



SK 19 SK 26

This compressor model....., s/n..... was shipped with the following factory installed features:

- | | |
|--|--|
| <input type="checkbox"/>Volt | <input type="checkbox"/> Cabinet heaters |
| <input type="checkbox"/> Wye-Delta Start | <input type="checkbox"/> 115 V receptacle |
| <input type="checkbox"/> D.O.L. Start | <input type="checkbox"/> Outdoor modification |
| <input type="checkbox"/>psig | <input type="checkbox"/> Rainhoods |
| <input type="checkbox"/> | <input type="checkbox"/> Nema 4 door |
| <input type="checkbox"/> | <input type="checkbox"/> Switchable Modulation |
| <input type="checkbox"/> Wiring Schematic: | <input type="checkbox"/> Synthetic lubricant |
| <input type="checkbox"/> | <input type="checkbox"/> Food Grade lubricant..... |

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I M P O R T A N T

Read entire service manual before operating unit or performing any maintenance.

Always shut off power to unit at main disconnect switch before attempting any maintenance. All system pressure should be discharged unless manual instructs otherwise.

Use only "Kaeser Compressors" approved replacement parts.

D A N G E R

Air from this compressor will cause severe injury or death if used for breathing or food processing.

Air used for these processes must meet Osha 29 CFR 1910.134 or FDA 21 CFR 178.3570 standards respectively.

A T T E N T I O N

Kaeser Compressors declines responsibility for any modifications made to any Kaeser compressor other than those made at the Kaeser factory or those made with prior written permission from Kaeser Compressors.

N O T E

For best system performance air dryers are required to remove excess moisture and are highly recommended. Contact your KAESER distributor for proper sizing and installation of your air dryer.

W A R N I N G

In case one or several thermostatically controlled heaters have been built in, they may only be switched on after the compressor unit has been switched off.

When switching on the compressor unit, make sure the thermostatically controlled heaters have been switched off at least 1/2 h before and cooled down properly.

Do not touch the surface of the heaters while they are hot.

SAFETY PRECAUTIONS

Every Screw Compressor is operated and thoroughly tested at the factory before shipment to make sure the compressor delivers its rated capacity and is in good working order. However, all the care given at the factory will not prevent possible damage during transit. We recommend the unit be carefully inspected for evidence of possible damage in shipment. During the first few hours of operation, the machine should be watched for any possible malfunction.

Comply with the following before start-up

- Remove all packing, tools and debris from in and around unit before operating.
- Do not operate in the presence of toxic or flammable vapor.
- Work on current-carrying parts may only be carried out by an appropriate personnel.
- Do not operate the compressor at a voltage other than the one specified on the compressor nameplate.
- Do not operate the compressor at pressures exceeding the maximum pressures indicated on nameplate.

Attention: Do not operate the compressor below the minimum operation pressure; see section 5.6.

- Install the compressor in an area where the air inlet temperature is at least 40°F but no higher than 100°F.
- If an air outlet duct is provided, it should be at least the size of the cooler outlet cross-section and the pressure loss in it should not exceed the maximum limit stated by the compressor manufacturer.
- Install the compressor to maintain a distance of 3 ft. between the cooling air inlet of the unit and the wall.
- Check oil level at oil separator tank (if necessary, fill in oil up to max. level).
- Do not shut off the compressor operating under load at the main disconnect switch (customer supplied). Use start/stop switch (4, Figure 4).
- Check for proper direction of rotation.
DO NOT OPERATE UNIT IF ROTATION IS INCORRECT.
- Make sure the shutoff valve (1, Figure 22) at the discharge line is open.
- Make sure the shutoff valve (5, Figure 22) is closed.
- Shut off unit, tighten up all the screws in the control box (repeat this after 50 operation hours).

Attention: This work may only be done while the unit is disconnected from the electrical supply.

- To guarantee the cooling air circulation in the compressor unit, be sure the maintenance doors are tightly closed during operation.

Attention: Attention: Operating the compressor with open maintenance doors is prohibited because the belt drive and electrical components may cause personal injury.

FAILURE TO HEED THIS OR ANY OTHER WARNING MAY RESULT IN AN ACCIDENT CAUSING PERSONAL INJURY OF PROPERTY DAMAGE.

Attention: These units have been fitted with a run-in oil filter cartridge. Replace the cartridge after approx. 200 operation hours. See section 6.3.

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1. Dimensions and specifications

Model	Pressure 1) psig	Free air delivery 2) cfm	Motor		
			kW	hp	rpm
SK 19	110	68	11	15	3600
	145	58			
	190	45			
SK 26	110	92	15	20	3600
	145	80			
	190	65			

- 1) Permissible operating pressure.
- 2) Free air delivery of unit at permissible operating pressure.

2. Description of the SIGMA screw compressor

The main components of the Sigma screw compressor are a housing and two rotors. The compressor operates according to the rotary piston principle and is driven by an electric motor through V-belts.

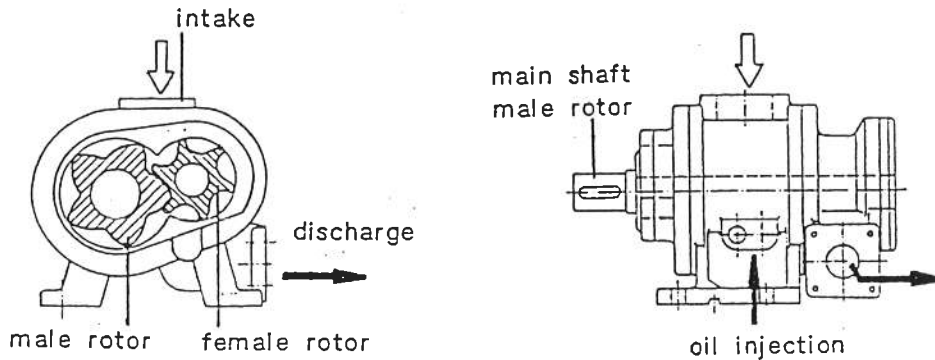
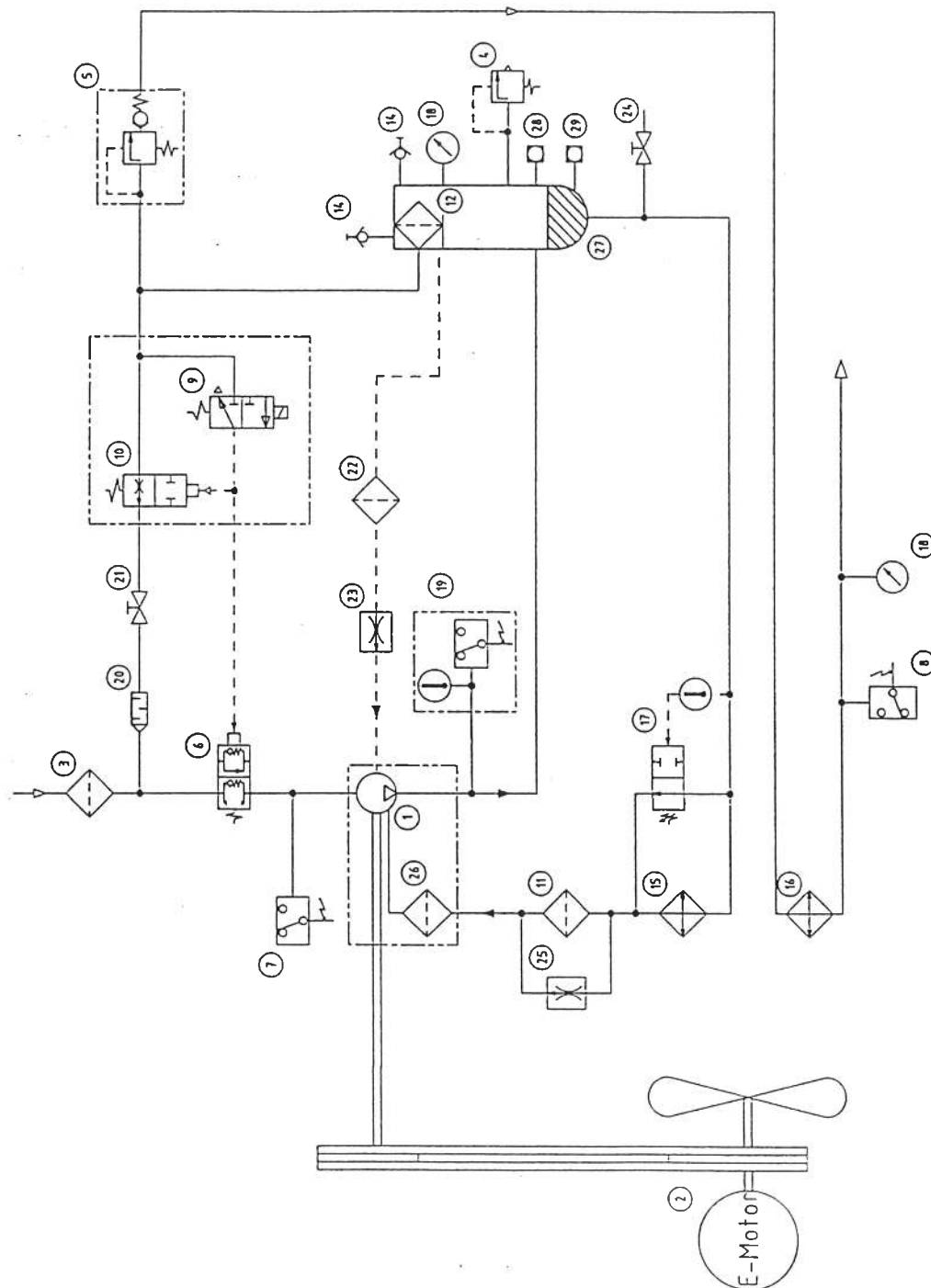


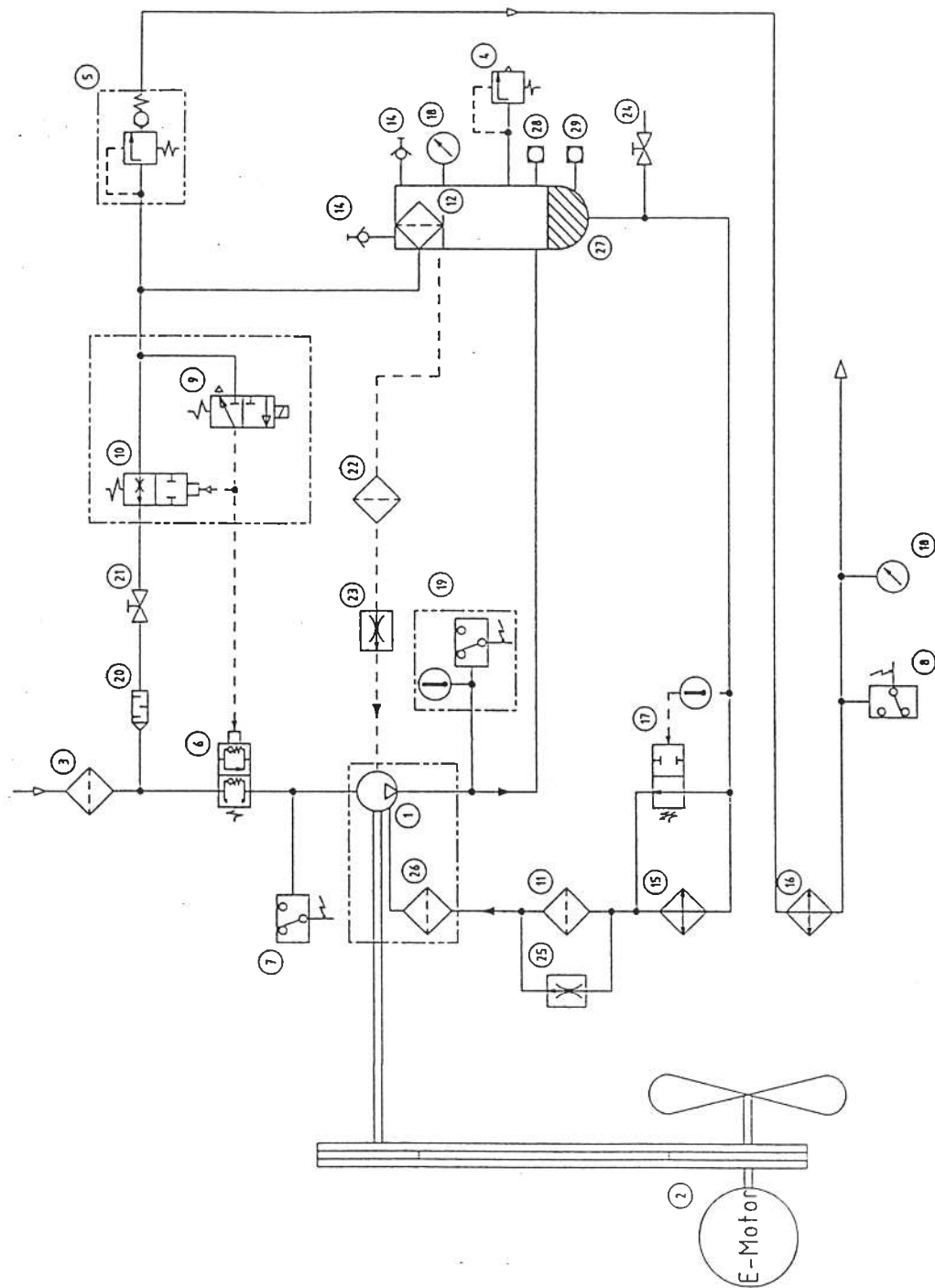
Figure 1

There are two rotors with antifriction bearings in the housing: a male rotor with 5 lobes driven by the motor and a female rotor with 6 voids. While the rotors are turning, air is drawn in through the inlet port at the upper side of the housing and the trapped air is compressed at the lower side. The oil injected into the housing at the lower side picks up the heat resulting from the compression process, prevents the rotors from contacting each other and lubricates the antifriction bearings at the same time. As there are no unbalanced forces, inlet or outlet valves, smooth running of the unit is ensured.

3. Construction and function of screw compressor model SK 19/26
T 7816



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T 7816



Construction and function of screw compressor model SK 19/26

- 1 Compressor
- 2 Driving motor
- 3 Air filter 4 μm
(not required, if bag-type filter is used)
- 4 Safety valve
- 5 Minimum pressure check valve (min. pressure approx. 65 psig)
- 6 Inlet valve
- 7 Pressure switch / Faulty direction of rotation (switching point 10/15 psig)
- 8 Pressure switch / Full load - idling (Δp min 10 psig)
- 9/10 Combined control / vent valve
 - 9 Control valve
 - 10 Vent valve
- 11 Oil filter 10 μm (by-flow filter)
- 12 Oil separating cartridge

- 14 Hose coupling
- 15 Oil cooler (air-cooled)
- 16 Air aftercooler (air-cooled)
- 17 Oil temperature controller (opening temperature approx. 160°F)
- 18 Pressure gauge
- 19 Distance thermometer (switching point 230°F)
- 20 Silencer
- 21 Ball cock
- 22 Dirt trap
- 23 Nozzle (dia. 1/64)
- 24 Oil drain cock
- 25 Main-flow nozzle
- 26 Strainer 350 μm
- 27 Oil separator tank
- 28 Oil sight glass: Oil level max.
- 29 Oil sight glass: Oil level min.

All pressure values in bar overpressure

4. Installation

4.1 Ventilation for air-cooled units

Installation of the screw compressor should take place according to the following schedule. For easy access and service, respect the minimum distance indicated below.

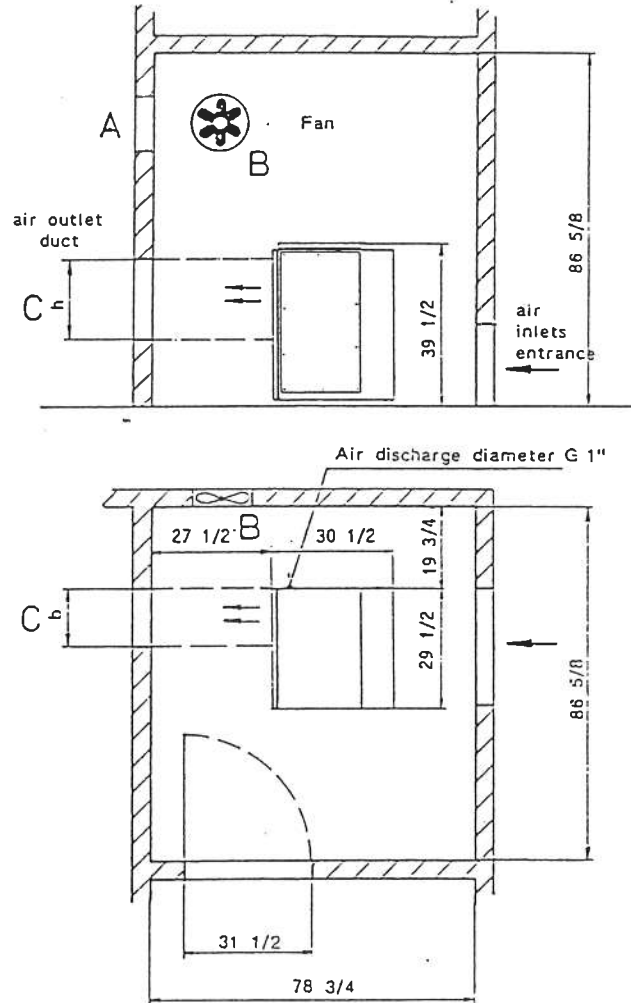


Figure 3

The compressor room should provide adequate ventilation.

Model	Possibility A Ventilation: natural draft air outlet duct inlet air entrance sq.ft.	Possibility B Ventilation: fan cfm at a static pressure of 0.4 inches WC	Possibility C Exhaust air is used for heating w x h inches	Required size at air inlet entrance for B or C sq.ft.
SK 19	11	2400	14 x 20	2.7
SK 26	16	2400	14 x 20	3.25

Possibility A:

For ventilation through natural draft, the air outlet duct must be the same size as the inlet air entrance (see chart on page 7).

Possibility B:

Air delivery of the exhaust fan must be adequate for the size of the unit (see chart on page 7).

Possibility C:

Warm exhaust air is forced through a duct into the room to be heated.

Attention:

Consult KAESER COMPRESSORS for maximum allowable pressure drop in exhaust ducts.

To ensure trouble-free operation of the unit, cooling air temperature should not drop below 40° F and not exceed 100° F.

4.2 Air discharge connection

The unit is piped ready for operation. It must be connected to the compressor's air discharge using the supplied adapter. Do not forget to include a flexible line between the adapter and the system piping. A check valve is not required in the discharge line as one is built into the unit.

4.3 Electrical connection

Kaeser compressors are supplied fully wired internally. Simply connect the main electrical supply conductors to complete the electrical installation. Electrical conductors and fuse recommendations for the main electrical supply are shown below. To connect the main electrical supply, proceed as follows:

- a. Lock out and tag out the Main Disconnect Switch in the off position.
- b. Ensure the main supply conductors are connected to the Main Disconnect Switch. Appropriately label each conductor L1, L2, L3 or G (ground).
- c. Feed the main supply conductors through the opening in compressor's control cabinet and secure with an appropriate strain relief.
- d. Connect main supply conductors to the to its corresponding terminal in the control cabinet, labeled L1, L2, L3, or G (ground).

Conductor and Fuse Recommendations

Model	Motor		Direct on-line start 230 V, 3-ph, 60 Hz		Direct on-line start 460 V, 3-ph, 60 Hz	
			Fuse dual element	Conductor wire size	Fuse dual element	Conductor wire size
	kW	hp	Amps	AWG	Amps	AWG
SK 19	11	15	60	8	30	8
SK 26	15	20	80	6	40	8

Please note that the above conductors, fuses and procedure are Kaeser's recommendations. These recommendations do not supersede other appropriate codes. All main electrical supply connections should be made by a qualified electrician in accordance with N.E.C. (National Electrical Code), O.S.H.A. (Occupational Safety and Health Administration), and any other applicable local codes.

4.4 Overload relay adjustment

Direct on-line start 230 V, windings in delta-connection.

Only the phase current of a winding is led through the overload relay. This phase current is only 0.58 times the motor rated current I_N , accordingly the relay has to be adjusted for $I_N \times 0.58$.

Adjustment:

The overload relay should be adjusted approx. 10 % higher than the phase current of a winding. This will prevent it from acting due to voltage fluctuations.

Direct on-line start 460 V, windings in WYE-connection.

Adjustment:

The overload relay should be adjusted approx. 10 % higher than rated current. This will prevent it from acting due to voltage fluctuations.

SHUT OFF POWER TO UNIT AT MAIN
DISCONNECT SWITCH BEFORE ATTEMPTING
ANY ADJUSTMENTS TO COMPRESSOR.

5. PREPARATION FOR INITIAL START-UP

see 'SAFETY PRECAUTIONS' on Page 2

5.1 Start-up after oil change and/or long standstill

The following procedure must be observed when starting the unit after an oil change and/or a standstill period of three (3) months and over:

- To add oil in the airend intake port:

Before starting the unit, pour approx 1 pint oil in the airend intake port and rotate the airend by hand before starting the unit.

Important:

Use the same brand and quality of oil as the one being used to operate the compressor unit only (refer to the specs label on the oil separator tank), or drain oil from the oil separator tank and use for that purpose.

Caution:

Discharge pressure in unit before draining any oil.

To add oil, unscrew the inlet valve of the airend and pour recommended amount oil into the airend. Screw inlet valve back on.

- To increase wye time respectively time of released start, at the initial start-up

For initial start-up, increase wye time relay respectively released start time relay to 20 seconds to prevent compression of inlet air during start-up. Stop unit by start/stop switch. JUST BEFORE REACHING THE 20 SECOND LIMIT.

Once this is done, wye time relay respectively released start time relay must be set back its normal operating point of approx. 6 seconds.

These two preventive measures will ensure that the airend is getting sufficient oil when starting up the unit and will provide sufficient time for filling the oil cooler and all oil lines.

Attention:

After a standstill of more than 12 month further special procedures are required before the initial start-up. For that consult KAESER COMPRESSORS, INC.

5.2 Checking the direction of rotation

- Switch on the unit (4, Figure 4) and check the direction of rotation of the compressor pulley or motor pulley. Arrows on motor and airend housing indicate direction of rotation.
- Should direction of rotation be incorrect, conductors L1 and L2 must be interchanged.
- If the direction is correct the built in ventilator blows through the cooler to the outside.

WARNING
If the compressor rotation is wrong, the unit is automatically shut down by the safety pressure switch (7, Figure 2).

5.3 Instrument panel

Compressor start-up

- Switch on the customer supplied main switch.
- Turn the start/stop switch (4, Figure 4) to the start position.

Compressor stop

- Turn the start/stop switch (4, Figure 4) to the stop position.
- Switch off the customer supplied main switch.

Important:
Do not shut off the compressor operating with load at the main disconnect switch.
Use the start/stop-switch on the unit first.

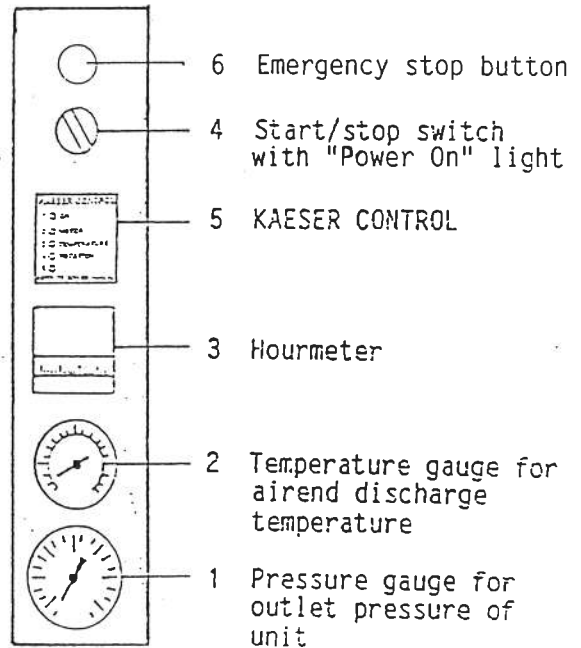


Figure 4

Attention:

Before opening the controller door the "POWER ON" (4, Figure 4) light must never be used as a positive indication that power has been shut off. A burned out bulb can give a false indication.

5.4 Safety system: KAESER-CONTROL

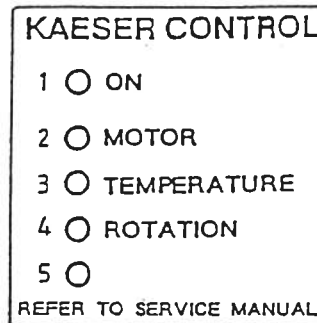


Figure 4 a

1. Comes on when the unit is in operation or ready for operation.
Goes out in case of malfunction.

In case of malfunction (lights 2, 3, 4 and 5) the respective light comes on and the compressor is immediately shut down.

2. Overload relay of the compressor motor
After having eliminated the trouble, push the reset button on the overload.
3. Contact thermometer for excessive final compression temperature.
When the temperature reaches 212 °F degrees C, the unit is shut down (19, Figure 2).
4. Pressure switch at the outlet port of the air end (7, Figure 2)
The unit is shut down if the direction of rotation is incorrect or the V-belts are broken or have slipped.
5. Provided for additional arrangements.

After the trouble has been eliminated, the unit must be reset. For that reset the switch (4, Figure 4) from START to STOP.
Now the compressor is ready for operation.

EMERGENCY STOP BUTTON

When „Emergency stop button“ is pressed, the unit is shut off and all LED lights on KAESER CONTROL will come on. For restart turn the „Emergency stop button“ clockwise and turn the control switch from start to stop. The unit is ready for operation.

ATTENTION:

The compressor unit is switched off by the corresponding door interlock switch if the access doors are opened during operation. When the door is closed again, the contact in the interlock switch also closes again and the unit can be restarted.

5.5 Idle time adjustment

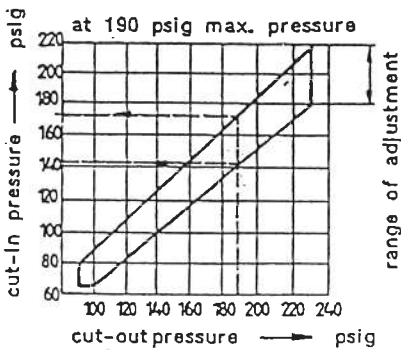
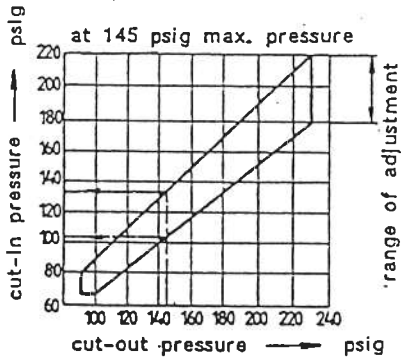
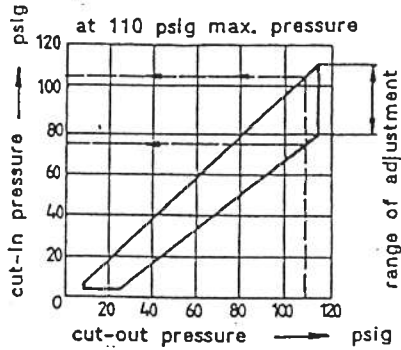
The time delay relay for idling time is located in the control box (time 3 - 30 minutes). The idling phase should be set in such a way that the maximum number of times the motor cuts in is less than 20 times an hour.

5.6 Pressure switch adjustment

Adjustment of the switch differential at the pressure switch for limiting the switching frequency.

Maximum frequency of idling operation: twice a minute

By increasing the switch differential between cut-out and cut-in the switching frequency can be reduced to a limited extent. If this is not sufficient a larger air tank is required.



The pressure switch has been pre-set at the factory as follows:

- 110 psig units: 100 to 110 psig ($\Delta p = 10$ psig)
- 145 psig units: 135 to 145 psig ($\Delta p = 10$ psig)
- 190 psig units: 180 to 190 psig ($\Delta p = 10$ psig)

Pressure adjustment must only be carried out at the mounted pressure switch when the compressed air line is under pressure.

Attention:

Do not set cut-out pressure below 90 psig or cut-in pressure below 80 psig.

Cut-out pressure:

- For higher pressure: turn handwheel to the right.
- For lower pressure: turn handwheel to the left.

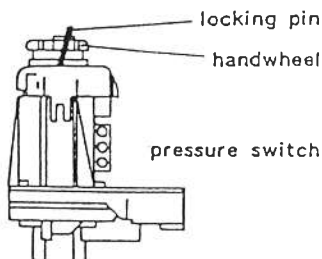
Cut-in pressure/switch differential:

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

- remove locking pin
- press handwheel so that the cross pin at the top of the handwheel comes out, then turn handwheel to the left
- place in locking pin

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

- remove locking pin
- proceed as indicated above but turn handwheel to the right
- place in locking pin



Caution

Before removing the pressure switch cover, shut off the compressor (start/stop switch and main disconnect switch). After each re-adjustment at pressure switch, place cover on pressure switch before switching on the compressor.

Figure 5-8

5.7 Control systems

5.7.1 DUAL-Control (standard)

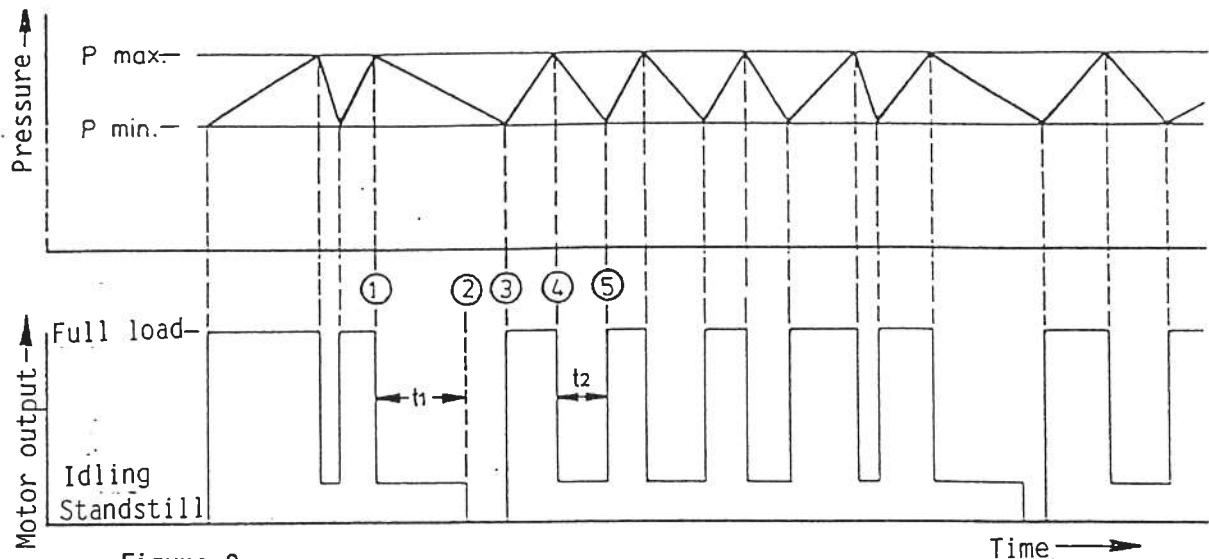


Figure 9

With the DUAL-Control (combined idling/intermittent operation control system) the compressor operates only at the following two points:

full load and idling

The compressor pressure is regulated by a pressure switch between the pressure limits, e.g. between 100 - 110 psig. This results in an extremely low switching differential of only 10 psig between full load and idling.

If the compressor continues to idle longer than for a pre-set adjustable period (1) to (2) e.g. $t_1 = 6$ min, then the electric motor will be switched off completely at (2).

Upon reaching the lower switching point at p_{min} (3) e.g. 100 psig, the unit is switched on again automatically. If, however, the pressure drops again to p (5) within a shorter period (4) to (5) e.g. $t_2 = 3$ min, then, automatic switching over to full load will take place.

5.7.2 QUADRO-Control (optional)

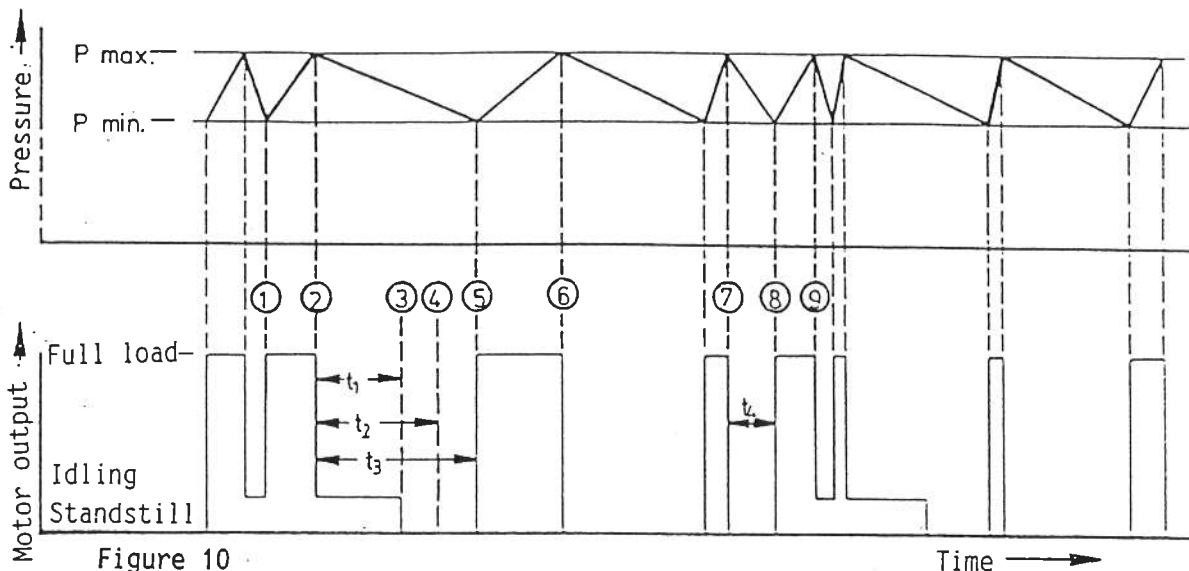


Figure 10

The Quadro-Control provides even greater savings in the case of widely varying air demand.

The following controls and operating modes are possible:

- Upon reaching the lower pressure limit of the pressure switch p_{min} (1), the control automatically selects full load.
- When the upper pressure limit p_{max} (2) is reached, the control automatically selects idling.
- At the end of the pre-set idling period (2) to (3) e.g. $t = 4$ min, the compressor is switched to standstill.
- If the time is dropping from p_{max} (2) to p_{min} (5) e.g. $t_3 = 6$ min is longer than the comparison period (2) to (4) e.g. $t_2 = 5$ min, the intermittent operation mode is selected automatically and the compressor drops to standstill rather than to idle for the subsequent cycle (6). If the time from (7) to (8) is shorter e.g. $t_4 = 2$ min, the idling mode is selected again for the following cycle (9). This comparison with the fixed time " t_2 " is repeated for each pressure drop.

The QUADRO-Control also replaces the commonly used selector switch for idling/intermittent operation in selecting the optimum operating mode automatically.

6. Maintenance schedule

Always follow maintenance instructions:

- Before performing any maintenance on the unit, shut off the unit at start-stop switch and main disconnect switch to make sure the power is off.
- Before restarting, make sure no one is working on the unit and covering plates are back on, as well as all doors are closed.
- After switching on main disconnect switch, start unit at start-stop switch (4, Figure 4).
- In case of power failure or cutoff at main disconnect switch, restart unit manually at start-stop switch.
- The socket to vent the tank is attached to the hose coupling (1, Figure 20). It is used for maintenance work, such as oil refill, oil and filter change.
- Work on current-carrying parts may only be carried out by an appropriate personnel.

6.1 Air inlet filter

Cleaning of the air inlet filter should take place at least every 500 operating hours.

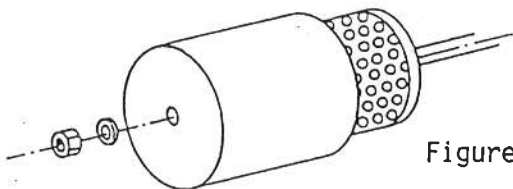


Figure 11

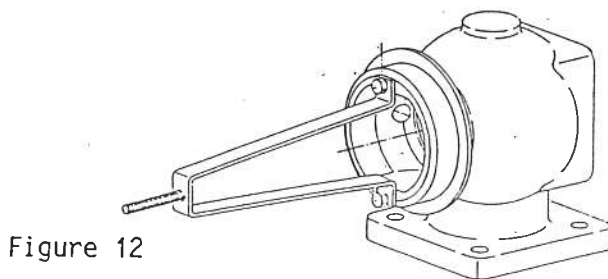


Figure 12

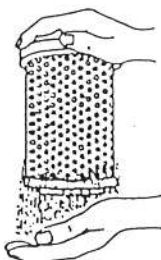


Figure 13



Figure 14

- Shut off the compressor (start-stop switch and main disconnect switch).
- Opening the filter housing (Figure 11): Dismount the hexagon nut on the cover of the filter housing and pull out the cartridge.
- By cleaning the filter housing, extra attention should be paid to the contact surfaces of the gasket (Figure 12).
- Cleaning by tapping off the dust (Figure 13): Tap the front side of the cartridge against your palm until all the dust has fallen out. Avoid damaging the cartridge. Clean the contact surfaces of the gaskets.
- Blow clean with compressed air (Figure 14): Blow dry compressed air (no higher than 5 bar) slanted against the paper pleats. Then blow clean the inside of the cartridge thoroughly.

Caution:

Do not use fluids to clean air filter. Replace cartridge after several cleanings (max. 5 cleanings) or if cartridge is overly contaminated.

6.2 Filter mat

Clean filter mat every 100 to 300 operating hours depending on amount of dust.

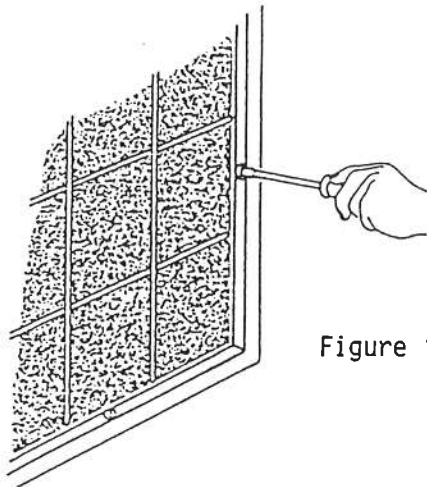


Figure 15

- Shut off the compressor (start/stop switch and main disconnect switch).
- Remove cover frame with a screwdriver. To mount, turn screws 90° (Figure 15).
- Cleaning:
Rinse the mat in water of approx. 100°F with some mild detergent. Cleaning can also be done by tapping, vacuuming, or blowing the dust off with compressed air. With oily dust, rinse the mat in mild solvent or warm water.
- If mat is excessively soiled, replace.

6.3 Oil filter

The run-in oil filter cartridge has to be exchanged after approx. 200 operating hours. A further exchange of the standard oil filter cartridge has to be carried out after approx. each 1000-2000 operating hours.

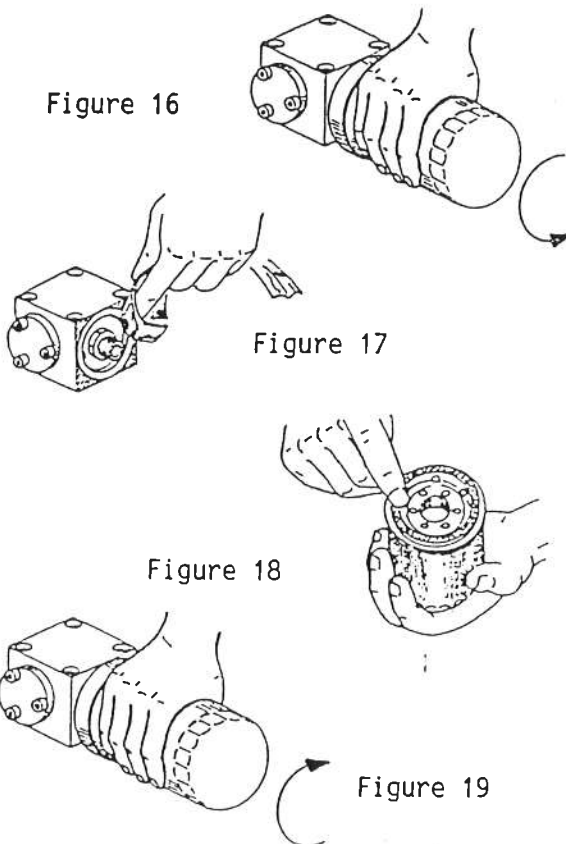


Figure 16

Figure 17

Figure 18

Figure 19

- Shut off the compressor (start/stop switch and main disconnect switch).
- Place vent socket (3, Figure 20) into hose coupling (2, Figure 20) at the tank (the tank loses its pressure). Then wait about 1 minute until the oil settles.
- Unscrew clogged filter by turning the filter counterclockwise and discard (Figure 16).
- Clean sealing surface at the filter head thoroughly with lint-free cloth (Figure 17).
- Lubricate the new oil filter at gasket lightly with oil. (Figure 18).
- Screw in the new filter manually until the cartridge gasket fits tightly (Figure 19).
Hand-tighten only!
- Pour oil into the tank to normal level. See section 6.6.

Important:

Remove vent socket from hose coupling.
Start up the compressor and check for leakage.

Caution:

Oil may be very hot. Allow unit to cool before working with oil system.

6.4 Oil separator

6.4.1 Checking the pressure differential

- Turn compressor on and keep the operating pressure as constant as possible.
- Insert pressure gauge into the hose couplings at the tank (1 and 2, Figure 20) and take pressure readings.
- The difference of these readings indicates the pressure differential at the oil separating cartridge.
- We recommend replacing the cartridge at a pressure differential of approx. 12 psig.
- The life of the oil separating cartridge depends to a high degree on the contamination of the inlet air and the maintenance of the air and oil filters. For this reason the pressure should be checked every 500 operating hours.

6.4.2 Filter replacement

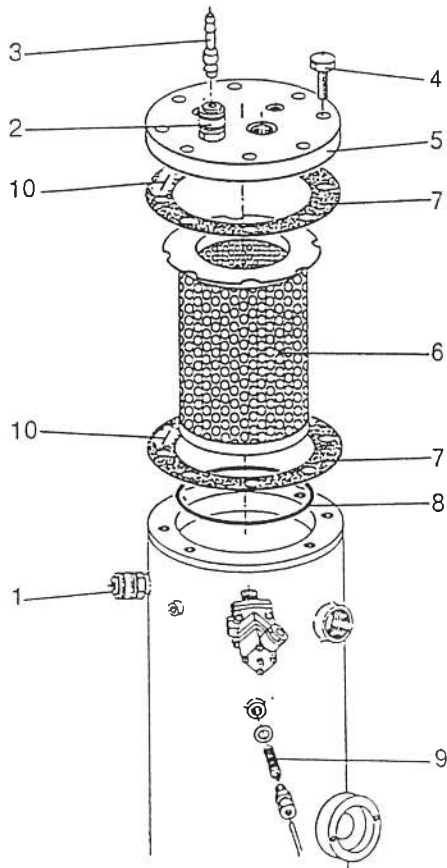


Figure 20

- Shut off the compressor (start/stop switch and main disconnect switch).
- Place vent socket (3) into hose coupling (2) at the tank (the tank loses its pressure).
- Loosen screws (4) and remove cover (5).
- Remove the old oil separating cartridge (6) with gaskets (7) and o-ring (8) and clean surfaces.
- Place new o-ring (8) in the groove on the oil separator tank.
- Place in a new cartridge (6) with gaskets (7) and mount cover (5) with screws (4).
- When changing the cartridge, unscrew and replace screen filter (9) in the oil suction line.
- Assemble parts in reverse order.
- Remove the vent socket (3) from hose coupling (2).

Attention

In order that static electricity can flow through the electrically conductive oil separator cartridge to the separator tank and grounded compressor frame, the gaskets (7) of the oil separator tank cover have been provided with a metal clip (10).
Do not remove the clip!

6.5 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 part. 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

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 rotary 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 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 (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 inevitable, oil changes may be necessary every 1,000 hours (4,000 hours for synthetic) or even more often. Oil change intervals required should be determined through periodic oil analysis.

SPECIALTY KAESER LUBRICANTS

- S-680 lubricant may be used when ambient temperatures are always between 70°F and 105°F.
- FG 460 is a special Food Grade Sigma lubricant, accepted for use in food processing and pharmaceutical manufacturing where USDA H1 lubricants are desired.

FOOD GRADE LUBRICANTS

- 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 CFR 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.
- **Compatibility:**
FG 460 is 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.
- 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 you Kaeser authorized distributors.

Regardless of the lubricant selected, the KAESER Sigma lubricants will separate readily from water. If water should condense, the water can easily be drained off by turning the compressor off while trapping some of the air pressure. Let the compressor sit so that any water can drain back to the separator tank and separate to the bottom. Then slowly open the oil drain valve and the air pressure will force water from the bottom of the tank.

Warning:
Be aware that the tank is still pressurized.

For further details, please refer to the oil change section in this manual.

When switching from mineral oil to a synthetic oil, the plant 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	

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

6.6 Adding oil

Check oil level weekly at the oil sight glass. Always shut off the compressor when checking the oil level. Oil must be added when the minimum oil level, which is the middle of the lower oil sight glass, has been reached. Fill to the middle of the upper oil sight glass, no higher.

DO NOT OVERFILL.

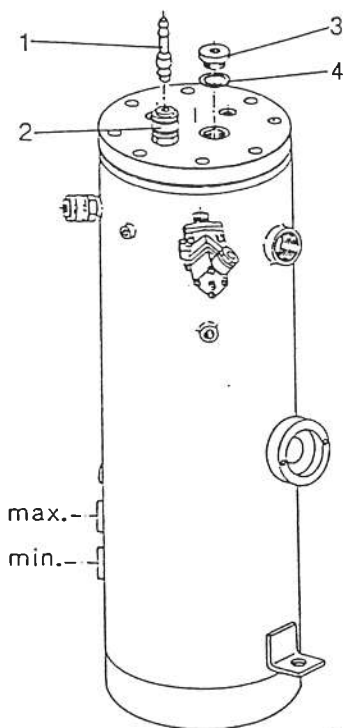


Figure 21

- Shut off the compressor (start/stop switch and main disconnect switch).
- Place vent socket (1) into coupling (2) at the tank. The tank loses its pressure.
- Loosen locking screw (5).
- Pour oil in to the max. level.
- Check o-ring (4) and tighten locking screw (5).
- Remove vent socket (1) from coupling (2).

Important:

Always use the same make and type of oil (indicated on the oil separator tank).

Different oil than that already in the unit may be used if it meets the oil specifications. See section 6.5. Whenever changing oil types, always drain all of old oil completely and change oil filter before adding new oil type.

Never mix oil types, other than approved by KAESER KOMPRESSOREN.

6.7 Oil change (oil separator tank and oil cooler)

The oil must be changed approx. every 2000 to 3000 service hours depending on contamination of inlet air, at least once a year.

If the unit operates at or close to ambient temperature of 100 °F (for example in boiler rooms etc.) the oil must be changed more frequently, i.e. every 1000-1500 service hours.

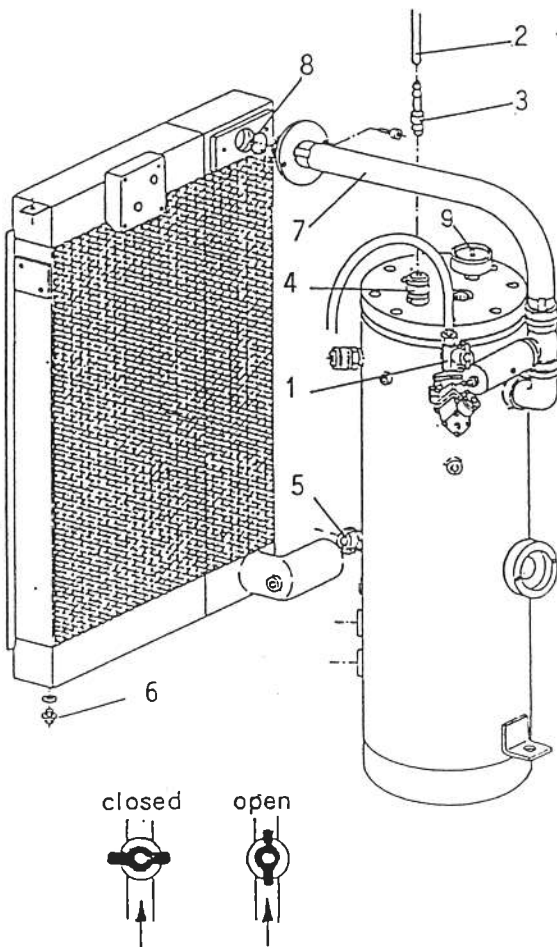
Model	Oil charge
SK 19	approx. 3 1/4 US Gal
SK 26	approx. 3 1/4 US Gal

Important:

Drain oil from the oil separator tank, cooler and lines. For restart procedure see section 5.1.

6.7.1 Oil change with pressure produced by another source

- Shut off the compressor (start/stop switch and main disconnect switch).
- Close shutoff valve (1).
- Place hose (2) of other pressure source with socket (3) into coupling (4) and pressure feed. The tank should have a pressure of approx. 30 psig.
- Remove hose (2) with socket (3) from coupling (4).
- Slowly open drain valve (5). The pressure remaining in the tank will cause the oil to flow.
- After discharging the tank, slowly open the cooler drain plug (6). The oil will drain without pressure.
- Close the drain valve (5) and the cooler oil drain (6).
- Open shutoff valve (1).
- Oil adding see section 6.6.



6.7.2 Oil change with pressure produced by the compressor:

- Shut off the compressor (start/stop switch and main disconnect switch).
- Close shutoff valve (1).
- Let compressor run for about half a minute. The tank should have a pressure of approx. 30 psig.
- Shut off the compressor (start/stop switch and main disconnect switch).
- Slowly open drain valve (5). The pressure remaining in the tank will cause the oil to flow.
- After discharging the tank, slowly open the cooler drain plug (6). The oil will drain without pressure.
- Close the drain valve (5) and the cooler oil drain (6).
- Open shutoff valve (1).
- Oil adding see section 6.6.

Caution:

Oil may be very hot. Allow unit to cool before draining oil.

6.8 Temperature gauge and high temperature switch

When final compression temperature reaches 230 °F, the compressor shuts off and the warning light (3 Figure 4a) comes on.

Troubleshoot and repair.

Probable causes: malfunction in the cooling system, e.g.:

- low oil level
- extreme ambient temperature (too low or too high)
- clogged oil filter
- clogged oil cooler
- clogged air inlet filter mat

After the trouble has been eliminated the compressor can be restarted at the start/stop switch (4, Figure 4).

6.9 Motor lubrication

The standard motors have **life-time grease lubrication**. Under normal working conditions (ambient temperature 75 °F), carry out maintenance of the motor according to the following chart. After the indicated working hours, but at least every 3 years, demount motor bearings, rins them and fill the void spaces with new grease.

Model	Lubrication interval operating hours	
	Motor 50 Hz	Motor 60 Hz
SK 19/26	11 000	10 000

We recommend the following brand of high temperature grease: Unirex N 3

Under harder working conditions, i.e. strongly polluted intake air and ambient temperature of the unit approx. 100 °F, lubrication interval is half as long.

For special motors, other protective systems etc., follow manufacturer's instructions (on motor name plate).

6.10 V-belt tension

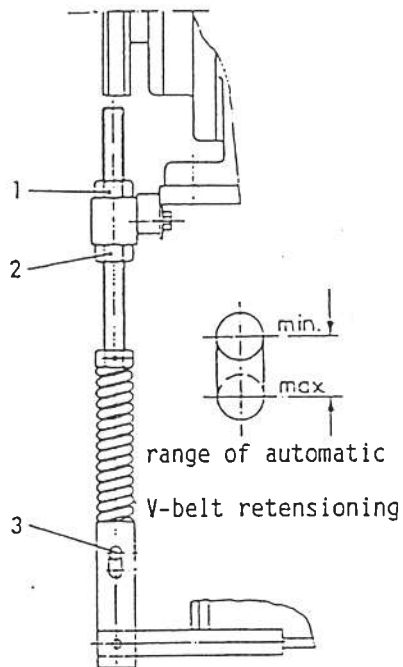


Figure 23

Belt tension must be checked every 500 operating hours.

The V-belt span is adjusted automatically within a limited range by the pressure spring. See figure at left.

An indicator pin (3) in the oblong hole indicates the V-belt span. When the pin (3) reaches the top of the hole, retensioning is required.

- Shut off the compressor (start/stop switch and main disconnect switch).
- Loosen hex nut (1).
- Retension the V-belt by turning the hex nut (2) until the pin (3) is all the way down.
- Retighten hex nut (1).

6.10.1 V-belt changing

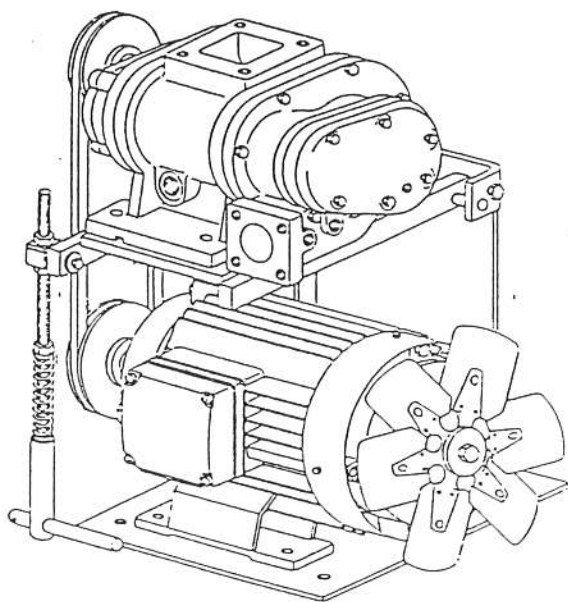


Figure 24

- Shut off the compressor (start/stop switch main disconnect switch).
- Turn adjusting hex nut (2, Figure 23) downwards.
- Slip V-belt over motor and compressor pulleys.
- Tension V-belt (see section 6.10.)
- Check V-belt tension after approx. 2 and 24 operating hours.

Important:

Replacement V-belts must absolutely have the same length and must be 100 % oil resistant. Order KAESER genuine factory-tested replacement parts only!

6.11 Cleaning the cooler

Check cooler at least every 1000 operating hours for contamination. Strong contamination can result in excessive temperature in oil circulation.

Disassembling and cleaning the cooler:

- Shut off the compressor (start/stop switch and main disconnect switch).
- Vent the unit (see section 6.4.2).
- Open maintenance doors (2).
- Discharge compressed air line.

Attention:

When the unit has been vented, pressure is provided from the air lines up to the minimum pressure check valve. Therefore, disconnect the unit from the air mains (shut-off valve). After that vent the air aftercooler by demounting the compressed air line carefully. If no shut-off valve is provided, the complete air lines must be vented.

- Demount air lines (3 and 4), control line (5) and pressure switch (10).
- Screw off combination valve (6) from cooler (8), lift it slightly and wipe off the oil flowing out with a piece of cloth. Remove o-rings (9) and check them.
- Close the openings of the oil lines at the cooler (8).
- Undo attachment screws (7) and lift off the cooler (8).
- Blow cooling fins clean with compressed air or spray with water.
- Assemble parts in reverse order.
- While mounting combination valve (6), make sure o-rings (9) are seated properly.

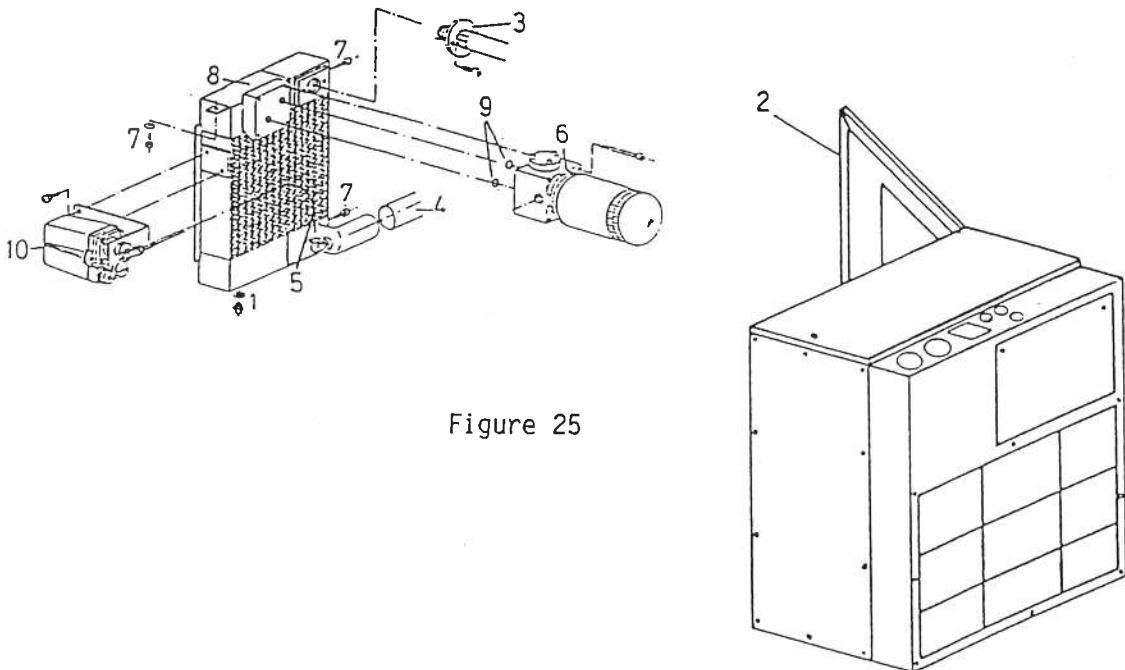


Figure 25

6.12 Checking the safety valve on the oil separator tank

To check the set maximum operating limit the unit must be operated at a final pressure higher than maximum setting of the pressure switch.

Maximum pressure of the unit	Set maximum operating pressure of the safety valve
110 psig	130 psig
145 psig	165 psig
190 psig	210 psig

In order to avoid readjustment of the pressure switch, carry out checking in the following way:

- Shut off the compressor (start/stop switch and main disconnect switch).
- Close the shutoff valve (1, Figure 22) at the discharge line.
- Close the shutoff valve downstream of the unit.
- Start the compressor and let it switch over from full load to idling.
- While the discharge line is being closed the pressure can easily be checked at the pressure gauge (9, Figure 22) on the separator tank as it is increased slowly up to the limit where the safety valve will react.
- Shut off the compressor.
- Open the shutoff valve downstream of the unit.
- Open the shutoff valve (1, Figure 22) at the discharge line.

6.13 Recommended maintenance schedule for model SK 19/26

Interval	Maintenance	Refer to section
50 hrs after initial start up	Tighten all wiring connections in the control panel	
	Replace oil filter	6.3 Oil filter
Weekly	Check oil level	6.6 Adding oil
	Check pressure differential at separating cartridge	6.4 Oil separator
Every 100 to to 300 hrs	Clean filter mat*	6.2 Filter mat
Every 500 hrs	Clean air inlet filter*	6.1 Air inlet
	Check V-belt tension	6.10 V-belt tension
Every 1000 hrs	Replace filter mat*	6.2 Filter mat
	Check cooler for surface dirt*	6.11 Checking the cooler
Every 1500 hrs	Replace air inlet filter*	6.1 Air inlet filter
Every 2000 hrs	Change oil filter*	6.3 Oil filter
	Change oil (if mineral oil is used)*	6.7 Oil change
Every 5000 hrs	Change separator cartridge*	6.4 Oil separator
Every 10000 hrs	Lubricate motor bearings*	6.9 Motor lubrication
Yearly	Clean cooler surfaces*	6.11 Checking the cooler
	Tighten all wiring connections in the control panel	
	Check safety valve	6.12 Checking the safety valve
Every second year	Change of sintered silencer	6.16 Change of sintered silencer

*** Note:**

Time interval may vary depending on type of unit, installation (e.g boiler room), frequency of use, and ambient conditions (e.g. ambient, temperature other than 32-105 °F), please consult KAESER COMPRESSORS, INC.

6.15 Maintenance parts list

Model	Maximum pressure	V-belt	Oil filter cartridge	Oil separating cartridge compl.set	Air inlet filter cartridge	Filter mat
	psig	compl.set Order No.	Order No.	Order No.	Order No.	Order No.
SK 19	110	6.2512.0	6.1985.0	6.2008.1	6.2003.0	6.1943.0
	145	6.2513.0				
	190	6.2513.0				
SK 26	110	6.2513.0	6.1985.0	6.2008.1	6.2003.0	6.1943.0
	145	6.2514.0				
	190	6.2516.0				

The oil separating cartridge set (Order No. 6.2008.1) consists of:

pcs.	Order No.	Name
1	6.1931.1	Oil separating cartridge
2	5.0474.1	Gasket
1	5.1563.0	O-ring
1	5.1143.1	Screen filter

When ordering spare parts always state compressor type, serial number and year of manufacture which are stamped in the nameplate.

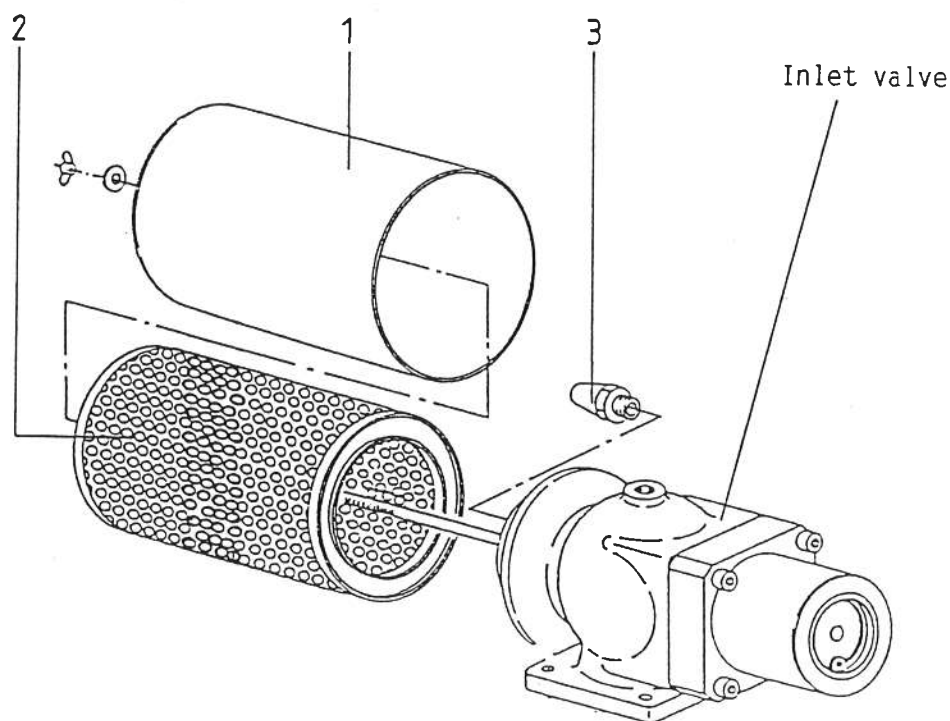
Attention:

To avoid lower quality order only genuine parts from the compressor manufacturer.

6.16 Change of sintered silencer

Change the silencer after maximally 5000 operating hours, at least every second year.

- Shut off unit (see Section 5.3).
- Place vent socket into hose coupling at the oil separator tank (see Section 6.6) The tank loses its pressure.
- Unscrew air filter (1) and remove filter cartridge (see Section 6.1).
- Remove old silencer (3).
- Mount new silencer and paste it with Omnifit 50 H.
- Screw on air filter and remove vent socket from hose coupling at the oil separator tank.



Model SK 19/26	Order No.
Silencer	6.2026.0

Wiring Diagram

screw compressor SK 19

direct on line start

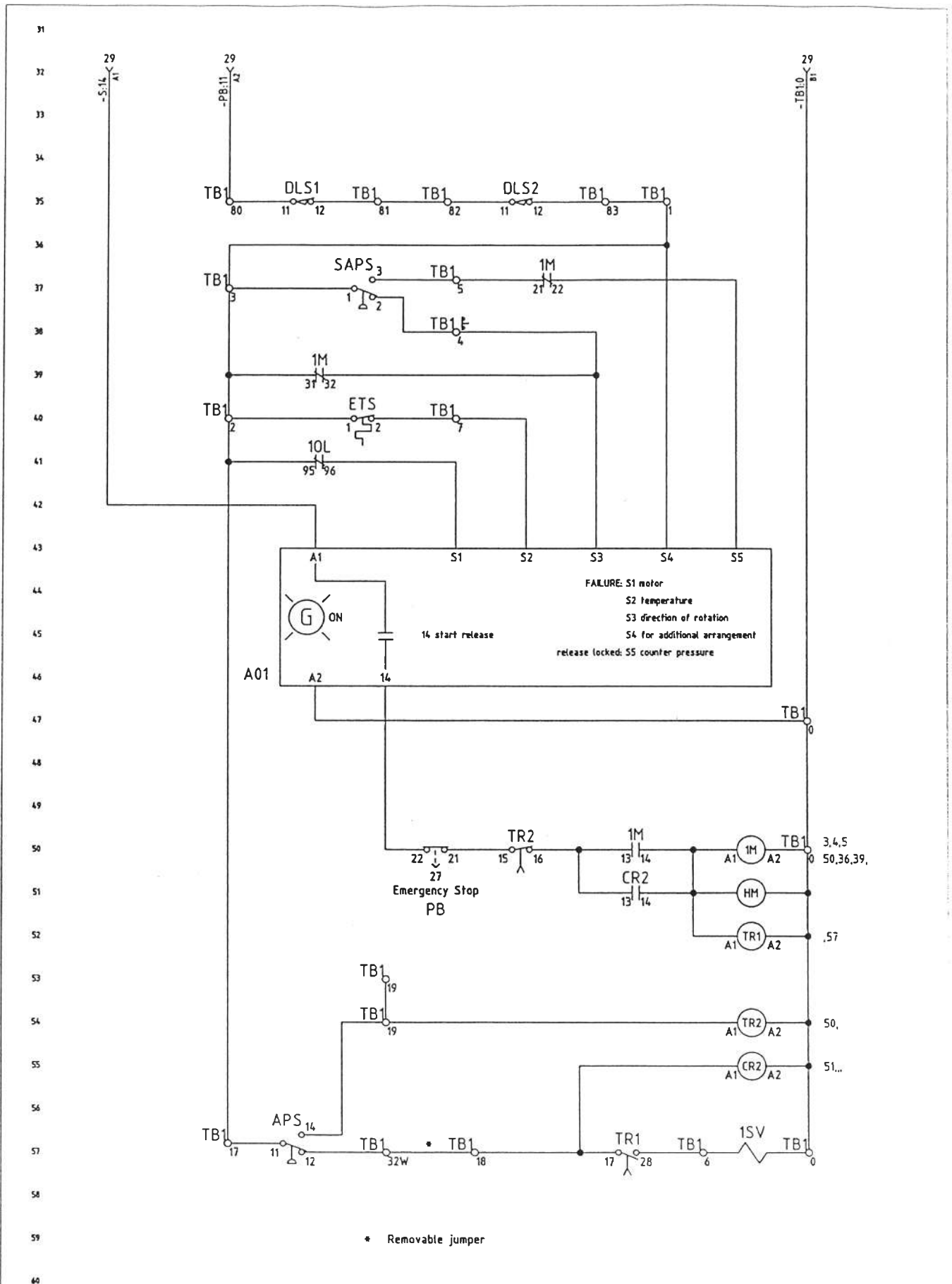
230V 3Ø 60CY or 460V 3Ø 60CY

manufacturer: KAESER COMPRESSORS
96450 COBURG
GERMANY

consignee:

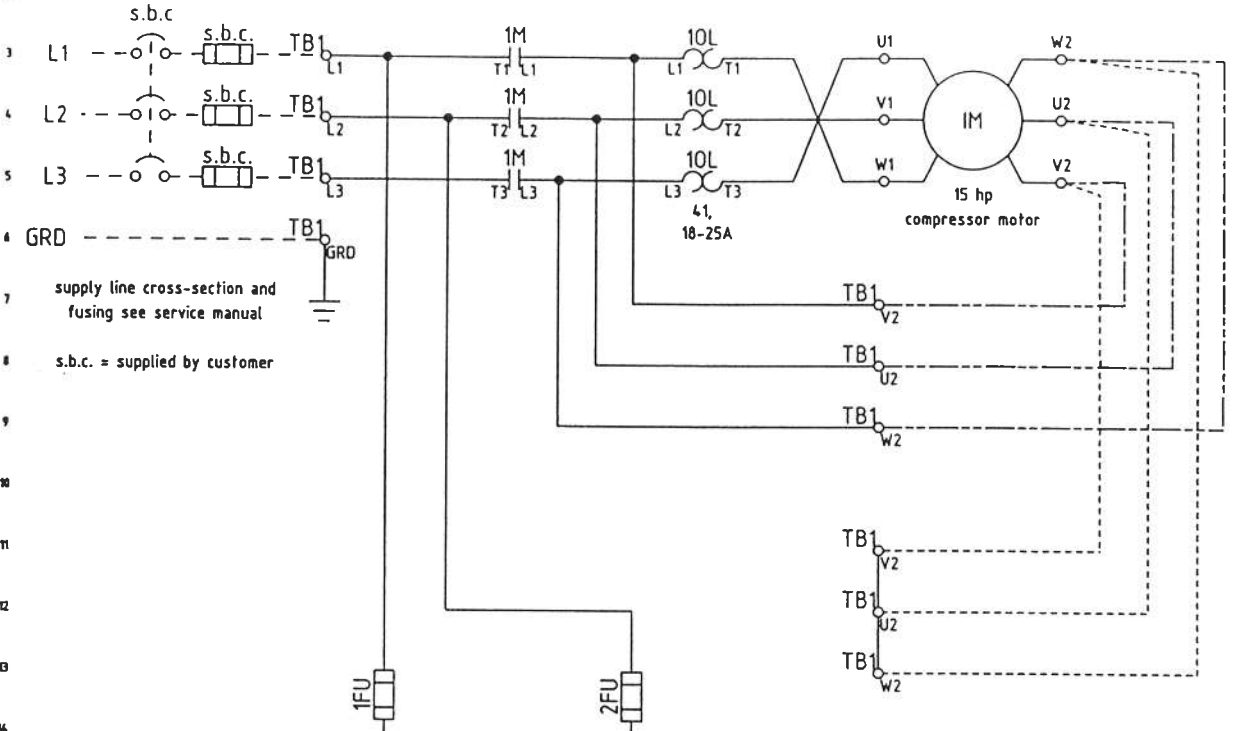
customer:

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b			editor	Sitter			
c			check	<i>Sitter</i>			
A	modification	date	name				Page 1

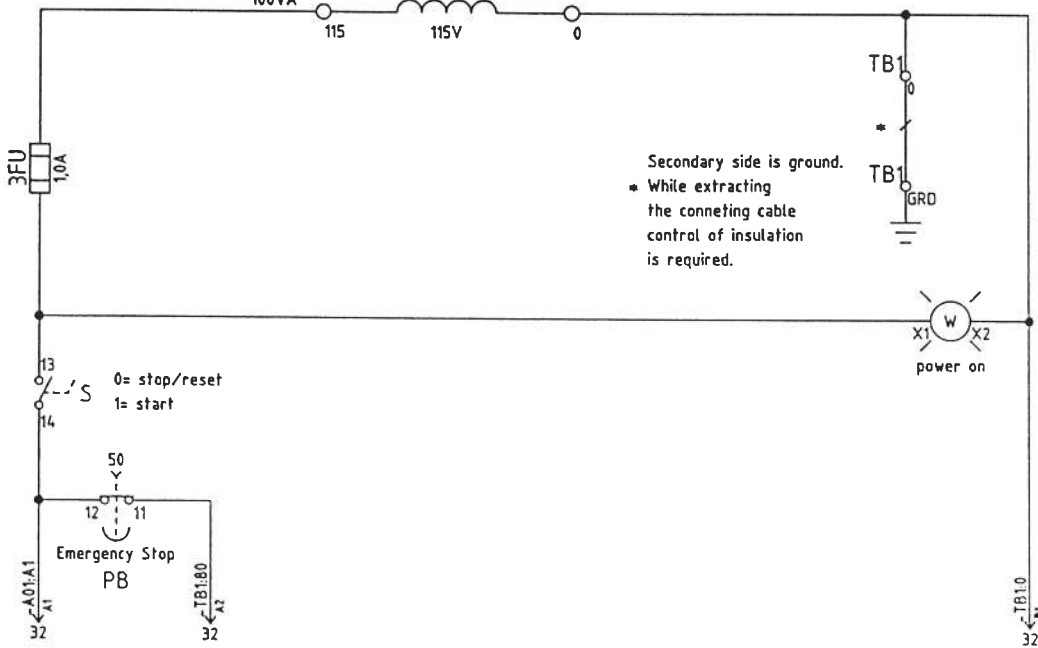


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b		editor	Sittler				
c		check	<i>[Signature]</i>				
d	modification	date	name				Page 2

1 Input voltage
 230V Ø3 60CY or 460V Ø3 60CY



connection:	
230V	-----
1FU:	1,0A, 2FU: 1,0A
460V	-----
1FU:	0,5A, 2FU: 0,5A



1M motor starter

1SV solenoid valve
(combined control/vent valve)

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

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

T transformer

CR2 control relay

1 M compressor motor

HM hour meter

W indicating light "power on"

DLS1,DLS2 door interlock switch

S switch 0 = stop/Reset
1 = start

A01 Kaeser Control

PB emergency stop pushbutton

TB1 terminal strip

APS air pressure switch

malfunction indicators

malfunction lights:
(automatic shutdown)

10L motor overload relay

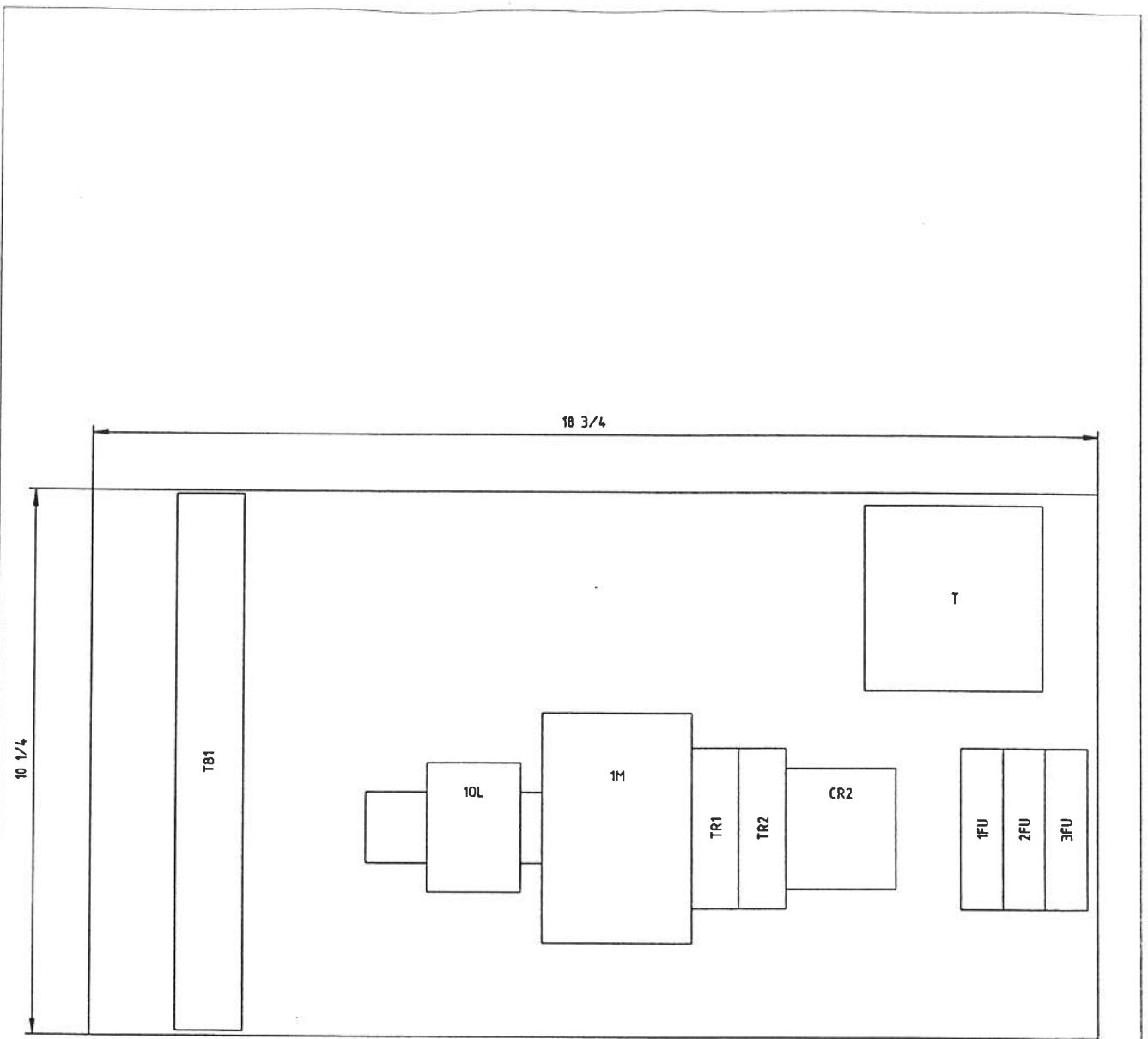
ETS excessive temperature switch 230 °F

SAPS safety air pressure switch

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b		editor	Sitter					
c		check	<i>[Signature]</i>					
e	modification	date	name				Page	01

A	B	C	D	E
Qty.	Description and function	Component identification data	Order No.	Component
1	control panel	10 1/4 x 18 3/4	CKC	2.8202.1
1	motor starter	B 40-30-00	115V 50/60Cy. ABB	7.3857.00010 -1M
2	auxiliary switch	CA 7-01	ABB	7.2039.0 -1M
1	auxiliary switch	CA 7-10	ABB	7.2038.0 -1M
1	motor overload relay	T 25	DU 18-25A ABB	7.2045.1 -10L
1	adapter	AB 25/32A	ABB	7.3851.0 -10L
1	control relay	K6-22Z	ABB	7.2088.00010 -CR2
1	time relay	7PU6020-SNJ20	2-20sec. Siemens	7.0466.1 -TR1
1	time relay	7PU4020-SAJ20	1,5-30min. Siemens	7.0467.1 -TR2
1	transformer	2x230V/115V	100VA Siemens	7.2220.1 -T
1	fuse socket	30323	3pol. Gould	7.3320.0 -1FU,-2FU,-3FU
2	primary control fuse for 460V	ATQ	0,5A Gould	7.3310.0 -1FU,-2FU
2	primary control fuse for 230V	TRM 1	1,0A Gould	7.3300.0 -1FU,-2FU
1	secondary control fuse	TRM 1	1,0A Gould	7.3300.0 -3FU
1	terminal strip		Wieland	7.5237.00010 -TB1
	instrument panel			
1	Kaeser Control	ENQ4/K	Zander	7.1092.00020 -A01
1	temperature gauge with switch	230°F	Störk	8.0197.0 -ETS
1	hour meter	BW40	115V 60Cy Müller	7.0784.0 -HM
1	control switch with indicator light	RLWK1R-WS-S/BE	Kl.Moeller	7.2778.1 -S
1	emergency stop pushbutton	CBK	ABB	7.3629.0 -PB
2	auxiliary contact	CBK 1NO	ABB	7.3630.0 -PB

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



a			date	23.11.1994	KAESER COMPRESSORS	lay-out compressor SK 19 control panel	ASK19 - 1194/U0005		
b		editor	Silber	1FU 2FU 3FU			1FU 2FU 3FU	Page	1
c		check	<i>[Signature]</i>						
d	modification	date	name						

Wiring Diagram

screw compressor SK 26

direct on line start

230V 3Ø 60CY or 460V 3Ø 60CY

manufacturer: KAESER COMPRESSORS
96450 COBURG
GERMANY

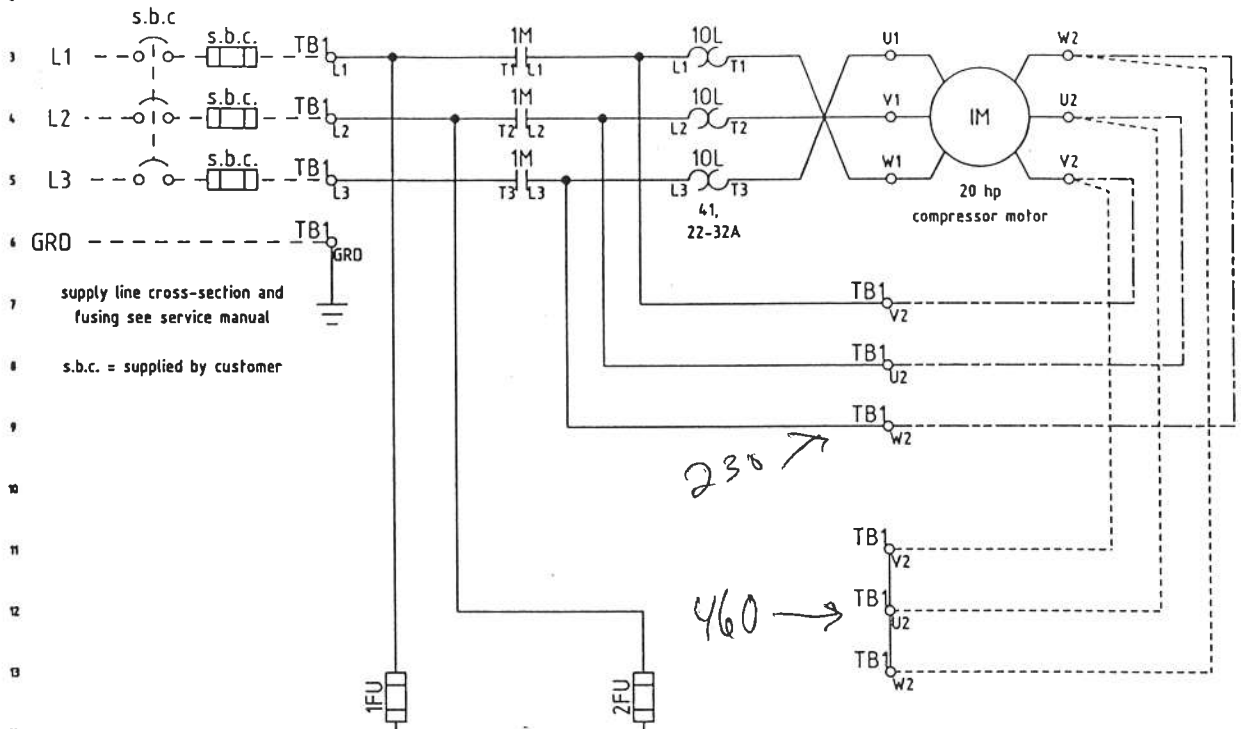
consignee:

customer:

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A	modification	date	name					

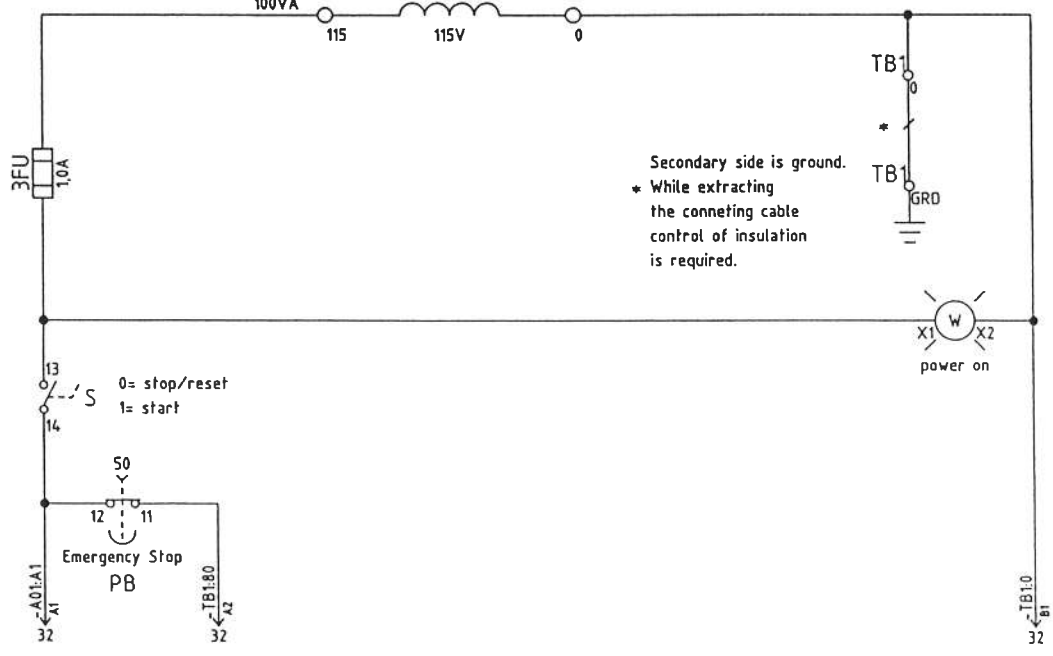
Also need to change MOTOR CAVN. IN MOTOR

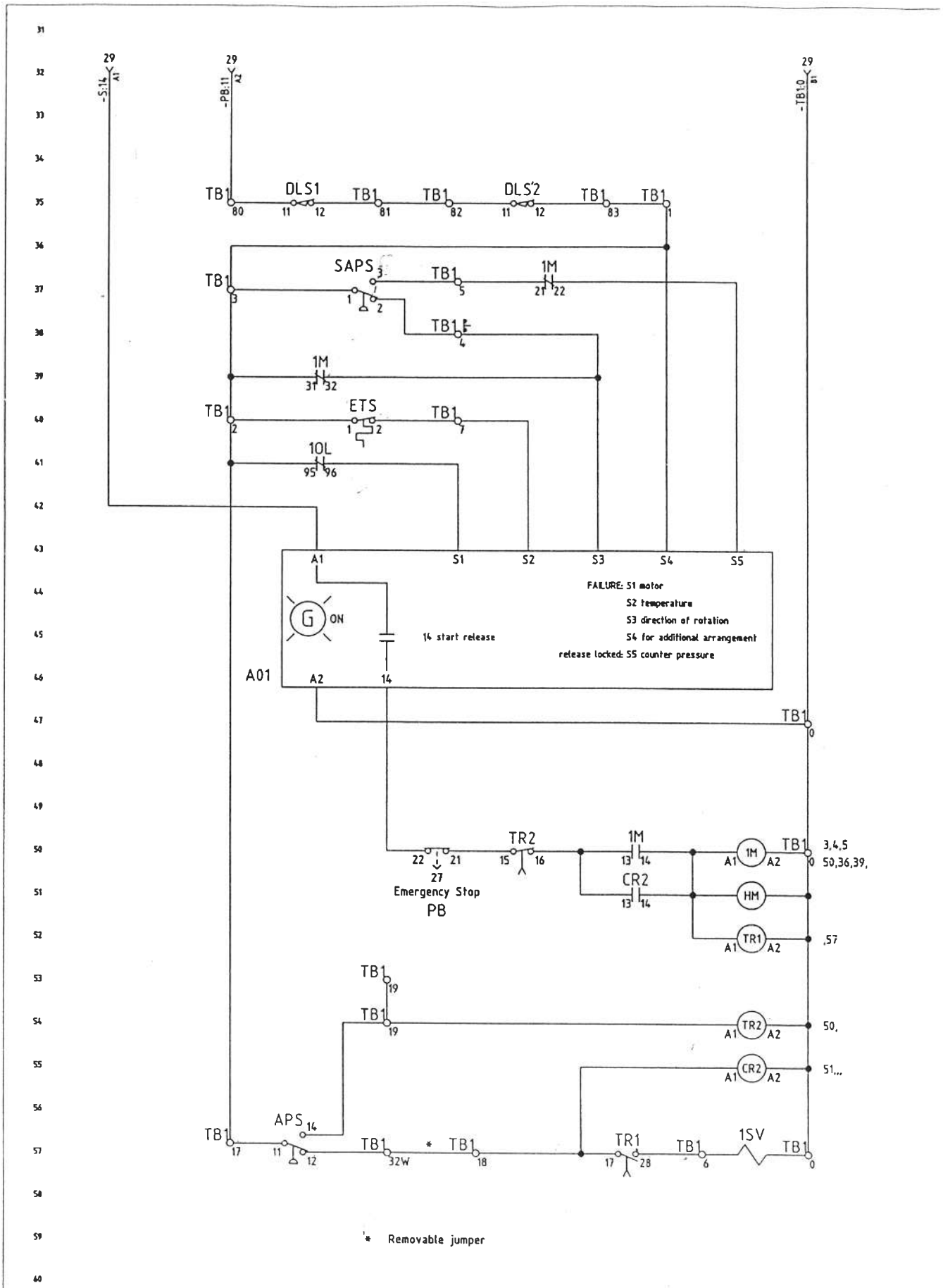
1 Input voltage
230V Ø3 60CY or 460V Ø3 60CY



230 →
460 →

connection:	
230V	-----
1FU:	1,0A, 2FU: 1,0A
460V	-----
1FU:	0,5A, 2FU: 0,5A





* Removable jumper

a			date	23.11.1994	KAESER COMPRESSORS	wiring diagram compressor SK 26	SSK26 - 1194/U0006
b			editor	Sitter			
c			check	<i>[Signature]</i>			
d	modification	date	name				Page 2

1M motor starter

1SV solenoid valve
(combined control/vent valve)

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

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

T transformer

CR2 control relay

I M compressor motor

HM hour meter

W indicating light "power on"

DLS1,DLS2 door interlock switch

S switch 0 = stop/Reset
1 = start

A01_Kaeser Control

PB emergency stop pushbutton

TB1 terminal strip

APS air pressure switch

malfunction indicators

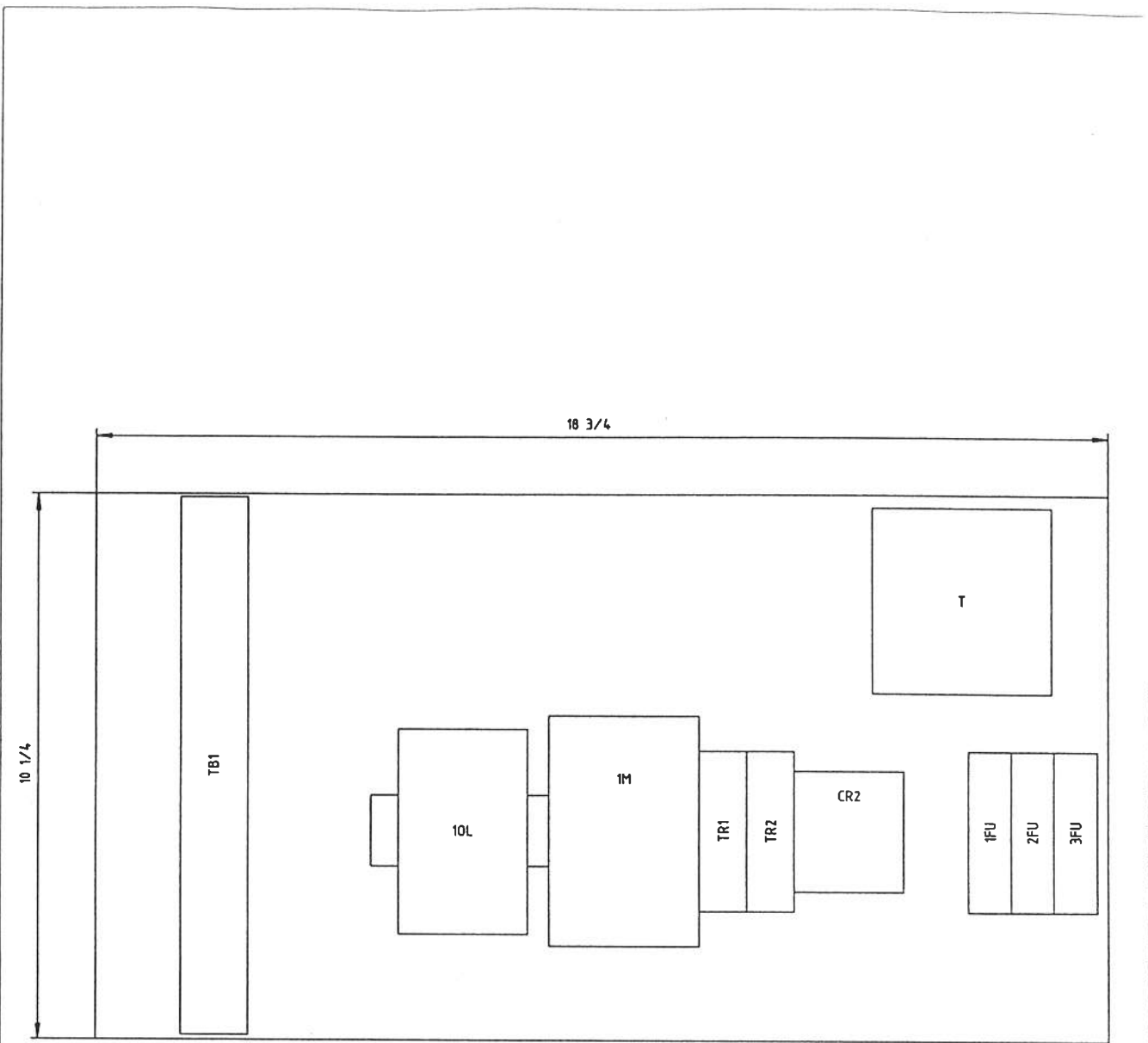
malfunction lights:
(automatic shutdown)

10L motor overload relay

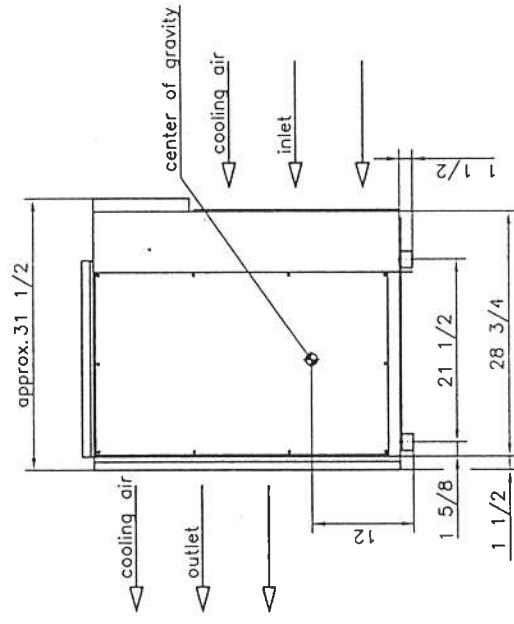
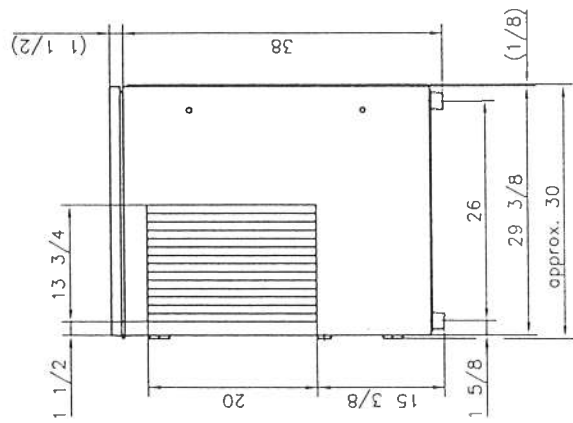
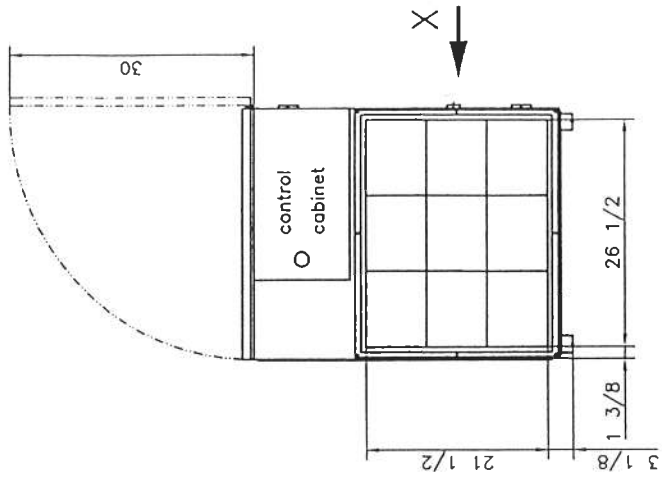
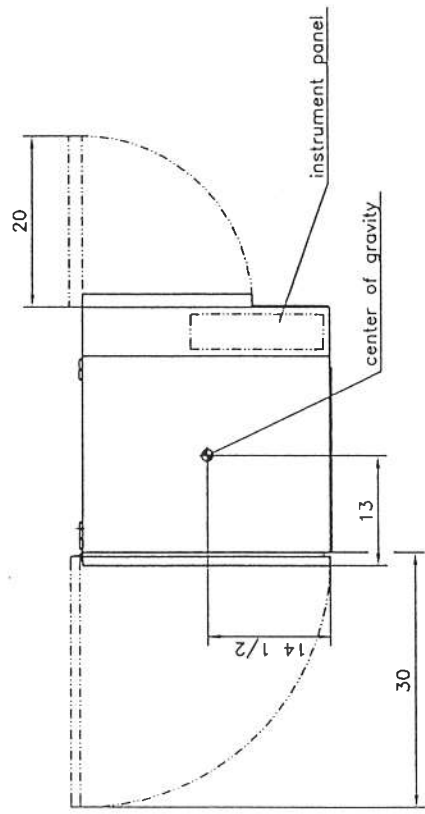
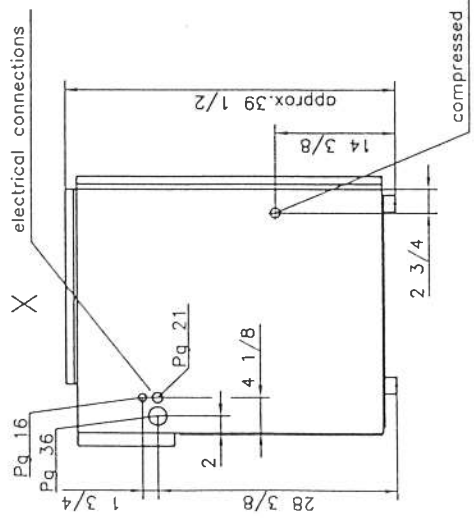
ETS excessive temperature switch 230 °F

SAPS safety air pressure switch

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E	modification	date	name				Page	01



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c		check	<i>[Signature]</i>				
1	modification	date	name				Page 1



ATTENTION!
Minimum width of door is total width of unit + 4

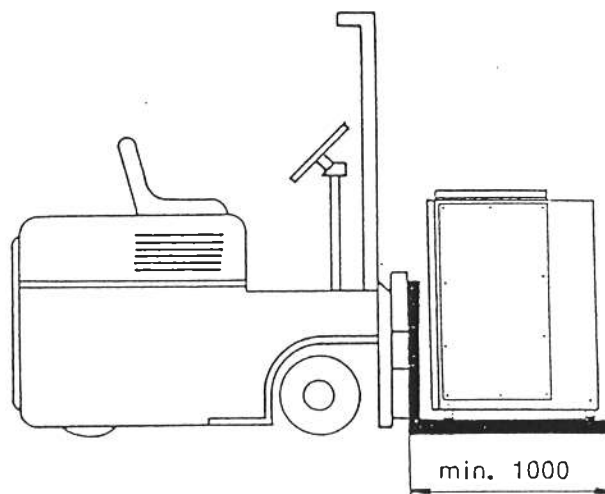
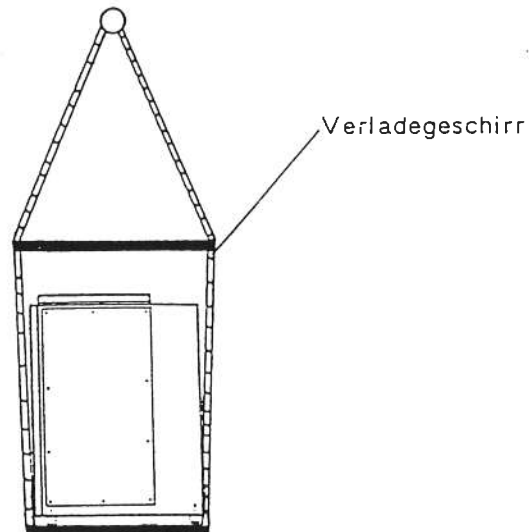
1994	DATUM	NAME	SK 19/26	
GEZ.	07.06.	Eckhardt	Dimensions in inches	
GEPR.		Bdt	T 7471.4	Q M
AENDERUNG				1:15
DATEI:	00001177.DWG	Ersatz f.	Ersetzt d.	BLATT

KAESER
COMPRESSORS

9. Transportation instructions

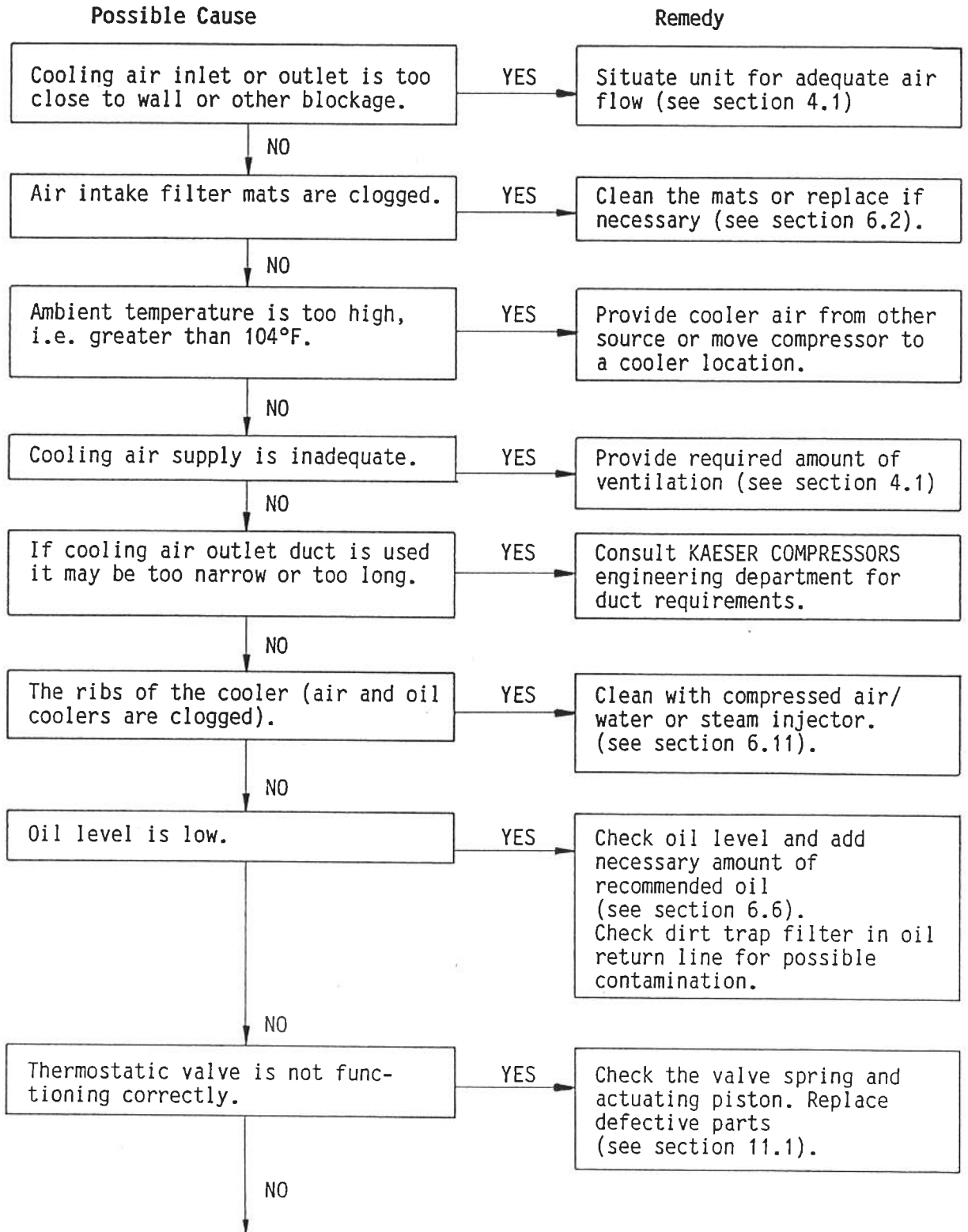
To avoid damage of the casing of the unit, it is recommended a fork lift or a spreader beam be used for transportation.

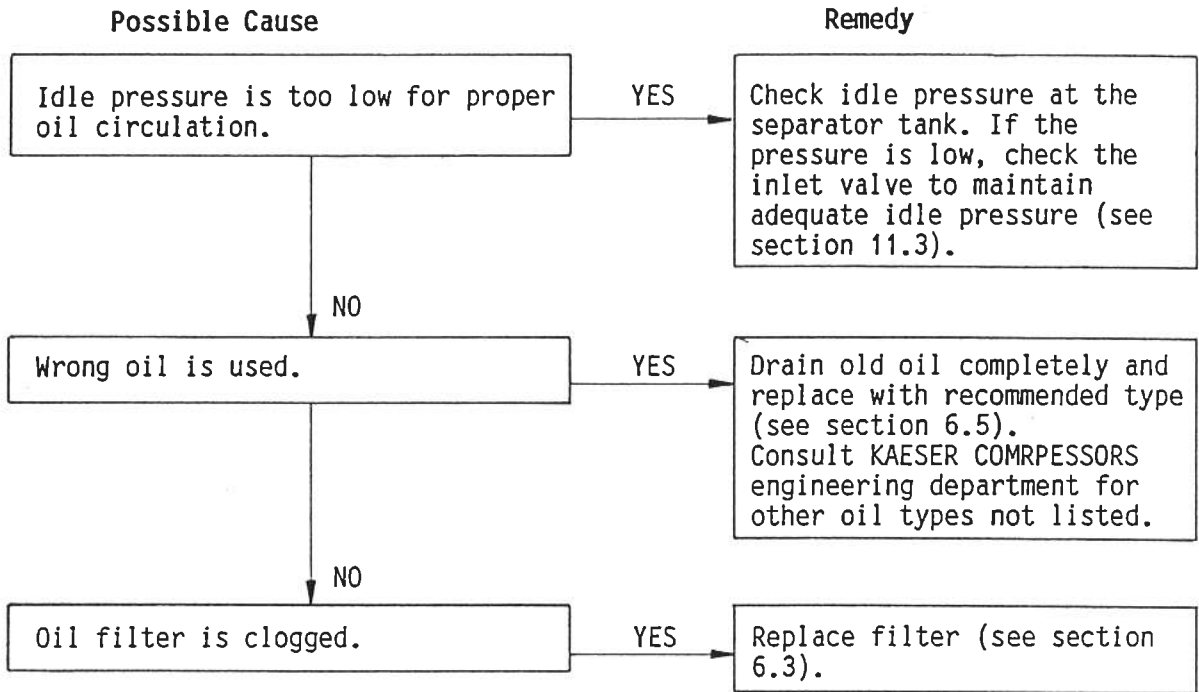
Model	Weight
SK 19	approx. 260 kg
SK 26	approx. 280 kg



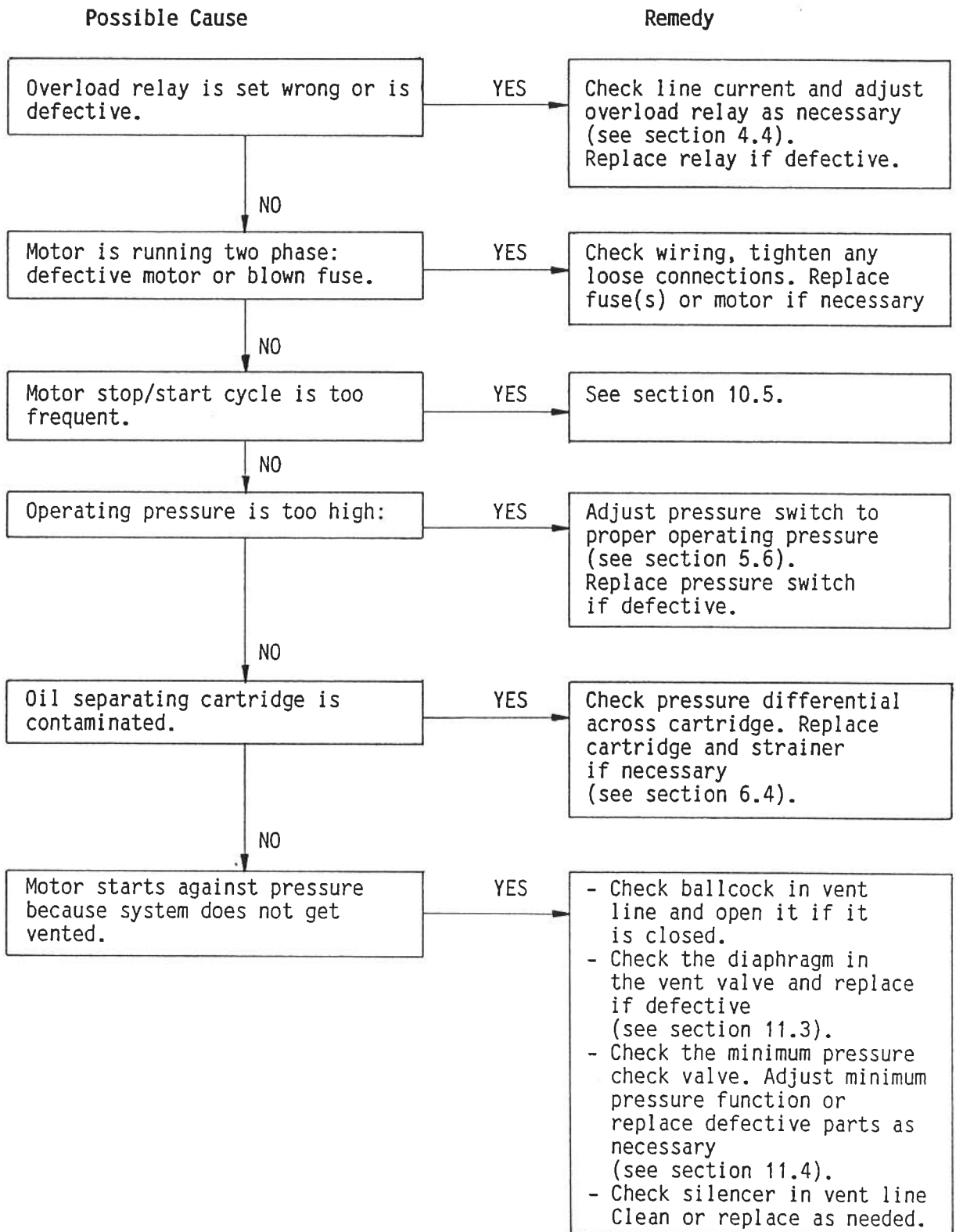
10. Trouble shooting

10.1 Airend temperature is too high (greater than 155-180°F)

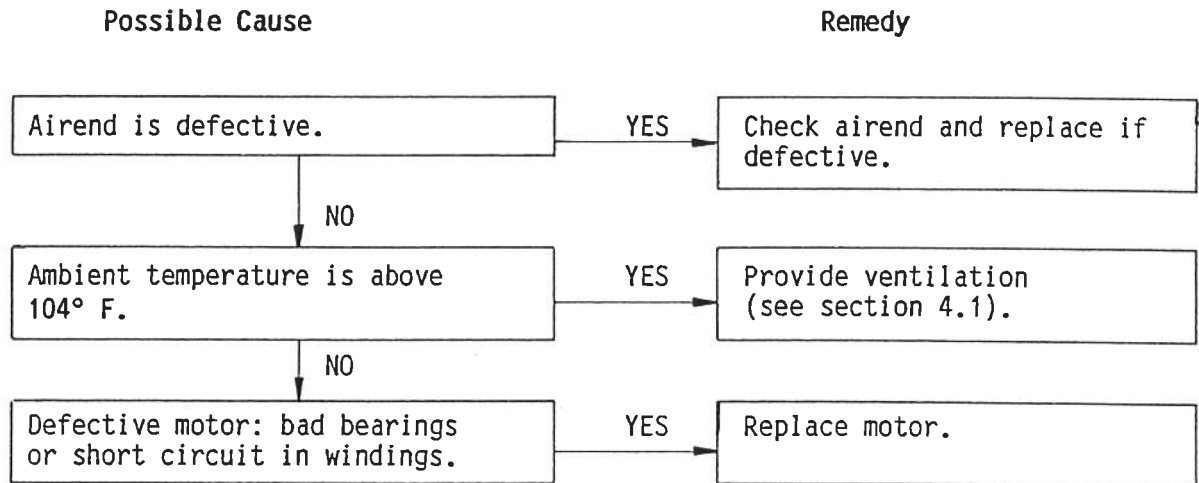




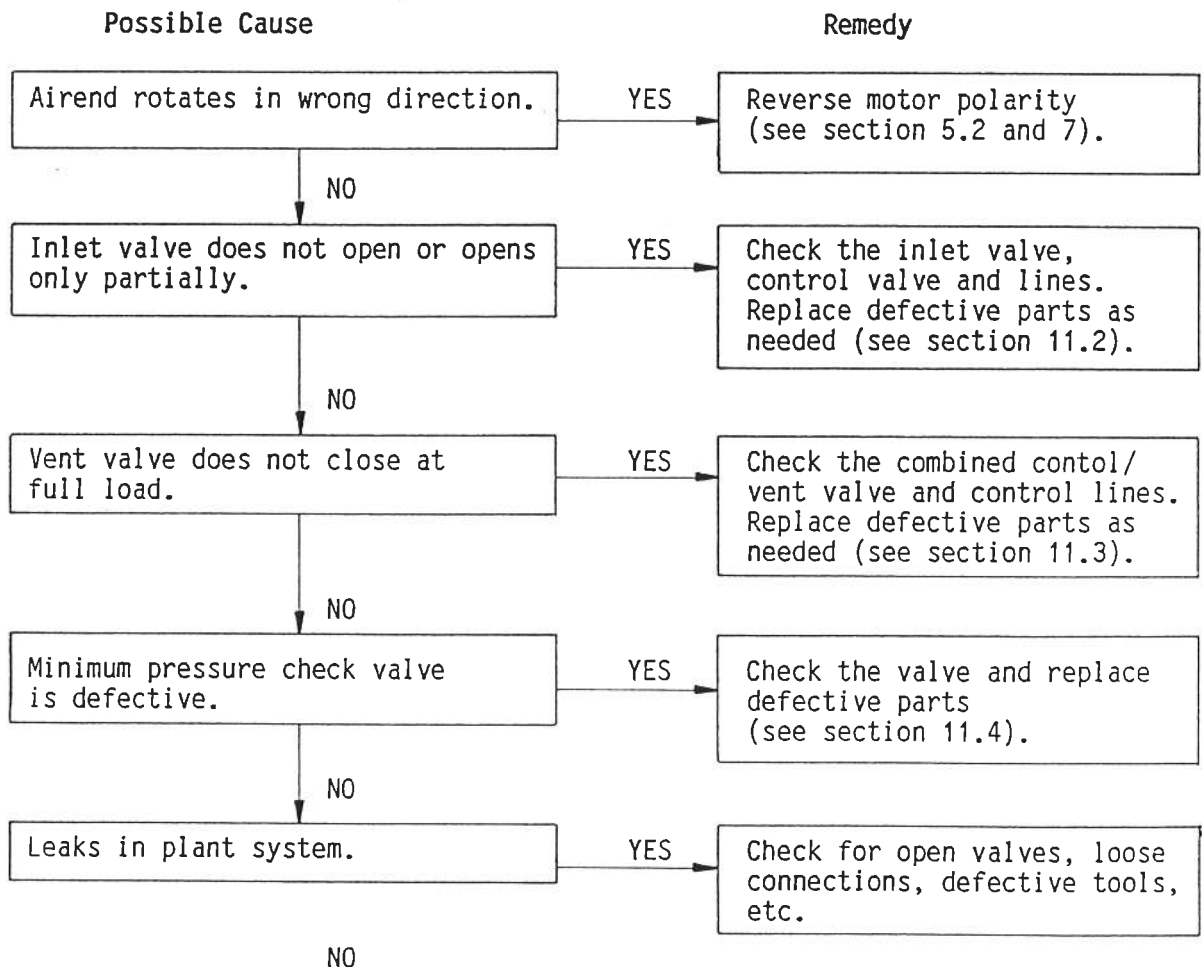
10.2 Motor overload relay switches the unit off

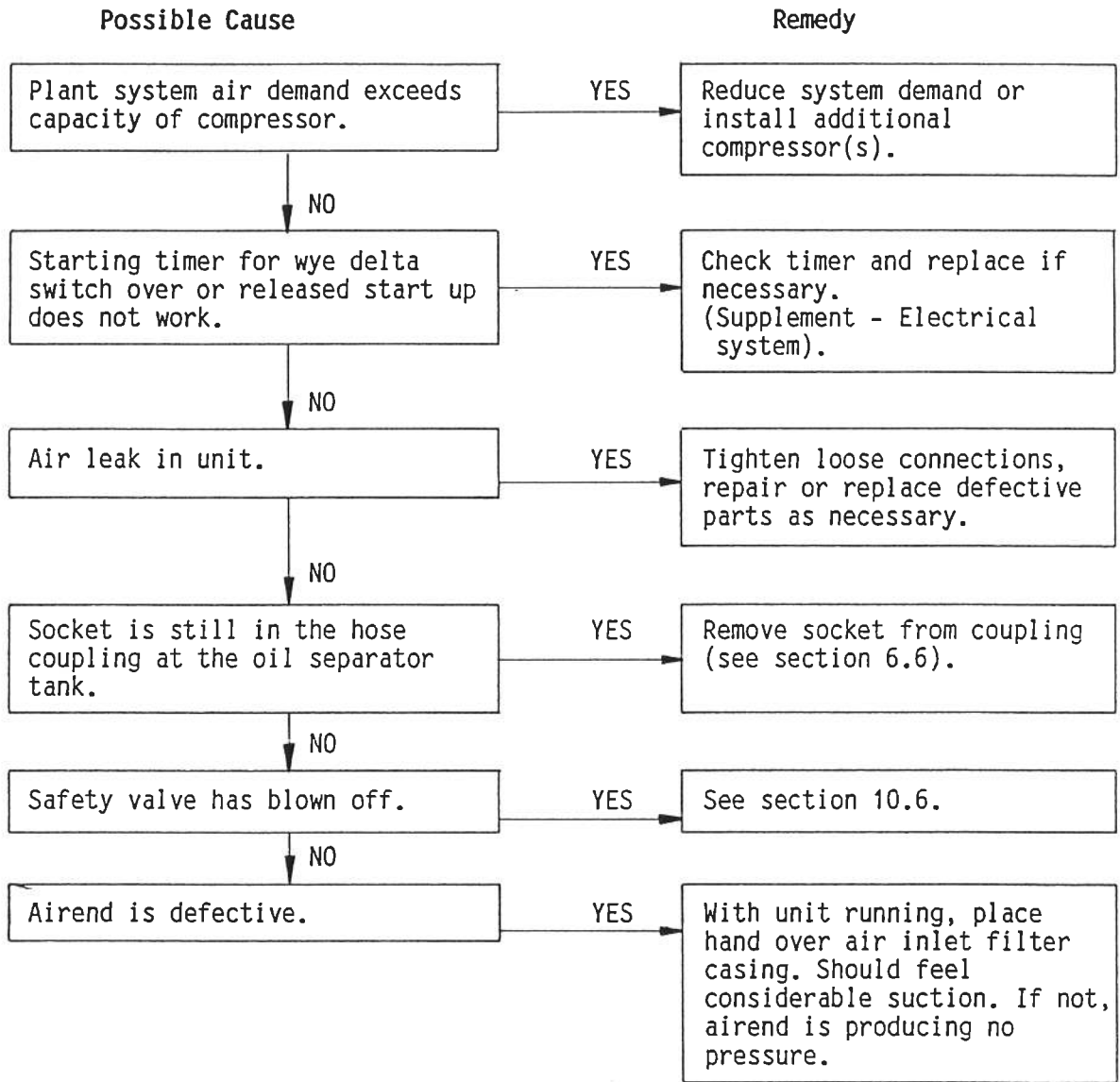


NO



10.3 Compressor is running but produces no pressure





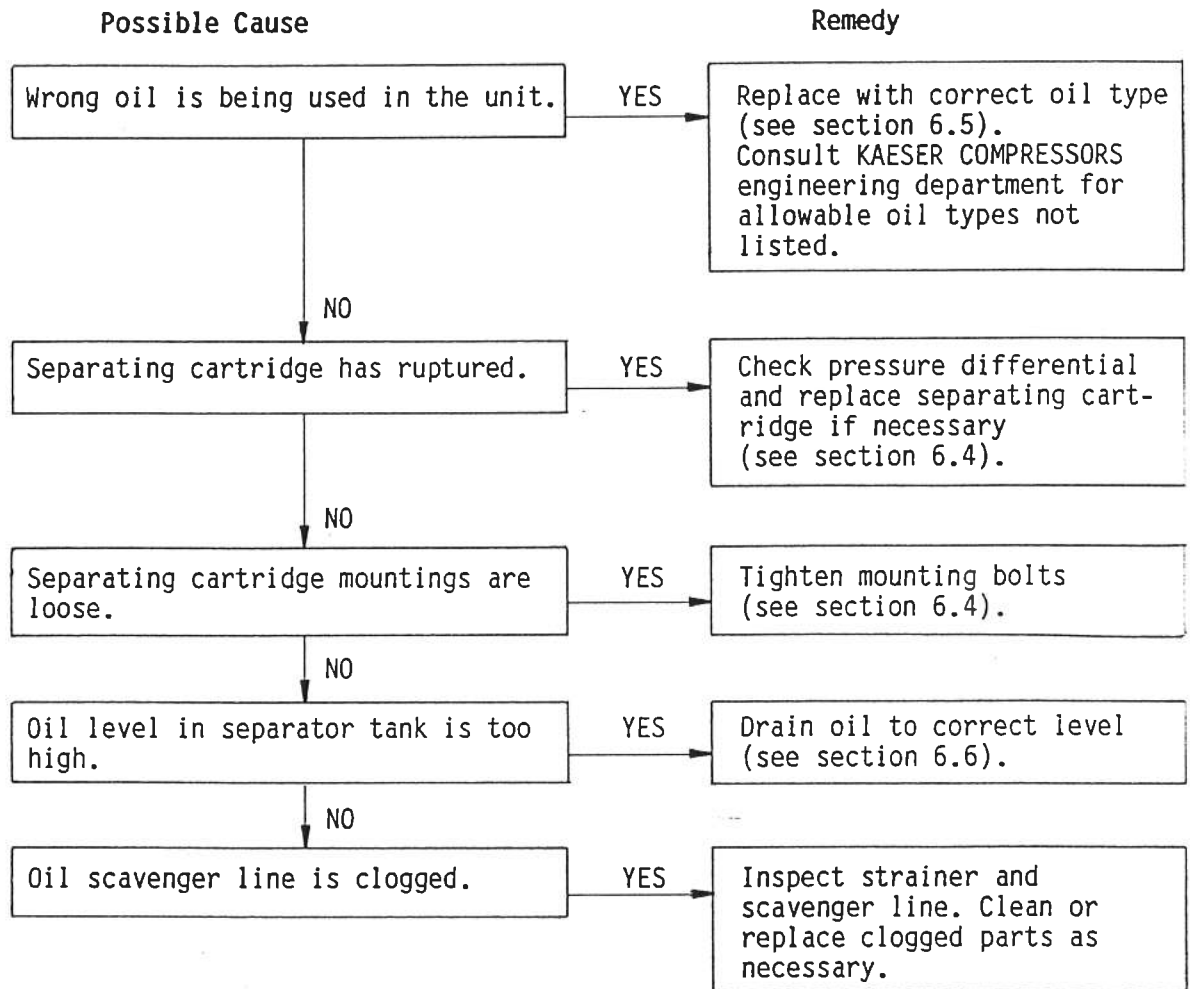
10.4 Oil flows out of air filter

Possible Cause		Remedy
Oil level in separator tank is too high.	YES	Drain oil to correct level (see section 6.5).

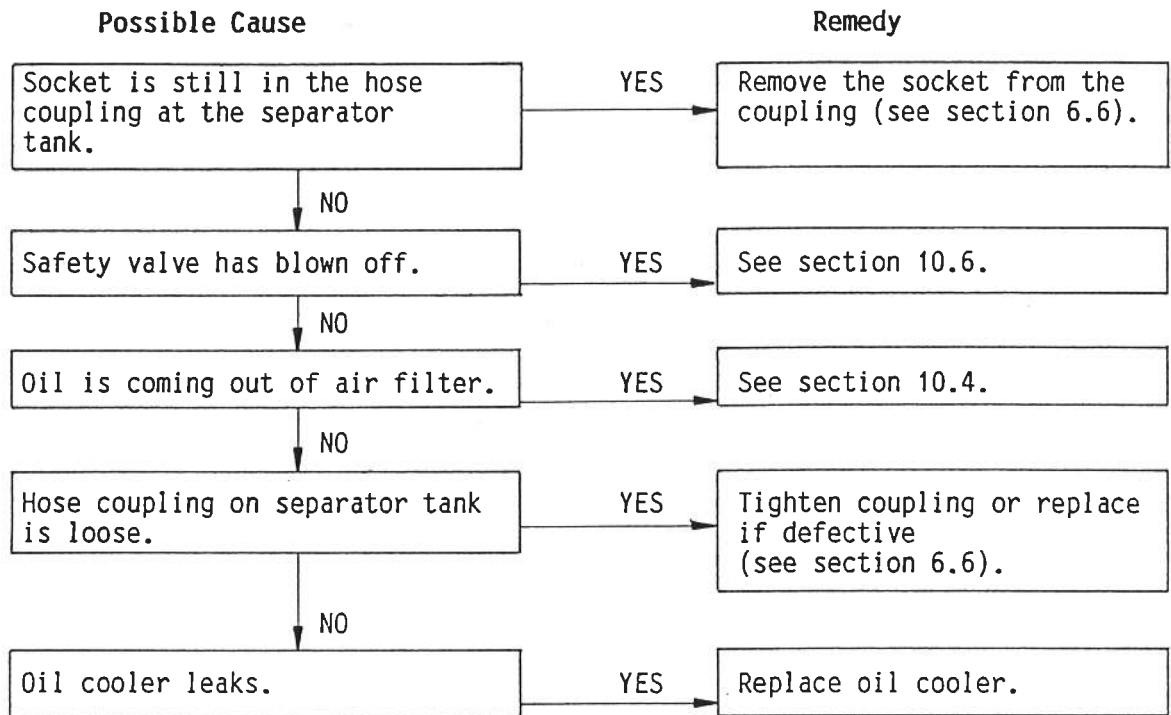
10.5 Full-load/idle sequence occurs too frequently

Possible Cause		Remedy
Air receiver (tank) size is too small or there is no tank.	YES	Consult KAESER COMPRESSORS engineering department for recommended tank size.
	NO	
Diameter of hose connecting the unit to the air receiver is too small.	YES	Connecting hose diameter should not be less than the air discharge pipe diameter. Install larger hose if necessary.
	NO	
Minimum pressure check valve leaks.	YES	Check the valve and replace defective parts (see section 11.4).
	NO	
Pressure switch is incorrectly adjusted or defective.	YES	Check adjustment of pressure switch; replace switch if defective (see section 5.6).
	NO	
Idle time is too short.	YES	Set idle timer for longer interval (see section 5.5).

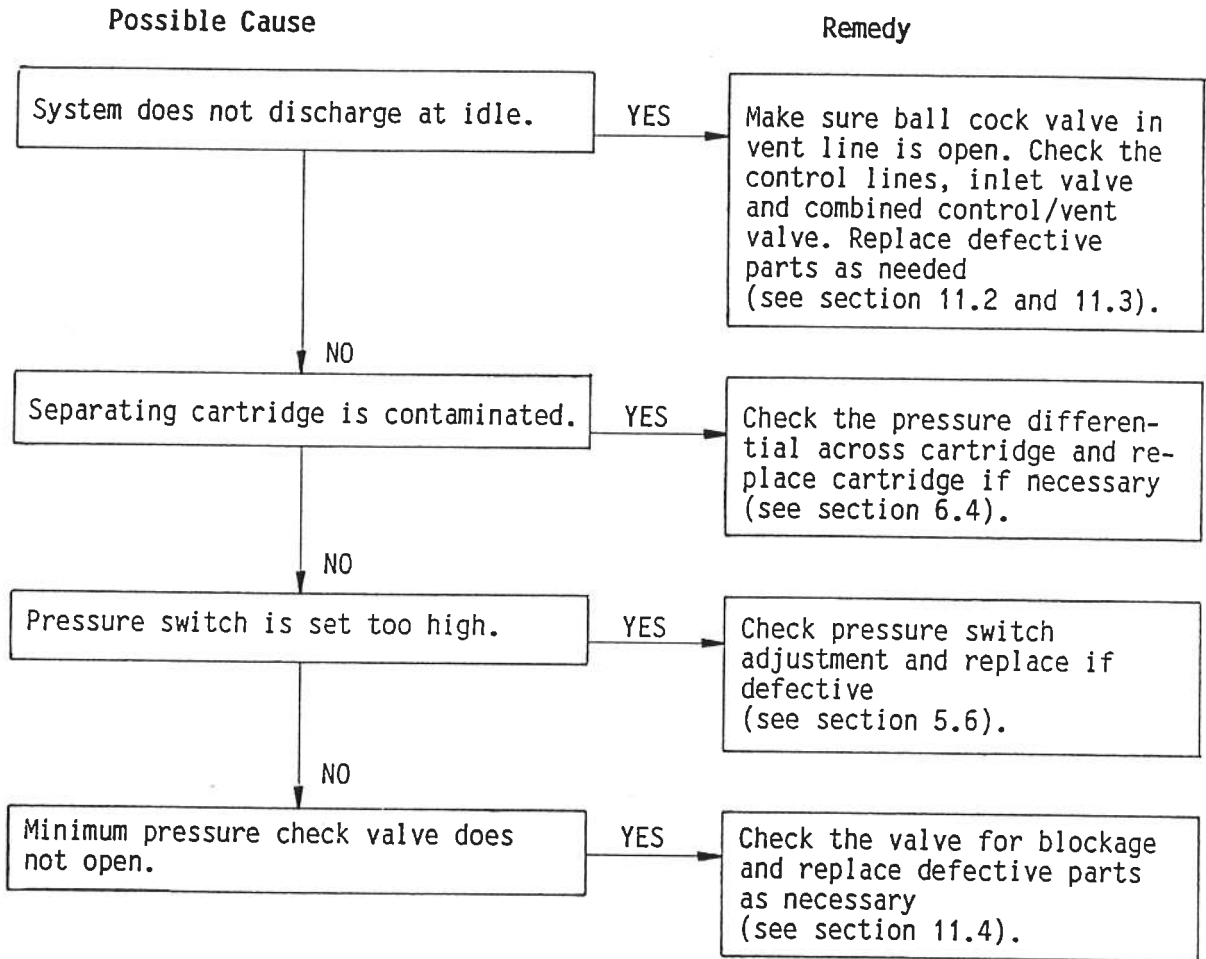
10.8 Excessive oil consumption



10.7 Oil in the unit enclosure

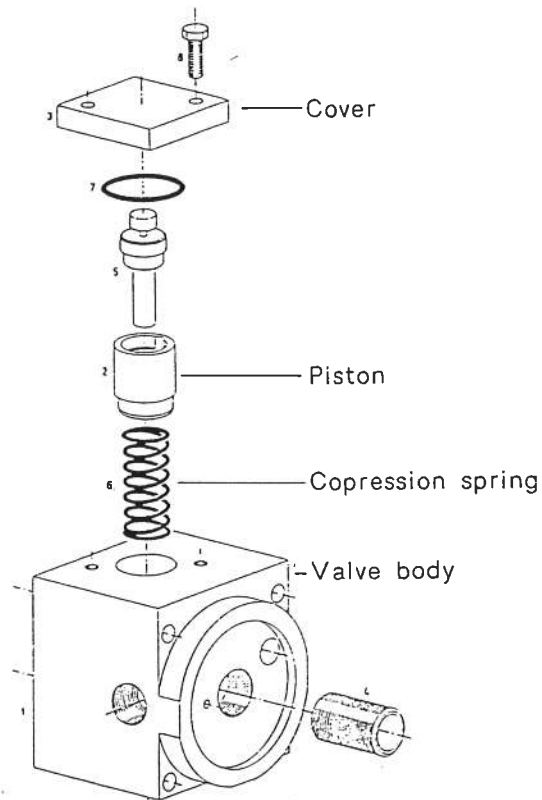


10.6 Safety-valve blows off



11. VALVE SERVICE SUPPLEMENT

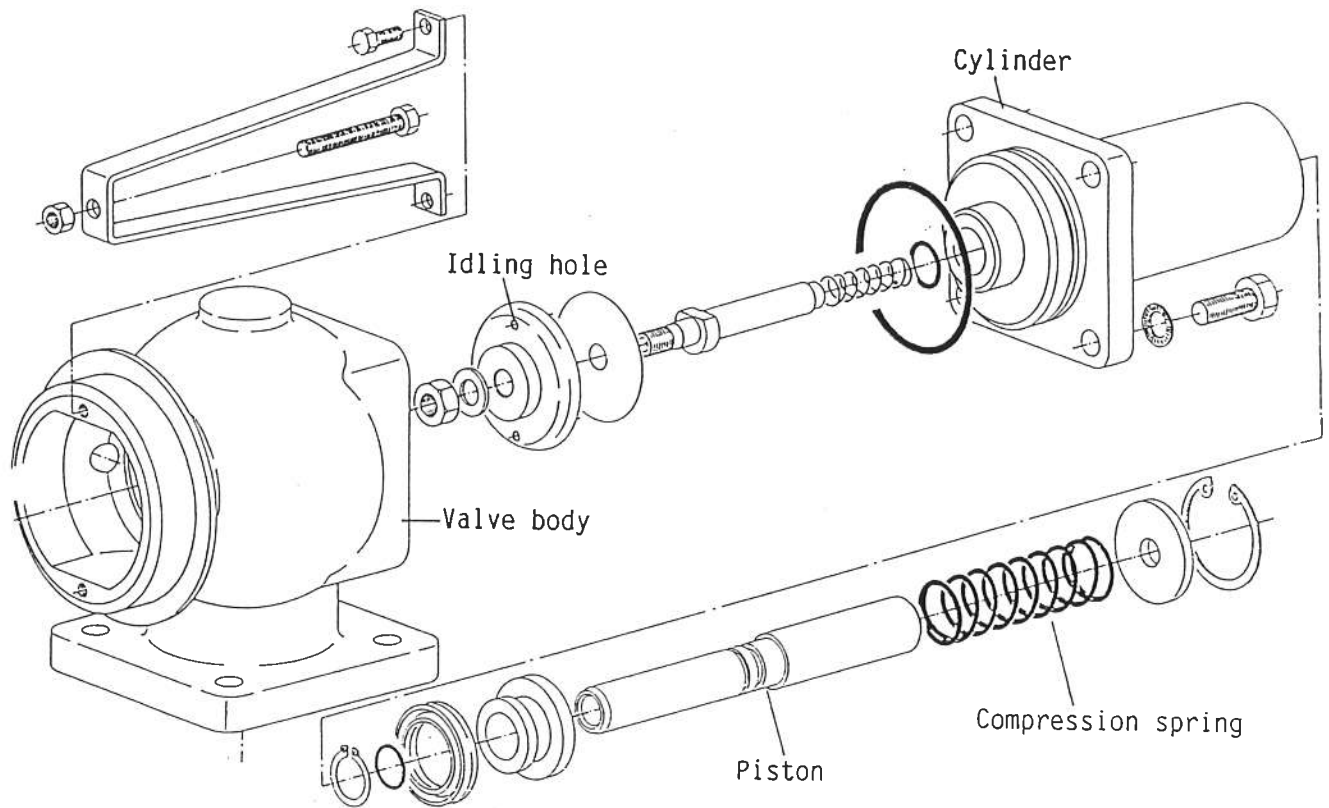
11.1 Combination (Thermostatic) Valve



Function

To regulate flow of oil into oil cooler, thus maintaining proper oil temperature. This valve directs oil into the cooler, or by-passes the cooler to send oil directly back to the airend, as necessary.

11.2 Inlet Valve



Function

To control the flow of air into the airend. There is a hole in the valve plate to allow some air to enter the airend when the inlet valve is closed. This hole is just big enough to allow adequate idle pressure for proper oil circulation.

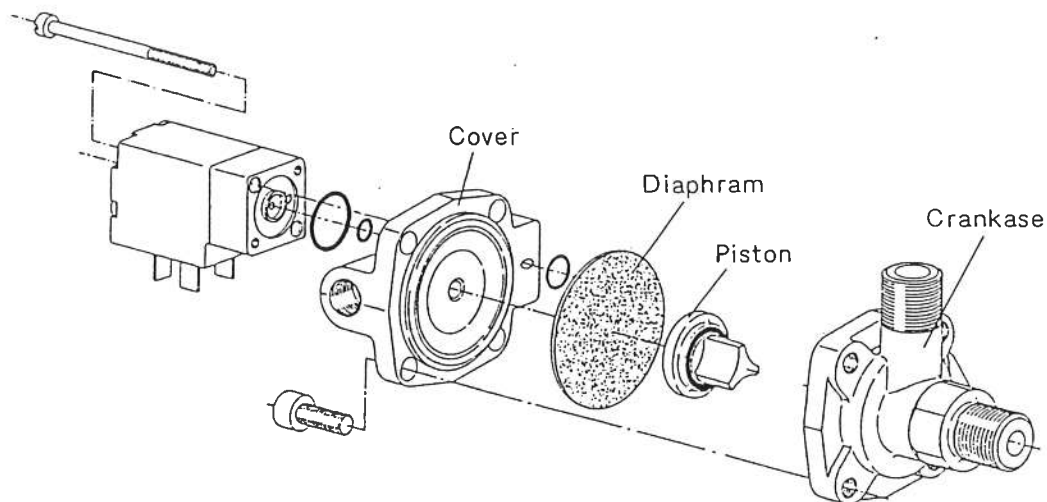
Compressor Mode

Full-load
Idle/Unloaded Start
Cut-off

Valve Condition

Open
Closed (but Idle hole open)
Closed

11.3 Vent valve (Discharge valve)



Function

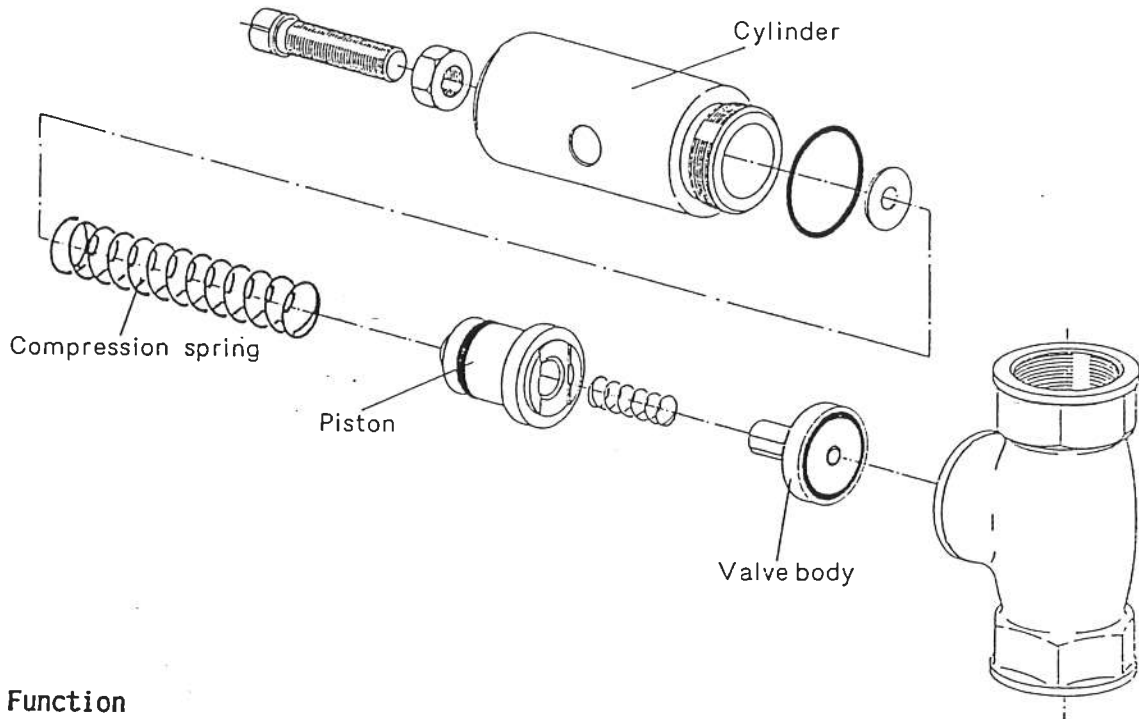
To discharge the system pressure during idle and cut-off. It is necessary to discharge pressure during idle to reduce motor load, thus saving energy. The system must be discharged when shut off because starting the compressor against pressure will damage the motor.

Compressor Mode	Valve Condition
Full-load	Closed
Idle	Open
Cut-off	Open

Checking

- Close ball cock valve in the discharge line.
- Start unit, allow to idle, and shut off immediately.
- If the vent valve diaphragm is defective the inlet valve will operate. Replace the diaphragm if it is defective.

11.4 Minimum pressure check valve



Function

- **Minimum Pressure:**
Allows compressor to build up sufficient pressure for adequate oil circulation before releasing air to the receiver.
- **Check Function:**
Prevents backflow of air through the unit.

Compressor Mode	Valve Condition
Full-load	Open
Idle (WYE-time, or released start up time)	Closed
Cut-off	Closed

Checking

- **Minimum Pressure:**
Start the unit and watch the separator tank pressure and the instrument panel readings. The separator tank pressure should go to about 60 psi before any pressure is indicated on the instrument panel. Be sure that the panel gauge shows no pressure before attempting this test.
- **Check Function:**
Isolate machine and shut it off at maximum pressure. If the valve is not operating then the instrument panel gauge will show a rapid loss of pressure.