GRUNDFOS **DATA BOOKLET**

TPE3 (D), TPE2 (D), TPE Series 2000/1000, TP and TPD

In-line circulator pumps

50 Hz

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1. Pump data

Introduction

TPE, TP pumps are designed for applications such as:

- district heating systems
- heating systems
- air-conditioning systems
- district cooling systems
- water supply
- industrial processes
- industrial cooling.

The pumps are available with either electronically speed-controlled motors (TPE, TPE2, TPE2 D, TPE3, TPE3 D) or mains-operated motors (TP and TPD).

The pumps are all single-stage, in-line centrifugal pumps with mechanical shaft seal. The pumps are of the close-coupled type, that is the pump and the motor are separate units.

TPE3 (D), TPE2 (D) and TPE Series 1000/2000 speed-controlled pumps

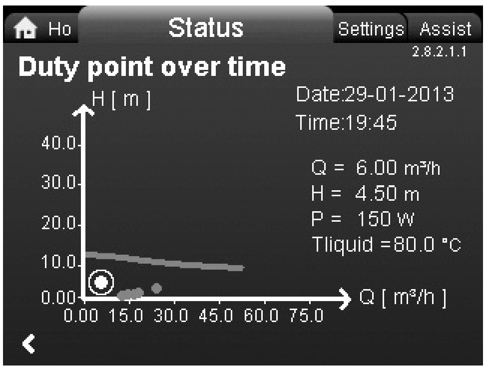
We offer the following speed-controlled pumps which are based on the construction and choice of material of the TP pumps:

- TPE3 pumps with built-in differential-pressure sensor and temperature sensor.
- TPE2 pumps without built-in differential-pressure sensor and temperature sensor.
- TPE Series 2000 pumps with factory-fitted differential-pressure sensor.
- TPE Series 1000 pumps without factory-fitted differential-pressure sensor.

All pumps up to 22 kW are fitted with Grundfos permanent-magnet MGE motors with motor efficiency class IE5 according to IEC 60034-30-2.

All pumps from 30 kW to 90 kW are delivered with motors with motor efficiency class IE3, IE4 or IE5 according to IEC 600034-30-2.

TPE3 pumps



TM060883

Example of status display for TPE3 pumps

The pumps have a built-in differential-pressure sensor and temperature sensor.

The pumps are factory-set to AUTOADAPT control.

The permanent-magnet motors of the pumps have a built-in frequency converter for continuous adjustment of the pressure to the flow rate. The hydraulic components have been specially designed for optimum efficiency.

The range is recognised as a preset solution for quick and safe installation. The pumps have a colour display for easy and intuitive pump setup and with full access to all functions. The pumps incorporate the following advanced functions:

- AUTOADAPT
- FLOWADAPT
- automatic night setback
- FLOWLIMIT
- heat energy monitor
- flow rate estimation
- proportional pressure
- constant pressure
- constant differential temperature control
- constant temperature control.

For further information, see section TPE3.

TPE2 pumps

The permanent-magnet motors have a built-in frequency converter and the hydraulic components have been specially designed for optimum efficiency.

Via an external signal from a sensor or a controller, the pumps allow for any configuration and control method required, that is constant pressure, temperature, flow or level. For further information, see section TPE2.

TPE Series 2000 pumps

The pumps have a factory-fitted differential-pressure sensor.

The pumps are factory-set to proportional-pressure control.

The motors have a built-in frequency converter for continuous adjustment of the pressure to the flow rate.

The range is recognised as a preset solution for quick and safe installation.

For further information, see section TPE Series 2000 pumps.

TPE Series 1000 pumps

The motors have a built-in frequency converter.

Via an external signal from a sensor or a controller, the pumps allow for any configuration and control method required, that is constant pressure, temperature or flow.

For further information, see section TPE Series 1000 pumps.

Why select a TPE pump

A pump with electronic speed control offers these benefits:

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

- communication with the pump.

TP, mains-operated pumps

The TP range is divided into three groups based on their construction: TP Series 100, 200 and 300.

TP Series 100 with union or flange connection

Rp 1 (DN 25) to Rp 1 1/4 (DN 32) and motor sizes from 0.12 to 0.25 kW.

For further information, see section TP Series 100 and 200 pumps.

TP Series 200 with flange connection

DN 32 to DN 100 and motor sizes from 0.12 to 2.2 kW.

For further information, see section TP Series 100 and 200 pumps.

TP Series 300 with flange connection

We offer two versions:

- 16-bar version with DN 32 to DN 350 flanges and motor sizes from 0.25 to 315 kW
- 25-bar version with DN 100 to DN 400 flanges and motor sizes from 5.5 to 630 kW.

For further information, see section TP Series 300 pumps.

ATEX-approved TP pumps

On request, Grundfos offers TP and TPD pumps with ATEX-approval.

See section Key application data.

High-efficiency motors, IE4

TP pumps are fitted with high-efficiency motors.

The pumps are primarily fitted with motors that meet the legislative requirements of the EuP grade.

For further information, see section Motors.

Energy-optimised pumps

TP pumps are energy-optimised and comply with the EuP Directive (Commission Regulation (EC) No 547/2012) in which most pumps are classified or graduated in an energy efficiency index, MEI. See also section Minimum efficiency index.

Related information

6. TPE3
7. TPE2
8. TPE Series 2000 pumps
9. TPE Series 1000 pumps
Motors
27. Minimum efficiency index
30. Key application data

Identification

Type key for TPE2, TPE3

Example: TPE3 D 65-120 S-A-F-A-BQQE-FAB

Code	Type	Explanation
TPE3		Pump range, electronically speed-controlled pump
	TPE2	Without built-in sensor
	TPE3	Built-in differential-pressure and temperature sensor
D		Twin-head pump
65		Nominal diameter of inlet and outlet ports, DN
-120		Maximum head [dm]
S	S	Built-in differential-pressure and temperature sensor
	N	Without built-in sensor
-A		**Code for pump version:**
	A	Basic version
	I	PN 6 flange
	X	Special version
-F		**Code for pipe connection:**
	F	DIN flange
-A		**Code for materials:**
	A	Basic version (Cast-iron pump housing with Cast-iron/ stainless steel 1.1301/Composite PES/PP 30 % GF impeller/Composite PES/PP 40 % GF impeller)
	B	Cast iron pump housing with bronze impeller
	I	Stainless steel 1.4308 pump housing and motor stool
	O	Ductile cast-iron pump housing with cast-iron impeller
	S	Cast-iron pump housing with stainless steel 1.4408 impeller
	Y	Ductile cast-iron pump housing with bronze impeller
-BQQE		Code for shaft seal including other plastic and rubber pump parts, except the neck ring. See section Codes for shaft seal.
-F		Code for rated motor power [kW]. See section Codes for rated motor power.
A		Code for phase and voltage [V] or other information. See section Codes for phase and voltage or other information.
B		Code for speed variant [rpm]. See section Codes for speed variant.

Note:TPE2 and TPE3 are not available with ATEX.

Type key for TP, TPD, TPE

Example: TPE 125-400/4 SC-A-F-A-BQQE-RW3

Code	Type	Explanation
TP		Pump range
E		Electronically speed-controlled pump, Series 1000, 2000
D		Twin-head pump
65		Nominal diameter of inlet and outlet ports, DN
-120		Maximum head [dm]
/2		Pole number
S		**Code for pump with sensor version:**
	NC	TPE Series 1000 with Innomotics/Nidec motor with integrated CUE
	SC	TPE Series 2000 with built-in differential-pressure sensor and Innomotics/Nidec motor with integrated CUE
-A		**Code for pump version.**
	A	Basic version
	A3	PN 25 flange
	B	Oversize motor
	I	PN 6 flange
	X	Special version
	AB	PN 12 flange • No ATEX approval, without certificate or test report
	AE/BE	PN 10 or 16 flange • No ATEX approval, with certificate or test report • ATEX approval, with/without certificate or test report
	AI/BI	PN 6 flange • No ATEX approval, without certificate or test report
	AEI/BEI	PN 6 flange • No ATEX approval, with certificate or test report • ATEX approval, with/without certificate or test report
-F		**Code for pipe connection:**
	F	DIN flange
	O	Union
-A		**Code for materials:**
	A	Basic version
	I	Stainless steel 1.4308 pump housing and motor stool
	Z	Bronze pump housing and motor stool
	B	Bronze impeller
	S	Stainless steel 1.4408 impeller
	O	Ductile cast-iron pump housing with cast-iron impeller
	Y	Ductile cast-iron pump housing with bronze impeller
	Q	Ductile cast-iron pump housing with stainless steel 1.4408 impeller
-BQQE		Code for shaft seal including other plastic and rubber pump parts, except the neck ring. See section Codes for shaft seal.
-G		Code for rated motor power [kW]. See section Codes for rated motor power.
D		Code for phase and voltage [V] or other information. See section Codes for phase and voltage or other information.
B		Code for speed variant [rpm]. See section Codes for speed variant.

Related information

Codes for shaft seal
Codes for rated motor power
Codes for phase and voltage or other information
Codes for speed variant

Codes for shaft seal

Example: BQQE

Code	Type	Explanation
B		Grundfos type designation
	A	O-ring seal with fixed seal driver
	B	Rubber bellows seal
	D	O-ring seal, balanced
	G	Bellows seal with reduced seal faces
	R	O-ring seal with reduced seal faces
Q		Material of rotating face
	A	Carbon, antimony-impregnated
	B	Carbon, resin-impregnated
	Q	Silicon carbide
Q		Material of stationary seat
	B	Carbon, resin-impregnated
	Q	Silicon carbide
	U	Tungsten carbide
E		Material of secondary seal
	E	EPDM
	P	NBR rubber
	V	FKM
	F	FXM

Codes for rated motor power

Code	Description	
	[hp]	[kW]
A	0.16	0.12
B	0.25	0.18
C	0.33	0.25
D	0.5	0.37
E	0.75	0.55
F	1	0.75
G	1.5	1.1
H	2	1.5
I	3	2.2
J	4	3
K	5 (5.5 1))	3.7 (4 1))
L	7.5	5.5
M	10	7.5
N	15	11
O	20	15
P	25	18.5
Q	30	22
R	40	30
S	50	37
T	60	45
U	75	55
V	100	75
W	125	90
X	Bare shaft pump	
Y	> 200 2)	> 150 2)
1	150	110
2	175	132
3	200	150
4	215 3)	160 3)
5	250 3)	185 3)

1) Value in bracket is for the standard IEC motor size. Value outside bracket is for the motor size according to NEMA standards.

2) Used for pumps where the pump shaft input power exceeds 200 hp (150 kW) and is not regulated under the DOE pump rule.

3) Special cases with power sizes above 200 hp (150 kW) which are still regulated under the DOE pump rule. For example: Pump has a P2 value of 198 hp (147.6 kW) in its duty point (in DOE scope) but customer wants the 215 hp (160 kW) motor instead of the 200 hp (150 kW). The pump is in scope of the DOE regulation and requires a PEI value and a motor code.

Codes for phase and voltage or other information

Code	Description
A	E-motor (ECM[4]), 1 x 200-240 V
B	E-motor (ECM[4]), 3 x 200-240 V
C	E-motor (ECM[4]), 3 x 440-480 V
D	E-motor (ECM[4]), 3 x 380-500 V
V	Intended for use with external VFD only, asynchronous motor
W	Not for sale in North America
X	No motor or US DOE regulated motor (CC marked motor)
Y	Out of DOE scope
Z	E-motor, asynchronous motor

4) ECM: Electronically Commutated Motor.

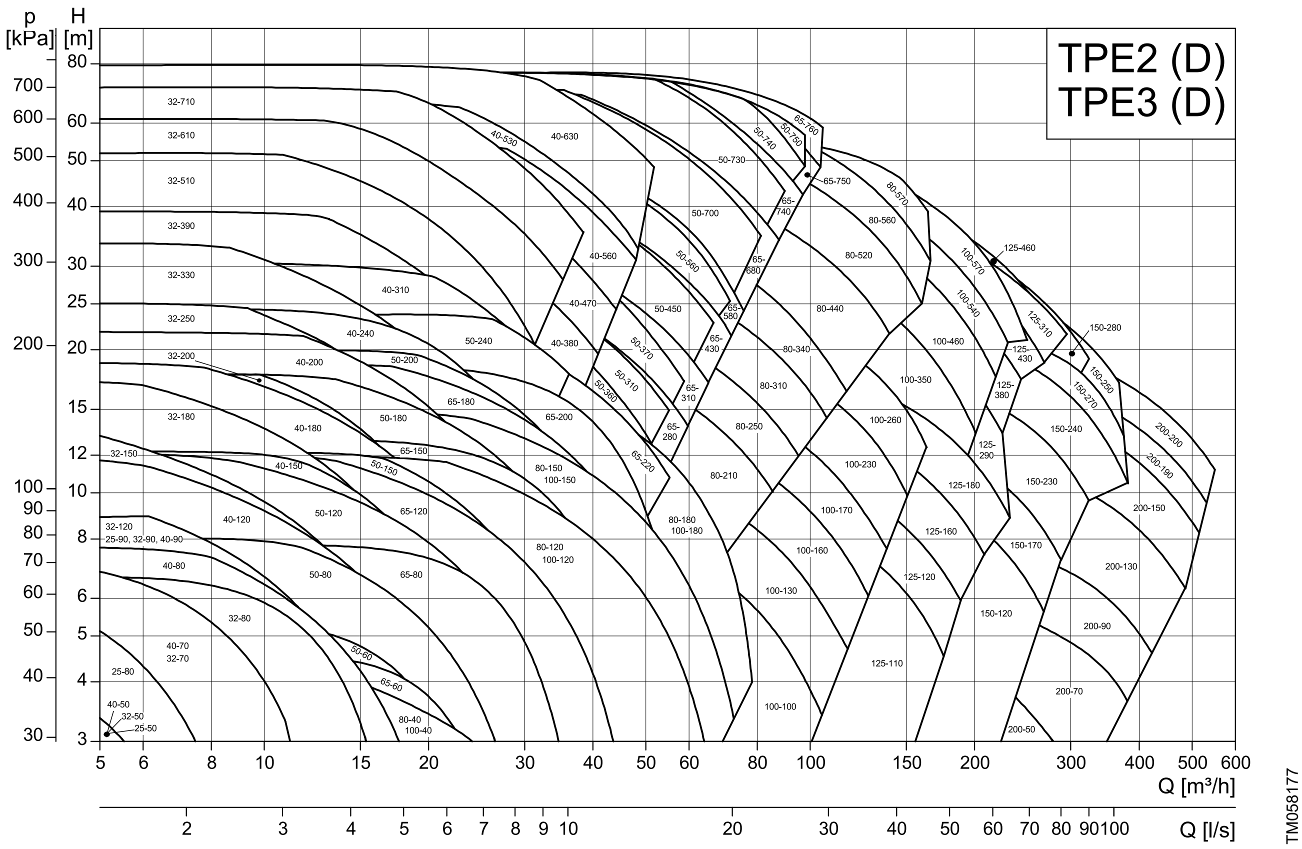
Codes for speed variant

Code	Description
A	1450-2200 RPM, E-motor (ECM[5])
B	2900-4000 RPM, E-motor (ECM[5])
C	4000-5900 RPM, E-motor (ECM[5])
1	2-pole, 50 Hz (Asynchronous motor)
2	2-pole, 60 Hz (Asynchronous motor)
3	4-pole, 50 Hz (Asynchronous motor)
4	4-pole, 60 Hz (Asynchronous motor)
5	6-pole, 50 Hz (Asynchronous motor)
6	6-pole, 60 Hz (Asynchronous motor)
7	8-pole, 50 Hz (Asynchronous motor)
8	8-pole, 60 Hz (Asynchronous motor)

5) ECM: Electronically Commutated Motor.

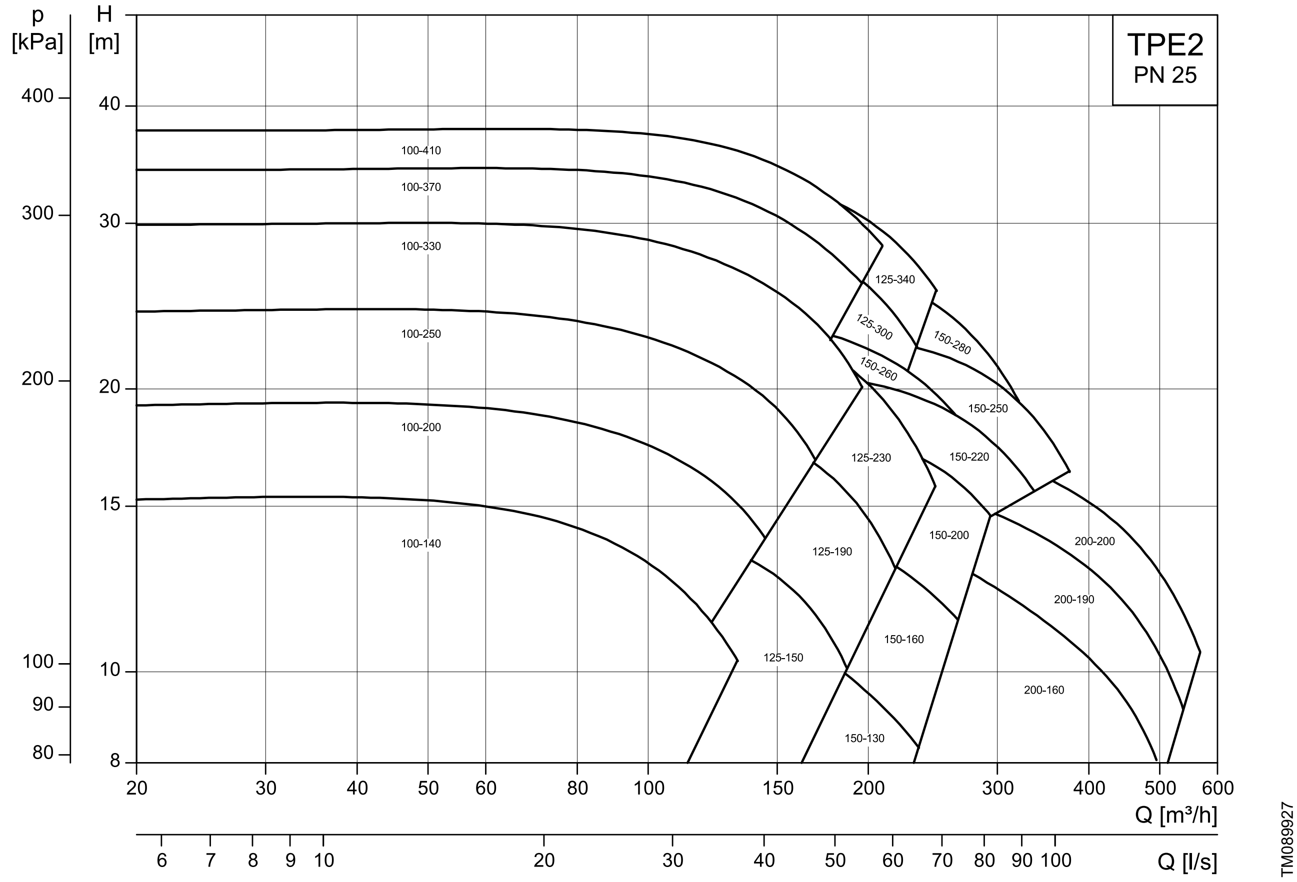
2. Performance range

Performance range, TPE2, TPE3, PN 6, 10, 16



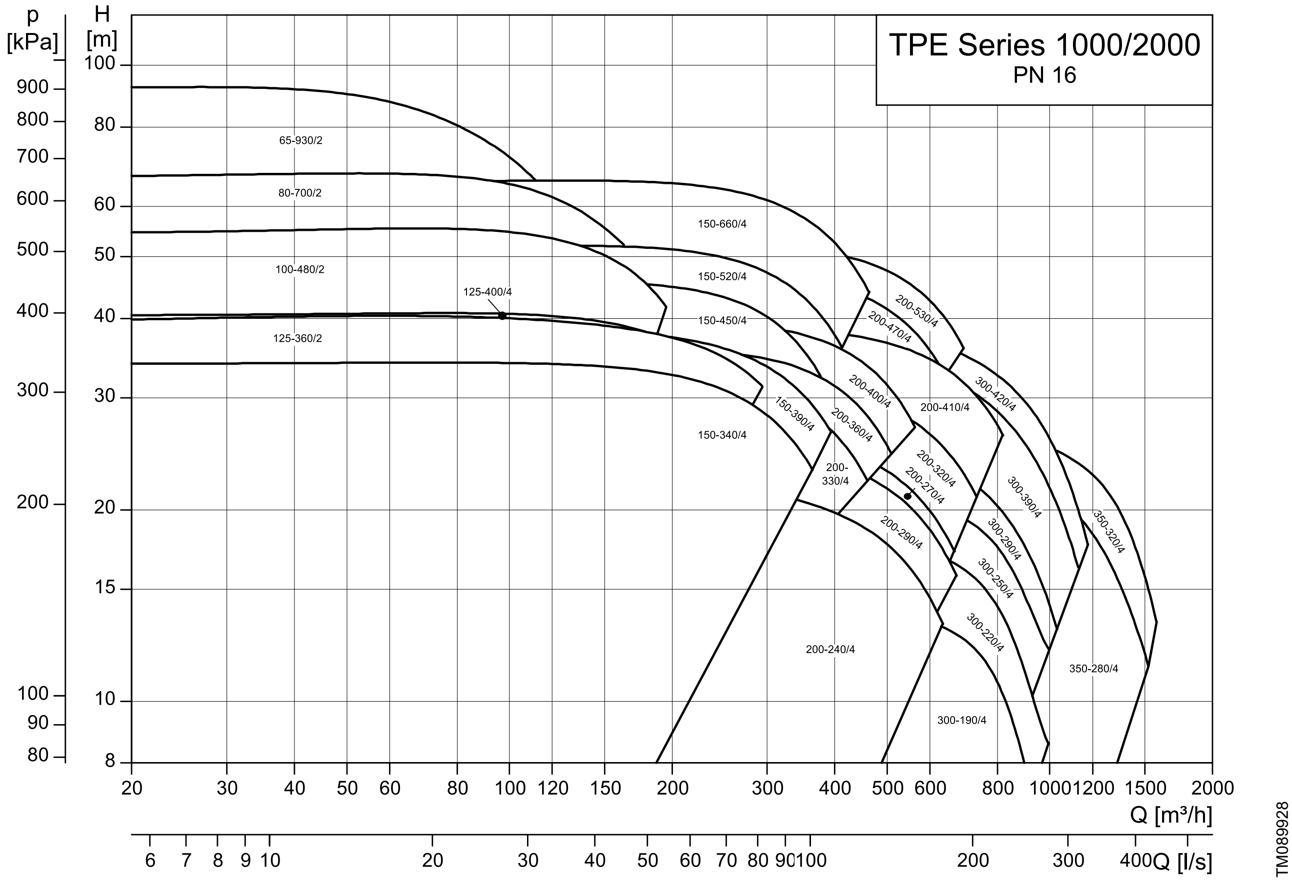
See section Performance curves and technical data for performance curves.

Performance range, TPE2, PN 25



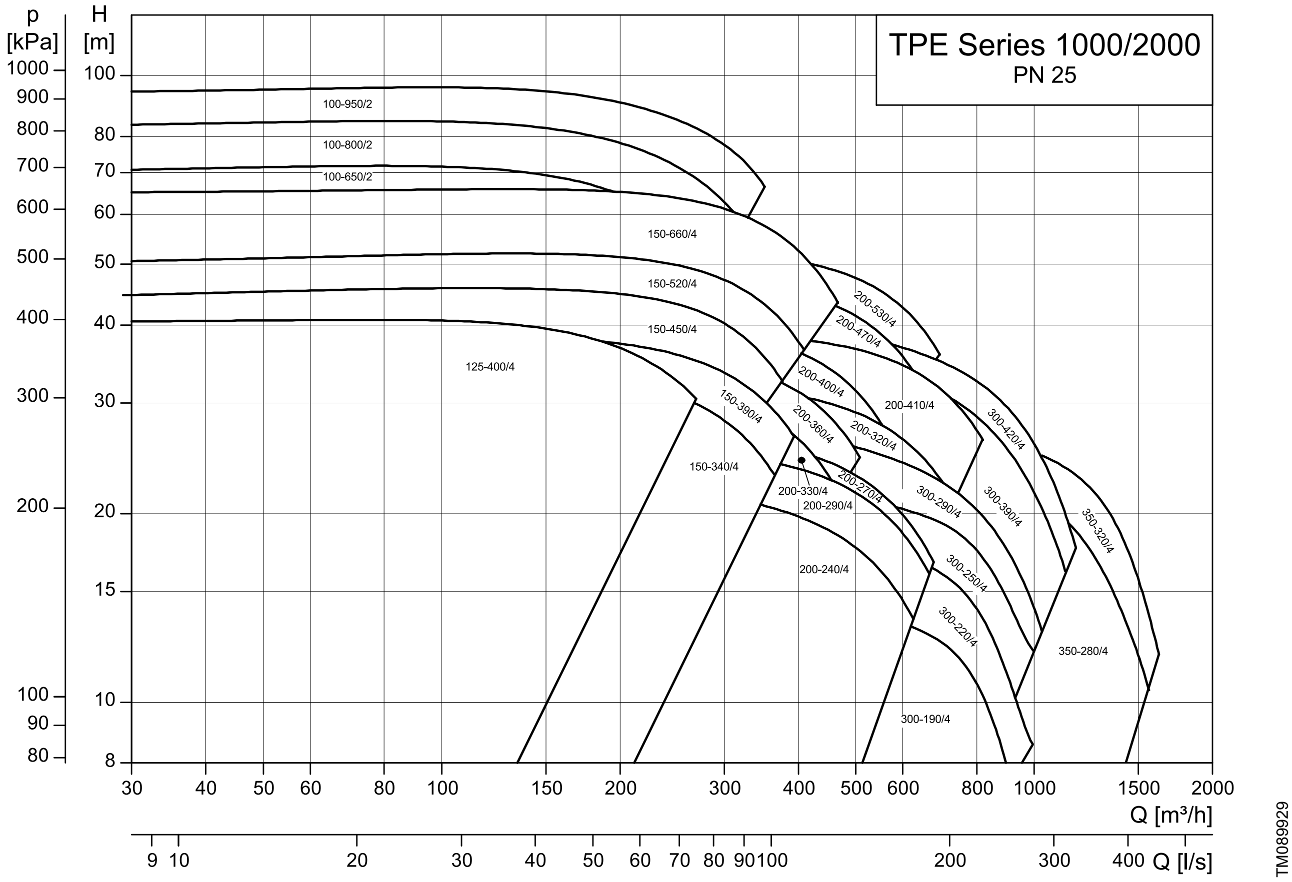
See section Performance curves and technical data for performance curves.

Performance range, TPE Series 1000 and 2000, PN 16



See section Performance curves and technical data for performance curves.

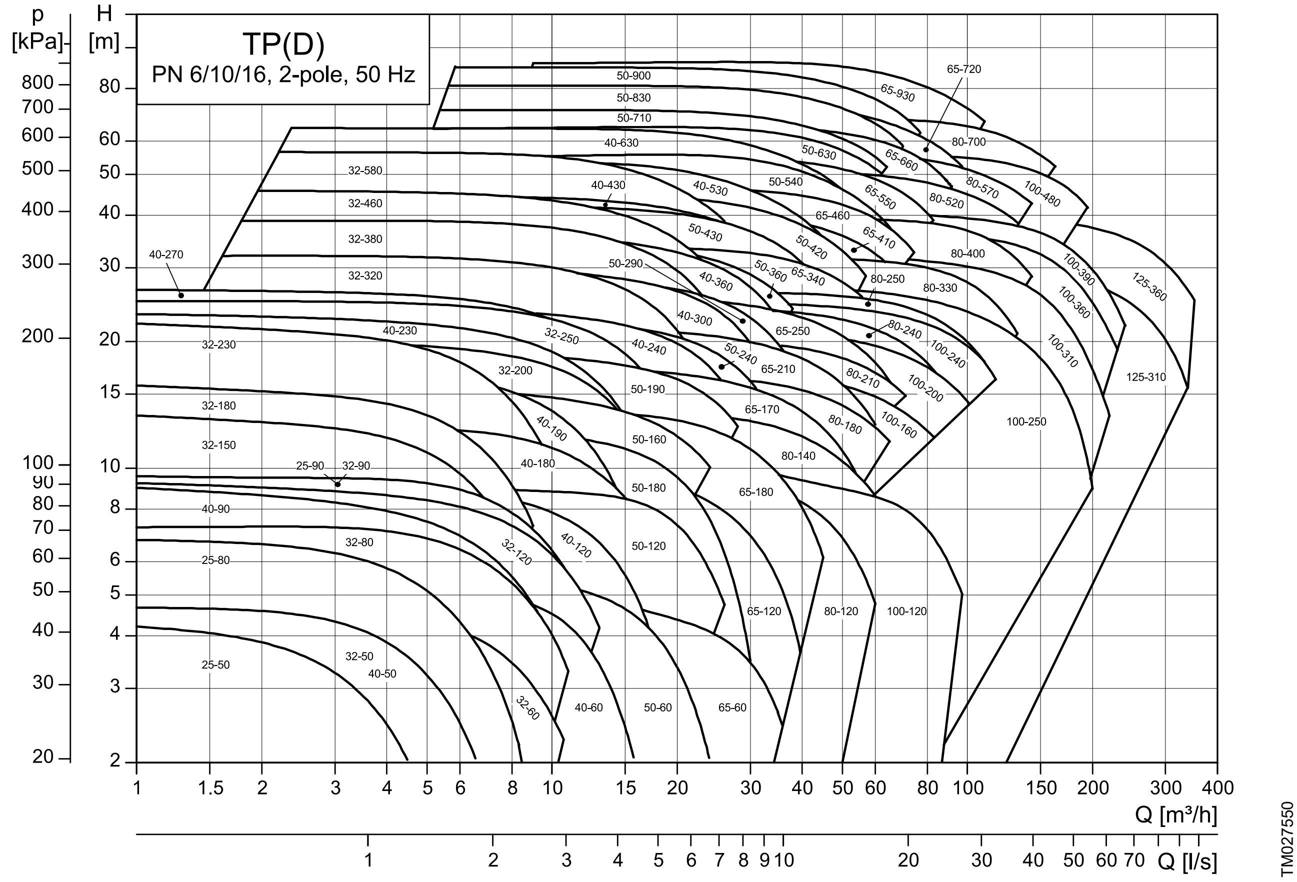
Performance range, TPE Series 1000, PN 25



See section Performance curves and technical data for performance curves.

Performance range, TP(D), 2-pole, PN 6, 10, 16

See section Performance curves and technical data for performance curves.



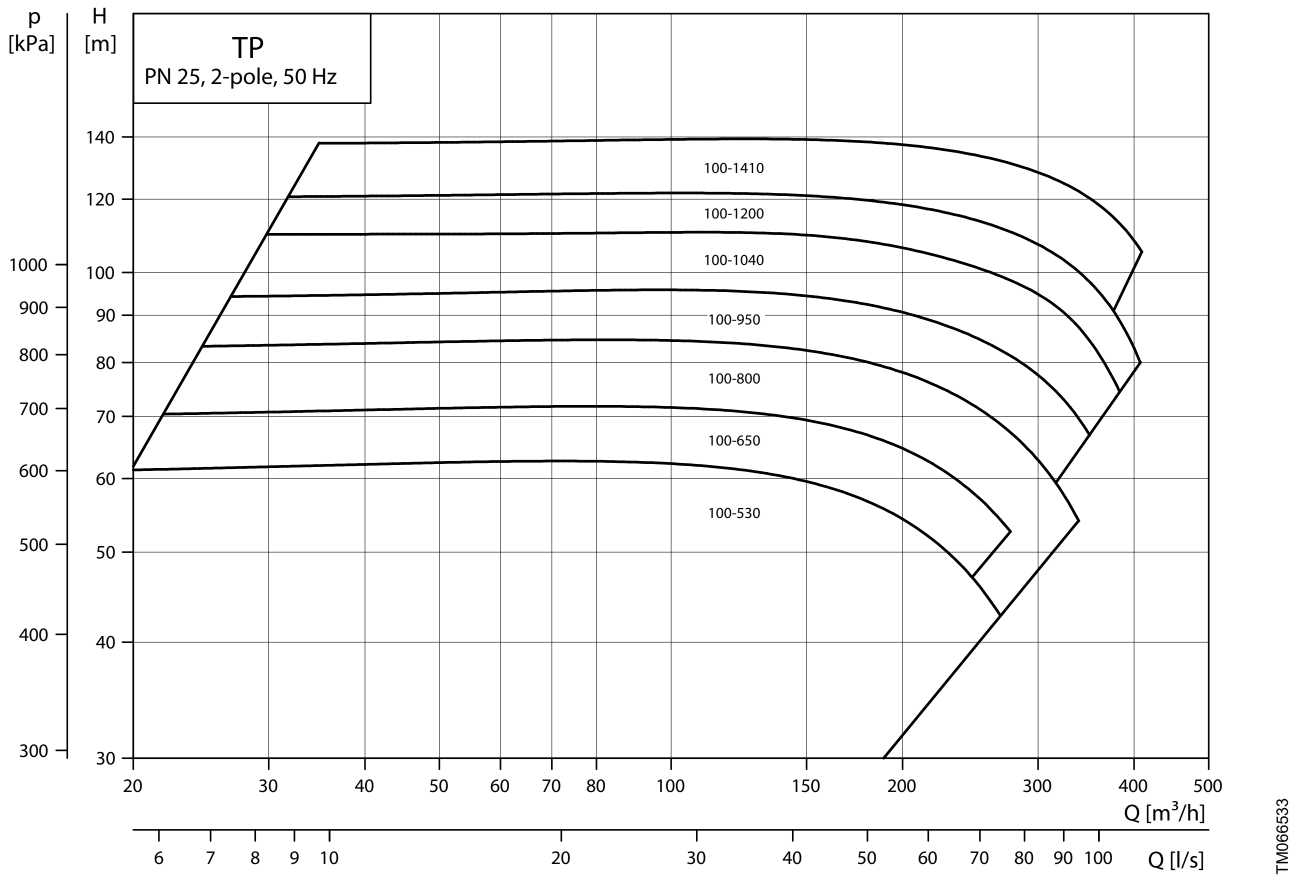
Note: All QH curves apply to single-head pumps. For further information about curve conditions, see section Curve conditions.

Related information

Curve conditions

Performance range, TP(D), 2-pole, PN 25

See section Performance curves and technical data for performance curves.



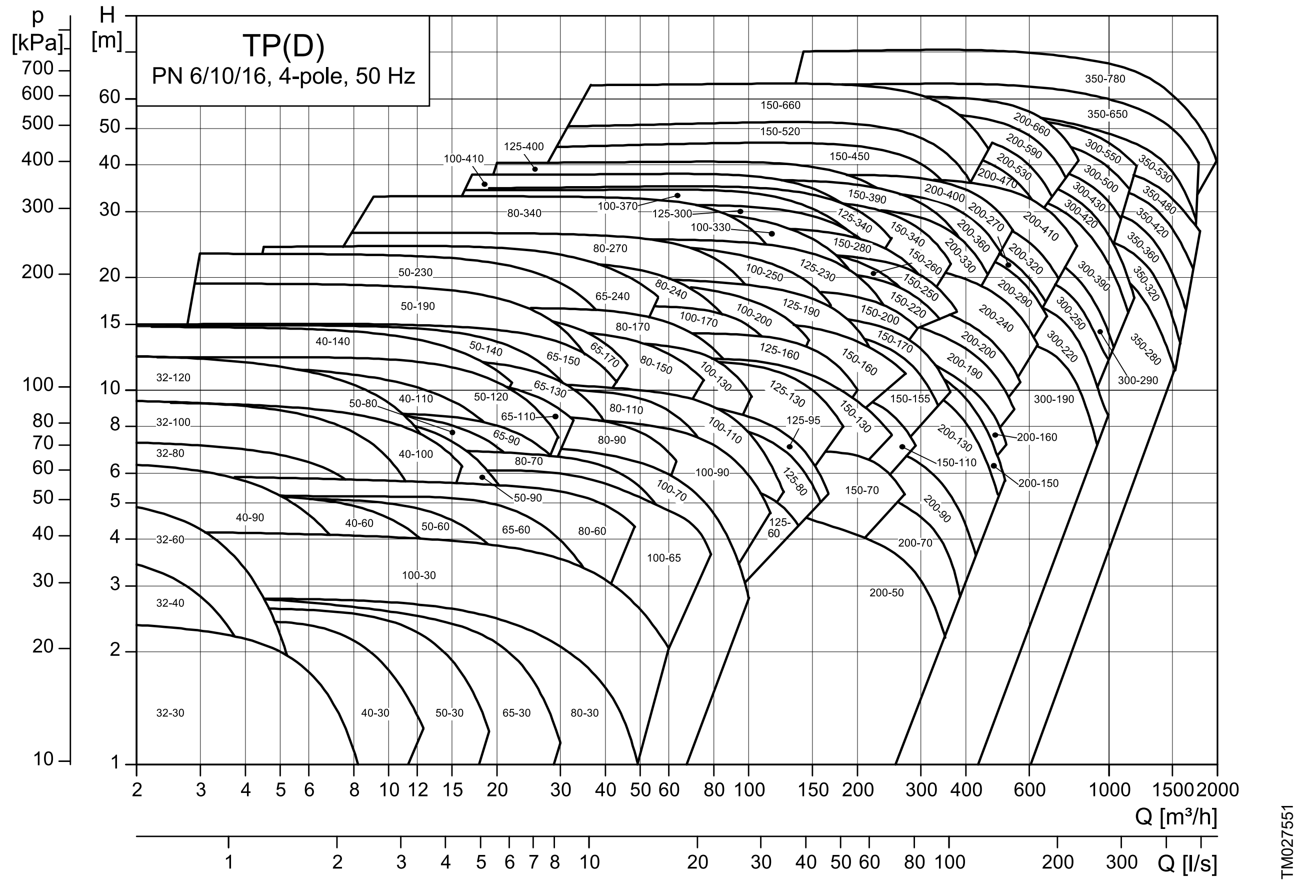
Note: All QH curves apply to single-head pumps. For further information about curve conditions, see section Curve conditions.

Related information

Curve conditions

Performance range, TP(D), 4-pole, PN 6, 10, 16

See section Performance curves and technical data for performance curves.



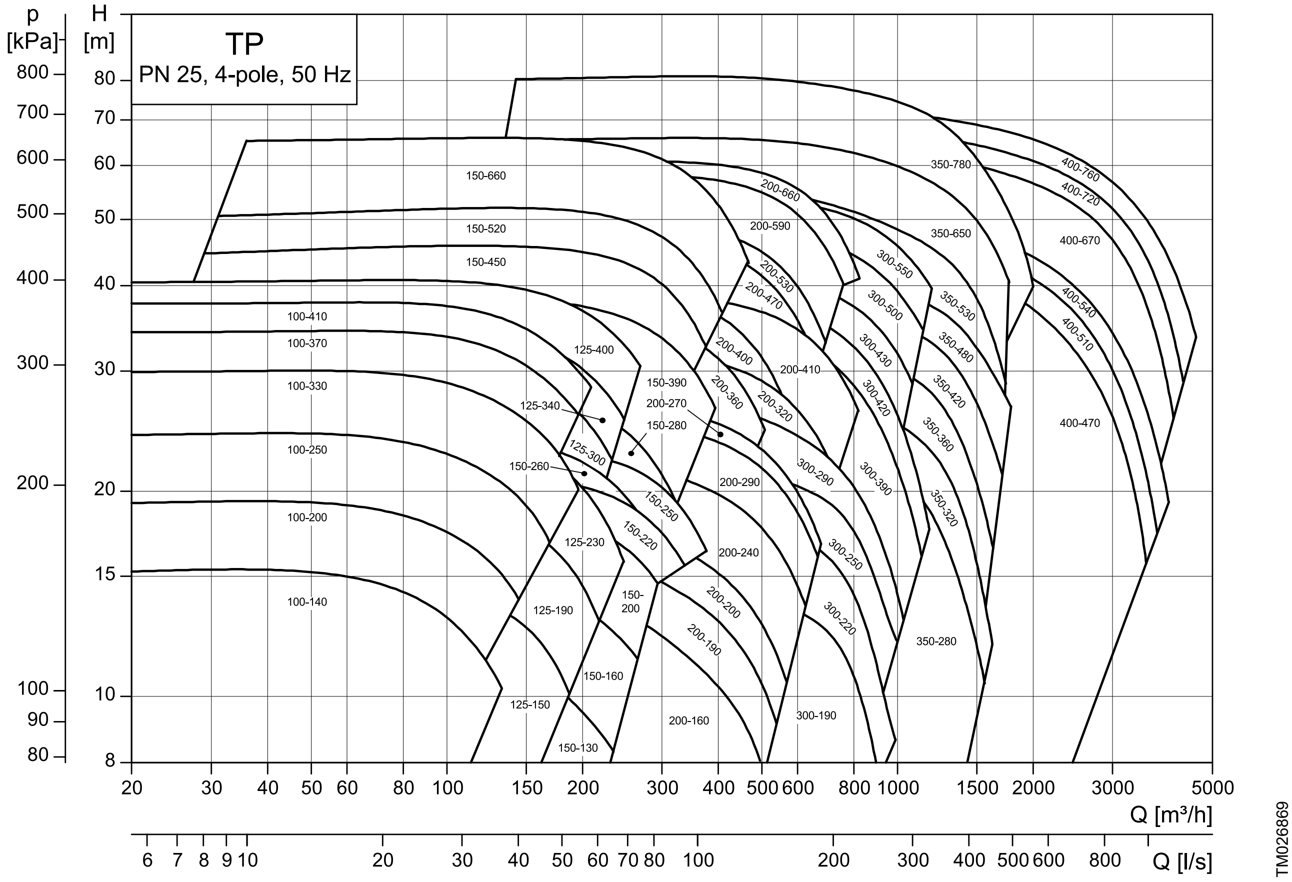
Note: All QH curves apply to single-head pumps. For further information about curve conditions, see section Curve conditions.

Related information

Curve conditions

Performance range, TP, 4-pole, PN 25

See section Performance curves and technical data for performance curves.



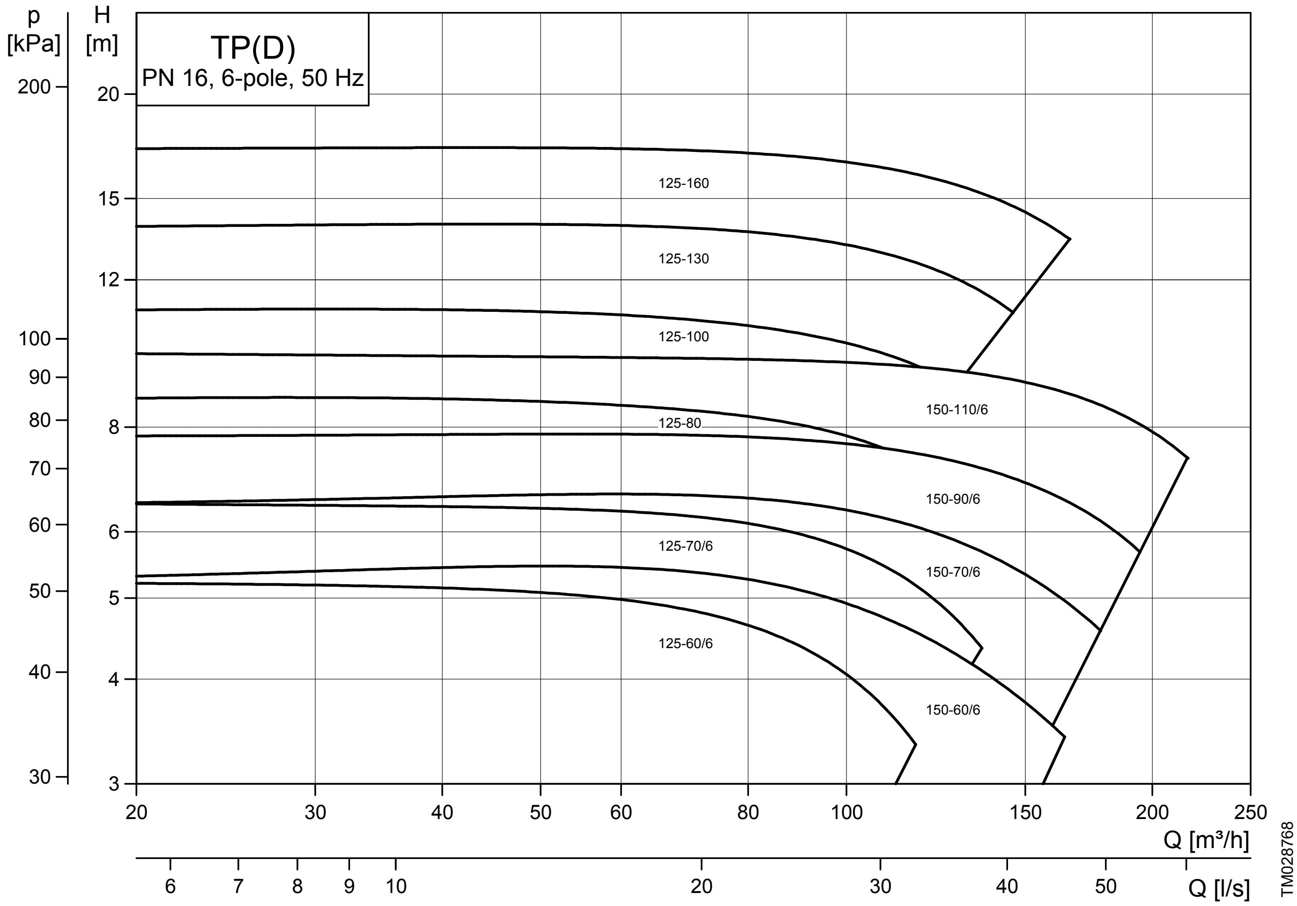
Note: All QH curves apply to single-head pumps. For further information about curve conditions, see section Curve conditions.

Related information

Curve conditions

Performance range, TP(D), 6-pole, PN 16

See section Performance curves and technical data for performance curves.



Note: All QH curves apply to single-head pumps. For further information about curve conditions, see section Curve conditions.

Related information

Curve conditions

3. Product range

Product range, TPE2, TPE2 D, TPE3, TPE3 D

● Standard.

Pump type	Design				Shaft seal					Pressure stage				Materials					Electronically speed-controlled motor	
														Pump housing		Impeller			Voltage [V]	
	Extra small	Small	Medium	Large	BQBE[6]	BAQE[6]	BQQE	DQQE	DAQF	PN 6/10	PN 6	PN 10	PN 16	Cast iron	Stainless steel[7]	Stainless steel	Composite	Cast iron	1 x 200-240 V P2 [kW]	3 x 380-500 V P2 [kW]
TPE2 25-50	●				●		●					●		●			●		0.12	
TPE2 25-80	●				●		●					●		●			●		0.18	
TPE2 25-90	●				●		●					●		●			●		0.37	
TPE2 32-50	●				●		●					●		●			●		0.12	
TPE2 32-70	●				●		●					●		●			●		0.25	
TPE2 32-90	●				●		●					●		●			●		0.37	
TPE2 (D), TPE3 (D) 32-80		●			●		●			●			●	●	●		●		0.25	0.25
TPE2 (D), TPE3 (D) 32-120		●			●		●			●			●	●	●		●		0.25	0.25
TPE2 (D), TPE3 (D) 32-150		●			●		●			●			●	●	●		●		0.37	0.37
TPE2 (D), TPE3 (D) 32-180		●			●		●			●			●	●	●		●		0.55	0.55
TPE2 (D), TPE3 (D) 32-200		●			●		●			●			●	●	●		●		0.75	0.75
TPE2 (D), TPE3 (D) 32-250			●			●	●		●			●	●	●			●		1.1	1.1
TPE2 (D), TPE3 (D) 32-330			●			●	●		●			●	●	●			●		1.5	1.5
TPE2 (D), TPE3 (D) 32-390			●			●	●		●			●	●	●			●			2.2
TPE2 (D), TPE3 (D) 32-510			●			●	●		●			●	●	●			●			3
TPE2 (D), TPE3 (D) 32-610			●			●	●		●			●	●	●			●			4
TPE2 (D), TPE3 (D) 32-710			●			●	●		●			●	●	●			●			5.5
TPE2 40-50	●				●		●					●		●			●		0.12	
TPE2 40-70	●				●		●					●		●			●		0.25	
TPE2 (D), TPE3 (D) 40-80		●			●		●			●			●	●	●		●		0.25	0.25
TPE2 40-90	●				●		●					●		●			●		0,37	
TPE2 (D), TPE3 (D) 40-120		●			●		●			●			●	●	●		●		0.37	0.37
TPE2 (D), TPE3 (D) 40-150		●			●		●			●			●	●	●		●		0.55	0.55
TPE2 (D), TPE3 (D) 40-180		●			●		●			●			●	●	●		●		0.75	0.75
TPE2 (D), TPE3 (D) 40-200		●			●		●			●			●	●	●		●		1.1	1.1
TPE2 (D), TPE3 (D) 40-240		●			●		●			●			●	●	●		●		1.5	1.5
TPE2 (D), TPE3 (D) 40-310			●			●	●		●			●	●	●			●			2.2
TPE2 (D), TPE3 (D) 40-380			●			●	●		●			●	●	●			●			3
TPE2 (D), TPE3 (D) 40-470			●			●	●		●			●	●	●			●			4
TPE2 (D), TPE3 (D) 40-530				●		●	●		●			●	●	●		●		●		7.5
TPE2 (D), TPE3 (D) 40-560			●			●	●		●			●	●	●			●			5.5
TPE2 (D), TPE3 (D) 40-630				●		●	●		●			●	●	●		●		●		11
TPE2 (D), TPE3 (D) 50-60		●			●		●			●			●	●	●		●		0.37	0.37
TPE2 (D), TPE3 (D) 50-80		●			●		●			●			●	●	●		●		0.37	0.37
TPE2 (D), TPE3 (D) 50-120		●			●		●			●			●	●	●		●		0.55	0.55
TPE2 (D), TPE3 (D) 50-150		●			●		●			●			●	●	●		●		0.75	0.75
TPE2 (D), TPE3 (D) 50-180		●			●		●			●			●	●	●		●		1.1	1.1
TPE2 (D), TPE3 (D) 50-200		●			●		●			●			●	●	●		●		1.5	1.5

Pump type	Design				Shaft seal					Pressure stage				Materials					Electronically speed-controlled motor	
														Pump housing		Impeller			Voltage [V]	
	Extra small	Small	Medium	Large	BQBE [6]	BAQE [6]	BQQE	DQQE	DAQF	PN 6/10	PN 6	PN 10	PN 16	Cast iron	Stainless steel [7]	Stainless steel	Composite	Cast iron	1 x 200-240 V P2 [kW]	3 x 380-500 V P2 [kW]
TPE2 (D), TPE3 (D) 50-240		●			●		●			●			●	●	●		●			2.2
TPE2 (D), TPE3 (D) 50-310			●			●	●		●			●	●	●			●			3
TPE2 (D), TPE3 (D) 50-360			●			●	●		●			●	●	●			●			3
TPE2 (D), TPE3 (D) 50-370			●			●	●		●			●	●	●			●			4
TPE2 (D), TPE3 (D) 50-450			●			●	●		●			●	●	●			●			5.5
TPE2 (D), TPE3 (D) 50-560				●		●	●		●			●	●	●		●		●		7.5
TPE2 (D), TPE3 (D) 50-700				●		●	●		●			●	●	●		●		●		11
TPE2 (D), TPE3 (D) 50-730				●		●	●		●			●	●	●		●		●		15
TPE2 (D), TPE3 (D) 50-740				●		●	●		●			●	●	●		●		●		18.5
TPE2 (D), TPE3 (D) 50-750				●		●	●		●			●	●	●		●		●		22
TPE2 (D), TPE3 (D) 65-60		●			●		●			●			●	●	●		●		0.37	0.37
TPE2 (D), TPE3 (D) 65-80		●			●		●			●			●	●	●		●		0.55	0.55
TPE2 (D), TPE3 (D) 65-120		●			●		●			●			●	●	●		●		0.75	0.75
TPE2 (D), TPE3 (D) 65-150		●			●		●			●			●	●	●		●		1.1	1.1
TPE2 (D), TPE3 (D) 65-180		●			●		●			●			●	●	●		●		1.5	1.5
TPE2 (D), TPE3 (D) 65-200		●			●		●			●			●	●	●		●			2.2
TPE2 (D), TPE3 (D) 65-220			●			●	●		●			●	●	●			●			2.2
TPE2 (D), TPE3 (D) 65-280			●			●	●		●			●	●	●			●			3
TPE2 (D), TPE3 (D) 65-310			●			●	●		●			●	●	●			●			4
TPE2 (D), TPE3 (D) 65-430			●			●	●		●			●	●	●			●			5.5
TPE2 (D), TPE3 (D) 65-580				●		●	●		●			●	●	●		●		●		7.5
TPE2 (D), TPE3 (D) 65-680				●		●	●		●			●	●	●		●		●		11
TPE2 (D), TPE3 (D) 65-740				●		●	●		●			●	●	●		●		●		15
TPE2 (D), TPE3 (D) 65-750				●		●	●		●			●	●	●		●		●		18.5
TPE2 (D), TPE3 (D) 65-760				●		●	●		●			●	●	●		●		●		22
TPE2 (D), TPE3 (D) 80-40		●			●		●				●	●	●	●			●		0.25	0.25
TPE2 (D), TPE3 (D) 80-120		●			●		●				●	●	●	●			●		1.1	1.1
TPE2 (D), TPE3 (D) 80-150		●			●		●				●	●	●	●			●		1.5	1.5
TPE2 (D), TPE3 (D) 80-180		●			●		●				●	●	●	●			●			2.2
TPE2 (D), TPE3 (D) 80-210			●			●	●		●			●	●	●			●			3
TPE2 (D), TPE3 (D) 80-250			●			●	●		●			●	●	●			●			4
TPE2 (D), TPE3 (D) 80-310			●			●	●		●			●	●	●			●			5.5
TPE2 (D), TPE3 (D) 80-340				●		●	●		●			●	●	●		●		●		7.5
TPE2 (D), TPE3 (D) 80-440				●		●	●		●			●	●	●		●		●		11
TPE2 (D), TPE3 (D) 80-520				●		●	●		●			●	●	●		●		●		15
TPE2 (D), TPE3 (D) 80-560				●		●	●		●			●	●	●		●		●		18.5
TPE2 (D), TPE3 (D) 80-570				●		●	●		●			●	●	●		●		●		22
TPE2 (D), TPE3 (D) 100-40		●			●		●				●	●	●	●			●		0.25	0.25
TPE2 (D), TPE3 (D) 100-100				●		●	●				●		●	●				●		1.5
TPE2 (D), TPE3 (D) 100-120		●			●		●				●	●	●	●			●		1.1	1.1
TPE2 (D), TPE3 (D) 100-130				●		●	●				●		●	●				●		2.2
TPE2 (D), TPE3 (D) 100-150		●			●		●				●	●	●	●			●		1.5	1.5
TPE2 (D), TPE3 (D) 100-160				●		●	●						●	●				●		3
TPE2 (D), TPE3 (D) 100-170				●		●	●						●	●				●		4
TPE2 (D), TPE3 (D) 100-180		●			●		●				●	●	●	●			●			2.2
TPE2 (D), TPE3 (D) 100-230				●		●	●						●	●				●		5.5
TPE2 (D), TPE3 (D) 100-260				●		●	●						●	●				●		7.5

Pump type	Design				Shaft seal					Pressure stage				Materials					Electronically speed-controlled motor	
														Pump housing		Impeller			Voltage [V]	
																			1 x 200-240 V	3 x 380-500 V
	Extra small	Small	Medium	Large	BQBE [6]	BAQE [6]	BQQE	DQQE	DAQF	PN 6/10	PN 6	PN 10	PN 16	Cast iron	Stainless steel [7]	Stainless steel	Composite	Cast iron	P2 [kW]	P2 [kW]
TPE2 (D), TPE3 (D) 100-350		●				●	●						●	●						11
TPE2 (D), TPE3 (D) 100-460				●		●	●						●	●				●		15
TPE2 (D), TPE3 (D) 100-540				●		●	●						●	●				●		18.5
TPE2 (D), TPE3 (D) 100-570				●		●	●						●	●				●		22
TPE2 (D), TPE3 (D) 125-110				●		●	●		●			●	●	●		●		●		3
TPE2 (D), TPE3 (D) 125-120				●		●	●		●			●	●	●		●		●		4
TPE2 (D), TPE3 (D) 125-160				●		●	●		●			●	●	●		●		●		5.5
TPE2 (D), TPE3 (D) 125-180				●		●	●		●			●	●	●		●		●		7.5
TPE2 (D), TPE3 (D) 125-290				●		●	●		●			●	●	●		●		●		11
TPE2, TPE3 125-310				●		●	●		●			●	●	●		●		●		22
TPE2 (D), TPE3 (D) 125-380				●		●	●		●			●	●	●		●		●		15
TPE2 (D), TPE3 (D) 125-430				●		●	●		●			●	●	●		●		●		18.5
TPE2 (D), TPE3 (D) 125-460				●		●	●		●			●	●	●		●		●		22
TPE2 (D), TPE3 (D) 150-120				●		●	●		●			●	●	●		●		●		5.5
TPE2 (D), TPE3 (D) 150-170				●		●	●		●			●	●	●		●		●		7.5
TPE2 (D), TPE3 (D) 150-230				●		●	●		●			●	●	●		●		●		11
TPE2 (D), TPE3 (D) 150-240				●		●	●		●			●	●	●		●		●		15
TPE2 (D), TPE3 (D) 150-250				●		●	●	●	●			●	●	●		●		●		22
TPE2 (D), TPE3 (D) 150-270				●		●	●		●			●	●	●		●		●		18.5
TPE2, TPE3 150-280				●		●	●	●	●			●	●	●		●		●		22
TPE2, TPE3 200-50				●		●	●		●			●	●	●		●		●		4
TPE2, TPE3 200-70				●		●	●		●			●	●	●		●		●		5.5
TPE2, TPE3 200-90				●		●	●		●			●	●	●		●		●		7.5
TPE2, TPE3 200-130				●		●	●		●			●	●	●		●		●		11
TPE2, TPE3 200-150				●		●	●		●			●	●	●		●		●		15
TPE2, TPE3 200-160				●				●	●					●				●		15
TPE2, TPE3 200-190				●		●	●	●	●			●	●	●		●		●		18.5
TPE2, TPE3 200-200				●		●	●	●	●			●	●	●		●		●		22

6) Available on request.

7) Stainless-steel versions are only available as single-head pumps and with a combined PN 6/10/16 flange.

Product range

Product range, TPE2, PN 25

Pump type	Design	Shaft seal					Pressure stage	Materials						Electronically speed-controlled motor
								Pump housing		Impeller				Voltage [V]
														3 x 380-500 V
	Large	BQBE	BAQE	BQQE	DQQE	DAQF	PN 25	Cast iron	Stainless steel	Stainless steel	Composite	Cast iron	Bronze	P2 [kW]
TPE2 100-140	●				●	●	●	●				●	●	5.5
TPE2 100-200	●				●	●	●	●				●	●	7.5
TPE2 100-250	●				●	●	●	●				●	●	11
TPE2 100-330	●				●	●	●	●				●	●	15
TPE2 100-370	●				●	●	●	●				●	●	18.5
TPE2 100-410	●				●	●	●	●				●	●	22
TPE2 125-150	●				●	●	●	●				●	●	7.5
TPE2 125-190	●				●	●	●	●				●	●	11
TPE2 125-230	●				●	●	●	●				●	●	15
TPE2 125-300	●				●	●	●	●				●	●	18.5
TPE2 125-340	●				●	●	●	●				●	●	22
TPE2 150-130	●				●	●	●	●				●	●	7.5
TPE2 150-160	●				●	●	●	●				●	●	11
TPE2 150-200	●				●	●	●	●				●	●	15
TPE2 150-220	●				●	●	●	●				●	●	18.5
TPE2 150-250	●				●	●	●	●				●	●	22
TPE2 150-260	●				●	●	●	●				●	●	18.5
TPE2 150-280	●				●	●	●	●				●	●	22
TPE2 200-160	●				●	●	●	●				●	●	15
TPE2 200-190	●				●	●	●	●				●	●	18.5
TPE2 200-200	●				●	●	●	●				●	●	22

Product range, TPE Series 1000/2000, PN 16

Pump type	Design		Shaft seal		Pressure stage	Materials			Electronically speed-controlled motor
						Pump housing	Impeller		Voltage [V]
	TPE Series 1000	TPE Series 2000	BAQE	BQQE	PN 16	Cast iron	Cast iron	Bronze	3 x 380-500 V P2 [kW]
TPE 65-930/2	●	●	●	●	●	●	●	●	30
TPE 80-700/2	●	●	●	●	●	●	●	●	30
TPE 100-480/2	●	●	●	●	●	●	●	●	30
TPE 125-360/2	●	●	●	●	●	●	●	●	30
TPE 125-400/4	●	●	●	●	●	●	●	●	30
TPE 150-340/4	●	●	●	●	●	●	●	●	30
TPE 150-390/4	●	●	●	●	●	●	●	●	37
TPE 150-450/4	●	●	●	●	●	●	●	●	45
TPE 150-520/4	●	●	●	●	●	●	●	●	55
TPE 150-660/4	●	●	●	●	●	●	●	●	75
TPE 200-240/4	●	●	●	●	●	●	●	●	30
TPE 200-270/4	●	●	●	●	●	●	●	●	45
TPE 200-290/4	●	●	●	●	●	●	●	●	37
TPE 200-320/4	●	●	●	●	●	●	●	●	55
TPE 200-330/4	●	●	●	●	●	●	●	●	37
TPE 200-360/4	●	●	●	●	●	●	●	●	45
TPE 200-400/4	●	●	●	●	●	●	●	●	55
TPE 200-410/4	●	●	●	●	●	●	●	●	75
TPE 200-470/4	●	●	●	●	●	●	●	●	75
TPE 200-530/4	●	●	●	●	●	●	●	●	90
TPE 300-190/4	●	●	●	●	●	●	●	●	30
TPE 300-220/4	●	●	●	●	●	●	●	●	37
TPE 300-250/4	●	●	●	●	●	●	●	●	45
TPE 300-290/4	●	●	●	●	●	●	●	●	55
TPE 300-390/4	●	●	●	●	●	●	●	●	75
TPE 300-420/4	●	●	●	●	●	●	●	●	90
TPE 350-280/4	●	●	●	●	●	●	●	●	75
TPE 350-320/4	●	●	●	●	●	●	●	●	90

Product range, TPE Series 1000/2000, PN 25

Pump type	Design		Shaft seal		Pressure stage	Materials			Electronically speed-controlled motor
						Pump housing	Impeller		Voltage [V]
	TPE Series 1000	TPE Series 2000	DQQE	DAQE	PN 25	Cast iron	Cast iron	Bronze	3 x 380-500 V P2 [kW]
TPE 100-650/2	●		●	●	●	●	●	●	55
TPE 100-800/2	●		●	●	●	●	●	●	75
TPE 100-950/2	●		●	●	●	●	●	●	90
TPE 125-400/4	●		●	●	●	●	●	●	30
TPE 150-340/4	●		●	●	●	●	●	●	30
TPE 150-390/4	●		●	●	●	●	●	●	37
TPE 150-450/4	●		●	●	●	●	●	●	45
TPE 150-520/4	●		●	●	●	●	●	●	55
TPE 150-660/4	●		●	●	●	●	●	●	75
TPE 200-240/4	●		●	●	●	●	●	●	30
TPE 200-270/4	●		●	●	●	●	●	●	45
TPE 200-290/4	●		●	●	●	●	●	●	37
TPE 200-320/4	●		●	●	●	●	●	●	55
TPE 200-330/4	●		●	●	●	●	●	●	37
TPE 200-360/4	●		●	●	●	●	●	●	45
TPE 200-400/4	●		●	●	●	●	●	●	55
TPE 200-410/4	●		●	●	●	●	●	●	75
TPE 200-470/4	●		●	●	●	●	●	●	75
TPE 200-530/4	●		●	●	●	●	●	●	90
TPE 300-190/4	●		●	●	●	●	●	●	30
TPE 300-220/4	●		●	●	●	●	●	●	37
TPE 300-250/4	●		●	●	●	●	●	●	45
TPE 300-290/4	●		●	●	●	●	●	●	55
TPE 300-390/4	●		●	●	●	●	●	●	75
TPE 300-420/4	●		●	●	●	●	●	●	90
TPE 350-280/4	●		●	●	●	●	●	●	75
TPE 350-320/4	●		●	●	●	●	●	●	90

Product range, TP/TPD, 2-pole, PN 6, 10, 16, 25

● Standard.

Pump type	Design			Shaft seal					Pressure stage				Materials										Mains-operated motor		
													Pump housing						Impeller				Voltage [V]		
	TP Series 100	TP Series 200	TP Series 300	BQBE [8]	BAQE [8]	BQQE	DQQE	DAQF	PN 6	PN 10	PN 16	PN 25	Cast iron EN-GJL-150	Cast iron EN-GJL-200	Cast iron EN-GJL-250	Nodular cast iron EN-GJS-400-18-LT	Bronze [9]	Stainless steel	Stainless steel	Cast iron	Composite	Bronze	1 x 220-230 V	3 x 220-240 ΔV/ 380-415 YV	3 x 380-415 ΔV/ 660-690 YV [10]
																							P2 [kW]	P2 [kW]	P2 [kW]
TP 25-50/2	●			●		●				●			●					●			●		0.12	0.12	
TP 25-80/2	●			●		●				●			●					●			●		0.18	0.18	
TP 25-90/2	●			●		●				●				●							●		0.37	0.37	
TP 32-50/2	●			●		●				●			●					●			●		0.12	0.12	
TP 32-80/2	●			●		●				●			●					●			●		0.25	0.25	
TP 32-90/2	●			●		●				●				●				●			●		0.37	0.37	
TP, TPD 32-60/2		●		●		●			●	●					●		●		●				0.25	0.25	
TP, TPD 32-120/2		●		●		●			●	●					●		●		●				0.37	0.37	
TP, TPD 32-150/2		●		●		●			●	●					●		●		●				0.37	0.37	
TP, TPD 32-180/2		●		●		●			●	●					●		●		●				0.55	0.55	
TP, TPD 32-230/2		●		●		●			●	●					●		●		●				0.75	0.75	
TP, TPD 32-200/2			●		●	●					●				●					●		●	1.1	1.1	
TP, TPD 32-250/2			●		●	●					●				●					●		●	1.5	1.5	
TP, TPD 32-320/2			●		●	●					●				●					●		●		2.2	2.2
TP, TPD 32-380/2			●		●	●					●				●					●		●		3.0	3.0
TP, TPD 32-460/2			●		●	●					●				●					●		●			4.0
TP, TPD 32-580/2			●		●	●					●				●					●		●			5.5
TP 40-50/2	●			●		●			●	●				●				●			●		0.12	0.12	
TP, TPD 40-60/2		●		●		●			●	●					●		●		●				0.25	0.25	
TP 40-80/2	●			●		●			●	●				●				●			●		0.25	0.25	
TP 40-90/2	●			●		●			●	●				●							●		0.37	0.37	
TP, TPD 40-120/2		●		●		●			●	●					●		●		●				0.37	0.37	
TP 40-180/2		●		●		●			●	●					●		●		●				0.55	0.55	
TP, TPD 40-190/2		●		●		●					●				●		●		●				0.75	0.75	
TP, TPD 40-230/2		●		●		●					●				●		●		●				1.1	1.1	
TP, TPD 40-270/2		●		●		●					●				●		●		●				1.5	1.5	
TP, TPD 40-240/2			●		●	●					●				●					●		●		2.2	2.2
TP, TPD 40-300/2			●		●	●					●				●					●		●		3.0	3.0
TP, TPD 40-360/2			●		●	●					●				●					●		●			4.0
TP, TPD 40-430/2			●		●	●					●				●					●		●			5.5
TP, TPD 40-530/2			●		●	●					●				●					●		●			7.5
TP, TPD 40-630/2			●		●	●					●				●					●		●			11.0
TP, TPD 50-60/2		●		●		●			●	●					●		●		●				0.37	0.37	
TP, TPD 50-120/2		●		●		●			●	●					●		●		●				0.75	0.75	
TP, TPD 50-180/2		●		●		●			●	●					●		●		●				0.75	0.75	
TP, TPD 50-160/2			●		●	●					●				●					●		●	1.1	1.1	
TP, TPD 50-190/2			●		●	●					●				●					●		●	1.5	1.5	
TP, TPD 50-240/2			●		●	●					●				●					●		●		2.2	2.2
TP, TPD 50-290/2			●		●	●					●				●					●		●		3.0	3.0
TP, TPD 50-360/2			●		●	●					●				●					●		●			4.0
TP, TPD 50-430/2			●		●	●					●				●					●		●			5.5
TP, TPD 50-420/2			●		●	●					●				●					●		●			7.5
TP, TPD 50-540/2			●		●	●					●				●					●		●			11.0
TP, TPD 50-630/2			●		●	●					●				●					●		●			15.0
TP, TPD 50-710/2			●		●	●					●				●					●		●			15.0

Pump type	Design			Shaft seal					Pressure stage				Materials										Mains-operated motor		
													Pump housing						Impeller				Voltage [V]		
	TP Series 100	TP Series 200	TP Series 300	BQBE [8]	BAQE [8]	BQQE	DQQE	DAQF	PN 6	PN 10	PN 16	PN 25	Cast iron EN-GJL-150	Cast iron EN-GJL-200	Cast iron EN-GJL-250	Nodular cast iron EN-GJS-400-18-LT	Bronze [9]	Stainless steel	Stainless steel	Cast iron	Composite	Bronze	1 x 220-230 V	3 x 220-240 ΔV/ 380-415 YV	3 x 380-415 ΔV/ 660-690 YV [10]
																							P2 [kW]	P2 [kW]	P2 [kW]
TP, TPD 50-830/2			●		●	●					●				●					●		●			18.5
TP, TPD 50-900/2			●		●	●					●				●					●		●			22.0
TP, TPD 65-60/2		●		●		●			●	●					●		●		●				0.55	0.55	
TP, TPD 65-120/2		●		●		●			●	●					●		●		●				1.1	1.1	
TP, TPD 65-180/2		●		●		●			●	●					●		●		●				1.5	1.5	
TP, TPD 65-170/2			●		●	●					●				●					●		●		2.2	2.2
TP, TPD 65-210/2			●		●	●					●				●					●		●		3.0	3.0
TP, TPD 65-250/2			●		●	●					●				●					●		●			4.0
TP, TPD 65-340/2			●		●	●					●				●					●		●			5.5
TP, TPD 65-410/2			●		●	●					●				●					●		●			7.5
TP, TPD 65-460/2			●		●	●					●				●					●		●			11.0
TP, TPD 65-550/2			●		●	●					●				●					●		●			15.0
TP, TPD 65-660/2			●		●	●					●				●					●		●			18.5
TP, TPD 65-720/2			●		●	●					●				●					●		●			22.0
TP, TPD 65-930/2			●		●	●					●				●					●		●			30.0
TP, TPD 80-120/2		●		●		●			●	●					●		●		●				1.5	1.5	
TP, TPD 80-140/2			●		●	●					●				●					●		●		2.2	2.2
TP, TPD 80-180/2			●		●	●					●				●					●		●		3.0	3.0
TP, TPD 80-210/2			●		●	●					●				●					●		●			4.0
TP, TPD 80-240/2			●		●	●					●				●					●		●			5.5
TP, TPD 80-250/2			●		●	●					●				●					●		●			7.5
TP, TPD 80-330/2			●		●	●					●				●					●		●			11.0
TP, TPD 80-400/2			●		●	●					●				●					●		●			15.0
TP, TPD 80-520/2			●		●	●					●				●					●		●			18.5
TP, TPD 80-570/2			●		●	●					●				●					●		●			22.0
TP, TPD 80-700/2			●		●	●					●				●					●		●			30.0
TP, TPD 100-120/2		●		●		●			●	●					●		●		●					2.2	2.2
TP, TPD 100-160/2			●		●	●					●				●					●		●			4.0
TP, TPD 100-200/2			●		●	●					●				●					●		●			5.5
TP, TPD 100-240/2			●		●	●					●				●					●		●			7.5
TP, TPD 100-250/2			●		●	●					●				●					●		●			11.0
TP, TPD 100-310/2			●		●	●					●				●					●		●			15.0
TP, TPD 100-360/2			●		●	●					●				●					●		●			18.5
TP, TPD 100-390/2			●		●	●					●				●					●		●			22.0
TP, TPD 100-480/2			●		●	●					●				●					●		●			30.0
TP 100-530/2			●				●	●				●				●				●		●			45.0
TP 100-650/2			●				●	●				●				●				●		●			55.0
TP 100-800/2			●				●	●				●				●				●		●			75.0
TP 100-950/2			●				●	●				●				●				●		●			90.0
TP 100-1040/2			●				●	●				●				●				●		●			110.0
TP 100-1200/2			●				●	●				●				●				●		●			132.0
TP 100-1410/2			●				●	●				●				●				●		●			160.0
TP 125-310/2			●		●	●					●				●					●		●			22.0
TP 125-360/2			●		●	●					●				●					●		●			30.0

8) Available on request.

9) Bronze versions are only available as single-head pumps.

10) 2-pole motors above 5.5 kW can be operated at 3 x 660-690 YV. Smaller motor sizes cannot be operated at 3 x 660-690 YV.

Product range, TP/TPD, 4-pole, PN 6, 10, 16, 25

● Standard.

Pump type	Design			Shaft seal						Pressure stage				Materials							Mains-operated motor	
														Pump housing			Impeller				Voltage [V]	
	TP Series 100	TP Series 200	TP Series 300	BQBE	BAQE	BQQE	DBUE	DQQE	DAQF	PN 6	PN 10	PN 16	PN 25	Cast iron	Nodular cast iron	Bronze [11]	Stainless steel	Cast iron	Nodular cast iron	Bronze	3 x 220-240 ΔV/ 380-415 YV P2 [kW]	3 x 380-415 ΔV/ 660-690 YV [12] P2 [kW]
TP, TPD 32-30/4		●		●		●				●	●			●		●	●				0.12	
TP, TPD 32-40/4		●		●		●				●	●			●		●	●				0.25	
TP, TPD 32-60/4		●		●		●				●	●			●		●	●				0.25	
TP, TPD 32-80/4			●		●	●						●		●				●		●	0.25	
TP, TPD 32-100/4			●		●	●						●		●				●		●	0.37	
TP, TPD 32-120/4			●		●	●						●		●				●		●	0.55	
TP, TPD 40-30/4		●		●		●				●	●			●		●	●				0.12	
TP 40-60/4		●		●		●				●	●			●		●	●				0.25	
TP, TPD 40-90/4		●		●		●						●		●		●	●				0.25	
TP, TPD 40-100/4			●		●	●						●		●				●		●	0.55	
TP, TPD 40-110/4			●		●	●						●		●				●		●	0.75	
TP, TPD 40-140/4			●		●	●						●		●				●		●	1.1	
TP, TPD 50-30/4		●		●		●				●	●			●		●	●				0.25	
TP, TPD 50-60/4		●		●		●				●	●			●		●	●				0.37	
TP, TPD 50-90/4			●		●	●						●		●				●		●	0.55	
TP, TPD 50-80/4			●		●	●						●		●				●		●	0.75	
TP, TPD 50-120/4			●		●	●						●		●				●		●	1.1	
TP, TPD 50-140/4			●		●	●						●		●				●		●	1.5	
TP, TPD 50-190/4			●		●	●						●		●				●		●	2.2	2.2
TP, TPD 50-230/4			●		●	●						●		●				●		●	3.0	3.0
TP, TPD 65-30/4		●		●		●				●	●			●		●	●				0.25	
TP, TPD 65-60/4		●		●		●				●	●			●		●	●				0.55	
TP, TPD 65-90/4			●		●	●						●		●				●		●	0.75	
TP, TPD 65-110/4			●		●	●						●		●				●		●	1.1	
TP, TPD 65-130/4			●		●	●						●		●				●		●	1.5	
TP, TPD 65-150/4			●		●	●						●		●				●		●	2.2	2.2
TP, TPD 65-170/4			●		●	●						●		●				●		●	3.0	3.0
TP, TPD 65-240/4			●		●	●						●		●				●		●		4.0
TP, TPD 80-30/4		●		●		●				●	●			●		●	●				0.37	
TP, TPD 80-60/4		●		●		●				●	●			●		●	●				0.75	
TP, TPD 80-70/4			●		●	●						●		●				●		●	1.1	
TP, TPD 80-90/4			●		●	●						●		●				●		●	1.5	
TP, TPD 80-110/4			●		●	●						●		●				●		●	2.2	2.2
TP, TPD 80-150/4			●		●	●						●		●				●		●	3.0	3.0
TP, TPD 80-170/4			●		●	●						●		●				●		●		4.0
TP, TPD 80-240/4			●		●	●						●		●				●		●		5.5
TP, TPD 80-270/4			●		●	●						●		●				●		●		7.5
TP, TPD 80-340/4			●		●	●						●		●				●		●		11.0
TP, TPD 100-30/4		●		●		●				●	●			●		●	●				0.55	
TP, TPD 100-65/4			●		●	●						●		●				●		●	1.1	
TP, TPD 100-70/4			●		●	●						●		●				●		●	1.5	
TP, TPD 100-90/4			●		●	●						●		●				●		●	2.2	2.2
TP, TPD 100-110/4			●		●	●						●		●				●		●	3.0	3.0

Product range

Pump type	Design			Shaft seal						Pressure stage				Materials							Mains-operated motor	
														Pump housing			Impeller				Voltage [V]	
	TP Series 100	TP Series 200	TP Series 300	BQBE	BAQE	BQQE	DBUE	DQQE	DAQF	PN 6	PN 10	PN 16	PN 25	Cast iron	Nodular cast iron	Bronze [11)]	Stainless steel	Cast iron	Nodular cast iron	Bronze	3 x 220-240 ΔV/ 380-415 YV	3 x 380-415 ΔV/ 660-690 YV [12)]
																					P2 [kW]	P2 [kW]
TP, TPD 100-130/4			●		●	●						●		●				●		●		4.0
TP, TPD 100-170/4			●		●	●						●		●				●		●		5.5
TP 100-140/4			●					●	●				●		●			●		●		5.5
TP, TPD 100-200/4			●		●	●		●	●			●	●	●	●			●		●		7.5
TP, TPD 100-250/4			●		●	●		●	●			●	●	●	●			●		●		11.0
TP, TPD 100-330/4			●		●	●		●	●			●	●	●	●			●		●		15.0
TP, TPD 100-370/4			●		●	●		●	●			●	●	●	●			●		●		18.5
TP, TPD 100-410/4			●		●	●		●	●			●	●	●	●			●		●		22.0
TP 125-60/4			●		●	●						●		●				●		●		2.2
TP 125-80/4			●		●	●						●		●				●		●	3.0	3.0
TP 125-95/4			●		●	●						●		●				●		●		4.0
TP, TPD 125-110/4			●		●	●						●		●				●		●		4.0
TP, TPD 125-130/4			●		●	●						●		●				●		●		5.5
TP, TPD 125-160/4			●		●	●						●		●				●		●		7.5
TP 125-150/4			●					●	●				●		●			●		●		7.5
TP, TPD 125-190/4			●		●	●		●	●			●	●	●	●			●		●		11.0
TP, TPD 125-230/4			●		●	●		●	●			●	●	●	●			●		●		15.0
TP, TPD 125-300/4			●		●	●		●	●			●	●	●	●			●		●		18.5
TP, TPD 125-340/4			●		●	●		●	●			●	●	●	●			●		●		22.0
TP, TPD 125-400/4			●		●	●		●	●			●	●	●	●			●		●		30.0
TP 150-70/4			●		●	●						●		●				●		●		5.5
TP 150-110/4			●		●	●						●		●				●		●		7.5
TP 150-155/4			●		●	●						●		●				●		●		11.0
TP 150-170/4			●		●	●						●		●				●		●		15.0
TP, TPD 150-130/4			●		●	●		●	●			●	●	●	●			●		●		7.5
TP, TPD 150-160/4			●		●	●		●	●			●	●	●	●			●		●		11.0
TP, TPD 150-200/4			●		●	●		●	●			●	●	●	●			●		●		15.0
TP, TPD 150-220/4			●		●	●		●	●			●	●	●	●			●		●		18.5
TP, TPD 150-250/4			●		●	●		●	●			●	●	●	●			●		●		22.0
TP 150-260/4			●		●	●		●	●			●	●	●	●			●		●		18.5
TP 150-280/4			●		●	●		●	●			●	●	●	●			●		●		22.0
TP 150-340/4			●		●	●		●	●			●	●	●	●			●		●		30.0
TP 150-390/4			●		●	●		●	●			●	●	●	●			●		●		37.0
TP 150-450/4			●		●	●		●	●			●	●	●	●			●		●		45.0
TP 150-520/4			●		●	●		●	●			●	●	●	●			●		●		55.0
TP 150-660/4			●		●	●		●	●			●	●	●	●			●		●		75.0
TP 200-50/4			●		●	●						●		●				●		●		4.0
TP 200-70/4			●		●	●						●		●				●		●		5.5
TP 200-90/4			●		●	●						●		●				●		●		7.5
TP 200-130/4			●		●	●						●		●				●		●		11.0
TP 200-150/4			●		●	●						●		●				●		●		15.0
TP 200-160/4			●		●	●		●	●			●	●	●	●			●		●		15.0
TP 200-190/4			●		●	●		●	●			●	●	●	●			●		●		18.5
TP 200-200/4			●		●	●		●	●			●	●	●	●			●		●		22.0
TP 200-240/4			●		●	●		●	●			●	●	●	●			●		●		30.0
TP 200-270/4			●		●	●		●	●			●	●	●	●			●		●		45.0
TP 200-290/4			●		●	●		●	●			●	●	●	●			●		●		37.0

Pump type	Design			Shaft seal						Pressure stage				Materials							Mains-operated motor	
														Pump housing			Impeller				Voltage [V]	
	TP Series 100	TP Series 200	TP Series 300	BQBE	BAQE	BQQE	DBUE	DQQE	DAQF	PN 6	PN 10	PN 16	PN 25	Cast iron	Nodular cast iron	Bronze [11]	Stainless steel	Cast iron	Nodular cast iron	Bronze	3 x 220-240 ΔV/ 380-415 YV P2 [kW]	3 x 380-415 ΔV/ 660-690 YV [12] P2 [kW]
TP 200-320/4			●		●	●		●	●			●	●	●	●			●		●		55.0
TP 200-330/4			●		●	●		●	●			●	●	●	●			●		●		37.0
TP 200-360/4			●		●	●		●	●			●	●	●	●			●		●		45.0
TP 200-400/4			●		●	●		●	●			●	●	●	●			●		●		55.0
TP 200-410/4			●		●	●		●	●			●	●	●	●			●		●		75.0
TP 200-470/4			●		●	●		●	●			●	●	●	●			●		●		75.0
TP 200-530/4			●		●	●		●	●			●	●	●	●			●		●		90.0
TP 200-590/4			●		●	●		●	●			●	●	●	●			●		●		110
TP 200-660/4			●		●	●		●	●			●	●	●	●			●		●		132
TP 300-190/4			●		●	●		●	●			●	●	●	●			●		●		30.0
TP 300-220/4			●		●	●		●	●			●	●	●	●			●		●		37.0
TP 300-250/4			●		●	●		●	●			●	●	●	●			●		●		45.0
TP 300-290/4			●		●	●		●	●			●	●	●	●			●		●		55.0
TP 300-390/4			●		●	●		●	●			●	●	●	●			●		●		75.0
TP 300-420/4			●		●	●		●	●			●	●	●	●			●		●		90.0
TP 300-430/4			●		●	●		●	●			●	●	●	●			●		●		110.0
TP 300-500/4			●		●	●		●	●			●	●	●	●			●		●		132.0
TP 300-550/4			●		●	●		●	●			●	●	●	●			●		●		160.0
TP 350-280/4			●		●	●		●	●			●	●	●	●			●		●		75.0
TP 350-320/4			●		●	●		●	●			●	●	●	●			●		●		90.0
TP 350-360/4			●		●	●		●	●			●	●	●	●			●		●		110.0
TP 350-420/4			●		●	●		●	●			●	●	●	●			●		●		132.0
TP 350-480/4			●		●	●		●	●			●	●	●	●			●		●		160.0
TP 350-530/4			●		●	●		●	●			●	●	●	●			●		●		200.0
TP 350-650/4			●		●	●		●	●			●	●	●	●			●		●		250.0
TP 350-780/4			●		●	●		●	●			●	●	●	●			●		●		315.0
TP 400-470/4			●				●						●		●				●	●		315.0
TP 400-510/4			●				●						●		●				●	●		355.0
TP 400-540/4			●				●						●		●				●	●		400.0
TP 400-670/4			●				●						●		●				●	●		500.0
TP 400-720/4			●				●						●		●				●	●		560.0
TP 400-760/4			●				●						●		●				●	●		630.0

[11] Bronze versions are only available as single-head pumps.

[12] 2-pole motors above 5.5 kW can be operated at 3 x 660-690 YV. Smaller motor sizes cannot be operated at 3 x 660-690 YV.

Product range, TP/TPD, 6-pole, PN 16

● Standard.

Pump type	Design			Shaft seal				Pressure stage				Materials							Mains-operated motor		
												Pump housing			Impeller				Voltage [V]		
	TP Series 100	TP Series 200	TP Series 300	BQBE	BAQE	BQQE	DBUE	PN 6	PN 10	PN 16	PN 25	Cast iron EN-GJL-250	Nodular cast iron EN-GJS-400-18	Bronze 13)	Stainless steel	Cast iron	Nodular cast iron EN-GJS-400-15	Bronze	1 x 220-230 ΔV/ 240 YV	3 x 220-240 ΔV/ 380-415 YV	3 x 380-415 ΔV/ 660-690 YV
																			P2 [kW]	P2 [kW]	P2 [kW]
TP, TPD 125-60/6			●		●	●				●		●				●		●		1.5	
TP, TPD 125-70/6			●		●	●				●		●				●		●		2.2	2.2
TP, TPD 125-80/6			●		●	●				●		●				●		●		3.0	3.0
TP, TPD 125-100/6			●		●	●				●		●				●		●			4.0
TP, TPD 125-130/6			●		●	●				●		●				●		●			5.5
TP, TPD 125-160/6			●		●	●				●		●				●		●			7.5
TP, TPD 150-60/6			●		●	●				●		●				●		●		2.2	2.2
TP, TPD 150-70/6			●		●	●				●		●				●		●		3.0	3.0
TP, TPD 150-90/6			●		●	●				●		●				●		●			4.0
TP, TPD 150-110/6			●		●	●				●		●				●		●			5.5

13) Bronze versions are only available as single-head pumps.

4. Operating conditions

System and test pressures

Pressure	System pressure		Test pressure	
	[bar]	[MPa]	[bar]	[MPa]
PN 6	6	0.6	10	1.0
PN 10	10	1.0	16	1.6
PN 16	16	1.6	24	2.4
PN 25	25	2.5	38	3.8

Sound pressure level

Single-phase: Maximum 70 dB(A).

Three-phase: See table below.

Motor [kW]	Maximum sound pressure level [dB(A)] - ISO 3743		
	Three-phase motors		
	2-pole	4-pole	6-pole
0.12	-	-	-
0.18	-	-	-
0.25	56	41	-
0.37	56	45	-
0.55	57	42	-
0.75	53	59.5	-
1.1	53	49.5	-
1.5	58	50	47
2.2	60	51	52
3.0	59.5	53	63
4.0	63	54	63
5.5	62	50	63
7.5	60	51	66
11.0	60	53	-
15.0	60	54	-
18.5	60.5	60	-
22.0	74	62	-
30.0	75	65	-
37.0	75	64	-
45.0	74	64	-
55.0	74	64	-
75.0	74	64	-
90.0	74	64	-
110.0	77	71	-
132.0	77	71	-
160.0	77	71	-
200.0	-	71	-
250.0	-	73	-
315.0	-	73	-
355.0	-	75	-
400.0	-	75	-
500.0	-	75	-
560.0	-	78	-
630.0	-	78	-

The values apply only to MG, WEG and Innomotics motors.

The values have a tolerance of 3 dB according to EN ISO 4871. The tolerance is not added to the values in the table.

The audible noise from TP pumps is primarily noise from the motor fan. The selection of TPE pumps will reduce the noise at partial load, as the motor and, consequently, the motor fan run at a lower speed. Possible flow noise from control valves is also reduced at partial load in the case of the TPE, TPE2, and TPE3 pumps.

Ambient temperature

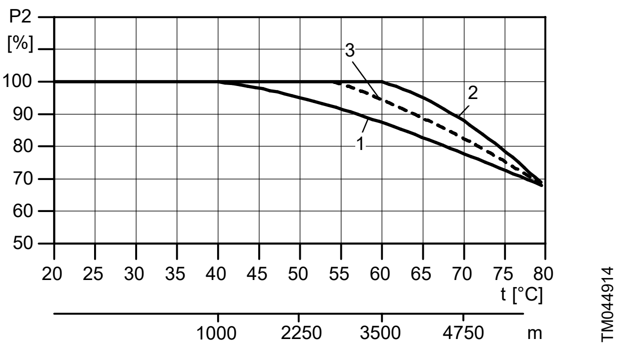
MG IE3 motors: 0.75 - 22 kW motors, 2-pole	-20 to +60 °C
WEG IE4 motors Innomotics IE3 motors: 30-55 kW motors, 2-pole 0.55 - 55 kW motors, 4-pole Innomotics IE4 motors	-20 to +55 °C
MGE motors	-20 to +50 °C
Innomotics/Nidec motor with integrated CUE	0 to +45 °C
Other motor sizes:	-20 to +40 °C
Storage	Down to -30 °C

Installation altitude

Pumps with standard motors

If the ambient temperature exceeds maximum values or if the motor is located more than 1000 m above sea level, the motor output, P2, must be reduced due to the low density and consequent low cooling effect of the air. In such cases, it may be necessary to use an oversize motor with a higher rated output.

Pos.	Description
3	WEG and Innomotics IE4 motors 22-160 kW motors, 2-pole 0.55 - 500 kW motors, 4-pole
2	MG IE4 motors: 0.37 - 18.5 kW motors, 2-pole
1	Other motor sizes



Maximum motor output in relation to ambient temperature and altitude

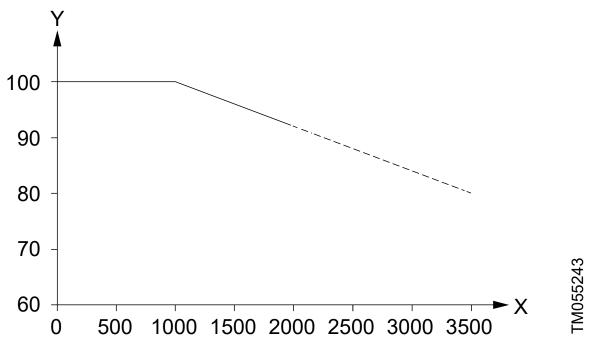
Pumps with Grundfos MGE motors

Description
MGE motors: 0.12 – 22 kW

Installation altitude is the height above sea level of the installation site.

Motors installed up to 1000 m above sea level can be loaded 100 %.

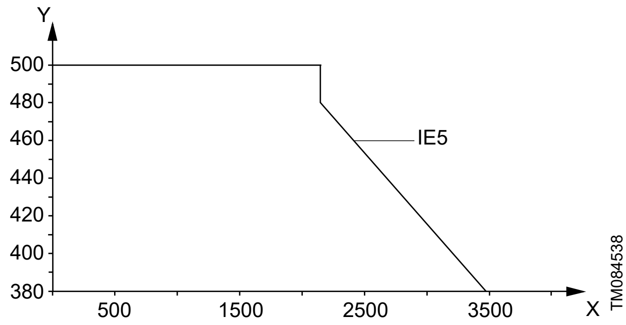
The motors can be installed up to 3500 m above sea level.



Motor output power in relation to altitude

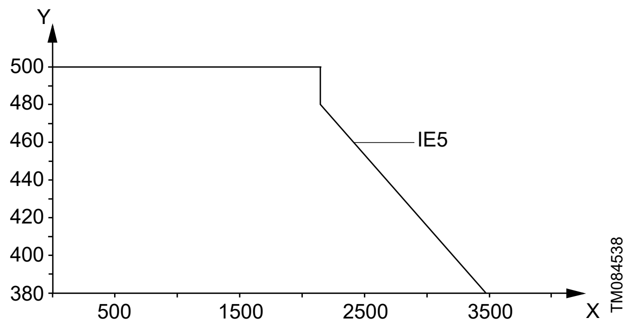
Pos.	Description
X	Altitude [m]
Y	P2 [%]

In order to maintain the galvanic isolation and ensure correct clearance according to EN 60664-1:2007, you must adapt the supply voltage to the altitude:



Supply voltage for three-phase motor in relation to altitude

Pos.	Description
X	Altitude [m]
Y	Supply voltage [V]



Supply voltage for single-phase motor in relation to altitude

Pos.	Description
X	Altitude [m]
Y	Supply voltage [V]

Note:

Motors installed more than 1000 m above sea level must not be fully loaded due to the low density and consequent low cooling effect of the air.

If the motor is to operate at ambient temperatures between 50 and 60 °C, select an oversized motor. Contact Grundfos.

Pump with Innomotics/Nidec motor with integrated CUE

Derating must be taken into account when using CUE in these situations:

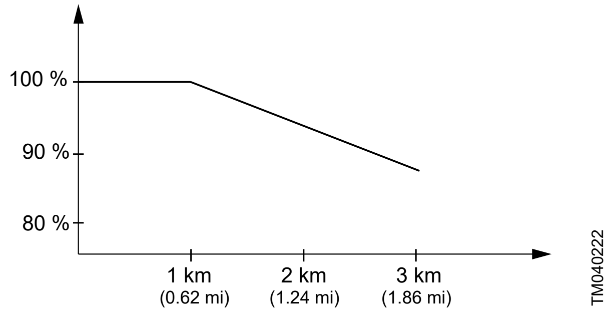
- low air pressure (heights)
- low speeds
- installations with long motor cables
- cables with a large cross-section
- high ambient temperature.

The required action is described in the next sections.

Low air pressure

At low air pressure, the cooling capability of air is reduced.

At altitudes above 1000 m (3280 ft), the maximum output current should be derated in accordance with the diagram in the figure below.



Derating of output current at low air pressure

At altitudes above 2000 m (6561 ft), the PELV requirements cannot be met.

PELV = Protective Extra Low Voltage.

An alternative is to lower the ambient temperature at high altitudes and thereby ensure 100 % output current at high altitudes.

Example

At an altitude of 2000 m (6561 ft), the output current 24.0 A of the selected CUE must be derated to 92 % according to figure Derating of output current at low air pressure. This is equal to 22.1 A and lower than the maximum motor current 23.6 A. The selection is not valid.

Data of the new selected CUE:

Max. output current:	32.0 A
Typical shaft power:	15.0 kW (20 hp)
Product number (IP20):	96754695

Calculation of derated current at an altitude of 2000 m (6561 ft):

Maximum output current = 32.0 x 0.92 = 29.4 A.

This is higher than the maximum motor current 23.6 A.

The new selection is valid.

High ambient temperature

If the output current is reduced to 80 % of the nominal output current of the CUE in question, the ambient temperature may be 5 °C (41 °F) higher.

The other possibility is to use a unit one size bigger. For higher temperature increases, bigger units are required. The efficiency of the CUE will, however, be reduced at higher temperatures.

If the CUE gets too hot, it will reduce the switching frequency.

Note that the nominal temperature rating depends on the enclosure type.

The maximum ambient temperature of the different enclosures can be found in section Technical data.

5. Pumped liquids

Pumped liquids

The pump is suitable for thin, clean, non-aggressive and non-flammable liquids, not containing solid particles or fibres that may attack the pump mechanically or chemically. See section List of pumped liquids.

Examples

- Central heating system water. The water must meet the requirements of accepted standards on water quality in heating systems.
- cooling liquids
- hot tap water
- industrial liquids
- softened water.

If glycol or another antifreeze agent is added to the pumped liquid, the pump must have a shaft seal of the BQQE or DQQE type. See section Recommended shaft seal for water-glycol mixture.

The pumping of liquids with density and/or kinematic viscosity higher than that of water will have the following effects:

- a considerable pressure drop
- a drop in hydraulic performance
- a rise in power consumption.

In such cases, fit the pump with a bigger motor. If in doubt, contact Grundfos.

If the water contains mineral or synthetic oils or chemicals or if other liquids than water are pumped, chose the O-rings accordingly.

Related information

Recommended shaft seal for water-glycol mixture

Liquid temperature

Liquid temperature: -25 to +150 °C.

Please note that shaft seals operating close to their maximum temperature will require regular maintenance or replacement.

Pump type	Shaft seal	Temperature
TP Series 100	BQBE	0 to +120 °C
	BQQE	-25 to +120 °C
TP Series 200	BQBE	0 to +140 °C
	BQQE	-25 to +120 °C
TP Series 300 and TPE Series 1000/2000, 16-bar version	BAQE	0 to +120 °C (140 °C) [14)]
	BQQE	-25 to +120 °C
TP Series 300 and TPE Series 1000, 25-bar version	DQQE	-25 to +140 °C
	DAQF	0 to +140 °C [15)]
TP Series 300, DN400 version	DBUE	0 to +150 °C [16)]
TPE2, TPE3 Extra small and Small	BQBE	0 to +120 °C [17)]
TPE2/3 Extra small and Small	BQQE	-25 to +120 °C

Pump type	Shaft seal	Temperature
TPE2, TPE3 Medium and Large	BAQE	0 to +120 °C (140 °C) [14)]
	BQQE	-25 to +120 °C
TPE2, PN 25	DAQF	0 to +140 °C
	DQQE	-25 to +140 °C

14) TP Series 300, PN 16 pumps are designed for a maximum operating temperature of 140 °C. For operation above 120 °C, select an alternative shaft seal. Contact Grundfos.

15) For operation above 140 °C, contact Grundfos. At 120 to 150 °C, the maximum operating pressure is less than 23 bar.

16) At 120 to 150 °C, the maximum operating pressure is less than 23 bar.

17) 140 °C for a short period.

Depending on the type of cast-iron version and the pump application, the maximum liquid temperature may be limited by local regulations and laws.

List of pumped liquids

TP and TPD pumps are designed for circulation systems with constant flow rate; TPE2, TPE2D, TPE3, TPE3D, TPE and TPED pumps for systems with variable flow rate.

Thanks to their design, you can use the pumps in a wider liquid temperature range than pumps of the canned rotor type.

A number of typical liquids are listed below.

You can use other pump versions, but we consider the ones stated in the list to be the best choices.

The list is intended as a general guide only, and it cannot replace actual testing of the pumped liquids and pump materials under specific working conditions. If in doubt, we recommend that you fill in the form shown on section Key application data and contact Grundfos.

Use the list 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.

A	May contain additives or impurities that may cause shaft seal problems.
B	The density and/or viscosity differ from those of water. Consider this when calculating motor and pump performance.
C	The liquid must be oxygen-free (anaerobic).
D	Risk of crystallisation or precipitation in the shaft seal.
E	Insoluble in water.
F	The shaft seal rubber parts must be replaced with FKM rubber.
G	Bronze housing or impeller required.
H	Risk of formation of ice on the standby pump. The risk only applies to TP, TPE Series 200 pumps.

Pumped liquids	Notes	Additional information	Shaft seal						
			TPE2, TPE 3 Extra small and Small	TPE2, TPE3 Medium and Large	TP Series 100	TP Series 200	TP Series 300, TPE Series 1000/2000, PN 16	TP Series 300, TPE Series 1000 and TPE2, PN 25	TP Series 300 DN 400
Water									
Groundwater		< 120 °C	BQBE BQQE	BQQE	BQBE BQQE	BQBE BQQE	BQQE	DQQE DAQF [19]	DBUE
		> 120 °C		DQQE [18,19]		BQBE	DQQE [18,19]	DQQE [19]	
Boiler-feed water		< 120 °C	BQBE BQQE	BAQE [20] BQQE	BQBE BQQE	BQBE BQQE	BAQE [20] BQQE	DQQE DAQF	DBUE
		< 140 °C		DAQF [18]		BQBE	DAQF [18]	DAQF	DBUE
		< 150 °C						DQQF [18]	DBUE
District-heating water		< 120 °C	BQBE BQQE	BAQE BQQE	BQBE BQQE	BQBE BQQE	BAQE BQQE	DQQE DAQF	DBUE
Condensate		< 120 °C	BQBE BQQE	BAQE BQQE	BQBE BQQE	BQBE BQQE	BAQE BQQE	DQQE DAQF	DBUE
		> 120 °C		DAQF [18]		BQBE	DAQF [18]	DAQF	
Softened water	C	< 120 °C	BQBE BQQE	BQQE BAQE	BQBE BQQE	BQBE BQQE	BQQE BAQE	DQQE DAQF	DBUE
		> 120 °C		DAQF [18]		BQBE	DAQF [18]	DAQF	
Brackish water	G	pH > 6.5, 40 °C, 1000 ppm Cl^-	BQBE BQQE	BQQE	BQBE BQQE	BQBE BQQE	BQQE	DQQE	DBUE
Coolants									
Ethylene glycol	B, D, H	< 120 °C	BQQE	BQQE	BQQE	BQQE	BQQE	DQQE	
		< 90 °C							DQQE [18]
	C	< 140 °C		DQQE			DQQE	DQQE	
Glycerine (glycerol)	B, D, H	< 120 °C	BQQE	BQQE	BQQE	BQQE	BQQE	DQQE	
		< 90 °C							DQQE [18]
	C	< 140 °C		DQQE			DQQE	DQQE	
Potassium acetate	B, D, C, H	< 120 °C	BQQE	BQQE	BQQE	BQQE	BQQE	DQQE	
		< 110 °C			BQQE				
		< 90 °C							DQQE [18]
	C	< 140 °C		DQQE			DQQE	DQQE	
Potassium formate	B, D, C, H	< 120 °C	BQQE	BQQE	BQQE	BQQE	BQQE	DQQE	
		< 90 °C							DQQE [18]
	C	< 140 °C		DQQE			DQQE	DQQE	
Propylene glycol	B, D, H	< 120 °C	BQQE	BQQE	BQQE	BQQE	BQQE	DQQE	
		< 90 °C							DQQE [18]
	C	< 140 °C		DQQE			DQQE	DQQE	
Brine sodium chloride	B, D, C, H	< 5 °C, 30 %	BQQE	BQQE	BQQE	BQQE	BQQE	DQQE	DQQE [18]

Pumped liquids	Notes	Additional information	Shaft seal: TPE2, TPE 3 Extra small and Small	Shaft seal: TPE2, TPE3 Medium and Large	Shaft seal: TP Series 100	Shaft seal: TP Series 200	Shaft seal: TP Series 300, TPE Series 1000/2000, PN 16	Shaft seal: TP Series 300, TPE Series 1000 and TPE2, PN 25	Shaft seal: TP Series 300 DN 400
Synthetic oils									
Silicone oil	B, E		BQBE BQQE	BAQE BQQE	BQBE BQQE	BQBE BQQE	BAQE BQQE	DAQF DQQE	DBUE
Vegetable oils									
Corn oil	B, F, E		BUBV [18) 21)] BQQV [18) 21)]	BBQV [18)] BQQV [18)]	BUBV [18)] BQQV [18)]	BUBV [18)] BQQV [18)]	BBQV [18)] BQQV [18)]	DAQF	DBUV [18)]
Olive oil	B, F, E	< 80 °C	BUBV [18) 21)] BQQV [18) 21)]	BBQV [18)] BQQV [18)]	BUBV [18)] BQQV [18)]	BUBV [18)] BQQV [18)]	BBQV [18)] BQQV [18)]	DAQF	DBUV [18)]
Peanut oil	B, F, E		BUBV [18) 21)] BQQV [18) 21)]	BBQV [18)] BQQV [18)]	BUBV [18)] BQQV [18)]	BUBV [18)] BQQV [18)]	BBQV [18)] BQQV [18)]	DAQF	DBUV [18)]
Rapeseed oil	D, B, F, E		BUBV [18) 21)] BQQV [18) 21)]	BBQV [18)] BQQV [18)]	BUBV [18)] BQQV [18)]	BUBV [18)] BQQV [18)]	BBQV [18)] BQQV [18)]	DAQF	DBUV [18)]
Soybean oil	B, F, E		BUBV [18) 21)] BQQV [18) 21)]	BBQV [18)] BQQV [18)]	BUBV [18)] BQQV [18)]	BUBV [18)] BQQV [18)]	BBQV [18)] BQQV [18)]	DAQF	DBUV [18)]
Cleaning agents									
Soap (salts of fatty acids)	A, E, (F)	< 80 °C	BQQE (BQQV) [18)]	BQQE (BQQV) [18)]	BQQE (BQQV) [18)]	BQQE (BQQV) [18)]	BQQE (BQQV) [18)]	DQQE	DQQE [18)]
Alkaline degreasing agent	A, E, (F)	< 80 °C	BQQE (BQQV) [18)]	BQQE (BQQV) [18)]	BQQE (BQQV) [18)]	BQQE (BQQV) [18)]	BQQE (BQQV) [18)]	DQQE	DQQE [18)]
Oxidants									
Hydrogen peroxide		< 40 °C, < 2 %	BQBE BQQE	BQQE	BQBE BQQE	BQBE BQQE	BQQE	DAQF DQQE	DQQE [18)]
Salts									
Ammonium bicarbonate	A	< 20 °C, < 15 %	BQQE	BQQE	BQQE	BQQE	BQQE	DQQE	DQQE [18)]
Calcium acetate	A, B	< 20 °C, < 30 %	BQQE	BQQE	BQQE	BQQE	BQQE	DQQE	DQQE [18)]
Potassium bicarbonate	A	< 20 °C, < 20 %	BQQE	BQQE	BQQE	BQQE	BQQE	DQQE	DQQE [18)]
Potassium carbonate	A	< 20 °C, < 20 %	BQQE	BQQE	BQQE	BQQE	BQQE	DQQE	DQQE [18)]
Potassium permanganate	A	< 20 °C, < 10 %	BQQE	BQQE	BQQE	BQQE	BQQE	DQQE	DQQE [18)]
Potassium sulphate	A	< 20 °C, < 20 %	BQQE	BQQE	BQQE	BQQE	BQQE	DQQE	DQQE [18)]
Sodium acetate	A	< 20 °C, < 100 %	BQQE	BQQE	BQQE	BQQE	BQQE	DQQE	DQQE [18)]
Sodium bicarbonate	A	< 20 °C, < 2 %	BQQE	BQQE	BQQE	BQQE	BQQE	DQQE	DQQE [18)]
Sodium carbonate	A	< 20 °C, < 20 %	BQQE	BQQE	BQQE	BQQE	BQQE	DQQE	DQQE [18)]
Sodium nitrate	A	< 0 °C, < 40 %	BQQE	BQQE	BQQE	BQQE	BQQE	DQQE	DQQE [18)]
Sodium nitrite	A	< 20 °C, < 40 %	BQQE	BQQE	BQQE	BQQE	BQQE	DQQE	DQQE [18)]
Sodium phosphate (di)	A	< 100 °C, < 30 %	BQQE	BQQE	BQQE	BQQE	BQQE	DQQE	DQQE [18)]
Sodium phosphate (tri)	A	< 90 °C, < 20 %	BQQE	BQQE	BQQE	BQQE	BQQE	DQQE	DQQE [18)]
Sodium sulphate	A	< 20 °C, < 20 %	BQQE	BQQE	BQQE	BQQE	BQQE	DQQE	DQQE [18)]
Sodium sulphite	A	< 20 °C, < 1 %	BQQE	BQQE	BQQE	BQQE	BQQE	DQQE	DQQE [18)]
Alkalis									
Ammonium hydroxide		< 100 °C, < 30 %	BQQE	BQQE	BQQE	BQQE	BQQE	DQQE	DQQE [18)]

Pumped liquids	Notes	Additional information	Shaft seal						
			TPE2, TPE 3 Extra small and Small	TPE2, TPE3 Medium and Large	TP Series 100	TP Series 200	TP Series 300, TPE Series 1000/2000, PN 16	TP Series 300, TPE Series 1000 and TPE2, PN 25	TP Series 300 DN 400
Calcium hydroxide	A	< 100 °C, < 10 %	BQQE	BQQE	BQQE	BQQE	BQQE	DQQE	DQQE [18)]
Potassium hydroxide	A	< 20 °C, < 20 %	BQQE	BQQE	BQQE	BQQE	BQQE	DQQE	DQQE [18)]
Sodium hydroxide	A	< 40 °C, < 20 %	BQQE	BQQE	BQQE	BQQE	BQQE	DQQE	DQQE [18)]

18) The shaft seal is not standard, but available on request.

19) Do not use for potable water.

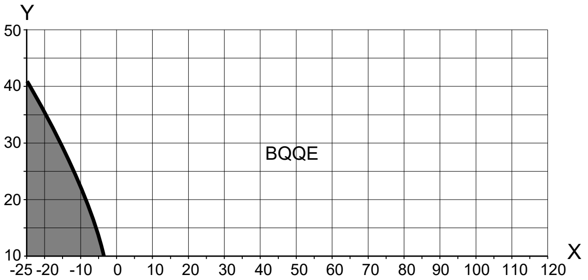
20) Do not use BAQE for potable water. For potable water, we recommend that you use a BBQE shaft seal.

21) Applies only for TPE2.

Related information

30. Key application data

Recommended shaft seal for water-glycol mixture



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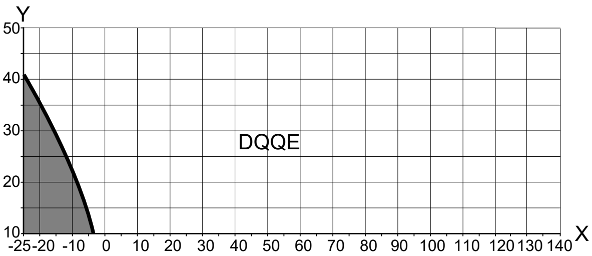
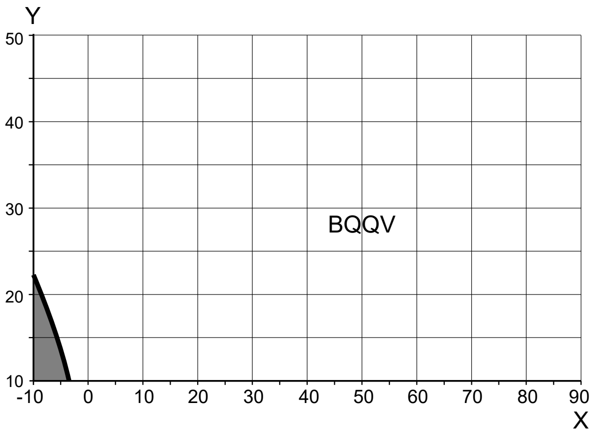


TM087985

Operating range of EPDM shaft seals

Pos.	Description
X	Temperature [°C]
Y	Glycol content [%]



TM061034

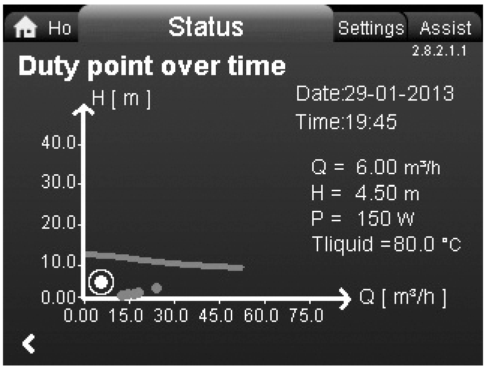
Operating range of FKM shaft seals

Pos.	Description
X	Temperature [°C]
Y	Glycol content [%]

6. TPE3

TM089739

TPE3 and TPE3 D pumps



TM060883

Example of status display for TPE3 pumps

Technical data

Small

Flow rate:	Up to 120 m^3/h
Head:	Up to 25 m
Liquid temperature:	-25 to +120 °C (140 °C for a short period)
Maximum operating pressure:	16 bar
Motor sizes, single-phase:	0.25 to 1.5 kW
Motor sizes, three-phase:	0.25 to 2.2 kW

Medium/Large

Flow rate:	Up to 565 m^3/h
Head:	Up to 78 m
Liquid temperature:	-25 to +120 °C 0 to +140 °C [22)]
Maximum operating pressure:	16 bar
Motor sizes, single-phase:	0.25 to 1.5 kW
Motor sizes, three-phase:	1.1 to 22 kW

22) TP Series 300, PN 16 pumps are designed for a maximum operating temperature of 140 °C. For operation above 120 °C, select an alternative shaft seal. Contact Grundfos.

Construction

The pumps have built-in differential-pressure and temperature sensor.

The permanent-magnet motor has a built-in frequency converter for continuous adjustment of the pressure to the flow rate. All pumps are fitted with Grundfos permanent-magnet MGE motors that have motor efficiency class IE5 according to IEC 60034-30-2.

The range is a preset solution for quick and safe installation.

The pump has a colour display for easy and intuitive pump setup and with full access to all functions.

The pumps are available as single-head, TPE3, and twin-head, TPE3 D, pumps.

The pumps have PN 6, PN 10 or PN 16 flanges.

The pumps are fitted with an unbalanced mechanical shaft seal.

For TPE3 (D) Small: The power head (motor, pump head and impeller) and pump housing are held together by a specially designed clamp. The clamp allows for fast repositioning of the pump housing and fast service of the pump.

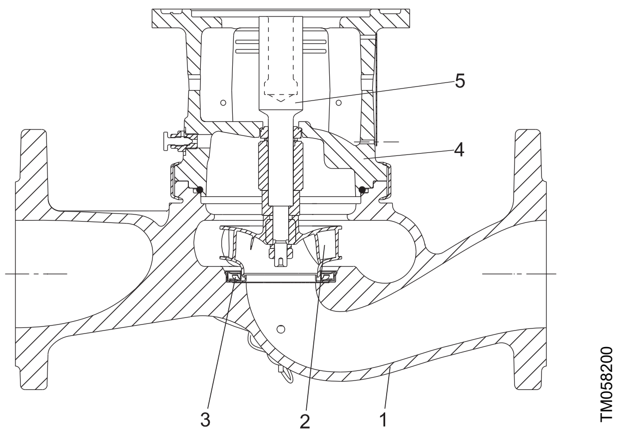
The twin-head pumps are designed with two parallel power heads. A flap valve in the common outlet port is opened by the flow of the pumped liquid and prevents backflow of liquid into the idle pump head.

Pumps with stainless-steel pump housing, version I, are suitable for hot water recirculation.

The TPE3 (D) are divided up in 3 sizes as there are small differences in their construction:

- TPE3 (D) Small
- TPE3 (D) Medium
- TPE3 (D) Large

Materials



Sectional drawing of a TPE3 Small pump

Material specification, TPE3 (D) Small PN 6, 10, 16

Pos.	Component	Material	EN/DIN
1	Pump housing	Cast iron EN-GJL-250 Stainless steel	EN1561 EN 1.4308
2	Impeller	Composite PES-GF30	
3	Wear ring	Stainless steel	EN 1.4404
4	Pump head/motor stool	Cast iron EN-GJL-250 Stainless steel	EN1561 EN 1.4308
	Secondary seals	EPDM	
	Rotating seal face	Silicon carbide	
	Stationary seat	Carbon (resin-impregnated) Silicon carbide	
5	Stub shaft	Stainless steel	EN 1.4404

Material specification, TPE3 (D) Medium PN 16

Pos.	Component	Material	EN/DIN
1	Pump housing	Cast iron EN-GJL-250	EN1561
2	Impeller	Composite PES-GF40	
3	Wear ring	Brass (CUZn34Mn3AL2Fe1-c)	
4	Pump head/motor stool	Cast iron EN-GJL-250	EN1561
	Secondary seals	EPDM	
	Rotating seal face	Silicon carbide	
	Stationary seat	Silicon carbide	
5	Stub shaft	Stainless steel	EN 1.4304

Material specification, TPE3 (D) Large PN 16

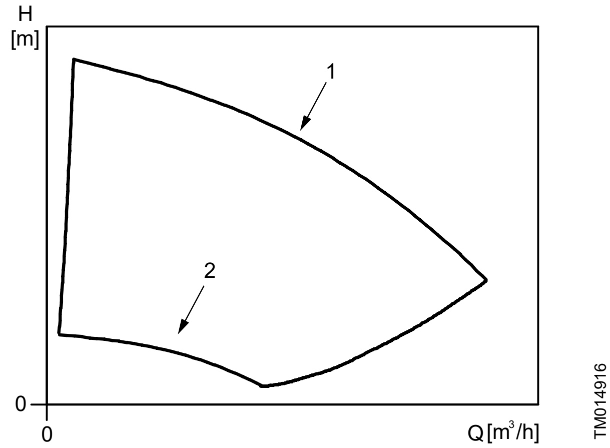
Pos.	Component	Material	EN/DIN
1	Pump housing	Cast iron EN-GJL-250	EN1561
2	Impeller	Cast iron EN-GJL-200 Stainless steel	EN1561 EN 1.4408
3	Wear ring	Brass (CUZn34Mn3AL2Fe1-c)	
4	Pump head/motor stool	Cast iron EN-GJL-250	EN1561
	Secondary seals	EPDM	
	Rotating seal face	Silicon carbide	
	Stationary seat	Silicon carbide	
5	Stub shaft	Stainless steel	EN 1.4304

Applications

The pumps have integrated speed control for automatic adaptation of performance to current conditions.

The energy consumption is thus kept at a minimum.

The pumps can operate at any duty point within the range between minimum and maximum speed.



Duty range of TPE3

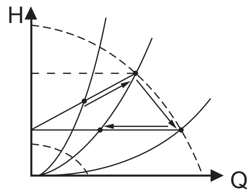
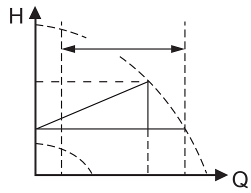
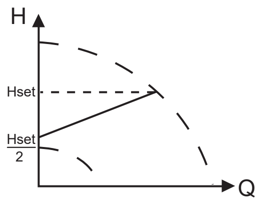
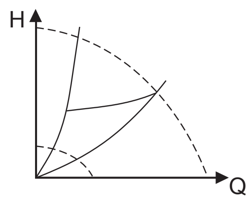
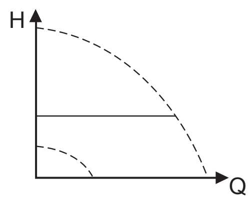
Pos.	Description
1	Maximum speed
2	Minimum speed

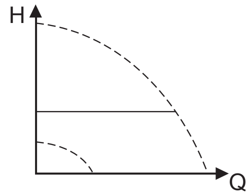
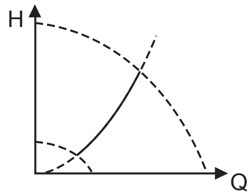
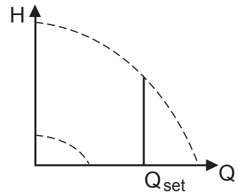
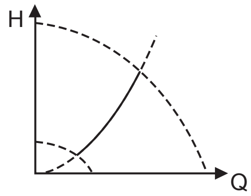
Depending on the application, the pumps offer energy savings, increased comfort or improved processing.

The pumps are suitable for applications requiring pressure control.

AUTOADAPT

TPE3 pumps are factory-set to AUTOADAPT which continuously adapts the pump performance according to the actual system characteristic.

System application	Select this control mode	Pump type
Recommended for most heating systems, especially in systems with relatively large pressure losses in the distribution pipes. See description under proportional pressure. In replacement situations where the proportional-pressure duty point is unknown. The duty point has to be within the AUTOADAPT operating range. During operation, the pump automatically makes the necessary adjustment to the actual system characteristics. This setting ensures minimum energy consumption and low noise level from the valves, and therefore reduces operating costs and increases comfort.	AUTOADAPT 	All
The FLOWADAPT control mode is a combination of AUTOADAPT and FLOWLIMIT. This control mode is suitable for systems where a maximum flow rate limit, FLOWLIMIT, is desired. The pump continuously monitors and adjusts the flow rate, thus ensuring that the selected FLOWLIMIT is not exceeded. Main pumps in boiler applications where a steady flow through the boiler is required. No extra energy is used for pumping too much liquid into the system. In systems with mixing loops, the control mode can control the flow rate in each loop. Benefits: • Enough water for all loops at peak load conditions if each loop has been set to the right maximum flow rate. • The dimensioned flow rate for each zone, required heat energy, is determined by the flow from the pump. • This value can be set precisely in the FLOWADAPT control mode without the use of pump throttling valves. • When the flow rate is set lower than the balancing valve setting, the pump ramps down instead of losing energy by pumping against a balancing valve. • Cooling surfaces in air-conditioning systems operate at high pressure and low flow rate.	FLOWADAPT 	All
In systems with relatively large pressure losses in the distribution pipes and in air-conditioning and cooling systems. • Two-pipe heating systems with thermostatic valves and the following: - very long distribution pipes - strongly throttled pipe balancing valves - differential-pressure regulators - large pressure losses in those parts of the system through which the total quantity of water flows, for example boiler, heat exchanger and distribution pipe up to the first branching. • Primary circuit pumps in systems with large pressure losses in the primary circuit. • Air-conditioning systems with the following: - heat exchangers (fan coils) - cooling ceilings - cooling surfaces.	**Proportional pressure** 	All
In systems with relatively large pressure losses in the distribution pipes and in air-conditioning and cooling systems. • Two-pipe heating systems with thermostatic valves and the following: - very long distribution pipes - strongly throttled pipe balancing valves - differential-pressure regulators - large pressure losses in those parts of the system through which the total quantity of water flows, for example boiler, heat exchanger and distribution pipe up to the first branching. • Primary circuit pumps in systems with large pressure losses in the primary circuit. • Air-conditioning systems with the following: - heat exchangers (fan coils) - cooling ceilings - cooling surfaces.	**Constant differential pressure with differential-pressure sensor located in the system** 	All
In systems with relatively small pressure losses in the distribution pipes. • Two-pipe heating systems with thermostatic valves and the following: - dimensioned for natural circulation - small pressure losses in those parts of the system through which the total quantity of water flows, for example boiler, heat exchanger and distribution pipe up to the first branching or modified to a high differential temperature between flow pipe and return pipe,for example district heating. • Underfloor heating systems with thermostatic valves. • One-pipe heating systems with thermostatic valves or pipe balancing valves. • Primary circuit pumps in systems with small pressure losses in the primary circuit.	**Constant differential pressure** 	All

<table>
<tr><th>System application</th><th>Select this control mode</th><th>Pump type</th></tr>
<tr><td>In pressure boosting systems.</td><td>Constant pressure

</td><td>All</td></tr>
<tr><td>In systems with a fixed system characteristic.
Examples:
• one-pipe heating systems
• boiler shunts
• systems with three-way valves
• hot water recirculation
You can use FLOWLIMIT to control the maximum circulation flow rate.</td><td>Constant temperature and constant differential temperature

</td><td>All</td></tr>
<tr><td>In systems requiring a constant flow rate, independently of pressure drop.
Examples:
• chillers for air-conditioning
• heating surfaces
• cooling surfaces.</td><td>Constant flow rate

</td><td>All</td></tr>
<tr><td>In systems requiring a constant tank level, independently of the flow rate.
Examples:
• process water tanks
• boiler condensate tanks.</td><td>Constant level

</td><td>All</td></tr>
<tr><td>In systems with pumps operating in parallel.
The multipump function enables the control of single-head pumps connected in parallel (two to four pumps) and twin-head pumps without the use of external controllers. The pumps in a multipump system communicate with each other via the wireless GENIair connection or the wired GENI connection.</td><td>Assist menu
Multipump setup</td><td>All</td></tr>
</table>

Multipump system

The multipump function enables the control of up to four single head pumps connected in parallel or twin-head pumps without the use of external controllers. The pumps in a multipump system communicate with each other via the wireless GENIair connection or the wired GENI connection.

For further information on multipump system, see section Multipump system.

Related information

Multipump function

Control options

Communication with the pumps is possible via the control panel, Grundfos GO or a central building management system.

The purpose of controlling the pumps is to monitor and control the pressure, temperature, flow rate of the system.

For further information on control options of the pumps, see section Communication.

7. TPE2

TM089738

TPE2 and TPE2 D pumps

Technical data

Extra small

Flow rate:	Up to 14.7 m^3/h
Head:	Up to 12 m
Liquid temperature:	-25 to +120 °C
Maximum operating pressure:	10 bar
Motor sizes, single-phase:	0.12 to 0.37 kW

Small

Flow rate:	Up to 120 m^3/h
Head:	Up to 25 m
Liquid temperature:	-25 to +120 °C (140 °C for a short period)
Maximum operating pressure:	16 bar
Motor sizes, single-phase:	0.25 to 1.5 kW
Motor sizes, three-phase:	0.25 to 2.2 kW

Medium/Large

Flow rate:	Up to 565 m^3/h
Head:	Up to 78 m
Liquid temperature:	-25 to +120 °C 0 to +140 °C
Maximum operating pressure:	16 bar
Motor sizes, single-phase:	0.25 to 1.5 kW
Motor sizes, three-phase:	1.1 to 22 kW

Large, PN 25

Flow rate:	Up to 565 m^3/h
Head:	Up to 45 m
Liquid temperature:	-25 to +120 °C 0 to +140 °C
Maximum operating pressure:	25 bar
Motor sizes, three-phase:	5.5 to 22 kW

Construction

Via an external signal from a sensor or a controller, the pumps allow for any configuration and control method required, that is constant pressure, temperature, flow rate or level.

The permanent-magnet motor has a built-in frequency converter for continuous adjustment of the pressure to the flow rate. All pumps are fitted with Grundfos permanent-magnet MGE motors that have motor efficiency class IE5 according to IEC 60034-30-2.

The range is a preset solution for quick and safe installation.

The pumps are of the top-pull-out design, that is you can remove the power head (motor, pump head and impeller) for maintenance or service while the pump housing remains in the pipes.

The pumps are available as single-head, TPE2, and twin-head, TPE2 D, pumps.

The TPE2 pumps have small differences in their construction and are divided up in four versions:

- TPE2 Extra Small
- TPE2 (D) Small
- TPE2 (D) Medium
- TPE2 (D) Large

The pumps are available as single-head, TPE2, and twin-head, TPE2 D, pumps.

TPE2 Extra Small

Motor and pump shafts are connected via a rigid two-part coupling. The pumps in DN 25 and 32 are available with union connections and DN 40 are available with PN 10 flanges. The pumps are fitted with an unbalanced mechanical shaft seal.

TPE2 (D) Small

The pumps have a rigid stub shaft. The pumps have PN 6, PN 10 or PN 16 flanges.

The pumps are fitted with an unbalanced mechanical shaft seal.

The power head (motor, pump head and impeller) and pump housing are held together by a specially designed clamp. The clamp allows for fast repositioning of the pump housing and fast service of the pump.

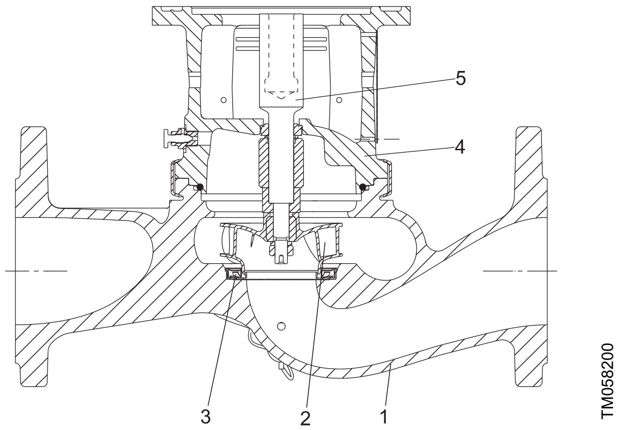
The twin-head pumps are designed with two parallel power heads. A flap valve in the common outlet port is opened by the flow of the pumped liquid and prevents backflow of liquid into the idle pump head.

Pumps with stainless-steel pump housing, version I, are suitable for hot water recirculation.

TPE2 (D) Medium and Large

The pumps have a rigid stub shaft. The pumps have PN 16 flanges and are fitted with an unbalanced mechanical shaft seal. The twin-head pumps are designed with two parallel power heads. A flap valve in the common outlet port is opened by the flow of the pumped liquid and prevents back flow of liquid into the idle pump head. TPE2 Large is also made in a PN 25 version and are fitted with a balanced shaft seal.

Materials



Sectional drawing of a TPE2 Small pump

Material specification, TPE2 Extra small, PN 10

Pos.	Component	Material	EN/DIN
1	Pump housing	Cast iron EN-GJL-150, EN-GJL-200, stainless steel	EN-JL 1020 EN-JL 1030 1.4308
2	Impeller	Composite PES/PP 30 % GF	
3	Shaft	Stainless steel	1.4057
4	Coupling	Cast iron EN-GJL-400	0.7040
5	Pump head	Cast iron EN-GJL-200, stainless steel	EN-JL 1030 1.4308
	Secondary seals	EPDM	
	Rotating seal face	Silicon carbide	
	Stationary seat	Silicon carbide	

Material specification, TPE2 (D) Small, PN 6, PN 10, PN 16

Pos.	Component	Material	EN/DIN
1	Pump housing	Cast iron EN-GJL-250 Stainless steel	EN1561 EN 1.4308
2	Impeller	Composite PES-GF30	
3	Wear ring	Stainless steel	EN 1.4404
4	Pump head/motor stool	Cast iron EN-GJL-250 Stainless steel	EN1561 EN 1.4308
	Secondary seals	EPDM	
	Rotating seal face	Silicon carbide	
	Stationary seat	Silicon carbide	
5	Stub shaft	Stainless steel	EN 1.4304/ 1.4404

Material specification, TPE2 (D) Medium, PN 16

Pos.	Component	Material	EN/DIN
1	Pump housing	Cast iron EN-GJL-250	EN1561
2	Impeller	Composite PES-GF40	
3	Wear ring	Brass (CUZn34Mn3AL2Fe1-c)	
4	Pump head/motor stool	Cast iron EN-GJL-250	EN1561
	Secondary seals	EPDM	
	Rotating seal face	Silicon carbide	
	Stationary seat	Silicon carbide	
5	Stub shaft	Stainless steel	EN 1.4304

Material specification, TPE2 (D) Large, PN 16

Pos.	Component	Material	EN/DIN
1	Pump housing	Cast iron EN-GJL-250	EN1561
2	Impeller	Cast iron EN-GJL-200 Stainless steel	EN1561 EN 1.4408
3	Wear ring	Brass (CUZn34Mn3AL2Fe1-c)	
4	Pump head/motor stool	Cast iron EN-GJL-250	EN1561
	Secondary seals	EPDM	
	Rotating seal face	Silicon carbide	
	Stationary seat	Silicon carbide	
5	Stub shaft	Stainless steel	EN 1.4304

Material specification, TPE2 Large, PN 25

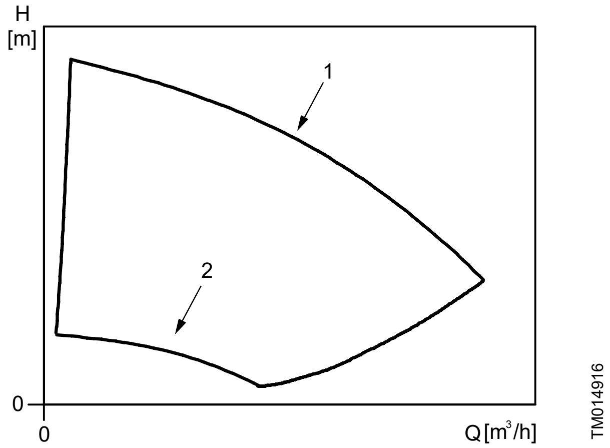
Pos.	Component	Material	EN/DIN
1	Pump housing	Ductile cast iron EN-GJS-400-18-LT	EN-JS 1025
2	Impeller	Cast iron EN-GJL-200, bronze CuSn10	EN-JL 1030 2.1093
3	Stub shaft Two-part stub shaft	Stainless steel Stainless steel / steel	1.4301 1.4301 / 1.0301
4	Motor stool	Cast iron EN-GJL-250	EN-JL 1040
	Secondary seals	EPDM FXM	
	Rotating seal face	Metal-impregnated carbon Silicon carbide	
	Stationary seat	Silicon carbide	
5	Wear ring	Brass CuZn34Mn3Al2Fe1-C	CC7645

Applications

The pumps have integrated speed control for automatic adaptation of performance to current conditions.

The energy consumption is thus kept at a minimum.

The pumps can operate at any duty point within the range between minimum and maximum speed.



Duty range of TPE2

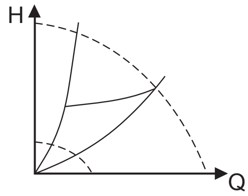
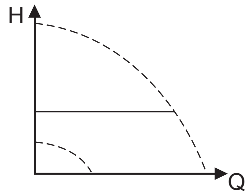
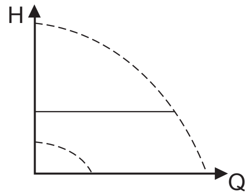
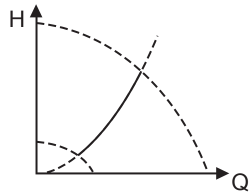
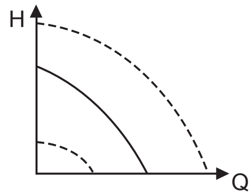
Pos.	Description
1	Maximum speed
2	Minimum speed

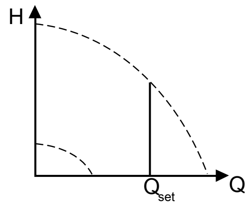
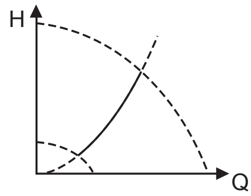
Depending on the application, the pumps offer energy savings, increased comfort or improved processing.

The pumps can be fitted with sensor types meeting the requirements mentioned in section Accessories.

Constant curve

The pumps are factory-set to constant-curve control mode.

System application	Select this control mode	Pump type
In systems with relatively large pressure losses in the distribution pipes and in air-conditioning and cooling systems. • Two-pipe heating systems with thermostatic valves and the following: • very long distribution pipes • strongly throttled pipe balancing valves • differential-pressure regulators • large pressure losses in those parts of the system through which the total quantity of water flows, for example boiler, heat exchanger and distribution pipe up to the first branching • primary circuit pumps in systems with large pressure losses in the primary circuit • air-conditioning systems with the following: - heat exchangers (fan coils) - cooling ceilings - cooling surfaces.	**Constant differential-pressure with differential pressure sensor located in the system** 	All
In systems with relatively small pressure losses in the distribution pipes. • Two-pipe heating systems with thermostatic valves and the following: - sized for natural circulation - small pressure losses in those parts of the system through which the total quantity of water flows, for example boiler, heat exchanger and distribution pipe up to the first branching, or modified to a high differential temperature between flow pipe and return pipe, for example district heating. • Underfloor heating systems with thermostatic valves. • One-pipe heating systems with thermostatic valves or pipe balancing valves. • Primary circuit pumps in systems with small pressure losses in the primary circuit.	**Constant differential pressure** 	All
In pressure boosting systems.	**Constant pressure** 	All
In systems with a fixed system characteristic. Examples: • one-pipe heating systems • boiler shunts • systems with three-way valves • hot water recirculation.	**Constant temperature and constant differential temperature** 	All
If an external controller is installed, the pump is able to change from one constant curve to another, depending on the value of the external signal. The pump can also be set to operate according to the maximum or minimum curve, like an uncontrolled pump: • Use the maximum curve mode in periods in which a maximum flow rate is required. This operating mode is for instance suitable for hot-water priority. • Use the minimum curve mode in periods in which a minimum flow rate is required. This operating mode is for instance suitable for manual night setback instead of automatic night setback.	**Constant curve** 	All

System application	Select this control mode	Pump type
In systems requiring a constant flow rate, independently of pressure drop. Examples: • chillers for air-conditioning • heating surfaces • cooling surfaces.	**Constant flow rate**  	All
In systems requiring a constant tank level, independently of the flow rate. Examples: • process water tanks • boiler condensate tanks.	**Constant level**  	All
In systems with pumps operating in parallel. The multipump function enables the control of single-head pumps connected in parallel (two to four pumps) and twin-head pumps without the use of external controllers. The pumps in a multipump system communicate with each other via the wireless GENIair connection or the wired GENI connection.	**Assist menu** **Multipump setup**	All

Multipump system

The multipump function enables the control of up to four single-head pumps connected in parallel or twin-head pumps without the use of external controllers. The pumps in a multipump system communicate with each other via the wireless GENIair connection or the wired GENI connection.

For further information on multipump system, see section Multipump system.

Related information

Multipump function

Control options

Communication with the pumps is possible via a central building management system, Grundfos GO or control panel.

The purpose of controlling TPE2 pumps is to monitor and control the pressure, temperature, flow rate and liquid level of the system.

For further information on control options of TPE2 pumps, see section Communication.

8. TPE Series 2000 pumps

TPE Series 2000

Technical data

Flow rate:	Up to 1600 m^3/h
Head:	Up to 92 m
Liquid temperature:	-25 to +140 °C
Maximum operating pressure:	16 bar
Motor sizes (three-phase):	30 to 90 kW

Construction

TPE, TPED Series 2000 pumps are based on TP, TPD 300 pumps.

The main differences between the TP and the TPE Series 2000 pumps are the motor and the factory-fitted differential-pressure sensor.

TPE pumps are free of choice with motors equivalent to IE4 or IE5.

The range is a preset solution for quick and safe installation.

For further information on construction and materials of the pumps, see sections TP Series 300 pumps.

Related information

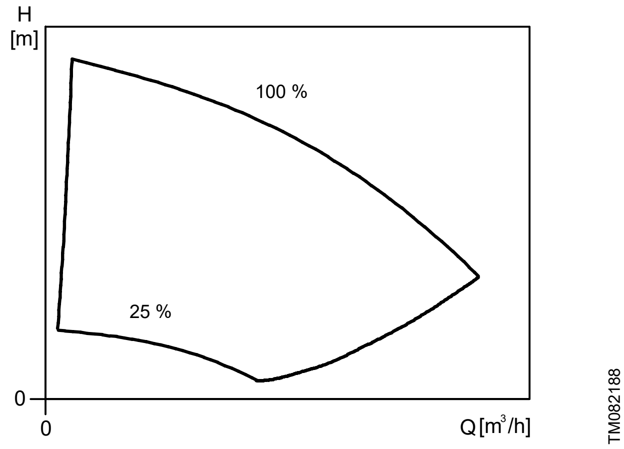
10. TP Series 300 pumps

Applications

TPE Series 2000 pumps have integrated speed control for automatic adaptation of performance to current conditions.

The energy consumption is thus kept at a minimum.

The pumps can operate at any duty point within the range between 25 and 100 % speed.



Duty range of TPE Series 2000 pumps

The 100 % curve corresponds to the curve of a pump with a mains-operated motor.

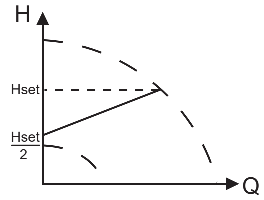
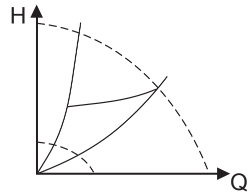
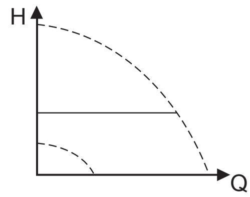
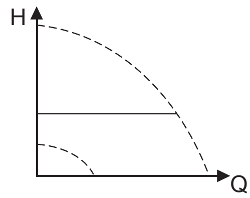
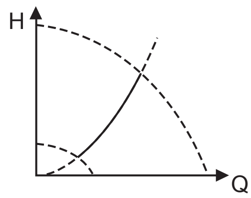
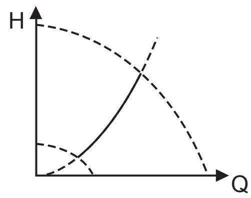
Depending on the application, the pumps offer energy savings, increased comfort or improved processing.

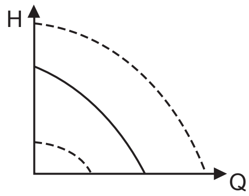
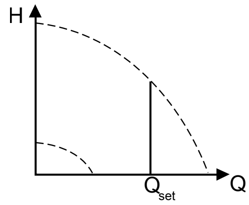
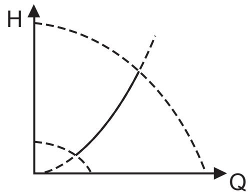
The pumps are suitable for applications requiring pressure control.

Proportional pressure

The pumps are factory-set to proportional pressure control. We recommend that you use proportional pressure control in systems with relatively large pressure losses, as it is the most economical control mode.

The charts below show possible control modes of the pumps in different applications.

System application	Select this control mode	Pump type
In systems with relatively large pressure losses in the distribution pipes and in air-conditioning and cooling systems. • Two-pipe heating systems with thermostatic valves and the following: - very long distribution pipes - strongly throttled pipe balancing valves - differential-pressure regulators - large pressure losses in those parts of the system through which the total quantity of water flows, for example boiler, heat exchanger and distribution pipe up to the first branching. • Primary circuit pumps in systems with large pressure losses in the primary circuit. • Air-conditioning systems with the following: - heat exchangers (fan coils) - cooling ceilings - cooling surfaces.	**Proportional pressure** 	All
In systems with relatively large pressure losses in the distribution pipes and in air-conditioning and cooling systems. • Two-pipe heating systems with thermostatic valves and the following: - very long distribution pipes - strongly throttled pipe balancing valves - differential-pressure regulators - large pressure losses in those parts of the system through which the total quantity of water flows, for example boiler, heat exchanger and distribution pipe up to the first branching. • Primary circuit pumps in systems with large pressure losses in the primary circuit. • Air-conditioning systems with the following: - heat exchangers (fan coils) - cooling ceilings - cooling surfaces.	**Constant differential pressure with differential-pressure sensor located in the system** 	All
In systems with relatively small pressure losses in the distribution pipes. • Two-pipe heating systems with thermostatic valves and the following: - sized for natural circulation - small pressure losses in those parts of the system through which the total quantity of water flows, for example boiler, heat exchanger and distribution pipe up to the first branching or modified to a high differential temperature between flow pipe and return pipe, for example district heating. • Underfloor heating systems with thermostatic valves. • One-pipe heating systems with thermostatic valves or pipe balancing valves. • Primary circuit pumps in systems with small pressure losses in the primary circuit.	**Constant differential pressure** 	All
In pressure boosting systems.	**Constant pressure** 	
In systems with a fixed system characteristic. Examples: • one-pipe heating systems • boiler shunts • systems with three-way valves • hot water recirculation.	**Constant temperature** 	
	Constant differential temperature 	0.12 - 22 kW

System application	Select this control mode	Pump type
If an external controller is installed, the pump is able to change from one constant curve to another, depending on the value of the external signal. The pump can also be set to operate according to the maximum or minimum curve: • Use the maximum curve mode in periods in which a maximum flow rate is required. This operating mode is for instance suitable for hot-water priority. • Use the minimum curve mode in periods in which a minimum flow rate is required.	**Constant curve** 	All
In systems requiring a constant flow, independently of pressure drop. Examples: • chillers for air-conditioning • heating surfaces • cooling surfaces.	**Constant flow rate** 	
In systems requiring a constant tank level, independently of the flow rate. Examples: • process water tanks • boiler condensate tanks.	**Constant level** 	

Control options

Communication with the pumps is possible via a central building management system or control panel.

The purpose of controlling the pumps is to monitor and control the pressure, temperature, flow rate and liquid level of the system.

For further information on control options of the pumps, see section Communication.

9. TPE Series 1000 pumps

TM075849

TPE Series 1000

Technical data

Flow rate:	Up to 1600 m^3/h
Head:	Up to 95 m
Liquid temperature:	-25 to +150 °C
Maximum operating pressure:	25 bar
Motor sizes, three-phase:	30 to 90 kW

Construction

TPE Series 1000 pumps are based on TP Series 300 pumps.

TPE pumps are free of choice with motors equivalent to IE4 or IE5.

The pumps are suitable for applications where the pressure, temperature, flow rate or another parameter is to be controlled on the basis of signals from a sensor at some point in the system.

Note: The pumps are not fitted with a sensor from the factory.

For further information on construction and materials of the pumps, see sections TP Series 300 pumps.

Related information

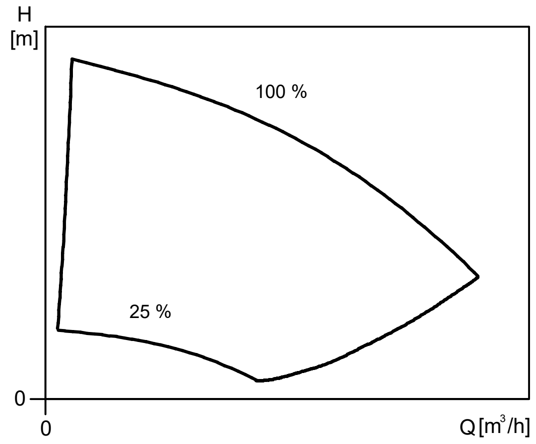
10. TP Series 300 pumps

Applications

TPE Series 1000 pumps have integrated speed control for automatic adaptation of performance to current conditions.

The energy consumption is thus kept at a minimum.

The pumps can operate at any duty point within the range between 25 and 100 % speed.



TM082188

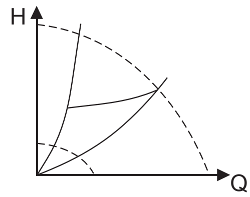
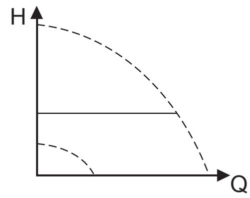
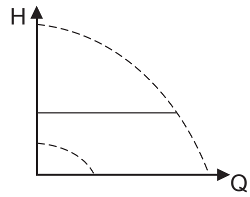
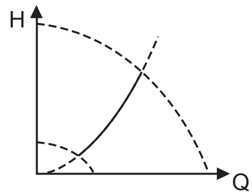
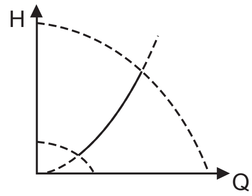
Duty range of TPE Series 1000 pumps

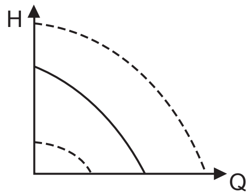
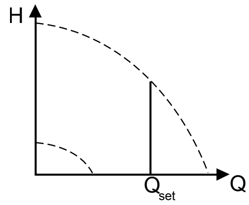
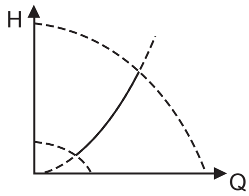
The 100 % curve corresponds to the curve of a pump with a mains-operated motor.

Depending on the application, the pumps offer energy savings, increased comfort or improved processing.

The pumps can be fitted with sensor types meeting the requirements mentioned in section Accessories.

The charts below show possible control modes of the pumps in different applications.

System application	Select this control mode	Pump type
In systems with relatively large pressure losses in the distribution pipes and in air-conditioning and cooling systems. • Two-pipe heating systems with thermostatic valves and the following: - very long distribution pipes - strongly throttled pipe balancing valves - differential-pressure regulators - large pressure losses in those parts of the system through which the total quantity of water flows, for example boiler, heat exchanger and distribution pipe up to the first branching. • Primary circuit pumps in systems with large pressure losses in the primary circuit. • Air-conditioning systems with the following: - heat exchangers (fan coils) - cooling ceilings - cooling surfaces.	**Constant differential pressure with differential-pressure sensor located in the system**  	All
In systems with relatively small pressure losses in the distribution pipes. • Two-pipe heating systems with thermostatic valves and the following: - sized for natural circulation - small pressure losses in those parts of the system through which the total quantity of water flows, for example boiler, heat exchanger and distribution pipe up to the first branching, or modified to a high differential temperature between flow pipe and return pipe, for example district heating. • Underfloor heating systems with thermostatic valves. • One-pipe heating systems with thermostatic valves or pipe balancing valves. • Primary circuit pumps in systems with small pressure losses in the primary circuit.	**Constant differential pressure**  	All
In pressure boosting systems.	**Constant pressure**  	All
In systems with a fixed system characteristic. Examples: • one-pipe heating systems • boiler shunts • systems with three-way valves • hot water recirculation.	**Constant temperature**  	All
	Constant differential temperature  	

System application	Select this control mode	Pump type
If an external controller is installed, the pump is able to change from one constant curve to another, depending on the value of the external signal. The pump can also be set to operate according to the maximum or minimum curve: • Use the maximum-curve mode in periods in which a maximum flow rate is required. This operating mode is for instance suitable for hot-water priority. • Use the minimum-curve mode in periods in which a minimum flow rate is required.	**Constant curve** 	All
In systems requiring a constant flow rate, independently of pressure drop. Examples: • chillers for air-conditioning • heating surfaces • cooling surfaces	**Constant flow rate** 	All
In systems requiring a constant tank level, independently of the flow rate. Examples: • process water tanks • boiler condensate tanks.	**Constant level** 	0.12 - 22 kW

Control options

Communication with TPE, TPED Series 1000 pumps is possible via a central building management system or control panel.

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

For further information on control options of the pumps, see section Communication.

10. TP Series 300 pumps

TP Series 300

Technical data

	PN 16 version	PN 25 version
Flow rate [m³/h]	Up to 2000	Up to 4500
Head [m]	Up to 93	Up to 140
Liquid temperature [°C]	-25 to +140	-25 to +150 [23)]
Maximum operating pressure [bar]	16	25
Direction of rotation	Clockwise	

23) At 120 to 150 °C, the maximum operating pressure is less than 23 bar.

Construction

Grundfos TP, TPD Series 300 pumps are single-stage, close-coupled pumps with in-line inlet and outlet ports of identical diameter.

The pumps are fitted with a fan-cooled asynchronous motor. Motor and pump shafts are connected via a rigid sleeve coupling.

Most TP Series 300 pumps are available as single-head, TP, and twin-head, TPD pumps.

TP Series 300 pumps have PN 16 flanges or PN 25 flanges.

The largest pumps have DN 500, PN 40 inlet flanges and DN 400, PN 40 outlet flanges and a maximum operating pressure of 25 bar.

The pumps are fitted with an unbalanced or a balanced mechanical shaft seal.

The pumps are of the top-pull-out design, that is you can remove the power head (motor, pump head and/or motor stool and impeller) for maintenance or service while the pump housing remains in the pipes.

The pump housing is provided with a replaceable wear ring to ensure high pump efficiency for life.

The twin-head pumps are designed with two parallel power heads. A non-return flap valve in the common outlet port is opened by the flow of the pumped liquid and prevents backflow of liquid into the idle pump head.

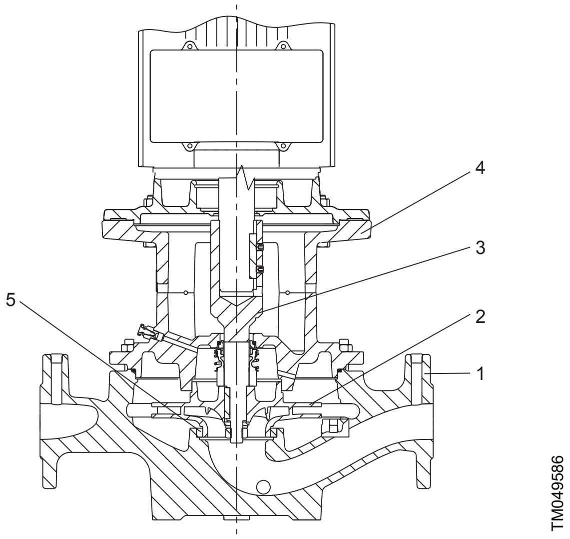
As radial and axial forces are absorbed by the fixed bearing in the motor drive-end, the pump requires no bearing.

The impeller is hydraulically balanced to minimise axial forces.

TP, TPD Series 300 pumps are fitted with high-efficiency motors.

TP Series 300 pumps with bronze impeller are suitable for pumping brine.

Materials



Sectional drawing of TP Series 300

Material specification

TP Series 300, PN 16

Pos.	Component	Material	EN/DIN
1	Pump housing	Cast iron EN-GJL-250	EN-JL 1040
2	Impeller	Cast iron EN-GJL-200, bronze CuSn10	EN-JL 1030 2.1093
3	Stub shaft Two-part stub shaft	Stainless steel Stainless steel / steel	1.4301 1.4301 / 1.0301
4	Pump head / motor stool	Cast iron EN-GJL-250	EN-JL 1040
	Secondary seals	EPDM	
	Rotating seal face	Metal-impregnated carbon Silicon carbide	
	Stationary seat	Silicon carbide	
5	Wear ring	Brass CuZn34Mn3Al2Fe1-C	CC7645

TP Series 300, PN 25

Pos.	Component	Material	EN/DIN
1	Pump housing	Ductile cast iron EN-GJS-400-18-LT	EN-JS 1025
2	Impeller	Cast iron EN-GJL-200, bronze CuSn10	EN-JL 1030 2.1093
3	Stub shaft Two-part stub shaft	Stainless steel Stainless steel / steel	1.4301 1.4301 / 1.0301
4	Motor stool	Cast iron EN-GJL-250	EN-JL 1040
	Secondary seals	EPDM FXM	
	Rotating seal face	Metal-impregnated carbon Silicon carbide	
	Stationary seat	Silicon carbide	
5	Wear ring	Brass CuZn34Mn3Al2Fe1-C	CC7645

TP Series 300, DN 400, PN 25

Pos.	Component	Material	EN/DIN
1	Pump housing	Ductile cast iron EN-GJS-400-18 (A-LT)	EN-JS1020
2	Impeller	Ductile cast iron EN-GJS-400	EN-JS1030
		Bronze CuSn10	2.1093
3	Pump shaft	Stainless steel	1.4436
4	Coupling	Cast iron EN-GJL-250	EN-JL1040
5	Motor stool	Cast iron EN-GJL-250	EN-JL1040
	Secondary seals	EPDM rubber	
	Rotating seal face	Resin-impregnated carbon	
	Stationary seat	Tungsten carbide	

Mechanical shaft seal

For 16-bar versions, the following unbalanced mechanical shaft seals is available as standard:

- **BQQE**
  The BQQE shaft seal is a rubber bellows seal with silicon carbide/silicon carbide seal faces and secondary seals of EPDM.

For 25-bar versions, the following types of balanced mechanical shaft seals are available as standard:

- **DAQF**
  The DAQF shaft seal is a balanced O-ring seal with carbon/silicon carbide seal faces and secondary seals of FXM.
- **DQQE**
  The DQQE shaft seal is a balanced O-ring seal with silicon carbide/silicon carbide seal faces and secondary seals of EPDM.
- **DBUE**
  The DBUE shaft seal is a balanced O-ring seal with carbon/tungsten carbide seal faces and secondary seals of EPDM.

For further information about common pumped liquids with recommended shaft seals, see section List of pumped liquids.

Special shaft seals are available for partly conditioned water or other liquids containing abrasive or crystallising particles. See section List of pumped liquids.

Related information

List of pumped liquids

Connections

TP Series 300 pumps have PN 16 or PN 25 flanges. All dimensions are according to ISO 7005-2 or EN 1092-2.

Features and benefits

TP Series 300 pumps have these features and benefits:

Optimised hydraulics for high efficiency

- Reduced power consumption.

High-efficiency motors

- TP pumps are fitted with high-efficiency motors. High-efficiency motors offer reduced energy consumption. TP pumps are primarily fitted with motors that meet the legislative requirements of the EuP IE3 or IE4 grade. For further information, see section Motors.

Top-pull-out design

- Easy dismantling in case of service.

In-line design

- Contrary to end-suction pumps, in-line pumps allow straight pipes and thus often reduced installation costs.

Motor-pump shaft with sleeve coupling

- Stable and quiet operation.
- Easy dismantling in case of service.

Hydraulically and mechanically balanced impeller

- The impeller is hydraulically and mechanically balanced to increase the life of motor bearings and shaft seal.

Surface treatment

TP series 300 pumps are given the following surface treatment

Pump type	Electrocoating	Spray painting
TP Series 300 from DN 32 to DN 350	x	
TP Series 300, DN 400		2x

Electrocoating includes:

1. Alkaline cleaning.
2. Pretreatment with zinc phosphate coating.
3. Cathodic electrocoating, epoxy.
4. Curing of paint film at 200-250 °C.

For low-temperature applications at a high humidity, Grundfos offers TP pumps with extra surface treatment to avoid corrosion. These pumps are available on request.

Related information

Motors

11. TP Series 100 and 200 pumps

TP Series 100 and TP Series 200

Technical data

Flow rate:	Up to 90 m^3/h
Head:	Up to 27 m
Liquid temperature, TP Series 100:	-25 to +120 °C
Liquid temperature, TP Series 200:	-25 to +140 °C
Maximum operating pressure:	Up to 16 bar
Direction of rotation:	Counterclockwise

Construction

Grundfos TP Series 100 and Series 200 pumps are single-stage, close-coupled pumps with in-line inlet and outlet ports of identical diameter.

The pumps are fitted with a fan-cooled asynchronous motor. Motor and pump shafts are connected via a rigid two-part coupling.

TP Series 100 pumps with union connection are available as single-head, TP, pumps.

TP Series 200 pumps are available as single-head, TP, and twin-head, TPD, pumps.

TP Series 200 pumps have PN 6 or PN 10 flanges.

The pumps are fitted with an unbalanced mechanical shaft seal.

The pumps are of the top-pull-out design, that is you can remove the power head (motor, pump head and impeller) for maintenance or service while the pump housing remains in the pipes.

The twin-head pumps are designed with two parallel power heads. A flap valve in the common outlet port is opened by the flow of the pumped liquid and prevents backflow of liquid into the idle pump head.

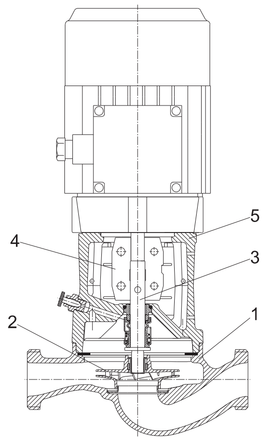
As radial and axial forces are absorbed by the fixed bearing in the motor drive-end, the pump requires no bearing.

The pumps are fitted with high-efficiency motors.

Pumps with a bronze or stainless-steel pump housing are suitable for hot water recirculation.

Materials

TP Series 100

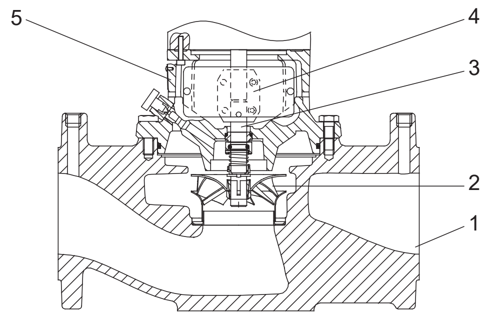


Sectional drawing of TP Series 100 with union connection

Material specification, Series 100

Pos.	Component	Material	EN/DIN
1	Pump housing	Cast iron EN-GJL-150, EN-GJL-200, stainless steel	EN-JL 1020 EN-JL 1030 1.4308
2	Impeller	Composite PES/PP 30 % GF	
3	Shaft	Stainless steel	1.4057
4	Coupling	Cast iron EN-GJL-400	0.7040
5	Pump head	Cast iron EN-GJL-200, stainless steel	EN-JL 1030 1.4308
	Secondary seals	EPDM	
	Rotating seal face	Silicon carbide	
	Stationary seat	Carbon (resin-impregnated), silicon carbide	

TP Series 200



Sectional drawing of TP Series 200 with flange connection

Material specification, Series 200

Pos.	Component	Material	EN/DIN
1	Pump housing	Cast iron EN-GJL-250, bronze CuSn10	EN-JL 1040 2.1093
2	Impeller	Stainless steel	1.4301
3	Shaft	Stainless steel	1.4305

Pos.	Component	Material	EN/DIN
4	Coupling	Cast iron EN-GJL-400	0.7040
5	Pump head	Cast iron EN-GJL-250, bronze	0.6025 2.1093
	Secondary seals	EPDM	
	Rotating seal face	Silicon carbide	
	Stationary seat	Silicon carbide	

Mechanical shaft seal

An unbalanced mechanical shaft seal is available as standard:

- **BQQE**
  The BQQE shaft seal is a rubber bellows seal with silicon carbide/silicon carbide seal faces and secondary seals of EPDM.

For more information about common pumped liquids with recommended shaft seals, see section List of pumped liquids.

Shaft seal specification

Unbalanced shaft seal	TP Series 100	Version KU according to EN 12756
	TP, TPD Series 200	Version NU according to EN 12756
Shaft diameter		12 and 16 mm
Rubber bellows		EPDM
Seal faces		Silicon carbide/silicon carbide

Special shaft seals are available for partly conditioned water or other liquids containing abrasive or crystallising particles. See section List of pumped liquids.

Related information

List of pumped liquids

Connections

TP Series 100 pumps with union connection have inlet and outlet union threads to ISO 228-1.

TP Series 200 pumps up to DN 65 are fitted with combination flanges PN 6 / PN 10. DN 80 or DN 100 pumps have either PN 6 or PN 10 flanges. You can connect all flanges to flanges in accordance with EN 1092-2 and ISO 7005-2.

Features and benefits

TP Series 100 and Series 200 pumps have these features and benefits:

Optimised hydraulics for high efficiency

- Reduced power consumption.

High-efficiency motors

- TP pumps are fitted with high-efficiency motors. High-efficiency motors offer reduced energy consumption. TP pumps are primarily fitted with motors that meet the legislative requirements of the EuP IE3 grade. For further information, see section Motors.

Top-pull-out design

- Easy dismantling in case of service.

In-line design

- Contrary to end-suction pumps, in-line pumps allow straight pipes and thus often reduce installation costs.

Pump housing and pump head are electrocoated to improve the corrosion resistance

- Electrocoating includes:
  1. Alkaline cleaning.
  2. Pretreatment with zinc phosphate coating.
  3. Cathodic electrocoating, epoxy.
  4. Curing of paint film at 200 to 250 °C.

  For low-temperature applications at a high humidity, Grundfos offers TP pumps with extra surface treatment to avoid corrosion. These pumps are available on request.

Stainless-steel impeller and neck ring

- Wear-free operation with high efficiency.

Related information

Motors

12. User interfaces for TPE2 pumps

You can make pump settings by means of the following user interfaces:

Control panels

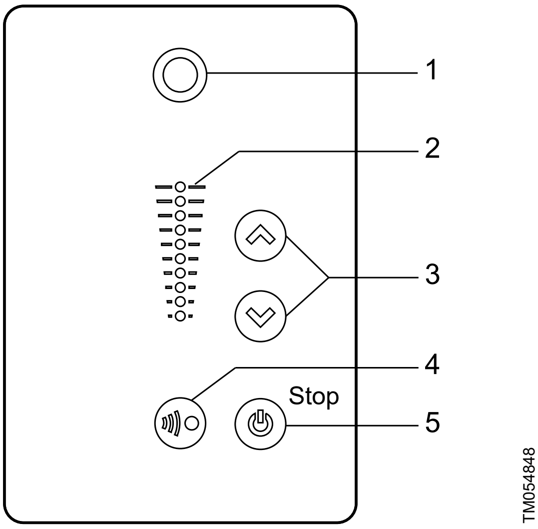
- TPE2 pumps
- Advanced control panel for TPE3 pumps.

Remote controls

- Grundfos GO.

If the power supply to the pump is switched off, the settings will be stored.

Control panel for TPE2 pumps



Standard control panel

Pos.	Symbol	Description
1	◎	Grundfos Eye The indicator light shows the operating status of the pump. See section Priority of settings for further information.
2	-	Light fields for indication of setpoint.
3	⌃ ⌄	Up and down. The buttons change the setpoint.
4		The button allows radio communication with Grundfos GO and other products of the same type. When you try to establish radio communication between the pump and Grundfos GO or another pump, the green indicator light in Grundfos Eye flashes continuously. Press **Communication** on the pump control panel to allow radio communication with Grundfos GO and other products of the same type.
5		The button makes the pump ready for operation and starts and stops the pump. Start: If you press the button when the pump is stopped, the pump only starts if no other functions with higher priority have been enabled. Stop: If you press the button when the pump is running, the pump always stops. The **Stop** text next to the button is on.

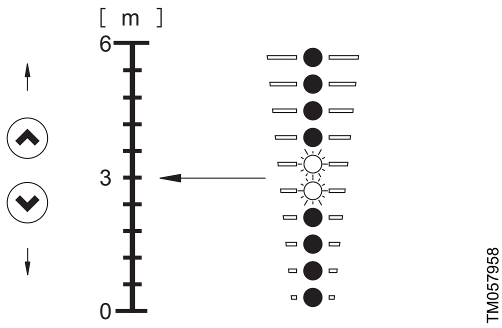
Setpoint setting

Set the desired setpoint of the pump by pressing **Up** or **Down**. The light fields on the control panel indicates the setpoint set.

Pump in differential-pressure control mode

The following example applies to a pump in an application where a pressure sensor gives feedback to the pump. If you retrofit the sensor to the pump, set it manually as the pump does not automatically register a connected sensor.

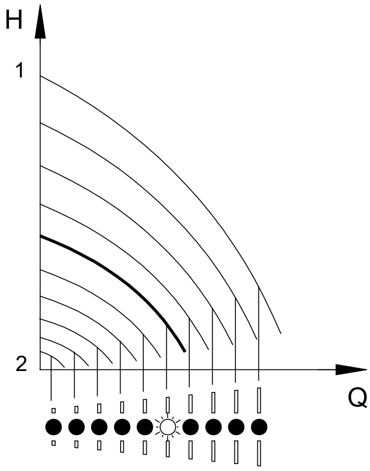
The figure below shows that light fields 5 and 6 are activated, indicating a desired setpoint of 3 m with a sensor measuring range from 0 to 6 m. The setting range is equal to the sensor measuring range.



Setpoint set to 3 m, differential-pressure control

Pump in constant-curve control mode

In constant-curve control mode, the pump performance is between the maximum and minimum curve of the pump.



Pump in constant-curve control mode

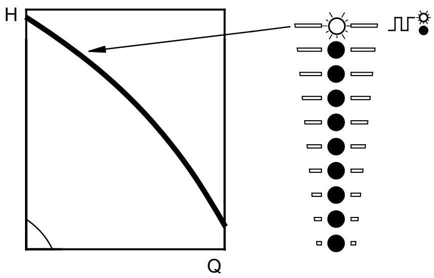
Pos.	Description
1	Max.
2	Min.

Setting to maximum curve:

- Press **Up** continuously to change over to the maximum curve of the pump. The top light field flashes. When the top light field is on, press **Up** for 3 seconds until the light field starts flashing.
- To change back, press **Down** continuously until the desired setpoint is indicated.

Example: Pump set to maximum curve.

The figure below shows that the top light field is flashing, indicating maximum curve.



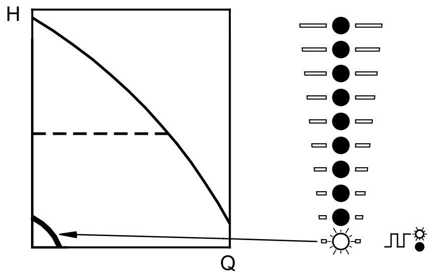
Maximum curve duty

Setting to minimum curve:

- Press **Down** continuously to change over to the minimum curve of the pump. The bottom light field flashes. When the bottom light field is on, press **Down** for 3 seconds until the light field starts flashing.
- To change back, press **Up** continuously until the light field starts flashing.

Example: Pump set to minimum curve.

The figure below shows that the bottom light field is flashing, indicating minimum curve.



Minimum curve duty

Start and stop of pump

Note: If you have stopped the pump by pressing **Start/Stop** and the **Stop** text on the control panel is on, you can only give it free to operation by pressing **Start/Stop** again.

If you have stopped the pump by pressing **Down**, you can restart it by pressing **Up** or by using Grundfos GO.

Start the pump by pressing **Start/Stop** or by continuously pressing **Up** until the desired setpoint is indicated.

Stop the pump by pressing **Start/Stop**. When the pump is stopped, the "Stop" text next to the button will illuminate. You can also stop the pump by continuously pressing **Down** until none of the light fields are on.

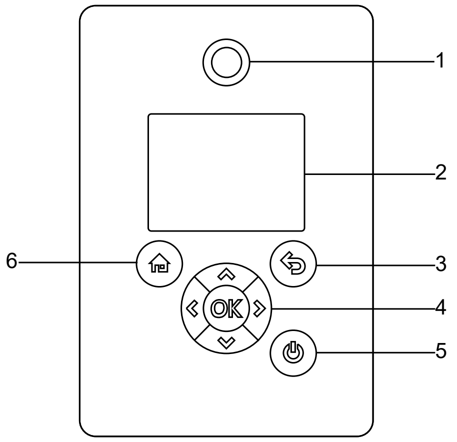
You can also stop the pump with Grundfos GO or via a digital input set to **External stop**.

Resetting of fault indications

Reset a fault indication in one of the following ways:

- Via the digital input if it has been set to **Alarm resetting**.
- Briefly press **Up** or **Down** on the pump. This will not change the setting of the pump. You cannot reset a fault indication by pressing **Up** or **Down** if the buttons have been locked.
- Switch off the power supply until the indicator lights are off.
- Switch the external start-stop input off and then on again.
- With Grundfos GO.

Advanced control panel for TPE3 pumps



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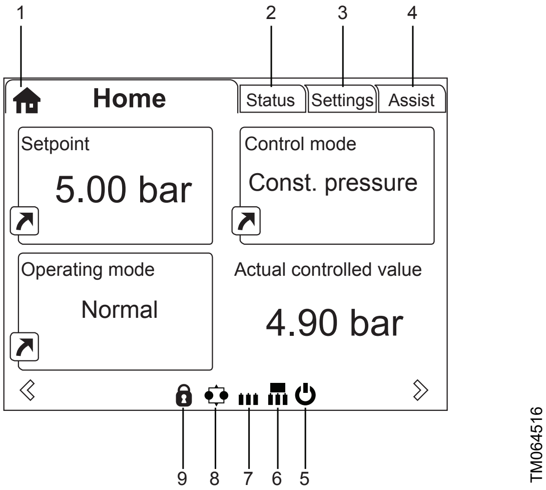
Advanced control panel

Pos.	Symbol	Description
1		**Grundfos Eye:** The indicator light shows the operating status of the product.
2	-	Graphical colour display.
3		**Back**: Press the button to go one step back.
4		**Left**/**Right**: Press the buttons to navigate between main menus, displays and digits. When you change the menu, the display shows the top display of the new menu.
		Up/**Down**: Press the buttons to navigate between submenus or change the value settings. If you have disabled the possibility to make settings with the **Enable/disable settings** function, you can enable it again temporarily by pressing these buttons simultaneously for at least 5 seconds.
	OK	**OK**: Press the button to do as follows: • save changed values, reset alarms and expand the value field • enable communication with Grundfos GO and other products of the same type. When you try to establish radio communication between the product and Grundfos GO or another product, the green indicator light in Grundfos Eye flashes. In the controller display, a note states that a device wants to connect to the product. Press **OK** on the product operating panel to allow communication with Grundfos GO or Grundfos GO Link and other products of the same type.
5		**Start/Stop**: Press the button to make the product ready for operation or to start and stop the product. **Start**: If you press the button when the product is stopped, the product starts if no other functions with higher priority have been enabled. **Stop**: If you press the button when the product is running, the product always stops. When you press the button, the stop icon appears at the bottom of the display.
6		**Home**: Press the button to go to the **Home** menu.

Home display



Example of Home display

Pos.	Symbol	Description
1		**Home**: This menu shows up to four user-defined parameters. You can access each parameter directly from this menu.
2	-	**Status**: This menu shows the status of the product and system, warnings and alarms.
3	-	**Settings**: This menu gives access to all setting parameters. The menu also allows you to make detailed settings.
4	-	**Assist**: This menu enables assisted setup, provides a short description of the control modes and offers fault-finding advice.
5		**Start/Stop**: The icon indicates that the product was stopped with the **Start/Stop** button.
6		**Master:** The icon indicates that the product is functioning as the master in a multipump system.
7		**Slave:** The icon indicates that the product is functioning as a slave in a multipump system.
8		**Multioperation:** The icon indicates that the product is operating in a multipump system.
9		**Lock:** The icon indicates that the possibility to make settings has been disabled for protective reasons.

Startup guide

The pump incorporates a startup guide which is started at the first startup. See section Run startup guide. After the startup guide, the main menus appear in the display.

Related information

Run start-up guide

Menu overview for advanced control panel

Main menus

● Available.

		TPE3, TPE3 D	TPE2, TPE2 D	Multipump system
Home		●	●	●

Status		TPE3, TPE3 D	TPE2, TPE2 D	Multipump system
Operating status		●	●	●
	Operating mode, from	●	●	●
	Control mode	●	●	●
Pump performance		●	●	●
	Actual control. value	●	●	●
	Max. curve and duty point	●	-	-
	Resulting setpoint	●	●	●
	Liquid temp.	●	-	-
	Speed	●	●	●
	Acc. flow and specific energy	●	●	●
Power and energy consumption		●	●	●
Measured values		●	●	●
	Analog input 1	●	●	●
	Analog input 2	●	●	●
	Analog input 3	●	●	●
	Grundfos Direct Sensor	●	-	●
	Pt100/1000 input 1	●	●	●
	Pt100/1000 input 2	●	●	●
Analog output		●	●	●
Warning and alarm		●	●	●
	Actual warning or alarm	●	●	●
	Warning log	●	●	●
	Alarm log	●	●	●
Heat energy monitor		●	-	●
Heat power		●	-	●
Heat energy		●	-	●
Flow rate		●	-	●
Volume		●	-	●
Hour counter		●	-	●
Temperature 1		●	-	●
Temperature 2		●	-	●
Differential temp.		●	-	●
Operating log		●	●	●
	Operating hours	●	●	●
	Trend data	●	-	●
Fitted modules		●	●	●
Date and time		●	●	
Product identification		●	●	●
Motor bearing monitoring		●	●	●
Multi-pump system		-	-	●
	System operating status	-	-	●
	System performance	-	-	●
	System input power and energy	-	-	●
	Pump 1, multi-pump system	-	-	●

Status		TPE3, TPE3 D	TPE2, TPE2 D	Multipump system
	Pump 2, multi-pump system	-	-	●
	Pump 3, multi-pump system	-	-	●
	Pump 4, multi-pump system	-	-	●

24) Only available if an advanced functional module, type FM310, is fitted.

Settings		TPE3, TPE3 D	TPE2, TPE2 D	Multipump system
Setpoint		●	●	●
Operating mode		●	●	●
Set manual speed		●	●	●
Set user defined speed		●	●	●
Control mode		●	●	●
FLOWLIMIT		●	-	●
Automatic night setback		●	-	●
Setting the proportional pressure		●	●	●
Analog inputs		●	●	●
	Analog input 1, setup	●	●	●
	Analog input 2, setup	●	●	●
	Analog input 3, setup	●	●	●
	Grundfos Direct Sensor	●	-	●
Pt100/1000 inputs		●	●	●
	Pt100/1000 input 1, setup	●	●	●
	Pt100/1000 input 2, setup	●	●	●
Digital inputs		●	●	●
	Digital input 1, setup	●	●	●
	Digital input 2, setup	●	●	●
Digital inputs/outputs		●	●	●
	Digital input/output 3, setup	●	●	●
	Digital input/output 4, setup	●	●	●
Relay outputs		●	●	●
	Relay output 1	●	●	●
	Relay output 2	●	●	●
Analog output		●	●	●
	Output signal	●	●	●
	Function of analog output	●	●	●
Controller settings		●	●	●
Operating range		●	●	●
Setpoint influence		●	●	●
	Ext. setpoint infl.	●	●	●
	Predefined setpoint	●	●	●
Temperature influence		●	-	●
Monitoring functions		●	●	●
	Motor bearing monitoring	●	●	●
	Alarm handling	●	●	●
	Motor bearing maintenance	●	●	●
	Limit-exceeded function	●	●	●
Special functions		●	●	●
	Pulse flowmeter setup	●	●	●
	Ramps	●	●	●
	Standstill heating	●	●	●
Communication		●	●	●
	Pump number	●	●	●
	Enable/disable radio comm.	●	●	●
	Enable/disable Bluetooth comm. [24)]	●	●	●

Settings		TPE3, TPE3 D	TPE2, TPE2 D	Multipump system
	Initiate Bluetooth connection [24)]	●	●	●
	Setup of AYB terminals [24)]	●	●	●
	Setup of Ethernet [24)]	●	●	●
General settings		●	●	●
	Language	●	●	●
	Set date and time	●	●	●
	Units	●	●	●
	Enable/disable settings	●	●	●
	Delete history	●	●	●
	Define Home display	●	●	●
	Display settings	●	●	●
	Store actual settings	●	●	●
	Recall stored settings	●	●	●
	Run start-up guide	●	●	●

24) Only available if an advanced functional module, type FM310, is fitted.

Assist	TPE3, TPE3 D	TPE2, TPE2 D	Multipump system
Assisted pump setup	●	●	●
Setup, analog input	●	●	●
Setting of date and time	●	●	●
Setup of multi-pump system	●	●	●
Description of control mode	●	●	●
Assisted fault advice	●	●	●

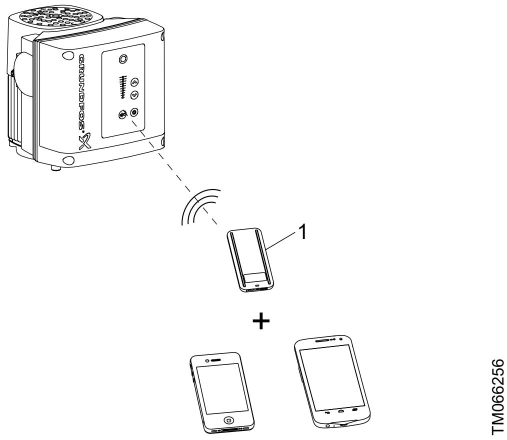
Grundfos GO

Grundfos GO, up to 2.2 kW medium/high speed and 1.5 kW low speed

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

Grundfos GO enables setting of functions and gives access to status overviews, technical product information and actual operating parameters.

Grundfos GO offers the following mobile interface, MI.



Grundfos GO communicating with the pump via radio or infrared connection, IR

Pos.	Description
1	Grundfos MI 301: Separate module enabling radio or infrared communication. You can use the module in conjunction with an Android or iOS-based smart device with Bluetooth connection.

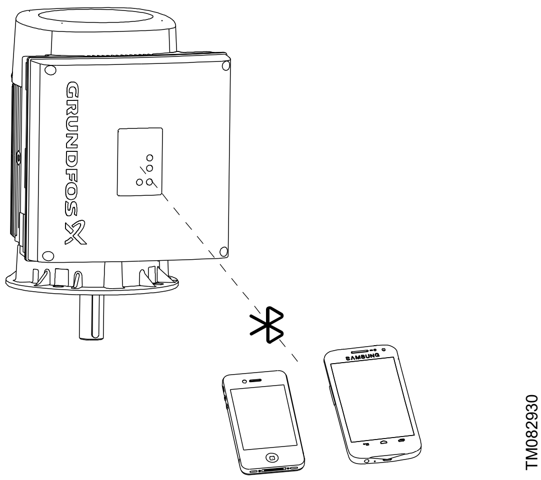
Grundfos GO, 3-22 kW medium/high speed and 2.2 - 22 kW low speed

CAUTION
Radiation
Minor or moderate personal injury

- Locate the product at a minimum distance of 20 cm from any body parts.Locate the product at a minimum distance of 8 inches (20 cm) from any body parts. Human tissue may be heated by RF energy.

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

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



Communication

When Grundfos GO initiates communication with the pump, the indicator light in the middle of Grundfos Eye flashes green. See section Priority of settings.

Furthermore, on pumps fitted with an advanced control panel a text appears in the display saying that a wireless device is trying to establish connection. Press **OK** on the pump in order to establish connection with Grundfos GO or press **Home** to reject connection.

Establish communication using one of these communication types:

- radio communication
- infrared communication
- Bluetooth communication

Related information

Enclosure

Menu overview for Grundfos GO

Main menus

● Available.

	TPE3, TPE3 D	TPE2, TPE2 D	Multipump system
Dashboard	●	●	●

View all metrics		TPE3, TPE3 D	TPE2, TPE2 D	Multipump system
Pump and application		●	●	●
	Actual controlled value	●	●	●
	Acc. flow, specific energy	●	●	●
	Energy consumption	●	●	●
	Energy consumption, system	-	-	●
	Power consumption	●	●	-
	Power consumption, system	-	-	●
	Motor bearing service	●	●	-
	Resulting setpoint	●	●	-
	Resulting system setpoint	-	-	●
	Motor speed	●	●	
	Pump 1	-	-	●
	Pump 2	-	-	●
	Pump 3	-	-	●
	Pump 4	-	-	●
Operating Log		●	●	●
	Operating hours	●	●	-
	Operating hours, system	-	-	●
	Motor current	●	●	-
	Number of starts	●	●	-
	Liquid temperature	●	-	-
Inputs/outputs		●	●	-
	Analog input 1	●	●	-
	Analog input 2	●	●	-
	Analog input 3	●	●	-
	Analog, Output	●	●	-
	Pt100/1000 input 1	●	●	-
	Pt100/1000 input 2	●	●	-
	Digital input 1	●	●	-
	Digital input 2	●	●	-
	Digital input/output 3	●	●	-
	Digital input/output 4	●	●	-
Monitored metrics		●	●	●
	Ambient temperature	●	●	●
	Differential pressure	●	●	●
	Differential pressure, inlet/outlet	●	●	●
	Differential temperature, external	●	●	●
	External pressure 1	●	●	●
	External pressure 2	●	●	●
	Feed tank pressure	●	●	●
	Flow rate	●	●	●
	Pressure: inlet	●	●	●
	Pressure: outlet	●	●	●
	Other parameter	●	●	●

View all metrics		TPE3, TPE3 D	TPE2, TPE2 D	Multipump system
	Tank pressure, external	●	●	●
	Temperature 1	●	●	●
	Temperature 2	●	●	●
	Conductivity	●	●	●
Fitted modules		●	●	-
	Functional module	●	●	-
	Power board	●	●	-
	CIM module	●	●	-
	Operating panel	●	●	-
	Trend data	●	-	-
	Heat energy monitor	●	-	-

Settings		TPE3, TPE3 D	TPE2, TPE2 D	Multipump system
Pump and application		●	●	●
	Pump name	●	●	●
	Control mode	●	●	●
	FLOWLIMIT	●	-	-
	Automatic night setback	●	-	-
	Temperature influence	●	-	-
	Operating mode	●	●	●
	Setpoint	●	●	●
	Set user-defined speed	●	●	●
	Operating range	●	●	●
	Controller	●	●	●
	External setpoint funct.	●	●	
	Predefined setpoint	●	●	●
	Setting the proportional pressure	●	-	-
	Liquid properties	●	-	-
	Buttons on product	●	●	-
	Service	●	●	-
	Alternating operation, time	-	-	●
	Sensor to be used	-	-	●
	Time for pump changeover	-	-	●
Inputs/outputs		●	●	-
	Analog input 1	●	●	-
	Analog input 2	●	●	-
	Analog input 3	●	●	-
	Grundfos Direct sensor	●	-	-
	Analog output	●	●	-
	Pt100/1000 input 1	●	●	-
	Pt100/1000 input 2	●	●	-
	Digital input 1	●	●	-
	Digital input 2	●	●	-
	Digital input/output 3	●	●	-
	Digital input/output 4	●	●	-
	Relay output 1	●	●	-
	Relay output 2	●	●	-
Monitoring functions		●	●	-
	Alarm handling	●	●	-
	Limit 1 exceeded	●	●	●
	Limit 2 exceeded	●	●	●
	Limit 3 exceeded [25)]	●	●	●
	Limit 4 exceeded [25)]	●	●	●

Settings		TPE3, TPE3 D	TPE2, TPE2 D	Multipump system
	Motor bearing monitoring	●	●	-
Special functions		●	●	●
	Pulse flow meter	●	●	-
	Ramps	●	●	-
	Standstill heating	●	●	-
Communication		●	●	-
	Bluetooth communication [25)]	●	●	-
	Radio communication	●	●	-
	GENIbus Number	●	●	-
	Connectivity and port settings [25)]	●	●	-
General		●	●	-
	Connection code	●	●	-
	Date and time	●	●	-
	Firmware	●	●	-
	Store settings	●	●	-
	Recall settings	●	●	-
	Undo	●	●	-
	Unit configuration	●	●	-

25) Only available if an advanced functional module, type FM310, is fitted.

Alarms and warnings	TPE3, TPE3 D	TPE2, TPE2 D	Multipump system
Alarm log	●	●	●
Warning log	●	●	●

Setup	TPE3, TPE3 D	TPE2, TPE2 D	Multipump system
Assisted pump setup	●	●	-
Assisted fault advice	●	●	-
Application wizard	●	●	-
Multi-pump setup	●	●	●

Description of selected functions

Heat energy monitor

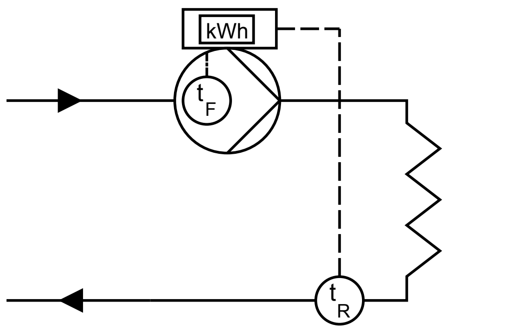
Pump variant	Heat energy monitor
TPE3, TPE3 D	●
TPE2, TPE2 D	-

The heat energy monitor is a monitoring function that calculates the heat energy consumption within a system. The built-in flow estimation needed for the calculation has an inaccuracy of ± 10 % of the maximum flow rate in the area down to 10 % flow and down to 12.5 % of the maximum head. The calculations are based on water at a temperature of 20 °C. Also, the temperature measurements needed for the calculation have some inaccuracy depending on the sensor type. Therefore, you cannot use the heat energy value for billing purposes. However, the value is perfect for optimisation purposes in order to prevent excessive energy costs caused by system imbalances.

The heat energy monitor requires an additional temperature sensor installed in the flow pipe or return pipe depending on where the pump is installed.

Use the analog inputs and/or Pt100/1000 inputs for measuring the temperatures used for calculation by the heat energy monitor.

The used inputs must not be set to **Not active** and one of the measuring parameters must be set to **Temperature 2**.



Example: *Pump installed in the flow pipe and additional temperature sensor installed in the return pipe*

Pos.	Description
t_F	Flow-pipe temperature
t_R	Return-pipe temperature

If the pumped liquid specific heat and density is different from water, other values can be entered to the pump via Grundfos GO in order to get a more precise heat energy.

Setpoint

Pump variant	Setpoint
TPE3, TPE3 D	●
TPE2, TPE2 D	●

When you have selected the desired control mode, set the setpoint.

You can set the setpoint for all control modes, except AUTOADAPT and FLOWADAPT, in this submenu when you have selected the desired control mode. See section Control mode.

Related information

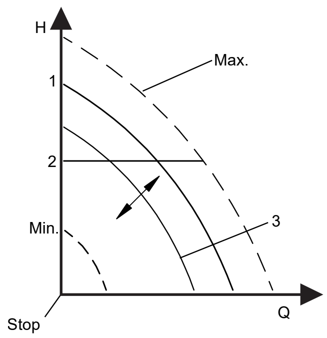
Control mode

Operating mode

Pump variant	Operating mode
TPE3, TPE3 D	●
TPE2, TPE2 D	●

Possible operating modes

Normal	The product runs according to the selected control mode.
Stop	The product stops.
Min.	The product runs at minimum speed. You can use the minimum curve mode in periods in which a minimum flow is required. When operating according to the minimum curve, the pump is operating like an uncontrolled pump.
Max.	The product runs at maximum speed. You can use the maximum curve mode in periods in which a maximum flow is required. When operating according to the maximum curve, the pump is operating like an uncontrolled pump.
Manual	The product is operating at a manually set speed, and the setpoint via bus and setpoint influence function are overruled.
User-defined speed	The product is operating at a speed set by the user.



TM064024

Pos.	Description
1	**Normal**
2	**Normal**
3	**Manual**

Set manual speed

Pump variant	Set manual speed
TPE3, TPE3 D	●
TPE2, TPE2 D	●

The function is only available in the HMI 300 and 301 operating panels.

Use this function to set the speed in percentage of the maximum speed. When you have set the operating mode to **Manual**, the product starts running at the set speed.

With Grundfos GO, you can set the speed via the **Setpoint** menu.

User-defined speed

Use this function to set the motor speed in percentage of the maximum speed. When you have set the operating mode to **User-defined speed**, the pump starts running at the set speed.

Control mode

Pump variant	Control mode
TPE3, TPE3 D	●
TPE2, TPE2 D	●

Note: Not all control modes are available for all pump variants.

Possible control modes:

- **AUTOADAPT**
- **FLOWADAPT**
- **Prop. pressure** (proportional pressure)
- **Const. pressure** (constant pressure)
- **Const. temp.** (constant temperature)
- **Con. diff. press.** (constant differential pressure)
- **Con. diff. temp.** (constant differential temperature)
- **Const. flow rate** (constant flow rate)
- **Const. level** (constant level)
- **Const. other val.** (constant other value)
- **Const. curve** (constant curve).

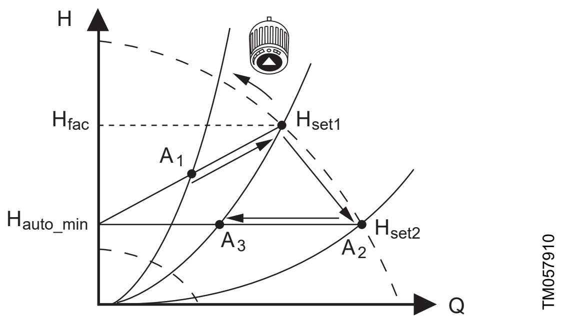
You can change the setpoint for all control modes, except **AUTOADAPT** and **FLOWADAPT**, in the **Setpoint** submenu under **Settings** when you have selected the desired control mode.

AUTOADAPT

Pump variant	AUTOADAPT
TPE3, TPE3 D	●
TPE2, TPE2 D	-

The AUTOADAPT control mode continuously adapts the pump performance according to the actual system characteristic.

Manual setting of the setpoint is not possible.



AUTOADAPT

When the AUTOADAPT control mode has been enabled, the pump will start with the factory setting, H_{fac} is equal to H_{set1}, and then adjust its performance to A_1. See the figure above.

When the pump registers a lower head on the maximum curve, A_2, the AUTOADAPT function automatically selects a correspondingly lower control curve, H_{set2}. If the valves in the system close, the pump adjusts its performance to A_3.

A_1:	Original duty point.
A_2:	Lower registered head on the maximum curve.
A_3:	New duty point after AUTOADAPT control.
H_{set1}:	Original setpoint setting.
H_{set2}:	New setpoint after AUTOADAPT control.
$H_{fac.}$:	Factory setting.
H_{auto_min}:	A fixed value of 1.5 m.

The AUTOADAPT control mode is a form of proportional-pressure control where the control curves have a fixed origin, H_{auto_min}.

The AUTOADAPT control mode has been developed specifically for heating systems and we do not recommend that you use it for air-conditioning and cooling systems.

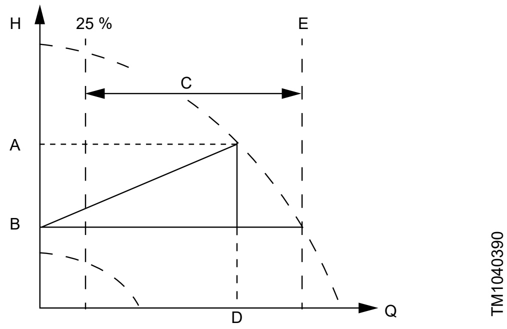
FLOWADAPT

Pump variant	FLOWADAPT
TPE3, TPE3 D	●
TPE2, TPE2 D	-

When you select FLOWADAPT, the pump runs AUTOADAPT and ensures that the flow rate never exceeds the entered FLOWLIMIT value.

The setting range for FLOWLIMIT is 25 to 90 % of the maximum flow rate of the pump.

The factory setting of the FLOWLIMIT is the flow rate where the AUTOADAPT factory setting meets the maximum curve.



FLOWADAPT

Pos.	Description
A	H_{fac}
B	H_{auto_min}
C	Setting range
D	Q_{fac}
E	90 % Q_{max}

Proportional pressure

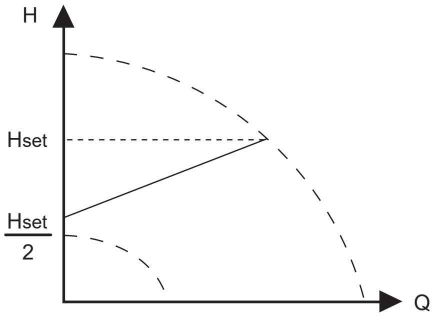
Pump variant	Proportional pressure
TPE3, TPE3 D	●
TPE2, TPE2 D	-

The head of the pump is reduced at decreasing water demand and increased at rising water demand. See the figure below.

This control mode is especially suitable in systems with relatively large pressure losses in the distribution pipes. The head of the pump increases proportionally to the flow in the system to compensate for the large pressure losses in the distribution pipes.

You can set the setpoint with an accuracy of 0.1 m. The head against a closed valve is half the setpoint. The setting range is between 25 % and 90 % of maximum head.

For more information about settings, see section on proportional-pressure setup.

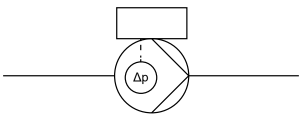


TM057909

Proportional pressure

Example

- Factory-fitted differential-pressure sensor.



TM057880

Proportional pressure

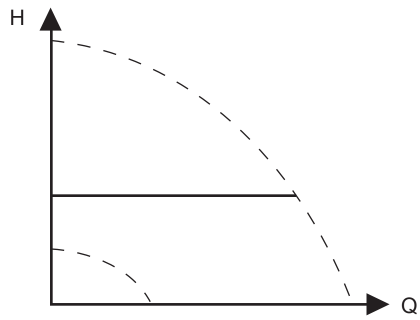
Related information

Proportional-pressure setup

Constant pressure

Pump variant	Constant pressure
TPE3, TPE3 D	●
TPE2, TPE2 D	●

We recommend this control mode if the pump is to deliver a constant pressure, independently of the flow in the system. The pump maintains a constant pressure independently of the flow rate.



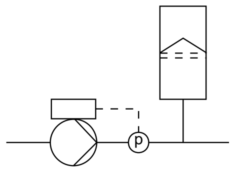
TM057901

Constant pressure

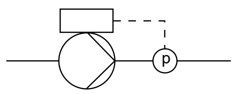
This control mode requires an external pressure sensor as shown in the examples below. You can set the pressure sensor in the **Assist** menu. See the section on assisted pump setup. The setting range is between 12.5 % and 100 % of maximum head.

Example:

- One external pressure sensor



TM057881



TM057882

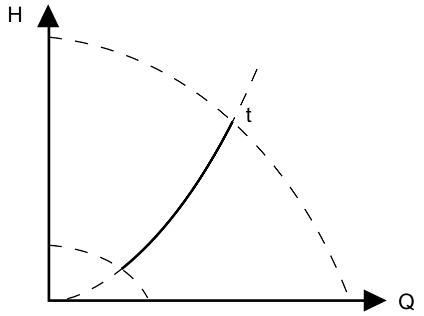
Related information

Assisted pump setup

Constant temperature

Pump variant	Constant temperature
TPE3, TPE3 D	•
TPE2, TPE2 D	•

This control mode ensures a constant temperature. Constant temperature is a comfort control mode that you can use in hot water recirculation systems to control the flow rate to maintain a fixed temperature in the system.

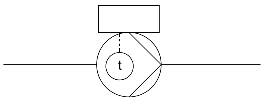


Constant temperature

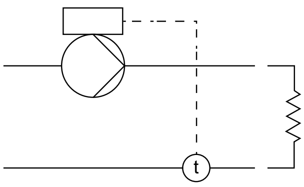
This control mode requires either an internal or external temperature sensor as shown in the examples below.

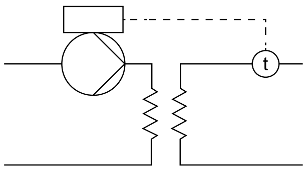
Example:

- Factory-fitted temperature sensor. Only TPE3, TPE3 D



- One external temperature sensor

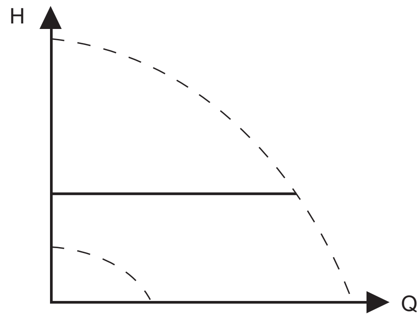




Constant differential pressure

Pump variant	Constant differential pressure
TPE3, TPE3 D	•
TPE2, TPE2 D	•

The pump maintains a constant differential pressure, independently of the flow rate in the system. See the figure below. This control mode is primarily suitable for systems with relatively small pressure losses.

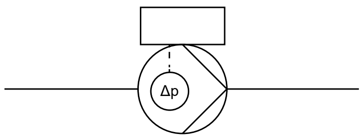


Constant differential pressure

The setting range is between 12.5 % and 100 % of maximum head. This control mode requires either an internal or external differential-pressure sensor or two external pressure sensors as shown in the examples below.

Examples:

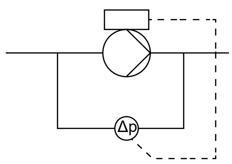
- Factory-fitted differential-pressure sensor. Only TPE3, TPE3 D.

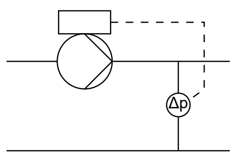


- One external differential-pressure sensor.

  The pump uses the input from the sensor to control the differential pressure.

  You can set the sensor manually or by using the **Assist** menu. See the section on assisted pump setup.

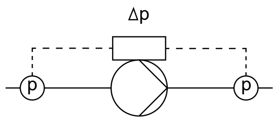




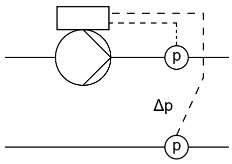
- Two external pressure sensors.

  Constant differential-pressure control is achievable with two individual pressure sensors. The pump uses the inputs from the two sensors and calculates the differential pressure.

The sensors must have the same unit and must be set as feedback sensors. You can set the sensors manually, sensor by sensor, or by using the **Assist** menu. See the section on assisted pump setup.



TM057888



TM057889

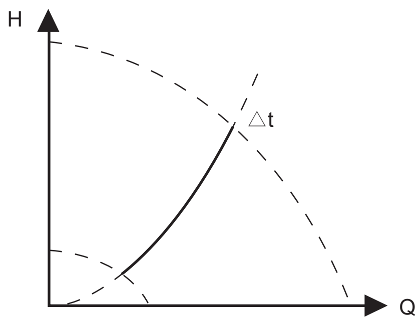
Related information

Assisted pump setup

Constant differential temperature

Pump variant	Constant differential temperature
TPE3, TPE3 D	•
TPE2, TPE2 D	•

The pump maintains a constant differential temperature in the system and the pump performance is controlled according to this.



TM057954

Constant differential temperature

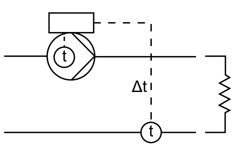
This control mode requires either two temperature sensors or one external differential-temperature sensor. See the examples below.

The temperature sensors can either be analog sensors connected to two of the analog inputs or two Pt100/ Pt1000 sensors connected to the Pt100/1000 inputs, if these are available on the specific pump.

Set the sensor in the **Assist** menu under **Assisted pump setup**. See the section on assisted pump setup.

Examples:

- Factory-fitted temperature sensor and an external temperature sensor. Only TPE3, TPE3 D.

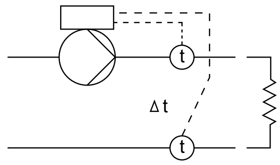


TM057891

- Two external temperature sensors.

Constant differential-temperature control is achievable with two temperature sensors. The pump uses the inputs from the two sensors and calculates the differential temperature.

The sensors must have the same unit and must be set as feedback sensors. You can set the sensors manually, sensor by sensor, or by using the **Assist** menu. See the section on assisted pump setup.

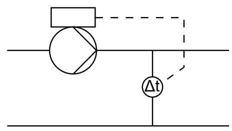


TM057894

- One external differential-temperature sensor.

  The pump uses the input from the sensor to control the differential temperature.

  You can set the sensor manually or by using the **Assist** menu. See the section on assisted pump setup.



TM057931

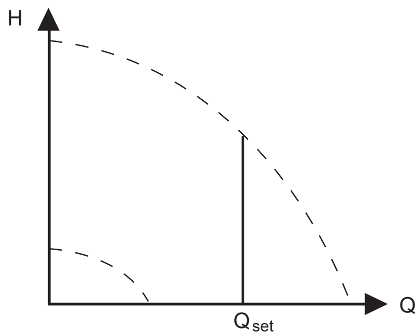
Related information

Assisted pump setup

Constant flow rate

Pump variant	Constant flow rate
TPE3, TPE3 D	•
TPE2, TPE2 D	•

The pump maintains a constant flow rate in the system, independently of the head.



TM057955

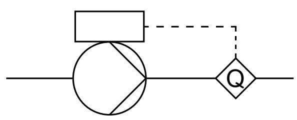
Constant flow rate

This control mode requires an external flow sensor.

See the example below.

Example:

- One external flow sensor.



TM057895

Constant flow rate

TPE3 is able to perform constant flow control based on internal flow estimation without using a flow sensor.

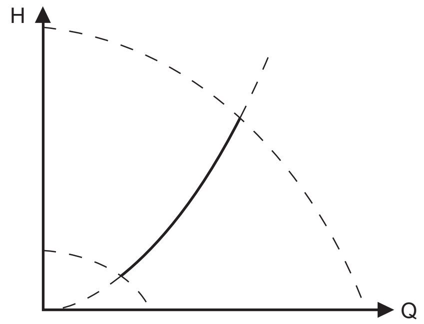
The Grundfos sensor must in this case be set to Other instead of Feedback and the control mode must be Constant flow.

The built-in flow estimation needed for the calculation has an inaccuracy of ± 10 % of the maximum flow rate in the area down to 10 % flow and down to 12.5 % of the maximum head.

Constant level

Pump variant	Constant level
TPE3, TPE3 D	•
TPE2, TPE2 D	•

The pump maintains a constant level, independently of the flow rate.



TM057941

Constant level

This control mode requires an external level sensor.

The pump can control the level in a tank in two ways:

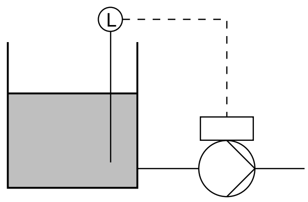
- As an emptying function where the pump draws the liquid from the tank.
- As a filling function where the pump pumps the liquid into the tank.

See the figure below.

The type of level control function depends on the setting of the built-in controller.

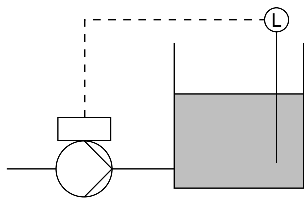
Example:

- One external level sensor with emptying function.



TM057896

- One external level sensor with filling function.



TM057965

Constant other value

Pump variant	Constant other value
TPE3, TPE3 D	•
TPE2, TPE2 D	•

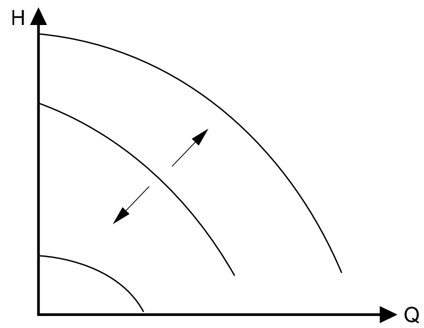
Use this control mode to control a value which is not available in the **Control mode** menu. To measure the controlled value, connect a sensor to one of the analog inputs. The controlled value is shown in percentage of the sensor range.

Constant curve

Pump variant	Constant curve
TPE3, TPE3 D	•
TPE2, TPE2 D	•

Use this control mode to control the motor speed.

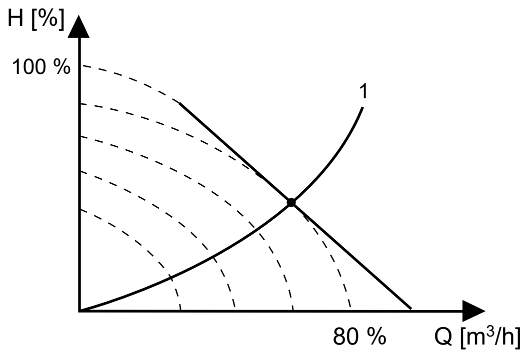
You can set the pump to operate according to a constant curve, like an uncontrolled pump. See the figure below.



TM057957

Constant curve

Depending on the system characteristic and the duty point, the 100 % setting may be slightly smaller than the actual maximum curve of the pump even though the display shows 100 %. This is due to the power limitations built into the pump. The deviation varies according to pump type and pressure loss in the pipes.



TM057913

Power limitation influencing the maximum curve

Pos.	Description
1	Limited maximum curve

Proportional-pressure setup

Pump variant	Proportional-pressure setup
TPE3, TPE3 D	●
TPE2, TPE2 D	-

Control-curve function

You can set the curve either to quadratic or linear.

Zero-flow head

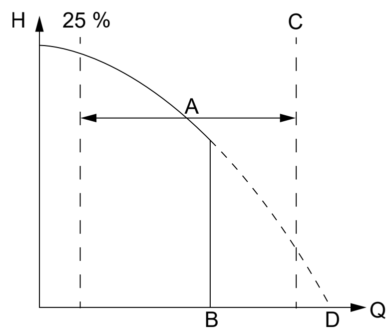
You can set this value in % of the setpoint. With a setting of 100 %, the control mode is equal to constant differential pressure.

FLOWLIMIT

Pump variant	FLOWLIMIT
TPE3, TPE3 D	●
TPE2, TPE2 D	-

FLOWLIMIT

- Enable the FLOWLIMIT function.
- Set the FLOWLIMIT.



FLOWLIMIT

Pos.	Description
A	Setting range
B	Q_{limit}
C	90 % Q_{max}
D	Q_{max}

You can combine the FLOWLIMIT function with the following control modes:

- Proportional pressure
- Constant differential pressure
- Constant differential temperature
- Constant temperature
- Constant curve.

A flow-limiting function ensures that the flow rate never exceeds the entered FLOWLIMIT value.

The setting range for FLOWLIMIT is 25 % to 90 % of the Q_{max} of the pump.

Related information

FLOWADAPT

Automatic night setback

Pump variant	Automatic night setback
TPE3, TPE3 D	●
TPE2, TPE2 D	-

Once you have enabled automatic night setback, the pump automatically changes between normal duty and night setback, duty at low performance.

Changeover between normal duty and night setback depends on the flow-pipe temperature.

The pump automatically changes over to night setback when the built-in sensor registers a flow-pipe temperature drop of more than 10 to 15 °C within approximately two hours. The temperature drop must be at least 0.1 °C/min.

Changeover to normal duty takes place without a time lag when the temperature has increased by approximately 10 °C.

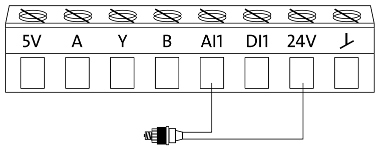
Note: You cannot enable automatic night setback when the pump is in constant-curve mode.

Analog inputs

Pump variant	Analog inputs
TPE3, TPE3 D	●
TPE2, TPE2 D	●

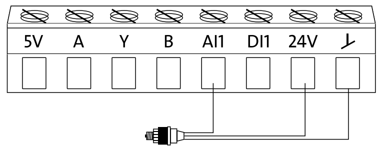
Wiring examples:

These connection scenarios are also valid for connection to analog input 2 and analog input 3.



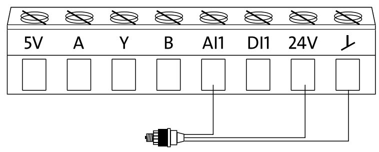
TM083181

2-wire sensor, 0/4-20 mA



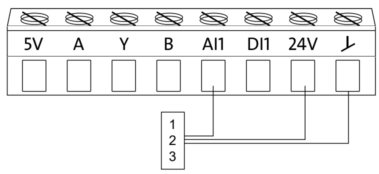
TM083182

3-wire sensor, 0/4-20 mA



TM083182

3-wire sensor, 0.5 - 3.5 V, 0-5 V, 0-10 V



TM083184

Setpoint influence, 0.5 - 3.5 V, 0-5 V, 0-10 V; 0/4-20 mA

Pos.	Description
1	Potentiometer
2	PLC
3	External controller

To set the input, make the settings below:

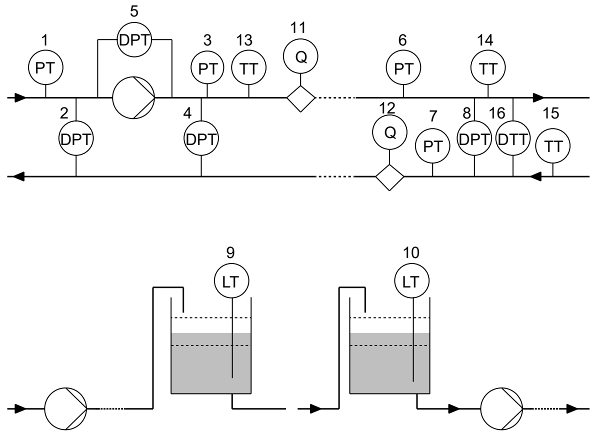
Function

You can set the inputs to these functions:

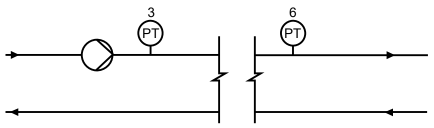
- **Not active**
- **Feedback sensor**
  The sensor is used for the selected control mode.
- **Setpoint influence**
  The input signal is used for influencing the setpoint.
- **Other function**
  The sensor input is used for measurement or monitoring.

Measured parameter

Select one of the below parameters to be measured in the system by the sensor connected to the input.



TM062328



TM075207

Pos.	Sensor function/measured parameter
1	**Inlet pressure**
2	**Diff. press., inlet**
3	**Outlet pressure**
4	**Diff. press.,outlet**
5	**Diff. press.,pump**
6	**Press. 1, external**
7	**Press. 2, external**
8	**Diff. press., ext.**
9	**Storage tank level**
10	**Feed tank level**
11	**Pump flow**
12	**Flow, external**
13	**Liquid temp.**
14	**Temperature 1**
15	**Temperature 2**
16	**Differential temp.**
Not shown	**Ambient temp.**
Not shown	**Conductivity**
Not shown	**Other parameter**

Unit

Parameter	Available units
Pressure	bar, m, kPa, psi, ft
Level	m, ft, in
Pump flow	m^3/h, l/s, yd^3/h, gpm
Liquid temperature	°C, °F
Other parameter	%

Electrical signal

Available signal types:

- 0.5 - 3.5 V
- 0-5 V
- 0-10 V
- 0-20 mA
- 4-20 mA.

Sensor range, minimum value

Set the minimum value of the connected sensor.

Sensor range, maximum value

Set the maximum value of the connected sensor.

Setting two sensors for differential measurement

In order to measure the difference of a parameter between two points, set the corresponding sensors as follows:

Parameter	Analog input for sensor 1	Analog input for sensor 2
Pressure, option 1	Differential pressure, inlet	Differential pressure, outlet
Pressure, option 2	Pressure 1, external	Pressure 2, external
Flow	Pump flow	Flow, external
Temperature	Temperature 1	Temperature 2

If you want to use the control mode **Constant differential pressure**, you must choose the function **Feedback sensor** for the analog input of both sensors.

Grundfos Direct Sensor

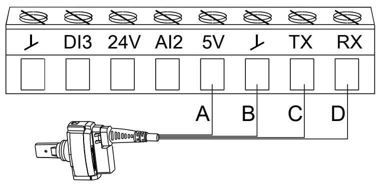
Pump variant	Grundfos Direct Sensor
TPE3, TPE3 D	●
TPE2, TPE2 D	-

Grundfos Direct Sensor is a digital sensor that auto detects range and unit.

Grundfos Direct Sensor always has the capability to also measure the media temperature. The pump will automatically detect range and unit of the temperature sensor.

For information about the functions and measured parameters of each sensor, see the sections on the sensor, temperature and dry-running protection.

Wiring example:



TM086416

Designation	Colour
A	Brown
B	Green
C	White
D	Yellow

Sensor

Function

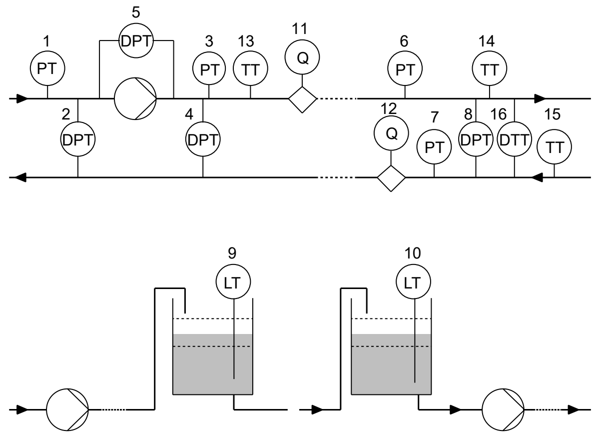
You can set the sensor to the following functions:

- **Not active**
- **Feedback sensor**
  The sensor is used for the selected control mode.
- **Setpoint influence**
  The input signal is used for influencing the setpoint.
- **Other function**
  The sensor input is used for measurement or monitoring.

Measured parameter

Select one of the below parameters to be measured in the system by the sensor connected to the input.

Note that the list will be reduced to match the installed sensor.



TM062328

Pos.	Sensor function/measured parameter
1	**Inlet pressure**
2	**Diff. press., inlet**
3	**Outlet pressure**
4	**Diff. press.,outlet**
5	**Diff. press.,pump**
6	**Press. 1, external**
7	**Press. 2, external**
8	**Diff. press., ext.**
9	**Storage tank level**
10	**Feed tank level**
11	**Pump flow**
12	**Flow, external**
13	**Liquid temp.**
14	**Temperature 1**
15	**Temperature 2**
16	**Differential temp.**
Not shown	**Ambient temp.**
Not shown	**Other parameter**

Temperature

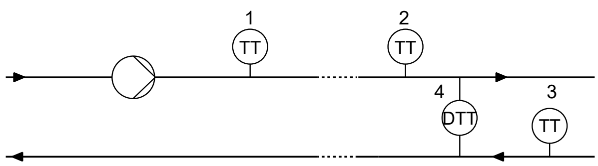
Function

You can set the sensor to the following functions:

- **Not active**
- **Feedback sensor**
  The sensor is used for the selected control mode.
- **Setpoint influence**
  The input signal is used for influencing the setpoint.
- **Other function**
  The sensor input is used for measurement or monitoring.

Measured parameter

Select one of the below parameters to be measured in the system by the sensor connected to the input.



TM064012

Pos.	Sensor function/measured parameter
1	**Liquid temp.**
2	**Temperature 1**
3	**Temperature 2**
4	**Differential temp.**
Not shown	**Ambient temp.**

Dry-running protection

Use this function to set dry-running protection to **Enabled** or **Disabled**.

The function requires that a CPS sensor has been fitted in the pump head and connected to the pump. When you have enabled the dry-running protection function, it stops the pump if dry running occurs. Restart the pump manually if it has been stopped due to dry running.

Dry-running detection delay

You can set a detection delay to make sure that the pump is given a chance to start up and pump the air in the pump out before the dry-running protection function again detects dry running and stops the pump.

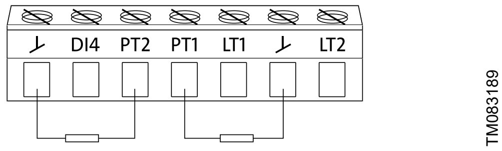
More than 10 seconds of dry running can damage the shaft seal and can reduce the lifetime of the product.

Range: 0-254 seconds.

Pt100/1000 inputs

Pump variant	Pt100/1000 inputs
TPE3, TPE3 D	•
TPE2, TPE2 D	•

Wiring example:



Pt100/1000

To set the input, choose one of the below settings.

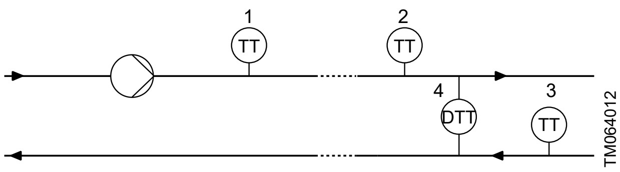
Function

You can set the inputs to these functions:

- **Not active**
- **Feedback sensor**
  The sensor is used for the selected control mode.
- **Setpoint influence**
  The input signal is used for influencing the setpoint.
- **Other function**
  The sensor input is used for measurement or monitoring.

Measured parameter

Select one of the below parameters to be measured in the system by the sensor connected to the input.



Pos.	Sensor function/measured parameter
1	**Liquid temp.**
2	**Temperature 1**
3	**Temperature 2**
4	**Differential temp.**
Not shown	**Ambient temp.**

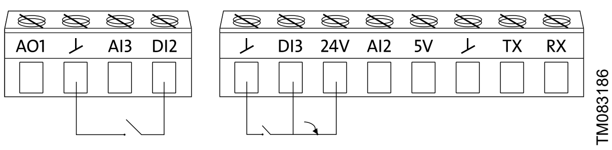
Measuring range

-50 to +204 °C.

Digital inputs

Pump variant	Digital inputs
TPE3, TPE3 D	●
TPE2, TPE2 D	●

Wiring example:



Digital input

To set the input, make the settings below:

Function

You can set the inputs to these functions:

- **Not active**
  When set to **Not active**, the input has no function.
- **Ext. stop**
  When the input is deactivated, open circuit, the motor stops.
- **Min.** (minimum speed)
  When the input is activated, the motor runs at the set minimum speed.
- **Max.** (maximum speed)
  When the input is activated, the motor runs at the set maximum speed.
- **User defined speed**
  When the input is activated, the motor runs at a speed set by the user.
- **External fault**
  When the input is activated, a timer is started. If the input is activated for more than 5 seconds, the motor stops and a fault is indicated. The function depends on input from external equipment.
- **Alarm resetting**
  When the input is activated, a fault indication, if any, is reset.
- **Dry running**
  When this function is selected, a lack of inlet pressure or water shortage (dry running) can be detected. When this happens, the pump stops. The pump cannot restart as long as the input is activated. This requires the use of an accessory such as these:
  - a pressure switch installed on the inlet side of the pump
  - a float switch installed on the inlet side of the pump.
- **Accumulated flow**
  When this function is selected, the accumulated flow can be registered. This requires the use of a flowmeter which can give a feedback signal as a pulse per defined volume of water.
- **Reverse rotation**
  This function reverses the direction of rotation of the motor.
- **Predefined setpoint 1**
  The function applies only to digital input 2.
  When you set digital inputs to a predefined setpoint, the pump operates according to a setpoint based on a combination of the activated digital inputs.
- **Activate output**
  When this function is selected, the related digital output is activated. This is done without any changes to pump operation.
- **Local motor stop**
  When the function is selected, the given motor in a multimotor system setup stops without affecting the performance of the other motors in the system.

The priority of the selected functions are interdependent.

A stop command always has the highest priority.

Activation of digital inputs

You can set the digital inputs to trigger on either Closed contact or Open contact. Selecting the trigger function can only be set via Grundfos GO Link.

The digital inputs can be activated either as active low or active high.

The digital inputs will react as described in the table below:

Activate/ Closed contact	Deactivate/Open contact
GND/0V	Floating/3-24V

Timer function for a digital input

Activation delay

The activation delay (T1) is the time between the digital signal and the activation of the selected function.

Range: 0-6000 seconds.

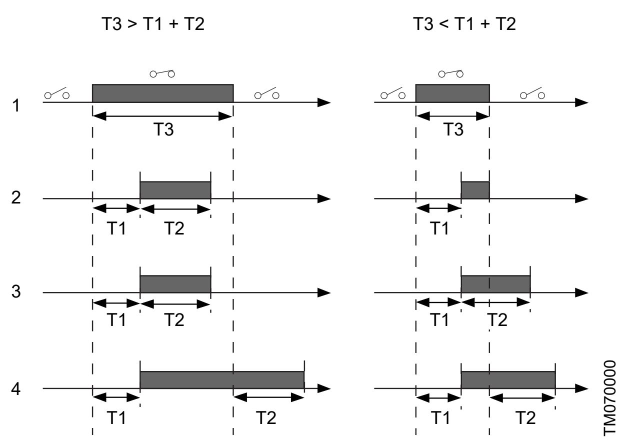
Duration time

Available modes:

- **Not active**
- **Active with interrupt**
- **Active without interrupt**
- **Active with after-run**.

The duration time (T2) is the time which, together with the mode, determines how long the selected function is active.

Range: 0 - 15,000 seconds.



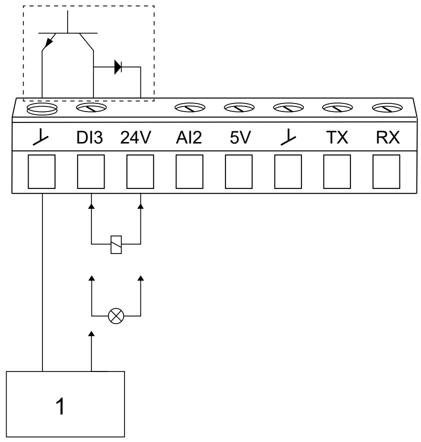
Pos.	Description
1	**Digital input**.
2	**Active with interrupt**.
3	**Active without interrupt**.
4	**Active with after-run**.
T1	**Activation delay**
T2	**Duration time**
T3	The period of time when the digital input is activated.

Digital inputs/outputs

Pump variant	Digital inputs/outputs
TPE3, TPE3 D	●
TPE2, TPE2 D	●

You can select whether the interface is to be used as an input or output. The output is an open collector. You can connect the open collector to, for example, an external relay or a controller such as a PLC.

Wiring example:



Digital output, open collector

Pos.	Description
1	External controller

Mode

You can set the digital input or output 3 and 4 to act as a digital input or digital output.

Functions if the digital input or output is set to input:

- **Not active**
- **Ext. stop**
- **Min.**
- **Max.**
- **User defined speed**
- **External fault**
- **Alarm resetting**
- **Dry running**
- **Accumulated flow**
- **Reverse rotation**
- **Predefined setpoint 2** (digital input/output 3)
- **Predefined setpoint 3** (digital input/output 4)
- **Local motor stop**
- **Activate output**

Functions if the digital input or output is set to output:

- **Not active**
- **Ready**
- **Alarm**
- **Operation**

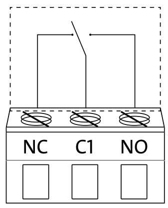
- **Pump running**
- **Warning**
- **Limit 1 exceeded**
- **Limit 2 exceeded**
- **Limit 3 exceeded** [26]
- **Limit 4 exceeded** [26]
- **Digital input 1, state**
- **Digital input 2, state**
- **Digital input 3, state**
- **Digital input 4, state**

26) Only available if an advanced functional module, type FM310 or FM311, is fitted.

Signal relay (Relay outputs)

Pump variant	Relay outputs	
	Signal relay 1	Signal relay 2
TPE3, TPE3 D	●	●
TPE2, TPE2 D	●	●

Wiring example:



TM083188

Relay output

Functions

You can configure the signal relays to be activated when the product changes to one of the following states:

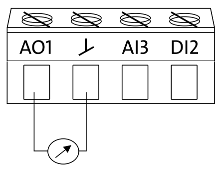
- **Not active**
  The relay has been deactivated.
- **Ready**
  The motor may be running or is ready to run, and no alarms are active.
- **Alarm**
  There is an active alarm, and the motor is stopped.
- **Operating** (**Operation**)
  Operating equals **Running**, but the motor is still in operation when it is stopped, for example, by the **Stop function** or **Limit exceeded**.
- **Running** (**Pump running**)
  The motor shaft is rotating.
- **Warning**
  There is an active warning.
- **Limit 1 exceeded**
  When you have set this function and the limit is exceeded, the signal relay is activated.
- **Limit 2 exceeded**
  When you have set this function and the limit is exceeded, the signal relay is activated.
- **Limit 3 exceeded** [27]
  When you have set this function and the limit is exceeded, the signal relay is activated.
- **Limit 4 exceeded** [27]
  When you have set this function and the limit is exceeded, the signal relay is activated.
- **External fan control** (**Control of external fan**)
  When you select this function, the relay is activated if the internal temperature of the motor electronics reaches a preset limit value. In this way the relay activates external cooling to add additional cooling to the motor.
- **Digital input 1, state**
  Follow digital input 1. If digital input 1 is triggered, the digital output is also triggered.
- **Digital input 2, state**
  Follow digital input 2. If digital input 2 is triggered, the digital output is also triggered.
- **Digital input 3, state**
  Follow digital input 3. If digital input 3 is triggered, the digital output is also triggered.
- **Digital input 4, state**
  Follow digital input 4. If digital input 4 is triggered, the digital output is also triggered.

27) Only available if an advanced functional module, type FM310 or FM311, is fitted.

Analog output

Pump variant	Analog output
TPE3, TPE3 D	●
TPE2, TPE2 D	●

The inputs and outputs available depend on the functional module fitted in the motor.
Wiring example:



TM083185

Analog output, 0/4-20 mA, 0-10 V

The analog output enables external control systems to read specific operating data.
To set the analog output, make the following settings.

Output signal

Possible signal types:

- 0-10 V
- 0-20 mA
- 4-20 mA.

Function of analog output

Actual speed		
0 %	**100 %**	**200 %**
0 V	10 V 5 V	10 V

Actual speed		
0 %	**100 %**	**200 %**
0 mA	20 mA 10 mA	20 mA
4 mA	20 mA 12 mA	20 mA

Sensor value	
Minimum	**Maximum**
0 V	10 V
0 mA	20 mA
4 mA	20 mA

Resulting setpoint	
0 %	**100 %**
0 V	10 V
0 mA	20 mA
4 mA	20 mA

Motor load	
0 %	**100 %**
0 V	10 V
0 mA	20 mA
4 mA	20 mA

Motor current		
0 %	**100 %**	**200 %**
0 V	5 V	10 V
0 mA	10 mA	20 mA
4 mA	12 mA	20 mA

Limit-exceeded function	
Output not active	**Output active**
0 V	10 V
0 mA	20 mA
4 mA	20 mA

Controller (Controller settings)

Pump variant	Controller settings
TPE3, TPE3 D	•
TPE2, TPE2 D	•

The pumps have a factory default setting of gain (K_p) and integral time (T_i).

However, if the factory setting is not the optimum setting, you can change the gain and the integral time:

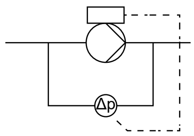
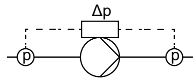
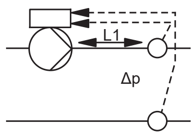
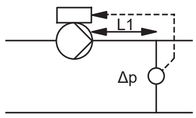
- Set the gain within the range from 0.1 to 20.
- Set the integral-action time within the range from 0.1 to 3600 seconds. If you select 3600 seconds, the controller functions as a P controller.

Furthermore, you can set the controller to inverse control.

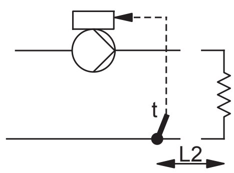
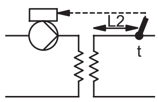
This means that if you increase the setpoint, the speed is reduced. In the case of inverse control, you must set the gain within the range from -0.1 to -20.

Guidelines for setting of PI controller

The tables below show the recommended controller settings:

Constant differential pressure	K_p	T_i
 	0.5	0.5
 	0.5	L1 < 5 m: 0.5 L1 > 5 m: 3 L1 > 10 m: 5

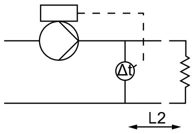
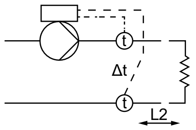
L1: Distance in metres between the pump and the sensor.

Constant temperature	K_p		T_i
	Heating system [28]	Cooling system [29]	
	0.5	-0.5	10 + 5L2
	0.5	-0.5	30 + 5L2

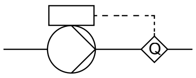
28) In heating systems, an increase in pump performance results in a rise in temperature at the sensor.

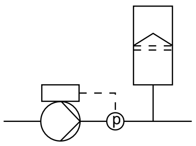
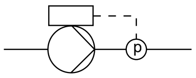
29) In cooling systems, an increase in pump performance results in a drop in temperature at the sensor.

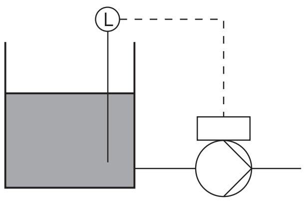
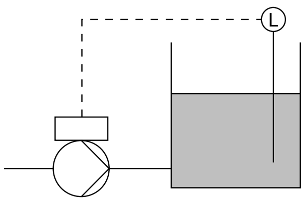
L2: Distance in metres between the heat exchanger and the sensor.

Constant differential temperature	K_p	T_i
 	-0.5	10 + 5L2

L2: Distance in metres between the heat exchanger and the sensor.

Constant flow rate	K_p	T_i
	0.5	0.5

Constant pressure	K_p	T_i
	0.5	0.5
	0.5	0.5

Constant level	K_p	T_i
	-10	0
	10	0

General rules of thumb:

If the controller is too slow-reacting, increase the gain.

If the controller is hunting or unstable, dampen the system by reducing the gain or increasing the integral time.

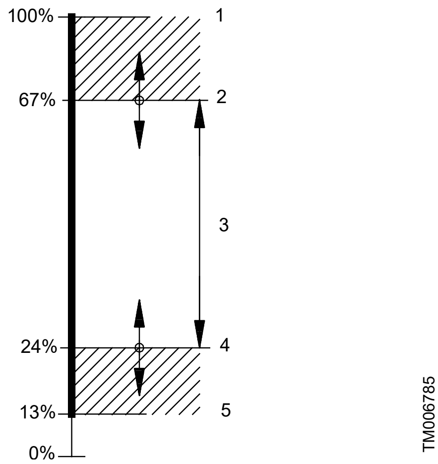
Operating range

Pump variant	Operating range
TPE3, TPE3 D	●
TPE2, TPE2 D	●

Set the operating range as follows:

1. Set the minimum speed within the range from fixed minimum speed (5) to user-set maximum speed (2).
2. Set the maximum speed within the range from user-set minimum speed (4) to fixed maximum speed (1).

The range between the user-set minimum and maximum speed is the operating range (3).



Example of minimum and maximum settings

Pos.	Description
1	Fixed maximum speed
2	User-set maximum speed
3	Operating range
4	User-set minimum speed
5	Fixed minimum speed

External setpoint function

Pump variant	External setpoint function
TPE3, TPE3 D	●
TPE2, TPE2 D	●

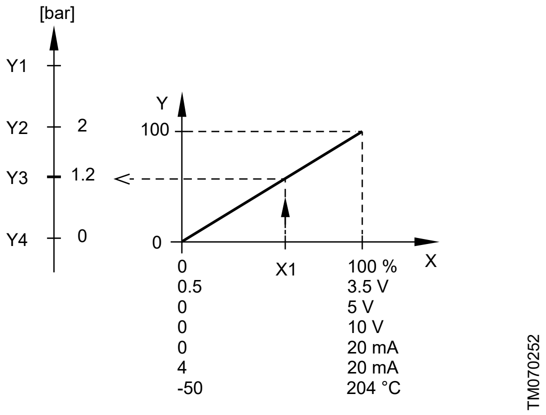
Use this function to influence the setpoint by an external signal via one of the analog inputs.

To enable the function, set one of the analog inputs or Pt100/1000 inputs to **Setpoint influence** with Grundfos GO or to **Ext. setpoint infl.** with the HMI 300 or 301 operating panel.

Example of setpoint influence in control mode Const. pressure

Actual setpoint: actual input signal × setpoint.

At a setpoint of 2 bar and an external setpoint of 60 %, the actual setpoint is 0.60 × 2 = 1.2 bar.

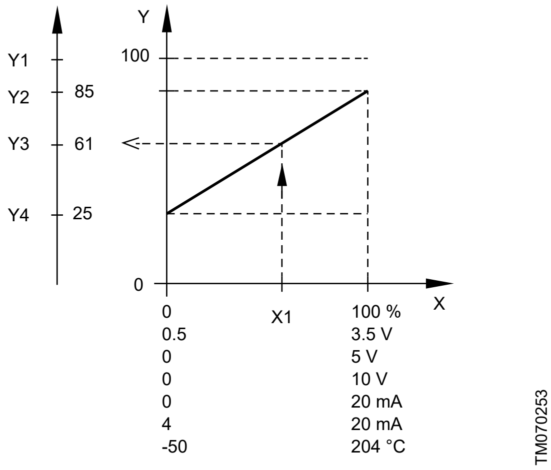


Pos.	Description
X:	External input signal from 0 to 100 %
Y:	Setpoint influence from 0 to 100 %
X1:	Actual input signal, 60 %
Y1:	Sensor maximum [bar]
Y2:	Setpoint [bar]
Y3:	Actual setpoint [bar]
Y4:	Sensor minimum [bar]

Example of a constant curve with linear influence function

Actual setpoint: actual input signal × (setpoint - user-set minimum speed) + user-set minimum speed.

At a user-set minimum speed of 25 %, a setpoint of 85 % and an external setpoint of 60 %, the actual setpoint is 0.60 × (85 - 25) + 25 = 61 %.



Pos.	Description
X:	External input signal from 0 to 100 %
Y:	Setpoint influence from 0 to 100 %
X1:	Actual input signal, 60 %
Y1:	Fixed maximum speed in percentage
Y2:	Setpoint speed in percentage
Y3:	Actual setpoint speed in percentage
Y4:	User-set minimum speed in percentage

Setpoint influence

Pump variant	Setpoint influence
TPE3, TPE3 D	●
TPE2, TPE2 D	●

The table below gives an overview of the types of setpoint influence and the availability depending on pump type.

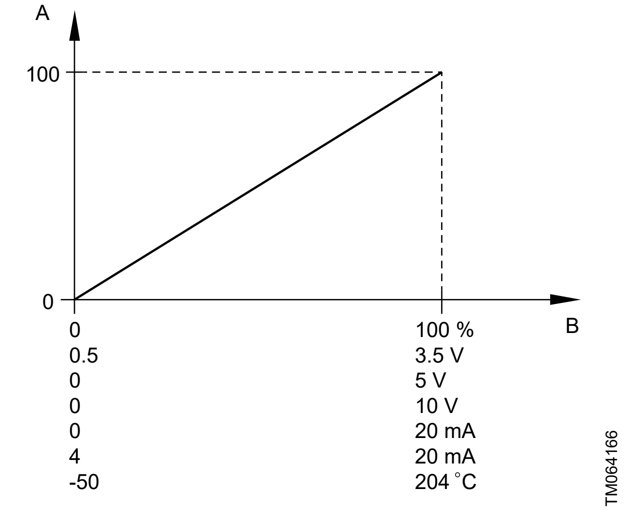
Type of setpoint influence	Pump type	
	TPE3	
	TPE3	TPE2
Not active	●	●
Linear function	●	●
Linear with Stop	●	●
Influence table	●	●

You can select these functions:

- **Not active**

  When set to **Not active**, the setpoint is not influenced from any external function.
- Linear function

  The setpoint is influenced linearly from 0 to 100 %. See the figure below.



Linear function

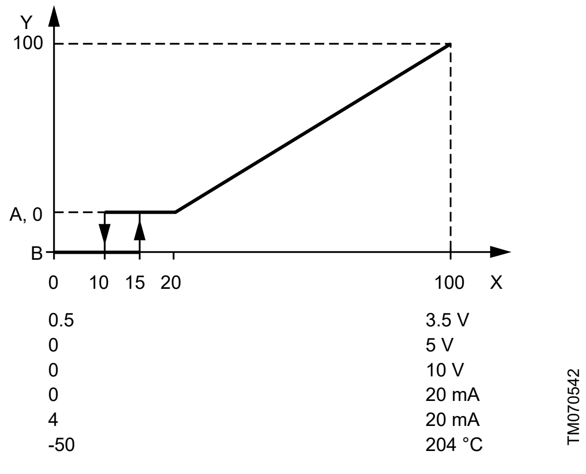
Pos.	Description
A	Setpoint influence from 0 to 100 %
B	External input signal from 0 to 100 %

- **Linear with Stop**

  In the input signal range from 20 to 100 %, the setpoint is influenced linearly.

  If the input signal is below 10 %, the pump changes to operating mode **Stop**.

  If the input signal is increased above 15 %, the operating mode is changed back to **Normal**. See the figure below.

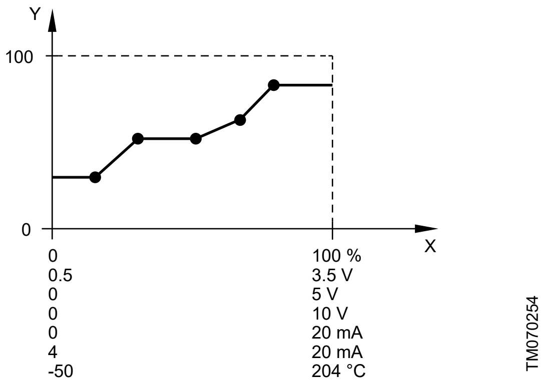


Linear with Stop

Pos.	Description
X:	External input signal from 0 to 100 %
Y:	Setpoint influence from 0 to 100 %
A:	**Normal**
B:	**Stop**

- **Influence table**

  The setpoint is influenced by a curve made out of two to eight points. There will be a straight line between the points and a horizontal line before the first point and after the last point.



Pos.	Description
X:	External input signal from 0 to 100 %
Y:	Setpoint influence from 0 to 100 %

Predefined setpoints

Pump variant	Predefined setpoints
TPE3, TPE3 D	•
TPE2, TPE2 D	•

You can set and activate seven predefined setpoints by combining the input signals with digital inputs 2, 3 and 4 as shown in the table below. Set the digital inputs 2, 3 and 4 to **Predefined setpoints** if all seven predefined setpoints are to be used. You can also set one or two of the digital inputs to **Predefined setpoints**. However, this limits the number of predefined setpoints available.

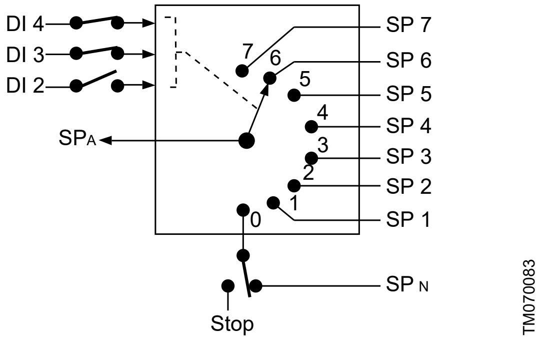
Digital inputs			Setpoint
2	3	4	
0	0	0	Normal setpoint or **Stop**
1	0	0	**Predefined setpoint 1**
0	1	0	**Predefined setpoint 2**
1	1	0	**Predefined setpoint 3**
0	0	1	**Predefined setpoint 4**
1	0	1	**Predefined setpoint 5**
0	1	1	**Predefined setpoint 6**
1	1	1	**Predefined setpoint 7**

0: Open contact

1: Closed contact

Example

The figure shows how you can use the digital inputs to set seven predefined setpoints. Digital input 2 is open, and digital inputs 3 and 4 are closed. If you compare with the table above, you can see that **Predefined setpoint 6** is activated.



Pos.	Description
DI	**Digital input**
SP	**Setpoint**
SP_A	**Actual setpoint**
SP_N	Normal setpoint
Stop	**Stop**

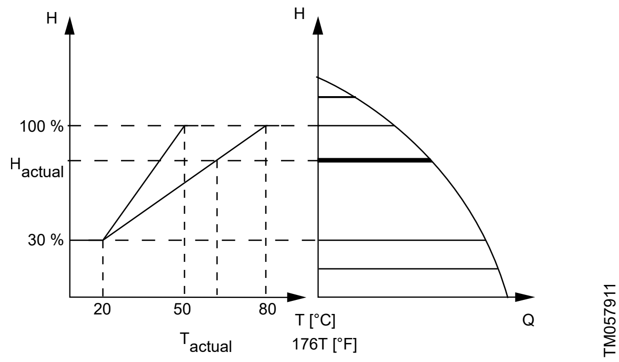
If all digital inputs are open, the motor stops or runs at the normal setpoint. Set the desired action with Grundfos GO or with the HMI 300 or 301 operating panel.

Temperature influence

Pump variant	Temperature influence
TPE3, TPE3 D	●
TPE2, TPE2 D	-

When this function is enabled in proportional- or constant-pressure control mode, the setpoint for head is reduced according to the liquid temperature.

You can set the temperature influence to function at liquid temperatures below 80 °C or 50 °C. These temperature limits are called T_{max}. The setpoint is reduced in relation to the head set which is equal to 100 % according to the characteristics below.



Temperature influence

In the above example, $T_{max.}$ which is equal to 80 °C, has been selected. The actual liquid temperature, T_{actual}, causes the setpoint for head to be reduced from 100 % to H_{actual}.

The temperature influence function requires the following:

- proportional-pressure or constant-pressure control mode
- pump installed in flow pipe
- system with flow-pipe temperature control.

Temperature influence is suitable for the following systems:

- Systems with variable flows, for example two-pipe heating systems, in which the enabling of the temperature influence function ensures a further reduction of the pump performance in periods with small heating demands and consequently a reduced flow-pipe temperature.
- Systems with almost constant flows, for example one-pipe heating systems and underfloor heating systems, in which variable heating demands cannot be registered as changes in the head as it is the case with two-pipe heating systems. In such systems, you can only adjust the pump performance by enabling the temperature influence function.

Selection of the maximum temperature

In systems with a dimensioned flow-pipe temperature of:

- up to and including 55 °C, select $T_{max.}$ equal to 50 °C.
- above 55 °C, select $T_{max.}$ equal to 80 °C.

Note: You cannot use the temperature function in air-conditioning and cooling systems.

Limit-exceeded function

Pump variant	Limit-exceeded function
TPE3, TPE3 D	●
TPE2, TPE2 D	●

Use this function to monitor a measured parameter or one of the internal values such as speed, motor load or motor current. If a set limit is reached, a selected action can take place. You can set up to four limit-exceeded functions, meaning that you can monitor four parameters or four limits of the same parameter simultaneously.

Note that, if using **Limit 1-3 exceeded** in a multipump system, the selected action will have an impact on the system, e.g. if Action is set to Stop, then the system will stop.

Limit 4 exceeded in a multipump system will be a local function. The selected action will only have an impact on the single pump, e.g. if Action is set to Stop, then only the single pump will stop.

For **Limit 4 exceeded** in a multipump system, the action will always lead to a pump stop, alarm and stop or a warning. [30)]

The function requires setting of the following parameters:

Measured

Set the measured parameter to be monitored.

Limit

Set the limit which activates the function.

Hysteresis band

Set the hysteresis band for when the function must be deactivated again.

Limit exceeded when

Set the function to be activated when the selected parameter exceeds or drops below the set limit.

- **above limit**
  The function is activated if the measured parameter exceeds the set limit.
- **below limit**
  The function is activated if the measured parameter drops below the set limit.

Action

If the value exceeds a limit, you can set an action. The following actions are available:

- **Not active**
  The pump remains in its current state. Use this setting if you only want to 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 maximum.
- **Alarm and User-defined speed**
  An alarm is given, and the pump runs at the speed set by the user.

Alarm and Warning text

The **Limit-exceeded** function will automatically define a relevant alarm/warning text based on the **Measured parameter** and **Limit exceeded when** functions.

The auto defined text can be overwritten by selecting the alarm/warning text option **Limit X exceeded**.

The following list shows the auto defined texts:

- Limit X exceeded
- Low inlet pressure
- High discharge pressure
- High pressure
- Low pressure
- High temperature
- Low temperature
- High flow
- Low flow
- High level
- Low level
- High diff. pressure
- Low diff. pressure
- High conductivity

Detection in Stop

Enable this function to prevent the pump from monitoring the limit while the pump is in the **Stop** state.

Use the **Detection delay** function to allow the pump to start up and bring the value above the limit before detecting.

Detection delay

Setting the detection delay ensures that the monitored parameter stays above or below a set limit in a set time before the function is activated.

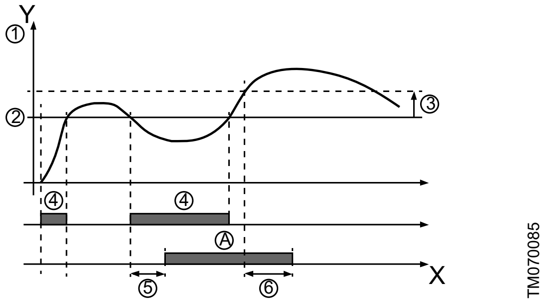
Resetting delay

The resetting delay is the time from when the measured parameter differs from the set limit, including the set hysteresis band, and until the function is reset.

Example

The function is to monitor the outlet pressure from the pump. If the pressure is below 5 bar for more than 5 seconds, a warning is indicated. If the pressure is above 7 bar for more than 8 seconds, reset the limit-exceeded warning.

30) Only available if an advanced functional module, type FM310, is fitted.



X: Time in seconds

Y: Pressure in bar

Pos.	Parameter	Setting
1	**Measured**	**Discharge pressure**
2	**Limit**	5 bar
3	**Hysteresis band**	2 bar
4	**Limit exceeded when**	**below limit**
5	**Detection delay**	5 seconds
6	**Resetting delay**	8 seconds
A	**Limit-exceeded function active**	-
-	**Action**	**Warning**

Communication

Pump number

Pump variant	Pump number
TPE3, TPE3 D	•
TPE2, TPE2 D	•

Use this function to allocate a unique number to the pump. This makes it possible to distinguish between pumps in connection with GENIbus communication.

Enable/disable radio comm.

Pump variant	Enable/disable radio comm.
TPE3, TPE3 D	•
TPE2, TPE2 D	•

Use this function to set the radio communication to **Enabled** or **Disabled**. Select **Disabled** in areas where radio communication is not allowed.

Bluetooth communication remains active.

Enable/disable Bluetooth comm.

Only from 3-22 kW 2-pole and 2.2 - 22 kW 4-pole.

Use this function to set the Bluetooth communication to **Enabled** or **Disabled**. Select **Disabled** in areas where Bluetooth communication is not allowed.

Radio communication remains active.

Initiate Bluetooth connection

Only from 3-22 kW 2-pole and 2.2 - 22 kW 4-pole.

Use this function if Grundfos GO is installed on Huawei smartphones with BLE version 5.0 or older. This function is used to establish a Bluetooth connection to Grundfos GO. Open the Grundfos GO app on your device and select **Initiate Bluetooth connection**. Then select **Yes** and follow the instructions on the device.

Setup of AYB terminals

Only from 3-22 kW 2-pole and 2.2 - 22 kW 4-pole.

Protocol selection

Use this function to select which fieldbus protocol that must be active on the AYB terminals (RS-485).

Select between the following:

- Modbus RTU
- GENIbus.

Modbus RTU settings

Only from 3-22 kW 2-pole and 2.2 - 22 kW 4-pole.

Modbus RTU address

Use this function to allocate a unique number to the pump. This makes it possible to distinguish between pumps in connection with Modbus RTU communication.

Select a number between 1 and 247.

Baud rate

Use this function to select the baud rate at which Modbus RTU is to communicate.

Select between the following baud rates:

- 9600 bps
- 19200 bps
- 38400 bps
- 115200 bps.

Parity

Use this function to set the parity of the Modbus RTU channel.

Select between these values:

- None
- Odd
- Even.

Stop bits

Use this function to set the number of stop bits on the Modbus RTU channel.

Select between these values:

- 1 bit
- 2 bits.

IP Setting

Only from 3-22 kW 2-pole and 2.2 - 22 kW 4-pole.

Use this function to set the Ethernet communication.

DHCP

Use this function to select if DHCP should be activated or deactivated.

If activated, the E-pump will receive network configuration from the DHCP server on the network.

If deactivated, IP address, Subnet mask, Gateway and Primary DNS must be configured manually.

IP address

Use this function to manually set the IP address. IP address format:

Example: 192.168.0.10

Subnet mask

Use this function to manually set the subnet mask. Subnet mask format:

Example: 255.255.255.0

Gateway

Use this function to manually set the gateway address. Gateway address format:

Example: 192.168.1.1

Primary DNS

Use this function to manually set the primary DNS address.

Example of primary DNS address format: 8.8.8.8

Secondary DNS

Use this function to manually set the secondary DNS address.

Example of secondary DNS address format: 4.4.4.4

Special functions

Pulse flowmeter setup

Pump variant	Pulse flowmeter setup
TPE3, TPE3 D	●
TPE2, TPE2 D	●

You can connect an external pulse flowmeter to one of the digital inputs in order to register the actual and accumulated flows. Based on this, you can also calculate the specific energy.

To enable a pulse flowmeter, set one of the digital-input functions to **Accumulated flow** and set the pumped volume per pulse.

Related information

Digital inputs

Ramps

Pump variant	Ramps
TPE3, TPE3 D	●
TPE2, TPE2 D	●

The ramps determine how quickly the product can accelerate and decelerate during start and stop or setpoint changes.

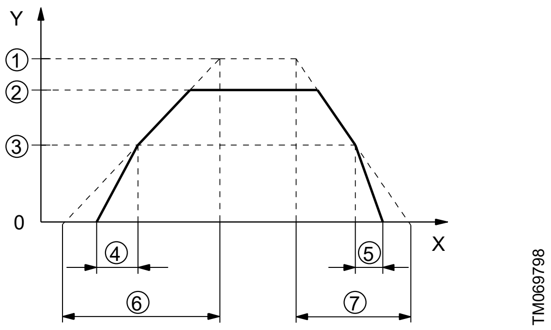
You can make the following settings:

- acceleration time, 0.1 to 300 s
- deceleration time, 0.1 to 300 s.

The times apply to the acceleration from 0 rpm to a fixed maximum speed and the deceleration from a fixed maximum speed to 0 rpm, respectively.

At short deceleration times, the deceleration of the product may depend on load and inertia as there is no possibility of actively braking the product.

If the power supply is switched off, the deceleration of the product only depends on the load and inertia.



Ramp-up and ramp-down

Pos.	Description
X	Time
Y	Speed
1	Fixed maximum
2	User set maximum
3	User set minimum
4	Fixed initial ramp
5	Fixed final ramp
6	User set ramp-up
7	User set ramp-down

Standstill heating

Pump variant	Standstill heating
TPE3, TPE3 D	●
TPE2, TPE2 D	●

Use this function to avoid condensation in humid environments.

When you set the function to **Active** and the product is in operating mode **Stop**, a low AC voltage is applied to the motor windings. The voltage is not high enough to make the motor rotate, but ensures that sufficient heat is generated to avoid condensation in the product, including the electronic parts in the drive.

Remember to remove the drain plugs and fit a cover over the product.

Alarm handling

Pump variant	Alarm handling
TPE3, TPE3 D	●
TPE2, TPE2 D	●

This setting determines how the pump must react in case of a sensor failure.

Alarm or warning types:

The alarm handling determines how the pump must react in case of a sensor failure.

- **Warning**
  A warning. There is no change in the operating mode.
- **Stop**
  The pump stops.
- **Min.**
  The pump reduces the speed to minimum.
- **Max.**
  The pump increases the speed to maximum.
- **User defined speed**
  The pump runs at the speed set by the user.

Affected inputs:

- **Analog input 1**
- **Analog input 2**
- **Analog input 3**
- **Grundfos Direct Sensor**
- **Pt100/1000 input 1**
- **Pt100/1000 input 2**
- **Liqtec input**.

Motor bearing monitoring

Pump variant	Motor bearing monitoring
TPE3, TPE3 D	●
TPE2, TPE2 D	●

Use this function to select whether or not you want to monitor the motor bearings.

You can make the following settings:

- **Active**
- **Not active**

When the function is set to **Active**, a counter in the controller starts counting the running hours of the bearings. The running hours are calculated on the basis of the motor speed. When a predefined limit is reached, a warning indicates that the bearings must be replaced or relubricated.

If you change the function to **Not active**, the counter continues to count. However, no warning is given when it is time to replace the bearings. If you change the function to **Active** again, the accumulated running hours are used to recalculate the replacement time.

Service

Pump variant	Service
TPE3, TPE3 D	●
TPE2, TPE2 D	●

Motor bearing service

This display shows when to replace the motor bearings. The controller monitors the operating pattern of the motor and calculates the period between bearing replacements.

Displayable values:

- **in 2 years**
- **in 1 year**
- **in 6 months**
- **in 3 months**
- **in 1 month**
- **in 1 week**
- **Now!**

Bearing replacements

The display shows the number of bearing replacements made during the lifetime of the motor.

Motor bearing maintenance

When the bearing monitoring function is active, a warning is given when the motor bearings must be replaced.

1. Replace the motor bearings.
2. Press **Bearings replaced**.

Bearings relubricated

When the bearing monitoring function is active, a warning is given when the motor bearings must be relubricated.

Bearings can be relubricated 5 times before they must be replaced.

The amount of grease can be found on the bearing nameplate on the motor.

1. When you have relubricated the bearings, press **Bearings relubricated**.

General settings

Language

Pump variant	Language
TPE3, TPE3 D	•
TPE2, TPE2 D	•

The function is only available in the HMI 300 and 301 operating panels.

Use this function to select the desired language from the list.

Date and time(Set date and time)

Pump variant	Date and time
TPE3, TPE3 D	•
TPE2, TPE2 D	•

The function is only available in the HMI 300 and 301 operating panels.

Use this function to set the date and time as well as how you want them to be viewed in the display.

- **Select date format**
  - **YYYY-MM-DD**
  - **DD-MM-YYYY**
  - **MM-DD-YYYY**
- **Select time format**
  - **HH:MM 24-hour clock**
  - **HH:MM am/pm 12-hour clock**
- **Set date**
- **Set time**.

Unit configuration (Units)

Pump variant	Unit configuration
TPE3, TPE3 D	•
TPE2, TPE2 D	•

The function is only available in the HMI 300 and 301 operating panels.

Use this function to select SI or US units. You can make the setting for all parameters or customize for each individual parameter.

Buttons on product (Enable/disable settings)

Pump variant	Buttons on product
TPE3, TPE3 D	•
TPE2, TPE2 D	•

Use this function to disable the option to make settings for protective reasons.

- If you use Grundfos GO and set the buttons to **Not active**, the buttons on the HMI 200 or 201 operating panel are disabled, except the **Radio communication** button.
- If you disable the buttons on pumps fitted with the HMI 300 or 301 operating panel via **Enable/disable settings**, you can still use the buttons to navigate through the menus but you cannot make changes directly on these operating panels. A lock symbol appears in the display. However, you can unlock the motor temporarily and allow settings by pressing the **Up** and **Down** buttons simultaneously for at least 5 seconds.

Delete history

Pump variant	Delete history
TPE3, TPE3 D	●
TPE2, TPE2 D	●

The function is only available in the HMI 300 and 301 operating panels.

Use this function to delete the following historical data:

- **Delete operating log**
- **Delete energy consumption**.

Define Home display

Pump variant	Define Home display
TPE3, TPE3 D	●
TPE2, TPE2 D	●

The function is only available in the HMI 300 and 301 operating panels.

Set the **Home** display to show up to four user-defined parameters.

Display settings

Pump variant	Display settings
TPE3, TPE3 D	●
TPE2, TPE2 D	●

The function is only available in the HMI 300 or 301 operating panels.

Use this function to adjust the display brightness. You can also set whether or not the display is to switch off if no buttons have been activated for a period of time.

Store settings (Store actual settings)

Pump variant	Store settings
TPE3, TPE3 D	●
TPE2, TPE2 D	●

Use this function to store the current settings to enable the user to go back to a previous set of settings.

Recall settings (Recall stored settings)

Pump variant	Recall settings
TPE3, TPE3 D	●
TPE2, TPE2 D	●

Grundfos GO

In this menu, you can recall stored settings from a number of previously stored settings that the pump then uses.

Advanced operating panel

In this menu, you can recall the last stored settings that the pump will then use.

Undo

Pump variant	Undo
TPE3, TPE3 D	●
TPE2, TPE2 D	●

The function is only available in Grundfos GO.

Use this function to undo all settings made with Grundfos GO in the current communication session. Once you have recalled settings, you cannot undo.

Pump name

Pump variant	Pump name
TPE3, TPE3 D	●
TPE2, TPE2 D	●

The function is only available in Grundfos GO.

Use this function to give the motor a name. The selected name then appears in Grundfos GO.

Connection code

Pump variant	Connection code
TPE3, TPE3 D	●
TPE2, TPE2 D	●

Use the connection code to enable automatic connection between Grundfos GO and the product. Thus, you do not need to press **OK** or the **Radio communication** button each time.

You can also use the connection code to restrict remote access to the product.

You can only set the connection code with Grundfos GO.

Run start-up guide

Pump variant	Run start-up guide
TPE3, TPE3 D	●
TPE2, TPE2 D	●

The function is only available in the HMI 300 and 301 operating panels.

The startup guide automatically starts when you start the product for the first time. You can always run the startup guide later. The startup guide guides you through the general settings of the product.

To run the startup guide, go to **Settings** > **General settings** > **Run start-up guide**.

Alarm log

Pump variant	Alarm log
TPE3, TPE3 D	•
TPE2, TPE2 D	•

This function contains a list of logged alarms from the product. The log shows the alarm code, name of the alarm, when the alarm occurred and when the alarm was reset.

Warning log

Pump variant	Warning log
TPE3, TPE3 D	•
TPE2, TPE2 D	•

This function contains a list of logged warnings from the product. The log shows the warning code, name of the warning, when the warning occurred and when the warning was reset.

Assist

Pump variant	Assist
TPE3, TPE3 D	•
TPE2, TPE2 D	•

This menu consists of a number of different assist functions.

Assist functions are small guides that take you through the steps needed to set the product.

Assisted pump setup

Pump variant	Assisted pump setup
TPE3, TPE3 D	•
TPE2, TPE2 D	•

The menu guides you through the following:

Setting of pump

- Selection of control mode
- Configuration of feedback sensors
- Adjustment of the setpoint
- Controller settings
- Summary of settings.

With Grundfos GO, access the **Assisted pump setup** menu.

With the HMI 300 or 301 operating panel, access the **Assisted pump setup** menu.

Example of how to use the **Assisted pump setup** for setting up the pump to constant pressure:

Grundfos GO

1. Open the **Assist** menu.
2. Select **Assisted pump setup**.
3. Select the control mode Constant pressure.
4. Read the description of this control mode.
5. Select which analog input to use as sensor input.
6. Select sensor function according to where the sensor is installed in the system. See figure Overview of sensor locations.
7. Select electrical input signal according to the sensor specifications.
8. Select measuring unit according to the sensor specifications.
9. Set the minimum and maximum sensor values according to the sensor specifications.
10. Set the desired setpoint.
11. Set the controller settings K_p and T_i. See the recommendations in section Controller (Controller settings).
12. Type the pump name.
13. Check the summary of settings and confirm them.

Advanced control panel

1. Open the **Assist** menu.
2. Select **Assisted pump setup**.
3. Select the control mode Const. pressure.
4. Select which analog input to use as sensor input.
5. Select the measured parameter to be controlled. See figure Overview of sensor locations.
6. Select measuring unit according to the sensor specifications.
7. Set the minimum and maximum sensor values according to the sensor specifications.
8. Select electrical input signal according to the sensor specifications.
9. Set the setpoint.
10. Set the controller settings K_p and T_i. See recommendations in section Controller (Controller settings).
11. Check the summary of settings and confirm them by pressing [OK].

Setup, analog inputs

Pump variant	Setup, analog inputs
TPE3, TPE3 D	•
TPE2, TPE2 D	•

This function is only available in the HMI 300 and 301 operating panels.

- **Analog inputs**, follow on-screen instructions.
- **Pt100/1000 inputs**, follow on-screen instructions.

Setting of date and time

Pump variant	Setting of date and time
TPE3, TPE3 D	•
TPE2, TPE2 D	•

The function is only available in the HMI 300 and 301 operating panels.

The inputs and outputs available depend on the functional module fitted in the motor.

This menu guides you through the following:

- **Select date format**
- **Set date**
- **Select time format**
- **Set time**.

Multipump function

Pump variant	Multipump function
TPE3, TPE3 D	●
TPE2, TPE2 D	●

The function **Multi-pump function** enables the control of up to four motors connected in parallel without the use of external controllers. The pumps or motors in a system communicate with each other via the wireless GENIair connection or the wired GENI connection.

You can set a multipump system via the master motor, which is the first selected motor.

If several pumps or motors in the system have sensors, they can all function as the master and take over the master function if the other fails. This provides additional redundancy in the multimotor system.

You can choose between the following multimotor functions:

Alternating operation

Alternating operation functions as a duty and standby operating mode and is possible with two pumps or two motors of the same size and type connected in parallel. The main purpose of the function is to ensure an even amount of running hours and to ensure that the other pump or motor starts if the duty pump or motor stops due to an alarm.

You can choose between two alternating operating modes:

- **Alternating operation, time**
  The change from one pump or motor to the other is based on time.
- **Alternating operation, energy**
  The change from one pump or motor to the other is based on energy consumption.

If the duty pump or motor fails, the other pump or motor starts.

Backup operation

Backup operation is possible with two motors of the same size and type connected in parallel. One motor is operating continuously. The backup motor is operated for a short time each day to prevent seizing up. If the duty motor stops due to a fault, the backup motor starts.

Cascade operation

This function is available with up to 4 motors installed in parallel. The motors must be of the same size and if used with pumps, the pumps must be of the same model.

- The performance is adjusted to the demand through cutting pumps in or out and through parallel control of the pumps in operation.
- The controller maintains controlled value through continuous adjustment of the speed of the pumps.
- Pump changeover is automatic and depends on load, operating hours and fault detection.
- All pumps in operation run at the same speed.
- The number of pumps in operation also depends on the energy consumption of the pumps. If only one pump is required, two pumps will run at a lower speed if this results in a lower energy consumption.
- If several pumps or motors in the system have a sensor, they can all function as the master and take over the master function if the other fails.

Sensor to be used

This function defines the sensor to be used for controlling the pump system.

Select **Master pump sensor** if the sensor is placed in a way where it can measure the output from all the pumps in the system, for example in the manifold.

Select **Running pump sensor** if the sensor is placed on or across individual pumps. For example, if the sensor is installed behind non-return valves, and if it is not able to measure the output from all pumps.

This setting is only available in alternating operation and cascade operation.

Description of control mode

Pump variant	Description of control mode
TPE3, TPE3 D	●
TPE2, TPE2 D	●

The function is only available in the HMI 300 and 301 operating panels.

The function describes each of the control modes available for the product.

Assisted fault advice

Pump variant	Assisted fault advice
TPE3, TPE3 D	●
TPE2, TPE2 D	●

This function provides guidance and corrective actions in the event of product failure.

Priority of settings

With Grundfos GO, you can set the motor to operate at maximum speed or to stop.

If two or more functions are enabled at the same time, the motor operates according to the function with the highest priority.

If you have set the motor to maximum speed via the digital input, the motor operating panel or Grundfos GO can only set the motor to **Manual** or **Stop**.

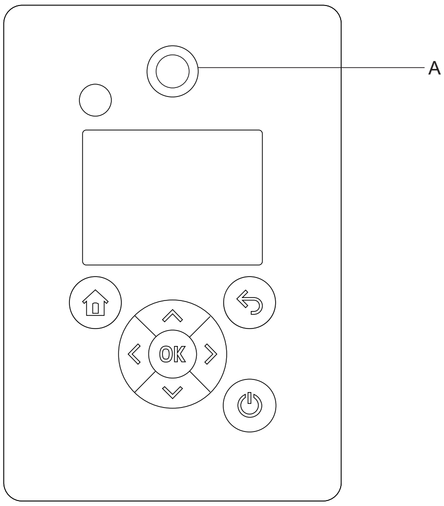
The priority of the settings appears from the table below:

Priority	Start/stop button	Grundfos GO or operating panel on motor	Digital input	Bus communication
1	**Stop**			
2		**Stop** [31]		
3		**Manual**		
4		**Maximum speed** / **User defined speed** [31]		
5			**Stop**	
6			**User defined speed**	
7				**Stop**
8				**Maximum speed** / **User defined speed**
9				**Minimum speed**
10				**Start**
11			**Maximum speed**	
12		**Minimum speed**		
13			**Minimum speed**	
14			**Start**	
15		**Start**		

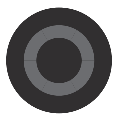
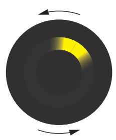
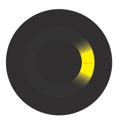
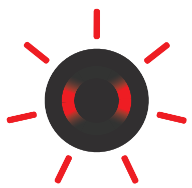
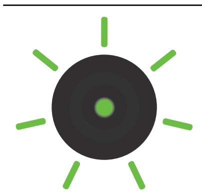
[31] **Stop** and **Maximum speed** settings made with Grundfos GO or on the motor operating panel can be overruled by another operating-mode command sent from a bus, for example **Start**. If the bus communication is interrupted, the motor resumes its previous operating mode, for example **Stop**, that was selected with Grundfos GO or the motor operating panel.

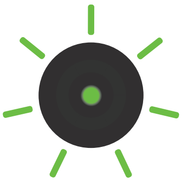
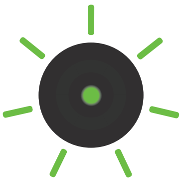
Grundfos Eye

The operating condition of the motor is indicated by Grundfos Eye on the motor operating panel. See figure below (A).



Grundfos Eye indicator light

Indicator light	Indication	Description
	No lights are on.	**Power off** The motor is not running.
	Two opposite green indicator lights are rotating.	**Power on** The motor is running. The indicator lights are rotating in the direction of rotation of the motor when seen from the non-drive end.
	Two opposite green indicator lights are permanently on.	**Power on** The motor is not running.
	One yellow indicator light is rotating.	**Warning** The motor is running. The indicator light is rotating in the direction of rotation of the motor when seen from the non-drive end.
	One yellow indicator light is permanently on.	**Warning** The motor has stopped.
	Two opposite red indicator lights are flashing simultaneously.	**Alarm** The motor has stopped.
	The green indicator light in the middle flashes quickly four times.	Grundfos Eye flashes four times when you press the Grundfos Eye symbol next to the motor name in Grundfos GO.

Indicator light	Indication	Description
	The green indicator light in the middle is flashing continuously.	You have selected the motor in Grundfos GO, and the motor is ready to be connected.
	The green indicator light in the middle flashes quickly for a few seconds.	The motor is controlled by Grundfos GO or exchanging data with Grundfos GO.
	The green indicator light in the middle is permanently on.	The motor is connected to Grundfos GO.

Signal relays

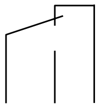
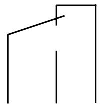
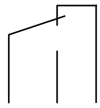
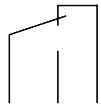
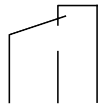
The following applies to the pumps below:

- TPE3, TPE3 D pumps
- TPE2, TPE2 D pumps

The motor has two outputs for potential-free signals via two internal relays. You can set the signal outputs to **Operation**, **Pump running**, **Ready**, **Alarm** and **Warning**.
The functions of the two signal relays appear from the table below:

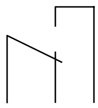
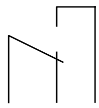
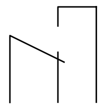
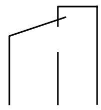
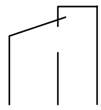
Grundfos Eye is off

The power is off.

Operation	Pump running	Ready	Alarm	Warning	Operating mode
 C NO NC	 C NO NC	 C NO NC	 C NO NC	 C NO NC	-

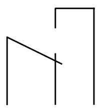
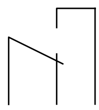
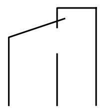
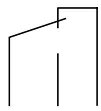
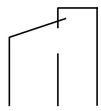
Grundfos Eye is rotating green

The pump runs in **Normal** mode in open or closed loop.

Operation	Pump running	Ready	Alarm	Warning	Operating mode
 C NO NC	 C NO NC	 C NO NC	 C NO NC	 C NO NC	**Normal** **Min.** or **Max.**

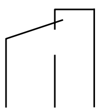
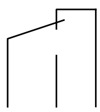
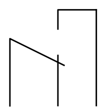
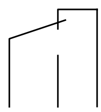
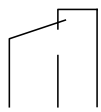
Grundfos Eye is rotating green

The pump runs in **Manual** mode.

Operation	Pump running	Ready	Alarm	Warning	Operating mode
 C NO NC	 C NO NC	 C NO NC	 C NO NC	 C NO NC	**Manual**

Grundfos Eye is permanently green

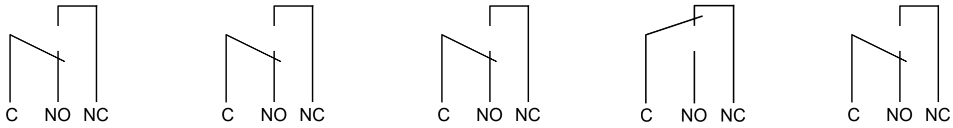
The pump is ready for operation but is not running.

Operation	Pump running	Ready	Alarm	Warning	Operating mode
 C NO NC	 C NO NC	 C NO NC	 C NO NC	 C NO NC	**Stop**

Grundfos Eye is rotating yellow

Warning, but the pump is running.

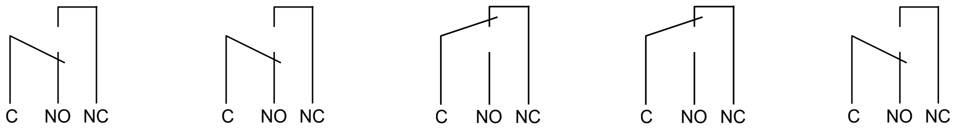
Operation	Pump running	Ready	Alarm	Warning	Operating mode
C NO NC	C NO NC	C NO NC	C NO NC	C NO NC	**Normal** **Min.** or **Max.**



Grundfos Eye is rotating yellow

Warning, but the pump is running.

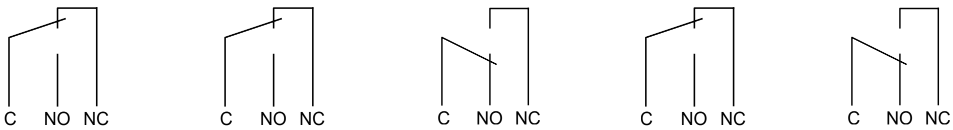
Operation	Pump running	Ready	Alarm	Warning	Operating mode
C NO NC	C NO NC	C NO NC	C NO NC	C NO NC	**Manual**



Grundfos Eye is permanently yellow

Warning, but the pump was stopped via a **Stop** command.

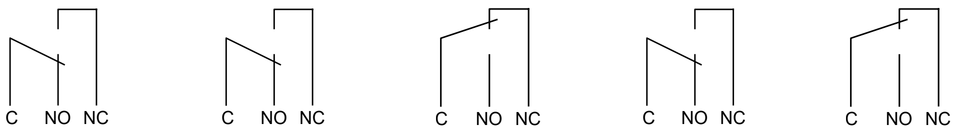
Operation	Pump running	Ready	Alarm	Warning	Operating mode
C NO NC	C NO NC	C NO NC	C NO NC	C NO NC	**Stop**



Grundfos Eye is rotating red

Alarm, but the pump is running.

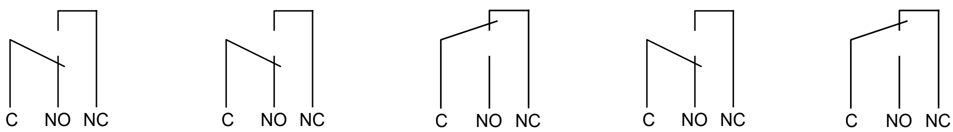
Operation	Pump running	Ready	Alarm	Warning	Operating mode
C NO NC	C NO NC	C NO NC	C NO NC	C NO NC	**Normal** **Min.** or **Max.**



Grundfos Eye is rotating red

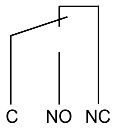
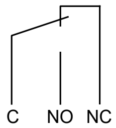
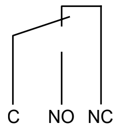
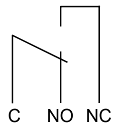
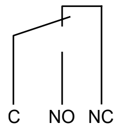
Alarm, but the pump is running.

Operation	Pump running	Ready	Alarm	Warning	Operating mode
C NO NC	C NO NC	C NO NC	C NO NC	C NO NC	**Manual**



Grundfos Eye is flashing red

The pump has been stopped due to an alarm.

Operation	Pump running	Ready	Alarm	Warning	Operating mode
					**Stop**

Safe Torque off (STO) function

Only from 3-22 kW 2-pole and 2.2 - 22 kW 4-pole.

Safe Torque Off (STO) is a safety function with the purpose to stop the motor from turning, without actively braking it. It follows the definition by EN61800-5-2.

For instructions on how to activate and operate the Safe Torque Off (STO) function, read these installation and operating instructions.

QR92916582

Safe Torque Off

Installation and operating instructions

http://net.grundfos.com/qr/i/92916582

13. Factory settings of TPE3 (D) and TPE2 (D)

- ● Function is enabled.
- ❍ Function is disabled.
- \- Function is not available.

Settings		TPE3, TPE3 D	TPE2, TPE2 D	Multipump
Setpoint		Auto	67 %	67 %
Operating mode		Normal	Normal	Normal
Control mode		AutoAdapt	Const. curve	Const. curve
Date and time		●	●	●
Buttons on product		●	●	●
Controller (Controller settings)				
	Ti	1.0	0.5	0.5
	Kp	8.0	0.5	0.5
Operating range				
	Min.	25 %	25 %	25 %
	Max.	100 %	100 %	100 %
Ramps		❍	❍	❍
	Ramp-up	20 seconds	20 seconds	20 seconds
	Ramp-down	20 seconds	20 seconds	20 seconds
Sensor to be used				
	Single-head pump	Master pump sensor	Master pump sensor	Master pump sensor
	Twin-head pump (Small)	Running pump sensor	Running pump sensor	Running pump sensor
	Twin-head pump (Medium/Large)	Master pump sensor	Master pump sensor	Master pump sensor
Number (**Pump number**)		1	1	1
Radio communication		●	●	●
Analog input 1		❍	❍	❍
Analog input 2		❍	❍	❍
Analog input 3		❍	❍	❍
Grundfos Direct Sensor		●	-	●
Pt100/1000 input 1		❍	❍	❍
Pt100/1000 input 2		❍	❍	❍
Digital input 1		❍	❍	❍
Digital input 2		❍	❍	❍
Digital input 3		❍	❍	❍
Digital input/output 4		❍	❍	❍
Pulse flowmeter		❍	❍	❍
Predefined setpoints		❍	❍	❍
Analog output		❍	❍	❍
External setpoint funct.		❍	❍	❍
Relay output 1		Alarm	Alarm	❍
Relay output 2		Ready	Ready	❍
Limit 1 exceeded		❍	❍	❍
Limit 2 exceeded		❍	❍	❍
Limit 3 exceeded [32)]		❍	❍	❍
Limit 4 exceeded [32)]		❍	❍	❍
Standstill heating		❍	❍	❍
Motor bearing monitoring		❍	❍	❍

Settings	TPE3, TPE3 D	TPE2, TPE2 D	Multipump
Pump name	Grundfos	Grundfos	Grundfos
Connection code	-	-	-
Unit configuration	SI	SI	SI

32) Only available if an advanced functional module, type FM310 or FM311, is fitted.

Settings	TPE3, TPE3 D	TPE2, TPE2 D
Setpoint	Auto	67 %
Operating mode	Normal	Normal
Control mode	AutoAdapt	Const. curve
Date and time	●	●
FLOWLIMIT	❍	-
Automatic night setback	❍	-
Temperature influence	❍	-
Buttons on product	●	●
Controller	●	●
T_p	1.0	0.5
T_i	8.0	0.5
Operating range		
Min.	25 %	25 %
Max.	100 %	100 %
Ramps	●	●
Unit number	❍	❍
Radio communication	-	-
Sensor type	-	-
Analog input 1	❍	❍
Analog input 2	❍	❍
Analog input 3	❍	❍
Grundfos Direct Sensor	-	-
Pt100/1000 input 1	❍	❍
Pt100/1000 input 2	❍	❍
Digital input 1	❍	❍
Digital input 2	❍	❍
Digital in/output 1	❍	❍
Digital in/output 2	❍	❍
Digital input 3	❍	❍
Digital input 4	❍	❍
Pulse flowmeter	-	-
Predefined setpoint	-	-
Analog output	❍	❍
External setpoint funct.	❍	❍
Signal relay 1	❍	❍
Signal relay 2	❍	❍
Limit 1 exceeded	❍	❍
Limit 2 exceeded	❍	❍
Limit 3 exceeded [32)]	❍	❍
Limit 4 exceeded [32)]	❍	❍
Standstill heating	❍	❍
Motor bearing monitoring	❍	❍
Pump name	❍	❍
Connection code	-	-
Unit configuration	SI	SI

32) Only available if an advanced functional module, type FM310 or FM311, is fitted.

Multipump factory setting for twin-pumps: Alternating operation on time.

14. User interfaces for TPE pumps 30-90 kW

TPE pumps 30-90 kW have Innomotics or Nidec motors with integrated CUE frequency converters. The frequency converter part of the TPE Series 2000 and TPE Series1000 will in the following descriptions be named as CUE.

Default control mode made in TPE Series 1000:

- Open loop.

Default control mode made in TPE Series 2000:

- Proportional differential pressure.

User interface

The user interface offers several possibilities:

- local operation via an operating panel with graphic display
- remote operation via external signals, for instance, via digital inputs or communication port
- monitoring of operating status via indicator lights and signal relays
- display of alarms or warnings and logging.

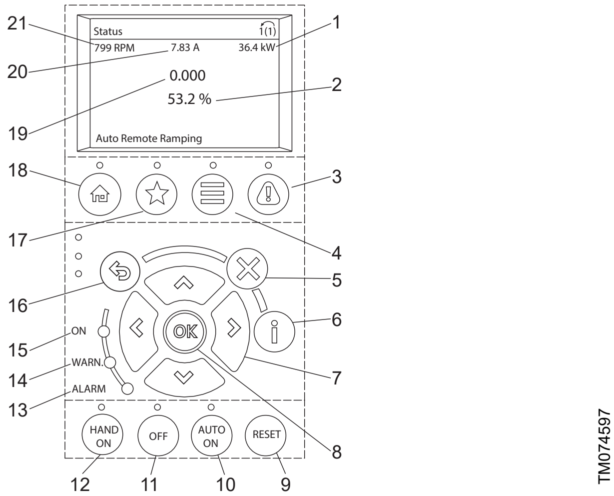
Operation/display

CUE offers a wide range of data readouts representing the operating conditions of the CUE itself, the motor, the pump, and the system. All these data readouts are available by entering the [Main] menu parameter group 16-xx "Data Readouts":

- 16-1x "General Status"
- 16-2x "Motor Status"
- 16-3x "Drive Status"
- 16-5x "Setpoint and Feedback"
- 16-6x "Inputs and Outputs"
- 16-8x "Fieldbus and GENI port"
- 19-9x "Diagnostics readouts".

CUE [Status] screen shows up to five operational information. These can be adjusted in [Main] menu parameters 0-2x.

Position	Parameter	Default
21	0-20 Display line 1.1 Small	External setpoint
20	0-20 Display line 1.2 Small	Actual setpoint
1	0-20 Display line 1.3 Small	Speed [RPM]
19	0-23 Display Line 2 Large	Operating mode
2	0-23 Display Line 3 Large	Control mode



Operating panel

Password protection

Password numbers can be used for protecting the **Main** and **Favourites** menus as well as operating keys **Hand on**, **Off**, **Auto On** and **Reset**.

Restricted access is set for the **Main** menu in the parameter 0-61 and for **Favourites** menu in the parameter 0-66. Select **Full access - 0** to disable the password defined in parameters 0-60 and 0-65, respectively. Select **Read only - 1** to prevent unauthorized editing of the parameters. Select **No access - 2** to prevent unauthorized viewing and editing of the parameters.

Restricted use of operating keys **Hand on**, **Off**, **Auto On** and **Reset** is set in the parameter group 0-4x. Select **Disabled - 0** to avoid accidental use of the key. Select **Password - 2** to avoid unauthorized use of the key.

Inputs and outputs

The CUE is equipped with a number of inputs and outputs:

- 1 RS485 serial communication port:
  - Genibus
  - Modbus RTU
  - BACnet MS/TP
- 1 USB serial communication port
- 1 analog input, 0-10 V, 0/4-20 mA
  - external setpoint
- 1 analog input, 0-10 V, 0/4-20 mA
  - sensor input, feedback sensor
- 1 analog output, 0/4-20 mA (depends on the output signal)
- 6 digital inputs
  - 2 inputs can be changed to digital outputs
  - all digital inputs and outputs are programmable
- 2 signal relays (C/NO/NC)
  - programmable.

Accessories

Grundfos offers a number of accessories for CUE. See section CUE accessories.

MCB 114 sensor input module

MCB 114 is an option offering additional analog inputs for CUE:

- 1 analog input, 0/4-20 mA
- 2 inputs for Pt100/Pt1000 temperature sensors.

MCO 101 multipump module

MCO 101 is an option offering cascade of multiple CUEs:

- cascade of up to 6 CUEs. Only possible with the Constant pressure control mode.

Related information

CUE accessories

Operating modes

These operating modes can be selected with CUE:

- Normal
- Stop
- Min. curve
- Max. curve
- User curve.

The operating modes are set on the operating panel by using the [Favourites] menu. The operating modes can be set without changing the setpoint setting.

Normal

The pump operates in the selected control mode.

The control modes are different ways of controlling the pump speed when the operating mode is set to "Normal".

Stop

The pump is stopped by the user.

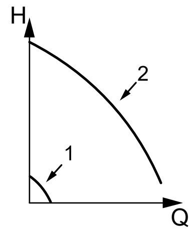
Minimum curve

The pump is running at a set minimum speed value. See the figure about the minimum and maximum curves.

For instance, this operating mode can be used during periods with very small flow requirement.

Max. curve

The pump is running at a set maximum speed. See the figure below.



TM038813

Min. and max. curves

Pos.	Description
1	Min.
2	Max.

User curve

The pump is running at a user-defined speed.

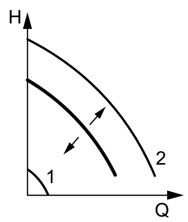
Control modes

CUE has a built-in PID controller that provides closed-loop control of the value you want to control. CUE can also be set to open-loop control where the setpoint represents the desired pump speed. The control modes are set on the operating panel in the startup guide or changed using the [Favourites] menu.

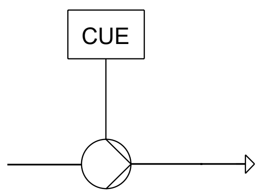
Open loop is typically used without a sensor. All the other control modes require a sensor.

Open loop, constant curve

The speed is kept at a set value in the range between the minimum and maximum curves. See the figure below.



TM038479



TM039727

Open loop, constant curve

Pos.	Description
1	Min.
2	Max.

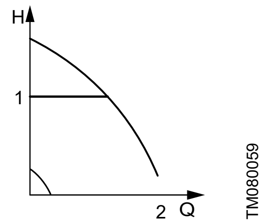
In the "Open loop" control mode, the setpoint is set in percentage of the nominal speed. The setting range is between the minimum and maximum curves.

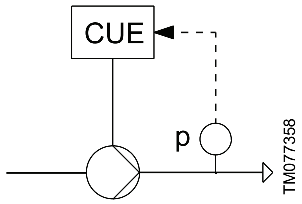
Operation on constant curve can, for instance, be used for pumps with no sensor connected.

This control mode is also typically used in connection with an overall control system such as Control MPC or another external controller.

Constant pressure

The outlet pressure is kept constant, independently of the flow rate.





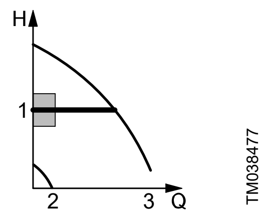
Pos.	Description
1	H_{set}
2	Q_{max}

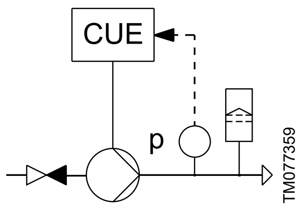
Constant pressure

The pump is controlled according to a constant pressure measured after the pump. This means that the pump offers a constant pressure in the Q-range of 0 to Q_{max}, represented by the horizontal line in the QH diagram.

Constant pressure with stop function

The outlet pressure is kept constant at high flow rate ($Q > Q_{min}$). There is on/off operation at low flow rate.





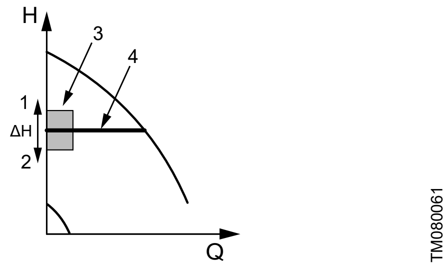
Pos.	Description
1	H_{set}
2	Q_{min}
3	Q_{max}

Constant pressure with stop function

The pump is controlled according to a constant pressure measured after the pump. This means that the pump offers a constant pressure in the Q-range of Q_{min} to Q_{max}, represented by the horizontal line in the QH diagram.

The Stop function is activated by default for constant pressure, but can be deactivated in parameter 200-19 **Stop function**.

The purpose of the Stop function is to stop the pump when low or no flow is detected. When low flow is detected, the pump is in on/off operation. If there is flow, the pump continues to operate according to the setpoint.



Constant pressure with stop function, difference between start and stop pressures (ΔH)

Pos.	Description
1	Stop pressure [33)]
2	Start pressure [34)]
3	On/off operation
4	Continuous operation

33) Stop pressure = Setpoint x (1+ ΔH x 201-43)

34) Start pressure = Setpoint x (1-ΔH x (1-201-43))

Note: ΔH=Setpoint x 201-42

Low flow detection can be configured in two different ways via the parameter 201-36:

- **0 - Open loop**: with the built-in low-flow detection function
- **1 - Close loop**: with a flow switch connected to a digital input.

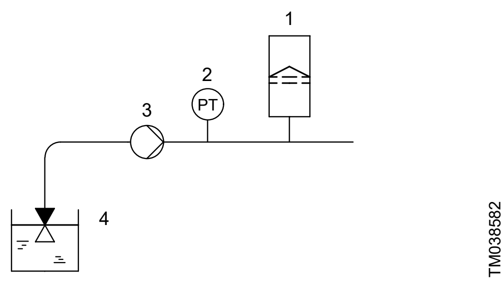
The low-flow detection function checks the flow regularly by reducing the speed for a short time. No or only a small change in pressure means that there is low flow.

When a flow switch detects low flow, the digital input is activated.

It is only possible to use the stop function if the system incorporates the following components:

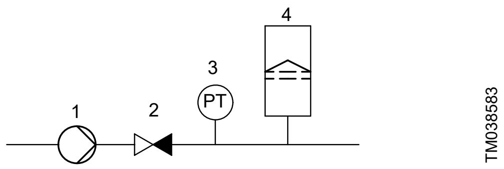
- a pressure sensor
- a non-return valve
- a diaphragm tank.

The non-return valve must always be installed before the pressure sensor.



Position of the non-return valve and pressure sensor in a system with suction lift

Pos.	Description
1	Diaphragm tank
2	Pressure sensor
3	Pump
4	Non-return valve



Position of the non-return valve and pressure sensor in a system with positive inlet pressure

Pos.	Description
1	Pump
2	Non-return valve
3	Pressure sensor
4	Diaphragm tank

The stop function requires a diaphragm tank of a certain minimum size. The tank must be installed as close as possible after the pump, and the precharge pressure must be the 70 % of actual setpoint.

Recommended diaphragm tank sizes:

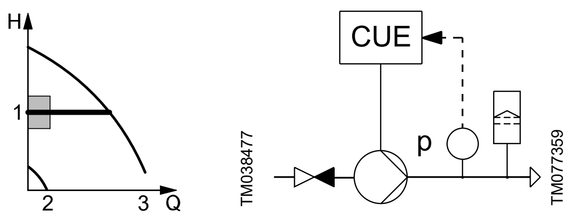
Rated flow rate of pump [m^3/h (gpm)]	Typical diaphragm tank size [litres (gallons)]
0-6 (0-26)	8 (2)
7-24 (26-110)	18 (5)
25-40 (110-180)	50 (13)
41-70 (180-310)	120 (32)
71-100 (310-440)	180 (48)

If a diaphragm tank of the above size is installed in the system, the factory setting of ΔH is the correct setting. If the tank installed is too small, the pump starts and stops too often.

The stop function is activated by default in constant pressure applications. If not desired, it can be deactivated in the parameter 200-19 **Stop function**.

Constant pressure with stop function

The outlet pressure is kept constant at high flow rate ($Q > Q_{min.}$). On/off operation at low flow rate.



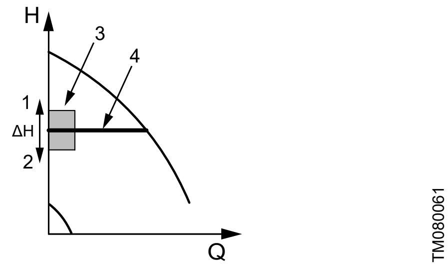
Pos.	Description
1	H_{set}
2	$Q_{min.}$
3	$Q_{max.}$

Constant pressure with stop function

The pump is controlled according to a constant pressure measured after the pump. This means that the pump offers a constant pressure in the Q-range of $Q_{min.}$ to $Q_{max.}$, represented by the horizontal line in the QH diagram.

The Stop function is activated by default for constant pressure, but can be deactivated in parameter 200-19 "Stop function".

The purpose of the stop function is to stop the pump when low or no flow is detected. When low flow is detected, the pump is in on/off operation. If there is flow, the pump continues to operate according to the setpoint.



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

Low flow can be detected in two different ways:

- with the built-in low-flow detection function
- with a flow switch connected to a digital input.

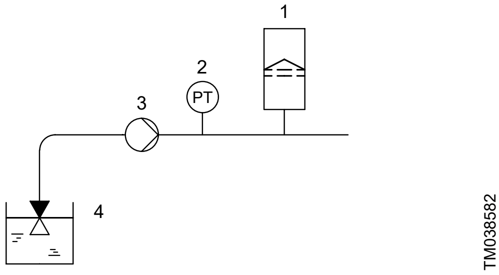
The low-flow detection function checks the flow regularly by reducing the speed for a short time. No or only a small change in pressure means that there is low flow.

When a flow switch detects low flow, the digital input is activated.

It is only possible to use the stop function if the system incorporates these components:

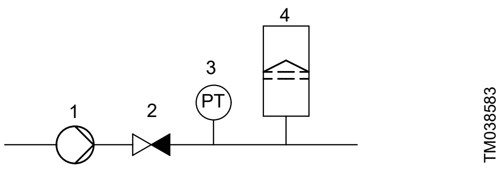
- a pressure sensor
- a non-return valve
- a diaphragm tank.

The non-return valve must always be installed before the pressure sensor.



Position of the non-return valve and pressure sensor in a system with suction lift

Pos.	Description
1	Diaphragm tank
2	Pressure sensor
3	Pump
4	Non-return valve



Position of the non-return valve and pressure sensor in a system with positive inlet pressure

Pos.	Description
1	Pump
2	Non-return valve
3	Pressure sensor
4	Diaphragm tank

The stop function requires a diaphragm tank of a certain minimum size. The tank must be installed as close as possible after the pump, and the precharge pressure must be 0.7 x actual setpoint.

Recommended diaphragm tank sizes:

Rated flow rate of pump [m^3/h (gpm)]	Typical diaphragm tank size [litres (gallons)]
0-6 (0-26)	8 (2)
7-24 (26-110)	18 (5)
25-40 (110-180)	50 (13)
41-70 (180-310)	120 (32)
71-100 (310-440)	180 (48)

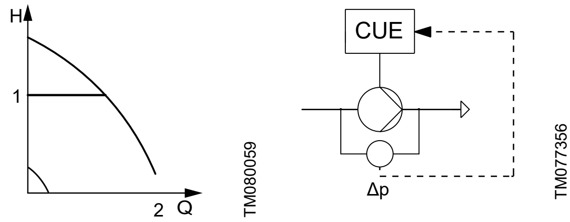
If a diaphragm tank of the above size is installed in the system, the factory setting of ΔH is the correct setting. If the tank installed is too small, the pump starts and stops too often.

The stop function is default activated in constant pressure applications. If not desired, it can be deactivated in parameter 200-19 "Stop function".

Constant differential pressure

Pump

The differential pressure of the pump is kept constant, independently of the flow rate.



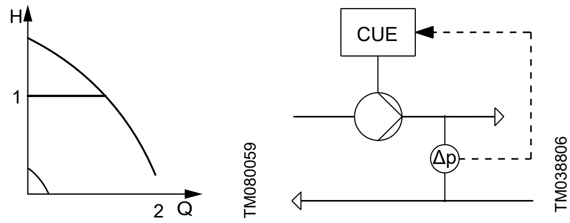
Pos.	Description
1	H_{set}
2	Q_{max}

Constant differential pressure, pump

The pump is controlled according to a constant differential pressure measured across the pump. This means that the pump system offers constant differential pressure in the Q-range of 0 to Q_{max}, represented by the horizontal line in the QH diagram.

System

The differential pressure of the system is kept constant, independently of the flow rate.



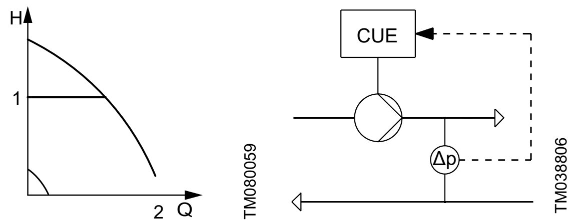
Pos.	Description
1	H_{set}
2	Q_{max}

Constant differential pressure, system

The pump is controlled according to a constant differential pressure measured across the system. This means that the pump offers constant differential pressure of the system in the Q-range of 0 to Q_{max}, represented by the horizontal line in the QH diagram.

Constant differential pressure, system

The differential pressure of the system is kept constant, independently of the flow rate.



Pos.	Description
1	H_{set}

Pos.	Description
2	Q_{max}

Constant differential pressure, system

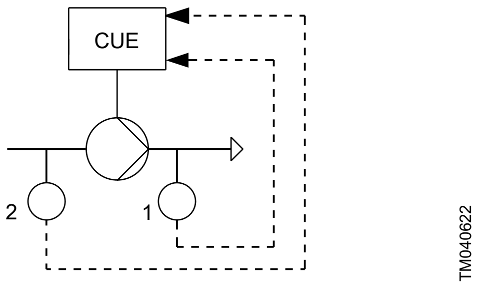
The pump is controlled according to a constant differential pressure measured across the system. This means that the pump offers constant differential pressure of the system in the Q-range of 0 to $Q_{max.}$, represented by the horizontal line in the QH diagram.

Differential pressure from two sensors

This function is for making differential pressure control possible by using measurements from two separate pressure sensors. It can be used in the following control modes:

- proportional differential pressure
- constant differential pressure.

The function requires an MCB 114 sensor input module.



Differential pressure from two sensors

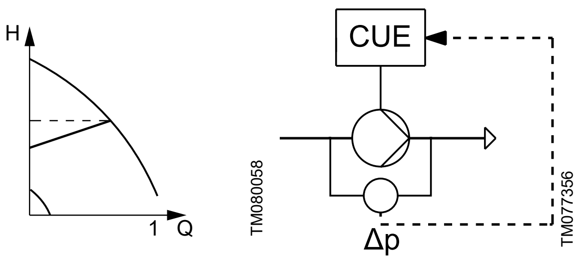
Pos.	Description
1	Sensor 1
2	Sensor 2

The sensor 1 is connected to the sensor input 1.

The sensor 2 is connected to the sensor input 2 of an MCB 114 sensor input module.

Proportional differential pressure

The differential pressure of the pump is reduced at falling flow rate and increased at rising flow rate.



Proportional differential pressure

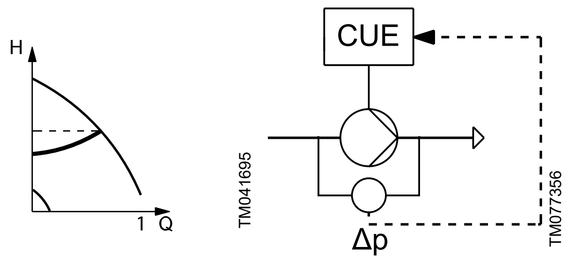
Pos.	Description
1	Q_{max}

The pump is controlled according to a differential pressure measured across the pump. This means that the pump system offers a proportional differential pressure in the Q-range of 0 to Q_{max}, represented by the sloping line in the QH diagram.

The proportional differential pressure can be selected with one of the following flow dependencies:

- linear, default
- quadratic.

When the flow dependency is selected as quadratic, the differential pressure of the pump is reduced with a quadratic curve at falling flow rate and increased at rising flow rate.



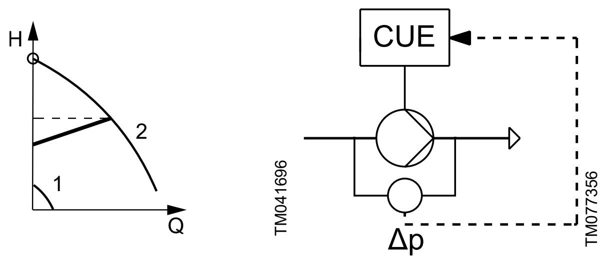
Proportional differential pressure, quadratic curve

Pos.	Description
1	Q_{max}

The pump is controlled according to a differential pressure measured across the pump. This means that the pump system offers a flow-compensated differential pressure in the Q-range of 0 to Q_{max} represented by the quadratic curve in the QH diagram.

H_{max} update

This function can be used in connection with the control mode Proportional differential pressure. The purpose is to find the actual value of the maximum head at no flow and nominal pump speed.



Pos.	Description
1	Minimum
2	Maximum

Proportional differential pressure, H_{max} update

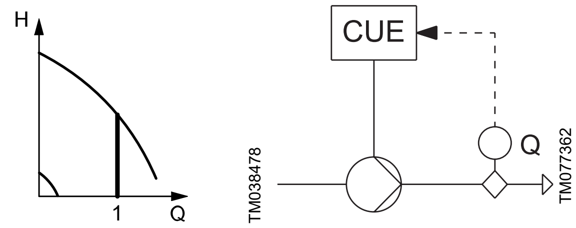
The function can be activated in parameter 200-27 and it consists of two steps:

1. The speed must be ramped up to nominal speed.
2. The H_{max} must be measured for 20 seconds at nominal speed.

Valves must be closed so that the pump is operating without flow.

Constant flow rate

The flow rate is kept constant, independently of the head.



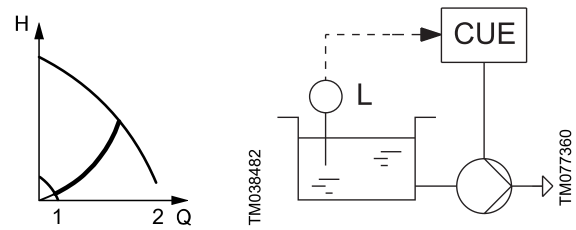
Constant flow rate

Pos.	Description
1	Q_{set}

The pump is controlled according to a constant flow rate, represented by the vertical line in the QH diagram.

Constant level

The liquid level is kept constant, independently of the flow rate.



Constant level

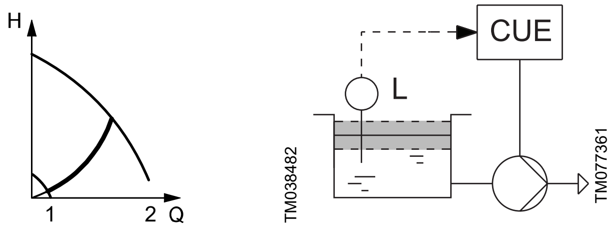
Pos.	Description
1	Q_{min}
2	Q_{max}

The pump is controlled according to a constant liquid level. This means that the pump offers a constant level in the Q-range of Q_{min} to Q_{max}, represented by the quadratic line in the QH diagram.

The function is an emptying function by default.

Constant level with stop function

The liquid level is kept constant at high flow rate. On/off operation is at low flow rate.



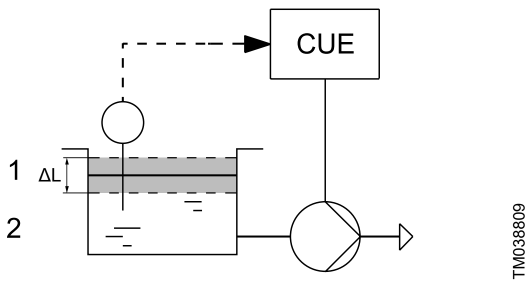
Constant level with stop function

Pos.	Description
1	Q_{min}
2	Q_{max}

The pump is controlled according to a constant liquid level. This means that the pump offers a constant level in the Q-range of Q_{min} to Q_{max}, represented by the quadratic line in the QH diagram.

The function is an emptying function by default.

The purpose of the stop function is to stop the pump when low or no flow is detected. When low flow is detected, the pump is in on/off operation. If there is flow, the pump continues to operate according to the setpoint.



Constant level with stop function, difference between start and stop levels (ΔL)

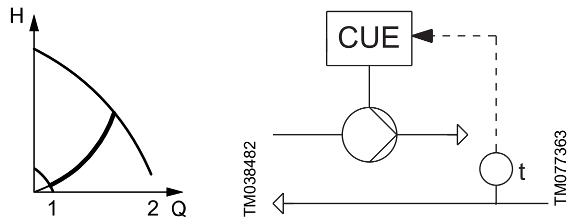
Pos.	Description
1	Start level
2	Stop level

Constant level with stop function is achieved with the **Limit Exceed** function.

If the desired Stop level is 1 meter and the start level is 5 meters, you can set the parameter 201-04 Limit Value to 1 and the parameter 201-05 Reset Hysteresis Value to 4.

Constant temperature

The liquid temperature is kept constant, independently of the flow rate.



Constant temperature

Pos.	Description
1	Q_{min}
2	Q_{max}

The pump is controlled according to a constant temperature. This means that the pump offers a variable flow rate in the Q-range of Q_{min} to Q_{max}, represented by the quadratic line in the QH diagram.

Constant other value

Any other sensor signals that can be read through the terminal AI54 can be utilized as the object of the PID controller. The CUE calculates an output based on the deviation between the desired setpoint and the actual measured value, to control the motor speed and make the actual measured value follow the setpoint.

Setpoints

The setpoint is normally set in the startup guide and changed via the [Favourites] menu on the CUE operating panel. If needed, the setpoint can be influenced via the external setpoint input.

CUE offers these setpoint possibilities:

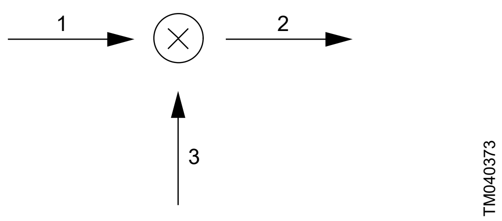
- External setpoint
- Predefined setpoints
- GENIbus setpoint.

The setpoint range depends on the selected control mode:

- In "Open loop" control mode, the setpoint is set in percentage corresponding to the required speed. The setting range is between the minimum and maximum curves in percentage of nominal frequency.
- In "Proportional differential pressure" control mode, the setting range is equal to 25 % to 90 % of the maximum head.
- In all the other control modes, the setting range is equal to the sensor measuring range.

External setpoint influence

The setpoint can be influenced by connecting an analog signal to the external setpoint input and is activated in the startup guide.



Setpoint, CUE menu and external setpoint signal

Pos.	Description
1	Setpoint, CUE menu
2	Actual setpoint
3	External setpoint signal

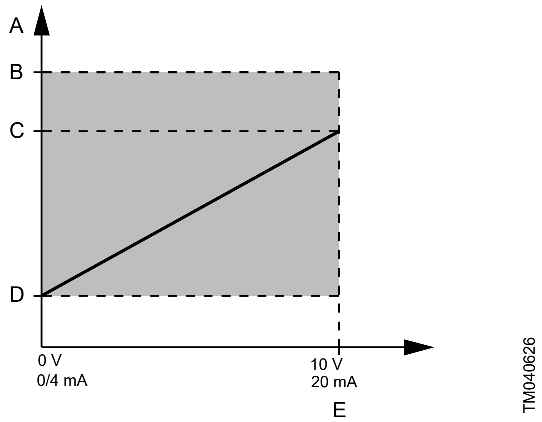
The signal can influence the actual setpoint by the following possibilities of the function:

- External setpoint, default
- Inverse external setpoint
- External setpoint with stop
- External setpoint based on a reference table.

The external setpoint signal is used for calculating the actual setpoint. The minimum signal is the minimum setpoint, and the maximum signal is the normal setpoint.

External setpoint, default

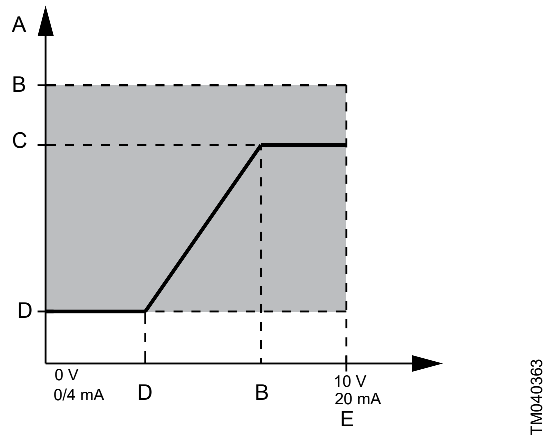
The actual setpoint is a linear function of the external setpoint signal.



External setpoint

Pos.	Description
A	Actual setpoint
B	Maximum
C	Setpoint, CUE menu
D	Minimum
E	External setpoint signal

The minimum and maximum values of the external setpoint signal are default within the full scale of 0 to 10 V (0/4-20 mA), but can be set in the parameters 200-11 to 200-14 within 20-1x **Setpoint Handling**.

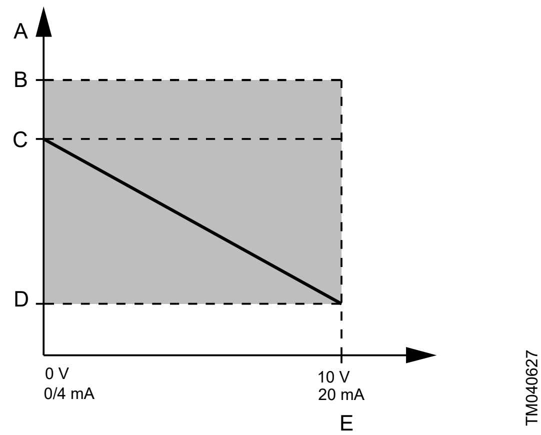


Reduced external setpoint signal

Pos.	Description
A	Actual setpoint
B	Maximum
C	Setpoint, CUE menu
D	Minimum
E	External setpoint signal

Inverse external setpoint

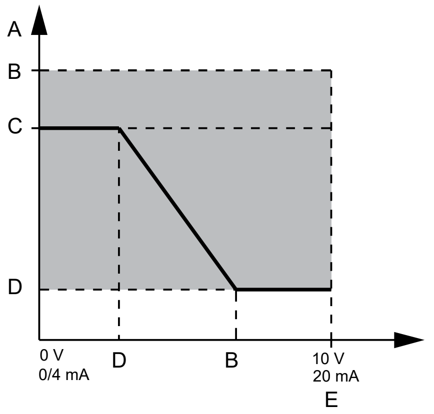
The actual setpoint is an inverse linear function of the external setpoint signal and is activated in the **Main** menu parameter 200-10 **External setpoint**.



Inverse external setpoint signal

Pos.	Description
A	Actual setpoint
B	Maximum
C	Setpoint, CUE menu
D	Minimum
E	External setpoint signal

The maximum and minimum values of the external setpoint signal are default within the full scale of 0 to 10 V (0/4-20 mA), but can be set in the parameters 200-11 to 200-14 within 20-1x **Setpoint Handling**.



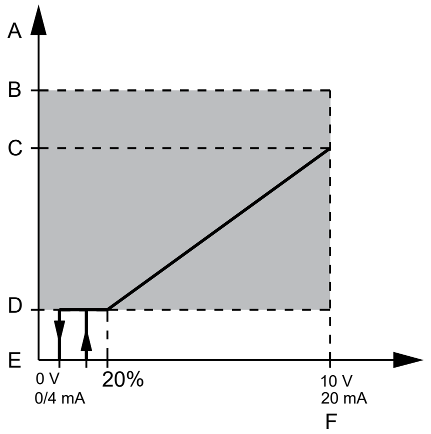
TM040365

Reduced inverse external setpoint signal

Pos.	Description
A	Actual setpoint
B	Maximum
C	Setpoint, CUE menu
D	Minimum
E	External setpoint signal

External setpoint with stop function

The actual setpoint with stop is a linear function of the external setpoint signal above 20 % signal and on/off operation below 20 % signal. Linear with stop is selected in the **Main** menu, parameter 200-10 **External setpoint**.



TM040364

External setpoint with stop function

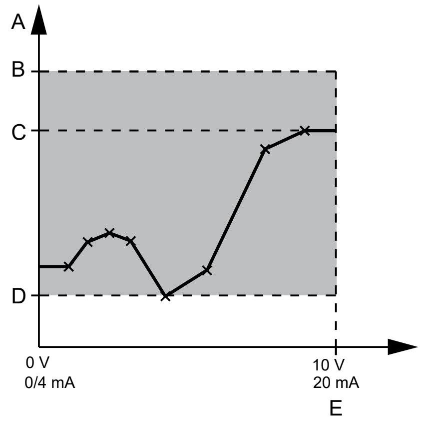
Pos.	Description
A	Actual setpoint
B	Maximum
C	Setpoint, CUE menu
D	Minimum
E	Stop
F	External setpoint signal

When the external setpoint signal is below 10 %, the operating mode is **Stop**.

When the external setpoint signal is above 15 %, the operating mode is **Normal**.

External setpoint based on a reference table

The actual setpoint is a piecewise linear function of the external setpoint signal and is activated in the **Main** menu, parameter 200-10 **External setpoint**.



TM040366

External setpoint based on a reference table

Pos.	Description
A	Actual setpoint
B	Maximum
C	Setpoint, CUE menu
D	Minimum
E	External setpoint signal

The linear function is defined as an interpolation between the points in a table. The table has up to eight points that are adjustable in the **Main** menu, group 200-1x **Setpoint Handling**.

The parameters of the eight points are the following:

- 200-15: **Number of reference influence table points**
- 200-16: **Reference Influence, input value**
- 200-17: **Reference Influence, output value**.

Predefined setpoints

This function makes it possible to select up to seven predefined setpoints using one to three digital inputs.

The setpoints are selected as a binary coding of the digital inputs as shown in the table below. The predefined setpoints are adjustable in the **Main** menu, parameter 310 **Preset Reference**.

Predefined setpoint	DI 2	DI 3	DI 4
15 %	x	-	-
30 %	-	x	-
45 %	x	x	-
60 %	-	-	x
75 %	x	-	x
90 %	-	x	x
100 %	x	x	x

x = Closed contact

If none of the digital inputs are activated, the operating mode can be configured to Stop or to being controlled according to a setpoint set via the **Main** menu, parameter 200-18 **Predefined Setpoint Zero Function**.

If the Min., Max. or Stop in the parameter 200-06 operating model is selected via the operating panel, the predefined setpoints are overruled.

Predefined setpoints cannot be influenced by the external setpoint input.

Communication setpoint

If the CUE is remote-controlled via the communication input, the setpoint is set via the bus.

The communication setpoint cannot be influenced by the external setpoint signal.

PID controller

CUE has a built-in PID controller for speed control of pumps. The factory setting of gain (K_p) and integral time (T_i) are automatically adjusted to suggested settings based on the chosen control mode. The values can easily be changed in the operating panel.

The controller can operate in both normal and inverse mode and is selected in parameter 20-81 "PID Normal/ Inverse Control".

Normal mode

Normal mode is used in systems in which an increase in pump performance results in a rise in the value measured at the feedback sensor. This will typically be the case in most CUE applications.

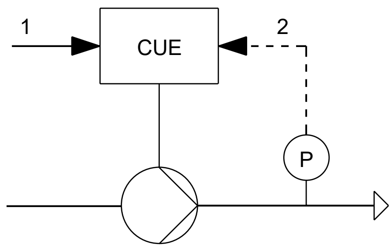
Inverse mode

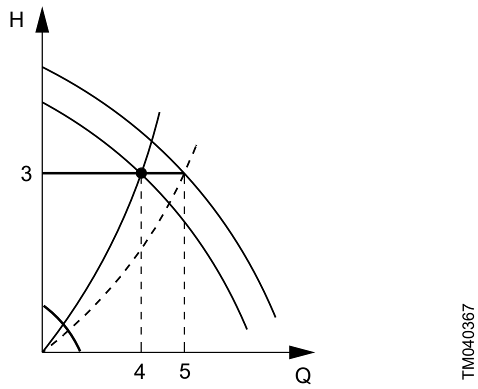
Inverse mode is used in systems in which an increase in pump performance will result in a drop in the value measured at the feedback sensor. This mode will typically be used for constant level operation (emptying tank) and for constant temperature operation in cooling systems.

Negative K_p value corresponds to inverse mode.

Description

The PID controller compares the required setpoint (p_{set}) with the actual value (p) measured by the transmitter (P). See the figure below.



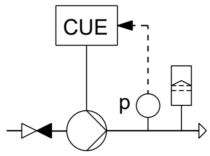
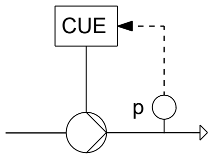
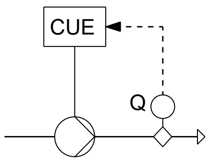
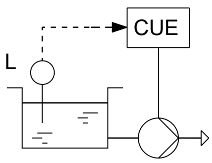
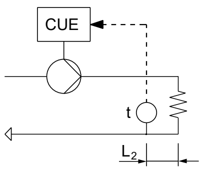
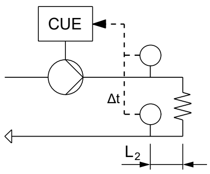
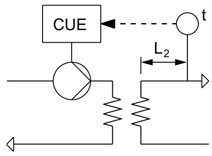
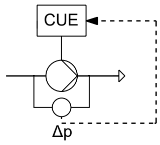
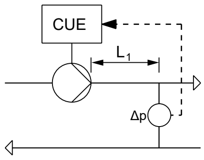


Constant pressure control

Pos.	Description
1	Setpoint p_{set}
2	Measured value p
3	P_{set}
4	Q
5	Q_{max}

If the measured value is higher than the required setpoint, the PID controller will reduce the speed and the performance of the pump until the measured value is equal to the required setpoint.

Suggested controller settings

System/application	K_p Heating system [35]	K_p Cooling system [36]	T_i
	0.2		0.5
	0.2		0.5
	0.2		0.5
	-2.5		100
	0.5	-0.5	$10 + 5L_2$
	0.5		$10 + 5L_2$
	0.5	-0.5	$30 + 5L_2$ [37]
	0.5		0.5 [37]
	0.5		L_1 < 5 m (16 ft): 0.5 [37] L_1 > 5 m (16 ft): 3 [37] L_1 > 10 m (32 ft): 5 [37]

35) Heating systems are systems in which an increase in pump performance will result in a rise in temperature at the sensor.

36) Cooling systems are systems in which an increase in pump performance will result in a drop in temperature at the sensor.

37) T_i = 100 seconds (default).

L_1 = Distance in [m (ft)] between the pump and the sensor.

L_2 = Distance in [m (ft)] between the heat exchanger and the sensor.

The setting of gain (K_p) and integral time (Ti) can be manually changed in the operating panel via the [Main] menu group 20-9x "PID Controller".

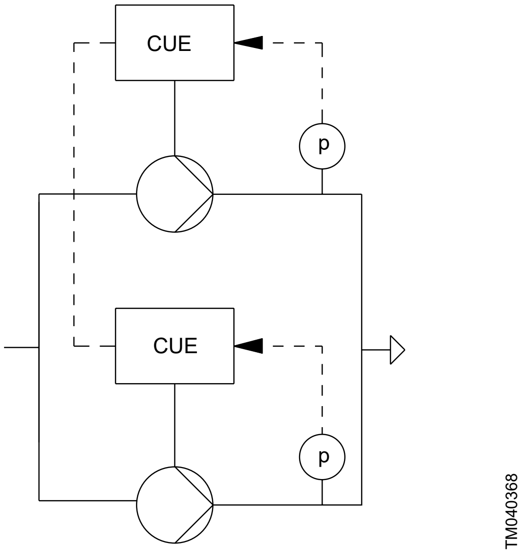
Duty/standby, Multi-master cascade

Use the startup guide for setting the multi-pump system with the following options:

- No (used for CUE controlling single pumps)
- Variable and fixed speed
- Variable speed only.

Duty/standby

The built-in duty/standby function applies to "Variable speed only" pumps connected in parallel to ensure reliability of supply.



Two pumps connected in parallel and controlled via Modbus RTU

The duty/standby function is set by choosing "Variable speed only" in the startup guide, then followed by setting the desired function to "Alternation" or "Back-up".

These are the primary purposes of the function:

- To let one pump run at a time.
- To start the standby pump if the duty pump stops due to an alarm.
- To alternate the pumps at least every 24 hours, only if alternation function is selected.

The two pumps are electrically connected by means of the Modbus RTU protocol on the GENIbus port.

The two pumps running duty/standby in this way cannot use the GENIbus interface for remote communication. The two pumps use their own local operating mode. See section Operating modes.

Both pumps must have the same control mode. See section Control modes.

Related information

Operating modes
Control modes

Duty/assist and variable-speed cascade

The duty/assist and variable-speed cascade functions are used to cascade additional variable speed pumps. Each pump is connected to a CUE unit. See the figure about two pumps connected in parallel and controlled via Modbus RTU.

Related information

Duty/standby

Setting the duty pump

The duty/assist function is set by selecting **Variable speed only** in the startup guide, then followed by setting the desired function to **Cascade**.

If there are more than two pumps in the system, the duty CUE must be fitted with an MCO 101 option. The variable speed cascade function is then set by choosing **Variable speed only** in the startup guide, then followed by setting the total number of pumps in the system.

Setting one or more assist pumps

Use the startup guide to set the control mode to **Open loop**, then confirm that the pump is an assist pump in a variable speed cascade system.

These are the primary purposes of the duty/assist function:

- To let the duty pump run all the time (except if low flow stop is activated)
- To start the assist pumps if the duty pumps cannot maintain the pressure
- To start the assist pumps if the duty pump stops due to an alarm.

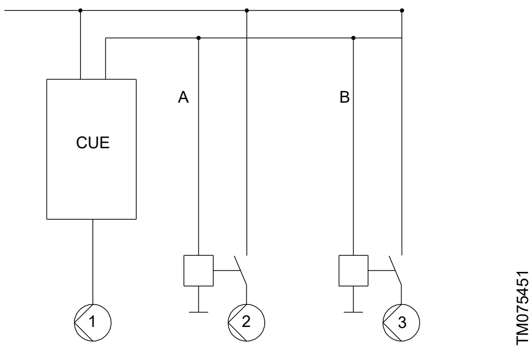
The cascade control ensures that the performance of the pumps is automatically adapted to consumption by switching on or off pumps and by changing the speed of the pumps in operation. This makes the system run as energy-efficiently as possible with a limited number of pumps.

When more than one pump is running in steady state, the pumps run at the same speed and are controlled by the PI controller of the master driver. As standard, the driver with the lowest address is the master driver.

The pumps running duty/assist in this way cannot use the serial communication for remote communication.

Fixed speed cascade

The fixed speed cascade function is used to cascade additional fixed speed pumps. Only one duty pump is connected to a CUE unit. See the figure below.



One duty pump connected with two fixed speed pumps controlled via relays

Pos.	Description
A	Relay 1
B	Relay 2

The fixed speed cascade function is set by selecting "Variable and Fixed speed" in the startup guide, then followed by setting the total number of pumps in the system. When "Variable and Fixed speed" is selected, this pump runs as a duty pump in the fixed speed cascade system. The following steps must be performed:

- For a two-pump setup: Relay 1 is automatically set to activate or deactivate one fixed speed pump based on pressure demand.
- For a three-pump setup: Relay 1 and Relay 2 are automatically set to activate or deactivate one additional fixed speed pump at the same time based on pressure demand.

These are the primary purposes of the function:

- To let the duty pump run all the time (except if low flow stop is activated).
- To start the fixed speed pumps if the system pressure decreases below 90 % of the setpoint.
- To stop the fixed speed pumps if the system pressure increases above 110 % of setpoint.

The cascade control ensures that the performance of the pumps is automatically adapted to consumption by switching on or off pumps and by changing the speed of the duty pump in operation.

Dry running

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

Lack of inlet pressure or water shortage can be detected in three ways:

- With a switch connected to a digital input configured to dry-running protection.
- CUE checks if the shaft power is below a dry-pump limit for a configurable time.
- CUE checks if the pressure cannot be reached at full speed for a configurable time.

Note that the dry-running function requires a sensor. This means that the function will not work in open loop. These conditions must be present to activate the dry-running alarm: The power consumption must be below a certain level (set by the parameters), and the pump must run at full speed (handled by the control mode and the sensor). CUE increases the speed to maximum if no water is present. Without a sensor, it will not work!

Setting the dry run protection based on a switch connected to a digital input

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

- a pressure switch installed on the suction side of the pump
- a float switch installed on the suction side of the pump.

See section Accessories for more information on the required sensors. The pump cannot restart if the input is activated. Restart may be delayed by up to 30 minutes, depending on the pump family.

The digital inputs of CUE (terminals, 18, 19, 27, 29, 32, 33) can be set individually to different functions in [Main] menu parameter group 5-1x "Digital Inputs".

Select dry running to activate the detection based on a switch.

Setting the dry run protection based on a shaft power

The use of shaft power requires an actual power reading at two frequencies.

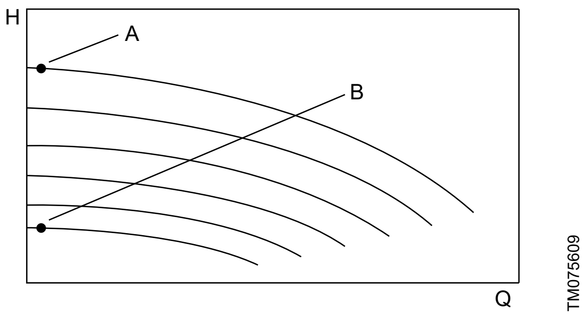
Procedure without pump curve: After completing the startup guide follow the steps:

1. Close the valve. No flow is required during the test.
2. Press Hand on and set the speed to 50 % (30 Hz or equivalent RPM). CUE starts the pump.
3. Go to [Main] menu parameter 16-10 "Power [kW]" and read the input power. Make a note of the low limit value.
4. Press [Home] to return to the status screen.
5. Press Hand on and set the speed to 90 % (54 Hz or equivalent RPM). CUE starts the pump.
6. Go to [Main] menu parameter 16-10 "Power [kW]" and read the input power. Make a note of the high limit value.
7. Stop CUE and open the valve.

Procedure with pump curve:

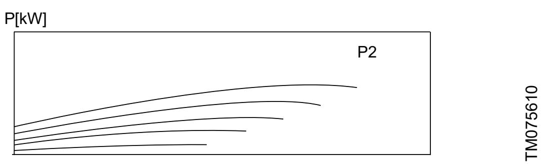
Go to Grundfos Product Center and enter the part number for your pump:

1. Enter "Show advanced options".
2. Go to "Hydraulic layout" and set variable speed to "Yes".
3. Click on the pump curve to set the duty point as close to $f_{min.}$ and enter Q to 0.1 as Operating point. See fig. QH curve for variable speed pump for choosing low flow operating points.
4. Read out power (P2) and speed (n) as low limit values. See fig. QP curve for variable speed pump for reading P2 at low flow.
5. Click on the pump curve to set the duty point as close to 90 % speed and enter Q to 0.1 as Operating point. See fig. QH curve for variable speed pump for choosing low flow operating points.
6. Read out power (P2) and speed (n) as high limit values. See fig. QP curve for variable speed pump for reading P2 at low flow.



QH curve for variable speed pump for choosing low flow operating points

Pos.	Description
A	90 % of f_{max}
B	f_{min}



QP curve for variable speed pump for reading P2 at low flow

The data must be entered in [Main] menu parameter group 22-3x "No-flow Power Tuning" as follows:

- 22-32 "Low Speed [RPM]" or 22-33 "Low Speed [Hz]" = 30 Hz
- 22-34 "Low Speed Power [kW]" = the power readout at Low limit in previous procedure
- 22-36 "High Speed [RPM]" or 22-37 "High Speed [Hz]" = 54 Hz
- 22-38 "High Speed Power [kW]" = the power readout at High limit in previous procedure.

Activate the desired protection function, for example an alarm, in [Main] menu parameter 22-26 "Dry Pump Function".

The dry-running stop function has now been set correctly. The time setting is 10 seconds from no-flow delay (22-24) + 10 seconds from dry-running detection delay (22-27) = 20 seconds.

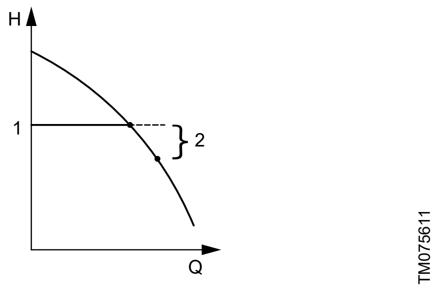
Setting the dry run protection based on an end of curve

CUE will by default issue an alarm at end of curve. This will also occur under the dry run conditions of water shortage and no flow.

In constant pressure control mode, the end of curve is detected if the pressure is below a 20 % tolerance of the sensor range of the setpoint and the pump is running at maximum speed for a 10-second delay. The pump cannot build up the setpoint pressure due to water shortage.

The end of curve tolerance, delay and protection function can be adjusted in [Main] menu parameter group 22-5x "End of Curve".

Example: A constant pressure system with 0-16 bar sensor and setpoint at 11.75 bar (120 m head) gives an end of curve alarm if the pressure is below (11.75 bar - 20 % x 16 bar) = 8.55 bar and the pump is running at maximum speed.



Curve tolerance

Pos.	Description
1	H_{set}
2	H tolerance

Dry-running detection based on end of curve also gives an alarm, if there is actual water and the system head curve shifts to high flow range; this means that the function may need to be adjusted to work properly in the high flow area.

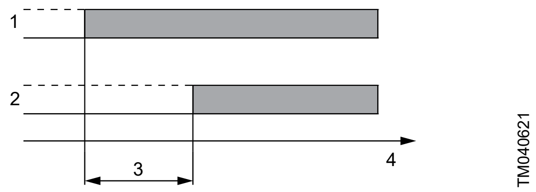
Related information

Unions and valves, TP Series 100, TPE2 Extra small

Start adjustments

Start delay

The start delay after power-on is a delay between power being applied and the pump starting.



Start delay after power-on

Pos.	Description
1	Power-on
2	Start CUE
3	Start delay
4	Time

The purpose is to allow the remote-control equipment to start up before the pump.

The start delay is deactivated if a remote command is received via communication port.

This can be set in the **Main** menu, parameter 1-71 **Start Delay**.

Flying start

This function makes it possible to catch a motor that is spinning freely due to a mains drop-out. This prevents a high current draw from the CUE by starting on a rotating motor.

When flying start is enabled, the start delay function is not active.

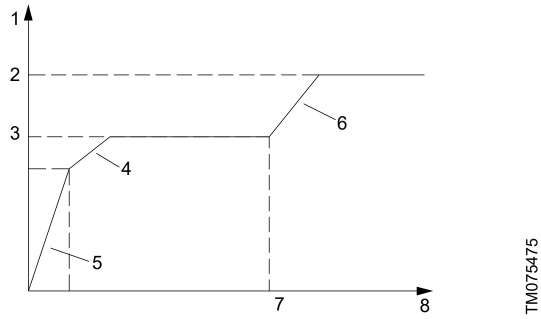
This can be set in the **Main** menu, parameter 1-73 **Flying Start**.

Pipe fill

This function is used for filling empty pipes with water in a controlled manner. If the function is not activated, pipes are filled at maximum speed. In pressure-controlled systems where pipes are empty at startup, high speed causes water hammer until the speed is reduced to fit the actual demand.

Water hammer can be prevented by introducing a pipe fill sequence before the system is running normal operation. The pipe fill function can limit the speed of the pump when filling pipes, thus reduce water hammer in filled pipes. A time limit or a pressure can be set to deactivate the pipe fill function and turn the CUE into normal operation.

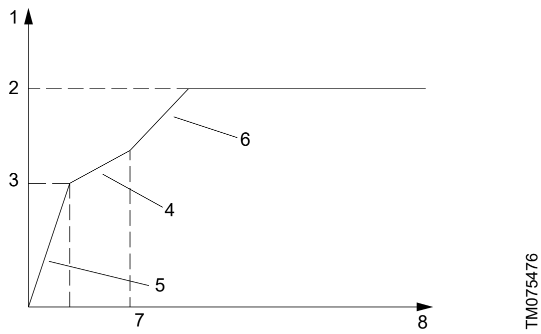
Since pressure in horizontal pipe systems does not climb as the system fills, in such systems, it is necessary to determine a user-specified speed and time to fill the pipes or a user-specified pressure setpoint.



Horizontal pipe system

Pos.	Description
1	Speed
2	Maximum speed
3	Minimum speed
4	Normal ramp
5	Initial ramp
6	Closed loop
7	Fill time or filled setpoint
8	Time

In a vertical pipe system it is recommended to use the PID function to ramp the pressure at a user-specified rate between the motor speed low limit and a user-specified pressure.



Vertical pipe system

Pos.	Description
1	Speed
2	Maximum speed
3	Minimum speed
4	Fill rate unit/second
5	Initial ramp
6	Closed loop
7	Filled setpoint
8	Time

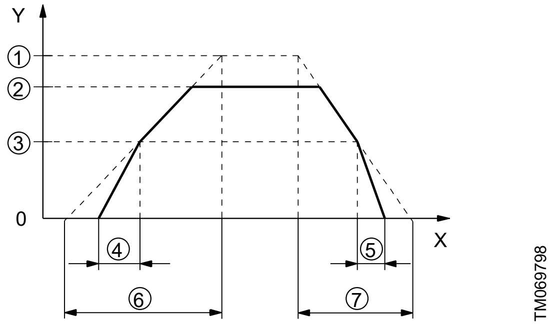
Activation or deactivation is done in the parameter 29-00 **Pipe Fill Enable**.

Operation

Ramps

The CUE startup guide incorporates adjustment of two types of ramp:

- ramp-up and ramp-down
- initial and final ramps.



Ramp-up and ramp-down of the CUE

Pos.	Description
X	Time
Y	Speed
1	Nominal
2	Maximum
3	Minimum
4	Initial ramp
5	Final ramp
6	Ramp-up
7	Ramp-down

The ramp-up and ramp-down are used for protection against overload when starting and stopping the CUE, and the time is defined as acceleration time from 0 rpm to nominal motor speed, and the deceleration time from nominal motor speed to 0 rpm, respectively. The settings are manually set in the parameter 3-41 **Ramp 1 Ramp Up Time** and the parameter 3-42 **Ramp 1 Ramp Down Time** of the operating panel.

The initial and final ramps prevent operation for a longer time than necessary at speeds below the minimum speed.

The setting is done automatically based on the pump family selected in the startup guide.

Operating range

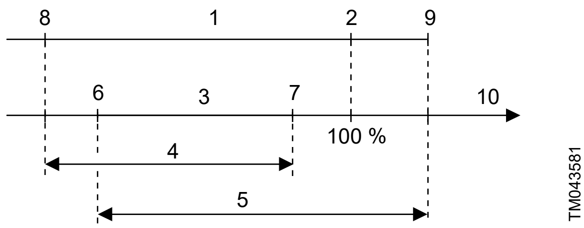
How to set the operating range:

- Set the minimum speed within the range from a pump-dependent minimum speed to the adjusted maximum speed. The factory setting depends on the pump family.
- Set the maximum speed within the range from the adjusted minimum speed to the pump-dependent maximum speed. The factory setting is equal to 100 %, meaning the speed stated on the pump nameplate.

The area between the minimum and maximum speed is the actual operating range of the pump.

The operating range can be changed by the user within the pump-dependent speed range.

For some pump families, oversynchronous operation (maximum speed above 100 %) will be possible. This requires an oversize motor to deliver the shaft power required by the pump during oversynchronous operation.



Setting of the minimum and maximum curves in percentage of maximum performance

Pos.	Description
1	Pump-dependent speed range
2	Nominal speed
3	Actual speed range
4	Max. speed, adjusted
5	Max. speed, adjusted
6	Min.
7	Max.
8	Min. speed
9	Max. speed
10	Speed [%]

Minimum and maximum speed can manually be overwritten in parameter 4-11 "Motor Speed Low Limit" and 4-13 "Motor Speed High Limit", respectively. Note that the maximum speed cannot exceed the maximum output frequency set in parameter 4-19.

Running outside the pump-dependent minimum and maximum speeds may damage the pumps.

Skip bands

Some systems require that certain output frequencies or speeds are avoided due to resonance problems in the system.

- If the CUE is in **RPM** mode, enter the lower limit of the speeds to be avoided in the parameter 4-60[0] and the upper limit in the parameter 4-62[0].
- If the CUE is in **Hz** mode, enter the lower limit of the speeds to be avoided in the parameter 4-61[0] and the upper limit in the parameter 4-63[0].

A maximum of four frequency or speed ranges can be avoided in rare cases. To add more skip bands, use the index 1, 2 or 3 for the above-mentioned parameters.

Standstill heating

Standstill heating preheats the motor during standstill to avoid condensation within the motor.

When the pump is stopped by a stop command, a current is applied to the motor windings to keep the temperature within the motor above the dew point temperature. No external heater is needed.

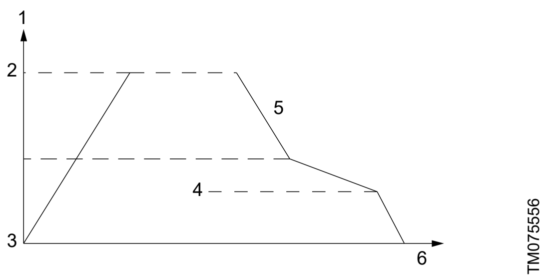
The preheating of the motor is especially important when the motor is installed under the following conditions:

- high humidity
- outdoor installation.

A consequence of condensed moisture within the motor is, for example, corrosion damage to electrical contacts and the bearings of the motor shaft.

This can be activated in the parameter 1-80 **Function at Stop**.

Check valve ramps



Check valve ramp

Pos.	Description
1	Speed
2	Motor speed high
3	Motor speed low
4	Check valve end speed
5	Normal ramp
6	Time

To protect ball check valves in a stop situation, the check valve ramp time can be utilised as a temporary slower ramp rate. When the parameter 3-85 **Check Valve Ramp Time** is different from 0 s, the check valve ramp time is effectuated between the motor speed low and the check valve end speed.

Set the check valve end speed where the check valve is expected to be closed and the check valve is no longer active.

Over-voltage control (OVC)

When deceleration is too fast in case of higher inertia, the braking energy can cause an overvoltage in the CUE. This can be overcome by enabling overvoltage control in the **Main** menu parameter 2-17, and the CUE automatically prolongs the deceleration times, that is, normal ramps, final ramps and check valve ramps to stop the CUE without an alarm.

Pump motor protection

Motor temperature

The motor thermal protection can be activated in the **Main** menu, parameter 1-90 **Motor Thermal Protection** and can be implemented using a range of techniques:

- A PTC sensor in the motor windings can be connected to one of the analog or digital inputs, parameter 1-93 **Thermistor Source**.
- The ETR (Electronic Thermal Relay) can be calculated of the thermal load based on the actual load and time. The calculated thermal load is compared with the rated motor current and the rated motor speed. If the parameter 1-91 **Motor External Fan** is set to **Yes**, the motor must have forced cooling and the ETR does not take motor speed into consideration.
- A mechanical thermal switch (Klixon type) can be used, parameter 1-93 **Thermistor Source**.

For the North American market: the ETR functions provide class 20 motor overload protection in accordance with the NEC.

Motor bearing monitoring

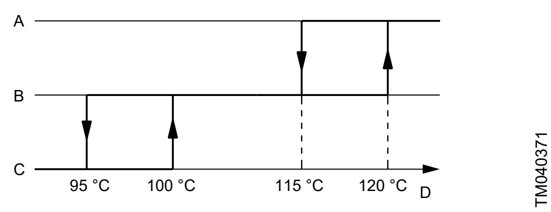
This function is used to give an indication when it is time to relubricate or replace the motor bearings.

It shows these information:

- When to relubricate the motor bearings.
- When to replace the motor bearings.

The function is based on the running hours of the pump, and shows a notification on the display to lubricate the bearings after 5000 running hours and replace the bearings after 20000 running hours.

Monitoring of motor bearing temperature using an MCB 114 sensor input module and Pt100/Pt1000 sensors measuring the bearing temperature can also be used to issue a warning. An alarm is generated if the bearing temperature gets too high. Warnings and alarms are generated and reset by using hysteresis.



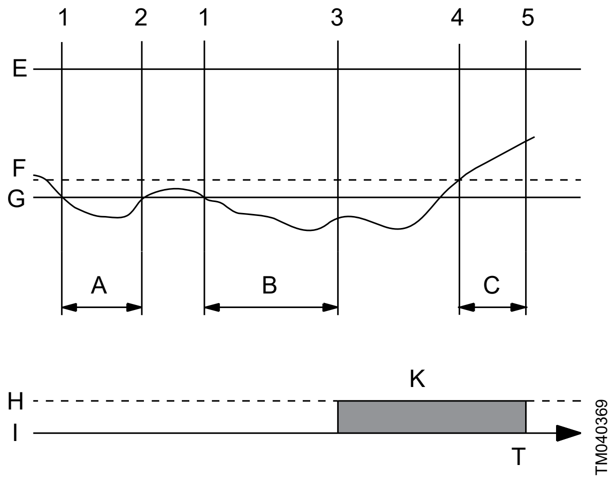
Monitoring of bearing temperature with warning and alarm limits

Pos.	Description
A	Alarm limit
B	Warning limit
C	Normal
D	Temperature

Limit exceed

The CUE has two independent limit-exceed functions.

These are monitoring functions offering information, warning, alarm or change of operating mode when a low or high limit is exceeded.



Example of low limit exceeded

Pos.	Description
E	High limit
F	Hysteresis
G	Low limit
H	On
I	Off
K	Low limit exceeded
T	Temperature

The two limit-exceed functions are set in the **Main** menu, parameter group 201-0x **Limit Exceed**. Parameters are grouped so that **Limit Exceed - 1** is set in index 0 and **Limit Exceed - 2** is set in index 1.

The default setting of this function is **Not active** and is activated in the parameter 201-00. Enabled and Disabled can be set to activate or deactivate the alarm when the limit is exceeded. Enabled with event action and Disabled with event action can be set to activate or deactivate actions, such as Stopping or Minimum speed, after the limit is exceeded.

The function has two timers, a detection delay timer and a reset delay timer, which are adjustable in the parameters 201-06 and 201-07, respectively.

The limits can either be a high or a low limit adjusted in the parameter 201-01, and the actual limit value must be entered in the parameter 201-04.

The detection delay timer starts when a limit is exceeded (1). See the figure above.

- A: If the limit is no longer exceeded (2) when the detection time expires, the timer is reset.
- B: If the limit is still exceeded (3) when the detection time expires, the output of the detector changes to **Limit exceeded**. The reset delay timer starts when the detector output is **Limit exceeded** and the limit is no longer exceeded, and hysteresis (4) applies.
- C: When the delay time has expired (5), the detector output changes to **Limit not exceeded**.

Input possibilities

It is possible to have two limit-exceeded functions in parallel with the following inputs set in the parameter 201-02:

- all analog inputs
- all Pt100/Pt1000 inputs (this requires an MCB 114 sensor input module)
- internal measured values: Power consumption (P2), Motor speed or Motor current.

Output possibilities

There are the following output possibilities:

- signal relay 1 and 2 activated in the parameters 5-40[0] and 5-40[1], respectively
- digital output activated in the parameters 5-30 and 5-31, respectively
- analog output activated in the parameter 6-50.

Event actions

Change of operating mode as event action is set in the parameter 201-03.

- Warning only
- Stop
- Maximum speed
- Minimum speed
- User curve speed.

The default setting of this function is **Not active**.

Digital and Analog I/O

The CUE digital inputs can be configured to either PNP or NPN mode in the **Main** menu, parameter 5-00 **Digital I/O Mode**:

- NPN - Active at 0 V
- PNP - Active at 24 V.

The CUE has six terminals for digital input and output functions:

Terminal No.	Name	Parameter	Default	I/O mode
18	DI 1	5-10	Start	-
19	DI 2	5-11	No operation	-
27	DI/O 1	5-12 for input or 5-30 for output	No operation	5-01
29	DI/O 2	5-13 for input or 5-31 for output	No operation	5-02
32	DI 3	5-14	No operation	-
33	DI 4	5-15	No operation	-

Digital input functions

- Reset: Used to reset an alarm manually from external signal.
- Coast: Used to immediately stop the pump without ramping down. Pump will stop free-wheeling.
- Start: Used to start the pump manually in [Auto on] mode.
- Reversing: Used to reverse the motor speed. Do not use this function on a pump.
- Jog: Used to set the motor speed fixed to Jog Speed [Hz] of parameter 3-11.
- Preset ref bit 0 through 2: Used to set the pump setpoint fixed to values of parameter 3-10.
- Freeze output: Used to continue pump speed at current speed.
- Hand/Auto start: Selects hand or auto start. High signal selects auto on only. Low signal selects hand on only.
- Hand start: A signal applied to put CUE into hand-on mode as if [Hand On] has been pressed and a normal stop command is overridden.
- Auto start: A signal applied to put CUE into auto-on mode as if [Auto On] has been pressed and a normal stop command is overridden.

Note that if disconnecting the signal, the motor stops. To make any other start commands valid, assign another digital input to [54] Auto Start and apply a signal to this. [Hand On] and [Auto On] have no impact. [Off] overrides local start and auto start. Press either [Hand On] or [Auto On] to make local start and auto start active again. If there is no signal on neither [53] Hand start nor [54] Auto start, the motor stops regardless of any normal start command applied. If a signal is applied to both [53] Hand start and [54] Auto start, the function is auto start. If pressing [Off], the motor stops regardless of signals on [53] Hand start and [54] Auto start.

- Min.: Changes the operating mode to Min. See section Operating modes.
- Max.: Changes the operating mode to Max. See section Operating modes.
- User curve: Changes the operating mode to User curve. See section Operating modes.

Note that most functions are available with and without inverse. Choose with inverse if you want a specific function to be activated opposite than the PNP or NPN mode.

Related information

Operating modes

Digital and Relay output functions

- **Control ready**: The control board receives supply voltage.
- **Drive ready**: The CUE is ready for operation and applies a supply signal on the control board.
- **Drive ready/remote control**: The CUE is ready for operation and is in auto-on mode.
- **Standby/no warning**: The CUE is ready for operation. No start or stop command has been given (start/ disable). There are no warnings.
- **Running**: The pump is running.
- **Running/no warning**: The pump is running and there are no warnings.
- **Run on reference/no warning**: The motor is running at reference speed.
- **Alarm**: An alarm activates the output.
- **Alarm or warning**: An alarm or a warning activates the output.
- **At torque limit**: The torque limit set in the parameter 4-16 Torque Limit Motor Mode has been exceeded.
- **Torque limit and stop**: It is used in performing a coast stop and in torque limit condition. If the frequency converter receives a stop signal and is at the torque limit, the signal is logic 0.
- **Out of current range**: The motor current is outside the range set in the parameter 4-18 Current Limit.
- **Below current, low**: The motor current is lower than the setting in the parameter 4-50 Warning Current Low.
- **Above current, high**: The motor current is higher than the setting in the parameter 4-51 Warning Current High.

- **Out of speed range**: The output speed is outside the ranges set in the parameter 4-52 Warning Speed Low and the parameter 4-53 Warning Speed High.
- **Below speed, low**: The output speed is lower than the setting in the parameter 4-52 Warning Speed Low.
- **Above speed, high**: The output speed is higher than the setting in the parameter 4-53 Warning Speed High.
- **Out of feedback range**: The feedback is outside the ranges set in the parameter 4-56 Warning Feedback Low and the parameter 4-57 Warning Feedback High.
- **Below feedback low**: The feedback is below the limit set in the parameter 4-56 Warning Feedback Low.
- **Above feedback high**: The feedback is above the limit set in the parameter 4-57 Warning Feedback High.
- **Thermal warning**: The thermal warning turns on when the temperature exceeds the limit in the motor, the CUE or the thermistor.
- **Bus OK**: There is active communication (no timeout) via the serial communication port.
- **Out of ref range**: The reference is outside the ranges set in the parameter 4-54 Warning Reference Low and the parameter 4-55 Warning Reference High.
- **Below reference low**: The reference is below the limit set in the parameter 4-54 Warning Reference Low.
- **Above reference high**: The reference is above the limit set in the parameter 4-55 Warning Reference High.
- **Comparator 0 through 5**: The signal outputs correspond to the logic output of the [Main] menu parameter group 13-1x Comparators.
- **Logic Rule 0 through 5**: The signal outputs correspond to the logic output of the [Main] menu parameter group 13-4x Logic Rules.
- **Running reverse**: The CUE is running counterclockwise.
- **Start command active**: The CUE has received an active start command, for example auto on, and a start command via digital input or bus is active or [Hand On]. It is not necessarily running.
- **Drive in hand mode**: The CUE is in hand-on mode (as indicated by the indicator light above [Hand on]).
- **Drive in auto mode**: The CUE is in auto-on mode (as indicated by the indicator light above [Auto on]).
- **Preventive Maintenance**: One or more of the preventive maintenance events have passed the time for the specified action.
- **Deragging**: The deragging procedure is active.
- **AHF Capacitor Connect**: The automatic control of the AHF capacitor connect at low loads under 20 %.
- **External Fan Control**: The external fan control is active.
- **No-Flow**: A no-flow situation or minimum speed situation has been detected.
- **Dry Pump**: A dry pump condition has been detected.
- **End of Curve**: An end of curve condition has been detected.
- **Sleep Mode**: The CUE has entered sleep mode.
- **Pipe Filling**: It is active when the pipe fill function is operating.

Analog outputs

The analog output (0/4-20 mA) can be set in the **Main** menu, parameter 6-50 to one of the following indications:

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

The analog output is set to not active by default.

- **Feedback value**: The output signal is a function of the actual feedback value.
- **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 is on/off when the limit is exceeded: Off = 0/4 mA and On = 20 mA.

MCB 114 sensor input module

The MCB 114 sensor input module offers three additional analog inputs for the CUE:

- one analog 0/4-20 mA input for an additional sensor
- two analog Pt100/Pt1000 inputs for temperature sensors.

Sensor 2

The analog 0/4-20 mA input is used for the following functions:

- It monitors the measured value of the sensor 2 (default setting).
- The measured value of the sensor 2 is used for control purpose. This makes differential pressure control possible by using measurements from the sensor 1 and sensor 2 (setting by PC Tool).

Temperature sensors 1 and 2

The analog Pt100/Pt1000 inputs are used for monitoring these temperatures:

- drive-end motor bearing
- non-drive-end motor bearing
- other liquid 1
- other liquid 2
- motor windings
- pumped liquid
- ambient temperature.

Displays

MCB 114 input	Displays	
	Reading	Setting
Sensor 2	2.5	3.16
Temperature sensor 1	2.12	3.21
Temperature sensor 2	2.13	3.22

Further information

See also the TPE Installation and operating instructions.

Auto/manual restart after alarm

In case of an alarm, CUE will stop the pump. Pump operation will be resumed when the cause of the alarm has been remedied and the alarm has been reset automatically or manually.

CUE can be configured to activate and deactivate automatic restart in [Main] menu parameter 14-20, and in case of automatic reset, the delay between reset attempts is adjustable in [Main] menu parameter 14-21.

15. Communication

Communication with TPE2, TPE3 D, TPE3, TPE3 D, TPE pumps

Communication with TPE2, TPE3 D, TPE3, TPE3 D, TPE pumps is possible via a central building management system, remote control, Grundfos GO, or control panel.

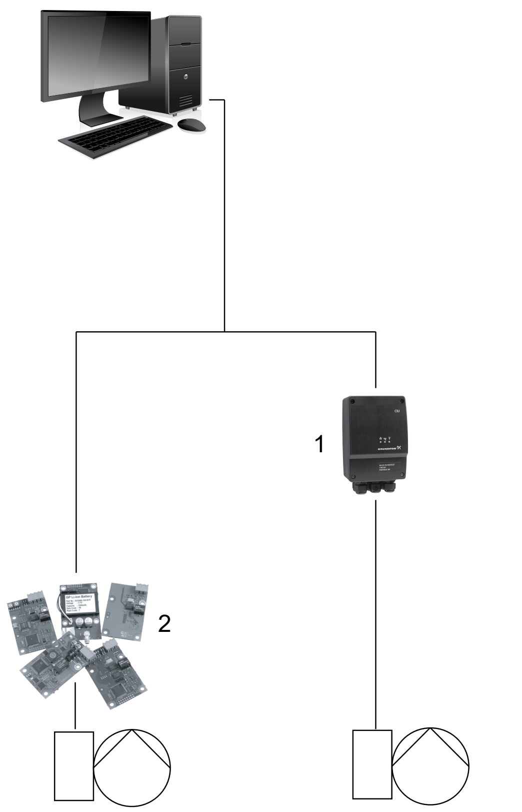
Central building management system

The operator can communicate with a TPE2, TPE3 D, TPE3, TPE3 D, TPE pump at a distance. Communication can take place via a central building management system allowing the operator to monitor and change control modes and setpoint settings.

The CIU module can be used for all TPE versions, but the CIM module can only be mounted directly in the terminal box in some of the TPE pumps. See the table below.

TPE version	CIM	CIU
TPE2, TPE3 D, TPE3, TPE3 D	●	●
TPE Series 1000/2000		●

● Available.



TM058607

Structure of a central building management system

Pos.	Description
1	CIU 900: The CIU box is without CIM and a CIM must be ordered separately.

Pos.	Description
2	CIM 100: LonWorks CIM 150: PROFIBUS DP CIM 200: Modbus RTU CIM 260: 3G/4G cellular CIM 280: GRM GiC 3G/4G CIM 300: BACnet MS/TP CIM 500: PROFINET CIM 500: Modbus TCP CIM 500: BACnet IP CIM 500: EtherNet/IP CIM 500: GRM IP

Remote control

The operator can monitor and change control modes and settings of the pump with Grundfos GO. See section Grundfos GO.

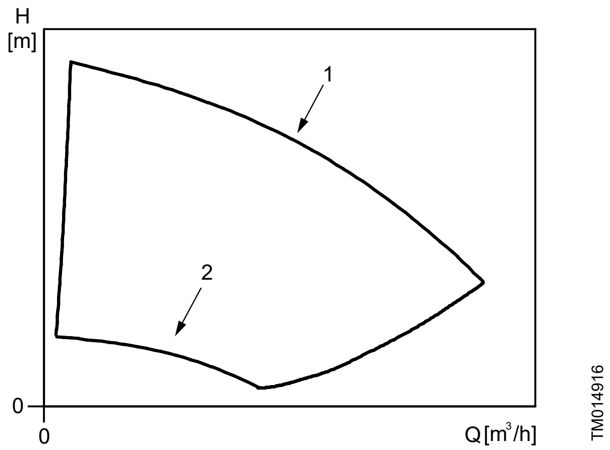
16. Speed regulation of TPE3 (D) pumps

Affinity equations

Normally, the pumps are used in applications characterised by a variable flow rate. Consequently, you cannot select a pump that is constantly operating at its optimum efficiency.

In order to achieve optimum operating economy, the duty point must be close to the optimum efficiency, eta, for most operating hours.

Between the minimum and maximum performance curves, the 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

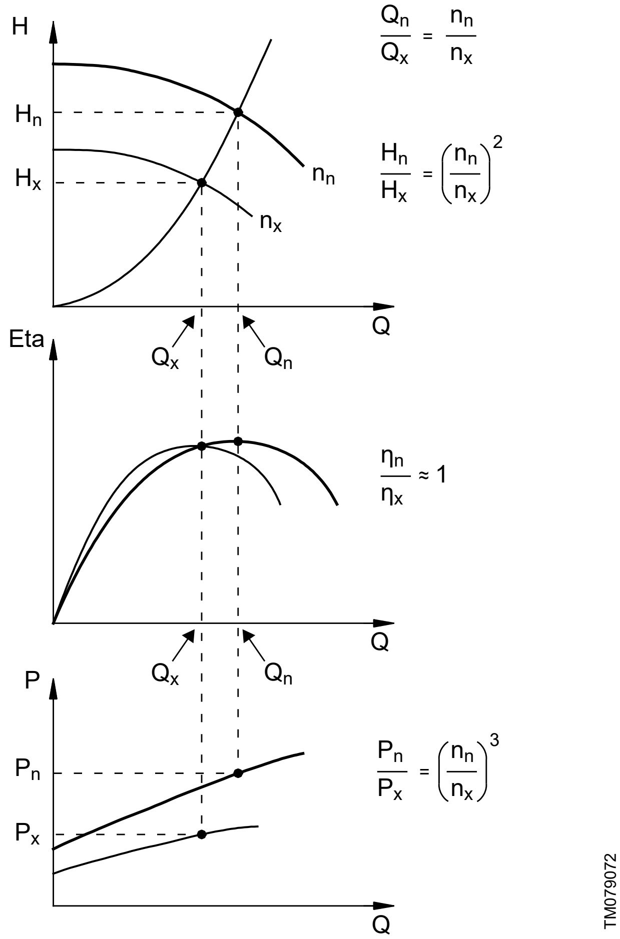
Pos.	Description
1	Maximum curve
2	Minimum curve

In situations where you can select a duty point close to the maximum curve, use the affinity equations below. The head, H, the flow rate, Q and the input power, P, are the appropriate variables you need for calculating the motor speed, n.

Note: The approximated formulas apply on condition that the system characteristic remains unchanged for the rated motor speed and the current motor speed, and that it is based on the following formula: H is equal to k × 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, it is worth noting that the efficiencies of the frequency converter and the motor must also be taken into account if you want a precise calculation of the power saving resulting from a reduction of the pump speed.



$$\frac{Q_n}{Q_x} = \frac{n_n}{n_x}$$

$$\frac{H_n}{H_x} = \left(\frac{n_n}{n_x}\right)^2$$

$$\frac{\eta_n}{\eta_x} \approx 1$$

$$\frac{P_n}{P_x} = \left(\frac{n_n}{n_x}\right)^3$$

Affinity equations

Legend

H_n	**Rated head in metres**
H_x	Current head in metres
Q_n	Rated flow rate in m^3/h
Q_x	Current flow rate in m^3/h
n_n	Rated motor speed in min^{-1}
n_x	Current motor speed in min^{-1}
η_n	Rated efficiency in %
η_x	Current efficiency in %
P_n	Rated power in kW
P_x	Current power in kW

Grundfos Product Center

Grundfos Product Center can help you select the right pump according to your requirements. See section Grundfos Product Center.

Related information

31. Grundfos Product Center

17. Control of pumps in parallel

In some applications, parallel pump operation is required for one or more of the following reasons:

- One pump cannot achieve the required performance, flow rate.
- Standby performance is required to ensure reliability of supply.
- Overall efficiency needs to be improved in case of big variations in the flow demand.

The table below lists the different possibilities of controlling pumps connected in parallel.

Parallel-operation control possibilities	TP	TPE2	TPE2 D	TPE3	TPE3 D	TPE Series 2000 TPE Series 1000
Built-in alternation/standby function		●	●	●	●	●
Built-in parallel operation function		●	●	●	●	
Control MPC 	●	●				●
Control MPC Series 2000 				●		

● Available.
❍ Available on request.

Alternation/standby function

The alternation/standby function is activated from factory and "Alternating" mode is selected as default. See section Alternating operation.

Pumps connected to Control MPC

You can connect TP, TPE Series 1000, TPE2 pumps directly to Grundfos Control MPC.

Control MPC incorporates a CU 352 control unit that can control up to six pumps.

By means of an external sensor, Control MPC can ensure optimum adaptation of the performance to the demand by closed-loop control of these parameters:

- proportional differential pressure
- constant differential pressure
- differential pressure (remote)
- flow rate
- temperature.

CU 352 incorporates features such as those below:

Startup wizard

Correct installation and commissioning is a prerequisite for attaining optimum performance of the system and trouble-free operation year in and year out.

During commissioning of the system, a startup wizard is shown on the display of CU 352. The wizard guides the operator through the various steps via a series of dialogue boxes to ensure that all settings are done in the correct sequence.

Application-optimised software

CU 352 incorporates application-optimised software which helps you set your system to the application in question.

Furthermore, navigating through the menus of the control unit is done in a user-friendly way. You do not need any training to be able to set and monitor the system.

Ethernet connection

CU 352 incorporates an ethernet connection which makes it possible to get full and unlimited access to the setting and monitoring of the system via a remote PC.

Service port, GENI TTL

The service port of CU 352 enables easy access to updating software and data logging in service situations.

External communication

Control MPC enables communication with other fieldbus protocols. In order to communicate with other fieldbus protocols, a GENIbus module and a gateway are required.

Control MPC can communicate with LonWorks, PROFIBUS, Modbus, BACnet, GSM/GPRS or GRM via Grundfos CIU.

Pumps connected to Control MPC Series 2000

TPE Series 2000, TPE3 pumps are connected directly to Grundfos Control MPC Series 2000 via GENIbus.

Control MPC Series 2000 incorporates a CU 352 control unit that can control up to six pumps.

All pumps must be of the same type and size.

Control MPC Series 2000 is used for controlling circulator pumps in heating and air-conditioning applications.

Control MPC Series 2000 ensures optimal adaptation of the performance to the demand by closed-loop control of these parameters:

- proportional differential pressure
- constant differential pressure.

By means of an external sensor Control MPC Series 2000 can also ensure optimum adaptation of the performance to the demand by closed-loop control of these parameters:

- differential pressure (remote)
- flow rate
- temperature.

Note : For further information about Control MPC and Control MPC Series 2000, see the data booklet "Control MPC". The data booklet is available online in Grundfos Product Center. See section Grundfos Product Center.

Related information

31. Grundfos Product Center

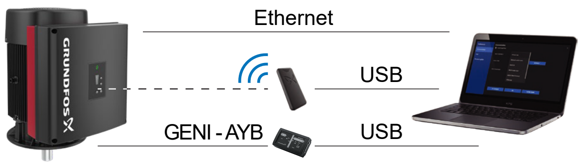
18. Grundfos GO Link

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

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

Use the Grundfos GO Link together with the following interfaces:

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



TM087681

Grundfos GO Link setup

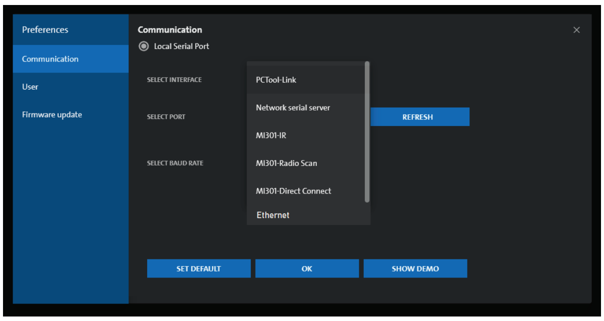
Pos.	Description
1	Ethernet cable: Standard Ethernet cable CAT5/CAT6
2	Grundfos MI 301: Separate radio equipment enabling radio communication [38]
3	Grundfos PC Tool Link: Separate module enabling wired connection to the pump [38]

[38] Use the module together with a USB cable to connect to a laptop.

Communication

When Grundfos GO Link initiates communication with the product, it is done using different verification methods.

Select the interface connected to the pump:



TM083976

Ethernet

Wired connection can take place using an Ethernet cable connected directly between a laptop and the RJ45 interface in the pump or via a local network having both the pump and the laptop connected to the same network.

To establish a secure connection between the laptop and the pump, the user will have to go through a verification process.

Connecting to a pump can either happen by scanning for a connected product, which can be a direct Ethernet connection, or the pump is connected to a local network or a connection via the pump IP address.

Initiate connection from Grundfos GO Link and follow onscreen instructions.

Grundfos MI 301

Radio communication can take place at distances up to 30 metres. The first time Grundfos GO Link communicates with the product, you enable communication by pressing the **Radio communication** button or **OK** on the operating panel. Select either MI301-Direct connect or MI301-Radio. When communication takes place, the product is recognized by Grundfos GO Link, and you can connect using Direct connect or Radio scan without having to run a verification.

Grundfos PC Tool Link

Wired connection can take place using Grundfos PC Tool connected to the AYB terminals of the pump. Since Grundfos GO Link is wired to the pump within a short distance, no verification is needed. A direct connection will be established.

19. Grundfos CUE

TP pumps connected to Grundfos CUE, external frequency converters

GR-1031505

Grundfos CUE

Grundfos CUE is a complete range of wall-mounted frequency converters for pump control in a wide range of applications.

The frequency converter provides a variety of benefits, such as these:

- Grundfos E-pump functionality and user interface
- application- and pump family-related functions
- increased comfort compared to fixed-speed pump solutions
- simple installation and commissioning compared to standard frequency converters
- speed control of pumps up to 250 kW.

Functions

Intuitive startup guide

The startup guide enables easy installation and commissioning as well as plug-and-pump convenience. Few settings need to be made by the installer as the rest is done automatically or preset from the factory.

Smart user interface

GR-1031498

Grundfos CUE user interface

The frequency converter features a unique user-friendly control panel with graphic display and easy-to-use buttons.

Controlling the value you choose

The frequency converter has a built-in PI controller offering closed-loop control of a desired value, such as these:

- constant differential pressure
- proportional pressure
- constant temperature
- constant pressure
- constant flow rate.

Wide product range

The CUE product range is quite comprehensive, covering five different voltage ranges, enclosure classes IP20/21 (NEMA 1) and IP54/55 (NEMA 12), and a wide range of output powers.

The table below provides a general overview.

Input voltage [V]	Output voltage [V]	Motor [kW]
1 × 200-240	3 × 200-240	1.1 - 7.5
3 × 200-240	3 × 200-240	0.75 - 45
3 × 380-500	3 × 380-500	0.55 - 250
3 × 525-600	3 × 525-600	0.75 - 7.5
3 × 525-690	3 × 525-690	11-250

External communication

The frequency converter can communicate with LonWorks, PROFIBUS, Modbus, BACnet or GSM/GPRS via Grundfos CIU.

20. Motor data

Motors

Motors fitted on TP pumps are totally enclosed, fan-cooled motors with main dimensions to IEC and DIN standards. Electrical tolerances to IEC 34.

Mounting designation

Pump type	Mounting designation - IEC 34-7
TP Series 100 TP Series 200	IM 3601 (IM B 14) / IM 3611 (IM V 18)
TP Series 300	IM 3001 (IM B 5) / IM 3011 (IM V 1)

Relative humidity:	Maximum 95 %
Enclosure class:	IP55
Insulation class:	F (IEC 85)
Ambient temperature:	Maximum 55 °C, Innomotics and WEG IE4 2-pole 18.5 - 160 kW and 4-pole 0.55 - 500 kW motors Maximum 60 °C, MG 0.37 -18.5 kW IE4 motors Maximum 50 °C, MGE motors Maximum 40 °C, minimum -20 °C, other motors Maximum 45 °C, Innomotics motors with integrated CUE Minimum -10 °C, Innomotics motors with integrated CUE

If the pump is installed in humid locations, open the lowest drain hole in the motor. This reduces the motor enclosure class to IP44.

High-efficiency 3-phase motors

TP pumps are fitted with high-efficiency motors.

TP, TPD pumps with three-phase motors of 0.12 and 0.37 kW are fitted with IE3 motors, 0.37 to 160 kW are fitted with IE4 motors. TP, TPD pumps with 4-pole 3-phase motors from 0.12 to 0.37 kW are fitted with IE2 motors and from 0.55 kW and up to 630 kW fitted with IE4 motors. TP, TPD pumps with 6-pole 3-phase motors of 1.5 and 2.2 kW are fitted with IE3 motors and from 3 kW and up to 7.5 kW fitted with IE4 motors.

TPE2, TPE2 D, TPE3, TPE3 D pumps are fitted with Grundfos permanent-magnet MGE motors that have motor efficiency class IE5 according to IEC 60034-30-2.

TPE pumps from 30 to 90 kW are free of choice with motors equivalent to IE3, IE4 or IE5.

Motor range

<table>
<tr><th rowspan="2">kW</th><th colspan="3">Mains-operated motors</th><th>Electronically speed-controlled motors</th></tr>
<tr><th>2-pole</th><th>4-pole</th><th>6-pole</th><th></th></tr>
<tr><td>0.12</td><td rowspan="3">1-phase MG, 3-phases Innomotics</td><td>3-phases Innomotics</td><td rowspan="7"></td><td rowspan="17">MGE</td></tr>
<tr><td>0.18</td><td rowspan="3">MG</td></tr>
<tr><td>0.25</td></tr>
<tr><td>0.37</td><td rowspan="13">MG</td></tr>
<tr><td>0.55</td><td rowspan="25">WEG</td></tr>
<tr><td>0.75</td></tr>
<tr><td>1.1</td></tr>
<tr><td>1.</td><td rowspan="6">Innomotics</td></tr>
<tr><td>2.2</td></tr>
<tr><td>3.0</td></tr>
<tr><td>4.0</td></tr>
<tr><td>5.5</td></tr>
<tr><td>7.5</td></tr>
<tr><td>11.0</td><td rowspan="21"></td></tr>
<tr><td>15.0</td></tr>
<tr><td>18.5</td></tr>
<tr><td>22.0</td><td rowspan="10">WEG</td></tr>
<tr><td>30.0</td><td rowspan="6">Innomotics/ Nidec with integrated CUE</td></tr>
<tr><td>37.0</td></tr>
<tr><td>45.0</td></tr>
<tr><td>55.0</td></tr>
<tr><td>75.0</td></tr>
<tr><td>90.0</td></tr>
<tr><td>110</td><td rowspan="11"></td></tr>
<tr><td>132</td></tr>
<tr><td>160</td></tr>
<tr><td>200</td><td rowspan="8"></td></tr>
<tr><td>250</td></tr>
<tr><td>315</td></tr>
<tr><td>355</td><td rowspan="5">Innomotics</td></tr>
<tr><td>400</td></tr>
<tr><td>500</td></tr>
<tr><td>560</td></tr>
<tr><td>630</td></tr>
</table>

MG and MGE are Grundfos motor brands.

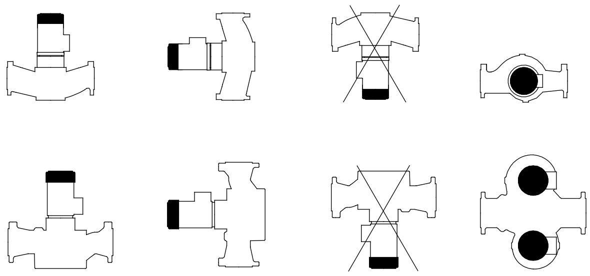
Innomotics/Nidec are a sourced high-quality motor brand.

The grey-shaded areas indicate non-available motors.

21. Installation

Mechanical installation

You can install TP pumps with motors smaller than 11 kW in horizontal or vertical pipes.

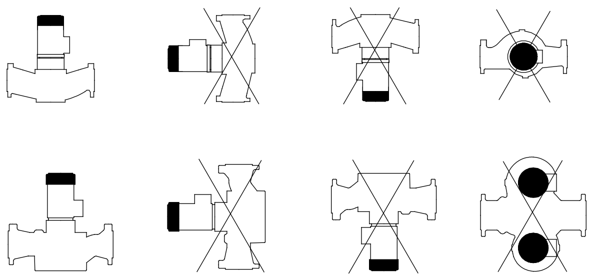


TM003734

Installation of motor sizes smaller than 11 kW

You can suspend pumps with motors smaller than 11 kW directly in the pipes, provided the pipes can support the pump. If not, install the pump on a mounting bracket or base plate.

Only install TP pumps with motors of 11 kW and up in horizontal pipes with the motor in vertical position. Always install the pump on an even and rigid foundation.



TM003735

Installation of motor sizes of 11 kW and up

Note: The motor must never point downwards.

Install the pumps in such a way that strain from the pipes is not transferred to the pump housing.

However, you can suspend some TP, TPE pumps of 11 kW and up directly in the pipes, either horizontally or vertically. See the table below.

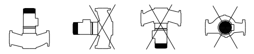
Related information

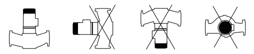
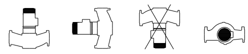
10. TP Series 300 pumps

11. TP Series 100 and 200 pumps

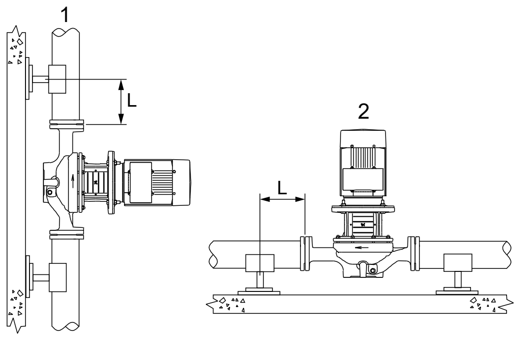
TPE2, TPE2 D, TPE3, TPE3 D 32

TP, TPE pumps from 11 kW and up suspended in the pipes

Pump type	PN 6	PN 16	PN 25	P2 [kW]		
50 Hz						
TP 65-460/2	-	●	-	11	-	●
TP 65-550/2	-	●	-	15	-	●
TP 65-660/2	-	●	-	18.5	-	●
TP 65-720/2	-	●	-	22	-	●
TP 80-330/2	-	●	-	11	-	●
TP 80-340/4	-	●	-	11	-	●
TP 80-400/2	-	●	-	15	-	●
TP 80-520/2	-	●	-	18.5	-	●
TP 80-570/2	-	●	-	22	-	●
TP 100-250/2	-	●	●	11	-	●
TP 100-250/4	-	●	●	11	-	●
TP 100-310/2	-	●	●	15	-	●
TP 100-330/4	-	●	●	15	-	●
TP 100-360/2	-	●	●	18.5	-	●
TP 100-370/4	-	●	●	18.5	-	●
TP 100-390/2	-	●	●	22	-	●
TP 100-410/4	-	●	●	22	-	●
TP 125-190/4	-	●	●	11	-	●
TP 125-230/4	-	●	●	15	-	●
TP 125-300/4	-	●	●	18.5	-	●
TP 125-340/4	-	●	●	22	-	●
TP 150-200/4	-	●	●	15	-	●
TP 150-220/4	-	●	●	18.5	-	●
TP 150-250/4	-	●	●	22	-	●
TP 150-260/4	-	-	●	18.5	●	-
TP 150-280/4	-	-	●	22	●	-
TP 150-340/4	-	-	●	30	●	-
TP 150-390/4	-	-	●	37	●	-
TP 150-450/4	-	-	●	45	●	-
TP 150-520/4	-	-	●	55	●	-
TP 150-660/4	-	-	●	75	●	-
TP 200-160/4	-	-	●	15	●	-
TP 200-190/4	-	-	●	18.5	●	-
TP 200-200/4	-	-	●	22	●	-
TP 200-240/4	-	-	●	30	●	-
TP 200-270/4	-	-	●	45	●	-
TP 200-320/4	-	-	●	55	●	-
TP 200-330/4	-	-	●	37	●	-
TP 200-360/4	-	-	●	45	●	-
TP 200-400/4	-	-	●	55	●	-
TP 200-410/4	-	-	●	75	●	-
TP 200-470/4	-	-	●	75	●	-
TP 300-190/4	-	-	●	30	●	-
TP 300-220/4	-	-	●	37	●	-
TP 300-250/4	-	-	●	45	●	-
TP 300-290/4	-	-	●	55	●	-
TP 300-390/4	-	-	●	75	●	-
TP 300-420/4	-	-	●	90	●	-
TP 300-430/4	-	-	●	110	●	-
TP 300-500/4	-	-	●	132	●	-

Pump type	PN 6	PN 16	PN 25	P2 [kW]		
TP 300-550/4	-	-	●	160	●	-
TP 350-280/4	-	-	●	75	●	-
TP 350-320/4	-	-	●	90	●	-
TP 350-360/4	-	-	●	110	●	-
TP 350-420/4	-	-	●	132	●	-
TP 350-480/4	-	-	●	160	●	-
TP 350-530/4	-	-	●	200	●	-
TP 350-650/4	-	-	●	250	●	-
TP 350-780/4	-	-	●	315	●	-
TPE2/3 40-630	-	●	-	11	●	-
TPE2/3 50-700	-	●	-	11	●	-
TPE2/3 50-730	-	●	-	15	●	-
TPE2/3 50-740	-	●	-	18.5	●	-
TPE2/3 50-750	-	●	-	22	●	-
TPE2/3 65-310	-	●	-	2.2	-	●
TPE2/3 65-680	-	●	-	11	-	●
TPE2/3 65-740	-	●	-	15	-	●
TPE2/3 65-750	-	●	-	18.5	-	●
TPE2/3 65-760	-	●	-	22	-	●
TPE2/3 80-440	-	●	-	11	-	●
TPE2/3 80-520	-	●	-	15	-	●
TPE2/3 80-560	-	●	-	18.5	●	-
TPE2/3 80-570	-	●	-	22	●	-
TPE2/3 100-350	-	●	-	11	-	●
TPE2/3 100-460	-	●	-	15	-	●
TPE2/3 100-540	-	●	-	18.5	-	●
TPE2/3 100-570	-	●	-	22	-	●
TPE2/3 125-290	-	●	-	11	-	●
TPE2/3 125-310	-	●	-	22	●	-
TPE2/3 125-380	-	●	-	15	-	●
TPE2/3 125-430	-	●	-	18.5	-	●
TPE2/3 125-460	-	●	-	22	-	●
TPE2/3 150-230	-	●	-	11	●	-
TPE2/3 150-240	-	●	-	15	-	●
TPE2/3 150-250	-	●	-	22	-	●
TPE2/3 150-270	-	●	-	18.5	-	●
TPE2/3 150-280	-	●	-	22	●	-
TPE2/3 200-130	-	●	-	11	●	-
TPE2/3 200-150	-	●	-	15	●	-
TPE2/3 200-190	-	●	-	18.5	●	-
TPE2/3 200-200	-	●	-	22	●	-

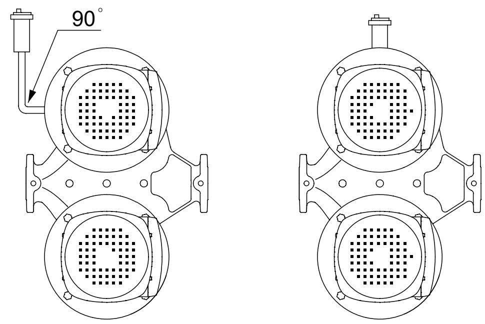
In installations where the pump is suspended directly in the pipes, the pump can support the pipe length L on both sides of the pump. L is less than 3 × DN. See the figure below. In installations where the pump is suspended directly in the pipes, the pump must be lifted and held in correct position by means of ropes or similar until both pump flanges are completely fastened to the pipe flanges.



Pump suspended directly in the pipes

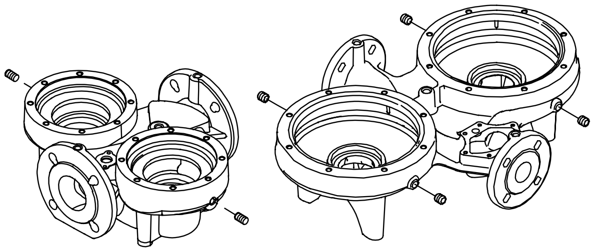
Pos.	Description
1	Vertical pipe
2	Horizontal pipe

When installing a twin-head pump in a horizontal pipe and with horizontal shaft, fit the upper pump housing with an automatic vent.



Twin-head pumps with automatic vent

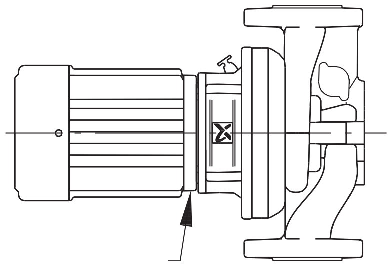
Twin-head pump housings have two Rp 1/4 tappings, TP Series 200, TPE2 D, TPE3 D, or four Rp 1/8 tappings, TP Series 300 for mounting of automatic vents.



Tappings for mounting of automatic vents in TP Series 200, TPE2 D, TPE3 D and TP Series 300

For further information about identification of TP Series 200 and TP Series 300 models, see sections TP Series 100 and 200 pumps and TP Series 300 pumps.

If the liquid temperature falls below the ambient temperature or if the pump is installed outside, condensation may form in the motor during inactivity. In this case, the drain hole in the motor flange must be open and point downwards. See the figure below.



Drain hole

If twin-head pumps are used for pumping liquids with a temperature below 0 °C / 32 °F, condensed water may freeze and cause the coupling to get stuck. You can remedy the problem by installing heating elements. Whenever possible, install pumps with motors smaller than 11 kW with horizontal motor shaft. See figure Twin-head pumps with automatic vent.

Cooling

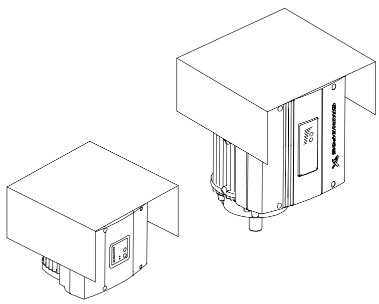
To ensure sufficient cooling of motor and electronics, observe the following:

- Place the pump in such a way that sufficient cooling is ensured.
- Keep the motor cooling fins, holes in fan cover and fan blades clean.
- Make sure that the frequency for the motor is at least 6 Hz, 12 % of maximum speed. The shaft seal may generate noise at speeds below 25 % of maximum speed.

Condensation cover

When installing the pumps outdoors, provide the motor with a suitable cover to protect the pump and motor against the direct effects of the elements. The drain holes in the motor must also be opened to avoid condensation in the motor and terminal box.

When mounting the condensation cover on top of the motor, make sure to leave enough space for the air to cool the motor.



Motors with condensation cover

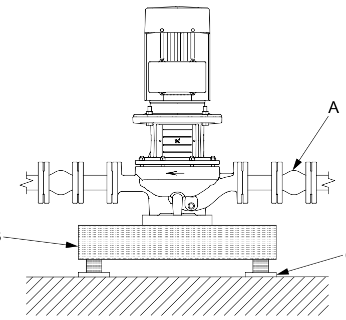
Elimination of noise and vibrations

In order to achieve optimum operation and minimum noise and vibration, consider vibration dampening of the pump. Generally, always consider this for pumps with motors of 11 kW and up, but for motors of 90 kW and up as well as the pump stated in the table below, vibration dampening is mandatory. Smaller motor sizes, however, may also cause undesirable noise and vibration.

Pump type	Frequency [Hz]
TP 200-290/4	50 Hz

Noise and vibration are generated by the revolutions of the motor and pump and by the flow in pipes and fittings. The effect on the environment is subjective and depends on correct installation and the state of the remaining system.

Elimination of noise and vibrations is best achieved by means of a concrete foundation, vibration dampers and expansion joints.



Foundation of TP pump

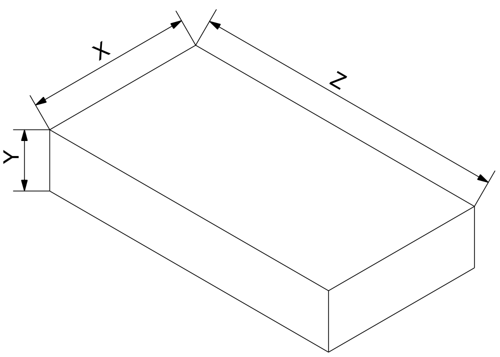
Pos.	Description
A	Expansion joint
B	Concrete foundation
C	Vibration dampers

Concrete foundation

Install the pump on a plane and rigid concrete foundation. This is the optimum solution for vibration dampening. As a rule of thumb, the weight of a concrete foundation must be 1.5 times the pump weight.

Recommended concrete foundations for TP, TPD Series 300 pumps

For TP Series 300 pumps with weights of 150 kg or more, we recommend that you mount the pump on a concrete foundation with the dimensions stated in the table below. The same recommendation applies for TPD Series 300 pumps with weights of 300 kg or more.



Foundation for TP, TPD Series 300 pumps

Concrete foundation dimensions				
Pump mass [kg]		Y (height) [mm]	Z (length) [mm]	X (width) [mm]
150	≤ DN 200	280	565	565
200		310	620	620
250		330	670	670
300		360	710	710
350		375	750	750
400		390	780	780
450		410	810	810
500		420	840	840
550		440	870	870
600		450	900	900
650		460	920	920
700		470	940	940
750		480	970	970
800		490	990	990
850		500	1010	1010
900		510	1030	1030
950		520	1050	1050
1000		530	1060	1060
1050		540	1080	1080
1100		550	1100	1100
1150		560	1100	1100
1200		560	1130	1130
1250		570	1150	1150
1300		580	1160	1160
1350		590	1180	1180
1400		600	1190	1190
1450		600	1200	1200
1500		610	1220	1220
1550		620	1230	1230
1600		620	1250	1250
1650		630	1250	1250
1700		635	1270	1270
800	DN 300 / DN 350 / DN 400	450	1400	800
1000		450	1400	1000
1200		450	1400	1200
1400		500	1600	1200
1600		500	1600	1350
1800		500	1600	1500
2000		550	1600	1600
2200		550	1700	1700
2400		550	1800	1800
2600		600	1800	1800
3000		600	2000	2000
3400		680	2000	2000
3800		760	2000	2000
4200		840	2000	2000
4600		920	2000	2000
5000		1000	2000	2000
5400		1080	2000	2000

Vibration dampers

To prevent the transmission of vibrations to buildings, we recommend that you isolate the pump foundation from building parts by means of vibration dampers.

The selection of the right vibration damper requires the following data:

- Forces transmitted through the damper.
- Motor speed considering speed control, if any.
- Required dampening in %. The suggested value is 70 %.

The right damper varies from installation to installation, and a wrong damper may increase the vibration level. Vibration dampers must therefore be sized by the supplier.

If you install the pump on a foundation with vibration dampers, always fit expansion joints on the pump flanges. This is important to prevent the pump from "hanging" in the flanges.

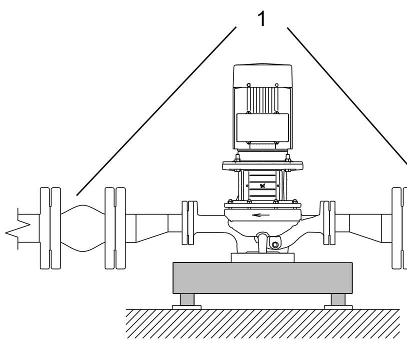
Expansion joints

Expansion joints do the following:

- absorb expansions or contractions in the pipes caused by changing liquid temperature.
- reduce mechanical strains in connection with pressure surges in the pipes.
- isolate mechanical structure-borne noise in the pipes. Only rubber bellows expansion joints.

Note: Do not install expansion joints to compensate for inaccuracies in the pipes such as centre displacement of flanges.

Fit expansion joints at a distance of minimum 1 to 1.5 times the nominal flange diameter away from the pump on the inlet as well as on the outlet side. This prevents the development of turbulence in the expansion joints, resulting in better suction conditions and a minimum pressure loss on the outlet side. At high water velocities, greater than 5 m/s, we recommend that you install larger expansion joints corresponding to the pipes. See the figure below.



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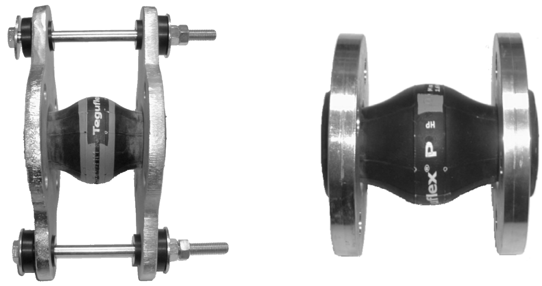
TP pump installed with larger expansion joints

Pos.	Description
1	Expansion joints

The illustration below shows examples of rubber bellows expansion joints with or without limit rods.

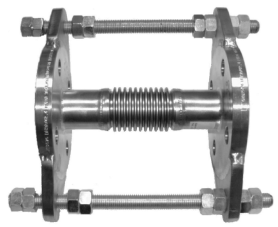


Examples of rubber bellows expansion joints

You can use expansion joints with limit rods to reduce the effects of the expansion or contraction forces on the pipes. We always recommend expansion joints with limit rods for flanges larger than DN 100.

Anchor the pipes in such a way that they do not stress the expansion joints and the pump. Follow the supplier's instructions and pass them on to advisers or pipe installers.

The illustration below shows an example of a metal bellows expansion joint with limit rods.



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Example of metal expansion joint

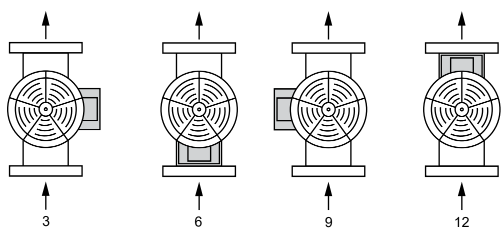
Due to the risk of rupture of the rubber bellows, metal bellows expansion joints may be preferred at temperatures above 100 °C combined with high pressure.

Terminal box positions

TP single-head pumps

As standard, the terminal boxes of TP and TPE, TPE2, TPE3 pumps are mounted in 9 o'clock position.

The possible terminal box positions are shown below.



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Possible terminal box positions

Pos.	Description
3	3 o'clock
6	6 o'clock
9	9 o'clock Standard
12	12 o'clock

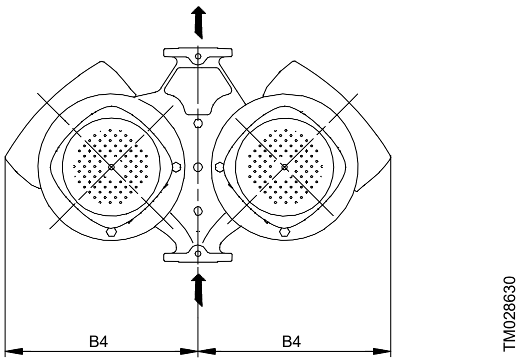
TPE pumps with Innomotics/Nidec motors with integrated CUE can deviate up to 30 degrees from the 9 o'clock position.

Note: Due to the motor construction, the terminal boxes of some TP pumps with motor sizes above 250 kW are mounted in 10:30 position.

TPD twin-head pumps

As standard, the terminal boxes of all TPD pumps are mounted in 12 o'clock position. See figure Possible terminal box positions.

On TPE2 D, TPE3 D Small and TPE2 D, TPE3 D Medium/Large pumps up to DN 80, the terminal box is installed in a position different from 12 o'clock.



Terminal box positions of TPED pumps

Note: You can find the B4 dimension in the tables of technical data of the individual pump. See section Performance curves and technical data.

Electrical installation

Mains-operated motors

The operating voltage and frequency are marked on the pump nameplate. Make sure that the motor is suitable for the power supply on which it will be used.

Single-phase standard motors incorporate a thermal switch and require no additional motor protection.

Three-phase motors must be connected to a motor starter.

Motors of 3 kW and up incorporate thermistors, PTC. The thermistors are designed according to DIN 44082.

The electrical connection must be carried out as shown in the diagram inside the terminal box cover.

The motors of twin-head pumps are to be connected separately.

Frequency converter operation

Motors types Innomotics/WEG, MG 71 and MG 80 for supply voltages up to and including 440 V must be protected against voltage peaks higher than 650 V between the supply terminals. See the motor nameplate.

Grundfos motors:

You can connect all three-phase Grundfos motors from frame size 90 and up to a frequency converter.

The connection of a frequency converter often has the effect that the motor insulation system is loaded more and that the motor is noisier than during normal operation.
In addition, large motors are loaded by bearing currents caused by the frequency converter.

In the case of frequency converter operation, consider the following:

In 2-pole motors from 45 kW, 4-pole motors from 37 kW and 6-pole motors from 30 kW, one of the motor bearings must be electrically isolated to prevent damaging currents from passing through the motor bearings.

In the case of noise-critical applications, reduce the motor noise by fitting a dU/dt filter between the motor and the frequency converter. In particularly noise-critical applications, we recommend that you fit a sinusoidal filter.

The length of the cable between the motor and frequency converter affects the motor load. Therefore, check that the cable length meets the specifications laid down by the frequency converter supplier.

For supply voltages between 500 and 690 V, fit either a dU/dt filter to reduce voltage peaks or use a motor with reinforced insulation.

For supply voltages of 690 V, use a motor with reinforced insulation, and fit a dU/dt filter.

For other motor makes than Grundfos, contact Grundfos or the motor manufacturer.

22. MGE motors and motors with integrated CUE

TPE2 and TPE3 pumps fitted with medium/high speed motors from 0.12 - 2.2 kW and low speed motors from 0.12 - 1.5 kW

Single-phase supply voltage

1 x 200-240 V - 10 % / + 10 %, 50/60 Hz, PE.

Recommended fuse size

Motor size [kW]	Min. [A]	Max. [A]
0.12 - 0.75	6	10
1.1 - 1.5	10	16

You can use standard as well as quick-blow or slow-blow fuses.

Leakage current

Earth leakage current must be less than 3.5 mA, AC.

Earth leakage current must be less than 10 mA, DC.

The leakage currents are measured in accordance with EN 61800-5-1:2007.

Three-phase supply voltage

3 x 380-500 V - 10 %/+ 10 %, 50/60 Hz, PE.

Recommended fuse size

Motor size [kW]	Min. [A]	Max. [A]
0.12 - 1.1	6	6
1.5	6	10
2.2	6	16

You can use standard as well as quick-blow or slow-blow fuses.

Leakage current, AC

Speed [min^{-1}]	Power [kW]	Mains voltage [V]	Leakage current [mA]
1400-2000	0.12 - 1.5	≤ 400	< 3.5
		> 400	< 5
2900-4000	0.25 - 2.2	≤ 400	< 3.5
		> 400	< 5
4000-5900	0.25 - 2.2	≤ 400	< 3.5
		> 400	< 5

The leakage currents are measured without any load on the shaft and in accordance with EN 61800-5-1:2007.

Inputs and outputs

Earth reference, GND

All voltages refer to GND.

All currents return to GND.

Absolute maximum voltage and current limits

Exceeding the following electrical limits may result in severely reduced operating reliability and motor life:

Relay 1:

Maximum contact load: 250 VAC, 2 A or 30 VDC, 2 A.

Relay 2:

Maximum contact load: 30 VDC, 2 A.

GENI terminals: -5.5 to 9.0 VDC or less than 25 mADC.

Other input or output terminals: -0.5 to 26 VDC or less than 15 mADC.

Digital inputs, DI

Internal pull-up current greater than 10 mA at V_i equal to 0 VDC.

Internal pull-up to 5 VDC (currentless for V_i greater than 5 VDC).

Low logic level: V_i less than 1.5 VDC.

High logic level: V_i greater than 3.0 VDC.

Hysteresis: No.

Screened cable: 0.5 - 1.5 mm^2, 28-16 AWG.

Maximum cable length: 500 m.

Open-collector digital outputs, OC

Current sinking capability: 75 mADC, no current sourcing.

Load types: Resistive or/and inductive.

Low-state output voltage at 75 mADC: Maximum 1.2 VDC.

Low-state output voltage at 10 mADC: Maximum 0.6 VDC.

Overcurrent protection: Yes.

Screened cable: 0.5 - 1.5 mm^2, 28-16 AWG.

Maximum cable length: 500 m.

Analog inputs, AI

Voltage signal ranges:

- 0.5 - 3.5 VDC, AL AU.
- 0-5 VDC, AU.
- 0-10 VDC, AU.

Voltage signal: R_i greater than 100 kΩ at 25 °C.

Leak currents may occur at high operating temperatures. Keep the source impedance low.

Current signal ranges:

- 0-20 mADC, AU.
- 4-20 mADC, AL AU.

Current signal: R_i equal to 292 Ω.

Current overload protection: Yes. Change to voltage signal.

Measurement tolerance: -0 / +3 % of full scale (maximum-point coverage).

Screened cable: 0.5 - 1.5 mm^2, 28-16 AWG.

Maximum cable length: 500 m (excl. potentiometer).

Potentiometer connected to +5 V, GND, any AI:

Use maximum 10 kΩ.

Maximum cable length: 100 m.

Analog output, AO

Current sourcing capability only.

Voltage signal:

- Range: 0-10 VDC.
- Minimum load between AO and GND: 1 kΩ.
- Short-circuit protection: Yes.

Current signal:

- Ranges: 0-20 and 4-20 mADC.
- Maximum load between AO and GND: 500 Ω.
- Open-circuit protection: Yes.

Tolerance: -0 / +4 % of full scale (maximum-point coverage).

Screened cable: 0.5 - 1.5 mm^2, 28-16 AWG.

Maximum cable length: 500 m.

Pt100/1000 inputs, PT

Temperature range:

- Minimum -30 °C. 88 Ω / 882 Ω.
- Maximum 180 °C. 168 Ω / 1685 Ω.

Measurement tolerance: ± 1.5 °C.

Measurement resolution: < 0.3 °C.

Automatic range detection, Pt100 or Pt1000: Yes.

Sensor fault alarm: Yes.

Screened cable: 0.5 - 1.5 mm^2, 28-16 AWG.

Use Pt100 for short wires.

Use Pt1000 for long wires.

LiqTec sensor inputs*

Use Grundfos LiqTec sensor only.

Screened cable: 0.5 - 1.5 mm^2, 28-16 AWG.

Grundfos Digital Sensor input and output, GDS *

Use Grundfos Digital Sensor only.

* Only applicable for TPE, TPED Series 2000 and TPE3, TPE3 D pumps.

Power supplies

+5 V:

- Output voltage: 5 VDC -5 % / +5 %.
- Maximum current: 50 mADC, sourcing only.
- Overload protection: Yes.

+24 V:

- Output voltage: 24 VDC -5 % / +5 %.
- Maximum current: 60 mADC, sourcing only.
- Overload protection: Yes.

Digital outputs, relays

Potential-free changeover contacts.

Minimum contact load when in use: 5 VDC, 10 mA.

Screened cable: 0.5 - 2.5 mm^2, 28-12 AWG.

Maximum cable length: 500 m.

Bus input

Grundfos GENIbus protocol, RS-485.

Screened 3-core cable: 0.5 - 1.5 mm^2, 28-16 AWG.

Maximum cable length: 500 m.

EMC, electromagnetic compatibility

Standard used: EN 61800-3.

The table below shows the emission category of the motor.

C1 fulfils the requirements for residential areas.

Note: When connected to a public network, 11 kW motors do not comply with the partial weighted harmonic distortion (PWHD) requirements of EN 61000-3-12. If required by the distribution network operator, compliance can be obtained in the following way:

The impedance of the mains cables between the motor and the point of common coupling (PCC) must be equivalent to the impedance of a 50 m cable with a cross-section of 0.5 mm.

C3 fulfils the requirements for industrial areas.

Note: When the motors are installed in residential areas, supplementary measures may be required as the motors may cause radio interference.

Motor [kW]	Emission category	
	1450-2000 min^{-1}	2900-4000 min^{-1} 4000-5900 min^{-1}
0.12	C1	C1
0.25	C1	C1
0.37	C1	C1
0.55	C1	C1
0.75	C1	C1
1.1	C1	C1
1.5	C1	C1
2.2	-	C1

Immunity: The motor fulfils the requirements for industrial areas.

Contact Grundfos for further information.

Enclosure class

Standard: IP55 (IEC 34-5).

Optional: IP66 (IEC 34-5).

Insulation class

F (IEC 85).

Ambient temperature

During operation: -20 to 50 °C.

During storage and transportation: -30 to 60 °C.

Standby power consumption

5-10 W.

Cable entries

Motor [kW]	Number and size of cable entries
	TPE2, TPE2 D, TPE3, TPE3 D
0.12 - 1.5	4 x M20
2.2	

Sound pressure level

TPE2, TPE2 D, TPE3, TPE3 D

Pump size	Sound pressure level ISO 3743 [dB(A)]
TPE2 25-50	53
TPE2 25-80	53
TPE2 25-90	53
TPE2 32-50	53
TPE2 32-70	53
TPE2 32-90	53
TPE2 40-50	53
TPE2 40-70	53
TPE2 40-90	53
TPE2/TPE3 32-80	55
TPE2/TPE3 32-120	60
TPE2/TPE3 32-150	65
TPE2/TPE3 32-180	66
TPE2/TPE3 32-200	66
TPE2/TPE3 32-250	52
TPE2/TPE3 32-330	62
TPE2/TPE3 40-80	52
TPE2/TPE3 40-120	59
TPE2/TPE3 40-150	60
TPE2/TPE3 40-180	63
TPE2/TPE3 40-200	65
TPE2/TPE3 40-240	66
TPE2/TPE3 50-60	48
TPE2/TPE3 50-80	56
TPE2/TPE3 50-120	60
TPE2/TPE3 50-150	60
TPE2/TPE3 50-180	63
TPE2/TPE3 50-200	64
TPE2/TPE3 50-240	66
TPE2/TPE3 65-60	44
TPE2/TPE3 65-80	51
TPE2/TPE3 65-120	59
TPE2/TPE3 65-150	62
TPE2/TPE3 65-180	62
TPE2/TPE3 65-200	62
TPE2/TPE3 80-40	43
TPE2/TPE3 80-120	53
TPE2/TPE3 80-150	62
TPE2/TPE3 80-180	64
TPE2/TPE3 100-40	43
TPE2/TPE3 100-100	49.5
TPE2/TPE3 100-120	53
TPE2/TPE3 100-150	62
TPE2/TPE3 100-180	64

Electrical supply systems

Power supply network and earthing systems

If you want to supply the product through an IT network, make sure that you have a suitable product variant. If you are in doubt, contact Grundfos.

The internal EMC filter remains connected, and subsequently no reduced leakage current variant is available.

Supply line types

Model H, I:

The product is not suitable for use on corner earthed grids in installations more than 2000 m above sea level.

The product is not suitable for use on corner earthed grids in installations more than 6560 ft (2000 m) above sea level.

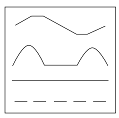
Motor protection

The motor requires no external motor protection. The motor incorporates thermal protection against slow overloading and blocking.

Model H, I: The product includes load- and speed-sensitive motor-overload protection.

Additional protection

The residual-current circuit breaker must be marked with the following symbol:



The total leakage current of all the electrical equipment in the installation must be taken into account. You find the leakage current of the motor in sections Leakage current and Leakage current, AC.

This product can cause a direct current in the protective-earth conductor.

Overvoltage and undervoltage protection

Overvoltage and undervoltage may occur in case of unstable power supply or a faulty installation. The motor is stopped if the voltage falls outside the permissible voltage range. The motor restarts automatically when the voltage is again within the permissible voltage range. Therefore, no additional protection relay is required.

Note: The motor is protected against transients from the power supply according to EN 61800-3. In areas with high lightning intensity, we recommend external lightning protection.

Overload protection

If the upper load limit is exceeded, the motor automatically compensates for this by reducing the speed and stops if the overload condition persists.

The motor remains stopped for a set period. After this period, the motor automatically attempts to restart. The overload protection prevents damage to the motor. Consequently, no additional motor protection is required.

Overtemperature protection

The electronic unit has a built-in temperature sensor as an additional protection. When the temperature rises above a certain level, the motor automatically compensates for this by reducing the speed and stops if the temperature keeps rising. The motor remains stopped for a set period. After this period, the motor automatically attempts to restart.

Protection against phase unbalance

Three-phase motors must be connected to a power supply with a quality corresponding to IEC 60146-1-1, class C, to ensure correct motor operation at phase unbalance. This also ensures long life of the components.

Related information

Leakage current

Leakage current, AC

Maximum number of starts and stops

The number of starts and stops via the power supply must not exceed four times per hour.

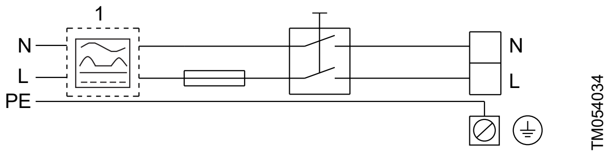
When switched on via the power supply, the pump starts after approximately 5 seconds.

If you want a higher number of starts and stops, use the input for external start-stop when starting or stopping the pump.

When you start a pump via an external on/off switch, the pump starts immediately.

Wiring diagrams

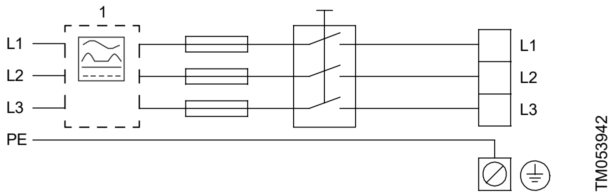
Single-phase supply:



Example of a mains-connected motor with main switch, backup fuse and additional protection

Pos.	Description
1	RCD, type B

Three-phase supply:



Example of a mains-connected motor with main switch, backup fuse and additional protection

Pos.	Description
1	RCD, type B

Connection terminals

The descriptions and terminal overviews in this section apply to both single-phase and three-phase motors.

Connection terminals, advanced functional module, FM 300

The advanced module has these connections:

- three analog inputs
- one analog output
- two dedicated digital inputs
- two configurable digital inputs or open-collector outputs
- Input and output for Grundfos Digital Sensor
  Not applicable for TPE2, TPE2 D pumps. The factory-fitted differential-pressure sensor for TPE3, TPE3 D pumps is connected to this input.
- two Pt100/1000 inputs [39)]
- two LiqTec sensor inputs
- two signal relay outputs
- GENIbus connection.

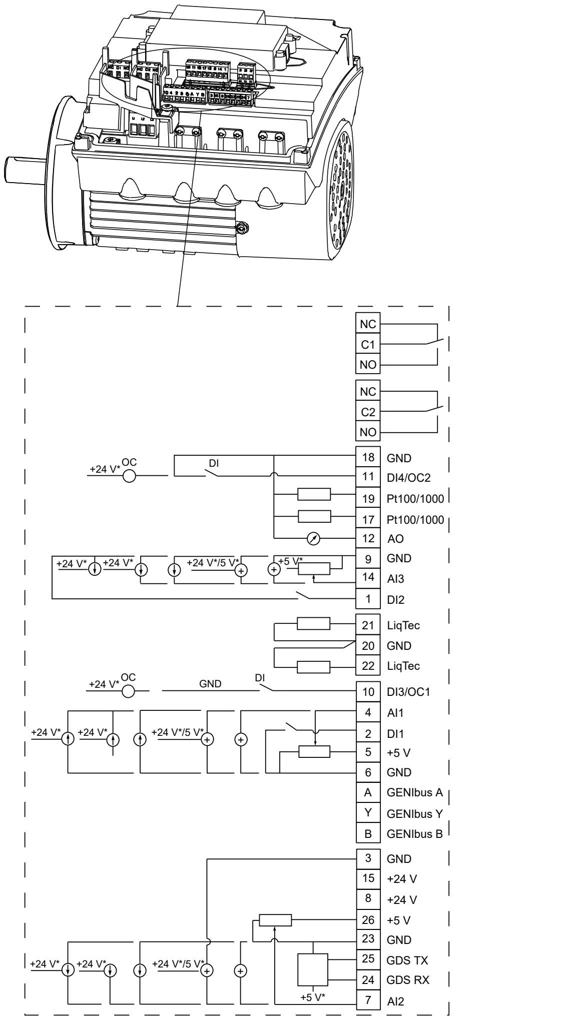
39) Some of the TPE3 pumps use these inputs for temperature sensor.

See figure Connection terminals, FM 300.

Note: Digital input 1 is factory-set to be start-stop input where open circuit results in stop.

A jumper has been factory-fitted between terminals 2 and 6. Remove the jumper if digital input 1 is to be used as external start-stop or any other external function.

- **Inputs and outputs**
  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 by protective extra-low voltage, PELV, thus ensuring protection against electric shock.
- **Signal relay outputs**
  - Signal relay 1:
    LIVE:
    You can connect supply voltages up to 250 VAC.
    PELV:
    The output is galvanically separated from other circuits. Therefore, you can connect the supply voltage or protective extra-low voltage to the output as desired.
  - Signal relay 2:
    PELV:
    The output is galvanically separated from other circuits. Therefore, you can connect the supply voltage or protective extra-low voltage to the output as desired.
- **Mains supply,** terminals N, PE, L or L1, L2, L3, PE.



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

Connection terminals, FM 300, option

Terminal	Type	Function
NC	Normally closed contact	Signal relay 1 LIVE or PELV
C1	Common	
NO	Normally open contact	
NC	Normally closed contact	Signal relay 2 PELV only
C2	Common	
NO	Normally open contact	
18	GND	Earth
11	DI4/OC2	Digital input/output, configurable. Open collector: Maximum 24 V resistive or inductive.
19	Pt100/1000 input 2	Pt100/1000 sensor input
17	Pt100/1000 input 1	Pt100/1000 sensor input
12	AO	Analog output: 0-20 mA / 4-20 mA 0-10 V
9	GND	Earth
14	AI3	Analog input: 0-20 mA / 4-20 mA 0-10 V
1	DI2	Digital input, configurable
21	LiqTec sensor input 1	LiqTec sensor input White conductor
20	GND	Earth Brown and black conductors
22	LiqTec sensor input 2	LiqTec sensor input Blue conductor
10	DI3/OC1	Digital input/output, configurable. Open collector: Max. 24 V resistive or inductive.
4	AI1	Analog input: 0-20 mA / 4-20 mA 0.5 - 3.5 V / 0-5 V / 0-10 V
2	DI1	Digital input, configurable
5	+5 V	Supply to potentiometer and sensor
6	GND	Earth
A	GENIbus, A	GENIbus, A (+)
Y	GENIbus, Y	GENIbus, GND
B	GENIbus, B	GENIbus, B (-)
3	GND	Earth
15	+24 V	Supply
8	+24 V	Supply
26	+5 V	Supply to potentiometer and sensor
23	GND	Earth
25	GDS TX	Grundfos Digital Sensor output
24	GDS RX	Grundfos Digital Sensor input
7	AI2	Analog input: 0-20 mA / 4-20 mA 0.5 - 3.5 V / 0-5 V / 0-10 V

TPE2/3 pumps fitted with medium/ high speed motors from 3-22 kW and low speed motors from 2.2 - 22 kW

Supply voltage

- 3 × 380-500 V -10 % / +10 %, 50/60 Hz, PE
- 3 × 380-480 V -10 % / +10 %, 50/60 Hz, PE

Check that the supply voltage and frequency correspond to the values stated on the nameplate.

Recommended size of fuse

You can use standard as well as quick-blow or slow-blow fuses.

3 × 380-500 V, Model J

Motor size [kW]	Recommended [A]	Maximum [A]
2.2	6	16
3	10	16
4	13	16
5.5	16	32
7.5	20	32
11	32	32

3 × 380-480 V, Model K

Motor size [kW]	Recommended [A]	Maximum [A]	Fuse type
11	35	63	gG
15	50	80	gG
18.5	60	80	gG
22	70	80	gG

Leakage current (AC)

The leakage currents are measured without any load on the shaft and in accordance with EN 61800-5-1:2007.

3 × 380-500 V, 50/60 Hz, Model J

Speed [rpm]	Power [kW]	Mains voltage [V]	Leakage current (I_L) [mA]
1450-2200	2.2 - 4	≤ 400	< 3.5
		> 400	< 3.5
	5.5 - 7.5	≤ 400	< 3.5
		> 400	$3.5 < I_L < 5.0$
2900-4000	3 - 5.5	≤ 400	< 3.5
		> 400	< 3.5
	7.5 - 11	≤ 400	< 3.5
		> 400	$3.5 < I_L < 5.0$
4000-5900	3 - 5.5	≤ 400	< 3.5
		> 400	< 3.5
	7.5 - 11	≤ 400	< 3.5
		> 400	$3.5 < I_L < 5.0$

3 × 380-480 V, 50/60 Hz, Model K

Speed [rpm]	Power [kW]	Mains voltage [V]	Leakage current (I_L) [mA]
1450-2200	11-22	≤ 400	$3.5 < I_L < 20$
		> 400	$3.5 < I_L < 30$
2900-4000	15-22	≤ 400	$3.5 < I_L < 20$
		> 400	$3.5 < I_L < 30$

Inputs and outputs

Signal reference

All voltages refer to signal ground (GND). All currents return to signal ground.

Absolute maximum voltage and current limits

Exceeding the following electrical limits may result in severely reduced operating reliability and motor life.

Relay 1:

- Maximum contact load: 250 VAC, 2 A or 30 VDC, 2 A.

Relay 2:

- Maximum contact load: 30 VDC, 2 A.

GENI terminals: -5.5 to +9.0 VDC or less than 25 mADC.

Other input and output terminals: -0.5 to +26 VDC or less than 15 mADC.

Digital inputs

Internal pull-up current greater than 10 mA at V_i equal to 0 VDC.

Internal pull-up to 5 VDC. Currentless for V_i greater than 5 VDC.

Input activated level: V_i less than 1.5 VDC.

Input deactivated level: V_i from 3.0 VDC to 24 VDC.

Hysteresis: No.

Screened cable: 0.5 - 1.5 mm^2 / 28-16 AWG.

Maximum cable length: 500 m.

Safe Torque Off (STO) terminals

S24:

24 V output voltage. Only for use with ST1 and ST2 inputs.

- Output voltage: 24 V -5 % to +5 %
- Maximum current: 50 mADC
- Overload protection: Yes.

ST1 and ST2:

- STO activated: V_{in} lower than 1.25 V
- STO deactivated: V_{in} greater than 21.6 V and lower than 25 V
- Input current greater than 10 mA at V_{in} equal to 24 V.

When the internal voltage source (connection S24) is used, the input voltage for ST1 and ST2 is within accepted limits.

When an external voltage source is used to drive the STO inputs, the following conditions must be met:

In operational state, the input voltage of ST1 and ST2 with reference to GND must be within:

- V_{min}: 21.6 V
- V_{max}: 25.0 V.

In the safe state, the input voltage of ST1 and ST2 with reference to GND must be as follows:

- V_{max}: 1.25 V.

In the operating state, the current flow into ST1 and ST2 must be within:

- Minimum contact current: 10 mA
- Maximum contact current: 25 mA.

Input source rating: SELV

Bus input (Ethernet)

Protocols TC/IP GENI, GDP.

Cable type, Standard CAT5, CAT5e or CAT6.

Open-collector digital outputs (OC)

Current-sinking capability: 75 mADC, no current sourcing.

Load types: Resistive and/or inductive.

Low-state output voltage at 75 mADC: Maximum 1.2 VDC.

Low-state output voltage at 10 mADC: Maximum 0.6 VDC.

Overcurrent protection: Yes.

Screened cable: 0.5 - 1.5 mm^2 / 28-16 AWG.

Maximum cable length: 500 m.

Analog inputs (AI)

Voltage signal ranges:

- 0.5 - 3.5 VDC, AL AU
- 0-5 VDC, AU
- 0-10 VDC, AU.

Voltage signal:

- R_i greater than 100 kΩ at 25 °C.

Leak currents may occur at high operating temperatures. Keep the source impedance low.

Current signal ranges:

- 0-20 mADC, AU
- 4-20 mADC, AL AU.

Current signal: R_i is equal to 292 Ω.

Current overload protection: Yes. Change to voltage signal.

Measurement tolerance: +/- 2 % of full scale.

Screened cable: 0.5 - 1.5 mm^2 / 28-16 AWG.

Maximum cable length: 500 m, excluding potentiometer.

Potentiometer connected to +5 V, GND, any AI: Use maximum 10 kΩ.

Maximum cable length: 100 m.

Analog output (AO)

Current sourcing capability only.

Voltage signal:

- Range: 0-10 VDC
- Minimum load between AO and GND: 1 kΩ
- Short-circuit protection: Yes.

Current signal:

- Ranges: 0-20 and 4-20 mADC
- Maximum load between AO and GND: 500 Ω
- Open-circuit protection: Yes.

Tolerance: +/- 4 % of full scale.

Screened cable: 0.5 - 1.5 mm^2 / 28-16 AWG.

Maximum cable length: 500 m.

Pt100 or Pt1000 inputs (Pt)

Temperature range:

- Minimum -50 °C (80 Ω/803 Ω).Minimum -58 °F (-50 °C) (80 Ω/803 Ω).

- Maximum 204 °C (177 Ω/1773 Ω).Maximum 399 °F (204 °C) (177 Ω/1773 Ω).

Measurement tolerance: +/- 1.5 °C.

Measurement tolerance: +/- 2.7 °F (1.5 °C).

Measurement resolution: less than 0.3 °C.

Measurement resolution: less than 0.54 °F (0.3 °C).

Automatic range detection (Pt100 or Pt1000): Yes.

Sensor fault alarm: Yes.

Screened cable: 0.5 - 1.5 mm^2 / 28-16 AWG.

Use Pt100 for short wires.

Use Pt1000 for long wires.

LiqTec sensor inputs

Use a Grundfos LiqTec sensor only.

Screened cable: 0.5 - 1.5 mm^2 / 28-16 AWG.

Grundfos Digital Sensor input and output (GDS)

Use Grundfos Digital Sensor only.

Power supplies, +5 V, +24 V

+5 V

- Output voltage: 5 VDC -5 % to +5 %
- Maximum current: 60 mADC, sourcing only
- Overload protection: Yes.

+24 V

- Output voltage: 24 VDC -5 % to +5 %
- Maximum current: 200 mADC, sourcing only
- Overload protection: Yes.

Digital outputs, relays

Potential-free changeover contacts.

Minimum contact load when in use: 5 VDC, 10 mA.

Screened cable: 0.5 - 2.5 mm^2 / 28-12 AWG.

Maximum cable length: 500 m.

Bus input

Grundfos GENIbus protocol, RS-485.

Grundfos Modbus protocol, RS-485.

Screened 3-core cable: 0.5 - 1.5 mm^2 / 28-16 AWG.

Maximum cable length: 500 m.

Other technical data

Ecodesign Directive

This product is out of scope of Directive 2009/125/EC and Commission Regulation (EU) 2019/1781 due to Article 2 (3a), as the variable speed drive (VSD) is integrated into a product and its energy performance cannot be tested independently from the product.

EMC (electromagnetic compatibility)

Standard used: EN 61800-3.

The table below shows the emission category of the motor.

C1 fulfils the requirements for residential areas.

Model J: When connected to a public network, 11-kW motors do not comply with the partial weighted harmonics (PWH) requirements of EN 61000-3-12. If required by the distribution network operator, compliance can be obtained in the following way:

The impedance of the mains cables between the motor and the point of common coupling (PCC) must be equivalent to the impedance of a 50 m cable.

Model K: This equipment complies with IEC 61000-3-12 provided that the short-circuit power S_{SC} is greater than or equal to the respective value described in the table below at the interface point between the user's supply and the public system. It is the responsibility of the installer or user of the equipment to ensure, by consultation with the distribution network operator if necessary, that the equipment is connected only to a supply with a short-circuit power S_{SC} greater than or equal to the respective value described in the table below.

C2 fulfils the requirements for residential areas if the system is operated and installed by qualified persons.

C3 fulfils the requirements for industrial areas.

In a residential environment, this product may cause radio interference in which case supplementary mitigation measures may be required.

3 × 380-480 V, 50/60 Hz, Model K

Speed [rpm]	Power P2 [kW]	Supply voltage [V]	Short-circuit power [MVA]
1450-2200	11	3 × 380-480	3.5
	15	3 × 380-480	4.6
	18.5	3 × 380-480	5.6
	22	3 × 380-480	6.6
2900-4000	15	3 × 380-480	4.6
	18.5	3 × 380-480	5.8
	22	3 × 380-480	6.6

Model J

Motor [kW]	Emission category	
	1450-2000 rpm	2900-4000 rpm 4000-5900 rpm
2.2	C1	-
3	C1	C1
4	C1	C1
5.5	C3/C2 [40)]	C1
7.5	C3/C2 [40)]	C3/C2 [40)]
11	-	C3/C2 [40)]

40) C2, if equipped with an external Grundfos EMC filter.

Model K

Motor [kW]	Emission category	
	1450-2200 rpm	2900-4000 rpm
11	C2/C3 [41)]	-
15	C2/C3 [41)]	C2/C3 [41)]
18.5	C2/C3 [41)]	C2/C3 [41)]
22	C2/C3 [41)]	C2/C3 [41)]

41) Depending on product hardware configuration.

Enclosure class

Standard: IP55.

Optional: IP66.

Insulation class

311 °F (155 °C).

Standby power consumption

5-10 W.

Cable entry sizes

Model J

Motor [kW]	1450-2200 rpm	2900-4000 rpm	4000-5900 rpm
2.2	1 × M25 + 4 × M20	-	-
3.0 - 4.0	1 × M25 + 4 × M20	1 × M25 + 4 × M20	1 × M25 + 4 × M20
5.5	1 × M32 + 5 × M20	1 × M25 + 4 × M20	1 × M25 + 4 × M20
7.5	1 × M32 + 5 × M20	1 × M32 + 5 × M20	1 × M32 + 5 × M20
11	-	1 × M32 + 5 × M20	1 × M32 + 5 × M20

Model K

Motor [kW]	1450-2200 rpm	2900-4000 rpm
11	1 × M40 + 6 × M20	-
15 - 22	1 × M40 + 6 × M20	1 × M40 + 6 × M20

Torques

Torques for terminals

Terminal	Recommended torque [Nm]
L1, L2, L3	2.2
PE	6
NC, C1, C2, NO	0.5
DI1, DI2, DI3, DI4, AI1, AI2, AI3, AO1, PT1, PT2, LT1, LT2, GND, 24V, 5V, TX, RX, A, Y, B, S24, ST1, ST2	0.5

Torques for other parts

Part designation	Recommended torque [Nm]
Control box, upper part	6.5 - 7
Cover for mains	1.0 - 1.3
Cable glands:	
M20/M40	1 - 1.5
Blind plugs:	
M20	1 - 1.5
½" NPT	8 - 10

Sound pressure level

Pump size	Sound pressure level ISO 3743 [dB(A)]
TPE2 100-140	59
TPE2 100-200	59
TPE2 100-250	61
TPE2 100-330	64
TPE2 100-370	66
TPE2 100-410	70
TPE2 125-150	59
TPE2 125-190	61
TPE2 125-230	64
TPE2 125-300	66
TPE2 125-340	70
TPE2 150-130	59
TPE2 150-160	61
TPE2 150-200	64
TPE2 150-220	66
TPE2 150-250	70
TPE2 150-260	66
TPE2 150-280	70
TPE2 200-160	64
TPE2 200-190	68
TPE2 200-200	70
TPE2 D, TPE3 D 32-250	52
TPE2 D, TPE3 D 32-330	62
TPE2 D, TPE3 D 32-390	64
TPE2 D, TPE3 D 32-510	67
TPE2 D, TPE3 D 32-610	69
TPE2 D, TPE3 D 32-710	71
TPE2 D, TPE3 D 40-310	61
TPE2 D, TPE3 D 40-380	69
TPE2 D, TPE3 D 40-470	66
TPE2 D, TPE3 D 40-530	66
TPE2 D, TPE3 D 40-560	69
TPE2 D, TPE3 D 40-630	66
TPE2 D, TPE3 D 50-310	69
TPE2 D, TPE3 D 50-360	66
TPE2 D, TPE3 D 50-370	66
TPE2 D, TPE3 D 50-450	68
TPE2 D, TPE3 D 50-560	69
TPE2 D, TPE3 D 50-700	72
TPE2 D, TPE3 D 50-730	76
TPE2 D, TPE3 D 50-740	74
TPE2 D, TPE3 D 50-750	75
TPE2 D, TPE3 D 65-220	60
TPE2 D, TPE3 D 65-280	67
TPE2 D, TPE3 D 65-310	69
TPE2 D, TPE3 D 65-430	68
TPE2 D, TPE3 D 65-580	70
TPE2 D, TPE3 D 65-680	72
TPE2 D, TPE3 D 65-740	76
TPE2 D, TPE3 D 65-750	74
TPE2 D, TPE3 D 65-760	75

Pump size	Sound pressure level ISO 3743 [dB(A)]
TPE2 D, TPE3 D 80-210	62
TPE2 D, TPE3 D 80-250	65
TPE2 D, TPE3 D 80-310	68
TPE2 D, TPE3 D 80-340	67
TPE2 D, TPE3 D 80-440	70
TPE2 D, TPE3 D 80-520	75
TPE2 D, TPE3 D 80-560	74
TPE2 D, TPE3 D 80-570	75
TPE2 D, TPE3 D 100-100	44
TPE2 D, TPE3 D 100-130	54
TPE2 D, TPE3 D 100-160	56
TPE2 D, TPE3 D 100-170	58
TPE2 D, TPE3 D 100-230	62
TPE2 D, TPE3 D 100-260	62
TPE2 D, TPE3 D 100-350	67
TPE2 D, TPE3 D 100-460	73
TPE2 D, TPE3 D 100-540	73
TPE2 D, TPE3 D 100-570	72
TPE2 D, TPE3 D 125-110	50
TPE2 D, TPE3 D 125-120	51
TPE2 D, TPE3 D 125-160	61
TPE2 D, TPE3 D 125-180	62
TPE2 D, TPE3 D 125-290	66
TPE2, TPE3 125-310	70
TPE2 D, TPE3 D 125-380	71
TPE2 D, TPE3 D 125-430	72
TPE2 D, TPE3 D 125-460	73
TPE2 D, TPE3 D 150-120	58
TPE2 D, TPE3 D 150-170	60
TPE2 D, TPE3 D 150-230	68
TPE2 D, TPE3 D 150-240	68
TPE2 D, TPE3 D 150-250	67
TPE2 D, TPE3 D 150-270	77
TPE2, TPE3 150-280	67
TPE2, TPE3 200-50	48
TPE2, TPE3 200-70	58
TPE2, TPE3 200-90	58
TPE2, TPE3 200-130	59
TPE2, TPE3 200-150	63
TPE2, TPE3 200-190	66
TPE2, TPE3 200-200	67

Electrical supply systems

Power supply network and earthing systems

If you want to supply the product through an IT network, make sure that you have a suitable product variant. If you are in doubt, contact Grundfos.

The internal EMC filter remains connected, and subsequently no reduced leakage current variant is available.

Supply line types

Model J:

The product is not suitable for use on corner earthed grids in installations more than 2000 m above sea level.

The product is not suitable for use on corner earthed grids in installations more than 6560 ft (2000 m) above sea level.

Model K:

For applications in accordance with IEC 61800-5-1, the maximum voltage to ground must not exceed 277 V.

The product is not suitable for use for corner earthed grids.

Maximum installation altitude: 3500 m.

Maximum installation altitude: 11480 ft (3500 m).

- TN-S earthing system
- TN-C earthing system
- TN-C-S earthing system
- TT earthing system

Protection against mains voltage transients

The product is protected against mains voltage transients in accordance with EN 61800-3.

Motor protection

The product incorporates thermal protection against slow overloading and blocking. No external motor protection is required.

Model J: The product includes load- and speed- sensitive motor-overload protection.

Model K: The product includes load- and speed- sensitive motor-overload protection with thermal memory retention.

Connecting an external switch

We recommend that you connect the product to an external switch.

1. Connect the switch via terminals 2 (DI1) and 6 (GND).
   A jumper is added from factory.
2. Enable the **External stop** function.
   Default setting from factory.

Cable requirements

Cable cross-section

Recommended cable type: H07RN-F.

Cable cross-section data for MGE motors

3 × 380-500 V, 50/60 Hz, Model J

Speed [rpm]	Power P2 [kW]	Supply voltage [V]	Nominal current [A]	Cable cross-section [mm^2]	Cable cross-section [AWG]
1450-2200	2.2	3 × 380-500	4.3 - 3.6	1.5	14
	3.0	3 × 380-500	5.8 - 4.6	1.5	14
	4.0	3 × 380-500	7.7 - 6.0	2.5	14
	5.5	3 × 380-500	10.5 - 8.4	2.5	14
	7.5	3 × 380-500	14.1 - 11.1	4	12
2900-4000	3.0	3 × 380-500	5.8 - 4.6	1.5	14
	4.0	3 × 380-500	7.7 - 6.0	2.5	14
	5.5	3 × 380-500	10.5 - 8.4	2.5	14
	7.5	3 × 380-500	14.1 - 11.1	4	12
	11.0	3 × 380-500	20.3 - 16.0	6	10
4000-5900	3.0	3 × 380-500	5.8 - 4.6	1.5	14
	4.0	3 × 380-500	7.7 - 6.0	2.5	14
	5.5	3 × 380-500	10.5 - 8.4	2.5	14
	7.5	3 × 380-500	14.1 - 11.1	4	12
	11.0	3 × 380-500	20.3 - 16.0	6	10

3 × 380-480 V, 50/60 Hz, Model K

Speed [rpm]	Power P2 [kW]	Supply voltage [V]	Nominal current [A]	Cable cross-section [mm^2]	Cable cross-section [AWG]
1450-2200	11	3 × 380-480	20.2 - 16.4	6	10
	15	3 × 380-480	26.7 - 21.8	6	8
	18.5	3 × 380-480	33.2 - 26.9	10	8
	22	3 × 380-480	39.2 - 31.5	10	8
2900-4000	15	3 × 380-480	26.7 - 22	6	8
	18.5	3 × 380-480	33 - 27.8	10	8
	22	3 × 380-480	39.2 - 31.5	10	8

Conductors

Conductor types

Use stranded copper conductors only.

Conductor temperature ratings

Use 75 °C copper conductors only.

Conduit hubs

Conduit hubs must be UL listed according to UL Category Code Number (CCN) DWTT/DWTT7 and be suitable for the relevant enclosure type rating in accordance with UL 514B and CSA C22.2 No. 18.3.

For type 12 enclosures, it is also allowed to use type 12 and 13 conduit hubs.

The relevant type rating can be found on the nameplate of the product.

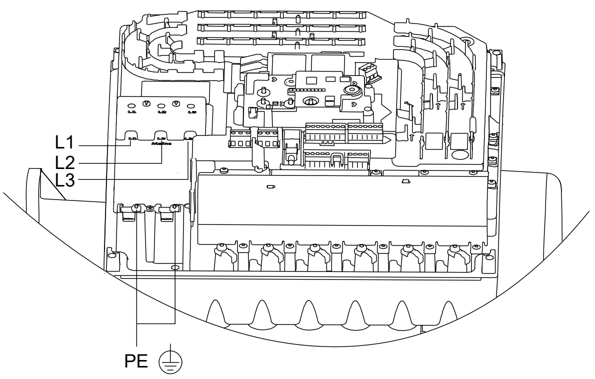
Three-phase connections

The cables in the terminal box must be as short as possible. However, the separated protective-earth conductor must be so long that it is the last one to be disconnected in case the cable is inadvertently pulled out of the cable entry.

To avoid loose connections, ring terminals must be used. Ensure that ring terminals are short enough to stay within the terminal cover.

Check that the supply voltage and frequency correspond to the values stated on the nameplate.

Mains connection on a three-phase product

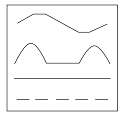


Pos.	Description
L1	Phase 1
L2	Phase 2
L3	Phase 3
PE	Protective earth

Additional protection

Residual-current circuit breakers

The residual-current circuit breaker must be marked.

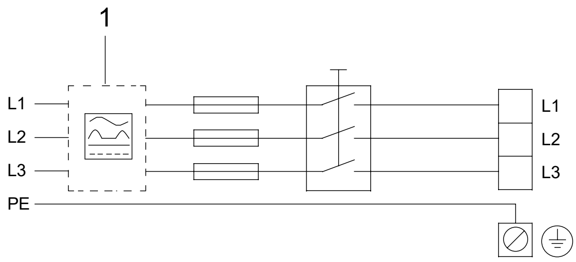


Take into account the total leakage current of all the electrical equipment in the installation.

This product may cause a direct current in the protective-earth conductor.

Connection example for three-phase supply

The figure shows an example of a mains-connected three-phase motor with a main switch, a backup fuse and a residual-current circuit breaker, type B.



Pos.	Description
1	Residual-current circuit breaker, type B
L1	Phase 1
L2	Phase 2
L3	Phase 3
PE	Protective earth

Overvoltage and undervoltage protection

Overvoltage and undervoltage may occur in case of unstable power supply or a faulty installation. The product stops if the voltage falls outside the permissible voltage range. The product restarts automatically when the voltage is within the permissible voltage range. The product requires no additional protection relay.

The product is protected against transients from the power supply according to EN 61800-3. In areas with high lightning intensity, we recommend external lightning protection.

Overvoltage category:

The product is approved for Overvoltage category III rating.

Overload protection

The motor-current protection settings are fixed for each motor variants. The settings ensure that the motor is protected against overtemperature in all operating states with regard to supply voltage and shaft load, including a blocked shaft.

The motors are current controlled and will respond by reducing the speed if the shaft load increases more than 10 % of the nominal load.

If the shaft load forces the speed down to minimum speed, the motor shuts down.

A sudden increase in the motor current caused by a fault where the peak of the motor current is increased 60 % above nominal will cause the motor to shut down within 0.5 ms.

The product requires no additional protection.

Overtemperature protection

The motor is thermally protected by a temperature measurement in the drive. It can handle the lack of airflow over the motor in case the fan cover is blocked. It also means that the protection has a built-in memory retention.

The time from start to shutdown due to overtemperature is therefore always longer when starting at a motor temperature close to the ambient temperature compared with restarting after a shutdown due to overtemperature.

Protection against phase unbalance

Phase unbalance on the power supply must be minimised. The three-phase motor must be connected to a power supply with a quality corresponding to IEC 60146-1-1, class C. This also ensures long life of the components.

Short-circuit current

The product's electronic power output short-circuit protection circuitry meets the requirements of IEC 60364-4-41:2005/AMD1:–, Clause 411.

Suitable for use on a circuit capable of delivering not more than 5000 rms symmetrical amperes, 480 V maximum when protected by J or T Class fuses, rated 80 A, 600 V.

Functional modules

The functional modules are different types of add-on boards containing various types of input and output terminals for the user to connect different types of sensors, for example switches and relays.

The product can only contain one functional module at the time.

The following functional modules are available:

- FM310 (standard)
- FM311 (option)[42)]

42) Without Bluetooth (BLE).

The selection of module depends on the application and the required number of inputs and outputs.

Functional module, FM310 and FM311 from 3 kW medium/high speed and 2.2 kW low speed

Inputs and outputs

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
- Input and output for Grundfos Digital Sensor Not applicable for TPE, TPED pumps. The factory-fitted differential-pressure sensor for TPE, TPED Series 2000 is connected to this input.
- 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
- Ethernet connection
- Bluetooth (BLE) connection.[43)]

43) FM311 is without Bluetooth.

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

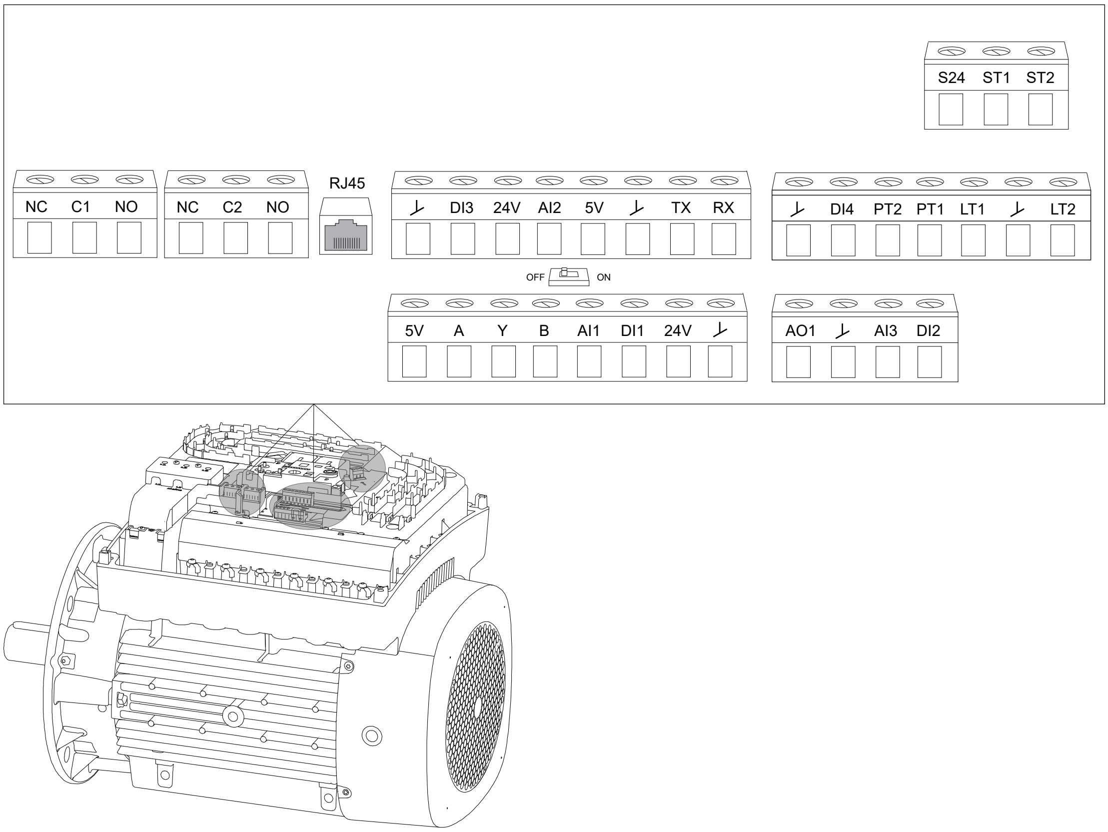
SELV: The output is galvanically separated from other circuits. Therefore, you can connect the supply voltage or safety extra-low voltage to the output as desired.

Connection terminals for inputs and outputs

The 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 safety extra-low voltage (SELV), ensuring protection against electric shock.

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

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



TM082862

Terminal	Type	Function
NC	Normally closed contact	
C1	Common	Signal relay 1: LIVE or SELV
NO	Normally open contact	
NC	Normally closed contact	
C2	Common	Signal relay 2: SELV only
NO	Normally open contact	
RJ45	Ethernet	Ethernet communication
GND	GND	Signal ground
DI3	DI3/OC1	Digital input/output, configurable Open collector: Maximum 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: Maximum 24 V resistive or inductive
PT2	Pt100/1000 input 2	Pt100/1000 sensor input 2

Terminal	Type	Function
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 (+)
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, configurable 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.
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

Innomotics/Nidec motors with integrated CUE frequency converters 30-90 kW

TPE pumps 30-90 kW have Innomotics/Nidec motors with integrated CUE frequency converters. The frequency converter part of the TPE Series 2000 and TPE Series 1000 will in the following descriptions be named as CUE.

Technical data

Enclosure

See nameplate and install according to enclosure type.

Typical shaft power P2 [kW]	[hp]	Enclosure (3 × 380-500 V, IP55)
30	40	B2
37	50	C1
45	60	
55	75	

Operating conditions

Relative humidity	5-95 % RH
Ambient temperature	Max. 50 °C (122 °F)
Average ambient temperature over 24 hours	Max. 45 °C (113 °F)

Minimum ambient temperature	-10 °C (14 °F)
Temperature during storage and transport	-25 to 65 °C (-13 to 149 °F)
Storage duration	Max. 6 months
Maximum altitude above sea level without performance reduction	1000 m (3280 ft)
Maximum altitude above sea level with performance reduction	3000 m (9840 ft)

TPE comes in a packaging which is not suitable for outdoor storage.

Mechanical data

Cable gland

Enclosure	Standard gland holes
B2 IP21 / NEMA type 1 and B2 IP55 / NEMA type 12	1 × 21.5
	1 × 26.3
	1 × 33.1
	2 × 42.9

Cable requirements

Maximum length, screened motor cable	150 m (500 ft)
Maximum length, unscreened motor cable	300 m (1000 ft)
Maximum length, signal cable	300 m (1000 ft)

Always comply with local regulations as to cable cross-sections.

Cable cross-section to signal terminals

Maximum cable cross-section to signal terminals, rigid conductor	1.5 mm^2 (14 AWG)
Maximum cable cross-section to signal terminals, flexible conductor	1.0 mm^2 (18 AWG)
Minimum cable cross-section to signal terminals	0.5 mm^2 (20 AWG)

Non-UL fuses and conductor cross-section to mains and motor, for installations outside North America

Typical shaft power P2 [kW (hp)]	Maximum fuse size [A]	Fuse type	Maximum conductor cross-section [44] [mm^2]
3 x 380-500 V			
30 (40)	80	gG	35
37 (50)	100	gG	50
45 (60)	125	gG	50
55 (75)	160	gG	50

44) Screened motor cable, unscreened supply cable. AWG. See section Electrical data.

Electrical data

Mains supply (L1, L2, L3)

Supply voltage	380-500 V ± 10 %
Supply frequency	50/60 Hz
Maximum temporary imbalance between phases	3 % of rated value
Leakage current to protective earth	> 3.5 mA
Number of cut-ins, enclosures B and C	Max. 1 time/min.

Do not use the power supply for switching CUE on and off.

RS-485 GENIbus connection

Terminal number	68 (A), 69 (B), 61 GND (Y)

The RS-485 circuit is functionally separated from other central circuits and galvanically separated from the supply voltage (PELV).

Digital inputs

Terminal number	18, 19, 32, 33
Voltage level	0-24 VDC
Voltage level, open contact	> 19 VDC
Voltage level, closed contact	< 14 VDC
Maximum voltage on input	28 VDC
Input resistance, R_i	Approx. 4 kΩ

All digital inputs are galvanically separated from the supply voltage (PELV) and other high-voltage terminals.

Signal relays

Relay 01, terminal number	1 (C), 2 (NO), 3 (NC)
Relay 02, terminal number	4 (C), 5 (NO), 6 (NC)
Maximum terminal load (AC-1) [45]	240 VAC, 2 A

Maximum terminal load (AC-15) 45)	240 VAC, 0.2 A
Maximum terminal load (DC-1) 45)	50 VDC, 1 A
Minimum terminal load	24 VDC 10 mA 24 VAC 20 mA

45) IEC 60947, parts 4 and 5.

C	Common
NO	Normally open
NC	Normally closed

The relay contacts are galvanically separated from other circuits by reinforced insulation (PELV).

Analog inputs

Analog input 1, terminal number	53
Voltage signal	A53 = "U" 46)
Voltage range	0-10 V
Input resistance, R_i	Approx. 10 kΩ
Maximum voltage	± 20 V
Current signal	A53 = "I" 46)
Current range	0-20, 4-20 mA
Input resistance, R_i	Approx. 200 Ω
Maximum current	30 mA
Maximum fault, terminals 53, 54	0.5 % of full scale
Analog input 2, terminal number	54
Current signal	A54 = "I" 46)
Current range	0-20, 4-20 mA
Input resistance, R_i	Approx. 200 Ω
Maximum current	30 mA
Maximum fault, terminals 53, 54	0.5 % of full scale

46) The factory setting is voltage signal "U".

All analog inputs are galvanically separated from the supply voltage (PELV) and other high-voltage terminals.

Analog output

Analog output 1, terminal number	42
Current range	0-20 mA
Maximum load to frame	500 Ω
Maximum fault	0.8 % of full scale

The analog output is galvanically separated from the supply voltage (PELV) and other high-voltage terminals.

MCB 114 sensor input module

Analog input 3, terminal number	2
Current range	0/4-20 mA
Input resistance	< 200 Ω
Analog inputs 4 and 5, terminal number	4, 5 and 7, 8
Signal type, 2- or 3-wire	Pt100/Pt1000

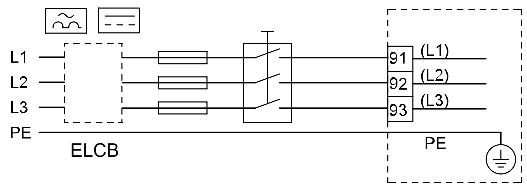
Miscellaneous data

STO application

The STO signal must be SELV or PELV supplied.

European directive	Machinery Directive (2006/42/EC)	EN ISO 13849-1
		EN IEC 62061
		EN IEC 61800-5-2
	EMC Directive (2004/108/EC)	EN 50011
		EN 61000-6-3
		EN 61800-3
	Low Voltage Directive (2006/95/EC)	EN 50178
		EN 61800-5-1
Safety standards	Safety of machinery	EN ISO 13849-1, IEC 62061, IEC 60204-1
	Functional safety	IEC 61508-1 to -7, IEC 61800-5-2
Safety function		IEC 61800-5-2 (Safe Torque Off, STO) IEC 60204-1 (Stop Category 0)
Safety performance	**IOS 13849-1**	
	Category	Cat 3
	Diagnostic Coverage	DC: 90 %, medium
	Mean Time to Dangerous Failure	MTTFd: 14000 years, high
	Performance Level	PL d
	IEC 61508 / IEC 62061	
	Safety Integrity Level	SIL 2, SIL CL2
	Probability of Dangerous Failure per Hour	PFH: 1E-10/h. High Demand Mode.
	Probability of Dangerous Failure on Demand	PFD: 1E-10. Low Demand Mode.
	Safe Failure Fraction	SFF: > 99 %
	Hardware Fault Tolerance	HFT: 0 (1oo1)
	Proof Test Interval T1	20 years
	Mission time TM	20 years
Reaction time	Input to output response time	Maximum 20 ms

Electrical connection



TM082261

Example of three-phase mains connection of CUE with main switch, backup fuses and additional protection

Electrical protection

Protection against electric shock, indirect contact

The leakage current to protective earth exceeds 3.5 mA, and a reinforced earth connection is required.

Protective conductors must always have a yellow and green (PE) or yellow, green and blue (PEN) colour marking.

Instructions according to EN IEC 61800-5-1:

- CUE must be stationary, installed permanently and connected permanently to the mains supply.
- The protective earth connection must be carried out with duplicate protective conductors or with a single reinforced protective conductor with a cross-section of minimum 10 mm^2.

Protection against short circuit, fuses

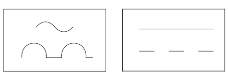
CUE and the supply system must be protected against short circuit.

Grundfos requires that the backup fuses mentioned in section Cable cross-section to signal terminals are used for protection against short circuit.

CUE offers complete short-circuit protection in case of a short circuit on the motor output.

Additional protection

If CUE is connected to an electrical installation where an earth leakage circuit breaker (ELCB/RCD) is used as additional protection, the circuit breaker must be of a type marked with the following symbols:



ELCB/RCD

The circuit breaker is type B.

The total leakage current of all the electrical equipment in the installation must be taken into account.

The leakage current of CUE in normal operation can be seen in section Electrical data.

During startup and in asymmetrical supply systems, the leakage current can be higher than normal and may cause the ELCB/RCD to trip.

Related information

Mains supply (L1, L2, L3)

Motor protection

The motor requires no external motor protection. CUE protects the motor against thermal overloading and blocking.

Protection against overcurrent

CUE has an internal overcurrent protection for overload protection on the motor output.

Protection against mains voltage transients

CUE is protected against mains voltage transients according to EN 61800-3, second environment.

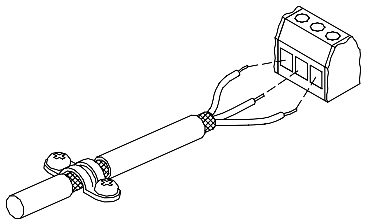
EMC-correct installation

The motor cable must be screened for CUE to meet EMC requirements.

This section provides guidelines for good practice when installing CUE. Follow these guidelines to meet EN 61800-3, first environment.

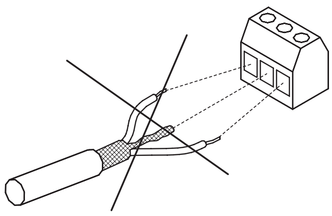
- Use only motor and signal cables with a braided metal screen in applications without output filter. There are no special requirements to supply cables, apart from local requirements.
- Leave the screen as close to the connecting terminals as possible. See figure Example of three-phase mains connection of CUE with main switch, backup fuses and additional protection.
- Avoid terminating the screen by twisting the ends. See figure Do not twist the screen ends. Use cable clamps or EMC screwed cable entries instead.
- Connect the screen to frame at both ends for both motor and signal cables. See figure Example of connection of a 3-conductor bus cable with screen connected at both ends. If the controller has no cable clamps, connect only the screen to the CUE cabinet. See fig. Example of connection of a 3-conductor bus cable with screen connected to CUE (controller with no cable clamps).
- Avoid unscreened motor and signal cables in electrical cabinets with frequency converters.
- Make the motor cable as short as possible in applications without output filter to limit the noise level and minimise leakage currents.
- Tighten screws for frame connections whether a cable is connected or not.
- Keep mains cables, motor cables and signal cables separated in the installation if possible.

Other installation methods may give similar EMC results if the above guidelines for good practice are followed.



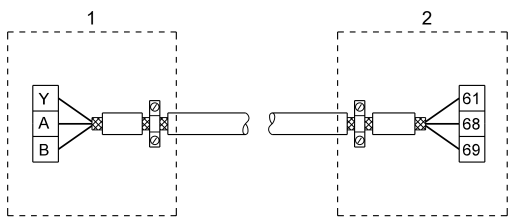
TM021325

Example of stripped cable with screen



TM038812

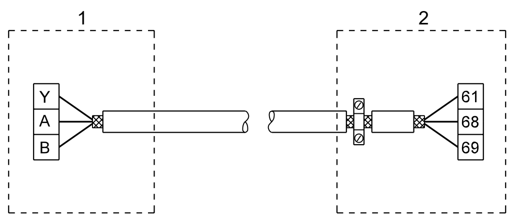
Do not twist the screen ends



TM038732

Example of connection of a 3-conductor bus cable with screen connected at both ends

Pos.	Description
1	Controller
2	CUE



TM038731

Example of connection of a 3-conductor bus cable with screen connected to CUE (controller with no cable clamps)

Pos.	Description
1	Controller
2	CUE

RFI filters

To meet the EMC requirements, CUE comes with the following types of built-in radio-frequency interference filter (RFI).

Voltage [V]	Typical shaft power P2 [kW (hp)]	RFI filter type
3 × 380-500	0.55 - 90 (0.75 - 125 hp)	C1

Description of RFI filter type	
C1:	For use in domestic areas.

RFI filter type is according to EN 61800-3.

Mains and motor connection

Check that the mains voltage and frequency correspond to the values on the nameplate of CUE and the motor.

The motor cable must be screened for CUE to meet EMC requirements.

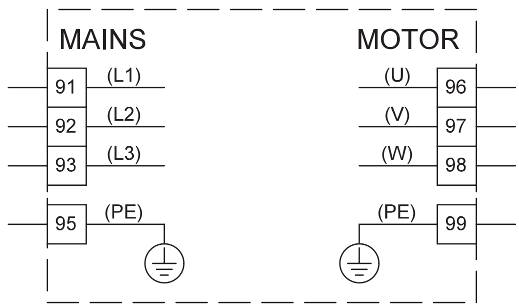
The supply voltage and frequency are marked on the CUE nameplate. Make sure that CUE is suitable for the power supply of the installation site.

Main switch

A main switch can be installed before the CUE cabinet according to local regulations. See figure Example of three-phase mains connection of CUE with main switch, backup fuses and additional protection.

Wiring diagram

The wires in the terminal box must be as short as possible. Excepted from this is the protective conductor which must be so long that it is the last one to be disconnected in case the cable is inadvertently pulled out of the cable entry.



TM038799

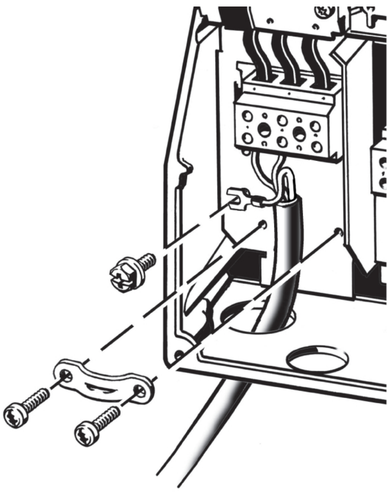
Wiring diagram, three-phase mains connection

Terminal		Function
91	(L1)	Three-phase mains supply
92	(L2)	
93	(L3)	
95/99	(PE)	Protective earth connection
96	(U)	Three-phase motor connection, 0-100 % of mains voltage
97	(V)	
98	(W)	

Mains connection, enclosures B2

Enclosure	Torque Nm [ft (lb)]			
	Mains	Motor	Protective earth	Relay
B2	4.5 (3.3)	4.5 (3.3)	3 (2.2)	0.6 (0.4)

1. Connect the earth conductor to terminal 95 (PE). See the figure below.
2. Connect the mains conductors to terminals 91 (L1), 92 (L2), 93 (L3).
3. Fix the mains cable with a cable clamp.

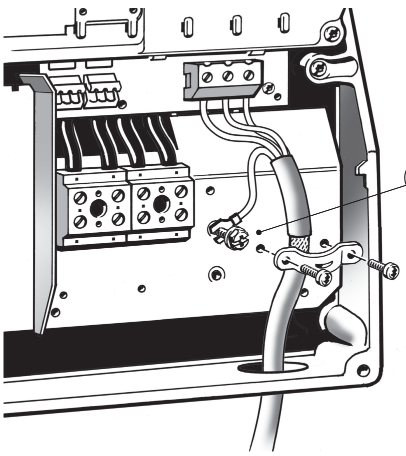


TM039019

Mains connection, B2

Motor connection, enclosures B2

1. Connect the earth conductor to terminal 99 (PE). See the figure below.
2. Connect the motor conductors to terminals 96 (U), 97 (V), 98 (W).
3. Fix the screened cable with a cable clamp.



TM039020

Motor connection, B2

Mains connection, enclosures C1 and C2

Enclosure	Torque Nm [ft-lb]			
	Mains	Motor	Protective earth	Relay
C1	10 (7.4)	10 (7.4)	3 (2.2)	0.6 (0.4)
C2	14[47]/24[48] (10.3[47]/ 17.7[48])	14[47]/24[48] (10.3[47]/ 17.7[48])	3 (2.2)	0.6 (0.4)

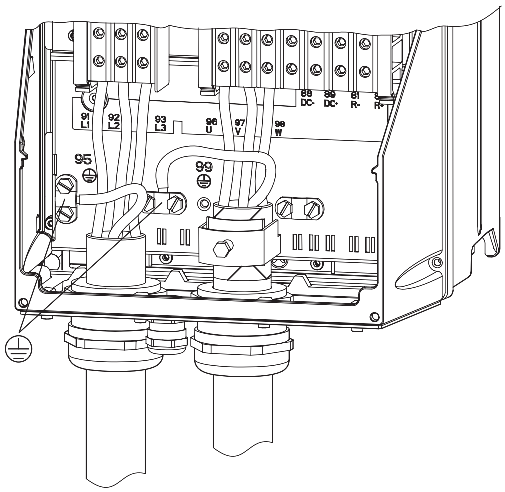
[47] Conductor cross-section ≤ 95 mm² (≤ 4/0 AWG)

[48] Conductor cross-section ≥ 95 mm² (≥ 4/0 AWG).

1. Connect the earth conductor to terminal 95 (PE). See figure Mains and motor connection, C1 and C2.
2. Connect the mains conductors to terminals 91 (L1), 92 (L2) and 93 (L3).

Motor connection, enclosures C1 and C2

1. Connect the earth conductor to terminal 99 (PE). See the figure below.
2. Connect the motor conductors to terminals 96 (U), 97 (V) and 98 (W).
3. Fix the screened cable with a cable clamp.



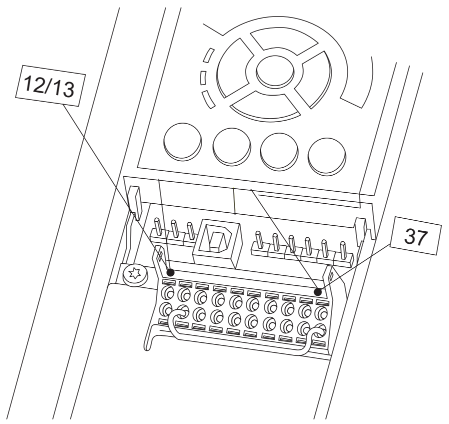
TM039016

Mains and motor connection, C1 and C2

STO installation, optional

To enable the integrated STO, follow these steps:

1. Remove the jumper wire between control terminals 37 and 12 or 13. Cutting or breaking the jumper is not sufficient to avoid short-circuiting.

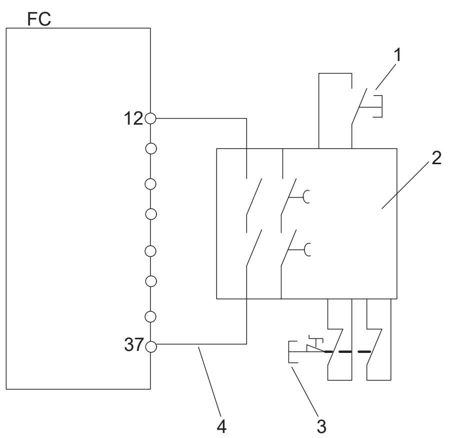


TM074595

Remove jumper

2. Connect an external safety-monitoring relay via a NO safety function to terminal 37 (STO) and either terminal 12 or 13, 24 V DC.

Select and apply the components in the safety control system appropriately to achieve the desired level of operational safety. Before integrating and using STO in an installation, carry out a thorough risk analysis on the installation to determine whether the STO functionality and safety levels are appropriate and sufficient.



TM074594

STO wiring

Pos.	Description
1	Reset button
2	Safety relay (category 3, PL d or SIL2)
3	Emergency stop button
4	Short-circuit protected cable if the product is not installed inside an IP54 cabinet.

Restart behaviour after STO activation

By default the STO function is set to unintended-restart prevention behaviour. To terminate STO and resume normal operation with manual reset, do the following:

- Reapply 24 V DC supply to terminal 37.
- Send a reset signal via bus, Digital I/O or the reset button.
- Set the STO function to automatic restart by changing the value of 5-19 terminal 37 "Safe Stop" from default value 1. "Safe Stop Alarm" to value 3, "Safe Stop Warning".

Automatic restart means that STO is terminated, and normal operation is resumed, as soon as the 24 V DC is applied to terminal 37. No reset signal is required.

Restart settings

- Remove the 24 V DC voltage supply to terminal 37 by using the interrupt device while the frequency converter drives the motor, so that the mains supply is not interrupted.
- Check that the motor coasts and that the alarm Safe Stop displays in the local operating panel if mounted.
- Reapply 24 V DC to terminal 37.
- Ensure that the motor remains in the coasted state.
- Send reset signal via bus, Digital I/O or the reset button.
- Ensure that the motor becomes operational again.

Connecting the signal terminals

As a precaution, signal cables must be separated from other groups by reinforced insulation in their entire lengths.

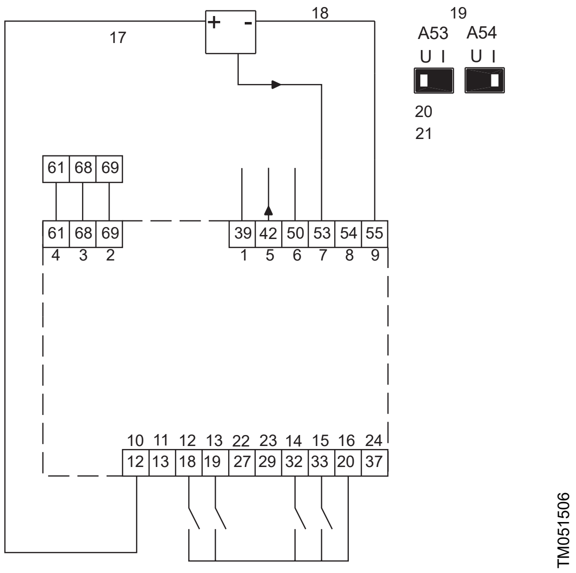
Connect the signal cables according to the guidelines for good practice to ensure EMC-correct installation. See section Restart behaviour after STO activation.

- Use screened signal cables with a conductor cross-section of minimum 0.5 mm^2 and maximum 1.5 mm^2.
- Use a 3-conductor screened bus cable in new systems.

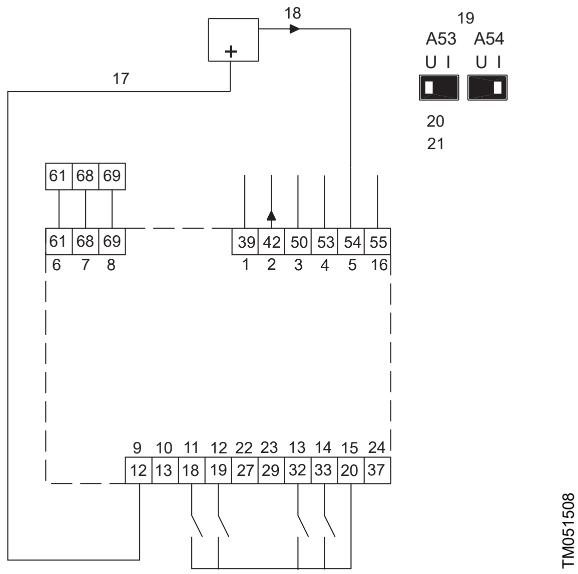
Related information

Restart behaviour after STO activation

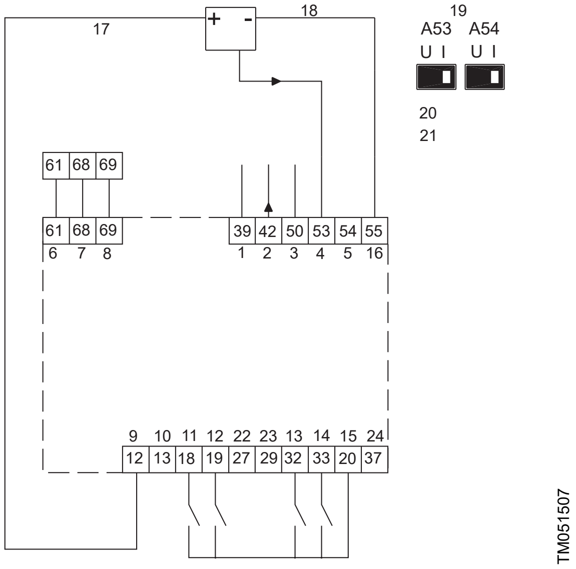
Wiring diagram, signal terminals



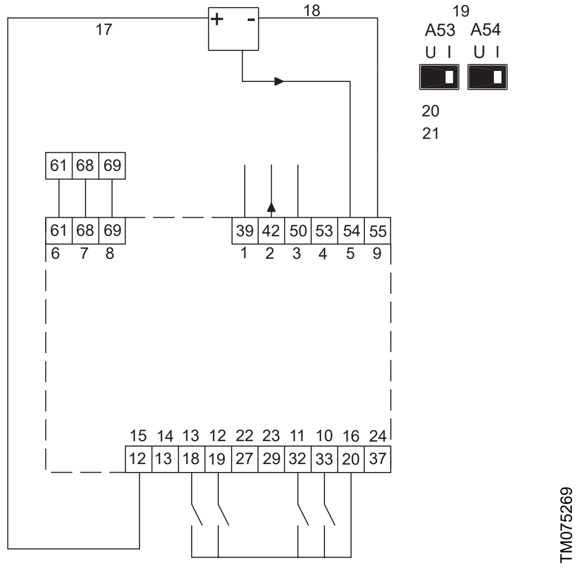
Pos.	Description
1	GND
2	RS-485 B
3	RS-485 A
4	RS-485 GND Y
5	AO 1
6	+10 V out
7	Ext. setpoint
8	Sensor 1
9	GND
10	+24 V out
11	+24 V out
12	DI 1
13	DI 2
14	DI 3
15	DI 4
16	GND
17	External setpoint, voltage input
18	0-10 V
19	Terminals
20	U: 0-10 V
21	I: 0/4-20 mA
22	DI/O 1
23	DI/O 2
24	Safe stop



Pos.	Description
1	GND
2	AO 1
3	+10 V out
4	Ext. setpoint
5	Sensor 1
6	RS-485 GND Y
7	RS-485 A
8	RS-485 B
9	+24 V out
10	+24 V out
11	DI 1
12	DI 2
13	DI 3
14	DI 4
15	GND
16	GND
17	Two-wire sensor
18	0/4-20 mA
19	Terminals
20	U: 0-10 V
21	I: 0/4-20 mA
22	DI/O 1
23	DI/O 2
24	Safe stop



Pos.	Description
1	GND
2	AO 1
3	+10 V out
4	Ext. setpoint
5	Sensor 1
6	RS-485 GND Y
7	RS-485 A
8	RS-485 B
9	+24 V out
10	+24 V out
11	DI 1
12	DI 2
13	DI 3
14	DI 4
15	GND
16	GND
17	External setpoint, current input
18	0/4-20 mA
19	Terminals
20	U: 0-10 V
21	I: 0/4-20 mA
22	DI/O 1
23	DI/O 2
24	Safe stop



Pos.	Description
1	GND
2	AO 1
3	+10 V out
4	Ext. setpoint
5	Sensor 1
6	RS-485 GND Y
7	RS-485 A
8	RS-485 B
9	GND
10	DI 4
11	DI 3
12	DI 2
13	DI 1
14	+24 V out
15	+24 V out
16	GND
17	Three-wire sensor
18	0/4-20 mA
19	Terminals
20	U: 0-10 V
21	I: 0/4-20 mA
22	DI/O 1
23	DI/O 2
24	Safe stop

Default connections made in TPE Series 1000:

- DI1 connected to GND.

Default connections made in TPE Series 2000:

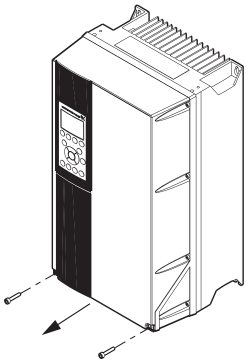
- DI1 connected to GND.
- A three-wire sensor is connected to terminal 12, 54 and 55.

Terminal	Type	Function	Terminal	Type	Function
12	+24 V out	Supply to sensor	39	GND	Frame for analog output
13	+24 V out	Additional supply	42	AO 1	Analog output, 0-20 mA
18	DI 1	Digital input, programmable	50	+10 V out	Supply to potentiometer
19	DI 2	Digital input, programmable	53	AI 1	External setpoint, 0-10 V, 0/4-20 mA
20	GND	Common frame for digital inputs	54	AI 2	Sensor input, sensor 1, 0/4-20 mA
27	DI/O 1	Digital input/output, programmable	55	GND	Common frame for analog inputs
29	DI/O 2	Digital input/output, programmable	61	RS-485 GND Y	GENIbus, frame
32	DI 3	Digital input, programmable	68	RS-485 A	GENIbus, signal A (+)
33	DI 4	Digital input, programmable	69	RS-485 B	GENIbus, signal B (-)
37	Safe stop	Safe stop			

The RS-485 screen must be connected to frame.

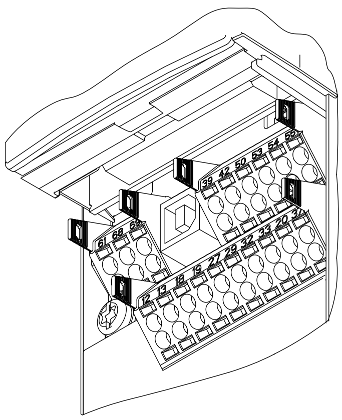
Access to signal terminals

All signal terminals are behind the terminal cover of the CUE front. Remove the terminal cover as shown in the figure below.



TM039004

Access to signal terminals, B2, C1 and C2

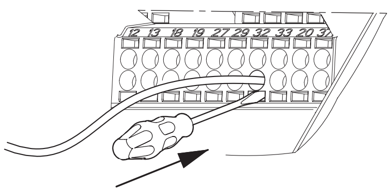


TM039025

Signal terminals, all enclosures

Fitting the conductor

1. Remove the insulation at a length of 9 to 10 mm.
2. Insert a screwdriver with a tip of maximum 0.4 x 2.5 mm into the square hole.
3. Insert the conductor into the corresponding round hole. Remove the screwdriver. The conductor is now fixed in the terminal.



TM039026

Fitting the conductor into the signal terminal

Setting the analog inputs, terminals 53 and 54

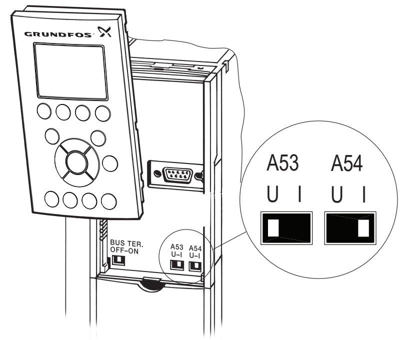
Contacts A53 and A54 are positioned behind the operating panel and used for setting the signal type of the two analog inputs.

The factory setting of the inputs is voltage signal "U" and "U".

The factory setting of TPE Series 2000 inputs is voltage signal "U" and "I".

If a 0/4-20 mA sensor is connected to terminal 54, the input must be set to current signal "I".
Switch off the power supply before setting contact A54.

Remove the operating panel to set the contact. See the figure below.



TM039104

Setting contact A54 to current signal "I"

RS-485 GENIbus network connection

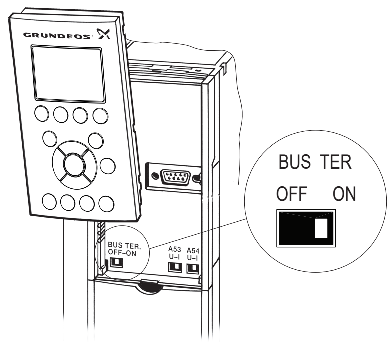
One or more CUE units can be connected to a control unit via GENIbus.

The reference potential, GND, for RS-485 (Y) communication must be connected to terminal 61.

If more than one CUE unit is connected to a GENIbus network, the termination contact of the last CUE must be set to "ON" (termination of the RS-485 port).

The factory setting of the termination contact is "OFF" (not terminated).

Remove the operating panel to set the contact. See the figure below.

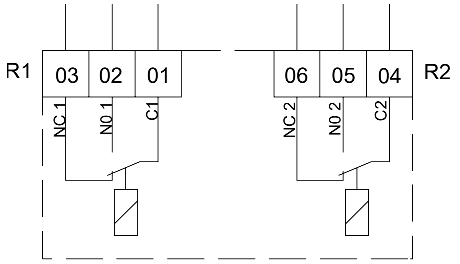


TM039006

Setting the termination contact to "ON"

Connecting the signal relays

As a precaution, signal cables must be separated from other groups by reinforced insulation in their entire lengths.



TM038801

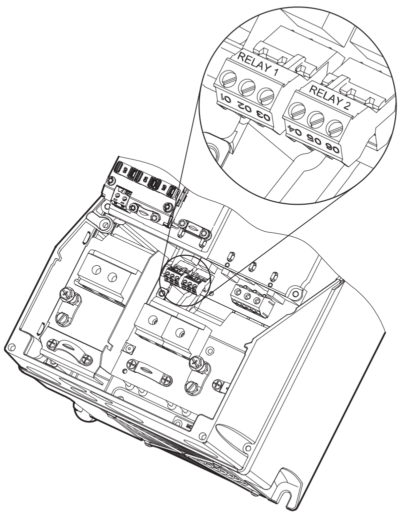
Terminals for signal relays in normal state (not activated)

Pos.	Description
R1	RELAY 1
R2	RELAY 2

Terminal		Function
C 1	C 2	Common
NO 1	NO 2	Normally open contact
NC 1	NC 2	Normally closed contact

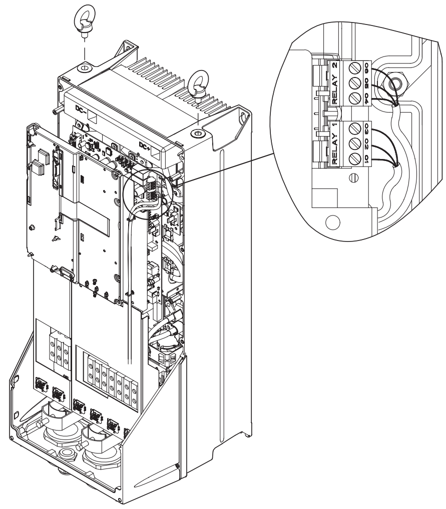
Access to signal relays

The relay outputs are positioned as shown in the figures below.



TM039008

Terminals for relay connection, B2



TM039009

Terminals for relay connection, C1 and C2

Connecting the MCB 114 sensor input module

The MCB 114 is an option offering additional analog inputs for CUE.

Configuration of MCB 114

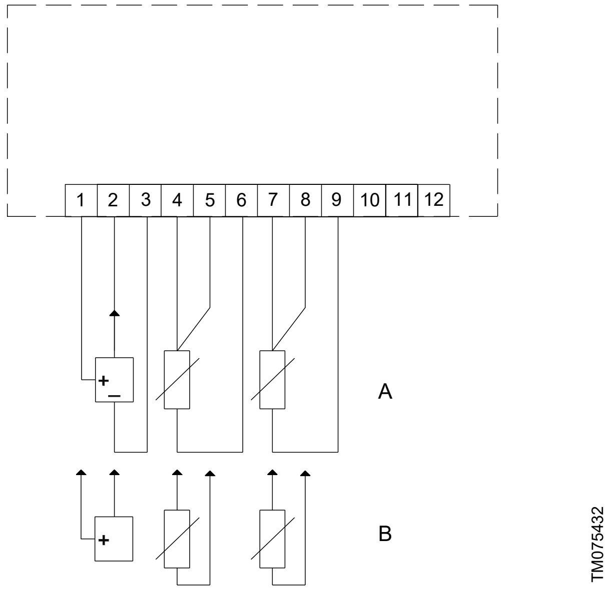
MCB 114 is equipped with three analog inputs for the following sensors:

- One additional sensor 0/4-20 mA.
- Two Pt100/Pt1000 temperature sensors for measurement of motor bearing temperature or an alternative temperature, such as liquid temperature.

When MCB 114 has been installed, CUE automatically detects if the sensor is Pt100 or Pt1000 when it is switched on.

Wiring diagram, MCB 114

When using Pt100 with a 3-wire cable, the resistance must not exceed 30 Ω.



Wiring diagram, MCB 114

Pos.	Description
A	3-wire
B	2-wire

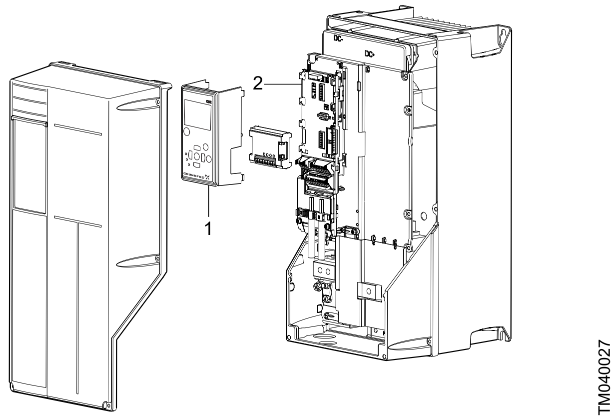
Terminal	Type	Function
1 (VDO)	+24 V out	Supply to sensor
2 (I IN)	AI 3	Sensor 2, 0/4-20 mA
3 (GND)	GND	Common frame for analog input
4 (TEMP) 5 (WIRE)	AI 4	Temperature sensor 1, Pt100/Pt1000
6 (GND)	GND	Common frame for temperature sensor 1
7 (TEMP) 8 (WIRE)	AI 5	Temperature sensor 2, Pt100/Pt1000
9 (GND)	GND	Common frame for temperature sensor 2

Terminals 10, 11 and 12 are not used.

Fitting MCB 114 in CUE

Enclosures B2, C1 and C2

1. Switch off the power to CUE. See section Mains and motor connection.
2. Remove the operating panel and the cradle from CUE. See the figure below.
3. Fit MCB 114 into port B.
4. Connect the signal cables, and fasten the cables with the enclosed cable strips. See the figure below.
5. Fit the cradle and the operating panel.
6. Connect power to CUE.



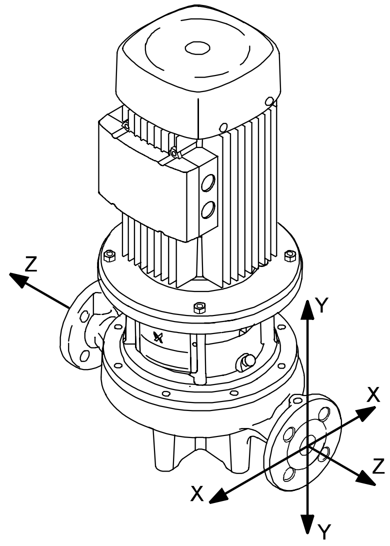
Enclosures B2, C1 and C2

Pos.	Description
1	Cradle
2	Port B

Related information

Mains and motor connection

23. Flange forces



Flange forces

PN 16

Diameter	Force [N]				Moment [Nm]			
	Fy	Fz	Fx [49)]	ΣF	My	Mz	Mx	ΣM [49)]
DN 25	405	322	352	627	395	487	594	875
DN 32	521	417	457	810	424	508	622	913
DN 40	625	500	550	975	450	525	650	950
DN 50	825	675	750	1300	500	575	700	1025
DN 65	1070	862	952	1672	540	610	750	1098
DN 80	1250	1025	1125	1969	575	650	800	1175
DN 100	1675	1350	1500	2625	625	725	875	1300
DN 125	2068	1671	1852	3239	657	805	955	1443
DN 150	2500	2025	2250	3925	875	1025	1250	1825
DN 200	3350	2700	3000	5225	1150	1325	1625	2400
DN 250	4175	3375	3725	6525	1575	1825	2225	3275
DN 300	7500	5000	7500	11725	5500	2500	5500	8170
DN 350	18000	12000	18000	21630	13000	6500	13000	19500

49) ΣF and ΣM are the vector sums of the forces and moments.

Values are based on EN ISO 5199:2002.

PN 25

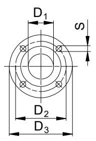
Diameter	Force [N]				Moment [Nm]			
	Fy	Fz	Fx	ΣF [49)]	My	Mz	Mx	ΣM [49)]
DN 100	2700	3000	3350	5250	1250	1450	3000	2800
DN 125	8000	3500	8000	11842	3000	1900	3000	4649
DN 150	10000	5000	10000	15000	5000	3000	5000	7681
DN 200	13000	7000	13000	19672	10000	4500	10000	14841
DN 300	15000	10000	15000	23450	11000	5000	11000	16340
DN 350	18000	12000	18000	28140	13000	6500	13000	19500
DN 400	30000	43100	37500	64500	25300	9800	25300	37100
DN 500	30000	61400	37500	77950	36100	9800	36100	52000

49) ΣF and ΣM are the vector sums of the forces and moments.

24. Flanges for TP pumps

Flange dimensions

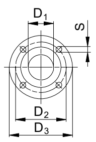
PN 6 and PN 10 flanges



TM027720

	EN 1092-2 PN 6 (0.6 MPa)						EN 1092-2 PN 10 (1.0 MPa)									
	Nominal diameter (DN)						Nominal diameter (DN)									
	32	**40**	**50**	**65**	**80**	**100**	**32**	**40**	**50**	**65**	**80**	**100**	**125**	**150**	**200**	**250**
D_1	32	40	50	65	80	100	32	40	50	65	80	100	125	150	200	250
D_2	90	100	110	130	150	170	100	110	125	145	160	180	210	240	295	350
D_3	120	130	140	160	190	210	140	150	165	185	200	220	250	285	340	395
S	4 x 14	4 x 14	4 x 14	4 x 14	4 x 19	4 x 19	4 x 19	4 x 19	4 x 19	4 x 19	8 x 19	8 x 19	8 x 19	8 x 23	8 x 23	12 x 23

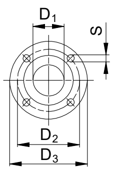
PN 16 and PN 25 flanges



TM027720

	EN 1092-2 PN 16 (1.6 MPa)									EN 1092-2 PN 25 (2.5 MPa)						
	Nominal diameter (DN)									Nominal diameter (DN)						
	32	**40**	**50**	**65**	**80**	**100**	**125**	**150**	**200**	**100**	**125**	**150**	**200**	**250**	**300**	**350**
D_1	32	40	50	65	80	100	125	150	200	100	125	150	200	250	300	350
D_2	100	110	125	145	160	180	210	240	295	190	220	250	310	370	430	490
D_3	140	150	165	185	200	220	250	285	340	235	270	300	360	425	485	555
S	4 x 19	4 x 19	4 x 19	4 x 19	8 x 19	8 x 19	8 x 19	8 x 23	12 x 23	8 x 23	8 x 28	8 x 28	12 x 28	12 x 31	16 x 31	16 x 34

PN 40 flanges

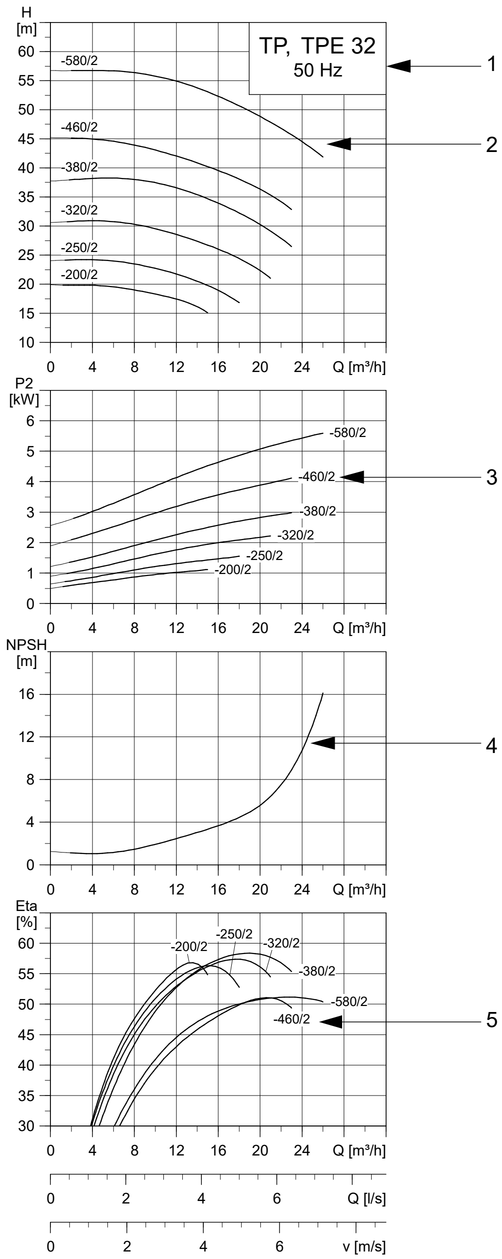


TM027720

	EN/DIN 2635 PN 40 (4.0 MPa)	
	Nominal diameter (DN)	
	400	500
D_1	400	500
D_2	585	670
D_3	660	755
S	16 x 39	20 x 42

25. Curve charts

How to read the curve charts



Pos.	Description
1	Pump type and frequency.
2	QH curve for the individual single-head pump. The bold curve indicates the recommended performance range.
3	The power curve indicates the pump input power [P2].
4	The NPSH (3 %) curve shows the maximum net positive suction head, NPSH, required to ensure that the pump head is not reduced by more than 3 %. The available system pressure at the pump inlet must be according to the NPSH (3 %) curve.
5	The eta curve shows the pump efficiency.

Curve conditions

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

- Tolerances to ISO 9906:2012 Grade 3B.
- The curves apply to the performance of **single-head three-phase pumps**. For other pump versions, please see the exact curves in Grundfos Product Center.
  See section Grundfos Product Center. For other pump versions, the performance may differ for the following reasons:
  - The valve in twin-head pumps may cause losses.
  - Single-phase motors run at lower speed.

  Note: Grundfos does not recommend continuous parallel operation of twin-head pumps, except TPE2 D, TPE3 D, due to the increased flow rate in the pump. A too high flow rate results in noisy operation, increased wear of the impeller due to cavitation, etc.
- QH curves of the individual single-head pumps are shown with expected speed of a three-phase mains-operated motor. For further information, see the tables of technical data on the following pages.
  The performance of the single-phase motor is slightly reduced. Please refer to Grundfos Product Center for the exact single-phase curves. See section Grundfos Product Center.
- Curves of TPE2 Extra small and TPE2 Large PN 25 are shown as 50 Hz curves only. Please refer to Grundfos Product Center for the exact curves. See section Grundfos Product Center.
- Measurements have been made with airless water at a temperature of 20 °C.
- The curves apply to a kinematic viscosity of υ equal to 1 mm^2/s (1 cSt).
- Due to the risk of overheating, the pump must not run constantly below the minimum flow rate indicated by the bold curves.
- If the pumped liquid density and/or viscosity are higher than those of water, it may be necessary to use a motor with a higher performance.

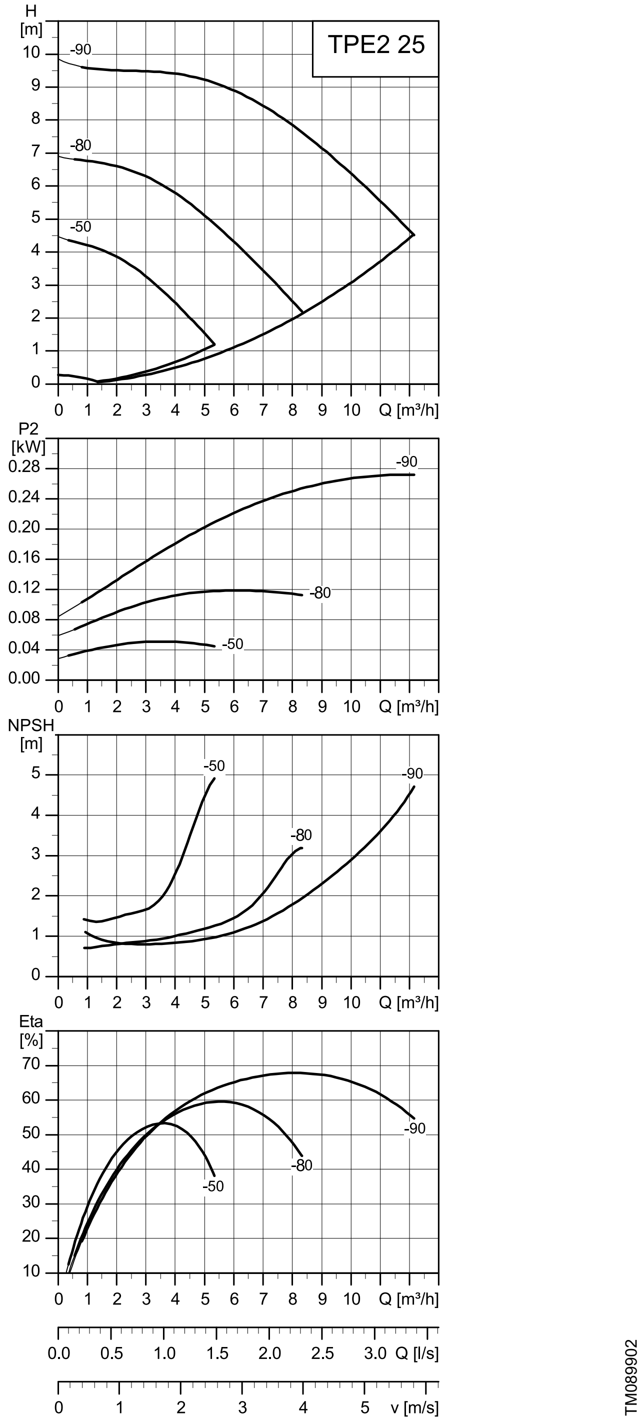
Related information

31. Grundfos Product Center

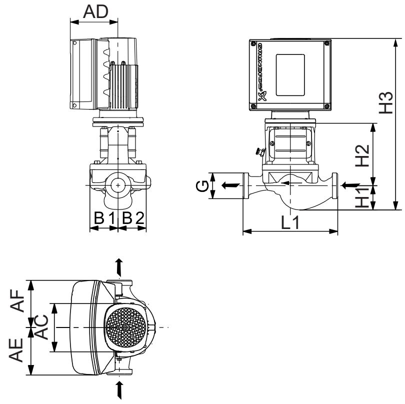
26. Performance curves and technical data

TPE2, TPE2 D, TPE3, TPE3 D, PN 6, 10, 16

TPE2 25



Note: The curves shown at 50 Hz, but the pumps run at 55 Hz, look in Grundfos Product Center to see 55 Hz curve.

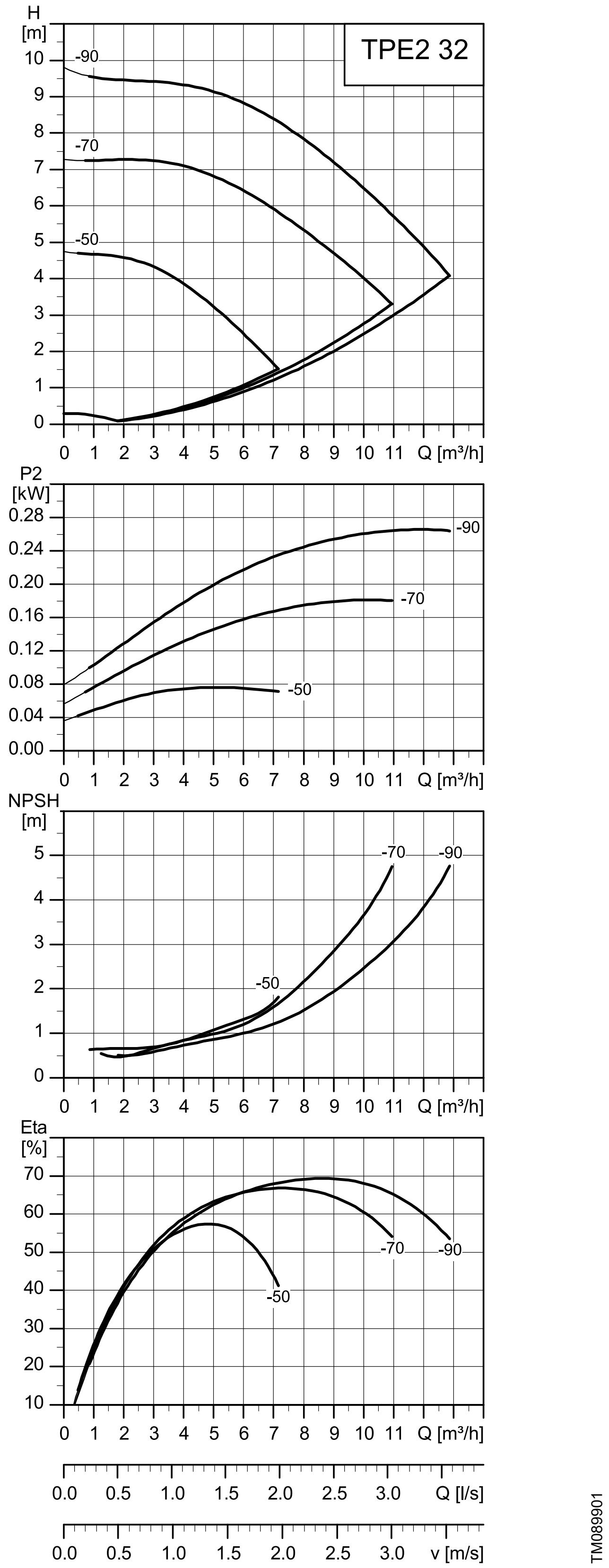


TM089913

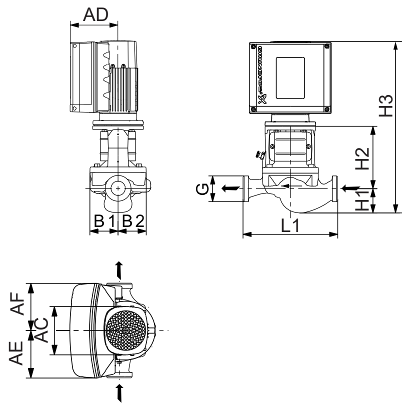
Technical data

TPE2 25			-50	-80	-90
P2	1~	[kW]	0.12	0.18	0.37
PN			25	25	25
T_{min};T_{max}		[°C]	[-25;110]	[-25;110]	[-25;110]
G			G 1 1/2	G 1 1/2	G 1 1/2
AC	1~	[mm]	141	141	141
AD	1~	[mm]	133	133	133
AE	1~	[mm]	-	-	-
AF	1~	[mm]	-	-	-
B1		[mm]	54	54	60
B2		[mm]	62	62	68
L1		[mm]	180	180	180
H1		[mm]	46	46	48
H2		[mm]	120	120	120
H3	1~	[mm]	357	357	399

TPE2 32



Note: The curves shown at 50 Hz, but the pumps run at 55 Hz, look in Grundfos Product Center to see 55 Hz curve.

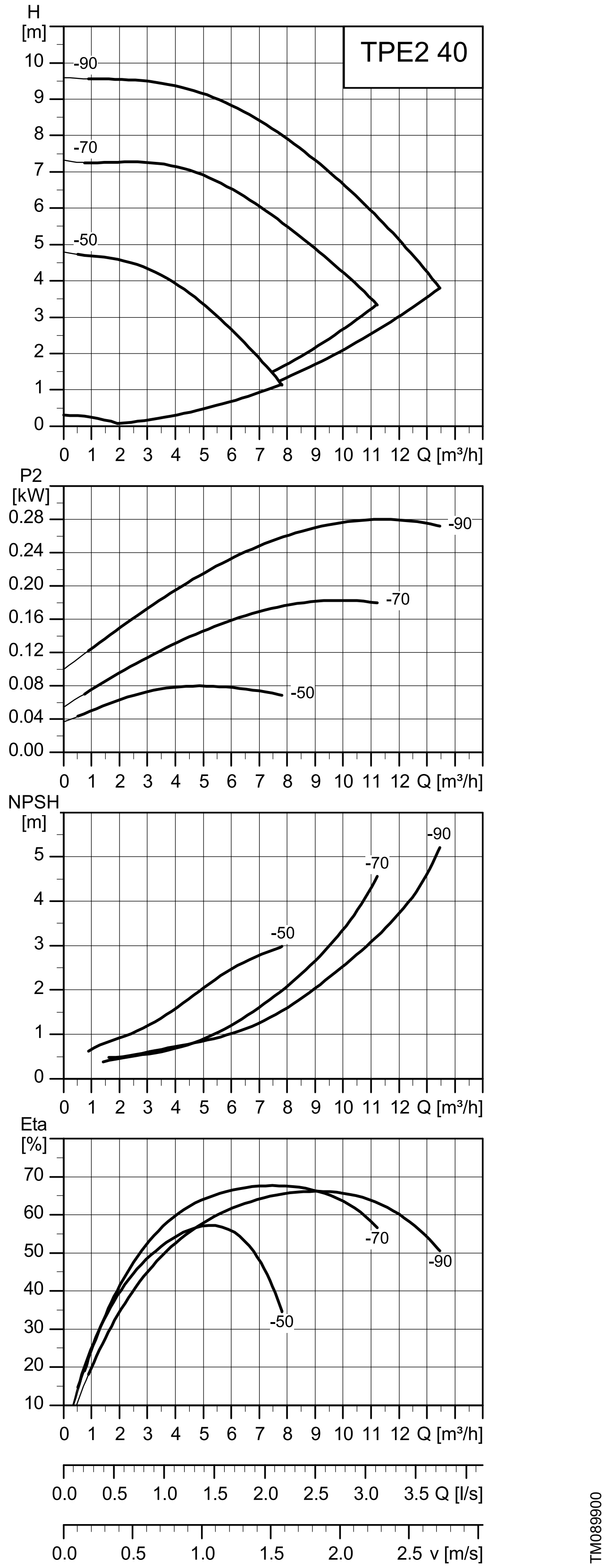


TM089913

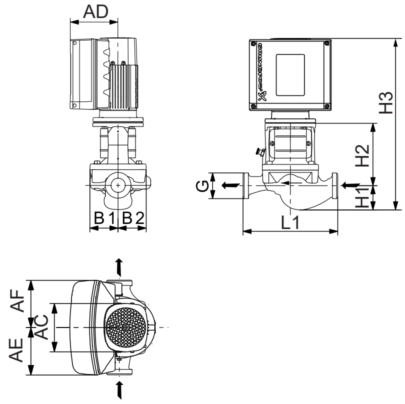
Technical data

TPE2 32			**-50**	**-70**	**-90**
P2	1~	[kW]	0.12	0.25	0.37
PN			25	25	25
T_{min};T_{max}		[°C]	[-25;110]	[-25;110]	[-25;110]
G			G 2	G 2	G 2
AC	1~	[mm]	141	141	141
AD	1~	[mm]	133	133	133
AE	1~	[mm]	-	-	-
AF	1~	[mm]	-	-	-
B1		[mm]	54	54	60
B2		[mm]	62	62	68
L1		[mm]	180	180	180
H1		[mm]	48	48	47
H2		[mm]	120	120	120
H3	1~	[mm]	359	359	398

TPE2 40



Note: The curves shown at 50 Hz, but the pumps run at 55 Hz, look in Grundfos Product Center to see 55 Hz curve.

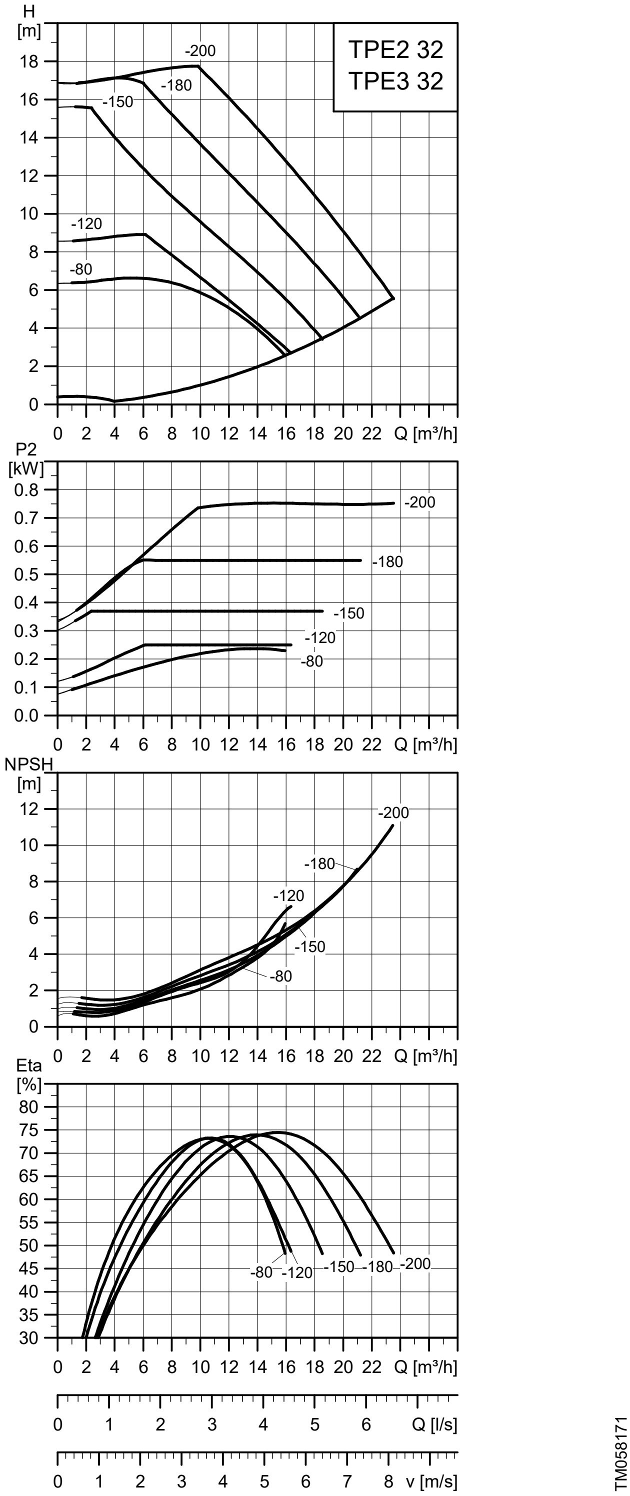


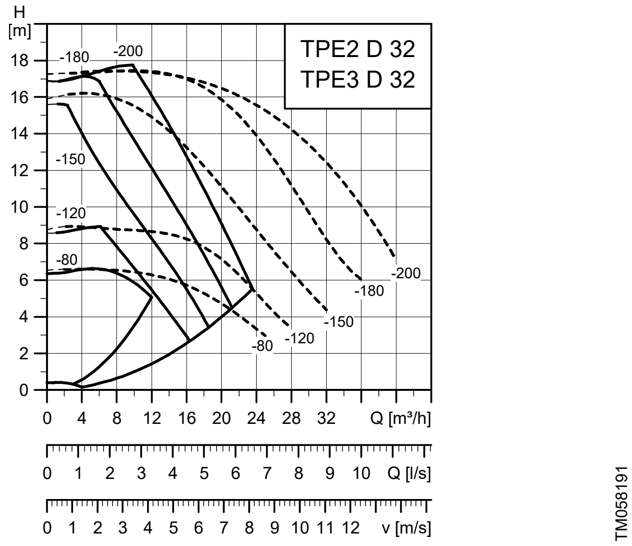
TM089913

Technical data

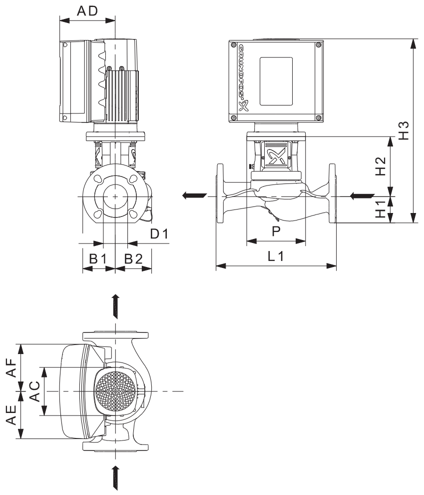
TPE2 40			**-50**	**-70**	**-90**
P2	1~	[kW]	0.12	0.25	0.37
PN			PN 6/10	PN 6/10	PN 6/10
T_{min};T_{max}		[°C]	[-25;110]	[-25;110]	[-25;110]
D1		[mm]	40	40	40
AC	1~	[mm]	141	141	141
AD	1~	[mm]	133	133	133
AE	1~	[mm]	-	-	-
AF	1~	[mm]	-	-	-
P		[mm]	-	-	-
B1	TPE2	[mm]	-	-	-
B2	TPE2	[mm]	-	-	-
B3		[mm]	-	-	-
B4		[mm]	-	-	-
C1		[mm]	-	-	-
C5		[mm]	-	-	-
C6		[mm]	-	-	-
L1		[mm]	250	250	250
H1		[mm]	67	67	62
H2		[mm]	120	120	120
H3	1~	[mm]	378	418	413
H4		[mm]	-	-	-
M			-	-	-

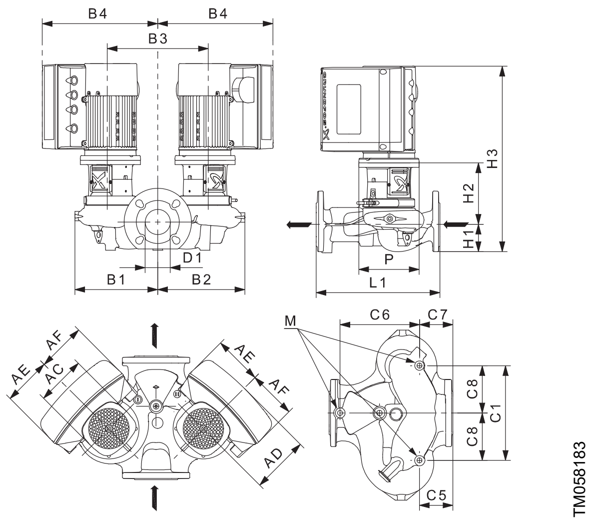
TPE2, TPE2 D, TPE3, TPE3 D 32





Note: The dotted QH curves apply to TPE2 D, TPE3 D in parallel operation.

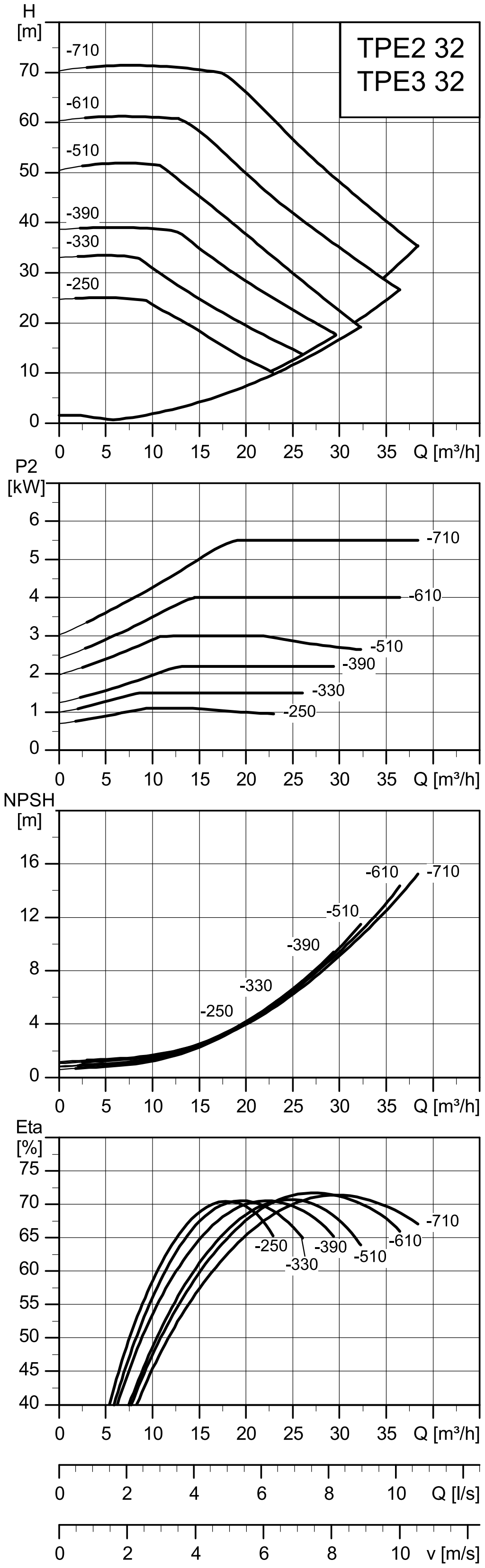




Technical data

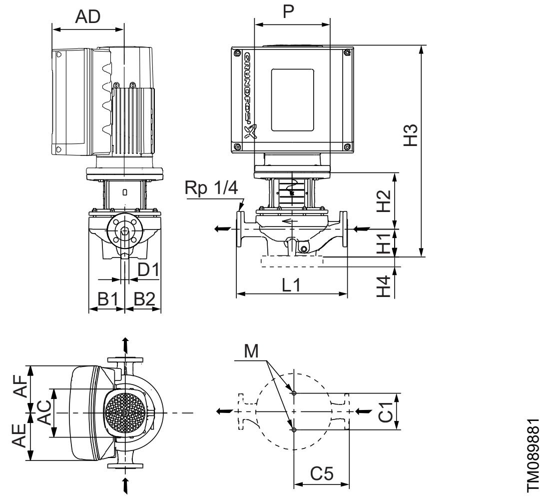
TPE2, TPE3 32			**-80**	**-120**	**-150**	**-180**	**-200**
TPE2, TPE3			●	●	●	●	●
TPE2 D, TPE3 D			●	●	●	●	●
P2	1~/3~	kW	0.25	0.25	0.37	0.55	0.75
PN			PN 6/10/16	PN 6/10/16	PN 6/10/16	PN 6/10/16	PN 6/10/16
T_{min};T_{max}		[°C]	[-25;120]	[-25;120]	[-25;120]	[-25;120]	[-25;120]
D1		[mm]	32	32	32	32	32
AC	1~/3~	[mm]	122/122	122/122	122/122	122/122	122/122
AD	1~/3~	[mm]	158/158	158/158	158/158	158/158	158/158
AE	1~/3~	[mm]	106/134	106/134	106/134	106/134	106/134
AF	1~/3~	[mm]	106/134	106/134	106/134	106/134	106/134
P		[mm]	165	165	165	165	165
B1	TPE2(3)/TPE2(3) D	[mm]	72/310	72/310	72/310	72/310	72/310
B2	TPE2(3)/TPE2(3) D	[mm]	72/309	72/309	72/309	72/309	72/309
B3		[mm]	260	260	260	260	260
B4	1~ TPE2(3)/TPE2(3) D	[mm]	-/317	-/317	-/317	-/317	-/317
	3~ TPE2(3)/TPE2(3) D	[mm]	-/337	-/337	-/337	-/337	-/337
C1	TPE2(3)/TPE2(3) D	[mm]	-/263	-/263	-/263	-/263	-/263
C5	TPE2(3)/TPE2(3) D	[mm]	-/50	-/50	-/50	-/50	-/50
C6	TPE2(3)/TPE2(3) D	[mm]	-/97	-/97	-/97	-/97	-/97
C7	TPE2(3)/TPE2(3) D	[mm]	-/90	-/90	-/90	-/90	-/90
C8	TPE2(3)/TPE2(3) D	[mm]	-/130	-/130	-/130	-/130	-/130
L1		[mm]	220	220	220	220	220
H1	TPE2(3)/TPE2(3) D	[mm]	65/68	65/68	65/68	65/68	65/68
H2		[mm]	159	159	159	159	159
H3	1~ TPE2(3)/TPE2(3) D	[mm]	439/442	439/442	439/442	439/442	439/442
	3~ TPE2(3)/TPE2(3) D	[mm]	479/482	479/482	479/482	479/482	479/482
M			M12	M12	M12	M12	M12

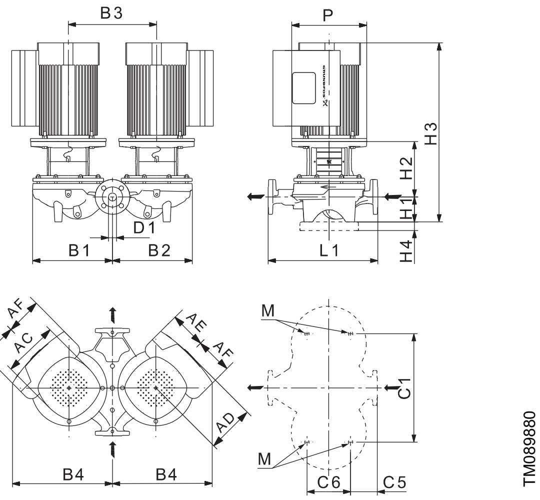
TPE2/3 (D) 32



TM089890

Note: Look in Grundfos Product Center for curves for TPE2 D, TPE3 D in parallel operation.

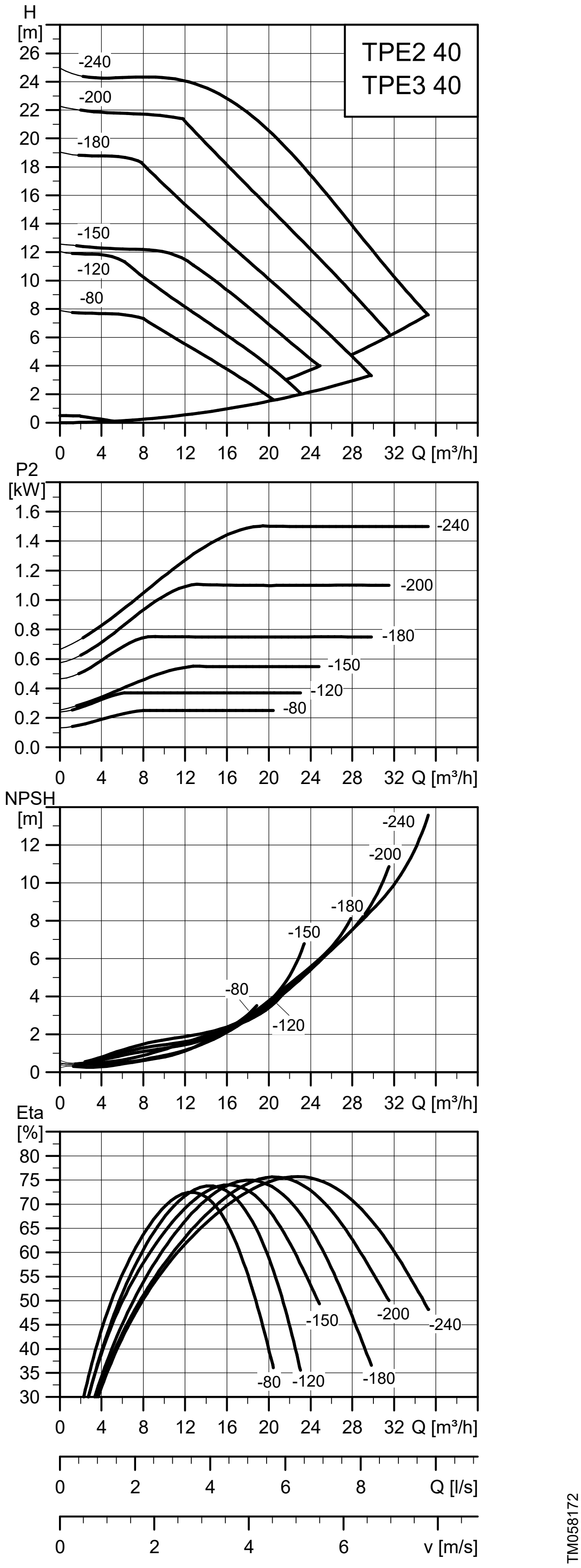


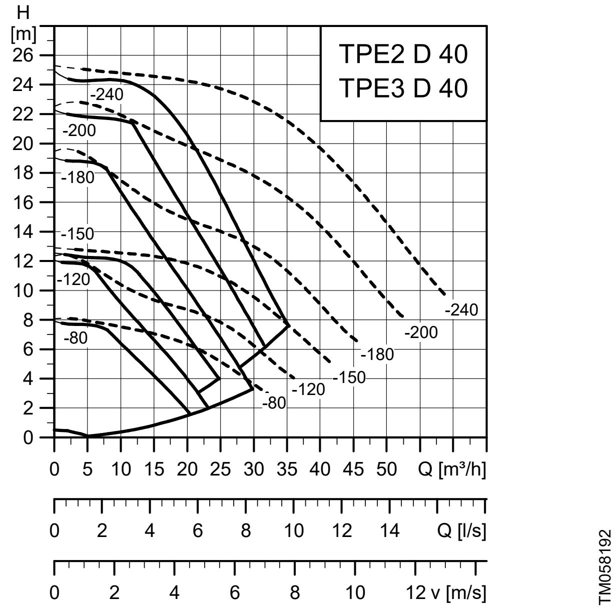


Technical data

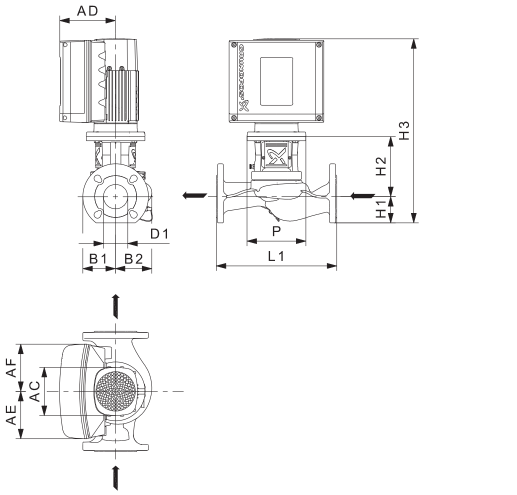
TPE2/3 (D) 32			-250	-330	-390	-510	-610	-710
P2	1~/3~	kW	1.1	1.5	-/2.2	-/3	-/4	-/5.5
PN			PN 10/16	PN 10/16	PN 10/16	PN 10/16	PN 10/16	PN 10/16
T_{min};T_{max}		[°C]	[-25;140]	[-25;140]	[-25;140]	[-25;140]	[-25;140]	[-25;140]
D1		[mm]	32	32	32	32	32	32
AC	1~/3~	[mm]	122/122	122/122	-/122	-/191	-/191	-/191
AD	1~/3~	[mm]	158/158	158/158	-/158	-/201	-/201	-/201
AE	1~/3~	[mm]	134/134	134/134	-/134	-/146	-/146	-/146
AF	1~/3~	[mm]	134/134	134/134	-/134	-/146	-/146	-/146
P		[mm]	200	200	200	250	250	300
B1	TPE2/3 / TPE2/3 D	[mm]	105/256	105/256	105/256	105/256	105/256	105/256
B2	TPE2/3 / TPE2/3 D	[mm]	97/250	97/250	97/250	97/250	97/250	97/250
B3		[mm]	310	310	310	310	310	310
B4	1~ TPE2/3 / TPE2/3 D	[mm]	-/325	-/325	-	-	-	-
	3~ TPE2/3 / TPE2/3 D	[mm]	-/343	-/343	-/343	-/380	-/380	-/422
C1	TPE2/3 / TPE2/3 D	[mm]	144/300	144/300	144/300	144/300	144/300	144/300
C5	TPE2/3 / TPE2/3 D	[mm]	130/38	130/38	130/38	130/38	130/38	130/38
C6	TPE2/3 / TPE2/3 D	[mm]	-/125	-/125	-/125	-/125	-/125	-/125
L1		[mm]	260	260	260	260	260	260
H1		[mm]	100	100	100	100	100	100
H2	TPE2/3 / TPE2/3 D	[mm]	172/168	172/168	172/168	182/178	182/178	221/217
H3	1~ TPE2/3 / TPE2/3 D	[mm]	506/542	506/542	-	-	-	-
	3~ TPE2/3 / TPE2/3 D	[mm]	546/542	546/542	546/542	616/612	616/612	686/682
H4		[mm]	-	-	-	-	-	-
M			M16	M16	M16	M16	M16	M16

TPE2, TPE2 D, TPE3, TPE3 D 40

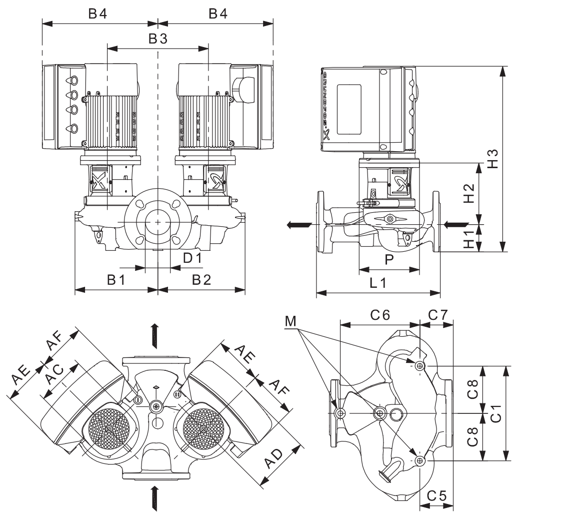




Note: The dotted QH curves apply to TPE2 D, TPE3 D in parallel operation.



TM058182

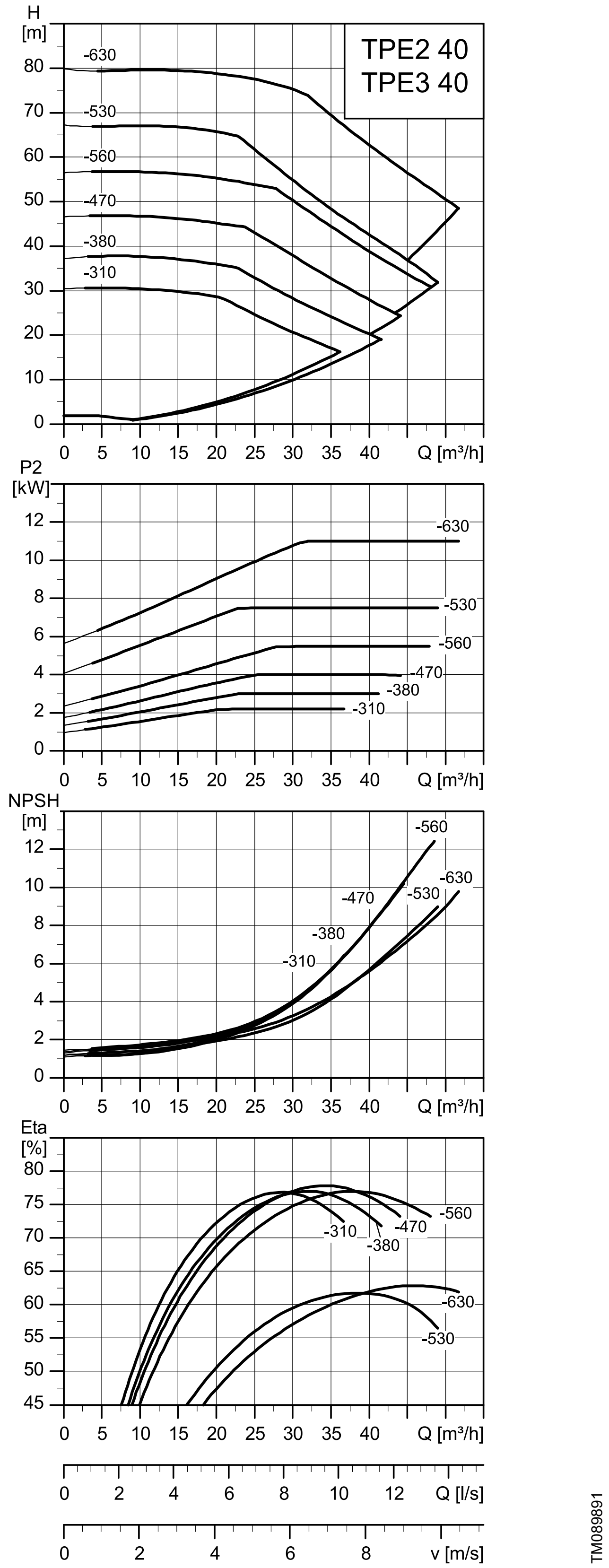


TM058183

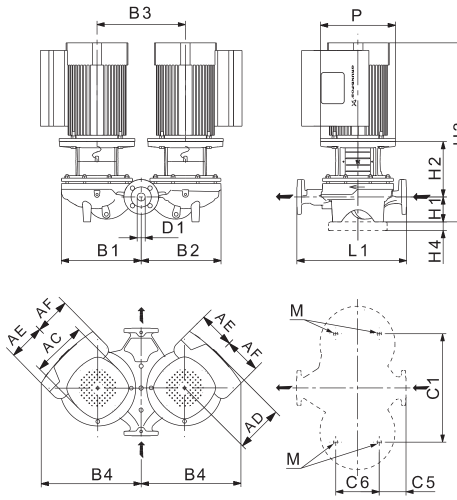
Technical data

TPE2 D, TPE3 D 40			**-80**	**-120**	**-150**	**-180**	**-200**	**-240**
TPE2, TPE3			●	●	●	●	●	●
TPE2 D, TPE3 D			●	●	●	●	●	●
P2	1~/3~	kW	0.25	0.37	0.55	0.75	1.1	1.5
PN			PN 6/10/16	PN 6/10/16	PN 6/10/16	PN 6/10/16	PN 6/10/16	PN 6/10/16
T_{min};T_{max}		[°C]	[-25;120]	[-25;120]	[-25;120]	[-25;120]	[-25;120]	[-25;120]
D1		[mm]	40	40	40	40	40	40
AC	1~/3~	[mm]	122/122	122/122	122/122	122/122	122/122	122/122
AD	1~/3~	[mm]	158/158	158/158	158/158	158/158	158/158	158/158
AE	1~/3~	[mm]	106/134	106/134	106/134	106/134	106/134	106/134
AF	1~/3~	[mm]	106/134	106/134	106/134	106/134	106/134	106/134
P		[mm]	165	165	165	165	165	165
B1	TPE2(3)/TPE2(3) D	[mm]	72/218	72/218	72/218	72/218	72/218	72/218
B2	TPE2(3)/TPE2(3) D	[mm]	82/220	82/220	82/220	82/220	82/220	82/220
B3		[mm]	260	260	260	260	260	260
B4	1~ TPE2(3)/TPE2(3) D	[mm]	-/317	-/317	-/317	-/317	-/317	-/317
	3~ TPE2(3)/TPE2(3) D	[mm]	-/337	-/337	-/337	-/337	-/337	-/337
C1	TPE2(3)/TPE2(3) D	[mm]	-/260	-/260	-/260	-/260	-/260	-/260
C5	TPE2(3)/TPE2(3) D	[mm]	-/75	-/75	-/75	-/75	-/75	-/75
C6	TPE2(3)/TPE2(3) D	[mm]	-/58	-/58	-/58	-/58	-/58	-/58
C7	TPE2(3)/TPE2(3) D	[mm]	-/155	-/155	-/155	-/155	-/155	-/155
C8	TPE2(3)/TPE2(3) D	[mm]	-/130	-/130	-/130	-/130	-/130	-/130
L1		[mm]	250	250	250	250	250	250
H1	TPE2(3)/TPE2(3) D	[mm]	65/69	65/69	65/69	65/69	65/69	65/69
H2		[mm]	162	162	162	162	162	162
H3	1~ TPE2(3)/TPE2(3) D	[mm]	442/446	442/446	442/446	442/446	442/446	462/466
	3~ TPE2(3)/TPE2(3) D	[mm]	482/486	482/486	482/486	482/486	482/486	502/506
M			M12	M12	M12	M12	M12	M12

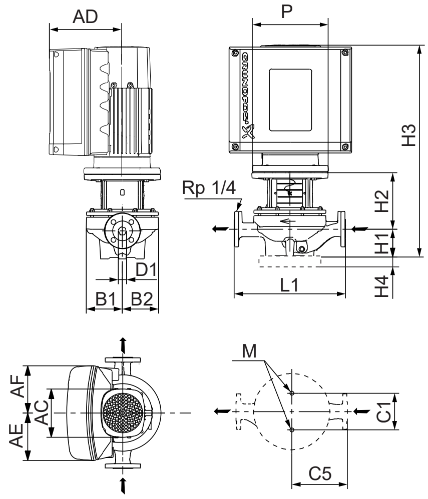
TPE2/3 (D) 40



Note: Look in Grundfos Product Center for curves for TPE2 D, TPE3 D in parallel operation.



TM089880



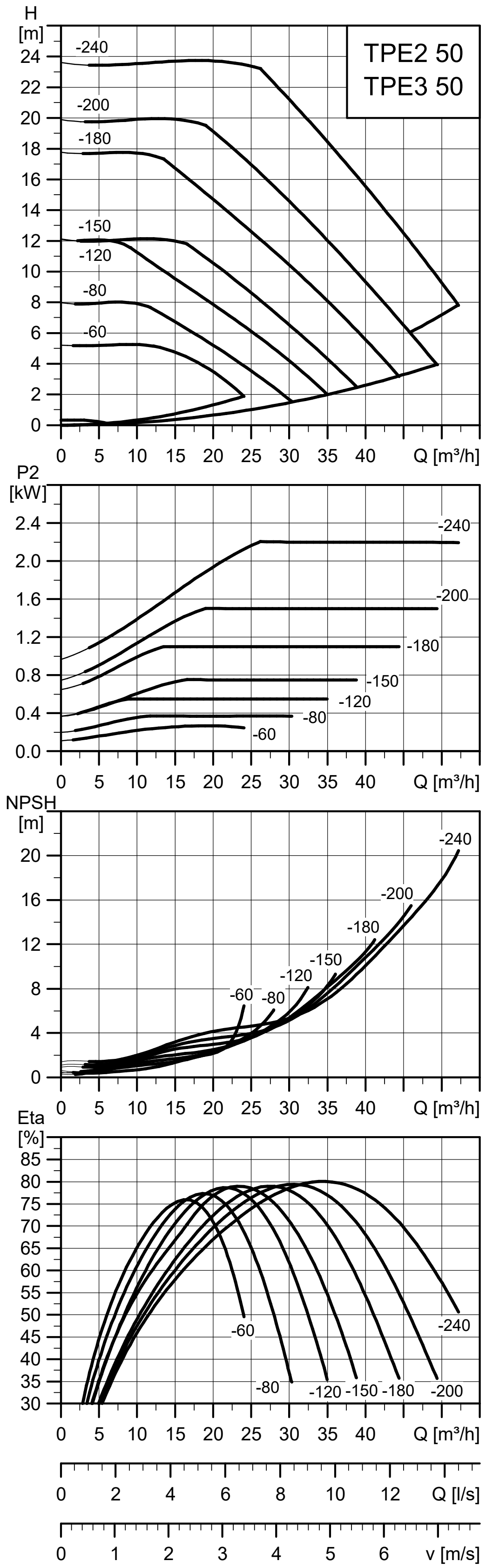
TM089881

Technical data

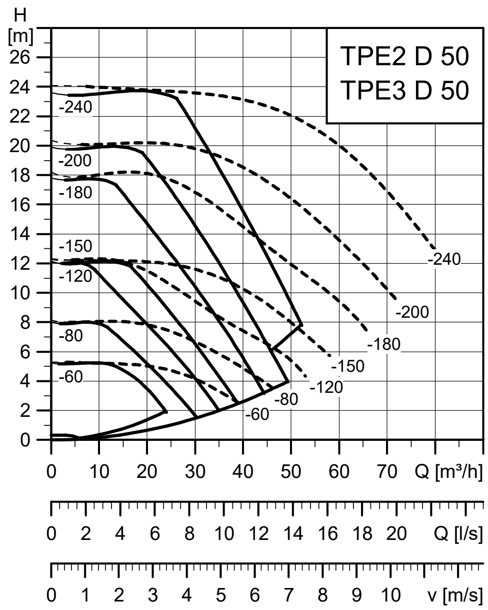
TPE2/3 (D) 40			-310	-380	-470	-560	-530	-630
P2	3~	kW	2.2	3	4	5.5	7.5	11
PN			PN 10/16	PN 10/16	PN 10/16	PN 10/16	PN 10/16	PN 10/16
T_{min};T_{max}		[°C]	[-25;140]	[-25;140]	[-25;140]	[-25;140]	[-25;140]	[-25;140]
D1		[mm]	40	40	40	40	40	40
AC	1~/3~	[mm]	-/122	-/191	-/191	-/191	-/255	-/255
AD	1~/3~	[mm]	-/158	-/201	-/201	-/201	-/237	-/237
AE	1~/3~	[mm]	-/134	-/146	-/146	-/146	-/173	-/173
AF	1~/3~	[mm]	-/134	-/146	-/146	-/146	-/173	-/173
P		[mm]	200	250	250	300	300	350
B1	TPE2/3 / TPE2/3 D	[mm]	106/256	106/256	106/256	106/256	151/325	151/325
B2	TPE2/3 / TPE2/3 D	[mm]	98/252	98/252	98/252	98/252	147/325	147/325
B3		[mm]	310	310	310	310	355	355
B4	3~ TPE2/3 / TPE2/3 D	[mm]	-/343	-/380	-/380	-/422	-/444	-/444
C1	TPE2/3 / TPE2/3 D	[mm]	144/320	144/320	144/320	144/320	144/435	144/435
C5	TPE2/3 / TPE2/3 D	[mm]	160/78	160/78	160/78	160/78	220/108	220/108
C6	TPE2/3 / TPE2/3 D	[mm]	-/125	-/125	-/125	-/125	-/175	-/175
L1		[mm]	320	320	320	320	440	440
H1	TPE2/3 / TPE2/3 D	[mm]	100/100	100/100	100/100	100/100	110/110	110/110
H2		[mm]	168	178	178	217	223	253
H3	TPE2/3 / TPE2/3 D	[mm]	542/612	612/612	612/706	682/682	722/722	769/769
H4	TPE2/3 / TPE2/3 D	[mm]	-	-	-	-	-	35/-
M			M12	M12	M12	M12		

TPE pumps with a H4 dimension are delivered with a base plate. See section Base plates for base plate dimensions.

TPE2, TPE2 D, TPE3, TPE3 D 50

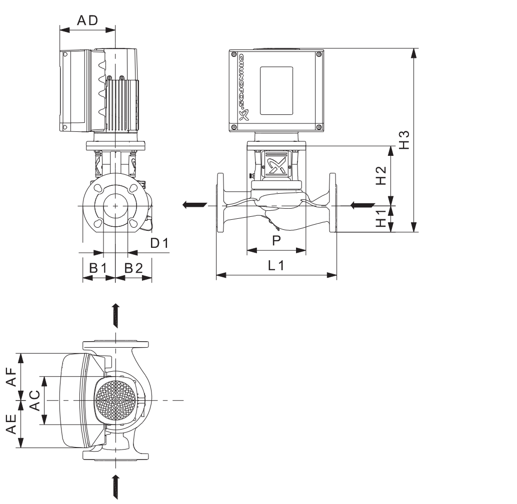


TM058173

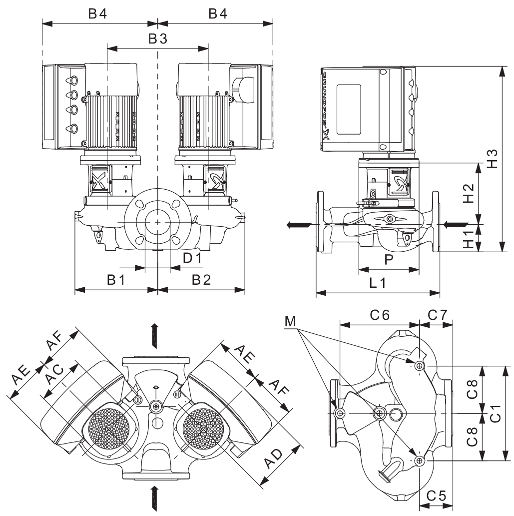


TM058193

Note: The dotted QH curves apply to TPE2 D, TPE3 D in parallel operation.



TM058182

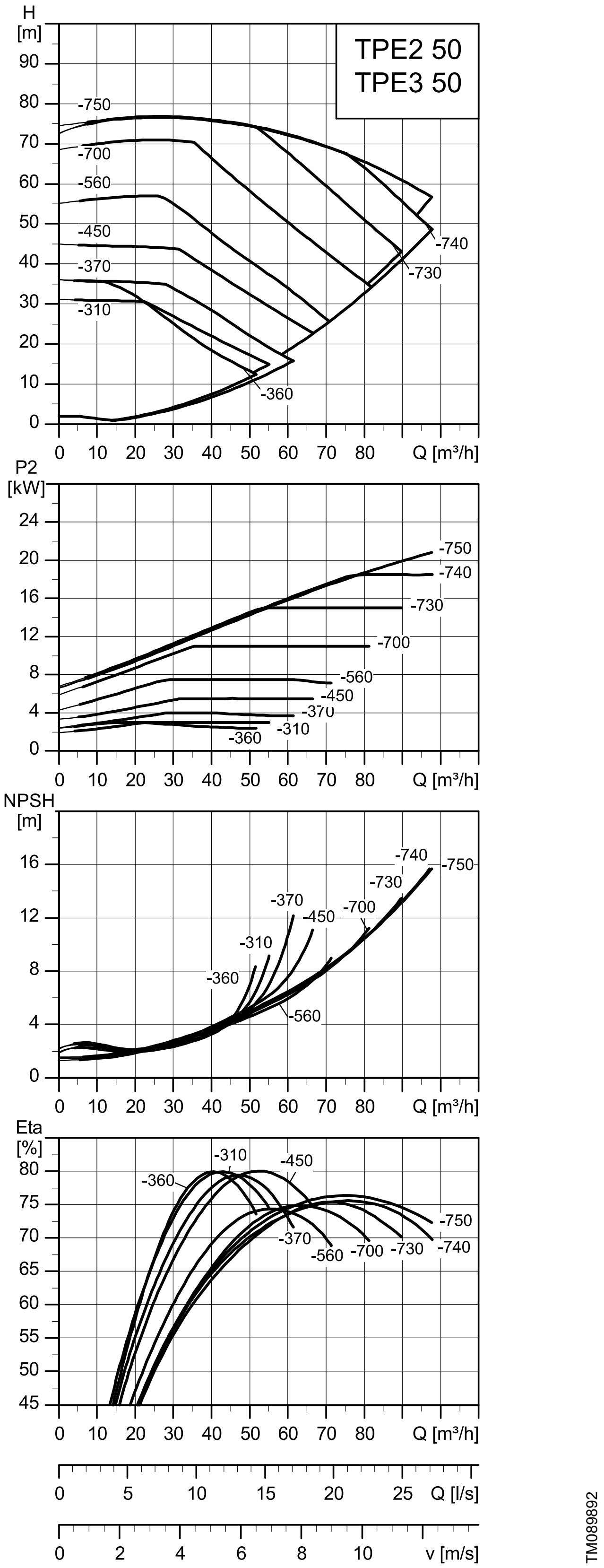


TM058183

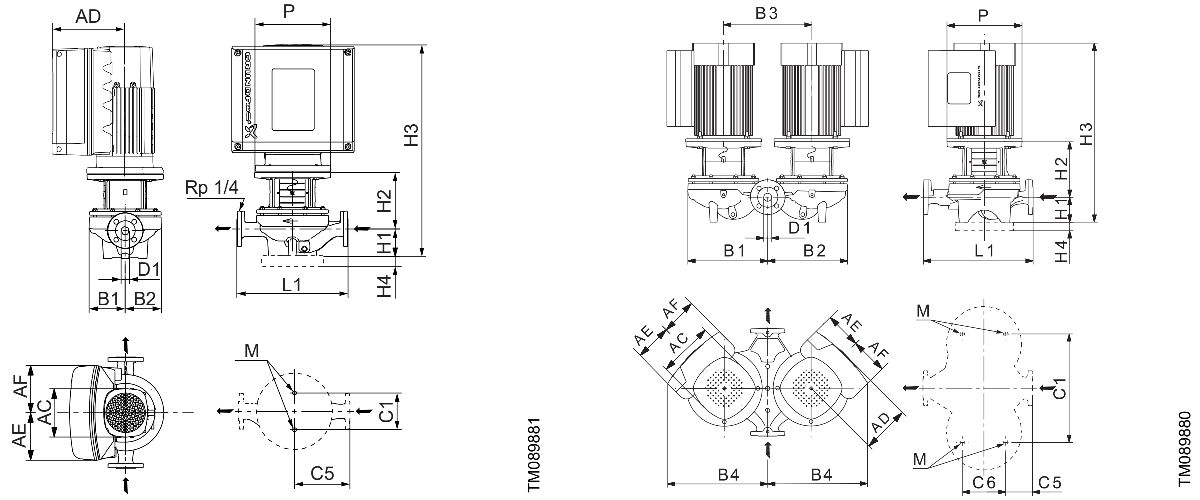
Technical data

TPE2, TPE3 50			**-60**	**-80**	**-120**	**-150**	**-180**	**-200**	**-240**
TPE2, TPE3			●	●	●	●	●	●	●
TPE2 D, TPE3 D			●	●	●	●	●	●	●
P2	1~/3~	kW	0.37	0.37	0.55	0.75	1.1	1.5	2.2
PN			PN 6/10/16	PN 6/10/16	PN 6/10/16	PN 6/10/16	PN 6/10/16	PN 6/10/16	PN 6/10/16
T_{min};T_{max}		[°C]	[-25;120]	[-25;120]	[-25;120]	[-25;120]	[-25;120]	[-25;120]	[-25;120]
D1		[mm]	50	50	50	50	50	50	50
AC	1~/3~	[mm]	122/122	122/122	122/122	122/122	122/122	122/122	122/122
AD	1~/3~	[mm]	158/158	158/158	158/158	158/158	158/158	158/158	158/158
AE	1~/3~	[mm]	106/134	106/134	106/134	106/134	106/134	106/134	-/134
AF	1~/3~	[mm]	106/134	106/134	106/134	106/134	106/134	106/134	-/134
P		[mm]	165	165	165	165	165	165	165
B1	TPE2(3)/TPE2(3) D	[mm]	75/223	75/223	75/223	75/223	75/223	75/223	75/223
B2	TPE2(3)/TPE2(3) D	[mm]	91/227	91/227	91/227	91/227	91/227	91/227	91/227
B3		[mm]	260	260	260	260	260	260	260
B4	1~ TPE2(3)/TPE2(3) D	[mm]	-/317	-/317	-/317	-/317	-/317	-/317	-/317
	3~ TPE2(3)/TPE2(3) D	[mm]	-/337	-/337	-/337	-/337	-/337	-/337	-/337
C1	TPE2(3)/TPE2(3) D	[mm]	-/260	-/260	-/260	-/260	-/260	-/260	-/260
C5	TPE2(3)/TPE2(3) D	[mm]	-/75	-/75	-/75	-/75	-/75	-/75	-/75
C6	TPE2(3)/TPE2(3) D	[mm]	-/175	-/175	-/175	-/175	-/175	-/175	-/175
C7	TPE2(3)/TPE2(3) D	[mm]	-/75	-/75	-/75	-/75	-/75	-/75	-/75
C8	TPE2(3)/TPE2(3) D	[mm]	-/130	-/130	-/130	-/130	-/130	-/130	-/130
L1		[mm]	280	280	280	280	280	280	280
H1	TPE2(3)/TPE2(3) D	[mm]	72/75	72/75	72/75	72/75	72/75	72/75	72/75
H2		[mm]	162	162	162	162	162	162	162
H3	1~ TPE2(3)/TPE2(3) D	[mm]	449/451	449/451	449/451	449/451	449/451	469/471	-
	3~ TPE2(3)/TPE2(3) D	[mm]	489/491	489/491	489/491	489/491	489/491	509/511	509/511
M			M12	M12	M12	M12	M12	M12	M12

TPE2/3 (D) 50



Note: Look in Grundfos Product Center for curves for TPE2 D, TPE3 D in parallel operation.

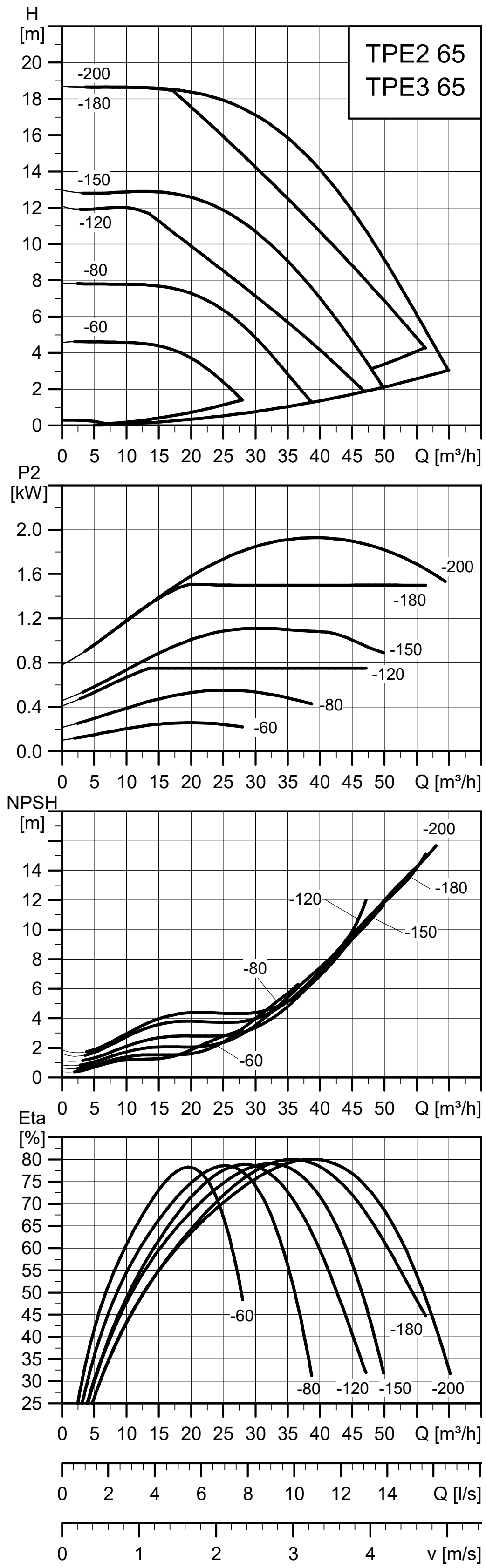


Technical data

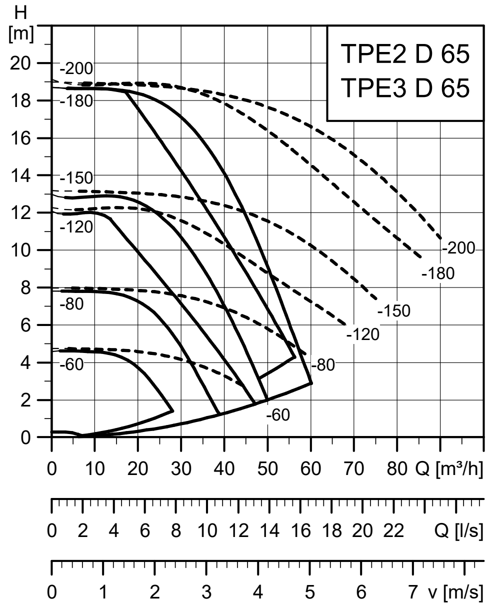
TPE2/3 (D) 50			-310	-360	-370	-450	-560	-700	-730	-740	-750
P2	3~	kW	3	3	4	5.5	7.5	11	15	18.5	22
PN			PN 10/16	PN 10/16	PN 10/16	PN 10/16	PN 10/16	PN 10/16	PN 10/16	PN 10/16	PN 10/16
T_{min};T_{max}		[°C]	[-25;140]	[-25;140]	[-25;140]	[-25;140]	[-25;140]	[-25;140]	[-25;140]	[-25;140]	[-25;140]
D1		[mm]	50	50	50	50	65	65	65	65	65
AC	1~/3~	[mm]	-/191	-/191	-/191	-/191	-/255	-/255	-/314	-/314	-/314
AD	1~/3~	[mm]	-/201	-/201	-/201	-/201	-/237	-/237	-/303	-/303	-/303
AE	1~/3~	[mm]	-/146	-/146	-/146	-/146	-/173	-/173	-/210	-/210	-/210
AF	1~/3~	[mm]	-/146	-/146	-/146	-/146	-/173	-/173	-/210	-/210	-/210
P		[mm]	250	250	250	300	300	350	350	350	350
B1	TPE2/3 / TPE2/3 D	[mm]	120/270	120/270	120/270	120/270	138/359	138/359	138/359	138/359	138/359
B2	TPE2/3 / TPE2/3 D	[mm]	97/260	97/260	97/260	97/260	124/350	124/350	124/350	124/350	124/350
B3		[mm]	310	310	310	310	450	450	450	450	450
B4	TPE2/3 / TPE2/3 D	[mm]	-/380	-/380	-/380	-/422	-/492	-/492	-/560	-/560	-/560
C1	TPE2/3 / TPE2/3 D	[mm]	144/300	144/300	144/300	144/300	144/400	144/400	144/400	144/400	144/400
C5	TPE2/3 / TPE2/3 D	[mm]	170/68	170/68	170/68	170/68	180/73	180/73	180/73	180/73	180/73
C6	TPE2/3 / TPE2/3 D	[mm]	-/125	-/125	-/125	-/125	-/175	-/175	-/175	-/175	-/175
L1		[mm]	340	340	340	340	360	360	360	360	360
H1	TPE2/3 / TPE2/3 D	[mm]	115/115	115/115	115/115	115/115	115/115	115/115	115/115	115/115	115/115
H2		[mm]	187	187	187	226	236	266	266	266	266
H3	3~ TPE2/3 / TPE2/3 D	[mm]	636/636	636/636	636/636	706/706	740/740	787/787	863/863	863/863	889/889
H4		[mm]	-	-	-	-	-	35	35	35	35
M			M16	M16	M16	M16	M16	M16	M16	M16	M16

TPE pumps with a H4 dimension are delivered with a base plate. See section Base plates for base plate dimensions.

TPE2, TPE2 D, TPE3, TPE3 D 65

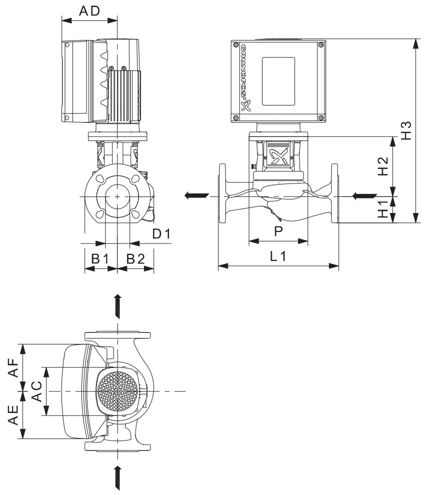


TM058174

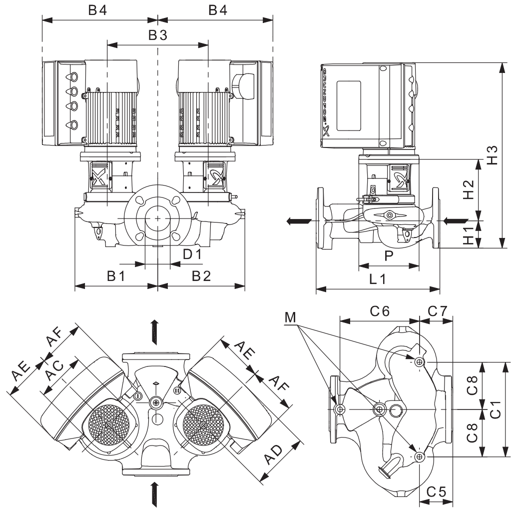


TM058194

Note: The dotted QH curves apply to TPE2 D, TPE3 D in parallel operation.



TM058182



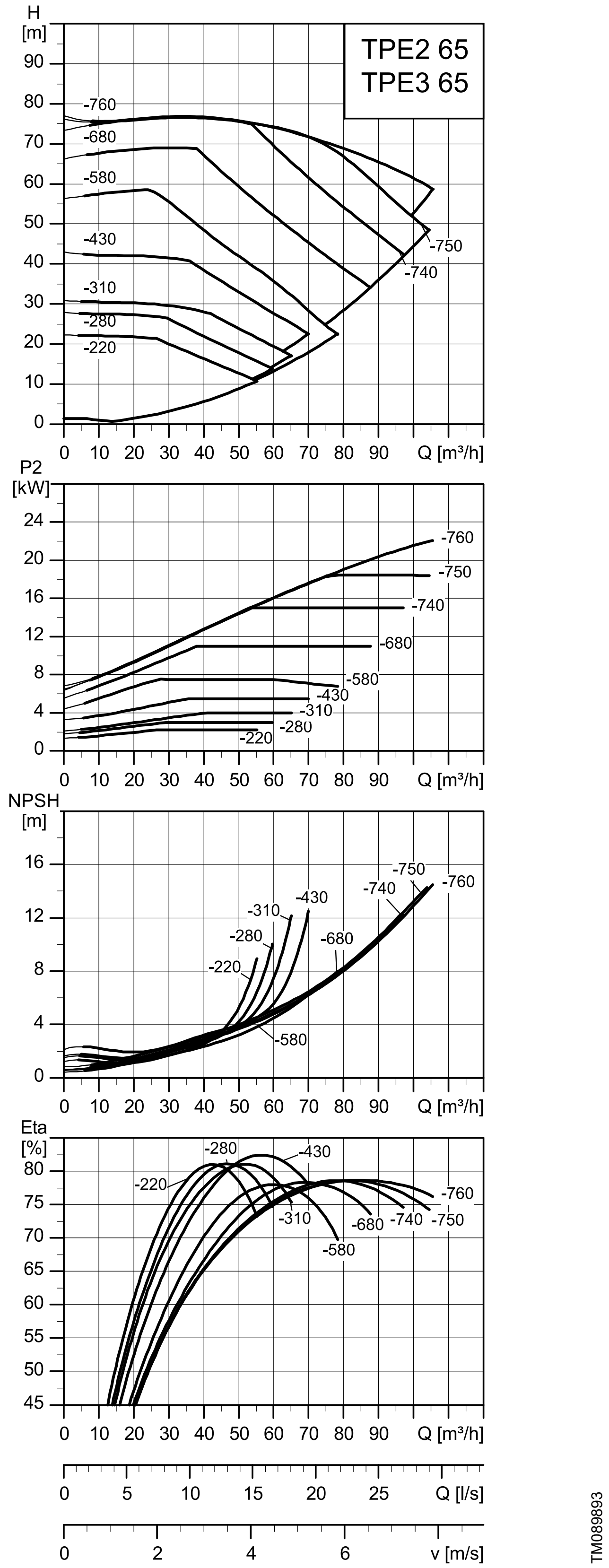
TM058183

Technical data

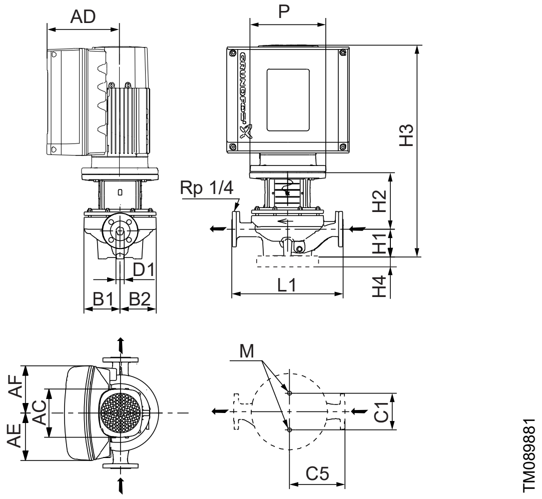
TPE2 D, TPE3 D 65			-60	-80	-120	-150	-180	-200
TPE2, TPE3			●	●	●	●	●	●
TPE2 D, TPE3 D			●	●	●	●	●	●
P2	1~/3~	kW	0.37	0.55	0.75	1.1	1.5	2.2
PN			PN 6/10/16	PN 6/10/16	PN 6/10/16	PN 6/10/16	PN 6/10/16	PN 6/10/16
T_{min};T_{max}		[°C]	[-25;120]	[-25;120]	[-25;120]	[-25;120]	[-25;120]	[-25;120]
D1		[mm]	65	65	65	65	65	65
AC	1~/3~	[mm]	122/122	122/122	122/122	122/122	122/122	122/122
AD	1~/3~	[mm]	158/158	158/158	158/158	158/158	158/158	158/158
AE	1~/3~	[mm]	106/134	106/134	106/134	106/134	106/134	-/134
AF	1~/3~	[mm]	106/134	106/134	106/134	106/134	106/134	-/134
P		[mm]	165	165	165	165	165	165
B1	TPE2(3)/TPE2(3) D	[mm]	81/228	81/228	81/228	81/228	81/228	81/228
B2	TPE2(3)/TPE2(3) D	[mm]	102/240	102/240	102/240	102/240	102/240	102/240
B3		[mm]	260	260	260	260	260	260
B4	1~TPE2(3)/TPE2(3) D	[mm]	-/317	-/317	-/317	-/317	-/317	-/317
	3~TPE2(3)/TPE2(3) D	[mm]	-/337	-/337	-/337	-/337	-/337	-/337
C1	TPE2(3)/TPE2(3) D	[mm]	-/260	-/260	-/260	-/260	-/260	-/260
C5	TPE2(3)/TPE2(3) D	[mm]	-/92	-/92	-/92	-/92	-/92	-/92
C6	TPE2(3)/TPE2(3) D	[mm]	-/218	-/218	-/218	-/218	-/218	-/218
C7	TPE2(3)/TPE2(3) D	[mm]	-/92	-/92	-/92	-/92	-/92	-/92
C8	TPE2(3)/TPE2(3) D	[mm]	-/130	-/130	-/130	-/130	-/130	-/130
L1		[mm]	340	340	340	340	340	340
H1	TPE2(3)/TPE2(3) D	[mm]	74/78	74/78	74/78	74/78	74/78	74/78
H2		[mm]	169	169	169	169	169	169
H3	1~ TPE2(3)/TPE2(3) D	[mm]	458/462	458/462	458/462	458/462	478/482	-
	3~ TPE2(3)/TPE2(3) D	[mm]	498/502	498/502	498/502	498/502	518/522	518/522
M			M12	M12	M12	M12	M12	M12

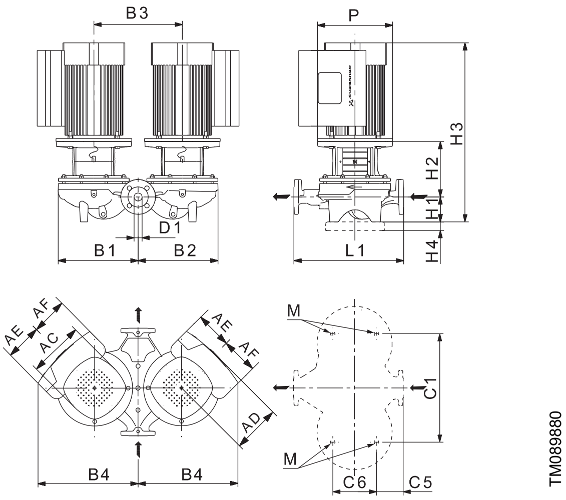
Performance curves and technical data

TPE2/3 (D) 65



Note: Look in Grundfos Product Center for curves for TPE2 D, TPE3 D in parallel operation.





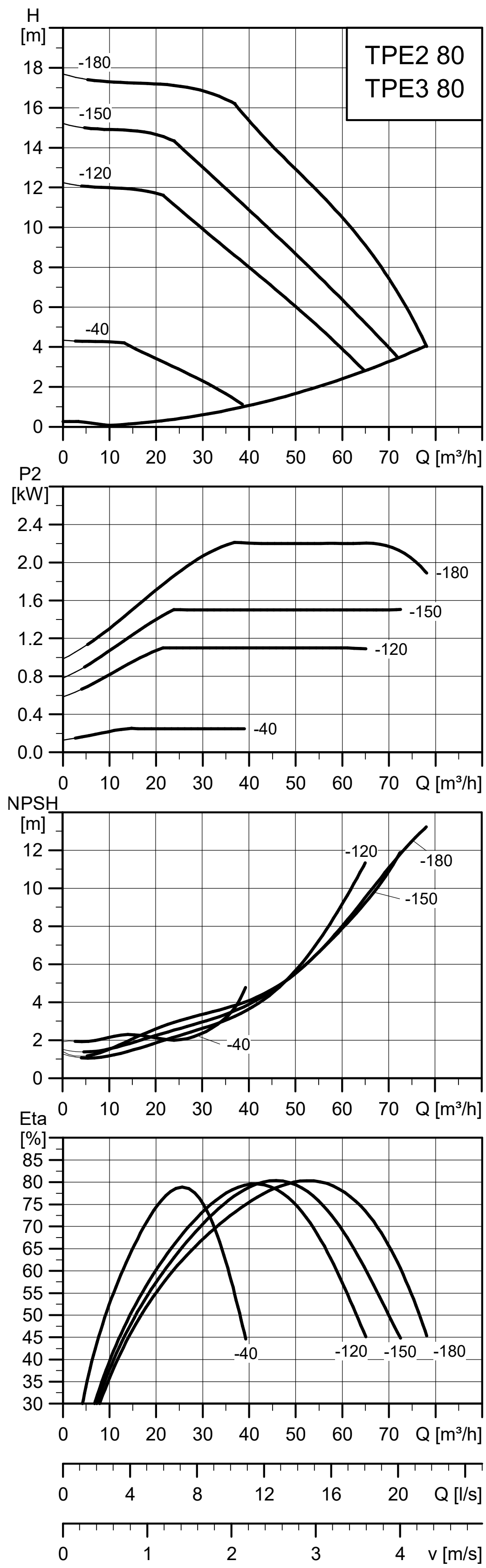
Technical data

TPE2/3 (D) 65			-220	-280	-310	-430	-580	-680	-740	-750	-760
P2	3~	kW	2.2	3	4	5.5	7.5	11	15	18.5	22
PN			PN 10/16	PN 10/16	PN 10/16	PN 10/16	PN 10/16	PN 10/16	PN 10/16	PN 10/16	PN 10/16
$T_{min};T_{max}$		[°C]	[-25;140]	[-25;140]	[-25;140]	[-25;140]	[-25;140]	[-25;140]	[-25;140]	[-25;140]	[-25;140]
D1		[mm]	66	66	66	66	66	66	66	66	66
AC	1~/3~	[mm]	-/122	-/191	-/191	-/191	-/255	-/255	-/314	-/314	-/314
AD	1~/3~	[mm]	-/158	-/201	-/201	-/201	-/237	-/237	-/303	-/303	-/303
AE	1~/3~	[mm]	-/134	-/146	-/146	-/146	-/173	-/173	-/210	-/210	-/210
AF	1~/3~	[mm]	-/134	-/146	-/146	-/146	-/173	-/173	-/210	-/210	-/210
P		[mm]	200	250	250	300	300	350	350	350	350
B1	TPE2/3 / TPE2/3 D	[mm]	124/317	124/317	124/317	124/317	138/359	138/359	138/359	138/359	138/359
B2	TPE2/3 / TPE2/3 D	[mm]	105/308	105/308	105/308	105/308	124/350	124/350	124/350	124/350	124/350
B3		[mm]	400	400	400	400	450	450	450	450	450
B4	TPE2/3 / TPE2/3 D	[mm]	-/390	-/425	-/425	-/467	-/492	-/492	-/560	-/560	-/560
C1	TPE2/3 / TPE2/3 D	[mm]	144/400	144/400	144/400	144/400	144/400	144/400	144/400	144/400	144/400
C2	TPE2/3 / TPE2/3 D	[mm]	80/-	80/-	80/-	80/-	80/-	80/-	80/-	80/-	80/-
C5	TPE2/3 / TPE2/3 D	[mm]	170/88	170/88	170/88	170/88	180/73	180/73	180/73	180/73	180/73
C6	TPE2/3 / TPE2/3 D	[mm]	-/125	-/125	-/125	-/125	-/175	-/175	-/175	-/175	-/175
L1		[mm]	340	340	340	340	360	360	360	360	360
H1	TPE2/3 / TPE2/3 D	[mm]	105/105	105/105	105/105	105/105	105/105	105/105	105/105	105/105	105/105
H2		[mm]	182	192	192	231	236	266	266	266	266
H3	TPE2/3 / TPE2/3 D	[mm]	561/561	631/631	631/631	701/701	730/730	777/777	853/853	853/853	879/879
H4		[mm]	-	-	-	-	-	35	35	35	35
M			M16	M16	M16	M16	M16	M16	M16	M16	M16

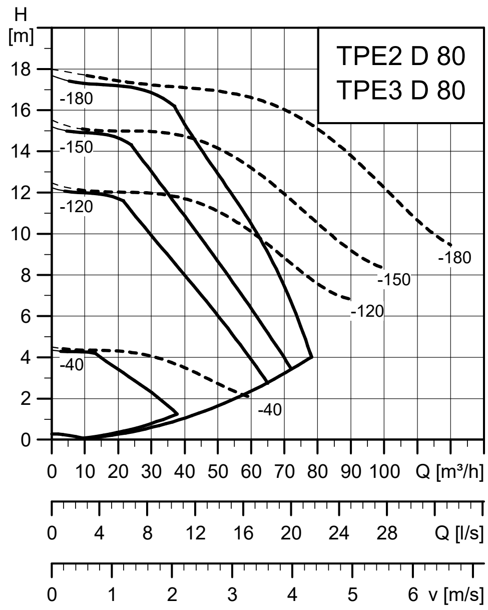
TPE pumps with a H4 dimension are delivered with a base plate. See section Base plates for base plate dimensions.

Performance curves and technical data

TPE2, TPE2 D, TPE3, TPE3 D 80

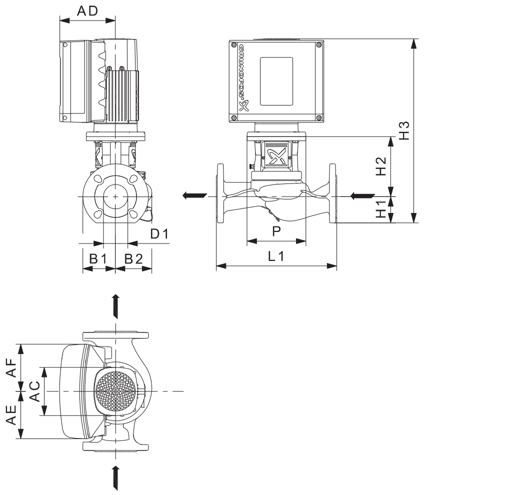


TM058175

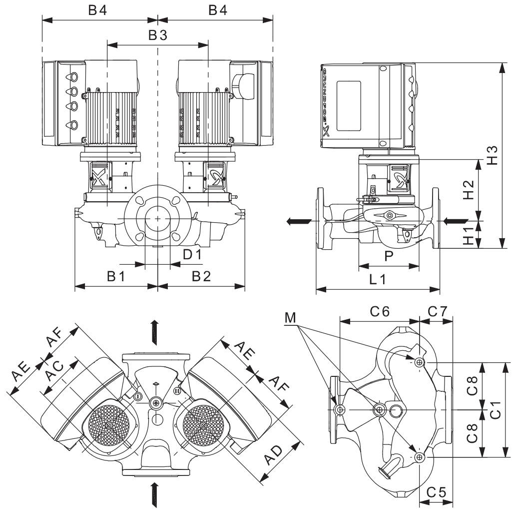


TM058195

Note: The dotted QH curves apply to TPE2 D, TPE3 D in parallel operation.



TM058182



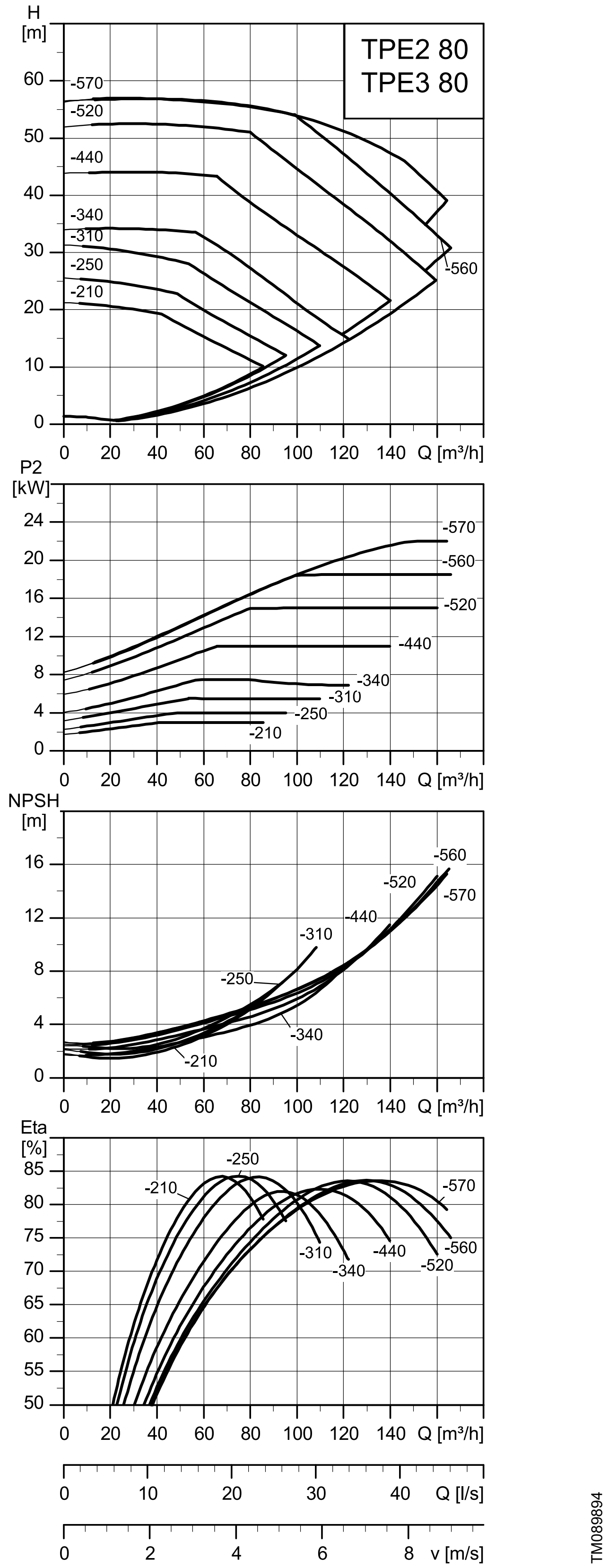
TM058183

Technical data

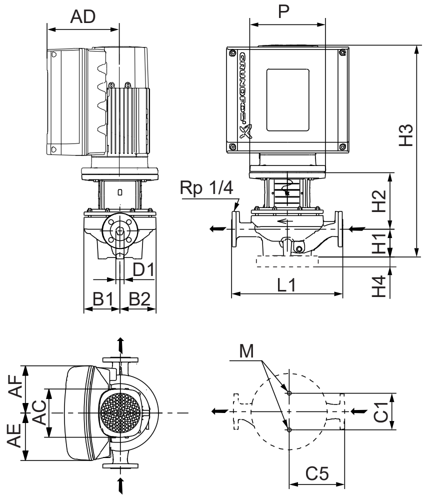
TPE2, TPE3 80			-40	-120	-150	-180
TPE2, TPE3			●	●	●	●
TPE2 D, TPE3 D			●	●	●	●
P2	1~/3~	kW	0.25	1.1	1.5	2.2
PN			PN 6/10/16	PN 6/10/16	PN 6/10/16	PN 6/10/16
T_{min};T_{max}		[°C]	[-25;120]	[-25;120]	[-25;120]	[-25;120]
D1		[mm]	80	80	80	80
AC	1~/3~	[mm]	122/122	122/122	122/122	122/122
AD	1~/3~	[mm]	158/158	158/158	158/158	158/158
AE	1~/3~	[mm]	106/134	106/134	106/134	-/134
AF	1~/3~	[mm]	106/134	106/134	106/134	-/134
P		[mm]	165	165	165	165
B1	TPE2(3)/TPE2(3) D	[mm]	97/244	97/244	97/244	97/244
B2	TPE2(3)/TPE2(3) D	[mm]	123/254	123/254	123/254	123/254
B3		[mm]	260	260	260	260
B4	1~ TPE2(3)/TPE2(3) D	[mm]	-/317	-/317	-/317	-/317
	3~	[mm]	-/337	-/337	-/337	-/337
C1	TPE2(3)/TPE2(3) D	[mm]	-/260	-/260	-/260	-/260
C5	TPE2(3)/TPE2(3) D	[mm]	-/102	-/102	-/102	-/102
C6	TPE2(3)/TPE2(3) D	[mm]	-/218	-/218	-/218	-/218
C7	TPE2(3)/TPE2(3) D	[mm]	-/102	-/102	-/102	-/102
C8	TPE2(3)/TPE2(3) D	[mm]	-/130	-/130	-/130	-/130
L1		[mm]	360	360	360	360
H1	TPE2(3)/TPE2(3) D	[mm]	94/97	94/97	94/97	94/97
H2		[mm]	176	176	176	176
H3	1~ TPE2(3)/TPE2(3) D	[mm]	485/488	485/488	505/508	-
	3~ TPE2(3)/TPE2(3) D	[mm]	525/528	525/528	545/548	545/548
M			M12	M12	M12	M12

Performance curves and technical data

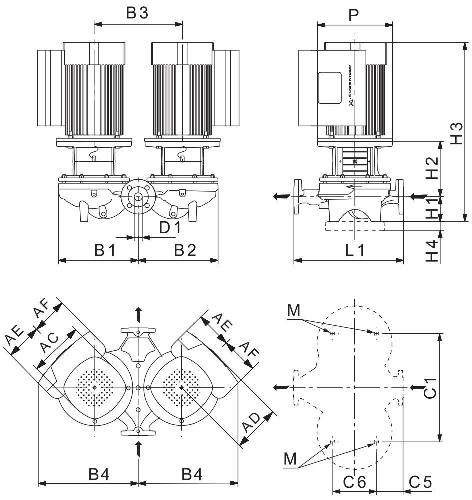
TPE2/3 (D) 80



Note: Look in Grundfos Product Center for curves for TPE2 D, TPE3 D in parallel operation.



TM089881



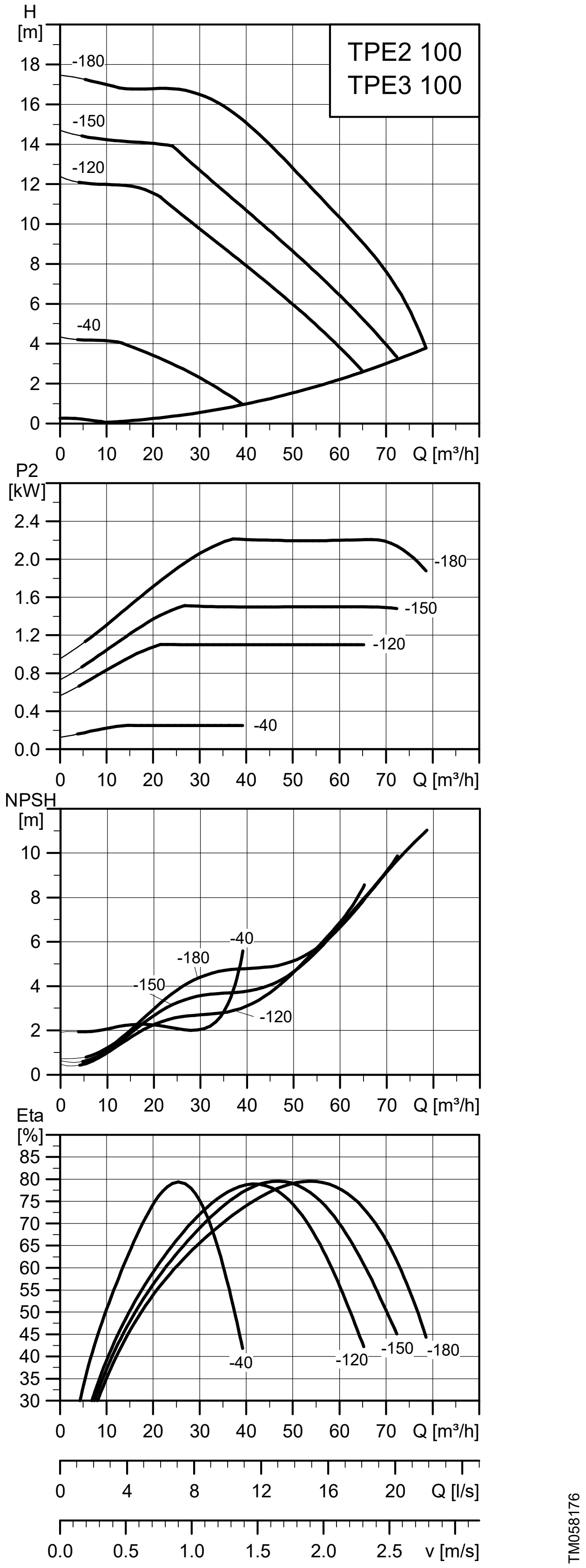
TM089880

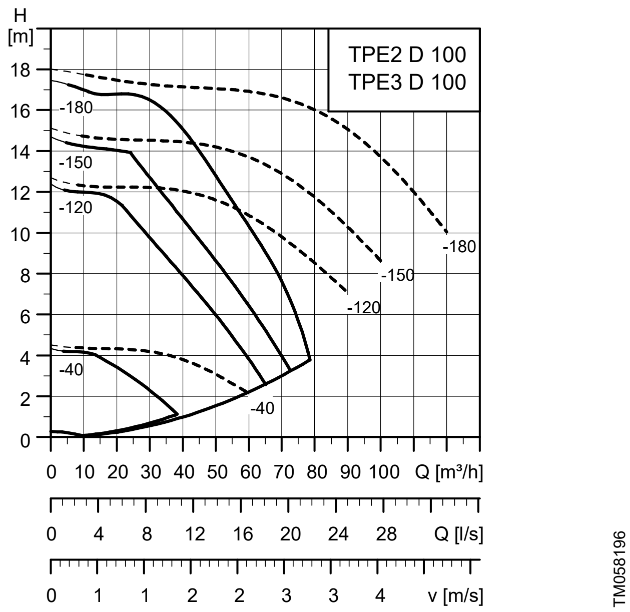
Technical data

TPE2/3 (D) 80			-210	-250	-310	-340	-440	-520	-560	-570
P2	1~/3~	kW	3	4	5.5	7.5	11	15	18.5	22
PN			PN 10/16	PN 10/16	PN 10/16	PN 10/16	PN 10/16	PN 10/16	PN 10/16	PN 10/16
T_{min};T_{max}		[°C]	[-25;140]	[-25;140]	[-25;140]	[-25;140]	[-25;140]	[-25;140]	[-25;140]	[-25;140]
D1		[mm]	81	81	81	81	81	81	81	81
AC	1~/3~	[mm]	-/191	-/191	-/191	-/255	-/255	-/314	-/314	-/314
AD	1~/3~	[mm]	-/201	-/201	-/201	-/237	-/237	-/303	-/303	-/303
AE	1~/3~	[mm]	-/146	-/146	-/146	-/173	-/173	-/210	-/210	-/210
AF	1~/3~	[mm]	-/146	-/146	-/146	-/173	-/173	-/210	-/210	-/210
P		[mm]	250	250	300	300	350	350	350	350
B1	TPE2/3 / TPE2/3 D	[mm]	147/362	147/362	147/362	161/405	161/405	161/405	161/405	161/405
B2	TPE2/3 / TPE2/3 D	[mm]	111/351	111/351	111/351	125/389	125/389	125/389	125/389	125/389
B3		[mm]	450	450	450	500	500	500	500	500
B4	TPE2/3 / TPE2/3 D	[mm]	-/450	-/450	-/450	-/517	-/517	-/585	-/585	-/585
C1	TPE2/3 / TPE2/3 D	[mm]	144/480	144/480	144/480	144/480	144/480	144/480	144/480	144/480
C5	TPE2/3 / TPE2/3 D	[mm]	180/63	180/63	180/63	220/113	220/113	220/113	220/113	220/113
C6	TPE2/3 / TPE2/3 D	[mm]	-/175	-/175	-/175	-/175	-/175	-/175	-/175	-/175
L1		[mm]	360	360	360	440	440	440	440	440
H1	TPE2/3 / TPE2/3 D	[mm]	105/105	105/105	105/105	105/105	105/105	105/105	105/105	105/105
H2		[mm]	205	205	244	246	276	276	276	276
H3	TPE2/3 / TPE2/3 D	[mm]	644/644	644/644	714/714	740/760	787/807	863/883	863/883	889/909
H4		[mm]	-	-	-	-	35	35	35	35
M			M16	M16	M16	M16	M16	M16	M16	M16

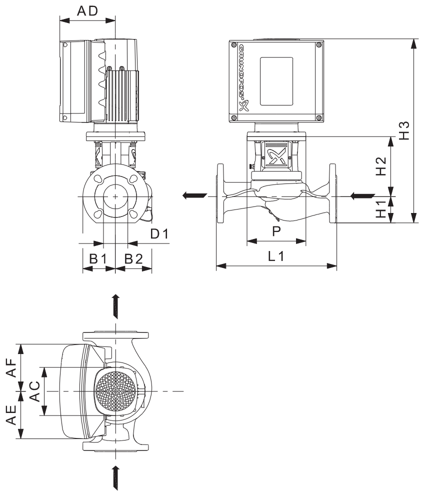
TPE pumps with a H4 dimension are delivered with a base plate. See section Base plates for base plate dimensions.

TPE2, TPE2 D, TPE3, TPE3 D 100

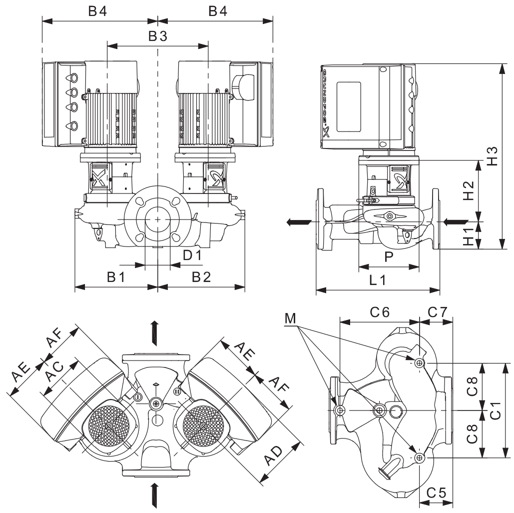




Note: The dotted QH curves apply to TPE2 D, TPE3 D in parallel operation.



TM058182

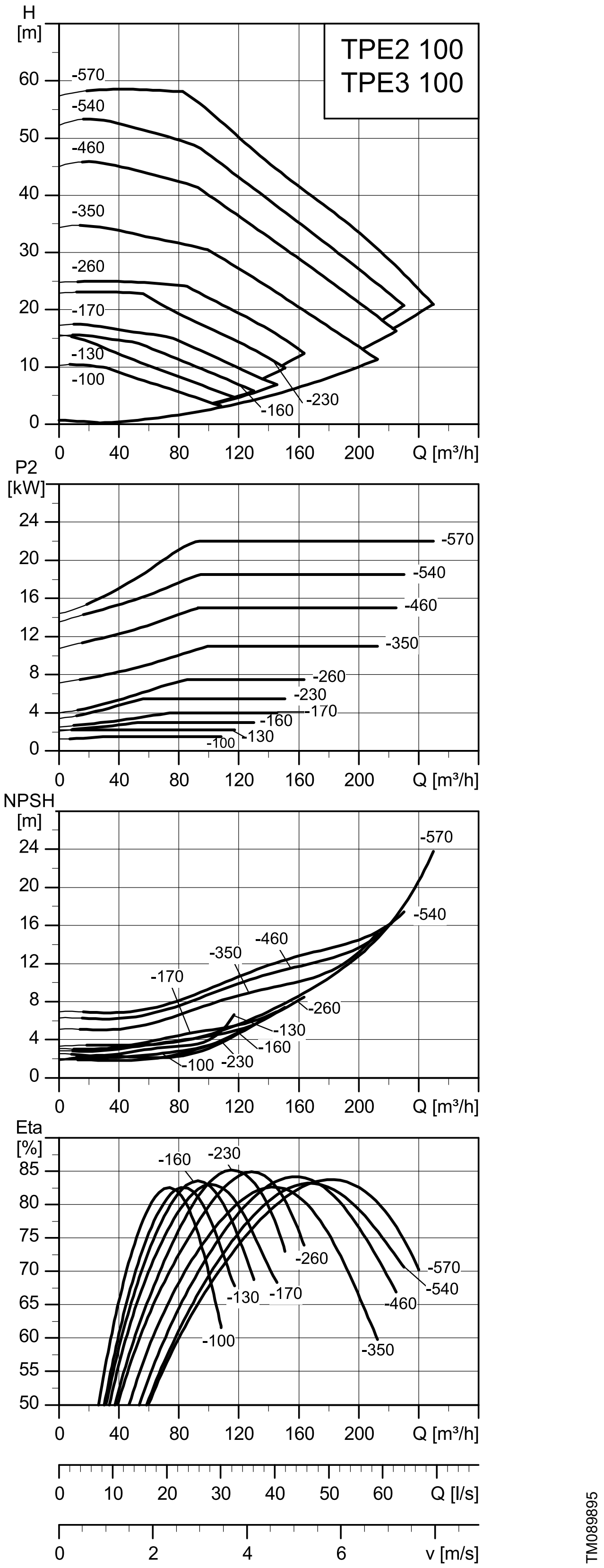


TM058183

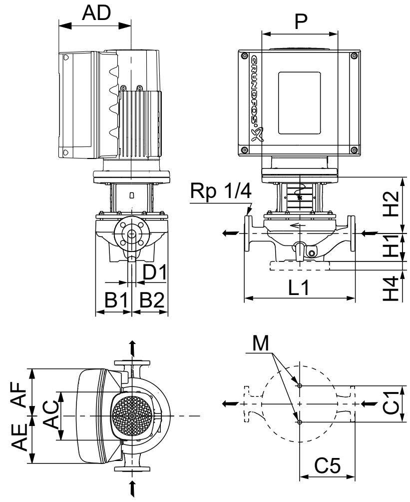
Technical data

TPE2, TPE3 100			-40	-120	-150	-180
TPE2, TPE3			●	●	●	●
TPE2 D, TPE3 D			●	●	●	●
P2	1~/3~	kW	0.25	1.1	1.5	2.2
PN			PN 6/10/16	PN 6/10/16	PN 6/10/16	PN 6/10/16
T_{min};T_{max}		[°C]	[-25;120]	[-25;120]	[-25;120]	[-25;120]
D1		[mm]	100	100	100	100
AC	1~/3~	[mm]	122/122	122/122	122/122	122/122
AD	1~/3~	[mm]	158/158	158/158	158/158	158/158
AE	1~/3~	[mm]	106/134	106/134	106/134	-/134
AF	1~/3~	[mm]	106/134	106/134	106/134	-/134
P		[mm]	165	165	165	165
B1	TPE2(3)/TPE2(3) D	[mm]	98/252	98/252	98/252	98/252
B2	TPE2(3)/TPE2(3) D	[mm]	125/265	125/265	125/265	125/265
B3	TPE2(3)/TPE2(3) D	[mm]	270	270	270	270
B4	1~ TPE2(3)/TPE2(3) D	[mm]	-/322	-/322	-/322	-/322
	3~ TPE2(3)/TPE2(3) D	[mm]	-/342	-/342	-/342	-/342
C1	TPE2(3)/TPE2(3) D	[mm]	-/270	-/270	-/270	-/270
C5	TPE2(3)/TPE2(3) D	[mm]	-/147	-/147	-/147	-/147
C6	TPE2(3)/TPE2(3) D	[mm]	-/243	-/243	-/243	-/243
C7	TPE2(3)/TPE2(3) D	[mm]	-/147	-/147	-/147	-/147
C8	TPE2(3)/TPE2(3) D	[mm]	-/135	-/135	-/135	-/135
L1		[mm]	450	450	450	450
H1	TPE2(3)/TPE2(3) D	[mm]	102/104	102/104	102/104	102/104
H2		[mm]	189	189	189	189
H3	1~ TPE2(3)/TPE2(3) D	[mm]	506/508	506/508	526/528	-
	3~ TPE2(3)/TPE2(3) D	[mm]	546/548	546/548	566/568	566/568
M			M12	M12	M12	M12

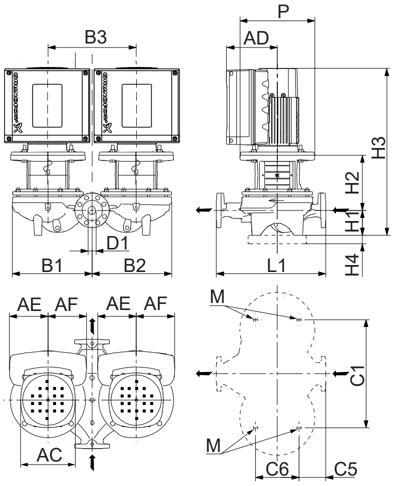
TPE2/3 (D) 100



Note: Look in Grundfos Product Center for curves for TPE2 D, TPE3 D in parallel operation.



TM089856

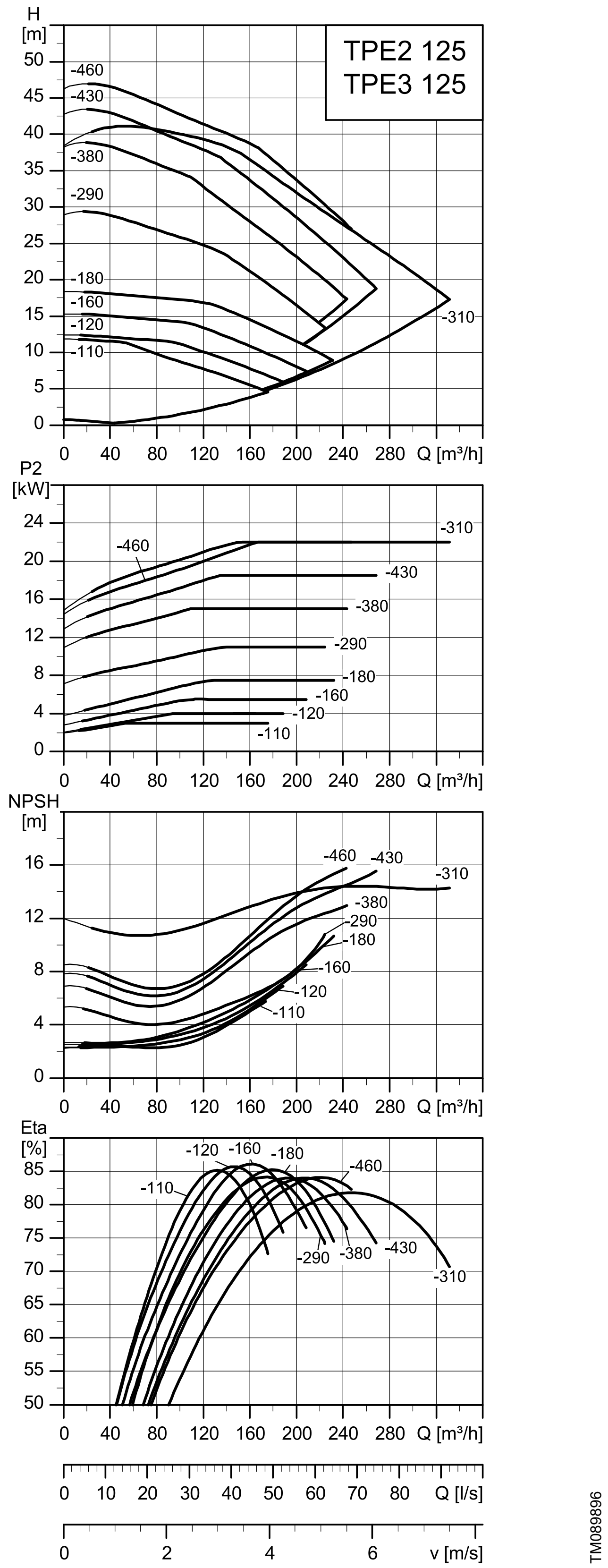


TM089858

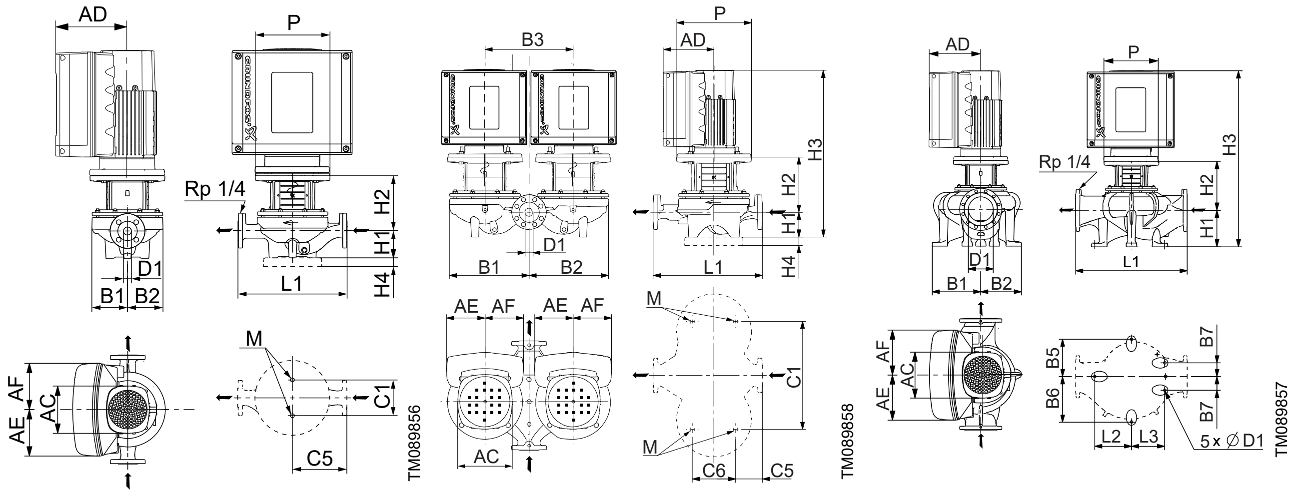
Technical data

TPE2/3 (D) 100			-100	-130	-160	-170	-230	-260	-350	-460	-540	-570
P2	1~/3~	kW	-/1.5	-/2.2	-/3	-/4	-/5.5	-/7.5	-/11	-/15	-/18.5	-/22
PN			PN 6/10/16	PN 6/10/16	PN 6/10/16	PN 6/10/16	PN 10/16	PN 10/16	PN 10/16	PN 10/16	PN 10/16	PN 10/16
T_{min};T_{max}		[°C]	[-25;140]	[-25;140]	[-25;140]	[-25;140]	[-25;140]	[-25;140]	[-25;140]	[-25;140]	[-25;140]	[-25;140]
D1		[mm]	102	102	102	102	102	102	102	102	102	102
AC	1~/3~	[mm]	-/122	-/191	-/191	-/191	-/255	-/255	-/255	-/314	-/314	-/314
AD	1~/3~	[mm]	-/158	-/201	-/201	-/201	-/237	-/237	-/237	-/303	-/303	-/303
AE	1~/3~	[mm]	-/134	-/146	-/146	-/146	-/173	-/173	-/173	-/210	-/210	-/210
AF	1~/3~	[mm]	-/134	-/146	-/146	-/146	-/173	-/173	-/173	-/210	-/210	-/210
P		[mm]	200	250	250	250	300	300	350	350	350	350
B1	TPE2(3)/ TPE2(3) D	[mm]	169/412	169/412	169/412	169/412	222/425	222/425	169/412	169/412	169/412	222/425
B2	TPE2(3)/ TPE2(3) D	[mm]	151/401	151/401	151/401	151/401	161/402	161/402	151/401	151/401	151/401	161/402
B3	TPE2(3)/ TPE2(3) D	[mm]	-/500	-/500	-/500	-/500	-/480	-/480	-/500	-/500	-/500	480/
C1	TPE2(3)/ TPE2(3) D	[mm]	230/480	230/480	230/480	230/480	230/480	230/480	230/480	230/480	230/480	230/480
C5	TPE2(3)/ TPE2(3) D	[mm]	225/118	225/118	225/118	225/118	250/113	250/113	225/118	225/118	225/118	250/113
C6	TPE2(3)/ TPE2(3) D	[mm]	-/175	-/175	-/175	-/175	-/175	-/175	-/175	-/175	-/175	-/175
L1		[mm]	450	450	450	450	500	500	450	450	450	500
H1	TPE2(3)/ TPE2(3) D	[mm]	117/117	117/117	117/117	117/117	140/140	140/140	117/117	117/117	117/117	140/140
H2		[mm]	195/226	195/226	195/226	195/226	266/276	266/276	258/289	258/289	258/289	264/274
H3	TPE2(3)/ TPE2(3) D	[mm]	586/617	646/677	646/677	646/677	795/805	795/805	781/812	857/888	857/888	912/922
H4		[mm]	-	-	-	-	-	-	35	35	35	35
M			M16	M16	M16	M16	M16	M16	M16	M16	M16	M16

TPE2/3 (D) 125



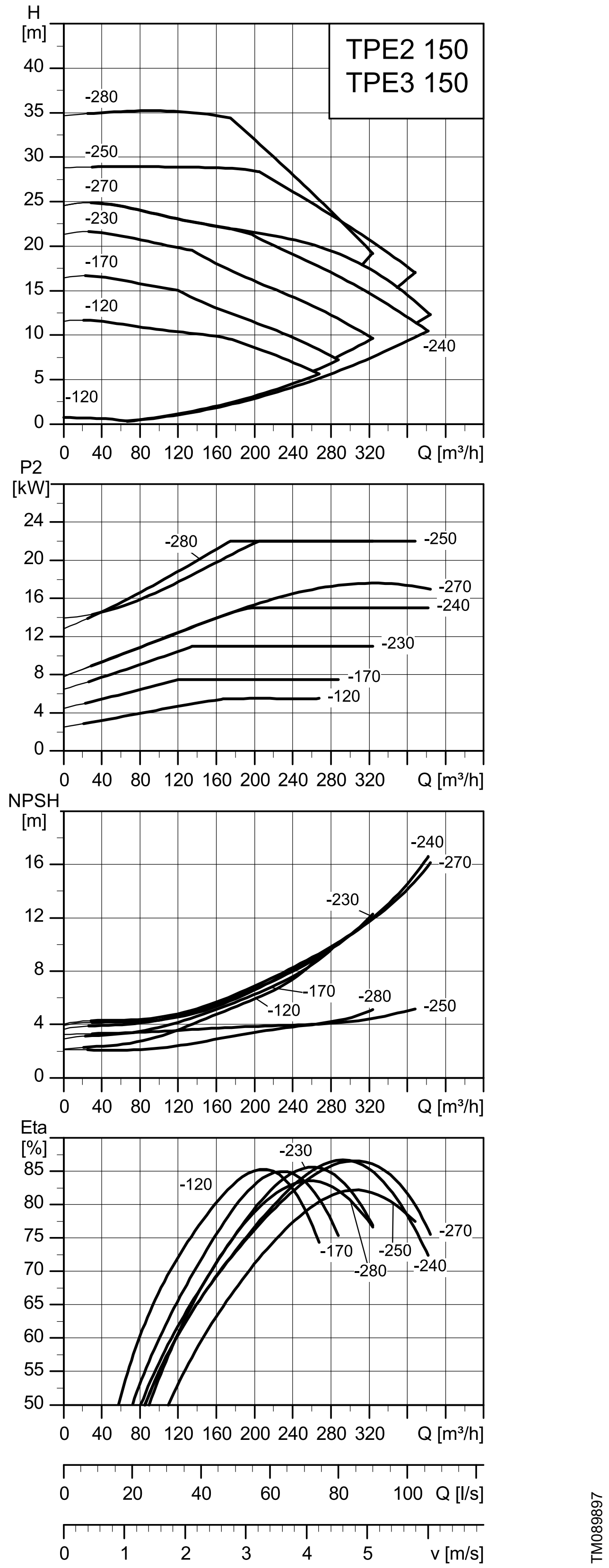
Note: Look in Grundfos Product Center for curves for TPE2 D, TPE3 D in parallel operation.



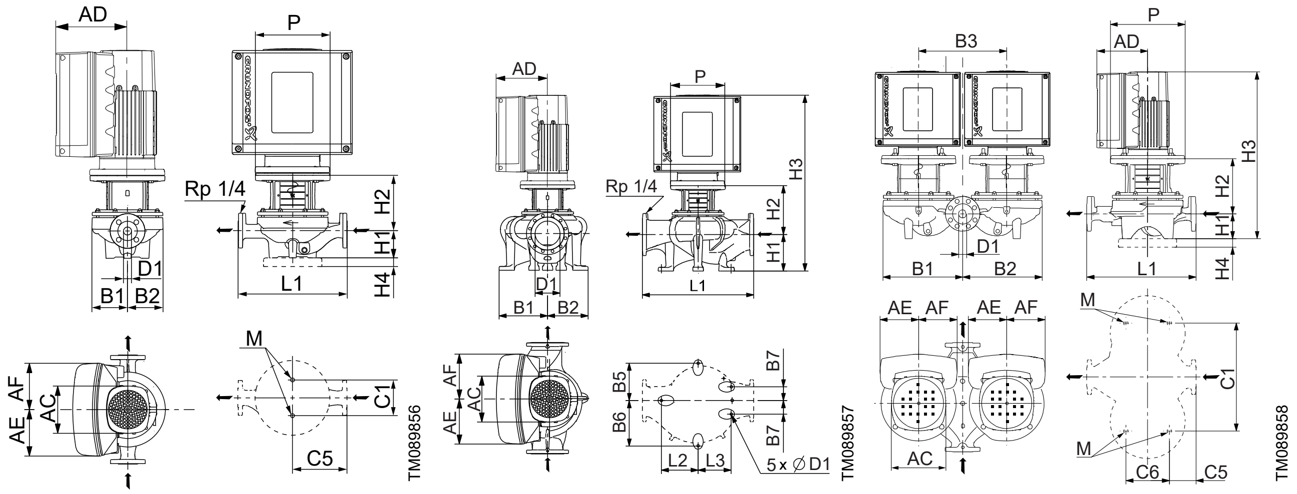
Technical data

TPE2/3 (D) 125			-110	-120	-160	-180	-290	-310	-380	-430	-460
P2	3~	kW	3	4	5.5	7.5	11	22	15	18.5	22
PN			PN 10/16	PN 10/16	PN 10/16	PN 10/16	PN 10/16	PN 10/16	PN 10/16	PN 10/16	PN 10/16
T_{min};T_{max}		[°C]	[-25;140]	[-25;140]	[-25;140]	[-25;140]	[-25;140]	[-25;140]	[-25;140]	[-25;140]	[-25;140]
D1		[mm]	132	132	132	132	132	125	132	132	132
AC	3~	[mm]	191	191	255	255	255	314	314	314	314
AD	3~	[mm]	201	201	237	237	237	303	303	303	303
AE	3~	[mm]	146	146	173	173	173	210	210	210	210
AF	3~	[mm]	146	146	173	173	173	210	210	210	210
P		[mm]	250	250	300	300	350	350	350	350	350
B1	TPE2/3 / TPE2/3 D	[mm]	223/455	223/455	223/455	223/455	209/433	243/-	209/433	209/433	209/433
B2	TPE2/3 / TPE2/3 D	[mm]	157/428	157/428	157/428	157/428	193/408	156/-	156/408	156/408	156/408
B3	TPE2/3 / TPE2/3 D	[mm]	-/500	-/500	-/500	-/500	-/500	-	-/500	-/500	-/500
B5	TPE2/3 / TPE2/3 D	[mm]	-	-	-	-	-	170/-	-	-	-
B6	TPE2/3 / TPE2/3 D	[mm]	-	-	-	-	-	220/-	-	-	-
B7	TPE2/3 / TPE2/3 D	[mm]	-	-	-	-	-	103.5/-	-	-	-
C1	TPE2/3 / TPE2/3 D	[mm]	230/600	230/600	230/600	230/600	230/600	170/-	230/600	230/600	230/600
C5	TPE2/3 / TPE2/3 D	[mm]	310/135	310/135	310/135	310/135	310/135	170/-	310/135	310/135	310/135
C6	TPE2/3 / TPE2/3 D	[mm]	-/230	-/230	-/230	-/230	-/230	-	-/230	-/230	-/230
L1		[mm]	620	620	620	620	620	620	620	620	620
L2		[mm]	-	-	-	-	-	170	-	-	-
L3		[mm]	-	-	-	-	-	183.5	-	-	-
H1	TPE2/3 / TPE2/3 D	[mm]	215/215	215/215	215/215	215/215	215/215	210/-	215/215	215/215	215/215
H2		[mm]	195	195	260	260	262	275	262	262	262
H3	TPE2/3 / TPE2/3 D	[mm]	744/770	744/770	864/890	864/890	883/905	993/-	959/981	959/981	985/1007
H4		[mm]	-	-	-	-	35	-	35	35	35
M			M16	M16	M16	M16	M16	-	M16	M16	M16
⌀D1			-	-	-	-	-	⌀18	-	-	-

TPE2/3 (D) 150



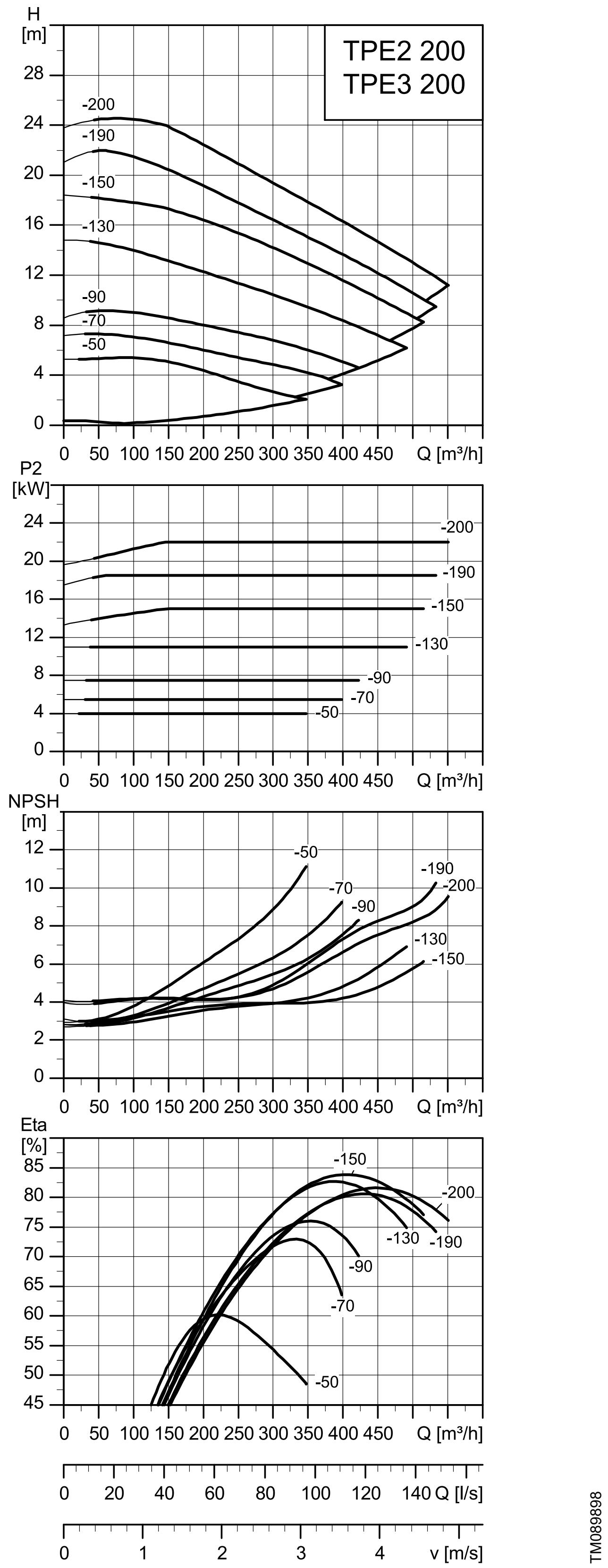
Note: Look in Grundfos Product Center for curves for TPE2 D, TPE3 D in parallel operation.

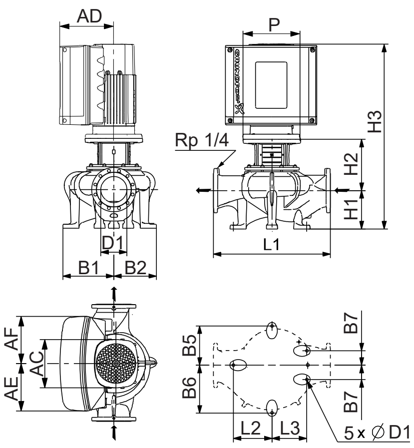


Technical data

TPE2/3 (D) 150			-120	-170	-230	-240	-250	-270	-280
P2	3~	kW	5.5	7.5	11	15	22	18.5	22
PN			PN 10/16	PN 10/16	PN 10/16	PN 10/16	PN 10/16	PN 10/16	PN 10/16
T_{min};T_{max}		[°C]	[-25;140]	[-25;140]	[-25;140]	[-25;140]	[-25;140]	[-25;140]	[-25;140]
D1		[mm]	158	158	158	158	150	158	150
AC	3~	[mm]	255	255	255	255	314	255	314
AD	3~	[mm]	237	237	303	303	303	303	303
AE	3~	[mm]	173	173	210	210	210	210	210
AF	3~	[mm]	173	173	210	210	210	210	210
P		[mm]	300	300	350	350	350	350	350
B1	TPE2/3 / TPE2/3 D	[mm]	277/564	277/564	277/564	277/564	296/553	277/564	334/-
B2	TPE2/3 / TPE2/3 D	[mm]	207/533	207/533	207/533	207/533	237/583	207/533	288/-
B3	TPE2/3 / TPE2/3 D	[mm]	-/680	-/680	-/680	-/680	-/680	-/680	-
B5	TPE2/3 / TPE2/3 D	[mm]	175/-	175/-	175/-	175/-	175/-	175/-	262/-
B6	TPE2/3 / TPE2/3 D	[mm]	175/-	175/-	175/-	175/-	175/-	175/-	309/-
B7	TPE2/3 / TPE2/3 D	[mm]	-	-	-	-	-	-	75/-
C1	TPE2/3 / TPE2/3 D	[mm]	-/680	-/680	-/680	-/680	-/680	-/680	-
C5	TPE2/3 / TPE2/3 D	[mm]	-/129	-/129	-/129	-/129	400/153	-/129	-
C6	TPE2/3 / TPE2/3 D	[mm]	-/300	-/300	-/300	-/300	-/300	-/300	-
L1		[mm]	700	700	700	700	800	700	800
L2	TPE2/3 / TPE2/3 D	[mm]	215/-	215/-	215/-	215/-	-	215/-	277/-
L3	TPE2/3 / TPE2/3 D	[mm]	215/-	215/-	215/-	215/-	-	215/-	267/-
H1	TPE2/3 / TPE2/3 D	[mm]	250/215	250/215	250/215	250/215	215/215	250/215	235/-
H2	TPE2/3 / TPE2/3 D	[mm]	276/306	276/306	274/304	274/304	322/322	274/304	319/-
H3	TPE2/3 / TPE2/3 D	[mm]	915/910	915/910	1006/1001	1006/1001	1089/1089	1076/1071	1106/-
H4		[mm]	-	-	-	-	35	-	-
M	TPE2/3 / TPE2/3 D		-/M16	-/M16	-/M16	-/M16	M16	-/M16	-
∅D1			-	-	-	-	-	-	∅18

TPE2/3 200

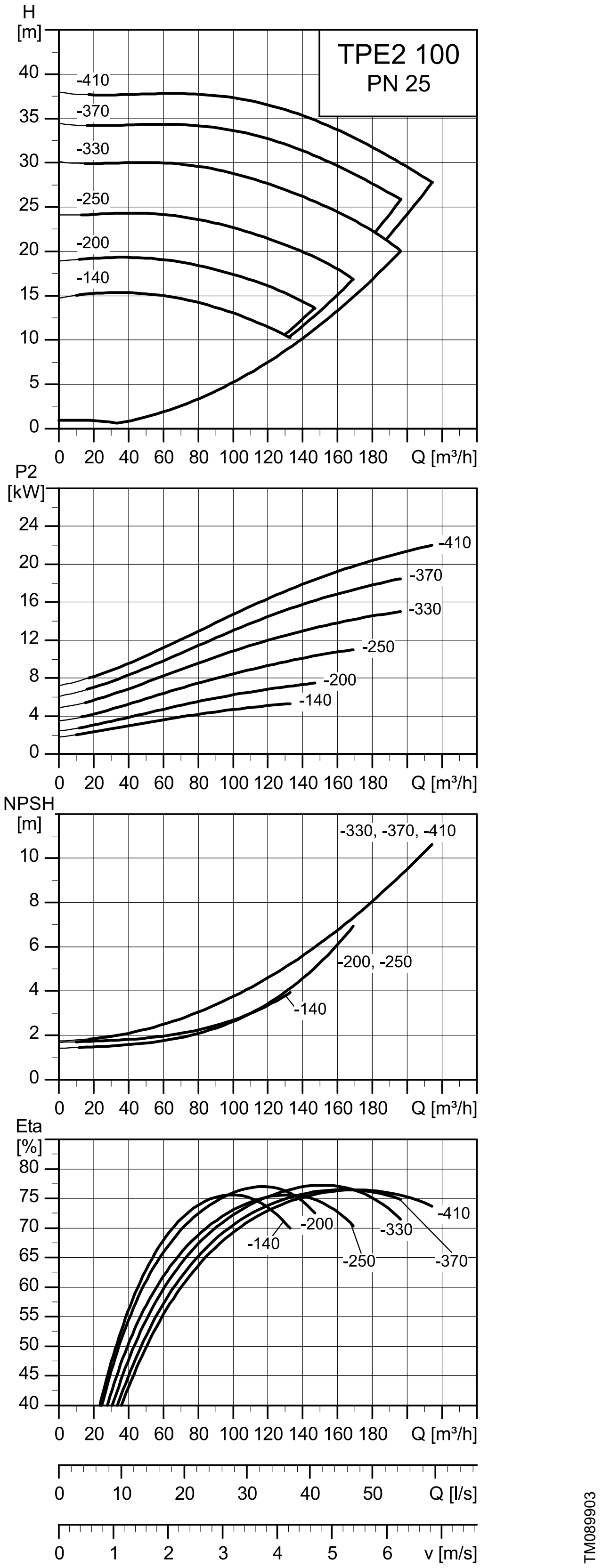

TPE2 200
TPE3 200
H [m]
P2 [kW]
NPSH [m]
Eta [%]
Q [m³/h]
Q [l/s]
v [m/s]
-200
-190
-150
-130
-90
-70
-50
TM089898



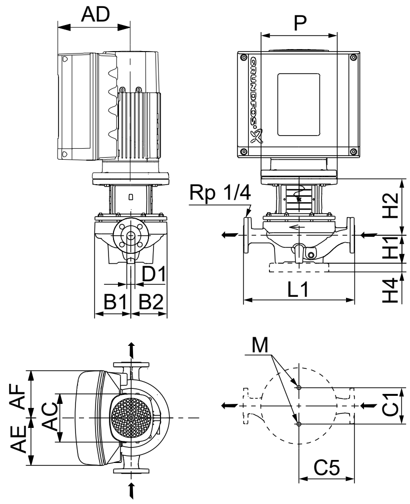
Technical data

TPE2/3 200			-50	-70	-90	-130	-150	-190	-200
P2	3~	kW	4	5.5	7.5	11	15	18.5	22
PN			PN 10/16	PN 10/16	PN 10/16	PN 10/16	PN 10/16	PN 10/16	PN 10/16
T_{min};T_{max}		[°C]	[-25;140]	[-25;140]	[-25;140]	[-25;140]	[-25;140]	[-25;140]	[-25;140]
D1		[mm]	200	200	200	200	200	200	200
AC	3~	[mm]	191	255	255	314	314	314	314
AD	3~	[mm]	201	237	237	303	303	303	303
AE	3~	[mm]	146	173	173	210	210	210	210
AF	3~	[mm]	146	173	173	210	210	210	210
P		[mm]	250	300	300	350	350	350	350
B1	TPE2(3)/TPE2(3) D	[mm]	363/-	363/-	363/-	363/-	363/-	363/-	363/-
B2	TPE2(3)/TPE2(3) D	[mm]	283/-	283/-	283/-	283/-	283/-	292/-	292/-
B5	TPE2(3)/TPE2(3) D	[mm]	250/-	250/-	250/-	250/-	250/-	260/-	260/-
B6	TPE2(3)/TPE2(3) D	[mm]	330/-	330/-	330/-	330/-	330/-	320/-	320/-
B7	TPE2(3)/TPE2(3) D	[mm]	141/-	141/-	141/-	141/-	141/-	167/-	167/-
L1		[mm]	900	900	900	900	900	900	900
L2	TPE2/3 / TPE2/3 D	[mm]	220/-	220/-	220/-	220/-	220/-	240/-	240/-
L3	TPE2/3 / TPE2/3 D	[mm]	287/-	287/-	287/-	287/-	287/-	243/-	243/-
H1	TPE2/3 / TPE2/3 D	[mm]	280/-	280/-	280/-	280/-	280/-	280/-	280/-
H3	TPE2/3 / TPE2/3 D	[mm]	855/-	975/-	975/-	1098/-	1098/-	1163/-	1163/-
∅D1			∅18	∅18	∅18	∅18	∅18	∅18	∅18

TPE2 Large 100, PN 25



Note: The curves shown at 50 Hz, but the pumps run at 55 Hz, look in Grundfos Product Center to see 55 Hz curve.



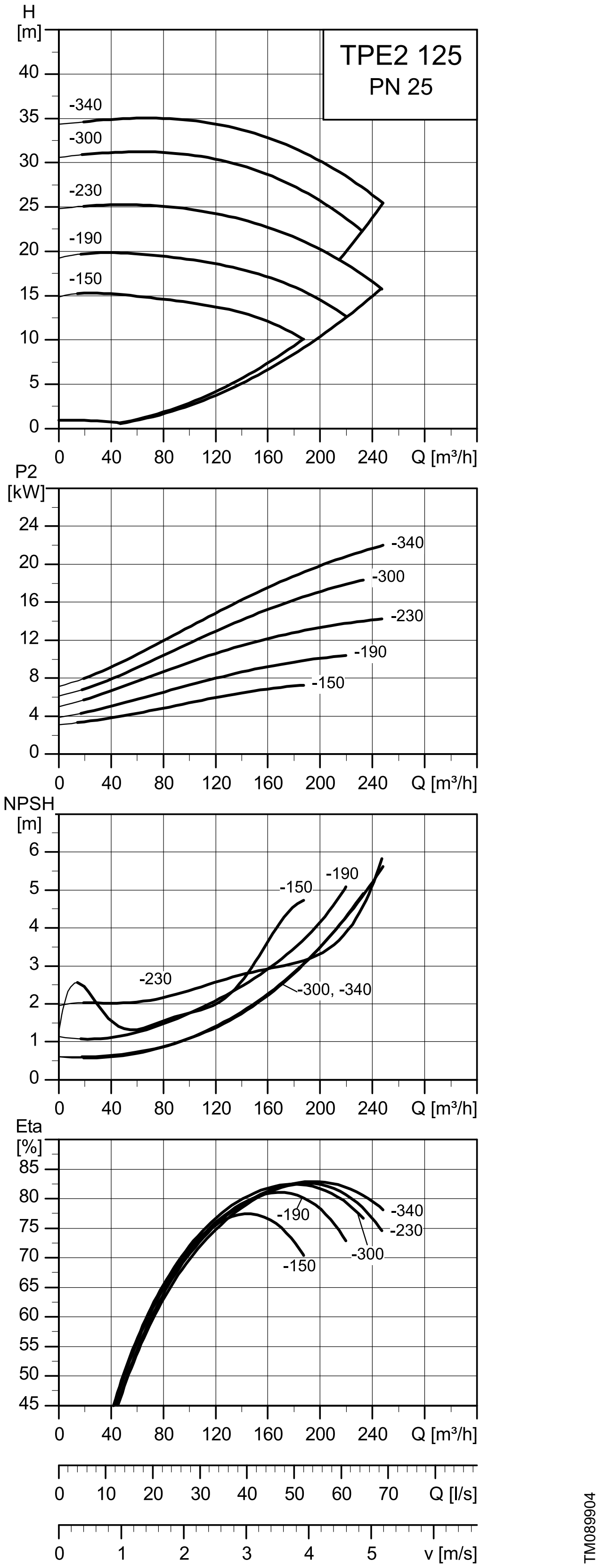
TM089856

Technical data

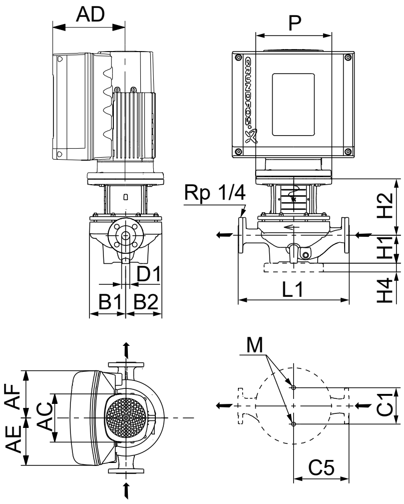
TPE2 100			-140	-200	-250	-330	-370	-410
TPE2			●	●	●	●	●	●
P2	3~	[kW]	5.5	7.5	11	15	18.5	22
PN			PN 25	PN 25	PN 25	PN 25	PN 25	PN 25
$T_{min};T_{max}$		[°C]	[-40;150]	[-40;150]	[-40;150]	[-40;150]	[-40;150]	[-40;150]
D1		[mm]	100	100	100	100	100	100
AC	3~	[mm]	255	255	316	316	316	316
AD	3~	[mm]	237	237	308	308	501	501
AE	3~	[mm]	173	173	210	210	210	210
AF	3~	[mm]	173	173	-/210	210	210	210
P		[mm]	300	300	350	350	350	350
B1		[mm]	290	290	290	290	290	290
B2		[mm]	249	249	249	249	249	249
C1		[mm]	230	230	230	230	230	230
C5		[mm]	335	335	335	335	335	335
L1		[mm]	670	670	670	670	670	670
H1		[mm]	175	175	175	175	175	175
H2		[mm]	254	254	308	308	308	308
H3	3~	[mm]	842	842	965	965	1035	1035
H4		[mm]	-	-	35	35	35	35
M			M16	M16	M16	M16	M16	M16

TPE pumps with a H4 dimension are delivered with a base plate. See section Base plates for base plate dimensions.

TPE2 Large 125, PN 25



Note: The curves shown at 50 Hz, but the pumps run at 55 Hz, look in Grundfos Product Center to see 55 Hz curve.

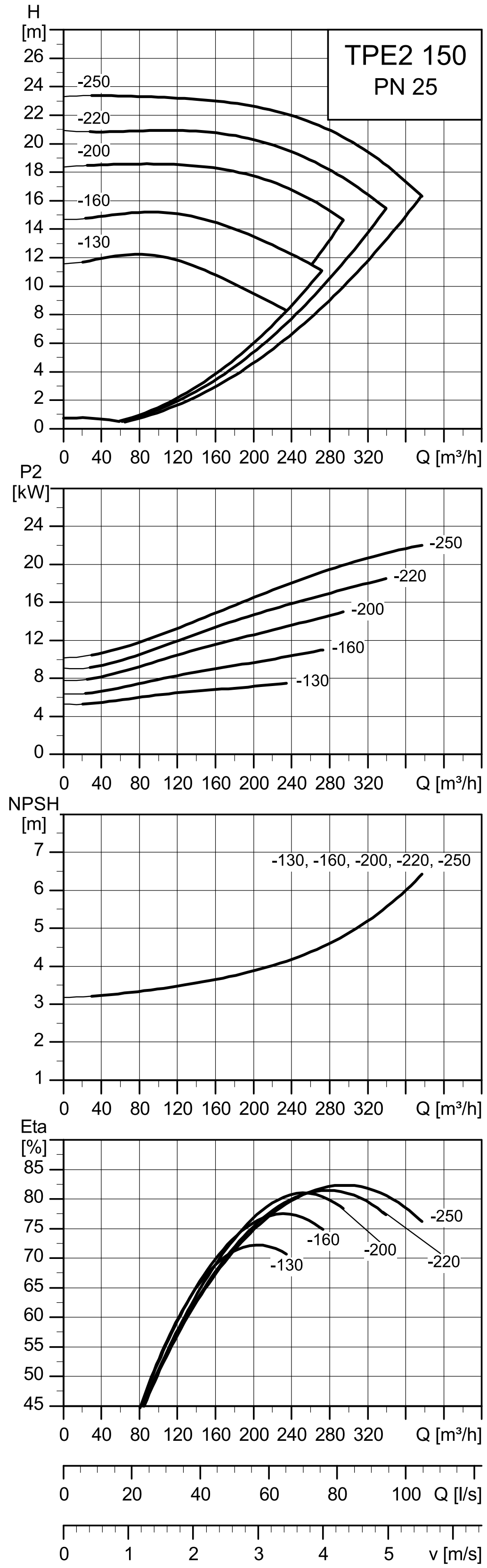


Technical data

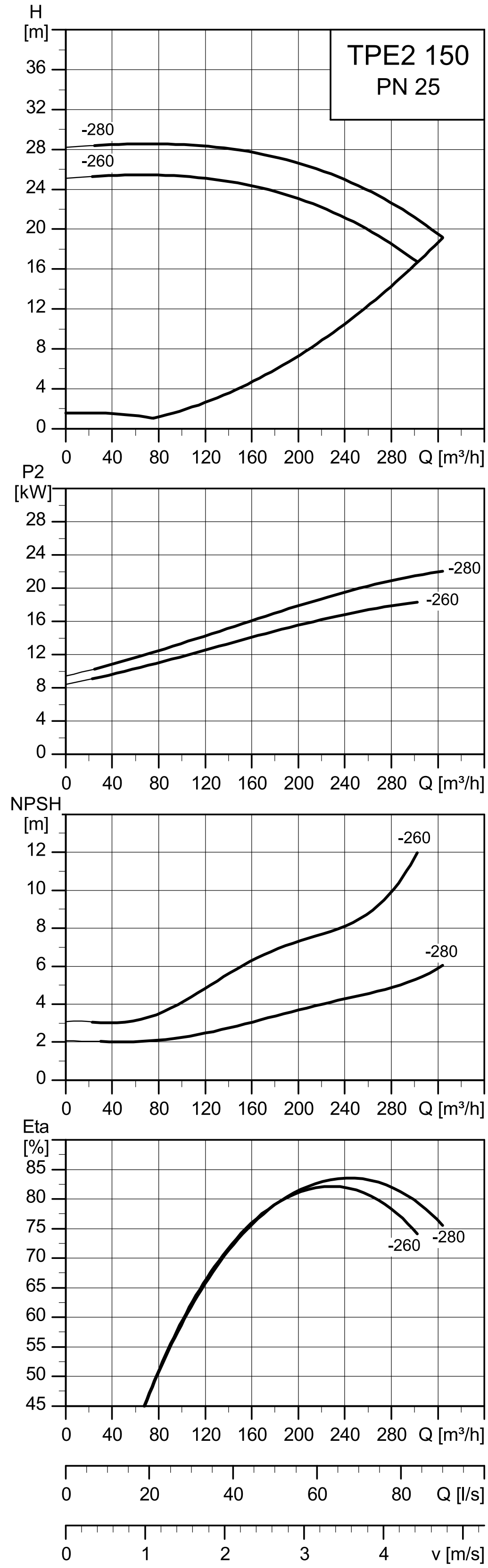
TPE2 125			-150	-190	-230	-300	-340
P2	3~	[kW]	7.5	11	15	18.5	22
PN			PN 25	PN 25	PN 25	PN 25	PN 25
$T_{min};T_{max}$		[°C]	[-40;140]	[-40;140]	[-40;140]	[-40;140]	[-40;140]
D1		[mm]	125	125	125	125	125
AC	3~	[mm]	255	316	316	316	316
AD	3~	[mm]	237	308	308	308	308
AE	3~	[mm]	173	210	210	210	210
AF	3~	[mm]	173	210	210	210	210
P		[mm]	300	350	350	350	350
B1		[mm]	250	244	244	273	273
B2		[mm]	202	220	220	236	236
B3		[mm]	-	-	-	-	-
B4		[mm]	-	-	-	-	-
C1		[mm]	230	230	230	230	230
C5		[mm]	400	400	400	400	400
C6		[mm]	-	-	-	-	-
L1		[mm]	800	800	800	800	800
H1		[mm]	215	215	215	215	215
H2		[mm]	318	315	315	312	312
H3	3~	[mm]	889	1012	1012	1079	1079
H4		[mm]	-	35	35	35	35
M			M16	M16	M16	M16	M16

TPE pumps with a H4 dimension are delivered with a base plate. See section Base plates for base plate dimensions.

TPE2 Large 150, PN 25

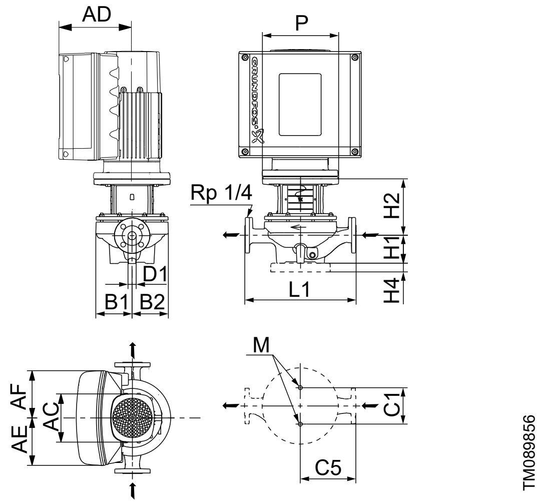


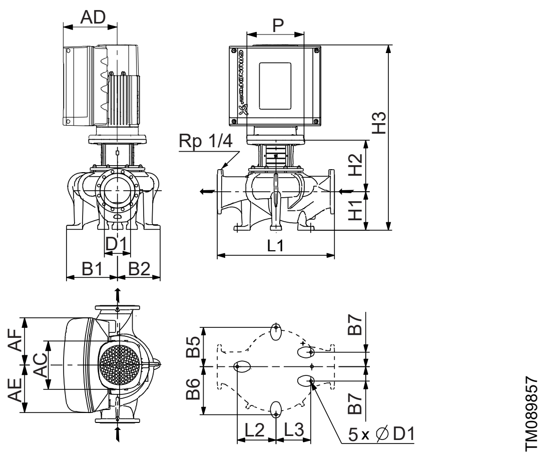
TM089905



TM089906

Note: The curves shown at 50 Hz, but the pumps run at 55 Hz, look in Grundfos Product Center to see 55 Hz curve.



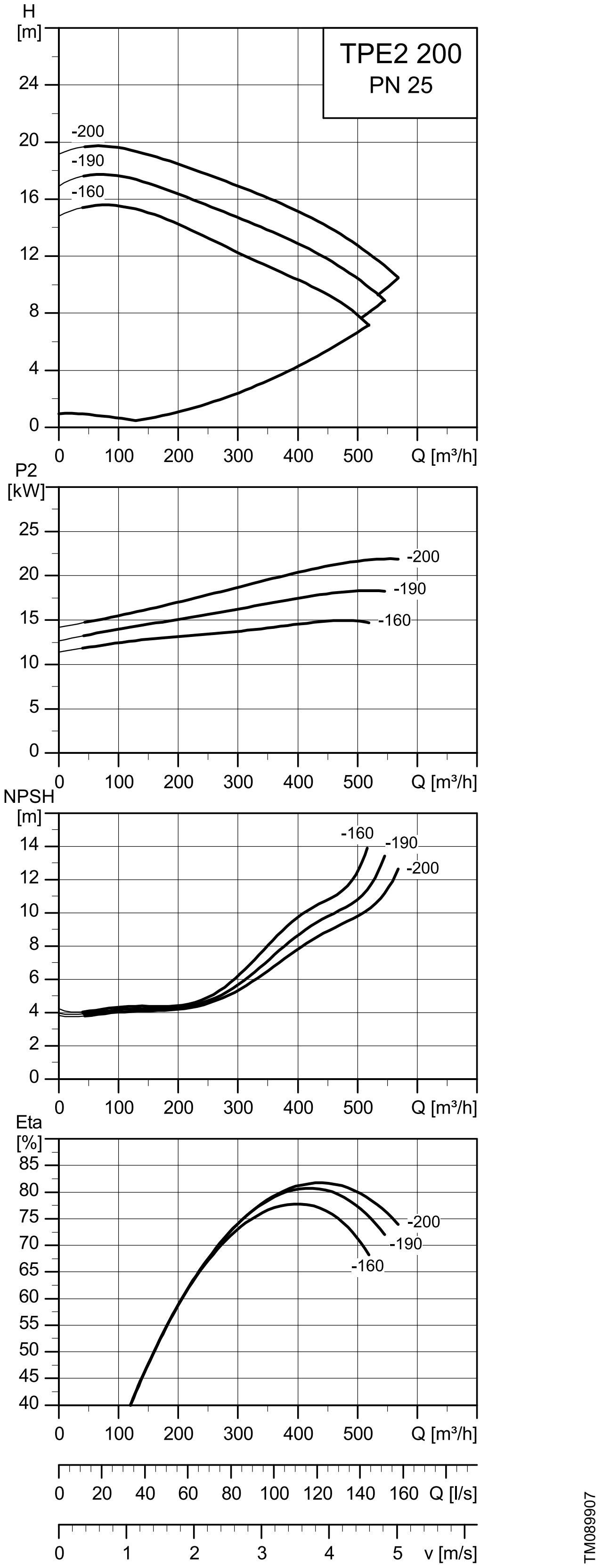


Technical data

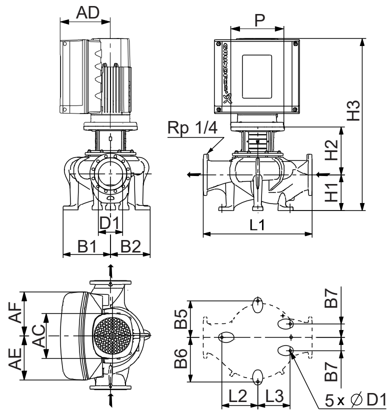
TPE2 150			-130	-160	-200	-220	-250	-260	-280
P2	3~	[kW]	7.5	11	15	18.5	22	18.5	22
PN			PN 25	PN 25	PN 25	PN 25	PN 25	PN 25	PN 25
$T_{min};T_{max}$		[°C]	[-40;140]	[-40;140]	[-40;140]	[-40;140]	[-40;140]	[-40;140]	[-40;140]
D1		[mm]	150	150	150	150	150	150	150
AC	3~	[mm]	255	316	316	316	316	316	316
AD	3~	[mm]	237	308	308	308	308	308	308
AE	3~	[mm]	173	210	210	210	210	210	210
AF	3~	[mm]	173	210	210	210	210	210	210
P		[mm]	300	350	350	350	350	350	350
B1		[mm]	296	296	296	296	296	335	335
B2		[mm]	237	237	237	237	237	288	288
C1		[mm]	230	230	230	230	230	-	-
C5		[mm]	400	400	400	400	400	-	-
L1		[mm]	800	800	800	800	800	800	800
H1		[mm]	215	215	215	215	215	235	235
H2		[mm]	291	321	321	321	321	319	319
H3	3~	[mm]	896	1018	1018	1088	1088	1036	1036
H4		[mm]	-	35	35	35	35	-	-
M			M16	M16	M16	M16	M16	-	-

TPE pumps with a H4 dimension are delivered with a base plate. See section Base plates for base plate dimensions.

TPE2 Large 200, PN 25



Note: The curves shown at 50 Hz, but the pumps run at 55 Hz, look in Grundfos Product Center to see 55 Hz curve.



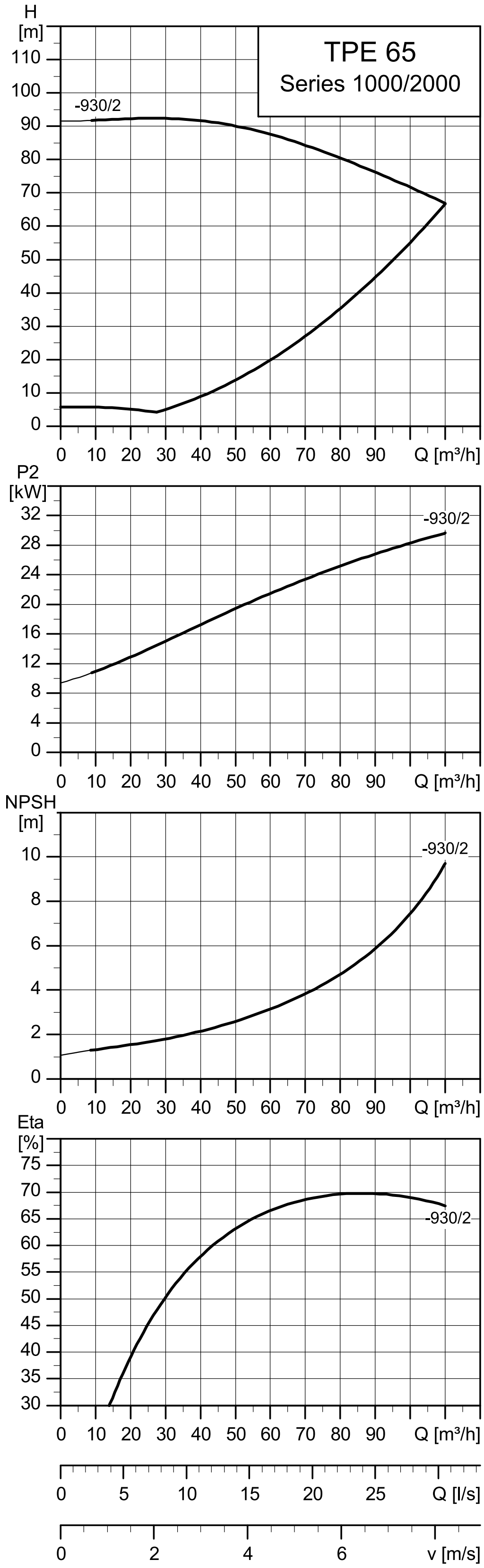
TM089857

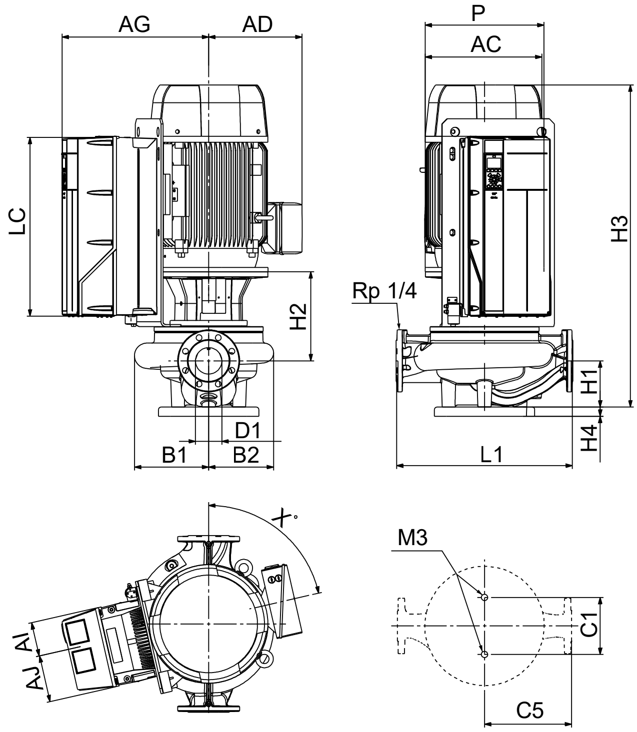
Technical data

TPE2 200			-160	-190	-200
P2	3~	[kW]	15	18.5	22
PN			PN 25	PN 25	PN 25
T_{min};T_{max}		[°C]	[-40;140]	[-40;140]	[-40;140]
D1		[mm]	200	200	200
AC	3~	[mm]	316	316	316
AD	3~	[mm]	308	308	308
AE	3~	[mm]	210	210	210
AF	3~	[mm]	210	210	210
P		[mm]	350	350	350
B1		[mm]	348	348	348
B2		[mm]	288	288	288
L1		[mm]	900	900	900
H1		[mm]	280	280	280
H2		[mm]	331	331	331
H3	3~	[mm]	1093	1163	1163

TPE Series 1000/2000, PN 16, 25

TPE 65-XXX/2





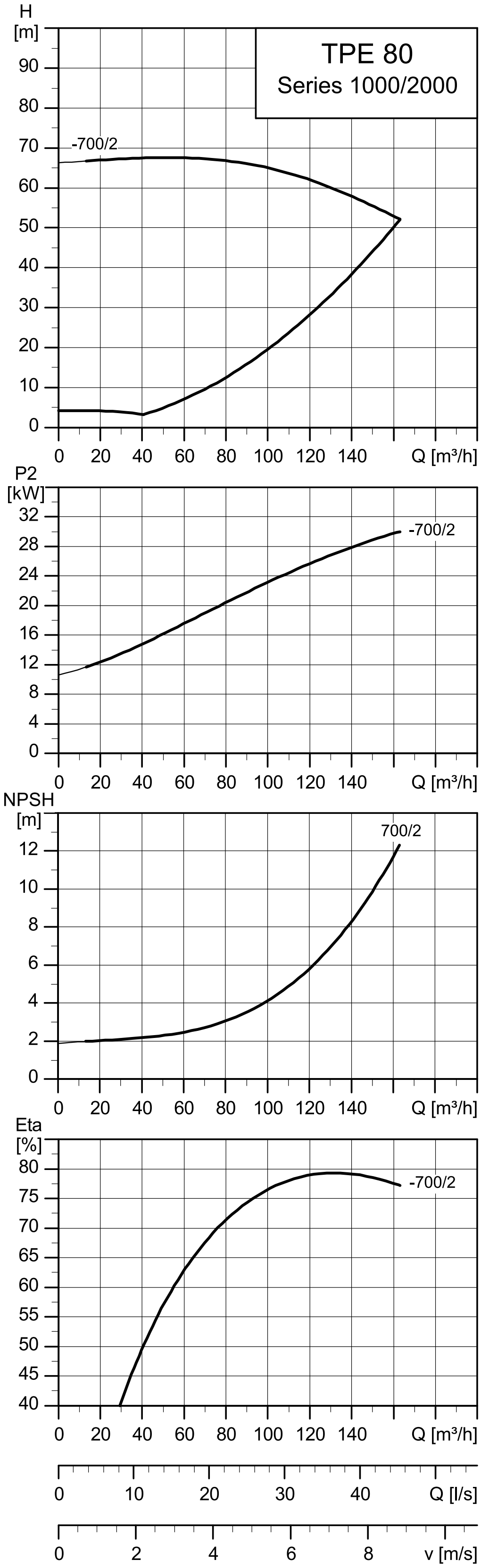
TM072107

Technical data

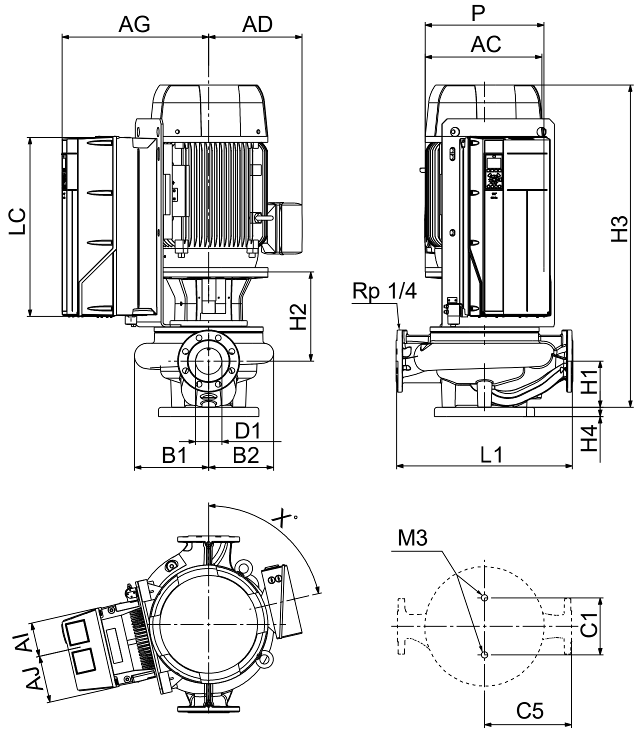
TPE 65			-930/2
IEC size	3~ TPE		200
P2	3~ TPE	[kW]	30
PN			PN 16
T_{min};T_{max}		[°C]	[-25;120]
D1		[mm]	65
AC	3~ TPE	[mm]	396
AD	3~ TPE	[mm]	338
AG		[mm]	480
AI		[mm]	126
AJ		[mm]	126
P		[mm]	400
B1	TPE	[mm]	178
B2	TPE	[mm]	164
C1	TPE	[mm]	144
C5	TPE	[mm]	238
L1		[mm]	475
LC		[mm]	650
H1		[mm]	125
H2		[mm]	263
H3	13~ TPE	[mm]	999
H4		[mm]	35
M3			M16
X			72°

- TPE pumps with a H4 dimension are delivered with a base plate.

TPE 80-XXX/2



TM089915

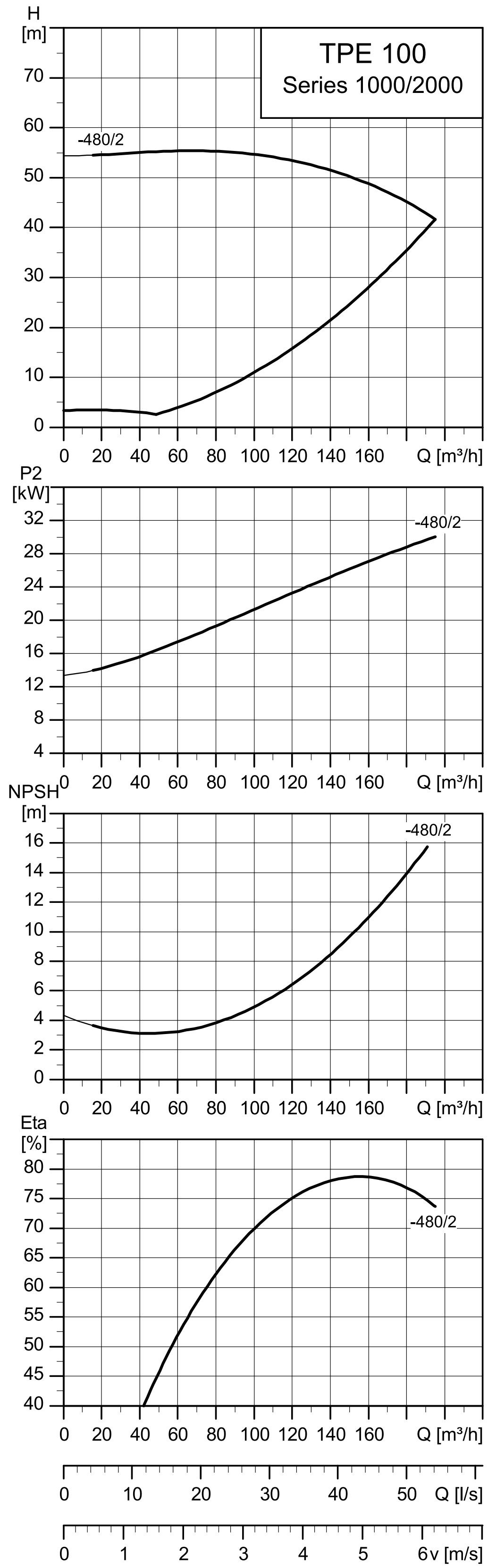


Technical data

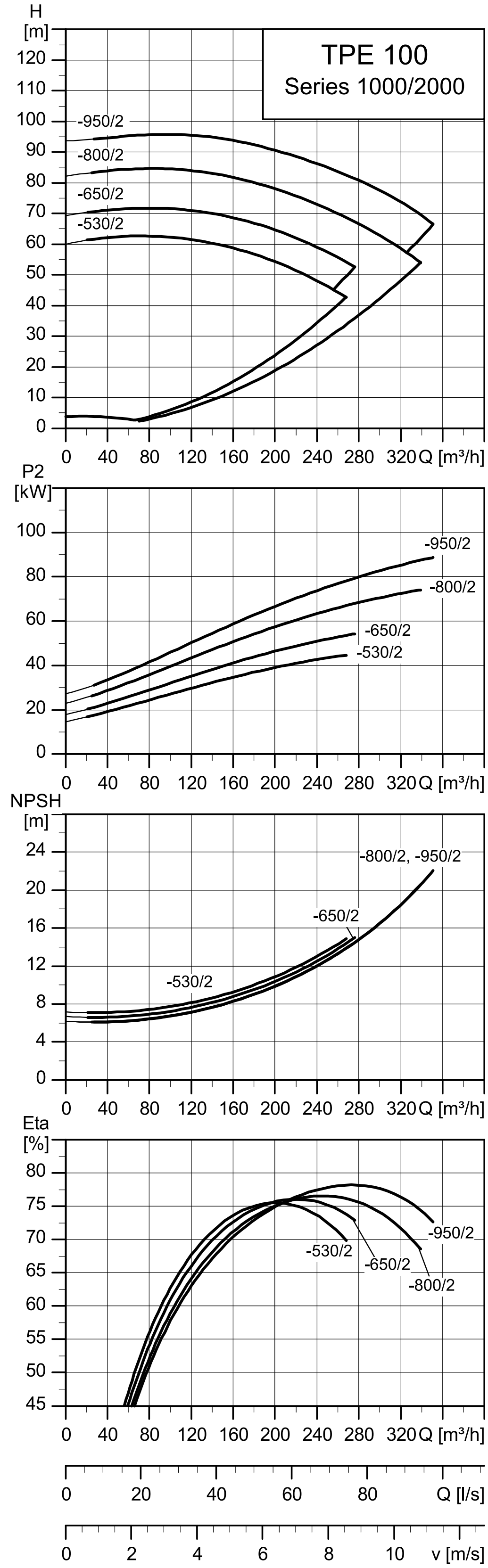
TPE 80			-700/2
IEC size	3~ TPE		200
P2	3~ TPE	[kW]	-/30
PN			PN 16
T_{min};T_{max}		[°C]	[-25;120]
D1		[mm]	80
AC	3~ TPE	[mm]	402
AD	3~ TPE	[mm]	320
AG		[mm]	470
AI	3~ TPE	[mm]	126
AJ	3~ TPE	[mm]	126
P		[mm]	400
B1	TPE	[mm]	187
B2	TPE	[mm]	162
C1	TPE	[mm]	144
C5	TPE	[mm]	250
L1		[mm]	500
LC		[mm]	650
H1		[mm]	115
H2		[mm]	273
H3	3~ TPE	[mm]	999
H4		[mm]	35
M3			M16
X			90°

- TPE pumps with a H4 dimension are delivered with a base plate.

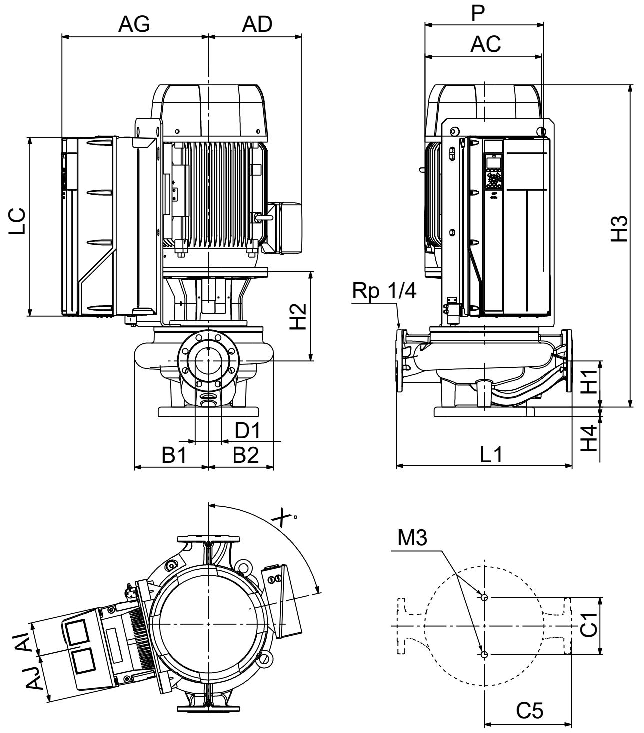
TPE 100-XXX/2



TM089916



TM089918

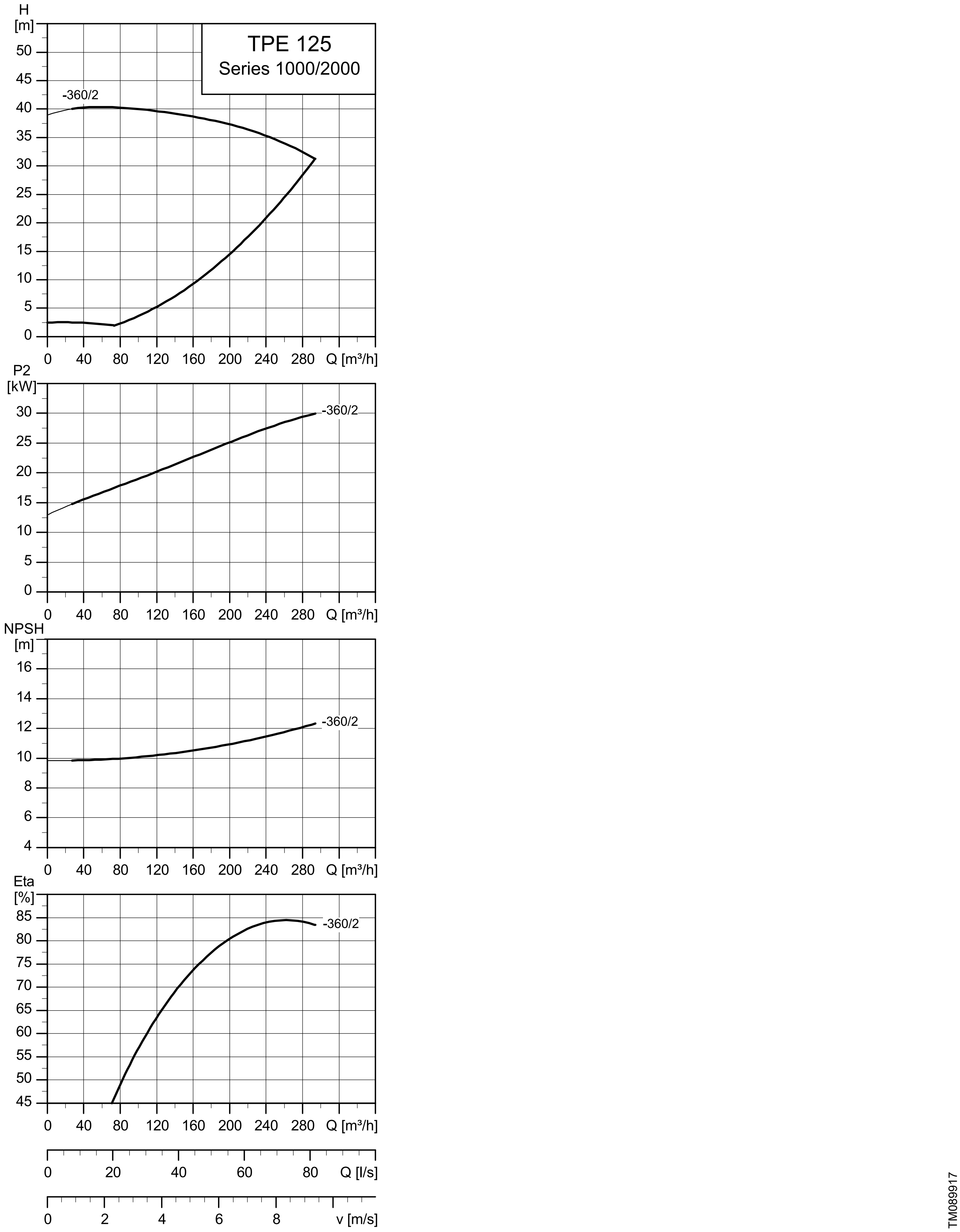


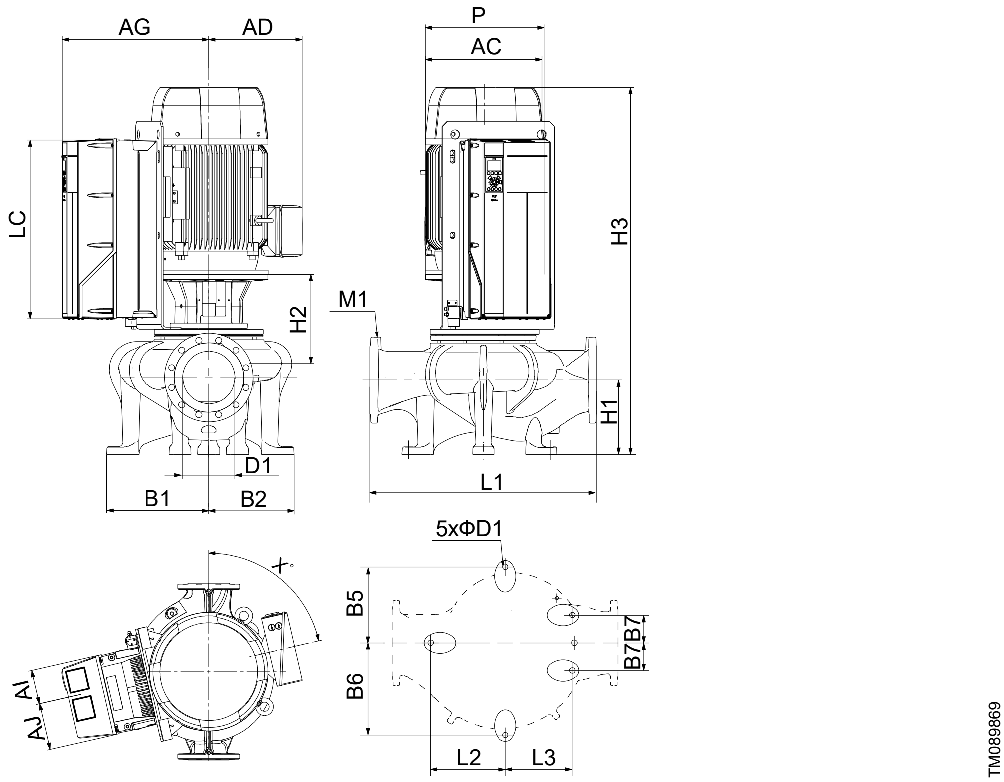
Technical data

TPE 100			-480/2	-530/2	-650/2	-800/2	-950/2
IEC size	3~ TPE		200	250	250	280	280
P2	3~ TPE	[kW]	30	45	55	75	90
PN			PN 16	PN 25	PN 25	PN 25	PN 25
T_{min};T_{max}		[°C]	[-25;120]	[-40;150]	[-40;150]	[-40;150]	[-40;150]
D1		[mm]	100	100	100	100	100
AC	3~ TPE	[mm]	350	350	479	528	528
AD	3~ TPE	[mm]	320	359	437	406	406
AG	3~ TPE	[mm]	470	558	604	617	617
AI	3~ TPE	[mm]	126	159	159	181	181
AJ	3~ TPE	[mm]	126	159	159	181	181
P		[mm]	400	450	550	550	550
B1	TPE	[mm]	201	281	281	281	281
B2	TPE	[mm]	173	246	246	246	246
C1	TPE	[mm]	230	230	230	230	230
C5	TPE	[mm]	275	335	335	335	335
L1		[mm]	550	670	670	670	670
LC		[mm]	650	680	680	758	758
H1		[mm]	140	175	175	175	175
H2		[mm]	307	338	338	338	338
H3	3~ TPE	[mm]	1058	1128	1323	1323	1323
H4		[mm]	35	35	35	35	35
M3			M16	M16	M16	M16	M16
X			90°	77°	77°	77°	77°

- TPE pumps with a H4 dimension are delivered with a base plate.

TPE 125-XXX/2

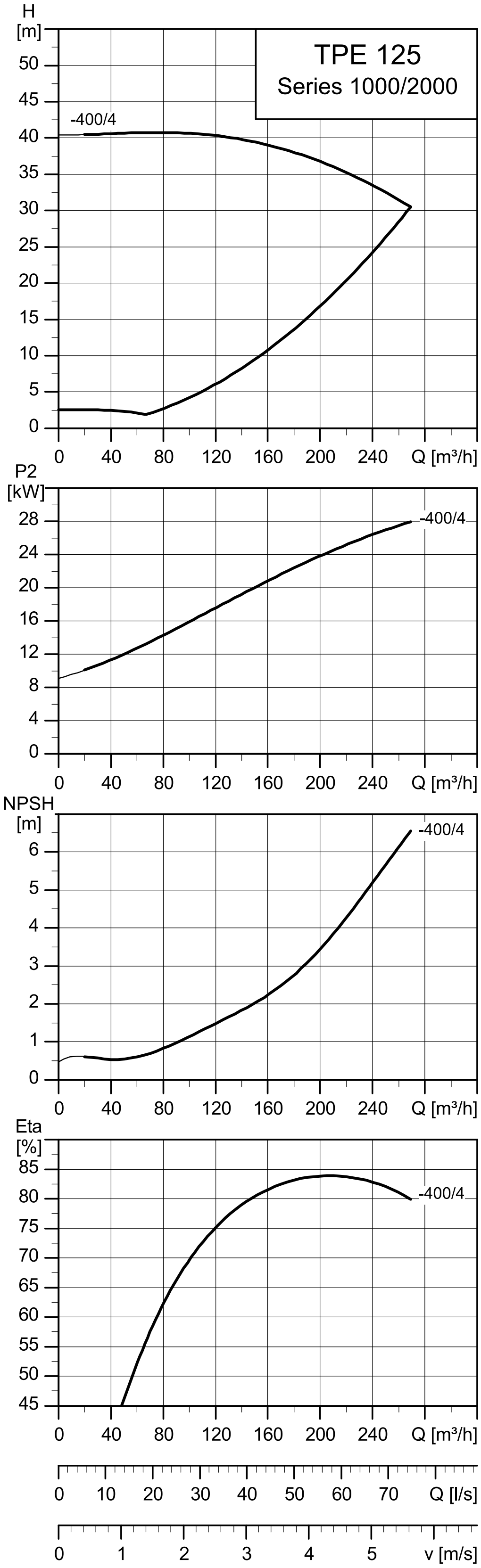

TPE 125
Series 1000/2000
H [m]
P2 [kW]
NPSH [m]
Eta [%]
-360/2
Q [m³/h]
Q [l/s]
v [m/s]
TM089917



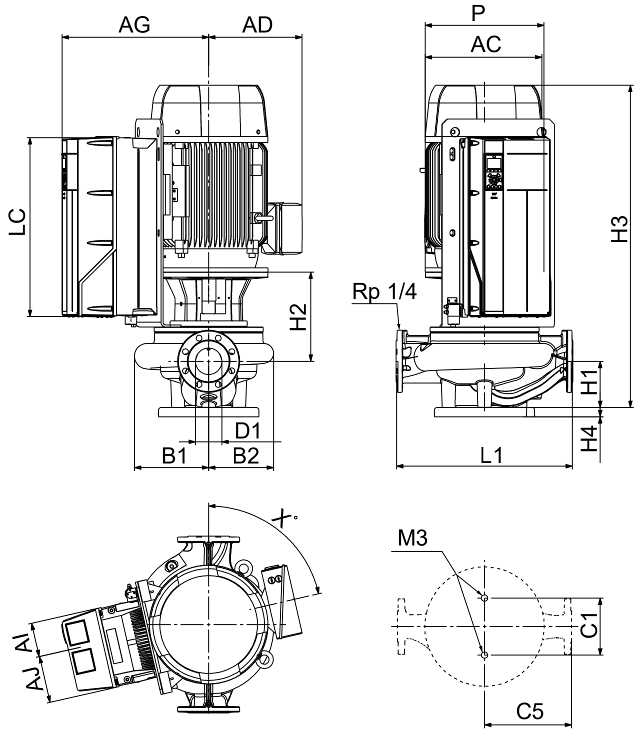
Technical data

TPE 125			-360/2
IEC size	3~ TPE		100
P2	3~ TPE	[kW]	30
PN			PN 16
T_{min};T_{max}		[°C]	[-25;120]
D1		[mm]	125
AC	3~ TPE	[mm]	350
AD	3~ TPE	[mm]	332
AG		[mm]	462
AI	3~ TPE	[mm]	126
AJ	3~ TPE	[mm]	126
P		[mm]	400
B1	TPE	[mm]	243
B2	TPE	[mm]	193
B5		[mm]	170
B6		[mm]	220
B7		[mm]	104
L1		[mm]	620
L2		[mm]	170
L3		[mm]	184
LC		[mm]	650
H1		[mm]	210
H2		[mm]	275
H3	3~ TPE	[mm]	1043
⌀D1		[mm]	18
X			60°

TPE 125-XXX/4



TM089919

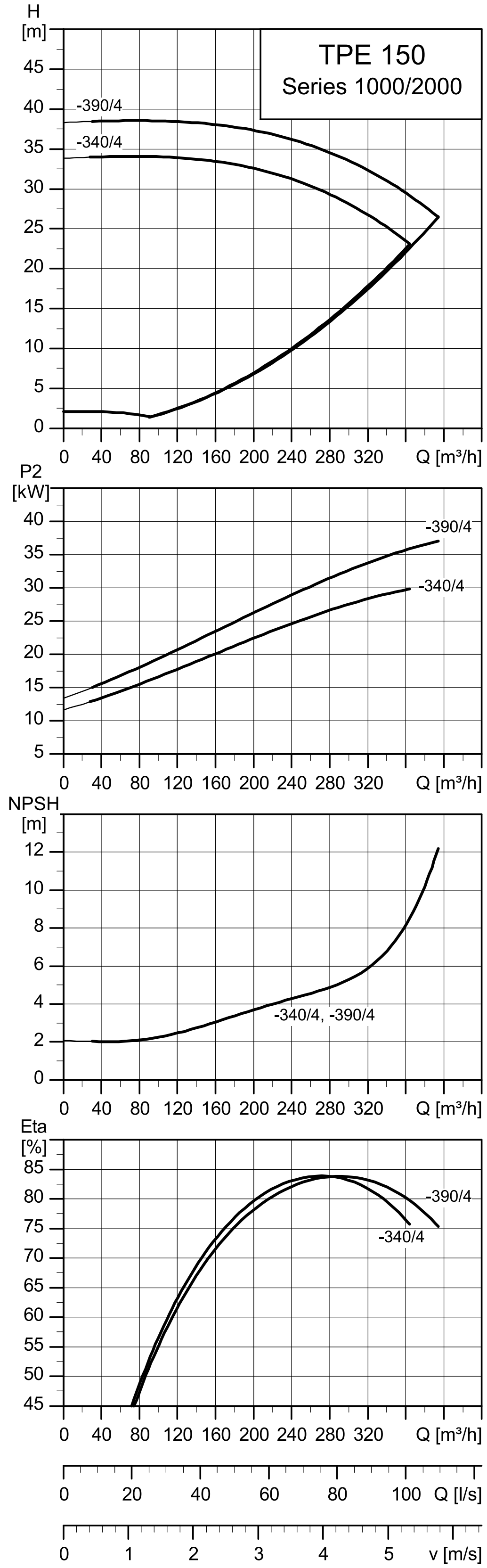


Technical data

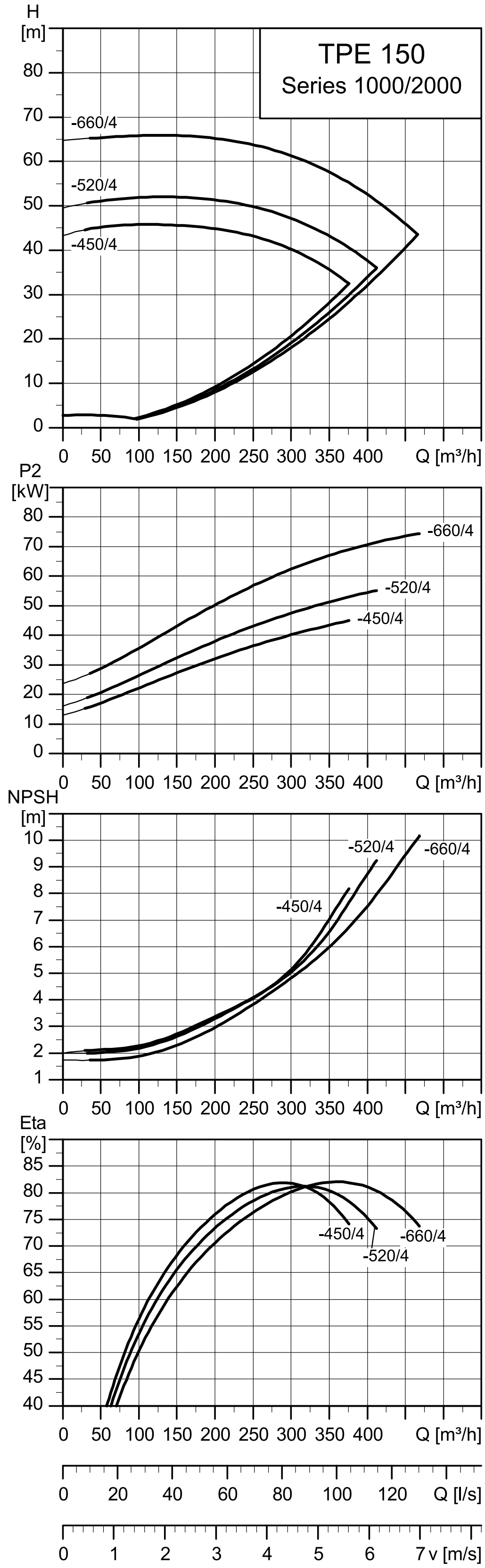
TPE 100			-400/4
IEC size	3~ TPE		200
P2	3~ TPE	[kW]	30
PN			PN 16
T_{min};T_{max}		[°C]	[-25;120]
D1		[mm]	100
AC	3~ TPE	[mm]	350
AD	3~ TPE	[mm]	337
AG	3~ TPE	[mm]	511
AI	3~ TPE	[mm]	126
AJ	3~ TPE	[mm]	126
P		[mm]	400
B1	TPE	[mm]	244
B2	TPE	[mm]	220
C1	TPE	[mm]	230
C5	TPE	[mm]	400
L1		[mm]	800
LC		[mm]	650
H1		[mm]	215
H2		[mm]	315
H3	3~ TPE	[mm]	1088
H4		[mm]	35
M3			M16
X			77°

- TPE pumps with a H4 dimension are delivered with a base plate.

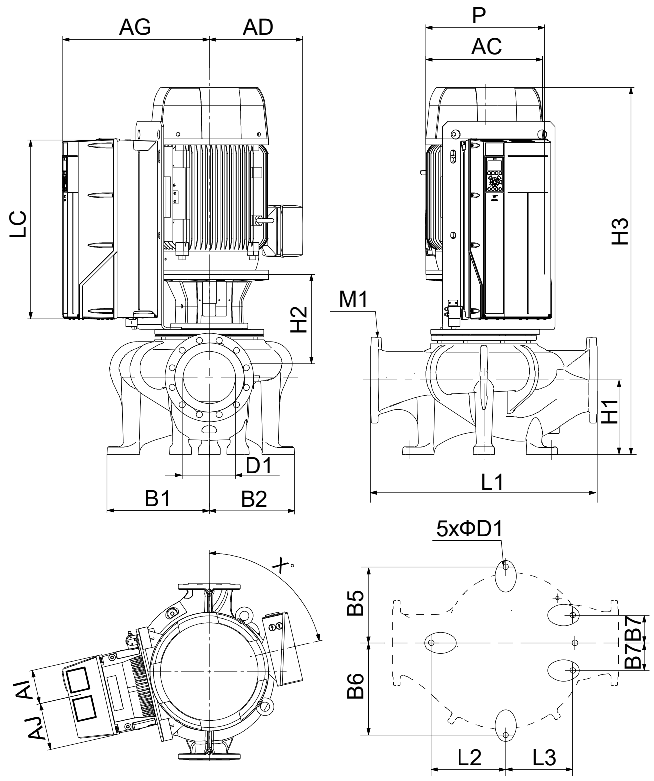
TPE 150-XXX/4



TM089920



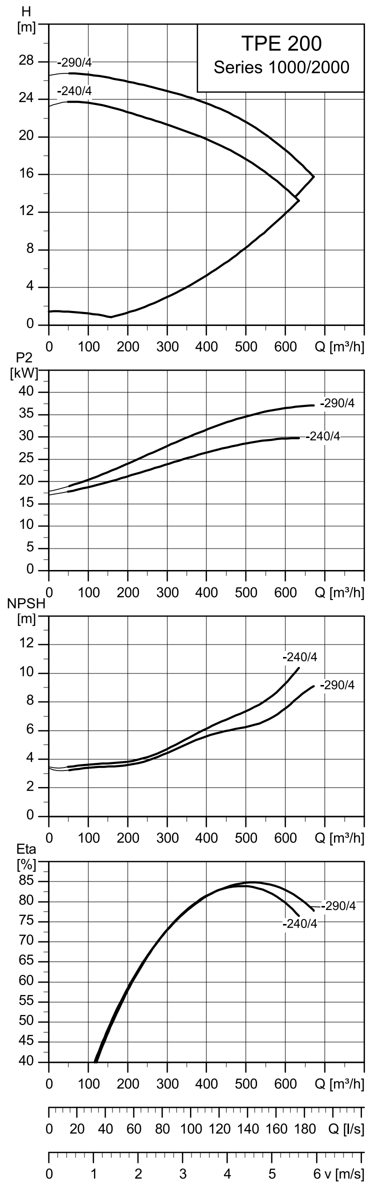
TM089921



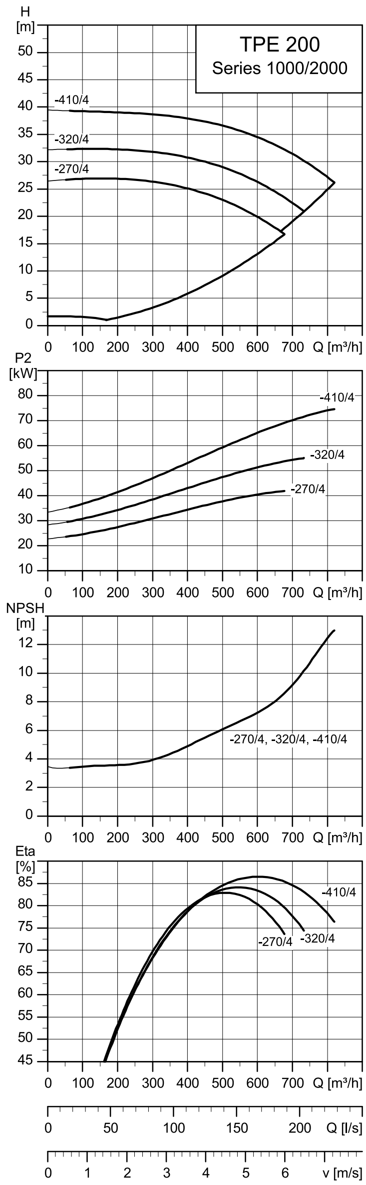
TPE 150			-340/4	-390/4	-450/4	-520/4	-660/4
IEC size	3~ TPE		200	225	225	250	280
P2	3~ TPE	[kW]	30	37	45	55	75
PN			PN 16/25	PN 16/25	PN 16/25	PN 16/25	PN 16/25
$T_{min};T_{max}$		[°C]	[-40;140]	[-40;140]	[-40;140]	[-40;140]	[-40;140]
D1		[mm]	150	150	150	150	150
AC	3~ TPE	[mm]	395	350	449	479	528
AD	3~ TPE	[mm]	337	359	343	415	406
AG			511	558	600	600	646
AI	3~ TPE	[mm]	126	159	159	159	181
AJ	3~ TPE	[mm]	126	159	159	159	181
P		[mm]	400	450	450	550	550
B1	TPE	[mm]	335	335	373	373	373
B2	TPE	[mm]	288	288	333	333	333
B5		[mm]	262	262	300	300	300
B6		[mm]	309	309	340	340	340
B7		[mm]	75	75	111	111	111
L1		[mm]	800	800	1000	1000	1000
L2		[mm]	277	277	285	285	285
L3		[mm]	267	267	287	287	287
LC		[mm]	650	680	680	680	758
H1		[mm]	235	235	250	250	250
H2		[mm]	319	349	352	352	352
H3	3~ TPE	[mm]	1190	1234	1310	1412	1472
⌀D1			18	18	18	18	18
X			77°	77°	90°	90°	90°

- TPE pumps with a H4 dimension are delivered with a base plate.

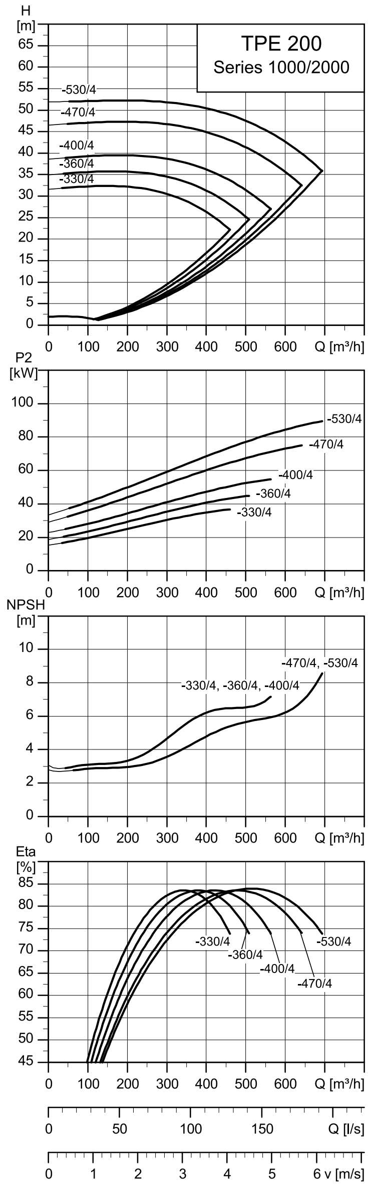
TPE 200-XXX/4



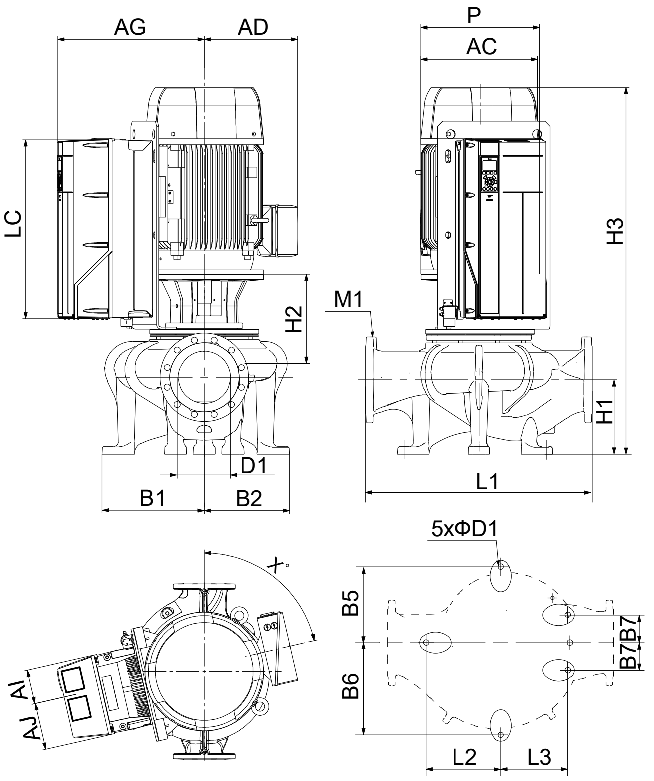
TM089922



TM089923



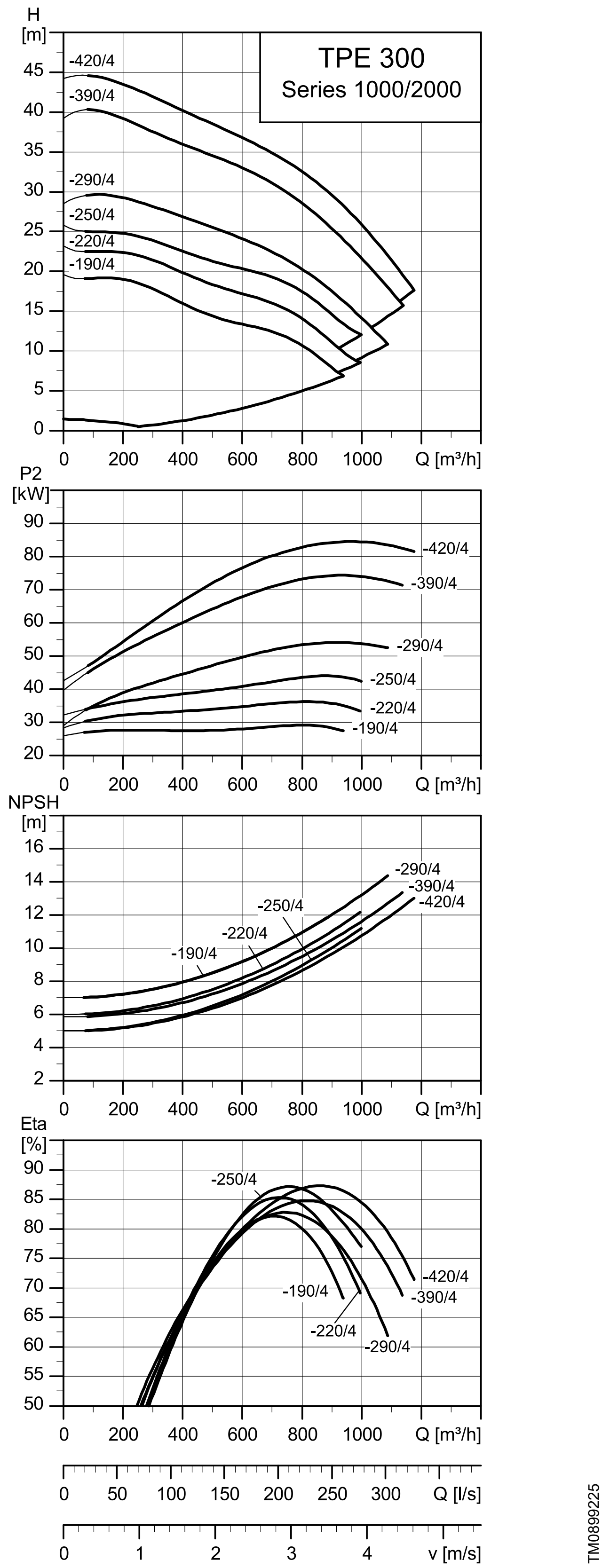
TM089924

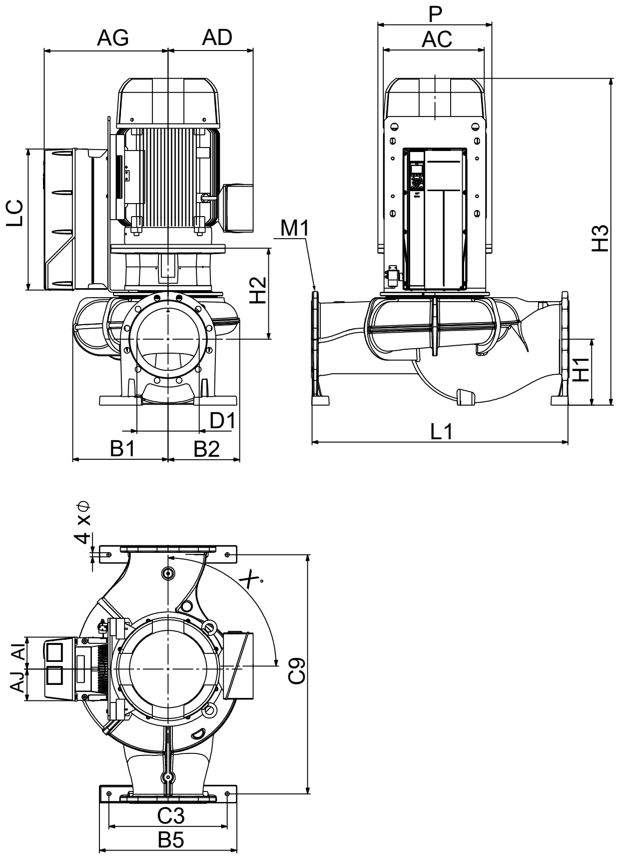


Technical data

TPE 200			-240/4	-290/4	-270/4	-320/4	-410/4	-330/4	-360/4	-400/4	-470/4	-530/4
IEC size	3~ TPE		200	225	225	250	280	225	225	250	280	280
P2	3~ TPE	[kW]	30	37	45	55	75	37	45	55	75	90
PN			PN 16/25	PN 16/25	PN 16/25	PN 16/25	PN 16/25	PN 16/25	PN 16/25	PN 16/25	PN 16/25	PN 16/25
T_{min};T_{max}		[°C]	[-40;140]	[-40;140]	[-40;140]	[-40;140]	[-40;140]	[-40;140]	[-40;140]	[-40;140]	[-40;140]	[-40;140]
D1		[mm]	200	200	200	200	200	200	200	200	200	200
AC	3~ TPE	[mm]	350	449	479	479	528	449	479	497	528	528
AD	3~ TPE	[mm]	340	362	350	437	406	343	343	415	406	406
AG		[mm]	480	557	558	614	649	600	597	600	649	649
AI	3~ TPE	[mm]	159	159	159	159	181	159	159	159	181	181
AJ	3~ TPE	[mm]	159	159	159	159	181	159	159	159	181	181
P		[mm]	400	450	450	550	550	450	450	550	550	550
B1	TPE	[mm]	348	348	393	393	393	423	423	423	423	423
B2	TPE	[mm]	288	288	328	328	328	368	368	368	368	368
B5		[mm]	260	260	302	302	302	342	342	342	342	342
B6		[mm]	320	320	367	367	367	397	397	397	397	397
B7		[mm]	167	167	110	110	110	116	116	116	116	116
L1		[mm]	900	900	900	900	900	1000	1000	1000	1000	1000
L2		[mm]	240	240	297	297	297	342	342	342	342	342
L3		[mm]	243	243	267	267	267	307	307	307	307	307
LC		[mm]	650	680	680	680	758	680	680	680	758	758
H1		[mm]	280	280	295	295	295	295	295	295	295	295
H2		[mm]	331	361	377	377	377	382	382	382	382	382
H3	3~ TPE	[mm]	1169	1298	1482	1482	1542	1387	1487	1424	1547	1547
⌀D1		[mm]	18	18	18	18	18	18	18	18	18	18
X			72°	72°	77°	77°	77°	90°	90°	90°	90°	90°

TPE 300-XXX/4


TPE 300
Series 1000/2000
H [m]
-420/4
-390/4
-290/4
-250/4
-220/4
-190/4
Q [m³/h]
P2 [kW]
NPSH [m]
Eta [%]
Q [l/s]
v [m/s]
TM0899225



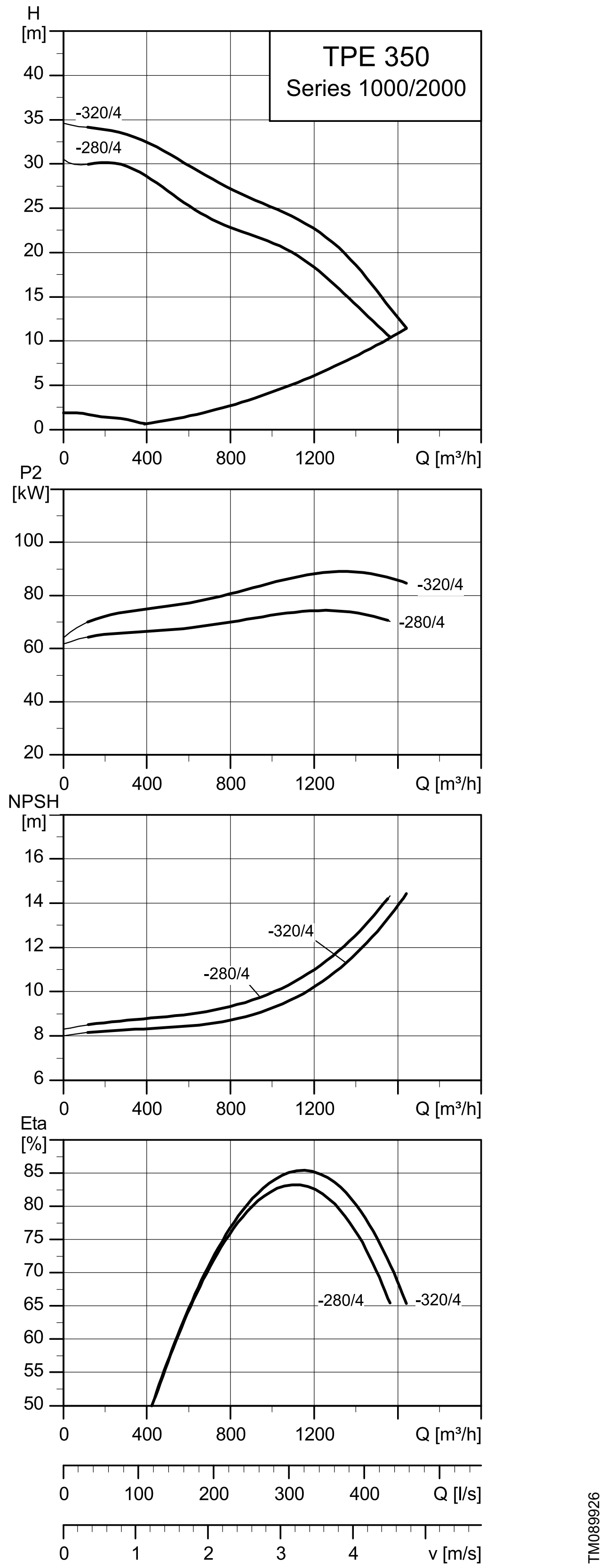
TM072116

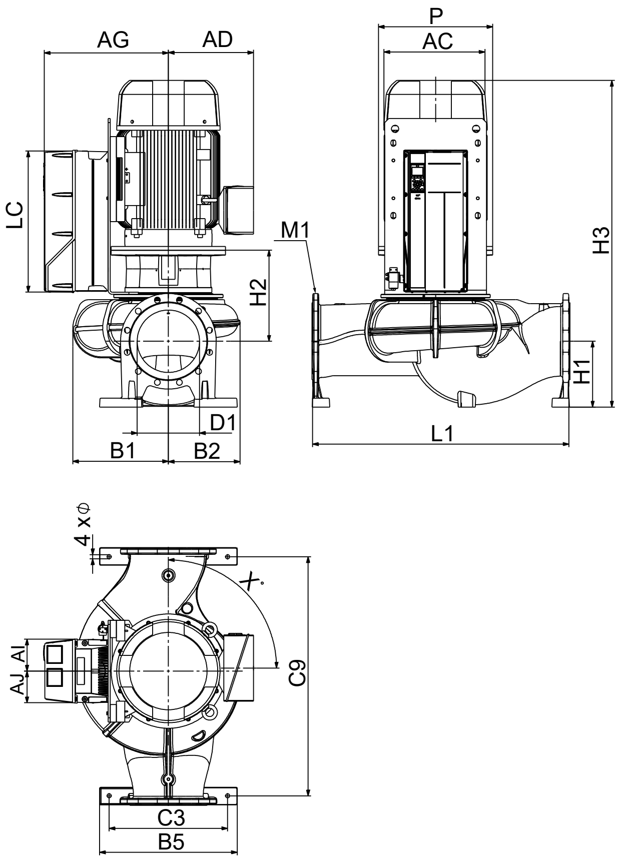
Technical data

TPE 300			-190/4	-220/4	-250/4	-290/4	-390/4	-420/4
IEC size	3~ TPE		200	225	225	250	280	280
P2	3~ TPE	[kW]	30	37	45	55	75	90
PN			PN16/25	PN16/25	PN16/25	PN16/25	PN16/25	PN16/25
T_{min};T_{max}		[°C]	[-40;150]	[-40;150]	[-40;150]	[-40;150]	[-40;150]	[-40;150]
D1		[mm]	300	300	300	300	300	300
AC	3~ TPE	[mm]	395	350	479	479	479	479
AD	3~ TPE	[mm]	337	360	360	415	406	406
AG		[mm]	511	560	561	600	649	649
AI		[mm]	126	159	159	159	181	181
AJ		[mm]	126	159	159	159	181	181
P		[mm]	394	450	450	550	550	550
B1		[mm]	438	438	438	460	460	460
B2		[mm]	320	320	320	345	344	345
B5		[mm]	663	663	663	663	663	663
C3		[mm]	570	570	570	570	570	570
C9		[mm]	1150	1150	1150	1150	1150	1150
L1		[mm]	1240	1240	1240	1240	1240	1240
LC		[mm]	650	680	680	680	758	758
H1		[mm]	348	348	348	317	317	317
H2		[mm]	393	423	423	438	438	438
H3		[mm]	1377	1422	1581	1565	1625	1625
∅		[mm]	20	20	20	20	20	20
X			77°	77°	77°	90°	90°	90°

Performance curves and technical data

TPE 350-XXX/4





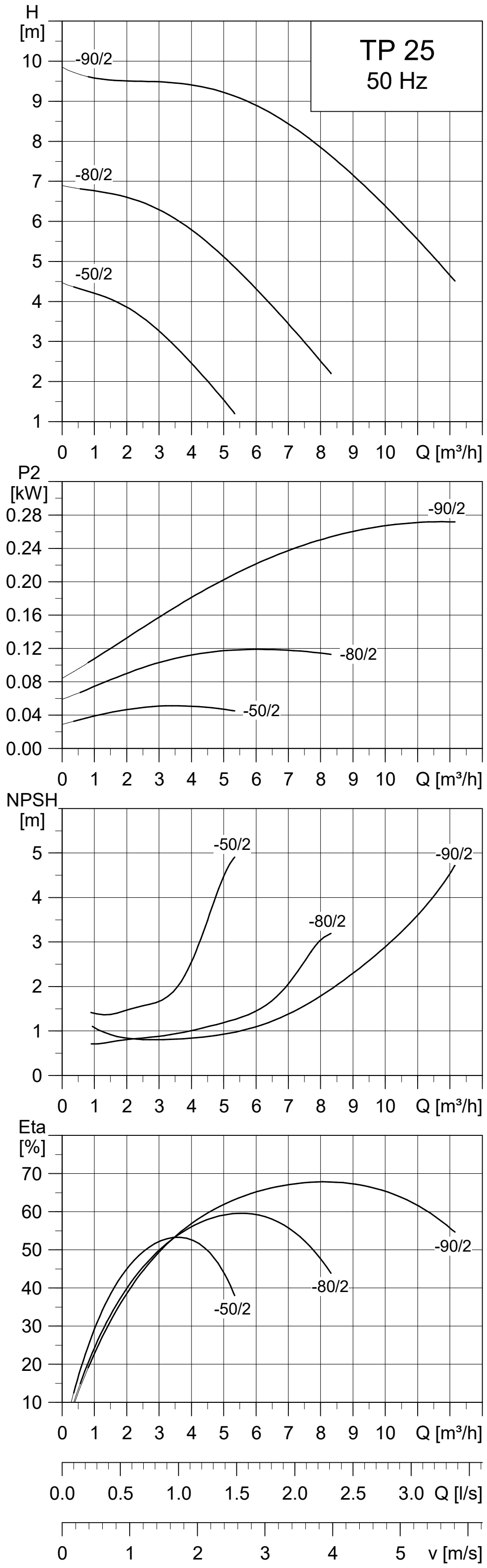
TM072116

Technical data

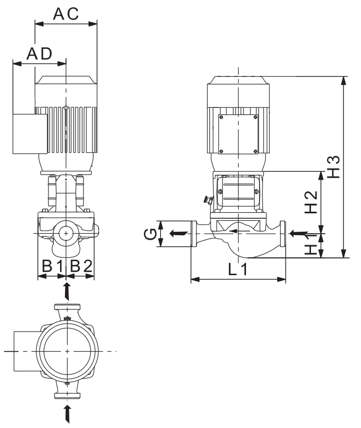
TPE 350			-280/4	-320/4
IEC size	3~ TPE		280	280
P2	3~ TPE	[kW]	75	90
PN			PN16/25	PN16/25
T_{min};T_{max}		[°C]	[-40;150]	[-40;150]
D1		[mm]	350	350
AC	3~ TPE	[mm]	479	479
AD	3~ TPE	[mm]	406	406
AG		[mm]	647	649
AI		[mm]	181	181
AJ		[mm]	181	181
P		[mm]	550	550
B1		[mm]	521	521
B2		[mm]	373	373
B5		[mm]	735	735
C3		[mm]	660	660
C9		[mm]	1310	1310
L1		[mm]	1400	1400
LC		[mm]	758	758
H1		[mm]	361	361
H2		[mm]	479	479
H3		[mm]	1710	1710
∅		[mm]	20	20
X			90°	90°

TP, TPD 2-pole, PN 6, 10, 16, 25

TP 25-XX/2



TM025014

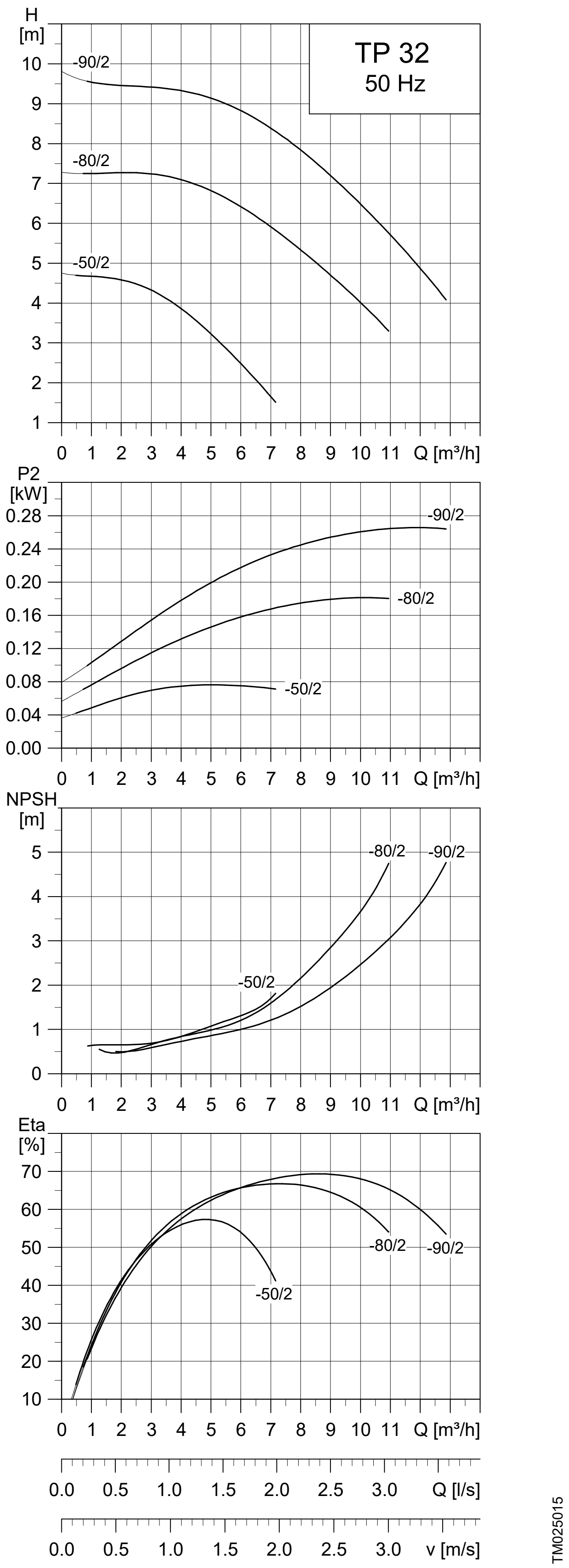


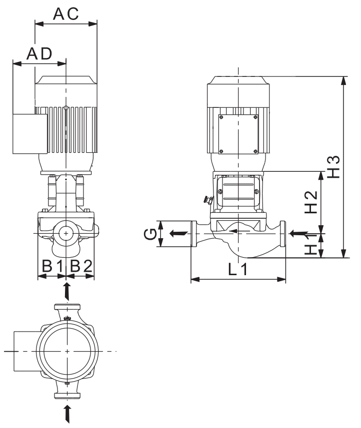
TM028348

Technical data

TP 25			-50/2	-80/2	-90/2
Series			100	100	100
IEC size	1~ TP		63	63	71
	3~ TP		63	63	71
P2	1~/3~ TP	[kW]	0.12/0.12	0.18/0.18	0.37/0.37
PN			10	10	10
T_{min};T_{max}		[°C]	[-25;110]	[-25;110]	[-25;110]
G			G 1 1/2	G 1 1/2	G 1 1/2
AC	1~/3~ TP	[mm]	141/124	141/124	141/141
AD	1~/3~ TP	[mm]	133/101	133/101	133/109
B1		[mm]	54	54	60
B2		[mm]	62	62	68
L1		[mm]	180	180	180
H1		[mm]	46	46	48
H2		[mm]	120	120	120
H3	1~/3~ TP	[mm]	357/345	357/345	399/358

TP 32-XX/2

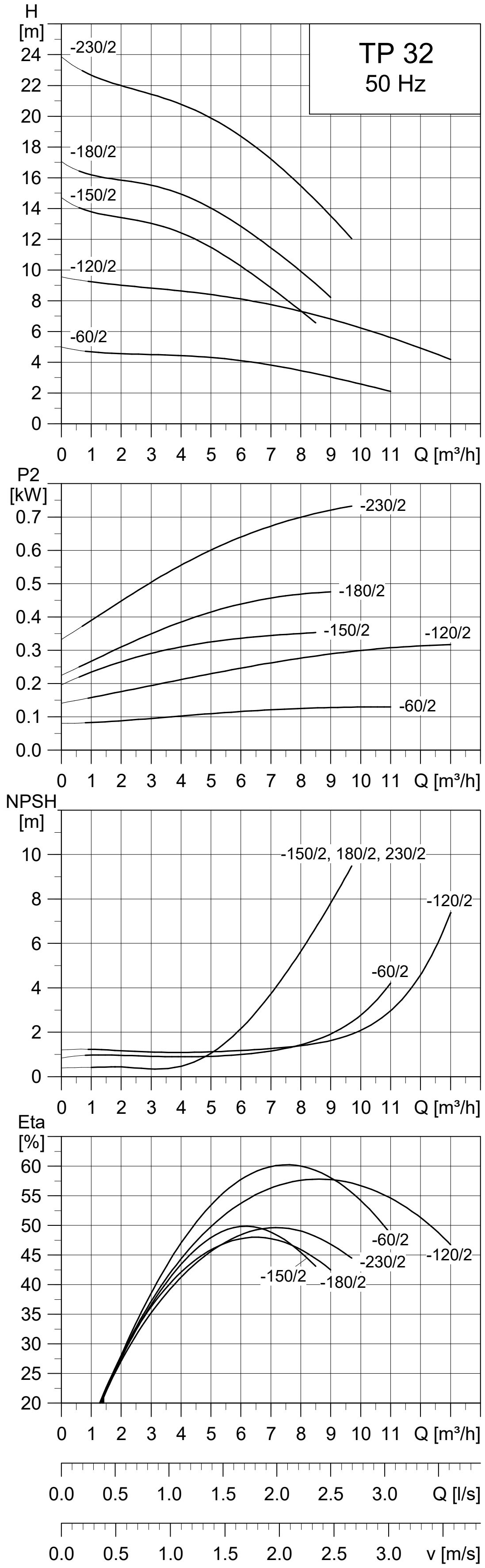




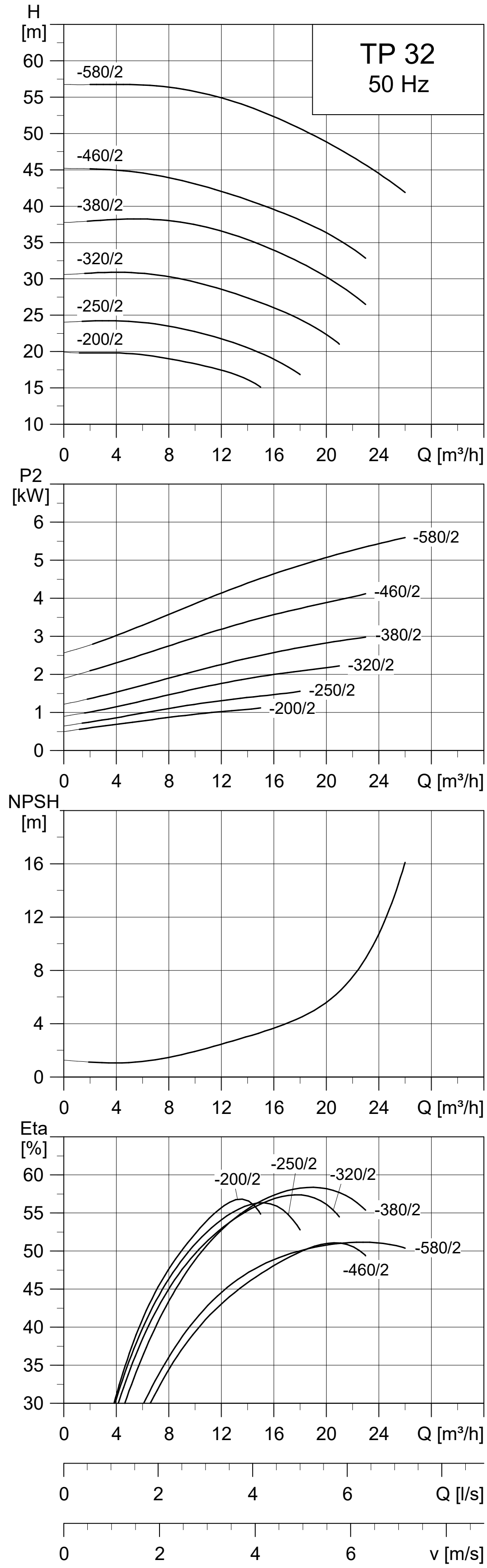
Technical data

TP 32			-50/2	-80/2	-90/2
Series			100	100	100
IEC size	1~ TP		63	63	71
	3~ TP		63	63	71
P2	1~/3~ TP	[kW]	0.12/0.12	0.25/0.25	0.37/0.37
PN			10	10	10
$T_{min};T_{max}$		[°C]	[-25;110]	[-25;110]	[-25;110]
G			G 2	G 2	G 2
AC	1~/3~ TP	[mm]	141/124	141/124	141/141
AD	1~/3~ TP	[mm]	133/101	133/101	133/109
B1		[mm]	54	54	60
B2		[mm]	62	62	68
L1		[mm]	180	180	180
H1		[mm]	48	48	47
H2		[mm]	120	120	120
H3	1~/3~ TP	[mm]	359/347	399/347	398/357

TP 32-XX/2

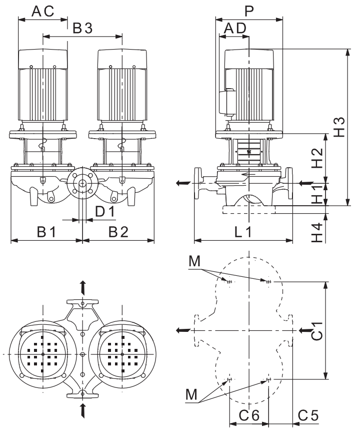


TM025016

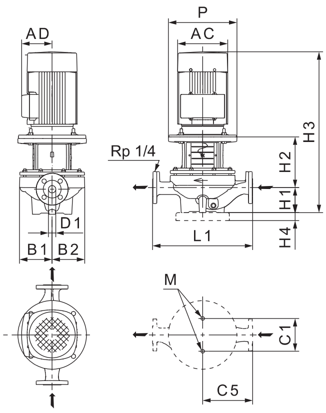


TM025017

Note: All curves apply to single-head pumps. For further information, see section Curve conditions.



TM028631



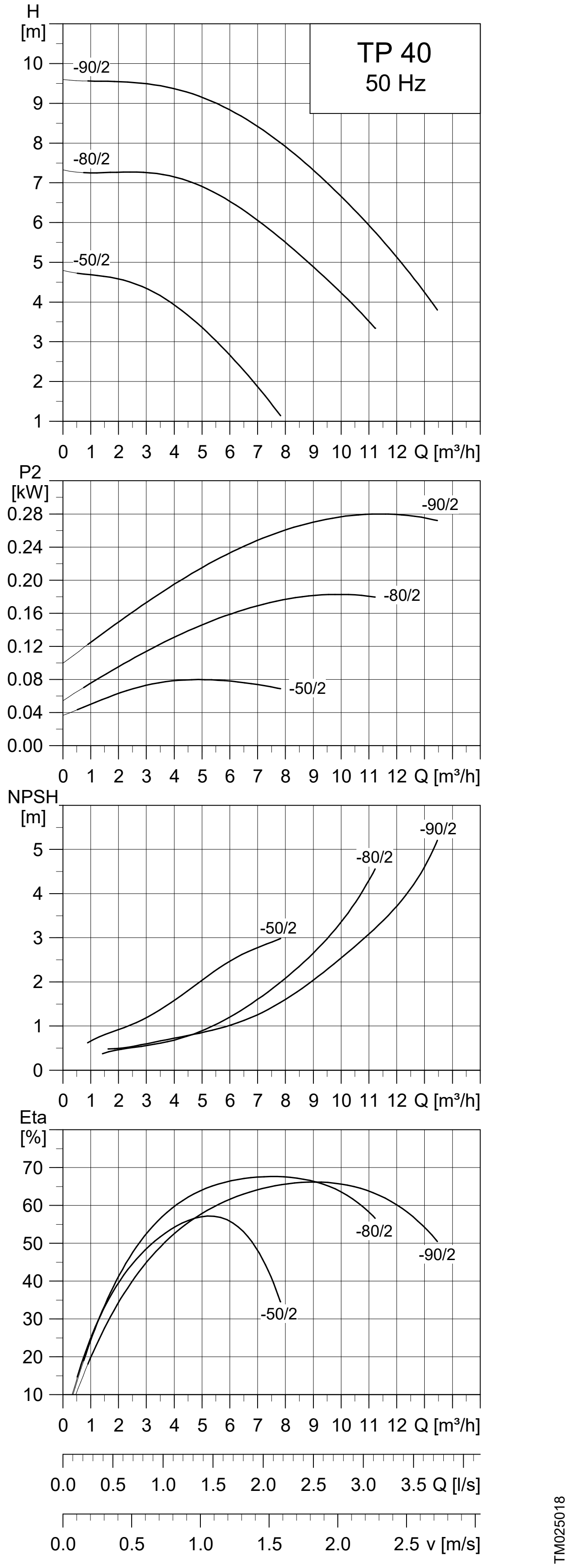
TM028632

Technical data

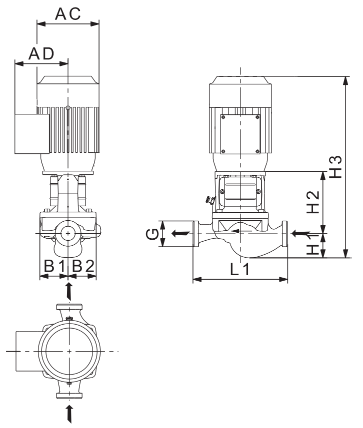
TP 32			-60/2	-120/2	-150/2	-180/2	-230/2	-200/2	-250/2	-320/2	-380/2	-460/2	-580/2
TPD			●	●	●	●	●	●	●	●	●	●	●
Series			200	200	200	200	200	300	300	300	300	300	300
IEC size	1~ TP		71	71	71	80	80	80	90	-	-	-	-
	3~ TP		63	71	71	71	80	80	90	90	100	112	132
P2	1~/3~ TP	[kW]	0.25/0.25	0.37/0.37	0.37/0.37	0.55/0.55	0.75/0.75	-/1.1	-/1.5	-/2.2	-/3	-/4	-/5.5
PN			PN 6/10	PN 6/10	PN 6/10	PN 6/10	PN 6/10	PN 16	PN 16	PN 16	PN 16	PN 16	PN 16
T_{min};T_{max}		[°C]	[-25;140]	[-25;140]	[-25;140]	[-25;140]	[-25;140]	[-25;120]	[-25;120]	[-25;120]	[-25;120]	[-25;120]	[-25;120]
D1		[mm]	32	32	32	32	32	32	32	32	32	32	32
AC	1~/3~ TP	[mm]	124/124	141/142	141/141	141/141	141/141	-/141	-/178	-/178	-/198	-/220	-/220
AD	1~/3~ TP	[mm]	101/101	133/133	133/109	133/109	133/109	-/109	-/110	-/110	-/120	-/134	-/134
P		[mm]	90	-	-	-	120	200	200	200	250	250	300
B1	TP/TPD	[mm]	75/176	75/180	102/222	102/222	102/222	125/260	125/260	125/260	125/260	144/321	144/321
B2	TP/TPD	[mm]	75/176	75/180	102/222	102/222	102/222	117/257	117/257	117/257	117/257	144/321	144/321
B3		[mm]	200	200	240	240	240	276	276	276	276	355	355
B4	TP/TPD	[mm]	-	-	-	-	-/327	-/345	-/338	-/334	-/384	-/421	-/421
C1	TP/TPD	[mm]	80/200	80/200	80/240	80/240	80/240	144/356	144/356	144/356	144/356	144/435	144/435
C5	TP/TPD	[mm]	110/52	110/52	140/82	140/82	140/82	170/45	170/45	170/45	170/45	220/46	220/46
C6		[mm]	103	103	103	103	103	175	175	175	175	175	175
L1		[mm]	220	220	280	280	280	340	340	340	340	440	440
H1		[mm]	68	68	79	79	79	100	100	100	100	100	100
H2		[mm]	140/139	126	125	125	137	154	154	154	183	184	223
H3	1~/3~ TP	[mm]	387/386	425/385	395/395	447/395	447/447	-/505	-/535	-/575	-/618	-/656	-/714
H4		[mm]	-	-	-	-	-	-	-	-	-	-	-
M			M12	M12	M12	M12	M12	M16	M16	M16	M16	M16	M16

- TP pumps with a H4 dimension are delivered with a base plate.

TP 40-XX/2



Note: All curves apply to single-head pumps. For further information, see section Curve conditions.

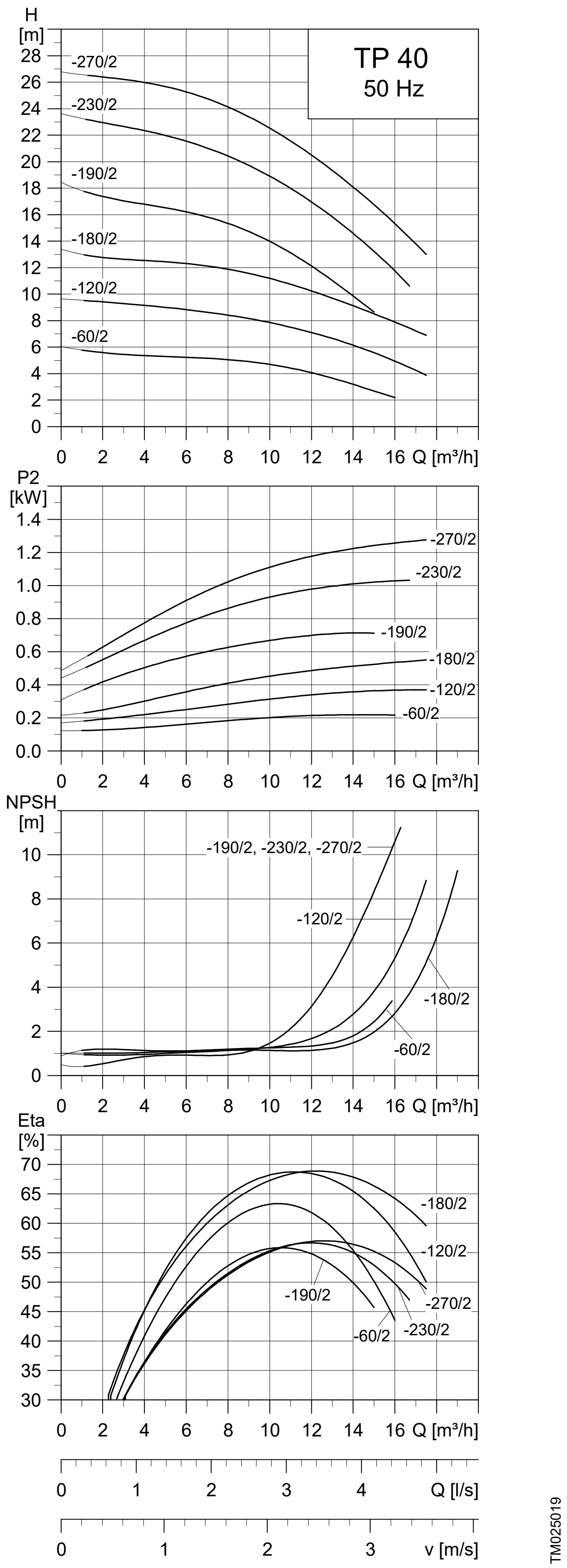


Technical data

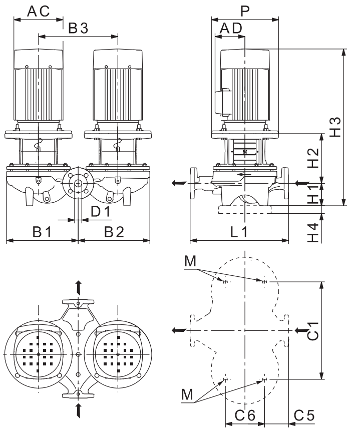
TP 40			-50/2	-80/2	-90/2
Series			100	100	100
IEC size	1~ TP		63	63	71
	3~ TP		63	63	71
P2	1~/3~ TP	[kW]	0.12/0.12	0.25/0.25	0.37/0.37
PN			PN 6/10	PN 6/10	PN 6/10
T_{min};T_{max}		[°C]	[-25;110]	[-25;110]	[-25;110]
D1		[mm]	40	40	40
AC	1~/3~ TP	[mm]	141/124	141/124	141/141
AD	1~/3~ TP	[mm]	133/101	133/101	133/109
P		[mm]	-	-	-
B1	TP/TPD	[mm]	-	-	-
B2	TP/TPD	[mm]	-	-	-
B3		[mm]	-	-	-
B4		[mm]	-	-	-
C1		[mm]	-	-	-
C5		[mm]	-	-	-
C6		[mm]	-	-	-
L1		[mm]	250	250	250
H1		[mm]	67	67	62
H2		[mm]	120	120	120
H3	1~/3~ TP	[mm]	378/366	418/366	413/373
H4		[mm]	-	-	-
M			-	-	-

- TP pumps with a H4 dimension are delivered with a base plate.

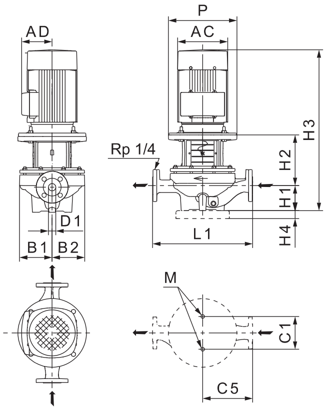
TP 40-XX/2



Note: All curves apply to single-head pumps. For further information, see section Curve conditions.



TM028631



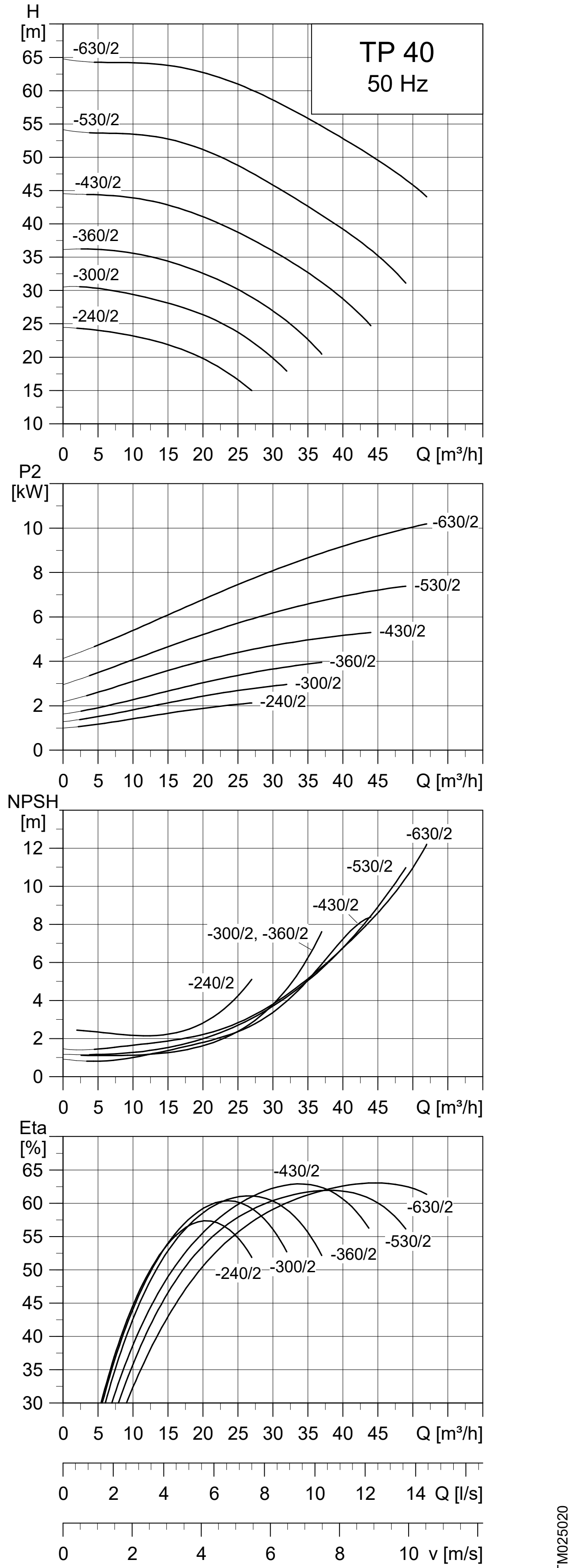
TM028632

Technical data

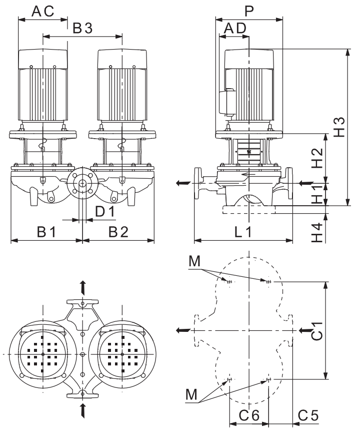
TP 40			-60/2	-120/2	-180/2	-190/2	-230/2	-270/2
TPD			●	●	-	●	●	●
Series			200	200	200	200	200	200
IEC size	1~ TP		71	71	80	80	90	90
	3~ TP		71	71	71	80	80	90
P2	1~/3~ TP	[kW]	0.25/0.25	0.37/0.37	0.55/0.55	0.75/0.75	1.1/1.1	1.5/1.5
PN			PN 6/10	PN 6/10	PN 6/10	PN 16	PN 16	PN 16
T_{min};T_{max}		[°C]	[-25;140]	[-25;140]	[-25;140]	[-25;140]	[-25;140]	[-25;140]
D1		[mm]	40	40	40	40	40	40
AC	1~/3~ TP	[mm]	141/141	141/141	141/141	141/141	178/141	178/178
AD	1~/3~ TP	[mm]	133/109	133/109	133/109	133/109	139/109	139/110
P		[mm]	-	-	-	-	-	135
B1	TP/TPD	[mm]	75/180	75/180	100/-	102/222	102/222	102/222
B2	TP/TPD	[mm]	75/180	75/180	100/-	102/222	102/222	102/222
B3		[mm]	200	200	-	240	240	240
B4	TP/TPD	[mm]	-	-	-	-	-	-/327
C1	TP/TPD	[mm]	80/200	80/200	80/-	120/240	120/240	120/240
C5	TP/TPD	[mm]	125/45	125/45	125/-	160/95	160/95	160/95
C6		[mm]	125	125	-	125	125	125
L1		[mm]	250	250	250	320	320	320
H1		[mm]	67	67	68	68	68	68
H2		[mm]	129	129	131	141	141	151
H3	1~/3~ TP	[mm]	387/366	427/387	442/390	439/439	499/510	500/500
H4		[mm]	-	-	-	-	-	-
M			M12	M12	M12	M12	M12	M12

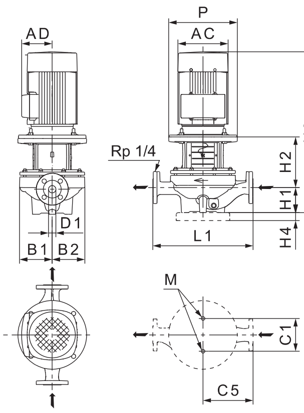
- TP pumps with a H4 dimension are delivered with a base plate.

TP 40-XX/2



Note: All curves apply to single-head pumps. For further information, see section Curve conditions.



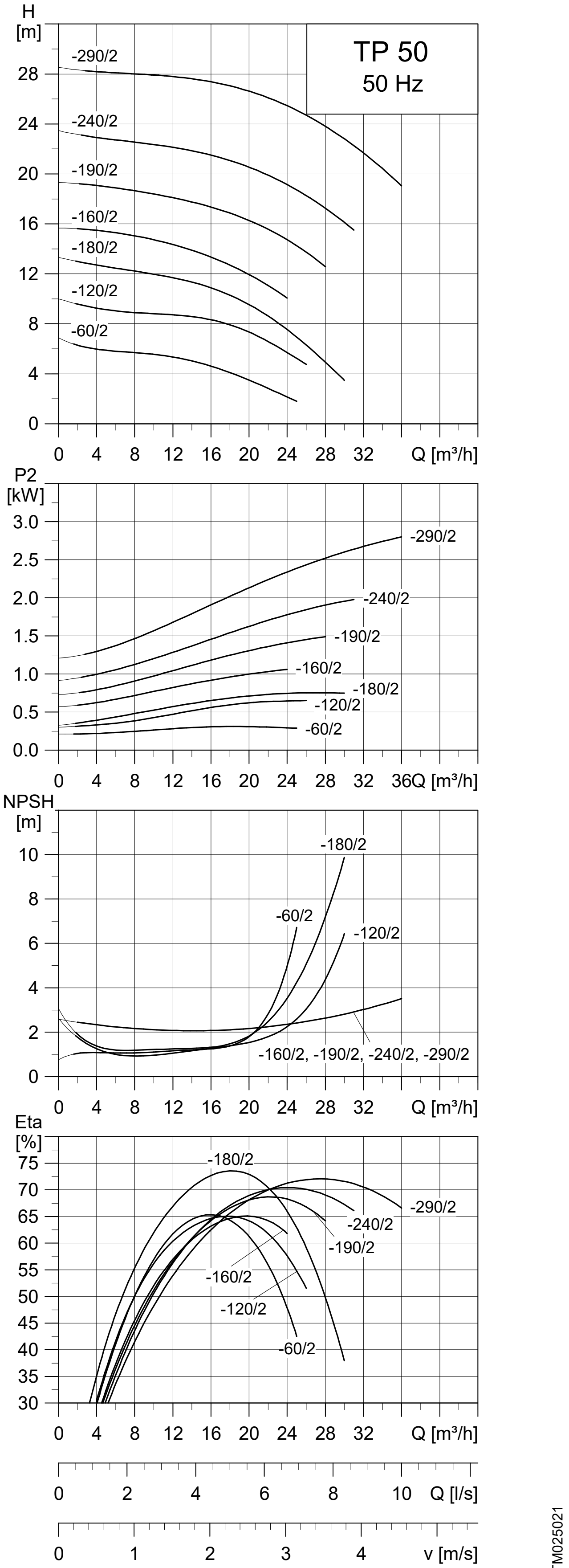


Technical data

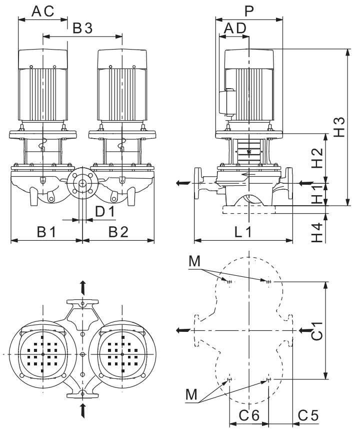
TP 40			-240/2	-300/2	-360/2	-430/2	-530/2	-630/2
TPD			●	●	●	●	●	●
Series			300	300	300	300	300	300
IEC size	1~ TP		-	-	-	-	-	-
	3~ TP		90	100	112	132	132	160
P2	1~/3~ TP	[kW]	-/2.2	-/3	-/4	-/5.5	-/7.5	-/11.0
PN			PN 16	PN 16	PN 16	PN 16	PN 16	PN 16
T_{min};T_{max}		[°C]	[-25;120]	[-25;120]	[-25;120]	[-25;120]	[-25;120]	[-25;120]
D1		[mm]	40	40	40	40	40	40
AC	1~/3~ TP	[mm]	-/178	-/198	-/220	-/220	-/260	-/316
AD	1~/3~ TP	[mm]	-/110	-/120	-/134	-/134	-/159	-/204
P		[mm]	200	250	250	300	300	350
B1	TP/TPD	[mm]	130/273	130/273	130/273	150/325	150/325	150/325
B2	TP/TPD	[mm]	117/267	117/267	117/267	147/325	147/325	147/325
B3		[mm]	290	290	290	355	355	355
B4	TP/TPD	[mm]	-	-/391	-/391	-/424	-/469	-/415
C1	TP/TPD	[mm]	144/400	144/400	144/400	144/435	144/435	144/435
C5	TP/TPD	[mm]	170/45	170/45	170/45	220/105	220/105	220/105
C6		[mm]	175	175	175	175	175	175
L1		[mm]	340	340	340	440	440	440
H1		[mm]	100	100	100	110	110	110
H2		[mm]	166	194	194	223	223	253
H3	1~/3~ TP	[mm]	-/587	-/629	-/666	-/724	-/724	-/843
H4		[mm]	-	-	-	-	-	35
M			M16	M16	M16	M16	M16	M16

- TP pumps with a H4 dimension are delivered with a base plate. See section Base plates for base plate dimensions.

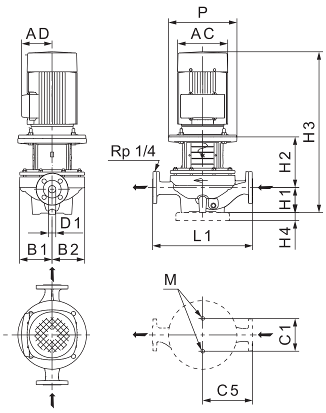
TP 50-XX/2



Note: All curves apply to single-head pumps. For further information, see section Curve conditions.



TM028631



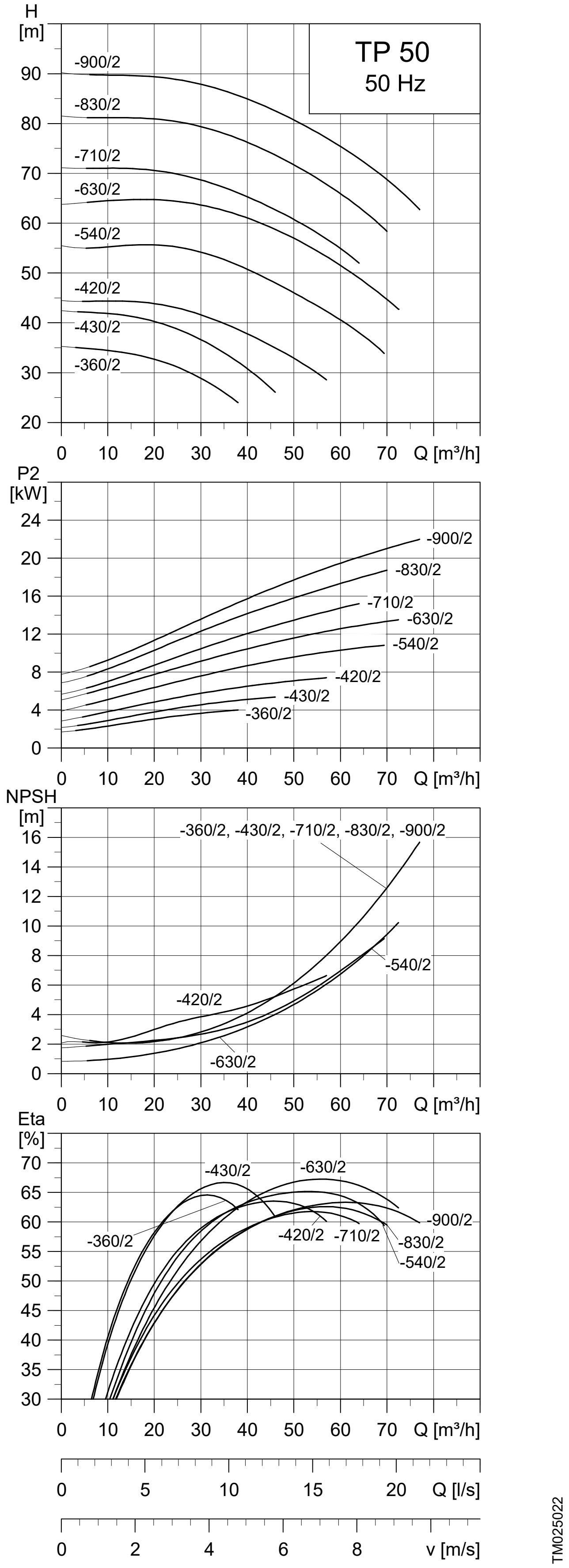
TM028632

Technical data

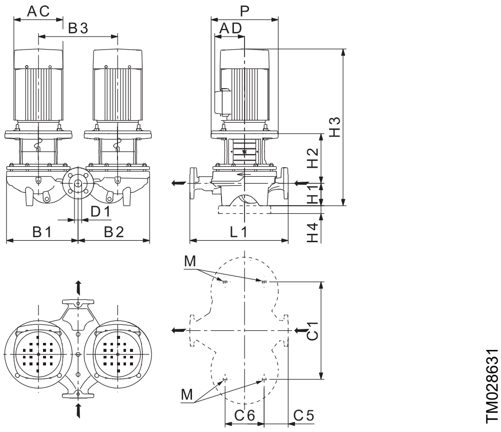
TP 50			-60/2	-120/2	-180/2	-160/2	-190/2	-240/2	-290/2
TPD			●	●	●	●	●	●	●
Series			200	200	200	300	300	300	300
IEC size	1~ TP		71	80	80	-	-	-	-
	3~ TP		71	80	80	80	90	90	100
P2	1~/3~ TP	[kW]	0.37/0.37	0.75/0.75	0.75/0.75	-/1.1	-/1.5	-/2.2	-/3
PN			PN 6/10	PN 6/10	PN 6/10	PN 16	PN 16	PN 16	PN 16
T_{min};T_{max}		[°C]	[-25;140]	[-25;140]	[-25;140]	[-25;120]	[-25;120]	[-25;120]	[-25;120]
D1		[mm]	50	50	50	50	50	50	50
AC	1~/3~ TP	[mm]	141/141	141/141	141/141	-/141	-/178	-/178	-/198
AD	1~/3~ TP	[mm]	133/133	133/133	133/109	-/109	-/110	-/110	-/120
P		[mm]	105	120	-	200	200	200	250
B1	TP/TPD	[mm]	90/177	100/221	100/225	117/252	117/252	117/252	117/252
B2	TP/TPD	[mm]	75/188	100/221	100/225	117/252	117/252	117/252	117/252
B3		[mm]	200	240	240	270	270	270	270
B4	TP/TPD	[mm]	-	-	-	-	-	-	-/381
C1	TP/TPD	[mm]	120/200	120/240	120/240	144/350	144/350	144/350	144/350
C5	TP/TPD	[mm]	140/60	140/60	140/60	170/60	170/60	170/60	170/60
C6		[mm]	125	126	126	175	175	175	175
L1		[mm]	280	280	280	340	340	340	340
H1		[mm]	75	75/61	75	115	115	115	115
H2		[mm]	137	135/141	135	152	152	152	180
H3	1~/3~ TP	[mm]	443/403	441/441	441/441	-/518	-/548	-/588	-/630
H4		[mm]	-	-	-	-	-	-	-
M			M12	M12	M12	M16	M16	M16	M16

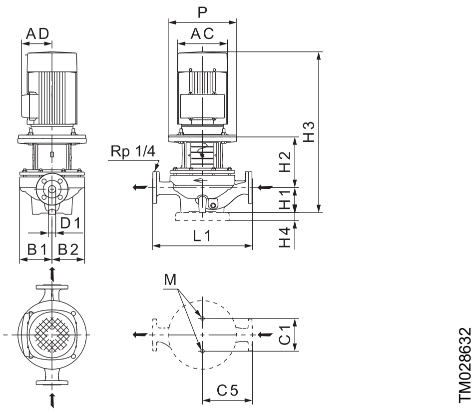
- TP pumps with a H4 dimension are delivered with a base plate. See section Base plates for base plate dimensions.

TP 50-XX/2



Note: All curves apply to single-head pumps. For further information, see section Curve conditions.



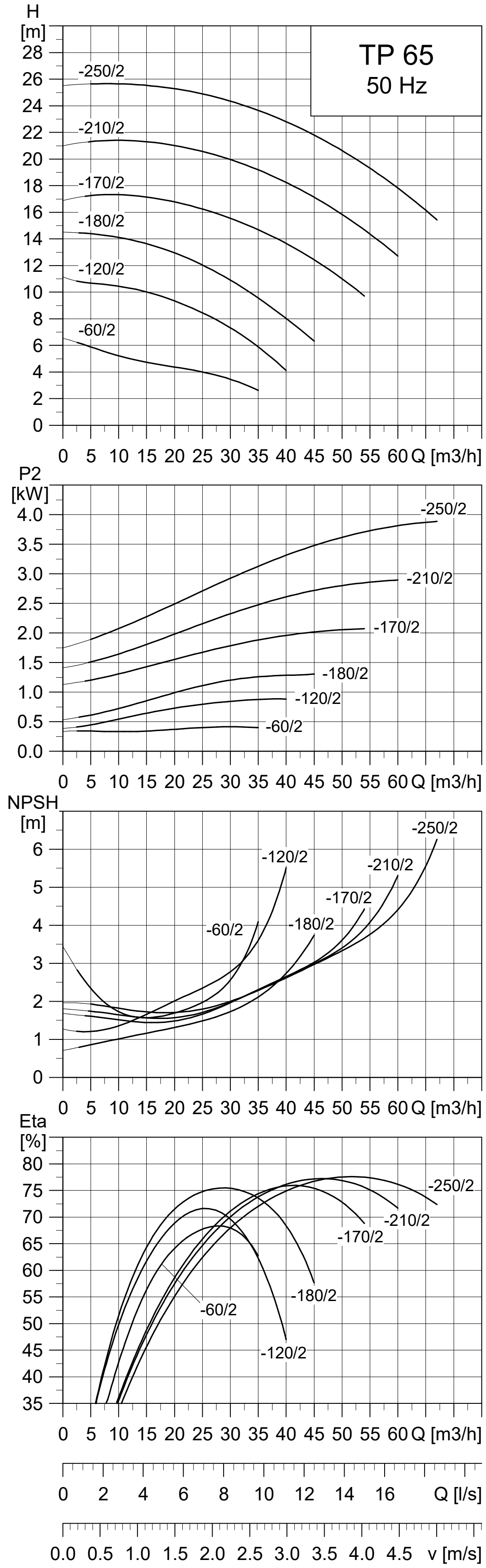


Technical data

TP 50			-360/2	-430/2	-420/2	-540/2	-630/2	-710/2	-830/2	-900/2
TPD			●	●	●	●	●	●	●	●
Series			300	300	300	300	300	300	300	300
IEC size	1~ TP		-	-	-	-	-	-	-	-
	3~ TP		112	132	132	160	161	160	160	180
P2	1~/3~ TP	[kW]	-/4	-/5.5	-/7.5	-/11	-/15	-/15	-/18.5	-/22
PN			PN 16	PN 16	PN 16	PN 16	PN 16	PN 16	PN 16	PN 16
T_{min};T_{max}		[°C]	[-25;120]	[-25;120]	[-25;120]	[-25;120]	[-25;120]	[-25;120]	[-25;120]	[-25;120]
D1		[mm]	50	50	50	50	50	50	50	50
AC	1~/3~ TP	[mm]	-/220	-/220	-/260	-/316	-/316	-/316	-/316	-/389
AD	1~/3~ TP	[mm]	-/134	-/134	-/159	-/204	-/204	-/204	-/204	-/293
P		[mm]	250	300	300	350	350	350	350	350
B1	TP/TPD	[mm]	133/290	133/290	162/373	162/373	162/373	180/386	180/386	180/386
B2	TP/TPD	[mm]	119/284	119/284	162/373	162/373	162/373	164/379	164/379	164/379
B3		[mm]	320	320	420	420	420	420	420	420
B4	TP/TPD	[mm]	-/406	-/406	-/383	-/501	-/385	-/555	-/555	-/555
C1	TP/TPD	[mm]	144/400	144/400	144/500	144/500	144/500	144/500	144/500	144/500
C5	TP/TPD	[mm]	170/52	170/52	220/123	220/123	220/123	220/123	220/123	220/123
C6		[mm]	175	175	175	175	175	175	175	175
L1		[mm]	340	340	440	440	440	440	440	440
H1		[mm]	115	115	115	115	115	115	115	115
H2		[mm]	189	228	227	257	257	264	264	264
H3	1~/3~ TP	[mm]	-/676	-/734	-/721	-/854	-/854	-/861	-/905	-/905
H4		[mm]	-	-	-	35	35	35	35	35
M			M16	M16	M16	M16	M16	M16	M16	M16

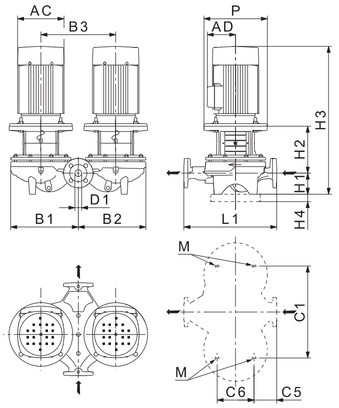
- TP pumps with a H4 dimension are delivered with a base plate.

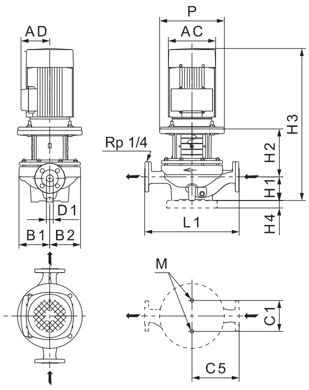
TP 65-XX/2



TM025023

Note: All curves apply to single-head pumps. For further information, see section Curve conditions.



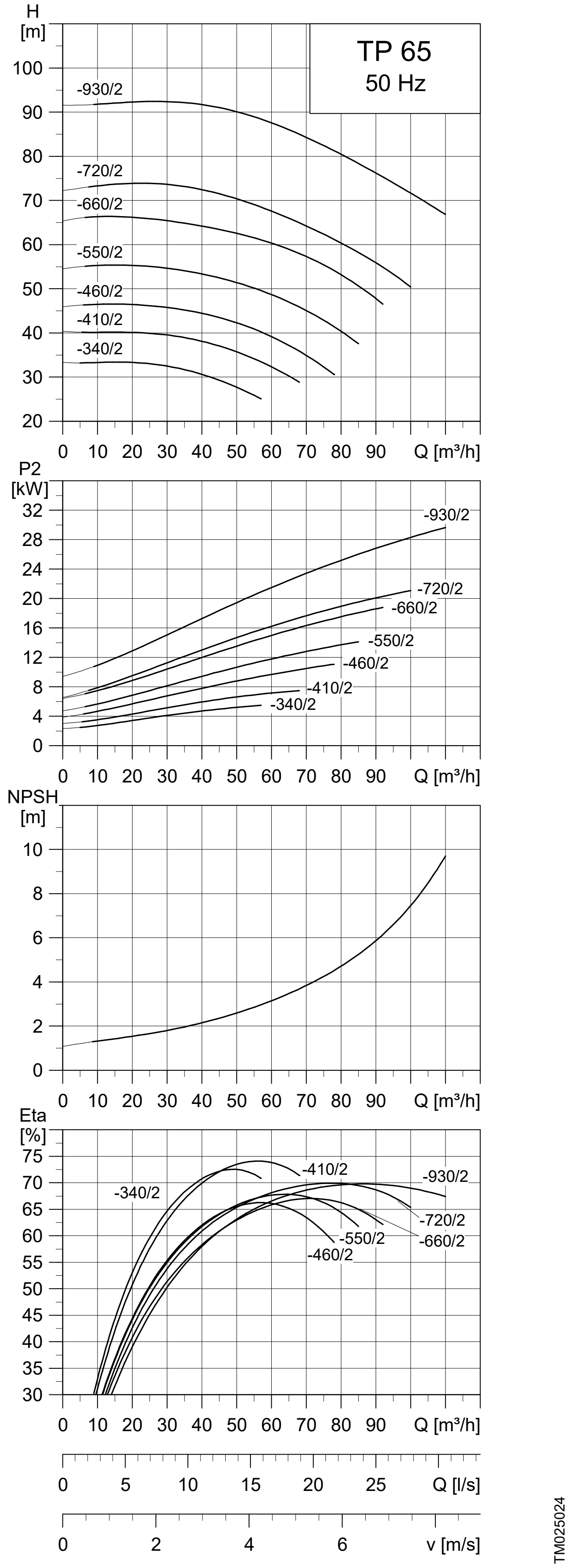


Technical data

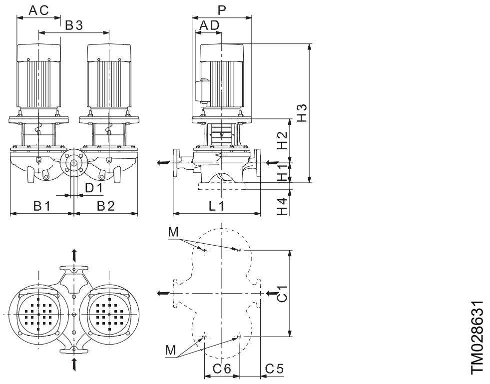
TP 65			-60/2	-120/2	-180/2	-170/2	-210/2	-250/2
TPD			●	●	●	●	●	●
Series			200	200	200	300	300	300
IEC size	1~ TP		80	90	90	-	-	-
	3~ TP		71	80	90	90	100	112
P2	1~/3~ TP	[kW]	0.55/0.55	1.1/1.1	1.5/1.5	-/2.2	-/3	-/4
PN			PN 6/10	PN 6/10	PN 6/10	PN 16	PN 16	PN 16
T_{min};T_{max}		[°C]	[-25;140]	[-25;140]	[-25;140]	[-25;120]	[-25;120]	[-25;120]
D1		[mm]	65	65	65	65	65	65
AC	1~/3~ TP	[mm]	141/141	178/141	178/178	-/178	-/198	-/220
AD	1~/3~ TP	[mm]	133/109	139/109	139/110	-/110	-/120	-/134
P		[mm]	-	-	-	200	250	250
B1	TP/TPD	[mm]	93/195	100/225	100/225	134/288	134/288	134/288
B2	TP/TPD	[mm]	93/210	100/225	100/225	122/282	122/282	122/282
B3		[mm]	240	240	240	320	320	320
B4	TP/TPD	[mm]	-	-	-	-	-/406	-/406
C1	TP/TPD	[mm]	120/240	120/240	120/240	144/400	144/400	144/400
C5	TP/TPD	[mm]	170/63	170/63	170/63	180/65	180/65	180/65
C6		[mm]	153	153	153	175	175	175
L1		[mm]	340	340	340	360	360	360
H1		[mm]	82	82	82	105	105	105
H2		[mm]	145	144	154	164	193	193
H3	1~/3~ TP	[mm]	468/418	517/532	517/507	-/590	-/633	-/670
H4		[mm]	-	-	-	-	-	-
M			M12	M12	M12	M16	M16	M16

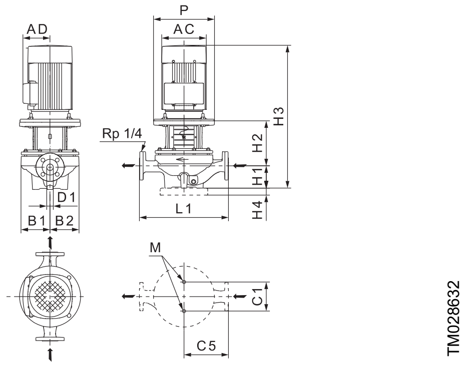
- TP pumps with a H4 dimension are delivered with a base plate. See section Base plates for base plate dimensions.

TP 65-XX/2



Note: All curves apply to single-head pumps. For further information, see section Curve conditions.



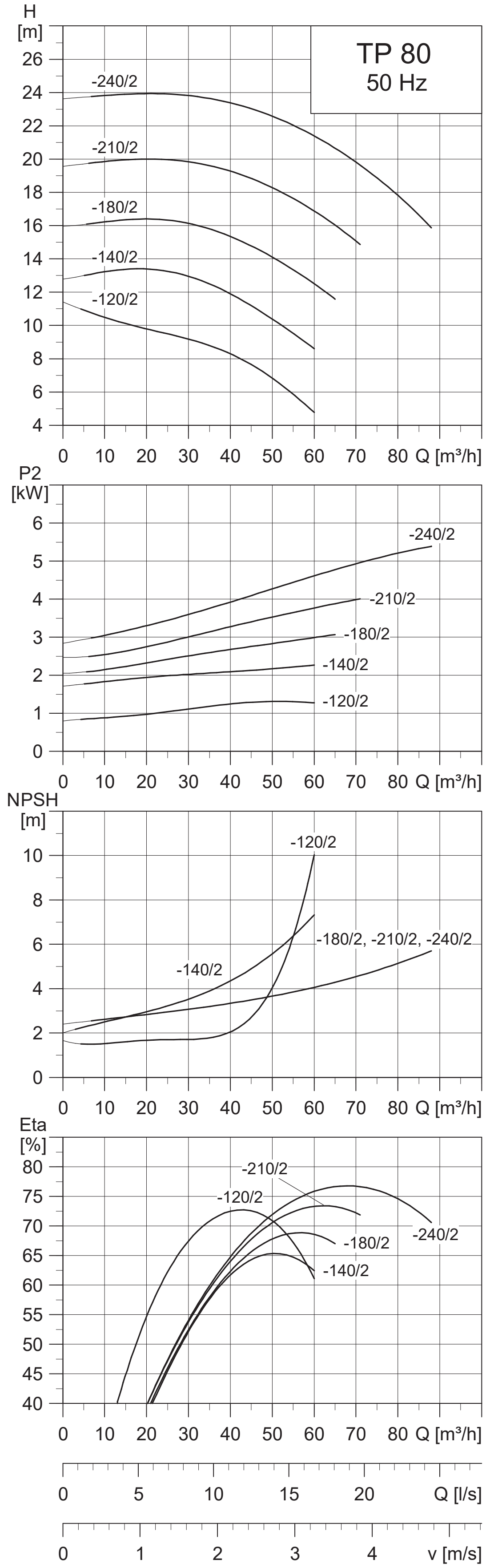


Technical data

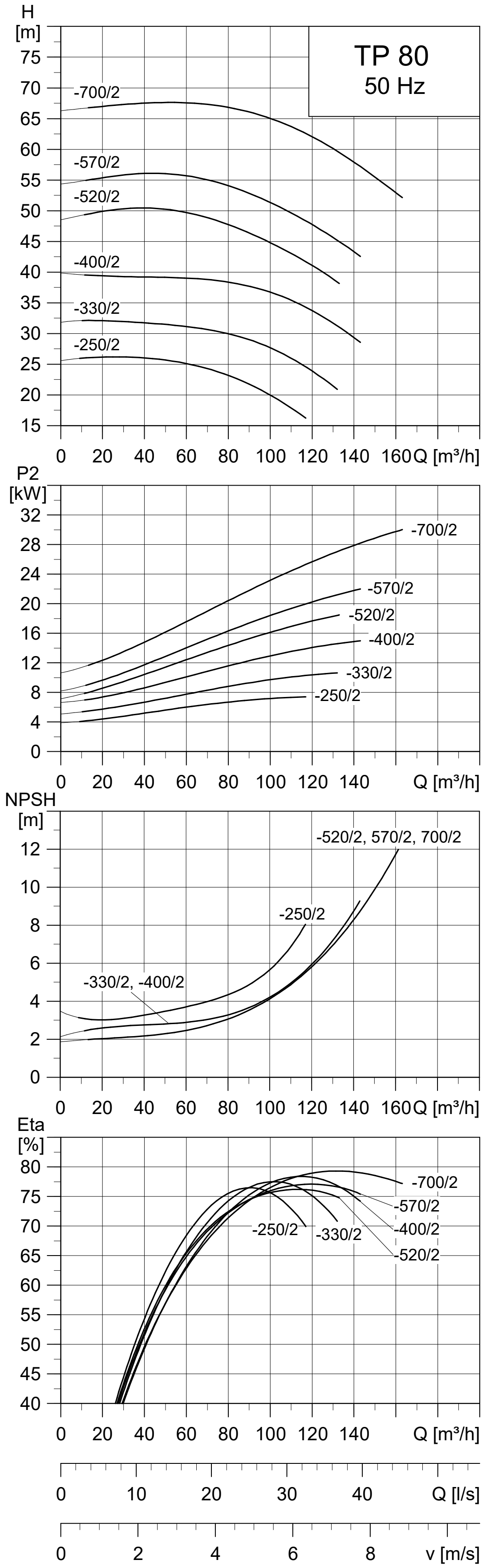
TP 65			-340/2	-410/2	-460/2	-550/2	-660/2	-720/2	-930/2
TPD			●	●	●	●	●	●	●
Series			300	300	300	300	300	300	300
IEC size	1~ TP		-	-	-	-	-	-	-
	3~ TP		132	132	160	160	160	180	200
P2	1~/3~ TP	[kW]	-/5.5	-/7.5	-/11	-/15	-/18.5	-/22	-/30
PN			PN 16	PN 16	PN 16	PN 16	PN 16	PN 16	PN 16
T_{min};T_{max}		[°C]	[-25;120]	[-25;120]	[-25;120]	[-25;120]	[-25;120]	[-25;120]	[-25;120]
D1		[mm]	65	65	65	65	65	65	65
AC	1~/3~ TP	[mm]	-/220	-/260	-/316	-/316	-/316	-/389	-/414
AD	1~/3~ TP	[mm]	-/134	-/159	-/204	-/204	-/204	-/293	-/334
P		[mm]	300	300	350	350	350	350	400
B1	TP/TPD	[mm]	142/298	142/298	178/349	178/349	178/349	178/349	178/349
B2	TP/TPD	[mm]	124/290	124/290	164/383	164/383	164/383	164/383	164/383
B3		[mm]	320	320	440	440	440	440	440
B4	TP/TPD	[mm]	-/406	-/451	-/511	-/558	-/558	-/558	-
C1	TP/TPD	[mm]	144/400	144/400	144/520	144/520	144/520	144/520	144/520
C5	TP/TPD	[mm]	180/65	180/65	238/111	238/111	238/111	238/111	238/111
C6		[mm]	175	175	175	175	175	175	175
L1		[mm]	360	360	475	475	475	475	475
H1		[mm]	105	105	125	125	125	125	125
H2		[mm]	239	239	263	263	263	263	263
H3	1~/3~ TP	[mm]	-/735	-/723	-/870	-/870	-/914	-/963	-/1046
H4		[mm]	-	-	35	35	35	35	35
M			M16	M16	M16	M16	M16	M16	M16

- TP pumps with a H4 dimension are delivered with a base plate.

TP 80-XX/2

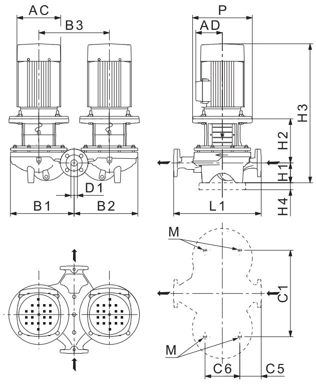


TM025025

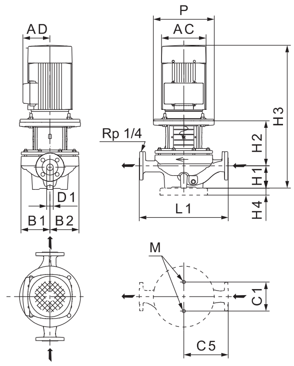


TM028750

Note: All curves apply to single-head pumps. For further information, see section Curve conditions.



TM028631



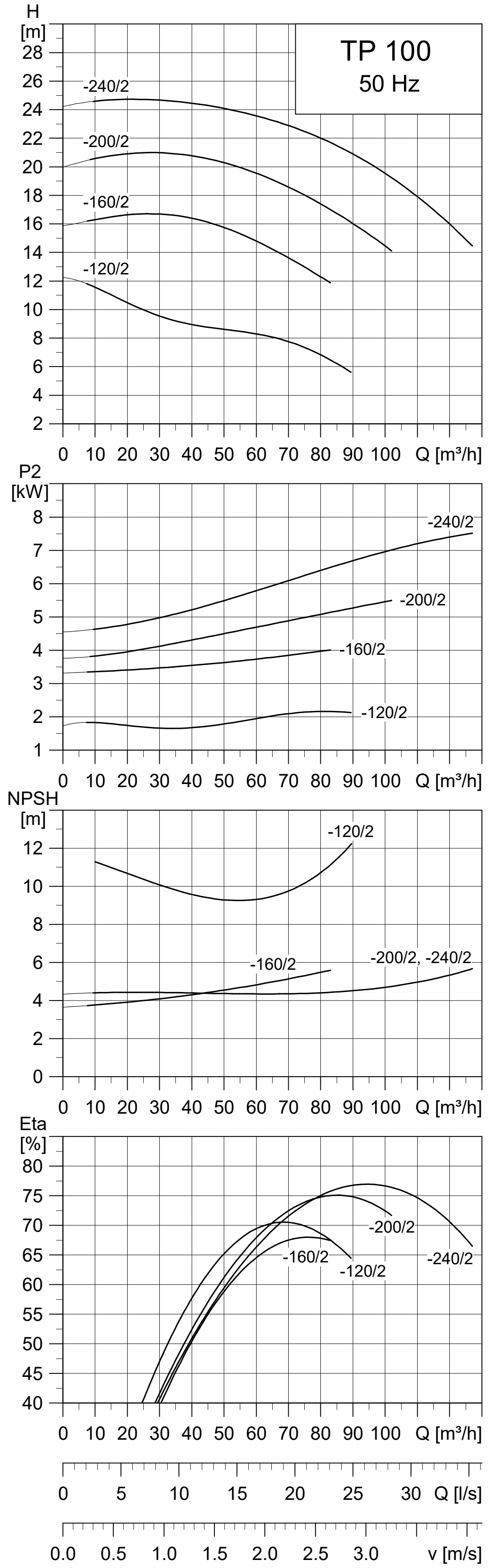
TM028632

Technical data

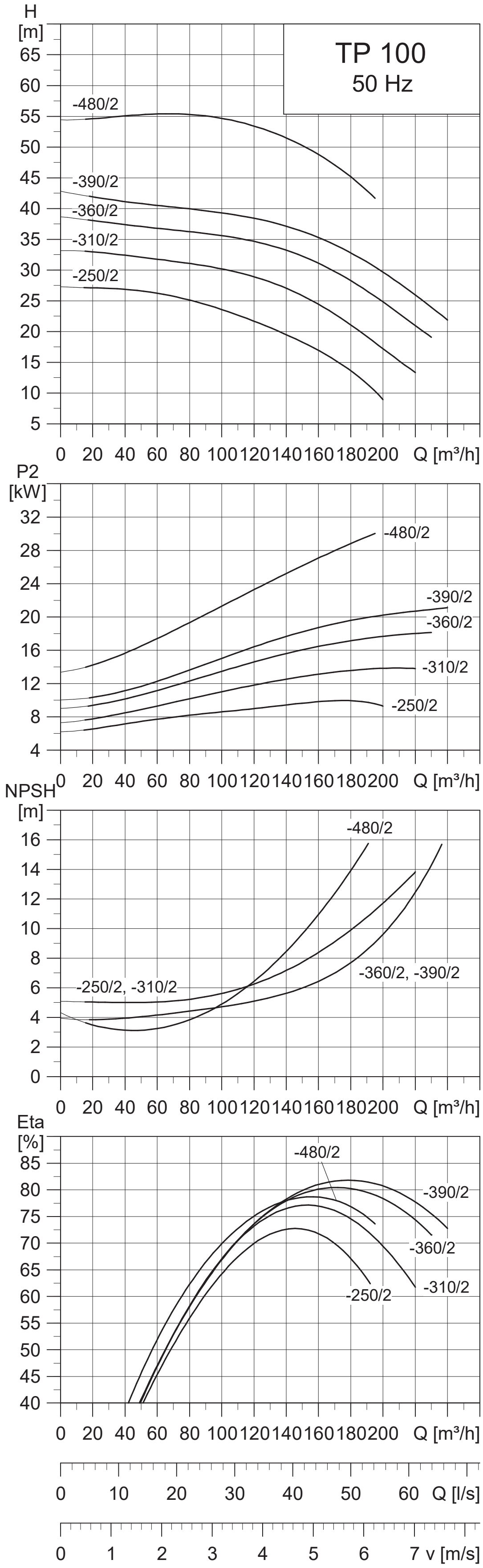
TP 80			**-120/2**	**-140/2**	**-180/2**	**-210/2**	**-240/2**	**-250/2**	**-330/2**	**-400/2**	**-520/2**	**-570/2**	**-700/2**
TPD			●	●	●	●	●	●	●	●	●	●	●
Series			200	300	300	300	300	300	300	300	300	300	300
IEC size	1~ TP		90	-	-	-	-	-	-	-	-	-	-
	3~ TP		90	90	100	112	132	132	160	160	160	180	200
P2	1~/3~ TP	[kW]	1.5/1.5	-/2.2	-/3	-/4	-/5.5	-/7.5	-/11	-/15	-/18.5	-/22	-/30
PN			PN 6/10	PN 16	PN 16	PN 16	PN 16	PN 16	PN 16	PN 16	PN 16	PN 16	PN 16
$T_{min};T_{max}$		[°C]	[-25;140]	[-25;120]	[-25;120]	[-25;120]	[-25;120]	[-25;120]	[-25;120]	[-25;120]	[-25;120]	[-25;120]	[-25;120]
D1		[mm]	80	80	80	80	80	80	80	80	80	80	80
AC	1~/3~ TP	[mm]	178/178	-/178	-/198	-/220	-/220	-/260	-/316	-/316	-/316	-/398	-/414
AD	1~/3~ TP	[mm]	139/139	-/110	-/120	-/134	-/134	-/159	-/204	-/204	-/204	-/293	-/333.5
P		[mm]	135	200	250	250	300	300	350	350	350	350	400
B1	TP/TPD	[mm]	120/134	125/296	125/296	125/296	125/296	176/366	176/366	176/366	187/416	187/416	187/416
B2	TP/TPD	[mm]	100/225	119/290	119/290	119/290	119/290	144/354	144/354	144/354	162/405	162/405	162/405
B3		[mm]	240	340	340	340	340	400	400	400	470	470	470
B4		[mm]	-	-	-/416	-/416	-/416	-/491	-/491	-/568	-/573	-/573	-
C1	TP/TPD	[mm]	160/240	144/420	144/420	144/420	144/420	144/480	144/480	144/480	144/550	144/550	144/550
C5	TP/TPD	[mm]	180/53	180/78	180/78	180/78	180/78	220/93	220/93	220/93	250/133	250/133	250/133
C6		[mm]	173	175	175	175	175	175	175	175	350	350	350
L1		[mm]	360	360	360	360	360	440	440	440	500	500	500
H1		[mm]	97	105	105	105	105	115	115	115	115	115	115
H2		[mm]	163	176	204	204	243	243	273	273	273	273	273
H3	1~/3~ TP	[mm]	541/581	-/602	-/644	-/681	-/739	-/737	-/870	-/870	-/914	-/963	-/1046
H4		[mm]	-	-	-	-	-	-	35	35	35	35	35
M			M16	M16	M16	M16	M16	M16	M16	M16	M16	M16	M16

- TP pumps with a H4 dimension are delivered with a base plate.

TP 100-XX/2

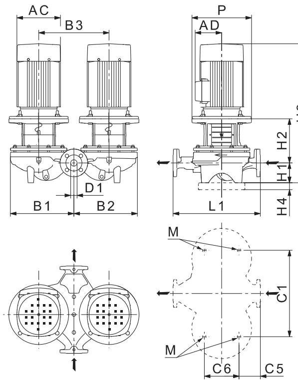


TM025026

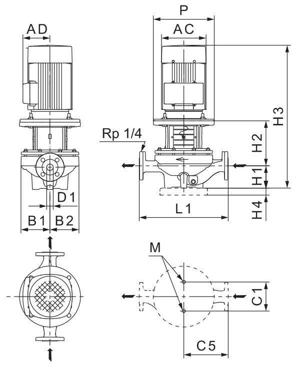


TM028751

Note: All curves apply to single-head pumps. For further information, see section Curve conditions.



TM028631



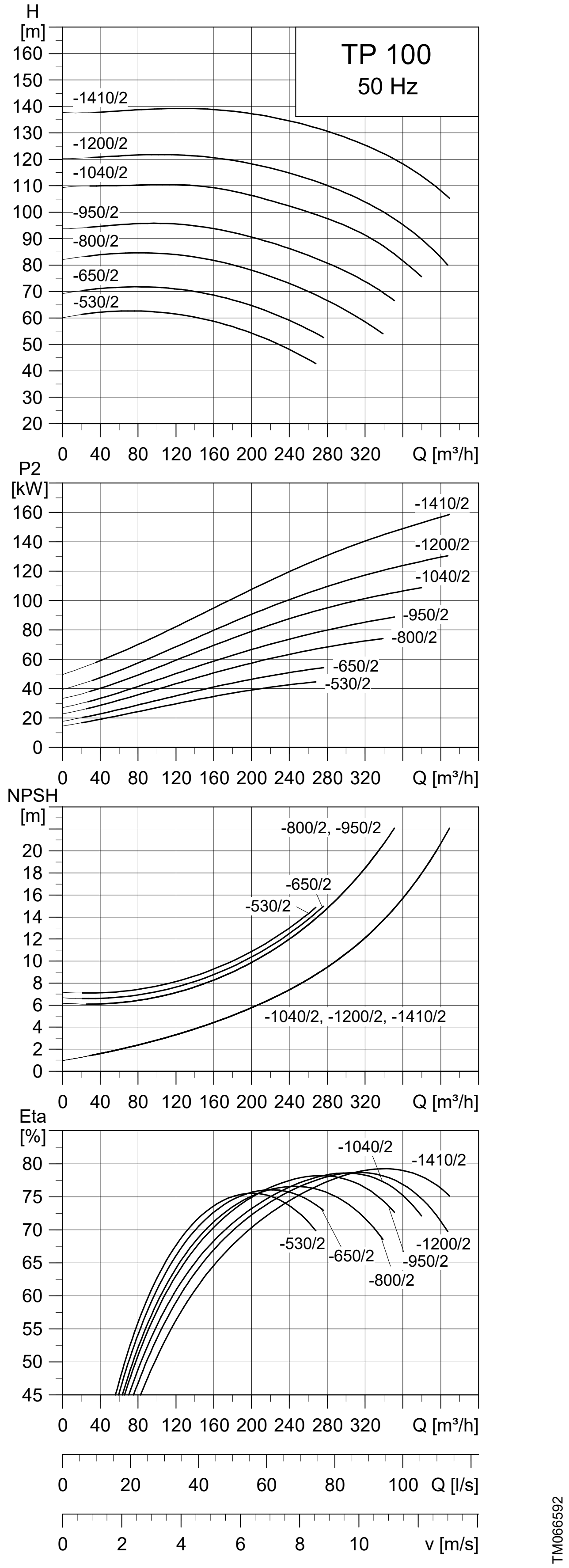
TM028632

Technical data

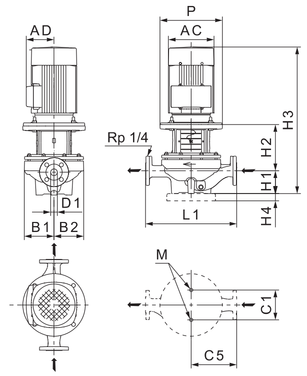
TP 100			-120/2	-160/2	-200/2	-240/2	-250/2	-310/2	-360/2	-390/2	-480/2
TPD			●	●	●	●	●	●	●	●	●
Series			200	300	300	300	300	300	300	300	300
IEC size	1~ TP		-	-	-	-	-	-	-	-	-
	3~ TP		90	112	132	132	160	160	160	180	200
P2	1~/3~ TP	[kW]	-/2.2	-/4	-/5.5	-/7.5	-/11	-/15	-/18.5	-/22	-/30
PN			PN 6/10	PN 16	PN 16	PN 16	PN 16	PN 16	PN 16	PN 16	PN 16
T_{min};T_{max}		[°C]	[-25;140]	[-25;120]	[-25;120]	[-25;120]	[-25;120]	[-25;120]	[-25;120]	[-25;120]	[-25;120]
D1		[mm]	100	100	100	100	100	100	100	100	100
AC	1~/3~ TP	[mm]	-/178	-/220	-/220	-/260	-/316	-/316	-/316	-/389	-/414
AD	1~/3~ TP	[mm]	-/110	-/134	-/134	-/159	-/204	-/204	-/204	-/293	-/333.5
P		[mm]	-	250	300	300	350	350	350	350	400
B1	TP/TPD	[mm]	125/245	156/347	156/347	156/347	190/414	190/414	190/414	190/414	201/443
B2	TP/TPD	[mm]	100/265	124/332	124/332	124/332	151/395	151/395	151/395	151/395	173/429
B3		[mm]	280	470	470	470	470	500	500	500	500
B4	TP/TPD	[mm]	-/340	-/481	-/481	-/526	-/541	-	-	-	-
C1	TP/TPD	[mm]	160/280	144/480	144/480	144/480	230/550	230/550	230/550	230/550	230/550
C5	TP/TPD	[mm]	225/83	250/104	250/104	250/104	275/110	275/110	275/110	275/110	275/110
C6		[mm]	221	175	175	175	230	230	230	230	230
L1		[mm]	450	500	500	500	550	550	550	550	550
H1		[mm]	107	140	140	140	140	140	140	140	140
H2		[mm]	185	206	245	245	270	270	270	270	307
H3	1~/3~ TP	[mm]	-/613	-/718	-/776	-/764	-/892	-/892	-/936	-/985	-/1105
H4		[mm]	-	-	-	-	35	35	35	35	35
M			M16	M16	M16	M16	M16	M16	M16	M16	M16

- TP pumps with a H4 dimension are delivered with a base plate.

TP 100-XX/2



Note: All curves apply to single-head pumps. For further information, see section Curve conditions.

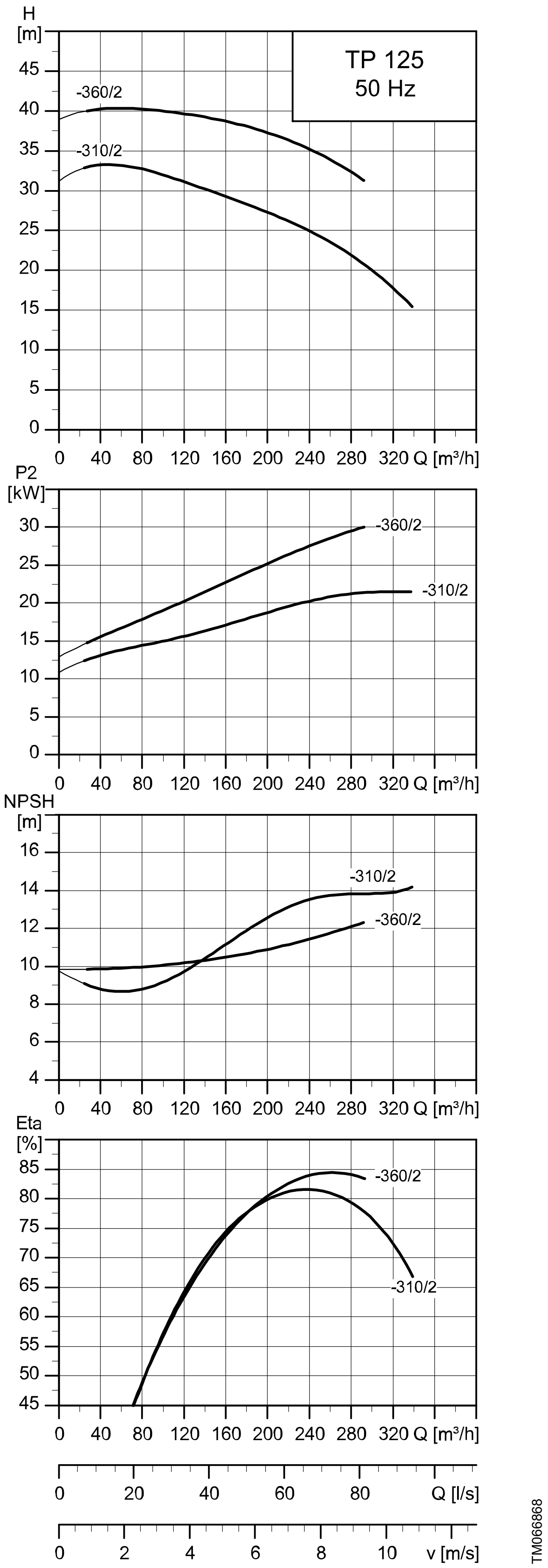


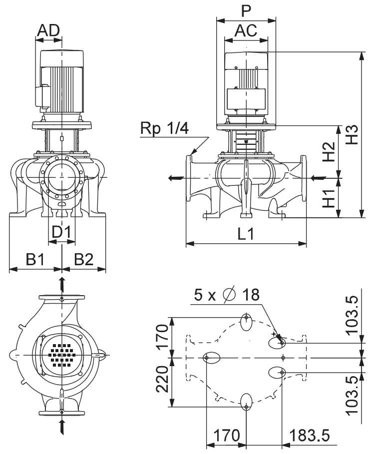
Technical data

TP 100			-530/2	-650/2	-800/2	-950/2	-1040/2	-1200/2	-1410/2
TPD			-	-	-	-	-	-	-
Series			300	300	300	300	300	300	300
IEC size	1~ TP		-	-	-	-	-	-	-
	3~ TP		250	250	280	280	315	315	315
P2	1~/3~ TP	[kW]	-/45	-/55	-/75	-/90	-/110	-/132	-/160
PN			PN25	PN25	PN25	PN25	PN25	PN25	PN25
T_{min};T_{max}		[°C]	[-40;150]	[-40;150]	[-40;150]	[-40;150]	[-40;150]	[-40;150]	[-40;150]
D1		[mm]	100	100	100	100	100	100	100
AC	1~/3~ TP	[mm]	-/414	-/528	-/528	-/528	-/528	-/599	-/657
AD	1~/3~ TP	[mm]	-/333.5	-/416.5	-/417	-/417	-/475	-/475	-/534
P		[mm]	450	550	550	550	660	660	660
B1	TP/TPD	[mm]	281/-	281/-	281/-	281/-	281/-	281/-	281/-
B2	TP/TPD	[mm]	246/-	246/-	246/-	246/-	246/-	246/-	246/-
B3		[mm]	-	-	-	-	-	-	-
B4		[mm]	-	-	-	-	-	-	-
C1	TP/TPD	[mm]	230/-	230/-	230/-	230/-	230/-	230/-	230/-
C5	TP/TPD	[mm]	335/-	335/-	335/-	335/-	335/-	335/-	335/-
C6		[mm]	-	-	-	-	-	-	-
L1		[mm]	670	670	670	670	670	670	670
H1		[mm]	175	175	175	175	175	175	175
H2		[mm]	333	338	338	338	366	366	366
H3	1~/3~ TP	[mm]	-/1185	-/1353	-/1367	-/1367	-/1473	-/1473	-/1647
H4		[mm]	35	35	35	35	35	35	35
M			M16	M16	M16	M16	M16	M16	M16

- TP pumps with a H4 dimension are delivered with a base plate.

TP 125-XX/2





TM050660

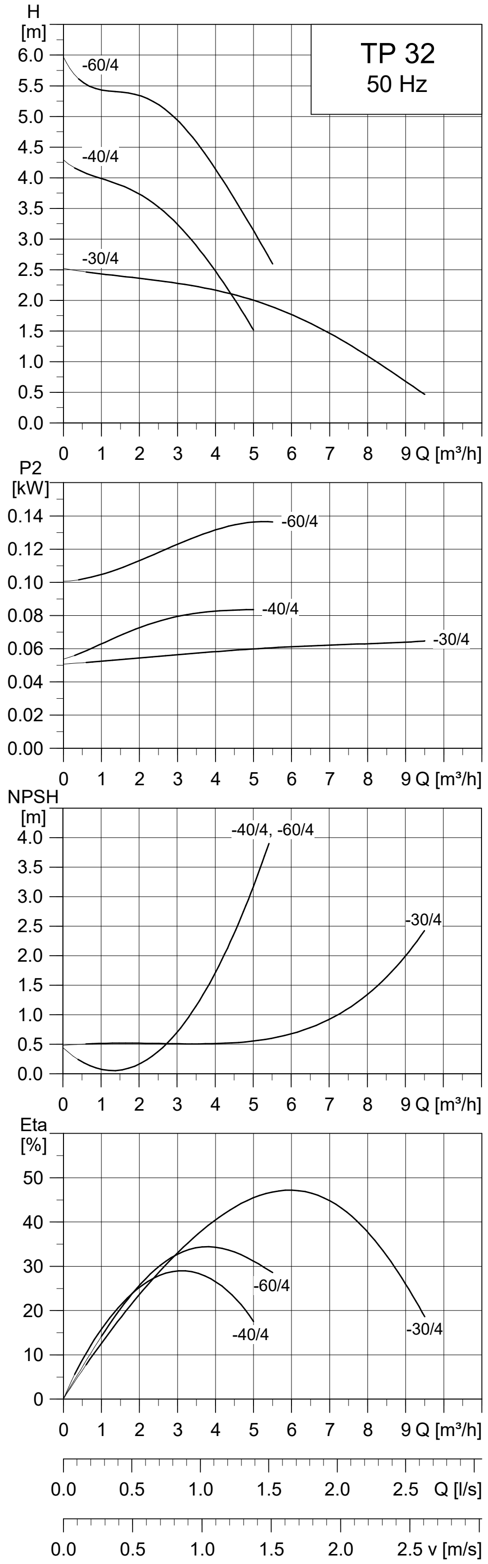
Technical data

TP 125			-310/2	-360/2
TPD			-	-
Series			300	300
IEC size	1~ TP		-	-
	3~ TP		100	100
P2	1~/3~ TP	[kW]	-/22	-/30
PN			PN 16	PN 16
T_{min};T_{max}		[°C]	[-25;120]	[-25;120]
D1		[mm]	125	125
AC	1~/3~ TP	[mm]	-/389	-/414
AD	1~/3~ TP	[mm]	-/293	-/334
P		[mm]	350	400
B1	TP/TPD	[mm]	243/-	243/-
B2	TP/TPD	[mm]	193/-	193/-
B3		[mm]	-	-
L1		[mm]	620	620
H1		[mm]	210	210
H2		[mm]	275	275
H3	1~/3~ TP	[mm]	-/1060	-/1143

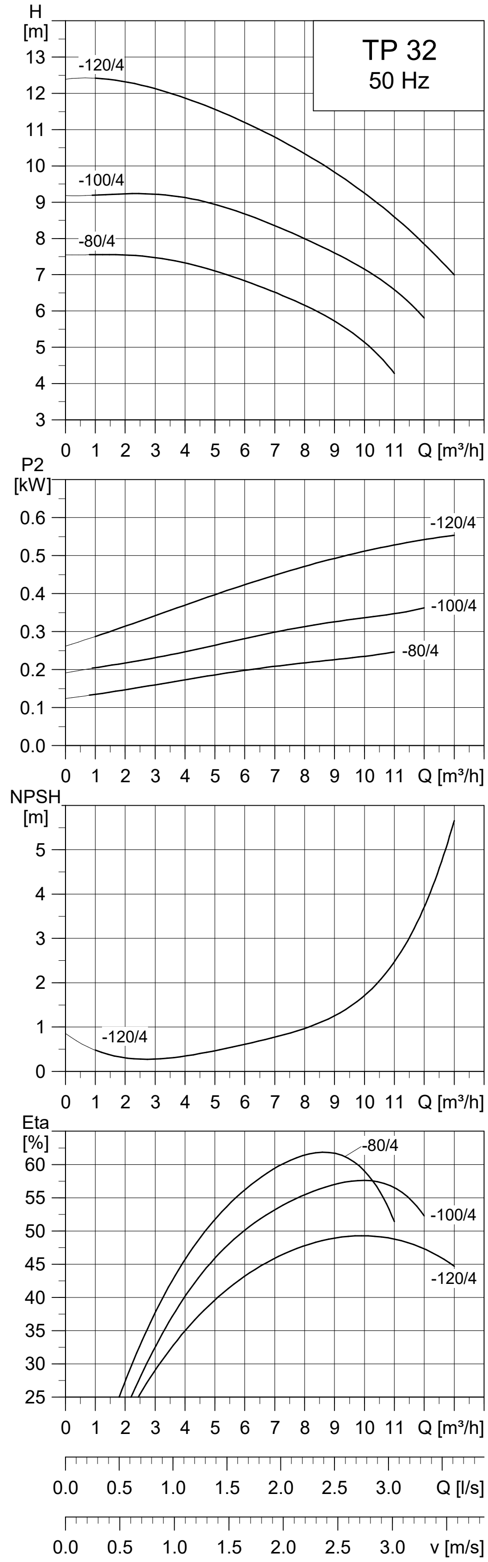
- TP pumps with a H4 dimension are delivered with a base plate. See section Base plates for base plate dimensions.

TP, TPD, 4-pole, PN 6, 10, 16, 25

TP, TPD, 32-XXX/4

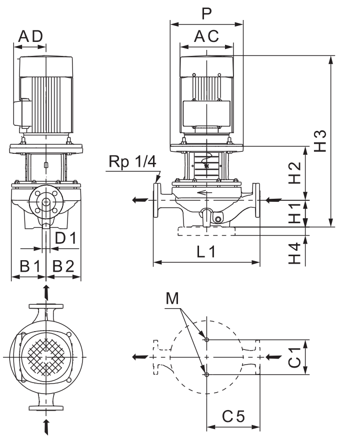


TM025027

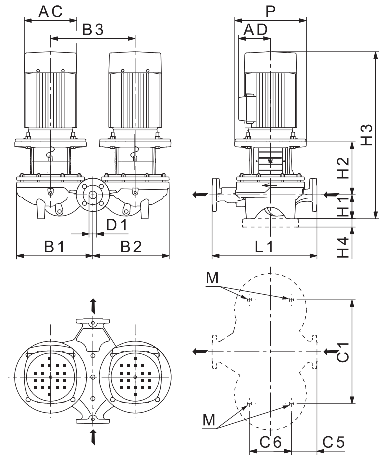


TM025028

Note: All curves apply to single-head pumps. For further information, see section Curve conditions.



TM028632



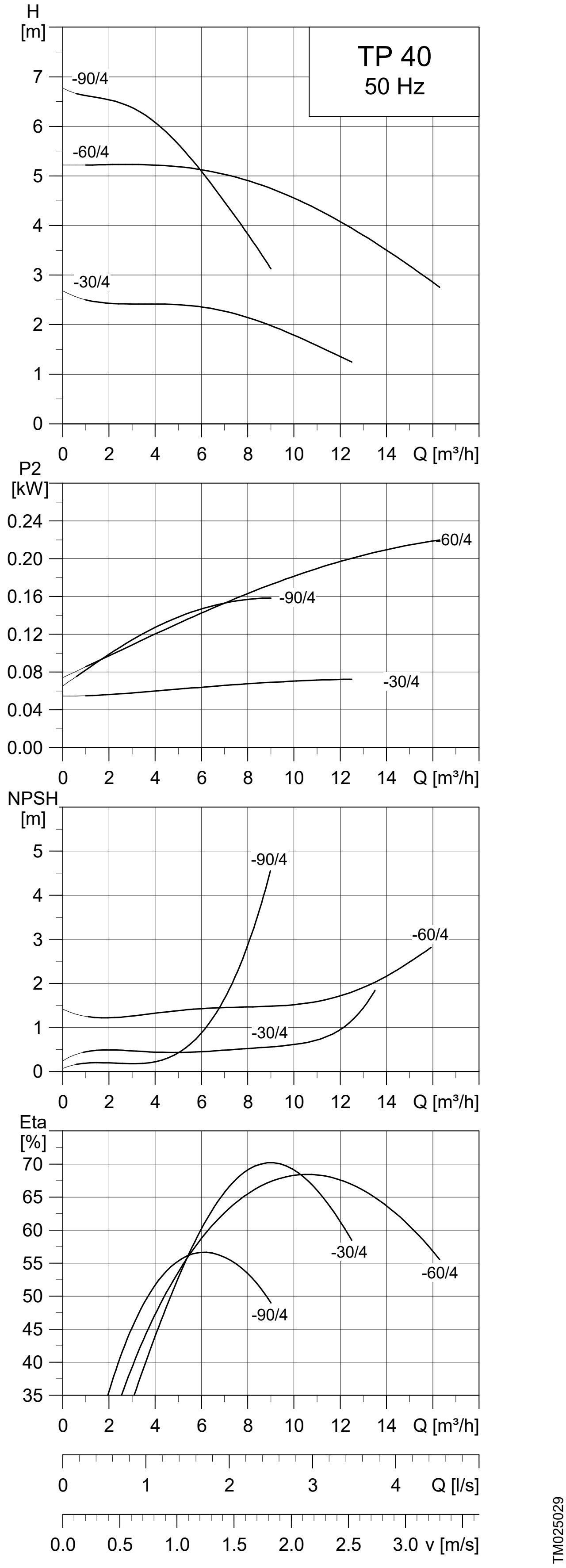
TM028631

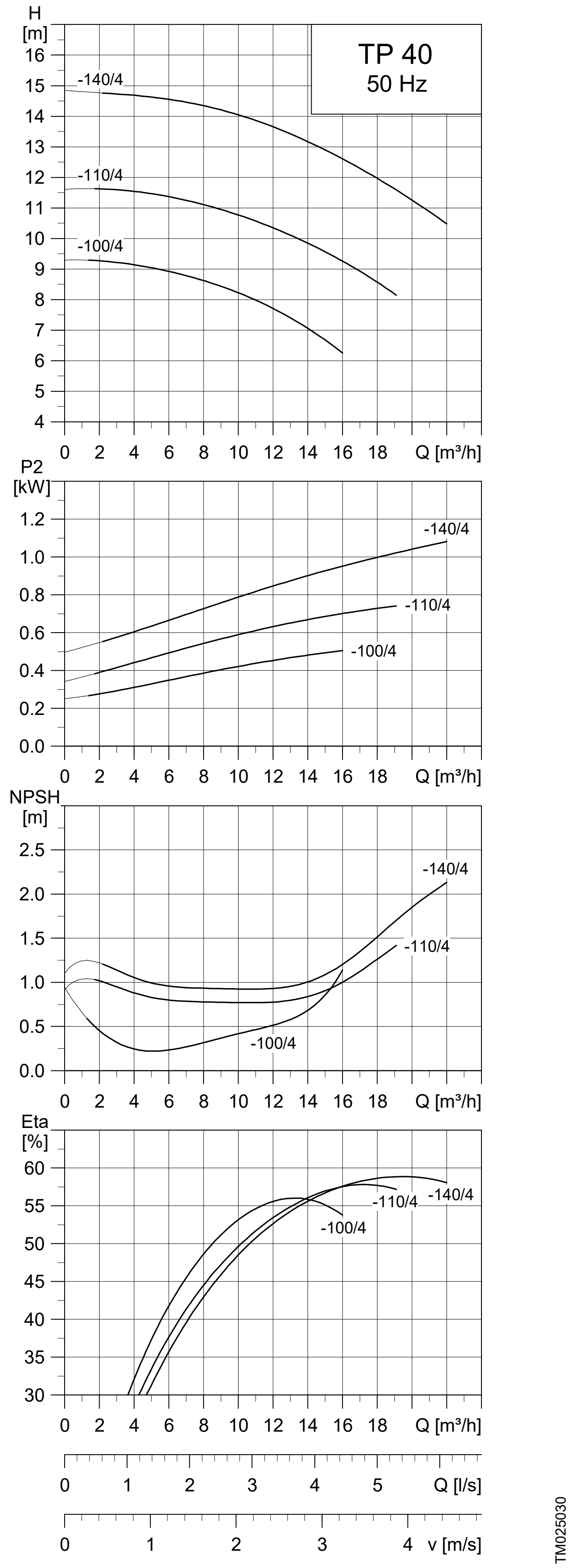
Technical data

TP 32			-30/4	-40/4	-60/4	-80/4	-100/4	-120/4
TPD			●	●	●	●	●	●
Series			200	200	200	300	300	300
IEC size	1~ TP		63	71	71	-	-	-
	3~ TP		63	71	71	71	71	80
P2	1~/3~ TP	[kW]	0.12/0.12	0.25/0.25	0.25/0.25	-/0.25	-/0.37	-/0.55
PN			PN 6/10	PN 6/10	PN 6/10	PN 16	PN 16	PN 16
T_{min};T_{max}		[°C]	[-25;140]	[-25;140]	[-25;140]	[-25;120]	[-25;120]	[-25;120]
D1		[mm]	32	32	32	32	32	32
AC	1~/3~ TP	[mm]	141/118	141/141	141/141	-/141	-/141	-/159
AD	1~/3~ TP	[mm]	133/101	133/133	133/133	-/109	-/109	-/121
P		[mm]	-	105	-	170	170	200
B1	TP/TPD	[mm]	75/180	100/222	100/222	125/260	125/260	144/321
B2	TP/TPD	[mm]	75/180	100/222	100/222	117/257	117/257	144/321
B3		[mm]	200	240	240	276	276	355
C1	TP/TPD	[mm]	80/200	80/240	80/240	144/356	144/356	144/435
C5	TP/TPD	[mm]	110/52	140/82	140/82	170/45	170/45	220/46
C6		[mm]	103	103	103	175	175	175
L1		[mm]	220	280	280	340	340	440
H1		[mm]	68	79	79	100	100	100
H2		[mm]	142	125	125	129	129	156
H3	1~/3~ TP	[mm]	401/390	395/395	395/395	-/420	-/420	-/508
H4		[mm]	-	-	-	-	-	-
M			M12	M12	M12	M16	M16	M16

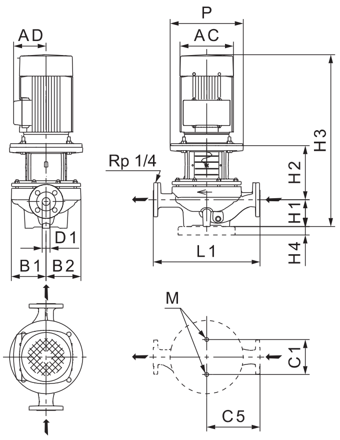
- TP pumps with a H4 dimension are delivered with a base plate.

TP 40-XXX/4

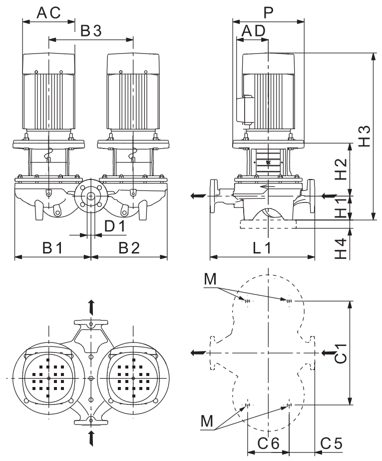




Note: All curves apply to single-head pumps. For further information, see section Curve conditions.



TM028632



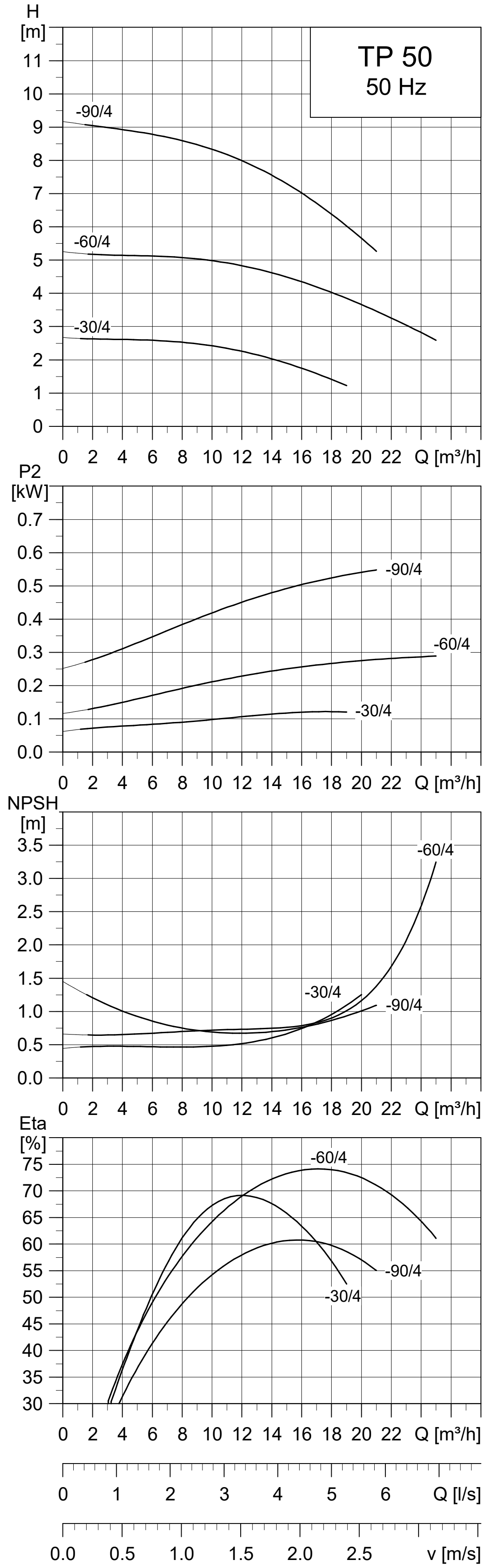
TM028631

Technical data

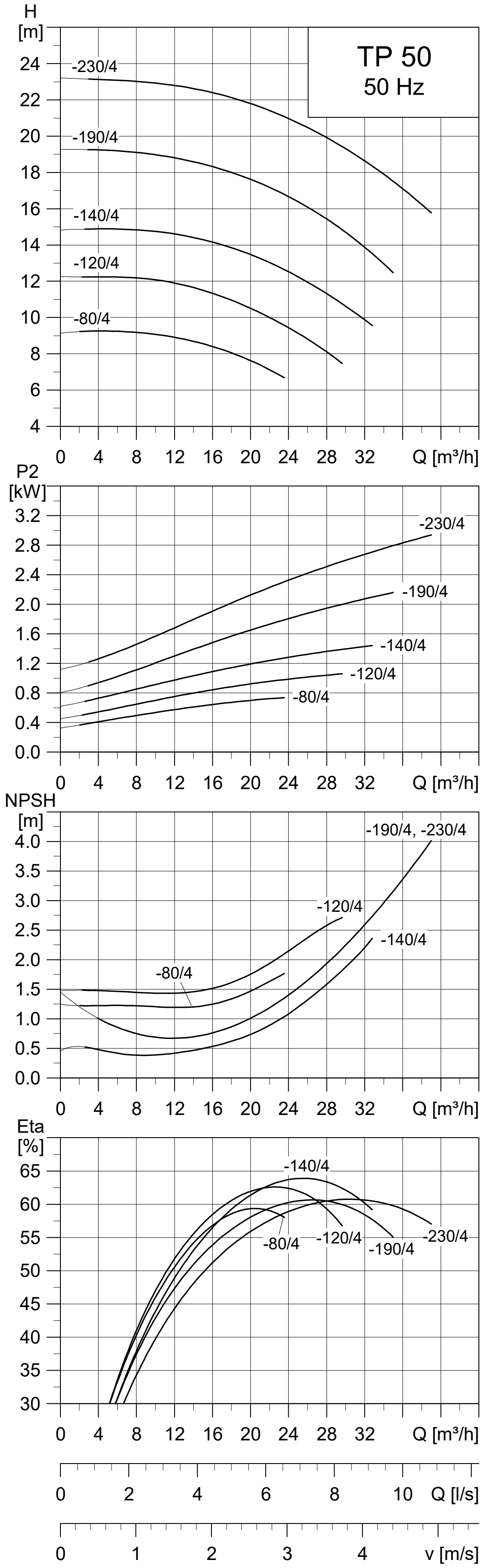
TP 40			-30/4	-60/4	-90/4	-100/4	-110/4	-140/4
TPD			●	-	●	●	●	●
Series			200	200	200	300	300	300
IEC size	1~ TP		63	71	71	-	-	-
	3~ TP		63	71	71	80	80	90
P2	1~/3~ TP	[kW]	0.12/0.12	0.25/0.25	0.25/0.25	-/0.55	-/0.75	-/1.1
PN			PN 6/10	PN 6/10	PN 16	PN 16	PN 16	PN 16
T_{min};T_{max}		[°C]	[-25;140]	[-25;140]	[-25;140]	[-25;120]	[-25;120]	[-25;120]
D1		[mm]	40	40	40	40	40	40
AC	1~/3~ TP	[mm]	141/118	141/141	141/141	-/159	-/159	-/178
AD	1~/3~ TP	[mm]	133/101	133/109	133/133	-/121	-/121	-/126
P		[mm]	-	-	105	200	200	200
B1	TP/TPD	[mm]	85/180	100/-	100/222	130/273	150/325	150/325
B2	TP/TPD	[mm]	75/180	100/-	100/222	117/267	147/325	147/325
B3		[mm]	200	-	240	290	355	355
C1	TP/TPD	[mm]	120/200	120/-	120/240	144/400	144/435	144/435
C5	TP/TPD	[mm]	125/45	125/-	160/95	170/45	220/108	220/108
C6		[mm]	125	-	125	175	175	175
L1		[mm]	250	250	320	340	440	440
H1		[mm]	67	75	68/79	100	110	110
H2		[mm]	146	123	128	166	156	156
H3	1~/3~ TP	[mm]	404/393	389/389	388/398	-/518	-/553	-/563
H4		[mm]	-	-	-	-	-	-
M			M12	M12	M12	M16	M16	M16

- TP pumps with a H4 dimension are delivered with a base plate. See section Base plates for base plate dimensions.

TP 50-XXX/4

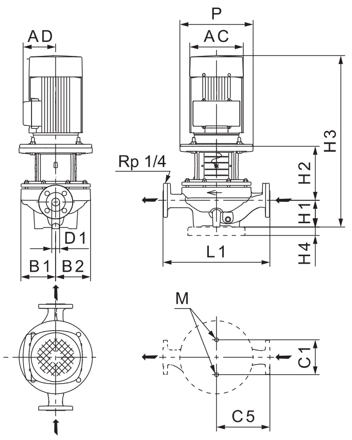


TM025031

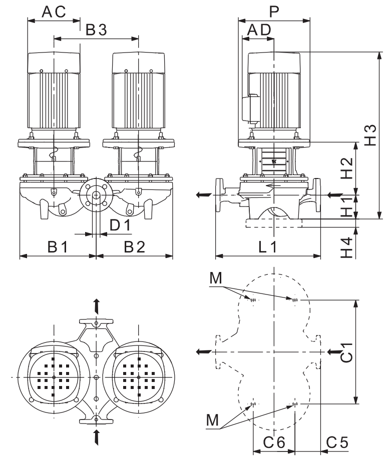


TM025032

Note: All curves apply to single-head pumps. For further information, see section Curve conditions.



TM028632



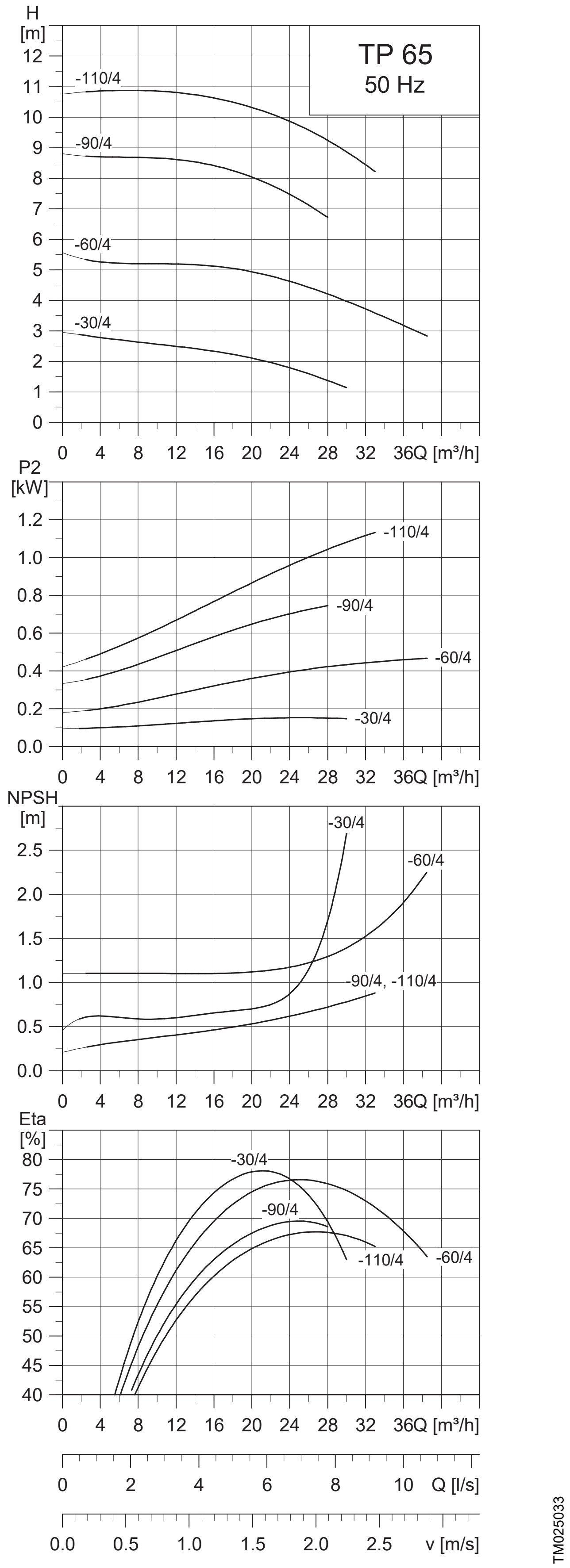
TM028631

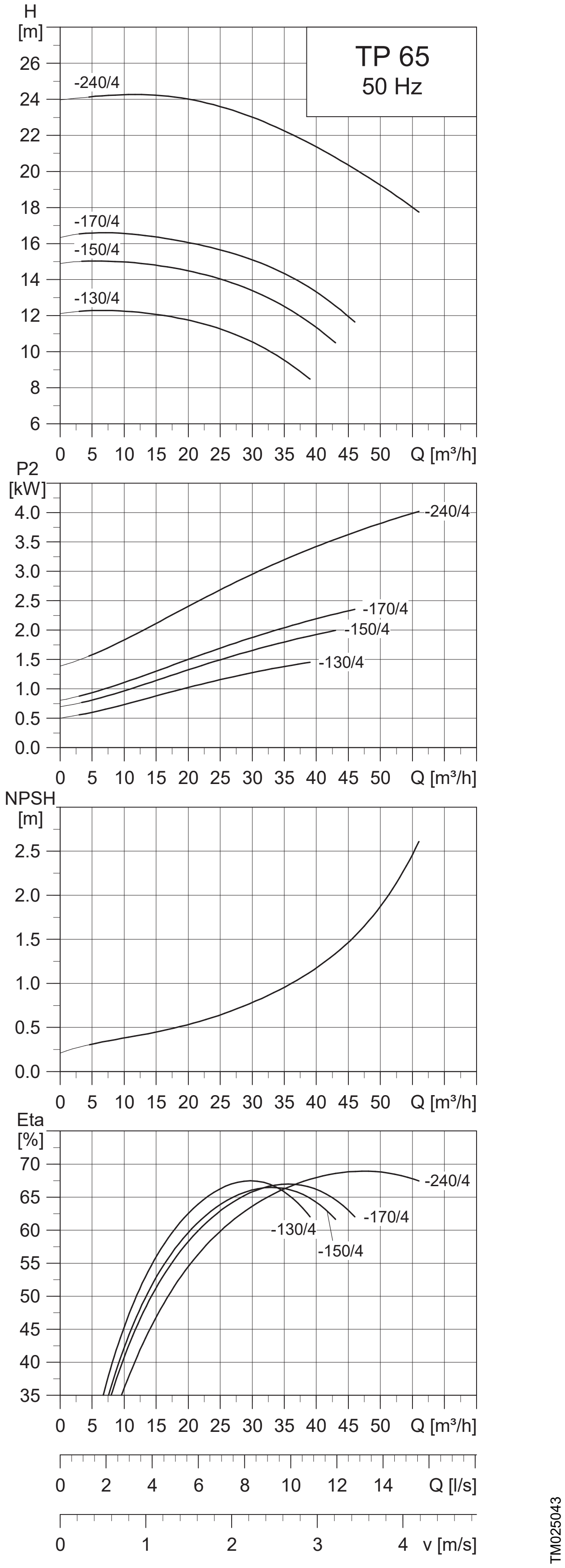
Technical data

TP 50			-30/4	-60/4	-90/4	-80/4	-120/4	-140/4	-190/4	-230/4
TPD			●	●	●	●	●	●	●	●
Series			200	200	300	300	300	300	300	300
IEC size	1~ TP		71	80	-	-	-	-	-	-
	3~ TP		71	71	80	80	90	90	100	100
P2	1~/3~ TP	[kW]	0.25/0.25	0.37/0.37	-/0.55	-/0.75	-/1.1	-/1.5	-/2.2	-/3
PN			PN 6/10	PN 6/10	PN 16	PN 16	PN 16	PN 16	PN 16	PN 16
T_{min};T_{max}		[°C]	[-25;140]	[-25;140]	[-25;120]	[-25;120]	[-25;120]	[-25;120]	[-25;120]	[-25;120]
D1		[mm]	50	50	50	50	50	50	50	50
AC	1~/3~ TP	[mm]	141/142	141/141	-/159	-/159	-/178	-/178	-/198	-/198
AD	1~/3~ TP	[mm]	133/133	133/109	-/121	-/121	-/126	-/126	-/166	-/166
P		[mm]	-	-	200	200	200	200	250	250
B1	TP/TPD	[mm]	75/181	110/225	133/290	162/373	162/373	162/373	180/386	180/386
B2	TP/TPD	[mm]	90/186	100/225	119/284	162/373	162/373	162/373	164/379	164/379
B3		[mm]	200	240	320	420	420	420	420	420
C1	TP/TPD	[mm]	120/200	120/240	144/400	144/500	144/500	144/500	144/500	144/500
C5	TP/TPD	[mm]	140/60	140/60	170/52	220/123	220/123	220/123	220/123	220/123
C6		[mm]	125	125	175	175	175	175	175	175
L1		[mm]	280	280	340	440	440	440	440	440
H1	TP/TPD	[mm]	82/90	82	115	115	115	115	115	115
H2		[mm]	135	127	161	160	160	160	195	195
H3	1~/3~ TP	[mm]	408/416	452/400	-/528	-/552	-/572	-/612	-/580.5	-/580.5
H4		[mm]	-	-	-	-	-	-	-	-
M			M12	M12	M16	M16	M16	M16	M16	M16

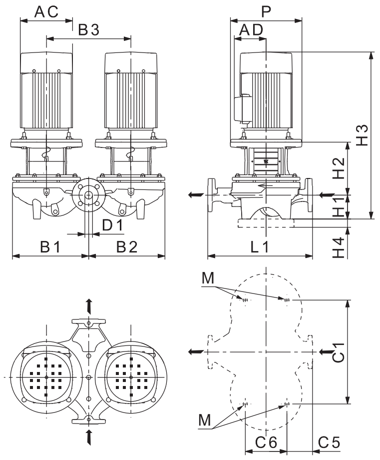
- TP pumps with a H4 dimension are delivered with a base plate.

TP 65-XXX/4

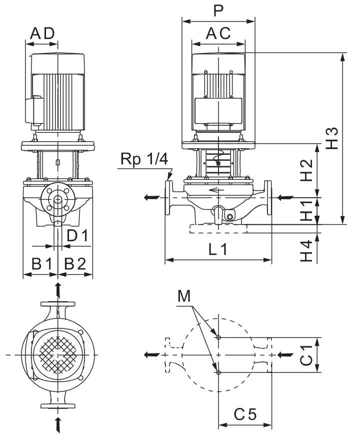




Note: All curves apply to single-head pumps. For further information, see section Curve conditions.



TM028631



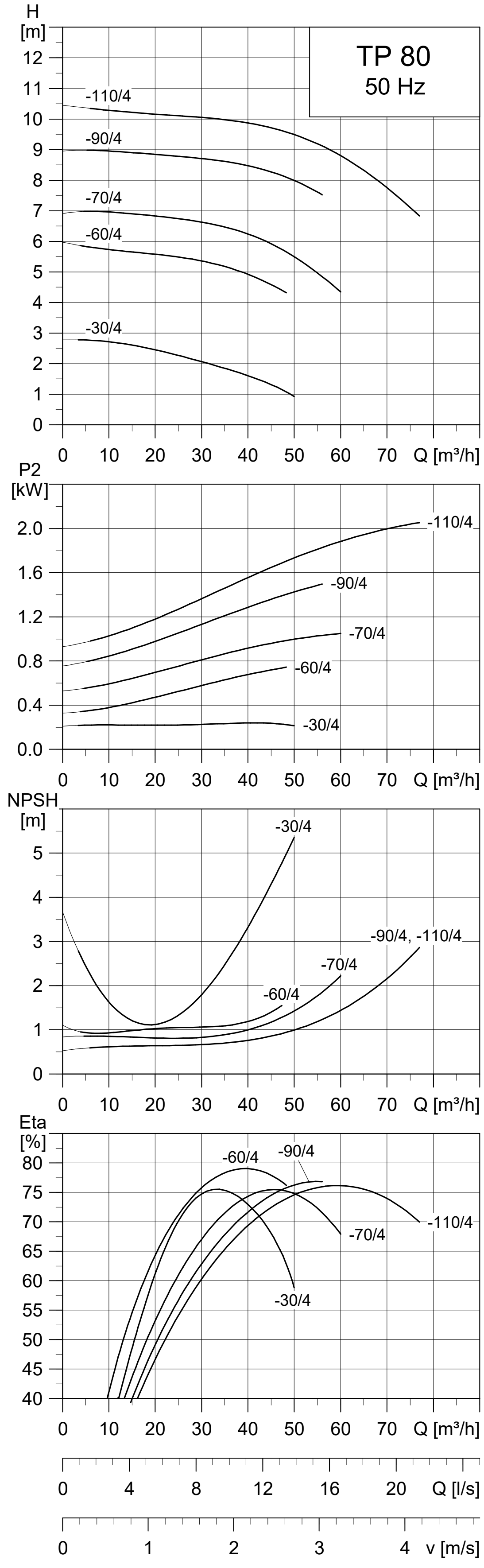
TM028632

Technical data

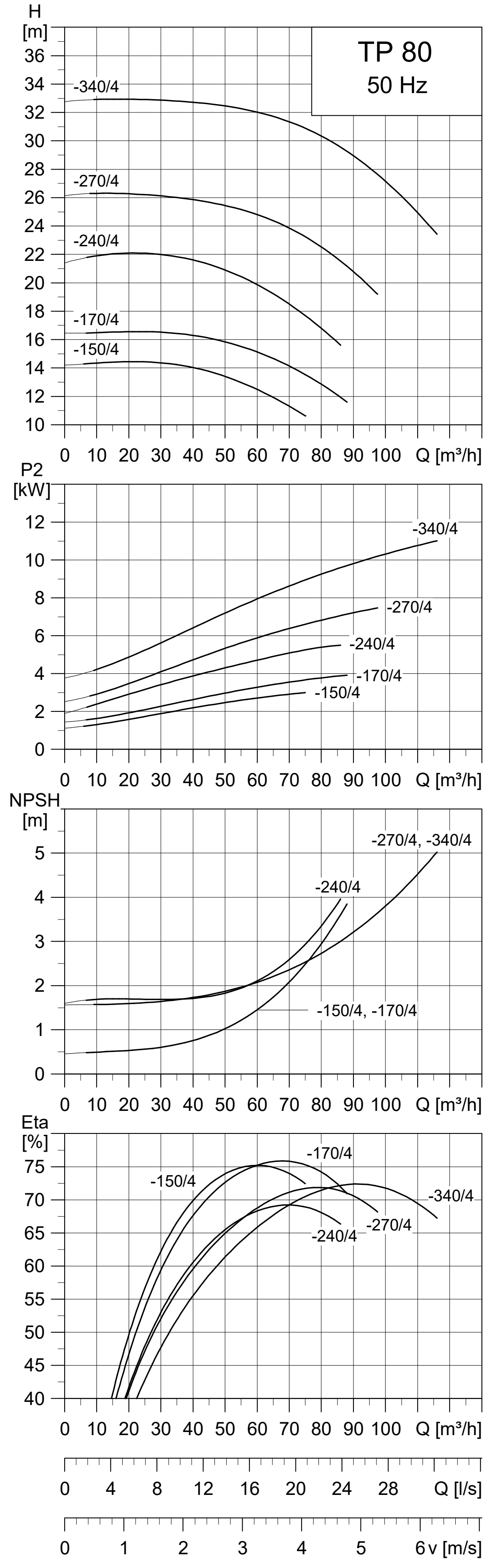
TP 65			-30/4	-60/4	-90/4	-110/4	-130/4	-150/4	-170/4	-240/4
TPD			●	●	●	●	●	●	●	●
Series			200	200	300	300	300	300	300	300
IEC size	1~ TP		71	80	-	-	-	-	-	-
	3~ TP		71	80	80	90	90	100	100	112
P2	1~/3~ TP	[kW]	0.25/0.25	0.55/0.55	-/0.75	-/1.1	-/1.5	-/2.2	-/3	-/4
PN			PN 6/10	PN 6/10	PN 16	PN 16	PN 16	PN 16	PN 16	PN 16
T_{min};T_{max}		[°C]	[-25;140]	[-25;140]	[-25;120]	[-25;120]	[-25;120]	[-25;120]	[-25;120]	[-25;120]
D1		[mm]	65	65	65	65	65	65	65	65
AC	1~/3~ TP	[mm]	141/141	141/159	-/159	-/178	-/178	-/198	-/198	-/222
AD	1~/3~ TP	[mm]	133/109	133/121	-/121	-/126	-/126	-/166	-/166	-/177
P		[mm]	-	-	200	200	200	250	250	250
B1	TP/TPD	[mm]	125/230	125/230	142/298	178/349	178/349	178/349	178/349	178/349
B2	TP/TPD	[mm]	100/240	100/240	124/290	164/383	164/383	164/0	164/383	164/383
B3		[mm]	240	240	320	440	440	440	440	440
B4	TP/TPD	[mm]	-	-	-	-	-	-	-	-/466
C1	TP/TPD	[mm]	160/240	160/240	144/400	144/520	144/520	144/520	144/520	144/520
C5	TP/TPD	[mm]	170/63	170/63	180/65	238/111	238/111	238/111	238/111	238/111
C6		[mm]	153	153	175	175	175	175	175	175
L1		[mm]	340	340	360	475	475	475	475	475
H1		[mm]	97	97	105	125	125	125	125	125
H2		[mm]	135	147	172	166	166	194	194	194
H3	1~/3~ TP	[mm]	423/423	475/496	-/564	-/588	-/628	-/700	-/700	-/673
H4		[mm]	-	-	-	-	-	-	-	-
M			M16	M16	M16	M16	M16	M16	M16	M16

- TP pumps with a H4 dimension are delivered with a base plate.

TP 80-XXX/4

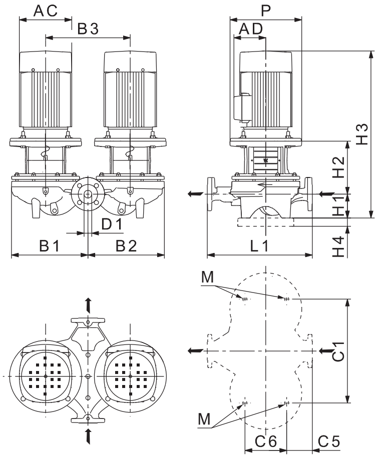


TM025044

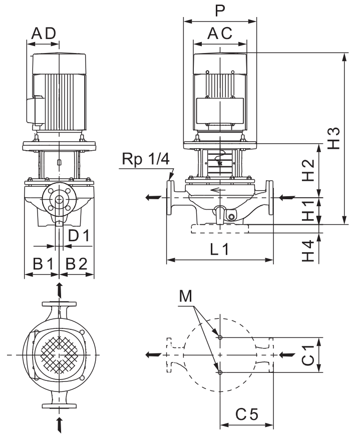


TM028752

Note: All curves apply to single-head pumps. For further information, see section Curve conditions.



TM028631



TM028632

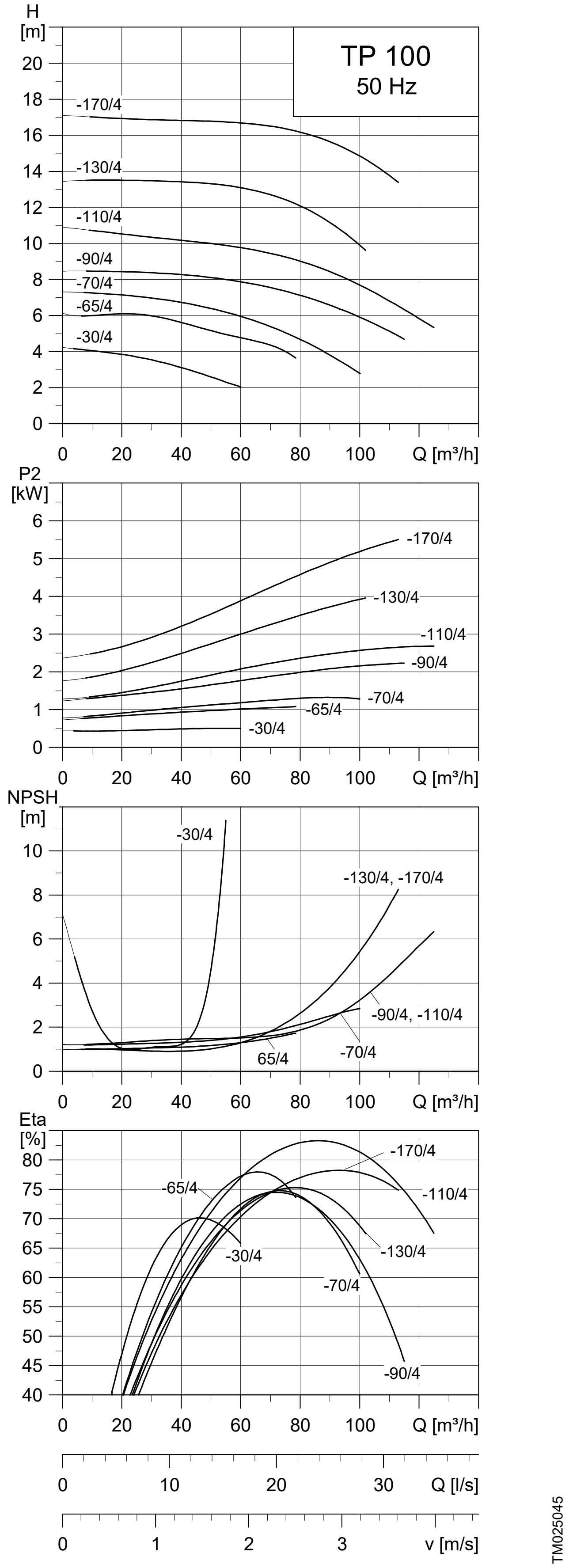
Technical data

TP 80			**-30/4**	**-60/4**	**-70/4**	**-90/4**	**-110/4**	**-150/4**	**-170/4**	**-240/4**	**-270/4**	**-340/4**
TPD			●	●	●	●	●	●	●	●	●	●
Series			200	200	300	300	300	300	300	300	300	300
IEC size	1~ TP		80	90	-	-	-	-	-	-	-	-
	3~ TP		71	80	90	90	100	100	112	132	132	160
P2	1~/3~ TP	[kW]	0.37/0.37	0.75/0.75	-/1.1	-/1.5	-/2.2	-/3	-/4	-/5.5	-/7.5	-/11
PN			PN 6/PN 10	PN 6/PN 10	PN 16	PN 16	PN 16	PN 16	PN 16	PN 16	PN 16	PN 16
T_{min};T_{max}		[°C]	[-25;140]	[-25;140]	[-25;120]	[-25;120]	[-25;120]	[-25;120]	[-25;120]	[-25;120]	[-25;120]	[-25;120]
D1		[mm]	80	80	80	80	80	80	80	80	80	80
AC	1~/3~ TP	[mm]	142/141	178/159	-/178	-/178	-/198	-/198	-/222	-/262	-/262	-/358
AD	1~/3~ TP	[mm]	133/109	139/121	-/126	-/126	-/166	-/166	-/177	-/202	-/202	-/277.5
P		[mm]	-	-	200	200	250	250	250	300	300	350
B1	TP/TPD	[mm]	130/230	135/240	176/366	176/366	176/366	187/416	187/416	243/491	243/491	243/491
B2	TP/TPD	[mm]	100/240	100/250	144/354	144/354	144/354	162/405	162/405	226/480	226/480	226/480
B3		[mm]	240	240	400	400	400	470	470	500	500	500
B4		[mm]	-	-	-	-	-	-/481	-/481	-/541	-/541	-
C1	TP/TPD	[mm]	160/240	160/240	144/480	144/480	144/480	144/550	144/550	230/550	230/550	230/550
C5	TP/TPD	[mm]	180/53	180/53	220/93	220/93	220/93	250/133	250/133	310/105	310/105	310/105
C6		[mm]	173	173	175	175	175	175	175	350	350	350
L1		[mm]	360	360	440	440	440	500	500	620	620	620
H1		[mm]	107	107	115	115	115	115	115	140	140	140
H2		[mm]	163	153	176	176	204	204	204	273	273	303
H3	1~/3~ TP	[mm]	513/461	551/547	-/588	-/628	-/689.5	-/689.5	-/673	-/848	-/848	-/953
H4		[mm]	-	-	-	-	-	-	-	-	-	35
M			M16	M16	M16	M16	M16	M16	M16	M16	M16	M16

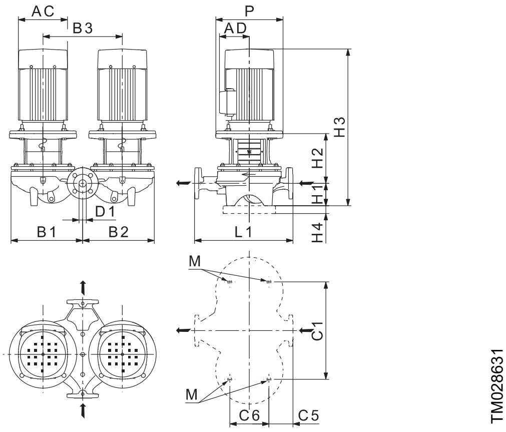
- TP pumps with a H4 dimension are delivered with a base plate.

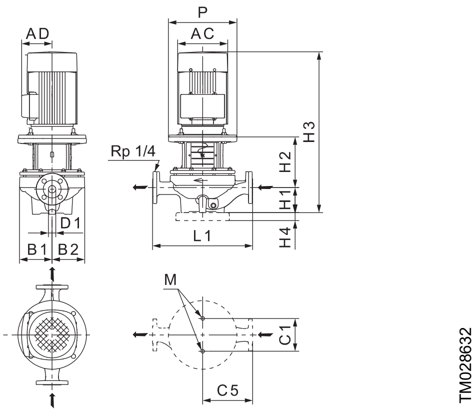
Performance curves and technical data

TP 100-XXX/4



Note: All curves apply to single-head pumps. For further information, see section Curve conditions.



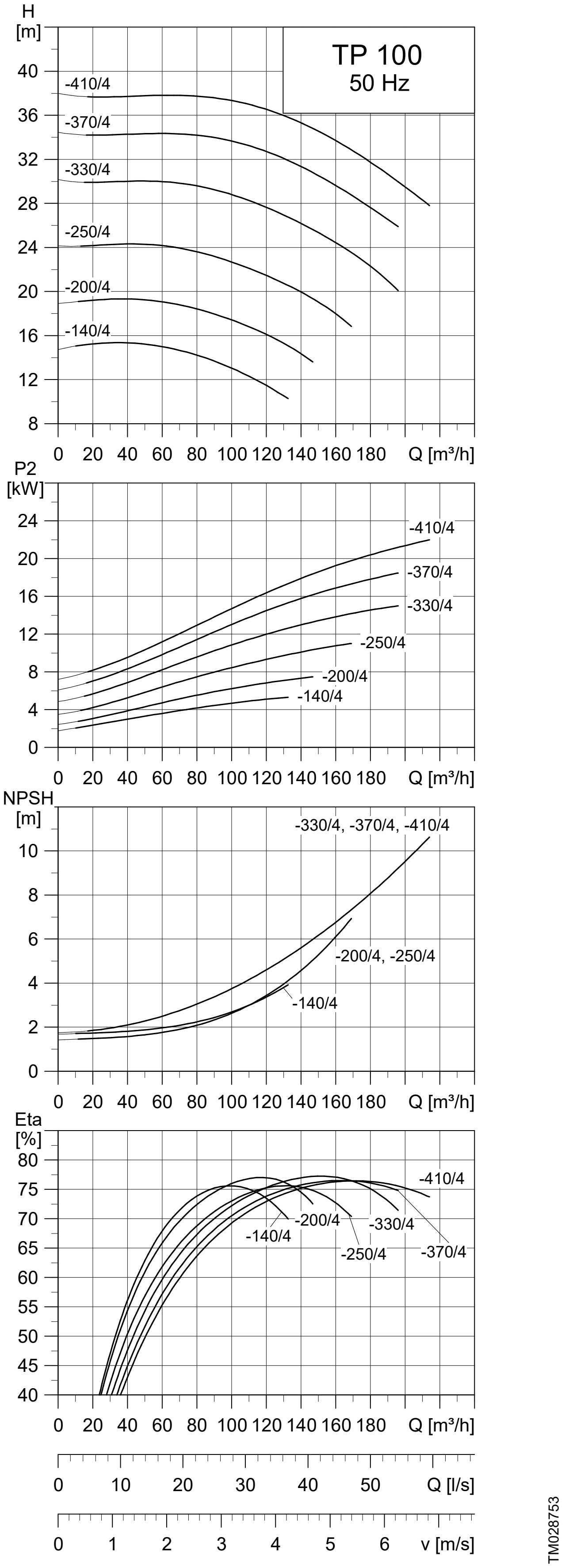


Technical data

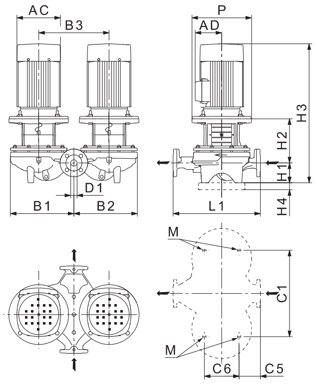
TP 100			-30/4	-65/4	-70/4	-90/4	-110/4	-130/4	-170/4
TPD			●	●	●	●	●	●	●
Series			200	300	300	300	300	300	300
IEC size	1~ TP		80	90	-	-	-	-	-
	3~ TP		80	90	90	100	100	112	132
P2	1~/3~ TP	[kW]	0.55/0.55	-/1.1	-/1.5	-/2.2	-/3	-/4	-/5.5
PN			PN 6/PN 10	PN 16	PN 16	PN 16	PN 16	PN 16	PN 16
T_{min};T_{max}		[°C]	[-25;140]	[-25;120]	[-25;120]	[-25;120]	[-25;120]	[-25;120]	[-25;120]
D1		[mm]	100	100	100	100	100	100	100
AC	1~/3~ TP	[mm]	141/159	-/178	-/178	-/198	-/198	-/222	-/262
AD	1~/3~ TP	[mm]	133/121	-/126	-/126	-/166	-/166	-/177	-/202
P		[mm]	-	200	200	250	250	250	300
B1	TP/TPD	[mm]	175/280	190/414	190/414	190/414	190/414	201/443	201/443
B2	TP/TPD	[mm]	125/305	151/395	151/395	151/395	151/395	173/429	173/429
B3		[mm]	280	280	470	470	470	500	500
B4	TP/TPD	[mm]	-	-/457	-/457	-/496	-/496	-/496	-/541
C1	TP/TPD	[mm]	200/280	230/550	230/550	230/550	230/550	230/550	230/550
C5	TP/TPD	[mm]	225/83	250/110	250/110	275/110	275/110	275/110	275/110
C6		[mm]	221	230	230	230	230	230	230
L1		[mm]	450	550	550	550	550	550	550
H1		[mm]	122	140	140	140	140	140	140
H2		[mm]	172	173	173	201	201	261	277
H3	1~/3~ TP	[mm]	525/546	-/612	-/550	-/711.5	-/711.5	-/755	-/852
H4		[mm]	-	-	-	-	-	-	-
M			M16	M16	M16	M16	M16	M16	M16

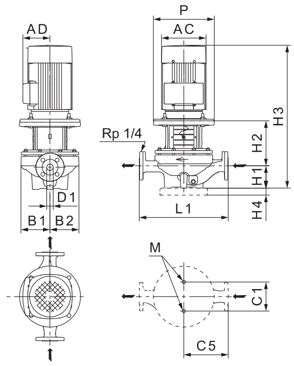
- TP pumps with a H4 dimension are delivered with a base plate.

TP 100-XXX/4



Note: All curves apply to single-head pumps. For further information, see section Curve conditions.



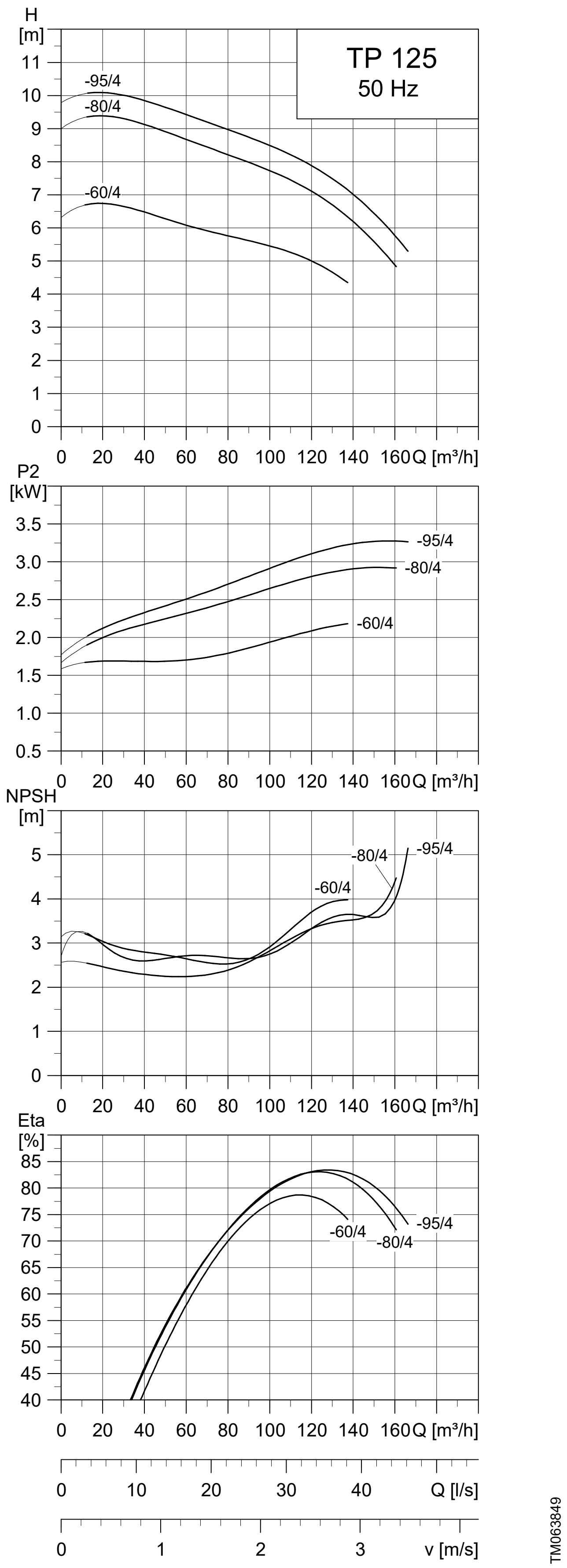


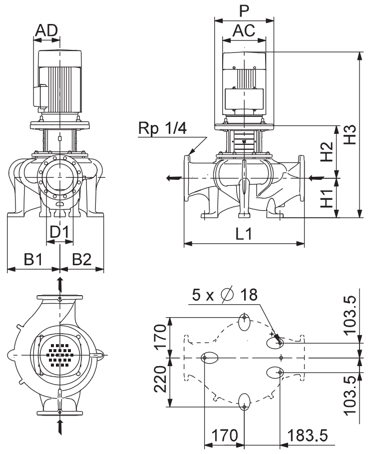
Technical data

TP 100			-140/4	-200/4	-250/4	-330/4	-370/4	-410/4
TPD			-	●	●	●	●	●
Series			300	300	300	300	300	300
IEC size	1~ TP		-	-	-	-	-	-
	3~ TP		132	132	160	160	180	180
P2	1~/3~ TP	[kW]	-/5.5	-/7.5	-/11	-/15	-/18.5	-/22
PN			PN25	PN16/25	PN16/25	PN16/25	PN16/25	PN16/25
T_{min};T_{max}		[°C]	[-40;150]	[-40;150]	[-40;150]	[-40;150]	[-40;150]	[-40;150]
D1		[mm]	100	100	100	100	100	100
AC	1~/3~ TP	[mm]	-/262	-/262	-/358	-/358	-/389	-/389
AD	1~/3~ TP	[mm]	-/202	-/202	-/277.5	-/277.5	-/293.5	-/293.5
P		[mm]	300	300	350	350	350	350
B1	TP/TPD	[mm]	290/-	290/579	290/579	290/579	290/579	290/579
B2	TP/TPD	[mm]	249/-	249/561	249/561	249/561	249/561	249/561
B3		[mm]	-	600	600	600	600	600
B4	TP/TPD	[mm]	-	-/591	-	-	-	-
C1	TP/TPD	[mm]	230/-	230/680	230/680	230/680	230/680	230/680
C5	TP/TPD	[mm]	335/-	335/110	335/110	335/110	335/110	335/110
C6		[mm]	-	350	350	350	350	350
L1		[mm]	670	670	670	670	670	670
H1		[mm]	175	175	175	175	175	175
H2		[mm]	254	254	308	308	308	308
H3	1~/3~ TP	[mm]	-/864	-/864	-/993	-/1037	-/1057	-/1116
H4		[mm]	-	-	35	35	35	35
M			M16	M16	M16	M16	M16	M16

- TP pumps with a H4 dimension are delivered with a base plate.

TP 125-XXX/4


TP 125
50 Hz
H [m]
-95/4
-80/4
-60/4
P2 [kW]
NPSH [m]
Eta [%]
Q [m³/h]
Q [l/s]
v [m/s]
TM063849

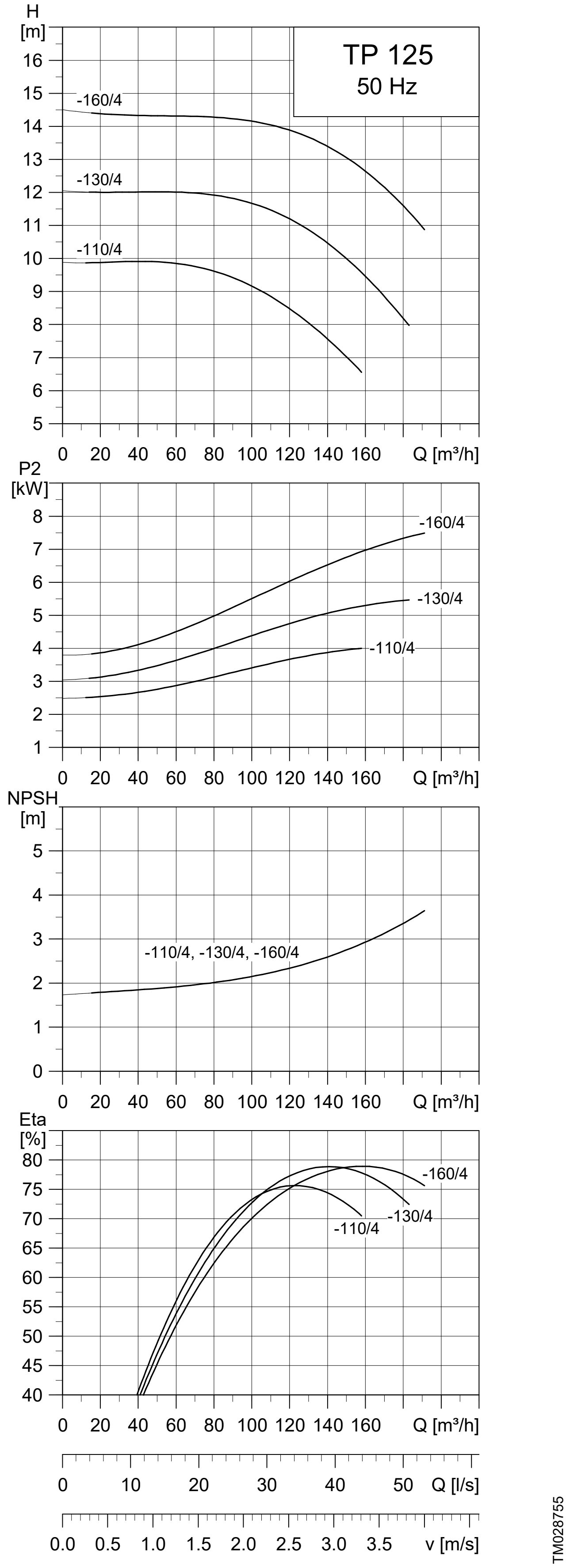


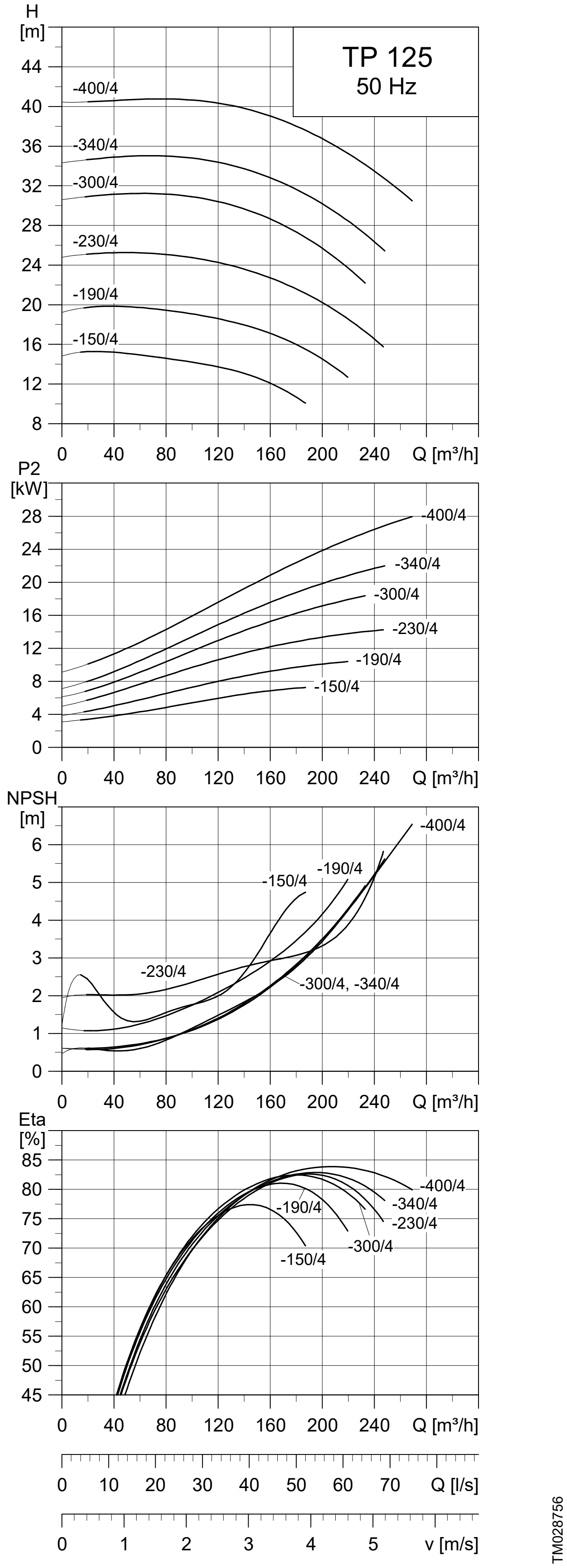
Technical data

TP 125			-60/4	-80/4	-95/4
TPD			-	-	-
Series			300	300	300
IEC size	1~ TP		-	-	-
	3~ TP		100	100	112
P2	1~/3~ TP	[kW]	-/2.2	-/3	-/4
PN			PN 16	PN 16	PN 16
$T_{min};T_{max}$		[°C]	[-25;120]	[-25;120]	[-25;120]
D1		[mm]	125	125	125
AC	1~/3~ TP	[mm]	-/198	-/198	-/222
AD	1~/3~ TP	[mm]	-/166	-/166	-/177
P		[mm]	250	250	250
B1	TP/TPD	[mm]	243/-	243/-	243/-
B2	TP/TPD	[mm]	193/-	193/-	193/-
B3		[mm]	-	-	-
L1		[mm]	620	620	620
H1		[mm]	210	210	210
H2		[mm]	-/225	-/225	-/225
H3	1~/3~ TP	[mm]	-/805.5	-/805.5	-/789

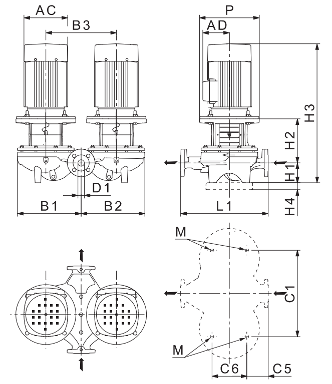
- TP pumps with a H4 dimension are delivered with a base plate.

TP 125-XXX/4

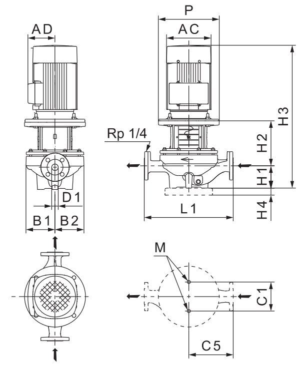




Note: All curves apply to single-head pumps. For further information, see section Curve conditions.



TM028631



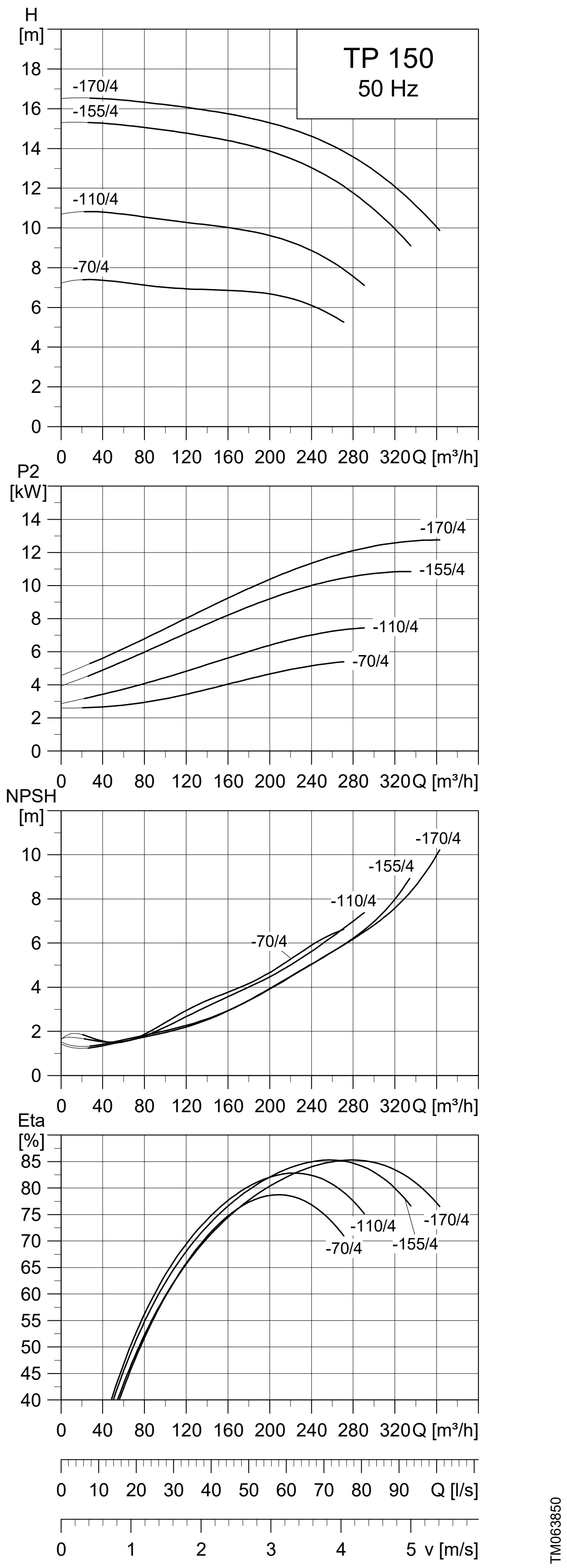
TM028632

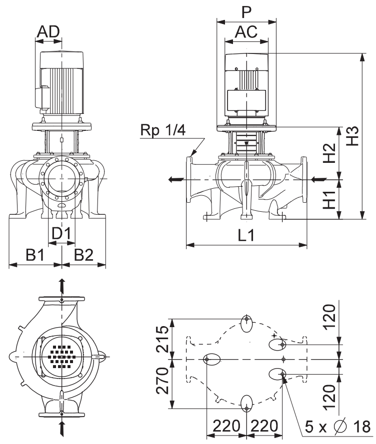
Technical data

TP 125			-110/4	-130/4	-160/4	-150/4	-190/4	-230/4	-300/4	-340/4	-400/4
TPD			●	●	●	-	●	●	●	●	●
Series			300	300	300	300	300	300	300	300	300
IEC size	1~ TP		-	-	-	-	-	-	-	-	-
	3~ TP		112	132	132	132	160	160	180	180	200
P2	1~/3~ TP	[kW]	-/4	-/5.5	-/7.5	-/7.5	-/11	-/15	-/18.5	-/22	-/30
PN			PN 16	PN 16	PN 16	PN 25	PN 16/25	PN 16/25	PN 16/25	PN 16/25	PN 16/25
T_{min};T_{max}		[°C]	[-25;120]	[-25;120]	[-25;120]	[-40;150]	[-40;140]	[-40;140]	[-40;140]	[-40;140]	[-40;140]
D1		[mm]	125	125	125	125	125	125	125	125	125
AC	1~/3~ TP	[mm]	-/222	-/262	-/262	-/262	-/358	-/358	-/389	-/389	-/414
AD	1~/3~ TP	[mm]	-/177	-/202	-/202	-/202	-/277.5	-/277.5	-/293.5	-/293.5	-/333.5
P		[mm]	250	300	300	300	350	350	350	350	400
B1	TP/TPD	[mm]	-/537	250/537	250/537	244/-	244/537	244/537	273/568	273/568	273/568
B2	TP/TPD	[mm]	-/518	202/518	202/518	220/-	220/516	220/516	236/545	236/545	236/545
B3		[mm]	600	600	600	-	600	600	600	600	600
B4	TP/TPD	[mm]	-/546	-/591	-/591	-	-	-	-	-	-
C1	TP/TPD	[mm]	-/680	230/680	230/680	230/-	230/680	230/680	230/680	230/680	230/680
C5	TP/TPD	[mm]	-/84	310/84	310/84	400/-	400/175	400/175	400/175	400/175	400/175
C6		[mm]	300	300	300	-	350	350	350	350	350
L1		[mm]	620	620	620	800	800	800	800	800	800
H1		[mm]	215	215	215	215	215	215	215	215	215
H2		[mm]	267	283	283	318	315	315	312	312	312
H3	1~/3~ TP	[mm]	-/836	-/933	-/933	-/968	-/1040	-/1084	-/1101	-/1160	-/1187
H4		[mm]	-	-	-	-	35	35	35	35	35
M			M16	M16	M16	M16	M16	M16	M16	M16	M16

- TP pumps with a H4 dimension are delivered with a base plate.

TP 150-XXX/4


TP 150
50 Hz
H [m]
P2 [kW]
NPSH [m]
Eta [%]
-170/4
-155/4
-110/4
-70/4
Q [m³/h]
Q [l/s]
v [m/s]
TM063850

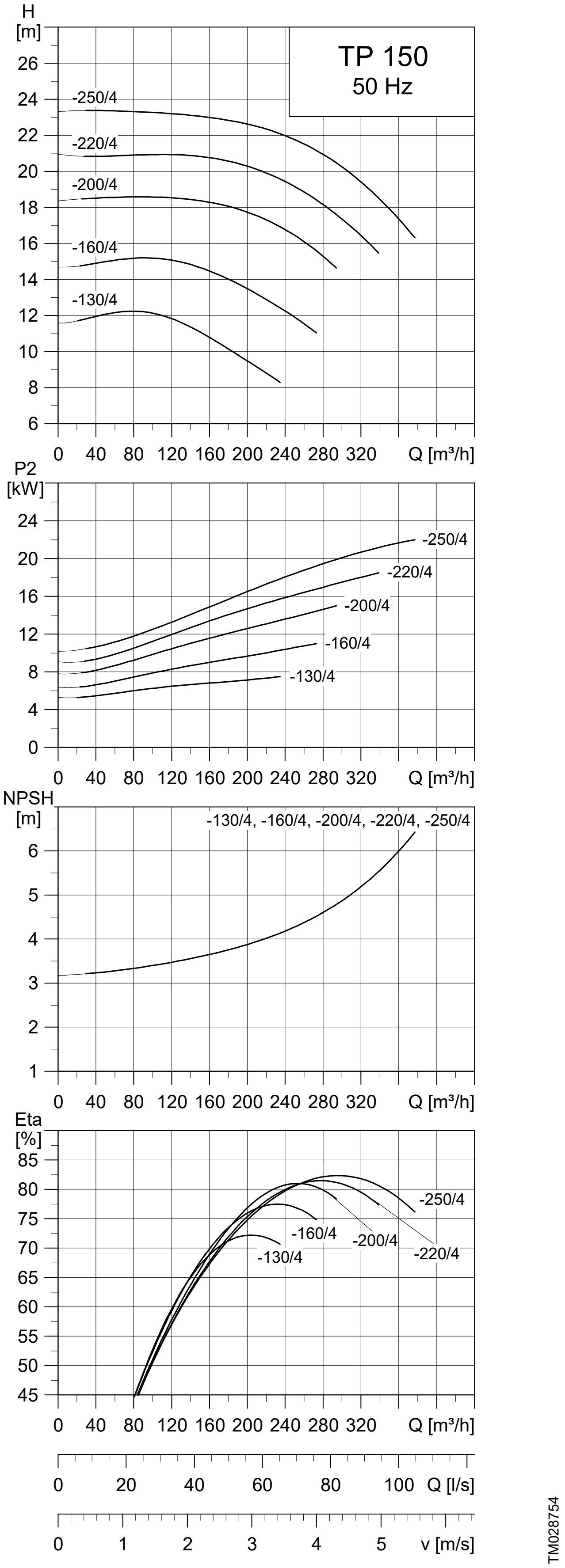


TM050661

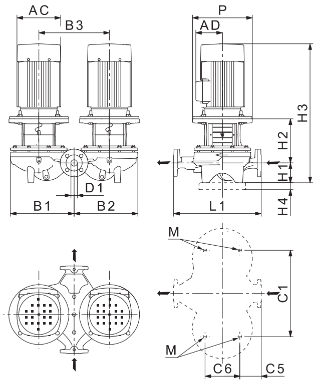
Technical data

TP 150			-70/4	-110/4	-155/4	-170/4
TPD			-	-	-	-
Series			300	300	300	300
IEC size	1~ TP		-	-	-	-
	3~ TP		132	132	160	160
P2	1~/3~ TP	[kW]	-/5.5	-/7.5	-/11	-/15
PN			PN 16	PN 16	PN 16	PN 16
T_{min};T_{max}		[°C]	[-25;120]	[-25;120]	[-25;120]	[-25;120]
D1		[mm]	150	150	150	150
AC	1~/3~ TP	[mm]	-/262	-/262	-/358	-/358
AD	1~/3~ TP	[mm]	-/202	-/202	-/277.5	-/277.5
P		[mm]	300	300	350	350
B1	TP/TPD	[mm]	295/-	295/-	295/-	295/-
B2	TP/TPD	[mm]	240/-	240/-	240/-	240/-
L1		[mm]	800	800	800	800
H1		[mm]	250	250	250	250
H2		[mm]	284	284	314	314
H3	1~/3~ TP	[mm]	-/969	-/969	-/1074	-/1118

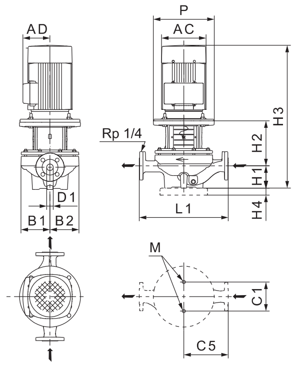
TP 150-XXX/4



Note: All curves apply to single-head pumps. For further information, see section Curve conditions.



TM028631



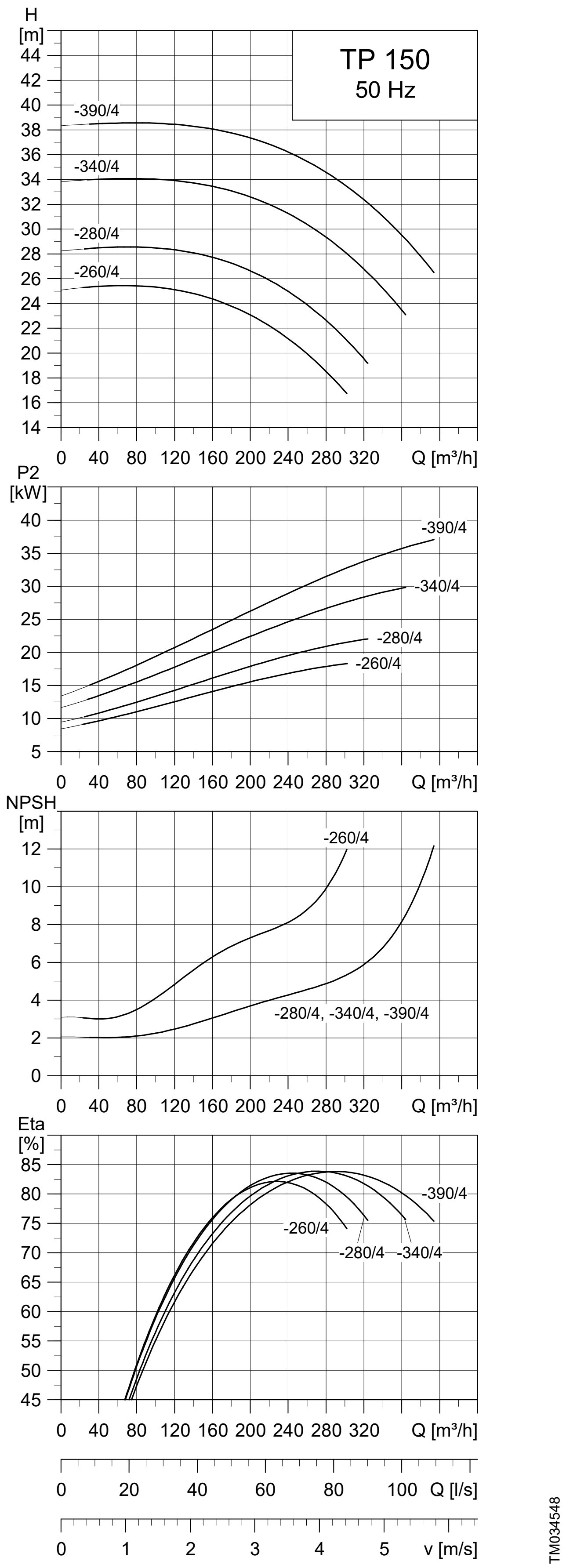
TM028632

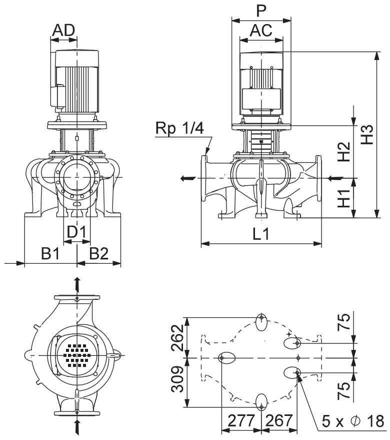
Technical data

TP 150			-130/4	-160/4	-200/4	-220/4	-250/4
TPD			●	●	●	●	●
Series			300	300	300	300	300
IEC size	1~ TP		-	-	-	-	-
	3~ TP		132	160	160	180	180
P2	1~/3~ TP	[kW]	-/7.5	-/11	-/15	-/18.5	-/22
PN			PN 16/25	PN 16/25	PN 16/25	PN 16/25	PN 16/25
T_{min};T_{max}		[°C]	[-40;140]	[-40;140]	[-40;140]	[-40;140]	[-40;140]
D1		[mm]	150	150	150	150	150
AC	1~/3~ TP	[mm]	-/262	-/358	-/358	-/389	-/389
AD	1~/3~ TP	[mm]	-/202	-/277.5	-/277.5	-/293.5	-/293.5
P		[mm]	300	350	350	350	350
B1	TP/TPD	[mm]	296/583	296/583	296/583	296/583	296/583
B2	TP/TPD	[mm]	237/553	237/553	237/553	237/553	237/553
B3		[mm]	600	600	600	600	600
B4	TP/TPD	[mm]	-/591	-	-	-	-
C1	TP/TPD	[mm]	230/680	230/680	230/680	230/680	230/680
C5	TP/TPD	[mm]	400/153	400/153	400/153	400/153	400/153
C6		[mm]	350	350	350	350	350
L1		[mm]	800	800	800	800	800
H1		[mm]	215	215	215	215	215
H2		[mm]	291	321	321	321	321
H3	1~/3~ TP	[mm]	-/941	-/1046	-/1090	-/1110	-/1169
H4		[mm]	-	35	35	35	35
M			M16	M16	M16	M16	M16

- TP pumps with a H4 dimension are delivered with a base plate.

TP 150-XXX/4

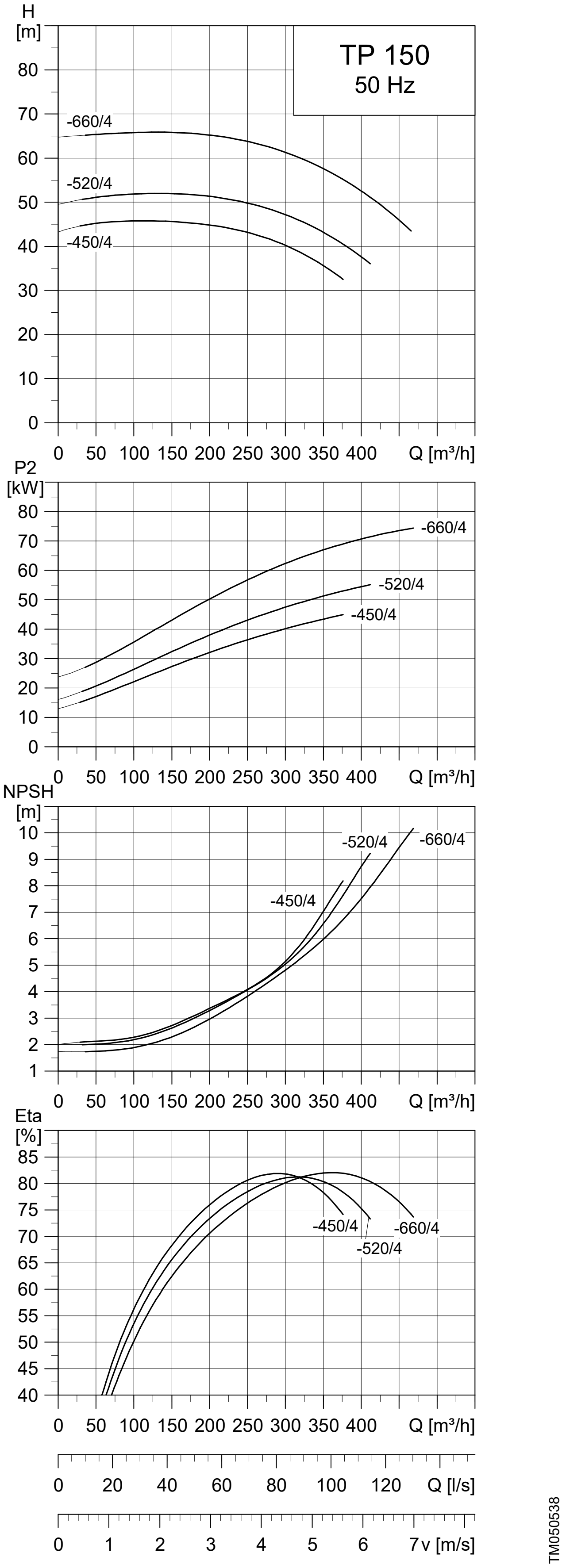

TP 150
50 Hz
H [m]
-390/4
-340/4
-280/4
-260/4
Q [m³/h]
P2 [kW]
NPSH [m]
-280/4, -340/4, -390/4
Eta [%]
Q [l/s]
v [m/s]
TM034548

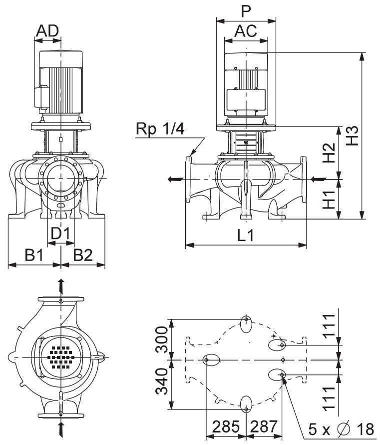


Technical data

TP 150			-260/4	-280/4	-340/4	-390/4
TPD			-	-	-	-
Series			300	300	300	300
IEC size	1~ TP		-	-	-	-
	3~ TP		180	180	200	225
P2	1~/3~ TP	[kW]	-/18.5	-/22	-/30	-/37
PN			PN 16/25	PN 16/25	PN 16/25	PN 16/25
T_{min};T_{max}		[°C]	[-40;140]	[-40;140]	[-40;140]	[-40;140]
D1		[mm]	150	150	150	150
AC	1~/3~ TP	[mm]	-/389	-/389	-/414	-/414
AD	1~/3~ TP	[mm]	-/293.5	-/293.5	-/333.5	-/333.5
P		[mm]	350	350	400	450
B1	TP/TPD	[mm]	335/-	335/-	335/-	335/-
B2	TP/TPD	[mm]	288/-	288/-	288/-	288/-
L1		[mm]	800	800	800	800
H1		[mm]	235	235	235	235
H2		[mm]	319	319	319	349
H3	1~/3~ TP	[mm]	-/1128	-/1187	-/1214	-/1300

TP 150-XXX/4


TP 150
50 Hz
H [m]
-660/4
-520/4
-450/4
Q [m³/h]
P2 [kW]
NPSH [m]
Eta [%]
Q [l/s]
v [m/s]
TM050538

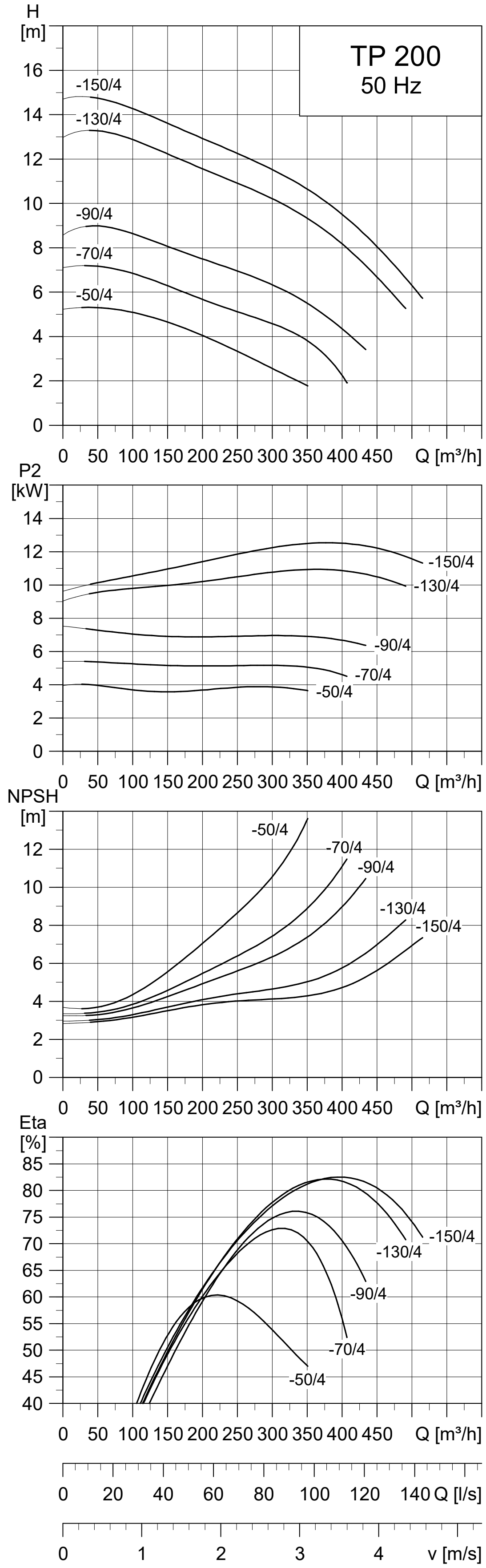


TM050662

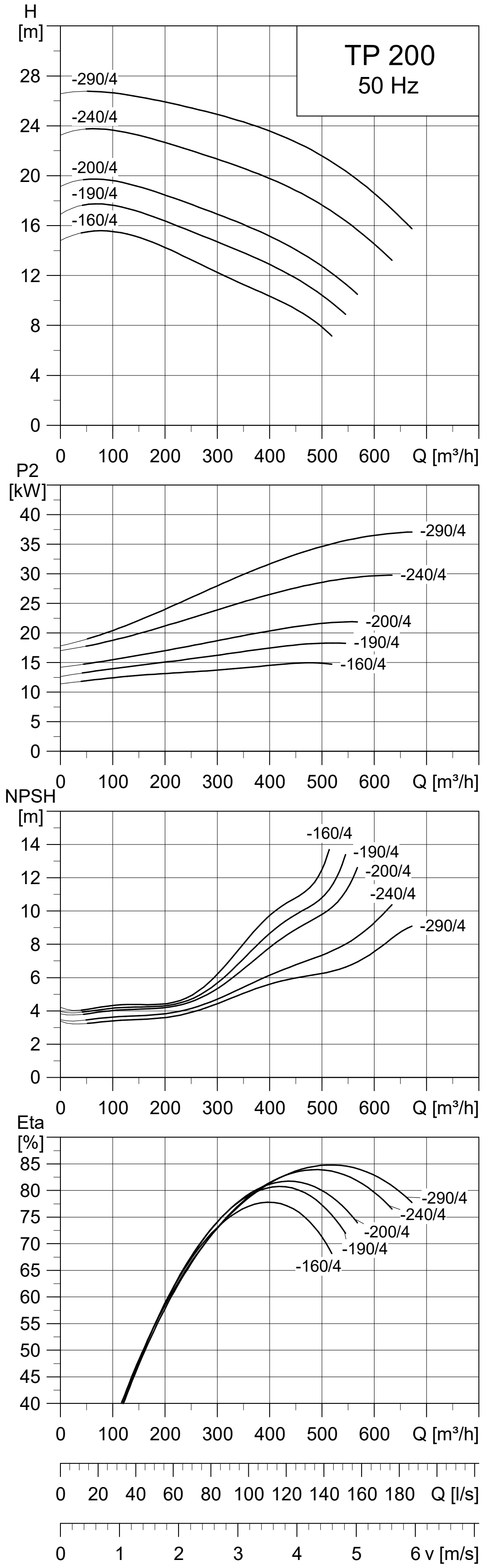
Technical data

TP 150			-450/4	-520/4	-660/4
TPD			-	-	-
Series			300	300	300
IEC size	1~ TP		-	-	-
	3~ TP		225	250	280
P2	1~/3~ TP	[kW]	-/45	-/55	-/75
PN			PN 16/25	PN 16/25	PN 16/25
T_{min};T_{max}		[°C]	[-40;140]	[-40;140]	[-40;140]
D1		[mm]	150	150	150
AC	1~/3~ TP	[mm]	-/414	-/528	-/528
AD	1~/3~ TP	[mm]	-/333.5	-/417	-/417
P		[mm]	450	550	550
B1	TP/TPD	[mm]	373/-	373/-	373/-
B2	TP/TPD	[mm]	333/-	333/-	333/-
L1		[mm]	1000	1000	1000
H1		[mm]	250	250	250
H2		[mm]	352	352	352
H3	1~/3~ TP	[mm]	-/1355	-/1427	-/1455

TP 200-XXX/4

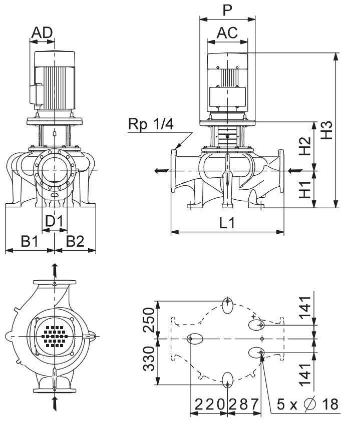


TM050540



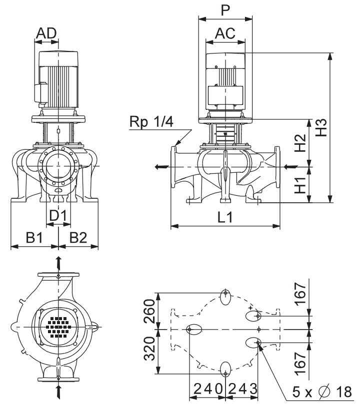
TM050542

TP 200-50/4
TP 200-70/4
TP 200-90/4
TP 200-130/4
TP 200-150/4



TM050663

TP 200-160/4
TP 200-190/4
TP 200-200/4
TP 200-240/4
TP 200-290/4

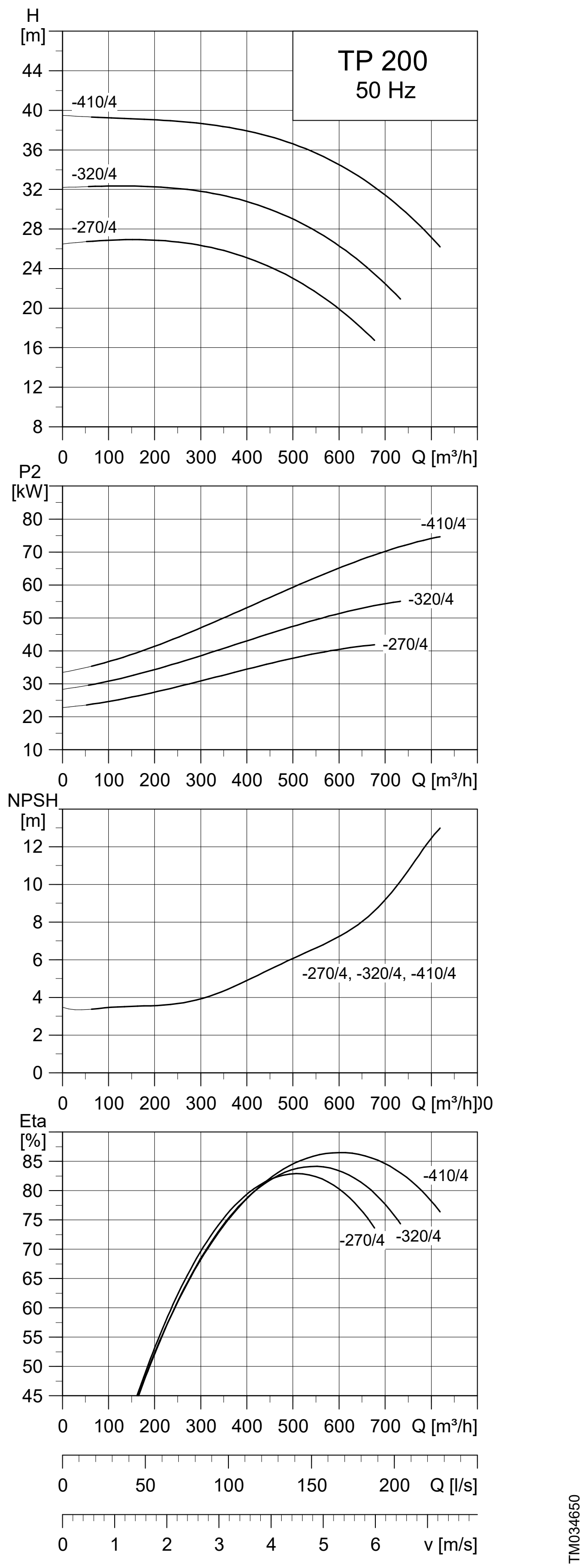


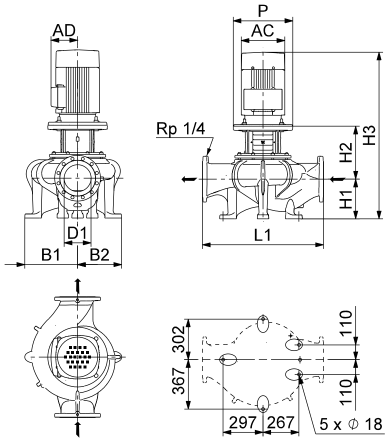
TM050664

Technical data

TP 200			-50/4	-70/4	-90/4	-130/4	-150/4	-160/4	-190/4	-200/4	-240/4	-290/4
TPD			-	-	-	-	-	-	-	-	-	-
Series			300	300	300	300	300	300	300	300	300	300
IEC size	1~ TP		-	-	-	-	-	-	-	-	-	-
	3~ TP		112	132	132	160	160	160	180	180	200	225
P2	1~/3~ TP	[kW]	-/4	-/5.5	-/7.5	-/11	-/15	-/15	-/18.5	-/22	-/30	-/37
PN			PN 16	PN 16	PN 16	PN 16	PN 16	PN 16/25	PN 16/25	PN 16/25	PN 16/25	PN 16/25
T_{min};T_{max}		[°C]	[-25;120]	[-25;120]	[-25;120]	[-25;120]	[-25;120]	[-40;140]	[-40;140]	[-40;140]	[-40;140]	[-40;140]
D1		[mm]	200	200	200	200	200	200	200	200	200	200
AC	1~/3~ TP	[mm]	-/222	-/262	-/262	-/358	-/358	-/358	-/389	-/389	-/414	-/414
AD	1~/3~ TP	[mm]	-/177	-/202	-/202	-/277.5	-/277.5	-/277.5	-/293.5	-/293.5	-/333.5	-/333.5
P		[mm]	250	300	300	350	350	350	350	350	400	450
B1	TP/TPD	[mm]	363/-	363/-	363/-	363/-	363/-	348/-	348/-	348/-	348/-	348/-
B2	TP/TPD	[mm]	283/-	283/-	283/-	283/-	283/-	288/-	288/-	288/-	288/-	288/-
L1		[mm]	900	900	900	900	900	900	900	900	900	900
H1		[mm]	280	280	280	280	280	280	280	280	280	280
H2		[mm]	273	293	293	336	336	331	331	331	331	361
H3	1~/3~ TP	[mm]	-/907	-/1008	-/1008	-/1126	-/1170	-/1165	-/1185	-/1244	-/1271	-/1387

TP 200-XXX/4


TP 200
50 Hz
H [m]
-410/4
-320/4
-270/4
Q [m³/h]
P2 [kW]
NPSH [m]
-270/4, -320/4, -410/4
Eta [%]
Q [l/s]
v [m/s]
TM034650

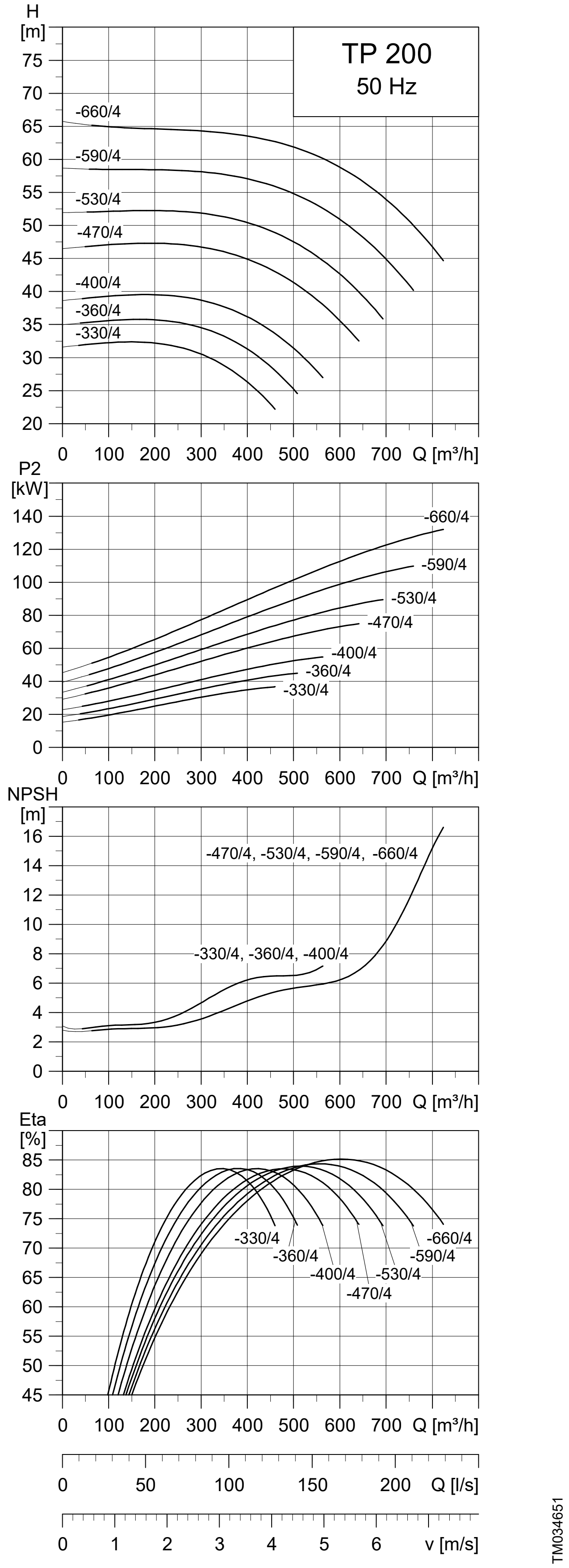


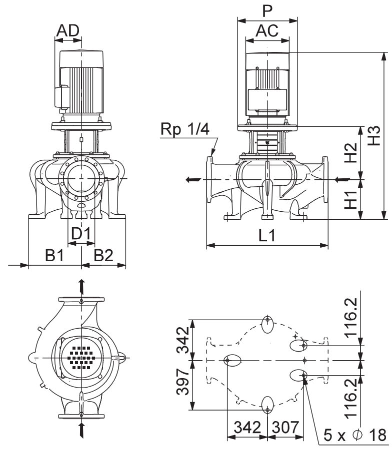
TM038621

Technical data

TP 200			**-270/4**	**-320/4**	**-410/4**
TPD			-	-	-
Series			300	300	300
IEC size	1~ TP		-	-	-
	3~ TP		225	250	280
P2	1~/3~ TP	[kW]	-/45	-/55	-/75
PN			PN 16/25	PN 16/25	PN 16/25
T_{min};T_{max}		[°C]	[-40;140]	[-40;140]	[-40;140]
D1		[mm]	200	200	200
AC	1~/3~ TP	[mm]	-/414	-/528	-/528
AD	1~/3~ TP	[mm]	-/333.5	-/417	-/417
P		[mm]	450	550	550
B1	TP/TPD	[mm]	393/-	393/-	393/-
B2	TP/TPD	[mm]	328/-	328/-	328/-
L1		[mm]	900	900	900
H1		[mm]	295	295	295
H2		[mm]	377	377	377
H3	1~/3~ TP	[mm]	-/1425	-/1497	-/1525

TP 200-XXX/4

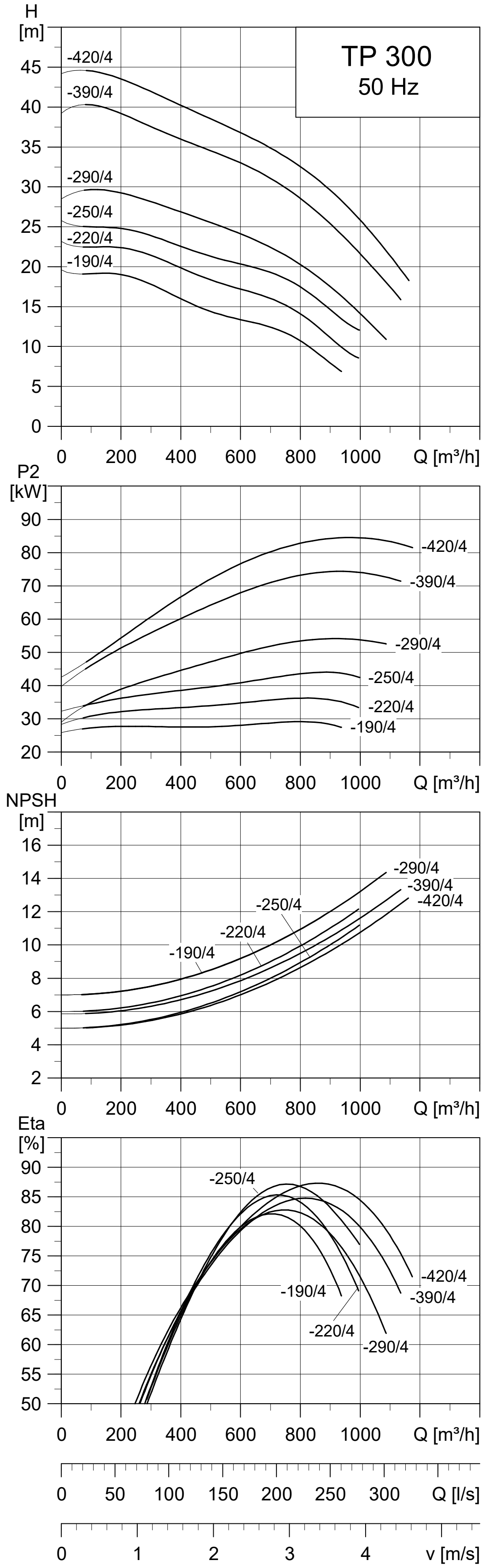

TP 200
50 Hz
H [m]
P2 [kW]
NPSH [m]
Eta [%]
Q [m³/h]
Q [l/s]
v [m/s]
-660/4
-590/4
-530/4
-470/4
-400/4
-360/4
-330/4
-470/4, -530/4, -590/4, -660/4
-330/4, -360/4, -400/4
TM034651



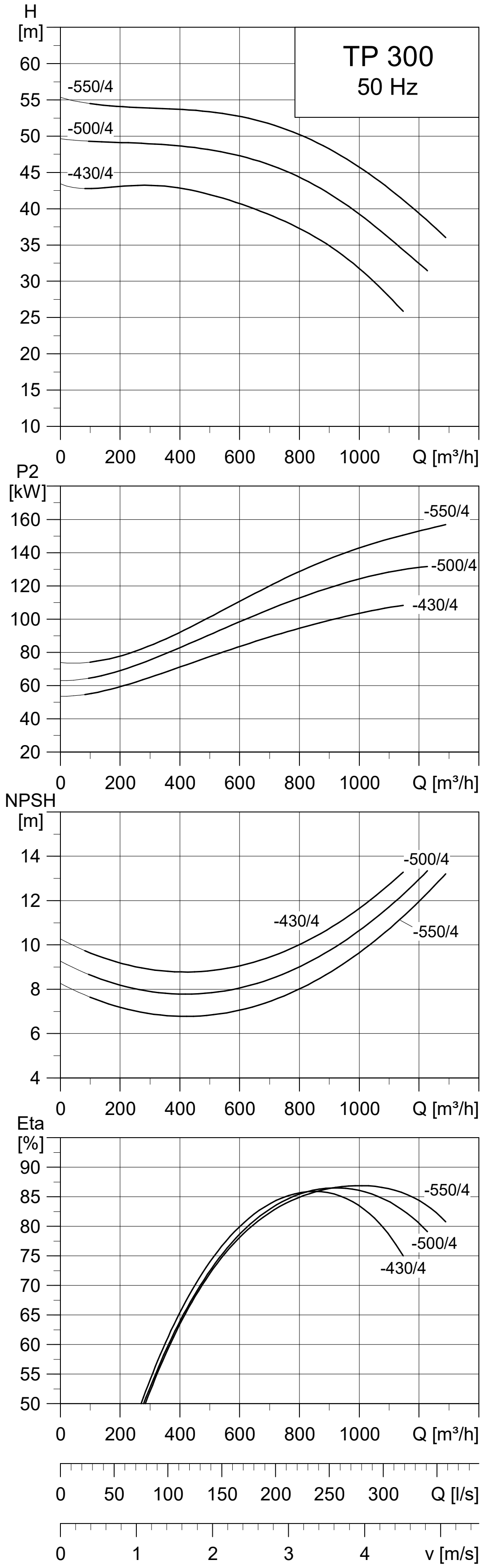
Technical data

TP 200			-330/4	-360/4	-400/4	-470/4	-530/4	-590/4	-660/4
TPD			-	-	-	-	-	-	-
Series			300	300	300	300	300	300	300
IEC size	1~ TP		-	-	-	-	-	-	-
	3~ TP		225	225	250	280	280	315	315
P2	1~/3~ TP	[kW]	-/37	-/45	-/55	-/75	-/90	-/110	-/132
PN			PN 16/25	PN 16/25	PN 16/25	PN 16/25	PN 16/25	PN 16/25	PN 16/25
T_{min};T_{max}		[°C]	[-40;140]	[-40;140]	[-40;140]	[-40;140]	[-40;140]	[-40;140]	[-40;140]
D1		[mm]	200	200	200	200	200	200	200
AC	1~/3~ TP	[mm]	-/414	-/414	-/528	-/528	-/528	-/599	-/599
AD	1~/3~ TP	[mm]	-/333.5	-/333.5	-/417	-/417	-/417	-/475	-/475
P		[mm]	450	450	550	550	550	660	660
B1	TP/TPD	[mm]	423/-	423/-	423/-	423/-	423/-	423/-	423/-
B2	TP/TPD	[mm]	368/-	368/-	368/-	368/-	368/-	368/-	368/-
L1		[mm]	1000	1000	1000	1000	1000	1000	1000
H1		[mm]	295	295	295	295	295	295	295
H2		[mm]	382	382	382	382	382	412	412
H3	1~/3~ TP	[mm]	-/1423	-/1430	-/1502	-/1530	-/1530	-/1640	-/1640

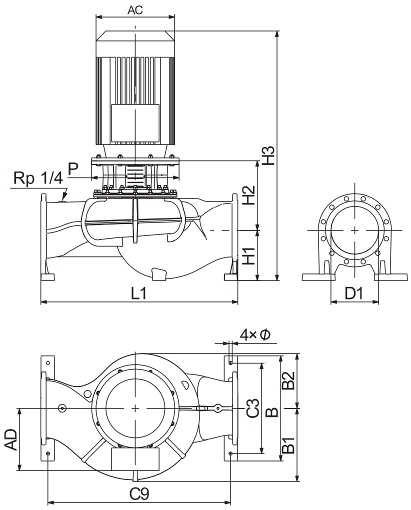
TP 300-XXX/4



TM066593



TM066620

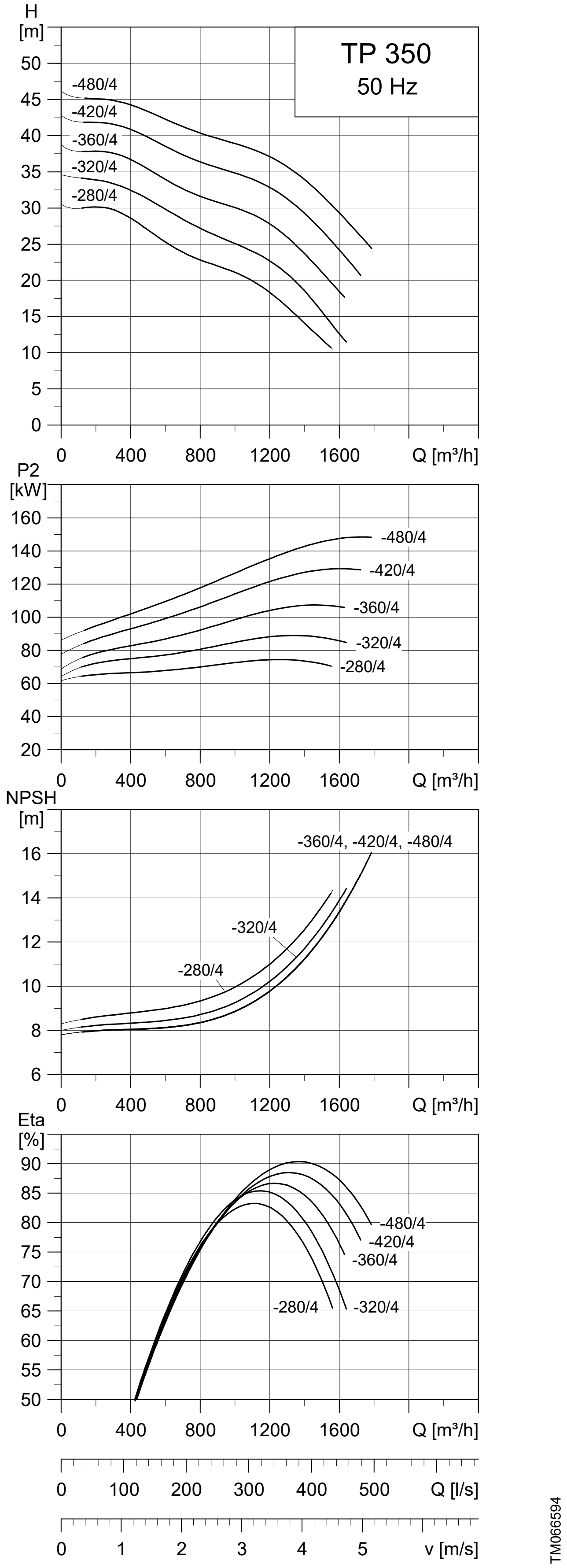


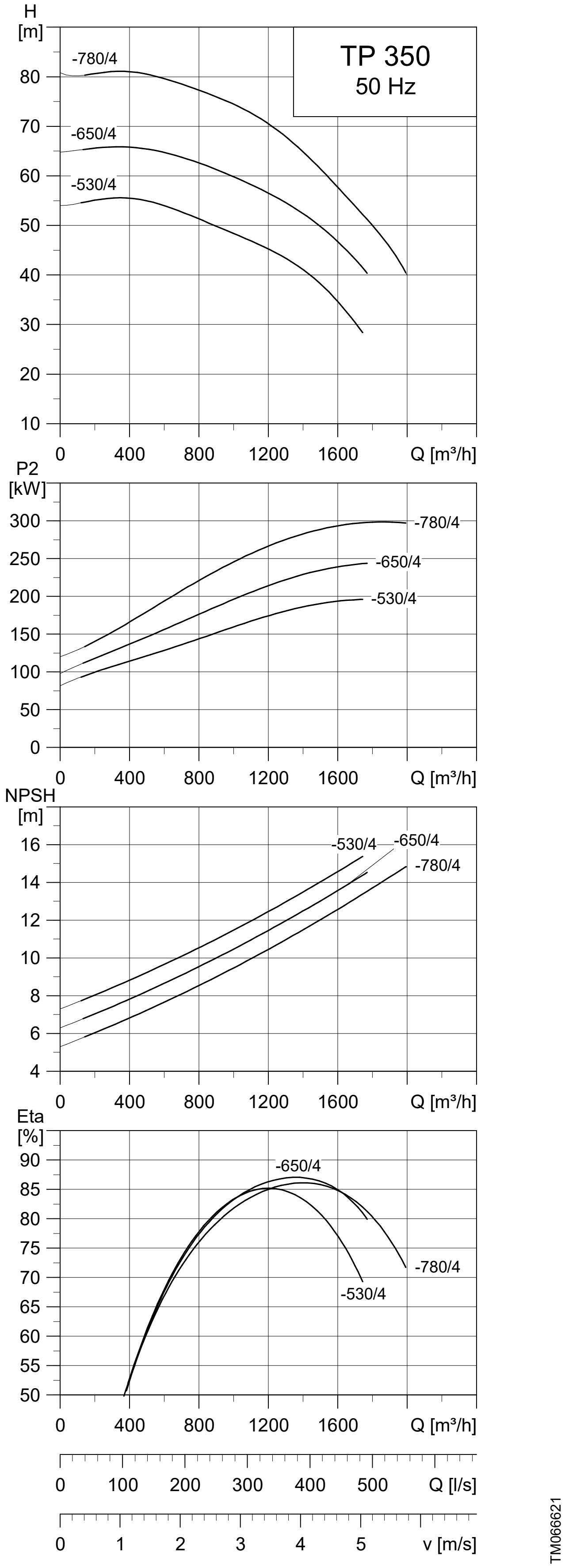
TM066532

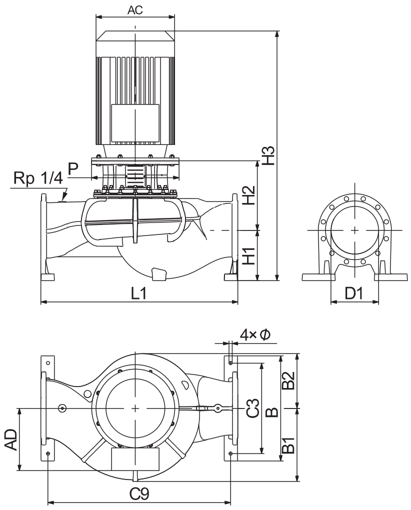
Technical data

TP 300			-190/4	-220/4	-250/4	-290/4	-390/4	-420/4	-430/4	-500/4	-550/4
TPD			-	-	-	-	-	-	-	-	-
Series			300	300	300	300	300	300	300	300	300
IEC size	1~ TP		-	-	-	-	-	-	-	-	-
	3~ TP		200L	225S	225M	250M	280S	280M	315S	315M	315M
P2	3~ TP	[kW]	30	37	45	55	75	90	110	132	160
PN			PN16/25	PN16/25	PN16/25	PN16/25	PN16/25	PN16/25	PN16/25	PN16/25	PN16/25
T_{min};T_{max}		[°C]	[-40;150]	[-40;150]	[-40;150]	[-40;150]	[-40;150]	[-40;150]	[-40;150]	[-40;150]	[-40;150]
D1		[mm]	300	300	300	300	300	300	300	300	300
AC	1~/3~ TP	[mm]	-/414	-/414	-/414	-/528	-/528	-/528	-/599	-/599	-/599
AD	1~/3~ TP	[mm]	-/333.5	-/333.5	-/333.5	-/417	-/417	-/417	-/475	-/475	-/475
P		[mm]	394	450	450	550	550	550	660	660	660
B		[mm]	663	663	663	663	663	663	666	666	666
B1		[mm]	438	438	438	460	460	460	438	438	438
B2		[mm]	320	320	320	345	345	345	338	338	338
C3		[mm]	570	570	570	570	570	570	570	570	570
C9		[mm]	1150	1150	1150	1150	1150	1150	1150	1150	1150
L1		[mm]	1240	1240	1240	1240	1240	1240	1240	1240	1240
H1		[mm]	348	348	348	317	317	317	340	340	340
H2		[mm]	393	423	423	438	443	443	460	460	455
H3		[mm]	1401	1517	1517	1580	1613	1613	1730	1733	1727
∅		[mm]	20	20	20	20	20	20	20	20	20

TP 350-XXX/4


TP 350
50 Hz
H [m]
P2 [kW]
NPSH [m]
Eta [%]
Q [m³/h]
Q [l/s]
v [m/s]
-480/4
-420/4
-360/4
-320/4
-280/4
-360/4, -420/4, -480/4
TM066594


TP 350
50 Hz
H [m]
P2 [kW]
NPSH [m]
Eta [%]
Q [m³/h]
Q [l/s]
v [m/s]
-780/4
-650/4
-530/4
TM066621

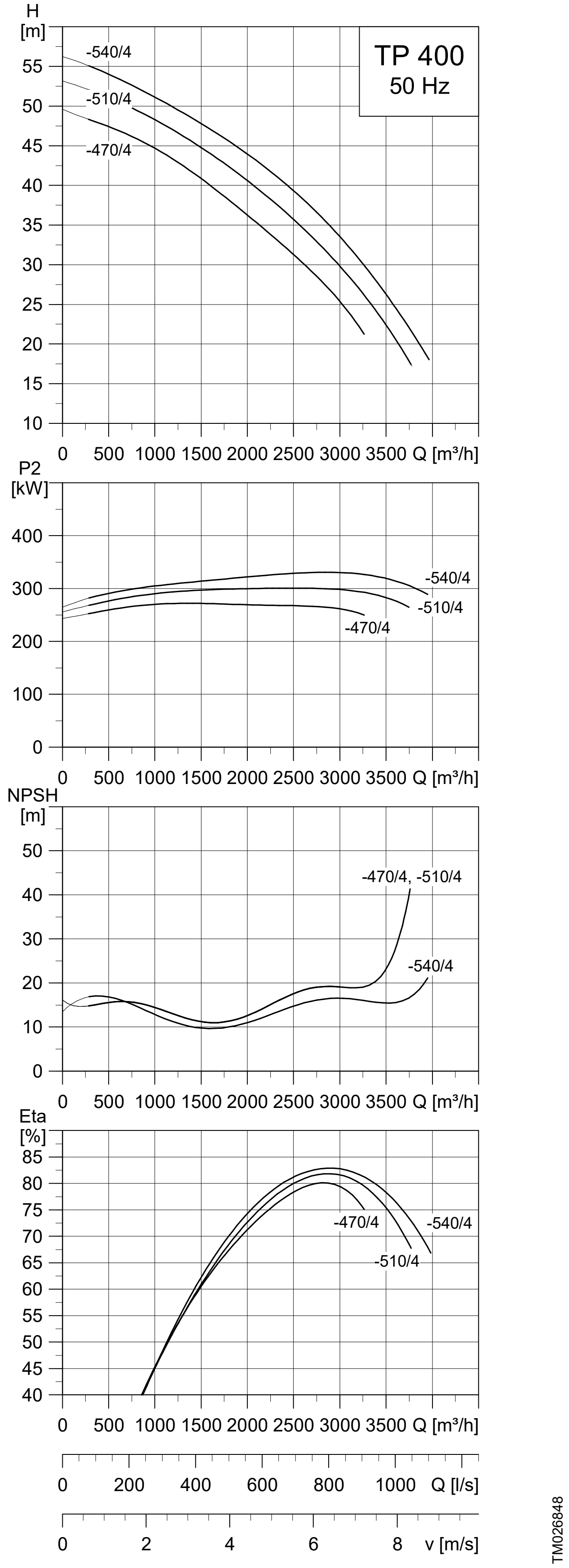


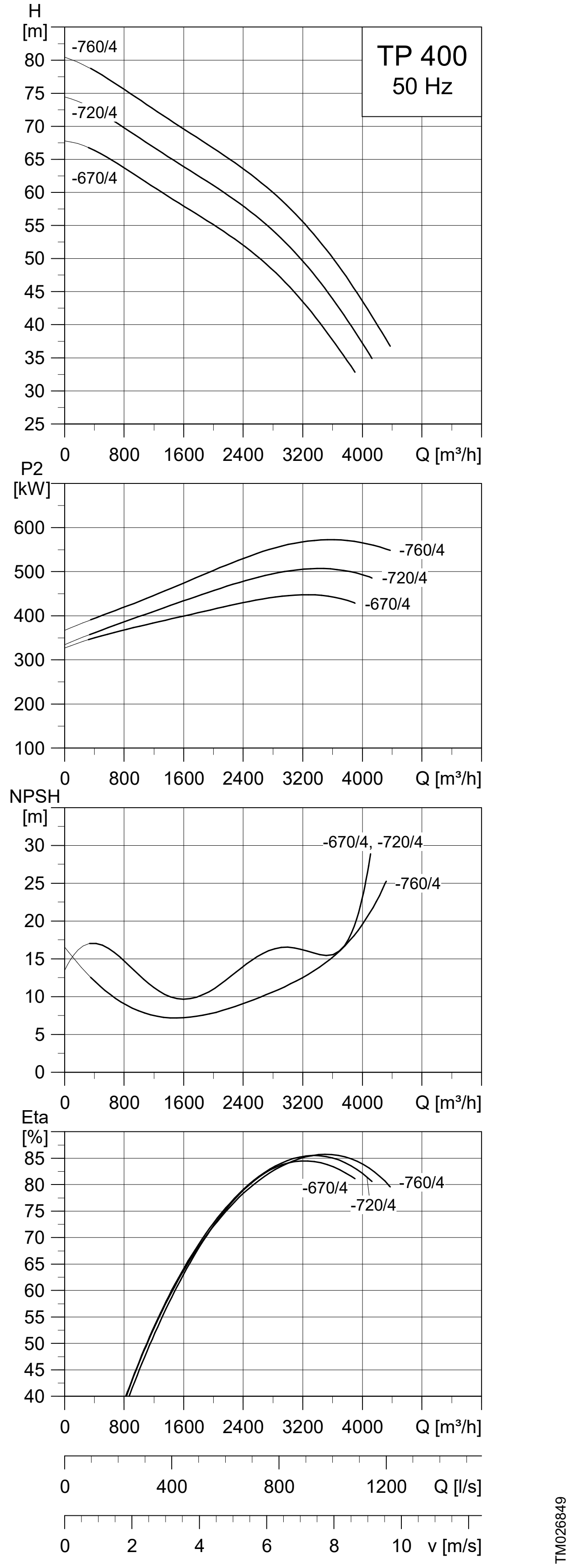
TM066532

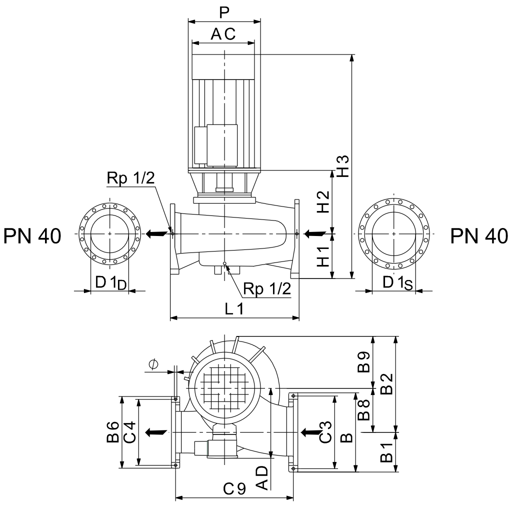
Technical data

TP 350			-280/4	-320/4	-360/4	-420/4	-480/4	-530/4	-650/4	-780/4
TPD			-	-	-	-	-	-	-	-
Series			300	300	300	300	300	300	300	300
IEC size	1~ TP		-	-	-	-	-	-	-	-
	3~ TP		280S	280M	315S	315M	315M	315L	315L	315L
P2	3~ TP	[kW]	75	90	110	132	160	200	250	315
PN			PN16/25	PN16/25	PN16/25	PN16/25	PN16/25	PN16/25	PN16/25	PN16/25
T_{min};T_{max}		[°C]	[-40;150]	[-40;150]	[-40;150]	[-40;150]	[-40;150]	[-40;150]	[-40;150]	[-40;150]
D1		[mm]	350	350	350	350	350	350	350	350
AC	1~/3~ TP	[mm]	528	528	528	599	-/599	-/657	-/657	-/702
AD	1~/3~ TP	[mm]	417	417	417	475	-/475	-/534	-/576	-/619
P		[mm]	550	550	660	660	660	798	798	798
B		[mm]	735	735	735	735	735	740	740	740
B1		[mm]	521	521	521	521	521	475	475	475
B2		[mm]	373	373	373	373	373	374	374	374
C3		[mm]	660	660	660	660	660	660	660	660
C9		[mm]	1310	1310	1310	1310	1310	1310	1310	1310
L1		[mm]	1400	1400	1400	1400	1400	1400	1400	1400
H1		[mm]	361	361	361	361	361	385	385	385
H2		[mm]	509	509	509	509	509	514	519	519
H3		[mm]	1723	1723	1803	1803	1802	2005	2121	2272
∅		[mm]	20	20	20	20	20	20	20	20

TP 400-XXX/4


TP 400
50 Hz
H [m]
-540/4
-510/4
-470/4
P2 [kW]
NPSH [m]
-470/4, -510/4
-540/4
Eta [%]
Q [m³/h]
Q [l/s]
v [m/s]
TM026848


TP 400
50 Hz
H [m]
-760/4
-720/4
-670/4
P2 [kW]
NPSH [m]
-670/4, -720/4
-760/4
Eta [%]
Q [m³/h]
Q [l/s]
v [m/s]
TM026849

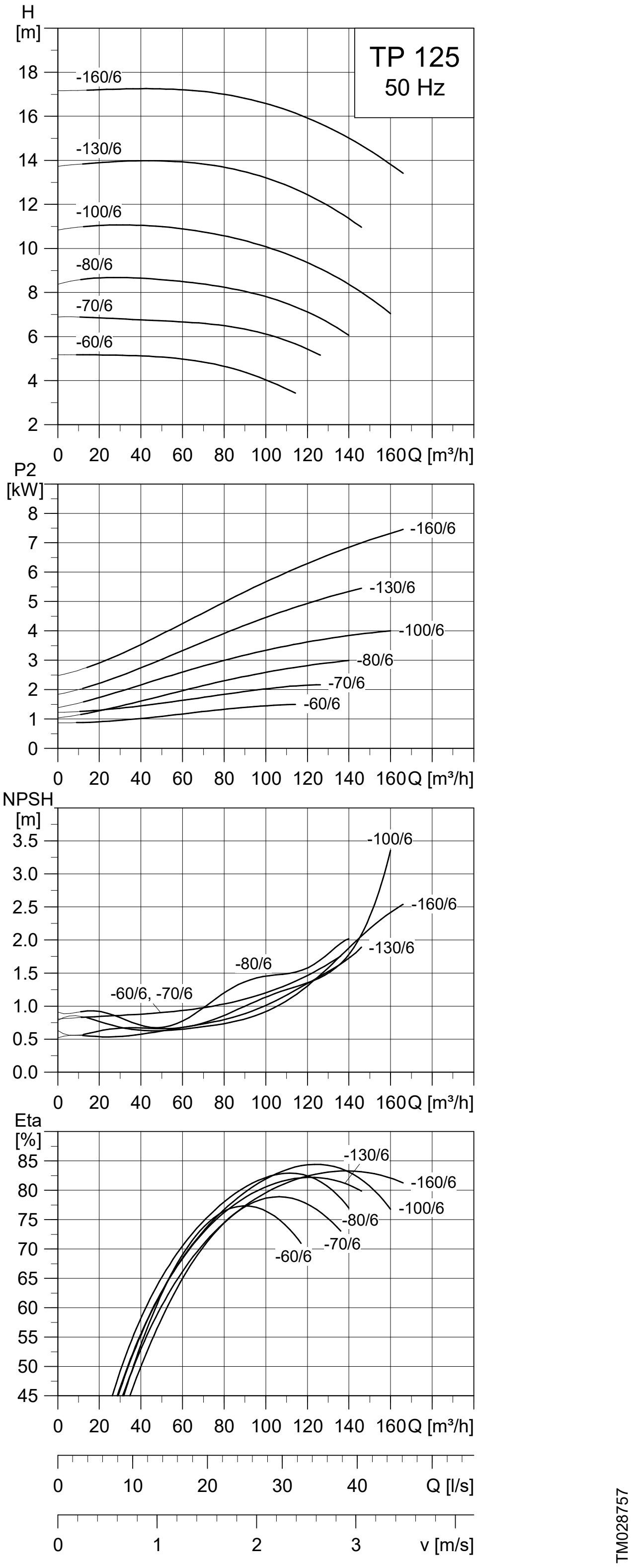


Technical data

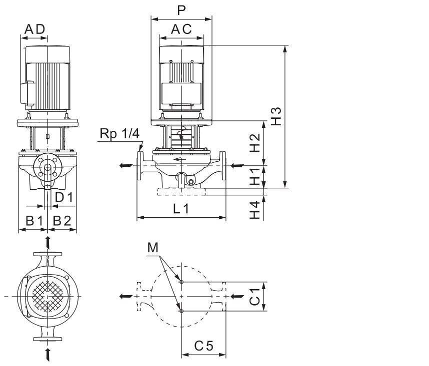
TP 400			-470/4	-510/4	-540/4	-670/4	-720/4	-760/4
TPD			-	-	-	-	-	-
Series			400	400	400	400	400	400
IEC size	1~ TP		-	-	-	-	-	-
	3~ TP		315	355	355	355	400	400
P2		[kW]	315	355	400	500	560	630
PN			PN 25	PN 25	PN 25	PN 25	PN 25	PN 25
T_{min};T_{max}		[°C]	[0;150]	[0;150]	[0;150]	[0;150]	[0;150]	[0;150]
$D1_D$/$D1_S$		[mm]	400/500	400/500	400/500	400/500	400/500	400/500
AC		[mm]	625	790	790	790	880	880
AD		[mm]	608	725	725	875	925	925
P		[mm]	1150	900	900	900	1150	1150
B		[mm]	895	895	895	895	895	895
B1		[mm]	448	448	448	448	448	448
B2		[mm]	1064	1064	1064	1064	1064	1064
B6		[mm]	800	800	800	800	800	800
B7		[mm]	1066	1066	1066	1066	1066	1066
B8		[mm]	500	500	500	500	500	500
B9		[mm]	564	564	564	564	564	564
C3		[mm]	830	830	830	830	830	830
C4		[mm]	735	735	735	735	735	735
C9		[mm]	1302	1302	1302	1302	1302	1302
∅		[mm]	27	27	27	27	27	27
L1		[mm]	1400	1400	1400	1400	1400	1400
H1		[mm]	450	450	450	450	450	450
H2		[mm]	706	706	706	706	706	706
H3		[mm]	2522	2611	2611	2611	2771	2771

TP, TPD, 6-pole, PN 16

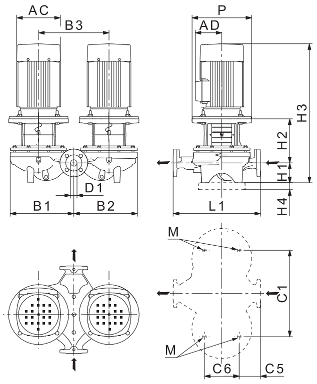
TP, TPD 125-XXX/6



Note: All curves apply to single-head pumps. For further information, see section Curve conditions.



TM028632



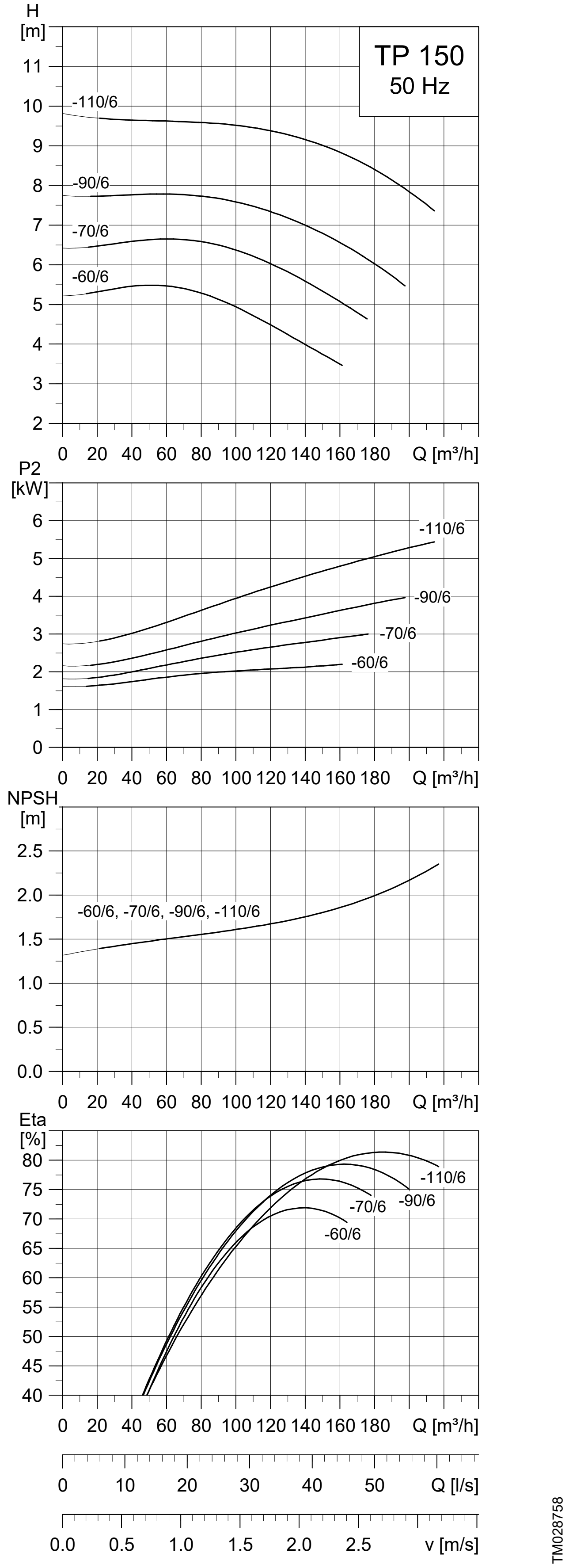
TM028631

Technical data

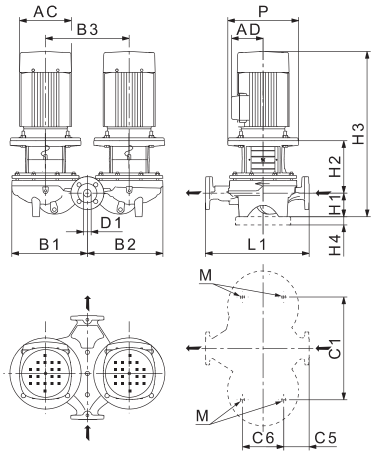
TP 125			**-60/6**	**-70/6**	**-80/6**	**-100/6**	**-130/6**	**-160/6**
TPD			●	●	●	●	●	●
Series			300	300	300	300	300	300
IEC size	1~ TP		-	-	-	-	-	-
	3~ TP		100	112	132	132	132	160
P2	1~/3~ TP	[kW]	-/1.5	-/2.2	-/3	-/4	-/5.5	-/7.5
PN			PN 16	PN 16	PN 16	PN 16	PN 16	PN 16
T_{min};T_{max}		[°C]	[-25;120]	[-25;120]	[-25;120]	[-25;120]	[-25;120]	[-25;120]
D1		[mm]	125	125	125	125	125	125
AC	1~/3~ TP	[mm]	-/198	-/222	-/262	-/262	-/262	-/262
AD	1~/3~ TP	[mm]	-/166	-/177	-/202	-/202	-/202	-/237
P		[mm]	250	250	300	300	300	350
B1	TP/TPD	[mm]	250/537	250/537	244/537	244/537	273/568	273/568
B2	TP/TPD	[mm]	202/518	202/518	220/516	220/516	236/545	236/545
B3		[mm]	600	600	600	600	600	600
C1	TP/TPD	[mm]	230/680	230/680	230/680	230/680	230/680	230/680
C5	TP/TPD	[mm]	310/84	310/84	400/175	400/175	400/175	400/175
C6		[mm]	300	300	350	350	350	350
L1		[mm]	620	620	800	800	800	800
H1		[mm]	215	215	215	215	215	215
H2		[mm]	267	267	285	285	282	312
H3	1~/3~ TP	[mm]	-/818	-/836	-/885	-/885	-/932	-/1021
H4		[mm]	-	-	-	-	-	-
M			M16	M16	M16	M16	M16	M16

- TP pumps with a H4 dimension are delivered with a base plate. See section Base plates for base plate dimensions.

TP, TPD 150-XXX/6



Note: All curves apply to single-head pumps. For further information, see section Curve conditions.



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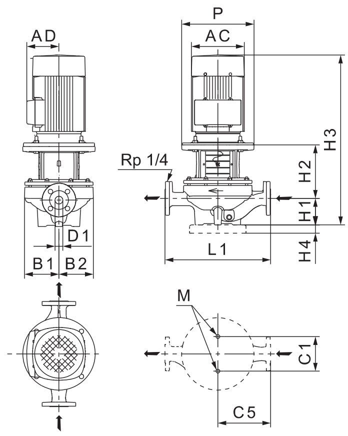


TM028632

Technical data

TP 150			-60/6	-70/6	-90/6	-110/6
TPD			●	●	●	●
Series			300	300	300	300
IEC size	1~ TP		-	-	-	-
	3~ TP		112	132	132	132
P2	1~/3~ TP	[kW]	-/2.2	-/3	-/4	-/5.5
PN			PN 16	PN 16	PN 16	PN 16
T_{min};T_{max}		[°C]	[-25;120]	[-25;120]	[-25;120]	[-25;120]
D1		[mm]	150	150	150	150
AC	1~/3~ TP	[mm]	-/222	-/262	-/262	-/262
AD	1~/3~ TP	[mm]	-/177	-/202	-/202	-/202
P		[mm]	250	300	300	300
B1	TP/TPD	[mm]	296/583	296/583	296/583	296/583
B2	TP/TPD	[mm]	237/553	237/553	237/553	237/553
B3		[mm]	600	600	600	600
C1	TP/TPD	[mm]	230/680	230/680	230/680	230/680
C5	TP/TPD	[mm]	400/153	400/153	400/153	400/153
C6		[mm]	350	350	350	350
L1		[mm]	800	800	800	800
H1		[mm]	215	215	215	215
H2		[mm]	275	291	291	291
H3	1~/3~ TP	[mm]	-/845	-/853	-/891	-/942
H4		[mm]	-	-	-	-
M			M16	M16	M16	M16

- TP pumps with a H4 dimension are delivered with a base plate.

27. Minimum efficiency index

Minimum efficiency index, MEI, means the dimensionless scale unit for hydraulic pump efficiency at best efficiency point, part load and overload. The Commission Regulation, EU, sets efficiency requirements to MEI greater than or equal to 0.10 as from 1 January 2013 and MEI greater than or equal to 0.40 as from 1 January 2015. An indicative benchmark for the best-performing water pump available on the market as from 1 January 2013 is determined in the regulation.

- The benchmark for the most efficient water pumps is MEI greater than or equal to 0.70.
- The efficiency of a pump with a trimmed impeller is usually lower than that of a pump with the full impeller diameter. The trimming of the impeller will adapt the pump to a fixed duty point, leading to reduced energy consumption. The minimum efficiency index, MEI, is based on the full impeller diameter.
- The operation of this water pump with variable duty points may be more efficient and economic when controlled, for example, by the use of a variable-speed drive that matches the pump duty to the system.
- Information on benchmark efficiency is available at http://europump.eu/efficiencycharts.

TPE2, TPE2 D, TPE3, TPE3 D

TPE2 Extra small

TPE2	P2 [kW]	Nominal impeller size / actual impeller size	Trimmed impeller	Maximum impeller	MEI
TPE2 25-50	0.12	-	-	●	*
TPE2 25-80	0.18	-	-	●	≥ 0.55
TPE2 25-90	0.37	-	-	●	≥ 0.70
TPE2 32-50	0.12	-	-	●	*
TPE2 32-70	0.25	-	-	●	≥ 0.70
TPE2 32-90	0.37	-	-	●	≥ 0.70
TPE2 40-50	0.12	-	-	●	*
TPE2 40-70	0.25	-	-	●	≥ 0.70
TPE2 40-90	0.37	-	-	●	≥ 0.70

Small, Medium and Large

TPE2, TPE2 D, TPE3, TPE3 D	P2 [kW]	Nominal impeller size / actual impeller size	Trimmed impeller	Maximum impeller	MEI
TPE2, TPE2 D, TPE3, TPE3 D	All			●	≥ 0.70

TPE2 Large, PN25

TPE2	P2 [kW]	Nominal impeller size / actual impeller size	Trimmed impeller	Maximum impeller	MEI
TPE2 Large, PN25	All				**

** Not in MEI classification because PN 25 is not a part of the MEI classification.

TPE Series 1000/2000, PN 16

TPE Series 1000/2000	P2 [kW]	Nominal impeller size / actual impeller size	Trimmed impeller	Maximum impeller	MEI
TPE 65-930/2	30	50-250 / 256		●	≥ 0.70
TPE 80-700/2	30	65-200 / 217		●	≥ 0.70
TPE 100-480/2	30	80-200 / 198		●	≥ 0.65
TPE 125-360/2	30	125-176 / 174		●	≥ 0.70
TPE 125-400/4	30	100-315 / 334		●	≥ 0.70
TPE 150-340/4	30	125-314 / 314	●		≥ 0.70
TPE 150-390/4	37	125-315 / 332		●	≥ 0.70
TPE 150-450/4	45	125-400 / 357	●		≥ 0.70
TPE 150-520/4	55	125-400 / 381	●		≥ 0.70
TPE 150-660/4	75	125-400 / 432		●	≥ 0.70
TPE 200-240/4	30	150-250 / 271	●		≥ 0.70
TPE 200-270/4	45	150-315 / 293	●		≥ 0.70
TPE 200-290/4	37	150-250 / 284	●		≥ 0.70
TPE 200-320/4	55	150-315 / 309	●		≥ 0.70
TPE 200-330/4	37	150-400 / 310	●		≥ 0.70
TPE 200-360/4	45	150-400 / 325	●		≥ 0.70
TPE 200-400/4	55	150-400 / 341	●		≥ 0.70
TPE 200-410/4	75	150-315 / 337	●		≥ 0.70
TPE 200-470/4	75	150-400 / 371	●		≥ 0.70
TPE 200-530/4	90	150-400 / 390	●		≥ 0.70
TPE 300-190/4	30	250-315 / 251	●		≥ 0.70
TPE 300-220/4	37	250-315 / 272	●		≥ 0.70
TPE 300-250/4	45	250-315 / 286		●	≥ 0.70
TPE 300-290/4	55	250-350 / 308	●		≥ 0.70
TPE 300-390/4	75	250-350 / 351	●		≥ 0.70
TPE 300-420/4	90	250-350 / 370		●	≥ 0.70
TPE 350-280/4	75	300-350 / 308	●		≥ 0.70
TPE 350-320/4	90	300-350 / 324	●		≥ 0.70

TPE Series 1000/2000, PN 25

TPE Series 1000/2000, PN 25	P2 [kW]	Nominal impeller size / actual impeller size	Trimmed impeller	Maximum impeller	MEI
TPE Series 1000/2000, PN 25	All				**

** Not in MEI classification because PN 25 is not a part of the MEI classification.

TP, TPD, 2-pole, PN 6, 10, 16

TP Series 100, 2-pole	P2 [kW]	Nominal impeller size / actual impeller size	Trimmed impeller	Maximum impeller	MEI
TP 25-50/2	0.12	-	-	●	*
TP 25-80/2	0.18	-	-	●	≥ 0.55
TP 25-90/2	0.37	-	-	●	≥ 0.70
TP 32-50/2	0.12	-	-	●	*
TP 32-80/2	0.25	-	-	●	≥ 0.70
TP 32-90/2	0.37	-	-	●	≥ 0.70
TP 40-50/2	0.12	-	-	●	*
TP 40-80/2	0.25	-	-	●	≥ 0.70
TP 40-90/2	0.37	-	-	●	≥ 0.70

* Not in MEI classification because flow rate at best efficiency point is less than 6 m^3/h.

TP Series 200, 2-pole	P2 [kW]	Nominal impeller size / actual impeller size	Trimmed impeller	Maximum impeller	MEI
TP, TPD 32-60/2	0.25	-	-	●	≥ 0.56
TP, TPD 32-120/2	0.37	-	-	●	≥ 0.40
TP, TPD 32-150/2	0.37	32-136 / 111	●	-	≥ 0.64
TP, TPD 32-180/2	0.55	32-136 / 118	●	-	
TP, TPD 32-230/2	0.75	32-136 / 136	-	●	
TP, TPD 40-60/2	0.25	-	-	●	≥ 0.70
TP, TPD 40-120/2	0.37	-	-	●	≥ 0.70
TP 40-180/2	0.55	-	-	●	≥ 0.70
TP, TPD 40-190/2	0.75	-	-	●	≥ 0.44
TP, TPD 40-230/2	1.1	-	-	●	≥ 0.61
TP, TPD 40-270/2	1.5	-	-	●	≥ 0.70
TP, TPD 50-60/2	0.37	-	-	●	≥ 0.60
TP, TPD 50-120/2	0.75	-	-	●	≥ 0.45
TP, TPD 50-180/2	0.75	-	-	●	≥ 0.70
TP, TPD 65-60/2	0.55	-	-	●	≥ 0.70
TP, TPD 65-120/2	1.1	-	-	●	≥ 0.59
TP, TPD 65-180/2	1.5	-	-	●	≥ 0.70
TP, TPD 80-120/2	1.5	-	-	●	≥ 0.70
TP, TPD 100-120/2	2.2	-	-	●	≥ 0.70

TP Series 300, 2-pole	P2 [kW]	Nominal impeller size / actual impeller size	Trimmed impeller	Maximum impeller	MEI
TP, TPD 32-200/2	1.1	32-160.1 / 127	●		≥ 0.70
TP, TPD 32-250/2	1.5	32-160.1 / 138	●		
TP, TPD 32-320/2	2.2	32-160.1 / 154	●		
TP, TPD 32-380/2	3	32-160.1 / 168		●	
TP, TPD 32-460/2	4	32-200.1 / 186	●		≥ 0.50
TP, TPD 32-580/2	5.5	32-200.1 / 203	●		
TP, TPD 40-240/2	2.2	32-160 / 137	●		≥ 0.52
TP, TPD 40-300/2	3	32-160 / 151	●		
TP, TPD 40-360/2	4	32-160 / 162		●	
TP, TPD 40-430/2	5.5	32-200 / 186	●		≥ 0.70
TP, TPD 40-530/2	7.5	32-200 / 200	●		
TP, TPD 40-630/2	11	32-200 / 219		●	
TP, TPD 50-160/2	1.1	32-125 / 109	●		≥ 0.70
TP, TPD 50-190/2	1.5	32-125 / 119	●		
TP, TPD 50-240/2	2.2	32-125 / 130	●		
TP, TPD 50-290/2	3	32-125 / 142		●	

TP Series 300, 2-pole	P2 [kW]	Nominal impeller size / actual impeller size	Trimmed impeller	Maximum impeller	MEI
TP, TPD 50-360/2	4	32-160 / 161	●		≥ 0.70
TP, TPD 50-430/2	5.5	32-160 / 175		●	
TP, TPD 50-420/2	7.5	40-200 / 184	●		≥ 0.57
TP, TPD 50-540/2	11	40-200 / 206	●		
TP, TPD 50-630/2	15	40-200 / 219		●	
TP, TPD 50-710/2	15	40-250 / 227	●		≥ 0.70
TP, TPD 50-830/2	18.5	40-250 / 243	●		
TP, TPD 50-900/2	22	40-250 / 252		●	
TP, TPD 65-170/2	2.2	40-125 / 116	●		≥ 0.70
TP, TPD 65-210/2	3	40-125 / 127	●		
TP, TPD 65-250/2	4	40-125 / 137		●	
TP, TPD 65-340/2	5.5	40-160 / 156	●		≥ 0.70
TP, TPD 65-410/2	7.5	40-160 / 170		●	
TP, TPD 65-460/2	11	50-200 / 183	●		≥ 0.53
TP, TPD 65-550/2	15	50-200 / 200	●		
TP, TPD 65-660/2	18.5	50-200 / 217		●	
TP, TPD 65-720/2	22	50-250 / 230	●		≥ 0.70
TP, TPD 65-930/2	30	50-250 / 256		●	
TP, TPD 80-140/2	2.2	50-125 / 105	●		≥ 0.69
TP, TPD 80-180/2	3	50-125 / 114	●		
TP, TPD 80-210/2	4	50-125 / 123	●		
TP, TPD 80-240/2	5.5	50-125 / 134		●	
TP, TPD 80-250/2	7.5	65-160 / 143	●		≥ 0.68
TP, TPD 80-330/2	11	65-160 / 157	●		
TP, TPD 80-400/2	15	65-160 / 171		●	
TP, TPD 80-520/2	18.5	65-200 / 188	●		≥ 0.70
TP, TPD 80-570/2	22	65-200 / 198	●		
TP, TPD 80-700/2	30	65-200 / 217		●	
TP, TPD 100-160/2	4	65-125 / 120-110	●		≥ 0.58
TP, TPD 100-200/2	5.5	65-125 / 125	●		
TP, TPD 100-240/2	7.5	65-125 / 135		●	
TP, TPD 100-250/2	11	80-160 / 145	●		≥ 0.70
TP, TPD 100-310/2	15	80-160 / 158	●		
TP, TPD 100-360/2	18.5	80-160 / 169	●		
TP, TPD 100-390/2	22	80-160 / 175		●	
TP, TPD 100-480/2	30	80-200 / 198	●		≥ 0.65
TP 125-310/2	22	100-160.1 / 160	●		≥ 0.70
TP 125-360/2	30	100-160.1 / 174		●	

TP, TPD, 4-pole, PN 6, 10, 16

TP Series 200, 4-pole	P2 [kW]	Nominal impeller size / actual impeller size	Trimmed impeller	Maximum impeller	MEI
TP, TPD 32-30/4	0.12			●	*
TP, TPD 32-40/4	0.25			●	*
TP, TPD 32-60/4	0.25			●	*
TP, TPD 40-30/4	0.12			●	≥ 0.70
TP 40-60/4	0.25			●	≥ 0.70
TP, TPD 40-90/4	0.25			●	≥ 0.70
TP, TPD 50-30/4	0.25			●	≥ 0.70
TP, TPD 50-60/4	0.37			●	≥ 0.70
TP, TPD 65-30/4	0.25			●	≥ 0.70
TP, TPD 65-60/4	0.55			●	≥ 0.70
TP, TPD 80-30/4	0.37			●	≥ 0.70
TP, TPD 80-60/4	0.75			●	≥ 0.70
TP, TPD 100-30/4	0.55			●	≥ 0.45

* Not in MEI classification because flow rate at best efficiency point is less than 6 m^3/h.

TP Series 300, 4-pole	P2 [kW]	Nominal impeller size / actual impeller size	Trimmed impeller	Maximum impeller	MEI
TP, TPD 32-80/4	0.25	32-160.1 / 152	●		≥ 0.70
TP, TPD 32-100/4	0.37	32-160.1 / 169		●	
TP, TPD 32-120/4	0.55	32-200.1 / 191	●		≥ 0.69
TP, TPD 40-100/4	0.55	32-160 / 167		●	≥ 0.40
TP, TPD 40-110/4	0.75	32-200 / 189	●		≥ 0.70
TP, TPD 40-140/4	1.1	32-200 / 210		●	
TP, TPD 50-90/4	0.55	32-160 / 163		●	≥ 0.50
TP, TPD 50-80/4	0.75	40-200 / 176	●		≥ 0.70
TP, TPD 50-120/4	1.1	40-200 / 197	●		
TP, TPD 50-140/4	1.5	40-200 / 214		●	
TP, TPD 50-190/4	2.2	40-250 / 238	●		≥ 0.70
TP, TPD 50-230/4	3	40-250 / 259	●		
TP, TPD 65-90/4	0.75	40-160 / 161		●	≥ 0.70
TP, TPD 65-110/4	1.1	50-200 / 179	●		≥ 0.70
TP, TPD 65-130/4	1.5	50-200 / 190	●		
TP, TPD 65-150/4	2.2	50-200 / 210	●		
TP, TPD 65-170/4	3	50-200 / 219		●	
TP, TPD 65-240/4	4	50-250 / 260	●		≥ 0.70
TP, TPD 80-70/4	1.1	65-160 / 149	●		≥ 0.68
TP, TPD 80-90/4	1.5	65-160 / 164	●		
TP, TPD 80-110/4	2.2	65-160 / 177		●	
TP, TPD 80-150/4	3	65-200 / 203	●		≥ 0.70
TP, TPD 80-170/4	4	65-200 / 217		●	
TP, TPD 80-240/4	5.5	65-250 / 252		●	≥ 0.60
TP, TPD 80-270/4	7.5	65-315 / 276	●		≥ 0.70
TP, TPD 80-340/4	11	65-315 / 305		●	
TP, TPD 100-65/4	1.1	80-160 / 139	●		≥ 0.70
TP, TPD 100-70/4	1.5	80-160 / 150	●		
TP, TPD 100-90/4	2.2	80-160 / 167	●		
TP, TPD 100-110/4	3	80-160 / 177		●	
TP, TPD 100-130/4	4	80-200 / 198	●		≥ 0.70
TP, TPD 100-170/4	5.5	80-200 / 218		●	
TP, TPD 100-200/4	7.5	80-250 / 237	●		≥ 0.45
TP, TPD 100-250/4	11	80-250 / 267		●	

TP Series 300, 4-pole	P2 [kW]	Nominal impeller size / actual impeller size	Trimmed impeller	Maximum impeller	MEI
TP, TPD 100-330/4	15	80-315 / 296	●		≥ 0.69
TP, TPD 100-370/4	18.5	80-315 / 316	●		
TP, TPD 100-410/4	22	80-315 / 331		●	
TP 125-60/4	2.2	100-160 / 160-140	●		≥ 0.70
TP 125-80/4	3	100-160 / 172	●		
TP 125-95/4	4	100-160 / 176		●	
TP, TPD 125-110/4	4	100-200 / 178	●		≥ 0.46
TP, TPD 125-130/4	5.5	100-200 / 194	●		
TP, TPD 125-160/4	7.5	100-200 / 209		●	
TP, TPD 125-190/4	11	100-250 / 238	●		≥ 0.70
TP, TPD 125-230/4	15	100-250 / 269		●	
TP, TPD 125-300/4	18.5	100-315 / 294	●		≥ 0.70
TP, TPD 125-340/4	22	100-315 / 311	●		
TP, TPD 125-400/4	30	100-315 / 334		●	
TP 150-70/4	5.5	125-200 / 170-148	●		≥ 0.70
TP 150-110/4	7.5	125-200 / 196-172	●		
TP 150-155/4	11	125-200 / 217	●		
TP 150-170/4	15	125-200 / 226		●	
TP, TPD 150-130/4	7.5	125-250 / 196	●		≥ 0.65
TP, TPD 150-160/4	11	125-250 / 220	●		
TP, TPD 150-200/4	15	125-250 / 240	●		
TP, TPD 150-220/4	18.5	125-250 / 252	●		
TP, TPD 150-250/4	22	125-250 / 264		●	
TP 150-260/4	18.5	125-315 / 274	●		≥ 0.70
TP 150-280/4	22	125-315 / 289	●		
TP 150-340/4	30	125-315 / 314	●		
TP 150-390/4	37	125-315 / 332		●	
TP 150-450/4	45	125-400 / 357	●		≥ 0.70
TP 150-520/4	55	125-400 / 381	●		
TP 150-660/4	75	125-400 / 432		●	
TP 200-50/4	4	150-200 / 160-120	●		≥ 0.70
TP 200-70/4	5.5	150-200 / 197-127	●		
TP 200-90/4	75	150-200 / 210-152	●		
TP 200-130/4	11	150-200 / 218-218	●		
TP 200-150/4	15	150-200 / 224		●	
TP 200-160/4	15	150-250 / 226-218	●		≥ 0.70
TP 200-190/4	18.5	150-250 / 234	●		
TP 200-200/4	22	150-250 / 247	●		
TP 200-240/4	30	150-250 / 271	●		
TP 200-290/4	37	150-250 / 284		●	
TP 200-270/4	45	150-315 / 293	●		≥ 0.70
TP 200-320/4	55	150-315 / 309	●		
TP 200-410/4	75	150-315 / 337		●	
TP 200-330/4	37	150-400 / 310	●		≥ 0.70
TP 200-360/4	45	150-400 / 325	●		
TP 200-400/4	55	150-400 / 341	●		
TP 200-470/4	75	150-400 / 371	●		
TP 200-530/4	90	150-400 / 390	●		
TP 200-590/4	110	150-400 / 410	●		
TP 200-660/4	132	150-400 / 430		●	
TP 300-190/4	30	250-315 / 251	●		≥ 0.70
TP 300-220/4	37	250-315 / 272	●		
TP 300-250/4	45	250-315 / 286		●	

TP Series 300, 4-pole	P2 [kW]	Nominal impeller size / actual impeller size	Trimmed impeller	Maximum impeller	MEI
TP 300-290/4	55	250-350 / 308	●		≥ 0.70
TP 300-390/4	75	250-350 / 351	●		
TP 300-420/4	90	250-350 / 370		●	
TP 300-430/4	110	250-400 / 358	●		≥ 0.70
TP 300-500/4	132	250-400 / 382	●		
TP 300-550/4	160	250-400 / 402		●	
TP 350-280/4	75	300-350 / 308	●		≥ 0.70
TP 350-320/4	90	300-350 / 324	●		
TP 350-360/4	110	300-350 / 343	●		
TP 350-420/4	132	300-350 / 359	●		
TP 350-480/4	160	300-350 / 372		●	
TP 350-530/4	200	300-400 / 394	●		≥ 0.70
TP 350-650/4	250	300-400 / 433	●		
TP 350-780/4	315	300-400 / 480		●	

TP, TPD, 6-pole, PN 16

TP Series 300, 6-pole	P2 [kW]	Nominal impeller size / actual impeller size	Trimmed impeller	Maximum impeller	MEI
TP, TPD 125-60/6	1.5	100-200 / 197	●	-	≥ 0.62
TP, TPD 125-70/6	2.2	100-200 / 216	-	●	
TP, TPD 125-80/6	3	100-250 / 236	●	-	≥ 0.70
TP, TPD 125-100/6	4	100-250 / 267	-	●	
TP, TPD 125-130/6	5.5	100-315 / 295	●	-	≥ 0.70
TP, TPD 125-160/6	7.5	100-315 / 326	-	●	
TP, TPD 150-60/6	2.2	125-250 / 204	●	-	≥ 0.62
TP, TPD 150-70/6	3	125-250 / 220	●	-	
TP, TPD 150-90/6	4	125-250 / 238	●	-	
TP, TPD 150-110/6	5.5	125-250 / 262	-	●	

TP, PN 25

PN 25	P2 [kW]	Nominal impeller size / actual impeller size	Trimmed impeller	Maximum impeller	MEI
TP Series 300, PN 25	All				**

** Not in MEI classification because PN 25 is not a part of the MEI classification.

28. Accessories

Unions and valves, TP Series 100, TPE2 Extra small

A union kit consists of two cast-iron union tails, two cast-iron union nuts and two EPDM gaskets.

Pump type, union connection	Pressure stage	Size	Product number
TP, TPE 25	PN 10	Rp 3/4	99888844
		Rp 1	99672022
		Rp 1 1/4	99888849
TP, TPE 32	PN 10	Rp 1	509921
		Rp 1 1/4	99672033

A valve kit consists of two brass valves, two brass union nuts and two EPDM gaskets.

The valve housing is made of pressure die-cast brass.

Pump type, valve connection	Pressure stage	Size	Product number
TP, TPE 25	PN 10	Rp 3/4	519805
		Rp 1	519806
		Rp 1 1/4	519807
TP, TPE 32	PN 10	Rp 1 1/4	505539

A union kit consists of two bronze union tails, two brass union nuts and two EPDM gaskets.

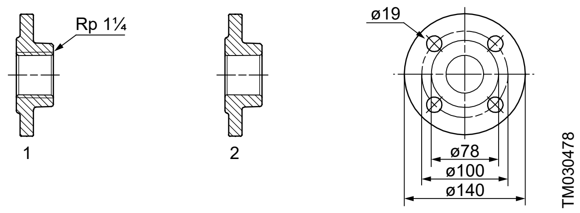
The valve housing is made of pressure die-cast brass.

Pump type, union connection	Pressure stage	Size	Product number
TP, TPE 25	PN 10	Rp 3/4	529971
		Rp 1	529972
TP, TPE 32	PN 10	Rp 1 1/4	509971

Counterflanges

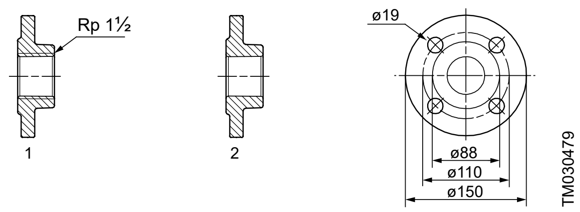
A flange kit consists of two steel flanges, two gaskets of asbestos-free material IT 200, and the requisite number of bolts.

Counterflange



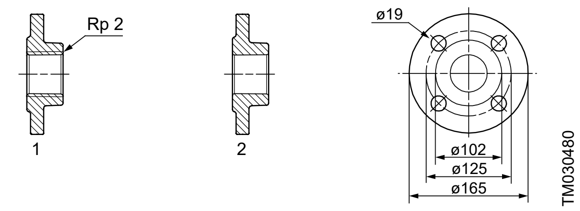
Pos.	Description
1	Threaded
2	For welding

Pump type	Description	Rated pressure	Pipe connection	Product number
TP, TPE 32 TPD, TPED 32	Threaded	10 bar, EN 1092-2	Rp 1 1/4	539703
	For welding	10 bar, EN 1092-2	32 mm, nominal	539704
	Threaded	16 bar, EN 1092-2	Rp 1 1/4	539703
	For welding	16 bar, EN 1092-2	32 mm, nominal	539704



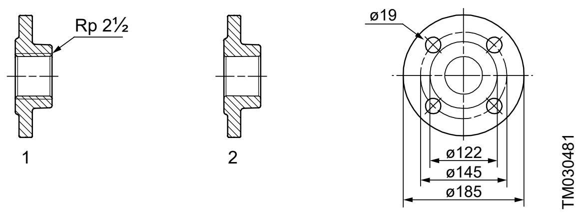
Pos.	Description
1	Threaded
2	For welding

Pump type	Description	Rated pressure	Pipe connection	Product number
TP, TPE 40 TPD, TPED 40	Threaded	10 bar, EN 1092-2	Rp 1 1/2	539701
	For welding	10 bar, EN 1092-2	40 mm, nominal	539702
	Threaded	16 bar, EN 1092-2	Rp 1 1/2	539701
	For welding	16 bar, EN 1092-2	40 mm, nominal	539702



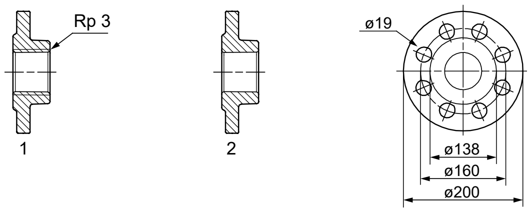
Pos.	Description
1	Threaded
2	For welding

Pump type	Description	Rated pressure	Pipe connection	Product number
TP, TPE 50 TPD, TPED 50	Threaded	10 bar, EN 1092-2	Rp 2	549801
	For welding	10 bar, EN 1092-2	50 mm, nominal	549802
	Threaded	16 bar, EN 1092-2	Rp 2	549801
	For welding	16 bar, EN 1092-2	50 mm, nominal	549802



Pos.	Description
1	Threaded
2	For welding

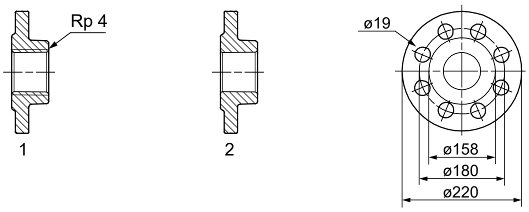
Pump type	Description	Rated pressure	Pipe connection	Product number
TP, TPE 65 TPD, TPED 65	Threaded	10 bar, EN 1092-2	Rp 2 1/2	559801
	For welding	10 bar, EN 1092-2	65 mm, nominal	559802
	Threaded	16 bar, EN 1092-2	Rp 2 1/2	559801
	For welding	16 bar, EN 1092-2	65 mm, nominal	559802



TM030482

Pos.	Description
1	Threaded
2	For welding

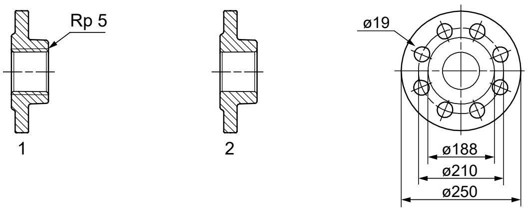
Pump type	Description	Rated pressure	Pipe connection	Product number
TP, TPE 80 TPD, TPED 80	Threaded	6 bar, EN 1092-2	Rp 3	569902
	For welding	6 bar, EN 1092-2	80 mm, nominal	569901
	Threaded	10 bar, EN 1092-2	Rp 3	569802
	For welding	10 bar, EN 1092-2	80 mm, nominal	569801
	Threaded	16 bar, EN 1092-2	Rp 3	569802
	For welding	16 bar, EN 1092-2	80 mm, nominal	569801



TM030483

Pos.	Description
1	Threaded
2	For welding

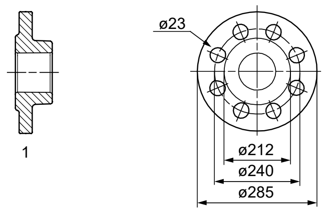
Pump type	Description	Rated pressure	Pipe connection	Product number
TP, TPE 100 TPD, TPED 100	Threaded	6 bar, EN 1092-2	Rp 4	579901
	For welding	6 bar, EN 1092-2	100 mm, nominal	579902
	Threaded	10 bar, EN 1092-2	Rp 4	99558423
	For welding	10 bar, EN 1092-2	100 mm, nominal	579802
	Threaded	16 bar, EN 1092-2	Rp 4	99558423
	For welding	16 bar, EN 1092-2	100 mm, nominal	579802



TM030484

Pos.	Description
1	Threaded
2	For welding

Pump type	Description	Rated pressure	Pipe connection	Product number
TP, TPE 125 TPD, TPED 125	Threaded	10 bar, EN 1092-2	Rp 5	485367
	For welding	10 bar, EN 1092-2	125 mm, nominal	485368
	Threaded	16 bar, EN 1092-2	Rp 5	485367
	For welding	16 bar, EN 1092-2	125 mm, nominal	485368

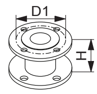
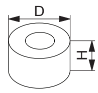
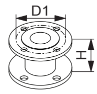
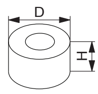
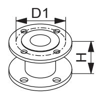
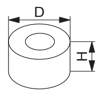
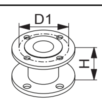
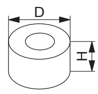
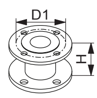
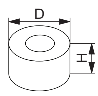
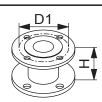
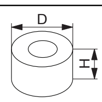
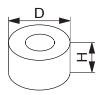


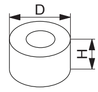
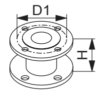
TM030485

Pos.	Description
1	For welding

Pump type	Description	Rated pressure	Pipe connection	Product number
TP, TPE 150 TPD, TPED 150	For welding	10 bar, EN 1092-2	150 mm, nominal	S1111600
	For welding	16 bar, EN 1092-2	150 mm, nominal	S1111600

Adapter flanges for various port-to-port lengths

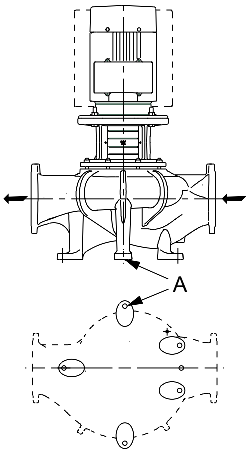
DN	Height (H) [mm]	Diameter, D [mm]		Pitch-circle diameter, D1 [mm]		Adapter flange	Product number	
		PN 6	PN 10/16	PN 6	PN 10/16		PN 6	PN 10/16
32	1 × 220	-	-	90	100		98848068	98848069
	1 × 120	-	-	90	100		98387529	98387530
	1 × 90	-	-	-	100		-	93328290
	1 × 60	70	78	90	-		98387527	98387528
	1 × 40	-	78	-	-		-	93328295
	1 × 30	70	78	-	-		98387531	98387588
	1 × 20	-	78	-	-		-	93341938
40	1 × 70	-	-	100	110		539921	539721
	1 × 90	-	-	100	110		98387590	98387591
	1 × 190	-	-	100	110		98387592	98387593
	1 × 70	-	90	-	-		-	96497637
	1 × 60	-	90	-	-		-	96097993
	1 × 35	-	90	-	-		-	96097994
	1 × 25	-	90	-	-		-	93328296
	1 × 10	-	90	-	-		-	93328297
50	1 × 160	-	-	110	125		98387594	98387595
	1 × 87.5	-	-	-	150		-	96497645
	1 × 60	-	-	110	125		549924	549824
	1 × 52.5	-	-	-			-	96097992
	1 × 72.5	-	106	-	-		-	96497639
	1 × 42.5	-	106	-	-		-	96097995
	1 × 40	90	102	-	-		96281077	96608516
65	1 × 135	-	-	130	145		98391271	98391272
	1 × 67.5	-	-	-	150		-	96497647
	1 × 67.5	-	-	-	165		-	96497649
	1 × 67.5	-	125	-	-		-	96497643
	1 × 57.5	-	125	-	-		-	96497641
	1 × 35	-	122	-	-		-	93328298
	1 × 20	110	122	-	-		98391273	98391274
	1 × 10	-	122	-	-		-	93328299
80	1 × 80	-	-	150	160		98391275	98391276
	1 × 82.5	-	-	-	185		-	96497650
	1 × 90	-	-	-	160		-	93328291
	1 × 130	-	-	-	160			93328292
	1 × 82.5	-	140	-	-		-	96545597
	1 × 70	-	140	-	-		-	93328301
	1 × 42.5	-	140	-	-		-	96545605
	1 × 30	-	140	-	-		-	93328300
	1 × 12.5	-	140	-	-		-	96545607
100	1 × 100	-	-	170	180		98391277	98391278
	1 × 110	-	-	170	180		93328294	93328293
	1 × 55	-	-	-	200		-	96545611
	1 × 85	-	160	-	-		-	93328302
	1 × 50	150	160	-	-		93328304	93328303
	1 × 25	-	160	-	-		-	96545610
125	1 × 40	-	190	-	-		-	93328305
	1 × 90	-	190	-	-		-	93328306

DN	Height (H) [mm]	Diameter, D [mm]		Pitch-circle diameter, D1 [mm]		Adapter flange	Product number	
		PN 6	PN 10/16	PN 6	PN 10/16		PN 6	PN 10/16
150	1 × 50	-	214	-	-		-	93328307
65-80	1 × 70	-	-	-	160		-	93328308
80-100	1 × 70	-	-	-	180		-	93328309

Base plates

Note: TPE2, TPE3 Extra small and Small and TP Series 100 pumps are not designed to be supplied with a base plate. Base plates are supplied as standard with TP and TPE pumps with 11 kW motors and above.

Some of the TPE and TP Series 300 pumps are provided with mounting feet and cannot be supplied with a base plate. See the figure below.



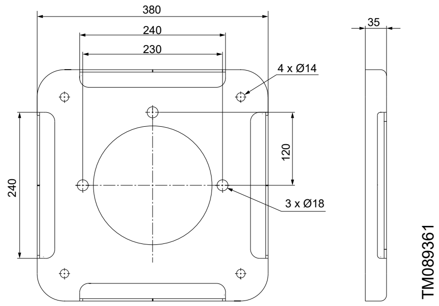
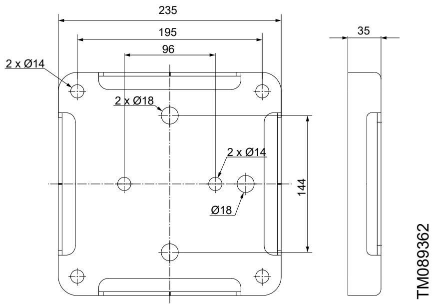
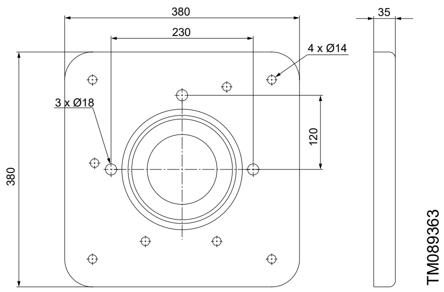
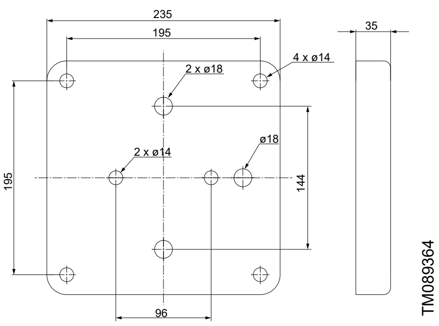
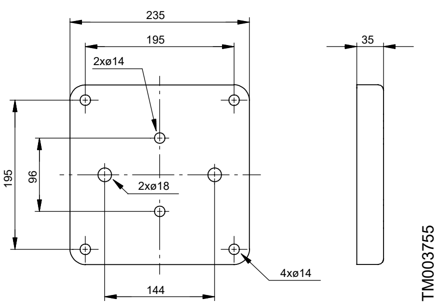
TM061083

Principal sketch of a Series 300 pump designed with mounting feet (A)

TPE2, TPE3, Medium and Large base plates

Pump type	Hexagon head screws	Product number
TPE2, TPE3 32-250	3 × M16 × 30 mm	93290205
TPE2, TPE3 32-330		
TPE2, TPE3 32-390		
TPE2, TPE3 32-510		
TPE2, TPE3 32-610		
TPE2, TPE3 32-710		
TPE2, TPE3 40-310		
TPE2, TPE3 40-380		
TPE2, TPE3 40-470		
TPE2, TPE3 40-560		
TPE2, TPE3 40-530	2 × M16 × 30 mm	00485031
TPE2, TPE3 40-630		
TPE2, TPE3 50-310	3 × M16 × 30 mm	93290205
TPE2, TPE3 50-360		
TPE2, TPE3 50-370		
TPE2, TPE3 50-450		
TPE2, TPE3 50-560		
TPE2, TPE3 50-700		93290207
TPE2, TPE3 50-730		
TPE2, TPE3 50-740		
TPE2, TPE3 50-750		
TPE2, TPE3 65-220	3 × M16 × 30 mm	93290205
TPE2, TPE3 65-280		
TPE2, TPE3 65-310		
TPE2, TPE3 65-470		
TPE2, TPE3 65-580		
TPE2, TPE3 65-680		93290207
TPE2, TPE3 65-740		

Pump type	Hexagon head screws	Product number
TPE2, TPE3 65-750		
TPE2, TPE3 65-760		
TPE2, TPE3 80-210	3 × M16 × 30 mm	93290205
TPE2, TPE3 80-250		
TPE2, TPE3 80-310		
TPE2, TPE3 80-340		
TPE2, TPE3 80-440	3 × M16 × 30 mm	93290207
TPE2, TPE3 80-520		
TPE2, TPE3 80-560		
TPE2, TPE3 80-570		
TPE2, TPE3 100-100	3 × M16 × 30 mm	93290204
TPE2, TPE3 100-130		
TPE2, TPE3 100-160		
TPE2, TPE3 100-170		
TPE2, TPE3 100-230		
TPE2, TPE3 100-260		
TPE2, TPE3 100-350	3 × M16 × 30 mm	93290206
TPE2, TPE3 100-460		
TPE2, TPE3 100-540		
TPE2, TPE3 100-570		
TPE2, TPE3 125-110	3 × M16 × 30 mm	93290204
TPE2, TPE3 125-120		
TPE2, TPE3 125-160		
TPE2, TPE3 125-180		
TPE2, TPE3 125-290	3 × M16 × 30 mm	93290206
TPE2, TPE3 125-380		
TPE2, TPE3 125-430		
TPE2, TPE3 125-460		
TPE2, TPE3 150-250	2 × M16 × 30 mm	96536246

Drawing	Product number
	93290204
	93290205
	93290206
	93290207
	00485031

TPE2/3 D Small

Pump type	Hexagon head screws	Product number
TPE2/3 D 32-80	3 × M12 × 40 mm	99150053
TPE2/3 D 32-120		
TPE2/3 D 32-150		

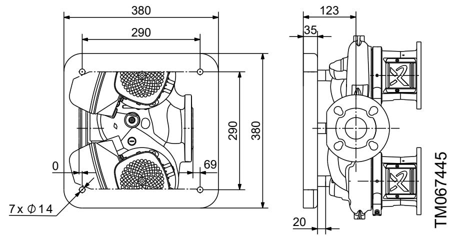
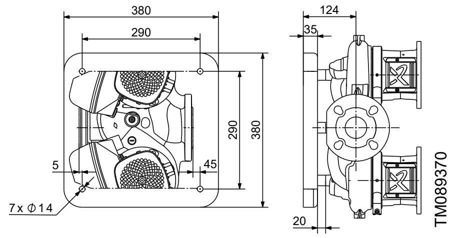
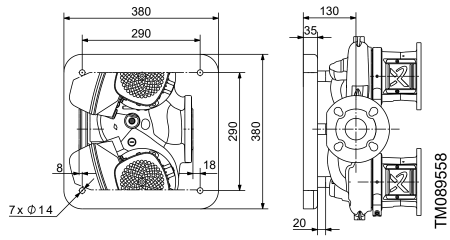
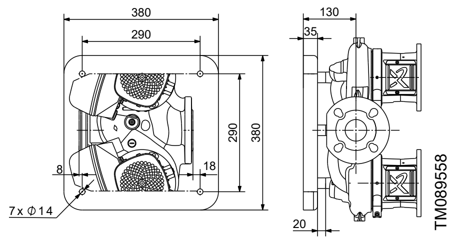
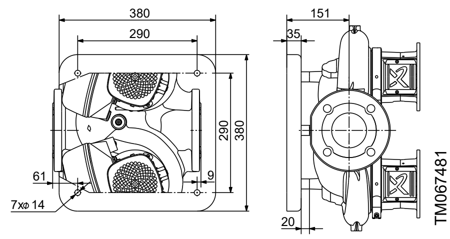
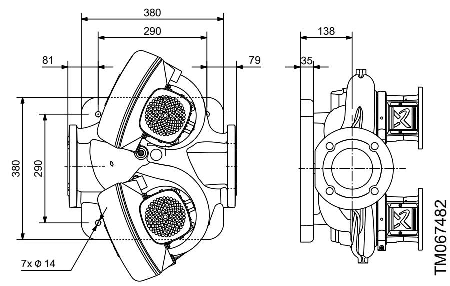
Pump type	Hexagon head screws	Product number
TPE2/3 D 32-180		
TPE2/3 D 32-200		
TPE2/3 D 40-80	3 × M12 × 40 mm	99150054
TPE2/3 D 40-120		
TPE2/3 D 40-150		
TPE2/3 D 40-180		
TPE2/3 D 40-200		
TPE2/3 D 40-240		
TPE2/3 D 50-60	3 × M12 × 40 mm	99150055
TPE2/3 D 50-80		
TPE2/3 D 50-120		
TPE2/3 D 50-150		
TPE2/3 D 50-180		
TPE2/3 D 50-200		
TPE2/3 D 50-240		
TPE2/3 D 65-60	3 × M12 × 40 mm	99150056
TPE2/3 D 65-80		
TPE2/3 D 65-120		
TPE2/3 D 65-150		
TPE2/3 D 65-180		
TPE2/3 D 65-200		
TPE2/3 D 80-40	3 × M12 × 40 mm	99150056
TPE2/3 D 80-120		
TPE2/3 D 80-150		
TPE2/3 D 80-180		
TPE2/3 D 100-40	3 × M12 × 16 mm	99150057
TPE2/3 D 100-120		
TPE2/3 D 100-150		
TPE2/3 D 100-180		

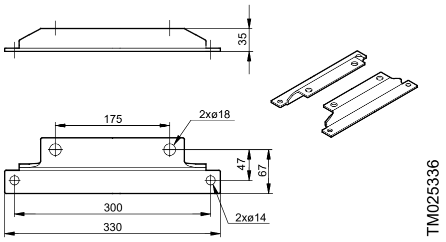
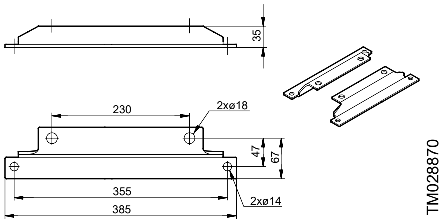
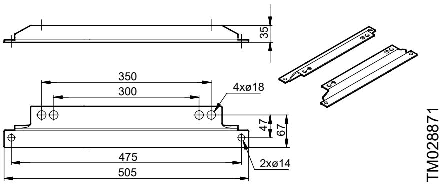
TPE2/3 D Medium

Pump type	Hexagon head screws	Product number
TPE2/3 D 32-260	4 × M16 × 30 mm	96489381
TPE2/3 D 32-360		
TPE2/3 D 32-410		
TPE2/3 D 32-560		
TPE2/3 D 32-660		
TPE2/3 D 32-760		
TPE2/3 D 40-310	4 × M16 × 30 mm	96489381
TPE2/3 D 40-410		
TPE2/3 D 40-510		
TPE2/3 D 40-560		
TPE2/3 D 50-310	4 × M16 × 30 mm	96489381
TPE2/3 D 50-360		
TPE2/3 D 50-410		
TPE2/3 D 50-510		
TPE2/3 D 65-310	4 × M16 × 30 mm	96489381
TPE2/3 D 65-360		
TPE2/3 D 65-410		
TPE2/3 D 65-510		
TPE2/3 D 80-210	4 × M16 × 30 mm	96489381
TPE2/3 D 80-260		
TPE2/3 D 80-310		

TPE2/3 D Large

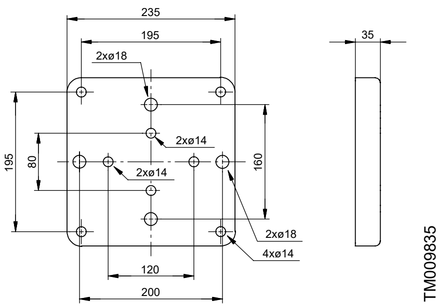
Pump type	Hexagon head screws	Product number
TPE2/3 D 40-530	4 × M16 × 30 mm	96489381
TPE2/3 D 40-630		
TPE2/3 D 50-560	4 × M16 × 30 mm	96489381
TPE2/3 D 50-700		
TPE2/3 D 50-730		
TPE2/3 D 50-740		
TPE2/3 D 50-750		
TPE2/3 D 65-580	4 × M16 × 30 mm	96489381
TPE2/3 D 65-680		
TPE2/3 D 65-740		
TPE2/3 D 65-750		
TPE2/3 D 65-760		
TPE2/3 D 80-340	4 × M16 × 30 mm	96489381
TPE2/3 D 80-440		
TPE2/3 D 80-520		
TPE2/3 D 80-560		
TPE2/3 D 80-570		
TPE2/3 D 100-40	3 × M12 × 16 mm	99150057
TPE2/3 D 100-120		
TPE2/3 D 100-150		
TPE2/3 D 100-180		
TPE2/3 D 100-100	4 × M16 × 30 mm	96489381
TPE2/3 D 100-130		
TPE2/3 D 100-160		
TPE2/3 D 100-170		
TPE2/3 D 100-230		
TPE2/3 D 100-260		
TPE2/3 D 100-350		
TPE2/3 D 100-460		
TPE2/3 D 100-540		
TPE2/3 D 100-570		
TPE2/3 D 100-610		
TPE2/3 D 125-110	4 × M16 × 30 mm	96536247
TPE2/3 D 125-120		
TPE2/3 D 125-160		
TPE2/3 D 125-180		
TPE2/3 D 125-290		
TPE2/3 D 125-380		
TPE2/3 D 125-430		
TPE2/3 D 125-460		
TPE2/3 D 150-120	4 × M16 × 30 mm	96536248
TPE2/3 D 150-170		
TPE2/3 D 150-230		
TPE2/3 D 150-240		
TPE2/3 D 150-250		
TPE2/3 D 150-270		

Drawing	Product number
	99150053
	99150054
	99150055
	99150056
 Due to different size of pump head, some of dimension related to pump head will be changed.	99150056
	99150057

Drawing	Product number
	96489381
	96536247
	96536248

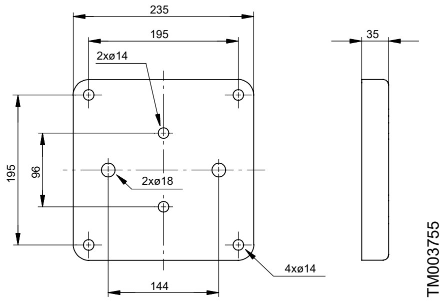
TP, TPE Series 200

Pump type	Hexagon head screws	Product number
TP, TPE 32	2 × M12 × 20 mm	96591246
TP, TPE 40		
TP, TPE 50		
TP 65-60/2		
TP, TPE 65-120/2		
TP 65-180/2		
TP 65-30/4	2 × M16 × 30 mm	96591245
TP, TPE 65-60/4		
TP, TPE 80		
TP, TPE 100		

Drawing	Product number
	96591246 96591245

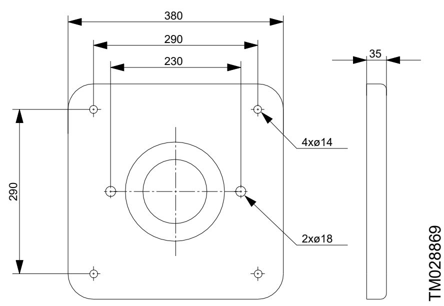
TP, TPE Series 300

Pump type	Hexagon head screws	Product number
TP, TPE 32	2 × M16 × 30 mm	00485031
TP, TPE 40		
TP, TPE 50		
TP, TPE 65		
TP, TPE 80-××/2		
TP, TPE 80-70/4		
TP, TPE 80-90/4		
TP, TPE 80-110/4		
TP, TPE 80-150/4		
TP, TPE 80-170/4		
TP, TPE 100-160/2		
TP, TPE 100-200/2		
TP, TPE 100-240/2		

Drawing	Product number
	00485031

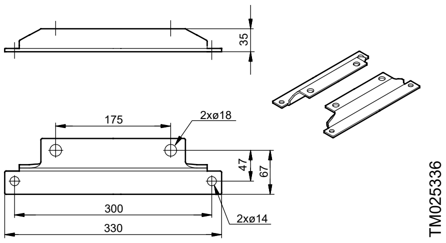
TP, TPE Series 300

Pump type	Hexagon head screws	Product number
TP, TPE 80-240/4	2 × M16 × 30 mm	96536246
TP, TPE 80-270/4		
TP, TPE 80-340/4		
TP, TPE 100-250/2		
TP, TPE 100-310/2		
TP, TPE 100-360/2		
TP, TPE 100-390/2		
TP, TPE 100-480/2		
TP 100-530/2		
TP 100-650/2		
TP 100-800/2		
TP 100-950/2		
TP 100-1040/2		
TP 100-1200/2		
TP 100-1410/2		
TP, TPE 100-××/4		
TP, TPE 125-××/4		
TP, TPE 150-××/4		
TP 125-××/6		
TP 150-××/6		

Drawing	Product number
	96536246

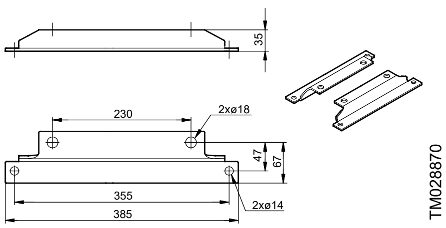
TPD Series 300

Pump type	Hexagon head screws	Product number
TPD 32 TPD 40 TPD 50 TPD 65 TPD 80-xx/2 TPD 80-70/4 TPD 80-90/4 TPD 80-110/4 TPD 80-150/4 TPD 80-170/4 TPD 100-160/2 TPD 100-200/2 TPD 100-240/2	4 × M16 × 30 mm	96489381

Drawing	Product number
	96489381

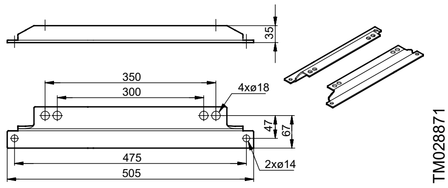
TPD Series 300

Pump type	Hexagon head screws	Product number
TPD 100-250/2 TPD 100-310/2 TPD 100-360/2 TPD 100-390/2 TPD 100-65/4 TPD 100-70/4 TPD 100-90/4 TPD 100-110/4 TPD 100-130/4 TPD 100-170/4	4 × M16 × 30 mm	96536247

Drawing	Product number
	96536247

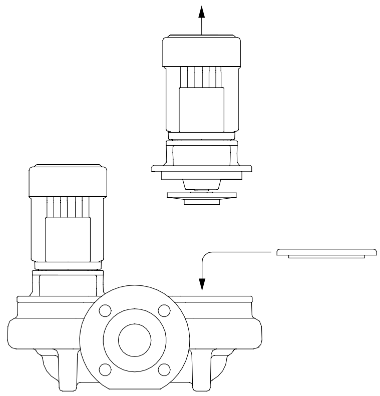
TPD Series 300

Pump type	Hexagon head screws	Product number
TPD 80-240/4 TPD 80-270/4 TPD 80-340/4 TPD 100-200/4 TPD 100-250/4 TPD 100-330/4 TPD 100-370/4 TPD 100-410/4 TPD 125-xx/4 TPD 150-xx/4 TPD 125-××/6 TPD 150-××/6	4 × M16 × 30 mm	96536248

Drawing	Product number
	96536248

Blanking flanges

A blanking flange is used to blank off the opening when one of the pumps of a twin-head pump is removed for service to enable uninterrupted operation of the other pump.



Blanking flange

TPE2 D, TPE3 D

Pump type	93290211	96495695	93290210	96525962	96525963
TPE2 D, TPE3 D 32-250	●				
TPE2 D, TPE3 D 32-330	●				
TPE2 D, TPE3 D 32-390	●				
TPE2 D, TPE3 D 32-510	●				
TPE2 D, TPE3 D 32-610	●				
TPE2 D, TPE3 D 32-710	●				
TPE2 D, TPE3 D 40-310	●				
TPE2 D, TPE3 D 40-380	●				
TPE2 D, TPE3 D 40-470	●				
TPE2 D, TPE3 D 40-530		●			
TPE2 D, TPE3 D 40-560	●				
TPE2 D, TPE3 D 40-630		●			
TPE2 D, TPE3 D 50-310	●				
TPE2 D, TPE3 D 50-360	●				
TPE2 D, TPE3 D 50-370	●				
TPE2 D, TPE3 D 50-450	●				
TPE2 D, TPE3 D 50-560			●		
TPE2 D, TPE3 D 50-700			●		
TPE2 D, TPE3 D 50-730			●		
TPE2 D, TPE3 D 50-740			●		
TPE2 D, TPE3 D 50-750			●		
TPE2 D, TPE3 D 65-220	●				
TPE2 D, TPE3 D 65-280	●				
TPE2 D, TPE3 D 65-310	●				
TPE2 D, TPE3 D 65-430	●				
TPE2 D, TPE3 D 65-580			●		
TPE2 D, TPE3 D 65-680			●		
TPE2 D, TPE3 D 65-740			●		
TPE2 D, TPE3 D 65-750			●		
TPE2 D, TPE3 D 65-760			●		
TPE2 D, TPE3 D 80-210	●				
TPE2 D, TPE3 D 80-250	●				
TPE2 D, TPE3 D 80-310	●				
TPE2 D, TPE3 D 80-340			●		
TPE2 D, TPE3 D 80-440			●		
TPE2 D, TPE3 D 80-520			●		
TPE2 D, TPE3 D 80-560			●		
TPE2 D, TPE3 D 80-570			●		
TPE2 D, TPE3 D 100-100				●	

Pump type	93290211	96495695	93290210	96525962	96525963
TPE2 D, TPE3 D 100-130				●	
TPE2 D, TPE3 D 100-160				●	
TPE2 D, TPE3 D 100-170				●	
TPE2 D, TPE3 D 100-230				●	
TPE2 D, TPE3 D 100-260				●	
TPE2 D, TPE3 D 100-350				●	
TPE2 D, TPE3 D 100-460				●	
TPE2 D, TPE3 D 100-540				●	
TPE2 D, TPE3 D 100-570				●	
TPE2 D, TPE3 D 125-110				●	
TPE2 D, TPE3 D 125-120				●	
TPE2 D, TPE3 D 125-160				●	
TPE2 D, TPE3 D 125-180				●	
TPE2 D, TPE3 D 125-290				●	
TPE2 D, TPE3 D 125-380				●	
TPE2 D, TPE3 D 125-430				●	
TPE2 D, TPE3 D 125-460				●	
TPE2 D, TPE3 D 150-120				●	
TPE2 D, TPE3 D 150-170				●	
TPE2 D, TPE3 D 150-230				●	
TPE2 D, TPE3 D 150-240				●	
TPE2 D, TPE3 D 150-250					●
TPE2 D, TPE3 D 150-270				●	

If you are not able to find a suitable blanking flange for the TPE2 D, TPE3 D pumps from above table, you should use 98159372.

TPD, 2-pole

Pump type	96591261	00565055	96495694	96495695	96495696	96525962	96525963	96525964
TPD 32-60/2	●							
TPD 32-120/2	●							
TPD 32-150/2		●						
TPD 32-180/2		●						
TPD 32-230/2		●						
TPD 32-200/2			●					
TPD 32-250/2			●					
TPD 32-320/2			●					
TPD 32-380/2			●					
TPD 32-460/2				●				
TPD 32-580/2				●				
TPD 40-60/2	●							
TPD 40-120/2	●							
TPD 40-190/2		●						
TPD 40-230/2		●						
TPD 40-270/2		●						
TPD 40-240/2			●					
TPD 40-300/2			●					
TPD 40-360/2			●					
TPD 40-430/2				●				
TPD 40-530/2				●				
TPD 40-630/2				●				
TPD 50-60/2	●							
TPD 50-120/2		●						
TPD 50-180/2		●						

Pump type	96591261	00565055	96495694	96495695	96495696	96525962	96525963	96525964
TPD 50-160/2			●					
TPD 50-190/2			●					
TPD 50-240/2			●					
TPD 50-290/2			●					
TPD 50-360/2			●					
TPD 50-430/2			●					
TPD 50-420/2					●			
TPD 50-540/2					●			
TPD 50-630/2					●			
TPD 50-710/2					●			
TPD 50-830/2					●			
TPD 50-900/2					●			
TPD 65-60/2	●							
TPD 65-120/2		●						
TPD 65-180/2		●						
TPD 65-170/2			●					
TPD 65-210/2			●					
TPD 65-250/2			●					
TPD 65-340/2			●					
TPD 65-410/2			●					
TPD 65-340/2			●					
TPD 65-410/2			●					
TPD 65-460/2					●			
TPD 65-550/2					●			
TPD 65-660/2					●			
TPD 65-720/2					●			
TPD 65-930/2					●			
TPD 80-120/2		●						
TPD 80-140/2			●					
TPD 80-180/2			●					
TPD 80-210/2			●					
TPD 80-240/2			●					
TPD 80-250/2			●					
TPD 80-330/2			●					
TPD 80-400/2			●					
TPD 80-520/2				●				
TPD 80-570/2				●				
TPD 80-700/2				●				
TPD 100-120/2		●						
TPD 100-160/2			●					
TPD 100-200/2			●					
TPD 100-240/2			●					
TPD 100-250/2			●					
TPD 100-310/2			●					
TPD 100-360/2			●					
TPD 100-390/2			●					
TPD 100-480/2						●		

TPD, 4-pole

Pump type	96591261	00565055	96495694	96495695	96495696	96525962	96525963	96525964
TPD 32-30/4	●							
TPD 32-40/4	-	●						
TPD 32-60/4		●						

Pump type	96591261	00565055	96495694	96495695	96495696	96525962	96525963	96525964
TPD 32-80/4			●					
TPD 32-100/4			●					
TPD 32-120/4				●				
TPD 40-30/4	●							
TPD 40-90/4		●						
TPD 40-100/4			●					
TPD 40-110/4				●				
TPD 40-140/4				●				
TPD 50-30/4	●							
TPD 50-60/4		●						
TPD 50-90/4			●					
TPD 50-80/4					●			
TPD 50-120/4					●			
TPD 50-140/4					●			
TPD 50-190/4					●			
TPD 50-230/4					●			
TPD 65-30/4		●						
TPD 65-60/4		●						
TPD 65-90/4			●					
TPD 65-110/4					●			
TPD 65-130/4					●			
TPD 65-150/4					●			
TPD 65-170/4					●			
TPD 65-240/4					●			
TPD 80-30/4		●						
TPD 80-60/4		●						
TPD 80-70/4			●					
TPD 80-90/4			●					
TPD 80-110/4			●					
TPD 80-150/4				●				
TPD 80-170/4				●				
TPD 80-240/4								●
TPD 80-270/4								●
TPD 80-340/4								●
TPD 100-30/4		●						
TPD 100-65/4			●					
TPD 100-70/4			●					
TPD 100-90/4			●					
TPD 100-110/4			●					
TPD 100-130/4						●		
TPD 100-170/4						●		
TPD 100-200/4								●
TPD 100-250/4								●
TPD 100-330/4								●
TPD 100-370/4								●
TPD 100-410/4								●
TPD 125-110/4						●		
TPD 125-130/4						●		
TPD 125-160/4						●		
TPD 125-190/4								●
TPD 125-230/4								●
TPD 125-300/4								●
TPD, 125-340/4								●
TPD 125-400/4								●
TPD 150-130/4							●	

Pump type	96591261	00565055	96495694	96495695	96495696	96525962	96525963	96525964
TPD 150-160/4							●	
TPD 150-200/4							●	
TPD 150-220/4							●	
TPD 150-250/4							●	

TPD, 6-pole

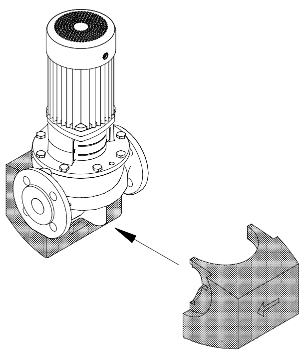
Pump type	96591261	00565055	96495694	96495695	96495696	96525962	96525963	96525964
TPD 125-60/6						●		
TPD 125-70/6						●		
TPD 125-80/6								●
TPD 125-100/6								●
TPD 125-130/6								●
TPD 125-160/6								●
TPD 150-60/6							●	
TPD 150-70/6							●	
TPD 150-90/6							●	
TPD 150-110/6							●	

Insulating kits

Insulating kits are available for TPE2 and TPE3 Small pumps.

The insulating kit consists of two shells.

The insulating kit is tailored to the individual pump model and encloses the entire pump housing, thus providing optimum insulation.



TM008095

Insulating kit

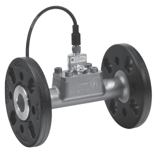
Kits for TPE2, TPE3 pumps

Pump type	Product number
TPE2, TPE3 32-80/120/150/180/200	98159366
TPE2, TPE3 40-80/120/150/180/200/240	98159368
TPE2, TPE3 50-60/80/120/150/180/200/240	98159367
TPE2, TPE3 65-60/80/120/150/180/200	98159361
TPE2, TPE3 80-40/120/150/180	98159363
TPE2, TPE3 100-40/120/150/180	98159362

Accessories

Sensors

Flow sensors

Grundfos Vortex flow sensor, VFI [50]	Type	Flow range [m^3/h]	Pipe connection	O-ring		Connection type		Product number
				EPDM	FKM	Cast-iron flange	Stainless-steel flange	
	VFI 1.3-25 DN32 020 E	1.3 - 25	DN 32	●		●		97686141
	VFI 1.3-25 DN32 020 F				●	●		97686142
	VFI 1.3-25 DN32 020 E			●			●	97688297
	VFI 1.3-25 DN32 020 F				●		●	97688298
	VFI 2-40 DN40 020 E	2-40	DN 40	●		●		97686143
	VFI 2-40 DN40 020 F				●	●		97686144
	VFI 2-40 DN40 020 E			●			●	97688299
	VFI 2-40 DN40 020 F				●		●	97688300
	VFI 3.2-64 DN50 020 E	2-64	DN 50	●		●		97686145
	VFI 3.2-64 DN50 020 F				●	●		97686146
	VFI 3.2-64 DN50 020 E			●			●	97688301
	VFI 3.2-64 DN50 020 F				●		●	97688302
Sensor tube with sensor	VFI 5.2-104 DN65 020 E	5.2 - 104	DN 65	●		●		97686147
sensor tube of 1.4408 and sensor of 1.4404	VFI 5.2-104 DN65 020 F				●	●		97686148
4-20 mA output signal	VFI 5.2-104 DN65 020 E			●			●	97688303
2 flanges	VFI 5.2-104 DN65 020 F				●		●	97688304
5 m cable with M12 connection in one end	VFI 8-160 DN80 020 E	8-160	DN 80	●		●		97686149
quick guide.	VFI 8-160 DN80 020 F				●	●		97686150
	VFI 8-160 DN80 020 E			●			●	97688305
	VFI 8-160 DN80 020 F				●		●	97688306
	VFI 12-240 DN100 020 E	12-240	DN 100	●		●		97686151
	VFI 12-240 DN100 020 F				●	●		97686152
	VFI 12-240 DN100 020 E			●			●	97688308
	VFI 12-240 DN100 020 F				●		●	97688309

50) For more information about the VFI sensor, see the data booklet "Grundfos direct sensors", publication number 97790189.

Temperature sensors

Temperature sensor, TTA

Temperature sensor with Pt100 temperature sensor fitted in a ⌀6 x 100 mm measuring tube made of stainless steel, DIN 1.4571 and a 4-20 mA sensor built into a type B head DIN 43.729.

The connecting head is made of painted pressure die-cast aluminium with Pg 16 screwed connection, stainless screws and neoprene rubber gasket.

The sensor is built into the system either by means of a cutting ring bush or by means of one of the two matching protecting tubes ⌀9 x 100 mm or ⌀9 x 50 mm, respectively.

The protecting tube has a G 1/2 connection.

Cutting ring bush or protecting tube must be ordered separately.

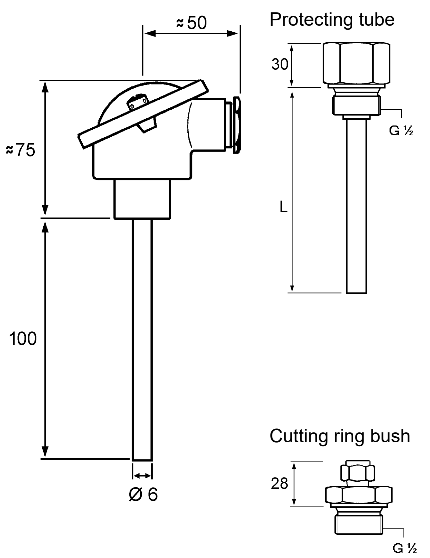
Technical data

Type		TTA (-25) 25	TTA (0) 25	TTA (0) 150	TTA (50) 100
Product number		96430194	96432591	96430195	96432592
Measuring range		-25 to +25 °C	0 to +25 °C	0 to +150 °C	50 to +100 °C
Measuring accuracy		According to IEC 751, class B, 0.3 °C at 0 °C			
Response time, τ (0.9) in water 0.2 m/s	Without protecting tube:	28 seconds			
	With oil-filled protecting tube:	75 seconds			
Enclosure class		IP55			
Output signal		4-20 mA			
Supply voltage		8-35 VDC			
EMC, electromagnetic compatibility	Emission:	According to EN 50081			
	Immunity:	According to EN 50082			

Accessories

Type	Protecting tube ⌀9 x 50 mm	Protecting tube ⌀9 x 100 mm	Cutting ring bush
Product number	96430201	96430202	96430203
Description	Protecting tube of stainless steel SINOX SSH 2 for ⌀6 mm measuring tube. Pipe connection G 1/2.		Cutting ring bush for ⌀6 mm measuring tube. Pipe connection G 1/2.

Dimensional sketch



Type	L
⌀9 x 50	49
⌀9 x 100	99

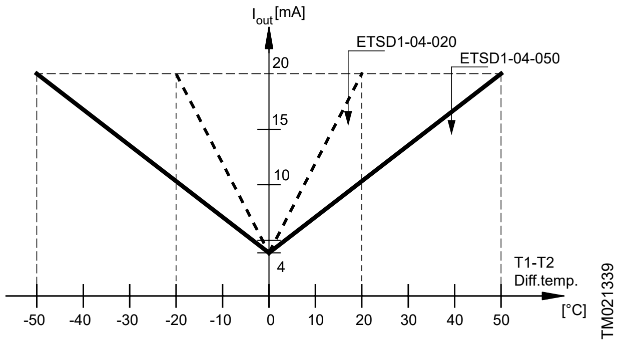
Differential-temperature sensor, HONSBERG

The temperature sensors T1 and T2 measure the temperature in their respective location at the same time. Besides the temperature measurement, the T1 features an electronic unit calculating the temperature difference between T1 and T2 and transmitting the result as a 4-20 mA signal via a current amplifier.

As the measured signal transmitted from the T2 is also a current signal, a relatively large distance is allowed between T2 and T1.

As appears from the figure below, it has no effect on the output signal, I_{out}, which of the sensors that measures the highest temperature.

Thus, the current signal generated will always be positive between 4 and 20 mA.



Sensor characteristics

Technical data

Type	ETSD1-04-020K045 + ETSD2-K045	ETSD1-04-050K045 + ETSD2-K045
Product number	96409362	96409363
Measuring range: Temperature difference (T1-T2) or (T2-T1)	0 to +20 °C	0 to +50 °C
Supply voltage	15-30 VDC	
Output signal	4-20 mA	
Measuring accuracy	± 0.3 % FS	
Repeatability	± 1 % FS	
Response time, τ (0.9)	2 minutes	
Ambient temperature	-25 to +85 °C	
Operating temperature of T1 and T2	-25 to +105 °C	
Maximum distance between T1 and T2	300 m with screened cable	
Electrical connection	Between T1 and T2: M12 x 1 plug, output signal with DIN 43650-A plug type	
Storage temperature	-45 to +125 °C	
Short-circuit-proof	Yes	
Protected against polarity reversal	Yes, up to 40 V	
Materials in contact with liquid	Stainless steel, DIN 1.4571	
Enclosure class	IP65	
EMC, electromagnetic compatibility	Emission: According to EN 50081	
	Immunity: According to EN 50082	

ETSD1-	04-	020	K	045	Specification
ETSD1-					Reference temperature, T1.
	04-				0 °C corresponds to 4 mA.
		020			20 °C corresponds to 20 mA.
		050			50 °C corresponds to 20 mA.
			K		Material in contact with liquid: Stainless steel, DIN 1.4571.
				045	Length of sensing element: 45 mm.

ETSD2-	K	045	Specification
ETSD2-			Reference temperature, T2.
	K		Material in contact with liquid: Stainless steel, DIN 1.4571.
		045	Length of sensing element: 45 mm.

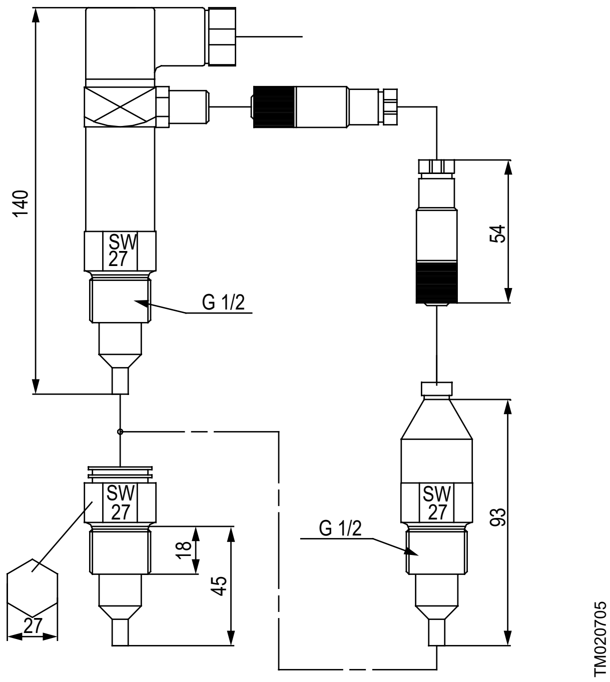
Installing the sensor

Fit the two sensors in such a way that the sensing elements are located in the middle of the flow of the liquid to be measured.

For tightening, use only the hexagon nut.

You can turn the upper part of the sensors to any position suitable for the connection of cables.

The sensors have a G 1/2 thread. See the figure below.



Dimensional sketch

Ambient temperature sensor

Sensor type	Type	Supplier	Measuring range	Product number
Temperature sensor, ambient temperature	WR 52	tmg DK: Plesner	-50 to +50 °C	ID8295

Pressure sensors

Sensors for boosting applications

Danfoss pressure sensor kit	Pressure range [bar]	Product number
• Connection: G 1/2 A, DIN 16288 - B6kt • Electrical connection: plug DIN 43650	0 - 2.5	96478188
	0-4	91072075
	0-6	91072076
	0-10	91072077
	0-16	91072078
• Pressure sensor, type MBS 3000, with 2 m screened cable Connection: G 1/4 A, DIN 16288 - B6kt • 5 cable clips, black • Fitting instructions PT, 00400212	0 - 2.5	405159
	0-4	405160
	0-6	405161
	0-10	405162
	0-16	405163

Sensors for circulation applications

Grundfos differential pressure sensor, DPI	Pressure range [bar]	Product number
• 1 sensor including 0.9 m screened cable, 7/16" connections • 1 original DPI bracket for wall mounting • 1 Grundfos bracket for mounting on motor • 2 M4 screws for mounting of sensor on bracket • 1 M6 screw, self-cutting, for mounting on MGE 90/100 • 1 M8 screw, self-cutting, for mounting on MGE 112/132 • 1 M10 screw, self-cutting, for mounting on MGE 160 • 1 M12 screw, self-cutting, for mounting on MGE 180 • 3 capillary tubes, short/long • 2 fittings, 1/4" - 7/16" • 5 cable clips, black • Installation and operating instructions • Service kit instruction	0 - 0.6	96611522
	0-1	96611523
	0 - 1.6	96611524
	0 - 2.5	96611525
	0-4	96611526
	0-6	96611527
	0-10	96611550
Fitting kit for TPED with two sensors		96491010

Select the differential pressure sensor so that the maximum pressure of the sensor is higher than the maximum differential pressure of the pump.

Second sensor for TPED pump

Order a second differential pressure sensor kit for TPED pumps when two sensors are needed.
The kits are set as optional part for TPE3 D Medium and Large.

Differential pressure sensor kit	Pressure range [bar]	Product number
• 1 differential pressure sensor • Capillary tubes • Screws and tee-piece for connecting existing sensor and the new sensor	0-4	99725401
	0-6	99725451
	0-10	99725455

External Grundfos sensors

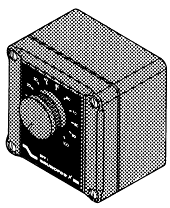
Sensor	Type	Supplier	Measuring range [bar]	Transmitter output [mA]	Power supply [VDC]	Process connection	Product number
Pressure transmitter	RPI	Grundfos	0 - 0.6	4-20	12-30	G 1/2	97748907
			0-1				97748908
			0 - 1.6				97748909
			0 - 2.5				97748910
			0-4				97748921
			0-6				97748922
			0-12				97748923
			0-16				97748924

Sensor interface

Sensor interface, SI 001 PSU [51)]	Description	Product number
	Grundfos Direct Sensors™, type SI 001 PSU, is an external power supply for the VFI, DPI and other transmitters with 24 VDC supply voltage. The power supply is used when the cable between transmitter and controller is more than 30 m long.	96915820

51) For further information about the PSU sensor interface, see the installation and operating instructions "SI 001 PSU - sensor interface", publication number 96944355, or quick guide, publication number 96944356.

Potentiometer



TM021630

Potentiometer

Potentiometer for setpoint setting and start/stop of the pump.

Product	Product number
External potentiometer with cabinet for wall mounting	625468

MI 301

MI 301 is a module with built-in infrared and radio communication with Gundfos GO and is used for MGE motors, which do not have Bluetooth. Use MI 301 in conjunction with Android or iOS-based smart devices with a Bluetooth connection. MI 301 has rechargeable Li-ion battery and you must charge it separately.

TM053890

MI 301

Supplied with the product:

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

Product numbers

	Product number
Grundfos MI 301	98046408

CIU communication interface units

GRA6118

Grundfos CIU communication interface unit

The CIU units enable communication of operating data, such as measured values and setpoints, between TPE pumps and a building management system. The CIU unit incorporates a 24-240 VAC/VDC power supply module. You can mount the CIU unit on a DIN rail or on a wall. The CIM module must be ordered separately and be mounted in the CIU box. For further information see section Communication.

We offer the following CIU unit:

Description	Fieldbus protocol	Product number
CIU 900	CIU box without CIM	99448387

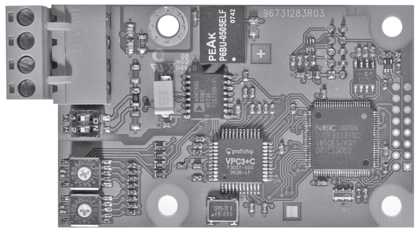
For further information about data communication via CIU units and fieldbus protocols, see the CIU documentation available in Grundfos Product Center. See section Grundfos Product Center.

Related information

Antennas and battery

31. Grundfos Product Center

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 TPE pumps and a building management system. The CIM modules are add-on communication modules which are fitted in the terminal box of TPE pumps or in a CIU box. For further information see section Communication.

Note: CIM modules must be fitted by authorised personnel.

We offer the following CIM modules:

Description	Fieldbus protocol	Product number
CIM 100	LONWorks for pumps	96824797
CIM 110	LONWorks for multipump	96824798
CIM 150	PROFIBUS DP	96824793
CIM 200	Modbus RTU	96824796
CIM 250 [52]	GSM	96824795
CIM 260-EU [52]	3G/4G cellular	99439302
CIM 260-US [52]	3G/4G cellular	99439306
CIM 270 [52]	GRM	96898815
CIM 280-EU [52]	GiC/GRM 3G/4G	99439724
CIM 280-US [52]	GiC/GRM 3G/4G	99439725
CIM 300	BACnet MS/TP	96893770
CIM 500	Ethernet, BACnet IP	98301408
CIM 500	Ethernet, Modbus TCP	
CIM 500	Ethernet, PROFINET IO	
CIM 500	Ethernet, GRM IP	
CIM 500	Ethernet, EtherNet/IP	

[52] Antenna not included. See section Antennas and battery.

For further information about data communication via CIM modules and fieldbus protocols, see the CIM documentation available in Grundfos Product Center. See section Grundfos Product Center.

Related information

Antennas and battery

31. Grundfos Product Center

Antennas and battery

Description	Product number
Antenna for roof for CIM/CIU 250/270	97631956
Antenna for desk for CIM/CIU 250/270	97631957
Antenna (rod) 3G/4G for CIM 260/280	99043061
Antenna (puc) 3G/4G for CIM 260/280	99518079
CIM 250 battery	99499908

EMC filter

EMC, electromagnetic compatibility to EN 61800-3

TM029198

EMC filter

The EMC filter for residential areas is available as a complete kit ready for installation (category C2, corresponding to CISPR11, group 1, class A).

Product	Product number
EMC filter, TPE 5.5 kW, low speed and 7.5 kW	96041047
EMC filter, TPE 11 kW, medium/high speed	96478309

CUE accessories

Add-on module	Type	Product number
Sensor input module	MCB 114	96760901
Multipump module [53)]	MCO 101	99753103

53) Only possible with the Constant pressure control mode.

29. Minimum inlet pressure - NPSH

To ensure optimum and noiseless operation, we recommend that you use the minimum inlet pressure values shown in sections TPE2, TPE2 D, TPE3, TPE3 D to TP, TPD, 6-pole, PN 16.

A minimum inlet pressure is required to avoid pressure drop that may cause cavitation.

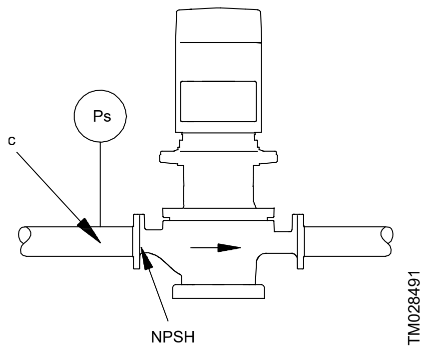
Use the following formula to calculate the minimum inlet pressure, p_s in bar relative. The pressure gauge value on the pump inlet side.

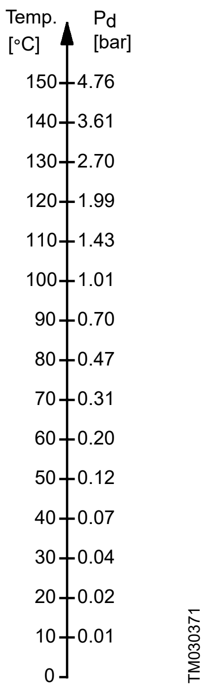
Note: Base the calculation of the minimum inlet pressure on the maximum required flow.

$$p_s \geq \left(\mathrm{NPSH}_R \times \rho \times g - \frac{1}{2} \times \rho \times c^2\right) \times 0.00001 - p_b + p_d$$

[bar relative]

p_s	=	Minimum inlet pressure in bar.
NPSH_R	=	The required Net Positive Suction Head in m head, to be read from the NPSH curve at the highest flow the pump will be delivering.
ρ	=	Density of the pumped liquid measured in kg/m^3.
g	=	Gravitational acceleration measured in m/s. For estimated calculations use the value 9.81 m/s^2.
c	=	Flow velocity of the pumped liquid at the pressure gauge. Insert the flow velocity as the unit [m/s]. See individual curve charts from section How to read the curve charts.
p_b	=	Barometric pressure in bar. Set the barometric pressure to 0.97 bar. **Note:** Only occasionally the pressure is as high as 1 bar; this value is also at sea level.
p_d	=	Vapour pressure in bar. See the figure below.





Minimum inlet pressure

Related information

How to read the curve charts

TPE2, TPE2 D, TPE3, TPE3 D

TP, TPE, TPD, TPED, 2-pole, PN 6, 10, 16, 25

TP, TPE, TPD, TPED, 4-pole, PN 6, 10, 16, 25

TP, TPD, 6-pole, PN 16

TPE2, TPE2 D, TPE3, TPE3 D

Pump type	p [bar]				
	20 °C	60 °C	90 °C	110 °C	120 °C
TPE2 25-50	0.1	0.1	0.2	0.5	1.1
TPE2 25-80	0.1	0.1	0.1	0.3	0.9
TPE2 25-90	0.1	0.1	0.2	0.5	1.1
TPE2 32-50	0.1	0.1	0.1	0.2	0.8
TPE2 32-70	0.1	0.1	0.2	0.5	1.1
TPE2 32-90	0.1	0.1	0.2	0.5	1.1
TPE2, TPE2 D, TPE3, TPE3 D 32-80	0.1	0.1	0.2	0.9	1.5
TPE2, TPE2 D, TPE3, TPE3 D 32-120	0.1	0.1	0.2	0.9	1.5
TPE2, TPE2 D, TPE3, TPE3 D 32-150	0.1	0.1	0.4	1.1	1.7
TPE2, TPE2 D, TPE3, TPE3 D 32-180	0.1	0.2	0.6	1.3	1.9
TPE2, TPE2 D, TPE3, TPE3 D 32-200	0.2	0.4	0.9	1.6	2.2
TPE2, TPE3 30-250	0.1	0.1	0.1	0.69	1.24
TPE2, TPE3 30-330	0.1	0.1	0.1	0.75	1.31
TPE2, TPE3 32-390	0.1	0.1	0.13	0.85	1.41
TPE2, TPE3 32-510	0.1	0.1	0.22	0.94	1.50
TPE2, TPE3 32-610	0.1	0.1	0.32	1.04	1.60
TPE2, TPE3 32-710	0.1	0.1	0.34	1.06	1.62
TPE2 40-50	0.1	0.1	0.1	0.3	0.9
TPE2 40-70	0.1	0.1	0.2	0.5	1.1
TPE2 40-90	0.1	0.1	0.2	0.5	1.1
TPE2, TPE2 D, TPE3, TPE3 D 40-80	0.1	0.1	0.2	0.9	1.5
TPE2, TPE2 D, TPE3, TPE3 D 40-120	0.1	0.1	0.2	0.9	1.5
TPE2, TPE2 D, TPE3, TPE3 D 40-150	0.1	0.1	0.5	1.2	1.8
TPE2, TPE2 D, TPE3, TPE3 D 40-180	0.1	0.1	0.6	1.3	1.9
TPE2, TPE2 D, TPE3, TPE3 D 40-200	0.1	0.2	0.7	1.4	2.0
TPE2, TPE2 D, TPE3, TPE3 D 40-240	0.1	0.3	0.8	1.5	2.1
TPE2, TPE3 40-310	0.1	0.1	0.1	0.76	1.32
TPE2, TPE3 40-380	0.1	0.1	0.16	0.88	1.44
TPE2, TPE3 40-470	0.1	0.1	0.23	0.95	1.51
TPE2, TPE3 40-530	0.1	0.1	0.1	0.74	1.30
TPE2, TPE3 40-560	0.1	0.1	0.35	1.07	1.63
TPE2, TPE3 40-630	0.1	0.1	0.1	0.76	1.32
TPE2, TPE2 D, TPE3, TPE3 D 50-60	0.1	0.1	0.5	1.2	1.8
TPE2, TPE2 D, TPE3, TPE3 D 50-80	0.1	0.3	0.8	1.5	2.1
TPE2, TPE2 D, TPE3, TPE3 D 50-120	0.4	0.6	1.1	1.8	2.4
TPE2, TPE2 D, TPE3, TPE3 D 50-150	0.6	0.8	1.3	2.0	2.6
TPE2, TPE2 D, TPE3, TPE3 D 50-180	0.7	0.9	1.4	2.1	2.7
TPE2, TPE2 D, TPE3, TPE3 D 50-200	0.9	1.1	1.6	2.3	2.9
TPE2, TPE2 D, TPE3, TPE3 D 50-240	0.9	1.1	1.6	2.3	2.9
TPE2, TPE3 50-310	0.1	0.1	0.30	1.02	1.58
TPE2, TPE3 50-360	0.1	0.1	0.29	1.02	1.57
TPE2, TPE3 50-370	0.1	0.1	0.51	1.23	1.79
TPE2, TPE3 50-450	0.1	0.1	0.40	1.12	1.68
TPE2, TPE3 50-560	0.1	0.1	0.10	0.82	1.37
TPE2, TPE3 50-700	0.1	0.1	0.15	0.88	1.43
TPE2, TPE3 50-730	0.1	0.1	0.25	0.97	1.53
TPE2, TPE3 50-740	0.1	0.1	0.31	1.04	1.59
TPE2, TPE3 50-750	0.1	0.1	0.31	1.03	1.59
TPE2, TPE2 D, TPE3, TPE3 D 65-60	0.1	0.1	0.2	0.9	1.5
TPE2, TPE2 D, TPE3, TPE3 D 65-80	0.1	0.1	0.3	1.1	1.7
TPE2, TPE2 D, TPE3, TPE3 D 65-120	0.1	0.2	0.6	1.4	2.0
TPE2, TPE2 D, TPE3, TPE3 D 65-150	0.1	0.2	0.7	1.5	2.1

Pump type	p [bar]				
	20 °C	60 °C	90 °C	110 °C	120 °C
TPE2, TPE2 D, TPE3, TPE3 D 65-180	0.3	0.5	1.0	1.8	2.4
TPE2, TPE2 D, TPE3, TPE3 D 65-200	0.6	0.8	1.3	2.1	2.7
TPE2, TPE3 65-220	0.1	0.1	0.52	1.24	1.79
TPE2, TPE3 65-280	0.1	0.14	0.62	1.34	1.89
TPE2, TPE3 65-310	0.25	0.41	0.89	1.61	2.16
TPE2, TPE3 65-430	0.28	0.44	0.92	1.63	2.18
TPE2, TPE3 65-580	0.1	0.1	0.28	1.00	1.56
TPE2, TPE3 65-680	0.1	0.1	0.40	1.12	1.68
TPE2, TPE3 65-740	0.1	0.1	0.58	1.30	1.85
TPE2, TPE3 65-750	0.1	0.24	0.72	1.44	1.99
TPE2, TPE3 65-760	0.12	0.28	0.76	1.48	2.03
TPE2, TPE2 D, TPE3, TPE3 D 80-40	0.1	0.1	0.3	1	1.6
TPE2, TPE2 D, TPE3, TPE3 D 80-120	0.1	0.3	0.9	1.5	2.1
TPE2, TPE2 D, TPE3, TPE3 D 80-150	0.1	0.3	0.9	1.5	2.1
TPE2, TPE2 D, TPE3, TPE3 D 80-180	0.3	0.5	1.1	1.7	2.3
TPE2, TPE3 80-210	0.1	0.1	0.21	0.94	1.49
TPE2, TPE3 80-250	0.1	0.1	0.30	1.02	1.58
TPE2, TPE3 80-310	0.1	0.1	0.51	1.23	1.79
TPE2, TPE3 80-340	0.1	0.1	0.36	1.08	1.64
TPE2, TPE3 80-440	0.1	0.1	0.56	1.28	1.83
TPE2, TPE3 80-520	0.14	0.3	0.78	1.50	2.05
TPE2, TPE3 80-560	0.19	0.35	0.83	1.55	2.10
TPE2, TPE3 80-570	0.19	0.35	0.83	1.55	2.10
TPE2, TPE2 D, TPE3, TPE3 D 100-40	0.1	0.1	0.4	1.1	1.7
TPE2, TPE3 100-100	0.1	0.1	0.10	0.75	1.30
TPE2, TPE2 D, TPE3, TPE3 D 100-120	0.1	0.1	0.6	1.3	1.9
TPE2, TPE3 100-130	0.1	0.1	0.29	1.01	1.57
TPE2, TPE2 D, TPE3, TPE3 D 100-150	0.1	0.2	0.7	1.4	2.0
TPE2, TPE3 100-160	0.1	0.1	0.16	0.88	1.44
TPE2, TPE3 100-170	0.1	0.1	0.26	0.99	1.54
TPE2, TPE2 D, TPE3, TPE3 D 100-180	0.1	0.3	0.8	1.5	2.1
TPE2 100-200	0.1	0.1	0.5	1.2	1.8
TPE2, TPE3 100-230	0.1	0.1	0.30	1.02	1.58
TPE2 100-250	0.1	0.1	0.16	0.88	1.44
TPE2, TPE3 100-260	0.1	0.1	0.38	1.10	1.66
TPE2 100-330	0.3	0.5	1.0	1.7	2.3
TPE2, TPE3 100-350	0.28	0.44	0.92	1.63	2.18
TPE2 100-370	0.3	0.5	1.0	1.7	2.3
TPE2 100-410	0.5	0.7	1.2	1.9	2.5
TPE2, TPE3 100-460	0.38	0.54	1.02	1.73	2.28
TPE2, TPE3 100-540	0.43	0.59	1.06	1.77	2.32
TPE2, TPE3 100-570	1.04	1.19	1.65	2.35	2.90
TPE2, TPE3 125-110	0.1	0.10	0.20	0.92	1.48
TPE2, TPE3 125-120	0.1	0.10	0.32	1.04	1.59
TPE2 125-150	0.2	0.4	0.8	1.8	2.3
TPE2, TPE3 125-160	0.1	0.1	0.45	1.16	1.72
TPE2, TPE3 125-180	0.1	0.17	0.65	1.37	1.92
TPE2 125-190	0.1	0.1	0.2	0.9	1.5
TPE2 125-230	0.1	0.1	0.3	1.0	1.6
TPE2, TPE3 125-290	0.1	0.16	0.65	1.36	1.92
TPE2 125-300	0.3	0.5	1.0	1.7	2.3
TPE2, TPE3 125-310	0.17	0.33	0.81	1.52	2.08
TPE2 125-340	0.1	0.1	0.3	1.0	1.5
TPE2, TPE3 125-380	0.19	0.36	0.84	1.55	2.1

Pump type	p [bar]				
	20 °C	60 °C	90 °C	110 °C	120 °C
TPE2, TPE3 125-430	0.43	0.59	1.07	1.78	2.32
TPE2, TPE3 125-460	0.1	0.16	0.64	1.35	1.91
TPE2, TPE3 150-120	0.1	0.1	0.53	1.24	1.80
TPE2 150-130	0.1	0.1	0.4	1.1	1.6
TPE2 150-160	0.1	0.1	0.4	1.1	1.7
TPE2, TPE3 150-170	0.1	0.19	0.67	1.38	1.94
TPE2 150-200	0.1	0.1	0.4	1.1	1.7
TPE2 150-220	0.1	0.1	0.5	1.2	1.8
TPE2, TPE3 150-230	0.24	0.41	0.89	1.60	2.15
TPE2, TPE3 150-240	0.5	0.66	1.13	1.84	2.39
TPE2, TPE3 150-250	0.1	0.1	0.1	0.79	1.35
TPE2 150-260	0.1	0.1	0.5	1.2	1.8
TPE2, TPE3 150-270	0.46	0.62	1.1	1.81	2.35
TPE2, TPE3 150-280	0.1	0.1	0.1	0.81	1.37
TPE2, TPE3 200-130	0.1	0.1	0.29	1.01	1.57
TPE2, TPE3 200-150	0.1	0.1	0.21	0.93	1.49
TPE2 200-160	0.3	0.5	1.0	1.7	2.3
TPE2, TPE3 200-190	0.1	0.18	0.67	1.38	1.93
TPE2, TPE3 200-200	0.1	0.12	0.6	1.32	1.87
TPE2, TPE3 200-50	0.11	0.28	0.76	1.47	2.03
TPE2, TPE3 200-70	0.1	0.1	0.58	1.29	1.85
TPE2, TPE3 200-90	0.1	0.1	0.49	1.2	1.76

TP, TPE, TPD, TPED, 2-pole, PN 6, 10, 16, 25

Pump type	p [bar]						
	20 °C	60 °C	90 °C	110 °C	120 °C	140 °C	150 °C
TP 25-50/2	0.1	0.1	0.2	0.5	1.1	-	-
TP 25-80/2	0.1	0.1	0.1	0.3	0.9	-	-
TP 25-90/2	0.1	0.1	0.2	0.5	1.1	-	-
TP 32-50/2	0.1	0.1	0.1	0.2	0.8	-	-
TP 32-80/2	0.1	0.1	0.2	0.5	1.1	-	-
TP 32-90/2	0.1	0.1	0.2	0.5	1.1	-	-
TP, TPD 32-60/2	0.1	0.1	0.2	1.0	1.5	3.2	-
TP, TPD 32-120/2	0.1	0.2	0.7	1.5	2.0	3.7	-
TP, TPD 32-150/2	0.1	0.3	0.8	1.6	2.1	3.8	-
TP, TPD 32-180/2	0.5	0.7	1.2	2.0	2.5	4.2	-
TP, TPD 32-230/2	0.7	0.9	1.4	2.2	2.7	4.4	-
TP, TPD 32-200/2	0.1	0.1	0.2	0.9	1.5	3.1	-
TP, TPD 32-250/2	0.1	0.1	0.3	1.0	1.6	3.2	-
TP, TPD 32-320/2	0.1	0.1	0.6	1.3	1.9	3.5	-
TP, TPD 32-380/2	0.1	0.2	0.7	1.4	2.0	3.6	-
TP, TPD 32-460/2	0.1	0.2	0.7	1.4	1.9	3.6	-
TP, TPD 32-580/2	0.2	0.4	0.9	1.6	2.2	3.8	-
TP 40-50/2	0.1	0.1	0.1	0.3	0.9	-	-
TP 40-80/2	0.1	0.1	0.2	0.5	1.1	-	-
TP 40-90/2	0.1	0.1	0.2	0.5	1.1	-	-
TP, TPD 40-60/2	0.1	0.1	0.5	1.2	1.8	3.5	-
TP, TPD 40-120/2	0.1	0.1	0.4	1.2	1.7	3.4	-
TP 40-180/2	0.1	0.2	0.7	1.5	2.0	3.7	-
TP, TPD 40-190/2	0.1	0.3	0.8	1.6	2.1	3.8	-
TP, TPD 40-230/2	0.7	0.9	1.4	2.2	2.7	4.4	-
TP, TPD 40-270/2	0.7	0.9	1.4	2.2	2.7	4.4	-
TP, TPD 40-240/2	0.1	0.1	0.4	1.1	1.7	3.3	-
TP, TPD 40-300/2	0.1	0.1	0.4	1.1	1.6	3.3	-
TP, TPD 40-360/2	0.2	0.4	0.9	1.6	2.1	3.8	-
TP, TPD 40-430/2	0.1	0.1	0.5	1.2	1.8	3.4	-
TP, TPD 40-530/2	0.1	0.1	0.6	1.3	1.9	3.5	-
TP, TPD 40-630/2	0.1	0.3	0.8	1.5	2.1	3.7	-
TP, TPD 50-60/2	0.1	0.1	0.4	1.1	1.7	3.4	-
TP, TPD 50-120/2	0.1	0.2	0.7	1.5	2.0	3.7	-
TP, TPD 50-180/2	0.1	0.2	0.7	1.4	2.0	3.7	-
TP, TPD 50-160/2	0.1	0.1	0.1	0.8	1.4	3.0	-
TP, TPD 50-190/2	0.1	0.1	0.1	0.8	1.4	3.0	-
TP, TPD 50-240/2	0.1	0.1	0.1	0.8	1.4	3.0	-
TP, TPD 50-290/2	0.1	0.1	0.2	0.9	1.5	3.1	-
TP, TPD 50-360/2	0.1	0.1	0.2	1.0	1.5	3.1	-
TP, TPD 50-430/2	0.1	0.1	0.4	1.1	1.6	3.3	-
TP, TPD 50-420/2	0.1	0.1	0.3	1.1	1.6	3.2	-
TP, TPD 50-540/2	0.1	0.1	0.5	1.3	1.8	3.4	-
TP, TPD 50-630/2	0.1	0.1	0.6	1.4	1.9	3.6	-
TP, TPD 50-710/2	0.6	0.8	1.3	2.0	2.6	4.2	-
TP, TPD 50-830/2	0.5	0.7	1.2	2.0	2.5	4.1	-
TP, TPD 50-900/2	1.0	1.2	1.7	2.4	3.0	4.6	-
TP, TPD 65-60/2	0.1	0.3	0.8	1.5	2.1	3.8	-
TP, TPD 65-120/2	0.5	0.7	1.2	2.0	2.5	4.2	-
TP, TPD 65-180/2	0.3	0.5	1.0	1.8	2.3	4.0	-
TP, TPD 65-170/2	0.1	0.1	0.1	0.9	1.4	3.1	-
TP, TPD 65-210/2	0.1	0.1	0.2	0.9	1.5	3.1	-

Pump type	p [bar]						
	20 °C	60 °C	90 °C	110 °C	120 °C	140 °C	150 °C
TP, TPD 65-250/2	0.1	0.1	0.3	1.0	1.6	3.2	-
TP, TPD 65-340/2	0.1	0.1	0.2	0.9	1.4	3.1	-
TP, TPD 65-410/2	0.1	0.1	0.2	0.9	1.4	3.1	-
TP, TPD 65-460/2	0.1	0.1	0.2	1.0	1.5	3.1	-
TP, TPD 65-550/2	0.1	0.1	0.3	1.0	1.6	3.2	-
TP, TPD 65-660/2	0.1	0.1	0.4	1.1	1.6	3.3	-
TP, TPD 65-720/2	0.1	0.1	0.6	1.3	1.9	3.5	-
TP, TPD 65-930/2	0.6	0.8	1.3	2.0	2.6	4.2	-
TP, TPD 80-120/2	1.2	1.4	1.9	2.7	3.2	4.9	-
TP, TPD 80-140/2	0.1	0.2	0.7	1.4	1.9	3.6	-
TP, TPD 80-180/2	0.1	0.1	0.3	1.1	1.6	3.2	-
TP, TPD 80-210/2	0.1	0.1	0.4	1.1	1.7	3.3	-
TP, TPD 80-240/2	0.1	0.1	0.5	1.3	1.8	3.4	-
TP, TPD 80-250/2	0.1	0.3	0.8	1.6	2.1	3.7	-
TP, TPD 80-330/2	0.1	0.2	0.7	1.4	2.0	3.6	-
TP, TPD 80-400/2	0.2	0.4	0.9	1.6	2.2	3.8	-
TP, TPD 80-520/2	0.1	0.1	0.6	1.4	1.9	3.5	-
TP, TPD 80-570/2	0.1	0.3	0.8	1.6	2.1	3.7	-
TP, TPD 80-700/2	0.6	0.8	1.3	2.1	2.6	4.2	-
TP, TPD 100-120/2	1.9	2.1	2.6	3.4	3.9	5.6	-
TP, TPD 100-160/2	0.1	0.1	0.6	1.3	1.9	3.5	-
TP, TPD 100-200/2	0.1	0.1	0.4	1.2	1.7	3.3	-
TP, TPD 100-240/2	0.1	0.1	0.5	1.3	1.8	3.4	-
TP, TPD 100-250/2	0.6	0.8	1.3	2.0	2.5	4.2	-
TP, TPD 100-310/2	0.6	0.8	1.3	2.0	2.6	4.2	-
TP, TPD 100-360/2	0.6	0.8	1.3	2.0	2.5	4.2	-
TP, TPD 100-390/2	1.0	1.2	1.7	2.4	3.0	4.6	-
TP, TPD 100-480/2	1.5	1.7	2.2	2.9	3.5	5.1	-
TP 100-530/2	1.6	1.8	2.2	3.2	3.7	5.3	6.6
TP 100-650/2	1.4	1.6	2.0	3.0	3.5	5.1	6.4
TP 100-800/2	1.3	1.5	1.9	2.9	3.4	5.0	6.3
TP 100-950/2	1.3	1.5	1.9	2.9	3.4	5.0	6.3
TP 100-1040/2	1.2	1.4	1.8	2.8	3.3	4.9	6.2
TP 100-1200/2	1.2	1.4	1.8	2.8	3.3	4.9	6.2
TP 100-1410/2	1.2	1.4	1.8	2.8	3.3	4.9	6.2
TP 125-310/2	0.4	0.5	1.0	1.7	2.3	3.9	-
TP 125-360/2	0.5	0.6	1.1	1.8	2.4	4.0	-

TP, TPE, TPD, TPED, 4-pole, PN 6, 10, 16, 25

Pump type	p [bar]						
	20 °C	60 °C	90 °C	110 °C	120 °C	140 °C	150 °C
TP, TPD 32-30/4	0.1	0.1	0.1	0.8	1.4	3.1	-
TP, TPD 32-40/4	0.1	0.1	0.1	0.9	1.4	3.1	-
TP, TPD 32-60/4	0.1	0.1	0.3	1.1	1.6	3.3	-
TP, TPD 32-80/4	0.1	0.1	0.1	0.5	1.0	2.7	-
TP, TPD 32-100/4	0.1	0.1	0.1	0.5	1.1	2.7	-
TP, TPD 32-120/4	0.1	0.1	0.1	0.6	1.1	2.7	-
TP, TPD 40-30/4	0.1	0.1	0.2	0.9	1.5	3.2	-
TP 40-60/4	0.1	0.1	0.1	0.8	1.4	3.1	-
TP, TPD 40-90/4	0.1	0.1	0.3	1.0	1.6	3.3	-
TP, TPD 40-100/4	0.1	0.1	0.2	0.9	1.5	3.1	-
TP, TPD 40-110/4	0.1	0.1	0.1	0.6	1.2	2.8	-
TP, TPD 40-140/4	0.1	0.1	0.1	0.7	1.3	2.9	-
TP, TPD 50-30/4	0.1	0.1	0.1	0.9	1.4	3.1	-
TP, TPD 50-60/4	0.1	0.1	0.2	0.9	1.5	3.2	-
TP, TPD 50-90/4	0.1	0.1	0.1	0.6	1.1	2.8	-
TP, TPD 50-80/4	0.1	0.1	0.1	0.8	1.3	3.0	-
TP, TPD 50-120/4	0.1	0.1	0.1	0.7	1.3	2.9	-
TP, TPD 50-140/4	0.1	0.1	0.1	0.7	1.3	2.9	-
TP, TPD 50-190/4	0.1	0.1	0.1	0.9	1.4	3.0	-
TP, TPD 50-230/4	0.1	0.1	0.2	1.0	1.5	3.1	-
TP, TPD 65-30/4	0.1	0.2	0.7	1.5	2.0	3.7	-
TP, TPD 65-60/4	0.2	0.4	0.9	1.6	2.2	3.9	-
TP, TPD 65-90/4	0.1	0.1	0.1	0.6	1.1	2.7	-
TP, TPD 65-110/4	0.1	0.1	0.1	0.6	1.1	2.7	-
TP, TPD 65-130/4	0.1	0.1	0.1	0.6	1.1	2.8	-
TP, TPD 65-150/4	0.1	0.1	0.1	0.6	1.2	2.8	-
TP, TPD 65-170/4	0.1	0.1	0.1	0.6	1.2	2.8	-
TP, TPD 65-240/4	0.1	0.1	0.1	0.8	1.3	2.9	-
TP, TPD 80-30/4	0.8	1.0	1.5	2.2	2.8	4.5	-
TP, TPD 80-60/4	0.8	1.0	1.5	2.3	2.8	4.5	-
TP, TPD 80-70/4	0.1	0.1	0.1	0.8	1.3	2.9	-
TP, TPD 80-90/4	0.1	0.1	0.1	0.7	1.2	2.8	-
TP, TPD 80-110/4	0.1	0.1	0.1	0.8	1.4	3.0	-
TP, TPD 80-150/4	0.1	0.1	0.1	0.8	1.3	2.9	-
TP, TPD 80-170/4	0.1	0.1	0.2	1.0	1.5	3.1	-
TP, TPD 80-240/4	0.1	0.1	0.3	1.0	1.5	3.2	-
TP, TPD 80-270/4	0.1	0.1	0.2	0.9	1.5	3.1	-
TP, TPD 80-340/4	0.1	0.1	0.3	1.1	1.6	3.2	-
TP, TPD 100-30/4	0.8	1.0	1.5	2.2	2.8	4.5	-
TP, TPD 100-65/4	0.1	0.1	0.1	0.8	1.3	3.0	-
TP, TPD 100-70/4	0.1	0.1	0.1	0.8	1.3	3.0	-
TP, TPD 100-90/4	0.1	0.1	0.1	0.9	1.4	3.0	-
TP, TPD 100-110/4	0.1	0.1	0.2	1.0	1.5	3.1	-
TP, TPD 100-130/4	0.1	0.1	0.6	1.3	1.9	3.5	-
TP, TPD 100-170/4	0.3	0.5	1.0	1.7	2.3	3.9	
TP 100-140/4	0.2	0.4	0.8	1.8	2.3	3.9	5.2
TP, TPD 100-200/4	0.1	0.1	0.5	1.2	1.8	3.4	4.7
TP, TPD 100-250/4	0.1	0.2	0.7	1.4	2.0	3.6	4.9
TP, TPD 100-330/4	0.3	0.5	1.0	1.7	2.3	3.9	5.2
TP, TPD 100-370/4	0.3	0.5	1.0	1.7	2.3	3.9	5.2
TP, TPD 100-410/4	0.5	0.7	1.2	1.9	2.5	4.1	5.4
TP 125-60/4	0.1	0.1	0.1	0.8	1.4	3.0	-

Pump type	p [bar]						
	20 °C	60 °C	90 °C	110 °C	120 °C	140 °C	150 °C
TP 125-80/4	0.1	0.1	0.1	0.9	1.4	3.1	-
TP 125-95/4	0.1	0.1	0.2	0.9	1.5	3.1	-
TP, TPD 125-110/4	0.1	0.1	0.1	0.9	1.4	3.0	-
TP, TPD 125-130/4	0.1	0.1	0.2	0.9	1.5	3.1	-
TP, TPD 125-160/4	0.1	0.1	0.2	1.0	1.5	3.1	-
TP 125-150/4	0.2	0.4	0.8	1.8	2.3	3.9	5.2
TP, TPD 125-190/4	0.1	0.1	0.2	0.9	1.5	3.1	4.4
TP, TPD 125-230/4	0.1	0.1	0.3	1.0	1.6	3.2	4.5
TP, TPD 125-300/4	0.1	0.1	0.2	0.9	1.5	3.1	4.4
TP, TPD 125-340/4	0.1	0.1	0.3	1.0	1.5	3.2	4.5
TP, TPD 125-400/4	0.1	0.1	0.3	1.0	1.6	3.2	4.5
TP 150-70/4	0.1	0.1	0.3	1.1	1.6	3.2	-
TP 150-110/4	0.1	0.1	0.4	1.1	1.7	3.3	-
TP 150-155/4	0.1	0.1	0.5	1.2	1.8	3.4	-
TP 150-170/4	0.1	0.1	0.6	1.3	1.9	3.5	-
TP, TPD 150-130/4	0.1	0.1	0.4	1.1	1.6	3.3	4.6
TP, TPD 150-160/4	0.1	0.1	0.4	1.1	1.7	3.3	4.6
TP, TPD 150-200/4	0.1	0.1	0.4	1.1	1.7	3.3	4.6
TP, TPD 150-220/4	0.1	0.1	0.5	1.2	1.8	3.4	4.7
TP, TPD 150-250/4	0.1	0.1	0.6	1.3	1.9	3.5	4.8
TP 150-260/4	0.1	0.1	0.5	1.2	1.8	3.4	4.7
TP 150-280/4	0.1	0.3	0.8	1.5	2.1	3.7	5.0
TP 150-340/4	0.1	0.2	0.7	1.5	2.0	3.6	4.9
TP 150-390/4	0.1	0.2	0.7	1.4	2.0	3.6	4.9
TP 150-450/4	0.1	0.1	0.5	1.2	1.8	3.4	4.7
TP 150-520/4	0.1	0.1	1.0	1.5	1.9	3.5	4.8
TP 150-660/4	0.1	0.2	0.7	1.4	1.9	3.6	4.9
TP 150-680/4	0.1	0.2	0.7	1.4	2.0	3.6	-
TP 200-50/4	0.3	0.4	0.9	1.7	2.2	3.8	-
TP 200-70/4	0.1	0.3	0.8	1.5	2.1	3.7	-
TP 200-90/4	0.1	0.2	0.7	1.4	2.0	3.6	-
TP 200-130/4	0.1	0.1	0.5	1.2	1.8	3.4	-
TP 200-150/4	0.1	0.1	0.4	1.2	1.7	3.3	-
TP 200-160/4	0.3	0.5	1.0	1.7	2.3	3.9	5.2
TP 200-190/4	0.2	0.4	0.9	1.6	2.2	3.8	5.1
TP 200-200/4	0.2	0.4	0.9	1.6	2.1	3.8	5.1
TP 200-240/4	0.1	0.2	0.7	1.4	2.0	3.6	4.9
TP 200-270/4	0.1	0.1	0.4	1.1	1.7	3.3	4.6
TP 200-290/4	0.1	0.1	0.6	1.3	1.9	3.5	4.8
TP 200-320/4	0.1	0.1	0.5	1.2	1.8	3.4	4.7
TP 200-330/4	0.1	0.1	0.3	1.1	1.6	3.2	4.5
TP 200-360/4	0.1	0.1	0.3	1.1	1.6	3.2	4.5
TP 200-400/4	0.1	0.1	0.3	1.0	1.6	3.2	4.5
TP 200-410/4	0.1	0.2	0.7	1.4	1.9	3.6	4.9
TP 200-470/4	0.1	0.1	0.4	1.1	1.6	3.3	4.6
TP 200-530/4	0.1	0.1	0.4	1.1	1.7	3.3	4.6
TP 200-590/4	0.1	0.2	0.7	1.4	2.0	3.6	4.9
TP 200-660/4	0.2	0.4	0.9	1.7	2.2	3.8	5.1
TP 300-190/4	0.5	0.7	1.1	2.1	2.6	4.2	5.5
TP 300-220/4	0.3	0.5	0.9	1.9	2.4	4.0	5.3
TP 300-250/4	0.1	0.3	0.7	1.7	2.2	3.8	5.1
TP 300-290/4	0.5	0.7	1.1	2.1	2.6	4.2	5.5

Pump type	p [bar]						
	20 °C	60 °C	90 °C	110 °C	120 °C	140 °C	150 °C
TP 300-390/4	0.5	0.7	1.1	2.1	2.6	4.2	5.5
TP 300-420/4	0.5	0.7	1.1	2.1	2.6	4.2	5.5
TP 300-430/4	0.5	0.7	1.1	2.1	2.6	4.2	5.5
TP 300-500/4	0.4	0.6	1.0	2.0	2.5	4.1	5.4
TP 300-550/4	0.3	0.5	0.9	1.9	2.4	4.0	5.3
TP 350-280/4	1.7	1.9	2.3	3.3	3.8	5.4	6.7
TP 350-320/4	1.6	1.8	2.2	3.2	3.7	5.3	6.6
TP 350-360/4	1.5	1.7	2.1	3.1	3.6	5.2	6.5
TP 350-420/4	1.4	1.6	2.0	3.0	3.5	5.1	6.4
TP 350-480/4	1.3	1.5	1.9	2.9	3.4	5.0	6.3
TP 350-530/4	0.5	0.7	1.1	2.1	2.6	4.2	5.5
TP 350-650/4	0.4	0.6	1.0	2.0	2.5	4.1	5.4
TP 350-780/4	0.3	0.5	0.9	1.9	2.4	4.0	5.3
TP 400-470/4	0.7	0.7	1.4	2.1	2.6	4.3	5.6
TP 400-510/4	1.6	1.7	2.3	3.1	3.6	5.2	6.5
TP 400-540/4	0.8	0.9	1.5	2.2	2.8	4.4	5.7
TP 400-670/4	0.8	0.8	1.5	2.2	2.8	4.4	5.7
TP 400-720/4	0.9	0.9	1.5	2.3	2.8	4.5	5.8
TP 400-760/4	1.4	1.5	2.1	2.8	3.4	5.0	6.3

TP, TPD, 6-pole, PN 16

Pump type	p [bar]					
	20 °C	60 °C	90 °C	110 °C	120 °C	140 °C
TP, TPD 125-60/6	0.1	0.1	0.1	0.7	1.2	2.8
TP, TPD 125-70/6	0.1	0.1	0.1	0.7	1.3	2.9
TP, TPD 125-80/6	0.1	0.1	0.1	0.7	1.2	2.9
TP, TPD 125-100/6	0.1	0.1	0.1	0.8	1.4	3.0
TP, TPD 125-130/6	0.1	0.1	0.1	0.7	1.3	2.9
TP, TPD 125-160/6	0.1	0.1	0.1	0.7	1.3	2.9
TP, TPD 150-60/6	0.1	0.1	0.1	0.7	1.3	2.9
TP, TPD 150-70/6	0.1	0.1	0.1	0.7	1.3	2.9
TP, TPD 150-90/6	0.1	0.1	0.1	0.8	1.3	2.9
TP, TPD 150-110/6	0.1	0.1	0.1	0.8	1.3	3.0

30. Key application data

Dear customer,

If you need an ATEX certificate or if you cannot select the pump on the basis of the guidelines in section Pumped liquids, please fill in the following form in cooperation with a Grundfos representative. This will help to ensure that Grundfos supplies you with a pump solution adapted to meet exactly your needs in terms of pump type, pump materials, shaft seal type, elastomers and accessories.

Customer information

Company name:	Project title:
Customer number:	Reference number:
Phone number:	Customer contact:
Fax number:	
Email address:	

Quotation made by:

Company name:	Prepared by:	
Phone number:	Date:	Page 1 of
Fax number:	Quotation number:	
Email address:		

Related information

Pumped liquids

Operating conditions

Pumped liquid

Type of liquid:			
Chemical composition, if available:			
Distilled/demineralised water?	Yes:	No:	
Conductivity of distilled or demineralised water:		[µS/cm]	
Minimum liquid temperature:		[°C]	
Maximum liquid temperature:		[°C]	
Vapour pressure of liquid:		[bar]	
Liquid concentration:		%	
Liquid pH value:			
Dynamic liquid viscosity:		[cP] = [mPa s]	
Kinematic liquid viscosity:		[cSt] = [mm^2/s]	
Liquid density:		[kg/m^3]	
Specific heat capacity of liquid:		[kJ/(kg·K)]	
Air or gas in liquid?	Yes:	No:	
Solids in liquid?	Yes:	No:	
Contents of solids in liquid, if available:		% of mass	
Additives in liquid?	Yes:	No:	
Does the liquid crystallise?	Yes:	No:	
When does crystallisation happen?			

Does the liquid get sticky when volatiles evaporate from the pumped liquid? Yes: ______ No: ______

Description of 'sticky' circumstances:

Is the liquid hazardous or poisonous? Yes: ______ No: ______

Special measures to be taken into account when dealing with this hazardous or poisonous liquid:

Special measures for handling this liquid:

CIP liquid, cleaning-in-place

Type of liquid:

Chemical composition, if available:

Liquid temperature during operation: ______ [°C]

Maximum liquid temperature: ______ [°C]

Vapour pressure of liquid: ______ [bar]

Liquid concentration: %

Liquid pH value:

Pump sizing

Main duty point: Q: ______ [m^3/h] H: ______ [m]

Maximum duty point: Q: ______ [m^3/h] H: ______ [m]

Minimum duty point: Q: ______ [m^3/h] H: ______ [m]

Ambient operating conditions

Ambient temperature: ______ [°C]

Altitude above sea level: ______ [m]

Pressure

Minimum inlet pressure: ______ [bar]

Maximum inlet pressure: ______ [bar]

Outlet pressure, inlet pressure and head: ______ [bar]

ATEX marking

Required marking of the pump

Customer’s equipment group, e.g. II:

Customer’s equipment category, e.g. 2, 3:

Gas, G, and/or dust, D: Gas (G): ______ Dust (D): ______ Gas and dust (G/D): ______

Required marking of the motor

Protection type, e.g. d, de, e, nA:

Maximum experimental safe gap, e.g. B, C:

Temperature class

gas, e.g. T3, T4, T5:

dust, e.g. 125 °C: ______ [°C]

Description/sketch

Detailed description of ATEX application
Attach a drawing, if possible:

ATEX certificate required	Yes: ______	No: ______		
Frequency converter				
Frequency converter option wanted?	Yes: ______	No: ______		
Control parameter:	Pressure: ______	Temperature: ______	Flow rate: ______	Other: ______
Detailed description of requirements Attach a drawing, if possible:				

System information

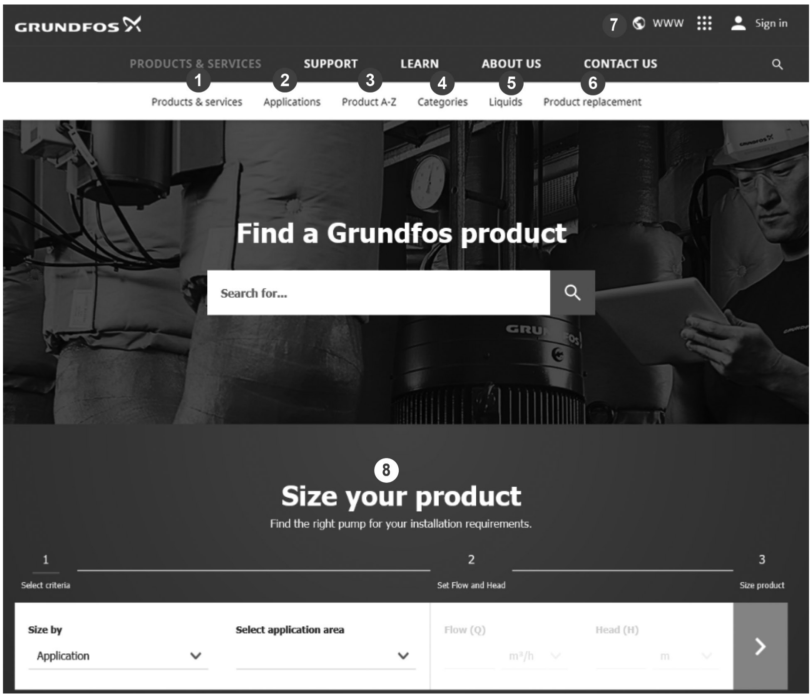
Please provide us with information about your system and a simple sketch, if possible. This gives us an idea as to whether you need accessories or monitoring equipment, or whether you already have a suitable system which makes it unnecessary to attach any further equipment.

31. Grundfos Product Center

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

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

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



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

Pos.	Description
1	**Products & services** enables you to find products and documents by typing a product number or name into the search field.
2	**Applications** enables you to choose an application to see how Grundfos can help you design and optimise your system.
3	**Products A-Z** enables you to look through a list of all the Grundfos products.
4	**Categories** enables you to look for a product category.
5	**Liquids** enables you to find pumps designed for aggressive, flammable or other special liquids.
6	**Product replacement** enables you to find a suitable replacement.
7	**WWW** enables you to select the country, which changes the language, the available product range and the structure of the website.
8	**Sizing** enables you to size a product based on your application and operating conditions.

32. Document quality feedback

To provide feedback about this document, use your smart device to scan the QR code.

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