



# Service instructions

**MTH 2 and 4**

**MTC 2 and 4**

**Model A**

**50/60 Hz**

**3~**

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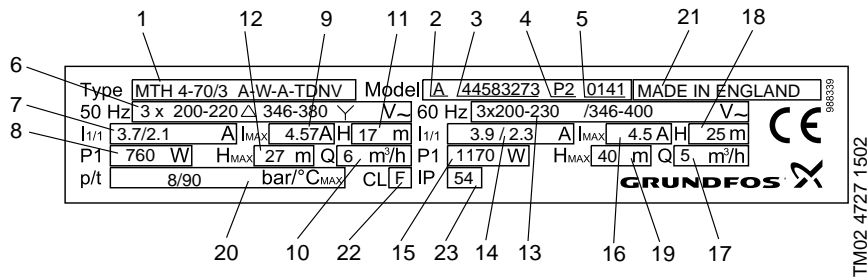
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# 1. Type identification

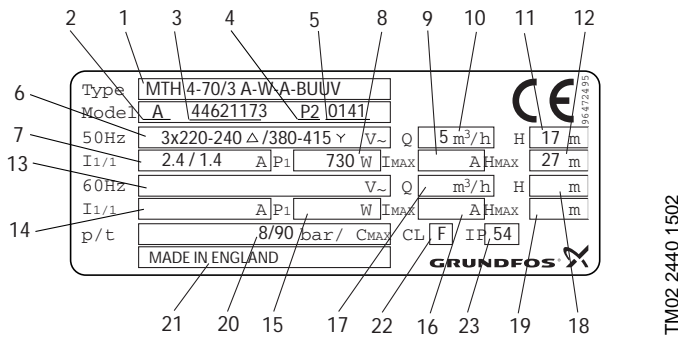
This section shows the type key, the nameplate and the codes that can appear in the variant code.

## 1.1 Nameplate

Japan:



Other countries:



Pos.	Description	Pos.	Description
1	Type designation, see section <a href="#">1.2 Type key</a> .	13	Voltage, 60 Hz
2	Model	14	Current, 60 Hz
3	Product number	15	Power input P1, 60 Hz
4	Place of production	16	Max. current, 60 Hz
5	Production year and week	17	Rated flow rate, 60 Hz
6	Voltage, 50 Hz	18	Head at rated flow rate, 60 Hz
7	Current, 50 Hz	19	Max. head, 60 Hz
8	Power input P1, 50 Hz	20	Max. pressure at stated temperature
9	Max. current, 50 Hz	21	Country of production
10	Rated flow rate, 50 Hz	22	Insulation class (IEC 85)
11	Head at rated flow rate, 50 Hz	23	Enclosure class (IEC 34-5)
12	Max. head, 50 Hz		

## 1.2 Type key

Example	MTH	4	-	70	/3	X-	X-	X-	XXXX
Type range									
Rated flow rate in m <sup>3</sup> /h									
Number of chambers x 10									
Number of impellers									
Code for pump version A = Basic version U = Nema version									
Code for pipe connection W = Internal thread									
Code for pump materials A = Pump head: Cast iron Other wetted parts: Stainless steel DIN W.-Nr. 1.4301									
Code for shaft seal BUUV = Rubber bellows seal; rotating face: tungsten carbide; stationary seat: tungsten carbide; O-rings: FKM  TDNV = Gap seal, rotating face (pump shaft): steel; stationary seat (bush): bronze; O-ring: FKM									

## 2. Torques and lubricants

This section shows the screws and nuts that must be tightened to a certain torque and the lubricants to be used.

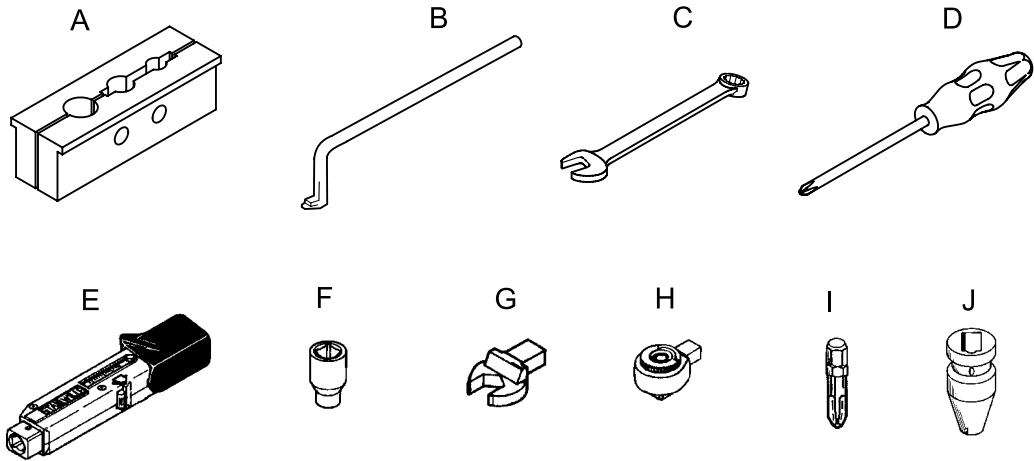
Pos.	Description	Number	Dim.	Torque [Nm]	Lubricant
28	Screw	4	M6	8-10	Thread-Eze
36	Nut	3	M6	10-12	Thread-Eze
67	Lock nut	1	M8	10-12	Gardolube L 6034
84b	Screw	1	M4	2	Gardolube L 6034
150a	Stator with housing (flange)	1			Thread-Eze
153	Ball bearing (bearing seat/ outer ring)	1			Lithium soap based grease

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

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

### 3. Service tools

The following drawings and tables show special, standard and torque tools for pump service.



#### 3.1 Special tools

Pos.	Description	For pos.	Suppl. information	Part no.
A	Shaft holder for assembly			SV0040
B	Puller	65		SV0239

#### 3.2 Standard tools

Pos.	Description	For pos.	Suppl. information	Part no.
C	Ring/open-end spanner	36	M6 - 10 mm	SV0083
		67	M8 - 13 mm	SV0055
D	Screwdriver for cross-head screw	28	No. 3	SV0194

#### 3.3 Torque tools

Pos.	Description	For pos.	Suppl. information	Part no.
E	Torque wrench	G-H	4-20 Nm      9 x 12	SV0292
F	Socket spanner	H-67	M8 - 13 mm      ½" x ½"	SV0413
G	Open-end insert tool	E-36	M6 - 10 mm      9 x 12	SV0610
H	Ratchet insert tool	E-F-J	9 x 12 -> ½" x ½"	SV0295
I	Cross-head bit	J-28	PCD 3      ¼" x ¼"	SV0450
J	Adapter	H-I	½" x ½" -> ¼" x ¼"	SV0343

## 4. Dismantling and assembly

### 4.1 General

If it is necessary to dismantle the pump, either because it is choked or damaged, please follow the instructions in the following sections.

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](#).

#### 4.1.1 Before dismantling

- Disconnect the electricity supply to the motor.
- Remove the discharge pipe.
- *Remove the electric cable in accordance with local regulations.*
- Remove the pump from a possible condensate tank.

#### 4.1.2 Before assembly

- Clean and check all parts.
- Order the necessary service kits.
- Replace defective parts by new parts.
- Gaskets and O-rings should always be replaced when the pump is overhauled.

#### 4.1.3 During assembly

- Lubricate and tighten screws and nuts to correct torque as stated in section [2. Torques and lubricants](#).

#### 4.1.4 After assembly

- The pump should be tested according to the following test specifications:

	Gap seal (TDNV)	Rubber bellows seal (BUUV)
MTH, MTC 2	430073	430079
MTH, MTC 4	440165	440170

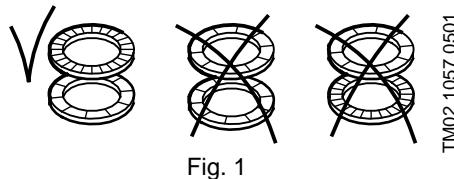
## 4.2 Replacement of hydraulic parts

### 4.2.1 Dismantling

1. Slacken the screws pos. 152 and remove them together with the fan cover pos. 151.
2. Remove the fan pos. 156 using a puller. It may be necessary to insert two screwdrivers under the fan to remove it from the shaft.
3. Place the shaft holder for assembly [pos. A](#) in a vice and position the rotor shaft in the shaft holder. Tighten the vice so that it holds the pump.
4. Remove the nuts pos. 36, the washers pos. 66a and the straps pos. 26.
5. Slacken the screw pos. 84b and remove it together with the washer pos. 84c, the strainer pos. 84 and the retainer for strainer pos. 121.
6. Slacken and remove the nuts pos. 67 together with the washers pos. 66.
7. Continue the dismantling up to the spacing pipe pos. 64/69, see section [5. Order of assembly for chambers and impellers](#).
8. Remove the gasket pos. 37 and the spacing pipe pos. 69a (only pumps with TDNV seal).

### 4.2.2 Assembly

1. Place the gasket pos. 37 on the recess of the pump head pos. 2. Fit the spacing pipe pos. 69a (only pumps with TDNV seal).
2. Assemble the pump from the top towards the bottom, see section [5. Order of assembly for chambers and impellers](#).
  - Fit the priming screw pos. 122 so that the small ring of the priming screw points towards the impeller.
  - *The washer pos. 66 consists of two washers glued together. If they have been separated, make sure that they are fitted correctly, see [fig. 1](#).*



- Tighten the lock nut pos. 67 to the correct torque.
  - Turn the retainer for strainer pos. 121 so that the slots for the straps are aligned to the points where the straps attach to the pump head.
3. Fit the straps pos. 26, the washers pos. 66a and the nuts pos. 36.
  4. Hold the straps to the pump and tighten the nuts diagonally to the correct torque.
  5. Slacken the vice and lift the pump off the shaft holder.
  6. Fit the stator with housing if it has been removed, see section [4.4.2 Assembly](#).
  7. Support the pump shaft when the fan pos. 156 is driven home on the rotor shaft in order not to damage the ball bearings.
  8. *Check the pump by turning the fan.*
  9. Fit the fan cover pos. 151 to the motor. Fit and tighten the screws pos. 152.
  10. Fit the strainer pos. 84, the spring washer pos. 84c and the screw pos. 84b.

## 4.3 Replacement of shaft seal

### 4.3.1 Dismantling

#### 4.3.1.1 TDNV type (gap seal)

1. Remove the chamber stack, see section [4.2.1 Dismantling](#).
2. Remove the rotating shaft seal part pos. 112.
3. Remove the retaining ring pos. 47d by pushing it up by means of a screwdriver.
4. Remove the bush pos. 47c and the O-ring pos. 107.
5. Push the stop ring pos. 62 free of the recess and pull it off the shaft. The stop ring cannot be reused.
6. Slacken and remove the screws pos. 28.
7. Lift the pump head pos. 2 off the motor.  
The bearing cover plate pos. 155 and the diverting disc pos. 79 may stick to the pump head. If this is the case, remove these parts from the pump head.
8. Press the lip seal ring pos. 79a out of the pump head from the side (pumps produced as from August 2002).

#### 4.3.1.2 BUUV type

1. Remove the chamber stack, see section [4.2.1 Dismantling](#).
2. Remove the spacing pipe pos. 112a (pumps produced as from August 2002).
3. Remove the spacer for shaft seal pos. 112.
4. Remove the rotating shaft seal part pos. 105.
5. Push the stop ring pos. 62 free of the recess and pull it off the shaft. The stop ring cannot be reused.
6. Slacken and remove the screws pos. 28.
7. Lift the pump head pos. 2 off the motor.  
The bearing cover plate pos. 155 and the diverting disc pos. 79 may stick to the pump head. If this is the case, remove these parts from the pump head.
8. Press the stationary seal ring with O-ring out of the pump head from the motor side.
9. Press the lip seal ring pos. 79a out of the pump head from the pump side (pumps produced as from August 2002).

### 4.3.2 Assembly

#### 4.3.2.1 TDNV type (gap seal)

1. Fit the bearing cover plate pos. 155 to the shaft so that it touches *the outer ball bearing ring*. The curved side of the bearing cover plate must point away from the ball bearing.
2. Fit the diverting disc pos. 79 to the pump shaft and push it until it touches the rotor shaft.
3. Apply grease between the lips of the lip seal ring pos. 79a and fit the ring into the pump head from the motor side.
4. Lubricate the flange of the stator housing to which the pump head is fitted.
5. Fit the pump head pos. 2 and press it home on the recess of the stator housing.  
If it is not possible to press home the pump head, check whether the corrugated spring pos. 158 is positioned correctly. See sectional drawing.
6. Turn the pump head pos. 2 so that the discharge port and the terminal box point in the same direction as before dismantling. Fit the screws pos. 28 and tighten diagonally to the torque stated.
7. Fit the O-ring pos. 107 against the collar of the bush pos. 47c.
8. Fit the bush on the shaft. The two taps must engage with the notches in the pump head. Press the bush home in the pump head.
9. Secure the bush with the retaining ring pos. 47d. Make sure it engages with the recess of the shaft.
10. Press the stop ring pos. 62 on the shaft so that it engages with the recess.
11. Fit the spacer pos. 112. The two notches must be against the seal.
12. Assemble the chamber stack, see section [4.2.2 Assembly](#).



#### 4.3.2.2 BUUV type

The seal rings must be intact, and the seal faces must be smooth and clean.

*Do not expose the seal rings to blows or knocks.*

1. Fit the bearing cover plate pos. 155 to the shaft so that it touches *the outer ball bearing ring*. The curved side of the bearing cover plate must point away from the ball bearing.
2. Fit the diverting disc pos. 79 to the pump shaft and push it until it touches the rotor shaft.
3. Apply grease between the lips of the lip seal ring pos. 79a and fit the ring into the pump head from the motor side.
4. Moisten the stationary seal ring with O-ring with water and press it into the recess of the pump head from the pump side.  
The O-ring must point to the motor.
5. Lubricate the flange of the stator housing to which the pump head is fitted.
6. Fit the pump head pos. 2 and press it home on the recess of the stator housing.  
If it is not possible to press home the pump head, check whether the corrugated spring pos. 158 is positioned correctly. See sectional drawing.
7. Turn the pump head pos. 2 so that the discharge port and the terminal box point in the same direction as before dismantling. Fit the screws pos. 28 and tighten diagonally to the torque stated.
8. Press the stop ring pos. 62 on the shaft so that it engages with the recess.
9. Fit the rotating shaft seal part. The seal face must point towards the stationary seat.
10. Fit the spacer for shaft seal pos. 112 with the smallest diameter towards the shaft seal.
11. Assemble the chamber stack, see section [4.2.2 Assembly](#).

## 4.4 Replacement of stator with housing

### 4.4.1 Dismantling

1. Slacken and remove the screws pos. 152. Pull the fan cover pos. 151 free of the housing.
2. Push the fan pos. 156 off the shaft using a puller. It may be necessary to insert two screwdrivers under the fan to remove it.
3. Slacken and remove the screws pos. 28.
4. Loosen the stator with housing with a light blow of a rubber mallet and pull it free of the pump.  
*Take care not to damage the stator windings.*

### 4.4.2 Assembly

1. Stand the stator with housing pos. 150a upright with the flange pointing upwards.
2. Press the O-ring pos. 159 home in the recess of the stator and fit the corrugated spring pos. 158.
3. Lubricate the flange of the stator housing to which the pump head is fitted.
4. Fit the rotor shaft with bearing pos. 154 in the stator housing. Take care that the end of the rotor shaft can pass freely through the stator housing when the pump body with rotor shaft is fitted in the stator housing.
5. Turn the pump head pos. 2 so that the discharge port and the terminal box point in the same direction as before dismantling. Fit the screws pos. 28 and tighten diagonally to the torque stated.
6. Remove the strainer pos. 84 and support the pump shaft when the fan pos. 156 is driven home on the rotor shaft in order not to damage the ball bearings.
7. *Check the pump by turning the fan.*
8. Fit the fan cover pos. 151 to the motor. Fit and tighten the screws pos. 152.
9. Fit the strainer pos. 84, the spring washer pos. 84c and the screw pos. 84b.

## 4.5 Replacement of pump-motor shaft complete

### 4.5.1 Dismantling

1. Remove the stator with housing complete, see section [4.4 Replacement of stator with housing](#).
2. Remove the hydraulic parts, see section [4.2 Replacement of hydraulic parts](#).
3. Remove the shaft seal, see section [4.3 Replacement of shaft seal](#).
4. Remove the pump-motor shaft complete from the pump head.
5. Remove the diverting disc pos. 79 and the bearing cover pos. 155.
6. Remove the lip seal ring pos. 79a from the pump head (pumps produced as from August 2002).
7. Clean and check the bearing seats.

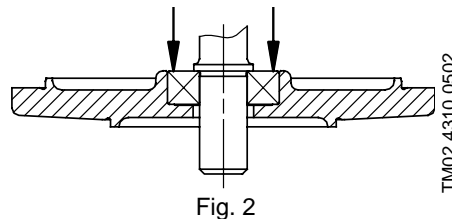
*The dimensions of bearing seats and the shaft end must be within close tolerances. Blasting with glass or sand for cleaning will damage these parts.*

*Many Grundfos components are electrocoated for corrosion protection. The coat of paint is so thick, that bearing seat dimensions will be changed if the paint is cleaned off the bearing seat.*

### 4.5.2 Assembly

Bearings are precision-machined elements that are very sensitive to dirt, dust, damaged bearing seats and knocks during mounting.

1. Fit the lip seal ring pos. 79a in the pump head (pumps produced as from August 2002).
2. Lubricate the outer ball bearing ring pos. 153 or the bearing seat in the pump head with lithium soap based grease.
3. Fit the bearing cover plate pos. 155 to the shaft so that it touches *the outer ball bearing ring*. The curved side of the bearing cover plate must point away from the ball bearing.
4. Fit the pump-motor shaft with bearing pos. 153 in the pump head. It is recommended to heat the flange to approx. 80°C so that the bearing seat can expand and the bearing be easily and securely fitted. If it is necessary to *press* the bearing home in the pump head, the force must be applied to the outer ring. See [fig. 2](#).



5. Fit the diverting disc pos. 79 to the pump shaft and push it until it touches the lip seal ring (pumps produced as from August 2002) or the pump head.
6. Fit the shaft seal, see section [4.3.2 Assembly](#).
7. Fit the hydraulic parts, see section [4.2.2 Assembly](#).
8. Fit the stator with housing complete, see section [4.4.2 Assembly](#).  
*Take care not to damage the stator windings.*

## 4.6 Checking and replacement of parts

Check	Replace
<b>Impeller</b>	<b>Neck ring/retainer for neck ring</b>
<ul style="list-style-type: none"> <li>Check whether it is necessary to replace the impeller due to friction between the neck ring and the impeller skirt.</li> </ul> <p>If wear has caused a noticeable (use a finger nail) groove in the impeller skirt, the impeller should be replaced.</p> <p>Neck rings and retainers for neck rings should always be replaced when the chamber stack is dismantled.</p>	<ol style="list-style-type: none"> <li>Prize the retainer for neck ring pos. 65 up and free of the chamber using the puller <a href="#">pos. B</a>.</li> <li>Remove the neck ring pos. 45.</li> <li>Fit a new neck ring into the chamber.</li> <li>Press a new retainer for neck ring down on the neck ring so that it engages with the chamber.</li> </ol> <p><i>It must be possible to move the neck ring freely (sideways) between the retainer and the chamber.</i></p>
<b>Bearing rings</b>	
<ul style="list-style-type: none"> <li>The permissible maximum difference between the diameters of the bearing ring pos. 47a and the bearing ring in the chamber pos. 4a is 0.4 mm.</li> <li>Check whether there is a visible and noticeable (use a finger nail) edge on the rotating bearing ring.</li> </ul>	<ul style="list-style-type: none"> <li>Both bearing rings pos. 47a and the chamber with bearing ring pos. 4a should be replaced at the same time.</li> </ul>
<b>Stator with housing</b>	
<ul style="list-style-type: none"> <li>Check the winding resistance in the three windings by means of an ohmmeter.</li> <li>Measuring points, see <a href="#">fig. 3</a>.</li> <li>Measuring values, see parts list pos. 150.</li> </ul>	<ul style="list-style-type: none"> <li>If the measured value is outside <math>\pm 10\%</math> of the nominal value, the stator with housing should be replaced. See section <a href="#">4.4 Replacement of stator with housing</a>.</li> </ul>

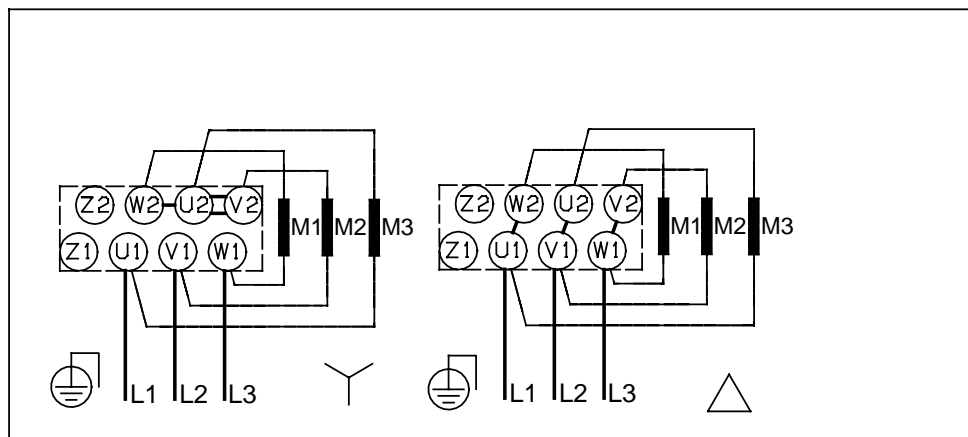


Fig. 3

TM00 1480 0193

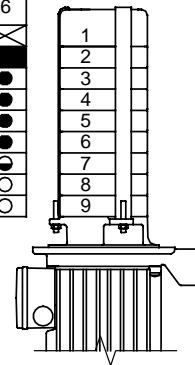
## 5. Order of assembly for chambers and impellers

1. Determine the pump type (MTH, MTC 2 or MTH, MTC 4) and the stage variant. Find the pump in the relevant stage survey table.
2. Find the components of each stage in the symbol survey.

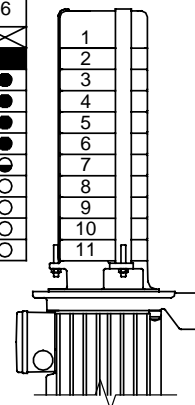
### 5.1 MTH, MTC 2

#### Stage survey

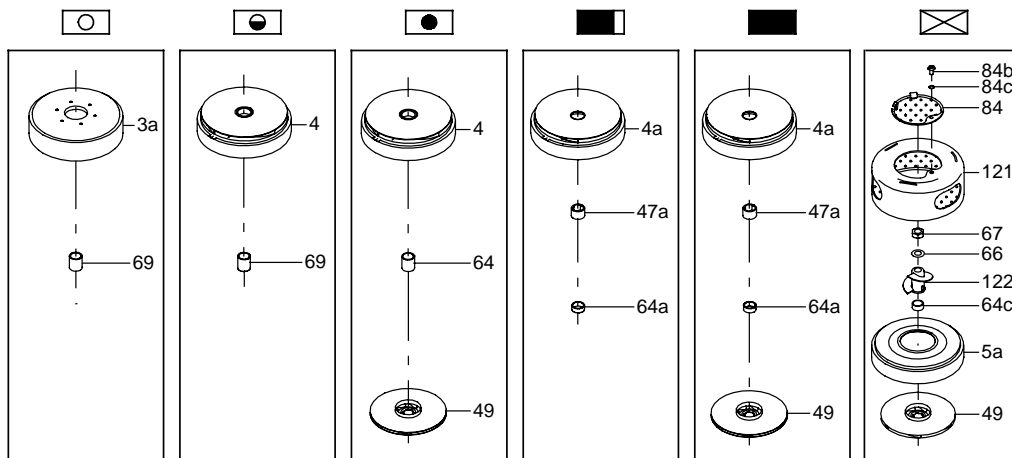
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⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗
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100/						110/					
1	2	3	4	5	6	1	2	3	4	5	6
⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗
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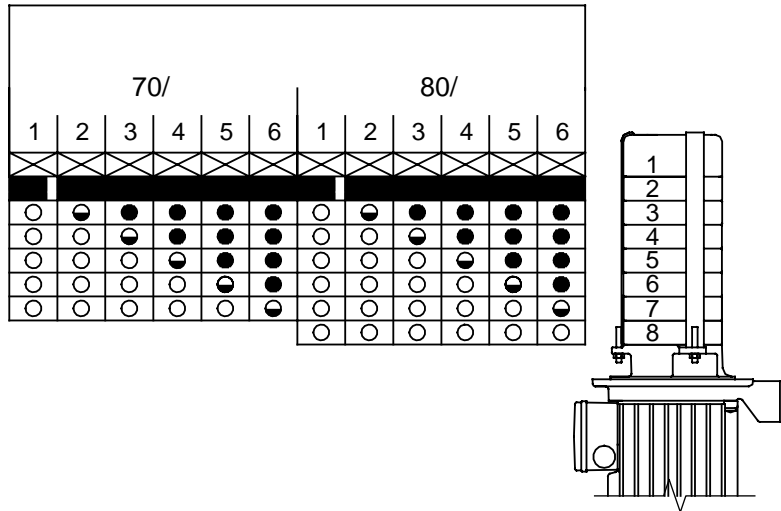
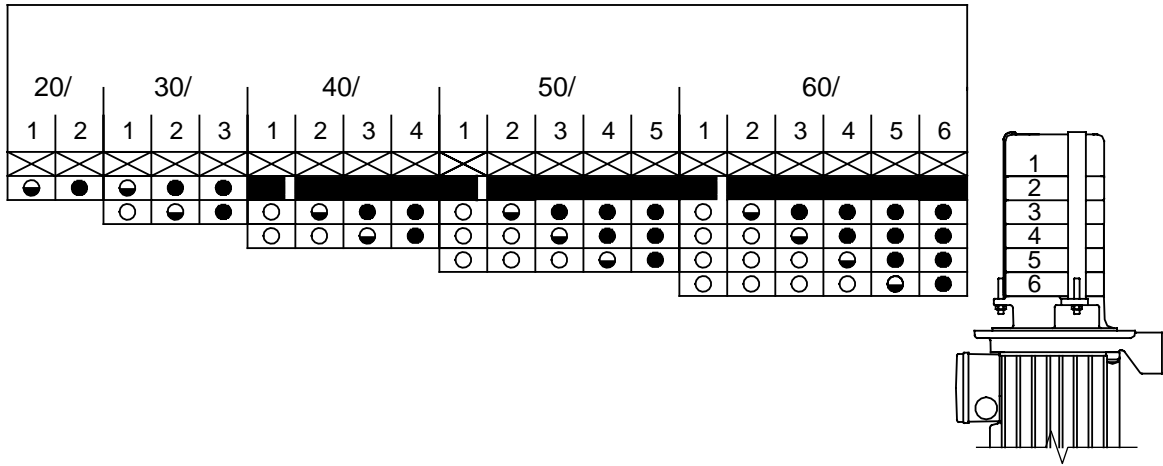
#### Symbol survey



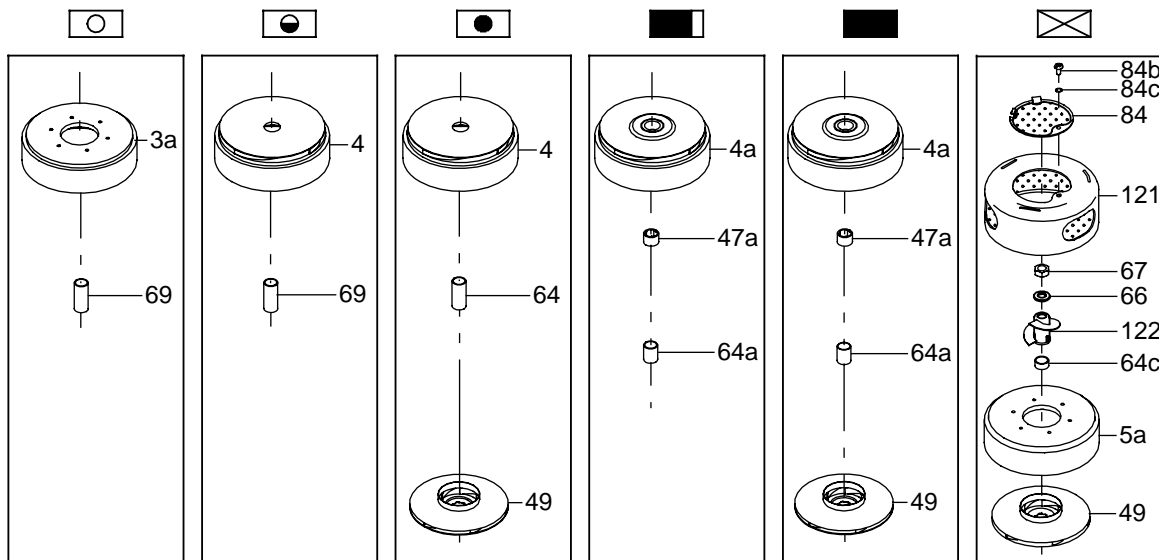
TM01 9021 0401

## 5.2 MTH, MTC 4

### Stage survey



### Symbol survey



TM01 9153 1901