

MTR, MTRE, MTC, MTA

Immersible pumps

60 Hz



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1. Introduction

MTR, MTRE



TM055165

MTR and MTH pumps

MTR pumps are vertical multistage centrifugal pumps designed for pumping of cooling lubricants for machine tools, condensate transfer and similar applications.

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, the pressure and the 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 consist of two main components: The motor and the pump unit.

The motor is a Grundfos standard ML motor or Grundfos specified motor designed to NEMA standard.

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

The pumps are available in two material versions:

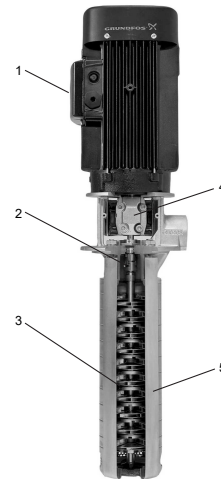
- standard range (A-version) with wetted parts of cast iron and stainless steel
- stainless steel version (I-version) with all wetted parts of stainless steel AISI 304 (EN/DIN 1.4301) or better. The I-version is used in applications where the pumped liquid can be corrosive.

The mounting flange dimensions are according to EN/DIN 12157. The mechanical shaft seal is according to EN/DIN 12756.

Pipe connections

Grundfos offers the following types of pipe connection for MTR, MTRE pumps:

Connection	Code	Description
Threaded	NPT	NPT threads (National Pipe Thread) (Female)
Flange	ANSI	Flanged connection



TM028536

MTR pump

Pos.	Description
1	Motor
2	Shaft seal
3	Impeller
4	Coupling
5	Chambers

MTRE pumps with built-in variable frequency drive



TM082643

MTRE pumps

MTRE pumps are MTR pumps with an E-motor, that is a motor with built-in variable frequency drive. Frequency control enables continuously variable control of motor speed, which makes it possible to set the pump to operate in any duty point. The motors of the MTRE pumps are Grundfos MLE motors.

An E-pump is not just a pump, but a system which is able to solve application problems or save energy in a variety of pump installations. All that is required is a power supply connection and the fitting of the E-pump in the pipe system, and the pump is ready for operation.

MTRE pumps are ideal for machining centers which operate with different machining processes and tools, as this will often result in different needs for flow rate and pressure.

The following features and benefits are typical for choosing an MTRE pump:

- energy savings
- 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.

MTC

MTC pumps are vertical multistage centrifugal pumps designed for pumping of cooling lubricants for machine tools, condensate transfer and similar applications.



TM081850

MTC pumps

The pumps can be used for applications such as spark machine tools, grinding machines, machine centers, cooling units, industrial washing machines, filtering systems. The pumps are designed to be mounted on top of tanks with the pump stack immersed in the pumped liquid.

Grundfos MTC pumps come with various pump sizes and numbers of stages to provide the flow rate, the pressure and the length required.

MTC features and benefits

MTC pumps are fitted with an integrated Grundfos motor where the rotor shaft is used as a pump shaft. This gives the pump a compact design.

MTA, MTA-H



TM051132

MTA pumps

Grundfos' MTA range of single-stage immersible pumps has been designed especially for transfer of liquids containing chips, fibers and abrasive particles in filtering systems in the machine tool industry.

These low-pressure pumps are available in nine different variants and come with a choice of top inlet or bottom inlet. The pumps are designed to be mounted on top of tanks with the pump part immersed into the pumped liquid. The pumps are designed to be maintenance free, and therefore does not contain shaft seals or other wear parts.

2. Applications

Machine tool applications

The Grundfos range of high-pressure pumps offers unsurpassed accuracy and stability to make sure that nothing interferes with the delicate machining process. Equally important, high efficiency ensures a remarkably low heat input into the cooling lubricant. Integrated frequency converters can be optionally supplied for increased system efficiency and flexibility. The immersible MTR pumps, offering a tank-mounted design are suitable for machine tool applications.

Machine tool sub applications

Boring

Grundfos is capable of providing the exact pressure and flow rate required for different materials, bore diameters and tool speeds in both through boring and blind boring. Our MTR, MTRE range includes pumps supplying a pressure of up to 435 psi (30 bar), required for the deep blind-hole boring.

Milling and turning

The Grundfos range easily meets the individual cooling requirements of different materials in milling and turning, from low flow rate and low pressure to high flow rate and high pressure. The pumps are available in different lengths and customized to fit specific tank sizes. In fact, the modular pump construction allows for more than 1,000,000 individual configurable variants.

Wire cutting

In wire cutting it is essential that the liquids are clean. This results in a more accurate process and extends the life of the filter. As a steady temperature is required for wire cutting operation, the process will benefit from a Grundfos E-solution.

Filtration

Reliable filtration is crucial in top-quality machine tool applications, as it prolongs the life of the tool and prevents chips from damaging surfaces or tolerances.

Part washing

The Grundfos range includes pumps suitable for corrosive liquids and liquids with a high content of particles. Our variable frequency-drive operated pumps with high-efficiency motors ensure that systems operate under the best possible conditions with low-energy consumption.

Chilling

The reliable and thoroughly-tested pump range for chillers offers a particularly diverse application spectrum. It covers cooling-water circuits, washing plants, industrial circulation systems and general pressure boosting applications. All pumps are available with an E-motor to increase efficiency and perfectly control any process. All immersible pumps are suitable for this application.

Condensate systems

As condensate is normally pumped from a tank, an immersible pump will be a perfect choice. It is a compact solution as half the pump will be in the tank. It has an optimum suction as no pipes or valves are needed in front of the inlet. For temperatures above 194 °F, a 248 °F version is available (only for stainless steel versions in case of MTR 1s to 20 pumps).

Wash and clean

As for condensate systems, wash and clean applications are typically based around a tank. The immersible pumps can save space and secure an optimum suction. A version in all stainless steel is available for aggressive liquids.

MTR, MTRE

Application	MTR, MTRE
Boring	•
Sawing and filtration	-
Milling	•
Grinding	•
Spark erosion	•
Wire cutting	•
Turning	•
Chilling	•
Part washing	•
Filtration	-
Condensate systems	•
Wash and clean	•

- The pump is suitable for this application.

MTC

Application	MTC
Lathes	•
Spark machine tools (EDM)	-
Grinding machines	•
Swarf conveyors	•
Machining centers	•
Cooling units	•
Industrial washing machines	•
Filtering systems	•

- The pump is suitable for this application.

MTA, MTA-H

The MTA, MTA-H pumps are suitable for these applications:

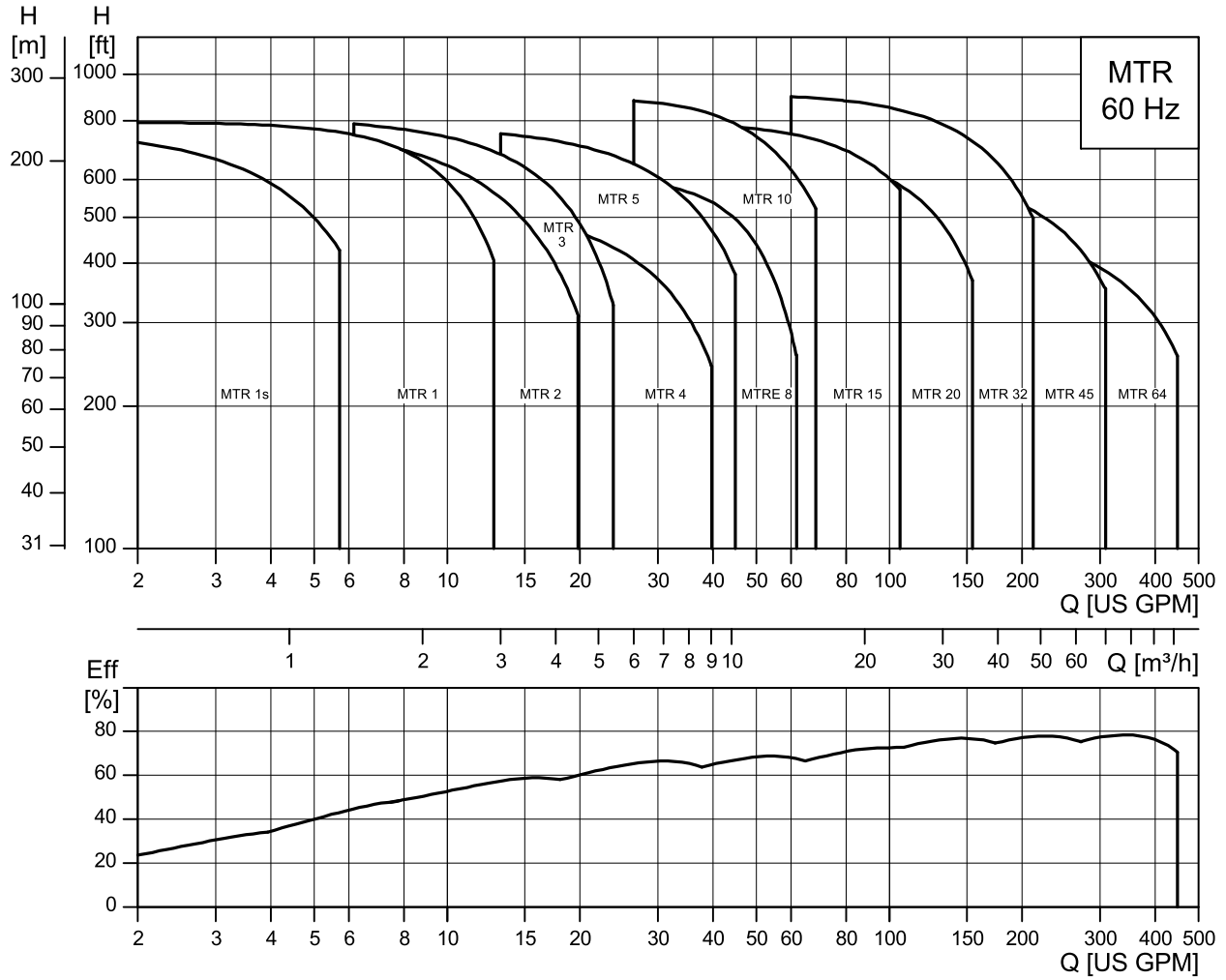
- boring
- sawing
- milling
- grinding
- filtration.

Multiple applications

The compact MTA pumps efficiently transport liquid containing chips, fibers and abrasive particles to the filtering unit. Semi-open impellers allow the passing of chips up to 0.40 in. (10 mm), making the pumps ideal for removing liquid from machining processes.

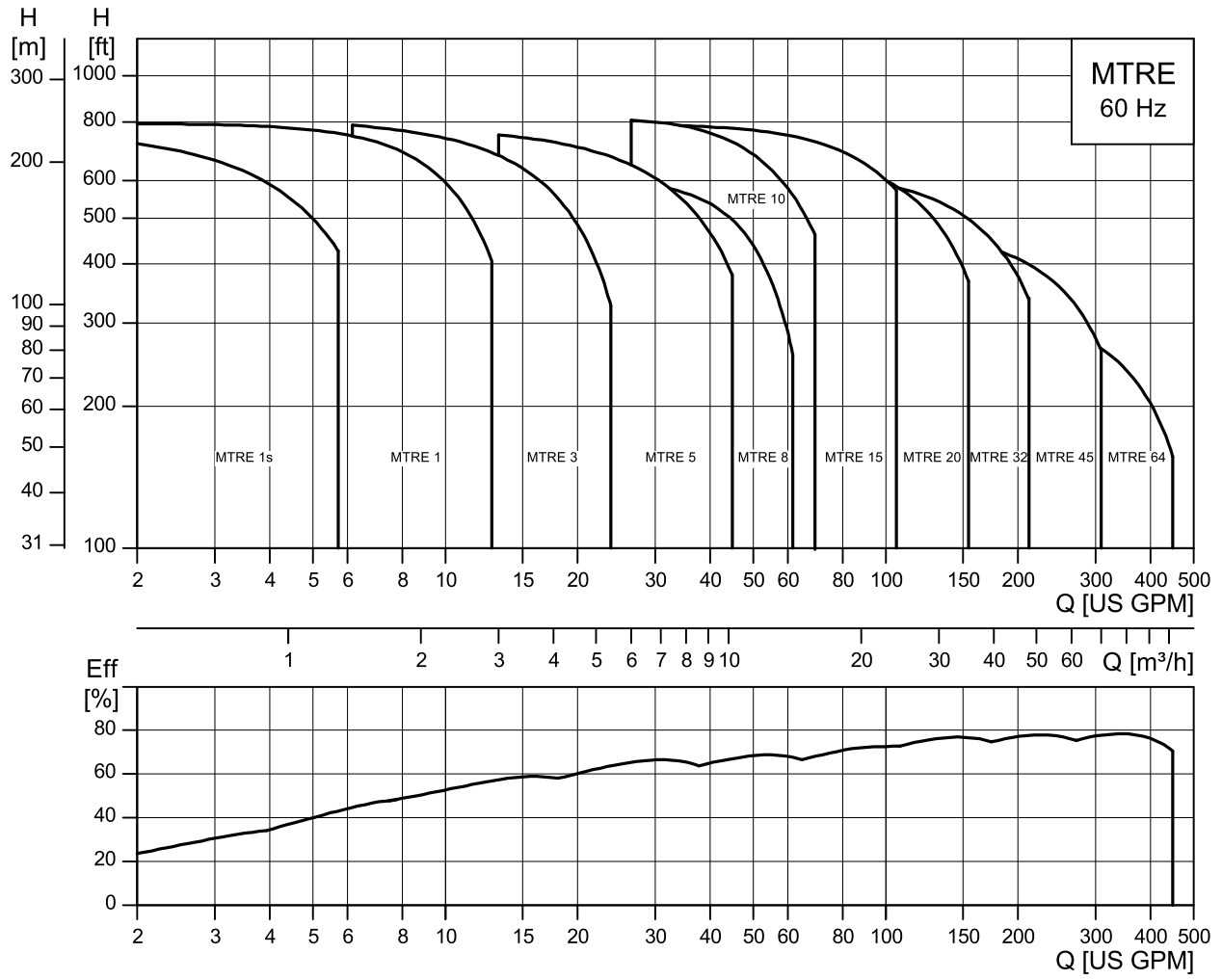
3. Performance range

MTR, 60 Hz



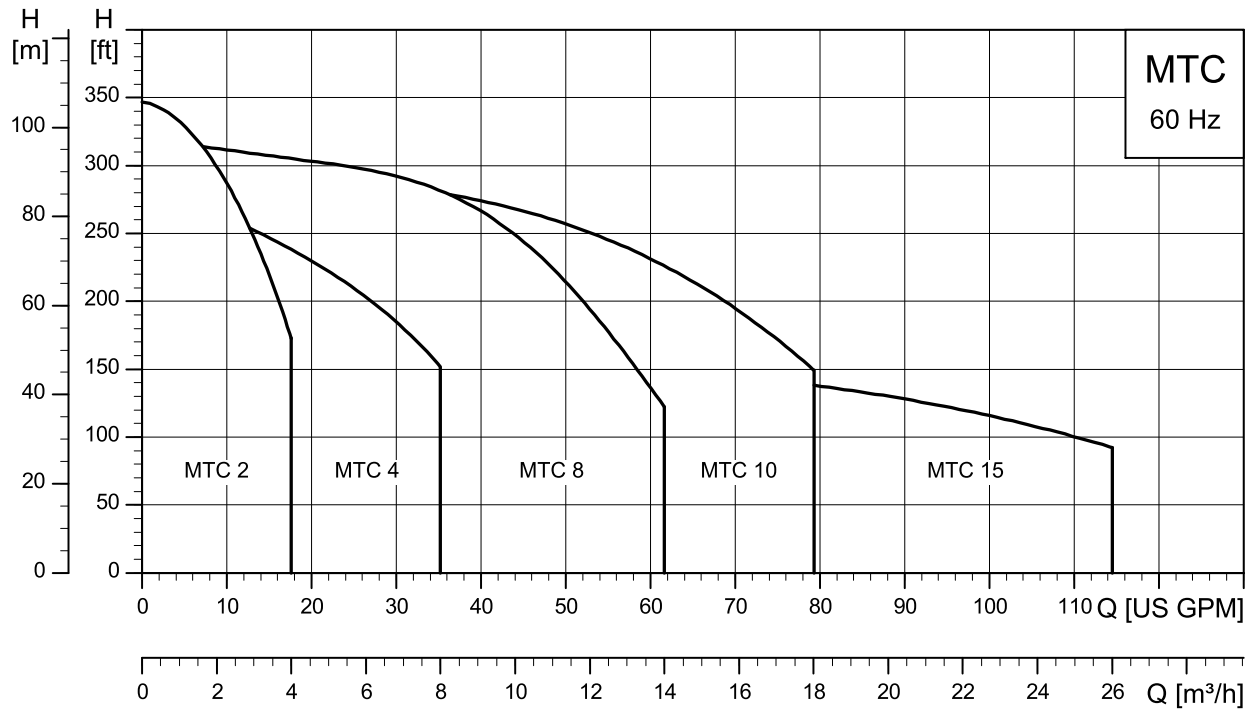
TM034250

MTRE, 60 Hz



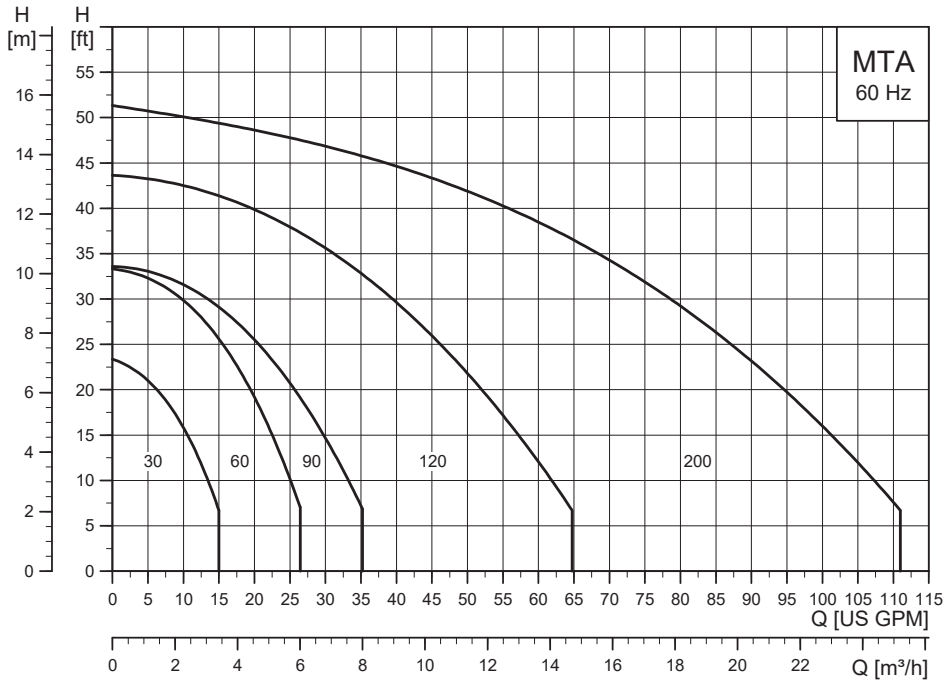
TM051599

MTC, 60 Hz



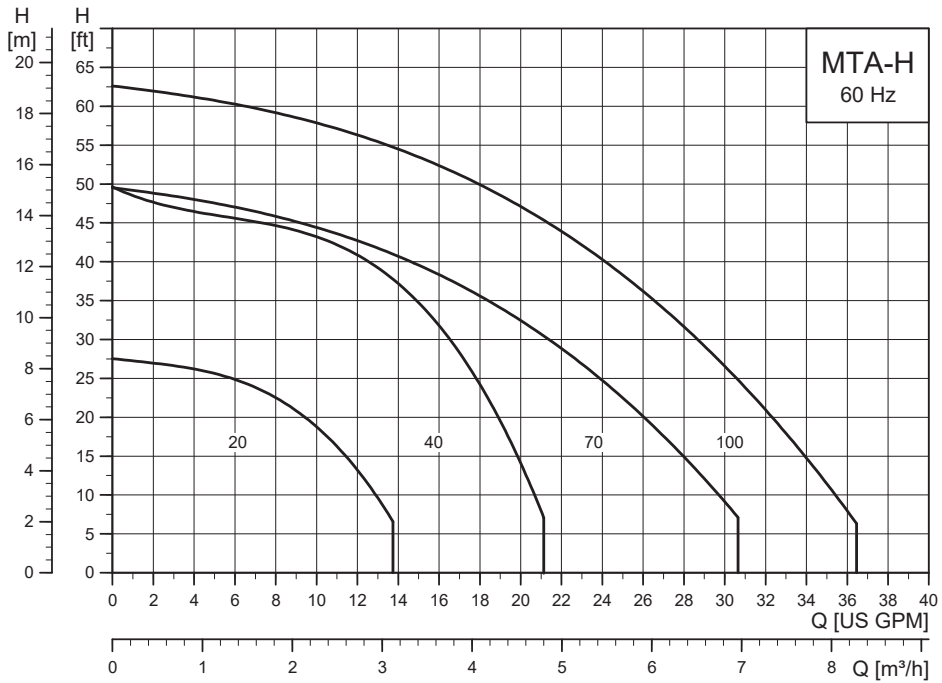
TM034278

MTA, MTA-H, 60 Hz



TM054977

Performance range, MTA, 60 Hz



TM054976

Performance range, MTA-H, 60 Hz

4. Product range

MTR, MTRE

Pump type	MTR, MTRE 1s	MTR, MTRE 1	MTR 2	MTR, MTRE 3	MTR 4	MTR, MTRE 5	MTR, MTRE 8	MTR, MTRE 10	MTR, MTRE 15	MTR, MTRE 20	MTR, MTRE 32	MTR, MTRE 45	MTR, MTRE 64
Nominal flow rate [US gpm]	4.4	8.5	8.81	15	17.6	30	44	55	95	110	140	220	340
Nominal flow rate [m ³ /h]	1.0	1.9	2	3.6	4	6.8	10	12.5	21.6	25.2	31.8	50.0	77.2
Temperature range [°F (°C)]	+14 to +194 (-10 to +90)												
Maximum pump efficiency [%]	35	49	45	59	60	67	61	70	72	72	76	78	79
Maximum operating pressure at 194 °F (90 °C) [psi (bar)]	363 (25)												
MTR pumps													
Flow range [US gpm]	0.5 - 7	0.9 - 12.8	4.4 - 19.8	1.5 - 23.8	11.5 - 39.6	3-45	19.8 - 61.6	5.5 - 68	9.5 - 125	11-155	14-210	22-310	34-450
Flow range [m ³ /h]	0.1 - 1.6	0.2 - 2.9	1.0 - 4.5	0.4 - 5.4	2.6 - 9	0.7 - 10.2	4.5 - 14	1.3 - 15.4	2.2 - 28.4	2.5 - 35.2	3.2 - 47.7	5.0 - 70.4	7.8 - 102
Maximum developed head [H (ft)]	760	787	804	820	558	780	623	835	800	700	630	590	450
Maximum developed head [psi]	329	344	348	355	246	337	275	361	347	303	273	255	195
Motor power [hp]	1/3 - 2	1/3 - 3	1/2 - 5	1/2 - 5	1-5	3/4 - 7 1/2	3/4 - 10	1-15	2-25	3-25	5-40	7 1/2 - 40	10-40
MTRE pumps													
Flow range [US gpm]	0 - 5.7	0 - 12.8	-	0 - 23.8	-	0-45	0 - 61.6	0-68	0-125	0-155	0-210	0-310	0-450
Flow range [m ³ /h]	0 - 1.3	0 - 2.9	-	0 - 5.4	-	0 - 10.2	0-14	0 - 15.4	0 - 28.4	0 - 35.2	0 - 47.7	0 - 70.4	0-102
Maximum developed head [H (ft)]	760	795	-	820	-	780	635	835	800	700	630	470	320
Maximum developed head [psi]	329	344	-	355	-	337	275	361	347	303	273	204	139
Motor power [hp]	1/2 - 2	1/2 - 3	-	1/2 - 5	-	1 - 7 1/2	2-10	2-15	2-25	3-25	5-30	7 1/2 - 30	10-30
Material variants													
A-version (AISI 304/cast iron)	•	•	•	•	•	•	•	•	•	•	•	•	•
I-version (AISI 316/AISI 304)	•	•	•	•	•	•	•	•	•	•	•	•	•
N-version (AISI 316)	•	•	•	•	•	•	•	•	•	•	•	•	•
Pipe connection													
Internal thread [NPT]	1.25"	1.25"	1.25"	1.25"	1.25"	1.25"	1.25"	2"	2"	2"	-	-	-

Pump type	MTR, MTRE 1s	MTR, MTRE 1	MTR 2	MTR, MTRE 3	MTR 4	MTR, MTRE 5	MTR, MTRE 8	MTR, MTRE 10	MTR, MTRE 15	MTR, MTRE 20	MTR, MTRE 32	MTR, MTRE 45	MTR, MTRE 64
Flange ANSI Class 125	-	-	-	-	-	-	-	-	-	-	2.5"	3.0"	3.0"
Flange ANSI Class 250	-	-	-	-	-	-	-	-	-	-	2.5" ¹⁾	3.0" ²⁾	3.0" ²⁾
Installation length [in. (mm)]													
MTR	6.3 - 24 (160-610)	6.3 - 24 (160-610)	6.3 - 39.6 (160-1006)	6.3 - 23.3 (160-592)	6.7 - 39.6 (170-1006)	6.7 - 30 (170-762)	7.7 - 39.6 (196-1006)	5.8 - 29.4 (147-747)	7 - 33.6 (178-853)	7 - 33.6 (178-853)	8.8 - 41.9 (224-1064)	9.6 - 41.1 (244-1044)	9.8 - 42.3 (249-1074)
MTRE	9.8 - 24 (249-610)	7.7 - 24 (196-610)	-	7 - 23.3 (178-592)	-	7.7 - 30 (196-762)	9.8 - 21.5 (249-546)	5.8 - 24.5 (147-622)	7 - 24.7 (178-627)	7 - 21.2 (178-538)	8.8 - 22.6 (224-574)	9.6 - 15.9 (244-404)	9.8 - 13.1 (249-333)
Shaft seal													
HUUV	•	•	•	•	•	•	•	•	•	•	•	•	•
HUUE ³⁾	•	•	•	•	•	•	•	•	•	•	•	•	•
HUUK ³⁾	•	•	•	•	•	•	•	•	•	•	•	•	•
HQQE ³⁾	•	•	•	•	•	•	•	•	•	•	•	•	•
HQQV ³⁾	•	•	•	•	•	•	•	•	•	•	•	•	•

1) Standard for more than six impellers for MTR 32.

2) Optional.

3) On request.

MTC

Pump type	MTC 2	MTC 4	MTC 8	MTC 10	MTC 15
Nominal flow rate [US gpm]	13	25	44	53	79
Nominal flow rate [m ³ /h]	3.0	5.7	10	12	18
Temperature range [°F (°C)]	+14 to +194 (-10 to +90)				
Maximum pump efficiency [%]	46.2	49.8	58.1	57.6	59.7
Flow range [US gpm]	1.3 - 17.5	2.5 - 35.5	19.81 - 61.6	26.4 - 79	44-115
Flow range [m ³ /h]	0.3 - 4.0	0.6 - 8.1	4.5 - 14	6 - 15.5	10 - 26
Maximum developed head [H (ft)]	360	305	360	220	157
Maximum developed head [psi]	155	133	144	95	71
Motor power [hp]	0.25 - 2	0.25 - 2	0.75 - 5	1-5	3-5
Pipe connection					
Internal thread [NPT]	0.75"	0.75"	0.75"	1.25"	1.25"
Installation length [in. (mm)]					
MTC	5.7 - 11.4 (145-290)	5.7 - 13.1 (145-333)	7.7 - 13.1 (196-333)	4 - 10 (102-254)	4 - 10 (102-254)
Shaft seal					
AQQV	•	•	•	•	•
AUUE ⁴⁾	•	•	•	•	•

4) On request.

MTA, MTA-H

Pump type	MTA 30	MTA 60	MTA 90	MTA 120	MTA 200	MTA 20H	MTA 40H	MTA 70H	MTA 100H
Rated flow rate [gpm (l/min)]	9.25 (35)	15.9 (60)	25.4 (96)	31.7 (120)	66 (250)	6.3 (24)	11.1 (42)	19 (72)	28.5 (108)
Temperature range [°F (°C)]	32 to 140 (0 to 60)								
Flow range [gpm (l/min)]	0 - 14.8 (0-56)	0 - 26.4 (0-100)	0 - 35.4 (0-134)	0 - 64.7 (0-245)	0-111 (0-420)	0 - 13.7 (0-52)	0 - 21.4 (0-81)	0 - 30.1 (0-114)	0 - 36.5 (0-138)
Maximum developed head (H [ft (m)])	23.3 (7.1)	33.1 (10.1)	33.5 (10.2)	43.6 (13.3)	51.2 (15.6)	27.6 (8.4)	46.6 (14.2)	47.8 (14.6)	62.7 (19.1)
Maximum developed head [psi]	10	14.5	14.8	19.3	22.6	12.2	20.6	21.2	27.7
Motor power [W]	79-145	161-333	219-460	319-755	671-1340	75-145	185-375	198-452	327-725
Pipe connection									
Internal thread	1/2" NPT	3/4" NPT	3/4" NPT	1 1/4" NPT	1 1/2" NPT	1/2" NPT	3/4" NPT	3/4" NPT	1" NPT
Material									
Pump housing	Cast iron	Cast iron	Cast iron	Cast iron	Cast iron	Cast iron	Cast iron	Cast iron	Cast iron
Impeller	PAA GF50	PAA GF50	PAA GF50	PAA GF50	Bronze	Bronze	Bronze	Bronze	Bronze
Installation length [in. (mm)]									
MTA, MTA-H	5.91 (150)	5.12 - 13.78 (130-350)	5.12 - 13.78 (130-350)	7.01 - 13.78 (180-350)	9.84 - 13.78 (250-350)	5.91 (150)	7.01 (180)	9.84 (250)	11.02 (280)
Inlet									
Top inlet	•	•	•	•	-	•	•	•	•
Bottom inlet	•	•	•	•	•	-	-	• ⁵⁾	-

⁵⁾ MTA 70H is available with bottom inlet and PAA GF50 impeller.

5. Identification

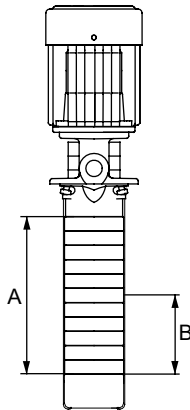
MTR, MTRE identification

Type key for MTR, MTRE

Example of a pump type key.

MTRE 32-2/2-1 A-G-A-HUUV

Code	Explanation
MTR	Pump type
E	Pump with integrated frequency converter
32	Rated flow rate [m ³ /h]
2	Number of chambers
2	Number of impellers
1	Number of impellers with reduced diameter
A	Code for pump version
G	Code for pipe connection
A	Code for materials
	Code for shaft seal:
H	• Shaft seal type designation
U	• Seal face material (rotating seal face)
U	• Seal face material (stationary seal face)
V	• Secondary seal material (rubber parts)



TM014993

Number of chambers (A) and number of impellers (B)

Key to codes

Note that each individual pump type is not available in all variants.

Code	Description
Pump version	
A	Basic version
B	Oversize motor
C	Inlet pipe
D	Drainage back to tank
E	Pump with certificate/approval
F	120 °C version
H	Horizontal version

Code	Description
HS	High pressure
J	E-pump with different maximum speed
L	With extension pipe
P	Undersize motor
T	Double oversize
X	Special version

Pipe connection

F	DIN flange
G	ANSI flange
J	JIS flange
W	Internal thread
WB	NPT internal thread
X	Special version

Materials

A	Basic version
I	Wetted parts EN/DIN 1.4301 / AISI 304
N	Wetted parts EN/DIN 1.4401 / AISI 316
X	Special version

Shaft seal type designation

A	O-ring seal with fixed seal driver
B	Bellows seal, rubber
C	O-ring seal with spring as seal driver
H	Balanced cartridge seal with O-ring
R	O-ring seal, type A, with reduced seal faces

Seal face material (rotating and stationary seal face)

A	Carbon, metal-impregnated
B	Carbon, synthetic resin-impregnated
Q	Silicon carbide
U	Cemented tungsten carbide
V	Metal oxides, ceramic

Secondary seal material (rubber parts)

E	EPDM
F	FXM (Fluoraz [®])
K	FFKM (Kalrez [®])
P	NBR
V	FKM (Viton [®])

MTC identification

Type key for MTC

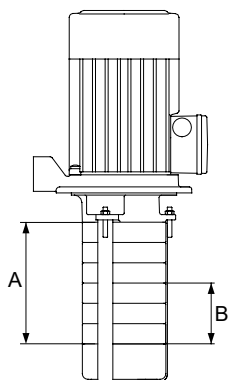
Example: MTC2-6/3-A-W-A-AQQV

Code	Description
MTC	Pump type
2	Rated flow rate [m ³ /h]
-6	Number of chambers
/3	Number of impellers
-A	Code for pump version A: Basic
-W	Internal thread (NPT)
-A	Code for materials A: Basic
-AQQV	Code for shaft seal

Mechanical shaft seal

Example: HUUV

Code	Description
H	A: O-ring seal with fixed driver H: Balanced cartridge seal
UU	Q: Silicone carbide U: Cemented tungsten carbide
V	E: EPDM V: FKM

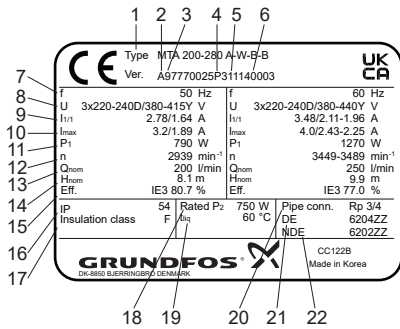


TM014992

Number of chambers (A) and number of impellers (B)

MTA, MTA-H identification

Nameplate



TM051938

Example of a nameplate

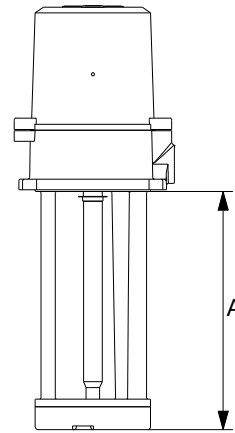
Pos.	Designation
1	Type designation (see type key)
2	Model
3	Product number
4	Place of production
5	Production year and week (YYWW)
6	Serial number
7	Frequency
8	Supply voltage
9	Full-load current
10	Max. current
11	Motor input power
12	Rated speed
13	Rated flow
14	Rated head
15	Efficiency class (only applies to MTA 200)
16	Motor enclosure class
17	Motor insulation class
18	Rated P2
19	Max. temperature of pumped liquid
20	Pipe connection
21	Motor drive-end bearing
22	Motor non-drive-end bearing

Type key for MTA

Example of a pump type key.

MTA 30 H-150 A-W-A-T

Code	Explanation
MTA	Pump type
30	Pump size
H	Pressure type
150	Installation length [mm]
A	Code for pump version
W	Code for pipe connection
A	Impeller material
T	Inlet



TM051021

Installation length (A)

Key to codes

Note that each individual pump type is not available in all variants.

Code	Description
Pump version	
A	Basic version
Pipe connection	
W	Internal thread
WB	NPT internal thread
Impeller material	
A	PAA GF50
B	Bronze
Inlet	
T	Top
B	Bottom

6. Motors

Motors for MTR, MTRE pumps

Motors for MTR pumps

Grundfos standard motors (ML and WEG motors)

MTR pumps are fitted with a Grundfos specified motor. The motors are all heavy-duty 2-pole, NEMA C-face motors built or selected to our rigid specifications. All MTR pump motors have built-in heavy-duty bearings for maximum thrust requirements.

We do not recommend that you use an off-the-shelf standard WEG motor on a Grundfos pump. Ideally, the best motor choice would be the Grundfos specified motor.

ML motors 0.25 to 30 hp

- Three-phase
- service factor 1.35, 1.25 and 1.15.




WEG motors 0.25 to 20 hp

- Rolled steel construction
- service factor 1.15
- suitable for VFD operation per NEMA MG 1 part 31.4.4.2
- certified Class I, Division 2, Groups A, B, C, D
- certified Class II, Division 2, Groups F, G (three-phase only).

WEG motors 25 to 40 hp

- Cast iron frame
- rated for severe duty
- service factor 1.25 (25 to 40 hp)
- Inverter rated per NEMA MG 1 part 31
- certified Class I, Division 2, Groups A, B, C, D
- certified Class II, Division 2, Groups F, G (three-phase only).

Electrical data for ML and WEG motors

Mounting designation	NEMA
Insulation class	F, B
Efficiency	Premium efficiency - EISA compliant
Enclosure class	IP55 TEFC - Totally Enclosed Fan Cooled (Grundfos standard). ODP - Open Drip Proof (on request).
60 Hz standard voltages	1 × 115/208-230 V 3 × 230/460 V 3 × 575 V
Number of poles	2
Approvals, WEG	 
Approvals, Grundfos ML	

Motors for MTRE pumps

Frequency-controlled motors (MLE motors)

MTRE and MTRIE pumps are fitted with a totally enclosed, fan-cooled, 2-pole high-speed Grundfos MLE motor with integrated frequency converter.

Permanent-magnet motors

From 1/2 to 2 hp Grundfos offers MTRE pumps fitted with single-phase MLE motors (1 × 200-240 V).


From 1 to 30 hp Grundfos offers MTRE pumps fitted with three-phase MLE motors (3 × 440-480 V).

From 1 1/2 to 7 1/2 hp Grundfos offers MTRE pumps fitted with three-phase MLE motors (3 × 200-240 V).

See the details below.

See Grundfos Product Center at www.grundfos.com.

Electrical data for MLE motors

Mounting designation	NEMA
Insulation class	F
Efficiency	See MTR, MTRE motor data in the section on TEFC motors (Totally Enclosed Fan Cooled, constant speed).
Enclosure class	Motor: TEFC (Totally Enclosed Fan-Cooled) Variable frequency drive: 1/2 to 15 hp: NEMA Type 3 20 to 30 hp: NEMA Type 12
Supply voltage	1/2 to 2 hp: 1 × 200-240 V
Tolerance: -10 % / +10 %	1 to 30 hp: 3 × 440-480 V 1 1/2 to 7 1/2 hp: 3 × 200-240 V
Approvals, MLE	

Related information

[TEFC motors \(Totally Enclosed Fan Cooled, constant speed\)](#)

Motor protection

MTR, MTRE pumps require no external motor protection. Three-phase motors must be connected to a motor-protective circuit breaker in accordance with local regulations. The MLE motor incorporates thermal protection against slow overloading and blocking (IEC 11: TP 211). A circuit breaker is required to protect the power cable to the motor.

Optional motors

The Grundfos standard range of motors covers a wide variety of application demands. However, for special applications or operating conditions, custom-built motor solutions can be provided.

For special applications or operating conditions, Grundfos offers custom-built motors such as the following:

- explosion-proof motors
- motors with anti-condensation heating unit
- low-noise motors
- motors with thermal protection.

Pumps supplied by Grundfos Canada

Pumps supplied by Grundfos Canada may be supplied with motors from other manufacturers.

575 volt motors meet EPAAct/NRC efficiency standards. Dimensions and data will vary. Contact your local Grundfos company for more information.

Motors for MTC pumps

MTC motors are totally enclosed, fan-cooled, 2-pole 3 phase 230/460V Grundfos standard motors. 575 volt motors are not available for MTC pumps.

7. MLE motors for MTRE

MLE functional modules

MLE permanent-magnet motors 1/2-15 hp

Supply voltage:

1/2 to 2 hp (1 × 200-240 V)

1 to 15 hp (3 × 440-480 V)

1 1/2 to 7 1/2 hp (3 × 200-240 V)

Advanced functional module (FM 300)

MLE 1/2 to 15 hp

The advanced functional module is factory-fitted in all pumps from 1/2 to 15 hp.

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.

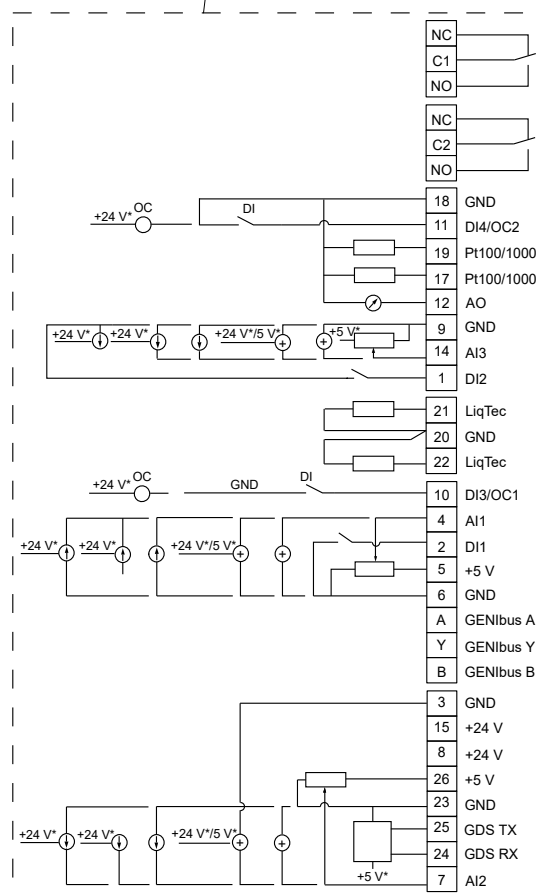
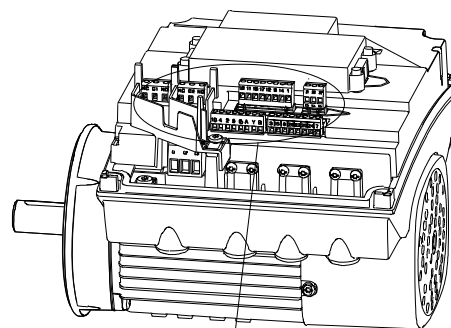
The module has these connections:

- 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 galvanically separated from other circuits. All control terminals are supplied with protective extra-low voltage (PELV), thus 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)



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

Connection terminals, advanced functional module

Terminal	Type	Function
NC	Normally closed contact	Signal relay 1: LIVE or PELV
C1	Common	
NO	Normally open contact	Signal relay 2: PELV only
NC	Normally closed contact	
C2	Common	Signal ground
NO	Normally open contact	
18	GND	Digital input/output, configurable Open collector: Maximum 24 V resistive or inductive
110.5 - 3.5 V or 0-5 V or 0-10 V	DI4/OC2	
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: Maximum 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
5	+5 V	Supply to 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

MLE permanent magnet motors 20-30 hp

Supply voltage:

20 to 30 hp (3 × 440-480 V)

Functional module, FM310 and FM311

MLE 20 to 30 hp

FM310 and FM311 are factory-fitted in all pumps from 20 to 30 hp.

Inputs and outputs

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

The module has these 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
(Safe Torque Off (STO) is a safety function to stop the motor from turning without actively braking it. It follows the definition by EN 61800-5-2.)
- Ethernet connection
- Bluetooth (BLE) connection.⁶⁾

⁶⁾ FM311 is without Bluetooth.

Connection terminals

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

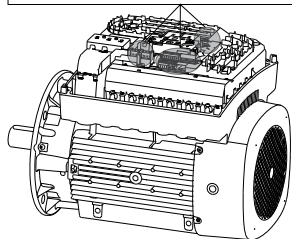
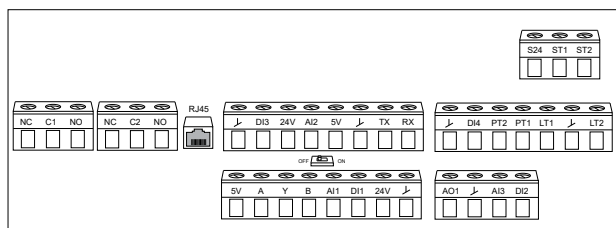
The inputs and outputs are internally separated from the mains-conducting parts by reinforced insulation and galvanically separated from other circuits.

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

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



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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
5V	+5 V	Power supply to a potentiometer or sensor
A	GENIbus, A	GENIbus, A (+) / Modbus, D1 (+)

Terminal	Type	Function
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 ⁷⁾ , 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

⁷⁾ Digital input 1 is factory-set to be start or stop input where an open circuit results in stop. A jumper has been factory-fitted between terminals DI1 and GND. Remove the jumper if digital input 1 is to be used as external start or stop or any other external function.

MLE technical data

Grundfos MLE motors are equipped with NEMA standard C-face flanges.

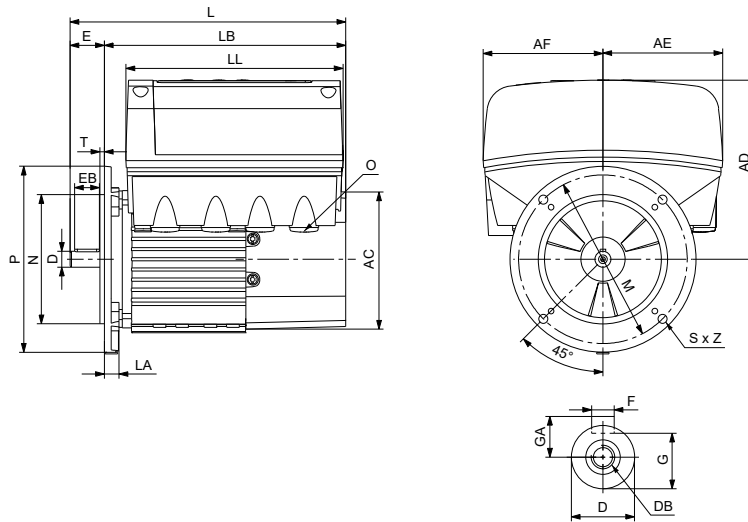
Grundfos MLE motors are recognized under the Component Recognition Program of Underwriters Laboratories Inc. for the United States and Canada.

MLE motors are equipped with a reinforced bearing system with locked bearings at the drive end, either a deep-groove ball bearing or an angular-contact bearing depending on the motor model.

This ensures an even uptake of the load in order to maximize the lifetime of the bearings, which are guaranteed for a minimum of 18,000 hours service life. At the non-drive end, the motors are fitted with bearings with axial clearance to meet production tolerances while allowing for thermal expansion during motor operation. This ensures trouble-free operation and long life.

MLE permanent-magnet motors 1/2-2 hp

(2-pole) 1/60/200-240



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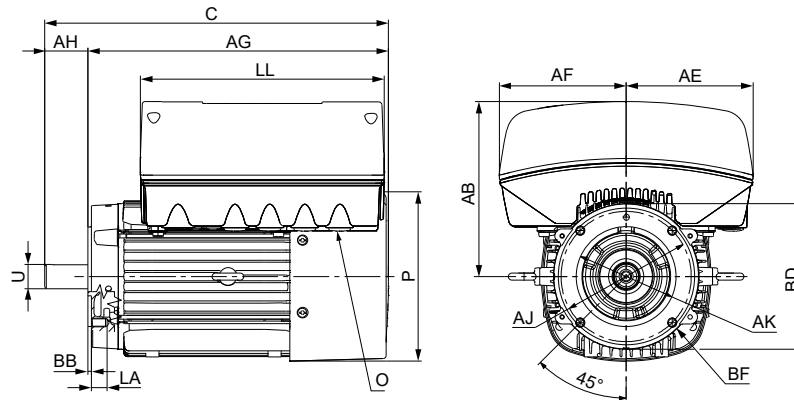
Dimensional data

Power [hp]	Frame	Stator housing [inches (mm)]						Shaft end [inches (mm)]	
		AC	AD	AF	L	LB	LL	D	E
1/2	56C								
3/4		4.80	6.22	4.17	10.55	8.46	7.56	0.63	2.06
1		(122)	(158)	(106)	(268)	(215)	(192)	(15.9)	(52.3)
1 1/2									
2		4.80	6.22	4.17	11.34	9.25	7.56	0.63	2.06
		(122)	(158)	(106)	(288)	(235)	(192)	(15.9)	(52.3)

Power [hp]	Frame	Flange [inches (mm)]						Cable entries [mm]
		LA	M	N	P	S	T	O
1/2	56C							
3/4		0.63	5.87	4.50	6.50	3/8"	0.16	1/2" NPT (4)
1		(16)	(149.2)	(114.3)	(165)		(4)	
1 1/2								
2		1.42	5.87	4.50	6.50	3/8"	0.16	1/2" NPT (4)
		(36)	(149.2)	(114.3)	(165)		(4)	

MLE permanent-magnet motors 1-15 hp

(2-pole) 3/60/440-480



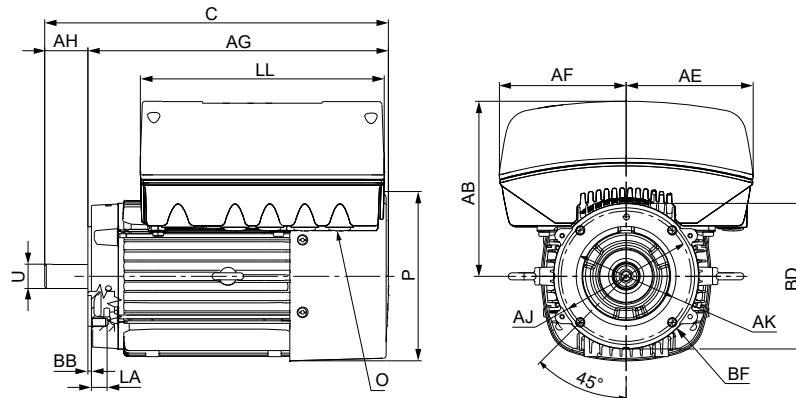
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Dimensional data

Power [hp]	Frame	Stator housing [inches (mm)]						Shaft end [inches (mm)]		
		P	AB	AE	AF	C	AG	LL	U	AH
1	56C	4.80 (122)	6.22 (158)	5.28 (134)	5.28 (134)	12.13 (308)	10.04 (255)	9.13 (232)	0.63 (15.9)	2.06 (52.3)
1 1/2		4.80 (122)	6.22 (158)	5.28 (134)	5.28 (134)	12.91 (328)	10.83 (275)	9.13 (232)	0.63 (15.9)	2.06 (52.3)
2		4.80 (122)	6.22 (158)	5.28 (134)	5.28 (134)	12.39 (314.75)	10.51 (267)	9.13 (232)	0.63 (16.075)	1.88 (47.75)
3	182TC	4.80 (122)	6.22 (158)	5.28 (134)	5.28 (134)	13.46 (342)	10.83 (275)	9.13 (232)	1.13 (28.6)	2.62 (66.6)
5		7.53 (191.3)	7.91 (201)	5.73 (145.5)	5.73 (145.5)	15.89 (403.6)	13.15 (334)	11.02 (280)	1.13 (28.6)	2.74 (69.6)
7 1/2	213TC	7.53 (191.3)	7.91 (201)	5.73 (145.5)	5.73 (145.5)	17.75 (450.9)	14.37 (365)	11.02 (280)	1.37 (34.9)	3.38 (85.9)
10		10.04 (254.9)	9.33 (237)	6.81 (173)	6.81 (173)	18.70 (474.9)	15.31 (389)	12.48 (317)	1.37 (34.9)	3.38 (85.9)
15	254TC	10.04 (254.9)	9.33 (237)	6.81 (173)	6.81 (173)	19.74 (501.3)	15.98 (406)	12.48 (317)	1.63 (41.3)	3.75 (95.3)

Power [hp]	Frame	Flange [inches (mm)]					Cable entries [mm]	
		LA	AJ	AK	BD	BF	BB	O
1	56C	0.63 (16)	5.87 (149.2)	4.50 (114.3)	6.50 (165)	3/8"	0.16 (4)	1/2" NPT (4)
1 1/2		1.42 (36)	5.87 (149.2)	4.50 (114.3)	6.50 (165)	3/8"	0.16 (4)	1/2" NPT (4)
2		0.51 (12.9)	5.87 (149.2)	4.50 (114.3)	6.53 (165.8)	3/8"	0.16 (4)	1/2" NPT (5)
3	182TC	0.75 (19)	7.25 (184.15)	8.50 (215.9)	8.50 (215.9)	0.50 - 13	0.25 (6.35)	1/2" NPT (5)
5		0.79 (20)	7.25 (184.15)	8.50 (215.9)	8.68 (220.5)	0.50 - 13	0.25 (6.35)	3/4" NPT (1) and 1/2" NPT (5)
7 1/2	213TC	0.79 (20)	7.25 (184.15)	8.50 (215.9)	8.68 (220.5)	0.50 - 13	0.25 (6.35)	3/4" NPT (1) and 1/2" NPT (5)
10		0.79 (20)	7.25 (184.15)	8.50 (215.9)	8.68 (220.5)	0.50 - 13	0.25 (6.35)	3/4" NPT (1) and 1/2" NPT (5)
15	254TC	0.79 (20)	7.25 (184.15)	8.50 (215.9)	8.68 (220.5)	0.50 - 13	0.25 (6.35)	3/4" NPT (1) and 1/2" NPT (5)

MLE permanent-magnet motors 1 1/2 - 7 1/2 hp
 (2-pole) 3/60/200-240



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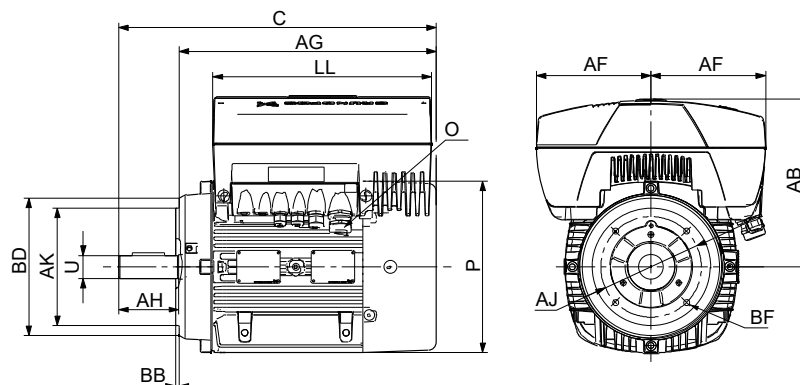
Dimensional data

Power [hp]	Frame	Stator housing [inches (mm)]							Shaft end [inches (mm)]	
		P	AB	AE	AF	C	AG	LL	U	AH
1 1/2	56C	4.80 (122)	6.22 (158)	5.28 (134)	5.28 (134)	12.13 (308)	10.04 (255)	9.13 (232)	0.63 (15.9)	2.06 (52.3)
2		4.80 (122)	6.22 (158)	5.28 (134)	5.28 (134)	12.91 (328)	10.83 (275)	9.13 (232)	0.63 (15.9)	2.06 (52.3)
3	182TC	7.53 (191.3)	7.91 (201)	5.73 (145.5)	5.73 (145.5)	15.89 (403.6)	13.15 (334)	11.02 (280)	1.13 (28.6)	2.74 (69.6)
5		7.53 (191.3)	7.91 (201)	5.73 (145.5)	5.73 (145.5)	15.89 (403.6)	13.15 (334)	11.02 (280)	1.13 (28.6)	2.74 (69.6)
7 1/2	213TC	10.04 (254.9)	9.33 (237)	6.81 (173)	6.81 (173)	18.70 (474.9)	15.31 (389)	12.48 (317)	1.37 (34.9)	3.38 (85.9)

Power [hp]	Frame	Flange [inches (mm)]						Cable entries	
		LA	AJ	AK	BD	BF	BB	O	
1 1/2	56C	0.63 (16)	5.87 (149.2)	4.50 (114.3)	6.50 (165)	3/8"	0.16 (4)	1/2" NPT (4)	
2		1.42 (36)	5.87 (149.2)	4.50 (114.3)	6.50 (165)	3/8"	0.16 (4)	1/2" NPT (4)	
3	182TC	0.75 (19)	7.25 (184.15)	8.50 (215.9)	8.50 (215.9)	0.50 - 13	0.25 (6.35)	1/2" NPT (5)	
5		0.75 (19)	7.25 (184.15)	8.50 (215.9)	8.50 (215.9)	0.50 - 13	0.25 (6.35)	1/2" NPT (5)	
7 1/2	213TC	0.79 (20)	7.25 (184.15)	8.50 (215.9)	8.68 (220.5)	0.50 - 13	0.25 (6.35)	3/4" NPT (1) and 1/2" NPT (5)	

MLE permanent magnet motors 20-30 hp

(2-pole) 3/60/460-480



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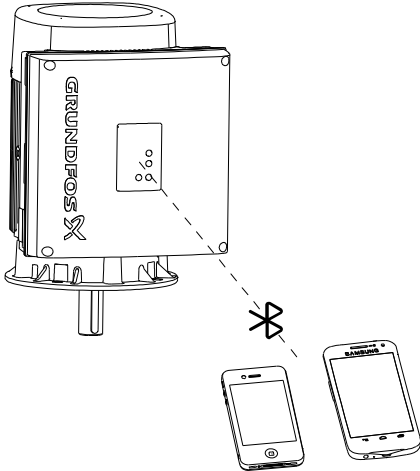
Dimensional data

Power [hp]	Frame	Stator housing [inches (mm)]							Shaft end [inches (mm)]	
		P	AB	AF	AF	C	AG	LL	U	AH
20	256TC	12.52 (318)	11.93 (303)	8.27 (210)	8.27 (210)	22.99 (584)	19.21 (488)	16.3 (414)	1.63 (41)	3.75 (95)
25	284TSC	12.52 (318)	11.93 (303)	8.27 (210)	8.27 (210)	23.23 (590)	20.24 (514)	16.3 (414)	1.63 (41)	3 (76.2)
30	286TSC	12.52 (318)	11.93 (303)	8.27 (210)	8.27 (210)	23.23 (590)	20.24 (514)	16.3 (414)	1.63 (41)	3 (76.2)

Power [hp]	NEMA frame	Flange [inches (mm)]					Cable entries [mm]
		AJ	AK	BD	BF	BB	O
20	256TC	7.25 (184)	8.50 (216)	9.88 (251)	0.50 - 13	0.26 (7)	1 x NPT 1" + 6 x NPT 1/2"
25	284TSC	9.00 (229)	10.50 (267)	10.75 (273)	0.50 - 13	0.32 (8)	1 x NPT 1" + 6 x NPT 1/2"
30	286TSC	9.00 (229)	10.50 (267)	10.75 (273)	0.50 - 13	0.32 (8)	1 x NPT 1" + 6 x NPT 1/2"

Bluetooth

For MLE motors from 20 to 30 hp, the product incorporates a Bluetooth (BLE) module for remote control. Via the built-in Bluetooth module, the product can communicate with the Grundfos GO. Bluetooth communication can take place at distances up to 32.8 ft.



TM082930

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

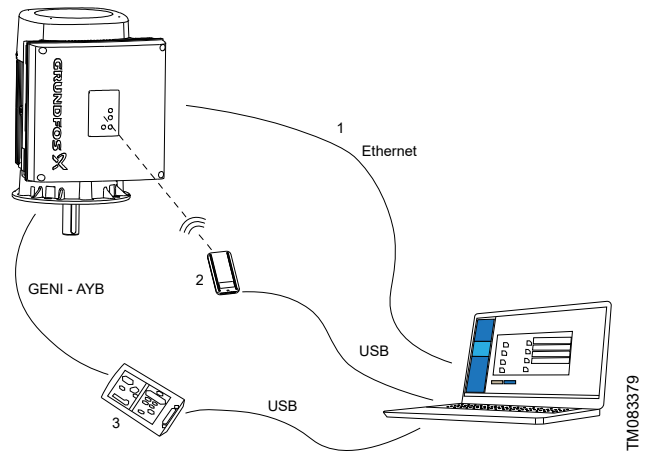
Grundfos GO Link

The product is designed for wired or wireless communication with Grundfos GO Link.

Grundfos GO Link enables you to set functions and gives you access to status overviews, configuration and current operating parameters.

Use Grundfos GO Link together with these interfaces:

- Ethernet cable (Only FM310 and FM311)
- Grundfos MI 301 - USB - Wired/wireless (Only HMI 100, HMI 200 and HMI 300)
- Grundfos MI 301 - USB - Wired/wireless (Only HMI 200 and HMI 300)
- Grundfos PC Tool Link - USB - Wired



TM083379

Grundfos GO Link setup

Pos.	Description
1	Ethernet cable: Standard Ethernet cable CAT5/CAT6.
2	Separate module enabling radio communication. Use the module together with a USB cable to connect to a laptop. Grundfos PC Tool Link:
3	Separate module enabling wired connection to the pump. Use the module together with a USB cable to connect to a laptop.

Safe Torque Off (STO) function

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

The main difference between the STO function and a functional stop using a digital input (for example DI1) is that the 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 the 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. See the section on STO alert handling.

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

8. Advanced use of MLE motors

Grundfos MLE motors have many features for the advanced user.

Grundfos three-phase MLE motors have features such as bearing monitoring, standstill heating, stop function, signal relays, analog sensors and limit exceeded. These features give a unique opportunity to customize the E-pumps.

GO Link gives access to most of the settings available in the products, as well as the possibility of logging and viewing data.

Bearing monitoring

Bearing monitoring is a built-in function indicating the time to relubricate or replace the bearings of the MLE motor. The relubrication feature is only available for three-phase pumps of 15-30 hp.

Purpose and benefits

The purpose of this function is to give an indication to the user when it is time to relubricate or replace the motor bearings. This is important information for maintenance planning.

Bearing monitoring provides these benefits:

- The bearing can be relubricated at the right time according to the manufacturer's recommendations.
- Maximum life of the motor bearings is obtained.
- Maintenance intervals are based on the operating conditions of the bearings.
- No worn-down or damaged bearings, and consequently no costly down-time, due to overseen maintenance.

Description

When the bearing monitoring function determines that it is time to relubricate the bearings, the user will receive a warning via GO Link, a bus or a relay.

When the bearings have been relubricated, a certain number of times, the warning function will inform the user to replace the bearings.

The number of relubrications before bearing replacement is set by Grundfos.

Technical description

The bearing monitoring function is available on two levels for calculating the relubrication interval, basic and advanced:

Bearing monitoring function	
	<p style="text-align: center;">Basic level</p> <p>Calculation of relubrication intervals based on motor revolutions</p> <p>The basic level is a standard feature of the 15-30 hp basic controller and no special functional module is required.</p>
	<p style="text-align: center;">Advanced level [only 15-30 hp]</p> <p>Calculation of relubrication intervals based on motor revolutions and bearing temperature</p> <p>Note that the advanced-level function requires the following:</p> <ul style="list-style-type: none"> • The extended functional module must be fitted in the MLE motor. • Temperature sensors must be fitted at the drive end and at the non-drive end of the motor.

Standstill heating

Standstill heating is a feature ensuring that even during standstill periods the motor windings have a certain minimum temperature.

Purpose and benefits

The purpose of this function is to make the MLE motor more suitable for outdoor installation. During standstill periods, there is a need to keep the motor temperature higher than the ambient temperature to avoid condensation in and on the motor.

Traditionally, this issue has been solved by using an anti-condensation heater on the stator coil heads. Now Grundfos provides this feature by means of a special function within the MLE motor and terminal box.

The MLE motor has standstill heating included. An external heater on the stator coil is not necessary.

Applications

This function is especially suitable in outdoor applications and at installation sites with fluctuating temperatures.

Description

The working principle is that AC voltage is applied to the motor windings. The applied AC voltage will ensure that sufficient heat is generated to avoid condensation in the motor. The terminal box is kept warm and dry by the heat generated via the power supply. However, it is a condition that the terminal box is not exposed to open air. It must be provided with a suitable cover to protect it from rain.

Environmental enclosure ratings

According to UL 778 and C22.2 No 108-14, pumps that are intended for outdoor use must be marked enclosure type 3, and the product must be tested at a rated surface temperature down to -31 °F (-35 °C). The enclosure of the MLE Model H, I and J (1/2 to 15 hp) is approved for type 3 and a rated surface temperature down to 32 °F (0 °C), and thus only for indoor use in UL 778 and C22.2 No 108-14 pump applications. The enclosure of the MGE, MLE Model K (20 to 30 hp) is approved for NEMA type 12 and is suitable for indoor use only. For more information about ambient temperature during operation, see the sections on operating conditions and ambient temperature.

Stop function

The stop function ensures that the pump is stopped at low or no flow. The function is also called low-flow stop function.

Purpose and benefits

The purpose of the stop function is to stop the pump when a low flow rate is detected.

The stop function provides these benefits:

- The energy consumption is optimized and the system efficiency is improved.
- Unnecessary heating of the pumped liquid which damages pumps is avoided.
- Wear of the shaft seals is reduced.
- Noise from operation is reduced.

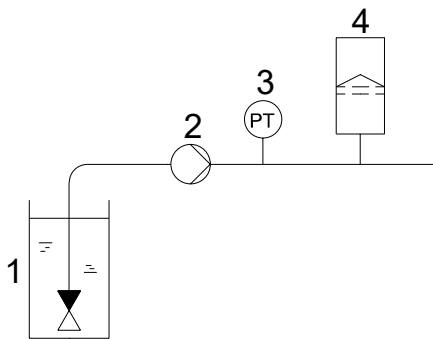
Applications

The stop function is used in systems with periodically low or no consumption, thus preventing the pump from running against a closed valve.

Operating conditions for the stop function

A pressure sensor, a check valve, and a diaphragm tank are required for the stop function to operate properly.

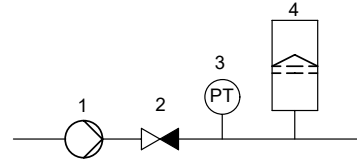
Note that the check valve must always be installed before the pressure sensor. See the two figures below.



TM038582

Position of the check valve and pressure sensor in system with suction lift operation

Pos.	Description
1	Check valve
2	Pump
3	Pressure sensor
4	Diaphragm tank

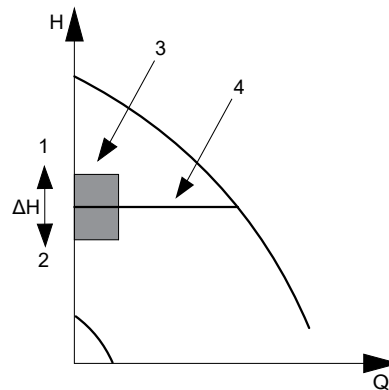


TM038583

Position of the check valve and pressure sensor in system with positive inlet pressure

Pos.	Description
1	Pump
2	Check valve
3	Pressure sensor
4	Diaphragm tank

When a low flow rate is detected, the pump is in on/off operation. If there is flow, the pump will continue operating according to the setpoint. See the figure below.



TM081347

Constant pressure with stop function. Difference between start and stop pressures (ΔH)

Pos.	Description
1	Stop pressure
2	Start pressure
3	On/off operation
4	Continuous operation

Diaphragm tank

The stop function requires a diaphragm tank of a certain size. The tank must be installed near the pump outlet, and the precharge air pressure must be 0.7 x setpoint.

Recommended diaphragm tank size:

MTRE pump	Typical diaphragm tank size [gal (liter)]
1, 3, 5	2 (8)
10	4.4 (17)
15, 20	10.3 (39)
32	14 (53)
45	20 (76)
64	34 (129)

If a diaphragm tank of the above size is installed in the system, no additional adjustment should be necessary. If the tank installed is too small, the pump will start and stop often. The tank size will influence at which flow rate the system will go into start/stop operation.

Description

The low-flow stop function can operate in two different ways:

- by means of an integrated "low-flow detection function"
- by means of an external flow switch connected to the digital input.

Low-flow detection function

- The low-flow detection function will check the flow rate regularly by reducing the speed for a short time. A small change in pressure or no change in pressure means that there is a low flow rate.

Low-flow detection with flow switch

- When a flow switch detects a low flow rate, the digital input will be activated.

Contact Grundfos for further information.

Dry-running protection

This function protects the pump against dry running. When a lack of inlet pressure or water shortage is detected, the pump will be stopped before being damaged.

A lack of inlet pressure or water shortage can be detected with a switch connected to a digital input configured to dry-running protection.

The use of a digital input requires an accessory, such as the following:

- Grundfos Liqtec® dry-running switch
- pressure switch installed on the inlet side of the pump
- float switch installed on the inlet side of the pump.
- The pump cannot restart as long as the digital input is activated.

Signal relays

Signal relays are used to give an output indication of the current operational status of the MLE. The signal relay is a potential-free contact (also called a dry contact). The output signals are typically transmitted to external control systems.

Purpose and benefits

The signal relays offer these features:

- The signal relays can be remotely (via bus) or internally controlled.
- The signal relays can be set to indicate several types of operational status.
- A relay delay can be defined to avoid activating the relay in case of periodic failures.

Applications

Signal relays can be used in all applications involving a need to read out the operational status to, for example, a control room or to a superior control system.

Description

The signal relays for 1/2-30 hp pumps can be set with these three parameters:

- relay control
- relay setup
- relay delay.

Relay control

The relay time is 0 seconds, and the signal relay is internally controlled.

The advanced relay control can only be set via GO Link.

Relay control has these two setting options:

- **Internally controlled**

The relay is internally controlled by the variable-frequency-drive software according to the setup of the relay [Ready, Fault, Operation].

- **Remotely controlled**

The relay is controlled via commands from the GENibus.

Analog sensor inputs 1 and 2

The analog sensor inputs 1 and 2 are standardized inputs for measuring all types of analog parameters.

Sensor input 1 is the only sensor input set for closed-loop operation. The input will be used as the sensor feedback input.

Sensor input 2 is referred to as the secondary sensor.

Purpose and benefits

The analog sensor inputs 1 and 2 provide these benefits:

- Sensor input 1 can be feedback input for the built-in PI controller.
- It is possible to monitor secondary parameters in the process, such as flow rate or liquid temperature.
- The secondary sensor can be set as a redundant sensor.

- The sensors can give input to the limit-exceeded functions 1 and 2.
- Status readings of the inputs are available via Grundfos GO and GO Link.

Applications

Analog sensor inputs 1 and 2 can be used in applications with a need for monitoring essential parameters.

Description

The analog sensors 1 and 2 enable several functions.

- When the secondary sensor is set as an input to the limit-exceeded functions 1 and 2, defined outputs or warnings or alarms can be given when system parameters are outside defined system limits.
- Connecting a flow sensor. When sensor input 2 is set with a flow sensor, the measured value can be used as an input to the proportional-pressure function. The flow rate displayed in Grundfos GO will be the measured flow rate instead of the estimated flow rate. The flow rate measurement can also be used in the low-flow stop function to detect a low flow rate instead of estimating the flow rate by lowering the speed of the pump.
- Sensor reading via Grundfos GO and GO Link. When sensors are set, the user can get a status reading via Grundfos GO and GO Link.

Analog output

Analog output

The analog output (0-10 mA) can be set via GO Link to one of these indications:

- feedback value
- speed
- frequency
- motor current
- external setpoint input
- limit exceeded.

The analog output is default set to not active.

Feedback value

The output signal is a function of the actual feedback sensor.

Speed

The output signal is a function of the actual pump speed.

Frequency

The output signal is a function of the actual frequency.

Motor current

The output signal is a function of the actual motor current.

External setpoint input

The output signal is a function of the external setpoint input.

Limit exceeded

The output signal indicates whether the limit is exceeded:

- Minimum output = limit is not exceeded.
- Maximum output = limit is exceeded.

Limit exceeded 1 and 2

The limit-exceeded function monitors one or two values or inputs. The function enables different inputs to activate various outputs and alarms or warnings when the signal input has exceeded pre-determined limits.

Purpose and benefits

The purpose of this function is to monitor parameters which are central for the application and enable the controller to react to possible, abnormal operating conditions. It is possible to set two limit-exceeded functions and monitor two parameters or two limits of the same parameter simultaneously. This makes the E-pump an important and integrated part of a system, and the E-pump can replace other existing monitoring units.

The function monitors measured parameters such as temperature, pressure, liquid level and flow, as well as internal values such as speed, motor load or motor current.

By monitoring the liquid temperature, the E-pump ensures that the system temperature does not exceed a maximum permissible level.

By monitoring the minimum inlet pressure, the E-pump can prevent damage caused by cavitation or dry running.

Applications

The limit-exceeded function is typically used for monitoring secondary parameters in the systems.

Actions

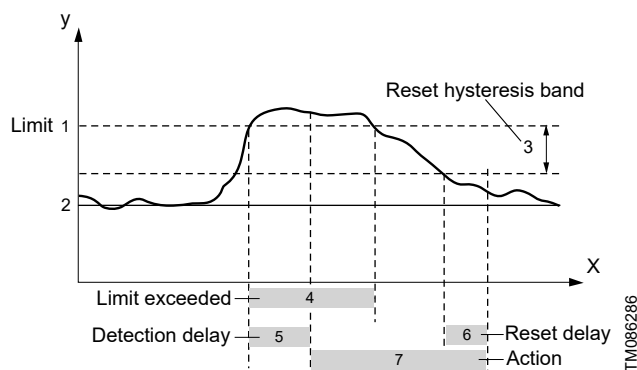
When the signal input exceeds, above or below, the pre-determined limit, the limit-exceeded function is activated and the selected action performed.

The following actions are available:

- **Not active.** The pump remains in its current state. Can be used to only activate a signal relay output when the limit is reached.
- **Stop.** The pump stops.
- **Min.** The pump reduces the speed to minimum speed.
- **Max.** The pump increases the speed to maximum speed.
- **User-defined speed.** The pump runs at a speed set by the user.
- **Alarm and Stop.** An alarm is given, and the pump stops.
- **Alarm and Min.** An alarm is given, and the pump decreases the speed to a minimum.
- **Alarm and Max.** An alarm is given, and the pump increases the speed to a maximum.
- **Alarm and User-defined speed.** An alarm is given, and the pump runs at the speed set by the user.

Example

The function is to monitor the pumped liquid temperature. If the temperature exceeds above the set limit of 180 °F (82 °C) for more than 5 seconds, the action is set to give an alarm and stop the pump. The pump will automatically restart when the temperature has dropped below the reset hysteresis band at 160 °F (71 °C) for more than 6 seconds.

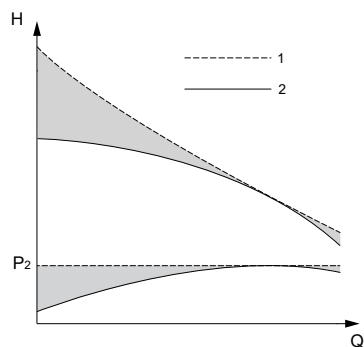


Limit exceeded above the limit

Pos.	Parameter	Setting
y	Measured (monitored)	Pumped liquid temperature
x	Time	Seconds
1	Limit	180 °F (82 °C)
2	Typical value	Typical pumped liquid temperature
3	Reset hysteresis band	20 °F (11 °C)
4	Limit exceeded	Above limit
5	Detection delay	5 seconds
6	Reset delay	6 seconds
7	Action	Alarm and Stop. The limit-exceeded function is active. An alarm is given and the pump stops.

Pump operating at power limit

When a pump is operating at the power limit, the MLE motor will deliver an output corresponding to the maximum load stated on the nameplate. The maximum load will never be exceeded.



Curves of a standard E-pump and a pump operating at power limit

Pos.	Description
1	Power limit
2	Standard

Purpose and benefits

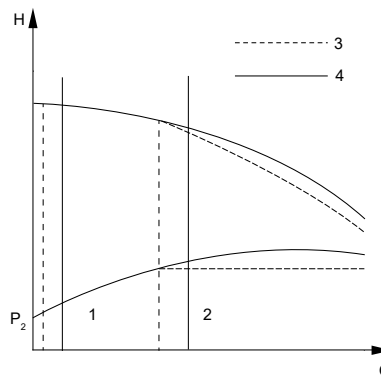
When using a standard pump at a low flow rate, the power consumption will drop and the motor will have excess power available.

By setting the pump to operate at a higher speed, the excess power can be used to provide a higher pressure. The power limit function will make sure that the motor load never exceeds its maximum by decreasing the speed until the motor is at its power limit.

In cases where an undersized motor is used with standard speed, the power limit function will still reduce the speed and protect the motor against overload at a high flow rate. The solution offers the following benefits:

- reduced motor size
- reduced pump size.

The figure below shows that a pump operating at low flow rates and relatively high pressures (1) can be fitted with an undersize motor with a rated power that matches this operating range. At higher flow rates and relatively lower pressures (2), the motor will reduce its speed when the power limit is exceeded and follow a steeper curve corresponding to the power available.

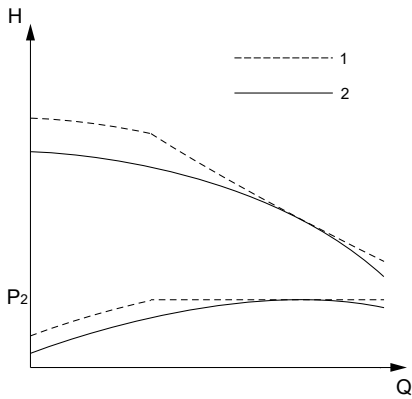


Standard performance curve compared to a curve for a pump fitted with an undersize MLE motor.

Pos.	Description
3	Undersize motor
4	Standard motor

The MLE motor can be set to a higher speed than a standard motor, enabling the pump to deliver more pressure. The pump will operate at this higher speed until the pump reaches the flow rate where the motor is loaded to its full rated power. If the flow rate is increased further, the motor will reduce its speed so as not to exceed its rated power.

Using this function can, in some instances, enable the use of a smaller pump to reach the desired duty point compared to a pump running with standard maximum speed.



TM053314

Standard performance curve (60 Hz) compared to a performance curve for a pump running at maximum speed.

Pos.	Description
1	Maximum speed
2	Standard speed

Applications

The power limit function is primarily used in applications where the motor size is dimensioned to be as small as possible to reduce size or cost. It is also used in applications demanding a high maximum speed to achieve a high pressure at a low flow rate. In both cases, the motor is protected by the power limit function at a higher flow rate where a lower speed is needed to prevent the motor from overloading.

Examples of applications:

- Washing and cleaning
- Boiler feed.

Setup

The power limit is always active in pumps to protect the motor against overload. Pumps with an undersize motor and pumps with a higher maximum speed are available as factory-configured products.

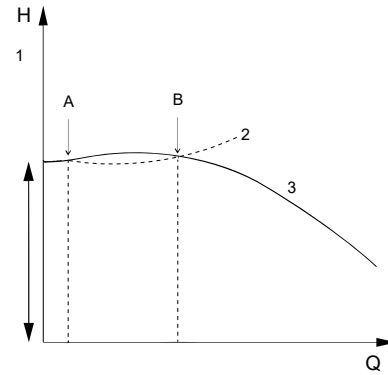
Note that running the pump at over-synchronous speed will affect the NPSH value, thus requiring a sufficient inlet pressure to avoid cavitation.

The sound pressure level emitted from the pump and motor may increase at higher speeds.

Furthermore, the differential pressure over the chambers must be taken into consideration.

Stabilizing unstable pump curves

When the pump curve has a shape where it intersects the system curve in two points (A and B) with identical pressure but at different flow rates, the pump curve is defined as unstable. See the figure below. This is especially problematic in systems with a flat system characteristic as it prevents the pump from being controlled to a flow rate which is lower than the flow rate at point B.

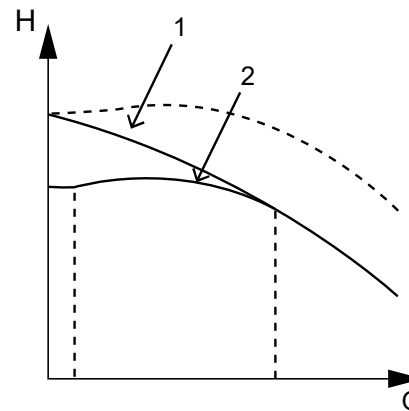


TM069673

Unstable pump curve

Pos.	Description
1	Counter pressure
2	Flat system characteristic
3	Unstable curve

The E-motor can stabilize an unstable pump curve in the low-flow area by changing to a higher speed. The figure below illustrates how the pump curve is straightened out in this area. As the flow rate increases, the E-motor gradually reduces the speed to normal speed and the pump performance will follow the standard pump curve.



TM069671

Pump curve with a stabilized operating range

Pos.	Description
1	Stabilized pump curve
2	Unstable standard pump curve

Purpose and benefits

The purpose of stabilizing an unstable pump is to enable normal control throughout the entire operating range. Thus fully stable operation is achieved, even in the low-flow range. This enables the use of modern high-efficiency pumps in applications where this would otherwise not be possible.

Applications

As mentioned, unstable operation may occur in applications with a high counter pressure and a flat system characteristic.

Examples of applications:

- pumping of water to a water tower
- boiler feed.

Note that the sound pressure level emitted from the pump and motor may increase at higher speeds.

Setup

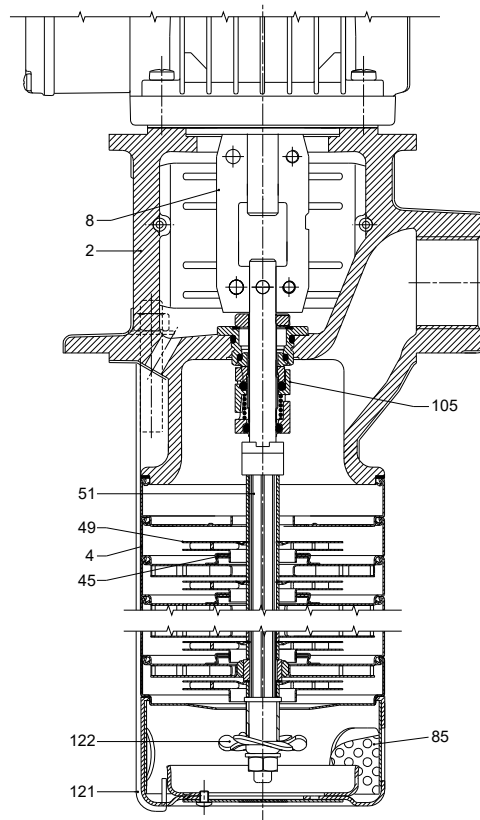
This function is available in factory-configured products.

9. Construction

Construction of MTR pumps

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

Sectional drawing



TM028687

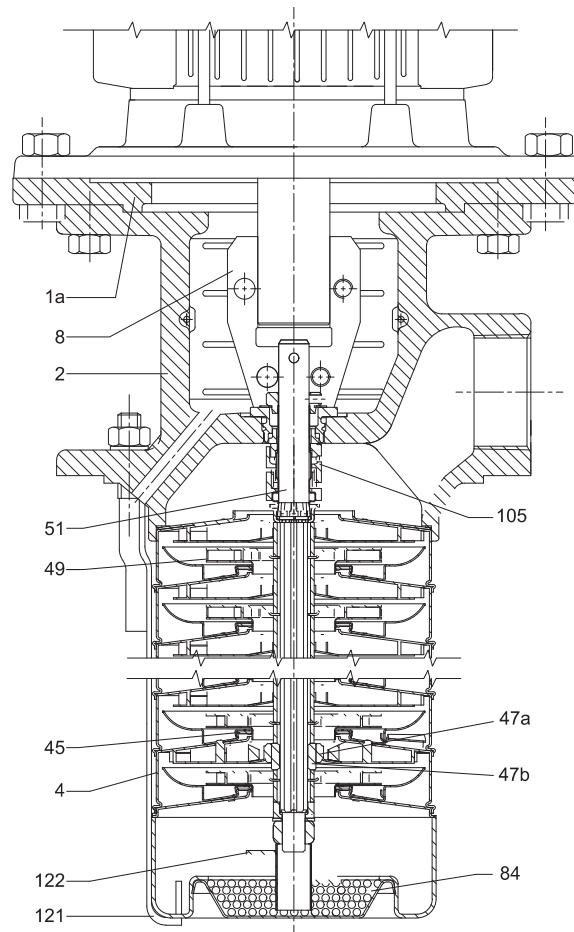
MTR, MTRE 1s, 1, 3, 5 and 8

Materials

Pos.	Description	A-version			I-version			N-version		
		Materials	EN/DIN	AISI/ASTM	Materials	EN/DIN	AISI/ASTM	Materials	EN/DIN	AISI/ASTM
2	Pump head	Cast iron	EN-GJL-200	ASTM 25B	Stainless steel	1.4408	CF8M	Stainless steel	1.4408	CF8M
4	Chamber	Stainless steel	1.4301	AISI 304	Stainless steel	1.4301	AISI 304	Stainless steel	1.4401	AISI 316
8	Coupling	Sintered metal	-	-	Sintered metal	-	-	Sintered metal	-	-
45	Neck ring	PTFE	-	-	PTFE	-	-	PTFE	-	-
47a	Bearing ring, stationary	Silicon carbide	-	-	Silicon carbide	-	-	Silicon carbide	-	-
47b	Bearing ring, rotating	Silicon carbide	-	-	Silicon carbide	-	-	Silicon carbide	-	-
49	Impeller	Stainless steel	1.4301	AISI 304	Stainless steel	1.4301	AISI 304	Stainless steel	1.4401	AISI 316
51	Pump shaft	Stainless steel	1.4401	AISI 316	Stainless steel	1.4401	AISI 316	Stainless steel	1.4401	AISI 316
84	Inlet strainer	Stainless steel	1.4301	AISI 304	Stainless steel	1.4301	AISI 304	Stainless steel	1.4401	AISI 316
85	Strainer internal	Stainless steel	1.4301	AISI 304	Stainless steel	1.4301	AISI 304	Stainless steel	1.4401	AISI 316
105	Shaft seal	HUUV/HUUE	-	-	HUUV/HUUE	-	-	HUUV/HUUE	-	-
121	Strap	Stainless steel	1.4301	AISI 304	Stainless steel	1.4301	AISI 304	Stainless steel	1.4539	AISI 904L
122	Priming screw	Stainless steel	1.4301	AISI 304	Stainless steel	1.4301	AISI 304	Stainless steel	1.4401	AISI 316

MTR, MTRE 10, 15, 20

Sectional drawing



TM028688

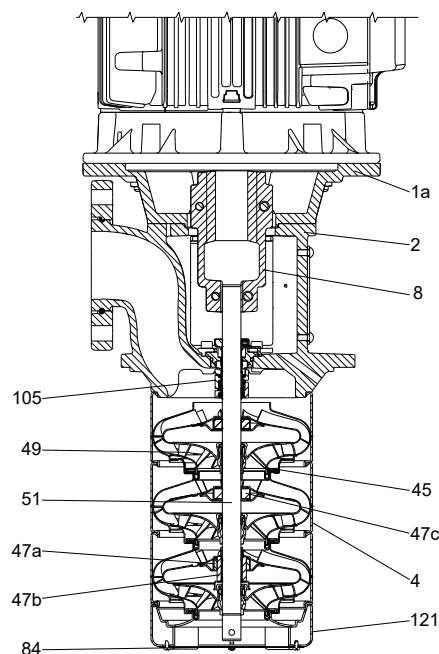
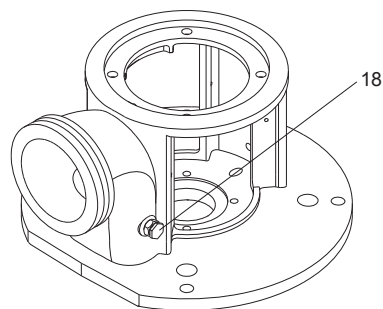
MTR, MTRE 10, 15 and 20

Materials

Pos.	Description	A-version			I-version			N-version		
		Materials	EN/DIN	AISI/ASTM	Materials	EN/DIN	AISI/ASTM	Materials	EN/DIN	AISI/ASTM
1a	Motor stool	Cast iron	EN-GJL-200	ASTM 25B	Cast iron	EN-GJL-200	ASTM 25B	Cast iron	EN-GJL-200	ASTM 25B
2	Pump head	Cast iron	EN-GJL-200	ASTM 25B	Stainless steel	1.4408	CF8M	Stainless steel	1.4408	CF8M
4	Chamber	Stainless steel	1.4301	AISI 304	Stainless steel	1.4301	AISI 304	Stainless steel	1.4401	AISI 316
8	Coupling	Sintered metal	-	-	Sintered metal	-	-	Sintered metal	-	-
45	Neck ring	PTFE	-	-	PTFE	-	-	PTFE	-	-
47a	Bearing ring, stationary	Silicon carbide	-	-	Silicon carbide	-	-	Silicon carbide	-	-
47b	Bearing ring, rotating	Silicon carbide	-	-	Silicon carbide	-	-	Silicon carbide	-	-
49	Impeller	Stainless steel	1.4301	AISI 304	Stainless steel	1.4301	AISI 304	Stainless steel	1.4401	AISI 316
51	Pump shaft	Stainless steel	1.4057	AISI 431	Stainless steel	1.4460		Stainless steel	1.4460	
84	Inlet strainer	Stainless steel	1.4301	AISI 304	Stainless steel	1.4301	AISI 304	Stainless steel	1.4401	AISI 316
105	Shaft seal	HUUV/HUUE	-	-	HUUV/HUUE	-	-	HUUV/HUUE	-	-
121	Strap	Stainless steel	1.4301	AISI 304	Stainless steel	1.4301	AISI 304	Stainless steel	1.4539	AISI 904L
122	Priming screw	Stainless steel	1.4301	AISI 304	Stainless steel	1.4301	AISI 304	-	-	-

MTR, MTRE 32, 45, 64

Sectional drawing



TM067514

MTR, MTRE 32, 45 and 64

Materials

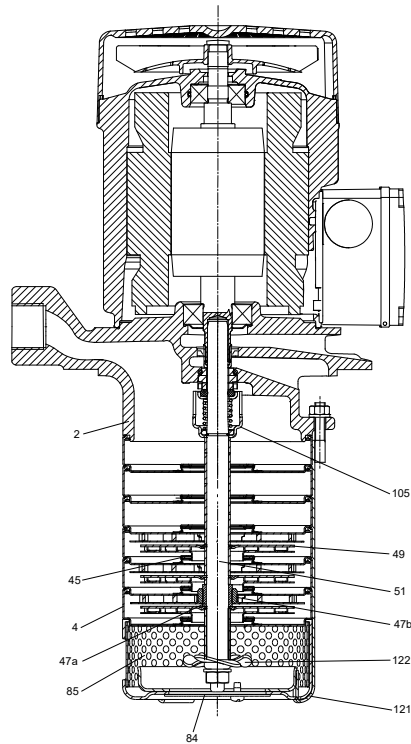
Pos.	Description	A-version			I-version			N-version		
		Materials	EN/DIN	AISI/ASTM	Materials	EN/DIN	AISI/ASTM	Materials	EN/DIN	AISI/ASTM
1a	Motor stool	Cast iron	EN-GJL-200	ASTM 25B	Cast iron	EN-GJL-200	ASTM 25B	Cast iron	EN-GJL-200	ASTM 25B
2	Pump head	Cast iron	EN-GJL-200	ASTM 25B	Stainless steel	1.4408	CF8M	Stainless steel	1.4408	CF8M
4	Chamber	Stainless steel	1.4301	AISI 304	Stainless steel	1.4301	AISI 304	Stainless steel	1.4401	AISI 316
8	Coupling	Nodular iron	EN-GJS-500-7	ASTM 80-55-06	Nodular iron	EN-GJS-500-7	ASTM 80-55-06	Nodular iron	EN-GJS-500-7	ASTM 80-55-06
18	Vent screw	Stainless steel	1.4301	AISI 304	Stainless steel	1.4301	AISI 304	Stainless steel	1.4401	AISI 316
45	Neck ring	PTFE	-	-	PTFE	-	-	PTFE	-	-
47a	Bearing ring, stationary	Silicon carbide	-	-	Silicon carbide	-	-	Silicon carbide	-	-
47b	Bearing ring, rotating	Silicon carbide	-	-	Silicon carbide	-	-	Silicon carbide	-	-
47c	Bush	Graflon®, HY49	-	-	Graflon®, HY49	-	-	Graflon®, HY49	-	-
49	Impeller	Stainless steel	1.4301	AISI 304	Stainless steel	1.4301	AISI 304	Stainless steel	1.4401	AISI 316
51	Pump shaft	Stainless steel	1.4057	AISI 431	Stainless steel	1.4462	-	Stainless steel	1.4462	-
-	O-ring*	A-version: NBR	-	-	Depending on rubber material in shaft seal	-	-	Depending on rubber material in shaft seal	-	-
84	Inlet strainer	Stainless steel	1.4301	AISI 304	Stainless steel	1.4301	AISI 304	Stainless steel	1.4401	AISI 316
105	Shaft seal	HUUV/HUUE	-	-	HUUV/HUUE	-	-	HUUV/HUUE	-	-
121	Strap	Stainless steel	1.4301	AISI 304	Stainless steel	1.4301	AISI 304	Stainless steel	1.4539	AISI 904L

* Only used in pumps with empty chambers.

Construction of MTC pumps

MTC 2, 4, 8

Sectional drawing



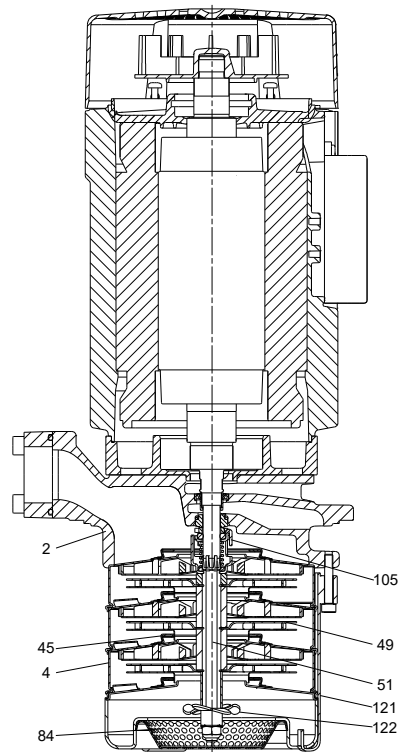
TM062773

MTC 2, 4, 8

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	I-version: stainless steel	1.4301	AISI 304
45	Neck ring	PTFE	-	-
47a	Bearing ring	MTC 2: SiC EkasiC F	-	-
		MTC 4: AL 203-95-100 % (HILOX 961/3)	-	-
		MTC 8: Silicon carbide	-	-
47b	Bearing	MTC 2: SiC EkasiC P	-	-
		MTC 4: Tungsten carbide	-	-
		MTC 8: Silicon carbide	-	-
49	Impeller	Stainless steel	1.4301	AISI 304
51	Pump shaft	Stainless steel	1.4057	AISI 431
84	Inlet strainer	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

MTC 10, 15



TM069651

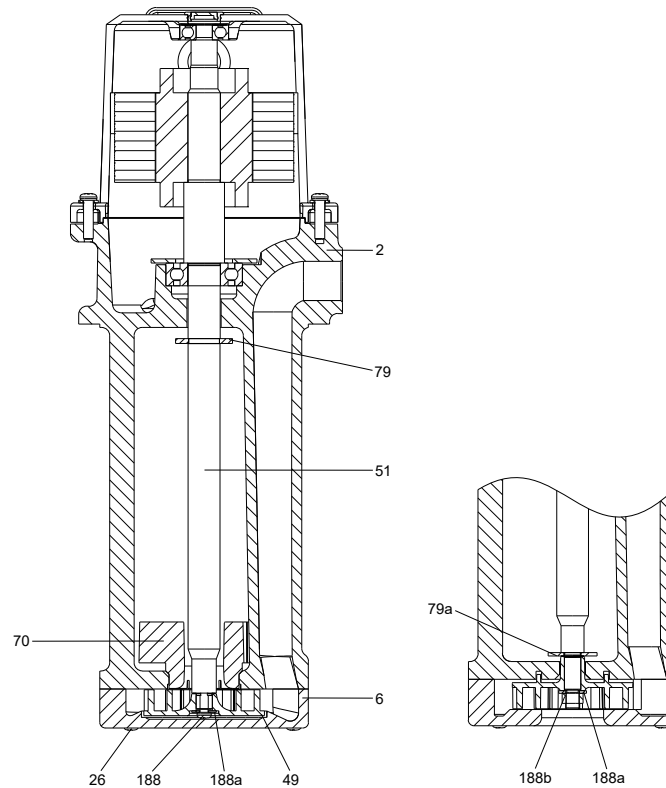
MTC 10, 15

Materials

Pos.	Description	A-version			I-version		
		Materials	EN/DIN	AISI/ASTM	Materials	EN/DIN	AISI/ASTM
2	Pump head	Cast iron	EN-GJL-200	ASTM 25B	Stainless steel	1.4408	CF8M
4	Chamber	Stainless steel	1.4301	AISI 304	Stainless steel	1.4301	AISI 304
45	Neck ring	PTFE	-	-	PTFE	-	-
49	Impeller	Stainless steel	1.4301	AISI 304	Stainless steel	1.4301	AISI 304
51	Pump shaft	Stainless steel	1.4057	AISI 431	Stainless steel	1.4057	AISI 431
84	Inlet strainer	Stainless steel	1.4301	AISI 304	Stainless steel	1.4301	AISI 304
105	Shaft seal	AQQV	-	-	AQQV	-	-
121	Strap	Stainless steel	1.4301	AISI 304	Stainless steel	1.4301	AISI 304
122	Priming screw	Stainless steel	1.4301	AISI 304	Stainless steel	1.4301	AISI 304

Construction of MTA pumps

MTA 30, 60, 90, 20H, 40H, 70H



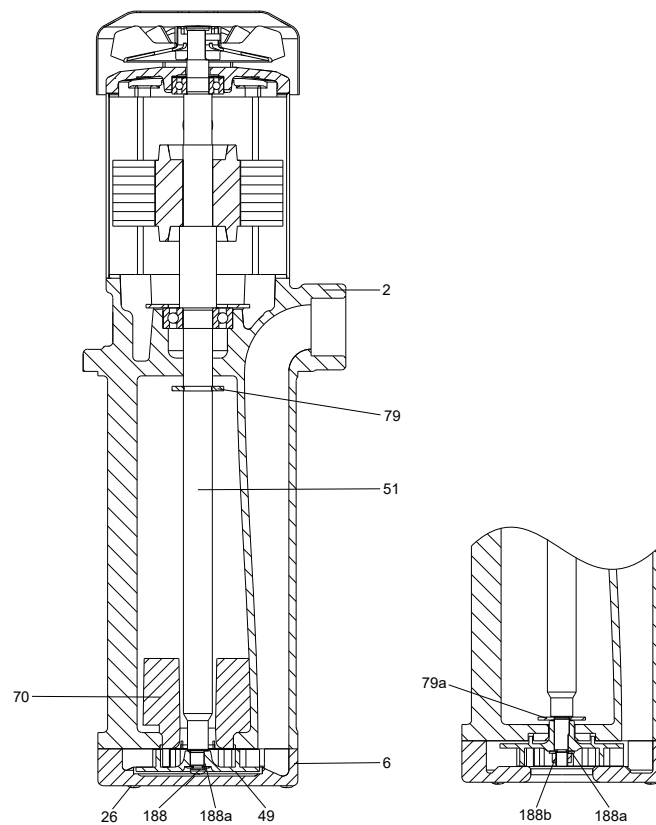
TM050894

Pos.	Description	Materials	EN/DIN	AISI/ASTM	JIS
2	Pump head	Cast iron	GG20	A48-CL30	FC200
6	Pump housing	Cast iron	GG20	A48-CL30	FC200
26	Screw	Stainless steel	1.4301	A276-304	SUS304
49	Impeller	MTA 30, 60, 90, 70H ⁸⁾	PAA GF50	-	-
		MTA 20H, 40H, 70H ⁹⁾	Bronze casting	G-CuZn-5ZnPb	C92200
51	Shaft with rotor	Steel	C45	A108-1045	S45C
70	Vortex preventer	MTA 90	PP	-	-
79	Thrower	NBR	-	-	-
79a	Splash ring	Steel	1623 ST 12	A366	SPCC
188	Cross-head screw	Stainless steel	1.4301	A276-304	SUS304
188a	Washer	Stainless steel	1.4301	A276-304	SUS304
188b	Hexagon nut	Stainless steel	1.4301	A276-304	SUS304
-	Terminal box	Aluminium	-	-	-

⁸⁾ MTA 70H, bottom inlet.

⁹⁾ MTA 70H, top inlet.

MTA 120, 200, 100H



TM050895

Pos.	Description	Materials	EN/DIN	AISI/ASTM	JIS
2	Pump head	Cast iron	GG20	A48-CL30	FC200
6	Pump housing	Cast iron	GG20	A48-CL30	FC200
26	Screw	Stainless steel	1.4301	A276-304	SUS304
49	Impeller	Bronze casting	G-CuZn-5ZnPb	C92200	BC7
		MTA 120	PAA GF 50	-	-
51	Shaft with rotor	Steel	C45	A108-1045	S45C
70	Vortex preventer	MTA 120	PP	-	-
79	Thrower	NBR	-	-	-
79a	Splash ring	Steel	1623 ST 12	A366	SPCC
188	Cross-head screw	Stainless steel	1.4301	A276-304	SUS304
188a	Washer	Stainless steel	1.4301	A276-304	SUS304
188b	Hexagon nut	Stainless steel	1.4301	A276-304	SUS304
-	Terminal box	Aluminium	-	-	-

10. Operating conditions

MTR, MTRE

Ambient temperature and installation altitude

The ambient temperature and the installation altitude are important factors for the motor life as they affect the bearings and the insulation system. The installation altitude is the height of the installation site above sea level.

Motors installed up to the maximum ambient temperature and altitude can be loaded 100 %.

If the ambient temperature or the installation altitude exceeds the recommended maximum values, the motor must not be fully loaded due to risk of overheating. Overheating may result from excessive ambient temperatures or high altitudes with low density and low cooling effect of the air.

In such cases, it may be necessary to select an oversized motor with a higher rated output. To determine the motor load, it is necessary to calculate the derated motor power.

Maximum ambient temperature and altitude for Grundfos ML motors

The maximum ambient temperature at which IE3 motors can operate is 140 °F (60 °C). The motor can run and still be within the tolerance of the insulation class at the maximum rated temperature.

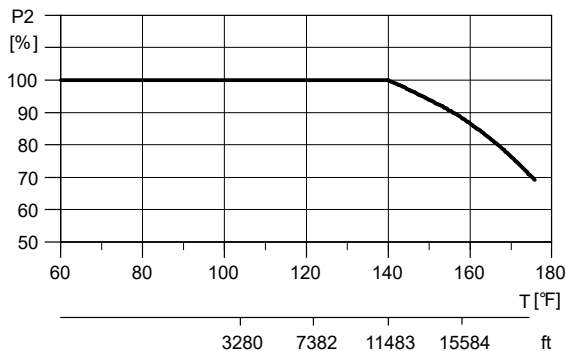
The maximum altitude is 3280 feet (1000 meters).

Motor output derating factors

If the ambient temperature exceeds the maximum temperature limits of the pump or the pump is installed at an altitude exceeding the altitude values in the chart below, the motor must not be fully loaded due to risk of overheating.

Overheating may result from excessive ambient temperatures or the low density and consequently low cooling effect of the air at high altitudes. In such cases, it may be necessary to use a motor with a higher rated output (P2).

Motor load for Grundfos ML motors



Relationship between motor output (P2) and ambient temperature (T) and altitude (ft)

Example of maximum motor load

From the figure above, it appears that P2 must be reduced to 88 % when a pump with a NEMA premium-efficiency ML motor is installed at 15,584 ft (4750 m) above sea level. At an ambient temperature of 167 °F (75 °C), P2 of a standard-efficiency motor must be reduced to 74 % of rated output.

In cases where both the maximum temperature and the maximum altitude are exceeded, the derating factors must be multiplied.

Example: $0.89 \times 0.89 = 0.79$.

Maximum ambient temperature and altitude for WEG motors

Unless otherwise specified, the rated power outputs shown in the electrical data tables within this Data Booklet refer to continuous duty operation S1, as per NEMA MG-1 Part 14 and under the following conditions:

- with ambient temperature range -22 °F (-30 °C) to 104 °F (40 °C)
- with altitudes up to 3280 ft (1000 m).

For operating temperatures and altitudes differing from those above, the factors indicated in the following table must be applied to the nominal motor power rating in order to determine the derated available output (P_{max}).

$$P_{max} = P_{nom} \times \text{correction factor}$$

Temperature [°F (°C)]	Altitude [ft (m)]									
	3280 (1000)	4921 (1500)	6562 (2000)	8202 (2500)	9843 (3000)	11483 (3500)	13123 (4000)	14764 (4500)	16404 (5000)	
50 (10)							0.97	0.92	0.88	
59 (15)						0.98	0.94	0.90	0.86	
68 (20)				1.00	0.95	0.91	0.87	0.83		
77 (25)			1.00	0.95	0.93	0.89	0.85	0.81		
86 (30)		1.00	0.96	0.92	0.90	0.86	0.82	0.78		
95 (35)	1.00	0.95	0.93	0.90	0.88	0.84	0.80	0.75		
104 (40)	1.00	0.97	0.94	0.90	0.86	0.82	0.80	0.76	0.71	
113 (45)	0.95	0.92	0.90	0.88	0.85	0.81	0.78	0.74	0.69	
122 (50)	0.92	0.90	0.87	0.85	0.82	0.80	0.77	0.72	0.67	
131 (55)	0.88	0.85	0.83	0.81	0.78	0.76	0.73	0.70	0.65	
140 (60)	0.83	0.82	0.80	0.77	0.75	0.73	0.70	0.67	0.62	
149 (65)	0.79	0.76	0.74	0.72	0.70	0.68	0.66	0.62	0.58	
158 (70)	0.74	0.71	0.69	0.67	0.66	0.64	0.62	0.58	0.53	
167 (75)	0.70	0.68	0.66	0.64	0.62	0.60	0.58	0.53	0.49	
176 (80)	0.65	0.64	0.62	0.60	0.58	0.56	0.55	0.48	0.44	

TM086611

Maximum ambient temperature and altitude for Grundfos MLE motors

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

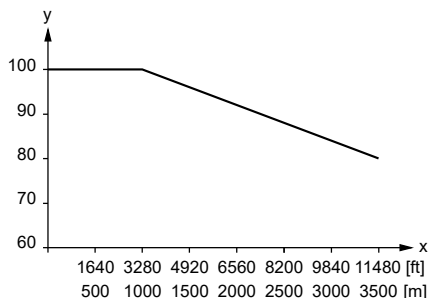
Motor efficiency class: IE5

Motor power [hp]	Motor make	Voltage [V]	Max. ambient temperature [°F (°C)]	Max. altitude above sea level [ft (m)]
1/2 to 2	MLE	1 × 200-240	122 (50)	
1 1/2 to 7 1/2	MLE	3 × 200-240	104 (40)	3280 (1000)
1 to 30	MLE	3 × 440-480	122 (50)	

Motor load for Grundfos MLE motors

MLE motors can be installed up to 11 480 ft (3500 m) above sea level.

Motors installed above the maximum installation altitude of 3280 ft (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 P_2 % (y-axis) in relation to installation altitude above sea level in feet (x-axis)

Viscosity

Pump	Maximum kinematic viscosity of pumped liquid [cSt] = [mm ² /s]
MTR 1s, 1, 3, 5, 8	50
MTR 10, 15, 20, 32, 45, 64	100
MTA	75

Pumping liquids with densities or kinematic viscosities higher than those of water will cause a considerable pressure drop, a drop in the hydraulic performance and a rise in the power consumption.

In such situations you must equip the pump with a larger motor. If in doubt, contact Grundfos.

For further information about pump performance when pumping liquids with densities or kinematic viscosities higher than those of water, see Grundfos Product Center at <http://product-selection.grundfos.com/>.

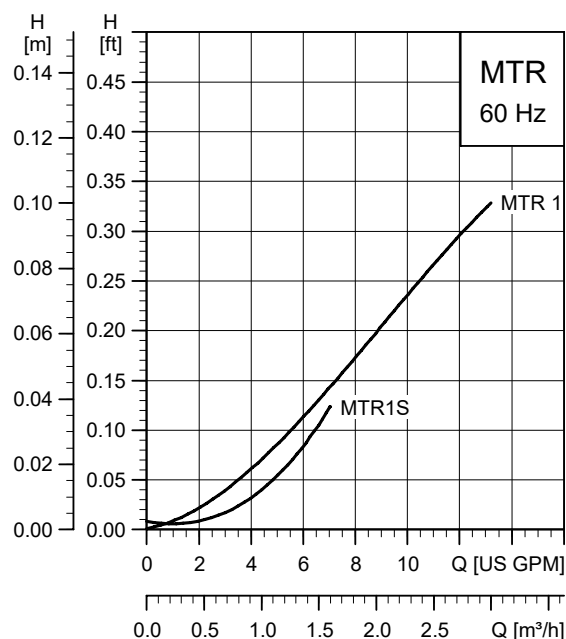
Related information

18. Grundfos Product Center

Pressure loss

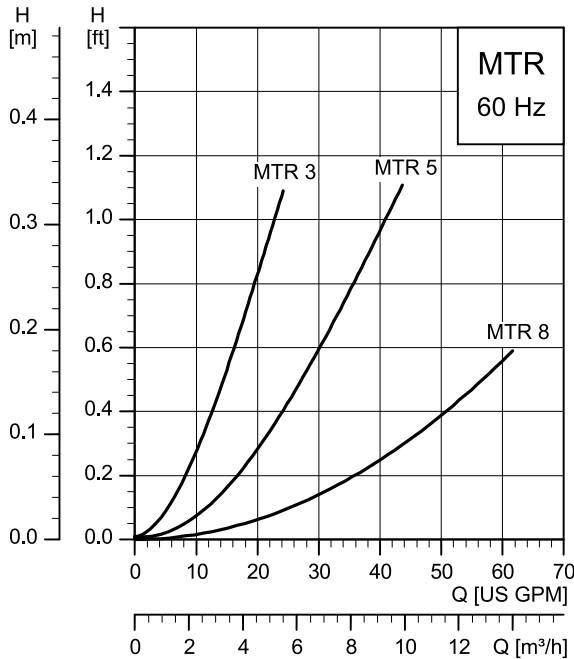
During operation pressure losses occur in all centrifugal pumps.

The below curves illustrate the pressure losses for pumped liquid passing through one empty chamber. An empty chamber is a chamber without an impeller.

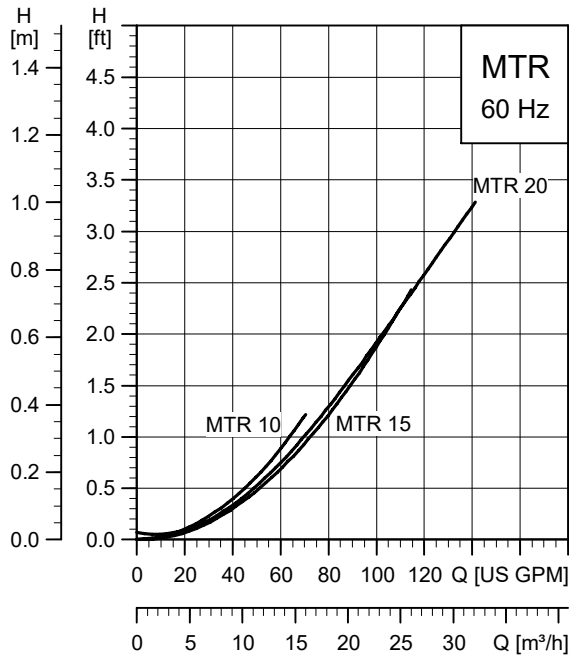


Pressure losses of pumped liquid passing through an empty chamber for MTR 1s and MTR 1 pumps

TM034273



Pressure losses of pumped liquid passing through an empty chamber for MTR 3, MTR 5 and MTR 8 pumps



Pressure losses of pumped liquid passing through an empty chamber for MTR 10, MTR 15 and MTR 20 pumps

As MTR, MTRE 32, 45 and 64 pumps have holes in the guide vanes, no pressure losses occur in the empty chambers of these pumps.

Calculation of the reduced head of a pump and pressure loss in empty chambers

By combining the pressure loss curves and the performance curves for each pump type, you can calculate the reduced head of a pump with empty chambers.

You can do the calculation as shown below.

Example:

Pump type	MTR 5-18/7
Flow rate Q (duty point)	25 gpm (5.67 m³/hr)
Head (duty point)	180 ft (55 m)

The selected pump is an MTR 5-18/7 with 11 empty chambers. See type keys in the section on the MTR, MTRE type key.

From the above pressure loss curve of MTR 5, it appears that the pressure loss of each empty chamber at 25 gpm (5.67 m³/hr) is 0.46 ft (0.14 m). This results in the following total pressure loss:

$$\text{(Total pressure loss)} = 0.46 \times 11 = 5 \text{ ft (1.5 m)}$$

The reduced head of the MTR 5-18/7 pump including pressure losses caused by empty chambers is:

$$\text{Head} = 185 - 5 = 180 \text{ ft (55 m)}$$

The head 185 ft (56 m) is read from the performance curve for an MTR 5-18/7. See the section on MTR, MTRE 5, 60 Hz.

Related information

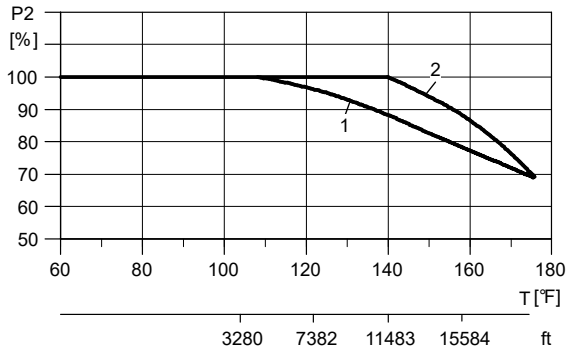
- [Type key for MTR, MTRE](#)
- [MTR, MTRE 5, 60 Hz](#)

MTC

Ambient temperature

Maximum ambient temperature: 104 °F (40 °C).

If the ambient temperature exceeds 104 °F (40 °C) or if the motor is located 3280 ft (1000 m) above sea level, the motor output (P_2) 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.



TM034272

Relationship between motor output (P_2) and ambient temperature/altitude

Key

Pos.	Description
1	NEMA energy-efficient motors
2	NEMA Premium Efficiency motors

Example: The above figure and key indicate that P_2 must be reduced to 88 % when a pump with a NEMA Premium Efficiency, ML motor is installed 15584 feet above sea level.

Maximum operating pressure

Immersible pump model	Maximum permissible operating pressure	
	NPT threads [psi (bar)]	ANSI flange
MTC 2, 4, 8, 10, 15	145 (10)	-

Sound pressure level

All MTC pumps have a sound pressure level below 70 dB(A).

Viscosity

Immersible pump model	Max. kinematic viscosity
MTC	50 Cst.

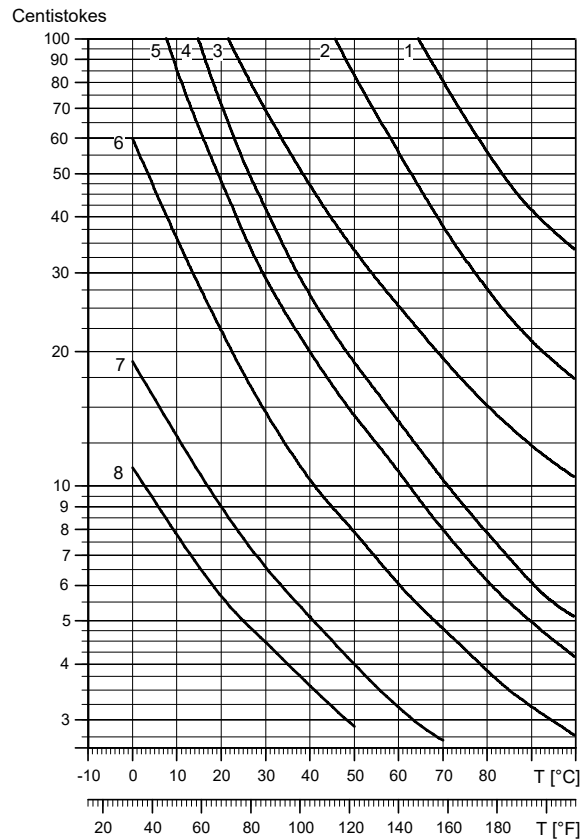
For further information about pump performance when pumping liquids with densities or kinematic viscosities higher than those of water, see the section on Grundfos Product Center.

Related information

[18. Grundfos Product Center](#)

Viscosity of different oils

The curves below show the viscosity of different oils in relation to oil temperature.



TM038140

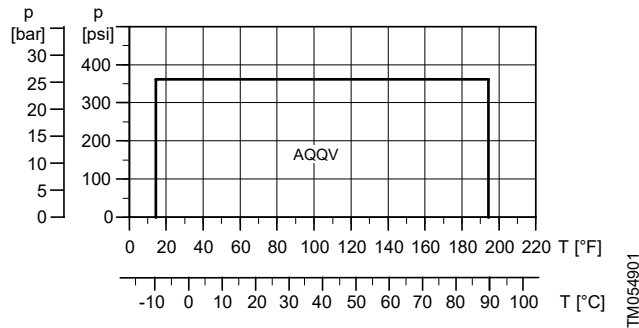
Viscosity of different oils in relation to oil temperature

Key to viscosities of different oils

Curve number	Type of oil
1	Gear oil
2	Motor oil (20W-50)
3	Hydraulic oil (ISO VG46)
4	Cutting oil
5	Thermal oil
6	Hydraulic oil (ISO VG10)
7	Grinding oil
8	Honing oil

Shaft seals for MTC

The operating range of the shaft seal depends on the operating pressure, pump type, type of shaft seal and liquid temperature.



Shaft seal	Description	Temperature range [°F (°C)]
AQQV	O-ring seal with fixed seal driver, tungsten carbide/tungsten carbide, FKM	14 °F to 194 °F (-10 °C to +90 °C)

MTA, MTA-H

Temperatures

Permissible liquid temperature [°F (°C)]	32 to 140 (0 to 60)
Maximum permissible ambient temperature during operation [°F (°C)]	104 (40)
Permissible ambient temperature during storage [°F (°C)]	-58 to +158 (-50 to +70)

Sound pressure level

Pump	Motor power [W]	[dB(A)]
MTA 30	100	< 45
MTA 60	180	< 45
MTA 90	250	< 45
MTA 120	400	< 62
MTA 200	750	< 62
MTA 20H	100	< 45
MTA 40H	180	< 45
MTA 70H	250	< 45
MTA 100H	400	< 62

Vibration level

Vibration velocity RMS < 0.07 in/s (1.8 mm/s).

Vibration to ISO 10816-1 class IB.

11. Control of MTRE 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 on E-pumps

The operating panel on the E-pump terminal box makes it possible to change the setpoint settings manually.

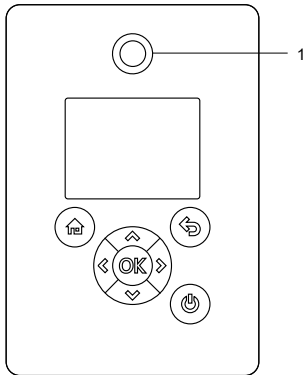
MLE permanent-magnet motors

1/2 to 2 hp (1 × 200-240 V)

1 to 30 hp (3 × 440-480 V)

1 1/2 to 7 1/2 hp (3 × 200-240 V)

The operating condition of the pump is indicated by Grundfos Eye on the operating panel.



Operating panel on E-pump

Pos.	Description
1	Grundfos Eye

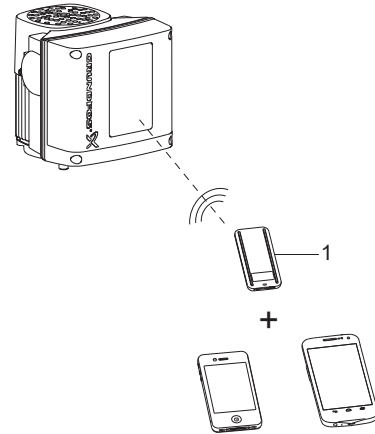
Grundfos GO

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

MLE 1/2 to 15 hp

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

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



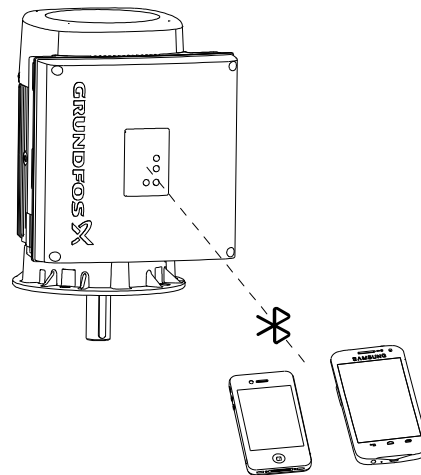
TM066256

Pos.	Description
1	Grundfos MI 301: It 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.

MLE 20 to 30 hp

The product is designed for wireless communication with Grundfos GO using Bluetooth (BLE).

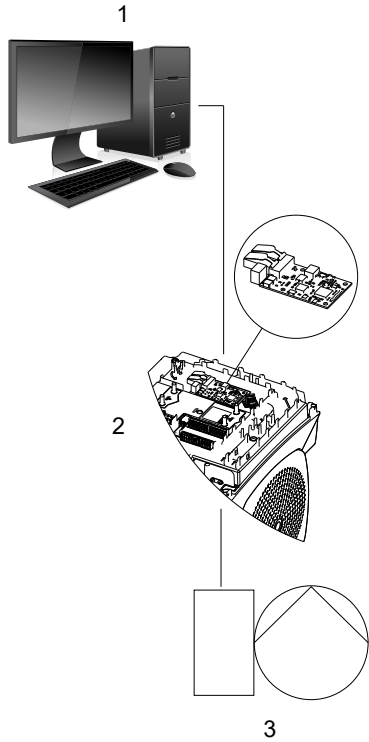
Via the built-in Bluetooth module, the product can communicate with Grundfos GO.



TM082930

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 Communication Interface Module (CIM).

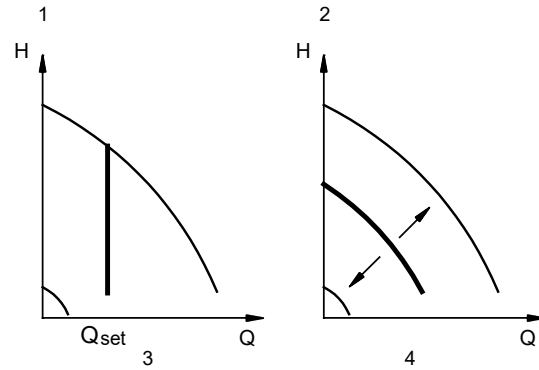


TM084691

Structure of a central management system

Pos.	Description
1	Central management system
2	CIM (See the section on Communication Interface Modules)
3	E-pump

Operating modes for E-pumps

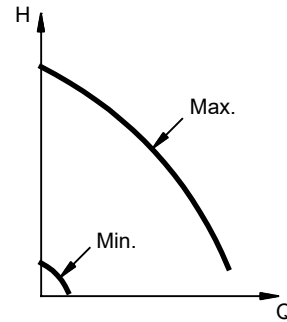


TM010684

Controlled and uncontrolled operating modes

Pos.	Description
1	Controlled operation
2	Uncontrolled operation
3	Constant flow
4	Constant curve

The pumps are set to uncontrolled operation from factory. Besides normal duty (constant flow and constant curve), the operating modes **Stop**, **Min.**, **Max.** are available.



TM005547

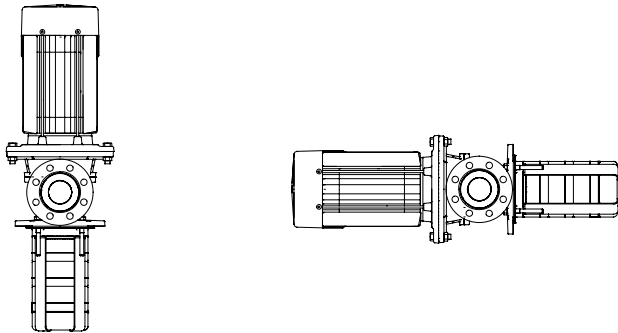
Maximum and minimum curves

12. Installation

Installation of MTR, MTRE pumps

MTR, MTRE 1s to 20 pumps can be installed vertically or horizontally. For safety or height reasons, certain applications, for instance on ships, require the pump to be mounted in horizontal position.

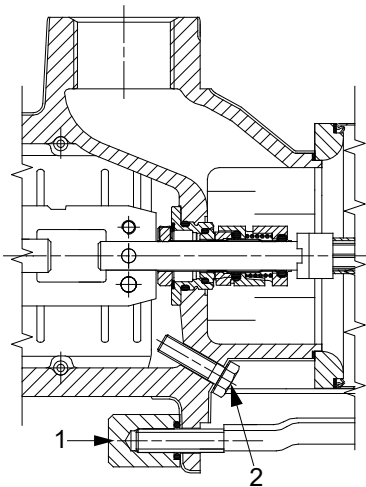
MTR, MTRE 32, 45, 64 pumps must be installed in a vertical position.



TM014990

Installation of an MTR, MTRE pump.

On horizontally installed MTR, MTRE pumps, the drain hole in the pump head is fitted with a plug, and four closed nuts with O-rings are fitted to the straps.



TM028043

Horizontal installation

Pos.	Description
1	Closed nut
2	Drain plug

The pumps are designed to provide full performance down to a level of A inches above the bottom of the strainer.

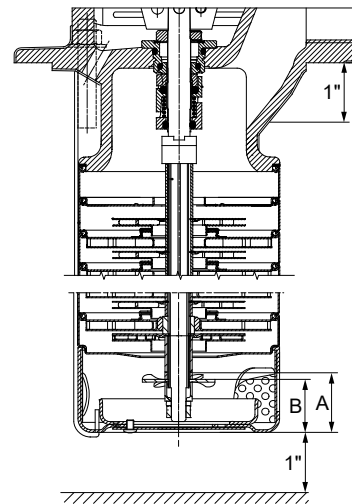
At a liquid level between A and B mm above the bottom of the strainer, the built-in priming screw will protect the pump against dry running.

MTR, MTRE 32, 45 and 64 pumps have no priming screw.

Pump type	A [in. (mm)]	B [in. (mm)]
MTR, MTRE 1s, 1, 2, 3, 4, 5, 8	1.6 (40.6)	1.1 (27.9)
MTR, MTRE 10, 15, 20	2.0 (50.8)	1.0 (25.4)
MTR, MTRE 32, 45, 64	2.8 (71.1)	-

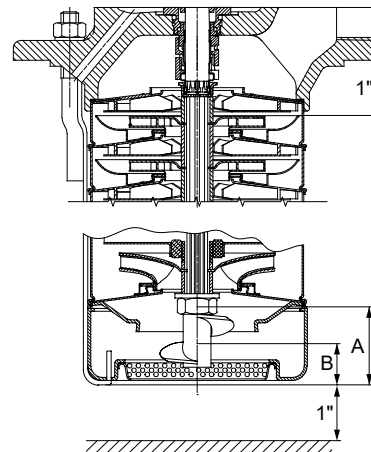
The distance between the flange and the liquid level must be minimum 1 inch (25 mm).

The distance between the pump and the tank bottom must be minimum 1 inch (25 mm).



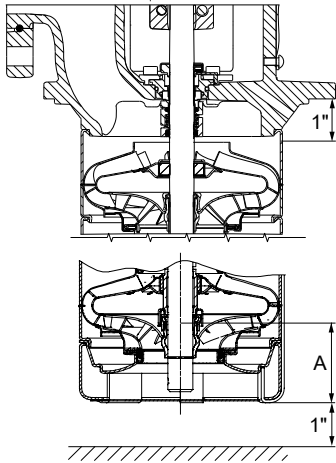
TM062411

MTR, MTRE 1s, 1, 2, 3, 4, 5, and 8



TM082412

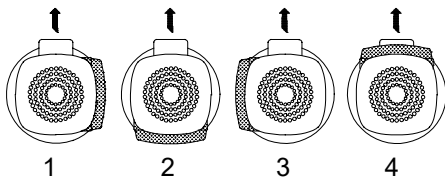
MTR, MTRE 10, 15 and 20



MTR, MTRE 32, 45 and 64

Terminal box positions

As standard MTR, MTRE pumps have their terminal box mounted in position 6 o'clock of the pump. However, other positions are possible.



Terminal box positions, top view

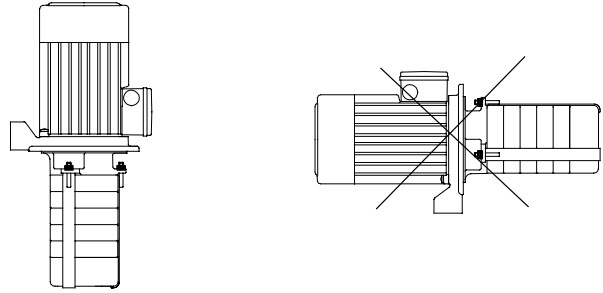
Pos.	Description
1	Position 3 o'clock
2	Position 6 o'clock
3	Position 9 o'clock
4	Position 12 o'clock

TM082413

TM027777

Installation of MTC pumps

MTC must be installed vertically.



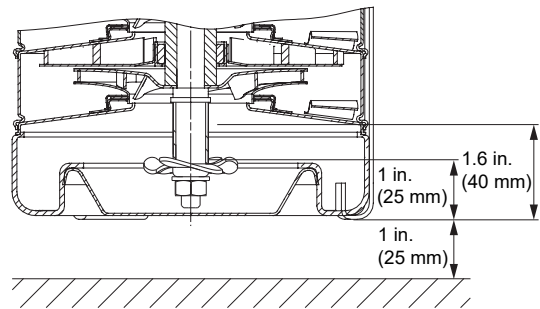
TM001923

Installation of an MTC pump

To enable a low liquid level of 1.6 inches (40 mm) above the bottom of the strainer, a priming screw is fitted below the bottom chamber. This helps to protect the pump against dry running down to 1 inch (25 mm) above the bottom of the strainer.

The distance between the pump and tank bottom must be minimum 1 inch (25 mm).

The distance between the flange and the liquid level must be minimum 1 inch (25 mm).

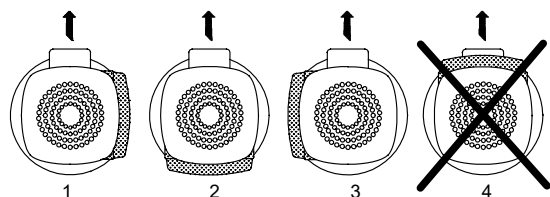


TM034304

Terminal box positions

As standard MTC pumps have their terminal box mounted in position 6 o'clock of the pump. However, other positions are possible.

Note that on MTC pumps it is not possible to mount the terminal box in position 12 o'clock as the terminal box does not fit in that position.



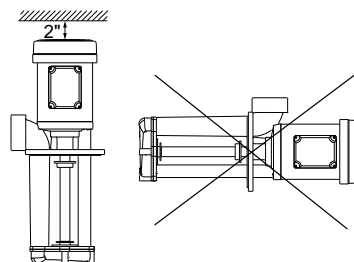
TM081060

Terminal box positions, top view

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

Installation of MTA, MTA-H pumps

MTA pumps are designed for vertical installation in a tank.



TM051690

Installation of an MTA pump. Left: vertical. Right: horizontal

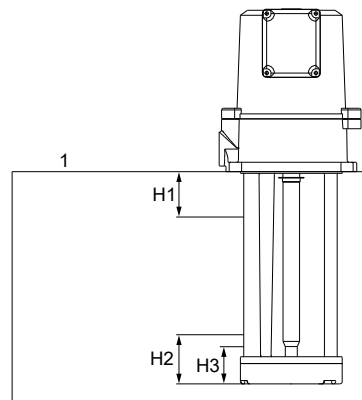
Provide a clearance of minimum 2 in. (50 mm) above the motor to ensure cooling of fan-cooled motors (MTA 120, 200 and 100H).

The pump is designed for indoor operation only.

Note that the motor must not be exposed to direct water/liquid sprays.

Liquid level

MTA with top inlet



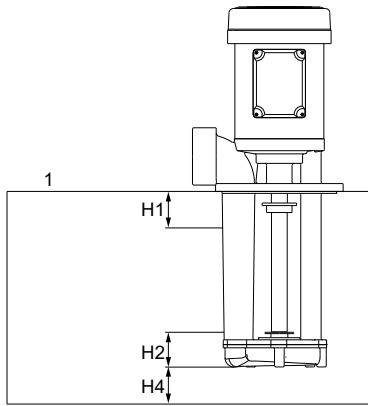
TM047992

MTA with top inlet

Pos.	Description
1	Tank
H1	Maximum liquid level
H2	Minimum liquid level (full performance)
H3	Minimum permissible liquid level (reduced performance)

Pump	H1	H2	H3
	[in. (mm)]	[in. (mm)]	[in. (mm)]
MTA 30	0.59 (15)	2.36 (60)	1.97 (50)
MTA 60	0.79 (20)	2.76 (70)	1.77 (45)
MTA 90	0.79 (20)	3.35 (85)	2.28 (58)
MTA 120	0.79 (20)	4.33 (110)	2.76 (70)
MTA 20H	0.59 (15)	1.97 (50)	1.57 (40)
MTA 40H	0.79 (20)	2.76 (70)	1.57 (40)
MTA 70H	0.79 (20)	3.15 (80)	1.97 (50)
MTA 100H	0.79 (20)	4.34 (110)	2.36 (60)

MTA with bottom inlet



TM047993

MTA with bottom inlet

Pos.	Description
1	Tank
H1	Maximum liquid level
H2	Minimum liquid level (full performance)
H4	Minimum liquid level

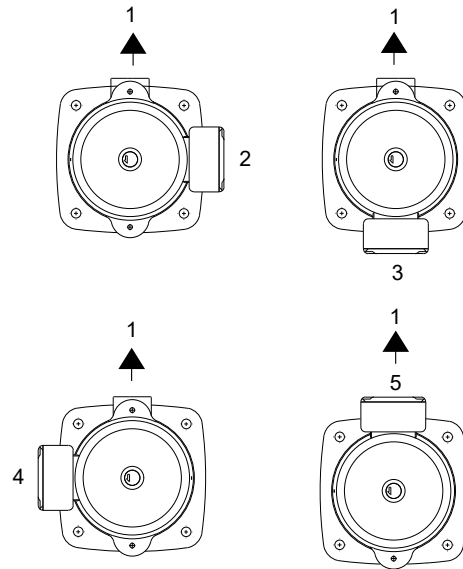
Pump	H1 [in. (mm)]	H2 [in. (mm)]	H4 [in. (mm)]
MTA 30	0.59 (15)	0.79 (20)	0.39 (10)
MTA 60	0.79 (20)	0.79 (20)	0.39 (10)
MTA 90	0.79 (20)	0.98 (25)	0.59 (15)
MTA 120	0.79 (20)	0.98 (25)	0.79 (20)
MTA 200	0.98 (25)	0.98 (50)	1.18 (30)

Terminal box positions

The terminal box of most of the MTA pump types can be turned to another position after delivery. See the table below.

Pump	Terminal box positions			
	3 o'clock	6 o'clock	9 o'clock (standard)	12 o'clock
MTA 30	•	-	•	-
MTA 60	•	(•)	•	(•)
MTA 90	•	(•)	•	(•)
MTA 120	(•)	(•)	•	(•)
MTA 200	(•)	(•)	•	(•)
MTA 20H	•	-	•	-
MTA 40H	•	(•)	•	(•)
MTA 70H	•	(•)	•	(•)
MTA 100H	(•)	(•)	•	(•)

- This position is possible. The pump can be ordered with the terminal box in this position, or the terminal box can be turned to this position after delivery.
- (•) This position is possible, but the terminal box cannot be turned to this position after delivery. Therefore, the pump must be ordered with the terminal box in this position.
- This position is not possible.



TM081057

Possible terminal box positions

Pos.	Description
1	Outlet
2	3 o'clock
3	6 o'clock
4	9 o'clock Standard
5	12 o'clock

13. Selection

Selection of pumps

Selection of pumps must be based on the following parameters:

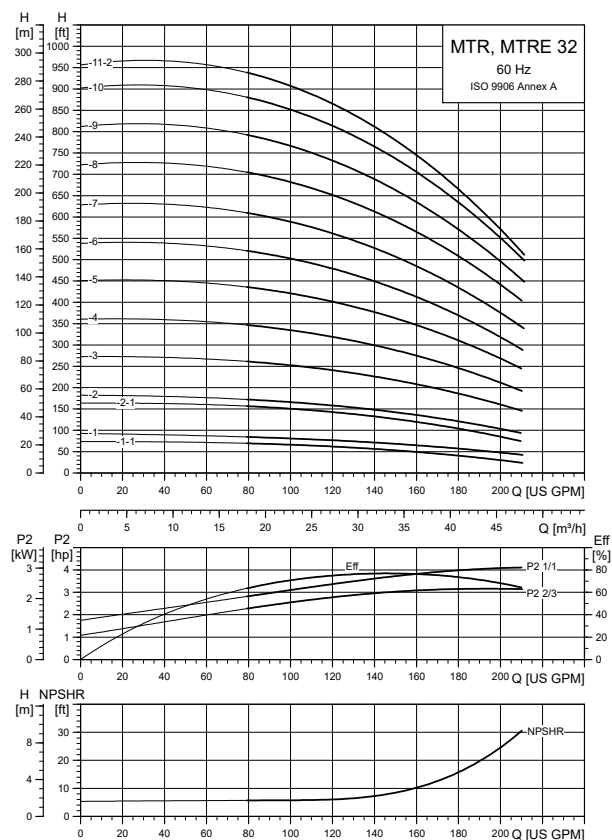
- the duty point of the pump
- dimensional data such as pressure loss as a result of height differences, friction loss in the pipes, pump efficiency
- minimum inlet pressure - NPSHR.

Related information

Minimum inlet pressure, NPSHR
MTR, MTRE 1s, 60 Hz
MTC 2, 60 Hz

Duty point of the pump

From a duty point you can select a pump on the basis of the curve charts shown in the section on performance curves and technical data.



Example of a curve chart

Related information

MTR, MTRE 1s, 60 Hz
MTC 2, 60 Hz

Sizing data

When sizing a pump the following aspects must be taken into account:

- required flow rate and pressure at the draw-off point
- pressure loss as a result of height differences (H_{geo})
- friction loss in the pipes (H_f). It may be necessary to account for pressure loss in connection with, for example, long pipes, bends or valves.
- best efficiency at the estimated duty point
- NPSHR value. For calculation of the NPSHR value, see the section on minimum inlet pressure, NPSHR.

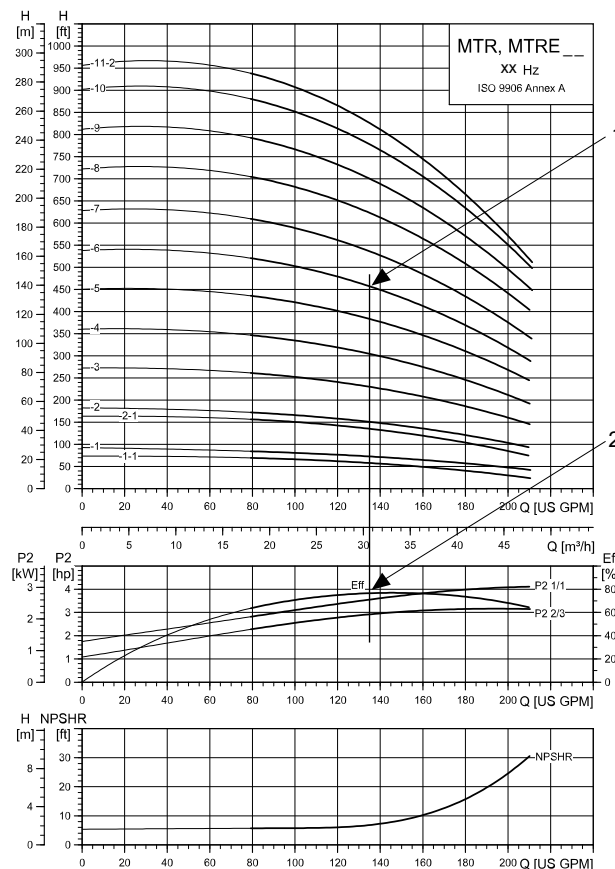
Related information

Minimum inlet pressure, NPSHR

Efficiency

Before determining the point of best efficiency, you need to identify the operating pattern of the pump.

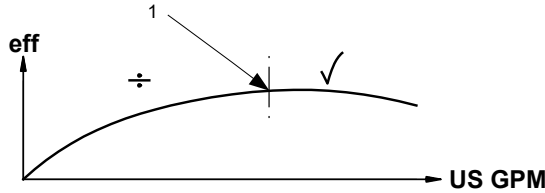
If the pump is expected always to operate in the same duty point, select a pump which is operating at a duty point corresponding to the best efficiency of the pump.



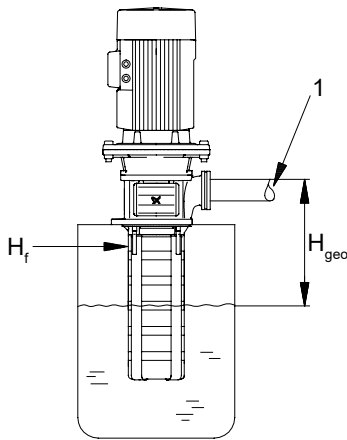
Example of a pump's duty point

Pos.	Description
1	Duty point
2	Best efficiency

As the pump is sized on the basis of the highest possible flow rate, it is important always to have the duty point to the right on the efficiency curve (eff) in order to keep efficiency high when the flow rate drops.



Best efficiency (1)



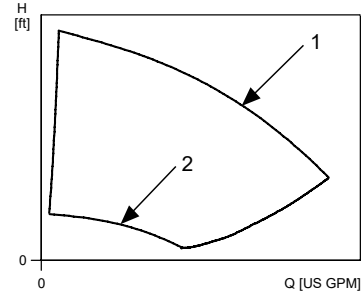
Dimensional data

Pos.	Description
1	Required flow rate, required pressure

Normally, MTRE pumps are used in applications characterized by a variable flow rate. Consequently, you cannot select a pump that is operating constantly at optimum efficiency. To achieve optimum operating economy, you must select the pump on the basis of the following criteria:

- The maximum duty point must be as close as possible to the QH curve of the pump.
- The required duty point must be positioned so that P2 is close to the maximum point of the QH curve.

Between the minimum and maximum performance curves, MTRE pumps have an infinite number of performance curves each representing a specific speed. Therefore, you may not be able to select a duty point close to the maximum curve.



Minimum and maximum performance curves

Pos.	Description
1	Maximum curve
2	Minimum curve

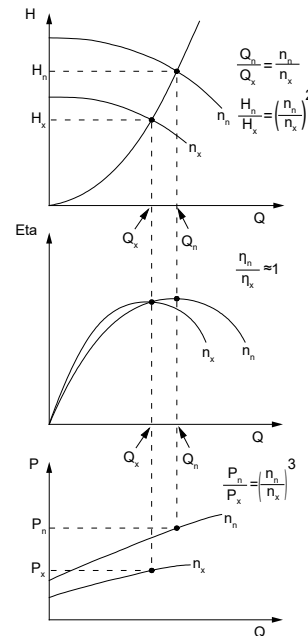
Affinity equations

In situations where you cannot select a duty point close to the maximum curve, you can use the affinity equations below. The head (H), the flow rate (Q) and the input power (P) are all the appropriate variables you need to be able to calculate the motor speed (n).

The approximated formulas apply on condition that the system characteristic remains unchanged for n_n and n_x and that it is based on the formula $H = k \times Q^2$ where k is a constant.

The power equation implies that the pump efficiency is unchanged at the two speeds. In practice this is not quite correct.

Finally, the efficiencies of the frequency converter and the motor must be taken into account if you want a precise calculation of the power saving resulting from a reduction of the pump speed.



Affinity equations

Legend

H_n	Rated head [m]
H_x	Current head [m]
Q_n	Flow rate [m ³ /h]
Q_x	Current flow rate [m ³ /h]
n_n	Rated motor speed [min ⁻¹]
n_x	Current motor speed [min ⁻¹]
η_n	Rated efficiency [%]
η_x	Current efficiency [%]

Grundfos Product Center

The Grundfos Product Center is an online product selection and sizing tool which you can use to calculate the specific duty point and energy consumption of the pump.

For further information, see the section in Grundfos Product Center.

Related information

[18. Grundfos Product Center](#)

Minimum inlet pressure, NPSHR

We recommend that you calculate the inlet pressure "H" when the following aspects apply:

- The liquid temperature is high.
- The flow is significantly higher than the flow rate.
- Water is drawn from depths.
- Water is drawn through long pipes.
- Inlet conditions are poor.

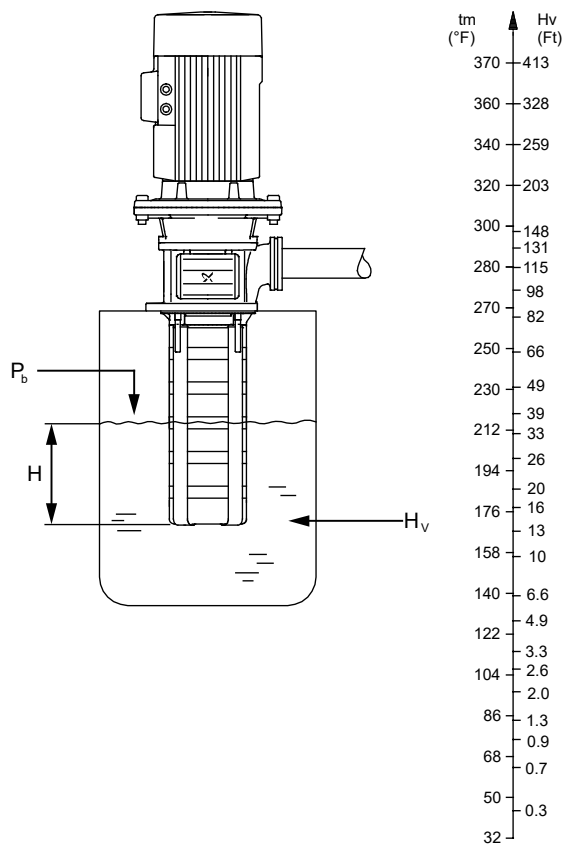
To avoid cavitation, make sure that there is a minimum pressure on the inlet side of the pump. You can calculate the maximum suction lift "H" in metres head as follows:

$$H = p_b - \text{NPSHR} - H_v - H_s$$

p_b	= Barometric pressure in feet absolute. (Barometric pressure can be set to 33.9 feet). In closed systems, p_b indicates the system pressure in feet.
NPSHR	= Net Positive Suction Head in feet of head. (To be read from the NPSHR curve at the highest flow rate the pump will be delivering.)
H_f	= Friction loss in inlet pipe in feet of head. (At the highest flow rate the pump will be delivering.)
H_v	= Vapor pressure in feet. (To be read from the vapor pressure scale. " H_v " depends on the liquid temperature " T_m ").
H_s	= Safety margin = minimum 2.0 feet.

If the calculated "H" is positive, the value shows how high the liquid level must be as minimum above the inlet strainer. If the "H" calculated is negative, the value shows how deep the pump is able to suck in theory.

However, you have to fulfil the requirements of the minimum liquid level above the inlet strainer. See the section on installation of MTR, MTRE pumps.



TM082144

Minimum inlet pressure - NPSHR

To avoid cavitation, never select a pump whose duty point is too far to the right on the NPSHR curve.

Always check the NPSHR value of the pump at the highest possible flow rate.

Related information

[Installation of MTR, MTRE pumps](#)

Pumped liquids

MTR, MTRE

Pumped liquids

The pumps are designed to pump non-explosive liquids that do not chemically attack the pump materials.

When pumping liquids with a density and/or viscosity higher than that of water, oversized motors may be required.

Whether a pump is suitable for a particular liquid depends on several factors of which the most important are the chloride content, pH-value, temperature and content of chemicals and oils.

Please note that aggressive liquids may attack or dissolve the protective oxide film of the stainless steel and thus cause corrosion.

Pumping of solid particles

MTR, MTRE pumps are fitted with an inlet strainer. The strainer prevents large solid particles from entering and damaging the pump.

The table below describes the size of the passage in the strainer and the impeller.

Pump type	Strainer passage [Ø in. (Ø mm)]	Free strainer passage [in. ² (mm ²)]	Impeller passage [in. (mm)]
MTR, MTRE 1s	0.08 (2)	3.60 (2322)	0.09 (2.29)
MTR, MTRE 1	0.08 (2)	3.60 (2322)	0.09 (2.29)
MTR, MTRE 3	0.08 (2)	3.60 (2322)	0.12 (3.05)
MTR, MTRE 5	0.16 (4)	4.30 (2774)	0.21 (5.33)
MTR, MTRE 8	0.16 (4)	4.30 (2774)	0.21 (5.33)
MTR, MTRE 10	0.16 (4)	6.70 (4322)	0.21 (5.33)
MTR, MTRE 15	0.16 (4)	6.70 (4322)	0.23 (5.84)
MTR, MTRE 20	0.16 (4)	6.70 (4322)	0.31 (7.87)
MTR, MTRE 32	0.16 (4)	8.70 (5612)	0.31 (7.87)
MTR, MTRE 45	0.16 (4)	8.70 (5612)	0.37 (9.40)
MTR, MTRE 64	0.16 (4)	8.70 (5612)	0.51 (12.95)

If the pumped liquid contains solid particles larger than the size of the holes in the strainer, the passage of the strainer may be blocked. In such situations the performance will drop as a result of a reduced flow through the pump.

If the strainer is removed from the inlet port, solid particles may enter the pump and cause a seizure or even damage the pump.

In grinding applications Grundfos recommends that the pumped liquid is screened for abrasive particles before entering the pump. When pumped, abrasive particles reduce the life of the pump components.

Wear of the pump components caused by abrasive particles starts when the concentration exceeds 20 ppm.

List of pumped liquids

A number of typical liquids are listed in the table below.

Other pump versions may be applicable.

The table is intended as a general guide only, and it cannot replace actual testing of the pumped liquids and pump materials under specific working conditions.

The list must be applied with some caution as factors such as concentration of the pumped liquid, liquid temperature or pressure may affect the chemical resistance of a specific pump version.

Safety precautions must be taken when pumping dangerous liquids.

Pumped liquid	Note	Liquid concentration, liquid temperature	Recommended pump version/shaft seal	
			MTR, MTRE	
			A-version (standard range, all wetted parts of cast iron and stainless steel)	I-version (stainless-steel version, all wetted parts of stainless steel EN/DIN 1.4301)
Acetic acid, CH ₃ COOH	-	5 %, 68 °F (20 °C)	-	HUUE
Alkaline degreasing agent	D, F	-	HUUE	-
Ammonium bicarbonate, NH ₄ HCO ₃	E	20 %, 86 °F (30 °C)	-	HUUE
Ammonium hydroxide, NH ₄ OH	-	20 %, 104 °F (40 °C)	HUUE	-
Benzoic acid, C ₆ H ₅ COOH	H	0.5 %, 68 °F (20 °C)	-	HUUV
Boiler water	-	< 194 °F (90 °C)	HUUE	-
Calcareous water	-	< 194 °F (90 °C)	HUUE	-
Calcium acetate (as coolant with inhibitor) Ca(CH ₃ COO) ₂	D, E	30 %, 122 °F (50 °C)	HUUE	-
Calcium hydroxide, Ca(OH) ₂	E	Saturated solution, 122 °F (50 °C)	HUUE	-
Chloride-containing water	F	< 86 °F (30 °C), max. 500 ppm	-	HUUE
Citric acid, HOC(CH ₂ CO ₂ H) ₂ COOH	H	5 %, 104 °F (40 °C)	-	HUUE
Completely desalinated water (demineralized water)	-	< 194 °F (90 °C)	-	HUUE
Condensate	-	< 194 °F (90 °C)	HUUE	-
Copper sulfate, CuSO ₄	E	10 %, 86 °F (30 °C)	-	HUUE
Corn oil	D, E, 3	100 %, 176 °F (80 °C)	HUUV	-
Cutting oil	E	194 °F (90 °C)	HUUV	-
Domestic hot water (drinking water)	-	< 248 °F (120 °C)	HUUE	-
Ethylene glycol, HOCH ₂ CH ₂ OH	D, E	50 %, 122 °F (50 °C)	HUUE	-
Formic acid, HCOOH	-	2 %, 68 °F (20 °C)	-	HUUE
Glycerine (glycerol), OHCH ₂ CH(OH)CH ₂ OH	D, E	50 %, 122 °F (50 °C)	HUUE	-
Hydraulic oil (mineral)	E, 2, 3	100 %, 212 °F (100 °C)	HUUV	-
Hydraulic oil (synthetic)	E, 2, 3	100 %, 212 °F (100 °C)	HUUV	-
Lactic acid, CH ₃ CH(OH)COOH	E, H	10 %, 68 °F (20 °C)	-	HUUV
Linoleic acid, C ₁₇ H ₃₁ COOH	E, 3	100 %, 68 °F (20 °C)	HUUV	-
Motor oil	E, 2, 3	100 %, 176 °F (80 °C)	HUUV	-
Naphthalene, C ₁₀ H ₈	E, H	100 %, 176 °F (80 °C)	HUUV	-
Nitric acid, HNO ₃	F	1 %, 68 °F (20 °C)	-	HUUE
Oil-containing water	-	< 194 °F (90 °C)	HUUV	-
Olive oil	D, E, 3	100 %, 176 °F (80 °C)	HUUV	-
Oxalic acid, (COOH) ₂	H	1 %, 68 °F (20 °C)	-	HUUE
Peanut oil	D, E, 3	100 %, 176 °F (80 °C)	HUUV	-
Phosphoric acid, H ₃ PO ₄	E	20 %, 68 °F (20 °C)	-	HUUE
Propylene glycol, CH ₃ CH(OH)CH ₂ OH	D, E	50 %, 194 °F (90 °C)	HUUE	-
Potassium carbonate, K ₂ CO ₃	E	20 %, 122 °F (50 °C)	HUUE	-

Pumped liquid	Note	Liquid concentration, liquid temperature	Recommended pump version/shaft seal	
			MTR, MTRE	
			A-version (standard range, all wetted parts of cast iron and stainless steel)	I-version (stainless-steel version, all wetted parts of stainless steel EN/DIN 1.4301)
Potassium formate (as coolant with inhibitor), KOOCH	D, E	30 %, 122 °F (50 °C)	HUUE	-
Potassium hydroxide, KOH	E	20 %, 122 °F (50 °C)	-	HUUE
Potassium permanganate, KMnO ₄	-	1 %, 68 °F (20 °C)	-	HUUE
Rape seed oil	D, E, 3	100 %, 176 °F (80 °C)	HUUV	-
Salicylic acid, C ₆ H ₄ (OH)COOH	H	0.1 %, 68 °F (20 °C)	-	HUUE
Silicone oil	E, 3	100 %	HUUV	-
Sodium bicarbonate, NaHCO ₃	E	10 %, 148 °F (64 °C)	-	HUUE
Sodium chloride (as coolant), NaCl	D, E	30 %, < 41 °F (5 °C), pH > 8	HUUE	-
Sodium hydroxide, NaOH	E	20 %, 122 °F (50 °C)	-	HUUE
Sodium nitrate, NaNO ₃	E	10 %, 148 °F (64 °C)	-	HUUE
Sodium phosphate, Na ₃ PO ₄	E, H	10 %, 148 °F (64 °C)	-	HUUE
Sodium sulfate, Na ₂ SO ₄	E, H	10 %, 148 °F (64 °C)	-	HUUE
Softened water	-	< 168 °F (76 °C)	-	HUUE
Soya oil	D, E, 3	100 %, 176 °F (80 °C)	HUUV	-
Unsalted swimming pool water	-	Approx. 2 ppm free chlorine (Cl ₂)	HUUE	-
Water-based cooling lubricant	E	194 °F (90 °C)	HUUV	-

List of notes

D	Often with additives.
E	Density and/or viscosity differ from that of water. Allow for this when calculating motor output and pump performance.
F	Pump selection depends on many factors. Contact Grundfos.
H	Risk of crystallisation/precipitation in shaft seal.
1	The pumped liquid is easily ignited.
2	The pumped liquid highly flammable.
3	Insoluble in water.
4	Low self-ignition point.

MTC

Pumped liquids

MTC pumps are designed to pump non-explosive liquids that do not chemically attack the pump materials.

When pumping liquids with a density and/or viscosity higher than that of water, oversized motors may be required.

Whether a pump is suitable for a particular liquid depends on a number of factors of which the most important are the chloride content, pH-value temperature and content of chemicals and oils.

Please note that aggressive liquids may attack or dissolve the protective oxide film of the stainless steel and thus cause corrosion.

Pumping of solid particles

MTC pumps are fitted with an inlet strainer. The strainer prevents large solid particles from entering and damaging the pump.

The table below describes the size of the passage in the strainer and the impeller.

Pump type	Strainer passage [Ø in. (Ø mm)]	Free strainer passage [in. ² (mm ²)]	Impeller passage [in. (mm)]
MTC 2	0.08 (2)	2.3 (1484)	0.08 (2)
MTC 4	0.16 (4)	2.8 (1806)	0.16 (4)
MTC 8	0.16 (4)	2.8 (1806)	0.22 (5.5)
MTC 10	0.16 (4)	4.30 (2774)	0.22 (5.5)
MTC 15	0.16 (4)	4.30 (2774)	0.22 (5.5)

If the pumped liquid contains solid particles larger than the size of the holes in the strainer, the passage of the strainer may be blocked. In such situations the performance will drop as a result of a reduced flow rate through the pump.

If the strainer is removed from the inlet port, solid particles may enter the pump and cause a seizure or even damage the pump.

In grinding applications Grundfos recommends that the pumped liquid is screened for abrasive particles before entering the pump. When pumped, abrasive particles reduce the life of the pump components.

Wear of the pump components caused by abrasive particles starts when the concentration exceeds 20 ppm.

MTA, MTA-H

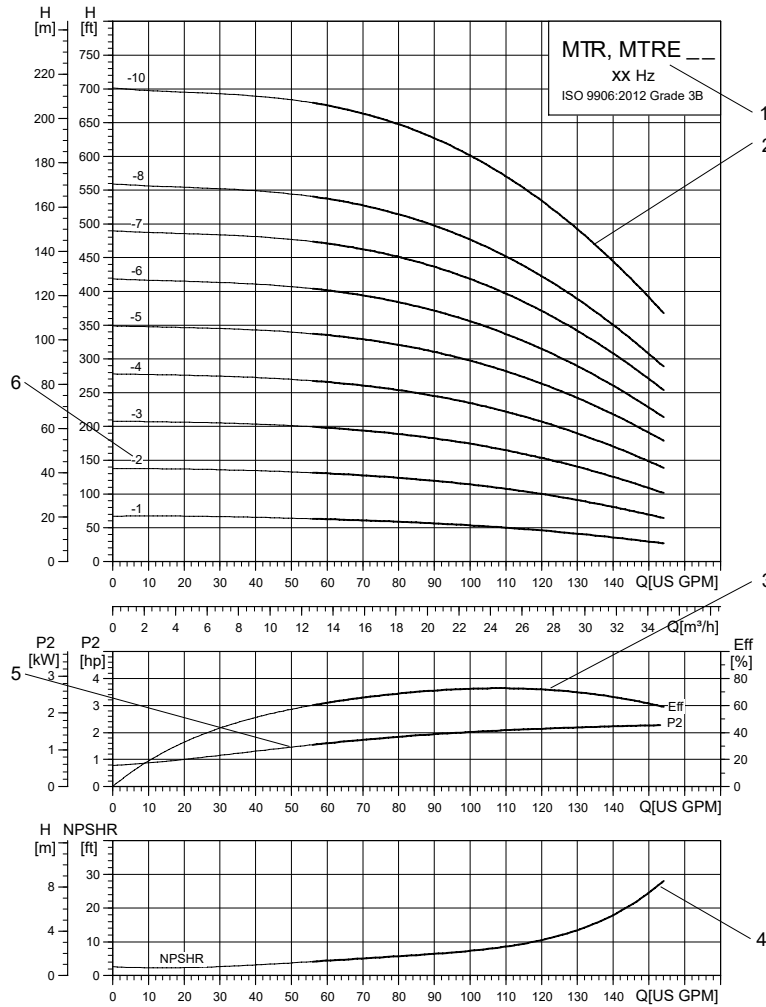
Pumped liquids

Pump	Max. particle size [in. (mm)]
MTA 30	0.16 - 0.20 (4-5)
MTA 60	
MTA 90	
MTA 120	0.31 - 0.40 (8-10)
MTA 200	
MTA 20H	0.16 - 0.20 (4-5)
MTA 40H	
MTA 70H	
MTA 100H	

Maximum kinematic viscosity [cSt]: 90.

14. Performance curves and technical data

How to read the curve charts



TM081103

Example of an MTR, MTRE curve chart

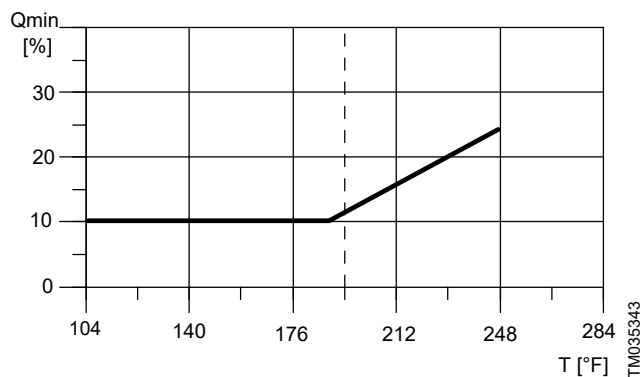
Pos.	Description
1	Pump type, frequency and ISO standard.
2	QH curve for the individual pump. The bold curves indicate the recommended performance range for best efficiency.
3	The eff curve shows the efficiency of the pump. The efficiency of pumps with reduced-diameter impellers is approx. 2 % lower than the curve shown in the chart.
4	The NPSHR curve is a maximum curve for all the variants shown. When sizing the pumps, add a safety margin of at least 2 feet.
5	The power curves indicate pump input power per stage. Curves are shown for complete (1/1) and reduced (2/3) impellers.
6	Number of stages. First figure: number of stages; second figure: number of reduced-diameter impellers.

Guidelines to performance curves

The guidelines below apply to the performance curves shown on the following pages:

1. Tolerances to ISO 9906:2012 Grade 3B, if indicated.
2. The motors used for the measurements are standard Grundfos motors (ML or MLE).
3. Measurements have been made with airless water at a temperature of 68 °F (20 °C).
4. The curves apply to a kinematic viscosity of $\nu = 1 \text{ mm}^2/\text{s}$ (1 cSt).
5. Due to the risk of overheating, the pumps must not be used at a flow below the minimum flow rate.
6. QH curves of the individual pumps are based on current motor speeds.

The curve below shows the minimum flow rate as a percentage of the nominal flow rate in relation to the liquid temperature. Only pumps with EPDM elastomers in the shaft seals can run in the temperature range from 194 °F to 248 °F (90 °C to 120 °C). Closed strap nuts with o-rings and plugging of the shaft seal drain hole, may also be required at temperatures above 212 °F (100 °C). See the section on selection of pumps.



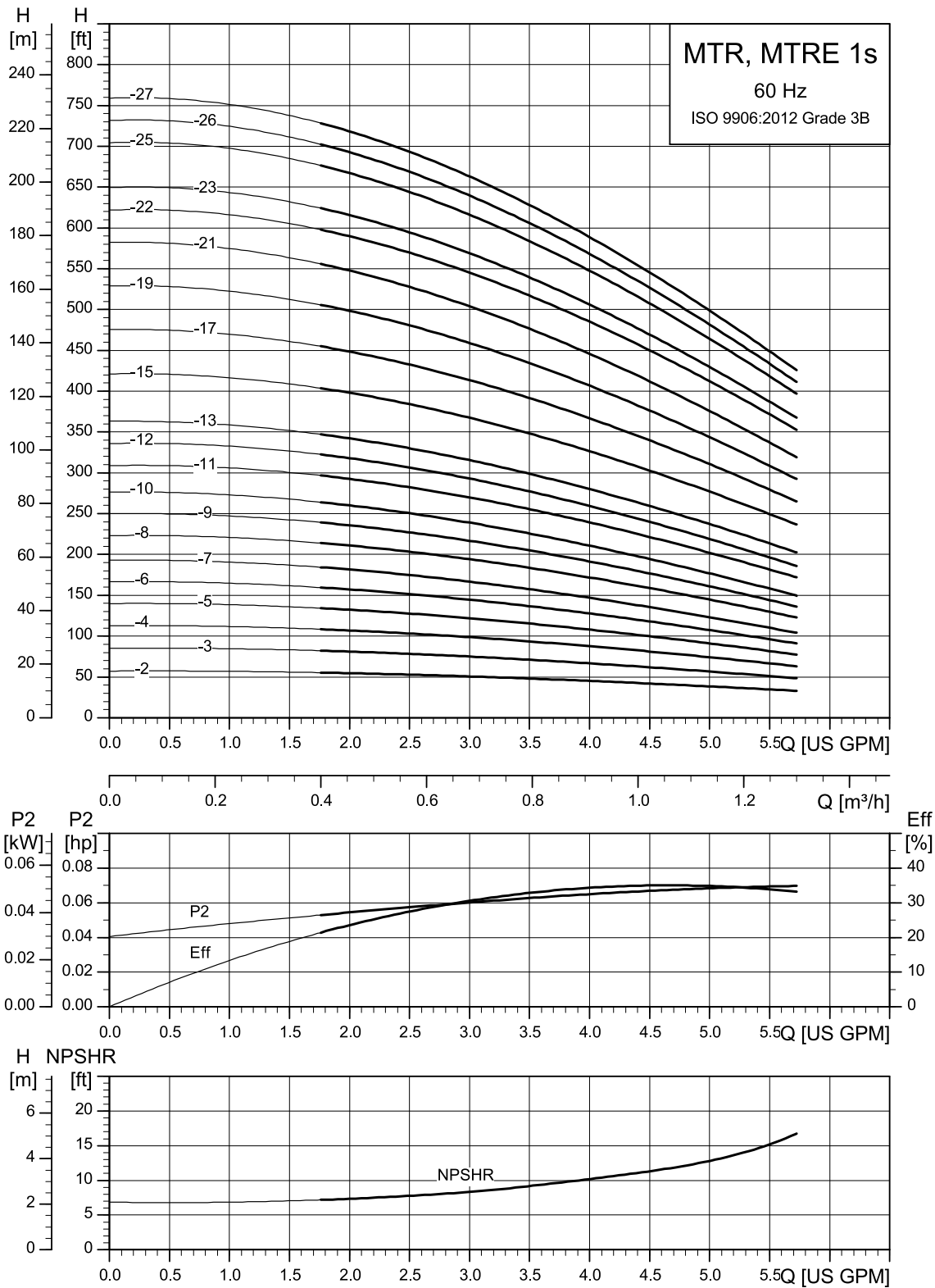
Minimum flow rate

Related information

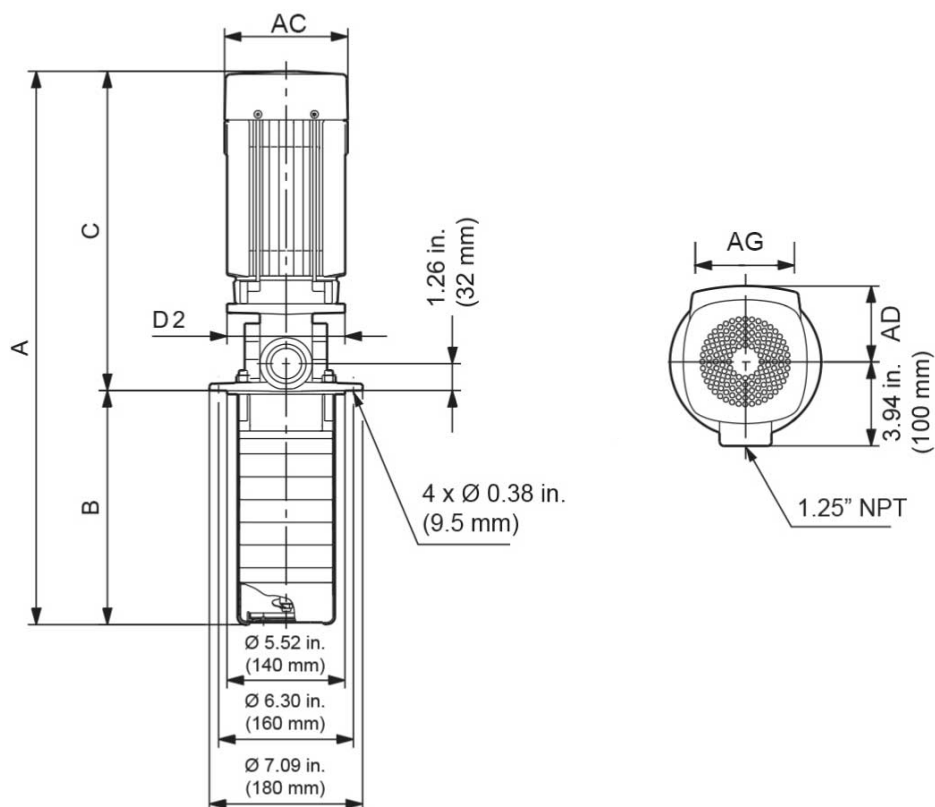
[Selection of pumps](#)

MTR curve charts and technical data

MTR, MTRE 1s, 60 Hz



Dimensional sketches



TM082730

Dimensions and weights

MTR 1s

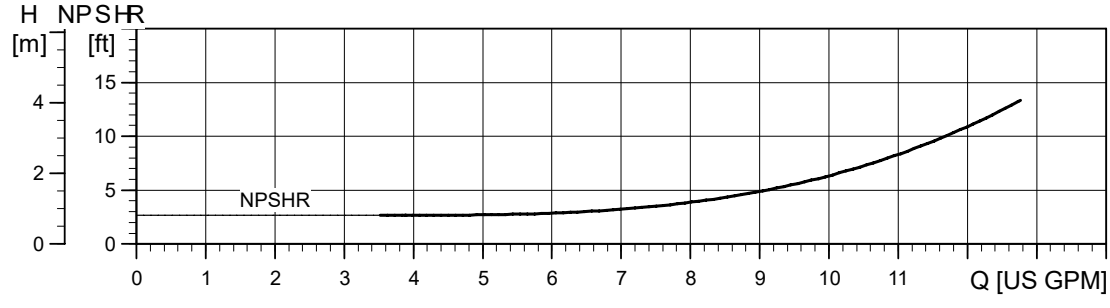
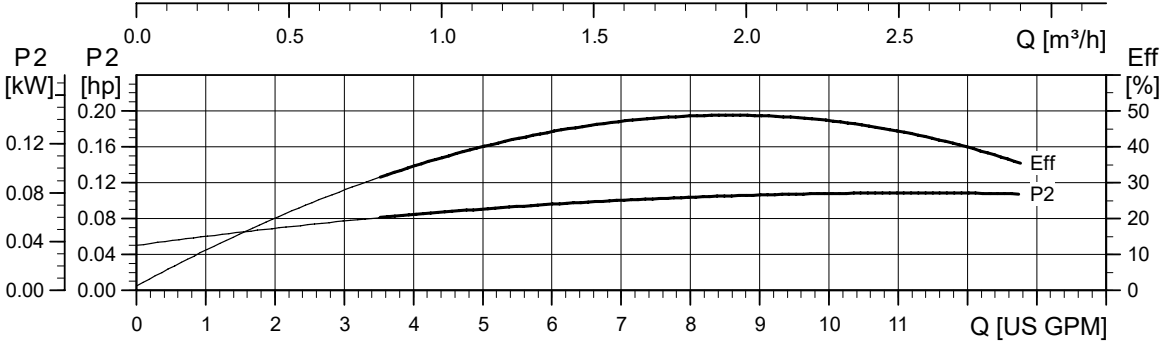
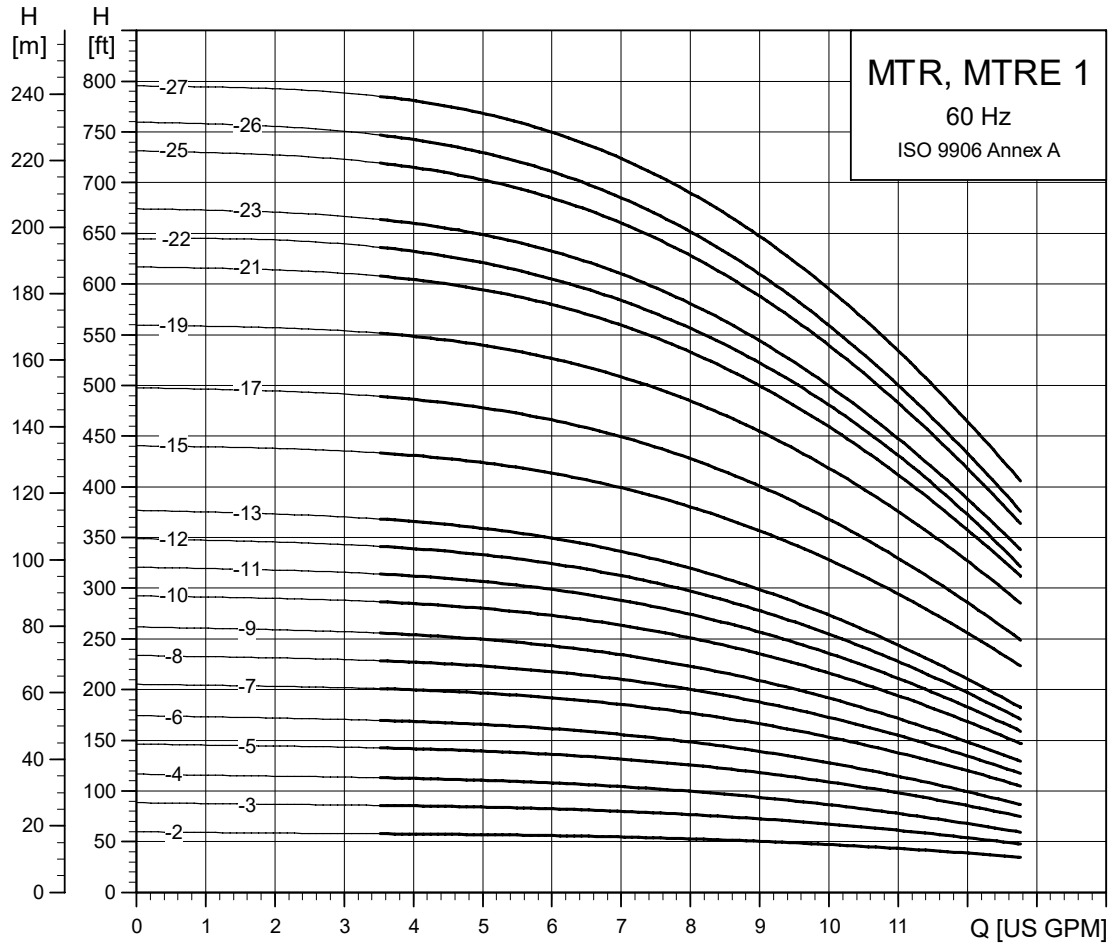
Pump type	P ₂ [hp]	Dimensions [in. (mm)]						Net weight [lb]
		A	B	C	AC	D2	AD	
MTR 1S-2/2	1/3	18.27 (464)	6.30 (160)	11.97 (304)	5.56 (141)	6.50 (165)	4.57 (116)	32
MTR 1S-3/3		18.98 (482)	7.01 (178)	11.97 (304)	5.56 (141)	6.50 (165)	4.57 (116)	32
MTR 1S-4/4		19.69 (500)	7.72 (196)	11.97 (304)	5.56 (141)	6.50 (165)	4.57 (116)	32
MTR 1S-5/5	1/2	20.39 (518)	8.43 (214)	11.97 (304)	5.56 (141)	6.50 (165)	4.57 (116)	32
MTR 1S-6/6		21.10 (536)	9.13 (232)	11.97 (304)	5.56 (141)	6.50 (165)	4.57 (116)	32
MTR 1S-7/7		21.81 (554)	9.84 (250)	11.97 (304)	5.56 (141)	6.50 (165)	4.57 (116)	32
MTR 1S-8/8	3/4	22.52 (572)	10.55 (268)	11.97 (304)	5.56 (141)	6.50 (165)	4.57 (116)	33
MTR 1S-9/9		23.23 (590)	11.26 (286)	11.97 (304)	5.56 (141)	6.50 (165)	4.57 (116)	33
MTR 1S-10/10		23.94 (608)	11.97 (304)	11.97 (304)	5.56 (141)	6.50 (165)	4.57 (116)	33
MTR 1S-11/11	1	24.65 (626)	12.68 (322)	11.97 (304)	5.56 (141)	6.50 (165)	4.57 (116)	33
MTR 1S-12/12		25.35 (644)	13.39 (340)	11.97 (304)	5.56 (141)	6.50 (165)	4.57 (116)	33
MTR 1S-13/13		26.06 (662)	14.09 (358)	11.97 (304)	5.56 (141)	6.50 (165)	4.57 (116)	33
MTR 1S-15/15	1 1/2	28.66 (728)	15.51 (394)	13.15 (334)	5.56 (141)	6.50 (165)	4.57 (116)	34
MTR 1S-17/17		30.08 (764)	16.93 (430)	13.15 (334)	5.56 (141)	6.50 (165)	4.57 (116)	34
MTR 1S-19/19		31.50 (800)	18.35 (466)	13.15 (334)	5.56 (141)	6.50 (165)	4.57 (116)	34
MTR 1S-21/21		32.91 (836)	19.76 (502)	13.15 (334)	5.56 (141)	6.50 (165)	4.57 (116)	34

Pump type	P ₂ [hp]	Dimensions [in. (mm)]						Net weight [lb]
		A	B	C	AC	D2	AD	
MTR 1S-22/22	2	36.22 (920)	20.47 (520)	15.75 (400)	7.01 (178)	6.50 (165)	4.34 (110)	52
MTR 1S-23/23		36.93 (938)	21.18 (538)	15.75 (400)	7.01 (178)	6.50 (165)	4.34 (110)	52
MTR 1S-25/25		38.35 (974)	22.60 (574)	15.75 (400)	7.01 (178)	6.50 (165)	4.34 (110)	52
MTR 1S-26/26		39.06 (992)	23.31 (592)	15.75 (400)	7.01 (178)	6.50 (165)	4.34 (110)	52
MTR 1S-27/27		39.76 (1010)	24.02 (610)	15.75 (400)	7.01 (178)	6.50 (165)	4.34 (110)	52

MTRE 1s

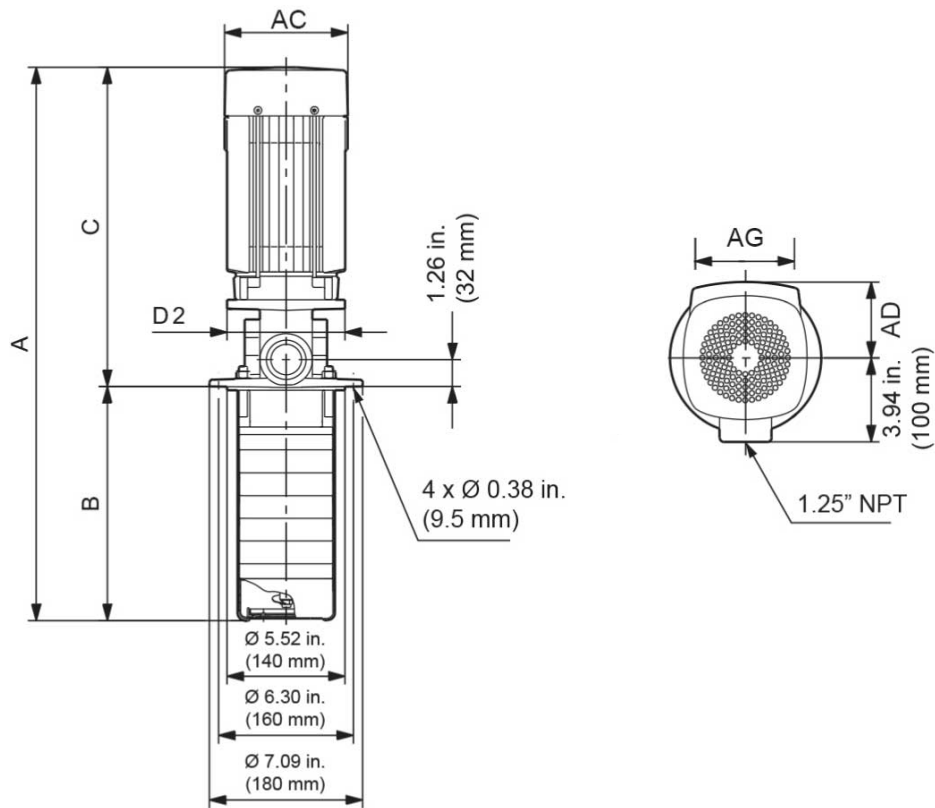
Pump type	P ₂ [hp]	PH	Voltage [V]	Motor frame size	Dimensions [in. (mm)]							Net weight [lb]
					A	B	C	AC	D2	AD	AG	
MTRE 1S-7/7	1/2	1	200-240	56C	22.68 (576)	9.84 (250)	12.83 (326)	4.80 (122)	6.50 (165)	6.22 (158)	8.34 (212)	38
MTRE 1S-11/11	3/4	1	200-240	56C	25.51 (648)	12.68 (322)	12.83 (326)	4.80 (122)	6.50 (165)	6.22 (158)	8.34 (212)	38
MTRE 1S-13/13	1	1	200-240	56C	26.93 (684)	14.09 (358)	12.83 (326)	4.80 (122)	6.50 (165)	6.22 (158)	8.34 (212)	39
		3	440-480	56C	30.74 (781)	14.10 (358)	16.64 (423)	4.80 (122)	6.50 (165)	6.22 (158)	10.56 (268)	42
MTRE 1S-21/21	1 1/2	1	200-240	56C	32.60 (828)	19.76 (502)	12.83 (326)	4.80 (122)	6.50 (165)	6.22 (158)	8.34 (212)	41
		3	200-240	56C	36.41 (925)	19.77 (502)	16.64 (423)	4.80 (122)	6.50 (165)	6.22 (158)	10.56 (268)	44
		3	440-480	56C	36.41 (925)	19.77 (502)	16.64 (423)	4.80 (122)	6.50 (165)	6.22 (158)	10.56 (268)	44
MTRE 1S-23/23	2	1	200-240	56C	34.80 (884)	21.18 (538)	13.62 (346)	4.80 (122)	6.50 (165)	6.22 (158)	8.34 (212)	45
		3	200-240	56C	38.62 (981)	21.19 (538)	17.43 (443)	4.80 (122)	6.50 (165)	6.22 (158)	10.56 (268)	48
		3	440-480	56C	38.62 (981)	21.19 (538)	17.43 (443)	4.80 (122)	6.50 (165)	6.22 (158)	10.56 (268)	48
MTRE 1S-27/27	2	1	200-240	56C	37.64 (956)	24.02 (610)	13.62 (346)	4.80 (122)	6.50 (165)	6.22 (158)	8.34 (212)	45
		3	200-240	56C	41.45 (1053)	24.02 (610)	17.43 (443)	4.80 (122)	6.50 (165)	6.22 (158)	10.56 (268)	48
		3	440-480	56C	41.45 (1053)	24.02 (610)	17.43 (443)	4.80 (122)	6.50 (165)	6.22 (158)	10.56 (268)	49

MTR, MTRE 1, 60 Hz



TM034253

Dimensional sketches



TM082730

Dimensions and weights

MTR 1

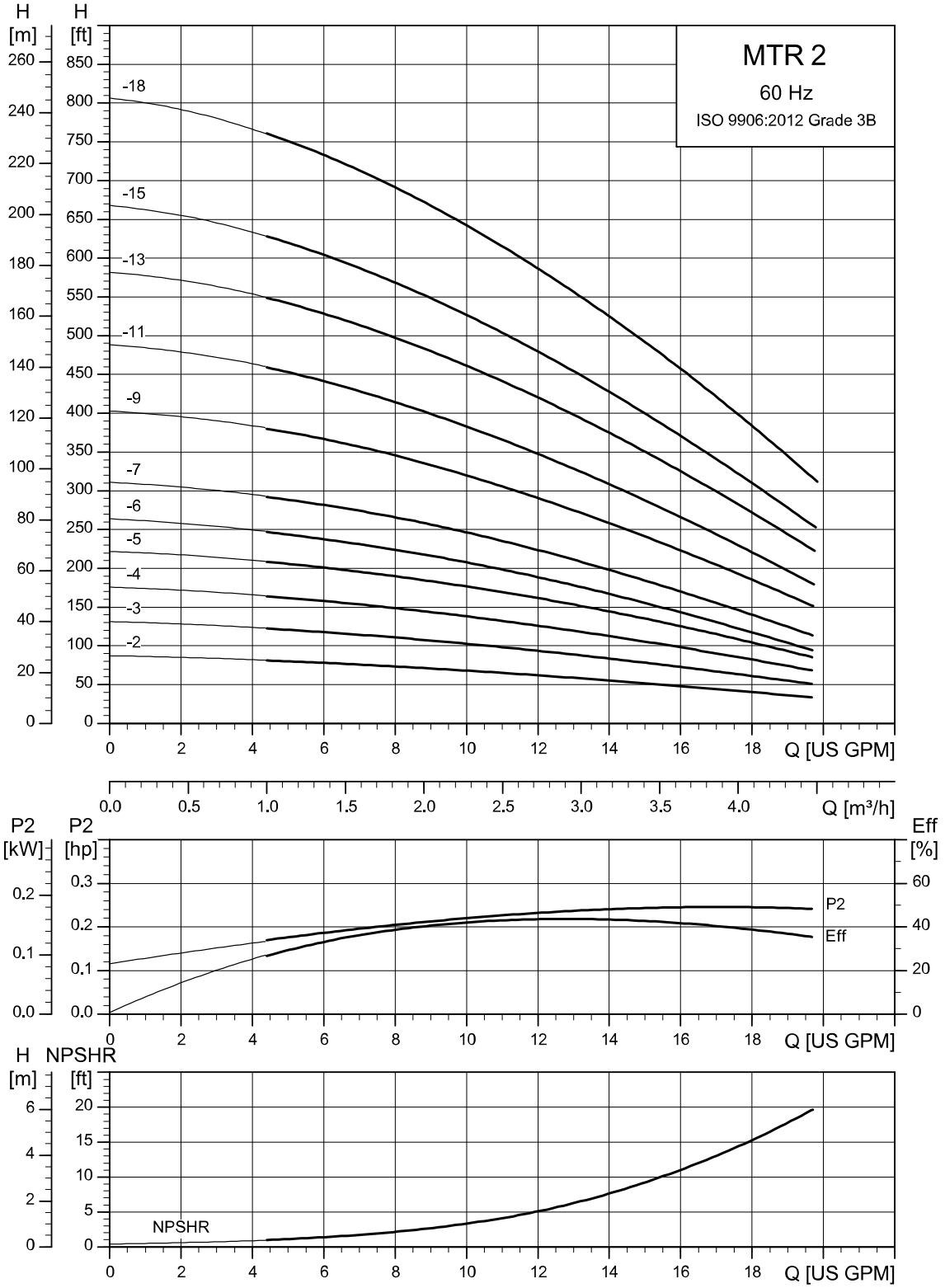
Pump type	P ₂ [hp]	Dimensions [in. (mm)]						Net weight [lb]
		A	B	C	AC	D2	AD	
MTR 1-2/2	1/3	18.27 (464)	6.30 (160)	11.97 (304)	5.56 (141)	6.50 (165)	4.57 (116)	32
MTR 1-3/3	1/2	18.98 (482)	7.01 (178)	11.97 (304)	5.56 (141)	6.50 (165)	4.57 (116)	32
MTR 1-4/4	1/2	19.69 (500)	7.72 (196)	11.97 (304)	5.56 (141)	6.50 (165)	4.57 (116)	32
MTR 1-5/5	3/4	20.40 (518)	8.43 (214)	11.97 (304)	5.56 (141)	6.50 (165)	4.57 (116)	33
MTR 1-6/6	3/4	21.11 (536)	9.13 (232)	11.97 (304)	5.56 (141)	6.50 (165)	4.57 (116)	33
MTR 1-7/7	3/4	21.82 (554)	9.84 (250)	11.97 (304)	5.56 (141)	6.50 (165)	4.57 (116)	33
MTR 1-8/8	1	22.52 (572)	10.55 (268)	11.97 (304)	5.56 (141)	6.50 (165)	4.57 (116)	33
MTR 1-9/9	1	23.23 (590)	11.26 (286)	11.97 (304)	5.56 (141)	6.50 (165)	4.57 (116)	33
MTR 1-10/10	1 1/2	25.12 (638)	11.97 (304)	13.15 (334)	5.56 (141)	6.50 (165)	4.57 (116)	33
MTR 1-11/11	1 1/2	25.83 (656)	12.68 (322)	13.15 (334)	5.56 (141)	6.50 (165)	4.57 (116)	34
MTR 1-12/12	1 1/2	26.54 (674)	13.39 (340)	13.15 (334)	5.56 (141)	6.50 (165)	4.57 (116)	34
MTR 1-13/13	1 1/2	27.25 (692)	14.09 (358)	13.15 (334)	5.56 (141)	6.50 (165)	4.57 (116)	34
MTR 1-15/15	2	31.26 (794)	15.51 (394)	15.75 (400)	7.01 (178)	6.50 (165)	4.34 (110)	51
MTR 1-17/17	2	32.68 (830)	16.93 (430)	15.75 (400)	7.01 (178)	6.50 (165)	4.34 (110)	51
MTR 1-19/19	3	36.78 (934)	18.35 (466)	18.43 (468)	7.01 (178)	9.85 (250)	4.34 (110)	75
MTR 1-21/21	3	38.19 (970)	19.76 (502)	18.43 (468)	7.01 (178)	9.85 (250)	4.34 (110)	75
MTR 1-22/22	3	38.90 (988)	20.47 (520)	18.43 (468)	7.01 (178)	9.85 (250)	4.34 (110)	75
MTR 1-23/23	3	39.61 (1006)	21.18 (538)	18.43 (468)	7.01 (178)	9.85 (250)	4.34 (110)	75

Pump type	P ₂ [hp]	Dimensions [in. (mm)]						Net weight [lb]
		A	B	C	AC	D2	AD	
MTR 1-25/25	3	41.03 (1042)	22.60 (574)	18.43 (468)	7.01 (178)	9.85 (250)	4.34 (110)	75
MTR 1-26/26	3	41.74 (1060)	23.31 (592)	18.43 (468)	7.01 (178)	9.85 (250)	4.34 (110)	75
MTR 1-27/27	3	42.45 (1078)	24.02 (610)	18.43 (468)	7.01 (178)	9.85 (250)	4.34 (110)	75

MTRE 1

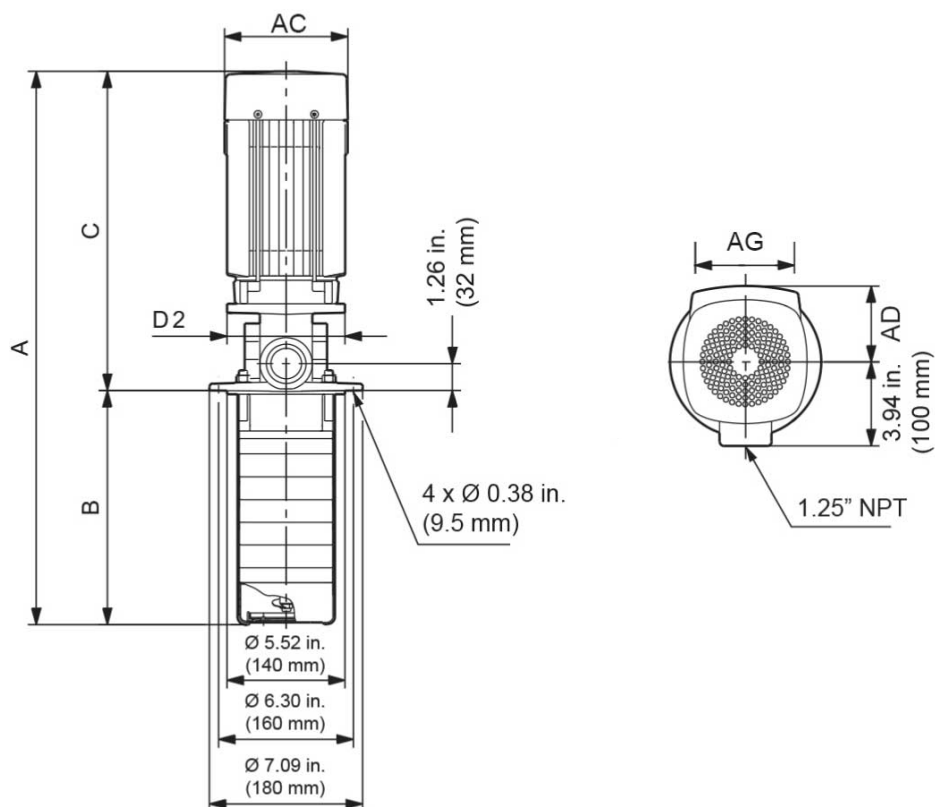
Pump type	P ₂ [hp]	PH	Voltage [V]	Motor frame size	Dimensions [in. (mm)]							Net weight [lb]
					A	B	C	AC	D2	AD	AG	
MTRE 1-4/4	1/2	1	200-240	56C	20.55 (522)	7.72 (196)	12.83 (326)	4.80 (122)	6.50 (165)	6.22 (158)	8.34 (212)	38
MTRE 1-7/7	3/4	1	200-240	56C	22.68 (576)	9.85 (250)	12.83 (326)	4.80 (122)	6.50 (165)	6.22 (158)	8.34 (212)	38
MTRE 1-9/9	1	1	200-240	56C	24.09 (612)	11.26 (286)	12.83 (326)	4.80 (122)	6.50 (165)	6.22 (158)	8.34 (212)	38
		3	440-480	56C	25.67 (652)	11.26 (286)	14.41 (366)	4.80 (122)	6.50 (165)	6.22 (158)	10.56 (268)	42
MTRE 1-13/13	1 1/2	1	200-240	56C	26.93 (684)	14.10 (358)	12.83 (326)	4.80 (122)	6.50 (165)	6.22 (158)	8.34 (212)	40
		3	200-240	56C	28.50 (724)	14.10 (358)	14.41 (366)	4.80 (122)	6.50 (165)	6.22 (158)	10.56 (268)	44
			440-480	56C	28.50 (724)	14.10 (358)	14.41 (366)	4.80 (122)	6.50 (165)	6.22 (158)	10.56 (268)	74
MTRE 1-17/17	2	1	200-240	56C	30.55 (776)	16.93 (430)	13.62 (346)	4.80 (122)	6.50 (165)	6.22 (158)	8.34 (212)	44
		3	200-240	56C	32.13 (816)	16.93 (430)	15.20 (386)	4.80 (122)	6.50 (165)	6.22 (158)	10.56 (268)	48
			440-480	56C	32.13 (816)	16.93 (430)	15.20 (386)	4.80 (122)	6.50 (165)	6.22 (158)	10.56 (268)	48
MTRE 1-22/22	3	3	200-240	182TC	38.82 (986)	20.48 (520)	18.35 (466)	7.53 (191)	9.85 (250)	7.91 (201)	11.46 (291)	74
		440-480	182TC	36.50 (927)	20.48 (520)	16.02 (407)	4.80 (122)	6.50 (165)	6.22 (158)	10.56 (268)	66	
MTRE 1-27/27	3	3	200-240	182TC	42.36 (1076)	24.02 (610)	18.35 (466)	7.53 (191)	9.85 (250)	7.91 (201)	11.46 (291)	44
		440-480	182TC	40.04 (1017)	24.02 (610)	16.02 (407)	4.80 (122)	6.50 (165)	6.22 (158)	10.56 (268)	66	

MTR 2, 60 Hz



TM082549

Dimensional sketches



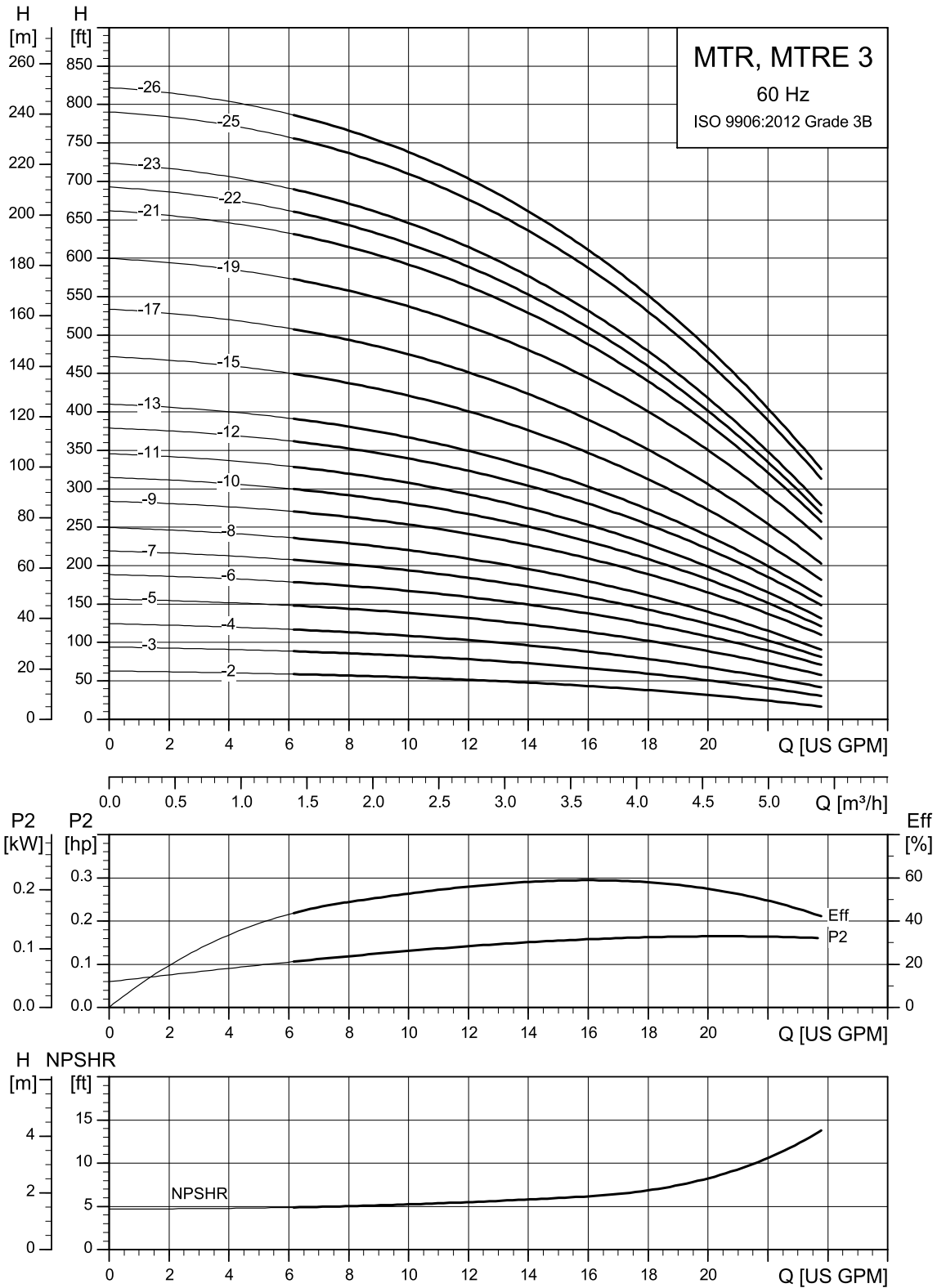
TM082730

Dimensions and weights

MTR 2

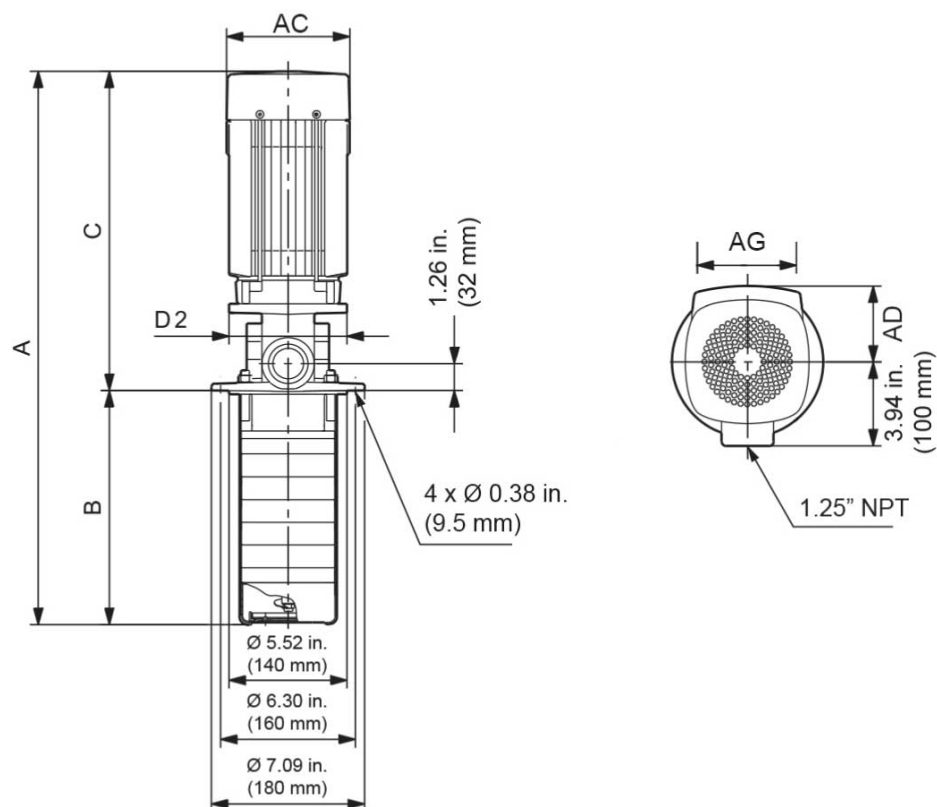
Pump type	P ₂ [hp]	Dimensions [in. (mm)]						Net weight [lb]
		A	B	C	AC	D2	AD	
MTR 2-2/2	1/2	18.27 (464)	6.3 (160)	11.97 (304)	5.55 (141)	6.5 (165)	4.57 (116)	32
MTR 2-3/3	3/4	18.98 (482)	7.01 (178)	11.97 (304)	5.55 (141)	6.5 (165)	4.57 (116)	33
MTR 2-4/4	1	19.69 (500)	7.72 (196)	11.97 (304)	5.55 (141)	6.5 (165)	4.57 (116)	33
MTR 2-5/5	1 1/2	21.57 (548)	8.43 (214)	13.15 (334)	5.59 (142)	6.5 (165)	4.59 (116.5)	33
MTR 2-6/6	1 1/2	22.28 (566)	9.13 (232)	13.15 (334)	5.59 (142)	6.5 (165)	4.59 (116.5)	33
MTR 2-7/7	2	25.59 (650)	9.84 (250)	15.75 (400)	7.01 (178)	6.5 (165)	4.33 (110)	51
MTR 2-9/9	3	29.69 (754)	11.26 (286)	18.43 (468)	7.01 (178)	9 (228.6)	4.33 (110)	74
MTR 2-11/11	3	31.1 (790)	12.68 (322)	18.43 (468)	7.01 (178)	9 (228.6)	4.33 (110)	74
MTR 2-13/13	5	34.8 (884)	14.09 (358)	20.71 (526)	8.66 (220)	9 (228.6)	5.28 (134)	115
MTR 2-15/15	5.0	36.22 (920)	15.51 (394)	20.71 (526)	8.66 (220)	9 (228.6)	5.28 (134)	115
MTR 2-18/18	5	38.35 (974)	17.64 (448)	20.71 (526)	8.66 (220)	9 (228.6)	5.28 (134)	116

MTR, MTRE 3, 60 Hz



TM034254

Dimensional sketches



TM082730

Dimensions and weights

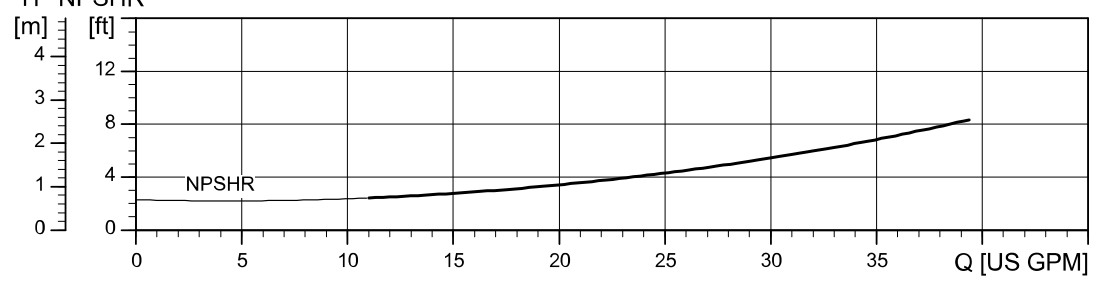
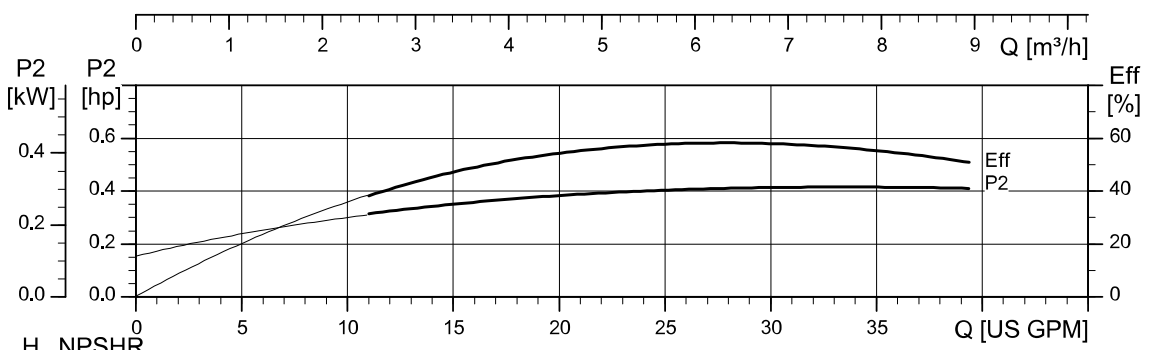
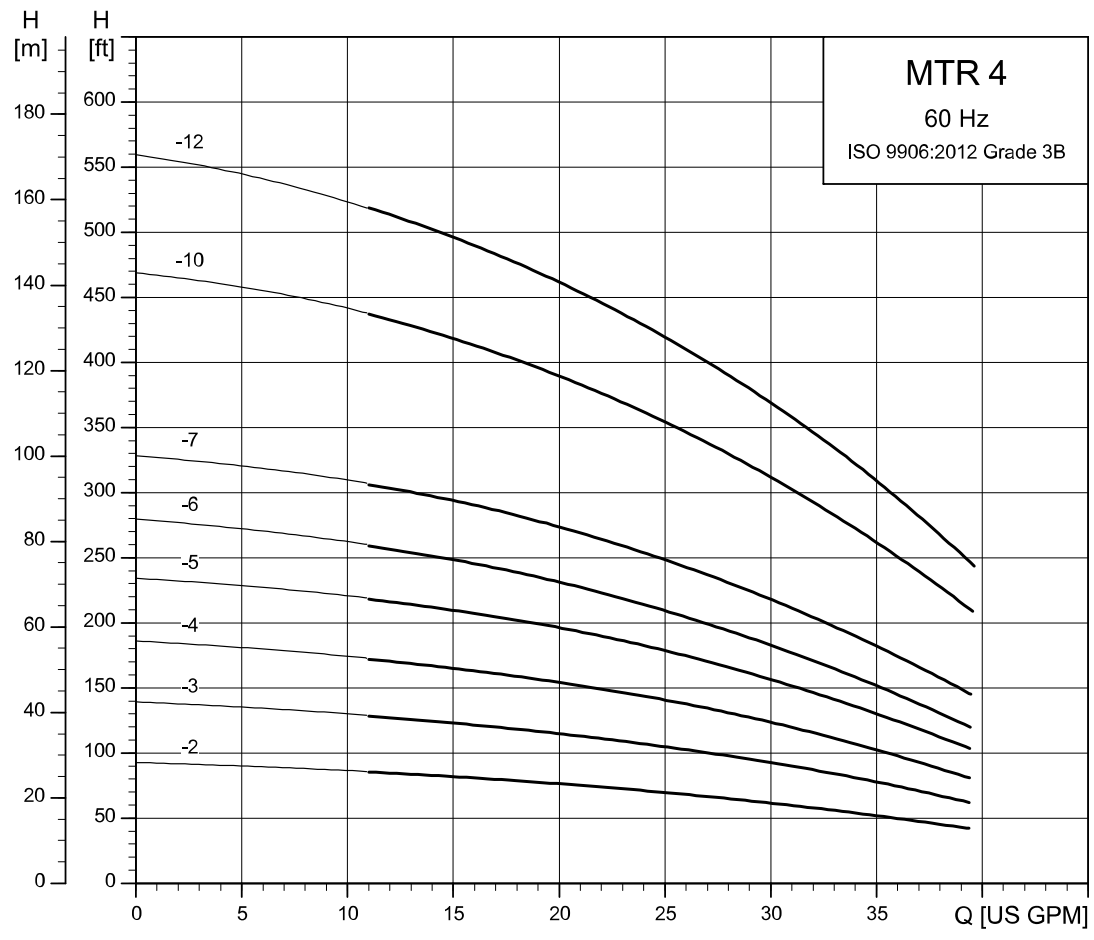
MTR 3

Pump type	P ₂ [hp]	Dimensions [in. (mm)]						Net weight [lb]
		A	B	C	AC	D2	AD	
MTR 3-2/2	1/2	18.27 (464)	6.30 (160)	11.97 (304)	5.56 (141)	6.50 (165)	4.57 (116)	32
MTR 3-3/3	1/2	18.98 (482)	7.01 (178)	11.97 (304)	5.56 (141)	6.50 (165)	4.57 (116)	32
MTR 3-4/4	3/4	19.69 (500)	7.72 (196)	11.97 (304)	5.56 (141)	6.50 (165)	4.57 (116)	33
MTR 3-5/5	1	20.39 (518)	8.43 (214)	11.97 (304)	5.56 (141)	6.50 (165)	4.57 (116)	33
MTR 3-6/6	1	21.10 (536)	9.13 (232)	11.97 (304)	5.56 (141)	6.50 (165)	4.57 (116)	33
MTR 3-7/7	1 1/2	22.99 (584)	9.84 (250)	13.15 (334)	5.56 (141)	6.50 (165)	4.57 (116)	33
MTR 3-8/8	1 1/2	23.70 (602)	10.55 (268)	13.15 (334)	5.56 (141)	6.50 (165)	4.57 (116)	33
MTR 3-9/9	1 1/2	24.41 (620)	11.26 (286)	13.15 (334)	5.56 (141)	6.50 (165)	4.57 (116)	33
MTR 3-10/10	2	27.72 (704)	11.97 (304)	15.75 (400)	7.01 (178)	6.50 (165)	4.34 (110)	51
MTR 3-11/11	2	28.43 (722)	12.68 (322)	15.75 (400)	7.01 (178)	6.50 (165)	4.34 (110)	51
MTR 3-12/12	2	29.13 (740)	13.39 (340)	15.75 (400)	7.01 (178)	6.50 (165)	4.34 (110)	51
MTR 3-13/13	3	32.52 (826)	14.09 (358)	18.43 (468)	7.01 (178)	9.85 (250)	4.34 (110)	75
MTR 3-15/15	3	33.94 (862)	15.51 (394)	18.43 (468)	7.01 (178)	9.85 (250)	4.34 (110)	75
MTR 3-17/17	3	35.35 (898)	16.93 (430)	18.43 (468)	7.01 (178)	9.85 (250)	4.34 (110)	75
MTR 3-19/19	5	39.06 (992)	18.35 (466)	20.71 (526)	8.67 (220)	9.85 (250)	5.28 (134)	116
MTR 3-21/21	5	40.47 (1028)	19.76 (502)	20.71 (526)	8.67 (220)	9.85 (250)	5.28 (134)	116
MTR 3-22/22	5	41.18 (1046)	20.47 (520)	20.71 (526)	8.67 (220)	9.85 (250)	5.28 (134)	116
MTR 3-23/23	5	41.89 (1064)	21.18 (538)	20.71 (526)	8.67 (220)	9.85 (250)	5.28 (134)	116
MTR 3-25/25	5	43.31 (1100)	22.60 (574)	20.71 (526)	8.67 (220)	9.85 (250)	5.28 (134)	116
MTR 3-26/26	5	44.02 (1118)	23.31 (592)	20.71 (526)	8.67 (220)	9.85 (250)	5.28 (134)	116

MTRE 3

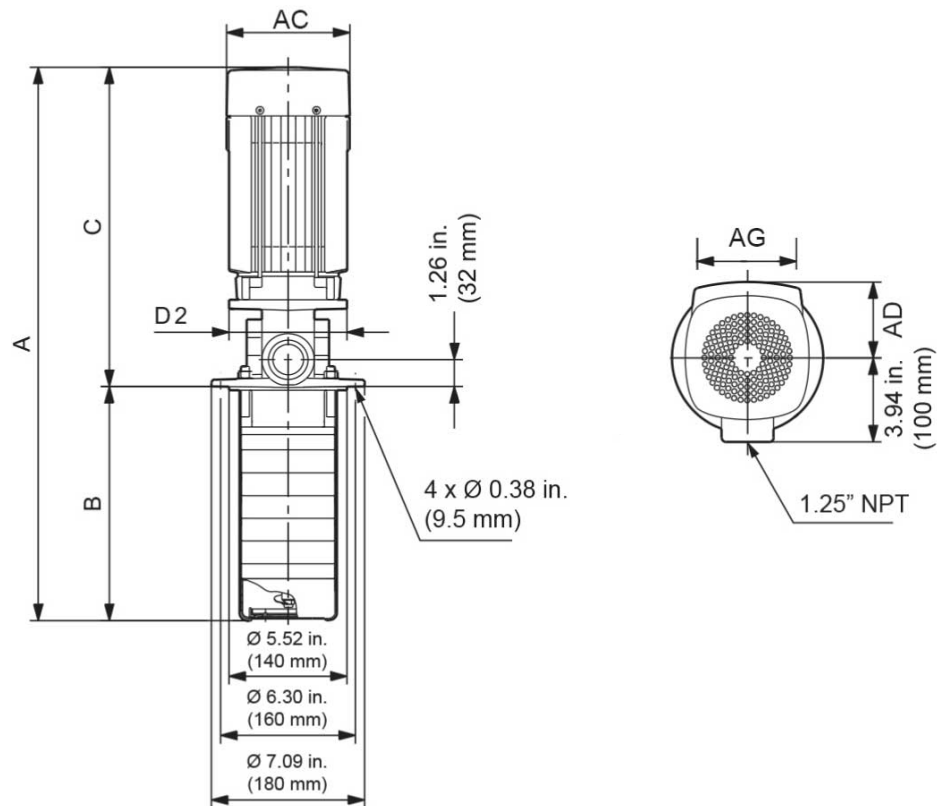
Pump type	P2 [hp]	PH	Voltage [V]	Motor frame size	Dimensions [in. (mm)]						Net weight [lb]	
					A	B	C	AC	D2	AD		AG
MTRE 3-3/3	1/2	1	200-240	56C	19.84 (504)	7.01 (178)	12.83 (326)	4.80 (122)	6.50 (165)	6.22 (158)	8.34 (212)	38
MTRE 3-4/4	3/4	1	200-240	56C	20.55 (522)	7.72 (196)	12.83 (326)	4.80 (122)	6.50 (165)	6.22 (158)	8.34 (212)	38
MTRE 3-6/6	1	1	200-240	56C	21.97 (558)	9.14 (232)	12.83 (326)	4.80 (122)	6.50 (165)	6.22 (158)	8.34 (212)	38
		3	440-480	56C	23.54 (598)	9.14 (232)	14.41 (366)	4.80 (122)	6.50 (165)	6.22 (158)	10.56 (268)	42
MTRE 3-9/9	1 1/2	1	200-240	56C	24.09 (612)	11.26 (286)	12.83 (326)	4.80 (122)	6.50 (165)	6.22 (158)	8.34 (212)	40
		3	200-240	56C	25.67 (652)	11.26 (286)	14.41 (366)	4.80 (122)	6.50 (165)	6.22 (158)	10.56 (268)	44
			440-480	56C	25.67 (652)	11.26 (286)	14.41 (366)	4.80 (122)	6.50 (165)	6.22 (158)	10.56 (268)	44
MTRE 3-12/12	2	1	200-240	56C	27.01 (686)	13.39 (340)	13.62 (346)	4.80 (122)	6.50 (165)	6.22 (158)	8.34 (212)	44
		3	200-240	56C	28.58 (726)	13.39 (340)	15.20 (386)	4.80 (122)	6.50 (165)	6.22 (158)	10.56 (268)	48
			440-480	56C	28.58 (726)	13.39 (340)	15.20 (386)	4.80 (122)	6.50 (165)	6.22 (158)	10.56 (268)	48
MTRE 3-17/17	3	3	200-240	182TC	35.28 (896)	16.93 (430)	18.35 (466)	7.53 (191)	9.85 (250)	7.91 (201)	11.46 (291)	74
		3	440-480	182TC	32.95 (837)	16.93 (430)	16.02 (407)	4.80 (122)	6.50 (165)	6.22 (158)	10.56 (268)	66
MTRE 3-23/23	5	3	200-240	182TC	39.53 (1004)	21.19 (538)	18.35 (466)	7.53 (191)	9.85 (250)	7.91 (201)	11.46 (291)	91
		3	440-480	182TC	39.53 (1004)	21.19 (538)	18.35 (466)	7.53 (191)	9.85 (250)	7.91 (201)	11.46 (291)	94
MTRE 3-26/26	5	3	200-240	182TC	41.65 (1058)	23.31 (592)	18.35 (466)	7.53 (191)	9.85 (250)	7.91 (201)	11.46 (291)	91
		3	440-480	182TC	41.65 (1058)	23.31 (592)	18.35 (466)	7.53 (191)	9.85 (250)	7.91 (201)	11.46 (291)	95

MTR 4, 60 Hz



TM082550

Dimensional sketches



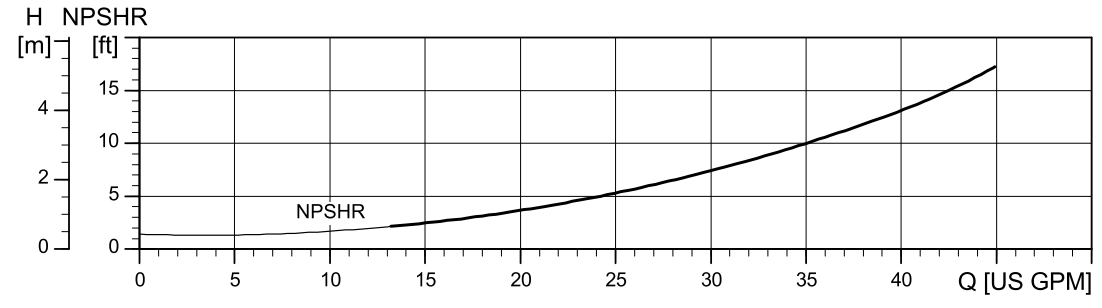
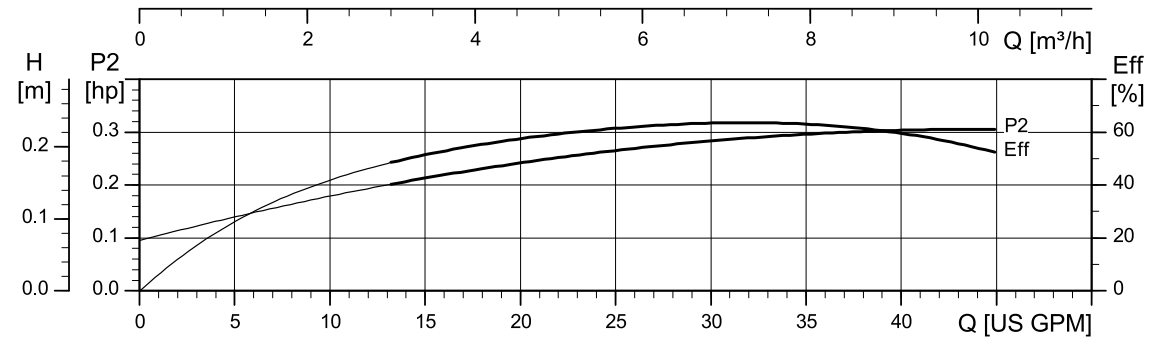
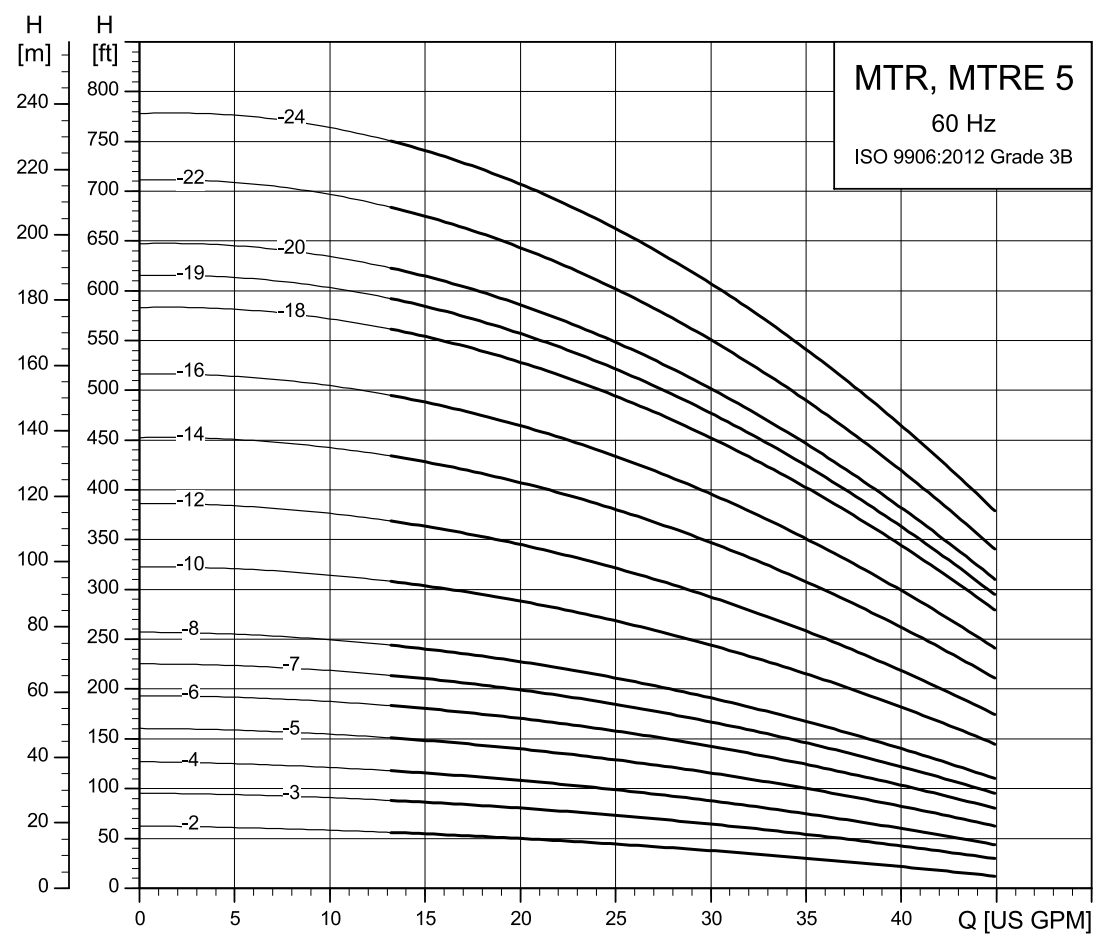
TM082730

Dimensions and weights

MTR 4

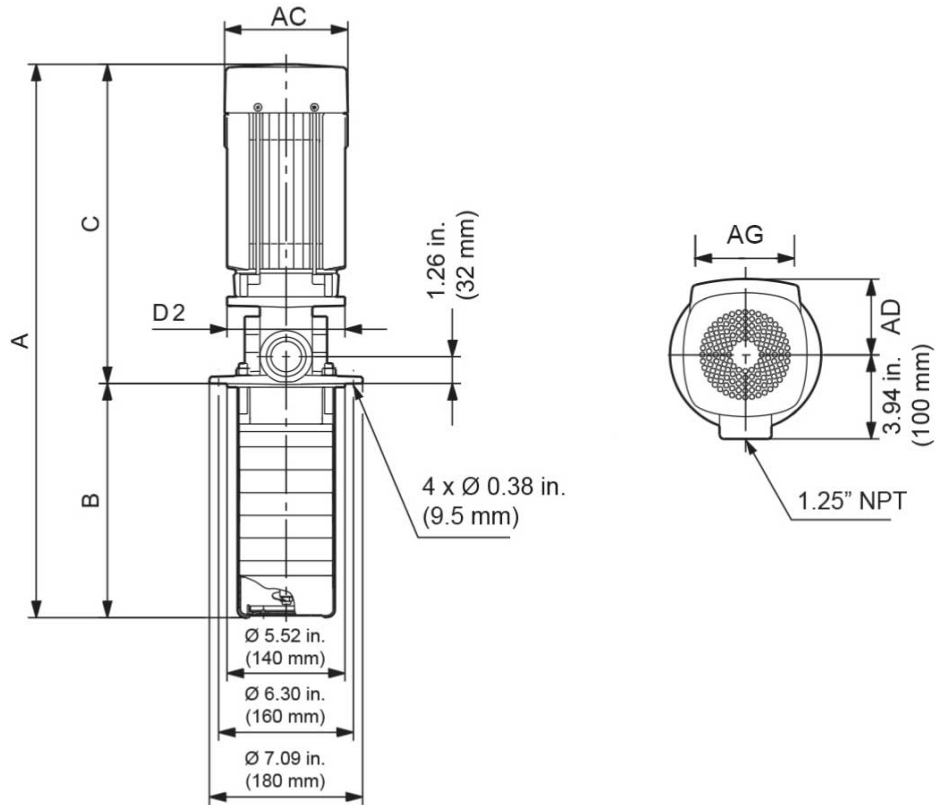
Pump type	P ₂ [hp]	Dimensions [in. (mm)]						Net weight [lb]
		A	B	C	AC	D2	AD	
MTR 4-2/2	3/4	18.62 (473)	6.65 (169)	11.97 (304)	5.55 (141)	6.5 (165)	4.57 (116)	35
MTR 4-3/3	1 1/2	20.87 (530)	7.72 (196)	13.15 (334)	5.59 (142)	6.5 (165)	4.59 (116.5)	36
MTR 4-4/4	2	24.53 (623)	8.78 (223)	15.75 (400)	7.01 (178)	6.5 (165)	4.33 (110)	53
MTR 4-5/5	2	25.59 (650)	9.84 (250)	15.75 (400)	7.01 (178)	6.5 (165)	4.33 (110)	53
MTR 4-6/6	3	29.33 (745)	10.91 (277)	18.43 (468)	7.01 (178)	9 (228.6)	4.33 (110)	77
MTR 4-7/7	3	30.39 (772)	11.97 (304)	18.43 (468)	7.01 (178)	9 (228.6)	4.33 (110)	77
MTR 4-8/8	5	33.74 (857)	13.03 (331)	20.71 (526)	8.66 (220)	9 (228.6)	5.28 (134)	118
MTR 4-10/10	5	35.87 (911)	15.16 (385)	20.71 (526)	8.66 (220)	9 (228.6)	5.28 (134)	118
MTR 4-12/12	5	37.99 (965)	17.28 (439)	20.71 (526)	8.66 (220)	9 (228.6)	5.28 (134)	118

MTR, MTRE 5, 60 Hz



TM034255

Dimensional sketches



TM082730

Dimensions and weights

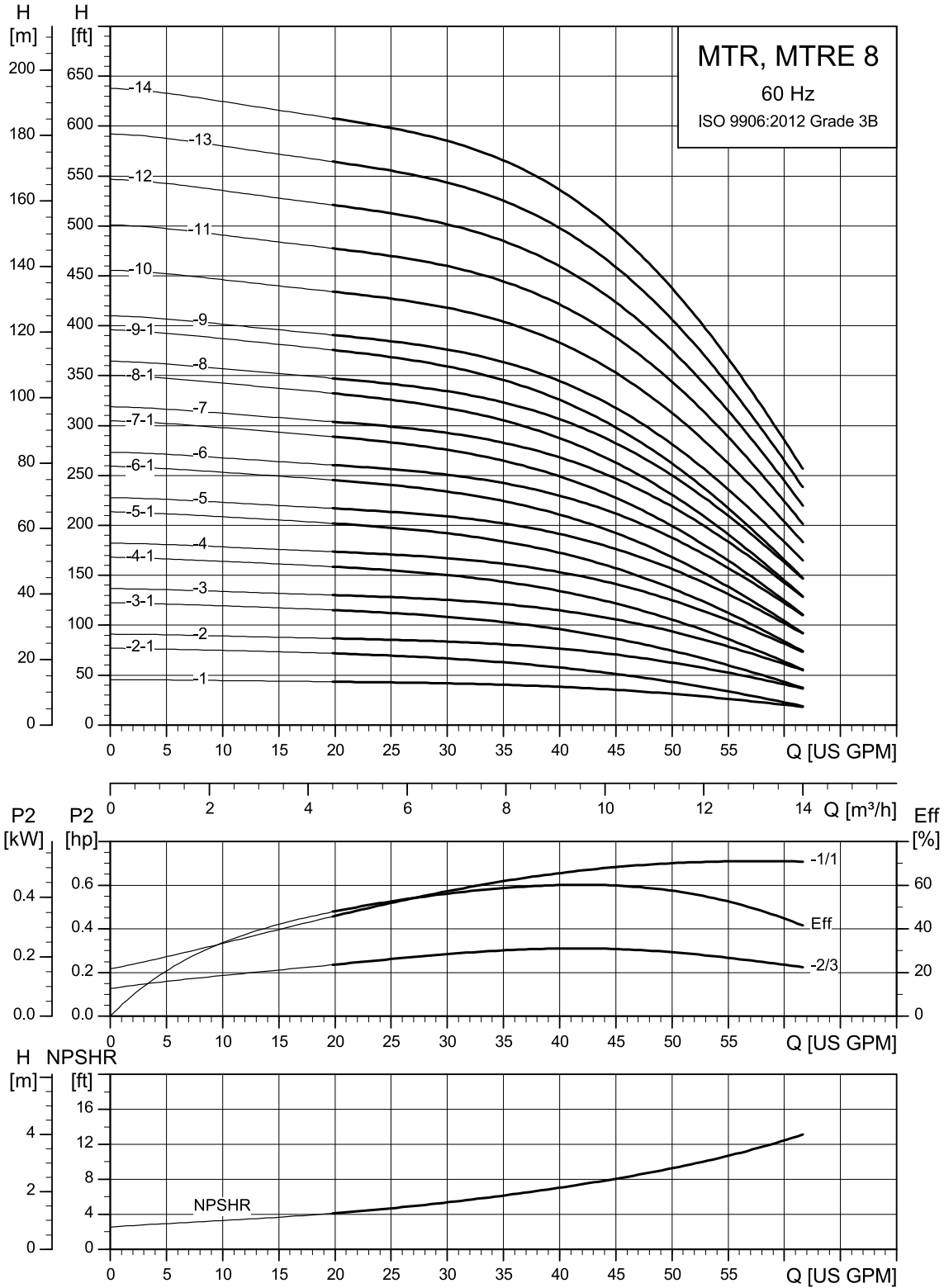
MTR 5

Pump type	P ₂ [hp]	Dimensions [in. (mm)]						Net weight [lb]
		A	B	C	AC	D2	AD	
MTR 5-2/2	3/4	18.62 (473)	6.65 (169)	11.97 (304)	5.56 (141)	6.50 (165)	4.57 (116)	33
MTR 5-3/3	1	19.69 (500)	7.72 (196)	11.97 (304)	5.56 (141)	6.50 (165)	4.57 (116)	33
MTR 5-4/4	1 1/2	21.93 (557)	8.78 (223)	13.15 (334)	5.56 (141)	6.50 (165)	4.57 (116)	34
MTR 5-5/5	2	25.59 (650)	9.84 (250)	15.75 (400)	7.01 (178)	6.50 (165)	4.34 (110)	51
MTR 5-6/6	2	26.65 (677)	10.91 (277)	15.75 (400)	7.01 (178)	6.50 (165)	4.34 (110)	51
MTR 5-7/7	3	30.39 (772)	11.97 (304)	18.43 (468)	7.01 (178)	9.85 (250)	4.34 (110)	75
MTR 5-8/8	3	31.46 (799)	13.03 (331)	18.43 (468)	7.01 (178)	9.85 (250)	4.34 (110)	75
MTR 5-10/10	5	35.87 (911)	15.16 (385)	20.71 (526)	8.67 (220)	9.85 (250)	5.28 (134)	116
MTR 5-12/12	5	37.99 (965)	17.28 (439)	20.71 (526)	8.67 (220)	9.85 (250)	5.28 (134)	116
MTR 5-14/14	5	40.12 (1019)	19.41 (493)	20.71 (526)	8.67 (220)	9.85 (250)	5.28 (134)	116
MTR 5-16/16	5	42.24 (1073)	21.54 (547)	20.71 (526)	8.67 (220)	9.85 (250)	5.28 (134)	116
MTR 5-18/18	7 1/2	44.37 (1127)	23.66 (601)	20.71 (526)	8.67 (220)	9.85 (250)	5.28 (134)	140
MTR 5-19/19	7 1/2	45.43 (1154)	24.72 (628)	20.71 (526)	8.67 (220)	9.85 (250)	5.28 (134)	140
MTR 5-20/20	7 1/2	46.50 (1181)	25.79 (655)	20.71 (526)	8.67 (220)	9.85 (250)	5.28 (134)	140
MTR 5-22/22	7 1/2	48.62 (1235)	27.91 (709)	20.71 (526)	8.67 (220)	9.85 (250)	5.28 (134)	140
MTR 5-24/24	7 1/2	50.75 (1289)	30.04 (763)	20.71 (526)	8.67 (220)	9.85 (250)	5.28 (134)	140

MTRE 5

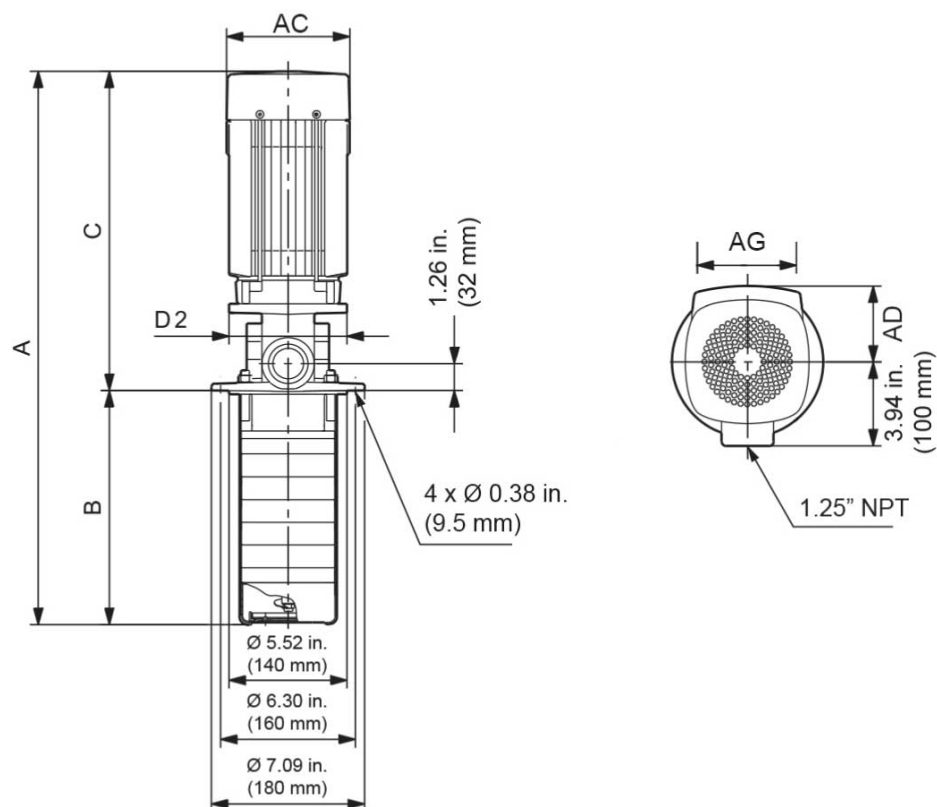
Pump type	P2 [hp]	PH	Voltage [V]	Motor frame size	Dimensions [in. (mm)]							Net weight [lb]
					A	B	C	AC	D2	AD	AG	
MTRE 5-3/3	1	1	200-240	56C	20.55 (522)	7.72 (196)	12.83 (326)	4.80 (122)	6.50 (165)	6.22 (158)	8.34 (212)	39
		3	440-480	56C	22.13 (562)	7.72 (196)	14.41 (366)	4.80 (122)	6.50 (165)	6.22 (158)	10.56 (268)	42
MTRE 5-4/4	1 1/2	1	200-240	56C	21.61 (549)	8.78 (223)	12.83 (326)	4.80 (122)	6.50 (165)	6.22 (158)	8.34 (212)	40
		3	200-240	56C	23.19 (589)	8.78 (223)	14.41 (366)	4.80 (122)	6.50 (165)	6.22 (158)	10.56 (268)	44
			440-480	56C	23.19 (589)	8.78 (223)	14.41 (366)	4.80 (122)	6.50 (165)	6.22 (158)	10.56 (268)	44
		1	200-240	56C	24.53 (623)	10.91 (277)	13.62 (346)	4.80 (122)	6.50 (165)	6.22 (158)	8.34 (212)	45
MTRE 5-6/6	2	3	200-240	56C	26.10 (663)	10.91 (277)	15.20 (386)	4.80 (122)	6.50 (165)	6.22 (158)	10.56 (268)	48
			440-480	56C	26.10 (663)	10.91 (277)	15.20 (386)	4.80 (122)	6.50 (165)	6.22 (158)	10.56 (268)	48
MTRE 5-8/8	3	3	200-240	182TC	31.38 (797)	13.04 (331)	18.35 (466)	7.53 (191)	9.85 (250)	7.91 (201)	11.46 (291)	74
			440-480	182TC	29.06 (738)	13.04 (331)	16.02 (407)	4.80 (122)	6.50 (165)	6.22 (158)	10.56 (268)	66
MTRE 5-12/12	5	3	200-240	182TC	35.63 (905)	17.29 (439)	18.35 (466)	7.53 (191)	9.85 (250)	7.91 (201)	11.46 (291)	92
			440-480	182TC	35.63 (905)	17.29 (439)	18.35 (466)	7.53 (191)	9.85 (250)	7.91 (201)	11.46 (291)	95
MTRE 5-16/16	5	3	200-240	182TC	39.88 (1013)	21.54 (547)	18.35 (466)	7.53 (191)	9.85 (250)	7.91 (201)	11.46 (291)	92
			440-480	182TC	39.88 (1013)	21.54 (547)	18.35 (466)	7.53 (191)	9.85 (250)	7.91 (201)	11.46 (291)	95
MTRE 5-20/20	7 1/2	3	200-240	213TC	46.30 (1176)	25.79 (655)	20.51 (521)	10.04 (255)	9.85 (250)	9.33 (237)	13.62 (346)	133
			440-480	213TC	45.35 (1152)	25.79 (655)	19.57 (497)	7.53 (191)	9.85 (250)	7.91 (201)	11.46 (291)	119
MTRE 5-24/24	7 1/2	3	200-240	213TC	50.55 (1284)	30.04 (763)	20.51 (521)	10.04 (255)	9.85 (250)	9.33 (237)	13.62 (346)	133
			440-480	213TC	49.61 (1260)	30.04 (763)	19.57 (497)	7.53 (191)	9.85 (250)	7.91 (201)	11.46 (291)	119

MTR, MTRE 8, 60 Hz



TM082551

Dimensional sketches



TM082730

Dimensions and weights

MTR 8

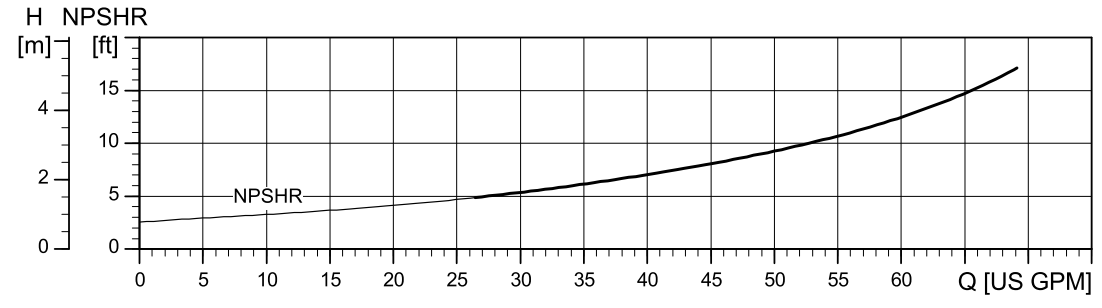
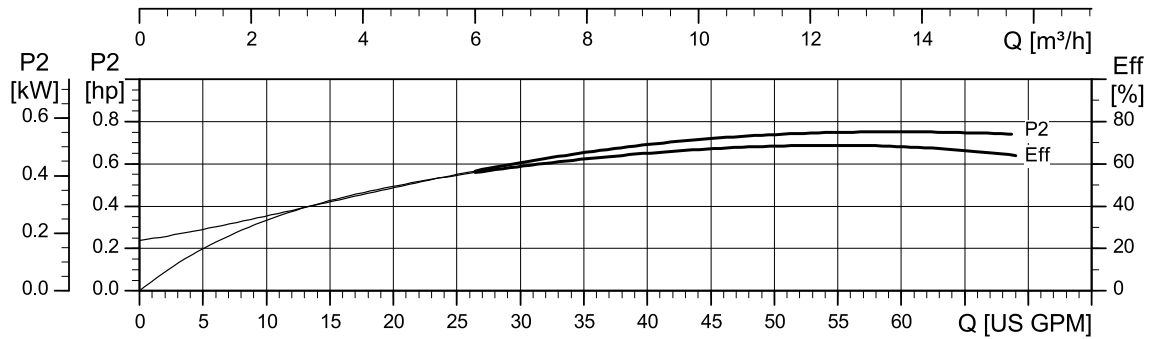
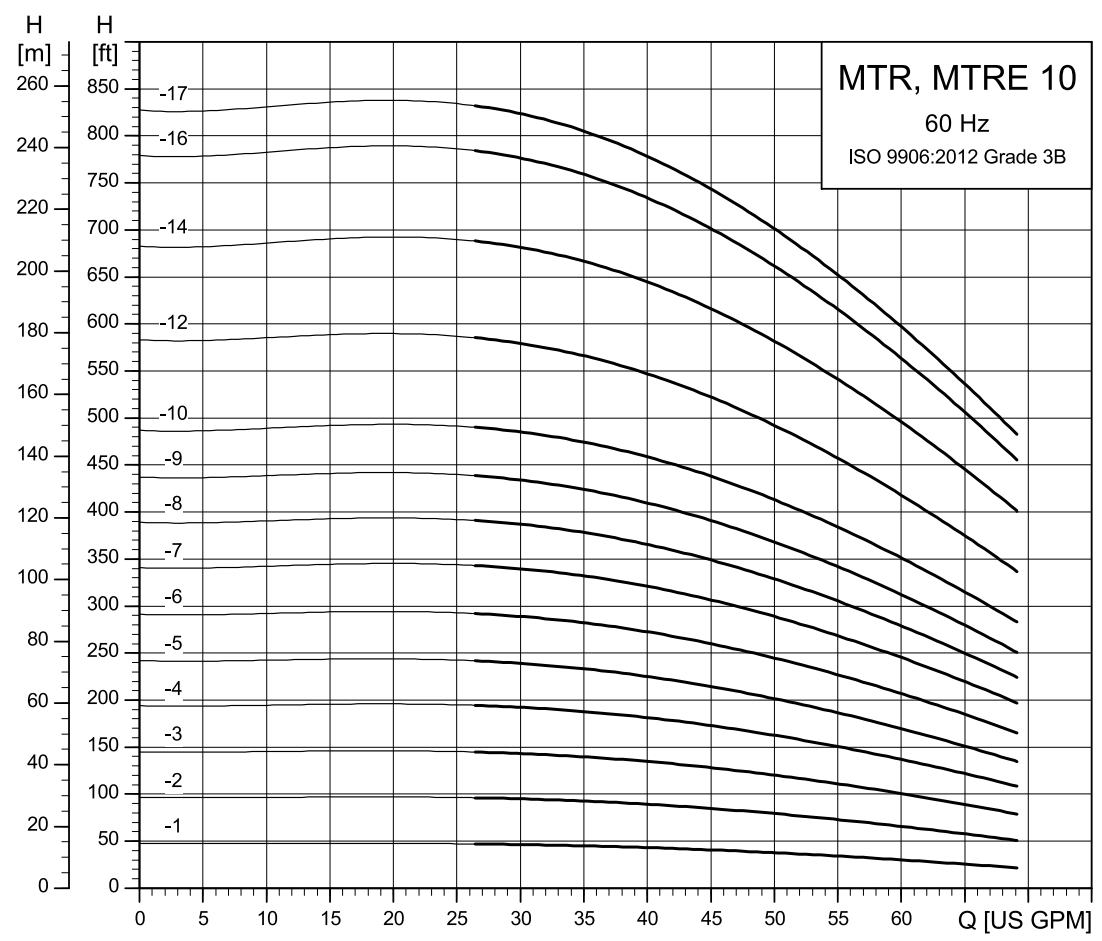
Pump type	P ₂ [hp]	Dimensions [in. (mm)]						Net weight [lb]
		A	B	C	AC	D2	AD	
MTR8-1/1	3/4	19.69 (500)	7.72 (196)	11.97 (304)	5.55 (141)	6.5 (165)	4.57 (116)	43
MTR8-2/2-1	1	20.75 (527)	8.78 (223)	11.97 (304)	5.55 (141)	6.5 (165)	4.57 (116)	43
MTR8-2/2	1 1/2	21.93 (557)	8.78 (223)	13.15 (334)	5.59 (142)	6.5 (165)	4.59 (116.5)	43
MTR8-3/3-1	2	25.59 (650)	9.84 (250)	15.75 (400)	7.01 (178)	6.5 (165)	4.33 (110)	61
MTR8-3/3	2	25.59 (650)	9.84 (250)	15.75 (400)	7.01 (178)	6.5 (165)	4.33 (110)	61
MTR8-4/4-1	3	29.33 (745)	10.91 (277)	18.43 (468)	7.01 (178)	9 (228.6)	4.33 (110)	84
MTR8-4/4	3	29.33 (745)	10.91 (277)	18.43 (468)	7.01 (178)	9 (228.6)	4.33 (110)	84
MTR8-5/5-1	3	30.39 (772)	11.97 (304)	18.43 (468)	7.01 (178)	9 (228.6)	4.33 (110)	84
MTR8-5/5	5	32.68 (830)	11.97 (304)	20.71 (526)	8.66 (220)	9 (228.6)	5.28 (134)	125
MTR8-6/6-1	5	33.74 (857)	13.03 (331)	20.71 (526)	8.66 (220)	9 (228.6)	5.28 (134)	125
MTR8-6/6	5	33.74 (857)	13.03 (331)	20.71 (526)	8.66 (220)	9 (228.6)	5.28 (134)	125
MTR8-7/7-1	5	34.8 (884)	14.09 (358)	20.71 (526)	8.66 (220)	9 (228.6)	5.28 (134)	126
MTR8-7/7	5	34.8 (884)	14.09 (358)	20.71 (526)	8.66 (220)	9 (228.6)	5.28 (134)	126
MTR8-8/8-1	5	35.87 (911)	15.16 (385)	20.71 (526)	8.66 (220)	9 (228.6)	5.28 (134)	126
MTR8-8/8	7 1/2	35.87 (911)	15.16 (385)	20.71 (526)	8.66 (220)	9 (228.6)	5.28 (134)	145
MTR8-9/9-1	7 1/2	36.93 (938)	16.22 (412)	20.71 (526)	8.66 (220)	9 (228.6)	5.28 (134)	146
MTR8-9/9	7 1/2	36.93 (938)	16.22 (412)	20.71 (526)	8.66 (220)	9 (228.6)	5.28 (134)	146
MTR8-10/10	7 1/2	37.99 (965)	17.28 (439)	20.71 (526)	8.66 (220)	9 (228.6)	5.28 (134)	146
MTR8-11/11	7 1/2	39.06 (992)	18.35 (466)	20.71 (526)	8.66 (220)	9 (228.6)	5.28 (134)	146

Pump type	P ₂ [hp]	Dimensions [in. (mm)]						Net weight [lb]
		A	B	C	AC	D2	AD	
MTR8-12/12	10	39.76 (1010)	19.41 (493)	20.35 (517)	10.24 (260)	9.02 (229)	6.26 (159)	169
MTR8-13/13	10	40.83 (1037)	20.47 (520)	20.35 (517)	10.24 (260)	9.02 (229)	6.26 (159)	169
MTR8-14/14	10	41.89 (1064)	21.54 (547)	20.35 (517)	10.24 (260)	9.02 (229)	6.26 (159)	169

MTRE 8

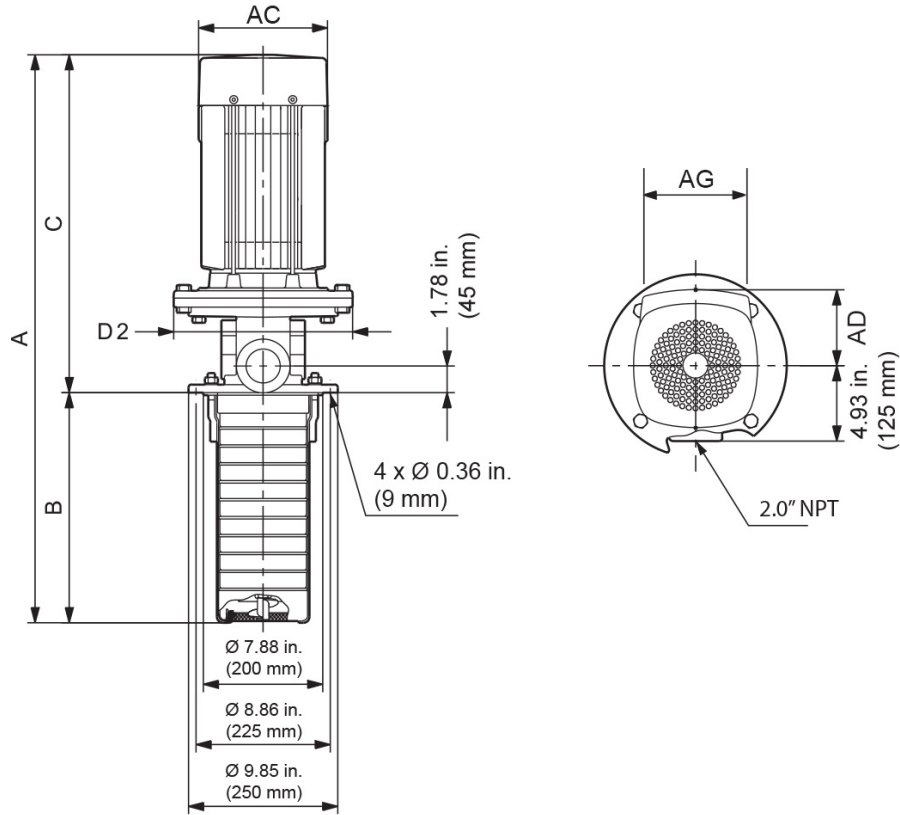
Pump type	P ₂ [hp]	PH	Voltage [V]	Motor frame size	Dimensions [in. (mm)]						Net weight [lb]		
					A	B	C	AC	D2	AD		AG	
MTRE 8-3/3	2	3	1	200-240	56C	23.46 (596)	9.84 (250)	13.62 (346)	4.80 (122)	6.50 (165)	6.22 (158)	8.35 (212)	54
			2	200-240	56C	25.04 (636)	9.84 (250)	15.20 (386)	4.80 (122)	6.50 (165)	6.22 (158)	10.55 (268)	58
			3	440-480	56C	25.04 (636)	9.84 (250)	15.20 (386)	4.80 (122)	6.50 (165)	6.22 (158)	10.55 (268)	58
MTRE 8-4/4	3	3	2	200-240	182TC	29.26 (743)	10.91 (277)	18.35 (466)	7.53 (191)	9.84 (250)	7.91 (201)	11.46 (291)	84
			3	440-480	182TC	26.93 (684)	10.91 (277)	16.02 (407)	4.80 (122)	9.84 (250)	6.22 (158)	10.55 (268)	76
MTRE 8-7/7	5	3	2	200-240	182TC	32.44 (824)	14.09 (358)	18.35 (466)	7.53 (191)	9.84 (250)	7.91 (201)	11.46 (291)	101
			3	440-480	182TC	32.44 (824)	14.09 (358)	18.35 (466)	7.53 (191)	9.84 (250)	7.91 (201)	11.46 (291)	104
MTRE 8-10/10	7 1/2	3	2	200-240	213TC	37.79 (960)	17.28 (439)	20.51 (521)	10.04 (255)	9.84 (250)	9.33 (237)	13.62 (346)	142
			3	440-480	213TC	36.85 (936)	17.28 (439)	19.57 (497)	7.53 (191)	9.84 (250)	7.91 (201)	11.46 (291)	128
MTRE 8-14/14	10	3	440-480	213TC	42.05 (1068)	21.54 (547)	20.51 (521)	10.04 (255)	9.84 (250)	9.33 (237)	13.62 (346)	151	

MTR, MTRE 10, 60 Hz



TM034256

Dimensional sketches



TM069782

Dimensions and weights

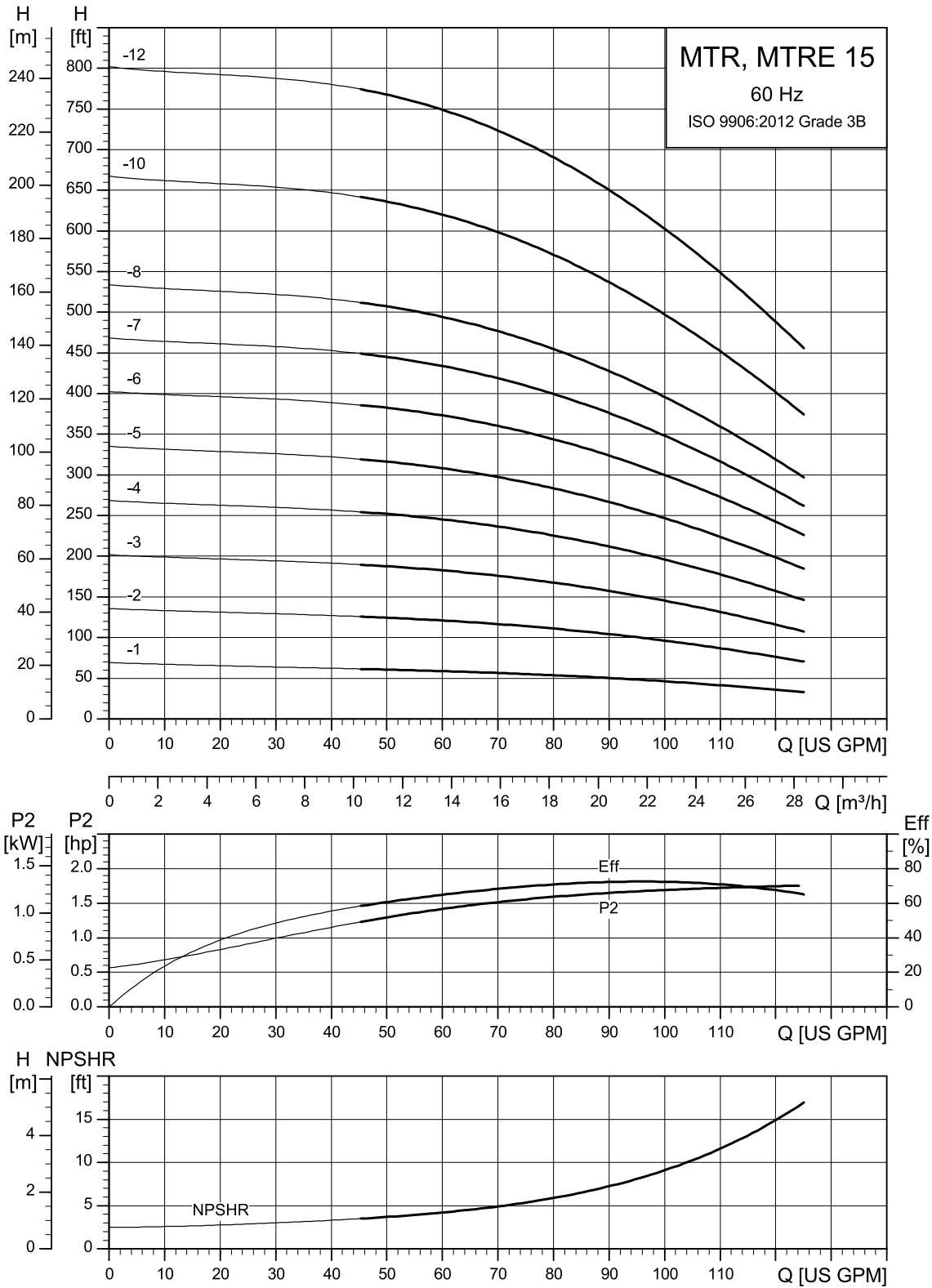
MTR 10

Pump type	P ₂ [hp]	Dimensions [in. (mm)]						Net weight [lb]
		A	B	C	AC	D2	AD	
MTR 10-2/1	1	18.94 (481)	5.83 (148)	13.11 (333)	5.56 (141)	6.50 (165)	4.57 (116)	50
MTR 10-2/2	2	22.72 (577)	5.83 (148)	16.89 (429)	7.01 (178)	6.50 (165)	4.34 (110)	68
MTR 10-3/3	3	27.28 (693)	7.01 (178)	20.28 (515)	7.01 (178)	9.85 (250)	4.34 (110)	91
MTR 10-4/4	5	30.75 (781)	8.19 (208)	22.56 (573)	8.67 (220)	9.85 (250)	5.28 (134)	132
MTR 10-5/5	5	31.93 (811)	9.37 (238)	22.56 (573)	8.67 (220)	9.85 (250)	5.28 (134)	132
MTR 10-6/6	5	33.11 (841)	10.55 (268)	22.56 (573)	8.67 (220)	9.85 (250)	5.28 (134)	132
MTR 10-7/7	7 1/2	34.41 (874)	11.73 (298)	22.68 (576)	8.67 (220)	9.85 (250)	5.28 (134)	153
MTR 10-8/8	7 1/2	35.59 (904)	12.91 (328)	22.68 (576)	8.67 (220)	9.85 (250)	5.28 (134)	153
MTR 10-9/9	7 1/2	36.77 (934)	14.09 (358)	22.68 (576)	8.67 (220)	9.85 (250)	5.28 (134)	154
MTR 10-10/10	10	37.95 (964)	15.28 (388)	22.68 (576)	8.67 (220)	9.85 (250)	5.28 (134)	154
MTR 10-12/12	10	40.31 (1024)	17.64 (448)	22.68 (576)	8.67 (220)	9.85 (250)	5.28 (134)	154
MTR 10-14/14	15	45.98 (1168)	20.00 (508)	25.98 (660)	10.08 (256)	9.85 (250)	8.55 (217)	251
MTR 10-16/16	15	48.35 (1228)	22.36 (568)	25.98 (660)	10.08 (256)	9.85 (250)	8.55 (217)	252
MTR 10-18/17	15	50.47 (1282)	24.49 (622)	25.98 (660)	10.08 (256)	9.85 (250)	8.55 (217)	252
MTR 10-20/17	15	53.07 (1348)	27.09 (688)	25.98 (660)	10.08 (256)	9.85 (250)	8.55 (217)	252
MTR 10-22/17	15	55.43 (1408)	29.45 (748)	25.98 (660)	10.08 (256)	9.85 (250)	8.55 (217)	253

MTRE 10

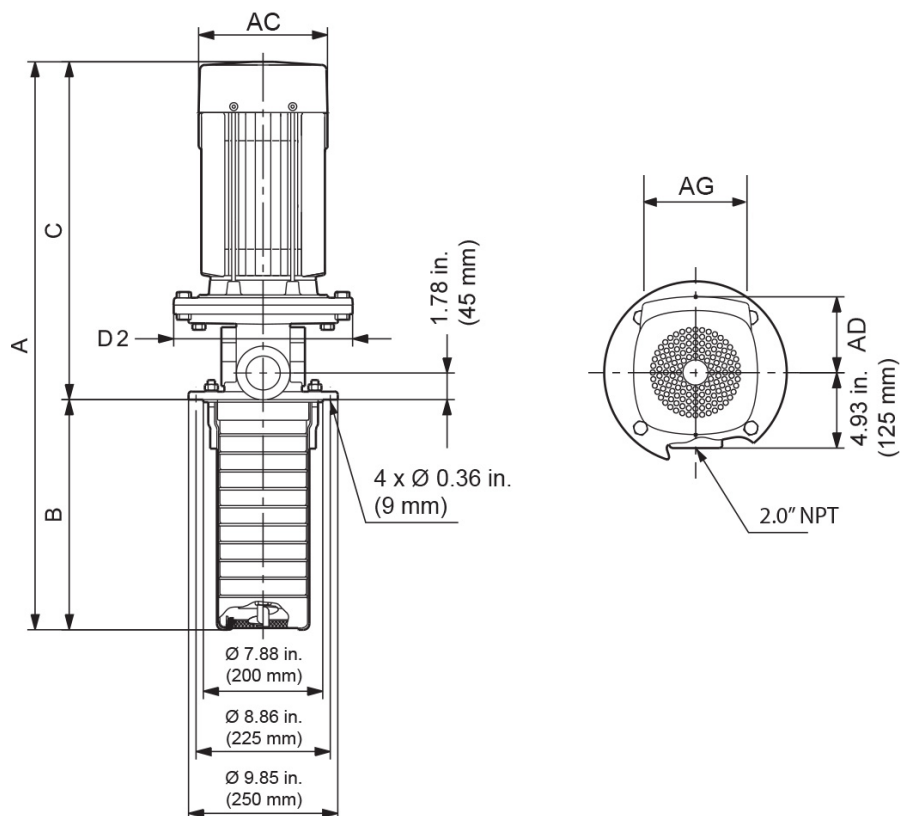
Pump type	P2 [hp]	PH	Voltage [V]	Motor frame size	Dimensions [in. (mm)]						Net weight [lb]		
					A	B	C	AC	D2	AD		AG	
MTRE 10-2/2	2	3	1	200-240	56C	20.59 (523)	5.83 (148)	14.76 (375)	4.80 (122)	6.50 (165)	6.22 (158)	8.34 (212)	61
			2	200-240	56C	22.17 (563)	5.83 (148)	16.34 (415)	4.80 (122)	6.50 (165)	6.22 (158)	10.56 (268)	65
			3	440-480	56C	22.17 (563)	5.83 (148)	16.34 (415)	4.80 (122)	6.50 (165)	6.22 (158)	10.56 (268)	65
MTRE 10-3/3	3	3	200-240	182TC	27.20 (691)	7.01 (178)	20.20 (513)	7.53 (191)	9.85 (250)	7.91 (201)	11.46 (291)	90	
			440-480	182TC	24.88 (632)	7.01 (178)	17.87 (454)	4.80 (122)	9.85 (250)	6.22 (158)	10.56 (268)	82	
MTRE 10-5/5	5	3	200-240	182TC	29.57 (751)	9.38 (238)	20.20 (513)	7.53 (191)	9.85 (250)	7.910 (201)	11.46 (291)	107	
			440-480	182TC	29.57 (751)	9.38 (238)	20.20 (513)	7.53 (191)	9.85 (250)	7.91 (201)	11.46 (291)	110	
MTRE 10-6/6	5	3	200-240	182TC	30.75 (781)	10.56 (268)	20.20 (513)	7.53 (191)	9.85 (250)	7.91 (201)	11.46 (291)	108	
			440-480	182TC	30.75 (781)	10.56 (268)	20.20 (513)	7.53 (191)	9.85 (250)	7.91 (201)	11.46 (291)	111	
MTRE 10-8/8	7 1/2	3	200-240	213TC	35.39 (899)	12.92 (328)	22.48 (571)	10.04 (255)	9.85 (250)	9.33 (237)	13.62 (346)	147	
			440-480	213TC	34.45 (875)	12.92 (328)	21.54 (547)	7.53 (191)	9.85 (250)	7.91 (201)	11.46 (291)	132	
MTRE 10-9/9	7 1/2	3	200-240	213TC	36.57 (929)	14.10 (358)	22.48 (571)	10.04 (255)	9.85 (250)	9.33 (237)	13.62 (346)	147	
			440-480	213TC	35.63 (905)	14.10 (358)	21.54 (547)	7.53 (191)	9.85 (250)	7.91 (201)	11.46 (291)	133	
MTRE 10-10/10	10	3	440-480	213TC	37.76 (959)	15.28 (388)	22.48 (571)	10.04 (255)	9.85 (250)	9.33 (237)	13.62 (346)	156	
MTRE 10-12/12	10	3	440-480	213TC	40.12 (1019)	17.64 (448)	22.48 (571)	10.04 (255)	9.85 (250)	9.33 (237)	13.62 (346)	156	
MTRE 10-14/14	15	3	440-480	254TC	43.15 (1096)	20.01 (508)	23.15 (588)	10.04 (255)	9.85 (250)	9.33 (237)	13.62 (346)	179	
MTRE 10-18/17	15	3	440-480	254TC	47.87 (1216)	24.49 (622)	23.15 (588)	10.04 (255)	9.85 (250)	9.33 (237)	13.62 (346)	179	

MTR, MTRE 15, 60 Hz



TM034257

Dimensional sketches



TM069782

Dimensions and weights

MTR 15

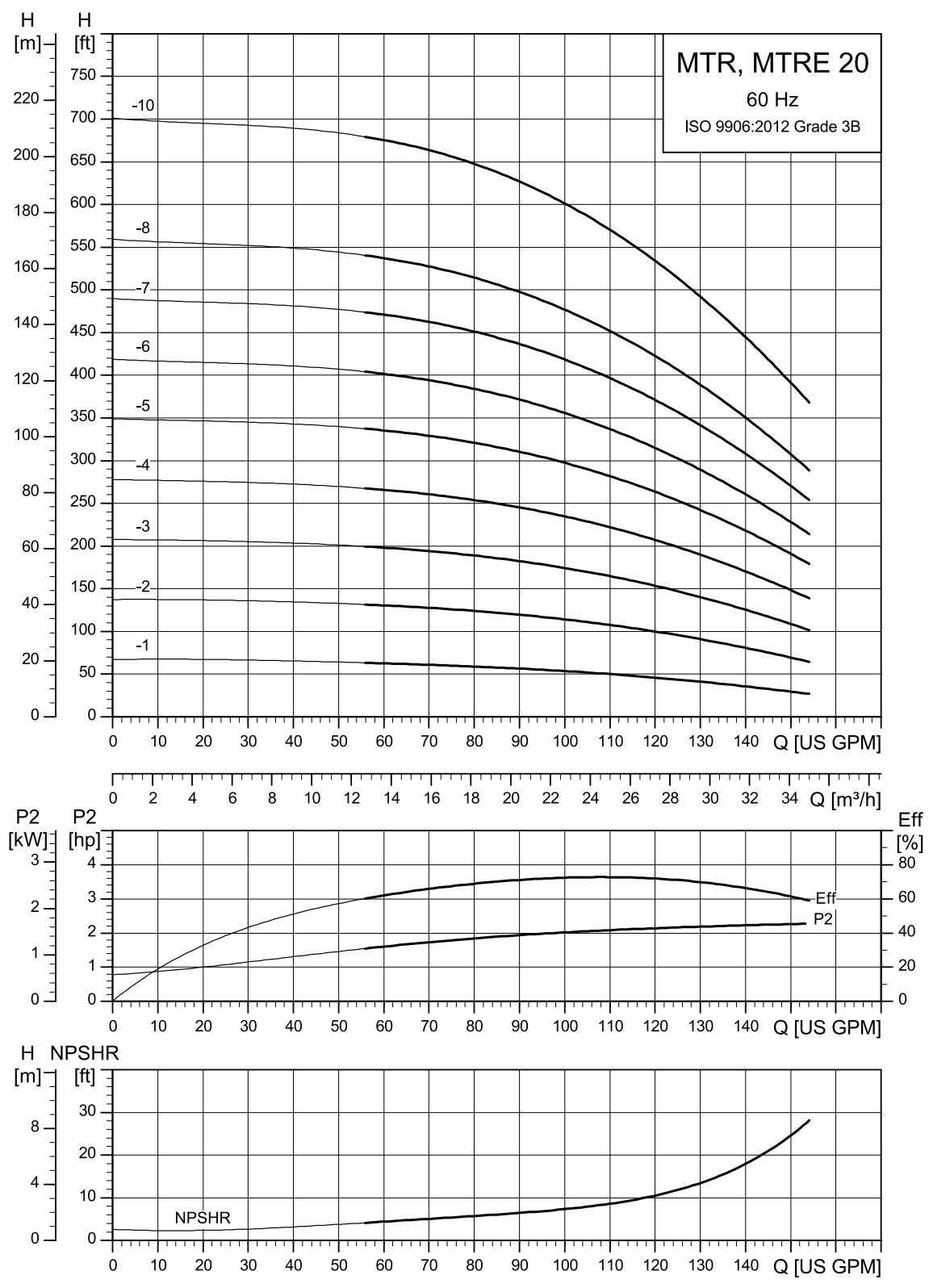
Pump type	P2 [hp]	Dimensions [in. (mm)]						Net weight [lb]
		A	B	C	AC	D2	AD	
MTR 15-2/1	2	23.90 (607)	7.01 (178)	16.89 (429)	7.01 (178)	6.50 (165)	4.34 (110)	71
MTR 15-2/2	5	29.57 (751)	7.01 (178)	22.56 (573)	8.67 (220)	9.85 (250)	5.28 (134)	134
MTR 15-3/3	7 1/2	31.46 (799)	8.78 (223)	22.68 (576)	8.67 (220)	9.85 (250)	5.28 (134)	155
MTR 15-4/4	7 1/2	33.23 (844)	10.55 (268)	22.68 (576)	8.67 (220)	9.85 (250)	5.28 (134)	155
MTR 15-5/5	10	35.00 (889)	12.32 (313)	22.68 (576)	8.67 (220)	9.85 (250)	5.28 (134)	155
MTR 15-6/6	15	40.08 (1018)	14.09 (358)	25.98 (660)	10.08 (256)	9.85 (250)	8.55 (217)	253
MTR 15-7/7	15	41.85 (1063)	15.87 (403)	25.98 (660)	10.08 (256)	9.85 (250)	8.55 (217)	253
MTR 15-8/8	15	43.62 (1108)	17.64 (448)	25.98 (660)	10.08 (256)	9.85 (250)	8.55 (217)	253
MTR 15-10/10	20	47.17 (1198)	21.18 (538)	25.98 (660)	10.08 (256)	9.85 (250)	8.55 (217)	254
MTR 15-12/12	25	54.21 (1377)	24.72 (628)	29.49 (749)	12.96 (329)	11.23 (285)	11.54 (293)	296
MTR 15-14/12	25	57.76 (1467)	28.27 (718)	29.49 (749)	12.96 (329)	11.23 (285)	11.54 (293)	296
MTR 15-16/12	25	61.30 (1557)	31.81 (808)	29.49 (749)	12.96 (329)	11.23 (285)	11.54 (293)	297
MTR 15-17/12	25	63.07 (1602)	33.58 (853)	29.49 (749)	12.96 (329)	11.23 (285)	11.54 (293)	297

MTRE 15

Pump type	P2 [hp]	PH	Voltage [V]	Motor frame size	Dimensions [in. (mm)]						Net weight [lb]	
					A	B	C	AC	D2	AD		AG
MTRE 15-2/1	2	1	200-240	56C	21.77 (553)	7.01 (178)	14.76 (375)	4.80 (122)	6.50 (165)	6.22 (158)	8.34 (212)	64
		3	200-240	56C	23.35 (593)	7.01 (178)	16.34 (415)	4.80 (122)	6.50 (165)	6.22 (158)	10.56 (268)	67
		3	440-480	56C	23.35 (593)	7.01 (178)	16.34 (415)	4.80 (122)	6.50 (165)	6.22 (158)	10.56 (268)	67

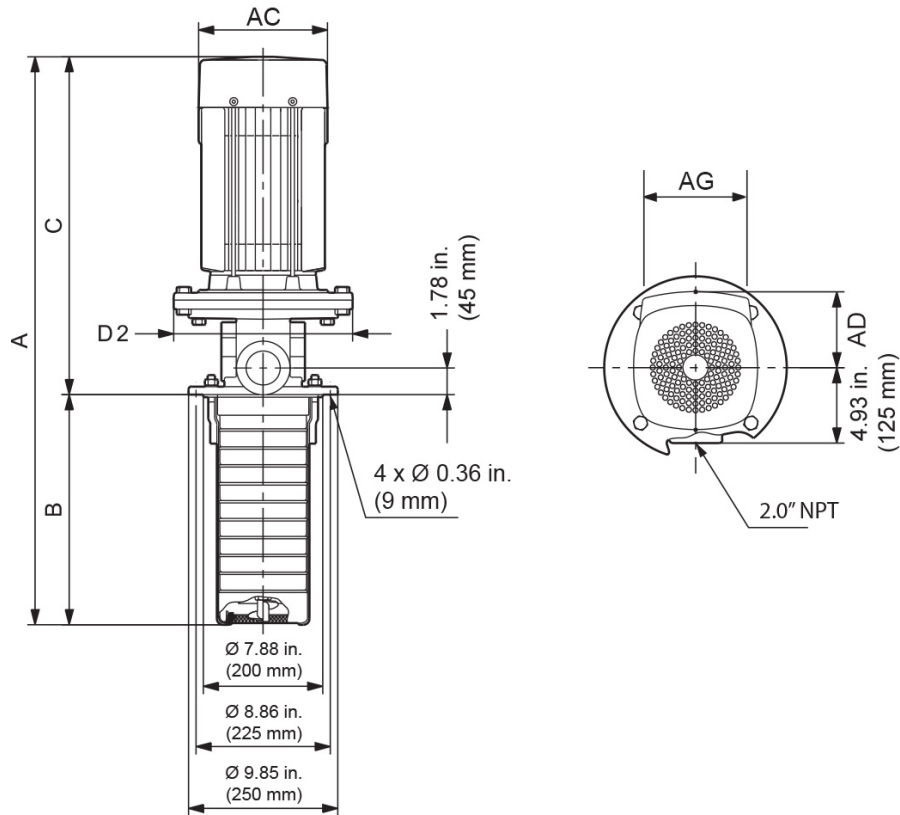
Pump type	P2 [hp]	PH	Voltage [V]	Motor frame size	Dimensions [in. (mm)]							Net weight [lb]
					A	B	C	AC	D2	AD	AG	
MTRE 15-2/2	5	3	200-240	182TC	27.20 (691)	7.01 (178)	20.20 (513)	7.53 (191)	9.85 (250)	7.91 (201)	11.46 (291)	109
			440-480	182TC	27.20 (691)	7.01 (178)	20.20 (513)	7.53 (191)	9.85 (250)	7.91 (201)	11.46 (291)	112
MTRE 15-3/3	7 1/2	3	200-240	213TC	31.26 (794)	8.78 (223)	22.48 (571)	10.04 (255)	9.85 (250)	9.33 (237)	13.62 (346)	148
			440-480	213TC	30.31 (770)	8.78 (223)	21.54 (547)	7.53 (191)	9.85 (250)	7.91 (201)	11.46 (291)	134
MTRE 15-4/4	7 1/2	3	200-240	213TC	33.03 (839)	10.56 (268)	22.48 (571)	10.04 (255)	9.85 (250)	9.33 (237)	13.62 (346)	148
			440-480	213TC	32.09 (815)	10.56 (268)	21.54 (547)	7.53 (191)	9.85 (250)	7.91 (201)	11.46 (291)	134
MTRE 15-5/5	10	3	440-480	213TC	34.80 (884)	12.33 (313)	22.48 (571)	10.04 (255)	9.85 (250)	9.33 (237)	13.62 (346)	157
MTRE 15-8/8	15	3	440-480	254TC	40.79 (1036)	17.64 (448)	23.15 (588)	10.04 (255)	9.85 (250)	9.33 (237)	13.62 (346)	180
MTRE 15-10/10	20	3	440-480	256TC	47.56 (1208)	21.18 (538)	26.38 (670)	12.52 (318)	9.88 (251)	11.93 (303)	16.54 (420)	236
MTRE 15-12/12	25	3	440-480	284TSC	51.69 (1313)	24.72 (628)	26.97 (685)	12.52 (318)	10.75 (273)	11.93 (303)	16.54 (420)	281

MTR, MTRE 20, 60 Hz



TM034258

Dimensional sketches



TM069782

Dimensions and weights

MTR 20

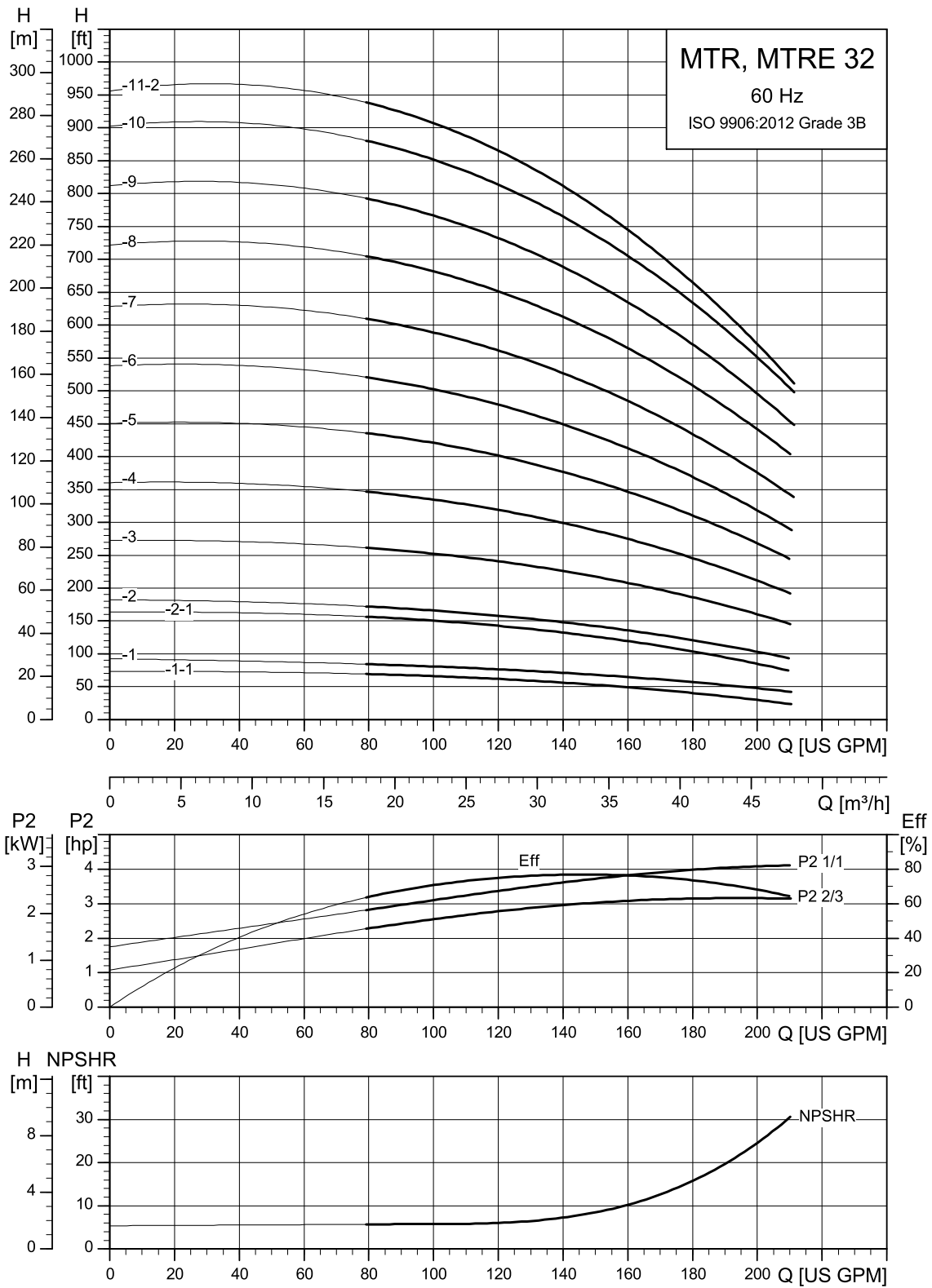
Pump type	P2 [hp]	Dimensions [in. (mm)]						Net weight [lb]
		A	B	C	AC	D2	AD	
MTR 20-2/1	3	27.28 (693)	7.01 (178)	20.28 (515)	7.01 (178)	9.85 (250)	4.34 (110)	93
MTR 20-2/2	5	29.57 (751)	7.01 (178)	22.56 (573)	8.67 (220)	9.85 (250)	5.28 (134)	134
MTR 20-3/3	7 1/2	31.46 (799)	8.78 (223)	22.68 (576)	8.67 (220)	9.85 (250)	5.28 (134)	155
MTR 20-4/4	10	33.23 (844)	10.55 (268)	22.68 (576)	8.67 (220)	9.85 (250)	5.28 (134)	155
MTR 20-5/5	15	38.31 (973)	12.32 (313)	25.98 (660)	10.08 (256)	9.85 (250)	8.55 (217)	252
MTR 20-6/6	15	40.08 (1018)	14.09 (358)	25.98 (660)	10.08 (256)	9.85 (250)	8.55 (217)	253
MTR 20-7/7	20	41.85 (1063)	15.87 (403)	25.98 (660)	10.08 (256)	9.85 (250)	8.55 (217)	253
MTR 20-8/8	20	43.62 (1108)	17.64 (448)	25.98 (660)	10.08 (256)	9.85 (250)	8.55 (217)	253
MTR 20-10/10	25	50.67 (1287)	21.18 (538)	29.49 (749)	12.96 (329)	11.23 (285)	11.54 (293)	296
MTR 20-12/10	25	54.21 (1377)	24.72 (628)	29.49 (749)	12.96 (329)	11.23 (285)	11.54 (293)	296
MTR 20-14/10	25	57.76 (1467)	28.27 (718)	29.49 (749)	12.96 (329)	11.23 (285)	11.54 (293)	296
MTR 20-16/10	25	61.30 (1557)	31.81 (808)	29.49 (749)	12.96 (329)	11.23 (285)	11.54 (293)	297
MTR 20-17/10	25	63.07 (1602)	33.58 (853)	29.49 (749)	12.96 (329)	11.23 (285)	11.54 (293)	297

MTRE 20

Pump type	P2 [hp]	PH	Voltage [V]	Motor frame size	Dimensions [in. (mm)]						Net weight [lb]	
					A	B	C	AC	D2	AD		AG
MTRE 20-2/1	3	3	200-240	182TC	27.20 (691)	7.01 (178)	20.20 (513)	7.53 (191)	9.85 (250)	7.91 (201)	11.46 (291)	92
			440-480	182TC	24.88 (632)	7.01 (178)	17.87 (454)	4.80 (122)	9.85 (250)	6.22 (158)	10.56 (268)	84
MTRE 20-2/2	5	3	200-240	182TC	27.20 (691)	7.01 (178)	20.20 (513)	7.53 (191)	9.85 (250)	7.91 (201)	11.46 (291)	109
			440-480	182TC	27.20 (691)	7.01 (178)	20.20 (513)	7.53 (191)	9.85 (250)	7.91 (201)	11.46 (291)	112

Pump type	P2 [hp]	PH	Voltage [V]	Motor frame size	Dimensions [in. (mm)]							Net weight [lb]
					A	B	C	AC	D2	AD	AG	
MTRE 20-3/3	7 1/2	3	200-240	213TC	31.26 (794)	8.78 (223)	22.48 (571)	10.04 (255)	9.85 (250)	9.33 (237)	13.62 (346)	148
			440-480		30.31 (770)	8.78 (223)	21.54 (547)	7.53 (191)	9.85 (250)	7.91 (201)	11.46 (291)	134
MTRE 20-4/4	10	3	440-480	213TC	33.03 (839)	10.56 (268)	22.48 (571)	10.04 (255)	9.85 (250)	9.33 (237)	13.62 (346)	157
MTRE 20-6/6	15	3	440-480	254TC	37.24 (946)	14.10(358)	23.15 (588)	10.04 (255)	9.85 (250)	9.33 (237)	13.62 (346)	180
MTRE 20-8/8	20	3	440-480	256TC	44.02 (1118)	17.64 (448)	26.38 (670)	12.52 (318)	9.88 (251)	11.93 (303)	16.54 (420)	235
MTRE 20-10/10	25	3	440-480	284TSC	48.15 (1223)	21.18 (538)	26.97 (685)	12.52 (318)	10.75 (273)	11.93 (303)	16.54 (420)	281

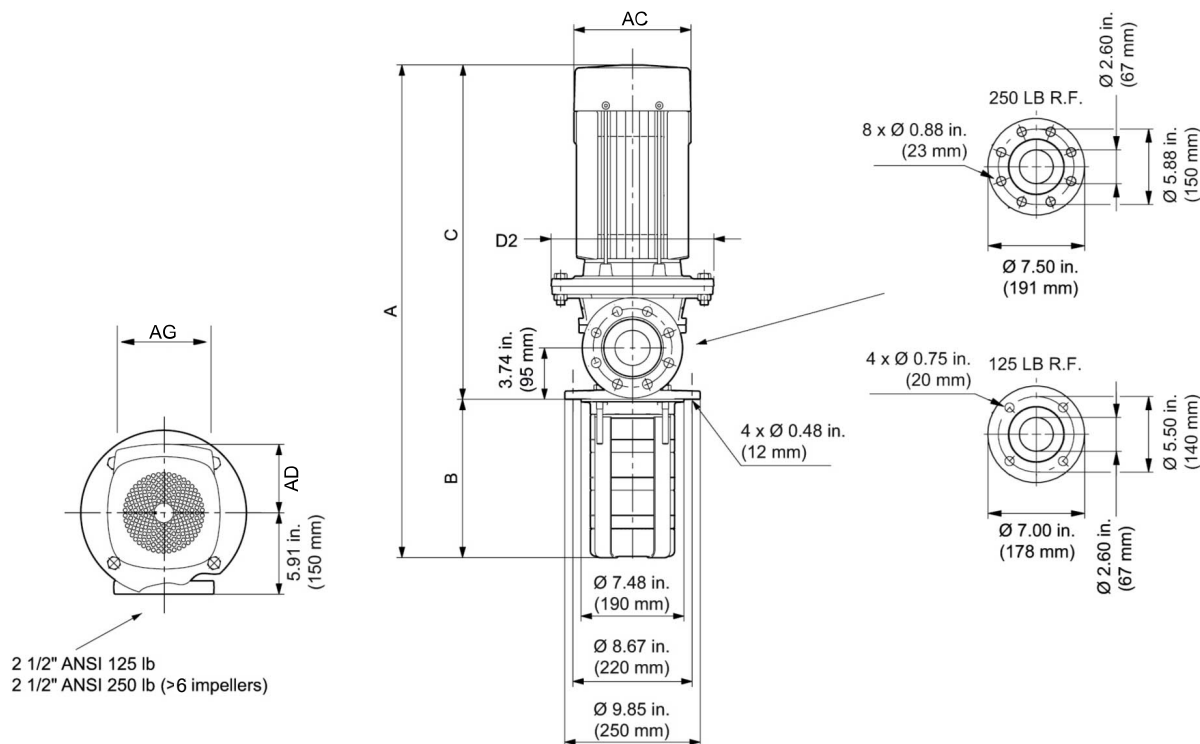
MTR, MTRE 32, 60 Hz



Pumps with eight chambers and up are available for MTR only.

TM034259

Dimensional sketches



TM069788

Dimensions and weights

MTR 32

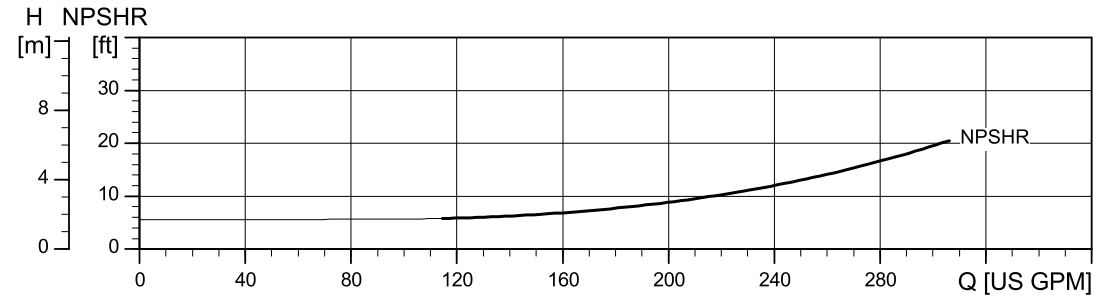
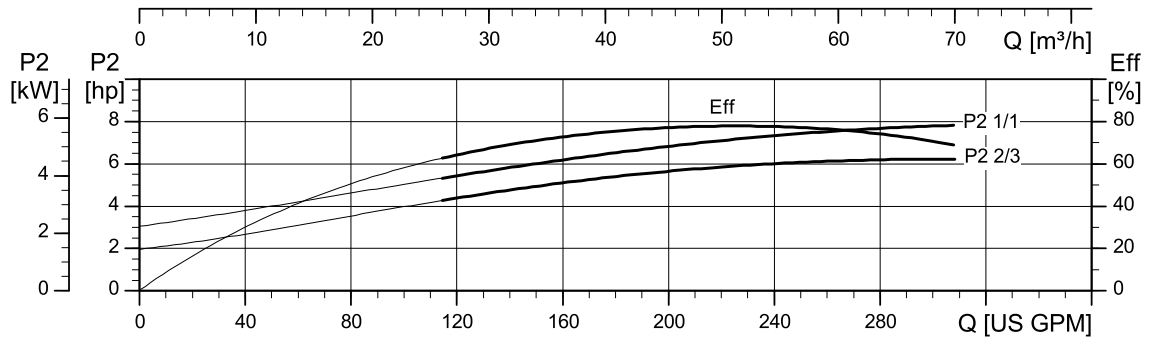
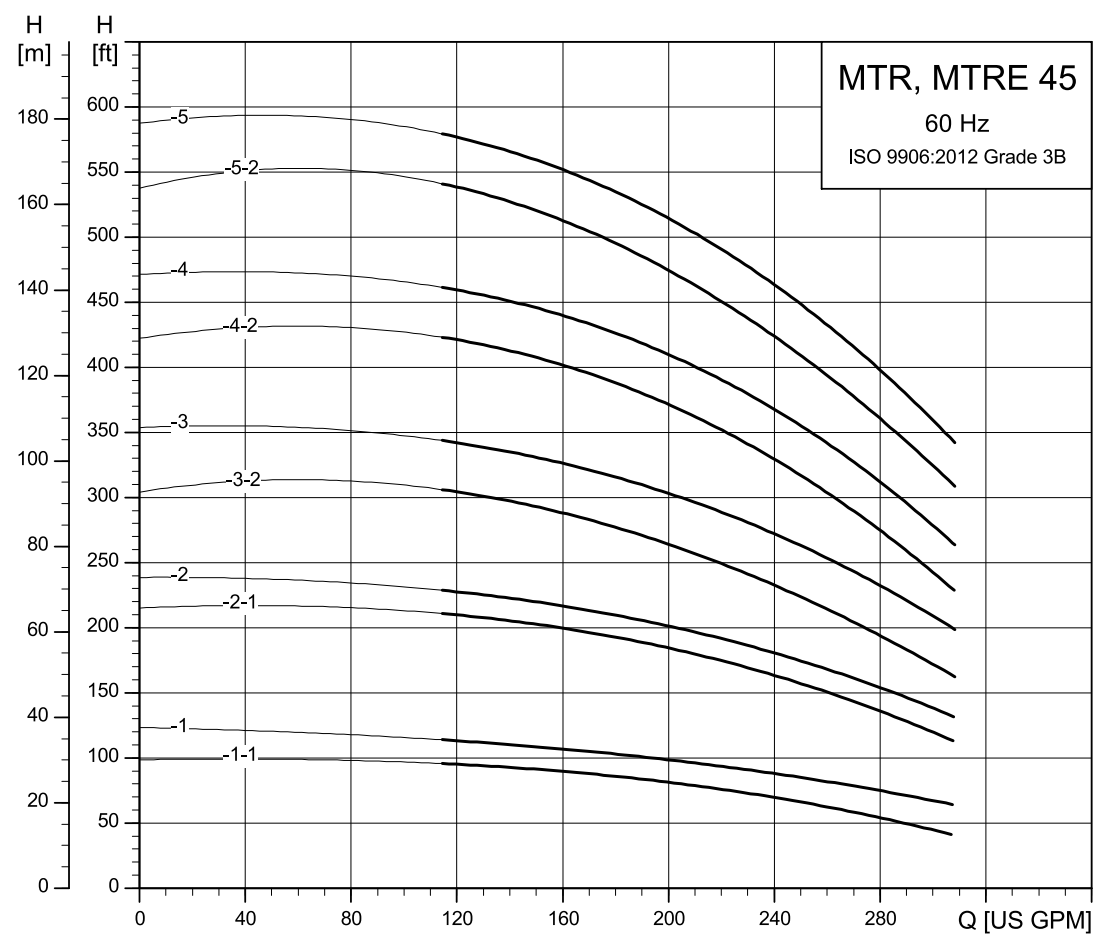
Pump type	P2 [hp]	Dimensions [in. (mm)]						Net weight [lb]
		A	B	C	AC	D2	AD	
MTR 32-2/1-1	5	32.52 (826)	8.78 (223)	23.74 (603)	8.67 (220)	8.94 (227)	5.28 (134)	181
MTR 32-2/1	5	32.52 (826)	8.78 (223)	23.74 (603)	8.67 (220)	8.94 (227)	5.28 (134)	181
MTR 32-2/2-1	7 1/2	32.52 (826)	8.78 (223)	23.74 (603)	8.67 (220)	8.94 (227)	5.28 (134)	192
MTR 32-2/2	10	32.52 (826)	8.78 (223)	23.74 (603)	8.67 (220)	8.94 (227)	5.28 (134)	192
MTR 32-3/3	15	38.59 (980)	11.54 (293)	27.05 (687)	12.37 (314)	8.94 (227)	8.04 (204)	289
MTR 32-4/4	20	41.34 (1050)	14.29 (363)	27.05 (687)	12.37 (314)	8.94 (227)	8.04 (204)	290
MTR 32-5/5	20	44.10 (1120)	17.05 (433)	27.05 (687)	12.37 (314)	8.94 (227)	8.04 (204)	291
MTR 32-6/6	25	50.79 (1290)	19.80 (503)	30.98 (787)	12.37 (314)	11.26 (286)	8.04 (204)	325
MTR 32-7/7	30	53.55 (1360)	22.56 (573)	30.98 (787)	12.37 (314)	11.26 (286)	8.04 (204)	352
MTR 32-8/8	40	57.13 (1451)	25.31 (643)	31.81 (808)	14.17 (360)	11.26 (286)	11.10 (282)	520
MTR 32-9/9	40	59.88 (1521)	28.07 (713)	31.81 (808)	14.17 (360)	11.26 (286)	11.10 (282)	521
MTR 32-10/10	40	62.64 (1591)	30.83 (783)	31.81(808)	14.17 (360)	11.26 (286)	11.10 (282)	522

MTRE 32

Pump type	P2 [hp]	PH	Voltage [V]	Motor frame size	Dimensions [in. (mm)]						Net weight [lb]	
					A	B	C	AC	D2	AD		AG
MTRE 32-2/1	5	3	200 - 240	182TC	30.16 (766)	8.78 (223)	21.38 (543)	7.53 (191)	8.94 (227)	7.91 (201)	11.46 (291)	156
			440 - 480		30.16 (766)	8.78 (223)	21.38 (543)	7.53 (191)	8.94 (227)	7.91 (201)	11.46 (291)	159
MTRE 32-2/2-1	7 1/2	3	200 - 240	213TC	32.32 (821)	8.78 (223)	23.54 (598)	10.04 (255)	8.94 (227)	9.33 (237)	13.62 (346)	185
			440 - 480		31.38 (797)	8.78 (223)	22.60 (574)	7.53 (191)	8.94 (227)	7.91 (201)	11.46 (291)	171
MTRE 32-2/2	10	3	440 - 480	213TC	32.32 (821)	8.78 (223)	23.54 (598)	10.04 (255)	8.94 (227)	9.33 (237)	13.62 (346)	194
MTRE 32-3/3	15	3	440 - 480	254TC	35.75 (908)	11.54 (293)	24.21 (615)	10.04 (255)	8.94 (227)	9.33 (237)	13.62 (346)	217
MTRE 32-4/4	20	3	440-480	256TC	41.73 (1060)	14.29 (363)	27.44 (697)	12.52 (318)	9.88 (251)	11.93 (303)	16.54 (420)	272

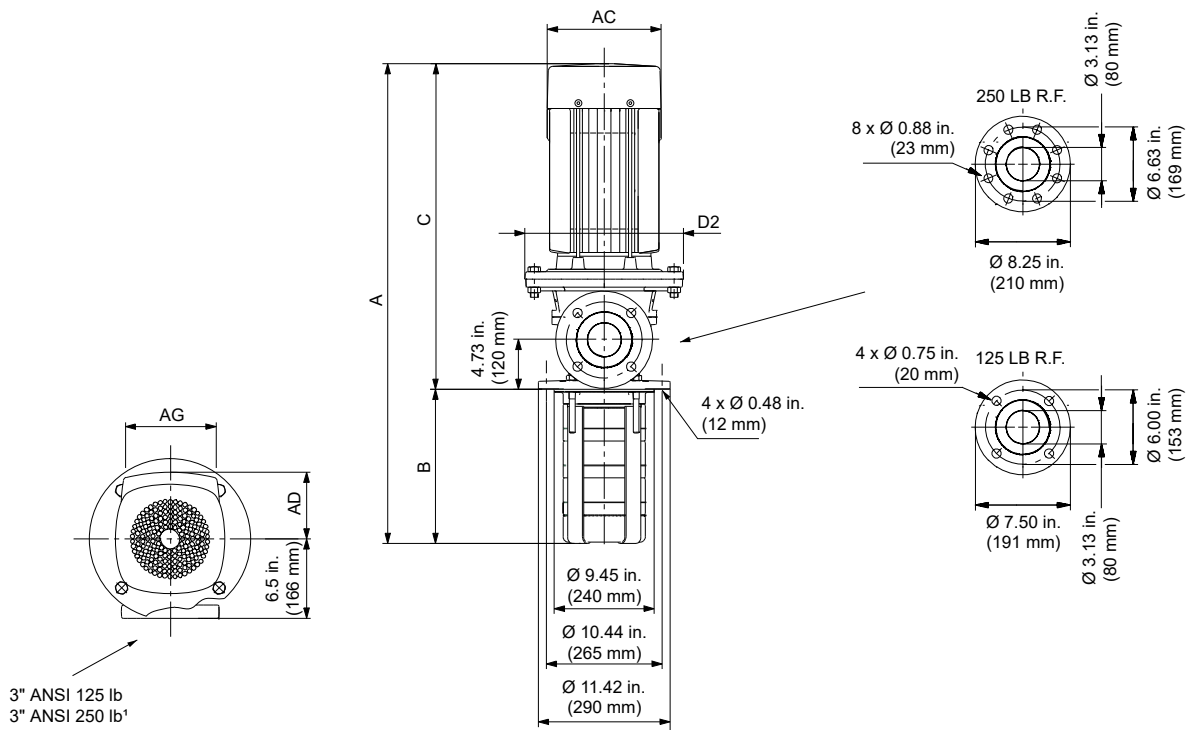
Pump type	P2 [hp]	PH	Voltage [V]	Motor frame size	Dimensions [in. (mm)]							Net weight [lb]
					A	B	C	AC	D2	AD	AG	
MTRE 32-5/5	20	3	440-480	256TC	44.49 (1130)	17.05 (433)	27.44 (697)	12.52 (318)	9.88 (251)	11.93 (303)	16.54 (420)	273
MTRE 32-6/6	25	3	440-480	284TSC	48.27 (1226)	19.8 (503)	28.46 (723)	12.52 (318)	10.75 (273)	11.93 (303)	16.54 (420)	311
MTRE 32-7/7	30	3	440-480	286TSC	51.02 (1296)	22.56 (573)	28.46 (723)	12.52 (318)	10.75 (273)	11.93 (303)	16.54 (420)	321

MTR, MTRE 45, 60 Hz



TM034260

Dimensional sketches



TM069790

Dimensions and weights

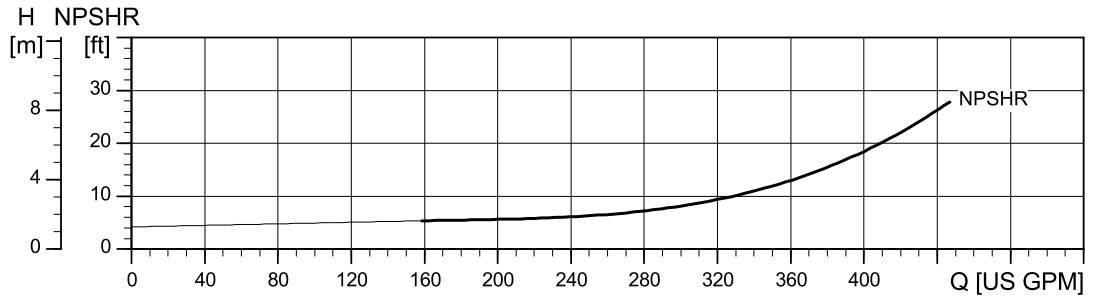
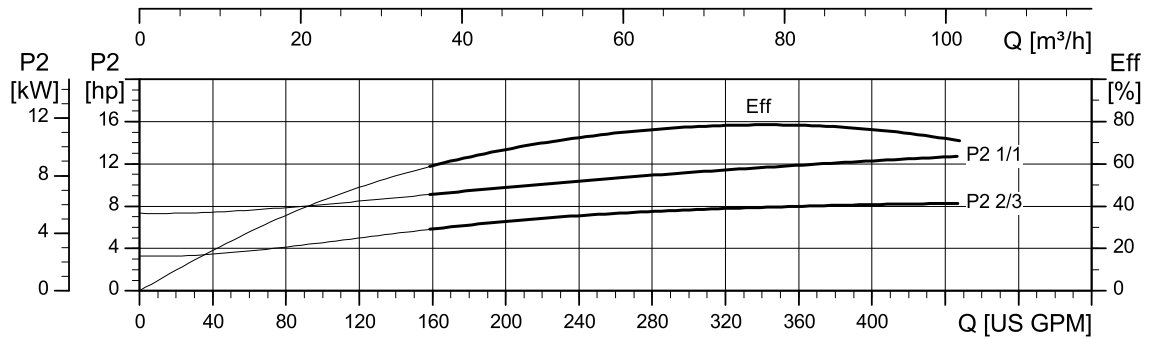
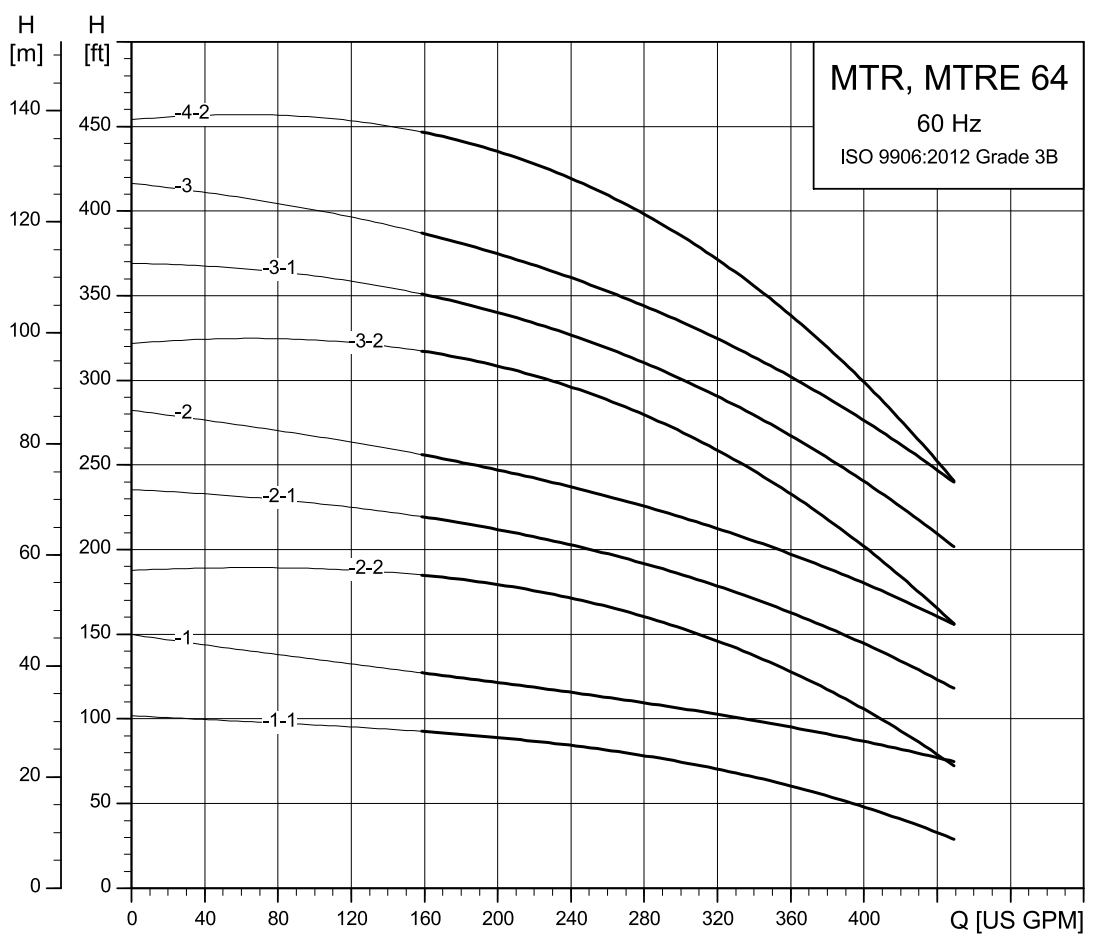
MTR 45

Pump type	P ₂ [hp]	Dimensions [in. (mm)]						Net weight [lb]
		A	B	C	AC	D2	AD	
MTR 45-2/1	15	34.57 (878)	9.61 (244)	24.96 (634)	8.67 (220)	8.94 (227)	5.28 (134)	213
MTR 45-2/2	15	37.88 (962)	9.61 (244)	28.27 (718)	12.37 (314)	8.94 (227)	8.04 (204)	310
MTR 45-3/3-2	20	41.03 (1042)	12.76 (324)	28.27 (718)	12.37 (314)	8.94 (227)	8.04 (204)	311
MTR 45-3/3	25	44.97 (1142)	12.76 (324)	32.20 (818)	12.37 (314)	11.26 (286)	8.04 (204)	345
MTR 45-4/4	30	48.12 (1222)	15.91 (404)	32.20 (818)	12.37 (314)	11.26 (286)	8.04 (204)	372
MTR 45-5/5	40	52.09 (1323)	19.06 (484)	33.03 (839)	14.17 (360)	11.26 (286)	11.10 (282)	540
MTR 45-12/5	40	74.13 (1883)	41.10 (1044)	33.03 (839)	14.17 (360)	11.26 (286)	11.10 (282)	545

MTRE 45

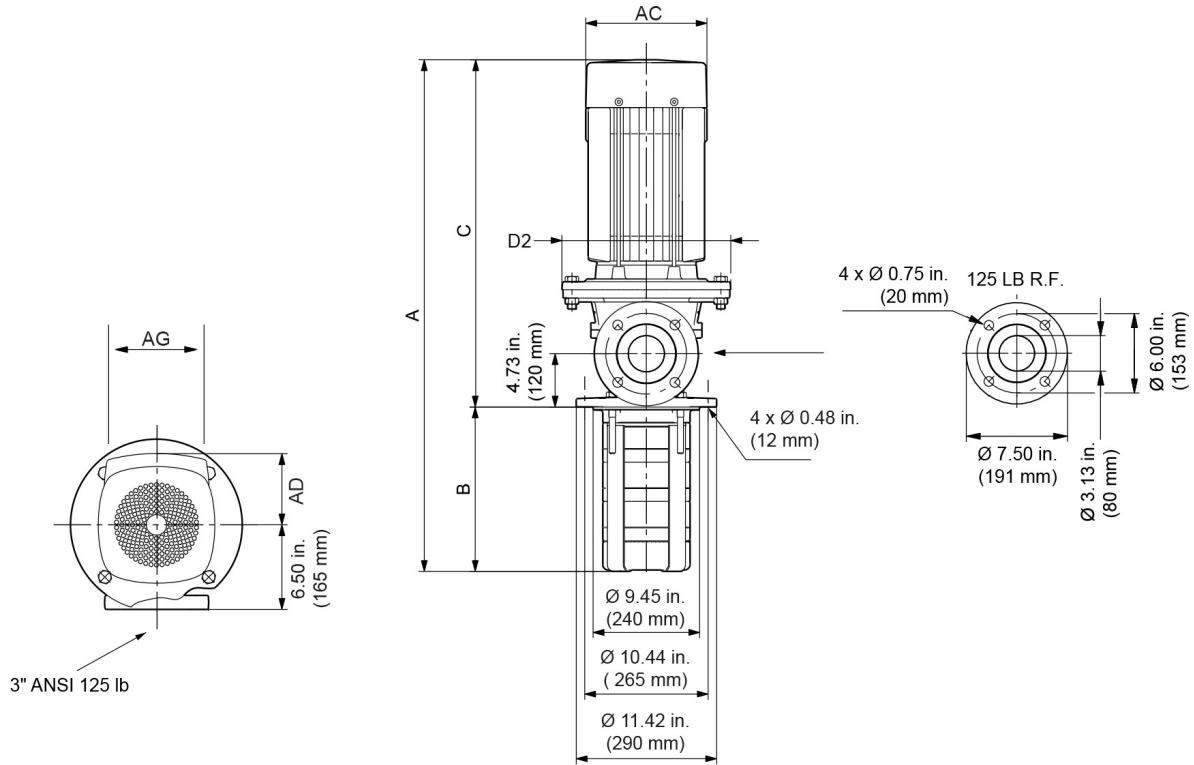
Pump type	P ₂ [hp]	PH	Voltage [V]	Motor frame size	Dimensions [in. (mm)]						Net weight [lb]	
					A	B	C	AC	D2	AD		AG
MTRE 45-2/1-1	7 1/2	3	200 - 240	213TC	34.37 (873)	9.61 (244)	24.76 (629)	10.04 (255)	8.94 (227)	9.33 (237)	13.62 (346)	206
			440 - 480	213TC	33.43 (849)	9.61 (244)	23.82 (605)	7.53 (191)	8.94 (227)	7.91 (201)	11.46 (291)	192
MTRE 45-2/1	10	3	440 - 480	213TC	34.37 (873)	9.61 (244)	24.76 (629)	10.04 (255)	8.94 (227)	9.33 (237)	13.62 (346)	215
MTRE 45-2/2	15	3	440 - 480	254TC	35.04 (890)	9.61 (244)	25.43 (646)	10.04 (255)	8.94 (227)	9.33 (237)	13.62 (346)	237
MTRE 45-3/3-2	20	3	440-480	256TC	41.42 (1052)	12.76 (324)	28.66 (728)	12.52 (318)	9.88 (251)	11.93 (303)	16.54 (420)	293
MTRE 45-3/3	25	3	440-480	284TSC	42.44 (1078)	12.76 (324)	29.69 (754)	12.52 (318)	10.75 (273)	11.93 (303)	16.54 (420)	330
MTRE 45-4/4-2	30	3	440-480	286TSC	45.59 (1158)	15.91 (404)	29.69 (754)	12.52 (318)	10.75 (273)	11.93 (303)	16.54 (420)	341
MTRE 45-4/4	30	3	440-480	286TSC	45.59 (1158)	15.91 (404)	29.69 (754)	12.52 (318)	10.75 (273)	11.93 (303)	16.54 (420)	341

MTR, MTRE 64, 60 Hz



TM034261

Dimensional sketches



TM069792

Dimensions and weights

MTR 64

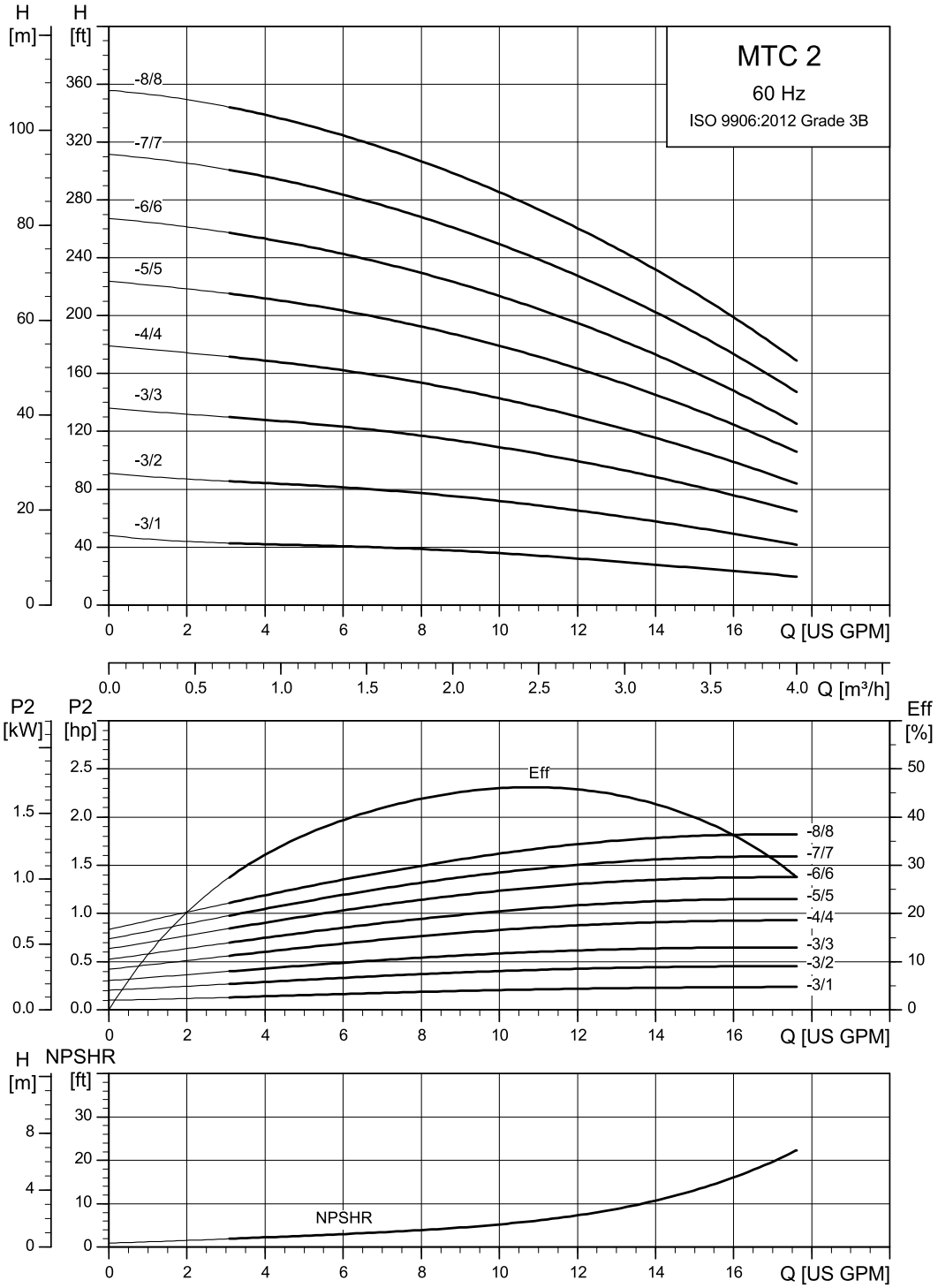
Pump type	P ₂ [hp]	Dimensions [in. (mm)]						Net weight [lb]
		A	B	C	AC	D2	AD	
MTR 64-2/1-1	10	34.77 (883)	9.80 (249)	24.96 (634)	8.67 (220)	8.94 (227)	5.28 (134)	220
MTR 64-2/1	15	38.08 (967)	9.80 (249)	28.27 (718)	12.37 (314)	8.94 (227)	8.04 (204)	317
MTR 64-2/2-2	20	38.08 (967)	9.80 (249)	28.27 (718)	12.37 (314)	8.94 (227)	8.04 (204)	317
MTR 64-2/2-1	20	38.08 (967)	9.80 (249)	28.27 (718)	12.37 (314)	8.94 (227)	8.04 (204)	317
MTR 64-2/2	25	42.01 (1067)	9.80 (249)	32.20 (818)	12.37 (314)	11.26 (286)	8.04 (204)	351
MTR 64-3/3-2	30	45.28 (1150)	13.07 (332)	32.20 (818)	12.37 (314)	11.26 (286)	8.04 (204)	378
MTR 64-3/3-1	40	46.10 (1171)	13.07 (332)	33.03 (839)	14.17 (360)	11.26 (286)	11.10 (282)	546
MTR 64-3/3	40	46.10 (1171)	13.07 (332)	33.03 (839)	14.17 (360)	11.26 (286)	11.10 (282)	546
MTR 64-4/4-2	40	49.33 (1253)	16.30 (414)	33.03 (839)	14.17 (360)	11.26 (286)	11.10 (282)	546
MTR 64-12/4-2	40	75.31 (1913)	42.28 (1074)	33.03 (839)	14.17 (360)	11.26 (286)	11.10 (2882)	552

MTRE 64

Pump type	P ₂ [hp]	PH	Voltage [V]	Motor frame size	Dimensions [in. (mm)]							Net weight [lb]
					A	B	C	AC	D2	AD	AG	
MTRE 64-2/1-1	10	3	440 - 480	213TC	34.57 (878)	9.81 (249)	24.76 (629)	10.04 (255)	8.94 (227)	9.33 (237)	13.62 (346)	222
MTRE 64-2/1	15	3	440 - 480	254TC	35.24 (895)	9.81 (249)	25.43 (646)	10.04 (255)	8.94 (227)	9.33 (237)	13.62 (346)	244
MTRE 64-2/2-2	20	3	440-480	256TC	38.46 (977)	9.8 (249)	28.66 (728)	12.52 (318)	9.88 (251)	11.93 (303)	16.54 (420)	299
MTRE 64-2/2-1	20	3	440-480	256TC	38.46 (977)	9.8 (249)	28.66 (728)	12.52 (318)	9.88 (251)	11.93 (303)	16.54 (420)	299
MTRE 64-2/2	25	3	440-480	284TSC	39.49 (1003)	9.8 (249)	29.69 (754)	12.52 (318)	10.75 (273)	11.93 (303)	16.54 (420)	336
MTRE 64-3/3-2	30	3	440-480	286TSC	42.76 (1086)	13.07 (332)	29.69 (754)	12.52 (318)	10.75 (273)	11.93 (303)	16.54 (420)	347

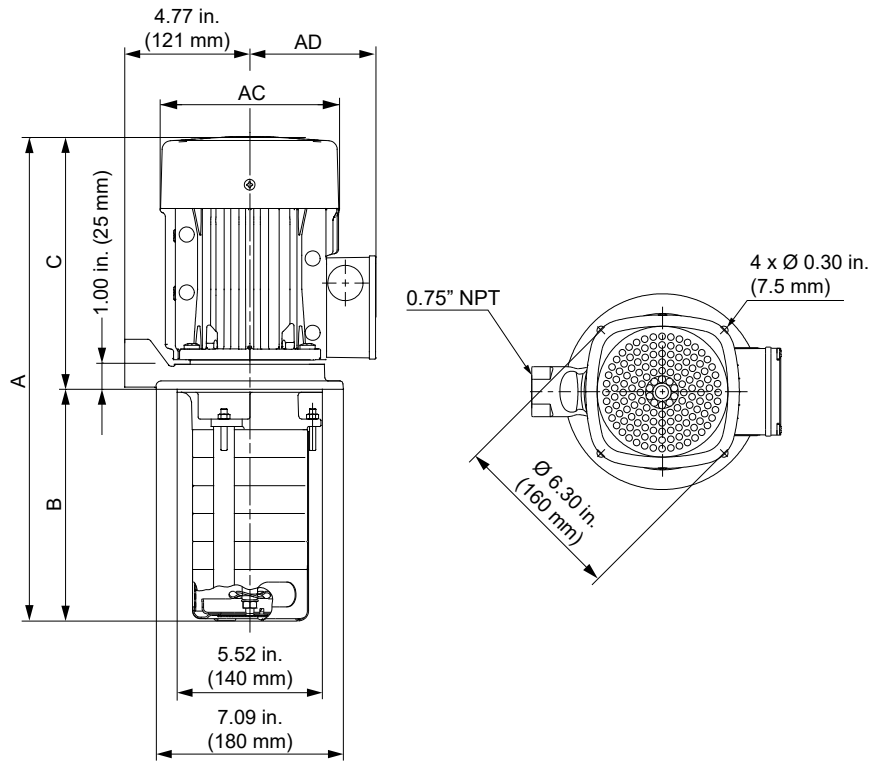
MTC curve charts and technical data

MTC 2, 60 Hz



TM034262

Dimensional sketches



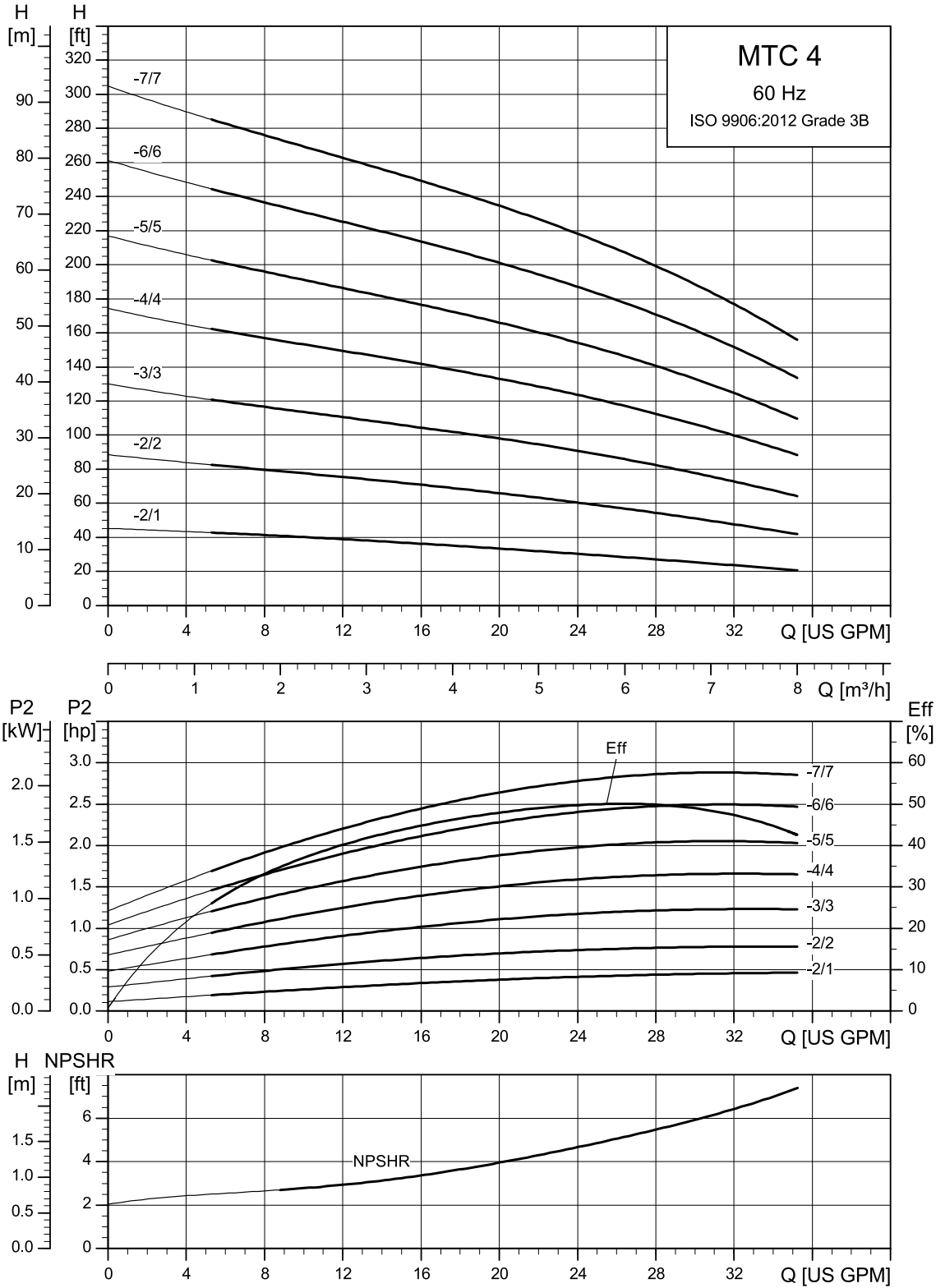
TM034300

MTC - 3 x 208-230 ΔV / 460 YV, 60 Hz - USA

Pump type	Motor power P ₂ [hp]	Dimensions [in. (mm)]					Net weight [lb]
		A	B	C	AC	AD	
MTC 2-3/1	3/4	13.66 (347)	5.71 (145)	7.95 (202)	5.55 (141)	4.29 (109)	28
MTC 2-3/2	3/4	13.66 (347)	5.71 (145)	7.95 (202)	5.55 (141)	4.29 (109)	29
MTC 2-3/3	3/4	13.66 (347)	5.71 (145)	7.95 (202)	5.55 (141)	4.29 (109)	29
MTC 2-4/1	3/4	14.37 (365)	6.42 (163)	7.95 (202)	5.55 (141)	4.29 (109)	29
MTC 2-4/2	3/4	14.37 (365)	6.42 (163)	7.95 (202)	5.55 (141)	4.29 (109)	29
MTC 2-4/3	3/4	14.37 (365)	6.42 (163)	7.95 (202)	5.55 (141)	4.29 (109)	30
MTC 2-4/4	1	14.37 (365)	6.42 (163)	7.95 (202)	5.55 (141)	4.29 (109)	30
MTC 2-5/1	3/4	15.08 (383)	7.13 (181)	7.95 (202)	5.55 (141)	4.29 (109)	30
MTC 2-5/2	3/4	15.08 (383)	7.13 (181)	7.95 (202)	5.55 (141)	4.29 (109)	30
MTC 2-5/3	3/4	15.08 (383)	7.13 (181)	7.95 (202)	5.55 (141)	4.29 (109)	30
MTC 2-5/4	1	15.08 (383)	7.13 (181)	7.95 (202)	5.55 (141)	4.29 (109)	31
MTC 2-5/5	1 1/2	17.44 (443)	7.13 (181)	10.31 (262)	5.55 (141)	4.29 (109)	32
MTC 2-6/1	3/4	15.79 (401)	7.83 (199)	7.95 (202)	5.55 (141)	4.29 (109)	30
MTC 2-6/2	3/4	15.79 (401)	7.83 (199)	7.95 (202)	5.55 (141)	4.29 (109)	31
MTC 2-6/3	3/4	15.79 (401)	7.83 (199)	7.95 (202)	5.55 (141)	4.29 (109)	31
MTC 2-6/4	1	15.79 (401)	7.83 (199)	7.95 (202)	5.55 (141)	4.29 (109)	32
MTC 2-6/5	1 1/2	18.15 (461)	7.83 (199)	10.31 (262)	5.55 (141)	4.29 (109)	33
MTC 2-6/6	1 1/2	18.15 (461)	7.83 (199)	10.31 (262)	5.55 (141)	4.29 (109)	33
MTC 2-7/1	3/4	16.5 (419)	8.54 (217)	7.95 (202)	5.55 (141)	4.29 (109)	31
MTC 2-7/2	3/4	16.5 (419)	8.54 (217)	7.95 (202)	5.55 (141)	4.29 (109)	31
MTC 2-7/3	3/4	16.5 (419)	8.54 (217)	7.95 (202)	5.55 (141)	4.29 (109)	32
MTC 2-7/4	1	16.5 (419)	8.54 (217)	7.95 (202)	5.55 (141)	4.29 (109)	32
MTC 2-7/5	1 1/2	18.86 (479)	8.54 (217)	10.31 (262)	5.55 (141)	4.29 (109)	34

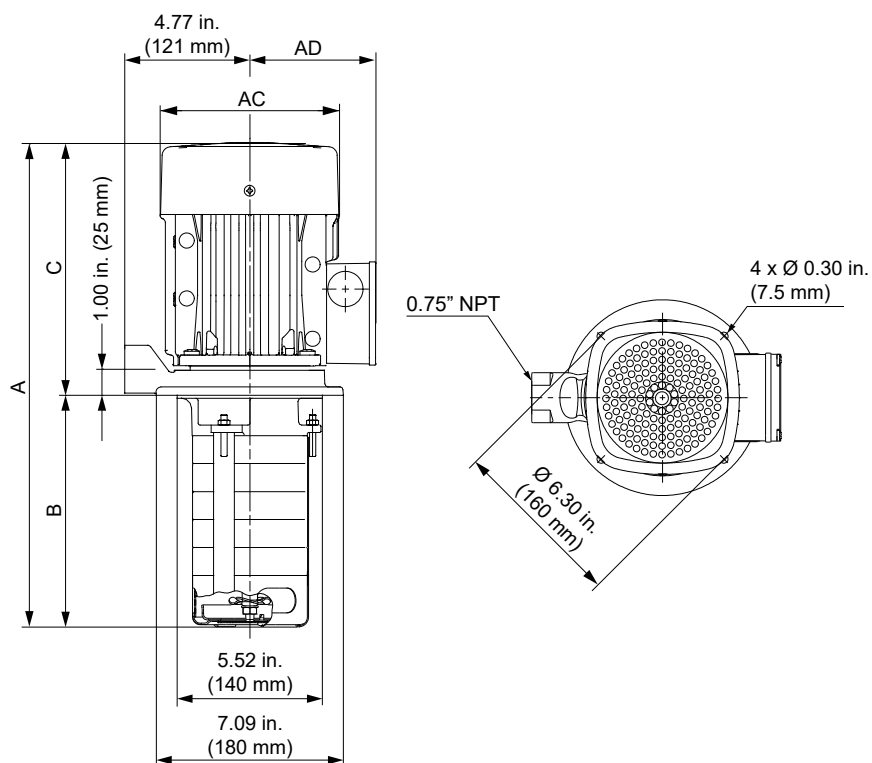
Pump type	Motor power P ₂ [hp]	Dimensions [in. (mm)]					Net weight [lb]
		A	B	C	AC	AD	
MTC 2-7/6	1 1/2	18.86 (479)	8.54 (217)	10.31 (262)	5.55 (141)	4.29 (109)	34
MTC 2-7/7	1 1/2	18.86 (479)	8.54 (217)	10.31 (262)	5.55 (141)	4.29 (109)	34
MTC 2-8/1	3/4	17.2 (437)	9.25 (235)	7.95 (202)	5.55 (141)	4.29 (109)	31
MTC 2-8/2	3/4	17.2 (437)	9.25 (235)	7.95 (202)	5.55 (141)	4.29 (109)	32
MTC 2-8/3	3/4	17.2 (437)	9.25 (235)	7.95 (202)	5.55 (141)	4.29 (109)	32
MTC 2-8/4	1	17.2 (437)	9.25 (235)	7.95 (202)	5.55 (141)	4.29 (109)	33
MTC 2-8/5	1 1/2	19.57 (497)	9.25 (235)	10.31 (262)	5.55 (141)	4.29 (109)	34
MTC 2-8/6	1 1/2	19.57 (497)	9.25 (235)	10.31 (262)	5.55 (141)	4.29 (109)	35
MTC 2-8/7	1 1/2	19.57 (497)	9.25 (235)	10.31 (262)	5.55 (141)	4.29 (109)	35
MTC 2-8/8	2	21.54 (547)	9.25 (235)	12.28 (312)	7.01 (178)	4.33 (110)	75
MTC 2-9/1	3/4	17.91 (455)	9.96 (253)	7.95 (202)	5.55 (141)	4.29 (109)	32
MTC 2-9/2	3/4	17.91 (455)	9.96 (253)	7.95 (202)	5.55 (141)	4.29 (109)	32
MTC 2-9/3	3/4	17.91 (455)	9.96 (253)	7.95 (202)	5.55 (141)	4.29 (109)	33
MTC 2-9/4	1	17.91 (455)	9.96 (253)	7.95 (202)	5.55 (141)	4.29 (109)	33
MTC 2-9/5	1 1/2	20.28 (515)	9.96 (253)	10.31 (262)	5.55 (141)	4.29 (109)	35
MTC 2-9/6	1 1/2	20.28 (515)	9.96 (253)	10.31 (262)	5.55 (141)	4.29 (109)	35
MTC 2-9/7	1 1/2	20.28 (515)	9.96 (253)	10.31 (262)	5.55 (141)	4.29 (109)	36
MTC 2-9/8	2	22.24 (565)	9.96 (253)	12.28 (312)	7.01 (178)	4.33 (110)	76
MTC 2-10/1	3/4	18.62 (473)	10.67 (271)	7.95 (202)	5.55 (141)	4.29 (109)	32
MTC 2-10/2	3/4	18.62 (473)	10.67 (271)	7.95 (202)	5.55 (141)	4.29 (109)	33
MTC 2-10/3	3/4	18.62 (473)	10.67 (271)	7.95 (202)	5.55 (141)	4.29 (109)	33
MTC 2-10/4	1	18.62 (473)	10.67 (271)	7.95 (202)	5.55 (141)	4.29 (109)	34
MTC 2-10/5	1 1/2	20.98 (533)	10.67 (271)	10.31 (262)	5.55 (141)	4.29 (109)	35
MTC 2-10/6	1 1/2	20.98 (533)	10.67 (271)	10.31 (262)	5.55 (141)	4.29 (109)	36
MTC 2-10/7	1 1/2	20.98 (533)	10.67 (271)	10.31 (262)	5.55 (141)	4.29 (109)	36
MTC 2-10/8	2	22.95 (583)	10.67 (271)	12.28 (312)	7.01 (178)	4.33 (110)	77
MTC 2-11/1	3/4	19.33 (491)	11.38 (289)	7.95 (202)	5.55 (141)	4.29 (109)	33
MTC 2-11/2	3/4	19.33 (491)	11.38 (289)	7.95 (202)	5.55 (141)	4.29 (109)	33
MTC 2-11/3	3/4	19.33 (491)	11.38 (289)	7.95 (202)	5.55 (141)	4.29 (109)	34
MTC 2-11/4	1	19.33 (491)	11.38 (289)	7.95 (202)	5.55 (141)	4.29 (109)	34
MTC 2-11/5	1 1/2	21.69 (551)	11.38 (289)	10.31 (262)	5.55 (141)	4.29 (109)	36
MTC 2-11/6	1 1/2	21.69 (551)	11.38 (289)	10.31 (262)	5.55 (141)	4.29 (109)	36
MTC 2-11/7	1 1/2	21.69 (551)	11.38 (289)	10.31 (262)	5.55 (141)	4.29 (109)	37
MTC 2-11/8	2	23.66 (601)	11.38 (289)	12.28 (312)	7.01 (178)	4.33 (110)	77

MTC 4, 60 Hz



TM034263

Dimensional sketches



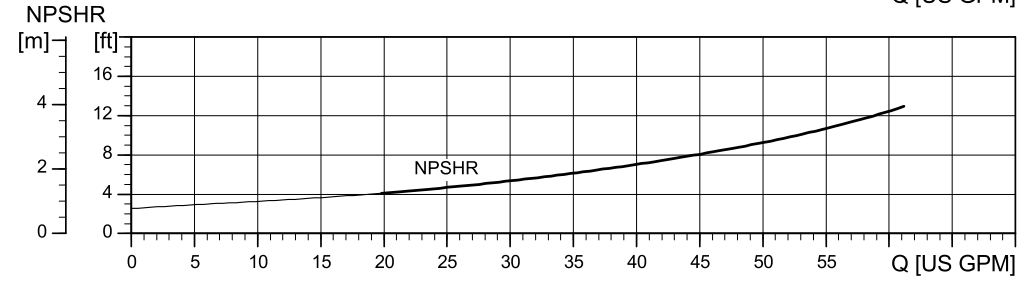
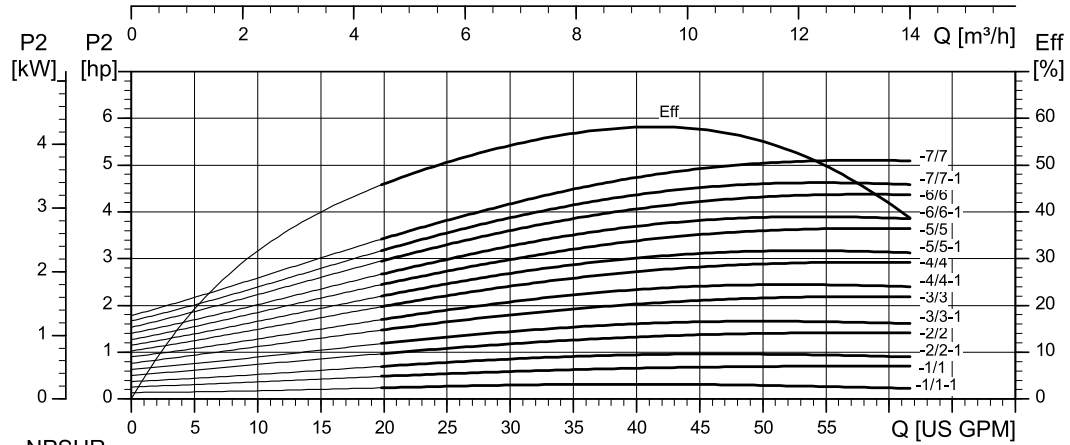
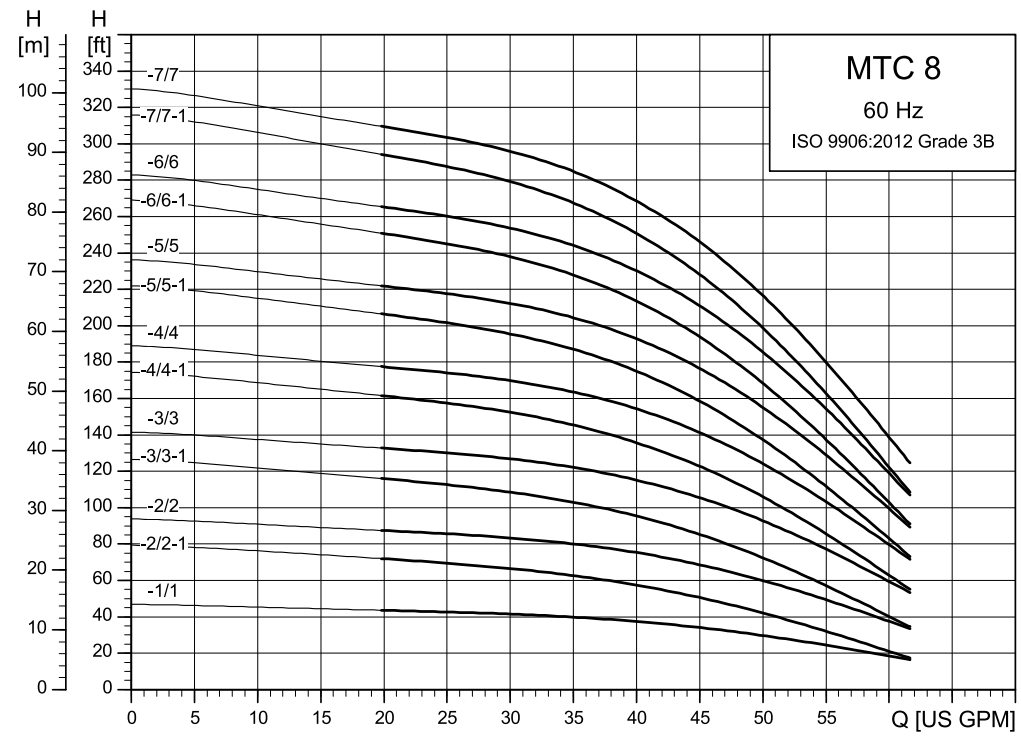
TM034300

MTC - 3 x 208-230 ΔV / 460 YV, 60 Hz - USA

Pump type	Motor power P ₂ [hp]	Dimensions [in. (mm)]					Net weight [lb]
		A	B	C	AC	AD	
MTC 4-2/1	3/4	13.66 (347)	5.71 (145)	7.95 (202)	5.55 (141)	4.29 (109)	29
MTC 4-2/2	3/4	13.66 (347)	5.71 (145)	7.95 (202)	5.55 (141)	4.29 (109)	29
MTC 4-3/1	3/4	14.72 (374)	6.77 (172)	7.95 (202)	5.55 (141)	4.29 (109)	29
MTC 4-3/2	3/4	14.72 (374)	6.77 (172)	7.95 (202)	5.55 (141)	4.29 (109)	29
MTC 4-3/3	1 1/2	17.09 (434)	6.77 (172)	10.31 (262)	5.55 (141)	4.29 (109)	30
MTC 4-4/1	3/4	15.79 (401)	7.83 (199)	7.95 (202)	5.55 (141)	4.29 (109)	29
MTC 4-4/2	3/4	15.79 (401)	7.83 (199)	7.95 (202)	5.55 (141)	4.29 (109)	30
MTC 4-4/3	1 1/2	18.15 (461)	7.83 (199)	10.31 (262)	5.55 (141)	4.29 (109)	31
MTC 4-4/4	1 1/2	18.15 (461)	7.83 (199)	10.31 (262)	5.55 (141)	4.29 (109)	31
MTC 4-5/1	3/4	16.85 (428)	8.9 (226)	7.95 (202)	5.55 (141)	4.29 (109)	30
MTC 4-5/2	3/4	16.85 (428)	8.9 (226)	7.95 (202)	5.55 (141)	4.29 (109)	30
MTC 4-5/3	1 1/2	19.21 (488)	8.9 (226)	10.31 (262)	5.55 (141)	4.29 (109)	31
MTC 4-5/4	1 1/2	19.21 (488)	8.9 (226)	10.31 (262)	5.55 (141)	4.29 (109)	32
MTC 4-5/5	2	21.18 (538)	8.9 (226)	12.28 (312)	7.01 (178)	4.33 (110)	66
MTC 4-6/1	3/4	17.91 (455)	9.96 (253)	7.95 (202)	5.55 (141)	4.29 (109)	30
MTC 4-6/2	3/4	17.91 (455)	9.96 (253)	7.95 (202)	5.55 (141)	4.29 (109)	31
MTC 4-6/3	1 1/2	20.28 (515)	9.96 (253)	10.31 (262)	5.55 (141)	4.29 (109)	32
MTC 4-6/4	1 1/2	20.28 (515)	9.96 (253)	10.31 (262)	5.55 (141)	4.29 (109)	32
MTC 4-6/5	2	22.24 (565)	9.96 (253)	12.28 (312)	7.01 (178)	4.33 (110)	66
MTC 4-6/6	3	23.82 (605)	9.96 (253)	13.86 (352)	7.01 (178)	4.33 (110)	69
MTC 4-7/1	3/4	18.98 (482)	11.02 (280)	7.95 (202)	5.55 (141)	4.29 (109)	31
MTC 4-7/2	3/4	18.98 (482)	11.02 (280)	7.95 (202)	5.55 (141)	4.29 (109)	31
MTC 4-7/3	1 1/2	21.34 (542)	11.02 (280)	10.31 (262)	5.55 (141)	4.29 (109)	32

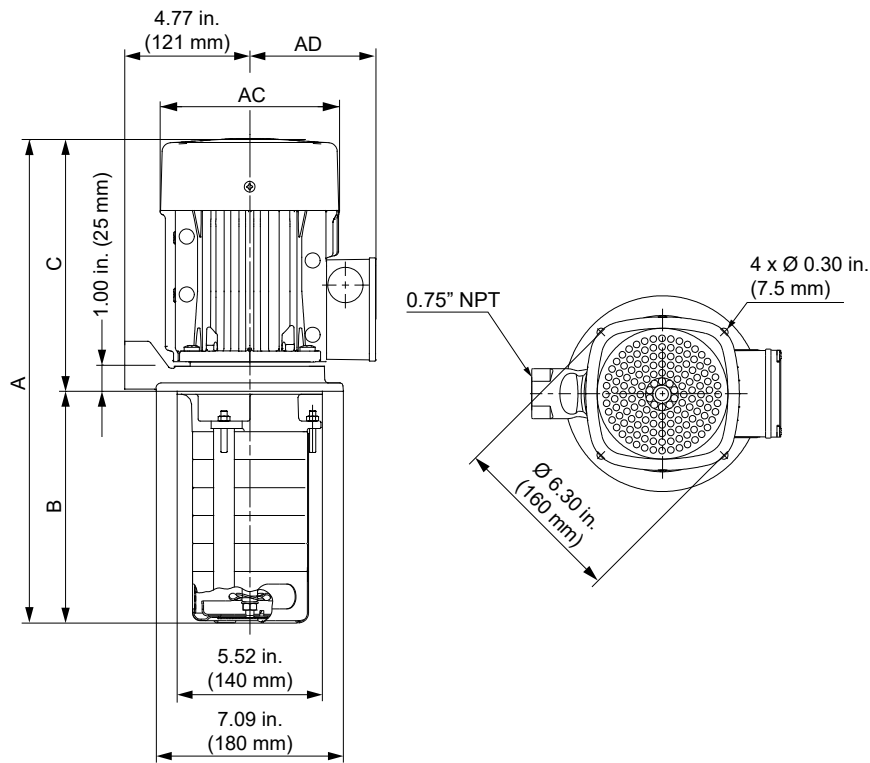
Pump type	Motor power P ₂ [hp]	Dimensions [in. (mm)]					Net weight [lb]
		A	B	C	AC	AD	
MTC 4-7/4	1 1/2	21.34 (542)	11.02 (280)	10.31 (262)	5.55 (141)	4.29 (109)	32
MTC 4-7/5	2	23.31 (592)	11.02 (280)	12.28 (312)	7.01 (178)	4.33 (110)	66
MTC 4-7/6	3	24.88 (632)	11.02 (280)	13.86 (352)	7.01 (178)	4.33 (110)	69
MTC 4-7/7	3	24.88 (632)	11.02 (280)	13.86 (352)	7.01 (178)	4.33 (110)	69
MTC 4-8/1	3/4	20.04 (509)	12.09 (307)	7.95 (202)	5.55 (141)	4.29 (109)	31
MTC 4-8/2	3/4	20.04 (509)	12.09 (307)	7.95 (202)	5.55 (141)	4.29 (109)	31
MTC 4-8/3	1 1/2	22.4 (569)	12.09 (307)	10.31 (262)	5.55 (141)	4.29 (109)	32
MTC 4-8/4	1 1/2	22.4 (569)	12.09 (307)	10.31 (262)	5.55 (141)	4.29 (109)	33
MTC 4-8/5	2	24.37 (619)	12.09 (307)	12.28 (312)	7.01 (178)	4.33 (110)	67
MTC 4-8/6	3	25.94 (659)	12.09 (307)	13.86 (352)	7.01 (178)	4.33 (110)	69
MTC 4-8/7	3	25.94 (659)	12.09 (307)	13.86 (352)	7.01 (178)	4.33 (110)	70
MTC 4-9/1	3/4	21.1 (536)	13.15 (334)	7.95 (202)	5.55 (141)	4.29 (109)	32
MTC 4-9/2	3/4	21.1 (536)	13.15 (334)	7.95 (202)	5.55 (141)	4.29 (109)	32
MTC 4-9/3	1 1/2	23.46 (596)	13.15 (334)	10.31 (262)	5.55 (141)	4.29 (109)	33
MTC 4-9/4	1 1/2	23.46 (596)	13.15 (334)	10.31 (262)	5.55 (141)	4.29 (109)	33
MTC 4-9/5	2	25.43 (646)	13.15 (334)	12.28 (312)	7.01 (178)	4.33 (110)	68
MTC 4-9/6	3	27.01 (686)	13.15 (334)	13.86 (352)	7.01 (178)	4.33 (110)	70
MTC 4-9/7	3	27.01 (686)	13.15 (334)	13.86 (352)	7.01 (178)	4.33 (110)	70

MTC 8, 60 Hz



TM082732

Dimensional sketches



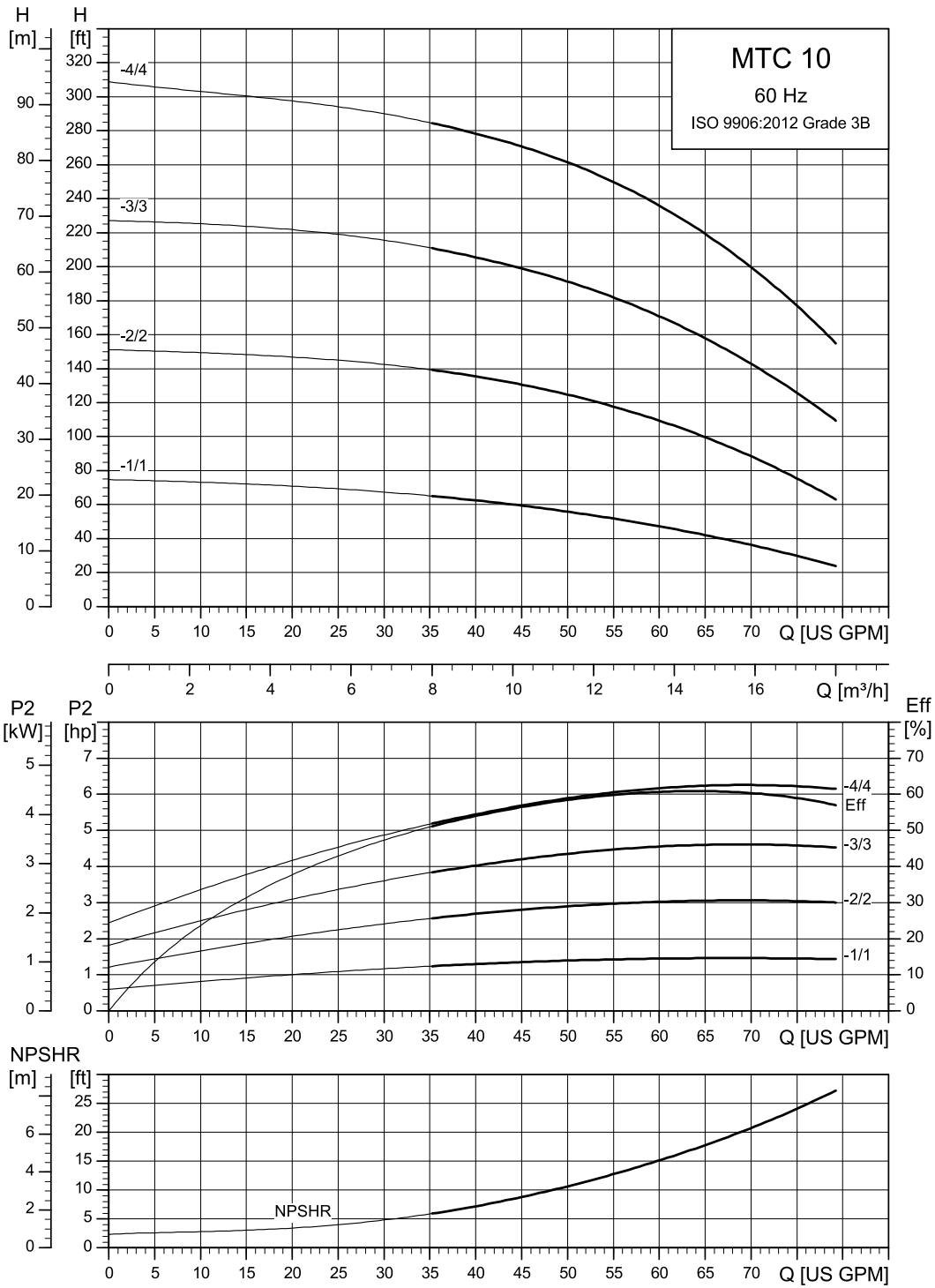
TM034300

MTC - 3 x 208-230 ΔV / 460 YV, 60 Hz - USA

Pump type	Motor power P ₂ [hp]	Dimensions [in. (mm)]					Net weight [lb]
		A	B	C	AC	AD	
MTC 8-1/1	3/4	13.66 (347)	5.71 (145)	7.95 (202)	5.55 (141)	4.29 (109)	27
MTC 8-2/1	3/4	14.72 (374)	6.77 (172)	7.95 (202)	5.55 (141)	4.29 (109)	27
MTC 8-2/2-1	1	14.72 (374)	6.77 (172)	7.95 (202)	5.55 (141)	4.29 (109)	28
MTC 8-2/2	1 1/2	16.3 (414)	6.77 (172)	9.53 (242)	5.55 (141)	4.29 (109)	29
MTC 8-3/1	3/4	15.79 (401)	7.83 (199)	7.95 (202)	5.55 (141)	4.29 (109)	28
MTC 8-3/2-1	1	15.79 (401)	7.83 (199)	7.95 (202)	5.55 (141)	4.29 (109)	28
MTC 8-3/2	1 1/2	17.36 (441)	7.83 (199)	9.53 (242)	5.55 (141)	4.29 (109)	29
MTC 8-3/3-1	2	20.91 (531)	7.83 (199)	13.07 (332)	7.01 (178)	4.33 (110)	63
MTC 8-3/3	2	20.91 (531)	7.83 (199)	13.07 (332)	7.01 (178)	4.33 (110)	64
MTC 8-4/1	3/4	16.85 (428)	8.9 (226)	7.95 (202)	5.55 (141)	4.29 (109)	28
MTC 8-4/2-1	1	16.85 (428)	8.9 (226)	7.95 (202)	5.55 (141)	4.29 (109)	29
MTC 8-4/2	1 1/2	18.43 (468)	8.9 (226)	9.53 (242)	5.55 (141)	4.29 (109)	30
MTC 8-4/3-1	2	21.97 (558)	8.9 (226)	13.07 (332)	7.01 (178)	4.33 (110)	64
MTC 8-4/3	2	21.97 (558)	8.9 (226)	13.07 (332)	7.01 (178)	4.33 (110)	64
MTC 8-4/4-1	3	22.76 (578)	8.9 (226)	13.86 (352)	7.01 (178)	4.33 (110)	67
MTC 8-4/4	3	22.76 (578)	8.9 (226)	13.86 (352)	7.01 (178)	4.33 (110)	67
MTC 8-5/1	3/4	17.91 (455)	9.96 (253)	7.95 (202)	5.55 (141)	4.29 (109)	29
MTC 8-5/2-1	1	17.91 (455)	9.96 (253)	7.95 (202)	5.55 (141)	4.29 (109)	29
MTC 8-5/2	1 1/2	19.49 (495)	9.96 (253)	9.53 (242)	5.55 (141)	4.29 (109)	30
MTC 8-5/3-1	2	23.03 (585)	9.96 (253)	13.07 (332)	7.01 (178)	4.33 (110)	64
MTC 8-5/3	2	23.03 (585)	9.96 (253)	13.07 (332)	7.01 (178)	4.33 (110)	64
MTC 8-5/4-1	3	23.82 (605)	9.96 (253)	13.86 (352)	7.01 (178)	4.33 (110)	67
MTC 8-5/4	3	23.82 (605)	9.96 (253)	13.86 (352)	7.01 (178)	4.33 (110)	67

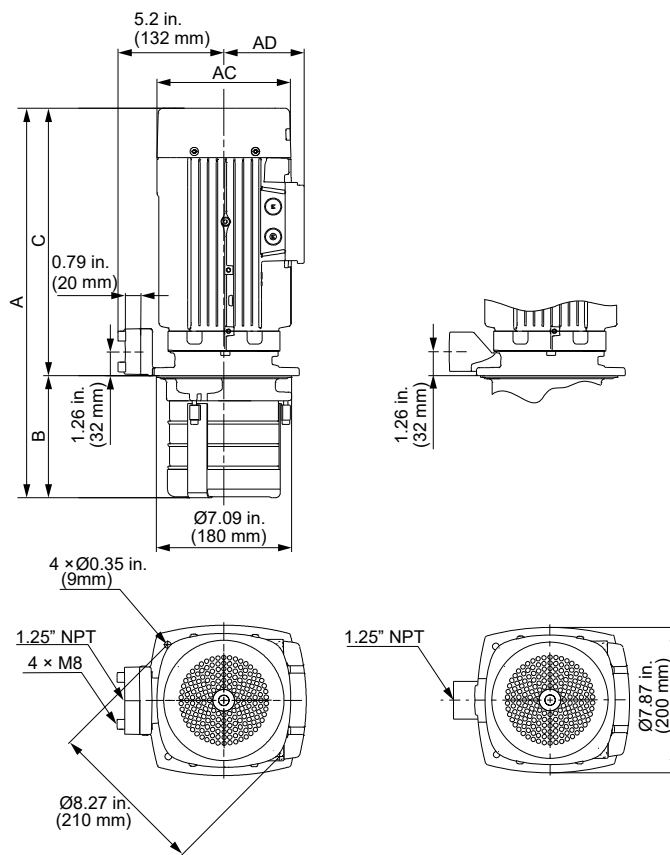
Pump type	Motor power P ₂ [hp]	Dimensions [in. (mm)]					Net weight [lb]
		A	B	C	AC	AD	
MTC 8-5/5-1	3	23.82 (605)	9.96 (253)	13.86 (352)	7.01 (178)	4.33 (110)	67
MTC 8-5/5	5	25.98 (660)	9.96 (253)	16.02 (407)	8.66 (220)	5.28 (134)	81
MTC 8-6/1	3/4	18.98 (482)	11.02 (280)	7.95 (202)	5.55 (141)	4.29 (109)	29
MTC 8-6/2-1	1	18.98 (482)	11.02 (280)	7.95 (202)	5.55 (141)	4.29 (109)	29
MTC 8-6/2	1 1/2	20.55 (522)	11.02 (280)	9.53 (242)	5.55 (141)	4.29 (109)	30
MTC 8-6/3-1	2	24.09 (612)	11.02 (280)	13.07 (332)	7.01 (178)	4.33 (110)	65
MTC 8-6/3	2	24.09 (612)	11.02 (280)	13.07 (332)	7.01 (178)	4.33 (110)	65
MTC 8-6/4-1	3	24.88 (632)	11.02 (280)	13.86 (352)	7.01 (178)	4.33 (110)	67
MTC 8-6/4	3	24.88 (632)	11.02 (280)	13.86 (352)	7.01 (178)	4.33 (110)	67
MTC 8-6/5-1	3	24.88 (632)	11.02 (280)	13.86 (352)	7.01 (178)	4.33 (110)	68
MTC 8-6/5	5	27.05 (687)	11.02 (280)	16.02 (407)	8.66 (220)	5.28 (134)	81
MTC 8-6/6-1	5	27.05 (687)	11.02 (280)	16.02 (407)	8.66 (220)	5.28 (134)	82
MTC 8-6/6	5	27.05 (687)	11.02 (280)	16.02 (407)	8.66 (220)	5.28 (134)	82
MTC 8-7/1	3/4	20.04 (509)	12.09 (307)	7.95 (202)	5.55 (141)	4.29 (109)	29
MTC 8-7/2-1	1	20.04 (509)	12.09 (307)	7.95 (202)	5.55 (141)	4.29 (109)	30
MTC 8-7/2	1 1/2	21.61 (549)	12.09 (307)	9.53 (242)	5.55 (141)	4.29 (109)	31
MTC 8-7/3-1	2	25.16 (639)	12.09 (307)	13.07 (332)	7.01 (178)	4.33 (110)	65
MTC 8-7/3	2	25.16 (639)	12.09 (307)	13.07 (332)	7.01 (178)	4.33 (110)	65
MTC 8-7/4-1	3	25.94 (659)	12.09 (307)	13.86 (352)	7.01 (178)	4.33 (110)	68
MTC 8-7/4	3	25.94 (659)	12.09 (307)	13.86 (352)	7.01 (178)	4.33 (110)	68
MTC 8-7/5-1	3	25.94 (659)	12.09 (307)	13.86 (352)	7.01 (178)	4.33 (110)	68
MTC 8-7/5	5	28.11 (714)	12.09 (307)	16.02 (407)	8.66 (220)	5.28 (134)	81
MTC 8-7/6-1	5	28.11 (714)	12.09 (307)	16.02 (407)	8.66 (220)	5.28 (134)	82
MTC 8-7/6	5	28.11 (714)	12.09 (307)	16.02 (407)	8.66 (220)	5.28 (134)	82
MTC 8-7/7-1	5	28.11 (714)	12.09 (307)	16.02 (407)	8.66 (220)	5.28 (134)	82
MTC 8-7/7	5	28.11 (714)	12.09 (307)	16.02 (407)	8.66 (220)	5.28 (134)	82
MTC 8-8/1	3/4	21.1 (536)	13.15 (334)	7.95 (202)	5.55 (141)	4.29 (109)	30
MTC 8-8/2-1	1	21.1 (536)	13.15 (334)	7.95 (202)	5.55 (141)	4.29 (109)	30
MTC 8-8/2	1 1/2	22.68 (576)	13.15 (334)	9.53 (242)	5.55 (141)	4.29 (109)	31
MTC 8-8/3-1	2	26.22 (666)	13.15 (334)	13.07 (332)	7.01 (178)	4.33 (110)	66
MTC 8-8/3	2	26.22 (666)	13.15 (334)	13.07 (332)	7.01 (178)	4.33 (110)	66
MTC 8-8/4-1	3	27.01 (686)	13.15 (334)	13.86 (352)	7.01 (178)	4.33 (110)	68
MTC 8-8/4	3	27.01 (686)	13.15 (334)	13.86 (352)	7.01 (178)	4.33 (110)	68
MTC 8-8/5-1	3	27.01 (686)	13.15 (334)	13.86 (352)	7.01 (178)	4.33 (110)	69
MTC 8-8/5	5	29.17 (741)	13.15 (334)	16.02 (407)	8.66 (220)	5.28 (134)	82
MTC 8-8/6-1	5	29.17 (741)	13.15 (334)	16.02 (407)	8.66 (220)	5.28 (134)	83
MTC 8-8/6	5	29.17 (741)	13.15 (334)	16.02 (407)	8.66 (220)	5.28 (134)	83
MTC 8-8/7-1	5	29.17 (741)	13.15 (334)	16.02 (407)	8.66 (220)	5.28 (134)	83
MTC 8-8/7	5	29.17 (741)	13.15 (334)	16.02 (407)	8.66 (220)	5.28 (134)	83

MTC 10, 60 Hz



TM082733

Dimensional sketches

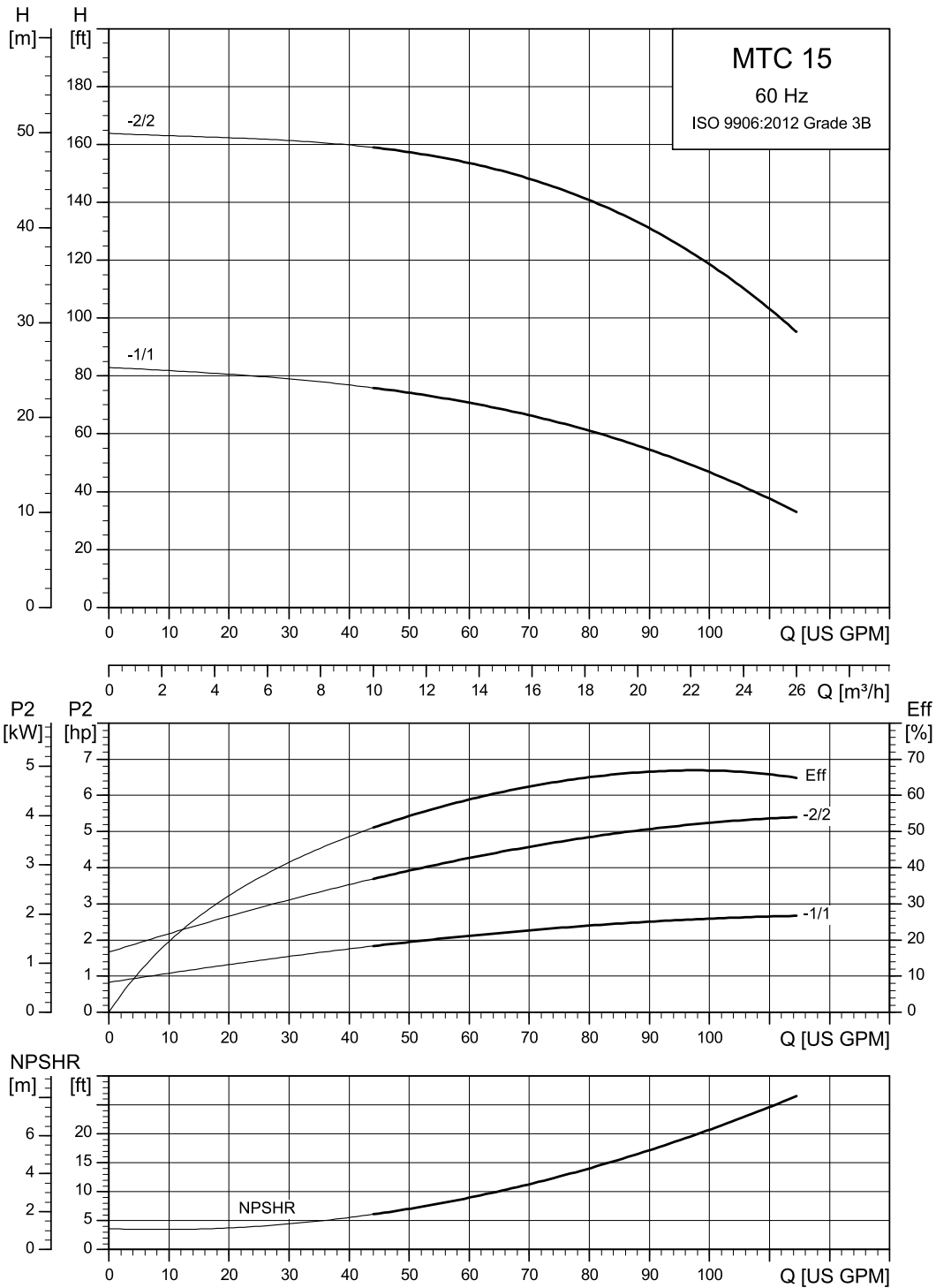


TM052991

MTC - 3 x 208-230 ΔV / 460 YV, 60 Hz - USA

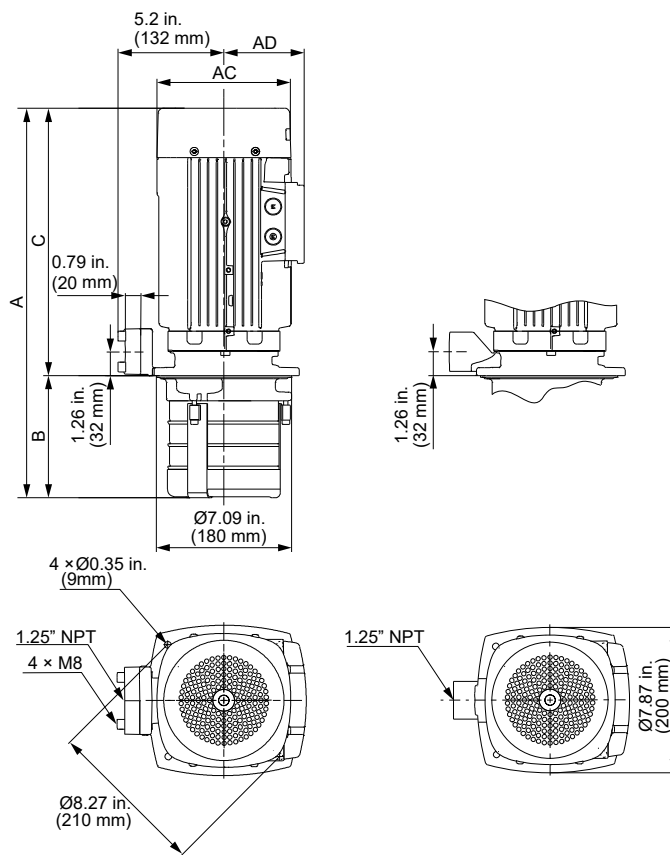
Pump type	Motor power P ₂ [hp]	Dimensions [in. (mm)]					Net weight [lb]
		A	B	C	AC	AD	
MTC 10-1/1	1	14.76 (375)	4.13 (105)	10.63 (270)	5.55 (141)	4.29 (109)	37
MTC 10-2/1	1	15.94 (405)	5.31 (135)	10.63 (270)	5.55 (141)	4.29 (109)	38
MTC 10-3/1	1	17.13 (435)	6.5 (165)	10.63 (270)	5.55 (141)	4.29 (109)	39
MTC 10-4/1	1	18.31 (465)	7.68 (195)	10.63 (270)	5.55 (141)	4.29 (109)	38
MTC 10-5/1	1	19.49 (495)	8.86 (225)	10.63 (270)	5.55 (141)	4.29 (109)	39
MTC 10-6/1	1	20.67 (525)	10.04 (255)	10.63 (270)	5.55 (141)	4.29 (109)	40
MTC 10-2/2	3	19.49 (495)	5.31 (135)	14.17 (360)	7.01 (178)	4.33 (110)	71
MTC 10-3/2	3	20.67 (525)	6.5 (165)	14.17 (360)	7.01 (178)	4.33 (110)	72
MTC 10-4/2	3	21.85 (555)	7.68 (195)	14.17 (360)	7.01 (178)	4.33 (110)	72
MTC 10-5/2	3	23.03 (585)	8.86 (225)	14.17 (360)	7.01 (178)	4.33 (110)	72
MTC 10-6/2	3	24.21 (615)	10.04 (255)	14.17 (360)	7.01 (178)	4.33 (110)	73
MTC 10-3/3	5	22.76 (578)	6.5 (165)	16.26 (413)	8.66 (220)	5.28 (134)	88
MTC 10-4/3	5	23.94 (608)	7.68 (195)	16.26 (413)	8.66 (220)	5.28 (134)	88
MTC 10-5/3	5	25.12 (638)	8.86 (225)	16.26 (413)	8.66 (220)	5.28 (134)	89
MTC 10-6/3	5	26.3 (668)	10.04 (255)	16.26 (413)	8.66 (220)	5.28 (134)	90

MTC 15, 60 Hz



TM082734

Dimensional sketches



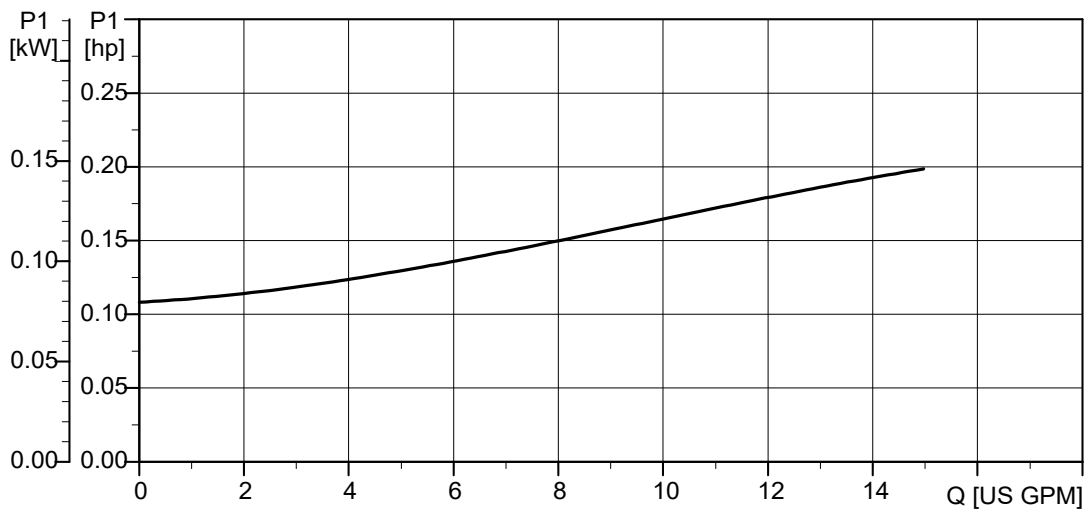
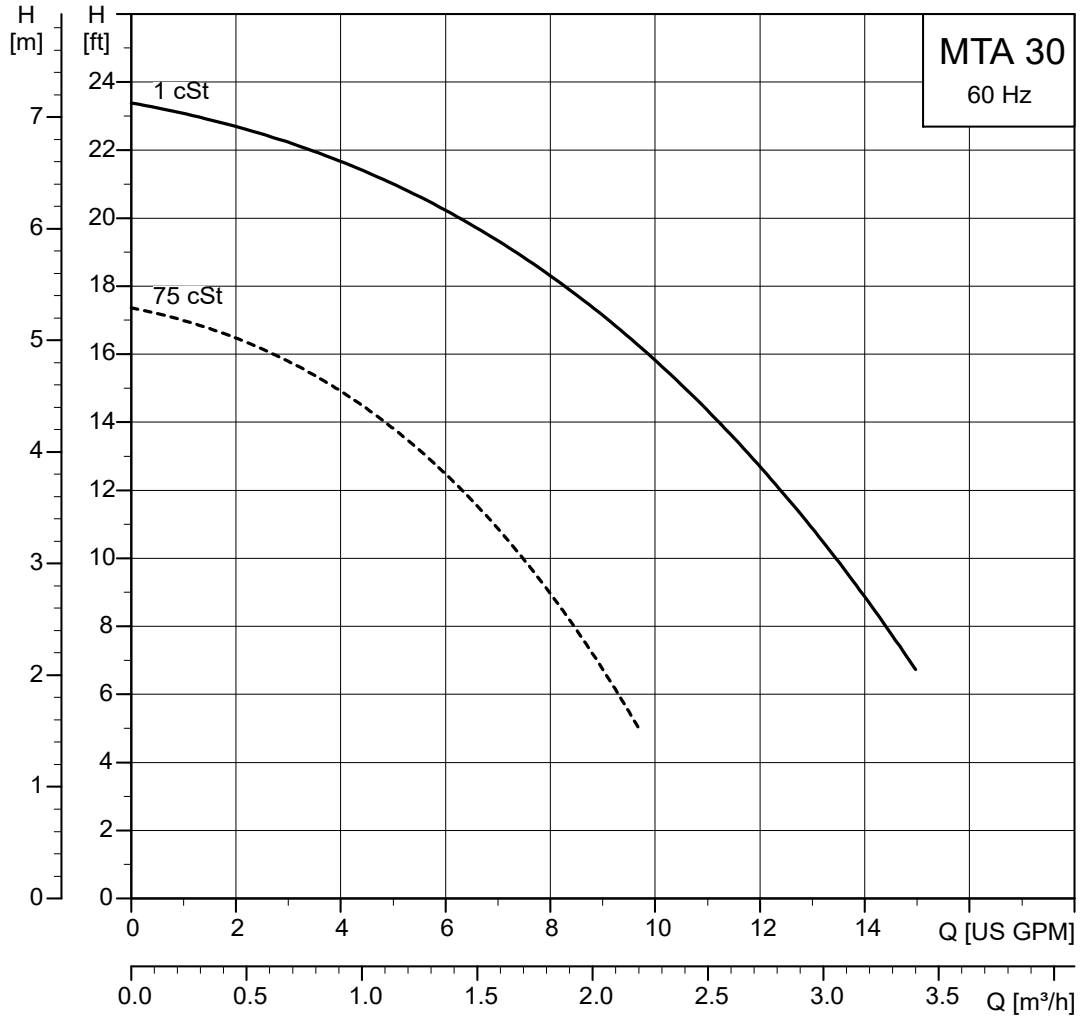
TM052991

MTC - 3 x 208-230 ΔV / 460 YV, 60 Hz - USA

Pump type	Motor power P ₂ [hp]	Dimensions [in. (mm)]					Net weight [lb]
		A	B	C	AC	AD	
MTC 15-1/1	3	18.31 (465)	4.13 (105)	14.17 (360)	7.01 (178)	4.33 (110)	68
MTC 15-2/1	3	19.49 (495)	5.31 (135)	14.17 (360)	7.01 (178)	4.33 (110)	69
MTC 15-3/1	3	20.67 (525)	6.5 (165)	14.17 (360)	7.01 (178)	4.33 (110)	70
MTC 15-4/1	3	21.85 (555)	7.68 (195)	14.17 (360)	7.01 (178)	4.33 (110)	70
MTC 15-5/1	3	23.03 (585)	8.86 (225)	14.17 (360)	7.01 (178)	4.33 (110)	70
MTC 15-6/1	3	24.21 (615)	10.04 (255)	14.17 (360)	7.01 (178)	4.33 (110)	71
MTC 15-2/2	5	21.57 (548)	5.31 (135)	16.26 (413)	8.66 (220)	5.28 (134)	86
MTC 15-3/2	5	22.76 (578)	6.5 (165)	16.26 (413)	8.66 (220)	5.28 (134)	87
MTC 15-4/2	5	23.94 (608)	7.68 (195)	16.26 (413)	8.66 (220)	5.28 (134)	87
MTC 15-5/2	5	25.12 (638)	8.86 (225)	16.26 (413)	8.66 (220)	5.28 (134)	87
MTC 15-6/2	5	26.3 (668)	10.04 (255)	16.26 (413)	8.66 (220)	5.28 (134)	88

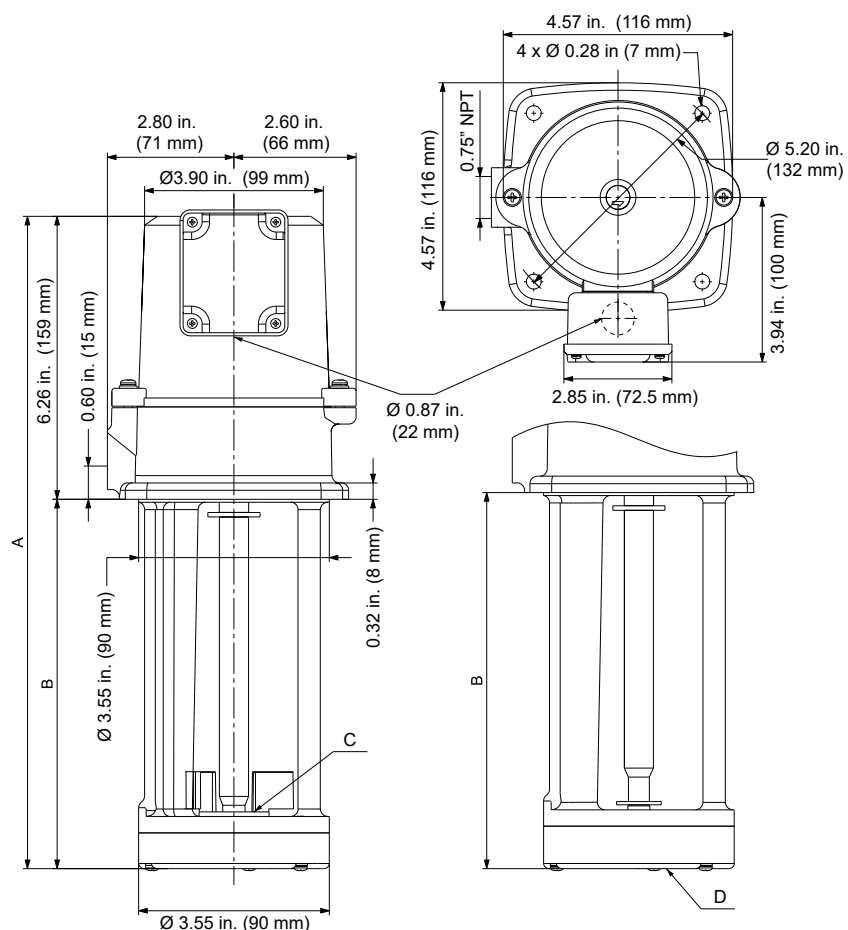
MTA, MTA-H curve charts and technical data

MTA 30, 60 Hz



TM054979

Dimensional sketches



Left: Top inlet (C). Right: Bottom inlet (D).

TM054993

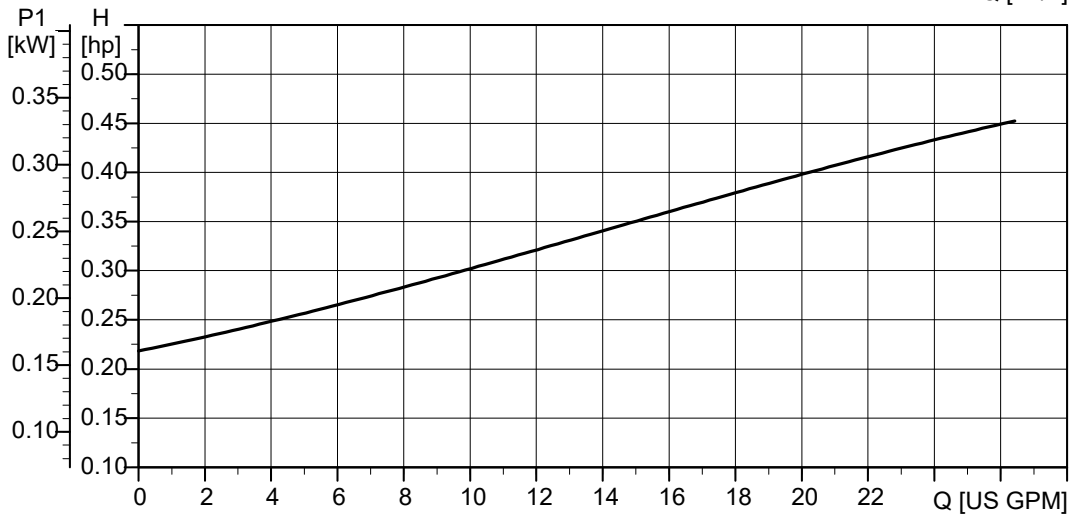
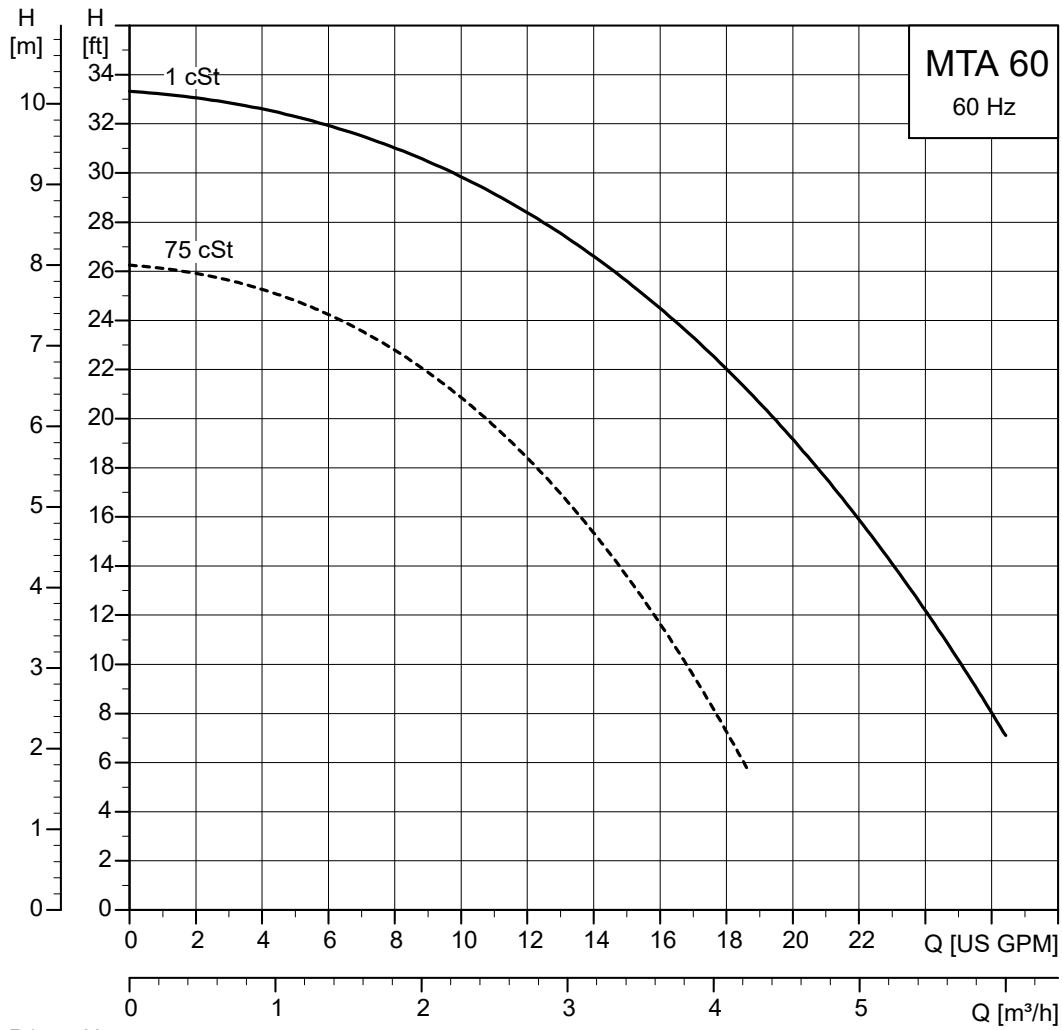
Dimensions and weights

Pump type	Inlet	A [in. (mm)]	B [in. (mm)]	Net weight [lb]
MTA 30-150	Top	12.17 (309)	5.91 (150)	15
MTA 30-150	Bottom	12.29 (312)	6.03 (153)	15

Electrical data

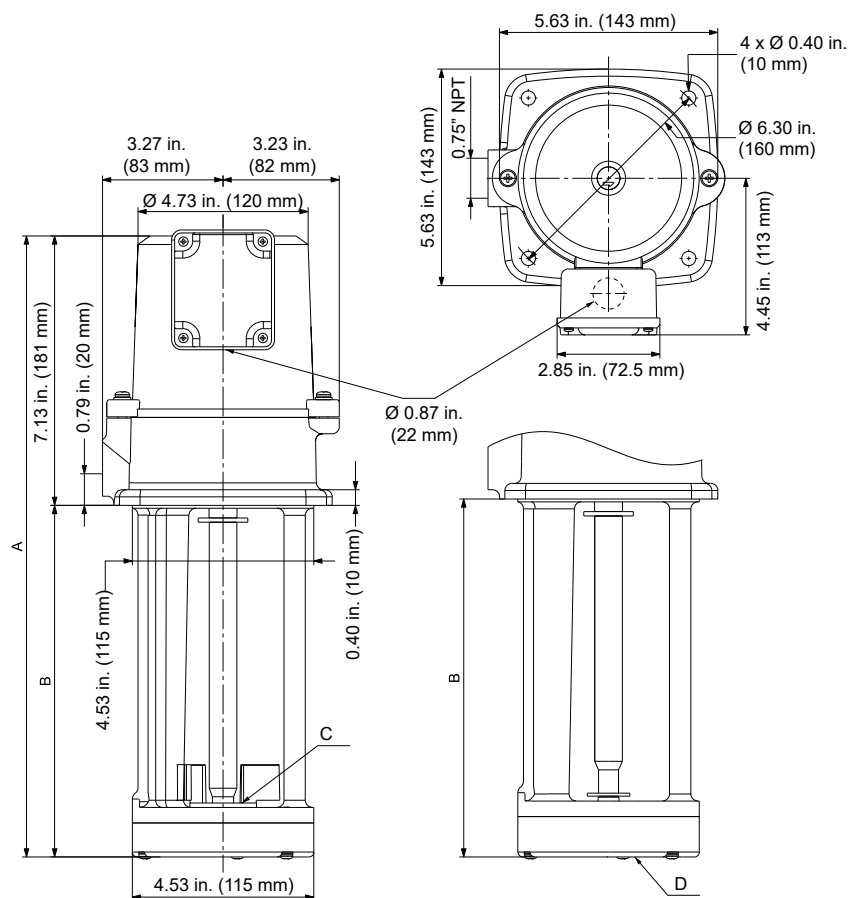
Voltage	Frequency [Hz]	P1 [W]	I _{1/1} [A]	I _{max} [A]	I _{start} / I _{1/1} [A]	Cos φ
3 × 200-220 Δ V	60	145	0.5	0.58 - 0.58	3.65 - 3.80	0.84 - 0.76
3 × 220-240 Δ / 380-440Y V	60	142	0.41/0.24 - 0.22	0.47/0.28 - 0.25	3.36/1.97 - 1.80	0.91 - 0.83

MTA 60, 60 Hz



TM054980

Dimensional sketches



Left: Top inlet (C). Right: Bottom inlet (D).

TM054994

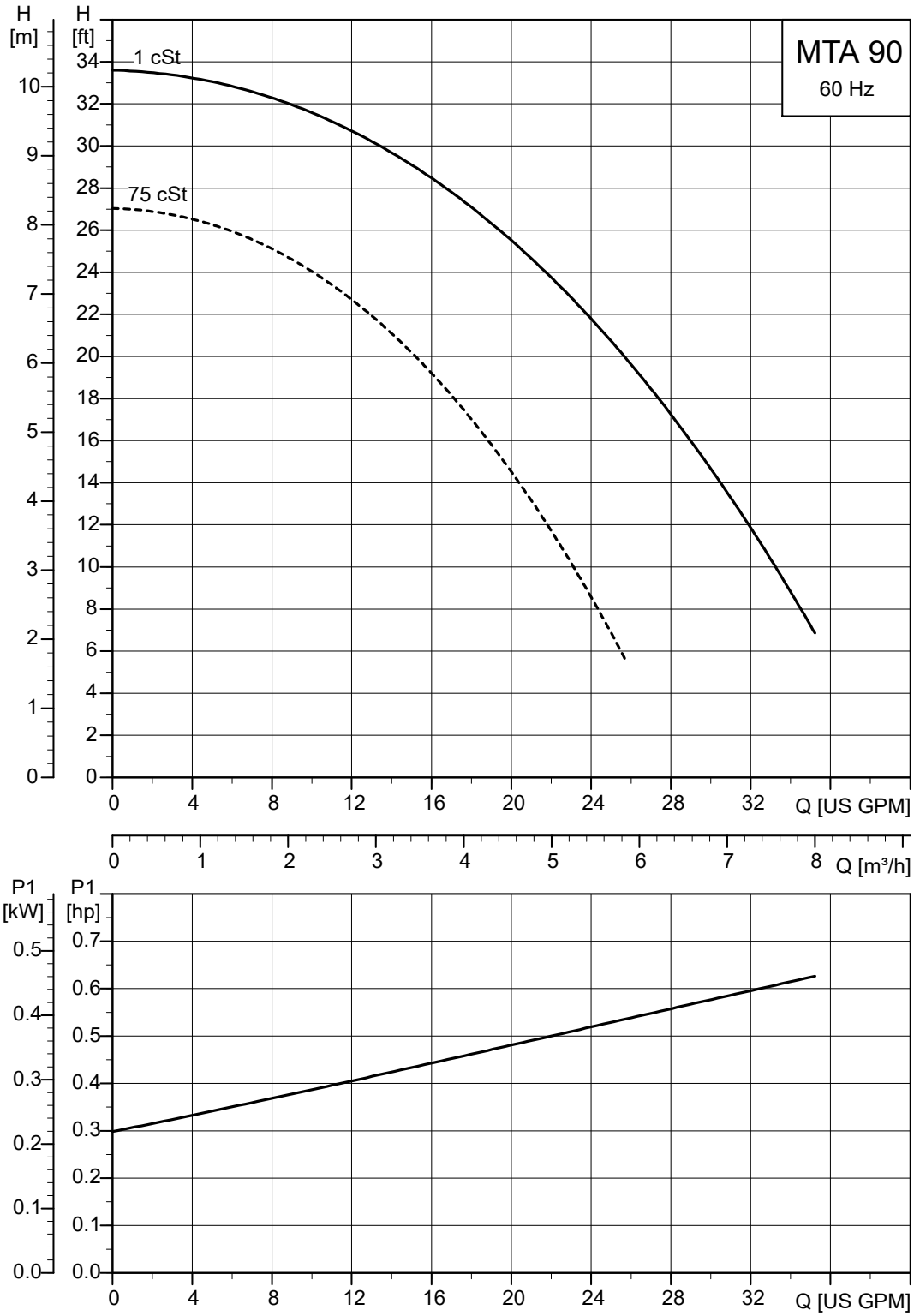
Dimensions and weights

Pump type	Inlet	A [in. (mm)]	B [in. (mm)]	Net weight [lb]
MTA 60-130	Top	12.10 (306)	4.93 (125)	23
MTA 60-180		14.02 (356)	6.89 (175)	25
MTA 60-250		16.78 (426)	9.65 (245)	26
MTA 60-350		20.71 (526)	13.59 (345)	28
MTA 60-130	Bottom	12.29 (312)	5.16 (131)	24
MTA 60-180		14.26 (362)	7.13 (181)	25
MTA 60-250		17.01 (432)	9.89 (251)	27
MTA 60-350		20.95 (532)	13.82 (351)	29

Electrical data

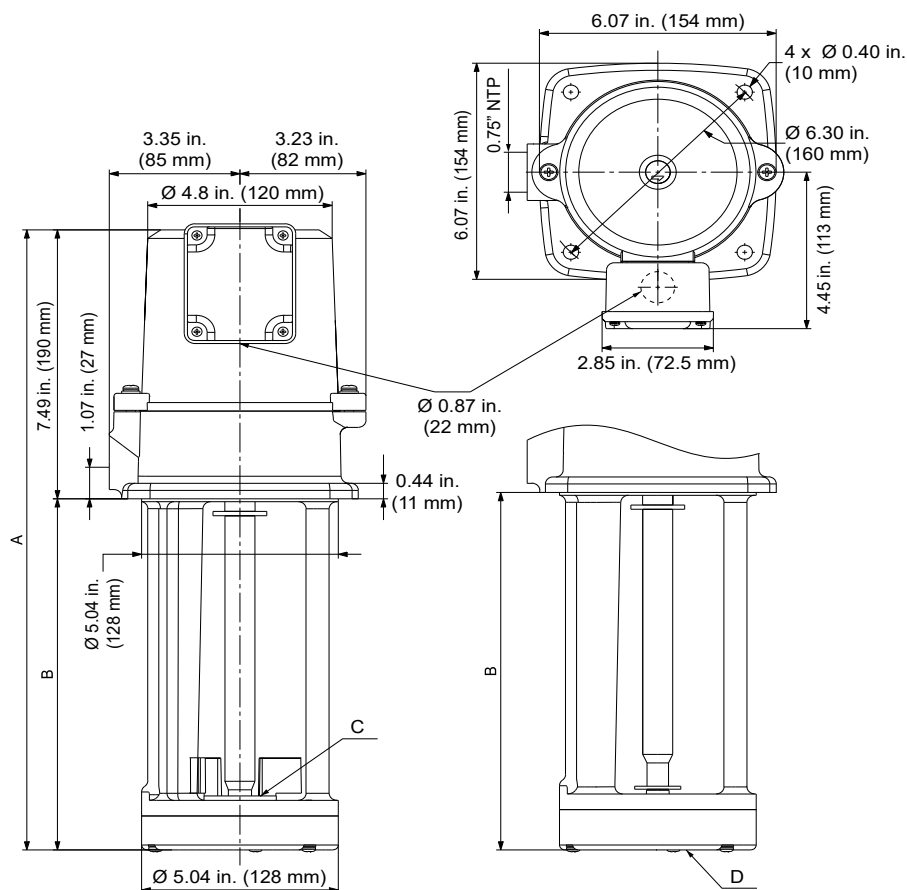
Voltage	Frequency [Hz]	P1 [W]	I _{1/1} [A]	I _{max} [A]	I _{start} / I _{1/1} [A]	Cos φ
3 × 200Δ V	60	333	1.18 - 1.09	1.36 - 1.27	4.8 - 5.2	0.81 - 0.80
3 × 220-240Δ / 380-440Y V	60	330	0.99 / 0.63 - 0.57	1.14 / 0.72 - 0.66	4.8 - 5.2	0.87 - 0.80

MTA 90, 60 Hz



TM054981

Dimensional sketches



Left: Top inlet (C). Right: Bottom inlet (D).

TM054995

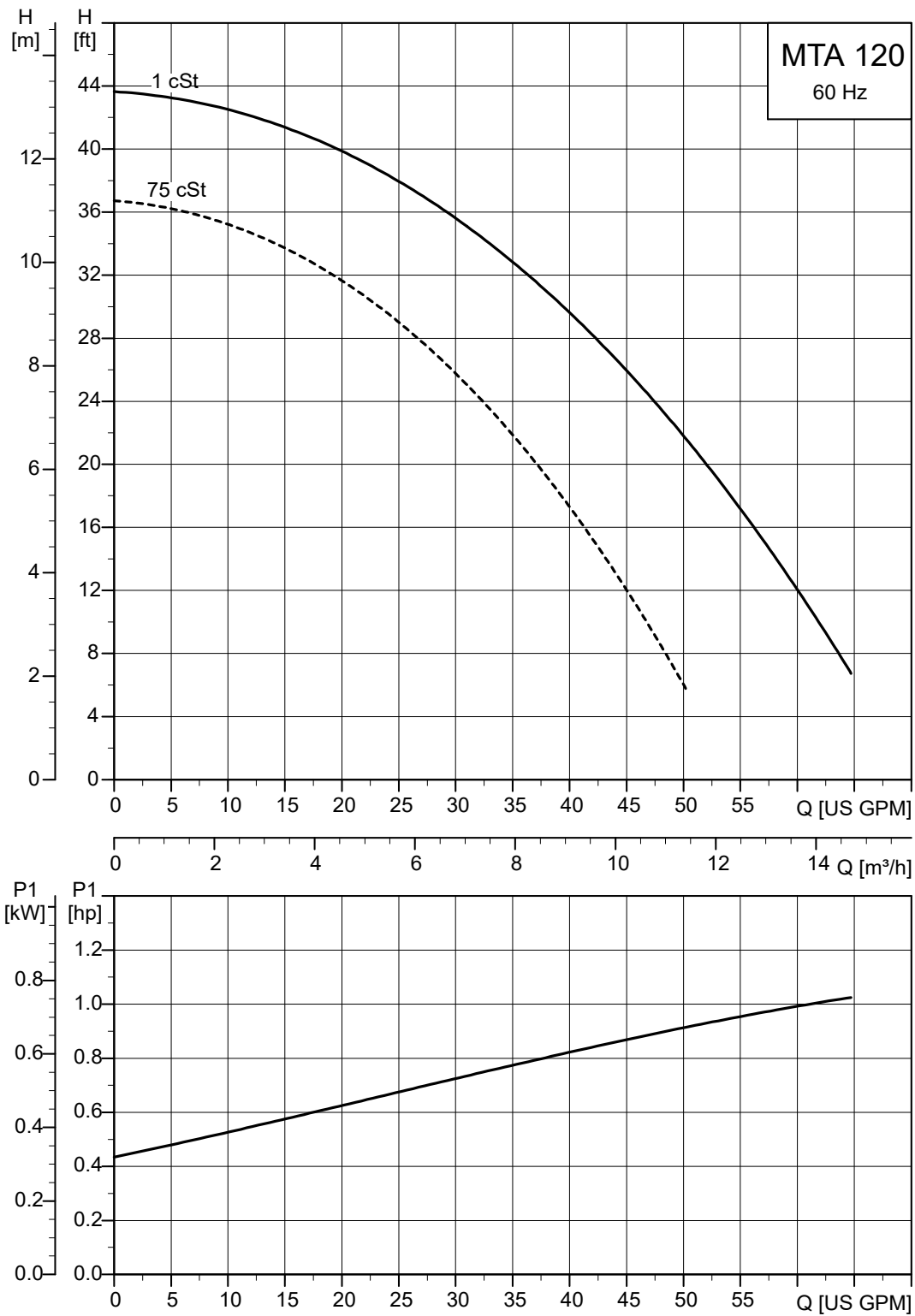
Dimensions and weights

Pump type	Inlet	A [in. (mm)]	B [in. (mm)]	Net weight [lb]
MTA 90-130	Top	12.52 (318)	5.01 (128)	28
MTA 90-180		14.49 (368)	7.01 (178)	29
MTA 90-250		17.25 (438)	9.77 (248)	31
MTA 90-350		21.19 (538)	13.71 (348)	34
MTA 90-130	Bottom	12.72 (323)	5.24 (133)	29
MTA 90-180		14.69 (373)	7.21 (183)	30
MTA 90-250		17.45 (443)	9.96 (253)	32
MTA 90-350		21.38 (543)	13.90 (353)	35

Electrical data

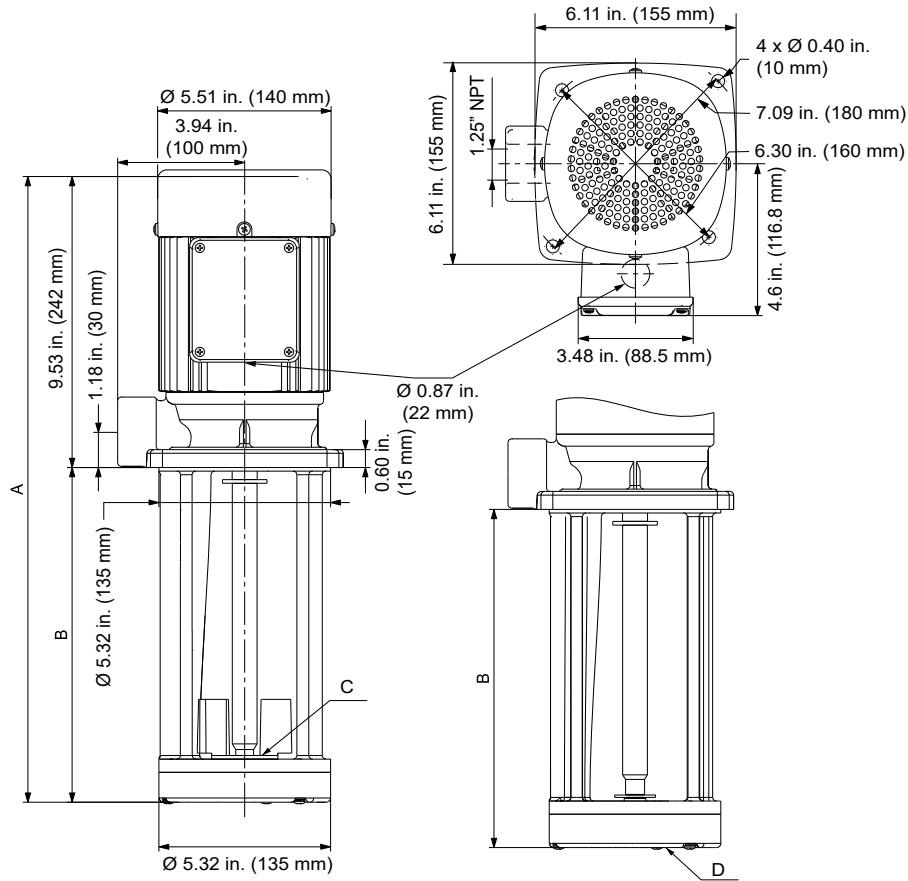
Voltage	Frequency [Hz]	P1 [W]	$I_{1/1}$ [A]	I_{max} [A]	$I_{start} / I_{1/1}$ [A]	Cos ϕ
3 × 200Δ V	60	460	1.63 - 1.51	1.87 - 1.74	4.8 - 5.2	0.81 - 0.80
3 × 220-240Δ / 380-440Y V	60	440	1.3 / 0.8 - 0.72	1.5 / 0.92 - 0.83	4.8 - 5.2	0.89 - 0.81

MTA 120, 60 Hz



TM054982

Dimensional sketches



TM054996

Left: Top inlet (C). Right: Bottom inlet (D).

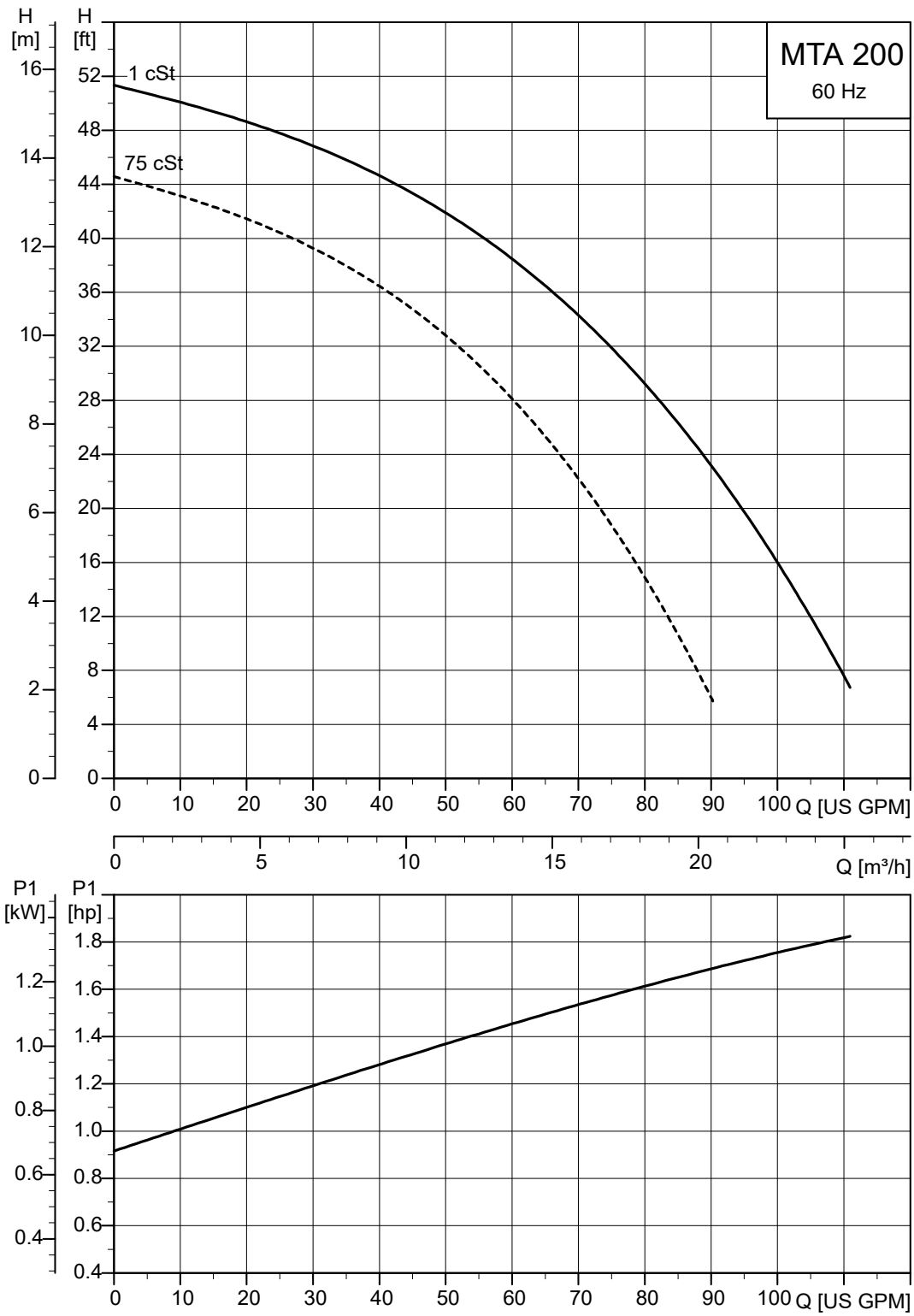
Dimensions and weights

Pump type	Inlet	A [in. (mm)]	B [in. (mm)]	Net weight [lb]
MTA 120-180	Top	16.61 (422)	7.10 (180)	35
MTA 120-250		19.37 (492)	9.85 (250)	37
MTA 120-280		20.55 (522)	11.03 (280)	38
MTA 120-350		23.31 (592)	13.78 (350)	41
MTA 120-180	Bottom	16.73 (425)	7.21 (183)	35
MTA 120-250		19.49 (495)	9.97 (253)	38
MTA 120-280		20.67 (525)	11.15 (283)	39
MTA 120-350		23.43 (595)	13.90 (353)	41

Electrical data

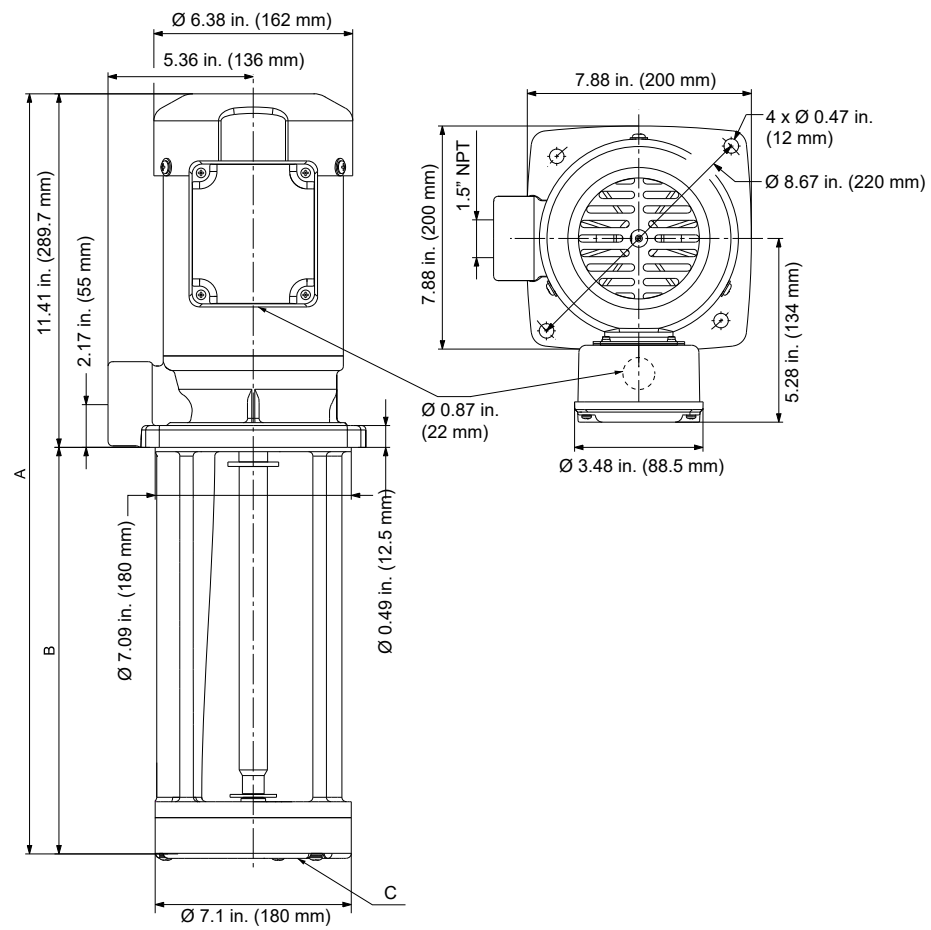
Voltage	Frequency [Hz]	P1 [W]	I _{1/1} [A]	I _{max} [A]	I _{start} / I _{1/1} [A]	Cos φ
3 × 200Δ V	60	755	2.47 - 2.37	2.84 - 2.73	5.0 - 5.5	0.88 - 0.84
3 × 220-240Δ / 380-440Y V	60	730	2.1 / 1.26 - 1.13	2.42 / 1.45 - 1.3	5.0 - 5.5	0.91 - 0.84

MTA 200, 60 Hz



TM054983

Dimensional sketches



Bottom inlet (C).

TM054997

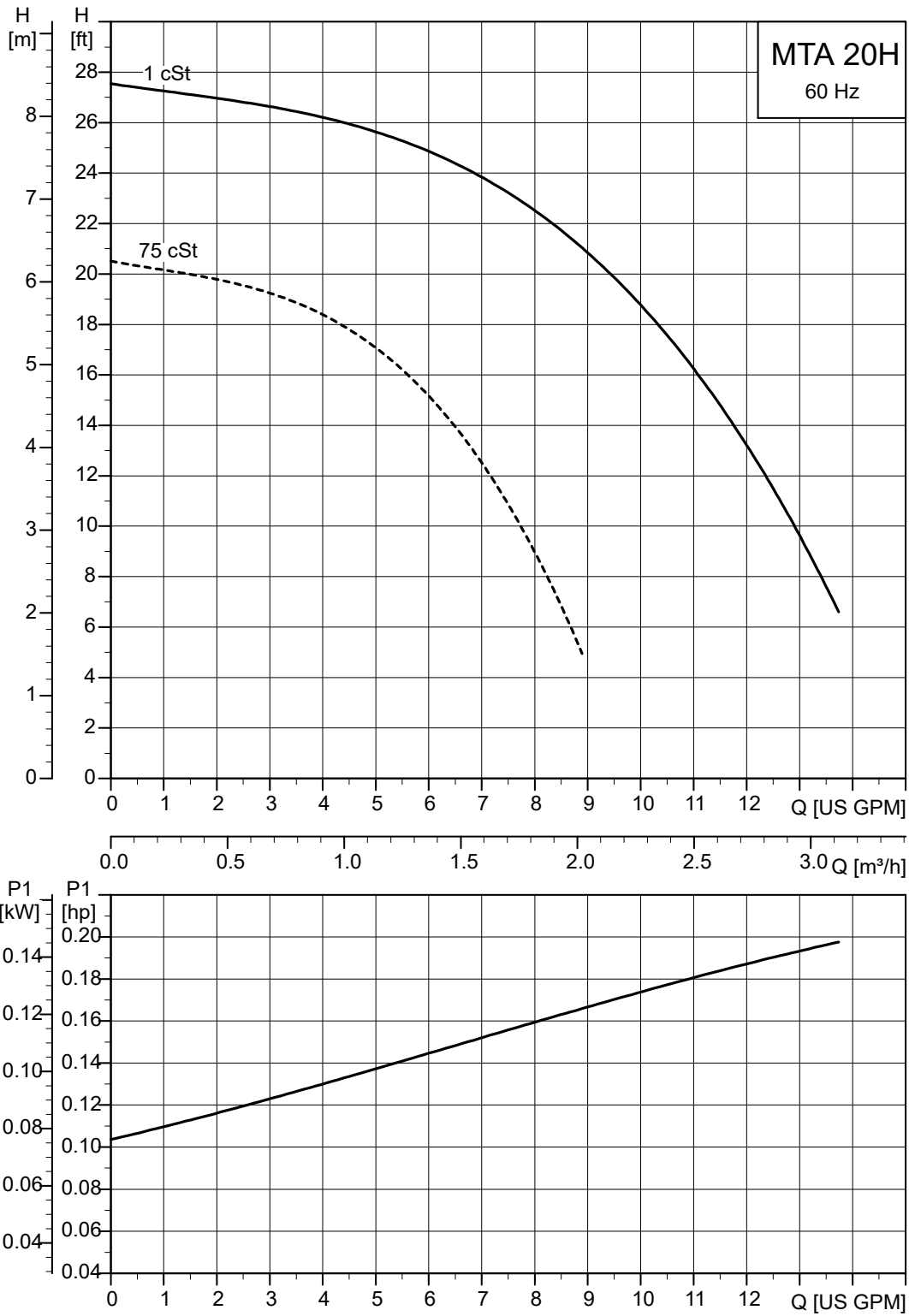
Dimensions and weights

Pump type	Inlet	A [in. (mm)]	B [in. (mm)]	Net weight [lb]
MTA 200-250		21.26 (540)	9.85 (250)	54
MTA 200-280	Bottom	22.45 (570)	11.03 (280)	55
MTA 200-350		25.20 (640)	13.78 (350)	57

Electrical data

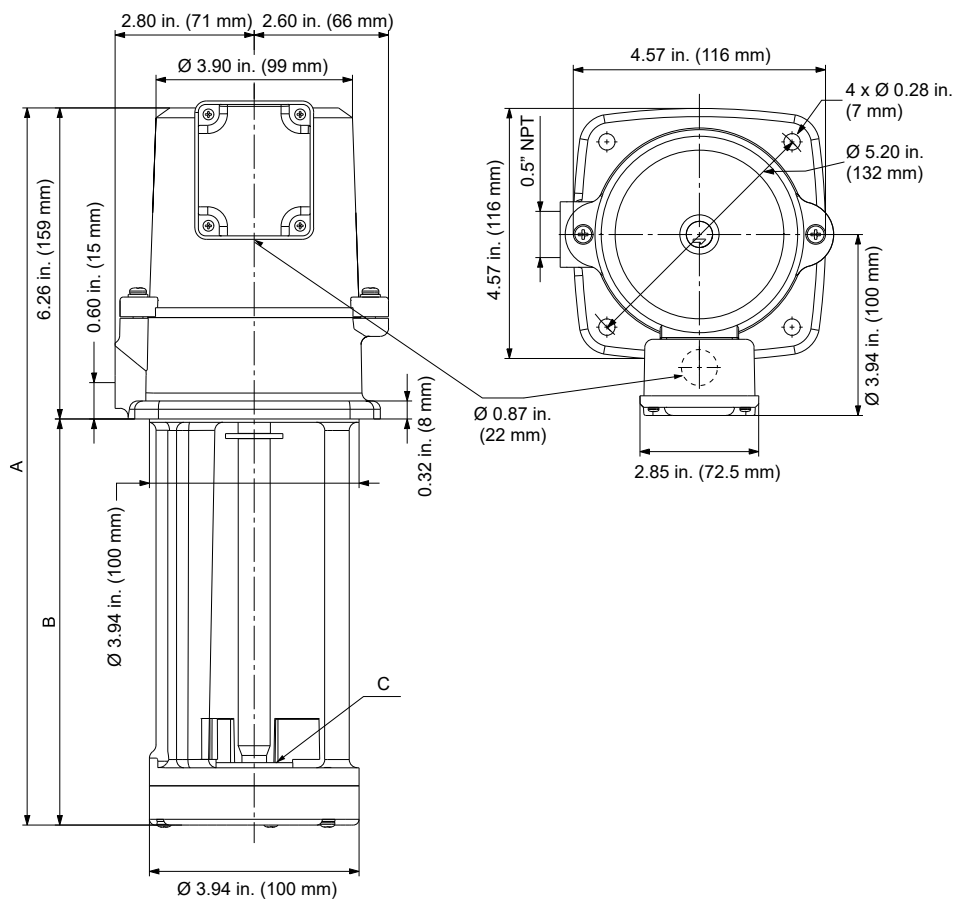
Voltage	Frequency [Hz]	P ₁ [W]	I _{1/1} [A]	I _{max} [A]	I _{start} / I _{1/1} [A]	Cos φ
3 × 200Δ V	60	1340	4.28 - 4.28	4.92 - 4.92	5.0 - 5.5	0.90 - 0.82
3 × 220-240Δ / 380-440Y V	60	1270	3.48 / 2.11 - 1.96	4.0 / 2.43 - 2.25	5.0 - 5.5	0.96 - 0.88

MTA 20H, 60 Hz



TM054984

Dimensional sketches



TM054998

Top inlet (C).

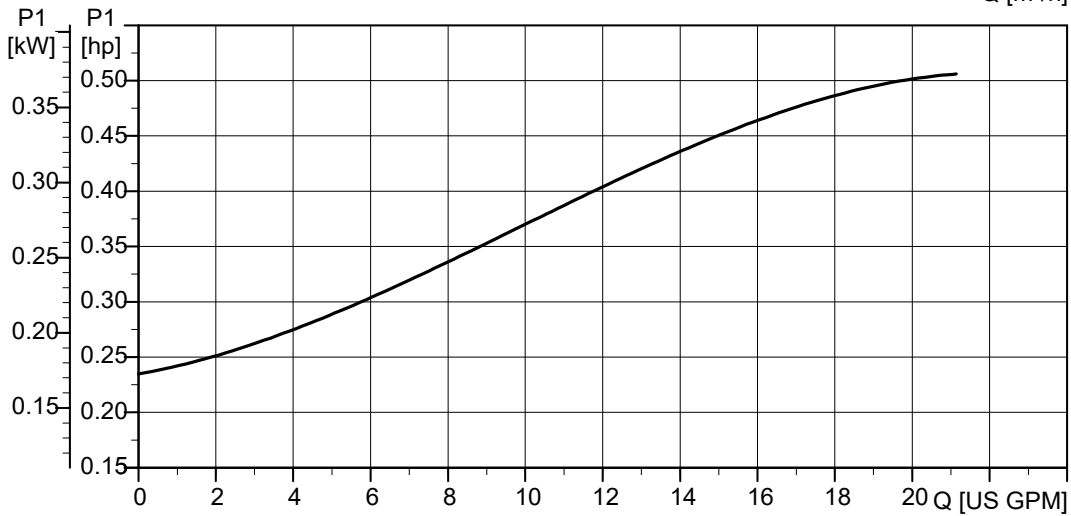
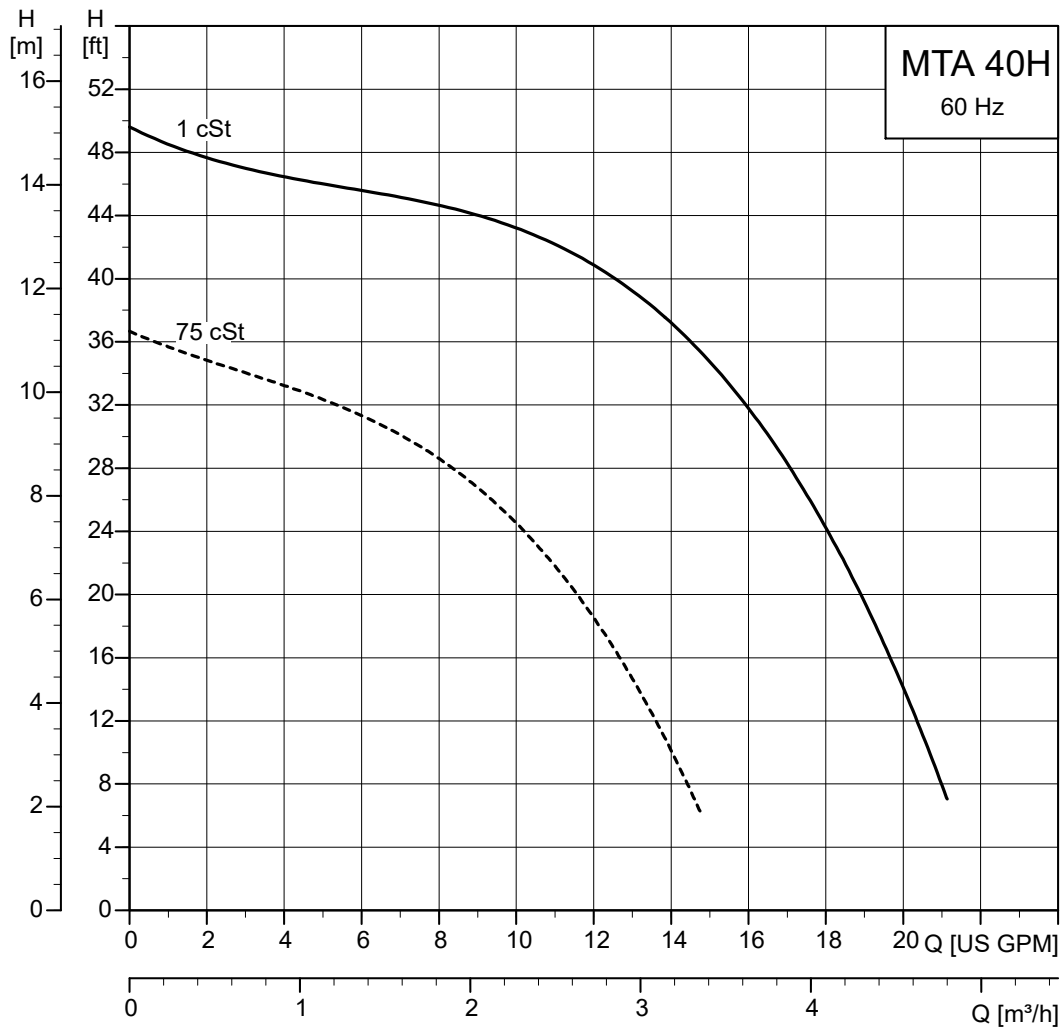
Dimensions and weights

Pump type	Inlet	A [in. (mm)]	B [in. (mm)]	Net weight [lb]
MTA 20H-150	Top	12.17 (309)	5.91 (150)	15

Electrical data

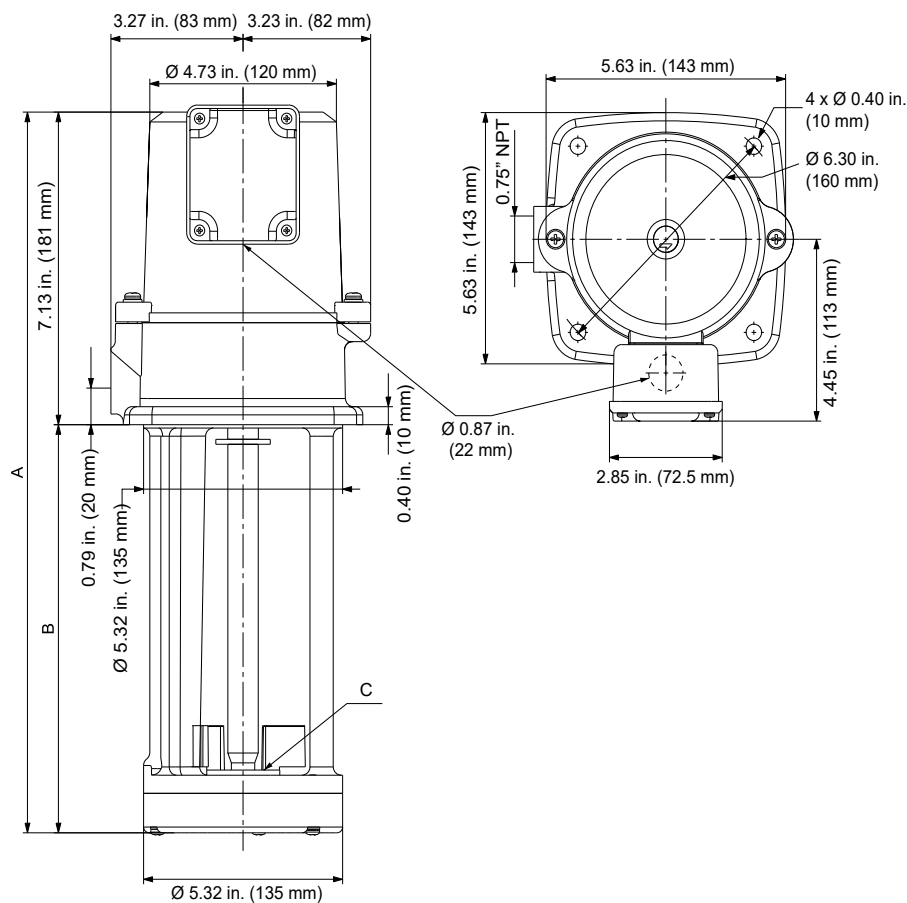
Voltage	Frequency [Hz]	P1 [W]	I _{1/1} [A]	I _{max} [A]	I _{start} / I _{1/1} [A]	Cos φ
3 × 200Δ V	60	145	0.46 - 0.46	0.53 - 0.53	4.8 - 5.2	0.91 - 0.83
3 × 220-240Δ/380-440Y V	60	140	0.41 / 0.25 - 0.22	0.47 / 0.29 - 0.25	4.8 - 5.2	0.9 - 0.82

MTA 40H, 60 Hz



TM054985

Dimensional sketches



TM054999

Top inlet (C).

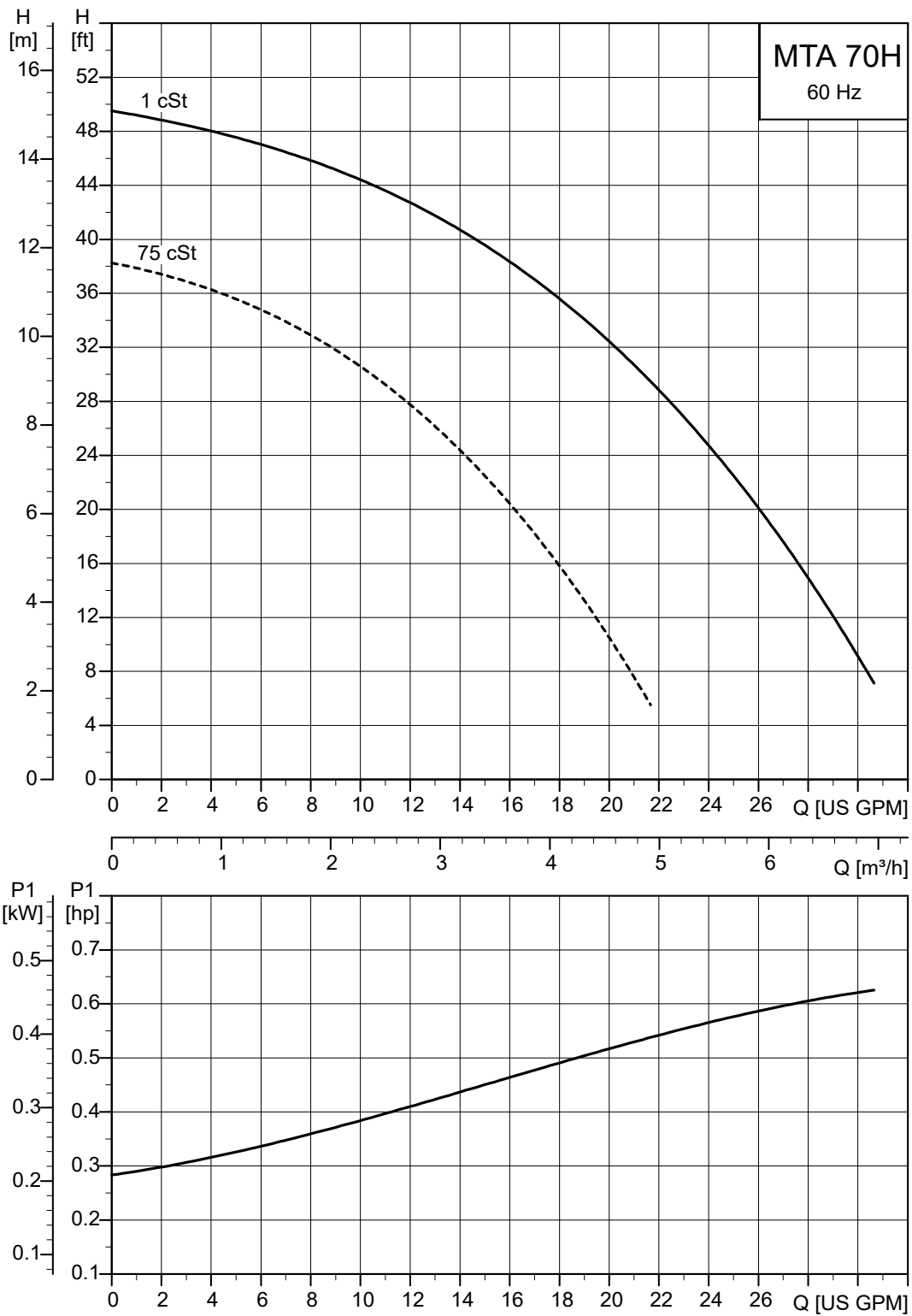
Dimensions and weights

Pump type	Inlet	A [in. (mm)]	B [in. (mm)]	Net weight [lb]
MTA 40H-180	Top	14.22 (361)	7.09 (180)	25

Electrical data

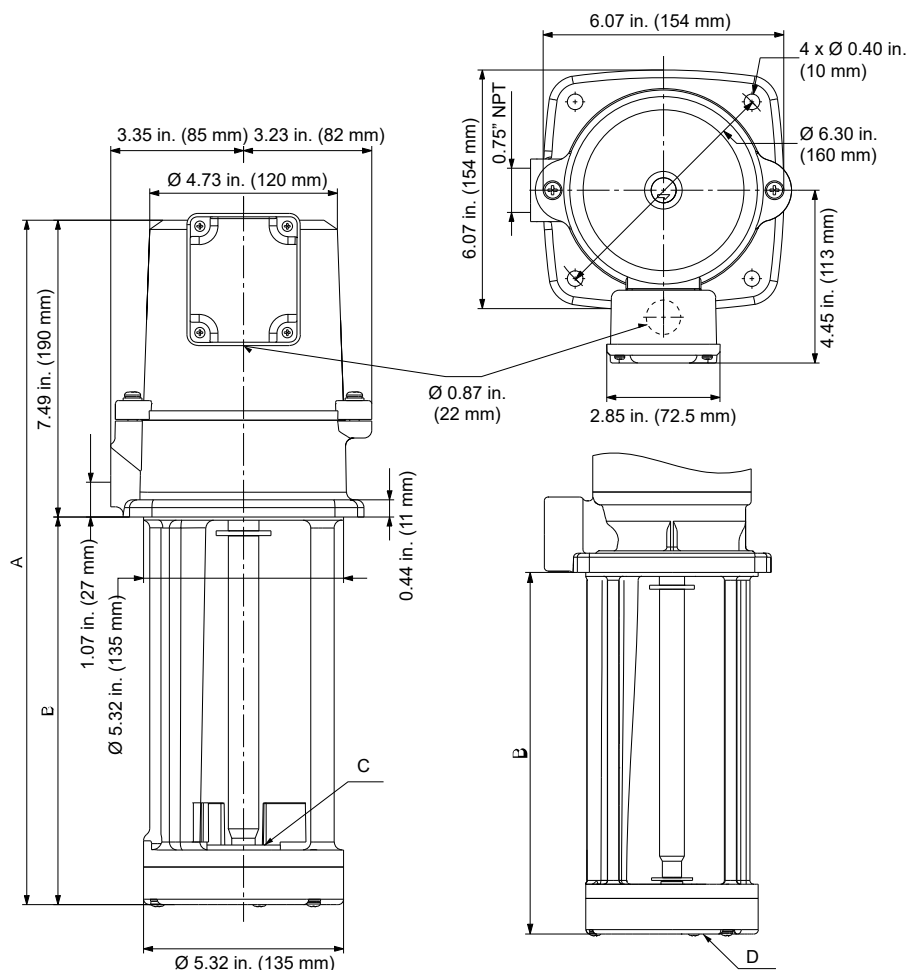
Voltage	Frequency [Hz]	P1 [W]	$I_{1/1}$ [A]	I_{max} [A]	$I_{start} / I_{1/1}$ [A]	Cos ϕ
3 × 200Δ V	60	375	1.28 - 1.2	1.47 - 1.38	4.8 - 5.2	0.85 - 0.82
3 × 220-240Δ/380-440Y V	60	365	1.14 / 0.69 - 0.63	1.31 / 0.79 - 0.72	4.8 - 5.2	0.84 - 0.77

MTA 70H, 60 Hz



TM054986

Dimensional sketches



TM055000

Left: Top inlet (C). Right: Bottom inlet (D).

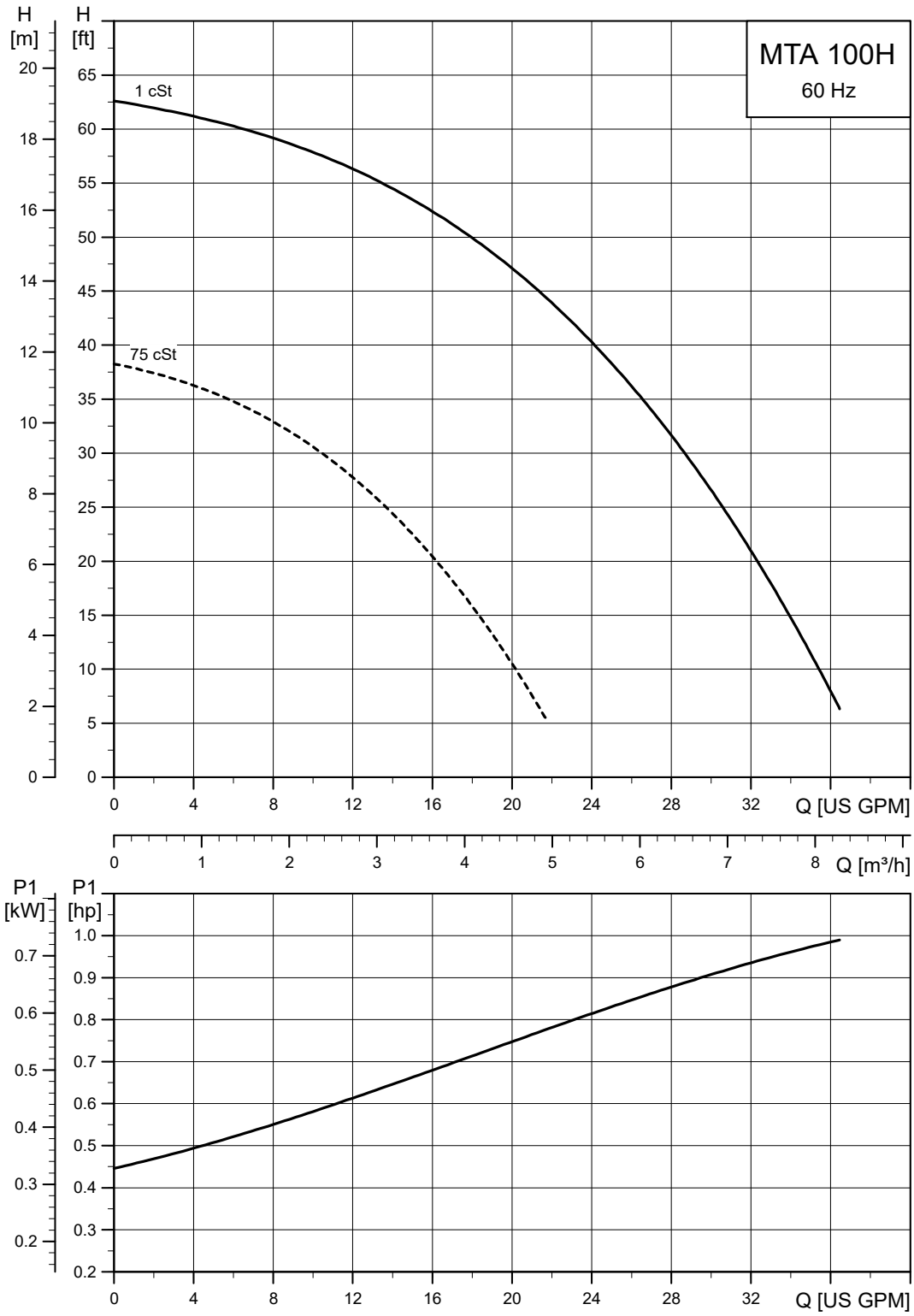
Dimensions and weights

Pump type	Inlet	A [in. (mm)]	B [in. (mm)]	Net weight [lb]
MTA 70H-250	Top/bottom	17.33 (440)	9.85 (250)	32

Electrical data

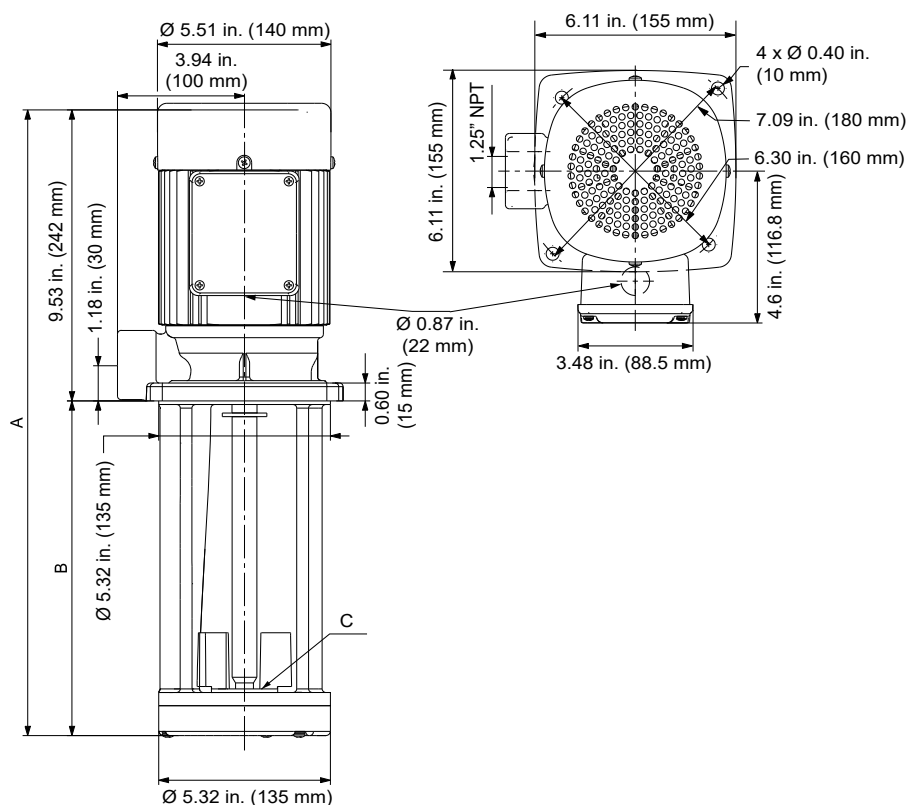
Voltage	Frequency [Hz]	P1 [W]	I _{1/1} [A]	I _{max} [A]	I _{start} / I _{1/1} [A]	Cos φ
3 × 200Δ V	60	460	1.63 - 1.54	1.87 - 1.77	4.8 - 5.2	0.81 - 0.78
3 × 220-240Δ/380-440Y V	60	458	1.45 / 0.86 - 0.74	1.67 / 0.99 - 0.85	4.8 - 5.2	0.83 - 0.76

MTA 100H, 60 Hz



TM055116

Dimensional sketches



TM055001

Top inlet (C).

Dimensions and weights

Pump type	Inlet	A [in. (mm)]	B [in. (mm)]	Net weight [lb]
MTA 100H-180	Top	16.61 (422)	7.09 (180)	37
MTA 100H-280		20.55 (522)	11.03 (280)	41

Electrical data

Voltage	Frequency [Hz]	P ₁ [W]	I _{1/1} [A]	I _{max} [A]	I _{start} / I _{1/1} [A]	Cos φ
3 × 200Δ V	60	725	2.4 - 2.28	2.76 - 2.62	5.0 - 5.5	0.87 - 0.83
3 × 220-240Δ/380-440Y V	60	715	1.98 / 1.21 - 1.05	2.28 / 1.39 - 1.21	5.0 - 5.5	0.95 - 0.87

15. Motor data

MTR, MTRE motor data

MTR motor data

TEFC motors (Totally Enclosed Fan Cooled, constant speed)

Grundfos ML motors



GR7848SH



GR7845SH

hp	Ph	Frame	Service factor	Insul. class	Voltage [V]	Motor eff. η [%]	Full-load current $I_{1/1}$ [A]	Service-factor current [A]	Starting current I_{start} [A]	Power factor $\cos \phi_{1/1}$	Speed [rpm]
1/3	3	56C	1.35	F/B	208-230/460	78.8 - 79.3	1.12 - 1.10 / 0.55	1.5 - 1.45 / 0.75	7.1 - 7.7 / 3.9	0.81 - 0.75	3450-3480
1/2	3	56C	1.25	F/B	208-230/460	79.5 - 80.6	1.64 - 1.55 / 0.78	2.0 - 1.9 / 0.95	9.7 - 10.1 / 5.1	0.84 - 0.78	3430-3460
3/4	3	56C	1.25	F/B	208-230/460	78.9 - 80.1	2.40 - 2.30 / 1.20	2.9 - 2.75 / 1.4	14.2 - 15 / 7.8	0.84 - 0.78	3430-3460
1	3	56C	1.25	F/B	208-230/460	77.0 - 77.0	3.25 - 3.35 / 1.68	4.0 - 3.9 / 1.95	19.2 - 21.8 / 10.9	0.81 - 0.72	3430-3460
1 1/2	3	56C	1.15	F/B	208-230/460	84.1 - 83.5	4.45 - 4.3 / 2.16	5.1 - 4.95 / 2.48	32 - 31 / 15.6	0.84 - 0.78	3440-3480
2	3	56C	1.15	F/B	208-230/460	85.5	6.00 - 5.80 / 2.90	6.80 - 6.60 / 3.30	48 - 52.8 / 26.4	0.81 - 0.78	3500-3520
3	3	182TC	1.15	F/B	208-230/460	86.5	8.50 - 8.20 / 4.10	9.60 - 9.20 / 4.60	72.3 - 79.5 / 39.8	0.85 - 0.82	3500-3520
5	3	182TC	1.15	F/B	208-230/460	88.5	14.1 - 13.1 / 7.29	16.2 - 15.0 / 8.40	141 - 192.6 / 107.2	0.89 - 0.86	3525-3540
7 1/2	3	213TC	1.15	F/B	208-230/460	89.5	19.5 - 18.1 / 9.09	22.4 - 20.8 / 10.4	198.9 - 267.9 / 134.5	0.89 - 0.86	3490-3520
10	3	215TC	1.15	F/B	208-230/460	90.0 - 90.2	26.5 - 24.6 / 12.4	30.5 - 28.3 / 14.3	180.2 - 221.4 / 111.6	0.87	3480-3500
15	3	254TC	1.15	F	208-230/460	90.5 - 91.0	37.5 - 34.0 / 17.0	43 - 39.0 / 19.6	255 - 306 / 153	0.91 - 0.89	3490-3530
20	3	256TC	1.15	F	208-230/460	90.5 - 91.0	50.5 - 46.0 / 23.0	58 - 53.0 / 26.5	308.1 - 372.6 / 186.3	0.92 - 0.90	3490-3530
25	3	284TC	1.15	F	208-230/460	91.0 - 91.7	62.0 - 56.0 / 28.0	71.5 - 64.5 / 32.0	341 - 420 / 210	0.92 - 0.91	3490-3530
30	3	286TC	1.15	F	208-230/460	91.5 - 91.7	74.0 - 67.0 / 33.5	85 - 77.0 / 38.5	399.6 - 489.1 / 244.6	0.92 - 0.91	3490-3540
40	3	Available. See TEFC WEG motors.									

Note that Grundfos ML motors are rated for 208-230/460 V.

WEG motors



TM077440

hp	Ph	Frame	Service factor	Insul. class	Voltage [V]	Motor eff. η [%]	Full-load current $I_{1/1}$ [A]	Service-factor current [A]	Starting current I_{start} [A]	Power factor $\cos \phi_{1/1}$	Speed [rpm]
1/3	1	56C	1.15	F	115/230	54.0	5.2 / 2.87 - 2.6	5.98 / 2.87 - 2.99	36.4 / 20.1 - 18.2	0.76	3490
1/2	1	56C	1.15	F	115/230	60.0	7 / 3.87 - 3.5	8.05 / 3.87 - 4.03	56 / 31.0 - 28	0.76	3490
3/4	1	56C	1.15	F	115/230	66.0	8 / 4.42 - 4	9.2 / 4.42 - 4.6	64 / 35.4 - 32	0.91	3500
1	1	56C	1.15	F	115/230	70.0	10.1 / 5.64 - 5.06	11.6 / 5.64 - 5.82	84.8 / 47.4 - 42.5	0.92	3500
1 1/2	1	56C	1.15	F	115/230	75.0	13.2 / 7.3 - 6.6	15.2 / 7.3 - 7.59	106 / 58.4 - 52.8	0.97	3500
2	1	56C	1.15	F	115/230	77.0	17.5 / 9.62 - 8.73	20.1 / 9.62 - 10	137 / 75.0 - 68.1	0.97	3495
3	1	182TC	1.15	F	115/230	80.0	24.2 / 19.7 - 12.1	27.8 / 19.7 - 13.9	169 / 138 - 84.7	0.99	3510
5	1	184TC	1.15	F	230	84.0	31.7 - 19.5	31.7 - 22.4	254-156	0.98	3515
7 1/2	1	213TC	1.15	F	230	84.0	31.7 - 38.8	31.7 - 44.6	225-275	0.99	3515
10	1	215TC	1.15	F	230	86.5	42.5 - 38.1	42.5 - 43.8	306-274	0.99	3510
40	3	324TSC	1.25	F	230/460	92.4	101 - 91.6 / 45.8	101-115 / 57.3	636-577 / 289	0.89	3555
	3	324TSC	1.25	F	575	92.4	37	46.3	233	0.88	3560

Note that motors with a nameplate stating 230/460 V are suitable for operation at 208 V.

ODP motors (Open Drip Proof, constant speed)

WEG motors

hp	Ph	Frame	Service factor	Insul. class	Voltage [V]	Motor eff. η [%]	Full-load current $I_{1/1}$ [A]	Service-factor current [A]	Starting current I_{start} [A]	Power factor $\cos \phi_{1/1}$	Speed [rpm]
15	3	254TC	1.15	F	230/460	90.2	38.0 - 34.4 / 17.2	38.0 - 39.6 / 19.8	258-234 / 117	0.89	3545
	3	254TC	1.15	F	575	90.2	14.1	16.2	106	0.87	3545
20	3	256TC	1.15	F	230/460	91.0	52.6 - 47.6 / 23.8	52.6 - 54.7 / 27.4	316-286 / 143	0.87	3525
	3	256TC	1.15	F	575	91.0	19	21.9	114	0.87	3525
25	3	284TSC	1.25	F	230/460	91.7	63.7 - 57.6 / 28.8	63.7 - 72 / 36	414-374 / 187	0.88	3535
	3	284TSC	1.25	F	575	91.7	23.3	29.1	154	0.87	3544
30	3	284TSC	1.25	F	230/460	91.7	77.4 - 70.0 / 35	77.4 - 87.5 / 43.8	488-441 / 221	0.86	3545
	3	284TSC	1.25	F	575	91.7	28	35.0	176	0.86	3550
40	3	324TSC	1.25	F	230/460	92.4	104 - 93.6 / 46.8	104 - 117 / 58.5	655-590 / 295	0.86	3545
	3	324TSC	1.25	F	575	92.4	37.5	46.9	229	0.87	3557

Note that motors with a nameplate stating 230/460 V are suitable for operation at 208 V.

Motor data

2-pole E-motors (Grundfos MLE)

Permanent-magnet motors with integrated variable frequency drive (VFD)
Totally Enclosed Fan Cooled, constant speed



TM085712

hp ¹⁰⁾	Voltage [V]	PH	Frame size	Service factor	Motor full-load efficiency [%] ¹¹⁾	Full-load current amps [A]	Service factor current amps [A]	Power factor	Full-load speed [rpm]	Sound pressure level [dB(A)]
1/2	200-240	1	56C	1	84	2.40 - 2.10		0.96	3400	58
3/4	200-240	1	56C	1	85.3	3.45 - 2.90		0.98	3400	58
1	200-240	1	56C	1	85.2	4.70 - 3.90		0.99	3400	58
1	440-480	3	56C	1.25	86.4	1.65	2.10	0.73	3480	58
1 1/2	200-240	1	56C	1	86.9	6.70 - 5.60		0.99	3400	58
1 1/2	200-240	3	56C	1.15	89.3	4.00 - 3.40	4.60 - 3.90	0.91	3480	55
1 1/2	440-480	3	56C	1.15	89.6	2.05	2.40	0.84	3480	58
2	200-240	1	56C	1	87.4	9.10 - 7.60		0.99	3400	64
2	200-240	3	56C	1.00	88.90	5.40 - 4.50		0.92	3480	55
2	440-480	3	56C	1.15	89.4	2.65	3.00	0.87	3480	64
3	200-240	3	182TC	1.15	88.70	7.90 - 6.60	9.10 - 7.60	0.94	3480	62
3	440-480	3	182TC	1.15	90.7	3.8	4.30	0.89	3480	64
5	200-240	3	182TC	1.15	90.90	13.2 - 10.9	14.90 - 12.40	0.94	3480	66
5	440-480	3	182TC	1.15	92.5	6.20 - 5.80	7.00 - 6.60	0.90	3500	60
7 1/2	200-240	3	213TC	1.15	90.20	20.0 - 16.6	23.0 - 19.3	0.94	3480	70
7 1/2	440-480	3	213TC	1.15	92.4	9.10 - 8.50	10.4 - 9.70	0.91	3500	60
10	440-480	3	213TC	1.15	92.5	12.4 - 11.5	14.2 - 13.0	0.91	3500	65
15	440-480	3	254TC	1.15	93.2	17.9 - 16.6	20.5 - 19.0	0.92	3500	65
20	440-480	3	256TC	1.15	93	23.1 - 21.8	27.3 - 24.8	0.93	3600	74
25	440-480	3	284TSC	1.15	93	28.5 - 26.4	32.9 - 30.2	0.94	3600	72
30	440-480	3	286TSC	1.15	94.1	34.3 - 31.6	39.4 - 36.2	0.94	3600	72

¹⁰⁾ Permanent-magnet motor

¹¹⁾ Efficiency of motor and VFD

MTC motor data

hp	Ph	Frame	Insul. class	Voltage [V]	Motor eff. η [%]	Full-load current $I_{1/1}$ [A]	Starting current I_{start} [A]	Speed [rpm]
3/4	3	71BA	F	208-230YY/460Y	79 / 79 - 80	2.40 - 2.30 / 1.20	7.1 - 14.2 / 7.8 - 15	3430-3460
3/4	3	71BA	F	208-230YY/460Y	85 / 84.5 - 85.5	2.40 - 2.30 / 1.20	7.1 - 14.2 / 7.8 - 15	3430-3460
3/4	3	71BA	F	208-230YY/460Y	84.2 / 85.5 - 85.5	2.40 - 2.30 / 1.20	7.1 - 14.2 / 7.8 - 15	3430-3460
1	3	71BB	F	208-230YY/460Y	79 / 79 - 80	3.25 - 3.35 / 1.68	9.6 - 19.2 / 10.9 - 21.8	3430-3460
1	3	71BB	F	208-230YY/460Y	80.0 / 79.8 - 79	3.25 - 3.35 / 1.68	9.6 - 19.2 / 10.9 - 21.8	3430-3460
1 1/2	3	80BA	F	208-230YY/460Y	80.0 / 79.8 - 79	4.70 - 4.60 / 2.30	17 - 33.8 / 18.4 - 36.8	3450-3480
2	3	90CC	F	208-230YY/460Y	88.5 - 89	5.70 - 5.40 / 2.70	23.1 - 46.2 / 24.3 - 48.6	3480-3510
2	3	90GB	F	208-230YY/460Y	81 / 83 - 84	6.00 - 5.80 / 2.90	24 - 48 / 26.4 - 52.8	3500-3520
3	3	90HA	F	208-230YY/460Y	88.5 - 89	8.50 - 8.20 / 4.10	36.1 - 72.3 / 39.8 - 79.5	3500-3520
5	3	112CA	F	208-230YY/460Y	85.9 / 86.5 - 86.5	14.1 - 13.8 / 6.9	70.5 - 141 / 101.4 - 202.9	3530-3540
5	3	112CA	F	208-230YY/460Y	79 / 79 - 80	14.1 - 13.8 / 6.9	70.5 - 141 / 101.4 - 202.9	3530-3540

MTA, MTA-H motor data

Electrical data

Power supply (tolerance $\pm 10\%$)	60 Hz	3 \times 200-220 V 3 \times 208-230/460 V
Efficiency class	MTA 200, 750 W ¹²⁾	IE3
Enclosure class to IEC60034-5		IP54
Insulation class		F

¹²⁾ Motors smaller than 750 W are not covered by the IE standard.

We do not recommend operation via a variable frequency drive (VFD).

Maximum number of starts

The recommended maximum number of starts per hour is 250.

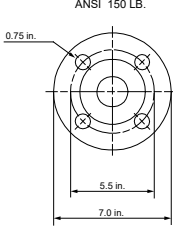
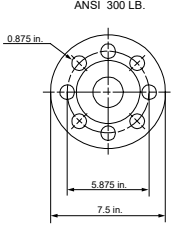
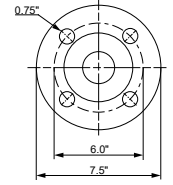
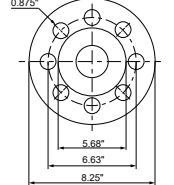
16. Accessories

Pipe connection

For pipe connection, various sets of counterflanges and couplings are available.

Counterflanges for MTR, MTRE 32, 45, 64

A set consists of one counterflange, one gasket, bolts and nuts.

Pump type	Counterflange	Description	Pressure class	Pipe connection	Product number	
MTR, MTRE 32			Threaded	ANSI 125 lb.	2.5" NPT	91136523
			Threaded	ANSI 250 lb.	2.5" NPT	91136524
MTR, MTRE 45 MTR, MTRE 64			Threaded	ANSI 125 lb.	3" NPT	91136525
			Threaded	ANSI 250 lb.	3" NPT	91136526

Potentiometer for MTRE

The potentiometer is for setpoint setting and start/stop of the MTRE pump.

Product	Product number
External potentiometer with cabinet for wall mounting	00625468

Pressure sensors

Grundfos ISP44 pressure sensor



Accessory

- Pressure sensors
- Pressure transmitter with 8.2 ft (2.5 m) unscreened cable and M12 connector
- Connection: 1/4" - 18 NPT
- M12 connector for custom wiring.

Supplier

Grundfos

Type

ISP44

Pressure range [psi (bar)]

0-87 (0-6)

0-145 (0-10)

0-232 (0-16)

0-362 (0-25)

Product number

99970220

99970234

99970236

99970238

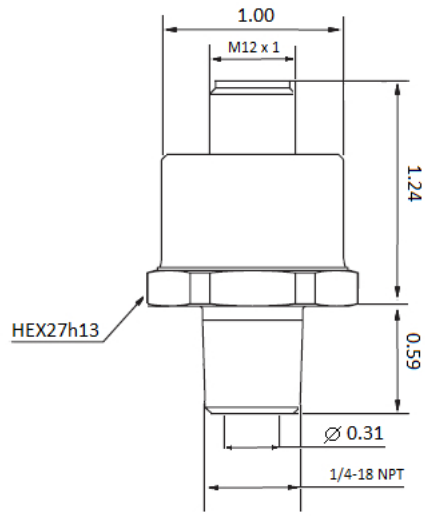
Technical data

Pressure sensor (Product number)	99970220	99970234	99970236	99970238
Pressure range [psi (bar)]	0-87 (0-6)	0-145 (0-10)	0-232 (0-16)	0-362 (0-25)
Maximum operating pressure [psi (bar)]	348 (24)	580 (40)	928 (64)	1450 (100)
Supply voltage [VDC]	8-28			
Output signal [mA]	4-20			
Accuracy, typical +/- FS [%]	0.5			
Response time, maximum [ms]	< 2			
Pumped liquid temperature range [°F (°C)]	-40 to +212 (-40 to +100)			
Ambient temperature range [°F (°C)]	-40 to +185 (-40 to +85)			
Wetted parts, material	AISI 316L			
Housing material	AISI 304L			
Enclosure rating	IP67			
Weight [lbs (kg)]	0.3 (0.14)			
EMC - Emission	EN 61000-6-3			
EMC Immunity	EN 61000-6-2			
Pressure connection	NPT 1/4-18			
CE-marked	EMC-protected in accordance with EU EMC Directive			
UL file number	E527399 (QUYX2/8)			

Maximum pumped liquid temperature

Pumped liquid temperature [°F (°C)]	230 (110)	248 (120)	266 (130)
Ambient temperature [°F (°C)]	< 149 (65)	< 113 (45)	< 77 (25)

Dimensions



TM082270

ISP44 sensor with M12 connection

Danfoss MBS3000 pressure sensor



TM051533_2911

- Pressure sensors
- Pressure transmitter with 6 ft (1.8 m) screened cable.
- Connection: 1/4" - 18 NPT

Danfoss

MBS3000

Pressure range
[psi (bar)]

0-580 (0-40)

Product number

91136173

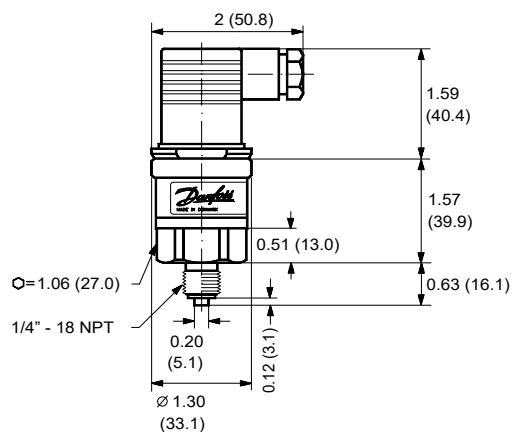
0-870 (0-60)

91136174

Technical data

Pressure sensor (Product number)	91136173	91136174
Pressure range [psi (bar)]	0-580 (0-40)	0-870 (0-60)
Maximum operating pressure [psi (bar)]	2900 (200)	2900 (200)
Supply voltage [VDC]	9-32	
Output signal [mA]	4-20	
Insulation resistance	> 100 MΩ at 100 V	
Accuracy, typical +/- FS [%]	0.5	
Response time, maximum [ms]	4	
Medium temperature range [°F (°C)]	-40 to +185 (-40 to +85)	
Ambient temperature range [°F (°C)]	-40 to +185 (-40 to +85)	
Wetted parts, material	AISI 316L	
Housing material	AISI 316L	
Enclosure rating	IP65	
Weight [lbs (kg)]	0.3 (0.14)	
EMC - Emission	EN 61000-6-3	
EMC Immunity	EN 61000-6-2	
Pressure connection	NPT 1/4-18	
CE-marked	EMC-protected in accordance with EU EMC Directive	

Dimensions



TM051532

Dimensional sketch

Communication Interface Unit (CIU)



GRA6118

Grundfos CIU

The CIU standard interface units with internal power supply are suitable for Grundfos products that do not support the internal mounting of a communication interface module (CIM).

The CIU incorporates a 24-240 VAC/VDC power supply module. The CIU can either be mounted on a DIN rail or on a wall.

We offer the following communication interface units:

CIU 900

It is for mounting an add-on CIM. The CIU 900 includes an internal power supply.

A CIM is required.

CIU 901

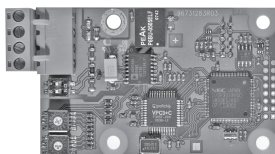
It is for mounting an add-on CIM 200, CIM 280 or CIM 500. The CIM 500 only supports Modbus TCP/IP and GiC/GRM IP when mounted in the CIU 901.

The CIU 901 includes an internal power supply and an integrated input/output board. The built-in multi-purpose input/output board enables monitoring of standard pumps, sensors, meters and switches.

A CIM is required.

Description	Fieldbus protocol	Product number
CIU 900	CIU unit only	99448387
CIU 901	CIU unit with input/output board	99448389

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 MTRE pumps of 15-30 hp and a building management system. The CIM modules are add-on communication modules which are fitted in the terminal box of MTRE pumps of 15-30 hp. Note that CIM modules must be fitted by authorized persons.

We offer the following CIM modules:

Description	Fieldbus protocol	Product number
CIM 040	TTL Adaptor Module	98415941
CIM 050	GENIbus Interface	96824631
CIM 060 ¹³⁾	Grundfos GO Remote Connection	98778356
CIM 100	LON interface for pumps	96824797
CIM 110	LON interface for boosters	96824798
CIM 200	Modbus RTU	96824796
CIM 280 ¹⁴⁾	US GiC/GRM 3G/4G	99895386
CIM 300	BACnet Interface	96893770
CIM 500	Ethernet, Modbus TCP/IP, BACnet IP, PROFINET, GiC/GRM IP, EtherNet IP	98301408
CIM 550	Ethernet GIC (DHCP only)	92546689

¹³⁾ Extended range antenna is available as an option for CIM 060. Product number: 98778357.

¹⁴⁾ Antenna is not included. See Antennas for CIM 280.

Antennas for CIM 280

Description	Product number
Antenna for GRM 3G/4G, flush mount	99606613
External mounting bracket for antenna. Optional.	99606614
Directional antenna for 3G/4G High gain. Includes mount and 25 ft cable.	98851149
Battery for CIM 280 3G/4G. For power loss to CIU. Optional.	99499908

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

CIM modules compatibility

The CIM modules can be used for the MTRE pumps with the following MLE motors.

MLE motor power [hp (kW)]	Voltage [V]
1/2 to 2 hp	1 × 200-240 V
1.5 to 7.5 hp	3 × 200-240 V
1 to 30 hp	3 × 440-480 V

Sensors for MTC

Accessory	Measuring range		Product number
	[psi]	[bar]	
Pressure sensor Connection: 1/4" NPT	0-200	0 - 13.8	91120777
	0-58	0-4	96026029
	0-87	0-6	96026030
	0-145	0-10	96026031
	0-232	0-16	96026032
	0-362	0-25	96026033

Remote controls

Grundfos GO

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

- infrared

- radio
- Bluetooth.

MLE 1/2 to 15 hp

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

MLE 20 to 30 hp

These motors will connect to the pump via Bluetooth (BLE).

MP 204 motor protector



TM031471

MP 204

The MP 204 is an electronic motor protector and data collecting unit. Apart from protecting the motor, it can also send information to a control unit via GENIbus, such as the following:

- trip
- warning

- energy consumption
- input power
- motor temperature.

MP 204 protects the motor primarily by measuring the motor current by means of a true RMS measurement.

The pump is protected secondarily by measuring the temperature with a Tempcon sensor, a Pt100/Pt1000 sensor and a PTC sensor/thermal switch.

MP 204 is designed for single- and three-phase motors.

Note that MP 204 must not be used together with variable frequency drives.

MP 204 features

- Phase-sequence monitoring
- indication of current or temperature
- input for PTC sensor/thermal switch
- indication of temperature in °F or °C
- 4-digit, 7-segment display
- setting and status reading with Grundfos GO
- setting and status reading via the Grundfos GENIbus fieldbus.

Tripping conditions

- Overload
- underload (dry running)
- temperature
- missing phase
- phase sequence
- overvoltage
- undervoltage
- power factor ($\cos \varphi$)
- current unbalance.

Warnings

- Overload
- underload
- temperature
- overvoltage
- undervoltage
- power factor ($\cos \varphi$)
- run capacitor (single-phase operation)
- starting capacitor (single-phase operation)
- loss of communication in network
- harmonic distortion.

Learning function

- Phase sequence (three-phase operation)
- run capacitor (single-phase operation)
- starting capacitor (single-phase operation)

- identification and measurement of Pt100/Pt1000 sensor circuit.

Product number

Description	Product number
MP 204 motor protection	96079927

17. Variants

Immersion depths, MTR, MTRE

To meet specific depths of tanks and containers, the immersion depth of the pump can be varied using empty chambers. The number of impellers depends on the requested head, and can be found on the technical data pages for each product type.

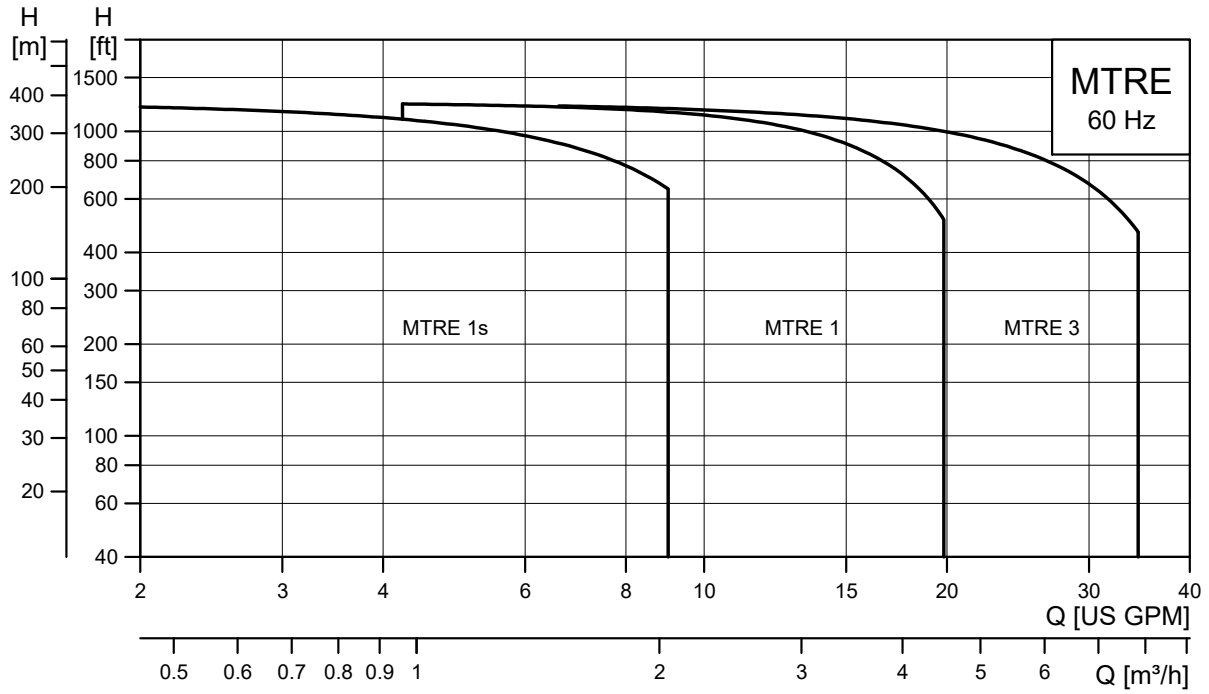
Number of chambers	Immersion depth [in. (mm)]												
	MTR, MTRE 1s	MTR, MTRE 1	MTR 2	MTR, MTRE 3	MTR 4	MTR, MTRE 5	MTR, MTRE 8	MTR, MTRE 10	MTR, MTRE 15	MTR, MTRE 20	MTR, MTRE 32	MTR, MTRE 45	MTR, MTRE 64
1	-	-	-	-	-	-	7.71 (196)	-	-	-	-	-	-
2	6.30 (160)	6.30 (160)	6.3 (160)	6.30 (160)	6.65 (169)	6.66 (169)	8.78 (223)	5.83 (148)	7.01 (178)	7.01 (178)	8.78 (223)	9.61 (244)	9.81 (249)
3	7.01 (178)	7.01 (178)	7.01 (178)	7.01 (178)	7.71 (196)	7.72 (196)	9.84 (250)	7.01 (178)	8.78 (223)	8.78 (223)	11.54 (293)	12.76 (324)	13.08 (332)
4	7.72 (196)	7.72 (196)	7.72 (196)	7.72 (196)	8.78 (223)	8.78 (223)	10.90 (277)	8.19 (208)	10.56 (268)	10.56 (268)	14.30 (363)	15.91 (404)	16.30 (414)
5	8.43 (214)	8.43 (214)	8.43 (214)	8.43 (214)	9.85 (250)	9.85 (250)	11.97 (304)	9.38 (238)	12.33 (313)	12.33 (313)	17.05 (433)	19.06 (484)	19.57 (497)
6	9.14 (232)	9.14 (232)	9.14 (232)	9.14 (232)	10.91 (277)	10.91 (277)	13.03 (331)	10.56 (268)	14.10 (358)	14.10 (358)	19.81 (503)	22.21 (564)	22.80 (579)
7	9.85 (250)	9.85 (250)	9.85 (250)	9.85 (250)	11.97 (304)	11.97 (304)	14.09 (358)	11.74 (298)	15.87 (403)	15.87 (403)	22.56 (573)	25.36 (644)	26.07 (662)
8	10.56 (268)	10.56 (268)	-	10.56 (268)	13.04 (331)	13.04 (331)	15.16 (385)	12.92 (328)	17.64 (448)	17.64 (448)	25.32 (643)	28.51 (724)	29.30 (744)
9	11.26 (286)	11.26 (286)	11.26 (286)	11.26 (286)	-	14.10 (358)	16.22 (412)	14.10 (358)	19.41 (493)	19.41 (493)	28.08 (713)	31.66 (804)	32.56 (827)
10	11.97 (304)	11.97 (304)	-	11.97 (304)	15.16 (385)	15.16 (385)	17.28 (439)	15.28 (388)	21.19 (538)	21.19 (538)	30.83 (783)	34.81 (884)	35.79 (909)
11	12.68 (322)	12.68 (322)	12.68 (322)	12.68 (322)	-	16.23 (412)	18.35 (466)	-	22.96 (583)	22.96 (583)	33.59 (853)	37.96 (964)	39.06 (992)
12	13.39 (340)	13.39 (340)	-	13.39 (340)	17.29 (439)	17.29 (439)	19.41 (493)	17.64 (448)	24.73 (628)	24.73 (628)	36.34 (923)	41.11 (1044)	42.29 (1074)
13	14.10 (358)	14.10 (358)	14.10 (358)	14.10 (358)	-	18.35 (466)	20.47 (520)	-	26.50 (673)	26.50 (673)	39.10 (993)	44.26 (1124)	45.56 (1157)
14	14.81 (376)	14.81 (376)	-	14.81 (376)	19.41 (493)	19.41 (493)	21.54 (547)	20.01 (508)	28.27 (718)	28.27 (718)	41.86 (1063)	47.41 (1204)	48.78 (1239)
15	15.52 (394)	15.52 (394)	15.52 (394)	15.52 (394)	-	20.48 (520)	22.60 (574)	-	30.04 (763)	30.04 (763)	44.61 (1133)	50.56 (1284)	52.05 (1322)
16	16.23 (412)	16.23 (412)	-	16.23 (412)	21.54 (547)	21.54 (547)	23.66 (601)	22.37 (568)	31.82 (808)	31.82 (808)	47.37 (1203)	53.71 (1364)	55.28 (1404)
17	16.93 (430)	16.93 (430)	-	16.93 (430)	-	22.6 (574)	24.72 (628)	-	33.59 (853)	33.59 (853)	50.12 (1273)	56.86 (1444)	58.55 (1487)
18	17.64 (448)	17.64 (448)	17.64 (448)	17.64 (448)	-	23.67 (601)	25.79 (655)	24.73 (628)	35.36 (898)	35.36 (898)	52.88 (1343)	-	-
19	18.35 (466)	18.35 (466)	-	18.35 (466)	24.73 (628)	24.73 (628)	26.85 (682)	-	37.13 (943)	37.13 (943)	-	-	-
20	19.06 (484)	19.06 (484)	-	19.06 (484)	-	25.79 (655)	27.91 (709)	27.09 (688)	38.90 (988)	38.90 (988)	-	-	-
21	19.77 (502)	19.77 (502)	-	19.77 (502)	-	26.86 (682)	28.98 (736)	-	40.67 (1033)	40.67 (1033)	-	-	-

Number of chambers	Immersion depth [in. (mm)]												
	MTR, MTRE 1s	MTR, MTRE 1	MTR 2	MTR, MTRE 3	MTR 4	MTR, MTRE 5	MTR, MTRE 8	MTR, MTRE 10	MTR, MTRE 15	MTR, MTRE 20	MTR, MTRE 32	MTR, MTRE 45	MTR, MTRE 64
22	20.48 (520)	20.48 (520)	20.48 (520)	20.48 (520)	27.92 (709)	27.92 (709)	30.04 (763)	29.45 (748)	-	-	-	-	-
23	21.19 (538)	21.19 (538)	-	21.19 (538)	-	28.98 (736)	31.10 (790)	30.63 (778)	-	-	-	-	-
24	21.89 (556)	21.89 (556)	-	21.89 (556)	-	30.04 (763)	32.17 (817)	31.82 (808)	-	-	-	-	-
25	22.60 (574)	22.60 (574)	-	22.60 (574)	-	31.11 (790)	33.23 (844)	33.00 (838)	-	-	-	-	-
26	23.31 (592)	23.31 (592)	23.31 (592)	23.31 (592)	-	32.17 (817)	34.29 (871)	34.18 (868)	-	-	-	-	-
27	24.02 (610)	24.02 (610)	-	24.02 (610)	-	33.23 (844)	35.35 (898)	35.36 (898)	-	-	-	-	-
28	24.73 (628)	24.73 (628)	-	24.73 (628)	-	34.30 (871)	36.41 (925)	36.54 (928)	-	-	-	-	-
29	25.44 (646)	25.44 (646)	-	25.44 (646)	-	35.36 (898)	37.48 (952)	37.72 (958)	-	-	-	-	-
30	26.15 (664)	26.15 (664)	-	26.15 (664)	-	36.42 (925)	38.54 (979)	38.90 (988)	-	-	-	-	-
31	26.86 (682)	26.86 (682)	-	26.86 (682)	-	37.49 (952)	39.61 (1006)	40.08 (1018)	-	-	-	-	-
32	27.56 (700)	27.56 (700)	-	27.56 (700)	-	38.55 (979)	-	-	-	-	-	-	-
33	28.27 (718)	28.27 (718)	-	28.27 (718)	39.57 (1005)	39.61 (1006)	-	-	-	-	-	-	-
34	28.98 (736)	28.98 (736)	-	28.98 (736)	-	-	-	-	-	-	-	-	-
35	29.69 (754)	29.69 (754)	-	29.69 (754)	-	-	-	-	-	-	-	-	-
36	30.40 (772)	30.40 (772)	-	30.40 (772)	-	-	-	-	-	-	-	-	-
37	31.11 (790)	31.11 (790)	-	31.11 (790)	-	-	-	-	-	-	-	-	-
38	31.82 (808)	31.82 (808)	-	31.82 (808)	-	-	-	-	-	-	-	-	-
39	32.52 (826)	32.52 (826)	-	32.52 (826)	-	-	-	-	-	-	-	-	-
40	33.23 (844)	33.23 (844)	-	33.23 (844)	-	-	-	-	-	-	-	-	-
41	33.94 (862)	33.94 (862)	-	33.94 (862)	-	-	-	-	-	-	-	-	-
42	34.65 (880)	34.65 (880)	-	34.65 (880)	-	-	-	-	-	-	-	-	-
43	35.36 (898)	35.36 (898)	-	35.36 (898)	-	-	-	-	-	-	-	-	-
44	36.07 (916)	36.07 (916)	-	36.07 (916)	-	-	-	-	-	-	-	-	-
45	36.78 (934)	36.78 (934)	-	36.78 (934)	-	-	-	-	-	-	-	-	-
46	37.49 (952)	37.49 (952)	-	37.49 (952)	-	-	-	-	-	-	-	-	-

Number of chambers	Immersion depth [in. (mm)]												
	MTR, MTRE 1s	MTR, MTRE 1	MTR 2	MTR, MTRE 3	MTR 4	MTR, MTRE 5	MTR, MTRE 8	MTR, MTRE 10	MTR, MTRE 15	MTR, MTRE 20	MTR, MTRE 32	MTR, MTRE 45	MTR, MTRE 64
47	38.19 (970)	38.19 (970)	-	38.19 (970)		-	-	-	-	-	-	-	-
48	38.90 (988)	38.90 (988)	-	38.90 (988)		-	-	-	-	-	-	-	-
49	39.61 (1006)	39.61 (1006)	-	39.61 (1006)		-	-	-	-	-	-	-	-

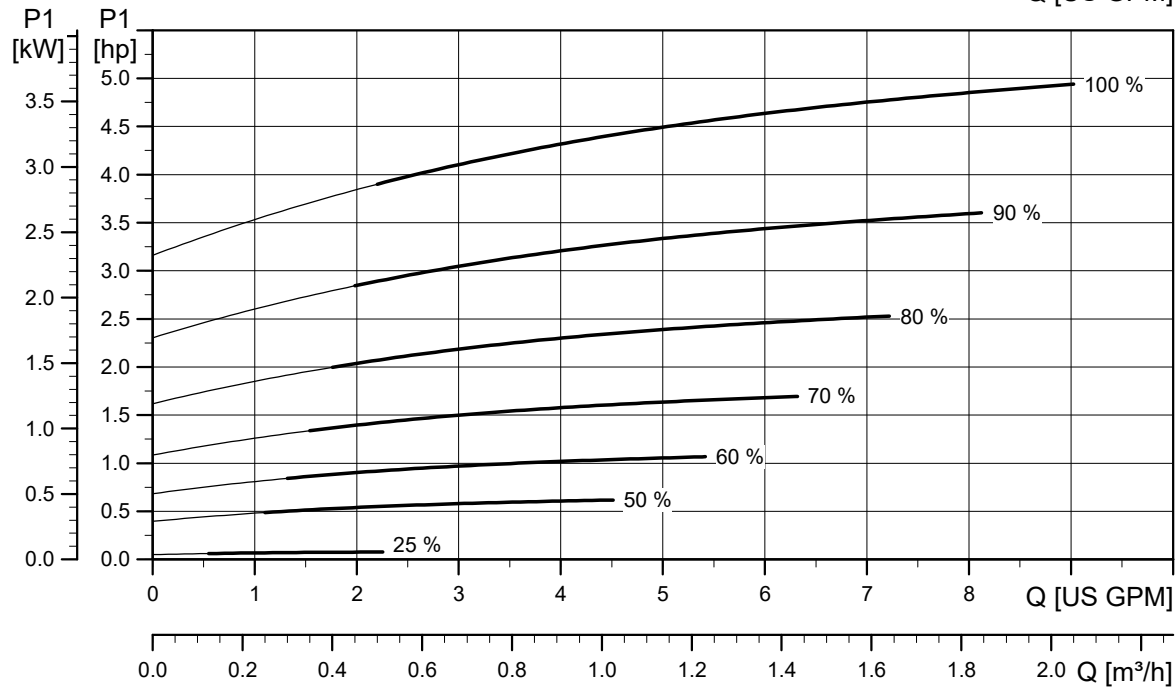
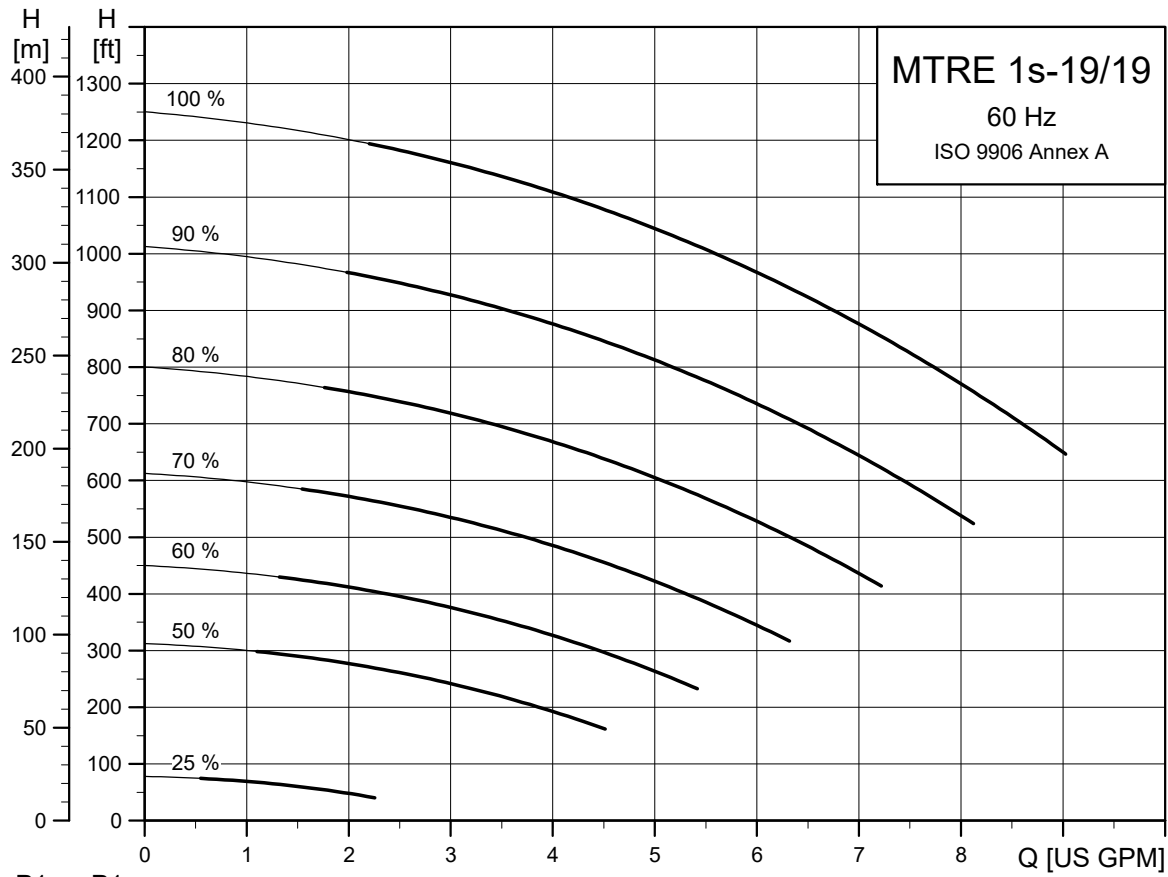
E-variants

For high-pressure applications, Grundfos offers a unique MTR pump capable of generating up to 550 psi (38 bar). These pumps are equipped with a high-speed motor, type MLE.



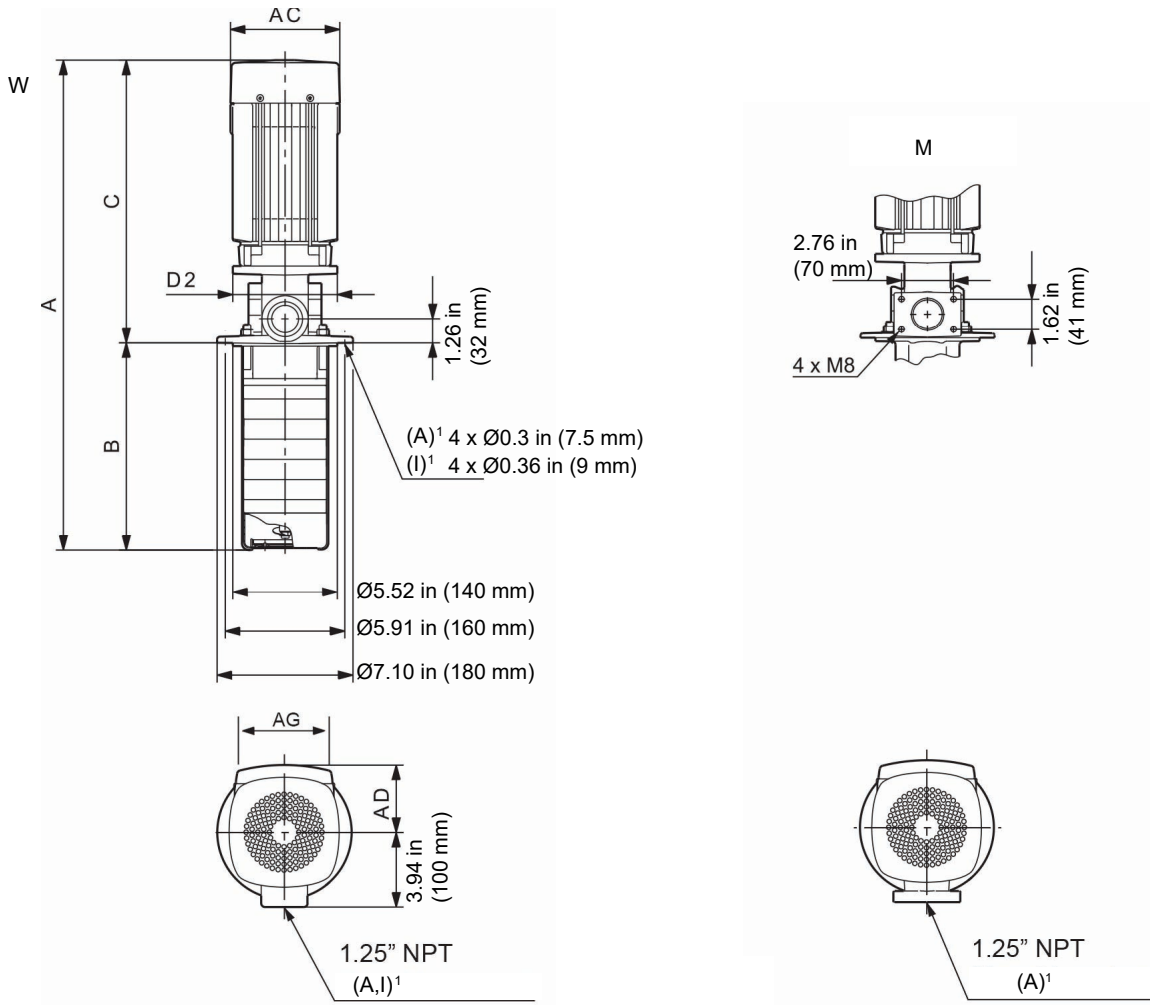
TM054989

MTRE 1s high-pressure pump



TM054987

Dimensional sketches



TM069797

W: Internal thread connection.

1) A: Basic version, cast iron. I: Stainless steel version.

Dimensions and weight

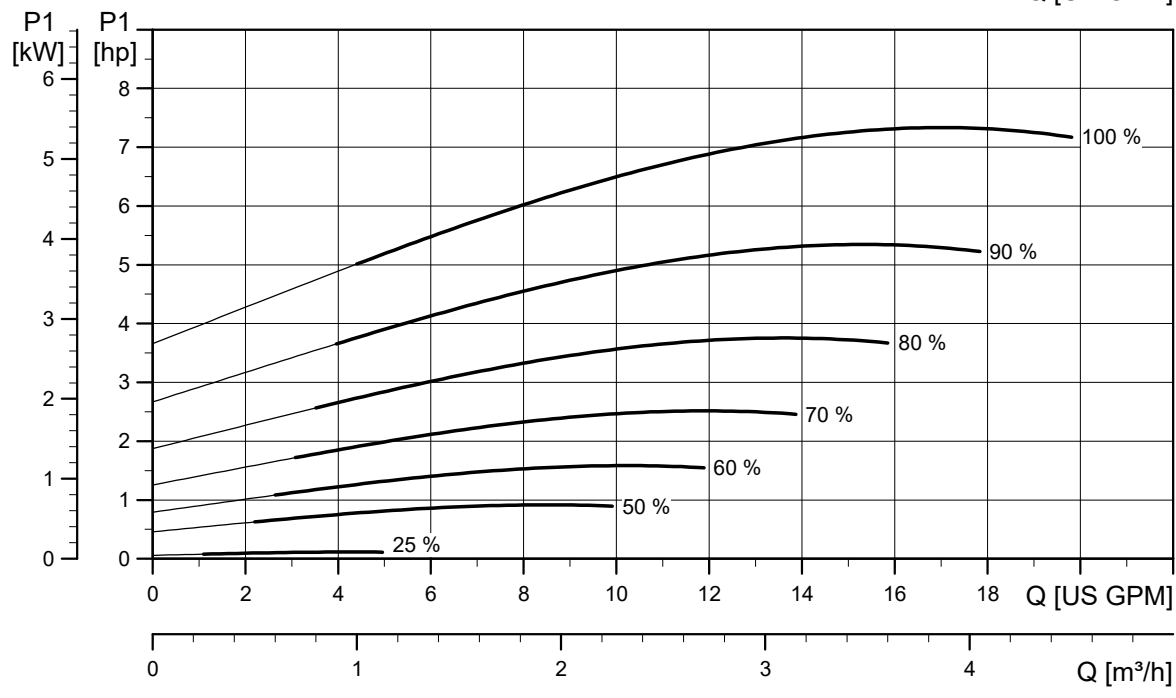
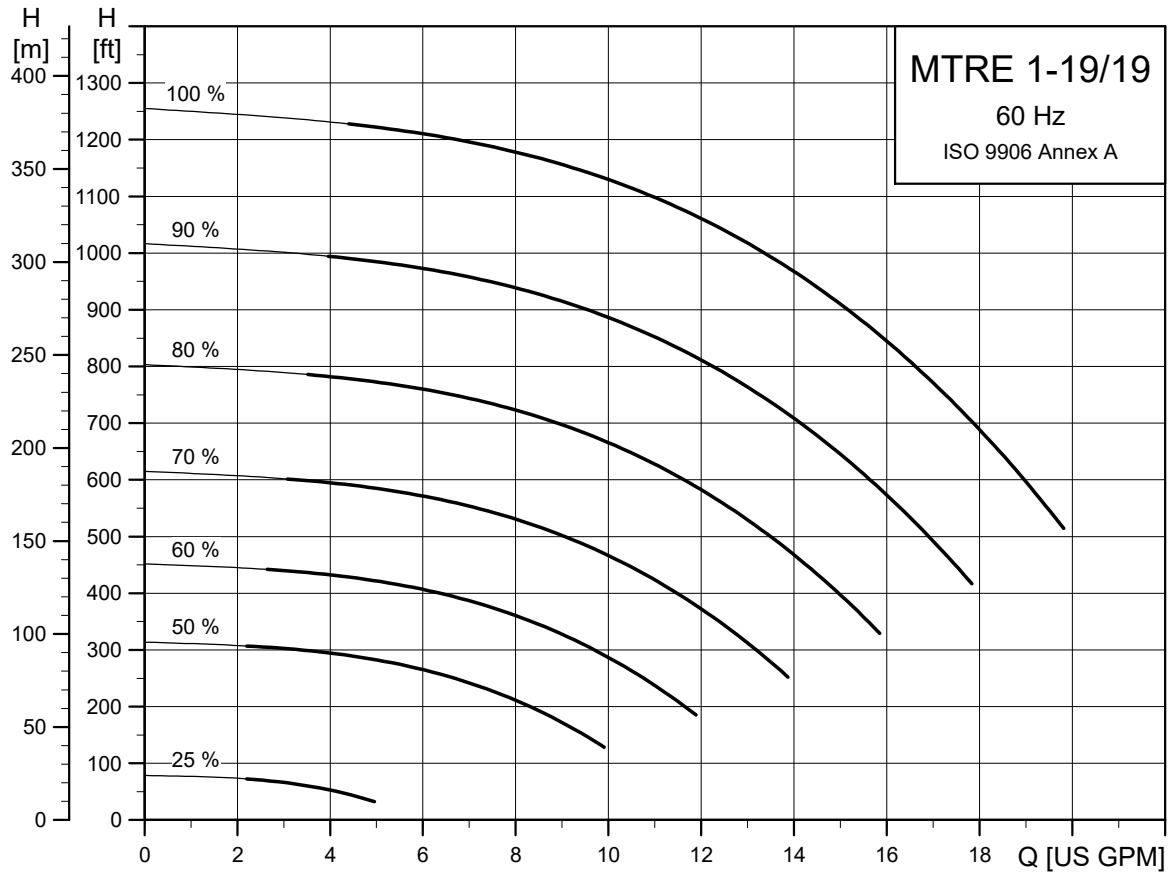
Pump type	Dimensions [in. (mm)]							Weight [lb]
	A	B	C	AC	D2	AD	AG	
MTRE 1s-19/19 HS	38.61 (981)	18.35 (466)	20.26 (515)	7.53 (191)	6.30 (160)	7.91 (201)	11.46 (291)	116

Electrical data

Voltage	P ₂ [hp]	Type	Full-load current	Starting current	Power factor cos $\phi_{1/1}$	Motor efficiency		Maximum motor speed [min ⁻¹]
			I _{1/1} [A]	I _{start} [A]		η [%]	Class	
3 x 440-480 V 60 Hz	5.0	MLE 112C	6.2 - 5.8	-	0.9 - 0.88	91.2	-	5374

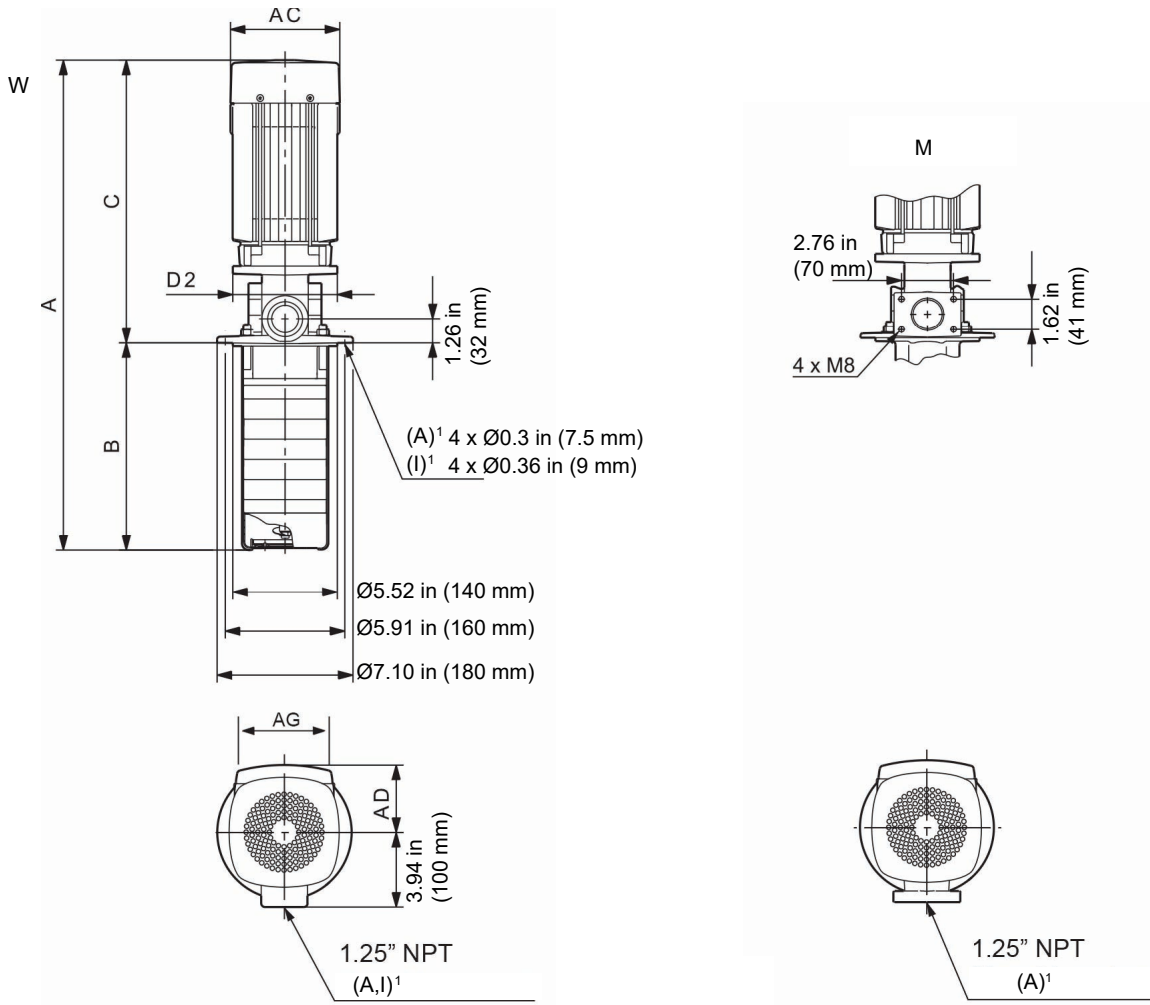
The maximum immersion depth is 39.5 in. (1006 mm). For further details about the available immersion depths for MTR, MTRE pumps, contact Grundfos.

MTRE 1 high-pressure pump



TM054990

Dimensional sketches



TM069797

W: Internal thread connection.

1) A: Basic version, cast iron. I: Stainless steel version.

Dimensions and weight

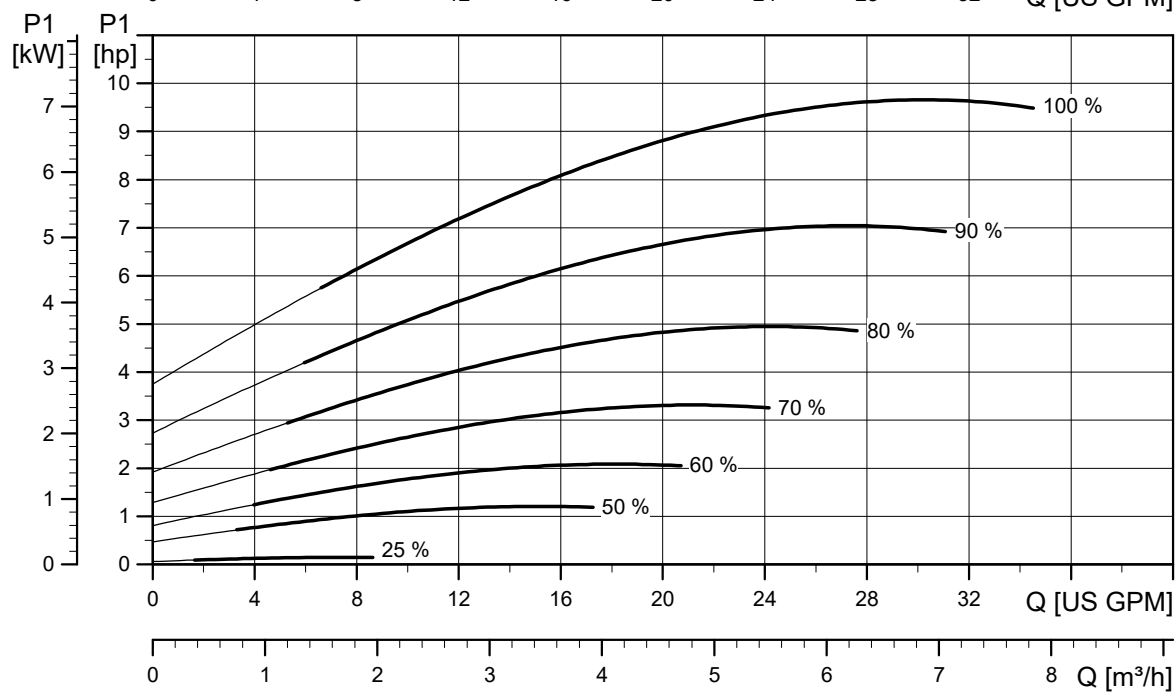
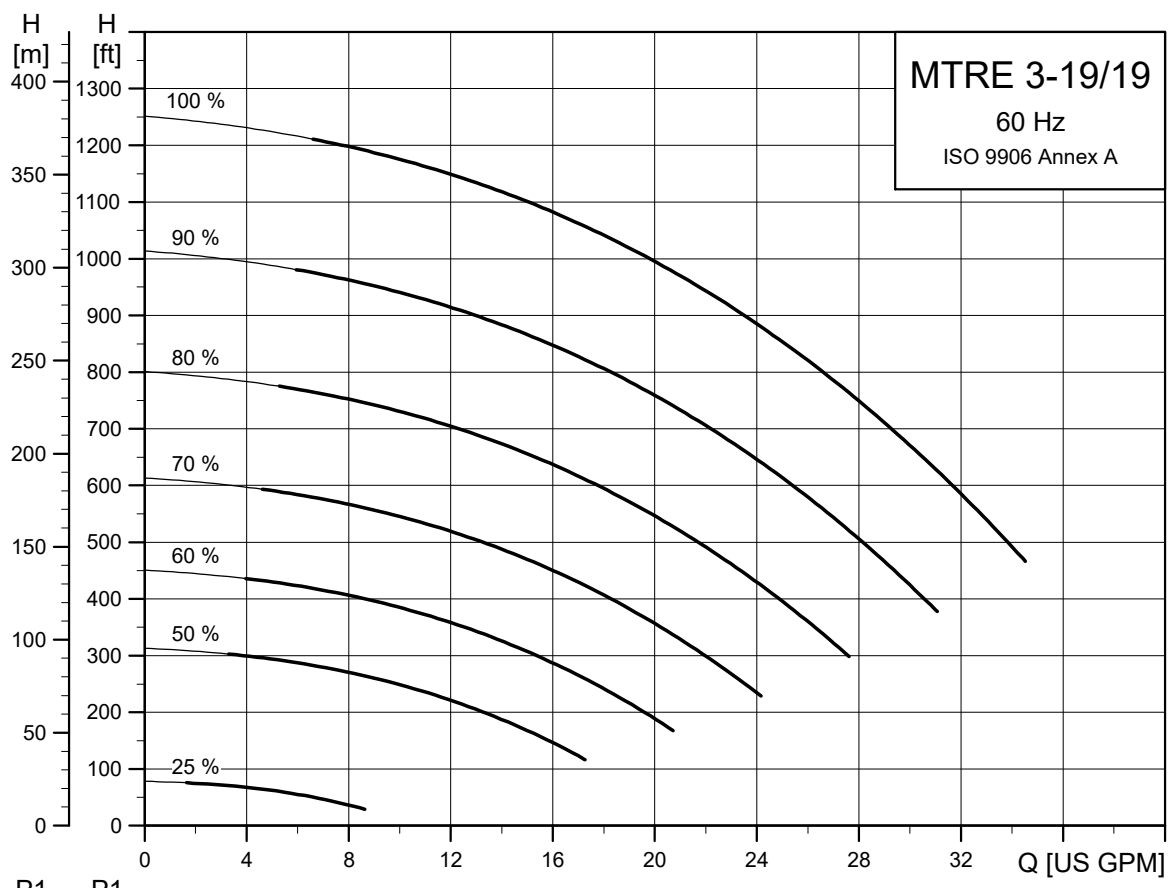
Pump type	Dimensions [in. (mm)]							Weight [lb]
	A	B	C	AC	D2	AD	AG	
MTRE 1-19/19 HS	39.90 (1013)	18.35 (466)	21.55 (547)	7.53 (191)	11.9 (300)	7.91 (201)	11.46 (291)	152

Electrical data

Voltage	P ₂ [hp]	Type	Full-load current I _{1/1} [A]	Starting current I _{start} [A]	Power factor cos $\phi_{1/1}$	Motor efficiency		Maximum motor speed [min ⁻¹]
						η [%]	Class	
3 x 440-480 V 60 Hz	7.5	MLE 132E	9.4 - 8.6	-	0.91 - 0.89	90.2	-	5282

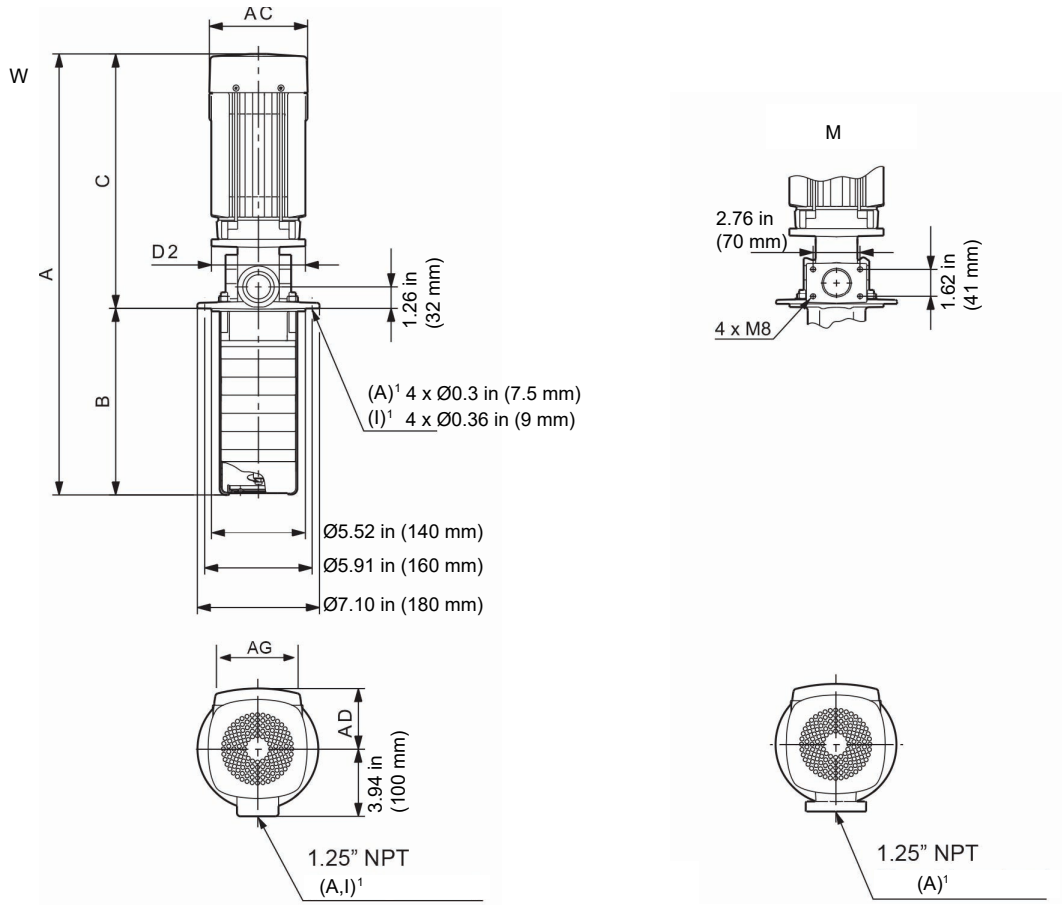
The maximum immersion depth is 39.6 in. (1006 mm). For further details about the available immersion depths for MTR, MTRE pumps, contact Grundfos.

MTRE 3 high-pressure pump



TM054988

Dimensional sketches



W: Internal thread connection.

1) A: Basic version, cast iron. I: Stainless steel version.

Dimensions and weight

Pump type	Dimensions [in. (mm)]							Weight [lb]
	A	B	C	AC	D2	AD	AG	
MTRE 3-19/19 HS	40.66 (1033)	18.35 (466)	22.31 (567)	10.04 (255)	11.9 (300)	9.33 (237)	13.62 (346)	168

Electrical data

Voltage	P ₂ [hp]	Type	Motor					Maximum motor speed [min ⁻¹]
			FFull-load current I _{1/1} [A]	Starting current I _{start} [A]	Power factor cos φ _{1/1}	Motor efficiency		
						η [%]	Class	
3 x 440-480 V 60 Hz	10	MLE 132F	12.5 - 11.6	-	0.91 - 0.90	90.7	-	5060

The maximum immersion depth is 39.5 in. (1006 mm). For further details about the available immersion depths for MTR, MTRE pumps, contact Grundfos.

18. Grundfos Product Center

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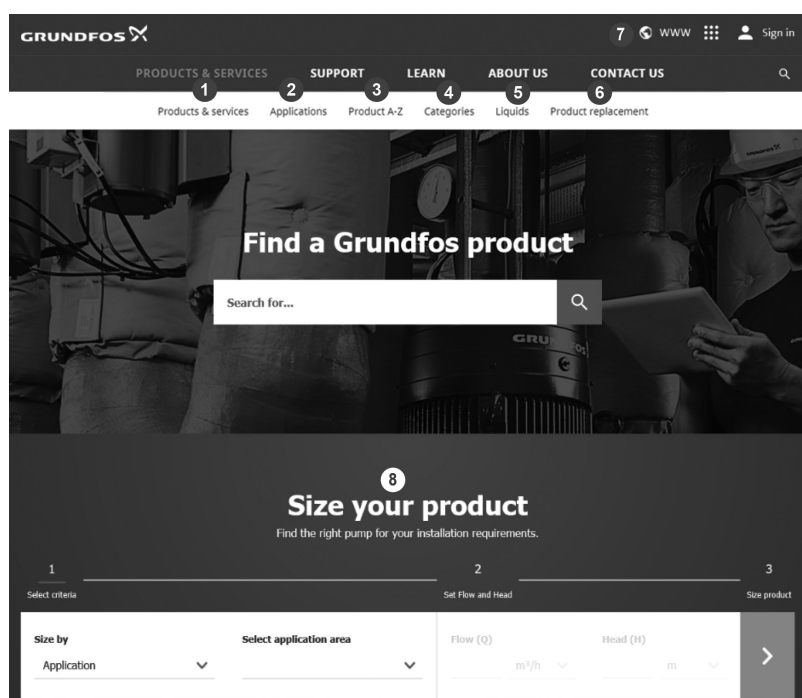
International view: <https://product-selection.grundfos.com>

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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.



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Example: <https://product-selection.grundfos.com/us>

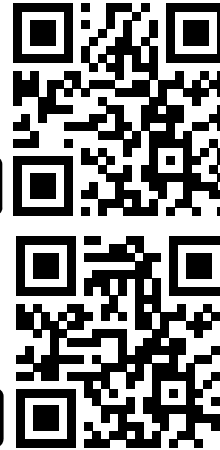
Pos.	Description
1	Products & services enables you to find products and documents by typing a product number or name into the search field.
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3	Products A-Z enables you to look through a list of all the Grundfos products.
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5	Liquids enables you to find pumps designed for aggressive, flammable or other special liquids.
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8	Sizing enables you to size a product based on your application and operating conditions.

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19. Document quality feedback



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