

INSTALLATION AND OPERATING MANUAL

Translation of the original manual

Series RSA

Mechanical seals

external, single or
double type Crane 58U – 58U



Keep for future use!

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

Subject to change without notice.

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9285-060-en Revision 10 Edition 03/2010

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Relevant documents

- ◆ Installation and operating manual RSA long life grease or oil bath lubrication **9285-050-en**
- ◆ Operating manual mechanical seal of the manufacturer

1 Technical data

Manufacturer :

Richter Chemie-Technik GmbH
Otto-Schott-Str. 2
D-47906 Kempen
Telephone: +49 (0) 2152 146-0
Fax: +49 (0) 2152 146-190
E-Mail: richter-info@idexcorp.com
Internet: <http://www.richter-ct.com>

Richter EP (Nanjing) Co., LTd.
No. 18 Ailing Rd., Moling,
Jiangning Dev. Zone
211111 Nanjing
P.R. China
Telephone: +86 (0) 25 / 5275 1718
Fax: +86 (0) 25 / 5275 1747
E-Mail: jyin@idexcorp.com
Internet: <http://www.richter-ct.com>

Authorised person acc. to machinery directive 2006/42/EG: Gregor Kleining

Designation :

Series RSA mechanical seal:
♦ External, single
♦ double type Crane 58U – 58U

Materials :

Seal housing: Stainless steel
Wetted parts:
Mechanical seal: SSiC, Al₂O₃/PTFE glass, etc.
see also data sheet

Temperature range : see installation and operating manual RSA, Section 1

2 Safety, transport, storage and disposal

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

RSA long life grease and oil bath lubrication
Bearing pedestal group 1 and 2 **9285-050-en**

2.1 Intended use

Mechanical seals for plastic-lined pumps of the series RSA are suitable for the use of aggressive, and pure media.

Observe the instructions contained in the operating manual or contractual documentation; if necessary, consult the manufacturer.

All 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 RSA series.

See Section 7.3

The **sectional drawing** shows an external, single mechanical seal.

See Section 7.4

The **sectional drawing** shows a double mechanical seal type Crane 58U – 58U.

4 Commissioning/Shutdown

4.1 Initial commissioning

See installation and operating manual for the series RSA.

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. Additionally, it is imperative to observe the ATEX notes in the operating manual of the mechanical seal manufacturer.

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 **Section 7**.

4.2.3 Double mechanical seal type Crane 58U – 58U

A pump fitted with a double mechanical seal must not be filled with a product before the pressurisation system provided has been started up.

Otherwise damage could occur, e.g. opening of the wetted sealing gap, before start-up.

To guarantee safe operation, the pressure of the barrier fluid must be 1-2 bar above the pressure of the process medium at the mechanical seal at Q=0 m³/h. It must be ensured that the barrier pressure does not exceed the admissible pressure of the mechanical seal used.

The required barrier pressure can be determined as follows:

$$\begin{aligned} & 2/3 \text{ of the delivery pressure at } Q = 0 \text{ m}^3/\text{h} \\ & + \text{ supply pressure} \\ & + 1 - -2 \text{ bar safety margin} \end{aligned}$$

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 m³/h can be determined with the pump characteristic curve.

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

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



Are the available connections correctly made?

SE - barrier fluid inlet
SA - barrier fluid outlet

See also sectional drawing in **Section 7**.

4.3 Improper operations and their consequences (examples)



Improper operation, even for brief periods, may 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) can 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 RSA, **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 RSA series.

5.1 External, single mechanical seal

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 **Fig. 1**.

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.

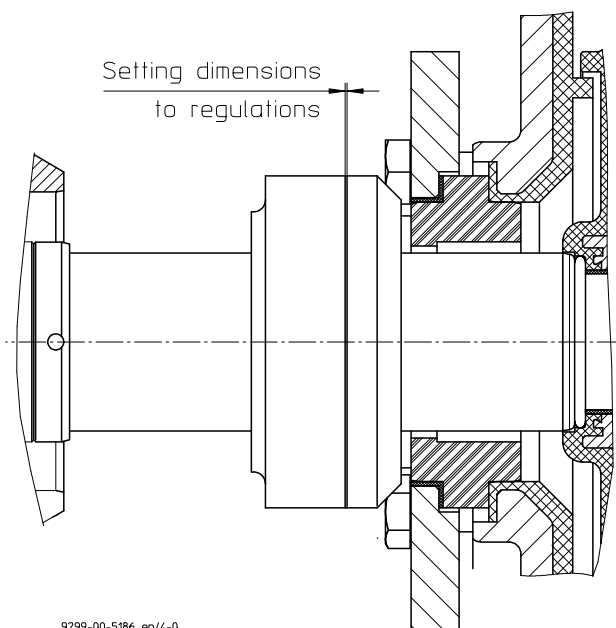


Fig. 1

Dismantling can be checked using the sectional drawings in **Section 7.3** and **Section 9** of the installation and operating manual RSA as well as the components available.

5.1.1 Dismantling



CAUTION: Make sure that the protective shaft sleeve **524** remains on the shaft **210** and does not fall down (risk of breakage)

- Deposit bracket **344** with the plastic side facing downwards on a soft surface.
- Pull the protective shaft sleeve **524** with the rotating unit **470/1** off the shaft **210**. The replaceable shaft sleeves **523/2** and **523/3** are normally removed as well.
- Remove the seal guard **685** on one or both sides, depending on requirements, by undoing the hex. socket screws **914/1**.
- Undo the clamp connection of the single mechanical seal and pull the rotating unit off the protective shaft sleeve **524**.
- Undo hex. screws **901/4** and remove mating ring adapter **487** with intermediate ring **509/1**.
- Push mating ring **475/1** out of the bracket.
- When changing the rotating unit **470/1**, observe the operating manual of the mechanical seal 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.
- ◆ External single mechanical seals can be best set to the required pre-tension with a clamping device which is available from Richter. See **Section 10.4**. Assembly aids, in the Installation and Operating Manual RSA.
- ◆ Prepare rotating unit (observe setting dimension, see fig. 1) and tighten on the protective shaft sleeve.

5.1.3 Assembly bracket chamber single mechanical seal

- Insert mating ring **475/1** in the appropriate bracket device.
- Place intermediate ring **509/1** on the mating ring.
- Secure mating ring adapter **487** with the hex. screws **901/4**. Tighten screws in diametrically opposite sequence..

Tightening torque group 1 = 160 in-lbs (18Nm)
Tightening torque group 2 = 213 in-lbs (24Nm)

- Push rotating unit **470/1** onto the protective shaft sleeve **524** but do not secure yet.
- Insert shaft sleeves **523/2** and **523/3** into the protective shaft sleeve **524**.
- Push pre-assembled protective shaft sleeve onto the pump shaft **210**. Make sure that the ring carrier grooves of the protective shaft sleeve **524** engage exactly into the stud connections **562/1** of the shaft **210**.



CAUTION: If assembly is not accurate, there is a risk of breakage on the protective shaft sleeve.

- Carefully mount pre-assembled bracket unit onto the appropriate centering of the bearing pedestal **330**. Pay attention to the concentric alignment with the protective shaft sleeve **524**.
- Tighten hex. screws **901/10** in diametrically opposite sequence.

Tightening torque group 1 = 398 in-lbs (45Nm)
Tightening torque group 2 = 486 in-lbs (55Nm)

- Pre-tension rotating unit according to the regulations of the mechanical seal manufacturer. A special clamping device can be used for this purpose (see [Section 10](#)).
- Mount mechanical seal guard **685** and secure with hex. socket screws **914/1** and washers **554/1**.

5.2 Double mechanical seal type Crane 58U – 58U

It is important to replenish in good time any barrier fluid which has escaped and to monitor the barrier fluid pressure

The minimum barrier fluid pressure must never be undershot as long as the pump housing is under pressure.

Refer also to the description of the pressurisation system used and [Section 4.2.2](#).

If the sealing liquid pressure is too high, this indicates a defect in the mechanical seal even though the mechanical seal on the atmosphere side is completely tight.

The pump must then be shut down so that no serious damage occurs.

Substantial damage generally occurs if the aggressive process medium enters the pressurisation system as a result of a drop in the barrier fluid pressure to below the minimum pressure.

If there is a risk that pressure surges occur in the plant, precautions must be taken to prevent damage. The barrier fluid pressure can, for example, be increased to the pressure limit of the mechanical seal in use.

Dismantling can be checked using the sectional drawings in [Section 7.3](#) and [Section 9](#) of the installation and operating manual RSA as well as the components available.

5.2.1 Dismantling

- Remove the bracket **344** including complete mechanical seal and protective shaft sleeve **524** from the shaft **210** by raising it.
- Deposit bracket **344** with the plastic side facing downwards on a soft surface.
- Remove screw-in pipe connectors **917/1** and **917/2** from the seal housing **483**.
- Undo hex. screws **901/4** and remove the seal housing **483** upwards out of the bracket chamber.



CAUTION: Make sure that no mechanical seal parts fall as they may be raised automatically (risk of breakage).

- Remove the remaining mechanical seal parts from the protective shaft sleeve **524** resp. out of the bracket **344**.
- When changing the rotating unit **470**, observe the operating manual of the mechanical seal manufacturer.

5.2.2 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.
- ◆ If the rotating units are moved by a key, the two seal halves are to be pushed from both sides onto the protective shaft sleeve. Otherwise the secondary seal would be damaged on the sharp edges of the key groove.
- ◆ Mount rotating unit **470/2** with pumping thread on the impeller side.
- ◆ The rotating units **470/1** and **470/2** must be flush.

5.2.3 Assembly bracket chamber double mechanical seal

- Press mating ring on the atmosphere side **475/2** with O-ring **412/7** into the seal housing **483**. Pay attention to the correct positioning of the mating ring **475/2** in relation to the spring-type slotted pin **531/1**.



CAUTION: If assembly is not accurate, there is a risk of breakage to the mating ring.

- Insert pre-assembled unit of the seal housing into the appropriate centering of the bearing pedestal **330**.
- ◆ Pay attention to the correct positioning of the three rear recesses of the seal housing **483** (positions 3, 6 and 9 o'clock).
- Mount rotating units **470/1** and **470/2** including the key **940/2** onto the protective shaft sleeve **524**.
- ◆ Pay attention to the correct positioning of the rotating units (protective shaft sleeve **524** has two semi-circular recesses on the motor side).
- Insert shaft sleeves **523/2** and **523/3** into the protective shaft sleeve **524**.
- Carefully introduce pre-assembled unit of the protective shaft sleeve into the seal housing **483**.
- Make sure that the two semi-circular recesses of the protective shaft sleeve **524** engage in the parallel pins **562/1** of the shaft **210**.

- ◆ For this purpose turn the shaft **210** beforehand so that the two parallel pins **562/1** in the recesses of the seal housing **483** can be seen at 3 and 9 o'clock.



CAUTION: If assembly is not accurate, there is a risk of breakage on the protective shaft sleeve.

- Insert intermediate ring **509/1** into the seal housing **483**.



CAUTION: If assembly is not accurate, there is a risk of breakage on the mating ring.

- Insert mating ring carrier **476** into the seal housing **483**.



CAUTION: If assembly is not accurate, there is a risk of breakage at the protective shaft sleeve and the mating ring carrier.

- Tighten hex. screws **901/10** in diametrically opposite sequence.

Tightening torque group 1 = 398 in-lbs (45Nm)
Tightening torque group 2 = 486 in-lbs (55Nm)

- Tighten hex. screws **901/4** of the connection seal housing **483** – bracket **344** in diametrically opposite sequence.

Tightening torque group 1 = 160 in-lbs (18Nm)
Tightening torque group 2 = 212 in-lbs (24Nm)

- Screw pipe connectors **917/1** and **917/2** into the seal housing **483**.

- Continuing in Installation and Operating Manual RSA 9285-050-en.

6 Malfunctions



Faults may result from inadmissible modes of operation. Such improper 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.

See also [Section 2.1](#).

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.

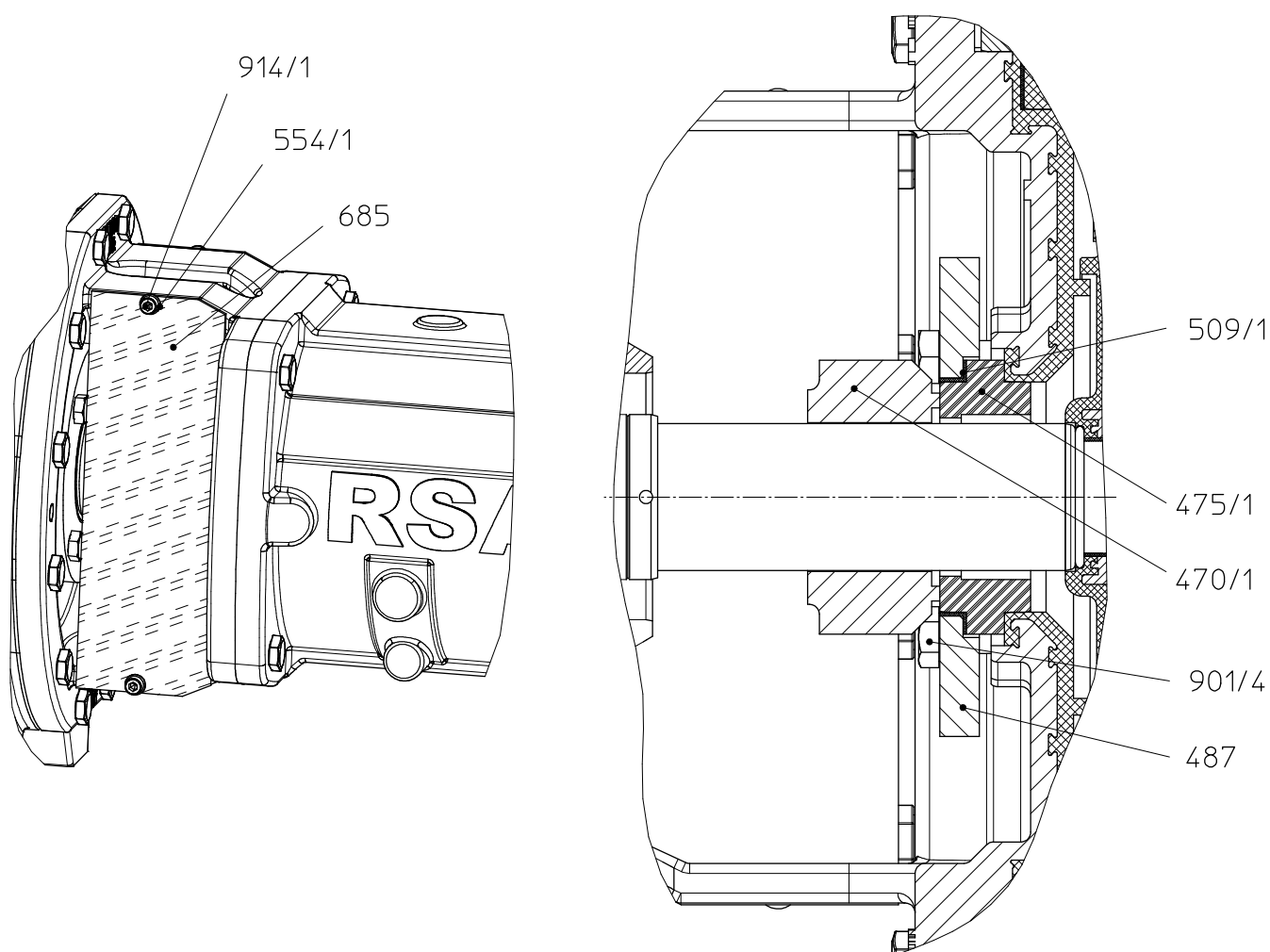
See also [Section 8](#) in the installation and operating manual of the RSA series.

7 Sectional drawing

7.1 Legend external, single mechanical seal

470/1	rotating unit	554/1	washer
475/1	mating ring	685	seal guard
487	mating ring adapter	901/4	hex. screw
509/1	intermediate ring	914/1	hex. socket screw

7.2 Sectional drawing external, single mechanical seal



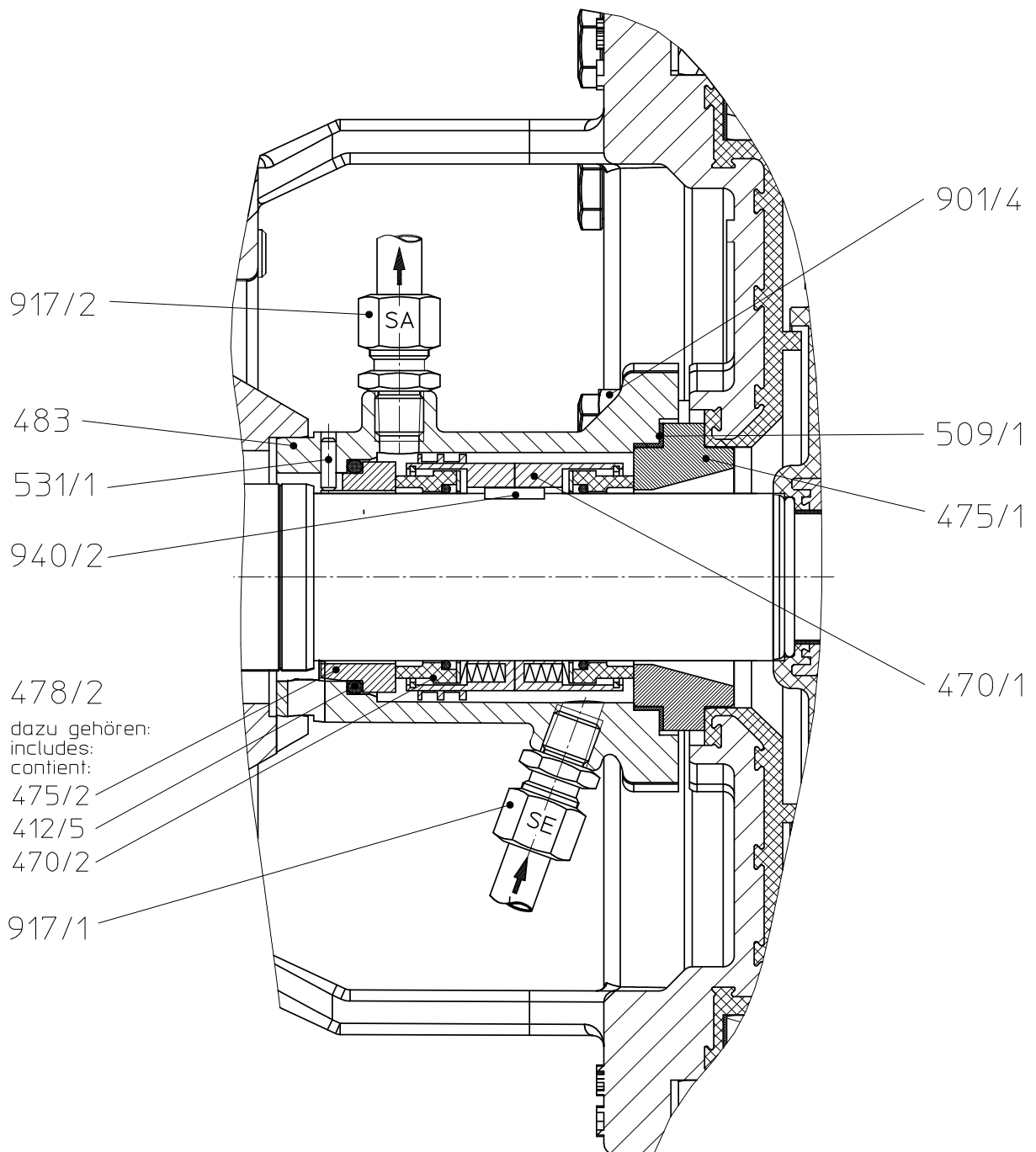
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Alternative sealing unit 478/1, consisting of rotating unit 470/1 and mating ring 475/1

7.3 Legend double mechanical seal type Crane 58U – 58U

470/1	rotating unit	509/1	intermediate ring
475/1	mating ring 1-piece	531/1	spring- type slotted pin
476	mating ring carrier	901/4	hex. screw
478/2	seal unit	917/x	screw-in pipe connector
includes		940/2	key
412/5	O-Ring		
470/2	rotating unit		
475/2	mating ring		
483	seal housing	SE	- barrier fluid inlet
		SA	- barrier fluid outlet / venting

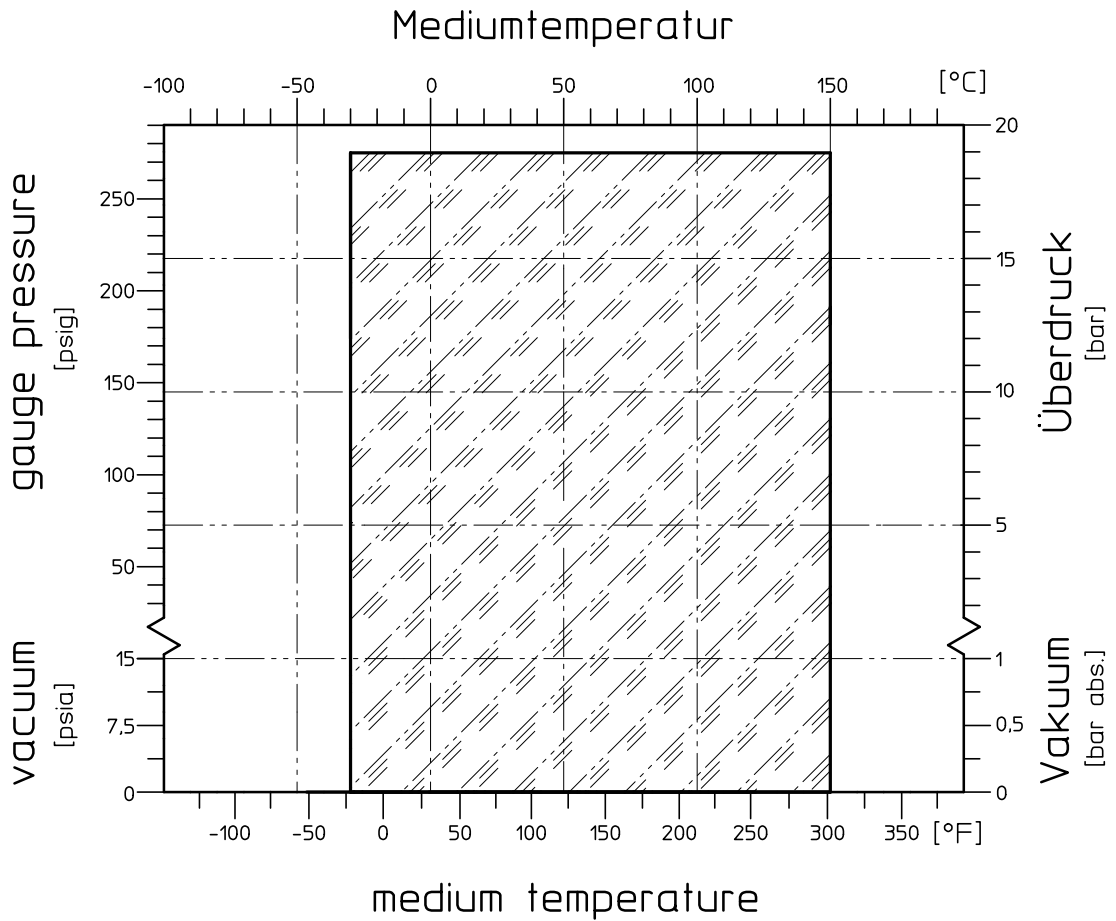
7.4 Sectional drawing double mechanical seal type Crane 58U – 58U



Baureihe/Series/Série Ausführung **Magnetkupplungspumpe**
RSA Design **Magnet drive pump**
 Construction **Pompe à entraînement magnétique**



Einsatzgrenzen / operating limits



Modification techniques possibles sans réservations!
 Graphique non à l'échelle!
 Dimensions variables uniquement revêtues d'une signature!

This leaflet is subject to alteration!
 Drawing not to scale!
 Certified for construction purposes only when signed!

Technische Änderungen vorbehalten!
 Nicht maßstäblich!
 Maße nur mit Unterschrift verbindlich!

CE Konformitätserklärung nach EN ISO//IEC 17050
Declaration of Conformity according to EN ISO//IEC 17050

Produkt	Chemiekreiselpumpe für Gleitringdichtungen freies Wellenende oder als Aggregat ¹⁾		
Product	Chemical Centrifugal Pump for Mechanical Seals Bare shaft or as unit ¹⁾		
Baureihe Series	SCK, SCK-X, SCK-S RSA, RSI		
EU-Richtlinien	2006/42/EG Maschinenrichtlinie 94/9/EG Explosionsschutzrichtlinie ATEX		
EU-Directive	Machinery Directive Equipment explosive atmosphere		
Modul	Interne Fertigungskontrolle Production Quality Assurance		
Angewandte harmonisierte Normen	EN 14121 EN 809 Applied harmonised Standards EN 13463-1		
Kennzeichnung	2006/42/EG	2006/42/EC	CE 
Marking	94/9/EG	94/9/EC	

Die technische Dokumentation nach Richtlinie 94/9EG ist bei der u.a. benannten Stelle hinterlegt.
The technical documentation is filed by below mentioned notified body according to directive 94/9/EC.
Physikalische-Technische Bundesanstalt (PTB), D-38116 Braunschweig

Baureihe Series	Registrier-Nr. Registered #	Baureihe Series	Registrier-Nr. Registered #
SCK	03ATEXD070	RSA	03ATEXD062
SCK-X	03ATEXD070	RSI	
SCK-S	03ATEXD070		

Das Unternehmen Richter Chemie-Technik GmbH bescheinigt hiermit, dass die o.a. Baureihen die grundsätzlichen Anforderungen der aufgeführten Richtlinien und Normen erfüllt.
Richter Chemie-Technik GmbH confirms that the basic requirements of the above specified directives and standards have been fulfilled.


Bevollmächtigt für die Zusammenstellung der technischen Unterlagen nach 2006/42/EG: A. Linges
Authorised person compiled the technical files according to 2006/42/EG:

1) Gilt nicht für das Aggregat nach 94/9/EG (ATEX Leitfaden Juni 2009 Abschn. 3.7.5 2.a)
1) Not valid for the unit according to 94/9/EG (ATEX Guideline June 2009 Paragraph 3.7.5 2.a)

Kempen, 01.03.2010



G. Kleining
Leiter Forschung & Entwicklung
Manager Research & Development



A. Linges
Leiter Qualitätsmanagement
Quality Manager

CE Konformitätserklärung nach EN ISO/IEC 17050
Declaration of Conformity according to EN ISO/IEC 17050

Produkt Chemiekreiselpumpe für Gleitringdichtungen
als Aggregat
*Product Chemical Centrifugal Pump for Mechanical Seals
as unit*

Baureihe SCK, SCK-X, SCK-S
Series RSA, RSI

EU-Richtlinien 2006/42/EG Maschinenrichtlinie
EU-Directive Machinery Directive

Modul Interne Fertigungskontrolle
Production Quality Assurance

Angewandte EN 14121
harmonisierte Normen EN 809
*Applied harmonised
Standards*

Kennzeichnung 2006/42/EG
Marking



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Richter Chemie-Technik GmbH confirms that the basic requirements of the above specified directives and standards have been fulfilled.

Bevollmächtigt für die Zusammenstellung der technischen Unterlagen nach 2006/42/EG:
Authorised person compiled the technical files according to 2006/42/EG:

A. Linges

Kempen, 01.07.2010

G. Kleining
Leiter Forschung & Entwicklung
Manager Research & Development

A. Linges
Leiter Qualitätsmanagement
Quality Manager

Safety Information / **Declaration of No Objection** Concerning the Contamination of Richter-Pumps, -Valves and Components

1 SCOPE AND PURPOSE

Each entrepreneur (operator) carries the responsibility for the health and safety of his employees. This extends also to the personnel, who implements repairs with the operator or with the contractor.

Enclosed declaration is for the information of the contractor concerning the possible contamination of the pumps, valves and component sent in for repair. On the basis of this information for the contractor is it possible to meet the necessary preventive action during the execution of the repair.

Note: The same regulations apply to repairs **on-site**.

2 PREPARATION OF DISPATCH

Before the dispatch of the aggregates the operator must fill in the following declaration completely and attach it to the shipping documents. The shipping instructions indicated in the respective manual are to be considered, for example:

- Discharge of operational liquids
- remove filter inserts
- lock all openings hermetically
- proper packing
- Dispatch in suitable transport container
- Declaration of the contamination fixed **outside!!** on the packing

FAX

Fax No. ()

Pages (incl. cover sheet) ()

To:

()

Richter Chemie-Technik GmbH
Otto-Schott-Straße 2
D-47906 Kempen

Telefon +49 (0) 21 52/146-0
Telefax +49 (0) 21 52/146-190

richter-info@richter-ct.com
www.richter-ct.com

Contact person:
()

Reference:
()

Extension:
- ()

E-Mail Address:
()

Date:
()

Your order No.: ()

Our Kom. No.: ()

Serial No.: ()

Dear Sirs,

The compliance with laws for the industrial safety obligates all commercial enterprises to protect their employees and/or humans and environment against harmful effects while handling dangerous materials.

The laws are such as: the Health and Safety at Work Act (ArbStättV), the Ordinance on Harzadous Substances (GefStoffV, BIOSTOFFV), the procedures for the prevention of accidents as well as regulations to environmental protection, e.g. the Waste Management Law (AbfG) and the Water Resources Act (WHG)

An inspection/repair of Richter products and parts will only take place, if the attached explanation is filled out correctly and completely by authorized and qualified technical personnel and is available.

In principle, radioactively loaded devices sent in, are not accepted.

Despite careful draining and cleaning of the devices, safety precautions should be necessary however, the essential information must be given.

The enclosed declaration of no objection is part of the inspection/repair order. Even if this certificate is available, we reserve the right to reject the acceptance of this order for other reasons.

Best regards
RICHTER CHEMIE-TECHNIK GMBH

Enclosures

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