

MTR, MTRE 1s, 1, 3, 5, 8

Service instructions



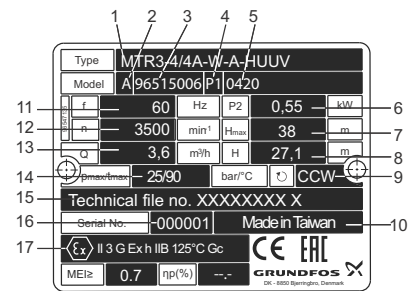
Original service instructions

These service instructions cover the basic pump version (A) and the drainage-back-to-tank pump version (D) of MTR, MTRE 1s, 1, 3, 5, 8.

Note that some parts of the pump were replaced in August 2015 (week 32). These service instructions apply to pumps before and after this date. See section 6. *Order of assembly for chambers and impellers.*

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1. Type identification**1.1 Nameplate****Fig. 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
8	Head at rated flow rate
9	Direction of rotation CCW: Counterclockwise CW: Clockwise
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 DEKRA (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	MTR	E	32	(s)	2	/1	1	A	F	A	H	UU	V
Pump type													
Pump with integrated frequency control													
Rated flow rate [m ³ /h]													
All impellers with reduced diameter (only MTR 1s)													
Number of chambers. See fig. 2.													
Number of impellers. See fig. 2.													
Number of impellers with reduced diameter													
Pump version													
A Basic version													
B Oversize motor													
C Inlet pipe													
D Drainage back to tank													
E Pump with certificate/approval													
F 120 °C version													
H Horizontal version													
HS High pressure													
J Pump with different maximum speed													
P Undersize motor													
T Double oversize													
X Special version													
Pipe connection													
F DIN flange													
G ANSI flange													
J JIS flange													
M Square flange with internal thread													
W Internal thread													
WB NPT internal thread													
X Special version													
Materials													
A Basic version													
I Wetted parts, EN/DIN 1.4301/AISI 304													
N Wetted parts, EN/DIN 1.4401/AISI 316													
X Special version													
Shaft seal													
A O-ring seal with fixed seal driver													
H Balanced cartridge seal													
Q Silicon carbide													
U Tungsten carbide													
B Carbon													
E EPDM													
F FXM													
K FFKM													
V FKM													

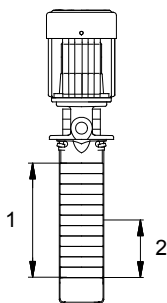


Fig. 2 MTR pump

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Pos.	Description
1	Number of chambers
2	Number of impellers

1.3 Code for shaft seal

The code for shaft seal always consists of four letters:

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

The following codes are used:

Pos.	Code	Description
1	A	O-ring seal with fixed seal 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
2 and 3	X	Special version
	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
4	V	Aluminium oxide
	X	Other ceramics
	E	EPDM
	F	FXM
	P	NBR (nitrile rubber)
	T	PFTE
	V	FKM
K	FFKM	

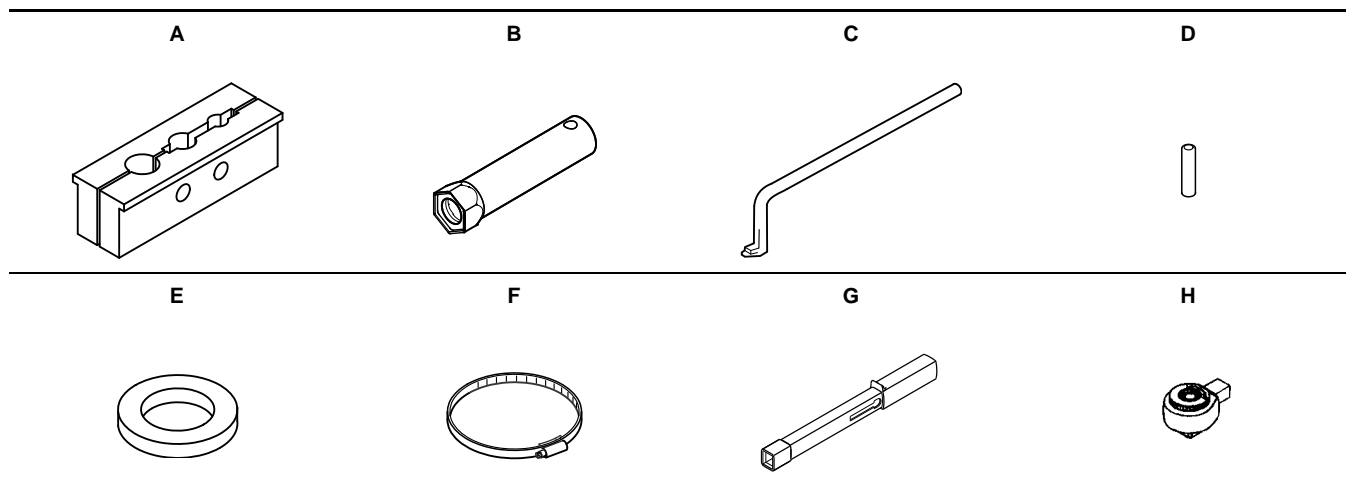
2. Torques and lubricants

Pos.	Designation	Quantity	Dimension	Torque [Nm]	Lubricant
7a	Screw	4	M4	3 ± 0.25	-
			M6	13 ± 1.5	
9	Hexagon socket head screw	4	M8	31 ± 3	Thread-Eze
			M10	62 ± 6	
		2	M8	18 ± 1	
36	Nut for strap	4	M10	20 ± 4	Gardolube
			M12	50 ± 5	
			M6	5 ± 1	
36a	Nut	4	M8	12 ± 2	Thread-Eze
			M12	30 ± 3	
			M16	40 ± 8	
			M8	12 ± 2	
67	Lock nut	1	M12	40 ± 8	Gardolube
84b	Screw for filter	1	M4	3 ± 0.25	-
105	Shaft seal	1	M28	35 ± 7	Soapy water
113	Set screw	3	M5	2.5 ± 0.25	-

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	Box spanner for shaft seal	105		SV2007
C	Puller for neck ring	65		SV0239
D	Punch for removing the shaft			SV0238
E	Mounting ring			SV0872
F	Mounting band			SV0871

3.2 Torque tools

Pos.	Designation	For pos.	Description	Part number
G	Torque wrench	9, 26b, 28a, 36, 67, 105, 113	1-6 Nm	SV0438
			4-20 Nm	SV0292
			20-100 Nm	SV0269
H	Ratchet insert tool	I	9 x 12, 1/2" x 1/2"	SV0295

4. Dismantling and assembling pump version A

MTR	E	32	(s)	2	/1	1	A	F	A	H	UU	V
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Fig. 3 Example of type key for pump version A (basic version)

Position numbers

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

Before dismantling the product

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

Before assembling the product

Always replace gaskets and O-rings when the pump is overhauled.

1. Clean and check all parts.
2. Order the necessary service kits.
3. Replace defective parts with new parts.

During assembly

4. Lubricate and tighten screws and nuts to the torque stated. See section 2. *Torques and lubricants*.

4.1 Dismantling the product

4.1.1 Removing the motor, coupling and shaft seal

1. Remove the screws (7a) together with the coupling guards (7).
2. Remove the screws (9) together with the coupling halves (10a) and the shaft pin (10).
3. Remove the screws (28).
4. Lift the motor off the pump head (2).
5. Loosen the three screws of the shaft seal (113) by approximately 1/4 of a turn.
6. Loosen the shaft seal (105) using the box spanner for shaft seal (B) until the thread is completely free of the pump head.
7. Pull the shaft seal off the shaft.

4.1.2 Dismantling the chamber stack

1. Remove the motor, the coupling and the shaft seal. See section 4.1.1 *Removing the motor, coupling and shaft seal*.
2. Place the shaft holder (A) in a vice, but do not tighten the vice.
3. Remove the nuts (36) together with the washers (66a).
4. Remove the straps (26a), the retainer for strainer (121) and the bottom chamber (5a).
5. Loosen the chamber stack with a light blow and pull it off.
6. Fit the shaft pin (10) into the shaft pin hole, place the chamber stack in the shaft holder (A) and tighten the vice.

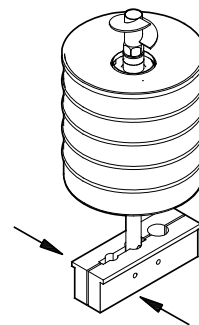


Fig. 4 Fitting the chamber stack in the holder

7. Remove the nut (67), the washer (66), the priming screw (122) and the splined clamp (64c).
8. Remove the chamber stack parts: impellers, spacing pipes, chambers and bearing rings.
9. If the neck rings (45) in the chambers are worn, remove them by pressing off the neck ring retainer (65), using the puller for neck ring (C).
10. Remove the gasket (37).

4.2 Assembling the product

4.2.1 Assembling the chamber stack

1. Fit the neck rings into the chambers (45) if removed.
2. Place the shaft holder (A) in a vice, but do not tighten the vice.
3. Fit the shaft pin (10) into the shaft pin hole, place the shaft in the shaft holder and tighten the vice.
4. Fit the chamber stack parts on the shaft: chamber, spacing pipe, impeller and bearing ring. See section 6. *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 the bearings.
5. Fit the splined clamp (64c), the priming screw (122), the washer (66) and the nut (67) and tighten to the torque stated. See section 2. *Torques and lubricants*.
6. Fit the gasket (37).
7. Loosen the vice and fit the chamber stack on the pump head (2).
8. Fit the bottom chamber (5a), the retainer for strainer (121) and the straps (26a).
Note: The holes for the straps in the retainer for strainer (121) are positioned asymmetrically.
9. Fit the washers (66a) and nuts (36), fixing the straps to the pump head.
10. 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 section 2. *Torques and lubricants*.

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4.2.2 Fitting the shaft seal, coupling and motor

1. Assemble the chamber stack. See section [4.2.1 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 box spanner for shaft seal (B).
5. Press home the shaft.
6. Fit the motor to the pump head.
7. Fit the screws (28), lubricate and tighten them diagonally to the torque stated. See section [2. Torques and lubricants](#).
8. Fit the pin (10) and the two coupling halves (10a).
9. Lubricate the four screws (9) with Thread-Eze and fit them.
10. Check that the gaps on either side of the coupling halves (10a) are equal.

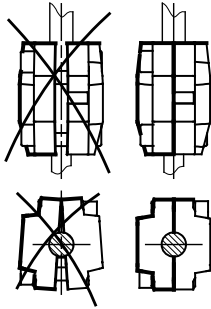


Fig. 5 Gaps between coupling halves (10a)

11. Tighten the screws slightly.
12. Insert a suitable screwdriver between the bottom of the coupling and the shaft seal, and raise the shaft and coupling as far as possible.

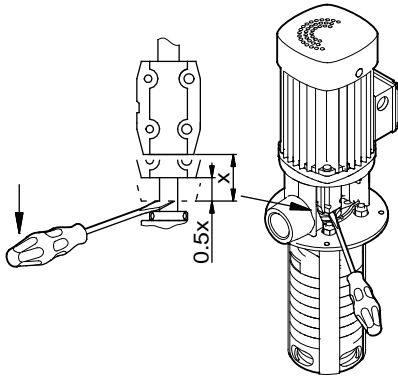


Fig. 6 Raising the shaft

13. Lower the shaft and coupling to half the height.
14. Hold the shaft and coupling in this position and tighten the four screws in the coupling (9) diagonally to the torque stated. See section [2. Torques and lubricants](#). Check that the gaps on either side of the coupling halves (10a) are equal. See fig. 5.
15. Press the ring with the three set screws (113) against the hexagon plug.
16. Tighten the screws (113) with 2.5 Nm.
17. Check that the shaft rotates freely and noiselessly.
18. Fit the coupling guard (7) and the screws (7a).

4.3 Checking and replacing impellers or wear rings and neck rings

Impellers or wear rings

1. Check whether there is a visible groove in the impeller skirts. Use a finger nail.
2. If there is a groove, replace the impellers.

Neck rings

Always replace the neck rings (45) if the chamber stack has been dismantled.

1. Push the neck ring retainer (65) free of the chamber, using the puller for neck ring (C).
2. Remove the neck ring (45).
3. Fit a new neck ring in the chamber.

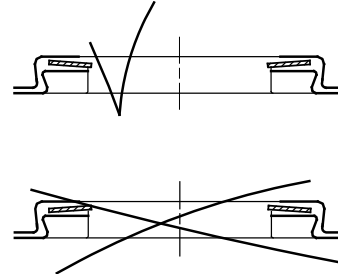


Fig. 7 Correct fitting of neck ring

4. Press the neck ring retainer (65) down on the neck ring (45) 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 edge on the rotating bearing rings (47a). Use a finger nail.
2. The bearing rings (47a) and the chambers with bearing ring (4a) must be replaced at the same time.

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5. Dismantling and assembling pump version D

MTR	E	32	(s)	2	/1	1	D	F	A	H	UU	V
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Fig. 8 Example of type key for pump version D (drainage back to tank)

Position numbers

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

Before dismantling the product

1. Disconnect the power supply to the motor.
2. Remove the outlet pipe and the supply cable in accordance with local regulations.
3. Remove the bolts or screws holding the pump to a possible condensate tank.
4. Lift the pump out of the tank.

Before assembling the product

Always replace nut for shaft, gaskets and O-rings when the pump is overhauled.

1. Clean and check all parts.
2. Order the necessary service kits.
3. Replace defective parts with new parts.

5.1 Dismantling the product

5.1.1 Removing the motor, coupling and shaft seal

1. Remove the screws (7a) together with the coupling guards (7) or remove the coupling guards from the pump head (2) using a screwdriver.
2. Remove the screws (9), the coupling (8) and the shaft pin (10).
3. Remove the screws (28), holding the motor to the pump.
4. Remove the motor.
5. Remove the nuts (36) together with the washers (66a).
6. Remove these parts from the bottom of the pump: retainer for strainer (121), strainer (84) and screws (84b)
7. Remove these parts from the top of the pump: pump head (2) and gasket (37).
8. Pull the rotating shaft seal part free of the shaft.

Note: Do not expose the seal ring to blows or knocks.

9. Hold the shaft by means of a screwdriver inserted in the shaft pin hole while you loosen the nut (67)
10. Remove the nut, the washer (66) and the priming screw (122).
11. Place the shaft holder (A) in a vice and tighten it. Place the pump body in the shaft holder with the threaded shaft end pointing upwards.
12. Screw the punch for dismantling (D) on the threaded shaft end.
13. The first chamber to be removed is always a chamber with bearing ring (4a). See also section 6. *Order of assembly for chambers and impellers*.
Note: Make sure that the chamber is positioned in the recess of the shaft holder and that the shaft can pass freely through and underneath the shaft holder.
14. If the impellers are stuck, use the punch to drive the shaft down through the impellers.
15. Remove the free parts from the shaft.
16. Repeat the procedure until the shaft passes through the shaft holder (A). Take care not to damage the shaft when you drive it free of the last impeller and the spacing pipe (69a).
17. Remove the punch (D) from the threaded shaft end.

Pump head

18. Prise the stationary shaft seal part out of the pump head, using a nylon punch or similar tool. Remove the lip seal (183). Do not expose the stationary shaft seal part to blows or knocks.

Neck ring

19. Release the neck ring (45) by pushing up the neck ring retainer (65), using the puller (C).

5.2 Assembling the product

5.2.1 Assembling the chamber stack

Bearing

The maximum permissible difference between the diameters of the bearing ring (47a) and the bearing in the chamber (4a) is 0.4 mm.

Pump head

1. Moisten the stationary seal ring with O-ring and the recess of the pump head with water. Place the lip seal (183) and press the seal ring home in the pump head with the O-ring against the pump head.

Note: Do not expose the seal ring to blows or knocks.

Impeller

2. Make sure that the impeller fits into the neck ring (45). If the clearance between neck ring and impeller is too large, replace the worn part.

Neck ring

3. Fit the neck ring (45) on the chamber. Then fit the retainer (65) on the neck ring and press it until it engages with the chamber.
It must be possible to move the neck ring freely sideways between the retainer and the chamber.
Note: No neck ring is fitted in the chambers (3, 3a and 5a).
4. Fit the shaft holder (A) in a vice.
5. Fit the shaft (51) in the shaft holder and tighten the vice. The threaded end of the shaft must be uppermost, and the opposite end must be flush with the lower edge of the shaft holder.
6. Continue the assembly. See section 6. *Order of assembly for chambers and impellers*.
7. Fit the nut (67) and tighten it to the torque stated. See section 2. *Torques and lubricants*.
8. Fit the straps into the slits of the retainer for strainer (121).
9. Fit the mounting band (F) in the middle of the pump and tighten it.
10. Loosen the vice and lift the pump body off the shaft holder.
11. Fit the pump body in the mounting ring (E) with the smooth shaft end pointing upwards.
12. Fit the rotating shaft seal part. Moisten the rubber part with water.
13. Fit the rotating seal ring so that the mark in the driving dog and the smooth, lapped face point upwards. Make sure that the O-ring is not damaged on the shaft pin hole and that the seal rings are not exposed to blows or knocks.
14. Before fitting the pump head (2), check that the stationary shaft seal part and the gasket (37) are positioned correctly. Take care not to damage the lip seal (183)
15. Lubricate the seal faces of the seal rings with silicone oil, type VO170038. Only lubricate the seal faces.
16. Fit the pump head to the pump body so that the threaded ends of the straps engage with the holes of the pump head.
17. Lubricate the nuts (36). Fit the nuts and tighten diagonally to the torque stated. See section 2. *Torques and lubricants*.

18. Fit the motor and turn it to the required terminal box position. Lubricate the screws (28). Fit the screws and tighten diagonally to the torque stated. See section 2. *Torques and lubricants*.
19. Fit the shaft pin (10) in the shaft. Fit the coupling (8). Lubricate the screws (9). Fit the screws, tighten and leave loose.
20. Check that the gaps on either side of the coupling halves (10a) are equal.

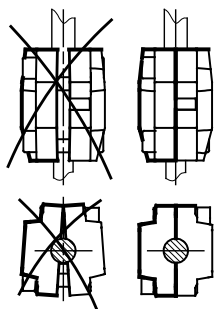


Fig. 9 Gaps between coupling halves (10a)

21. Raise the pump body as far as possible by means of a large screwdriver or a similar tool inserted underneath the coupling. Take care not to raise the motor shaft.
22. Lower the pump body 1 - 1.5 mm from its top position, and tighten the screws two and two (same side). See section 2. *Torques and lubricants*.
23. Check that the gaps on either side of the coupling halves (10a) are equal, and check the pump by turning the coupling. If the pump is tight or it cannot be rotated, adjust the pump once more.
24. Spring the two coupling guards (7) into place or secure them by means of the screws (7a).
25. Remove the mounting band (F).
26. The pump is now assembled.

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5.3 Checking and replacing impellers or wear rings and neck rings

Impellers or wear rings

1. Check whether there is a visible groove in the impeller skirts. Use a finger nail.
2. If there is a groove, replace the impellers.

Neck rings

Always replace the neck rings (45) if the chamber stack has been dismantled.

1. Push the neck ring retainer (65) free of the chamber, using the puller for neck ring (C).
2. Remove the neck ring (45).
3. Fit a new neck ring in the chamber.

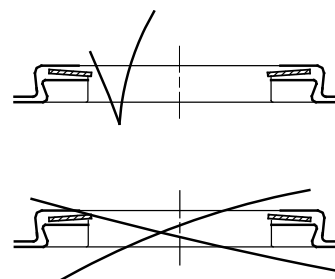


Fig. 10 Correct fitting of neck ring (45)

4. Press the neck ring retainer (65) down on the neck ring (45) 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

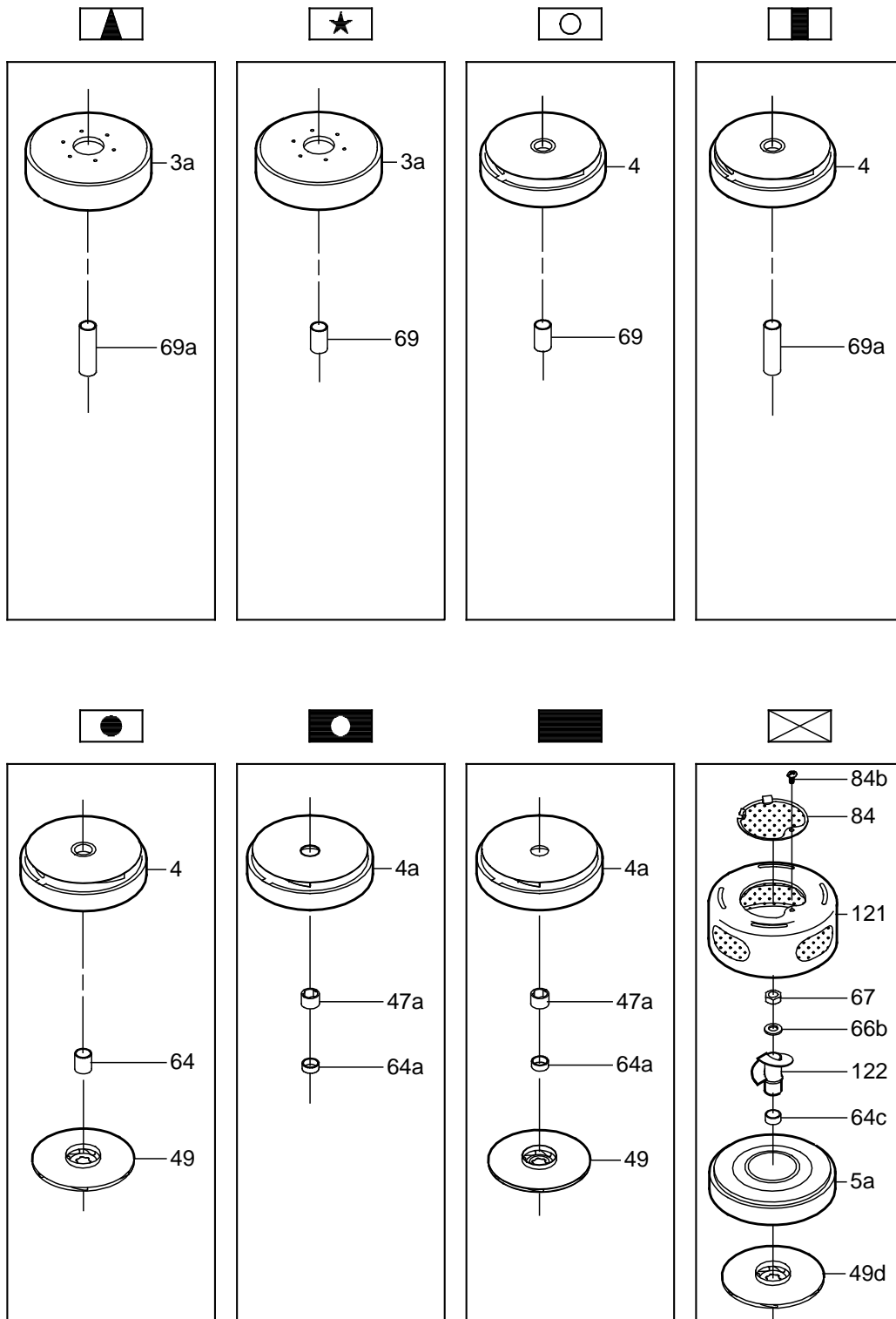
1. Check whether there is a visible edge on the rotating bearing rings (47a). Use a finger nail.
2. Replace the bearing rings (47a) and the chambers with bearing ring (4a) at the same time.

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6. Order of assembly for chambers and impellers

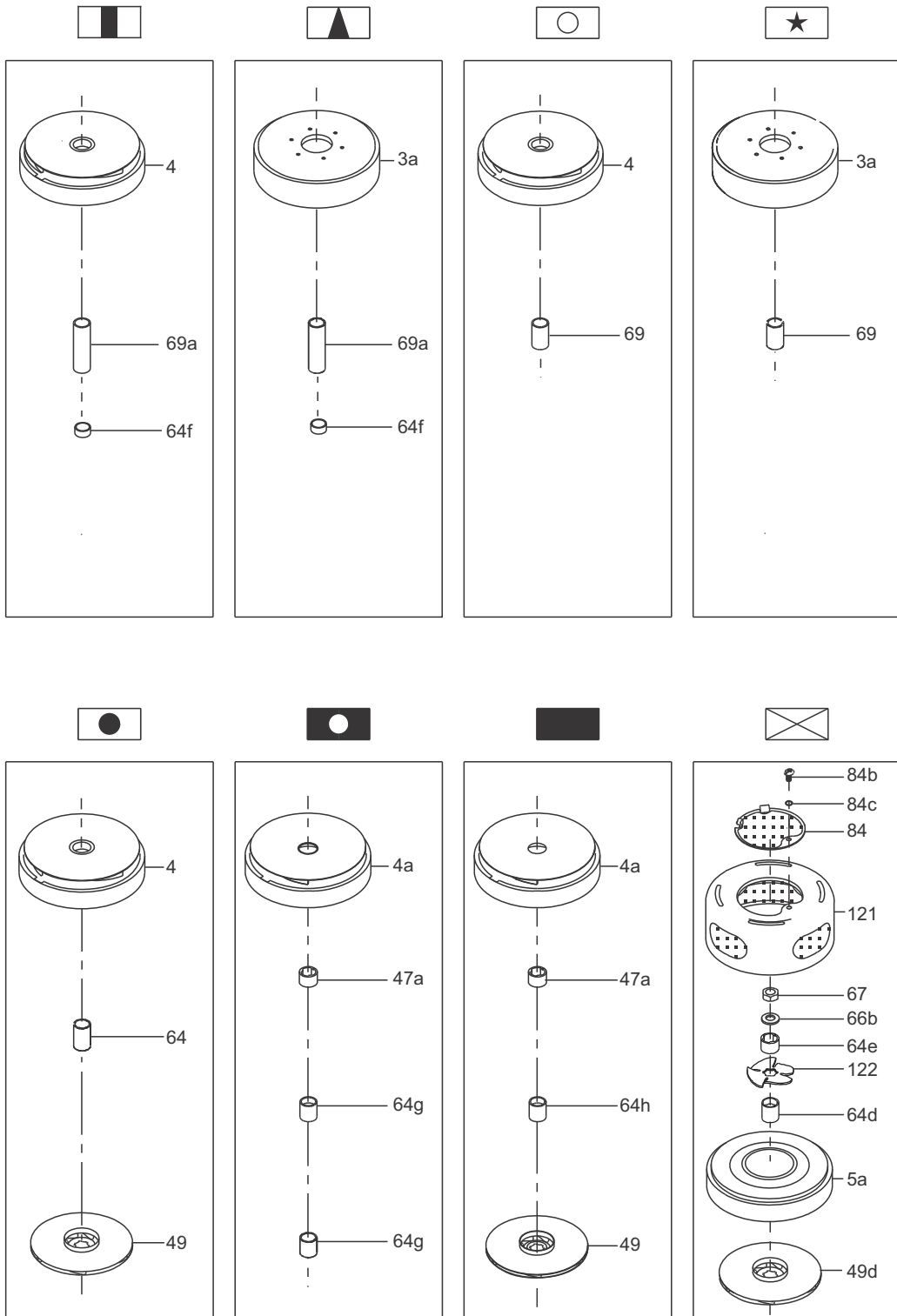
6.1 Overview of chambers for MTR, MTRE 1s, 1, 3, 5 (before 1532, production year and week)

The production year and week is printed on the nameplate. See section [1.1 Nameplate](#).



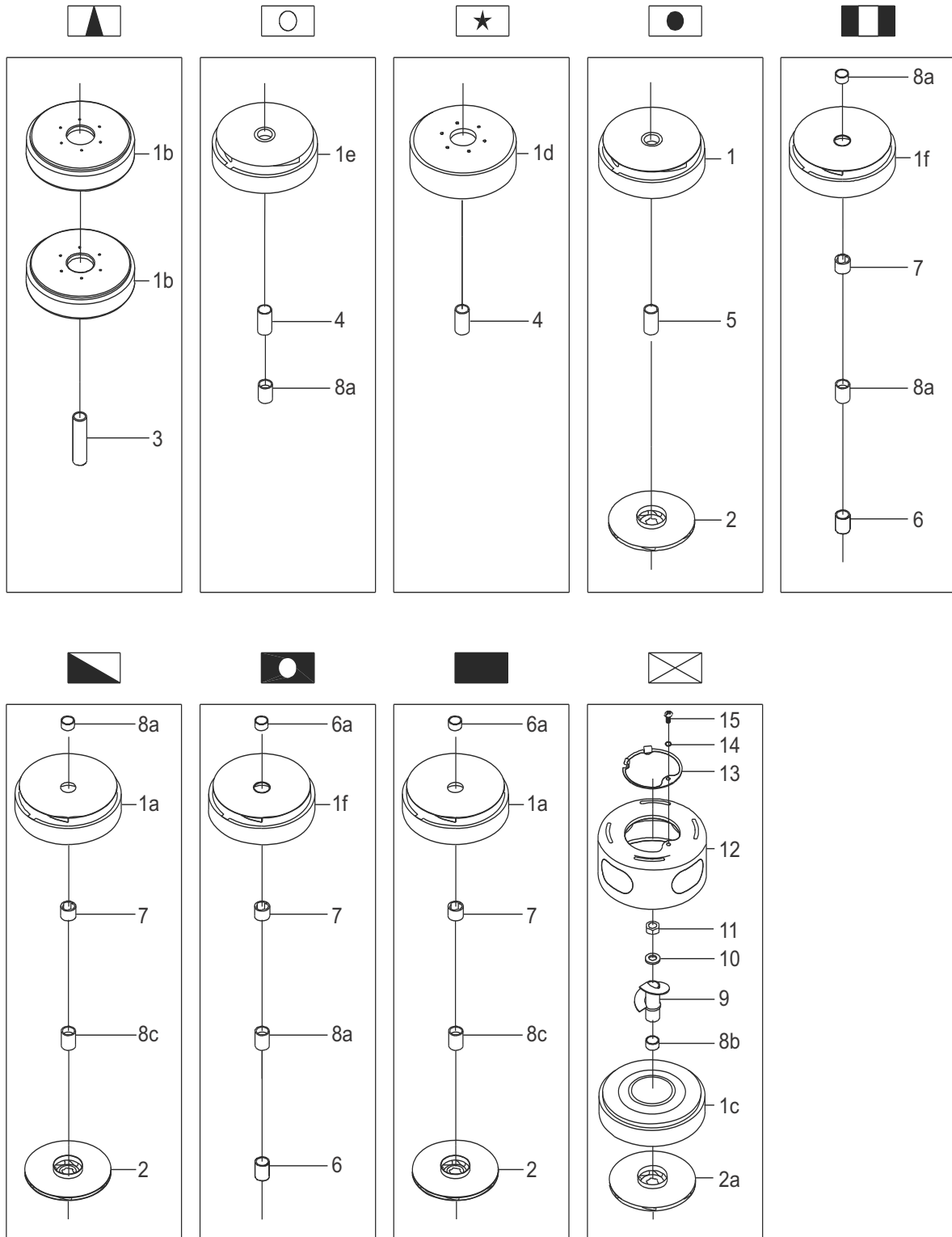
6.2 Overview of chambers for MTR, MTRE 1s, 1, 3, 5 (after 1532, production year and week)

The production year and week is printed on the nameplate. See section [1.1 Nameplate](#).



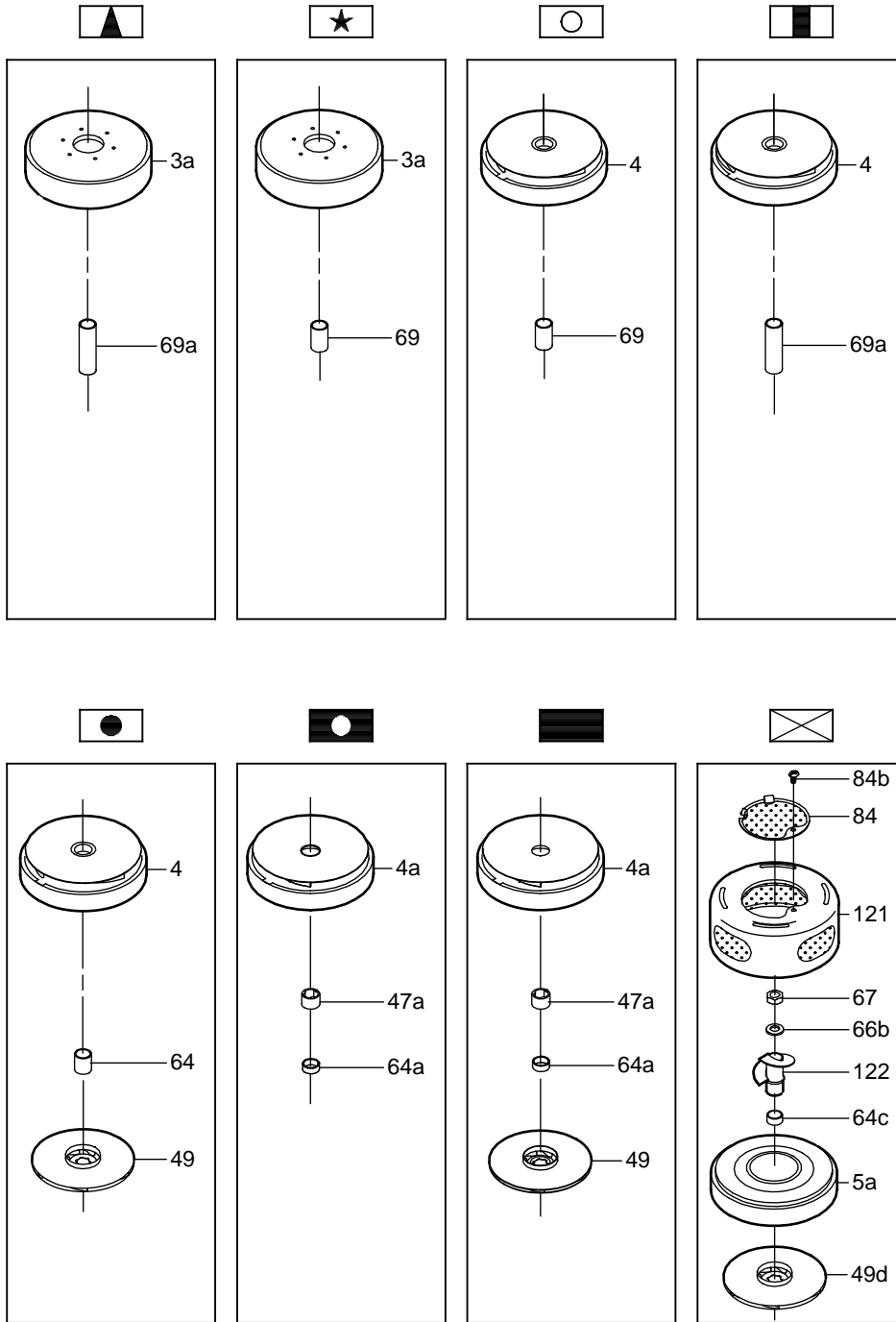
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6.3 Overview of chambers for MTR, MTRE 8



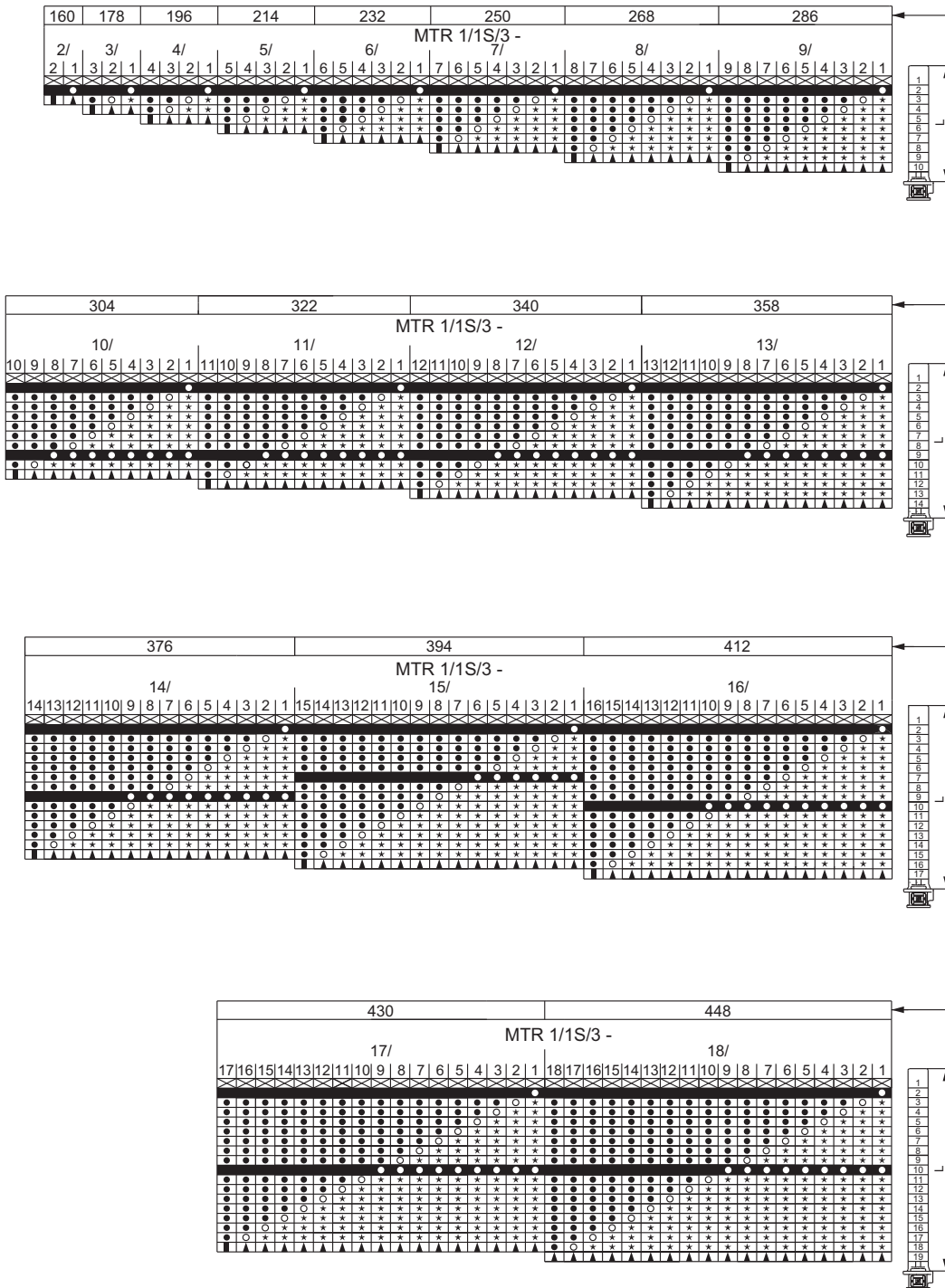
6.4 Overview of chambers for pump version D

See section [1.2 Type key](#)

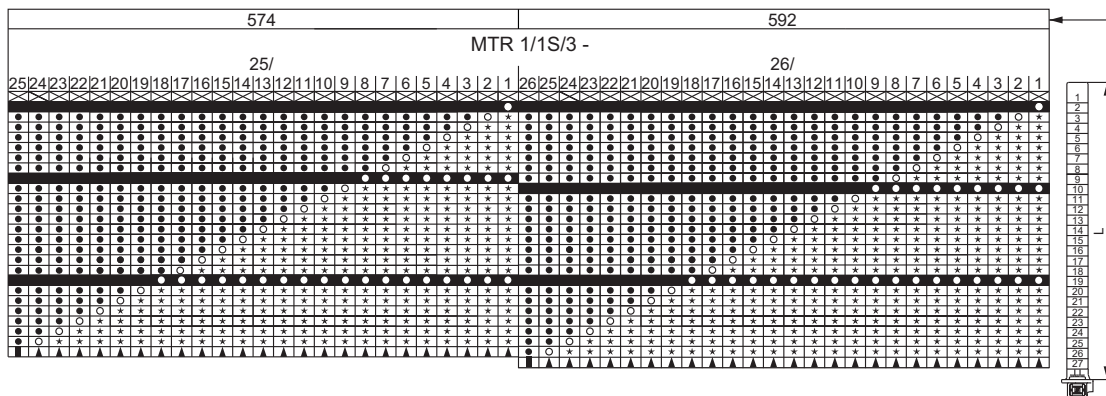
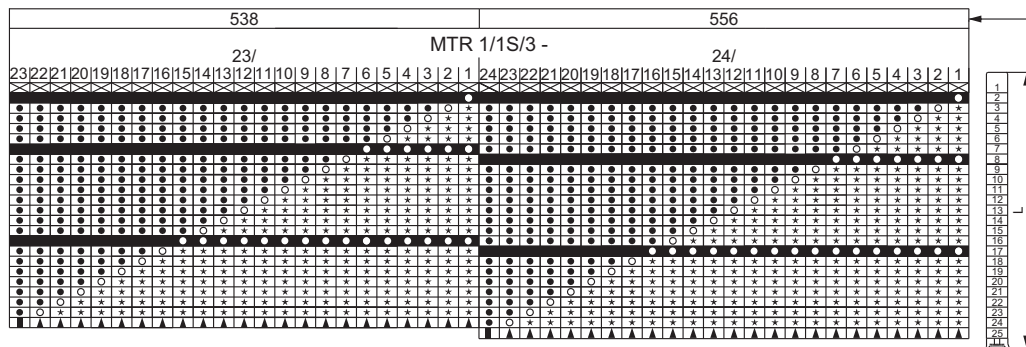
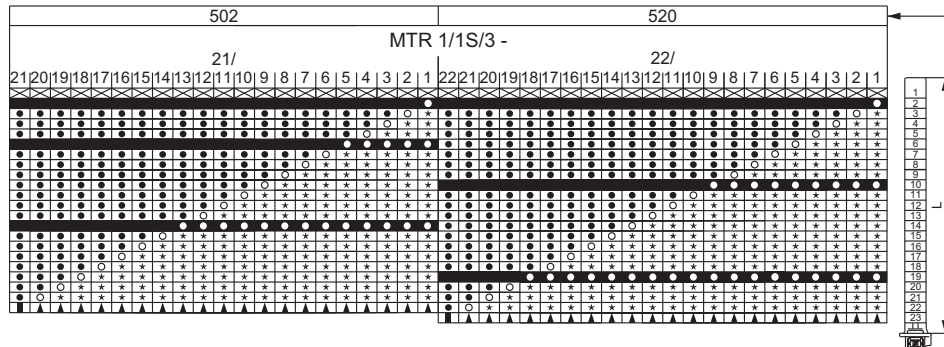
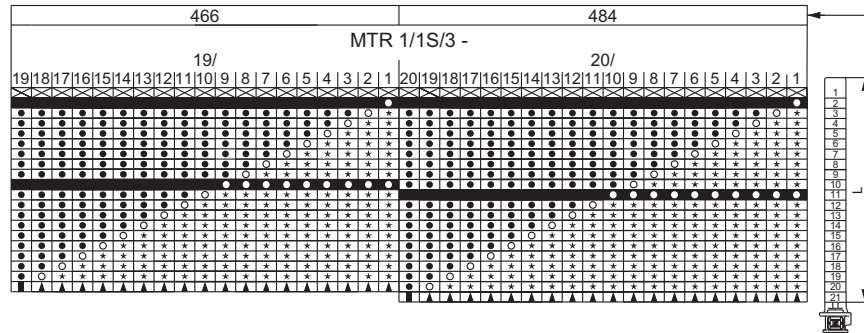


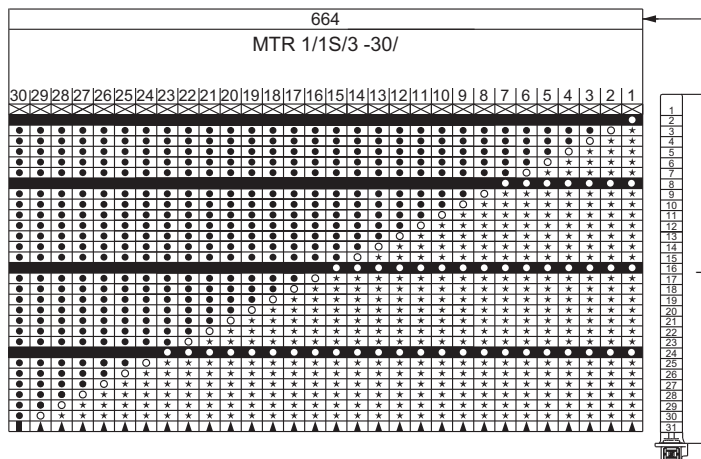
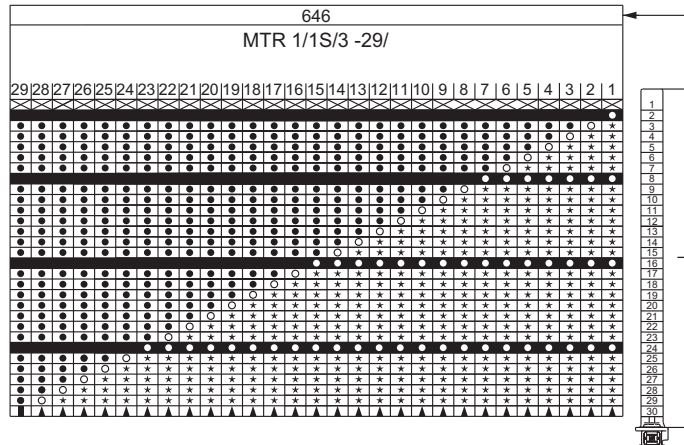
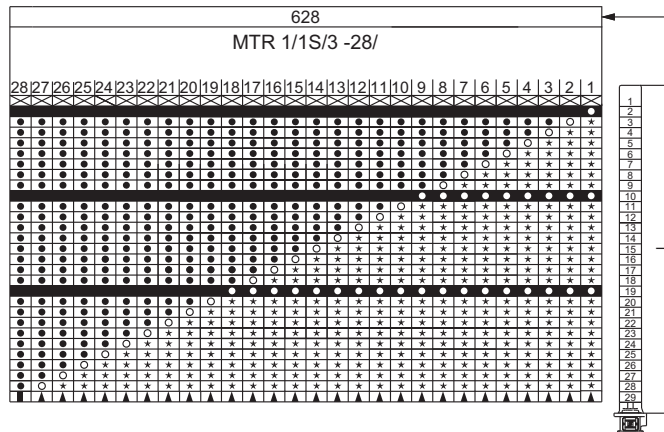
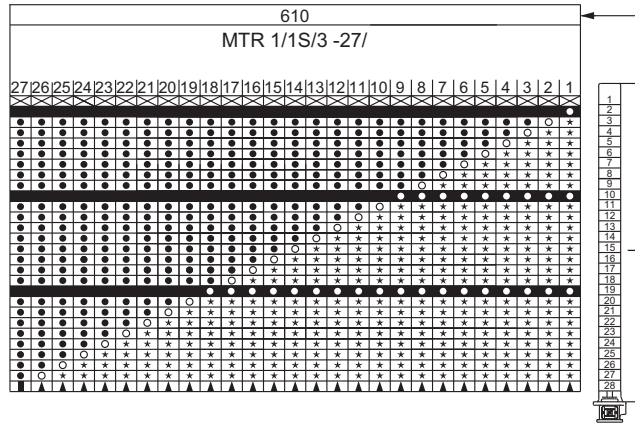
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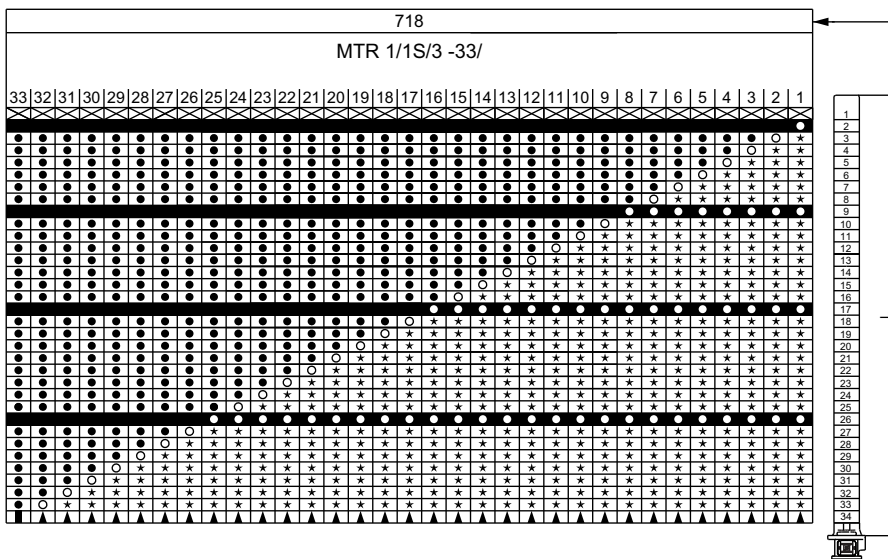
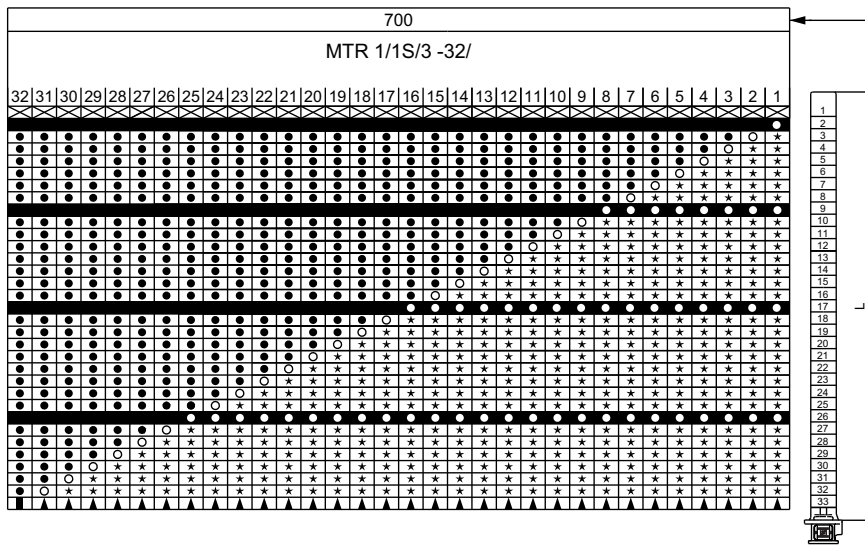
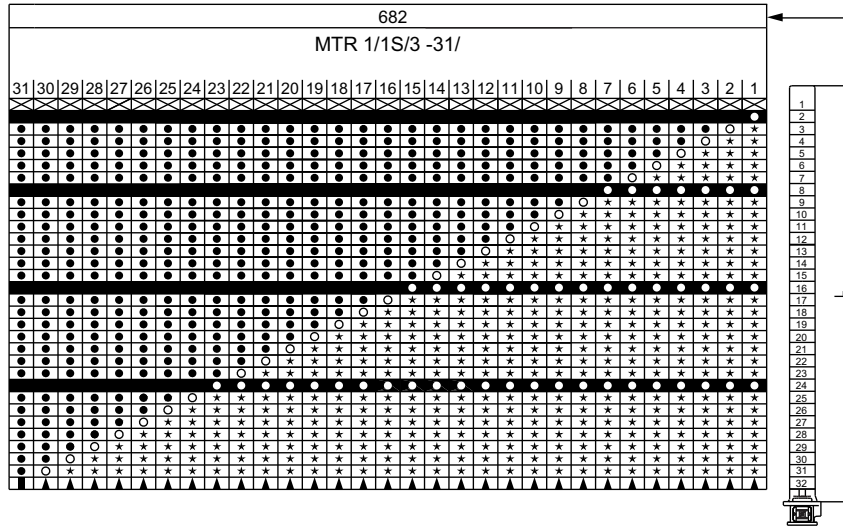
6.5 Positioning of chambers

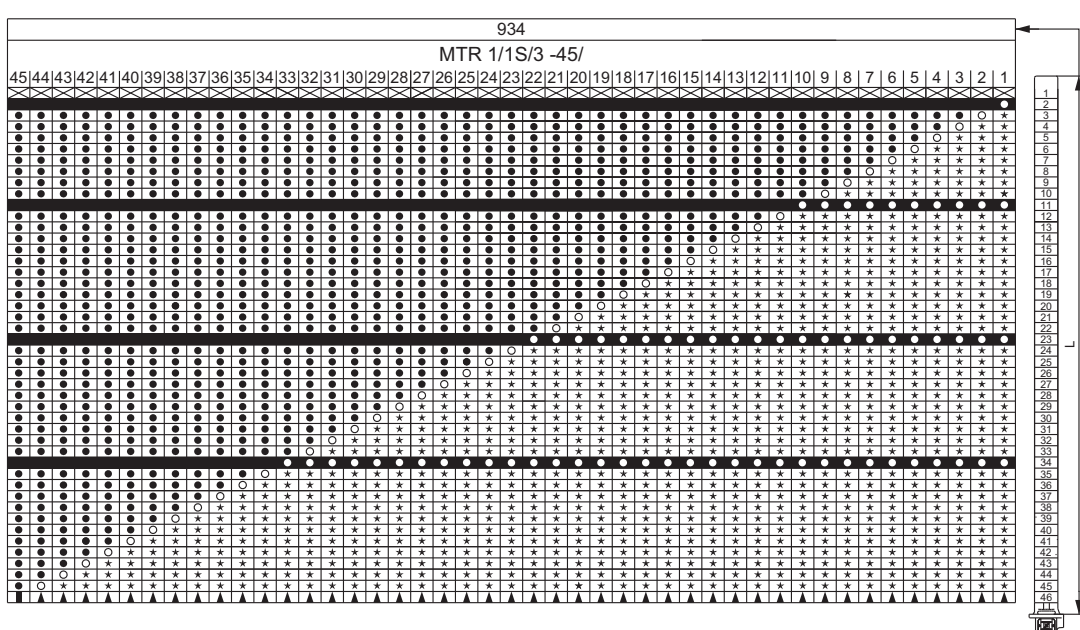
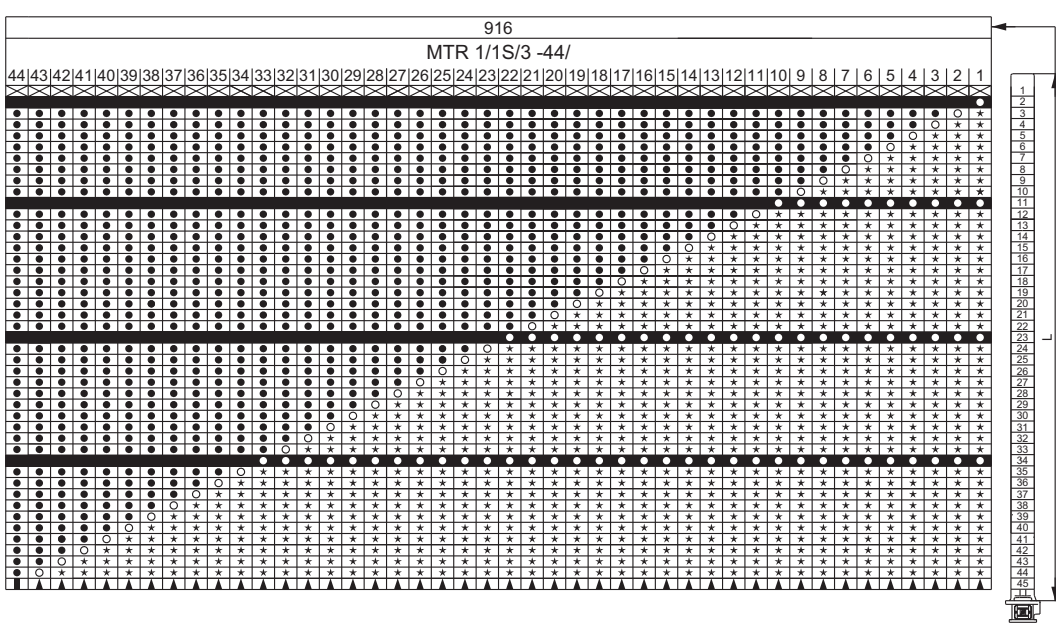
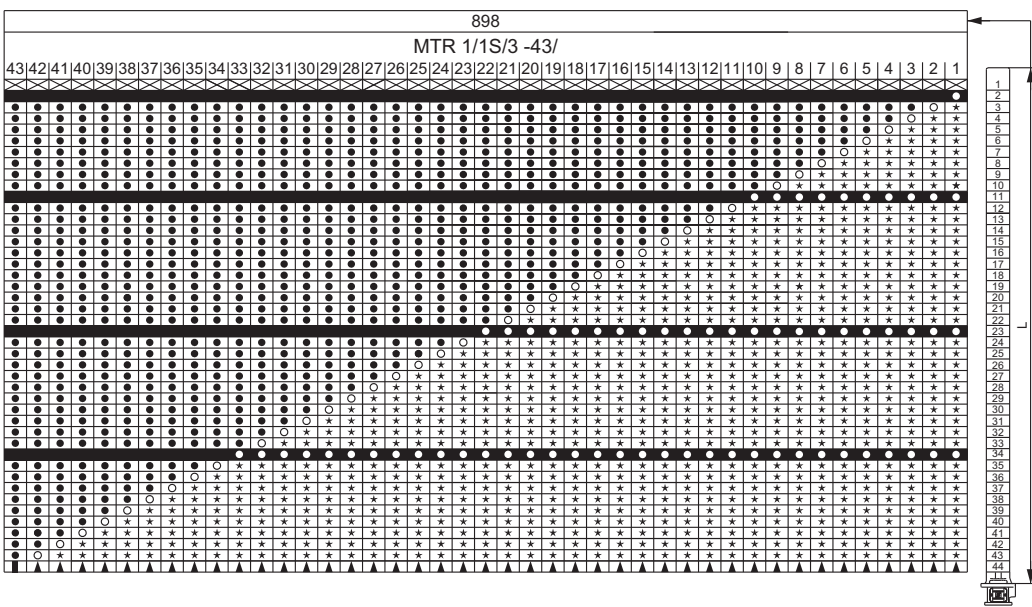


TM06 9380 2317

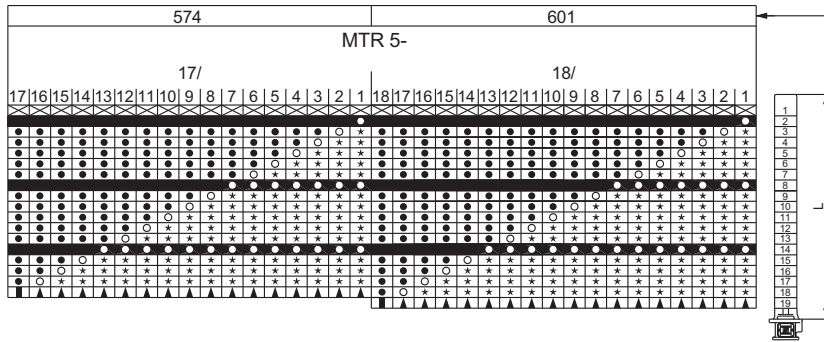
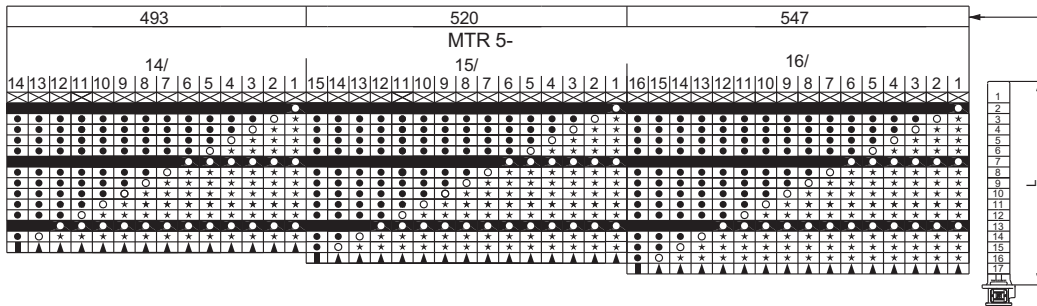
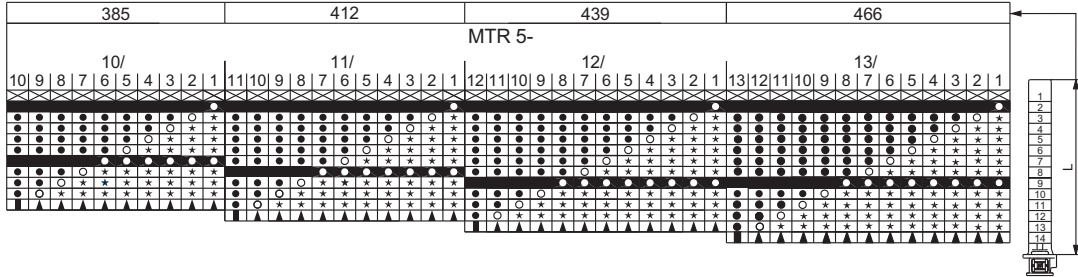
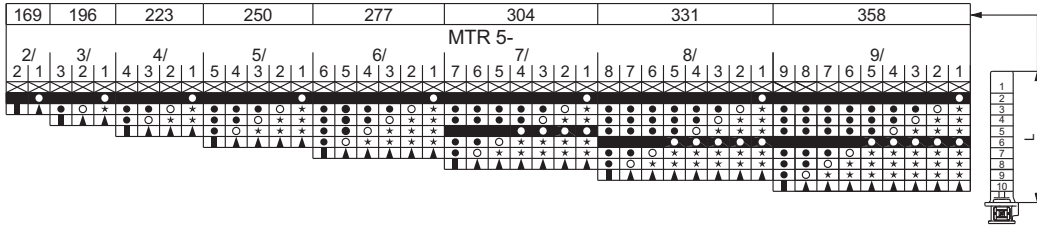


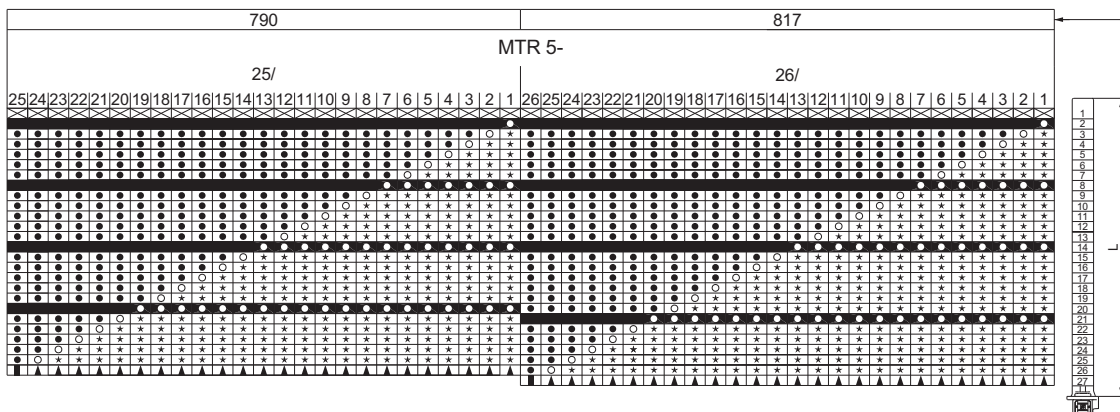
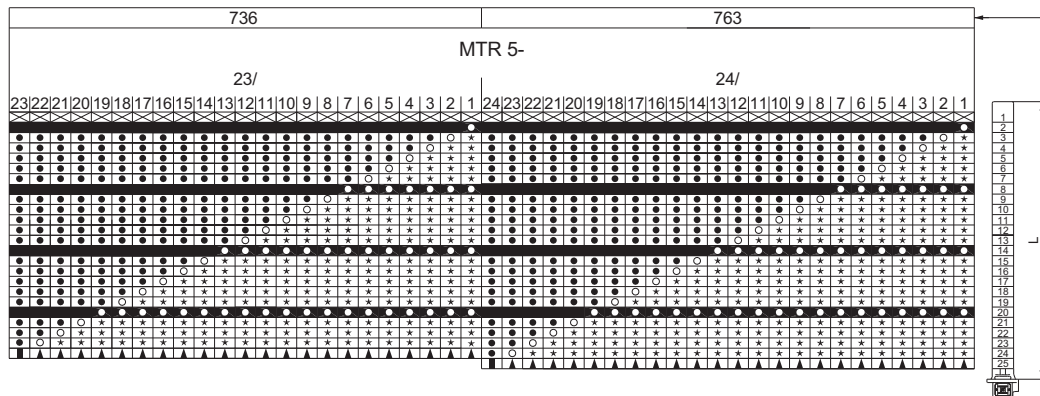
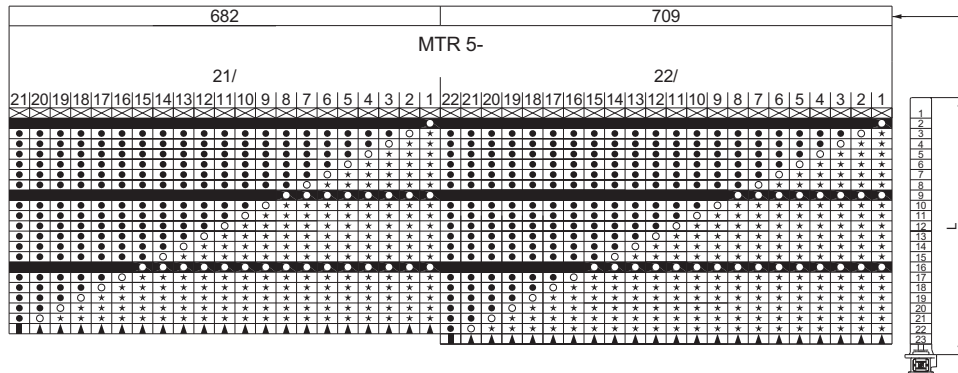
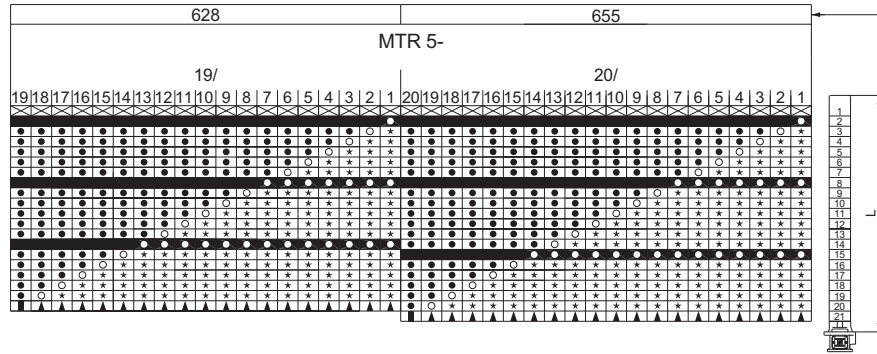


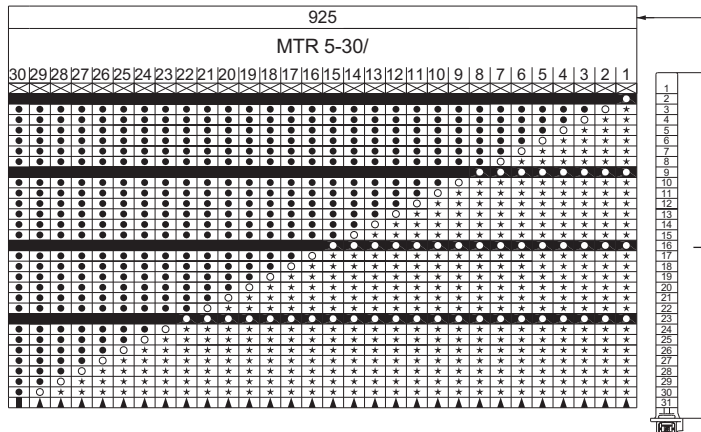
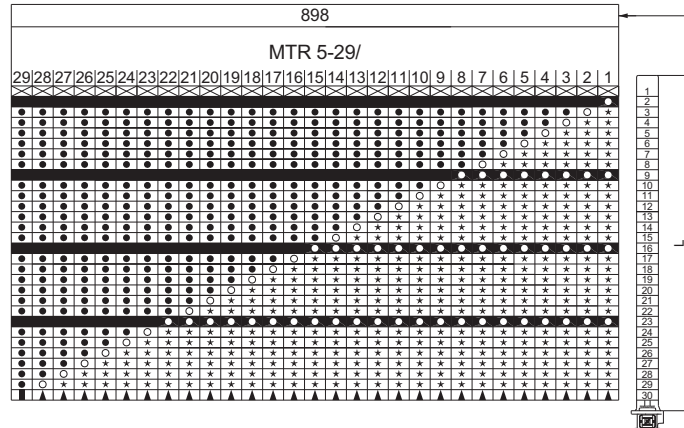
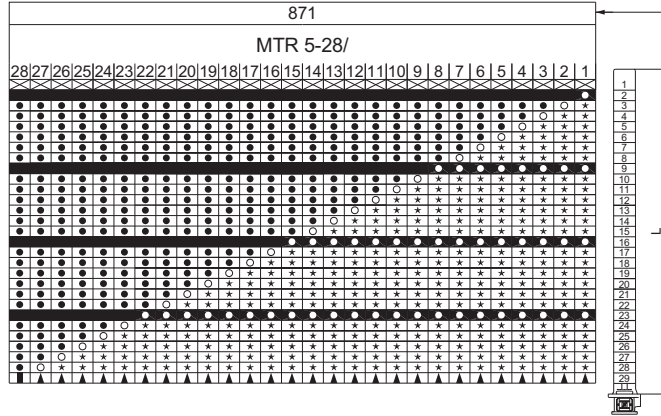
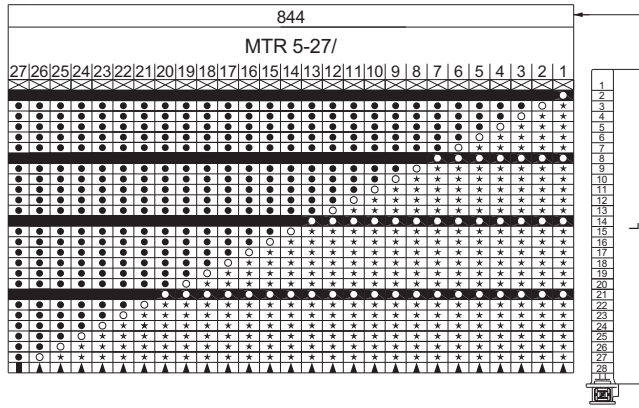


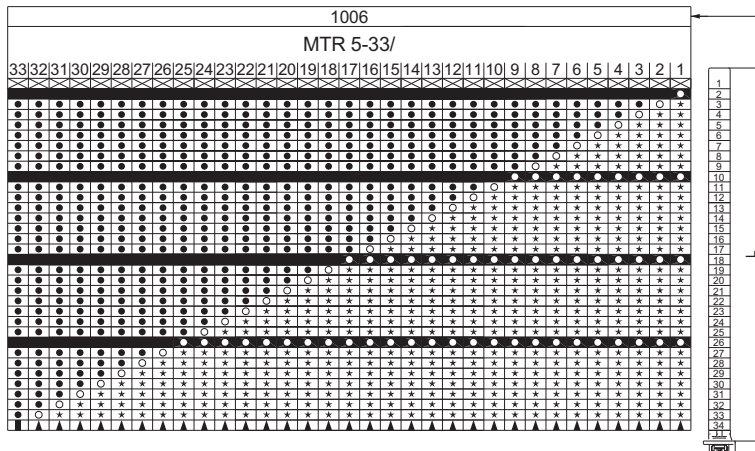
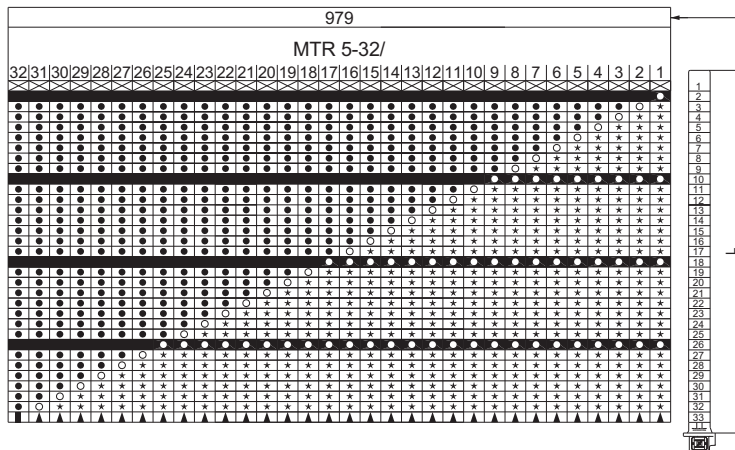
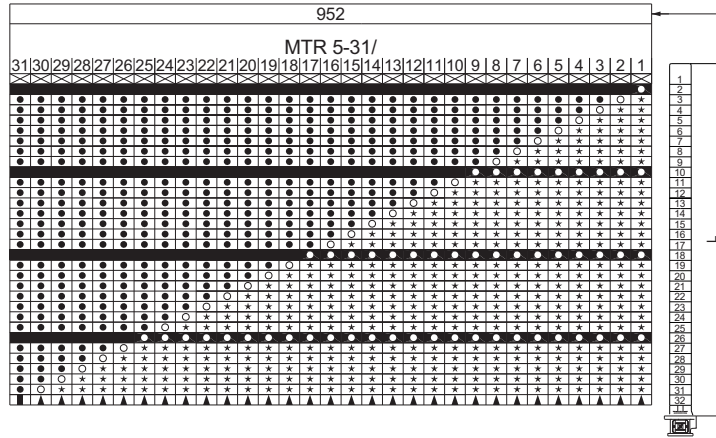


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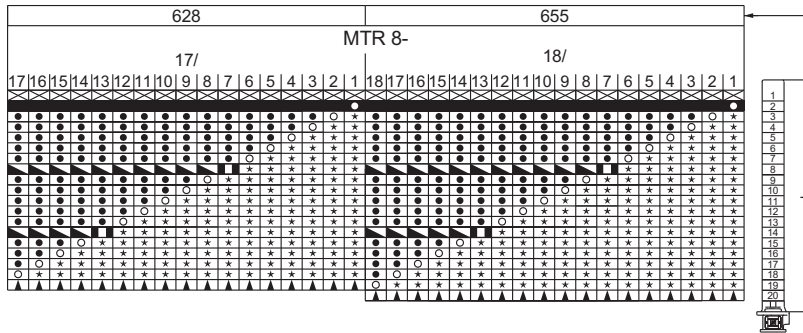
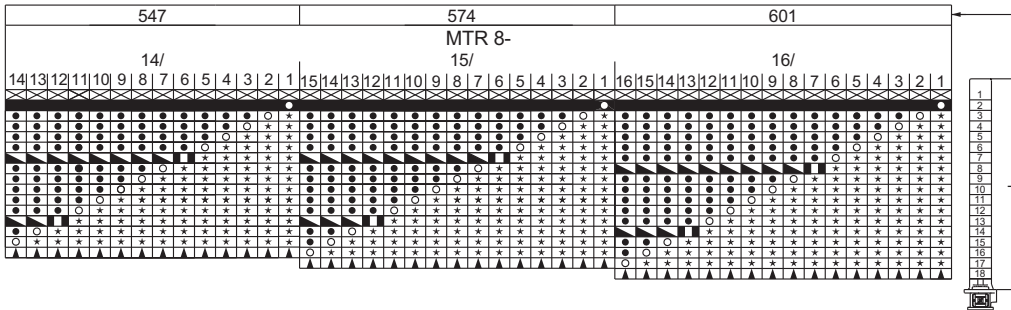
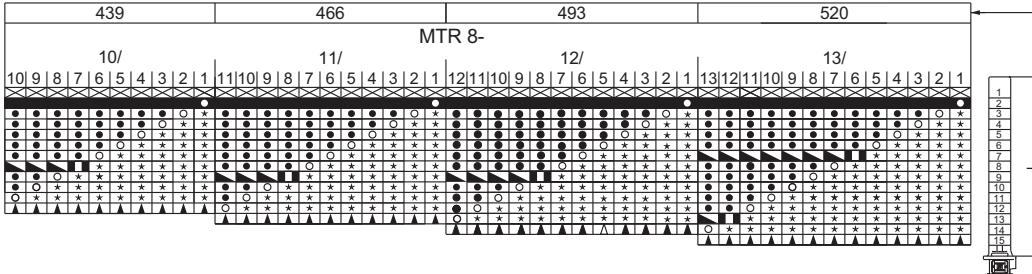
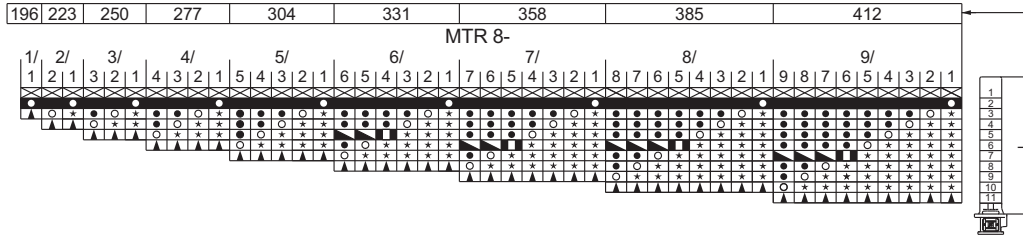


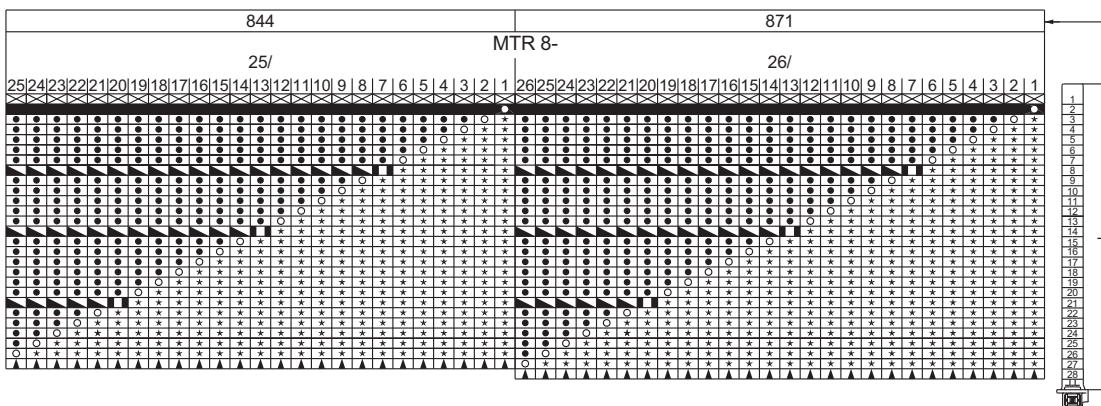
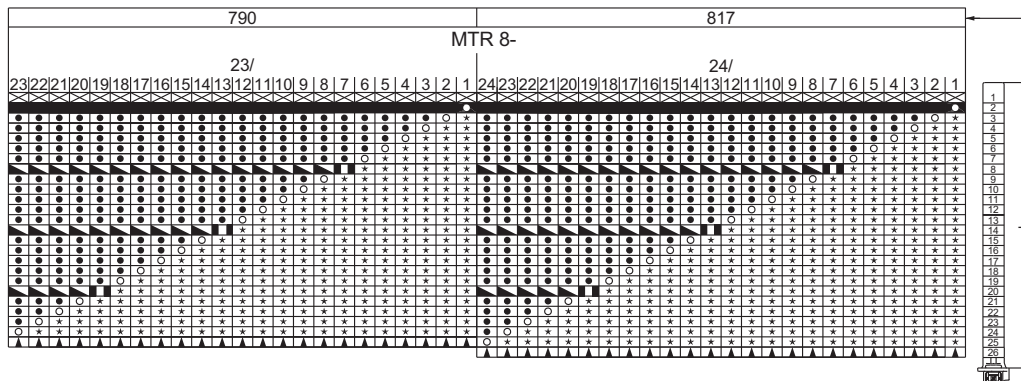
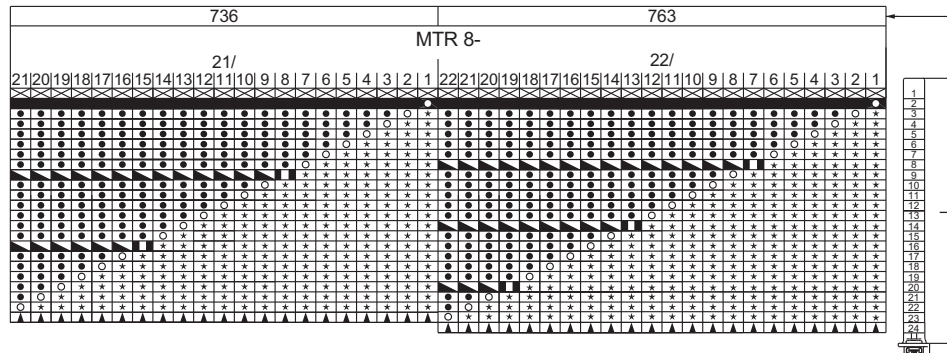
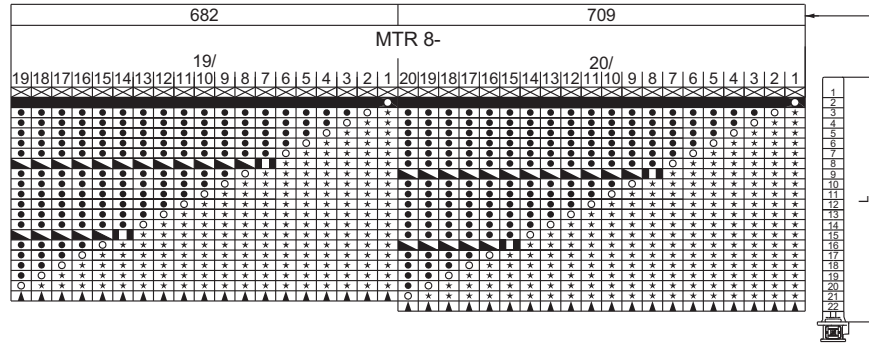




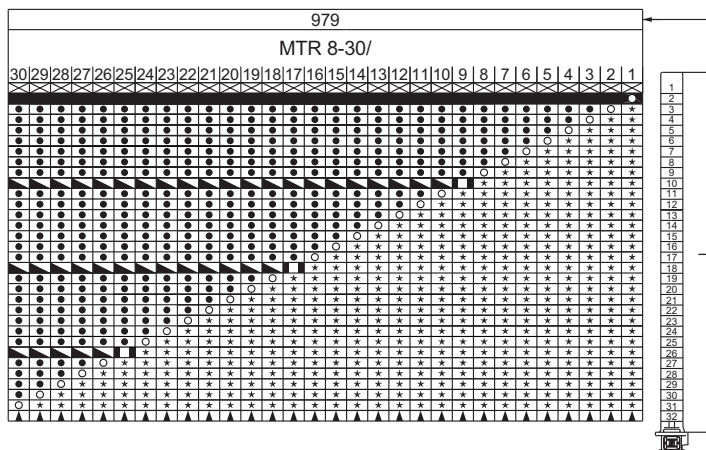
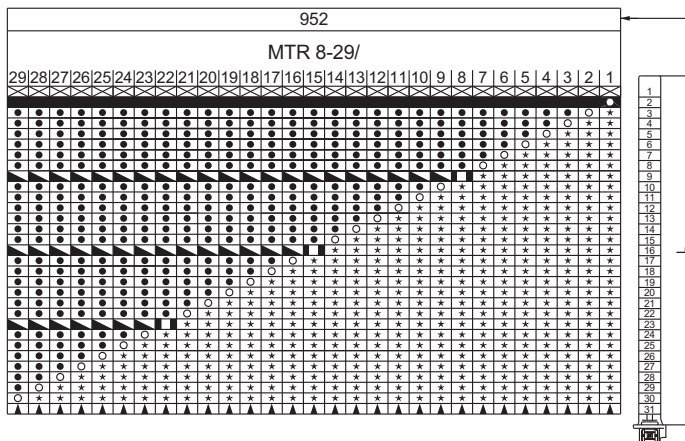
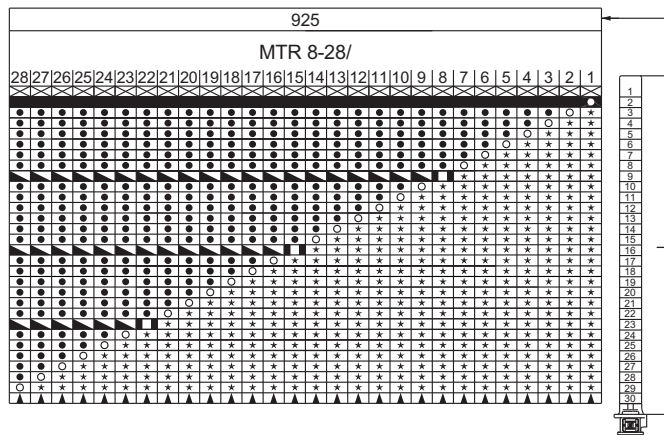
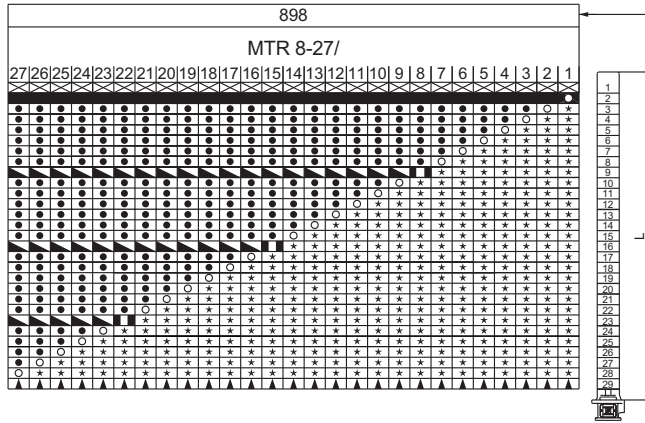


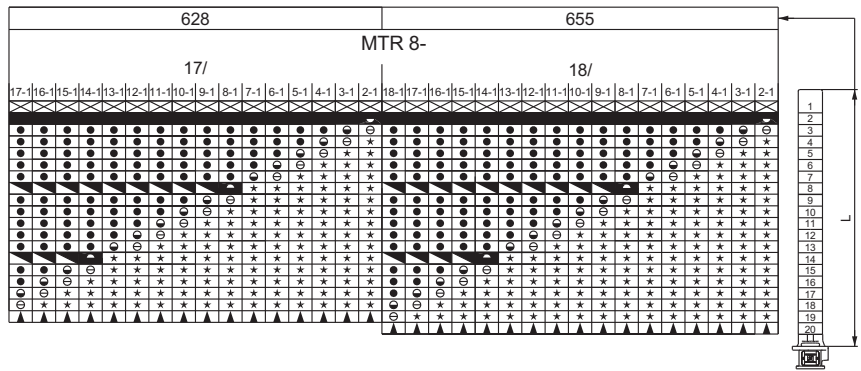
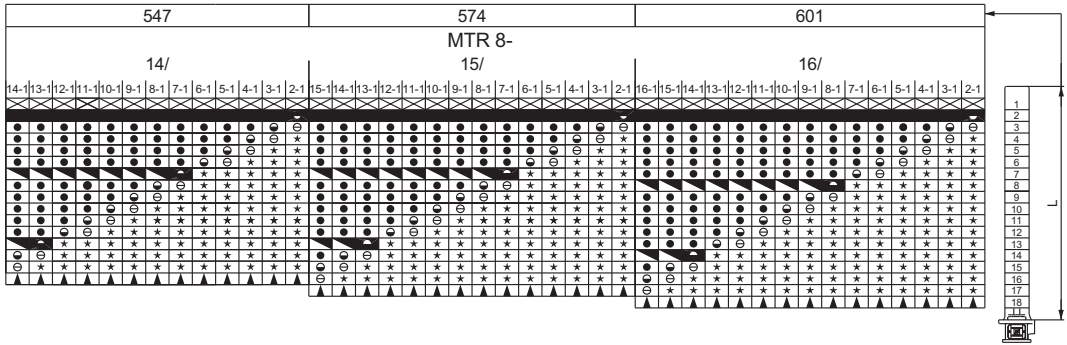
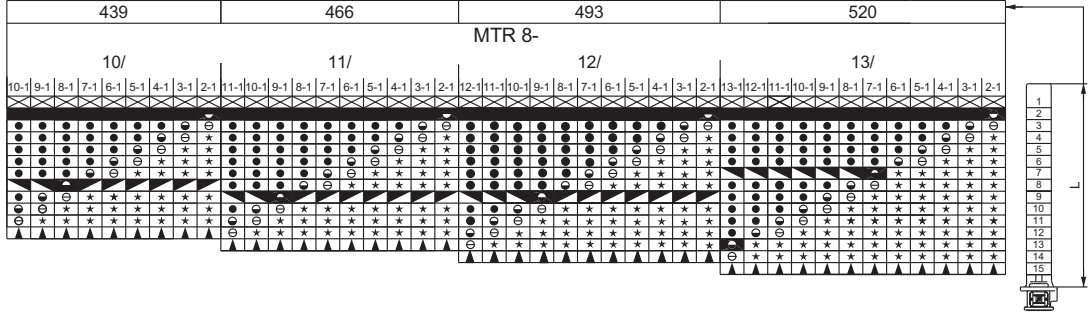
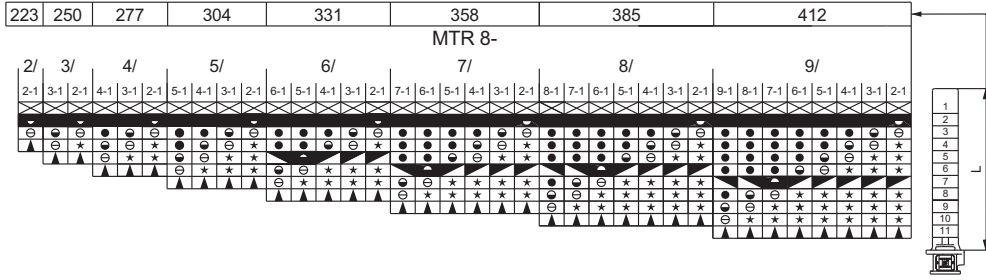
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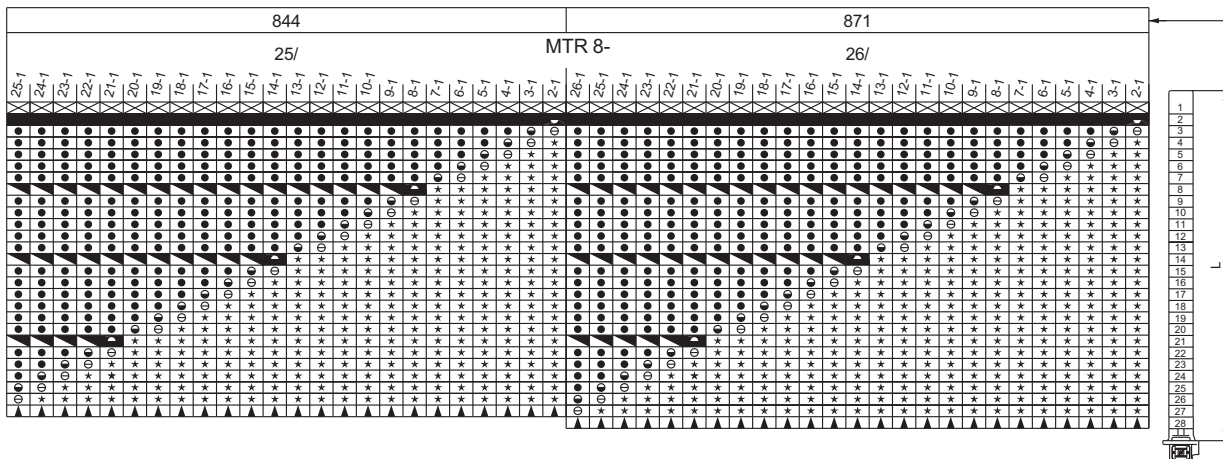
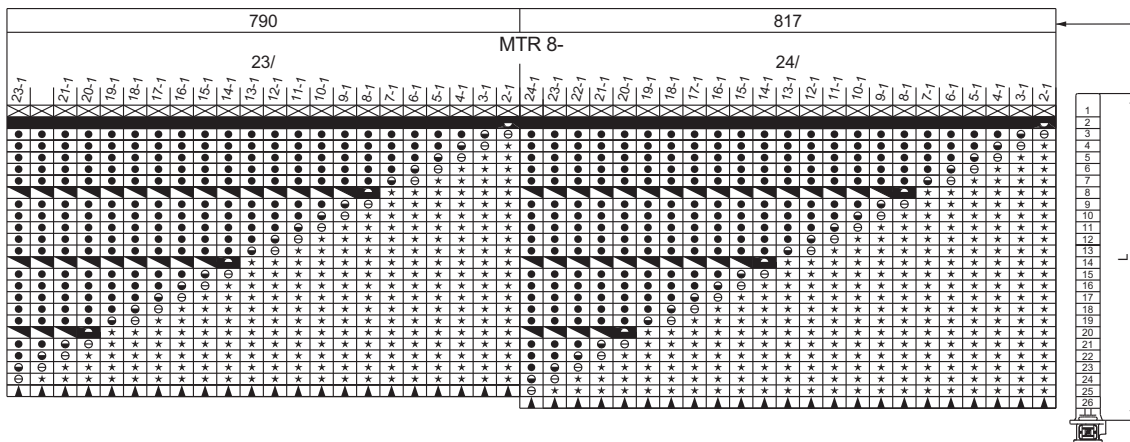
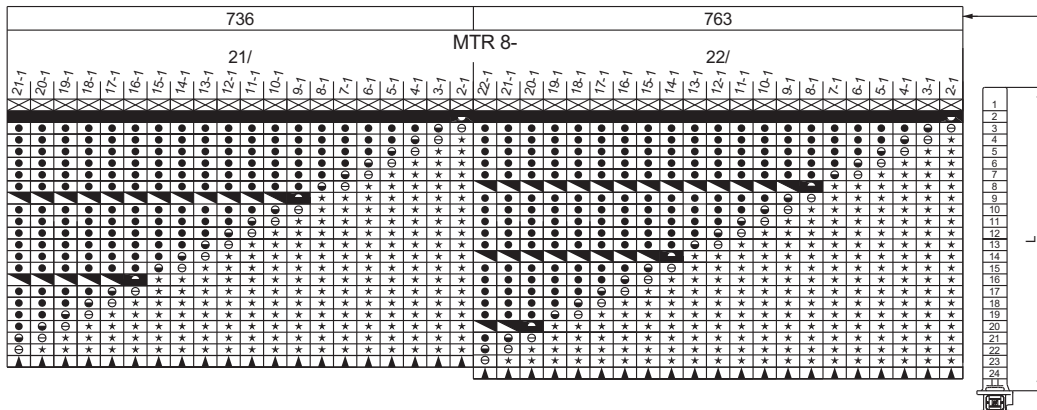
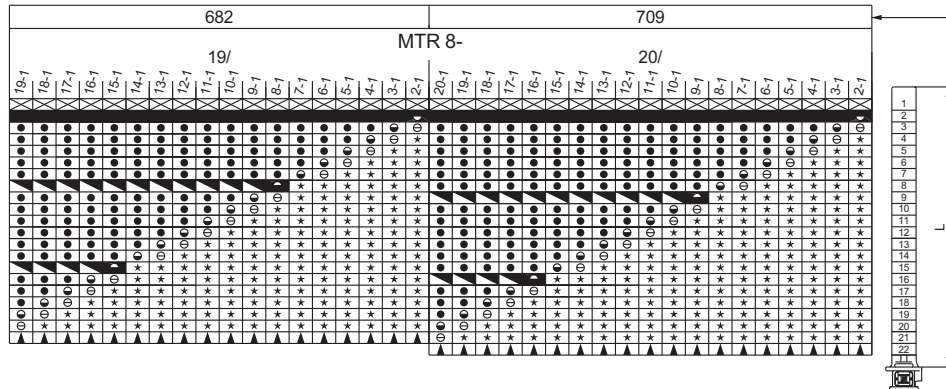


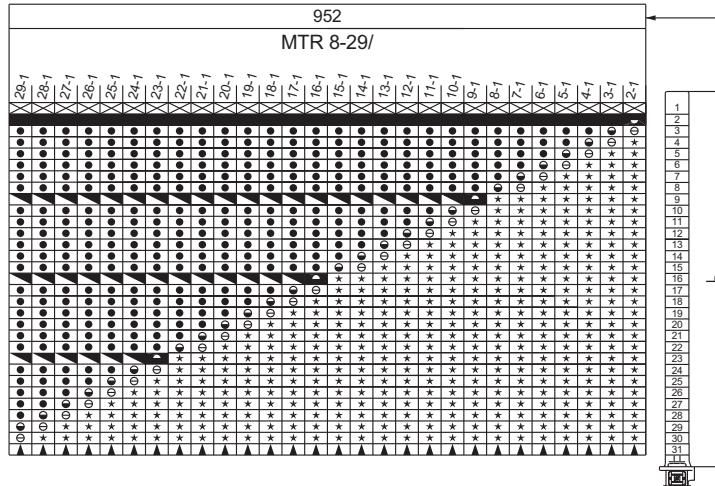
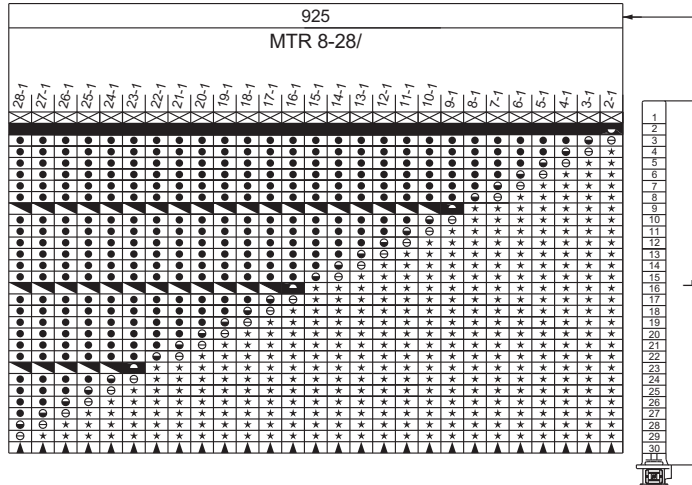
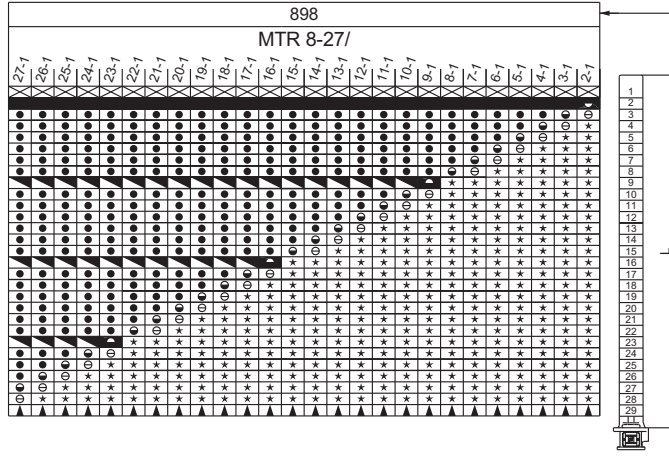


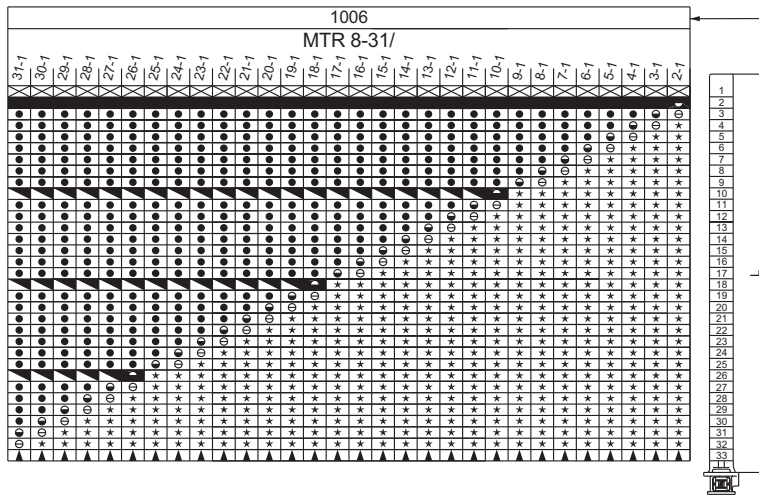
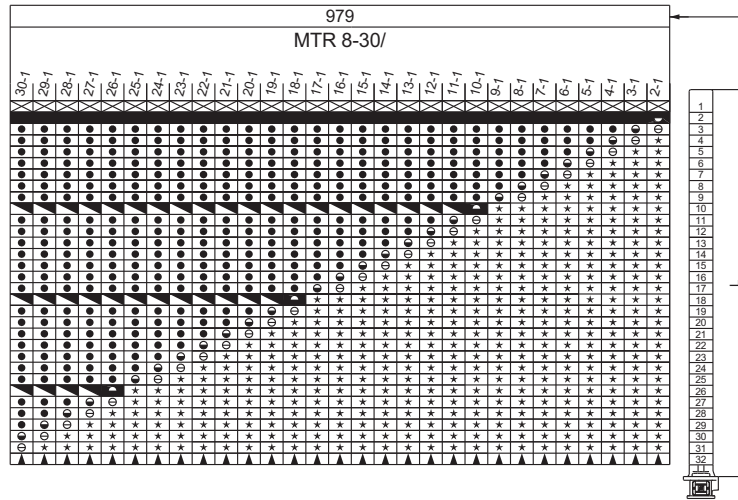
TW06 9395 2317











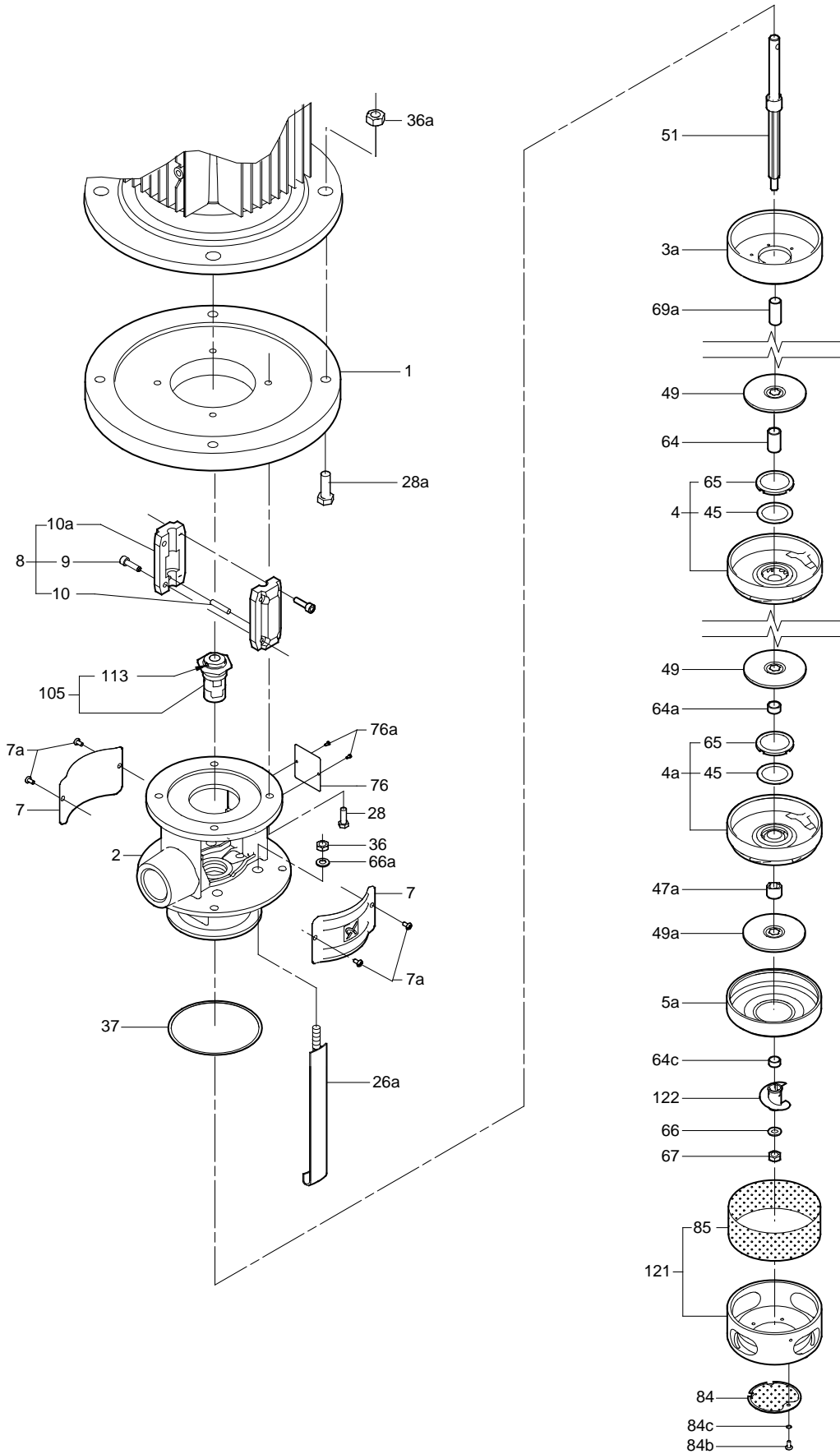
TM06 9401 2317

7. Drawings

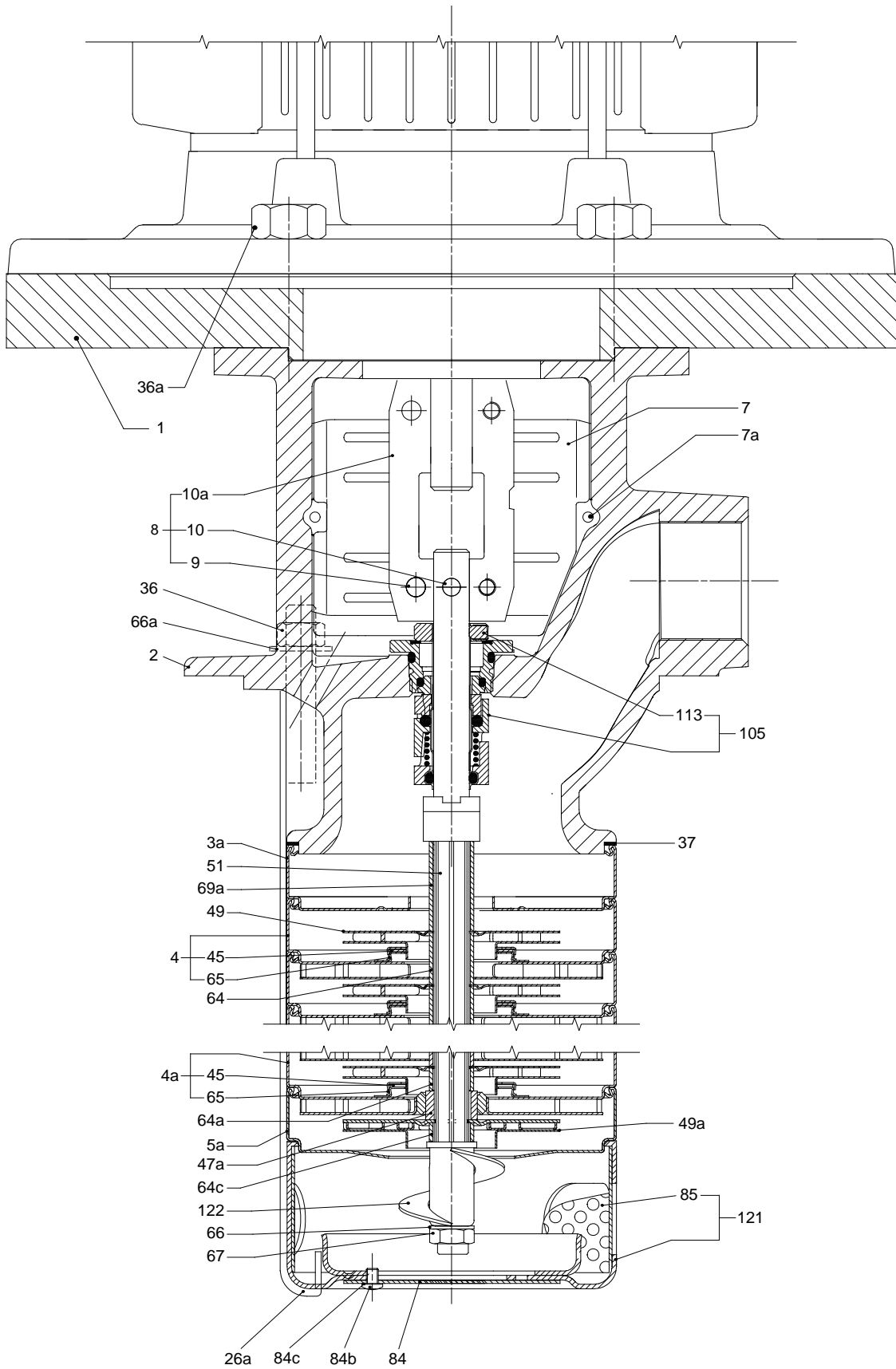
7.1 MTR, MTR 1s, 1, 3, 5, 8 (before 1532, production year and week)

See section [1.1 Nameplate](#).

7.1.1 Exploded view



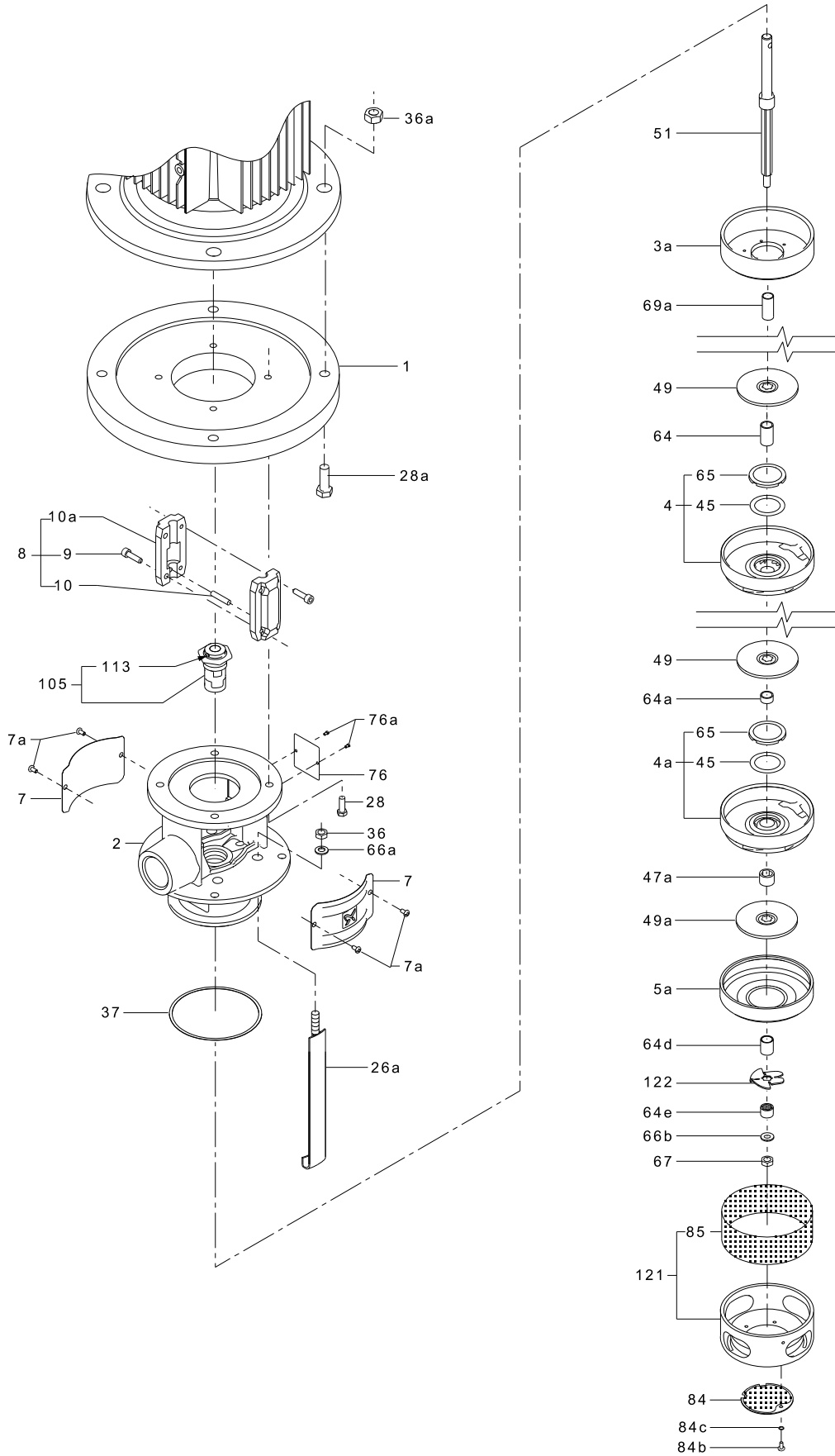
7.1.2 Sectional drawing



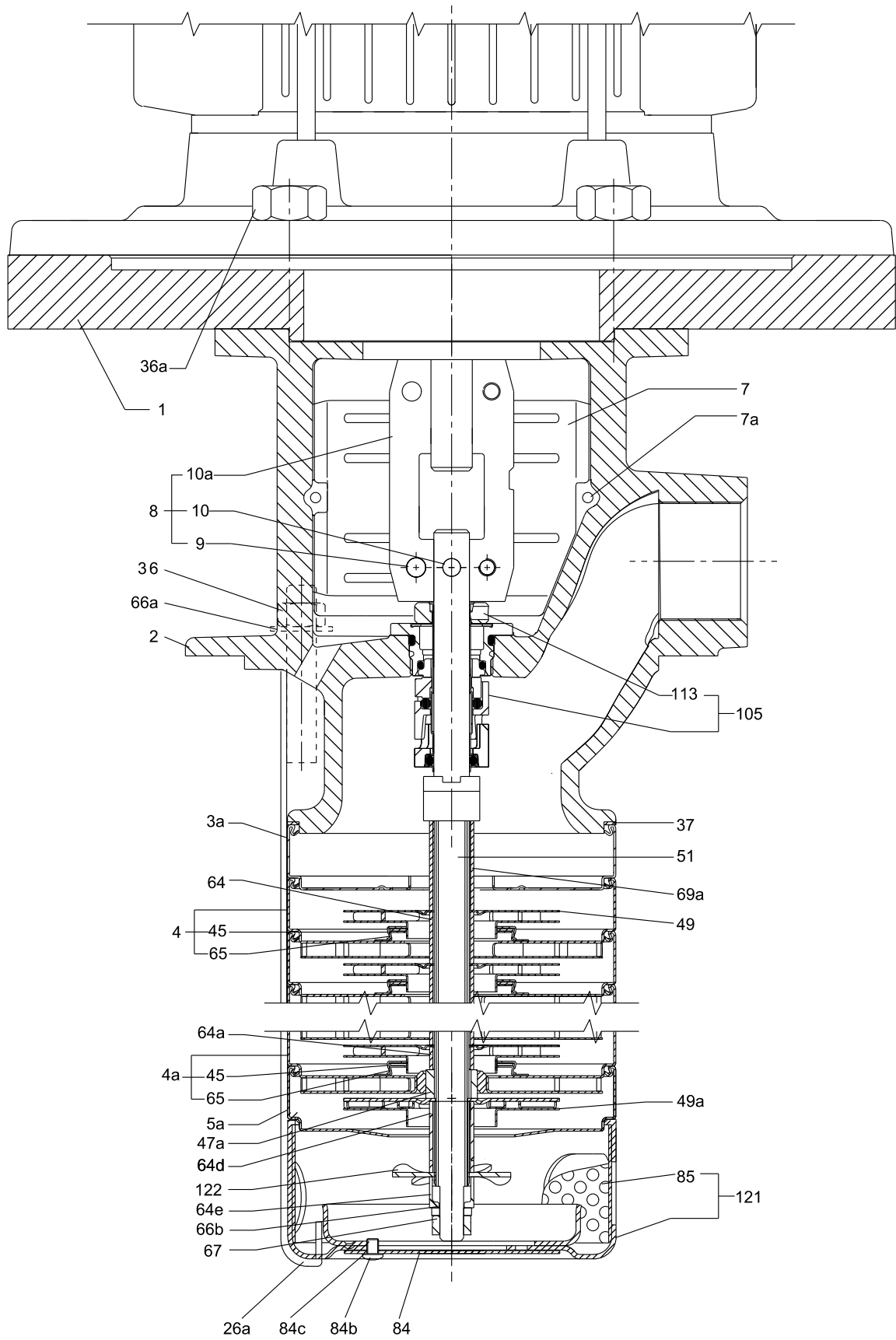
7.2 MTR, MTRE 1s, 1, 3, 5, 8 (after 1532, production year and week)

See section 1.1 Nameplate.

7.2.1 Exploded view

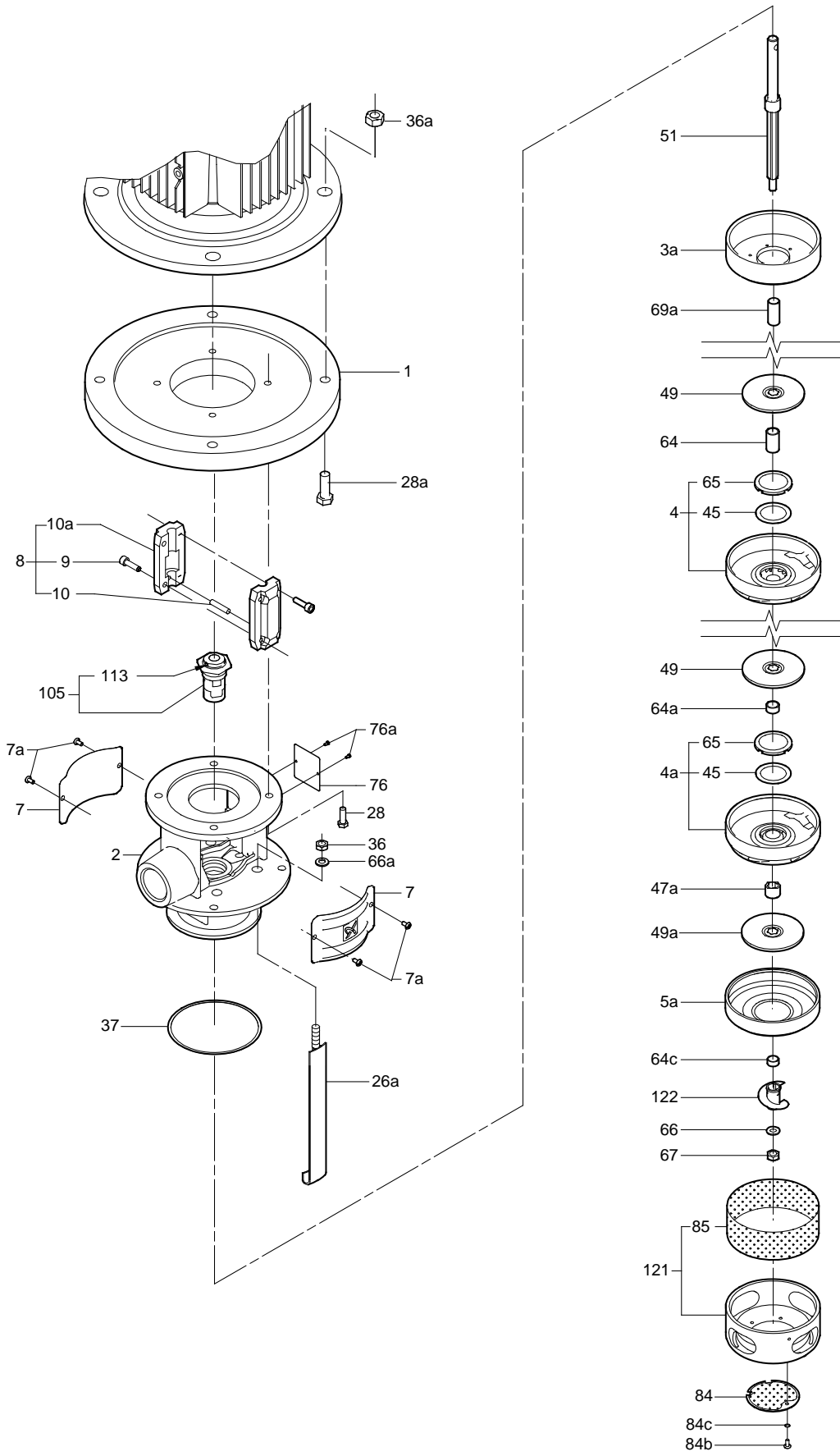


7.2.2 Sectional drawing



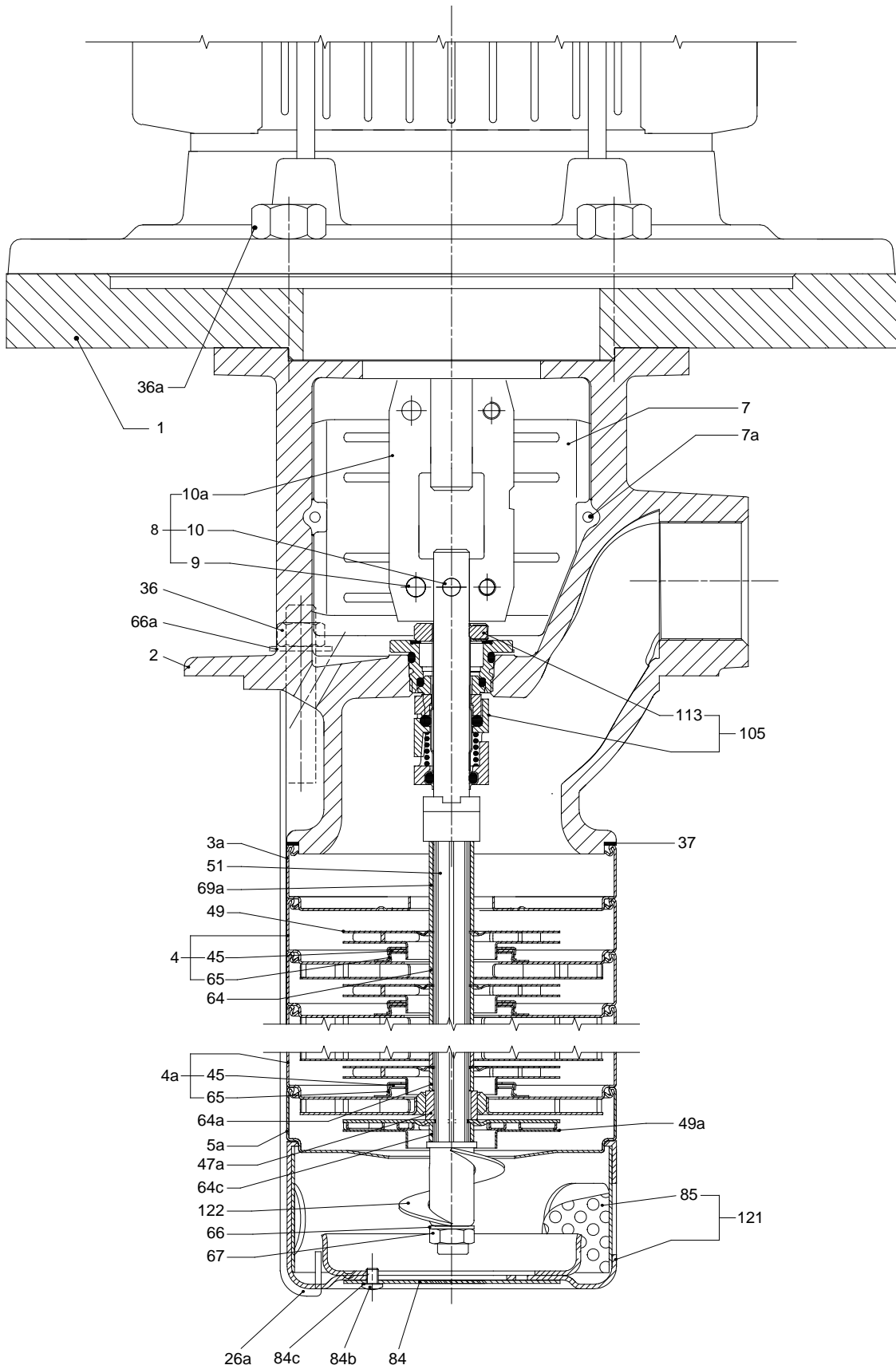
7.3 MTR, MTRE 8

7.3.1 Exploded view



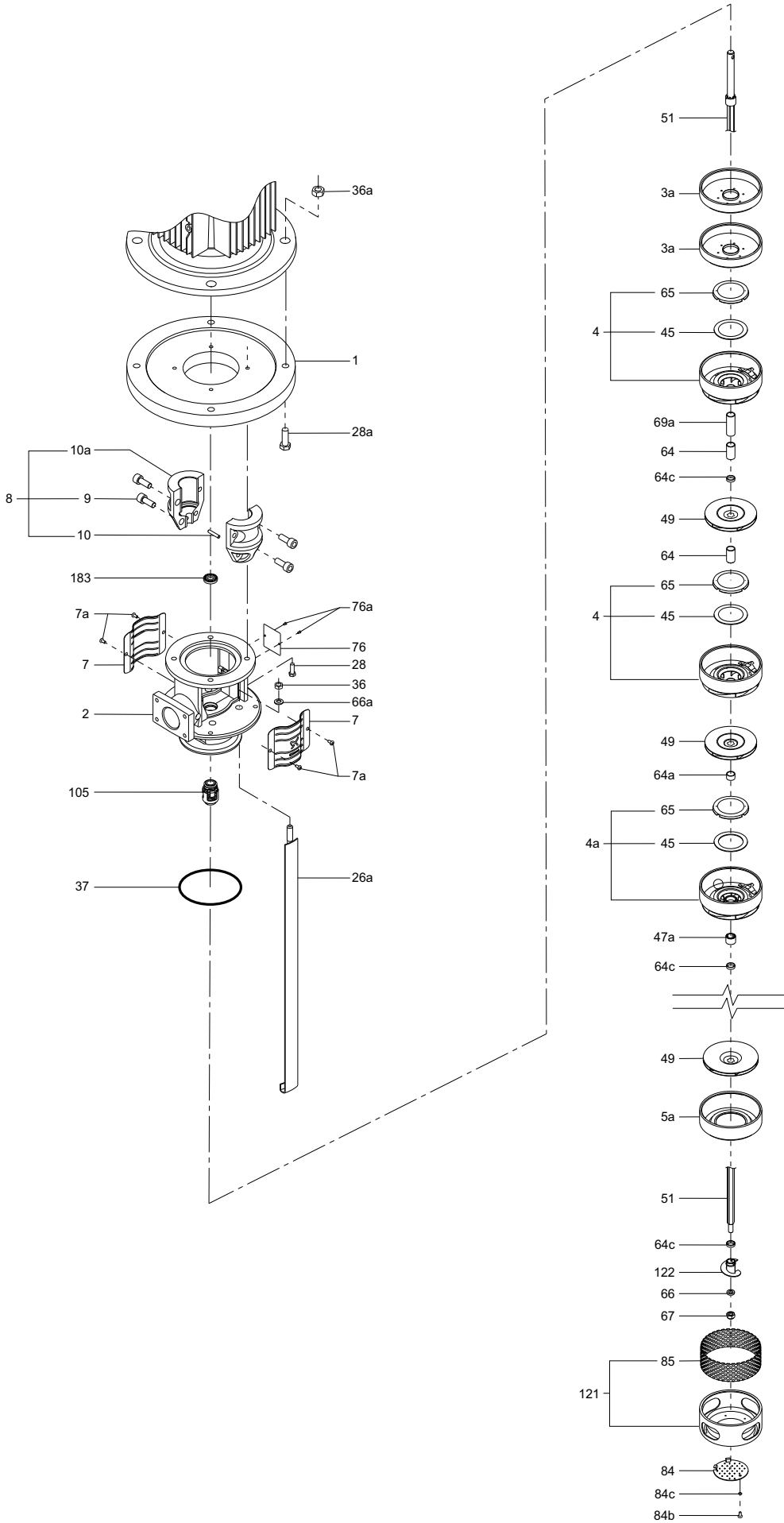
TM02 8034 3204

7.3.2 Sectional drawing

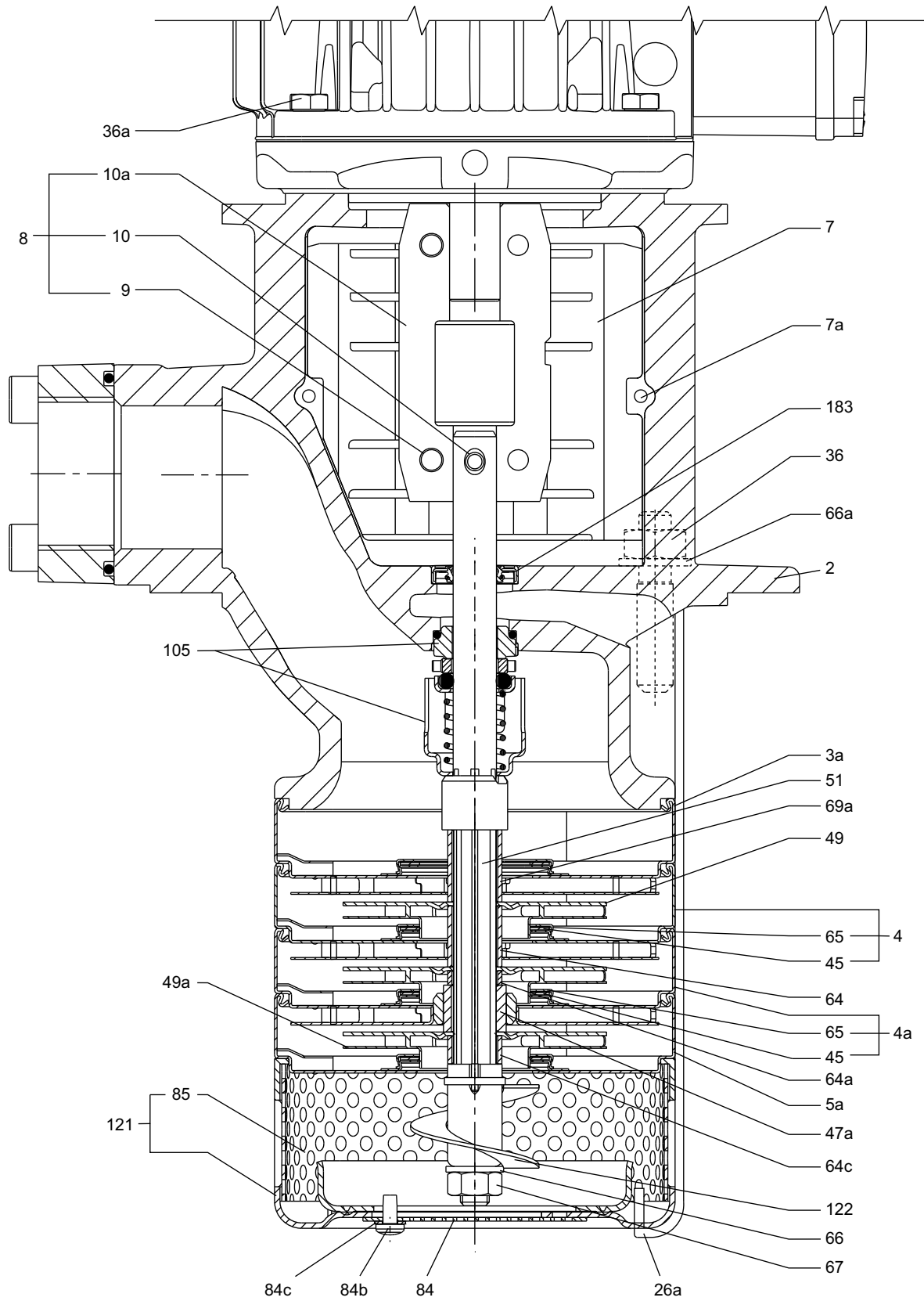


7.4 MTR, MTRE 1s, 1, 3, 5, 8 (pump version D). See section 1.2 Type key

7.4.1 Exploded view



7.4.2 Sectional drawing



TM02 9378 3517

99257005 1217

ECM: 1223821
