



BS 50
BS 60

KAESER COMPRESSORS, INC.

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IMPORTANT

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.

Compressed air from any oil lubricated Kaeser compressor is not suitable for use in any breathing apparatus or food related process. (Food grade oils are available on request)

ATTENTION

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.

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1. DIMENSIONS AND SPECIFICATIONS

| Model | Maximum pressure psig | Free air delivery unit cfm | Motor | | Dimensions inches length - width - height |
|--------|--------------------------|-------------------------------|-------|-----|---|
| | | | kW | hp | |
| BS 44 | 110 | 170 | 30 | 40 | 62 x 40 1/4 x 52 3/4 |
| BS 44 | 145 | 155 | | | |
| BS 44 | 190 | 135 | | | |
| BS 50 | 110 | 195 | 30 | 40 | |
| BS 50 | 145 | 165 | | | |
| BS 50 | 190 | 145 | | | |
| BS 60 | 110 | 240 | 37 | 50 | |
| BS 60 | 145 | 205 | | | |
| BS 60 | 190 | 178 | | | |
| CS 75 | 110 | 282 | 45 | 60 | 70 1/2 x 44 1/2 x 56 3/4 |
| CS 75 | 145 | 252 | | | |
| CS 75 | 190 | 215 | | | |
| CS 90 | 110 | 345 | 55 | 75 | |
| CS 90 | 145 | 300 | | | |
| CS 90 | 190 | 260 | | | |
| CS 120 | 110 | 458 | 75 | 100 | |
| CS 120 | 145 | 390 | | | |
| CS 120 | 190 | 340 | | | |

2. DESCRIPTION OF THE SIGMA SCREW COMPRESSOR

The main components of the Sigma Screw Compressor consist of housing and two rotors. The compressor operates according to the rotary piston principle and is driven by an electromotor through V-belts.

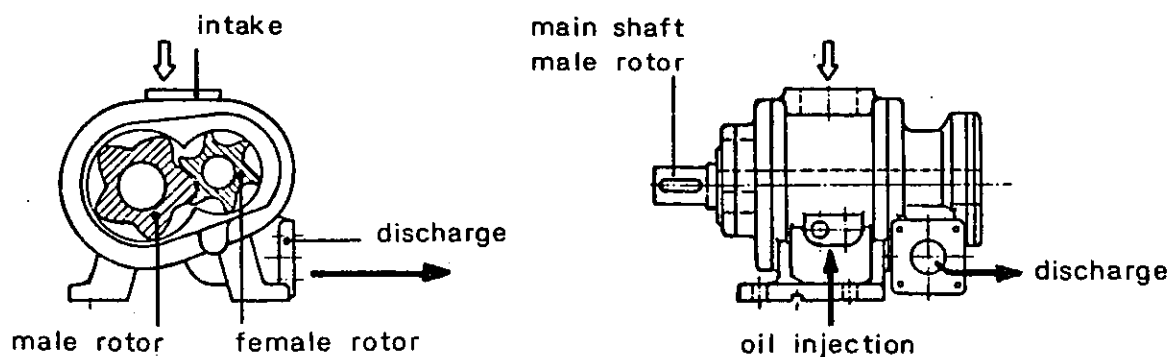


Figure 1

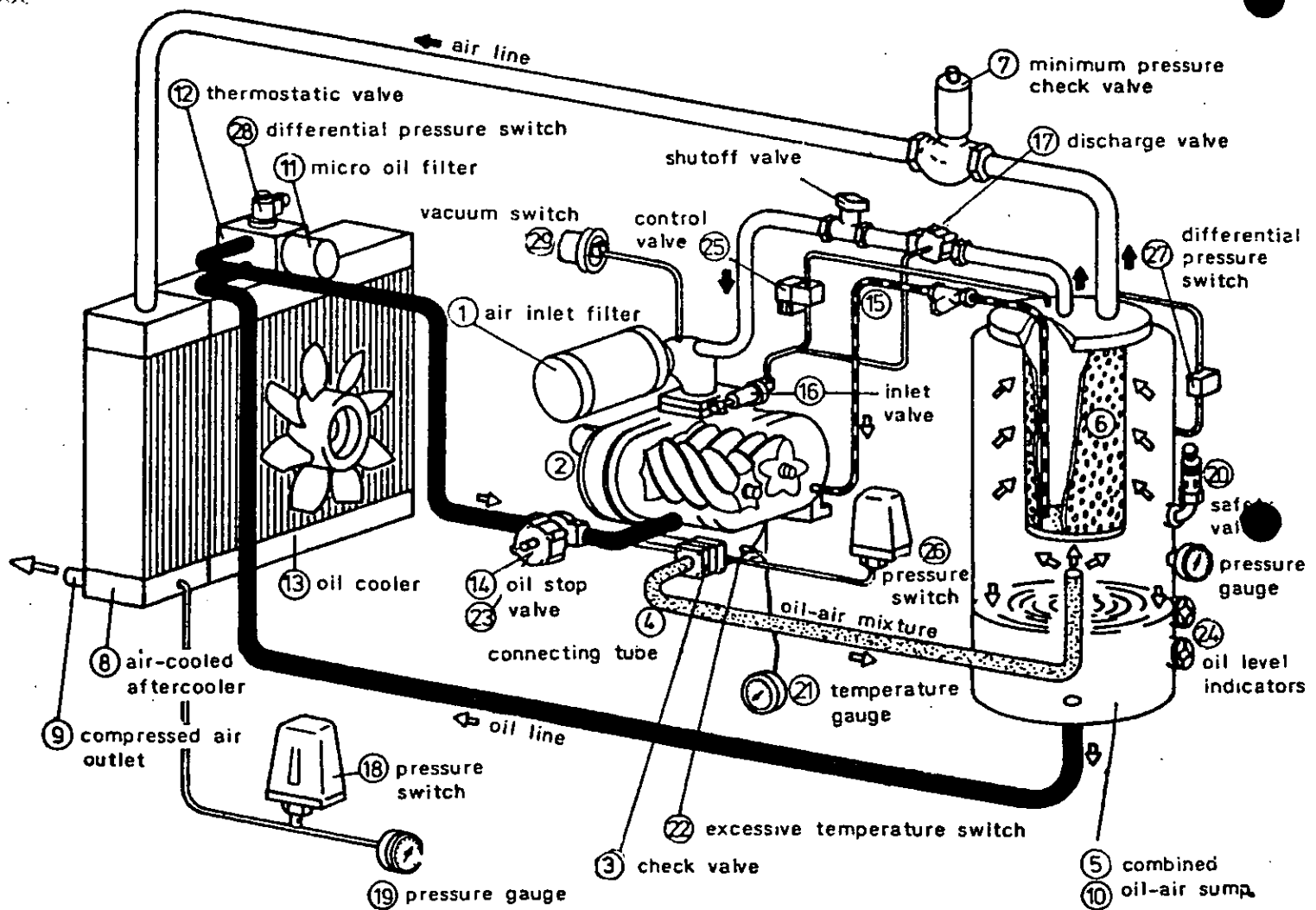
There are two rotors with antifriction bearings in the housing: a male rotor with 5 lobes driven by the motor and a female rotor with 6 voids. While the rotors are turning, air is drawn in through the inlet port at the upper side of the housing and the trapped air is compressed at the lower side.

The oil injected into the housing at the lower side absorbs the heat produced by the compression process, prevents the rotors from coming into contact and lubricates the antifriction bearings.

As there are no unbalanced forces, inlet or outlet valves, smooth running of the unit is ensured.

3. DESIGN AND FUNCTION OF THE UNIT

Figure 2



AIR FLOW

- ① Air inlet filter
Cleans intake air
- ② Screw compressor
The air is compressed. The heat produced by compression is absorbed by the oil.
- ③ Check valve
Prevents the backflow of oil-air mixture
- ④ Connecting tube
with elastic pipe connection
- ⑤ Combined oil-air sump
Serves as oil storage sump and for first stage of oil/air separation
- ⑥ Oil separating cartridge
Separates the oil from compressed air
- ⑦ Minimum pressure check valve
Safeguards compressor lubrication by maintaining minimum pressure within oil sump for adequate lubrication at all times
- ⑧ Air-cooled aftercooler
The compressed air is cooled almost to ambient temperature
- ⑨ Compressed air outlet
Air pressure can be taken from a threaded or flanged connection

OIL CIRCULATION

- ⑩ Combined oil-air sump
Separates oil from compressed air and directs the oil back to circulation
- ⑪ Micro oil filter
Cleans the total oil flow through a fine replaceable oil cartridge
- ⑫ Thermostatic valve
Controls the oil temperature and thus prevents moisture separation in the compressed air and in the oil.
Result: cold oil is directed back to the compressor - warm oil closes this passage and is then directed to the oil cooler
- ⑬ Oil cooler (air-cooled)
Cools the heated oil
- ⑭ Oil stop valve (deenergized closed)
Opens the passage for oil injection after the compressor has been started and closes it when the compressor has been stopped
- ⑮ Oil return line with nozzle
Directs the oil, separated in the oil separator, back to the inlet side of the compressor

CONTROL

- ⑯ Inlet valve
Opens at full load and closes when the compressor is idling or stopped. The inlet valve is controlled by the control valve.
- ⑰ Discharge valve
Ventilates the oil-air sump when the compressor is idling or stopped.
Result: low idling power, loadless starting
This valve is pneumatically controlled by the control valve.
- ⑱ Pressure switch
Controls the compressor between full load and idling time

SAFETY CHAIN

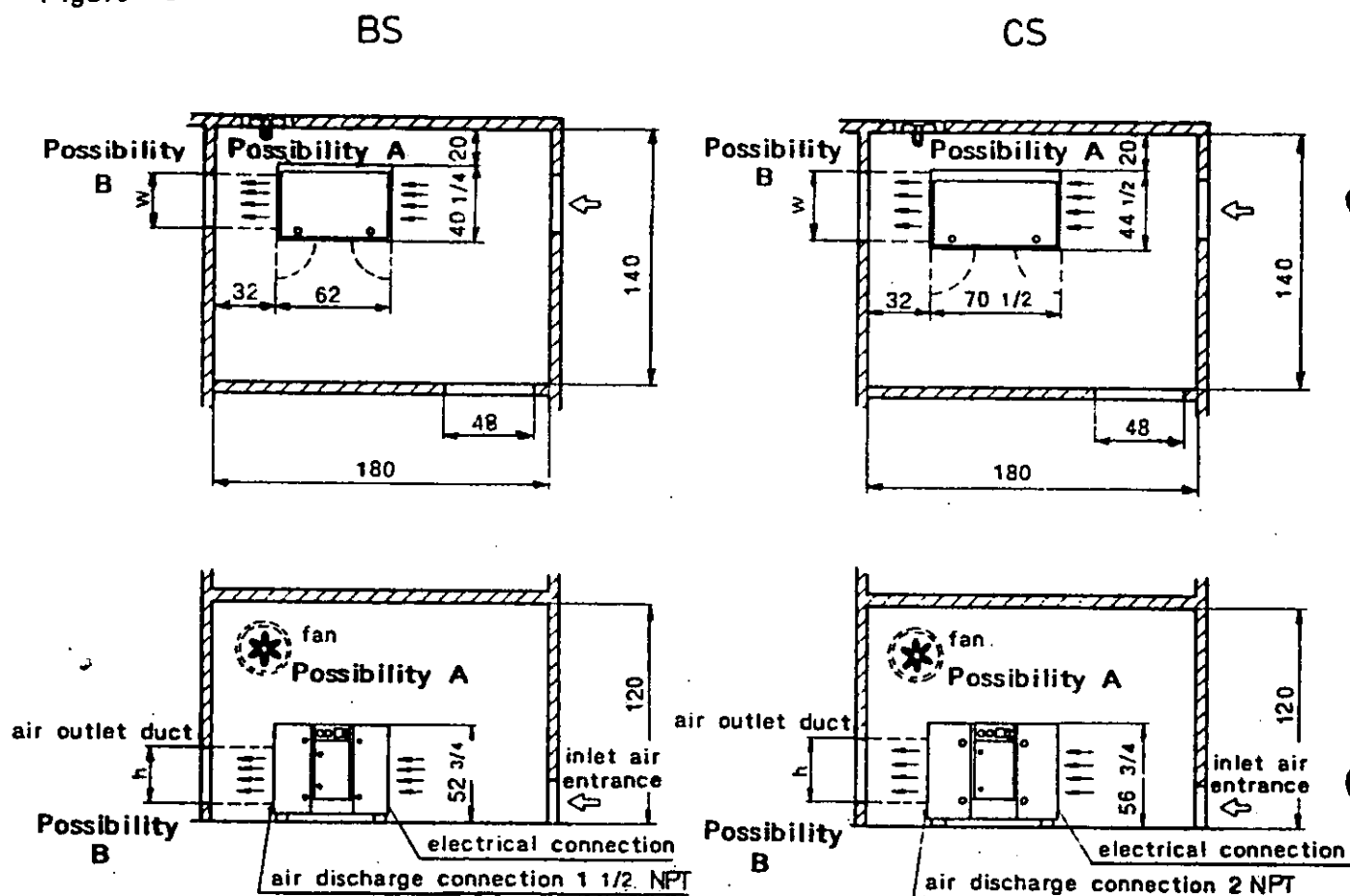
- ⑲ Pressure gauge
Indicates the pressure at discharge
- ⑳ Safety valve
Protects the oil-air sump against exceeding the maximum pressure
- ㉑ Temperature gauge
Indicates the final compression temperature at the a/rend
- ㉒ Excessive temperature switch
Cuts out the compressor at excessive temperature (212°F measured at the a/rend)
- ㉓ Oil stop valve (deenergized closed)
Regulates oil flow into compressor and thus eliminates excessive load on the motor
- ㉔ Oil level indicators
Maximum and minimum oil levels can be checked through two sight glasses
- ㉕ Control valve (deenergized closed)
Supplies pressure to the control cylinder of the inlet valve and discharge valve or ventilates them. The control valve is controlled by the pressure switch 18.
- ㉖ Pressure switch
Shuts down the unit if the V-belts are broken, if the direction of rotation is wrong or if the unit is operating on one phase only
- ㉗ Differential pressure switch
Indicates the contamination of the oil separating cartridge
- ㉘ Differential pressure switch
Indicates the contamination of the oil filter
- ㉙ Vacuum switch
Indicates the contamination of the intake filter

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 distances indicated below.

Figure 3



Dimensions in inches

The compressor room should provide adequate ventilation.

| Model | Possibility A Ventilation: fan cfm at a static pressure of 0.4 inches WC | Possibility B Exhaust air is used for heating w x h inches | Required size at air inlet entrance for A and B sq. ft. |
|--------|---|---|--|
| BS 44 | 5000 | 27 x 30 | 6.5 |
| BS 50 | 5000 | 27 x 30 | 6.5 |
| BS 60 | 6200 | 27 x 30 | 8 |
| CS 75 | 7700 | 36 x 34 | 10 |
| CS 90 | 9500 | 36 x 34 | 13 |
| CS 120 | 14000 | 38 x 40 | 17.5 |

Possibility A:

Air delivery of the exhaust fan must be adequate for the size of the unit (see chart on page 5).

Possibility B:

Warm exhaust air is forced through a duct into the room to be heated. 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 air line with a flexible connecting hose. A check valve is not required in the discharge line as one is built into the unit.

4.3 Electrical connection

The unit is wired ready for operation and it needs only be connected to the supply line. Pull the cable with conductors L1, L2, L3 and earth E through the openings of the base frame into the controller and connect them to the terminals marked L1, L2, L3 and earth E. The main disconnect switch and main fuses must be supplied by the purchaser. This main disconnect switch must have a minimum switching capacity which is 1.1 times the indicated rated power of motor.

The required fuses and cross sections of cables are shown in the following chart.

| Model | Motor | | WYE-Delta start 230V, 3-phase, 60 cycles | | WYE-Delta start 460V, 3-phase, 60 cycles | |
|--------|-------|-----|---|------------------------|---|------------------------|
| | | | Fuse dual element | Conductor wire size | Fuse dual element | Conductor wire size |
| | kW | hp | Amps | AWG | Amps | AWG |
| BS 44 | 30 | 40 | 100 | 1 | 60 | 6 |
| BS 50 | 30 | 40 | 100 | 1 | 60 | 6 |
| BS 60 | 37 | 50 | 150 | 1/0 | 80 | 4 |
| CS 75 | 45 | 60 | 200 | 3/0 | 100 | 3 |
| CS 90 | 55 | 75 | 225 | 4/0 | 125 | 2 |
| CS 120 | 75 | 100 | 300 | 350 MCM | 150 | 2/0 |

4.4 Overload relay adjustment

WYE-Delta start 460 V, windings WYE-Delta switching.

Only the phase current of a winding is led through the overload relay. This phase current is only 0.58 time 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 phase current of a winding. This will prevent it from acting at voltage fluctuations.

5. PREPARATION FOR INITIAL START-UP

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 recommendations before initial start-up

- 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.
- 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 surface and its length should not exceed 13 ft.
- Install the compressor to maintain a distance of 2 ft. between the cooling air inlet of the unit and the wall.
- Check for proper direction of rotation.
- Make sure the shutoff valve (figure 22) is open.
- Shut off the unit, tighten up all the screws in the control box (repeat this after 50 operation hours).
- Make sure the maintenance doors are closed.

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 oil in the airend intake port, in quantities below recommended and rotate the airend by hand.

| Model | Quantity |
|----------|----------|
| BS 44 | 1 pint |
| BS 50/60 | 1 quart |
| CS | 1 quart |

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 air inlet connection at the inlet port, open the butterfly valve by hand and pour recommended amount oil into the airend. Screw air inlet connection back on.

To increase Wye time at start-up:

For start-up, increase Wye-Delta time relay to 30 seconds to prevent compression of inlet air during start-up. Stop unit by pushing stop button JUST BEFORE REACHING THE 30 SECOND LIMIT.

Once this is done, the Wye-Delta time relay must be set back to its normal operating point according to the following chart.

| Model | WYE time |
|----------|----------|
| BS | 9 sec. |
| CS 75/90 | 9 sec. |
| CS 120 | 12 sec. |

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.

Checking the direction of rotation:

- Push momentarily start and then stop button (parts 6 and 7, figure 4) and check for proper direction of rotation.
- Arrows on motor and airend housing indicate direction of rotation.
- Should direction of rotation be incorrect, conductors L1 and L2 must be interchanged.

Important:

If the compressor rotation is wrong, pressure switch No. 26 (figure 2) will automatically shut compressor off.

Compressor start-up

- Cut in main disconnect switch
- Push start button (part 6, figure 4)

Compressor stop

- Push stop button (part 7, figure 4)
- Shut off main disconnect switch

Important:

Do not shut off the compressor operating with load at the main disconnect switch.

Instrument Panel

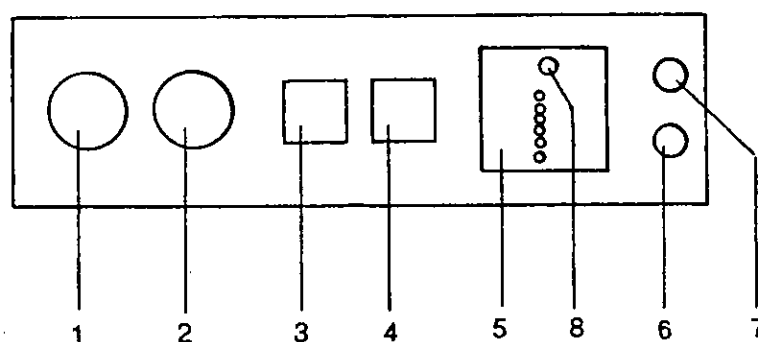
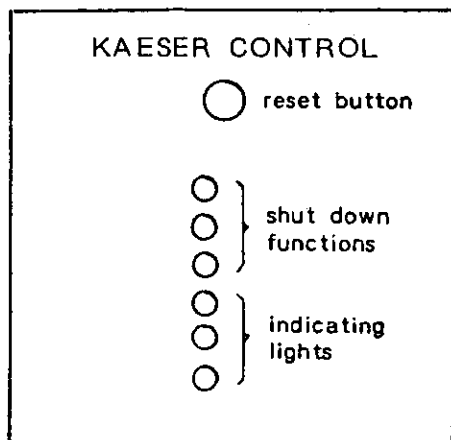


Figure 4

- 1 Outlet pressure of unit
- 2 Temperature gauge
- 3 Hourmeter (service hours)
- 4 Hourmeter (full load hours)
- 5 KAESER CONTROL
- 6 Start button
- 7 Stop button
- 8 Reset button

5.1 Malfunction

Safety system: KAESER CONTROL



- 1 Overload of motor (overload relay)
- 2 Excessive temperature
- 3 Airend - low pressure
- 4 Oil filter contamination
- 5 Oil separator contamination
- 6 Air inlet filter contamination

Figure 5

In case of malfunction (lights 1, 2 or 3) the compressor is shut down by:

- 1 Overload relay of the motor.
After having eliminated the trouble, push first the contact pin at the overload relay, then the reset button (figure 5). Now the compressor is ready for operation.
- 2 Thermostatic switch for final compression temperature will shut unit off when temperature reaches 212°F.
- 3 Pressure switch (No. 26, figure 2) at the air outlet port of the airend will shut down the unit if the direction of rotation is incorrect or the V-belts are broken or have slipped. This pressure switch is jumped during the WYE-time.

Maintenance requirements are monitored by indicating lights 4, 5 and 6 with warning functions only.

- 4 Differential pressure switch (No. 28, figure 2) indicates oil filter contamination.
- 5 Differential pressure switch (No. 27, figure 2) indicates oil separator contamination.
- 6 Vacuum switch (No. 29, figure 2) indicates air inlet filter contamination.

Watch and check indicating lights 4 and 5 after unit has been running for a minimum of 5 to 10 minutes from start-up. Warning light 6 will stay on until cartridge is cleaned.

During any one of the above malfunctions, the reset button red light will come on. To restart unit, press reset and "ON" buttons.

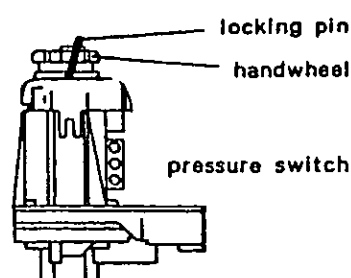
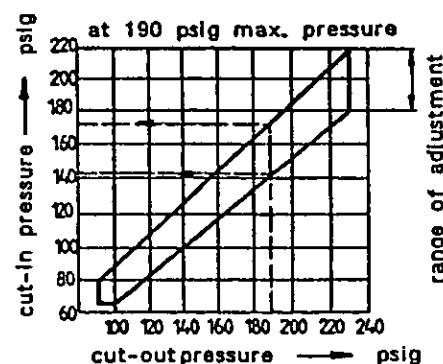
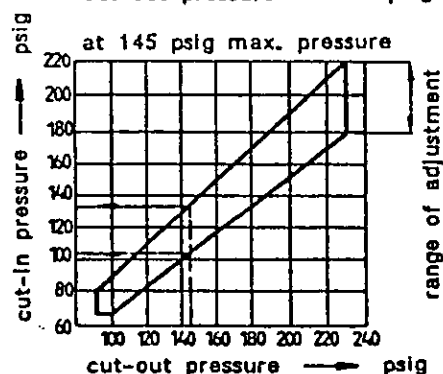
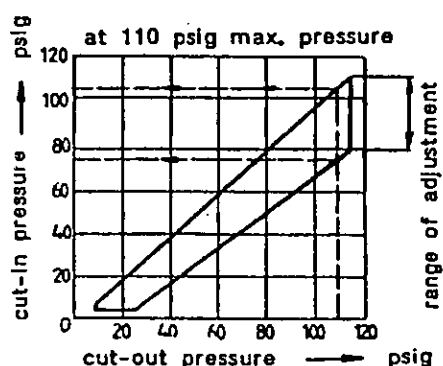
To check whether the warning lights are working, press reset button. All lights should come on.

5.2 Idle time adjustment

The time delay relay for idling time is located in the control box (time 0.5-10 minutes). The idling phase should be set in such a way that the maximum permissible cutting in frequency of the motor is not exceeded.

| Model | Cutting in frequency (per h) | | Model | Cutting in frequency (per h) | |
|-------|------------------------------|-------|--------|------------------------------|-------|
| | IP 23 | IP 44 | | IP 23 | IP 44 |
| BS 44 | 15 | 8 | CS 75 | 15 | 15 |
| BS 50 | 30 | 15 | CS 90 | 15 | 8 |
| BS 60 | 15 | 15 | CS 120 | 8 | 8 |

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

Pressure adjustment can only be carried out at the mounted pressure switch when the air tank is under pressure.

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 (stop button and main disconnect switch). After each readjustment at pressure switch, place cover on pressure switch before switching on the compressor.

6. MAINTENANCE SCHEDULE

Always follow maintenance instructions:

- Before performing any maintenance on the unit, cut off 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.
- After switching on main disconnect switch, start unit by pushing start button.
- In case of power failure or cutoff at main disconnect switch, restart unit manually by pushing the start button.
- The socket to vent the tank is placed in a plastic bag inside the control box. It is used for maintenance work, such as oil refill, oil and filter change.

6.1 Air inlet filter

Clean the air inlet filter, when the warning light 6 of KAESER CONTROL (figure 5) comes on.

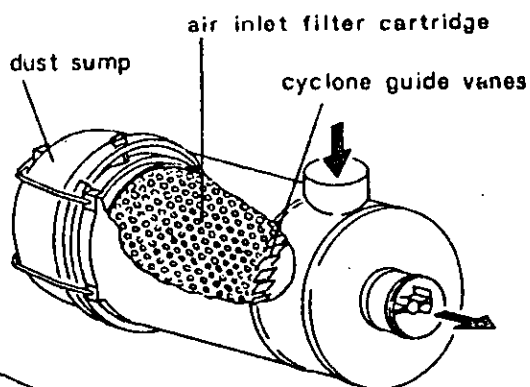


Figure 10

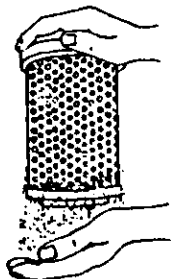


Figure 11

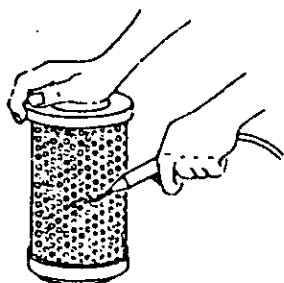


Figure 12



Figure 13

Shut off the compressor (stop button and main disconnect switch).

Opening of the filter housing (figure 10):

Remove and empty dust container.

Important: Make sure dust container is reassembled correctly.

Cleaning by tapping off the dust (figure 11):

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 12):

Blow dry compressed air (no higher than 70 psig) slanted against the paper pleats. Then blow clean the inside of the cartridge thoroughly.

Cleaning by rinsing (in case of oily dust):

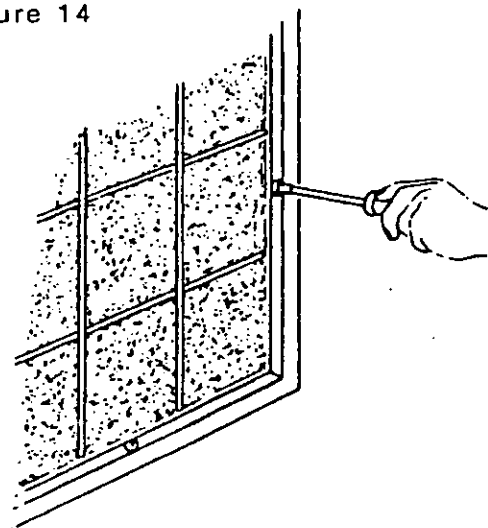
Add industrial solvent to lukewarm water and agitate cartridge. Rinse thoroughly in clean water, shake and dry (figure 13). Never use gasoline, lye solutions or hot fluids.

Replace cartridge after several 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 14



- Shut off the compressor (stop button and main disconnect switch).
- Remove cover frame with a screwdriver. To mount, turn screws 90° (figure 14).
- Cleaning:
Rinse the mat in water of approx. 100°F with some fine washing detergent. Cleaning can also be done by tapping, vacuuming, or blowing the dust off with compressed air. With oily dust, rinse the mat in safety solvent or warm water.
- If mat is excessively soiled, replace.

6.3 Oil filter

Replace the oil filter after the first 100 to 200 hours (depending on environment), thereafter every 2000 to 3000 service hours, or when warning light 4 of KAESER CONTROL comes on.

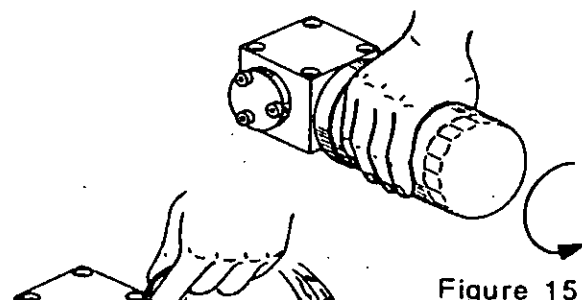


Figure 15

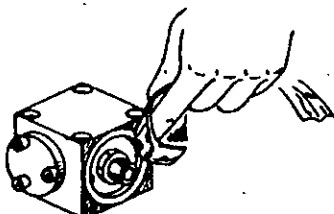


Figure 16

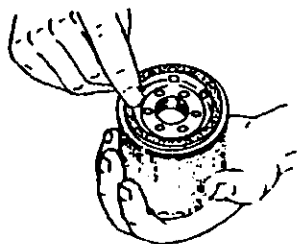


Figure 17

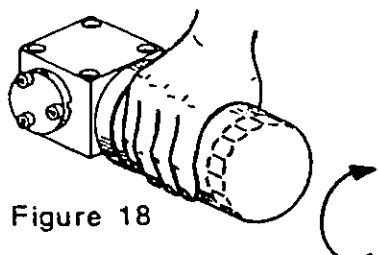


Figure 18

- Shut off the compressor (stop button and main disconnect switch).
- Place vent socket into hose coupling (1, figure 21) 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.
- Clean sealing surface at the filter head thoroughly with lint-free cloth.
- Lubricate the filter gasket lightly with oil.
- Screw in the new filter manually until the cartridge gasket fits tightly. Do not use any tools! Pour oil into the sump to normal level.

Important:

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

6.4 Oil separator

If the cartridge is contaminated (indicated by warning light 5 of KAESER CONTROL), replace. Start by pressing start button. The unit is ready for operation.

6.4.1 Filter replacement

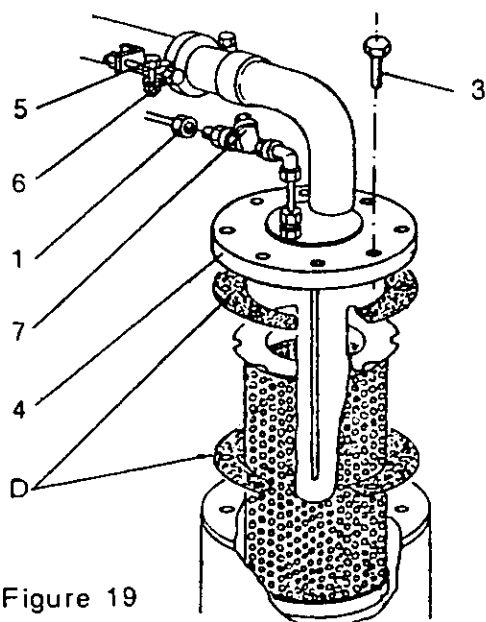


Figure 19

- Shut off the compressor (stop button and main disconnect switch).
- Open maintenance doors.
- Place vent socket into hose coupling at the tank (the tank loses its pressure), see 6.5.1.
- Loosen self-locking nuts 5 and 6 of the elastic pipe connection and remove bracket halves.
- Loosen pipe fittings (1), remove screws (3) and sump head (4).
- When changing the oil separating cartridge, unscrew and replace screen filter (7). This filter is mounted on the oil return line at the sump head.
- Replace the two gaskets (D). All the aforementioned components come with the spare oil separating cartridge.
- Assemble parts in reverse order.
- To install elastic pipe connection, please refer to 6.4.2.
- Remove the vent socket.

6.4.2 Mounting of the elastic pipe connection

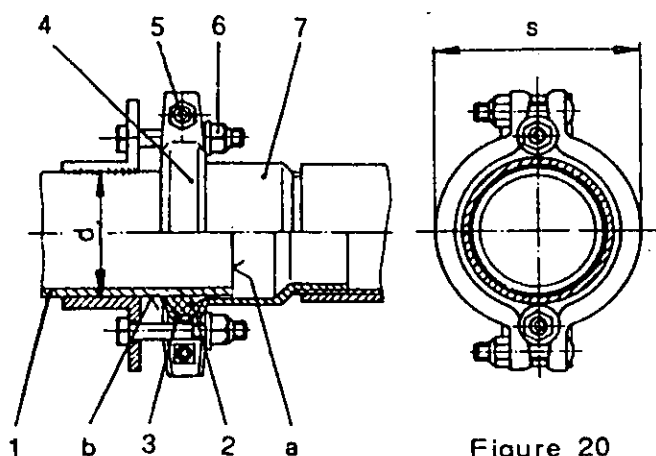


Figure 20








- Cutting edge "a" of pipe 1 has to be burr-free and surface "b" clean.
- Place cone ring holder 3 and cone ring 2 on pipe 1.
- Place pipe 1 into sleeve 7 without preliminary stress; push cone ring 2 with cone ring holder 3 up to the cone end of sleeve 7 (realign the pipe, if necessary).
- Place the bracket halves 4 on the cone ring holder and sleeve and tighten according to measurement "s". Measurement "s" is a recommended value and can fluctuate by approx. 2 %.
- Tighten locking screws so as to allow adjusting by hand when the unit is off. When the unit is operating at full load, all screws must be under equal load.

After the self-locking nuts 5 and 6 have been tightened and loosened several times they have to be replaced.

| Model | d | s | Order No. |
|-------|---------------|----------------|-----------|
| BS 44 | 1 3/8 (1.38) | 2 21/32 (2.66) | 5.1390.0 |
| BS | 1 29/32 (1.9) | 3 1/32 (3.22) | 5.1391.0 |
| CS | 2 3/8 (2.38) | 3 23/32 (3.72) | 5.1392.0 |

Dimensions in inches

6.5 Compressor oil specifications

| | |
|---|---|
|  | ENERGOL THB 46 ENERGOL HLP 46 |
|  | HYSPIN AWS 46 |
|  | OC TURBINE OIL 46 CALTEX REGAL OIL R+O |
|  | NUTO H 46 |
|  | D.T.E OIL MEDIUM |
|  | ROTELLA 10 W* X 100 Motoroil 10 W |
|  | RANDO OIL HD 46 |

02.25.85

The oil used for cooling the screw compressor during operation must have the following properties:

- high aging resistance
- high dispersive power
- low emulsifiability
- minimum capacity for forming foam

Basic oil: solvent raffinate
 Hydraulic or turbine oil: viscosity class VG 46
 Viscosity at 104°F: approx. 42-50 cSt
 (200-230 SU sec)

Flash point, surface temperature: above 392°F
 Pour point: at least 18°F below low ambient temperature

To ensure trouble-free operation, use only one of the oil types listed on the left. These oil types are of comparable quality and can be purchased from the listed oil companies or service stations.

The order in which the oils are listed is not indicative of or related to the quality of the oils.

The oil companies reserve the right to change the names of the oil designations!

*The oil sort "Rotella X 10 W" is mixable with the filled in oil sort "Shell comptella oil 46" respectively "Shell oil S. 9159"

6.5.1 Adding of oil

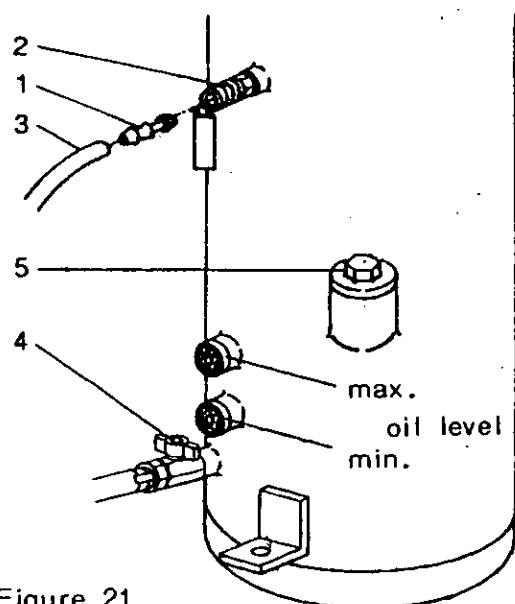


Figure 21

Check oil level daily at the oil sight glass.

Always shut compressor off when checking the oil. 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.

- Shut off the compressor (stop button and main disconnect switch).
- Open maintenance doors.
- Place vent socket (1) into coupling (2) at the tank (the tank loses its pressure).
- Loosen locking screw (5) at the filling vent.
- Pour oil in to the max. level.
- Check gasket and tighten locking screw (5).
- Remove vent socket (1) from coupling.

Important:

Always use the same make and type of oil. (indicated on the oil-air sump)

6.5.2. Oil change

The oil must be changed approx. every 2000 to 3000 service hours depending on contamination of inlet air.

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 hours.

Important: Drain all oil from the oil/air sump, cooler and lines.

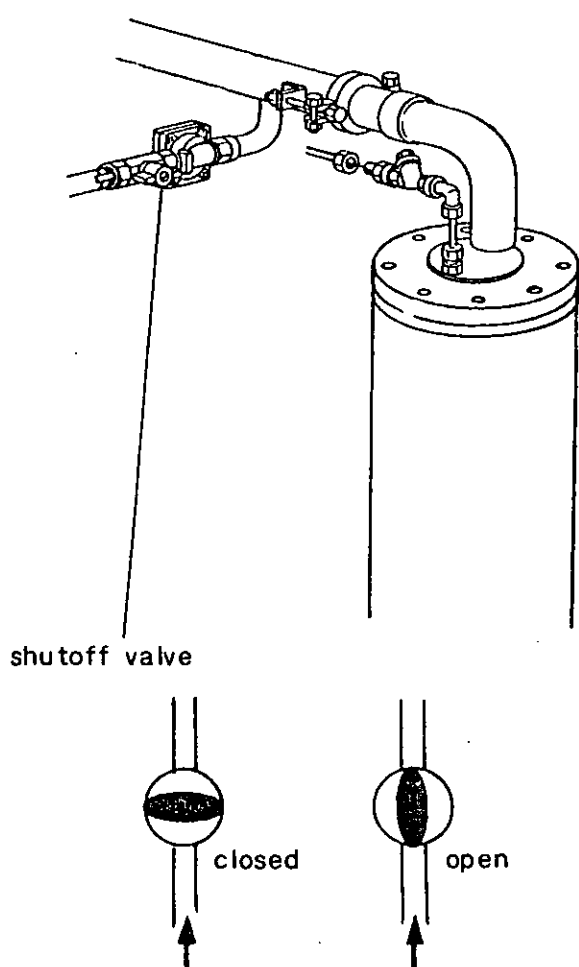


Figure 22

Important:

For restart procedure please refer to instructions on page 7a.

| Model | Oil charge |
|----------|-----------------------|
| BS | approx. 9 1/4 US Gal |
| CS 75/90 | approx. 16 US Gal |
| CS 120 | approx. 18 1/2 US Gal |

Oil change with pressure produced by another source:

- Shut off the compressor (stop button and main disconnect switch).
- Open maintenance doors.
- Close shutoff valve.
- Hook hose (3, figure 21) of other pressure source to socket (1, figure 21) onto tank and pressure feed.
- Remove hose with socket (the tank should have a pressure of approx. 30 psig).
- Slowly open tank drain valve (4, figure 21). The pressure remaining in the tank will cause the oil to flow.
- After discharging air tank, slowly open the cooler drain plug (the oil will drain without pressure).
- Close drain valve and drain plug.
- Open shutoff valve.
- Oil adding see item 6.5 and 6.5.1.

Oil change with pressure produced by the compressor:

- Shut off the compressor (stop button and main disconnect switch).
- Open maintenance doors.
- Close shutoff valve.
- Let compressor run for about half a minute.
- Shut compressor off (stop button and main disconnect switch).
- Slowly open tank drain valve (4, figure 21). The pressure remaining in the tank will cause the oil to flow.
- After discharging air tank, slowly open the cooler drain plug (the oil will drain without pressure).
- Close drain valve and drain plug.
- Open shutoff valve at the tank cover.
- Oil adding see item 6.5 and 6.5.1.

6.5.3 Synthetic Oils

The following synthetic oil brands have been approved for use in KAESER screw compressors:

| Manufacturer | Brand Name |
|--------------|-------------|
| Nuodex | Anderol 497 |
| Keystone | KSL 220 |

Also any other brand with the same specifications. Consult KAESER COMPRESSORS for brands not listed.

Two important requirements are:

| | |
|-----------------------------|-----------------|
| Viscosity at 175° F: | 10-12 cSt |
| Foaming Test ASTM D 892-74: | Sequenz II 20/0 |

Extra care must be taken when changing from mineral oil use to synthetic oil or when changing oil brands. Make sure that all oil in the separator tank, oil lines, oil cooler and airend has been drained.

When switching from mineral oil to a synthetic oil it is recommended that the first change of synthetic oil be replaced after 100 h of operation, along with the oil filter. This is because the synthetic oil will act as a solvent and remove deposits left by the mineral oil. Once the compressor is free of deposits, follow the recommended oil and filter change interval.

Also, 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 | Neoprene |
| High Nitrile Buna N | SBR Rubber |
| Teflon | Low Nitrile Buna N |
| Epoxy Paint | Acrylic Paint |
| Oil-resistant Alkyd | Lacquer |
| Nylon | Polystyrene |
| Delrin | PVC |
| Celcon | ABS |

Consult KAESER COMPRESSORS, INC. for details or materials not listed.

Caution: synthetic oils are not compatible with polycarbonate bowls. Any such bowls in the compressed air system should be covered with metal bowl guards or replaced with metal bowls.

6.6 Temperature gauge and high temperature switch

When final compression temperature reaches 230° F, the compressor shuts off and warning light 2 (excessive temperature) on the KAESER CONTROL (Figure 5) 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 filter mat

To restart, press reset (8) and start (6) buttons (Figure 4).
 The compressor is back in operation.

6.7 Motor lubrication

Models BS 44 up to CS 90:

The standard motors have life-time grease lubrication.
 Under normal working conditions (ambient temperature 40° F), carry out maintenance of the motor bearings according to the following chart.
 After the indicated working hours, demount motor bearings, rinse them and fill the void spaces with new grease.

Model CS 120:

The standard motors are equipped with relubrication system.
 Under normal working conditions (ambient temperature 40° F), carry out relubrication of the motor bearings according to the following chart.
 After the indicated working hours, relubricate motor bearings with the indicated amount of grease.

| Model | Lubrication interval operating hours | Amount of grease ounce |
|--------|---|---------------------------|
| BS 44 | 16 000 | - |
| BS 50 | 32 000 | - |
| BS 60 | 32 000 | - |
| CS 75 | 32 000 | - |
| CS 90 | 32 000 | - |
| CS 120 | 8 000 | 3/4 |

We recommend the following brands of lithium base grease:

BP Energrease LS 3
 Calypsol H 443
 Exxon Beacon 3
 Mobilux Grease 3
 Shell Alvania 3
 SKF Waelzerol FL

Under harder working conditions, i.e. strongly polluted intake air and ambient temperature of the unit, approx. 105° F, lubrication interval is half as long.

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

6.8 V-belt tension

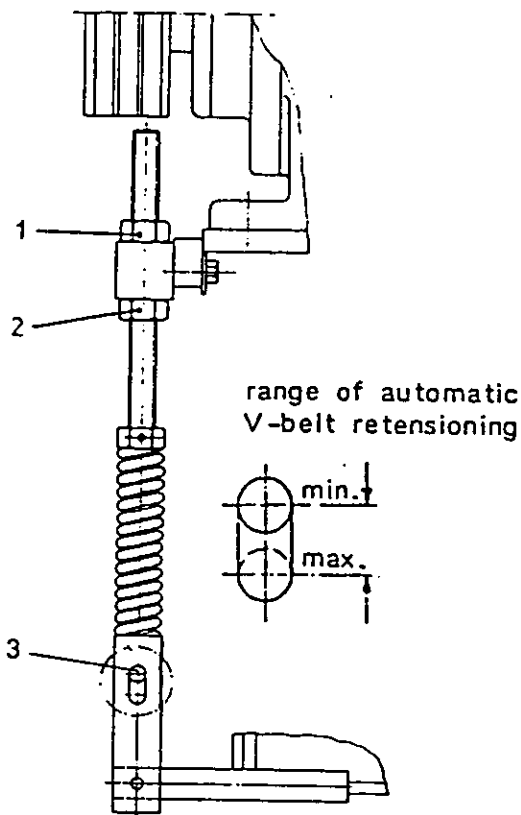


Figure 23

6.8.1 V-belt changing

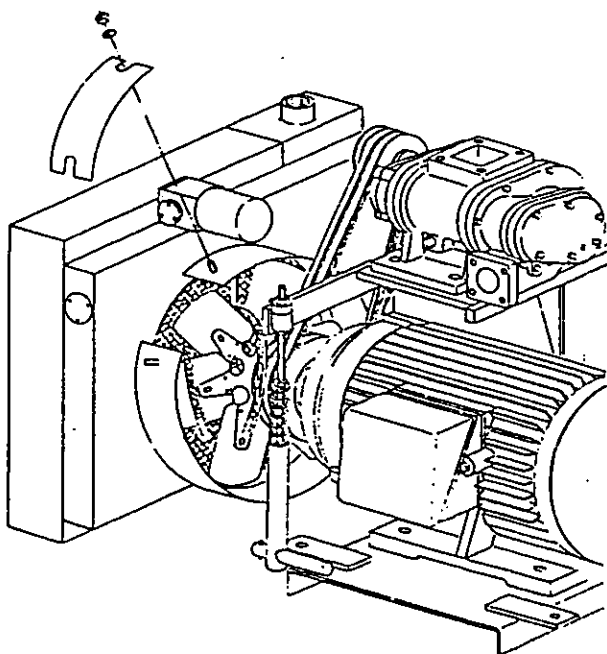


Figure 24

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 (stop button 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.

- Shut off the compressor (stop button and main disconnect switch).
- Open left maintenance door.
- Unscrew and remove covering plate from fan frame.
- Place V-belt first over the free-standing fan blade, then turn fan and move belt over the other blades.
- Turn adjusting hex nut (2, Figure 23) at the swing support downwards.
- Slip V-belt over motor and compressor pulleys.
- Tension V-belt. (see section 6.8.)
- Fasten covering plate on the frame.
- Close maintenance door.
- Check V-belt tension after approx. 2 and 24 operating hours.

Important:

Spare V-belts must be marked SPZ and be 100 % oil resistant.

6.9 Checking the oil cooler and air aftercooler

Contamination of the cooler can be checked through an inspection hole. Its location is indicated on figure 25.

Check cooler at least every 1000 operating hours.

Clean cooler

- Remove covering plates A and open the left and the upper maintenance doors.
- Unscrew air pipes B and C, valve combination D and control line E from the cooler.
- Loosen screws F and swivel the cooler outwards.
- If cooler is contaminated, blow clean cooling fins with compressed air from inside or spray with water.
- Reassemble parts in reverse order.

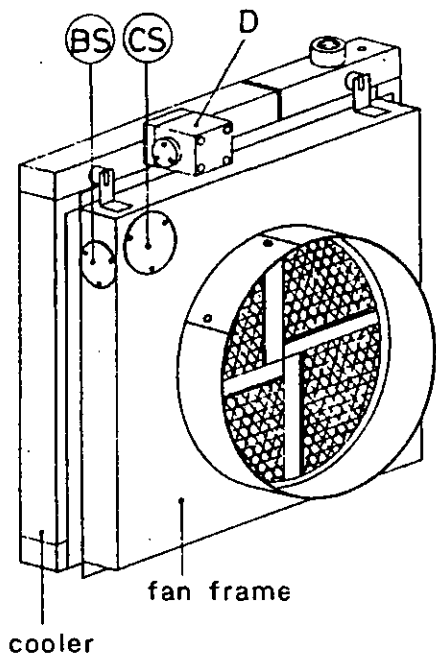


Figure 25

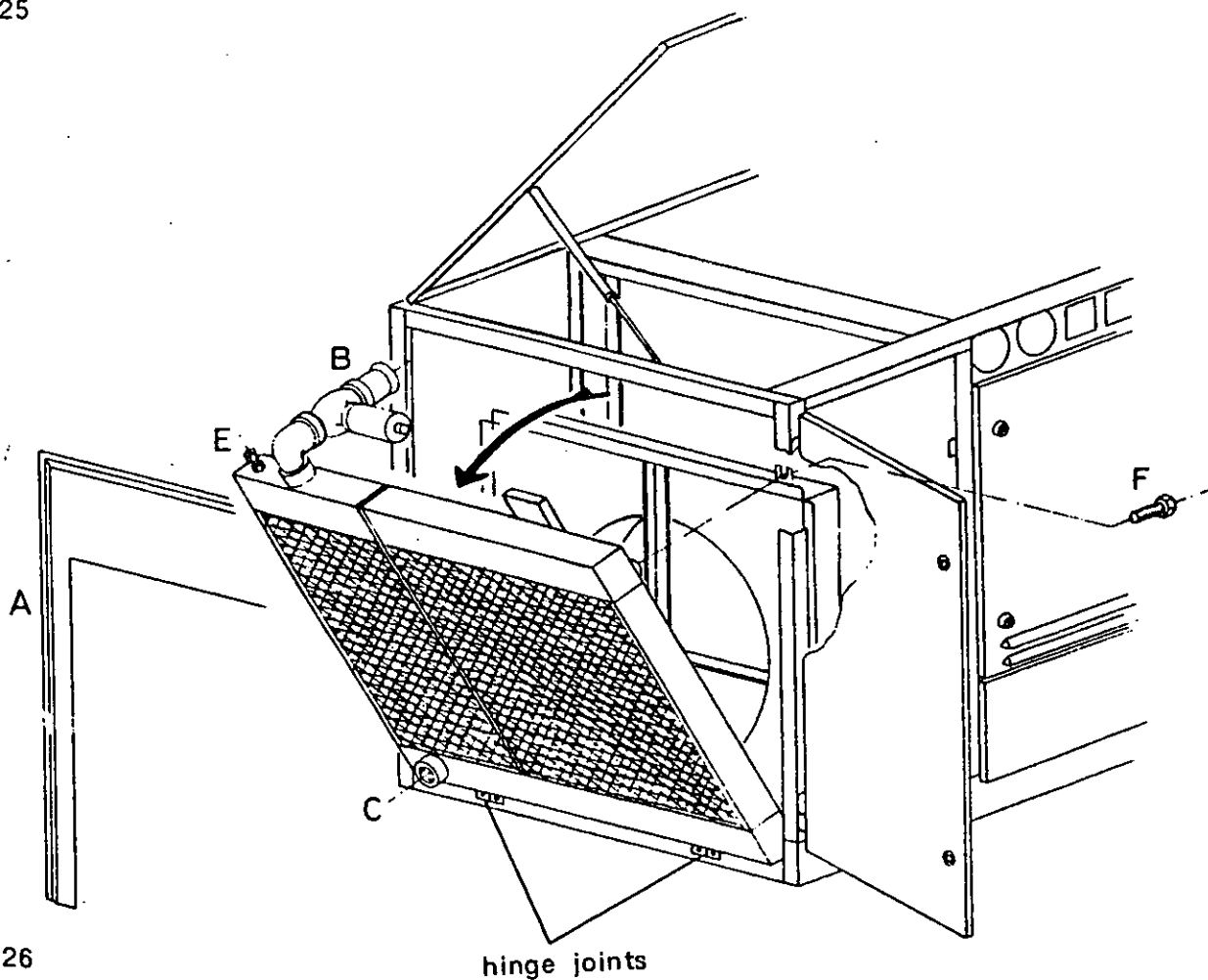


Figure 26

6.10 Spare parts list

Maintenance parts

| Model | Maximum pressure psig | V-belt | | Oil filter cartridge Order No. | Oil separation cartridge compl. set Order No. | Air inlet filter cartridge Order No. | Filter mat Order No. |
|--------|--------------------------|--------|------------------------|-----------------------------------|---|---|-------------------------|
| | | pcs. | compl.set Order No. | | | | |
| BS 44 | 110 | 4 | 6.2540.0 | 6.1981.0 | 6.2012.0 | 6.1996.0 | 6.1938.0 |
| | 145 | 4 | 6.2540.0 | | | | |
| | 190 | 4 | 6.2540.0 | | | | |
| BS 50 | 110 | 6 | 6.1434.0 | 6.1981.0 | 6.2012.0 | 6.1996.0 | 6.1938.0 |
| | 145 | 6 | 6.2533.0 | | | | |
| | 190 | 6 | 6.2542.0 | | | | |
| BS 60 | 110 | 6 | 6.2532.0 | 6.1981.0 | 6.2012.0 | 6.1996.0 | 6.1938.0 |
| | 145 | 6 | 6.1434.0 | | | | |
| | 190 | 6 | 6.2533.0 | | | | |
| CS 75 | 110 | 9 | 6.1432.0 | 6.1981.0 | 6.2013.0 | 6.1997.0 | 6.1945.0 |
| | 145 | 9 | 6.2521.0 | | | | |
| | 190 | 9 | 6.2522.0 | | | | |
| CS 90 | 110 | 9 | 6.2529.0 | 6.1981.0 | 6.2013.0 | 6.1997.0 | 6.1945.0 |
| | 145 | 9 | 6.1432.0 | | | | |
| | 190 | 9 | 6.2521.0 | | | | |
| CS 120 | 110 | 9 | 6.2529.0 | 6.1981.0 | 6.2013.0 | 6.1997.0 | 6.1945.0 |
| | 145 | 9 | 6.1432.0 | | | | |
| | 190 | 9 | 6.1432.0 | | | | |

Hoses

| Model | Hose line Vent line Order No. | Hose line Oil stop valve Order No. |
|----------|-------------------------------------|--|
| BS | 8.0864.0 | 8.1139.0 |
| CS 75/90 | 8.0806.0 | 8.1138.0 |
| CS 120 | 8.0806.0 | 8.1100.0 |

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

Important:

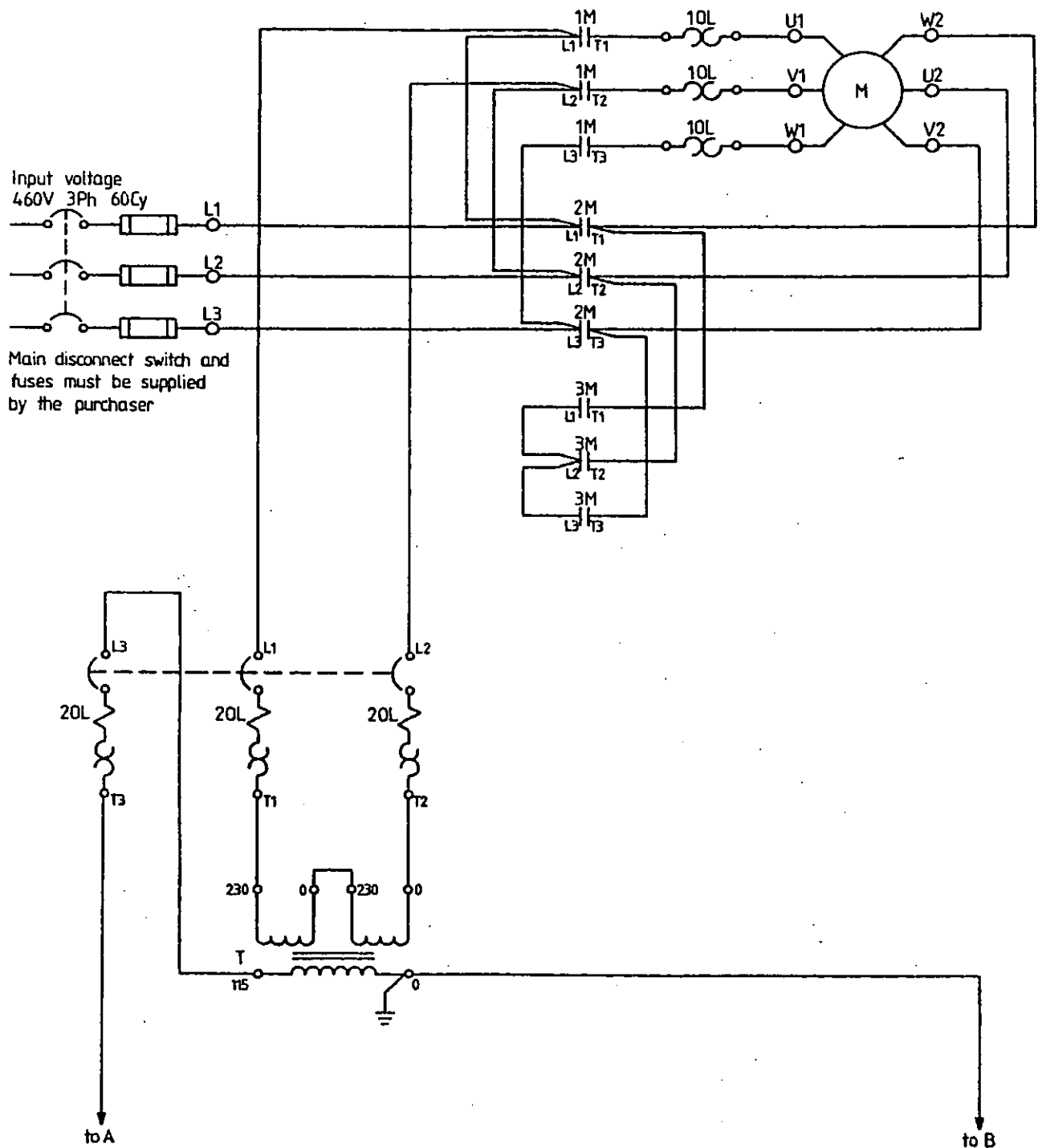
Order KAESER genuine factory-tested replacement parts only !!

6.11 Maintenance check list

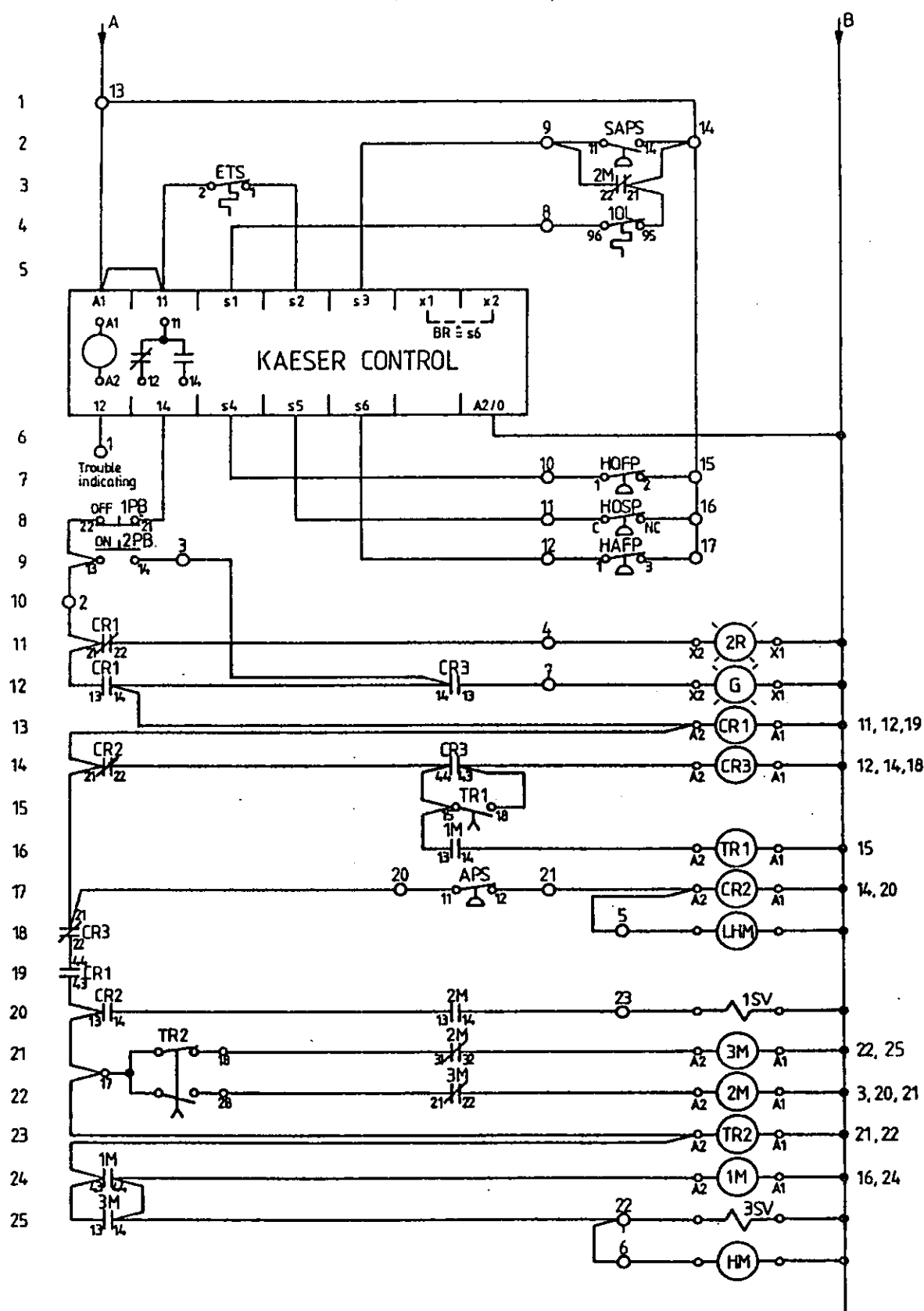
Record hours of operation and check maintenance work performed.
Record values where indicated.

[illegible]

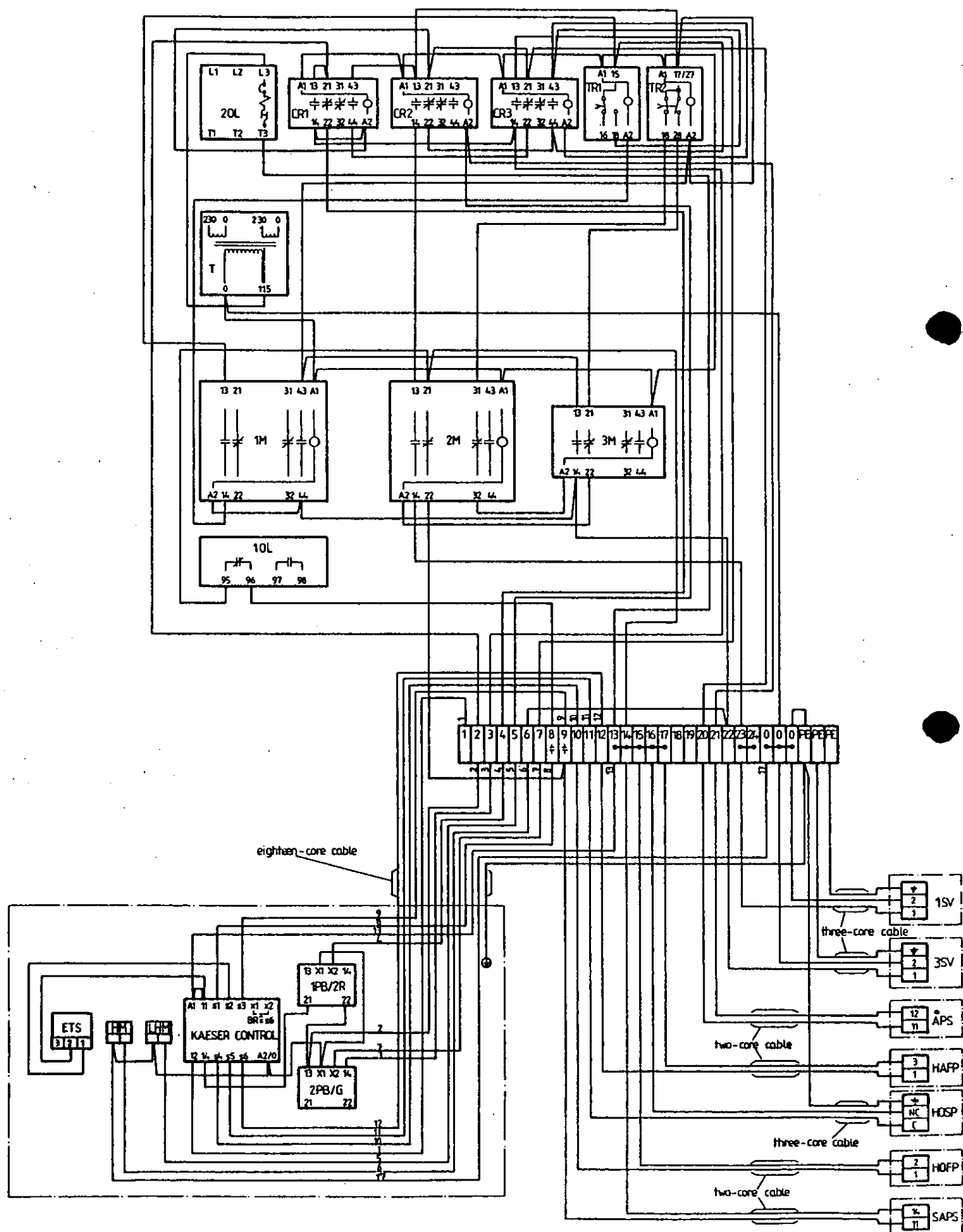
7. Wiring diagram for BS,CS, St 501.170 Page 1



7. Wiring diagram for BS,CS, St 501.170 Page 2



7. Wiring diagram for BS,CS, St 501.170 Page 3

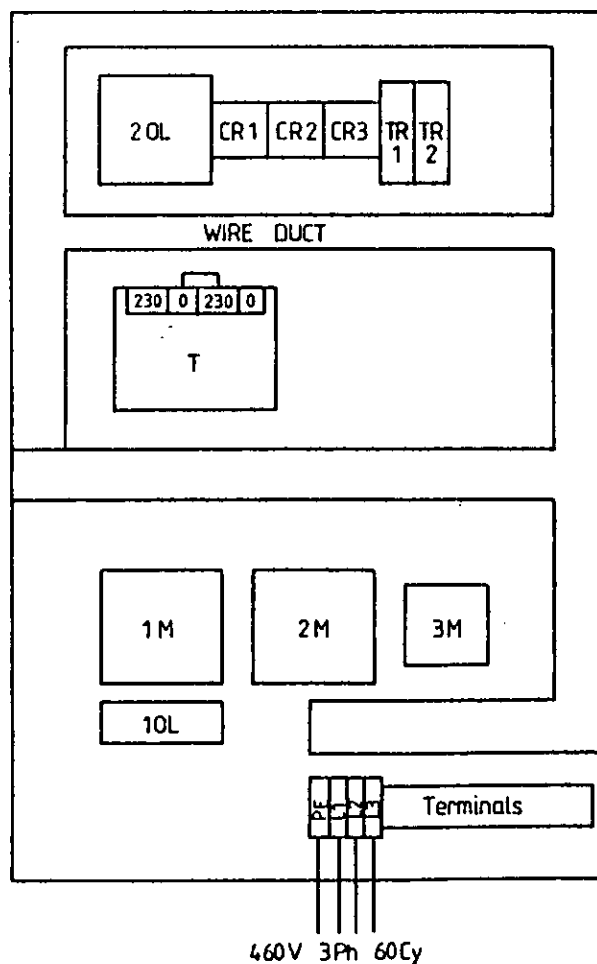


7. Wiring diagram for BS,CS, St 501.170 Page 4

1M Motor starter (main contactor)
 2M Motor starter (delta contactor)
 3M Motor starter (weye contactor)
 2OL Overload relay for transformer
 T Transformer
 M Motor
 APS Air pressure switch
 CR1/2/3 Control relay
 1SV Solenoid valve (controls inlet valve /
 discharge valve)
 3SV Solenoid valve (oil stop)
 TR1 Time delay relay (delay ~ off)
 TR2 Time delay relay (weye time)
 1PB Push button "off"
 2PB Push button "on"
 G Indicating light (green, ready for operation)
 1R Indicating light (red, off)
 HM Hour meter
 LHM Load hour meter

Malfunction Indicators:

| | |
|----------------------------------|----------------------|
| 1OL Overload relay for motor | } shutdown functions |
| ETS Excessive temperature switch | |
| SAPS Safety air pressure switch | |
| HOFP High oil filter pressure | } indicating lights |
| HOSP High oil separator pressure | |
| HAFP High air filter pressure | |



8. CHECKING THE SAFETY VALVE AT THE OIL-AIR SEPARATOR

To check the set maximum operating limit and the blow-off capacity, 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 | 175 psig |
| 190 psig | 210 psig |

* except Model CS 120: 175 psig

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

- Shut off the compressor (stop button and main disconnect switch).
- Close the shut off cock at the discharge line (Figure 22).
- Close the shut off cock downstream of the unit.
- Start the compressor and let it switch over to idling.
- While the discharge line is being closed the pressure can easily be checked as it is increased slowly up to the limit where the safety valve will react.
- Shut off the compressor and proceed in the reverse order.

9. AUTOMATIC CONDENSATE DRAIN (OPTIONAL)

The condensate collected in the air tank is drained automatically by a solenoid valve at regular intervals.

The solenoid valve is controlled by a time delay relay with timers at which the opening times of the solenoid valve can be preset from 0.4 to 10 seconds and the intervals from 1.5 to 30 minutes, depending on the amount of condensate.

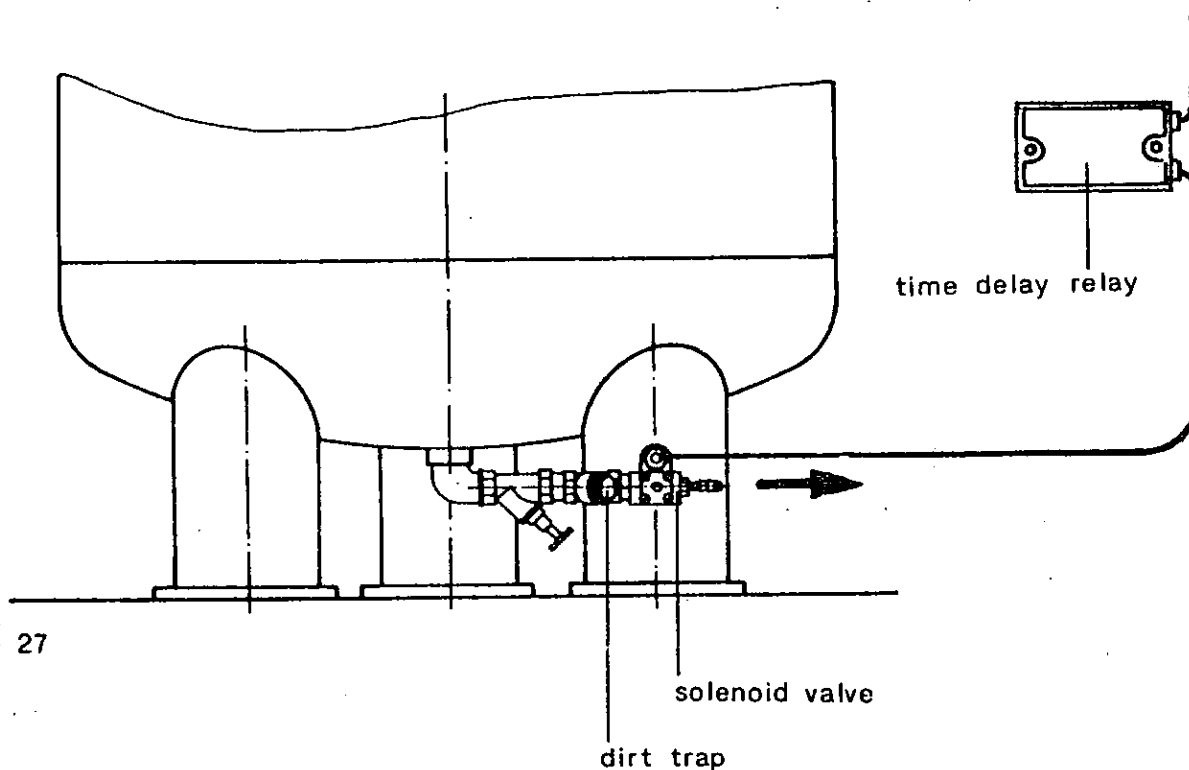


Figure 27

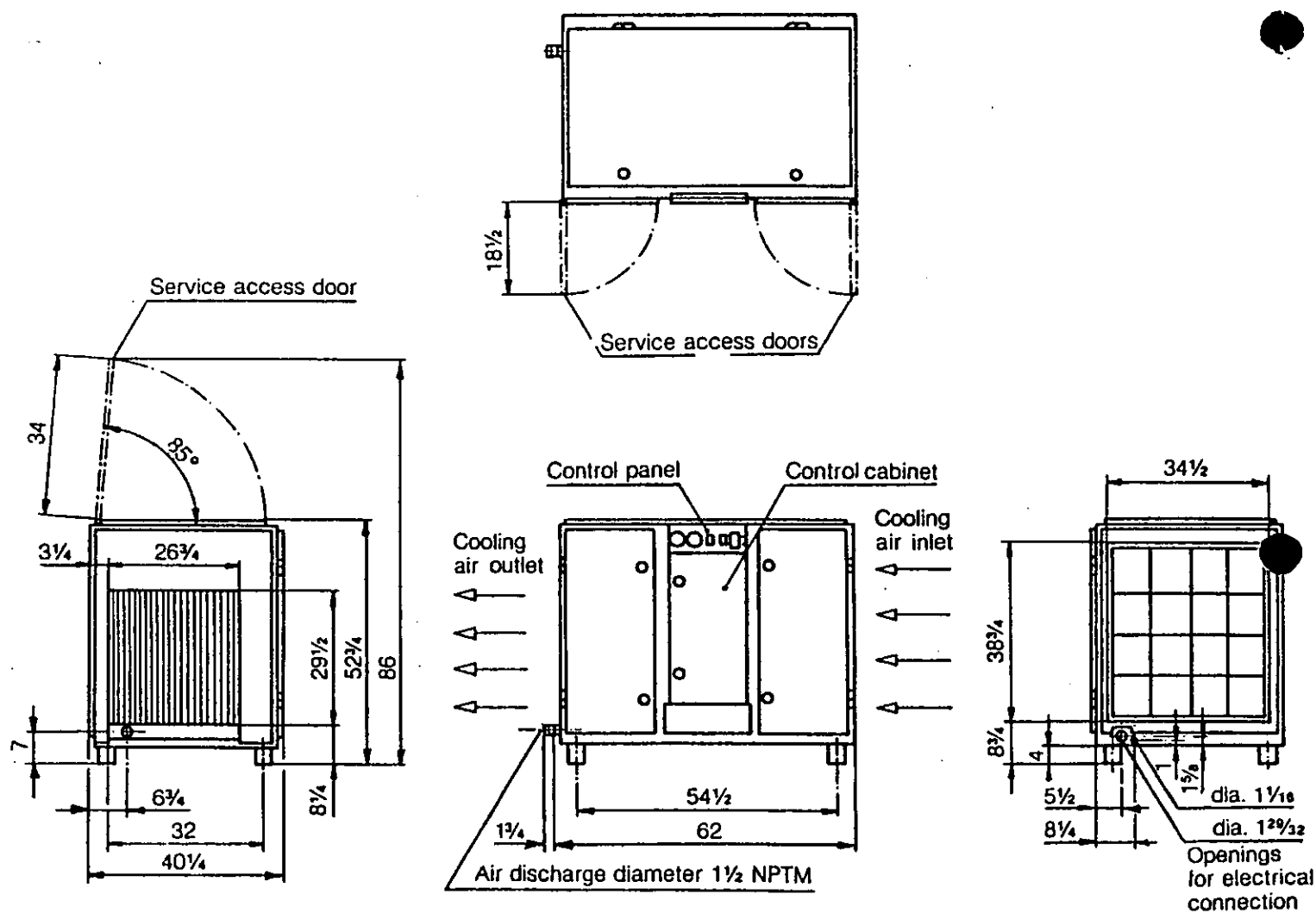
Install a dirt trap in front of the solenoid valve to catch larger dirt particles and thereby ensuring the solenoid valve's proper operation. Clean the strainer of the dirt trap at regular intervals.

Make sure the dirt trap and solenoid valve are properly installed in the direction of the arrow.

Connect a hose to the solenoid valve for the condensate to reach the sump.

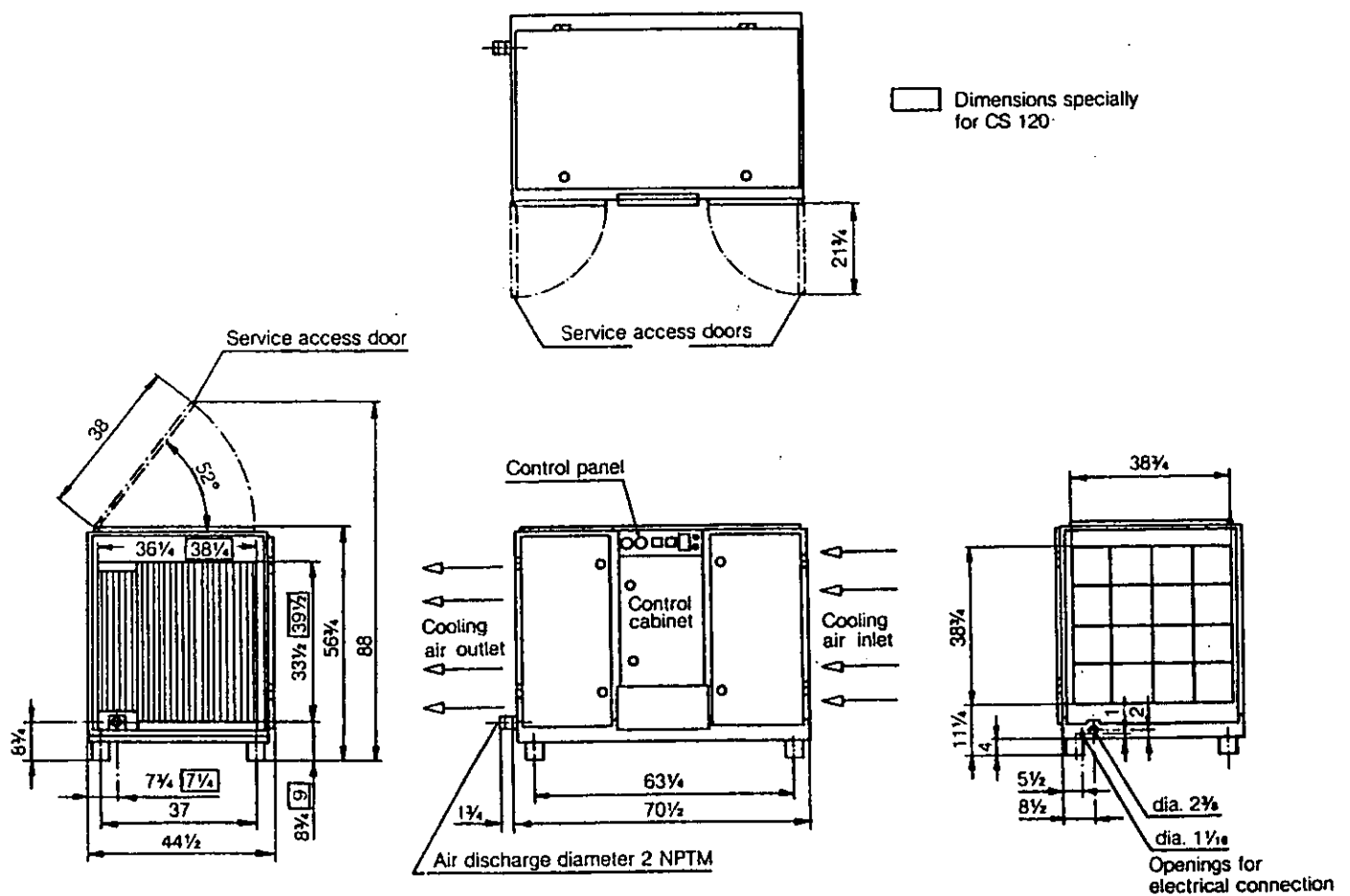
10. DIMENSIONAL DRAWING BS- air cooled with soundproofing casing

Dimensions in inches



11. DIMENSIONAL DRAWING CS - air cooled with soundproofing casing

Dimensions in inches



12. TRANSPORTATION INSTRUCTIONS

| Model | Weight |
|--------|-------------------|
| BS 44 | approx. 1520 lbs. |
| BS 50 | approx. 1850 lbs. |
| BS 60 | approx. 1940 lbs. |
| CS 75 | approx. 2490 lbs. |
| CS 90 | approx. 2600 lbs. |
| CS 120 | approx. 2930 lbs. |

Dimensions in inches

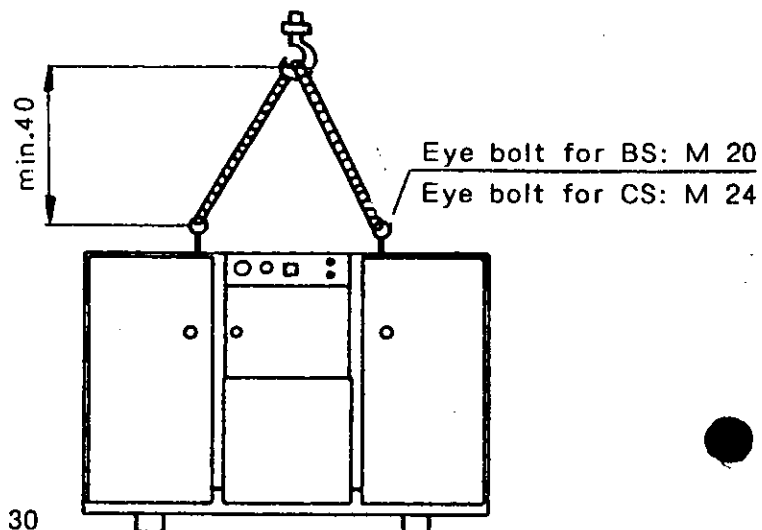


Figure 30

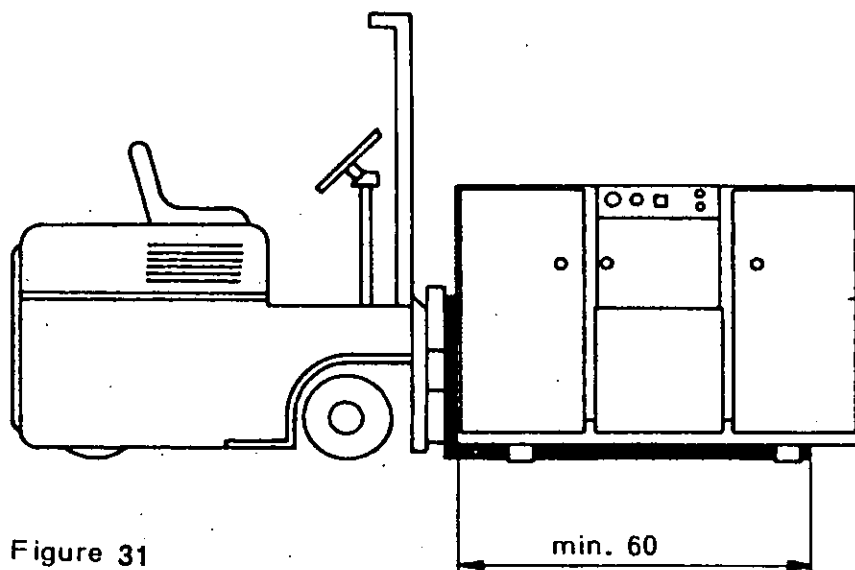


Figure 31

lift truck

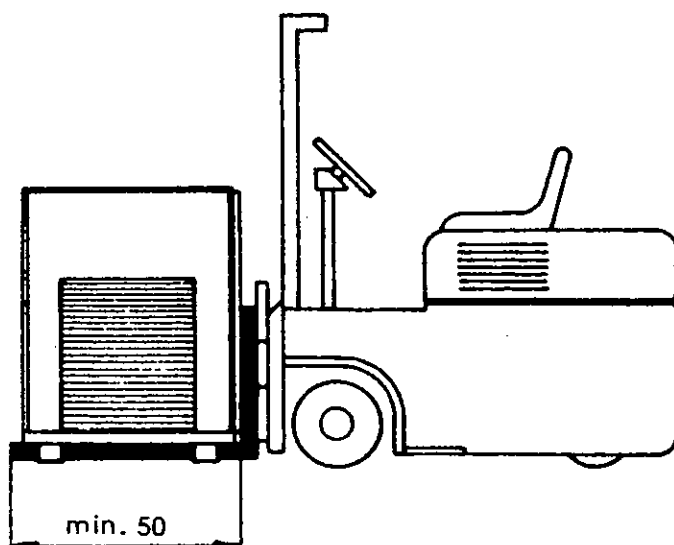
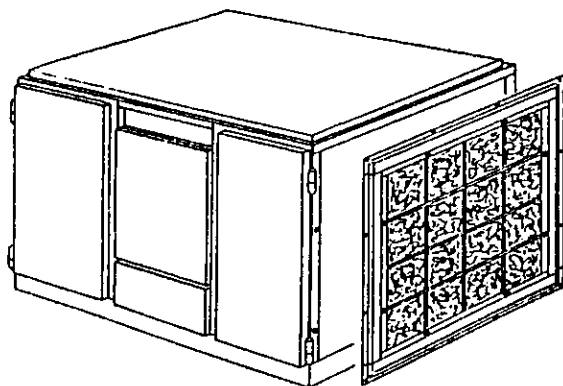


Figure 32

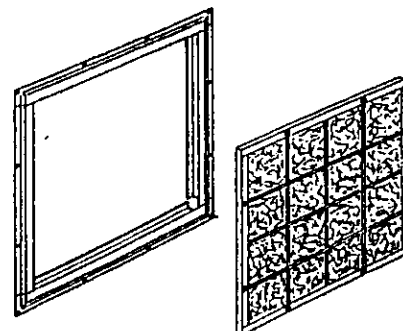
13. Conversion instructions for Screw Compressors Model BS/CS
from soundproofed to super soundproofed design

①



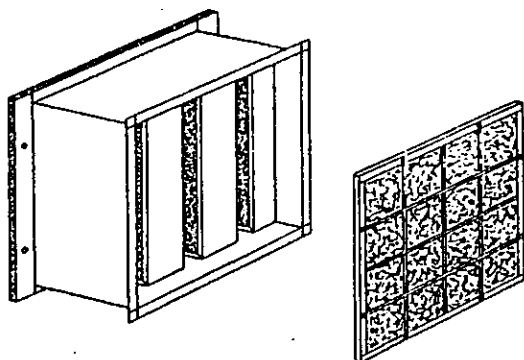
Demount the steel plate with filter frame at the right end

②



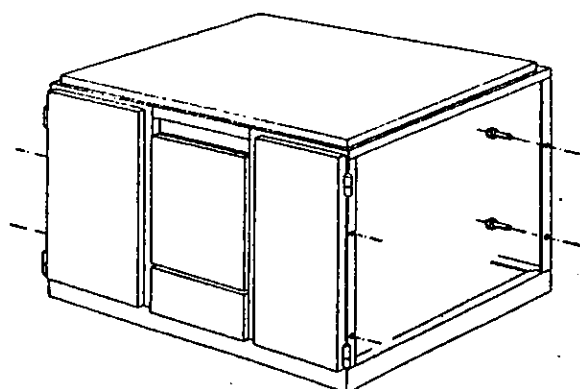
Screw the quick-changeable frame off the steel plate

③



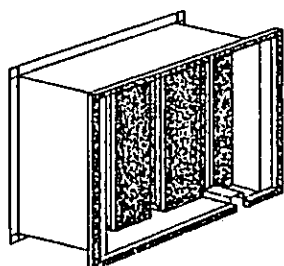
Screw the quick-changeable frame on silencing box

④

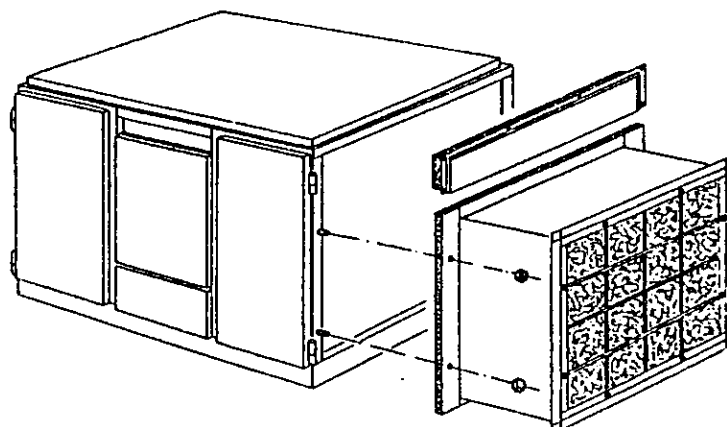


Fasten the screws in the threads of the supporting frame (at both ends of the unit)

⑤



Screw the extra plate (delivered with the other parts) on frame and now fasten the two boxes on both ends of the unit with hexagon nuts



BS 50
BS 60

- PARTS MANUAL
- RECOMMENDED
SPARE PARTS LIST

A 20

B 20

C 20

D 20

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SECTION 1

INTRODUCTION

1. FOREWORD

This manual is provided for the operator's use and reference when ordering parts. An illustrated parts breakdown is included for parts identification. All compressor parts meet the manufacturer's highest quality standards used in the manufacture of the original equipment.

2. DESCRIPTION

The parts breakdown lists every part, assembly and sub-assembly of the compressor unit. Each part is identified with a number. The location of and relationship between parts are clearly illustrated. Questions pertaining to the number, description and quantities needed for each assembly are dealt with in the following pages.

3. TO ORDER PARTS

When ordering parts, furnish the following information to prevent any error:

- Model designation and serial number of the unit as shown on compressor nameplate.
- Reference number, part number, description and quantity required as listed.

4. RECOMMENDED SPARE PARTS LIST

A recommended spare parts list is provided at the end of this manual. The list indicates the description, part number, the quantity used in the compressor, and minimum quantities which should be carried to ensure maximum protection of the compressor. The recommended spare parts inventory to be kept on hand varies according to the location of the nearest distributor, and is broken down as follows:

- A. Local distributor
- B. Nearby distributor
- C. Remote distributor.

5. CAUTION

NEVER use parts other than the ones approved by the manufacturer and listed in this parts manual. The use of parts not approved by the manufacturer may result in hazardous conditions, over which the manufacturer has no control, bodily injury, and damage to the compressor unit. Such action would invalidate the manufacturer's warranty of the compressor unit.

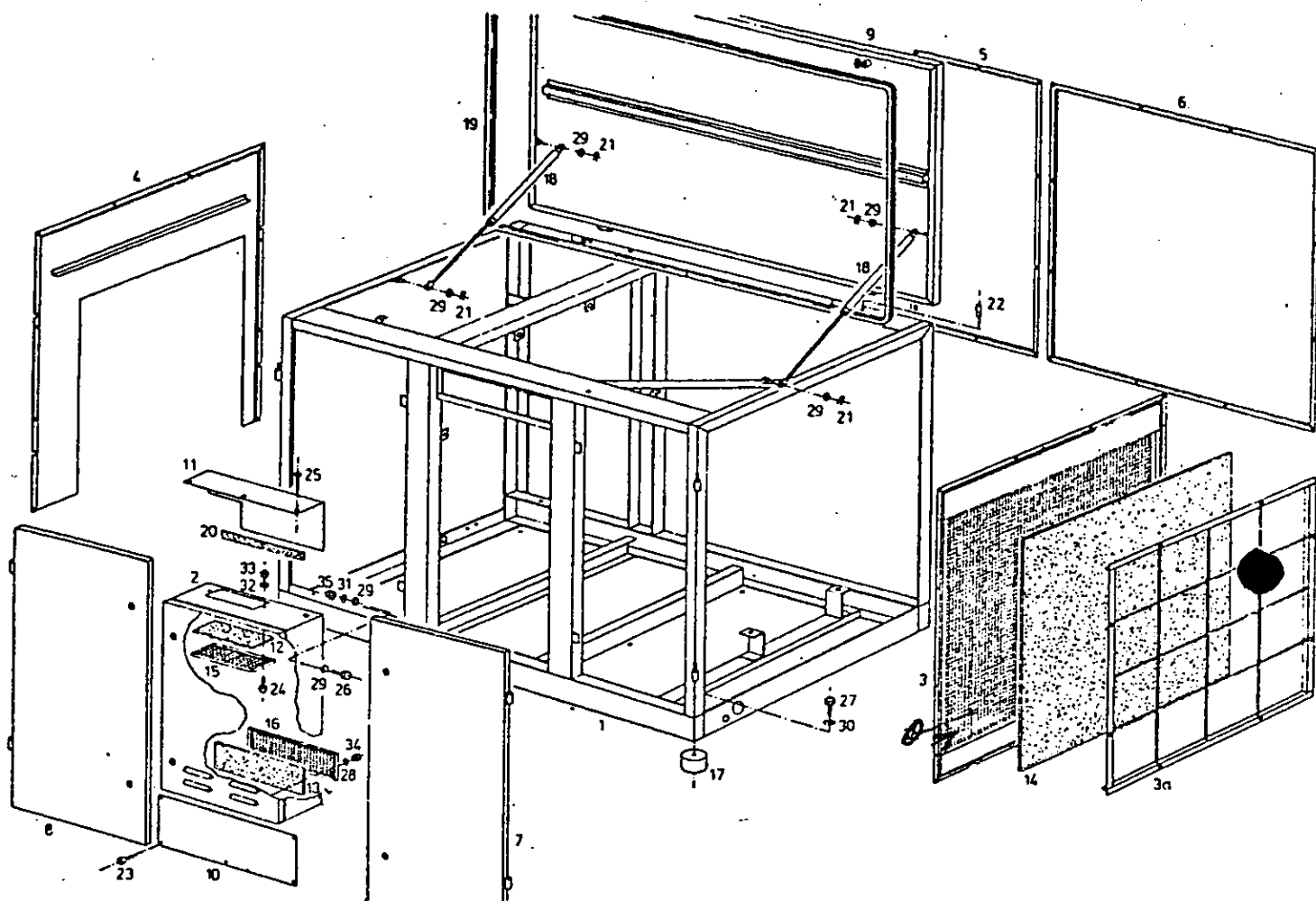
SECTION 2

PARTS LIST

| Title | Page No. |
|-------------------------------------|----------|
| Frame, Casing | 5 |
| Driving system | 6,7 |
| Oil tubes, Vent lines | 8 |
| Control tubes, Compressed air tubes | 9,10 |
| Vent valve | 11 |
| Inlet valve | 12 |
| Check valve | 13 |
| Minimum pressure check valve | 14 |
| Combination valve | 15 |

Frame, Casing

BS 50, BS 60 type



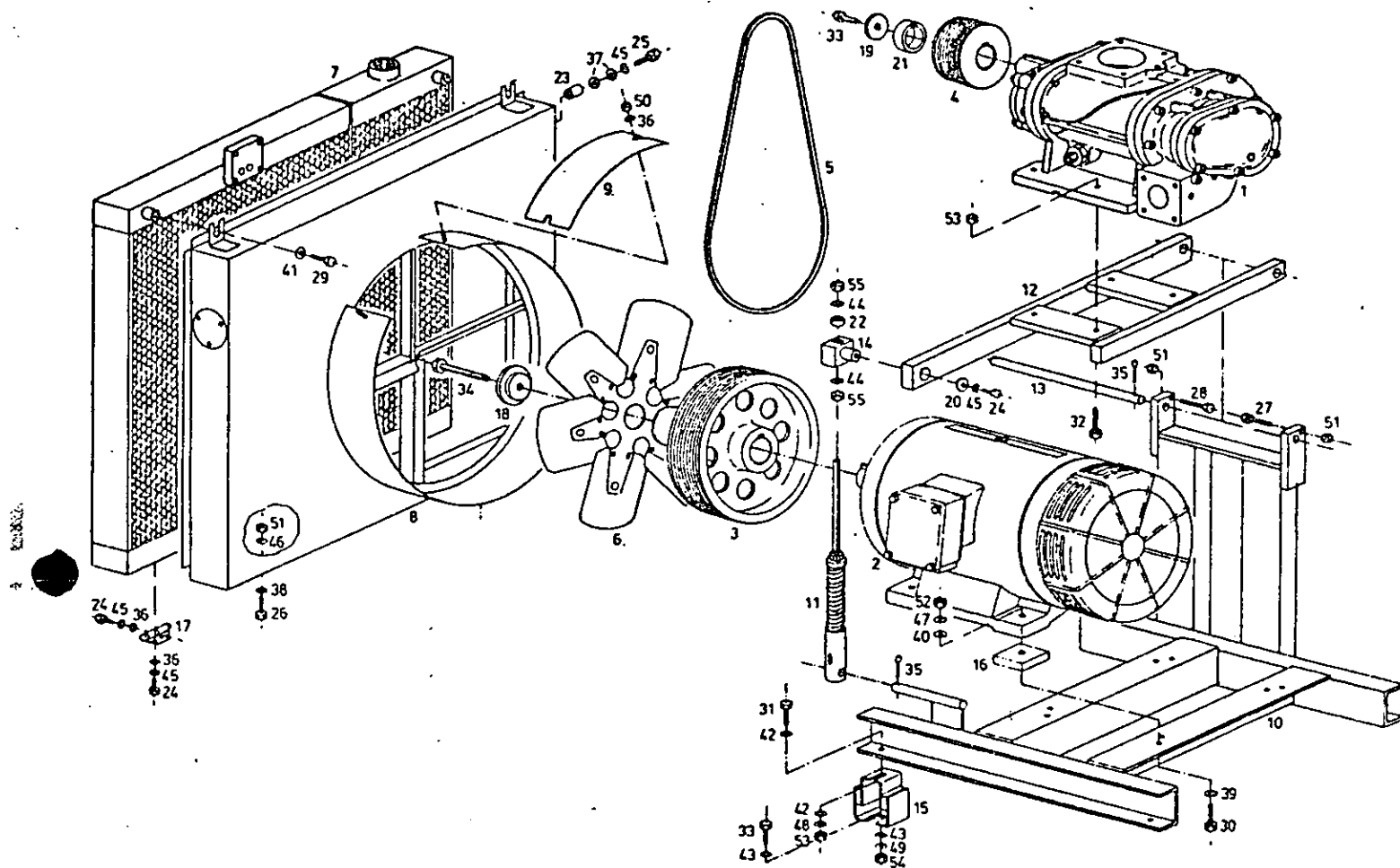
| Ref. | Qty | Part No | Description |
|------|-----|----------|---|
| 1 | 1 | 4.9320.0 | Frame |
| 1) 2 | 1 | 7.2305.0 | Controller |
| 2) 2 | 1 | 7.2306.0 | Controller |
| 3 | 1 | 4.9257.0 | Casing complete with 3a |
| 3a | 1 | 6.1937.0 | Quick-change frame |
| 4 | 1 | 4.7019.1 | Casing |
| 5 | 1 | 4.8324.0 | Casing |
| 6 | 1 | 4.8325.0 | Casing |
| 7 | 1 | 4.7071.1 | Door |
| 8 | 1 | 4.7072.1 | Door |
| 9 | 1 | 4.8323.0 | Door |
| 10 | 1 | 4.7070.1 | Cover sheet |
| 11 | 1 | 4.8305.0 | Cover plate |
| 12 | 1 | 4.7349.0 | Filter mat |
| 13 | 1 | 4.7347.0 | Filter mat |
| 14 | 1 | 6.1938.0 | Filter mat |
| 15 | 1 | 4.7348.0 | Covering grating |
| 16 | 1 | 4.7346.0 | Covering grating |
| 17 | 4 | 6.1347.0 | Anti-vibration pads dia. 3 15/16 x 3 15/16" |
| 18 | 2 | 5.1331.0 | Gas spring |
| 19 | 1 | 5.1398.0 | Gasket profile 185 " |
| 20 | 1 | 5.1408.0 | Froth rubber band 13 " |
| 21 | 4 | 5.1330.0 | Split pin |
| 22 | 1 | 6.2344.0 | Stud M 10 x 35 |
| 23 | 49 | 6.0916.0 | Philips head screw M 5 x 10 |
| 24 | 2 | 6.0901.0 | Philips head screw M 5 x 15 |
| 25 | 3 | 6.0986.0 | Sheet metal screw 3,5x9,5 |
| 26 | 4 | 6.0726.0 | Hex. hd. screw M 8 x 20 |
| 27 | 4 | 6.2203.0 | Hex. hd. screw M 16 x 20 |
| 28 | 2 | 6.0622.0 | Washer |
| 29 | 12 | 6.0623.0 | Washer |
| 30 | 4 | 6.0627.0 | Washer |

| Ref. | Qty | Part No | Description |
|------|-----|----------|---------------------|
| 31 | 4 | 6.0653.0 | Spring washer |
| 32 | 2 | 6.0660.0 | Toothed lock washer |
| 33 | 2 | 6.0681.0 | Hex. nut M 5 |
| 34 | 2 | 6.0682.0 | Hex. nut M 6 |
| 35 | 4 | 6.0684.0 | Hex. nut M 8 |

1) Compressor Unit BS 50
2) Compressor Unit BS 60

Driving system

BS 50, BS 60 type

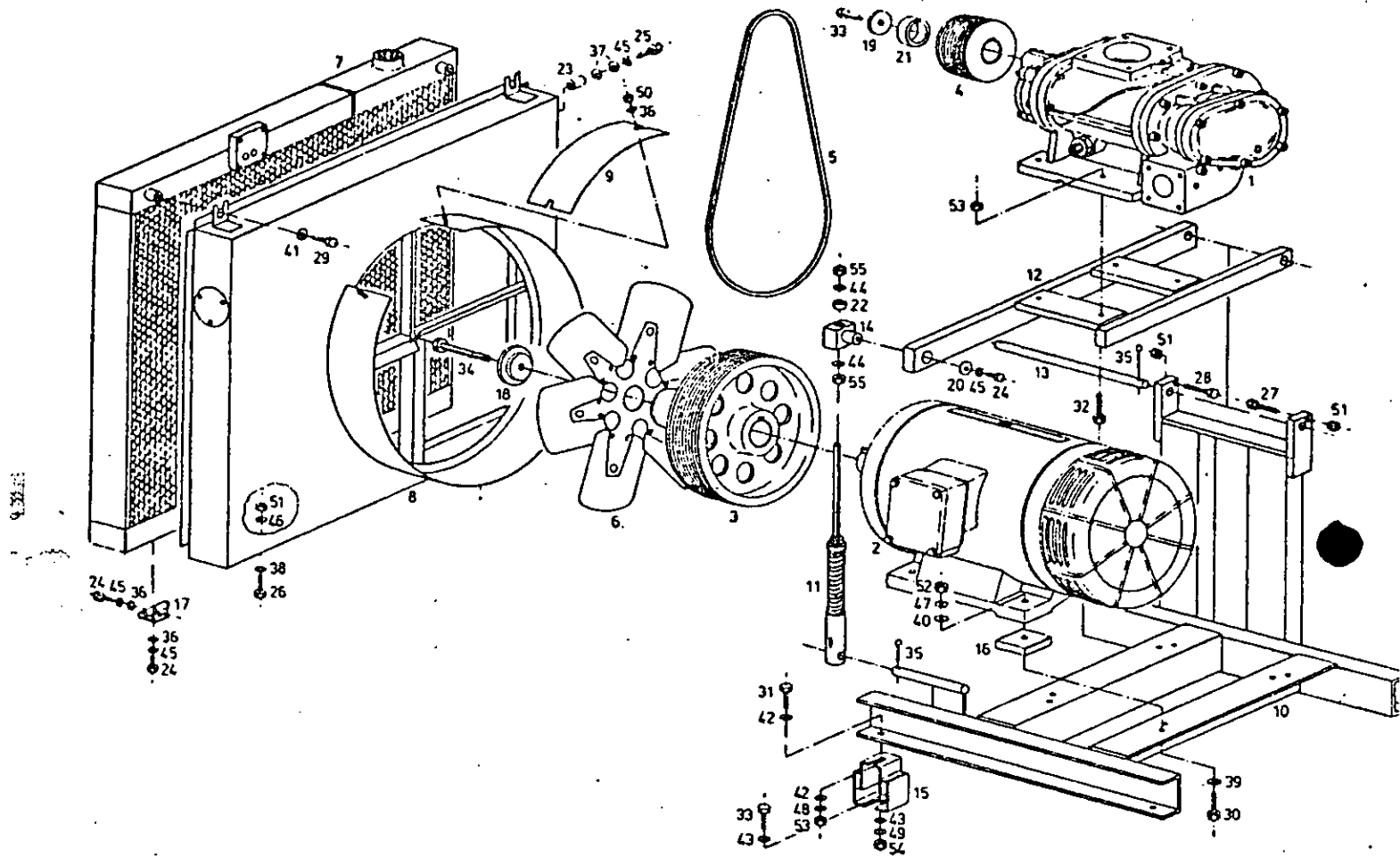


| Ref. | Qty | Part No | Description |
|------|-----|------------|----------------------------------|
| | 1 | 1.3851.3 | Screw compresso. Sigma 2 |
| 1-3) | 2 | 7.0940.0 | Motor 3-phase 30 kW, 230/460 V |
| 4-6) | 2 | 7.0941.0 | Motor 3-phase 37 kW, 230/460 V |
| 1-3) | 3 | 4.7283.1 | Motor pulley dia. 12 19/32" |
| 4-6) | 3 | 4.7284.1 | Motor pulley dia. 12 19/32" |
| 1) | 4 | 4.9876.0 | Compressor pulley dia. 8 3/16" |
| 2) | 4 | 4.9877.0 | Compressor pulley dia. 9 39/64" |
| 3) | 4 | 4.9878.0 | Compressor pulley dia. 11 17/64" |
| 4) | 4 | 4.9879.0 | Compressor pulley dia. 6 11/16" |
| 5) | 4 | 4.9880.0 | Compressor pulley dia. 7 43/64" |
| 6) | 4 | 4.9881.0 | Compressor pulley dia. 8 13/16" |
| 1) | 5 | 6.1434.0 | Set of v-belts |
| 2) | 5 | 6.2533.0 | Set of v-belts |
| 3) | 5 | 6.2542.0 | Set of v-belts |
| 4) | 5 | 6.2532.0 | Set of v-belts |
| 5) | 5 | 6.1434.0 | Set of v-belts |
| 6) | 5 | 6.2533.0 | Set of v-belts |
| 6) | 1 | 5.0684.0 | Fan wheel |
| 7) | 1 | 5.1074.3 | Cooler |
| 8) | 1 | 4.8328.0 | Fan case |
| 9) | 1 | Sk 1426.73 | Cover plate |
| 10) | 1 | 4.8327.1 | Swing frame |
| 11) | 1 | 4.7566.1 | Balance adjustment |
| 12) | 1 | 4.8326.0 | Whip |
| 13) | 1 | 4.7572.1 | Shaft |
| 14) | 1 | 4.8322.0 | Pivot bearing |
| 15) | 4 | 6.1329.0 | Base of the machine |
| 1-3) | 16 | 4.7593.0 | Steel plate |
| 17) | 2 | 4.7428.0 | Hinge |
| 18) | 1 | 4.7588.1 | Centering disk |
| 19) | 1 | 4.7592.0 | Disk |
| 20) | 1 | 5.0428.0 | Disk |

| Ref. | Qty | Part No | Description |
|---------|-----|----------|---------------------------|
| 21 | 1 | 4.7207.1 | Intermediate ring |
| 22 | 1 | 4.7225.0 | Intermediate ring |
| 23 | 1 | 4.8321.0 | Distance washer |
| 24 | 9 | 6.0725.0 | Hex. hd. screw M 8 x 15 |
| 25 | 1 | 6.0730.0 | Hex. hd. screw M 8 x 40 |
| 26 | 2 | 6.0763.0 | Hex. hd. screw M 10 x 30 |
| 27 | 1 | 6.0772.0 | Hex. hd. screw M 10 x 55 |
| 28 | 1 | 6.0798.0 | Hex. hd. screw M 10 x 70 |
| 29 | 2 | 6.2215.0 | Hex. hd. screw M 12 x 25 |
| 1-3) 30 | 4 | 6.0799.0 | Hex. hd. screw M 12 x 75 |
| 4-6) 30 | 4 | 6.0819.0 | Hex. hd. screw M 16 x 60 |
| 31 | 4 | 6.2210.0 | Hex. hd. screw M 14 x 40 |
| 32 | 4 | 6.2200.0 | Hex. hd. screw M 14 x 60 |
| 33 | 5 | 6.0813.0 | Hex. hd. screw M 16 x 40 |
| 1-3) 34 | 1 | 6.0795.0 | Hex. hd. screw M 20 x 100 |
| 4-6) 34 | 1 | 6.0777.0 | Hex. hd. screw M 20 x 65 |
| 35 | 3 | 6.0617.0 | Split pin |
| 36 | 10 | 6.0623.0 | Washer |
| 37 | 2 | 6.0631.0 | Washer |
| 38 | 2 | 6.0624.0 | Washer |
| 1-3) 39 | 4 | 6.0625.0 | Washer |
| 4-6) 39 | 4 | 6.0627.0 | Washer |
| 1-3) 40 | 4 | 6.0633.0 | Washer |
| 4-6) 40 | 4 | 6.2376.0 | Washer |
| 41 | 2 | 6.0633.0 | Washer |
| 42 | 8 | 6.0626.0 | Washer |
| 43 | 8 | 6.0627.0 | Washer |
| 44 | 2 | 6.0629.0 | Washer |
| 45 | 10 | 6.0653.0 | Spring washer |
| 46 | 2 | 6.0654.0 | Spring washer |
| 1-3) 47 | 4 | 6.0655.0 | Spring washer |
| 4-6) 47 | 4 | 6.0657.0 | Spring washer |

Driving system

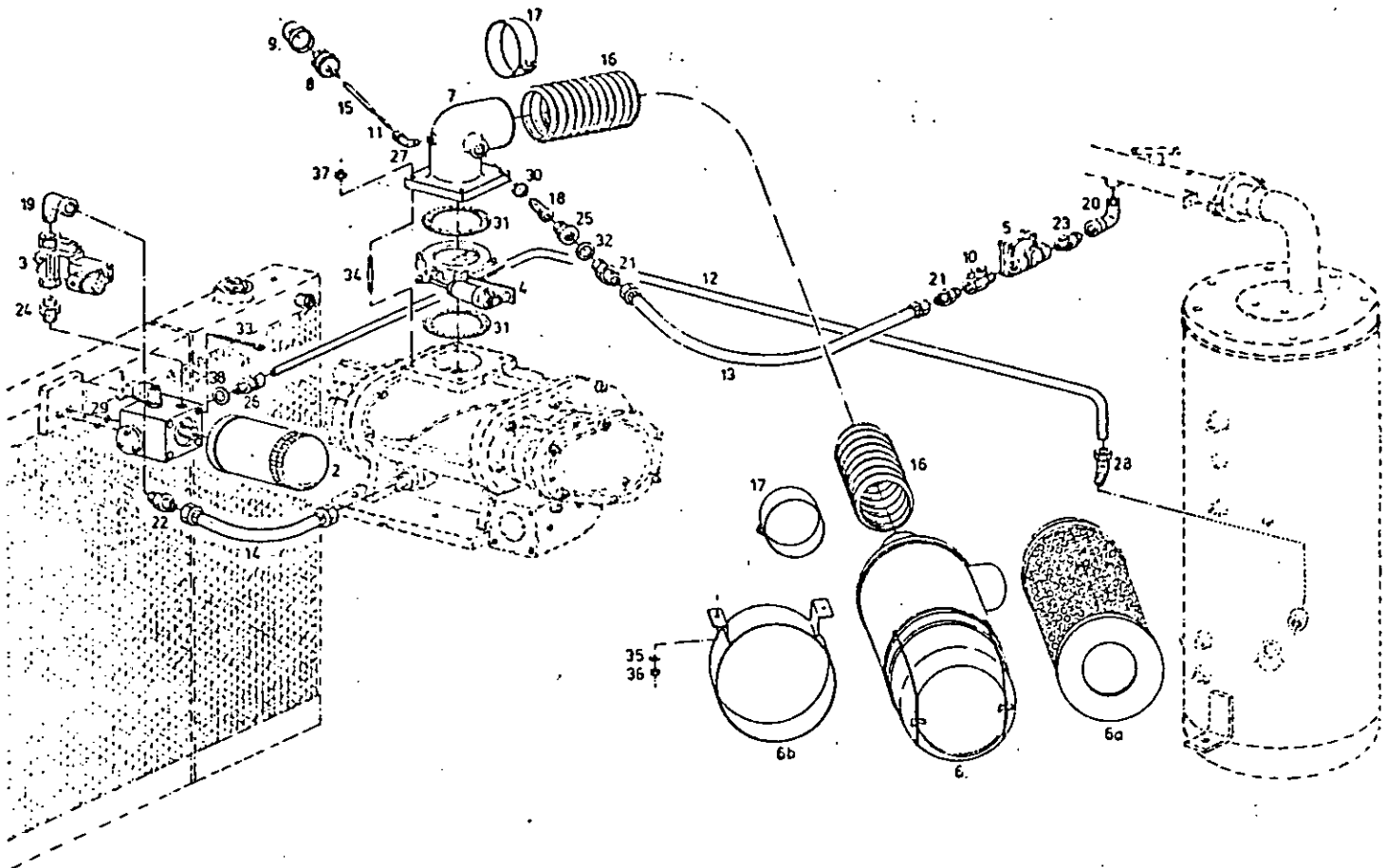
BS 50, BS 60 type



| Ref. | Qty | Part No | Description |
|---------|-----|----------|------------------------------------|
| 48 | 4 | 6.0656.0 | Spring washer |
| 49 | 4 | 6.0657.0 | Spring washer |
| 50 | 2 | 6.0684.0 | Hex. nut M 8 |
| 51 | 4 | 6.0685.0 | Hex. nut M 10 |
| 1-3) 52 | 4 | 6.0686.0 | Hex. nut M 12 |
| 4-6) 52 | 4 | 6.0688.0 | Hex. nut M 16 |
| 53 | 8 | 6.0687.0 | Hex. nut M 14 |
| 54 | 4 | 6.0688.0 | Hex. nut M 16 |
| 55 | 2 | 6.0693.0 | Hex. nut M 20 |
| | | | 1) Compressor Unit BS 50; 110 psig |
| | | | 2) Compressor Unit BS 50; 145 psig |
| | | | 3) Compressor Unit BS 50; 190 psig |
| | | | 4) Compressor Unit BS 60; 110 psig |
| | | | 5) Compressor Unit BS 60; 145 psig |
| | | | 6) Compressor Unit BS 60; 190 psig |

Oil tubes , Vent lines

BS 50, BS 60 type

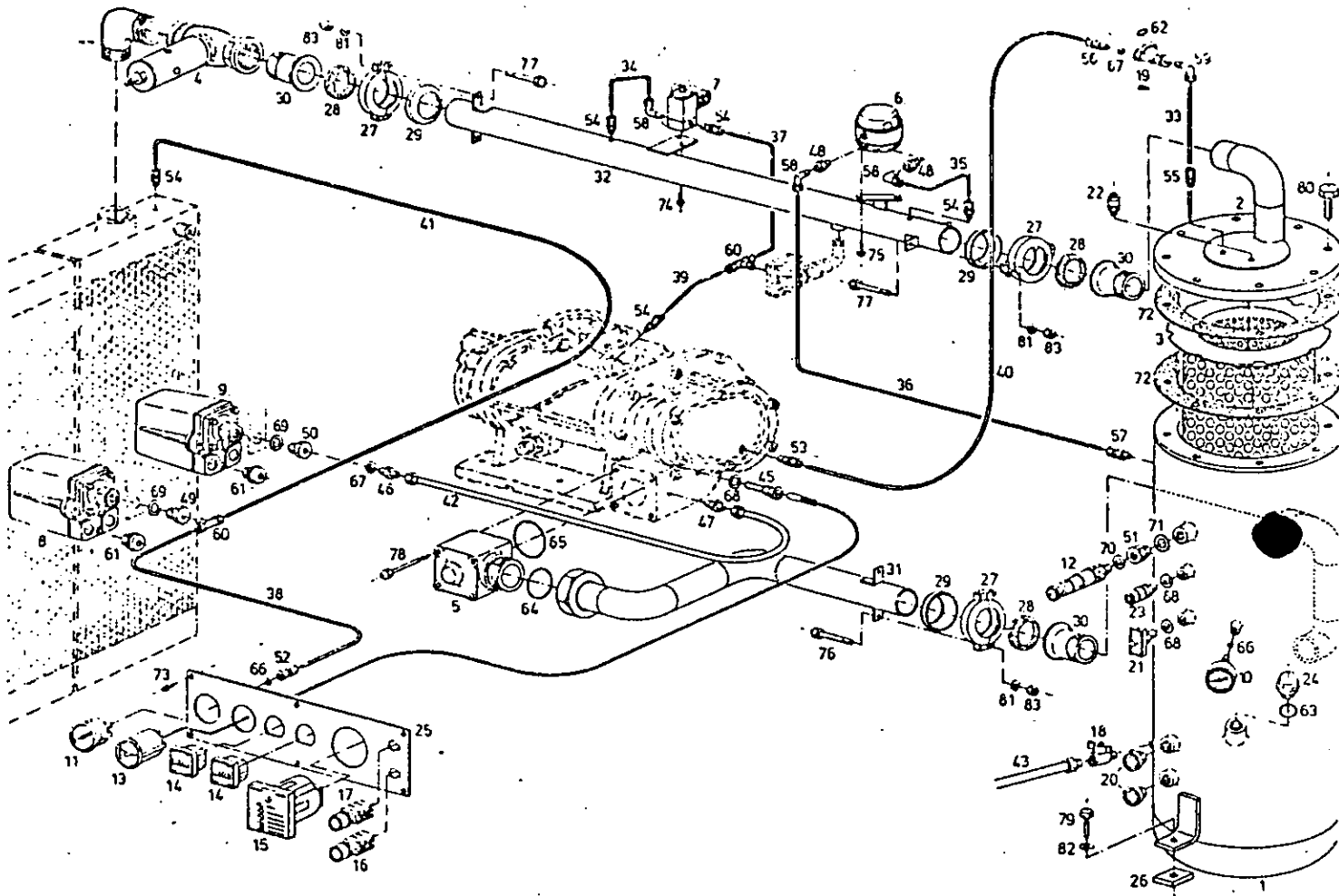


| Ref. | Qty | Part No | Description |
|------|-----|----------|---------------------------------|
| 1 | 1 | 4.8870.1 | Combination valve |
| 2 | 1 | 6.1981.0 | Filter cartridge |
| 3 | 1 | 7.1366.0 | Oil stop valve R 3/4" |
| 4 | 1 | 4.7387.1 | Inlet valve II |
| 5 | 1 | 4.7345.0 | Vent valve R 1/2" |
| 6 | 1 | 6.1917.0 | Air filter complete |
| 6a | 1 | 6.1996.0 | Filter cartridge |
| 6b | 1 | 6.1920.0 | Support for air filter |
| 7 | 1 | 4.7324.2 | Flange |
| 8 | 1 | 7.0294.0 | Vacuum switch (-19 11/16 " wg) |
| 9 | 1 | 7.0298.0 | Protecting cap |
| 10 | 1 | 8.0259.0 | Ball cock R 1/2" |
| 11 | 1 | 4.1850.0 | Copper tube |
| 12 | 1 | 4.8307.0 | Tube |
| 13 | 1 | 8.0864.0 | Hose line R 1/2"x19 11/16 " |
| 14 | 1 | 8.1139.0 | Hose line R 3/4"x28 47/64 " |
| 15 | 1 | | Hose line R 1/8"x1 49/64 " |
| 16 | 1 | 9.1078.0 | Hose R3"x25 25/64 " |
| 17 | 2 | 9.0639.0 | Hose clip |
| 18 | 1 | 6.1969.0 | Silencer |
| 19 | 1 | 6.1113.0 | Angle R 3/4" |
| 20 | 1 | 6.1062.0 | Elbow R 1/2" |
| 21 | 2 | 5.0784.0 | Double nipple R 1/2" |
| 22 | 1 | 5.0785.0 | Double nipple R 3/4" |
| 23 | 1 | 6.1030.1 | Fitting R 1/2" |
| 24 | 1 | 6.1033.0 | Fitting R 3/4" |
| 25 | 1 | 5.0725.0 | Reducing socket R 3/4" x R 1/2" |
| 26 | 1 | 6.0274.0 | Pipe fitting R 3/4" |
| 27 | 1 | 6.0251.0 | Angle fitting R 1/8" |
| 28 | 1 | 6.0259.0 | Angle fitting R 3/4" |
| 29 | 2 | 5.1423.0 | O - ring dia. 3/4x1/8 " |
| 30 | 1 | 5.0532.0 | Rubber sleeve |

| Ref. | Qty | Part No | Description |
|------|-----|----------|---|
| 31 | 2 | 5.0567.1 | Gasket for inlet valve |
| 32 | 1 | 6.1524.0 | Gasket R 1/2" |
| 33 | 4 | 6.2411.0 | Cylinder screw with inside hex. M 6 x 100 |
| 34 | 4 | 6.2342.0 | Stud M 10 x 65 |
| 35 | 2 | 6.0631.0 | Washer |
| 36 | 2 | 6.0684.0 | Hex. nut M 8 |
| 37 | 4 | 6.0685.0 | Hex. nut M 10 |
| 38 | 1 | 6.1527.0 | Gasket R 3/4" |

Control tubes , Compressed air tubes

BS 50, BS 60 type

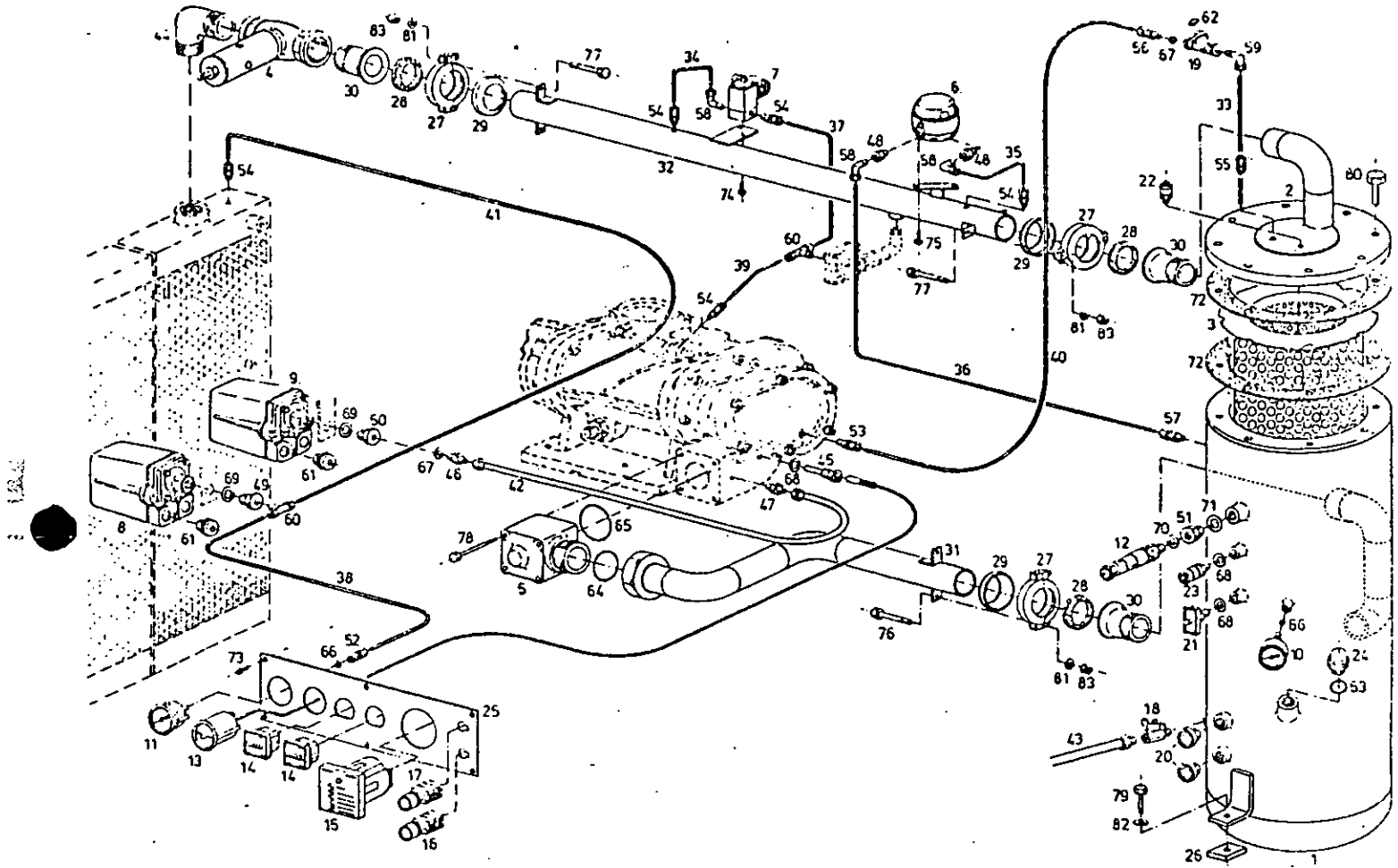


| Ref. | Qty | Part No | Description |
|-------|-----|----------|--------------------------------------|
| 1 | 1 | 3.5056.4 | Tank 13gal. /203psig |
| 2 | 1 | 4.7238.1 | Cover |
| 3 | 1 | 6.1960.0 | Oil separator cartridge |
| 4 | 1 | 4.7342.0 | Minimum pressure check valve R1 1/2" |
| 5 | 1 | 4.7393.1 | Check valve complete |
| 6 | 1 | 7.0217.0 | Difference pressure switch |
| 7 | 1 | 7.1369.0 | Solenoid valve |
| 1) 8 | 1 | 7.0220.0 | Pressure switch 116 psig |
| 2) 8 | 1 | 7.0221.0 | Pressure switch 232 psig |
| 3) 8 | 1 | 7.0221.0 | Pressure switch 232 psig |
| 9 | 1 | 7.0219.0 | Pressure switch |
| 10 | 1 | 8.0018.0 | Pressure gauge 0-360/220 psig |
| 1) 11 | 1 | 8.0137.0 | Pressure gauge 0 - 145/110 psig |
| 2) 11 | 1 | 8.0136.0 | Pressure gauge 0 - 232/145 psig |
| 3) 11 | 1 | 8.0138.0 | Pressure gauge 0 - 232/190 psig |
| 1) 12 | 1 | 8.0332.0 | Safety valve R 3/4", 130 psig |
| 2) 12 | 1 | 8.0334.0 | Safety valve R 3/4", 175 psig |
| 3) 12 | 1 | 8.0336.0 | Safety valve R 1/2", 210 psig |
| 13 | 1 | 8.0197.0 | Distance thermometer |
| 14 | 2 | 7.0784.0 | Hour meter |
| 15 | 1 | 7.0449.0 | Malfunction relay |
| 16 | 1 | 7.1083.0 | Luminous button green |
| 17 | 1 | 7.1084.0 | Luminous button red |
| 18 | 1 | 8.0259.0 | Ball cock R 1/2" |
| 19 | 1 | 8.0381.0 | Dirt trap R 1/4" |
| 20 | 2 | 6.0105.0 | Oil sight glass R 3/4" |
| 21 | 1 | 6.0501.0 | Locking screw R3/8" |
| 22 | 1 | 9.0817.0 | Hose coupling R 1/4" |
| 23 | 1 | 9.0814.0 | Hose coupling R 3/8" |
| 24 | 1 | 6.0519.0 | Locking screw R 1 1/4" |
| 25 | 1 | 4.7454.0 | Instrument panel |

| Ref. | Qty | Part No | Description |
|-------|-----|----------|-----------------------------------|
| 26 | 2 | 4.8435.0 | Steel plate |
| 27 | 3 | 5.1125.0 | Tension clamp complete |
| 28 | 3 | 5.1391.0 | Gasket ring |
| 29 | 3 | 5.1122.0 | Support for gasket ring |
| 30 | 3 | 4.8268.0 | Sleeve |
| 31 | 1 | 4.8309.1 | Air tube |
| 32 | 1 | 4.8308.0 | Air tube |
| 33 | 1 | 4.8317.0 | Suction tube |
| 34 | 1 | 4.8297.0 | Copper tube R 1/8" |
| 35 | 1 | 4.8330.0 | Copper tube R 1/8" |
| 36 | 1 | 4.8329.0 | Copper tube R 1/8" |
| 37 | 1 | 4.8332.0 | Copper tube R 1/8" |
| 38 | 1 | | Control tube R 1/4"x13" |
| 39 | 1 | | Control tube R 1/4"x16 59/64" |
| 40 | 1 | | Control tube R 1/4"x17 23/32" |
| 41 | 1 | | Control tube R 1/4"x51 11/64" |
| 42 | 1 | 8.1130.0 | Hose line R 1/4"x27 9/16" |
| 43 | 1 | 8.0581.0 | Hose line R 1/2"x 59" |
| 44 | 1 | 6.1098.0 | Angle R 1 1/2" |
| 45 | 1 | 5.0929.0 | Protection sleeve R 3/8" |
| 46 | 1 | 5.0780.0 | Double nipple R 1/4" |
| 47 | 1 | 5.0795.0 | Double nipple R 1/4" x M 12 x 1,5 |
| 48 | 2 | 5.0820.0 | Reducing socket R 1/4" x R 1/8" |
| 49 | 1 | 5.0846.0 | Reducing socket R 1/2" x R 1/8" |
| 50 | 1 | 5.0963.0 | Reducing socket R 1/2" x R 1/4" |
| 3) 51 | 1 | 5.0925.0 | Reducing socket R 3/4" x R 1/2" |
| 52 | 1 | 6.0390.0 | Pipe fitting R 1/4" |
| 53 | 1 | 6.0231.0 | Pipe fitting R 1/8" |
| 54 | 5 | 6.0246.0 | Pipe fitting R 1/8" |
| 55 | 1 | 4.8199.0 | Pipe fitting R 1/4" |
| 56 | 1 | 4.8335.0 | Pipe fitting R 1/4" |
| 57 | 1 | 6.0229.0 | Pipe fitting R 1/4" |

Control tubes , Compressed air tubes

BS 50, BS 60 type



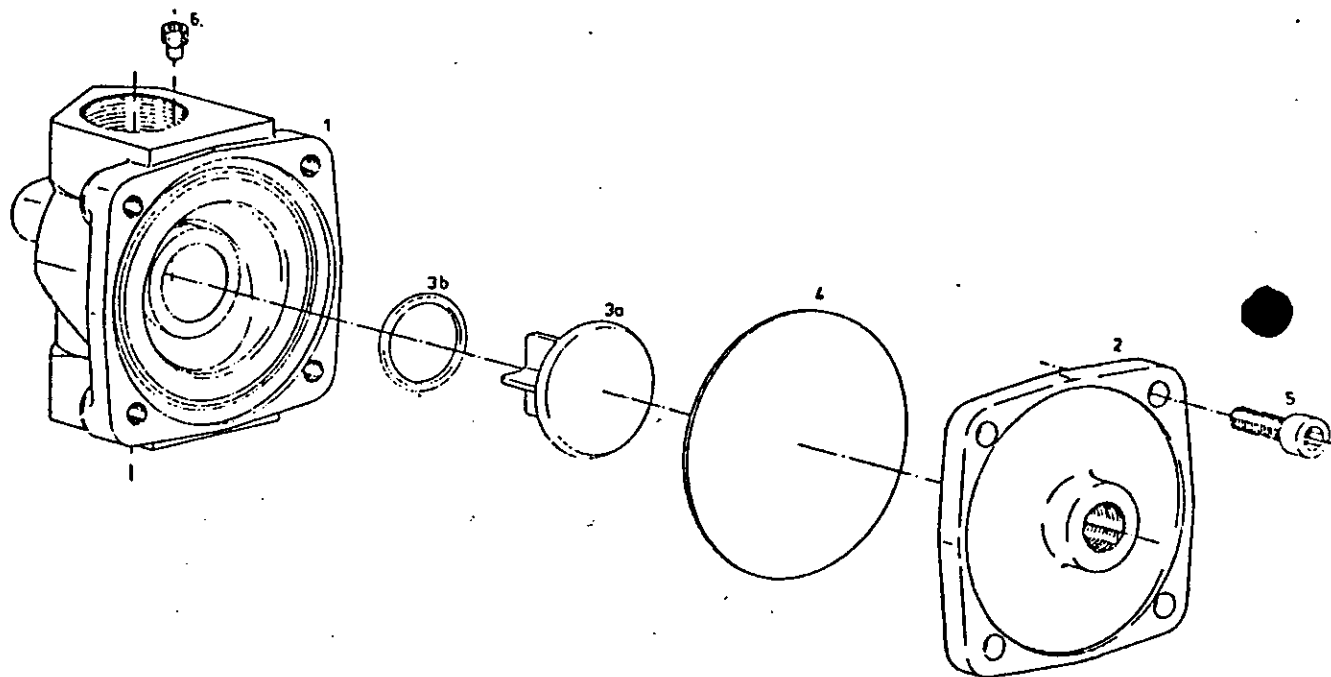
| Ref. | Qty | Part No | Description |
|------|-----|----------|----------------------------------|
| 58 | 3 | 6.0266.0 | Angle fitting R 1/8" |
| 59 | 1 | 6.0254.0 | Angle fitting R 1/4" |
| 60 | 2 | 6.0344.0 | T pipe fitting R 1/8" |
| 61 | 2 | 7.0673.0 | Plug PG 16 |
| 62 | 1 | 5.1443.0 | O-ring dia. 25/32x3/32" |
| 63 | 1 | 5.1455.0 | O-ring dia. 1 27/32x5/64" |
| 64 | 1 | 5.1422.0 | O-ring dia. 2 13/64x1/8" |
| 65 | 1 | 5.1462.0 | O-ring dia. 3 5/32x5/64" |
| 66 | 2 | 6.0470.0 | Gasket for pressure gauge R 1/4" |
| 67 | 2 | 6.0432.0 | Gasket R 1/4" |
| 68 | 3 | 6.1521.0 | Gasket R 3/8" |
| 69 | 2 | 6.0438.0 | Gasket R 1/2" |
| 70 | 1 | 6.1524.0 | Gasket R 1/2" |
| 71 | 1 | 6.1527.0 | Gasket R 3/4" |
| 72 | 2 | 5.0556.0 | Gasket for tank |
| 73 | 6 | 6.0914.0 | Phillips head screw M 4 x 10 |
| 74 | 2 | 6.0960.0 | Fillister head screw M 4 x 8 |
| 75 | 2 | 6.0746.0 | Hex. hd. screw M 6 x 10 |
| 76 | 2 | 6.2214.0 | Hex. hd. screw M 8 x 50 |
| 77 | 4 | 6.0733.0 | Hex. hd. screw M 8 x 60 |
| 78 | 4 | 6.0780.0 | Hex. hd. screw M 10 x 110 |
| 79 | 2 | 6.0821.0 | Hex. hd. screw M 10 x 40 |
| 80 | 8 | 6.0759.0 | Hex. hd. screw M 16 x 45 |
| 81 | 6 | 6.2374.0 | Washer |
| 82 | 2 | 6.2373.0 | Washer |
| 83 | 6 | 6.2431.0 | Hex. nut M 8 |

1) Compressor Unit 110 psig
2) Compressor Unit 145 psig
3) Compressor Unit 190 psig

020

Vent valve 4.7345.0

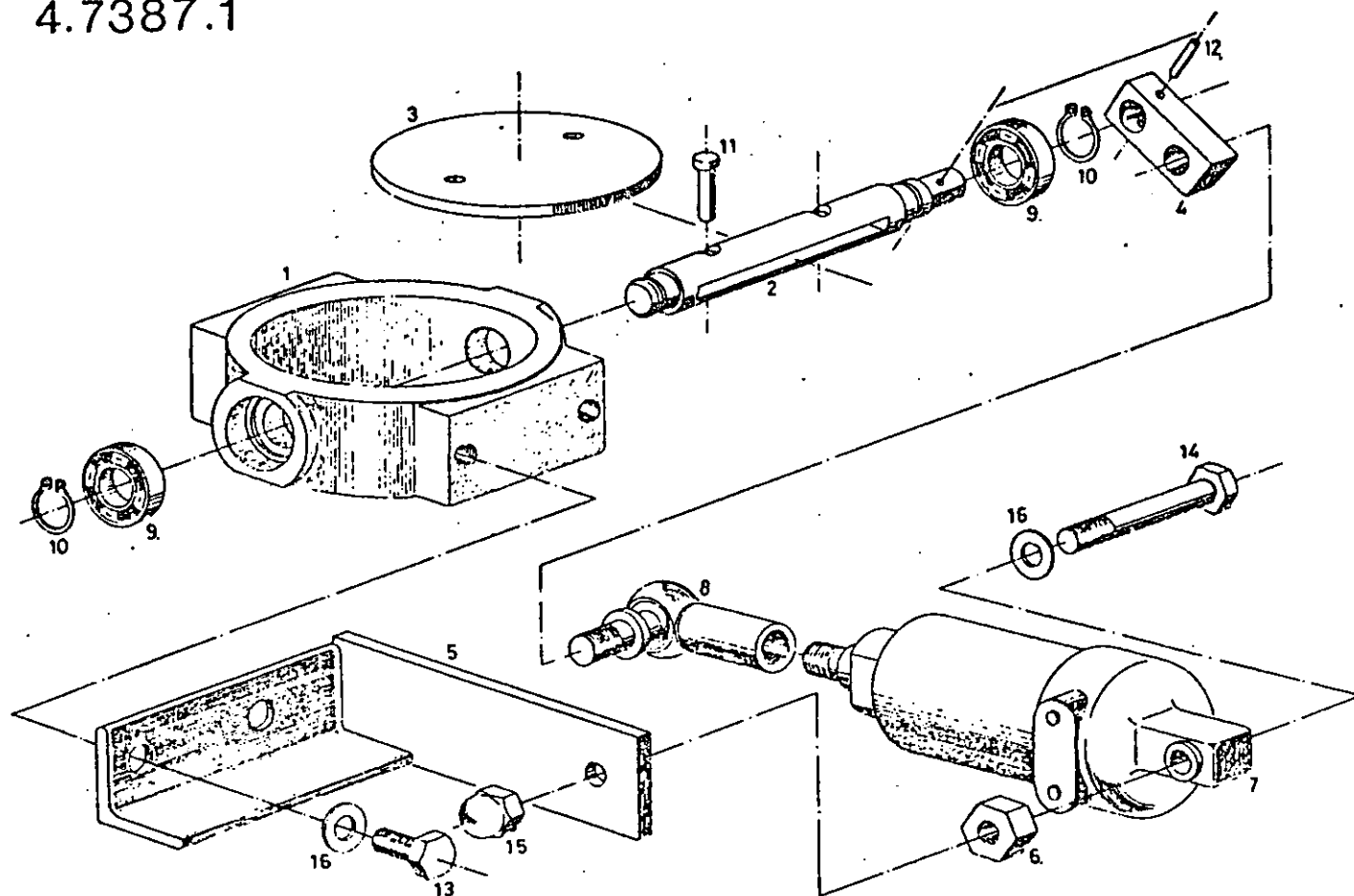
BS 50, BS 60 type



| Ref. | Qty | Part No | Discription |
|------|-----|----------|---|
| 1 | 1 | 5.0789.0 | Crankcase |
| 2 | 1 | 5.0997.0 | Cover |
| 3 | 1 | 4.9026.0 | Piston complete |
| 3a | 1 | 5.0998.0 | Piston - |
| 3b | 1 | 5.1473.0 | O-ring dia. 5/8x3/32" |
| 4 | 1 | 5.0999.0 | Diaphragm |
| 5 | 4 | 6.2408.0 | Cylinder screw with inside hex. M 5 x 12 |
| 6 | 1 | 6.2482.0 | Stud bolt M 5 x 8 |

Inlet valve 4.7387.1

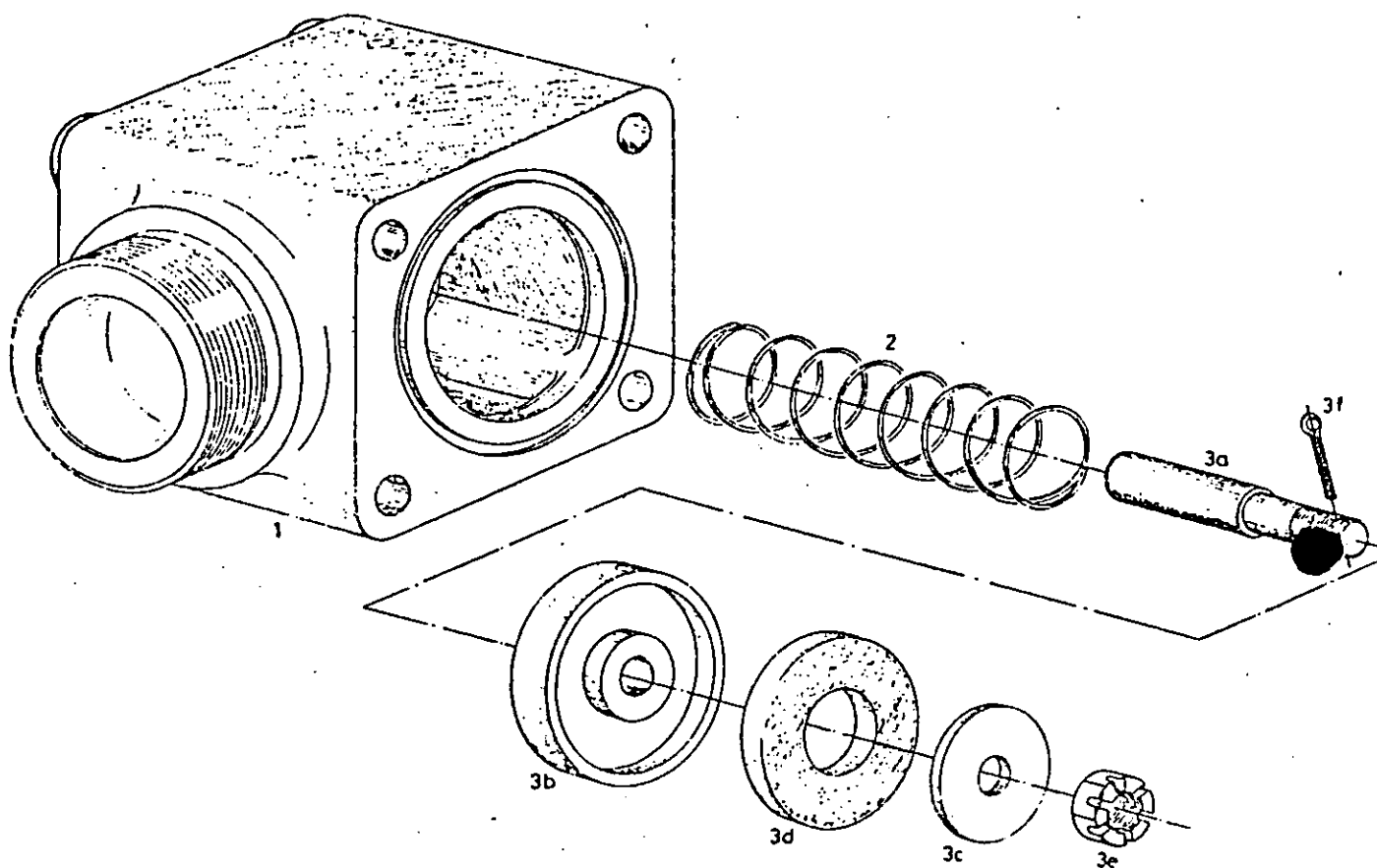
BS 50, BS 60 type



| Ref. | Qty | Part No. | Discription |
|------|-----|----------|-------------------------|
| 1 | 1 | 4.8930.2 | Valve body |
| 2 | 1 | 4.8963.0 | Shaft |
| 3 | 1 | 4.8932.0 | Disk |
| 4 | 1 | 4.8964.0 | Lever |
| 5 | 1 | 4.8961.1 | Support |
| 6 | 1 | 4.8965.0 | Hex. nut |
| 7 | 1 | 7.0486.0 | Working cylinder |
| 8 | 1 | 7.0489.0 | Angle joint |
| 9 | 2 | 6.0033.0 | Ball bearing |
| 10 | 2 | 6.0541.0 | Guard ring |
| 11 | 1 | 4.7564.0 | Rivet with button head |
| 12 | 1 | 6.0609.0 | Clamping sleeve |
| 13 | 2 | 6.0720.0 | Hex. hd. screw M 6 x 15 |
| 14 | 1 | 6.0723.0 | Hex. hd. screw M 6 x 45 |
| 15 | 1 | 6.0701.0 | Cap nut M 6 |
| 16 | 3 | 6.0622.0 | Washer |

Check valve
4.7393.1

BS 50, BS 60 type

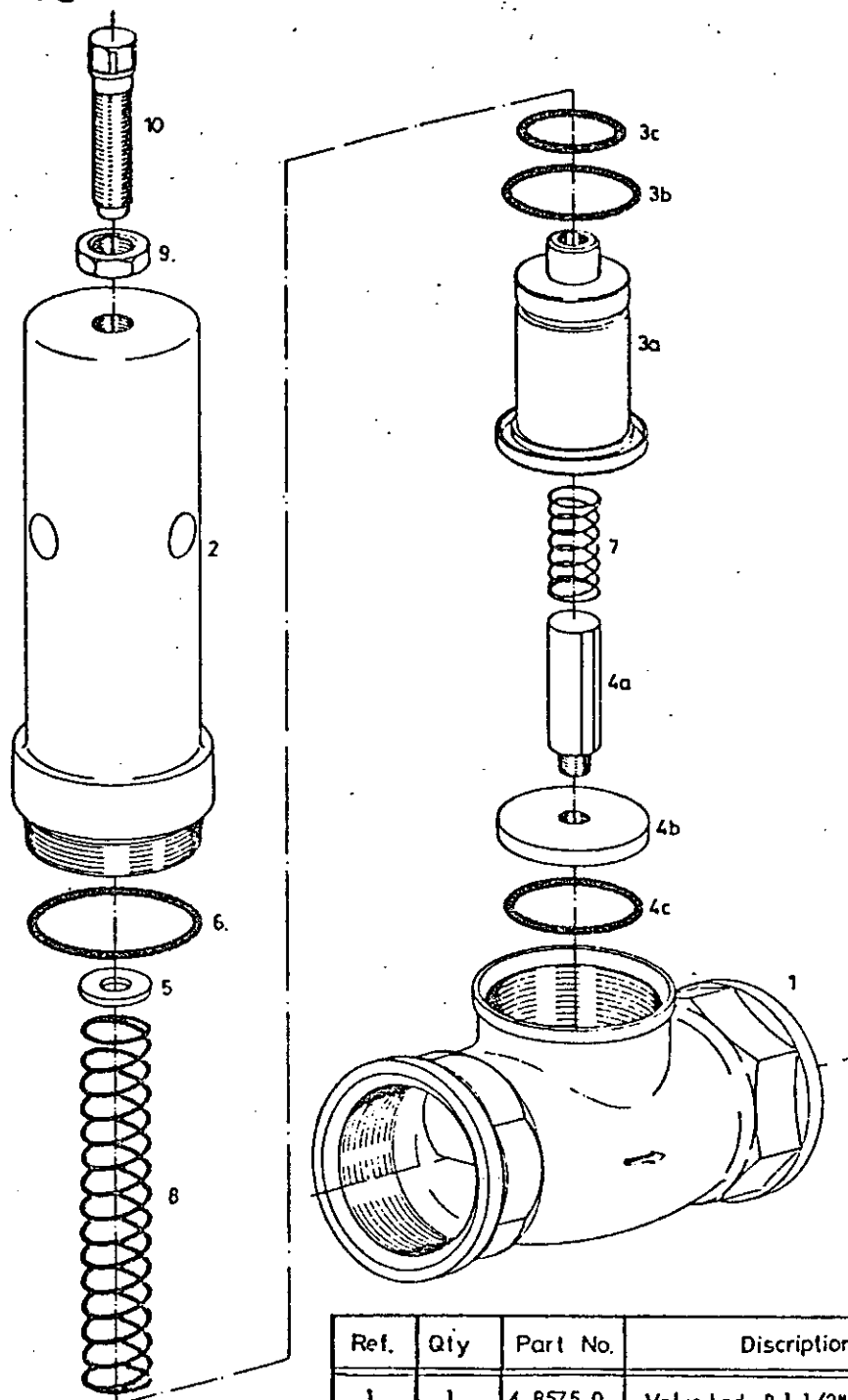


| Ref. | Qty | Part No. | Discription. |
|------|-----|----------|-----------------------|
| 1 | 1 | 4.8910.2 | Valve body |
| 2 | 1 | 5.0617.1 | Compression spring |
| 3 | 1 | 4.9011.0 | Valve disk complete |
| 3a | 1 | 4.8916.0 | Guide bolt |
| 3b | 1 | 4.8915.2 | Disk |
| 3c | 1 | 4.8914.1 | Disk |
| 3d | 1 | 5.0565.1 | Gasket |
| 3e | 1 | 6.0700.0 | Crown nut M 10 |
| 3f | 1 | 6.0649.0 | Split pin dia. 2 x 20 |

Minimum pressure check valve

4.7342.0

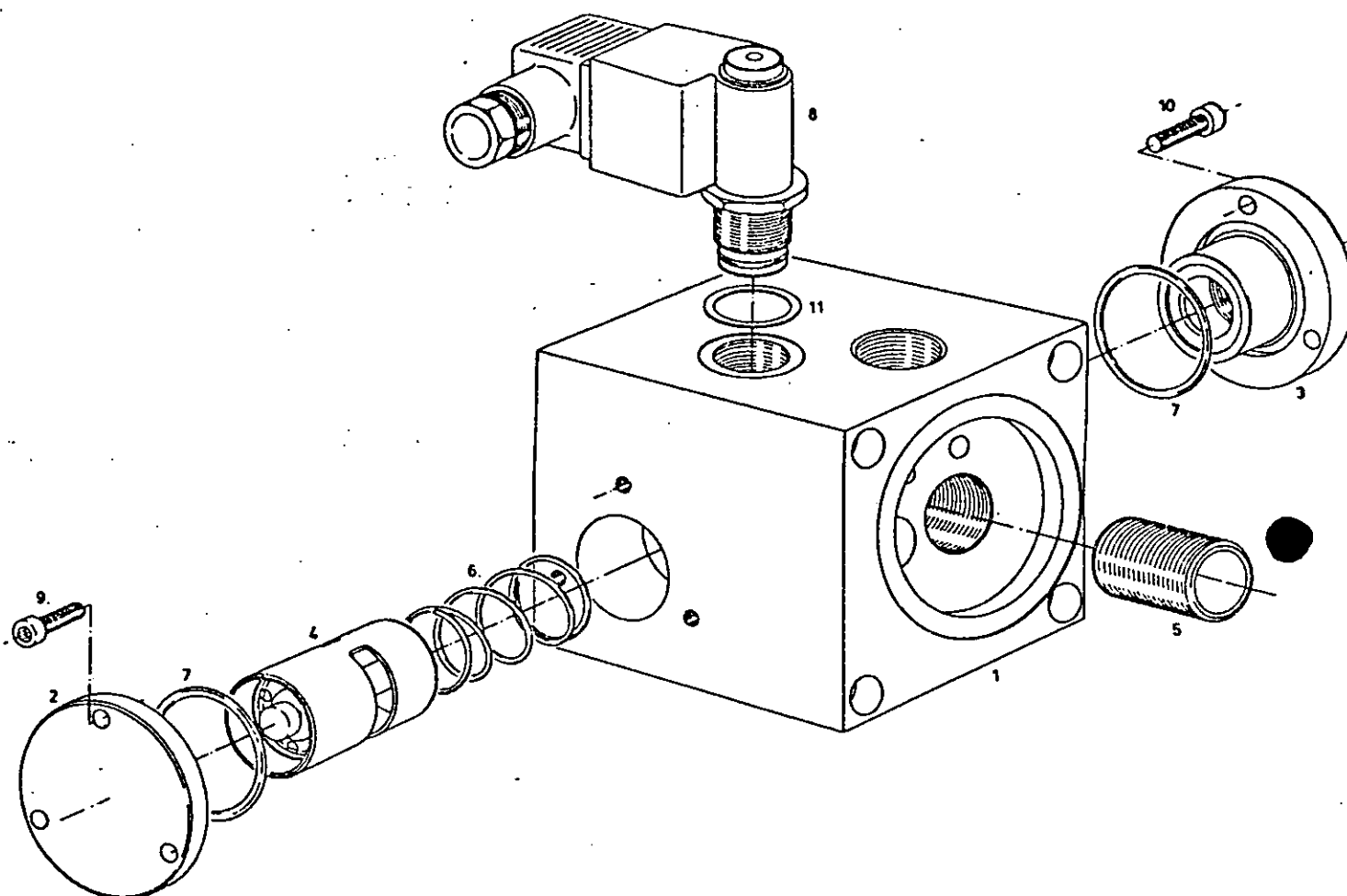
BS 50, BS 60 type



| Ref. | Qty | Part No. | Discription |
|------|-----|----------|----------------------------|
| 1 | 1 | 4.8575.0 | Valve body R 1 1/2" |
| 2 | 1 | 4.8576.0 | Cylinder |
| 3 | 1 | 4.9021.0 | Piston complete |
| 3a | 1 | 4.8578.0 | Piston |
| 3b | 1 | 5.1434.0 | O - ring 1 27/64x1/8" |
| 3c | 1 | 5.1411.0 | O - ring 1 1/32x5/32" |
| 4 | 1 | 4.9015.0 | Valve disk complete |
| 4a | 1 | 4.8568.0 | Bolt |
| 4b | 1 | 4.8577.0 | Disk |
| 4c | 1 | 5.1434.0 | O - ring 1 27/64x1/8" |
| 5 | 1 | 6.2371.0 | Disk |
| 6 | 1 | 5.1470.0 | O - ring 1 49/64x1/8" |
| 7 | 1 | 5.0643.0 | Compression spring |
| 8 | 1 | 5.0645.0 | Compression spring |
| 9 | 1 | 6.0686.0 | Hex. nut M 12 |
| 10 | 1 | 6.0945.0 | Square-head bolt M 12 x 40 |

Combination valve 4.8870.1

BS 50, BS 60 type



| Ref. | Qty | Part No. | Discription |
|------|-----|----------|---|
| 1 | 1 | 4.8872.1 | Valve body |
| 2 | 1 | 4.8875.0 | Cover |
| 3 | 1 | 4.8873.0 | Cover |
| 4 | 1 | 7.0399.0 | Actuating piston with working element |
| 5 | 1 | 4.8874.1 | Thread nipple |
| 6 | 1 | 5.0636.0 | Compression spring |
| 7 | 2 | 5.1445.0 | O-ring dia. 1 3/8x5/64" |
| 8 | 1 | 7.1407.0 | Difference pressure switch |
| 9 | 3 | 6.2406.0 | Cylinder screw with inside hex. M 5 x 16 |
| 10 | 3 | 6.2400.0 | Cylinder screw with inside hex. M 5 x 20 |
| 11 | 1 | 6.1534.0 | Gasket dia. 25/32"x dia. 15/16x1/16" |

SECTION 3

RECOMMENDED SPARE PARTS LIST

Model BS 50 / 60

| DESCRIPTION | Part No. | Qty. per unit | LOCATION / USE | Recommended Quantities | | |
|---|---------------------|---------------|---|------------------------|---|---|
| | | | | A | B | C |
| Lubricating oil filter element | 6.1981.0 | 1 | at valve combination | 1 | 2 | 3 |
| Oil separating cartridge complete set | 6.2012.0 | 1 | in oil separator | 1 | 1 | 2 |
| Intake air filter cartridge | 6.1996.0 | 1 | at air inlet port | 2 | 3 | 4 |
| Filter mat | 6.1938.0 | 1 | at cooling air inlet port | 2 | 3 | 4 |
| V-belt set for BS 50/110 psig | 6.1434.0 | 1 | at motor/compressor pulley | 1 | 1 | 2 |
| 6.2533.0 145 psig | 6.2541.0 | 1 | " | 1 | 1 | 2 |
| 190 psig | 6.2542.0 | 1 | " | 1 | 1 | 2 |
| V-belt set for BS 60/110 psig | 6.2532.0 | 1 | at motor/compressor pulley | 1 | 1 | 2 |
| 145 psig | 6.1434.0 | 1 | " | 1 | 1 | 2 |
| 190 psig | 6.2533.0 | 1 | " | 1 | 1 | 2 |
| Valve plate complete | 4.9011.0 | 1 | in check valve | 1 | 1 | 2 |
| Valve plate complete | 4.9015.0 | 1 | in minimum pressure check valve | 1 | 1 | 2 |
| Inlet valve complete | 4.7387.1 | 1 | suction side of airend | 0 | 1 | 1 |
| Compression spring | 5.0617.1 | 1 | in check valve | 0 | 1 | 1 |
| Compression spring 1/64" x 5/16" x 1 13/32" | 5.0643.0 | 1 | in minimum pressure check valve | 0 | 1 | 1 |
| Compression spring 5/32" x 63/64" x 7 9/32" | 5.0645.0 | 1 | in minimum pressure check valve | 0 | 1 | 1 |
| O-ring inside dia. 3/4"x1/8" | 5.1423.0 | 2 | at valve combination | 1 | 1 | 2 |
| O-ring ins.dia. 1 27/32"x5/64" | 5.1455.0 | 1 | at oil filler neck | 1 | 1 | 2 |
| Flat gasket | 5.0567.1 | 2 | at inlet valve | 1 | 1 | 2 |
| O-ring ins.dia. 25/32"x3/32" | 5.1443.0 | 1 | in dirt trap | 1 | 1 | 2 |
| O-ring ins.dia. 3 5/32"x5/64" | 5.1462.0 | 1 | between airend and check valve | 1 | 1 | 2 |
| O-ring ins.dia. 2 13/64"x1/8" | 5.1422.0 | 1 | between check valve and fitting | 1 | 1 | 2 |
| Gasket ring ins.dia. 1 57/64" | 5.1391.0 | 3 | pipe gasket: 2 separator/cooler 1 airend/separator | 1 | 1 | 2 |
| O-ring ins.dia. 1 3/8"x5/64" | 5.1445.0 | 2 | in valve combination | 1 | 1 | 2 |
| O-ring ins.dia. 1 1/32"x5/32" | 5.1411.0 | 1 | in minimum pressure check valve | 1 | 1 | 2 |
| O-ring ins.dia. 1 49/64"x1/8" | 5.1470.0 | 1 | in minimum pressure check valve | 1 | 1 | 2 |
| Diaphragm | 5.0999.0 | 1 | in vent valve | 1 | 1 | 2 |
| Diaphragm | 7.0347.0 | 1 | in oilstop valve | 1 | 1 | 2 |
| Mains pressure switch for 110 psig units | 7.0220.0 | 1 | control line from air cooler | 0 | 1 | 1 |
| Mains pressure switch for 145/190 psig units | 7.0221.0 | 1 | control line from air cooler | 0 | 1 | 1 |
| Safety pressure switch | 7.0219.0 | 1 | control line from airend outlet | 0 | 1 | 1 |
| Valve combination | 4.8870.0 | 1 | at oil cooler | 0 | 1 | 2 |

RECOMMENDED SPARE PARTS LIST

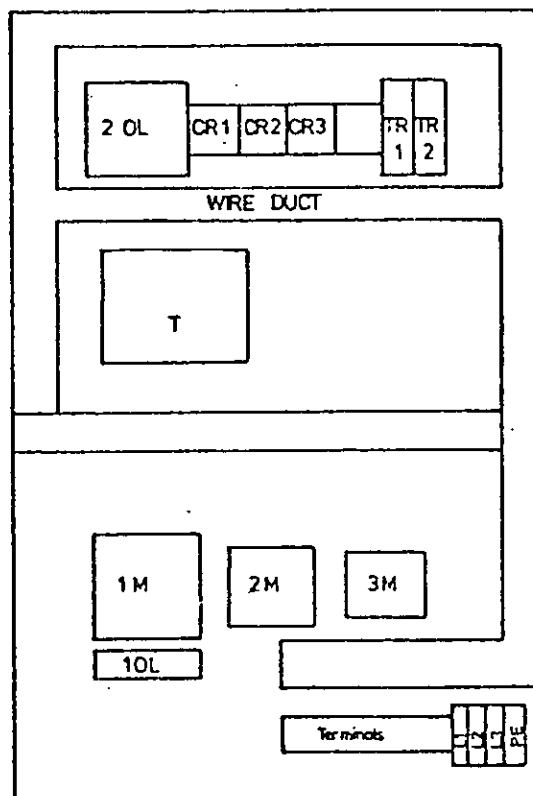
Model BS 50 / 60

| DESCRIPTION | Part No. | Qty. per unit | LOCATION / USE | Recommended Quantities | | |
|--------------------------------------|-----------|---------------|--|------------------------|---|---|
| | | | | A | B | C |
| Oil stop valve R 3/4" compl. pasted | SK2881.73 | 1 | at valve combination | 0 | 1 | 2 |
| Discharge valve R 1/2" compl. pasted | SK2602.73 | 1 | at pipe oil separator / minimum pressure check valve | 0 | 1 | 1 |
| Silencer | 6.1969.0 | 1 | in 90° elbow before inlet valve | 0 | 0 | 1 |
| Dirt trap R 1/4" | 8.0381.0 | 1 | in oil return line from oil separator to airend | 0 | 1 | 1 |
| Hose line R1/4"x27 9/16" | 8.1130.0 | 1 | control line to safety pressure switch | 0 | 1 | 1 |
| Hose line R1/2"x19 11/16" | 8.0864.0 | 1 | discharge valve to silencer | 0 | 1 | 1 |
| Hose line R3/4"x28 47/64" | 8.1139.0 | 1 | oilstop valve to airend | 0 | 1 | 1 |
| Control valve R 1/8" compl. pasted | SK2866.73 | 1 | at pipe oil separator / minimum pressure check valve | 0 | 1 | 1 |
| Piston compl. with O-rings | 4.9021.0 | 1 | in minimum pressure check valve | 1 | 1 | 2 |

RECOMMENDED SPARE PARTS LIST FOR ELECTRICAL EQUIPMENT

Model BS 50

WYE-Delta-start

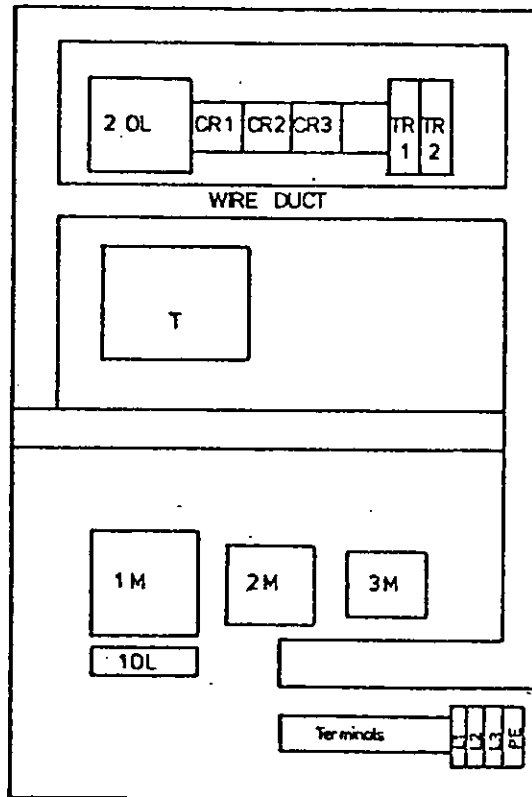


| DESCRIPTION | | Qty. per unit | Part No. | Input voltage | | | LOCATION/USE | Recommended Quantities | | |
|-------------|---------------------------------|---------------------|----------|---------------|-------|-------|--------------|---------------------------|---|---|
| | | | | 208 V | 230 V | 460 V | | A | B | C |
| 1 M | Motor starter (Main contactor) | 1 | 7.2063.0 | x | x | | Control box | 0 | 1 | 1 |
| | | | 7.2067.0 | | | x | | | | |
| 2 M | Motor starter (Delta contactor) | 1 | 7.2063.0 | x | x | | Control box | 0 | 1 | 1 |
| | | | 7.2067.0 | | | x | | | | |
| 3 M | Motor starter (WYE contactor) | 1 | 7.2062.0 | x | x | | Control box | 0 | 1 | 1 |
| | | | 7.2060.0 | | | x | | | | |
| 2 OL | Overload relay for transformer | 1 | 7.2201.0 | x | x | x | Control box | 0 | 1 | 1 |
| T | Transformer | 1 | 7.2224.0 | x | | | Control box | 0 | 1 | 1 |
| | | | 7.2221.0 | | x | x | | | | |
| CR 1,2,3 | Control relay | 3 | 7.2066.0 | x | x | x | Control box | 0 | 1 | 1 |
| TR 1 | Time delay relay (delay off) | 1 | 7.0467.0 | x | x | x | Control box | 0 | 1 | 1 |
| TR 2 | Time delay relay (WYE time) | 1 | 7.0466.0 | x | x | x | Control box | 1 | 1 | 2 |
| 1 OL | Overload relay for motor | 1 | 7.2252.0 | x | x | | Control box | 0 | 1 | 1 |
| | | | 7.2250.0 | | | x | | | | |

RECOMMENDED SPARE PARTS LIST FOR ELECTRICAL EQUIPMENT

Model BS 60

WYE-Delta-start



| DESCRIPTION | | Qty. per unit | Part No. | Input voltage | | | LOCATION/USE | Recommended Quantities | | |
|-------------|---------------------------------|---------------------|----------|---------------|-------|-------|--------------|---------------------------|---|---|
| | | | | 208 V | 230 V | 460 V | | A | B | C |
| 1 M | Motor starter (Main contactor) | 1 | 7.2063.0 | x | x | | Control box | 0 | 1 | 1 |
| | | | 7.2062.0 | | | x | | | | |
| 2 M | Motor starter (Delta contactor) | 1 | 7.2063.0 | x | x | | Control box | 0 | 1 | 1 |
| | | | 7.2062.0 | | | x | | | | |
| 3 M | Motor starter (WYE contactor) | 1 | 7.2062.0 | x | x | | Control box | 0 | 1 | 1 |
| | | | 7.2067.0 | | | x | | | | |
| 2 OL | Overload relay for transformer | 1 | 7.2201.0 | x | x | x | Control box | 0 | 1 | 1 |
| T | Transformer | 1 | 7.2224.0 | x | | | Control box | 0 | 1 | 1 |
| | | | 7.2221.0 | | x | x | | | | |
| CR 1,2,3 | Control relay | 3 | 7.2066.0 | x | x | x | Control box | 0 | 1 | 1 |
| TR 1 | Time delay relay (delay off) | 1 | 7.0467.0 | x | x | x | Control box | 0 | 1 | 1 |
| TR 2 | Time delay relay (WYE time) | 1 | 7.0466.0 | x | x | x | Control box | 1 | 1 | 2 |
| 1 OL | Overload relay for motor | 1 | 7.2253.0 | x | x | | Control box | 0 | 1 | 1 |
| | | | 7.2251.0 | | | x | | | | |