CR(N) SF 32, 45, 64 and 90

Model A

Service instructions

Original service instructions.

CONTENTS

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 and parts lists; 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.

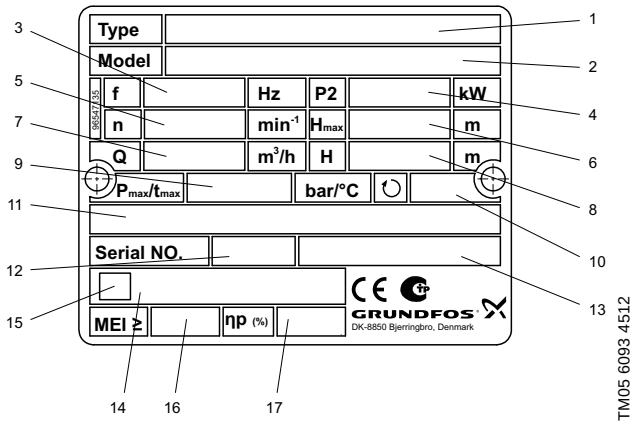
If this is not possible, contact the nearest Grundfos company or service workshop.

3. Type 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



Pos.	Description
1	Type designation
2	Model
3	Frequency
4	Shaft power
5	Speed
6	Closed valve head, 50 Hz
7	Rated flow rate
8	Head at rated flow rate, 50 Hz
9	Maximum pressure and temperature
10	Direction of rotation CCW: Counter-clockwise 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
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

Code for pipe connections
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

Code for materials
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 part 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

Code for rubber parts
E = EPDM (ethylene propylene)
F = FXM (polytetrafluoroethylene and propylene)
K = FFKM (perfluoroelastomer)
P = NBR (nitrile)
T = PTFE (polytetrafluoroethylene)
V = FKM (fluorocarbon)

Code for shaft seal. See section *3.3 Code for shaft seal*.

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				

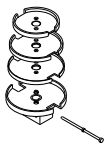
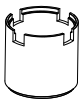
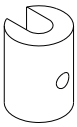
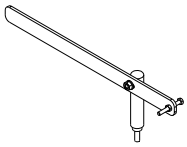
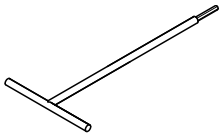
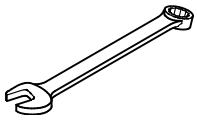
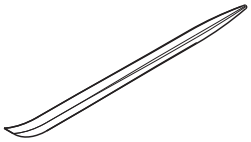
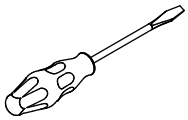
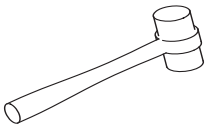
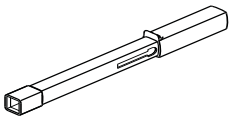
The following codes are used:

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
	X	Other ceramics
4	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	Cylinder hexagon socket head screw	M10 x 50	65	Thread-Eze
6c	Cylinder hexagon socket head screw	M6	8	Thread-Eze
9	Cylinder hexagon socket head 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	Cylinder head bolt	M16 x 50		Thread-Eze
29	Nut	M16		Thread-Eze
46c	Cylinder hexagon socket head screw	M10 x 30	80	
47f	Cylinder hexagon socket head screw	M8 x 15	80	
48	Nut for Split cone	M30 x 1	70	
58a	Cylinder hexagon socket head screw	M10 x 25	62	Thread-Eze

5. Service tools

A	B	C	D
			
E	**F**	**G**	**H**
			
I	**J**	**K**	**L**
			
M	**N**	**O**	**P**
			
Q	**R**	**S**	**T**
			

5.1 Special tools

Pos.	Designation	For pos.	Description	Part number
A	Holder with pin for dismantling and assembly		CR(N) SF 32 ~ SV0003-3	SV0003
			CR(N) SF 45 ~ SV0003-4	
			CR(N) SF 64 ~ SV0003-5	
			CR(N) SF 90 ~ SV0003-2	
B	Service tool for top connector		CR(N) SF 32	96855938
			CR(N) SF 45	96856251
			CR(N) SF 64	96901146
			CR(N) SF 90	96936273
C	Punch	47		SV0015
D	Forked distance piece	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 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	Socket driver for hexagon socket head screws		5 mm	SV0296
			6 mm	SV0297
			8 mm	SV0298
			3/8"	SV0094
			5/8"	SV0093
K	Socket spanner		13 mm	SV0091
			19 mm	SV0267
			24 mm	SV0092
			24 mm	
L	Ring/open-end spanner		10 mm	SV0083
			13 mm	SV0055
			19 mm	SV0054
			24 mm	SV0122
M	Tap for key for split cone nut		∅14 mm 9 x 12 mm	SV0403
N	Ratchet insert tool		9 x 12 mm	SV0295
O	Hexagon socket head screw key		8 mm	ID1205
			5/8" - 1/2"	SV0095
			1/2" - 3/8"	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 exploded views, sectional drawings and parts lists. 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(N) 32, 45, 64 and 90, are multi-stage in-line pumps.

Position numbers, see sections *8. Exploded drawings* and *5. Service tools*.

Order the necessary service kits, see "Parts list".

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 distance piece (pos. D) between the shaft seal (pos. 105) and the seal carrier (pos. 58). See fig. 1.

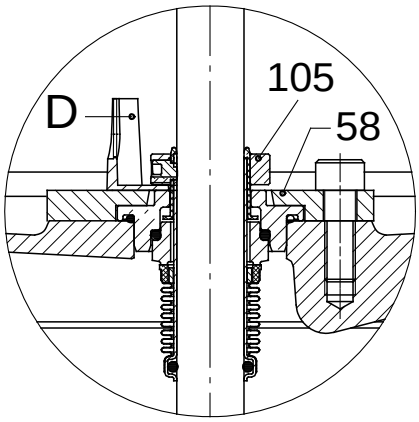


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Fig. 1 Shaft seal

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 forked distance piece (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 clearance chamber in the coupling. See fig. 2.

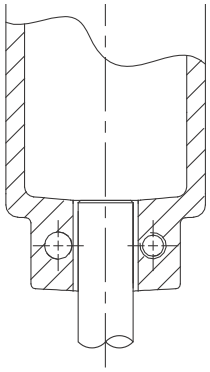

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Fig. 2 Coupling

Lubricate the hexagon socket head screws (pos. 9). Fit the screws, tighten and leave loose.

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

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

Pull the forked distance piece (pos. D) free of the shaft, turn it and store it on the screw (pos. 58a).

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

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 distance piece (pos. D) between the shaft seal (pos. 105) and the seal carrier (pos. 58). See fig. 1.

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 forked distance piece (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 clearance chamber in the coupling. See fig. 2.

Lubricate the hexagon socket head screws (pos. 9). Fit the screws, tighten and leave loose.

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

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

Pull the forked distance piece (pos. D) free of the shaft, turn it and store it on the screw (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 distance piece (pos. D) between the shaft seal (pos. 105) and the seal carrier (pos. 58). See fig. 1.

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 forked distance piece (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 clearance chamber in the coupling. See fig. 2.

Lubricate the hexagon socket head screws (pos. 9). Fit the screws, tighten and leave loose.

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

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

Pull the forked distance piece (pos. D) free of the shaft, turn it and store it on the screw (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. Slacken the three screws (pos. 113) so that they do not touch the shaft. See fig. 3.

The screws should be slackened 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. 3. Pull it off the shaft.

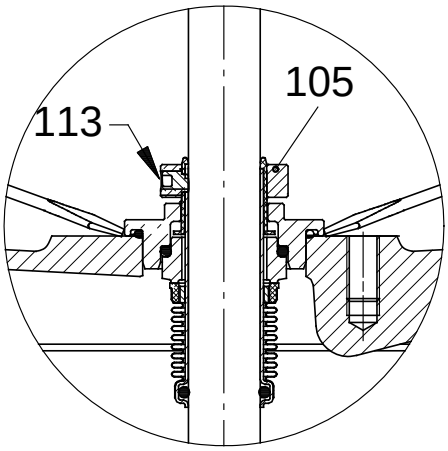

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Fig. 3 Shaft seal

6.5.2 Assembly

Clean and smooth the shaft before fitting the shaft seal. Use the holder with 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. 1.

Lift the pump shaft with the lifting tool (pos. F), and insert two of the forked distance pieces (pos. D) from opposite directions, between the shaft seal (pos. 105) and the seal carrier (pos. 58). See fig 4.

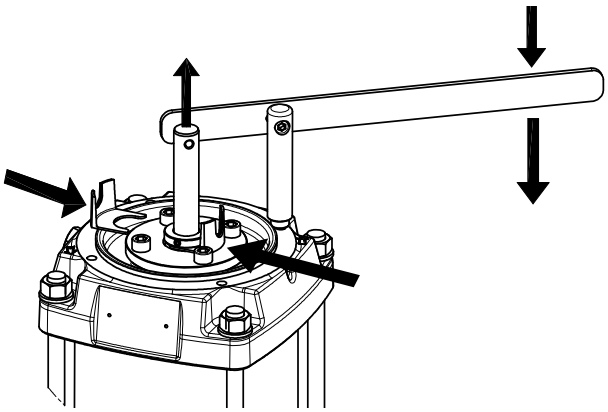


Fig. 4 Insertion of distance pieces

Loosen the screws (pos. 113), see fig. 3, 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. 3, on the shaft seal. Remove one of the forked distance pieces (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 clearance chamber in the coupling. See fig. 2.

Lubricate the hexagon socket head screws (pos. 9).
Fit the screws, tighten and leave loose.

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

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

Pull the last forked distance piece (pos. D) free of the shaft, turn it and store it on the screw (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. Slacken the three screws (pos. 113) so that they do not touch the shaft.

The screws should be slackened 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. 3. Pull it off the shaft.

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

Lift up and remove pump head (pos. 2). To slacken 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 holder with 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. 1.

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

Loosen the screws (pos. 113), see fig. 3, 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. 3, on the shaft seal. Remove one of the forked distance pieces (pos. D) and the lifting tool (pos. F).

Fit the motor and the stool, 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 clearance chamber in the coupling. See fig. 2.

Lubricate the hexagon socket head screws (pos. 9).
Fit the screws, tighten and leave loose.

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

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

Pull the forked distance piece (pos. D) free of the shaft, turn it and store it on the screw (pos. 58a).

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

6.7 Replacement of chamber stack

6.7.1 Dismantling

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

Remove the ring for top connector (pos. 2A) if fitted.

Note ***The top connector is only fitted on pump size CRN 45 SF.***

Remove the outer sleeve.

Carefully pull the chamber stack (pos. 80) up and completely free of the base (pos. 6).

Remove the O-rings (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. 6b), and displace the straps 45 ° in relation to the stay bolts. See fig. 5.

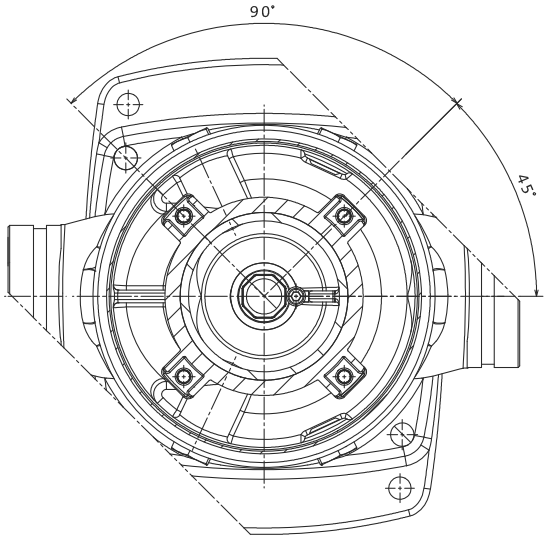


Fig. 5 Placement of straps

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

Fit the ring for the top connector (pos. 2A).

Note ***The top connector 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.

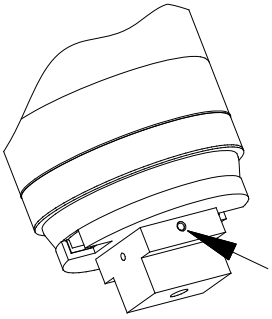
Fit the washers (pos. 26c).

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 Dismantling of chamber stack

Place the holder for dismantling and assembly (pos. A) in a vice, and tighten it. Place the top connector that fits the correct pump size (pos. B), see section *5. Service tools*, into the holder.



TM01 2050 0998

Fig. 6 Dismantling/assembly tool

Place the chamber stack so that the fixing lugs for the straps on the inlet part are above the cutouts in the holder. Make sure that the chamber stack engages with the holder.

Turn the shaft so that the hole in the shaft and the holder hole marked "Dismantling" are in the same position. Fit the pin into the hole to hold the shaft. See fig. 6.

Slacken the screws (pos. 46c), and remove them together with the washers (pos. 46d) and the straps (pos. 26a).

Dismantling of rotating bearing ring (pos. 47b)

Loosen and remove the screw (pos. 47f), washers (pos. 47c, 47e) and bearing ring (pos. 47b).

Dismantling of chamber stack???

Letters, e.g. A, refer to the named chambers in section *7. Order of assembly, chambers and impellers*.

Lift off and remove the discharge part (pos. 46).

Dismantling of chamber section A

Lift off and remove the intermediate middle chamber with bearing (pos. 3).

Hold the impeller with the hook spanner (pos. H), and slacken the split cone nut (pos. 48) by means of the key (pos. E, M and S).

Turn the key (pos. E) and knock the nut to loosen the impeller from the split cone (pos. 48a).

Remove the split cone nut (pos. 48), the split cone (pos. 48a) and the impeller (pos. 49) from the shaft (pos. 51).

Dismantling of chamber section B

Lift off and remove the intermediate chamber with neck ring (pos. 3a).

Hold the impeller with the hook spanner (pos. H), and slacken the split cone nut (pos. 48) by means of the key (pos. E, M and S).

Turn the key (pos. E) and knock the nut to loosen the impeller from the split cone (pos. 48a).

Remove the split cone nut (pos. 48), the split cone (pos. 48a) and the impeller (pos. 49) from the shaft (pos. 51).

Dismantling of chamber section C

Lift off and remove the intermediate chamber with bearing and neck ring (pos. 4a).

Remove the intermediate bearing (pos. 107).

Remove the bearing ring (pos. 107a), if fitted.

Note ***The bearing ring (pos. 107a) is only fitted on pump size CR(N) 90 SF.***

Hold the impeller with the hook spanner (pos. H), and slacken the split cone nut (pos. 48) by means of the key (pos. E, M and S).

Turn the key (pos. E) and knock the nut to loosen the impeller from the split cone (pos. 48a).

Remove the split cone nut (pos. 48), the split cone (pos. 48a) and the impeller (pos. 49) from the shaft (pos. 51).

When the last impeller has been removed, the inlet part can be lifted off the holder.

The chamber stack is now dismantled, and the shaft can be removed.

Removal of stationary bearing ring (pos. 47)

Slacken the screw (pos. 6c), and remove it together with the washer (pos. 6h).

Place the puller (pos. G) underneath the bearing ring (pos. 47).

Screw the hexagon socket head screw into the puller.

Pull the puller against the bearing ring, and at the same time screw the hexagon socket head screw against the bottom of the base.

Make sure that the hexagon socket head screw is in the centre of the bottom bearing.

Turn the hexagon socket head screw until the bearing ring is free of the base.

Bush (pos. 47c)

The maximum permissible difference between the diameters of the bush and the shaft is 1.0 mm. If the difference is greater, the worn part(s) must be replaced.

Stationary bearing ring (pos. 6g) and rotating bearing ring (pos. 47b)

The maximum permissible difference between the diameters of the stationary and the rotating bottom bearing ring is 0.3 mm. If the difference is greater, the worn part(s) must be replaced.

Removal of rotating bearing ring (pos. 47b)

Slacken the hexagon socket head screw (pos. 67), and remove it together with the washers (pos. 66b and 66).

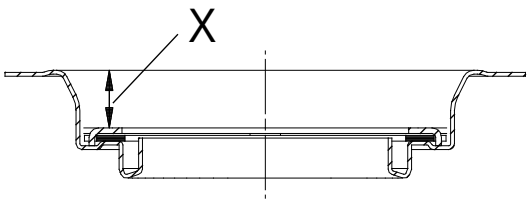
Pull the bearing ring off the shaft.

6.9 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(N) 32 SF	10.1	± 0.2
CR(N) 45 SF	15.5	
CR(N) 64 SF	11.5	
CR(N) 90 SF	12.1	

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

Assembly of rotating bearing ring (pos. 47b)

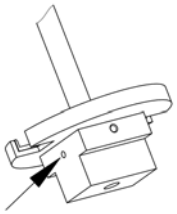
Fit the bearing ring (pos. 47b) to the shaft.

Fit the washers (pos. 47c and 47e). Lubricate the hexagon socket head screw (pos. 47f) and tighten it. See section *4. Torques and lubricants*.

Chamber stack

Place the holder for dismantling and assembly (pos. A) in a vice, and tighten it. Place the top connector that fits the correct pump size (pos. B), see section *5. Service tools*, into the holder.

When assembling the chamber stack, use the holder hole marked "Assembly". See fig. 7.



TM01 2028 0998

Fig. 7 Dismantling/assembly tool

Place the shaft in the holder.

Turn the shaft so that the hole in the shaft and the holder hole marked "Assembly" are in the same position. Fit the pin into the hole to hold the shaft.

Fit the inlet part (pos. 3b)(chamber section D), and turn it so that the fixing lugs for straps on the inlet part are above the cutouts in the holder. Make sure that the inlet part engages with the holder.

Continue the assembly as follows:

Symbols refer to section *7. Order of assembly, chambers and impellers*.

Assembly of chamber section B

Fit the impeller and the split cone (pos. 48, 48a)).

Press the impeller home, and knock the split cone into the impeller hub using the key (pos. E).

Hold the impeller with the hook spanner (pos. H), and fit and tighten the split cone nut (pos. 48). See section *4. Torques and lubricants*.

Press the intermediate chamber (pos. 3a) home against the chamber below or the inlet part.

Assembly of chamber section C

Fit the impeller and the split cone (pos. 48, 48a).

Press the impeller home, and knock the split cone into the impeller hub using the key (pos. E).

Hold the impeller with the hook spanner (pos. H), and fit and tighten the split cone nut (pos. 48).
See section *4. Torques and lubricants*.

Slide the intermediate bearing (pos. 107) over the split cone nut. It must engage with the split cone nut.

Fit the ring for intermediate bearing

Note ***The bearing ring (pos. 107a) is only fitted on pump size CR(N) 90 SF.***

Fit the chamber (pos. 4a), and press it home against the chamber below or the inlet part.

Assembly of chamber section A

Fit the impeller and the split cone (pos. 48, 48a).

Press the impeller home, and knock the split cone into the impeller hub using the key (pos. E).

Hold the impeller with the hook spanner (pos. H), and fit and tighten the split cone nut (pos. 48). See section *4. Torques and lubricants*.

Press the intermediate chamber (pos. 3) home against the chamber below or the inlet part.

Fit the discharge part and make sure that the straps points are aligned at the top and bottom of the stack.

Fit the straps (pos. 26a), the washers (pos. 46d) and the screws (pos. 46c). Lubricate the screws and tighten.
See section *4. Torques and lubricants*.

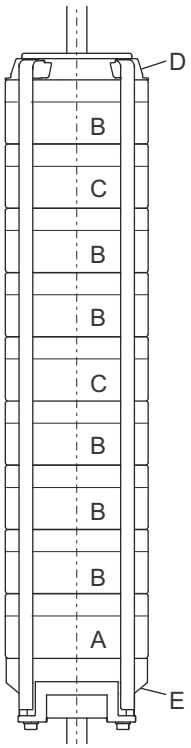
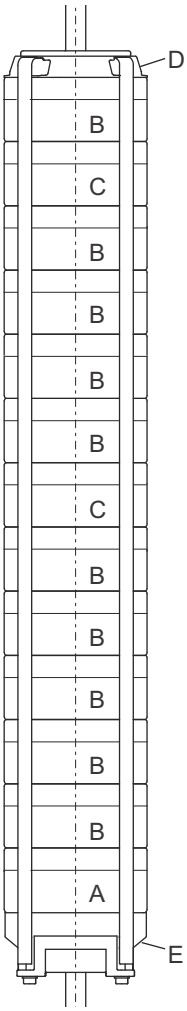
Remove the pin holding the shaft, and lift the chamber stack off the holder.

Continue assembling the pump according to the instructions above.

7. Order of assembly, chambers and impellers

7.1 CRN 32 SF

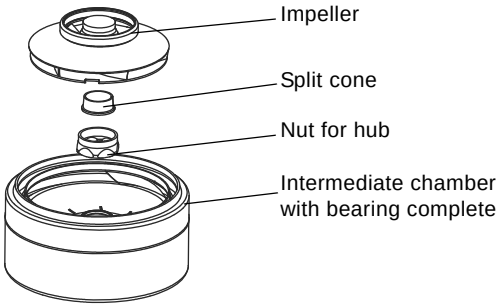
The table shows the assembly order of the chamber stacks by means of symbols.

9 chambers	13 chambers
	

TM05 3394 1312

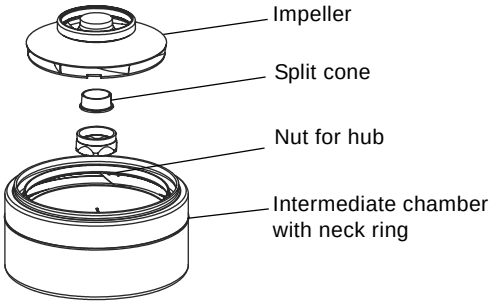
TM05 3395 1312

Chamber section **A**



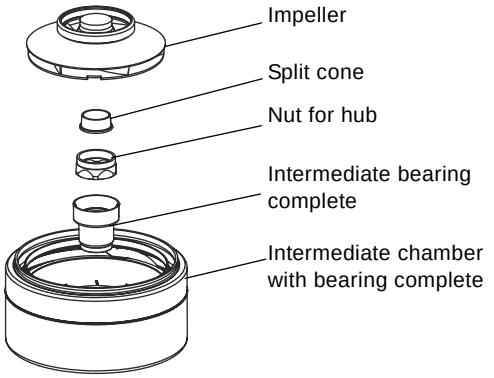
TM05 3396 1312

Chamber section **B**



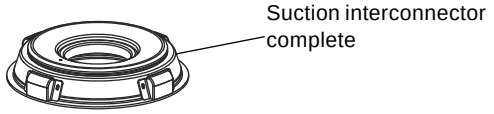
TM05 3397 1312

Chamber section **C**



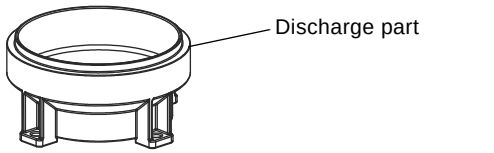
TM05 3398 1312

Chamber section **D**



TM05 3399 1312

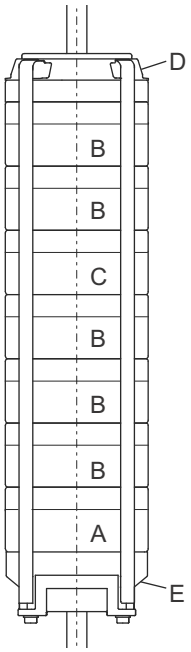
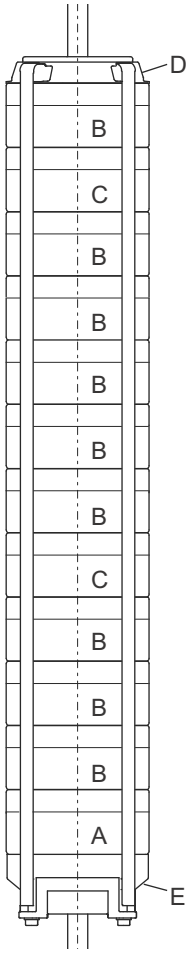
Chamber section **E**



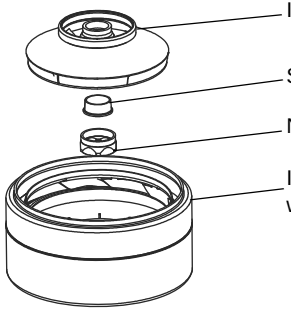
TM05 3400 1312

7.2 CRN 45 SF

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

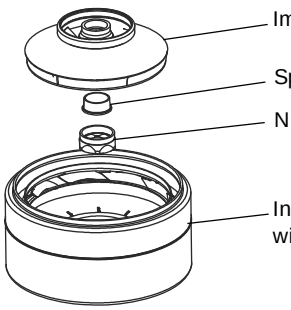
7 chambers	12 chambers
 TM05 3401 1312	 TM05 3402 1312

Chamber section **A**



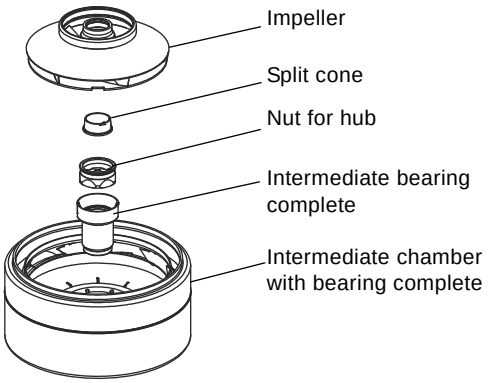
TM05 3403 1312

Chamber section **B**



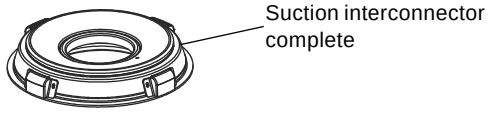
TM05 3404 1312

Chamber section **C**



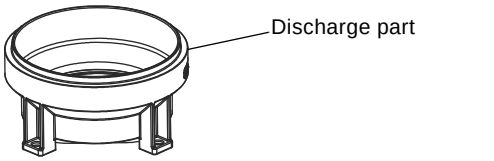
TM05 3405 1312

Chamber section **D**



TM05 3406 1312

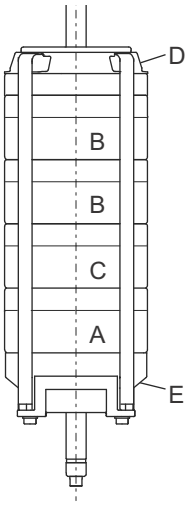
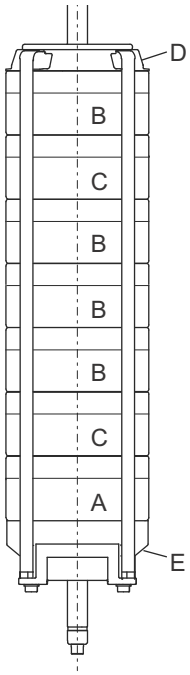
Chamber section **E**



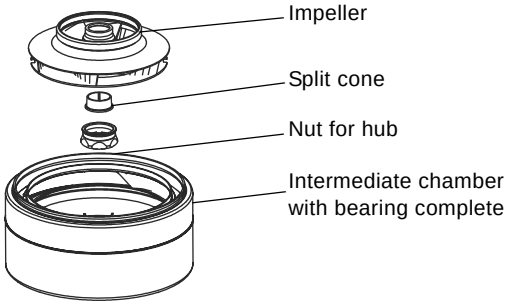
TM05 3407 1312

7.3 CRN 64 SF

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

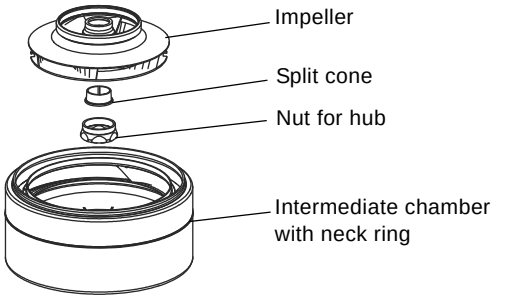
4 chambers	7 chambers
 TM05 4124 2012	 TM05 4125 2012

Chamber section **A**



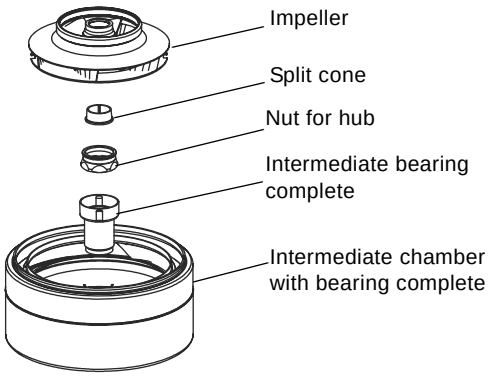
TM05 4126 2012

Chamber section **B**



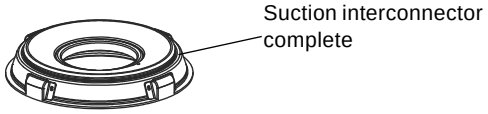
TM05 4127 2012

Chamber section **C**



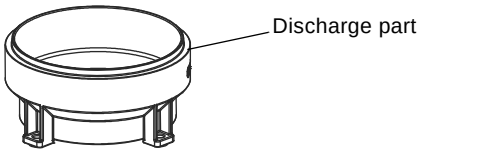
TM05 4128 2012

Chamber section **D**



TM05 4129 2012

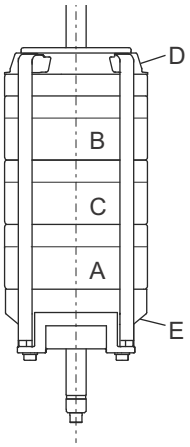
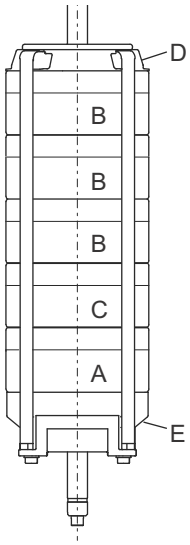
Chamber section **E**



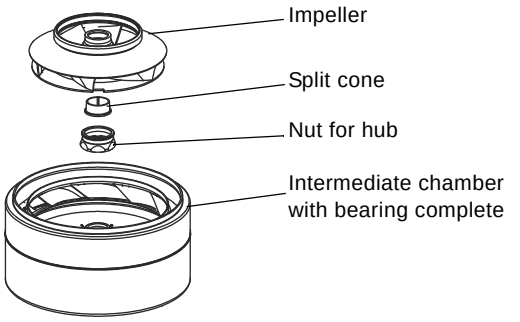
TM05 4130 2012

7.4 CRN 90 SF

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

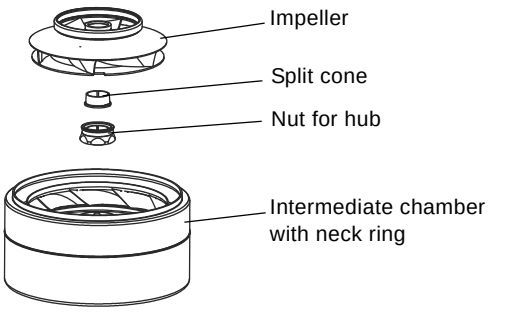
3 chambers	5 chambers
 TM05 4131 2012	 TM05 4132 2012

Chamber section **A**



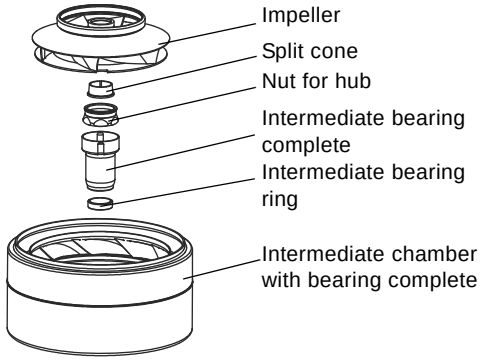
TM05 4133 2012

Chamber section **B**



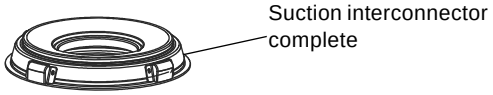
TM05 4134 2012

Chamber section **C**



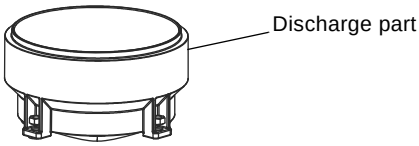
TM05 4135 2012

Chamber section **D**



TM05 4136 2012

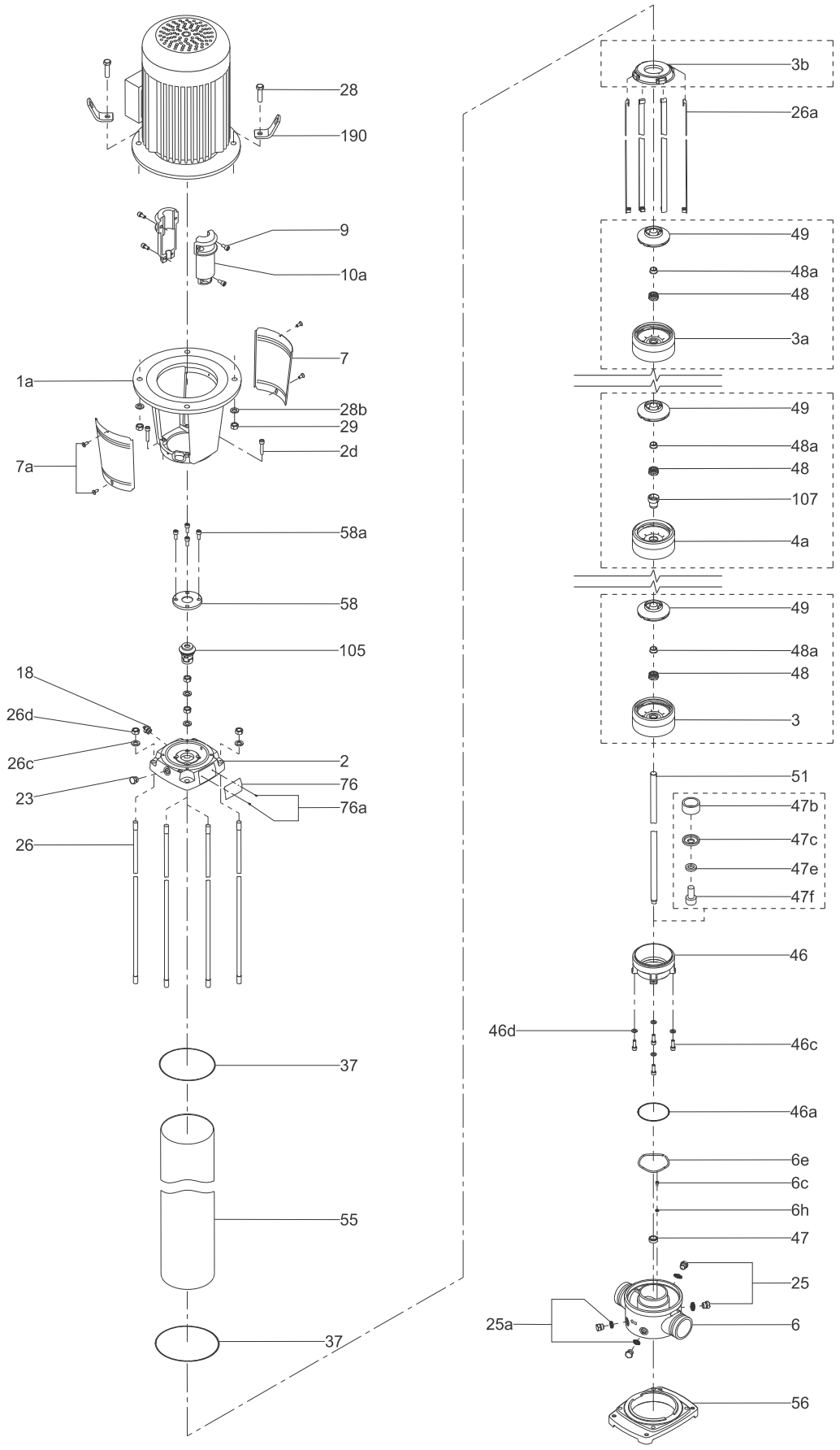
Chamber section **E**



TM05 4137 2012

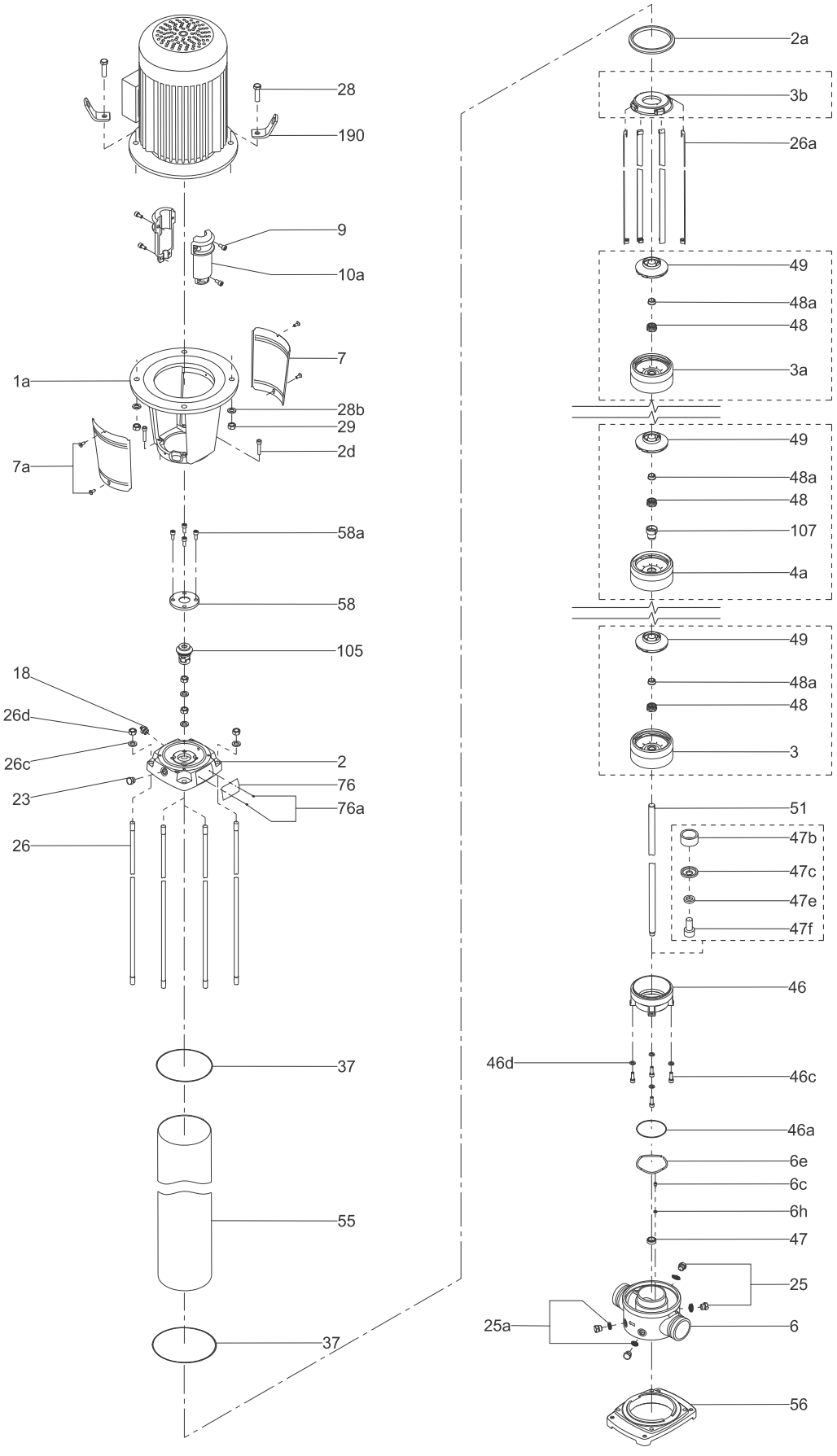
8. Exploded drawings

Exploded drawing of CRN 32 and 64 SF



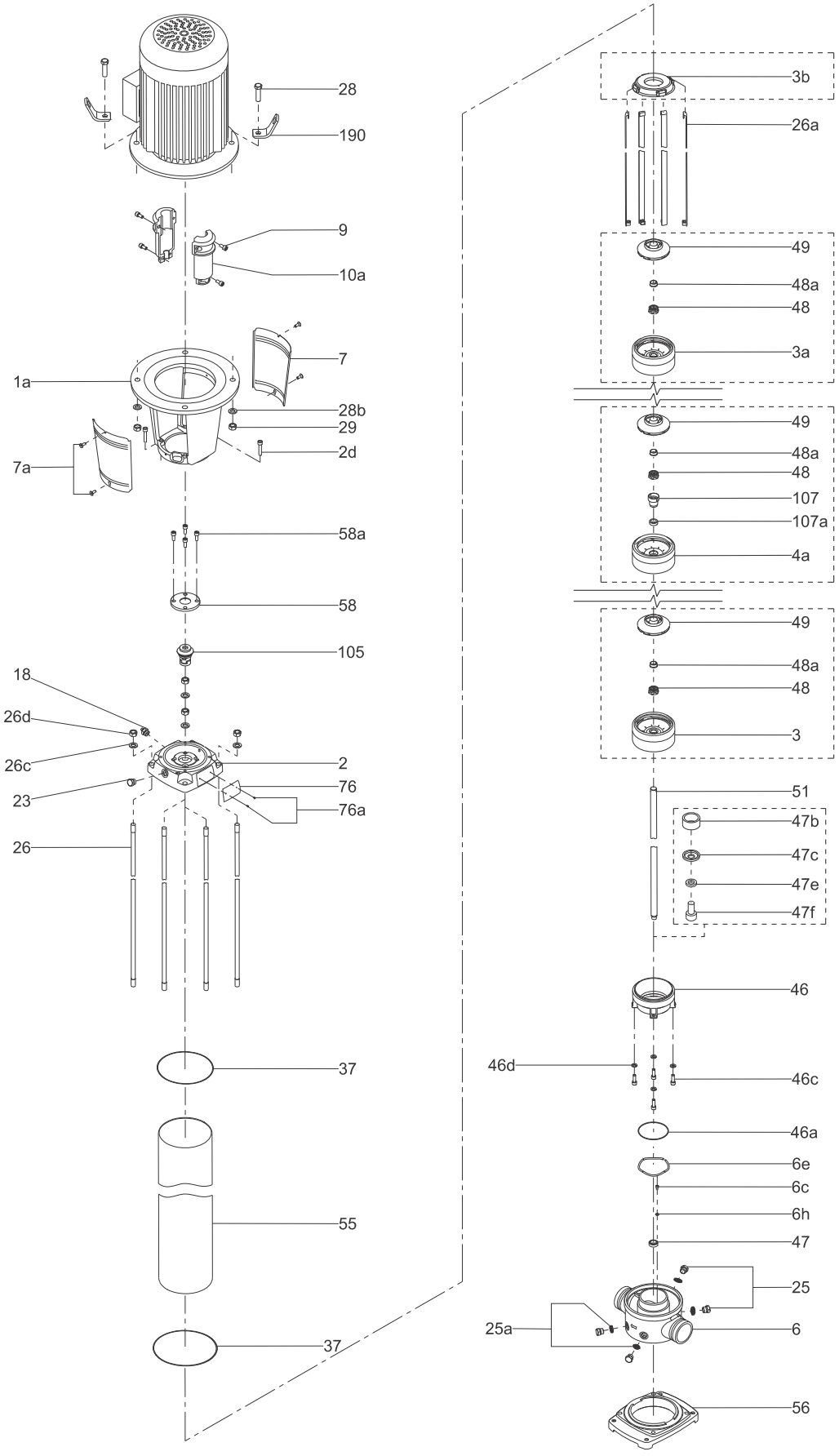
TM05 5810 4012

Exploded drawing of CRN 45 SF



TM05 5811 4012

Exploded drawing of CRN 90 SF



TM05 5812 4012

98373625 1212
ECM: 1103616