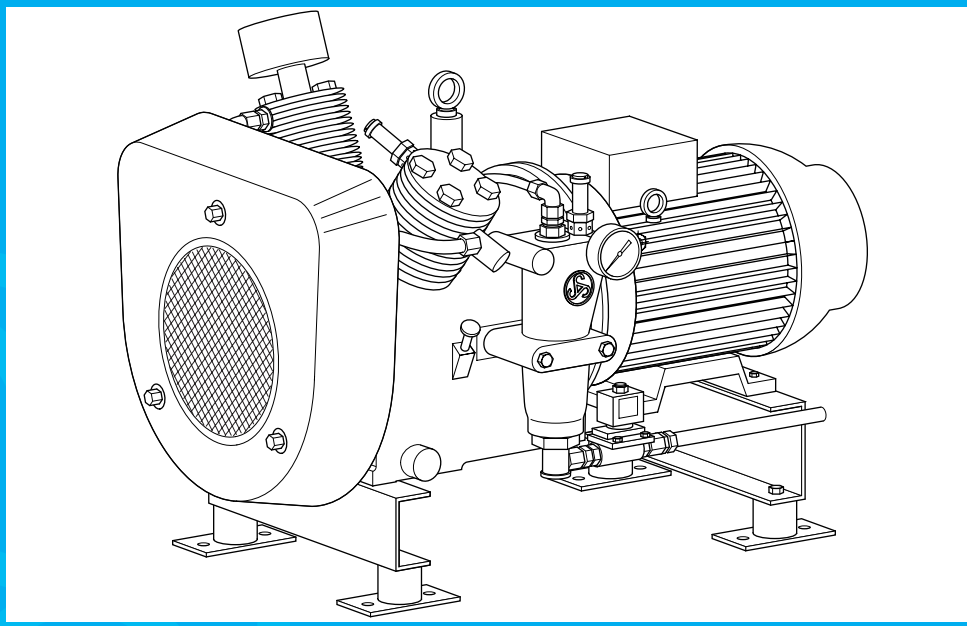
J.P. SAUER & SOHN
MASCHINENBAU GMBH



Sauer Compressor

Type: WP 22 L

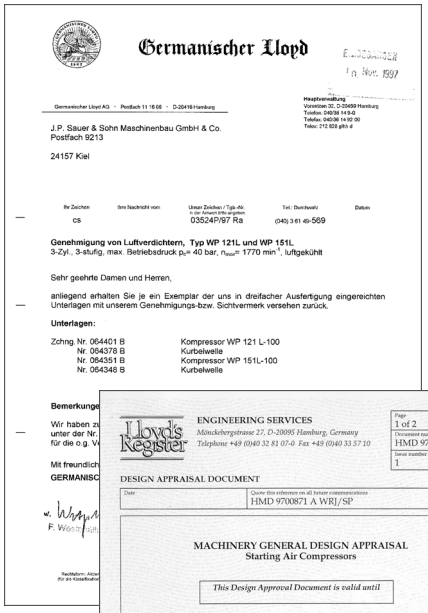
Operating Instructions

- High-pressure Compressor
- 2 Stages
- Air Cooled

Ein Mitglied der
SAUER-Gruppe

Version 1 - 1

Sauer compressor type approvals



Germanischer Lloyd

J.P. Sauer & Sohn Maschinenbau GmbH & Co.
Postfach 9213

24157 Kiel

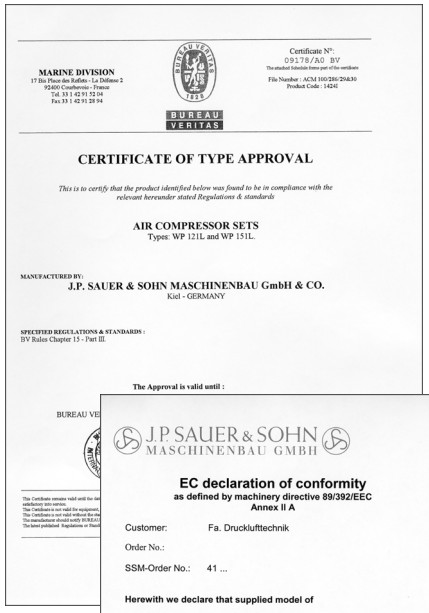
Genehmigung von Luftverdichtern, Typ WP 121L und WP 151L
3-Zyl., 3-stufig, max. Betriebsdruck p_e= 40 bar, n_{max}= 1770 min^{-1}, luftgekühlt

Sehr geehrte Damen und Herren,

anliegend erhalten Sie je ein Exemplar der uns in dreifacher Ausfertigung eingereichten Unterlagen mit unserem Genehmigungs-bzw. Sichtvermerk versehen zurück.

Unterlagen:

Zchng. Nr. 064401 B	Kompressor WP 121 L-100
Nr. 064378 B	Kurbelwelle
Nr. 064351 B	Kompressor WP 151L-100
Nr. 064348 B	Kurbelwelle



MARINE DIVISION
17 Bis Place des Reflets - La Défense 2
92400 Courbevoie - France
Tel. 33 1 42 91 52 04
Fax 33 1 42 91 28 94

BUREAU VERITAS

Certificate N°: 09178/A0 BV

File Number : ACM 110/281/29430
Product Code : 14241

CERTIFICATE OF TYPE APPROVAL

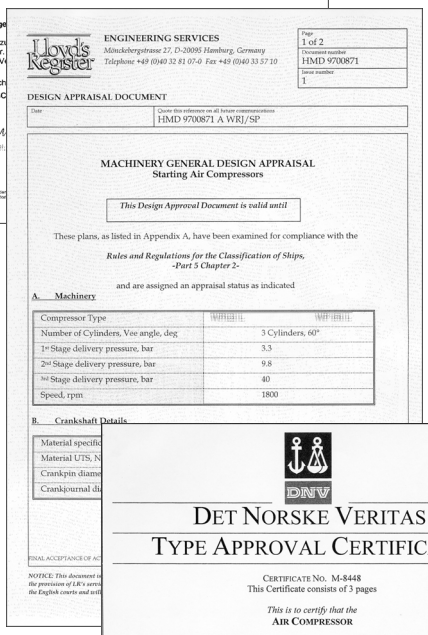
This is to certify that the product identified below was found to be in compliance with the relevant hereunder stated Regulations & standards

AIR COMPRESSOR SETS
Types: WP 121L and WP 151L.

MANUFACTURED BY:
J.P. SAUER & SOHN MASCHINENBAU GmbH & CO.
Kiel - GERMANY

SPECIFIED REGULATIONS & STANDARDS :
BV Rules Chapter 15 - Part III.

The Approval is valid until :



Lloyd's Register

ENGINEERING SERVICES
Mönckebergstrasse 27, D-20095 Hamburg, Germany
Telephone +49 (0)40 32 81 07-0 Fax +49 (0)40 33 57 10

Page 1 of 2
Document number HMD 9700871
Issue number 1

DESIGN APPRAISAL DOCUMENT

Date
Quote this reference on all future communications HMD 9700871 A WRJ/SP

MACHINERY GENERAL DESIGN APPRAISAL
Starting Air Compressors

This Design Approval Document is valid until

These plans, as listed in Appendix A, have been examined for compliance with the

Rules and Regulations for the Classification of Ships, -Part 5 Chapter 2-

and are assigned an appraisal status as indicated

A. Machinery

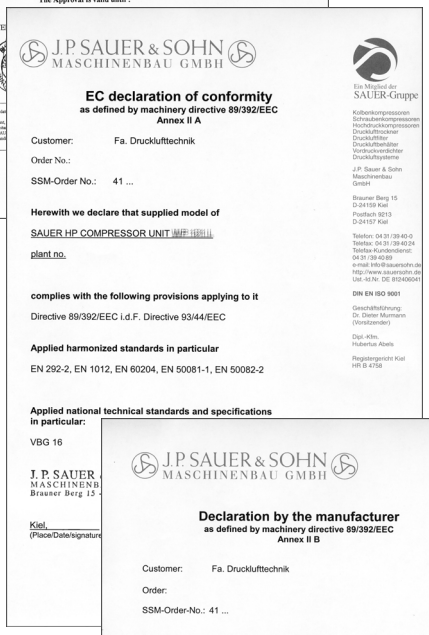
Compressor Type	WP121L, WP151L
Number of Cylinders, Vee angle, deg	3 Cylinders, 60°
1st Stage delivery pressure, bar	3.3
2nd Stage delivery pressure, bar	9.8
3rd Stage delivery pressure, bar	40
Speed, rpm	1800

B. Crankshaft Details

Material specific	
Material UTS, N	
Crankpin diame	
Crankjournal di	

FINAL ACCEPTANCE OF AC

NOTICE: This document is the provision of LR's servi the English courts and unli



J.P. SAUER & SOHN MASCHINENBAU GMBH

Ein Mitglied der SAUER-Gruppe

EC declaration of conformity
as defined by machinery directive 89/392/EEC
Annex II A

Customer: Fa. Drucklufttechnik

Order No.:

SSM-Order No.: 41 ...

Herewith we declare that supplied model of

SAUER HP COMPRESSOR UNIT WP 151L

plant no.

complies with the following provisions applying to it

Directive 89/392/EEC i.d.F. Directive 93/44/EEC

Applied harmonized standards in particular

EN 292-2, EN 1012, EN 60204, EN 50081-1, EN 50082-2

Applied national technical standards and specifications in particular:

VBG 16

J. P. SAUER & SOHN MASCHINENBAU GMBH Brauner Berg 15 - 24159 Kiel

Kiel,
(Place/Date/signature)

Kolbenkompressoren
Schraubenkompressoren
Hochdruckkompressoren
Druckluftrockner
Druckluftfilter
Druckluftbehälter
Vordruckverdichter
Druckluftsysteme

J.P. Sauer & Sohn Maschinenbau GmbH

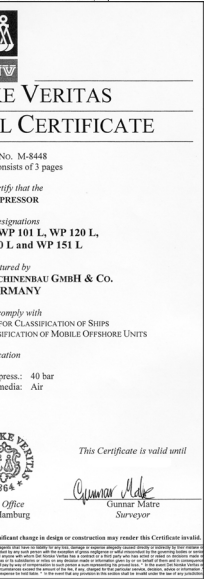
Brauner Berg 15
D-24159 Kiel
Postfach 9213
D-24157 Kiel

Telefon: 04 31 / 39 40-0
Telefax: 04 31 / 39 40 24
Telefax-Kundendienst: 04 31 / 39 40 89
e-mail: info@sauersohn.de
http://www.sauersohn.de
Ust.-Id.Nr. DE 815406041

DIN EN ISO 9001

Geschäftsführung:
Dr. Dieter Murmann (Vorsitzender)
Dipl.-Kfm. Hubertus Abels

Registergericht Kiel HR B 4758



DNV

DET NORSKE VERITAS

TYPE APPROVAL CERTIFICATE

CERTIFICATE NO. M-8448
This Certificate consists of 3 pages

This is to certify that the
AIR COMPRESSOR

with type designations
WP 81 L, WP 100 L, WP 101 L, WP 120 L, WP 121 L, WP 150 L and WP 151 L

Manufactured by
J.P. SAUER & SOHN MASCHINENBAU GMBH & CO. KIEL, GERMANY

is found to comply with
DET NORSKE VERITAS' RULES FOR CLASSIFICATION OF SHIPS
DET NORSKE VERITAS' RULES FOR CLASSIFICATION OF MOBILE OFFSHORE UNITS

Application

Max. working press.: 40 bar
Operating media: Air

Place and date
for DET NORSKE VERITAS AS
Jon Rysst
Head of Section

DET NORSKE VERITAS
1864
Local Office
DNV Hamburg

This Certificate is valid until
Gunnar Matre
Surveyor

Notice: This Certificate is subject to terms and conditions overleaf. Any significant change in design or construction may render this Certificate invalid.

J.P. SAUER & SOHN MASCHINENBAU GMBH

Ein Mitglied der SAUER-Gruppe

Declaration by the manufacturer
as defined by machinery directive 89/392/EEC
Annex II B

Customer: Fa. Drucklufttechnik

Order:

SSM-Order-No.: 41 ...

Herewith we declare that supplied models of

SAUER HP Compressor Unit WP 151L
with serial nos.
with accessories and spare parts

are intended to be incorporated into machinery or assembled with other machinery to constitute machinery covered by this directive and must not be put into service until the machinery into which they are to be incorporated has been declared in conformity with the provisions of the derective as amended by 89/392EEC i.d.F. 93/44/EEC.

Applied harmonized standards in particular

EN 292-2, EN 1012, EN 60204, EN 50081-1, EN 50082-2

Applied national technical standards and specifications in particular:

VBG 16

J. P. SAUER & SOHN MASCHINENBAU GMBH Brauner Berg 15 - 24159 Kiel

Kiel,
(Date/signature)

Kolbenkompressoren
Schraubenkompressoren
Hochdruckkompressoren
Druckluftrockner
Druckluftfilter
Druckluftbehälter
Vordruckverdichter
Druckluftsysteme

J.P. Sauer & Sohn Maschinenbau GmbH

Brauner Berg 15
D-24159 Kiel
Postfach 9213
D-24157 Kiel

Telefon: 04 31 / 39 40-0
Telefax: 04 31 / 39 40 24
Telefax-Kundendienst: 04 31 / 39 40 89
e-mail: info@sauersohn.de
http://www.sauersohn.de
Ust.-Id.Nr. DE 815406041

DIN EN ISO 9001

Geschäftsführung:
Dr. Dieter Murmann (Vorsitzender)
Dipl.-Kfm. Hubertus Abels

Registergericht Kiel HR B 4758

Landesbank Kiel BLZ 210 500 00 Konto 53 004 480

Deutsche Bank Kiel BLZ 210 700 20 Konto 0 531 608

Commerzbank AG, Kiel BLZ 210 400 10 Konto 7 383 300

Note!

On this page only a few examples are shown. Further type approvals are available on request.

Genuine Sauer spare parts – certified safety

Certificate of Conformity and Authenticity

Serial Number: 211789 *

With this Certificate of Conformity and Authenticity we the

J.P. SAUER & SOHN
MASCHINENBAU GMBH
24157 Kiel – Germany

certify that the items, total no. _____ and only these items which have been delivered with attached shipping note number _____ are

Genuine Sauer Spare Parts

with proven, guaranteed and traceable quality. Any hand-written or other change resp. revision in any way on the attached shipping note or the certificate itself will make this certificate invalid. In this case there are justified evidences that grey market spares of inferior quality have been delivered.

SPECIMEN

If you want to be informed about your advantages when using Genuine Sauer Spare Parts or in case of doubts, please contact our Service Department:
Int. -49-431-39 40 -86/87 (Fax -89),
e-mail: service@sauersohn.de
or visit our website http//www.sauersohn.de.

Kiel, _____ _____

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Contents

1. General

1.1 At the outset

The following main specifications of your Sauer compressor are found on the type label affixed to the crankcase:

- compressor type
- factory number
- year of construction

We recommend you write down this information in chapter 11. “Spare Parts and Accessories”.

1.2 General information

Conditions

We presuppose that only authorized persons will operate and service the Sauer compressor. These persons must have read and understood the operating instructions.

Availability

These instructions shall always be kept available at the site of operation.

Copyright

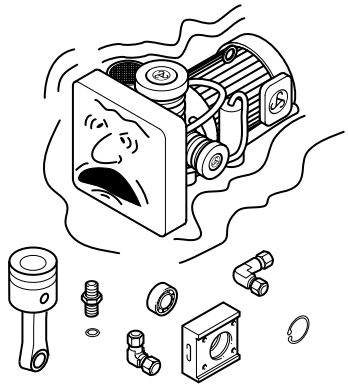
1.3 Warranty and Liability

We exonerate the contractually agreed warranty claims and liability claims, if they can be attributed to at least one of the following:

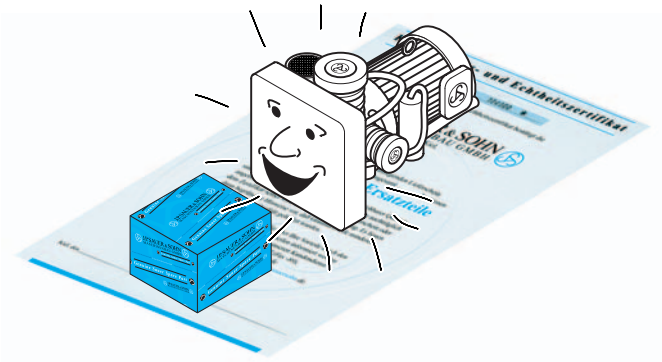
- use of the machine not as specified;
- use of spare parts that are not genuine Sauer spare parts;
- operation of the machine with faulty or not properly installed safety devices and protection devices;
- disregard of the operating instructions;
- unauthorized modifications of the machine or its control system;
- inadequate monitoring of machine parts subject to wear;
- inexpert repairs;
- force majeure.

1.4 Type approval and genuine Sauer spare parts

- The type approval for the Sauer compressor is valid under the condition that parts and components specified and qualified by J.P. SAUER & SOHN are used. The type approval is made by the Classification Society and the EC Declaration of Conformity or EC Manufacturer's Declaration. Disregard of the specifications may cause the type approval to expire.
- Only the use of genuine Sauer spare parts ensures compliance with these specfications and thus the perfect and safe operation of the Sauer compressor.
- If genuine Sauer spare parts are not used we reserve the right of exclusion of liability for personal injury and material damage.
- genuine Sauer spare parts are supplied with a Certificate of Conformity and a Certificate of Authenticity. A specimen of this document is shown before the table of contents of these instructions. If spare parts are received without this certificate, there is a risk that these are not genuine Sauer spare parts. In such case please contact our customer service.



Do not use parts from the „grey market“…



… but only genuine Sauer spare parts with certificate!

AL001AA1.fm

1.5 J.P. SAUER & SOHN customer service

In case of technical questions pertaining to maintenance or repair please contact our customer service:

J.P. SAUER & SOHN Maschinenbau GmbH
Customer Service
P.O. Box 92 13
D-24157 Kiel

Telephone (international):	
Technical information	+49 431 39 40 -87
Spare parts ordering	+49 431 39 40 -86/886
Telefax (international):	+49 431 39 40 -89
Emergency service (international):	+49 172 4 14 63 94
E-Mail:	service@sauersohn.de
Web:	www.sauersohn.de

Note!

If you have questions regarding your Sauer compressor please state compressor type and factory number (see chapter 11. “Spare Parts and Accessories” or type label on the crankcase).

AL001AA1.fm

1.6 How these instructions are organized

Listings

General listings are denoted by horizontal bars.

Example:

The cooling consists of

– fan wheel,
– fan wheel cage, and
– cooler assembly.

Action

Individual instructions or multiple instructions, where the sequence is of no importance are normally denoted by bullets.

Example:

• Check oil level.

Instructions to be carried out in a certain sequence are numbered.

Example:

1. Turn the main switch ON.
2. Choose the operating mode.
3. Turn the control ON.

Results

Results of actions carried out are denoted by a check mark.

Example:

✓ The control light is on.

Safety instructions

Safety instructions are emphasized by pictographs and signal words. The safety instructions are described in detail in chapter 2. “Safety”.

2. Safety

2.1 Specified conditions of use

This Sauer compressor must be used for the compressing of air only. The Sauer compressor must not be used at ambient temperatures of below +5 °C. Any other use is not as specified and requires the explicit consent in writing by J.P. SAUER & SOHN.

Observance of these operating instructions, the installation requirements detailed in the instructions, and the keeping of maintenance rates are part of the specified conditions of use as well.

2.2 Prohibition of unauthorized conversion

Unauthorized conversion and modification of the Sauer compressor is not permitted, since they could endanger humans and may lead to machine damage.

Contact J.P. SAUER & SOHN when planning conversions or modifications to obtain a written permission.

2.3 Safety information

The safety information in these instructions is divided in two classes. The following pictographs and signal words are used:

Danger!

High risk.
Disregard of this safety information may cause personal injury and substantial material damage.

Note!

Average risk.
Disregard of this safety information may cause damage to the machine.

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2.4 Safety markings on the machine

Danger!

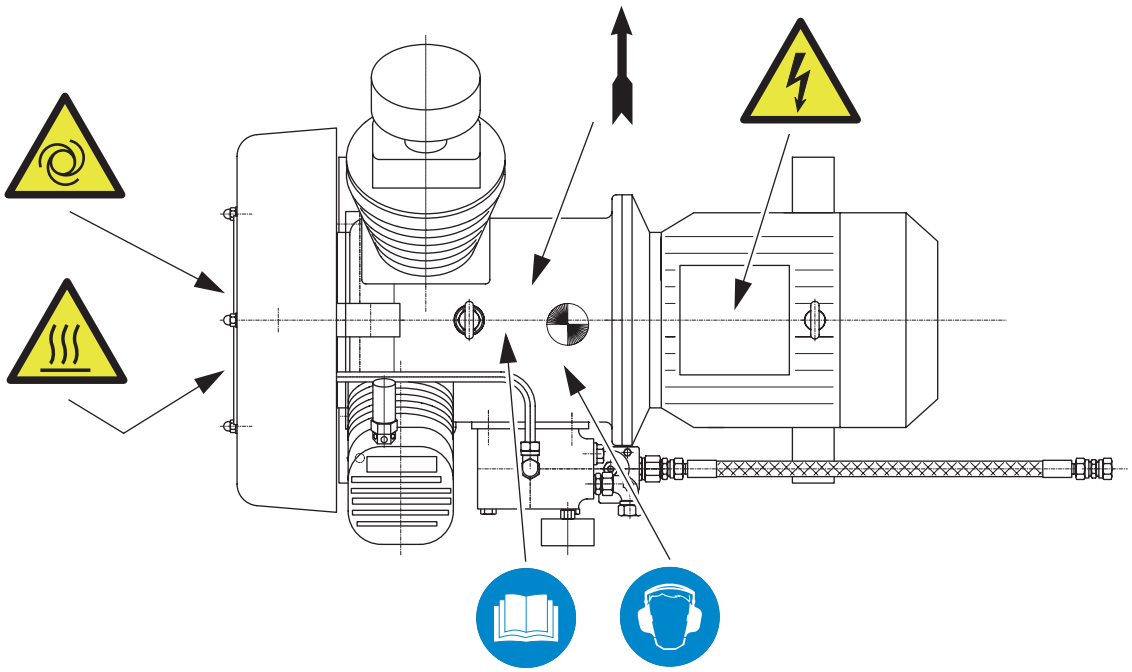
Safety markings affixed to the machine must not be altered or removed. Replace damaged or lost safety markings immediately, true to the original.

Sauer compressor models with an EC Manufacturer's Declaration or EC Declaration of Conformity are marked with the following safety markings:

Safety marking	Meaning
	Danger! High voltage! (Only on Sauer compressor with electric motor)
	Compressor starts automatically without warning!
	Hot surface!

Safety marking	Meaning
	Read instructions!
	Wear hearing protection!
	Rotational direction of Crankshaft

Location of safety markings (top view)



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2.5 Safety devices

Danger!

Safety devices must not be adjusted, disabled or removed.

The safety devices shall be periodically tested and checked.

Safety valves must be

– installed sealed and
– should be replaced, adjusted and sealed by authorised personnel only.

Safety valves

Every pressure compartment of a stage of the Sauer compressor is equipped with a safety valve, which will blow off when the blowing-off pressure is reached.

Safety valves are installed at these locations:

– 1st Compression stage: on the cylinder head of the 2nd stage's cylinder;
– 2nd compression stage: in the condensate separator behind the stage;

Fusible plug/ temperature control

A fusible plug is provided on the condensate separator for monitoring cooling. It melts at 120 °C and allows the compressed air to escape, when its temperature exceeds the threshold value. This protects the compressor against overheating.

The fusible plug functions only once. If it blows, it needs to be replaced with a new one.

As an alternative to the fusible plug, Sauer compressor can be fitted with a temperature control. This will turn the compressor off if the temperature of the compressed air exceeds the limit.

2.6 Noise protection

Sound pressure level details are found in the Technical Specifications (see chapter 4).

If necessary the Sauer compressor can be equipped with a noise protection hood, which is available as optional accessory from J.P. SAUER & SOHN.

Danger!

When the compressor is operated without noise protection hood, hearing protection should be worn near the compressor.

2.7 Waste disposal

Note!

Under the laws and regulations in force, the following materials arising from the operation of the compressor need to be disposed of ecologically safe:

- condensate (oil and water saturated) arising from recooling in the compression process;
- used oil and grease and rags soiled by it;
- cleaning material and rags soiled by it.

2.8 Staff requirements

Only authorised persons are permitted to service the Sauer Compressor! Before commencing work they must have read and understand the operating manual and must be familiar with the safety devices and safety regulations.

In addition to the instructions in this operating manual and manufacturer documentation, accepted technical standards must be observed as well as all regional laws, standards and regulations such as the

- Equipment and Product Safety Act (Geräte- und Produktsicherheitsgesetz),
- Ordinance on Industrial Safety and Health (Betriebssicherheitsverordnung),
- Regulations for accident prevention pertaining to compressors,
- VDE regulations and
- Regulations on environmental protection.

In addition, where appropriate, regulations of the responsible classification society as well as operational regulations must be observed.

Persons authorised to operate the compressor are the attending specialists introduced to the job and trained by the operator.

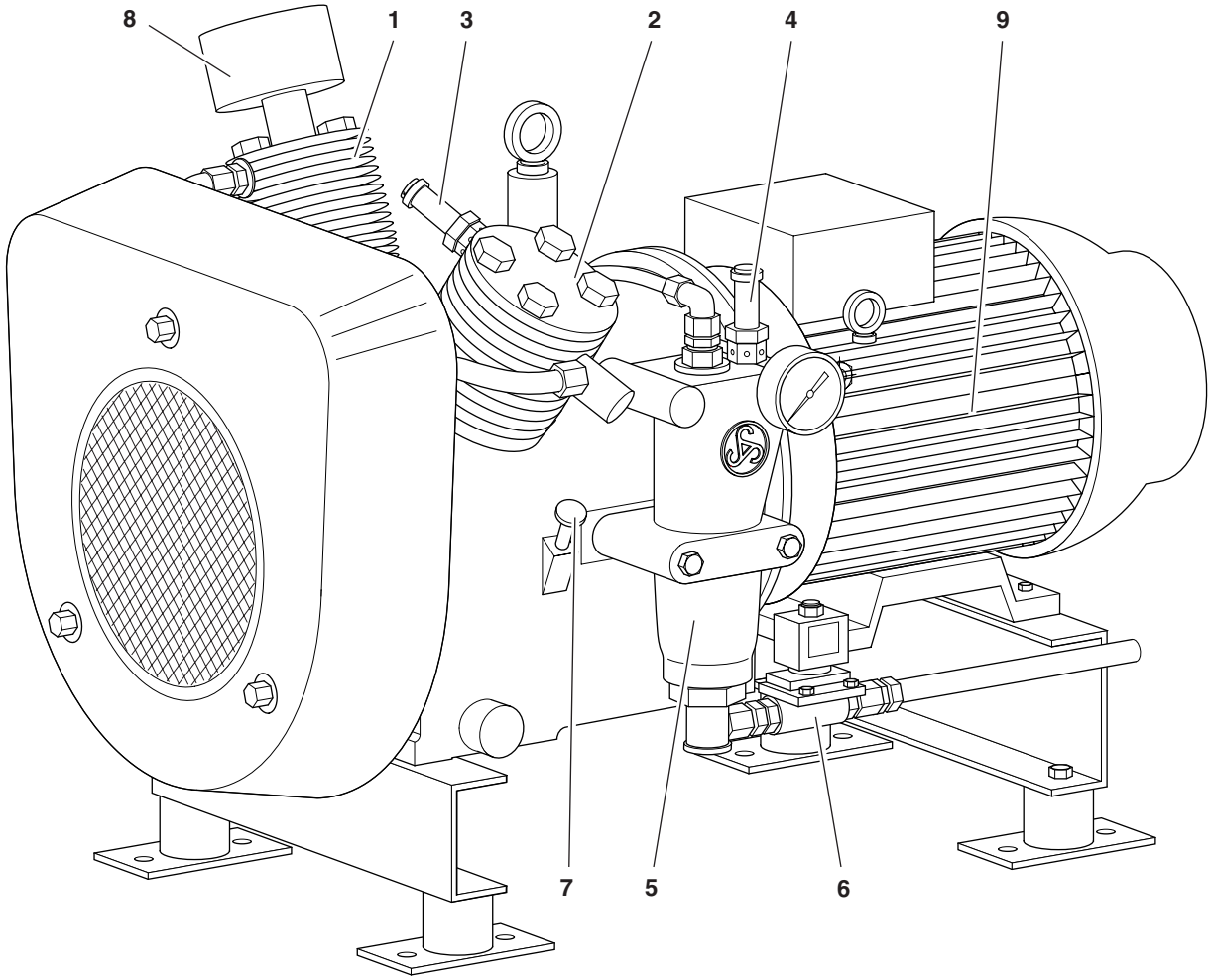
Persons authorised to service the compressor are the trained specialists of the operator and of the manufacturer.

2.9 Personal protection gear

The operator has to provide the personal protection gear (hearing protection, safety boots, etc.) for the personnel carrying out any work on the Sauer compressor.

3. Design and Function

3.1 Overview



Item	Name
1	Cylinder 1st stage
2	Cylinder 2nd stage
3	Safety valve 1st stage
4	Safety valve 2nd stage
5	Condensate separator 2nd stage (final separator)
6	Drain valve
7	Oil dip stick
8	Air filter
9	Drive (electric motor or diesel engine)

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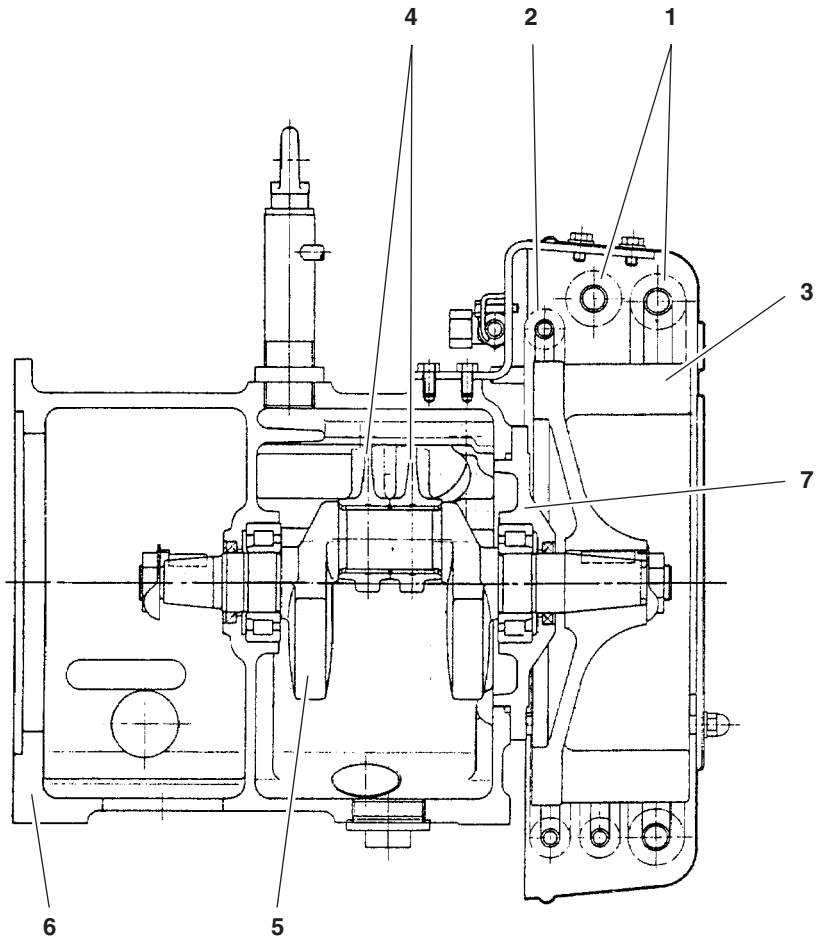
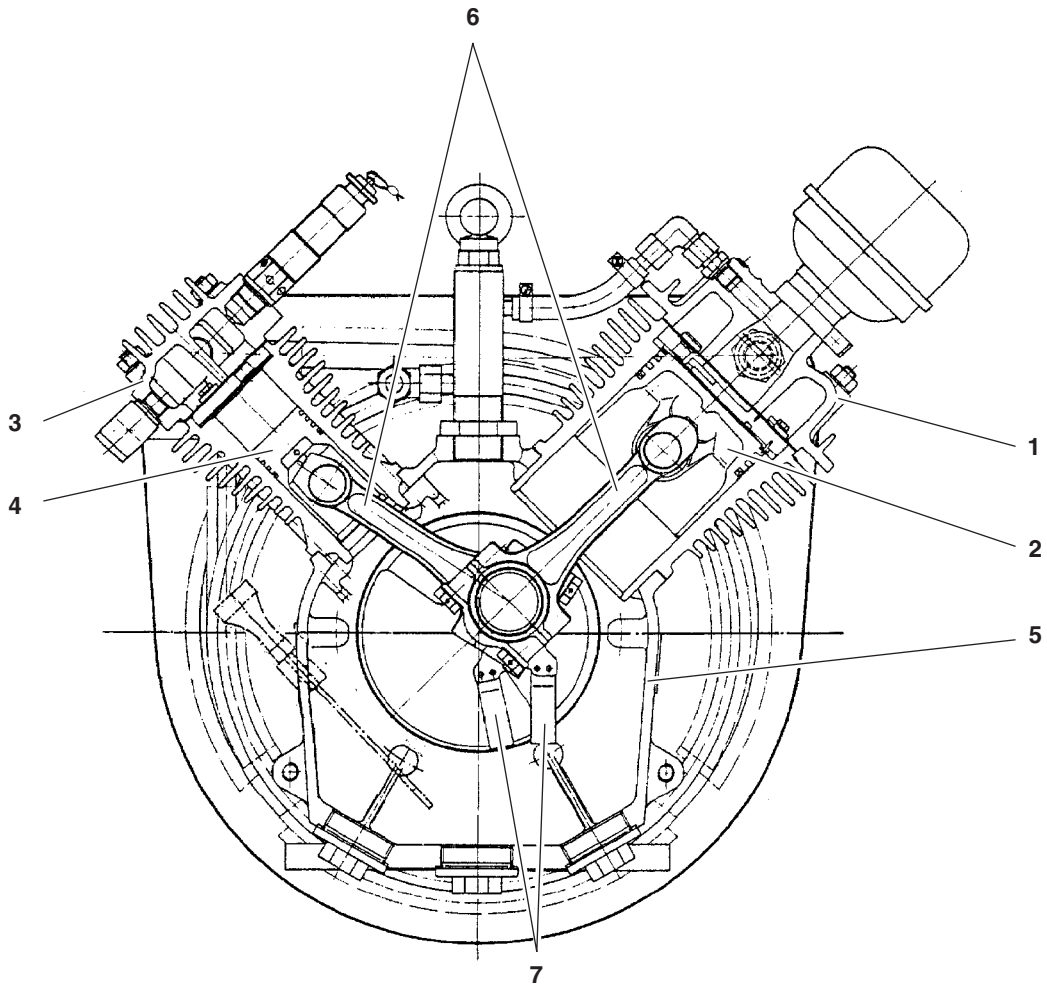
Longitudinal section



Item	Name
1	Cooler 1st stage
2	Cooler 2nd stage
3	Fan flywheel
4	Connecting rod
5	Crankshaft
6	Transmission bell housing
7	Bearing bracket

Cross section



Note!

Details of parts and spare parts are found in the spare parts catalogue.

Item	Name
1	1st stage: cylinder with head and valve
2	Piston 1st stage
3	2nd stage: cylinder with head and valve
4	Piston 2nd stage
5	Crankcase
6	Connecting rod
7	Dipper

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3.2 Mode of operation

Drive

The Sauer compressor is driven by an electric motor directly flange mounted to the clutch bell housing of the crankcase, where the power is transmitted by means of a flexible coupling. The radial fan on the crankshaft serves as a flywheel.

Alternatively a diesel engine can be used to drive the compressor. This is attached by means of a special flange. It transmits power by means of a centrifugal clutch.

Compressor control

The Sauer compressor with electric drive is electrically controlled and monitored by a compressor control system. This control system must comply with statutory regulations. Optionally, J.P. SAUER & SOHN can supply a suitable compressor control system.

Compression

The compressor takes in ambient air through a sheet filter and compresses it in two single-stage cylinders to the final pressure. Each cylinder is a compression stage, after which the air is aftercooled.

The final compression temperatures are below the flash point of standard motor oils (mineral oils).

The cylinders arranged in the shape of the letter V are fitted with easy-to-service lamellar valves with long service lives. Due to the low final compression temperatures, the susceptibility of the valves to carbonisation is extremely low.

Cooling

A radial fan located on the crankshaft blows cool air from the surrounding area over the cylinder, cooler, valves and oil sump.

The after-cooling takes place after every stage in externally galvanised gilled pipe radiators.

Condensate separation

Condensate containing oil and water, produced during compressing and aftercooling, collects in the condensate separator behind the 2nd stage.

Condensate draining / pressure relief

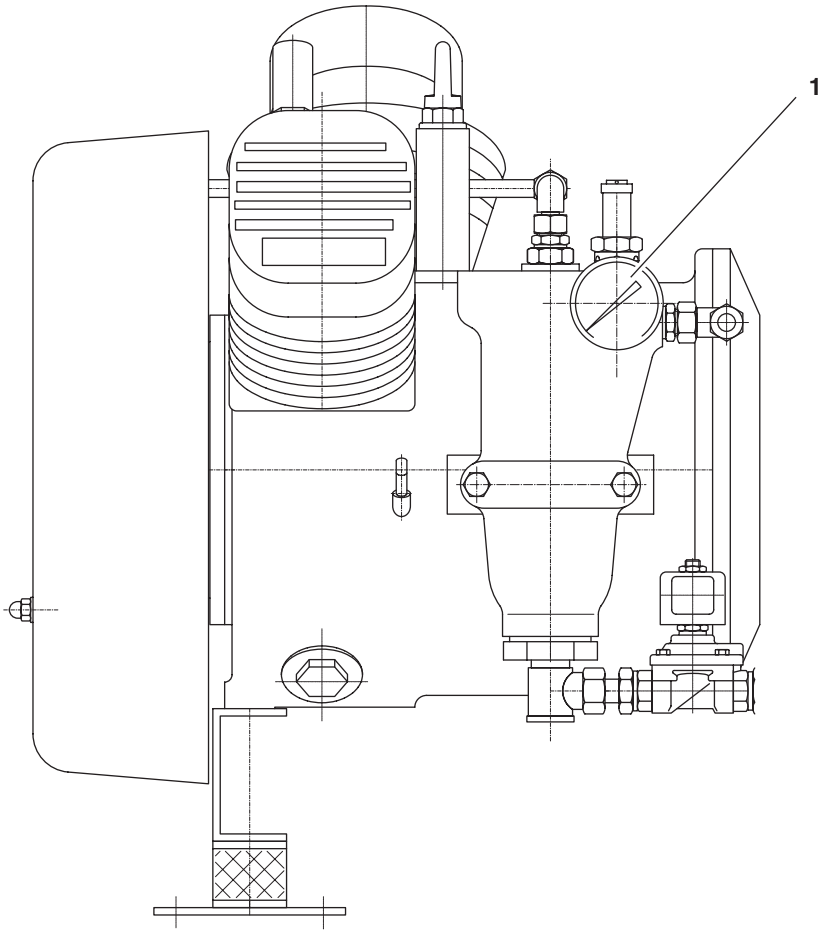
The condensate is drained through a drain line. A solenoid valve is fitted in the drain line for the Sauer compressor with electric drive. The solenoid valve must be open when the Sauer compressor is depressurised. The drain valve should close a few seconds after starting and the Sauer compressor should accelerate against pressure. The solenoid valve should drain the machine at predetermined intervals during operation. The solenoid valve is controlled by the compressor control.

A manual valve is fitted in the drain line for the Sauer compressor with diesel drive. A solenoid valve can be used (as an option).

Lubrication

The drive is lubricated by the splash oil in the crankcase. Dippers on the connecting rods dip into the oil sump and fling the lubrication oil at the lubricating point.

3.3 Indicators on the Sauer Compressor



Item	Name	Indication
1	Pressure gauge 2nd stage	Ultimate pressure

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3.4 Displays and control elements on the compressor control

Note!

The standard version of Sauer compressor with diesel engine does not have a compressor control.

If the compressor control is supplied by J.P. SAUER & SOHN, refer the documentation in addition.

The following display and control elements should be present on the front side of the compressor control:

Display/ control element	Explanation
"Operation" signal lamp	Glows when the compressor is running.
"Oil level" fault indicator lamp (optional)	Glows if the compressor is cut-off due to oil deficiency.
"Air temperature " fault indicator lamp (optional)	Glows if the compressor is cut-off due to too high a compressed air outlet temperature.
"Overcurrent" fault indicator lamp	Glows if the compressor is cut-off due to too high a motor current.
Operating hour meter	Displays the hours of operation of the compressor.
Operating mode selector	• Switch position "Manual": To switch on the compressor manually. Compressor starts and continues to operate until it is manually switched off. • Switch position "0" To switch off the compressor manually. Fault indicators, if any, are reset. • Switch position "Auto“: Compressor is started and stopped due to the opening and closing of an external make-and-break contact (e.g. pressure switch of the compressed air receiver).
Main switch	Disconnects the power supply from the compressor control to the compressor. A main switch should be provided, if required by the legal or regulatory provisions.

4. Technical specifications

4.1 Data table

Name	Data
Compressor type	WP 22 L
Number of cylinders	2
Number of compression stages	2
Cylinder diameter, 1st stage	100 mm
Cylinder diameter, 2nd stage	46 mm
Piston stroke	42 mm
Maximum pump speed	2000 rpm
Direction of rotation (viewed from drive end)	clockwise
Maximum working pressure	40 bar
Set pressures of safety valves:	
1st stage	8 bar
2nd stage	5 % higher than the final pressure
Oil filling quantity	1.5 l
Volume of oil between dip stick markings	0.5 l
Oil type	see Chapter 10 "Lubricant table"
Oil level switch (optional)	
Holding capacity	10 VA
Operating current	0.5 A
Setting	Opens when oil level is falling
Solenoid valve (standard for operation with electric motor; optional for operation with diesel engine):	
Pick-up and holding power	18 VA / 14 W

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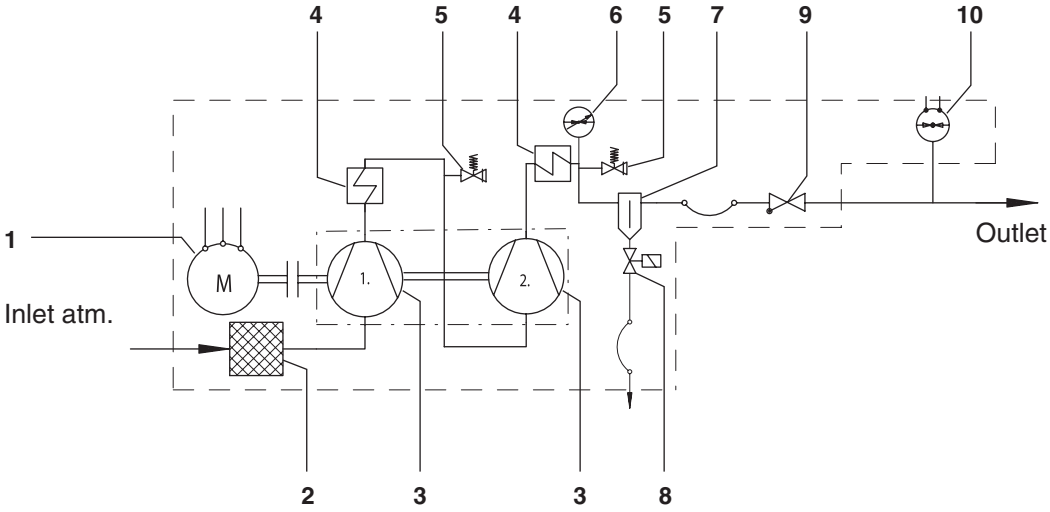
Name	Data
Setting	normally open; starting relief: approx. 15 seconds; intermediate draining: 15 seconds every 15 minutes.
Final pressure switch (standard for operation with electric motor; optional for operation with diesel engine):	
Maximum switching current	6A / 220 V
Setting	to customer's specifications
Switch function	change-over contact
Temperature switch (optional):	
Maximum switching current	16A / 440 V
Setting	opens at 80 °C rising
Switch function	change-over contact
Non-return valve:	
Response pressure	approx. 1 bar
Sound pressure level (in free sound field at 1 m distance)	maximum 87 dB(A)
Weight and dimensions	see installation plan

Note!

Please refer to the order-specific documentation of your compressor for specific data, such as final pressure, speed, power requirements, etc.

4.2 Compressed air system plan



Item	Name
1	Drive motor
2	Intake filter
3	Compressor stage
4	Intercooler and aftercooler
5	Safety valve
6	Pressure gauge
7	Condensate separator
8	Drain valve (for operation with electric motor: solenoid valve; for operation with diesel engine: hand valve)
9	Non-return valve
10	Ultimate pressure switch (standard for operation with electric motor; optional for operation with diesel engine):

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5. Transport and Installation

5.1 Transport

Shipping

The machine is packed suitable for shipping.

- Immediately on receipt of the Sauer compressor it should be checked for completeness and damage.
- The transport company and J.P. SAUER & SOHN must be immediately notified of any damage to the packing or the machine.

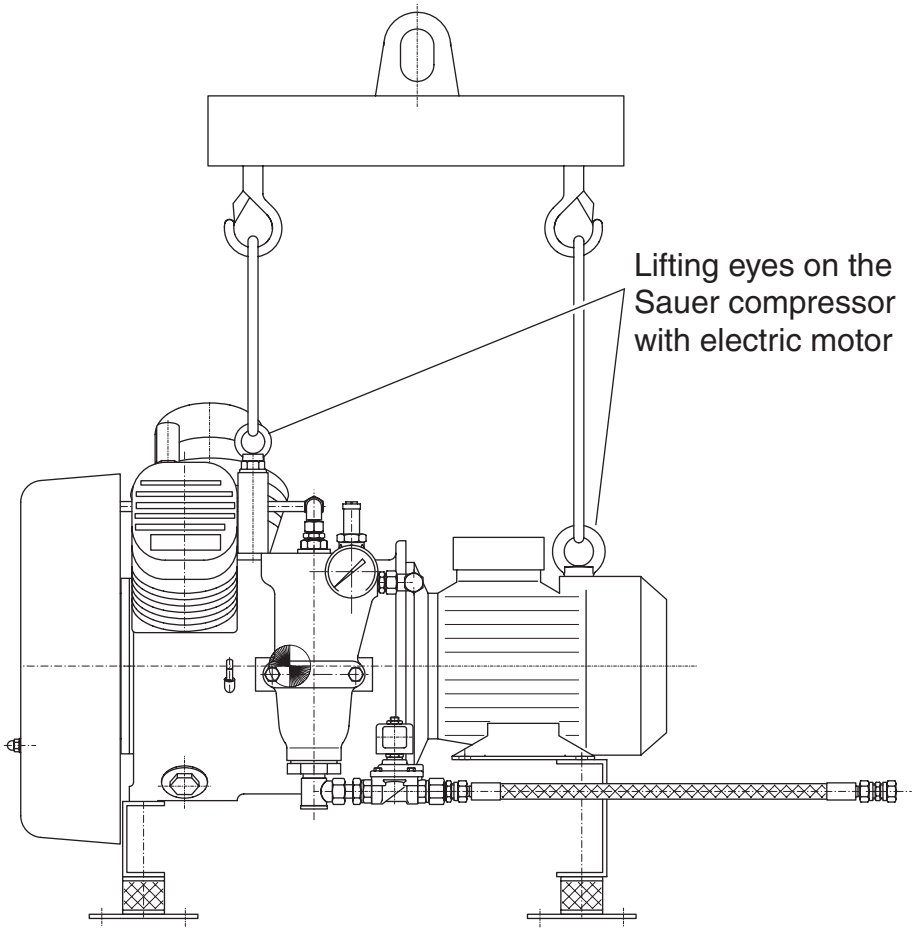
Transportation

The Sauer compressor must be transported by a forklift truck or hoisted by crane.

Danger!

Suspended load when transported.
The forklift truck/crane must have sufficient load bearing capacity.

- Ensure that no persons stay within the danger area of the suspended load and the forklift truck/crane.
- Sling the unpacked compressor at the two lifting eyes on the crankcase and electric motor or diesel engine as the case may be (see illustration).
- Lift, move, and set down carefully.



Lifting eyes on the Sauer compressor with electric motor

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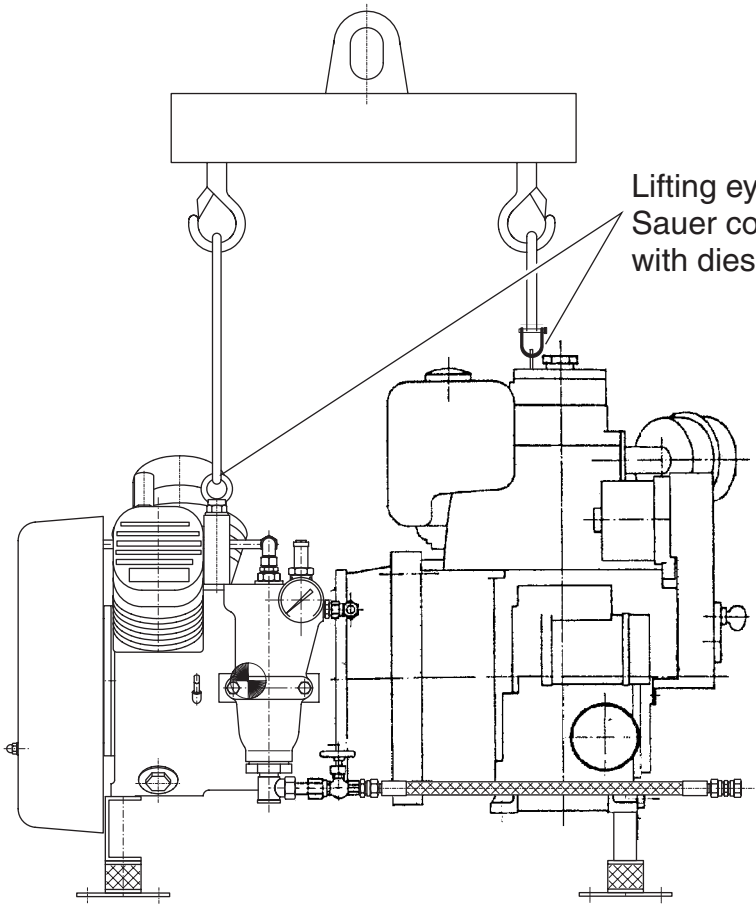


5.2 Storage before installation

If the Sauer compressor has to be stored before installation, do not unpack and store at the following conditions:

- temperature: +5 to +40 °C;
- relative humidity 30 … 95%, not condensating;
- dry, under a roof and protected against dew;
- protected against soiling;
- protected against vibrations and shocks.

Note!

The standard factory conservation is sufficient for a maximum storage period of 12 months.

5.3 Installation

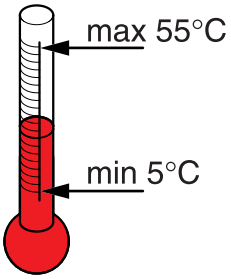
Note!

When in doubt if the intended place of installation and room are suitable, contact J.P. SAUER & SOHN in time before the installation. There you will also get help with the design of a ventilating system, if required at the place of installation.

For installation observe the installation instructions and the following conditions.

Installation conditions

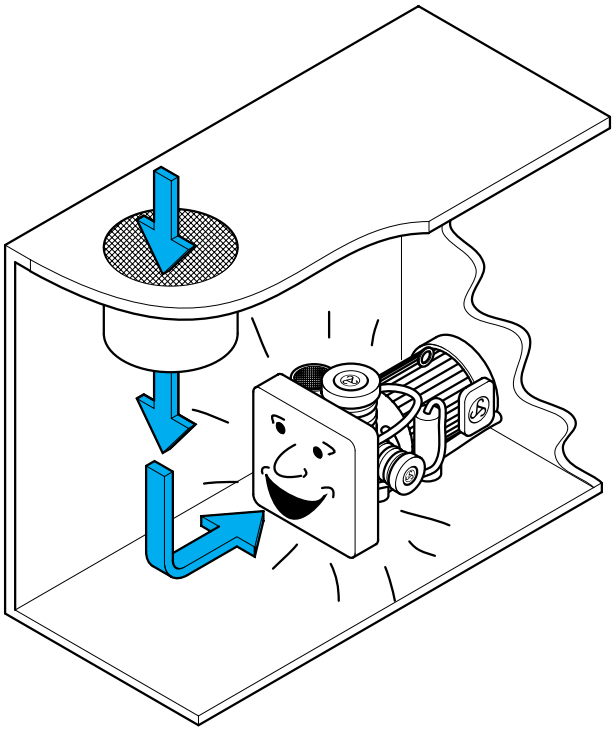
- The place of installation must be dry and free of dust.
- The place of installation must be vented in such way that the heat generated during operation is dissipated.
- Room temperature while the Sauer compressor is running: +5 … +55 °C (deviating temperatures only if confirmed in writing by J.P. SAUER & SOHN)



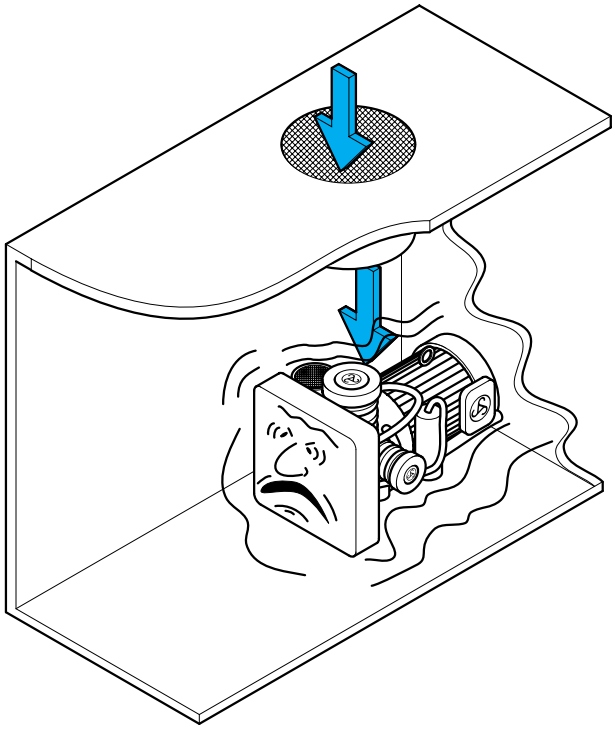
Note!

The air temperature at the cooling air intake of the compressor must not exceed +55 °C when the compressor is running. Room conditions and the heat, generated by the compressor and other machines installed in the room, must be taken into consideration.

- If necessary, install a ventilation or exhaust system at the place of installation.
- Install any ventilation system in such way that the fresh air stream is not directly directed against the compressor. Otherwise there is a risk of condensation of water inside the machine and subsequent damage.



This way is correct!



Do not install fresh air feed this way!

Installation conditions (cont'd)

- At a room temperature of below +5 °C the room needs to be heated or the Sauer compressor must be equipped with a heating system.
- Choose the location so that the Sauer compressor is accessible and has sufficient clearance to walls and other machinery (see installation documents).
- Do not position the motor side in a room niche, so the Sauer compressor will not take in the warmed-up cooling air again.
- Do not position several compressors one after the other, to prevent one compressor from taking in the warmed-up cooling air of another compressor.

Note!

J.P. SAUER & SOHN is glad to advise you on the installation of the compressors.

Foundation

Note!

The standard delivery resilient-mount bedding has a resonant frequency of approx. 10 Hz.
Generation of oscillations of the intended foundation by other nearby machinery must not be at 10 Hz. Otherwise there is a risk that the standard delivery resilient-mount bedding is destroyed by sympathetic vibration.

1. Check early enough if there are foundation vibrations in the 10 Hz range.
2. If in doubt, check with J.P. SAUER & SOHN to see if a modified resilient-mount bedding can be used.

5.4 Connecting the compressor

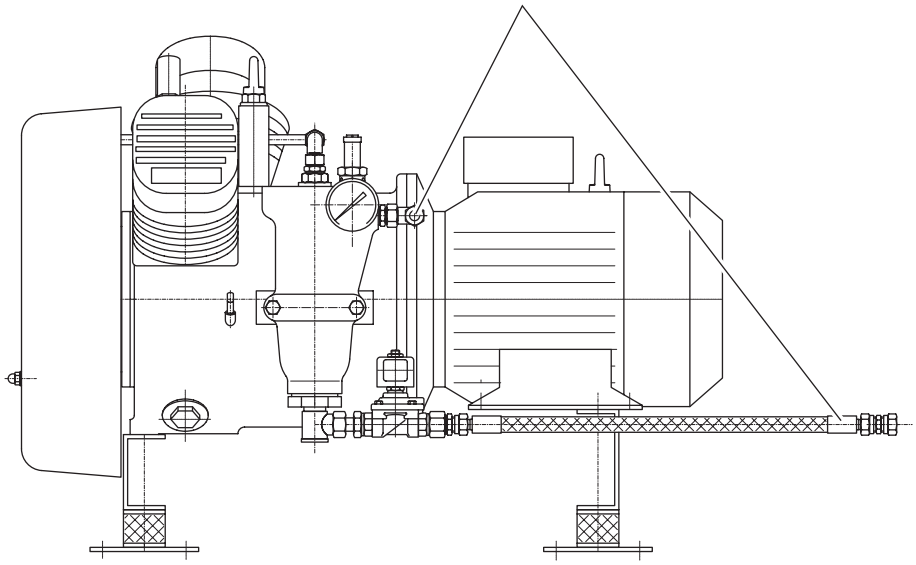
Danger!

The compressor should only be connected by qualified technicians. Any work on the electrical installation must be carried out by qualified electricians only.

Pipelines

The compressed air outlet and the drain outlet of the Sauer compressor must be connected to the permanently fitted pipelines using hose lines (see illustration).

Hose lines on the Sauer compressor with electric motor



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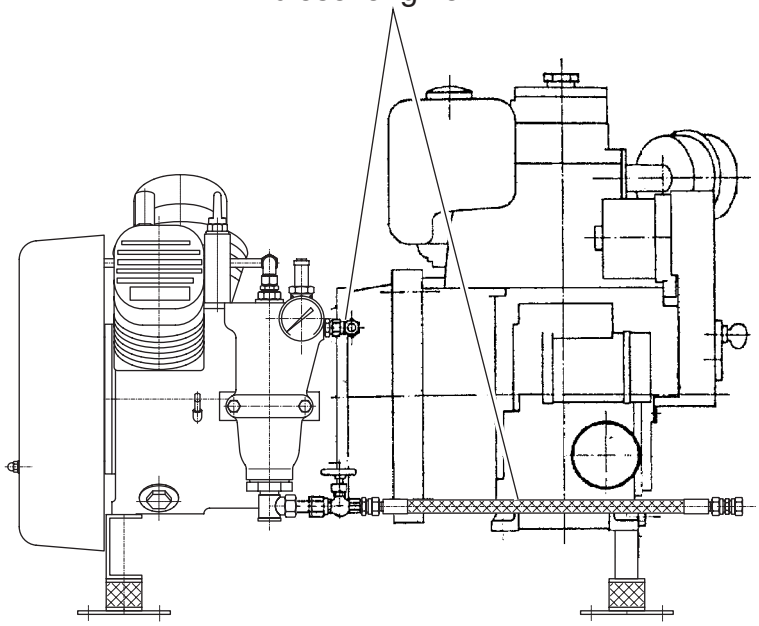
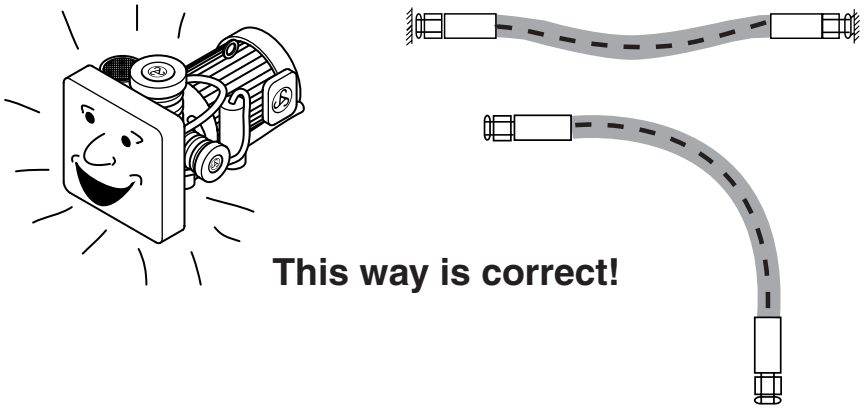
Hose lines on the Sauer compressor with diesel engine

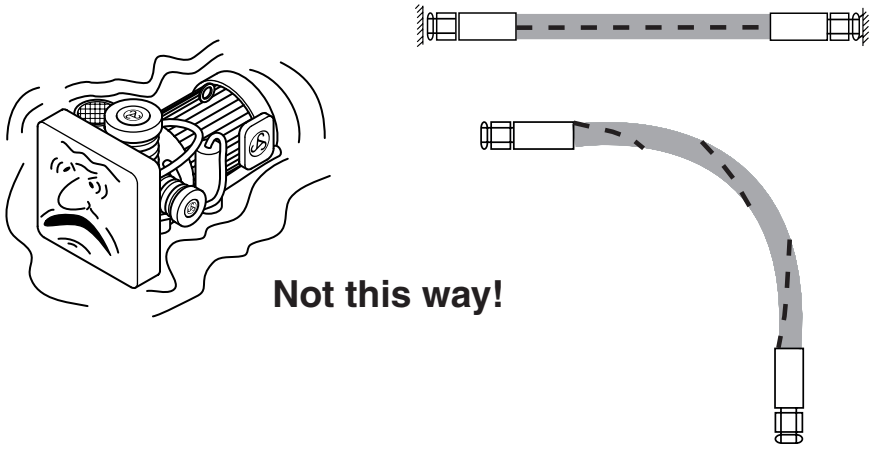


Danger!

Compressed air escapes from the drain outlets when the compressor starts and when the condensate is drained. Do not operate compressor without the hose lines connected.

Hose lines have to be installed free of tension and untwisted.





Drain

Note!

Condensate build-up is oil-saturated. It may only be disposed of in compliance with applicable legal regulations.

J.P. SAUER & SOHN can supply condensate collecting pots for separating condensate, as well as condensate treatment units for separating the oil from the condensate.

Note!

We recommend connecting the compressor's drainage separately.

When the drain lines of **several compressors** are to be connected to a common pipe, observe the following:

– Choose a sufficient nominal diameter for the common drain line.
– Connect drain lines of the individual compressors at a sharp angle to the common drain line, so no pressure can build up in the drain line of a stopped compressor.

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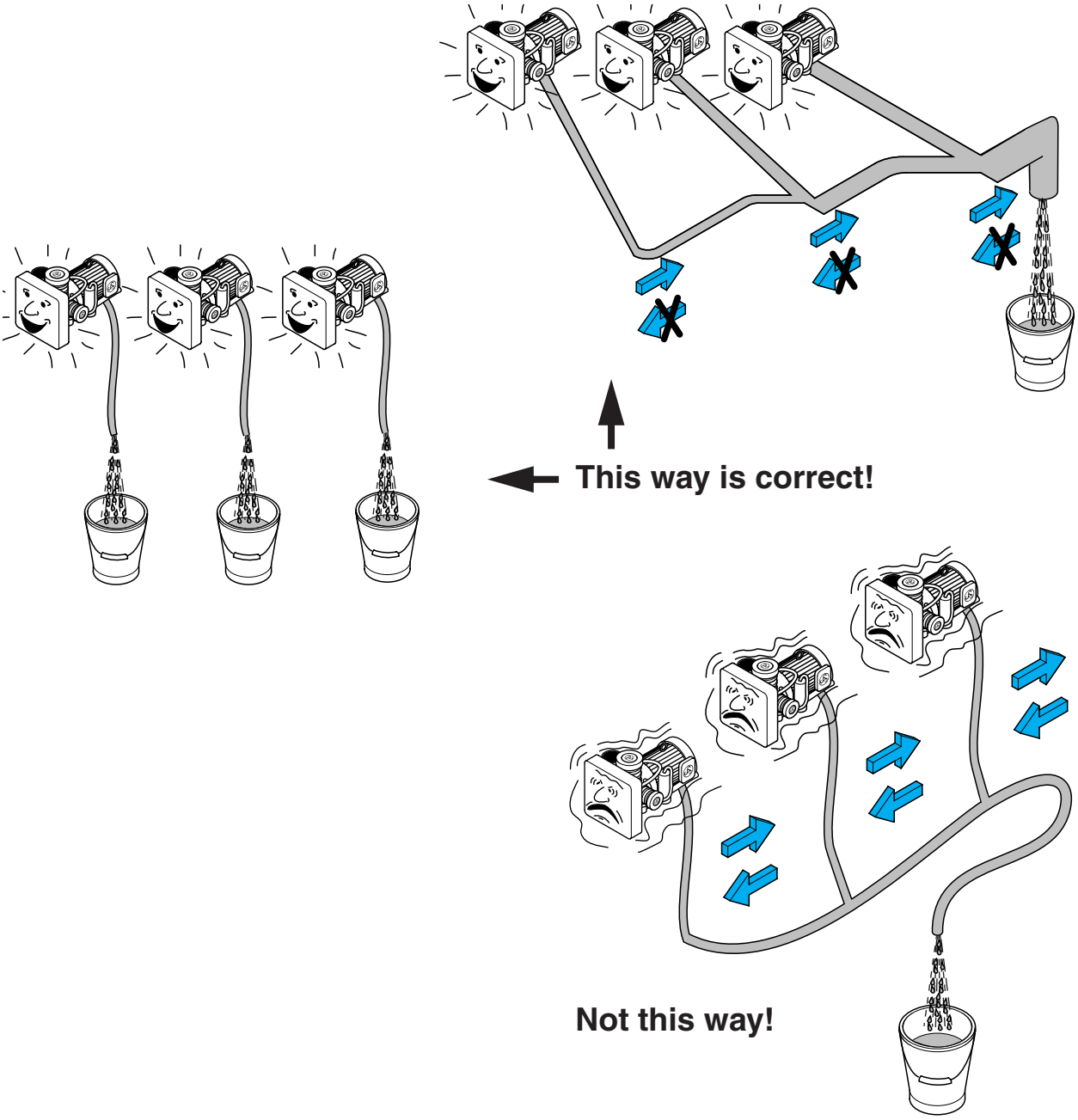
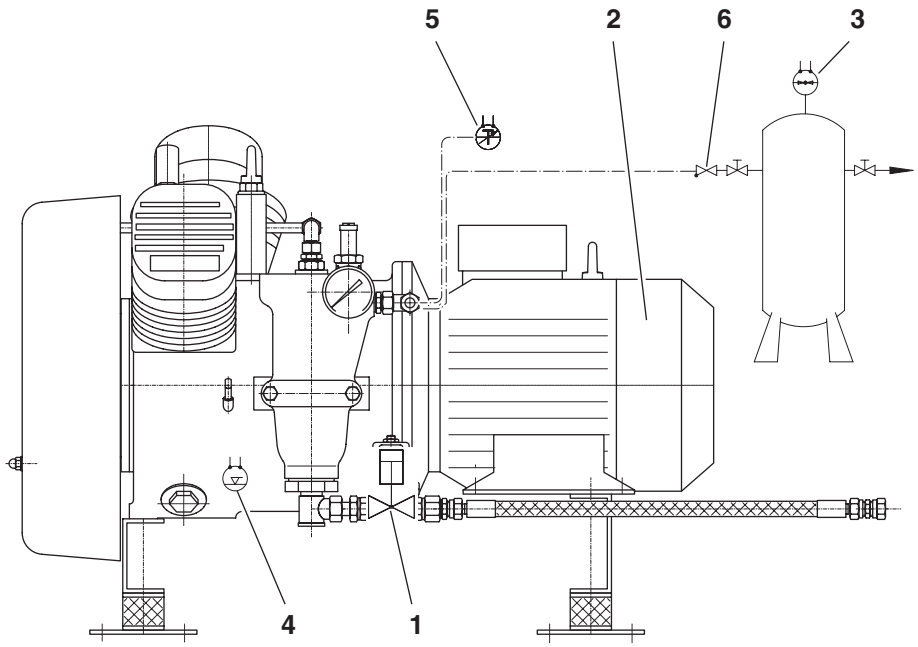


Connections

The illustrations show the connections and fittings for the operation of the standard version Sauer compressor.



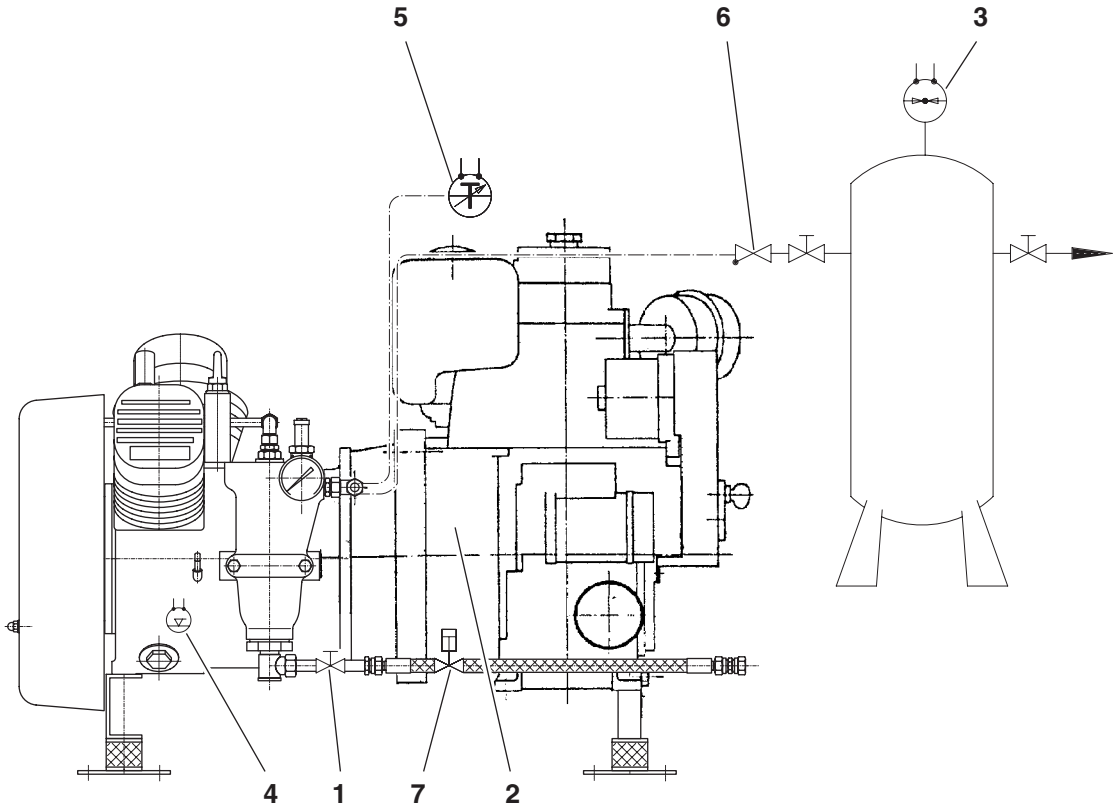
Note!

For technical specifications of the individual items please refer to Chapter 4

All toggle switches are factory set.

As an option, the subsystems can be prewired in a terminal box.

Item	Name	Type	Function
1	Drain valve	Solenoid valve	Starting relief and draining
2	Drive motor	3-phase motor	Drive of the compressor
3	Ultimate pressure switch	Toggle switch	Stops/starts the compressor
4	Oil level switch (opti-onal)	Toggle switch	Stops compressor in case of low oil level
5	Temperature control (optional)	Toggle switch	Stops compressor in case of excess tempera-ture
6	Non-return valve	Plug valve	Prevent air backflow



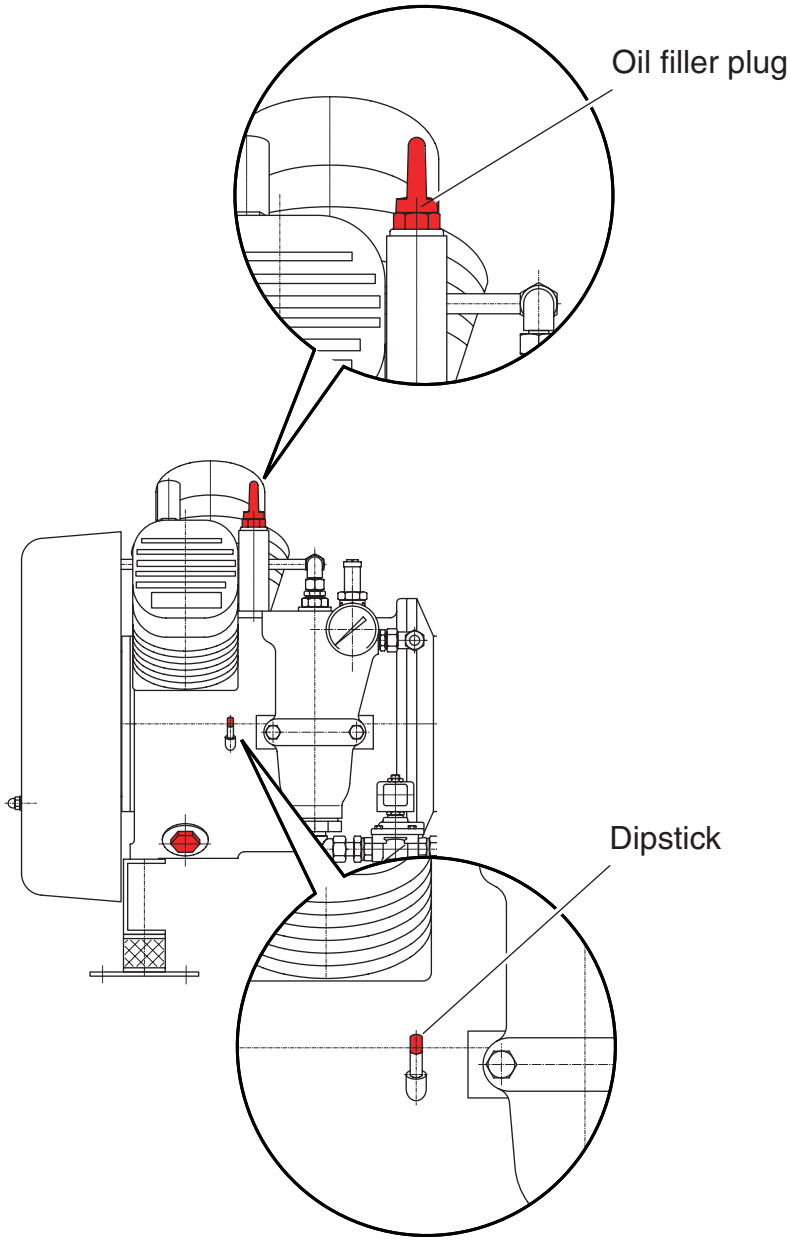
Item	Name	Type	Function
1	Drain valve	Hand valve	Starting relief and draining
2	Drive motor	Diesel engine	Drive of the compressor
3	Ultimate pressure switch (optional):	Toggle switch	Stops/starts the compressor
4	Oil level switch (optional)	Toggle switch	Stops compressor in case of low oil level
5	Temperature control (optional)	Toggle switch	Stops compressor in case of excess temperature
6	Non-return valve	Plug valve	Prevent air backflow
7	Solenoid valve (optional)	Solenoid valve	Starting relief and draining

5.5 Filling in oil

The Sauer compressor is supplied without oil.

Danger!

Oil must be filled into the compressor's crankcase before initial operation!
Use lubricating oil (see chapter 10. “Lubricant table”).
Observe filling amount (see chapter 4. “Technical Specifications”).



1. Unscrew oil filler plug (red).
2. Fill in oil and check level with the dipstick.

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Note!

Fill only to the upper marking on the dipstick. Otherwise the oil consumption of the compressor will increase.

3. Put dipstick back in and replace the oil filler plug.

5.6 Setting the ultimate pressure switch

Note!

The ultimate pressure switch must be connected directly to the compressed air receiver to ensure a quiet and uniform compressor operation.

The pressure loss between the compressor and compressed air receiver must be taken into account for selecting the maximum set pressure. Too high a set pressure can cause the safety valve of the final stage to blow off.

5.7 Checks after installation and before the first start

- Electrical connection corresponds with the type label data?
- Are all connections between compressor and the pressurized air unit supplied correctly installed? Pay special attention to the compressed air outlet.
- Are drain lines properly connected? See section “Drainage”
- Oil filled into crankcase?
- Have all tools and foreign objects been removed from the compressor?
- Entire unit clean?

6. Operation

6.1 Safe operation

Danger!

Only authorized persons are permitted to commission and operate the Sauer compressor!

Danger!

Turn on and start the compressor only if

– it has been checked for proper working condition;

– all tools and foreign objects are removed from the machine.

Danger!

Turn compressor immediately OFF when persons or objects are endangered. Start compressor only when the danger is over.

Danger!

In Automatic mode the compressor starts automatically without warning!

Danger!

Risk of burns by hot surfaces of the compressor when it is running. Wear gloves.

Danger!

Risk of hearing damage due to the sound pressure level when the compressor is running! Wear hearing protection near the compressor.

Note!

Turn compressor OFF in the case of faults, abnormal ratings or irregularities. Refer to chapter 7. “Trouble Shooting” to remove cause.

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6.2 Operating mode

Note!
Applicable to Sauer compressor with compressor control.

After switching on the power supply to Sauer compressor it can be started in one of the following two operating modes using the operating mode selector :

– "**Manual**" operating mode:
Compressor starts and keeps on operating until it is stopped or switched off using the operating mode selector or the main switch respectively.

– "**Automatic**" operating mode:
The starting and stopping of the compressor is controlled externally (e.g. by the pressure switch of the compressed air receiver).

When the Sauer compressor starts, it does so without any load with the drain valves open. The valves close after a few seconds and the compressor accelerates against pressure.

6.3 Commissioning

Checking the direction of rotation

Note!
Applicable to Sauer compressor with compressor control.

Initially only allow the Sauer compressor to run for a few seconds to check the direction of rotation.

1. Turn power supply ON.
2. Set the operating mode selector to "Manual" to start the compressor in Manual mode.
3. Check the compressor's direction of rotation immediately. It must rotate in the direction indicated by the arrow on the crankcase.
4. Set the operating mode selector to "0" to stop the compressor.
5. Turn the power supply OFF.
6. If the direction of rotation is incorrect, have polarity of electric motor changed by a qualified electrician.

Test run for Sauer compressor with electric motor

1. Turn power supply ON.
2. Set the operating mode selector to "Manual" to start the compressor in Manual mode.

✓ If correctly set, the drain valves close after approx. 15 seconds and the compressor accelerates against pressure.

3. Check the automatic intermediate draining function.

✓ It must drain every 15 minutes for approx. 15 seconds. You can tell when this is happening from the pressure drop at the pressure gauges.

4. Set the operating mode selector to "0" to stop the compressor.
5. Turn the power supply OFF.
6. If necessary, remove causes for deviations from nominal values and faults. For more information, also see Chapter 7 "Troubleshooting".

Test run for Sauer compressor with

Danger!

The Sauer compressor is fitted with a centrifugal clutch for starting relief. The activation speed of the clutch is approx. 1000 rpm.

The speed setting must not be changed. Otherwise power transmission as of about 1400 rpm cannot be guaranteed.

Note!

For Sauer compressor with compressor control, see section "Test run for Sauer compressor with electric motor".

diesel engine

1. Open drain valve at condensate separator.
2. Start the diesel engine.
3. Close drain valve.

✓ The compressor accelerates against pressure.

4. Open drain valve every 15…20 min., drain off condensate and close drain valve again.
5. Open drain valve.
6. Stop the diesel engine.
7. If necessary, remove causes for deviations from nominal values and faults. For more information, also see Chapter 7 "Troubleshooting".

6.4 Routine operation

Cleaning

- Keep compressor site clean.
- Keep indicators and control elements clean.

Checks

- Inspect connections, pipelines and electric cables for damage.
- Check the oil level once a week before starting, top up if necessary. Do not fill oil beyond the maximum mark.

Operation with compressor control

1. Turn power supply ON.
2. Set operating mode selector to "Auto" to operate the compressor in Automatic Mode.

Operation without compressor control

1. Open drain valve at condensate separator.
2. Start the diesel engine.
3. Close drain valve.
4. Open drain valve every 15…20 min., drain off condensate and close drain valve again.

Observation

- Note abnormal operating sounds.
- Note leakages (compressed air, oil, condensate).
- In the event of deviations, see Chapter 7 "Troubleshooting".

7. Troubleshooting

Note!

- In the event of malfunctions, first check the indicators on the compressor control and the compressor .
- Try to remedy the fault by following the information provided in the table below.
- If the cause for the fault cannot be eliminated, contact J.P. SAUER & SOHN customer service.

Fault	Likely cause	Remedy
Operation with compressor control: compressor does not start or is cut-off.	No supply voltage / no control voltage.	Check fuses. Replace blown fuses.
Operation with compressor control: compressor was cut-off, "Oil level" fault indicator lamp (optional) is glowing.	The oil level is too low.	Check the oil level, add oil as required.
Operation with compressor control: compressor was cut-off, "Overcurrent" fault indicator lamp is glowing.	The motor is overheated. Excessive current consumption.	Determine the cause of the fault and remedy. The compressor can be started again after being allowed to cool off.
	Piston seizure	Check cylinder and piston for striation, replace if necessary.
Safety valve of 1st stage blows off:	2nd stage valve is not working properly.	Check 2nd stage valve, replace if necessary.
	Safety valve is faulty.	Replace the safety valve.
2nd stage safety valve blows off:		
Pressure exceeds blowing-off pressure (final pressure + 5%)	Valve in air line to compressed air receiver closed.	Open the valve.
	Pressure switch set too high.	Reduce set pressure.
Pressure below blowing-off pressure (final pressure + 5%)	Safety valve set too low or faulty.	Increase set pressure or replace safety valve.
	Pressure loss in the compressed air line to the air receiver too high.	Reduce pressure losses.
Pressure gauge of 2nd stage indicates that pressure is too low.	Valve of 1st stage leaking.	Check 1st stage valve, replace if necessary.
	Air filter very dirty.	Replace air filter cartridge.

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Fault	Likely cause	Remedy
Pressure gauge of 2nd stage indicates no pressure.	Sauer compressor with electric motor: no voltage at solenoid valve.	Check power supply of solenoid valve.
	Sauer compressor with electric motor: solenoid valve defective.	Check solenoid valve and replace if necessary.
	Sauer compressor with diesel engine: hand valve open.	Close manual valve.
Air escaping from compressed air lines	Gaskets of connections leaking.	Replace relevant gasket.
	Compression ring connections leaking.	Turn compressor OFF. Wait until all parts are relieved of pressure (check pressure gauges). Then tighten unions.
Air escaping from the overflow opening of the final separator's fusible plug.	Temperature of compressed air too high at outlet; insufficient cooling by faulty fan.	Replace fan. Replace fusible plug.
	Very dirty cooler; insufficient ventilation.	Clean the cooler. Check room ventilation. Replace fusible plug.
Operation with compressor control: compressor was cut-off, "Air temperature" fault indicator lamp (optional) is glowing.	Temperature of compressed air too high at outlet; insufficient cooling by faulty fan.	Replace fan.
	Very dirty cooler; insufficient ventilation.	Clean the cooler. Check the room ventilation.
Operation with compressor control: solenoid valve does not close.	No supply voltage.	Check fuses, replace blown fuses.
	Solenoid faulty.	Replace solenoid.
	Foreign matter in solenoid valve.	Clean solenoid valve.
Compressor makes loud noises.	Connecting rod bearing faulty.	Check connecting rod bearing, replace if necessary. Check oil supply.
	Gudgeon pin bearing faulty.	Check gudgeon pin bearing, replace if necessary.
	Crank shaft bearing faulty.	Check crank shaft bearing, replace if necessary.
Oil leaking from crankcase.	Gasket or shaft seal faulty. Screws not tight.	Tighten screws. **If there is heavy leaking**, check to see which gasket is faulty, then replace it. **Minor traces of oil** on the crankcase or oil drops below the compressor are harmless. Wipe off with a rag.

Fault	Likely cause	Remedy
Water in oil	Incorrect ventilation (compressor is undercooled).	Change the room ventilation.
	Insufficient drainage.	Check drain lines and drain intervals.
Premature breaking of valve plates, valve springs or valve disks.	Insufficient drainage.	Check drain lines and drain intervals. **Note:** Indentation marks appearing on the valve plate due to valve impact are normal.

8. Maintenance

8.1 Maintenance service by J.P. SAUER & SOHN

The J.P. SAUER & SOHN customer service offers different maintenance services – e.g. full maintenance or valve replacement service.

8.2 Maintenance safety

Before servicing

1. Disconnect the power supply to the compressor.
2. Post danger sign “Caution Maintenance Work!” at the power supply.

Danger!

Only authorised persons are permitted to service and make adjustments to the Sauer compressor!

Danger!

Risk of injury from hot surfaces!
Let compressor cool off after turning OFF.

Danger!

Risk of injury from pressurised compressor components!
Check the pressure gauges before servicing to ensure the compressor is completely relieved of pressure.

Danger!

Danger! High voltage!

– Never assume that a circuit is de-energised – always check for your own safety!
– The main switch is energised, even when it is turned OFF.
– Components being worked on should only be energised if this is explicitly specified.

Danger!

Danger of death from missing safety devices and missing isolating protection devices!
Reinstall all safety devices and isolating protection devices after servicing. This also applies to electrical protection devices (e.g. earth wires).

8.3 Maintenance schedule

Danger!

For all maintenance work, Chapter 8.4 “Table of tightening torques” must be observed for specific screws.

Note!

The maintenance intervals specified in the maintenance schedule must be observed. Shortening the maintenance intervals is of no advantage with regard to operating performance or service life of the Sauer compressor.

Note!

After a major overhaul (=8000 operating hours), the maintenance schedule begins all over again.

Instructions for the maintenance schedule

- Use the maintenance schedule as master template or copy the relevant page from the digital document and save it as a separate file under a suitable name. Use the maintenance schedule as a guide and verification.
- Regularly check the maintenance schedule to see which maintenance intervals are due depending upon the number of operating hours. The intervals are shown in the table's column headers.
- Check the column of each maintenance interval to see which maintenance work is to be carried out at the end of each maintenance interval. The required tasks are indicated by check boxes. Description and Chapter number of the tasks are shown in the first column.
- **Carry out** all maintenance work of a maintenance interval and **tick** the appropriate check boxes of the maintenance schedule. Then **enter** the operating hours count, date and your signature.
- When beginning a new maintenance schedule
  - **enter**: main specifications, date of commissioning, number of maintenance schedule, current date and operating hours count
  - **tick**: start after commissioning/after major overhaul

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Maintenance Schedule No.	
Beginning of this maintenance schedule	
❑ **after commissioning** ❑ **after major overhaul**	
Date:	
Operating hours count:	

Compressor type	
Type series	2L
Compressor number	
Factory no.:	
Year of construction:	
Date of commissioning:	

Interval (operating hours) / **Maintenance work**	**50 after commissioning**	**50 after major overhaul**	**At least yearly if < 1000 / year**	**1000**	**2000**	**3000**	**4000**	**5000**	**6000**	**7000**	**8000 = major overhaul**
Check screwed connections 8.6	❑	❑									
Oil change 8.5	❑	❑	❑	❑	❑	❑	❑	❑	❑	❑	❑
Air filter cartridge replacement 8.7			❑	❑	❑	❑	❑	❑	❑	❑	❑
Checking valves 8.8			❑	❑	❑	❑	❑	❑	❑	❑	❑
Checking the piston rings 8.9							❑				❑
Replacing gudgeon pins/gudgeon pin bearings 8.10							❑				❑
Replacing valves 8.11					❑		❑		❑		❑
Checking pistons and cylinders 8.12											❑
Checking drive bearings 8.13											❑
Checking coupling 8.14							❑				❑
Clean condensate separator 8.15			❑	❑	❑	❑	❑	❑	❑	❑	❑
Operating hours count:											
Date											
Signature (initials)											

Note!

Check compressor **50 hours after every piece of maintenance work** is carried out. Check all screws affected by the maintenance work to see if they are tight.

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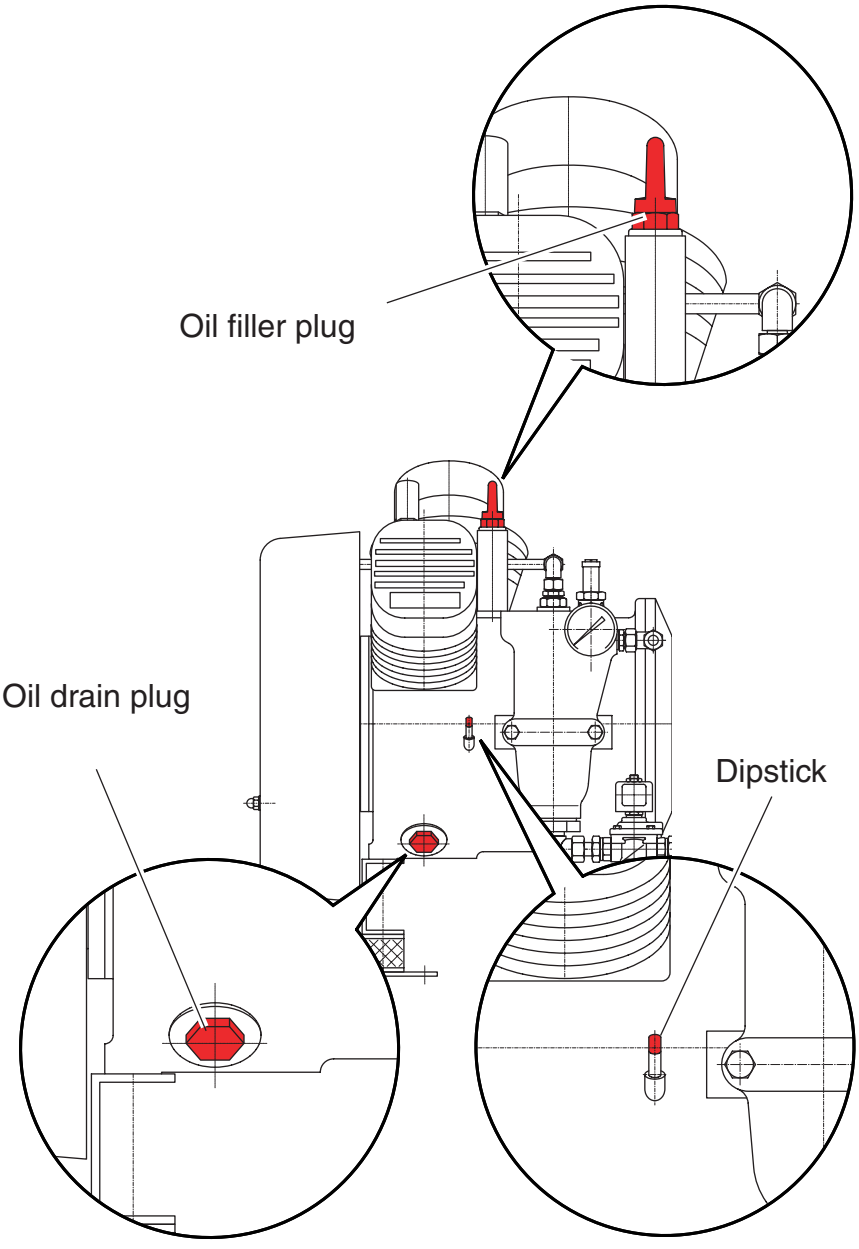
8.4 Table of tightening torques

Screw(s)	Tightening torque
Cylinder head nuts, 1st and 2nd stage	38 Nm
Connecting rod bolts, 1st and 2nd stage	50 Nm

8.5 Oil change

Note!
Use oil as per Lubricant Table (see chapter 10).



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1. Place oil sump (of sufficient capacity to hold the complete oil filling, see chapter 4 "Technical data") under the oil drain plug.
2. Remove the oil drain plug.
3. Wait until all oil is drained.
4. Replace the oil drain plug.
5. Unscrew oil filler plug (red).
6. Fill in oil and check level with the dipstick.

✓ The level shall be between the upper and lower mark on the dipstick.

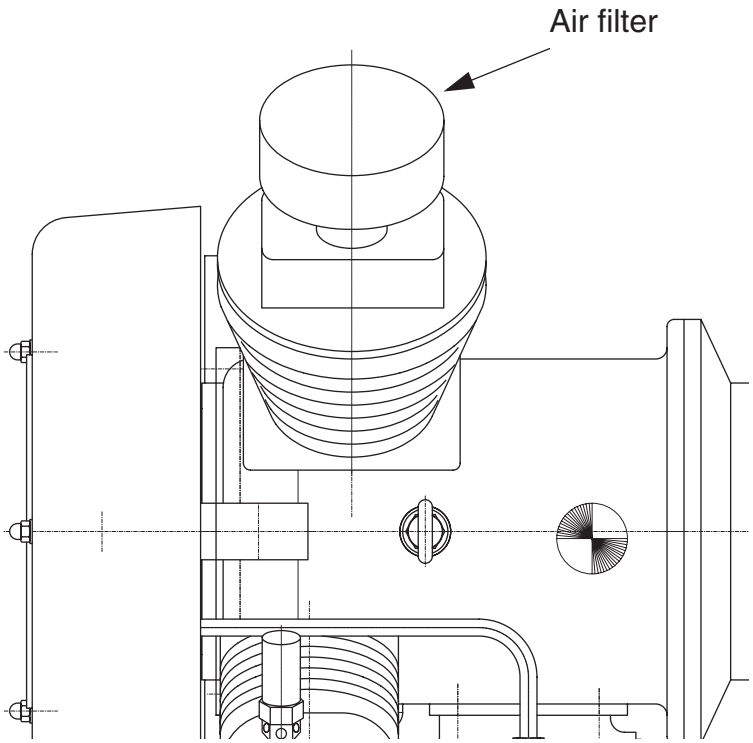
7. Put dipstick back in and screw the oil filler plug back on.

8.6 Check screwed connections

Check all unions for tightness and tighten if necessary. It concerns:

– Cooler and air lines;
– Unions of pipe and hose lines;
– Cylinder head;
– Cylinder;
– Drive motor, coupling and intermediate flange;
– Measuring equipment and switchgear;
– bearings;
– accessories and equipment accessories.

8.7 Air filter cartridge replacement



1. Open clips and take the air filter cap off.
2. Remove air filter cartridge and check for wear and tear.
3. If necessary, wash air filter cartridge in an oil dissolving fluid (e.g. petroleum or benzene).

Danger!
Do not direct compressed air at persons!

4. Blow air filter cartridge with compressed air from inside to outside.
5. Dip air filter cartridge in fresh crankcase oil of the viscosity class SAE 20 and allow to drip for 20…30 min. Collect the dripping oil.
6. Insert new or cleaned air filter cartridge.
7. Put cap back on and close the clips.

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8.8 Checking valves

Note!

Always refit all valves with new gaskets and rings. Only use genuine Sauer spare parts. They are precision parts with defined and tested dimensions and material characteristics, specially designed for use in Sauer compressors. Fitting other gaskets may result in leaks and could cause substantial damage to the compressor.

Valve removal

1. Loosen unions and hose line of the crankcase vent at the cylinder heads.
2. Remove cylinder head nuts and remove the cylinder heads.
3. Remove the valves with care.

Checking the lamellar valves (1st and 2nd stage)

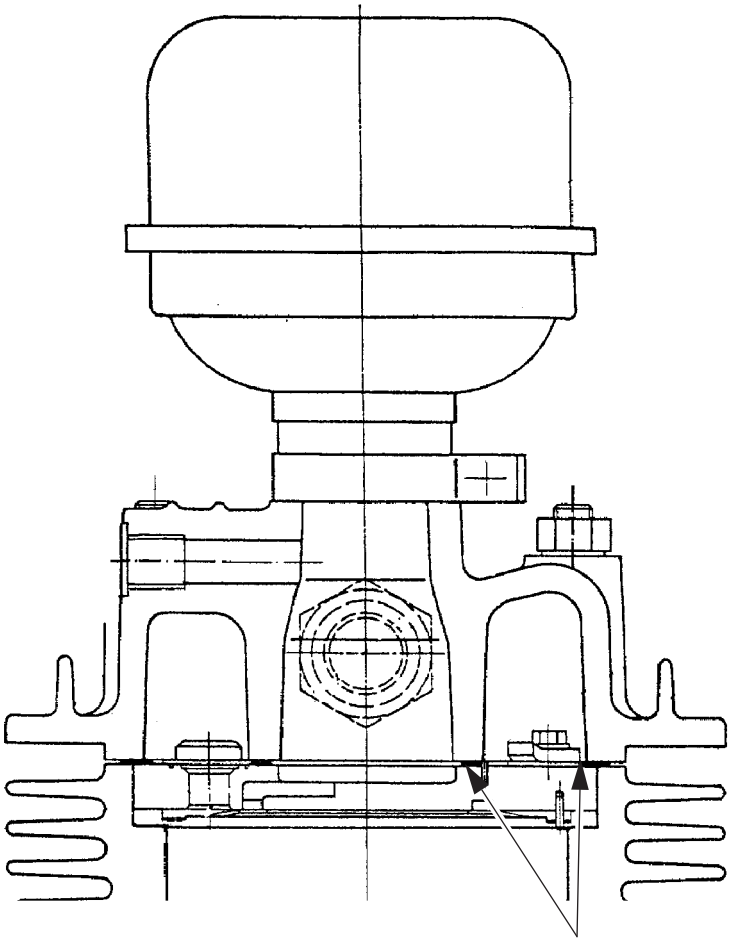
4. Check valves. If lamellar valve is heavily carbonised or damaged, replace complete valve.

Note!

Lamellar valves require very little maintenance and function even in the presence of small quantities of dirt in contrast to plate valves. Normally the plates have the same service life as the valve body which, due to its geometry, cannot be refaced or lapped. We would therefore not recommend replacing individual plates.

Should a plate be broken prematurely nevertheless (e.g. through the influence of foreign objects), contact our service team.

Valve installation



5. Fit lamellar valve and cylinder head of the 1st stage. Use new cylinder head gasket in the process (see illustration above). Observe the tightening torque (see section 8.4).

Note!

Detach webs of seal ring set. Only use both cylinder head gaskets as a set!

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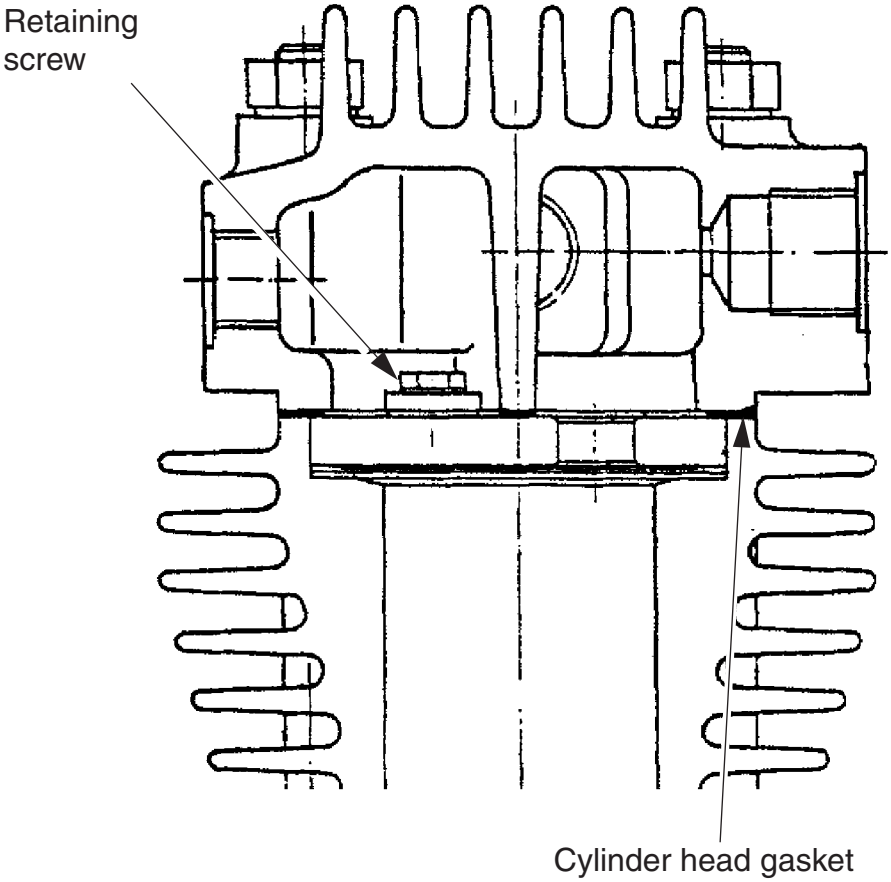


6. Fit lamellar valve and cylinder head of the 2nd stage, Ensure the correct installation position: the valve retaining screw must be opposite the safety valve nipple. Use new cylinder head gasket (see illustration above). Observe the tightening torque (see section 8.4).
7. Attach unions and hose line to the cylinder heads.

Note!

Lamellar valves in particular are those parts of a reciprocating compressor, that are subject to the most stress. In order to achieve the guaranteed maintenance intervals, these valve are high-quality precision parts, specially matched to the individual compression stages and their function will have been checked carefully before delivery. Repair work undertaken by the maintenance and operating personnel requires special knowledge, which the staff may not have under all circumstances. In such cases, J.P. SAUER & SOHN offer a valve replacement service. If required, please contact the Sauer service department.

8.9 Checking the piston rings

1. Remove cylinder heads and valves as described in Chapter 8.8 "Checking the valves".
2. Pull cylinder off. Secure the piston until the cylinder has been pulled off.

Note!
If the piston is not secured when pulling the cylinder off, it will strike the crankcase.

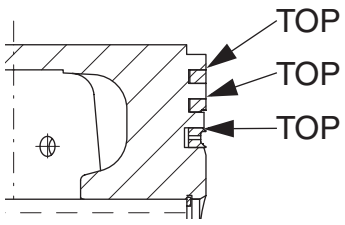
3. Remove circlips of gudgeon pins, push gudgeon pin out and take piston off.
4. Remove all piston rings from the pistons.
5. Place piston rings in their respective cylinders and measure the gap clearance with a feeler gauge.
6. Replace piston rings if gap clearance exceeds the following limit values (see illustration).

All piston rings, 1st stage	0.90 mm
N-ring, 2nd stage	0.55 mm
R-ring, 2nd stage	0.55 mm
S-ring, 2nd stage	0.4 mm

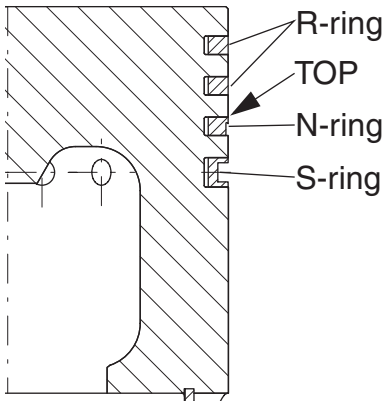
Note!
Always replace all pistons rings of a piston when one of the piston rings exceeds the limit.

7. Install piston rings on the respective piston. Make sure they are in the correct position: piston rings with an asymmetric cross section are marked on one of the surfaces with "TOP". This surface must be at the top when installing (see illustration).

1st stage



2nd stage



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8. Fit a new cylinder base gasket for each cylinder.
9. Push the piston into the respective cylinder up to the gudgeon pin bore and mount the cylinder along with the piston.
10. Fix pistons on the connecting rods. For this purpose, press the gudgeon pin in and fit the circlip of the gudgeon pin.
11. Fit cylinder heads and valves as described in Chapter 8.8, "Checking the valves".

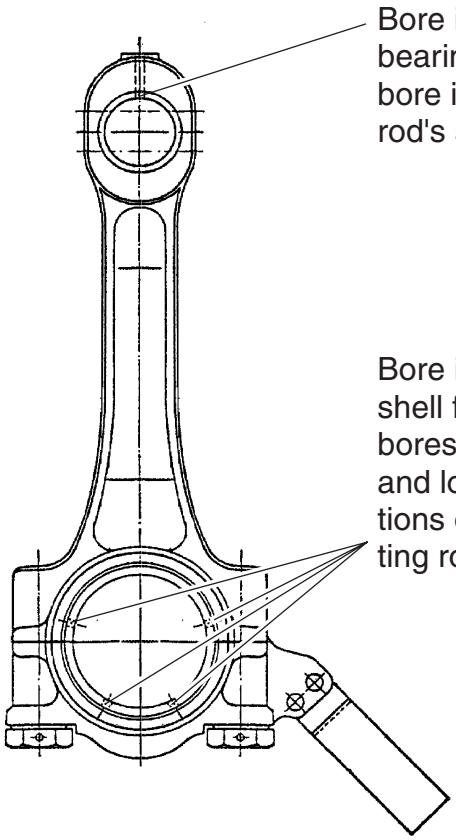
8.10 Replacing gudgeon pins/gudgeon pin bearings

1. Remove cylinder heads and valves as described in Chapter 8.8 “Checking the valves”.
2. Remove cylinders and pistons as described in Chapter 8.9 "Checking the piston rings".

Note!

If the connecting rods are not secured during removal, they will strike the crankcase.

3. Remove connecting rod bolts and remove connecting rod bearing cover with bearing bush. Take out connecting rods.
4. Press gudgeon pin bearing out of the connecting rod's small end.
5. Replace gudgeon pin and gudgeon pin bearing.



Note!

The bore in the gudgeon pin bearing must be flush with the bore in the connecting rod's small end (see illustration).

6. Press gudgeon pin bearing into the connecting rod's small end.

Note!

The bores in the bearing shell must be flush with the bores in the upper and lower sections of the connecting rod (see illustration).

Figures are hammered into the upper and lower sections of the connecting rods. These MUST match.

7. Put connecting rod back with sufficient oil and screw on the bottom part by hand.

✓ It must be possible for the connecting rod bolts to be fully screwed in by hand. This is the only way of ensuring that they are seated correctly on the crankshaft. The connecting rod must be able to rotate easily on the crankshaft once tightened.

8. Fit cylinders and pistons as described in Chapter 8.9 “Checking the piston rings”.
9. Fit cylinder heads and valves as described in Chapter 8.8 “Checking the valves”.

8.11 Replacing valves

Remove and install valves as detailed in section 8.8 “Checking valves”. Replace complete valve.

8.12 Checking pistons and cylinders

1. Remove cylinder heads and valves as described in chapter 8.8 “Checking the valves”.
2. Remove cylinders and pistons as described in chapter 8.9, “Checking the piston rings”.
3. Check cylinders and pistons for scouring and excessive wearing marks. Replace relevant parts.
4. Measure cylinder and replace if the following wear limits are exceeded:

Cylinder	Wear limit of diameter
1st stage	100.15 mm
2nd stage	46.10 mm

5. Fit cylinders and pistons as described in chapter 8.9, “Checking the piston rings”.
6. Fit cylinder heads and valves as described in chapter 8.8, “Checking the valves”.

8.13 Checking the drive bearings

1. Remove cylinder heads and valves as described in Chapter 8.8 "Checking the valves".
2. Remove cylinders and pistons with connecting rods as described in Chapter 8.9 "Checking the piston rings".
3. Inspect the connecting rod bearing for score marks and excessive wear marks and replace if heavily worn.
4. Remove fan cover, radial fan and complete cooler pack.
5. Remove motor with intermediate flange and clutch.
6. Remove bearing bracket.
7. Remove crankshaft.

Note!

Only replace shaft seals of crankshaft bearing if the bearing bracket is removed!

8. Inspect the crankshaft bearing for score marks and excessive wear marks and replace if heavily worn. If necessary use new shaft seal.
9. Fit crankshaft.
10. Fit bearing bracket. Use new gasket.
11. Fit motor with intermediate flange and clutch.
12. Fit cooler pack, radial fan and fan cover.

13. Fit cylinders and pistons as described in Chapter 8.9 "Checking the piston rings".
14. Fit cylinder heads and valves as described in Chapter 8.8 "Checking the valves".

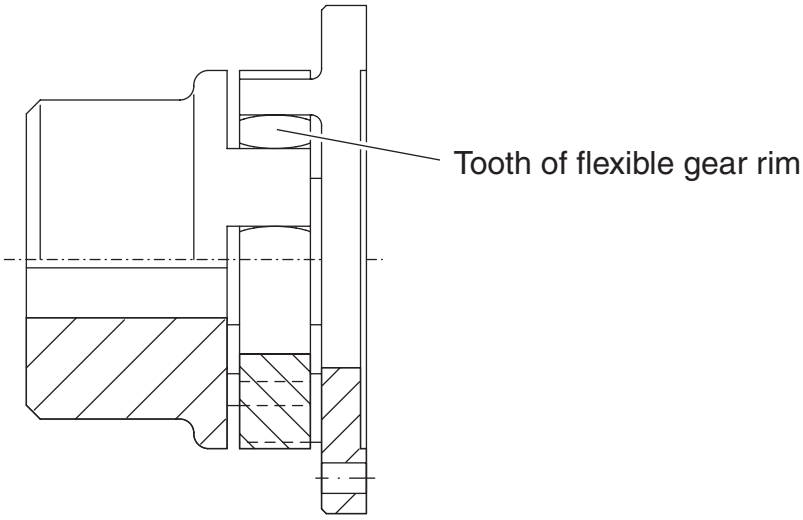
8.14 Checking the coupling

Note!

Applicable to Sauer compressor with electric motor.

Checking ring gear

1. Support compressor under the transmission bell housing.
2. Remove the electric motor mounting screws.
3. Carefully lift the electric motor using the lifting eyes (see chapter 5.1: "Transport").
4. Pull electric motor carefully away from the intermediate flange.
5. Check the flexible gear rim of the coupling for damage. The teeth of the flexible gear rim must not be deformed.
6. If required, replace flexible gear rim.
7. Slide electric motor gently against the intermediate flange and tighten the motor mounting screws.
8. Remove support from under the transmission bell housing.



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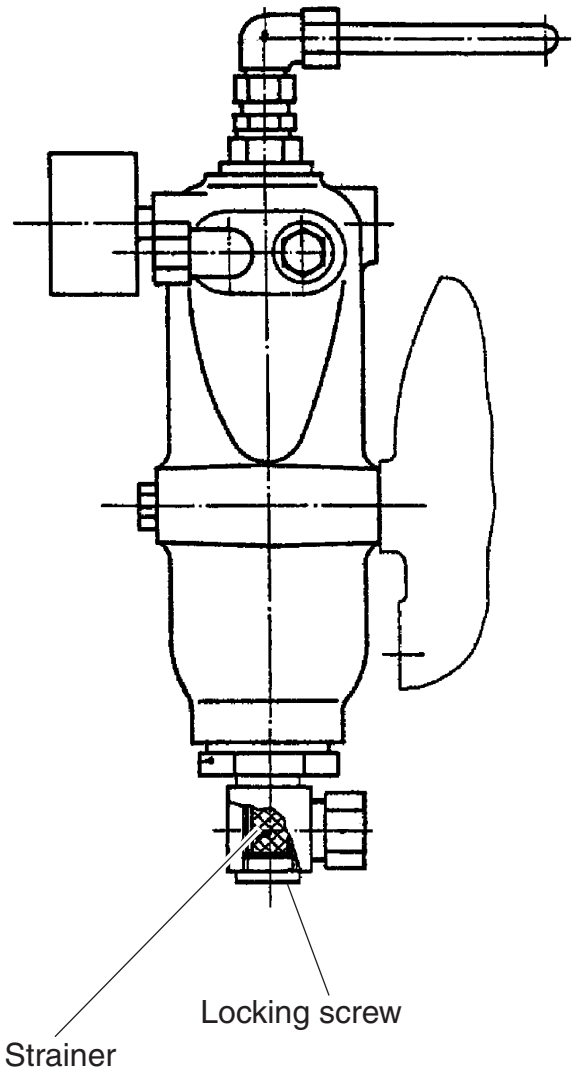
8.15 Clean condensate separator



1. Remove locking screw.
2. Remove strainer and check for wear and tear.

Danger!
Do not direct compressed air at people!

3. Blow off strainer with compressed air.
4. Insert strainer.
5. Screw in locking screw.

9. Placing out of Service

9.1 Safety when placing out of service and dismounting

Danger!

The compressor shall only be placed out of service and dismounted by instructed and trained specialists of the operator. The specialists must be familar with the protection devices and regulations before starting the work. Any work on the electrical installation must be carried out by qualified electricians only.

In addition, information contained in the documentation of outside vendors is to be observed.

9.2 Shutting down the compressor temporarily

Every 4 weeks perform a test run for at least 30 minutes. Additional corrosion prevention measures are not then required.

When the Sauer compressor is to be shut down **for more than 12 weeks**, conservation with oil containing a corrosion inhibitor additive is recommended. Regular test runs are not then needed.

Note!

Use one of the oils with a corrosion inhibitor additive recommended in Chapter 10 "Lubricant Table" for corrosion protection.

The oil containing a corrosion inhibitor additive has satisfactory running properties. In the event of an emergency, the machine can be started for a short duration with oil containing a corrosion inhibitor additive filling.

1. Run compressor for approx. 5 minutes with drain valves and pressure line open.

✓ Any condensate present is blown off.

2. Open the oil drain plug (see illustration in Chapter 8.5 "Oil change"), drain compressor oil and dispose of it in an environmentally friendly manner. Close the oil drain plug again.
3. Fill about 1 litres of oil containing a corrosion inhibitor additive.
4. Start compressor and run for approx. 5 minutes with drain valves and pressure line opened.
5. Stop compressor.
6. Remove air filter on cylinder head of 1st stage (see illustration in section 3.1 "Overview"). For this purpose, loosen the clamp and lift off the air filter.
7. Loosen union of cooler, 1st stage, from cylinder head of 2nd

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stage and lift off cooler.

8. Start compressor and slowly inject approx. 15 cc of oil containing a corrosion inhibitor additive into the intake port of the 1st stage.
9. Slowly inject approx. 10 cc of oil containing a corrosion inhibitor additive in the opening in the cylinder head of the 2nd stage.
10. Wait until oil mist comes out of pressure line.
11. Stop compressor.
12. Refit air filter and cooler.
13. If necessary, post a sign that the compressor has been treated with anticorrosion agents and is shut down.
14. Disconnect power lines from the mains supply, if necessary.

Placing back into service

1. Connect power lines to power supply, if necessary.
2. Drain oil containing a corrosion inhibitor additive and fill with compressor oil. Proceed as described in Chapter 6.3 "Commissioning".

9.3 Disassembling

Disassembling

1. Switch off compressor and disconnect the power supply.
2. Make sure that the compressor is no more under pressure by means of the pressure gauge.
3. Disconnect power lines from the mains supply.
4. Remove oils and lubricants and dispose them in an environmentally friendly manner.
5. Drain residual condensate and dispose it in an environmentally friendly manner.

Disposal

Material/component	Method of disposal
Lubricants	as hazardous waste
Steel/iron	as scrap
Electric cables	as hazardous waste
Electronic components	as electronic scrap
Plastics	as hazardous waste

10. Lubricant Table

Note!

Lubricants not mentioned in the lubricant table may only be used after approval by J.P. SAUER & SOHN. Otherwise the warranty will expire. Contact customer service in case of need.

Take note of all information about the lubricants given in this chapter.

Area of validity

The lubricant table applies to all Sauer compressors intended for the compression of air.

The lubricant table does **not** apply to

– Sauer compressors for the compression of neutral gases;
– temperature ranges outside of 5 … 55 °C.

General recommendation

The following recommendations apply to the 5 … 55 °C temperature range:

– Use **mineral oils** of viscosity class **ISO VG 100** or **SAE 30**.
– Lubricating oils should conform to group **VCL** according to **DIN 51506**.

Note!

In the case of **2-stage 30 bar compressors** the use of **synthetic lubricating oils** may be beneficial. Please contact us for more information about synthetic lubricating oils approved by us.

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10.1 Lubricating oils

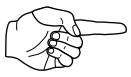
Brand	Name	Group
Agip	Diesel Gamma 30	VCL-100
	Dicrea 100	VDL-100
	Acer 100	VCL-100
	Motor Oil HD 30	SAE 30
	Cladium 50	SAE 30
ARAL	Motanol HE 100	VDL-100
	Kowal M 30	VCL-100
	Disola M 30	SAE 30
AVIA	Avilub Compressor Oil VDL-100	VDL-100
	Avilub Compressor Oil VDL-100	VCL-100
	Motor oil HDC 30	SAE 30
	Motor oil HD 30	SAE 30
BP	Energol RC 100	VDL-100
	Energol IC-DG 30	VCL-100
	Energol DL-MP 30	SAE 30
	Energol OE-HT 30	SAE 30
	Vanellus C3 SAE 30	SAE 30
Castrol	Aircol PD 100	VDL-100
	Marine CDX 30	SAE 30
Chevron	HD Compressor Oil 100	VDL-100
	Delo 1000 Marine 30	SAE 30
	Veritas 800 Marine 30	SAE 30
	RPM Heavy Duty Motor 30	SAE 30
DEA	Actro EP VDL-100	VDL-100
	Trion EP VDL-100	VDL-100
	Regis SAE 30	SAE 30
Esso	Exxcolub 77	VDL
	Exxcolub 100	VDL-100
	Compressor Oil 3021 N	VDL-100
	Exxmar 12 TP 30	SAE 30
	Exxmar XA	SAE 30
	Essolube HDX Plus +30	SAE 30
Mobil	Rarus 427	VDL-100
	DTE Oil Heavy	VDL
	Mobilgard 300	SAE 30
Shell	Corena Oil P 100	VDL-100
	Rimula X 30	SAE 30
	Melina S Oil 30	SAE 30
	Melina Oil 30	SAE 30
	Gadinia Oil 30	SAE 30

Brand	Name	Group
TEXACO	Compressor Oil EP VDL 100	VDL-100
	Regal R&O 100	VCL-100
	Ursatex 30	SAE 30
	DORO AR 30	SAE 30
TOTAL	Dacnis P 100	VDL-100
	Carprano TD 30	SAE 30
	Milcano TC 30	SAE 30
	Disola M 3015	SAE 30

10.2 Slushing oils

Brand	Name
Agip	Rustica C SAE 30
ARAL	Konit Motor Oil SAE 30
AVIA	MK 1540 S
	Avilub MK 3000
BP	MEK 20 W-20
Castrol	Running-in and Preservation Oil
DEA	Deamot EKM 642 SAE 30
ELF	Stockage 30
Esso	MZK Motor Oil HD 30
	Antirust MZ 110
FINA	Rusan NF Motor Oil SAE 30
Mobil	Mobilarma 524
Shell	Ensis Motor Oil 30
TEXACO	Engine Oil EKM 146 SAE 30

11. Spare Parts and Accessories



Note!

Please note the information in chapter 1. “General” regading our genuine Sauer spare parts.

J.P. SAUER & SOHN garantee the complete spare parts supply over the entire service life of the Sauer compressor.

Our genuine Sauer spare parts are subject to constant quality control and further development. They conform to the latest technical developments.

In addition to the genuine Sauer spare parts, our delivery program comprises a large number of accessories for your Sauer compressor and special components to complete your air system, such as:

- fully automatic controls;
- adsorption dryers;
- refrigerated air dryers;
- filters;
- silencing cabinets;
- compressed air receivers;
- fittings.

We supply instructions and a maintenance manual for each accessory.

Spare parts catalogue

The spare parts catalogue is found in the annex to these instructions.

- With the help of overviews, illustrations and lists the required parts is quickly found.
- The spare parts catalogue, including the operating instructions is also available on CD-ROM. Here, an order form can be filled in, printed out and send immediately.
  For doing so, you need the **main specifications** of your Sauer compressor from the table below. If they have not yet been entered there, they can be found on the type label affixed to the crankcase.

Compressor type					
Factory no.:					
Year of construction:					

Furthermore, the **number of operating hours** should be stated, if possible.

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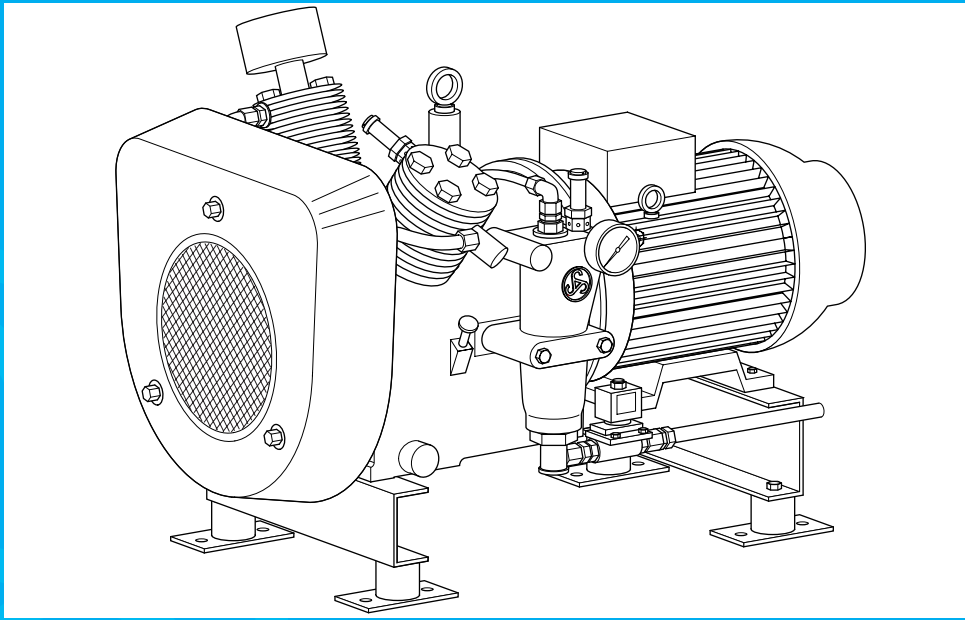
12. Annex

This Annex to the operating instructions contains

– documentation supplied by outside vendors;
– data sheets.

J.P. SAUER & SOHN
MASCHINENBAU GMBH



Sauer Compressor

Type: WP 22 L

Spare Part List

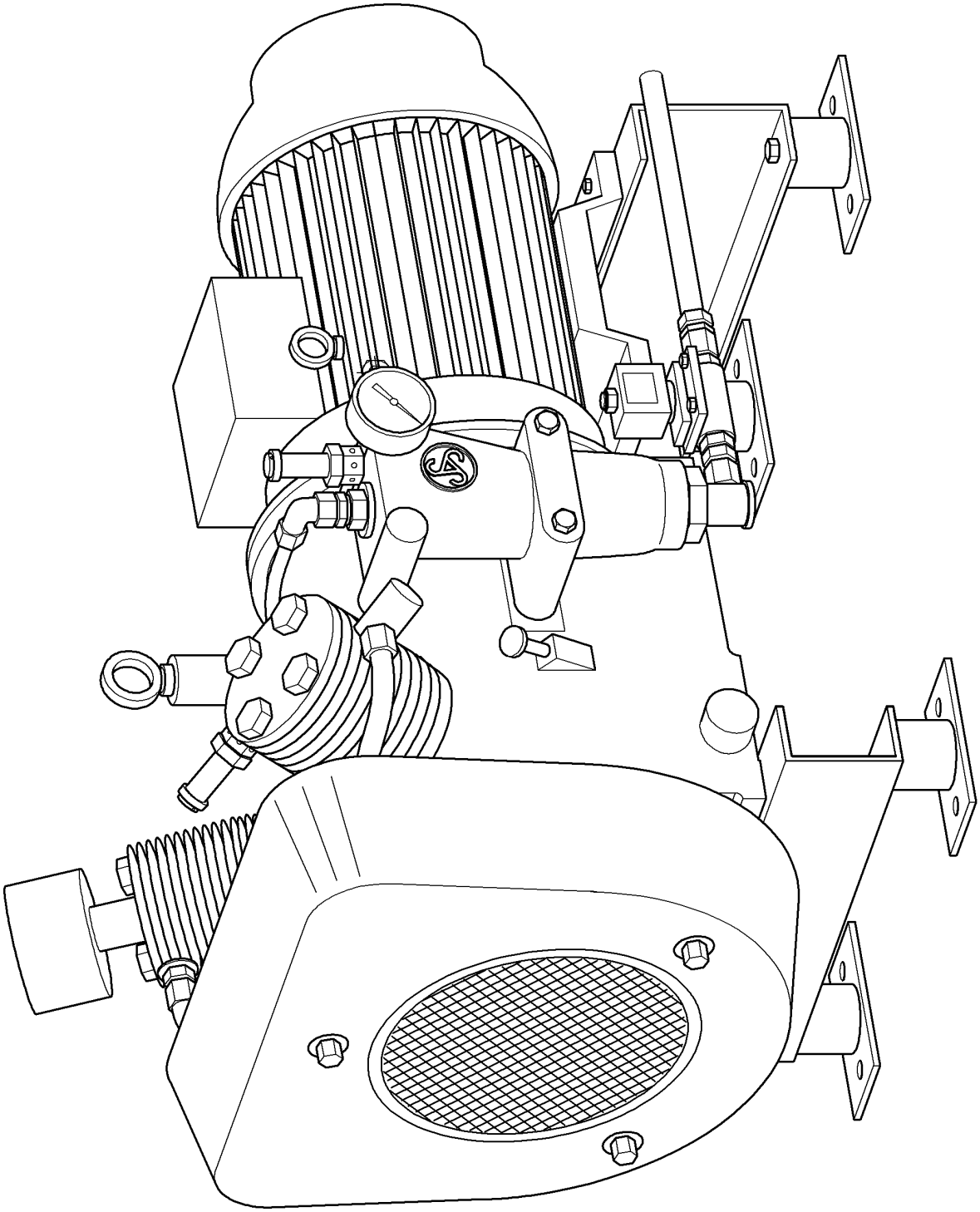
Ein Mitglied der
SAUER-Gruppe

Version 1 - 1

WP 22L Sauer compressor

Note: Explanation of the subassemblies in chapter 3 "Design and Function" of the operating instructions

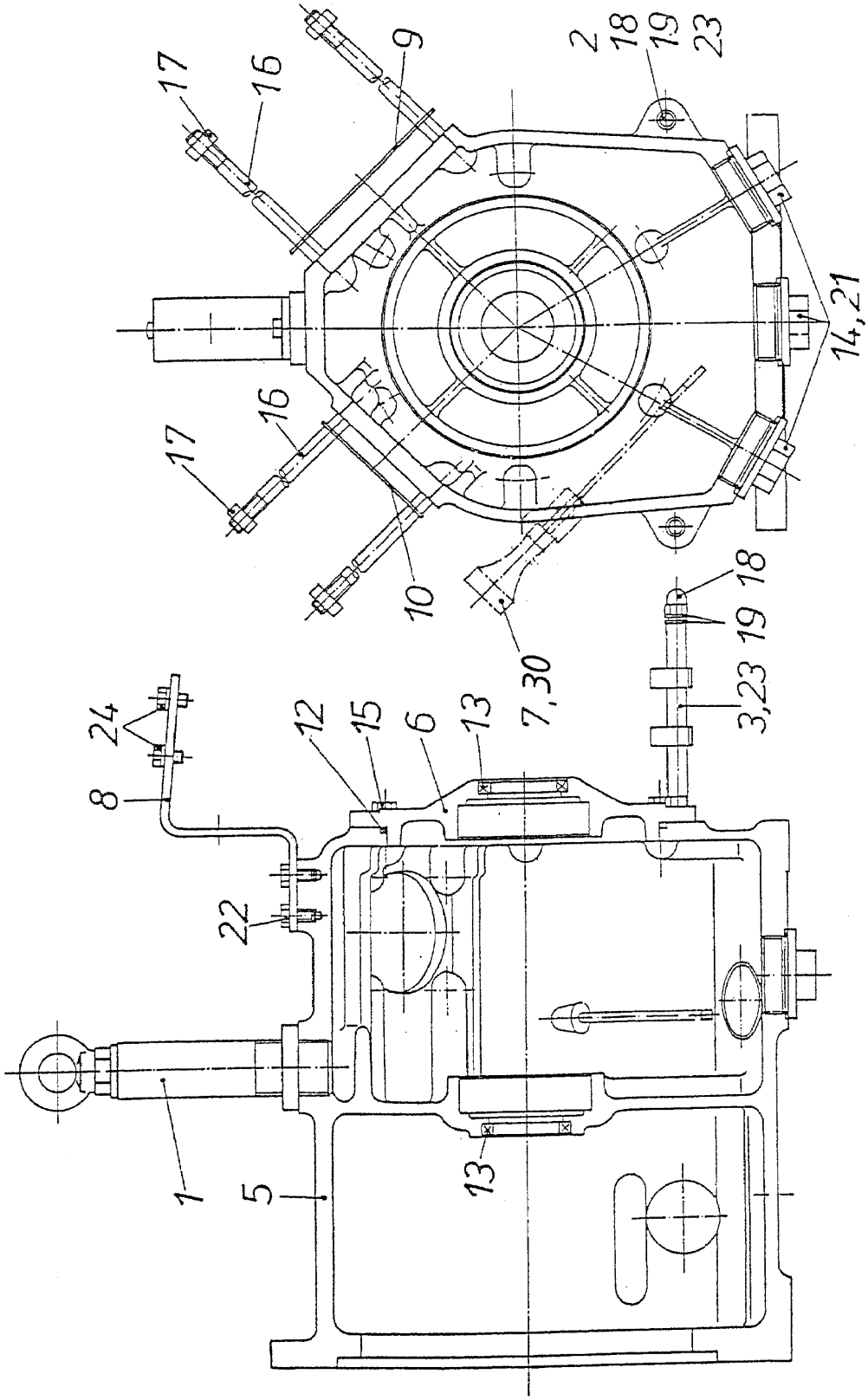
WP 22L Sauer compressor



WP 22L Sauer compressor

Item	Reference No.	Designation	Qty.
1	060 316	crankcase, complete	1
2	060 318	crankshaft	1
3	060 279	connecting rod 1st stage	1
4	060 282	connecting rod 2nd stage	1
5	034 989	piston 1st stage	1
6	060 319	piston 2nd stage	1
7	060 367C	cylinder 1st stage	1
8	060 302D	cylinder 2nd stage	1
9	060 322	cooler	1
10	060 328	vent line, complete	1
11	060 440	compressed air pipes	1
12	030 915E	safety valve, complete	1
13	030 752E	safety valve, complete	1
14	060 354	automatic drainage	1
15	035 048	flexible coupling	1
16	060 589	flexible mount	1
17	035 253	centrifugal clutch, complete (f,combustion engine)	1
18	064 325	manual drainage f. diesel engine	1

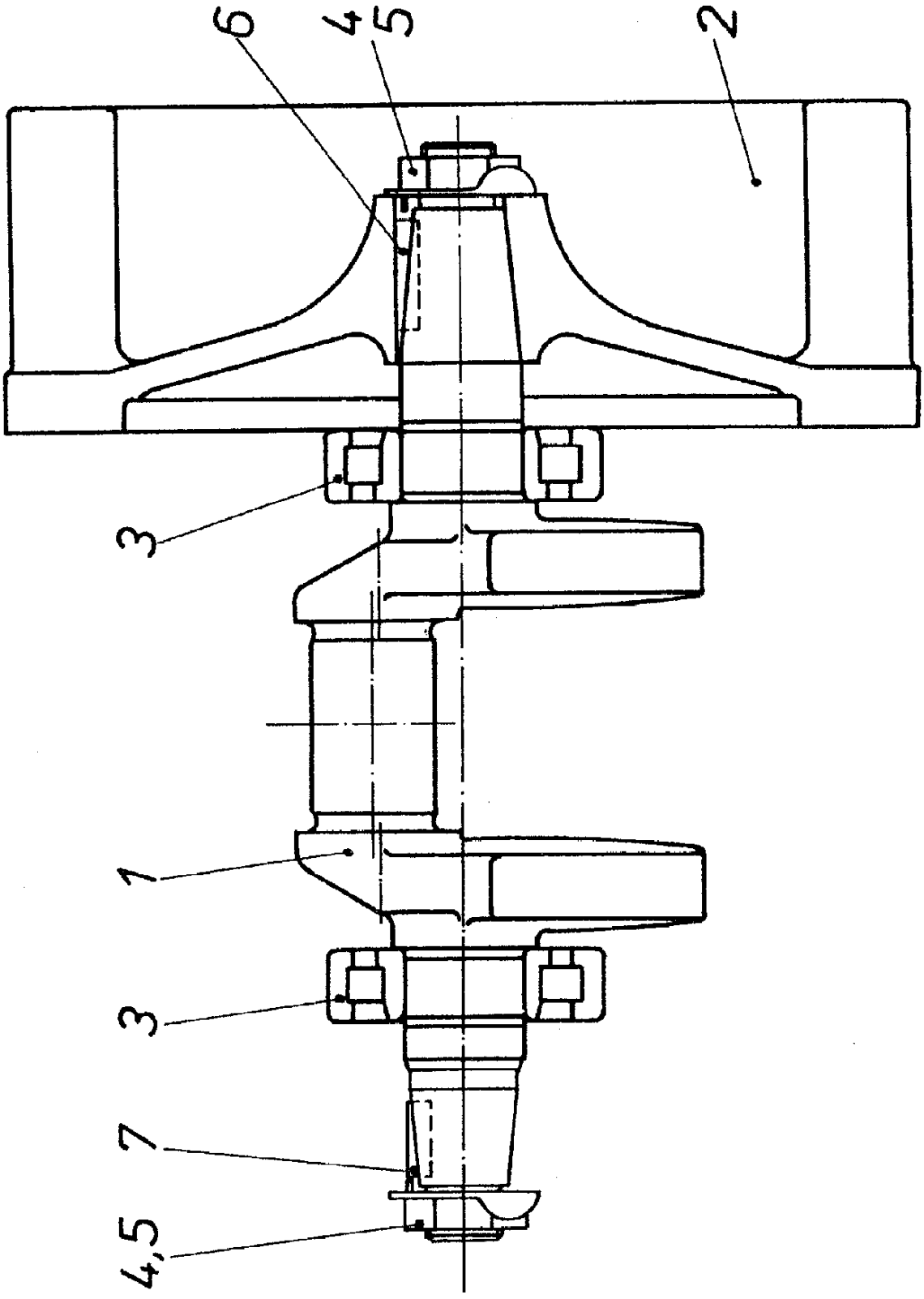
060 316 crankcase, complete



060 316 crankcase, complete

Item	Reference No.	Designation	Qty.
1	060 376	vent connection	1
2	054 816	stud bolt	1
3	054 817	stud bolt	1
5	060 404	crankcase	1
6	060 409	bearing bracket	1
7	061 383	dipstick	1
8	060 425	holder	1
9	060 448	cylinder foot packing	1
10	060 449	cylinder foot packing	1
12	031 103	o-ring	1
13	001 884	radialgasket	2
14	001 021	screw plug	3
15	005 247	hexagon head screw	6
16	035 032	stud screw	8
17	002 031	nut	8
18	002 360	cap nut	2
19	002 151	washer	4
21	005 029	gasket	3
22	000 026	hexagon head screw	2
23	001 620	hexagon head nut	2
24	034 228	Tensilock screw	2
30	035 528	o-ring	2

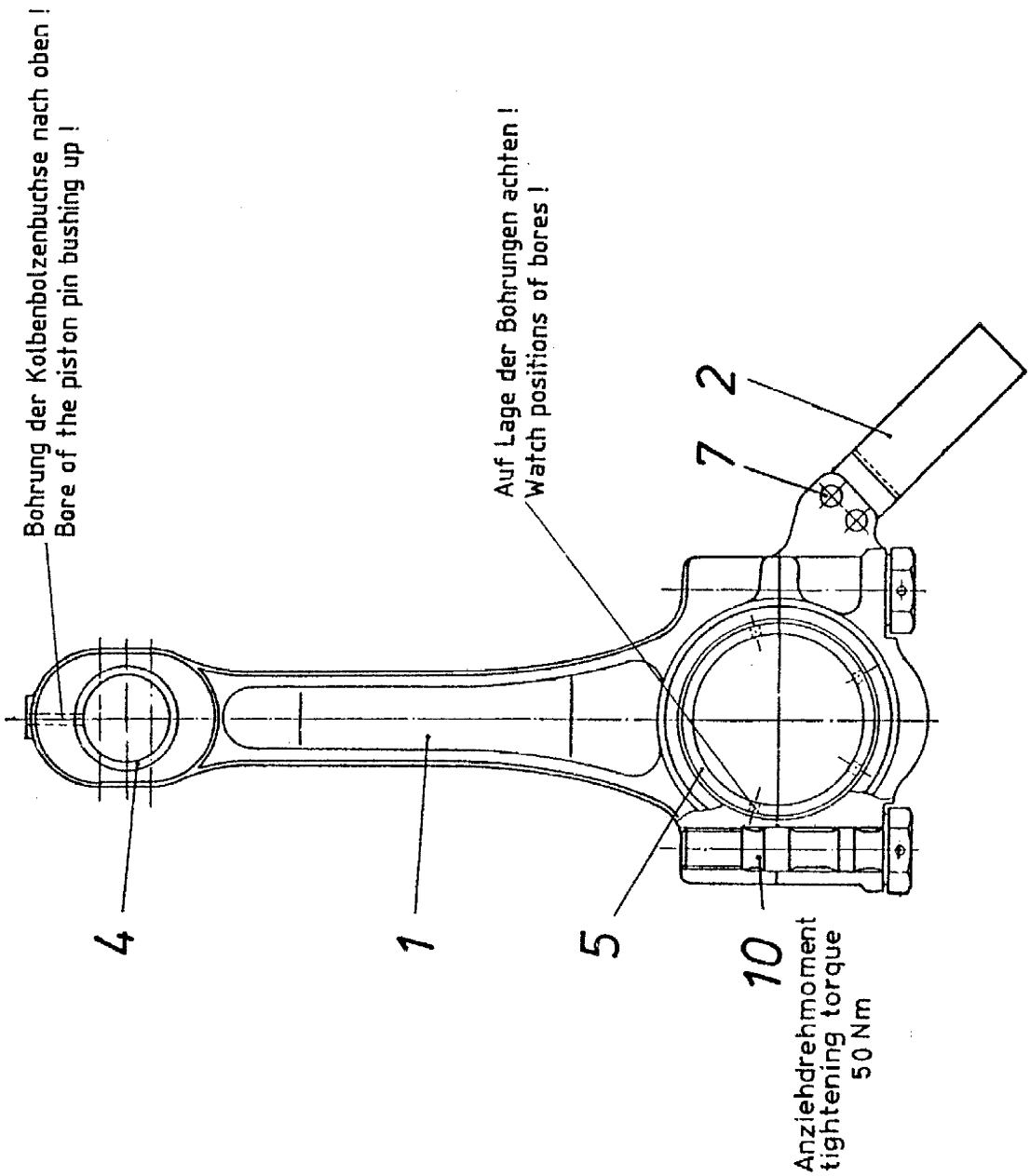
060 318 crankshaft



060 318 crankshaft

Item	Reference No.	Designation	Qty.
1	060 324	crankshaft	1
2	050 510	fan flywheel	1
3	035 026	cylinder roller bearing	2
4	001 096	hexagon nut	2
5	001 691	lock plate	2
6	001 984	fitting key	1
7	001 981	fitting key	1

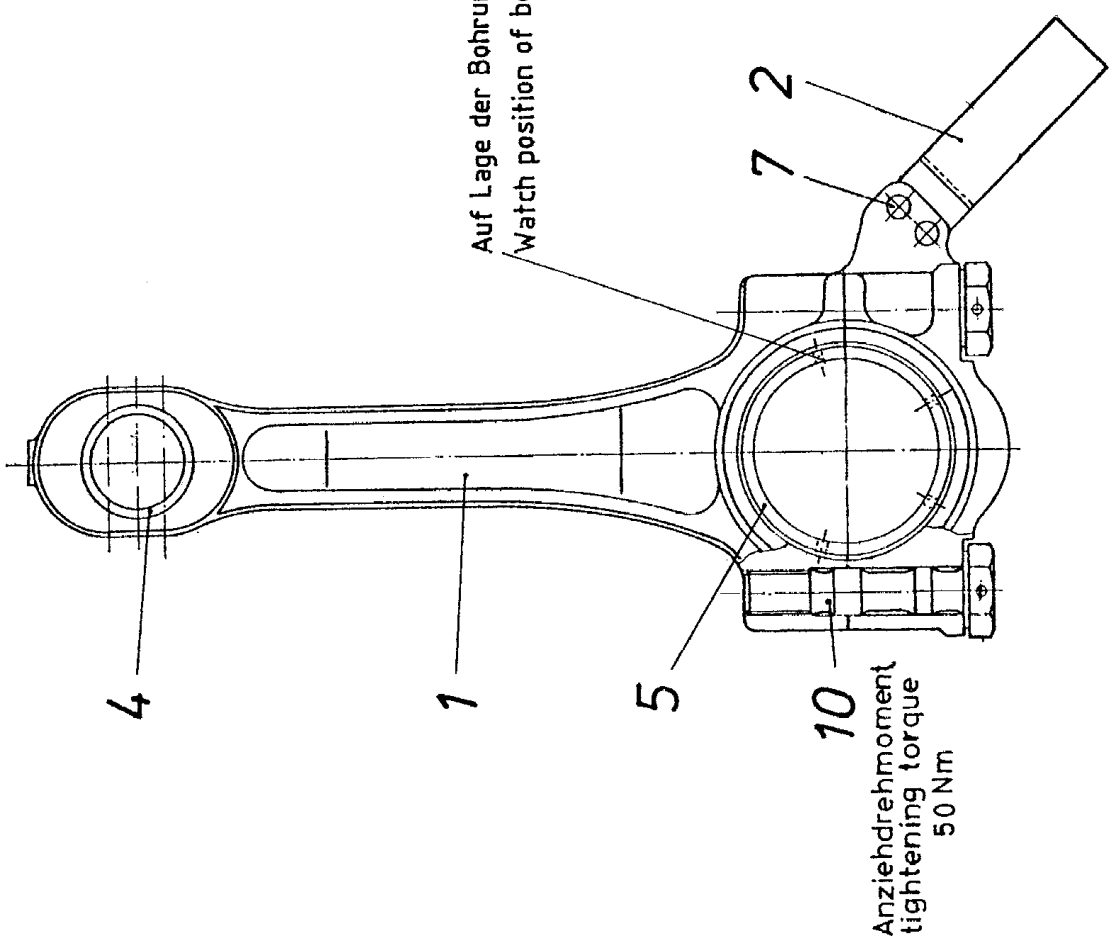
060 279 connecting rod 1st stage



060 279 connecting rod 1st stage

Item	Reference No.	Designation	Qty.
1	050 579	connecting rod	1
2	060 285	lubrikator	1
4	050 519	piston pin bushing	1
5	050 520	connecting rod bearing	1
7	003 335	round head rivet	2
10	050 459	connecting rod screw	2

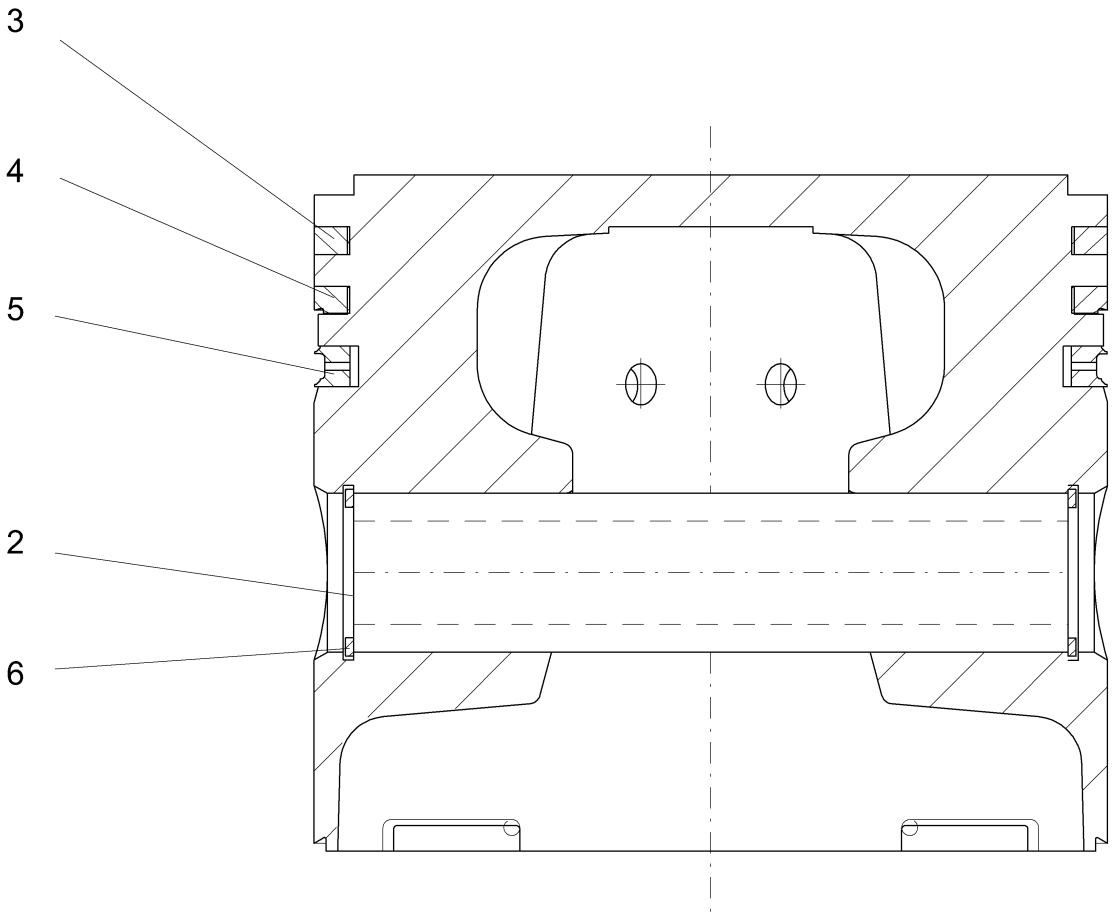
060 282 connecting rod 2nd stage



060 282 connecting rod 2nd stage

Item	Reference No.	Designation	Qty.
1	060 695	connecting rod	1
2	060 285	lubrikator	1
4	035 191	needle roller bearing	1
5	050 520	connecting rod bearing	1
7	003 335	round head rivet	2
10	050 459	connecting rod screw	2

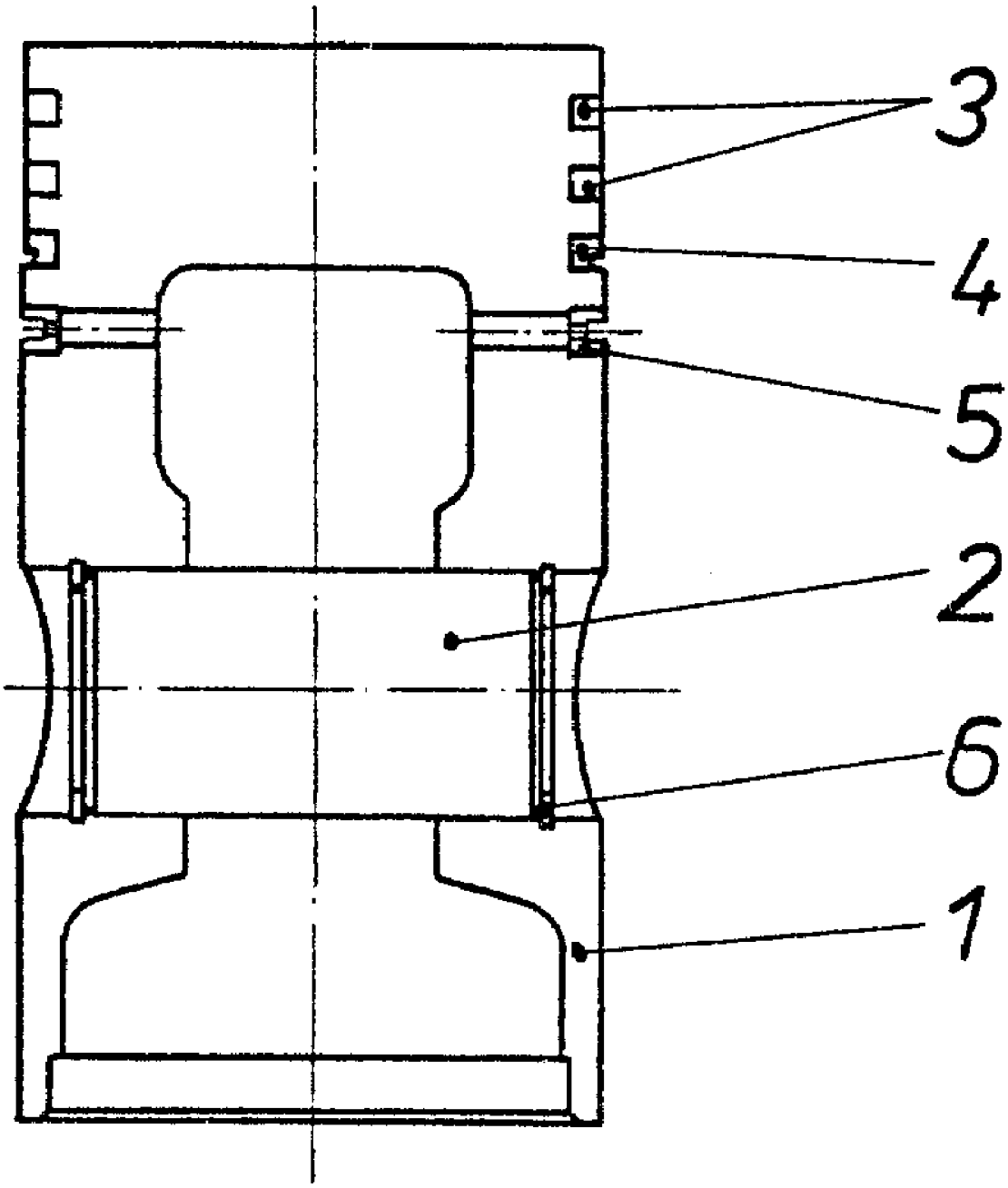
034 989 piston 1st stage



034 989 piston 1st stage

Item	Reference No.	Designation	Qty.
2	032 117	piston pin	1
3	002 755	R-ring	1
4	002 563	N-ring	1
5	034 988	G-ring	1
6	002 973	lock ring	2

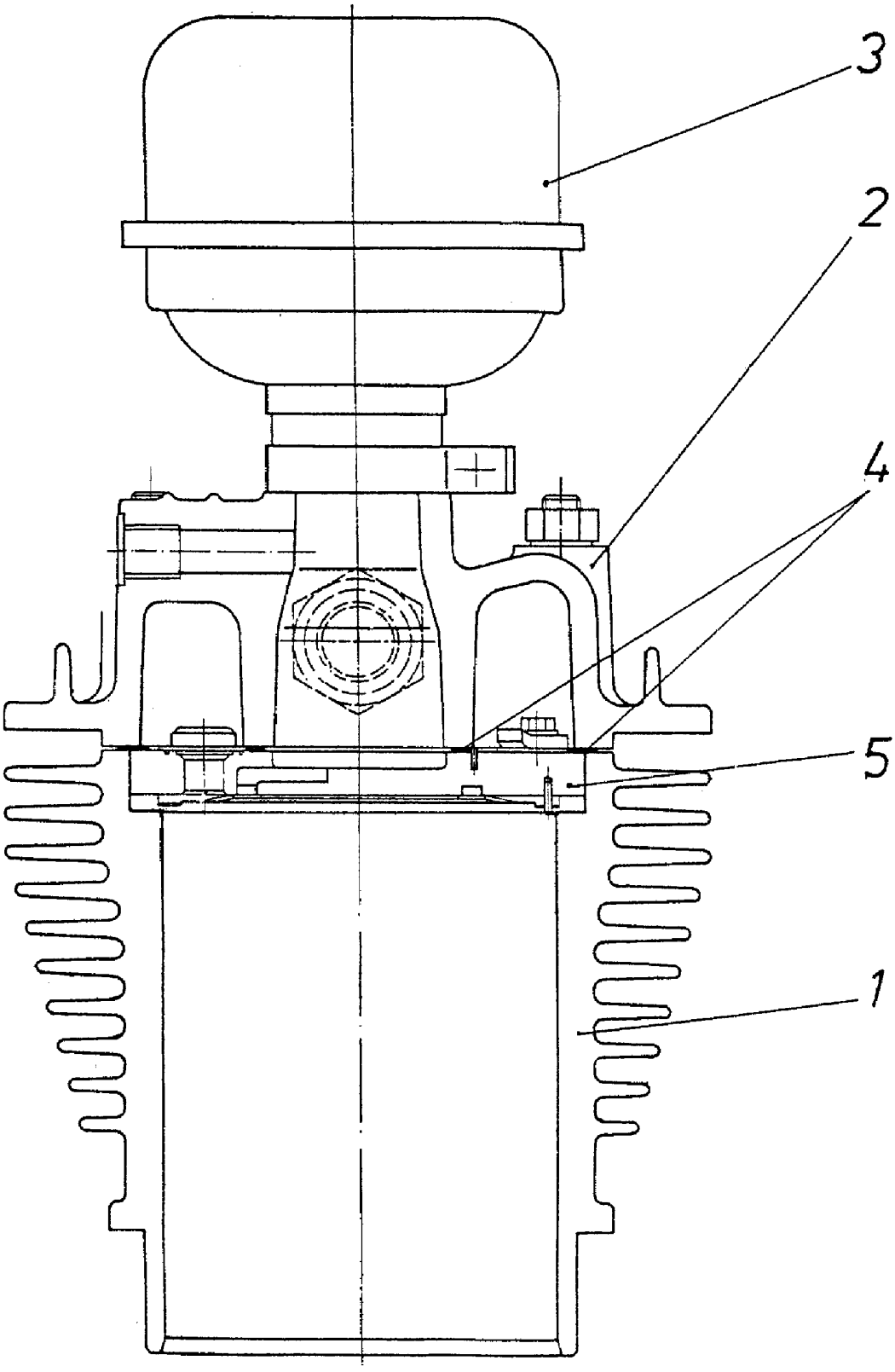
060 319 piston 2nd stage



060 319 piston 2nd stage

Item	Reference No.	Designation	Qty.
1	060 355	piston	1
2	050 585	piston pin	1
3	002 662	R-ring	2
4	002 543	N-ring	1
5	002 576	S-ring	1
6	002 973	lock ring	2

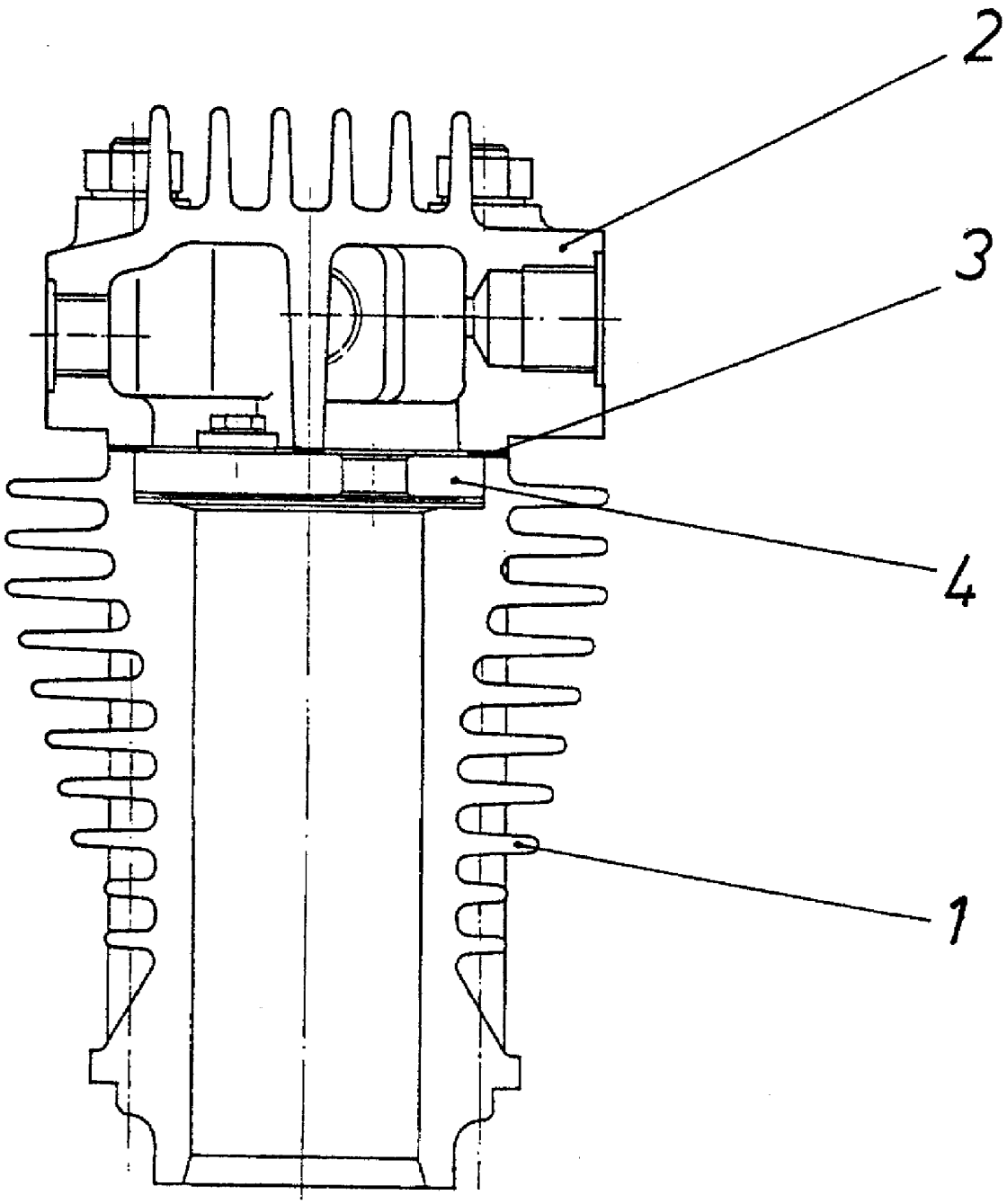
060 367C cylinder 1st stage



060 367C cylinder 1st stage

Item	Reference No.	Designation	Qty.
1	060 367	cylinder	1
2	060 300	cylinder head	1
3	030 113	air filter	1
4	060 266	cylinder head packing	1
5	034 983	lamellar valve	1

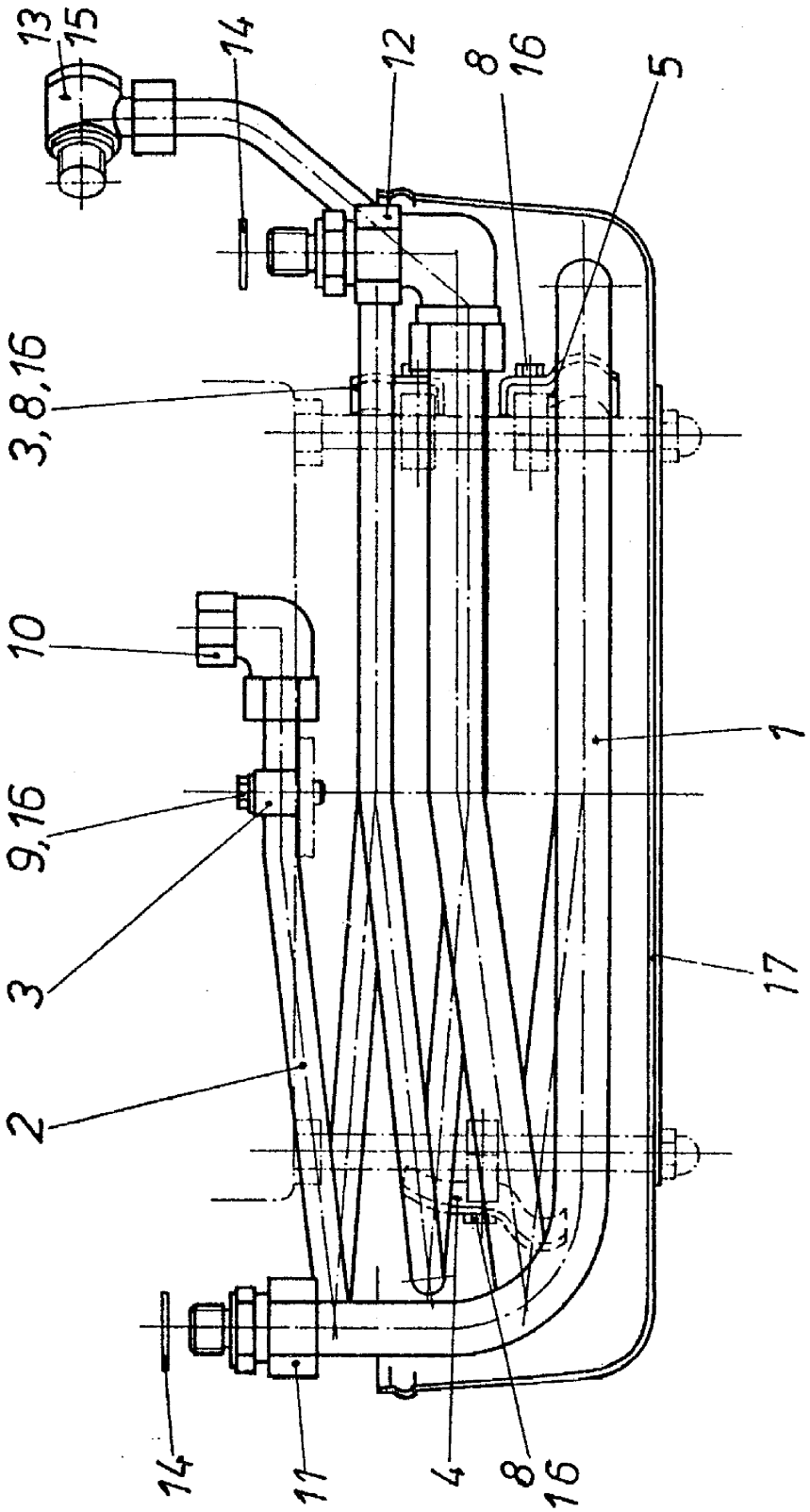
060 302D cylinder 2nd stage



060 302D cylinder 2nd stage

Item	Reference No.	Designation	Qty.
1	060 302	cylinder	1
2	060 267	cylinder head	1
3	060 264	cylinder head packing	1
4	034 984	lamellar valve	1

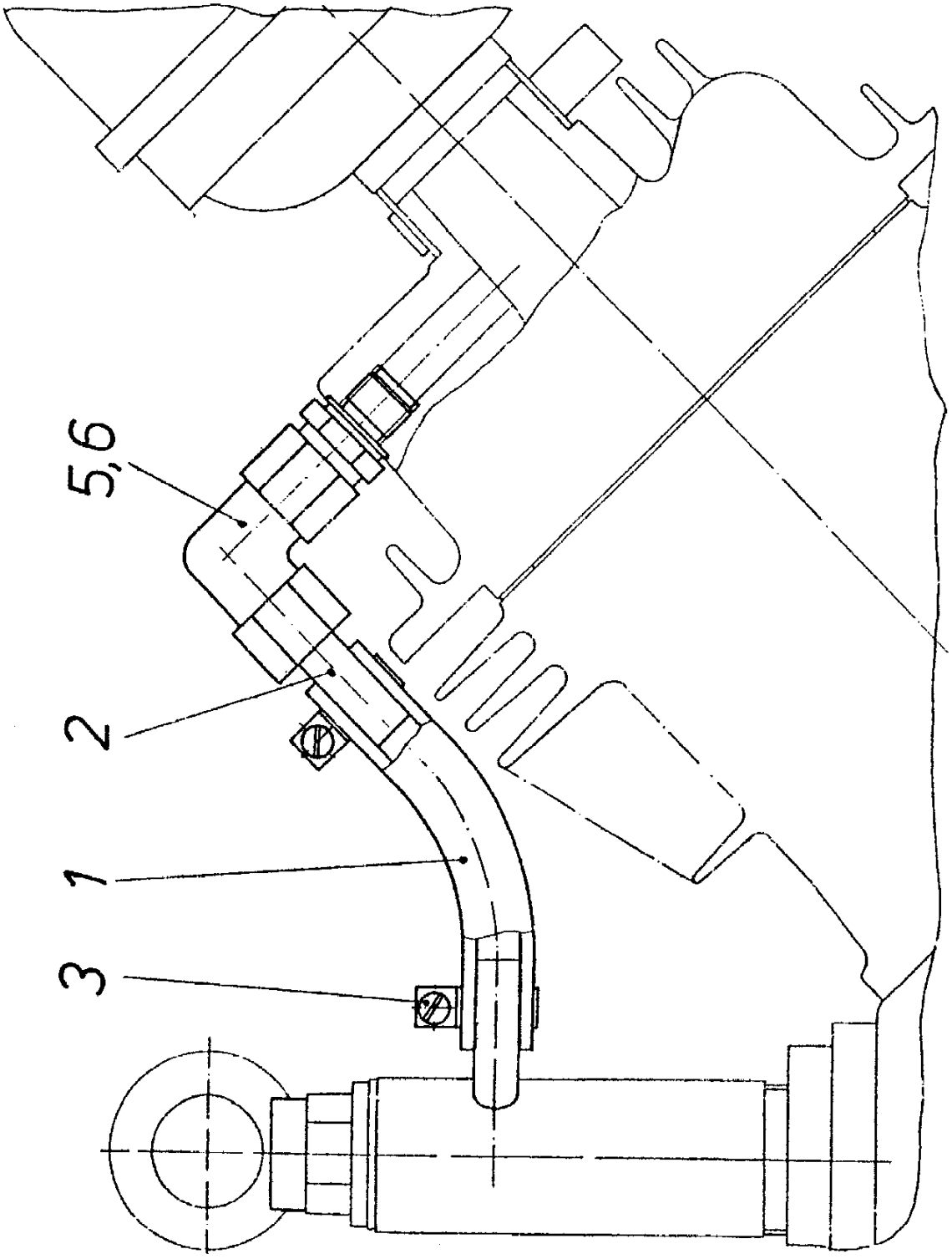
060 322 cooler



060 322 cooler

Item	Reference No.	Designation	Qty.
1	050 545	cooler 1st stage	1
2	060 323	cooler 2nd stage	1
3	050 547	clip	2
4	050 548	clip	1
5	050 549	clip	1
8	000 015	hexagon head screw	3
9	012 728	hexagon head screw	1
10	004 993	union	1
11	004 647	union	1
12	006 219	union	1
13	006 183	union	1
14	005 009	safety valve gasket	2
15	005 006	gasket	1
16	003 113	locking washer	4
17	050 551	covering	1

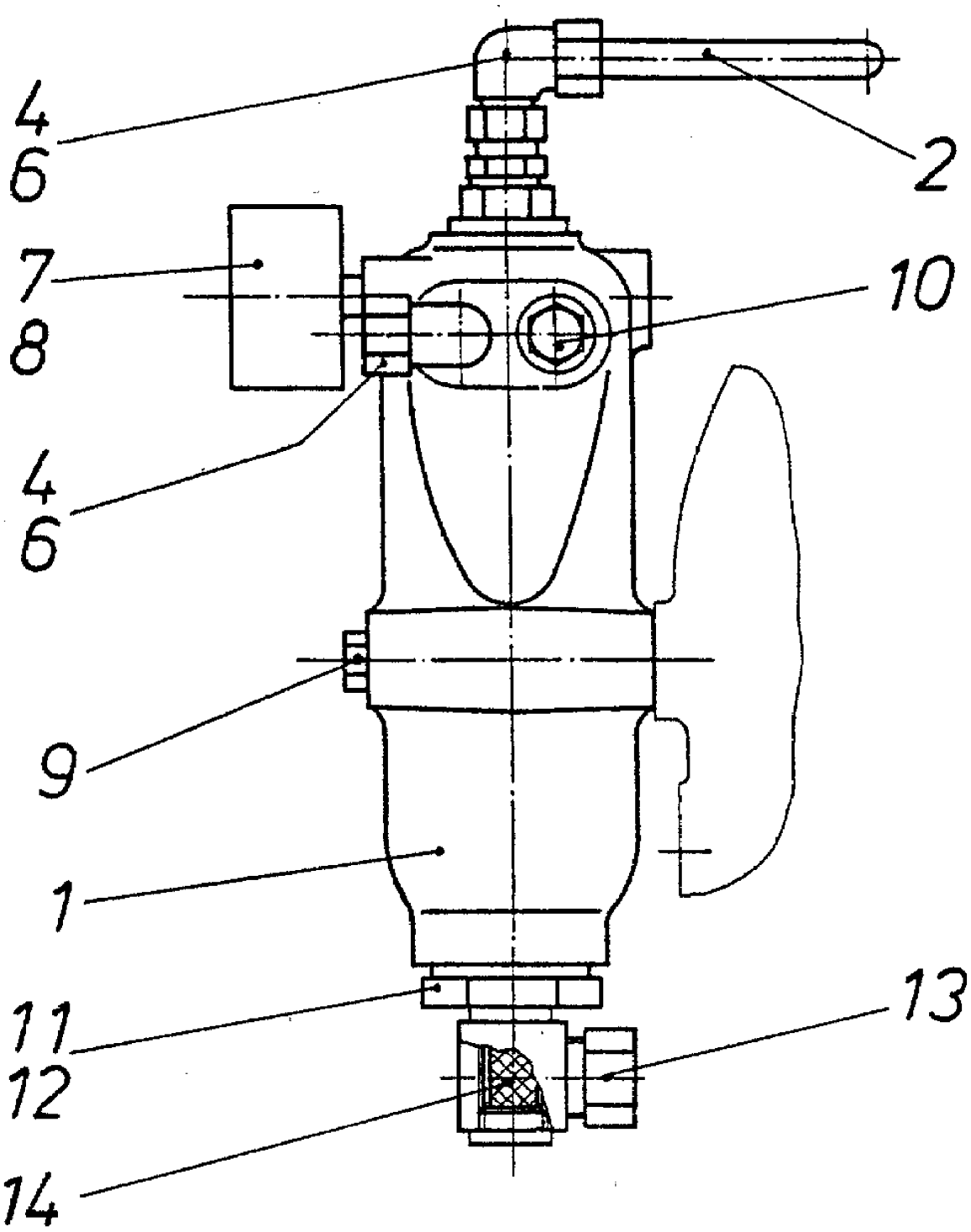
060 328 vent line, complete



060 328 vent line, complete

Item	Reference No.	Designation	Qty.
1	035 007	low pressure tube	1
2	008 646	pipe 45 long	1
3	035 254	tube clame	2
5	006 205	union	1
6	005 001	gasket	1

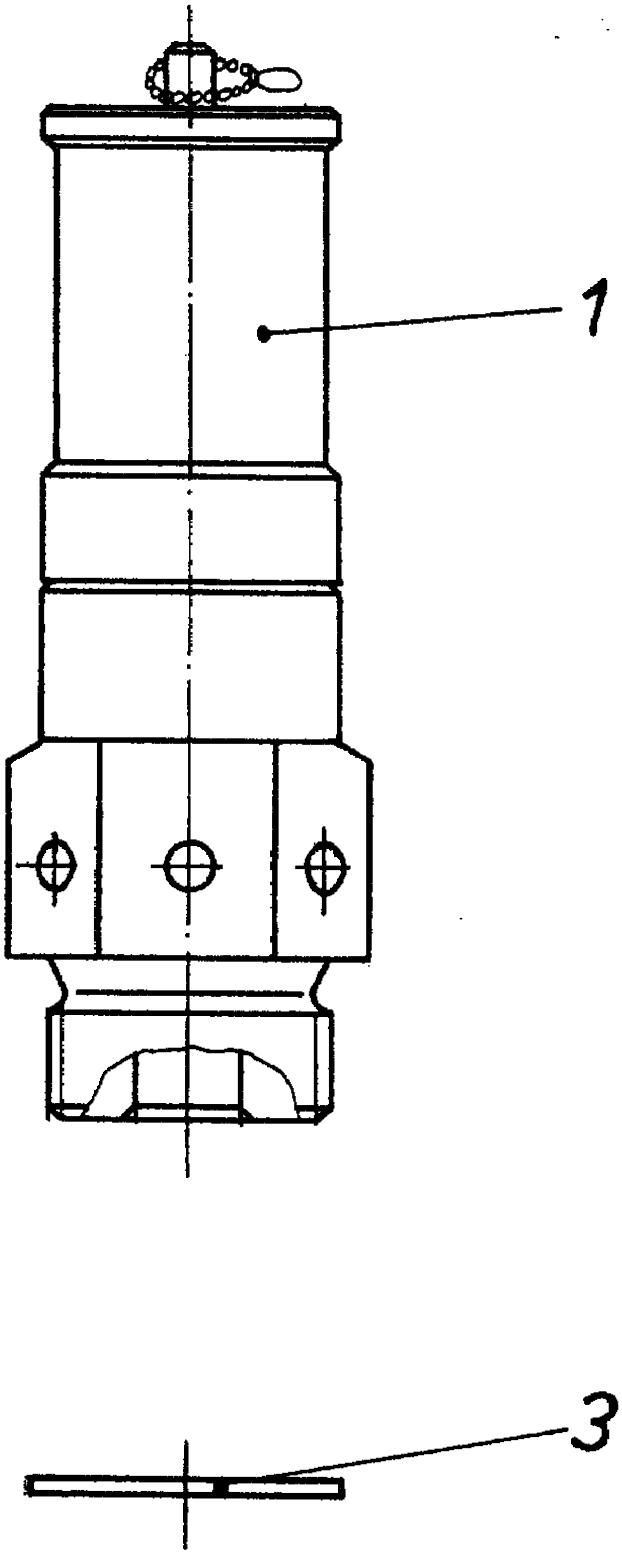
060 440 compressed air pipes



060 440 compressed air pipes

Item	Reference No.	Designation	Qty.
1	060 312	separator	1
2	060 444	pipe	1
4	006 212	union	2
6	005 006	gasket	2
7	035 010	pressure gauge	1
8	035 061	pressure gauge packing	1
9	004 750	hexagon head screw	2
10	060 342	fusible plug	1
11	006 390	reducer	1
12	005 029	gasket	1
13	006 187	union	1
14	035 426	sieve	1

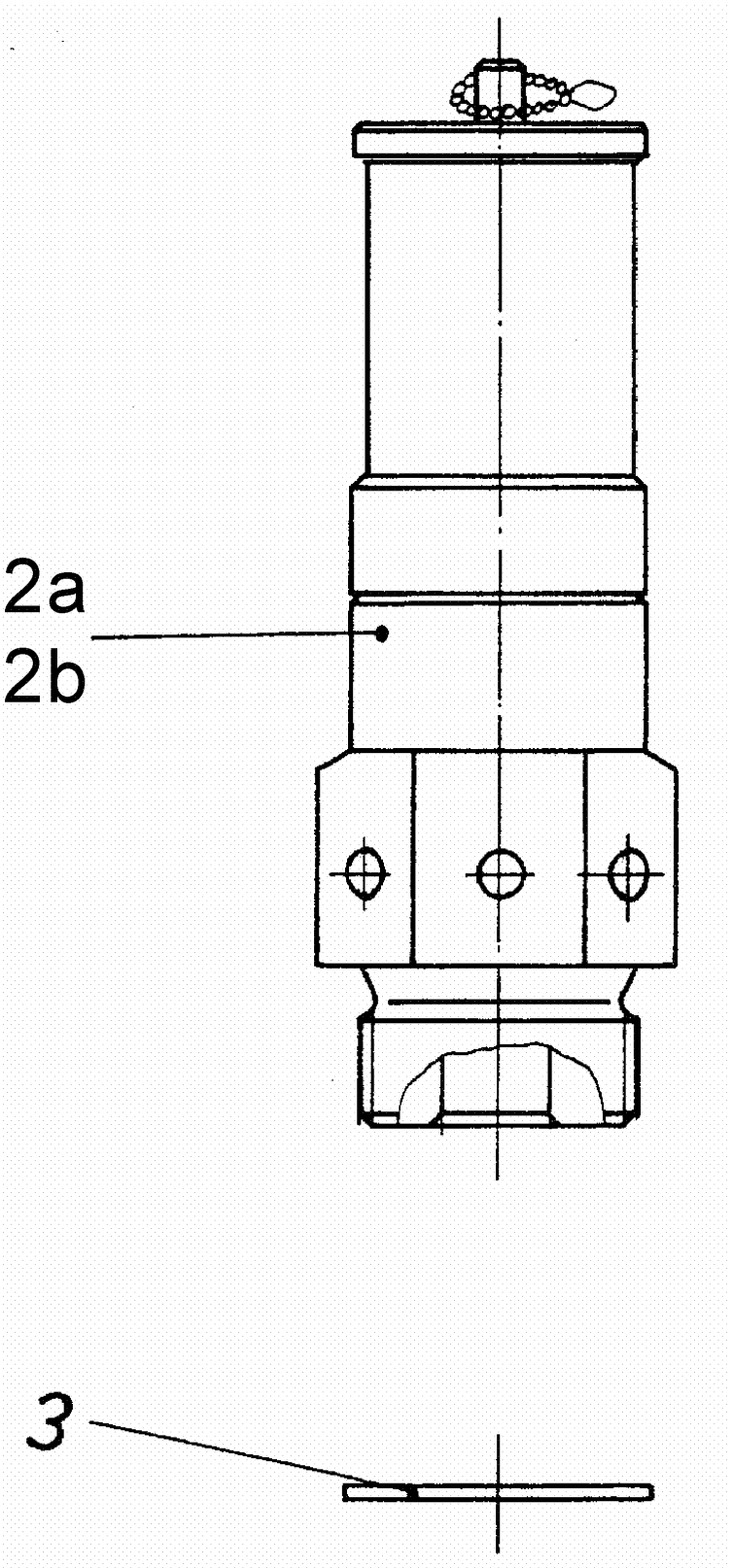
030 915E safety valve, complete



030 915E safety valve, complete

Item	Reference No.	Designation	Qty.
1	030 915	safety valve 1st stage 8bar	1
3	005 009	safety valve gasket	1

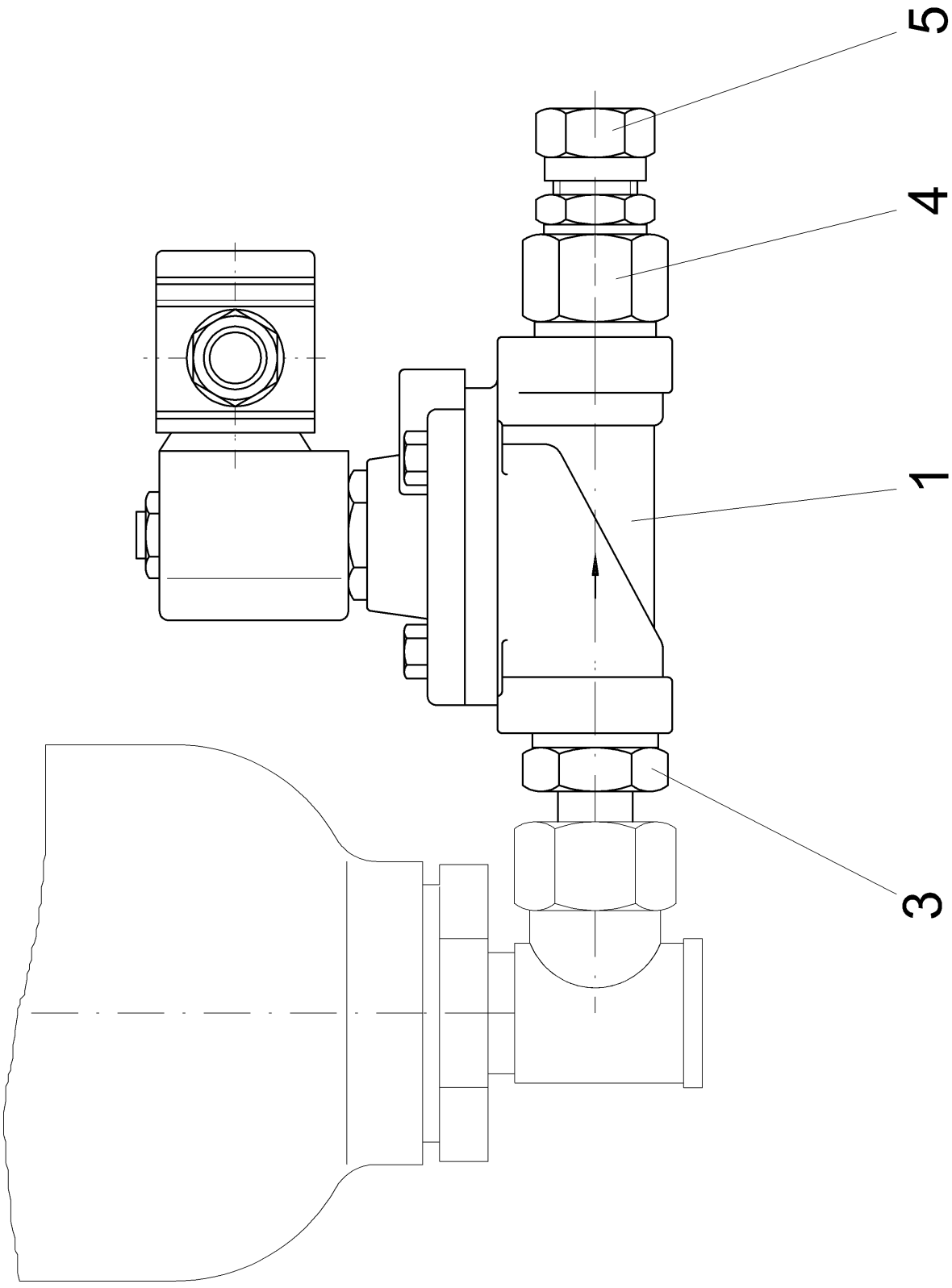
030 752E safety valve, complete



030 752E safety valve, complete

Item	Reference No.	Designation	Qty.
2a	030 752	safety valve 2nd stage 30bar	1
2b	033 600	safety valve 2nd stage 40bar	1
3	005 009	safety valve gasket	3

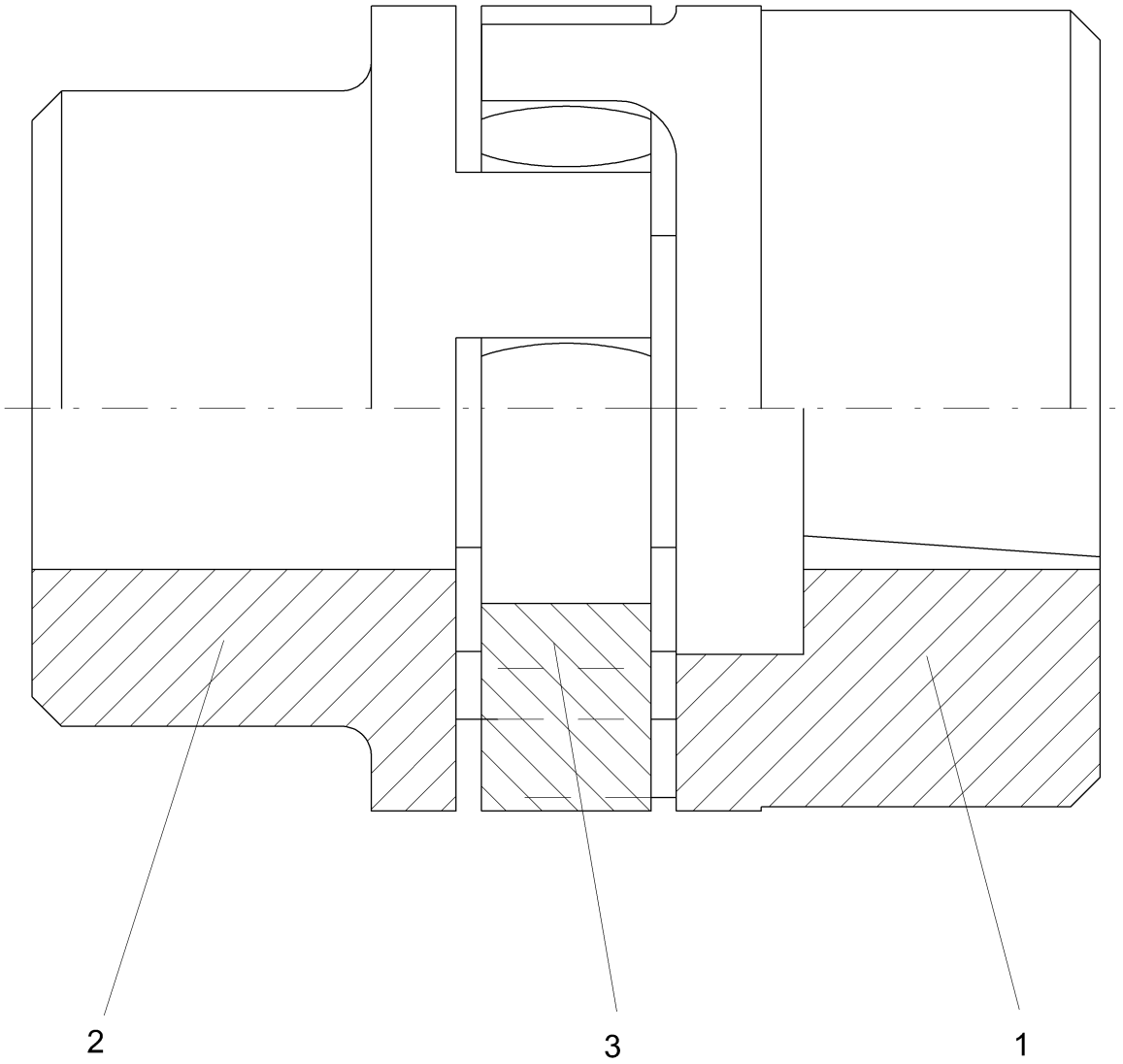
060 354 automatic drainage



060 354 automatic drainage

Item	Reference No.	Designation	Qty.
1	037 680	solenoid valve	1
3	006 455	stud adaptor	1
4	006 381	reducer	1
5	004 635	union	1

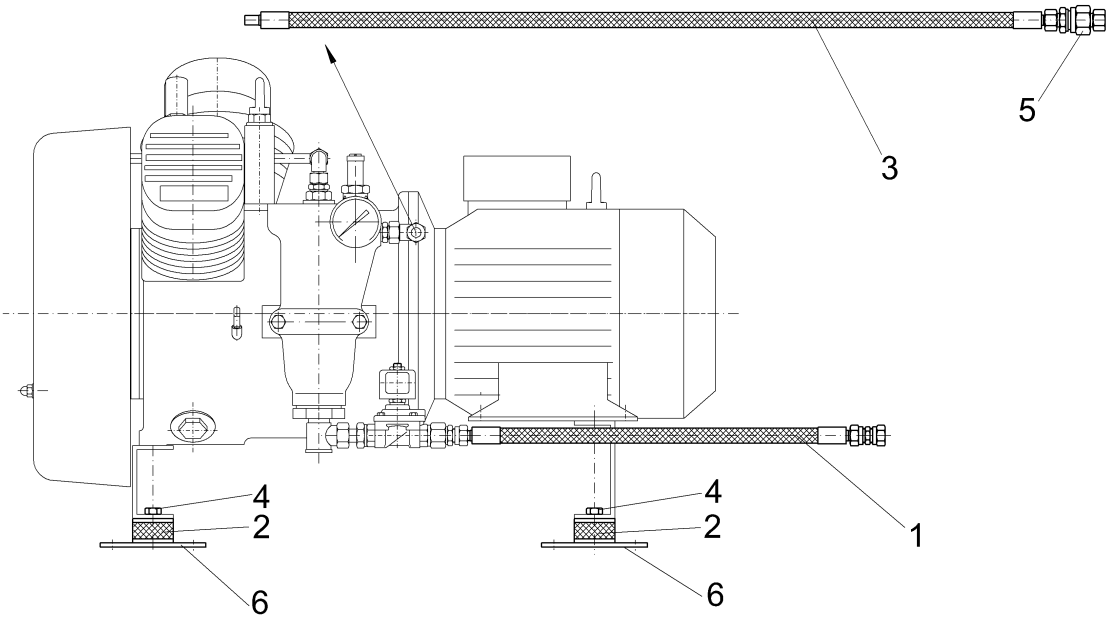
035 048 flexible coupling



035 048 flexible coupling

Item	Reference No.	Designation	Qty.
1	035 316	coupling part 1a	1
2	035 318	coupling part 1	1
3	033 637	flexible gear rim for coupling	1

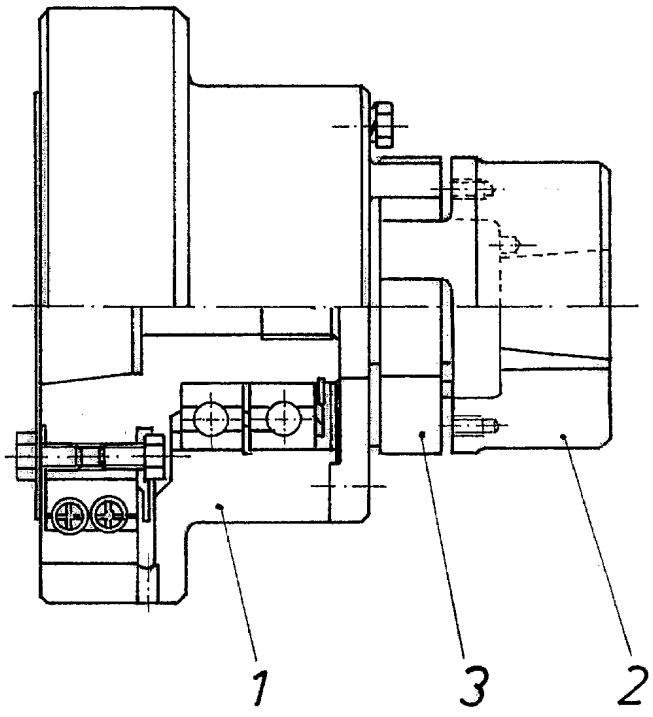
060 589 flexible mount



060 589 flexible mount

Item	Reference No.	Designation	Qty.
1	061 001	hose	1
2	035 457	resilient mount	4
3	038 310	hp-hose	1
4	002 031	nut	4
5	011 130	non return valve	1
6	038 197	baseplate with stud	4

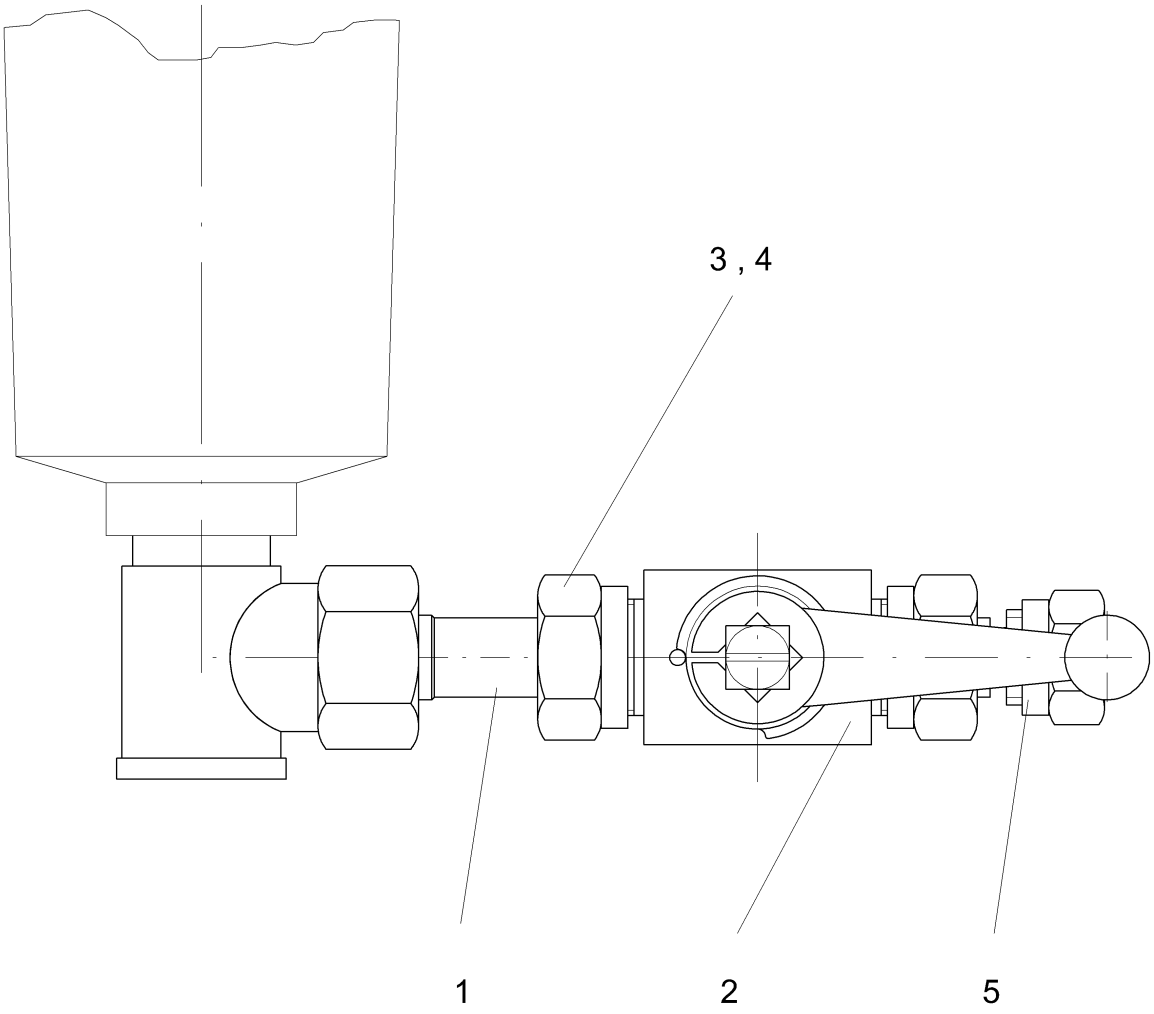
035 253 centrifugal clutch, complete (f,combustion engine)



035 253 centrifugal clutch, complete (f,combustion engine)

Item	Reference No.	Designation	Qty.
1	061 081	centrifugal clutch	1
2	035 316	coupling part 1a	1
3	033 637	flexible gear rim for coupling	1

064 325 manual drainage f. diesel engine



064 325 manual drainage f. diesel engine

Item	Reference No.	Designation	Qty.
1	064 772	tube	1
2	031 623	ball valve	1
3	037 334	nut	1
4	006 473	cutting ring	1
5	037 649	union	1

Reference No.	Designation	Page	Pos.
030 915	safety valve 1st stage 8bar	29	1
030 915E	safety valve, complete	5	12
031 103	o-ring	7	12
031 623	ball valve	41	2
032 117	piston pin	15	2
033 600	safety valve 2nd stage 40bar	31	2b
033 637	flexible gear rim for coupling	35	3
033 637	flexible gear rim for coupling	39	3
034 228	Tensilock screw	7	24
034 983	lamellar valve	19	5
034 984	lamellar valve	21	4
034 988	G-ring	15	5
034 989	piston 1st stage	5	5
035 007	low pressure tube	25	1
035 010	pressure gauge	27	7
035 026	cylinder roller bearing	9	3
035 032	stud screw	7	16
035 048	flexible coupling	5	15
035 061	pressure gauge packing	27	8
035 191	needle roller bearing	13	4
035 253	centrifugal clutch, complete (f,combustion engine)	5	17
035 254	tube clame	25	3
035 316	coupling part 1a	35	1
035 316	coupling part 1a	39	2
035 318	coupling part 1	35	2
035 426	sieve	27	14
035 457	resilient mount	37	2
035 528	o-ring	7	30
037 334	nut	41	3
037 649	union	41	5
037 680	solenoid valve	33	1
038 197	baseplate with stud	37	6
038 310	hp-hose	37	3
050 459	connecting rod screw	11	10
050 459	connecting rod screw	13	10
050 510	fan flywheel	9	2
050 519	piston pin bushing	11	4
050 520	connecting rod bearing	11	5
050 520	connecting rod bearing	13	5
050 545	cooler 1st stage	23	1
050 547	clip	23	3
050 548	clip	23	4
050 549	clip	23	5
050 551	covering	23	17
050 579	connecting rod	11	1
050 585	piston pin	17	2
054 816	stud bolt	7	2
054 817	stud bolt	7	3
060 264	cylinder head packing	21	3
060 266	cylinder head packing	19	4
060 267	cylinder head	21	2