Service instructions

CRT 8 and 16

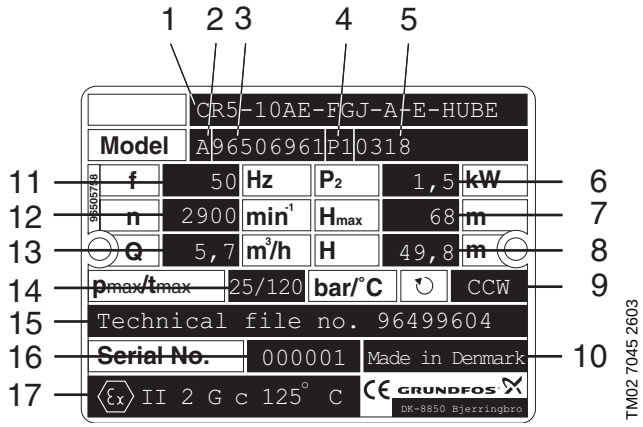
Produced after 0404 (yyww)

50/60 Hz, IEC

1/3~

1. Type identification

1.1 Nameplate



Pos.	Description
1	Type designation
2	Model
3	Product number
4	Place of production
5	Production year and week
6	P_2
7	Closed valve head, 50 Hz
8	Head at rated flow rate, 50 Hz
9	Direction of rotation CCW: Counter-clockwise CW: Clockwise

Pos.	Description
10	Country of production
11	Frequency
12	Speed
13	Rated flow rate
14	Maximum pressure and temperature
15	The number of the copy of the technical file kept at KEMA (stated if the pump is ATEX classified)
16	The serial number of the pump (stated if the pump is ATEX classified)
17	ATEX category (stated if the pump is ATEX classified)

1.2 Type key

Example	CRT	5 -	10	AE-	FGJ-	A-	E-	AUUE

Type range

Rated flow rate m³/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 = Different 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
- GI = 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 (polytetrafluorethylene and propylene)
- K= FFKM (perfluor)
- P = NBR (nitrile)
- T = PTFE (polytetrafluorethylene)
- V = FKM (fluor)

Code for shaft seal. See 1.3 Code for shaft seal.

1.3 Code for shaft seal

The code for shaft seal always consists of four letters.

Example		A	U	U	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:

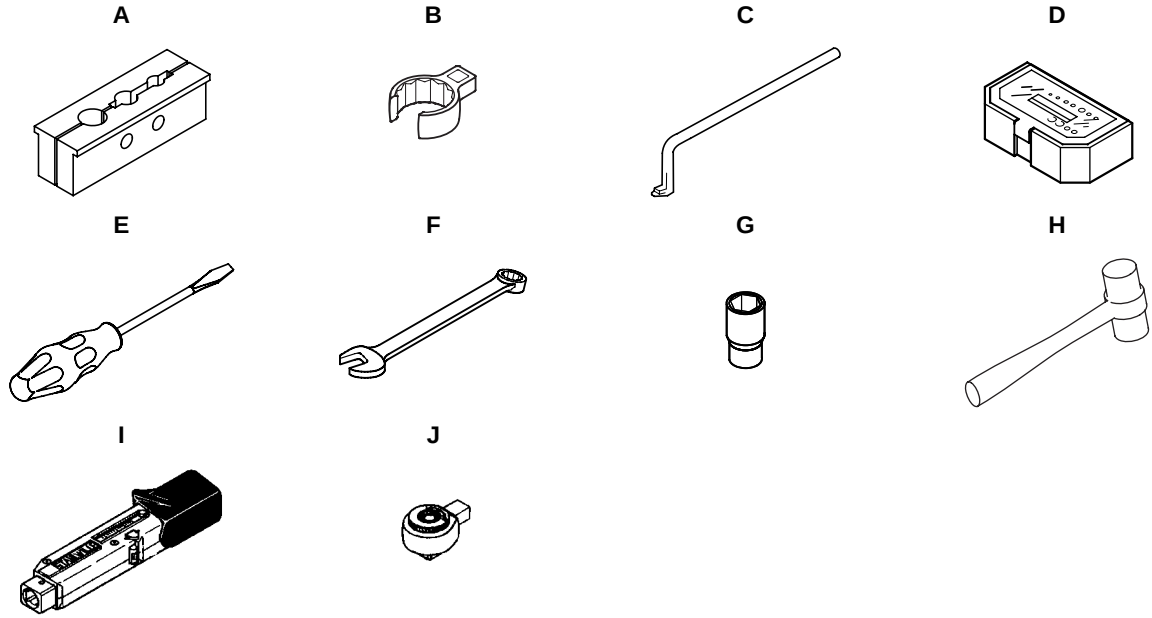
Position	Code	Description
1	A	O-ring seal with fixed driver
2 and 3	U	Cemented tungsten carbide
	Q	Silicon carbide
4	E	EPDM
	F	FXM
	K	FFKM

2. Torques and lubricants

Pos.	Designation	Quantity	Dimensions	Torque [Nm]	Lubricant
7.a	Screw	4	M4		-
9	Hexagon socket head screw	4	M6	13	Thread-Eze
			M8	31	
			M10	62	
18	Air vent screw	1	½"	35	-
	Air vent screw, spindle	1	M8		
23	Plug	1	½"	35	-
25	Priming valve	1	½"	35	-
	Priming valve, spindle	1	M10	5	
26	Staybolt	4	M16		Gardolube L 6034
26b	Hexagon socket head screw	2	M8	12	-
28	Hexagon head screw	4	M6	10	Thread-Eze
			M8	12	
			3/8" UNC	23	
			M12	40	
			½" UNC	40	
			M16	80	
36	Nut for staybolt	4	M16	100	Gardolube L 6034
37	O-ring	2	∅170,7 x 3,3		Rocol 22
47a	Bearing ring	-	-	-	Rocol 22
67	Castle nut	1	M12	40	Gardolube L 6034
100	O-ring	1	16.3 x 2.4		Rocol 22
105	Shaft seal	1			Soapy water
107	Plug	1	M33	35	-

Thread-Eze, part no. SV9997 (0.5 l).
Gardolube L 6034, part no. SV9995 (1 l).
Rocol 22 (SAPPHIRE AGUA SIL), part no. RM2924 (1 kg).

3. Service tools



3.1 Special tools

Pos.	Designation	For pos.	Description	Part number
A	Shaft holder for assembly	80		SV0040
B	Ring insert tool for shaft seal + square adapter	105		SV2101 SV2100
C	Puller for neck ring	49, 65		SV0239

3.2 Standard tools

Pos.	Designation	For pos.	Description	Part number
D	Bits kit	9, 26b, 113		SV2010
E	Screwdriver	105	Straight slot	-
		7a	Torx TX20	-
F	Ring/open-end spanner	28, 36	M6 - 10 mm	SV0083
			M8 - 13 mm	SV0055
			M12 - 19 mm	SV0054
			½" UNC - 19 mm	
			M16 - 24 mm	SV0122
G	Socket	28, 36	M6 - 10 mm	SV0806
			M8 - 13 mm	SV0091
			M12 - 19 mm	SV0267
			½" UNC - 19 mm	
			M16 - 24 mm	SV0092
H	Plastic hammer	2	No. 2	SV0349

3.3 Torque tools

Pos.	Designation	For pos.	Description	Part number
I	Torque wrench	9, 26b, 28, 36, 105, 113	1-6 Nm	SV0438
			4-20 Nm	SV0292
			20-100 Nm	SV0269
J	Ratchet insert tool	H	9 x 12, ½" x ½"	SV0295

4. Dismantling and assembly

Position numbers

Position numbers of parts (digits) refer to exploded views, sectional drawings and parts lists; position numbers of tools (letters) refer to 3. 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

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

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

During assembly

- Lubricate and tighten screws and nuts to the torque stated. See 2. Torques and lubricants.

4.1 Transport bracket

To protect the bearings and the shaft seal, a transport bracket must always be used when transporting the pump without motor.

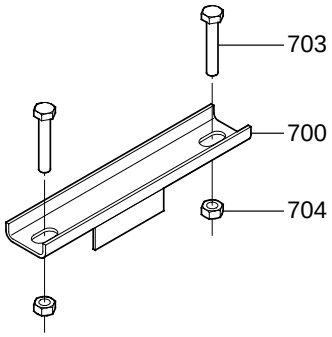


Fig. 1 Transport bracket for small flange sizes

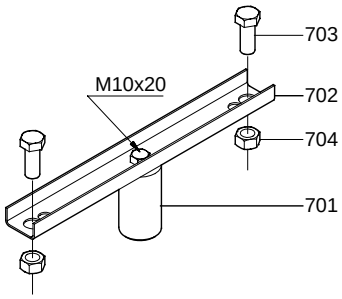


Fig. 2 Transport bracket for large flange sizes

Flange size	Fig. 1	Fig. 2		Hexagon head screw pos. 703 (2 pcs.)		Nut pos. 704 (2 pcs.)
	Transport bracket complete pos. 700	Shaft stub pos. 701	Rail pos. 702			
F85	96521627	-	-	ID8022	M6 x 20	96429513
F100	96521627	-	-	ID8023	M6 x 25	96429513
F115	96521626	-	-	ID8024	M8 x 20	ID0825
F130	96521626	-	-	ID8025	M8 x 25	ID0825
F265	-	96508079	96508073	ID7904	M12 x 30	None
F300	-	96508080	96508073	ID7905	M16 x 45	ID7908
56C	-	96508075	96508072	ID1839	UNC 3/8" x 25	96120884
182TC	-	96508076	96508074	ID1840	UNC 1/2" x 25	96467385
213TC	-	96508077	96508074	ID0185	UNC 1/2" x 1 ½"	96467385
254TC	-	96508078	96508074	96491112	UNC 1/2" x 2 ½"	96467385
284TSC	-	96508078	96508074	ID1840	UNC 1/2" x 25	96467385

4.1.1 Fitting the transport bracket

1. Press home the shaft (pos. 51).
2. Press home the driver of the shaft seal (pos. 105) and tighten the three screws (pos. 113).
3. Lift the shaft (pos. 51) and fit the adjusting fork.
4. Fit the coupling (pos. 8) and the screws (pos. 9), but leave loose.
5. Fit the transport bracket.
6. Fit the two screws and nuts (pos. 703 and 704), but leave loose.
7. Tighten the screws (pos. 9) in the coupling.
   The coupling must be fitted so that it is possible to remove it without slackening the screws (pos. 703).
8. Tighten the screws (pos. 703).
9. Remove the adjusting fork.
10. The pump can now be transported without motor.

4.1.2 Removing the transport bracket

It is very important to proceed according to these instructions, as the shaft seal may otherwise be damaged.

1. Remove the screws (pos. 9).
2. Slacken the last screw (pos. 9), but do not unscrew it completely.
3. Hit the end of the hexagon key carefully with the flat of the hand to loosen one of the coupling halves.
4. Remove the last screw (pos. 9) and the loose coupling half.
5. Hit the flat part of the coupling half on the shaft end very carefully.
6. Remove the coupling half when it is loose.
7. Remove the screws (pos. 703) and the nuts (pos. 704) and remove the transport bracket.
8. Fit the motor to the pump head.
9. Fit the screw (pos. 28), lubricate and tighten them diagonally to the torque stated. See 2. Torques and lubricants.
10. Fit the pin (pos. 10) and the two coupling halves (pos. 10a).
11. Lubricate the four screws (pos. 9) with Thread-Eze and fit them.
12. Yellow-chromated couplings: Check that the gaps either side of the coupling halves are equal.

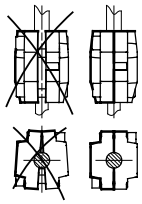


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Fig. 3 Gaps between coupling halves

13. Place a screwdriver between the coupling and the plug (pos. 107).
14. Lift the shaft/coupling as far as possible and lower the shaft/coupling to half that height.

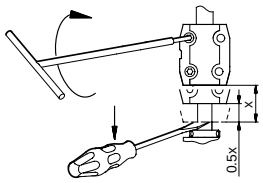

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Fig. 4 Adjustment of chamber stack

15. Hold the shaft/coupling in this position and tighten the four screws in the coupling (pos. 9) diagonally to the torque stated. See 2. Torques and lubricants.
16. Check that the shaft rotates freely and noiselessly.
17. Fit the coupling guards (pos. 7) and the screws (pos. 7a).

4.2 Dismantling the pump

4.2.1 Removing the motor and coupling

1. Remove the screws (pos. 7a) together with the coupling guards (pos. 7).
2. Remove the screws (pos. 9) together with the coupling halves (pos. 10a) and the shaft pin (pos. 10).
3. Remove the screws (pos. 28).
4. Lift the motor off the pump head (pos. 2).

4.2.2 Removing the pump main parts and the shaft seal

1. Remove the plug (pos. 107).
2. Remove the nuts (pos. 36) together with the washers (pos. 66a).
3. Loosen the pump head (pos. 2) with a light knock on the edge and lift it free of the staybolts (pos. 26).
4. Remove the shaft seal (pos. 105).
5. Remove the outer sleeve (pos. 55).
6. Lift the chamber stack off the base.
7. Remove the O-rings (pos. 37).

4.2.3 Dismantling the chamber stack

1. Place the shaft holder (pos. A) in a vice, but do not tighten the vice.
2. Fit the shaft pin (pos. 10) into the shaft pin hole and place the chamber stack in the shaft holder (pos. A) and tighten the vice.

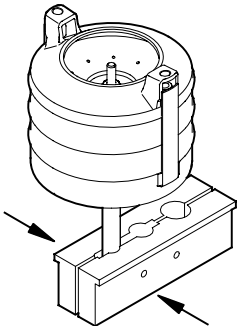

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Fig. 5 Fitting the chamber stack in the holder

3. Remove the screws (pos. 26b) and the washers (pos. 26c) holding the straps to the chamber stack.
4. Remove the straps (pos. 26a) and the inlet parts (pos. 44b) and 44a.
5. Remove the split pin (pos. 67a), the nut (pos. 67) and the splined clamp (pos. 64c).
6. Remove the chamber stack parts: impellers, spacing pipes, chambers and bearing rings. See 5. Order of assembly for chambers and impellers.
7. Remove the driver (pos. 61).
8. If the neck rings (pos. 45) in the chambers are worn, remove them by pressing off the retainer for neck rings using the puller for neck ring (pos. C).
9. If the wear rings of the impellers (pos. 49a) are worn, remove them with the puller for neck ring (pos. C).

4.3 Mounting

4.3.1 Assembling the chamber stack

1. Fit the neck rings into the chambers (pos. 45) if removed.
2. Fit the wear rings on the impellers (pos. 49a) if removed.
3. Place the shaft holder (pos. A) in a vice, but do not tighten the vice.
4. Fit the shaft pin (pos. 10) into the shaft pin hole, place the chamber stack in the shaft holder and tighten the vice.
5. Check that the lock ring of the shaft (pos. 51) is not damaged.
6. Fit the driver (pos. 61).
7. Fit the chamber stack parts on the shaft: chamber, spacing pipe, impeller and bearing ring. See 5. Order of assembly for chambers and impellers.
   Note: When fitting the chamber stack make sure that bearings and other rotating parts are not dropped on the shaft. They must be slid carefully over the shaft to prevent any damage to bearings.
8. Fit the splined clamp (pos. 66) and the nut (pos. 67) and tighten with 40 Nm.
9. Fit the inlet parts (pos. 44a and 44b) and the straps (pos. 26a).
10. Fit the split pin (pos. 67a).
11. Fit the washers (pos. 26c) and the screws (pos. 26b) holding the straps to the chamber stack.
12. Check that the straps are straight (parallel with the shaft), and tighten the screws alternately to ensure that the chamber stack is clamped straight. Tighten with 12 Nm.
13. Slacken the vice and remove the chamber stack (pos. 80) and the shaft pin (pos. 10).

4.3.2 Assembling the pump main parts

1. Assemble the chamber stack. See 4.3.1 Assembling the chamber stack.
2. Fit the O-ring (pos. 37) in the pump head (pos. 2) and in the base (pos. 6) and lubricate them with Rocol 22.
3. Fit the chamber stack on the base taking care that the heads of the screws for straps do not touch the inlet pipe in the base.
4. Fit the outer sleeve (pos. 55) in the base and press it home in the base.
5. Fit the shaft seal (pos. 105). If necessary, clean and smooth the shaft end using the holder with emery cloth supplied with the shaft seal kit.
6. Check that the four rubber springs (pos. 60) are in the pump head.
7. Fit the pump head on the pump with the air vent screw (pos. 18) towards the discharge side.
8. Lubricate the threads of the staybolts (pos. 26). See 2. Torques and lubricants.
9. Fit the washers (pos. 66a) and the nuts (pos. 36).
10. Tighten the nuts (pos. 36) diagonally to the torque stated. See 2. Torques and lubricants.

4.3.3 Fitting the motor and coupling

1. Press the O-ring (pos. 106) and the plug (pos. 107) down on the shaft, screw the plug into the pump head and tighten with 35 Nm using the ring insert tool for shaft seal (pos. B).
2. Fit the motor to the pump head.
3. Fit the screw (pos. 28), lubricate and tighten them diagonally to the torque stated. See 2. Torques and lubricants.
4. Fit the pin (pos. 10) and the two coupling halves (pos. 10a).
5. Lubricate the four screws (pos. 9) with Thread-Eze and fit them.
6. Check that the gaps either side of the coupling halves are equal.

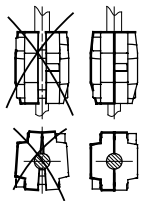

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Fig. 6 Gaps between coupling halves

7. Place a screwdriver between the coupling and the top ring for shaft seal.
8. Lift the shaft/coupling as far as possible and lower the shaft/coupling to half that height.

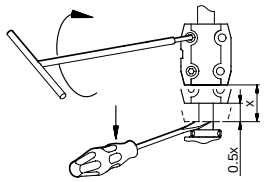

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Fig. 7 Adjustment of chamber stack

9. Hold the shaft/coupling in this position and tighten the four screws in the coupling (pos. 9) diagonally to the torque stated. See 2. Torques and lubricants.
10. Check that the gaps either side of the coupling halves are equal.
11. Check that the shaft rotates freely and noiselessly.
12. Fit the coupling guard (pos. 7) and the screws (pos. 7a).

4.4 Replacing the shaft seal of pumps with spacer coupling

4.4.1 Dismantling

1. Remove the screws (pos. 7a) together with the coupling guards (pos. 7).
2. Remove the screws (pos. 9) together with the coupling halves (pos. 10a) and the shaft pin (pos. 10).
3. Slacken the three screws of the shaft seal (pos. 113) by approx. ¼ of a turn.
4. Slacken the shaft seal (pos. 105) using the ring insert tool for shaft seal (pos. B) until the thread is completely free of the pump head.
5. Pull the shaft seal off the shaft.

4.4.2 Mounting

1. If necessary, clean and smooth the shaft end using the holder with emery cloth supplied with the shaft seal kit.
2. Moisten the shaft end with soapy water.
3. Press the shaft seal on the shaft, screw it into the pump head and tighten it with 35 Nm.
4. Press the ring with the three set screws (pos. 113) against the hexagon plug.
5. Tighten the screws (pos. 113) with 2.5 Nm.
6. Lift the chamber body by inserting a screwdriver or similar tool in the hole for the pin in the shaft and fit the adjusting fork, which is fitted to one of the coupling guards (pos. 7).

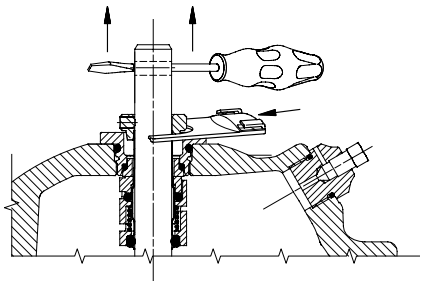

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Fig. 8 Fitting the adjusting fork

7. Fit the pin (pos. 10) and the two coupling halves (pos. 10a).
8. Lubricate and fit the four screws (pos. 9).

9. Yellow-chromated couplings: Check that the gaps either side of the coupling halves are equal.

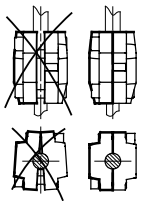

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Fig. 9 Gaps between coupling halves

10. Tighten the screws to the torque stated. See 2. Torques and lubricants, and remove the adjusting fork.
11. Check that the shaft rotates freely and noiselessly.
12. Place the adjusting fork on the inside of one of the coupling guards.
13. Fit the coupling guard (pos. 7) and the screws (pos. 7a).

4.5 Checking and replacing impellers/wear rings and neck rings

Impellers/wear rings

1. Check if there is a noticeable groove in the impeller skirts (CRT 8) or wear rings (CRT 16) caused by friction (use a finger nail).
2. If there is a groove, the impellers/wear rings must be replaced. The wear rings can be removed by means of the puller for neck ring (pos. C).

Neck rings

The neck rings (pos. 65) should always be replaced if the chamber stack has been dismantled.

1. Push the retainer for neck ring free of the chamber using the puller for neck ring (pos. C).
2. Remove the neck ring (pos. 45).
3. Fit a new neck ring in the chamber.

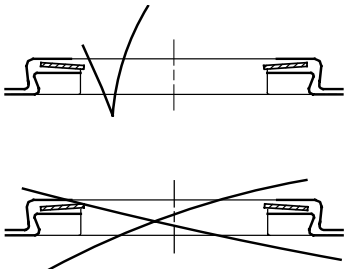

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Fig. 10 Correct fitting of neck ring

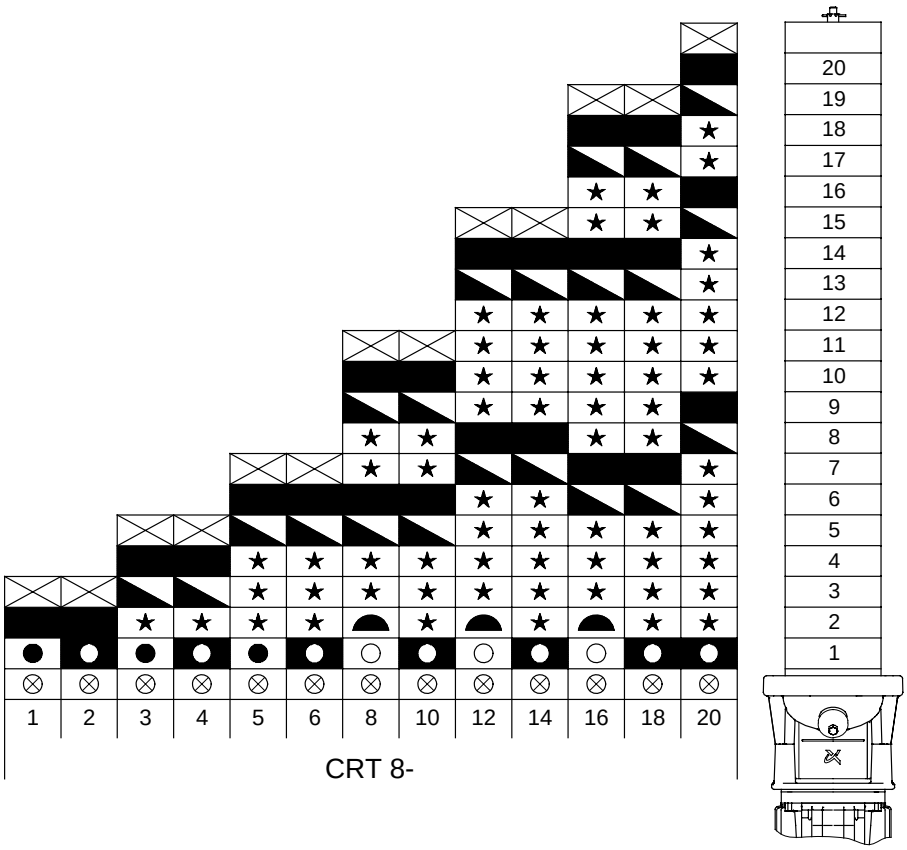
4. Press the retainer for neck ring down on the neck ring and make it engage with the chamber. It must be possible to move the neck ring freely (sideways) between the retainer and the chamber.

Bearing rings

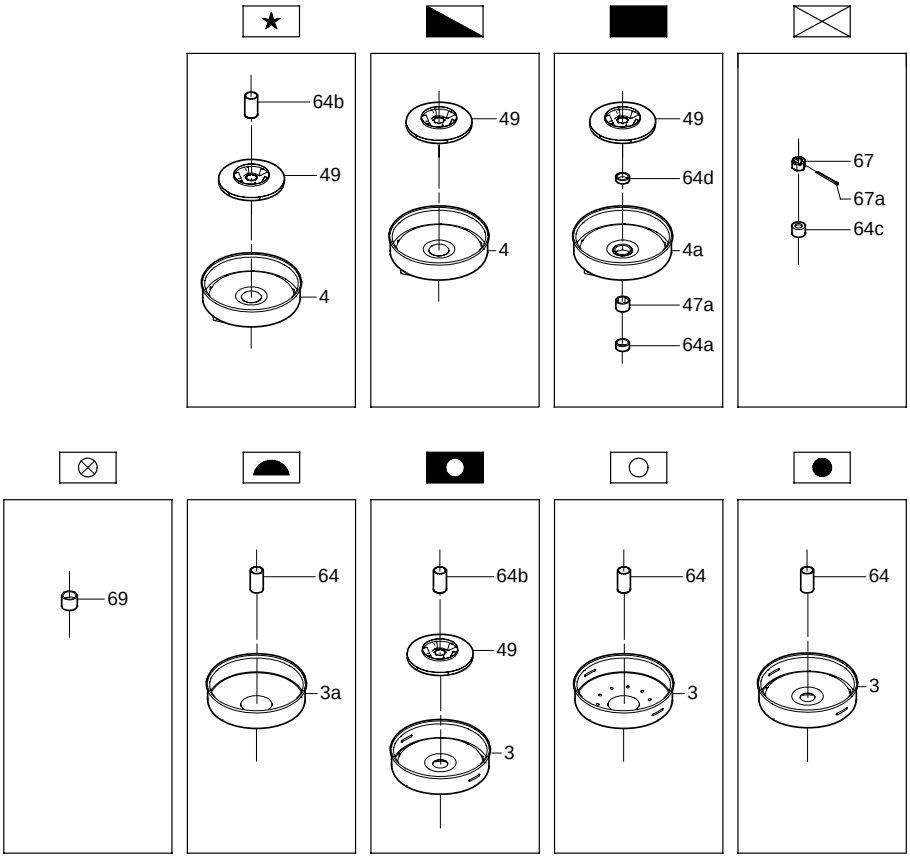
1. Check whether there is a visible or noticeable (use a finger nail) edge on the rotating bearing rings.
2. The bearing rings (pos. 47a) and the chambers with bearing ring (pos. 4a) must be replaced at the same time.

5. Order of assembly for chambers and impellers

CRT 8



CRT 8-



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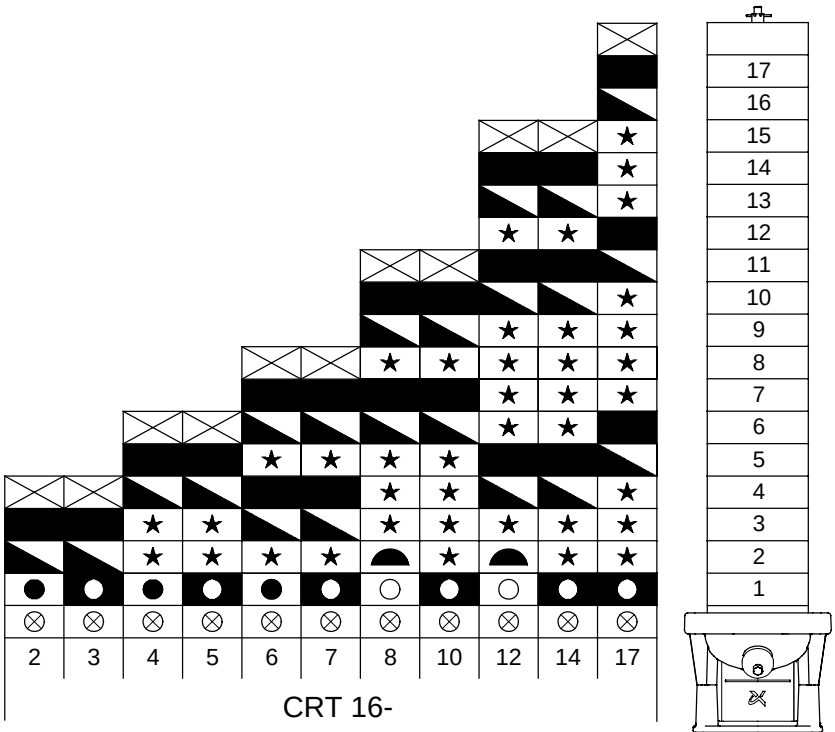

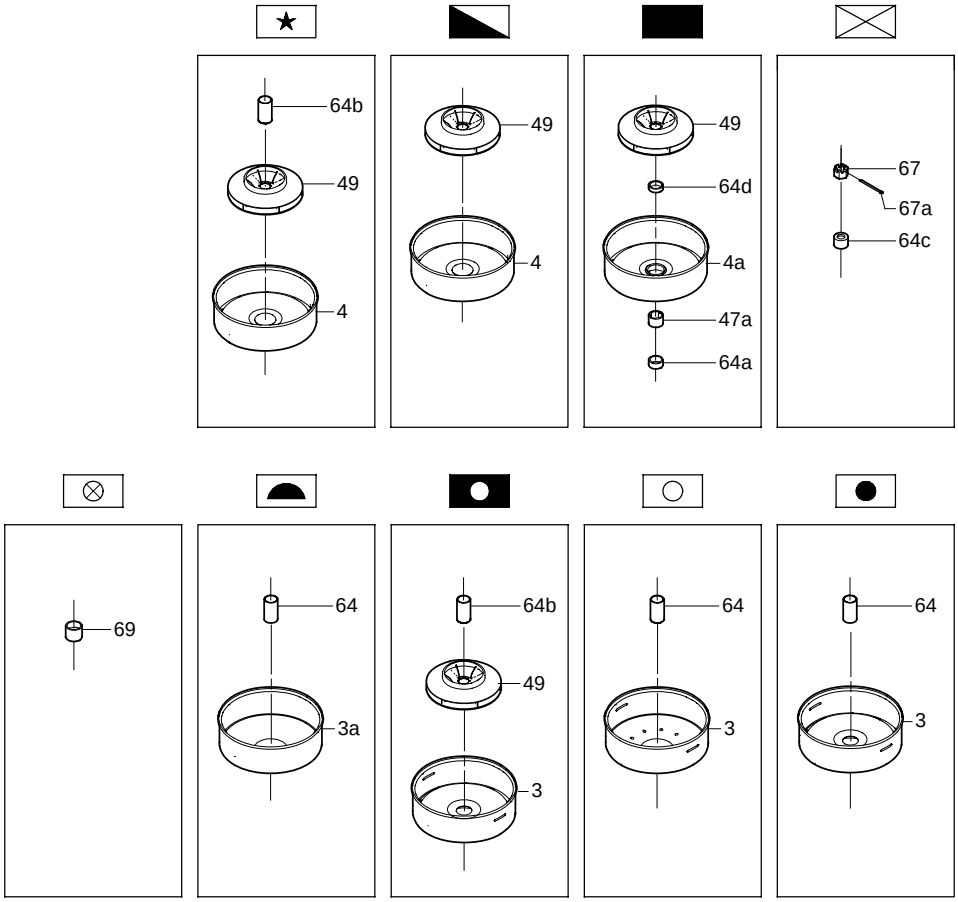

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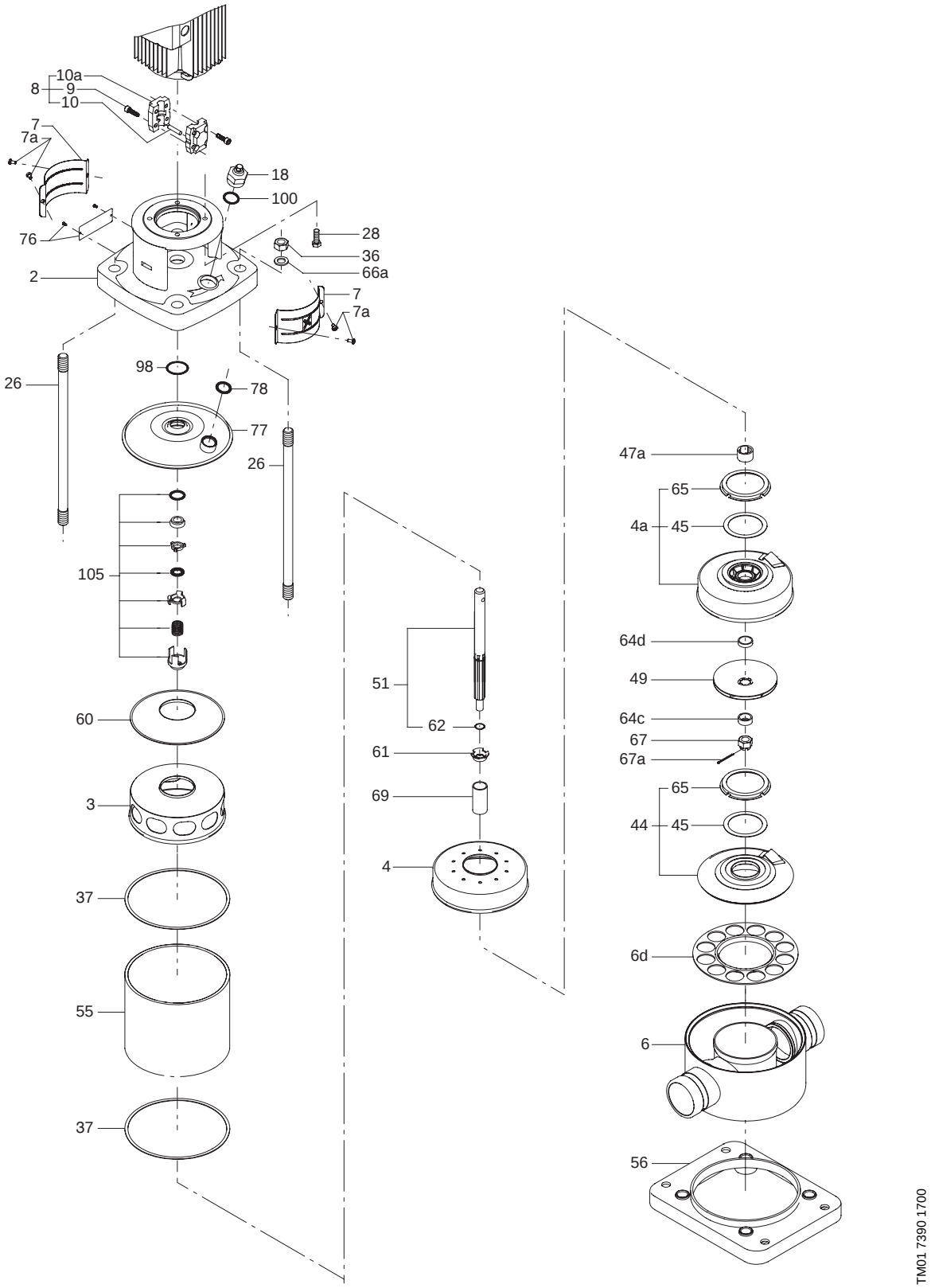
GRUNDFOS

6. Drawings

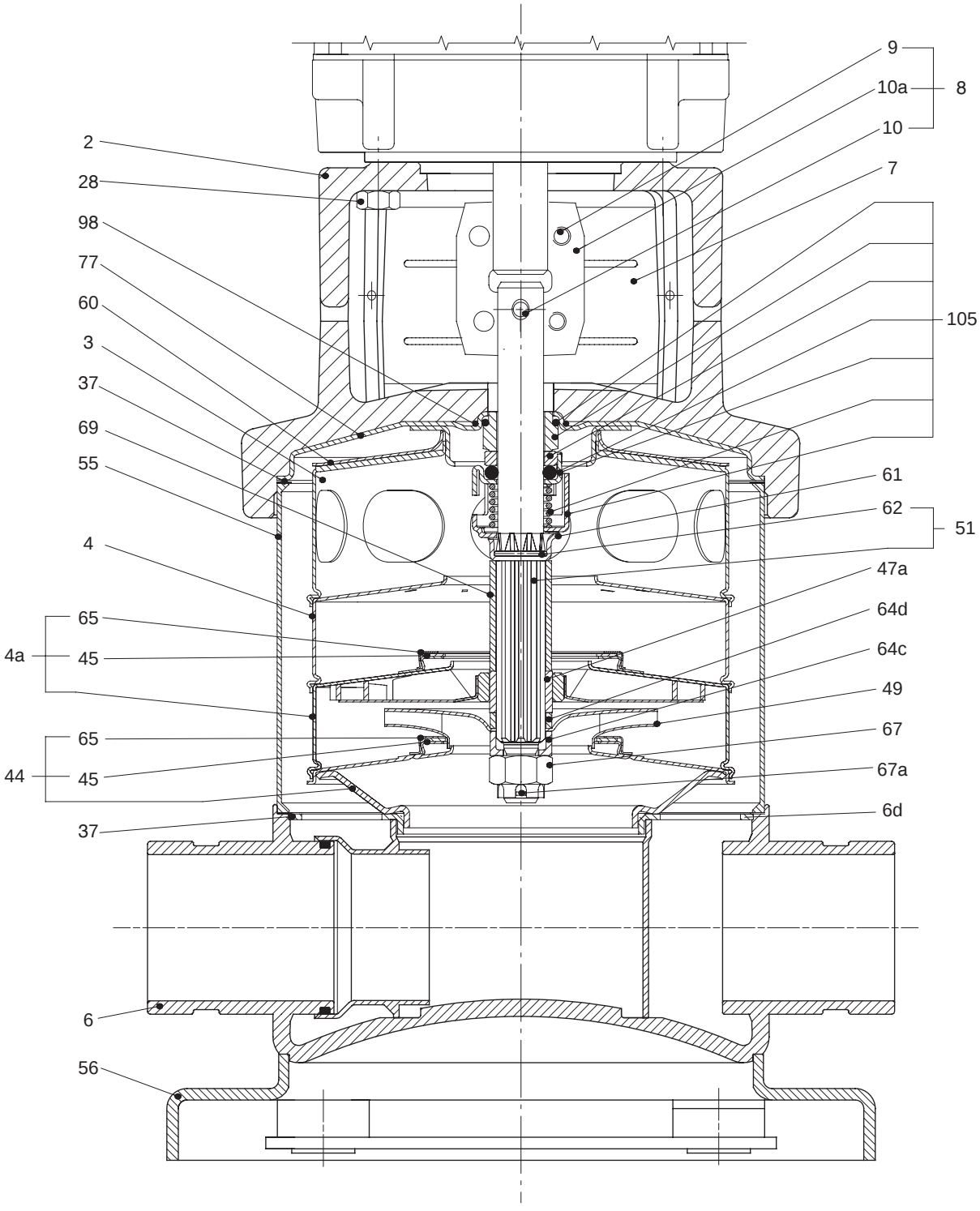
6.1 CRT 8

Exploded view

(pumps with one stage)

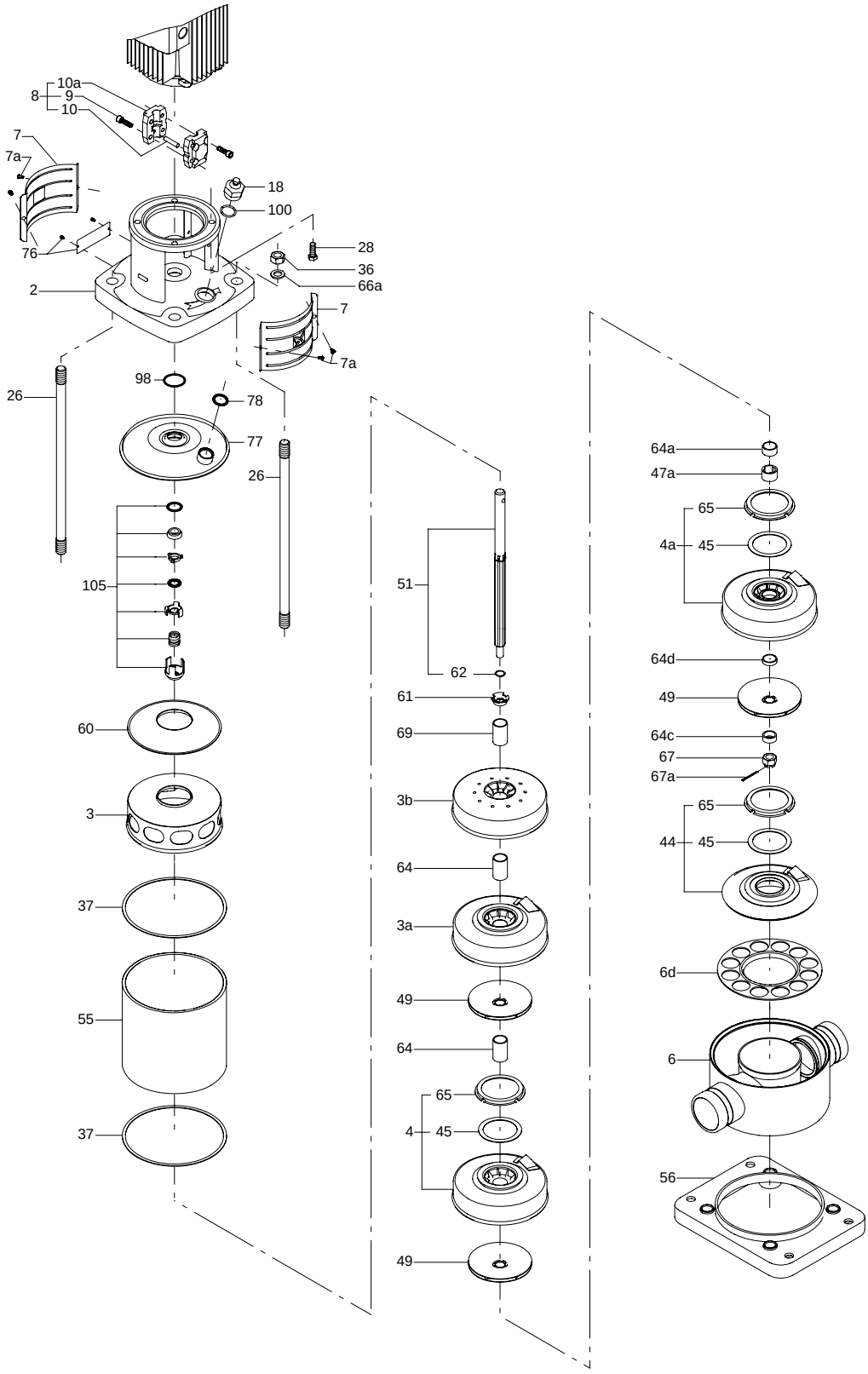


Sectional drawing
(pumps with one stage)



Exploded view

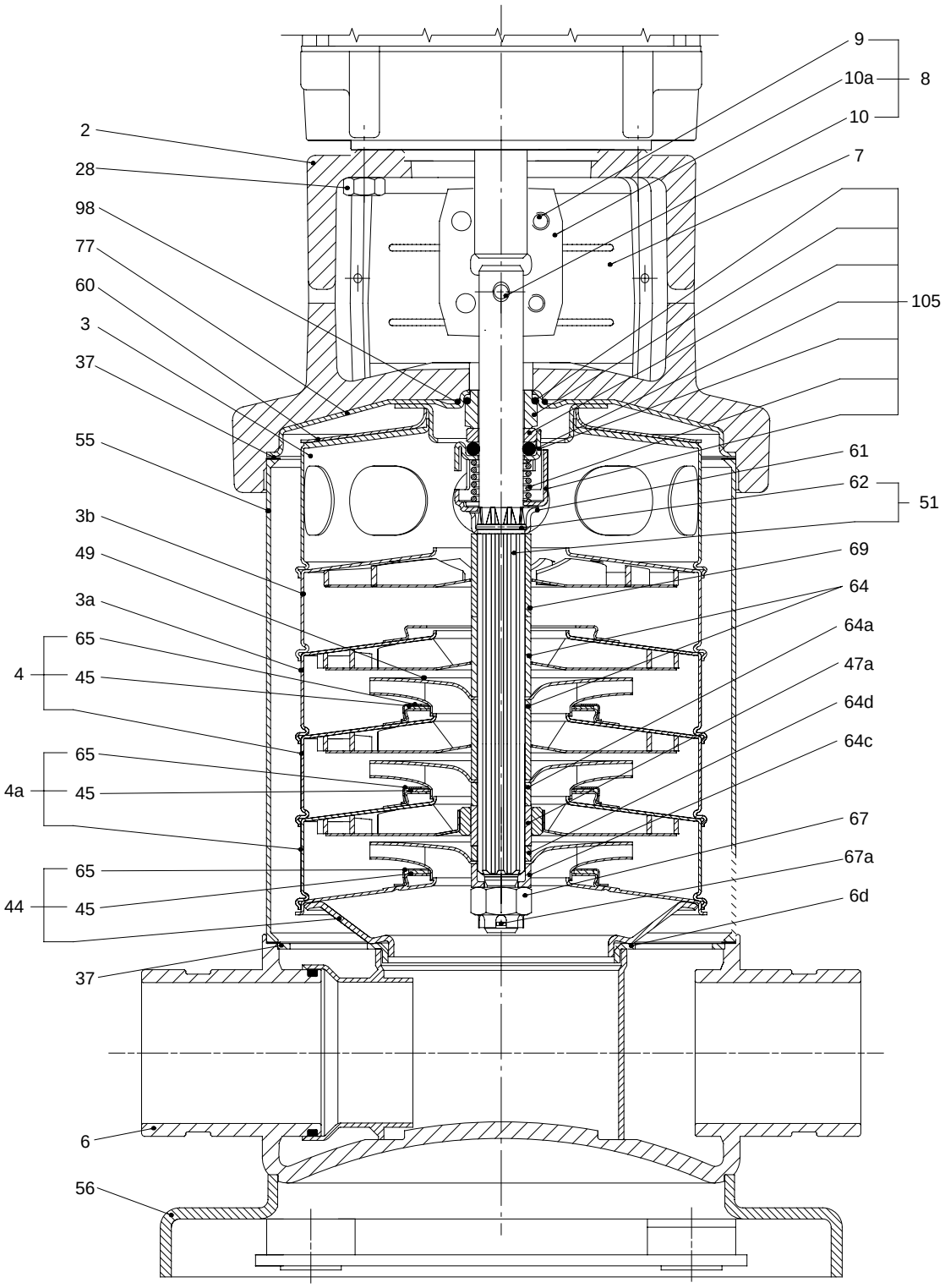
(pumps with two stages or more)



GRUNDFOS

Sectional drawing

(pumps with two stages or more)

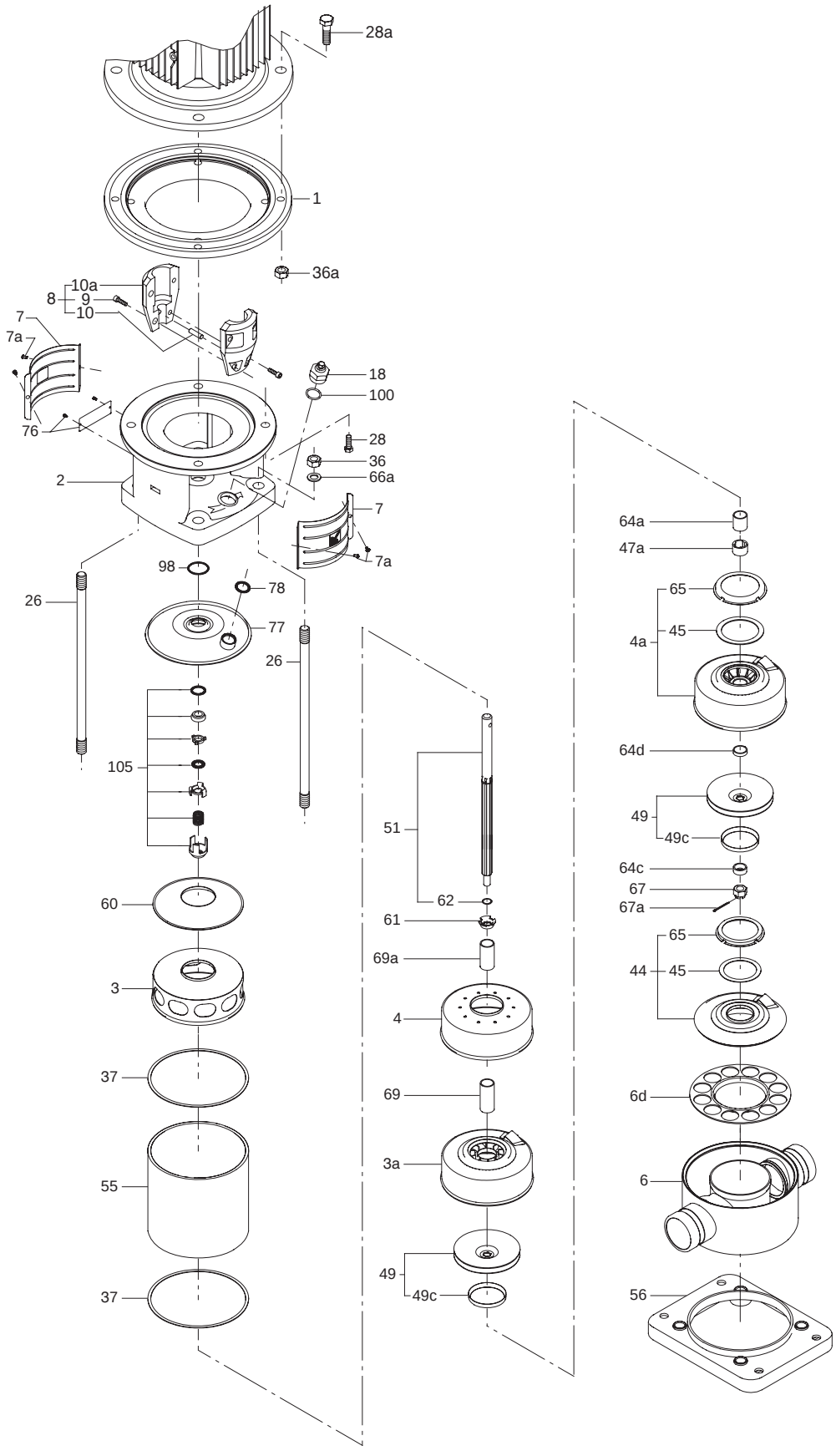


GRUNDFOS

6.2 CRT 16

Exploded view

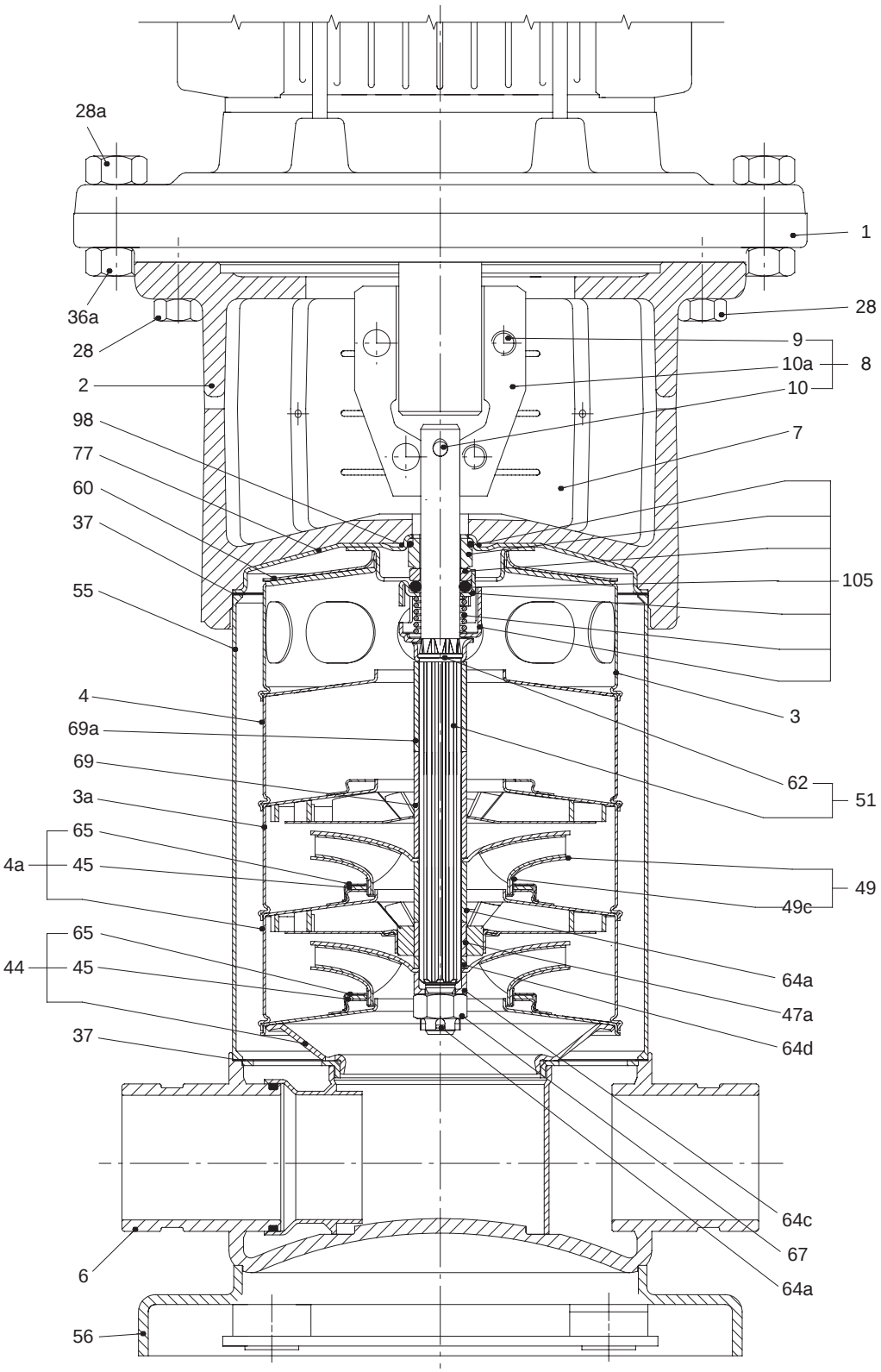
(pumps with two stages)



GRUNDFOS

Sectional drawing

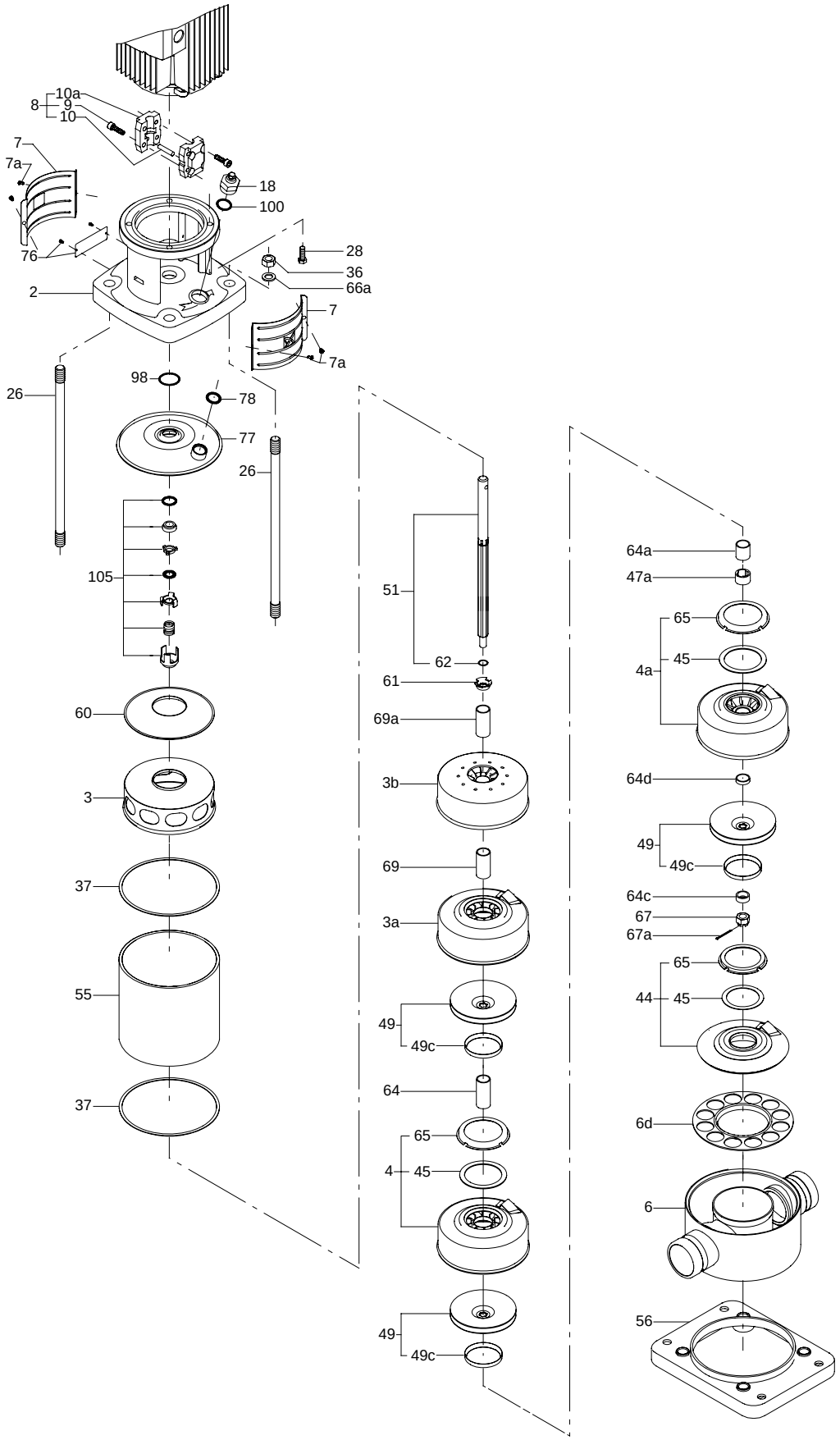
(pumps with two stages)



GRUNDFOS

Exploded view

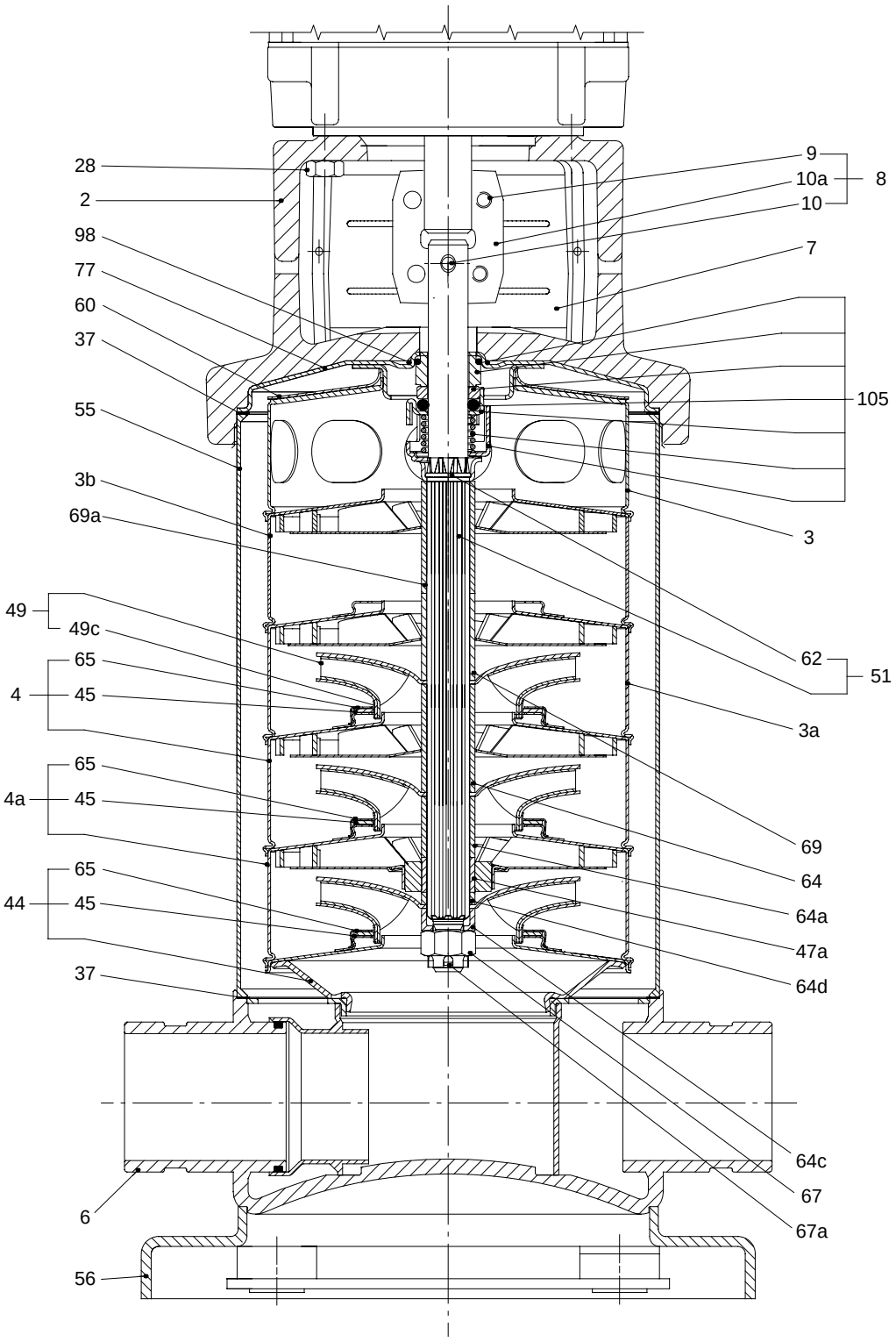
(pumps with three stages or more)



GRUNDFOS

Sectional drawing

(pumps with three stages or more)



TM01 7393 1202

Subject to alterations.

GRUNDFOS