Data booklet

MTS, MTSE

50/60 Hz IEC

Model D screw pumps

GRUNDFOS

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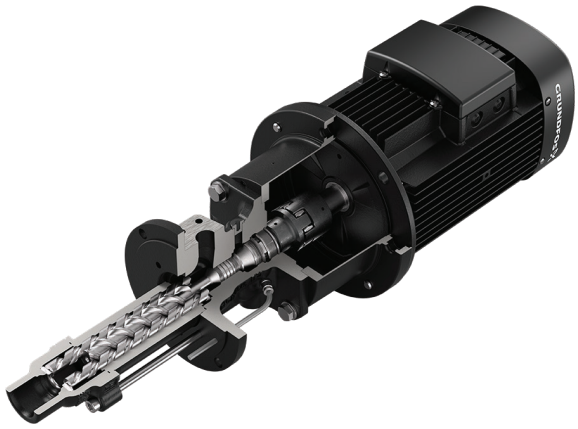
1. Introduction

1.1 MTS Model D pumps



TM091987

MTS pump in cutaway view

MTS pumps are screw pumps designed for pumping cooling lubricants and cutting oils for machine tool applications.

Depending on pump type, it can be mounted on top of tanks with the pump immersed in the pumped liquid, or the pump can be dry-installed to the tank with pipe connections. See the section on pump designs.

The pumps come in various sizes and screw pitches to provide the flow rate, pressure and length required.

The pumps consist of a motor and a pump unit. The motor is a Grundfos standard MG motor designed in accordance with EN standards.

The pump unit consists of optimized hydraulics, various types of connections, a motor stool and various other parts.

Related information

7.3.1 Pump designs

1.2 When to select an E-pump

Select an E-pump if the following is required:

- controlled operation, as the consumption fluctuates
- constant pressure
- communication with the pump.

Adaptation of performance through frequency-controlled speed control offers obvious benefits, such as the following:

- energy savings
- increased comfort
- control and monitoring of the pump performance.

1.3 MTSE pumps with built-in frequency converter

TM091983

MTSE pump with an E-motor

MTSE pumps are MTS pumps with an E-motor, that is, a motor with built-in frequency converter. A frequency converter enables continuously variable motor speed control, allowing the pump to operate at any duty point. The motors of the MTSE pumps are Grundfos MGE motors designed in compliance with EN standards.

MTSE pumps are ideal for machining centers where different processes and tools lead to changing flow and pressure requirements.

The MTSE pump offers the following features and benefits:

- energy saving
- low heat input into the cooling lubricant
- increased cooling efficiency
- better performance of the machining center
- simple integration with the machining center
- Safe Torque Off safety function.

Note that the product must be installed in a place with access control to prevent unauthorized access.

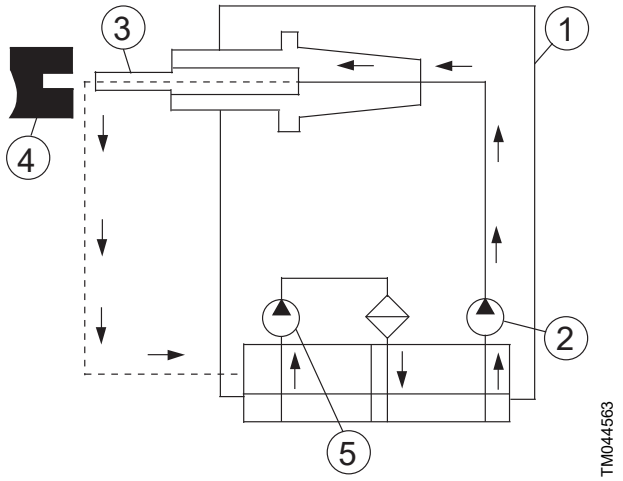
1.4 Applications

MTS pumps are an important part of modern metal machining centers, transfer lines, and grinding and deep-hole-drilling machines.

In metal working or process engineering, MTS pumps transfer well-, conditionally- or poorly- lubricating abrasive liquids, such as cutting, grinding and deep-hole-drilling oils, oil-in-water emulsions, and cooling lubricant solutions. The pumped liquid must not attack the materials.

Permissible cooling lubricants:

- Solutions (inorganic substances in water, organic and synthetic substances in water)
- emulsions (oil-in-water emulsion containing 2 to 20 % oil)
- cutting and grinding oils (without additives, with polar physically acting additives, with mildly acting, lubricating film forming additives, with polar and mildly acting additives, with active, chemical additives, with polar and active additives).



Schematic drawing

Pos.	Description
1	Machining centre
2	MTS high-pressure pump
3	Drilling tool
4	Work piece
5	Filter pump

2. Features and benefits

2.1 Pump

The MTS Model D pump offers the following features and benefits:

- **compact design**
  - featuring an opening for ventilation, filling and emptying
  - tube ensuring visual inspection for leak detection
- **variable installation**
  - integrated installation flange
  - SAE-connection option on the pressure side above the container plate making possible a simplified installation of attachments
- **two types of inlet casings**
  - axial inlet option for tank-top installation
  - SAE-connection option at the side, 90°-rotatable, for dry installation
- **high efficiency**
  - screw spindles made of tool steel, specially hardened and precision-machined
  - labyrinth for effective pressure reduction
- **long service life**
  - single-part running casing made of grey cast iron, specially hardened and precision-machined
  - external main bearing
  - wear-resistant mechanical seal
  - screw spindles made of tool steel, specially hardened and precision-machined
- **good performance ratio**
  - various pump sizes and screw pitches for providing the required flow rate, pressure and length to achieve good performance ratio.

2.2 Motors for MTS pumps

The pumps are fitted with a fully enclosed, fan-cooled, 2-pole Grundfos standard MG motor with principal dimensions according to EN and IEC standards.

Electrical tolerances are compliant with EN 60034.

Electrical data

Mounting designation	B5/V1	
Insulation class	F	
Efficiency class, 50 Hz	MG motors: [1]	IE3
Efficiency class, 60 Hz	MG motors:	IE3
Enclosure class	IP55	
Supply voltage, 50 Hz (tolerance -10 % / +10 %)	P_2: 1.5 - 22 kW:	3 × 220-240D / 380-415Y V
	P_2: 7.5 - 22 kW:	3 × 380-415D / 660-690Y V
Supply voltage, 60 Hz (tolerance -10 % / +10 %)	P_2: 1.5 - 22 kW:	3 × 220-277D / 380-480Y V
		3 × 380-480D / 660-690Y V

On request	
Supply voltage, 50 Hz	3 × 200-220 / 346-380 V
Supply voltage, 60 Hz	3 × 200-230 / 346-400 V 3 × 208-230 / 460-480 V

1) IE4 motors are available on request.

On request, Grundfos MG motors are available with cURus approvals issued by the Underwriters Laboratories Inc. according to UL 1004 standard for electrical motors.

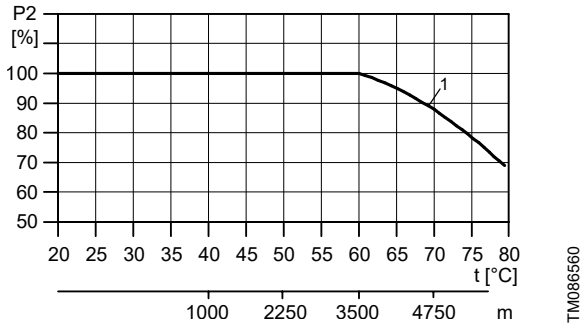
Related information

9.1.1 MG motors

2.2.1 Ambient temperature

MG motors (1.5 - 22 kW): maximum 60 °C.

If the ambient temperature exceeds the above maximum value, or if the motor is located at or above 1000 metres above sea level, the motor output (P2) must be reduced due to the low density, and consequently low cooling effect, of the air. In such cases, it may be necessary to use a motor with a higher output.



Relationship between motor output (P2) and ambient temperature or altitude

Pos.	Description
1	MG motors (1.5 - 22 kW)

2.2.2 Motor protection

Three-phase motors must be connected to a motor-protective circuit breaker in accordance with local regulations.

Three-phase Grundfos and Siemens motors from 3 kW and upwards have a built-in thermistor (PTC) in compliance with DIN 44082 (IEC 34-11: TP 211).

2.2.3 Maximum number of starts

Pump	Motor [kW]	Recommended max. number of starts per hour
MTS	1.5 - 2.2	250
	3-4	100
	5.5 - 11	50
	15-22	40

2.2.4 Sound pressure level

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

Measuring conditions:

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

Size	Sound pressure level [dB]	
	2900 [rpm]	3500 [rpm]
20	56	58
40	59	61

The data are reference values.

The actual airborne sound level depends specifically on the installation conditions.

2.2.4.1 Motors for MTS

Motor [kW]	Max. sound pressure level [dB(A)] ISO 3743	
	50 Hz	60 Hz
1.5	55.5	59.8
2.2	55.5	59.8
3	55.3	59.8
4	58.7	63.6
5.5	58.8	63.6
7.5	60.3	65.1
11	60.5	65.1
15	60.6	65.2
18.5	60.7	65.3
22	64.4	69.1

The values apply only to MG motors.

The values for both 50 and 60 Hz have a tolerance of 3 dB(A) according to EN ISO 4871, which is not added to the values in these tables.

2.3 Motors for MTSE pumps

The pumps are fitted with a totally enclosed, fan-cooled, 2-pole Grundfos frequency-controlled MGE motor with principal dimensions in accordance with the EN standards.

Electrical tolerances comply with EN 60034. MTSE pumps from 1.5 to 11 kW are fitted with three-phase MGE motors as standard.

See the Grundfos Product Center at *http://product-selection.grundfos.com/.*

Electrical data

Mounting designation	B5/V1
Insulation class	F
Efficiency class	I5
Enclosure class	IP55
Supply voltage (-10 % / +10 %)	380-500 V
Supply frequency	50/60 Hz

Related information

12. Grundfos Product Center

2.3.1 Maximum ambient temperature and altitude for Grundfos MGE motors

The table shows the maximum permissible ambient temperature at full load, and the maximum permissible installation altitude above sea level at full load.

Motor efficiency class: IE5

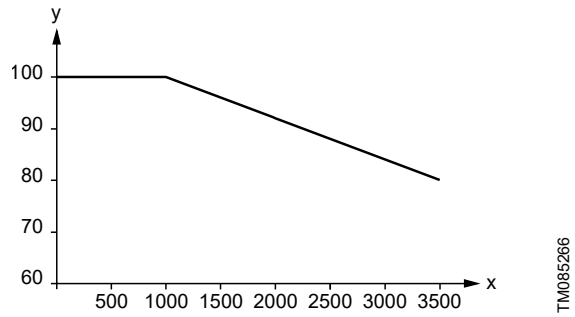
Motor power [kW]	Motor make	Phase	Max. ambient temperature [°C]	Max. altitude above sea level [m]
1.5 - 11	MGE	3	50 [2)]	1000

2) 3 × 200–240 V MGE motors are rated for a maximum ambient temperature of 40 °C.

2.3.2 Motor load for Grundfos MGE motors

MGE motors can be installed up to 3500 m above sea level.

Motors installed above the maximum installation altitude of 1000 m above sea level must not be fully loaded. Use the below curve to calculate the derated motor power. If the required motor output exceeds the derated motor power, select an oversized motor.



Derating of motor output power P2 % (y-axis) in relation to installation altitude above sea level in metres (x-axis)

2.3.3 Motor protection

MGE motors incorporate thermal protection against slow overload and blocking (IEC 34-11:TP 211).

Grundfos pumps with an MGE motor require no external motor protection.

2.3.4 Sound pressure level

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

Measuring conditions:

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

Size	Sound pressure level [dB]	
	2900 [rpm]	3500 [rpm]
20	56	58
40	59	61

The data are reference values.

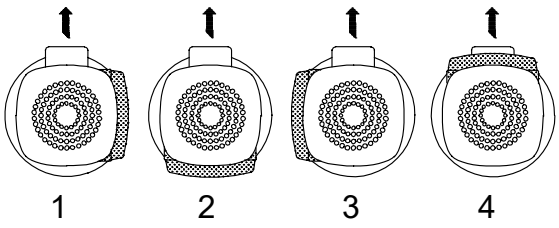
The actual airborne sound level depends specifically on the installation conditions.

2.3.4.1 Motors for MTSE

Motor [kW]	Max. sound pressure level [dB(A)] ISO 3743
	50/60 Hz
1.5	64
2.2	64
3	68
4	68
5.5	68
7.5	74
11	74
15	66.8
18.5	62.6
22	63.8

2.4 Terminal box positions

As standard, the pumps have their terminal box mounted in position 12 o'clock of the pump. However, other positions are possible.

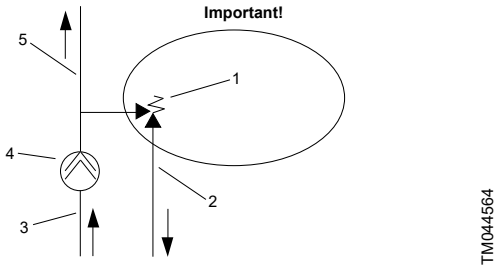


Terminal box positions

Pos.	Description
1	Position 3 o'clock
2	Position 6 o'clock
3	Position 9 o'clock
4	Position 12 o'clock (standard)

2.5 Overload protection

The pump has no pressure-relief valve. Thus overload protection must be provided in the control system, or with pressure relief.

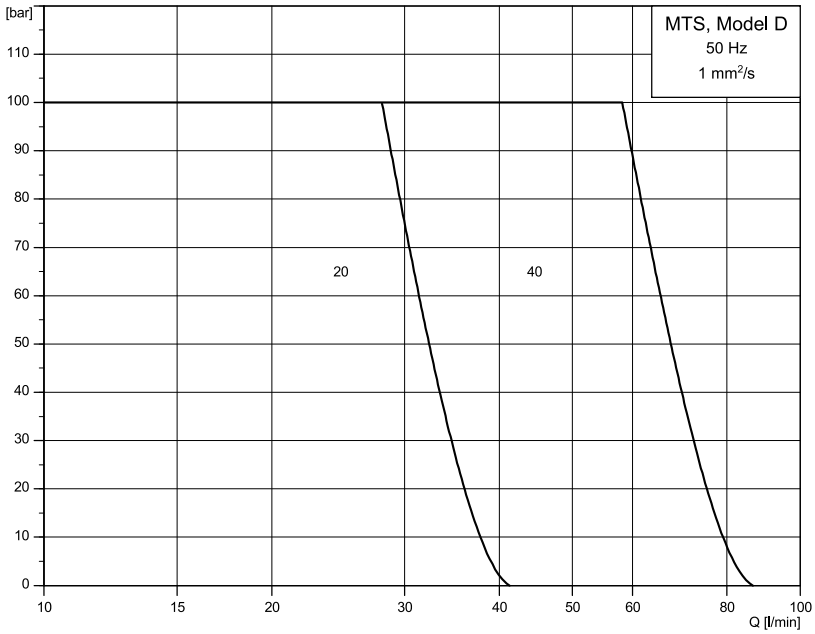


Overload protection

Pos.	Description
1	Pressure-relief valve
2	Backflow line to tank
3	Suction from tank
4	Pump
5	Pressure line to system

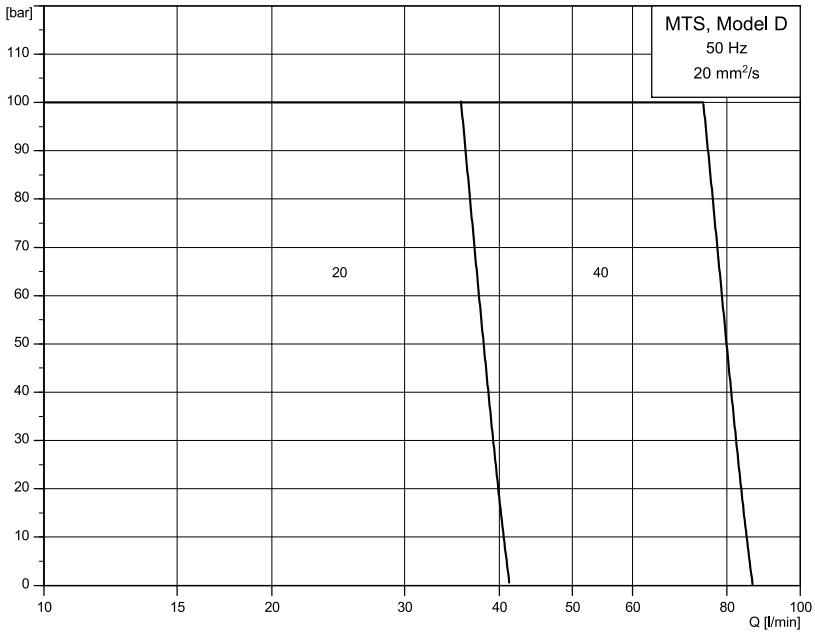
3. Performance range

3.1 MTS, 50 Hz



TM091531

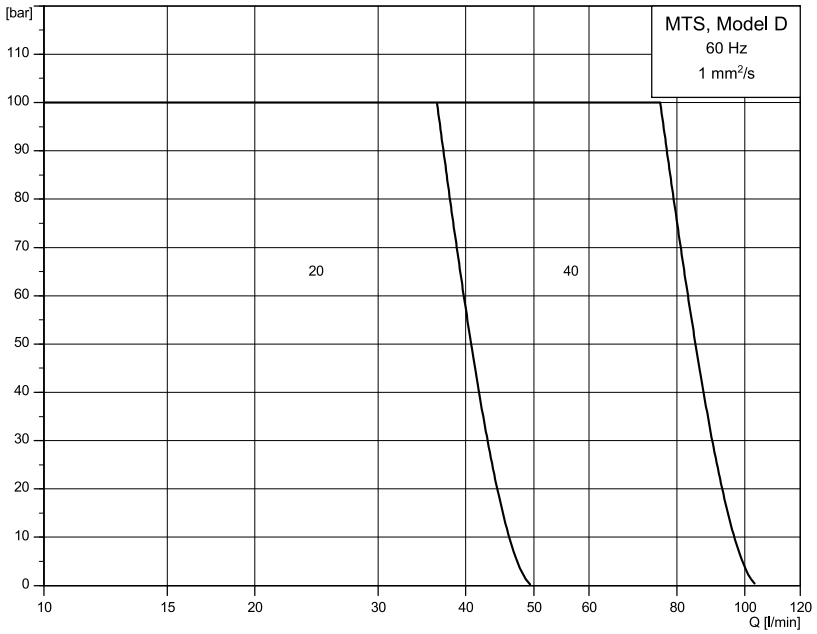
Performance range - MTS, 50 Hz



TM091532

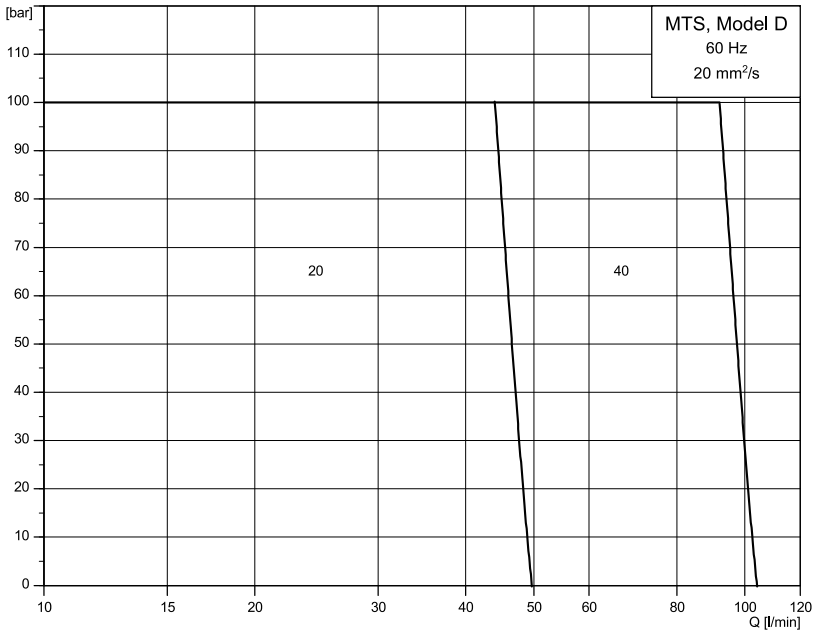
Performance range - MTS, 50 Hz

3.2 MTS, 60 Hz



TM091533

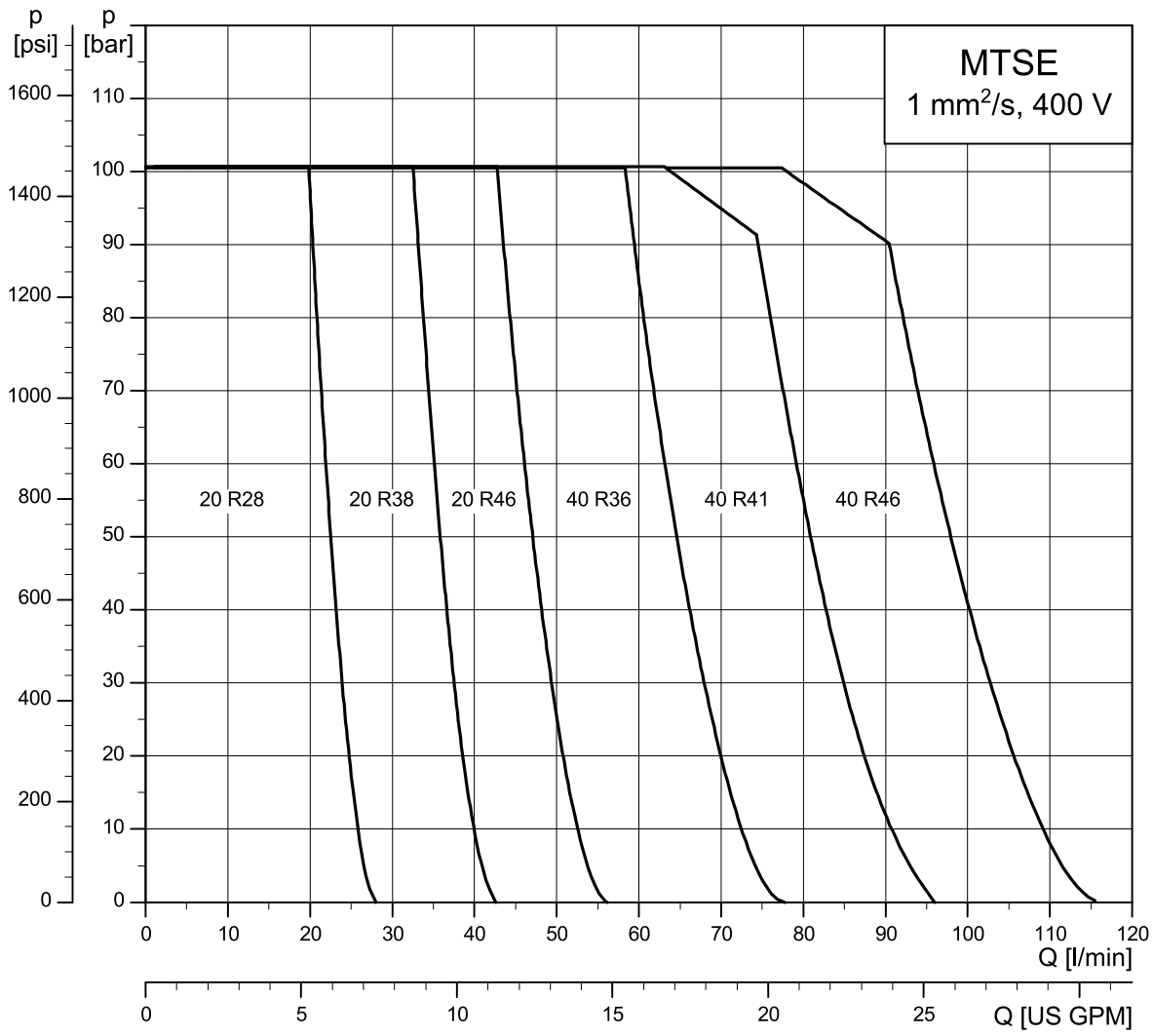
Performance range - MTS, 60 Hz



TM091534

Performance range - MTS, 60 Hz

3.3 MTSE, 50/60 Hz



Performance range - MTSE, 50/60 Hz

4. Product range

50 Hz

Range	MTS 20	MTS 40
Flow range [l/min]	0 - 41.3	0 - 86.6
Motor power P2 [kW]	0.3 - 7.2	0.4 - 14.8

60 Hz

Range	MTS 20	MTS 40
Flow range [l/min]	0 - 49.7	0 - 104.2
Motor power P2 [kW]	0.4 - 8.7	0.5 - 17.9

Operating conditions

Range	MTS 20	MTS 40
Max. temperature [°C]	80	80
Max. differential pressure (emulsion) [bar]	80	100
Max. differential pressure (oil)[bar]	80	100
Max. inlet pressure(DQ version) [bar]	1	1
Max. inlet pressure (D8.6 version) [bar]	10	10

Pipe connection

Range	MTS 20	MTS 40
Inlet (DQ version)	G 1 1/4	G 1 1/4
Inlet (D8.6 version)	SAE 1 1/2"	SAE 1 1/2"
Outlet pipe thread	G 3/4	G 3/4
Outlet flange	SAE 1"	SAE 1"
Installation length [mm]	230	280

Shaft seal

Range	MTS 20	MTS 40
DQ (seal ring)	•	•
D8.6 (mechanical seal)	•	•

5. Identification

5.1 Type key

Example: MTS (E) 20-40 R 46 D 8.6 T

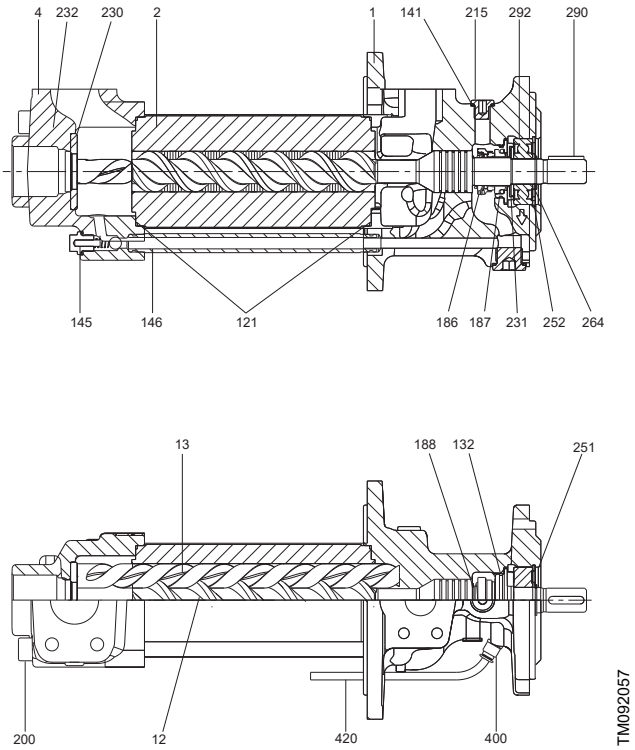
Code	Explanation
MTS	Pump type
(E)	Pump with integrated frequency converter
20-40	Frame size - maximum pressure (bar)
R	Spindle sense of gradient (R = right)
46	Spindle pitch angle in degrees
D	Construction feature D = External ball bearing, shaft seal unheated, uncooled
8.6	Shaft seal or connections Q = Shaft seal ring or axial inlet, pipe thread as standard 8.6 = Mechanical shaft seal or radial inlet, SAE as standard
T	T = Pump for tank-top installation D = Pump for dry installation H = Pump for horizontal installation

6. Construction

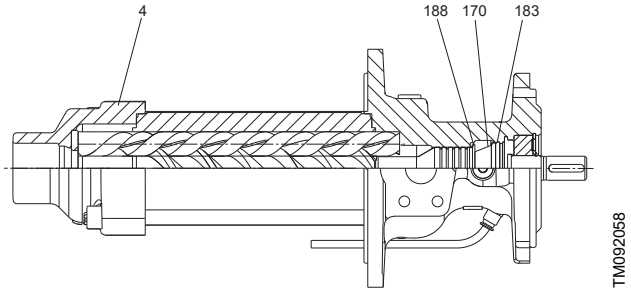
This model is a three-screw, self-priming, flange-mounted pump (DIN ISO 3019-2) with special surface-hardened drive and idler screws. The idler screws are hydraulically driven, and the axial thrust is completely neutralized hydrostatically. The drive screw is fixed in position with external, permanently lubricated groove ball bearing. The large overall length with many chambers results in little surface pressure, low pressure differences, and thus reduced wear. The rotor housing has been optimized to ensure maximum resistance to wear. The material used is specially hardened grey cast iron (EN-GJL) that is part of a special safety concept. The housing surface in contact with the screws has a ceramic-like hardness. Additionally, unlike with other materials, such as SiC, wear, shocks, vibration or aeration cannot lead to sudden failure of the pump unit. Construction and materials ensure little wear, good controllability and high efficiency.

6.1 MTS 20 and 40

DQ with axial pipe thread connection on the inlet side



D 8.6 SAE flange on the inlet side



Pos.	Designation	Pos.	Designation	Pos.	Designation
1	Outlet casing	146	Bypass pipe	231	Disc
2	Rotor housing	170	Secondary seal	251	Circlip
4	Inlet casing	183	Shaft seal ring	252	Circlip
12	Drive screw	186	Mechanical screw	264	Supporting washer
13	Idler screw	187	Mechanical seal adapter	290	Key
121	O-ring	188	Supporting washer	292	Deep groove ball bearing
132	O-ring	200	Socket cap head screw	400	Adapter
141	Seal ring	215	Screw plug	420	Tube
145	Non-return valve	230	Thrust disc		

6.2 Material specification

Pos.	Designation	Materials W 310332		
2	Rotor housing (basic material)	EN GJL-250	GG25	Cast iron
	Rotor housing (active surfaces in the spindle bores), specially hardened	Specially hardened	Basic hardness	62 HRC
			Surface hardness	1200 HV
4	Inlet casing	EN-GJS-400	GGG40	Ductile cast iron
1	Outlet casing	EN-GJL-250	GG25	Cast iron
12+13	Screw set (basic material)	1.2379		Special steel, nitrided 62 HRC
13+13	Screw set (surface)	Specially treated	Nitrided	1000 HV
186	Mechanical shaft seal	Q1Q1VGG	SiC/SiC, FPM, 1.4571	Silicon carbide, fluoroelastomer, stainless steel
183	Shaft seal ring	FPM		Fluoroelastomer
121	O-ring	FPM		Fluoroelastomer

7. Operating conditions

7.1 Pumped liquids

7.1.1 List of pumped liquids

The composition, oil content, that is, the ability to provide lubrication, and cooling effect of the liquid determine the pump maintenance intervals and maximum permissible performance data.

Based on DIN 51 385, cooling lubricants are divided into three groups based on water and oil content. The pump also pumps cooling lubricants with a very low lubricating effect, but a very high cooling performance.

Cooling lubricant main group	Subgroup	Effect at the processing spot
L Solutions	Solutions of inorganic materials in water	Higher cooling effect, lower lubricating effect
	Solutions, dispersions of organic and synthetic materials in water	
E Emulsions	Oil-in-water emulsions (Oil content E 3 to E 20 %)	Cooling and lubricating effect
S Petroleum-based cutting and grinding oils (natural and synthetic)	Cutting oils without additives (pure)	Higher lubricating effect, lower cooling effect
	Cutting oils with polar (physically effective) additives	
	Cutting oils with mild-effect (lubricating film forming) EP additives	Better surface adhesion protecting against corrosion
	Cutting oils with polar and mild-effect EP additives	
	Cutting oils with active (chemical) EP additives	Higher temperature and pressure resistance
	Cutting oils with polar and active EP additives	

7.1.2 Filtration

To ensure an acceptable service life for the pump, we recommend filtering the cooling lubricants to meet the cleanness classes defined in ISO 4406:2021. The recommended cleanness class depends on the pumping pressure and abrasive classes 1 to 7.

There are process examples for abrasive classes given in the table below.

The additional specifications to filter mesh and mass proportion are guide values for orientation, the decisive factor is the cleanness class.

To avoid damage by coarse particles, we recommend using a filter mesh of 65 µm (nominal, two dimensional) or finer.

	Abrasive class						
	1	**2**	**3**	**4**	**5**	**6**	**7**
Material	Steel, GG, Al	Steel, GG, Al	Al (Si > 5 %)	Steel	Steel, hard	Hard metal	Titanium
Process	Drilling	Turning/milling	Turning/milling	Grinding	Grinding	Grinding	Grinding
Tool	HSS	Hard metal	Hard metal	Corundum	Corundum	CBN	Diamond
Pressure stage							
	21/19/16	**21/19/16**	**21/19/16**	**20/18/15**	**20/18/15**	**19/17/14**	**18/16/13**
≤ 120 bar	≤ 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
	22/20/17	**22/20/17**	**22/20/17**	**21/19/16**	**21/19/16**	**20/18/15**	**19/17/14**
≤ 90 bar	≤ 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
	23/21/18	**23/21/18**	**23/21/18**	**22/20/17**	**22/20/17**	**21/19/16**	**20/18/15**
≤ 60 bar	≤ 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
	24/22/19	**24/22/19**	**24/22/19**	**23/21/18**	**23/21/18**	**22/20/17**	**21/19/16**
≤ 30 bar	≤ 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

7.2 Control of MTSE pumps

7.2.1 Control options

It is possible to communicate with E-pumps via the following platforms:

- operating panel on the pump
- Grundfos GO
- Grundfos GO Link
- central management system.

The purpose of controlling an E-pump is to monitor and control the pressure, temperature, flow rate, and liquid level of the system.

7.2.1.1 Operating panels

The operating panel on the E-pump terminal box makes it possible to change the setpoint settings manually. All settings are saved if the power supply is switched off.

The following operating panels are available as standard:

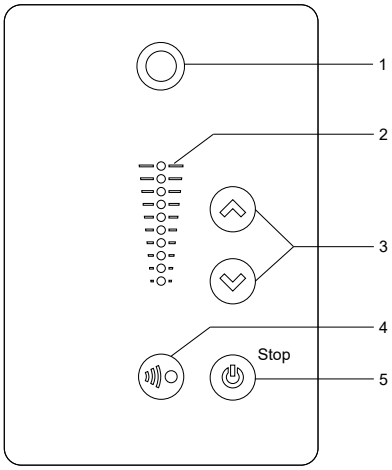
- HMI 200
- HMI 300.

Note that these panels include an integrated radio module.

The following operating panels without an integrated radio module are available on request:

- HMI 100
- HMI 101
- HMI 201
- HMI 301.

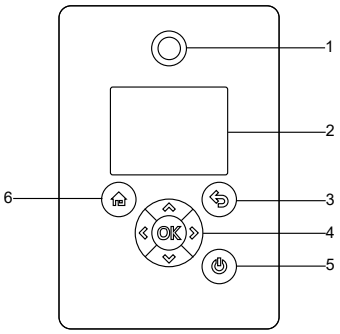
7.2.1.2 Standard operating panel, HMI 200 and HMI 201



TM054848

Pos.	Symbol	Description
1		**Grundfos Eye**: Indicator light showing the operating status of the product
2	-	Light fields for indication of the setpoint
3		**Up**/**Down**: Buttons to change the setpoint
4		**Radio communication**: Button enabling radio communication with the Grundfos GO
5		**Start/Stop**: Button for starting and stopping the product

7.2.1.3 Advanced operating panel, HMI 300 and HMI 301



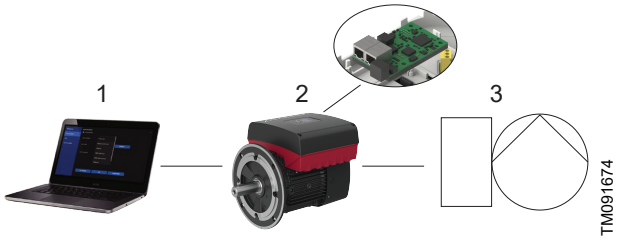
TM054849

Pos.	Symbol	Description
1		**Grundfos Eye**: Indicator light showing the operating status of the product
2	-	Graphical color display
3		**Back**: Button for going one step back
4		**Left**/**Right**: Button navigating between main menus, displays and digits
		Up/**Down**: Buttons navigating between submenus or changing the value settings
	OK	**OK**: Button for saving changed values, resetting alarms, expanding the value field, and enabling radio connection with the Grundfos GO
5		**Start/Stop**: Button for starting and stopping the product
6		**Home**: Button for going to the Home menu

7.2.1.4 Central management system

Communication with the E-pump is possible even if the operator is not present near the E-pump. Communication is enabled by connecting the E-pump to a central building management system, which allows the operator to monitor the pump, and change control modes and setpoint settings.

Communication between E-pumps and a central building management system is enabled via a Grundfos Communication Interface Module (CIM).



Structure of a central management system

Pos.	Description
1	Central management system
2	Communication Interface Module (CIM)
3	E-pump

Related information

11.1 CIM (Communication Interface Modules)

12. Grundfos Product Center

7.2.2 Communication

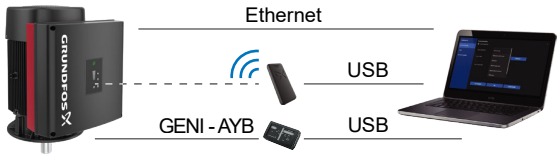
7.2.2.1 MGE 1.5 to 2.2 kW

7.2.2.2 Grundfos GO Link

The product is designed for wired or wireless communication with the Grundfos GO Link, allowing for setting functions and accessing status overviews, configuration and current operating parameters.

Use the Grundfos GO Link together with the following interfaces:

- Ethernet cable: only with FM310 and FM311
- Grundfos MI 301: wired connection with USB cable (wireless connection over radio, only with HMI 100, HMI 200 and HMI 300)
- Grundfos PC Tool Link: wired connection with USB cable.



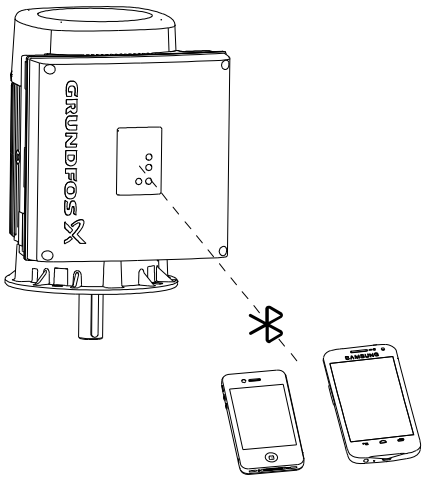
Grundfos GO Link setup

Pos.	Description
1	Standard Ethernet cable with at least CAT5e/CAT6 rating
2	Grundfos MI 301 enabling radio communication (to be used together with a USB cable to connect to a laptop)
3	Grundfos PC Tool Link module enabling wired connection to the pump (to be used together with a USB cable to connect to a laptop)

7.2.2.3 MGE 3 to 22 kW

7.2.2.4 Bluetooth

Via the built-in Bluetooth module, the product can communicate with the Grundfos GO. Bluetooth communication can take place at distances up to 10 metres.



Bluetooth information

Frequency of operation	2400 - 2483.5 MHz
Modulation type	GFSK
Data rate	2 Mbps
Transmit power	5 dBm EIRP with internal antenna

GLoWpan information

Frequency of operation	2405-2480 MHz
Modulation type	GP O-QPSK
Data rate	1 Mbps
Transmit power	5 dBm EIRP with internal antenna

Related information

11.2.3 Bluetooth communication

7.2.3 Control modes for E-pumps

Grundfos MTSE pumps are only available without a pressure sensor.

7.2.3.1 MTSE without sensor

MTSE pumps without a sensor are suitable in the following situations:

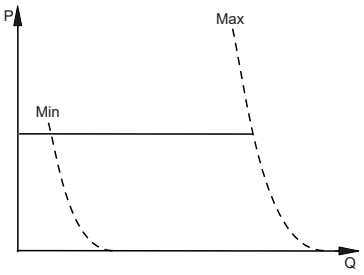
- when uncontrolled operation is required
- when another sensor is retrofit to control, for example, the flow rate, temperature, differential temperature, liquid level and pH value at some arbitrary points in the system.

MGE 1.5 to 22 kW

These MTSE pumps without a sensor can be set to either of the following control modes:

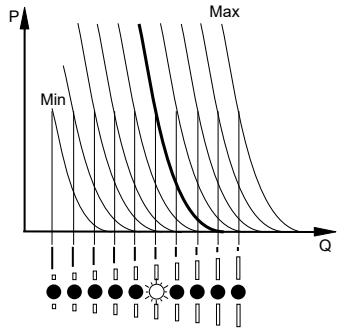
- constant pressure
- constant curve
- constant other value.

In constant pressure operating mode, the pump adjusts its performance to the desired setpoint. See the figure below.



Constant pressure mode

In constant curve operating mode, which is the factory setting, the pump operates according to the constant curve set. See the figure below.



Constant curve mode

7.2.4 Functional module for MGE 1.5 to 2.2 kW

7.2.4.1 FM300

The module has a number of inputs and outputs enabling the motor to be used in advanced applications where many inputs and outputs are required.

Inputs and outputs

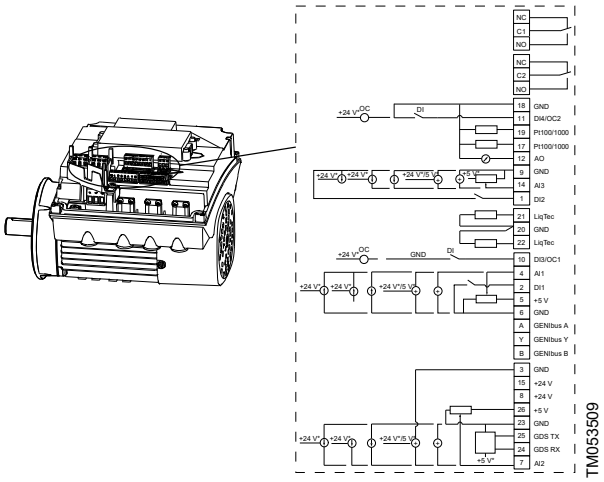
The module has the following connections:

- three analog inputs
- one analog output
- two dedicated digital inputs
- two configurable digital inputs or open-collector outputs
- Grundfos Digital Sensor input and output
- two Pt100/1000 inputs
- two LiqTec sensor inputs
- two signal relay outputs
- GENIbus connection.

Connection terminals

All inputs and outputs are internally separated from the mains-conducting parts by reinforced insulation, and are galvanically separated from other circuits. All control terminals are supplied with protective extra-low voltage (PELV) ensuring protection against electric shock.

- Signal relay outputs
  - Signal relay 1:
    LIVE:
    Power supply voltages up to 250 VAC can be connected to this output.
    PELV:
    The output is galvanically separated from other circuits. Therefore, the supply voltage or protective extra-low voltage can be connected to the output as desired.
  - Signal relay 2:
    PELV:
    The output is galvanically separated from other circuits. Therefore, the supply voltage or protective extra-low voltage can be connected to the output as desired.
- Power supply (terminals N, PE, L or L1, L2, L3, PE).



Connection terminals, FM300 functional module

* If an external supply source is used, there must be a connection to the GND.

Terminal	Type	Function
NC	Normally closed contact	Signal relay 1: LIVE or PELV
C1	Common	
NO	Normally open contact	
NC	Normally closed contact	Signal relay 2: PELV only
C2	Common	
NO	Normally open contact	
18	GND	Signal ground
110.5 - 3.5 V or 0-5 V or 0-10 V	DI4/OC2	Digital input/output, configurable Open collector: max. 24 V resistive or inductive
19	Pt100/1000 input 2	Pt100/1000 sensor input 2
17	Pt100/1000 input 1	Pt100/1000 sensor input 1
12	AO	Analog output: • 0-20 mA or 4-20 mA • 0-10 V
9	GND	Signal ground
14	AI3	Analog input: • 0-20 mA or 4-20 mA • 0-10 V
1	DI2	Digital input, configurable
21	LiqTec sensor input 1	LiqTec sensor input 1 White conductor
20	GND	Signal ground Brown and black conductors
22	LiqTec sensor input 2	LiqTec sensor input 2 Blue conductor
10	DI3/OC1	Digital input/output, configurable Open collector: max. 24 V resistive or inductive
4	AI1	Analog input: • 0-20 mA or 4-20 mA • 0.5 - 3.5 V, 0-5 V or 0-10 V
2	DI1	Digital input, configurable

Terminal	Type	Function
5	+5 V	Power supply to a potentiometer and sensor
6	GND	Signal ground
A	GENIbus, A	GENIbus, A (+)
Y	GENIbus, Y	GENIbus, GND
B	GENIbus, B	GENIbus, B (-)
3	GND	Signal ground
15	+24 V	Power supply
8	+24 V	Power supply
26	+5 V	Supply to potentiometer and sensor
23	GND	Signal ground
25	GDS TX	Grundfos Digital Sensor output
24	GDS RX	Grundfos Digital Sensor input
7	AI2	Analog input: • 0-20 mA or 4-20 mA • 0.5 - 3.5 V, 0-5 V or 0-10 V

7.2.5 Functional module for MGE 3 to 22 kW

7.2.5.1 FM310 and FM311

Inputs and outputs

Note that the FM311 functional module does not include Bluetooth connection.

The module has the following connections:

- three analog inputs
- one analog output
- two dedicated digital inputs
- two configurable digital inputs or open-collector outputs
- Grundfos Digital Sensor input and output
- two Pt100/1000 inputs
- two LiqTec sensor inputs
- two signal relay outputs
- GENIbus/Modbus connection
- two Safe Torque Off (STO) inputs [3)]
- Ethernet connection
- Bluetooth (BLE) connection. [4)]

3) Safe Torque Off (STO) is a safety function to stop the motor from turning without actively braking it. It complies with the definition in EN 61800-5-2.

4) The FM311 is without Bluetooth.

Connection terminals

All control terminals are supplied with safety extra-low voltage (SELV), ensuring protection against electric shock.

All inputs and outputs are internally separated from the mains-conducting parts by reinforced insulation, and are galvanically separated from other circuits.

Cables for the relays and the Ethernet cable must be rated at least 250 V / 2 A.

The relays are approved for overvoltage category II, regardless of whether power is supplied from a transformer or a power supply.

Signal relay outputs

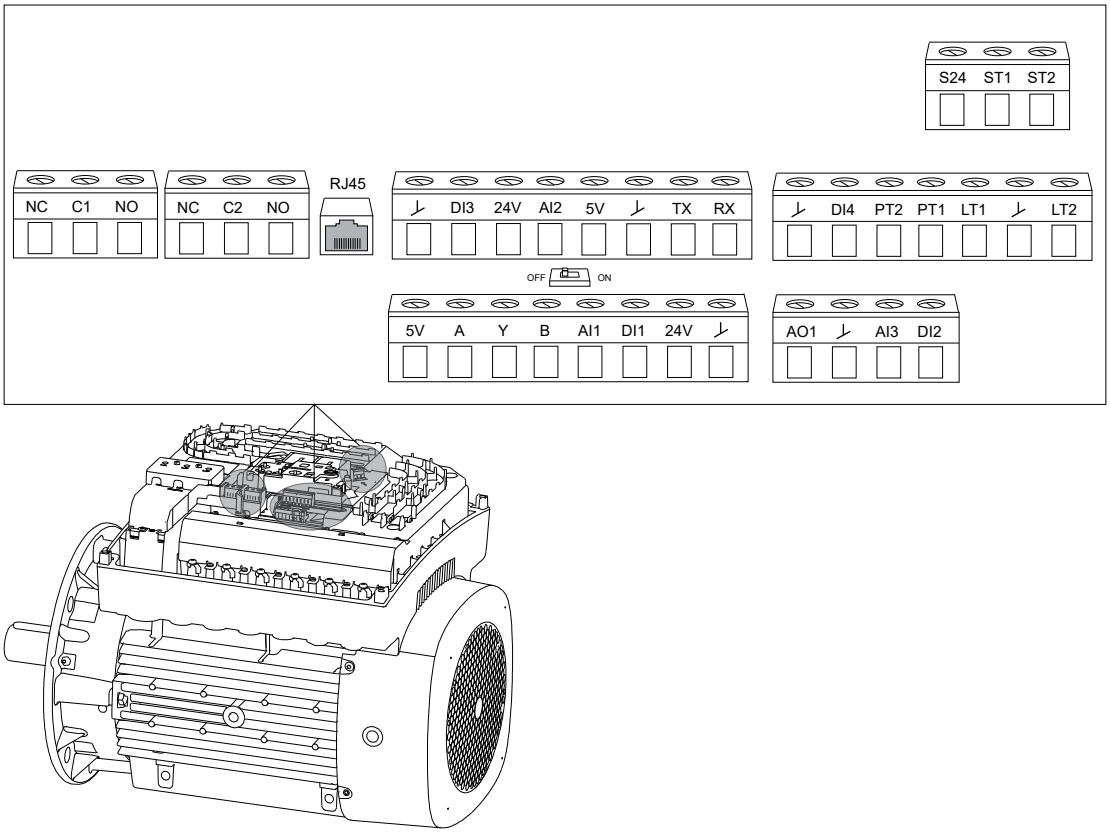
Signal relay 1

LIVE: You can connect supply voltages up to 250 VAC to the output.

SELV: The output is galvanically separated from other circuits. Therefore, you can connect the supply voltage or safety extra-low voltage to the output as desired.

Signal relay 2

SELV: The output is galvanically separated from other circuits. Therefore, you can connect the supply voltage or safety extra-low voltage to the output as desired.



TM082862

Terminal	Type	Function
NC	Normally closed contact	Signal relay 1: LIVE or SELV
C1	Common	
NO	Normally open contact	
NC	Normally closed contact	Signal relay 2: SELV only
C2	Common	
NO	Normally open contact	
RJ45	Ethernet	Ethernet communication
GND	GND	Signal ground
DI3	DI3/OC1	Digital input/output, configurable Open collector: max. 24 V resistive or inductive
24V	+24 V	Power supply
AI2	AI2	Analog input: • 0-20 mA or 4-20 mA • 0.5 - 3.5 V, 0-5 V or 0-10 V
5V	+5 V	Power supply to a potentiometer or sensor
GND	GND	Signal ground
TX	GDS TX	Grundfos Digital Sensor output
RX	GDS RX	Grundfos Digital Sensor input
GND	GND	Signal ground
DI4	DI4/OC2	Digital input/output, configurable Open collector: max. 24 V resistive or inductive
PT2	Pt100/1000 input 2	Pt100/1000 sensor input 2
PT1	Pt100/1000 input 1	Pt100/1000 sensor input 1
LT1	LiqTec sensor input 1	LiqTec sensor input 1 White conductor
GND	GND	Signal ground Brown and black conductors
LT2	LiqTec sensor input 2	LiqTec sensor input 2 Blue conductor

Terminal	Type	Function
5V	+5 V	Power supply to a potentiometer or sensor
A	GENIbus, A	GENIbus, A (+) / Modbus, D1 (+)
Y	GENIbus, Y	GENIbus, GND / Modbus, GND
B	GENIbus, B	GENIbus, B (-) / Modbus, D0 (-)
AI1	AI1	Analog input: • 0-20 mA or 4-20 mA • 0.5 - 3.5 V, 0-5 V or 0-10 V
DI1	DI1	Digital input [5], configurable
24V	+24 V	Power supply
GND	GND	Signal ground
AO1	AO	Analog output: • 0-20 mA or 4-20 mA • 0-10 V
GND	GND	Signal ground
AI3	AI3	Analog input: • 0-20 mA or 4-20 mA • 0.5 - 3.5 V, 0-5 V or 0-10 V
DI2	DI2	Digital input, configurable
S24	+24 V (STO)	Power supply to the Safe Torque Off inputs
ST1	STO1	Safe Torque Off - Input 1
ST2	STO2	Safe Torque Off - Input 2

5) The digital input 1 is factory-set to be start or stop input where an open circuit results in stop. A jumper is factory-fitted between the terminals DI1 and GND. Remove the jumper if the digital input 1 is to be used as external start or stop, or any other external function.

7.2.5.2 Safe Torque Off (STO) function

Safe Torque Off (STO) is a safety function to stop the motor from turning without actively braking it. It complies with the definition in EN 61800-5-2.

The main difference between the STO and a functional stop using a digital input, for example DI1, is that STO is approved to provide a defined safety integrity.

The principle of operation is the following:

1. The STO function is activated. The input circuits are opened, for example, by opening contactors.
2. The STO inputs of the motor de-energize.
3. The motor cuts off the control signal for the output transistors.
4. The motor coasts to a stop if it is running. The drive cannot restart while the STO function is activated. After deactivating STO, the motor can restart immediately.
5. The control software of the motor generates an STO alert and corresponding indications. The STO alert can be configured.

The version of the STO function is marked on the motor nameplate after the product version number.

Safety approvals

The Safe Torque Off (STO) function of the E-pump with an MGE, MLE motor complies with the following standards:

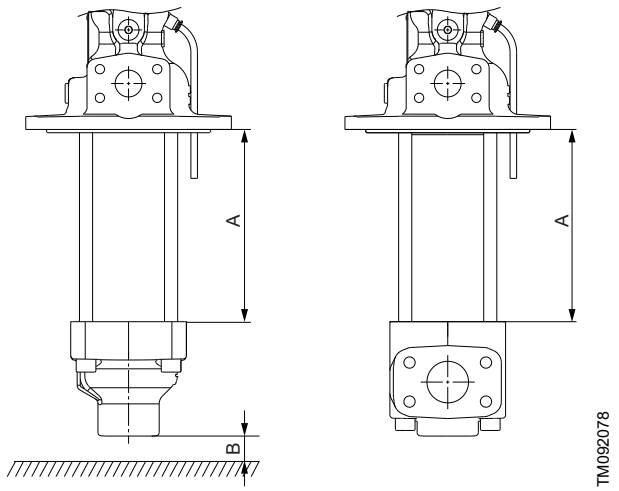
Rating	Standard
Definition of safety function STO	IEC 61800-5-2:2016
Safety Integrity Level SIL3	IEC 61508-1/-2:2010
Performance level e (PL e)	EN ISO 13849-1:2015
Category 3	EN ISO 13849-1:2015

7.3 Installation

The following applies for pumps installed in tanks.

To protect the pump at startup and ensure correct performance, observe the requirements in the table below.

Pump type	A [mm]	B [mm]
MTS 20	Max. 125	Min. 25
MTS 40	Max. 182	Min. 25



Design types DQ (left) and D8.6 (right)

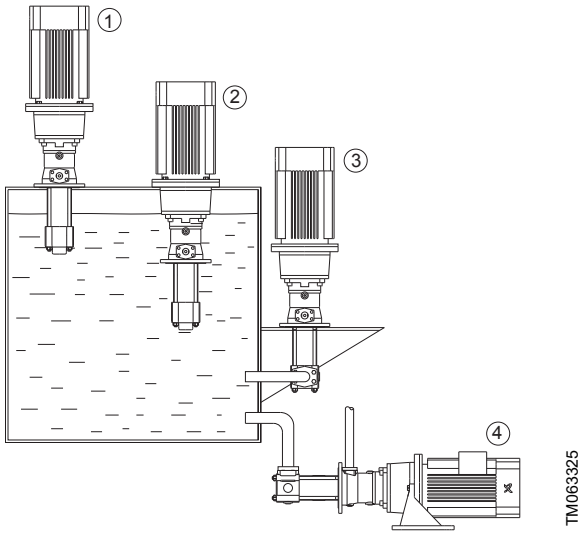
Related information

7.3.1.1 Pumps for tank-top installation

7.3.1.2 Pumps for in-tank installation

7.3.1 Pump designs

The pump designs available as standard and on request are shown in the figure below.



Pump designs

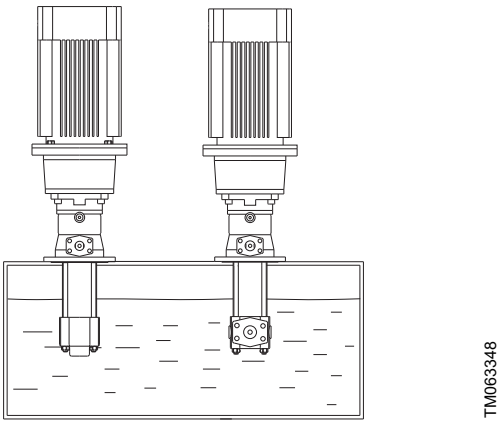
Pos.	Description
1	Pump designed for tank-top installation
2	Pump designed for in-tank installation (on request)
3	Pump designed for dry installation with flange
4	Pump designed for dry installation with mounting foot

Related information

1.1 MTS Model D pumps

7.3.1.1 Pumps for tank-top installation

The pump is equipped with a flange for mounting on the tank top, and the outlet port is above the tank cover. This type of installation is easy and economic to install. The pump is equipped with a seal ring, and is well-suited for operation with an inlet pressure up to 1 bar.



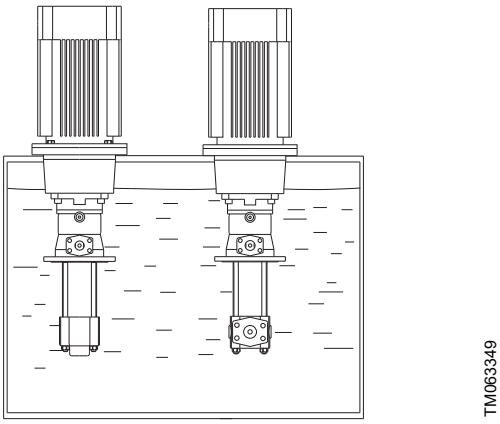
Tank-top installation

Related information

7.3 Installation

7.3.1.2 Pumps for in-tank installation

This type of installation saves space compared with pumps designed for dry installation. Any leakage remain in the tank. See the section on installation requirements.

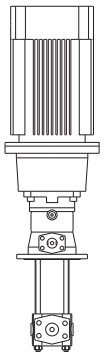


In-tank installation

Related information

7.3 Installation

7.3.1.3 Pumps for dry installation

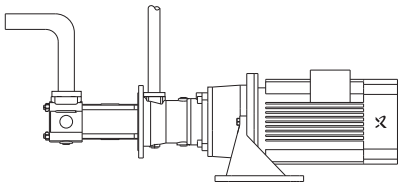


TM063350

Pump designed for dry installation with a flange

This type of installation is well-suited for operation with an inlet pressure up to 10 bar, and it is easy to access the pump. A silicon carbide mechanical shaft seal ensures a long service life.

7.3.1.4 Pumps for horizontal installation



TM063351

Pump designed for dry installation with horizontal mounting foot

The pump is equipped with a mounting foot. This type of installation is well-suited for operation with an inlet pressure up to 10 bar, and it is easy to access the pump. A silicon carbide mechanical shaft seal ensures a long service life.

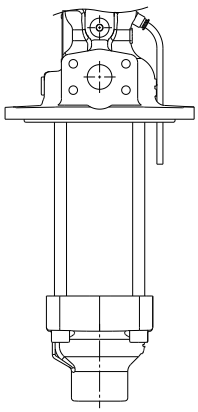
7.4 Shaft seals

Design DQ

The shaft seal includes a sealing ring, and is well-suited for operation with an inlet pressure up to 1 bar.

The design offers the following features:

- axial inlet with pipe thread connection according to DIN EN ISO 228-1
- radial high-pressure outlet flange according to SAE J518C.



TM092079

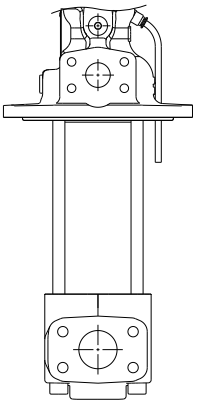
Design DQ

Design D8.6

The maintenance-free and highly wear-resistant shaft seal complies with EN 12756.

The design offers the following features:

- radial high-pressure inlet and outlet flanges according to SAE J518C
- optional: axial inlet connection with pipe thread (DIN ISO 228-1).

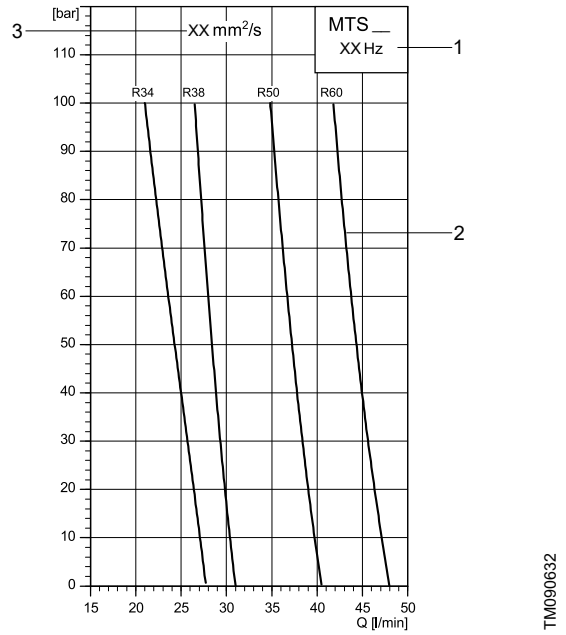


TM092080

Design D8.6

8. Performance curves and technical data

8.1 How to read the curve charts



Pos.	Description
1	Pump type and frequency
2	Spindle pitch angle in degrees where R refers to the spindle sense of gradient (R=right)
3	Curve sheet for liquid at 1 mm^2/s or 20 mm^2/s

Note that the power consumption of the pump can be found in the data table below the curve.

8.2 Guidelines to performance curves

Performance tolerances:

Q > 100 l/min	VDMA 24284, Class II, Group II Tolerance ΔQ: +10 % / -5 %
Q ≤ 100 l/min	Grundfos specification Tolerance ΔQ: + (22-0,12*Q) [%]/-(22-0,17*Q) [%]

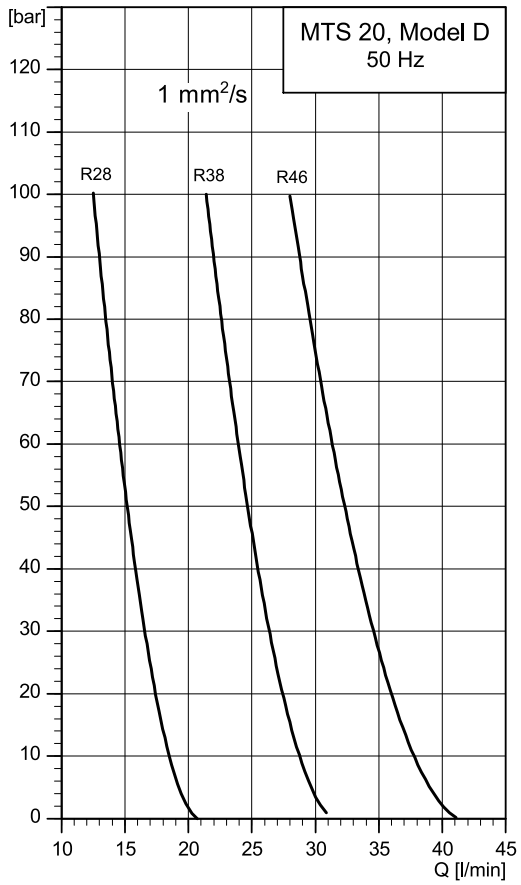
Example:

MTS 20 R38	
at 30 bar: Q_{nom} = 26,4 l/min	
Maximum flow:	31,4 l/min
Minimum flow:	21,8 l/min

8.3 MTS 20, 50 Hz

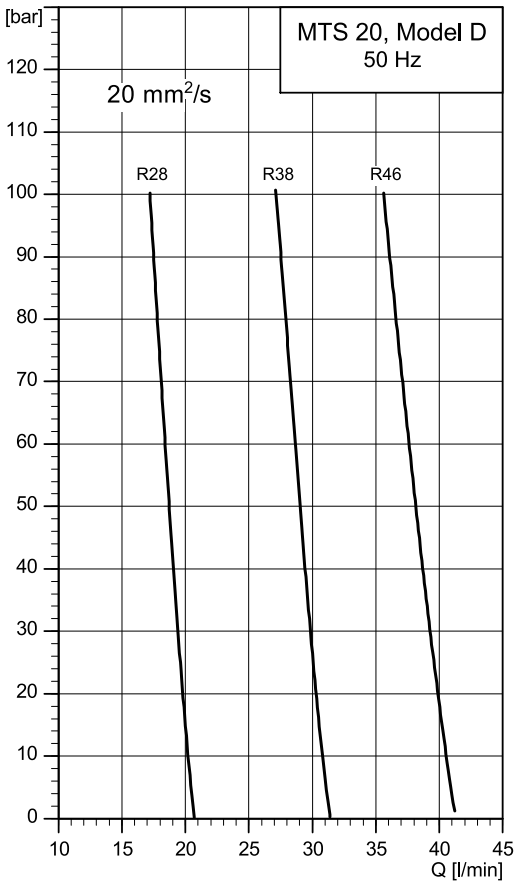
Performance range

Performance data at 1 mm/2/s (emulsion)



TM091523

Performance data at 20 mm²/s (cutting oil with EP additives)



TM091525

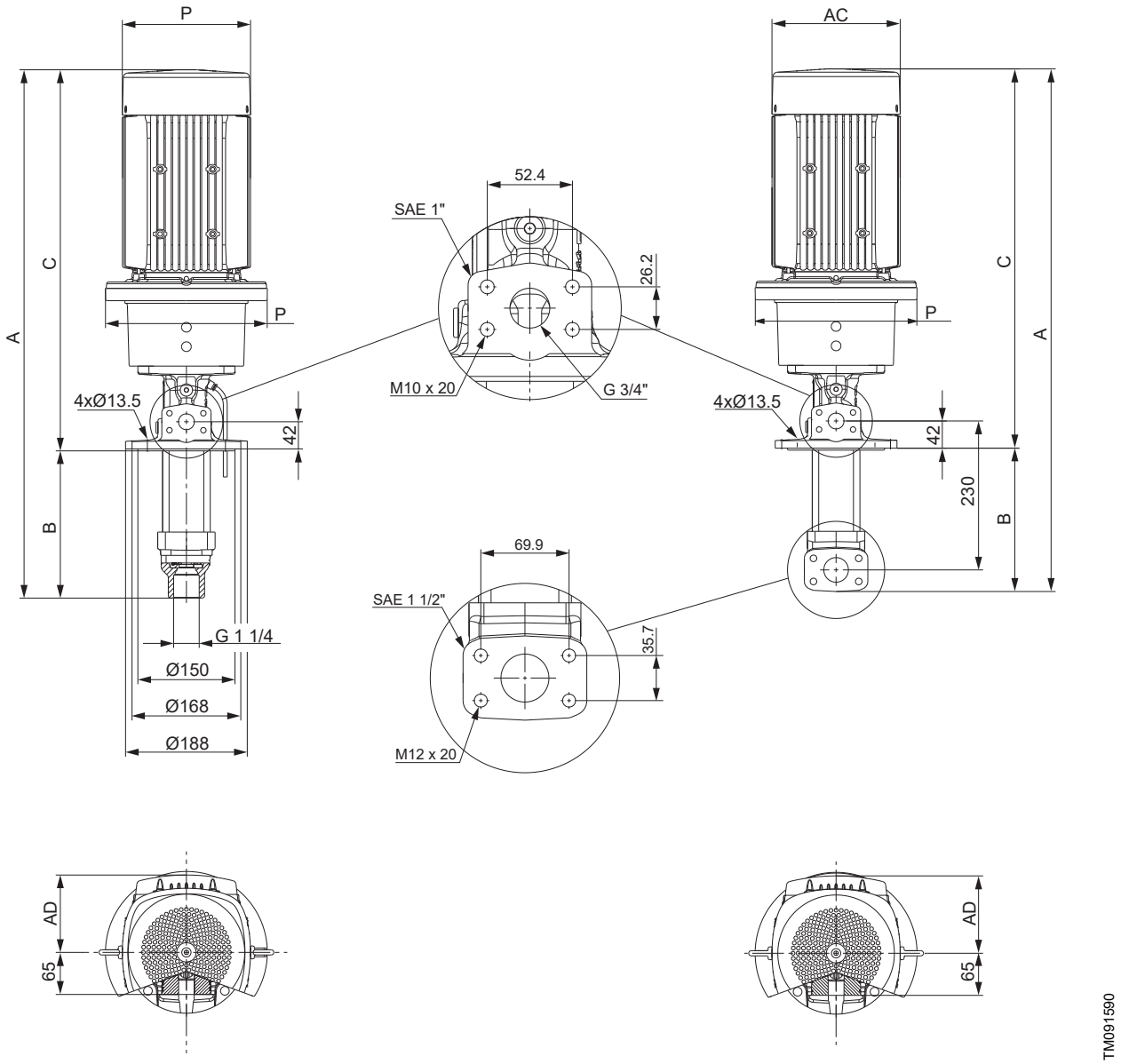
Related information

10.1.10 Dimensions

8.3.1 Performance data

Pressure	1 mm²/s (emulsion)						20 mm²/s (cutting oil with EP additives)					
	R28		R38		R46		R28		R38		R46	
	Q	P	Q	P	Q	P	Q	P	Q	P	Q	P
[bar]	[l/min]	[kW]	[l/min]	[kW]	[l/min]	[kW]	[l/min]	[kW]	[l/min]	[kW]	[l/min]	[kW]
0	20.7	0.3	31.4	0.3	41.3	0.3	20.7	0.3	31.4	0.3	41.3	0.3
10	18.5	0.7	28.7	0.8	37.7	1.0	20.2	0.7	30.8	0.8	40.5	1.0
20	17.4	1.0	27.4	1.3	36.0	1.7	19.8	1.0	30.3	1.4	39.9	1.7
30	16.6	1.4	26.4	1.9	34.6	2.4	19.4	1.4	29.9	1.9	39.3	2.4
40	15.8	1.7	25.5	2.4	33.4	3.1	19.1	1.7	29.4	2.4	38.7	3.1
50	15.2	2.0	24.7	2.9	32.3	3.8	18.7	2.0	29	2.9	38.2	3.8
60	14.6	2.4	23.9	3.5	31.3	4.4	18.4	2.4	28.6	3.5	37.7	4.4
70	14.0	2.7	23.2	4.0	30.4	5.1	18.1	2.7	28.3	4.0	37.2	5.1
80	13.5	3.1	22.6	4.5	29.6	5.8	17.8	3.1	27.9	4.5	36.7	5.8
90	13.0	3.4	22.0	5.0	28.7	6.5	17.5	3.4	27.6	5.0	36.2	6.5
100	12.5	3.8	21.4	5.6	28.0	7.2	17.2	3.8	27.1	5.6	35.7	7.2

8.3.2 Dimensional sketches



Tank-top installation (left), dry installation (right)

8.3.3 Dimensions and weights

Pump type	P2[kW]	Dimensions [mm]									Net weight[kg]	
		A		B		C		AC	AD	P		
		Tank-top	Dry	Tank-top	Dry	Tank-top	Dry				Tank-top	Dry
MTS 20-30 R28	1.5	779	770	230	221	549	549	178	173	200	34	35
MTS 20-40 R28	2.2	819	810	230	221	589	589	178	110	200	37	38
MTS 20-50 R28	2.2	819	810	230	221	589	589	178	110	200	37	38
MTS 20-60 R28	3	813	804	230	221	583	583	198	183	250	42	43
MTS 20-70 R28	3	813	804	230	221	583	583	198	183	250	42	43
MTS 20-80 R28	4	850	841	230	221	620	620	220	134	250	54	55
MTS 20-90 R28	4	850	841	230	221	620	620	220	134	250	54	55
MTS 20-100 R28	4	850	841	230	221	620	620	220	134	250	54	55
MTS 20-30 R38	2.2	819	810	230	221	589	589	178	110	200	37	38
MTS 20-40 R38	3	813	804	230	221	583	583	198	120	250	42	43
MTS 20-50 R38	4	850	841	230	221	620	620	220	134	250	54	55

Pump type	P2[kW]	Dimensions [mm]									Net weight[kg]	
		A		B		C		AC	AD	P		
		Tank-top	Dry	Tank-top	Dry	Tank-top	Dry				Tank-top	Dry
MTS 20-60 R38	4	850	841	230	221	620	620	220	134	250	54	55
MTS 20-70 R38	4	850	841	230	221	620	620	220	134	250	54	55
MTS 20-80 R38	5.5	893	884	230	221	663	663	220	134	300	60	61
MTS 20-90 R38	5.5	893	884	230	221	663	663	220	134	300	60	61
MTS 20-100 R38	7.5	881	872	230	221	651	651	260	159	300	69	70
MTS 20-30 R46	3	813	804	230	221	583	583	198	120	250	42	43
MTS 20-40 R46	4	850	841	230	221	620	620	220	134	250	54	55
MTS 20-50 R46	4	850	841	230	221	620	620	220	134	250	54	55
MTS 20-60 R46	5.5	893	884	230	221	663	663	220	134	300	60	61
MTS 20-70 R46	5.5	893	884	230	221	663	663	220	134	300	60	61
MTS 20-80 R46	7.5	881	872	230	221	651	651	260	159	300	69	70
MTS 20-90 R46	7.5	881	872	230	221	651	651	260	159	300	69	70
MTS 20-100 R46	11	1028	1019	230	221	798	798	318	204	350	107	108

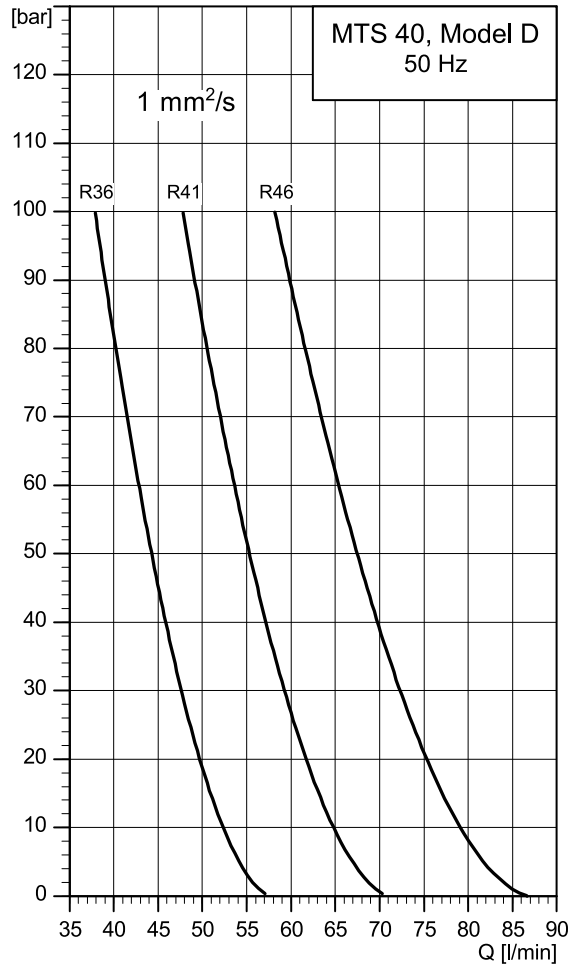
Related information

10.1.10 Dimensions

8.4 MTS 40, 50 Hz

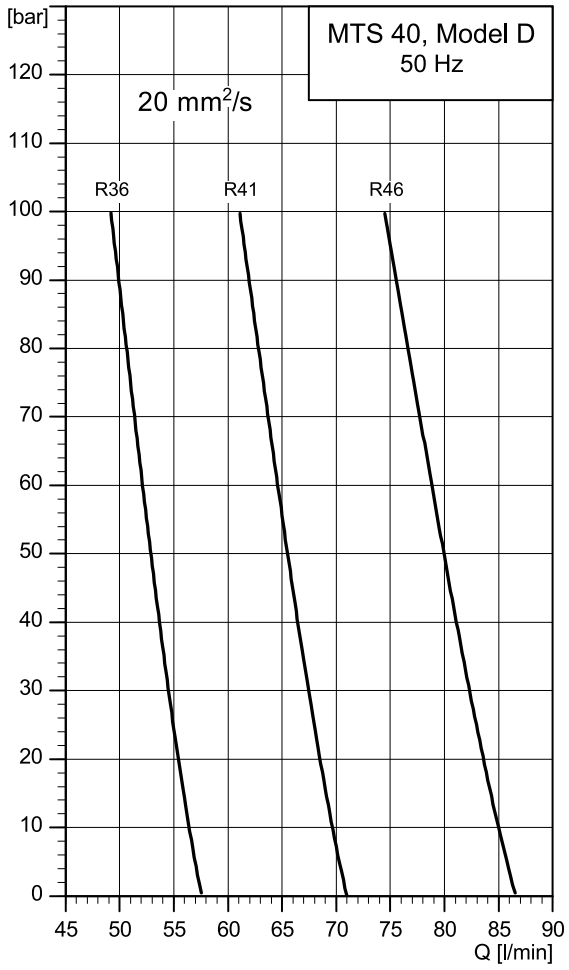
Performance range

Performance data at 1 mm²/s (emulsion)



TM091524

Performance data at 20 mm²/s (cutting oil with EP additives)

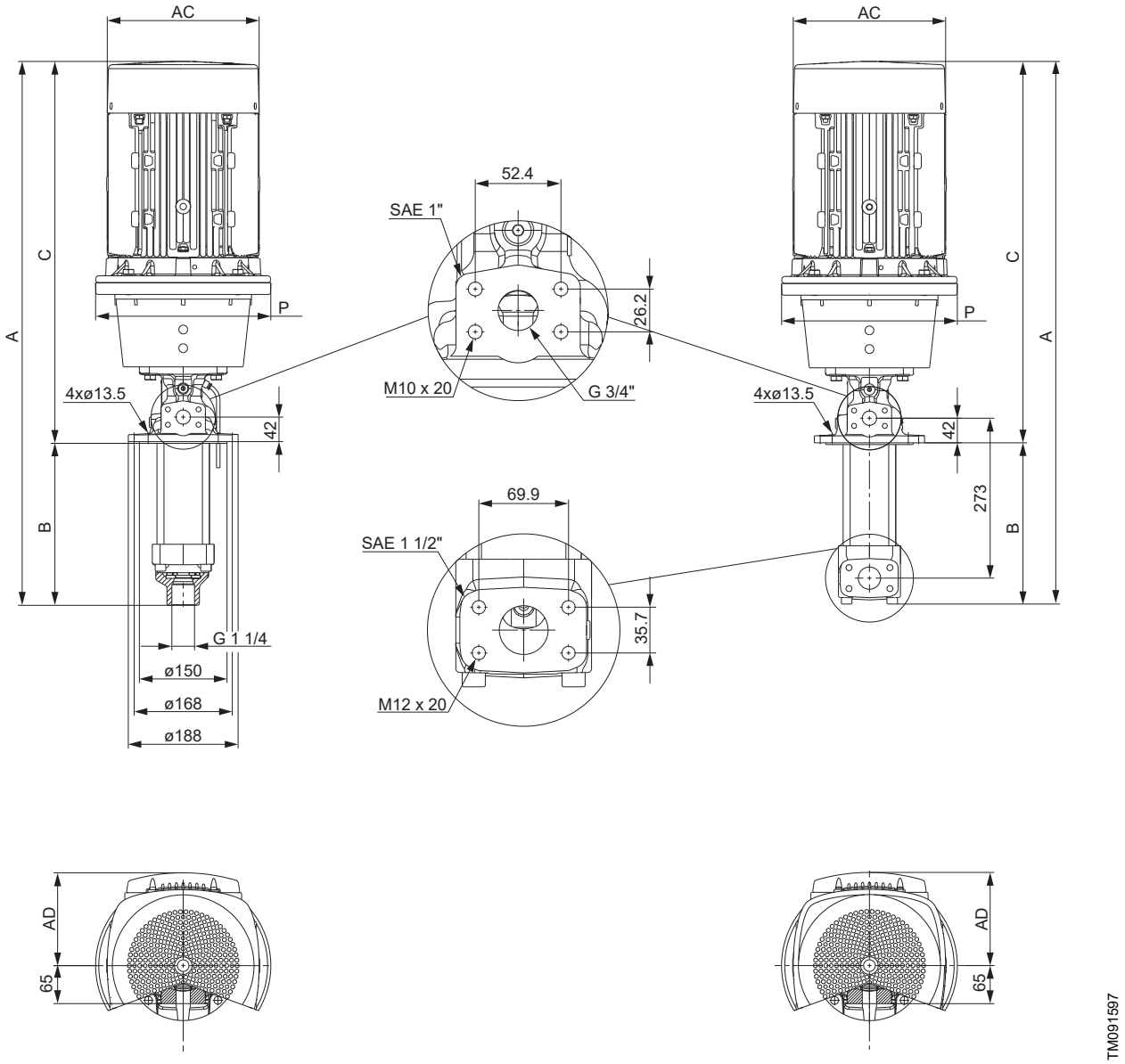


TM091526

8.4.1 Performance data

Pressure	1 mm²/s (emulsion)						20 mm²/s (cutting oil with EP additives)					
	R36		R41		R46		R36		R41		R46	
	Q	P	Q	P	Q	P	Q	P	Q	P	Q	P
[bar]	[l/min]	[kW]	[l/min]	[kW]	[l/min]	[kW]	[l/min]	[kW]	[l/min]	[kW]	[l/min]	[kW]
0	57.6	0.4	71	0.4	86.6	0.4	57.6	0.8	71	0.8	86.6	0.8
10	52.3	1.4	64.7	1.6	79.1	1.8	56.4	1.7	69.6	1.9	84.9	2.2
20	49.7	2.3	61.7	2.8	75.3	3.3	55.4	2.7	68.5	3.1	83.6	3.6
30	47.6	33	59.3	4	72.3	4.7	54.5	3.6	67.4	4.3	82.3	5.1
40	45.9	4.2	57.2	5.1	69.7	6.2	53.7	4.6	66.5	5.5	81.1	6.5
50	44.3	5.2	55.3	6.3	67.5	7.6	52.9	5.6	65.5	6.7	79.9	8.0
60	42.8	6.2	53.6	7.5	65.4	9.1	52.1	6.5	64.6	7.9	78.9	9.4
70	41.5	7.2	52	8.7	63.4	10.5	51.4	7.5	63.7	9	77.7	10.9
80	40.2	8.1	50.5	9.9	61.6	12.0	50.6	8.4	62.8	10.2	76.6	12.3
90	39	9	49.1	11.1	59.8	13.4	49.9	9.4	61.9	11.4	75.5	13.7
100	37.9	10	47.8	12.2	58.2	14.8	49.2	10.3	61.1	12.6	74.5	15.2

8.4.2 Dimensional sketches



Tank-top installation (left), dry installation (right)

8.4.3 Dimensions and weights

Pump type	P2 [kW]	Dimensions [mm]									Net weight [kg]	
		A		B		C		AC	AD	P	Tank-top	Dry
		Tank-top	Dry	Tank-top	Dry	Tank-top	Dry					
MTS 40-30 R36	4	900	895	280	275	620	620	220	134	250	60	61
MTS 40-40 R36	5.5	943	938	280	275	663	663	220	134	300	65	67
MTS 40-50 R36	5.5	943	938	280	275	663	663	220	134	300	65	67
MTS 40-60 R36	7.5	931	926	280	275	651	651	260	159	300	75	77
MTS 40-70 R36	7.5	931	926	280	275	651	651	260	159	300	75	77
MTS 40-80 R36	11	1.078	1.073	280	275	798	798	318	204	350	112	114
MTS 40-90 R36	11	1.078	1.073	280	275	798	798	318	204	350	112	114
MTS 40-100 R36	11	1.078	1.073	280	275	798	798	318	204	350	112	114
MTS 40-30 R41	5.5	943	938	280	275	663	663	220	134	300	65	67
MTS 40-40 R41	5.5	943	938	280	275	663	663	220	134	300	65	67
MTS 40-50 R41	7.5	931	926	280	275	651	651	260	159	300	75	77

Pump type	P2 [kW]	Dimensions [mm]									Net weight [kg]	
		A		B		C		AC	AD	P	Tank-top	Dry
		Tank-top	Dry	Tank-top	Dry	Tank-top	Dry					
MTS 40-60 R41	7.5	931	926	280	275	651	651	260	159	300	75	77
MTS 40-70 R41	11	1.078	1.073	280	275	798	798	318	204	350	112	114
MTS 40-80 R41	11	1.078	1.073	280	275	798	798	318	204	350	112	114
MTS 40-90 R41	15	1.078	1.073	280	275	798	798	318	204	350	124	126
MTS 40-100 R41	15	1.078	1.073	280	275	798	798	318	204	350	124	126
MTS 40-30 R46	5.5	943	938	280	275	663	663	220	134	300	65	67
MTS 40-40 R46	7.5	931	926	280	275	651	651	260	159	300	75	77
MTS 40-50 R46	11	1078	1073	280	275	798	798	318	204	350	112	114
MTS 40-60 R46	11	1078	1073	280	275	798	798	318	204	350	112	114
MTS 40-70 R46	11	1078	1073	280	275	798	798	318	204	350	112	114
MTS 40-80 R46	15	1078	1073	280	275	798	798	318	204	350	124	126
MTS 40-90 R46	15	1078	1073	280	275	798	798	318	204	350	124	126
MTS 40-100 R46	18.5	1122	1117	280	275	842	842	318	204	350	137	138

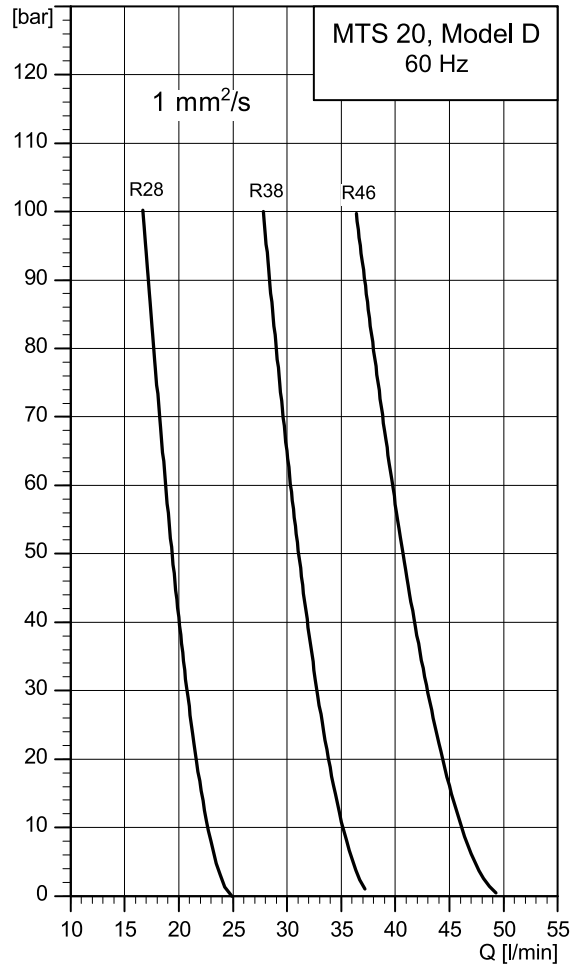
Related information

10.1.10 Dimensions

8.5 MTS 20, 60 Hz

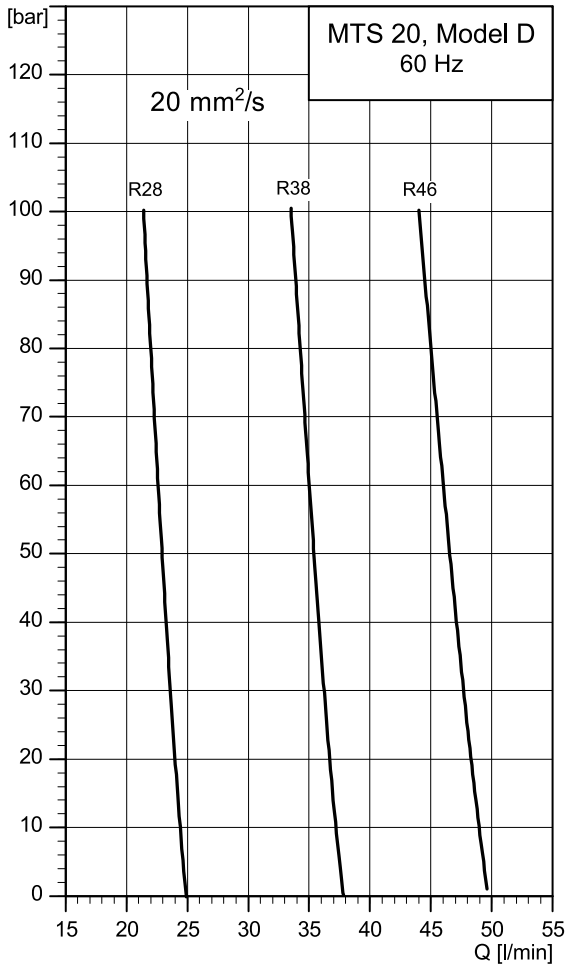
Performance range

Performance data at 1 mm²/s (emulsion)



TM091527

Performance data at 20 mm²/s (cutting oil with EP additives)

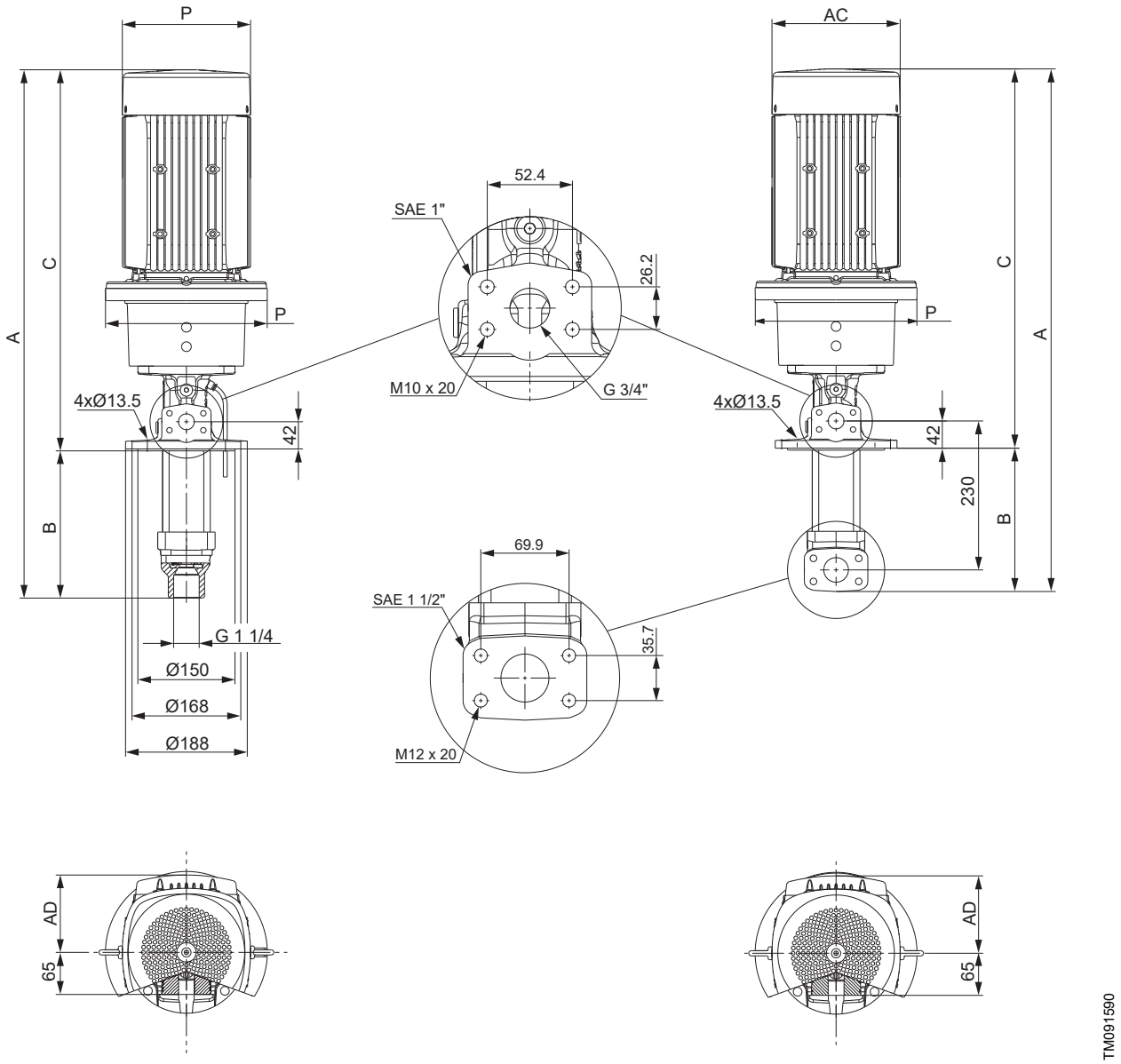


TM091529

8.5.1 Performance data

Pressure	1 mm²/s (emulsion)						20 mm²/s (cutting oil with EP additives)					
	R28		R38		R46		R28		R38		R46	
	Q	P	Q	P	Q	P	Q	P	Q	P	Q	P
[bar]	[l/min]	[kW]	[l/min]	[kW]	[l/min]	[kW]	[l/min]	[kW]	[l/min]	[kW]	[l/min]	[kW]
0	24.9	0.4	37.8	0.4	49.7	0.4	24.9	0.4	37.8	0.4	49.7	0.4
10	22.7	0.8	35.1	1.1	46.1	1.2	24.4	0.8	37.2	1.1	48.9	1.2
20	21.6	1.2	33.8	1.7	44.3	2.1	24.0	1.2	36.7	1.7	48.3	2.1
30	20.8	1.7	32.8	2.3	43.0	2.9	23.6	1.7	36.2	2.3	47.7	2.9
40	20	2.1	31.9	2.9	41.8	3.7	23.3	2.1	35.8	2.9	47.1	3.7
50	19.4	2.5	31.1	3.6	40.7	4.6	22.9	2.5	35.4	3.6	46.5	4.6
60	18.8	2.9	30.3	4.2	39.7	5.4	22.6	2.9	35	4.2	46.0	5.4
70	18.2	3.3	29.6	4.8	38.8	6.2	22.3	3.3	34.6	4.8	45.5	6.2
80	17.7	3.7	29	5.5	38	7.0	22.0	3.7	34.3	5.5	45.0	7.0
90	17.2	4.1	28.4	6.1	37.1	7.9	21.7	4.1	33.9	6.1	44.5	7.9
100	16.7	4.6	27.8	6.7	36.4	8.7	21.4	4.6	33.5	6.7	44.0	8.7

8.5.2 Dimensional sketches



Tank-top installation (left), dry installation (right)

8.5.3 Dimensions and weights

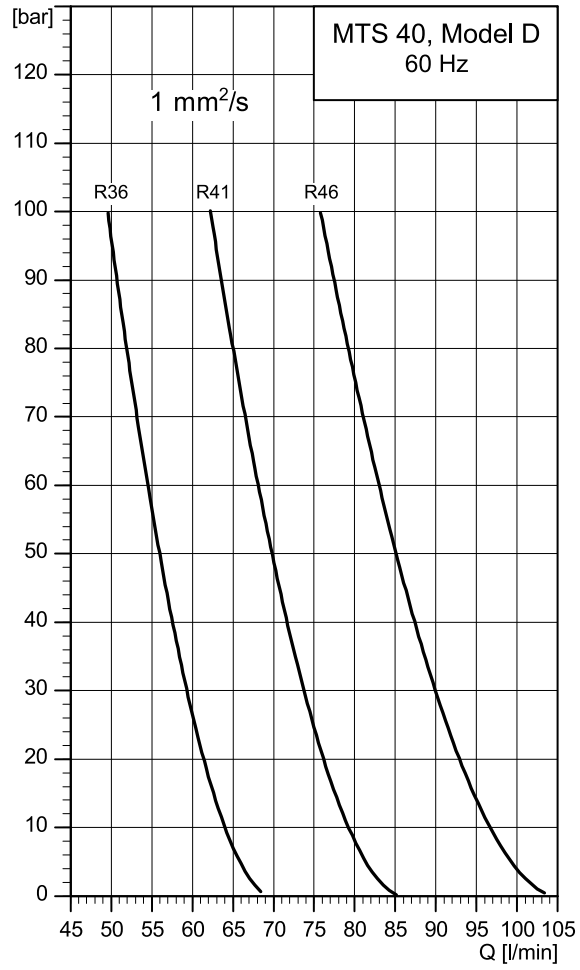
Pump type	P2 [kW]	Dimensions [mm]									Net weight [kg]	
		A		B		C		AC	AD	P	Tank-top	Dry
		Tank-top	Dry	Tank-top	Dry	Tank-top	Dry					
MTS 20-30 R28	2.2	819	810	230	221	589	589	178	110	200	37	38
MTS 20-40 R28	2.2	819	810	230	221	589	589	178	110	200	37	38
MTS 20-50 R28	3	813	804	230	221	583	583	198	183	250	42	43
MTS 20-60 R28	3	813	804	230	221	583	583	198	183	250	42	43
MTS 20-70 R28	4	850	841	230	221	620	620	220	134	250	54	55
MTS 20-80 R28	4	850	841	230	221	620	620	220	134	250	54	55
MTS 20-90 R28	5.5	893	884	230	221	663	663	220	134	300	60	61
MTS 20-100 R28	5.5	893	884	230	221	663	663	220	134	300	60	61
MTS 20-30 R38	3	813	804	230	221	583	583	198	183	250	42	43
MTS 20-40 R38	3	813	804	230	221	583	583	198	183	250	42	43
MTS 20-50 R38	4	850	841	230	221	620	620	220	134	250	54	55

Pump type	P2 [kW]	Dimensions [mm]									Net weight [kg]	
		A		B		C		AC	AD	P		
		Tank-top	Dry	Tank-top	Dry	Tank-top	Dry				Tank-top	Dry
MTS 20-60 R38	5.5	893	884	230	221	663	663	220	134	300	60	61
MTS 20-70 R38	5.5	893	884	230	221	663	663	220	134	300	60	61
MTS 20-80 R38	5.5	893	884	230	221	663	663	220	134	300	60	61
MTS 20-90 R38	7.5	881	872	230	221	651	651	260	231	300	69	70
MTS 20-100 R38	7.5	881	872	230	221	651	651	260	231	300	69	70
MTS 20-30 R46	3	804	804	230	221	583	583	198	120	250	42	43
MTS 20-40 R46	4	841	841	230	221	620	620	220	134	250	54	55
MTS 20-50 R46	5.5	884	884	230	221	663	663	220	134	300	60	61
MTS 20-60 R46	5.5	884	884	230	221	663	663	220	134	300	60	61
MTS 20-70 R46	7.5	872	872	230	221	651	651	260	159	300	69	70
MTS 20-80 R46	7.5	872	872	230	221	651	651	260	159	300	69	70
MTS 20-90 R46	11	1019	1019	230	221	798	798	318	204	350	107	108
MTS 20-100 R46	11	1019	1019	230	221	798	798	318	204	350	107	108

8.6 MTS 40, 60 Hz

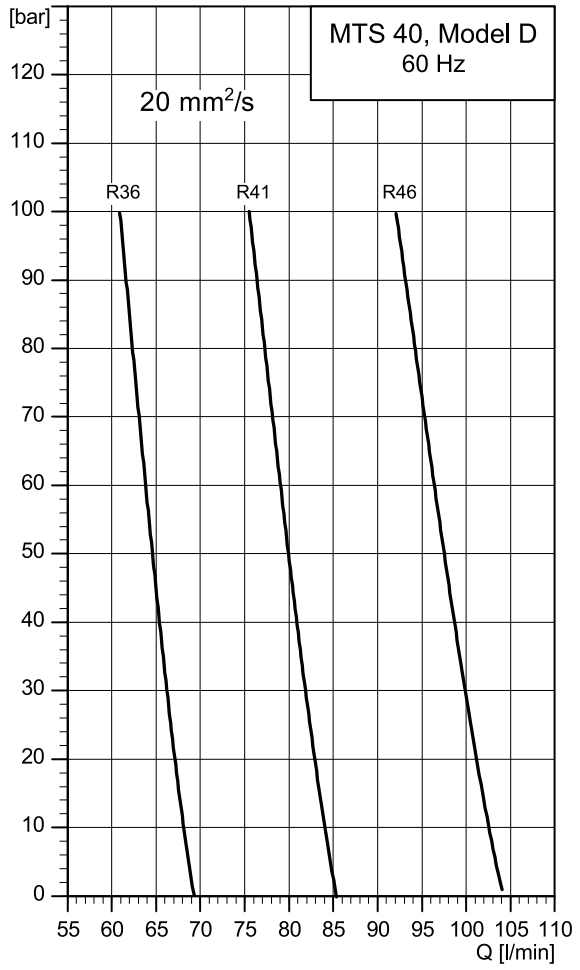
Performance range

Performance data at 1 mm²/s (emulsion)



TM091528

Performance data at 20 mm²/s (cutting oil with EP additives)

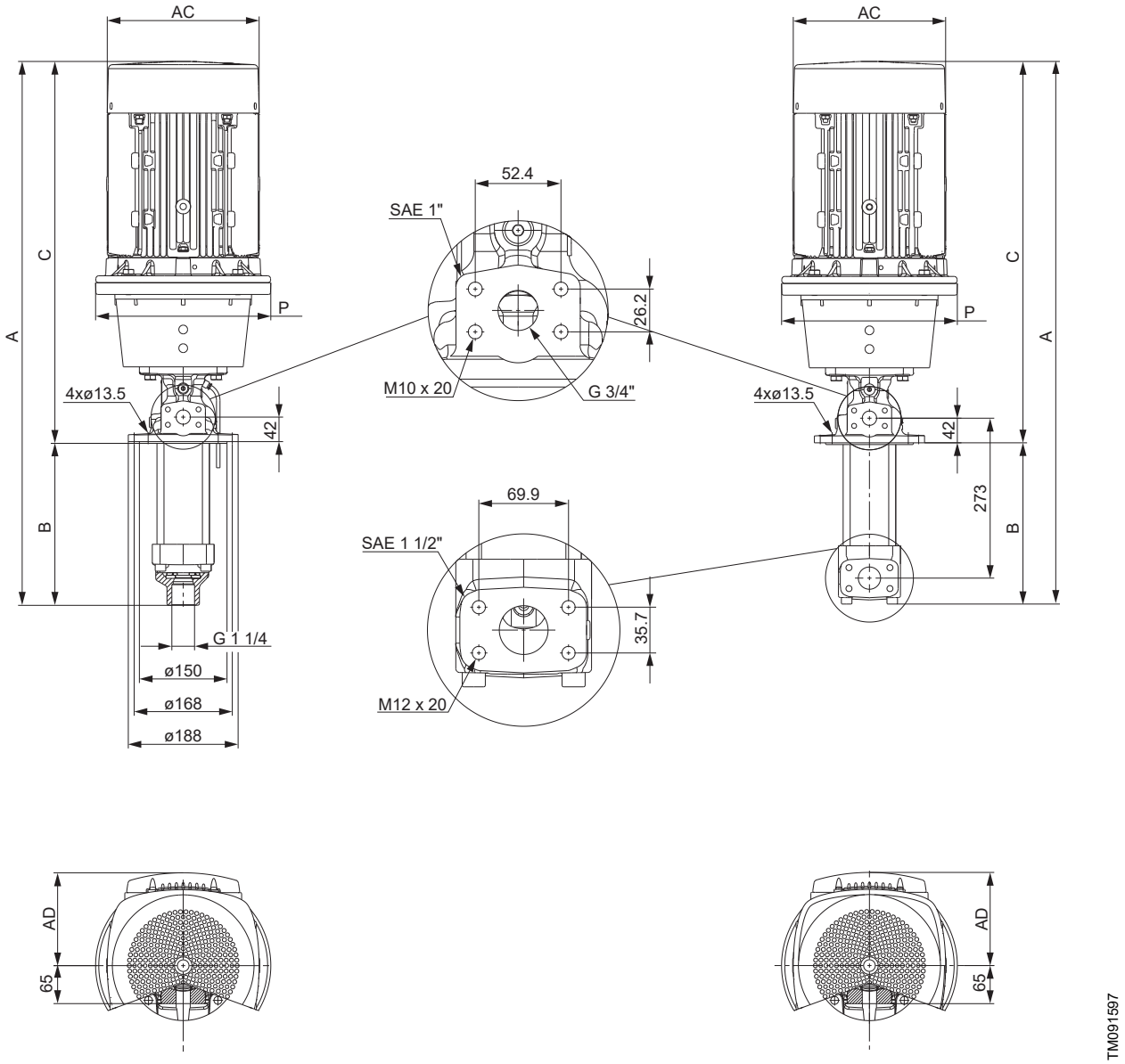


TM091530

8.6.1 Performance data

Pressure	1 mm²/s (emulsion)						20 mm²/s (cutting oil with EP additives)					
	R36		R41		R46		R36		R41		R46	
	Q	P	Q	P	Q	P	Q	P	Q	P	Q	P
[bar]	[l/min]	[kW]	[l/min]	[kW]	[l/min]	[kW]	[l/min]	[kW]	[l/min]	[kW]	[l/min]	[kW]
0	69.3	0.5	85.4	0.5	104.2	0.5	69.3	1	85.4	1	104.2	1
10	64	1.7	79.2	2	96.6	2.3	68.1	2.2	84	2.4	102.5	2.7
20	61.4	2.8	76.2	3.4	92.9	4	67.1	3.3	82.9	3.8	101.1	4.5
30	59.3	4	73.7	4.8	89.9	5.7	66.2	4.5	81.9	5.3	99.9	6.2
40	57.6	5.2	71.7	6.2	87.4	7.5	65.4	5.6	80.9	6.7	98.7	7.9
50	56	6.3	69.8	7.7	85.1	9.2	64.6	6.8	80	8.1	97.5	9.7
60	54.5	7.5	68.1	9.1	83.0	11	63.8	7.9	79	9.5	96.4	11.4
70	53.2	8.6	66.5	10.5	81.0	12.7	63.1	9.1	78.1	11	95.3	13.2
80	51.9	9.8	65	11.9	79.2	14.4	62.3	10.2	77.3	12.4	94.2	14.9
90	50.7	10.9	63.6	13.4	77.4	16.2	61.6	11.4	76.4	13.8	93.1	16.6
100	49.6	12.1	62.2	14.8	75.8	17.9	60.9	12.5	75.5	15.2	92.1	18.4

8.6.2 Dimensional sketches



Tank-top installation (left), dry installation (right)

8.6.3 Dimensions and weights

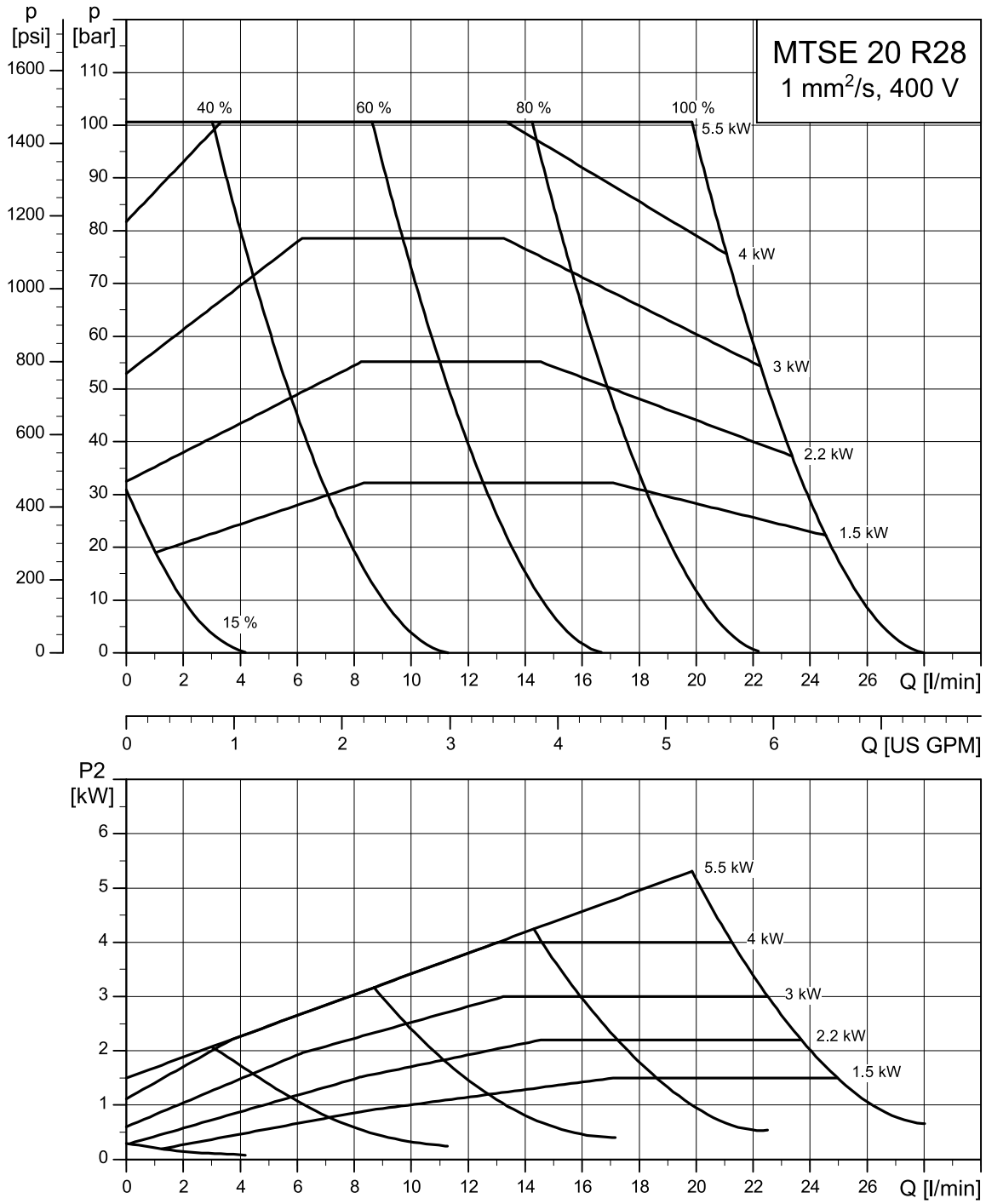
Pump type	P2 [kW]	Dimensions [mm]									Net weight [kg]	
		A		B		C		AC	AD	P	Tank-top	Dry
		Tank-top	Dry	Tank-top	Dry	Tank-top	Dry					
MTS 40-30 R36	4	900	895	280	275	620	620	220	134	250	60	61
MTS 40-40 R36	5.5	943	938	280	275	663	663	220	134	300	65	67
MTS 40-50 R36	7.5	931	926	280	275	651	651	260	231	300	75	77
MTS 40-60 R36	7.5	931	926	280	275	651	651	260	231	300	75	77
MTS 40-70 R36	11	1144	1073	280	275	864	798	315	290	350	112	114
MTS 40-80 R36	11	1144	1073	280	275	864	798	315	290	350	112	114
MTS 40-90 R36	11	1144	1073	280	275	864	798	315	290	350	112	114
MTS 40-100 R36	15	1188	1073	280	275	908	798	315	290	350	124	126
MTS40-30 R41	5.5	943	938	280	275	663	663	220	134	300	65	67
MTS40-40 R41	7.5	931	926	280	275	651	651	260	159	300	75	77
MTS40-50 R41	11	1078	1073	280	275	798	798	318	204	350	112	114

Pump type	P2 [kW]	Dimensions [mm]									Net weight [kg]	
		A		B		C		AC	AD	P	Tank-top	Dry
		Tank-top	Dry	Tank-top	Dry	Tank-top	Dry					
MTS40-60 R41	11	1078	1073	280	275	798	798	318	204	350	112	114
MTS40-70 R41	11	1078	1073	280	275	798	798	318	204	350	112	114
MTS40-80 R41	15	1078	1073	280	275	798	798	318	204	350	124	126
MTS40-90 R41	15	1078	1073	280	275	798	798	318	204	350	124	126
MTS40-100 R41	15	1078	1073	280	275	798	798	318	204	350	124	126
MTS 40-30 R46	7.5	931	926	280	275	651	651	260	159	300	75	77
MTS 40-40 R46	7.5	931	926	280	275	651	651	260	159	300	75	77
MTS 40-50 R46	11	1144	1073	280	275	864	798	315	204	350	112	114
MTS 40-60 R46	11	1144	1073	280	275	864	798	315	204	350	112	114
MTS 40-70 R46	15	1188	1073	280	275	908	798	315	204	350	124	126
MTS 40-80 R46	15	1188	1073	280	275	908	798	315	204	350	124	126
MTS 40-90 R46	18.5	1188	1117	280	275	908	842	315	204	350	137	139
MTS 40-100 R46	18.5	1188	1117	280	275	908	842	315	204	350	137	139

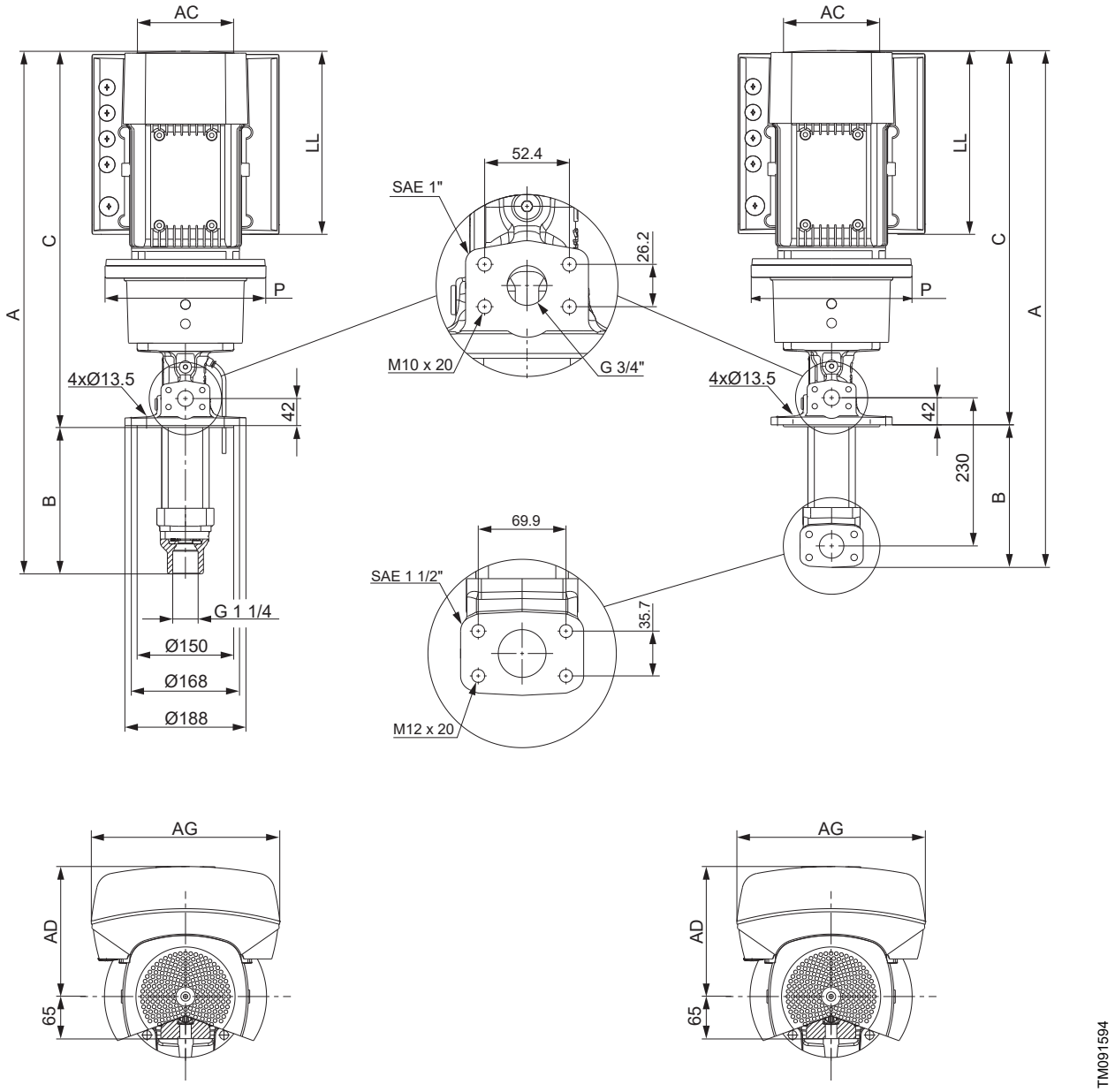
8.7 MTSE 20 R28, 50/60 Hz

8.7.1 Performance range

Performance data at 1 mm²/s (emulsion)



8.7.2 Dimensional sketches



Tank-top installation (left), dry installation (right)

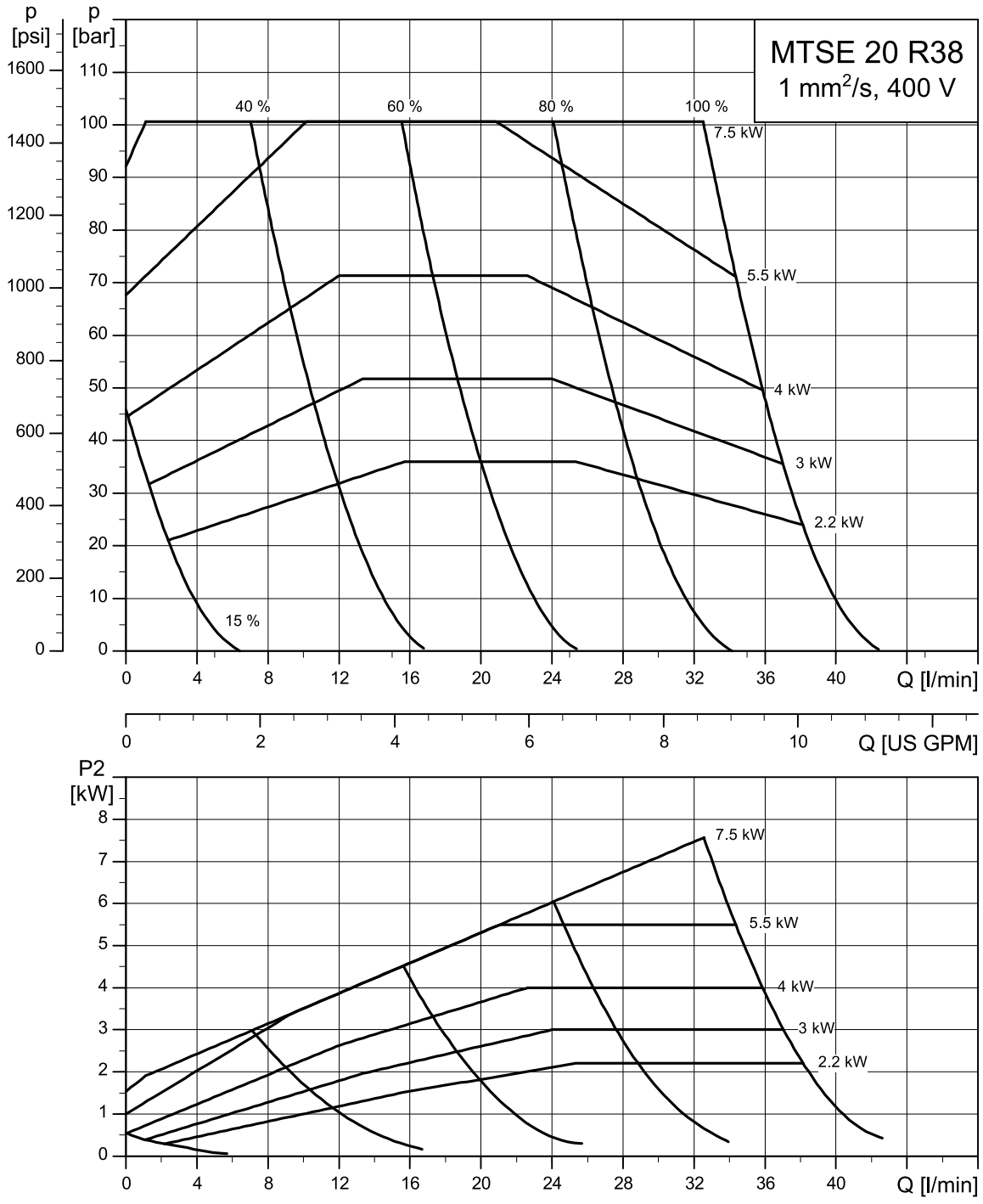
8.7.3 Dimensions and weights

Pump type	P2 [kW]	Dimensions [mm]											Net weight [kg]	
		A		B		C		AC	AD	AG	LL	P	Tank-top	Dry
		Tank-top	Dry	Tank-top	Dry	Tank-top	Dry							
MTSE 20-32 R28	1.5	772	763	230	221	542	542	122	158	268	232	200	32	33
MTSE 20-55 R28	2.2	772	763	230	221	542	542	122	158	268	232	200	33	34
MTSE 20-78 R28	3.0	812	803	230	221	582	582	191	201	291	280	250	40	41
MTSE 20-100 R28	4.0	812	803	230	221	582	582	191	201	291	280	250	42	43
MTSE 20-100 R28	5.5	867	858	230	221	637	637	191	201	291	280	300	52	53

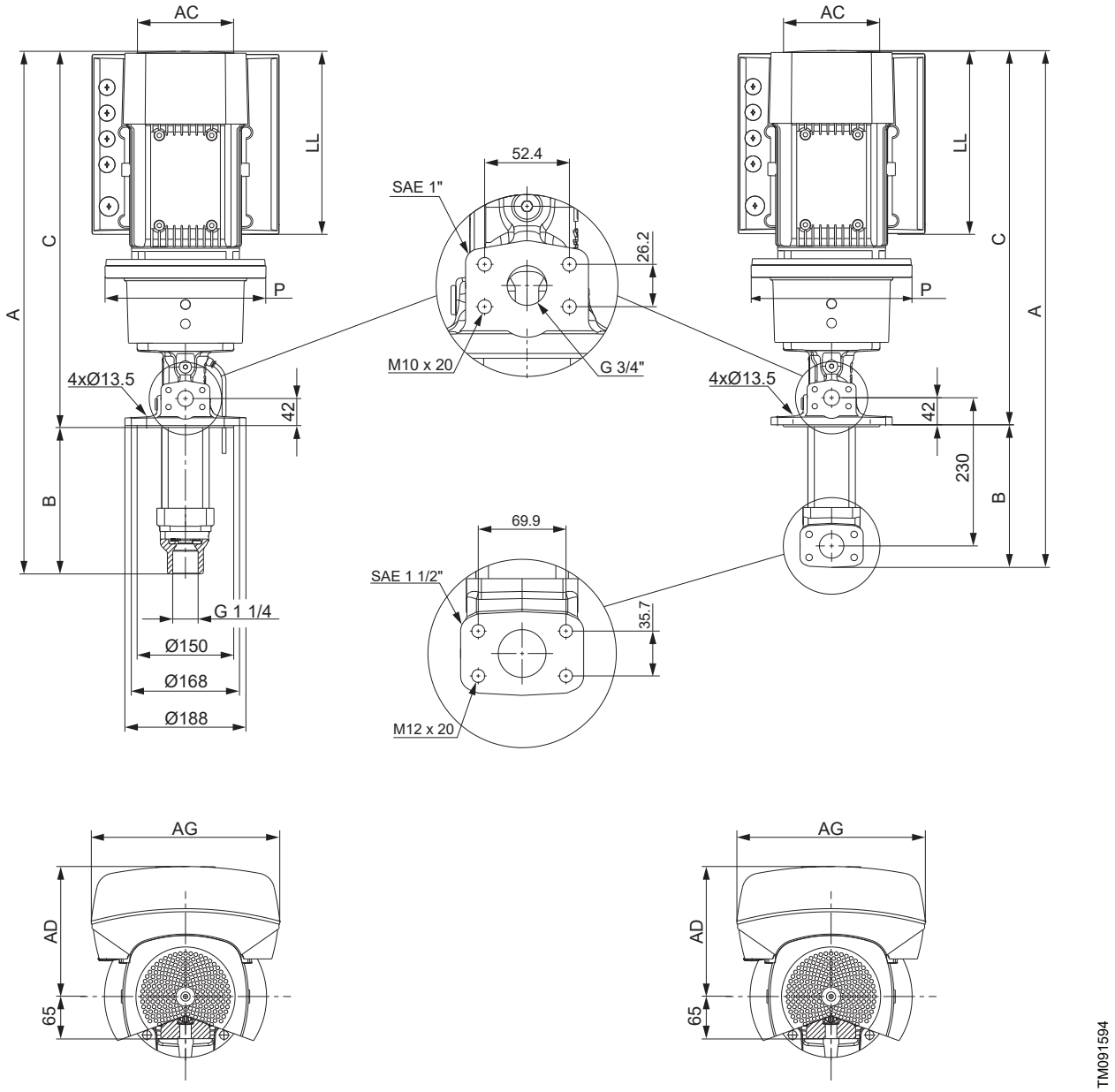
8.8 MTSE 20 R38, 50/60 Hz

8.8.1 Performance range

Performance data at 1 mm²/s (emulsion)



8.8.2 Dimensional sketches



Tank-top installation (left), dry installation (right)

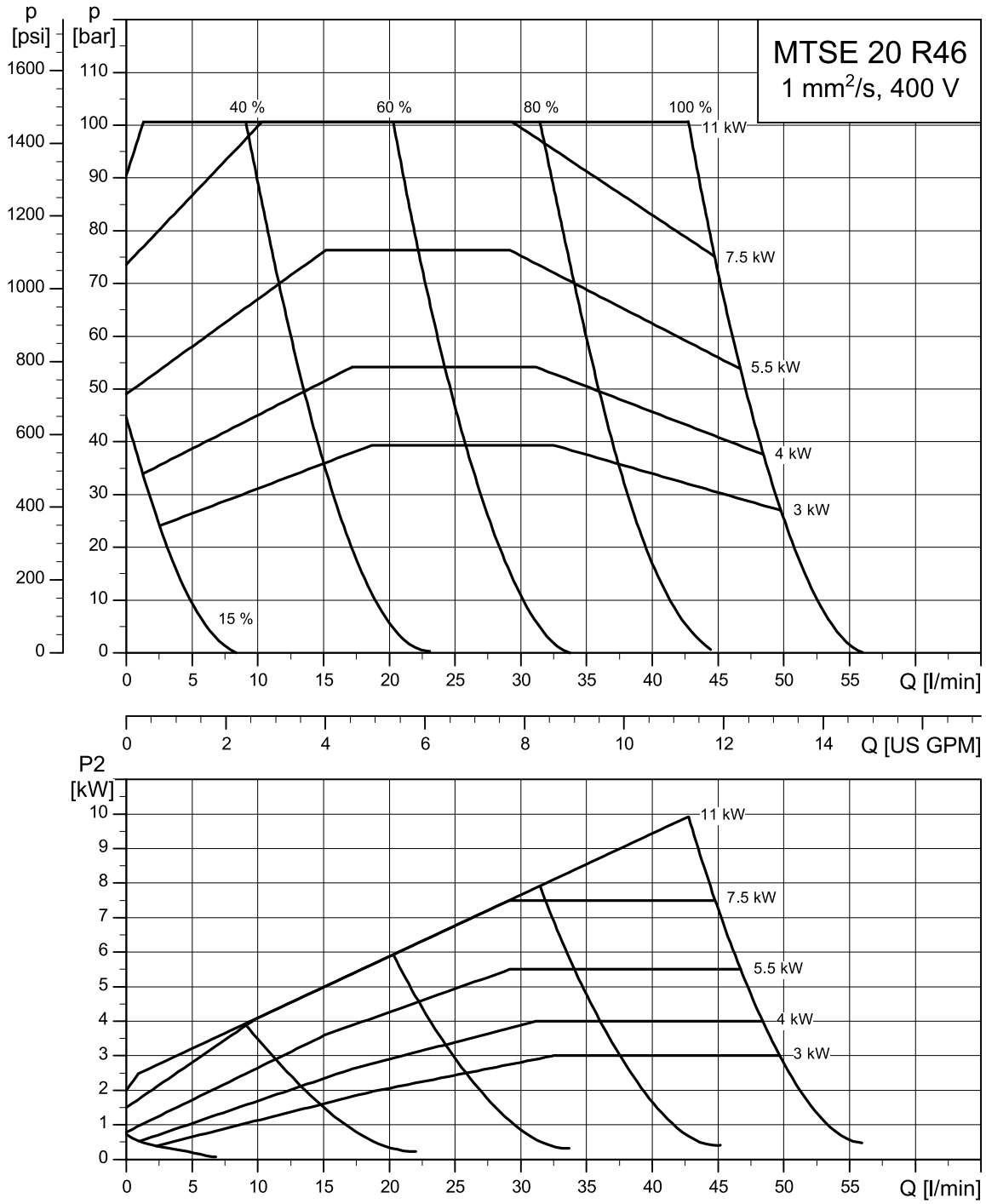
8.8.3 Dimensions and weights

Pump type	P2 [kW]	Dimensions [mm]											Net weight [kg]	
		A		B		C		AC	AD	AG	LL	P	Tank-top	Dry
		Tank-top	Dry	Tank-top	Dry	Tank-top	Dry							
MTSE 20-36 R38	2.2	772	763	230	221	542	542	122	158	268	232	200	33	34
MTSE 20-51 R38	3.0	812	803	230	221	582	582	191	201	291	232	250	40	41
MTSE 20-71 R38	4.0	812	803	230	221	582	582	191	201	291	280	250	42	43
MTSE 20-100 R38	5.5	867	858	230	221	637	637	191	201	291	280	300	52	53
MTSE 20-100 R38	7.5	891	882	230	221	661	661	255	237	346	317	300	58	59

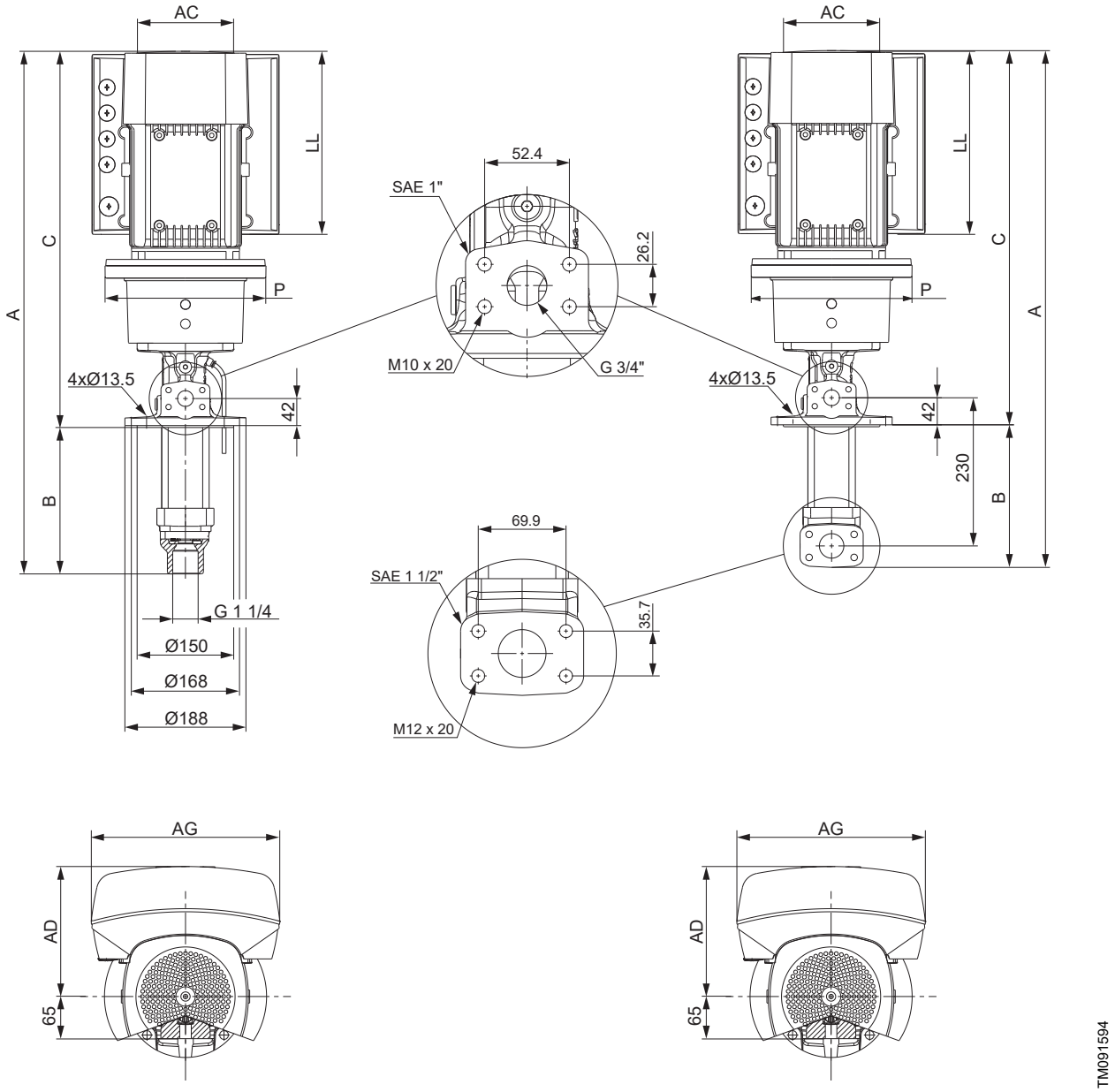
8.9 MTSE 20 R46, 50/60 Hz

8.9.1 Performance range

Performance data at 1 mm²/s (emulsion)



8.9.2 Dimensional sketches



Tank-top installation (left), dry installation (right)

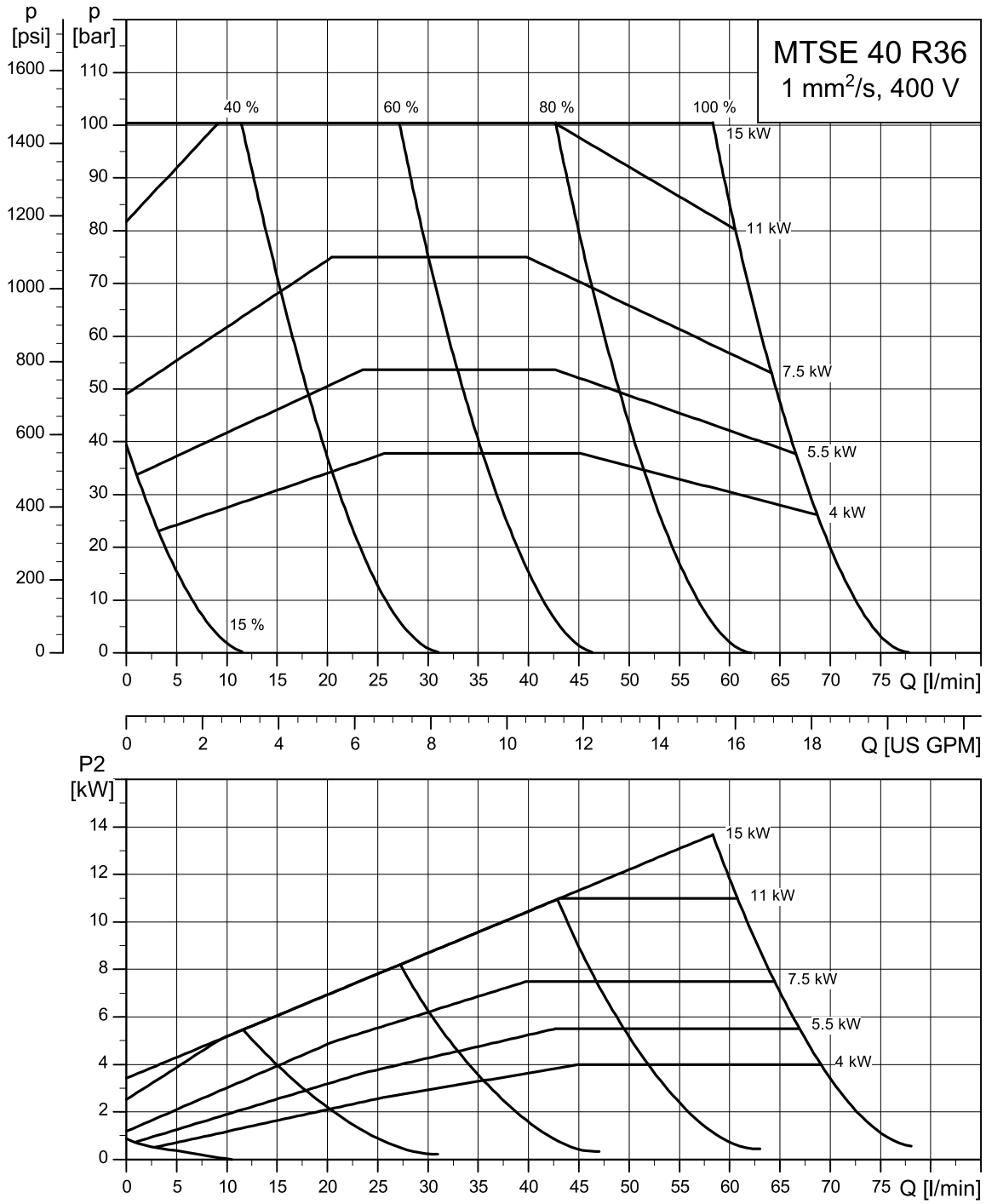
8.9.3 Dimensions and weights

Pump type	P2 [kW]	Dimensions [mm]											Net weight [kg]	
		A		B		C		AC	AD	AG	LL	P	Tank-top	Dry
		Tank-top	Dry	Tank-top	Dry	Tank-top	Dry							
MTSE 20-39 R46	3.0	812	803	230	221	582	582	122	201	291	232	250	40	41
MTSE 20-54 R46	4.0	812	803	230	221	582	582	191	201	291	232	250	42	43
MTSE 20-75 R46	5.5	867	858	230	221	637	637	191	201	291	280	300	52	53
MTSE 20-100 R46	7.5	891	882	230	221	661	661	255	237	346	317	300	58	59
MTSE 20-100 R46	11	952	943	230	221	722	722	255	237	346	317	300	77	78

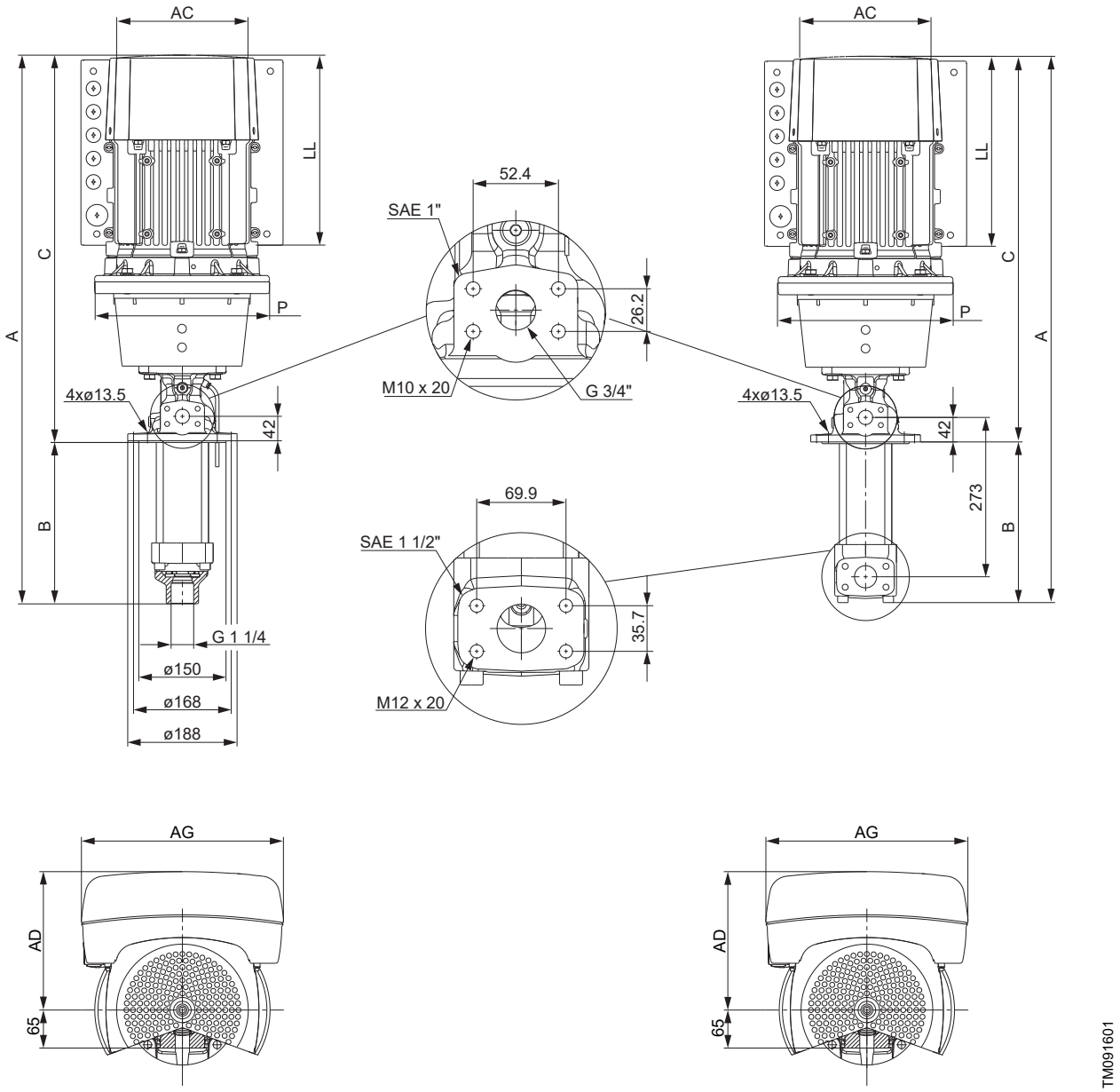
8.10 MTSE 40 R36, 50/60 Hz

8.10.1 Performance range

Performance data at 1 mm²/s (emulsion)



8.10.2 Dimensional sketches



Tank-top installation (left), dry installation (right)

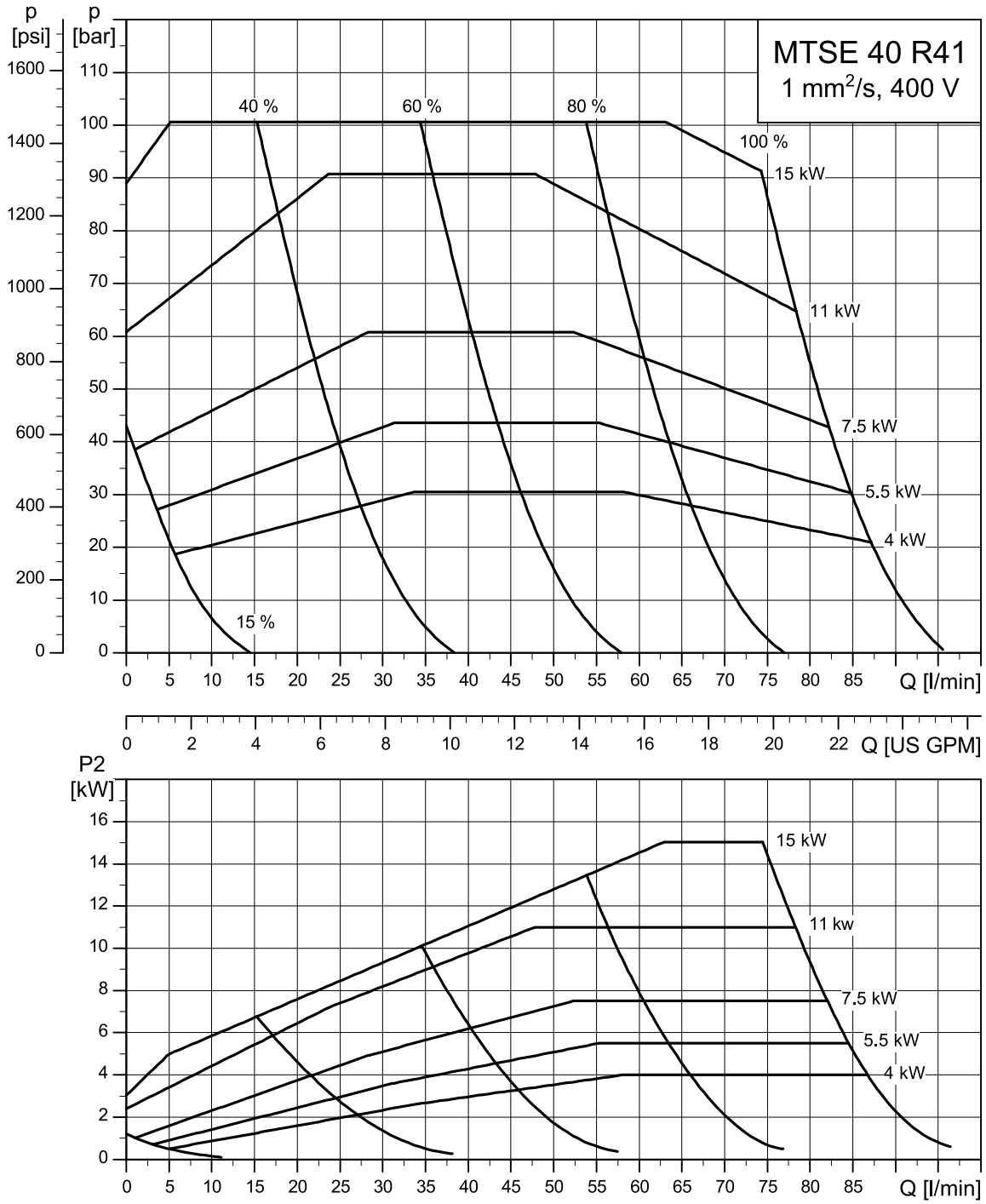
8.10.3 Dimensions and weights

Pump type	P2 [kW]	Dimensions [mm]											Net weight [kg]	
		A		B		C		AC	AD	AG	LL	P	Tank-top	Dry
		Tank-top	Dry	Tank-top	Dry	Tank-top	Dry							
MTSE 40-35 R36	4	862	857	280	275	582	582	191	201	291	280	250	48	50
MTSE 40-50 R36	5.5	917	912	280	275	637	637	191	201	291	280	300	58	59
MTSE 40-74 R36	7.5	941	936	280	275	661	661	255	237	346	317	300	64	65
MTSE 40-96 R36	11	1002	997	280	275	722	722	255	237	346	317	350	82	84
MTSE 40-100 R36	15	1078	1073	280	275	798	798	314	303	420	414	350	107	109

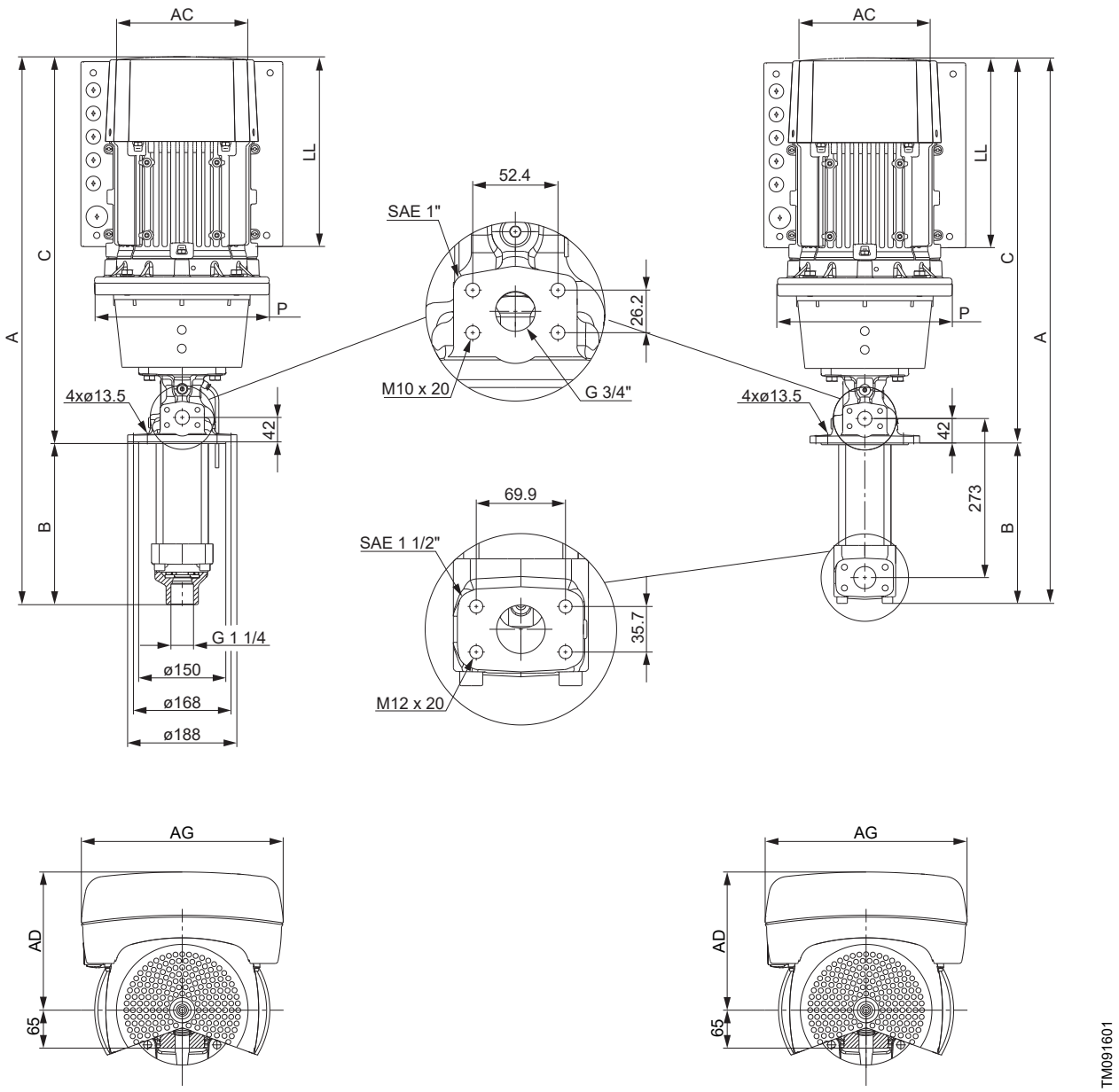
8.11 MTSE 40 R41, 50/60 Hz

8.11.1 Performance range

Performance data at 1 mm²/s (emulsion)



8.11.2 Dimensional sketches



Tank-top installation (left), dry installation (right)

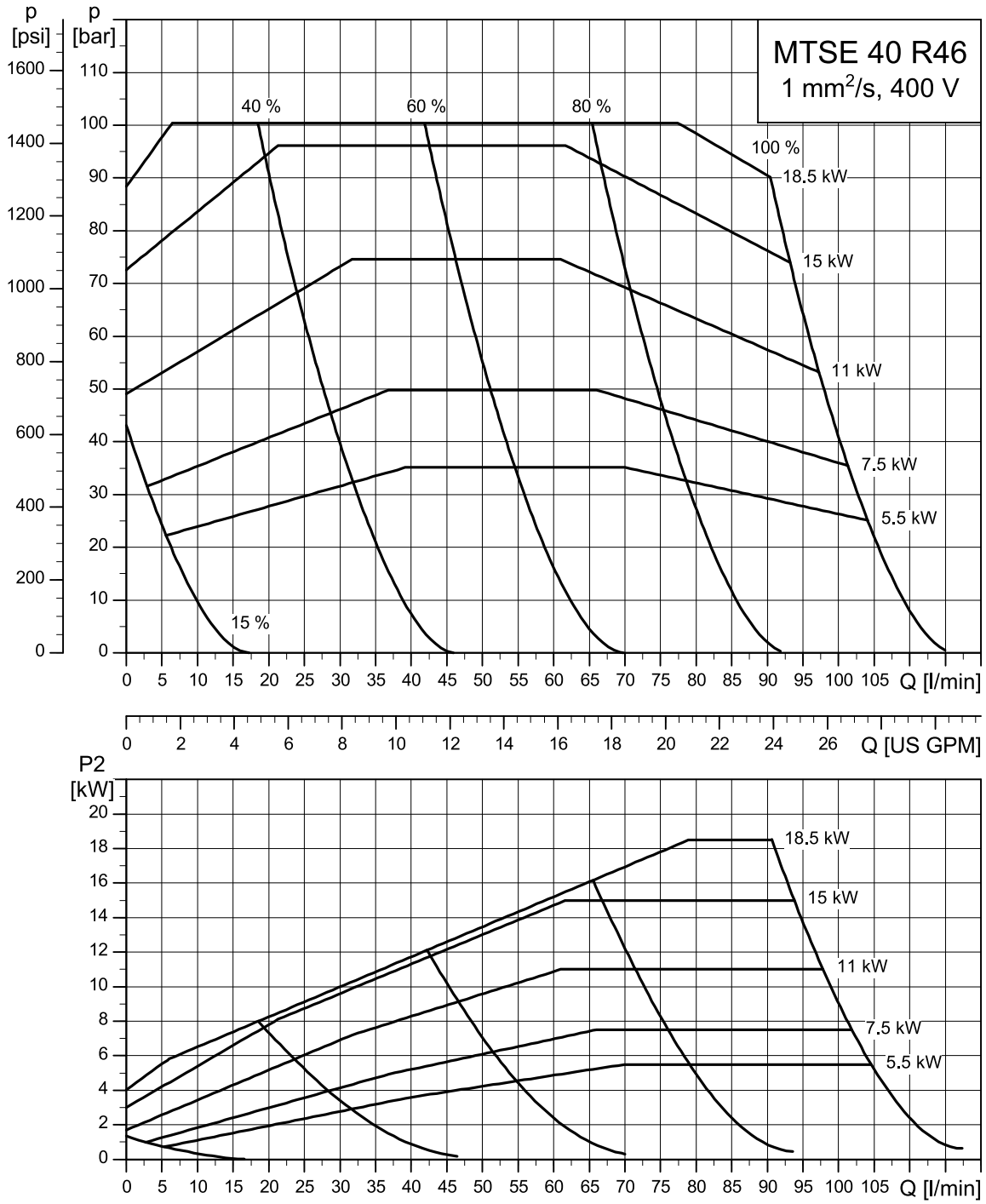
8.11.3 Dimensions and weights

Pump type	P2 [kW]	Dimensions [mm]											Net weight [kg]	
		A		B		C		AC	AD	AG	LL	P		
		Tank-top	Dry	Tank-top	Dry	Tank-top	Dry						Tank-top	Dry
MTSE 40-31 R41	4	862	857	280	275	582	582	191	201	291	280	250	48	50
MTSE 40-44 R41	5.5	917	912	280	275	637	637	191	201	291	280	300	58	59
MTSE 40-61 R41	7.5	941	936	280	275	661	661	255	237	346	317	300	64	65
MTSE 40-91 R41	11	1002	997	280	275	722	722	255	237	346	317	350	82	84
MTSE 40-100 R41	15	1078	1073	280	275	798	798	314	303	420	414	350	107	109

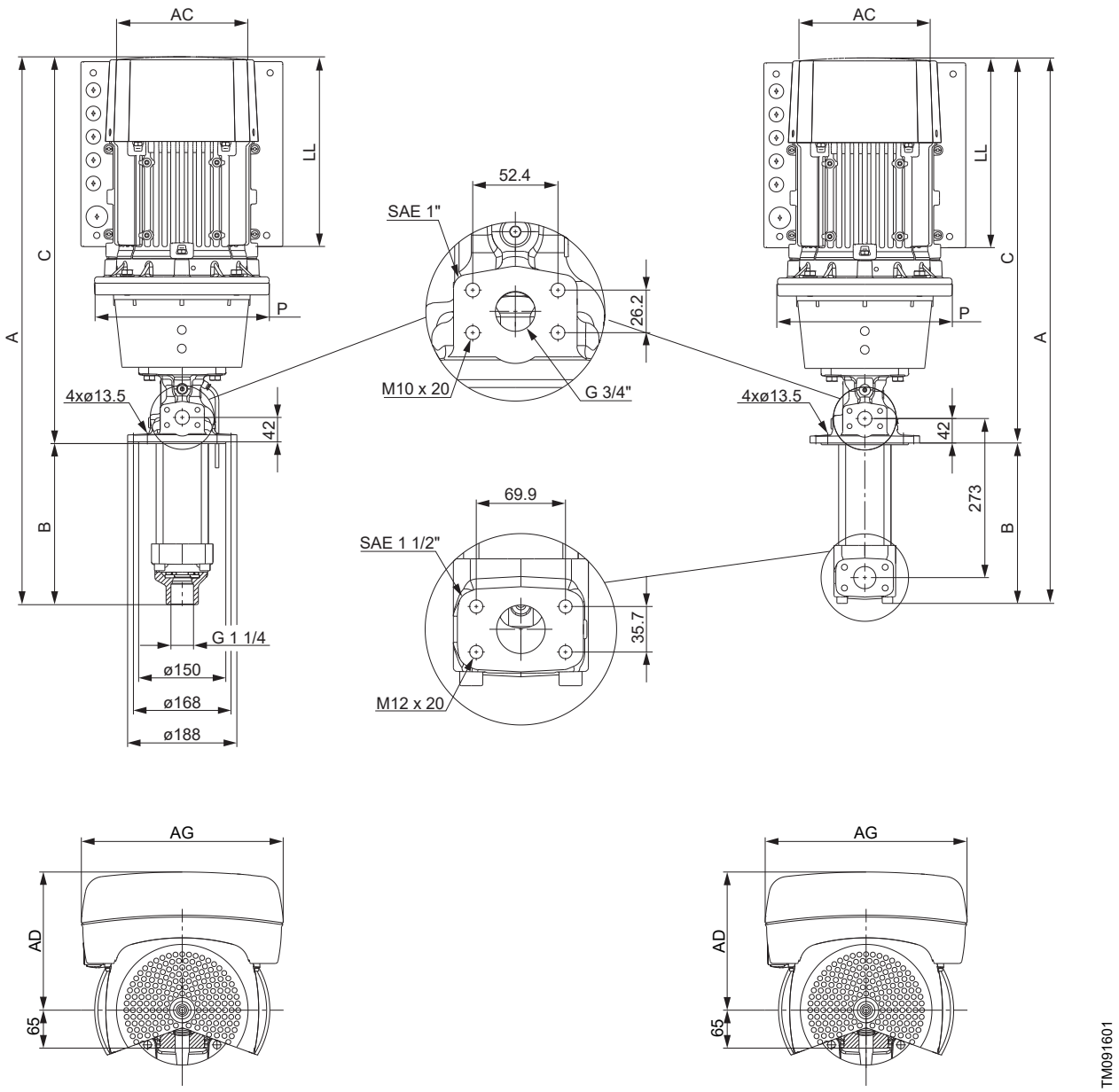
8.12 MTSE 40 R46, 50/60 Hz

8.12.1 Performance range

Performance data at 1 mm²/s (emulsion)



8.12.2 Dimensional sketches



Tank-top installation (left), dry installation (right)

8.12.3 Dimensions and weights

Pump type	P2 [kW]	Dimensions [mm]											Net weight [kg]	
		A		B		C		AC	AD	AG	LL	P		
		Tank-top	Dry	Tank-top	Dry	Tank-top	Dry						Tank-top	Dry
MTSE 40-35 R46	5.5	917	912	280	275	637	637	191	201	291	280	300	58	59
MTSE 40-50 R46	7.5	941	936	280	275	661	661	255	201	346	317	300	64	65
MTSE 40-74 R46	11	1002	997	280	275	722	722	255	237	346	317	350	82	84
MTSE 40-96 R46	15	1078	1073	280	275	798	798	314	237	420	414	350	107	109
MTSE 40-100 R46	18.5	1078	1073	280	275	798	798	314	303	420	414	350	112	113

8.13 NPSH curves for MTS pumps

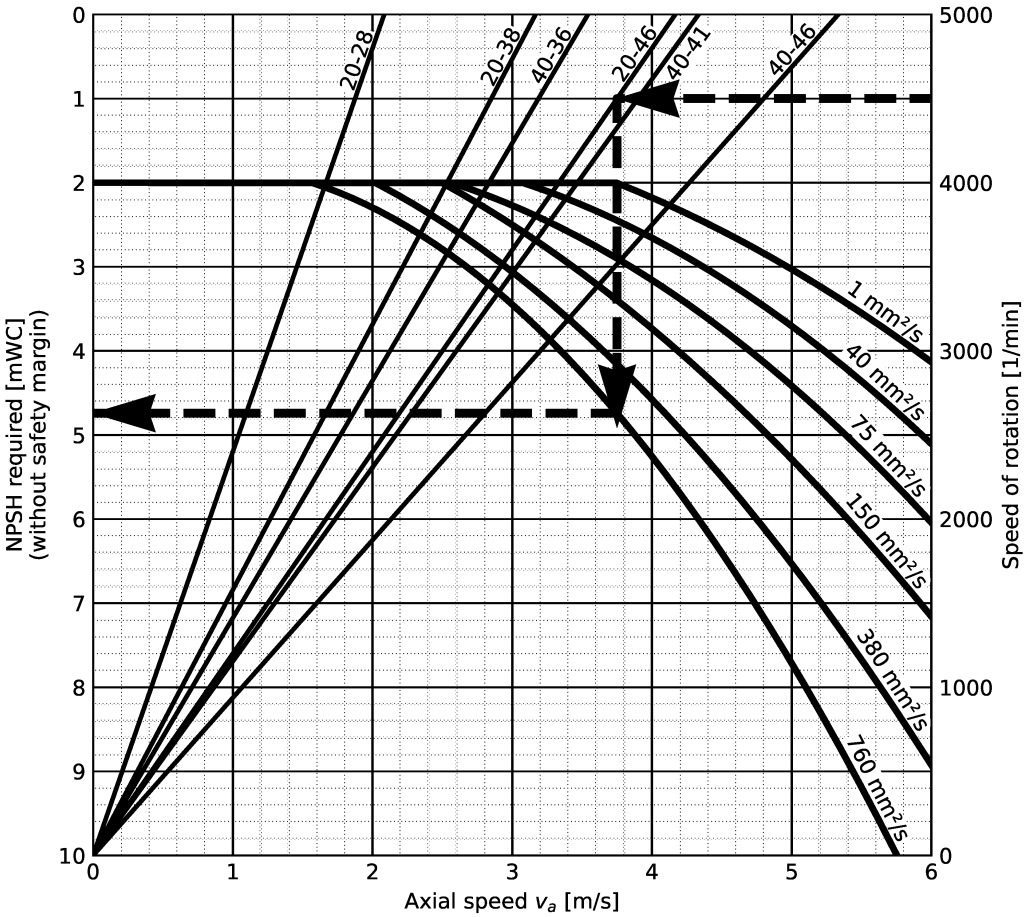
The performance curves refer to liquids without any air enclosed, and show the beginning of aeration. For this reason, a safety margin of 0.5 m must be added to the NPSH value taken from the curve. For liquids with air inclusions or undissolved air, an additional value must be added to the NPSH value derived. When dealing with critical conditions in your plant, always consult Grundfos.

Maximum allowable air content

Emulsion: 10 %

Oil: 7 %

8.13.1 Spindle pitch angle 46 degrees



TM091632

Example for finding the NPSH value for MTS and MTSE 20 R46

Provided data:

Size:	20
Pitch:	46
Speed:	n = 6000 1/min
Viscosity:	v = 380 mm^2/s

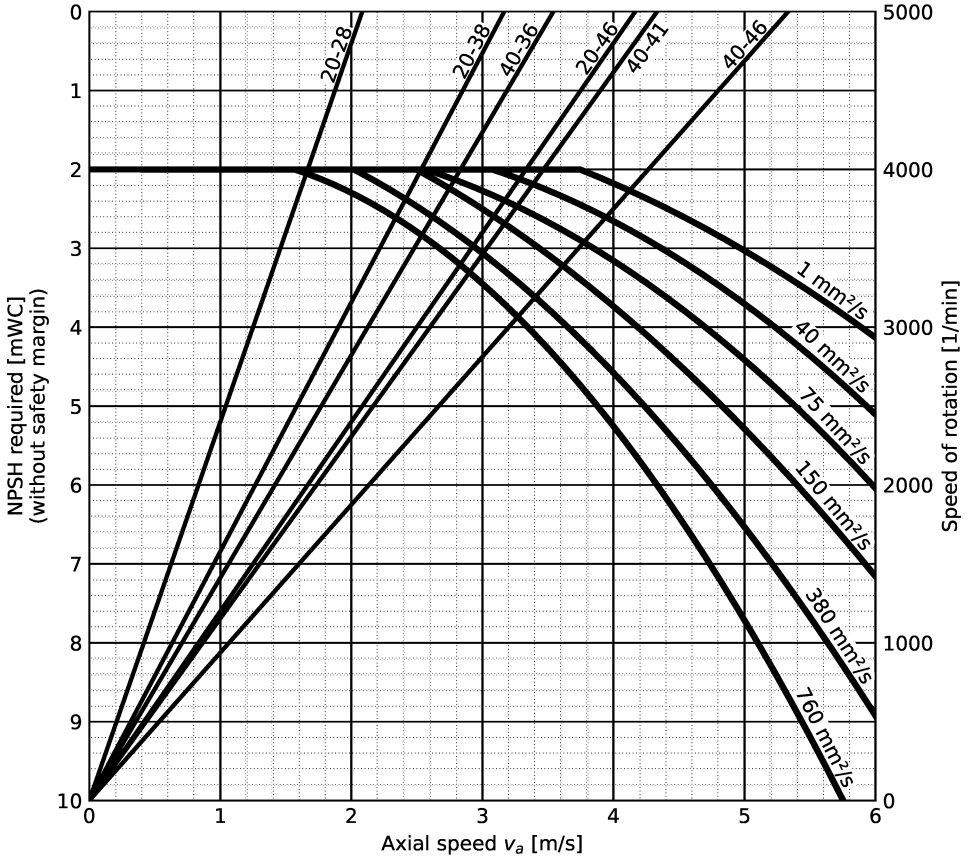
Required:

NPSH value.

Solution:

NPSH taken from 4.7 m WC plus safety margin 0.5 m equals 5.2 m WC.

8.13.2 Spindle pitch angle below 46 degrees



TM091633

9. Motor data

9.1 Mains-operated motors for MTS, 50 Hz

9.1.1 MG motors

TM031711

Motor make	P2 [kW]	Frame size	Phase	Standard voltage [V]	$I_{1/1}$[A]	$\frac{I_{start}}{I_{1/1}}$[%]	Cos $\varphi_{1/1}$	η [%]	Motor efficiency class
Grundfos MG	1.50	90SD	3	3 × 220-240D / 380-415Y	5.70 / 3.30	700-750	0.84 - 0.78	84.2	IE3
Grundfos MG	2.20	90LE			8.00 / 4.60	790-860	0.86 - 0.80	85.9	
Grundfos MG	3.00	100LC			11.0 / 6.30	840-1100	0.87 - 0.82	87.1	
Grundfos MG	4.00	112MC			13.6 / 7.90	1000-1470	0.87	88.1	
Grundfos MG	5.50	132MC			19.0 / 11.0	1080-1480	0.87 - 0.82	89.2	
Grundfos MG	7.50	132SB			25.0 - 24.2 / 14.4 - 14.0	780-1050	0.88 - 0.82	90.1 - 90.4	
Grundfos MG	11.0	160MB			36.0 - 34.5 / 20.8 - 19.8	660-890	0.88 - 0.84	91.2	
Grundfos MG	15.0	160MD			48.5 - 45.0 / 28.0 - 26.0	660-890	0.89 - 0.87	91.9	
Grundfos MG	18.5	160LB			59.5 - 56.5 / 34.5 - 32.5	830-1100	0.89 - 0.85	92.4	
Grundfos MG	22.0	180MB			68.5 / 39.5	830-1040	0.90	92.7	
Grundfos MG	1.50	90SD		3 × 380-415D	3.30	700-750	0.84 - 0.78	84.2	
Grundfos MG	2.20	90LE			4.60	790-860	0.86 - 0.80	85.9	
Grundfos MG	3.00	100LC			6.30	840-1100	0.87 - 0.82	87.1	
Grundfos MG	4.00	112MC			7.90	1000-1470	0.87	88.1	
Grundfos MG	5.50	132SC			11.0	1080-1480	0.87 - 0.82	89.2	
Grundfos MG	7.50	132SB		3 × 380-415D / 660-690Y	14.4 - 14.0 / 8.30 - 8.10	780-1050	0.88 - 0.86	90.4	
Grundfos MG	11.0	160MB			20.8 - 19.8 / 12.0 - 11.8	660-890	0.88 - 0.84	91.2	
Grundfos MG	15.0	160MD			28.0 - 26.0 / 16.2 - 15.6	660-890	0.89 - 0.87	91.9	
Grundfos MG	18.5	160LB			34.5 - 32.5 / 20.0 - 18.8	830-1100	0.89 - 0.85	92.4	
Grundfos MG	22.0	180MB			39.5 / 22.8	830-1040	0.90	92.7	

Motor make	P2 [kW]	Frame size	Phase	Standard voltage [V]	$I_{1/1}$[A]	$\frac{I_{start}}{I_{1/1}}$[%]	Cos φ 1/1	η [%]	Motor efficiency class
Grundfos MG	1.50	90SE	3	3 × 200-220D / 346-380Y	6.00 - 5.85 / 3.45 - 3.40	880-990	0.86 - 0.80	84.2	IE3
Grundfos MG	2.20	90LE			8.95 - 9.10 / 5.15 - 5.25	880-950	0.84 - 0.76	85.9	
Grundfos MG	3.00	100LC			11.6 - 11.6 / 6.65 - 6.65	1130-1270	0.85 - 0.77	87.1	
Grundfos MG	4.00	112MC			14.6 - 14.0 / 8.50 - 8.10	1040-1220	0.88 - 0.84	88.1	
Grundfos MG	5.50	132SC			21 / 12.2	1080-1180	0.87 - 0.82	89.2	
Grundfos MG	7.50	132SB			29 - 32 / 16.8 - 18.2	910-930	0.82 - 0.69	90.1	
Grundfos MMG-E	11.0	160MA		3 × 200DD / 400D	40.1 / 19.9	740-740	0.86	93.1	
Grundfos MMG-E	15.0	160MB			53.5 / 26.8	700-700	0.87	92.9	
Grundfos MMG-E	18.5	160L			67.7 / 33.9	710-710	0.87	93.2	
Grundfos MMG-E	22.0	180M			74.6 / 37.5	880-880	0.90	93	

Motor make	P2 [kW]	Frame size	Phrase	Standard voltage [V]	$I_{1/1}$[A]	$\frac{I_{start}}{I_{1/1}}$[%]	Cos φ 1/1	η [%]	Motor efficiency class
Grundfos MG	1.50	90SE	3	3 × 220-230D / 380-400Y	5.70 / 3.30	950-990	0.82 - 0.78	86.5	IE4
Grundfos MG	2.20	90LG			7.85 / 4.55	970-1020	0.85 - 0.82	88	
Grundfos MG	3.00	100LE			10.6 / 6.10	1130-1140	0.86 - 0.84	89.1	
Grundfos MG	4.00	112MD			13.6 / 7.80	1130-1190	0.90 - 0.88	90	
Grundfos MG	5.50	132SB			19.4 / 11.2	950-1010	0.84 - 0.81	90.9	
Grundfos MG	7.50	132SE			25.5 / 14.8	1020-1080	0.86 - 0.84	91.7	
Grundfos MG	2.20	90LG		3 × 380-400D / 660-690Y	4.55 / 2.60	970-1020	0.85 - 0.82	88	
Grundfos MG	3.00	100LE			6.10 / 3.55	1130-1140	0.86 - 0.84	89.1	
Grundfos MG	4.00	112MD			7.80 / 4.50	1130-1190	0.90 - 0.88	90	
Grundfos MG	5.50	132SB			11.2 / 6.50	950-1010	0.84 - 0.81	90.9	
Grundfos MG	7.50	132SE			14.8 / 8.50	1020-1080	0-86 - 0.84	91.7	
Grundfos MG	11.0	160MD			21.4 / 12.4	950-1000	0.86 - 0.84	92.6	
Grundfos MG	15.0	160LB			29.5 / 16.8	1040-1130	0.86 - 0.83	93.3	
Grundfos MG	18.5	160LC			37.0 / 21.4	1160-1190	0.84 - 0.79	93.7	

Related information

2.2 Motors for MTS pumps

9.2 Mains-operated motors for MTS, 60 Hz

9.2.1 MG motors

TM031711

Motor make	P2 [kW]	Frame size	Phase	Standard voltage [V]	$I_{1/1}$[A]	$\frac{I_{start}}{I_{1/1}}$[%]	Cos φ 1/1	η [%]	Motor efficiency class
Grundfos MG	1.50	90SD	3	3 × 230-277D / 400-480Y	5.30 - 5.00 / 3.5 - 2.90	730-900	0.85 - 0.75	85.5	IE3
Grundfos MG	2.2	90LE		3 × 230-277D / 400-480Y	7.50 - 6.95 / 4.30 - 4.00	820-1050	0.88 - 0.80	86.5	
Grundfos MG	3	100LC		3 × 230-277D / 400-480Y	10.5 - 9.35 / 6.00 - 5.40	910-1100	0.90 - 0.84	88.5	
Grundfos MG	4	112MC		3 × 230-277D / 380-480Y	13.6 - 11.8 / 7.80 - 6.80	1000-1470	0.91 - 0.82	88.5	
Grundfos MG	5.5	132SC		3 × 230-277D / 380-480Y	18.4 - 16.2 / 10.6 - 9.30	1020-1480	0.90 - 0.80	89.5	
Grundfos MG	7.5	132SB		3 × 230-277D / 380-480Y	24.6 - 20.8 / 14.2 - 12.0	680-1050	0.90 - 0.82	90.2	
Grundfos MG	11	160MB		3 ×230-277D / 400-480Y	34.8 - 30.0 / 20.1 - 17.2	580-890	0.88 - 0.83	91.0	
Grundfos MG	15	160MD		3 ×230-277D / 400-480Y	46.6 - 39.0 / 26.9 - 22.4	640-890	0.89 - 0.86	91.0	
Grundfos MG	18.5	160LB		3 ×230-277D / 380-480Y	59.5 - 48.5 / 34.5 - 28.0	670-1100	0.89 - 0.84	92.4	
Grundfos MG	22	180MB		3 × 230-277D / 380-480Y	69.5 - 56.5 / 40.0 - 32.5	650-1040	0.91	91.7	

Motor make	P2 [kW]	Frame size	Phase	Standard voltage [V]	$I_{1/1}$[A]	$\frac{I_{start}}{I_{1/1}}$[%]	Cos φ 1/1	η [%]	Motor efficiency class
Grundfos MG	1.50	90SE	3	3 × 200-220D / 346-380Y	5.80 - 5.40 / 3.35 - 3.10	800-940	0.89 - 0.86	85.5	IE3
Grundfos MG	2.20	90LE			8.60 - 8.00 / 5.00 - 4.60	770-910	0.89 - 0.85	86.5	
Grundfos MG	3.00	100LC			11.4 - 10.4 / 6.55 - 6	990-1230	0.88 - 0.86	88.5	
Grundfos MG	4.00	112MC			14.6 - 13.0 / 8.45 - 7.45	890-1190	0.90 - 0.87	88.5	
Grundfos MG	5.50	132SC			20.2 - 18.8 / 11.7 - 10.8	1020-1480	0.90 - 0.85	89.5	
Grundfos MG	7.50	132SB			26.5 - 25 / 15.4 - 14.4	830-1050	0.89 - 0.82	90.2	
Grundfos MMG-E	11.0	160MA		3 × 200-220DD / 400-440D	39.2 - 35.9 / 19.5 - 17.8	650-790	0.88 - 0.87	92.5 - 93.2	
Grundfos MMG-E	15.0	160MB			53.1 - 48.3 / 26.6 - 24.2	620-780	0.89 - 0.88	92.5 - 92.4	
Grundfos MMG-E	18.5	160L			65.3 - 60.2 / 32.8 - 30.2	620-860	0.89 - 0.81	93 - 94.5	
Grundfos MMG-E	22.0	180M			75.2 - 68.7 / 38.0 - 34.5	790-980	0.91 - 0.89	92.3 - 94.2	

9.3 Mains-operated motors for MTSE, 50/60 Hz

9.3.1 MGE motors

TM085711

MGE 380-500 V

Motor make	P2 [kW]	Frame size	Phase	Standard voltage [V]	$I_{1/1}$ [A]	Cos φ 1/1	η [%]	Motor efficiency class
Grundfos MGE	1.5	90	3	380-500	2.9 - 2.4	0.92 - 0.85	88.9	IE5
	2.2	90		380-500	4.15 - 3.4	0.93 - 0.87	90.1	
	3.0	100		380-500	5.8 - 4.8	0.91 - 0.86	90.7	
	4.0	112		380-500	7.6 - 6.2	0.92 - 0.87	92.2	
	5.5	132		380-500	10.3 - 8.2	0.92 - 0.88	92.7	
	7.5	132		380-500	14.1 - 11.2	0.93 - 0.89	92.5	
	11.0	160		380-500	20.3 - 16.0	0.93 - 0.90	93.1	
	15.0	160		380-500	26.7 - 22.0	0.94 - 0.92	92.8	
	18.5	160		380-500	33.0 - 27.8	0.94 - 0.92	92.8	
	22.0	160		380-500	39.2 - 31.5	0.94 - 0.93	92.9	

MGE 200-240 V

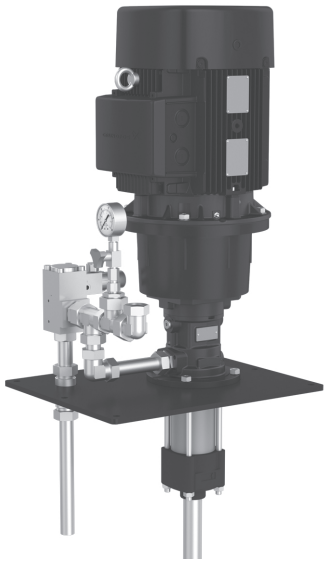
Motor make	P2 [kW]	Frame size	Phase	Standard voltage [V]	$I_{1/1}$ [A]	Cos φ 1/1	η [%]	Motor efficiency class
Grundfos MGE	2.2	100	3	200-240	7.8 - 6.5	0.94	88.8	IE5
	3	100		200-240	10.5 - 8.8	0.94	90.3	
	4	112		200-240	14.1 - 11.8	0.94	90.8	
	5.5	132		200-240	19.6 - 16.3	0.94	90.2	
	7.5	160		200-240	25.6 - 21.4	0.95 - 0.94	90.8	
	11	160		200-240	37.4 - 31.4	0.95 - 0.94	92	

10. System solutions

10.1 MTS pump system

10.1.1 MTS pump system

The assembled MTS pump system consists of an MTS screw pump, a mounting plate, a pressure-relief valve, and pipes.



TM054422

10.1.2 Fully integrated all-in-one system

All components, including valves, are preassembled to meet customer specifications. For more information about valves, see the section on pressure-relief valves.

Related information

11.5 Pressure-relief valves

10.1.3 Pump design

The pumps are screw pumps designed for pumping cooling lubricants and cutting oils for machine tool applications.

10.1.4 Long lifetime

Service life is extended through the use of PVD-coated, highly wear-resistant spindles in combination with a specially hardened rotor housing.

10.1.5 High-efficiency motor

IE3 motors are standard, and MTSE with IE5 motors are optional.

10.1.6 Economical pump operation

- High pump efficiency (above 80 %)
- low heat transfer into the coolant system
- low cooling requirements.

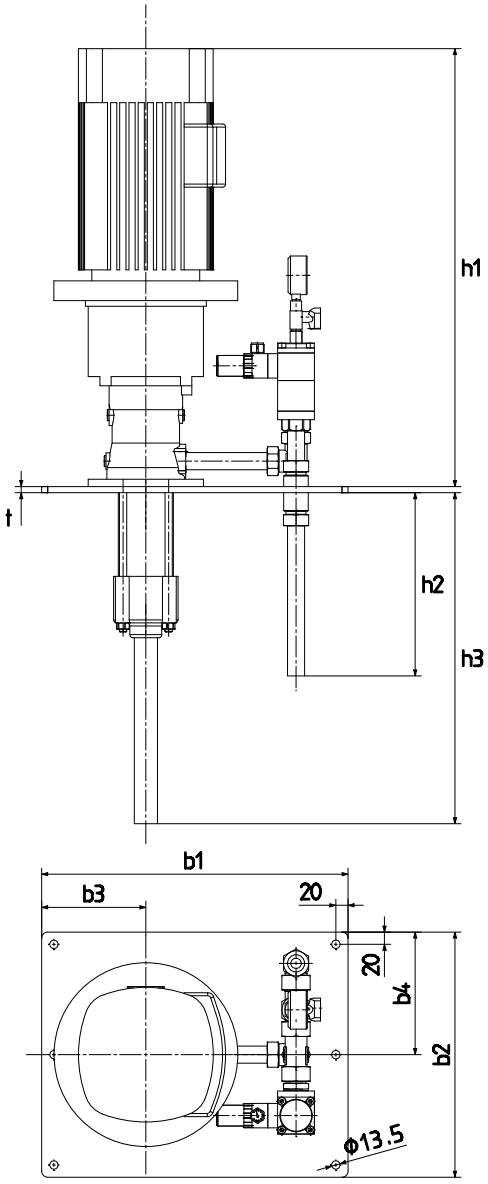
10.1.7 Wide pump range

- Seven pump sizes
- 16 versions.

10.1.8 Noiseless

The design of MTS allows gentle, pulsation-free and low-noise pumping.

10.1.9 Dimensional sketches



TM054423

10.1.10 Dimensions

Pump type	Dimensions [mm]				
	t	h2	b1	b2	b3
MTS 20	10	250	500	400	170
MTS 40	10	290	500	400	170

For the **h1** dimension, see the section on technical data.
The **h3** dimension depends on the pipe length.

Related information

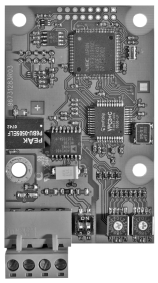
8.3.3 Dimensions and weights
8.3 MTS 20, 50 Hz
8.4.3 Dimensions and weights

10.1.11 Customization

The pump system can be customized to meet specific requirements. Contact Grundfos for further information.

11. Accessories

11.1 CIM (Communication Interface Modules)



Grundfos CIM (Communication Interface Module)

The CIM enables communication of operating data, such as measured values and setpoints, between the pumps and a building management system. The CIM devices are add-on communication modules that are fitted in the terminal box of the pumps.

Note that the CIM must be fitted by authorized persons.

We offer the following CIM devices:

CIM 100

For communication via LONWorks

CIM 150

For communication via PROFIBUS DP

CIM 200

For communication via Modbus RTU

CIM 300

For communication via BACnet MS/TP

CIM 500

Ethernet module for communication via PROFINET, Modbus TCP, BACnet IP, EtherNet/IP GRM IP, Grundfos iSOLUTIONS Cloud.

Available CIM devices

Description	Fieldbus protocol	Product number
CIM 100	LONWorks	96824797
CIM 150	PROFIBUS DP	96824793
CIM 200	Modbus RTU	96824796
CIM 300	BACnet MS/TP	96893770
CIM 500	Ethernet	98301408
Antenna (puc)	3G/4G	99518079

For further information about data communication via CIM and fieldbus protocols, see the CIM documentation available at the Grundfos Product Center at www.grundfos.com.

Related information

7.2.1.4 Central management system

11.2 Remote controls

11.2.1 Grundfos GO

Use the Grundfos GO for the following types of wireless communication with the pump:

- infrared
- radio
- Bluetooth.

11.2.2 Infrared and radio communication

The following motors connect to the pump through wireless infrared or radio communication:

- MGE 1.5 to 2.2 kW.

11.2.2.1 MI 301

The MI 301 is a module with built-in infrared and radio communication. It is required for the Grundfos GO communication. The MI 301 can be used together with Android or iOS-based smart devices with a Bluetooth connection. It has a rechargeable Li-ion battery that must be charged separately.

TM053890

MI 301

The following are supplied with the product:

- Grundfos MI 301
- sleeve
- battery charger
- quick guide.

11.2.2.2 Product numbers

Grundfos GO variant	Product number
Grundfos MI 301	98046408

11.2.3 Bluetooth communication

The following motors connect to the pump through Bluetooth communication:

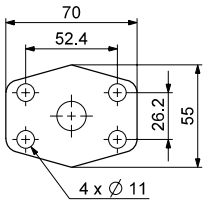
- MGE 3 to 11 kW.

Related information

7.2.2.4 Bluetooth

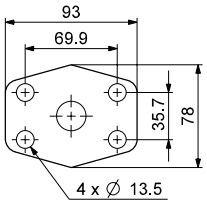
11.3 Counterflanges for outlet port

A set consists of one counterflange, one O-ring, bolts and lock washers.

SAE flange	Pump type	SAE size	Description	Rated pressure	Pipe connection	Product number
 TM041963	MTS 20 MTS 40	1"	Threaded For welding	345 bar 160 bar	G1 25 mm, nominal	96397165 96397171

11.4 Counterflanges for inlet port (only D8.6)

A set consists of one counterflange, one O-ring, bolts and lock washers.

SAE flange	Pump type	SAE size	Description	Rated pressure	Pipe connection	Product number
 TM041964	MTS 20 MTS 40	1 1/2"	Threaded For welding	207 bar 16 bar	G1 1/2 38 mm, nominal	96397166 96397176

11.5 Pressure-relief valves

Screw spindle pumps are positive-displacement pumps that must be pressure-controlled to protect the motor and pipe system. The pumped liquid which is not needed is returned to the tank via the pressure-relief valve. Selection of valves depends on the following factors:

- required pressure, flow rate and viscosity of the pumped liquid
- required valve adjustability or control.

The pressure-relief valves below are especially designed for use in coolant applications.

Type	Description	Product number		
H	Manually operated, continuously adjustable pressure-relief valve: • The valve working pressure can be adjusted by a hand wheel.	98784405		TM054391
P	Manually operated, continuously adjustable pressure-relief valve with air pilot valve and solenoid valve for pressureless circulation: • The valve working pressure can be adjusted by a hand wheel. • Circulation with minimized pressure can be electrically activated. The valve is open at zero current and pressure.	98784432		TM054390
E	Electrically controlled, continuously adjustable pressure-relief valve with proportional solenoid air pilot valve: • The vario valve type enables setting any pressure from 5 to 120 bar. For pressure regulation, the machine control sends an analogue signal (0-10 V). The pneumatic control pressure is changed in proportion to the analogue signal, and regulates the working pressure. • The valve is open in case of power loss or loss of pressure.	98784436		TM054392
-	Manually operated safety valve: • The valve working pressure can be adjusted by a hexagon key.	98659731		

Related information

10.1.2 Fully integrated all-in-one system

12. Grundfos Product Center

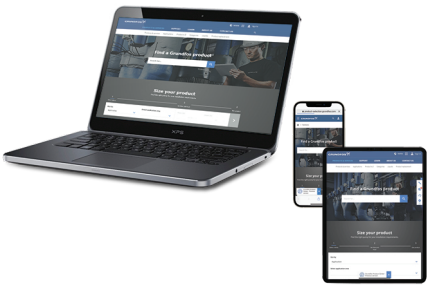
Online search and sizing tool to help you make the right choice.
From the international view, you can select your specific country to view the product range available to you.
International view: *http://product-selection.grundfos.com*

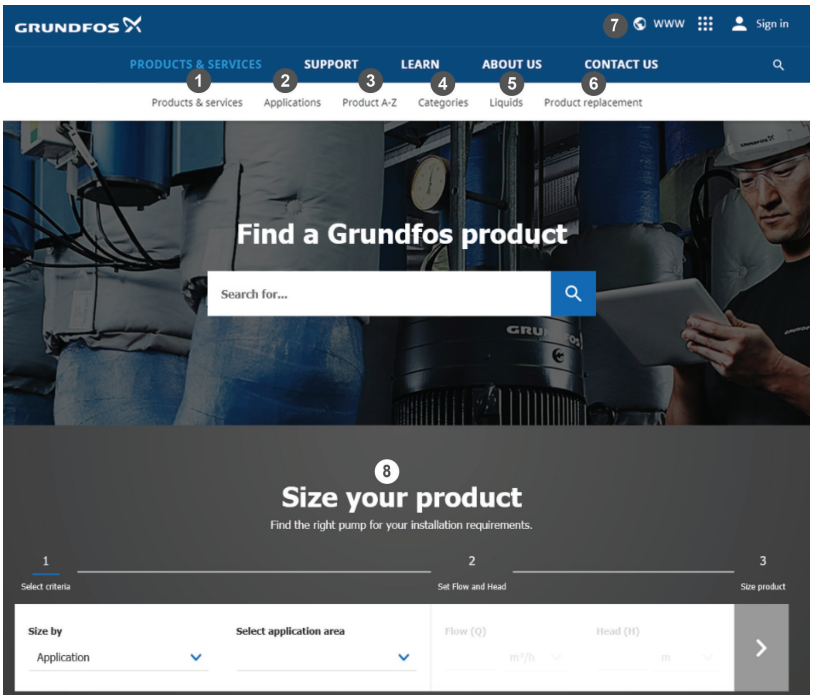
All the information you need in one place

Performance curves, technical specifications, pictures, dimensional drawings, motor curves, wiring diagrams, spare parts, service kits, 3D drawings, documents, system parts. The Product Center displays any recent and saved items - including complete projects - right on the main page.

Downloads

On the product pages, you can download installation and operating instructions, data booklets, service instructions, etc., in PDF format.





TM072383-1

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Example: *https://product-selection.grundfos.com/uk*

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3	**Products A-Z** enables you to look through a list of all the Grundfos products.
4	**Categories** enables you to look for a product category.
5	**Liquids** enables you to find pumps designed for aggressive, flammable or other special liquids.
6	**Product replacement** enables you to find a suitable replacement.
7	**WWW** enables you to select the country, which changes the language, the available product range and the structure of the website.
8	**Sizing** enables you to size a product based on your application and operating conditions.

Related information

2.3 Motors for MTSE pumps
7.2.1.4 Central management system

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