

# Service instructions



**MTR 10, 15 and 20**

**50/60 Hz**

**1/3~**

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# 1. Type identification

## 1.1 Nameplate

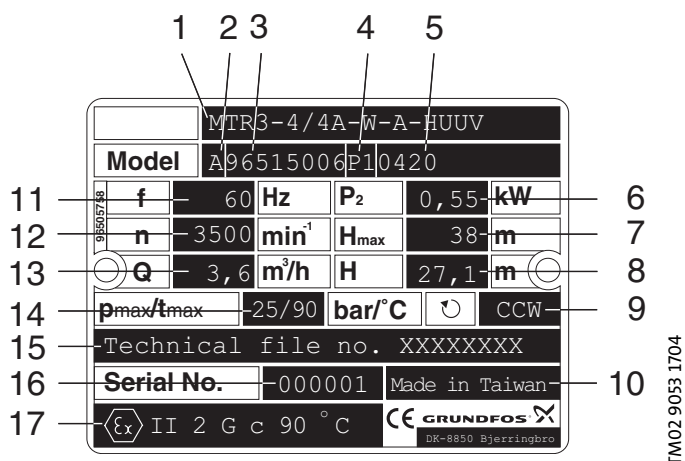


Fig. 1. Nameplate with 60 Hz data

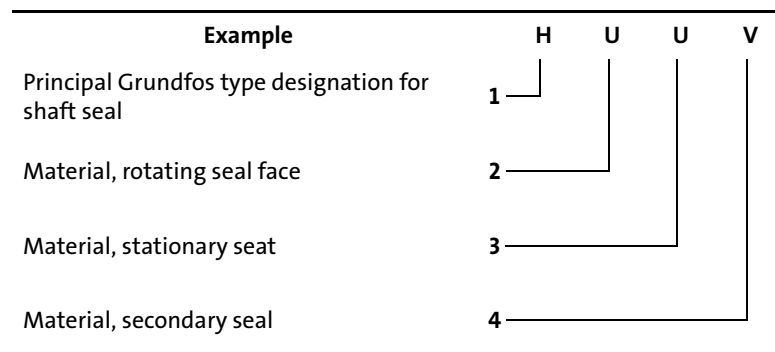
Pos.	Description	Pos.	Description
1	Type designation	10	Country of production
2	Model	11	Frequency
3	Product number	12	Speed
4	Place of production	13	Rated flow rate
5	Production year and week	14	Maximum pressure and temperature
6	$P_2$	15	The number of the copy of the technical file kept with KEMA (stated if the pump is ATEX classified)
7	Closed valve head, 50 Hz	16	The serial number of the pump (stated if the pump is ATEX classified)
8	Head at rated flow rate, 50 Hz	17	ATEX category (stated if the pump is ATEX classified)
9	Direction of rotation: CCW: Counter-clockwise CW: Clockwise		

## 1.2 Type key

Example	MTR	10	-4	/ 4	A	-W	-A	-HUUV
Type range								
Rated flow rate m <sup>3</sup> /h								
Number of stages								
Number of impellers in the pump								
Code for pump version								
A = Basic version								
B = Oversize motor								
P = Undersize adapter flange (one flange size smaller)								
T = Oversize adapter flange (two flange sizes bigger)								
X = Special version								
Code for pipe connections								
M = Changed flange connection								
W = Internally threaded								
Code for materials								
A = Standard								
I = Stainless steel parts of DIN W.-Nr. 1.4301 / AISI 304 or similar class								
Code for shaft seal, see <a href="#">1.3 Code for shaft seal</a> .								

### 1.3 Code for shaft seal

The code for shaft seal always consists of four letters.



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

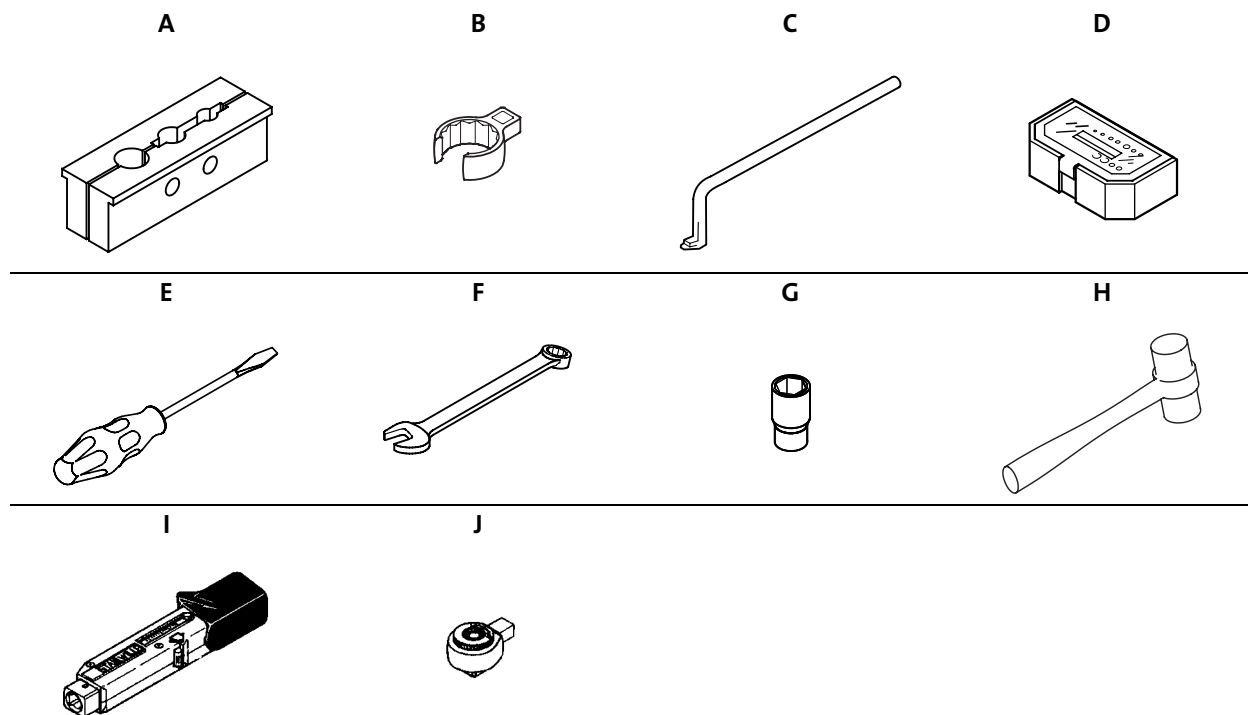
## 2. Torques and lubricants

Pos.	Designation	Quantity	Dim.	Torque [Nm]	Lubricant
7.a	Screw	4	M4	3 ± 0.25	-
9	Hexagon socket head screw	4	M6	13 ± 1.5	Thread-Eze
			M8	31 ± 3	
			M10	62 ± 6	
28	Hexagon head screw	4	M6	?	Thread-Eze
			M8	?	
			M12	?	
			M16	?	
36	Nut for strap	2	M8	18 ± 1	Gardolube
		4	M10	20 ± 4	
			M12	50 ± 5	
36a	Nut	4	M6	5 ± 1	Thread-Eze
			M8	12 ± 2	
			M12	30 ± 3	
			M16	40 ± 8	
105	Shaft seal	1	M33	35 ± 7	Soapy water
113	Set screw	3	M5	2.5 ± 0.25	-
122	Lock nut	1	M8	12 ± 2	Gardolube
			M12	40 ± 8	

Thread-Eze, part no. SV9997 (0.5 l).

Gardolube L 6034, part no. SV9995 (1 l).

### 3. Service tools



#### 3.1 Special tools

Pos.	Designation	For pos.	Description	Part number
A	Shaft holder for assembly			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, 113		SV2010
E	Screwdriver	105	Straight slot	-
		7a	Torx TX20	-
F	Ring/open-end spanner	28, 36, 122	M6 - 10 mm	SV0083
			M8 - 13 mm	SV0055
			M12 - 19 mm	SV0054
			M16 - 24 mm	SV0122
G	Socket	28, 36	M6 - 10 mm	SV0806
			M8 - 13 mm	SV0091
			M12 - 19 mm	SV0267
			M16 - 24 mm	SV0092
H	Plastic hammer		No. 2	SV0349

**3.3 Torque tools**

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

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 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.

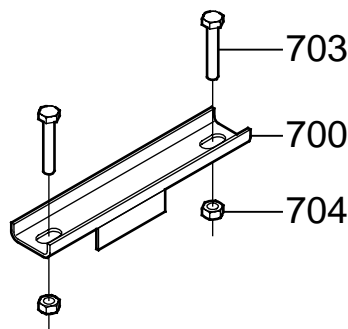


Fig. 1 Transport bracket pos. 700

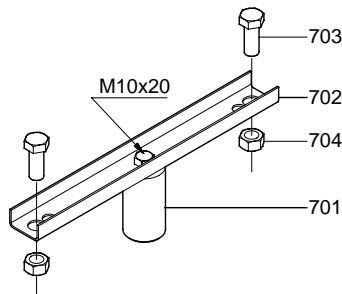


Fig. 2 Transport bracket pos. 701 and 702

Flange size	Fig. 1	Fig. 2		Hexagon head screw		Nut
	Transport bracket complete pos. 700	Shaft stub pos. 701	Rail pos. 702	pos. 703 (2 pcs.)		pos. 704 (2 pcs.)
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 1/2"	96467385
254TC	-	96508078	96508074	96491112	UNC 1/2" x 2 1/2"	96467385
284TSC	-	96508078	96508074	ID1840	UNC 1/2" x 25	96467385

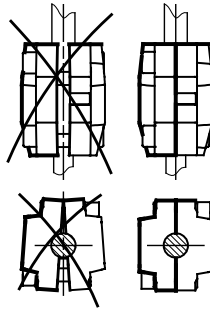
### 4.1.1 Fitting the transport bracket

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.
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 three of 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. Slacken the screws pos. 113 by  $\frac{1}{4}$  turn.
9. Lift the shaft pos. 51 and fit the adjusting fork.
10. Tighten the screws pos. 113 with 2.5 Nm.
11. Fit the motor to the pump head.
12. Fit the screw pos. 28, lubricate and tighten them diagonally to the torque stated, see [2. Torques and lubricants](#).
13. Fit the pin pos. 10 and the two coupling halves pos. 10a.
14. Lubricate the four screws pos. 9 with Thread-Eze and fit them.
15. Check that the gaps either side of the coupling halves are equal.



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Fig. 3 Gaps between coupling halves

16. Tighten the screws pos. 9 to the torque stated, see [2. Torques and lubricants](#), and remove the adjusting fork.
17. Check that the shaft rotates freely and noiselessly.
18. Place the adjusting fork on the inside of one of the coupling guards.
19. Fit the coupling guards pos. 7 and the screws pos. 7a.

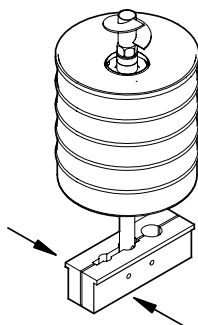
## 4.2 Dismantling the pump

### 4.2.1 Removing the motor, coupling and shaft seal

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.
5. Slacken the three screws of the shaft seal pos. 113 by approx.  $\frac{1}{4}$  of a turn.
6. 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.
7. Pull the shaft seal off the shaft.

### 4.2.2 Dismantling the chamber stack

1. Remove motor, coupling and shaft seal, see [4.2.1 Removing the motor, coupling and shaft seal](#)
2. Place the shaft holder [pos. A](#) in a vice, but do not tighten the vice.
3. Remove the nuts pos. 36 together with the washers pos. 66a.
4. Remove the straps pos. 26a, the strainer pos. 84 and the inlet parts pos. 44 and 121.
5. Loosen the chamber stack with a light blow and pull it off.
6. Fit the shaft pin pos. 10 into the shaft pin hole, place the chamber stack in the shaft holder [pos. A](#) and tighten the vice.



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**Fig. 4** Fitting the chamber stack in the holder

7. Remove the nut pos. 122, the washer pos. 66 and the splined clamp pos. 64c.
8. Remove the chamber stack parts: impellers, spacing pipes, chambers and bearing rings.
9. Remove the driver pos. 61.
10. 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](#).
11. **MTR 15 and 20:**  
If the wear rings of the impellers pos. 49a are worn, remove them with the puller for neck ring [pos. C](#).
12. Remove the gasket pos. 37.

## 4.3 Assembly

### 4.3.1 Assembling the chamber stack

1. Fit the neck rings into the chambers pos. 45, if removed.
2. **MTR 15 and 20:**  
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 shaft 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. 64c, washer pos. 66 and nut pos. 122 and tighten to the torque stated, see [2. Torques and lubricants](#).
9. Fit the gasket pos. 37.
10. Slacken the vice and fit the chamber stack on the pump head pos. 2.
11. Fit the inlet parts pos. 44 and 121, the strainer pos. 84 and the straps pos. 26a.  
**Note:** The holes for the straps are positioned asymmetrically.
12. Fit the washers pos. 66a and the nuts pos. 36 fixing the straps to the pump head.
13. 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 to the torque stated, see [2. Torques and lubricants](#).

### 4.3.2 Fitting the shaft seal, coupling and motor

1. Assemble the chamber stack, see [4.3.1 Assembling the chamber stack](#).
2. If necessary, clean and smooth the shaft end using the holder with emery cloth supplied with the shaft seal kit.
3. Moisten the shaft end with soapy water.
4. Press the shaft seal on the shaft, screw it into the pump head and tighten it with 35 Nm using the ring insert tool for shaft seal [pos. B](#).
5. Press home the shaft.
6. Press the ring with the three set screws pos. 113 against the hexagon plug.
7. Tighten the screws pos. 113 with 2.5 Nm.
8. Lift the chamber stack by inserting a screwdriver or similar tool in the hole for the pin in the shaft and fit the adjusting fork fitted to one of the coupling guards.

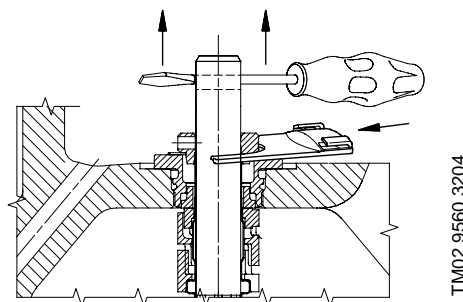
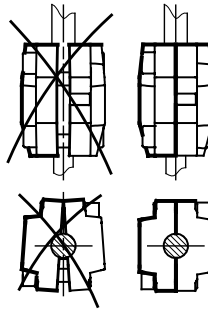


Fig. 5 Fitting the adjusting fork

9. Fit the motor to the pump head.
10. Fit the screws pos. 28, lubricate and tighten them diagonally to the torque stated, see [2. Torques and lubricants](#).
11. Fit the pin pos. 10 and the two coupling halves pos. 10a.
12. Lubricate the four screws pos. 9 with Thread-Eze and fit them.

- Check that the gaps either side of the coupling halves are equal.



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**Fig. 6** Gaps between coupling halves

- Tighten the screws to the torque stated, see [2. Torques and lubricants](#), and remove the adjusting fork.
- Check that the shaft rotates freely and noiselessly.
- Place the adjusting fork on the inside of one of the coupling guards.
- Fit the coupling guard pos. 7 and the screws pos. 7a.

#### 4.4 Checking and replacing impellers/wear rings and neck rings

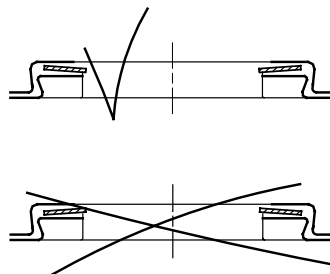
##### Impellers/wear rings

- Check whether there is a noticeable groove in the impeller skirts (CR 10) or wear rings (CR 15 and 20) caused by friction (use a finger nail).
- 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.

- Push the retainer for neck ring free of the chamber using the puller for neck ring [pos. C](#).
- Remove the neck ring pos. 45.
- Fit a new neck ring in the chamber.



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**Fig. 7** Correct fitting of neck ring

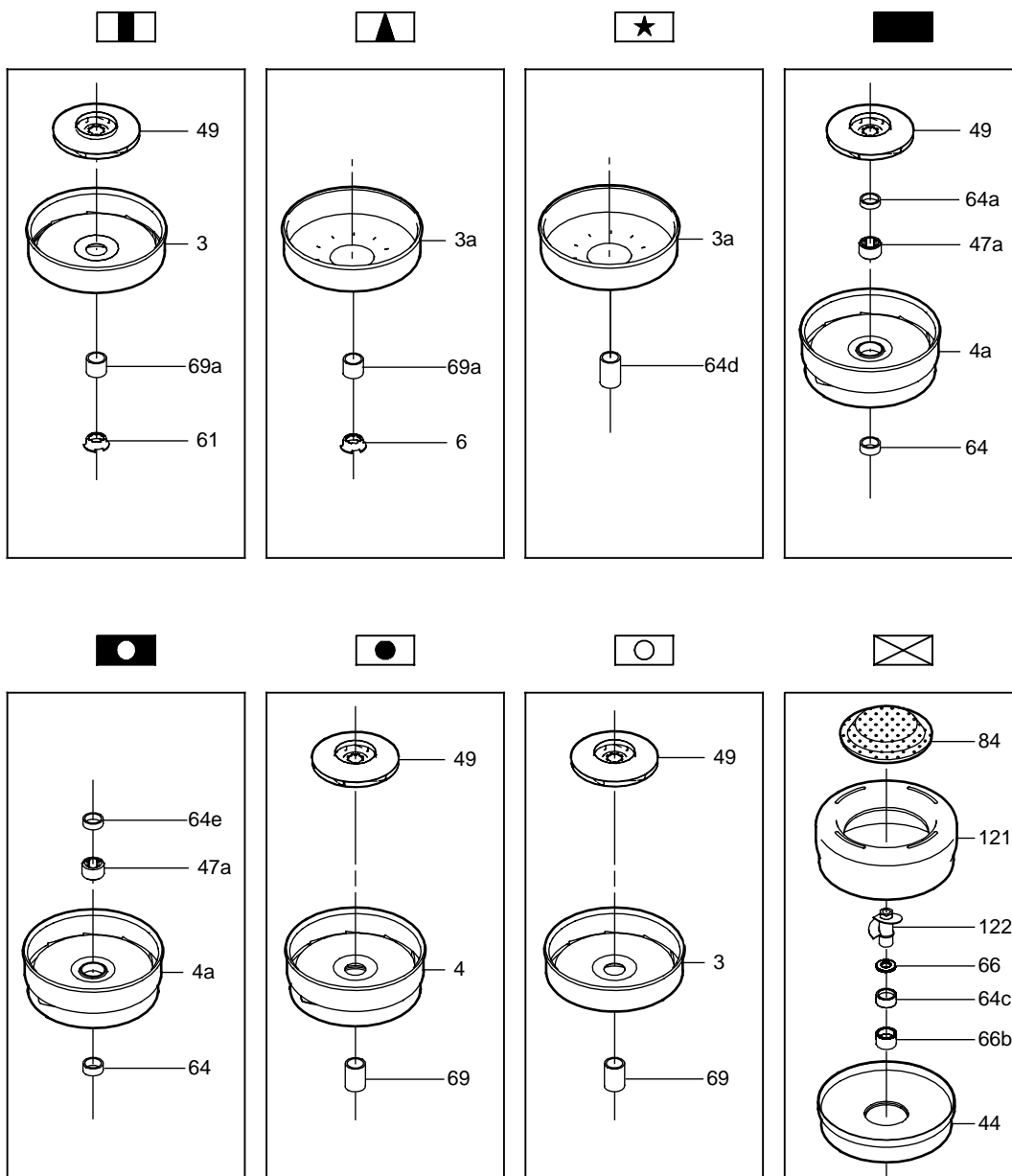
- Press the retainer for neck ring down on the neck ring and make it engage with the chamber. It must be possible to move the neck ring freely (sideways) between the retainer and the chamber.

##### Bearing rings

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

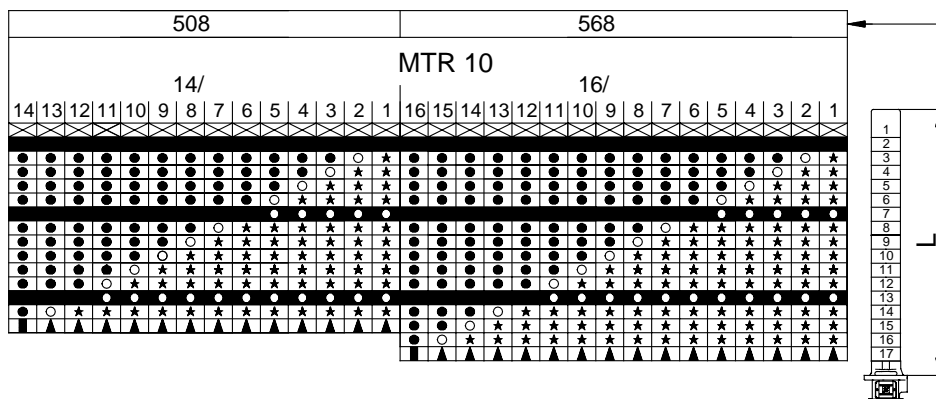
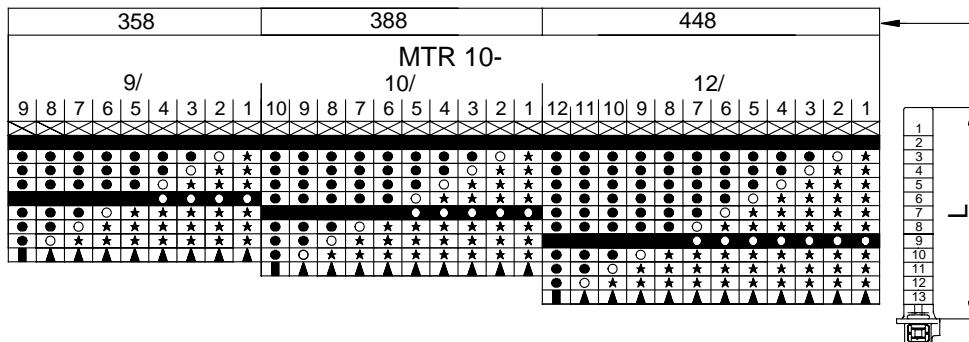
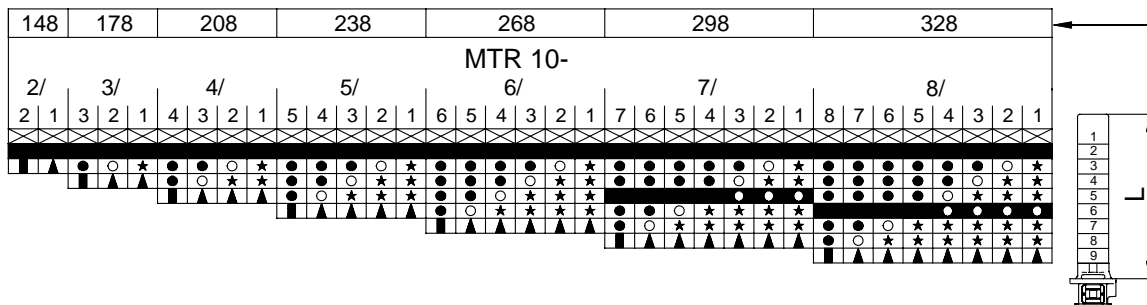
## 5. Order of assembly for chambers and impellers

### 5.1 Overview of chambers for MTR 10



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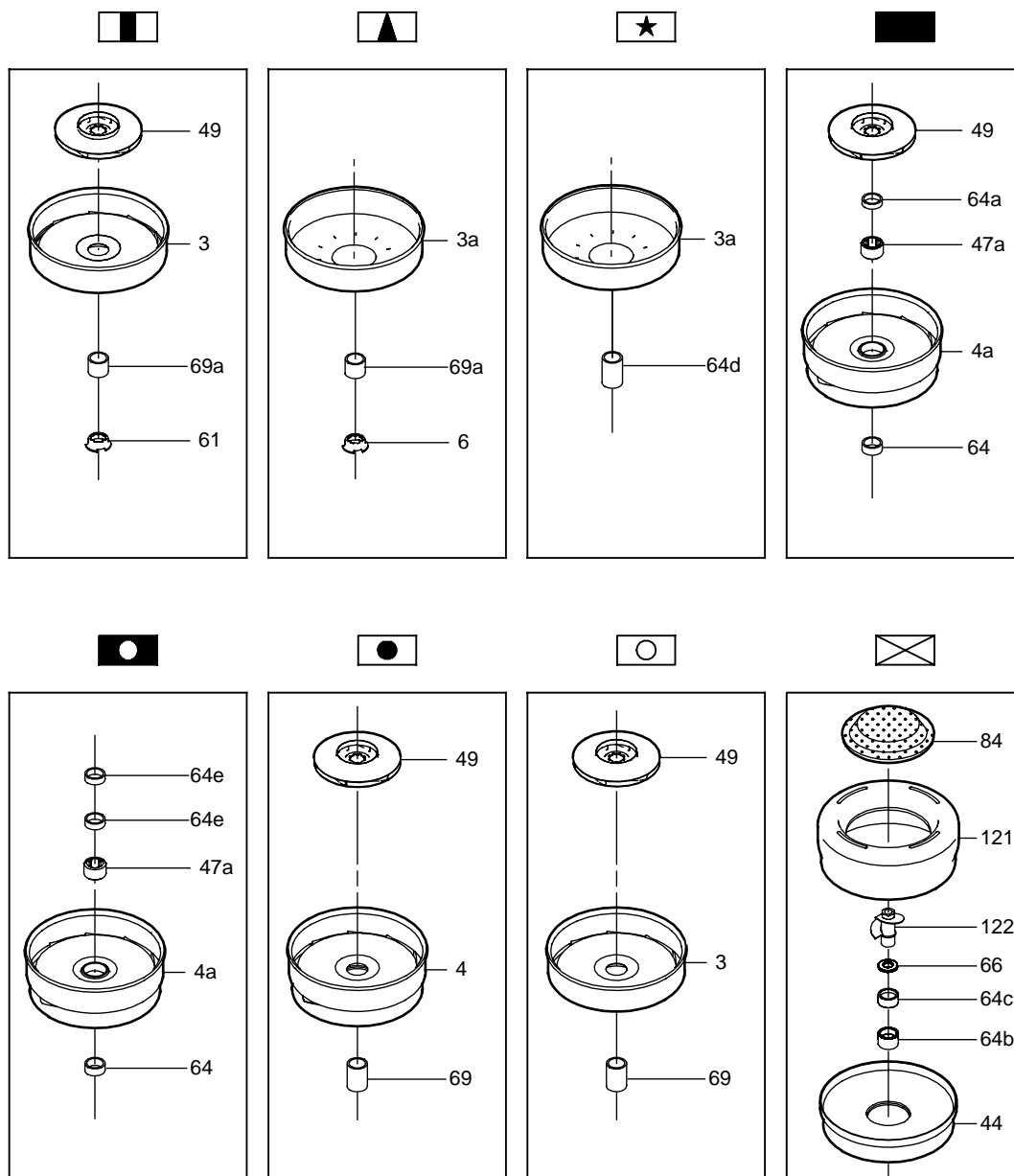
### 5.2 Positioning of chambers in MTR 10-2 up to MTR 10-16



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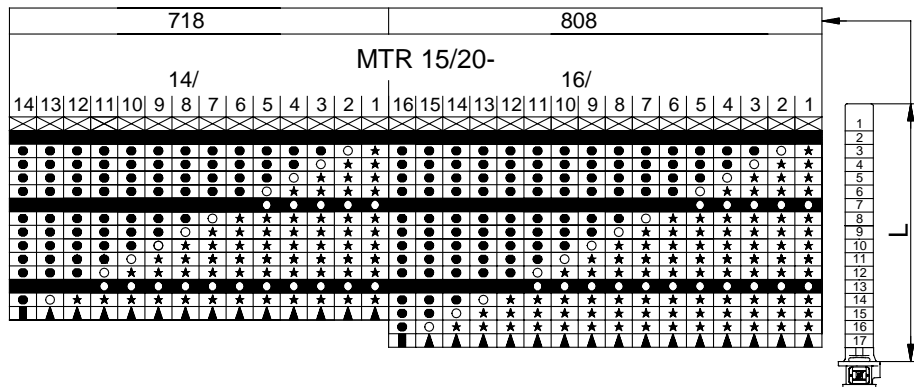
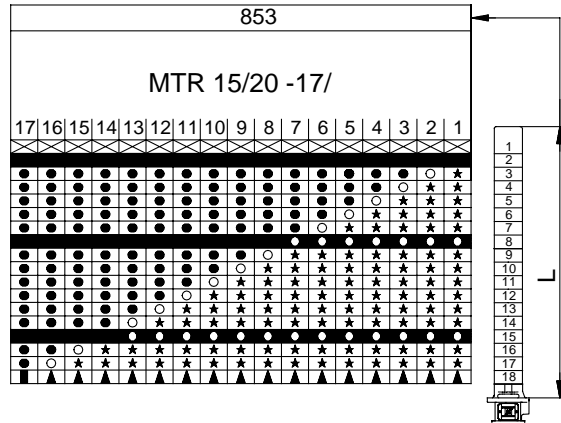
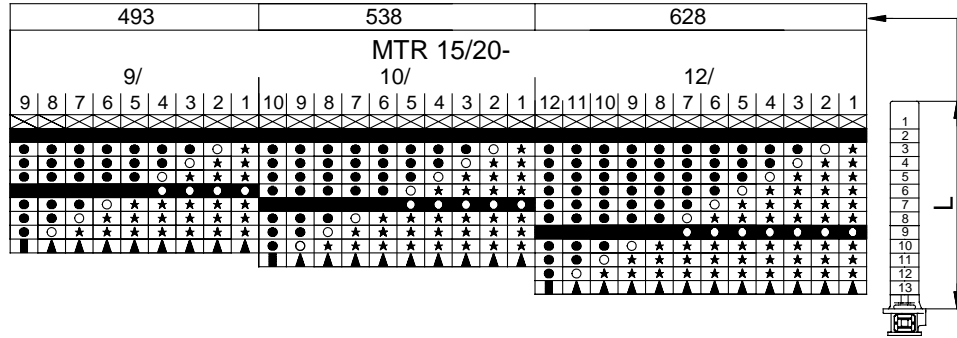
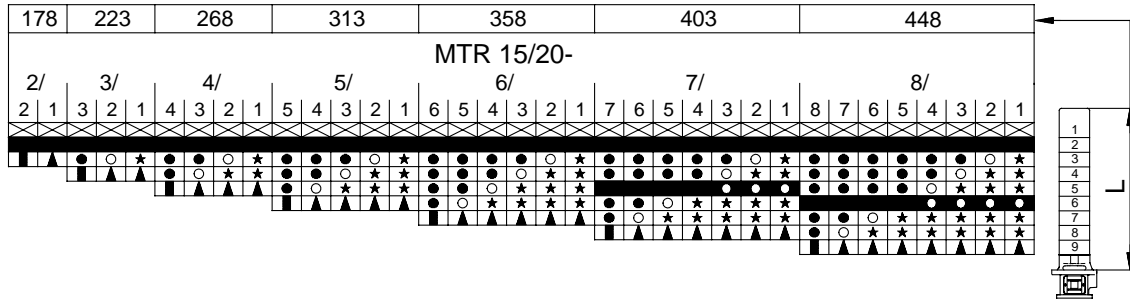


## 5.4 Overview of chambers for MTR 15 and MTR 20



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## 5.5 Positioning of chambers in MTR 15 and MTR 20



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