

# MTS

Installation and operating instructions



# English (GB) Installation and operating instructions

## Original installation and operating instructions

These installation and operating instructions describe Grundfos MTS pumps.

Sections 1-4 give the information necessary to be able to unpack, instal and start up the product in a safe way.

Sections 5-12 give important information about the product, as well as information on service, fault finding and disposal of the product.

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Read this document before installing the product. Installation and operation must comply with local regulations and accepted codes of good practice.

## 1. General information

### 1.1 Hazard statements

The symbols and hazard statements below may appear in Grundfos installation and operating instructions, safety instructions and service instructions.



#### DANGER

Indicates a hazardous situation which, if not avoided, will result in death or serious personal injury.



#### WARNING

Indicates a hazardous situation which, if not avoided, could result in death or serious personal injury.



#### CAUTION

Indicates a hazardous situation which, if not avoided, could result in minor or moderate personal injury.

The hazard statements are structured in the following way:



#### SIGNAL WORD

##### Description of hazard

Consequence of ignoring the warning.  
- Action to avoid the hazard.

## 1.2 Notes

The symbols and notes below may appear in Grundfos installation and operating instructions, safety instructions and service instructions.



Observe these instructions for explosion-proof products.



A blue or grey circle with a white graphical symbol indicates that an action must be taken.



A red or grey circle with a diagonal bar, possibly with a black graphical symbol, indicates that an action must not be taken or must be stopped.



If these instructions are not observed, it may result in malfunction or damage to the equipment.



Tips and advice that make the work easier.

## 1.3 Safety



The manufacturer does not accept any liability for damage caused by disregarding the documentation.

### 1.3.1 General safety instructions

Observe the following regulations before carrying out any work.

#### Product safety

The pump has been designed according to the latest technology and recognised technical safety regulations. Nevertheless, the operation of the pump can still put the life and health of the user or third party at risk or cause damage to the pump or other property.

- Only operate the pump if it is in perfect technical condition and only use it as intended, being always aware of safety and risks and complying with the instructions in these installation and operating instructions.
- Keep these installation and operating instructions and all other applicable documents complete, legible and accessible to persons at all times.
- Keep the information on the pump in a complete and legible condition.
- In the event of any safety-related malfunctions, switch off the pump immediately and have the malfunction corrected by qualified persons.
- In addition to the safety instructions given in these installation and operating instructions, comply with statutory or other safety and accident-prevention regulations as well as standards and guidelines applying in the country where the pump is operated.

## Obligations of the operating company

Safety-conscious operation:

- Only operate the pump if it is in perfect technical condition and only use it as intended (see section [7.1 Operating conditions](#)).
- Make sure that the following safety regulations are observed:
  - statutory or other safety and accident-prevention regulations
  - safety regulations governing the handling of hazardous substances
  - relevant standards and guidelines applying in the country where the pump is operated.
- Make personal protective equipment available.
- Make sure that all persons working on the pump have read and understood these installation and operating instructions and all other applicable documents, especially the safety, maintenance and repair information, before they start any work.
- Organise responsibilities, areas of competence and the supervision of persons.
- Make sure that the following activities are carried out by specialist technicians only:
  - fitting, repair and maintenance
  - work on the electrical system.
- Make sure that trainee persons only work on the pump under supervision of specialist technicians.

Safety equipment:

- Provide the following safety equipment and make sure it is in working condition:
  - guards protecting against hot, cold or moving parts
  - appropriate earthing protecting against possible building-up of electrostatic charge
  - appropriate safety valve on the outlet side between the pump and the first isolating valve if there is no pressure-relief valve.

Warranty:

Obtain the manufacturer's approval before carrying out any modifications, repairs or alterations during the warranty period.

Use only original spare parts approved by the manufacturer.

## Obligations of users

- Observe all instructions provided on the pump, such as the arrow indicating the direction of rotation and the markings for pipe connections.
- Use personal protective equipment when carrying out any work on the pump.
- Avoid inappropriate use of pump and components:
  - Do not step on or use them as a climbing aid.
  - Do not use them to support boards, ramps or beams.
  - Do not use them as a fixing point for winches or supports.
  - Do not use them for storing paper or similar materials.
  - Do not use the hot pump or motor components as a heating point.
  - Do not de-ice using gas burners or similar tools.
- Do not remove the safety guards protecting against hot, cold or moving parts during operation.
- Reinstall the safety equipment on the pump as required by regulations after any work on the pump.

### 1.3.2 Specific hazard

Observe the relevant safety regulations when handling hazardous pumped liquids (hot, flammable, poisonous or potentially harmful liquids).

## 2. Product introduction

### 2.1 Intended use

- Only use the pump for the permissible pumped liquids. See section [2.4 Pumped liquids](#).
- Make sure the pump is only operated with, and never without, pumped liquid.
- Avoid cavitation:
  - Open the inlet-side valve completely and do not use it to adjust the flow rate.
  - Open the outlet-side valve completely.
- Avoid damage to the motor:
  - Note the maximum permissible number of starts per hour.
- Consult the manufacturer about any other use of the pump.
- When a pump is supplied without a motor, the pump unit must fulfil the stipulations of the Machinery Directive, 2006/42/EC.

### Observe these instructions in order to avoid misuse

- Do not operate the pump outside the operating limits with regard to temperature, pressure, viscosity, flow rate and motor speed.
- Do not operate the pump against a closed outlet-side valve.
- Do not use the pump for foodstuffs if the pump has not been adapted accordingly.
- Only select the installation types described in the installation and operating instructions:
  - do not install the pump hanging in the pipe
  - do not install the pump very close to sources of extreme heat or cold
  - do not install the pump too close to a wall.

## 2.2 Identification

### 2.2.1 Nameplate



Fig. 1 Example of nameplate

Pos.	Description
1	Type designation (see type key)
2	Model (see model code)
3	Pressure [bar]
4	Kinematic viscosity [mm <sup>2</sup> /s]
5	Frequency [Hz]
6	Country of production
7	Speed [min <sup>-1</sup> ]
8	Power consumption [kW]
9	Rated flow rate [l/min]

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2.2.2 Type key

Example	MTS	(E)	80	-40	R	46	D	8.6
Type range								
Frequency converter E = With integrated frequency converter Blank = Without frequency converter								
Frame size								
Max. pressure [bar]								
Screw sense of gradient R = right								
Screw pitch angle in degrees								
Construction D = External ball bearing, shaft seal unheated, uncooled								
Shaft seal/pipe connection Q = Shaft seal ring/axial inlet, pipe thread as standard 8.6 = Mechanical shaft seal/radial inlet, SAE as standard								

Model code

Example	A	95009789	1149	P5	0001
Model					
Product number					
Production year and week					
Place of production					
Serial number					

## 2.3 Applications

MTS pumps are screw pumps designed for pumping cooling lubricants and cutting oils for machine tool applications such as:

- modern metal machining centres
- grinding and deep-hole drilling machines.

Pumps can transfer cooling lubricants with high lubricating effect or high cooling performance based on the customer's requirements.

## 2.4 Pumped liquids

The pumped liquids must not attack the pump materials. The composition, oil content (ability to provide lubrication) and cooling effect of the liquid determine the pump maintenance intervals and maximum permissible loading.

The permissible pumped liquids according to DIN 51385 are divided into three groups according to water and oil content.

### Solutions (L)

- Inorganic materials in water
- dispersions of organic and synthetic materials in water.

### Emulsions (E)

Oil in water, oil content E 2 % to E 20 %.

### Cutting and grinding oils (S)

- without additives
- with polar, physically effective additives
- with mild-effect, lubricating film forming EP additives
- with polar and mild-effect EP additives
- with active, chemical additives
- with polar and active EP additives.

Main group	Effect at the processing spot
L	High cooling effect, low lubricating effect
E	Cooling and lubricating effect
	High lubricating effect, low cooling effect
S	High surface adhesion providing protection against corrosion
	High temperature and pressure resistance

## 3. Receiving the product

### 3.1 Inspecting the product

1. Unpack the pump on delivery and inspect it for transport damage.
2. Report any transport damage to the manufacturer immediately.
3. Dispose of packaging material according to local regulations.

### 3.2 Handling and lifting the product

- Use lifting gear designed for carrying the total weight to be transported.
- Fasten the lifting gear as shown in fig. 1 and fig. 2.
- For vertical lifting, provide a safety rope between the hook and the motor eyebolt.
- Never fasten the lifting gear to the motor eyebolt, unless used as a safety precaution against tipping over. This is especially relevant for units with a high centre of gravity.
- Do not stand under suspended loads.

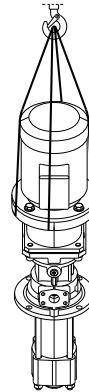


Fig. 1 Vertical lifting

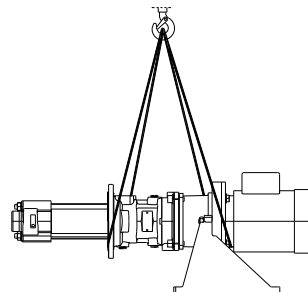


Fig. 2 Horizontal lifting

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## 4. Installing the product

### 4.1 General precautions

Do not stress the bearing or pass electrical current through the bearing as this will cause material damage.

Do not make any structural modifications to the pump unit or pump housing.

Do not carry out any welding work on the pump unit or pump housing.

Do not remove any plastic covers or screw plugs until immediately before connecting the pipes to the pump.

#### CAUTION

##### Hot surface

Minor or moderate personal injury

- The pump must be installed so that persons cannot accidentally come into contact with the hot surface of the motor.



#### 4.1.1 Preparations

Make sure the required ambient conditions are fulfilled.

See section [7.1.1 Ambient temperature and altitude](#).

#### Pump location

Make sure the installation site meets the following requirements:

- The pump must be freely accessible from all sides.
- There must be sufficient space for the installation or removal of the pipes and for maintenance and repair work, especially for the installation or removal of the pump and the motor.
- The pump must not be exposed to external vibrations (damage to bearings).
- The pump must be protected against frost.
- The pump must be stable so that it cannot tip over.

#### The mounting surface

Make sure the mounting surface fulfils the following requirements:

- level
- clean (no oil, dust or other impurities)
- able to support the weight of the pump unit and all operating forces.

### 4.1.2 Installation types

MTS pumps can be mounted in three types of installation:

#### Tank-top installation

The pump is mounted on top of the tank using the holes in the outlet casing flange. Thus the outlet casing and pump bracket are above the tank top.

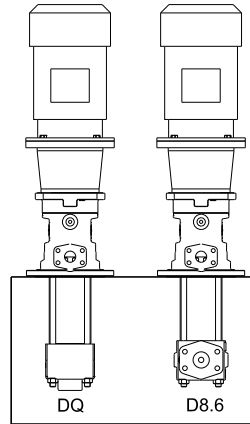


Fig. 3 Tank-top installation

#### In-tank installation

The pump can also be mounted with the outlet casing and pump bracket inside the tank using the holes in the motor flange. This type of installation ensures that any leakage will remain in the tank. However, this installation requires the motor to be dismantled before the pump can be fastened to the tank.

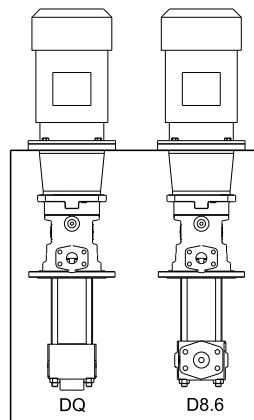


Fig. 4 In-tank installation

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## Dry installation

Using the holes in the motor flange, the pump can be fastened to a mounting foot which must be placed on a level surface. The drain must point downwards, so turn the pump cover on the drive side, if necessary. A mechanical shaft seal ensures a long service life.

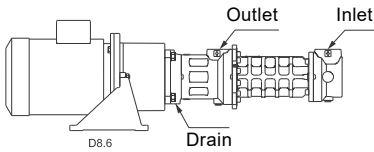


Fig. 5 Dry installation

### 4.1.3 Installing the motor

These instructions are only necessary if the pump unit is to be assembled on site.



Keep the coupling halves properly aligned when slipping them on.

Do not knock or hit any components of the pump.

1. Apply a very thin coat of molybdenum disulfide (such as Molykote®) to the shaft ends of the pump and motor.
2. Insert the shaft keys.
3. Slip on the pump-side and motor-side coupling halves. Follow the description in Appendix, section [Coupling assembly](#).
  - If a mounting fixture is not available, remove the rubber bushes and heat the coupling halves up to approximately 100 °C.
4. Tighten the set screws on both coupling halves.
5. Lift the motor and position it on the pump bracket.
6. Screw in the motor bolts.

### 4.1.4 Planning the pipes

#### Supports and flange connections



Keep the coupling halves properly aligned when slipping them on.

Do not knock or hit any components of the pump.

1. Calculate the pipe forces, taking every possible operating condition into account, such as these:
  - are flange loads according to EN ISO 14847?
  - are pipes cold or warm?
  - are pipes empty or full?
  - are pipes depressurised or pressurised?
  - have flanges changed position?
2. Make sure the used pipe supports do not damage the pipes due to friction and do not lose flexibility due to corrosion.

## Pipe diameters

Keep the flow resistance in the pipes as low as possible.

Inlet side:

- Make sure the nominal inlet pipe diameter is not smaller than the nominal inlet port diameter.
- Make sure the flow velocity is below 1 m/s.

Outlet side:

- Make sure the nominal outlet pipe diameter is not smaller than the nominal outlet port diameter.
- Make sure the flow velocity is below 3.28 m/s.

### 4.1.5 Pipe lengths

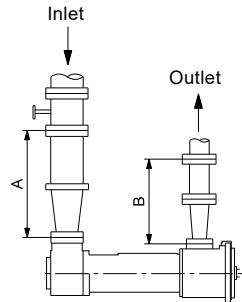


Fig. 6 Recommended lengths of a straight pipe to and from the pump inlet and outlet sides

$A > 5 \times$  nominal inlet pipe diameter

$B > 5 \times$  nominal outlet pipe diameter

Observe the recommended minimum lengths of a straight pipe when installing the pump.

Inlet side: Shorter lengths of a straight pipe are possible but may limit the hydraulic performance.

Outlet side: Shorter lengths of a straight pipe are possible but can result in increased operating noise.

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#### 4.1.6 Optimising flow conditions

1. Avoid bending radii that are smaller than 1.5 times the nominal pipe diameter.
2. Avoid abrupt changes of cross-section and direction along the pipes.

#### 4.1.7 Handling leaks

1. Provide equipment for collecting and discharging leaking liquids.
2. Make sure that leaking liquids can be freely discharged.

#### 4.1.8 Avoiding excessive pressure

1. Observe the operating instructions of the manufacturer.
2. Make sure the settings of the pressure relief valve meet the requirements of the system.
3. Do not feed the return flow from the safety valve directly back into the inlet pipe.

#### 4.1.9 Further safety and control equipment (recommended)

- Install a dirt trap in the inlet pipe (mesh size: 0.6 mm).
  - Provide a fine filter, if necessary. See section [7.1 Operating conditions](#).
  - Install a non-return valve between the outlet flange and the isolating valve to ensure that liquid does not flow back when the pump is stopped.
  - Install isolating valves in the inlet and outlet pipes to facilitate maintenance and repair work.
  - Provide pressure gauges for pressure measurements in the inlet and outlet pipes.
  - Provide inlet-side temperature measurements.
- Only necessary for hot or hazardous pumped liquids:
- Provide leak monitoring equipment.

Collect any leaking pumped liquid and dispose of it in accordance with local environmental rules and requirements.

#### 4.1.10 Connecting the pipes



Remove any impurities in the pump before connecting the pipes in order to avoid material damage.

##### Keeping the pipes clean

1. Flush all pipe parts and fittings before connection.
2. Make sure that no flange seals protrude inwards.
3. Remove any blank flanges, plugs, protective foils and/or protective paint from the flanges.
4. Remove any welding beads from welded pipes.

##### Connecting the inlet pipe, if any

1. Remove the transport screw plugs from the pump.
  - run the pipes with a continuous downward slope towards the pump to avoid air pockets.
2. Make sure that no seals protrude inwards.
3. For tank-top and in-tank installations: Observe the minimum immersion depth. See section [4.1.11 Liquid level](#).

##### Connecting the outlet pipe

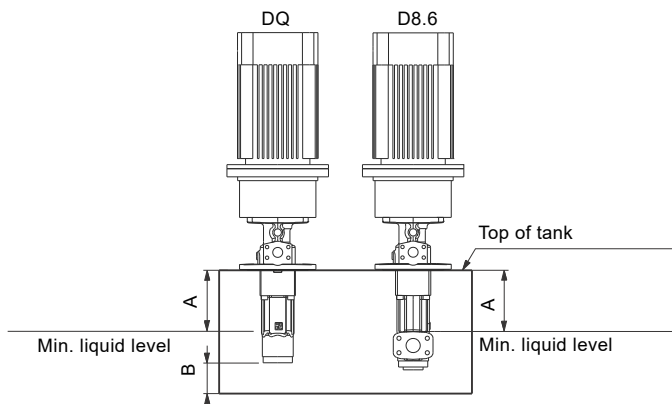
1. Remove the transport screw plugs from the pump.
2. Connect the outlet pipe.
3. Make sure that no seals protrude inwards.

##### Checking pipe connections for stress

1. Before checking, make sure that the pipes are connected and cooled down.
2. Disconnect the pipe flanges from the pump.
3. Ensure that the pipes can be moved freely in all directions within the expected range of expansion:
  - nominal diameter < 150 mm: By hand
  - nominal diameter > 150 mm: With a small lever.
4. Make sure that flange surfaces are parallel.
5. Reconnect the pipe flanges to the pump.

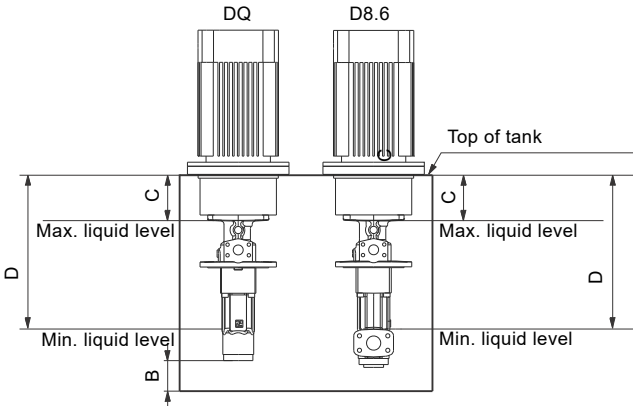
#### 4.1.11 Liquid level

In order to protect the pumps and to ensure correct performance, observe the requirements in the tables below.



**Fig. 7** Tank-top installation

Pump	A [mm]	B [mm]
MTS 20	147	25
MTS 40	190	25
MTS 80	224	25
MTS 140	265	25
MTS 210	286	-
MTS 280	335	-
MTS 440	387	-



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Fig. 8 In-tank installation

Motor frame size	MTS 20		MTS 40		MTS 80		MTS 140		MTS 210		MTS 280		MTS 440	
	C [mm]	D [mm]	C [mm]	D [mm]	C [mm]	D [mm]	C [mm]	D [mm]	C [mm]	D [mm]	C [mm]	D [mm]	C [mm]	D [mm]
90	126	422												
100	131	427	131	482	-	-	-	-	-	-	-	-	-	-
112	131	427	131	482	192	601	-	-	-	-	-	-	-	-
132	154	450	154	506	192	601	200	675	215.5	732	-	-	-	-
160	192	488	192	543	192	601	216	691	215.5	732	220.5	817	229	866
180	-	-	-	-	208	617	216	691	215.5	732	220.5	817	229	866
200	-	-	-	-	208	617	216	691	215.5	732	244.5	841	229	866
225	-	-	-	-	-	-	246	721	245.5	762	250.5	847	261	898
250	-	-	-	-	-	-	-	-	259.5	776	281.5	878	292	929
280	-	-	-	-	-	-	-	-	259.5	776	281.5	878	292	929
315	-	-	-	-	-	-	-	-	-	-	267.5	864	331	968

4.1.12 Tightening torques

The values in the table apply to oiled screws when using torque wrenches.

Thread size	Tightening torque [Nm] at strength class		
	5.6	8.8	10.9
M6	3.9	8.8	13.2
M8	9.8	21.6	31.8
M10	18.6	43.1	63.0
M12	32.3	73.5	108
M16	78.4	181	264
M20	157	353	517
M24	289	662	890
M27	426	975	1304
M30	578	1323	1775

## 4.2 Electrical connection

### WARNING

#### Electric shock

Death or serious personal injury

- Before starting any work on the product, make sure that the power supply has been switched off and that it cannot be accidentally switched on.
- Connect the pump to an external main switch close to the pump and to a motor-protective circuit breaker or a CUE frequency converter. Make sure that you can lock the main switch in OFF position (isolated). Type and requirements as specified in EN 60204-1, 5.3.2.



The user is to consider whether it is necessary to install an emergency stop switch.

The operating voltage and frequency are marked on the motor nameplate. Make sure that the motor is suitable for the power supply on which it will be used and the motor terminal connection is correct. You will find a wiring diagram in the terminal box.

#### 4.2.1 Frequency converter operation

All three-phase motors supplied by Grundfos can be connected to a frequency converter. The frequency converter must be set to operation with a constant torque.

Dependent on the frequency converter type, this may cause increased acoustic noise from the motor. Furthermore, it may also cause the motor to be exposed to detrimental voltage peaks.



Grundfos motors type MG 90 (1.5 kW, 2-pole), for supply voltages up to and including 440 V (see motor nameplate), must be protected against voltage peaks higher than 650 V (peak value) between the supply terminals.

We recommend to protect all other motors against voltage peaks higher than 850 V.

The above disturbances, that is both increased acoustic noise and detrimental voltage peaks, can be eliminated by fitting an LC filter between the frequency converter and the motor.

For further details, please contact your frequency converter or motor supplier.

## 5. Starting up the product

### WARNING

#### Too high pressure and leakage

Death or serious personal injury

- Do not run the pump against a closed outlet valve for more than approximately 5 minutes.



Before starting up the pump for the first time, make sure that the following requirements have been fulfilled:

- The pump is installed properly.
- The motor is installed properly.
- The operational data are according to the data on the pump nameplate and technical data.
- All plastic covers have been removed.
- All pipe connections are stress-free and sealed.
- All safety equipment is installed and tested for functionality.
- There is sufficient liquid level in the tank (minimum immersion depth).

### 5.1 First start-up

#### 5.1.1 Removing the corrosion inhibitor

Only necessary for pumps treated with corrosion inhibitor.

See section [6.3 Removing corrosion inhibitor](#).

### 5.1.2 Priming

#### Priming pumps with a DQ shaft seal, without inlet pipe

1. For tank-top and in-tank installations, fig. 7 and fig. 8, observe the minimum immersion depth. See section [4.1.11 Liquid level](#).
2. Open the inlet-side valve, if installed.
3. Open the outlet-side valve.
4. Make sure that the outlet pipes are not blocked or leaky.
5. Start the pump.

#### Priming pumps with a DQ shaft seal, with inlet pipe

1. For tank-top and in-tank installations, fig. 7 and fig. 8, observe the minimum immersion depth. See section [4.1.11 Liquid level](#).
2. Fill the outlet area with liquid via the screwed plug (pos. 214) then wait a few minutes. See section [10.4 Position numbers](#).
3. Open the inlet-side valve, if installed.
4. Open the outlet-side valve.
5. Make sure that the outlet pipes are not blocked or leaky.
6. Start the pump.

#### Priming pumps with a D8.6 shaft seal

1. Fill the shaft seal area via the screwed plugs (pos. 215 and 216) See section [10.4 Position numbers](#).
2. For tank-top and in-tank installations, fig. 7 and fig. 8, observe the minimum immersion depth. See section [4.1.11 Liquid level](#).
3. For dry installations, see section [4.1.2 Installation types](#), fill the outlet area with liquid via the screwed plug (pos. 214) then wait a few minutes. See section [10.4 Position numbers](#).
4. Open the inlet-side valve, if installed.
5. Open the outlet-side valve.
6. Make sure that the outlet pipes are not blocked or leaky.
7. Start the pump.

### 5.1.3 Checking the direction of rotation



Do not start the pump to check the direction of rotation until it has been filled with liquid.

1. Switch the motor on for some seconds.
2. Make sure the motor turns clockwise (viewed from the motor fan).
3. If the direction of rotation is wrong, exchange two phases in the power supply.

### 5.1.4 Start-up

1. Make sure that the pump is filled properly.
2. Open the threaded connection in the pump bracket.
3. Open the outlet-side valve.
4. Open the inlet-side valve.
5. Switch on the motor and check that it is running smoothly.
6. Make sure the temperature rises at a rate of no more than 2 °C/min.
7. Make sure the minimum outlet pressure is higher than 2 bar.
8. After running at operating pressure and temperature for a while, check that the pump is not leaking.
9. Check if the filter system works properly and that the pump is protected against entrained air, solid particles and mud.

## 6. Storing the product

See section [3.2 Handling and lifting the product](#).

The pump has not been treated for storage from factory.



Prepare the pump for storage as described below to avoid material damage.

### 6.1 Preparation for storage

Prepare the pump properly for storage both inside and outside.

Use RUST-BAN 335, for example, as corrosion inhibitor.

#### Applying corrosion inhibitor to the inside of the pump

1. Close the inlet-side flange with a blind flange.
2. Fill the pump with corrosion inhibitor.
3. Turn the shaft slowly by hand against the pump's direction of rotation.
4. Continue filling and turning until corrosion inhibitor comes out of the outlet-side flange without bubbles.
5. Close the outlet-side flange with a blind flange.

#### Applying corrosion inhibitor to the outside of the pump

Apply corrosion inhibitor to all bare metal parts using a brush or spray can.

### 6.2 Storage

1. Seal all openings with blind flanges, blind plugs or plastic covers.
2. Make sure the storage room meets the following conditions:
  - dry
  - frost-free
  - vibration-free
  - dust-free.
3. Turn the shaft once a month and make sure the shaft and bearing change position in the process.

### 6.3 Removing corrosion inhibitor

Only necessary for pumps treated with corrosion inhibitor.



High water pressure or spray water can damage bearings.

Do not clean bearing areas with a water or steam jet.



Using wrong cleaning agent may cause damage to seals.

Make sure the cleaning agent does not corrode the seals.

1. Choose among the following cleaning agents:
  - benzene
  - wax solvents
  - diesel
  - paraffin
  - alkaline cleaner.
2. Remove the corrosion inhibitor from all bare internal parts of the pump.
3. Dispose of cleaning agents in accordance with local environmental rules and requirements.
4. For storage times exceeding six months:
  - Replace the elastomer parts made of EPDM.
  - Check all elastomer parts (O-rings, shaft seals) for proper elasticity and replace them, if necessary.

## 7. Technical data

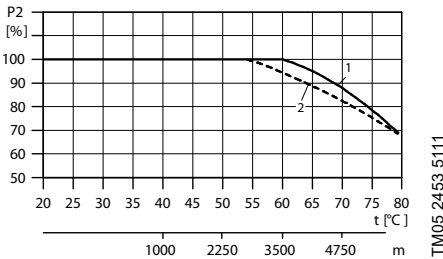
### 7.1 Operating conditions

#### 7.1.1 Ambient temperature and altitude

Motor power [kW]	Motor make	Motor efficiency class	Maximum ambient temperature [°C]	Maximum altitude above sea level [m]
2.2 - 22	MG	IE3	+60	3500
30-200	Siemens	IE3	+55	2750

If the ambient temperature exceeds the above maximum temperatures or the pump is installed at an altitude exceeding the above altitudes, the motor must not be fully loaded due to the risk of overheating. Overheating may result from excessive ambient temperatures or the low density and, consequently, low cooling effect of the air.

If this is the case, it may be necessary to use a motor with a higher rated output.



**Fig. 9** The maximum motor output (P2) depends on the ambient temperature and altitude

Pos.	Description
1	2.2 - 22 kW IE3 MG motors
2	30-200 kW IE3 Siemens motors

#### Example:

Pump with a 2.2 kW IE3 MG motor

If this pump is installed 4750 m above sea level, the motor must not be loaded more than 88 % of the rated output. At an ambient temperature of 75 °C, the motor must not be loaded more than 78 % of the rated output. If the pump is installed 4750 m above sea level at an ambient temperature of 75 °C, the motor must not be loaded more than 88 % x 78 % = 68.6 % of the rated output.

#### 7.1.2 Humidity

Relative humidity: Max. 85 %.

#### 7.1.3 Sound pressure level

Measuring conditions:

- Distance to the pump: 1 m
- Operation: Cavitation-free
- Motor: IEC standard motor
- Tolerance: ± 3 dB(A).

The MTS design allows gentle, even, virtually pulsation-free and low-noise pumping. The noise emission lies between 56 and 74 dB(A) depending on speed, pump size and installation. MTS pumps operate significantly quieter than rotary-lobe and centrifugal pumps with comparable performance.

### 7.1.4 Filtration

To reach an acceptable pump life, we recommend the pumped liquids to be filtered to cleanliness class according to ISO 4406/99. The recommended cleanliness class depends on pumping pressure and abrasive class 1 to 7. Process examples for abrasive classes are shown in the table below.

The additional specifications for filter mesh and flow rate are guiding values for orientation. The decisive factor is the cleanliness of the liquids indicated by the cleanliness class.

To avoid damage by solid particles, we recommend that you use a filter mesh of 65 µm (nominal, two-dimensional) and finer.

	Abrasive class						
	1	2	3	4	5	6	7
<b>Material</b>	Steel, cast iron, Al	Steel, cast iron, Al	Al (Si > 5 %)	Steel	Steel, hard	Tungsten carbide	Titanium
<b>Process</b>	Drilling	Turning/milling	Turning/milling	Grinding	Grinding	Grinding	Grinding
<b>Tool</b>	High-speed steel (HSS)	Tungsten carbide	Tungsten carbide	Corundum	Corundum	CBN	Diamond
<b>Pressure level</b>							
≤ 120 bar	21/19/16	21/19/16	21/19/16	20/18/15	20/18/15	19/17/14	18/16/13
	≤ 30 µm	≤ 25 µm	≤ 20 µm	≤ 17 µm	≤ 15 µm	≤ 10 µm	≤ 6 µm
	≤ 30 mg/l	≤ 25 mg/l	≤ 20 mg/l	≤ 15 mg/l	≤ 10 mg/l	≤ 5 mg/l	≤ 3 mg/l
≤ 90 bar	22/20/17	22/20/17	22/20/17	21/19/16	21/19/16	20/18/15	19/17/14
	≤ 50 µm	≤ 45 µm	≤ 40 µm	≤ 30 µm	≤ 20 µm	≤ 15 µm	≤ 10 µm
	≤ 60 mg/l	≤ 50 mg/l	≤ 40 mg/l	≤ 30 mg/l	≤ 20 mg/l	≤ 10 mg/l	≤ 5 mg/l
≤ 60 bar	23/21/18	23/21/18	23/21/18	22/20/17	22/20/17	21/19/16	20/18/15
	≤ 80 µm	≤ 75 µm	≤ 60 µm	≤ 50 µm	≤ 40 µm	≤ 20 µm	≤ 15 µm
	≤ 120 mg/l	≤ 100 mg/l	≤ 80 mg/l	≤ 60 mg/l	≤ 40 mg/l	≤ 20 mg/l	≤ 10 mg/l
≤ 30 bar	24/22/19	24/22/19	24/22/19	23/21/18	23/21/18	22/20/17	21/19/16
	≤ 150 µm	≤ 120 µm	≤ 100 µm	≤ 80 µm	≤ 60 µm	≤ 40 µm	≤ 20 µm
	≤ 250 mg/l	≤ 200 mg/l	≤ 160 mg/l	≤ 120 mg/l	≤ 80 mg/l	≤ 40 mg/l	≤ 20 mg/l

The data in the below table are reference values. The actual airborne sound pressure level depends especially on the installation conditions.

Pump	L <sub>pA</sub> [dB(A)] for pump at speed	
	2900 [min <sup>-1</sup> ]	3500 [min <sup>-1</sup> ]
MTS 20	56	58
MTS 40	59	61
MTS 80	61	63
MTS 140	64	66
MTS 210	67	69
MTS 280	69	71
MTS 440	72	74



## 8. Taking the product out of operation



**CAUTION**

**Corrosive liquids**

Minor or moderate personal injury  
- Wear personal protective equipment.



**CAUTION**

**Toxic liquids**

Minor or moderate personal injury  
- Wear personal protective equipment.



**CAUTION**

**Hot or cold liquid**

Minor or moderate personal injury  
- Wear personal protective equipment.



**CAUTION**

**Hot or cold surface**

Minor or moderate personal injury  
- Make sure that no one can accidentally come into contact with hot or cold surfaces.



Take the following measures whenever the pump is shut down:

The pump is to be...	Action
... shut down for a prolonged period:	Take measures suited to the pumped liquids in the table below.
... emptied:	<b>D8.6:</b> Close the inlet-side and outlet-side valves and drain the pump by removing the drain plug and turning the pump manually until the pump is empty. <b>DQ:</b> Close the outlet-side valve and empty the pump through the inlet-side by turning the pump manually.
... dismantled:	Switch off the power supply, and make sure that it cannot be accidentally switched on.
... stored:	Follow the storage instructions (section <a href="#">6.2 Storage</a> ).

Behaviour of the pumped liquid	Duration of shutdown (depending on process)	
	Short	Long
1. Solids sedimenting	Flush the pump.	Flush the pump.
2. Solidifying/freezing, non-corrosive	Heat up or empty the pump and tanks.	Empty the pump and tanks.
3. Solidifying/freezing, corrosive	Heat up or empty the pump and tanks.	<ul style="list-style-type: none"> <li>Empty the pump and tanks.</li> <li>Apply corrosion inhibitor to the pump and tanks.</li> </ul>
4. Remaining liquid, non-corrosive	-	-
5. Remaining liquid, corrosive	-	<ul style="list-style-type: none"> <li>Empty the pump and tanks.</li> <li>Apply corrosion inhibitor to the pump and tanks.</li> </ul>

## 9. Starting up after standstill

- If the pump has been shut down for over six years, take the following measures before starting it up again:
  - Replace elastomer seals (O-rings, shaft seal rings).
  - Replace anti-friction bearings in the pump.
  - Replace the motor bearing, if necessary.
- Carry out all steps as for the first start-up. See section [5.1 First start-up](#).

### 9.1 Test run of the standby pump (if installed)

A standby pump must be primed and vented.  
Test run the standby pump at least once a week.

## 10. Servicing the product

### WARNING

#### Electric shock



Death or serious personal injury  
- Before starting any work on the product, make sure that the power supply has been switched off and that it cannot be accidentally switched on.

### WARNING

#### Moving parts



Death or serious personal injury  
- Tighten the coupling screws to the correct torque.  
- Install the coupling guards securely to the pump with the screws intended for this purpose.

### CAUTION

#### Corrosive liquids



Death or serious personal injury  
- Wear personal protective equipment.

### CAUTION

#### Toxic liquids



Minor or moderate personal injury  
- Wear personal protective equipment.



### CAUTION

#### Hot or cold liquid



Minor or moderate personal injury  
- Wear personal protective equipment.

## 10.1 Maintaining the product



### CAUTION

#### Hot or cold surface

Minor or moderate personal injury  
- Make sure that no one can accidentally come into contact with hot or cold surfaces.



### 10.1.1 Periodic checks

Make the following checks at regular intervals, depending on the operational load on the pump:

- Check that the temperature of anti-friction bearings is lower than 70 °C.
- Check that normal operating conditions prevail.
- Check that the pressure relief valve is working.

For trouble-free operation, always ensure the following:

- no dry running
- no leaks
- no cavitation
- inlet-side isolating valves open
- unclogged and clean filters
- sufficient pump inlet pressure
- no unusual running noises or vibrations
- no excessive leakage at the shaft seal.

### 10.1.2 Bearings

Intermittent operation, high temperatures and aggressive ambient and process conditions reduce the service life of bearings.

Deep-groove ball bearings are according to DIN 625.

The bearings are greased-for-life, they cannot be relubricated, and have sealing washers on both sides.

We recommend that you replace greased-for-life bearings every two years as a precaution,.

### 10.1.3 Shaft seal

MTS pumps are available with two types of shaft seal:

- mechanical shaft seal
- shaft seal ring.

Mechanical shaft seals are subject to natural wear which strongly depends on the operating conditions. Therefore, general statements regarding their service life cannot be made.

Both mechanical shaft seals and shaft seal rings have functional leaks. In the event of major leaks, replace the shaft seal and its auxiliary seals.

## 10.2 Repairing the product

### 10.2.1 Dismantling

Before dismantling the pump, make sure the following requirements have been fulfilled:

- The pump has been depressurised.
- The outlet-side isolating valve has been closed.
- The pump is completely empty, flushed and decontaminated.
- All electrical connections have been disconnected and the motor cannot be accidentally switched on again.
- The pump has cooled down.
- The coupling guard has been dismantled.
- The spacer has been removed, if the coupling is a spacer coupling.
- Auxiliary systems have been shut down, depressurised and emptied.
- Pressure gauge lines have been dismantled.

Observe the following during dismantling:

- Mark the precise orientation and position of all components before dismantling them.
- Dismantle components concentrically without tilting them.
- For dismantling of the pump, see Appendix, section [Constructional drawings](#).

### 10.2.2 Re-installing

Install the components concentrically without tilting them, in accordance with the markings made.

Observe the following during re-installation:

- Always replace lost or damaged screws with screws of the same strength class.
- Replace worn parts with genuine spare parts.
- Replace seals with new seals of the same materials, inserting them in such a way that they are unable to rotate.
- Tighten screws and nuts to the prescribed tightening torques. See section [4.1.12 Tightening torques](#).
- Clean all parts. Do not remove any markings.
- Assemble the pump. See Appendix, section [Constructional drawings](#).
- Install the pump in the system. See section [4. Installing the product](#).

## 10.3 Ordering spare parts

Parts which can be replaced can be found in the list in section [10.4 Position numbers](#).

Please have the following information ready when ordering spare parts:

- pump type
- model and serial number
- production year and week
- part number
- designation
- quantity.

For trouble-free replacement in the event of faults, we recommend keeping a spare pump available on site.

## 10.4 Position numbers

### 10.4.1 MTS model A position numbers

The position numbers in the table below refer to the MTS model A constructional drawings in the appendix. See Appendix, section [Constructional drawings](#).

Pos.	Description
1	Outlet casing
2	Rotor housing
3	Pump bracket
4	Inlet casing
12	Drive screw
13	Idler screw
21	Labyrinth seal
22	Labyrinth seal
23	Spacer ring
24	Spacer ring
26 <sup>3)</sup>	Pressure balancing bush
100 <sup>3)</sup>	Gasket
121 <sup>3)</sup>	O-ring
122 <sup>3)</sup>	O-ring
129	O-ring
140 <sup>3)</sup>	Seal ring
160	Sealing plug
161	Sealing plug
183 <sup>1)</sup>	Shaft seal ring
186 <sup>2)</sup>	Mechanical shaft seal
200	Hexagon socket head cap screw
201	Stud bolt
214	Screw plug
220	Hexagon nut
230 <sup>3)</sup>	Thrust disc
251	Circlip
252 <sup>3)</sup>	Circlip
270	Inside ring
280	Rivet
290	Shaft key
292 <sup>3)</sup>	Deep-groove ball bearing
970	Nameplate
980	Plastic cover
981	Plastic cover

1) Can be ordered as a seal ring kit.

2) Can be ordered as a mechanical seal kit.

3) Included in a repair kit.

For service kit numbers, please see Grundfos Product Center at <http://product-selection.grundfos.com>.

### 10.4.2 MTS model C position numbers

The position numbers in the table below refer to the MTS model C constructional drawings in the appendix. See Appendix, section [Constructional drawings](#).

Pos.	Description
1	Outlet casing
2	Rotor housing
12	Drive screw
13	Idler screw
19	Spring
40	Ball
48	Stop screw
100 <sup>3)</sup>	Gasket
121 <sup>3)</sup>	O-ring
132 <sup>3)</sup>	O-ring
140 <sup>3)</sup>	Seal ring
141 <sup>3)</sup>	Seal ring
142 <sup>3)</sup>	Seal ring
143 <sup>3)</sup>	Seal ring
144 <sup>3)</sup>	Seal ring
170 <sup>1) 3)</sup>	Secondary seal
183 <sup>1)</sup>	Shaft sealing ring with dust lip
186 <sup>2)</sup>	Mechanical shaft seal
187 <sup>2)</sup>	Adapter for mechanical seal
201	Stud bolt
214	Screw plug
215	Screw plug
216	Screw plug
217	Screw plug
231 <sup>3)</sup>	Thrust disc
250 <sup>3)</sup>	Circlip
254 <sup>3)</sup>	Circlip
264 <sup>3)</sup>	Supporting washer
280	Rivet
290 <sup>3)</sup>	Shaft key
292 <sup>3)</sup>	Deep-groove ball bearing
400 <sup>4)</sup>	Adapter
420 <sup>4)</sup>	Hose
970	Nameplate

1) Can be ordered as a seal ring kit.

2) Can be ordered as a mechanical seal kit.

3) Included in a repair kit.

4) Can be ordered as a hose kit.

For service kit numbers, please see Grundfos Product Center at <http://product-selection.grundfos.com>.

## 10.5 Returning the pump to the manufacturer

Before returning the pump, make sure the following requirements have been fulfilled:

- The pump has been depressurised.
- The pump is completely empty.
- All electrical connections have been disconnected and the motor cannot be accidentally switched on again.
- The pump has cooled down.
- The coupling guard has been dismantled.
- The spacer has been removed, if the coupling is a spacer coupling.
- Auxiliary systems have been shut down, depressurised and emptied.
- Pressure gauge lines have been dismantled.

Before returning the pump to the manufacturer, take necessary measures, depending on the required repair work, as listed in the table below.

Repair to be carried out...	Action before return
... at the customer's premises:	<ul style="list-style-type: none"> <li>• Dismount the defective component and return it to the manufacturer.</li> </ul>
... at the manufacturer's premises:	<ul style="list-style-type: none"> <li>• Flush the pump and decontaminate it if it was used for hazardous pumped liquids.</li> </ul>
... at the manufacturer's premises for warranty repairs:	<ul style="list-style-type: none"> <li>• Return the complete pump, not dismantled, to the manufacturer.</li> </ul>

### 10.5.1 Contaminated products

#### CAUTION



#### Biological hazard

- Minor or moderate personal injury
- Flush the product thoroughly with clean water and rinse the product parts in water.

The product will be classified as contaminated if it has been used for a liquid which is injurious to health or toxic.

If you request Grundfos to service the product, contact Grundfos with details about the liquid before returning the product for service. Otherwise, Grundfos can refuse to accept the product for service.

Any application for service must include details about the liquid.

Clean the product in the best possible way before you return it.

Costs of returning the product are to be paid by the customer.

### 10.6 Service documentation

Service documents are available in Grundfos Product Center at <http://product-selection.grundfos.com>.

## 11. Fault finding the product

### WARNING

#### Electric shock



- Death or serious personal injury
- Before starting any work on the product, make sure that the power supply has been switched off and that it cannot be accidentally switched on.

### WARNING

#### Moving parts



- Death or serious personal injury
- Tighten the coupling screws to the correct torque.
  - Install the coupling guards securely to the pump with the screws intended for this purpose.

### CAUTION



#### Corrosive liquids

- Minor or moderate personal injury
- Wear personal protective equipment.

### CAUTION



#### Toxic liquids

- Minor or moderate personal injury
- Wear personal protective equipment.



### CAUTION

#### Hot or cold liquid

- Minor or moderate personal injury
- Wear personal protective equipment.



### CAUTION

#### Hot or cold surface

- Minor or moderate personal injury
- Make sure that no one can accidentally come into contact with hot or cold surfaces.



Possible faults are identified by a fault number in the table below. This number identifies the cause and remedy in the fault finding list.

If faults occur which are not specified in the following table or cannot be traced back to the specified causes, please consult Grundfos.

Fault number	Fault description	Fault number	Fault description
1	The pump is not pumping.	5	Unstable pump operation (jerks and noise).
2	The pump performance is insufficient.	6	The pump is jammed.
3	The pump performance is excessive.	7	The pump is leaking.
4	There is no inlet pressure.	8	Excessive motor power input.

Fault number								Cause	Remedy
1	2	3	4	5	6	7	8		
X	-	-	-	-	-	-	-	The transport screw plugs are still in place.	<ul style="list-style-type: none"> <li>Remove the transport screw plugs.</li> <li>Dismantle the pump and inspect it for dry-running damage.</li> </ul>
X	-	-	-	-	-	-	-	The inlet pipe is closed by the valve.	<ul style="list-style-type: none"> <li>Open the valve.</li> </ul>
X	-	-	-	X	-	-	-	The inlet pipe is not vented properly or not filled up completely.	<ul style="list-style-type: none"> <li>Fill up the pump and/or pipes completely and vent them.</li> </ul>
X	-	-	-	X	-	-	-	Formation of air pockets in the inlet pipe.	<ul style="list-style-type: none"> <li>Install a venting device.</li> <li>Correct the pipe layout.</li> </ul>
X	-	-	-	X	-	-	-	The outlet pipe is blocked.	<ul style="list-style-type: none"> <li>Clean the outlet pipe.</li> </ul>
X	-	-	X	X	-	-	-	Incorrect direction of rotation of the pump.	<ul style="list-style-type: none"> <li>Exchange any two phases of the motor power supply. See section <a href="#">5.1.3 Checking the direction of rotation</a>.</li> </ul>
X	-	-	X	-	X	-	-	The pump is very dirty.	<ul style="list-style-type: none"> <li>Dismount and clean the pump.</li> </ul>
X	X	-	X	X	-	-	-	The inlet pipe, rotor housing or inlet casing is blocked or encrusted.	<ul style="list-style-type: none"> <li>Clean the inlet pipe, rotor housing or inlet casing.</li> <li>Clean the inlet casing.</li> </ul>
X	X	-	X	X	-	-	-	Air is sucked in.	<ul style="list-style-type: none"> <li>Seal the source of air leakage or repair the malfunctioning component, if necessary.</li> </ul>
X	X	-	X	X	-	-	-	The pump is cavitating due to an excessive amount of gas.	<ul style="list-style-type: none"> <li>Check the pipes.</li> <li>Clean or enlarge the filter.</li> <li>Install an inlet pipe with a bigger cross-section.</li> </ul>
X	X	-	X	X	-	-	-	Excess play between the following: <ul style="list-style-type: none"> <li>spindles</li> <li>spindles and housing.</li> </ul>	<ul style="list-style-type: none"> <li>Repair or replace any worn parts.</li> </ul>
X	X	-	X	-	-	X	-	The shaft seal is leaking excessively.	<ul style="list-style-type: none"> <li>Replace the shaft seal.</li> </ul>
-	X	-	X	X	-	-	X	The motor is running on two phases.	<ul style="list-style-type: none"> <li>Check the fuse and replace it, if necessary.</li> <li>Check the cable connections and insulation. Replace the cable, if necessary.</li> </ul>
-	X	-	X	-	-	-	-	The motor speed is too low.	<ul style="list-style-type: none"> <li>Compare the required motor speed with the specifications on the pump nameplate. Replace the motor, if necessary.</li> <li>Increase the motor speed if speed control is available.</li> </ul>
-	-	X	-	X	-	-	X	The motor speed is too high.	<ul style="list-style-type: none"> <li>Compare the required motor speed with the specifications on the pump nameplate. Replace the motor, if necessary.</li> <li>Reduce the motor speed if speed control is available.</li> </ul>
-	X	-	X	-	-	-	-	An isolating valve in the inlet pipe is not fully opened.	<ul style="list-style-type: none"> <li>Open the valve completely.</li> </ul>

Fault number								Cause	Remedy
1	2	3	4	5	6	7	8		
-	X	-	X	X	-	-	-	The inlet pipe cross-section is too small.	<ul style="list-style-type: none"> <li>• Install an inlet pipe with a larger cross-section.</li> <li>• Remove any encrustations from the inlet pipe.</li> <li>• Open the valve completely.</li> </ul>
-	X	-	X	X	-	-	-	The inlet height is too high: $NPSH_{\text{pump}}$ is larger than $NPSH_{\text{system}}$ .	<ul style="list-style-type: none"> <li>• Increase the inlet pressure.</li> <li>• Consult the manufacturer.</li> </ul>
-	X	-	X	X	-	-	-	The pump is cavitating because the pumped liquid temperature is too high.	<ul style="list-style-type: none"> <li>• Increase the inlet pressure.</li> <li>• Lower the pumped liquid temperature.</li> <li>• Consult the manufacturer.</li> </ul>
-	X	-	X	X	-	-	-	The hydraulic parts of the pump are dirty, clotted or encrusted.	<ul style="list-style-type: none"> <li>• Dismount the pump and clean the parts.</li> </ul>
-	X	-	X	-	-	-	X	The viscosity or specific gravity of the pumped liquid is outside the range specified for the pump.	<ul style="list-style-type: none"> <li>• Consult the manufacturer.</li> </ul>
-	X	-	X	X	X	-	-	Pump parts are worn.	<ul style="list-style-type: none"> <li>• Replace the worn pump parts.</li> </ul>
-	-	-	-	X	X	X	X	The pump is distorted.	<ul style="list-style-type: none"> <li>• Check the pipe connections at the pump.</li> </ul>
-	-	-	-	X	X	-	X	The anti-friction bearing in the pump is defective.	<ul style="list-style-type: none"> <li>• Replace the anti-friction bearing.</li> </ul>
-	-	-	-	-	X	-	X	The anti-friction bearing in motor is defective.	<ul style="list-style-type: none"> <li>• Replace the anti-friction bearing.</li> </ul>
-	-	-	-	X	-	-	-	The outlet-side valve is not opened wide enough.	<ul style="list-style-type: none"> <li>• Open the outlet-side valve completely.</li> </ul>
-	-	-	-	X	-	-	-	Coupling parts are worn.	<ul style="list-style-type: none"> <li>• Replace the coupling.</li> </ul>
-	-	-	-	-	-	X	-	Flange bolts are not tightened properly.	<ul style="list-style-type: none"> <li>• Tighten the flange bolts. See section 4.1.12 <i>Tightening torques</i>.</li> </ul>
-	-	-	-	-	-	X	-	The mechanical shaft seal is worn.	<ul style="list-style-type: none"> <li>• Replace the mechanical shaft seal.</li> </ul>
-	-	-	-	-	-	X	-	The pump housing seal is defective.	<ul style="list-style-type: none"> <li>• Replace the pump housing seal.</li> </ul>

## 12. Disposal

This product or parts of it must be disposed of in an environmentally sound way:

1. Use the public or private waste collection service.
2. If this is not possible, contact the nearest Grundfos company or service workshop.



The crossed-out wheeie bin symbol on a product means that it must be disposed of separately from household waste. When a product marked with this symbol reaches its end of life, take it to a collection point designated by the local

waste disposal authorities. The separate collection and recycling of such products will help protect the environment and human health.

See also end-of-life information at [www.grundfos.com/product-recycling](http://www.grundfos.com/product-recycling).



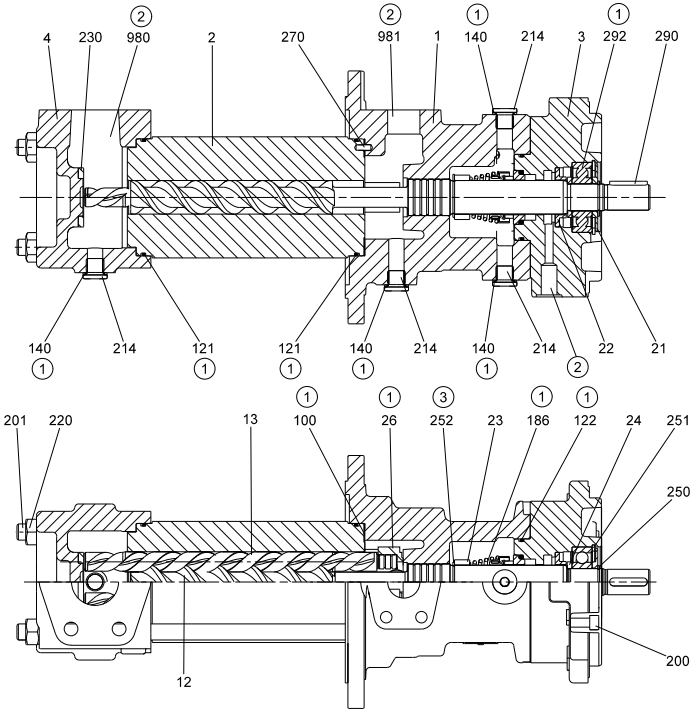
Constructional drawings

Sectional drawings and exploded views

MTS 20, 40, model A sectional drawings

D 8.6

SAE flange on suction side



DQ

Axial pipe thread connection on suction side

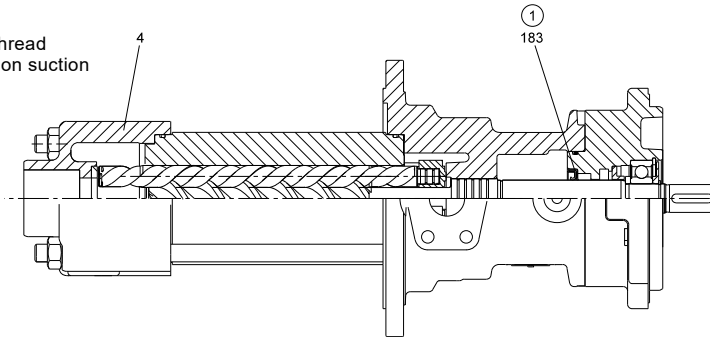


Fig. 1 Sectional drawings of MTS 20, 40

- 1 Can be ordered as spare part.
- 2 Remove the plastic cover before starting the pump.
- 3 Not with size MTS 40.

TM05 2368 5011

TM05 2369 5011

MTS 20, 40, model A exploded view

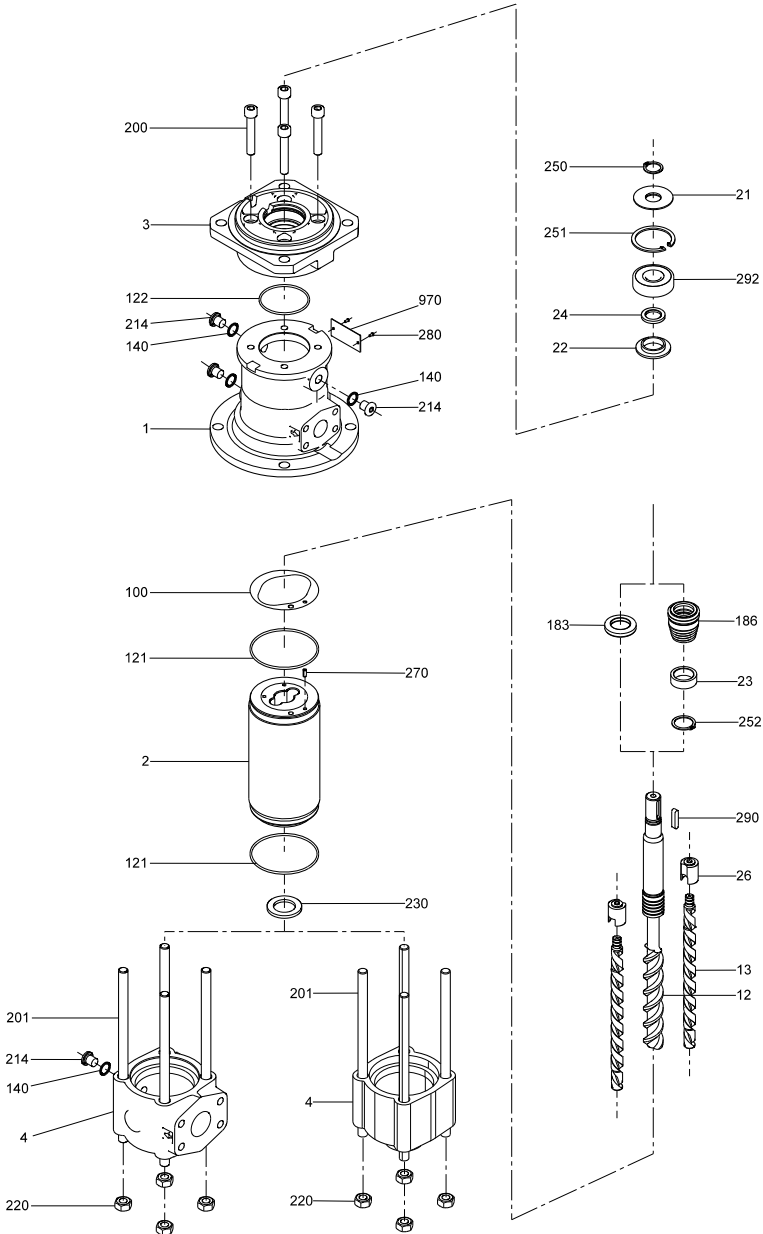


Fig. 2 Exploded view of MTS 20, 40

TM04 2629 5011

MTS model C sectional drawings

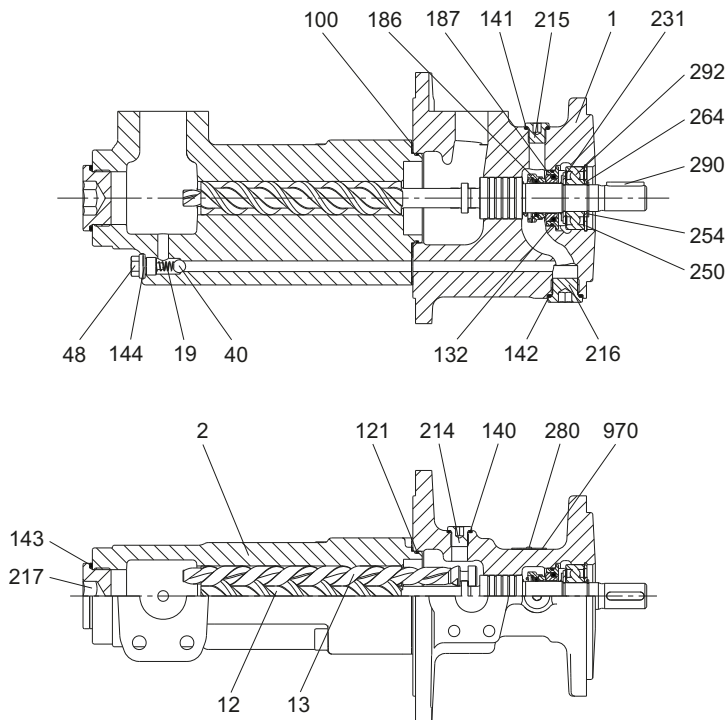
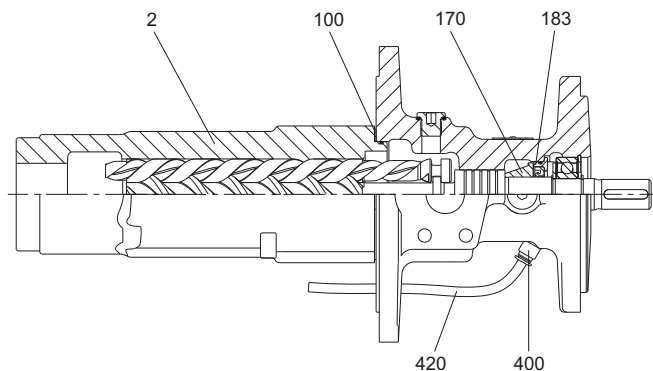


Fig. 3 Sectional drawings of MTS 20 model B



TM07 0566 1820

TM07 0567 1820

MTS model C exploded view

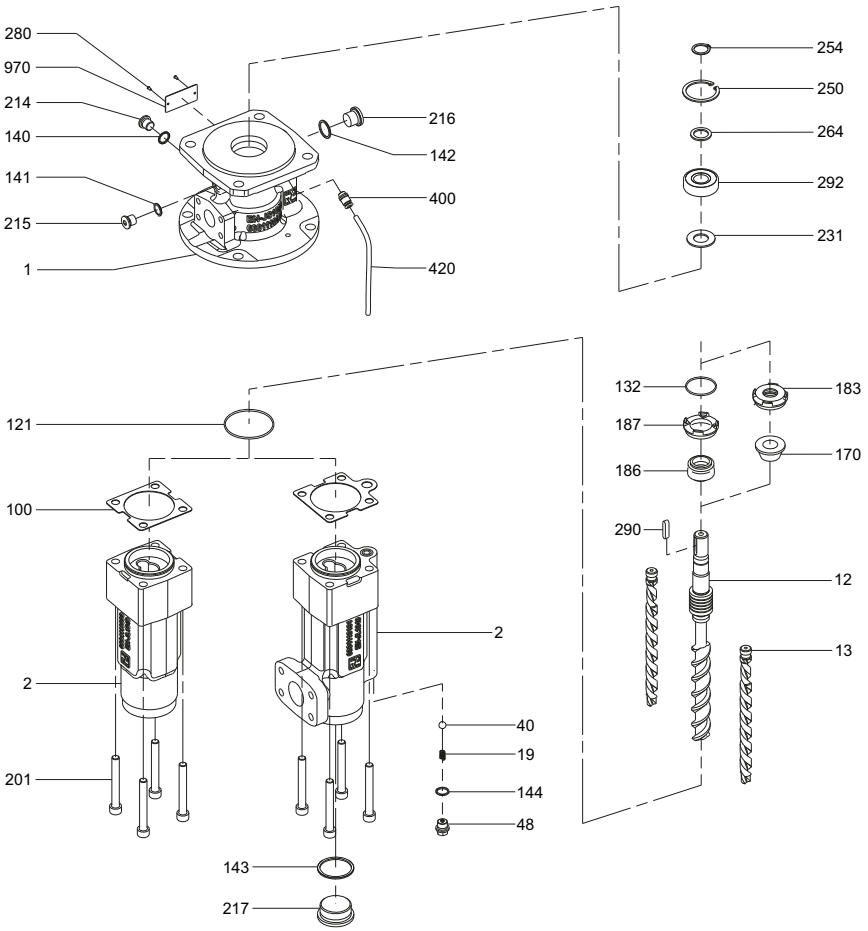


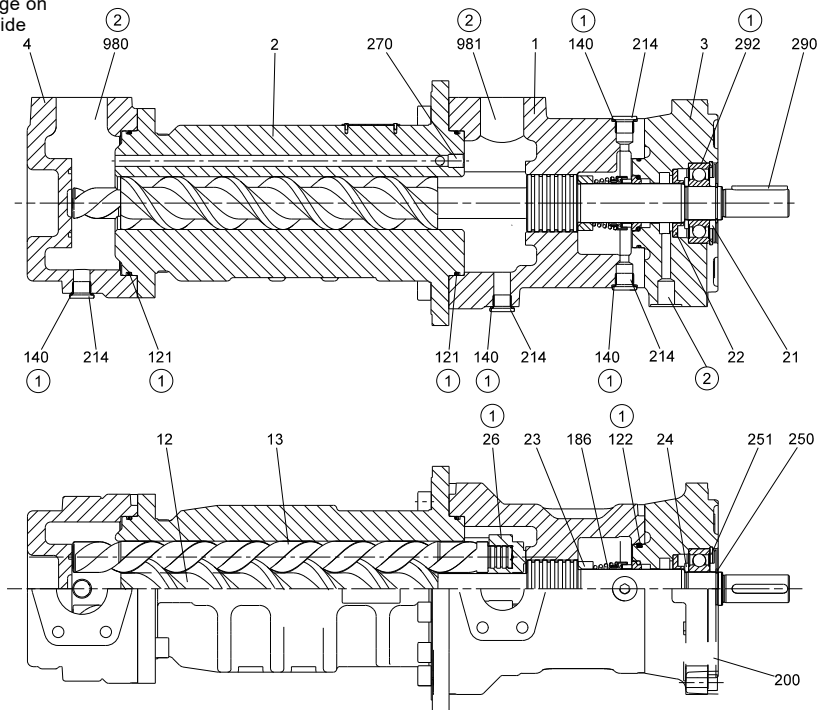
Fig. 4 Exploded view of MTS 20 model C

TM07 6253 1620

MTS 80, 140, sectional drawings

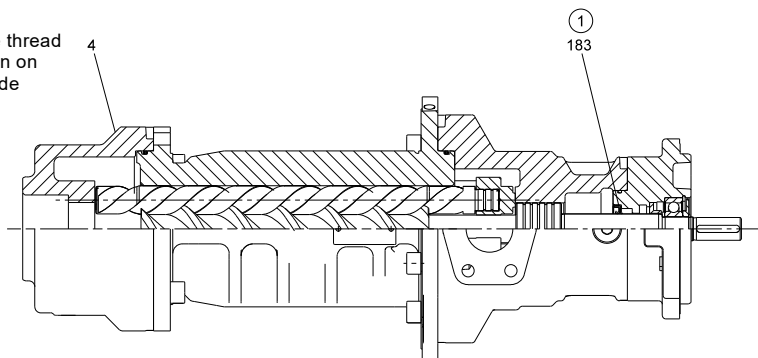
D 8.6

SAE flange on suction side



TM05 2370 5011

DQ  
Axial pipe thread connection on suction side



TM05 2371 5011

Fig. 5 Sectional drawings of MTS 80, 140

- 1 Can be ordered as spare part.
- 2 Remove the plastic cover before starting the pump.

MTS 80, 140, exploded view

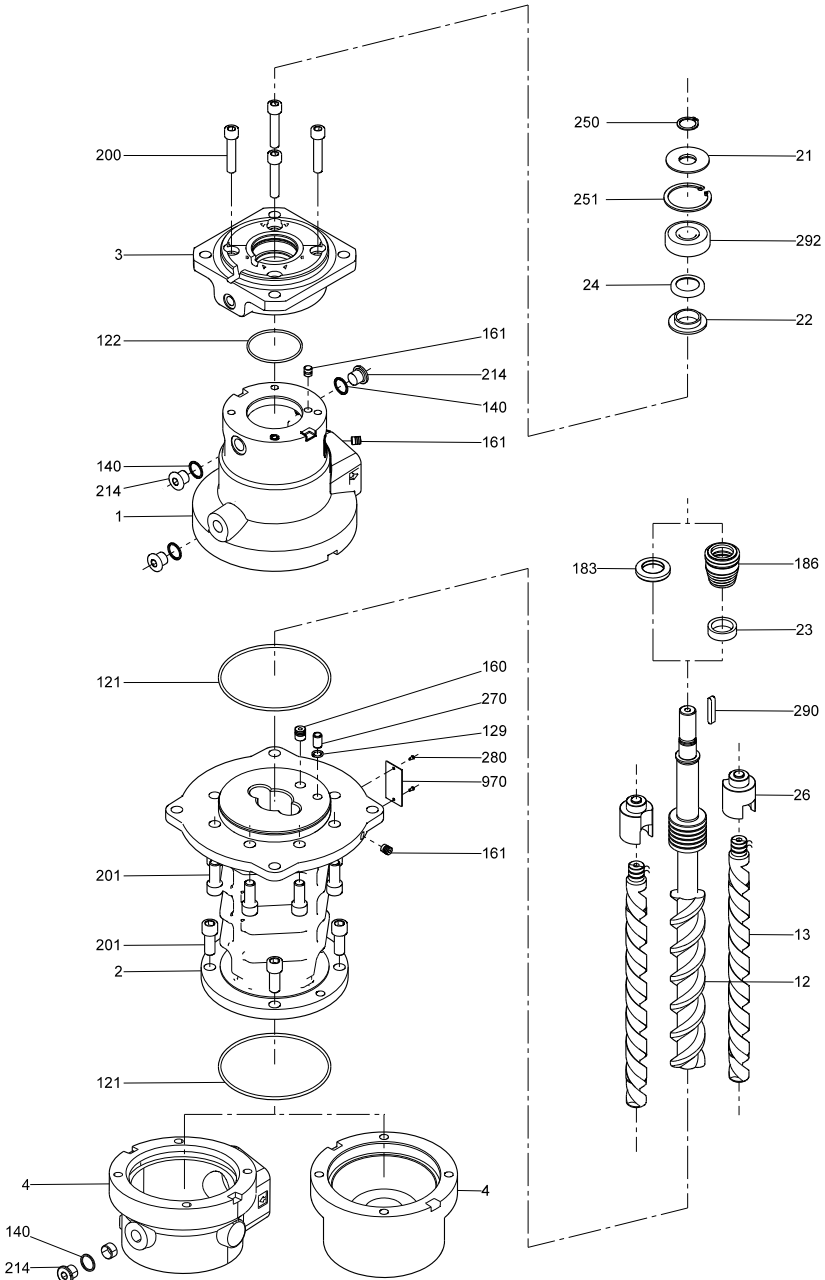


Fig. 6 Exploded view of MTS 80, 140

TM04 2630 5011

MTS 210, 280, 440, sectional drawings

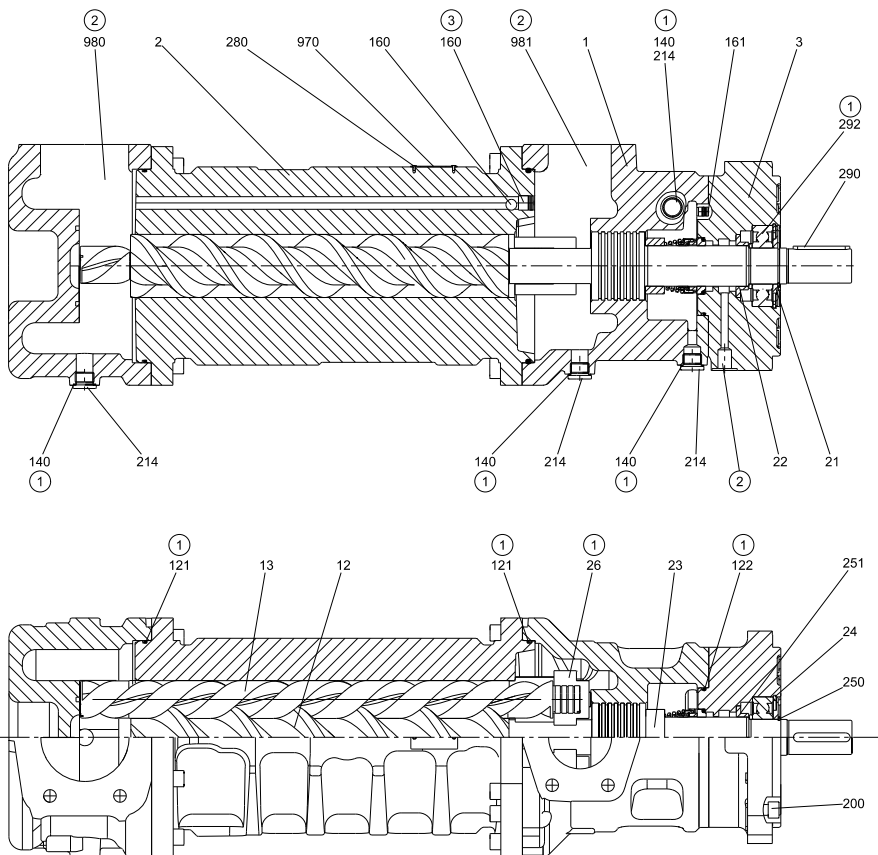


Fig. 7 Sectional drawings of MTS 210, 280, 440

- 1 Can be ordered as spare part.
- 2 Remove the plug before putting the pump into service.
- 3 Not with size MTS 210, 280.

TM05 2576 1312

MTS 210, 280, 440, exploded view

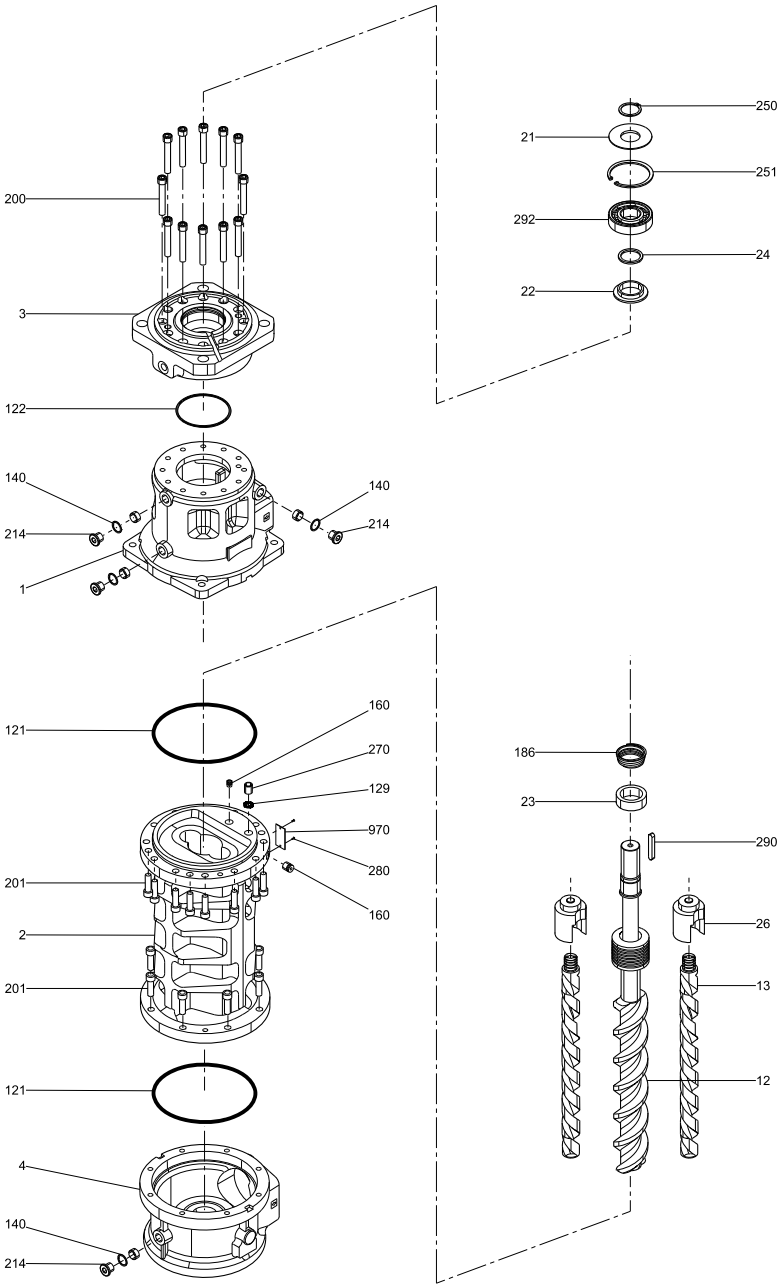
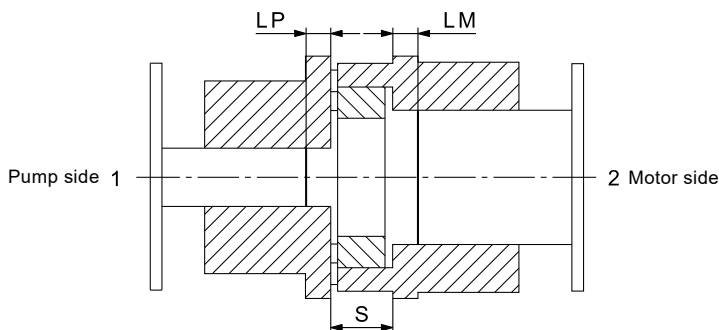


Fig. 8 Exploded view of MTS 210, 280, 440



## Coupling assembly



TM05 2418 5111

Fig. 9 Coupling assembly

## Coupling assembly for dry installation (foot mounted) for pump sizes MTS 20, 40, 80, 140

Motor frame size	MTS 20/40				MTS 80				MTS 140			
	LM	LP [mm]	S	Coupling	LM	LP [mm]	S	Coupling	LM	LP [mm]	S	Coupling
80	-1	6	18	A24/32(19x30-19x40)	-	-	-	-	-	-	-	-
90	2	0	18	A24/32(24x30-19x30)	-	-	-	-	-	-	-	-
100	-2	-2	18	A24/32(28x30-19x30)	-	-	-	-	-	-	-	-
112	-2	-2	18	A24/32(28x30-19x30)	-1	0	18	A24/32(28x30-19x30)	-	-	-	-
132	-2	1	20	A28/38(38x35-19x35)	-1	0	20	A28/38(38x35-19x35)	-2	0	24	A38/45(38/45-25x45)
160	-2	11	24	A38/45(42x45-19x45)	-2	5	24	A38/45(42x45-19x45)	0	-3	24	A38/45(38x45-25x45)
180	-	-	-	-	7	10	26	A42/55(48x50-19x50)	0	-5	26	A42/55(48x50-25x50)
200	-	-	-	-	1	17	26	A42/55(55x50-19x50)	7	11	28	A48/60(55x56-25x56)
225	-	-	-	-	-	-	-	-	7	17	28	A48/60(55x56-25x56)

## Coupling assembly for dry installation (foot mounted) for pump sizes MTS 210, 280, 440

Motor frame size	MTS 210				MTS 280				MTS 440			
	LM	LP [mm]	S	Coupling	LM	LP [mm]	S	Coupling	LM	LP [mm]	S	Coupling
132	-2	-2	20	A28/38(38x35-28x35)	-	-	-	-	-	-	-	-
160	-2	0	24	A38/45(42x45-28x45)	-2	0	24	A38/45(42x45-32x45)	0	0	24	A38/45(42x45-38x45)
180	0	-4	26	A42/55(45x50-28x50)	6	0	26	A42/55(48x50-32x50)	-2	0	26	A42/55(48x50-38x50)
200	-3	-3	28	A48/60(55x56-28x56)	1	2	26	A42/55(55x50-32x50)	1	4	26	A42/55(55x50-38x50)
225	7	18	28	A48/60(55x56-28x56)	1	8	26	A42/55(55x50-32x50)	7	2	28	A48/60(55x56-38x56)
250	2	6	28	A48/60(60x56-28x56)	2	5	28	A48/60(60x56-32x56)	2	7	28	A48/60(60x56-38x56)
280	1	5	30	A55/70(65x65-28x65)	5	0	30	A55/70(65x65-32x65)	7	1	30	A55/70(65x65-38x65)
315	-	-	-	-	10	0	35	A65/75(65x75-32x75)	27	16	40	A75/90(65x85-38x85)

## Coupling assembly for tank-top and in-tank installation for pump sizes MTS 20, 40, 80, 140

Motor frame size	MTS 20/40				MTS 80				MTS 140			
	LM	LP [mm]	S	Coupling	LM	LP [mm]	S	Coupling	LM	LP [mm]	S	Coupling
100	-1	-1	18	A24/32(28x30-19x30)	-	-	-	-	-	-	-	-
112	-1	-1	18	A24/32(28x30-19x30)	55	12	20	A28/38(28x80-19x35)	-	-	-	-
132	-2	1	20	A28/38(38x35-19x35)	46	1	20	A28/38(38x80-19x35)	25	0	20	A28/38(38/80-25x35)
160	-2	11	24	A38/45(42x45-19x45)	-2	5	24	A38/45(42x45-19x45)	0	-3	24	A38/45(42x45-25x45)
180	-	-	-	-	7	10	26	A42/55(48x75-19x50)	0	-5	26	A42/55(48x50-25x50)
200	-	-	-	-	1	17	26	A42/55(55x50-19x50)	-3	-4	28	A48/60(55x56-25x56)
225	-	-	-	-	-	-	-	-	7	17	28	A48/60(55x56-25x56)

## Coupling assembly for tank-top and in-tank installation for pump sizes MTS 210, 280, 440

Motor frame size	MTS 210				MTS 280				MTS 440			
	LM	LP [mm]	S	Coupling	LM	LP [mm]	S	Coupling	LM	LP [mm]	S	Coupling
132	46	11	20	A28/38(38x80-28x50)	-	-	-	-	-	-	-	-
160	7	16	24	A38/45(42x45-28x45)	4	0	24	A38/45(42x45-32x45)	5	0	24	A38/45(42x45-38x45)
180	7	14	26	A42/55(45x50-28x50)	0	0	26	A48/60(48x56-32x56)	3	0	26	A42/55(48x50-38x50)
200	-3	-3	28	A48/60(55x56-28x56)	-2	0	26	A55/70(55x65-32x65)	2	3	26	A42/55(55x50-38x50)
225	7	18	28	A48/60(55x56-28x56)	6	0	26	A48/60(55x56-32x56)	7	2	28	A48/60(55x56-38x56)
250	2	6	28	A48/60(60x56-28x56)	5	0	28	A55/70(60x56-32x56)	2	7	28	A48/60(60x56-38x56)
280	1	5	30	A55/70(65x65-28x65)	5	0	30	A65/75(65x75-32x75)	7	1	30	A55/70(65x65-38x65)
315	-	-	-	-	10	0	35	A65/75(65x75-32x75)	27	16	40	A75/90(65x85-38x85)

## Declaration of conformity

**GB: EC/EU declaration of conformity**

We, Grundfos, declare under our sole responsibility that the product MTS, to which the declaration below relates, is in conformity with the Council Directives listed below on the approximation of the laws of the EC/EU member states.

**DE: EG-/EU-Konformitätserklärung**

Wir, Grundfos, erklären in alleiniger Verantwortung, dass das Produkt MTS, auf das sich diese Erklärung bezieht, mit den folgenden Richtlinien des Rates zur Angleichung der Rechtsvorschriften der EG-/EU-Mitgliedsstaaten übereinstimmt.

**FR: Déclaration de conformité CE/UE**

Nous, Grundfos, déclarons sous notre seule responsabilité, que le produit MTS, auquel se réfère cette déclaration, est conforme aux Directives du Conseil concernant le rapprochement des législations des États membres CE/UE relatives aux normes énoncées ci-dessous.

**IT: Dichiarazione di conformità CE/UE**

Grundfos dichiara sotto la sua esclusiva responsabilità che il prodotto MTS, al quale si riferisce questa dichiarazione, è conforme alle seguenti direttive del Consiglio riguardanti il riavvicinamento delle legislazioni degli Stati membri CE/UE.

**PT: Declaração de conformidade CE/UE**

A Grundfos declara sob sua única responsabilidade que o produto MTS, ao qual diz respeito a declaração abaixo, está em conformidade com as Directivas do Conselho sobre a aproximação das legislações dos Estados Membros da CE/UE.

**CZ: Prohlášení o shodě EU**

My firma Grundfos prohlašujeme na svou plnou odpovědnost, že výrobek MTS, na který se toto prohlášení vztahuje, je v souladu s níže uvedenými ustanoveními směrnice Rady pro sblížení právních předpisů členských států Evropského společenství.

**ES: Declaración de conformidad de la CE/UE**

Grundfos declara, bajo su exclusiva responsabilidad, que el producto MTS al que hace referencia la siguiente declaración cumple lo establecido por las siguientes Directivas del Consejo sobre la aproximación de las legislaciones de los Estados miembros de la CE/UE.

**HU: EC/EU megfeleléségi nyilatkozat**

Mi, a Grundfos vállalat, teljes felelősséggel kijelentjük, hogy a(z) MTS termék, amelyre az alábbi nyilatkozat vonatkozik, megfelel az Európai Unió tagállamainak jogi irányelveit összehangoló tanács alábbi előírásainak.

**PL: Deklaracja zgodności WE/UE**

My, Grundfos, oświadczamy z pełną odpowiedzialnością, że nasz produkt MTS, którego deklaracja niniejsza dotyczy, jest zgodny z następującymi dyrektywami Rady w sprawie zbliżenia przepisów prawnych państw członkowskich.

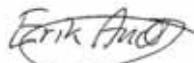
**RU: Декларация о соответствии нормам ЕЭС/ЕС**

Мы, компания Grundfos, со всей ответственностью заявляем, что изделие MTS, к которому относится нижеприведенная декларация, соответствует нижеприведенным Директивам Совета Евросоюза о тождественности законов стран-членов ЕЭС/ЕС.

- Machinery Directive (2006/42/EC).  
Standard used: EN 809:1998 +A1:2009.
- Ecodesign Directive (2009/125/EC).  
Electric motors:  
Commission Regulation No 640/2009.  
Applies only to three-phase Grundfos motors marked IE2 or IE3.  
See motor nameplate.  
Standard used: EN 60034-30:2009.  
Water pumps:  
Commission Regulation No 547/2012.  
Applies only to water pumps marked with the minimum efficiency index MEI. See pump nameplate.
- RoHS Directives: (2011/65/EU and 2015/863/EU)  
Standard used: EN IEC 63000:2018

This EC/EU declaration of conformity is only valid when published as part of the Grundfos installation and operating instructions (98189180).

Bjerringbro, 5th of January 2021



Erik Andersen  
Senior Manager  
Grundfos Holding A/S  
Poul Due Jensens Vej 7  
8850 Bjerringbro, Denmark

Person authorised to compile the technical file and empowered to sign the EC/EU declaration of conformity.

Declaration of conformity

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**UK declaration of conformity**

We, Grundfos, declare under our sole responsibility that the product **MTS**, to which the declaration below relates, is in conformity with UK regulations, standards and specifications to which conformity is declared, as listed below:

- Machinery Directive (2006/42/EC).  
Standard used: EN 809:1998, A1:2009.
- Ecodesign Directive (2009/125/EC).  
Electric motors:  
Commission Regulation No 640/2009.  
Applies only to three-phase Grundfos motors marked IE2 or IE3.  
See motor nameplate.  
Standard used: EN 60034-30-1:2009.  
Water pumps:  
Commission Regulation No 547/2012.  
Applies only to water pumps marked with the minimum efficiency index MEI. See pump nameplate.
- The Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment Regulations 2019  
Standard used: EN IEC 63000:2018

This UK declaration of conformity is only valid when published as part of the Grundfos installation and operating instructions.

UK Importer: Grundfos Pumps Ltd. Grovebury Road, Leighton Buzzard, LU7 4TL.

Bjerringbro, January 1, 2021



Erik Andersen  
Senior Manager  
Grundfos Holding A/S  
Poul Due Jensens Vej 7  
8850 Bjerringbro, Denmark

Person authorised to compile technical file and empowered to sign the UK declaration of conformity.

10000335765
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RUS

**MTS**



## Руководство по эксплуатации

Руководство по эксплуатации на данное изделие является составным и включает в себя несколько частей:

Часть 1: настоящее «Руководство по эксплуатации».

Часть 2: электронная часть «Паспорт. Руководство по монтажу и эксплуатации» размещенная на сайте компании Грундфос. Перейдите по ссылке, указанной в конце документа.

Часть 3: информация о сроке изготовления, размещенная на фирменной табличке изделия.

Сведения о сертификации:

Насосы типа MTS сертифицированы на соответствие требованиям Технических регламентов Таможенного союза: ТР ТС 004/2011 «О безопасности низковольтного оборудования»; ТР ТС 010/2011 «О безопасности машин и оборудования»; ТР ТС 020/2011 «Электромагнитная совместимость технических средств».

KAZ

**MTS**

## Пайдалану бойынша нұсқаулық

Атаулы өнімге арналған пайдалану бойынша нұсқаулық құрамалы болып келеді және келесі бөлімдерден тұрады:

1 бөлім: атаулы «Пайдалану бойынша нұсқаулық»

2 бөлім: Грундфос компаниясының сайтында орналасқан электронды бөлім «Төлқұжат, Құрастыру және пайдалану бойынша нұсқаулық». Құжат соңында көрсетілген сілтеме арқылы өтіңіз.

3 бөлім: өнімнің фирмалық тактшасында орналасқан шығарылған уақыты жөніндегі мәлімет Сертификаттау туралы ақпарат:

MTS типті сорғылары «Төмен вольтты жабдықтардың қауіпсіздігі туралы» (ТР ТС 004/2011), «Машиналар және жабдықтар қауіпсіздігі туралы» (ТР ТС 010/2011) «Техникалық заттардың электрлі магниттік сәйкестілігі» (ТР ТС 020/2011) Кеден Одағының техникалық регламенттерінің талаптарына сәйкес сертификатталды.

KG

**MTS**

## Пайдалану боюнча колдонмо

Аталган жабдууну пайдалануу боюнча колдонмо курамдык жана өзүнө бир нече бөлүкчөнү камтыйт:

1-Бөлүк: «Пайдалануу боюнча колдонмо»

2-Бөлүк: «Паспорт. Пайдалануу жана монтаж боюнча колдонмо» электрондук бөлүгү Грундфос компаниянын сайтында жайгашкан. Документтин аягында көрсөтүлгөн шилтемеге кайрылыңыз.

3-Бөлүк: жабдуунун фирмалык тактшасында жайгашкан даярдоо мөөнөтү тууралуу маалымат.

Шайкештик жөнүндө декларация

MTS түрүндөгү соргучтар Бажы Биримдиктин Техникалык регламенттин талаптарына ылайыктуу тастыкталган: ТР ТБ 004/2011 «Төмөн вольттук жабдуунун коопсуздугу жөнүндө»; ТР ТБ 010/2011 «Жабдуу жана машиналардын коопсуздугу жөнүндө»; ТР ТБ 020/2011 «Техникалык каражаттардын электрмагниттик шайкештиги».

ARM

# MTS

Շահագործման ձեռնարկ

Տվյալ սարքավորման շահագործման ձեռնարկը բաղկացած է մի քանի մասերից.

Մաս 1. սույն «Շահագործման ձեռնարկ»:

Մաս 2. էլեկտրոնային մաս. այն է՝ «Անձնագիր: Մոնտաժման և

շահագործման ձեռնարկ» տեղադրված «Գրունդֆոս». Անցեք փաստաթղթի վերջում նշված հղումով.

Մաս 3. տեղեկություն արտադրման ամսաթվի վերաբերյալ՝ նշված սարքավորման պիտակի վրա:

Տեղեկություններ հավաստագրման մասին՝

MTS տիպի պոմպերը սերտիֆիկացված են համաձայն Մաքսային Միության տեխնիկական կանոնակարգի պահանջների՝ TP TC 004/2011 «Ցածրավոլտ սարքավորումների վերաբերյալ», TP TC 010/2011 «Մեքենաների և սարքավորումների անվտանգության վերաբերյալ» ; TP TC 020/2011

«Տեխնիկական միջոցների էլեկտրամագնիսական համատեղելիության վերաբերյալ»:

Համապատասխանության հավաստագիր



<http://net.grundfos.com/qr/i/99612567>

<b>10000270913</b>	1219
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