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1: INTRODUCTION:

1A: INTRODUCTION

The purpose of this repair manual is to get you started with the major repair and maintenance procedures on the ST screw compressors. Therefore, it is VITALLY IMPORTANT for any person taking care of transport, start, operation, maintenance, and repairs of this compressor to have read and UNDERSTOOD this manual.

NB: The first service inspection is to be made after approx. 200 hours in operation. If the inspection has not been made before max. 250 hours in operation, STENHØJ reserves the right to refuse any request for future guarantee repairs.

1B: COPYRIGHT

This manual must be considered confidential; it is only intended for internal use within the STENHØJ group and for our importers / distributors. It must not be copied in any way or transferred to a third person. No copying is allowed without STENHØJ’s written approval. Any violation of these rules will be punished. STENHØJ reserves all rights.

The compressor is fitted with a serial number plate as shown below. It is a good idea to insert the details of this here and in the maintenance schedule.

The serial number plate is fitted on/in the control box.

1C: TECHNICAL INFORMATION:

All technical information, data, and references in this specimen of the manual referring to operation and maintenance of the compressor have been updated according to the latest version (see version letter on the front) and therefore contain our present experience and knowledge of this type of compressor.

STENHØJ reserves the right to change without notice the technical specifications for the compressor(s) described in this manual.

STENHØJ is not liable for possible damages or break-downs resulting from faulty operation, non-observance of directions etc. in this manual, or professionally incorrect repairs.

STENHØJ also refuses to accept any responsibility for spare parts or accessories not delivered by us and therefore not approved by us.

Installation and/or use of such non-original parts and accessories can have a negative effect on the qualities of the compressor and may endanger persons, compressor or other values. Damages resulting from use of non-original spare parts are under no circumstances covered by STENHØJ.

STENHØJ is not liable for damages resulting from any reconditioning or modification of the compressor unless it has been approved by STENHØJ in writing.
STENHØJ also refuses to accept any responsibility for any consequent damage.

Document translation is done by STENHØJ as exactly as possible, but we are not responsible for possible faults. The Danish version is normative and is available on request.

All texts and drawings cannot be considered as covering all deliveries as per e.g. spare parts orders. Drawings and graphics are only normative and are not shown in scale 1:1.

As per current safety regulations use of the compressor is ONLY allowed when all doors/covers in the cabinet are installed correctly since it would otherwise result in the highest danger for persons nearby. STENHØJ is not responsible for any such operation.

The compressor should only be used for compressed air production as per the instruction manual.

1D: WARRANTY

On condition of normal operation of the compressor STENHØJ offers a warranty covering defects in manufacture and material for 12 months from date of invoice from STENHØJ KOMPRESSOR A/S. The screw unit is covered for 24 months irrespective of the number of working hours.

NB: The first service inspection is to be made before max. 250 hours in operation, otherwise it might influence the guarantee (see section 1A).

The warranty is valid only providing that all instructions in the instruction manual have been followed and that the compressor is situated in a neutral atmosphere. Wearing parts are not covered by the warranty.

In case of a warranty claim STENHØJ must be contacted immediately describing the extent of the damage and with a reference to:

Compressor type and pressure
Serial number
Date of delivery
STENHØJ’s order No. or invoice No.

2: SAFETY:

2 A: SAFETY DIRECTIONS FOR SERVICE, INSPECTION, AND INSTALLATION WORK:

The owner of this compressor must ensure that all maintenance, inspection, and installation work is made by authorized or professional personnel in possession of the necessary knowledge.

Any work on the compressor must be made with the compressor out of operation.

If it is necessary in order to make service work on the compressor to remove/”jump” safety devices these MUST be refitted correctly when the work is done. Thereafter, the general starting procedures must be followed, see paragraph 8 H in this manual.

Any warranty work MUST be carried out by an authorized STENHØJ fitter, see paragraph 1 D.

2 B: LOCAL MODIFICATION AND PRODUCTION OF SPARE PARTS:

Any modification or change of the compressor is NOT allowed.
Use of original spare parts and accessories secures quality.
Use of non-original/locally produced spare parts may have incalculable consequences for which STENHØJ is not responsible.
2C: LIMITS:

The limits in all data sheets must be kept. The compressor must only be used for the applications mentioned in the instruction manual.
SAFETY SYMBOL:
This symbol is to be found in the manual where danger to life or health is described. The symbol is intended as a warning with reference to safety at work.

Note this warning and exercise extreme caution. Ensure that all persons working with the compressor know this symbol. This special warning should be noted in addition to the ordinary safety regulations valid.

MANUAL SYMBOL:
Ensure that the paragraphs marked with this symbol have been read and UNDERSTOOD by the personnel working with the compressor every day (see paragraph 1A, INTRODUCTION).

HEARING PROTECTION:
Hearing protection is compulsory during service and repair work, especially when service doors and covers are removed.

SERVICE AND REPAIR WORKS:
This manual must be read prior to starting service and/or repair works.

COMPRESSOR RELIABILITY:
This symbol is used in the manual when describing what can damage the compressor if not attended to. The symbol is also used as a general safety reference where extra attention is required and to show which service or repair works are to be carried out by an authorized STENHØJ fitter.

TEMPERATURE RANGE:
This symbol calls for extra attention because of the risk of extreme temperatures, excessively high or especially low.

LIFTING INSTRUCTIONS:
This symbol shows that it is possible to lift by means of a forklift truck.
LIFTING INSTRUCTIONS:
This symbol shows that it is NOT allowed to lift by means of a forklift truck.

WARNING - HIGH-VOLTAGE:
Doors/covers wearing this symbol must only be opened by authorized electricians after having switched off main switch. Touch of the voltage carrying parts may cause death.

AUTOMATIC START:
The compressor can start automatically without any warning.

SYSTEM PRESSURE:
The vessel or the system is under pressure.

HOT PARTS:
The surface/part may be hot.

FLOW DIRECTION:
Air outlet or flow direction.

NON-INHALABLE AIR:
The air may contain impurities/oil and must not be used for inhalation.

OIL DRAIN:
The compressor is drained of oil here.

VENTILATOR:
Beware! Rotating ventilator. Do not remove protection.

INSTRUCTION MANUAL:
The manual must NOT be removed from the compressor.
3: POSITIONS OF COMPONENTS:

3A: LAYOUT - ST-7 / 10 / 15 / 20 / 25 / 30

These images show the construction of the compressor.

1: Control unit - start/stop
2: Control box
3: Pressure switch
4: Air filter
5: Thermometer
6: Pressure gauge
7: Control valve
8: Screw unit
9: Drain
10: Cooler
11: Minimum pressure valve
12: Solenoid valve
13: Oil filling
14: Oil drain
15: Separator vessel
16: Electric motor
17: Ventilator
18: Safety valve

3B: GENERAL ARRANGEMENT DRAWING:
3C: LAYOUT: ST-40 / 50 / 60

These images show the construction of the compressor.

1: Thermometer
2: Control box
3: Pressure switch
4: Control unit start/stop
5: Pressure gauge
6: Cooler
7: Ventilator
8: Air filter
9: Control valve
10: Screw unit/Air-end
11: Solenoid valve
12: Min. pressure valve
13: Safety valve
14: Drain
15: Separator vessel
16: Electric motor
17: Oil filling
18: Oil drain

3D: GENERAL ARRANGEMENT DRAWING:
3E: DESCRIPTION OF FUNCTIONS - ALL UNITS:
The air is taken in through a combined inlet and control valve controlling the compressor operation together with a solenoid valve. The air is compressed between two moving rotors and is exhausted into the separator vessel with the oil.
In the vessel the oil is separated from the air and is returned through the oil cooler and oil filter to the screw. The air is conducted through the separator filter and a combined minimum pressure valve via the aftercooler to the air net.
On the control panel lamps/light-emitting diodes indicate compressor operation and possible problems and also all relevant operating data as e.g. pressure and temperature.

STENHØJ uses highly efficient screw units in all screw compressors. The compression is one-stage, and the compressor control constantly supervises and controls operation optimizing compressed air production to produce the compressed air as economically as possible.
4: TRANSPORT AND INSTALLATION:

4A: TRANSPORT:

During compressor transport all rules for transportation of goods must be followed and any damage avoided. Special protection of control panel / start-stop switches. When using a fork lift truck please observe that the forks should fully support the compressor with their total length. It is possible to lift the compressor by means of a crane, but great care should be taken in this case.

TRANSPORT FASTENING:

During transport it is necessary to fixate the motor platform and to relieve V-belts to protect screw and motor bearings. This has been done when the compressor leaves the factory. After correct installation of the compressor on site move screw A from the locked position to the thread in the motor platform. On model ST 30 the screw must be completely removed since it is too close to one of the oil hoses. It is now possible to use the screw to lift the motor platform in order to change V-belts without damage.

NOTE: Check at regular intervals that there is adequate tolerance between lower part of bolt and the base frame.

NOTE: Models ST 7/10/15 (5.5-7.5 and 11 kW) comprise a spring to give the correct V-belt tension. This system is pre-set from the factory and must NOT be changed; it also prevents possible V-belt shocks during transport, and therefore DO NOT remove screw A on models ST 7- ST-10 and ST 15.

4B: INSTALLATION:

IMPORTANT: DO NOT place this compressor outdoors. It should be placed in a suitable, ventilated room, protected against snow, rain, and humidity.

Even if the compressor is fitted with an air filter separating more than 99% of air impurities we recommend that it is placed in as clean surroundings as possible. The ambient temperature should be in the range of +5°C -20 °C, measured centrally in the cooling air intake.

In order to ensure operation without problems DO NOT place compressor in surroundings below +2° C. Ambient temperatures above + 40°C are not allowed since this may result in unnecessary operation problems.

The compressor unit is fitted on vibration dampers. It is not required or necessary to bolt down the compressor unit. It can be placed on a concrete floor or any similar base of a normal, good quality.

To be able to check the oil level it is necessary to place the compressor horizontally and supported by all 4 legs.

When placing the compressor please also take electrical and air net connections into consideration (see section 4E/F).

4C: VENTILATION AND WASTE HEAT RECOVERY:

Temperature control in the compressor room:

To control temperature rises in the compressor room one or more separate ventilators can be fitted in an exterior wall. The required ventilator output “V” can be found from the formula:

\[ V = KW \times 320 \text{ M}^3 / \text{HOUR} \]

where

KW = total rated kW output of all electrical motors in the room.

Temperature rise in the room should not exceed 8 - 10 °C.

Air inlet of the ventilator should be placed as low and outlet as high in the room as possible.

Inlet grid:

To ensure a reasonable air exchange in the room an inlet grid should be fitted corresponding to the output of the ventilator(s).

The area “A” required of the inlet grid can be found from the formula:
A = KW x 180 CM² where

KW = total rated kW output of all electrical motors in the room.

Waste heat recovery:
Since almost all energy induced in a screw compressor is transformed into heat there are great possibilities to utilize this heat for water or room heating.

Water heating requires modification of the compressor. Therefore contact STENHØJ.

The hot ventilation air can be used for room heating (see next page).

⚠️ When using the air directly for room heating follow all rules and regulations from local authorities.

POSITIONING / DIMENSION SKETCH:

Positioning in the compressor room as per this sketch. Minimum distance to wall 0.6 m for ST 7 --> ST 30 and 1 m for ST 40 --> ST 60. It is a condition that the ceiling height is at least 2.5 m. When placing the compressor also take electrical and air connections into consideration (see paragraphs 4E and 4F).

Duct dimensioning to be made according to inlet grid dimensioning (see paragraph 4C).

⚠️ Install all ducts in a way to minimize total pressure drop as much as possible. Data of available extra pressure can be found in the technical data, paragraph 7A / 7B.

To avoid noise the air speed in the ducts should also be minimized as much as possible; a suitable speed would be app. 4 m/s.

Air inlet should always be placed near the floor and outlet near the ceiling.
Normal compressor installation:

Ventilator dimensioning V as described in paragraph 4C. Compressor to be placed at least 0.6 m alternatively 1 m from wall.

Temperature measured at A must not be below +2°C.

Compressor installation with waste heat recovery:

An adjustable damper is fitted here to conduct air out in the open (summer) or into a warehouse (winter).

An extra damper G can be added to recirculate air thereby keeping it above 0°C.

Temperature measured at A must not be below +2°C.
If a heat exchanger for heating of water is required please contact STENHØJ since this requires modification of the compressor.

4D: AMBIENT TEMPERATURE:

Ambient temperature must not exceed the limits mentioned. The compressor works best in the temperature range from +5 to +20 °C.

If temperature may fall below app. +2 °C a heating element should be installed.

On certain models the contact thermometer disconnects in case of temperatures below 0°C.

4E: CONNECTION OF COMPRESSED AIR:

Connection on models ST-7 --> ST-30 is 3/4” BSP placed on the control panel in the right side.

On models ST-40 --> ST-60 it is 1 1/4” BSP, placed on top of compressor in the left side.

Piping from compressor and further in the air net should ALWAYs be at least the same size as compressor outlet, and ALWAYs USE a flexible hose. On ST-20 --> ST-30 it is recommended to make the piping 1 1/4” BSP. STENHØJ’s part No. for 3/4” hose is 745040 and for 1 1/4” hose 745042.

4F: ELECTRICAL CONNECTION:

Electrical connection must be made by an authorized electrician and always in accordance with local regulations (see paragraph 7C).

Electrical connection in the control box. A 4-core cable is required with L1-L2-L3 and PE (earth). Neutral conductor is NOT required since the compressor has a built-in transformer from 400 V to 24 V. The cabinet has a bottom / top hole respectively for the electrical cable which MUST be installed with a lead-in and therefore relief of the cable. The internal cables of the compressor as per EN 60204-1.

A wiring diagram is included in delivery of the compressor which should always be adhered to.

The compressor MUST be connected to mains via a lockable main switch which MUST be in the immediate vicinity of the compressor.

The compressor CANNOT stand incorrect direction of rotation since this would result in serious screw damage. Check that phase sequence and direction of rotation are correct (see sign on phase sequence relay and arrow on screw unit). In case of incorrect phase sequence reverse two of the three incoming phases. Never change direction of rotation by reversing motor cables. To prevent these problems a phase sequence relay is available as optional extra on models ST 7 --> ST 30 whereas it is standard on models ST 40 --> ST 60.
5: CONTROL VALVE:

5A: CONTROL VALVE ST-7 -----> ST-30:

Description of function:
During standstill the main piston of control valve F rests in its seat due to weight, with atmospheric pressure all over. When screw unit E starts rotating a vacuum is created under the main piston, and the air starts to flow from separator vessel --> solenoid valve --> non-return valve --> through small bore in main piston centre --> down into the screw unit and back to the separator vessel. A “pressure balance” in the whole system is quickly reached and a separator vessel pressure of app. 0.7 - 0.8 bar.

Change from star to delta results in voltage on the solenoid valve G. The flow stops, the vacuum under the main piston increases (pressure falls) and is now carried up through the bore to the upper side of the diaphragm. Because of the effective area difference between over- and underside of the diaphragm the main piston is lifted, and the air is drawn through the control valve and down into the screw unit. This process continues until the preset maximum pressure is reached. The pressure switch removes voltage from the solenoid valve which is thereby opened. The pressure in the separator vessel has now access to the diaphragm overside thus closing the main piston and relieving compressor. The necessary idle air is drawn into the screw unit through the bore in main piston centre. The separator vessel is relieved by blowing backwards through the suction filter. The entire control valve is therefore controlled by the solenoid valve, and all air flow goes through this. The solenoid valve is a 2/2 currentless open (NO) valve. The purpose of the small non-return valve on the control valve overside is preventing oil mist from the screw unit from flowing into the surroundings in case of compressor stop. The opening pressure of the discharge non-return valve is different, i.e. 0.5 bar.

NOTE: The exterior of the two non-return valves is identical; they can be identified by measuring the piston diameter on inlet side. 214160: Ø 6 mm piston diameter compared to 214161: Ø 8 mm piston diameter and with “0.5” stamped on. DO NOT REVERSE!

Maintenance:
The only maintenance is replacement of diaphragms, preferably every 8-10.000 hours. In case of control valve leakage replace it. New diaphragms for ST-7/10: No. 358040 / 358041, and for ST-15/20/25/30: No. 358045 / -41

NOTE: When assembling control valve, dismount non-return valve and press down main piston while tightening. DO NOT use any lock fluid for the non-return valve, only a copper disc.

5B: CONTROL VALVE ST-40 -----> ST-60:

Description of function:
During standstill the main piston of control valve F rests in its seat due to weight, with atmospheric pressure all over. When screw unit E starts rotating a vacuum is created under the main piston. Change from star to delta results in voltage on the solenoid valve G, thereby opening passage between connections B and R. The vacuum under the main piston is now carried up through the solenoid valve to the overside of the diaphragm, and because of the effective area difference the valve opens, air is drawn in through the control valve and down into the screw unit. The process continues until the preset maximum pressure is reached. The pressure switch removes voltage from the solenoid valve which is thereby opened, i.e. a passage is opened between port P and port B. The pressure in the separator vessel has now access to the diaphragm overside thus closing the main piston and relieving the compressor. The necessary idle air is drawn into the screw unit through one of the two auxiliary valves in the lower part which opens when the main piston closes. The separator vessel is relieved through the other auxiliary valve by blowing backwards through inlet filter. The control valve is therefore controlled by the solenoid valve without an actual air flow through it. The solenoid valve is a 3/2 currentless open (NO) valve.

Maintenance: The only maintenance is replacement of diaphragms, preferably at least every 10.000 hours. In case of control valve leakage replace it. Diaphragm repair kit No. 759001, valve housing kit No. 654766.

ON ALL MODELS the 4 x M6 screws MUST be locked by Omnifit 100 M lock fluid.
6: V-BELT PULLEYS:

6A: LINING UP OF PULLEYS:
In order to secure life of belts it is important that parallelism between both pulleys is constantly optimum. It is therefore important that V-belts are controlled in accordance with belt manufacturer directions with a view to fitting, tightening, and later maintenance. All belts are dimensioned for up to 25,000 hours’ trouble-free operation, but their life is dependant on the above.

Motor is positioned in a way to keep a constant and correct belt tension by its weight. However, models ST-7, ST-10 and ST 15 are fitted with an extra spring to increase belt tension as the motors of these models are too light.

On all ST screw compressors the belt tension is controlled in accordance with belt manufacturer recommendations.

V-belt pulley with TB tension bush!
Clean axle, tension bush, and cone in belt pulley, lubricate cone and Allen screws.
Place pulley on shaft and fit bush.
Turn pulley until its threaded holes are opposite to the bush holes.
Fit Allen screws and tighten so that pulley can still be moved on the axle.

**Horizontal axle alignment**

Align motor and compressor axles, if necessary by means of level, until they are parallel.

**OBS!** Maximum deviation from 100% parallelism is 0.5˚.

**NOTE: ALIGN PULLEYS BY ADJUSTING POSITION OF AXLE IN ADJUSTMENT RING AT MOTOR AXLE END.**

**Vertical pulley alignment.**

Align pulleys until their exterior side is level with straightedge.

**OBS!** After tightening of tension bushes check that pulleys are still level.

**TB Torques**

<table>
<thead>
<tr>
<th>TB</th>
<th>Min</th>
<th>Max</th>
</tr>
</thead>
<tbody>
<tr>
<td>TB 1008+1108</td>
<td>4.5</td>
<td>5.7</td>
</tr>
<tr>
<td>TB 1210+1215+1310+1315</td>
<td>16</td>
<td>20</td>
</tr>
<tr>
<td>TB 1610+1615</td>
<td>16</td>
<td>20</td>
</tr>
<tr>
<td>TB 2012+2017</td>
<td>25</td>
<td>31</td>
</tr>
<tr>
<td>TB 2517+2525</td>
<td>39</td>
<td>49</td>
</tr>
<tr>
<td>TB 3020+3030</td>
<td>74</td>
<td>92</td>
</tr>
<tr>
<td>TB 3525+3535</td>
<td>92</td>
<td>115</td>
</tr>
<tr>
<td>TB 4030+4040</td>
<td>138</td>
<td>172</td>
</tr>
<tr>
<td>TB 4535+4545</td>
<td>156</td>
<td>195</td>
</tr>
<tr>
<td>TB 5040+5050</td>
<td>220</td>
<td>275</td>
</tr>
</tbody>
</table>
6B: INSTALLATION - TIGHTENING - WEAR CHECK

**Installation of new SK, VB & SuperTX V-belts**

*Always* place V-belts *loosely* on pulleys - NOT violently!

To make room for fitting the belts tilt motor platform by tightening the M12 bolt on it down against the base frame. When motor has been sufficiently tilted it is easy to replace the belts, see also paragraph 13B.

**NOTE:** Afterwards, remember to remove the bolt.

**Tightening of new Optibelt V-belts**

The motor on all ST screw compressors is positioned in a way to give a satisfactory belt tension by its weight. However, models ST 7, ST 10 and ST 15 are fitted with an extra spring to increase belt tension as the motors of these models are too light.

The belt tension $[T_{min} / T_{max}]$ can be checked by means of a belt tension tester. Later tightening is superfluous.

The belt tension is checked for the first time after the factory test run. The belt tension values are for almost all types within the lower range of tolerance zone.

* Belt tension tester is available from STENHØJ KOMPRESSOR A/S.

### Maximum permissible angle deviation

With belts tightened the pulleys do not level any longer, i.e. there is a play at point $X$!

<table>
<thead>
<tr>
<th>V-belt pulley diameter</th>
<th>$X_{max}$</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 112 mm</td>
<td>0.5 mm</td>
</tr>
<tr>
<td>&lt; 224 mm</td>
<td>1.0 mm</td>
</tr>
<tr>
<td>&lt; 450 mm</td>
<td>2.0 mm</td>
</tr>
<tr>
<td>&lt; 630 mm</td>
<td>3.0 mm</td>
</tr>
<tr>
<td>&lt; 900 mm</td>
<td>4.0 mm</td>
</tr>
<tr>
<td>&lt; 1100 mm</td>
<td>5.0 mm</td>
</tr>
<tr>
<td>&lt; 1400 mm</td>
<td>6.0 mm</td>
</tr>
<tr>
<td>&lt; 1600 mm</td>
<td>7.0 mm</td>
</tr>
</tbody>
</table>

**Control of Optibelt SK, VB & SuperTX V-belts**

The belt tension values can be checked as per next page.

Check V-belts regularly.

Also check wear of V-belt pulleys regularly, e.g. once a year, and always when replacing V-belts.

* Belt tension tester is available from STENHØJ KOMPRESSOR A/S.

* Groove gauge is available from STENHØJ KOMPRESSOR A/S.
### 6C: BELT TENSION VALUES

**Tightening of SK, VB & SuperTX V-belts**

**T_{\text{max}}** values [N] for **SK & SuperTX narrow V-belts** with belt speeds 5 ... 42 m/s.

<table>
<thead>
<tr>
<th>Belt profile</th>
<th>Smallest pulley diameter [mm]</th>
<th>Installation T_{\text{max}} [N]</th>
<th>Control T_{\text{max}} [N]</th>
<th>SuperTX V-belts</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td><strong>SK, VB V-belts</strong></td>
<td></td>
<td><strong>SuperTX V-belts</strong></td>
</tr>
<tr>
<td><strong>SPZ, 3V</strong></td>
<td>&lt; 71</td>
<td>200 N</td>
<td>150 N</td>
<td>250 N <strong>200 N</strong></td>
</tr>
<tr>
<td><strong>XPZ, 3VX</strong></td>
<td>71 ... 90</td>
<td>250 N</td>
<td>200 N</td>
<td>300 N <strong>250 N</strong></td>
</tr>
<tr>
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*) MAX. PRESSURE AND CONTINUOUS FULL LOAD SPECIFICATIONS SUBJECT TO ALTERATION

**) OUTPUT IN ACCORDANCE WITH ISO 1217, MEASURED AT COMPRESSED AIR DISCHARGE
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<td>2950</td>
<td>98</td>
<td>4</td>
<td>12 - 14°C</td>
<td>10-11 LIT</td>
</tr>
<tr>
<td>ST 60</td>
<td>7.5, 6.8 E12</td>
<td>6188</td>
<td>45 KW</td>
<td>48.3</td>
<td>8.7</td>
<td>2950</td>
<td>98</td>
<td>4</td>
<td>12 - 14°C</td>
<td>10-11 LIT</td>
<td>76</td>
</tr>
<tr>
<td>ST 60</td>
<td>8.8, 6.4 E12</td>
<td>5841</td>
<td>45 KW</td>
<td>48.3</td>
<td>8.7</td>
<td>2950</td>
<td>98</td>
<td>4</td>
<td>12 - 14°C</td>
<td>10-11 LIT</td>
<td>76</td>
</tr>
<tr>
<td>ST 60</td>
<td>10</td>
<td>5.9 E12</td>
<td>5215</td>
<td>45 KW</td>
<td>48.3</td>
<td>8.7</td>
<td>2950</td>
<td>98</td>
<td>4</td>
<td>12 - 14°C</td>
<td>10-11 LIT</td>
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<tr>
<td>ST 60</td>
<td>13</td>
<td>5.3 E12</td>
<td>4868</td>
<td>45 KW</td>
<td>48.3</td>
<td>8.7</td>
<td>2950</td>
<td>98</td>
<td>4</td>
<td>12 - 14°C</td>
<td>10-11 LIT</td>
</tr>
</tbody>
</table>

*) MAX. PRESSURE AND CONTINUOUS FULL-LOAD SPECIFICATIONS ARE SUBJECT TO ALTERATIONS

**) OUTPUT ACCORDING TO ISO 1217, MEASURED AT COMPRESSED AIR DISCHARGE
7C: ELECTRO-TECHNICAL DATA:

Standard version:

Voltage: 3 x 400 Volt
Frequency: 50 Hz
Control voltage: 24 V(AC)

The compressor control is made of well-known components available world-wide. All ST screw compressors have a control voltage of 24 VAC, and therefore only a 4-core cable is necessary. The control supervises and controls compressor operation optimizing operation to produce the compressed air as economically as possible.

Solenoid valve voltage: 24 V(AC)

Protection:
Motor: IP 54
Complete compressor: IP 21

Remote alarm: ST 7 - ST30: No, not prepared for this
ST 40 - ST 60: Yes, prepared, see paragraph 8B
Remote start/stop: Yes, all types are prepared. See wiring diagram.
Temperature range: +2 ---> +40°C
Main motor data:
RPM: 2840 ----> 2950, depending on motor size
Insulation class: F
Starting current with star/delta starter: app. 2 x nominal current consumption
Star time: app. 12 sec.

WHEN REPAIRING AND MAINTAINING THE COMPRESSOR ALWAYS USE THE WIRING DIAGRAM INCLUDED IN DELIVERY.

The data below are only valid for standard versions (400/24 Vac).

<table>
<thead>
<tr>
<th>TYPE</th>
<th>MOTOR</th>
<th>NOM. CURR.</th>
<th>MIN. CU WI</th>
<th>MOTOR</th>
<th>MAX.</th>
<th>NUMBER</th>
<th>MAX. NO.</th>
<th>START/h</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>KW</td>
<td>AMP.</td>
<td>SECT. MM²</td>
<td>RPM</td>
<td>AMP.</td>
<td>DUCTORS</td>
<td>1/h</td>
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<tr>
<td></td>
<td></td>
<td>MAIN)</td>
<td></td>
<td></td>
<td></td>
<td>***</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ST - 7</td>
<td>5,5</td>
<td>11,4/11,4</td>
<td>1,5</td>
<td>2840</td>
<td>35</td>
<td>4</td>
<td>15</td>
<td></td>
</tr>
<tr>
<td>ST - 10</td>
<td>7,5</td>
<td>15,6/15,6</td>
<td>2,5</td>
<td>2860</td>
<td>35</td>
<td>4</td>
<td>14</td>
<td></td>
</tr>
<tr>
<td>ST - 15</td>
<td>11</td>
<td>21/21</td>
<td>2,5</td>
<td>2900</td>
<td>35</td>
<td>4</td>
<td>13</td>
<td></td>
</tr>
<tr>
<td>ST - 20</td>
<td>15</td>
<td>28/28</td>
<td>4</td>
<td>2920</td>
<td>50</td>
<td>4</td>
<td>12</td>
<td></td>
</tr>
<tr>
<td>ST - 25</td>
<td>18,5</td>
<td>35/35</td>
<td>6</td>
<td>2920</td>
<td>50</td>
<td>4</td>
<td>11</td>
<td></td>
</tr>
<tr>
<td>ST - 30</td>
<td>22</td>
<td>42/42</td>
<td>10</td>
<td>2930</td>
<td>80</td>
<td>4</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>ST - 40</td>
<td>30</td>
<td>56/58</td>
<td>16</td>
<td>2930</td>
<td>100</td>
<td>4</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>ST - 50</td>
<td>37</td>
<td>68/70</td>
<td>16</td>
<td>2950</td>
<td>100</td>
<td>4</td>
<td>9</td>
<td></td>
</tr>
<tr>
<td>ST - 60</td>
<td>45</td>
<td>82/84</td>
<td>25</td>
<td>2950</td>
<td>100</td>
<td>4</td>
<td>8</td>
<td></td>
</tr>
</tbody>
</table>

*: This value can vary a bit from one compressor to the other.
**: Always contact the local authorized electrician.
***: Pre-fuses with normal fusing time. Dimension in accordance with local regulations.
8: CONTROL IN GENERAL - CONNECTION OF OPTIONAL EXTRAS:

8A: CONTROL IN GENERAL:
Models ST 7 --> ST 30 do not incorporate any optional extras; the control function of these compressors corresponds in principle to that of the well-known SI models. For safety reasons the motor is controlled by a motor starter (overcurrent protection), and the temperature is controlled by a contact thermometer.

There are two control versions on models ST-40 --> ST-60, standard WITHOUT possibility of connecting optional extras, the other WITH this possibility. Later connection of optional extras requires therefore a new circuit board for the control unit. The control supervises both motors by means of their motor starters, and temperature by means of a contact thermometer. A phase sequence relay supervises phase sequence. The standard control works fully automatically as well as manually (semi-automatically). The circuit board WITH optional extras offers all possibilities. Every optional extra is connected by moving a dip-switch on the back of the board. Functions as follows:

Dip-switch 1: Oil level  Dip-switch 2: Filter 1  Dip-switch 3: Filter 2

Control of functions by means of lamp/LED test, i.e. press start button during operation.
An extra hour counter can be connected to both controls, e.g. for counting full-load hours.

8B: CONNECTION OF REMOTE ALARM:
Models ST-7 ----> ST-30 are not prepared for remote alarm. The control on models ST-40 - ST-60 is as standard equipped with a non-voltage switch for connection of remote alarm. Maximum load 2A (AC), see page 11 of wiring diagrams. Connection to terminal block X1, terminals 9 and 10, see page 11 of wiring diagrams.

8C: CONNECTION OF REMOTE CONTROL:
All models ST-7 --> ST-60 are as standard prepared for connection of remote control. It is done by by-passing the pressure switch. On models ST-7 --->ST-30 connection to terminal block X1, terminal 4 and 5. To force the compressor to stand still, simply connect the two terminals 4 and 5 directly. See wiring diagram page 3.

On models ST-40 ----> ST-60, connection to terminal block X1, terminals 7 and 8. To force the compressor to stand still, simply disconnect the " jumper " between the two terminals 7 and 8. See page 11 of wiring diagrams.

8D: CONNECTION OF FILTER SUPERVISION:
Models ST-40 --> ST-60 can be fitted with supervision of two out of three filters at your choice. Differential pressure gauges with connection function in case of failure are used. For air filter the pressure gauge is fitted in the 1/8” coupling on top of air filter plate, for oil filter in the oil filter base, for separator filter in the two quick couplings where possible pressure drop over this filter is measured.

Electrical connection of pressure gauges direct to terminal block X1 in control unit, terminals 3 and 4, 5 and 6 respectively. Remember to connect earth correctly. Any faults are indicated by the control unit, but the compressor DOES NOT stop. See wiring diagram. Models ST-7 ---> ST-30 do not have this option.

8E: CONNECTION OF OIL LEVEL SUPERVISION:
On models ST-40 --> ST-60 the oil level supervision can be connected independent of the filter supervision. An optical sensor is used here measuring oil level continuously during operation and stopping the compressor in case of faults. The sensor is fitted in the flat end cover of the separator vessel with a 3/8” plug. Connect sensor conductors direct to terminal block X1 in control unit, terminals 1 and 2, and to terminal block X3, terminal 10.

Brown cable (+) to terminal X1-1, black cable (signal) to terminal X1-2, and blue cable (-) to terminal X3-10.

Optional extra order Nos. can be found on page 8 of spare parts list. Models ST-7 ----> ST-30 do not have oil level supervision.

8F: TIMER ADJUSTMENT:
Models ST-7 ---> ST-30 have one built-in timer (KT 3.07) adjustable from 0 ---> 12 min. The adjustment is dependant on motor size and no-load time for separator vessel. The timer starts when maximum compressor pressure is reached. The timer is placed in the control box and must never be set at less than 3 minutes, see paragraph 7C.

Models ST-40 ---> ST-60 have two built-in timers: no-load timer (T2) adjustable from 0 ---> app. 165 sec. and stop timer (T3) adjustable from app. 90 sec. ---> app. 800 sec. Adjustment must correspond to relevant motor size for
maximum number of starts per hour and separator vessel no-load time. T2 starts counting when compressor maximum pressure is reached, and T3 starts counting when motor stops. The no-load timer must not be set at less than 45 sec., and the stop timer not at less than 360 sec. The timers are placed at the top left of the circuit board, see paragraph 7C.

8G: ADJUSTMENT OF PRESSURE SWITCH:

The compressor is factory adjusted; on the pressure gauge (see item 3, paragraph 3A / 3C) it is possible to adjust maximum and minimum pressures. Maximum pressure: turn clockwise / anti-clockwise to raise / lower pressure. Differential pressure: push button and turn clockwise / anti-clockwise to reduce / increase differential pressure.

8H: STARTING PROCEDURE:

The compressor has been factory adjusted at values corresponding to “normal” operation. After start, fine-adjust it to the actual operating conditions.

Do not start compressor unless ALL doors/covers have been fitted correctly. NEVER make the compressor work with a higher pressure and/or temperature than it is intended for. Maximum temperature 100°C.

The following standard pressures with corresponding differential pressures are available: 5 bar /1bar - 7.5 bar/ 1.5 bar - 8.8 bar / 1.5 bar - 10 bar / 2 bar - 13bar / 2.5 bar.

During transport oil may collect in the separator filter. Therefore the compressor should run no-load operation app. 5 minutes at the first starting procedure.

Full sound reduction is only achieved with ALL doors/covers fitted. ALWAYS use hearing protection, even in case of brief adjustments.

The compressor operation is fully automatic, and it therefore starts and stops automatically. It is possible to optimize operation to make it most economical (see paragraphs 8F / 8G).

IN CASE OF ANY DANGER PRESS STOP SWITCH AT ONCE TO STOP THE COMPRESSOR IMMEDIATELY.

9: BREAK-DOWNS - REMEDY - REPAIR:

9A: CONTROL PANEL:
Function of buttons and lamp/LED indications are to be found in the instruction manuals.

9B: COMPRESSOR:

CAUTION: Prior to any disassembly of the compressor, including oil or filter replacement etc., check that the complete system is without pressure and that the mains has been switched off, see next page.

9C: ELECTRICAL SYSTEM:
Any intervention in or repair of the electrical system must only be done by authorized personnel. The compressor delivery includes detailed diagrams of ALL electrical equipment, see also next page.
### 9D: TROUBLE-SHOOTING CHART:

<table>
<thead>
<tr>
<th>SYMPTOM</th>
<th>CAUSE</th>
<th>REMEDY</th>
<th>SEE PARAGRAPH</th>
</tr>
</thead>
<tbody>
<tr>
<td>Compressor cannot start</td>
<td>Electric installation defective</td>
<td>Check installation</td>
<td>8A</td>
</tr>
<tr>
<td></td>
<td>Motor starter activated</td>
<td>Re-set motor starter</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Automatic fuse activated</td>
<td>Re-set automatic fuse</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Call authorized electrician</td>
<td></td>
</tr>
<tr>
<td>Compressor starts, but stops after a few revolutions</td>
<td>Motor starter activated</td>
<td>Re-set motor starter</td>
<td>8A</td>
</tr>
<tr>
<td></td>
<td>Excessive separator vessel pressure, leaking non-return valve</td>
<td>System without pressure, check non-return valve</td>
<td></td>
</tr>
<tr>
<td>Compressor starts sluggishly</td>
<td>Leaking non-return valve</td>
<td>Check installation</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Too low supply voltage</td>
<td>Replace solenoid valve</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Defective solenoid valve</td>
<td>Check inlet valve</td>
<td></td>
</tr>
<tr>
<td>Compressor starts, but only runs no-load</td>
<td>Leaking air hosing</td>
<td>Replace hosing</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Defective solenoid valve</td>
<td>Replace solenoid valve</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Defective star/delta timer</td>
<td>Replace star/delta timer</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Control valve cannot open</td>
<td>Recondition control valve</td>
<td></td>
</tr>
<tr>
<td>The no-load time is too long</td>
<td>Too small pressure difference</td>
<td>Adjust pressure difference</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Too small air vessel water in reciever</td>
<td>Connect larger/more vessel(s)</td>
<td></td>
</tr>
<tr>
<td>Compressor stops or discharges before reaching the pre-set discharge pressure</td>
<td>Vessel pressure higher than shown on pressure gauge</td>
<td>Replace pressure gauge</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Defective pressure switch</td>
<td>Replace pressure switch</td>
<td></td>
</tr>
<tr>
<td>Compressor does not stop at pre-set discharge pressure</td>
<td>Defective pressure switch</td>
<td>Replace pressure switch</td>
<td></td>
</tr>
<tr>
<td>Safety valve in separator vessel blows</td>
<td>Blocked separator filter</td>
<td>Replace separator filter</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Defective safety valve</td>
<td>Replace safety valve</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Defective pressure switch</td>
<td>Replace pressure switch</td>
<td></td>
</tr>
<tr>
<td>Excessive oil consumption</td>
<td>Blocked drain filter</td>
<td>Clean drain filter</td>
<td></td>
</tr>
<tr>
<td>Oil in compressed air</td>
<td>Leaking drain system</td>
<td>Check oil level</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Excessive oil level</td>
<td>Replace separator filter</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Defective separator filter</td>
<td>Recondition inlet valve</td>
<td></td>
</tr>
<tr>
<td>Oil in inlet filter after a stop</td>
<td>Defective control valve</td>
<td>Recondition inlet valve</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Defective solenoid valve</td>
<td>Replace solenoid valve</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Lack of belt tension</td>
<td>Check clearance between bolt and baseframe</td>
<td></td>
</tr>
</tbody>
</table>

### 10: MAINTENANCE:

### 10A: MAINTENANCE PLAN:
### WHAT TO DO

<table>
<thead>
<tr>
<th>Check</th>
<th>When</th>
<th>How</th>
<th>See Para.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oillevel</td>
<td>0h</td>
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<tr>
<td>Oil consumption</td>
<td>50h</td>
<td>*</td>
<td>*</td>
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<tr>
<td>Drainfilter</td>
<td>250h</td>
<td>*</td>
<td>*</td>
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<tr>
<td>Leaks</td>
<td>8000h</td>
<td>*</td>
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<tr>
<td>Pressure and temperature differences</td>
<td>2. year</td>
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<td>*</td>
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<tr>
<td>Cooler and ribs</td>
<td>check</td>
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<tr>
<td>Pre-filter</td>
<td>clean</td>
<td>*</td>
<td>*</td>
</tr>
<tr>
<td>Oil filter</td>
<td>replace</td>
<td>*</td>
<td>*</td>
</tr>
<tr>
<td>Air filter</td>
<td>*</td>
<td>*</td>
<td>*</td>
</tr>
<tr>
<td>Separation filter</td>
<td>*</td>
<td>*</td>
<td>*</td>
</tr>
<tr>
<td>Separation pressure &lt; 1 bar</td>
<td>*</td>
<td>*</td>
<td>*</td>
</tr>
<tr>
<td>Inlet controller</td>
<td>*</td>
<td>*</td>
<td>*</td>
</tr>
<tr>
<td>Bolt torque</td>
<td>*</td>
<td>*</td>
<td>*</td>
</tr>
<tr>
<td>Hosing condition</td>
<td>*</td>
<td>*</td>
<td>*</td>
</tr>
<tr>
<td>All electrical connections and functions</td>
<td>*</td>
<td>*</td>
<td>*</td>
</tr>
<tr>
<td>Minimum pressure valve</td>
<td>*</td>
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<td>*</td>
</tr>
<tr>
<td>All safety functions</td>
<td>*</td>
<td>*</td>
<td>*</td>
</tr>
<tr>
<td>Direction of rotation</td>
<td>*</td>
<td>*</td>
<td>*</td>
</tr>
<tr>
<td>Motor / motor bearings</td>
<td>*</td>
<td>*</td>
<td>*</td>
</tr>
<tr>
<td>Parallellism of belt pulleys</td>
<td>*</td>
<td>*</td>
<td>*</td>
</tr>
</tbody>
</table>

**REMEMBER FIRST OIL-CHANGE AFTER 200 HOURS. (See paragraph 1A)**
11: MAINTENANCE PROCEDURES:

11A: GENERAL:

Prior to any intervention in the compressor the main switch MUST be switched off and the COMPLETE system be without pressure.

If repairs or service work necessitate test run of the compressor the following precautions must be made:

- No other persons near the compressor
- Suitable protective clothing should be worn, and it must not be loose
- Surroundings must be informed of possible risks (e.g. air escape from safety valve, dismounted safety devices etc.)
- A warning sign should be visible stating “service work - running compressor”.

After the end of this work the following precautions should be made:
- Suitable test run of the compressor has been made
- All safety devices should be refitted correctly
- Correct packing, handling, and removal of all dangerous materials

11B: PERIODICAL STANDSTILL:
If the compressor stands still for long periods (> 3 months ) the maintenance procedures described in paragraph 8H should be made prior to re-starting the compressor.

11C: OIL LEVEL:

In order to keep reliability up to standard regular oil level checks are recommended, preferably once a week.

Oil level checking procedure:
Both compressor types are fitted with two oil inspection glasses placed at the end/bottom of the separator vessel.
The two glasses become visible after opening / dismounting the front cover. see paragraph 10D of the instruction manual.
As shown on the sketch the upper glass centre is maximum level and lower glass centre is minimum level. Refilling from minimum to maximum level corresponds to app. 3.5-4 l of oil for ST 7 ---> ST 30 and 4-5 l of oil for ST 40 ---> ST 60.
OBSERVE!!:
On models ST 7 --> ST 30 the system has during standstill a small overpressure of app. 0.5 bar. In order to relieve this pressure the oil filling plug MUST be loosened slowly before it is dismounted.

When oil level is checked during operation the rotating parts of the compressor should be observed carefully. Oil level check is therefore recommended during standstill.

NOTE: NEVER OVERFILL THE COMPRESSOR
BEFORE DISMOUNTING OIL FILLING PLUG ENSURE THAT THE WHOLE SYSTEM IS WITHOUT PRESSURE.

On sites near the sea or in chemical atmospheres the oil characteristics may be destroyed due to the chlorine (salt) or other chemicals. In such cases please contact STENHØJ or the oil supplier.

11D: OIL CHANGE:
The oil in the system lubricates all moving parts in the compressor to make other lubrication superfluous.
First oil change after 200 hours; thereafter, once per 2000 hours or at least once a year.

NOTE: During operation the oil and the separator vessel are hot, and there is therefore danger of burn.
Always remove the old oil in an environmentally correct way.

OIL QUANTITY IN COMPRESSOR, MODELS ST 7 --> ST 30 APP. 6-7 L DEPENDING ON SIZE; MODELS ST 40 --> ST 60 APP. 10-11 L DEPENDING ON SIZE.

With reference to choice of oil brand please see oil specification instruction No. T81455 included in delivery.

11E: CHANGE OF OIL BRAND:
Prior to changing oil brand the complete system should be flushed. Drain off old oil and fill in new. Let the compressor run full-load operation for app. 20 minutes. Re-drain oil, change oil filter, and fill in new oil.

Replace separator filter (see paragraph 11M).

ONLY USE SUITABLE OIL (SEE OIL SPECIFICATIONS T81455).
Note in the maintenance schedule (paragraph 11Z) that the oil brand has been changed.

Remove oil and separator filters in an environmentally correct way.

11F: OIL CONSUMPTION:

Note in the maintenance schedule (paragraph 11Z) the amount of oil filled into the compressor.
Notice if there is oil emulsion in cyclone, drain etc. Excessive oil consumption may be due to choked drain, defective separator filter, or too high working temperature.

11G: DRAIN FILTER:
The primary purpose of the drain filter is protecting the small drain system jet against choking. The filter insert can be removed by screwing off the lower part of the filter housing. The flow is from interior --> out, and therefore all dirt is caught inside the filter. The filter insert with O-ring is available, see spare parts list.

11H: LEAKAGE:
Check the whole compressor for possible leakage with special attention to the oil system and the drain.

11I: PRESSURE AND TEMPERATURE DEVIATIONS:
Check compressor for possible abnormal pressures and temperatures. As a rule-of-thumb the working temperature should be app. 45-55°C above ambient temperature, measured at cooling air intake. This temperature is dependant on size.
Check pressure with a precision pressure gauge; possible deviations may be due to a defective pressure gauge.

11J: COOLER, PRE-FILTER:

COOLER:
In order to ensure optimum compressor cooling the cooler should be cleaned at regular intervals, e.g. by means of compressed air (MAX. 3-4 BAR) or an oil/grease dissolvent.

PRE-FILTER:
The standard compressor pre-filter can be removed and cleaned in a light sulphonic solution. NEVER use solvents or other chemicals for this purpose. The filter should be completely dry before it is re-fitted.

11K: OIL FILTER:

Only replace oil filter when compressor is stopped and without pressure.

1: Stop compressor and relieve pressure.

2: Dismount old oil filter (possibly by means of oil filter spanner).

3: Apply a thin layer of oil to the seal on the new filter and fit it. Turn filter clockwise until "contact" is felt, thereafter 3/4 turn with the hand. The filter is now fitted correctly.
After having started the compressor check possible leaks.
Oil filter order No.: see spare parts list.

11L: AIR FILTER:
Only replace air filter when compressor is stopped and without pressure.
1: Stop compressor and relieve pressure.
2: Dismount old air filter.
3: Replace or clean air filter insert. Cleaning not more than three times, thereafter replacement **MUST** take place.

Cleaning of air filter:
Clean filter with compressed air (max. app. 3-4 bar), only from interior ---> out.

**NEVER CLEAN FILTER WITH FLAMMABLE FLUIDS OR SOLVENTS.**

**11M: SEPARATOR FILTER:**

Only replace separator filter when compressor is stopped and without pressure.

1: Stop compressor and relieve pressure from the whole system.
2: Dismount piping and hosing to separator vessel and minimum pressure valve.
3: Loosen twelve M12 bolts in the top cover flange, dismount cover and thereafter filter.
4: Clean cover of seal residues.
5: Check drain system for circulation.
6: Fit new separator filter with new sealing.
7: Fasten (with torque 52 NM) and refit piping and hosing.

The actual pressure drop over the separator filter is measured (at constant pressure) as the difference between measurements at the quick couplings 1 and 2. If pressure drop is above 1 bar the filter should be
replaced. A pressure drop of app. 0.7 - 0.8 bar indicates a filter replacement within the next app. 400-500 hours.

Remove old oil and separator filter in an environmentally correct way.

Separator filter order Nos. see spare parts list.

11N: SEPARATOR VESSEL PRESSURE < 1.0 BAR:
The separator vessel pressure must be checked to ensure perfect function of relief system.
On models ST 7 ---> ST 30 the no-load pressure is normally 0.7 - 0.8 bar. If it is higher than 1.5 bar it is necessary to check and clean the complete relief system. The pressure must not be measured until after app. 60 seconds of no-load operation.
On models ST 40 ---> ST 60 the separator vessel pressure should be similar to atmospheric pressure, i.e. the separator vessel is completely relieved.

NOTE: On models ST 7 ---> ST 30 there is still pressure in separator vessel of app. 0.5 bar during standstill, see paragraph 11C.

11O: CONTROL VALVE:
Check function of control valve as described in paragraphs 5A and 5B. Main piston as well as possible auxiliary valves must move freely up and down. Special attention to possible wear on the seat under the main piston and condition of diaphragms.

Take care that the two auxiliary valves do not fall down into the screw unit during disassembly.

NOTE: PRIOR TO LIFTING MAIN PISTON TO INSPECT SEAT ENSURE THAT SEPARATOR VESSEL IS WITHOUT PRESSURE AS HOT OIL MAY OTHERWISE BE PRESSED OUT OF THE CONTROL VALVE.

11P: BOLT TIGHTENING:
Check/tighten all connections as described in paragraph 12.

11Q: CONDITION OF HOUSING:
Check all hoses for wear and possible damage. They must not be in press and must not touch each other or anything sharp since the vibrations would then damage the hoses.

11R: ELECTRICAL CONNECTIONS AND FUNCTIONS:
The electrical equipment on the compressor must be kept free from dirt and dust, i.e. by means of compressed air.
Check and tighten all electrical connections as well as all components having been abnormally hot and therefore with an abnormal colour.
Finally, check start and stop functions and lamp/LED test (press start during operation).

11S: MINIMUM PRESSURE / NON-RETURN VALVE:

Disassemble and clean minimum pressure/non-return valve:
In order to ensure correct function this valve must be checked regularly, i.e. disassembled and the sliding surfaces lubricated.

NOTE: The hose between this valve and the aftercooler may be under pressure.

Shut off compressor from air net at the cock just after the compressor. Loosen union nut slowly and relieve pressure. Loosen all valve upper part on the big top hexagon nut. Disassemble and clean all parts.
Brush sliding surfaces with thin grease, e.g. CASTROL MOLYLAX or a similar molykote product.

NOTE: NEVER remove locking pin in upper part since this gives the valve the correct factory-set opening pressure of 3.5 bar.
Repair kits for all minimum pressure valves are available, see spare parts list.
Re-assemble in the reverse order.

11T: SAFETY FUNCTIONS:
Check compressor safety functions as follows:
Over temperature relay: Cover cooler surface to prevent ventilation air from flowing through cooler. This makes temperature rise, and compressor must stop at app. 100 ℃.
Motor protection / motor starter: Check motor starter adjustment; reduce adjustment and observe that compressor stops. Follow this procedure for each of the motor starters if more than one.

NOTE: After the test re-adjust the motor starter(s) according to motor plate.

SAFETY VALVE:

The safety valve in the separator vessel is factory-set at a pressure of 2 bar above nominal working pressure of compressor. The safety valve is sealed and must not be adjusted. The function of the safety valve must be checked at regular intervals (at least every 6 months). The procedure is as follows:

With compressor running and pressure on, lift valve piston or turn union nut on top of safety valve ANTI-CLOCKWISE. This opens the valve, and the compressed air MUST now blow out through the safety valve. After this test let go of valve piston or turn union nut CLOCKWISE back to normal closed position.

NOTE: The safety valve and the air may be very hot.

11U: DIRECTION OF ROTATION:
When installing and / or repositioning the compressor ensure that direction of rotation is correct since it is otherwise damaged, see instruction manual, paragraph 5F.

11V: MOTOR / MOTOR BEARINGS:

MOTOR:

It is important to keep motor cooling ribs free of dirt and dust, e.g. by means of compressed air.

NEVER clean motor with water or other fluids.
Check motor cooling air inlet at regular intervals.

MOTOR BEARINGS WITHOUT LUBRICATING NIPPLES:
In normal working conditions two-pole motors are maintenance-free for several thousand hours, often 6 - 8000 hours. Multi-pole motors are normally maintenance-free in a longer period, often 15-18,000 hours. The motor should, however, be disassembled, cleaned and checked at least every 4th year. If necessary the bearings should be replaced, but at least the space between inner and outer rings of bearings should be filled app. 50% with a suitable grease.

MOTOR BEARINGS WITH LUBRICATING NIPPLES:
The life of the motor depends on strict observation of the lubricating intervals. It is important not to “over-lubricate” the bearings.
Prior to changing to lubricating grease on a different base the bearings MUST be thoroughly cleaned. The lubricating grease should fulfil the following specifications:
- Pour point: > 190°C
- Water content: < 0.3 %

If the motor has factory-fitted lubricating nipples the bearings should only be lubricated every app. 2500 hours. The quantity depends on the size of the motor, i.e. app. 5 g for the small (5.5 kW) and app. 18 g for the large (45 kW) motors.

ONLY LUBRICATE MOTOR IN OPERATION BUT OBSERVE DANGEROUS ROTATING PARTS.

11X: PARALLELISM OF V-BELT PULLEYS:
Motor and compressor V-belt pulleys must be completely parallel to ensure optimum function and optimum life, see paragraph 6.
11Y: TEST RUN:

After every service or maintenance work it is necessary to test run the compressor.

1: Start compressor, see paragraph 8H.

2: Check all functions relevant to the work done.

3: Check compressor for possible leaks.

4: Finally, check oil level, see paragraph 11C.
## 11Z: MAINTENANCE SCHEDULE

<table>
<thead>
<tr>
<th>COMPRESSOR TYPE</th>
<th>YEAR</th>
<th>MAINTENANCE SCHEDULE</th>
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<tr>
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<td></td>
<td></td>
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</tr>
<tr>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td></td>
<td></td>
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<td>diff. repl.</td>
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</tr>
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<td></td>
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<td>V-BELTS</td>
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<td>ELECTR EQUIP.</td>
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<tr>
<td></td>
<td></td>
<td>NOTE / SIGNATURE</td>
<td></td>
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Check off, insert possible values, and confirm compressor condition with signature of operator/repairer.
A copy of this page can be used as the compressor logbook.
12: TIGHTENING OF BOLTS / SCREWS:

Tighten all bolts and screws as follows:

<table>
<thead>
<tr>
<th>Quality ---</th>
<th>5.6</th>
<th>8.8</th>
<th>12.9</th>
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</thead>
<tbody>
<tr>
<td>thread</td>
<td>NM / KPM</td>
<td>NM / KPM</td>
<td>NM / KPM</td>
</tr>
<tr>
<td>M6</td>
<td>6 / 0.6</td>
<td>10 / 1.0</td>
<td>17 / 1.7</td>
</tr>
<tr>
<td>M8</td>
<td>15 / 1.5</td>
<td>25 / 2.5</td>
<td>41 / 4.1</td>
</tr>
<tr>
<td>M10</td>
<td>30 / 3.0</td>
<td>48 / 4.8</td>
<td>81 / 8.1</td>
</tr>
<tr>
<td>M12</td>
<td>52 / 5.2</td>
<td>82 / 8.2</td>
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</tr>
<tr>
<td>M16</td>
<td>126 / 12.6</td>
<td>190 / 19.0</td>
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</tr>
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</table>

TIGHTENING OF BOLTS / SCREWS ON DISCHARGE FLANGES ETC. FOR AIR ENDS as follows:

<table>
<thead>
<tr>
<th>SCREW UNIT TYPE</th>
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<tbody>
<tr>
<td>thread</td>
<td>NM / KPM</td>
<td></td>
</tr>
<tr>
<td>1” BSP STENHØJ E3</td>
<td>/</td>
<td></td>
</tr>
<tr>
<td>M12 STENHØJ E6</td>
<td>91 / 9.1</td>
<td></td>
</tr>
<tr>
<td>M12 STENHØJ E12</td>
<td>91 / 9.1</td>
<td></td>
</tr>
<tr>
<td>M16 STENHØJ E25</td>
<td>222 / 22.2</td>
<td></td>
</tr>
<tr>
<td>M20 STENHØJ E75</td>
<td>434 / 43.4</td>
<td></td>
</tr>
</tbody>
</table>

The bolts MUST be tightened with a manual torque wrench with ordinary bevelled washers underneath.

13: DISASSEMBLY / ASSEMBLY DIRECTIONS:
PRIOR TO ANY DISASSEMBLY SWITCH OFF MAIN SWITCH.

13A: INLET CONTROLLER:
The control valve is a vital part of the compressor, and it should therefore be treated carefully. No tools should be used other than for loosening the screws on the valve.
* : Remove air filter and possible plate.
* : Remove all hosing to the control valve.
* : Remove 4 x M8, M10 or M12 bolts in the centre of the valve.
* : Support valve with both hands and pull carefully out in the longitudinal direction of the screw unit until the two auxiliary valves (if the compressor model in question has these auxiliary valves) are “caught” with the fingers under the lower part in order to prevent them from falling down into the screw unit.

** : Re-fit in the reverse order with new seals.
** : Press main piston carefully down towards the seat WITHOUT using tools.
** : Connect voltage and start compressor.
** : Check valve function as per description in paragraphs 5A / 5B.
** : Clean / replace air filter and re-fit.

13B: V-BELTS:
V-belts should be fitted without any form of violence or use of tools.
* : Lift motor by tightening the bolt from the transport fastening down against the base frame.
* : With motor lifted it is easy to remove and fit the belts.
** : Lower motor to its normal position. Remove the bolt or ensure that there is sufficient space under it, even when the belts have settled.
** : Check belt pulleys for wear and check their parallelism as per paragraphs 6A / 6B.

NOTE: THE DIRECTIONS IN PARAGRAPH 6 MUST BE STRICTLY ADHERED TO.

13C: ELECTRICAL MOTOR:
* : Remove supply cables to motor; mark them and note their position in the terminal block carefully.
* : Remove V-belts as described above.
* : Remove motor fixing bolts.
* : Remove possible ventilator at the back of the motor.
* : Place crane over motor lifting eye and pull motor gently out of the cabinet.

** : Re-fit in the reverse order and tighten bushes with torque wrench.
** : Check motor direction of rotation and correct indication on phase sequence relay.
** : Fit V-belts as described above.
** : Check parallelism of belt pulleys.
** : Remove transport fastening bolt as described above.

13D: SCREW UNIT:
* : Shut off air between compressor and air receiver.
* : Drain off oil from compressor unit.
* : Remove air filter and V-belts.
* : Remove all piping and hosing to screw unit and control valve.
* : Loosen the four fixing bolts.
* : Arrange for support of the screw unit.
* : Remove the four bolts.
* : It is now possible by turning the screw unit to manoeuvre it out of the base frame / supporting frame and place it on a table.
* : Remove control valve, flange, fittings, and possibly the belt pulley.

** : Fit loose parts except control valve on the new screw unit with new seals.
** : Re-fit screw unit in frame in the reverse order.
** : Tighten all bolts with moment as per paragraphs 11P / 12.
** : Fill in oil and also app. 1 l into the screw unit; turn screw in direction “arrow” until it runs easily and smoothly again.
** : Re-fit control valve and tighten it with moment as described in paragraphs 5A / 12.
** : Re-fit V-belts and loosen transport fastening.
** : Adjust star/delta timer at app. 15/20 seconds. Start compressor, check function and possible leaks.
** : Re-adjust star/delta timer.

** : It is possible by turning the screw unit to manoeuvre it out of the base frame / supporting frame and place it on a table.

13E: COOLER:
* : Shut off air between compressor and air receiver.
* : Drain off oil from compressor unit.
* : Loosen top / front cover.
* : Loosen all fixing bolts and lift out cooler.
* : Remove fittings on cooler.

** : Move fittings to new cooler (or fit new fittings).
** : Re-fit in the reverse order.
** : Fill in oil, check oil level, and start compressor, see paragraphs 11C / 8H.
** : Check for possible leaks.

13F: CONTROL UNIT:
On models ST-7 ---> ST-30 the complete control unit must be replaced.
On models ST-40 ---> ST-60 the control unit is placed behind the cover on front of compressor and becomes accessible when the cover is removed. The cover is fitted with “keyholes” to make disassembly easier. It is possible to replace circuit board only, see spare parts list.

13G: COVERS:
All covers on all ST screw compressors are fitted with “keyholes”.

14: SPAREPARTS RECOMMENDATION:
14A: RECOMMENDED SPAREPARTS, SERVICECARS CONCERNING ST-SCREWCOMPRESSORS:
In order to carry out the most common repairing and maintenance on ST- screws, the following spareparts are recommended always to be present in the service car:

<table>
<thead>
<tr>
<th>Designation</th>
<th>Part nr.</th>
<th>Qty.l</th>
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</thead>
<tbody>
<tr>
<td>Airfilter ST-7 --&gt; ST30</td>
<td>213140</td>
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<tr>
<td>Airfilter ST-40 --&gt; ST60</td>
<td>213130</td>
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<tr>
<td>Oilfilter ST-7 --&gt; ST10 Max. 10 Bar</td>
<td>213123</td>
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<tr>
<td>Oilfilter ST-15 --&gt; ST30 Max. 10 Bar</td>
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<td>Oilfilter ST-40 --&gt; ST60 Max. 10 Bar</td>
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<td>Separator filter ST-7 --&gt; ST15</td>
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<tr>
<td>Separator filter ST-20 --&gt; ST60</td>
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<tr>
<td>Non ret. valve 0.045 Bar</td>
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<tr>
<td>Non ret. valve 0.5 Bar</td>
<td>214161</td>
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<tr>
<td>Bulb 30 Volt</td>
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<tr>
<td>Press. switch 8,8-10 respt. 13 bar</td>
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<td>Press. switch 5 respt. 7,5 bar</td>
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<tr>
<td>Fase seq. relay</td>
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