

CR, CRI, CRN 1s, 1, 3, 5, 10, 15, 20

CR, CRN 32, 45, 64, 90, 120, 150

Double seal (back-to-back)

Installation and operating instructions

GB D F I E P GR NL S FIN DK PL RU H SI HR
SER RO BG CZ SK TR EE LT LV ZH JP KO



**CR, CRI, CRN 1s, 1, 3, 5, 10, 15, 20
CR, CRN 32, 45, 64, 90, 120, 150
Double seal (back-to-back)**

Installation and operating instructions	4	GB
Montage- und Betriebsanleitung	10	D
Notice d'installation et de fonctionnement	17	F
Istruzioni di installazione e funzionamento	24	I
Instrucciones de instalación y funcionamiento	30	E
Instruções de instalação e funcionamento	36	P
Οδηγίες εγκατάστασης και λειτουργίας	43	GR
Installatie- en bedieningsinstructies	49	NL
Monterings- och driftsinstruktion	55	S
Asennus- ja käyttöohjeet	61	FIN
Monterings- og driftsinstruktion	67	DK
Instrukcja montażu i eksploatacji	73	PL
Руководство по монтажу и эксплуатации	80	RU
Szerelési és üzemeltetési utasítás	87	H
Navodila za montažo in obratovanje	94	SI
Montažne i pogonske upute	101	HR
Uputstvo za instalaciju i rad	108	SER
Instrucțiuni de instalare și utilizare	115	RO
Упътване за монтаж и експлоатация	121	BG
Montážní a provozní návod	128	CZ
Návod na montáž a prevádzku	135	SK
Montaj ve kullanım kılavuzu	142	TR
Paigaldus- ja kasutusjuhend	149	EE
Įrengimo ir naudojimo instrukcija	155	LT
Uzstādīšanas un ekspluatācijas instrukcija	161	LV
安装和使用说明书	167	ZH
据付・運転・保守に関する取扱説明書	173	JP
설치 및 작동 지침	179	KO

CONTENTS

	Page
1. Symbols used in this document	4
2. General information	4
3. Product description	4
4. Applications	4
5. Maximum liquid pressure and temperature	4
6. Barrier fluid connections	4
7. Pump with pressure intensifier	6
7.1 Components of pressure intensifier	6
7.2 Dimensions of pump with pressure intensifier	6
8. Pump with dosing pump	6
9. Start-up	7
9.1 Pump with pressure intensifier	7
9.2 Pump with dosing pump	8
10. Maintenance	9
11. Operation	9
11.1 Frost protection	9
12. Disposal	9

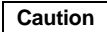


Prior to installation, read these installation and operating instructions. Installation and operation must comply with local regulations and accepted codes of good practice.

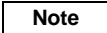
1. Symbols used in this document



Warning
If these safety instructions are not observed, it may result in personal injury!



Caution
If these safety instructions are not observed, it may result in malfunction or damage to the equipment!



Note
Notes or instructions that make the job easier and ensure safe operation.

2. General information

These installation and operating instructions are a supplement to installation and operating instructions for standard CR, CRI, CRN pumps, publication No 96462123, and for CRN-SF pumps, publication No 96530119.

3. Product description

This type of double seal consists of two shaft seals mounted in a "back-to-back" arrangement in a separate seal chamber. The pressure in the seal chamber is higher than the pump pressure. The double seal arrangement with pressurised seal chamber prevents the pumped liquid from leaking to the environment via the shaft seal.

The pressure in the seal chamber can be generated in three ways:

- by means of a pressure intensifier (section 9.1)
- by means of a dosing pump (section 9.2)
- by means of an already existing system.

4. Applications

The shaft seal is available for the following Grundfos pumps:

Pump type	CR 1s	CR 1	CR 3	CR 5	CR 10	CR 15	CR 20	CR 32	CR 45	CR 64	CR 90	CR 120	CR 150
CR	•	•	•	•	•	•	•	•	•	•	•	•	•
CRI	•	•	•	•	•	•	•						
CRN	•	•	•	•	•	•	•	•	•	•	•	•	•

This type of shaft seal is the optimum solution when handling abrasive or sticky liquids which would either wear out, damage or block a mechanical shaft seal.

Recommended for applications involving toxic, aggressive or flammable liquids, the seal shaft protects the surrounding environment and the people working in the vicinity of the pump.



If the shaft seal is used in applications where special safety precautions must be observed due to hazardous liquids, the customer bears full responsibility!

5. Maximum liquid pressure and temperature

Due to the shaft seal design, the pressure in the seal chamber must not exceed 25 bar. The pressure of the barrier fluid must always be higher than the pressure of the pumped liquid.

The maximum temperature of the barrier fluid depends on the rubber material of the shaft seal.

Shaft seal	Maximum temperature [°C]
EPDM	+120
FKM	+90
FFKM	+120
FXM	+120

6. Barrier fluid connections

Key to the letters in the drawings:

Pos. A = pumped liquid.

Pos. C/D and E = barrier fluid.

Figures 1, 2, 3 and 4 show where to fit a sensor (pos. A), if retrofitted.

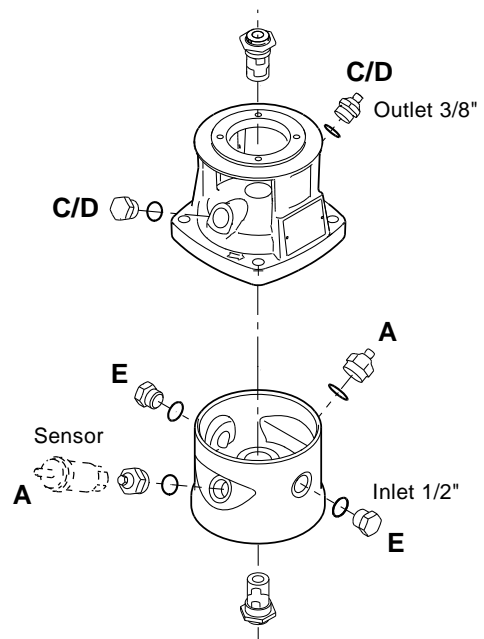


Fig. 1 Seal chamber CR, CRI, CRN 1s, 1, 3, 5

TM04 3225 3908

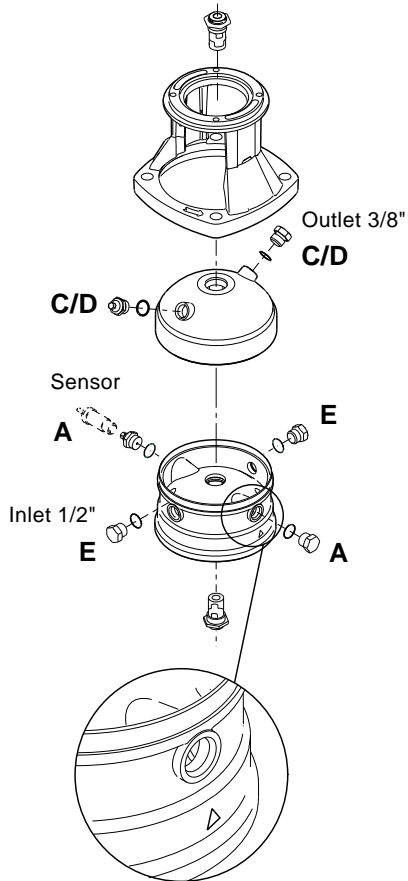


Fig. 2 Seal chamber CR, CRI, CRN 10, 15, 20

TM04 3226 3908

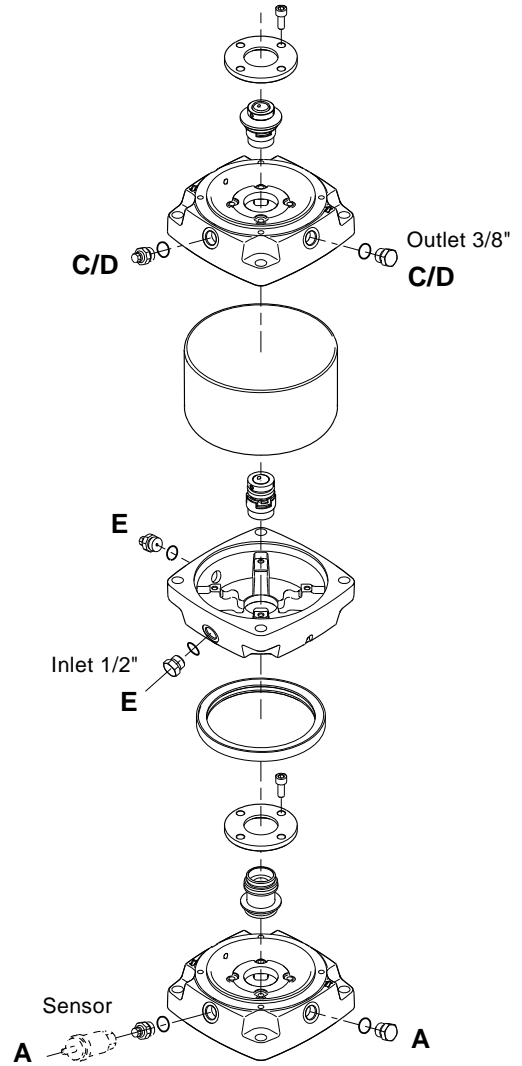


Fig. 3 Seal chamber CR, CRN 32, 45, 64, 90

TM03 8269 3308

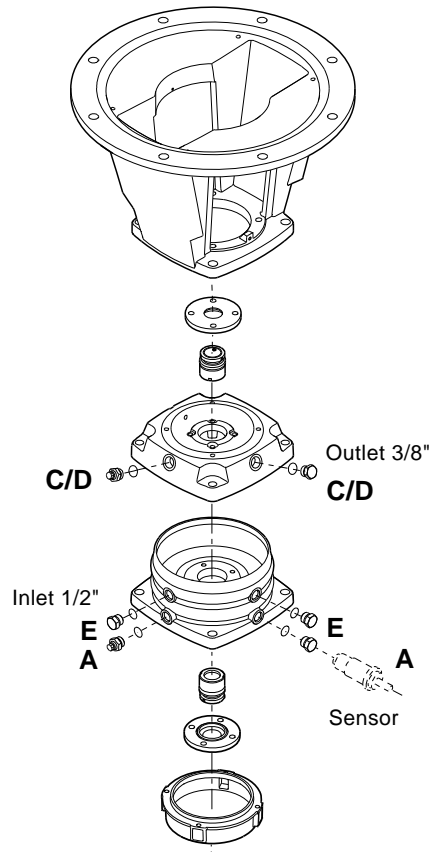


Fig. 4 Seal chamber CR, CRN 120, 150

TM04 4080 0909

7. Pump with pressure intensifier

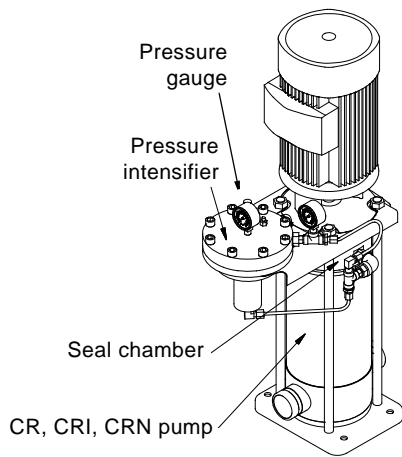


Fig. 5 Pump with pressure intensifier

7.1 Components of pressure intensifier

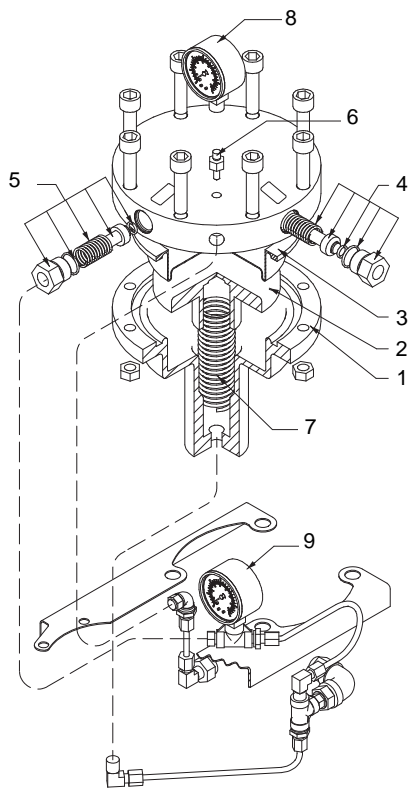


Fig. 6 Components of pressure intensifier

Pos.	Designation
1	Pressure intensifier
2	Piston
3	Diaphragm
4	Non-return valve
5	Relief valve
6	Vent screw, Rp 1/8
7	Spring for piston
8	Pressure gauge (barrier fluid)
9	Pressure gauge (pumped liquid)

TM01 4455 0399

TM03 8299 1007

7.2 Dimensions of pump with pressure intensifier

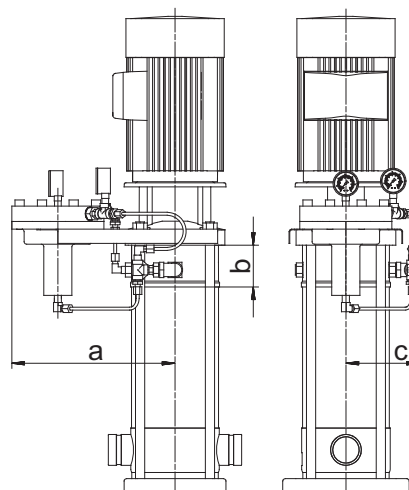


Fig. 7 Pump with pressure intensifier

Pump type	a [mm]	b [mm]	c [mm]
CR, CRI, CRN 1s, 1, 3, 5	297	108	128
CR, CRI, CRN 10, 15, 20	234	90	140
CR, CRN 32	342	210	155
CR, CRN 45	349	240	164
CR, CRN 64	349	166	164
CR, CRN 90	355	184	170
CR, CRN 120, 150	355	111	170

The dimension **b** is the additional height compared to the standard pump.

8. Pump with dosing pump

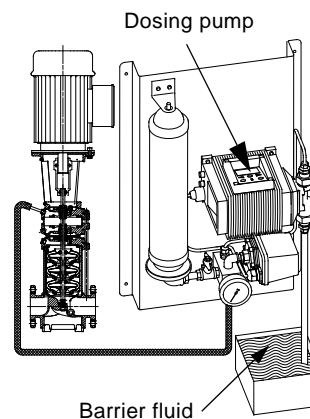


Fig. 8 Pump with dosing pump

8.0.1 Dimensions of pump with dosing pump

Pump type	Additional height of seal chamber [mm]
CR, CRI, CRN 1s, 1, 3, 5	108
CR, CRI, CRN 10, 15, 20	90
CR, CRN 32	210
CR, CRN 45	240
CR, CRN 64	166
CR 90	184
CR, CRN 120, 150	111

TM01 4459 0399

TM01 9099 1701

9. Start-up

9.1 Pump with pressure intensifier



Warning

Pay attention to the orientation of the vent holes, and take care to ensure that the escaping liquid does not cause personal injury or damage to the motor or other components.

When handling hot or hazardous liquids, special attention should be paid to the risk of personal injury.

When pumping flammable liquids, beware of static discharges. The funnel, for instance, should be earthed!

Illustration	Step	Action
	1	<p>Operation with positive inlet pressure</p> <ul style="list-style-type: none"> Open the vent screw (pos. A, fig. 1, 2, 3 or 4) on the side of the pump head. Close the isolating valve on the discharge side. Open the isolating valve on the inlet side. Slowly fill the pump with the liquid to be pumped. When the liquid starts running out of the vent hole, immediately close the vent screw. <p>Operation with suction lift</p> <ul style="list-style-type: none"> Open the vent screw (pos. A, fig. 1, 2, 3 or 4) on the side of the pump head. Close the isolating valve on the discharge side. Fill the pump and the inlet pipe with the liquid to be pumped using a funnel. When the liquid starts running out of the vent hole, immediately close the vent screw. <p>Note: A non-return valve must be fitted to the inlet pipe.</p>
	2	<p>Filling the seal chamber</p> <ul style="list-style-type: none"> Fill the intensifier and the seal chamber with barrier fluid, and connect the barrier fluid supply pipe to the unused inlet of the intensifier (pos. 4, fig. 6). The pressure in the seal chamber must always be 1.5 to 4 bar higher than the pump pressure when the pump is not operating. <p>$p_f = p_s^* + 1.5 \text{ to } 4 \text{ bar}$.</p> <p>$p_f$ = To be read on the pressure gauge on the intensifier (pos. 8, fig. 6). p_s = To be read on the pressure gauge in the connection pipe (pos. 9, fig. 6) between intensifier and pump.</p> <p>* p_s = inlet pressure when the pump is not operating; must always be 0.1 to 5 bar higher than the atmospheric pressure.</p>
	3	<p>Venting</p> <p>During filling, the seal chamber and the intensifier must be vented:</p> <ul style="list-style-type: none"> Use the vent screw at the top of the seal chamber (pos. C/D, fig. 1, 2, 3 or 4) and the vent screw at the top of the intensifier (pos. 6, fig. 6).
	4	<p>Disconnecting the barrier fluid supply pipe</p> <ul style="list-style-type: none"> Disconnect the barrier fluid supply pipe from the intensifier.
	5	<p>Starting up the pump</p> <ul style="list-style-type: none"> See also the installation and operating instructions for standard CR, CRI, CRN pumps. Start the pump, and check the direction of rotation. See the correct direction of rotation on the motor fan cover. After a few minutes, vent the pump again by means of the vent screw (pos. A, fig. 1, 2, 3 or 4).

9.2 Pump with dosing pump



Warning

Pay attention to the orientation of the vent holes, and take care to ensure that the escaping liquid does not cause personal injury or damage to the motor or other components.

When handling hot or hazardous liquids, special attention should be paid to the risk of personal injury.

When pumping flammable liquids, beware of static discharges. The funnel, for instance, should be earthed!

GB

Illustration	Step Action
	<p>1 Connecting the barrier fluid supply pipe</p> <ul style="list-style-type: none"> Connect one end to the seal chamber (pos. E, fig. 1, 2, 3 or 4). Connect the other end to the outlet of the dosing pump.
	<p>2 Recommended pressure</p> <ul style="list-style-type: none"> Set the start pressure of the dosing pump to a pressure 1.5 to 2 bar above the highest pressure the pump can deliver. ($P_{\text{pump}} + P_{\text{inlet}} + P_{1.5 - 2.0} < P_{\text{dosing max.}}$)
	<p>3 Filling and venting the seal chamber</p> <ul style="list-style-type: none"> Start the dosing pump. Fill and vent the seal chamber by means of the vent screw at the top of the seal chamber (pos. C/D, fig. 1, 2, 3 or 4). The dosing pump will stop automatically when the pressure set in step 2 has been reached.
	<p>4 Operation with positive inlet pressure</p> <ul style="list-style-type: none"> Open the vent screw (pos. A, fig. 1, 2, 3 or 4) on the side of the pump head. Close the isolating valve on the discharge side. Open the isolating valve on the inlet side. Slowly fill the pump with the liquid to be pumped. When the liquid starts running out of the vent hole, immediately close the vent screw.
	<p>4 Operation with suction lift</p> <ul style="list-style-type: none"> Open the vent screw (pos. A, fig. 1, 2, 3 or 4) on the side of the pump head. Close the isolating valve on the discharge side. Fill the pump and the inlet pipe with the liquid to be pumped using a funnel. When the liquid starts running out of the vent hole, immediately close the vent screw. <p>Note: A non-return valve must be fitted to the inlet pipe.</p>
	<p>5 Starting up the pump</p> <ul style="list-style-type: none"> See also the installation and operating instructions for standard CR, CRI, CRN pumps. Open the isolating valve on the discharge side. Start the pump, and check the direction of rotation. See the correct direction of rotation on the motor fan cover. After a few minutes, vent the pump again by means of the air vent screw (pos. A, fig. 1, 2, 3 or 4).

10. Maintenance

See the installation and operating instructions for standard CR, CRI, CRN pumps.

Pressure intensifier

The pressure intensifier is maintenance-free.

Dosing pump

See the installation and operating instructions for the dosing pump.

11. Operation

To ensure optimum function and performance, check the pressure regularly.

Pressure intensifier

The pressure difference between the two pressure gauges (seal chamber and pump) must be between 1 and 1.5 bar. This indicates that the seal chamber contains sufficient barrier fluid.

Dosing pump

The pressure of the barrier fluid must always be 1.5 to 2 bar higher than the pressure of the pumped liquid. This is automatically checked by the pressure switch/ transmitter fitted together with the dosing pump.

Note

A very small quantity of the barrier fluid, i.e. less than 10 ml/24 operating hours, will always flow into the pumped liquid.

11.1 Frost protection

For general guidelines on frost protection of the pump, see the installation and operating instructions for standard CR, CRI, CRN pumps.

Seal chamber

Drain the seal chamber by slackening the lower plug (pos. E, figures 1, 2, 3 or 4).

Pressure intensifier

Replace the barrier fluid by antifreeze liquid.

Dosing pump

For frost protection, see the installation and operating instructions for the dosing pump.



Warning

If the pumped liquid is hazardous to health, take special care when draining the pump. Local safety regulations must be observed.

12. Disposal

This product or parts of it must be disposed of in an environmentally sound way:

1. Use the public or private waste collection service.
2. If this is not possible, contact the nearest Grundfos company or service workshop.

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