable lock out/tag out procedures to ensure the compressor does not restart.

Lock the isolation shut–off valve in the "closed" position and vent all compressed air trapped between the compressor and the isolation shut–off valve in accordance with applicable lock out/ tag out procedures.

The compressor unit oil circulation system vents automatically.

- ☞ Open the right–hand maintenance door.
- ☞ The pressure gauge (4) on the oil separator tank (2) must indicate zero psig.
- ☞ Close the ball valve (1).

☞ Start the compressor unit (see chapter 8.2) and allow to run for approximately 30 seconds.

☞ Stop the compressor unit (see chapter 8.2).

Lock the main disconnect in the "off" position in accordance with applicable lock out/tag out procedures to ensure the compressor does not restart.

☞ Check the actual pressure on the pressure gauge (4). Open the ball valve (1), let the pressure on the pressure gauge (4) sink to approximately 40 psig and then close the ball valve (1) again.

☞ Prepare catch container for the oil.

Attention! **The total oil capacity of the compressor unit must be taken into account (see chapter 1.7).**

☞ Insert the maintenance hose – **with the ball valve closed** – (see chapter 9.7) into the hose coupling (6) on the oil separator tank (2).

☞ Hang the hose in the catch container and secure.

☞ Open the ball valve (7).

☞ Slowly open the ball valve (8, see chapter 9.7). The remaining pressure in the tank forces out the oil. When air escapes, close the ball valve immediately.

☞ Close the ball valve (7).

☞ Remove the maintenance hose from the hose coupling (6) on the oil separator tank (2).

☞ Open the left–hand maintenance and the drive access doors.

☞ Prepare a catch container for the oil cooler.

☞ Insert the maintenance hose – **with the ball valve closed** – into the hose coupling (2, chapter 9.9) on the oil cooler.

☞ Hang the hose in the catch container and secure.

☞ Slowly open the ball valve (8, see chapter 9.7). The remaining pressure in the oil cooler forces out the oil.

☞ Remove the nozzle with the attached hose from the hose coupling (2, chapter 9.9) on the oil cooler.

☞ Open the ball valve (1).

See chapter 9.7 for oil top off.

See chapter 1.7 for oil capacity.

☞ Close the left–hand drive access and both maintenance doors.

☞ Open the isolation shut-off valve between the compressor unit and the main air system.

Dispose of the used oil according to environmental regulations.

Carry out a test run.

When the operating temperature is reached (see chapter 1.1) shutdown the compressor unit (see chapter 8.2) and lock the main disconnect in the "off" position in accordance with applicable lock out/tag out procedures (example: OSHA CFR 29 § 1910.147) to ensure compressor does not restart.

Afterwards, carry out a visual check for leaks.

9.11.1 Procedure for putting back into operation

- ☞ Refer to chapter 7.9 and follow the instructions in section "Pouring a small quantity of oil into the air inlet port" .
- ☞ Refer to chapter 7.6 and follow the instructions in section "Extension of start period during the first start".
- ☞ Refer to chapter 9.7 and follow the instructions in section "Venting the compressor unit".
- ☞ Top off with oil again (see chapter 9.7).
- ☞ Open the shut–off valve between the compressor unit and the air system.
- ☞ Start the compressor unit (see chapter 8.2) and run until working temperature (see chapter 1.1), as shown on the temperature switch gauge (see chapter 8.1), is reached.
- ☞ Top off the oil, see chapter 9.7.

⚠ **Perform a test run.**

When the operating temperature is reached (see chapter 1.1), shut down the compressor unit (see chapter 8.2) and lock the main disconnect in the "off" position in accordance with applicable lock out/tag out procedures (example: OSHA CFR 29 § 1910.147) to ensure the compressor does not restart.

Afterwards, carry out a visual check for leaks.

9.12 Testing the Safety Relief Valve on the Oil Separator Tank

To test the set point of the safety relief valve the compressor must be run so that its discharge pressure exceeds the maximum pressure set on the air pressure switch.

See chapter 1.5 for the safety relief valve activating pressure.

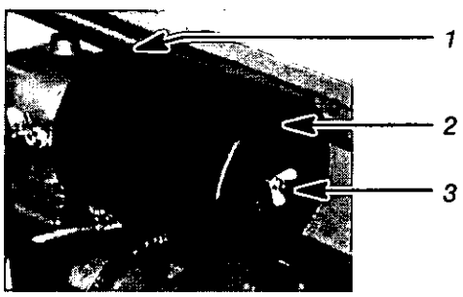
Attention! **Have the saftey relief valve tested by an authorized KAESER distributor in accordance with the maintenance schedule (see chapter 9.2).**

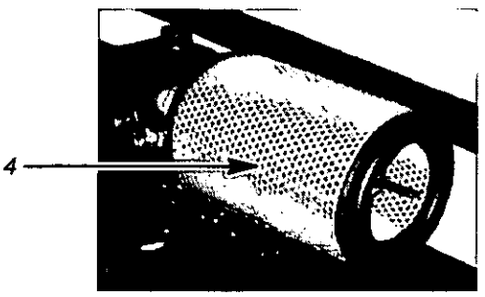
9.13 Cleaning or Replacing the Air Filter

Clean the air filter after every 500 service hours.

☞ Stop the compressor unit (see chapter 8.2).

⚠ **Lock the main disconnect switch in the "off" position in accordance with applicable lockout/tagout procedures to ensure the compressor does not restart.**





1 Air filter
2 Air filter cap
3 Wing nut for opening air filter housing
4 Air filter cartridge

To open the air filter housing:

☞ Open the upper maintenance door and the drive guard.

☞ Unscrew the wing nut (3) and remove the air filter cap (2) and the filter cartridge (4).

☞ Clean the air filter cap and sealing surfaces.

Cleaning the air filter cartridge (4) by tapping:

☞ Tap the air filter cartridge several times on the front with the ball of the hand.

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

☞ Clean all sealing surfaces.

Cleaning the air filter cartridge with compressed air:

☞ Use dry, compressed air blowing at a pressure of not more than 30 psig at a slant from the inside to the outside of the air filter cartridge surfaces.

Attention! **Do not clean the air filter cartridge with fluids. If the air filter cartridge is heavily contaminated or was already cleaned several times (max. five times), replace.**

Compressed air shall not be used for cleaning purposes except where reduced to less than 30 psig and then only with effective chip guarding and personal protective equipment. (OSHA CFR 29 § 1910.242)

To close the filter housing:

☞ Insert the filter cartridge (4) and replace the air filter cap (2).

☞ Screw on the wing nut (3) tightly.

☞ Fix the drive guard with the screws and close the upper maintenance door.

9.14 Changing the Oil Separator Cartridge

Change the oil separator cartridge every 2000 to 3000 service hours.

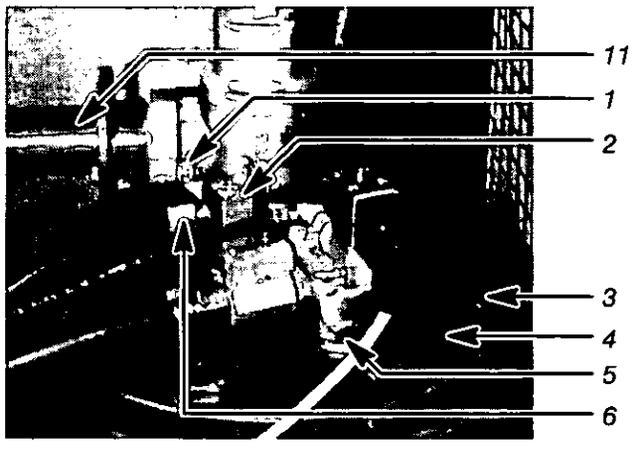
The life of the oil separator cartridge is largely determined by the degree of contamination of the inlet air and the duration of the maintenance period for the air and oil filter cartridges.

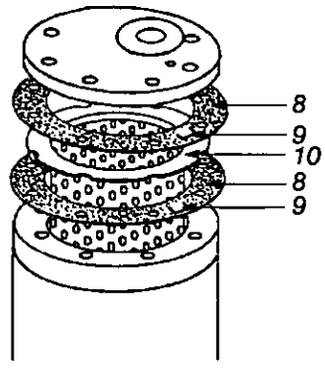
☞ Stop the compressor (see chapter 8.2).

Lock the main disconnect in the "off" position in accordance with applicable lock out/tag out procedures to ensure the compressor does not restart.

Lock the isolation shut–off valve in the "closed" position and vent all compressed air trapped between the compressor and the isolation shut–off valve in accordance with applicable lock out/ tag out procedures.

The compressor unit oil circulation system vents automatically.





1 *Lock nut*
2 *Dirt trap*
3 *Hexhead screw*
4 *Cover*
5 *Union*
6 *Pipe fitting*
7 *Lock nut*
8 *Gasket*
9 *Staple*
10 *Oil separator cartridge*
11 *Air pipe*

☞ Open the right–hand maintenance door.

☞ Open the upper maintenance door and the drive guard.

☞ The pressure gauge on the oil separator tank must indicate zero psig.

Oil mist can escape when the oil separator tank is vented.

☞ Insert the maintenance hose – **with the ball valve closed** – (see chapter 9.7) into the hose coupling (1, chapter 9.7) on the oil separator tank.

☞ Slowly open the ball valve (8, chapter 9.7). The tank is thus vented to zero psig.

- ☞ Remove the maintenance hose from the hose coupling on the oil separator tank.
- ☞ Insert the maintenance hose – **with the ball valve closed** – (7, chapter 9.9) into the hose coupling on the aftercooler.
- ☞ Slowly open the ball valve (8, chapter 9.7). The aftercooler and air pipe up to the minimum pressure check valve are thus vented to zero psig.
- ☞ Remove the maintenance hose from the hose coupling on the aftercooler.
- ☞ Unscrew the pipe connector (6).
- ☞ Unscrew the union (5) on the vent valve and carefully remove the vent valve with connections.
- ☞ Loosen the lock nuts (1 and 7) and remove the air pipe (11).

Attention! **When removing the cover plate (4), take utmost care not to damage the copper pipe on the bottom of the cover plate.**

- ☞ Unscrew the hexagonal bolts (3) holding down the cover plate (4) and carefully remove the cover plate.
- ☞ Remove the used oil separator cartridge (10), with gaskets (8) and clean the sealing surfaces.

Attention! **When cleaning the sealing surfaces take care that no dirt particles fall into the oil separator tank.**

The oil separator cartridge is a disposable item and cannot be cleaned.

Dispose of the used oil separator cartridge according to environmental regulations!

- ☞ Insert the new oil separator cartridge (10) with the new gaskets (8), fit and tighten down the cover plate (4) with the bolts (3).
- ☞ Replace the screen filter and the O-ring of the dirt trap (2) when the oil separator cartridge is replaced.
- ☞ Reassemble in the reverse order.
- ☞ Close the right–hand maintenance door.
- ☞ Fix the drive guard with the screws and close the upper maintenance door.
- ☞ Open the isolation shut-off valve between the compressor unit and the main air system.

Do not remove the staple (9) in gaskets.

The metal parts of the oil separator cartridge are electrically conductive and thus require "electrically conductive gaskets". The gaskets (8) are stapled to provide an electrical path from the oil separator tank to the frame of the compressor unit.

Do not remove the staples.

Perform a test run.

When the operating temperature is reached (see chapter 1.1), shut down the compressor unit (see chapter 8.2) and lock the main disconnect switch in the "off" position in accordance with applicable lock out/tag out procedures (example: OSHA CFR 29 § 1910.147) to ensure the compressor does not restart.

Afterwards, carry out a visual check for leaks.

9.15 Maintenance Schedule

Model No. ..... **Serial No.** .....

Date	Description of work	Operating hours	Signature

10 Spare Parts and After Sales Service

10.1 Service parts and maintenance parts

Description	Qty.	Order No.
Oil filter	1	6.1985.0
Air filter cartridge	1	6.2055.0
Filter mat	1	6.1687.0
Oil separator cartridge Complete set Comprising: Separator cartridge Gasket Dirt trap strainer O–Ring	1 1 2 1 1	6.2011.1

KAESER COMPRESSORS

Model		Part-No.
Year		Serial-No.
psig	cfm	Voltage
Hz/RPM		FLA
Phase	HP	Scheme

Important for all queries:

☞ Enter the data on the compressor name plate in the name plate shown above.

Always quote the data on the name plate when making a query or ordering spare parts.

Attention! **Always order original spare parts from the compressor manufacturer to avoid lower quality spare parts in your compressor unit.**

11 Appendix

11.1 Wiring Diagram

Wiring Diagram

screw compressor AS 31

direct on line start

230V 3Ø 60CY or 460V 3Ø 60CY

manufacturer: KAESER COMPRESSORS
96450 COBURG
GERMANY

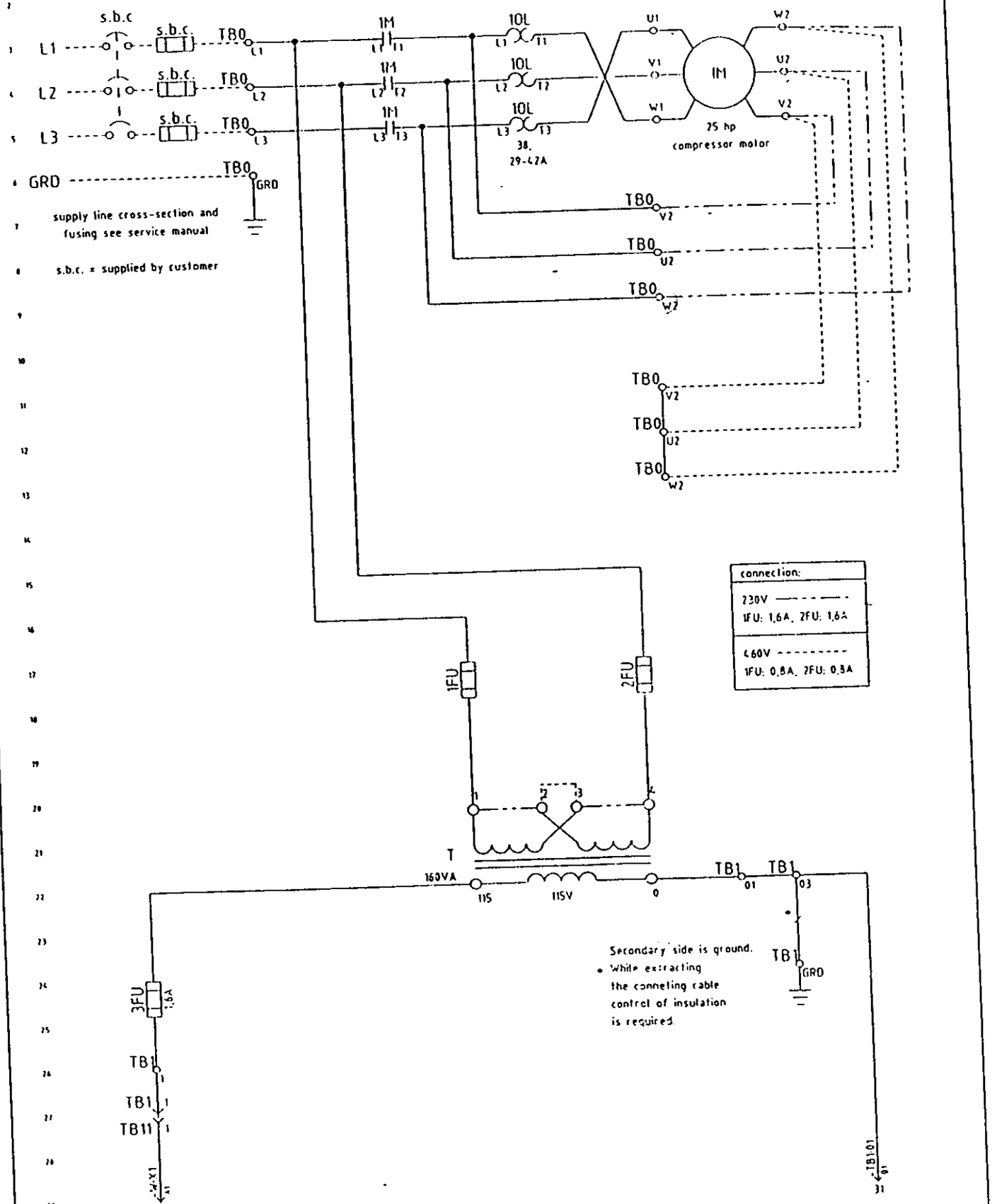
consignee:

customer:

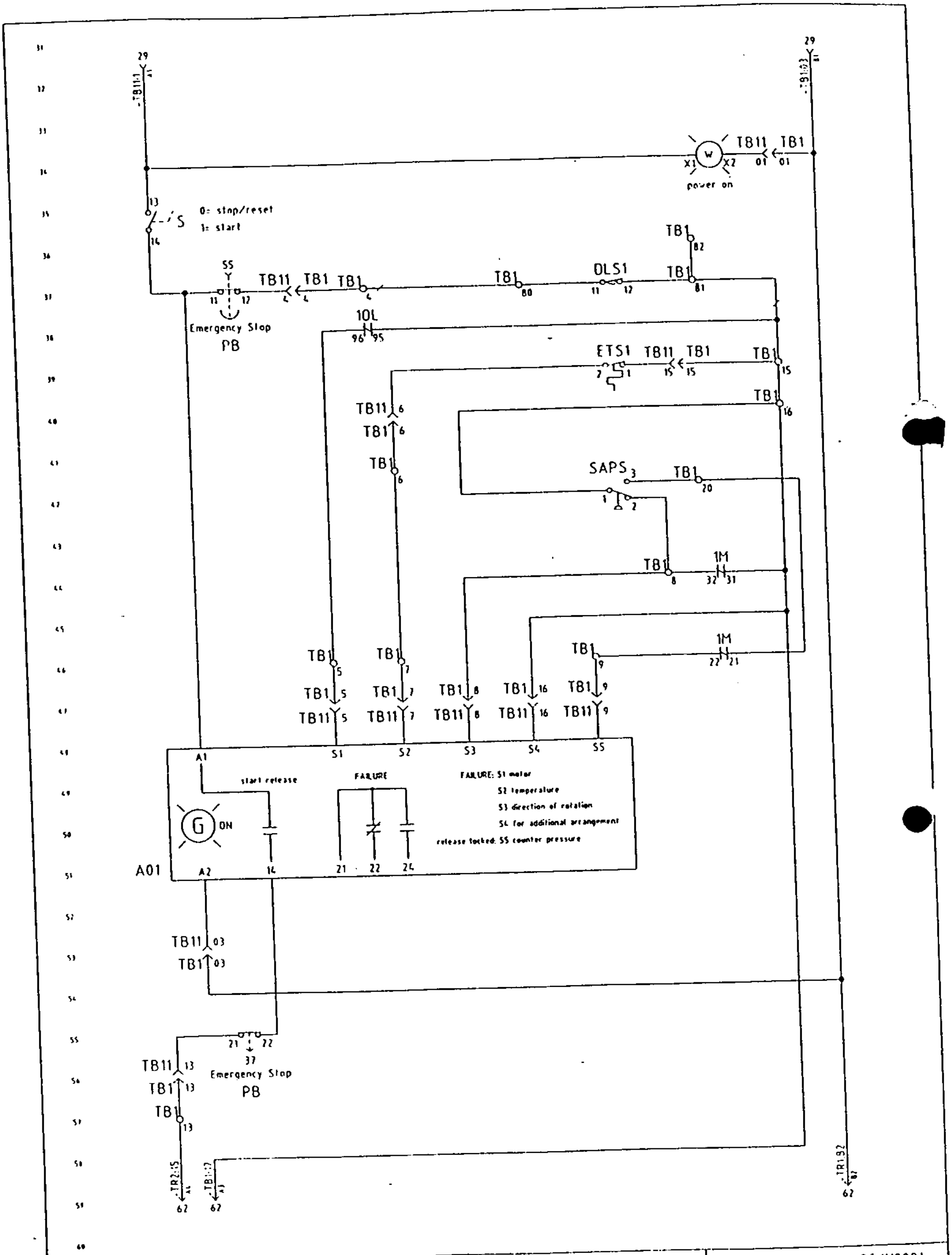
a				date	26.06.1997	KAESER COMPRESSORS	cover page compressor AS 31	DAS31 - 0697/U0001	
b				editor	Sitter				
c				check				Page	1
A	modification	date	name						

Input voltage

230V ø3 60CY or 460V 3ø 60CY



KAESER COMPRESSORS	wiring diagram compressor AS 31	SAS31 - 0697/U0001	Page 1



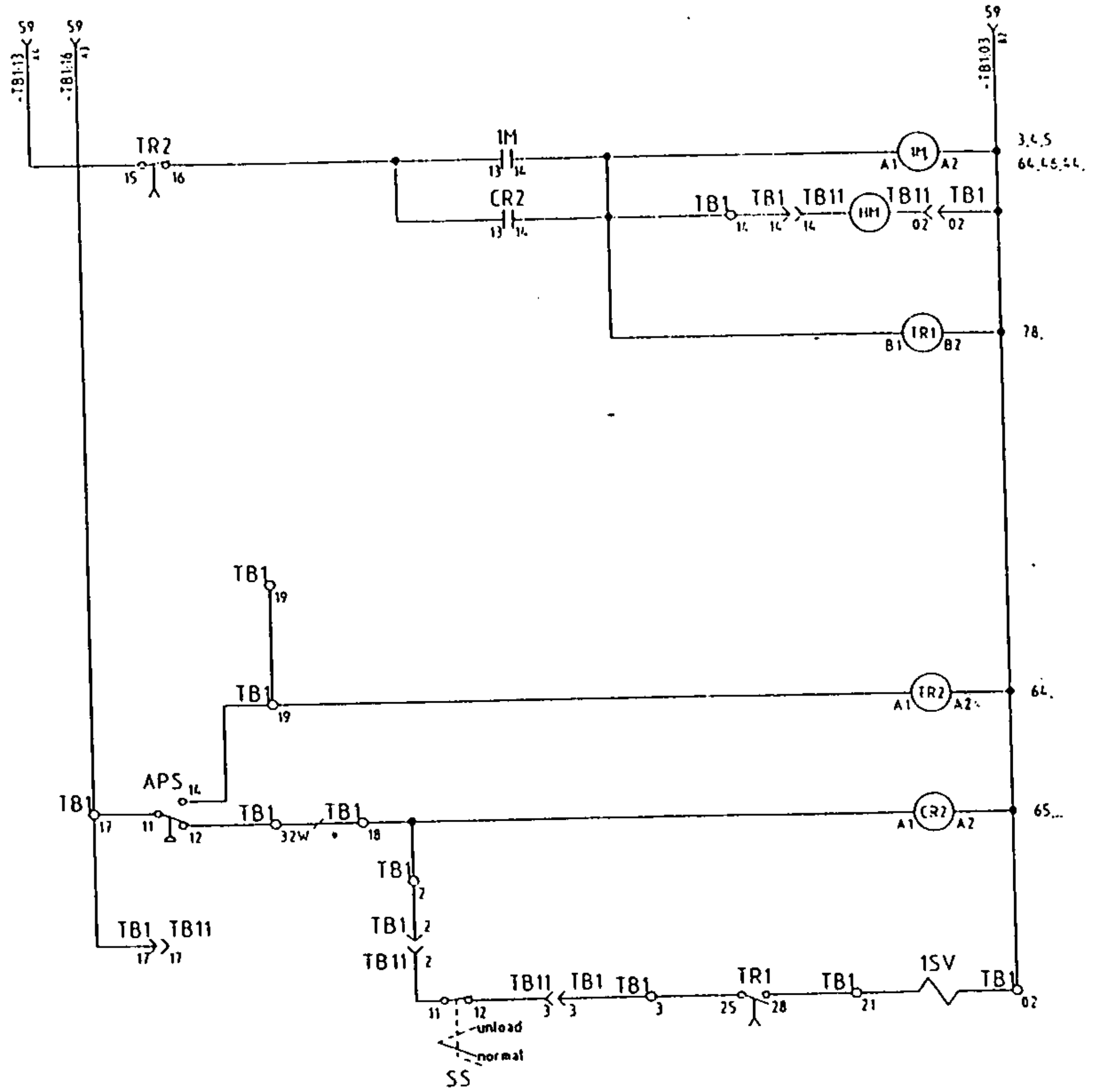
KAESER COMPRESSORS

wiring diagram

compressor AS 31

SAS31 - 0697/U0001

Page 2



* Removable jumper

KAESER COMPRESSORS	wiring diagram compressor AS 31	SAS31 - 0697/U0001	Page 3

1M motor starter

1SV solenoid valve
(combined control/vent valve)

1FU - 2FU primary control fuse
3FU secondary control fuse

T transformer

I M compressor motor
TB0 terminal strip power supply
TB1 terminal strip control unit
TB11 17-pole plug-connector

DLS1 door interlock switch
PB emergency stop pushbutton
A01 Kaeser Control

TR1 time relay (start unloading)
TR2 time relay (delay-off)

CR2 control relay

HM hour meter

W indicating light "power on"

S switch 0 = stop/Reset
1 = start

SS selector switch "normal/unload"

APS air pressure switch

malfunction indicators

malfunction lights:
(automatic shutdown)

10L motor overload relay

ETS1 excessive temperature switch 230 °F

SAPS safety air pressure switch

a				date	26.06.1997	KAESER COMPRESSORS	component legend	SAS31 - 0697/U0001	
b				editor	Sitter		compressor AS 31		
c				check				Page	01
E	modification	date	name						

device legend	s.b.c. = supplied by customer	cable-no.	connection 460V W0	connection 230V W0	destination external: name of device / connection	terminal strip: terminal-no. / link / terminal legend	terminal strip: jumper wire	terminal strip: location	destination inside: name of device / connection	cable-no.	device legend
					terminal strip: -TB0 total 12 terminals						
				X	-s.b.c.	GRD		6	controller		
				X	-s.b.c.	L1		3	-1M L1		
				X	-s.b.c.	L2		4	-1M L2		
				X	-s.b.c.	L3		5	-1M L3		
					-1M GRD	GRD			control panel		
compressor motor			X	X	-1M GRD	GRD			-TB1 GRD		
compressor motor			X		-1M V2	V2		11			
"			X		-1M U2	U2		12			
"			X		-1M W2	W2		13			
compressor motor				X	-1M V2	V2		7	-1M T1		
"				X	-1M U2	U2		8	-1M T2		
"				X	-1M W2	W2		9	-1M T3		

a			date	26.06.1997	KAESER COMPRESSORS
b			editor	Sitter	
c			check		
d	modification	date	name		

terminal connection
compressor AS 31
terminal strip -TB0

KAS31-0697/U0001

Page 1

A Qty.	B Description and function	C Component identification data			D Order No.	E Component
1	controller	33 9/16x15x8		CKC	7.4355.1	
1	control panel	26x17 3/8x3/32		CKC	201269.00011	
1	motor starter	A 95-30-22	115V 50/60Cy.	ABB	7.4830.00010	-1M
1	motor overload relay	T 75 DU 42	29-42A	ABB	7.3812.0	-10L
1	adapter	AB 80		ABB	7.3852.0	-10L
1	control relay	K 6-22Z	115V 50/60Cy.	ABB	7.2088.00010	-CR2
1	combined time relay	SGKAE 5	2-20s/1,5-30min.	Scharco	7.3999.00030	-TR1,-TR2
1	transformer	2x230V/115V	160VA	Siemens	7.2221.1	-T
1	fuse socket	USM 3	3pol.	Gould	7.3320.00010	-1FU,-2FU,-3FU
2	primary control fuse	ATO 0,8	0,8A 460V	Gould	7.3311.0	-1FU,-2FU
2	primary control fuse	TRM 1 6/10	1,6A 230V	Gould	7.3301.0	-1FU,-2FU
1	secondary control fuse	TRM 1 6/10	1,6A 230V	Gould	7.3301.0	-3FU
1	terminal strip	L 22/2		Wieland	7.3245.0	-TB0
1	terminal strip	L 31		Wieland	7.3095.0	-TB1
1	plug connector		17-pole	Wieland	7.3626.10030	-TB11
1	instrument panel			CKC	201047.0	
1	Kaeser Control	END 46K....		Zander	7.3767.00100	-A01
1	plug connector		8-pole	Phönix	7.2743.0	-A01
1	control switch with indicator light	1SFA616241R4218		ABB	7.2778.2	-S
1	control switch NORMAL/UNLOAD	1SFA616241R4046		ABB	7.2782.2	-SS
1	emergency pushbutton	1SFA616502R4051		ABB	7.3290.10010	-PB
1	temperature gauge with switch	230°F		Störk	8.0197.0	-ETS1
1	hour meter	632.1.10	115V 60Cy	Bauser	7.0784.0	-HM

When ordering spare parts include all the information
in columnes B, C and D and nameplate of compressor

a				date	26.06.1997
b				editor	Sitter
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F	modification	date	name		

Kaeser
COMPRESSORS

electrical component parts list
compressor AS 31

GAS31 - 0697/U0001

device legend	cable-no. W12 NYSLYÖ-J 18x16 AWG	destination inside name of device / connection	terminal strip terminal-no. / link / terminal legend	jumper wire	location	destination external name of device / connection	cable-no. 17-pole plug connector	W1 NYSLYÖ-J 4x16 AWG	W2 NYSLYÖ-J 4x16 AWG	W25 NYSLYÖ 2x16 AWG	W31 NYSLYÖ-J 3x16 AWG	device legend
		terminal strip: -TB1 total 51 terminals										
	X	-ETS GRD	GRD			-TB0 GRD						
		-3FU	1		26							
			1		27 →	-TB11 1	X					
		-CR2 A1	2		76							
			2		77 →	-TB11 2	X					
		-TR1 25	3		78							
			3		78 →	-TB11 3	X					
			4		37							
			4		37 →	-TB11 4	X					
		-10L 96	5		46							
			5		47 →	-TB11 5	X					
			6		41							
			6		40 →	-TB11 6	X					
			7		46							
			7		47 →	-TB11 7	X					
		-1M 32	8		44	-SAPS 2			X			
			8		47 →	-TB11 8	X					
		-1M 22	9		46							
			9		47 →	-TB11 9	X					
		-TR2 15	13		57							
			13		56 →	-TB11 13	X					
		-CR2 14	14		65							
			14		65 →	-TB11 14	X					
			15		39							
			15		39 →	-TB11 15	X					
		-1M 31	16		40	-SAPS 1			X			
			16		47 →	-TB11 16	X					
			17		74	-APS 11		X				
			17		77 →	-TB11 17	X					
		-T 0	01		22							
			01		34 →	-TB11 01	X					
		-1M A2	02		78	-1SV					X	
			02		65 →	-TB11 02	X					
			03		22							
			03		53 →	-TB11 03	X					
		-CR2 A1	18		75							
			32W		75	-APS 12		X				
		-TR2 A1	19		73	-APS 14		X				
			19		71							
		-1M 21	20		41	-SAPS 3			X			
		-TR1 28	21		78	-1SV					X	
			90		37	-DLS1 11				X		
			91		37	-DLS1 12				X		
			82		36							
			83									
			84									
			85									
			GRD		24	-APS		X				
		-T	GRD			-SAPS			X			
			GRD			-1SV					X	

* Removable jumper

a				date	26.06.1997	KAESER COMPRESSORS	terminal connection compressor AS 31 terminal strip -TB1
b				editor	Sitter		KAS31-0697/U0001
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device legend	cable-no.	W12 NYSLY6-J 18x16 AWG	destination external: name of device / connection	terminal strip: terminal-no. / link / terminal legend	terminal strip: jumper wire	terminal strip: location	destination inside: name of device / connection	cable-no.	device legend
			terminal strip: -TB11 total 17 terminals						
		X	-S 13	1		27 >	-TB1 1		
		X	-SS 11	2		77 >	-TB1 2		
		X	-SS 12	3		78 >	-TB1 3		
Emergency Stop		X	-PB 12	4		37 >	-TB1 4		
		X	-A01 S1	5		47 >	-TB1 5		
		X	-ETS1 2	6		40 >	-TB1 6		
		X	-A01 S2	7		47 >	-TB1 7		
		X	-A01 S3	8		47 >	-TB1 8		
		X	-A01 S5	9		47 >	-TB1 9		
		X	-PB 21	13		55 >	-TB1 13		
		X	-HM	14		65 >	-TB1 14		
		X	-ETS1 1	15		39 >	-TB1 15		
		X	-A01 S4	16		47 >	-TB1 16		
				17		77 >	-TB1 17		
power on		X	-W X2	01		34 >	-TB1 01		
		X	-HM	02		65 >	-TB1 02		
		X	-A01 A2	03		52 >	-TB1 03		

a				date	26.06.1997	KAESER COMPRESSORS
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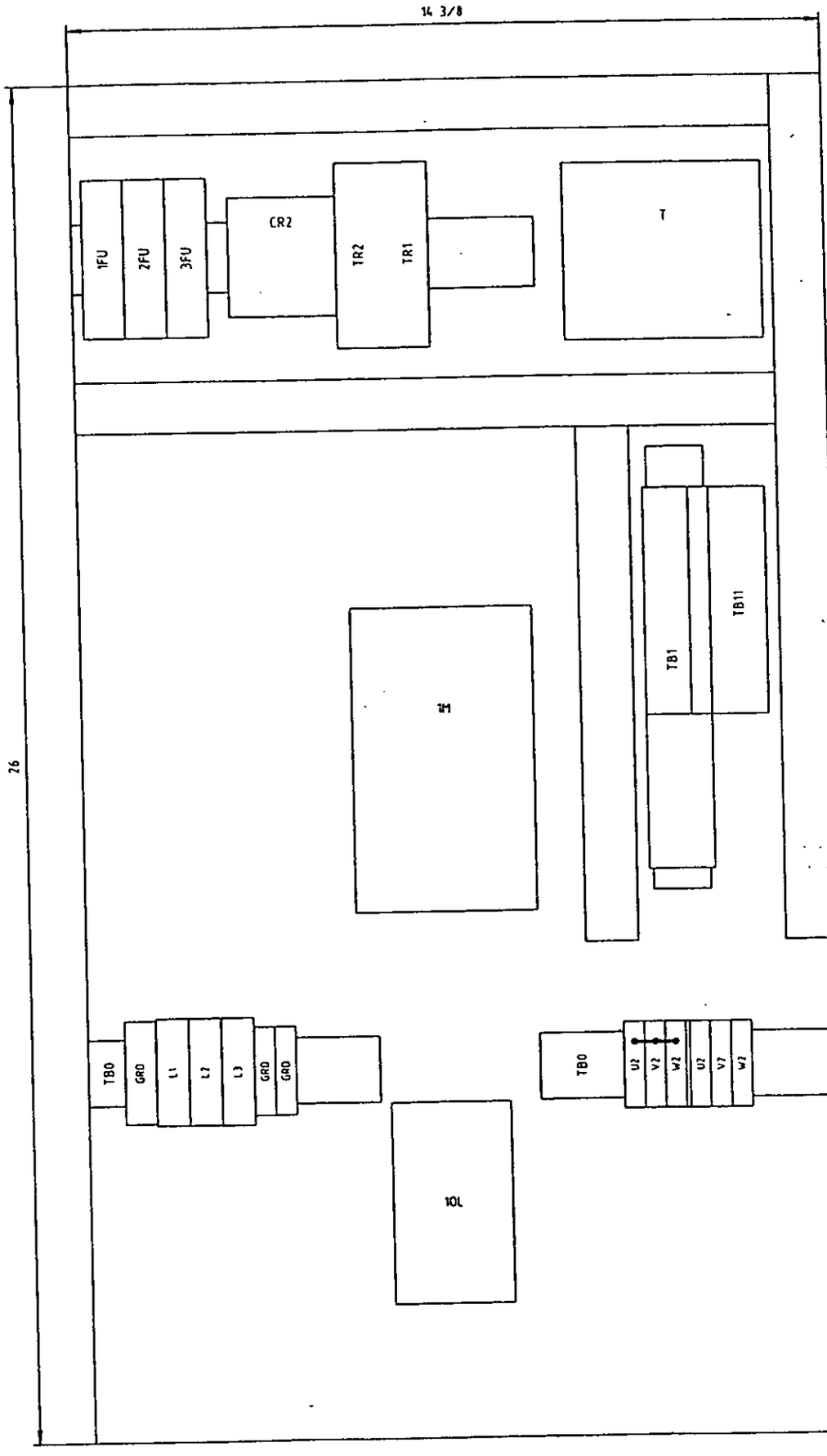
c				check		KAS31-0697/U0001
D	modification	date	name			Page 3



a				date	26.06.1997	KAESER COMPRESSORS	lay-out: compressor AS 31 control panel	AAS31 - 0697/U0001
b				editor	Sitter			
c				check				Page 1
D	modification	date	name					

11.2 Trouble shooting: Possible cause–Remedy

11.2.1 Airend temperature is too high (greater than 167°F–200°F)

Possible cause:	Remedy:
Cooling air inlet or outlet is too close to wall or other blockage.	Situate unit for adequate air flow.
Air intake filter mats are clogged.	Clean the mats or replace if necessary.
Ambient temperature is too high.	Provide cooler air from other source or move compressor to a cooler location. See chapter 1.6.
Ambient temperature too low.	Provide warmer air from other source or move compressor to warmer location or add a cabinet heater. See chapter 1.6.
Cooling air supply is inadequate.	Provide required amount of ventilation.
If cooling air outlet duct is used it may be too narrow or too long.	Consult authorized KAESER distributor for duct requirements.
The fins of the coolers (air and oil coolers) are clogged.	Clean with compressed air/water or steam injector.
Oil level is low.	Check oil level and add necessary amount of recommended oil.
	Check dirt trap strainer in oil return line for possible contamination.
Thermostatic valve is not functioning correctly.	Check the valve spring and actuating piston. Replace defective parts.
Idle pressure is too low for proper oil circulation.	Check idle pressure at the separator tank. If the pressure is low check the inlet valve. Adjust inlet valve to maintain adequate idle pressure.
Wrong oil is used.	Drain old oil completely and replace with recommended type.
	Consult authorized KAESER distributor for other oil types not listed.
Oil filter is clogged.	Replace filter.
Airend is defective.	Check airend and replace if defective.

11.2.2 Motor overload relay switches the unit off

Possible cause:	Remedy:
Overload relay is defective or setting is wrong.	Check line current and adjust overload relay as necessary.
	Replace relay if defective.
Motor is running two phase: defective motor or blown fuse.	Check input power, check wiring, tighten any loose connections.
	Replace fuse(s) or motor if necessary.
Motor stop/start cycle is too frequent.	See chapter 11.2.5.
Operating pressure is too high.	Adjust air pressure switch to proper setting. Replace air pressure switch if defective.

Possible cause:	Remedy:
Oil separator cartridge is contaminated.	Check pressure differential across cartridge. Replace cartridge and dirt trap strainer if necessary.
Motor starts against pressure because system does not get vented.	Check ball valve in vent line and open if it is closed.
	Check the diaphragm in the vent valve and replace if defective.
	Check the minimum pressure check valve. Adjust minimum pressure function or replace defective parts as necessary.
Airend is defective.	Check airend and replace if defective.
Ambient temperature is above 104°F.	Provide adequate compressor ventilation.
Defective motor: bad bearings or short circuit in windings.	Repair or replace motor.

11.2.3 Compressor is running but produces no pressure

Possible cause:	Remedy:
Airend rotates in wrong direction.	Reverse motor polarity.
Inlet valve does not open or opens only partially.	Check the inlet valve, control valve and lines. Replace defective parts as needed
Vent valve does not close at full load.	Check the combined control/vent valve and control lines. Replace defective parts as needed.
Minimum pressure check valve is defective.	Check the valve and replace defective parts.
Leaks in plant system.	Check for open valves, loose connections, defective tools, etc.
Plant system air, demand exceeds capacity of compressor	Reduce system demand or install additional compressor(s).
Start timer does not work.	Check timer and replace if necessary (Supplement–Electrical System).
Air leak in unit.	Tighten loose connections, repair or replace defective parts as necessary.
Socket is still in the hose coupling at the oil separator tank or aftercooler.	Remove socket from coupling.
Safety relief valve has blown off.	See chapter 11.2.5.
Airend is defective.	With unit running, slowly and carefully place hand over air inlet filter casing. There should be considerable suction. If not, airend is producing no pressure.

11.2.4 Oil leaks out of air filter

Possible cause:	Remedy:
Oil level in separator tank is too high.	Drain oil to correct level.
Inlet valve faulty.	Find the fault and replace the defective part.
The unit cycles too often (short cycles) from load to idling (Oil mist flows through the vent line to the air filter).	Check the switching differential on air pressure switch.

11.2.5 Full–load/Idle sequence occurs too frequently (short cycles)

Possible cause:	Remedy:
Receiver tank size is too small or there is no tank.	Consult authorized KAESER distributor for recommended tank size.
Diameter of hose connecting the unit to the receiver tank is too small.	Connecting hose diameter should not be smaller than the air discharge pipe diameter. Install larger hose if necessary.
Minimum pressure check valve leaks.	Check the valve and replace defective parts.
Air pressure switch is incorrectly adjusted or defective.	Check adjustment of air pressure switch; replace switch if defective.
Idle time is too short.	Set idle timer for longer interval.
Flow is restricted at discharge.	Look for plugged filters, partially closed valves, frozen pipes or malfunctioning pressure regulators.

11.2.6 Safety relief valve blows off

Possible cause:	Remedy:
System does not discharge at idle.	Make sure ball valve in vent line is open. Check the control lines, inlet valve and combined control/vent valve. Replace defective parts as needed.
Oil separator cartridge is contaminated.	Check the cartridge pressure differential and replace cartridge if necessary.
Air pressure switch is set too high.	Check the air pressure switch adjustment and replace if defective.
Minimum pressure check valve does not open.	Check the valve for blockage and replace defective parts as necessary.
Safety relief valve not properly sized for the pressure of the compressor unit.	Check blow–off pressure and compare to name plate of the compressor. Replace if necessary.

11.2.7 Oil inside the unit

Possible cause:	Remedy:
Socket is still in the hose coupling at the separator tank.	Remove the socket from the coupling.
Safety valve has blown off.	See chapter 11.2.5.
Oil is coming out of air filter.	See chapter 11.2.4.
Hose coupling on separator tank is loose.	Tighten coupling or replace as needed.
Oil cooler leaks.	Replace oil cooler.

11.2.8 Excessive oil consumption

Possible cause:	Remedy:
Wrong oil is being used in the unit.	Replace with correct oil type. Consult authorized KAESER distributor for other oil types not listed.
Oil separator cartridge has ruptured.	Check pressure differential and replace oil separator cartridge if necessary.
Oil separator cartridge mountings are loose.	Tighten mounting bolts.
Oil level in separator tank is too high.	Drain oil to correct level.
Scavenger line is clogged.	Inspect dirt trap strainer in scavenger line. Clean or replace clogged parts as necessary.