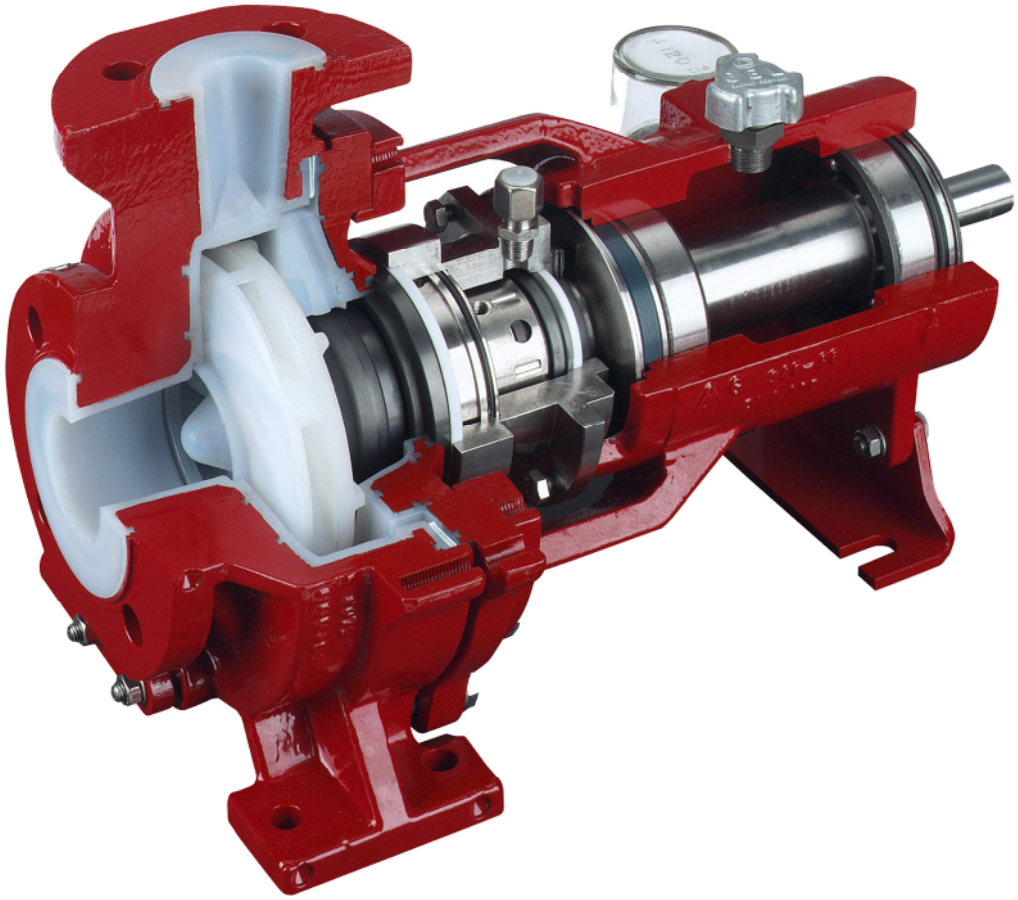
INSTALLATION AND OPERATING MANUAL

Translation of the original manual

Series SCK

Mechanical Seals

external, single
single with double lip seal on the wetted side
single with lip seal on the atmosphere side,
with quench



Keep for future use!

This operating manual must be strictly observed before transport, installation, operation and maintenance

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9220-060-en Revision 10 Edition 03/2010

RICHTER
Process Pumps & Valves

List of Contents

Relevant documents

- Operating manual SCK long-life grease and oil bath lubrication **9220-050-en**
- Operating manual mechanical seal of the manufacturer

1 Technical data

Manufacturer :

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Designation :

Series SCK mechanical seal:

- External, single
- External single mechanical seal with double lip seal on the wetted side **(not applicable for the EX area)**
- External single mechanical seal with lip seal on the atmosphere side, with quench **(not applicable for the EX area)**

Materials :

Wetted parts:
Mechanical seal : SSiC, Al_2O_3/PTFE glass, etc., see also data sheet

Temperature range : see installation and operating manual SCK, Section 1.

Temperature classes : see installation and operating manual SCK, Section 2.6.7.

2 Safety, transport and storage

The relevant sections in the adjacent installation and operating manuals apply to safety, transport and storage.

This installation and operating manual is only valid in conjunction with the installation and operating manuals of

SCK long-life grease and oil bath lubrication **9220-050-en**

2.1 Intended use

Single mechanical seals for plastic-lined pumps of the series SCK are suitable for the use of aggressive and pure media.

The instructions contained in the operating manual or contractual documentation are to be observed, if necessary consult the manufacturer.

All the important features are documented in the data sheet included in the scope of delivery.

3 Product description

For a product description of the pump, see the installation and operating manual for the SCK series.

Section 7.2

The **sectional drawing** shows a external single mechanical seal.

Section 7.3

The **sectional drawing** shows a single mechanical seal with double lip seal on the wetted side.

Section 7.4

The **sectional drawing** shows a single mechanical seal with lip seal on the atmosphere side, with quench.

All components which come into contact with the process medium are either lined with plastic or are made of other resistant materials, e.g. silicon carbide.

4 Commissioning / Shutdown

4.1 Initial commissioning

See installation and operating manual for the series SCK.

4.2 Mechanical seals

The design and material combination are specified in the data sheet.

The proper condition of the components and the protective facilities must be ensured to prevent any risk from escaping medium.

The regulations and recommendations of the mechanical seal manufacturer must always be observed.

4.2.1 Use in an explosive area

Use in an explosive area means that only mechanical seals may be employed which permit observation of temperature.
The operating manual of the respective mechanical seal manufacturer is an integral part of this general operating manual.
This permits, amongst other things, the calculation of the expected surface temperature at the mechanical seal. The suitability for the permissible temperature class as per ATEX is hereby given.

CAUTION:
The permissible temperature class of the complete unit (pump, mechanical seal, coupling, motor) is determined by the lowest temperature class of the individual components.

Example: Pump **T4**, mechanical seal **T3**,
coupling **T4**, motor **T4**

In both cases the unit may only be used in atmospheres which may ignite above the temperature class T3, i.e. >200 °C (>392°F).

4.2.2 External, single mechanical seal

Pumps fitted with a single mechanical seal must not be started up before they are filled with medium.

Otherwise the single mechanical seal is not lubricated and cooled and could be damaged.

Mechanical seal guard mounted?

See sectional drawing in **Section 7**.

4.2.3 Single mechanical seal with lip seal

Design and material combination are specified in the data sheet.

A pump with a flushed mechanical seal may not be started up until the flushing system is in operation and the pump is filled with medium.

The pressure of the flushing medium must be higher than the medium pressure in the sealing chamber.

The required sealing pressure can be determined as follows:

2/3 of the delivery pressure at Q = 0 m^3/h
\+ supply pressure

The supply pressure is measured in bar at the pump suction nozzle. If no measuring point is available, the supply pressure can be calculated using the following formula.

Using the same formula, the delivery pressure at Q=0 m^3/h can be determined with the pump characteristic curve.

$$p\,(bar) = \frac{H\,(mFS) \times \rho\,(kg/dm^3)}{10{,}2}$$

p = supply pressure or delivery pressure
H = supply height or delivery head
ρ = density

The pressure is to be set so that a minimum flushing flow of 10 l/h is observed.

4.3 Improper operation and their consequences (examples)

Improper operation, even for a short time, can result in serious damage to the unit.
In connection with explosion protection, potential sources of ignition (overheating, electrostatic and induced charges, mechanical and electric sparks) may result from these inadmissible modes of operation; their occurrence can only be prevented by adhering to the intended use.
For examples, see installation and operating manual SCK, **Section 6.6**.

5 Maintenance

The regulations of the mechanical seal manufacturer must always be observed.
See also the installation and operating manual for the SCK series.
In normal operations this seal should not drip. The leak should only be so minimal that it evaporates immediately.
It is advisable to check the attachment screws of the mating ring adapter **487** and of the rotating unit **470/2** for a tight fit from time to time.

The wear on the rotary ring can be readily seen by the increased size of the set dimension in many makes.
See **Figure 1 and 2**.

The external mechanical seals are to be replaced

- before the wear on the rotary ring become so great that the pressing forces are no longer sufficient
- as a result major leaks occur.

Often marks on the mechanical seal indicate the admissible wear.

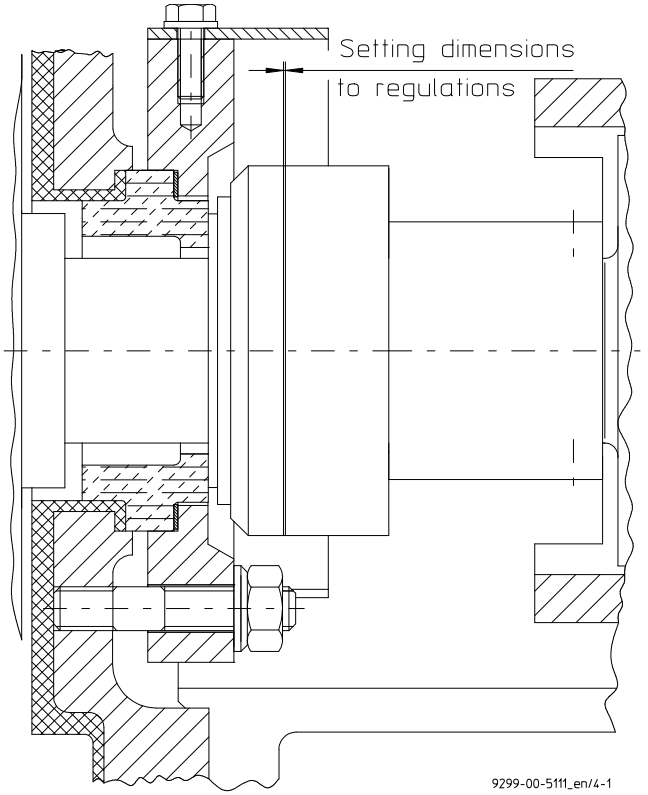


Figure 1 **External, single mechanical seal with and without lip seal**

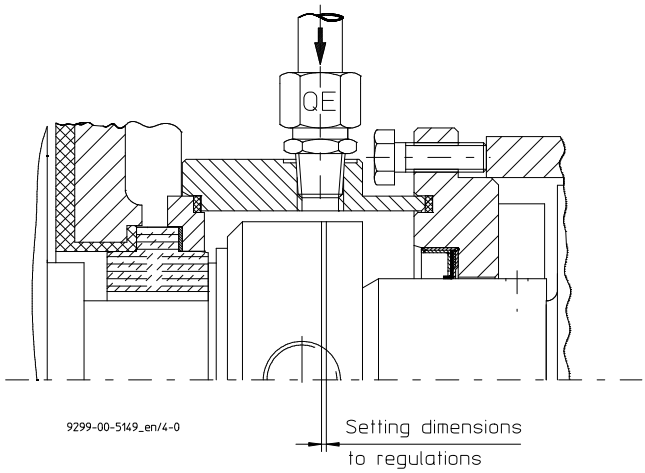


Figure 2 **Single mechanical seal with lip seal and quench**

5.1 External, single mechanical seal

Dismantling can be checked using the sectional drawings in **Section 7.2** and **Section 9** in the installation and operating manual SCK, also the available components.

5.1.1 Dismantling

- Remove seal guard **685**.
- Undo setscrews **904/1** of the distance bush **543**.
- Undo attachment screws of the rotating unit **470/2**.
- Undo screws of bearing pedestal **330** / back plate **161** and, with the mating ring **475/1** and the mating ring adapter **487** still mounted, move up to the impeller with light hammer blows (plastic hammer).
  For design of back plate, see **Section 4.2 and 7.7.4** in the installation and operating manual SCK.
- Bearing pedestal group 3:
  Labyrinth disc **555** must be secured with two bolts **prior to the dismantling** of the impeller. For this purpose there are 2 bores Ø5mm in the bearing pedestal. The double mechanical seal is relieved of pressure as a result.
  See dismantling in **Sections 7.7.1 and 7.7.5** in the installation and operating manual SCK.
- Undo impeller **230** with a strap wrench or assembly wrench. **Right-hand thread**.
  For assembly aid for impeller, see **Section 10.1** in the installation and operating manual SCK.

  See also installation and operating manual SCK, **Section 7.7.1**.
- Unscrew the impeller **230** completely.

- Pull the back plate **161** with the mating ring adapter **487** and mating ring **475/1** off the shaft sleeve.
- After undoing the nuts **920/3** with the washers **554/3**, the mating ring adapter **487** is removed first.
- Then remove mating ring **475/1**.
- Now pull the shaft sleeve **524** with the rotating unit **470/1** which is still installed off the shaft.
- When changing the rotating unit **470/2,** observe the operating manual of the mechanical seal manufacturer.
- Remove distance bush **543** and clean.

If it is discovered after pulling off a shaft sleeve made of a ceramic material that its plastic bearing points are destroyed, they can be renewed by the pump manufacturer.

5.1.2 Notes on assembly

- Only use original spare parts.
- Do not use any defective parts.
- The recommendations of the mechanical seal manufacturer are to be observed.
- Bearing pedestal group 3:
  Always make sure that when installing the mechanical seal the labyrinth disc is secured by 2 bolts.
  The bolts must be removed again after assembly of the impeller.
- External single mechanical seals can best be brought to the required pre-tension with a tensioning device available from Richter. See **Section 10.4** assembly aids in the installation and operating manual SCK.
- Prepare rotating unit (observe setting dimension) and tighten on the shaft sleeve.

5.2 Single mechanical seal with double lip ring

Dismantling can be checked using the sectional drawings in **Section 7.3** and **Section 9** in the installation and operating manual SCK, also the available components.

5.2.1 Dismantling

- Remove seal guard **685**.
- Remove tube **710**
- Undo setscrews **904/1** of the distance bush **543**.
- Undo attachment screws of the rotating unit **470/2**.
- Undo screws of bearing pedestal **330** / back plate **161** and, with the mating ring **475/1** and the mating ring adapter **487** still mounted, move up to the impeller with light hammer blows (plastic hammer). For design of back plate, see **Section 4.2 and 7.7.4** in the installation and operating manual SCK.
- Bearing pedestal group 3:
  
  Labyrinth disc **555** must be secured with two bolts **prior to the dismantling** of the impeller. For this purpose there are 2 bores Ø5mm in the bearing pedestal. The double mechanical seal is relieved of pressure as a result. See dismantling in **Sections 7.7.1 and 7.7.5** in the installation and operating manual SCK.
- Undo impeller **230** with a strap wrench or assembly wrench. **Right-hand thread**.
  For assembly aid for impeller, see **Section 10.1** in the installation and operating manual SCK.
  See also installation and operating manual SCK, **Section 7.7.1**.
- Unscrew the impeller **230** completely.
- Pull the back plate **161** with the mating ring adapter **487** and mating ring **475/1** off the shaft sleeve.
- After undoing the nuts **920/3** with the washers **554/3**, the mating ring adapter **487** is removed first.
- Remove mating ring **475/1**.
- Remove retaining ring **506**.
- Pull the intermediate ring **509/2** and the lip seal **413** off the shaft sleeve **524**.
- The shaft sleeve **524** can now be pulled with the rotating unit **470/2** off the shaft **210**.
- When changing the rotating unit **470/2,** observe the operating manual of the mechanical seal manufacturer.
- Remove distance bush **543** and clean.

If it is discovered after pulling off a shaft sleeve made of a ceramic material that its plastic bearing points are destroyed, they can be renewed by the pump manufacturer.

5.2.2 Assembly

- Observe notes in **Section 5.1.2**.
- Secure mating ring **475/1**, intermediate ring **509/2**, support ring **506** and mating ring adapter **487** on the back plate **161** with the stud screw **902/3**, washer **554/3** and hex. nut **920/3.** For sequence for back plate, see **Sections 4.2 and 7.7.4** in the installation and operating manual SCK.
- Insert assembly cone (see **Section 10.3** Assembly aids in the installation and operating manual SCK) into the shaft sleeve and pull the lip seal **413** with the pre-mounted back plate over the cone.
- Remove assembly cone.
- Push entire unit over the shaft **210**.

5.3 Single mechanical seal with lip seal and quench

Dismantling can be checked using the sectional drawings in **Section 7.4** and **Section 9** in the installation and operating manual SCK, also the available components.

5.3.1 Dismantling

- Undo hex. nuts from the screw-in pipe connectors **917/1** and **917/2** and remove pipe.
- Undo screw fitting **901/6, 554/6** from the bearing pedestal **330** / back plate **161**.
  For design, see **Sections 4.2.1 and 7.7.4** in the installation and operating manual SCK.
- Move back plate almost up to the impeller with light hammer blows (plastic hammer).
- Bearing pedestal group 3:
  Labyrinth disc **555** must be secured with two bolts **prior to the dismantling** of the impeller. For this purpose there are 2 bores Ø5mm in the bearing pedestal. The double mechanical seal is relieved of pressure as a result. See dismantling in **Sections 7.7.1 and 7.7.5** in the installation and operating manual SCK.
- Undo impeller **230** with a strap wrench or assembly wrench. **Right-hand thread**.

  For assembly aid for impeller, see **Section 10.1** in the installation and operating manual SCK.

  See also installation and operating manual SCK, **Section 7.7.1**.
- Then completely undo the impeller **230**, remove back plate **161** with mating ring **475/1** and the flat gasket **400/3**.
- Remove mating ring adapter **487** with flat gasket **400/6**.
- Pull shaft sleeve **524** with the rotating unit **470/2** still mounted off the shaft **210**.
- When changing the rotating unit **470/2**, observe the operating manual of the mechanical seal manufacturer.
- Remove seal housing **483**.
- Undo setscrew **904/1**.
- Pull seal cover **471,** flat gasket **400/7**, distance bush **543,** lip seal **413/2** and O-ring **412/12** off the shaft.

5.3.2 Pre-assembly

- Pre-assembly without seals.
- Push distance bush **543** onto the shaft.
- Push the shaft sleeve **524** with the rotating unit **470/2** not attached onto the shaft.
- Mount back plate **161** with the mating ring **475/1**, tighten plate screws **901/6** and **554/6**.
- Mount impeller **230**.
- Prepare rotating unit (observe setting dimension) and tighten on the shaft sleeve.
- Dismantle everything again.

5.3.3 Assembly

- Observe notes in **Section 5.1.2**.
- Perform assembly in reverse sequence to dismantling using new seals.

6 Faults

Faults may result from inadmissible modes of operation. Such inadmissible modes of operation – even brief ones – may cause serious damage to the unit.
In connection with explosion protection, potential sources of ignition (overheating, electrostatic and induced charges, mechanical and electric sparks) can result from these inadmissible modes of operation; their occurrence can only be prevented by adhering to the intended use.

Should there be any uncertainty about the remedy to be applied, please inquire at the in-house pump office or at the pump manufacturer's.

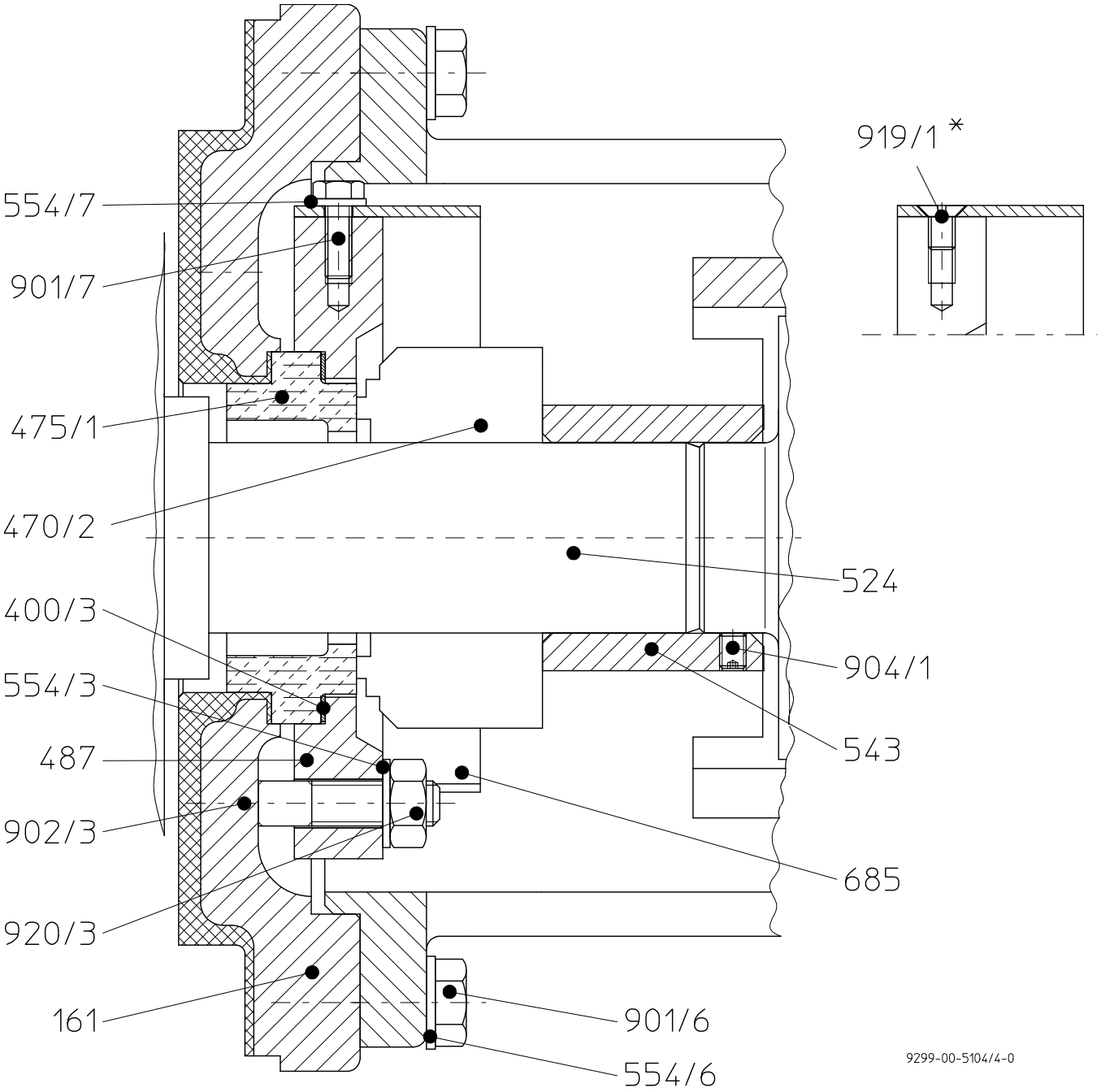
See also **Section 8** in the installation and operating manual of the SCK series.

7 Sectional drawing

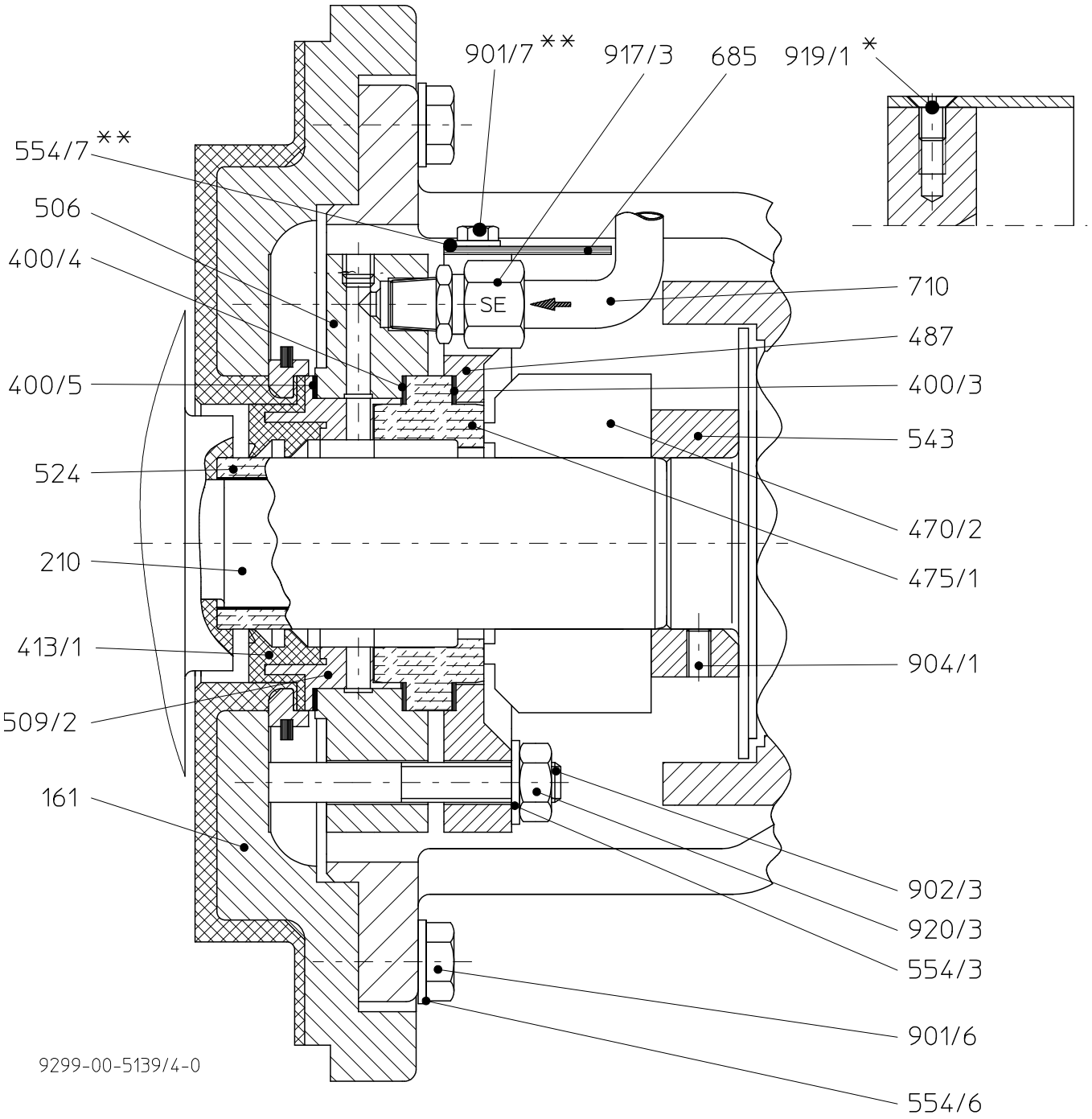
7.1 Legend

161 back plate
210 shaft
400/x flat gasket
412/12 o-ring
413/x lip seal
470/2 rotating unit
475/1 mating ring
483 seal housing
487 mating ring adapter
506 retaining ring
509/2 intermediate ring
524 shaft sleeve
543 distance bush
554/3 washer
554/7 washer
*(only bearing pedestal group 0, 2, 3)
685 seal guard
710 tube
901/7 hex. screw
*(only bearing pedestal group 0, 2, 3)
902/3 stud
904/1 setscrew
917/3 screw-in pipe connector
919/1 countersunk screw
**(only bearing pedestal group 1)
920/3 hex. nut

7.2 External, single mechanical seal



7.3 Single mechanical seal with double lip seal on the wetted side



7.4 Single mechanical seal with lip seal on the atmosphere side, with quench