

CRN SF 32, 45, 64 and 90

Model B

Service instructions



Original 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.



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 in section 8. *Exploded views*; position numbers of tools (letters) refer to section 5. *Service tools*.

Electrical parts must only be serviced by Grundfos or an authorised service workshop.



Warning
Use personal protective equipment if there is a risk of getting into contact with the pumped liquid.
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.
- Note the centre of gravity of the pump to prevent it from overturning. This is especially important in the case of long pumps.
- Disconnect the electricity supply to the motor.

Before assembly

- Clean and check all parts.
- Replace defective parts with new parts.
- Order the necessary service kits.
- Always replace gaskets and O-rings.

During assembly

- Lubricate and tighten screws and nuts according to section 4. *Torques and 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.

Disposal

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

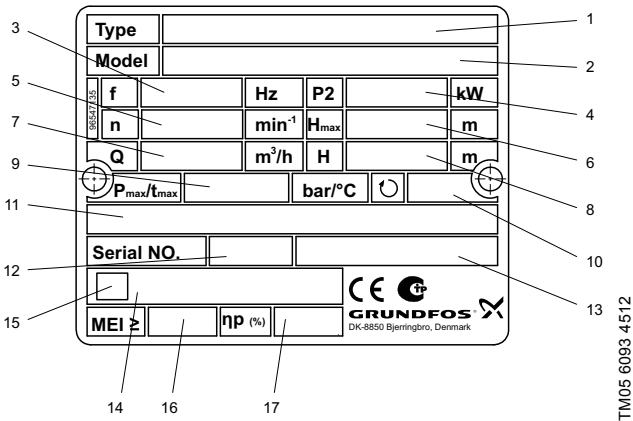
- Use the public or private waste collection service.
- If this is not possible, contact the nearest Grundfos company or service workshop.

3. Identification

This section shows the type key, the nameplate and the codes that can appear in the variant code.

Note As codes can be combined, a code position may contain more than one code (letter).

3.1 Nameplate



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Fig. 1 Nameplate

Pos.	Description
1	Type designation
2	Model
3	Frequency
4	Shaft power
5	Speed
6	Head against closed valve
7	Rated flow rate
8	Head at rated flow rate
9	Maximum pressure and temperature
10	Direction of rotation CCW: Counterclockwise CW: Clockwise
11	Not in use
12	The serial number of the pump
13	Country of production
14	Not in use
15	Not in use
16	Minimum Efficiency Index
17	Pump efficiency

3.2 Type key

Example	CRN	10-	21	SF-	P-	GI-	E-	HQQE
Type range								
Rated flow rate, m ³ /h								
Number of stages								
Code for pump version								
<p>A = Basic version B = Oversize motor E = Certificate/approval F = Pump for high temperatures (air-cooled top) H = Horizontal version HS = High-pressure pump with over-synchronous speed and reversed chamber stack and direction of rotation I = Differential pressure rating K = Pump with low NPSH M = Magnetic drive P = Undersize motor R = Horizontal version with bearing bracket SF = High-pressure pump with reversed chamber stack and direction of rotation T = Oversize motor (two flange sizes bigger) X = Special version, or the pump consists of more than two versions</p>								
Code for pipe connections								
<p>A = Oval flange B = NPT thread CA = FlexiClamp (CRI, CRN) CX = TriClamp (CRI, CRN) F = DIN flange FGJ = DIN, ANSI and JIS flange GJ = ANSI and JIS flange G = ANSI flange J = JIS flange---- N = Different connection diameter O = Externally threaded, union P = PJE coupling W = Internally threaded X = Special version</p>								
Code for materials								
<p>A = Pump head: cast iron Other parts in contact with the pumped liquid: stainless steel DIN W.-Nr. 1.4301 D = Carbon graphite-filled PTFE (bearings) G = Stainless steel parts of DIN W.-Nr. 1.4401/AISI 316 or better class I = Base plate and flanges of DIN W.-Nr. 1.4408/AISI 316LN or better class I = Stainless steel parts of DIN W.-Nr. 1.4301/AISI 304 or similar class II = All parts of stainless steel; parts in contact with the pumped liquid of DIN W.-Nr. 1.4301/AISI 304 K = Bronze (bearings) S = Silicon carbide bearings and PTFE neck rings (standard in CR) T = Titanium X = Special version</p>								
Code for rubber parts								
<p>E = EPDM (ethylene propylene) F = FXM (polytetrafluoroethylene and propylene) K = FFKM (perfluoroelastomer) P = NBR (nitrile) T = PTFE (polytetrafluoroethylene) V = FKM (fluorocarbon)</p>								
Code for shaft seal. See section 3.3 <i>Code for shaft seal.</i>								

3.3 Code for shaft seal

The code for shaft seal always consists of four letters.

Example	H	Q	Q	E
Principal Grundfos type designation for shaft seal	1			
Material, rotating seal face	2			
Material, stationary seat	3			
Material, secondary seal	4			

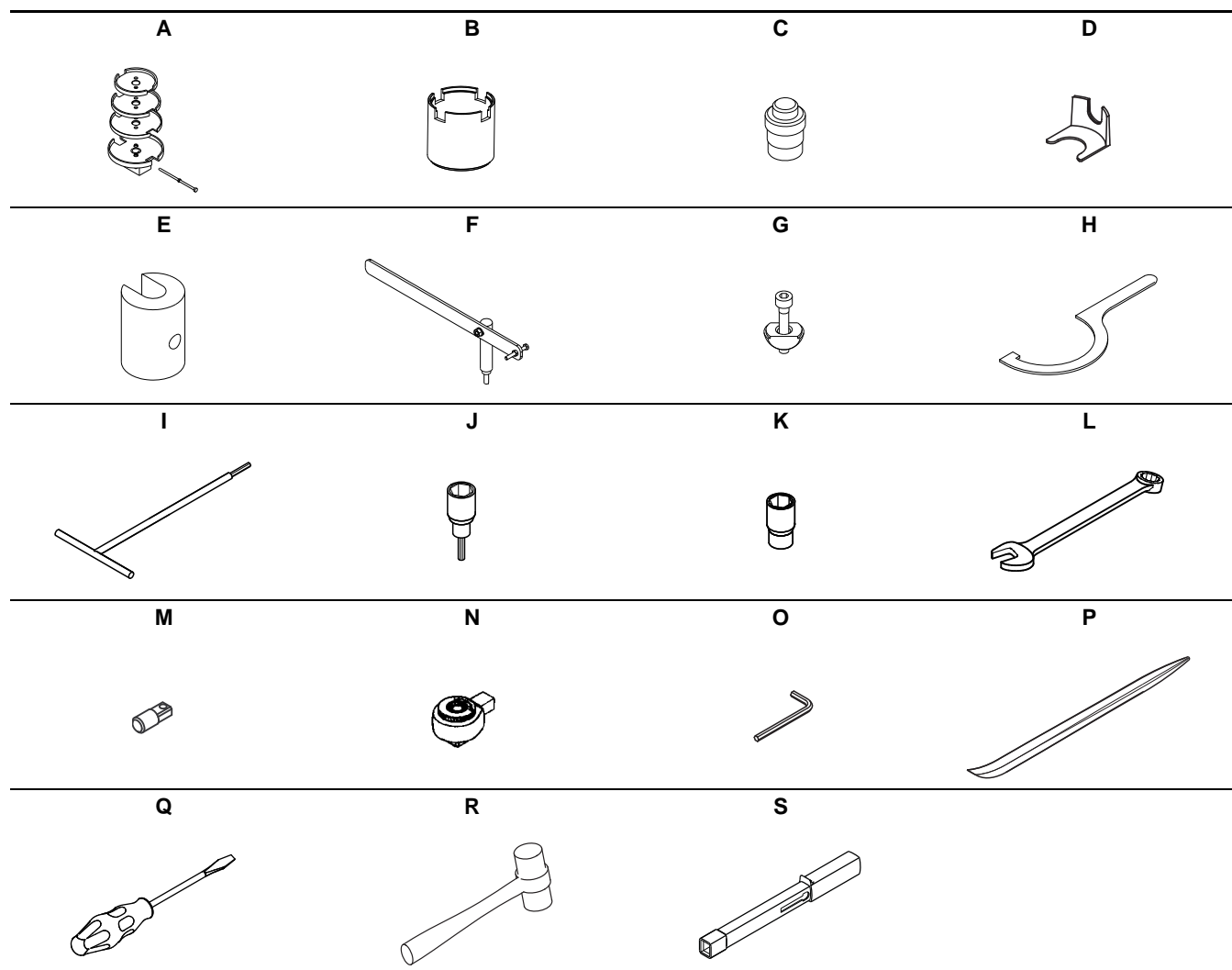
The following codes are used:

Position	Code	Description
1	A	O-ring seal with fixed driver
	B	Rubber bellows seal
	C	O-ring seal with spring as seal driver
	D	O-ring seal, balanced
	E	Cartridge seal with O-ring
	F	Cartridge seal with rubber bellows
	H	Balanced cartridge seal with O-ring
	K	Type M as cartridge seal
	M	Shaft seal with metal bellows
	O	Double seal, back-to-back
	P	Double seal, tandem
	R	O-ring seal, type A, with reduced sliding surfaces
	X	Special version
2 and 3	B	Carbon, synthetic resin-impregnated
	C	Other types of carbon
	S	Chromium steel
	H	Cemented tungsten carbide, embedded (hybrid)
	U	Cemented tungsten carbide
	Q	Silicon carbide
	V	Aluminium oxide
4	X	Other ceramics
	E	EPDM
	F	FXM
	P	NBR (nitrile rubber)
	T	PFTE
	V	FKM
	K	FFKM

4. Torques and lubricants

Pos.	Designation	Dimensions	Torque [Nm]	Lubricant
2d	Hexagon socket head cap screw	M10 x 50	65	Thread-Eze
9	Hexagon socket head cap screw	M10 x 25	85	Thread-Eze
18	Air vent screw		5/20	
23	Plug	1/2"	35	Thread-Eze
25				
26d	Nut	M16	100	Thread-Eze
28	Hexagon head bolt	M16 x 50		Thread-Eze
29	Nut	M16		Thread-Eze
46c	Hexagon socket head cap screw	M10 x 30	40	
48	Split cone nut	M30 x 1	70	
58a	Hexagon socket head cap screw	M10 x 25	62	Thread-Eze

5. Service tools



5.1 Special tools

Pos.	Designation	For pos.	Description	Part number
A	Tool for dismantling and assembly of chamber stack, with pin		CR, CRN SF 32 ~ SV0003-3	SV0003
			CR, CRN SF 45 ~ SV0003-4	
			CR, CRN SF 64 ~ SV0003-5	
			CR, CRN SF 90 ~ SV0003-2	
B	Tool for fixation of chamber stack		CR, CRN SF 32	96855938
			CR, CRN SF 45	96856251
			CR, CRN SF 64	96901146
			CR, CRN SF 90	96936273
C	Punch	47		SV0015
D	Adjusting fork	105		985924
E	Key for split cone nut	48	34 mm	SV0004
F	Lifting tool	51		97536386
G	Puller for bottom bearing	47		SV0002
	Hexagon socket head cap screw for puller		M8 x 50	ID6595
H	Hook spanner	49		SV0031

5.2 Standard tools

Pos.	Designation	For pos.	Description	Part number
I	Tee key		3 mm	SV0153
			5 mm	SV0124
			6 mm	SV0050
			8 mm	SV0051
J	Hexagon head driver		5 mm	SV0296
			6 mm	SV0297
			8 mm	SV0298
			1/2"	SV0094
			5/8"	SV0093
K	Hexagon socket		13 mm	SV0413
			19 mm	SV0419
			24 mm	SV0424
L	Ring/open-end spanner		10 mm	SV0083
			13 mm	SV0055
			19 mm	SV0054
			24 mm	SV0122
M	Pin for torque wrench	Ø14	9 x 12 mm	SV0403
N	Ratchet insert tool		9 x 12 mm	SV0295
O	Hexagon key		8 mm	SV0032
			5/8"	SV0095
			1/2"	SV0096
P	Pinch bar	105		SV5201
Q	Screwdriver		9 mm	SV0804
R	Plastic hammer	2	No. 2	SV0349

5.3 Torque tools

Pos.	Designation	For pos.	Description	Part number
S	Torque wrench		1-6 Nm	SV0438
			4-20 Nm	SV0292
			20-100 Nm	SV0269

6. Dismantling and assembly

6.1 General information

Position numbers

Position numbers of parts (digits) refer to drawings in section 8. *Exploded views*. Position numbers of tools (letters) refer to section 5. *Service tools*.

Before dismantling

- Disconnect the electricity supply to the motor.
- Close the isolating valves, if fitted, to avoid draining the system.
- Remove the electric cable in accordance with local regulations.
- Note the centre of gravity of the pump to prevent it from overturning. This is especially important in the case of long pumps.

Before assembly

Gaskets and O-rings should always be replaced when the pump is overhauled.

- Clean and check all parts.
- Order the necessary service kits.
- Replace defective parts with new parts.

During assembly

Before assembly, clean and check all parts. Parts that are defective should be replaced by new parts.

Lubricate and tighten screws and nuts to the torque stated. See section 4. *Torques and lubricants*.

The Grundfos centrifugal pumps, types CR, CRN 32, 45, 64 and 90, are multi-stage in-line pumps.

Position numbers, see sections 7. *Positions* and 5. *Service tools*. Order the necessary service kits.

Gaskets and O-rings should always be replaced when the pump is overhauled.

6.2 Replacement of motor

6.2.1 Dismantling

Remove the screws (pos. 7a) and the coupling guards (pos. 7). Keep the shaft seal in position on the shaft by inserting the adjusting fork (pos. D) between the shaft seal (pos. 105) and the seal carrier (pos. 58). See fig. 2.

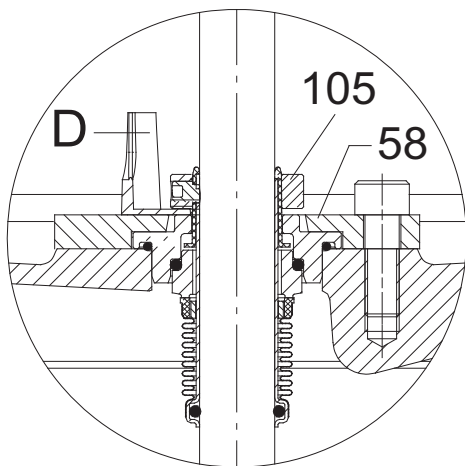


Fig. 2 Shaft seal

Remove the screws (pos. 9) and the coupling (pos. 10a). Remove the screws (pos. 28) and the nuts (pos. 29). Carefully lift the motor free of the pump using lifting equipment suitable for the motor size.

6.2.2 Assembly

Before assembly, clean all parts.

Fit the motor, and turn it to the required terminal box position. Lubricate the screws (pos. 28) with Thread-Eze. Fit and cross-tighten them to the torque stated. See section 4. *Torques and lubricants*.

Before fitting the coupling, check that the adjusting fork (pos. D) is still inserted between the shaft seal (pos. 105) and the seal carrier (pos. 58).

Fit the coupling (pos. 10a) on the shaft so that the top of the pump shaft is flush with the bottom of the coupling. See fig. 3.

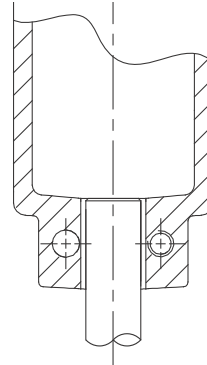


Fig. 3 Coupling

Lubricate the hexagon socket head cap screws (pos. 9). Fit the screws by hand and leave loose.

Check that the gaps either side of the coupling halves are identical.

Tighten the hexagon socket head cap screws (pos. 9) two and two (one side at a time). See section 4. *Torques and lubricants*.

Pull the adjusting fork (pos. D) free of the shaft, turn it and press it on to one of the screws (pos. 58a).

Fit the coupling guards (pos. 7), and fasten them with the screws (pos. 7a).

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6.3 Replacement of motor stool

6.3.1 Dismantling

Remove the screws (pos. 7a) and the coupling guards (pos. 7). Keep the shaft seal in position on the shaft by inserting the adjusting fork (pos. D) between the shaft seal (pos. 105) and the seal carrier (pos. 58). See fig. 2.

Remove the screws (pos. 9) and the coupling (pos. 10a).

Remove the screws (pos. 28) and the nuts (pos. 29).

Carefully lift the motor free of the pump using lifting equipment suitable for the motor size.

Remove the screws (pos. 2d) and the motor stool (pos. 1a).

6.3.2 Assembly

Before assembly, clean all parts.

Fit the motor stool (pos. 1a), and turn it to the required position.

Lubricate the screws (pos. 2d). Fit the screws, and cross-tighten them. See section 4. *Torques and lubricants*.

Fit the motor, and turn it to the required terminal box position.

Lubricate the screws (pos. 28) with Thread-Eze. Fit and cross-tighten them to the torque stated. See section 4. *Torques and lubricants*.

Before fitting the coupling, check that the adjusting fork (pos. D) is still inserted between the shaft seal (pos. 105) and the seal carrier (pos. 58).

Fit the coupling (pos. 10a) on the shaft so that the top of the pump shaft is flush with the bottom of the coupling. See fig. 3.

Lubricate the hexagon socket head cap screws (pos. 9). Fit the screws by hand and leave loose.

Check that the gaps either side of the coupling halves are identical.

Tighten the hexagon socket head cap screws (pos. 9) two and two (one side at a time). See section 4. *Torques and lubricants*.

Pull the adjusting fork (pos. D) free of the shaft, turn it and press it on to one of the screws (pos. 58a).

Fit the coupling guards (pos. 7), and fasten them with the screws (pos. 7a).

6.4 Replacement of coupling

6.4.1 Dismantling

Remove the screws (pos. 7a) and the coupling guards (pos. 7).

Keep the shaft seal in position on the shaft by inserting the adjusting fork (pos. D) between the shaft seal (pos. 105) and the seal carrier (pos. 58). See fig. 2.

Remove the screws (pos. 9) and the coupling (pos. 10a).

6.4.2 Assembly

Before assembly, clean all parts.

Before fitting the coupling, check that the adjusting fork (pos. D) is still inserted between the shaft seal (pos. 105) and the seal carrier (pos. 58).

Fit the coupling (pos. 10a) on the shaft so that the top of the pump shaft is flush with the bottom of the coupling. See fig. 3.

Lubricate the hexagon socket head cap screws (pos. 9). Fit the screws by hand and leave loose.

Check that the gaps either side of the coupling halves are identical.

Tighten the hexagon socket head cap screws (pos. 9) two and two (one side at a time). See section 4. *Torques and lubricants*.

Pull the adjusting fork (pos. D) free of the shaft, turn it and press it on to one of the screws (pos. 58a).

Fit the coupling guards (pos. 7), and fasten them with the screws (pos. 7a).

6.5 Replacement of shaft seal

6.5.1 Dismantling

Remove the screws (pos. 7a) and the coupling guards (pos. 7).

Remove the screws (pos. 9) and the coupling (pos. 10a).

Remove the screws (pos. 58a) and the seal carrier (pos. 58).

Clean the shaft end. Loosen the three screws (pos. 113) so that they do not touch the shaft. See fig. 4.

The screws should be loosened only so much that the shaft seal can be removed from the shaft.

Loosen the shaft seal (pos. 105) from the pump head using two screwdrivers. See fig. 4. Pull it off the shaft.

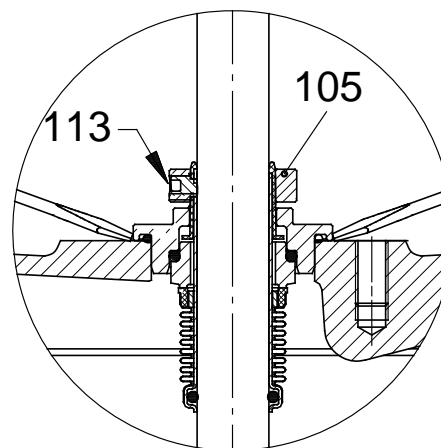


Fig. 4 Shaft seal

6.5.2 Assembly

Clean and smooth the shaft before fitting the shaft seal. Use the plastic holder and emery cloth supplied with the shaft seal kit.

Apply O-ring grease to the shaft end and the O-ring of the shaft seal (pos. 105). Press the shaft seal down on the shaft and against the pump head.

Remove excess grease from the shaft end using a cloth.

Fit the seal carrier (pos. 58).

Lubricate the screws (pos. 58a). Fit and cross-tighten the screws. See section 4. *Torques and lubricants*.

Press the pump shaft down, and fasten the shaft seal on the shaft with the screws (pos. 113). See fig. 2.

Lift the pump shaft with the lifting tool (pos. F), and insert two adjusting forks (pos. D) from opposite directions between the shaft seal (pos. 105) and the seal carrier (pos. 58). See fig. 5.

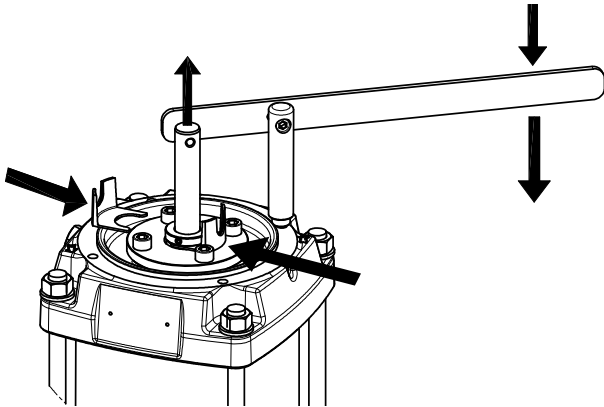


Fig. 5 Insertion of adjusting forks

Loosen the screws (pos. 113), see fig. 4, and the shaft will drop slightly. Lift the shaft up again to top position using the lifting tool (pos. F), and tighten the screws (pos. 113), see fig. 4, on the shaft seal. Remove one of the adjusting forks (pos. D) and the lifting tool (pos. F).

Fit the coupling (pos. 10a) on the shaft so that the top of the pump shaft is flush with the bottom of the coupling. See fig. 3.

Lubricate the hexagon socket head cap screws (pos. 9). Fit the screws by hand and leave loose.

Check that the gaps either side of the coupling halves are identical.

Tighten the hexagon socket head cap screws (pos. 9) two and two (one side at a time). See section 4. *Torques and lubricants*.

Pull the second adjusting fork (pos. D) free of the shaft, turn it and press it on to one of the screws (pos. 58a).

Fit the coupling guards (pos. 7), and fasten them with the screws (pos. 7a).

6.6 Replacement of pump head

6.6.1 Dismantling

Remove the screws (pos. 7a) and the coupling guards (pos. 7).

Remove the screws (pos. 9) and the coupling (pos. 8).

Remove the screws (pos. 28).

Carefully lift the motor and the motor stool (pos. 1a) free of the pump using lifting equipment suitable for the motor size.

Remove the screws (pos. 58a) and the seal carrier (pos. 58).

Clean the shaft end. Loosen the three screws (pos. 113), see fig. 4, so that they do not touch the shaft.

The screws should be loosened only so much that the shaft seal can be removed from the shaft.

Loosen the shaft seal (pos. 105) from the pump head using two screwdrivers. See fig. 4. Pull it off the shaft.

Loosen and remove nuts (pos. 26d) and washers (pos. 26c) using a 24 mm ring/open-end spanner (pos. L).

Lift up and remove the pump head (pos. 2). To loosen the pump head, use a plastic hammer (pos. R) and knock it free of the outer sleeve (pos. 55).

6.6.2 Assembly

Fit the upper O-ring (pos. 37) on the pump head and apply grease.

Carefully fit the pump head and make sure the upper O-ring (pos. 37) is still mounted in the slotted ring on the pump head.

Use a plastic hammer (pos. R) to make sure the pump head is mounted correctly.

Fit the washers (pos. 26c).

Lubricate the nuts (pos. 26d). Fit and cross-tighten the nuts.

See section 4. *Torques and lubricants*.

Clean and smooth the shaft before fitting the shaft seal. Use the plastic holder and emery cloth supplied with the shaft seal kit.

Apply O-ring grease to the shaft end and the O-ring of the shaft seal (pos. 105). Press the shaft seal down on the shaft and against the pump head.

Remove excess grease from the shaft end using a cloth.

Fit the seal carrier (pos. 58).

Lubricate the screws (pos. 58a). Fit and cross-tighten the screws. See section 4. *Torques and lubricants*.

Press the pump shaft down, and fasten the shaft seal on the shaft with the screws (pos. 113). See fig. 4.

Lift the pump shaft with the lifting tool (pos. F), and insert two adjusting forks (pos. D) from opposite directions, between the shaft seal (pos. 105) and the seal carrier (pos. 58).

Loosen the screws (pos. 113), see fig. 4, and the shaft will drop slightly. Lift the shaft up again to top position using the lifting tool (pos. F), and tighten the screws (pos. 113), see fig. 4, on the shaft seal. Remove one of the adjusting forks (pos. D) and the lifting tool (pos. F).

Fit the motor, and turn it to the required terminal box position.

Lubricate the screws (pos. 2d). Fit and cross-tighten them to the torque stated. See section 4. *Torques and lubricants*.

Fit the coupling (pos. 10a) on the shaft so that the top of the pump shaft is flush with the bottom of the coupling. See fig. 3.

Lubricate the hexagon socket head cap screws (pos. 9). Fit the screws by hand and leave loose.

Check that the gaps either side of the coupling halves are identical.

Tighten the hexagon socket head cap screws (pos. 9) two and two (one side at a time). See section 4. *Torques and lubricants*.

Pull the second adjusting fork (pos. D) free of the shaft, turn it and press it on to one of the screws (pos. 58a).

Fit the coupling guards (pos. 7), and fasten them with the screws (pos. 7a).

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6.7 Replacement of chamber stack

6.7.1 Dismantling

Remove the pump head. See section 6.6 *Replacement of pump head*.

Remove the intermediate ring (pos. 2a), if fitted.

Note

The intermediate ring is only fitted on pump size CRN 45 SF.

Remove the outer sleeve.

Carefully pull the chamber stack up and completely free of the base (pos. 6).

Remove the O-ring (pos. 37) from the base.

6.7.2 Assembly

Before assembly, clean all parts.

Apply O-ring grease to the new O-rings (pos. 37), and fit the O-rings in the base (pos. 6) and the pump head (pos. 2).

Carefully fit the chamber stack into the base (pos. 6), and displace the straps 45° in relation to the staybolts. See fig. 6.

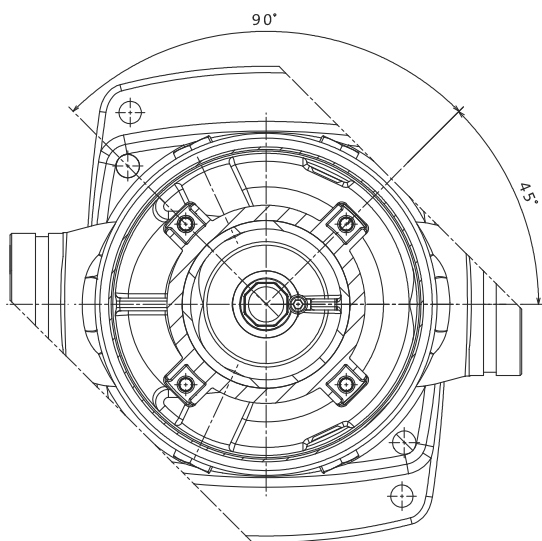


Fig. 6 Placement of straps

Fit the outer sleeve (pos. 55) into the base (pos. 6).

Fit the intermediate ring (pos. 2a), if fitted.

Note

The intermediate ring is only fitted on pump size CRN 45 SF.

Fit the pump head (pos. 2) with the air vent screw (pos. 18) in its previous position.

Fit the washers (pos. 26c).

Lubricate the nuts (pos. 26d). Fit and cross-tighten the nuts. See section 4. *Torques and lubricants*.

Continue the assembly. See section 6.6 *Replacement of pump head*.

6.8 Chamber stack

6.8.1 Dismantling of chamber stack

Place the tool for dismantling and assembly of chamber stack (pos. A) in a vice, and tighten it. Place the tool for fixation of chamber stack (pos. B) fitting the pump, see section 5. *Service tools*, into the tool.

1. Pull the chamber stack out of the outer sleeves (pos. 55) and place it in the holder according to fig. 7. Make sure the chamber stack engages with the holder.
2. Fit the locking pin in the hole marked "Dismantling".

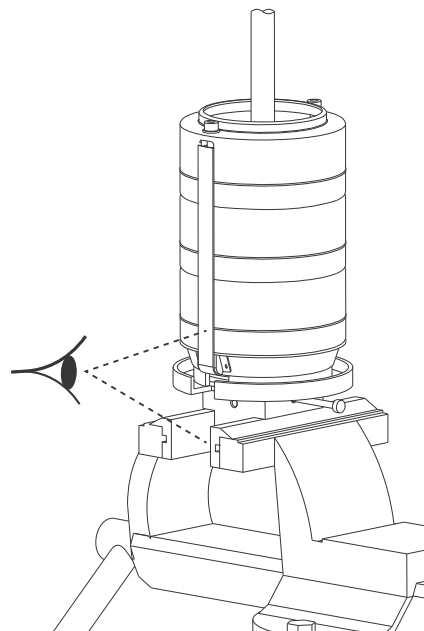


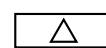
Fig. 7 Positioning the chamber stack in the holder

3. Remove screws (pos. 46c) and washers (pos. 46d).
4. Remove straps (pos. 26) and outlet part (pos. 46).

6.8.2 Dismantling chambers

Depending on their construction, dismantle the chambers according to the instructions below. The symbols refer to section 6. *Dismantling and assembly*

Chamber without bearing



1. Loosen chamber (pos. 4) 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. 48a).
3. Pull the split cone nut, split cone and impeller off the shaft.

Chamber with bearing

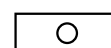
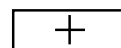


Fig. 8 Chamber with bearing

1. Loosen chamber (pos. 4a) from the chamber below or inlet part (pos. 44) using a screwdriver.
2. Loosen bearing (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. 48a).
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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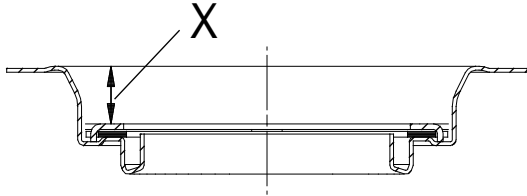
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6.8.3 Assembly of chamber stack

Before assembly, clean and check all parts. Parts that are defective or do not comply with the measurements due to wear should be replaced by new parts.

Neck ring

See check measurements below.



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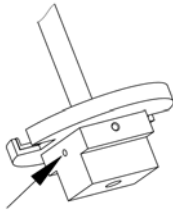
Pump	Nominal height X [mm]	Tolerance [mm]
CR, CRN 32 SF	10.1	
CR, CRN 45 SF	15.5	
CR, CRN 64 SF	11.5	± 0.2
CR, CRN 90 SF	12.1	

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

Chamber stack

Place the tool for dismantling and assembly of chamber stack (pos. A) in a vice, and tighten it. Place the tool for fixation of chamber stack (pos. B) fitting the pump, see section 5. *Service tools*, into the tool.

When assembling the chamber stack, use the hole in the tool marked "Assembly". See fig. 9.



TM01 2028 0998

Fig. 9 Tool for dismantling and assembly of chamber stack

Place the shaft in the tool.

Turn the shaft so that the hole in the shaft and the hole in the tool marked "Assembly" are aligned. Fit the pin into the hole to hold the shaft.

Fit the inlet part (pos. 44), and turn it so that the fixing lugs for straps (pos. 26a) on the inlet part are above the cutouts in the tool. Make sure that the inlet part engages with the tool.

Continue the assembly as follows:

6.8.4 Assembling chambers

Depending on their construction, dismantle the chambers according to the instructions below. The symbols refer to overview on page 15.

Chamber without bearing



Fig. 10 Chamber without bearing

1. Fit impeller (pos. 49) and press it home.
2. Fit split cone (pos. 48a) 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, or inlet part (pos 44)

Chamber with bearing

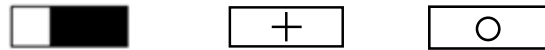


Fig. 11 Chamber with bearing

1. Fit impeller (pos. 49) and press it home.
2. Fit split cone (pos. 48a) 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 (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 positioning the chambers on the shaft. The bearings are fragile and cannot stand blows or contact with the shafts.

Outlet part

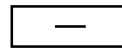


Fig. 12 Outlet part

1. Place outlet part and align the holes for the straps with the fixing lugs for straps in the inlet part.
2. Fit straps (pos. 26a), washers (pos. 46d), and cross-tighten screws (pos. 46c).

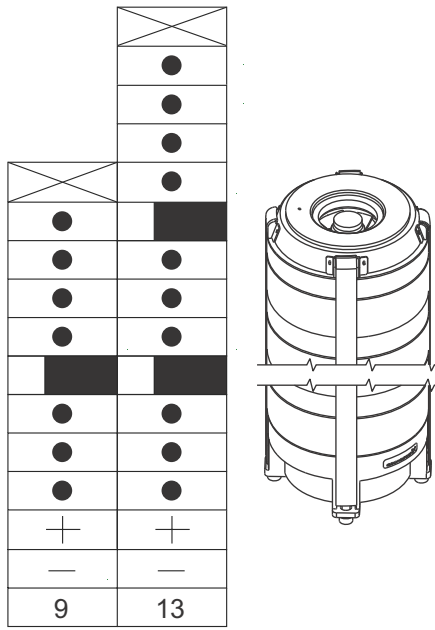
6.9 Pump head and shaft seal

1. Replace O-ring (pos. 37).
2. Fit pump head on outer sleeves (pos. 55).
3. Fit washers (pos. 26c) and cross-tighten nuts (26d).
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). For adjustment of shaft seal see section 6.5 *Replacement of shaft seal*. Order of assembly, chambers and impellers

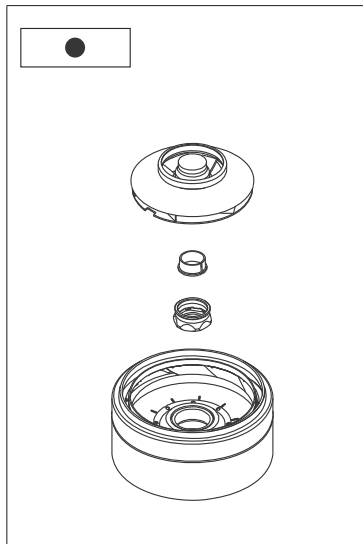
6.10 CRN 32 SF order of assembly

The table shows the assembly order of the chamber stacks by means of symbols.

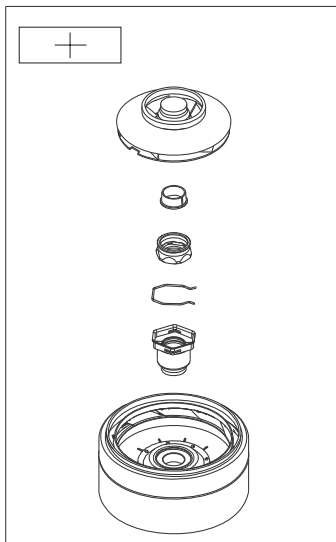
Order of assembly, chambers and impellers



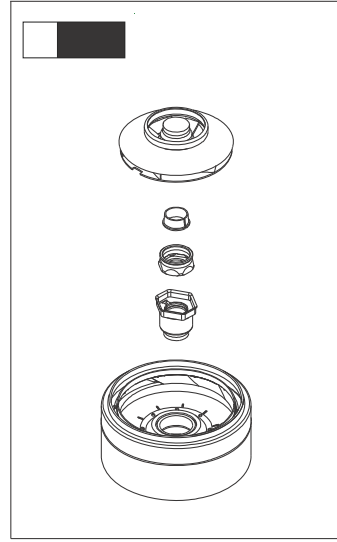
TM06 5215 3515



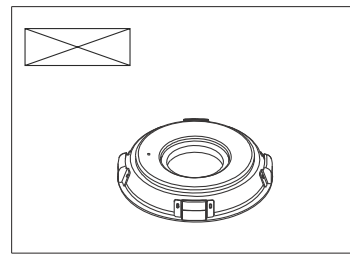
TM06 5211 3515



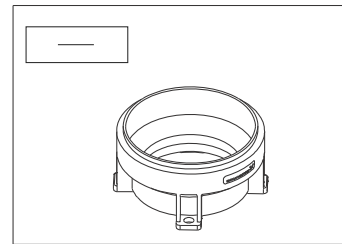
TM06 5210 3515



TM06 5212 3515



TM06 5213 3515

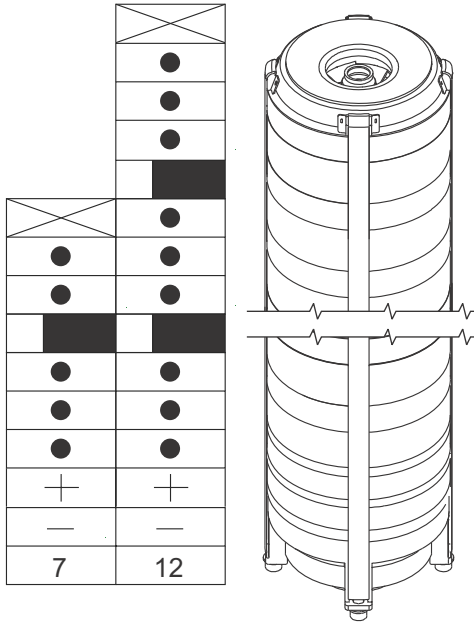


TM065214 3515

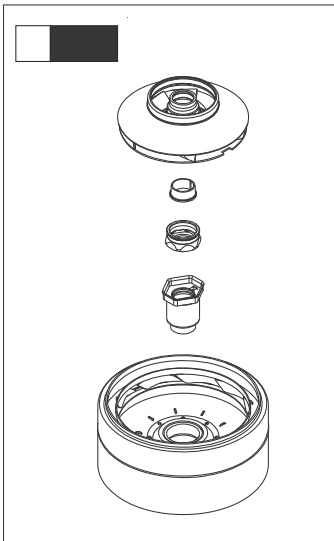
6.11 CRN 45 SF order of assembly

The table shows the assembly order of the chamber stacks by means of symbols.

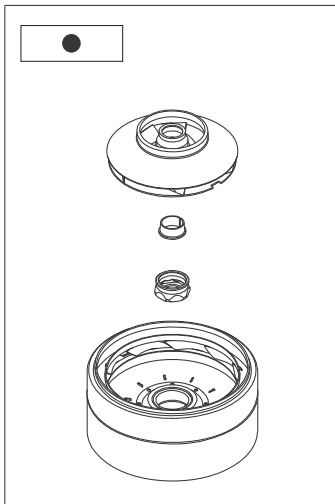
Order of assembly, chambers and impellers



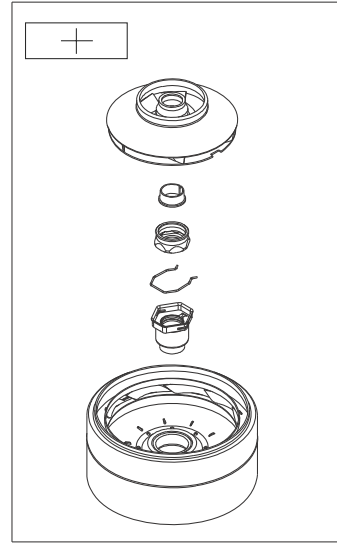
TM05 3401 1312



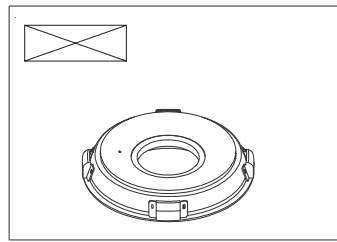
TM05 3403 1312



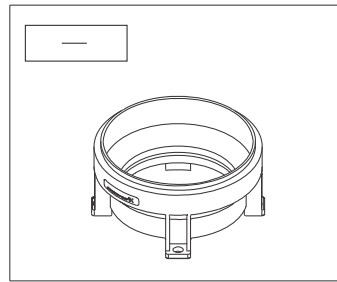
TM05 3404 1312



TM05 3405 1312



TM05 3406 1312

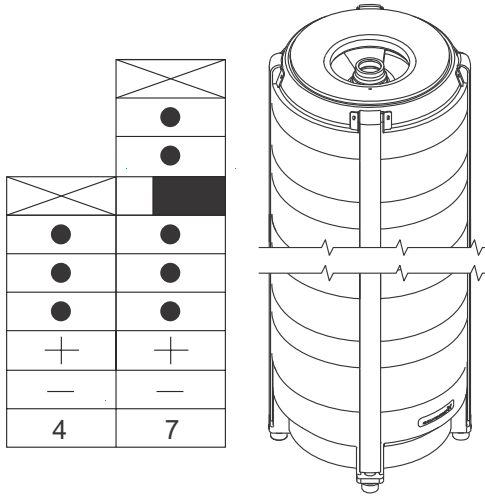


TM05 3407 1312

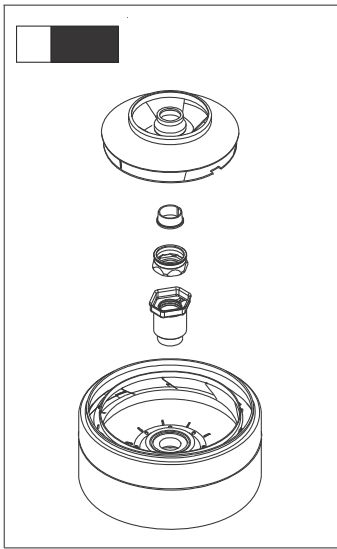
6.12 CRN 64 SF order of assembly

The table shows the assembly order of the chamber stacks by means of symbols.

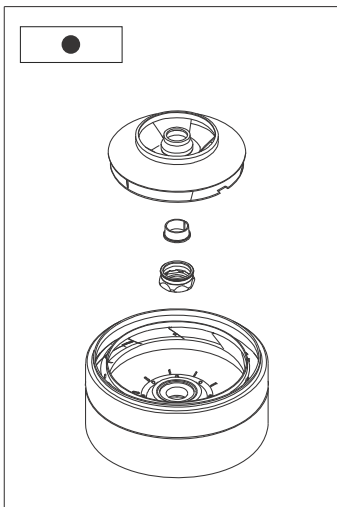
Order of assembly, chambers and impellers



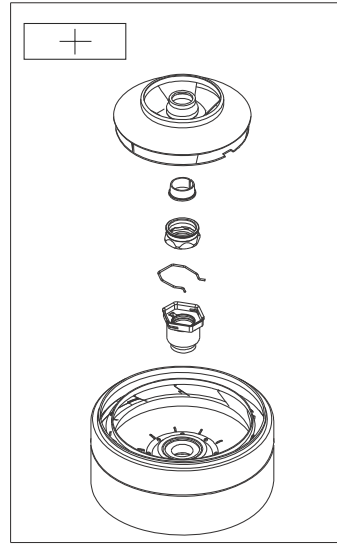
TM05 4124 2012



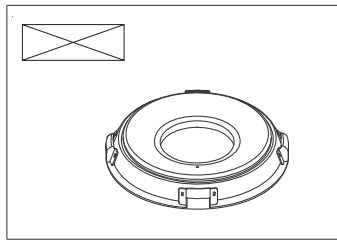
TM05 4126 2012



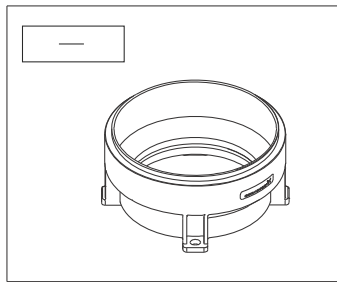
TM05 4127 2012



TM05 4128 2012



TM05 4129 2012

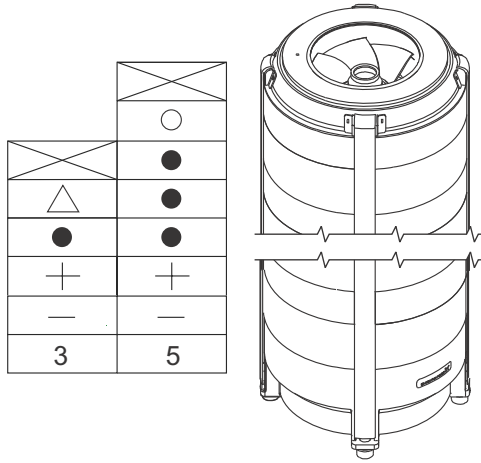


TM05 4130 2012

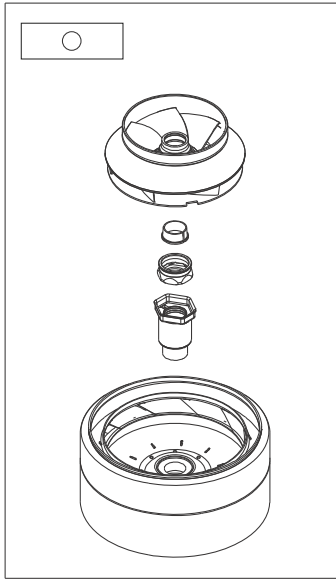
6.13 CRN 90 SF order of assembly

The table shows the assembly order of the chamber stacks by means of symbols.

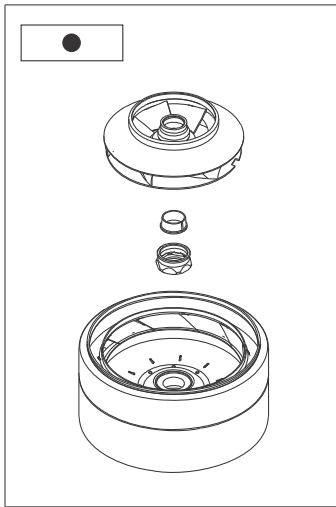
Order of assembly, chambers and impellers



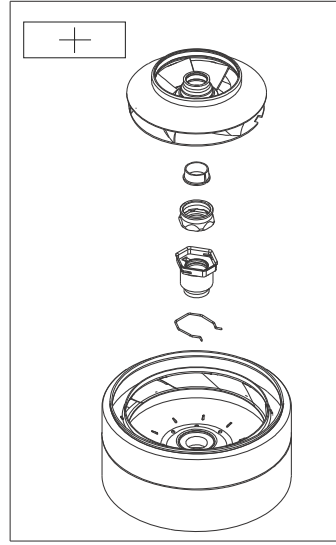
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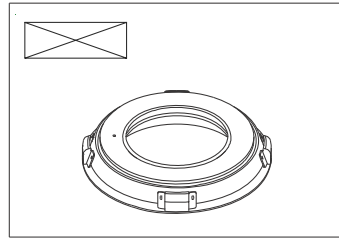
TM05 4133 2012



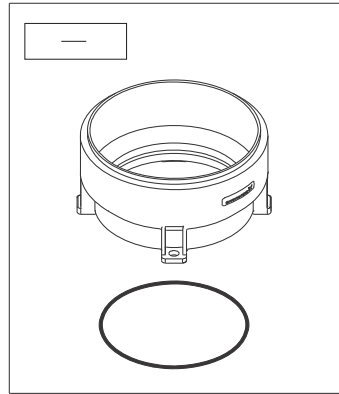
TM05 4134 2012



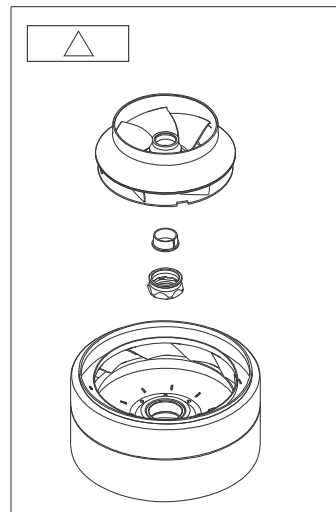
TM05 4135 2012



TM05 4136 2012



TM05 4137 2012



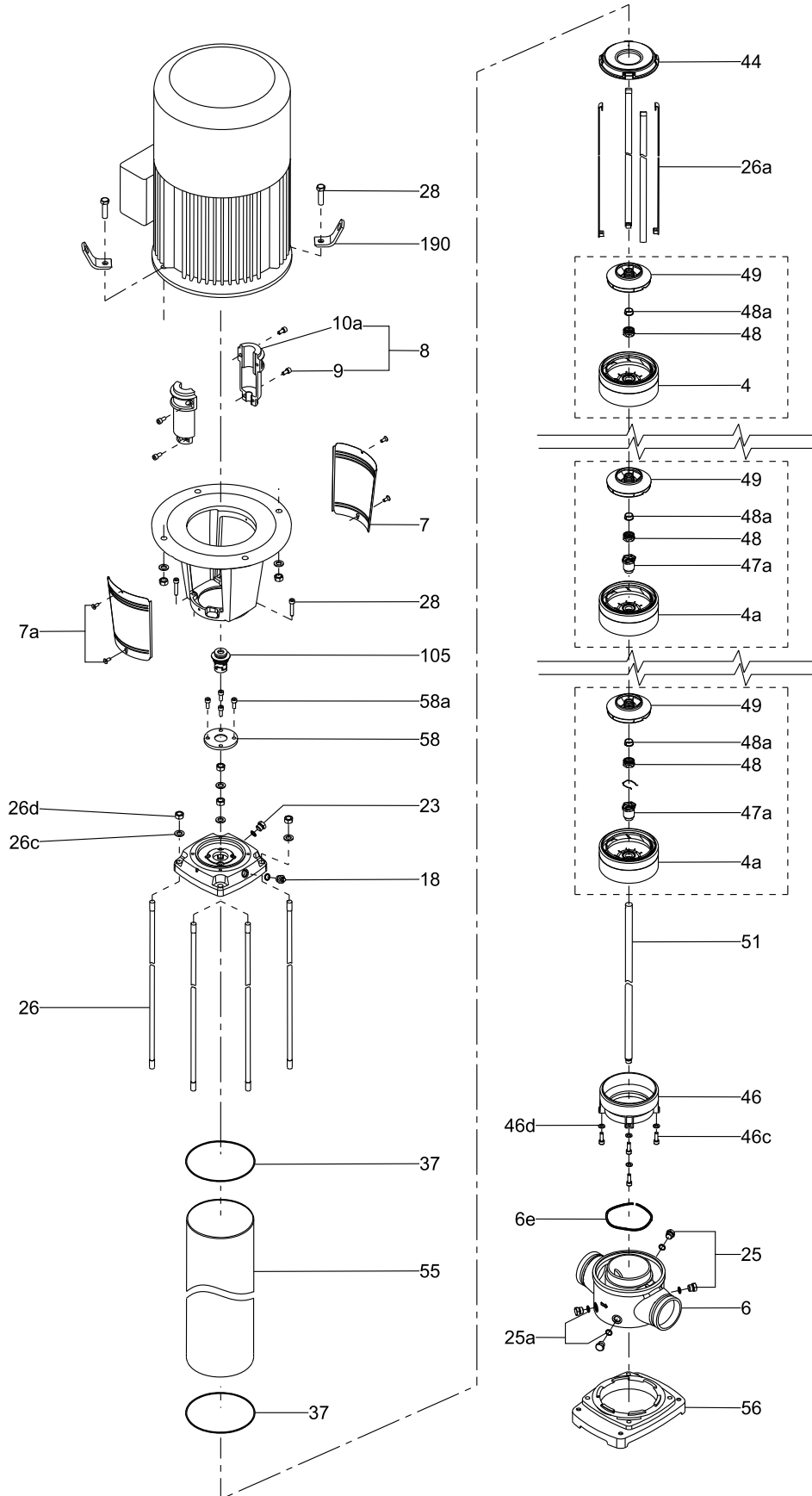
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7. Positions

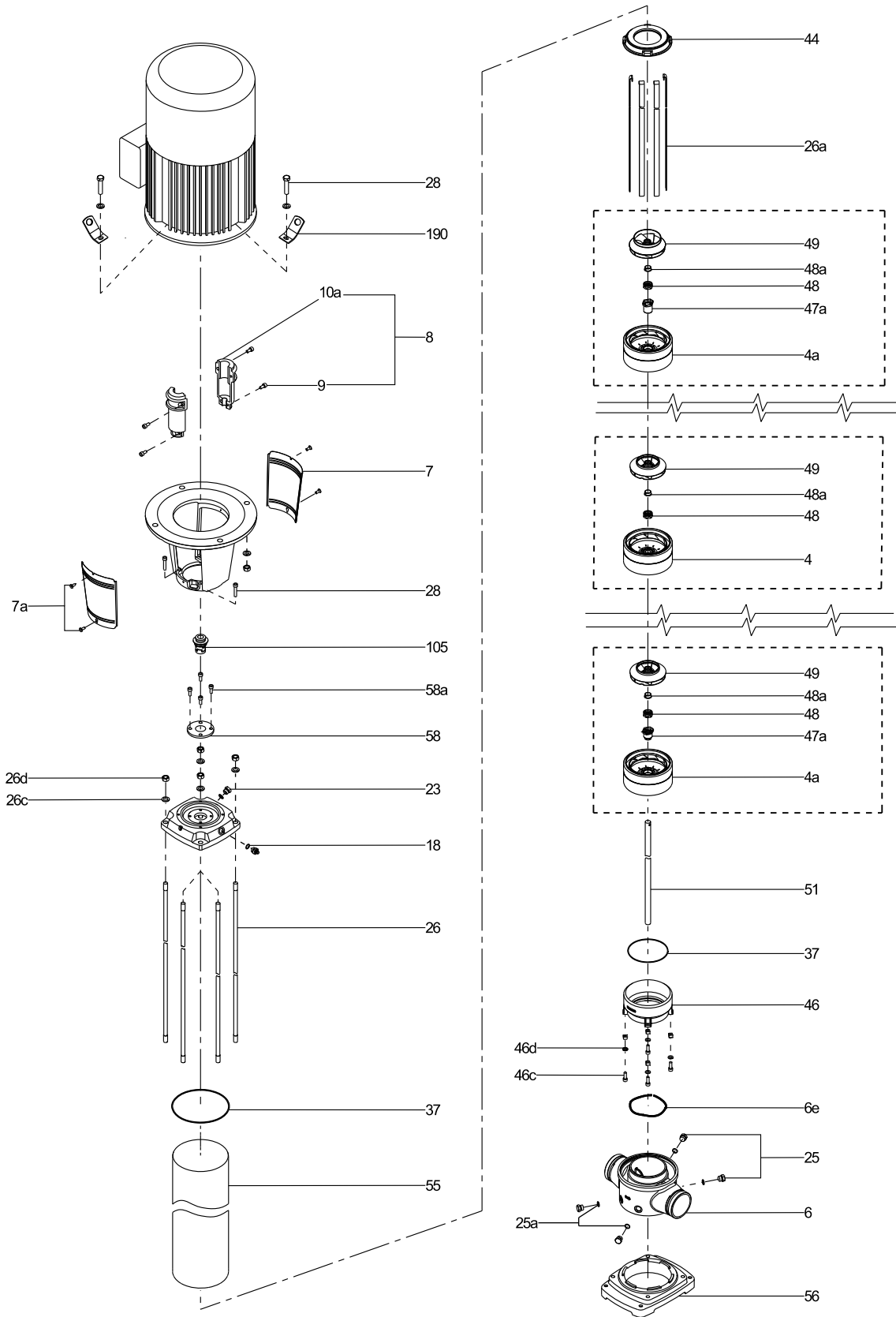
Pos.	Designation
1a	Motor stool
2	Pump head
2a	Intermediate ring
2d	Hexagon socket head cap screw
4	Intermediate chamber
4a	Chamber with bearing
6	Base
6c	Hexagon socket head cap screw
6e	Corrugated spring for base
6h	Washer
7	Coupling guard
7a	Screw
9	Hexagon socket head cap screw
10a	Coupling half
18	Vent screw
23	Plug
25	Drain plug
25a	O-ring
26	Staybolt
26a	Strap
26c	Washer
26d	Nut
28	Hexagon head bolt
28b	Washer
29	Nut
37	O-ring
44	Inlet part
46	Outlet part
46a	O-ring
46c	Hexagon socket head cap screw
46d	Washer
47	Bearing ring, stationary
47b	Bearing ring, rotating
47c	Washer
47e	Washer
47f	Hexagon socket head cap screw
48	Split cone nut
48a	Split cone
49	Impeller
51	Pump shaft
55	Outer sleeve
56	Base plate
58	Seal carrier
58a	Hexagon socket head cap screw
76	Nameplate
76a	Rivet
105	Shaft seal
47a	Bearing with driver
190	Lifting lug

8. Exploded views

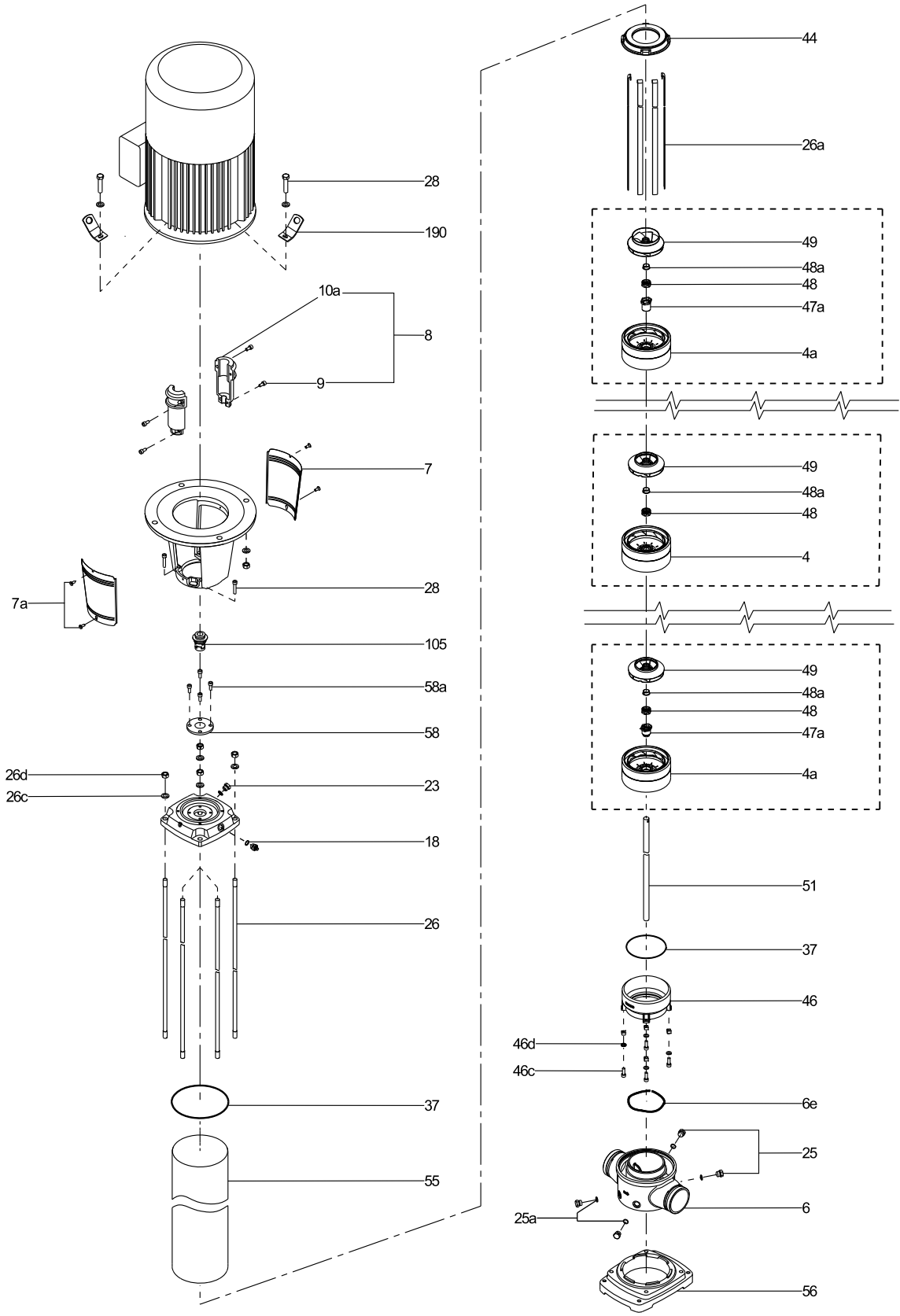
Exploded view of CRN 32 and 64 SF



Exploded view of CRN 45 SF model B



Exploded view of CRN 90 SF model B



TM065526 0116

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