

# CR, CRN 32-90 Model B

Standard model

Service instructions



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**Warning**

*Prior to service work, read these service instructions carefully. Installation and service work must comply with local regulations and accepted codes of good practice.*

*Observe the safety instructions in the installation and operating instructions for the product.*

## 1. Symbols used in this document

**Warning**

*If these safety instructions are not observed, it may result in personal injury.*

**Warning**

*If these instructions are not observed, it may lead to electric shock with consequent risk of serious personal injury or death.*

**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

Position numbers of parts (digits) refer to drawings and parts lists; position numbers of tools (letters) refer to section 3. *Service tools.*

**Warning**

*If there is a risk of getting into contact with the pumped liquid, use personal protective equipment.*

*Observe local regulations.*

**Before dismantling****Warning**

*Switch off the power supply and make sure that it cannot be accidentally switched on.*

*Check that other pumps or sources do not force flow through the pump even if the pump is stopped. This will cause the motor to act like a generator, resulting in voltage on the pump.*

- Close the isolating valves, if fitted, and make sure that they cannot be accidentally opened.
- Before starting work on the product, let the product and pumped liquid cool off.

**Before assembly**

- Clean and check all parts.
- Replace defective parts with new parts.
- Always replace gaskets and O-rings.

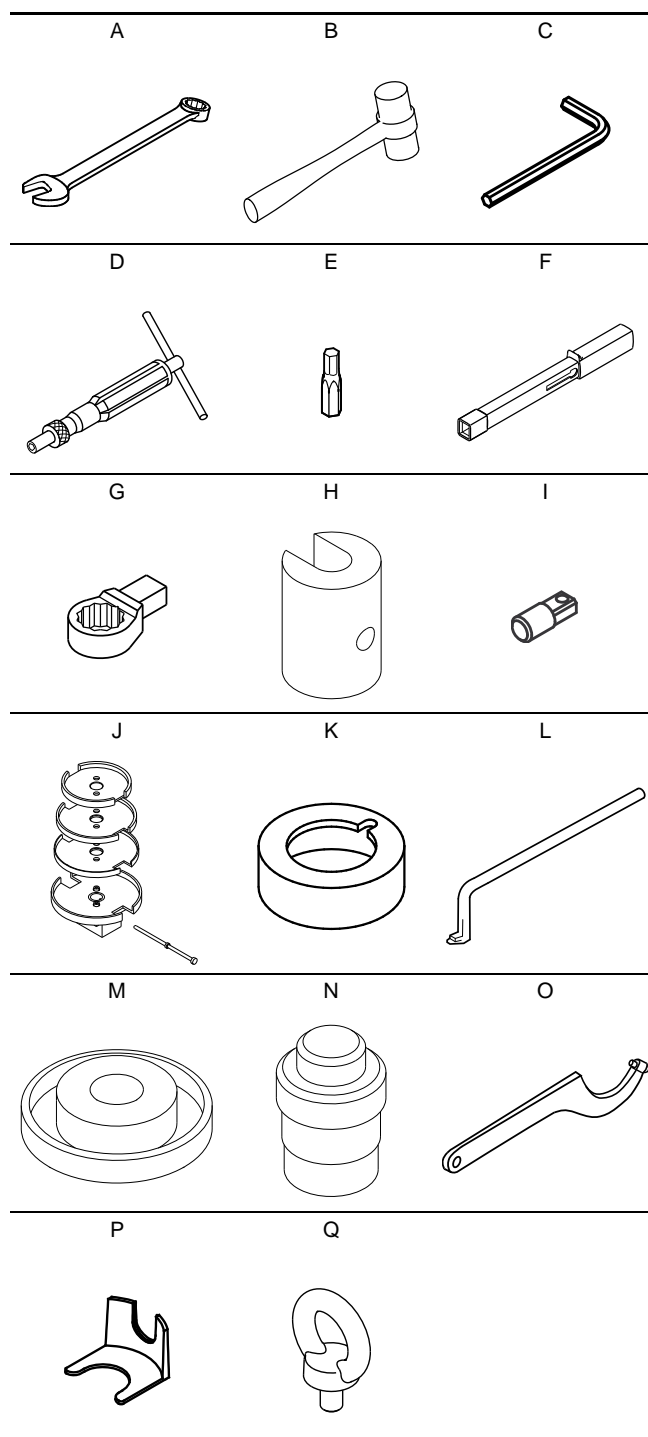
**During assembly**

- Tighten screws and nuts according to section 4. *Torques.*
- Lubricate rings and screws according to section 5. *Lubricants.*

**After assembly**

If analog or digital inputs, the relay output or the CIM module has been removed from the pump, you must check the communication with external units after service.

### 3. Service tools



Pos.	Designation	For pos.	Tool size	Product No
A	Ring/open-end spanner	18, 23	24 mm	SV0122
		28	8 mm	SV0273
		36	24 mm	SV0122
B	Rubber hammer			SV0349
C	Hexagon key	9	8 mm	SV0032
		113	3 mm	-
		28	8 mm	SV0032
C	Hexagon key	58a	8 mm	SV0032
D	Torque screwdriver	113, 7a	.1-4 ft.-lbs./ 1-6 Nm	SV0435 SV0438
		9	8 mm	-
E	Hexagon bit	113	3 mm	-
		28	8 mm	-
F	Torque wrench	9, 18, 23, 28, 36, 58	15-74 ft.-lbs./ 20-100 Nm	SV0269
G	Ring insert tool	18, 23	24 mm	SV0524
		28	8 mm	SV0411
		36	24 mm	SV0524
H	Key for split cone nut	48	34 mm	SV0004
I	Tap for key for split cone nut	48-K	Ø14 mm 9 x 12 mm	SV0403
J	Holder with pin for dismantling and assembly	80	-	CR, CRN 32 SV0003-3
				CR, CRN 45 SV0003-4
				CR, CRN 64 SV0003-5
				CR, CRN 90 SV0003-2
				CR, CRN 32 SV0043
K	Holder for wear ring	49c	-	CR, CRN 45 SV0044
				CR, CRN 64 SV0045
				CR, CRN 90 SV0046
L	Puller for wear ring	49c	-	SV0239
M	Punch for complete neck ring	45a	-	CR, CRN 32 SV0025
				CR, CRN 45 SV0027
				CR, CRN 64 SV0028
				CR, CRN 90 SV0029
N	Punch for bush	47c-47d	-	SV0015
O	Hook spanner	49-49a	-	SV0031
P	Adjusting fork	105	22 mm	985924
Q	Eye bolt	28b		ID2779

## 4. Torques

Pos.	Description	Dimensions	Torque
7a	Coupling guard screws	-	4.4 ft-lbs./6 Nm
9	Coupling screws	M10 x 25 mm	63 ft-lbs./85 Nm
18	Air vent screws	-	26 ft-lbs./35 Nm
23	Drain plugs	1/2"	
26b	Screws for straps	-	11 ft-lbs./15 Nm
28	Motor stool screws	M10 x 50 mm	46 ft-lbs./62 Nm
36	Pump head nuts	M16	74 ft-lbs./100 Nm
48	Spit cone nut	-	52 ft-lbs./70 Nm
58a	Seal carrier screws	M10 x 25 mm	46 ft-lbs./62 Nm
113	Shaft seal set screws	-	4 ft-lbs./6 Nm

## 5. Lubricants

Pos.	Description	Lubricant	Product No
9	Coupling screws	THREAD-EZE	00SV9997
28	Motor stool screws		
58a	Seal carrier screws		
51	Shaft	Soapy water	-
105	Shaft seal		
37	O-ring pump housing	Rocol Sapphire Aqua-Sil	00RM2924
47	Bearing ring		
109	O-ring shaft seal		
110	O-ring shaft seal		

## 6. Pump dismantling

Position numbers refer to the drawings in section 11. *Exploded views.*

### 6.1 Motor

**To prevent the motor from tipping over, hold it straight when using a lifting device.**

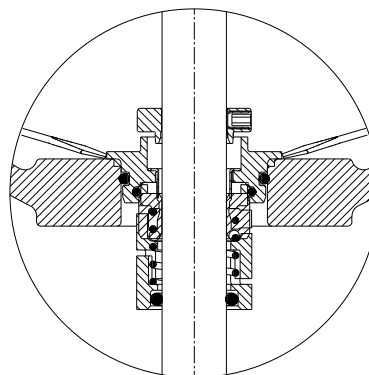
#### Caution

**Do not use the lifting eyes of the motor for lifting the entire pump and motor assembly.**

1. Remove screws (pos. 7a) and coupling guards (pos. 7).
2. Remove screws (pos. 9) and coupling (pos. 8). It may be necessary to loosen the coupling with a rubber hammer.
3. Remove screws (pos. 28). Lift and remove motor and motor stool (pos. 1a) with lifting straps that pass through the motor stool. Ensure that the motor does not tip and the load is not applied to the pump shaft.

### 6.2 Shaft seal and pump head

1. Remove screws (pos. 58a) and retainer (pos. 58).
2. Clean end of shaft (pos. 51).
3. Slacken set screws (pos. 113) of shaft seal (pos. 105).
4. Carefully press shaft seal out of pump head (pos. 2) using two slot screwdrivers, and pull it off the shaft. See fig. 1.



**Fig. 1** Removing upper shaft seal

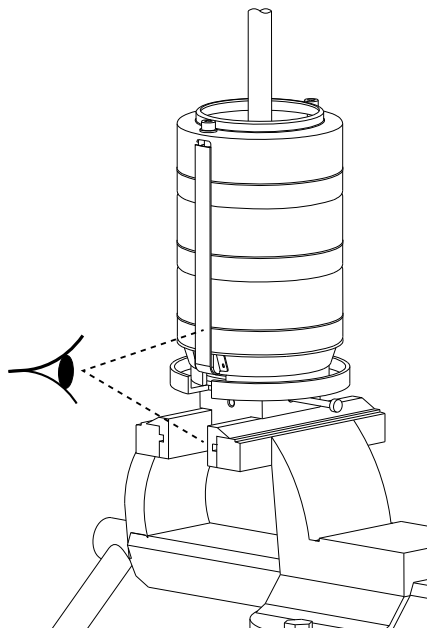
5. Remove nuts (pos. 36) and washers (pos. 66a).
6. Remove pump head (pos. 2). It may be necessary to loosen it with a rubber hammer.

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## 6.3 Chamber stack

### 6.3.1 Fitting chamber stack on the holder

1. Place the holder for dismantling and assembly in a vice and tighten it. See fig. 2 for right positioning.
2. Pull the chamber stack out of the outer sleeves (pos. 55) and place it in the holder according to fig. 2. Make sure the chamber stack engages with the holder.
3. Fit the locking pin in the hole marked "Dismantling".



**Fig. 2** Positioning the chamber stack in the holder

4. Remove screws (pos. 26b) and washers (pos. 26c).
5. Remove straps (pos. 26a).

### 6.3.2 Dismantling chambers

Depending on their construction, dismantle the chambers according to the instructions below. The symbols refer to section 10. *Order of assembly for chambers and impellers.*

#### Single chamber



**Fig. 3** Single chamber

1. Pull apart the rotating spring of the bearing (pos. 47a) and remove the bearing.
2. Hold impeller (pos. 49) with the hook spanner, and slacken split cone nut (pos. 48) using the key for split cone nut. Turn the key around and knock the nut to loosen the impeller from the split cone (pos. 49b).
3. Pull the split cone nut, split cone and impeller off the shaft.

#### Top chamber and chamber without bearing



**Fig. 4** Left: top chamber; right: chamber without bearing

1. Loosen chamber (pos. 3) from the chamber below using a screwdriver, and remove it.
2. Hold impeller (pos. 49) with the hook spanner, and slacken split cone nut (pos. 48) using the key for split cone nut. Turn the key around, and knock the nut to loosen the impeller from split cone (pos. 49b).
3. Pull the split cone nut, split cone and impeller off the shaft.

#### Chamber with bearing



**Fig. 5** Chamber with bearing

1. Loosen chamber (pos. 4a) from the chamber below or inlet part (pos. 44) using a screwdriver.
2. Loosen bearing ring (pos. 47a) from split cone nut (pos. 48) and pull it off the shaft.
3. Hold impeller (pos. 49) with the hook spanner, and slacken split cone nut (pos. 48) using the key for split cone nut. Turn the key around, and knock the nut to loosen the impeller from split cone (pos. 49b).
4. Pull the split cone nut, split cone and impeller off the shaft.
5. When the last impeller has been removed, inlet part (pos. 44) can be lifted off the holder.

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## 7. Checking chamber parts

Position numbers refer to the drawings in section 11. *Exploded views*.

Check the distance between parts 1 and 2. See the table below. If the distance is superior to the maximum tolerance indicated, replace the parts.

Fig.	Part 1		Part 2		Max. tolerance [in. (mm)]
	Pos	Description	Pos.	Description	
6	47c	Bush	51	Shaft	.039" (1.0 mm)
7	47	Bearing ring	47a	Driver	.012" (0.3 mm)

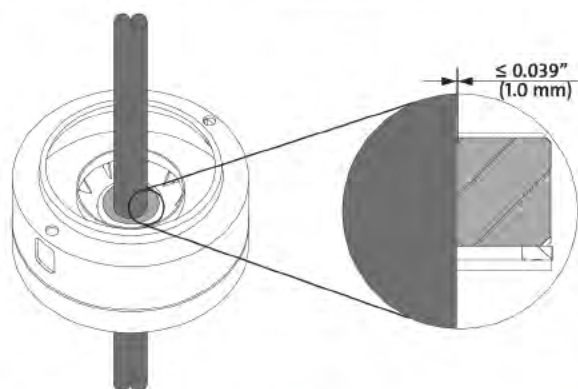


Fig. 6 Tolerance between bush and shaft

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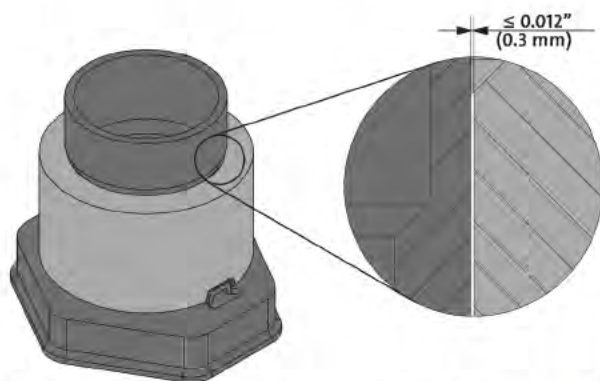


Fig. 7 Tolerance between bearing ring and driver

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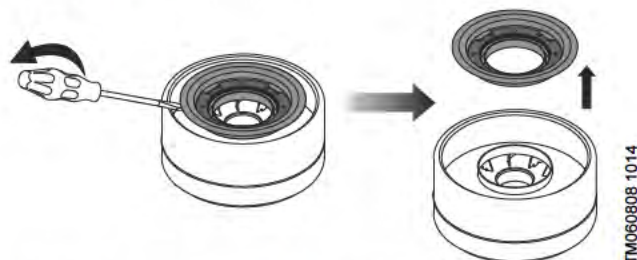
## 8. Replacing chamber parts

Position numbers refer to the drawings in section 11. *Exploded views*.

### 8.1 Complete neck ring (pos. 45a)

#### 8.1.1 Dismantling

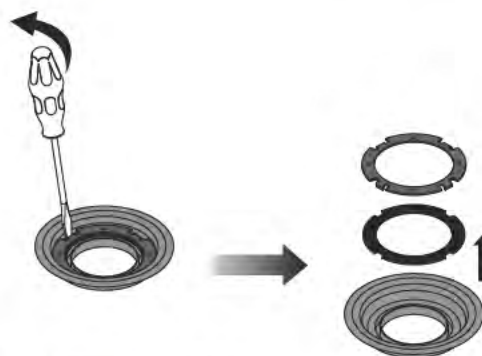
1. Push the complete neck ring up and free from chamber (pos. 4/4a) or inlet part (pos. 44) using a screwdriver. See fig. 8.



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Fig. 8 Removing complete neck ring

2. Push neck ring retainer (pos. 65) up and free from cup (pos. 46) using a screwdriver, and remove neck ring (pos. 45). See fig. 9.

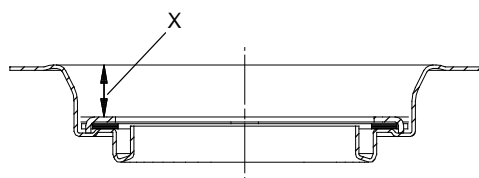


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Fig. 9 Removing neck ring

### 8.1.2 Assembly

1. Place neck ring (pos. 45) in cup (pos. 46).
2. Fit neck ring retainer (pos. 65) with the four driving dogs pointing downwards. Turn the neck ring retainer until it engages with the neck ring.
3. Knock/press the neck ring retainer home against the cup using the punch for complete neck ring. Check that the measurement is within the tolerance range. See fig.10.



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**Fig. 10** Measure distance between retainer and top of cup

Pump	Nominal height, X [in. (mm)]	Tolerance range [in. (mm)]
CR, CRN 32	0.40" (10.1 mm)	± .007" (0.2 mm)
CR, CRN 45	0.61" (15.5 mm)	
CR, CRN 64	0.45" (11.5 mm)	
CR, CRN 90	0.48" (12.1 mm)	

**Note**

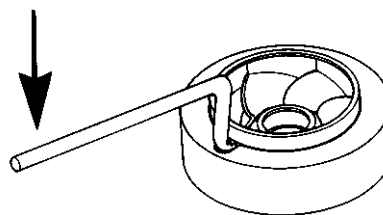
*It should be possible to move the neck ring freely (sideways) between the neck ring retainer and the cup.*

4. Fit the complete neck ring in chamber (pos. 4/4a) or inlet part (pos. 44) and knock/press it home using the punch for complete neck ring.

### 8.2 Wear ring (pos. 49c)

#### 8.2.1 Dismantling

1. Fit the holder on the impeller. The wear ring should come out in the center of the holder. See fig 11.
2. Place the impeller and holder on a flat surface, the wear ring uppermost.
3. Push the wear ring up and free of the impeller using the puller. See fig. 11.



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**Fig. 11** Removing wear ring

#### 8.2.2 Assembly

Press wear ring (pos. 49c) carefully down over impeller skirt (pos. 49/49a).

**Caution**

***Make sure to push the ring straight down against the impeller skirt. Make sure not to damage the impeller.***

### 8.3 Bush (pos. 47c) and retaining ring (pos. 47d)

#### 8.3.1 Dismantling

Place the chamber on a flat surface, and press the bush and retaining ring down using the punch for bush.

#### 8.3.2 Assembly

Place the chamber on a level and solid surface with complete neck ring (pos. 45a) facing downwards, and press the bush and retaining ring home against the chamber using the punch for bush.

## 9. Pump assembly

Position numbers refer to the drawings in section 11. *Exploded views.*

### 9.1 Chamber stack

#### 9.1.1 Fitting the inlet part

1. Place the holder for dismantling and assembly in a vice and tighten it.
2. Place the shaft and inlet part (pos. 44) in the holder according to fig. 12. Make sure that the inlet part engages with the holder.

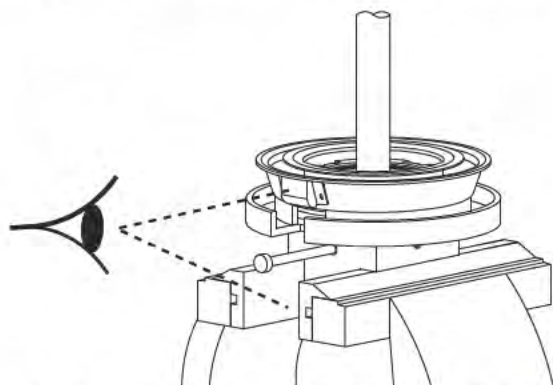


Fig. 12 Placing the shaft and inlet part in the holder

3. Fit the locking pin in the hole marked "Assembly".
4. Fit impeller (pos. 49) onto the shaft and press it home in the inlet part.
5. Fit split cone (pos. 49b) and knock it into the impeller hub using the key for split cone nut.
6. Hold the impeller with the hook spanner and tighten split cone nut (pos. 48).
7. Remove the shaft from the holder and check that the impeller flushes with the shaft groove. See fig. 13.

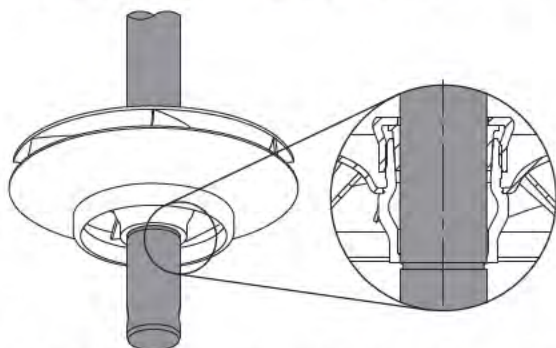


Fig. 13 Checking that the impeller flushes with the shaft groove

Refit the shaft in the holder, and fit the locking pin in the "Assembly" hole.

### 9.1.2 Assembling chambers

Depending on their construction, assemble the chambers according to the instructions below. The symbols refer to section 10. *Order of assembly for chambers and impellers.*

Note

**Mount the reduced impeller(s), if any, last in the top chamber(s).**

#### Chamber without bearing



Fig. 14 Chamber without bearing

1. Fit impeller (pos. 49) and press it home.
2. Fit split cone (pos. 49b) and knock it into the impeller hub using the key for split cone nut.
3. Hold the impeller with the hook spanner. Fit and tighten split cone nut (pos. 48).
4. Fit chamber (pos. 4a) and press it home against the chamber below.

#### Chamber with bearing



Fig. 15 Chamber with bearing

1. Fit impeller (pos. 49) and press it home.
2. Fit split cone (pos. 49b) and knock it into the impeller hub using the key for split cone nut.
3. Hold the impeller with the hook spanner. Fit and tighten split cone nut (pos. 48).
4. Slide bearing ring (pos. 47a) over the split cone nut. It must engage with the split cone nut.
5. Fit chamber (pos. 4a) and press it home against the chamber below or inlet part (pos. 44).

Caution

**Be careful when pressing the chambers down the shaft. The bearings are fragile and cannot stand blows or contact with the shafts.**

#### Top chamber



Fig. 16 Top chamber

1. Fit impeller (pos. 49) and press it home.
2. Fit split cone (pos. 49b) and knock it into the impeller hub using the key for split cone nut.
3. Hold the impeller with the hook spanner. Fit and tighten split cone nut (pos. 48).
4. Fit chamber (pos. 3a). Turn it so that the holes for straps are aligned to the fixing lugs for straps on the inlet part.
5. Press the chamber home against the chamber below.
6. Fit straps (pos. 26a), washers (pos. 26c), and cross-tighten screws (pos. 26b).



## Single chamber



Fig. 17 Single chamber

1. Fit impeller (pos. 49) and press it home.
2. Fit split cone (pos. 49b) and knock it into the impeller hub using the key for split cone nut.
3. Hold the impeller with the hook spanner. Fit and tighten split cone nut (pos. 48).
4. Slide bearing ring (pos. 47a) over the split cone nut. It must engage with the split cone nut.
5. Fit chamber (pos. 3). Turn it so that the holes for straps are aligned to the fixing lugs for straps on the inlet part.
6. Press the chamber home against inlet part (pos. 44).
7. Fit straps (pos. 26a) and washers (pos. 26c), and cross-tighten screws (pos. 26b).

## 9.2 Pump head and shaft seal

1. Replace rubber springs (pos. 60) and O-ring (pos. 37).
2. Fit pump head (pos. 2) on outer sleeves (pos. 55).
3. Fit washers (pos. 66a) and cross-tighten nuts (36).
4. Carefully press shaft seal (pos. 105) down the shaft and in the pump head.
5. Fit retainer (pos. 58) and cross-tighten screws (58a).
6. Press the pump shaft home and tighten set screws (pos. 113).
7. Lift the pump shaft and insert the adjusting fork between the shaft seal driver and its retainer. See fig. 18.

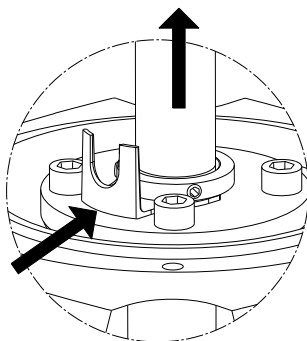


Fig. 18 Fitting adjusting forks

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## 9.3 Motor

*To prevent the motor from tipping over, hold it straight when using a lifting device.*

### Caution

*Do not use the lifting eyes of the motor for lifting the entire pump and motor assembly.*

1. With lifting straps that pass through the motor stool, lift and fit the motor and motor stool (pos. 1a) to the pump head (pos. 2). Ensure that the motor does not tip and the load is not applied to the pump shaft.
2. Cross-tighten screws (pos. 28).
3. Fit coupling (pos. 8), according to fig. 19 and 20, and tighten screws (pos. 9).

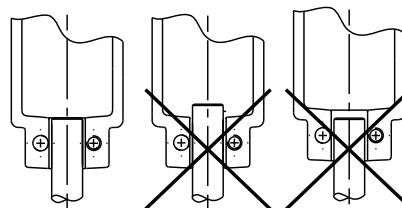


Fig. 19 Fitting coupling

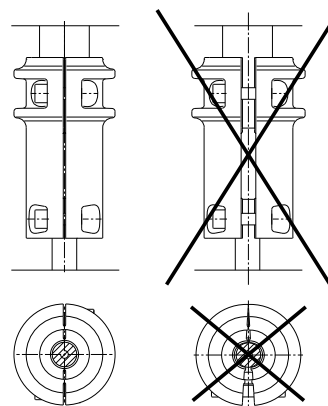


Fig. 20 Adjusting coupling

4. Remove the adjusting fork, and place it under one of screws (pos. 58a).
5. Check that the pump shaft can rotate freely.
6. Fit coupling guards (pos. 7) and screws (pos. 7a).

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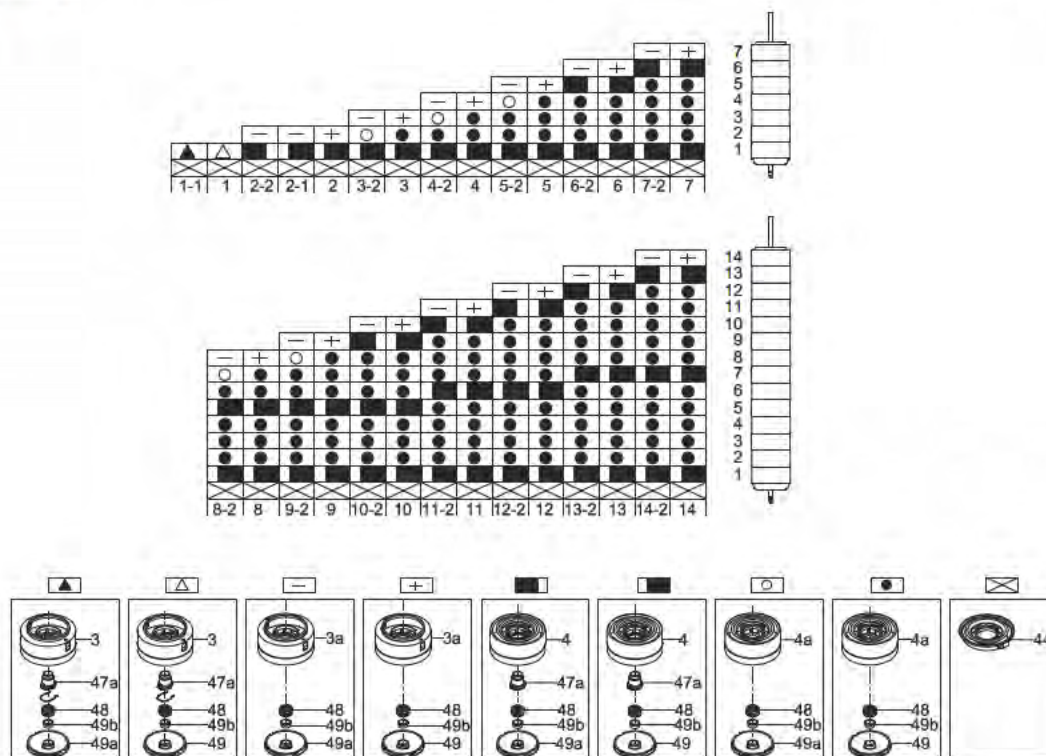
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## 10. Order of assembly for chambers and impellers

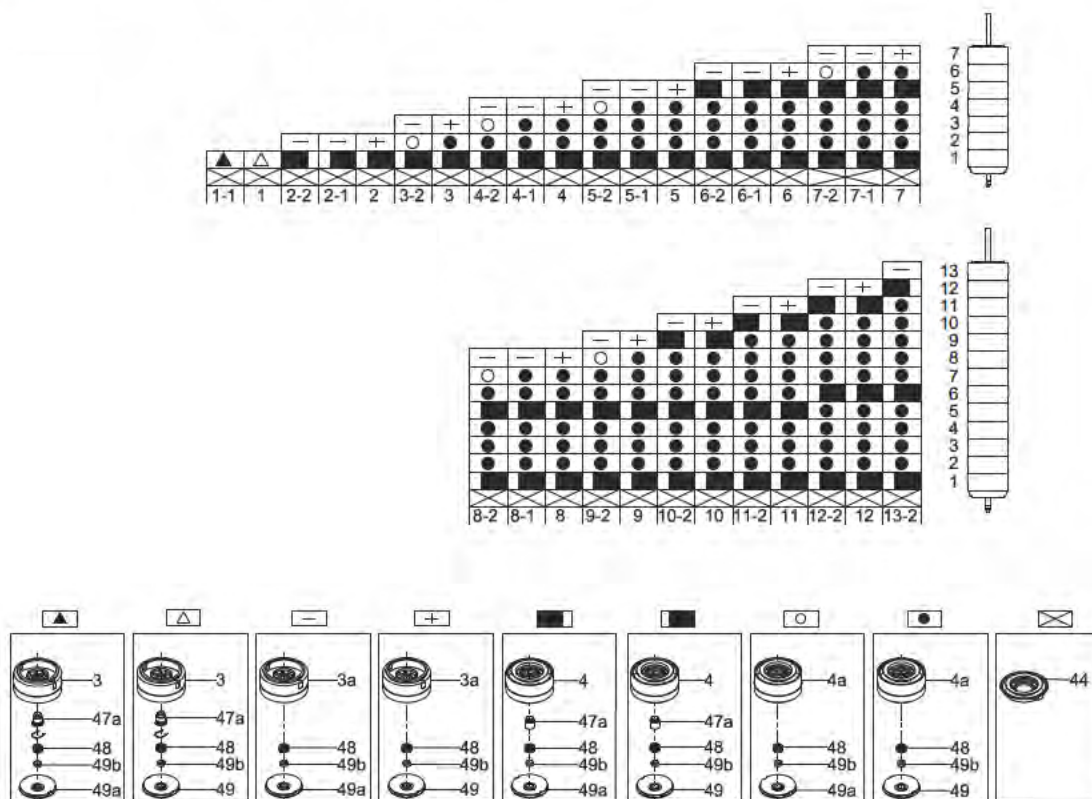
The assembly of the pump is illustrated in the following drawings. Each symbol corresponds to a different chamber.

**Note** Pos. 49 is the standard size impeller. Pos. 49a is a reduced impeller (2/3 of standard size).

### 10.1 CR, CRN 32



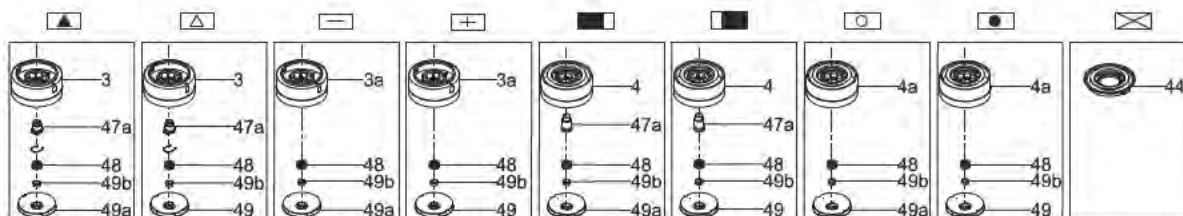
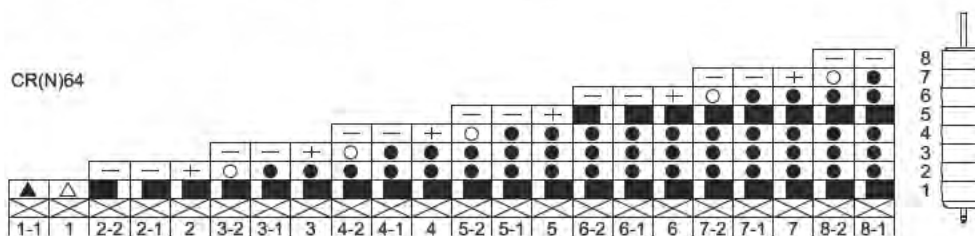
### 10.2 CR, CRN 45



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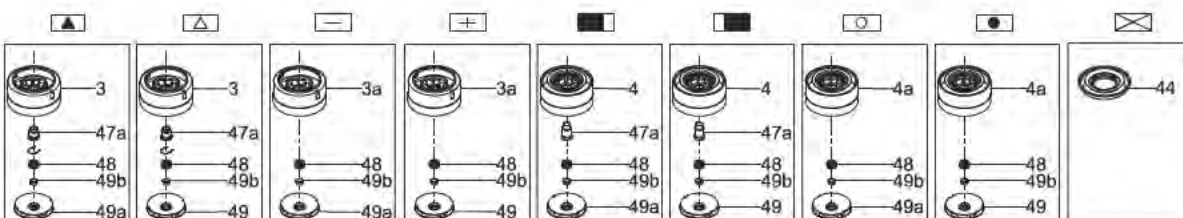
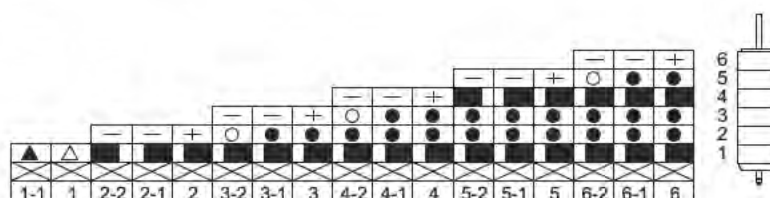
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# 10.3 CR, CRN 64



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# 10.4 CR, CRN 90



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## 11. Exploded views

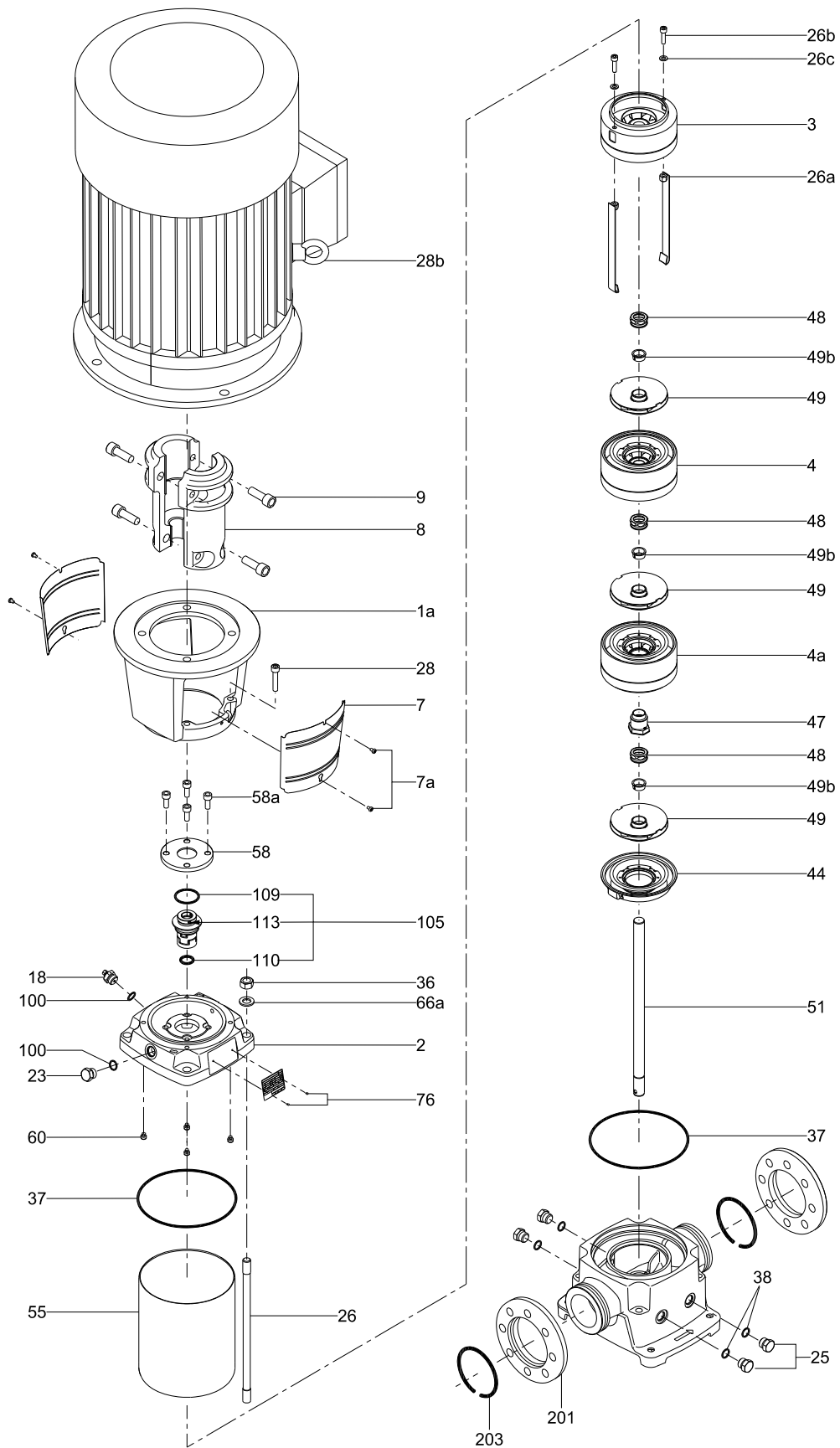


Fig. 21 Exploded view, CR, CRN 32, model B

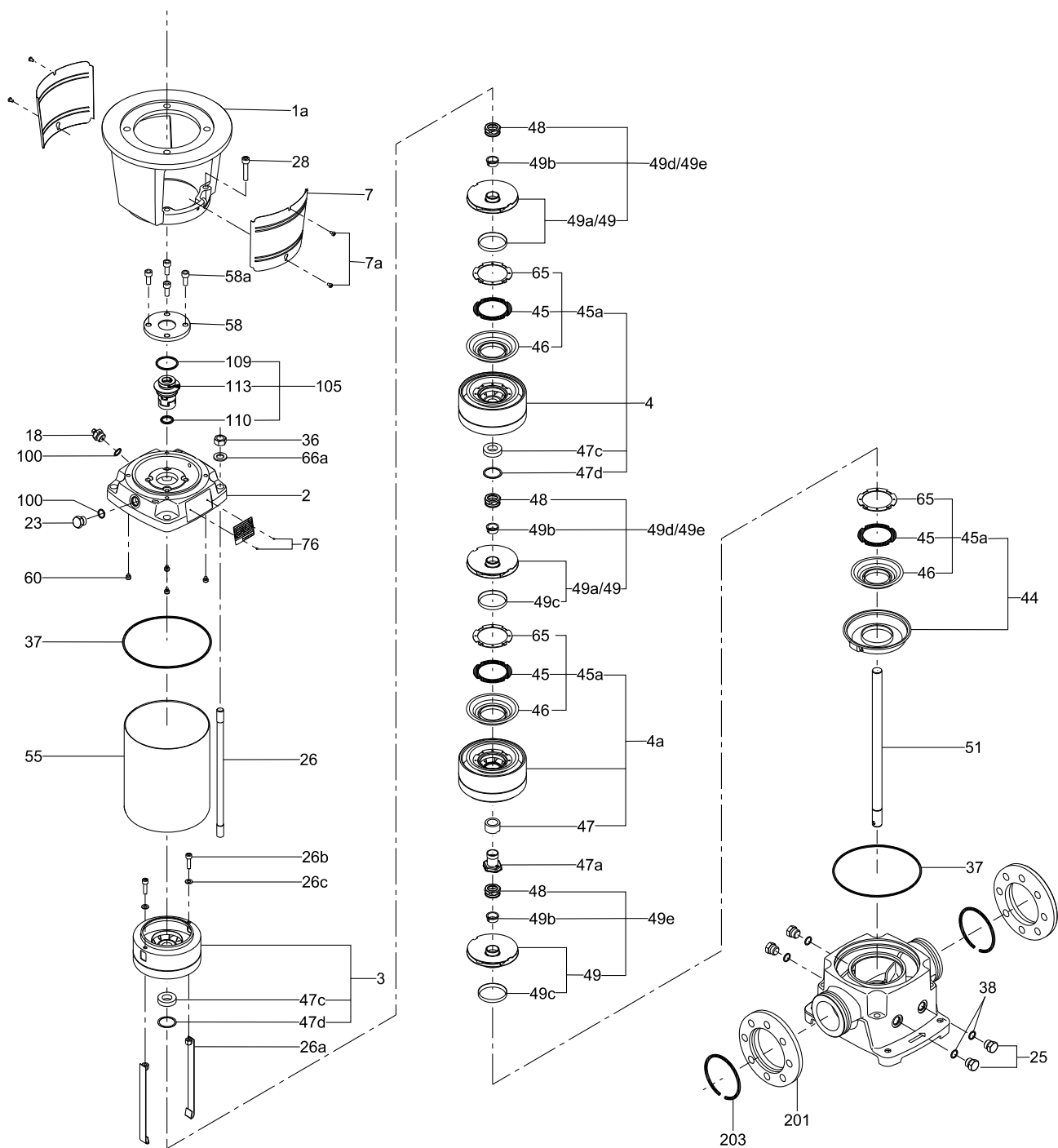


Fig. 22 Exploded view (detailed), CR, CRN 32, model B

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