MTHE

Tank top mounted E-pumps

GRUNDFOS

Table of contents

1. Introduction 3

2. Features and benefits 4

3. Performance range 5

4. The MTHE product range data 6

5. Motor for the MTHE pump 7
Integrated drives 7
Robustness of the MGE motor 7
Functional modules of the MTHE pumps 8

6. Control of the MTHE pumps 9
Control options 9

7. Construction of the MTHE pumps 11

8. Performance curves and technical data . . . 12
MTHE 1s 12
MTHE 1 14
MTHE 3 16
MTHE 5 18

9. Accessories 20
Sensors 20
Grundfos GO 21
CIM (communication interface modules) 21

10. Multi-packaging for the MTHE pumps 22

11. Grundfos Product Center 23

12. Document quality feedback 24

1. Introduction

The MTHE range with the pump, motor and drive in one unit is a compact solution that makes installation easy.

The pumps are designed to be mounted on top of tanks with the chamber stack immersed in the pumped liquid.

The pumps come in various sizes and have various numbers of stages to provide the flow rate, pressure and installation length required. To meet specific depths of tanks or containers, the immersed length of the pump can be varied using empty chambers.

The pumps are available in two material versions:

- standard range (A-version) with wetted parts of cast iron and stainless steel
- stainless steel version (I-version) with all wetted parts of stainless steel EN/DIN 1.4301 or better.

The MTHE range is ideal for machine tool, wash and clean, and chiller applications. It is an all-in-one solution with pump, motor, and integrated frequency converter, packed with intelligent features that make installation, operation and service effective, and performance efficient and reliable.

The compact, integrated design comes with one drive for use worldwide, and complies with all international standards.

TM085445

MTHE, A-version

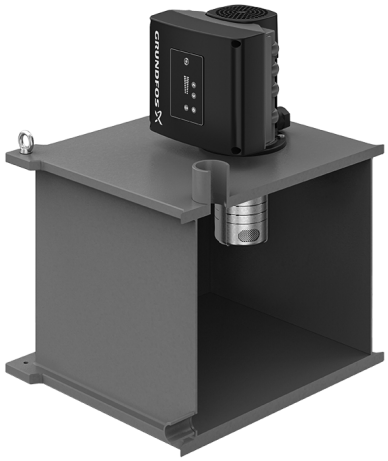
TM085441

MTHE, I-version

2. Features and benefits

The pump is compact:

- The pump-end is inside the tank.
- It is close-coupled, there is no coupling.
- There is only one pipe connection.
- Speed is increased, size is decreased.



TM085452

Mounting the pump on a tank

The pump is leakage-free because any potential leakage from the shaft seal stays in the tank.

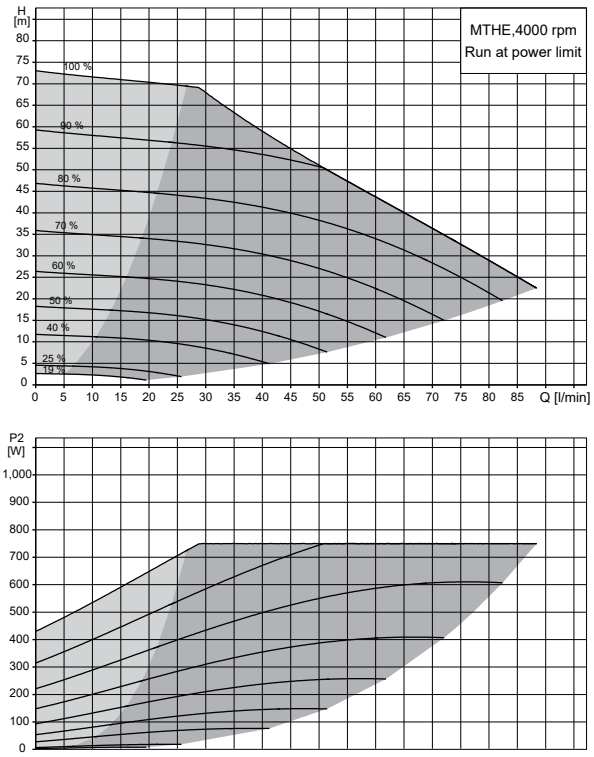
TM085453

Leakage-free pump

The pump is energy efficient:

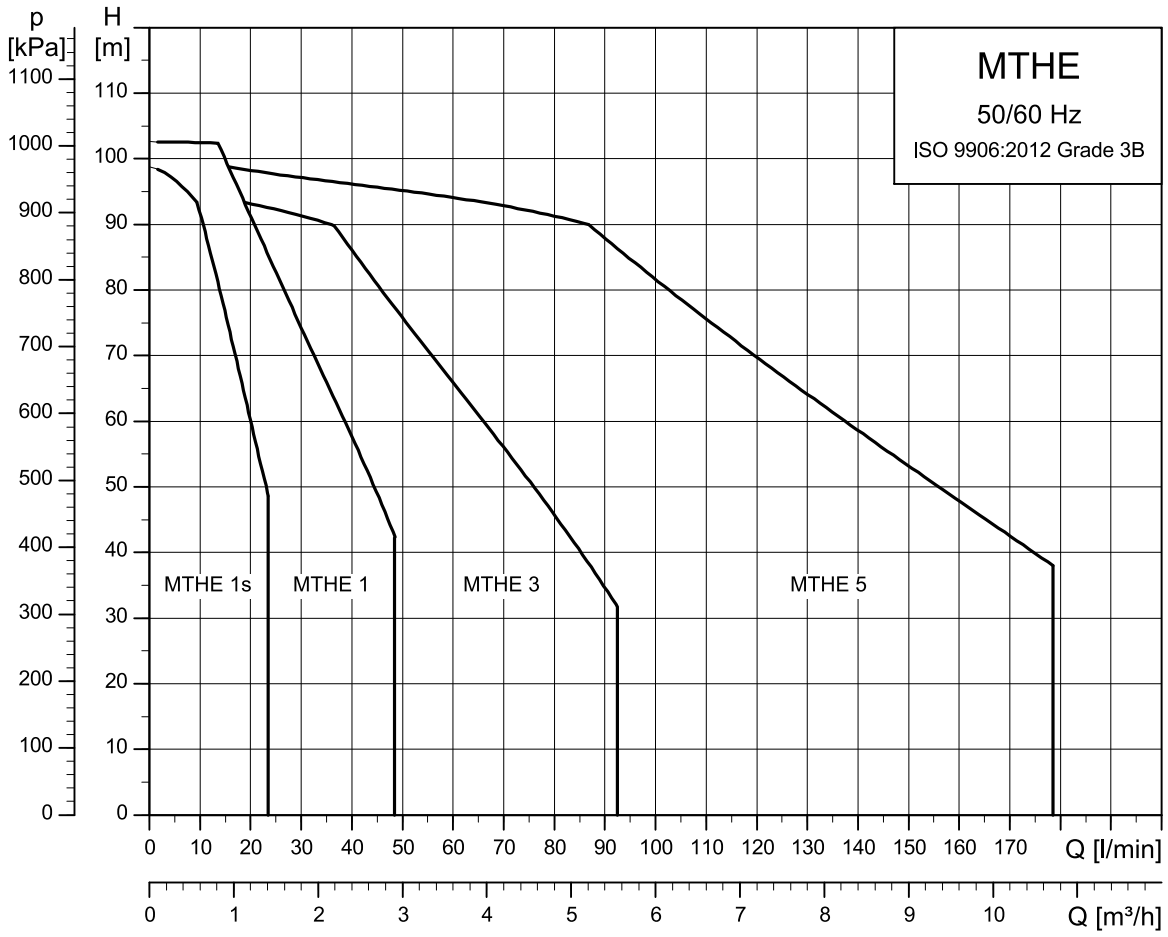
- It has the best-in-class hydraulics.
- It has a permanent magnet motor (IE5).
- It runs at power limit.

The pump is controllable, as it includes all standard MGE features.



TM085503

3. Performance range



TM082267

4. The MTHE product range data

50 Hz/60 Hz

Pump	MTHE 1s	MTHE 1	MTHE 3	MTHE 5
Rated flow rate [m^3/h]	1.1	2.2	3.5	6.9
Rated flow rate [l/min]	1	37	58	115
Max. efficiency [%]	35	50	60	64
Flow range [m^3/h]	0.1 - 1.4	0.2 - 2.9	0.2 - 6	0.2 - 10.5
Flow range [l/min]	2-23	3-4	3-100	3-175
Max. head [bar]	10	10	10	10
Motor power [kW]	0.25 - 0.55	0.37 - 0.75	0.55 - 1.1	1.1 - 2.2

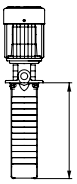
Material variants

Pump	MTHE 1s	MTHE 1	MTHE 3	MTHE 5
Pump head (A-version): cast iron, EN-GJL-200	•	•	•	•
Pump head (I-version): stainless steel, EN 1.4408	•	•	•	•

Pipe connection

Pump	MTHE 1s	MTHE 1	MTHE 3	MTHE 5
A-version				
Internal thread	Rp 3/4	Rp 3/4	Rp 3/4	Rp 3/4
I-version				
Internal thread	Rp 3/4	Rp 3/4	Rp 3/4	Rp 3/4

Installation length [mm]

Pump	MTHE 1s	MTHE 1	MTHE 3	MTHE 5
 TM1040629	145-289	145-289	145-289	145-334

Shaft seal

Pump	MTHE 1s	MTHE 1	MTHE 3	MTHE 5
AQQV	•	•	•	•

5. Motor for the MTHE pump

MGE is a dedicated motor-drive system for pumps and other applications. Pumps equipped with MGE motors overcome application challenges and save energy in a variety of pump installations to reach the lowest Life Cycle Cost (LCC) possible.

Enclosure class	IP55
Insulation class	F
Supply voltage, 50 Hz/60 Hz (-5 % / +5%)	3 x 380-500 V
	3 x 200-240 V

Integrated drives

Integrated drives are beneficial and they are installed on non-controlled pumps at no additional cost. Once the mains are connected and the pump is fitted into the pipe system, they are ready to operate at the desired setpoint.

Operating pumps with MGE also reduces the CAPEX (capital expense) of additional cabinets, components and facility space by having the entire pump system in line with the pipe system.

MGE is the result of the effective motor technology of Grundfos and it is an efficient IE5 motor, that minimises OPEX (operating expense).

Features of the integrated drives

Application control

Feature	Benefit
Control modes	There is easy commissioning to match system design criteria.
Multipump function including alternating, back-up, or cascade	There is no need for external controllers and continuous operation by redundant pump and sensor if either component fails.
Differential pressure or differential temperature with 2 sensors	The CAPEX is lower due to common inexpensive sensor types.
Pump curve adjustments and run at power limit	It stabilises unstable pump curves and extends the operating range.
Setpoint influence	It adapts QH to internal or measured values.

Energy saving for lower OPEX

Feature	Benefit
Low-flow stop function	It allows for improved energy optimisation and comfort.
Permanent-magnet synchronous motor with IE5 (in accordance with IEC 60034-30-2)	The IE5 motor loss is over 30 % lower that of IE3. This alone reduces energy consumption by 10 % with a typical pump load profile.

Robustness of the MGE motor

The Grundfos full line supply of components, from mains connections to pipe fittings, provides the most robust solutions:

- built-in protection against mains supply disturbances, environment and motor load
- MGE is designed for mitigating bearing currents
- no cooling fans in drive (wear part).

Robustness

Features	Benefits
Operating temperature between -20 °C and 60 °C	It allows for installation almost anywhere and supports high margins in control rooms, resulting in longer product service life.
Impulse transient resistance (VDE0160 compliant)	It provides resistance against lightning, ESD, switching impulses and utility fault clearing.
Interruptions and voltage sags (SEMIF47 compliant)	It keeps processes running and derates the pump to the available power.
Line harmonics resistance (EN 61000-4-13, class 3)	It is a built-in compensation of disturbance to avoid overheating of the motor windings, and to maintain a steady pump operation.
Built-in RFI filters	It eliminates the need for external components.
IP55 / IP66 enclosures	It is installed in-line of pipe system at no additional cost.

Functional modules of the MTHE pumps

The MTHE pumps offer a number of advantages, depending on hardware combinations and software configuration of the motor. For example, various functional modules are available.

As standard, the MTHE pumps are fitted with the standard functional module. The basic or advanced modules are available as customised solutions.

Standard functional module (FM 200)

The standard module has more inputs and outputs than the basic module and is suitable for even more demanding applications.

The standard module has the following connections:

- two analog inputs
- two digital inputs or one digital input and one open-collector output
- Grundfos Digital Sensor input and output
- two signal relay outputs
- GENIbus connection.

Inputs and outputs

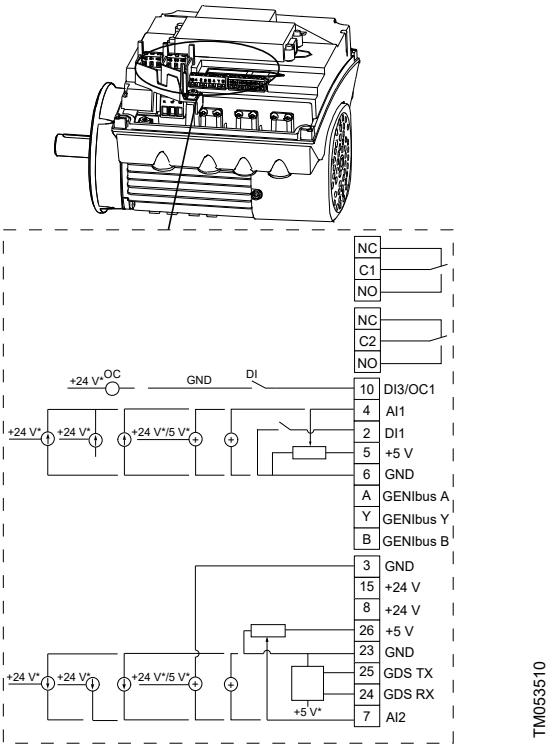
All inputs and outputs are internally separated from the mains-conducting parts by reinforced insulation, and are galvanically separated from other circuits. All control terminals are supplied with protective extra-low voltage (PELV) to ensure protection against electric shock.

- Signal relay outputs
  - Signal relay 1:

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

    PELV: The output is galvanically separated from other circuits. Therefore, you can connect the supply voltage or protective extra-low voltage to the output as desired.
  - Signal relay 2:

    PELV: The output is galvanically separated from other circuits. Therefore, you can connect the supply voltage or protective extra-low voltage to the output as desired.
- Mains supply (terminals N, PE, L or L1, L2, L3, PE).



Connection terminals, MTHE pumps

* If you use an external supply source, there must be a connection to GND.

Advanced functional module (FM 300)

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

The advanced 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
- LiqTec sensor inputs
- two signal relay outputs
- GENIbus connection.

6. Control of the MTHE pumps

Control options

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

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

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

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.

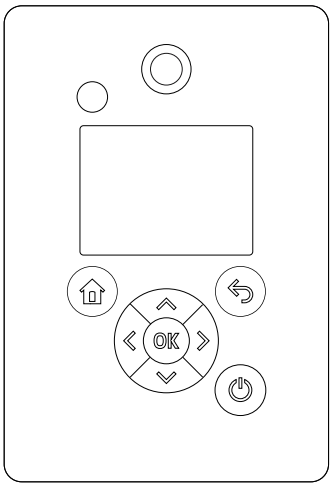
Note that these panels include an integrated radio module.

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

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

HMI 300

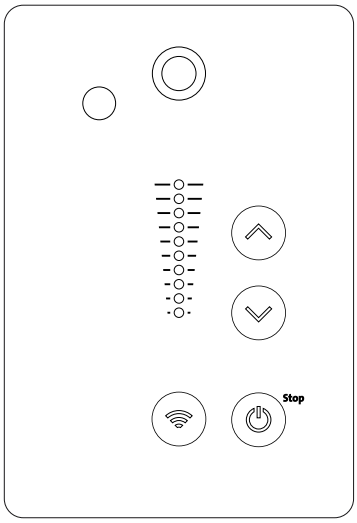
This operating panel is available as either standard or an option, depending on the region.



TM084862

HMI 200

This operating panel is available as standard.



TM084861

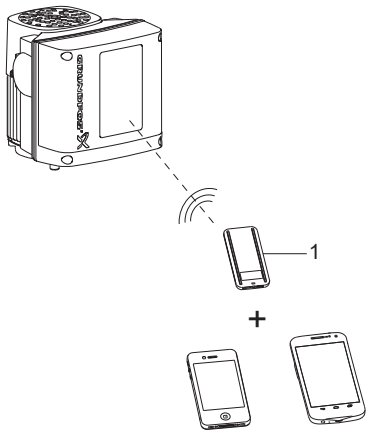
Grundfos GO

Grundfos GO enables you to set functions, and gives you access to status overviews, technical product information, and current operating parameters.

MGE 0.37 to 11 kW

The product is designed for wireless radio or infrared communication with Grundfos GO.

Use Grundfos GO together with the Grundfos MI 301 mobile interface.



TM066256

Grundfos MI 301

Pos.	Description
1	The Grundfos MI 301 is a separate module enabling radio or infrared communication. Use the module together with an Android or iOS-based smart device via a Bluetooth connection.

Communication using Grundfos GO

When Grundfos GO initiates communication with the product, the indicator light in the centre of Grundfos Eye flashes green.

You can use these communication types:

- radio communication
- infrared communication.

Radio communication

Radio communication can take place at distances up to 30 metres. The first time Grundfos GO communicates with the product, communication can be enabled by pressing the **Radio communication** button or **OK** on the operating panel.

When communication takes place, the product is recognized by Grundfos GO, and you can select the product from the **List** menu.

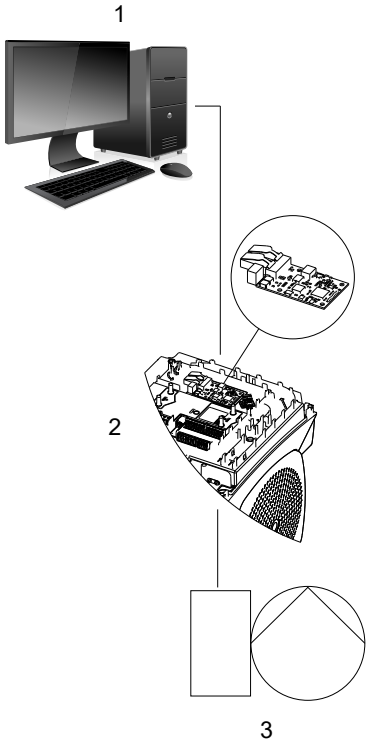
Infrared communication

Infrared communication can take place at distances up to 2 metres. When communicating via infrared light, Grundfos GO must be pointed at the operating panel of the product.

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. This 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 CIM module.

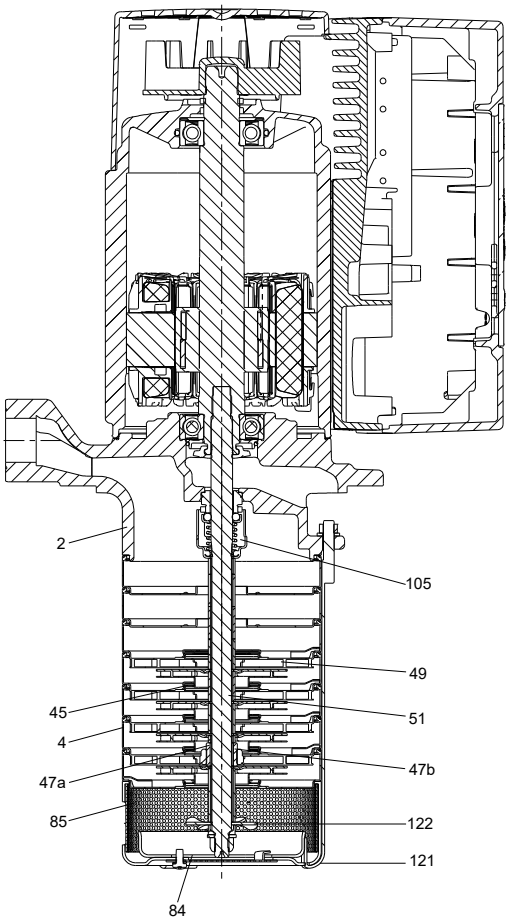


Structure of a central management system

Pos.	Description
1	Central management system
2	CIM (See the section on communication interface modules)
3	E-pump

7. Construction of the MTHE pumps

Sectional drawing



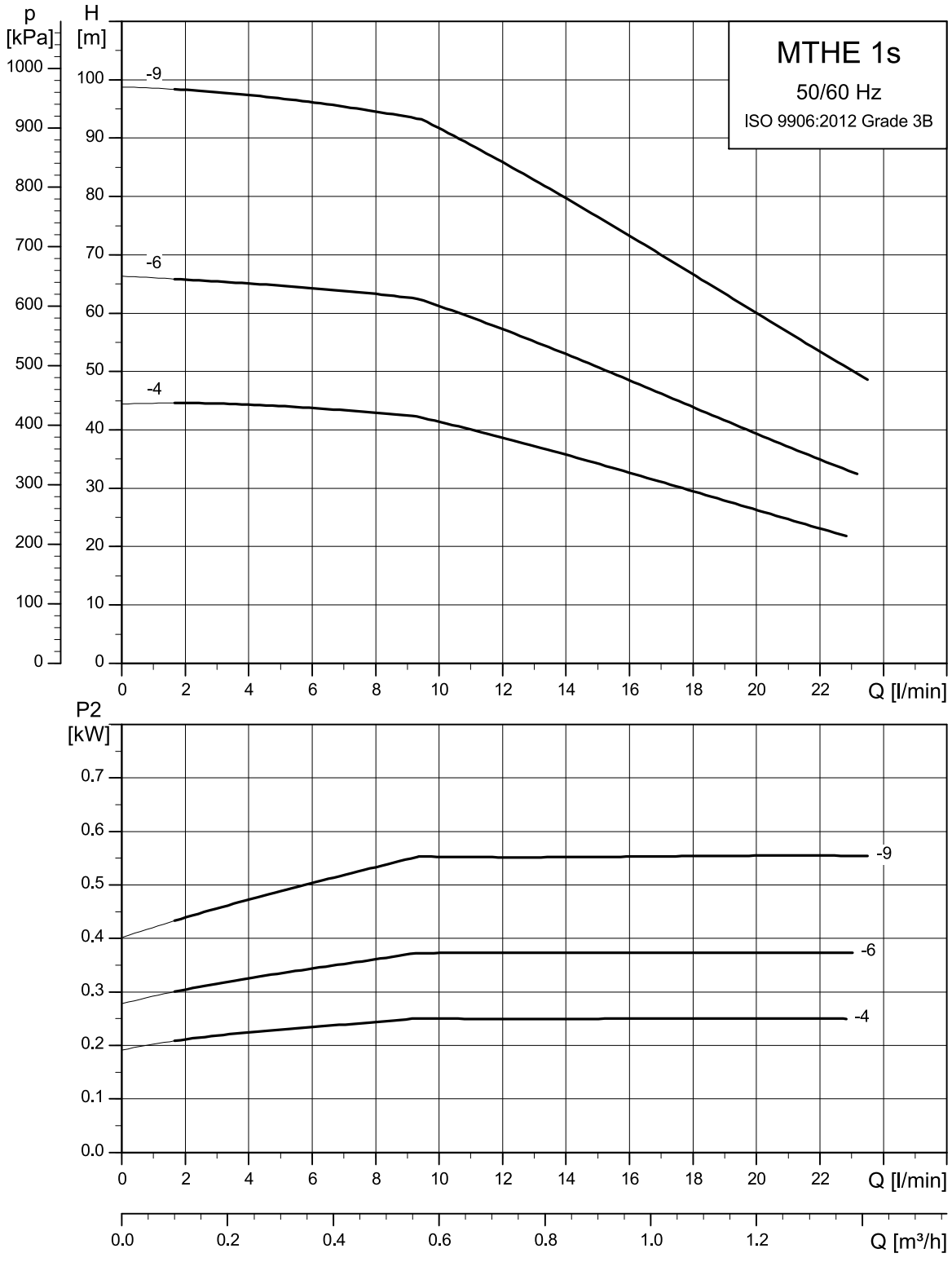
MTHE pumps

Materials

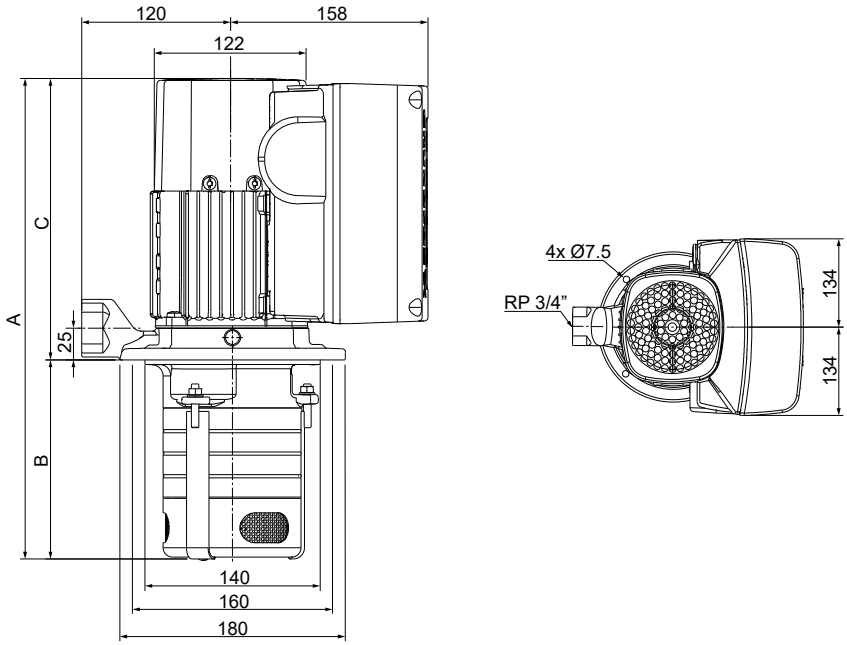
Pos.	Description	Materials	EN/DIN	AISI/ASTM
2	Pump head	A-version: cast iron	EN-GJL-200	ASTM 25B
		I-version: stainless steel	1.4408	AISI 316LN
4	Chamber	Stainless steel	1.4301	AISI 304
45	Neck ring	PTFE	-	-
47a	Bearing ring	Silicon carbide	-	-
47b	Bearing	Silicon carbide	-	-
49	Impeller	Stainless steel	1.4301	AISI 304
51	Pump shaft	Stainless steel	1.4057	AISI 431
84	Strainer, inlet	Stainless steel	1.4301	AISI 304
85	Strainer, internal	Stainless steel	1.4301	AISI 304
105	Shaft seal	AQQV	-	-
121	Strap	Stainless steel	1.4301	AISI 304
122	Priming screw	Stainless steel	1.4301	AISI 304

8. Performance curves and technical data

MTHE 1s



Dimensional sketches



Dimensions and weights

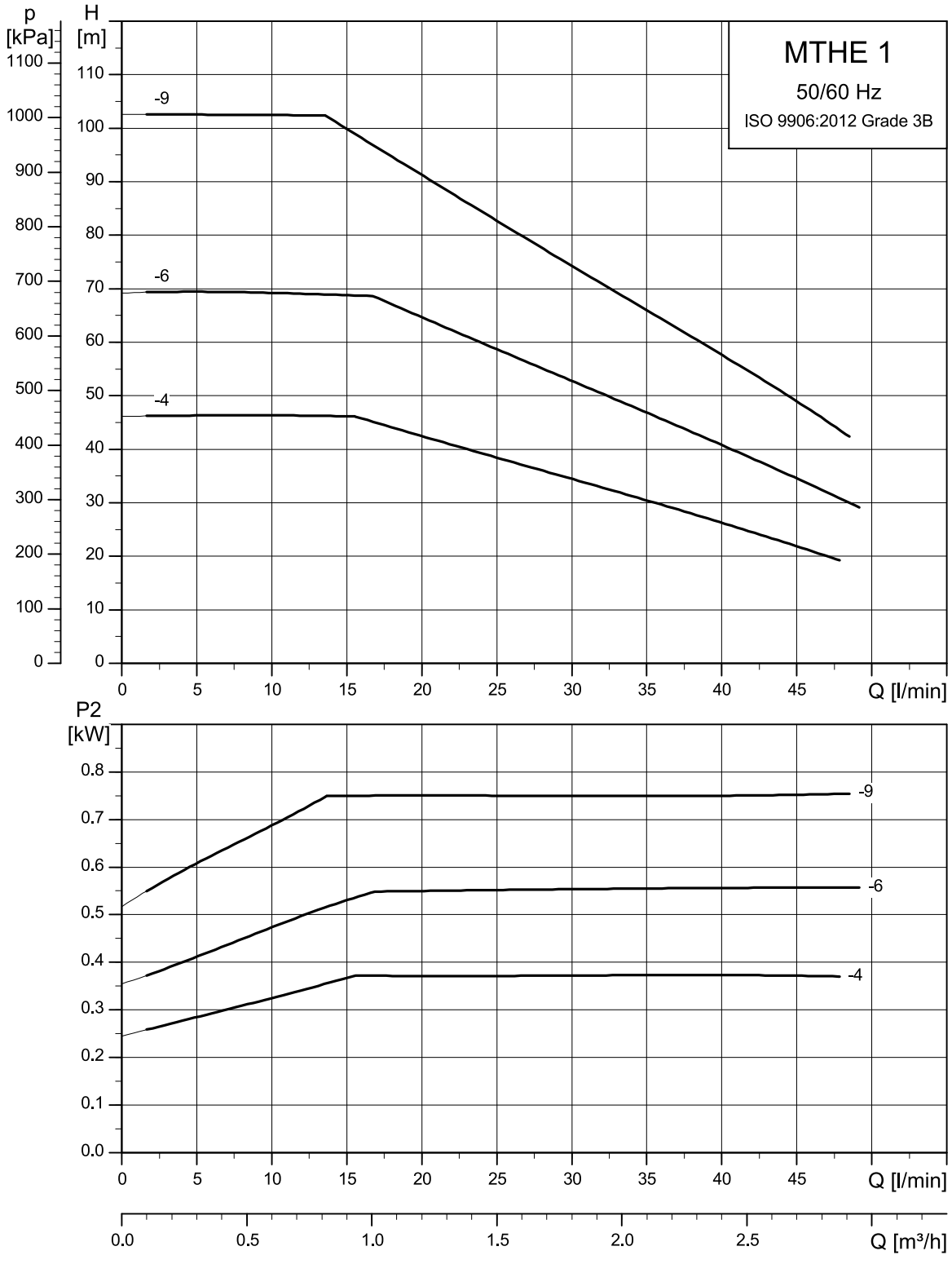
Pump type	Motor P2 [kW]	Dimensions [mm]			Weight [kg]
		A	B	C	
MTHE 1s-4/4	0.25	428	163	265	17.4
MTHE 1s-6/6	0.37	464	199	265	17.5
MTHE 1s-9/9	0.55	518	253	265	18.6

Electrical data

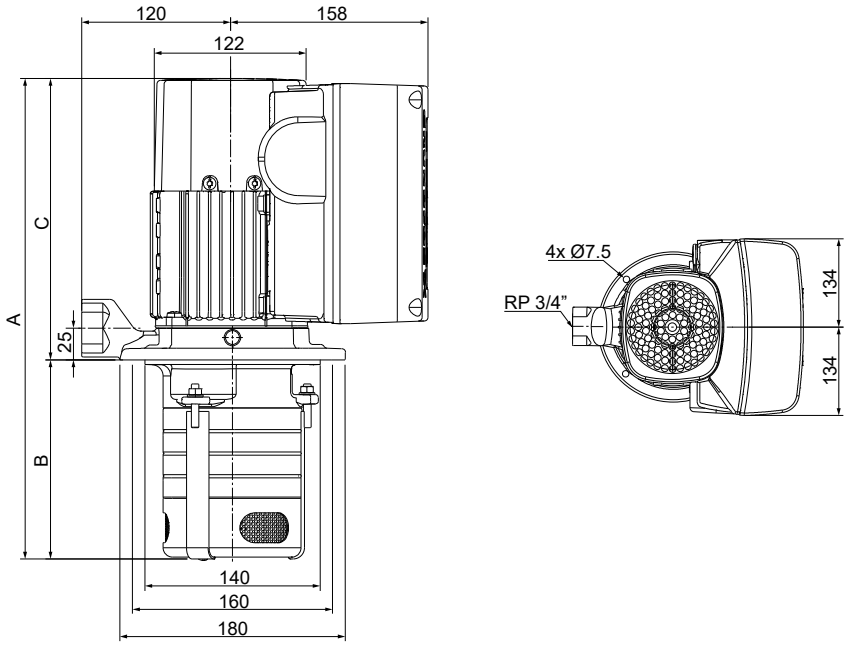
Voltage	P2 [kW]	Frame size	Phase	$I_{1/1}$ [A]	Cos $\varphi_{1/1}$	Motor efficiency	
						η [%]	Class
3x380-500 V	0.25	71	3	0.9 - 0.75	0.58 - 0.50	81.2	IE5
3x380-500 V	0.37	71	3	1.05 - 1.0	0.68 - 0.54	84.5	IE5
3x380-500 V	0.55	71	3	1.35 - 1.3	0.77 - 0.61	85.9	IE5

The maximum immersion depth (B-dimension) is 289 mm.

MTHE 1


p
[kPa]
H
[m]
MTHE 1
50/60 Hz
ISO 9906:2012 Grade 3B
-9
-6
-4
Q [l/min]
P2
[kW]
Q [m³/h]
TM082264

Dimensional sketches



Dimensions and weights

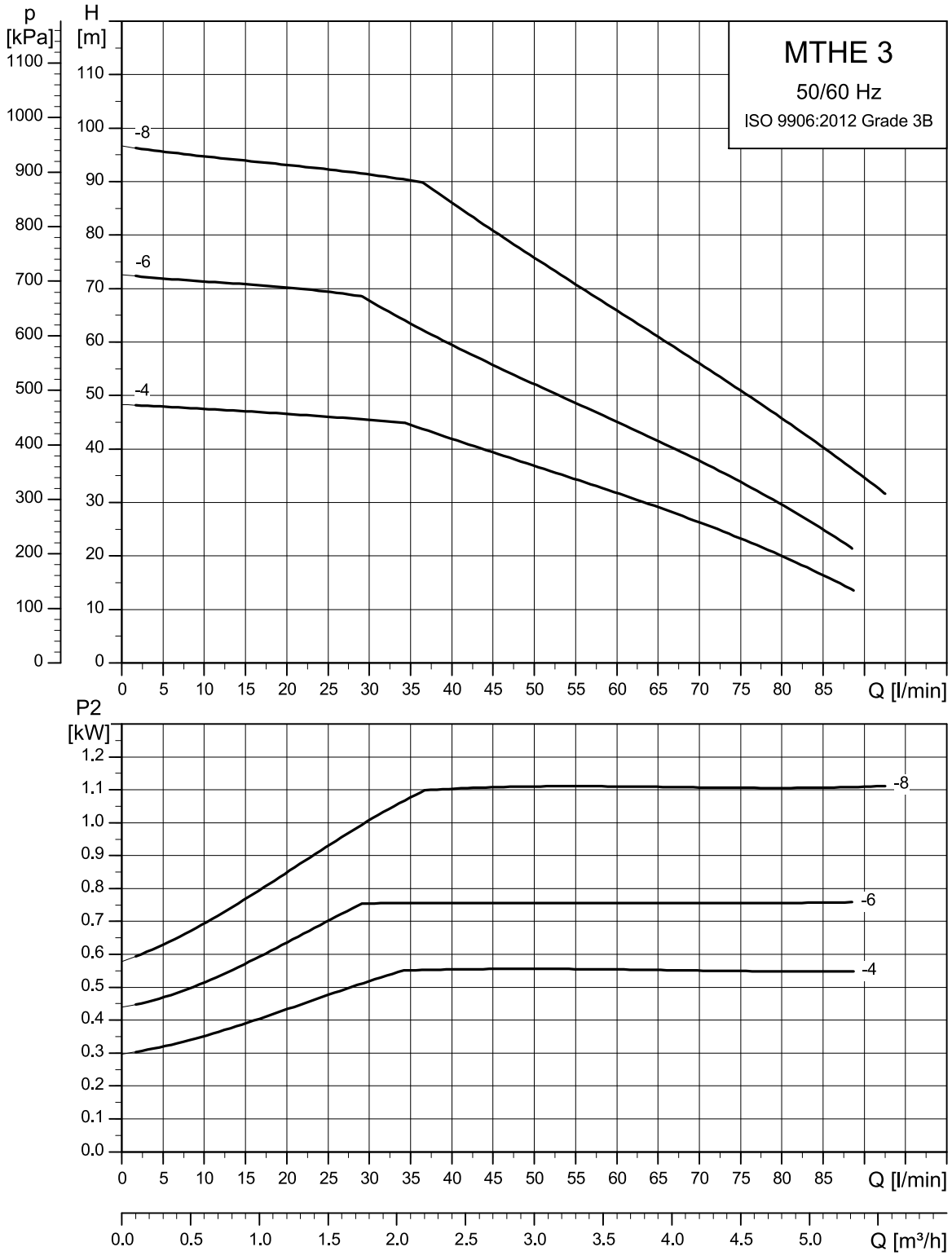
Pump type	P2 [kW]	Dimensions [mm]			Weight [kg]
		A	B	C	
MTHE 1-4/4	0.37	428	163	265	17.0
MTHE 1-6/6	0.55	464	199	265	17.9
MTHE 1-9/9	0.75	518	253	265	18.2

Electrical data

Voltage	P2 [kW]	Frame size	Phase	$I_{1/1}$ [A]	Cos $\varphi_{1/1}$	Motor efficiency	
						η [%]	Class
3x380-500 V	0.37	71	3	1.05 - 1.0	0.68 - 0.54	84.5	IE5
3x380-500 V	0.55	71	3	1.35 - 1.3	0.77 - 0.61	85.9	IE5
3x380-500 V	0.75	80	3	1.7 - 1.6	0.83 - 0.67	85.9	IE5

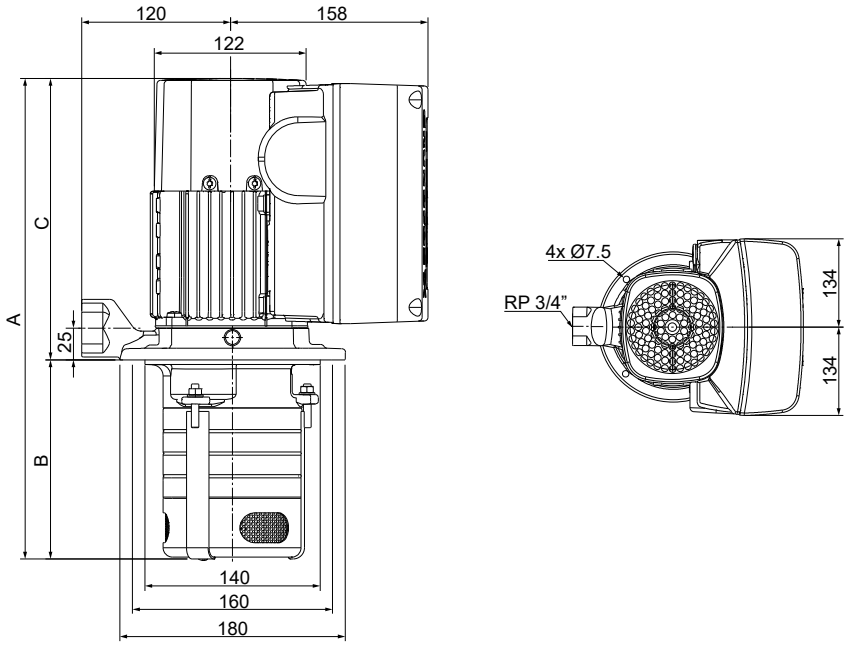
The maximum immersion depth (B-dimension) is 289 mm.

MTHE 3



TM082265

Dimensional sketches



Dimensions and weights

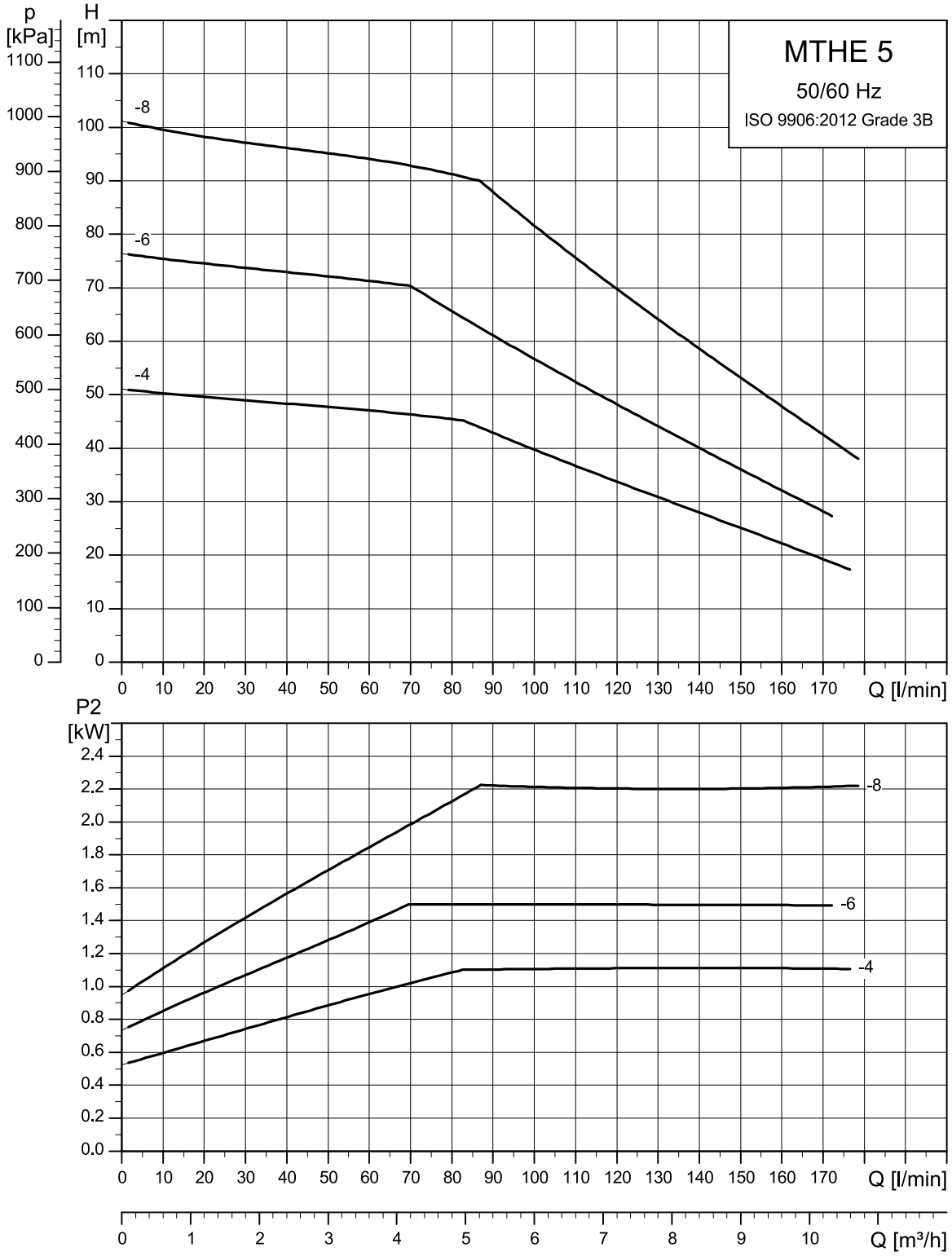
Pump type	Motor P2 [kW]	Dimensions [mm]			Weight [kg]
		A	B	C	
MTHE 3-4/4	0.55	428	163	265	17.5
MTHE 3-6/6	0.75	464	199	265	17.7
MTHE 3-8/8	1.1	500	235	265	19.4

Electrical data

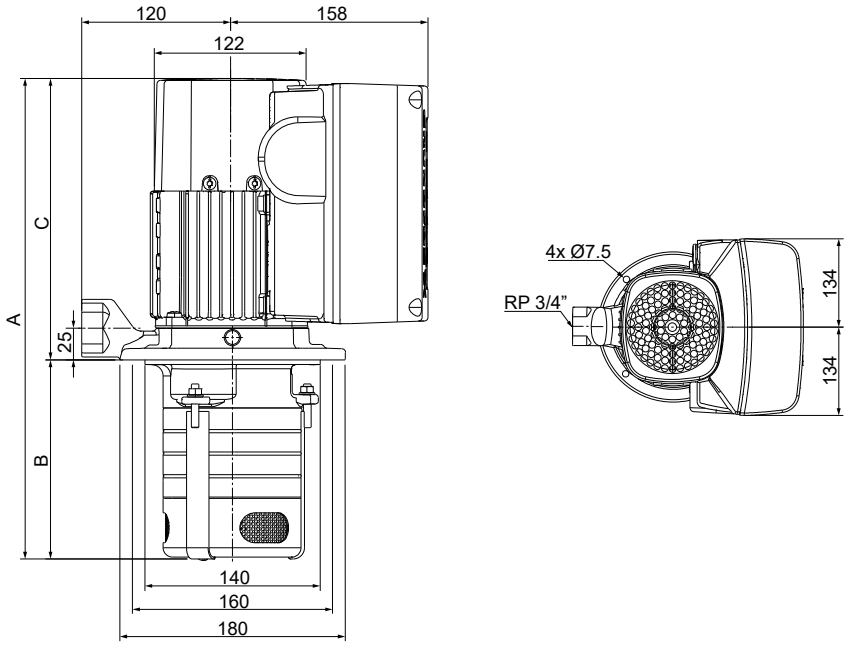
Voltage	P2 [kW]	Frame size	Phase	$I_{1/1}$ [A]	Cos $\varphi_{1/1}$	Motor efficiency	
						η [%]	Class
3x380-500 V	0.55	71	3	1.35 - 1.3	0.77 - 0.61	85.9	IE5
3x380-500 V	0.75	80	3	1.7 - 1.6	0.83 - 0.67	85.9	IE5
3x380-500 V	1.1	80	3	2.2 - 1.9	0.89 - 0.79	89.1	IE5
3x200-240 V	1.1	80	3	4.1 - 3.5	0.92 - 0.91	89.3	IE5

The maximum immersion depth (B-dimension) is 289 mm.

MTHE 5


p
[kPa]
H
[m]
MTHE 5
50/60 Hz
ISO 9906:2012 Grade 3B
-8
-6
-4
Q [l/min]
P2
[kW]
Q [l/min]
Q [m³/h]
TM082266

Dimensional sketches



TM085458

Dimensions and weights

Pump type	Motor P2 [kW]	Dimensions [mm]			Weight [kg]
		A	B	C	
MTHE 5-4/4	1.1	464	199	265	19.1
MTHE 5-6/6	1.5	525	253	272	20.6
MTHE 5-8/8	2.2	579	307	272	22.2

Electrical data

Voltage	P2 [kW]	Frame size	Phase	$I_{1/1}$ [A]	Cos $\varphi_{1/1}$	Motor efficiency	
						η [%]	Class
3x380-500 V	1.1	80	3	2.2 - 1.9	0.89 - 0.79	89.1	IE5
3x380-500 V	1.5	90	3	2.9 - 2.4	0.92 - 0.85	88.9	IE5
3x380-500 V	2.2	90	3	4.15 - 3.4	0.93 - 0.87	90.1	IE5
3x200-240 V	1.1	80	3	4.1 - 3.5	0.92 - 0.91	89.3	IE5
3x200-240 V	1.5	90	3	5.4 - 4.6	0.92 - 0.92	88.9	IE5

The maximum immersion depth (B-dimension) is 334 mm.

9. Accessories

Sensors

Sensor	Type	Supplier	Measuring range	Product number
Flowmeter	SITRANS FM MAGFLO MAG 5100 W	Siemens	1-5 m^3 (DN 25)	ID8285
	SITRANS FM MAGFLO MAG 5100 W		3-10 m^3 (DN 40)	ID8286
	SITRANS FM MAGFLO MAG 5100 W		6-30 m^3 (DN 65)	ID8287
	SITRANS FM MAGFLO MAG 5100 W		20-75 m^3 (DN 100)	ID8288
Temperature sensor	TTA (0) 25	Carlo Gavazzi	0 to 25 °C	96432591
	TTA (-25) 25		-25 to +25 °C	96430194
	TTA (50) 100		50 to 100 °C	96432592
	TTA (0) 150		0 to 150 °C	96430195
Accessory for temperature sensor (all with 1/2 RG connection)	Protecting tube ∅9 x 50 mm			96430201
	Protecting tube ∅9 x 100 mm			96430202
	Cutting ring bush			96430203
Temperature sensor, ambient temperature	WR 52	tmg DK: Plesner	-50 to +50 °C	ID8295
Differential-temperature sensor	ETSD	Honsberg	0 to 20 °C	96409362
			0 to 50 °C	96409363

Note that all sensors have 4-20 mA signal output.

Danfoss pressure sensor kits

Content	Liquid temperature	Pressure [bar]	Product number
• Danfoss pressure sensor, type MBS 3000, with 2 m screened cable Connection: G 1/2 A (DIN 16288 - B6kt) • 5 cable clips (black) • Instructions PT (400212)	-40 to +85 °C	0-4	96428014
		0-6	96428015
		0-10	96428016
		0-16	96428017
		0-25	96428018

Grundfos GO

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

- infrared
- radio.

MGE 0.37 to 11 kW

These motors will connect to the pump through wireless infrared or radio communication.

MI 301

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

TM053890

MI 301

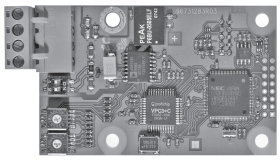
Supplied with the product:

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

Product numbers

Grundfos GO variant	Product number
Grundfos MI 301	98046408

CIM (communication interface modules)



GRA6121

Grundfos CIM (communication interface module)

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

Note that CIM modules must be fitted by authorised persons.

We offer the following CIM modules:

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 modules

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 modules and fieldbus protocols, see the CIM documentation available at Grundfos Product Center at www.grundfos.com.

10. Multi-packaging for the MTHE pumps

Benefits of multi-packaging:

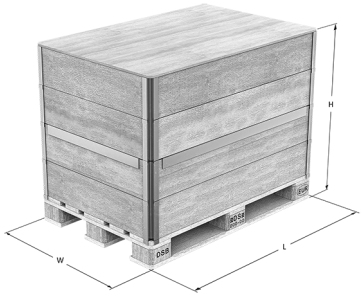
- It makes unpacking easy.
- There is no packaging to dispose of after unpacking.
- It is returnable, which supports the Green Agenda.

Description of the multi-packaging:

- It contains a standard EURO pallet and standard pallet frames.
- Six pumps can be transported per pallet.
- The plate and the holder for plate are the only returnable parts of the packaging.

TM085454

Pallet packed with MTHE pumps



TM085455

Packaging of the MTHE pumps

11. Grundfos Product Center

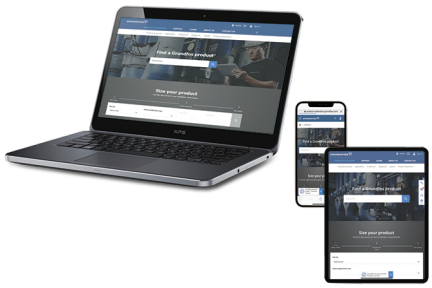
Online search and sizing tool to help you make the right choice.
From the international view, you can select your specific country to view the product range available to you.
International view: *http://product-selection.grundfos.com*

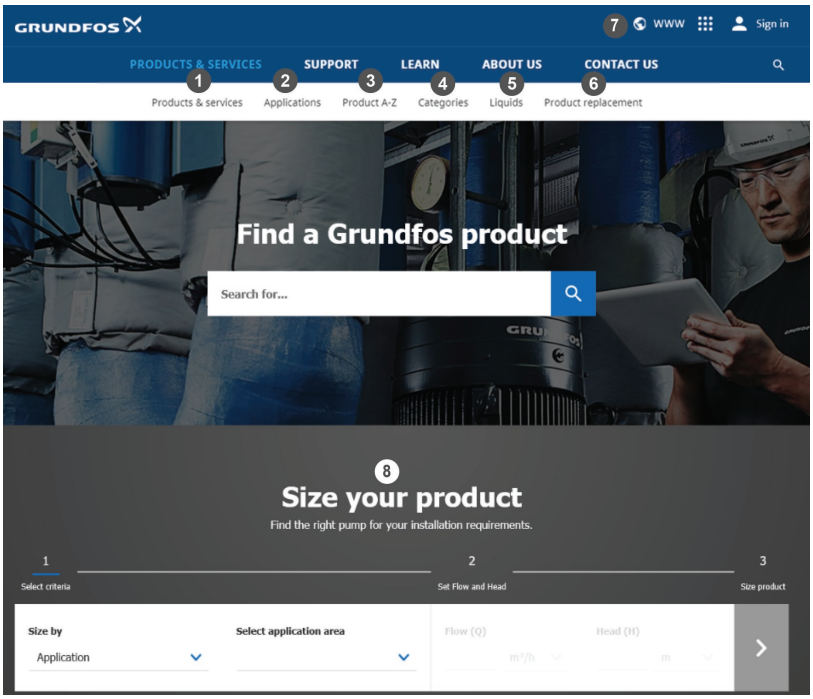
All the information you need in one place

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.





When you select your country, you will see the menus below. Note that some menus may not be available depending on the country.
Example: *https://product-selection.grundfos.com/uk*

Pos.	Description
1	**Products & services** enables you to find products and documents by typing a product number or name into the search field.
2	**Applications** enables you to choose an application to see how Grundfos can help you design and optimise your system.
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.

12. Document quality feedback

To provide feedback about this document, scan the QR code using your phone's camera or a QR code app.

FEEDBACK93015080

Click here to submit your feedback

93015080 **08.2023**
ECM: 1373124

GRUNDFOS Holding A/S
Poul Due Jensens Vej 7
DK-8850 Bjerringbro
Tel: +45 87 50 14 00
www.grundfos.com

Trademarks displayed in this material, including but not limited to Grundfos and the Grundfos logo, are registered trademarks owned by The Grundfos Group. © 2023 Grundfos Holding A/S, all rights reserved.