

TP, TPD, TPE, TPED

In-line circulator pumps

50 Hz



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1. Pump data

Introduction

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 mains-operated motors (TP and TPD) or electronically speed-controlled motors (TPE, TPED).

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

TP, mains-operated pumps

The TP range is divided into the following four groups based on their construction: TP Series 100, 200, 300 and 400.

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 page 24.

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 page 24.

TP Series 300 with flange connection

DN 32 to DN 200 and motor sizes from 0.25 to 132 kW.

For further information, see page 26.

TP Series 400 with flange connection

We offer two TP Series 400 versions:

- 10 bar version with DN 250 flange and motor sizes from 45 to 75 kW.
- 25 bar version with DN 100 to DN 400 and motor sizes from 5.5 to 630 kW.

For further information, see page 28.

TPE speed-controlled pumps

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

- TPE Series 1000 pumps without factory-fitted differential-pressure sensor
- TPE Series 2000 pumps with factory-fitted differential-pressure sensor.

TPE, TPED pumps with 2-pole motors below 3 kW and 4-pole motors below 1.5 kW are fitted with permanent-magnet motors that have an efficiency that exceeds the IE4 demands - including the energy consumption of the integrated frequency converter (compared to IE levels in IEC 60034-30-1 Ed. 1 (CD)).

TPE Series 2000 pumps

TPE Series 2000 pumps have a factory-fitted differential-pressure sensor.

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

The motors of TPE Series 2000 pumps have a built-in frequency converter for continuous adjustment of the pressure to the flow rate.

The TPE Series 2000 range is recognised as a preset solution for quick and safe installation. Pumps fitted with 2-pole motors below 3 kW and 4-pole motors below 1.5 kW have a colour display for easy and intuitive pump setup and with full access to all functions.



Fig. 1 Example of main display on a TPE Series 2000 with advanced control panel

For further information, see page 30.

TM05 8893 2813

TPE Series 1000 pumps

The motors of TPE Series 1000 pumps have a built-in frequency converter.

Via an external signal (from a sensor or a controller), TPE Series 1000 pumps allow for any configuration and control method required, i.e. constant pressure, temperature or flow.

For further information, see page 33.

Why select a TPE pump?

A TPE pump with electronic speed control offers these obvious benefits:

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

ATEX-approved TP pumps

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

See section *Key application data*, page 241.

High-efficiency motors, IE3

TP pumps are fitted with high-efficiency motors.

TP pumps are primarily fitted with motors that meet the legislative requirements of the EuP IE3 grade.

For further information, see section *Motors*, pages 73 to 76.

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/graduated in an energy efficiency index (MEI). See also page 209.

Identification

Type key for TP, TPD, TPE, TPED

Code	Example	TP	E	D	65	-120	/2	-S	-A	-F	-A	-BUBE
	Pump range											
	Electronically speed-controlled pump (Series 1000, 2000)											
	Twin-head pump											
	Nominal diameter of suction and discharge ports (DN)											
	Maximum head [dm]											
	Pole number											
S	TPE Series 2000 (with factory-fitted differential-pressure sensor)											
	Code for pump version (the codes may be combined):											
A	Basic version											
B	Oversize motor											
E	With ATEX approval, certificate or test report, the second character of the code for pump version is an E											
I	PN 6 flange											
X	Special version											
	Code for pipework connection:											
F	DIN flange											
O	Union											
	Code for materials:											
A	Basic version											
I	Stainless steel 1.4308 pump housing and pump head											
Z	Bronze pump housing and pump head											
B	Bronze impeller											
	Code for shaft seal (include other plastic and rubber pump parts, except the neck ring)											

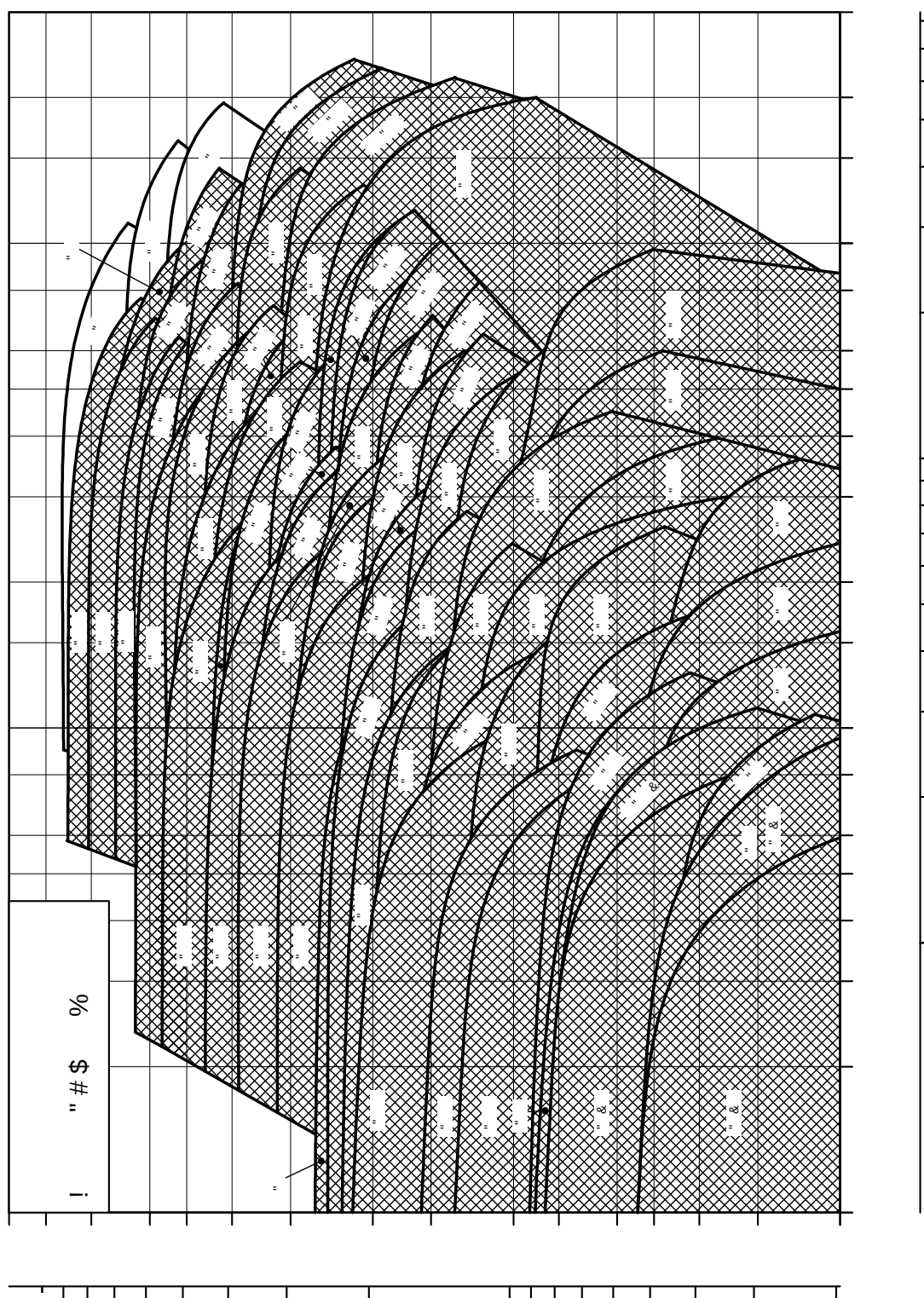
Codes for shaft seal

Code	Example	B	U	B	E
	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				
	Material of rotating face				
A	Carbon, antimony-impregnated				
B	Carbon, resin-impregnated				
Q	Silicon carbide				
U	Tungsten carbide				
	Material of stationary seat				
B	Carbon, resin-impregnated				
Q	Silicon carbide				
U	Tungsten carbide				
	Material of secondary seal				
E	EPDM				
P	NBR rubber				
V	FKM				

2. Performance range

Performance range, 2-pole, PN 6, 10, 16

See page 128 for performance curves.

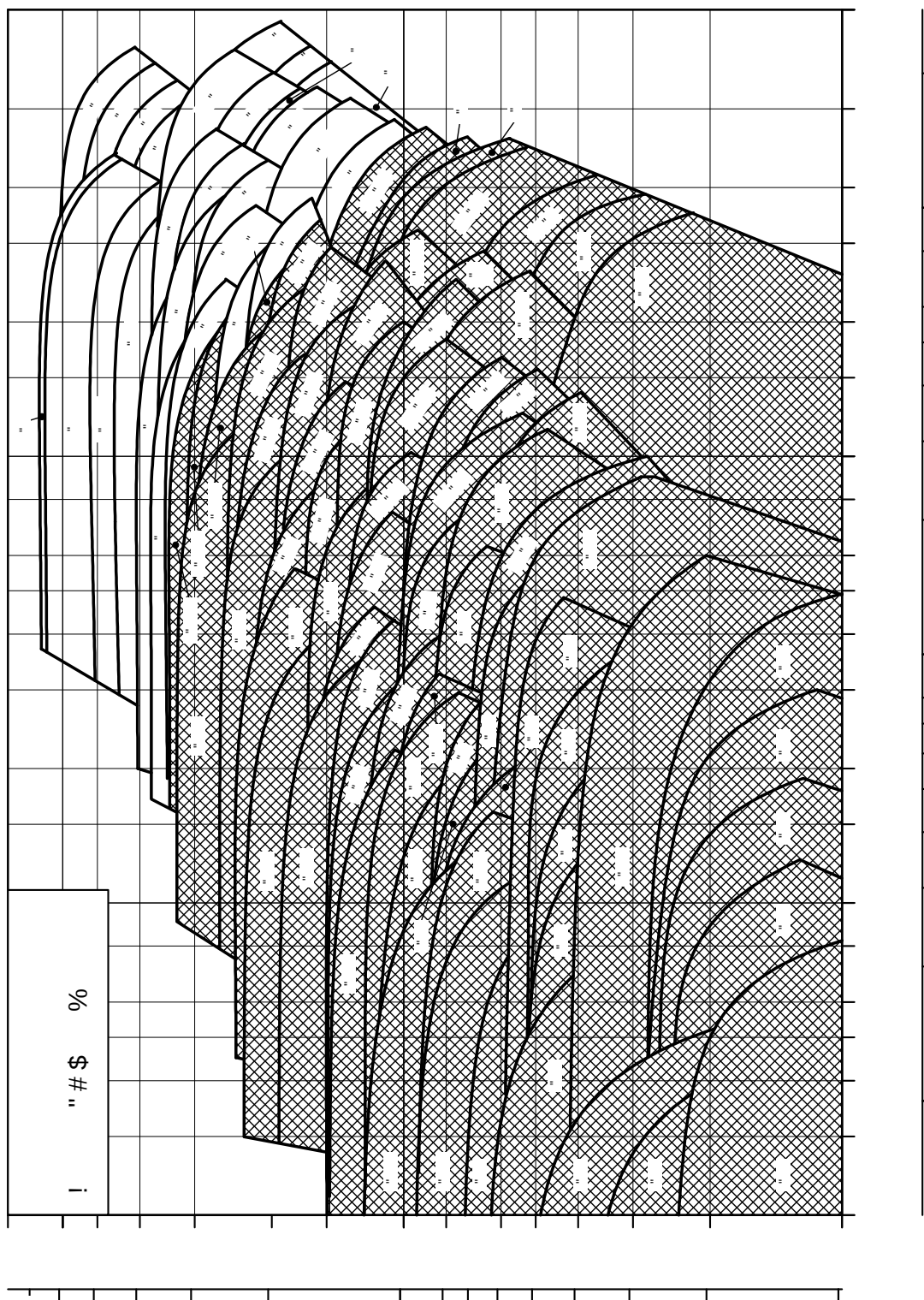


Note: All QH curves apply to single-head pumps. For further information about curve conditions, see page 97.
The hatched area shows the performance range of TPE pumps.

TM02 7550 3814

Performance range, 4-pole, PN 6, 10, 16

See page 150 for performance curves.

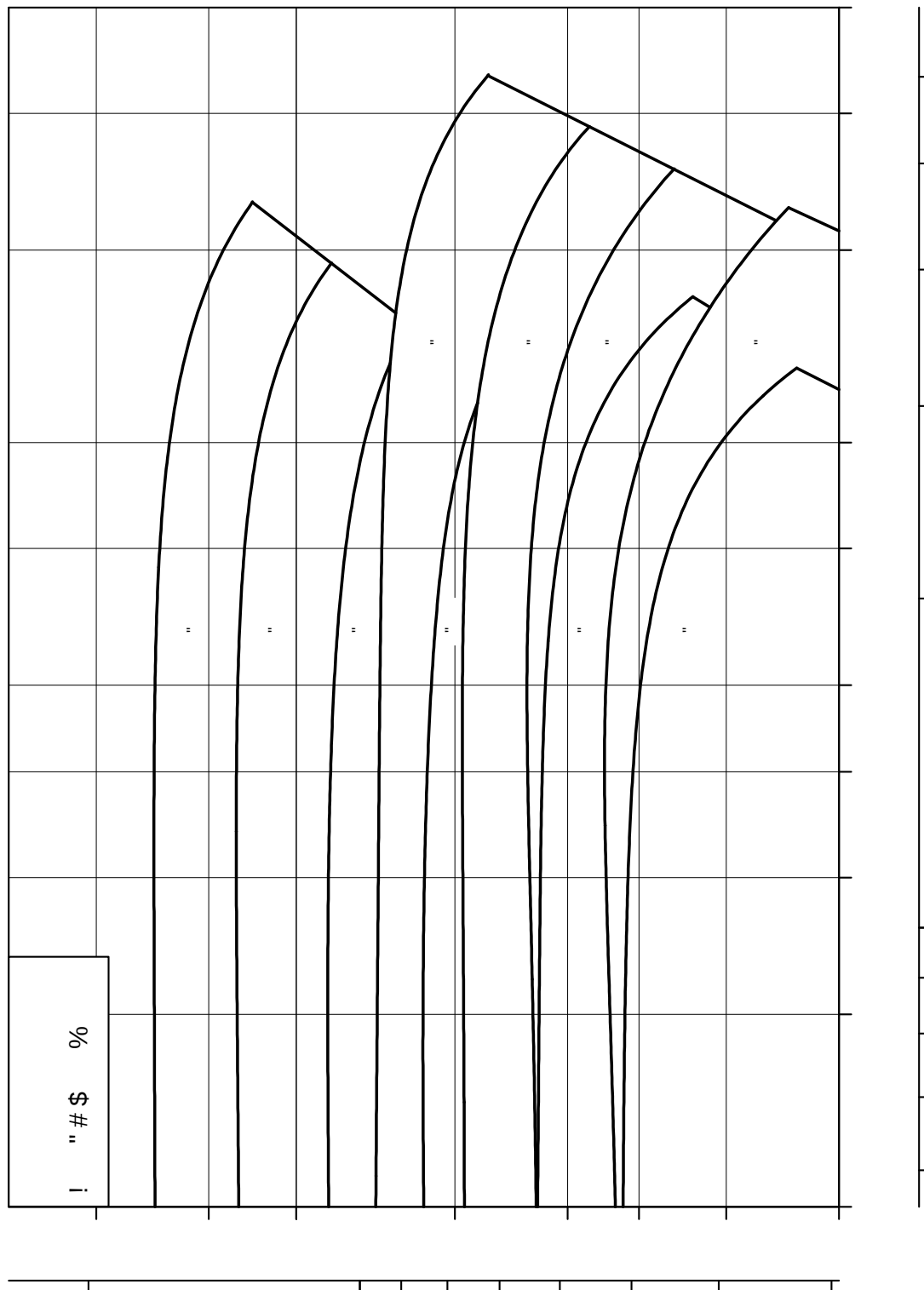


Note: All QH curves apply to single-head pumps. For further information about curve conditions, see page 97.
The hatched area shows the performance range of TPE pumps.

TM02 7551 3814

Performance range, 6-pole, PN 16

See page 182 for performance curves.

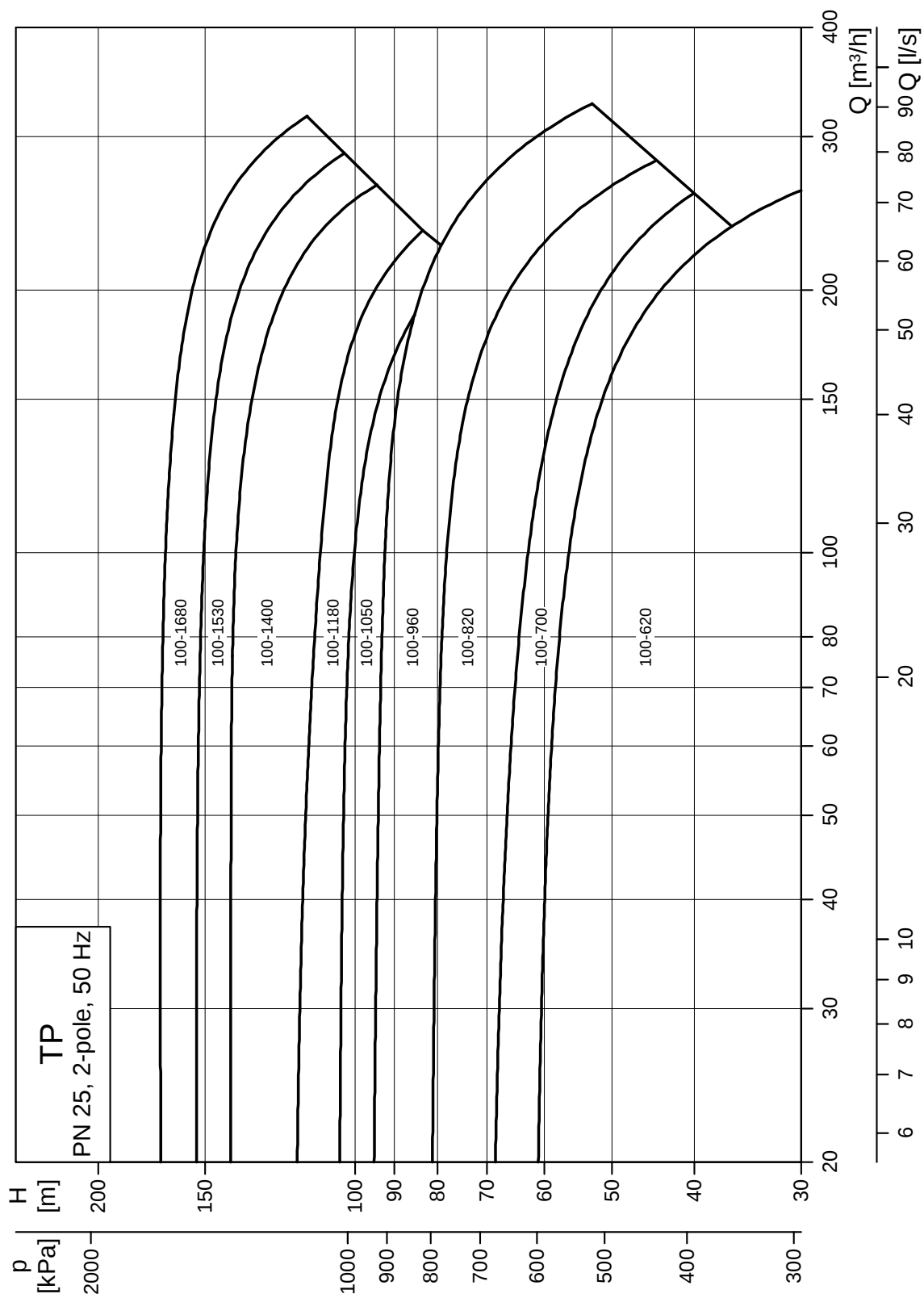


Note: All QH curves apply to single-head pumps. For further information about curve conditions, see page 97.

TM02 8768 3814

Performance range, 2-pole, PN 25

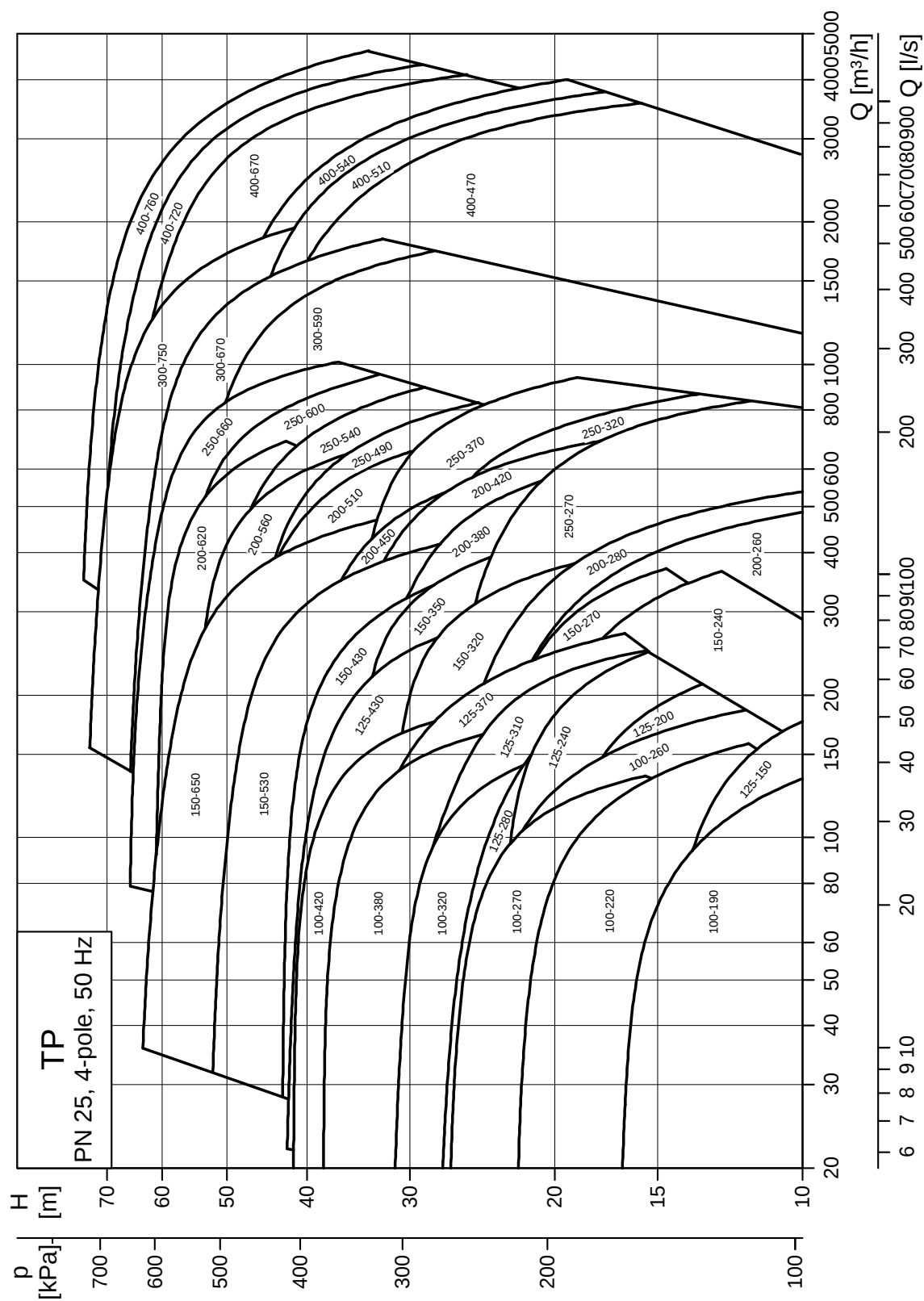
See page 186 for performance curves.



TM02 6868 5010

Performance range, 4-pole, PN 25

See page 188 for performance curves.



TM02 6869 5010

3. Product range

Product range, 2-pole, PN 6, 10, 16

Pump type			Design	Shaft seal	Pressure stage	Materials										Mains-operated motor			Electronically speed-controlled motor		
						Pump housing					Impeller					Voltage [V]			Voltage [V]		
						Cast iron EN-GJL-150	Cast iron EN-GJL-200	Cast iron EN-GJL-250	Bronze ¹⁾	Stainless steel	Stainless steel	Cast iron	Composite	Bronze		1 x 220-230 ΔV/ 240 YV	3 x 220-240 ΔV/ 380-415 YV	3 x 380-415 ΔV/ 660-690 YV ²⁾	1 x 200-240 V	3 x 380-480 V	3 x 380-500 V
																P2 [kW]	P2 [kW]	P2 [kW]	P2 [kW]	P2 [kW]	P2 [kW]
TP 25-50/2 R	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	0.12	0.12		0.12		
TP 25-80/2 R	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	0.18	0.18		0.18		
TP 25-90/2 R	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	0.37	0.37		0.37		
TP 32-50/2 R	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	0.12	0.12		0.12		
TP 32-80/2 R	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	0.25	0.25		0.25		
TP 32-90/2 R	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	0.37	0.37		0.37		
TP, TPD 32-60/2	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	0.25	0.25		0.25		
TP, TPD 32-120/2	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	0.37	0.37		0.37		
TP, TPD 32-150/2	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	0.37	0.37		0.37		
TP, TPD 32-180/2	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	0.55	0.55		0.55		
TP, TPD 32-230/2	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	0.75	0.75		0.75		0.75
TP, TPD 32-200/2	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	1.1	1.1		1.1		1.1
TP, TPD 32-250/2	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	1.5	1.5				1.5
TP, TPD 32-320/2	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•		2.2	2.2			2.2
TP, TPD 32-380/2	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•		3.0	3.0		3.0	
TP, TPD 32-460/2	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•		4.0	4.0		4.0	
TP, TPD 32-580/2	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•		5.5	5.5		5.5	
TP 40-50/2	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	0.12	0.12		0.12		
TP, TPD 40-60/2	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	0.25	0.25		0.25		
TP 40-80/2	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	0.25	0.25		0.25		
TP 40-90/2	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	0.37	0.37		0.37		
TP, TPD 40-120/2	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	0.37	0.37		0.37		
TP 40-180/2	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	0.55	0.55		0.55		
TP, TPD 40-190/2	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	0.75	0.75		0.75		0.75
TP, TPD 40-230/2	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	1.1	1.1		1.1		1.1
TP, TPD 40-270/2	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	1.5	1.5				1.5
TP, TPD 40-240/2	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•		2.2	2.2			2.2
TP, TPD 40-300/2	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•		3.0	3.0		3.0	
TP, TPD 40-360/2	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•		4.0	4.0		4.0	
TP, TPD 40-430/2	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•		5.5	5.5		5.5	
TP, TPD 40-530/2	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•		7.5	7.5		7.5	
TP, TPD 40-630/2	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•		11.0	11.0		11.0	
TP, TPD 50-60/2	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	0.37	0.37		0.37		
TP, TPD 50-120/2	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	0.75	0.75		0.75		0.75
TP, TPD 50-180/2	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	0.75	0.75		0.75		0.75
TP, TPD 50-160/2	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•		1.1	1.1		1.1	
TP, TPD 50-190/2	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•		1.5	1.5			1.5
TP, TPD 50-240/2	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•		2.2	2.2			2.2
TP, TPD 50-290/2	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•		3.0	3.0		3.0	
TP, TPD 50-360/2	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•		4.0	4.0		4.0	
TP, TPD 50-430/2	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•		5.5	5.5		5.5	
TP, TPD 50-420/2	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•		7.5	7.5		7.5	
TP, TPD 50-540/2	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•		11.0	11.0		11.0	
TP, TPD 50-630/2	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•		15.0	15.0		15.0	
TP, TPD 50-710/2	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•		15.0	15.0		15.0	
TP, TPD 50-830/2	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•		18.5	18.5		18.5	
TP, TPD 50-900/2	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•		22.0	22.0		22.0	
TP, TPD 65-60/2	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	0.55	0.55		0.55		
TP, TPD 65-120/2	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	1.1	1.1		1.1		1.1
TP, TPD 65-180/2	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	1.5	1.5				1.5
TP, TPD 65-170/2	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•		2.2	2.2			2.2
TP, TPD 65-210/2	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•		3.0	3.0		3.0	
TP, TPD 65-250/2	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•		4.0	4.0		4.0	
TP, TPD 65-340/2	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•		5.5	5.5		5.5	

Pump type			Design	Shaft seal			Pressure stage			Materials							Mains-operated motor			Electronically speed-controlled motor																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											
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										Cast iron EN-GJL-150	Cast iron EN-GJL-200	Cast iron EN-GJL-250	Bronze ¹⁾	Stainless steel	Stainless steel	Cast iron	Composite	Bronze	1 x 220-230 ΔV/ 240 VV	3 x 220-240 ΔV/ 380-415 VV	3 x 380-415 ΔV/ 660-690 VV ²⁾	1 x 200-240 V	3 x 380-480 V	3 x 380-500 V																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																							
	TPE Series 1000	TPE Series 2000	TP Series 100	TP Series 200	TP Series 300	TP Series 400	BUBE	AUUE	RUUE	BAQE	BQOE	GQOE	PN 6	PN 10	PN 16																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																

• Standard.

¹⁾ Bronze versions are only available as single-head pumps.

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

Product range, 4-pole, PN 6, 10, 16

Pump type				Design				Shaft seal				Pressure stage				Materials						Mains-operated motor			Electronically speed-controlled motor							
				TP Series 100	TP Series 200	TP Series 300	TP Series 400	BUBE	AUUE	RUUE	BAQE	BQQE	GQQE	DBUE	PN 6	PN 10	PN 16	PN 25	Pump housing			Impeller			Voltage [V]			Voltage [V]				
																			Cast iron EN-GJL-250	Nodular cast iron EN-GJS-400-18	Bronze ¹⁾	Stainless steel	Cast iron	Nodular cast iron EN-GJS-400-15	Bronze	1 x 220-230 ΔV/ 240 VV	P2 [kW]	P2 [kW]	P2 [kW]	1 x 200-240 V	3 x 380-480 V	3 x 380-500 V
TP, TPD 32-30/4	•	•		•		•	•	•		•			•				•		•				0.12	0.12		0.12						
TP, TPD 32-40/4	•	•				•	•	•									•						0.25	0.25		0.25						
TP, TPD 32-60/4	•	•		•		•	•	•		•				•			•		•				0.25	0.25		0.25						
TP, TPD 32-80/4	•	•			•				•	•	•					•			•			•	0.25	0.25		0.25						
TP, TPD 32-100/4	•	•			•				•	•	•					•			•			•	0.37	0.37		0.37						
TP, TPD 32-120/4	•	•			•				•	•	•					•			•			•	0.55	0.55		0.55						
TP, TPD 40-30/4	•	•	•			•	•	•		•				•				•	•				0.12	0.12		0.12						
TP 40-60/4	•	•		•		•	•	•		•				•				•	•				0.25	0.25		0.25						
TP, TPD 40-90/4	•	•		•		•	•	•		•						•		•	•				0.25	0.25		0.25						
TP, TPD 40-100/4	•	•			•				•	•	•					•			•			•	0.55	0.55		0.55		0.55				
TP, TPD 40-110/4	•	•			•				•	•	•					•			•			•	0.75	0.75		0.75		0.75				
TP, TPD 40-140/4	•	•			•				•	•	•					•			•			•	1.1	1.1				1.1				
TP, TPD 50-30/4	•	•	•			•	•	•		•				•				•	•				0.25	0.25		0.25						
TP, TPD 50-60/4	•	•				•	•	•		•				•				•	•				0.37	0.37		0.37						
TP, TPD 50-90/4	•	•	•		•				•	•	•					•			•			•	0.55	0.55		0.55		0.55				
TP, TPD 50-80/4	•	•			•				•	•	•					•			•			•	0.75	0.75		0.75		0.75				
TP, TPD 50-120/4	•	•		•					•	•	•					•			•			•	1.1	1.1				1.1				
TP, TPD 50-140/4	•	•							•	•	•					•			•			•	1.5	1.5			1.5					
TP, TPD 50-190/4	•	•		•					•	•	•					•			•			•		2.2		2.2						
TP, TPD 50-230/4	•	•		•					•	•	•					•			•			•		3.0	3.0		3.0					
TP, TPD 65-30/4	•	•	•			•	•	•		•				•				•	•				0.25	0.25		0.25						
TP, TPD 65-60/4	•	•	•			•	•	•		•				•				•	•				0.55	0.55		0.55		0.55				
TP, TPD 65-90/4	•	•		•					•	•	•					•			•			•	0.75	0.75		0.75		0.75				
TP, TPD 65-110/4	•	•		•					•	•	•					•			•			•	1.1	1.1				1.1				
TP, TPD 65-130/4	•	•			•				•	•	•					•			•			•	1.5	1.5			1.5					
TP, TPD 65-150/4	•	•							•	•	•					•			•			•		2.2	2.2		2.2					
TP, TPD 65-170/4	•	•			•				•	•	•					•			•			•		3.0	3.0		3.0					
TP, TPD 65-240/4	•	•			•				•	•	•					•			•			•		4.0	4.0		4.0					
TP, TPD 80-30/4	•	•	•			•	•	•						•	•			•	•				0.37	0.37		0.37						
TP, TPD 80-60/4	•	•	•			•	•	•		•				•	•			•	•				0.75	0.75		0.75		0.75				
TP, TPD 80-70/4	•	•		•					•	•	•					•			•			•	1.1	1.1				1.1				
TP, TPD 80-90/4	•	•							•	•	•					•			•			•	1.5	1.5			1.5					
TP, TPD 80-110/4	•	•		•					•	•	•					•			•			•		2.2	2.2		2.2					
TP, TPD 80-150/4	•	•			•				•	•	•					•			•			•		3.0	3.0		3.0					
TP, TPD 80-170/4	•	•		•					•	•	•					•			•			•		4.0	4.0		4.0					
TP, TPD 80-240/4	•	•			•				•	•	•					•			•			•		5.5	5.5		5.5					
TP, TPD 80-270/4	•	•		•					•	•	•					•			•			•		7.5	7.5		7.5					
TP, TPD 80-340/4	•	•		•					•	•	•					•			•			•		11.0	11.0		11.0					
TP, TPD 100-30/4	•	•	•			•	•	•		•				•	•			•	•				0.55	0.55		0.55		0.55				
TP, TPD 100-60/4	•	•	•			•	•	•		•				•	•			•	•				1.1	1.1				1.1				
TP, TPD 100-70/4	•	•		•					•	•	•					•			•			•	1.5	1.5			1.5					
TP, TPD 100-90/4	•	•			•				•	•	•					•			•			•		2.2	2.2		2.2					
TP, TPD 100-110/4	•	•			•				•	•	•					•			•			•		3.0	3.0		3.0					
TP, TPD 100-130/4	•	•			•				•	•	•					•			•			•		4.0	4.0		4.0					
TP, TPD 100-170/4	•	•			•				•	•	•					•			•			•		5.5	5.5		5.5					
TP, TPD 100-200/4	•	•			•				•	•	•					•			•			•		7.5	7.5		7.5					
TP, TPD 100-250/4	•	•			•				•	•	•					•			•			•		11.0	11.0		11.0					
TP, TPD 100-330/4	•	•			•				•	•	•					•			•			•		15.0	15.0		15.0					
TP, TPD 100-370/4	•	•		•					•	•	•					•			•			•		18.5	18.5		18.5					
TP, TPD 100-410/4				•					•	•	•					•			•			•		22.0	22.0							
TP 125-70/4	•	•		•					•	•	•					•			•			•		2.2	2.2		2.2					
TP 125-90/4	•	•			•				•	•	•					•			•			•		3.0	3.0		3.0					
TP 125-100/4	•	•			•				•	•	•					•			•			•		4.0	4.0		4.0					
TPD 125-110/4	•	•			•				•	•	•					•			•			•		4.0	4.0		4.0					
TP, TPD 125-130/4	•	•			•				•	•	•					•			•			•		5.5	5.5		5.5					
TP, TPD 125-160/4	•	•			•				•	•	•					•			•			•		7.5	7.5		7.5					
TP, TPD 125-190/4	•	•			•				•	•	•					•			•			•		11.0	11.0		11.0					

Pump type			Design	Shaft seal								Pressure stage				Materials						Mains-operated motor			Electronically speed-controlled motor										
				TP Series 100	TP Series 200	TP Series 300	TP Series 400	BUBE	AUUE	RUUE	BAQE	BQOE	GQOE	DBUE	PN 6	PN 10	PN 16	PN 25	Pump housing			Impeller			Voltage [V]			Voltage [V]							
																			Cast iron EN-GJL-250	Nodular cast iron EN-GJS-400-18	Bronze ¹⁾	Stainless steel	Cast iron	Nodular cast iron EN-GJS-400-15	Bronze	1 x 220-230 ΔV/ 240 VV	P2 [kW]	3 x 220-240 ΔV/ 380-415 VV	P2 [kW]	3 x 380-415 ΔV/ 660-690 VV ²⁾	1 x 200-240 V	P2 [kW]	3 x 380-480 V	P2 [kW]	3 x 380-500 V
TP, TPD 125-230/4	•	•		•						•	•	•				•	•	•	Cast iron EN-GJL-250				•			15.0	15.0		15.0						
TP, TPD 125-300/4	•	•		•						•	•	•				•	•	•					•			18.5	18.5		18.5						
TP, TPD 125-340/4				•																				•		22.0	22.0								
TP, TPD 125-400/4				•																				•		30.0	30.0								
TP 150-100/4	•	•		•							•	•	•							Cast iron EN-GJL-250				•			5.5	5.5		5.5					
TPD 150-130/4	•	•		•																			•			7.5	7.5		7.5						
TP 150-140/4	•	•		•																			•			5.5	5.5		7.5						
TP 150-150/4	•	•		•																			•			5.5	5.5		11.0						
TPD 150-160/4	•	•		•																			•			11.0	11.0		11.0						
TP, TPD 150-200/4	•	•		•																			•			15.0	15.0		15.0						
TP, TPD 150-220/4	•	•		•																			•			18.5	18.5		18.5						
TP, TPD 150-250/4				•																			•			22.0	22.0								
TP 150-260/4	•	•		•																			•			18.5	18.5		18.5						
TP 150-280/4				•																			•			22.0	22.0								
TP 150-340/4				•																			•			30.0	30.0								
TP 150-390/4				•																			•				37.0								
TP 150-450/4				•																			•			45.0	45.0								
TP 150-520/4				•																			•			55.0	55.0								
TP 150-660/4				•																			•			75.0	75.0								
TP 200-50/4	•	•		•																			•			4.0	4.0		4.0						
TP 200-70/4	•	•		•																			•			5.5	5.5		5.5						
TP 200-90/4	•	•		•																			•			7.5	7.5		7.5						
TP 200-130/4	•	•		•																			•			11.0	11.0		11.0						
TP 200-150/4	•	•		•																			•			15.0	15.0		15.0						
TP 200-160/4	•	•		•																			•			15.0	15.0		15.0						
TP 200-190/4	•	•		•																			•			18.5	18.5		18.5						
TP 200-200/4				•																			•			22.0	22.0								
TP 200-240/4				•																			•			30.0	30.0								
TP 200-270/4				•																			•				45.0								
TP 200-290/4				•																			•				37.0								
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 250-280/4					•																		•				45.0								
TP 250-310/4					•																		•				55.0								
TP 250-390/4					•																		•				75.0								

• Standard.

¹⁾ Bronze versions are only available as single-head pumps.

²⁾ 4-pole motors above 4 kW can be operated at 3 x 660-690 YV. Smaller motor sizes cannot.

Product range, 6-pole, PN 16

Pump type			Design	Shaft seal	Pressure stage	Materials				Mains-operated motor		Electronically speed-controlled motor		
						Pump housing		Impeller		Voltage [V]		Voltage [V]		
						Cast iron EN-GJL-250	Nodular cast iron EN-GJS-400-18	Bronze ¹⁾	Stainless steel	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		TPE Series 1000											1.5	
TP, TPD 125-70/6		TPE Series 2000										2.2	2.2	
TP, TPD 125-80/6		TP Series 100										3.0	3.0	
TP, TPD 125-100/6		TP Series 200										4.0	4.0	
TP, TPD 125-130/6		TP Series 300										5.5	5.5	
TP, TPD 125-160/6		TP Series 400										7.5	7.5	
TP, TPD 150-60/6		BUBE										2.2	2.2	
TP, TPD 150-70/6		AUUE										3.0	3.0	
TP, TPD 150-90/6		RUUE										4.0	4.0	
TP, TPD 150-110/6		BAQE										5.5	5.5	
		BQGE												
		GQGE												
		DBUE												
		PN 6												
		PN 10												
		PN 16												
		PN 25												

• Standard.

¹⁾ Bronze versions are only available as single-head pumps.

Product range, 2-pole, PN 25

Pump type			Design	Shaft seal	Pressure stage	Materials				Mains-operated motor		Electronically speed-controlled motor		
						Pump housing		Impeller		Voltage [V]		Voltage [V]		
						Cast iron EN-GJL-250	Nodular cast iron EN-GJS-400-18	Bronze	Stainless steel	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 100-620/2		TPE Series 1000												37.0
TP 100-700/2		TPE Series 2000												45.0
TP 100-820/2		TP Series 100												55.0
TP 100-960/2		TP Series 200												75.0
TP 100-1050/2		TP Series 300												75.0
TP 100-1180/2		TP Series 400												90.0
TP 100-1400/2		BUBE												110.0
TP 100-1530/2		AUUE												132.0
TP 100-1680/2		RUUE												160.0
		BAQE												
		BQGE												
		GQGE												
		DBUE												
		PN 6												
		PN 10												
		PN 16												
		PN 25												

• Standard.

Product range, 4-pole, PN 25

Pump type				Design	Shaft seal							Pressure stage				Materials							Mains-operated motor			Electronically speed-controlled motor																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																		
																Pump housing			Impeller				Voltage [V]			Voltage [V]																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																		
					Cast iron EN-GJL-250	Nodular cast iron EN-GJS-400-18	Bronze	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	1 x 200-240 V	3 x 380-480 V																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																												
												P2 [kW]	P2 [kW]	P2 [kW]	P2 [kW]	P2 [kW]																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																												
TP 100-190/4																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																												

• Standard.

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: Max. 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	65.5	60	-
30.0	70	62	-
37.0	71	66	-
45.0	67	66	-
55.0	72	67	-
75.0	74	70	-
90.0	73	70	-
110.0	76	70	-
132.0	76	70	-
160.0	76	70	-
200.0	-	70	-
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 and Siemens 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 runs at a lower speed. Possible flow noise from control valves is also reduced at partial load in the case of the TPE pumps.

Ambient temperature

MG IE2 and IE3 motors: 0.75 - 22 kW motors, 2-pole 0.75 - 15 kW motors, 4-pole	-20-60 °C
Siemens IE2 and IE3 motors: 30-90 kW motors, 2-pole 18.5 - 90 kW motors, 4-pole	-20-55 °C
MGE motors: 0.12 - 2.2 kW, 2-pole 0.12 - 1.1 kW, 4-pole	-20-50 °C
MGE motors: 3-22 kW, 2 pole 1.5 - 18.5 kW, 4-pole	-20-40 °C
Other motor sizes:	-20-40 °C
Storage	Down to -30 °C

Installation altitude

If the ambient temperature exceeds maximum values or if the motor is located more than 1,000 metres 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
1	Siemens IE2 and IE3 motors: 30-90 kW motors, 2-pole 18.5 - 90 kW motors, 4-pole
2	MG IE2 and IE3 motors: 0.75 - 22 kW motors, 2-pole 0.75 - 15 kW motors, 4-pole
3	MGE motors: 3-22 kW, 2 pole 1.5 - 18.5 kW, 4-pole Other motor sizes

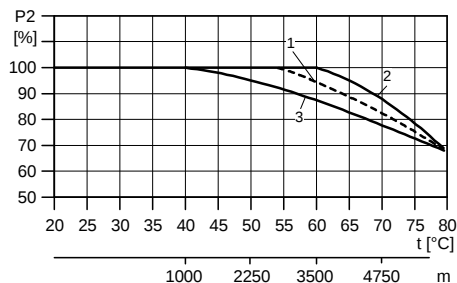


Fig. 2 Relationship between motor output (P2) and altitude

Description
MGE motors: 0.12 - 2.2 kW, 2-pole 0.12 - 1.1 kW, 4-pole

TM03 2479 4405

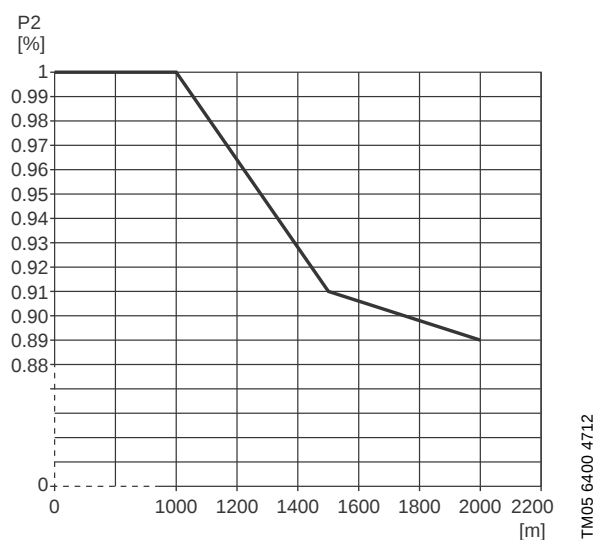


Fig. 3 Derating of motor output (P2) in relation to altitude above sea level

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

5. Pumped liquids

Pumped liquids

Thin, clean, non-aggressive and non-explosive liquids, not containing solid particles or fibres that may mechanically or chemically attack the pump. See section *List of pumped liquids* on page 21.

Examples of liquids

- Central heating system water (the water should meet the requirements of accepted standards on water quality in heating systems)
- cooling liquids
- domestic hot 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, RUUE, GQQE or DQQE type, see *Operating range of the shaft seal* on page 23.

The pumping of liquids with densities or kinematic viscosities higher than those of water can have these consequences:

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

In these situations, equip the pump with an oversize motor. If in doubt, contact Grundfos.

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

Liquid temperature

Liquid temperature: -25 to 150 °C.

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

Pump type	Shaft seal	Temperature
TP Series 100	BUBE	0-110 °C
	BQQE	-25-110 °C
	GQQE	-25-60 °C
TP Series 200	BUBE	0-140 °C
	BQQE	-25-110 °C
	AUUE	0-90 °C
	RUUE	-25-60 °C
TP Series 300	BAQE	0-120 °C (140 °C) ¹⁾
	BQQE	-25-110 °C
	GQQE	-25-60 °C
TP Series 400, 10 bar version	BAQE	0-120 °C
	BQQE	-25-110 °C
	GQQE	-25-60 °C
TP Series 400, 25 bar version	DBUE	0-150 °C ²⁾

¹⁾ TP Series 300 pumps are designed for a maximum operating temperature of 140 °C. For operation above 120 °C, select an alternative shaft seal. Contact Grundfos.

²⁾ At 120 to 150 °C, the maximum operating pressure is ≤ 23 bar. Depending on the type of cast iron used and the pump application, the maximum liquid temperature may be limited by local regulations and laws.

List of pumped liquids

Grundfos TP and TPD pumps are designed for circulation systems with constant flow; TPE and TPED pumps for systems with variable flow.

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

A number of typical liquids are listed below.

Other pump versions may be used, 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 page 241 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.

Legend

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/precipitation in the shaft seal.
E	Insoluble in water.
F	The shaft seal rubber parts must be replaced with FKM rubber.
G	Bronze housing/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				
			TP Series 100	TP Series 200	TP Series 300	TP Series 400 PN 10	TP Series 400 PN 25
Water							
Groundwater		< 90 °C	BQQE	AUUE	BQQE	BAQE	DBUE
		> 90 °C	BUBE	BUBE	BAQE ¹⁾ BBQE ²⁾		
Boiler-feed water		< 120 °C	BUBE ³⁾	BUBE	BAQE	BAQE	DBUE
		< 140 °C		BUBE	DAQF ²⁾		DBUE
		< 150 °C					DBUE
District heating water		< 120 °C	BUBE	BUBE	BAQE	BAQE	DBUE
Condensate		< 90 °C	BQQE	AUUE	BQQE	BAQE	DBUE
		> 90 °C	BUBE	BUBE	BAQE		
Softened water	C	< 90 °C	BQQE	AUUE	BQQE	BAQE	DBUE
		> 90 °C	BUBE	BUBE	BAQE		
Brackish water	G	pH > 6.5, 40 °C, 1,000 ppm Cl ⁻	BUBE BQQE	BUBE AUUE	BQQE	BQQE	DBUE
Coolants							
Ethylene glycol	B, D, H	< 120 °C			DQQE ²⁾		
		< 110 °C	BQQE	BQQE	BQQE	BQQE	
		< 90 °C					DQQE ²⁾
		< 60 °C	GQQE	RUUE	GQQE	GQQE	
Glycerine (glycerol)	B, D, H	< 120 °C			DQQE ²⁾		
		< 110 °C	BQQE	BQQE	BQQE	BQQE	
		< 90 °C					DQQE ²⁾
		< 60 °C	GQQE	RUUE	GQQE	GQQE	
Potassium acetate	B, D, C, H	< 120 °C			DQQE ²⁾		
		< 110 °C	BQQE	BQQE	BQQE	BQQE	
		< 90 °C					DQQE ²⁾
		< 60 °C	GQQE	RUUE	GQQE	GQQE	
Potassium formate	B, D, C, H	< 120 °C			DQQE ²⁾		
		< 110 °C	BQQE	BQQE	BQQE	BQQE	
		< 90 °C					DQQE ²⁾
		< 60 °C	GQQE	RUUE	GQQE	GQQE	
Propylene glycol	B, D, H	< 120 °C			DQQE ²⁾		
		< 110 °C	BQQE	BQQE	BQQE	BQQE	
		< 90 °C					DQQE ²⁾
		< 60 °C	GQQE	RUUE	GQQE	GQQE	
Brine sodium chloride	B, D, C, H	< 5 °C, 30 %	GQQE	RUUE	GQQE	GQQE	DQQE ²⁾
Synthetic oils							
Silicone oil	B, E		BUBE BQQE	BUBE AUUE	BAQE BQQE	BAQE	DBUE

(To be continued)

Pumped liquids	Notes	Additional information	Shaft seal				
			TP Series 100	TP Series 200	TP Series 300	TP Series 400 PN 10	TP Series 400 PN 25
Vegetable oils							
Corn oil	B, F, E		BUBV ⁽²⁾ BQQV ⁽²⁾	BUBV ⁽²⁾ AUUV ⁽²⁾	BAQV ⁽²⁾ BQQV ⁽²⁾	BAQV ⁽²⁾	DBUV ⁽²⁾
Olive oil	B, F, E	< 80 °C	BUBV ⁽²⁾ BQQV ⁽²⁾	BUBV ⁽²⁾ AUUV ⁽²⁾	BAQV ⁽²⁾ BQQV ⁽²⁾	BAQV ⁽²⁾	DBUV ⁽²⁾
Peanut oil	B, F, E		BUBV ⁽²⁾ BQQV ⁽²⁾	BUBV ⁽²⁾ AUUV ⁽²⁾	BAQV ⁽²⁾ BQQV ⁽²⁾	BAQV ⁽²⁾	DBUV ⁽²⁾
Rapeseed oil	D, B, F, E		BUBV ⁽²⁾ BQQV ⁽²⁾	BUBV ⁽²⁾ AUUV ⁽²⁾	BAQV ⁽²⁾ BQQV ⁽²⁾	BAQV ⁽²⁾	DBUV ⁽²⁾
Soybean oil	B, F, E		BUBV ⁽²⁾ BQQV ⁽²⁾	BUBV ⁽²⁾ AUUV ⁽²⁾	BAQV ⁽²⁾ BQQV ⁽²⁾	BAQV ⁽²⁾	DBUV ⁽²⁾
Cleaning agents							
Soap (salts of fatty acids)	A, E, (F)	< 80 °C	BQQE (BQQV) ⁽²⁾	AUUE (AUUV) ⁽²⁾	BQQE (BQQV) ⁽²⁾	GQQE	DQQE ⁽²⁾
Alkaline degreasing agent	A, E, (F)	< 80 °C	BQQE (BQQV) ⁽²⁾	AUUE (AUUV) ⁽²⁾	BQQE (BQQV) ⁽²⁾	GQQE	DQQE ⁽²⁾
Oxidants							
Hydrogen peroxide		< 40 °C, < 2 %	BUBE BQQE	BUBE AUUE	BQQE	BQQE	DQQE ⁽²⁾
Salts							
Ammonium bicarbonate	A	< 20 °C, < 15 %	BQQE	AUUE	BQQE	BQQE	DQQE ⁽²⁾
Calcium acetate	A, B	< 20 °C, < 30 %	BQQE	AUUE	BQQE	BQQE	DQQE ⁽²⁾
Potassium bicarbonate	A	< 20 °C, < 20 %	BQQE	AUUE	BQQE	BQQE	DQQE ⁽²⁾
Potassium carbonate	A	< 20 °C, < 20 %	BQQE	AUUE	BQQE	BQQE	DQQE ⁽²⁾
Potassium permanganate	A	< 20 °C, < 10 %	BQQE	AUUE	BQQE	BQQE	DQQE ⁽²⁾
Potassium sulphate	A	< 20 °C, < 20 %	BQQE	AUUE	BQQE	BQQE	DQQE ⁽²⁾
Sodium acetate	A	< 20 °C, < 100 %	BQQE	AUUE	BQQE	BQQE	DQQE ⁽²⁾
Sodium bicarbonate	A	< 20 °C, < 2 %	BQQE	AUUE	BQQE	BQQE	DQQE ⁽²⁾
Sodium carbonate	A	< 20 °C, < 20 %	BQQE	AUUE	BQQE	BQQE	DQQE ⁽²⁾
Sodium nitrate	A	< 0 °C, < 40 %	BQQE	AUUE	BQQE	BQQE	DQQE ⁽²⁾
Sodium nitrite	A	< 20 °C, < 40 %	BQQE	AUUE	BQQE	BQQE	DQQE ⁽²⁾
Sodium phosphate (di)	A	< 100 °C, < 30 %	BQQE	AUUE	BQQE	BQQE	DQQE ⁽²⁾
Sodium phosphate (tri)	A	< 90 °C, < 20 %	BQQE	AUUE	BQQE	BQQE	DQQE ⁽²⁾
Sodium sulphate	A	< 20 °C, < 20 %	BQQE	AUUE	BQQE	BQQE	DQQE ⁽²⁾
Sodium sulphite	A	< 20 °C, < 1 %	BQQE	AUUE	BQQE	BQQE	DQQE ⁽²⁾
Alkalis							
Ammonium hydroxide		< 100 °C, < 30 %	BQQE	AUUE	BQQE	GQQE	DQQE ⁽²⁾
Calcium hydroxide	A	< 100 °C, < 10 %	BQQE	AUUE	BQQE	GQQE	DQQE ⁽²⁾
Potassium hydroxide	A	< 20 °C, < 20 %	BQQE	AUUE	BQQE	GQQE	DQQE ⁽²⁾
Sodium hydroxide	A	< 40 °C, < 20 %	BQQE	AUUE	BQQE	GQQE	DQQE ⁽²⁾

¹⁾ BAQE must not be used for potable water. For potable water, Grundfos recommends that you use a BBQE shaft seal.

²⁾ The shaft seal is not standard, but available on request.

³⁾ Maximum 110 °C.

Operating range of the shaft seal

Shaft seals containing EPDM rubber parts

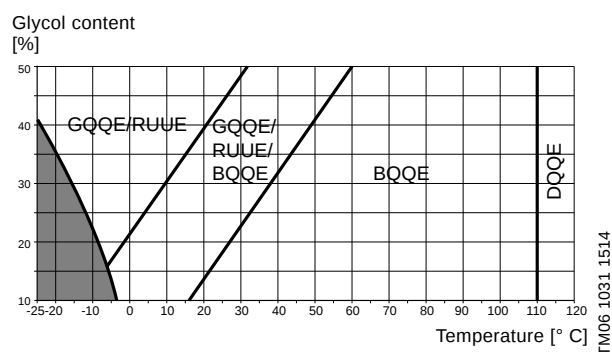


Fig. 4 Operating range of EPDM shaft seals in water/glycol mixture at 0-6 bar discharge pressure

Shaft seals containing FKM rubber parts

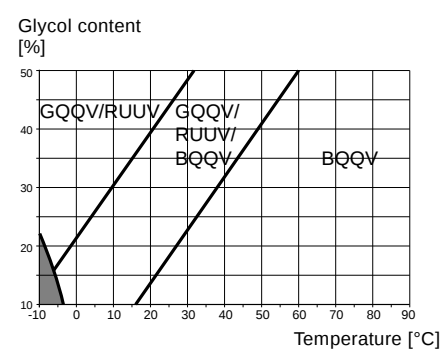


Fig. 6 Operating range of FKM shaft seals in water/glycol mixture at 0-6 bar discharge pressure

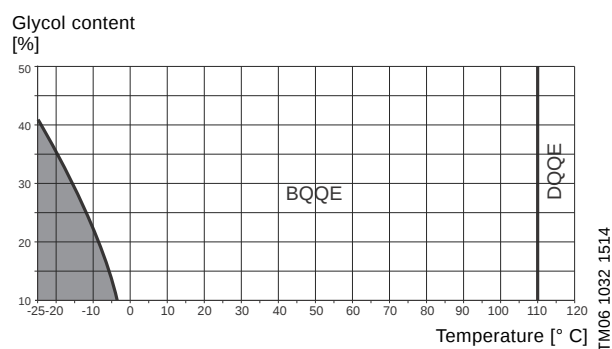


Fig. 5 Operating range of EPDM shaft seals in water/glycol mixture at 6-16 bar discharge pressure

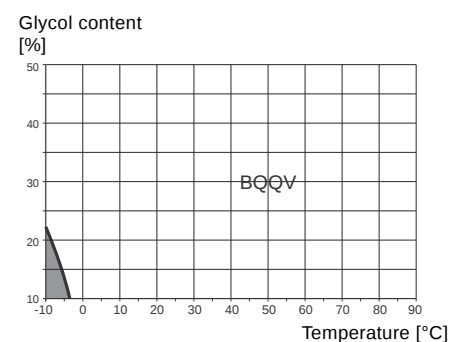


Fig. 7 Operating range of FKM shaft seals in water/glycol mixture at 6-16 bar discharge pressure

6. TP Series 100 and 200 pumps



Fig. 8 TP Series 100 and TP Series 200

GrB2850 - GrB261

Technical data

Flow rate:	Up to 90 m ³ /h
Head:	Up to 27 m
Liquid temperature (TP Series 100):	-25 to 110 °C
Liquid temperature (TP Series 200):	-25 to 140 °C
Maximum operating pressure:	Up to 16 bar
Direction of rotation:	Counter-clockwise

Construction

Grundfos TP Series 100 and Series 200 pumps are single-stage, close-coupled pumps with in-line suction and discharge 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, i.e. the power head (motor, pump head and impeller) can be removed for maintenance or service while the pump housing remains in the pipework.

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

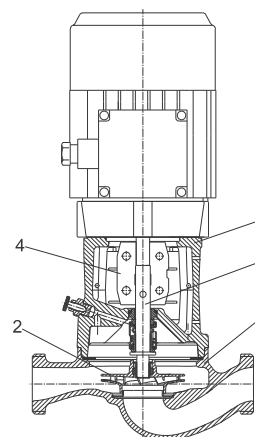
As radial and axial forces are absorbed by the fixed bearing in the motor drive-end, the pump requires no bearing.

TP, TPD Series 100 and 200 pumps are fitted with high-efficiency motors.

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

Materials

TP Series 100



TM03 1210 2612

Fig. 9 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	Tungsten carbide Silicon carbide	
	Stationary seat	Carbon (resin-impregnated), silicon carbide	

TP, TPE Series 200

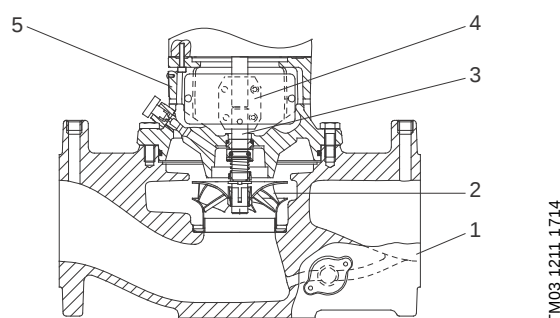


Fig. 10 Sectional drawing of TP Series 200 (with flange connection)

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
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	Tungsten carbide	
	Stationary seat	Carbon (resin-impregnated), tungsten carbide	

Mechanical shaft seal

Three types of unbalanced mechanical shaft seal are available as standard:

- **BUBE**

The BUBE shaft seal is a Grundfos rubber bellows seal with tungsten carbide/carbon seal faces and secondary seals of EPDM.

- **RUUE/GQQE**

The RUUE shaft seal is a Grundfos O-ring seal with reduced tungsten carbide/tungsten carbide seal faces and secondary seals of EPDM.

The GQQE shaft seal is a Grundfos rubber bellows seal with reduced silicon carbide/silicon carbide seal faces and secondary seals of EPDM.

- **AUUE/BQQE**

The AUUE shaft seal is a Grundfos O-ring seal with fixed seal driver, tungsten carbide/tungsten carbide seal faces and secondary seals of EPDM.

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

You find information on a selection of common pumped liquids with recommended shaft seals on page 21.

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	Tungsten carbide/carbon	
	Tungsten carbide/tungsten carbide	
	Silicon carbide/silicon carbide	

Special shaft seals are available for partly conditioned water or other liquids containing abrasive or crystallising particles. See page 21.

Connections

TP Series 100 pumps with union connection have suction and discharge 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. All flanges can be connected 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*, pages 73 to 76.

- **Top-pull-out design**

- Easy dismantling in case of service.

- **In-line design**

- Contrary to end-suction pumps, in-line pumps allow a straight pipework and thus often reduced 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 200-250 °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.

7. TP Series 300 pumps



Fig. 11 TP Series 300

Technical data

Flow rate:	Up to 825 m ³ /h
Head:	Up to 93 m
Liquid temperature:	-25 to 140 °C
Maximum operating pressure:	16 bar
Direction of rotation:	Clockwise

Construction

Grundfos TP, TPD Series 300 pumps are single-stage, close-coupled pumps with in-line suction and discharge 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.

The pumps are fitted with an unbalanced mechanical shaft seal.

The pumps are of the top-pull-out design, i.e. the power head (motor, pump head and/or motor stool and impeller) can be removed for maintenance or service while the pump housing remains in the pipework.

The pump housing is provided with replaceable wear rings 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 discharge 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

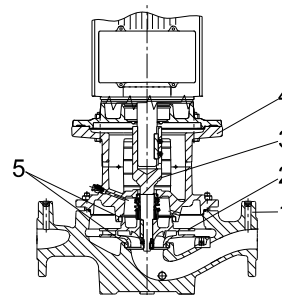


Fig. 12 Sectional drawing of TP Series 300

Material specification

Pos.	Component	Material	EN/DIN
1	Pump housing	Cast iron EN-GJL-250	EN-JL 1040
2	Impeller	Cast iron EN-GJL-200, bronze CuSn5Zn5Pb	EN-JL 1030 2.1096.01
3	Stub shaft	Stainless steel	1.4301
	Two-part stub shaft	Stainless steel/steel	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 rings	Bronze CuSn10	2.1093

Mechanical shaft seal

Three types of unbalanced mechanical shaft seal are available as standard:

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

You find information on a selection of common pumped liquids with recommended shaft seals on page 21.

Shaft seal specification

Unbalanced shaft seal	Version NU according to EN 12756
Shaft diameter	28, 38, 48 and 55 mm
Rubber bellows	EPDM
Seal faces	Carbon/silicon carbide Silicon carbide/silicon carbide

Special shaft seals are available for partly conditioned water or other liquids containing abrasive or crystallising particles. See page 21.

Connections

TP Series 300 pumps have PN 16 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 grade. For further information, see section *Motors*, pages 73 to 76.

Top-pull-out design

- Easy dismantling in case of service.

In-line design

- Contrary to end-suction pumps, in-line pumps allow a straight pipework 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.

Pump housing and pump head/motor stool 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 200-250 °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.

8. TP Series 400 pumps



Fig. 13 TP Series 400

Technical data

Flow rate: PN 10 version: Up to 950 m³/h
PN 25 version: Up to 4500 m³/h

Head: PN 10 version: Up to 38 m
PN 25 version: Up to 170 m

Liquid temperature: PN 10 version: -25 to 120 °C
PN 25 version: 0 to 150 °C*

* From 120 to 150 °C, max. 23 bar

Maximum operating pressure: 10 bar version: 10 bar
25 bar version: 25 bar

Direction of rotation: Clockwise

Construction

Grundfos TP Series 400 pumps are single-stage, close-coupled pumps with in-line suction and discharge ports.

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

TP Series 400 pumps are available as single-head (TP) pumps.

All TP Series 400 pumps have PN 10 or PN 25 flanges. The largest pumps have DN 400, PN 40 discharge flanges and a maximum operating pressure of 25 bar. The pumps are fitted with an unbalanced mechanical shaft seal.

The pumps are of the top-pull-out design, i.e. the power head (motor, motor stool and impeller) can be removed for maintenance or service while the pump housing remains in the pipework.

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

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

TP Series 400 pumps are fitted with high-efficiency motors.

Materials

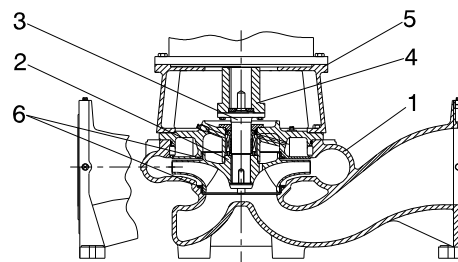


Fig. 14 Sectional drawing of TP Series 400

Material specification

TP Series 400, PN 10

Pos.	Component	Material	EN/DIN
1	Pump housing	Cast iron EN-GJL-250	EN-JL1040
2	Impeller	Ductile cast iron EN-GJS-400 Bronze	EN-JL1030 2.1096.01
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	Metal-impregnated carbon Silicon carbide	
	Stationary seat	Silicon carbide	
6	Wear rings	Bronze CuSn10	2.1093

TP Series 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 Bronze	EN-JS1030 2.1096.01
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 10 bar versions, the following three types of unbalanced mechanical shaft seal are available as standard:

- **BAQE**

The BAQE shaft seal is a Grundfos rubber bellows seal with carbon/silicon carbide seal faces and secondary seals of EPDM.

- **GQQE**

The GQQE shaft seal is a Grundfos rubber bellows seal with reduced silicon carbide/silicon carbide seal faces and secondary seals of EPDM.

- **BQQE**

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

For 25 bar versions, the following mechanical shaft seal is available as standard:

- **DBUE**

The DBUE shaft seal is a Grundfos balanced O-ring seal with carbon/tungsten carbide seal faces and secondary seals of EPDM.

You find information on a selection of common pumped liquids with recommended shaft seals on page 21.

Special shaft seals are available for partly conditioned water or other liquids containing abrasive or crystallising particles. See page 21.

Connections

TP Series 400 pumps are the only TP pumps with suction and discharge ports of different diameters. The suction port is one dimension larger than the discharge port in order to obtain a low inlet velocity. This reduces the risk of cavitation and noise.

From DN 100 to DN 300, TP Series 400 pumps have flanges according to ISO 7005-2 or EN 1092-2.

Features and benefits

TP Series 400 pumps have the following 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*, pages 73 to 76.

Top-pull-out design

- Easy dismantling in case of service.

In-line design

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

Motor-pump shaft with flange coupling

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

Supported flange connection

- Pump housing flanges have integrated feet in order to stabilise the pump.

Surface treatment

TP Series 400 pumps are given the following surface treatment:

Pump type	Electrocoating	Spray painting
TP Series 400 (from DN 100 to DN 300)	x	x
TP Series 400 (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.

9. TPE Series 2000 pumps



Fig. 15 TPE Series 2000

TM03 0348 4904 - TM05 8839 2813

Technical data

Flow rate:	Up to 340 m ³ /h
Head:	Up to 90 m
Liquid temperature:	-25 to 140 °C
Maximum operating pressure:	16 bar
Motor sizes (single-phase):	0.12 to 1.5 kW
Motor sizes (three-phase):	0.12 to 22 kW

Construction

TPE, TPED Series 2000 pumps are based on TP, TPD Series 200 and 300 pumps.

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

The MGE motor of TPE Series 2000 pumps has a built-in frequency converter for continuous adjustment of the pressure to the flow rate. TPE, TPED pumps with 2-pole motors below 3 kW and 4-pole motors below 1.5 kW are fitted with permanent-magnet motors which have an efficiency that exceeds the IE4 demands - including the energy consumption of the integrated frequency converter (compared to IE levels in IEC 60034-30-1 Ed. 1 (CD)).

The TPE Series 2000 range is a preset solution for quick and safe installation. TPE Series 2000 pumps fitted with 2-pole motors below 3 kW and 4-pole motors below 1.5 kW have a colour display for easy and intuitive pump setup and with full access to all functions.



Fig. 16 Example of main display on a TPE Series 2000 with advanced control panel

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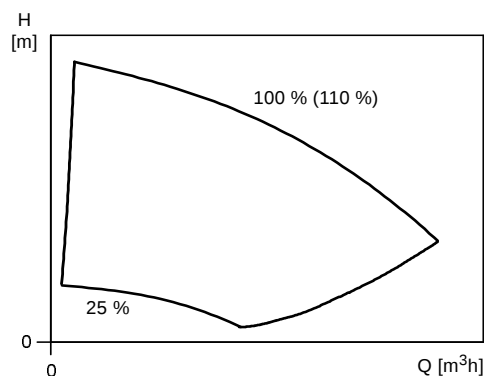
For further information on construction and materials of TPE Series 2000 pumps, see pages 24 to 27.

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.

TPE Series 2000 pumps can operate at any duty point within the range between 25 and 100 % speed. In a part of the duty range, the pumps can operate at speeds up to 110 %.



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Fig. 17 Duty range of TPE Series 2000 pumps

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

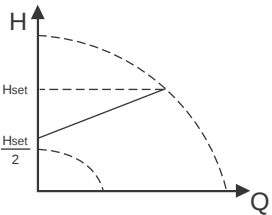
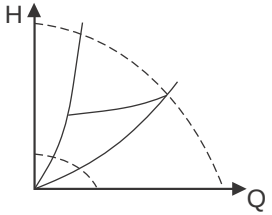
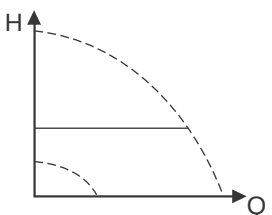
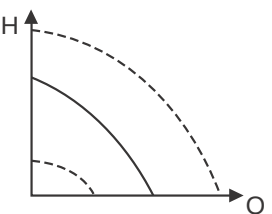
Depending on the application, TPE Series 2000 pumps offer energy savings, increased comfort or improved processing.

TPE Series 2000 pumps are suitable for applications requiring pressure control.

Proportional pressure

TPE Series 2000 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 TPE Series 2000 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 - 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 - 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 - 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 - heat exchangers (fan coils) - cooling ceilings - cooling surfaces.	Constant differential pressure (with differential-pressure sensor located in the system) 	0.12 - 2.2 kW, 2 pole 0.12 - 1.1 kW, 4 pole
In systems with relatively small pressure losses in the distribution pipes. - Two-pipe heating systems with thermostatic valves and - 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
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: - The max. curve mode can be used in periods in which a maximum flow is required. This operating mode is for instance suitable for hot-water priority. - The minimum curve mode can be used in periods in which a minimum flow is required.	Constant curve 	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) without the use of external controllers. The pumps in a multipump system communicate with each other via the wireless GENlair connection or the wired GENI connection.	"Assist" menu "Multipump setup"	0.12 - 2.2 kW, 2 pole 0.12 - 1.1 kW, 4 pole

TPE(D) pumps with extended performance range

Standard TPE(D) pumps, 50 Hz, are able to operate in a range above the 100 % curve. See fig. 18.

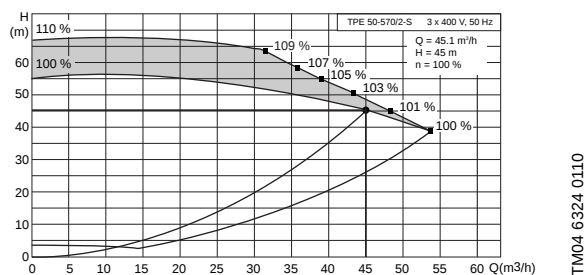


Fig. 18 TPE(D) pumps with extended performance range

The extended range is provided by means of optimised software which utilises the MGE motor in an optimum way. The result is that the TPE(D) pump is able to deliver higher head and flow with the same motor size. The curve sheets in the TP data booklet only show the nominal 100 % Q-H curve.

WinCAPS and WebCAPS show the extended performance range of the TPE(D) pumps.

Operating modes of twin-head pumps

The following operating modes are available for twin-head pumps:

Alternating operation

The two pumps run alternately for 24 operating hours. In case of fault in the operating pump, the other pump will start.

Standby operation

One pump is in constant operation. Every 24 operating hours the standby pump will start and run for a short period to prevent it from seizing up. In case of fault in the operating pump, the standby pump will start.

In case of sensor fault, the operating pump will switch to maximum operation.

Control options

Communication with TPE, TPED Series 2000 pumps is possible via a central building management system, remote control (Grundfos GO Remote) or control panel.

The purpose of controlling TPE, TPED Series 2000 pumps is to monitor and control the pressure, temperature, flow rate and liquid level of the system. For further information on control options of TPE pumps, see page 68.

10. TPE Series 1000 pumps



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Fig. 19 TPE and TPED Series 1000

Technical data

Flow rate:	Up to 340 m ³ /h
Head:	Up to 90 m
Liquid temperature:	-25 °C to 140 °C
Maximum operating pressure:	16 bar
Motor sizes (single-phase):	0.12 to 1.5 kW
Motor sizes (three-phase):	0.12 to 22 kW

Construction

TPE, TPED Series 1000 pumps are based on TP, TPD Series 100, 200 and 300 pumps.

The main difference between the TP and the TPE Series 1000 pump range is the motor. The MGE motor of TPE Series 1000 pumps has a built-in frequency converter for continuous adjustment of the pressure to the flow rate. TPE, TPED pumps with 2-pole motors below 3 kW and 4-pole motors below 1.5 kW are fitted with permanent-magnet motors which have an efficiency that exceeds the IE4 demands - including the energy consumption of the integrated frequency converter (compared to IE levels in IEC 60034-30-1 Ed. 1 (CD)).

TPE Series 1000 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: TPE Series 1000 pumps are not fitted with a sensor from factory.

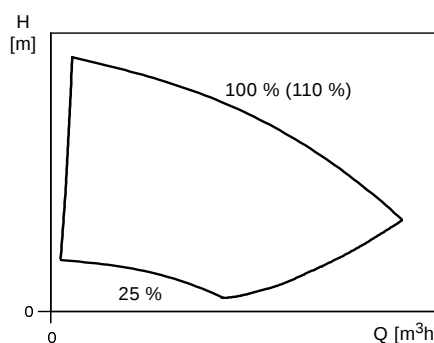
For further information on construction and materials of TPE Series 1000 pumps, see pages 24 to 27.

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.

TPE Series 1000 pumps can operate at any duty point within the range between 25 and 100 % speed. In a part of the duty range, the pumps can operate at speeds up to 110 %.



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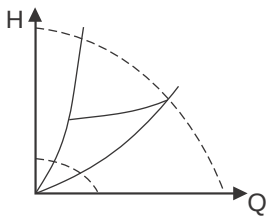
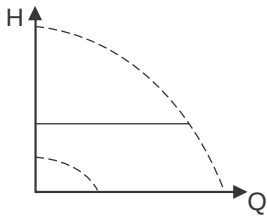
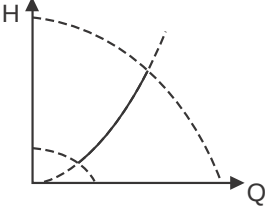
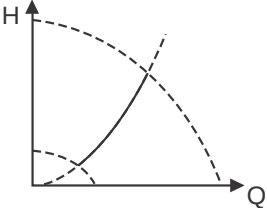
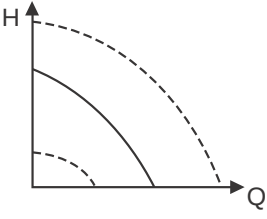
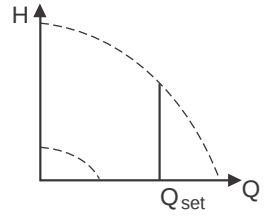
Fig. 20 Duty range of TPE Series 1000 pumps

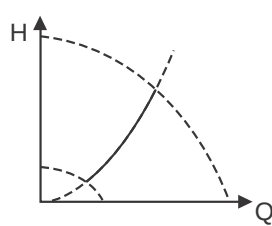
The 100 % curve corresponds to the curve of a pump with a mains-operated motor.

Depending on the application, TPE Series 1000 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 TPE Series 1000 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 - 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 - 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 - 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
	Constant temperature 	All
In systems with a fixed system characteristic. Examples: - one-pipe heating systems - boiler shunts - systems with three-way valves - domestic hot-water circulation.	Constant differential temperature 	0.12 - 2.2 kW, 2-pole 0.12 - 1.1 kW, 4-pole
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: - The maximum curve mode can be used in periods in which a maximum flow is required. - This operating mode is for instance suitable for hot-water priority. - The minimum curve mode can be used in periods in which a minimum flow 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 	All

System application	Select this control mode	Pump type
In systems requiring a constant tank level, independently of the flow rate. Examples: - process water tanks - boiler condensate tanks.	Constant level 	0.12 - 2.2 kW, 2-pole 0.12 - 1.1 kW, 4-pole
In systems with pumps operating in parallel. The multipump function enables the control of single-head pumps connected in parallel (two to four 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"	0.12 - 2.2 kW, 2-pole 0.12 - 1.1 kW, 4-pole

TPE(D) pumps with extended performance range

Standard TPE(D) pumps, 50 Hz, are able to operate in a range above the 100 % curve. See fig. 18.

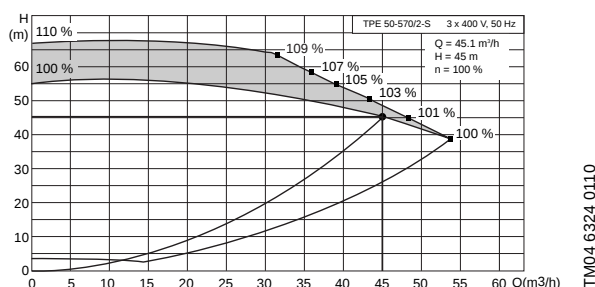


Fig. 21 TPE(D) pumps with extended performance range

The extended range is provided by means of optimised software which utilises the MGE motor in an optimum way. The result is that the TPE(D) pump is able to deliver higher head and flow with the same motor size. The curve sheets in the TP data booklet only show the nominal 100 % Q-H curve.

WinCAPS and WebCAPS show the extended performance range of TPE(D) pumps.

Operating modes of twin-head pumps

The following operating modes are available for twin-head pumps:

Alternating operation

The two pumps run alternately for 24 operating hours. In case of fault in the operating pump, the other pump will start.

Standby operation

One pump is in constant operation. Every 24 operating hours the standby pump will start and run for a short period to prevent it from seizing up. In case of fault in the operating pump, the standby pump will start.

In case of sensor fault, the operating pump will switch to maximum operation.

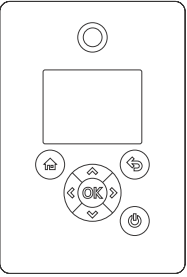
Control options

Communication with TPE, TPED Series 1000 pumps is possible via a central building management system, remote control (Grundfos GO Remote) or control panel.

The purpose of controlling a TPE, TPED Series 1000 pump is to monitor and control the pressure, temperature, flow rate and liquid level of the system.

For further information on control options of TPE pumps, see page 68.

11. Overview of functions

Control panel	E-pump functions	E-pump type			
		TPE, TPED Series 2000	TPE, TPED Series 2000	TPE, TPED Series 1000	TPE, TPED Series 1000
		0.12 - 2.2 kW, 2-pole 0.12 - 1.1 kW, 4-pole	3-22 kW, 2-pole 1.5 - 18.5 kW, 4-pole	0.12 - 2.2 kW, 2-pole 0.12 - 1.1 kW, 4-pole	3-22 kW, 2-pole 1.5 - 18.5 kW, 4-pole
	Settings via advanced control panel				
	Setpoint	•		• ⁴⁾	
	Operating mode	•		• ⁴⁾	
	Set manual speed	•		• ⁴⁾	
	Control mode	•		• ⁴⁾	
	Analog inputs				
	Analog input 1	•		• ⁴⁾	
	Analog input 2	•		• ⁴⁾	
	Analog input 3	• ³⁾		• ^{3) + 4)}	
	Pt100/1000 inputs				
	Pt100/1000 input 1	• ³⁾		• ^{3) + 4)}	
	Pt100/1000 input 2	• ³⁾		• ^{3) + 4)}	
	Digital inputs				
	Digital input 1	•		• ⁴⁾	
	Digital input 2	• ³⁾		• ^{3) + 4)}	
	Digital inputs/outputs				
	Digital in/output 3	•		• ⁴⁾	
	Digital in/output 4	• ³⁾		• ^{3) + 4)}	
	Relay outputs	•		• ⁴⁾	
	Signal relay 1	•		• ⁴⁾	
	Signal relay 2	•		• ⁴⁾	
	Analog output	• ³⁾		• ^{3) + 4)}	
	Output signal	• ³⁾		• ^{3) + 4)}	
	Function of analog output	• ³⁾		• ^{3) + 4)}	
	Controller settings			• ⁴⁾	
	Operating range	•		• ⁴⁾	
	Setpoint influence	•		• ⁴⁾	
	External setpoint function	•		• ⁴⁾	
	Predefined setpoints	• ³⁾		• ^{3) + 4)}	
	Monitoring functions	•		• ⁴⁾	
	Motor bearing monitoring	•		• ⁴⁾	
	Motor bearing maintenance	•		• ⁴⁾	
	Limit-exceeded function			• ⁴⁾	
	Special functions	•		• ⁴⁾	
	Pulse flow meter setup			• ⁴⁾	
	Ramps			• ⁴⁾	
	Standstill heating	•		• ⁴⁾	
	Communication	•		• ⁴⁾	
	Pump number	•		• ⁴⁾	
	Enable/disable radio communication	•		• ⁴⁾	
	General settings	•		• ⁴⁾	

• Available.

¹⁾ Only 11-22 kW.

²⁾ Lubricated, only 11-22 kW.

³⁾ Only available if an advanced functional module is fitted.

⁴⁾ The advanced control panel is available as an option on TPE Series 1000 pumps, 0.12 - 2.2 kW, 2-pole and 0.12 - 1.1 kW, 4-pole.

Control panel	E-pump functions	E-pump type			
		TPE, TPED Series 2000	TPE, TPED Series 2000	TPE, TPED Series 1000	TPE, TPED Series 1000
		0.12 - 2.2 kW, 2-pole 0.12 - 1.1 kW, 4-pole	3-22 kW, 2-pole 1.5 - 18.5 kW, 4-pole	0.12 - 2.2 kW, 2-pole 0.12 - 1.1 kW, 4-pole	3-22 kW, 2-pole 1.5 - 18.5 kW, 4-pole
Status readings via advanced control panel					
	Operating status	•		• ⁴⁾	
	Pump performance	•		• ⁴⁾	
	Actual controlled value	•		• ⁴⁾	
	Resulting setpoint	•		• ⁴⁾	
	Speed	•		• ⁴⁾	
	Accumulated flow and specific energy			• ⁴⁾	
	Power and energy consumption	•		• ⁴⁾	
	Measured values	•		• ⁴⁾	
	Analog output	• ³⁾		• ^{3) + 4)}	
	Warning and alarm	•		• ⁴⁾	
	Operating log	•		• ⁴⁾	
	Fitted modules	•		• ⁴⁾	
	Date and time	• ³⁾		• ^{3) + 4)}	
	Product identification	•		• ⁴⁾	
	Motor bearing monitoring	•		• ⁴⁾	
	Multipump system	•		• ⁴⁾	
	Setting via standard control panel				
	Setpoint		•		
	Start/stop		•		
	Max. curve		•		
	Min. curve		•		
	Alarm reset		•		
	Constant or proportional pressure		•		
	Status readings via standard control panel				
	Setpoint		•		
	Operating indication		•		
	Fault indication		•		
	Operating mode: MIN, MAX, STOP		•		
	Setting via standard control panel				
	Setpoint			•	
	Start/stop			•	
	Max. curve			•	
	Min. curve			•	
	Alarm reset			•	
	Enable radio communication			•	
	Status readings via standard control panel				
	Setpoint			•	
	Operating indication			•	
	Fault indication			•	
	Operating mode: MIN, MAX, STOP			•	

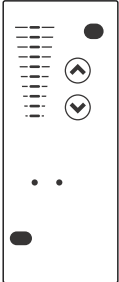
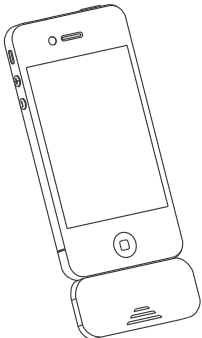
• Available.

¹⁾ Only 11-22 kW.

²⁾ Lubricated, only 11-22 kW.

³⁾ Only available if an advanced functional module is fitted.

⁴⁾ The advanced control panel is available as an option on TPE Series 1000 pumps, 0.12 - 2.2 kW, 2-pole and 0.12 - 1.1 kW, 4-pole.

Control panel	E-pump functions	E-pump type			
		TPE, TPED Series 2000	TPE, TPED Series 2000	TPE, TPED Series 1000	TPE, TPED Series 1000
		0.12 - 2.2 kW, 2-pole 0.12 - 1.1 kW, 4-pole	3-22 kW, 2-pole 1.5 - 18.5 kW, 4-pole	0.12 - 2.2 kW, 2-pole 0.12 - 1.1 kW, 4-pole	3-22 kW, 2-pole 1.5 - 18.5 kW, 4-pole
	Setting via standard control panel				
	Setpoint				•
	Start/stop				•
	Max. curve				•
	Min. curve				•
	Alarm reset				•
	Status readings via standard control panel				
	Setpoint				•
	Operating indication				•
	Fault indication				•
	Operating mode: MIN, MAX, STOP				•
	Settings via Grundfos GO Remote				
	Setpoint	•	•	•	•
	Operating mode	•	•	•	•
	Control mode	•	•	•	•
	Date and time	• ³⁾		• ³⁾	
	Buttons on product	•	•	•	•
	Controller			•	•
	Operating range	•		•	•
	Ramps			•	
	Pump number	•	•	•	•
	Radio communication	•		•	
	Sensor type				•
	Analog input 1	•		•	
	Analog input 2	•		•	
	Analog input 3	• ³⁾		• ³⁾	
	Pt100/1000 input 1	• ³⁾		• ³⁾	
	Pt100/1000 input 2	• ³⁾		• ³⁾	
	Digital input 1	•		•	
	Digital input 2	• ³⁾	•	• ³⁾	•
	Digital in/output 3	•		•	
	Digital in/output 4	• ³⁾		• ³⁾	
	Predefined setpoint	• ³⁾		• ³⁾	
	Analog output	• ³⁾		• ³⁾	
	External setpoint funct.	•	•	•	•
	Signal relay 1	•	•	•	•
	Signal relay 2	•	•	•	• ¹⁾
	Limit 1 exceeded			•	
	Limit 2 exceeded			•	
	Standstill heating	•	•	•	•
	Motor bearing monitoring	•	• ²⁾	•	• ²⁾
	Service	•		•	
	Store settings	•	•	•	•
	Recall settings	•	•	•	•
	Undo	•	•	•	•
	Pump name	•		•	
	Unit configuration	•	•	•	•

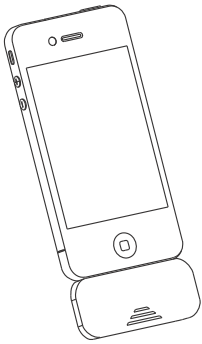
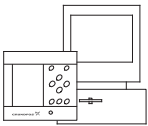
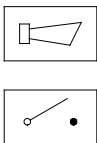
• Available.

¹⁾ Only 11-22 kW.

²⁾ Lubricated, only 11-22 kW.

³⁾ Only available if an advanced functional module is fitted.

⁴⁾ The advanced control panel is available as an option on TPE Series 1000 pumps, 0.12 - 2.2 kW, 2-pole and 0.12 - 1.1 kW, 4-pole.

		E-pump type			
Control panel	E-pump functions	TPE, TPED Series 2000	TPE, TPED Series 2000	TPE, TPED Series 1000	TPE, TPED Series 1000
		0.12 - 2.2 kW, 2-pole 0.12 - 1.1 kW, 4-pole	3-22 kW, 2-pole 1.5 - 18.5 kW, 4-pole	0.12 - 2.2 kW, 2-pole 0.12 - 1.1 kW, 4-pole	3-22 kW, 2-pole 1.5 - 18.5 kW, 4-pole
	Status readings via Grundfos GO Remote				
	Resulting setpoint	•	•	•	•
	Actual controlled value	•	•	•	•
	Motor speed (rpm, %)	•	•	•	•
	Power consumption	•	•	•	•
	Energy consumption	•	•	•	•
	Acc. flow, specific energy	•	•	•	•
	Operating hours	•	•	•	•
	Pt100/1000 input 1	• ³⁾		• ³⁾	
	Pt100/1000 input 2	• ³⁾		• ³⁾	
	Analog output	• ³⁾		• ³⁾	
	Analog input 1	•		•	
	Analog input 2	•		•	
	Analog input 3	• ³⁾		• ³⁾	
	Digital input 1	•		•	
	Digital input 2	• ³⁾	•	• ³⁾	•
	Digital in/output 3	•		•	
	Digital in/output 4	• ³⁾		• ³⁾	
	Fitted modules	•		•	
	Setting via GENIBus				
	Setpoint	•	•	•	•
	Start/stop	•	•	•	•
	Max. curve	•	•	•	•
	Min. curve	•	•	•	•
	Constant pressure, proportional pressure or constant curve	•	•	•	•
	Reading via GENIBus				
	Setpoint	•	•	•	•
	Operating indication	•	•	•	•
	Pump status	•	•	•	•
	Setting via external signal				
	Setpoint	•	•	•	•
	Predefined setpoint	•		•	
	Start/stop	•	•	•	•
	Min./max. curve via digital input	•	•	•	•
	Alarm resetting	•		•	
	Reading via external signal				
	Fault, Operation, Ready, Pump running, Bearing lubrication, Warning (signal relay)	•	•	•	•
	Limit exceeded 1 and 2 (signal relay)			•	
Additional functions	Additional functions				
	Twin-head pump function	•	•	•	•
Optional functions	Optional functions with advanced functional module				
	Real time clock	•		•	
	Analog output	•		•	
	Additional analog, digital and PT100/1000 inputs	•		•	

• Available.

1) Only 11-22 kW.

2) Lubricated, only 11-22 kW.

3) Only available if an advanced functional module is fitted.

4) The advanced control panel is available as an option on TPE Series 1000 pumps, 0.12 - 2.2 kW, 2-pole and 0.12 - 1.1 kW, 4-pole.

12. User interfaces for TPE pumps

Pump settings can be made by means of the following user interfaces:

Control panels

- TPE Series 1000 pumps, 0.12 - 2.2 kW, 2-pole and 0.12 - 1.1 kW, 4-pole. See page 40.
- TPE Series 1000 pumps, 3-22 kW, 2-pole and 1.5 - 18.5 kW, 4-pole. See page 42.
- TPE Series 2000 pumps, 0.12 - 2.2 kW, 2-pole and 0.12 - 1.1 kW, 4-pole. See page 44.
- TPE Series 2000 pumps, 3-22 kW, 2-pole and 1.5 - 18.5 kW, 4-pole. See page 43.

Remote controls

- Grundfos GO Remote.
See section *Grundfos GO Remote* on page 47.

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

Control panel for TPE Series 1000 pumps, 0.12 - 2.2 kW, 2-pole and 0.12 - 1.1 kW, 4-pole

Pump variant		Fitted as standard	Option
TPE Series 2000	0.12 - 2.2 kW, 2-pole	-	-
	0.12 - 1.1 kW, 4-pole	-	-
	3-22 kW, 2-pole	-	-
	1.5 - 18.5 kW, 4-pole	-	-
TPE Series 1000	0.12 - 2.2 kW, 2-pole	•	-
	0.12 - 1.1 kW, 4-pole	•	-
	3-22 kW, 2-pole	-	-
	1.5 - 18.5 kW, 4-pole	-	-

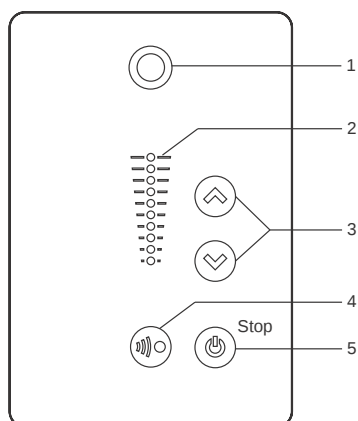


Fig. 22 Standard control panel

TM05 4848 3512

Pos.	Symbol	Description
1		Grundfos Eye Shows the operating status of the pump. See page 64 for further information.
2	-	Light fields for indication of setpoint.
3		Changes the setpoint and reset of alarms and warnings.
4		Enables radio communication with the Grundfos GO Remote and other products of the same type.
5		Makes the pump ready for operation/starts and stops the pump. Start: If the button is pressed when the pump is stopped, the pump will only start if no other functions with higher priority have been enabled. Stop: If the button is pressed when the pump is running, the pump will always be stopped. When the pump is stopped via this button, the "Stop" text next to the button will illuminate.

Setpoint setting

Set the desired setpoint of the pump by pressing or . The light fields on the control panel will indicate the setpoint set.

Pump in differential-pressure control mode

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

Figure 23 shows that the light fields 5 and 6 are activated, indicating a desired setpoint of 3 metres with a sensor measuring range from 0 to 6 metres. The setting range is equal to the sensor measuring range.

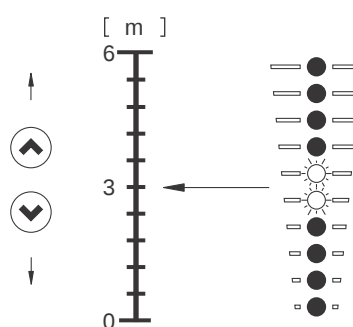


Fig. 23 Setpoint set to 3 metres, differential-pressure control

TM05 4894 3512

Pump in constant-curve control mode

In constant-curve control mode, the pump performance will lie between the maximum and minimum curve of the pump. See fig. 24.

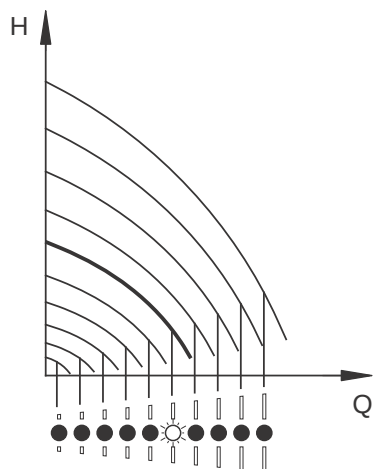


Fig. 24 Pump in constant-curve control mode

Setting to maximum curve:

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

Example: Pump set to maximum curve.

Figure 25 shows that the top light field is flashing, indicating maximum curve.

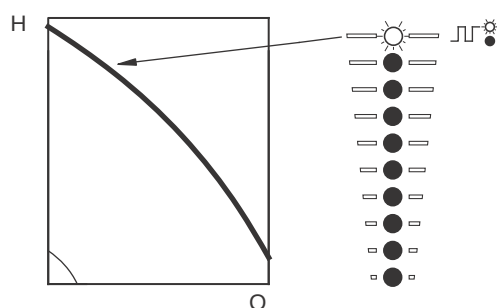


Fig. 25 Maximum curve duty

Setting to minimum curve:

- Press continuously to change over to the minimum curve of the pump (bottom light field flashes). When the bottom light field is on, press for 3 seconds until the light field starts flashing.
- To change back, press continuously until the desired setpoint is indicated.

Example: Pump set to minimum curve.

Figure 26 shows that the bottom light field is flashing, indicating minimum curve.

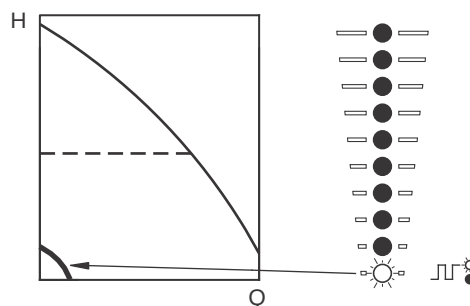


Fig. 26 Minimum curve duty

Start/stop of pump

Start the pump by pressing or by continuously pressing until the desired setpoint is indicated.

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

If the pump has been stopped by pressing , you can only give it free to operation by pressing again.

If the pump has been stopped by pressing , you can only restart it by pressing .

You can also stop the pump with the Grundfos GO Remote 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 or on the pump. This will not change the setting of the pump. A fault indication cannot be reset by pressing or 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 the Grundfos GO Remote.

TM05 4895 2812

TM05 4896 2812

TM05 4897 2812

Control panel for TPE Series 1000 pumps, 3-22 kW, 2-pole and 1.5 - 18.5 kW, 4-pole

Pump variant		Fitted as standard	Option
TPE Series 2000	0.12 - 2.2 kW, 2-pole	-	-
	0.12 - 1.1 kW, 4-pole	-	-
	3-22 kW, 2-pole	-	-
	1.5 - 18.5 kW, 4-pole	-	-
TPE Series 1000	0.12 - 2.2 kW, 2-pole	-	-
	0.12 - 1.1 kW, 4-pole	-	-
	3-22 kW, 2-pole	•	-
	1.5 - 18.5 kW, 4-pole	-	-

The pump control panel incorporates the following buttons and indicator lights:

- buttons, Ⓐ and Ⓑ, for setpoint setting
- light fields, yellow, for setpoint indication
- Indicator lights, green (operation) and red (fault).

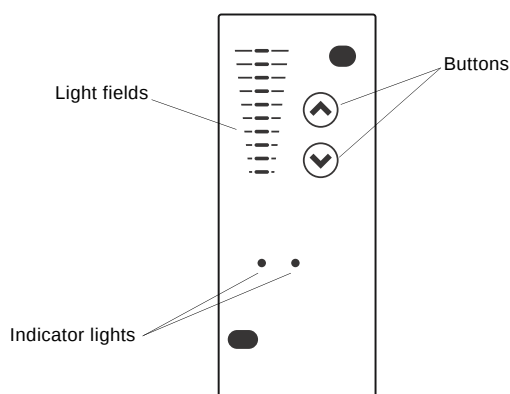


Fig. 27 Control panel for TPE Series 1000 pumps, 3-22 kW, 2-pole and 1.5 - 18.5 kW, 4-pole

Setpoint setting

Note: The setpoint can only be set when the operating mode is "Normal".

Set the desired setpoint by pressing Ⓐ or Ⓑ.

The light fields on the control panel will indicate the setpoint set.

Control mode "Differential-pressure control"

Example

Figure 28 shows that light fields 5 and 6 are activated, indicating a desired setpoint of 3.4 m. The sensor measuring range is 0 to 6 m. The setting range is equal to the sensor measuring range (see sensor nameplate).

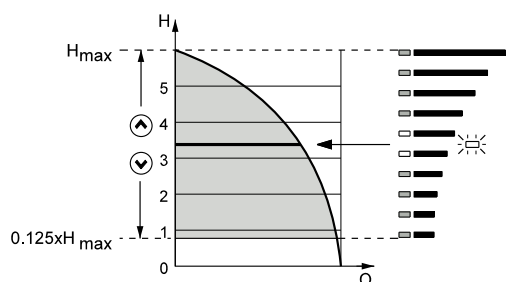


Fig. 28 Setpoint set to 3.4 m (differential-pressure control)

Control mode "Constant curve"

Example

In this control mode, the pump performance is set within the range from minimum to maximum curve. See fig. 29.

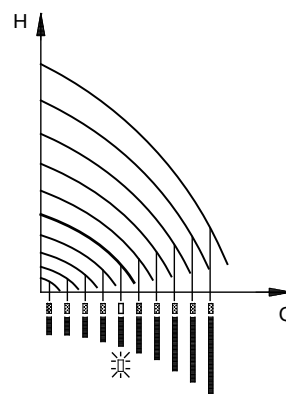


Fig. 29 Pump performance setting, control mode "Constant curve"

Setting to maximum curve duty

Press Ⓐ continuously to change to the maximum curve of the pump (top light field flashes). See fig. 30.

To change back, press Ⓑ continuously until the desired setpoint is indicated.

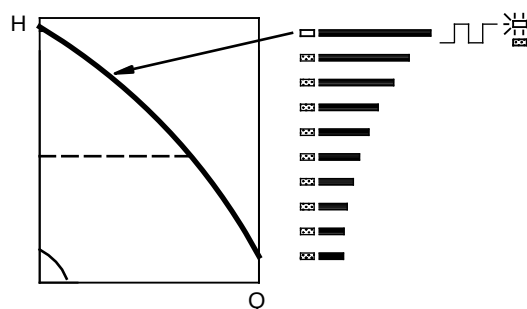


Fig. 30 Maximum curve duty

Setting to minimum curve duty

Press Ⓑ continuously to change to the minimum curve of the pump (bottom light field flashes). See fig. 31.

To change back, press Ⓐ continuously until the desired setpoint is indicated.

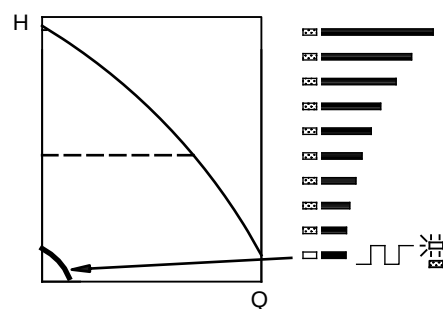


Fig. 31 Minimum curve duty

Start/stop of pump

Start the pump by continuously pressing  until the desired setpoint is indicated.

Stop the pump by continuously pressing  until none of the light fields are activated and the green indicator light flashes.

Control panel for TPE Series 2000 pumps, 3-22 kW, 2-pole and 1.5 - 18.5 kW, 4-pole

Pump variant		Fitted as standard	Option
TPE Series 2000	0.12 - 2.2 kW, 2-pole	-	-
	0.12 - 1.1 kW, 4-pole	-	-
	3-22 kW, 2-pole	•	-
	1.5 - 18.5 kW, 4-pole	•	-
TPE Series 1000	0.12 - 2.2 kW, 2-pole	-	-
	0.12 - 1.1 kW, 4-pole	-	-
	3-22 kW, 2-pole	-	-
	1.5 - 18.5 kW, 4-pole	-	-

The pump control panel (fig. 32) incorporates the following buttons and indicator lights:

- buttons,  and , for setpoint setting
- light fields, yellow, for indication of setpoint
- indicator lights, green (operation) and red (fault).

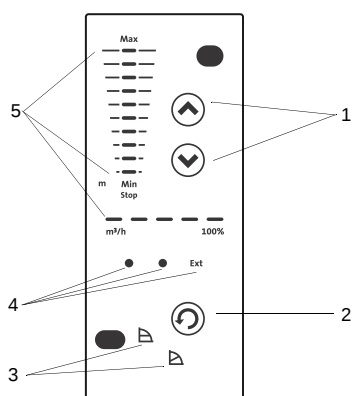


Fig. 32 Control panel, TPE Series 2000 pumps, 3-22 kW, 2-pole and 1.5 - 18.5 kW, 4-pole

Pos.	Description
1 and 2	Buttons for setting
3 and 5	Light fields for indication of • control mode (pos. 3) • head, performance and operating mode (pos. 5)
4	Indicator lights for indication of • operation and fault • external control (EXT)

Setting of control mode

Change the control mode by pressing  (pos. 2) according to the following cycle:

- constant pressure, 
- proportional pressure, .



Fig. 33 Setting the control mode

Setting of pump head

Set the pump head by pressing  or .

The light fields on the control panel will indicate the head set (setpoint). See the following examples.

Proportional pressure

Figure 34 shows that light fields 5 and 6 are activated, indicating a desired head of 3.4 metres at maximum flow. The setting range is between 25 to 90 % of maximum head.

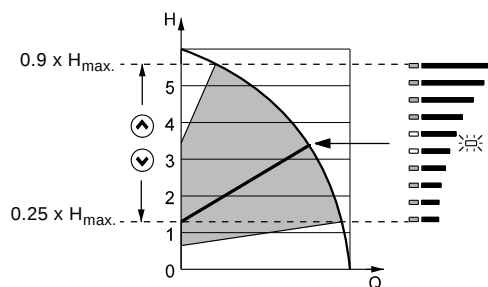


Fig. 34 Pump in "Proportional-pressure" control mode

Constant pressure

Figure 35 shows that light fields 5 and 6 are activated, indicating a desired head of 3.4 metres. The setting range is between 1/8 (12.5 %) of maximum head and maximum head.

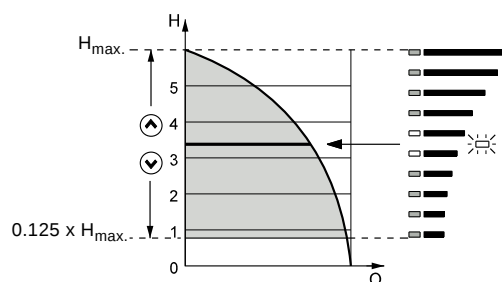


Fig. 35 Pump in "Constant-pressure" control mode

Setting to maximum curve duty

Press  continuously to change to the maximum curve of the pump (MAX illuminates). See fig. 36.

To change back, press  continuously until the desired head is indicated.

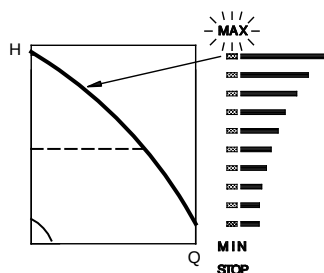


Fig. 36 Maximum curve duty

Setting to minimum curve duty

Press  continuously to change to the minimum curve of the pump (MIN illuminates). See fig. 37.

To change back, press  continuously until the desired head is indicated.

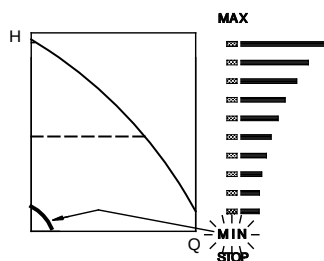


Fig. 37 Minimum curve duty

Start/stop of pump

Start the pump by continuously pressing  until the desired head is indicated.

- Stop the pump by continuously pressing  until STOP illuminates and the green indicator light flashes.

Control panel for TPE Series 2000 pumps, 0.12 - 2.2 kW, 2-pole and 0.12 - 1.1 kW, 4-pole

Pump variant	Fitted as standard	Option
TPE Series 2000		
0.12 - 2.2 kW, 2-pole	•	-
0.12 - 1.1 kW, 4-pole	•	-
3-22 kW, 2-pole	-	-
1.5 - 18.5 kW, 4-pole	-	-
TPE Series 1000		
0.12 - 2.2 kW, 2-pole	-	•
0.12 - 1.1 kW, 4-pole	-	•
3-22 kW, 2-pole	-	-
1.5 - 18.5 kW, 4-pole	-	-

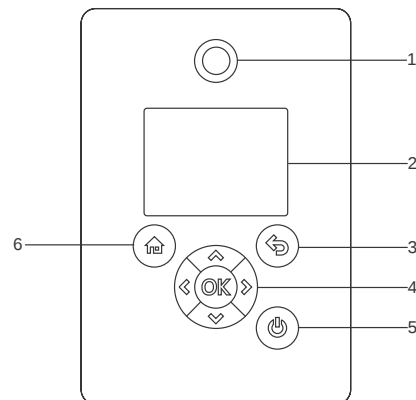


Fig. 38 Advanced control panel

Pos.	Symbol	Description
1		Grundfos Eye Shows the operating status of the pump. See section <i>Grundfos Eye</i> on page 64 for further information.
2	-	Graphical colour display.
3		Goes one step back.
		Navigates between main menus, displays and digits. When the menu is changed, the display will always show the top display of the new menu.
4		Navigates between submenus.
		Saves changed values, resets alarms and expands the value field. Enables communication with the Grundfos GO Remote.
5		Makes the pump ready for operation/starts and stops the pump. Start: If you press the button when the pump is stopped, the pump will only start if no other functions with higher priority have been enabled. Stop: If you press the button when the pump is running, the pump will always be stopped. When the pump is stopped via this button, the "Stop" text next to the button illuminates.
6		Goes to the "Home" menu.

Menu structure

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

1. Home

This menu shows up to four user-defined parameters with shortcuts or a graphical illustration of a Q/H performance curve.

2. Status

This menu shows the status of the pump and system as well as warnings and alarms.

3. Settings

This menu gives access to all setting parameters. A detailed setting of the pump can be made in this menu.

See section *Description of selected functions*.

4. Assist

This menu enables assisted pump setup, provides a short description of the control modes and offers fault advice.

See section *Assist*.

Menu overview for advanced control panel

Main menus

	TPE Series 2000 0.12 - 2.2 kW, 2-pole 0.12 - 1.1 kW, 4-pole	TPE Series 1000 0.12 - 2.2 kW, 2-pole 0.12 - 1.1 kW, 4-pole
Home	•	•
Status	•	•
Operating status	•	•
Operating mode, from	•	•
Control mode	•	•
Pump performance	•	•
Actual controlled value	•	•
Resulting setpoint	•	•
Speed	•	•
Acc. flow, specific energy		•
Power and energy consumption	•	•
Measured values	•	•
Analog input 1	•	•
Analog input 2	•	•
Analog input 3	• ¹⁾	• ¹⁾
Pt100/1000 input 1	• ¹⁾	• ¹⁾
Pt100/1000 input 2	• ¹⁾	• ¹⁾
Analog output	• ¹⁾	• ¹⁾
Warning and alarm	•	•
Actual warning and alarm	•	•
Warning log	•	•
Alarm log	•	•
Operating log	•	•
Operating hours	•	•
Fitted modules	•	•
Date and time	• ¹⁾	• ¹⁾
Product identification	•	•
Motor bearing monitoring	•	•
Multipump system	•	•
System operating status	•	•
System performance	•	•
System input power and energy	•	•
Pump 1, multipump sys.	•	•
Pump 2, multipump sys.	•	•
Pump 3, multipump sys.	•	•

¹⁾ Only available if an advanced functional module is fitted.

Settings	TPE Series 2000 0.12 - 2.2 kW, 2-pole 0.12 - 1.1 kW, 4-pole	TPE Series 1000 0.12 - 2.2 kW, 2-pole 0.12 - 1.1 kW, 4-pole	Section	Page
Setpoint	•	•	Setpoint	49
Operating mode	•	•	Operating mode	49
Set manual speed	•	•	Set manual speed	49
Control mode	•	•	Control mode	49
Analog inputs	•	•	Sensor type	53
Analog input 1, setup	•	•		
Analog input 2, setup	•	•		
Analog input 3, setup	• ¹⁾	• ¹⁾		
Pt100/1000 inputs	• ¹⁾	• ¹⁾	Pt100/1000 inputs	54
Pt100/1000, setup	• ¹⁾	• ¹⁾		
Digital inputs	•	•	Digital inputs	54
Digital input 1, setup	•	•		
Digital input 2, setup	• ¹⁾	• ¹⁾		
Digital inputs/outputs	•	•	Digital inputs/outputs	55
Digital input/output 3, setup	•	•		
Digital input/output 4, setup	• ¹⁾	• ¹⁾		
Relay outputs	•	•	Relay outputs	56
Relay output 1	•	•		
Relay output 2	•	•		
Analog output	• ¹⁾	• ¹⁾	Analog output	56
Output signal	• ¹⁾	• ¹⁾		
Function of analog output	• ¹⁾	• ¹⁾		
Operating range	•	•	Operating range	58
Setpoint influence	•	•	Setpoint influence	58
External setpoint function	•	•	External setpoint influence	58
Predefined setpoints	• ¹⁾	• ¹⁾	Predefined setpoints	61
Monitoring functions	•	•	Monitoring functions	61
Motor bearing monitoring	•	•		
Motor bearing maintenance	•	•		
Limit-exceeded function		•	Limit-exceeded function	61
Special functions	•	•	Special functions	62
Pulse flow meter setup		•	Pulse flow meter setup	62
Ramps		•	Ramps	62
Standstill heating	•	•		
Communication	•	•	Communication	62
Pump number	•	•	Pump number	62
Enable/disable radio communication	•	•	Enable/disable radio communication	62
General settings	•	•	General settings	62

¹⁾ Only available if an advanced functional module is fitted.

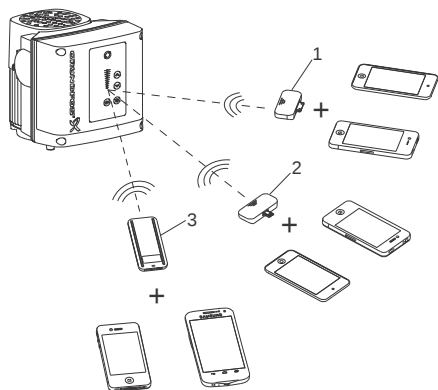
Assist	TPE Series 2000 0.12 - 2.2 kW, 2-pole 0.12 - 1.1 kW, 4-pole	TPE Series 1000 0.12 - 2.2 kW, 2-pole 0.12 - 1.1 kW, 4-pole	Section	Page
Assisted pump setup	•	•		
Setup, analog input	•	•		
Setting of date and time	•	•		
Multipump setup	•	•	Multipump setup	63
Description of control mode	•	•		
Assisted fault advice	•	•		

Grundfos GO Remote

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

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

The Grundfos GO Remote offers the following mobile interfaces (MI). See fig. 39.



TM06 0744 0914

Fig. 39 Grundfos GO Remote communicating with the pump via radio or infrared connection (IR)

Pos.	Description
1	Grundfos MI 202: Add-on module which can be used in conjunction with an Apple iPhone or iPod with 30-pin connector and iOS 5.0 or later, e.g. fourth generation iPhone or iPod.
2	Grundfos MI 204: Add-on module which can be used in conjunction with an Apple iPhone or iPod with Lightning connector, e.g. fifth generation iPhone or iPod. (The MI 204 is also available together with an Apple iPod touch and a cover.)
3	Grundfos MI 301: Separate module enabling radio or infrared communication. The module can be used in conjunction with an Android or iOS-based smart device with Bluetooth connection.

Communication

When the Grundfos GO Remote communicates with the pump, the indicator light in the middle of the Grundfos Eye flashes green. See section *Grundfos Eye* on page 64.

Communication must be established using one of these communication types:

- radio communication
- infrared communication.

Radio communication

Radio communication can take place at distances up to 30 metres. It is necessary to enable communication by pressing  or  on the pump control panel.

Infrared communication

When communicating via infrared light, point the Grundfos GO Remote at the pump control panel.

Menu overview for Grundfos GO Remote

Main menus

	TPE Series 2000 0.12 - 2.2 kW, 2-pole 0.12 - 1.1 kW, 4-pole	TPE Series 2000 3-22 kW, 2-pole 1.5 - 18.5 kW, 4-pole	TPE Series 1000 0.12 - 2.2 kW, 2-pole 0.12 - 1.1 kW, 4-pole	TPE Series 1000 3-22 kW, 2-pole 1.5 - 18.5 kW, 4-pole
Dashboard	•	•	•	•
Status				
Resulting setpoint	•		•	
Actual setpoint		•		•
External setpoint		•		•
Actual controlled value	•		•	
Sensor value		•		•
Motor speed (rpm, %)	•	•	•	•
Power consumption	•	•	•	•
Energy consumption	•	•	•	•
Acc. flow, specific energy			•	
Operating hours	•	•	•	•
Analog input 1	•		•	
Analog input 2	•		•	
Analog input 3	• ¹⁾		• ¹⁾	
Pt100/1000 input 1	• ¹⁾		• ¹⁾	
Pt100/1000 input 2	• ¹⁾		• ¹⁾	
Analog output	• ¹⁾		• ¹⁾	
Digital input 1	•		•	
Digital input 2	• ¹⁾	•	• ¹⁾	•
Digital in/output 3	•		•	
Digital in/output 4	• ¹⁾		• ¹⁾	
Fitted modules	•	•	•	•
Controlled from		•		•

¹⁾ Only available if an advanced functional module is fitted.

Settings	TPE Series 2000 0.12 - 2.2 kW, 2-pole 0.12 - 1.1 kW, 4-pole	TPE Series 2000 3-22 kW, 2-pole 1.5 - 18.5 kW, 4-pole	TPE Series 1000 0.12 - 2.2 kW, 2-pole 0.12 - 1.1 kW, 4-pole	TPE Series 1000 3-22 kW, 2-pole 1.5 - 18.5 kW, 4-pole	Section	Page
Setpoint	•	•	•	•	Setpoint	49
Operating mode	•	•	•	•	Operating mode	49
Control mode	•	•	•	•	Control mode	49
Date and time	• ¹⁾		• ¹⁾			
Buttons on product	•	•	•	•		
Controller			•	•	Controller settings	57
Operating range	•		•	•	Operating range	58
Ramps			•		Ramps	62
Pump number	•	•	•	•	Pump number	62
Radio communication	•		•			
Sensor type				•	Sensor type	53
Analog input 1	•		•		Sensor type	53
Analog input 2	•		•			
Analog input 3	• ¹⁾		• ¹⁾			
Pt100/1000 input 1	• ¹⁾		• ¹⁾		Pt100/1000 inputs	54
Pt100/1000 input 2	• ¹⁾		• ¹⁾			
Digital input 1	•		•		Digital inputs	54
Digital input 2	• ¹⁾	•	• ¹⁾	•		
Digital in/output 3	•		•		Digital inputs/outputs	55
Digital in/output 4	• ¹⁾		• ¹⁾			
Predefined setpoint	• ¹⁾		• ¹⁾		Predefined setpoints	61
Analog output	• ¹⁾		• ¹⁾		Analog output	56
External setpoint funct.	•	•	•	•	External setpoint influence	58
Signal relay 1	•	•	•	•	Relay outputs	56
Signal relay 2	•	• ²⁾	•	• ²⁾		
Limit 1 exceeded			•		Limit-exceeded function	61
Limit 2 exceeded			•			
Standstill heating	•	•	•	•		
Motor bearing monitoring	•	•	•	•		
Service	•		•			
Store settings	•	•	•	•		
Recall settings	•	•	•	•		
Undo	•	•	•	•		
Pump name	•		•			
Unit configuration	•	•	•	•		

Alarms and warnings	TPE Series 2000 0.12 - 2.2 kW, 2-pole 0.12 - 1.1 kW, 4-pole	TPE Series 2000 3-22 kW, 2-pole 1.5 - 18.5 kW, 4-pole	TPE Series 1000 0.12 - 2.2 kW, 2-pole 0.12 - 1.1 kW, 4-pole	TPE Series 1000 3-22 kW, 2-pole 1.5 - 18.5 kW, 4-pole
Alarm log	•		•	
Warning log	•		•	
"Reset alarm" button	•		•	

¹⁾ Only available if an advanced functional module is fitted.

²⁾ Only 11-22 kW.

Assist	TPE Series 2000 0.12 - 2.2 kW, 2-pole 0.12 - 1.1 kW, 4-pole	TPE Series 2000 3-22 kW, 2-pole 1.5 - 18.5 kW, 4-pole	TPE Series 1000 0.12 - 2.2 kW, 2-pole 0.12 - 1.1 kW, 4-pole	TPE Series 1000 3-22 kW, 2-pole 1.5 - 18.5 kW, 4-pole	Section	Page
Assisted pump setup	•		•			
Assisted fault advice	•		•			
Multipump setup	•		•		Multipump setup	63

Description of selected functions

Setpoint

Pump variant	Setpoint
TPE Series 2000	0.12 - 2.2 kW, 2-pole
	0.25 - 1.1 kW, 4-pole
	3-22 kW, 2-pole
	1.5 - 18.5 kW, 4-pole
TPE Series 1000	0.12 - 2.2 kW, 2-pole
	0.25 - 1.1 kW, 4-pole
	3-22 kW, 2-pole
	1.5 - 18.5 kW, 4-pole

The setpoint for all control modes, can be set in this submenu when the desired control mode has been selected. See section *Control mode*.

Operating mode

Pump variant	Operating mode
TPE Series 2000	0.12 - 2.2 kW, 2-pole
	0.25 - 1.1 kW, 4-pole
	3-22 kW, 2-pole
	1.5 - 18.5 kW, 4-pole
TPE Series 1000	0.12 - 2.2 kW, 2-pole
	0.25 - 1.1 kW, 4-pole
	3-22 kW, 2-pole
	1.5 - 18.5 kW, 4-pole

Possible operating modes:

- Normal
The pump runs according to the selected control mode.
- Stop
The pump stops.
- Min.
The min curve mode can be used in periods in which a minimum flow is required.
- Max.
The max. curve mode can be used in periods in which a maximum flow is required.
This operating mode is for instance suitable for hot-water priority.
- Manual
The pump is operating at a manually set speed. See section *Set manual speed*.

The pump can be set to operate according to the maximum or minimum curve. See fig. 40.

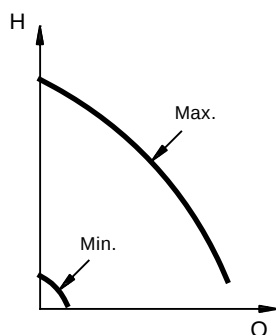


Fig. 40 Maximum and minimum curves

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Set manual speed

Pump variant	Set manual speed
TPE Series 2000	0.12 - 2.2 kW, 2-pole
	0.25 - 1.1 kW, 4-pole
	3-22 kW, 2-pole
TPE Series 1000	0.12 - 2.2 kW, 2-pole
	0.25 - 1.1 kW, 4-pole
	3-22 kW, 2-pole

The pump speed can be set in %. When the operating mode has been set to "Manual", the pump will run at the set speed.

Control mode

Pump variant	Control mode
TPE Series 2000	0.12 - 2.2 kW, 2-pole
	0.25 - 1.1 kW, 4-pole
	3-22 kW, 2-pole
	1.5 - 18.5 kW, 4-pole
TPE Series 1000	0.12 - 2.2 kW, 2-pole
	0.25 - 1.1 kW, 4-pole
	3-22 kW, 2-pole
	1.5 - 18.5 kW, 4-pole

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

Possible control modes:

- Prop. press. (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).

The setpoint for all control modes can be changed in the "Setpoint" submenu under "Settings" when the desired control mode has been selected.

Proportional pressure

Pump variant	Proportional pressure
TPE Series 2000	0.12 - 2.2 kW, 2-pole
	0.12 - 1.1 kW, 4-pole
	3-22 kW, 2-pole
TPE Series 1000	1.5 - 18.5 kW, 4-pole
	0.12 - 2.2 kW, 2-pole
	0.12 - 1.1 kW, 4-pole
	3-22 kW, 2-pole
	1.5 - 18.5 kW, 4-pole

The pump head is reduced at decreasing water demand and increased at rising water demand. See fig. 41.

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 metre. The head against a closed valve is half the setpoint, H_{set} .

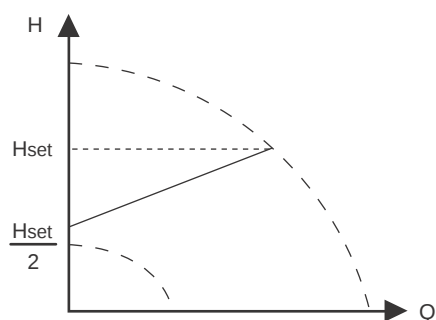


Fig. 41 Proportional pressure

Example

- Factory-fitted differential-pressure sensor.

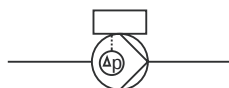


Fig. 42 Proportional pressure

Constant pressure

Pump variant	Constant pressure
TPE Series 2000	0.12 - 2.2 kW, 2-pole
	0.12 - 1.1 kW, 4-pole
	3-22 kW, 2-pole
TPE Series 1000	1.5 - 18.5 kW, 4-pole
	0.12 - 2.2 kW, 2-pole
	0.12 - 1.1 kW, 4-pole
	3-22 kW, 2-pole
	1.5 - 18.5 kW, 4-pole

The pump maintains a constant discharge pressure, independently of the flow rate. See fig. 43.

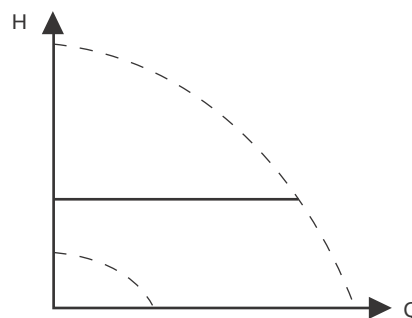


Fig. 43 Constant pressure

This control mode requires an external pressure sensor as shown in the examples below:

Examples

- One external pressure sensor.

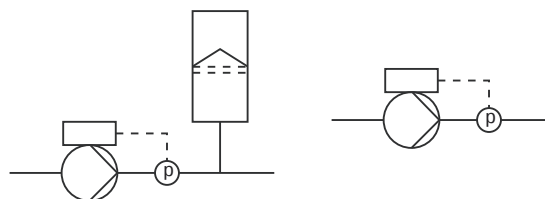
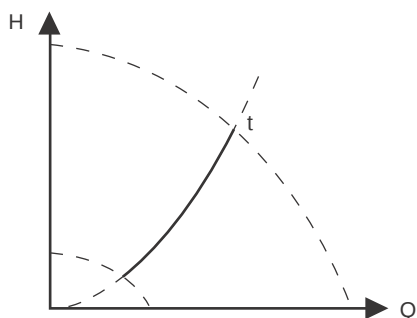


Fig. 44 Constant pressure

Constant temperature

Pump variant	Constant temperature
TPE Series 2000	0.12 - 2.2 kW, 2-pole
	0.12 - 1.1 kW, 4-pole
	3-22 kW, 2-pole
TPE Series 1000	0.12 - 2.2 kW, 2-pole
	0.12 - 1.1 kW, 4-pole
	3-22 kW, 2-pole

This control mode ensures a constant temperature. Constant temperature is a comfort control mode that can be used in domestic hot-water systems to control the flow to maintain a fixed temperature in the system. See fig. 45. When this control mode is used, you must not install any balancing valves in the system.



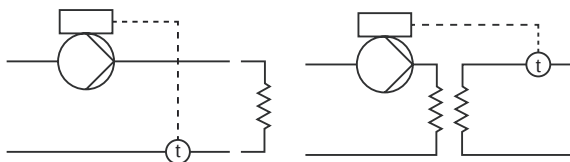
TM05 7900 1613

Fig. 45 Constant temperature

This control mode requires either an external temperature sensor as shown in the examples below:

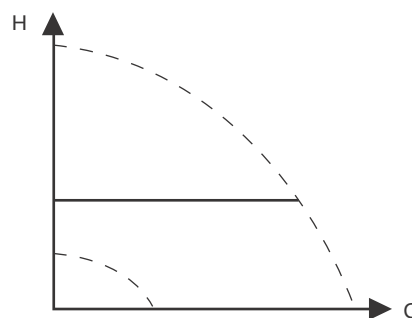
Examples

- One external temperature sensor.

**Fig. 46** Constant temperature**Constant differential pressure**

Pump variant	Constant differential pressure
TPE Series 2000	0.12 - 2.2 kW, 2-pole
	0.12 - 1.1 kW, 4-pole
	3-22 kW, 2-pole
TPE Series 1000	0.12 - 2.2 kW, 2-pole
	0.12 - 1.1 kW, 4-pole
	3-22 kW, 2-pole

The pump maintains a constant differential pressure, independently of the flow in the system. See fig. 47. This control mode is primarily suitable for systems with relatively small pressure losses.



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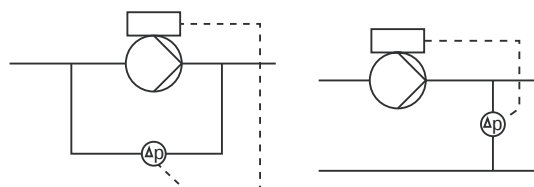
Fig. 47 Constant differential pressure

This control mode requires an external differential-pressure sensor or two external pressure sensors as shown in the examples below.

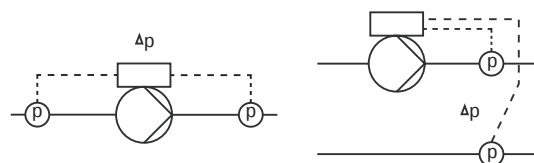
Note: TPE Series 2000 pumps fitted with 2-pole motors from 3 kW and 4-pole motors from 1.5 kW can only control differential pressure by means of the factory-fitted differential-pressure sensor.

Examples

- One external differential-pressure sensor.



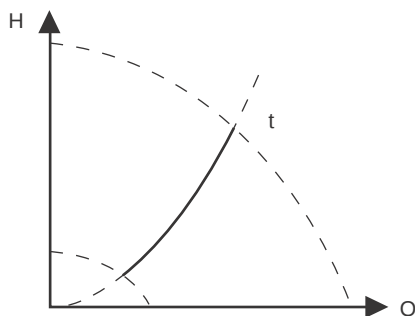
- Two external pressure sensors.
(Applies only to TPE pumps with motor sizes from 0.12 to 2.2 kW.)

**Fig. 48** Constant differential pressure

Constant differential temperature

Pump variant	Constant differential temperature
TPE Series 2000	0.12 - 2.2 kW, 2-pole
	0.12 - 1.1 kW, 4-pole
	3-22 kW, 2-pole
	1.5 - 18.5 kW, 4-pole
TPE Series 1000	0.12 - 2.2 kW, 2-pole
	0.12 - 1.1 kW, 4-pole
	3-22 kW, 2-pole
	1.5 - 18.5 kW, 4-pole

The pump maintains a constant differential temperature in the system and the pump performance is controlled according to this. See fig. 49.



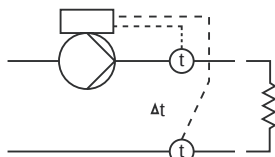
TM05 7954 1713

Fig. 49 Constant differential temperature

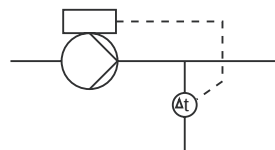
This control mode requires either two temperature sensors or one external differential-temperature sensor as shown in the examples below:

Examples

- Two external temperature sensors.
(Applies only to TPE pumps with motor sizes from 0.12 to 2.2 kW.)

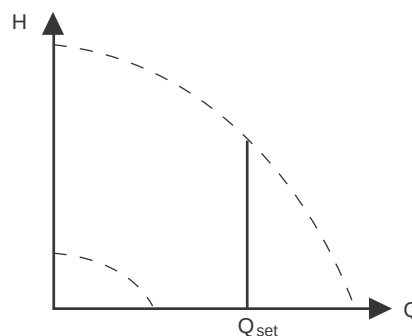


- One external differential-temperature sensor.

**Fig. 50** Constant differential temperature**Constant flow rate**

Pump variant	Constant flow rate
TPE Series 2000	0.12 - 2.2 kW, 2-pole
	0.12 - 1.1 kW, 4-pole
	3-22 kW, 2-pole
	1.5 - 18.5 kW, 4-pole
TPE Series 1000	0.12 - 2.2 kW, 2-pole
	0.12 - 1.1 kW, 4-pole
	3-22 kW, 2-pole
	1.5 - 18.5 kW, 4-pole

The pump maintains a constant flow in the system, independently of the head. See fig. 51.



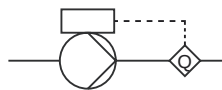
TM05 7955 1713

Fig. 51 Constant flow rate

This control mode requires an external flow sensor as shown below:

Example

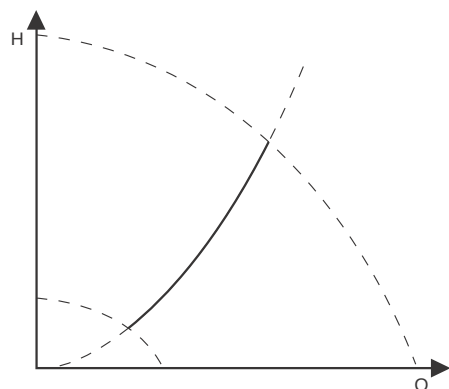
- One external flow sensor.

**Fig. 52** Constant flow rate

Constant level

Pump variant	Constant level
TPE Series 2000	0.12 - 2.2 kW, 2-pole
	0.12 - 1.1 kW, 4-pole
	3-22 kW, 2-pole
TPE Series 1000	0.12 - 2.2 kW, 2-pole
	0.12 - 1.1 kW, 4-pole
	3-22 kW, 2-pole

The pump maintains a constant level, independently of the flow rate. See fig. 53.



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Fig. 53 Constant level

This control mode requires an external level sensor.

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

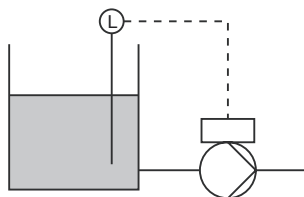
- as an emptying function where the pump draws the liquid from the tank.
- as a filling function where the pump pumps the liquid into the tank.

See fig. 54.

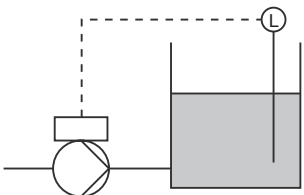
The type of level control function depends on the setting of the built-in controller. See section *Controller settings*.

Examples

- One external level sensor.
– emptying function.



- One external level sensor.
– filling function.

**Fig. 54** Constant level**Constant other value**

Pump variant	Constant other value
TPE Series 2000	0.12 - 2.2 kW, 2-pole
	0.12 - 1.1 kW, 4-pole
	3-22 kW, 2-pole
TPE Series 1000	0.12 - 2.2 kW, 2-pole
	0.12 - 1.1 kW, 4-pole
	3-22 kW, 2-pole

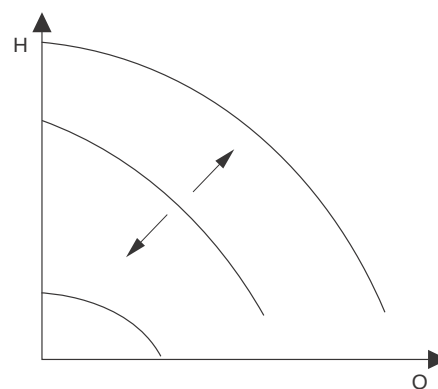
Any other value is kept constant.

Constant curve

Pump variant	Constant curve
TPE Series 2000	0.12 - 2.2 kW, 2-pole
	0.12 - 1.1 kW, 4-pole
	3-22 kW, 2-pole
TPE Series 1000	0.12 - 2.2 kW, 2-pole
	0.12 - 1.1 kW, 4-pole
	3-22 kW, 2-pole

The pump can be set to operate according to a constant curve. See fig. 55.

The desired speed can be set in % of maximum speed in the range from 25 to 100 %.



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Fig. 55 Constant curve**Sensor type**

Pump variant	Sensor type
TPE Series 2000	0.12 - 2.2 kW, 2-pole
	0.12 - 1.1 kW, 4-pole
	3-22 kW, 2-pole
TPE Series 1000	0.12 - 2.2 kW, 2-pole
	0.12 - 1.1 kW, 4-pole
	3-22 kW, 2-pole

The setting of the sensor is only relevant in the case of controlled operation.

Select among the following values:

- Sensor output signal
0-10 V
0-20 mA
4-20 mA.
- Unit of measurement of sensor:
bar, mbar, m, kPa, psi, ft, m³/h, m³/s, l/s, gpm, °C, °F, %.
- Sensor measuring range.

Analog inputs

Pump variant	Analog inputs
TPE Series 2000	0.12 - 2.2 kW, 2-pole
	0.12 - 1.1 kW, 4-pole
	3-22 kW, 2-pole
	1.5 - 18.5 kW, 4-pole
TPE Series 1000	0.12 - 2.2 kW, 2-pole
	0.12 - 1.1 kW, 4-pole
	3-22 kW, 2-pole
	1.5 - 18.5 kW, 4-pole

Available inputs depending on the functional module fitted in the pump:

Function (terminal)	FM 200 (standard)	FM 300 (advanced)
Analog input 1, setup (4)	•	•
Analog input 2, setup (7)	•	•
Analog input 3, setup (14)	-	•

To set up an analog input, make the settings below.

Function

The analog inputs can be set to these functions:

- Not active
- Feedback sensor
- Ext. setpoint infl.
See section *Setpoint influence*.
- Other function.

Measured parameter

Select one of the parameters, i.e. the parameter to be measured in the system by the sensor connected to the actual analog input.

Unit

Available measuring units:

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

Electrical signal

Select signal type (0.5 - 3.5 V, 0-5 V, 0-10 V, 0-20 mA or 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.

Pt100/1000 inputs

Pump variant	Pt100/1000 inputs
TPE Series 2000	0.12 - 2.2 kW, 2-pole
	0.12 - 1.1 kW, 4-pole
	3-22 kW, 2-pole
	1.5 - 18.5 kW, 4-pole
TPE Series 1000	0.12 - 2.2 kW, 2-pole
	0.12 - 1.1 kW, 4-pole
	3-22 kW, 2-pole
	1.5 - 18.5 kW, 4-pole

Available inputs depending on the functional module fitted in the pump:

Function (terminal)	FM 200 (standard)	FM 300 (advanced)
Pt100/1000 input 1, setup (17 and 18)	-	•
Pt100/1000 input 2, setup (18 and 19)	-	•

Function

The Pt100/1000 inputs can be set to these functions:

- Not active
- Feedback sensor (not applicable for TPE Series 2000)
- Ext. setpoint infl.
See section *Setpoint influence*.
- Other function.

Measured parameter

Select one of the parameters, i.e. the parameter to be measured in the system.

Digital inputs

Pump variant	Digital inputs
TPE Series 2000	0.12 - 2.2 kW, 2-pole
	0.12 - 1.1 kW, 4-pole
	3-22 kW, 2-pole
	1.5 - 18.5 kW, 4-pole
TPE Series 1000	0.12 - 2.2 kW, 2-pole
	0.12 - 1.1 kW, 4-pole
	3-22 kW, 2-pole
	1.5 - 18.5 kW, 4-pole

Motors from 0.12 - 2.2 kW, 2-pole and 0.12 - 1.1 kW, 4-pole

Available inputs depending on the functional module fitted in the pump:

Function (terminal)	FM 200 (standard)	FM 300 (advanced)
Digital input 1, setup (2 and 6)	•	•
Digital input 2, setup (1 and 9)	-	•

To set up a digital input, make the settings below.

Function

Select one of these functions:

- Not active
When set to "Not active", the input has no function.
- External stop
When the input is deactivated (open circuit), the pump stops.
- Min. (min. speed)
When the input is activated, the pump runs at the set min. speed.
- Max. (max. speed)
When the input is activated, the pump runs at the set max. speed.
- External fault
When the input is activated, a timer starts. If the input is activated for more than 5 seconds, the pump stops and a fault is indicated.
- Alarm resetting
When the input is activated, a possible fault indication is reset.
- Dry running
When this function is selected, you can detect lack of inlet pressure or water shortage.
When lack of inlet pressure or water shortage (dry running) is detected, 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 suction side of the pump
 - a float switch installed on the suction side of the pump.
- Accumulated flow
This function is only available for TPE Series 1000 pumps with motor sizes from 0.12 - 2.2 kW, 2-pole and 0.12 - 1.1 kW, 4-pole.
When this function is selected, you can register the accumulated flow. This requires the use of a flowmeter which can give a feedback signal as a pulse per defined flow of water.
See section *Pulse flow meter setup*.
- Predefined setpoint digit 1 (applies only to digital input 2)
When digital inputs are set to a predefined setpoint, the pump operates according to a setpoint based on the combination of the activated digital inputs.
See section *Predefined setpoints*.

Motors from 3-22 kW, 2-pole and 1.5 - 18.5 kW, 4-pole

The digital input of the pump can be set to different functions. Select one of the following functions:

- Min. (min curve)
- Max. (max. curve).

You activate the selected function by closing the contact between terminals 1 and 9.

Min.:

When the input is activated, the pump operates according to the minimum curve.

Max.:

When the input is activated, the pump operates according to the maximum curve.

Digital inputs/outputs

Pump variant	Digital inputs/outputs
TPE Series 2000	0.12 - 2.2 kW, 2-pole
	0.12 - 1.1 kW, 4-pole
	3-22 kW, 2-pole
TPE Series 1000	1.5 - 18.5 kW, 4-pole
	0.12 - 2.2 kW, 2-pole
	0.12 - 1.1 kW, 4-pole
	3-22 kW, 2-pole
	1.5 - 18.5 kW, 4-pole

Available inputs/outputs depending on the functional module fitted in the pump:

Function (terminal)	FM 200 (standard)	FM 300 (advanced)
Digital input/output 3, setup (10 and 16)	•	•
Digital input/output 4, setup (11 and 18)	-	•

To set up a digital input/output, make the settings below.

Mode

The digital input/output 3 and 4 can be set to act as digital input or digital output:

- digital input
- digital output.

Function

The digital input/output 3 and 4 can be set to these functions:

Possible functions, digital input/output 3

Function if input	Function if output
• Not active • External stop • Min. • Max. • External fault • Alarm resetting • Dry running • Accumulated flow* • Predefined setpoint digit 2	• Not active • Ready • Alarm • Operation • Pump running • Warning • Limit 1 exceeded* • Limit 2 exceeded*

* This function is only available for TPE Series 1000 pumps with motor sizes from 0.12 - 2.2 kW, 2-pole and 0.12 - 1.1 kW, 4-pole

Possible functions, digital input/output 4

Function if input	Function if output
• Not active • External stop • Min. • Max. • External fault • Alarm resetting • Dry running • Accumulated flow* • Predefined setpoint digit 3	• Not active • Ready • Alarm • Operation • Pump running • Warning • Limit 1 exceeded* • Limit 2 exceeded*

* This function is only available for TPE Series 1000 pumps with motor sizes from 0.12 - 2.2 kW, 2-pole and 0.12 - 1.1 kW, 4-pole.

Relay outputs

Pump variant		Relay outputs	
		Signal relay 1	Signal relay 2
TPE Series 2000	0.12 - 2.2 kW, 2-pole	•	•
	0.12 - 1.1 kW, 4-pole	•	•
	3 - 7.5 kW, 2-pole	-	•
	1.5 - 7.5 kW, 4-pole	-	•
	11-22 kW, 2-pole	•	•
TPE Series 1000	11 - 18.5 kW, 4-pole	•	•
	0.12 - 2.2 kW, 2-pole	•	•
	0.12 - 1.1 kW, 4-pole	•	•
	3 - 7.5 kW, 2-pole	-	•
	1.5 - 7.5 kW, 4-pole	-	•
	11-22 kW, 2-pole	•	•
	11 - 18.5 kW, 4-pole	•	•

The pump incorporates two signal relays for potential-free signalling.

You can configure the signal relays to be activated by one of the following incidents:

- Ready
- Operation
- Alarm
- Warning
- Limit 2 exceeded*
- Limit 1 exceeded*
- Pump running
- Relubricate (11-22 kW)
- Control of external fan*
- Not active.

* This function is only available for TPE Series 1000 pumps with motor sizes from 0.12 to 2.2 kW, 2-pole and 0.12 - 1.1 kW, 4-pole.

Analog output

Pump variant	Analog output	
TPE Series 1000	0.12 - 2.2 kW, 2-pole	•
	0.12 - 1.1 kW, 4-pole	•
	3-22 kW, 2-pole	-
	1.5 - 18.5 kW, 4-pole	-

Whether the analog output is available or not, depends on the functional module fitted in the pump:

Function (terminal)	FM 200 (standard)	FM 300 (advanced)
Analog output	-	•

To set up the analog output, make the settings below.

Output signal

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

Function of analog output

- Actual speed
- Actual value
- Resulting setpoint
- Motor load
- Motor current
- Limit 1 exceeded*
- Limit 2 exceeded*
- Flow rate.

* This function is only available for TPE Series 1000 pumps with motor sizes from 0.12 - 2.2 kW, 2-pole and 0.12 - 1.1 kW, 4-pole.

Controller settings

Pump variant	Controller settings
TPE Series 1000	0.12 - 2.2 kW, 2-pole
	0.12 - 1.1 kW, 4-pole
	3-22 kW, 2-pole
	1.5 - 18.5 kW, 4-pole

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, the gain and the integral time can be changed:

- Set the gain (K_p) within the range from 0.1 to 20.
- Set the integral-action time (T_i) within the range from 0.1 to 3,600 s.

If 3,600 s is selected, the controller will function as a P controller.

Furthermore, the controller can be set to inverse control. This means that if the setpoint is increased, the speed will be reduced. In the case of inverse control, the gain (K_p) must be set within the range from -0.1 to -20.

Guidelines for setting of PI controller

The tables below show the recommended controller settings:

Differential-pressure control	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 [m] between pump and sensor.

Temperature control	K_p		T_i
	Heating system ¹⁾	Cooling system ²⁾	
	0.5	-0.5	10 + 5L2
	0.5	-0.5	30 + 5L2

¹⁾ In heating systems, an increase in pump performance results in a rise in temperature at the sensor.

²⁾ In cooling systems, an increase in pump performance results in a drop in temperature at the sensor.

L2 = Distance [m] between heat exchanger and sensor.

Differential-temperature control	K_p	T_i
	-0.5	10 + 5L2

L2 = Distance [m] between heat exchanger and sensor.

Flow control	K_p	T_i
	0.5	0.5

Constant-pressure control	K_p	T_i
	0.5	0.5
	0.1	0.5

Level control	K_p	T_i
	-2.5	100
	2.5	100

General rules of thumb

If the controller is too slow-reacting, increase K_p .
If the controller is hunting or unstable, dampen the system by reducing K_p or increasing T_i .

Operating range

Pump variant	Operating range
TPE Series 1000	0.12 - 2.2 kW, 2-pole 0.12 - 1.1 kW, 4-pole 3-22 kW, 2-pole 1.5 - 18.5 kW, 4-pole

Set the operating range as follows:

- Set the minimum speed within the range from fixed minimum speed to user-set maximum speed.
- Set the maximum speed within the range from user-set minimum speed to fixed maximum speed.

The range between the user-set minimum and maximum speeds is the operating range. See fig. 56.

Note: Speeds below 25 % may result in noise from the shaft seal.

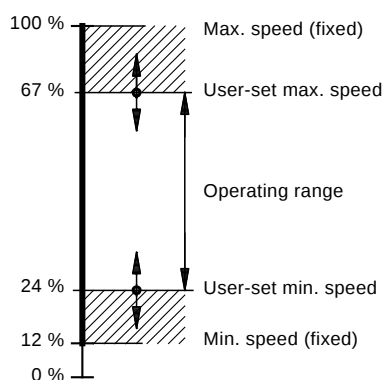


Fig. 56 Example of minimum and maximum settings

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Setpoint influence

External setpoint influence

Pump variant	External setpoint influence
TPE Series 1000	0.12 - 2.2 kW, 2-pole 0.12 - 1.1 kW, 4-pole 3-22 kW, 2-pole 1.5 - 18.5 kW, 4-pole

Motors from 0.12 - 2.2 kW, 2-pole and 0.12 - 1.1 kW, 4-pole

It is possible to influence the setpoint by an external signal, either via one of the analog inputs or, if an advanced functional module is fitted, via one of the Pt100/1000 inputs.

Note: Before the "Digital inputs" can be enabled, set one of the analog inputs or Pt100/1000 inputs to "External setpoint function".

See sections *Sensor type* and *Pt100/1000 inputs*.

If more than one input has been set up for setpoint influence, the function selects the analog input with the lowest number, for example "Analog input 2", and ignores the other inputs, for example "Analog input 3" or "Pt100/1000 input 1".

Motors from 3-22 kW, 2-pole and 1.5 - 18.5 kW, 4-pole

You can set the input for external setpoint signal to different signal types. Select one of the following types:

- 0-10 V
- 0-20 mA
- 4-20 mA
- Not active.

If you select one of the signal types, the actual setpoint is influenced by the signal connected to the external setpoint input.

Example of external setpoint influence

See fig. 57.

At a lower sensor value of 0 bar, a set setpoint of 2 bar and an external setpoint of 60 %, the actual setpoint is $0.60 \times (2 - 0) + 0 = 1.2$ bar.

Actual setpoint = actual input signal x (setpoint - lower value) + lower value.

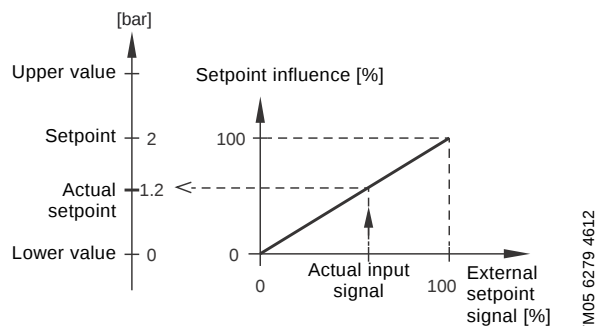


Fig. 57 Example of setpoint influence

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			
	TPE Series 2000		TPE Series 1000	
	0.12 - 2.2 kW, 2-pole 0.12 - 1.1 kW, 4-pole	3-22 kW, 2-pole 1.5 - 18.5 kW, 4-pole	0.12 - 2.2 kW, 2-pole 0.12 - 1.1 kW, 4-pole	3-22 kW, 2-pole 1.5 - 18.5 kW, 4-pole
Not active	•	•	•	•
Linear function	•	•	•	•
Linear with Stop	-	-	•	-
Linear with Min.	•	-	•	-
Inverse function	-	-	•	-
Inverse with Stop	-	-	•	-
Inverse with Min.	-	-	•	-
Influence table	-	-	•	-
Influence table with Stop at Min.	-	-	•	-
Influence table with Stop at Max.	-	-	•	-

You can select between 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 fig. 58.

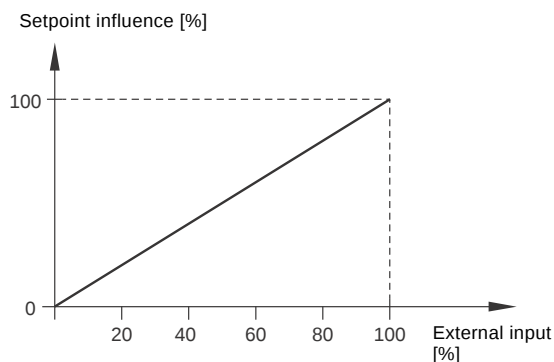


Fig. 58 Linear function

- "Linear with Stop" and "Linear with Min."
 - 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 changes back to "Normal". See fig. 59.
 - Linear with Min.
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 "Min.". If the input signal is increased above 15 %, the operating mode is changed back to "Normal". See fig. 59.

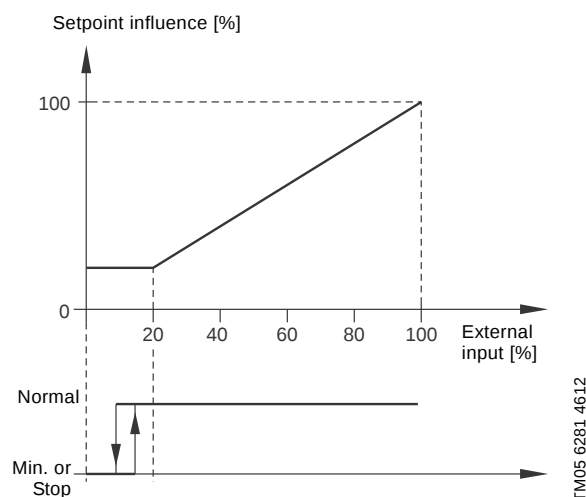


Fig. 59 "Linear with Stop" and "Linear with Min."

- Inverse function
The setpoint is influenced inversely from 0 to 100 %.
See fig. 60.

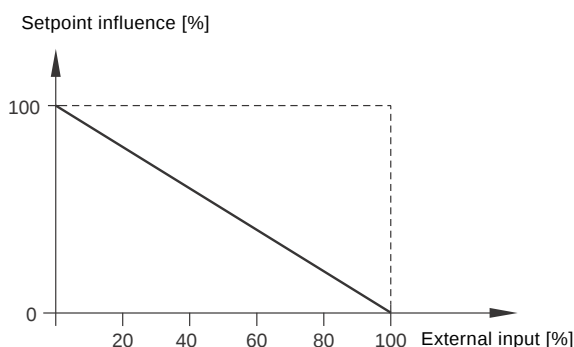


Fig. 60 Inverse function

- "Inverse with Stop" and "Inverse with Min."
 - Inverse with Stop
In the input signal range from 0 to 80 %, the setpoint is influenced inversely.
If the input signal is above 90 %, the pump changes to operating mode "Stop".
If the input signal is reduced below 85 %, the operating mode is changed back to "Normal".
See fig. 61.
 - Inverse with Min.
In the input signal range from 0 to 80 %, the setpoint is influenced inversely.
If the input signal is above 90 %, the pump changes to operating mode "Min.".
If the input signal is reduced below 85 %, the operating mode is changed back to "Normal".
See fig. 61.

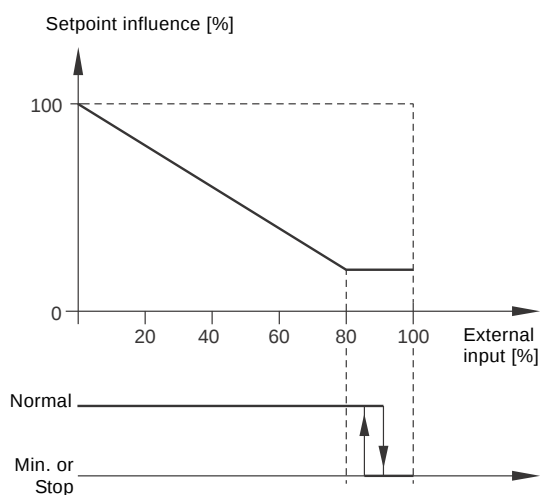


Fig. 61 "Inverse with Stop" and "Inverse with Min."

- 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.

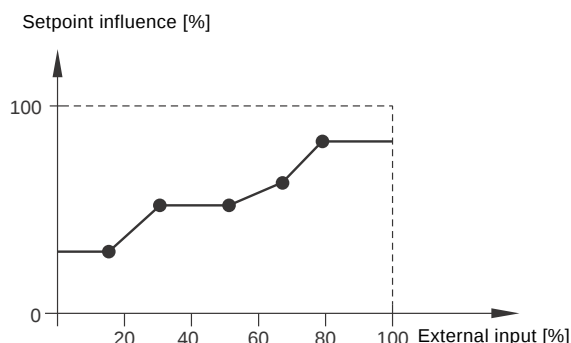


Fig. 62 Influence table

- Influence table with Stop at Min.
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.
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 fig. 63.

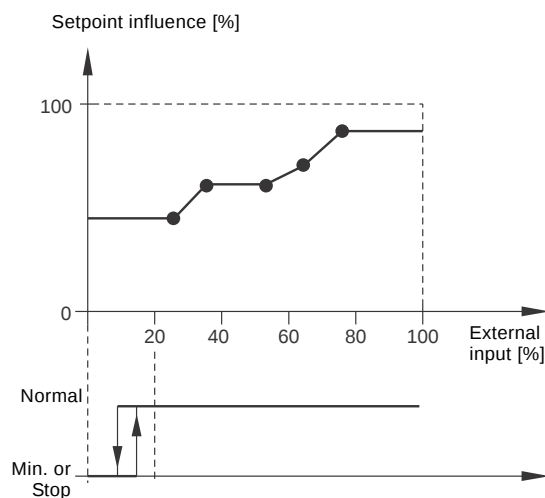


Fig. 63 Influence table with Stop at Min.

- Influence table with Stop at Max.

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.

If the input signal is above 90 %, the pump changes to operating mode "Min."

If the input signal is reduced below 85 %, the operating mode is changed back to "Normal".

See fig. 64.

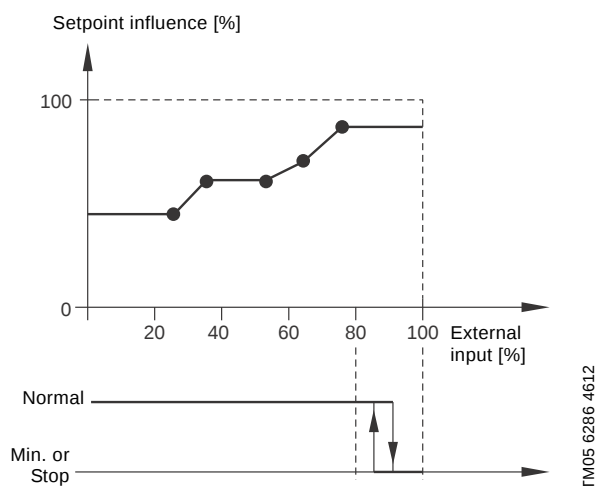


Fig. 64 Influence table with Stop at Max.

Predefined setpoints

Pump variant	Predefined setpoints
TPE Series 2000	0.12 - 2.2 kW, 2-pole
	0.12 - 1.1 kW, 4-pole
	3-22 kW, 2-pole
	1.5 - 18.5 kW, 4-pole
TPE Series 1000	0.12 - 2.2 kW, 2-pole
	0.12 - 1.1 kW, 4-pole
	3-22 kW, 2-pole
	1.5 - 18.5 kW, 4-pole

You can set and activate seven predefined setpoints by combining the input signals to digital inputs 2, 3 and 4 as shown in the table below.

Digital inputs			Setpoint
2	3	4	
0	0	0	Normal setpoint
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

Monitoring functions

Limit-exceeded function

Pump variant	Limit-exceeded function
TPE Series 2000	0.12 - 2.2 kW, 2-pole
	0.12 - 1.1 kW, 4-pole
	3-22 kW, 2-pole
TPE Series 1000	0.12 - 2.2 kW, 2-pole
	0.12 - 1.1 kW, 4-pole
	3-22 kW, 2-pole

This function can monitor set limits of analog values. It will react if the values exceed the limits. Each limit can be set as a maximum or minimum value. For each of the monitored values, you must define a warning limit and an alarm limit.

The function makes it possible to monitor two different locations in a pump system at the same time.

For instance the pressure at a consumer and the pump discharge pressure. This ensures that the discharge pressure does not reach a critical value.

If the value exceeds the warning limit, a warning is given. If the value exceeds the alarm limit, the pumps stop.

A delay can be set between the detection of an exceeded limit and the activation of a warning or an alarm. A delay can also be set for resetting a warning or an alarm.

A warning can be reset automatically or manually.

It is possible to set whether the system is to restart automatically after an alarm, or if the alarm must be reset manually. Restarting can be delayed by an adjustable time. It is also possible to set a startup delay ensuring that the system reaches a steady state before the function becomes active.

Special functions

Pulse flow meter setup

Pump variant	Pulse flow meter setup
TPE Series 2000	0.12 - 2.2 kW, 2-pole
	0.12 - 1.1 kW, 4-pole
	3-22 kW, 2-pole
	1.5 - 18.5 kW, 4-pole
TPE Series 1000	0.12 - 2.2 kW, 2-pole
	0.12 - 1.1 kW, 4-pole
	3-22 kW, 2-pole
	1.5 - 18.5 kW, 4-pole

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 [kWh/m³].

To enable a pulse flowmeter, one of the digital-input functions must be set to "Accumulated flow" and the pumped volume per pulse must be set. See section *Digital inputs*.

Ramps

Pump variant	Ramps
TPE Series 2000	0.12 - 2.2 kW, 2-pole
	0.12 - 1.1 kW, 4-pole
	3-22 kW, 2-pole
	1.5 - 18.5 kW, 4-pole
TPE Series 1000	0.12 - 2.2 kW, 2-pole
	0.12 - 1.1 kW, 4-pole
	3-22 kW, 2-pole
	1.5 - 18.5 kW, 4-pole

The setting of ramps is only relevant in the case of constant-curve operation.

The ramps determine how quickly the motor can accelerate and decelerate, respectively, during start/stop or setpoint changes.

You can set the following:

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

The times apply to the acceleration from stop to rated speed and the deceleration from rated speed to stop, respectively.

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

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

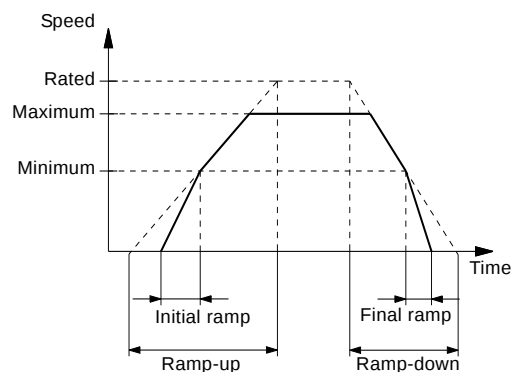


Fig. 65 Ramp-up and ramp-down

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Communication

Pump number

Pump variant	Pump number
TPE Series 2000	0.12 - 2.2 kW, 2-pole
	0.12 - 1.1 kW, 4-pole
	3-22 kW, 2-pole
	1.5 - 18.5 kW, 4-pole
TPE Series 1000	0.12 - 2.2 kW, 2-pole
	0.12 - 1.1 kW, 4-pole
	3-22 kW, 2-pole
	1.5 - 18.5 kW, 4-pole

You can allocate a unique number to the pump. This makes it possible to distinguish between pumps in connection with bus communication.

Enable/disable radio communication

Pump variant	Pump number
TPE Series 2000	0.12 - 2.2 kW, 2-pole
	0.12 - 1.1 kW, 4-pole
	3-22 kW, 2-pole
	1.5 - 18.5 kW, 4-pole
TPE Series 1000	0.12 - 2.2 kW, 2-pole
	0.12 - 1.1 kW, 4-pole
	3-22 kW, 2-pole
	1.5 - 18.5 kW, 4-pole

You can either enable or disable the radio communication.

General settings

Language

Pump variant	Language
TPE Series 2000	0.12 - 2.2 kW, 2-pole
	0.12 - 1.1 kW, 4-pole
	3-22 kW, 2-pole
	1.5 - 18.5 kW, 4-pole
TPE Series 1000	0.12 - 2.2 kW, 2-pole
	0.12 - 1.1 kW, 4-pole
	3-22 kW, 2-pole
	1.5 - 18.5 kW, 4-pole

A number of languages is available.

Measuring units are automatically changed according to selected language.

Units

In this menu, you can select between SI and US units. The setting can be made generally for all parameters or customised for each individual parameter.

Enable/disable settings

In this display, you can disable the possibility of making settings for protective reasons.

To unlock the pump and allow settings, press $\wedge$ and $\vee$ simultaneously for at least 5 seconds.

Delete history

In this menu, you can delete the following historic data:

- Delete work log.
- Delete heat energy data.
- Delete energy consumption.

Define Home display

In this menu, you can select whether the "Home" display should show various user-defined parameters or a graphical illustration of a performance curve with the actual duty point of the pump.

Display settings

In this menu you can adjust the display brightness and define whether or not the display should turn off if no buttons have been touched for a period of time.

Store actual settings

In this menu you can store the actual settings for later use.

Recall stored settings

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

Run startup guide

The startup guide guides you through the general settings of the pump.

Assist

Multipump setup

Pump variant	Multipump setup
TPE Series 2000	0.12 - 2.2 kW, 2-pole
	0.12 - 1.1 kW, 4-pole
	3-22 kW, 2-pole
	1.5 - 18.5 kW, 4-pole
TPE Series 1000	0.12 - 2.2 kW, 2-pole
	0.12 - 1.1 kW, 4-pole
	3-22 kW, 2-pole
	1.5 - 18.5 kW, 4-pole

The multipump function enables the control of 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 GENlair connection or the wired GENI connection.

A multipump system is set up via a selected pump, i.e. the master pump (the first selected pump). All Grundfos pumps with a wireless GENlair connection can be connected to the multipump system.

The multipump functions are described in the following sections.

Alternating operation

Only one pump is operating at a time.

The change from one pump to the other depends on time or energy. If a pump fails, the other pump takes over automatically.

Pump system:

- Twin-head pump.
- Two single-head pumps connected in parallel.
The pumps must be of the same type and size.
Each pump requires a non-return valve in series with the pump.

Backup operation

One pump is operating continuously. The backup pump is operated at intervals to prevent seizing up. If the duty pump stops due to a fault, the backup pump starts automatically.

Pump system:

- Twin-head pump.
- Two single-head pumps connected in parallel.
The pumps must be of the same type and size.
Each pump requires a non-return valve in series with the pump.

Cascade operation

Cascade operation ensures that the pump performance is automatically adapted to the consumption by switching pumps on or off. The system thus runs as energy-efficiently as possible with a constant pressure and a limited number of pumps.

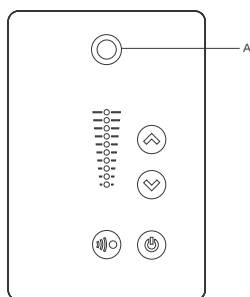
All pumps in operation run at equal speed. Pump changeover is automatic and depends on energy, operating hours and fault.

Pump system:

- Two to four single-head pumps connected in parallel.
The pumps must be of the same type and size.
Each pump requires a non-return valve in series with the pump.
- Set the control mode to "Const. pressure", Const. diff. pressure or "Const. curve".

Grundfos Eye

The operating condition of the motor is indicated by the Grundfos Eye on the control panel. See fig. 66, pos. A.



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Fig. 66 Grundfos Eye

Grundfos Eye	Indication	Description
	No lights on.	Power off. Motor not running.
	Two opposite green indicator lights rotating in the direction of rotation of the motor when seen from the non-drive end.	Power on. Motor running.
	Two opposite green indicator lights permanently on.	Power on. Motor not running.
	One yellow indicator light rotating in the direction of rotation of the motor when seen from the non-drive end.	Warning. Motor running.
	One yellow indicator light permanently on.	Warning. Motor stopped.
	Two opposite red indicator lights flashing simultaneously.	Alarm. Motor stopped.
	The green indicator light in the middle flashes quickly four times.	Remote control with the Grundfos GO Remote via radio. The motor is trying to communicate with the Grundfos GO Remote. The motor in question is highlighted in the Grundfos GO Remote display to inform the user of the location of the motor.
	The green indicator light in the middle flashes continuously.	When the motor in question is selected in the Grundfos GO Remote menu, the green indicator light in the middle will flash continuously. Press on the motor control panel to allow remote control and data exchange via the Grundfos GO Remote.
	The green indicator light in the middle is permanently on.	Remote control with the Grundfos GO Remote via radio. The motor is communicating with the Grundfos GO Remote via radio connection.
	The green indicator light in the middle flashes quickly while the Grundfos Go Remote is exchanging data with the motor. It will take a few seconds.	Remote control with the Grundfos GO Remote via infrared light. The motor is receiving data from the Grundfos GO Remote via infrared communication.

Indicator lights and signal relays

The following applies to the pumps below:

- TPE Series 1000 and 2000 pumps with the following motor sizes:
 - 0.12 - 2.2 kW, 2-pole
 - 0.12 - 1.1 kW, 4-pole

The motor has two outputs for potential-free signals via two internal relays.

The signal outputs can be set to "Operation", "Pump running", "Ready", "Alarm" and "Warning".

The functions of the two signal relays appear from the table below:

Description	Grundfos Eye	Contact position for signal relays when activated					Operating mode
		Operation	Pump running	Ready	Alarm	Warning	
Power off.	 Off						-
Pump running in "Normal" mode.	 Green, rotating						Normal, Min. or Max.
Pump running in "Manual" mode.	 Green, rotating						Manual
Pump in operating mode "Stop".	 Green, steady						Stop
Warning, but the pump is running.	 Yellow, rotating						Normal, Min. or Max.
Warning, but the pump is running in "Manual" mode.	 Yellow, rotating						Manual
Warning, but the pump was stopped via "Stop" command.	 Yellow, steady						Stop
Alarm, but the pump is running.	 Red, rotating						Normal, Min. or Max.
Alarm, but the pump is running in "Manual" mode.	 Red, rotating						Manual
Pump stopped due to an alarm.	 Red, flashing						Stop

The following applies to the pumps below:

- TPE Series 1000 and 2000 pumps with the following motor sizes:
3-22 kW, 2-pole
1.5 - 18.5 kW, 4-pole

The operating condition of the pump is indicated by the green (pos. A) and red (pos. B) indicator lights on the pump control panel and inside the terminal box. See fig. 67.

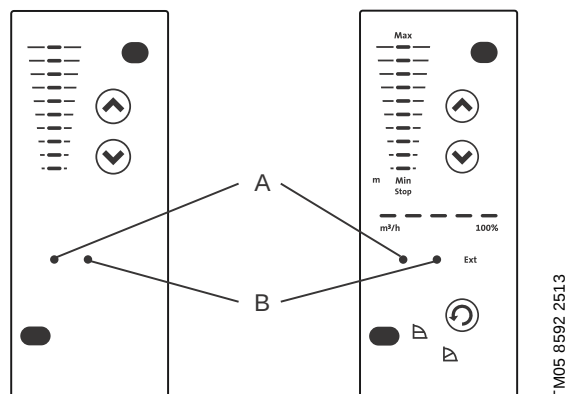


Fig. 67 Position of indicator lights

Furthermore, the pump incorporates an output for a potential-free signal via an internal relay.

The functions of the two indicator lights and the signal relay are as shown in the following table:

Indicator lights		Signal relay activated during:				Description
Fault (red)	Operation (green)	Fault/Alarm, Warning and Relubricate	Operating	Ready	Pump running	
Off	Off					The power supply has been switched off.
Off	Permanently on					The pump is operating.
Off	Flashing					The pump has been set to stop.
Permanently on	Off					The pump has stopped because of a "Fault" / "Alarm" or is running with a "Warning" or "Relubricate" indication. If the pump was stopped, restarting will be attempted (it may be necessary to restart the pump by resetting the "Fault" indication).
Permanently on	Permanently on					The pump is operating, but it has or has had a "Fault" / "Alarm" allowing the pump to continue operation or it is operating with a "Warning" or "Relubricate" indication. If the cause is "Sensor signal outside signal range", the pump will continue operating according to the max. curve, and the fault indication cannot be reset until the signal is inside the signal range. If the cause is "Setpoint signal outside signal range", the pump will continue operating according to the minimum curve, and the fault indication cannot be reset until the signal is inside the signal range.
Permanently on	Flashing					The pump has been set to stop, but it has been stopped because of a "Fault".

Resetting of fault indication

You can reset a fault indication in one of the following ways:

- Briefly press or on the pump. This will not change the setting of the pump. A fault indication cannot be reset by means of or 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.
- Use the Grundfos GO Remote.

13. Communication

Communication with TPE, TPED pumps

Communication with TPE, TPED pumps is possible via a central building management system, remote control (Grundfos GO Remote) or control panel.

Central building management system

The operator can communicate with a TPE, TPED 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.

Remote control

The operator can monitor and change control modes and settings of the pump with the Grundfos GO Remote. See section *Grundfos GO Remote* on page 47.

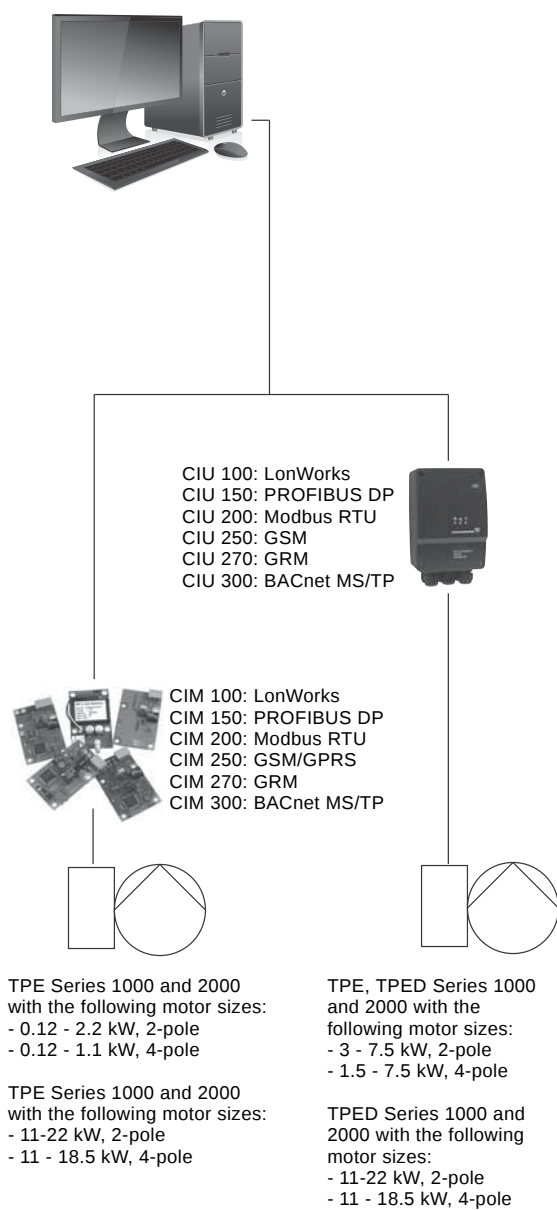


Fig. 68 Structure of a central building management system

14. Speed regulation of TPE pumps

Affinity equations

Normally, TPE, TPED pumps are used in applications characterised by a variable flow. Consequently, it is not possible to 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, TPE, TPED pumps have an infinite number of performance curves each representing a specific speed. It may therefore not be possible to select a duty point close to the maximum curve.

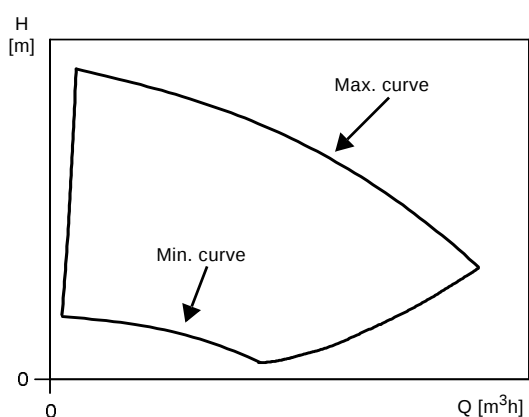


Fig. 69 Minimum and maximum performance curves

In situations where it is not possible to 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 n_n and n_x , and that it is based on the following formula: $H = k \times Q^2$ where k is a constant.

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

Finally, it is worth noting that the efficiency of the frequency converter and the motor must be taken into account if you want a precise calculation of the power saving resulting from a reduction of the pump speed.

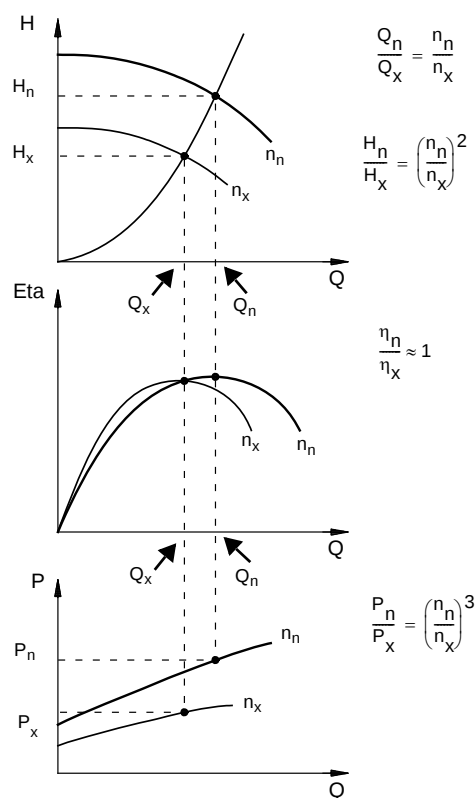


Fig. 70 Affinity equations

Legend

H_n	Rated head in metres
H_x	Current head in metres
Q_n	Rated flow rate in m³/h
Q_x	Current flow rate in m³/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

WinCAPS and WebCAPS

WinCAPS and WebCAPS are selection programs offered by Grundfos.

The two programs make it possible to calculate the specific duty point and energy consumption of a TPE pump.

When you enter the dimensions of the pump, WinCAPS and WebCAPS calculate the exact duty point and energy consumption. For further information, see page 239.

15. TP, TPE pumps in parallel

Control of TP, TPE pumps connected 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 TP, TPE pumps connected in parallel.

Parallel-operation control possibilities	TP	TPE, TPED Series 2000	TPE, TPED Series 1000
		0.12 - 2.2 kW, 2-pole 0.12 - 1.1 kW, 4-pole 3-22 kW, 2-pole 1.5 - 18.5 kW, 4-pole	0.12 - 2.2 kW, 2-pole 0.12 - 1.1 kW, 4-pole 3-22 kW, 2-pole 1.5 - 18.5 kW, 4-pole
Built-in alternation/standby function		• • ¹⁾	• • ¹⁾
Built-in parallel operation function		• ²⁾	• ²⁾
Control MPC		•	• •
Control MPC Series 2000		• •	

• Available.

¹⁾ Applies only to TPED pumps.

²⁾ Applies only to TPE pumps.

Alternation/standby function of TPED pumps

The alternation/standby function is activated from factory and "Alternating" mode is selected as default. See pages 32 and 35.

TP, TPE pumps connected to Control MPC

You can connect TP, TPE pumps directly to Grundfos Control MPC.

Control MPC incorporates a CU 352 controller 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.

The 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 the 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

The CU 352 incorporates application-optimised software which helps you set up your system to the application in question.

Furthermore, navigating through the menus of the controller is done in a user-friendly way. You do not need any training to be able to set and monitor the system.

Ethernet connection

The 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 the 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 a Grundfos CIU.

TPE Series 2000 pumps connected to Control MPC Series 2000

TPE Series 2000 pumps are connected directly to Grundfos Control MPC Series 2000 via GENIbus.

Control MPC Series 2000 incorporates a CU 352 controller 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 titled "Control MPC". The data booklet is available in WebCAPS, on www.grundfos.com. For further information on WebCAPS, see page 239.

16. Grundfos CUE

TP pumps connected to Grundfos CUE, external frequency converters



GrA 4404

Fig. 71 Grundfos CUE

Grundfos CUE is a complete range of wall-mounted frequency converters for pump control in a wide range of applications.

Grundfos CUE 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



TM04 3283 4108

Fig. 72 Grundfos CUE user interface

Grundfos CUE features a unique user-friendly control panel with graphic display and easy-to-use buttons.

Controlling the value you choose

Grundfos CUE 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 differential 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 x 200-240	3 x 200-240	1.1 - 7.5
3 x 200-240	3 x 200-240	0.75 - 45
3 x 380-500	3 x 380-500	0.55 - 250
3 x 525-600	3 x 525-600	0.75 - 7.5
3 x 525-690	3 x 525-690	11-250

External communication

Grundfos CUE can communicate with LonWorks, PROFIBUS, Modbus, BACnet or GSM/GPRS via a Grundfos CIU.

17. 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)
TP Series 400	IM 3001 (IM B 5) / IM 3011 (IM V 1)
Relative humidity:	Max. 95 %
Enclosure class:	IP55
Insulation class:	F (IEC 85)
Ambient temperature:	Max. 55 °C (Siemens motors) Max. 60 °C (MG motors) Max. 50 °C (2-pole MGE motors below 3 kW and 4-pole MGE motors below 1.5 kW) Max. 40 °C (other motors) Min. -30 °C

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 motors

TP pumps are fitted with high-efficiency motors.

TP, TPD pumps with three-phase motors from 0.75 to 375 kW are fitted with IE3 motors.

TPE, TPED pumps with 2-pole motors below 3 kW and 4-pole motors below 1.5 kW are fitted with permanent-magnet motors that have an efficiency that exceeds the IE4 demands - including the energy consumption of the integrated frequency converter (compared to IE levels in IEC 60034-30-1 Ed. 1 (CD)).

TPE, TPED pumps with three-phase 2-pole motors from 3 to 22 kW are fitted with motors equivalent to IE3.

TPE, TPED pumps with three-phase 4-pole motors from 1.5 to 15 kW are fitted with motors equivalent to IE3.

TPE, TPED pumps with 4-pole, three-phase motors of 18.5 kW are fitted with motors equivalent to IE2.

Motor range

kW	Mains-operated motors			Electronically speed-controlled motors						
	2-pole	4-pole	6-pole	2-pole	4-pole					
0.12	Siemens	Siemens		MGE*	MGE*					
0.18										
0.25										
0.37	MG									
0.55										
0.75										
1.1										
1.5	MG	Siemens		MGE						
2.2										
3.0	MGE									
4.0										
5.5										
7.5										
11.0	MGE									
15.0										
18.5						Siemens				
22.0										
30.0										
37.0										
45.0										
55.0										
75.0										
90.0										
110.0										
132.0										
160.0										
200.0										
250.0										
315.0										
355.0										
400.0										
500.0										
560.0										
630.0										

* Permanent-magnet motors
MG and MGE are Grundfos motor brands.
Siemens is a sourced high-quality motor brand.
The grey-shaded areas indicate non-available motors.

Electrical data, mains-operated motors

Electrical data, 2-pole 1 x 220-230/240 V

Motor [kW]	I _{1/1} [A]	Cos φ 1/1	η [%]	n [min ⁻¹]	I _{Start} / I _{1/1}
0.12	1.05	1.0	65	2,800-2,840	3.2 - 3.6
0.18	1.34	0.94	62	2,895	4.3
0.25	2.05 / 2	0.99	58	2,800	-
0.37	2.95 / 2.7	0.99	60	2,770	2.8
0.55	4 / 3.65	0.99	66	2,750	2.8
0.75	5.1 / 4.75	0.99	69	2,780	3.0
1.1	7.4 / 6.7	0.98 - 0.99	-	2,770	3.9 / 3.9
1.5	9.9 / 8.9	0.98 - 0.99	72-74	2,750-2,740	3.9 / 3.9

Electrical data, 2-pole 3 x 220-240/380-415 V

Motor [kW]	I _{1/1} [A]	Cos φ 1/1	η [%]	n [min ⁻¹]	I _{Start} / I _{1/1}
0.12	0.59 / 0.34	0.8 - 0.72	71	2,800-2,850	4.2 - 4.6
0.18	0.9 / 0.52	0.79 - 0.71	67	2,800-2,850	4.5
0.25	1.18 / 0.68	0.81 - 0.72	73	2,800-2,850	4.0 - 4.4
0.37	1.74 / 1	0.8 - 0.7	78.5	2,850-2,880	4.9 - 5.3
0.55	2.5 / 1.44	0.8 - 0.7	80	2,830-2,850	1.9
0.75	3.3 / 1.9	0.81 - 0.71	80.7	2,840-2,870	5.8 - 6.2
1.1	4.35 - 2.5	0.83 - 0.76	82.7	2,840-2,870	4.5 - 5.0
1.5	5.45 / 3.15	0.87 - 0.82	84.2	2,890-2,910	8.5 - 9.3
2.2	7.70 / 4.45	0.89 - 0.87	85.9	2,890-2,910	8.5 - 9.5
3.0	11.0 / 6.3	0.87 - 0.82	87.1	2,900-2,920	8.4 - 9.2
4.0	13.6 / 7.9	0.87	88.1	2,920-2,940	10 - 11.1
5.5	19.0 - 11.0	0.87 - 0.82	89.2	2,920-2,940	10.8 - 11.8
7.5	25.0 - 24.2 / 14.4 - 14.0	0.88 - 0.82	90.4	2,910-2,920	7.8 - 9.1
11.0	36.0 - 34.5 / 20.8 - 19.8	0.88 - 0.84	91.2	2,940-2,950	6.6 - 7.8
15.0	48.5 - 45.0 / 28.0 - 26.0	0.89 - 0.87	91.9	2,930-2,950	6.6 - 7.8
18.5	59.0 - 53.5 / 34.0 - 31.0	0.90 - 0.89	92.4	2,930-2,950	7.1 - 8.5
22.0	68.5 / 39.5	0.90	92.7	2,950	8.3

Electrical data, 2-pole 3 x 220-240/380-420 V

Motor [kW]	I _{1/1} [A]	Cos φ 1/1	η [%]	n [min ⁻¹]	I _{Start} / I _{1/1}
30.0	98.0 - 91.0 / 56.0 - 53.0	0.86	93.3	2,955	7.8
37.0	118-110 / 68.0 - 64.0	0.86	93.7	2,950	7.6
45.0	140-132 / 81.0 - 76.0	0.89	94	2,960	7.3
55.0	172-160 / 99.0 - 92.0	0.89	94.3	2,975	7.0
75.0	236-220 / 136 - 126	0.89	94.7	2,975	7.2

Electrical data, 2-pole 3 x 380-415/660-690 V

Motor [kW]	I _{1/1} [A]	Cos φ 1/1	η [%]	n [min ⁻¹]	I _{Start} / I _{1/1}
2.2	4.45	0.89 - 0.87	85.9	2,890-2,910	8.5 - 9.5
3.0	6.3	0.87 - 0.82	87.1	2,900-2,920	8.4 - 9.2
4.0	7.9	0.87	88.1	2,920-2,940	10 - 11
5.5	11.0	0.87 - 0.82	89.2	2,920-2,940	10.8 - 11.8
7.5	14.4 - 14.0 / 8.3 - 8.1	0.88 - 0.82	90.4	2,910-2,920	7.8 - 9.1
11.0	20.8 - 19.8 / 12.0 - 11.8	0.88 - 0.84	91.2	2,940-2,950	6.6 - 7.8
15.0	28.0 - 26.0 / 16.2 - 15.6	0.89 - 0.87	91.9	2,930-2,950	6.6 - 7.8
18.5	34.0 - 31.0 / 19.6 - 18.8	0.90 - 0.89	92.4	2,930-2,950	7.1 - 8.5
22.0	39.5 / 22.8	0.90	92.7	2,950	8.3
30.0	55.0 - 51.0 / 31.5 - 30.0	0.88	93.5	2,960	7.0
37.0	67.0 - 63.0 / 38.5 - 36.0	0.89	94.1	2,960	7.2
45.0	77 / 44.5	0.89	94.9	2,970	7.3
55.0	93 / 53.7	0.9	95.3	2,980	6.8
75.0	128 / 73.9	0.89	95.2	2,980	7.0
90.0	147.0 / 85.0	0.90	95.0	2,975	7.2
110.0	176.0 / 102.0	0.91	95.2	2,982	7.1
132.0	210.0 / 121.0	0.91	95.4	2,982	7.2
160.0	255.0 / 147.0	0.92	95.6	2,982	7.8

Electrical data, 2-pole 3 x 380-420/660-690 V

Motor [kW]	I _{1/1} [A]	Cos φ 1/1	η [%]	n [min ⁻¹]	I _{Start} / I _{1/1}
30.0	56.0 - 52.0 / 32.5 - 30.0	0.86	93.3	2,955	7.8
37.0	68.0 - 63.0 / 39.0 - 36.5	0.86	93.7	2,950	7.6
45.0	81.0 - 75.0 / 47.0 - 43.5	0.89	94.0	2,960	7.3
55.0	99.0 - 91.0 / 57.0 - 53.0	0.89	94.3	2,975	7.0
75.0	136 - 126 / 78.0 - 73.0	0.89	94.7	2,975	7.2

Electrical data, 4-pole 1 x 220-230/240 V

Motor [kW]	I _{1/1} [A]	Cos φ 1/1	η [%]	n [min ⁻¹]	I _{Start} / I _{1/1}
0.12	0.99	0.99	53.1	1434	2.58
0.18	1.62	0.97	54	1,350-1,370	2.0
0.25	2.14	0.97	57	1,350-1,370	2.2
0.37	2.85	0.97	62	1,350-1,370	2.4
0.55	4	0.97	66	1,350-1,370	2.6
0.75	5.45	0.96	71	1,390-1,410	3.2
1.1	7	0.96	75	1,420-1,430	3.9

Electrical data, 4-pole 3 x 220-240/380-415 V

Motor [kW]	I _{1/1} [A]	Cos φ 1/1	η [%]	n [min ⁻¹]	I _{Start} / I _{1/1}
0.12	0.78 / 0.45	0.67	54	1380	3.2
0.25	1.48 / 0.85	0.75 - 0.65	69	1,400-1,420	4.0 - 4.4
0.37	1.9 / 1.1	0.77 - 0.67	71	1,400-1,420	4.0 - 4.4
0.55	2.6 / 1.5	0.79 - 0.7	77	1,390-1,410	4.3 - 4.7
0.75	3.3 / 1.9	0.76 - 0.71	82.5	1,440-1,450	6.6 - 7.2
1.1	4.85 / 2.0	0.71 - 0.64	84.1	1,450-1,460	8.2 - 9.0
1.5	6.15 - 6.3 / 3.55 - 3.65	0.75 - 0.68	85.3	1,450-1,460	7.3 - 7.9
2.2	8.5 / 4.9	0.79 - 0.73	86.7	1,450	6.0 - 6.6
3.0	11.0 / 6.3	0.82 - 0.76	87.7	1,440-1,450	7.0 - 7.7
4.0	16.2 / 9.3	0.75 - 0.68	88.6	1,460	7.9 - 8.7
5.5	19.0 / 11.0	0.86 - 0.80	89.6	1,460	7.6
7.5	26.0 - 24.6 / 14.9 - 14.2	0.86 - 0.82	90.4	1,460	6.8 - 7.8
11.0	36.5 - 35.5 / 21.2 - 20.4	0.86 - 0.81	91.4	1,470-1,470	7.1 - 8.1
15.0	50.0 - 48.5 / 29.0 - 28.0	0.86 - 0.82	92.1	1,460-1,470	7.6 - 8.7
18.5	64.0 - 58.0 / 37.0 - 33.5	0.82	92.6	1,470	6.9
22.0	73.5 - 70.0 / 42.5 - 40.5	0.83	93.0	1,470	6.8
30.0	99.5 - 93.5 / 57.5 - 54.0	0.84	93.6	1,470	6.9

Electrical data, 4-pole 3 x 380-415/660-690 V

Motor [kW]	I _{1/1} [A]	Cos φ 1/1	η [%]	n [min ⁻¹]	I _{Start} / I _{1/1}
2.2	1.9	0.76 - 0.71	82.5	1,440-1,450	6.6 - 7.2
3.0	6.3	0.82 - 0.76	87.7	1,440-1,450	7.0 - 7.7
4.0	9.3	0.75 - 0.68	88.6	1,460	7.9 - 8.7
5.5	11.0 - 11.0 / 6.35 - 6.35	0.86 - 0.80	89.6	1,460	7.0 - 7.6
7.5	14.9 - 14.2 / 8.6 - 8.4	0.86 - 0.82	90.4	1,460	6.8 - 7.8
11.0	21.2 - 20.4 / 12.2 - 12.0	0.86 - 0.81	91.4	1,460-1,470	7.1 - 8.1
15.0	29.0 - 28.0 / 16.8 - 16.4	0.86 - 0.82	92.1	1,460-1,470	7.6 - 8.7
18.5	37.0 - 33.5 / 21.5 - 20.5	0.82	92.6	1,470	6.9
22.0	42.5 - 40.5 / 24.5 - 24.0	0.83	93.0	1,470	6.8
30.0	57.5 - 54.0 / 33.5 - 32.0	0.84	93.6	1,470	6.9
37.0	69.0 - 64.0 / 39.5 - 38.5	0.86	93.9	1,478	6.4
45.0	83.0 - 77.0 / 48.0 - 46.5	0.86	94.2	1,478	6.4
55.0	100.0 - 93.0 / 58.0 - 56.0	0.87	94.6	1,482	6.8
75.0	139.0 - 129.0 / 80.0 - 77.0	0.86	95.0	1,485	6.9
90.0	165.0 - 152.0 / 95.0 - 91.0	0.87	95.2	1,485	7.2
110.0	200.0 - 185.0 / 115.0 - 111.0	0.87	95.4	1,488	6.8
132.0	240.0 - 220.0 / 139.0 - 133.0	0.87	95.6	1,490	7.3
160.0	285.0 - 265.0 / 166.0 - 161.0	0.87	95.8	1,490	7.3
200.0	355.0 - 330.0 / 205.0 - 198.0	0.88	96.0	1,490	7.4
250.0	455.0 - 420.0 / 260.0 - 250.0	0.87	96.0	1,488	7.7
315.0	570.0 - 550.0 / 330.0 - 320.0	0.86	96.0	1,488	7.9
355.0	650.0 - 610.0 / 375.0 - 365.0	0.85	96.1	1489	6.5
400.0	690.0 / 400.0	0.87	-	1488	-

Motor [kW]	I _{1/1} [A]	Cos φ 1/1	η [%]	n [min ⁻¹]	I _{Start} / I _{1/1}
500.0	850.0 / 490.0	0.88	-	1488	-
560.0	950.0 / 550.0	0.88	-	1492	-
630.0	1060.0 / 610.0	0.88	-	1492	-

Electrical data, 6-pole 3 x 220-240/380-415 V

Motor [kW]	I _{1/1} [A]	Cos φ 1/1	η [%]	n [min ⁻¹]	I _{Start} / I _{1/1}
1.5	6.6 - 5.9 / 3.8 - 3.4	0.79	86.5	1,160	5.6
2.2	9.17 - 8.3 / 5.3 - 4.8	0.79	87.5	1,160	6.8
3.0	12.0 - 11.0 / 7.0 - 6.4	0.78	87.5	1,165	6.9
4.0	15.7 - 14.2 / 9.1 - 8.2	0.79	87.5	1,160	6.5
5.5	21.0 - 19.3 / 12.2 - 11.0	0.81	89.5	1,180	6.6
7.5	27.7 - 25.4 / 16.0 - 14.5	0.82	89.5	1,165	6.3

Electrical data, 6-pole 3 x 380-415/660-690 V

Motor [kW]	I _{1/1} [A]	Cos φ 1/1	η [%]	n [min ⁻¹]	I _{Start} / I _{1/1}
2.2	5.3 - 4.8 / 3.0 - 2.9	0.75	84.3	970	6.8
3.0	7.0 - 6.4 / 4.05 - 3.9	0.76	85.6	975	6.9
4.0	9.1 - 8.2 / 5.2 - 4.95	0.77	86.8	970	6.5
5.5	12.2 - 11.0 / 7.0 - 6.7	0.78	88	970	6.6
7.5	16.0 - 14.5 / 9.2 - 8.8	0.80	89.1	975	6.3

Electrical data, speed-controlled motors

Electrical data, 2-pole, 1 x 200-240 V, 4000 min⁻¹

Motor [kW]	I _{1/1} [A]
0.12	1.70 - 1.45
0.18	1.70 - 1.45
0.25	1.70 - 1.45
0.37	2.40 - 2.10
0.55	3.40 - 2.90
0.75	4.60 - 3.80
1.1	6.55 - 5.45
1.5	8.90 - 7.45

Electrical data, 2-pole, 3 x 380-500 V, 4000 min⁻¹

Motor [kW]	I _{1/1} [A]
0.12	0.85 - 0.80
0.18	0.85 - 0.80
0.25	0.85 - 0.80
0.37	1.00 - 0.90
0.55	1.30 - 1.10
0.75	1.55 - 1.30
1.1	2.15 - 1.80
1.5	2.90 - 2.40
2.2	4.15 - 3.40

Electrical data, 4-pole, 1 x 200-240 V, 2000 min⁻¹

Motor [kW]	I _{1/1} [A]
0.12	1.65 - 1.40
0.18	1.65 - 1.40
0.25	1.65 - 1.40
0.37	2.40 - 2.00
0.55	3.40 - 2.85
0.75	4.50 - 3.80

Electrical data, 4-pole, 3 x 380-500 V, 2000 min⁻¹

Motor [kW]	I _{1/1} [A]
0.12	0.85 - 0.80
0.18	0.85 - 0.80
0.25	0.85 - 0.80
0.37	1.00 - 0.90
0.55	1.20 - 1.10
0.75	1.55 - 1.40
1.1	2.20 - 1.90

Electrical data, 2-pole, 1 x 200-240 V, 2900 min⁻¹

Motor [kW]	I _{1/1} [A]
0.12	3.0 - 2.5
0.25	3.0 - 2.5
0.37	2.7 - 2.5
0.55	3.9 - 3.6
0.75	5.1 - 4.7
1.1	7.1 - 6.6

Electrical data, 2-pole, 3 x 380-480 V, 2900 min⁻¹

Motor [kW]	I _{1/1} [A]
3.0	6.2 - 5.0
4.0	8.1 - 6.6
5.5	11.0 - 8.8
7.5	14.8 - 11.6
11.0	22.5 - 18.8
15.0	30 - 26.0
18.5	37 - 31.0
22.0	43.5 - 35.0

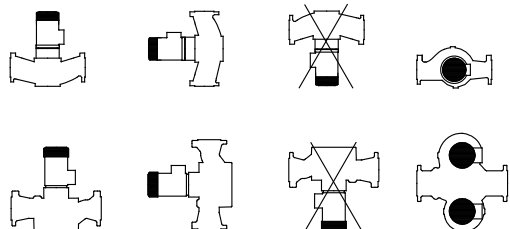
Electrical data, 4-pole, 3 x 380-480 V, 1450 min⁻¹

Motor [kW]	I _{1/1} [A]
1.5	3.3 - 2.9
2.2	4.6 - 3.8
3.0	6.2 - 5.0
4.0	8.1 - 6.6
5.5	11 - 9.0
7.5	15.0 - 12.0
11.0	22.0 - 17.8
15.0	30.0 - 25.4
18.5	37.0 - 30.0

18. Installation

Mechanical installation

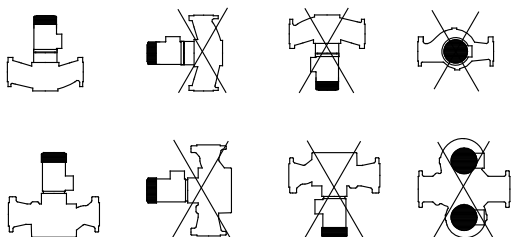
You can install TP pumps with motors smaller than 11 kW in horizontal or vertical pipework.



TM00 3734 0897

Fig. 73 Installation of motor sizes smaller than 11 kW

TP pumps with motors of 11 kW and up may only be installed in horizontal pipes with the motor in vertical position.



TM00 3735 0897

Fig. 74 Installation of motor sizes of 11 kW and up

Note: The motor must never point downwards.

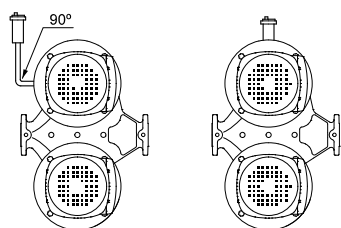
Install the pumps in such a way that strain from the pipework is not transferred to the pump housing.

Pumps with motors smaller than 11 kW may be suspended directly in the pipes, provided the pipework can support the pump. If not, install the pump on a mounting bracket or base plate.

Pumps with motors of 11 kW and up may only be installed in horizontal pipes with the motor placed in vertical position. Always install the pump on an even and rigid foundation.

However some TP, TPE pumps with motors above 11 kW may be suspended directly in the pipes. Please contact Grundfos for further information.

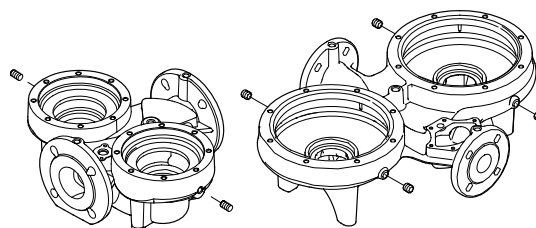
When installing a twin-head pump in a horizontal pipe and with horizontal shaft, fit the upper pump housing with an automatic air vent.



TM03 8127 0507

Fig. 75 Twin-head pumps with automatic air vent

Twin-head pump housings have two Rp 1/4" tapping (TP Series 200) or four Rp 1/8" tapping (TP Series 300) for mounting of automatic air vents.

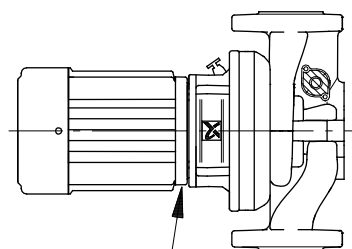


TM02 7533 3703

Fig. 76 Tappings for mounting of automatic air vents in TP Series 200 and TP Series 300

For further information about identification of TP Series 200 and TP Series 300 models, see pages 25 to 26.

If the liquid temperature falls below the ambient temperature, 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 fig. 77.



TM00 9831 3202

Fig. 77 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.

The problem can be remedied by installing heating elements. Whenever possible, install pumps with motors smaller than 11 kW with horizontal motor shaft. See fig. 75.

Cooling

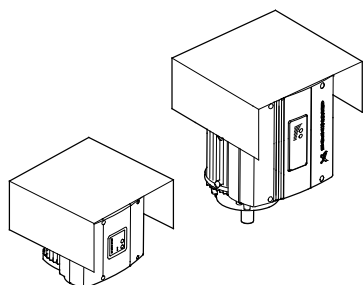
To ensure sufficient cooling of motor and electronics, observe the following:

- 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 for TPE pumps

When installing TPE pumps outdoors, provide the motor with a suitable cover to avoid condensation on the electronic components and to protect the pump and motor against the direct effects of the elements.

When mounting the condensation cover on top of the motor, make sure to leave enough space for the air to cool the motor.



TM02 8514 0304

Fig. 78 Speed-controlled motors with condensation cover

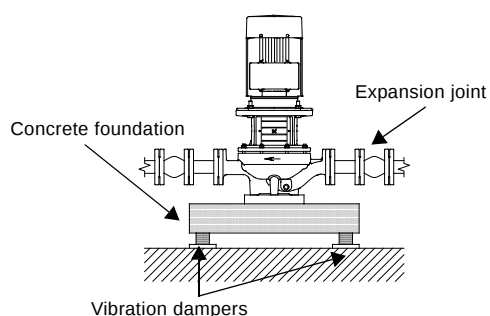
Elimination of noise and vibrations

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.



TM02 4993 2102

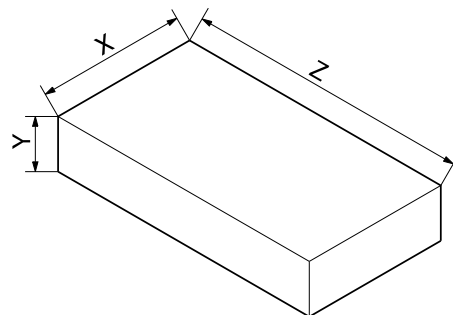
Fig. 79 Foundation of TP pump

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 should be 1.5 times the pump weight.

Recommended concrete foundations for TP(D) 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.



TM03 9190 3507

Fig. 80 Foundation for TP(D) Series 300 pumps

Concrete foundation dimensions			
Pump mass [kg]	Y (height) [mm]	Z (length) [mm]	X (width) [mm]
150	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	1,010	1,010
900	510	1,030	1,030
950	520	1,050	1,050
1,000	530	1,060	1,060
1,050	540	1,080	1,080
1,100	550	1,100	1,100
1,150	560	1,100	1,100
1,200	560	1,130	1,130
1,250	570	1,150	1,150
1,300	580	1,160	1,160
1,350	590	1,180	1,180
1,400	600	1,190	1,190
1,450	600	1,200	1,200
1,500	610	1,220	1,220
1,550	620	1,230	1,230
1,600	620	1,250	1,250
1,650	630	1,250	1,250
1,700	635	1,270	1,270

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 % (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.

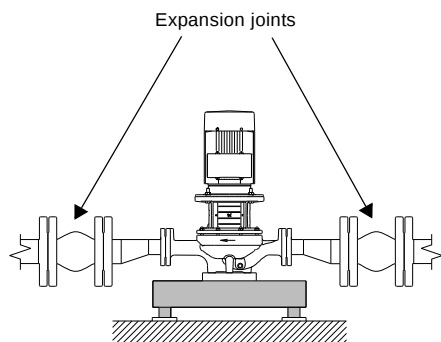
Expansion joints

Install expansion joints to

- absorb expansions/contractions in the pipework caused by changing liquid temperature.
- reduce mechanical strains in connection with pressure surges in the pipework.
- isolate mechanical structure-borne noise in the pipework (only rubber bellows expansion joints).

Note: Do not install expansion joints to compensate for inaccuracies in the pipework such as centre displacement of flanges.

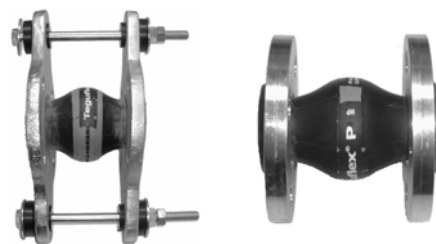
Fit expansion joints at a distance of minimum 1 to 1.5 times the nominal flange diameter away from the pump on the suction as well as on the discharge side. This prevents the development of turbulence in the expansion joints, resulting in better suction conditions and a minimum pressure loss on the pressure side. At high water velocities (> 5 m/s) we recommend that you install larger expansion joints corresponding to the pipework. See fig. 81.



TM04 9629 4810

Fig. 81 TP pump installed with larger expansion joints

The illustration below shows examples of rubber bellows expansion joints with or without limit rods.



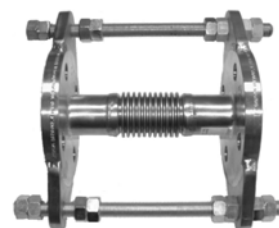
TM02 4979 1902 - TM02 4981 1902

Fig. 82 Examples of rubber bellows expansion joints

Expansion joints with limit rods can be used to reduce the effects of the expansion/contraction forces on the pipework. 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.



TM02 4980 1902

Fig. 83 Example of metal expansion joint

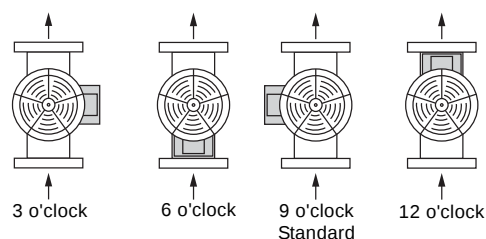
Due to the risk of rupture of the rubber bellows, metal bellows expansion joints may be preferred at temperatures above 100 °C combined with high pressure.

Terminal box positions

TP single-head pumps

As standard, the terminal boxes of TP and TPE pumps are mounted in 9 o'clock position.

The possible terminal box positions are shown below.



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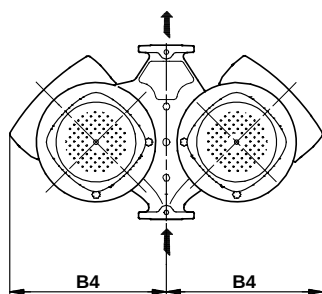
Fig. 84 Possible terminal box positions

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 and most TPED pumps are mounted in 12 o'clock position. See fig. 84.

The TPED pumps with terminal boxes installed in other positions are listed in the table. See example in fig. 85.



TM02 8630 0604

Fig. 85 Terminal box positions of TPED pumps

Note: The B4 dimension can be seen in the following table.

TPED pumps with terminal boxes installed in positions different from 12 o'clock

Single-phase	P2 [kW]	B4 [mm]	Three-phase	P2 [kW]	B4 [mm]
TPED 32-60/2	0.37	264	TPED 32-230/2	0.75	320
TPED 32-120/2	0.37	264	TPED 32-200/2	1.1	338
TPED 40-60/2	0.37	264	TPED 32-250/2	1.5	338
TPED 40-120/2	0.37	264	TPED 32-320/2	2.2	338
TPED 50-60/2	0.37	264	TPED 32-380/2	3.0	344
TPED 32-30/4	0.37	264	TPED 32-460/2	4.0	403
TPED 40-30/4	0.37	264	TPED 32-580/2	5.5	403
TPED 50-30/4	0.37	264	TPED 40-190/2	0.75	320
			TPED 40-230/2	1.1	320
			TPED 40-270/2	1.5	320
			TPED 40-240/2	2.2	345
			TPED 40-300/2	3.0	351
			TPED 40-360/2	4.0	370
			TPED 40-430/2	5.5	403
			TPED 40-530/2	7.5	414
			TPED 40-630/2	11	523
			TPED 50-120/2	0.75	320
			TPED 50-160/2	1.1	335
			TPED 50-180/2	0.75	320
			TPED 50-190/2	1.5	335
			TPED 50-240/2	2.2	335
			TPED 50-290/2	3.0	335
			TPED 50-360/2	4.0	385
			TPED 50-420/2	5.5	385
			TPED 50-540/2	11	555
			TPED 50-630/2	15	555
			TPED 50-710/2	15	555
			TPED 50-830/2	18.5	555
			TPED 50-900/2	22	555
			TPED 65-120/2	1.1	320
			TPED 65-180/2	1.5	320
			TPED 65-170/2	2.2	360
			TPED 65-210/2	3.0	366
			TPED 65-250/2	4.0	385
			TPED 65-340/2	5.5	385
			TPED 65-410/2	7.5	396
			TPED 65-460/2	11	558
			TPED 65-550/2	15	558
			TPED 65-660/2	18.5	558
			TPED 65-720/2	22	558
			TPED 80-120/2	1.5	320
			TPED 80-210/2	4.0	395
			TPED 80-240/2	5.5	395
			TPED 80-330/2	11	538
			TPED 80-400/2	15	538
			TPED 80-520/2	18.5	573
			TPED 80-570/2	22	573
			TPED 100-120/2	2.2	340
			TPED 65-60/4	0.55	320
			TPED 65-90/4	0.75	360
			TPED 80-60/4	0.75	320
			TPED 100-30/4	0.55	340
			TPED 100-60/4	1.1	340

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 Siemens, MG 71 and MG 80 for supply voltages up to and including 440 V (see motor nameplate) must be protected against voltage peaks higher than 650 V between the supply terminals.

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 have the effect that the motor insulation system is loaded more and that the motor is more noisy 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 30 kW and 6-pole motors from 22 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.

19. MGE motors

0.12 - 2.2 kW, 2-pole and 0.12 - 1.1 kW, 4-pole

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

Standard as well as quick-blow or slow-blow fuses may be used.

Leakage current

Earth leakage current < 3.5 mA (AC supply).

Earth leakage current < 10 mA (DC supply).

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 - 2.2	6	10

Standard as well as quick-blow or slow-blow fuses may be used.

Leakage current

Motor size [kW]	Leakage current [mA]
0.75 - 2.2 (supply voltage < 400 V)	< 3.5
0.75 - 2.2 (supply voltage > 400 V)	< 5

The leakage currents are measured in accordance with EN 61800-5-1:2007.

Inputs/outputs

Ground 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 < 25 mADC.

Other input/output terminals: -0.5 to 26 VDC or < 15 mADC.

Digital inputs (DI)

Internal pull-up current > 10 mA at $V_i = 0$ VDC.

Internal pull-up to 5 VDC (currentless for $V_i > 5$ VDC).

Certain low logic level: $V_i < 1.5$ VDC.

Certain high logic level: $V_i > 3.0$ VDC.

Hysteresis: No.

Screened cable: 0.5 - 1.5 mm² / 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: Max. 1.2 VDC.

Low-state output voltage at 10 mADC: Max. 0.6 VDC.

Overcurrent protection: Yes.

Screened cable: 0.5 - 1.5 mm² / 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: $R_i > 100$ k Ω 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: $R_i = 292$ Ω .

Current overload protection: Yes. Change to voltage signal.

Measurement tolerance: - 0/+ 3 % of full scale (max.-point coverage).

Screened cable: 0.5 - 1.5 mm² / 28-16 AWG.

Maximum cable length: 500 m (excl. potentiometer).

Potentiometer connected to +5 V, GND, any AI:

Use maximum 10 k Ω .

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 mA DC.
- Maximum load between AO and GND: 500 Ω.
- Open-circuit protection: Yes.

Tolerance: - 0/+ 4 % of full scale (max-point coverage).

Screened cable: 0.5 - 1.5 mm² / 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 mm² / 28-16 AWG.

Use Pt100 for short wires.

Use Pt1000 for long wires.

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 %/+ 5 %.
- Maximum current: 50 mA DC (sourcing only).
- Overload protection: Yes.

+24 V:

- Output voltage: 24 VDC - 5 %/+ 5 %.
- Maximum current: 60 mA DC (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 mm² / 28-12 AWG.

Maximum cable length: 500 m.

Bus input

Grundfos GENIbus protocol, RS-485.

Screened 3-core cable: 0.5 - 1.5 mm² / 28-16 AWG.

Maximum cable length: 500 m.

EMC (electromagnetic compatibility)

EN 61800-3.

Residential areas, unlimited distribution, corresponding to CISPR 11, class B, group 1.

Industrial areas, unlimited distribution, corresponding to CISPR 11, class A, group 1.

Contact Grundfos for further information.

Enclosure class

Standard: IP55 (IEC 34-5).

Optional: IP66 (IEC 34-5).

Insulation class

F (IEC 85).

Sound pressure level**TPE, TPED Series 1000 and 2000**

Motor [kW]	Max. speed stated on nameplate [min ⁻¹]	Speed [min ⁻¹]	Sound pressure level ISO 3743 [dB(A)]	
			1-phase motors	3-phase motors
0.12 - 0.75	2000	1500	38	38
		2000	42	42
	4000	3000	53	53
		4000	58	58
1.1	2000	1500		38
		2000		42
	4000	3000	53	53
		4000	58	58
1.5	4000	3000	57	57
		4000	64	64
2.2	4000	3000		57
		4000		64

The grey fields indicate that the motor is not yet available in this MGE motor range, but is available in the previous MGE motor range.

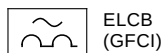
Motor protection

The motor requires no external motor protection. The motor incorporates thermal protection against slow overloading and blocking.

Additional protection

Single-phase motors

If the motor is connected to an electric installation where an earth leakage circuit breaker (ELCB) or ground fault circuit interrupter (GFCI) is used as additional protection, this circuit breaker or interrupter must be marked with the following symbol:



ELCB
(GFCI)

Note: When an earth leakage circuit breaker or ground fault circuit interrupter is selected, take the total leakage current of all the electrical equipment in the installation into account.

Three-phase motors

If the motor is connected to an electric installation where an earth leakage circuit breaker (ELCB) or ground fault circuit interrupter (GFCI) is used as additional protection, this circuit breaker or interrupter must be of the following type:

- It must be suitable for handling leakage currents and cutting-in with short pulse-shaped leakage.
- It must trip out when alternating fault currents and fault currents with DC content, i.e. pulsating DC and smooth DC fault currents, occur.

For these motors, use an earth leakage circuit breaker or ground fault circuit interrupter, type B. This circuit breaker or interrupter must be marked with the following symbols:



ELCB
(GFCI)

Note: When an earth leakage circuit breaker or ground fault circuit interrupter is selected, the total leakage current of all the electrical equipment in the installation must be taken into account.

Start/stop of pump

The number of starts and stops via the mains voltage must not exceed 4 times per hour.

When the pump is switched on via the mains, it starts after approximately 5 seconds.

If you want a higher number of starts and stops, use the input for external start/stop when starting/stopping the pump.

When the pump is started/stopped via an external on/off switch, it starts immediately.

Wiring diagrams

Single-phase supply:

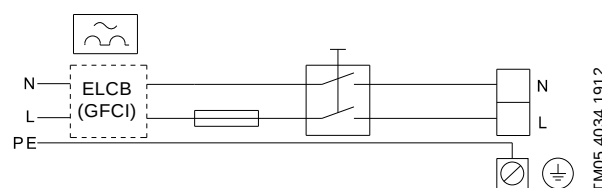


Fig. 86 Example of a mains-connected motor with mains switch, backup fuse and additional protection

Three-phase supply:

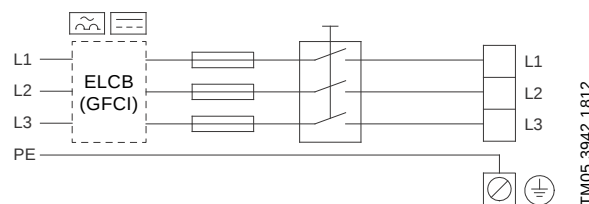


Fig. 87 Example of a mains-connected motor with mains switch, backup fuse and additional protection

Connection terminals

The descriptions and terminal overviews in this section apply to both single-phase and three-phase motors.

The number of terminals depends on the functional module (FM). You can identify the fitted module on the motor nameplate. See fig. 88.

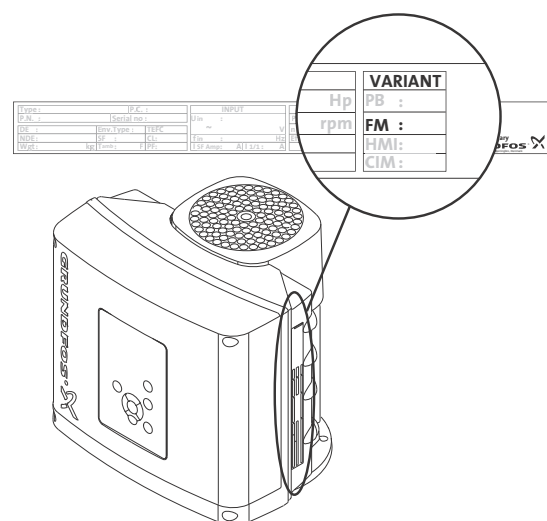


Fig. 88 Identification of functional module

Connection terminals, standard functional module (FM 200)

The standard module has these connections:

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

See fig. 89.

Note: Digital input 1 is factory-set to be start/stop input where open circuit will result 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.

Note: As a precaution, the wires to be connected to the connection groups below must be separated from each other by reinforced insulation in their entire lengths.

- **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 safety extra-low voltage (SELV), thus ensuring protection against electric shock.

- Signal relay outputs

- Signal relay 1:

LIVE:

You can connect mains supply voltages up to 250 VAC to this 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.

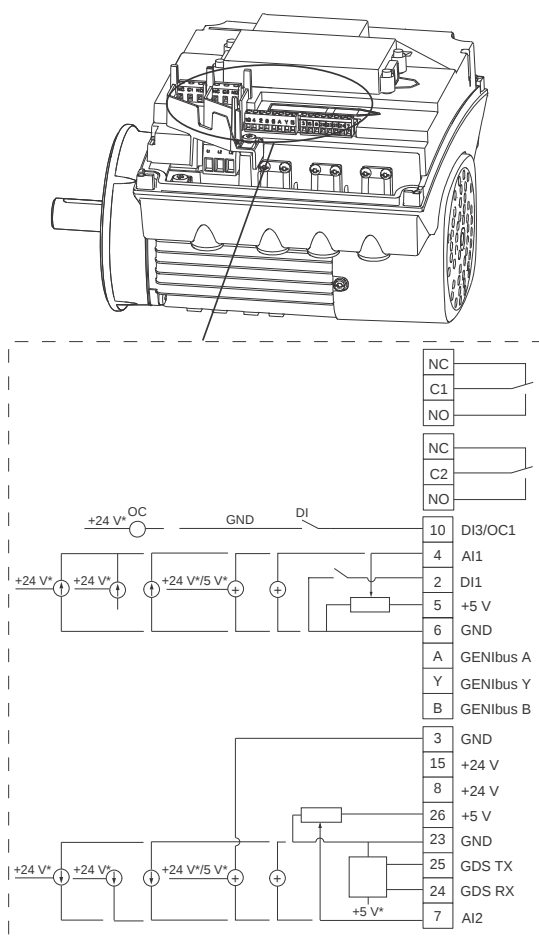
- Signal relay 2:

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.

- **Mains supply** (terminals N, PE, L or L1, L2, L3, PE).

A galvanically safe separation must fulfil the requirements for reinforced insulation including creepage distances and clearances specified in EN 61800-5-1.



TM05 3510 3512

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

Fig. 89 Connection terminals, FM 200

Terminal	Type	Function
NC	Normally closed contact	Signal relay 1 (LIVE or SELV)
C1	Common	
NO	Normally open contact	
NC	Normally closed contact	Signal relay 2 (SELV only)
C2	Common	
NO	Normally open contact	
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	Ground
A	GENIbus, A	GENIbus, A (+)
Y	GENIbus, Y	GENIbus, GND
B	GENIbus, B	GENIbus, B (-)
3	GND	Ground
15	+24 V	Supply
8	+24 V	Supply
26	+5 V	Supply to potentiometer and sensor
23	GND	Ground
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

Connection terminals, advanced functional module (FM 300)

The advanced functional module is only available as an option.

The advanced module has these connections:

- three analog inputs
- one analog output
- two dedicated digital inputs
- two configurable digital inputs or open-collector outputs
- Grundfos Digital Sensor input and output
- two Pt100/1000 inputs
- two LiqTec sensor inputs¹⁾
- two signal relay outputs
- GENIbus connection.

¹⁾ Not applicable for TPE, TPED pumps.

See fig. 90.

Note: Digital input 1 is factory-set to be start/stop input where open circuit will result 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.

Note: As a precaution, the wires to be connected to the connection groups below must be separated from each other by reinforced insulation in their entire lengths.

• 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 safety extra-low voltage (SELV), thus ensuring protection against electric shock.

• Signal relay outputs

– Signal relay 1:

LIVE:

Mains supply voltages up to 250 VAC can be connected to this output.

SELV:

The output is galvanically separated from other circuits. Therefore, the supply voltage or safety extra-low voltage can be connected to the output as desired.

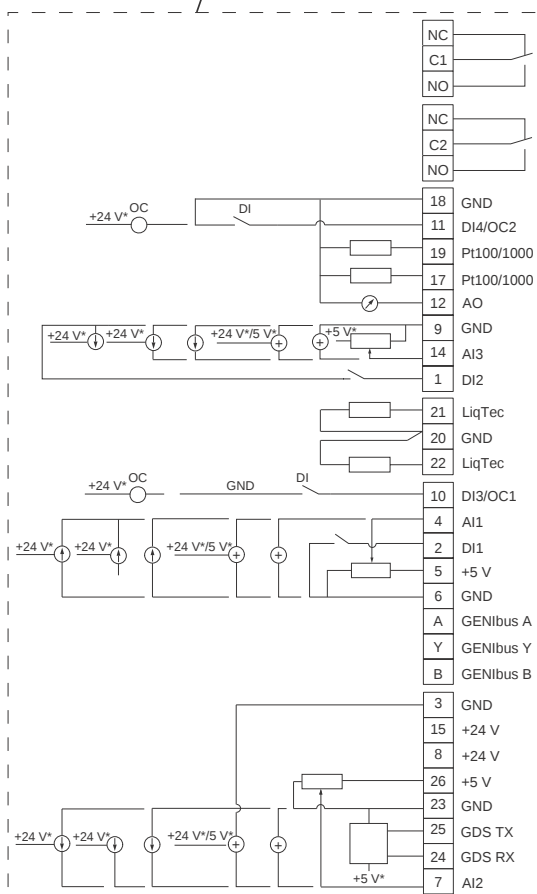
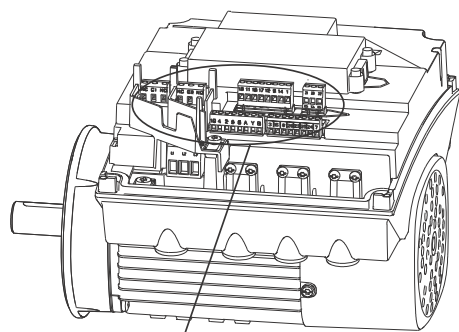
– Signal relay 2:

SELV:

The output is galvanically separated from other circuits. Therefore, the supply voltage or safety extra-low voltage can be connected to the output as desired.

- **Mains supply** (terminals N, PE, L or L1, L2, L3, PE).

A galvanically safe separation must fulfil the requirements for reinforced insulation including creepage distances and clearances specified in EN 61800-5-1.



TM05 3509 3512

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

Fig. 90 Connection terminals, FM 300 (option)

Terminal	Type	Function
NC	Normally closed contact	Signal relay 1 (LIVE or SELV)
C1	Common	
NO	Normally open contact	
NC	Normally closed contact	Signal relay 2 (SELV only)
C2	Common	
NO	Normally open contact	
18	GND	Ground
11	DI4/OC2	Digital input/output, configurable. Open collector: Max. 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	Ground
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	Ground (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	Ground
A	GENIbus, A	GENIbus, A (+)
Y	GENIbus, Y	GENIbus, GND
B	GENIbus, B	GENIbus, B (-)
3	GND	Ground
15	+24 V	Supply
8	+24 V	Supply
26	+5 V	Supply to potentiometer and sensor
23	GND	Ground
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

3-22 kW, 2-pole and 1.5 - 18.5 kW, 4-pole

Grundfos MGE 100, MGE 112, MGE 132, MGE 160 and MGE 180 motors offer these features:

- Three-phase mains connection.
- Three-phase, asynchronous squirrel-cage induction motors designed to current IEC, DIN and VDE guidelines and standards. The motors incorporate a frequency converter and PI controller.
- Used for continuously variable speed control of Grundfos E-pumps available in power sizes 3 to 22 kW, 2-pole and 1.5 to 18.5 kW, 4-pole.

Supply voltage

3 x 380-480 V - 10 %/+ 10 %, 50/60 Hz, PE.

Backup fuse

Motor size [kW]	Maximum fuse [A]
1.5 - 5.5	16
7.5	32
11	26
15	36
18.5	43
22	51

Standard as well as quick-blow or slow-blow fuses may be used.

Leakage current

Motor size [kW]	Leakage current [mA]
1.5 - 3.0	< 3.5
4.0 - 5.5	< 5
5.5 (1400-1800 min ⁻¹)	< 10
7.5	< 10
11-22	> 10

The leakage currents are measured in accordance with EN 60355-1 for 0.55 to 7.5 kW and EN 61800-5-1 for 11 to 22 kW motors.

Input/output

Start/stop

- External potential-free switch.
Voltage: 5 VDC.
Current: < 5 mA.
Screened cable: 0.5 - 1.5 mm² / 28-16 AWG.

Digital input

- External potential-free switch.
Voltage: 5 VDC.
Current: < 5 mA.
Screened cable: 0.5 - 1.5 mm² / 28-16 AWG.

Setpoint signals

- Potentiometer
0-10 VDC, 10 kΩ (via internal voltage supply).
Screened cable: 0.5 - 1.5 mm² / 28-16 AWG.
Maximum cable length: 100 m.
- Voltage signal
0-10 VDC, R_i > 50 kΩ.
Tolerance: + 0 %/- 3 % at maximum voltage signal.
Screened cable: 0.5 - 1.5 mm² / 28-16 AWG.
Maximum cable length: 500 m.
- Current signal
DC 0-20 mA / 4-20 mA, R_i = 175 Ω.
Tolerance: + 0 %/- 3 % at maximum current signal.
Screened cable: 0.5 - 1.5 mm² / 28-16 AWG.
Maximum cable length: 500 m.

Sensor signals

- Voltage signal
0-10 VDC, R_i > 50 kΩ (via internal voltage supply).
Tolerance: + 0 %/- 3 % at maximum voltage signal.
Screened cable: 0.5 - 1.5 mm² / 28-16 AWG.
Maximum cable length: 500 m.
- Current signal
DC 0-20 mA / 4-20 mA, R_i = 175 Ω.
Tolerance: + 0 %/- 3 % at maximum current signal.
Screened cable: 0.5 - 1.5 mm² / 28-16 AWG.
Maximum cable length: 500 m.
- Power supply to sensor
+24 VDC, max. 40 mA.

Signal output

- Potential-free changeover contact.
Maximum contact load: 250 VAC, 2 A.
Minimum contact load: 5 VDC, 10 mA.
Screened cable: 0.5 - 1.5 mm² / 28-16 AWG.
Maximum cable length: 500 m.

Bus input

- Grundfos GENIbus protocol, RS-485.
Screened cable: 0.5 - 1.5 mm² / 28-16 AWG.
Maximum cable length: 500 m.

EMC (electromagnetic compatibility to EN 61800-3)

Motor [kW]	Emission/immunity
1.5	Emission:
2.2	The motors may be installed in residential areas (first environment), unrestricted distribution, corresponding to CISPR11, group 1, class B.
3.0	
4.0	
5.5	Immunity:
7.5	The motors fulfil the requirements for both the first and second environment.
11	Emission:
15	The motors are category C3, corresponding to CISPR11, group 2, class A, and may be installed in industrial areas (second environment).
18.5	If fitted with an external Grundfos EMC filter, the motors are category C2, corresponding to CISPR11, group 1, class A, and may be installed in residential areas (first environment).
22	
	Note: When the motors are installed in residential areas, supplementary measures may be required as the motors may cause radio interference.
	Immunity: The motors fulfil the requirements for both the first and second environment.

For further information about EMC, see section *EMC*, page 94.

Enclosure class

Standard: IP55 (IEC34-5).

Insulation class

F (IEC 85).

Ambient temperature

During operation: -20 to 40 °C.

During storage/transport:

1.5 to 7.5 kW: -40 to 60 °C

11 to 22 kW: -25 to 70 °C.

Relative air humidity

Maximum 95 %.

Sound pressure level

Motor [kW]	Speed stated on the nameplate [min ⁻¹]	Sound pressure level [dB(A)]
1.5	1,400-1,500	53
	1,700-1,800	57
2.2	1,400-1,500	50
	1,700-1,800	52
3.0	1,400-1,500	55
	1,700-1,800	60
	2,800-3,000	65
	3,400-3,600	70
4.0	1,400-1,500	58
	1,700-1,800	63
	2,800-3,000	70
	3,400-3,600	75
5.5	1,400-1,500	52
	1,700-1,800	56
	2,800-3,000	75
	3,400-3,600	80
7.5	1,400-1,500	54
	1,700-1,800	58
	2,800-3,000	65
	3,400-3,600	69
11	1,400-1,500	54
	1,700-1,800	59
	2,800-3,000	65
	3,400-3,600	70
15	1,400-1,500	54
	1,700-1,800	59
	2,800-3,000	65
	3,400-3,600	70
18.5	1,400-1,500	65
	1,700-1,800	69
	2,800-3,000	69
	3,400-3,600	74
22	2,800-3,000	73
	3,400-3,600	78

Motor protection

The motor requires no external motor protection.
The motor incorporates thermal protection against slow overloading and blocking.

Additional protection

If the motor is connected to an electric installation where an earth leakage circuit breaker is used as additional protection, this circuit breaker must fulfil the following:

- It is suitable for handling leakage currents and cutting-in in case of short pulse-shaped leakage.
- It trips out when alternating fault currents and fault currents with DC content, i.e. pulsating DC and smooth DC fault currents, occur.

For these pumps, use an earth leakage circuit breaker type B.

This circuit breaker must be marked with the following symbols:



Note: When an earth leakage circuit breaker is selected, the total leakage current of all the electrical equipment in the installation must be taken into account.

Start/stop of pump

The number of starts and stops via the mains voltage must not exceed 4 times per hour.

When the pump is switched on via the mains, it will start after approximately 5 seconds.

If a higher number of starts and stops is desired, use the input for external start/stop when starting/stopping the pump.

When the pump is started/stopped via an external on/off switch, it starts immediately.

Wiring diagram, 1.5 - 7.5 kW (4-pole) and 3 - 7.5 kW (2-pole)

3 x 380-480 V - 10 %/+ 10 %, 50/60 Hz

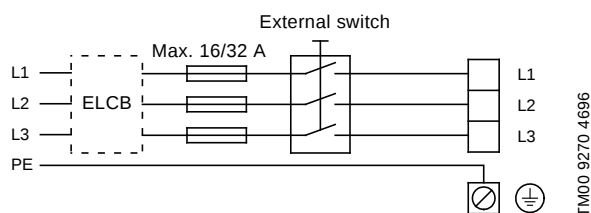


Fig. 91 Wiring diagram

Other connections

Figure 92 shows the connection terminals of external potential-free contacts for start/stop and digital function, external setpoint signal, sensor signal, GENIbus and relay signal.

Note: If no external on/off switch is connected, short-circuit terminals 2 and 3 are using a short wire.

Note: As a precaution, the wires to be connected to the following connection groups must be separated from each other by reinforced insulation in their entire lengths:

- Group 1:** Inputs (external start/stop, digital function, setpoint and sensor signals, terminals 1-9, and bus connection, terminals B, Y, A). All inputs (group 1) 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.
- Group 2:** Output (relay signal, terminals NC, C, NO). The output (group 2) is galvanically separated from other circuits. A maximum supply voltage of 250 V or protective extra-low voltage can be connected to the output as desired.
- Group 3:** Mains supply (terminals L1, L2, L3, PE). A galvanically safe separation must fulfil the requirements for reinforced insulation including creepage distances and clearances specified in EN 60335.
- Group 4:** Communication cable (8-pin male socket), only TPED. The communication cable is connected to the socket in group 4. The cable ensures communication between the two pumps, whether one or two pressure sensors are connected. The selector switch in group 4 enables changeover between the operating modes "Alternating operation" and "Standby operation".

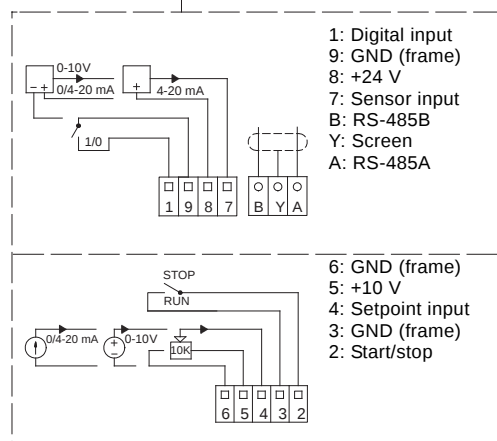
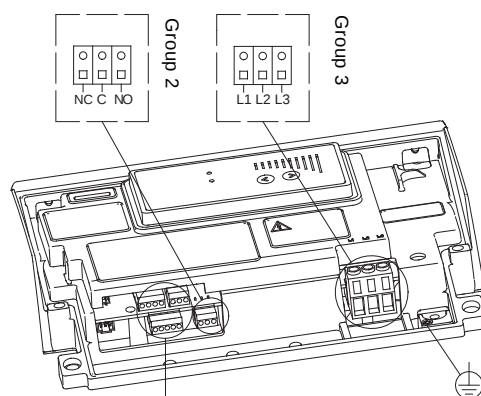


Fig. 92 Connection terminals

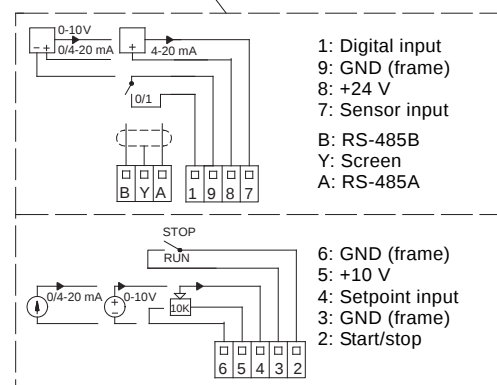
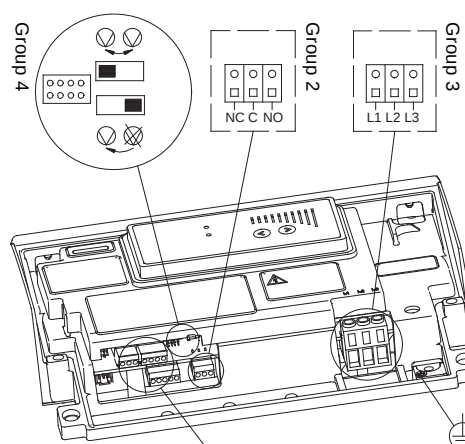


Fig. 93 Connection terminals, TPED Series 2000

Wiring diagram, 11-22 kW

3 x 380-480 V - 10 %/+ 10 %, 50/60 Hz

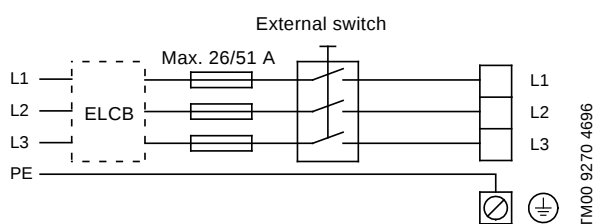


Fig. 94 Wiring diagram, three-phase MGE motors, 11-22 kW

Other connections

Note: As a precaution, the wires to be connected to the following connection groups must be separated from each other by reinforced insulation in their entire lengths:

Group 1: Inputs

- Start/stop, terminals 2 and 3
- digital input, terminals 1 and 9
- setpoint input, terminals 4, 5 and 6
- sensor input, terminals 7 and 8
- GENIbus, terminals B, Y and A.

All inputs (group 1) 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.

- **Group 2:** Output (relay signal, terminals NC, C, NO). The output (group 2) is galvanically separated from other circuits. Therefore, the supply voltage or protective extra-low voltage can be connected to the output as desired.
- **Group 3:** Mains supply (terminals L1, L2, L3). A galvanically safe separation must fulfil the requirements for reinforced insulation including creepage distances and clearances specified in EN 61800-5-1.
- **Group 4:** Communication cable (8-pin male socket), only TPED
The communication cable is connected to the socket in group 4. The cable ensures communication between the two pumps, whether one or two pressure sensors are connected. The selector switch in group 4 enables changeover between the operating modes "Alternating operation" and "Standby operation".

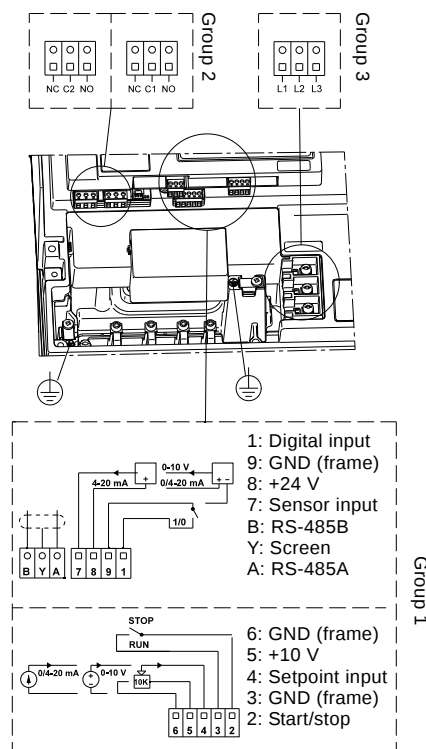


Fig. 95 Connection terminals

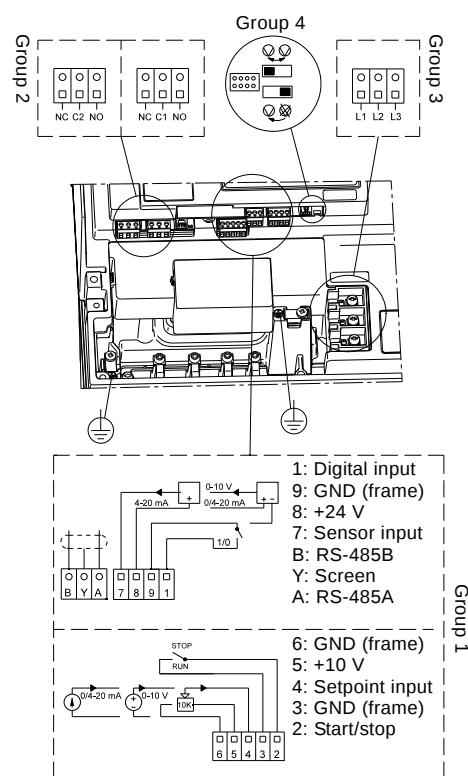


Fig. 96 Connection terminals, TPED Series 2000

20. EMC

EMC and proper installation

General information

The growing use of electric/electronic controls and electronic equipment including PLCs and computers within all business areas require these products to fulfil the existing standards within EMC (ElectroMagnetic Compatibility). The equipment must be mounted properly.

This section deals with these issues.

What is EMC?

ElectroMagnetic Compatibility is an electric or electronic device's ability to function in a given electromagnetic environment without disturbing the surroundings and without being disturbed by other devices in the surroundings. EMC is normally split into emission and immunity.

Emission

Emission is defined as the electric or electromagnetic noise emitted by a device during operation and which can reduce the function of other devices or disturb various radio communications, including radio/TV.

Immunity

Immunity deals with a device's ability to function in spite of the presence of electric or electromagnetic noise, such as sparking noise from contactors or high-frequency fields from various transmitters, mobile phones, etc.

E-pumps and EMC

All Grundfos E-pumps are CE- and C-tick-marked indicating that the product is designed to meet the EMC requirements defined by the EU (European Union) and Australia/New Zealand.

EMC and CE



All E-pumps fulfil the EMC directive 2004/108/EC and are tested according to standard EN 61800-3.

All E-pumps are fitted with a radio interference filter and varistors in the mains supply input to protect the electronics against voltage peaks and noise present in the mains supply (immunity). At the same time, the filter will limit the amount of electrical noise which the E-pump emits to the mains supply network (emission). All remaining inputs included in the electronic unit will also be protected against peaks and noise which can damage or disturb the function of the unit.

On top of that, the mechanical and electronic designs are made in such a way that the unit can operate sufficiently under a certain level of radiated electromagnetic disturbance.

The limits which the E-pumps are tested against are listed in standard EN 61800-3.

Where can E-pumps be installed?

All E-pumps with MGE motors can be used in both residential areas (first environment) and industrial areas (second environment) within certain limitations.

What is meant by the first and the second environment?

The first environment (residential areas) includes establishments directly connected to a low-voltage power supply network which supplies domestic buildings.

The second environment (industrial areas) includes establishments which are not connected to a low-voltage network that supplies domestic buildings.

The level of electromagnetic disturbance can be expected to be much higher than in the first environment.

EMC and C-tick



All E-pumps marked with the C-tick logo fulfil the requirements for EMC in Australia and New Zealand.

The C-tick approval is based on the EN standards, and the units are therefore tested according to the European standard EN 61800-3.

Only E-pumps with MGE-motors are marked with C-tick.

The C-tick only covers emission.

EMC and proper installation

With the CE and C-tick marks, the E-pumps live up to and have been tested to meet specific EMC requirements. This, however, does not mean that E-pumps are immune to all the sources of noise to which they can be exposed in practice. In some installations, the impact may exceed the level to which the product is designed and tested.

Furthermore, unproblematic operation in a noisy environment presupposes that the installation of the E-pump is made properly.

Below you will find a description of a correct E-pump installation.

Connection of mains supply in MGE

Practice shows that large cable loops are often made inside the terminal box to get some "spare cable".

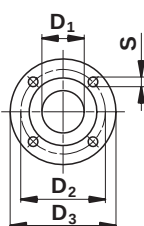
Of course, this can be useful. However, with regard to EMC, it is a poor solution as these cable loops will function as antennas inside the terminal box.

To avoid EMC problems, the mains supply cable and its individual conductors in the terminal box of the E-pump must be as short as possible. If required, a spare cable can be established outside the E-pump.

21. Flanges for TP pumps

Flange dimensions

PN 6 and PN 10 flanges

	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
TM02 7720 3803	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

 TM02 7720 3803	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

TM02 7720 3803

EN/DIN 2635 PN 40 (4.0 MPa)

Nominal diameter (DN)

400

500

D₁

400

500

D₂

585

670

D₃

660

755

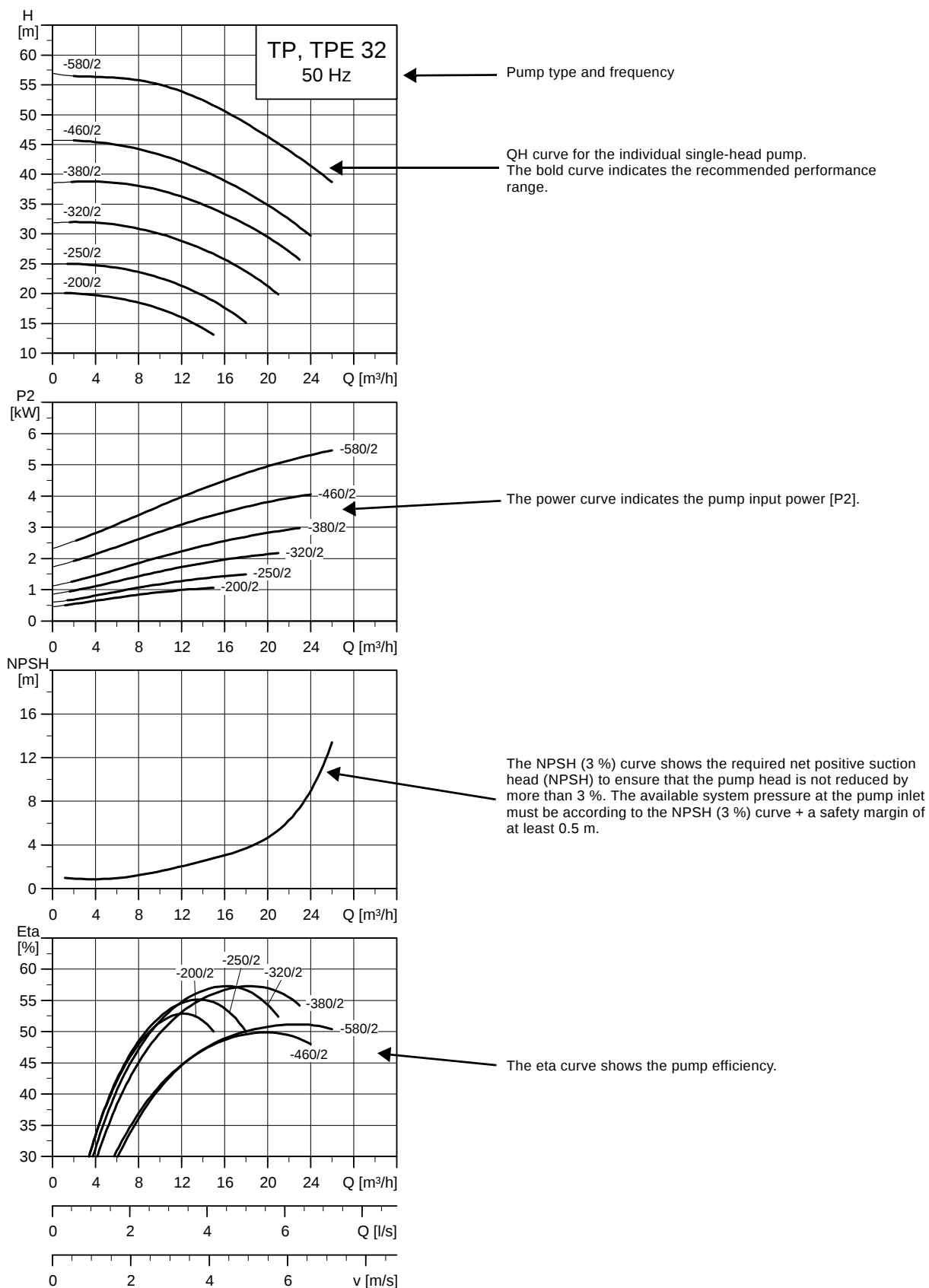
S

16 x 39

20 x 42

22. Curve charts

How to read the curve charts



Curve conditions

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

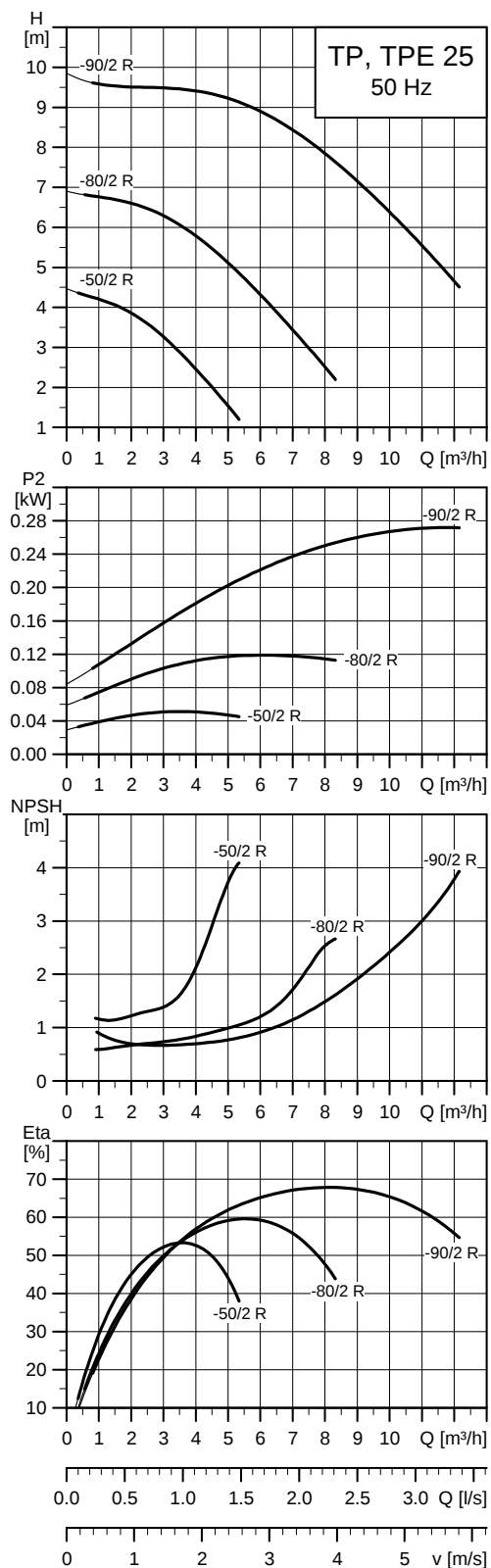
- Tolerances to ISO 9906:2012 Grade 3B.
- The curves apply to the performance of single-head three-phase pumps. For other pump versions, please see the exact curves in WinCAPS or WebCAPS. For other pump versions, the performance may differ for the following reasons:
 - The valve in twin-head pumps may cause losses.
 - Single-phase motors run at lower speed.

Note: Grundfos does not recommend continuous parallel operation of twin-head pumps due to the increased flow in the pump. A too high flow 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 WinCAPS or WebCAPS for the exact single-phase curves.
- Curves of TPE Series 1000 pumps and TPE Series 2000 pumps are shown as nominal curves (100 % curves) only. Please refer to WinCAPS for the exact curves.
- Measurements have been made with airless water at a temperature of 20 °C.
- The curves apply to a kinematic viscosity of $\nu = 1 \text{ mm}^2/\text{s}$ (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.

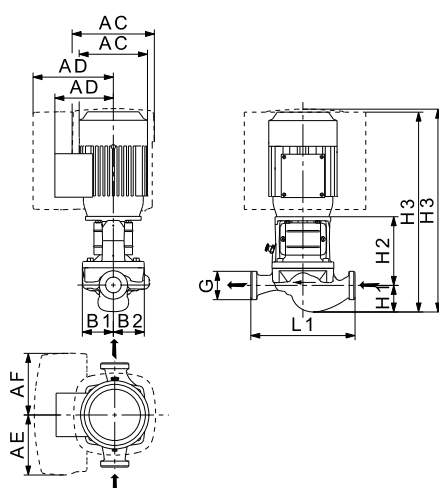
23. Performance curves and technical data

TP, TPD, TPE, TPED, 2-pole, PN 6, 10, 16

TP, TPE 25-XX /2 R



TM02 5014 4509

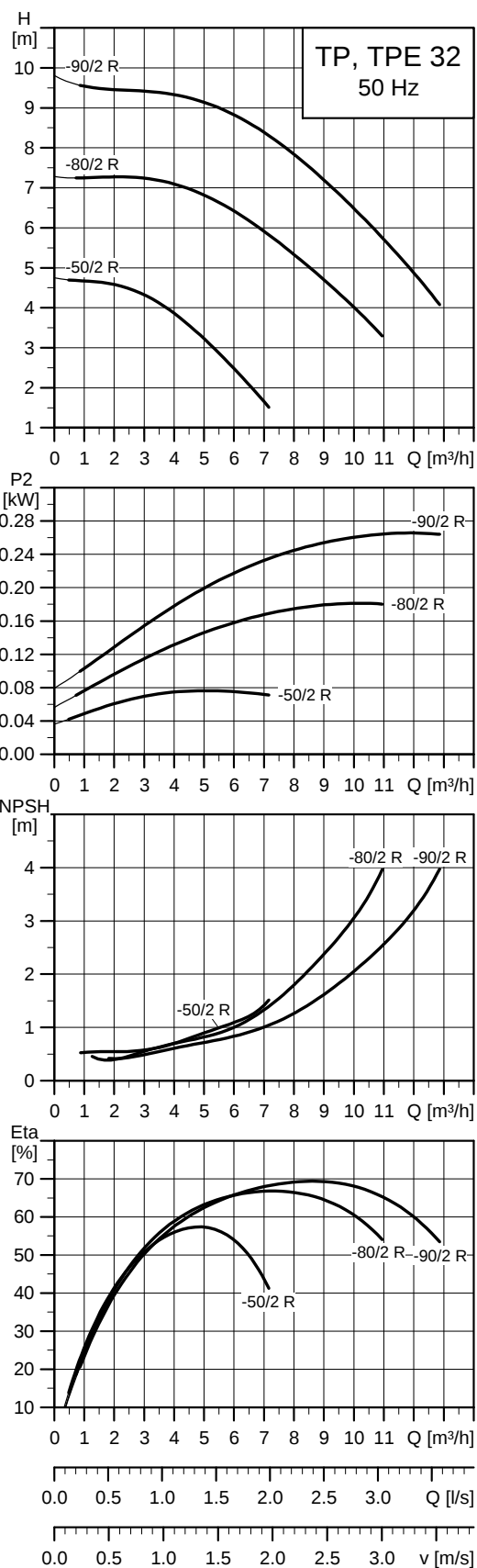


TM02 8348 2614

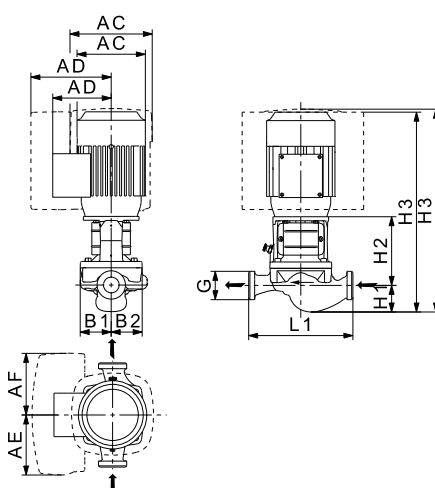
Technical data

TP 25		-50/2 R	-80/2 R	-90/2 R
TPD		-	-	-
TPE		•	•	•
TPED		-	-	-
Series		100	100	100
IEC size	1~ TP	63	63	71
	3~ TP	63	63	71
	1~ TPE	71	71	71
	3~ TPE	-	-	-
P2	1~3~ TP [kW]	0.12/0.12	0.18/0.18	0.37/0.37
	1~3~ TPE [kW]	0.12/-	0.18/-	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]	118/124	118/124	141/141
	1~3~ TPE [mm]	122/-	122/-	122/-
AD	1~3~ TP [mm]	101/101	101/101	133/109
	1~3~ TPE [mm]	158/-	158/-	158/-
AE	1~3~ TPE [mm]	106/-	106/-	106/-
AF	1~3~ TPE [mm]	106/-	106/-	106/-
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]	345/345	345/345	358/358
	1~3~ TPE [mm]	380/-	380/-	381/-

TP, TPE 32-XX/2



TM02 5015 4509

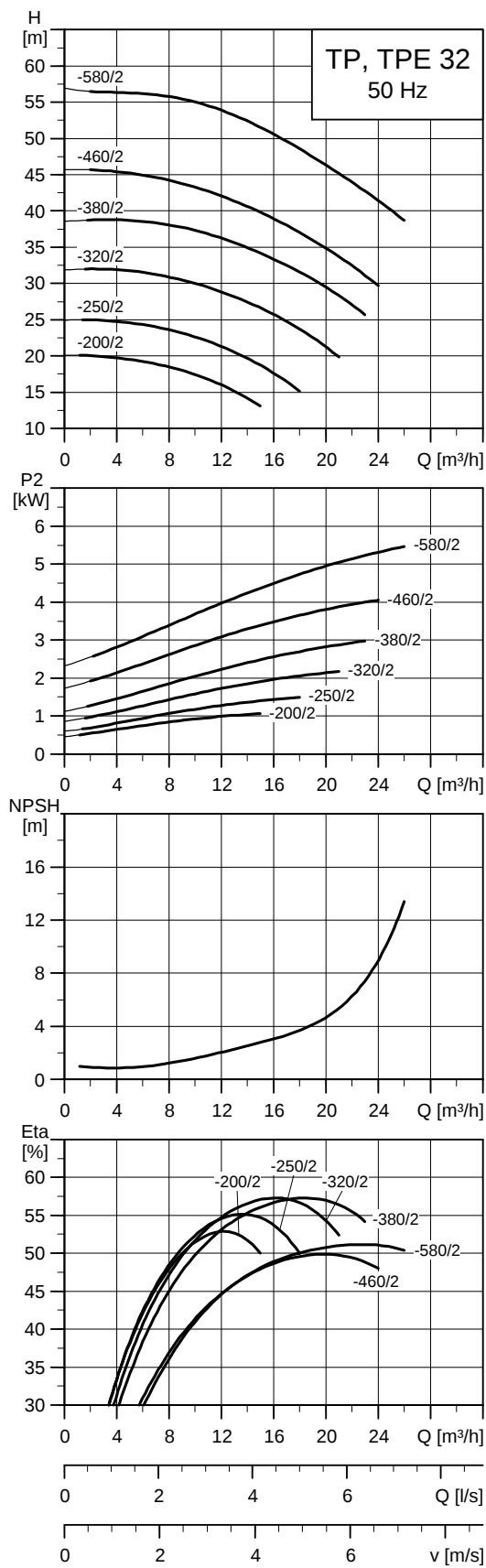
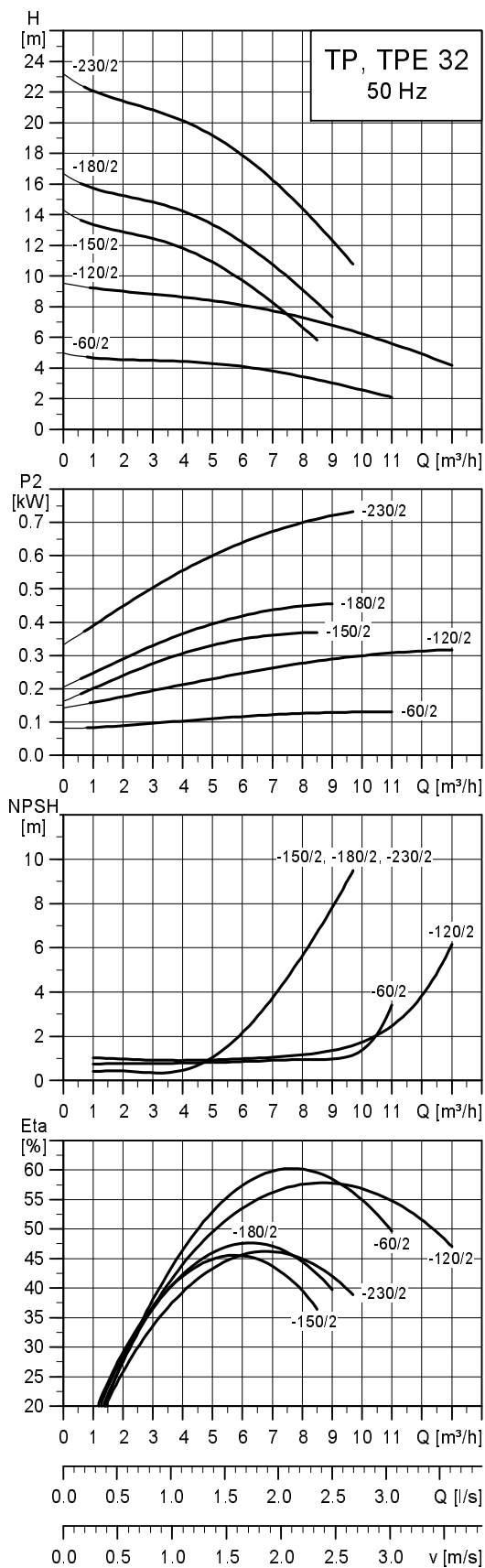


TM02 8348 2614

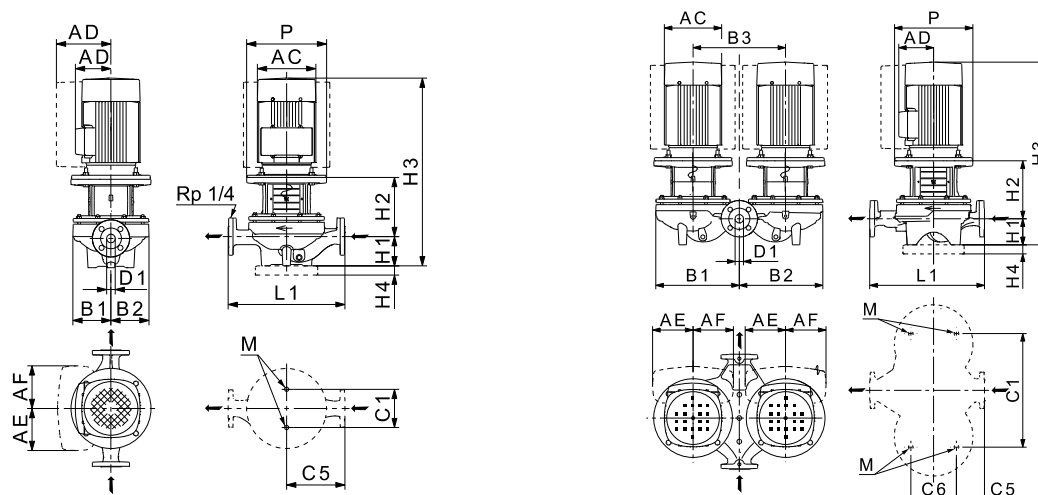
Technical data

TP 32		-50/2 R	-80/2 R	-90/2 R
TPD		-	-	-
TPE		•	•	•
TPED		-	-	-
Series		100	100	100
IEC size	1~ TP	63	63	71
	3~ TP	63	63	71
	1~ TPE	71	71	71
	3~ TPE	-	-	-
P2	1~3~ TP [kW]	0.12/0.12	0.25/0.25	0.37/0.37
	1~3~ TPE [kW]	0.12/-	0.25/-	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]	118/124	139/124	141/141
	1~3~ TPE [mm]	122/-	122/-	122/-
AD	1~3~ TP [mm]	101/101	111/101	133/109
	1~3~ TPE [mm]	158/-	158/-	158/-
AE	1~3~ TPE [mm]	106/-	106/-	106/-
AF	1~3~ TPE [mm]	106/-	106/-	106/-
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]	347/347	378/347	357/357
	1~3~ TPE [mm]	382/-	382/-	380/-

TPED 32-XX/2



Note: All curves apply to single-head pumps. For further information, see page 115.



TM02 8632 2614 - TM02 8631 2614

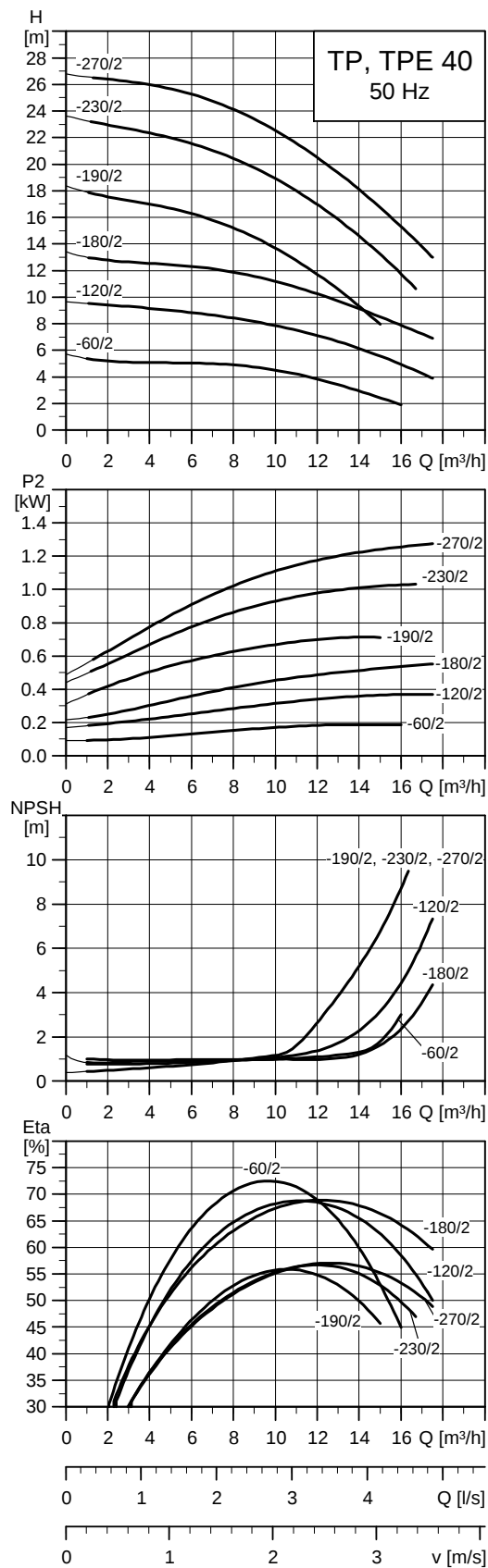
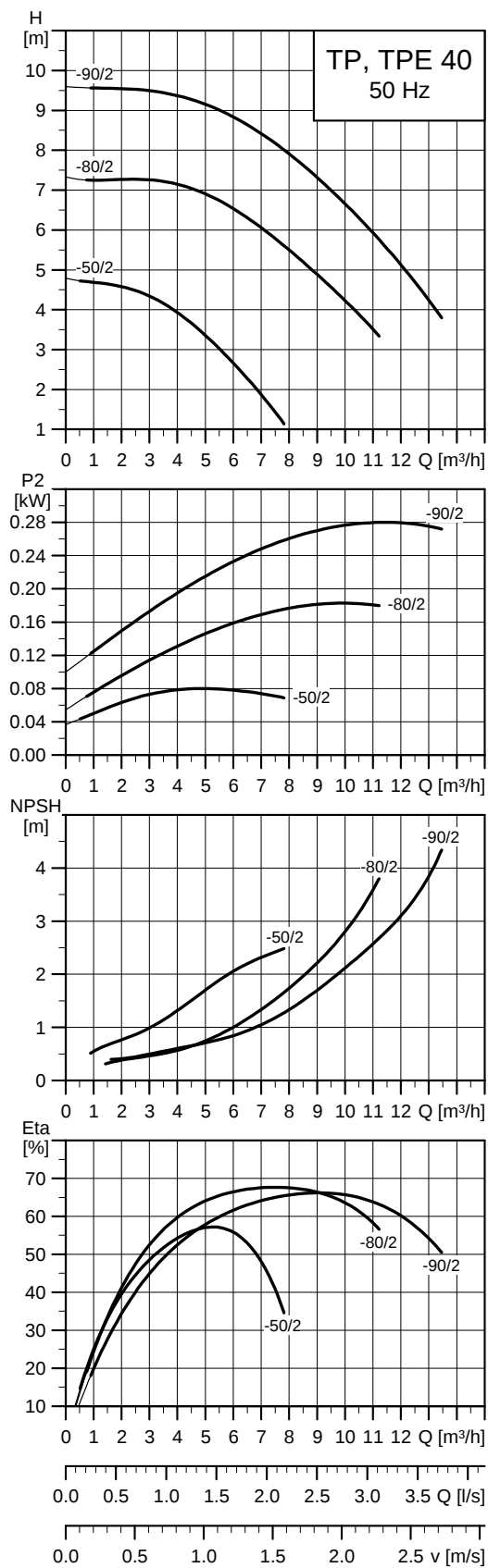
Technical data

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		•	•	•	•	•	•	•	•	•	•	•
TPE		•	•	•	•	•	•	•	•	•	•	•
TPED		•	•	•	•	•	•	•	•	•	•	•
Series		200	200	200	200	200	300	300	300	300	300	300
IEC size	1~ TP	71	71	71	80	80	-	-	-	-	-	-
	3~ TP	63	71	71	71	80	80	90	90	100	112	132
	1~ TPE	71	71	71	80	80	80	-	-	-	-	-
	3~ TPE	-	-	-	-	90	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
	1~3~ TPE [kW]	0.25/-	0.37/-	0.37/-	0.55/-	0.75/0.75	1.1/1.1	-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
	1~3~ TPE [mm]	122/-	122/-	122/-	122/-	122/122	122/122	-122	-122	-198	-220	-220
AD	1~3~ TP [mm]	101/101	133/133	133/109	133/109	133/109	-109	-110	-110	-120	-134	-134
	1~3~ TPE [mm]	158/-	158/-	158/-	158/-	158/158	158/158	-158	-158	-177	-188	-188
AE	1~3~ TPE [mm]	106/-	106/-	106/-	106/-	104/134	104/103	-130	-130	-132	-145	-145
AF	1~3~ TPE [mm]	106/-	106/-	106/-	106/-	104/134	104/103	-130	-130	-132	-145	-145
P	[mm]	90/90	-	-	-	-	200	200	200	250	250	300
B1 ★★	[mm]	75/176	75/180	102/222	102/222	102/222	125/260	125/260	125/260	125/260	144/321	144/321
B2 ★★	[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
C1 ★★	[mm]	80/200	80/200	80/240	80/240	80/240	144/356	144/356	144/356	144/356	144/435	144/435
C5 ★★	[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	385/385	395/395	447/395	447/447	-505	-535	-575	-618	-656	-714
	1~3~ TPE [mm]	430/-	408/-	418/-	-418/-	420/450	508/488	-488	-528	-618	-656	-714
H4	[mm]	-	-	-	-	-	-	-	-	-	-	-
M		M12	M12	M12	M12	M12	M16	M16	M16	M16	M16	M16

★ TP(E), TP(E)D pumps are primarily fitted with IE3 motors. See *Motors* on pages 90 to 94.

★★ The dimension before the slash applies to the single-head pump and the dimension after the slash applies to the twin-head pump.

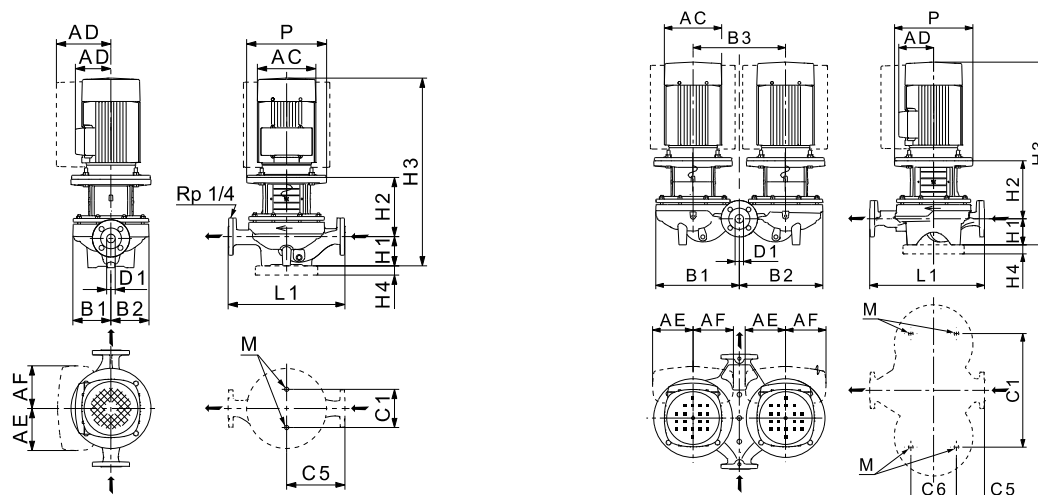
TP, TPE 40-XX/2



Note: All curves apply to single-head pumps. For further information, see page 115.

TM02 5018 4509

TM02 5019 4810



TM02 8632 2614 - TM02 8631 2614

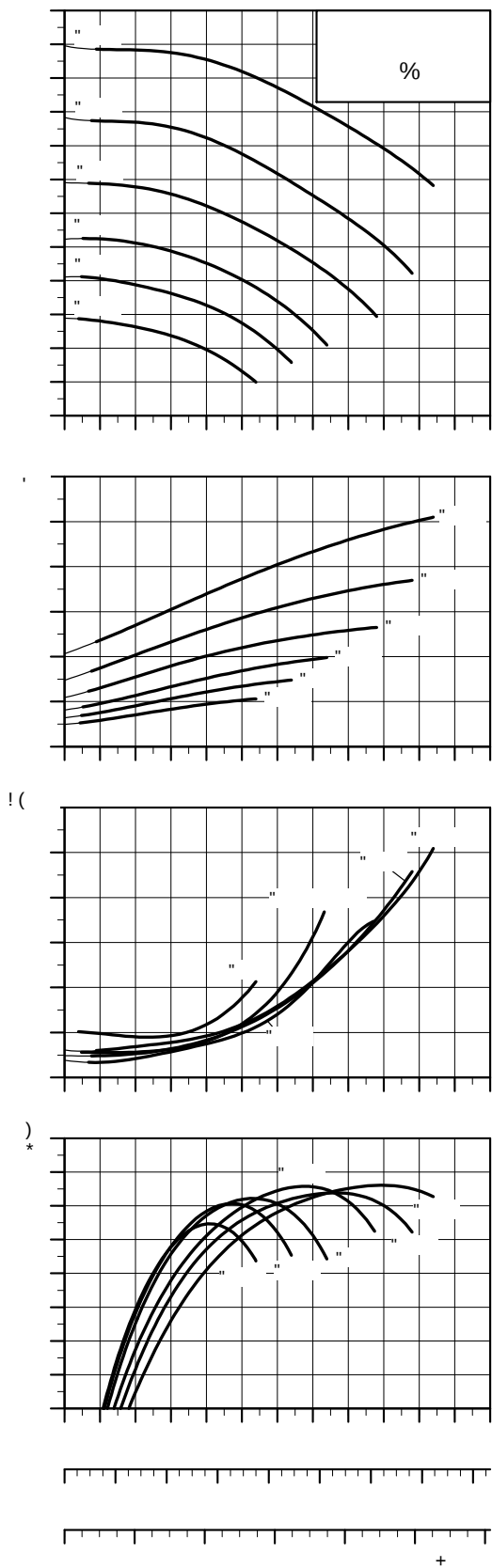
Technical data

TP 40		-50/2	-60/2	-80/2	-90/2	-120/2	-180/2	-190/2	-230/2	-270/2
TPD		-	•	•	-	•	-	•	•	•
TPE		•	•	•	•	•	•	•	•	•
TPED		-	•	-	-	•	-	-	-	-
Series		100	200	100	100	200	200	200	200	200
IEC size	1~ TP	63	71	63	71	71	80	80	90	90
	3~ TP	63	71	63	71	71	71	80	80	90
	1~ TPE	71	71	71	71	71	71	80	80	-
	3~ TPE	-	-	-	-	-	-	90	90	90
P2	1~3~ TP ★ [kW]	0.12/0.12	0.25/0.25	0.25/0.25	0.37/0.37	0.37/0.37	0.55/0.55	0.75/0.75	1.1/1.1	1.5/1.5
	1~3~ TPE [kW]	0.12/-	0.25/-	0.25/-	0.37/-	0.37/-	0.55/-	0.75/0.75	1.1/1.1	-/1.5
PN		PN 6/10	PN 6/10	PN 6/10	PN 6/10	PN 6/10	PN 6/10	PN 16	PN 16	PN 16
T _{min} , T _{max}	[°C]	[-25;110]	[-25;140]	[-25;110]	[-25;110]	[-25;140]	[-25;140]	[-25;140]	[-25;140]	[-25;140]
D1	[mm]	40	40	40	40	40	40	40	40	40
AC	1~3~ TP [mm]	118/124	141/141	139/124	141/141	141/141	141/141	141/141	178/141	178/178
	1~3~ TPE [mm]	122/-	122/-	122/-	122/-	122/-	122/-	122/159	122/159	-/159
AD	1~3~ TP [mm]	101/101	133/109	111/101	133/109	133/109	133/109	133/109	139/109	139/110
	1~3~ TPE [mm]	158/-	158/-	158/-	158/-	158/-	158/-	158/158	158/158	-/158
AE	1~3~ TPE [mm]	106/-	106/-	106/-	106/-	106/-	106/-	106/134	106/134	-/134
AF	1~3~ TPE [mm]	106/-	106/-	106/-	106/-	106/-	106/-	106/134	106/134	-/134
P	[mm]	-	-	-	-	-	-	-	-	-
B1 ★★	[mm]	75/-	75/180	75/-	75/-	75/180	100/-	102/222	102/222	102/222
B2 ★★	[mm]	75/-	75/180	75/-	75/-	75/180	100/-	102/222	102/222	102/222
B3	[mm]	-	200	-	-	200	-	240	240	240
C1 ★★	[mm]	-	80/200	-	-	80/200	80/-	120/240	120/240	120/240
C5 ★★	[mm]	-	125/45	-	-	125/45	125/-	160/95	160/95	160/95
C6	[mm]	-	125	-	-	125	-	125	125	125
L1	[mm]	250	250	250	250	250	250	320	320	320
H1	[mm]	67	67	67	62	67	68	68	68	68
H2	[mm]	120	129	120	120	129	131	141	141	151
H3	1~3~ TP [mm]	366/366	387/366	397/366	373/373	387/387	442/390	439/439	499/510	539/500
	1~3~ TPE [mm]	401/-	418/-	401/-	396/-	411/-	413/-	303/443	422/443	-/453
H4	[mm]	-	-	-	-	-	-	-	-	-
M		-	M12	-	-	M12	M12	M12	M12	M12

★ TP(E), TP(E)D pumps are primarily fitted with IE3 motors. See *Motors*, page 90.

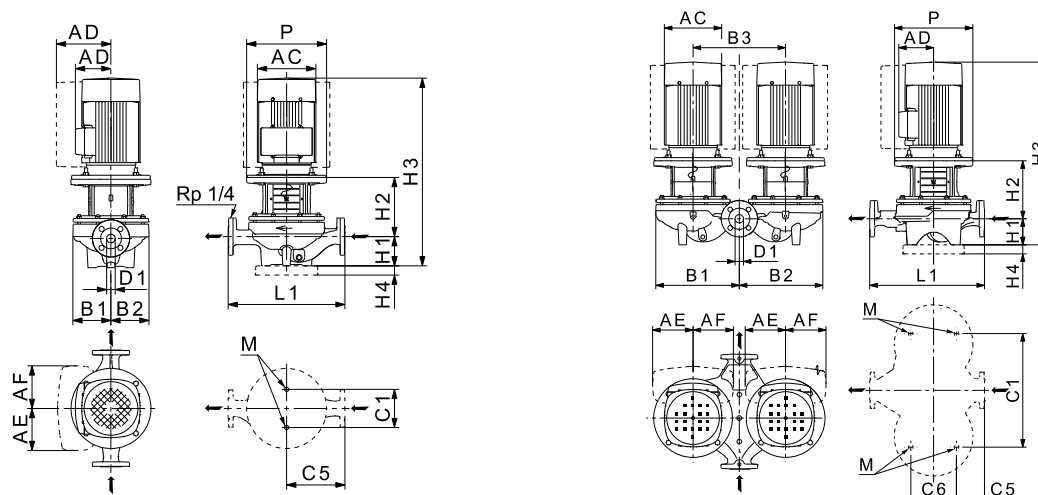
★★ The dimension before the slash applies to the single-head pump, and the dimension after the slash applies to the twin-head pump.

TP 40-XX/2



TM02 5020 3814

Note: All curves apply to single-head pumps. For further information, see page 115.



TM02 8632 2614 - TM02 8631 2614

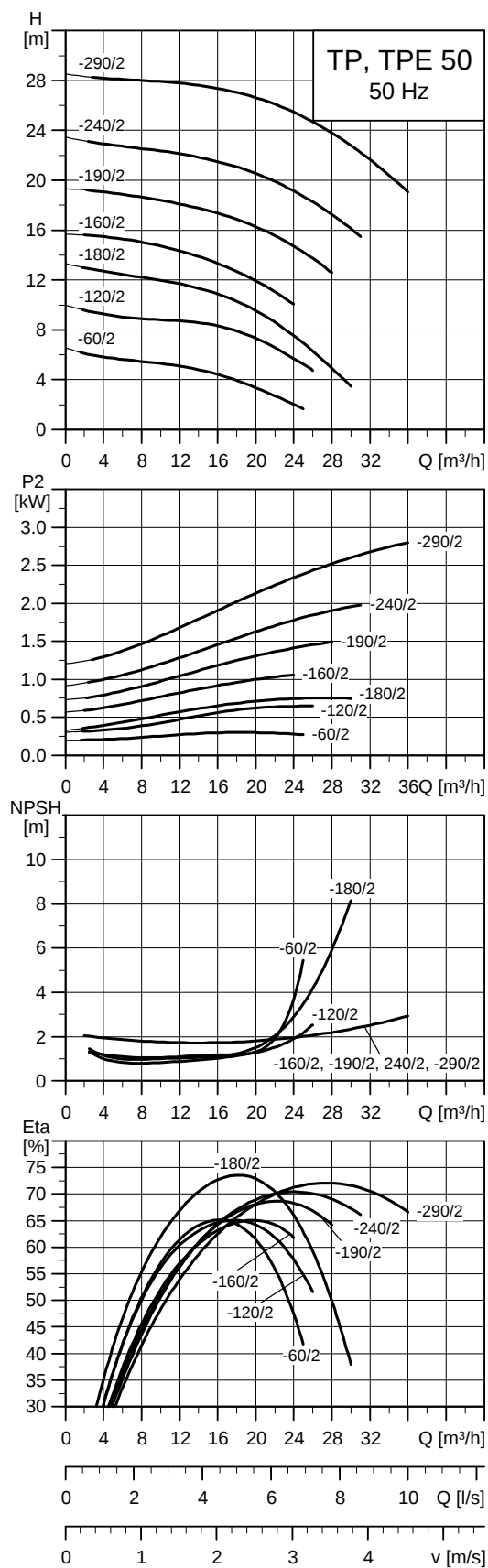
Technical data

TP 40	-240/2	-300/2	-360/2	-430/2	-530/2	-630/2
TPD	•	•	•	•	•	•
TPE	•	•	•	•	•	•
TPED	•	•	•	•	•	•
Series	300	300	300	300	300	300
IEC size	1~ TP	-	-	-	-	-
	3~ TP	90	100	112	132	160
	1~ TPE	-	-	-	-	-
	3~ TPE	90	100	112	132	160
P2	1~3~ TP ★ [kW]	-/2.2	-/3	-/4	-/5.5	-/7.5
	1~3~ TPE [kW]	-/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]	40	40	40	40	40
AC	1~3~ TP [mm]	-/178	-/198	-/220	-/220	-/260
	1~3~ TPE [mm]	-/159	-/198	-/220	-/220	-/260
AD	1~3~ TP [mm]	-/110	-/120	-/134	-/134	-/159
	1~3~ TPE [mm]	-/158	-/177	-/188	-/188	-/213
AE	1~3~ TPE [mm]	-/134	-/132	-/145	-/145	-/145
AF	1~3~ TPE [mm]	-/134	-/132	-/145	-/145	-/145
P	[mm]	200	250	250	300	300
B1 ★★	[mm]	130/273	130/273	130/273	150/325	150/325
B2 ★★	[mm]	117/267	117/267	117/267	147/325	147/325
B3	[mm]	290	290	290	355	355
C1 ★★	[mm]	144/400	144/400	144/400	144/435	144/435
C5 ★★	[mm]	170/45	170/45	170/45	220/105	220/105
C6	[mm]	175	175	175	175	175
L1	[mm]	340	340	340	440	440
H1	[mm]	100	100	100	110	110
H2	[mm]	166	194	194	225	225
H3	1~3~ TP [mm]	-/587	-/629	-/666	-/726	-/714
	1~3~ TPE [mm]	-/540	-/629	-/666	-/726	-/714
H4	[mm]	-	-	-	-	35
M		M16	M16	M16	M16	M16

★ TP(E), TP(E)D pumps are primarily fitted with IE3 motors. See Motors, page 90.

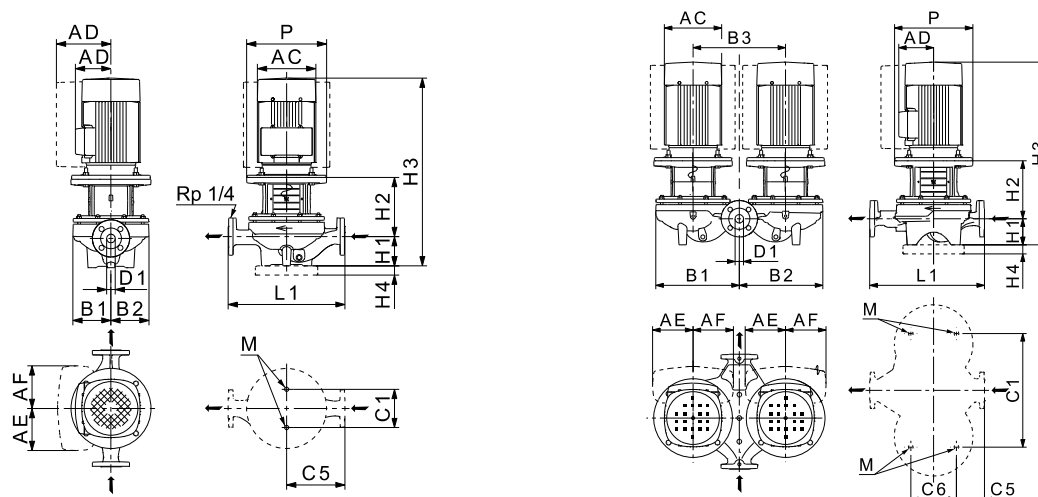
★★ The dimension before the slash applies to the single-head pump, and the dimension after the slash applies to the twin-head pump.

TP 50-XX/2



Note: All curves apply to single-head pumps. For further information, see page 115.

TM02 5021 4810



TM02 8632 2614 - TM02 8631 2614

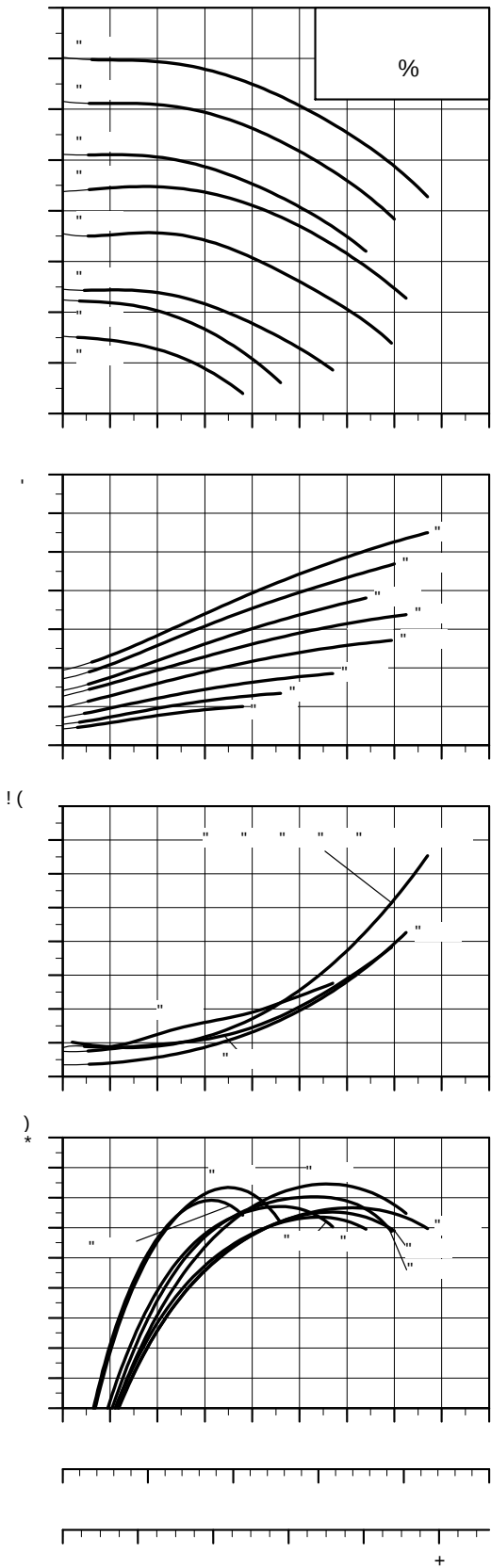
Technical data

TP 50		-60/2	-120/2	-180/2	-160/2	-190/2	-240/2	-290/2
TPD		•	•	•	•	•	•	•
TPE		•	•	•	•	•	•	•
TPED		•	•	•	•	•	•	•
Series		200	200	200	300	300	300	300
IEC size	1~ TP	71	80	80	-	-	-	-
	3~ TP	71	80	80	80	90	90	100
	1~ TPE	71	80	80	80	-	-	-
	3~ TPE	-	90	90	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
	1~3~ TPE [kW]	0.37/-	0.75/0.75	0.75/0.75	1.1/1.1	-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
	1~3~ TPE [mm]	122/-	122/12	122/-122	122/85	-122	-122	-198
AD	1~3~ TP [mm]	133/133	133/133	133/109	-109	-110	-110	-120
	1~3~ TPE [mm]	158/-	158/158	158/158	158/158	-158	-158	-177
AE	1~3~ TPE [mm]	106/-	106/134	106/134	106/134	-134	-134	-132
AF	1~3~ TPE [mm]	106/-	106/134	106/134	106/134	-134	-134	-132
P	[mm]	105/105	120/120	-	200	200	200	250
B1 ★★	[mm]	90/177	100/221	100/225	117/252	117/252	117/252	117/252
B2 ★★	[mm]	75/188	100/221	100/225	117/252	117/252	117/252	117/252
B3	[mm]	200	240	240	270	270	270	270
C1 ★★	[mm]	120/200	120/240	120/240	144/350	144/350	144/350	144/350
C5 ★★	[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]	403/403	441/441	441/441	-518	-548	-588	-630
	1~3~ TPE [mm]	426/-	425/444	425/444	481/501	-501	-541	-630
H4	[mm]	-	-	-	-	-	-	-
M		M12	M12	M12	M16	M16	M16	M16

★ TP(E), TP(E)D pumps are primarily fitted with IE3 motors. See *Motors*, page 90.

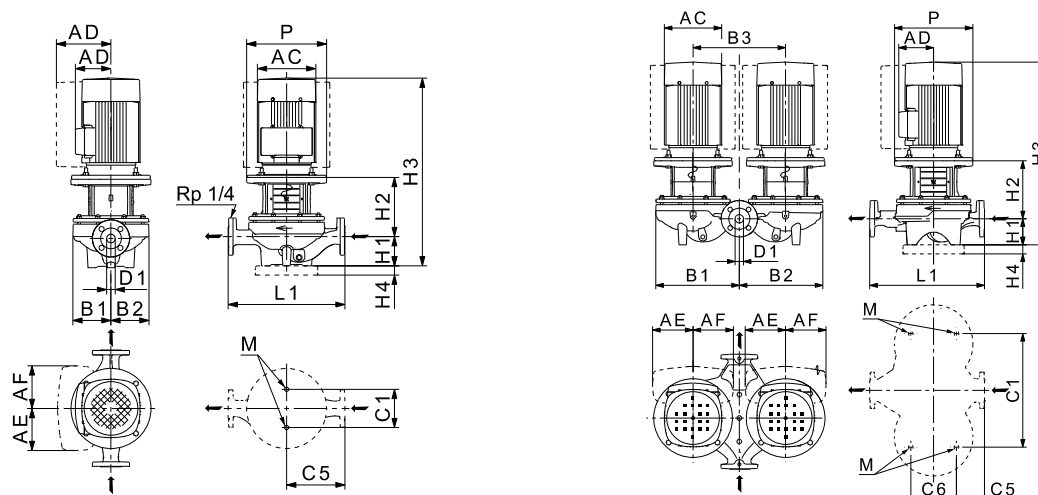
★★ The dimension before the slash applies to the single-head pump, and the dimension after the slash applies to the twin-head pump.

TP 50-XX/2



TM02 5022 3814

Note: All curves apply to single-head pumps. For further information, see page 115.



TM02 8632 2614 - TM02 8631 2614

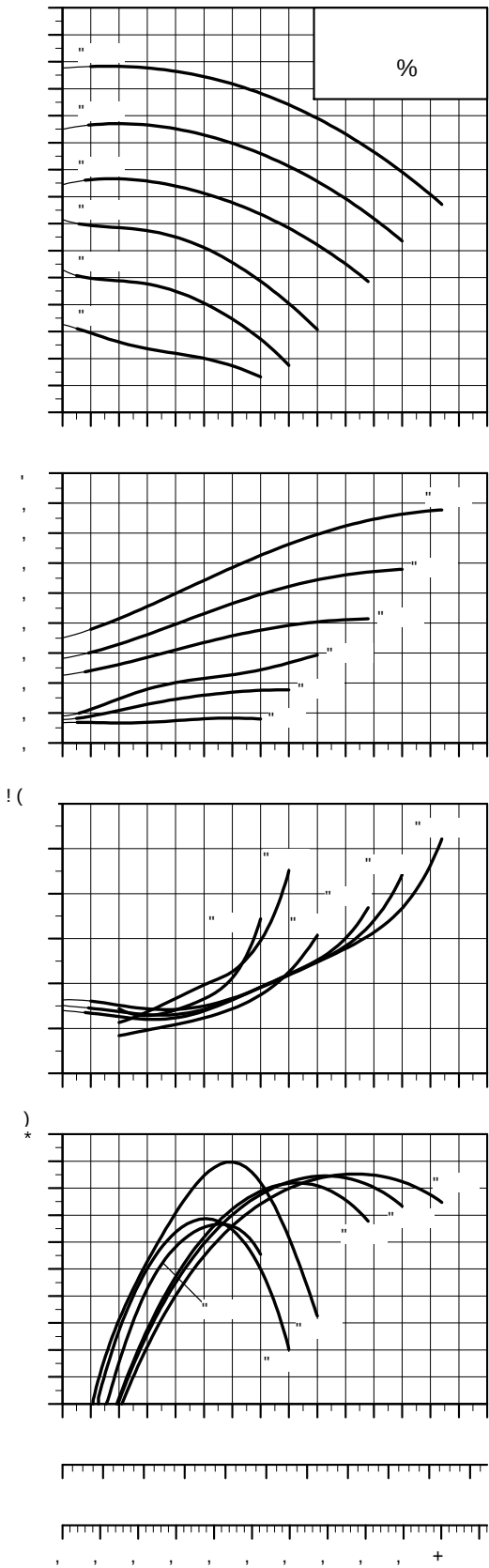
Technical data

TP 50	-360/2	-430/2	-420/2	-540/2	-630/2	-710/2	-830/2	-900/2
TPD	•	•	•	•	•	•	•	•
TPE	•	•	•	•	•	•	•	•
TPED	•	•	•	•	•	•	•	•
Series	300	300	300	300	300	300	300	300
IEC size	1~ TP	-	-	-	-	-	-	-
	3~ TP	112	132	132	160	161	160	180
	1~ TPE	-	-	-	-	-	-	-
	3~ TPE	112	132	132	160	161	160	180
P2	1~3~ TP ★ [kW]	-/4	-/5.5	-/7.5	-/11	-/15	-/15	-/18.5
	1~3~ TPE [kW]	-/4	-/5.5	-/7.5	-/11	-/15	-/15	-/18.5
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]
D1	[mm]	50	50	50	50	50	50	50
AC	1~3~ TP [mm]	-/220	-/220	-/260	-/314	-/314	-/314	-/314
	1~3~ TPE [mm]	-/220	-/220	-/260	-/314	-/314	-/314	-/314
AD	1~3~ TP [mm]	-/134	-/134	-/159	-/204	-/204	-/204	-/204
	1~3~ TPE [mm]	-/188	-/188	-/213	-/308	-/308	-/308	-/308
AE	1~3~ TPE [mm]	-/145	-/145	-/145	-/210	-/210	-/210	-/210
AF	1~3~ TPE [mm]	-/145	-/145	-/145	-/210	-/210	-/210	-/210
P	[mm]	250	300	300	350	350	350	350
B1 ★★	[mm]	133/290	133/290	162/373	162/373	162/373	180/386	180/386
B2 ★★	[mm]	119/284	119/284	162/373	162/373	162/373	164/379	164/379
B3	[mm]	320	320	420	420	420	420	420
C1 ★★	[mm]	144/400	144/400	144/500	144/500	144/500	144/500	144/500
C5 ★★	[mm]	170/52	170/52	220/123	220/123	220/123	220/123	220/123
C6	[mm]	175	175	175	175	175	175	175
L1	[mm]	340	340	440	440	440	440	440
H1	[mm]	115	115	115	115	115	115	115
H2	[mm]	189	228	234	264	264	264	264
H3	1~3~ TP [mm]	-/676	-/734	-/728	-/850	-/850	-/850	-/894
	1~3~ TPE [mm]	-/676	-/734	-/728	-/850	-/850	-/850	-/920
H4	[mm]	-	-	-	35	35	35	35
M		M16	M16	M16	M16	M16	M16	M16

★ TP(E), TP(E)D pumps are primarily fitted with IE3 motors. See *Motors*, page 90.

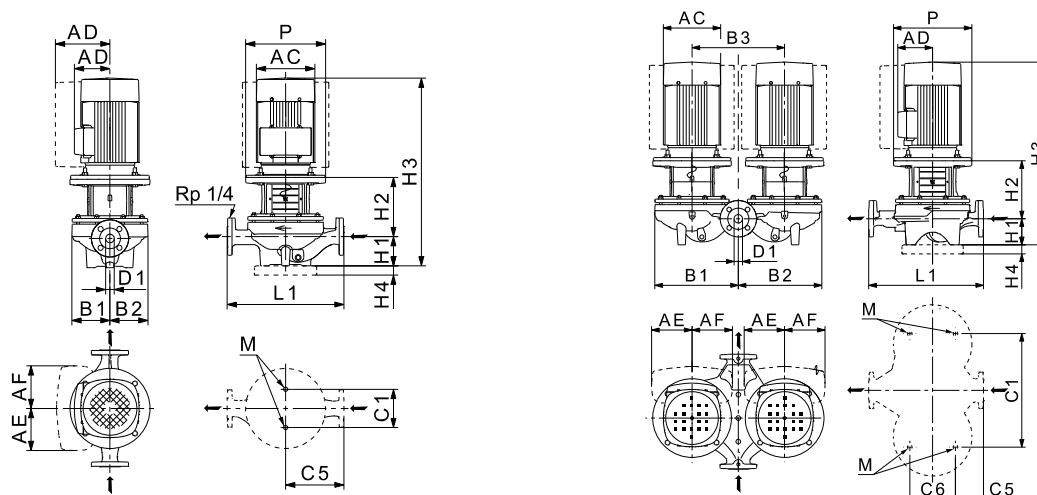
★★ The dimension before the slash applies to the single-head pump, and the dimension after the slash applies to the twin-head pump.

TP 65-XX/2



TM02 5023 3814

Note: All curves apply to single-head pumps. For further information, see page 115.



TM02 8632 2614 - TM02 8631 2614

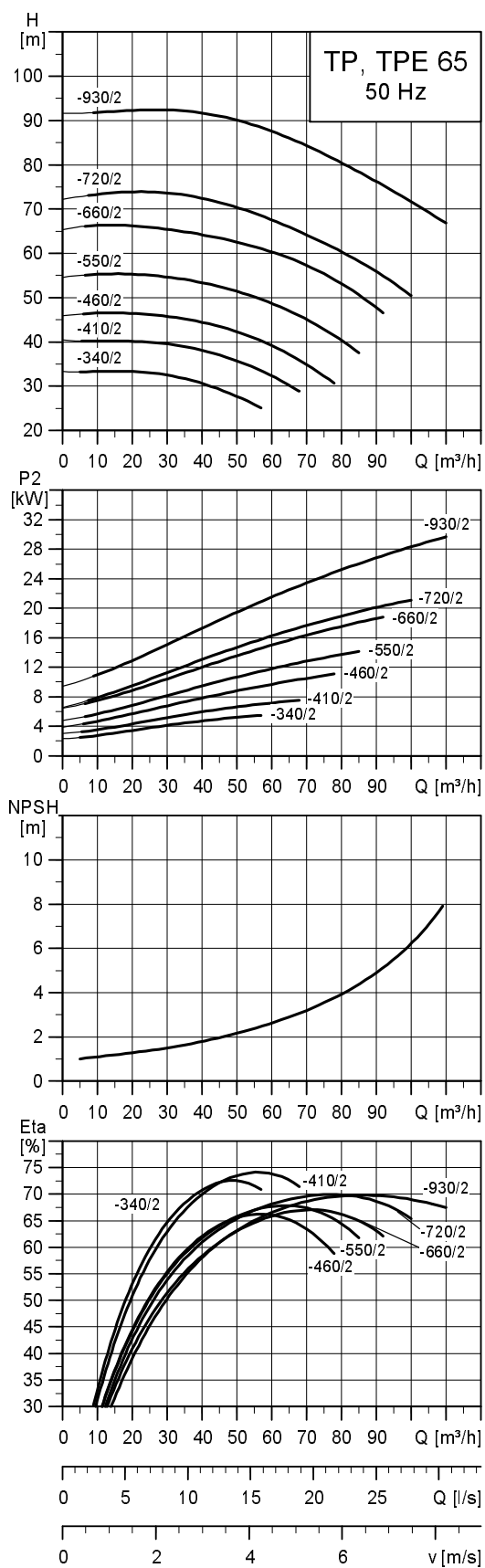
Technical data

TP 65		-60/2	-120/2	-180/2	-170/2	-210/2	-250/2
TPD		•	•	•	•	•	•
TPE		•	•	•	•	•	•
TPED		•	•	•	•	•	•
Series		200	200	200	300	300	300
IEC size	1~ TP	80	90	90	-	-	-
	3~ TP	71	80	90	90	100	112
	1~ TPE	71	80	-	-	-	-
	3~ TPE	-	90	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
	1~3~ TPE [kW]	0.55/-	1.1/1.1	-/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
AC	1~3~ TP [mm]	141/141	178/141	178/178	-/178	-/198	-/220
	1~3~ TPE [mm]	122/-	122/122	-/122	-/122	-/198	-/220
AD	1~3~ TP [mm]	133/109	139/109	139/110	-/110	-/120	-/134
	1~3~ TPE [mm]	158/-	158/158	-/158	-/158	-/177	-/188
AE		1~3~ TPE [mm]	106/-	106/134	-/134	-/134	-/145
AF		1~3~ TPE [mm]	106/-	106/134	-/134	-/134	-/145
P		[mm]	-	-	200	250	250
B1 ★★		[mm]	93/195	100/225	100/225	134/288	134/288
B2 ★★		[mm]	93/210	100/225	100/225	122/282	122/282
B3		[mm]	240	240	240	320	320
C1 ★★		[mm]	120/240	120/240	120/240	144/400	144/400
C5 ★★		[mm]	170/63	170/63	170/63	180/65	180/65
C6		[mm]	153	153	153	175	175
L1		[mm]	340	340	340	360	360
H1		[mm]	82	82	82	105	105
H2		[mm]	145	144	154	172	201
H3	1~3~ TP [mm]	468/418	517/532	557/507	-/598	-/641	-/678
	1~3~ TPE [mm]	441/-	445/465	-/470	-/551	-/641	-/678
H4		[mm]	-	-	-	-	-
M			M12	M12	M12	M16	M16

★ TP(E), TP(E)D pumps are primarily fitted with IE3 motors. See *Motors*, page 90.

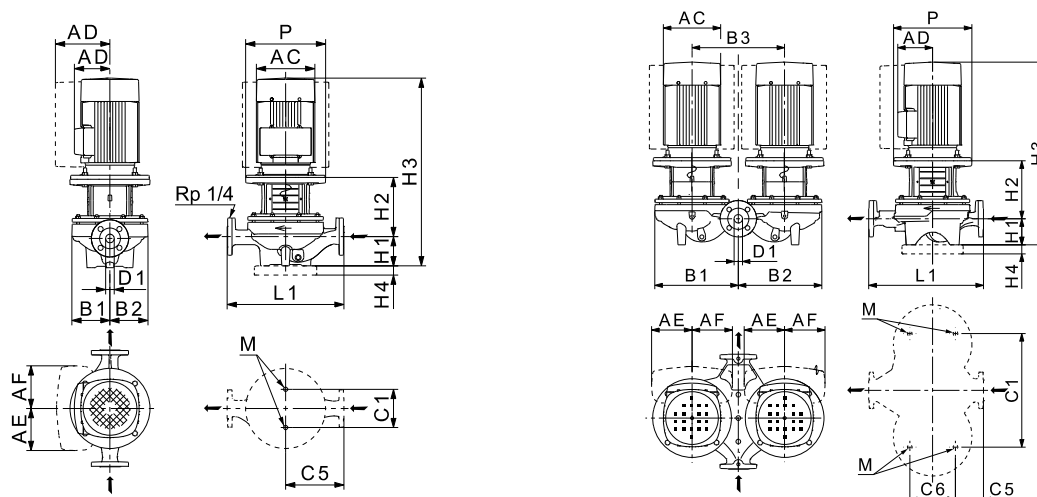
★★ The dimension before the slash applies to the single-head pump, and the dimension after the slash applies to the twin-head pump.

TP 65-XX/2



Note: All curves apply to single-head pumps. For further information, see page 115.

TM02 5024 0504



TM02 8632 2614 - TM02 8631 2614

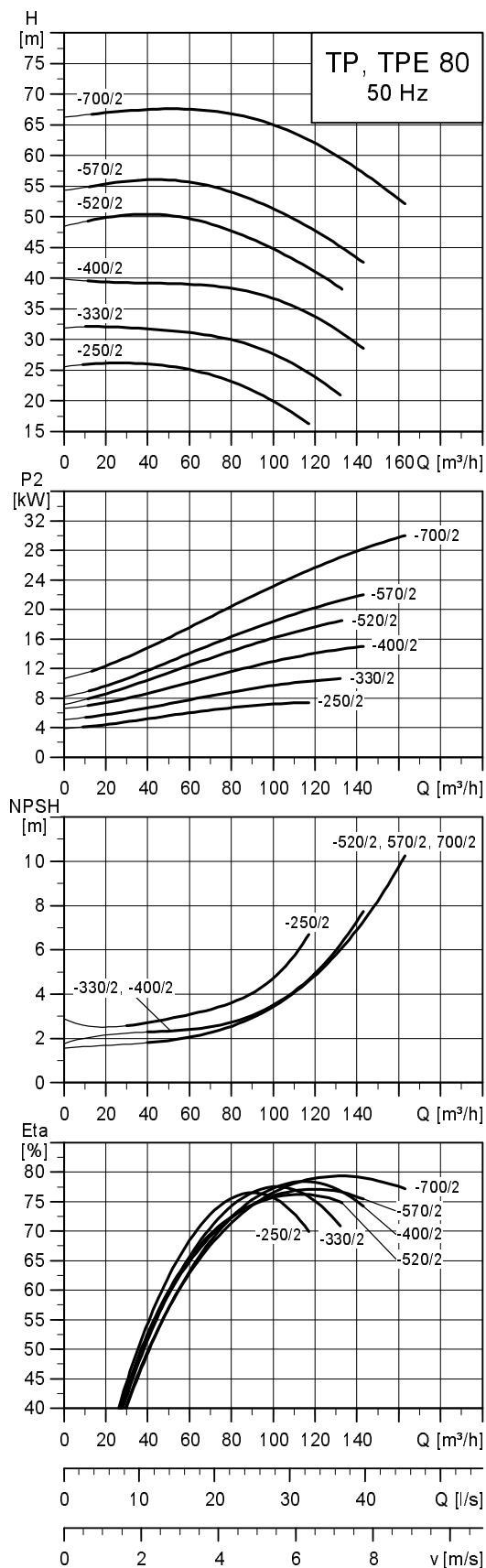
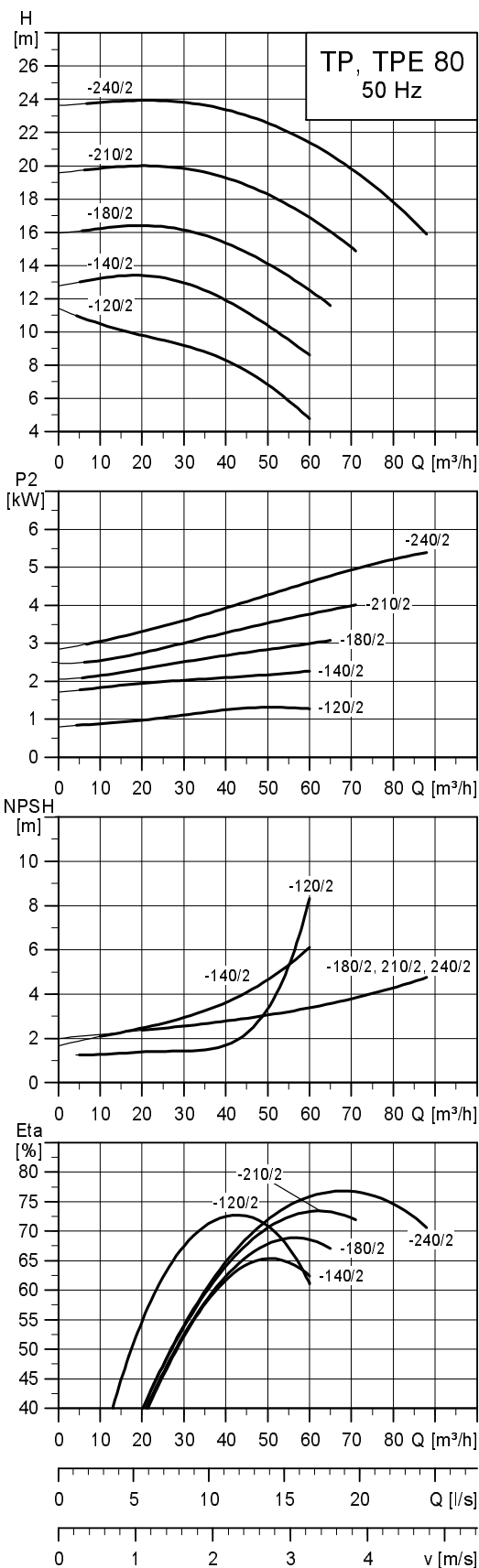
Technical data

TP 65	-340/2	-410/2	-460/2	-550/2	-660/2	-720/2	-930/2
TPD	•	•	•	•	•	•	•
TPE	•	•	•	•	•	•	-
TPED	•	•	•	•	•	•	-
Series	300	300	300	300	300	300	300
IEC size	1~ TP	-	-	-	-	-	-
	3~ TP	132	132	160	160	160	200
	1~ TPE	-	-	-	-	-	-
	3~ TPE	132	132	160	160	160	-
P2	1~3~ TP ★ [kW]	-/5.5	-/7.5	-/11	-/15	-/18.5	-/30
	1~3~ TPE [kW]	-/5.5	-/7.5	-/11	-/15	-/18.5	-/22
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
AC	1~3~ TP [mm]	-/220	-/260	-/314	-/314	-/314	-/407
	1~3~ TPE [mm]	-/220	-/260	-/314	-/314	-/314	-
AD	1~3~ TP [mm]	-/134	-/159	-/204	-/204	-/204	-/315
	1~3~ TPE [mm]	-/188	-/213	-/308	-/308	-/308	-
AE	1~3~ TPE [mm]	-/145	-/145	-/210	-/210	-/210	-
AF	1~3~ TPE [mm]	-/145	-/145	-/210	-/210	-/210	-
P	[mm]	300	300	350	350	350	400
B1 ★★	[mm]	142/298	142/298	178/349	178/349	178/349	178/349
B2 ★★	[mm]	124/290	124/290	164/383	164/383	164/383	164/383
B3	[mm]	320	320	440	440	440	440
C1 ★★	[mm]	144/400	144/400	144/520	144/520	144/520	144/520
C5 ★★	[mm]	180/65	180/65	238/111	238/111	238/111	238/111
C6	[mm]	175	175	175	175	175	175
L1	[mm]	360	360	475	475	475	475
H1	[mm]	105	105	125	125	125	125
H2	[mm]	239	239	263	263	263	263
H3	1~3~ TP [mm]	-/735	-/723	-/859	-/859	-/903	-/999
	1~3~ TPE [mm]	-/735	-/723	-/859	-/859	-/903	-
H4	[mm]	-	-	35	35	35	35
M		M16	M16	M16	M16	M16	M16

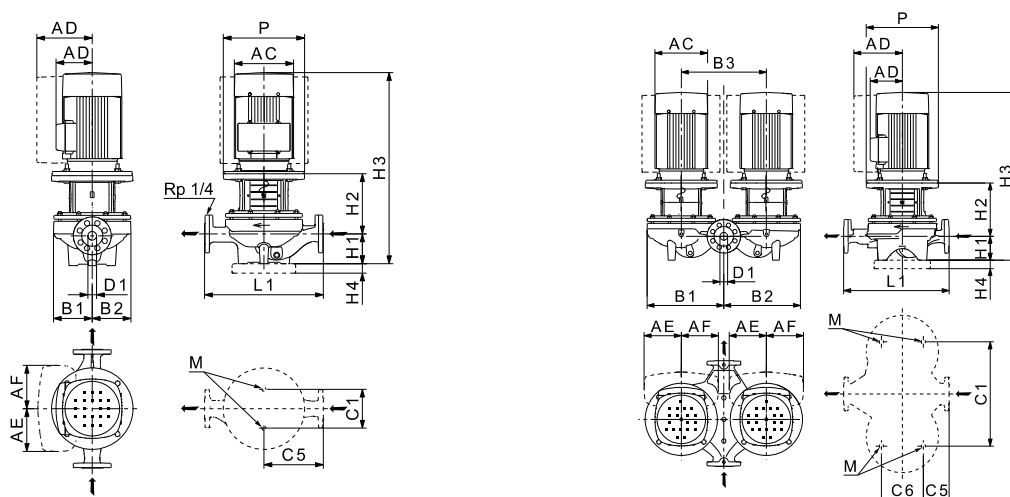
★ TP(E), TP(E)D pumps are primarily fitted with IE3 motors. See *Motors*, page 90.

★★ The dimension before the slash applies to the single-head pump, and the dimension after the slash applies to the twin-head pump.

TP 80-XX/2



Note: All curves apply to single-head pumps. For further information, see page 115.



TM03 5348 2614 - TM03 5349 2614

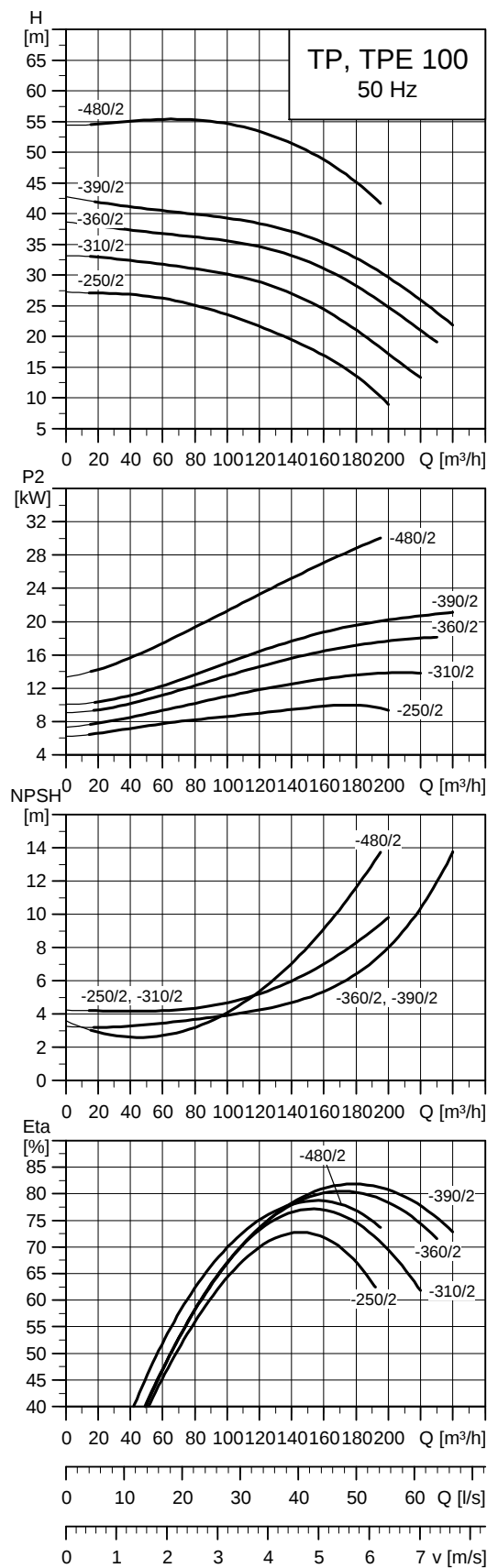
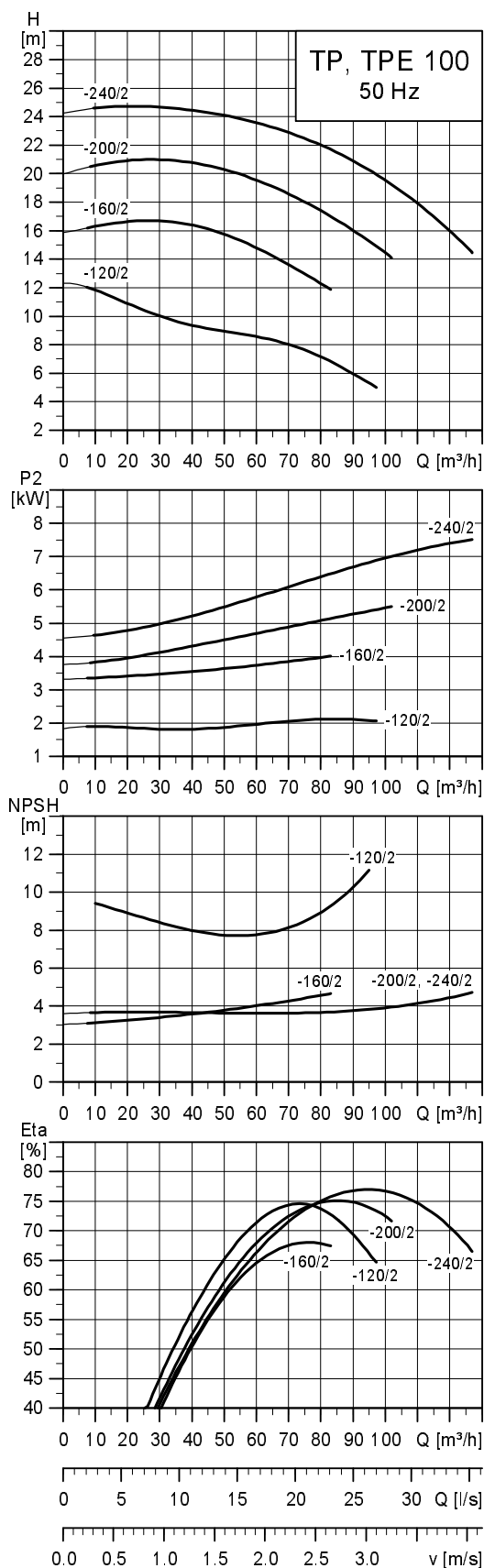
Technical data

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		•	•	•	•	•	•	•	•	•	•	•
TPE		•	•	•	•	•	•	•	•	•	•	-
TPED		•	•	•	•	•	•	•	•	•	•	-
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
	1~ TPE	-	-	-	-	-	-	-	-	-	-	-
	3~ TPE	90	90	100	112	132	132	160	160	160	180	-
P2	1~3~ TP ★ [kW]	1.5/1.5	-/2.2	-/3	-/4	-/5.5	-/7.5	-/11	-/15	-/18.5	-/22	-/30
	1~3~ TPE [kW]	-/1.5	-/2.2	-/3	-/4	-/5.5	-/7.5	-/11	-/15	-/18.5	-/22	-
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	-/314	-/314	-/314	-/314	-/402
	1~3~ TPE [mm]	-/122	-/122	-/198	-/220	-/220	-/260	-/314	-/314	-/314	-/314	-
AD	1~3~ TP [mm]	139/139	-/110	-/120	-/134	-/134	-/159	-/204	-/204	-/204	-/204	-/315
	1~3~ TPE [mm]	-/158	-/158	-/177	-/188	-/188	-/213	-/308	-/308	-/308	-/308	-
AE	1~3~ TPE [mm]	-/134	-/134	-/132	-/145	-/145	-/145	-/210	-/210	-/210	-/210	-
AF	1~3~ TPE [mm]	-/134	-/134	-/132	-/145	-/145	-/145	-/210	-/210	-/210	-/210	-
P	[mm]	135/135	200	250	250	300	300	350	350	350	350	400
B1 ★★	[mm]	120/134	125/296	125/296	125/296	125/296	176/366	176/366	176/366	187/416	187/416	187/416
B2 ★★	[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
C1 ★★	[mm]	160/240	144/420	144/420	144/420	144/420	144/480	144/480	144/480	144/550	144/550	144/550
C5 ★★	[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]	581/581	-/602	-/644	-/681	-/739	-/737	-/859	-/859	-/903	-/903	-/999
	1~3~ TPE [mm]	-/494	-/555	-/644	-/681	-/739	-/737	-/859	-/859	-/903	-/929	-
H4	[mm]	-	-	-	-	-	-	35	35	35	35	35
M		M16	M16	M16	M16	M16	M16	M16	M16	M16	M16	M16

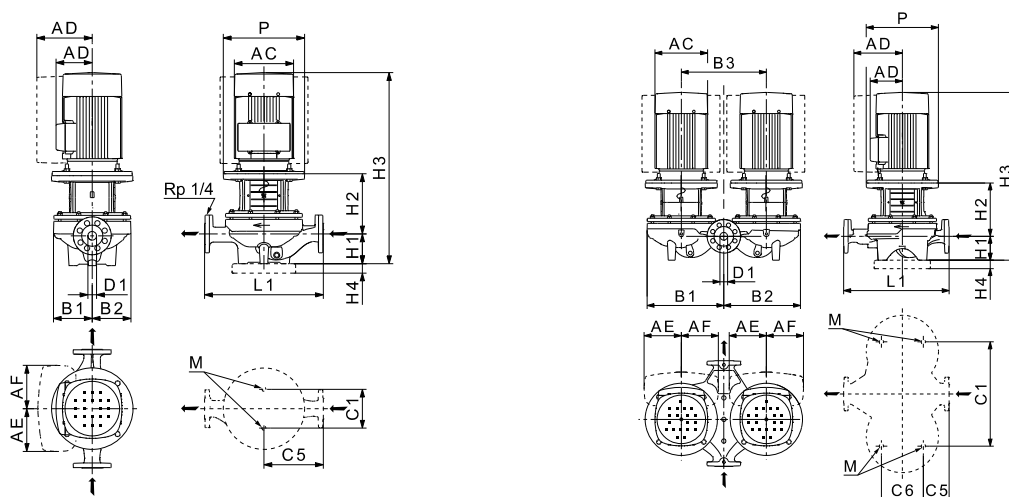
★ TP(E), TP(E)D pumps are primarily fitted with IE3 motors. See Motors, page 90.

★★ The dimension before the slash applies to the single-head pump, and the dimension after the slash applies to the twin-head pump.

TP 100-XX/2



Note: All curves apply to single-head pumps. For further information, see page 115.



TM03 5348 2614 - TM03 5349 2614

Technical data

TP 100	-120/2	-160/2	-200/2	-240/2	-250/2	-310/2	-360/2	-390/2	-480/2
TPD	•	•	•	•	•	•	•	•	-
TPE	•	•	•	•	•	•	•	•	-
TPED	•	•	•	•	•	•	•	•	-
Series	200	300	300	300	300	300	300	300	300
IEC size	1~ TP	-	-	-	-	-	-	-	-
	3~ TP	90	112	132	132	160	160	180	200
	1~ TPE	-	-	-	-	-	-	-	-
	3~ TPE	90	112	132	132	160	160	180	-
P2	1~3~ TP ★ [kW]	-/2.2	-/4	-/5.5	-/7.5	-/11	-/15	-/18.5	-/22
	1~3~ TPE [kW]	-/2.2	-/4	-/5.5	-/7.5	-/11	-/15	-/18.5	-/22
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]
D1	[mm]	100	100	100	100	100	100	100	100
AC	1~3~ TP [mm]	-/178	-/220	-/220	-/260	-/314	-/314	-/314	-/407
	1~3~ TPE [mm]	-/122	-/220	-/220	-/260	-/314	-/314	-/314	-
AD	1~3~ TP [mm]	-/110	-/134	-/134	-/159	-/204	-/204	-/204	-/315
	1~3~ TPE [mm]	-/158	-/188	-/188	-/213	-/308	-/308	-/308	-
AE	1~3~ TPE [mm]	-/134	-/145	-/145	-/145	-/210	-/210	-/210	-
AF	1~3~ TPE [mm]	-/134	-/145	-/145	-/145	-/210	-/210	-/210	-
P	[mm]	-	250	300	300	350	350	350	400
B1 ★★	[mm]	125/245	156/347	156/347	156/347	190/414	190/414	190/414	201/443
B2 ★★	[mm]	100/265	124/332	124/332	124/332	151/395	151/395	151/395	173/429
B3	[mm]	280	470	470	470	470	500	500	500
C1 ★★	[mm]	160/280	144/480	144/480	144/480	230/550	230/550	230/550	230/550
C5 ★★	[mm]	225/83	250/104	250/104	250/104	275/110	275/110	275/110	275/110
C6	[mm]	221	175	175	175	230	230	230	230
L1	[mm]	450	500	500	500	550	550	550	550
H1	[mm]	107	140	140	140	140	140	140	140
H2	[mm]	185	206	245	245	270	270	270	307
H3	1~3~ TP [mm]	-/613	-/718	-/776	-/764	-/881	-/881	-/925	-/1058
	1~3~ TPE [mm]	-/566	-/718	-/776	-/764	-/881	-/881	-/925	-
H4	[mm]	-	-	-	-	35	35	35	35
M		M16	M16	M16	M16	M16	M16	M16	M16

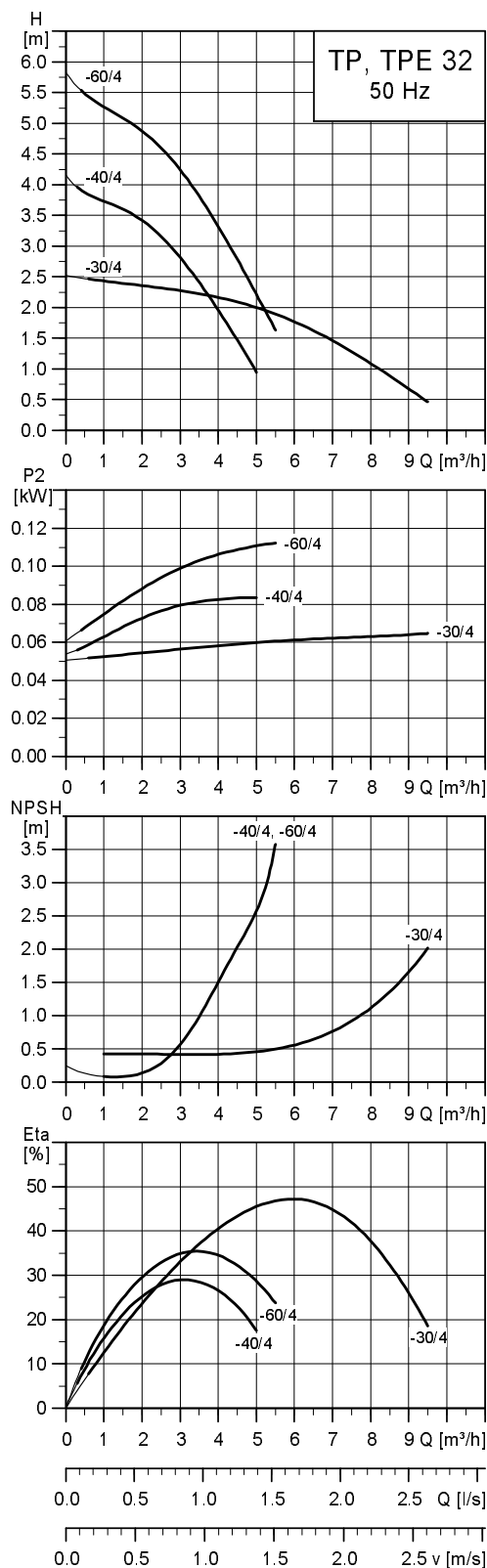
★ TP(E), TP(E)D pumps are primarily fitted with IE3 motors. See *Motors*, page 90.

★★ The dimension before the slash applies to the single-head pump, and the dimension after the slash applies to the twin-head pump.

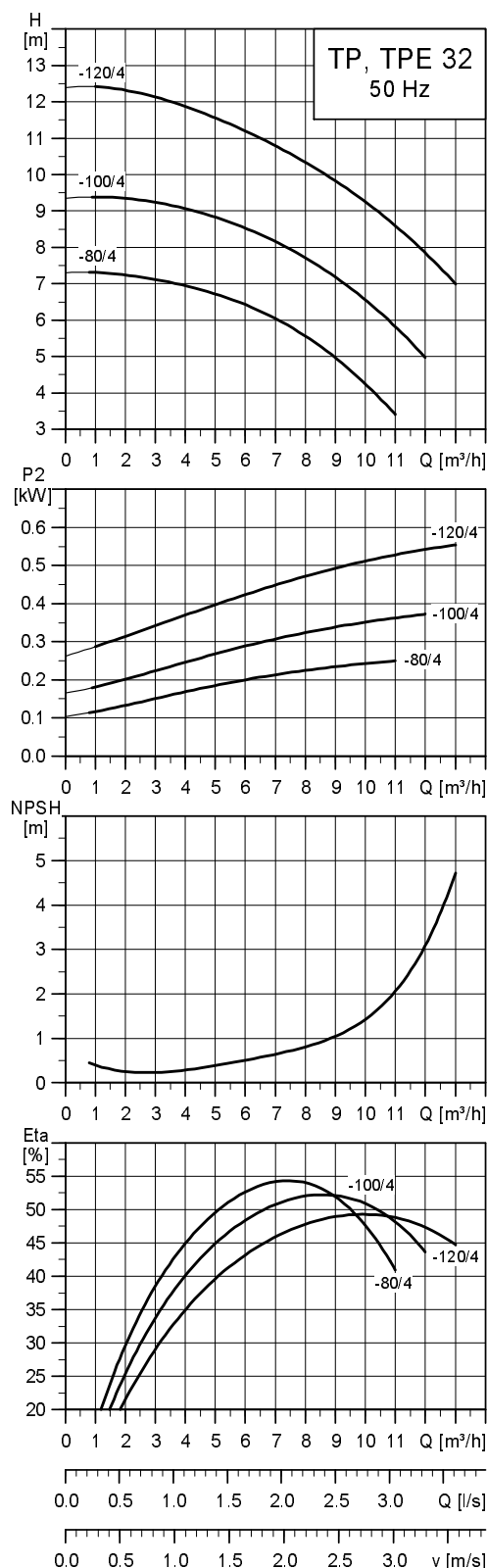
24. Performance curves and technical data

TP, TPD, TPE, TPED, 4-pole, PN 6, 10, 16

TP, TPD, TPE, TPED, 32-XXX/4

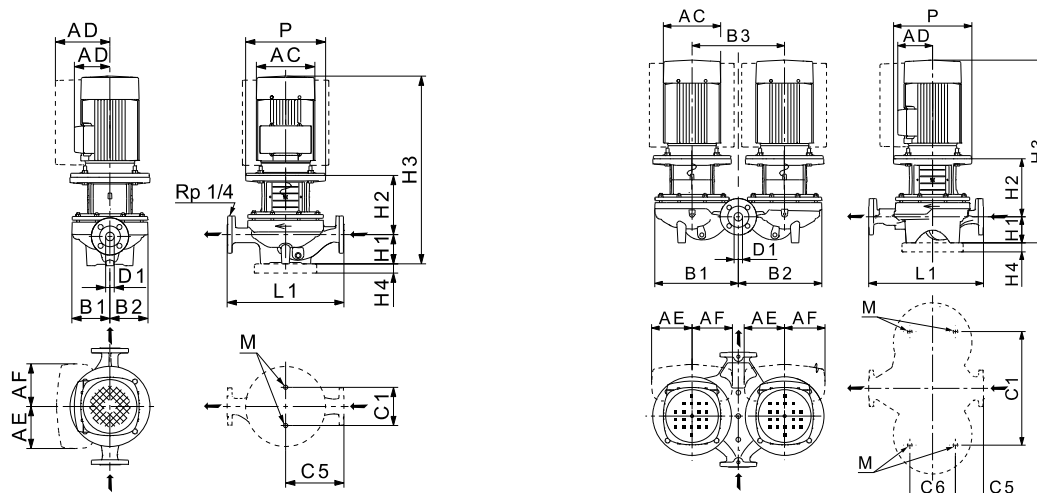


TM02 5027 4509



TM02 5028 0504

Note: All curves apply to single-head pumps. For further information, see page 115.



TM02 8632 2614 - TM02 8631 2614

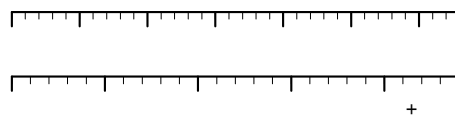
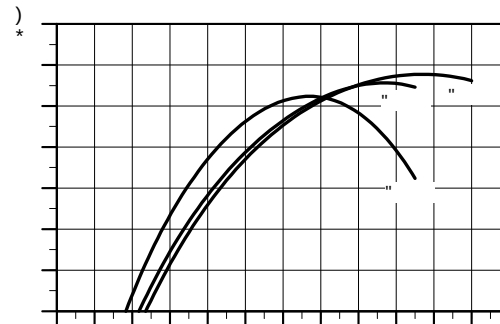
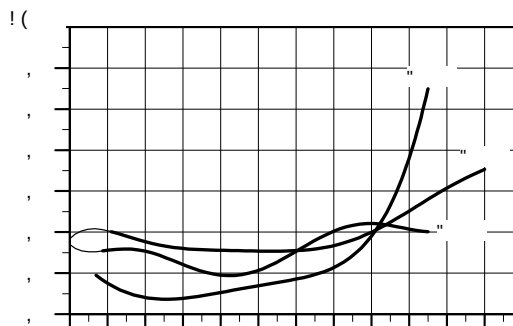
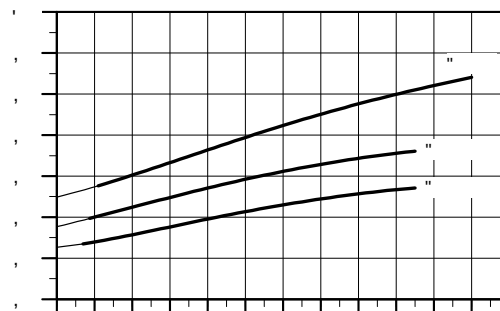
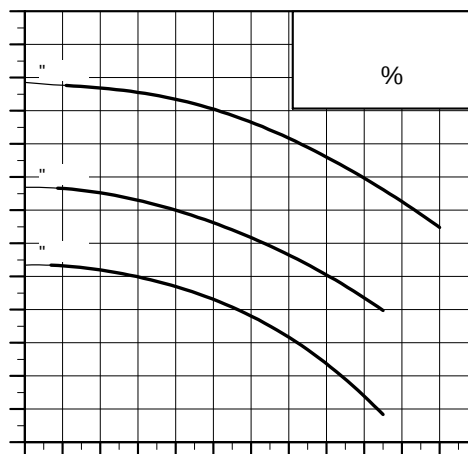
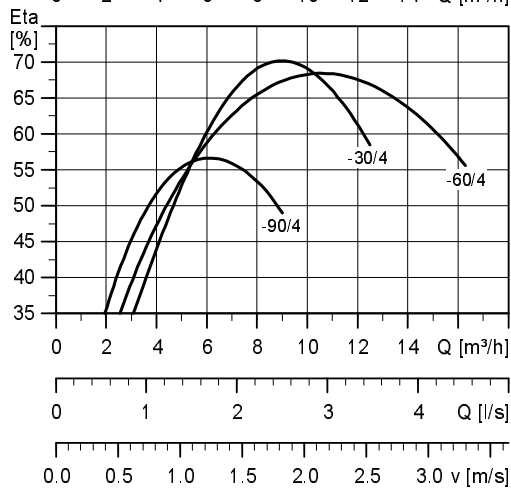
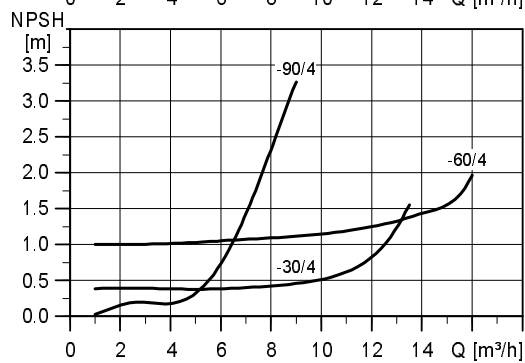
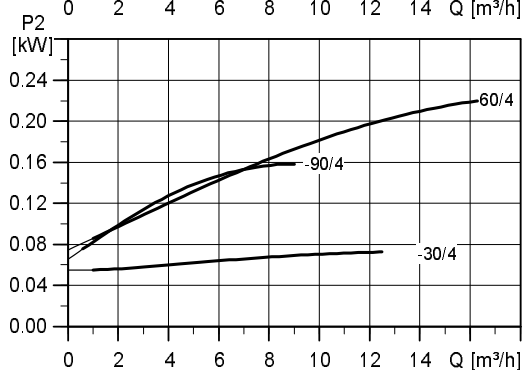
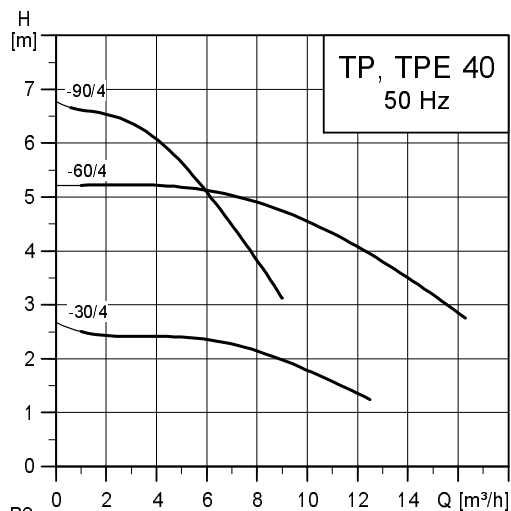
Technical data

TP 32		-30/4	-40/4	-60/4	-80/4	-100/4	-120/4
TPD		•	•	•	•	•	•
TPE		•	•	•	•	•	•
TPED		•	•	•	•	•	•
Series		200	200	200	300	300	300
IEC size	1~ TP	63	71	71	-	-	-
	3~ TP	63	71	71	71	71	80
	1~ TPE	71	71	71	71	71	80
	3~ TPE	-	-	-	-	-	80
P2	1~3~ TP★ [kW]	0.12/0.12	0.25/0.25	0.25/0.25	-/0.25	-/0.37	-/0.55
	1~3~ TPE [kW]	0.12/-	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 _{ma} _x	[°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]	118/118	141/141	141/141	-/141	-/141	-/141
	1~3~ TPE [mm]	122/-	122/-	122/-	122/-	122/-	122/-
AD	1~3~ TP [mm]	101/101	133/133	133/133	-/109	-/109	-/109
	1~3~ TPE [mm]	158/-	158/-	158/-	158/-	158/-	158/-
AE	1~3~ TPE [mm]	106/-	106/-	106/-	106/-	106/-	106/-
AF	1~3~ TPE [mm]	106/-	106/-	106/-	106/-	106/-	106/-
P	[mm]	-	105/105	-	170	170	200
B1★★	[mm]	75/180	100/222	100/222	125/260	125/260	144/321
B2★★	[mm]	75/180	100/222	100/222	117/257	117/257	144/321
B3	[mm]	200	240	240	276	276	355
C1★★	[mm]	80/200	80/240	80/240	144/356	144/356	144/435
C5★★	[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]	416/390	395/395	395/395	-/420	-/420	-/487
	1~3~ TPE [mm]	431/-	418/-	418/-	443/-	443/-	470/-
H4	[mm]	-	-	-	-	-	-
M		M12	M12	M12	M16	M16	M16

★ TP(E), TP(E)D pumps are primarily fitted with IE3 motors. See *Motors*, page 90.

★★ The dimension before the slash applies to the single-head pump, and the dimension after the slash applies to the twin-head pump.

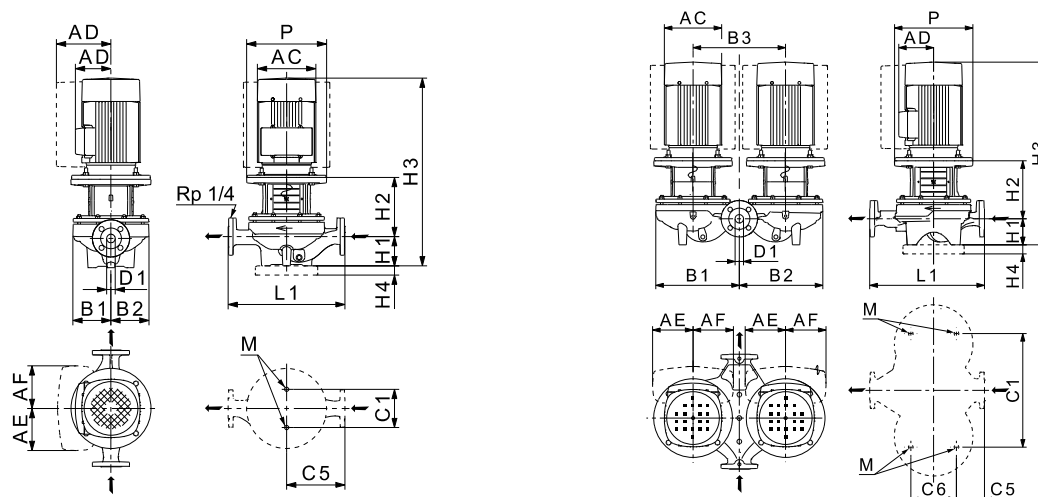
TP 40-XXX/4



Note: All curves apply to single-head pumps. For further information, see page 115.

TM02 5029 4509

TM02 5030 3814



TM02 8632 2614 - TM02 8631 2614

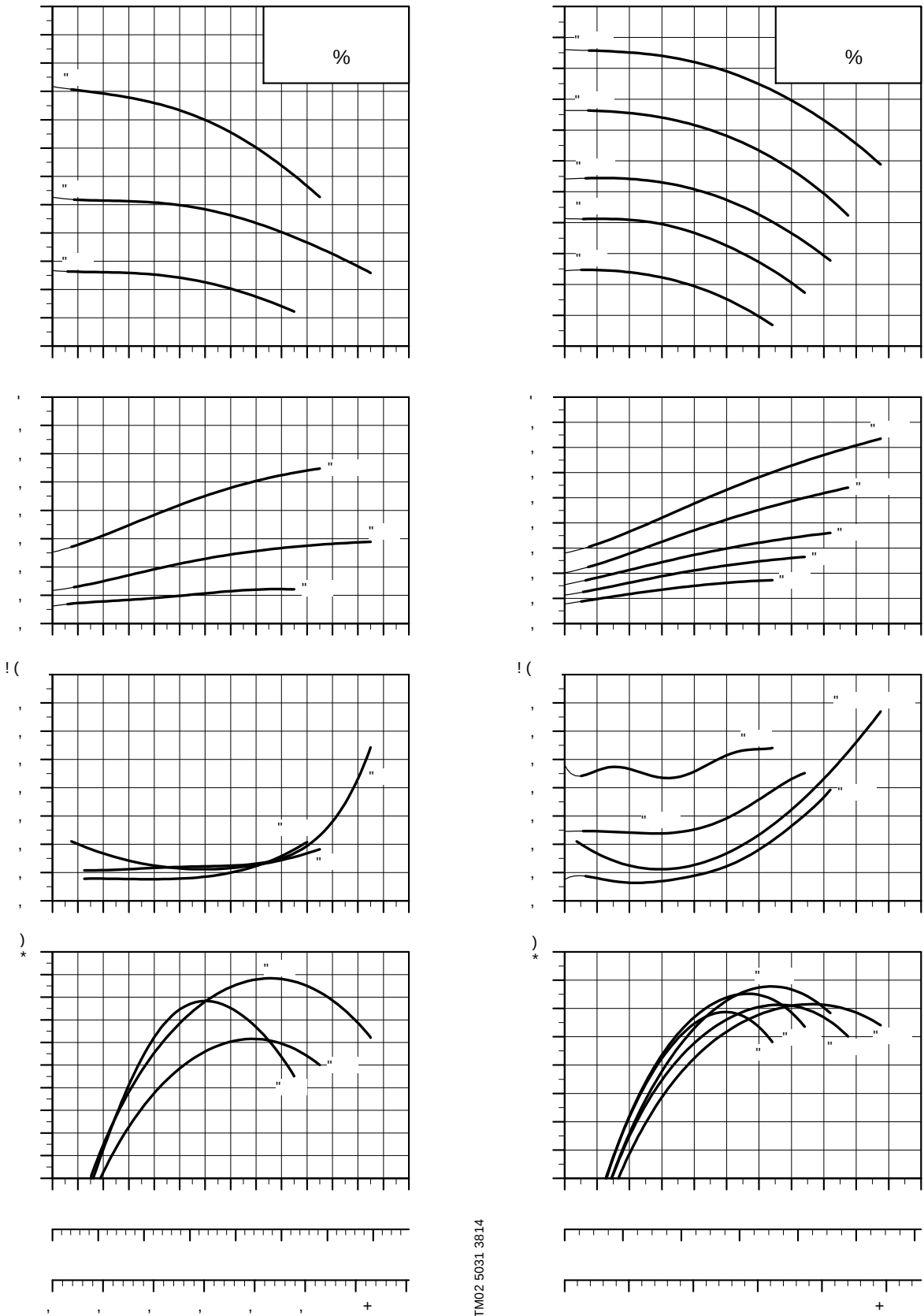
Technical data

TP 40	-30/4	-60/4	-90/4	-100/4	-110/4	-140/4
TPD	•	-	•	•	•	•
TPE	•	•	•	•	•	•
TPED	•	-	•	•	•	•
Series	200	200	200	300	300	300
IEC size	1~ TP	63	71	71	-	-
	3~ TP	63	71	71	80	80
	1~ TPE	71	71	71	80	80
	3~ TPE	-	-	-	90	90
P2	1~3~ TP ★ [kW]	0.12/0.12	0.25/0.25	0.25/0.25	-0.55	-0.75
	1~3~ TPE [kW]	0.12/-	0.25/-	0.25/-	0.55/0.55	0.75/0.75
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]
D1	[mm]	40	40	40	40	40
AC	1~3~ TP [mm]	118/118	141/141	141/141	-141	-178
	1~3~ TPE [mm]	122/-	122/-	122/-	122/122	122/122
AD	1~3~ TP [mm]	101/101	133/109	133/133	-109	-110
	1~3~ TPE [mm]	158/-	158/-	158/-	158/158	158/158
AE	1~3~ TPE [mm]	106/-	106/-	106/-	106/134	106/134
AF	1~3~ TPE [mm]	106/-	106/-	106/-	106/134	106/134
P	[mm]	-	-	105	200	200
B1 ★★	[mm]	85/180	100/-	100/222	130/273	150/325
B2 ★★	[mm]	75/180	100/-	100/222	117/267	147/325
B3	[mm]	200	-	240	290	355
C1 ★★	[mm]	120/200	120/-	120/240	144/400	144/435
C5 ★★	[mm]	125/45	125/-	160/95	170/45	220/108
C6	[mm]	125	-	125	175	175
L1	[mm]	250	250	320	340	440
H1	[mm]	67	75	68/79	100	110
H2	[mm]	146	123	128	166	158
H3	1~3~ TP [mm]	419/393	389/389	388/398	-/497	-/549
	1~3~ TPE [mm]	434/-	412/-	-412/	490/500	482/502
H4	[mm]	-	-	-	-	-
M		M12	M12	M12	M16	M16

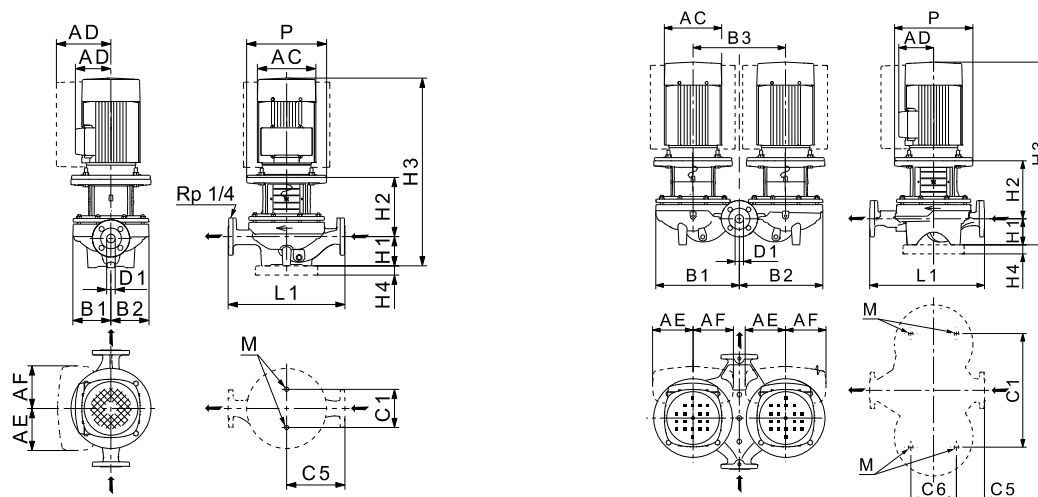
★ TP(E), TP(E)D pumps are primarily fitted with IE3 motors. See *Motors*, page 90.

★★ The dimension before the slash applies to the single-head pump, and the dimension after the slash applies to the twin-head pump.

TP 50-XXX/4



Note: All curves apply to single-head pumps. For further information, see page 115.



TM02 8632 2614 - TM02 8631 2614

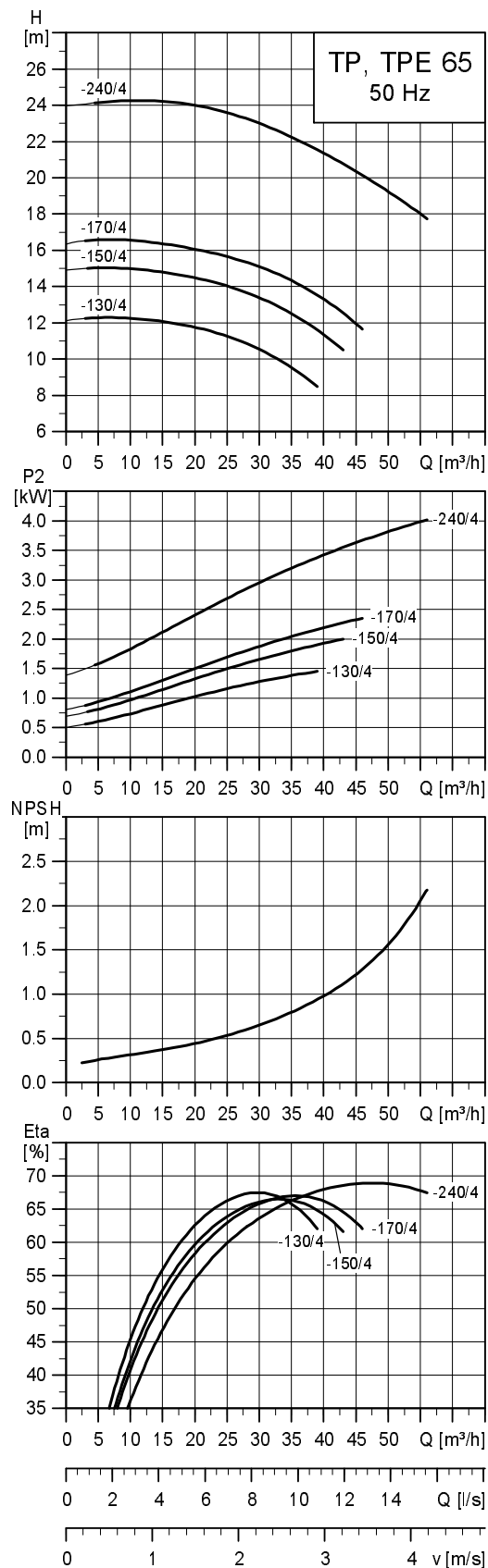
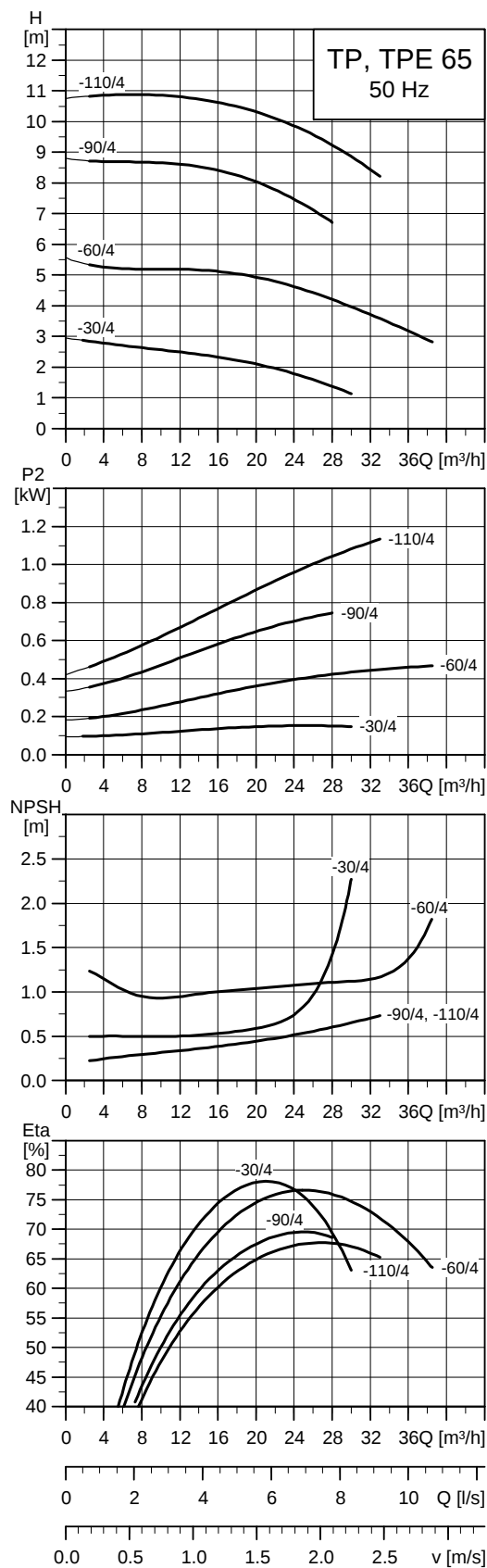
Technical data

TP 50	-30/4	-60/4	-90/4	-80/4	-120/4	-140/4	-190/4	-230/4
TPD	•	•	•	•	•	•	•	•
TPE	•	•	•	•	•	•	•	•
TPED	•	•	•	•	•	•	•	•
Series	200	200	300	300	300	300	300	300
IEC size	1~ TP	71	80	-	-	-	-	-
	3~ TP	71	71	80	80	90	90	100
	1~ TPE	71	71	80	80	-	-	-
	3~ TPE	-	-	90	90	90	90	90
P2	1~3~ TP ★ [kW]	0.25/0.25	0.37/0.37	-/0.55	-/0.75	-/1.1	-/1.5	-/2.2
	1~3~ TPE [kW]	0.25/-	0.37/-	0.55/0.55	0.75/0.75	-/1.1	-/1.5	-/2.2
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]
D1	[mm]	50	50	50	50	50	50	50
AC	1~3~ TP [mm]	141/142	141/141	-/141	-/178	-/178	-/178	-/198
	1~3~ TPE [mm]	122/-	122/-	122/122	122/122	-/122	-/178	-/198
AD	1~3~ TP [mm]	133/133	133/109	-/109	-/110	-/110	-/110	-/120
	1~3~ TPE [mm]	158/-	158/-	158/158	158/158	-/158	-/167	-/177
AE	1~3~ TPE [mm]	106/-	106/-	106/134	106/134	-/134	-/132	-/132
AF	1~3~ TPE [mm]	106/-	106/-	106/134	106/134	-/134	-/132	-/132
P	[mm]	-	-	200	200	200	200	250
B1 ★★	[mm]	75/181	110/225	133/290	162/373	162/373	162/373	180/386
B2 ★★	[mm]	90/186	100/225	119/284	162/373	162/373	162/373	164/379
B3	[mm]	200	240	320	420	420	420	420
C1 ★★	[mm]	120/200	120/240	144/400	144/500	144/500	144/500	144/500
C5 ★★	[mm]	140/60	140/60	170/52	220/123	220/123	220/123	220/123
C6	[mm]	125	125	175	175	175	175	175
L1	[mm]	280	280	340	440	440	440	440
H1	[mm]	82/90	82	115	115	115	115	115
H2	[mm]	135	127	161	167	167	167	195
H3	1~3~ TP [mm]	408/416	452/400	-/507	-/553	-/603	-/603	-/645
	1~3~ TPE [mm]	431/-	423/-	490/510	496/516	-/516	-/603	-/645
H4	[mm]	-	-	-	-	-	-	-
M		M12	M12	M16	M16	M16	M16	M16

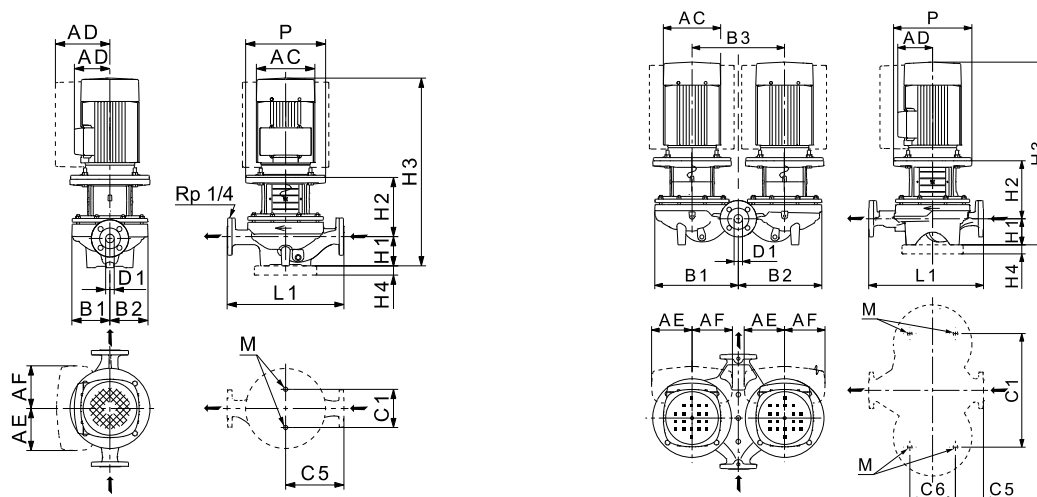
★ TP(E), TP(E)D pumps are primarily fitted with IE3 motors. See *Motors*, page 90.

★★ The dimension before the slash applies to the single-head pump, and the dimension after the slash applies to the twin-head pump.

TP 65-XXX/4



Note: All curves apply to single-head pumps. For further information, see page 115.



TM02 8632 2614 - TM02 8631 2614

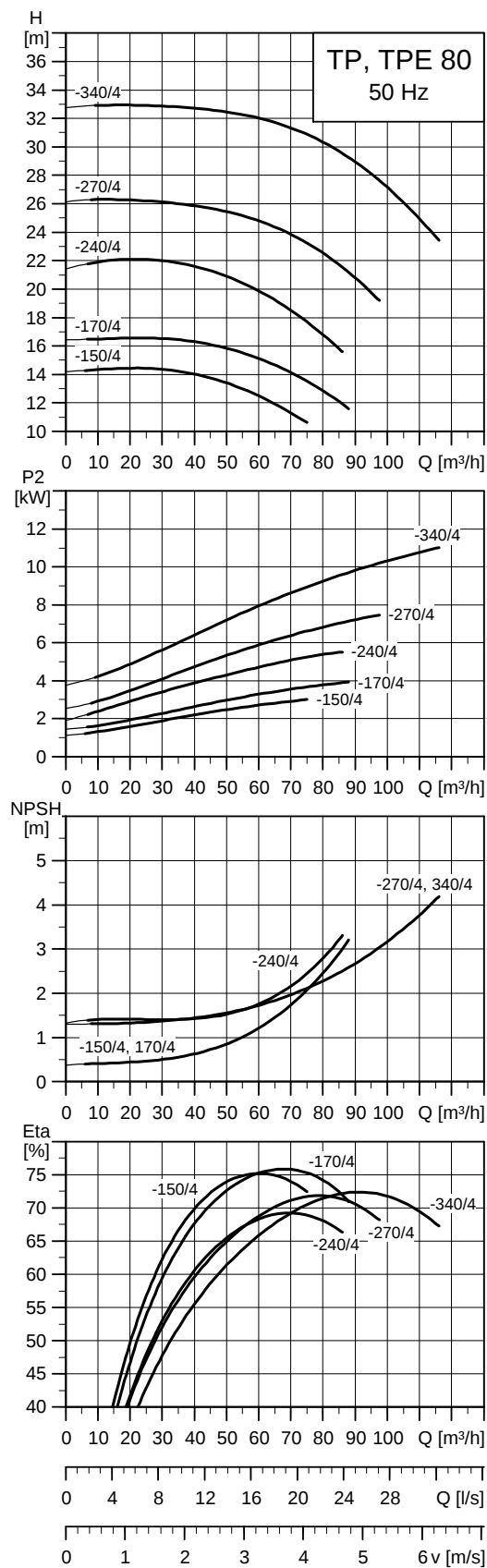
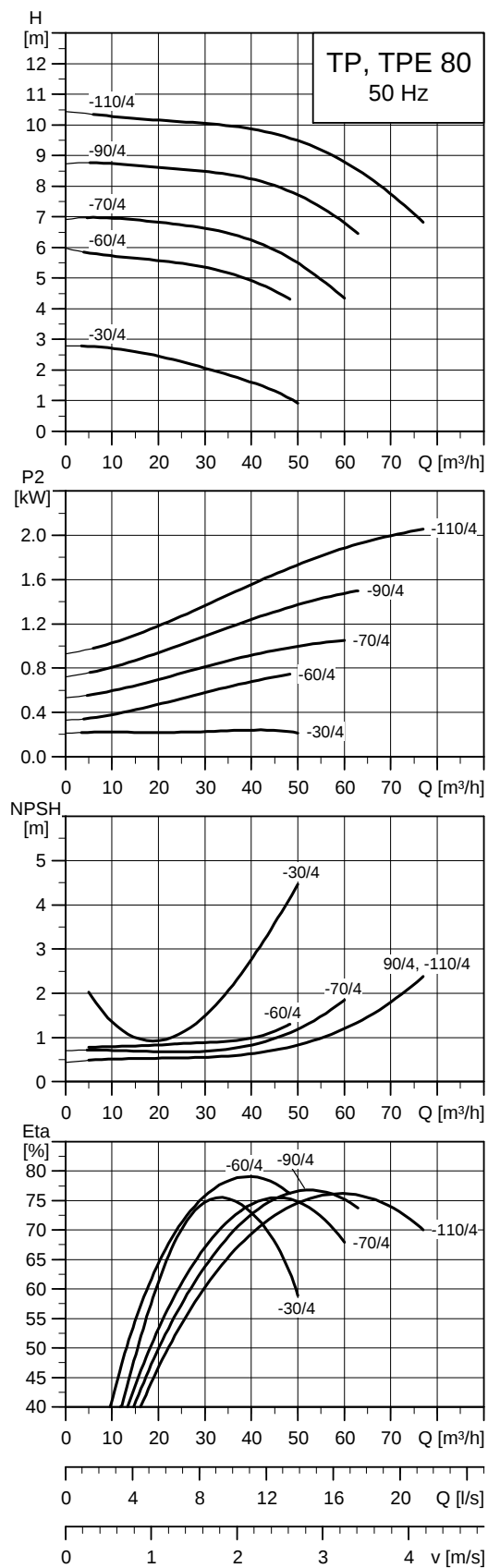
Technical data

TP 65		-30/4	-60/4	-90/4	-110/4	-130/4	-150/4	-170/4	-240/4
TPD		•	•	•	•	•	•	•	•
TPE		•	•	•	•	•	•	•	•
TPED		•	•	•	•	•	•	•	•
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
	1~ TPE	71	80	80	-	-	-	-	-
	3~ TPE	-	90	90	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
	1~3~ TPE [kW]	0.25/-	0.55/0.55	0.75/0.75	-/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]	[°C] [-25;140]	[°C] [-25;120]	[°C] [-25;120]	[°C] [-25;120]	[°C] [-25;120]	[°C] [-25;120]	[°C] [-25;120]
D1		[mm] 65	[mm] 65	[mm] 65	[mm] 65	[mm] 65	[mm] 65	[mm] 65	[mm] 65
AC	1~3~ TP [mm]	141/141	141/141	-/178	-/178	-/178	-/198	-/198	-/220
	1~3~ TPE [mm]	122/-	122/122	122/122	-/122	-/178	-/198	-/198	-/220
AD	1~3~ TP [mm]	133/109	133/109	-/110	-/110	-/110	-/120	-/120	-/134
	1~3~ TPE [mm]	158/-	158/158	158/158	-/158	-/167	-/177	-/177	-/188
AE		1~3~ TPE [mm]	106/-	106/134	106/134	-/134	-/132	-/132	-/145
AF		1~3~ TPE [mm]	106/-	106/134	106/134	-/134	-/132	-/132	-/145
P		[mm] -	[mm] -	[mm] 200	[mm] 200	[mm] 200	[mm] 250	[mm] 250	[mm] 250
B1 ★★		[mm] 125/230	[mm] 125/230	[mm] 142/298	[mm] 178/349	[mm] 178/349	[mm] 178/349	[mm] 178/349	[mm] 178/349
B2 ★★		[mm] 100/240	[mm] 100/240	[mm] 124/290	[mm] 164/383	[mm] 164/383	[mm] 164/0	[mm] 164/383	[mm] 164/383
B3		[mm] 240	[mm] 240	[mm] 320	[mm] 440	[mm] 440	[mm] 440	[mm] 440	[mm] 440
C1 ★★		[mm] 160/240	[mm] 160/240	[mm] 144/400	[mm] 144/520	[mm] 144/520	[mm] 144/520	[mm] 144/520	[mm] 144/520
C5 ★★		[mm] 170/63	[mm] 170/63	[mm] 180/65	[mm] 238/111	[mm] 238/111	[mm] 238/111	[mm] 238/111	[mm] 238/111
C6		[mm] 153	[mm] 153	[mm] 175	[mm] 175	[mm] 175	[mm] 175	[mm] 175	[mm] 175
L1		[mm] 340	[mm] 340	[mm] 360	[mm] 475	[mm] 475	[mm] 475	[mm] 475	[mm] 475
H1		[mm] 97	[mm] 97	[mm] 105	[mm] 125	[mm] 125	[mm] 125	[mm] 125	[mm] 125
H2		[mm] 135	[mm] 147	[mm] 172	[mm] 166	[mm] 166	[mm] 194	[mm] 194	[mm] 194
H3	1~3~ TP [mm]	423/423	475/475	-/558	-/612	-/612	-/654	-/654	-/691
	1~3~ TPE [mm]	446/-	458/478	491/511	-/525	-/612	-/645	-/645	-/691
H4		[mm] -	[mm] -	[mm] -	[mm] -	[mm] -	[mm] -	[mm] -	[mm] -
M		M16	M16	M16	M16	M16	M16	M16	M16

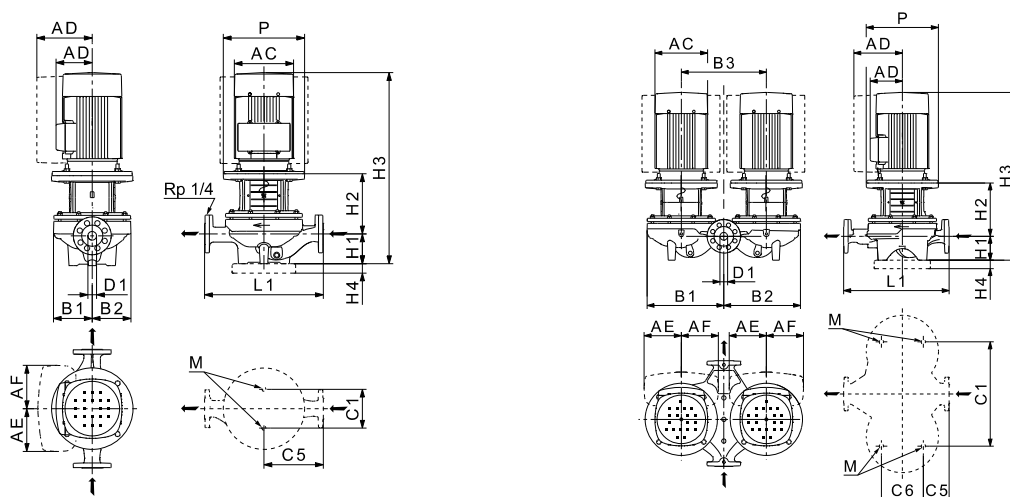
★ TP(E), TP(E)D pumps are primarily fitted with IE3 motors. See *Motors*, page 90.

★★ The dimension before the slash applies to the single-head pump, and the dimension after the slash applies to the twin-head pump.

TP 80-XXX/4



Note: All curves apply to single-head pumps. For further information, see page 115.



TM03 5348 2614 - TM03 5349 2614

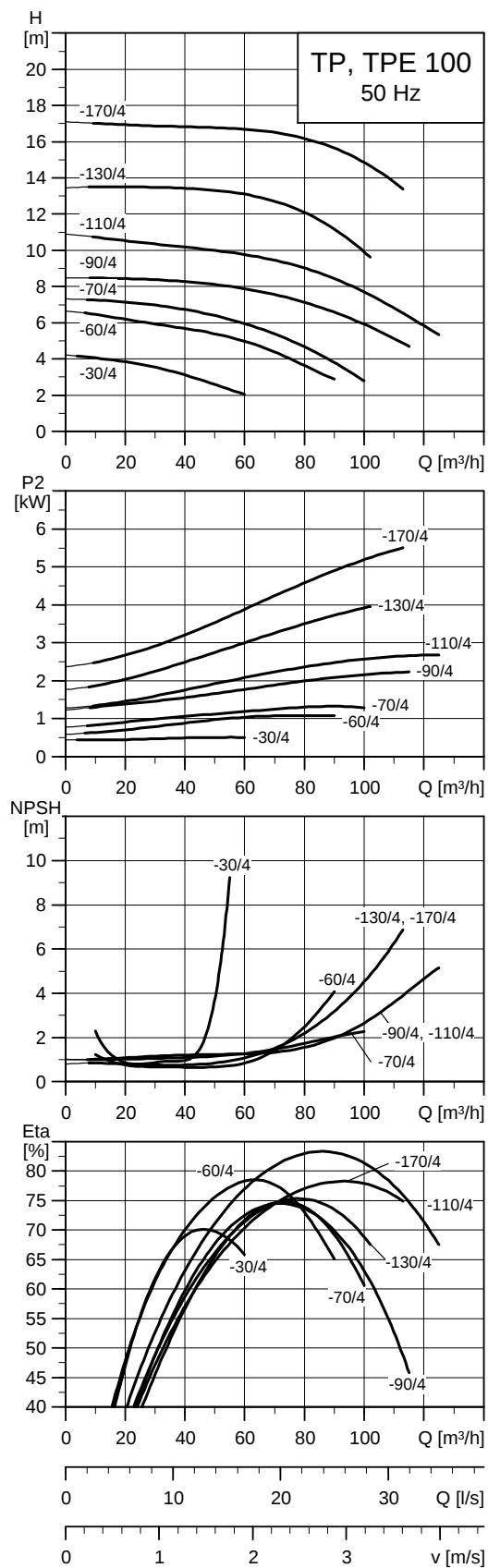
Technical data

TP 80	-30/4	-60/4	-70/4	-90/4	-110/4	-150/4	-170/4	-240/4	-270/4	-340/4
TPD	•	•	•	•	•	•	•	•	•	•
TPE	•	•	•	•	•	•	•	•	•	•
TPED	•	•	•	•	•	•	•	•	•	•
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	160
	1~ TPE	71	80	-	-	-	-	-	-	-
	3~ TPE	-	90	90	90	100	112	112	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
	1~3~ TPE [kW]	0.37/-	0.75/0.75	-1.1	-1.5	-2.2	-3	-4	-5.5	-7.5
PN		PN 6/PN 10	PN 6/PN 10	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]
D1	[mm]	80	80	80	80	80	80	80	80	80
AC	1~3~ TP [mm]	142/141	178/178	-178	-178	-198	-198	-220	-260	-314
	1~3~ TPE [mm]	122/-	122/122	-122	-178	-198	-198	-220	-260	-314
AD	1~3~ TP [mm]	133/109	139/110	-110	-110	-120	-120	-134	-159	-204
	1~3~ TPE [mm]	158/-	158/158	-158	-167	-177	-177	-188	-213	-308
AE	1~3~ TPE [mm]	106/-	106/134	-134	-132	-132	-132	-145	-145	-210
AF	1~3~ TPE [mm]	106/-	106/134	-134	-132	-132	-132	-145	-145	-210
P	[mm]	-	-	200	200	250	250	250	300	350
B1 ★★	[mm]	130/230	135/240	176/366	176/366	176/366	187/416	187/416	243/491	243/491
B2 ★★	[mm]	100/240	100/250	144/354	144/354	144/354	162/405	162/405	226/480	226/480
B3	[mm]	240	240	400	400	400	470	470	500	500
C1 ★★	[mm]	160/240	160/240	144/480	144/480	144/480	144/550	144/550	230/550	230/550
C5 ★★	[mm]	180/53	180/53	220/93	220/93	220/93	250/133	250/133	310/105	310/105
C6	[mm]	173	173	175	175	175	175	175	350	350
L1	[mm]	360	360	440	440	440	500	500	620	620
H1	[mm]	107	107	115	115	115	115	115	140	140
H2	[mm]	163	153	176	176	204	204	204	273	273
H3	1~3~ TP [mm]	513/461	551/541	-612	-612	-654	-654	-691	-792	-842
	1~3~ TPE [mm]	444/-	474/494	-525	-612	-654	-654	-691	-792	-872
H4	[mm]	-	-	-	-	-	-	-	-	35
M		M16	M16	M16	M16	M16	M16	M16	M16	M16

★ TP(E), TP(E)D pumps are primarily fitted with IE3 motors. See *Motors*, page 90.

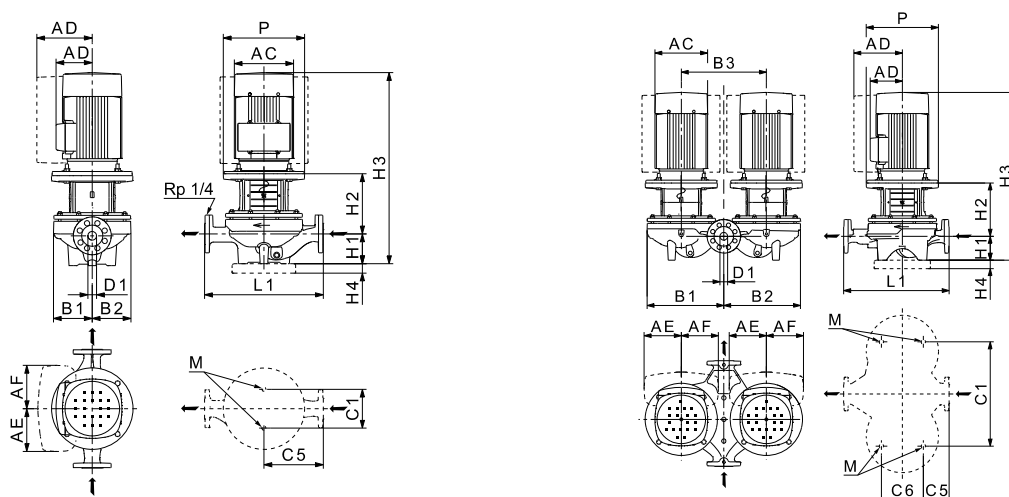
★★ The dimension before the slash applies to the single-head pump, and the dimension after the slash applies to the twin-head pump.

TP 100-XXX/4



Note: All curves apply to single-head pumps. For further information, see page 115.

TM02 5045 4509



TM03 5348 2614 - TM03 5349 2614

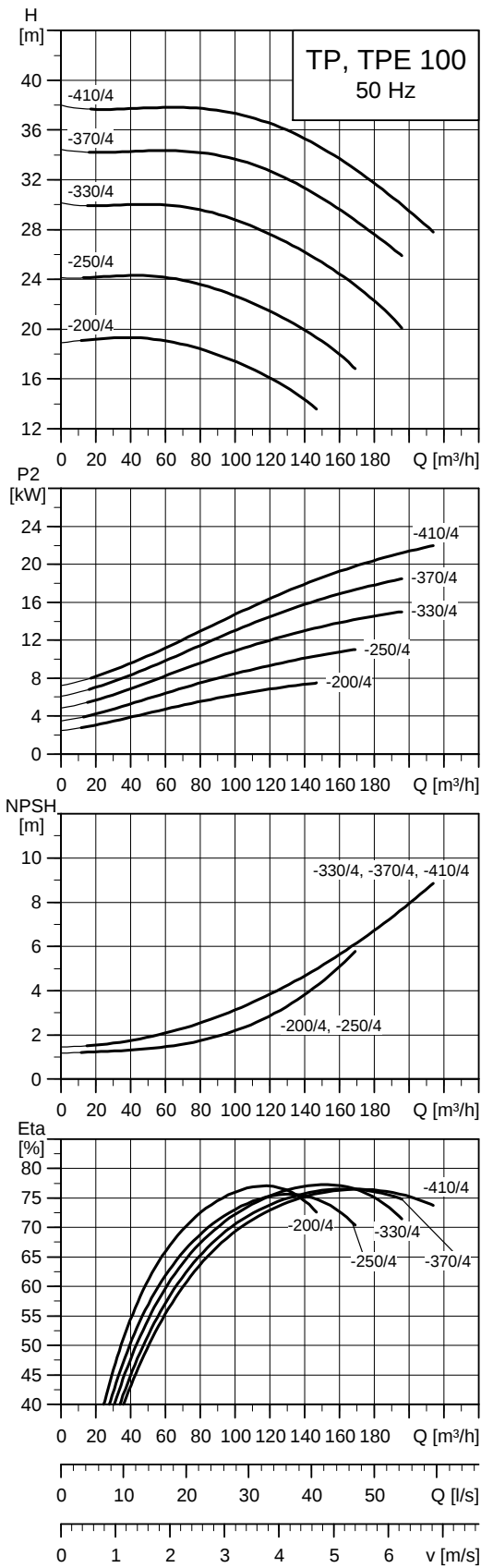
Technical data

TP 100	-30/4	-60/4	-70/4	-90/4	-110/4	-130/4	-170/4
TPD	•	•	•	•	•	•	•
TPE	•	•	•	•	•	•	•
TPED	•	•	•	•	•	•	•
Series	200	200	300	300	300	300	300
IEC size	1~ TP	80	90	-	-	-	-
	3~ TP	80	90	90	100	100	112
	1~ TPE	80	-	-	-	-	-
	3~ TPE	90	90	90	100	112	112
P2	1~3~ TP ★ [kW]	0.55/0.55	1.1/1.1	-1.5	-12.2	-3	-4
	1~3~ TPE [kW]	0.55/0.55	-1.1	-1.5	-12.2	-3	-4
PN	PN 6/PN 10		PN 6/PN 10	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]
D1	[mm]	100	100	100	100	100	100
AC	1~3~ TP [mm]	141/141	178/178	-178	-198	-198	-220
	1~3~ TPE [mm]	122/122	-122	-178	-198	-198	-220
AD	1~3~ TP [mm]	133/109	139/110	-110	-120	-120	-134
	1~3~ TPE [mm]	158/158	-158	-167	-177	-177	-188
AE	1~3~ TPE [mm]	106/134	-134	-132	-132	-132	-145
AF	1~3~ TPE [mm]	106/134	-134	-132	-132	-132	-145
P	[mm]	-	-	200	200	200	250
B1 ★★	[mm]	175/280	175/280	190/414	190/414	190/414	201/443
B2 ★★	[mm]	125/305	125/305	151/395	151/395	151/395	173/429
B3	[mm]	280	280	470	470	470	500
C1 ★★	[mm]	200/280	200/280	230/550	230/550	230/550	230/550
C5 ★★	[mm]	225/83	225/83	250/110	275/110	275/110	275/110
C6	[mm]	221	221	230	230	230	230
L1	[mm]	450	450	550	550	550	550
H1	[mm]	122	122	140	140	140	140
H2	[mm]	172	182	173	201	201	261
H3	1~3~ TP [mm]	525/525	625/625	-634	-676	-676	-773
	1~3~ TPE [mm]	508/528	-538	-634	-676	-676	-773
H4	[mm]	-	-	-	-	-	-
M		M16	M16	M16	M16	M16	M16

★ TP(E), TP(E)D pumps are primarily fitted with IE3 motors. See *Motors*, page 90.

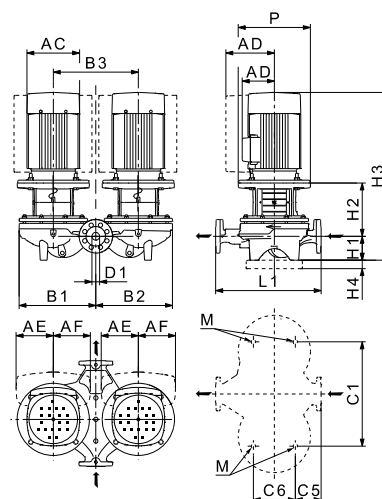
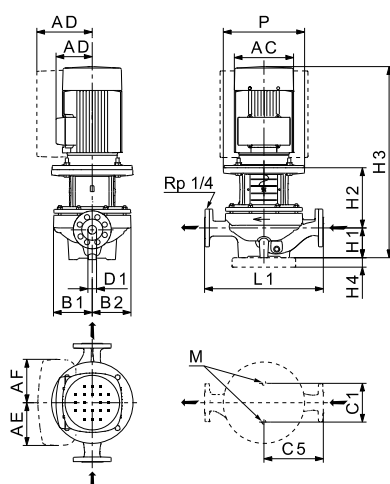
★★ The dimension before the slash applies to the single-head pump, and the dimension after the slash applies to the twin-head pump.

TP 100-XXX/4



Note: All curves apply to single-head pumps. For further information, see page 115.

TM02 8753 4810



TM03 5348 2614 - TM03 5349 2614

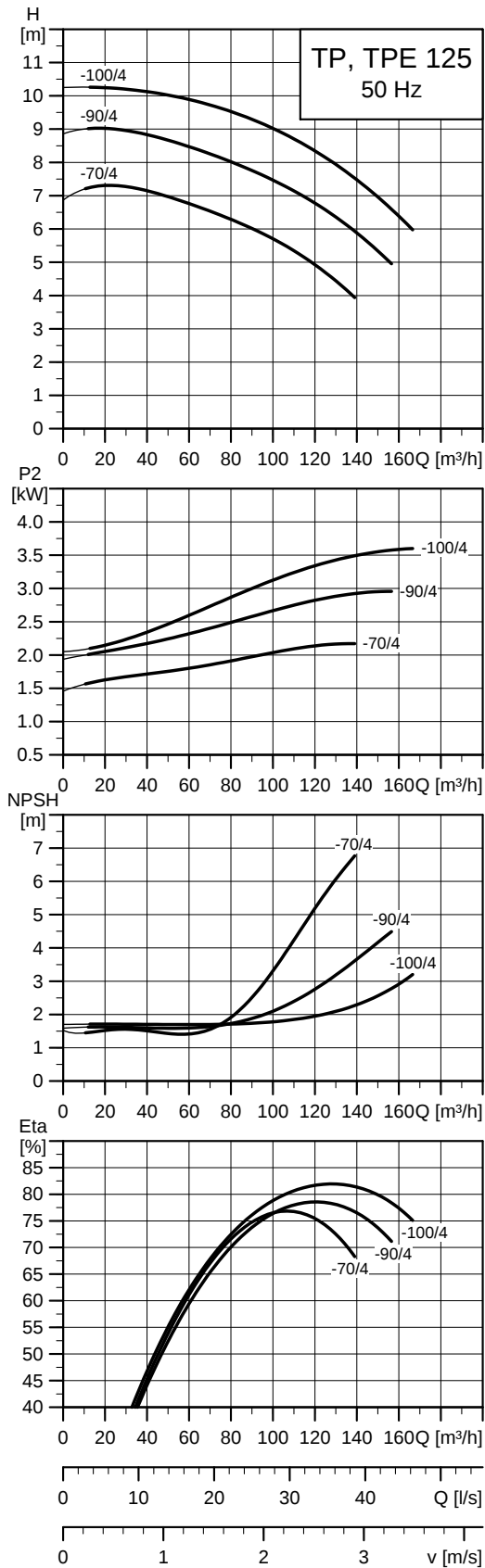
Technical data

TP 100	-200/4	-250/4	-330/4	-370/4	-410/4
TPD	•	•	•	•	•
TPE	•	•	•	•	-
TPED	•	•	•	•	-
Series	300	300	300	300	300
IEC size	1~ TP	-	-	-	-
	3~ TP	132	160	160	180
	1~ TPE	-	-	-	-
	3~ TPE	132	160	160	180
P2	1~3~ TP ★ [kW]	-/7.5	-/11	-/15	-/18.5
	1~3~ TPE [kW]	-/7.5	-/11	-/15	-/18.5
PN	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]
D1	[mm]	100	100	100	100
AC	1~3~ TP [mm]	-/260	-/314	-/314	-/368
	1~3~ TPE [mm]	-/260	-/314	-/314	-
AD	1~3~ TP [mm]	-/159	-/204	-/204	-/286
	1~3~ TPE [mm]	-/213	-/308	-/308	-
AE	1~3~ TPE [mm]	-/145	-/210	-/210	-
AF	1~3~ TPE [mm]	-/145	-/210	-/210	-
P	[mm]	300	350	350	350
B1 ★★	[mm]	290/579	290/579	290/579	290/579
B2 ★★	[mm]	249/561	249/561	249/561	249/561
B3	[mm]	600	600	600	600
C1 ★★	[mm]	230/680	230/680	230/680	230/680
C5 ★★	[mm]	335/110	335/110	335/110	335/110
C6	[mm]	350	350	350	350
L1	[mm]	670	670	670	670
H1	[mm]	175	175	175	175
H2	[mm]	254	308	308	308
H3	1~3~ TP [mm]	-/858	-/954	-/1028	-/998
	1~3~ TPE [mm]	-/888	-/954	-/998	-/1024
H4	[mm]	-	35	35	35
M	M16	M16	M16	M16	M16

★ TP(E), TP(E)D pumps are primarily fitted with IE3 motors. See *Motors*, page 90.

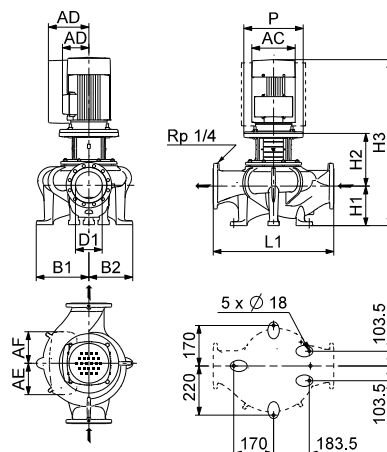
★★ The dimension before the slash applies to the single-head pump, and the dimension after the slash applies to the twin-head pump.

TP 125-XXX/4



Note: All curves apply to single-head pumps. For further information, see page 115.

TM05 0044 06.11



TM05 0660 2614

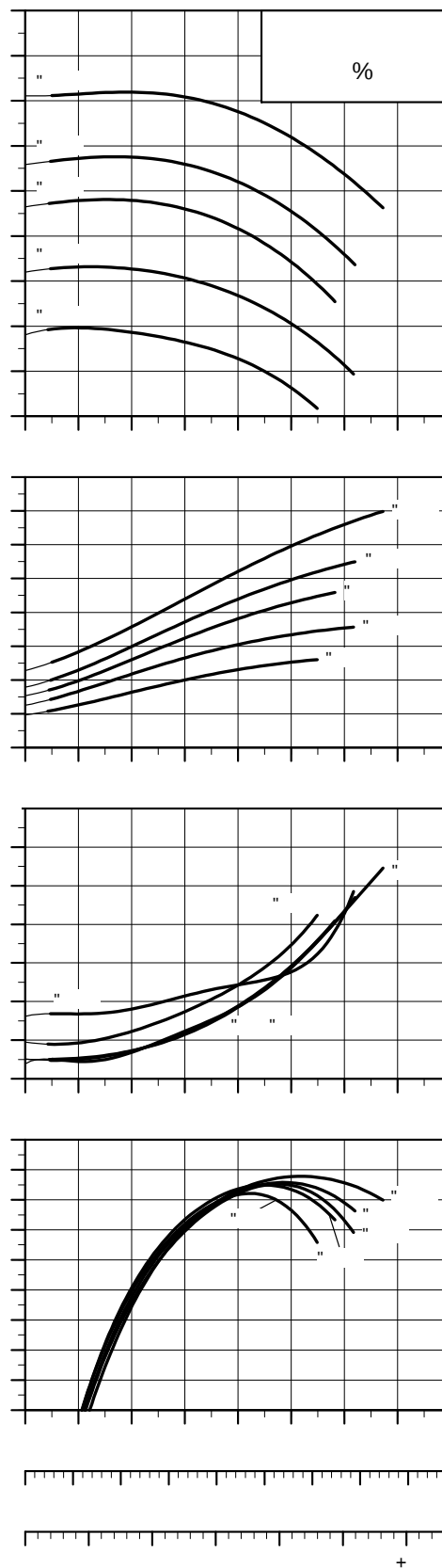
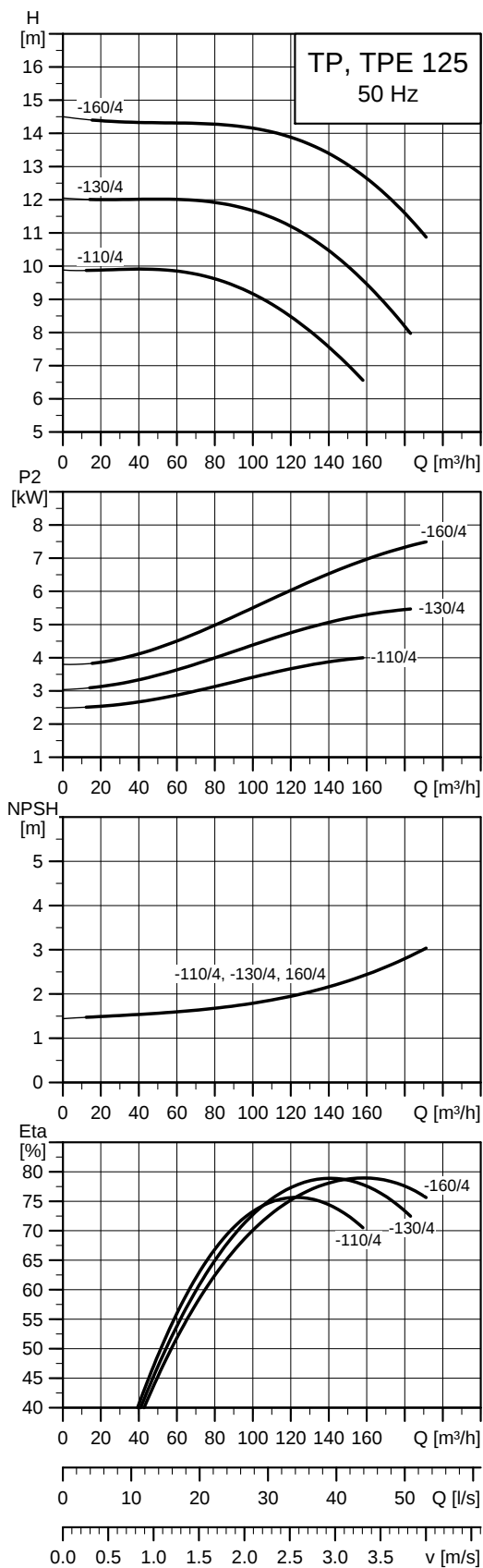
Technical data

TP 125	-70/4	-90/4	-100/4
TPD	-	-	-
TPE	•	•	•
TPED	-	-	-
Series	300	300	300
IEC size	1~ TP	-	-
	3~ TP	100	112
	1~ TPE	-	-
	3~ TPE	100	112
P2	1~/3~ TP ★ [kW]	-/2.2	-/4
	1~/3~ TPE [kW]	-/2.2	-/4
PN	PN 16	PN 16	PN 16
T _{min} :T _{max}	[°C] [-25;120]	[-25;120]	[-25;120]
D1	[mm]	125	125
AC	1~/3~ TP [mm]	-/198	-/220
	1~/3~ TPE [mm]	-/198	-/220
AD	1~/3~ TP [mm]	-/120	-/134
	1~/3~ TPE [mm]	-/177	-/188
AE	1~/3~ TPE [mm]	-/132	-/145
AF	1~/3~ TPE [mm]	-/132	-/145
P	[mm]	250	250
B1 ★ ★	[mm]	243/-	243/-
B2 ★ ★	[mm]	193/-	193/-
B3	[mm]	-	-
L1	[mm]	620	620
H1	[mm]	210	210
H2	[mm]	-/225	-/225
H3	1~/3~ TP [mm]	-/771	-/808
	1~/3~ TPE [mm]	-/771	-/808

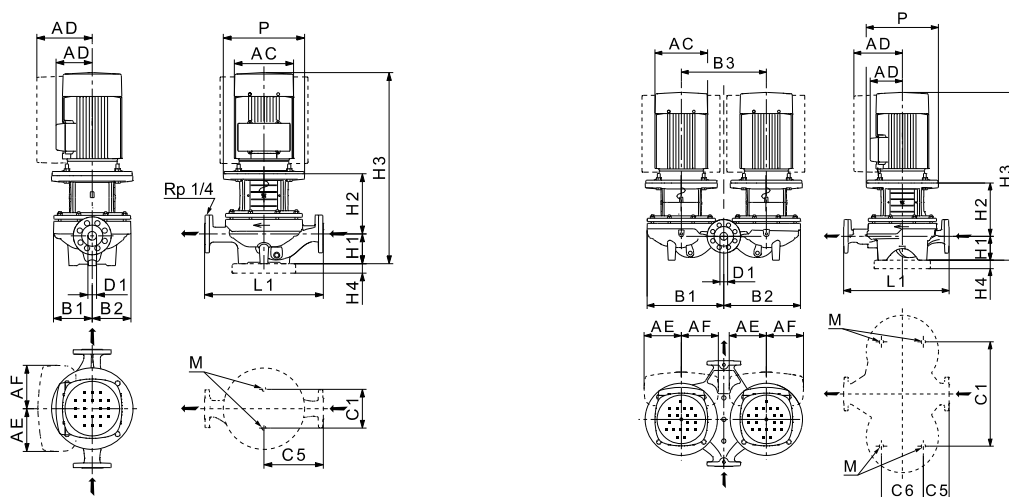
★ TP(E), TP(E)D pumps are primarily fitted with IE3 motors. See *Motors*, page 90.

★ ★ The dimension before the slash applies to the single-head pump, and the dimension after the slash applies to the twin-head pump.

TP 125-XXX/4



Note: All curves apply to single-head pumps. For further information, see page 115.



TM03 5348 2614 - TM03 5349 2614

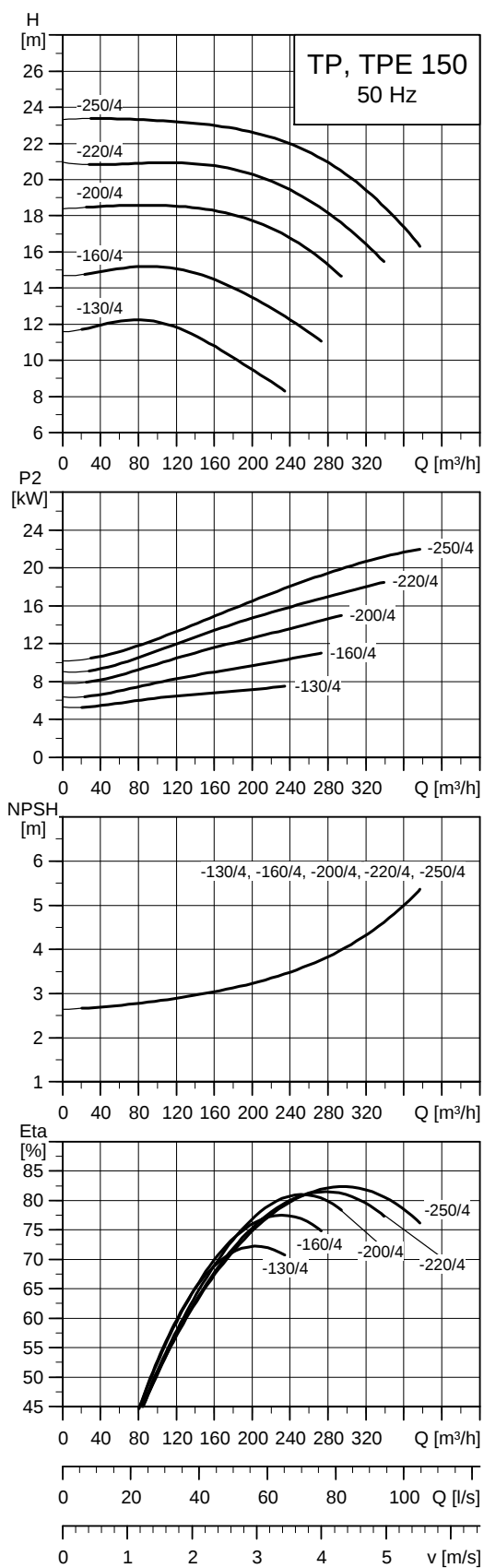
Technical data

TP 125	-110/4	-130/4	-160/4	-190/4	-230/4	-300/4	-340/4	-400/4
TPD	•	•	•	•	•	•	•	•
TPE	-	-	-	•	•	•	-	-
TPED	•	•	•	•	•	•	-	-
Series	300	300	300	300	300	300	300	300
IEC size	1~ TP	-	-	-	-	-	-	-
	3~ TP	112	132	132	160	160	180	200
	1~ TPE	-	-	-	-	-	-	-
	3~ TPE	112	132	132	160	160	180	-
P2	1~3~ TP ★ [kW]	-/4	-/5.5	-/7.5	-/11	-/15	-/18.5	-/22
	1~3~ TPE [kW]	-/4	-/5.5	-/7.5	-/11	-/15	-/18.5	-
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]
D1	[mm]	125	125	125	125	125	125	125
AC	1~3~ TP [mm]	-/220	-/260	-/260	-/314	-/314	-/368	-/408
	1~3~ TPE [mm]	-/220	-/260	-/260	-/314	-/314	-/314	-
AD	1~3~ TP [mm]	-/134	-/159	-/159	-/204	-/204	-/286	-/315
	1~3~ TPE [mm]	-/188	-/213	-/213	-/308	-/308	-	-
AE	1~3~ TPE [mm]	-/145	-/145	-/145	-/210	-/210	-	-
AF	1~3~ TPE [mm]	-/145	-/145	-/145	-/210	-/210	-	-
P	[mm]	250	300	300	350	350	350	400
B1 ★★	[mm]	-/537	250/537	250/537	244/537	244/537	273/568	273/568
B2 ★★	[mm]	-/518	202/518	202/518	220/516	220/516	236/545	236/545
B3	[mm]	600	600	600	600	600	600	600
C1 ★★	[mm]	-/680	230/680	230/680	230/680	230/680	230/680	230/680
C5 ★★	[mm]	-/84	310/84	310/84	400/175	400/175	400/175	400/175
C6	[mm]	300	300	300	350	350	350	350
L1	[mm]	620	620	620	800	800	800	800
H1	[mm]	215	215	215	215	215	215	215
H2	[mm]	267	283	283	318	318	318	318
H3	1~3~ TP [mm]	-/854	-/877	-/927	-/1004	-/1078	-/1048	-/1129
	1~3~ TPE [mm]	-/854	-/877	-/969	-/1004	-/1048	-/1074	-
H4	[mm]	-	-	-	35	35	35	35
M		M16	M16	M16	M16	M16	M16	M16

★ TP(E), TP(E)D pumps are primarily fitted with IE3 motors. See *Motors*, page 90.

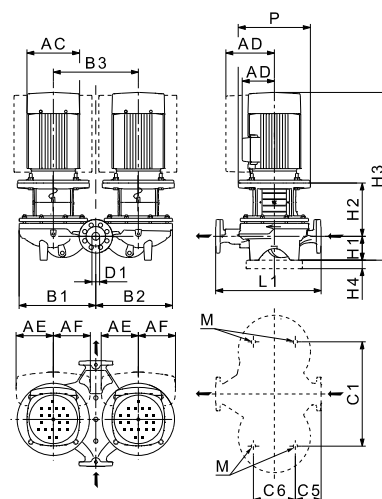
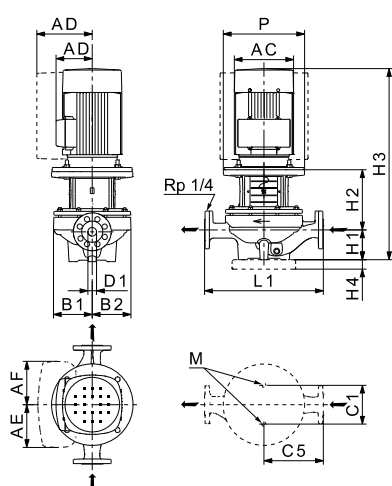
★★ The dimension before the slash applies to the single-head pump, and the dimension after the slash applies to the twin-head pump.

TP 150-XXX/4



TM02 8754 4810

Note: All curves apply to single-head pumps. For further information, see page 115.



TM03 5348 2614 - TM03 5349 2614

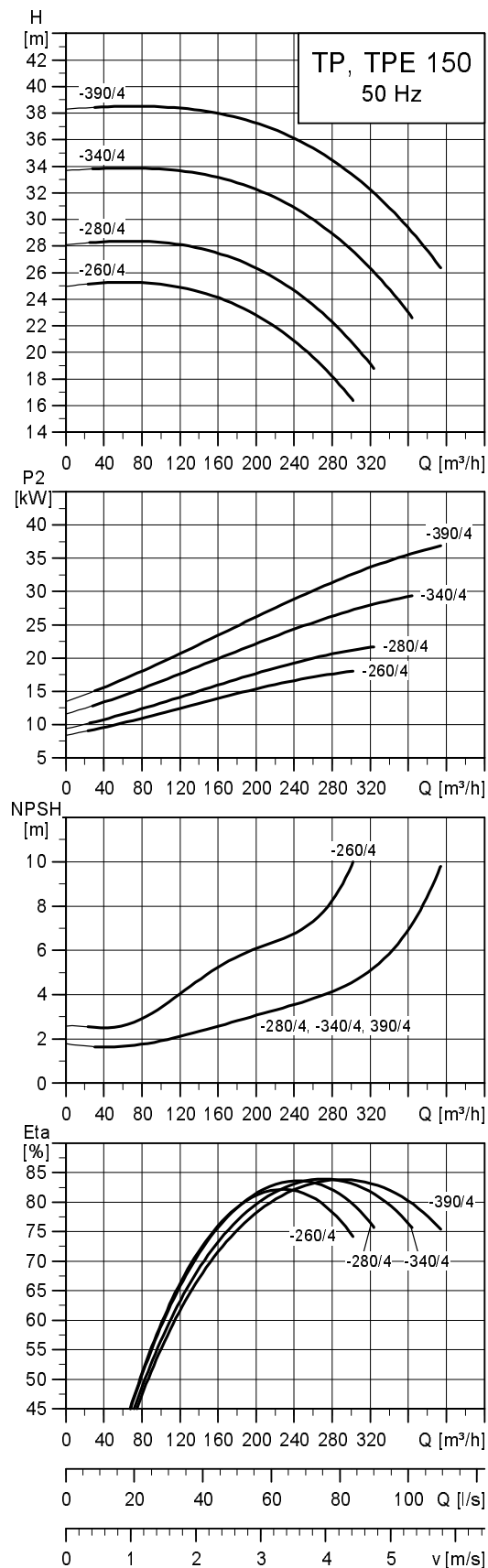
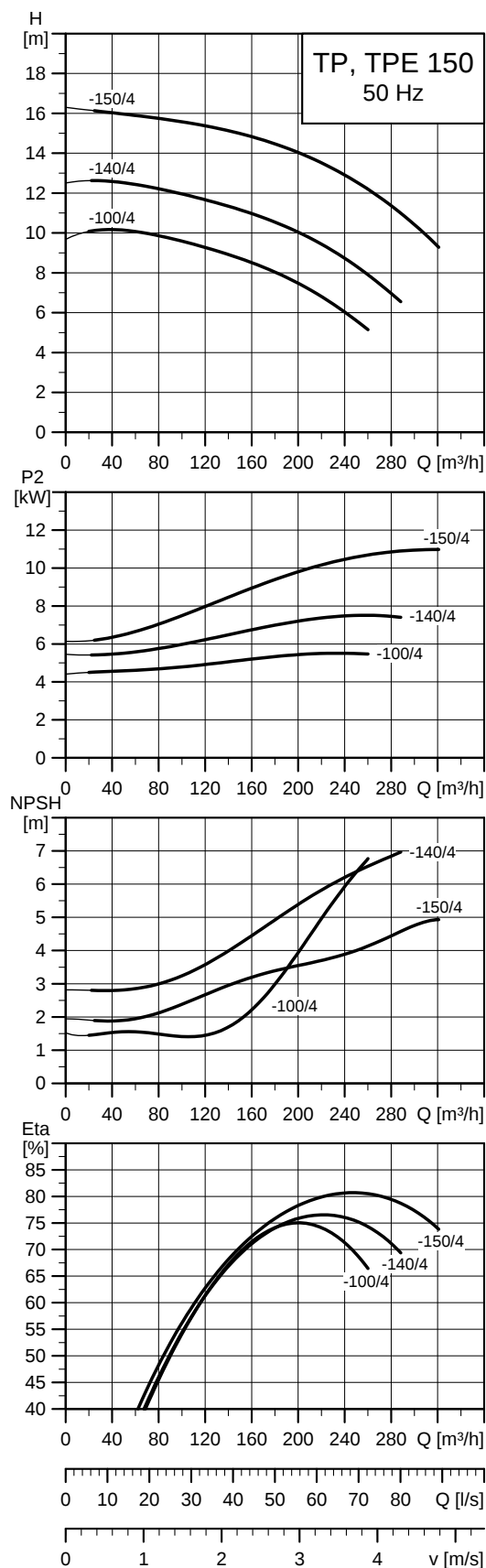
Technical data

TP 150	-130/4	-160/4	-200/4	-220/4	-250/4
TPD	•	•	•	•	•
TPE	-	-	•	•	-
TPED	•	•	•	•	-
Series	300	300	300	300	300
IEC size	1~ TP	-	-	-	-
	3~ TP	132	160	160	180
	1~ TPE	-	-	-	-
	3~ TPE	132	160	160	180
P2	1~3~ TP ★ [kW]	-/7.5	-/11	-/15	-/18.5
	1~3~ TPE [kW]	-/7.5	-/11	-/15	-/18.5
PN	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]
D1	[mm]	150	150	150	150
AC	1~3~ TP [mm]	-/267	-/314	-/314	-/368
	1~3~ TPE [mm]	-/260	-/314	-/314	-
AD	1~3~ TP [mm]	-/167	-/204	-/204	-/286
	1~3~ TPE [mm]	-/213	-/308	-/308	-
AE	1~3~ TPE [mm]	-/145	-/210	-/210	-
AF	1~3~ TPE [mm]	-/145	-/210	-/210	-
P	[mm]	300	350	350	350
B1 ★★	[mm]	-/583	-/583	296/583	296/583
B2 ★★	[mm]	-/553	-/553	237/553	237/553
B3	[mm]	600	600	600	600
C1 ★★	[mm]	-/680	-/680	230/680	230/680
C5 ★★	[mm]	-/153	-/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]	291	321	321	321
H3	1~3~ TP [mm]	-/917	-/1008	-/1082	-/1052
	1~3~ TPE [mm]	-/966	-/1008	-/1052	-/1078
H4	[mm]	-	35	35	35
M	M16	M16	M16	M16	M16

★ TP(E), TP(E)D pumps are primarily fitted with IE3 motors. See *Motors*, page 90.

★★ The dimension before the slash applies to the single-head pump, and the dimension after the slash applies to the twin-head pump.

TP 150-XXX/4

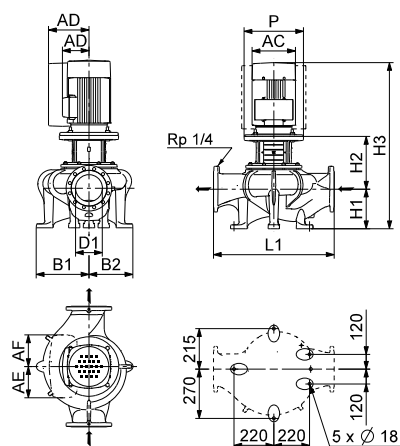


Note: All curves apply to single-head pumps. For further information, see page 115.

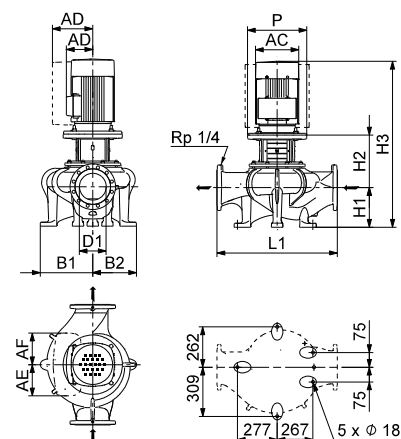
TM05 0046 06.11

TM03 4548 2406

TP, TPE 150-100/4
TP, TPE 150-140/4
TP, TPE 150-150/4



TP, TPE 150-260/4
TP, TPE 150-280/4
TP, TPE 150-340/4
TP, TPE 150-390/4



TM05 0661 2614 - TM03 8623 2614

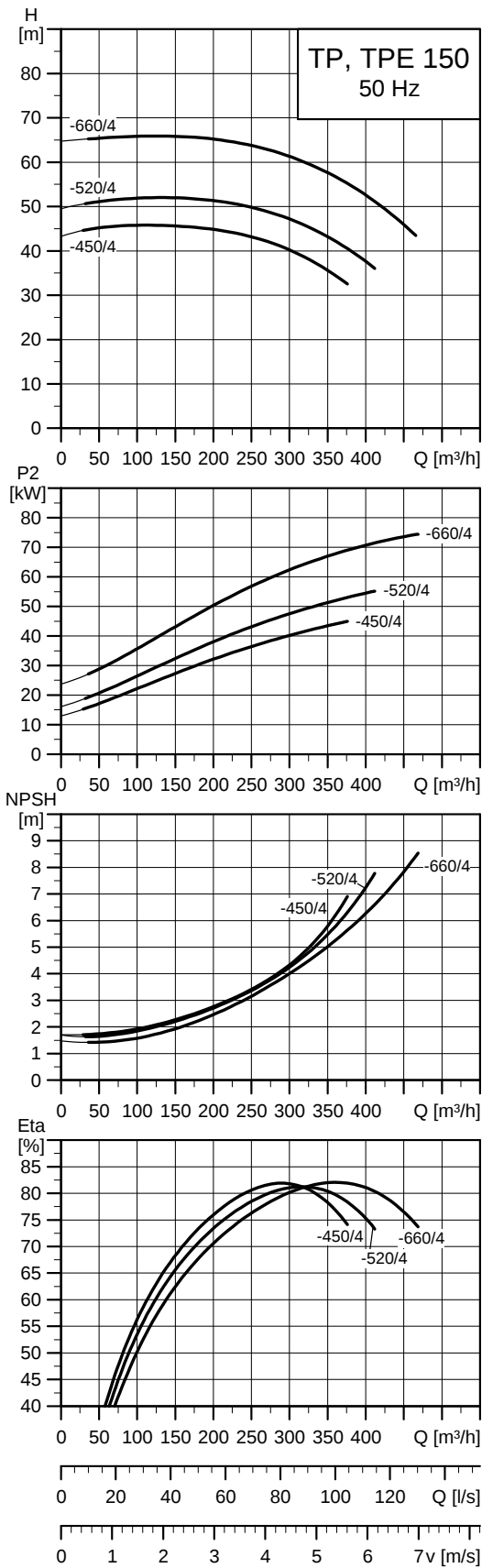
Technical data

TP 150		-100/4	-140/4	-150/4	-260/4	-280/4	-340/4	-390/4
TPD		-	-	-	-	-	-	-
TPE		•	•	•	•	-	-	-
TPED		-	-	-	-	-	-	-
Series		300	300	300	300	300	300	300
IEC size	1~ TP	-	-	-	-	-	-	-
	3~ TP	132	132	160	180	180	200	225
	1~ TPE	-	-	-	-	-	-	-
	3~ TPE	132	160	160	180	-	-	-
P2	1~3~ TP ★ [kW]	-/5.5	-/7.5	-/11	-/18.5	-/22	-/30	-/37
	1~3~ TPE [kW]	-/5.5	-/7.5	-/11	-/18.5	-/-	-	-
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]	150	150	150	150	150	150	150
AC	1~3~ TP [mm]	-/267	-/267	-/320	-/368	-/368	-/408	-/449
	1~3~ TPE [mm]	-/260	-/260	-/314	-/314	-	-	-
AD	1~3~ TP [mm]	-/167	-/167	-/197	-/286	-/286	-/315	-/338
	1~3~ TPE [mm]	-/213	-/213	-/308	-/308	-	-	-
AE	[mm]	-/145	-/145	-/210	-/210	-	-	-
AF	[mm]	-/145	-/145	-/210	-/210	-	-	-
P	[mm]	300	300	350	350	350	400	450
B1 ★ ★	[mm]	295/-	295/-	295/-	335/-	335/-	335/-	335/-
B2 ★ ★	[mm]	240/-	240/-	240/-	288/-	288/-	288/-	288/-
L1	[mm]	800	800	800	800	800	800	800
H1	[mm]	250	250	250	235	235	235	235
H2	[mm]	284	284	313	319	319	319	349
H3	1~3~ TP [mm]	-/906	-/944	-/1041	-/1069	-/1150	-/1199	-/1232
	1~3~ TPE [mm]	-/906	-/944	-/1041	-/1095	-	-	-

★ TP(E), TP(E)D pumps are primarily fitted with IE3 motors. See *Motors*, page 90.

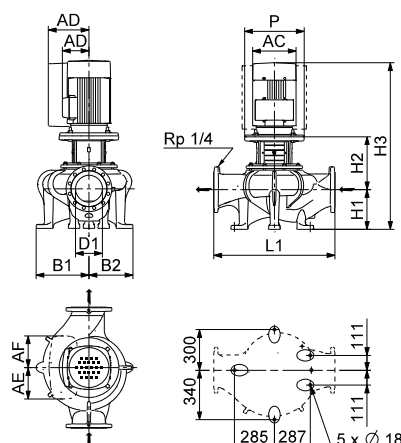
★ ★ The dimension before the slash applies to the single-head pump, and the dimension after the slash applies to the twin-head pump.

TP 150-XXX/4



Note: All curves apply to single-head pumps. For further information, see page 115.

TM05 0538 4812



TM05 0662 2614

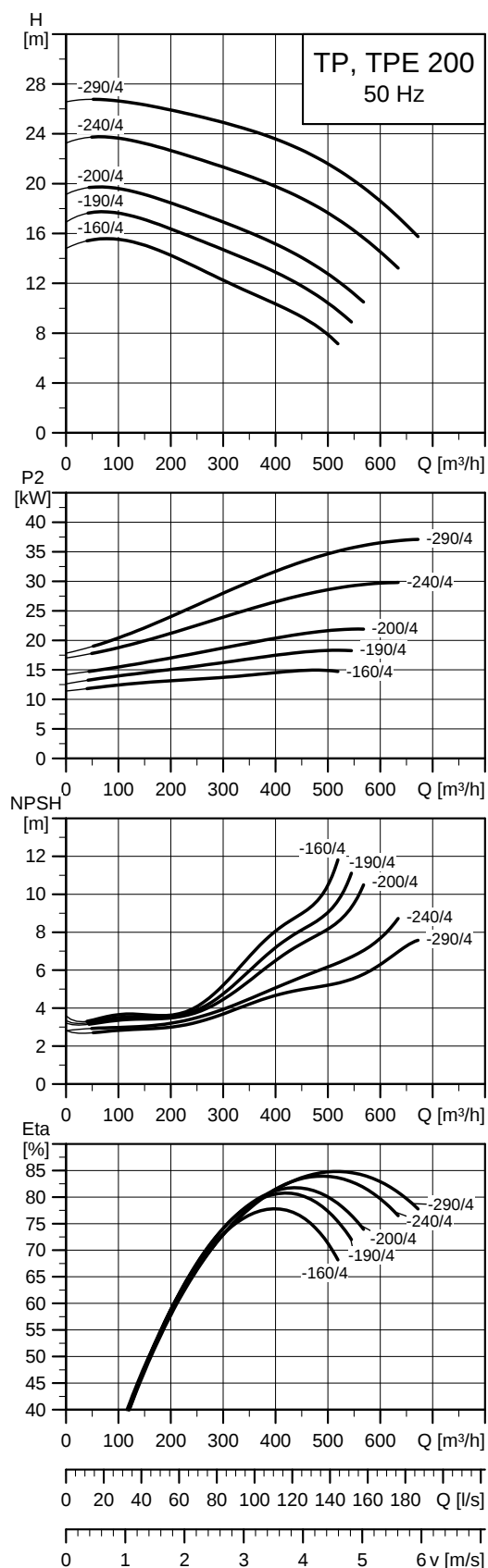
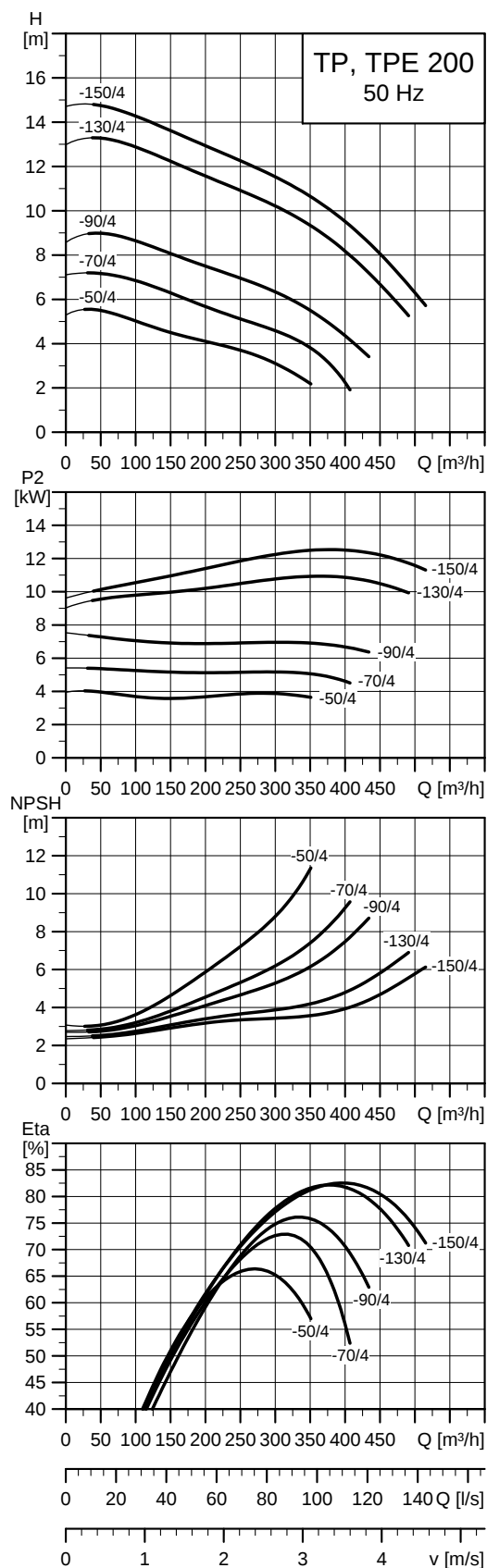
Technical data

TP 150		-450/4	-520/4	-660/4
TPD		-	-	-
TPE		•	•	•
TPED		-	-	-
Series		300	300	300
IEC size	1~ TP	-	-	-
	3~ TP	225	250	280
	1~ TPE	-	-	-
	3~ TPE	-	-	-
P2	1~/3~ TP ★ [kW]	-/45	-/55	-/75
	1~/3~ TPE [kW]	-	-	-
PN		PN 16	PN 16	PN 16
T _{min} :T _{max}		[°C] [-25;120]	[-25;120]	[-25;120]
D1		[mm]	150	150
AC	1~/3~ TP [mm]	-/442	-/495	-/555
	1~/3~ TPE [mm]	-	-	-
AD	1~/3~ TP [mm]	-/325	-/392	-/432
	1~/3~ TPE [mm]	-	-	-
AE		[mm]	-	-
AF		[mm]	-	-
P		[mm]	450	550
B1 ★★		[mm]	373/-	373/-
B2 ★★		[mm]	333/-	333/-
L1		[mm]	1000	1000
H1		[mm]	250	250
H2		[mm]	352	352
H3	1~/3~ TP [mm]	-/1316	-/1419	-/1422
	1~/3~ TPE [mm]	-	-	-

★ TP(E), TP(E)D pumps are primarily fitted with IE3 motors. See *Motors*, page 90.

★★ The dimension before the slash applies to the single-head pump, and the dimension after the slash applies to the twin-head pump.

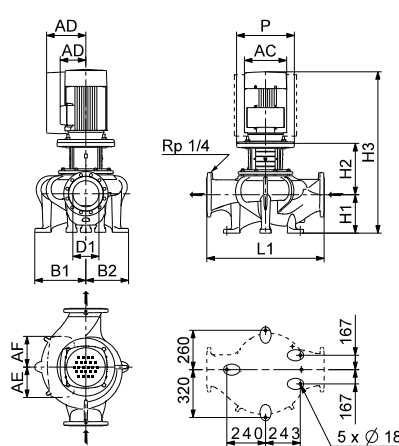
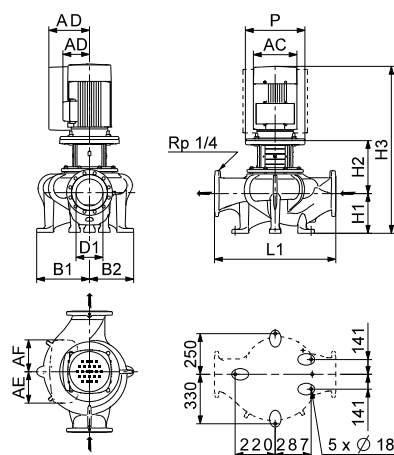
TP 200-XXX/4



Note: All curves apply to single-head pumps. For further information, see page 115.

TP, TPE 200-50/4
TP, TPE 200-70/4
TP, TPE 200-90/4
TP, TPE 200-130/4
TP, TPE 200-150/4

TP, TPE 200-160/4
TP, TPE 200-190/4
TP, TPE 200-200/4
TP, TPE 200-240/4
TP, TPE 200-290/4



TM05 0663 2614 - TM05 0664 2614

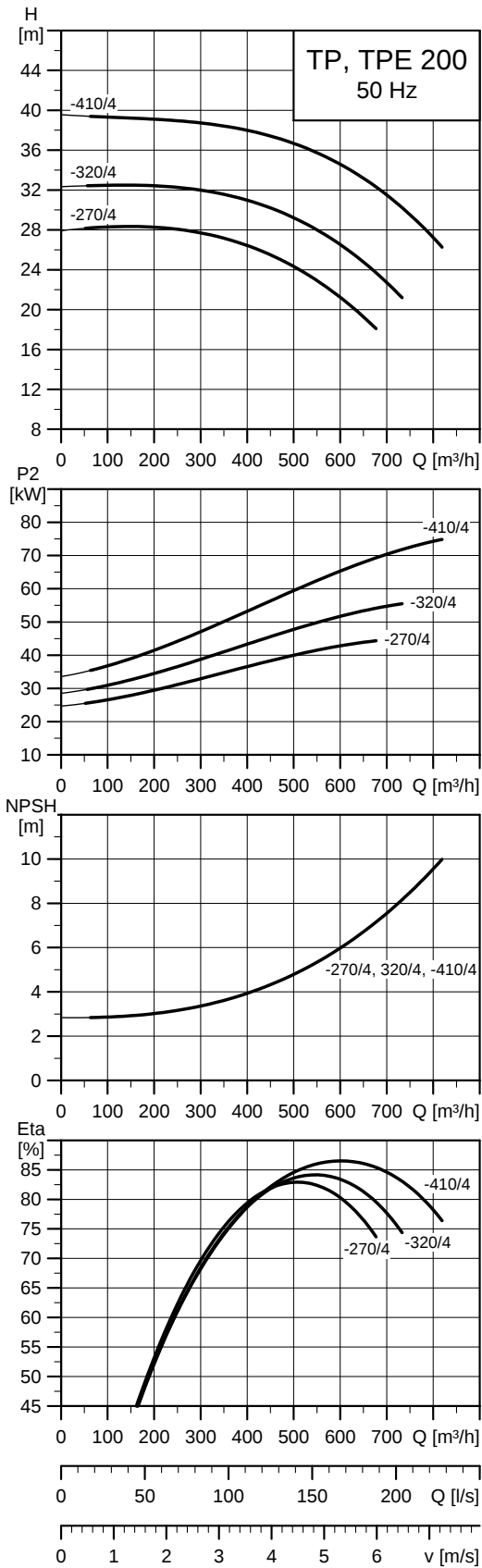
Technical data

TP 200	-50/4	-70/4	-90/4	-130/4	-150/4	-160/4	-190/4	-200/4	-240/4	-290/4
TPD	-	-	-	-	-	-	-	-	-	-
TPE	•	•	•	•	•	•	•	-	-	-
TPED	-	-	-	-	-	-	-	-	-	-
Series	300	300	300	300	300	300	300	300	300	300
IEC size	1~ TP	-	-	-	-	-	-	-	-	-
	3~ TP	112	132	132	160	160	180	180	200	225
	1~ TPE	-	-	-	-	-	-	-	-	-
	3~ TPE	112	132	160	160	160	180	-	-	-
P2	1~3~ TP ★ [kW]	-/4	-/5.5	-/7.5	-/11	-/15	-/15	-/18.5	-/22	-/30
	1~3~ TPE [kW]	-/4	-/5.5	-/7.5	-/11	-/15	-/15	-/18.5	-	-
PN		PN 16	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]	[-25;120]
D1	[mm]	200	200	200	200	200	200	200	200	200
AC	1~3~ TP [mm]	-/220	-/267	-/267	-/320	-/320	-/320	-/368	-/408	-/449
	1~3~ TPE [mm]	-/220	-/260	-/260	-/314	-/314	-/314	-/314	-	-
AD	1~3~ TP [mm]	-/134	-/167	-/167	-/197	-/197	-/197	-/286	-/315	-/338
	1~3~ TPE [mm]	-/188	-/213	-/213	-/308	-/308	-/308	-/308	-	-
AE	1~3~ TPE [mm]	-/145	-/145	-/145	-/210	-/210	-/210	-/210	-	-
AF	1~3~ TPE [mm]	-/145	-/145	-/145	-/210	-/210	-/210	-/210	-	-
P	[mm]	250	300	300	350	350	350	350	350	400
B1 ★ ★	[mm]	363/-	363/-	363/-	363/-	363/-	348/-	348/-	348/-	348/-
B2 ★ ★	[mm]	283/-	283/-	283/-	283/-	283/-	288/-	288/-	288/-	288/-
L1	[mm]	900	900	900	900	900	900	900	900	900
H1	[mm]	280	280	280	280	280	280	280	280	280
H2	[mm]	273	293	293	336	336	331	331	331	361
H3	1~3~ TP [mm]	-/925	-/945.5	-/984	-/1094	-/1134	-/1050	-/1090	-/1120	-/1298
	1~3~ TPE [mm]	-/925	-/945.5	-/984	-/1094	-/1134	-/1050	-/1134	-	-

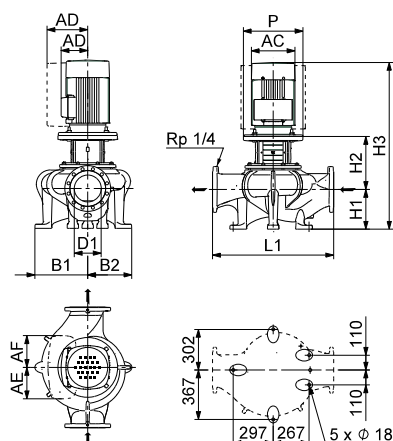
★ TP(E), TP(E)D pumps are primarily fitted with IE3 motors. See *Motors*, page 90.

★★ The dimension before the slash applies to the single-head pump, and the dimension after the slash applies to the twin-head pump.

TP 200-XXX/4



TM03 4650 1411



TM03 8621 2614

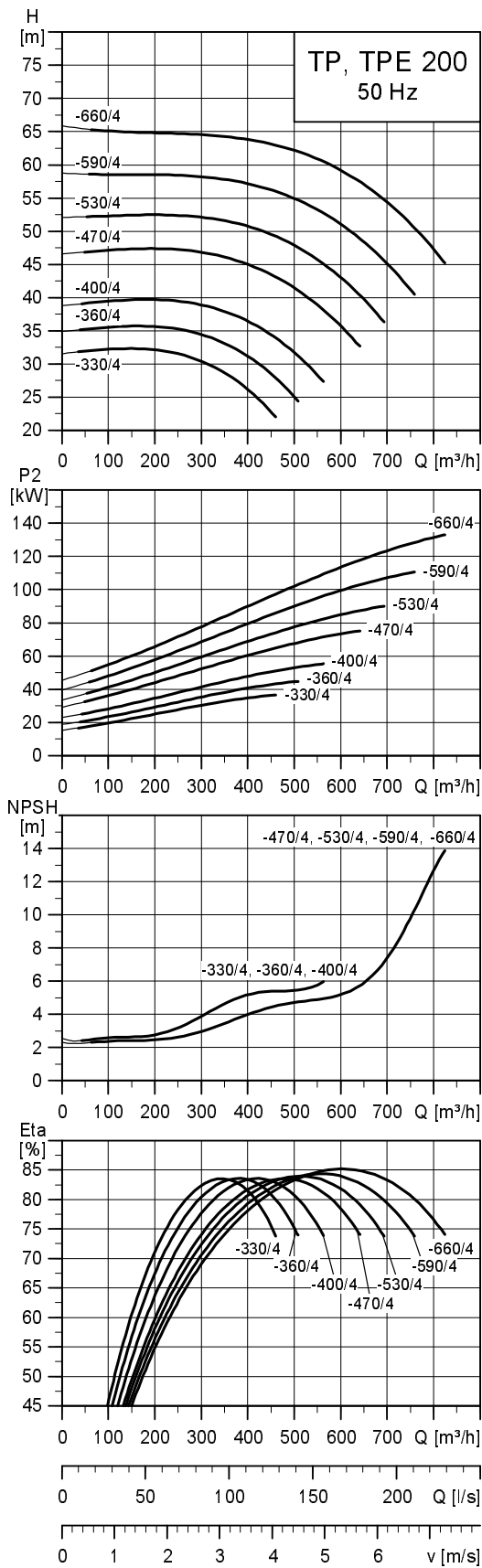
Technical data

TP 200	-270/4	-320/4	-410/4
TPD	-	-	-
TPE	-	-	-
TPED	-	-	-
Series	300	300	300
IEC size	1~ TP	-	-
	3~ TP	225	250
	1~ TPE	-	-
	3~ TPE	-	-
P2	1~3~ TP ★ [kW]	-/45	-/55
	1~3~ TPE [kW]	-	-
PN	PN 16	PN 16	PN 16
T _{min} , T _{max}	[°C] [-25;120]	[-25;120]	[-25;120]
D1	[mm]	200	200
AC	1~3~ TP [mm]	-/449	-/497
	1~3~ TPE [mm]	-	-
AD	1~3~ TP [mm]	-/338	-/410
	1~3~ TPE [mm]	-	-
AE	1~3~ TPE [mm]	-	-
AF	1~3~ TPE [mm]	-	-
P	[mm]	450	550
B1 ★★	[mm]	393/-	393/-
B2 ★★	[mm]	328/-	328/-
L1	[mm]	900	900
H1	[mm]	295	295
H2	[mm]	377	377
H3	1~3~ TP [mm]	-/1380	-/1429
	1~3~ TPE [mm]	-	-

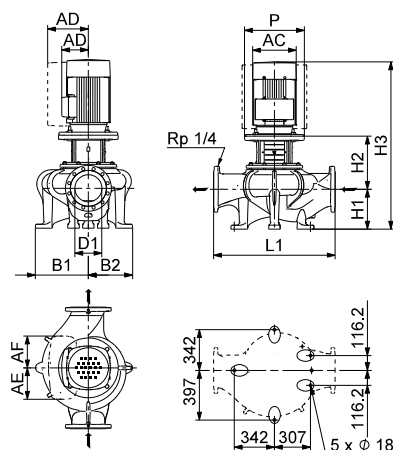
★ TP(E), TP(E)D pumps are primarily fitted with IE3 motors. See *Motors*, page 90.

★★ The dimension before the slash applies to the single-head pump, and the dimension after the slash applies to the twin-head pump.

TP 200-XXX/4



TM03 4651 2007



TM03 8622 2614

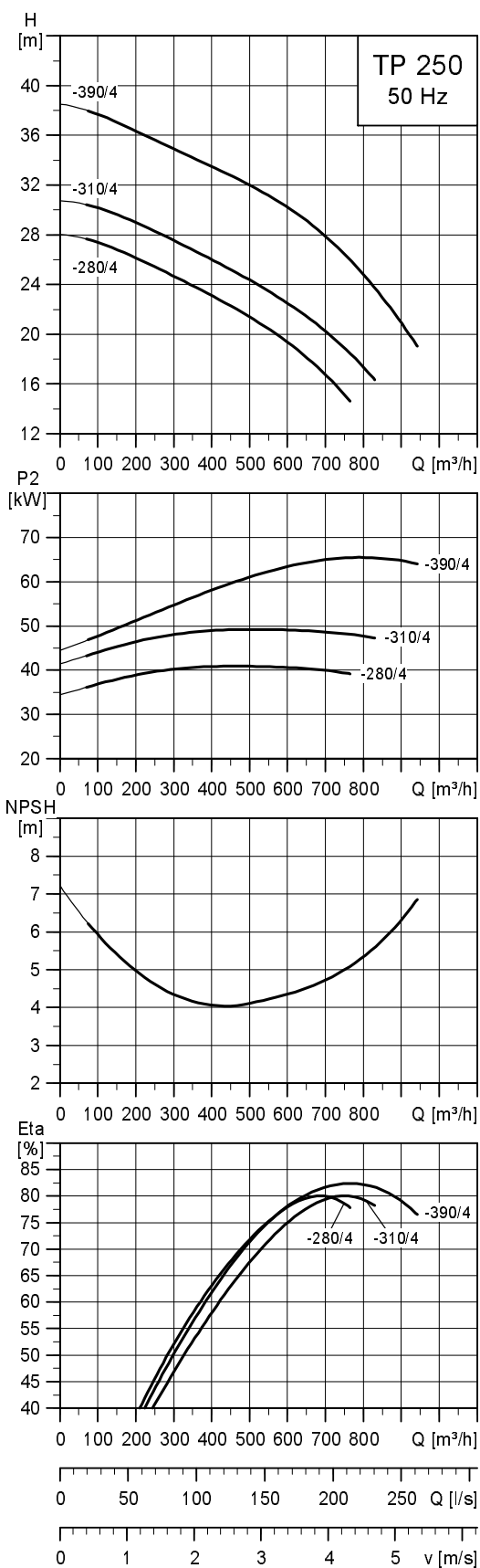
Technical data

TP 200	-330/4	-360/4	-400/4	-470/4	-530/4	-590/4	-660/4
TPD	-	-	-	-	-	-	-
TPE	-	-	-	-	-	-	-
TPED	-	-	-	-	-	-	-
Series	300	300	300	300	300	300	300
IEC size	1~ TP	-	-	-	-	-	-
	3~ TP	225	225	250	280	315	315
	1~ TPE	-	-	-	-	-	-
	3~ TPE	-	-	-	-	-	-
P2	1~3~ TP ★ [kW]	-/37	-/45	-/55	-/75	-/90	-/110
	1~3~ TPE [kW]	-	-	-	-	-	-
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]	200	200	200	200	200	200
AC	1~3~ TP [mm]	-/449	-/449	-/497	-/551	-/616	-/616
	1~3~ TPE [mm]	-	-	-	-	-	-
AD	1~3~ TP [mm]	-/338	-/338	-/410	-/433	-/515	-/515
	1~3~ TPE [mm]	-	-	-	-	-	-
AE	1~3~ TPE [mm]	-	-	-	-	-	-
AF	1~3~ TPE [mm]	-	-	-	-	-	-
P	[mm]	450	450	550	550	550	660
B1 ★★	[mm]	423/-	423/-	423/-	423/-	423/-	423/-
B2 ★★	[mm]	368/-	368/-	368/-	368/-	368/-	368/-
L1	[mm]	1000	1000	1000	1000	1000	1000
H1	[mm]	295	295	295	295	295	295
H2	[mm]	382	382	382	382	412	412
H3	1~3~ TP [mm]	-/1325	-/1385	-/1424	-/1497	-/1607	-/1619
	1~3~ TPE [mm]	-	-	-	-	-	-

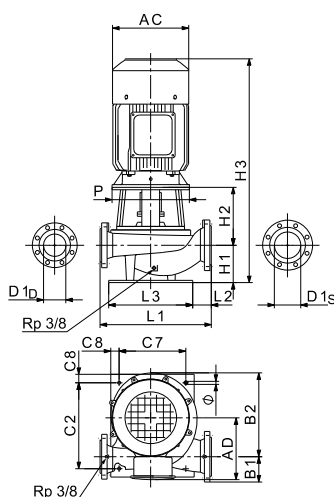
★ TP(E), TP(E)D pumps are primarily fitted with IE3 motors. See *Motors*, page 90.

★★ The dimension before the slash applies to the single-head pump, and the dimension after the slash applies to the twin-head pump.

TP 250-XXX/4



TM02 6816 0504



TM02 8349 2614

Technical data

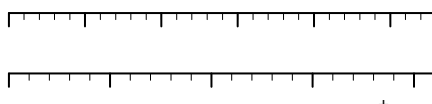
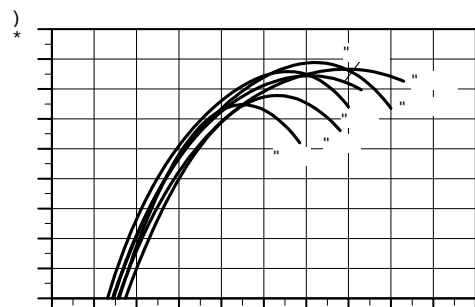
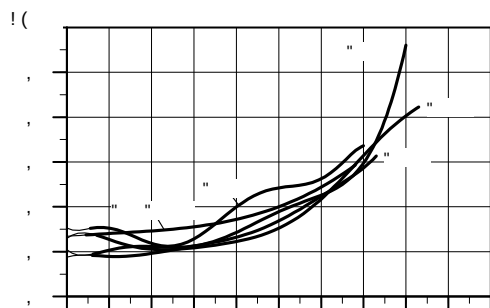
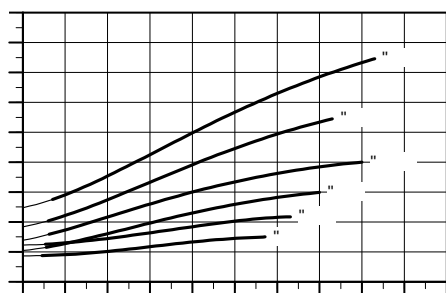
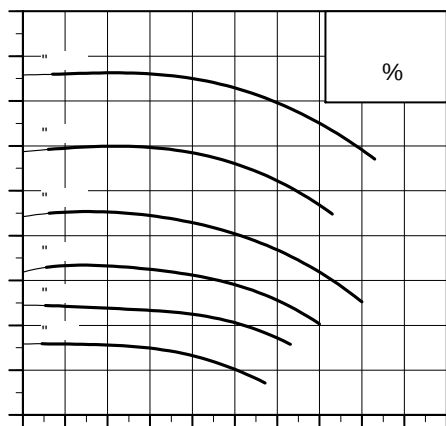
TP 250	-280/4	-310/4	-390/4
TPD	-	-	-
TPE	-	-	-
TPED	-	-	-
Series	400	400	400
IEC size	1~ TP	-	-
	3~ TP	225 M	250 M 280 S
	1~ TPE	-	-
	3~ TPE	-	-
P2	[kW]	45	55 75
PN		PN 10	PN 10 PN 10
T _{min} , T _{max}	[°C]	[-25;120]	[-25;120] [-25;120]
D1 _p /D1 _s	[mm]	250/300	250/300 250/300
AC	[mm]	449	449 551
AD	[mm]	338	338 433
P	[mm]	550	550 550
B1	[mm]	223	223 223
B2	[mm]	635	635 635
B7	[mm]	647	647 647
B8	[mm]	300	300 300
B9	[mm]	335	335 335
C2	[mm]	580	580 580
C7	[mm]	520	520 520
C8	[mm]	50	50 50
Ø	[mm]	20	20 20
L1	[mm]	950	950 950
L2	[mm]	190	190 190
L3	[mm]	620	620 620
H1	[mm]	310	310 310
H2	[mm]	368	368 368
H3	[mm]	1386	1425 1498

★ TP(E), TP(E)D pumps are primarily fitted with IE3 motors. See *Motors*, page 90.

25. Performance curves and technical data

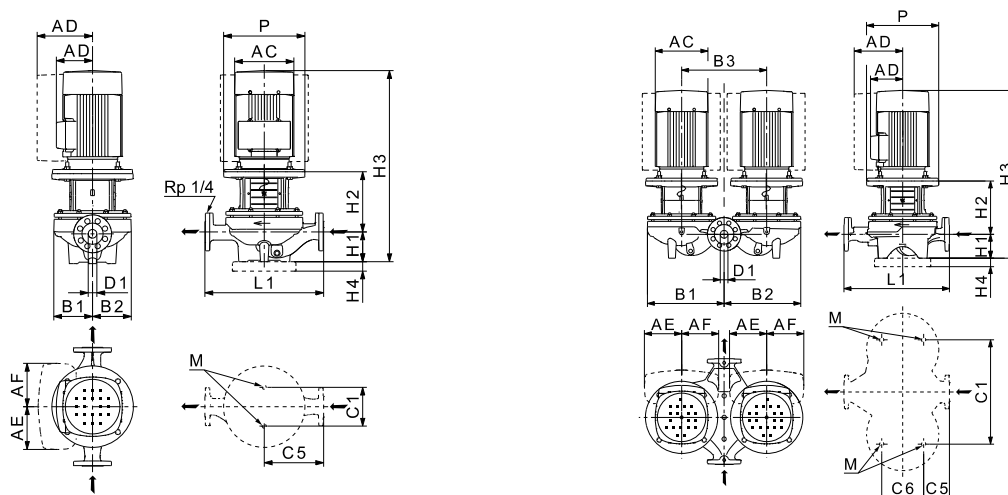
TP, TPD, TPE, TPED, 6-pole, PN 16

TP, TPD 125-XXX/6



TM02 8757 381.4

Note: All curves apply to single-head pumps. For further information, see page 115.



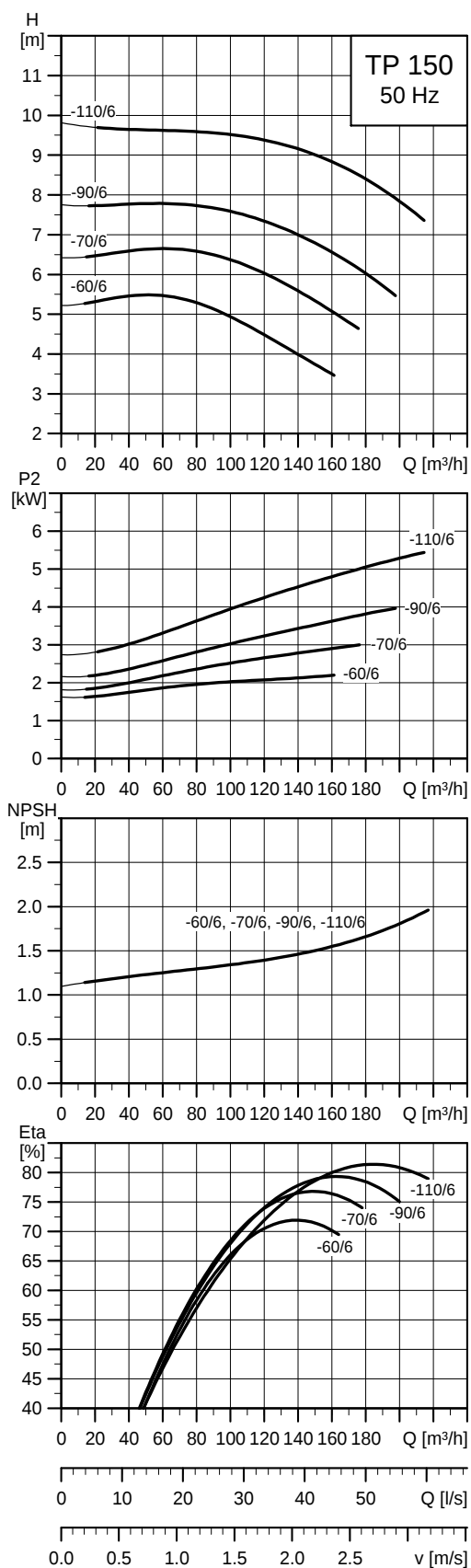
TM03 5348 2614 - TM03 5349 2614

Technical data

TP 125		-60/6	-70/6	-80/6	-100/6	-130/6	-160/6
TPD		•	•	•	•	•	•
TPE		-	-	-	-	-	-
TPED		-	-	-	-	-	-
Series		300	300	300	300	300	300
IEC size	1~ TP	-	-	-	-	-	-
	3~ TP	100	112	132	132	132	160
	1~ TPE	-	-	-	-	-	-
	3~ TPE	-	-	-	-	-	-
P2	1~3~ TP [kW]	-1.5	-2.2	-3	-4	-5.5	-7.5
	1~3~ TPE [kW]	-	-	-	-	-	-
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
	1~3~ TPE [mm]	-	-	-	-	-	-
AD	1~3~ TP [mm]	-166	-177	-202	-202	-202	-237
	1~3~ TPE [mm]	-	-	-	-	-	-
AE	1~3~ TPE [mm]	-	-	-	-	-	-
AF	1~3~ TPE [mm]	-	-	-	-	-	-
P	[mm]	250	250	300	300	300	350
B1 ★★	[mm]	250/537	250/537	244/537	244/537	273/568	273/568
B2 ★★	[mm]	202/518	202/518	220/516	220/516	236/545	236/545
B3	[mm]	600	600	600	600	600	600
C1 ★★	[mm]	230/680	230/680	230/680	230/680	230/680	230/680
C5 ★★	[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	288	288	288	318
H3	1~3~ TP [mm]	-818	-836	-850	-888	-939	-1027
	1~3~ TPE [mm]	-	-	-	-	-	-
H4	[mm]	-	-	-	-	-	-
M		M16	M16	M16	M16	M16	M16

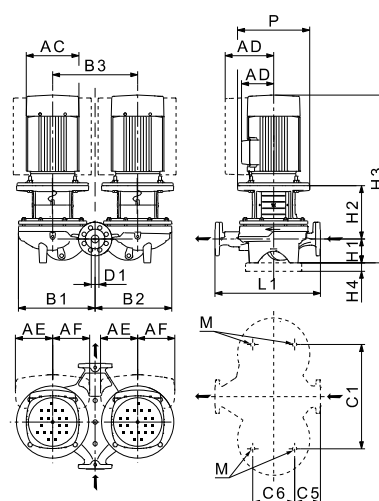
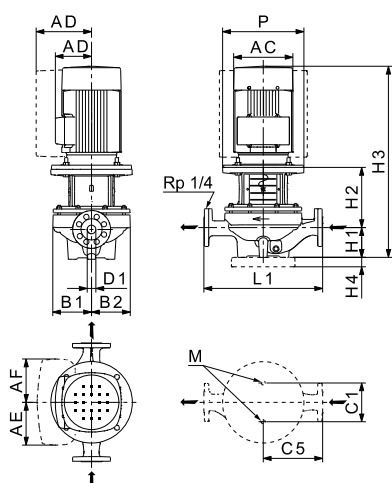
★★ The dimension before the slash applies to the single-head pump, and the dimension after the slash applies to the twin-head pump.

TP, TPD 150-XXX/6



TM02 8758 0904

Note: All curves apply to single-head pumps. For further information, see page 115.



TM03 5348 2614 - TM03 5349 2614

Technical data

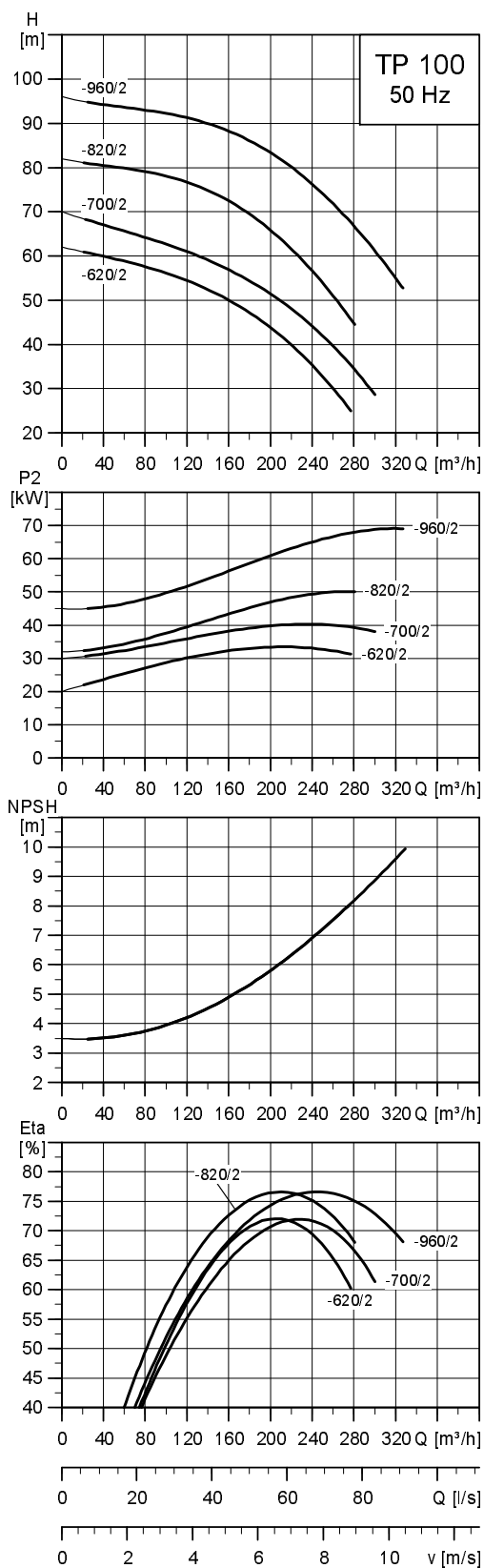
TP 150		-60/6	-70/6	-90/6	-110/6
TPD		•	•	•	•
TPE		-	-	-	-
TPED		-	-	-	-
Series		300	300	300	300
IEC size	1~ TP	-	-	-	-
	3~ TP	112	132	132	132
	1~ TPE	-	-	-	-
	3~ TPE	-	-	-	-
P2	1~/3~ TP [kW]	-/2.2	-/3	-/4	-/5.5
	1~/3~ TPE [kW]	-	-	-	-
PN		PN 16	PN 16	PN 16	PN 16
T _{min} :T _{max}	[°C]	[-25;120]	[-25;120]	[-25;120]	[-25;120]
D1	[mm]	150	150	150	150
AC	1~/3~ TP [mm]	-/222	-/262	-/262	-/262
	1~/3~ TPE [mm]	-	-	-	-
AD	1~/3~ TP [mm]	-/177	-/202	-/202	-/202
	1~/3~ TPE [mm]	-	-	-	-
AE	1~/3~ TPE [mm]	-	-	-	-
AF	1~/3~ TPE [mm]	-	-	-	-
P	[mm]	250	300	300	300
B1 ★★	[mm]	296/583	296/583	296/583	296/583
B2 ★★	[mm]	237/553	237/553	237/553	237/553
B3	[mm]	600	600	600	600
C1 ★★	[mm]	230/680	230/680	230/680	230/680
C5 ★★	[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
	1~/3~ TPE [mm]	-	-	-	-
H4	[mm]	-	-	-	-
M		M16	M16	M16	M16

★★ The dimension before the slash applies to the single-head pump, and the dimension after the slash applies to the twin-head pump.

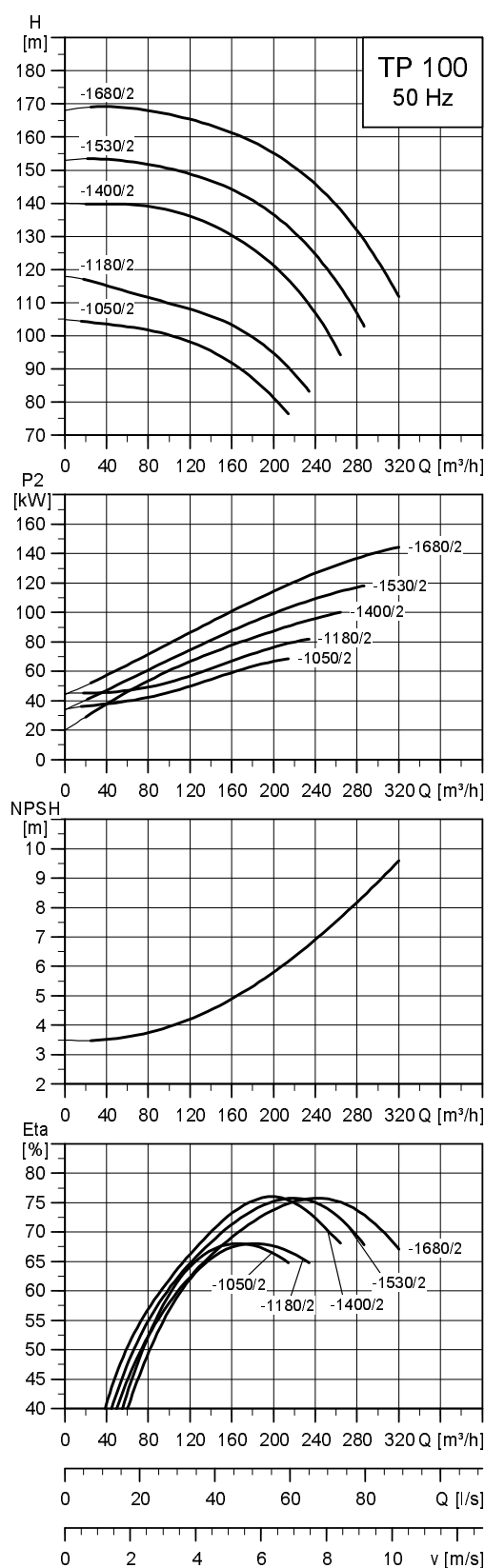
26. Performance curves and technical data

TP, 2-pole, PN 25

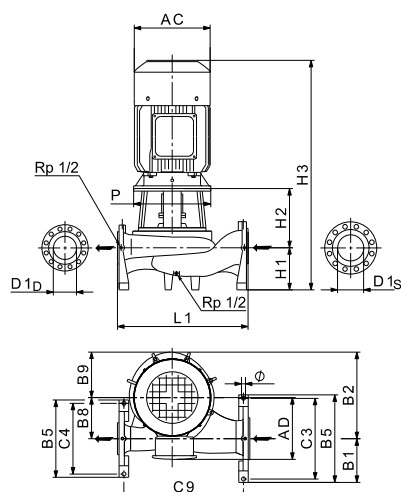
TP 100-XXX/2



TM02 6830 0504



TM02 6831 0504



TM02 8350 2614

Technical data

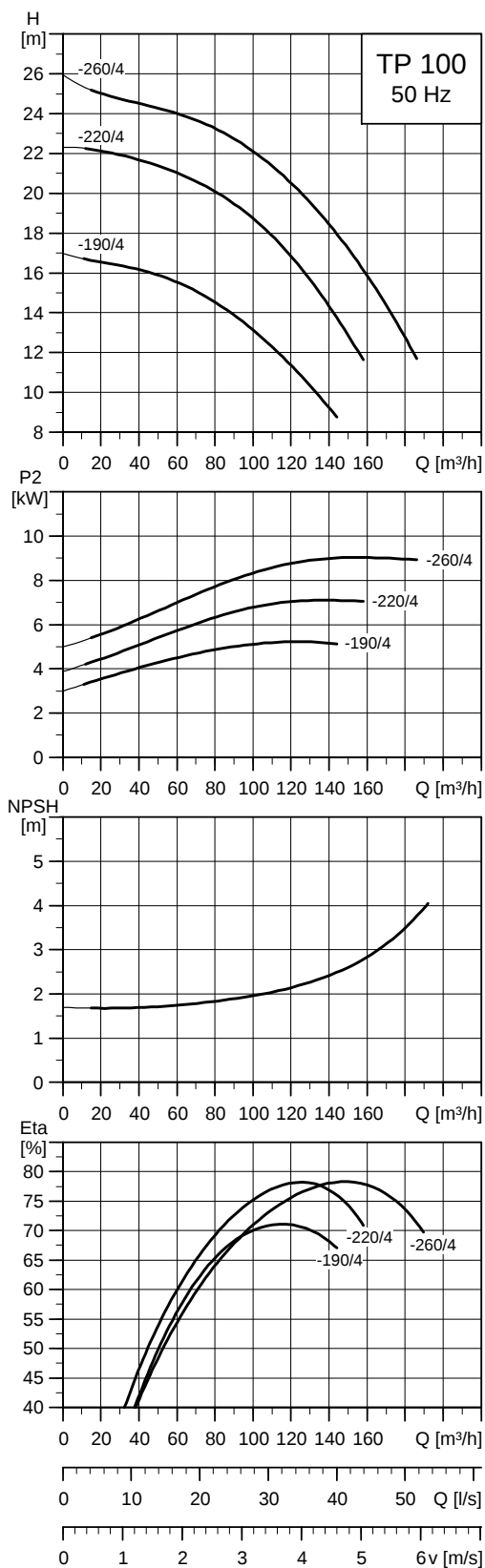
TP 100	-620/2	-700/2	-820/2	-960/2	-1050/2	-1180/2	-1400/2	-1530/2	-1680/2
TPD	-	-	-	-	-	-	-	-	-
TPE	-	-	-	-	-	-	-	-	-
TPED	-	-	-	-	-	-	-	-	-
Series	400	400	400	400	400	400	400	400	400
IEC size	1~ TP	-	-	-	-	-	-	-	-
	3~ TP	200 L	225 M	250 M	280 S	280 S	315 S	315 M	315 L
	1~ TPE	-	-	-	-	-	-	-	-
	3~ TPE	-	-	-	-	-	-	-	-
P2	[kW]	37	45	55	75	75	90	110	160
PN		PN 25	PN 25	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]	[0;150]	[0;150]
D1 _D /D1 _S	[mm]	100/125	100/125	100/125	100/125	100/125	100/125	100/125	100/125
AC	[mm]	407	439	487	540	540	551	616	616
AD	[mm]	315	410	433	432	432	433	515	515
P	[mm]	550	550	550	550	550	550	800	800
B1	[mm]	180	180	180	180	180	180	180	180
B2	[mm]	407	407	407	407	425	425	425	425
B5	[mm]	360	360	360	360	360	360	360	360
B6	[mm]	335	335	335	335	335	335	335	335
B7	[mm]	467	467	467	467	475	475	600	600
B8	[mm]	192	192	192	192	200	200	200	200
B9	[mm]	215	215	215	215	225	225	225	225
C3	[mm]	320	320	320	320	320	320	320	320
C4	[mm]	295	295	295	295	295	295	295	295
C9	[mm]	489	489	489	489	606	606	606	606
Ø	[mm]	20	20	20	20	20	20	20	20
L1	[mm]	543	543	543	543	660	660	660	660
H1	[mm]	160	160	160	160	170	170	170	170
H2	[mm]	315	315	315	315	300	300	303	303
H3	[mm]	1186	1183	1222	1295	1290	1400	1385	1550

★ TP(E), TP(E)D pumps are primarily fitted with IE3 motors. See *Motors*, page 90.

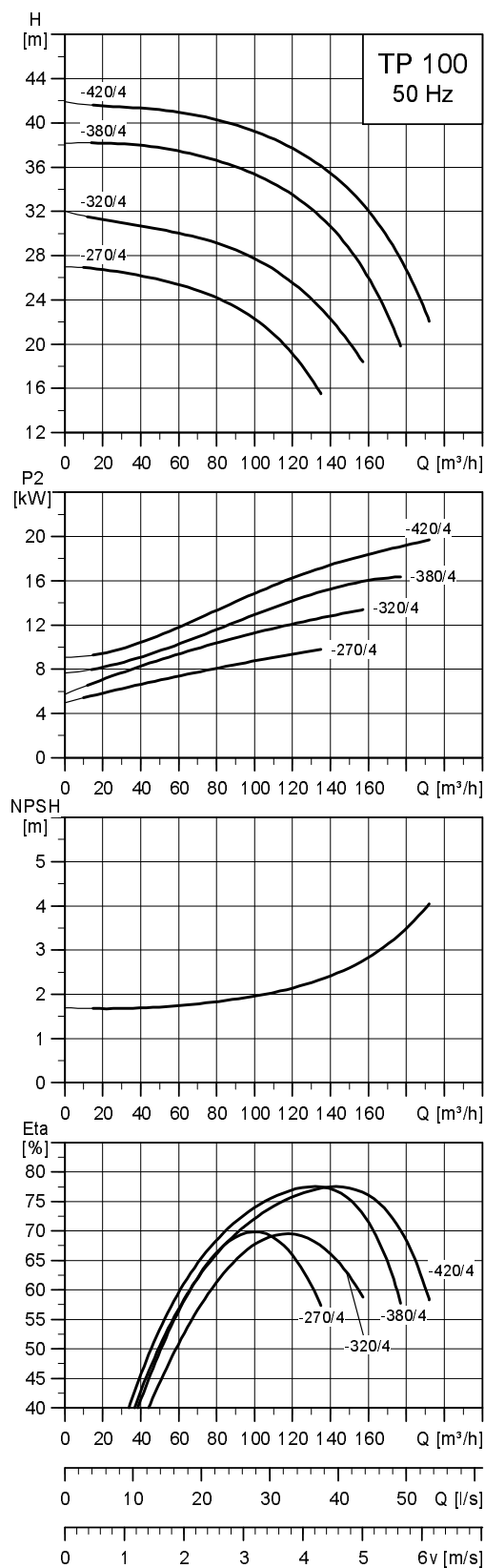
27. Performance curves and technical data

TP, 4-pole, PN 25

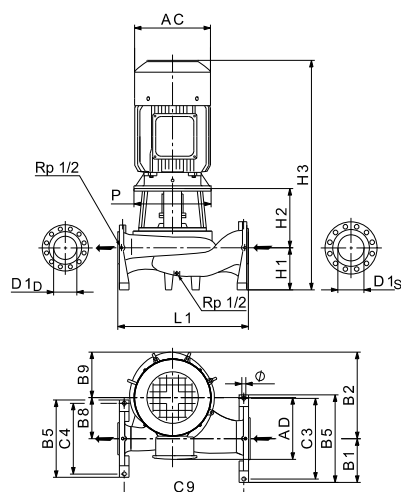
TP 100-XXX/4



TM02 6837 4810



TM02 6838 0504



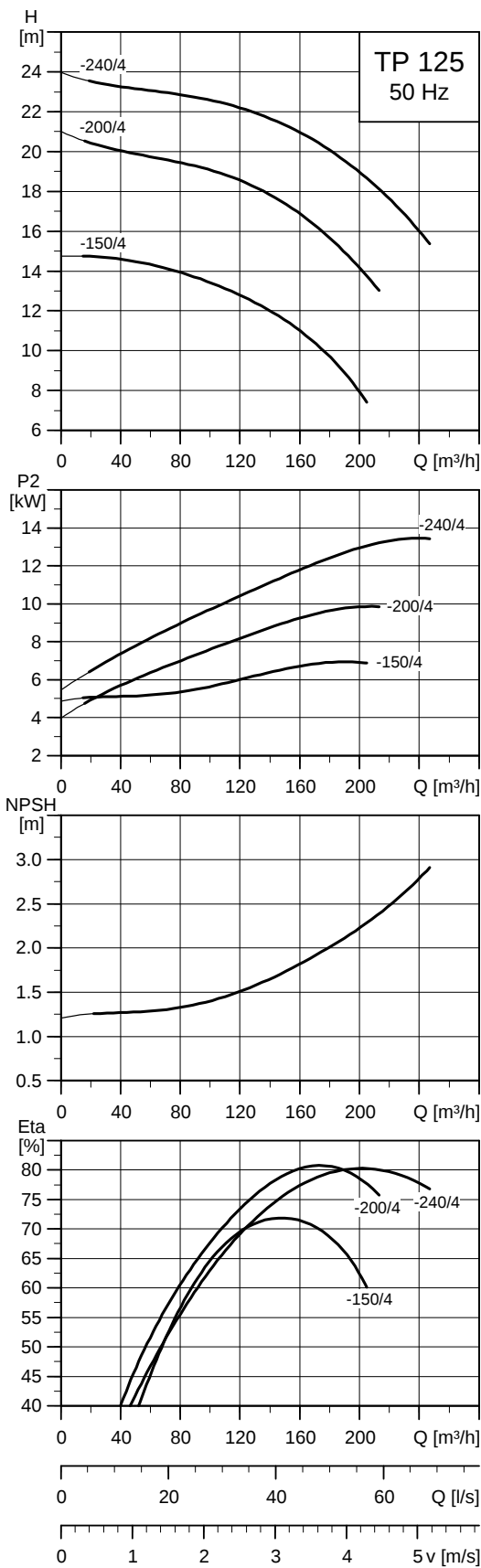
TM02 8350 2614

Technical data

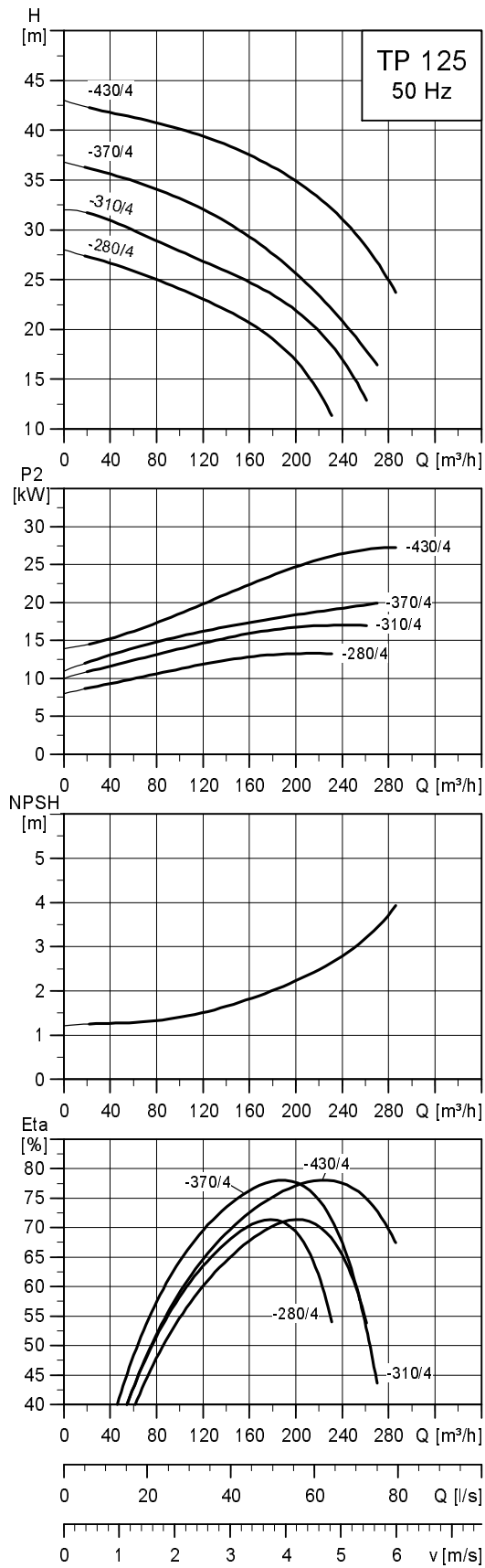
TP 100	-190/4	-220/4	-260/4	-270/4	-320/4	-380/4	-420/4
TPD	-	-	-	-	-	-	-
TPE	-	-	-	-	-	-	-
TPED	-	-	-	-	-	-	-
Series	400	400	400	400	400	400	400
IEC size	1~ TP	-	-	-	-	-	-
	3~ TP	132 S	132 M	160 M	160 M	160 L	180 M
	1~ TPE	-	-	-	-	-	-
	3~ TPE	-	-	-	-	-	-
P2	[kW]	5.5	7.5	11	11	15	18.5
PN		PN 25	PN 25	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 _p /D1 _s	[mm]	100/125	100/125	100/125	100/125	100/125	100/125
AC	[mm]	260	260	314	314	314	368
AD	[mm]	159	159	204	204	204	286
P	[mm]	400	400	400	450	450	450
B1	[mm]	180	180	180	180	180	180
B2	[mm]	407	407	407	425	425	425
B5	[mm]	360	360	360	360	360	360
B6	[mm]	335	335	335	335	335	335
B7	[mm]	401	401	401	429	430	429
B8	[mm]	192	192	192	200	200	200
B9	[mm]	215	215	215	225	225	225
C3	[mm]	320	320	320	320	320	320
C4	[mm]	295	295	295	295	295	295
C9	[mm]	489	489	489	606	606	606
Ø	[mm]	20	20	20	20	20	20
L1	[mm]	543	543	543	660	660	660
H1	[mm]	160	160	160	170	170	170
H2	[mm]	285	285	285	270	270	270
H3	[mm]	824	874	916	911	985	1036

★ TP(E), TP(E)D pumps are primarily fitted with IE3 motors. See *Motors*, page 90.

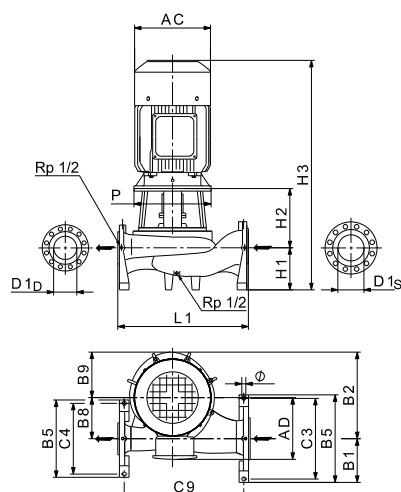
TP 125-XXX/4



TM02 6839 4810



TM02 6840 0805



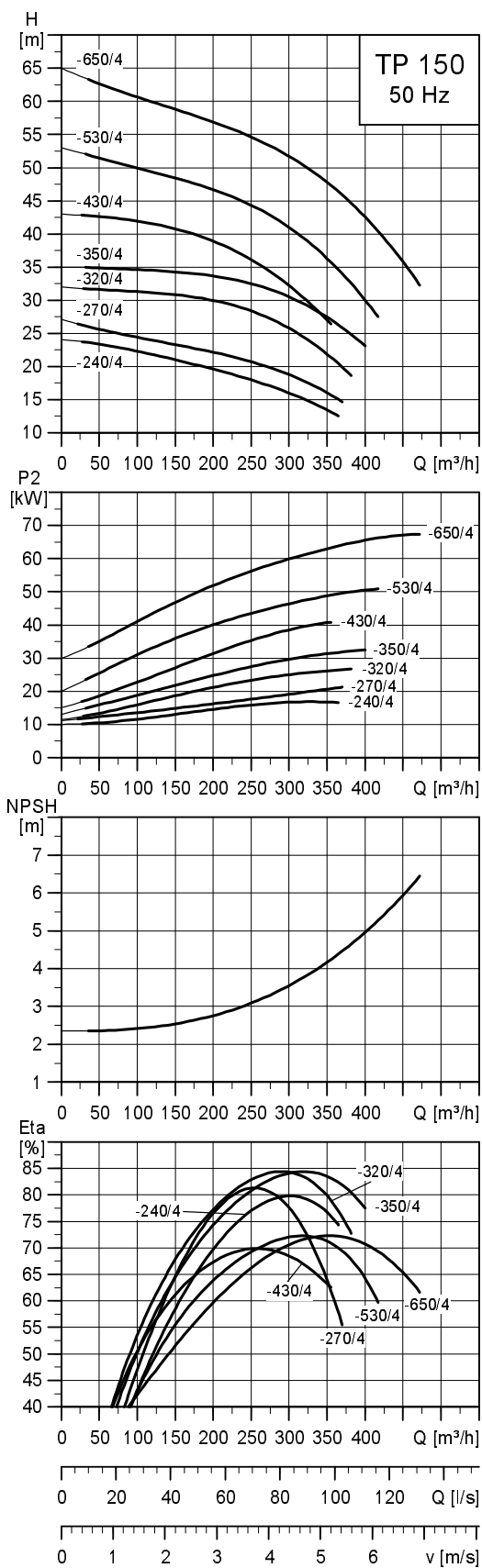
TM02 8350 2614

Technical data

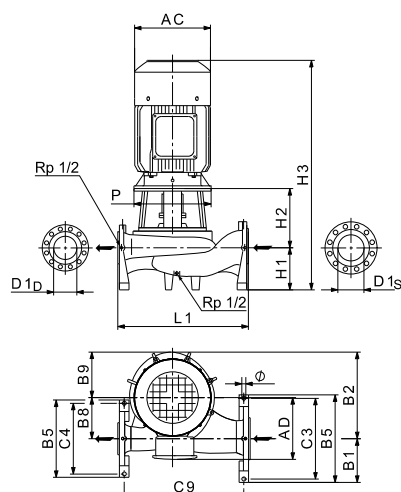
TP 125	-150/4	-200/4	-240/4	-280/4	-310/4	-370/4	-430/4
TPD	-	-	-	-	-	-	-
TPE	-	-	-	-	-	-	-
TPED	-	-	-	-	-	-	-
Series	400	400	400	400	400	400	400
IEC size	1~ TP	-	-	-	-	-	-
	3~ TP	132 M	160 M	160 L	160 L	180 M	180 L
	1~ TPE	-	-	-	-	-	-
	3~ TPE	-	-	-	-	-	-
P2	[kW]	7.5	11	15	15	18.5	22
PN		PN 25	PN 25	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]
D _{1D} /D _{1S}	[mm]	125/150	125/150	125/150	125/150	125/150	125/150
AC	[mm]	260	314	314	314	368	368
AD	[mm]	159	204	204	204	286	286
P	[mm]	400	400	400	450	450	450
B1	[mm]	200	200	200	200	200	200
B2	[mm]	430	430	430	451	451	451
B5	[mm]	400	400	400	400	400	400
B6	[mm]	360	360	360	360	360	360
B7	[mm]	423	423	423	467	468	468
B8	[mm]	200	200	200	224	224	224
B9	[mm]	230	230	230	227	227	227
C3	[mm]	360	360	360	360	360	360
C4	[mm]	320	320	320	320	320	320
C9	[mm]	536	536	536	606	606	606
Ø	[mm]	20	20	20	20	20	20
L1	[mm]	590	590	590	660	660	660
H1	[mm]	185	185	185	180	180	180
H2	[mm]	287	287	287	283	283	283
H3	[mm]	902	943	1017	1008	978	1059

★ TP(E), TP(E)D pumps are primarily fitted with IE3 motors. See *Motors*, page 90.

TP 150-XXX/4



TM02 6842 0504



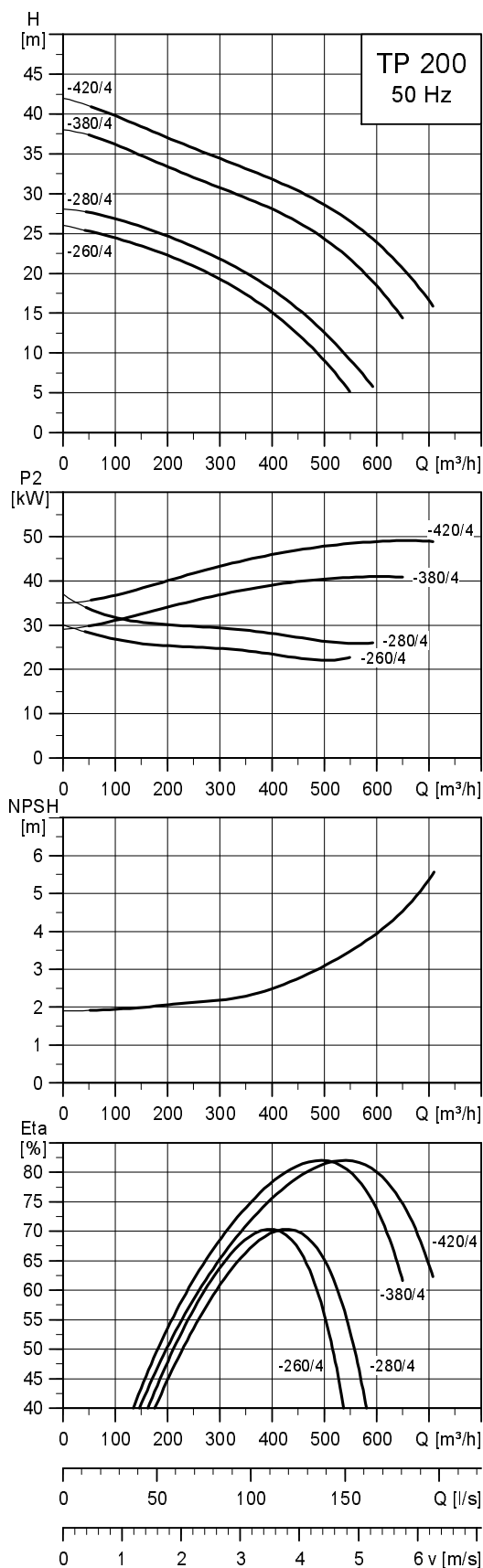
TM02 8350 2614

Technical data

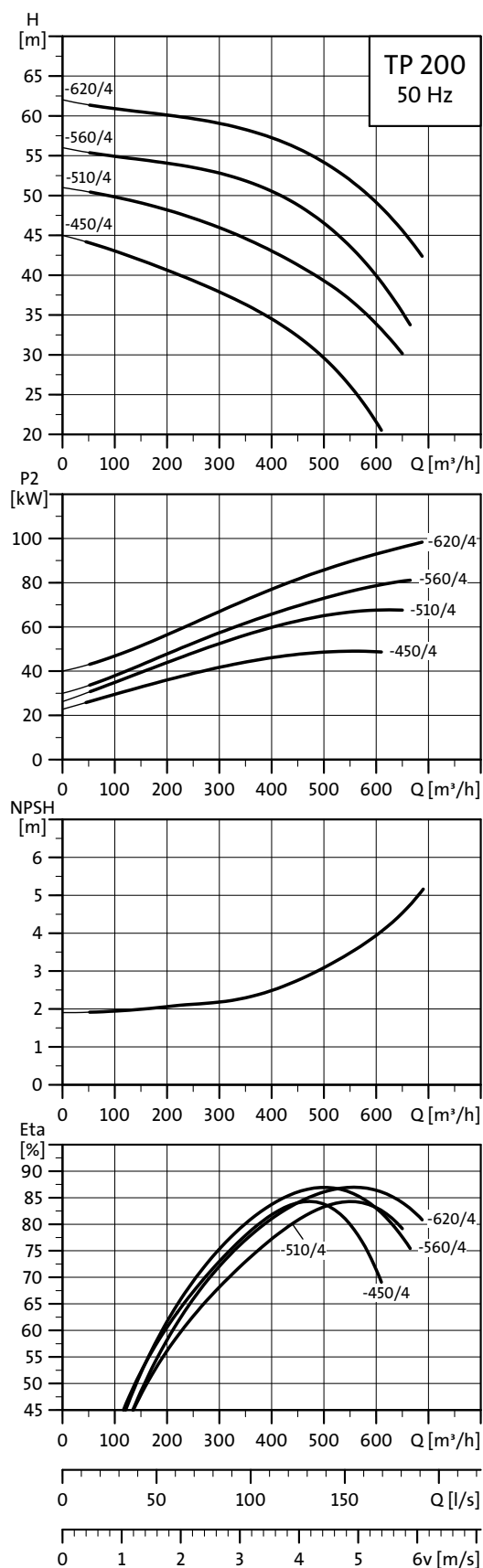
TP 150	-240/4	-270/4	-320/4	-350/4	-430/4	-530/4	-650/4
TPD	-	-	-	-	-	-	-
TPE	-	-	-	-	-	-	-
TPED	-	-	-	-	-	-	-
Series	400	400	400	400	400	400	400
IEC size	1~ TP	-	-	-	-	-	-
	3~ TP	180 M	180 L	200 L	225 S	225 M	250 M
	1~ TPE	-	-	-	-	-	-
	3~ TPE	-	-	-	-	-	-
P2	[kW]	18.5	22	30	37	45	55
PN		PN 25	PN 25	PN 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 _p /D1 _s	[mm]	150/200	150/200	150/200	150/200	150/200	150/200
AC	[mm]	368	368	408	449	449	497
AD	[mm]	286	286	315	338	338	410
P	[mm]	450	450	450	550	550	550
B1	[mm]	230	230	230	230	235	235
B2	[mm]	504	504	504	504	575	575
B5	[mm]	460	460	460	460	470	470
B6	[mm]	400	400	400	400	410	410
B7	[mm]	517	517	518	518	584	584
B8	[mm]	229	229	229	229	260	260
B9	[mm]	275	275	275	275	315	315
C3	[mm]	420	420	420	420	420	420
C4	[mm]	360	360	360	360	360	360
C9	[mm]	676	676	676	676	823	823
Ø	[mm]	20	20	20	20	20	20
L1	[mm]	740	740	740	740	900	900
H1	[mm]	225	225	225	225	250	250
H2	[mm]	293	293	293	323	325	325
H3	[mm]	1033	1114	1164	1196	1283	1322

★ TP(E), TP(E)D pumps are primarily fitted with IE3 motors. See *Motors*, page 90.

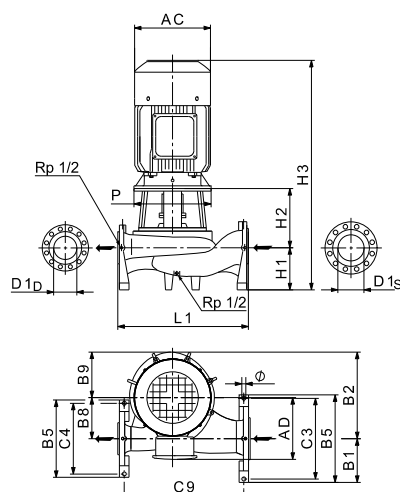
TP 200-XXX/4



TM02 6843 0805



TM02 6844 0504



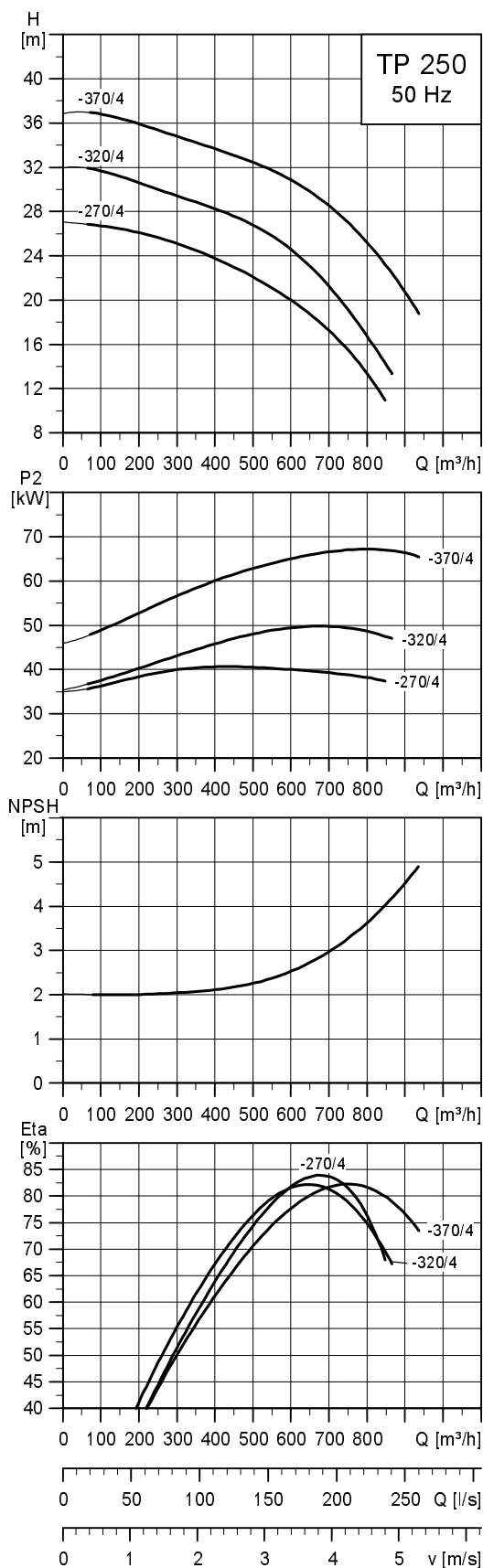
TM02 8350 2614

Technical data

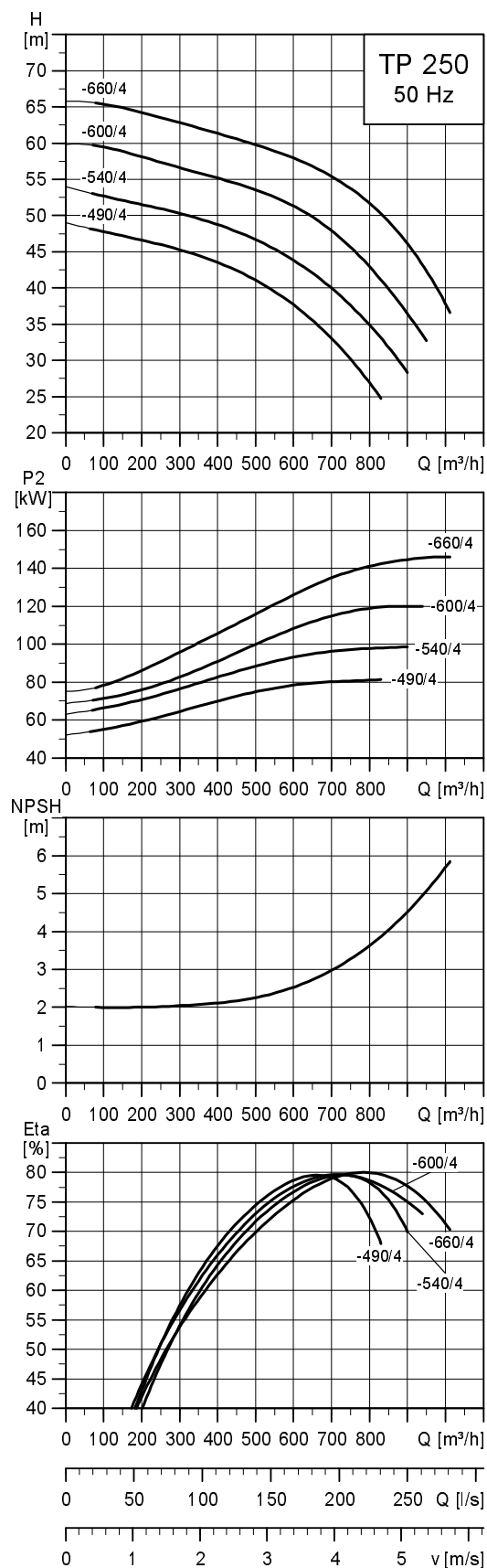
TP 200	-260/4	-280/4	-380/4	-420/4	-450/4	-510/4	-560/4	-620/4
TPD	-	-	-	-	-	-	-	-
TPE	-	-	-	-	-	-	-	-
TPED	-	-	-	-	-	-	-	-
Series	400	400	400	400	400	400	400	400
IEC size	1~ TP	-	-	-	-	-	-	-
	3~ TP	200 L	225 S	225 M	250 M	250 M	280 S	280 M
	1~ TPE	-	-	-	-	-	-	-
	3~ TPE	-	-	-	-	-	-	-
P2	[kW]	30	37	45	55	55	75	90
PN		PN 25	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]	[0;150]
D _{1p} /D _{1s}	[mm]	200/250	200/250	200/250	200/250	200/250	200/250	200/250
AC	[mm]	408	449	449	497	497	551	551
AD	[mm]	315	338	338	410	410	433	433
P	[mm]	450	550	550	550	550	550	550
B1	[mm]	260	260	260	260	268	268	268
B2	[mm]	560	560	560	560	640	640	640
B5	[mm]	520	520	520	520	535	535	535
B6	[mm]	460	460	460	460	470	470	470
B7	[mm]	572	572	572	572	645	645	645
B8	[mm]	260	260	260	260	300	300	300
B9	[mm]	300	300	300	300	340	340	340
C3	[mm]	480	480	480	480	485	485	485
C4	[mm]	420	420	420	420	420	420	420
C9	[mm]	766	766	766	766	1013	1013	1013
Ø	[mm]	20	20	20	20	20	20	20
L1	[mm]	830	830	830	830	1100	1100	1100
H1	[mm]	250	250	250	250	290	290	290
H2	[mm]	308	338	338	338	327	327	357
H3	[mm]	1186	1236	1296	1335	1364	1437	1559

★ TP(E), TP(E)D pumps are primarily fitted with IE3 motors. See *Motors*, page 90.

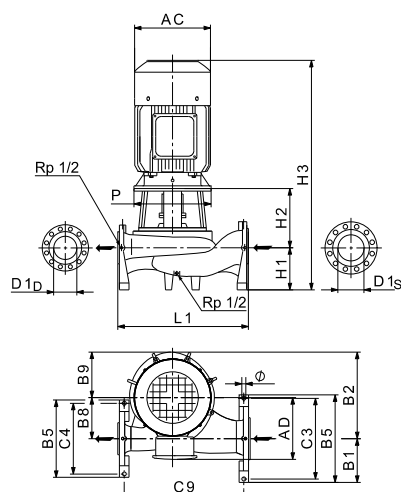
TP 250-XXX/4



TM02 6845 0504



TM02 6846 0504



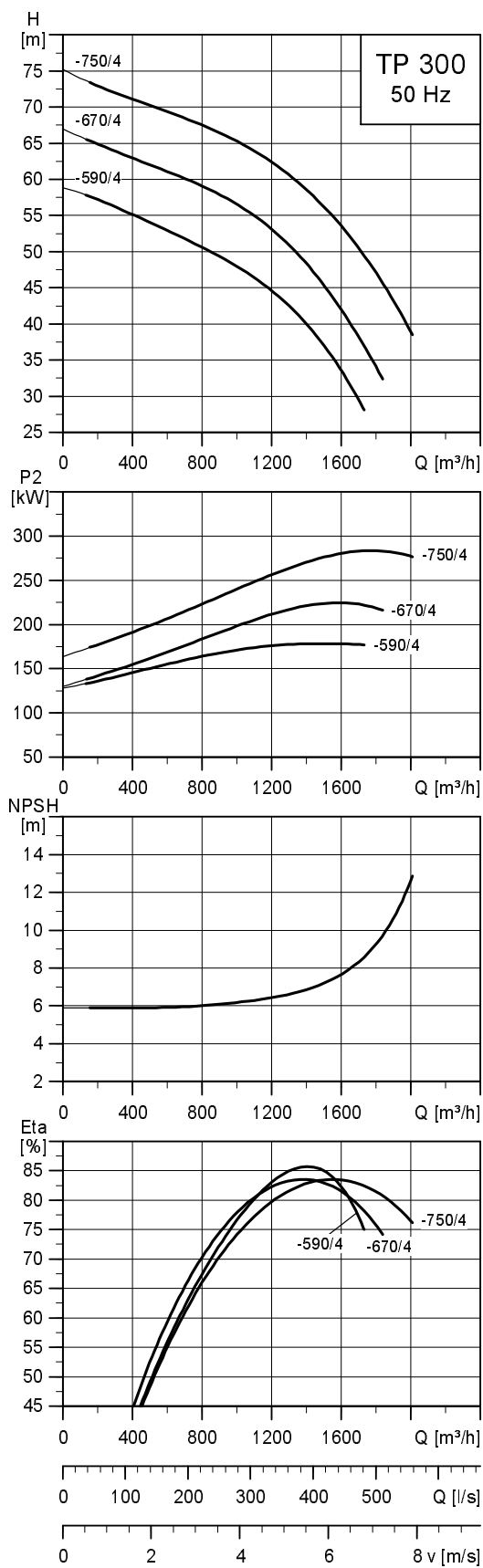
TM02 8350 2614

Technical data

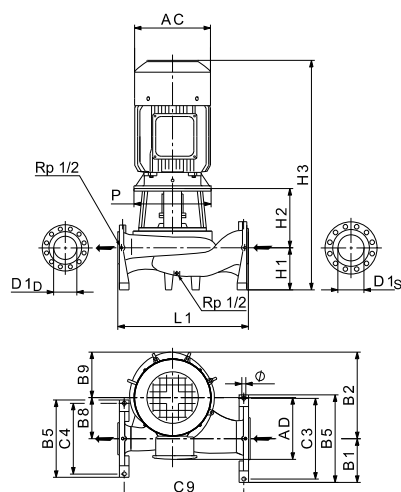
TP 250		-270/4	-320/4	-370/4	-490/4	-540/4	-600/4	-660/4
TPD		-	-	-	-	-	-	-
TPE		-	-	-	-	-	-	-
TPED		-	-	-	-	-	-	-
Series		400	400	400	400	400	400	400
IEC size	1~ TP	-	-	-	-	-	-	-
	3~ TP	225 M	250 M	280 S	280 M	315 S	315 M	315 M
	1~ TPE	-	-	-	-	-	-	-
	3~ TPE	-	-	-	-	-	-	-
P2	[kW]	45	55	75	90	110	132	160
PN		PN 25	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]	[0;150]
D1 _D /D1 _S	[mm]	250/300	250/300	250/300	250/300	250/300	250/300	250/300
AC	[mm]	449	497	551	551	616	616	616
AD	[mm]	338	410	433	433	515	515	515
P	[mm]	550	550	550	660	660	660	660
B1	[mm]	303	303	303	303	303	303	303
B2	[mm]	650	650	650	700	700	700	700
B5	[mm]	605	605	605	605	605	605	605
B6	[mm]	540	540	540	540	540	540	540
B7	[mm]	647	647	647	720	720	720	720
B8	[mm]	300	300	300	330	330	330	330
B9	[mm]	350	350	350	370	370	370	370
C3	[mm]	550	550	550	550	550	550	550
C4	[mm]	485	485	485	485	485	485	485
C9	[mm]	855	855	855	1106	1106	1106	1106
Ø	[mm]	24	24	24	24	24	24	24
L1	[mm]	950	950	950	1200	1200	1200	1200
H1	[mm]	300	300	300	350	350	350	350
H2	[mm]	368	368	368	373	373	358	358
H3	[mm]	1376	1415	1488	1653	1635	1785	1785

★ TP(E), TP(E)D pumps are primarily fitted with IE3 motors. See *Motors*, page 90.

TP 300-XXX/4



TM02 6847 0504

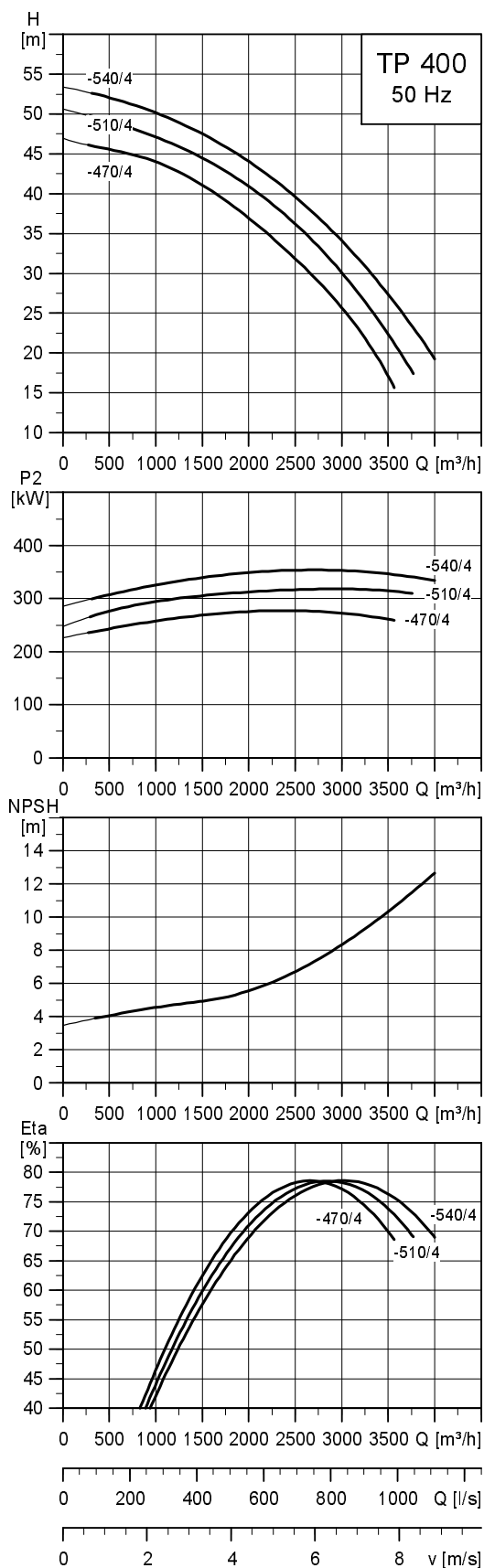


TM02 8350 2614

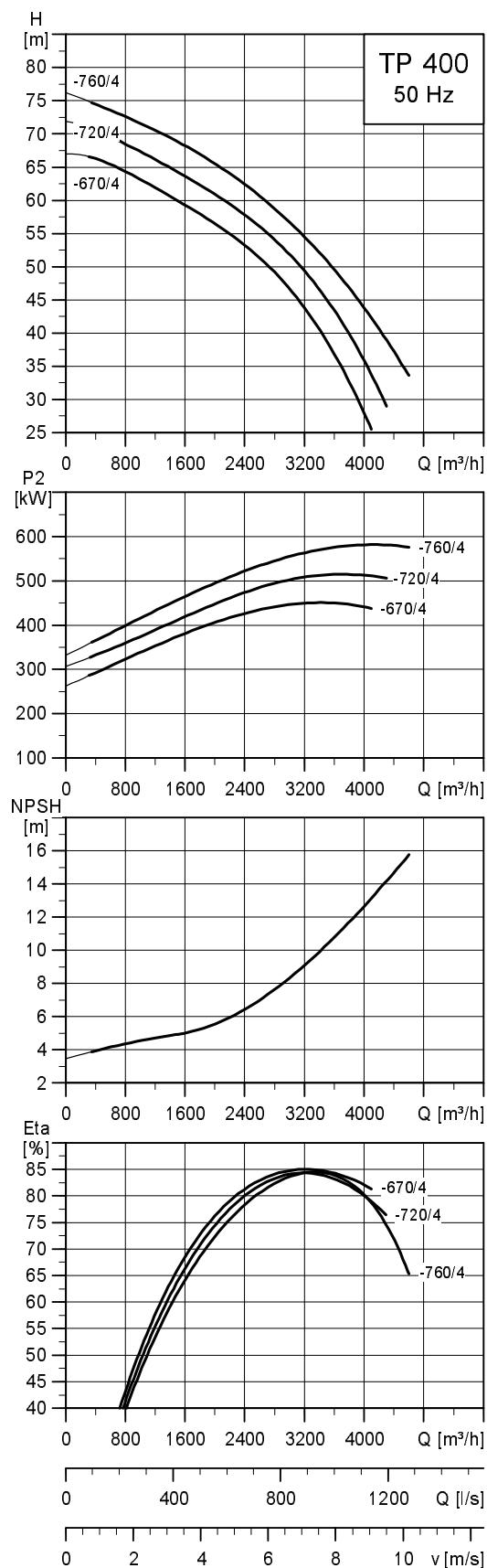
Technical data

TP 300		-590/4	-670/4	-750/4
TPD		-	-	-
TPE		-	-	-
TPED		-	-	-
Series		400	400	400
IEC size	1~ TP	-	-	-
	3~ TP	315 L	315	315
	1~ TPE	-	-	-
	3~ TPE	-	-	-
P2	[kW]	200	250	315
PN		PN 25	PN 25	PN 25
T _{min} , T _{max}	[°C]	[0;150]	[0;150]	[0;150]
D1p/D1s	[mm]	300/350	300/350	300/350
AC	[mm]	616	610	625
AD	[mm]	515	500	608
P	[mm]	660	1150	1150
B1	[mm]	338	338	338
B2	[mm]	790	790	790
B5	[mm]	675	675	675
B6	[mm]	605	605	605
B7	[mm]	817	817	817
B8	[mm]	370	370	370
B9	[mm]	420	420	420
C3	[mm]	620	620	620
C4	[mm]	550	550	550
C9	[mm]	1204	1204	1204
Ø	[mm]	24	24	24
L1	[mm]	1300	1300	1300
H1	[mm]	375	375	375
H2	[mm]	406	446	446
H3	[mm]	2013	2043	2187

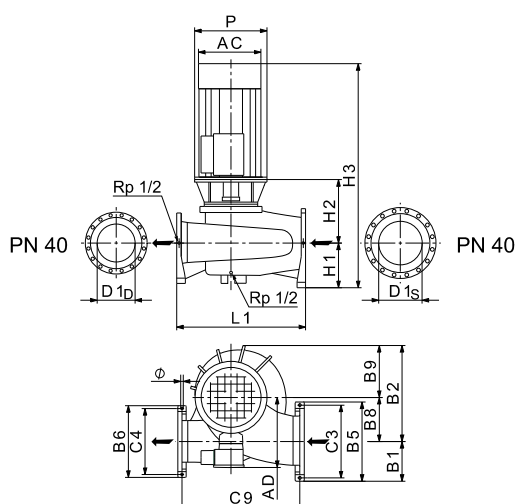
TP 400-XXX/4



TM02 6848 0504



TM02 6849 0504



TM02 8351 2614

Technical data

TP 400		-470/4	-510/4	-540/4	-670/4	-720/4	-760/4
TPD		-	-	-	-	-	-
TPE		-	-	-	-	-	-
TPED		-	-	-	-	-	-
Series		400	400	400	400	400	400
IEC size	1~ TP	-	-	-	-	-	-
	3~ TP	315	355	355	355	400	400
	1~ TPE	-	-	-	-	-	-
	3~ TPE	-	-	-	-	-	-
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 _P /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
B1	[mm]	448	448	448	448	448	448
B2	[mm]	1064	1064	1064	1064	1064	1064
B5	[mm]	895	895	895	895	895	895
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
Ø	[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

28. Weights and shipping volume

TP, TPD, TPE, TPED, 2-pole, PN 6, 10, 16

Pump type	Connection		Weights				Shipping volume [m ³]	
	D1 _D	D1 _S	Net [kg]★		Gross [kg]★		TP/TPD	TPE/TPED
			TP/TPD	TPE/TPED	TP/TPD	TPE/TPED		
TP 25-50/2 R	G 1/2	G 1/2	8/-	13/-	9/-	15/-	0.022/-	0.039/-
TP 25-80/2 R	G 1/2	G 1/2	8/-	13/-	9/-	15/-	0.022/-	0.039/-
TP 25-90/2 R	G 1/2	G 1/2	11/-	13/-	12/-	15/-	0.039/-	0.039/-
TP 32-50/2 R	G 2	G 2	9/-	13/-	10/-	15/-	0.022/-	0.039/-
TP 32-80/2 R	G 2	G 2	9/-	13/-	11/-	15/-	0.039/-	0.039/-
TP 32-90/2 R	G 2	G 2	11/-	14/-	13/-	16/-	0.039/-	0.039/-
TP, TPD 32-60/2	DN 32	DN 32	16/32	21/38	17/33	24/41	0.036/0.072	0.064/0.151
TP, TPD 32-120/2	DN 32	DN 32	19/38	20/41	20/40	21/42	0.036/0.072	0.056/0.072
TP, TPD 32-150/2	DN 32	DN 32	23/54	28/58	26/57	32/60	0.064/0.082	0.064/0.151
TP, TPD 32-180/2	DN 32	DN 32	24/54	30/60	27/57	33/63	0.064/0.082	0.064/0.082
TP, TPD 32-230/2	DN 32	DN 32	25/54	41/81	28/57	45/85	0.064/0.082	0.091/0.221
TP, TPD 32-200/2	DN 32	DN 32	42/86	39/90	47/101	51/96	0.138/0.3912	0.138/0.3912
TP, TPD 32-250/2	DN 32	DN 32	46/93	38/91	51/109	43/95	0.138/0.3912	0.184/0.3912
TP, TPD 32-320/2	DN 32	DN 32	51/104	45/102	57/120	50/109	0.184/0.3912	0.184/0.3912
TP, TPD 32-380/2	DN 32	DN 32	63/127	65/130	68/144	70/149	0.184/0.4584	0.184/0.5184
TP, TPD 32-460/2	DN 32	DN 32	76/151	79/157	82/169	85/176	0.2176/0.4584	0.2176/0.5184
TP, TPD 32-580/2	DN 32	DN 32	90/180	95/189	106/198	113/208	0.2176/0.4584	0.2176/0.5184
TP 40-50/2	DN 40	DN 40	12/-	16/-	13/-	18/-	0.022/-	0.039/-
TP, TPD 40-60/2	DN 40	DN 40	20/42	22/46	21/43	24/50	0.036/0.072	0.056/0.072
TP 40-80/2	DN 40	DN 40	12/-	16/-	14/-	18/-	0.039/-	0.039/-
TP 40-90/2	DN 40	DN 40	15/-	17/-	17/-	19/-	0.039/-	0.039/-
TP, TPD 40-120/2	DN 40	DN 40	20/41	21/44	21/43	23/48	0.036/0.072	0.056/0.072
TP 40-180/2	DN 40	DN 40	24/-	30/-	25/-	33/-	0.036/-	0.064/-
TP, TPD 40-190/2	DN 40	DN 40	29/54	44/82	32/59	48/87	0.064/0.151	0.091/0.221
TP, TPD 40-230/2	DN 40	DN 40	36/56	35/59	39/61	38/64	0.064/0.151	0.091/0.221
TP, TPD 40-270/2	DN 40	DN 40	39/70	23/47	42/75	26/52	0.064/0.151	0.091/0.221
TP, TPD 40-240/2	DN 40	DN 40	53/107	46/94	58/124	52/112	0.184/0.3912	0.184/0.3912
TP, TPD 40-300/2	DN 40	DN 40	65/130	66/133	70/148	72/152	0.184/0.4584	0.184/0.5184
TP, TPD 40-360/2	DN 40	DN 40	70/140	73/146	75/158	78/165	0.184/0.4584	0.184/0.5184
TP, TPD 40-430/2	DN 40	DN 40	91/186	96/195	106/204	114/214	0.2176/0.4584	0.2176/0.5184
TP, TPD 40-530/2	DN 40	DN 40	105/214	107/218	120/231	126/237	0.2176/0.4584	0.2176/0.5184
TP, TPD 40-630/2	DN 40	DN 40	141.2/	171.2/	172.0/	201.2/	0.58/	0.58/
TP, TPD 50-60/2	DN 50	DN 50	20/45	23/48	21/48	27/51	0.056/0.072	0.064/0.151
TP, TPD 50-120/2	DN 50	DN 50	28/56	40/83	29/58	41/85	0.056/0.072	0.091/0.221
TP, TPD 50-180/2	DN 50	DN 50	28/56	41/83	29/58	45/86	0.056/0.072	0.091/0.221
TP, TPD 50-160/2	DN 50	DN 50	47/94	42/84	52/111	53/101	0.138/0.3912	0.184/0.3912
TP, TPD 50-190/2	DN 50	DN 50	48/98	40/82	53/114	46/100	0.138/0.3912	0.184/0.3912
TP, TPD 50-240/2	DN 50	DN 50	54/108	47/95	59/125	52/113	0.184/0.3912	0.184/0.3912
TP, TPD 50-290/2	DN 50	DN 50	65/131	67/134	70/149	72/153	0.184/0.4584	0.184/0.5184
TP, TPD 50-360/2	DN 50	DN 50	71/144	74/150	76/161	80/168	0.184/0.4584	0.184/0.5184
TP, TPD 50-430/2	DN 50	DN 50	86/174	91/182	101/191	109/201	0.184/0.4584	0.184/0.5184
TP, TPD 50-420/2	DN 50	DN 50	112/230	114/233	127/248	132/252	0.2176/0.5184	0.2176/0.5184
TP, TPD 50-540/2	DN 50	DN 50	149/304	181/367	166/325	199/393	0.7248/0.6507	0.7248/1.524
TP, TPD 50-630/2	DN 50	DN 50	165/333	198/399	195/357	228/482	0.58/0.64	0.58/1.5
TP, TPD 50-710/2	DN 50	DN 50	179/363	184/373	196/384	203/399	0.7248/0.6507	0.7248/1.524
TP, TPD 50-830/2	DN 50	DN 50	181/367	209/422	198/388	227/448	0.7248/0.6507	0.7248/1.524
TP, TPD 50-900/2	DN 50	DN 50	196/396	222/448	222/448	240/474	0.7248/0.6507	0.7248/1.524
TP, TPD 65-60/2	DN 65	DN 65	26/53	31/60	27/56	34/64	0.056/0.140	0.064/0.151
TP, TPD 65-120/2	DN 65	DN 65	31/63	29/64	32/65	31/68	0.056/0.140	0.091/0.221
TP, TPD 65-180/2	DN 65	DN 65	38/76	31/64	41/79	34/67	0.066/0.140	0.091/0.221
TP, TPD 65-170/2	DN 65	DN 65	56/118	51/102	62/134	56/121	0.184/0.3912	0.184/0.3912
TP, TPD 65-210/2	DN 65	DN 65	68/141	70/144	73/158	75/163	0.184/0.4584	0.184/0.5184
TP, TPD 65-250/2	DN 65	DN 65	73/151	76/157	78/168	81/175	0.184/0.4584	0.184/0.5184
TP, TPD 65-340/2	DN 65	DN 65	89/178	93/187	104/196	112/206	0.184/0.4584	0.184/0.5184
TP, TPD 65-410/2	DN 65	DN 65	103/206	105/210	118/224	123/229	0.184/0.4584	0.184/0.5184
TP, TPD 65-460/2	DN 65	DN 65	151/310	182/372	168/331	201/398	0.7248/0.6507	0.7248/1.524
TP, TPD 65-550/2	DN 65	DN 65	180/369	185/379	197/390	204/405	0.7248/0.6507	0.7248/1.524
TP, TPD 65-660/2	DN 65	DN 65	182/373	210/427	199/394	228/453	0.7248/0.6507	0.7248/1.524
TP, TPD 65-720/2	DN 65	DN 65	197/402	223/454	216/429	242/481	0.7248/1.524	0.7248/1.524
TP, TPD 65-930/2	DN 65	DN 65	345/699	-	364/725	-	0.7248/1.524	-

Pump type	Connection		Weights				Shipping volume [m ³]	
	D1 _D	D1 _S	Net [kg]★		Gross [kg]★		TP/TPD	TPE/TPED
			TP/TPD	TPE/TPED	TP/TPD	TPE/TPED		
TP, TPD 80-120/2	DN 80	DN 80	43/83	38/72	44/86	43/78	0.066/0.140	0.091/0.370
TP, TPD 80-140/2	DN 80	DN 80	61/124	54/110	74/141	66/127	0.184/0.3912	0.184/0.3912
TP, TPD 80-180/2	DN 80	DN 80	65/132	74/150	78/149	88/180	0.184/0.4584	0.184/0.6507
TP, TPD 80-210/2	DN 80	DN 80	78/157	80/162	90/174	94/192	0.184/0.4584	0.184/0.5184
TP, TPD 80-240/2	DN 80	DN 80	93/187	97/195	105/204	118/225	0.184/0.4584	0.7248/0.5184
TP, TPD 80-250/2	DN 80	DN 80	101/211	115/238	115/230	136/268	0.2176/0.5184	0.7248/0.5184
TP, TPD 80-330/2	DN 80	DN 80	148/304	181/370	169/334	203/420	0.7248/0.6507	0.7248/0.6507
TP, TPD 80-400/2	DN 80	DN 80	160/327	185/377	180/356	205/425	0.7248/0.6507	0.7248/0.6507
TP, TPD 80-520/2	DN 80	DN 80	176/349	215/427	197/379	236/477	0.7248/1.524	0.7248/1.524
TP, TPD 80-570/2	DN 80	DN 80	205/407	228/453	226/457	249/503	0.7248/1.524	0.7248/1.524
TP, TPD 80-700/2	DN 80	DN 80	350/697	-	371/747	-	0.7248/1.524	-
TP, TPD 100-120/2	DN 100	DN 100	53/108	49/100	55/113	54/106	0.140/0.213	0.120/0.370
TP, TPD 100-160/2	DN 100	DN 100	93/196	95/202	107/246	109/252	0.2176/0.5184	0.2176/0.6507
TP, TPD 100-200/2	DN 100	DN 100	108/226	112/235	122/276	134/285	0.7248/0.5184	0.7248/0.6507
TP, TPD 100-240/2	DN 100	DN 100	122/254	127/264	136/304	149/314	0.7248/0.5184	0.7248/0.6507
TP, TPD 100-250/2	DN 100	DN 100	175/351	206/413	199/401	230/463	0.7248/1.524	0.7248/1.524
TP, TPD 100-310/2	DN 100	DN 100	204/410	209/420	228/460	233/470	0.7248/1.524	0.7248/1.524
TP, TPD 100-360/2	DN 100	DN 100	207/414	234/468	230/464	257/518	0.7248/1.524	0.7248/1.524
TP, TPD 100-390/2	DN 100	DN 100	221/443	247/495	244/493	270/545	0.7248/1.524	0.7248/1.524
TP, TPD 100-480/2	DN 100	DN 100	384/771	-	425/828	-	0.797/1.800	-

★ The dimension before the slash applies to the single-head pump, and the dimension after the slash applies to the twin-head pump.

TP, TPD, TPE, TPED, 4-pole, PN 6, 10, 16

Pump type	Connection		Weights				Shipping volume [m ³]★	
	D1 _D	D1 _S	Net [kg]★		Gross [kg]★		TP/TPD	TPE/TPED
			TP/TPD	TPE/TPED	TP/TPD	TPE/TPED		
TP, TPD 32-30/4	DN 32	DN 32	15/30	20/36	16/31	23/40	0.036/0.072	0.064/0.151
TP, TPD 32-40/4	DN 32	DN 32	25/32	28/52	28/33	31/56	0.064/0.072	0.064/0.151
TP, TPD 32-60/4	DN 32	DN 32	25/50	28/52	28/53	31/56	0.036/0.082	0.064/0.151
TP, TPD 32-80/4	DN 32	DN 32	35/69	35/72	40/86	47/90	0.138/0.3912	0.184/0.3912
TP, TPD 32-100/4	DN 32	DN 32	36/71	36/73	41/88	48/90	0.138/0.3912	0.184/0.3912
TP, TPD 32-120/4	DN 32	DN 32	49/94	49/97	55/110	62/114	0.1632/0.3912	0.2176/0.3912
TP, TPD 40-30/4	DN 40	DN 40	17/33	22/39	18/34	25/42	0.036/0.072	0.064/0.151
TP 40-60/4	DN 40	DN 40	22/42	26/-	23/43	29/-	0.036/0.072	0.064/-
TP, TPD 40-90/4	DN 40	DN 40	28/50	31/47	32/56	35/52	0.076/0.151	0.076/0.151
TP, TPD 40-100/4	DN 40	DN 40	41/83	43/86	45/99	55/104	0.138/0.3912	0.184/0.3912
TP, TPD 40-110/4	DN 40	DN 40	48/101	58/120	54/117	71/137	0.1632/0.3912	0.184/0.3912
TP, TPD 40-140/4	DN 40	DN 40	54/113	53/109	60/129	60/128	0.2176/0.3912	0.2176/0.3912
TP, TPD 50-30/4	DN 50	DN 50	24/46	29/49	25/48	32/53	0.036/0.072	0.064/0.151
TP, TPD 50-60/4	DN 50	DN 50	25/50	27/54	26/52	29/59	0.056/0.072	0.056/0.072
TP, TPD 50-90/4	DN 50	DN 50	43/87	45/90	47/103	57/107	0.138/0.3912	0.184/0.3912
TP, TPD 50-80/4	DN 50	DN 50	55/116	66/137	61/135	79/167	0.1632/0.5184	0.2176/0.5184
TP, TPD 50-120/4	DN 50	DN 50	61/128	61/127	67/147	68/145	0.1632/0.5184	0.2176/0.5184
TP, TPD 50-140/4	DN 50	DN 50	64/133	73/151	70/152	80/170	0.2176/0.5184	0.2176/0.5184
TP, TPD 50-190/4	DN 50	DN 50	69/142	83/171	75/162	90/190	0.2176/0.5184	0.2176/0.5184
TP, TPD 50-230/4	DN 50	DN 50	80/165	80/165	87/181	87/184	0.2176/0.5184	0.2176/0.5184
TP, TPD 65-30/4	DN 65	DN 65	33/56	36/60	35/59	40/63	0.056/0.140	0.064/0.151
TP, TPD 65-60/4	DN 65	DN 65	33/63	37/70	34/66	39/80	0.056/0.140	0.056/0.140
TP, TPD 65-90/4	DN 65	DN 65	46/92	57/115	51/109	69/132	0.1632/0.3912	0.184/0.3912
TP, TPD 65-110/4	DN 65	DN 65	63/134	63/133	69/150	69/152	0.2176/0.3912	0.2176/0.4584
TP, TPD 65-130/4	DN 65	DN 65	65/138	75/158	71/155	82/176	0.2176/0.3912	0.2176/0.4584
TP, TPD 65-150/4	DN 65	DN 65	70/160	84/177	76/166	91/195	0.2176/0.4584	0.2176/0.5184
TP, TPD 65-170/4	DN 65	DN 65	81/171	81/171	87/188	88/189	0.2176/0.4584	0.2176/0.5184
TP, TPD 65-240/4	DN 65	DN 65	80/169	101/210	87/186	108/229	0.2176/0.4584	0.2176/0.5184
TP, TPD 80-30/4	DN 80	DN 80	37/68	40/70	39/71	43/74	0.056/0.140	0.064/0.151
TP, TPD 80-60/4	DN 80	DN 80	37/70	50/95	39/72	53/100	0.066/0.140	0.091/0.370
TP, TPD 80-70/4	DN 80	DN 80	67/141	63/134	80/159	76/151	0.2176/0.3912	0.2176/0.4584
TP, TPD 80-90/4	DN 80	DN 80	70/148	75/158	83/165	88/175	0.2176/0.4584	0.2176/0.4584
TP, TPD 80-110/4	DN 80	DN 80	73/153	84/176	86/170	98/206	0.2176/0.4584	0.2176/0.5184
TP, TPD 80-150/4	DN 80	DN 80	88/172	87/171	102/192	101/201	0.2176/0.5184	0.2176/0.6507
TP, TPD 80-170/4	DN 80	DN 80	101/199	106/209	115/218	120/239	0.2176/0.5184	0.7248/0.6507
TP, TPD 80-240/4	DN 80	DN 80	194/393	180/366	218/443	204/417	0.9696/1.524	0.9696/1.524
TP, TPD 80-270/4	DN 80	DN 80	205/415	205/416	229/465	230/466	0.9696/1.524	0.9696/1.524
TP, TPD 80-340/4	DN 80	DN 80	239/484	233/472	263/534	258/522	0.9696/1.524	0.9696/1.524

Pump type	Connection		Weights				Shipping volume [m ³]*	
	D1 _D	D1 _S	Net [kg]*		Gross [kg]*		TP/TPD	TPE/TPED
			TP/TPD	TPE/TPED	TP/TPD	TPE/TPED		
TP, TPD 100-30/4	DN 100	DN 100	41/85	-	44/90	-	0.140/0.213	-
TP, TPD 100-60/4	DN 100	DN 100	52/107	52/100	55/113	56/105	0.140/0.213	0.120/0.370
TP, TPD 100-70/4	DN 100	DN 100	95/191	100/201	109/208	114/251	0.7248/0.6507	0.7248/0.6507
TP, TPD 100-90/4	DN 100	DN 100	97/196	109/218	122/246	133/268	0.7248/0.6507	0.7248/0.6507
TP, TPD 100-110/4	DN 100	DN 100	107/215	106/213	131/265	130/264	0.7248/0.6507	0.7248/0.6507
TP, TPD 100-130/4	DN 100	DN 100	139/282	144/292	164/332	169/342	0.7248/1.524	0.7248/1.524
TP, TPD 100-170/4	DN 100	DN 100	168/340	155/313	192/390	189/364	0.7248/1.524	0.7248/1.524
TP, TPD 100-200/4	DN 100	DN 100	239/499	240/500	264/549	290/550	0.9696/1.524	0.9696/1.524
TP, TPD 100-250/4	DN 100	DN 100	274/568	268/556	298/618	318/606	0.9696/1.524	0.9696/1.524
TP, TPD 100-330/4	DN 100	DN 100	285/589	291/601	309/640	341/652	0.9696/1.524	0.9696/1.524
TP, TPD 100-370/4	DN 100	DN 100	370/759	330/679	412/810	380/730	0.9696/1.524	0.9696/1.800
TP, TPD 100-410/4	DN 100	DN 100	380/781	-	422/831	-	0.9696/1.800	-
TP 125-70/4	DN 125	DN 125	125/-	131/-	144/-	150/-	0.969/-	0.969/-
TP 125-90/4	DN 125	DN 125	129/-	133/-	148/-	152/-	0.969/-	0.969/-
TP 125-100/4	DN 125	DN 125	144/-	148/-	163/-	167/-	0.969/-	0.969/-
TPD 125-110/4	DN 125	DN 125	-/393	-/403	-/443	-/453	-/1.524	-/1.524
TP, TPD 125-130/4	DN 125	DN 125	212/450	198/400	242/501	249/474	0.9696/1.524	0.9696/1.524
TP, TPD 125-160/4	DN 125	DN 125	222/471	223/472	252/522	273/523	0.9696/1.524	0.9696/1.524
TP, TPD 125-190/4	DN 125	DN 125	288/604	282/592	318/654	332/642	0.9696/1.524	0.9696/1.524
TP, TPD 125-230/4	DN 125	DN 125	298/623	304/635	348/674	354/686	0.9696/1.800	0.9696/1.524
TP, TPD 125-300/4	DN 125	DN 125	394/795	354/715	451/853	424/766	0.9696/1.800	0.9696/1.524
TP, TPD 125-340/4	DN 125	DN 125	404/817	-	462/874	-	0.9696/1.800	-
TP, TPD 125-400/4	DN 125	DN 125	500/1008	-	557/1065	-	1.800/1.800	-
TP 150-100/4	DN 150	DN 150	198/-	208/-	371/-	381/-	2.3/-	2.3/-
TPD 150-130/4	DN 150	DN 150	-/574	-/575	-/624	-/625	-/1.524	-/1.524
TP 150-140/4	DN 150	DN 150	213/-	221/-	386/-	394/-	2.3/-	2.3/-
TP 150-150/4	DN 150	DN 150	235/-	254/-	408/-	427/-	2.3/-	2.3/-
TPD 150-160/4	DN 150	DN 150	-/643	-/631	-/693	-/681	-/1.524	-/1.524
TP, TPD 150-200/4	DN 150	DN 150	330/663	336/675	380/714	386/756	0.9696/1.800	0.9696/1.800
TP, TPD 150-220/4	DN 150	DN 150	415/833	375/753	472/891	425/804	0.9696/1.800	0.9696/1.800
TP, TPD 150-250/4	DN 150	DN 150	426/854	-	483/912	-	0.9696/1.800	-
TP 150-260/4	DN 150	DN 150	424/-	388/-	592/-	561/-	2.3/-	2.3/-
TP 150-280/4	DN 150	DN 150	445/-	-	689/-	-	2.3/-	-
TP 150-340/4	DN 150	DN 150	502/-	-	672/-	-	2.3/-	-
TP 150-390/4	DN 150	DN 150	550/-	-	719/-	-	2.3/-	-
TP 150-450/4	DN 150	DN 150	672/-	-	870/-	-	3.1/-	-
TP 150-520/4	DN 150	DN 150	827/-	-	1025/-	-	3.1/-	-
TP 150-660/4	DN 150	DN 150	942/-	-	1140/-	-	3.1/-	-
TP 200-50/4	DN 200	DN 200	272/-	276/-	445/-	449/-	2.3/-	2.3/-
TP 200-70/4	DN 200	DN 200	279/-	289/-	452/-	462/-	2.3/-	2.3/-
TP 200-90/4	DN 200	DN 200	294/-	302/-	467/-	475/-	2.3/-	2.3/-
TP 200-130/4	DN 200	DN 200	343/-	362/-	516/-	535/-	2.3/-	2.3/-
TP 200-150/4	DN 200	DN 200	369/-	388/-	542/-	561/-	2.3/-	2.3/-
TP 200-160/4	DN 200	DN 200	336/-	355/-	509/-	528/-	2.3/-	2.3/-
TP 200-190/4	DN 200	DN 200	394/-	358/-	567/-	532/-	2.3/-	2.3/-
TP 200-200/4	DN 200	DN 200	409/-	-	587/-	-	2.3/-	-
TP 200-240/4	DN 200	DN 200	520/-	-	718/-	-	3.1/-	-
TP 200-270/4	DN 200	DN 200	671/-	-	840/-	-	2.3/-	-
TP 200-290/4	DN 200	DN 200	588/-	-	786/-	-	3.1/-	-
TP 200-320/4	DN 200	DN 200	797/-	-	996/-	-	3.1/-	-
TP 200-330/4	DN 200	DN 200	730/-	-	933/-	-	3.1/-	-
TP 200-360/4	DN 200	DN 200	766/-	-	969/-	-	3.1/-	-
TP 200-400/4	DN 200	DN 200	891/-	-	1090/-	-	3.1/-	-
TP 200-410/4	DN 200	DN 200	950/-	-	1148/-	-	3.1/-	-
TP 200-470/4	DN 200	DN 200	1044/-	-	1243/-	-	3.1/-	-
TP 200-530/4	DN 200	DN 200	1146/-	-	1379/-	-	4.6/-	-
TP 200-590/4	DN 200	DN 200	1311/-	-	1543/-	-	4.6/-	-
TP 200-660/4	DN 200	DN 200	1513/-	-	1745/-	-	4.6/-	-
TP 250-280/4	DN 250	DN 300	695/-	-	880/-	-	3.13/-	-
TP 250-310/4	DN 250	DN 300	800/-	-	985/-	-	3.13/-	-
TP 250-390/4	DN 250	DN 300	950/-	-	1135/-	-	3.13/-	-

* The dimension before the slash applies to the single-head pump, and the dimension after the slash applies to the twin-head pump.

TP, TPD, 6-pole, PN 6, 10, 16

Pump type	Connection		Weights				Shipping volume [m³] ★	
	D1 _D	D1 _S	Net [kg] ★		Gross [kg] ★			
			TP/TPD	TPE/TPED	TP/TPD	TPE/TPED	TP/TPD	TPE/TPED
TP, TPD 125-60/6	DN 125	DN 125	158/343	-	188/393	-	0.9696/1.524	-
TP, TPD 125-70/6	DN 125	DN 125	164/355	-	194/405	-	0.9696/1.524	-
TP, TPD 125-80/6	DN 125	DN 125	228/479	-	258/529	-	0.9696/1.524	-
TP, TPD 125-100/6	DN 125	DN 125	235/492	-	265/543	-	0.9696/1.524	-
TP, TPD 125-130/6	DN 125	DN 125	246/500	-	276/550	-	0.9696/1.524	-
TP, TPD 125-160/6	DN 125	DN 125	284/575	-	314/626	-	0.9696/1.524	-
TP, TPD 150-60/6	DN 150	DN 150	227/457	-	257/508	-	0.9696/1.524	-
TP, TPD 150-70/6	DN 150	DN 150	261/524	-	291/574	-	0.9696/1.524	-
TP, TPD 150-90/6	DN 150	DN 150	267/538	-	297/588	-	0.9696/1.524	-
TP, TPD 150-110/6	DN 150	DN 150	267/538	-	297/588	-	0.9696/1.524	-

★ The dimension before the slash applies to the single-head pump, and the dimension after the slash applies to the twin-head pump.

TP, 2-pole, PN 25

Pump type	Connection		Weights		Shipping volume [m ³]
	D1 _D	D1 _S	Net [kg]	Gross [kg]	
TP 100-620/2	DN 100	DN 125	425	580	2.29
TP 100-700/2	DN 100	DN 125	475	630	2.29
TP 100-820/2	DN 100	DN 125	580	735	2.29
TP 100-960/2	DN 100	DN 125	675	850	3.13
TP 100-1050/2	DN 100	DN 125	730	915	3.13
TP 100-1180/2	DN 100	DN 125	835	1020	3.13
TP 100-1400/2	DN 100	DN 125	995	1185	3.13
TP 100-1530/2	DN 100	DN 125	1125	1310	3.13
TP 100-1680/2	DN 100	DN 125	1225	1445	4.57

TP, 4-pole, PN 25

Pump type	Connection		Weights		Shipping volume [m ³]
	D1 _D	D1 _S	Net [kg]	Gross [kg]	
TP 100-190/4	DN 100	DN 125	227	257	0.72
TP 100-220/4	DN 100	DN 125	237	267	0.72
TP 100-260/4	DN 100	DN 125	260	290	0.72
TP 100-270/4	DN 100	DN 125	325	358	0.70
TP 100-320/4	DN 100	DN 125	344	377	0.70
TP 100-380/4	DN 100	DN 125	419	452	0.70
TP 100-420/4	DN 100	DN 125	439	472	0.70
TP 125-150/4	DN 125	DN 150	257	290	0.70
TP 125-200/4	DN 125	DN 150	280	313	0.70
TP 125-240/4	DN 125	DN 150	299	332	0.70
TP 125-280/4	DN 125	DN 150	299	332	0.70
TP 125-310/4	DN 125	DN 150	439	472	0.70
TP 125-370/4	DN 125	DN 150	464	492	0.70
TP 125-430/4	DN 125	DN 150	509	664	2.29
TP 1/4	DN 150	DN 200	479	634	2.29
TP 150-270/4	DN 150	DN 200	499	654	2.29
TP 150-320/4	DN 150	DN 200	549	704	2.29
TP 150-350/4	DN 150	DN 200	585	740	2.29
TP 150-430/4	DN 150	DN 200	660	815	2.29
TP 150-530/4	DN 150	DN 200	765	950	3.13
TP 150-650/4	DN 150	DN 200	915	1100	3.13
TP 200-260/4	DN 200	DN 250	604	759	2.29
TP 200-280/4	DN 200	DN 250	640	795	2.29
TP 200-380/4	DN 200	DN 250	675	830	2.29
TP 200-420/4	DN 200	DN 250	780	965	3.13
TP 200-450/4	DN 200	DN 250	840	1025	3.13
TP 200-510/4	DN 200	DN 250	960	1,145	3.13
TP 200-560/4	DN 200	DN 250	1,090	1,275	3.13
TP 200-620/4	DN 200	DN 250	1,190	1,410	4.57
TP 250-270/4	DN 250	DN 300	785	970	3.13
TP 250-320/4	DN 250	DN 300	890	1,075	3.13
TP 250-370/4	DN 250	DN 300	1,040	1,225	3.13
TP 250-490/4	DN 250	DN 300	1,240	1,460	4.57
TP 250-540/4	DN 250	DN 300	1,340	1,560	4.57
TP 250-600/4	DN 250	DN 300	1,540	1,760	4.57
TP 250-660/4	DN 250	DN 300	1,575	1,895	4.57
TP 300-590/4	DN 300	DN 350	1,855	2,165	5.88
TP 300-670/4	DN 300	DN 350	1,900	2,210	5.88
TP 300-750/4	DN 300	DN 350	2,110	2,420	5.88
TP 400-470/4	DN 400	DN 500	3,680	4,120	10.76
TP 400-510/4	DN 400	DN 500	4,200	4,640	10.76
TP 400-540/4	DN 400	DN 500	4,200	4,640	10.76
TP 400-670/4	DN 400	DN 500	4,400	4,840	10.76
TP 400-720/4	DN 400	DN 500	5,000	5,440	10.76
TP 400-760/4	DN 400	DN 500	5,200	5,640	10.76

29. Minimum efficiency index

Minimum efficiency index (MEI) means the dimensionless scale unit for hydraulic pump efficiency at best efficiency point (BEP), part load (PL) and overload (OL). The Commission Regulation (EU) sets efficiency requirements to $MEI \geq 0.10$ as from 1 January 2013 and $MEI \geq 0.40$ as from 1 January 2015. An indicative benchmark for best-performing water pump available on the market as from 1 January 2013 is determined in the Regulation.

- The benchmark for most efficient water pumps is $MEI \geq 0.70$.
- 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>.

TP, TPD, TPE, TPED, 2-pole, PN 6, 10, 16

TP Series 100, 2-pole	P2 [kW]	Nominal impeller size / actual impeller size	Trimmed impeller	Max. impeller	MEI
TP, TPE 25-50/2 R	0.12			•	*
TP, TPE 25-80/2 R	0.18			•	≥ 0.55
TP, TPE 25-90/2 R	0.37			•	≥ 0.70
TP, TPE 32-50/2 R	0.12			•	*
TP, TPE 32-80/2 R	0.25			•	≥ 0.70
TP, TPE 32-90/2 R	0.37			•	≥ 0.70
TP, TPE 40-50/2	0.12			•	*
TP, TPE 40-80/2	0.25			•	≥ 0.70
TP, TPE 40-90/2	0.37			•	≥ 0.70

* Not in MEI classification because flow at best efficiency point is less than 6 m³/h.

TP Series 200, 2-pole	P2 [kW]	Nominal impeller size / actual impeller size	Trimmed impeller	Max. impeller	MEI
TP, TPD, TPE, TPED 32-60/2	0.25			•	≥ 0.56
TP, TPD, TPE, TPED 32-120/2	0.37			•	≥ 0.40
TP, TPD, TPE, TPED 32-150/2	0.37	32-136 / 111	•		
TP, TPD, TPE, TPED 32-180/2	0.55	32-136 / 118	•		≥ 0.64
TP, TPD, TPE, TPED 32-230/2	0.75	32-136 / 136		•	
TP, TPD, TPE, TPED 40-60/2	0.25			•	≥ 0.70
TP, TPD, TPE, TPED 40-120/2	0.37			•	≥ 0.70
TP, TPE 40-180/2	0.55			•	≥ 0.70
TP, TPD, TPE, TPED 40-190/2	0.75			•	≥ 0.44
TP, TPD, TPE, TPED 40-230/2	1.1			•	≥ 0.61
TP, TPD, TPE, TPED 40-270/2	1.5			•	≥ 0.70
TP, TPD, TPE, TPED 50-60/2	0.37			•	≥ 0.60
TP, TPD, TPE, TPED 50-120/2	0.75			•	≥ 0.45
TP, TPD, TPE, TPED 50-180/2	0.75			•	≥ 0.70
TP, TPD, TPE, TPED 65-60/2	0.55			•	≥ 0.70
TP, TPD, TPE, TPED 65-120/2	1.1			•	≥ 0.59
TP, TPD, TPE, TPED 65-180/2	1.5			•	≥ 0.70
TP, TPD, TPE, TPED 80-120/2	1.5			•	≥ 0.70
TP, TPD, TPE, TPED 100-120/2	2.2			•	≥ 0.70

TP Series 300, 2-pole	P2 [kW]	Nominal impeller size / actual impeller size	Trimmed impeller	Max. impeller	MEI
TP, TPD, TPE, TPED 32-200/2	1.1	32-160.1 / 129	•		≥ 0.70
TP, TPD, TPE, TPED 32-250/2	1.5	32-160.1 / 140	•		
TP, TPD, TPE, TPED 32-320/2	2.2	32-160.1 / 155	•		
TP, TPD, TPE, TPED 32-380/2	3	32-160.1 / 169		•	≥ 0.50
TP, TPD, TPE, TPED 32-460/2	4	32-200.1 / 188	•		
TP, TPD, TPE, TPED 32-580/2	5.5	32-200.1 / 205		•	
TP, TPD, TPE, TPED 40-240/2	2.2	32-160 / 137	•		≥ 0.52
TP, TPD, TPE, TPED 40-300/2	3	32-160 / 151	•		
TP, TPD, TPE, TPED 40-360/2	4	32-160 / 163		•	
TP, TPD, TPE, TPED 40-430/2	5.5	32-200 / 186	•		≥ 0.70
TP, TPD, TPE, TPED 40-530/2	7.5	32-200 / 202	•		
TP, TPD, TPE, TPED 40-630/2	11	32-200 / 219		•	
TP, TPD, TPE, TPED 50-160/2	1.1	32-125 / 110	•		≥ 0.70
TP, TPD, TPE, TPED 50-190/2	1.5	32-125 / 120	•		
TP, TPD, TPE, TPED 50-240/2	2.2	32-125 / 130	•		
TP, TPD, TPE, TPED 50-290/2	3	32-125 / 142		•	≥ 0.70
TP, TPD, TPE, TPED 50-360/2	4	32-160 / 163	•		
TP, TPD, TPE, TPED 50-430/2	5.5	32-160 / 177		•	
TP, TPD, TPE, TPED 50-420/2	7.5	40-200 / 187	•		≥ 0.57
TP, TPD, TPE, TPED 50-540/2	11	40-200 / 207	•		
TP, TPD, TPE, TPED 50-630/2	15	40-200 / 210		•	
TP, TPD, TPE, TPED 50-710/2	15	40-250 / 230	•		≥ 0.70
TP, TPD, TPE, TPED 50-830/2	18.5	40-250 / 245	•		
TP, TPD, TPE, TPED 50-900/2	22	40-250 / 255		•	
TP, TPD, TPE, TPED 65-170/2	2.2	40-125 / 116	•		≥ 0.70
TP, TPD, TPE, TPED 65-210/2	3	40-125 / 127	•		
TP, TPD, TPE, TPED 65-250/2	4	40-125 / 138		•	
TP, TPD, TPE, TPED 65-340/2	5.5	40-160 / 158	•		≥ 0.70
TP, TPD, TPE, TPED 65-410/2	7.5	40-160 / 172		•	
TP, TPD, TPE, TPED 65-460/2	11	50-200 / 185	•		
TP, TPD, TPE, TPED 65-550/2	15	50-200 / 200	•		≥ 0.53
TP, TPD, TPE, TPED 65-660/2	18.5	50-200 / 219		•	
TP, TPD, TPE, TPED 65-720/2	22	50-250 / 230	•		
TP, TPD 65-930/2	30	50-250 / 257		•	≥ 0.69
TP, TPD, TPE, TPED 80-140/2	2.2	50-125 / 105	•		
TP, TPD, TPE, TPED 80-180/2	3	50-125 / 115	•		
TP, TPD, TPE, TPED 80-210/2	4	50-125 / 125	•		≥ 0.68
TP, TPD, TPE, TPED 80-240/2	5.5	50-125 / 135		•	
TP, TPD, TPE, TPED 80-250/2	7.5	65-160 / 145	•		
TP, TPD, TPE, TPED 80-330/2	11	65-160 / 157	•		≥ 0.70
TP, TPD, TPE, TPED 80-400/2	15	65-160 / 173		•	
TP, TPD, TPE, TPED 80-520/2	18.5	65-200 / 190	•		
TP, TPD, TPE, TPED 80-570/2	22	65-200 / 200	•		≥ 0.65
TP, TPD 80-700/2	30	65-200 / 219		•	
TP, TPD, TPE, TPED 100-160/2	4	65-125 / 120-110	•		
TP, TPD, TPE, TPED 100-200/2	5.5	65-125 / 127	•		≥ 0.70
TP, TPD, TPE, TPED 100-240/2	7.5	65-125 / 137		•	
TP, TPD, TPE, TPED 100-250/2	11	80-160 / 147-127	•		
TP, TPD, TPE, TPED 100-310/2	15	80-160 / 153	•		≥ 0.65
TP, TPD, TPE, TPED 100-360/2	18.5	80-160 / 163	•		
TP, TPD, TPE, TPED 100-390/2	22	80-160 / 169		•	
TP, TPD 100-480/2	30	80-200 / 200		•	

TP, TPD, TPE, TPED, 4-pole, PN 6, 10, 16

TP Series 200, 4-pole	P2 [kW]	Nominal impeller size / actual impeller size	Trimmed impeller	Max. impeller	MEI
TP, TPD, TPE, TPED 32-30/4	0.12		•	•	*
TP, TPD, TPE, TPED 32-40/4	0.25		•	•	*
TP, TPD, TPE, TPED 32-60/4	0.25		•	•	*
TP, TPD, TPE, TPED 40-30/4	0.12		•	•	≥ 0.70
TP, TPE 40-60/4	0.25		•	•	≥ 0.70
TP, TPD, TPE, TPED 40-90/4	0.25		•	•	≥ 0.70
TP, TPD, TPE, TPED 50-30/4	0.25		•	•	≥ 0.70
TP, TPD, TPE, TPED 50-60/4	0.37		•	•	≥ 0.70
TP, TPD, TPE, TPED 65-30/4	0.25		•	•	≥ 0.70
TP, TPD, TPE, TPED 65-60/4	0.55		•	•	≥ 0.70
TP, TPD, TPE, TPED 80-30/4	0.37		•	•	≥ 0.70
TP, TPD, TPE, TPED 80-60/4	0.75		•	•	≥ 0.70
TP, TPD, TPE, TPED 100-30/4	0.55		•	•	≥ 0.45
TP, TPD, TPE, TPED 100-60/4	1.1		•	•	≥ 0.70

* Not in MEI classification because flow at best efficiency point is less than 6 m³/h.

TP Series 300, 4-pole	P2 [kW]	Nominal impeller size / actual impeller size	Trimmed impeller	Max. impeller	MEI
TP, TPD, TPE, TPED 32-80/4	0.25	32-160.1 / 152	•	•	≥ 0.70
TP, TPD, TPE, TPED 32-100/4	0.37	32-160.1 / 169	•	•	≥ 0.69
TP, TPD, TPE, TPED 32-120/4	0.55	32-200.1 / 196	•	•	≥ 0.40
TP, TPD, TPE, TPED 40-100/4	0.55	32-160 / 169	•	•	≥ 0.70
TP, TPD, TPE, TPED 40-110/4	0.75	32-200 / 194	•	•	≥ 0.50
TP, TPD, TPE, TPED 40-140/4	1.1	32-200 / 212	•	•	≥ 0.70
TP, TPD, TPE, TPED 50-90/4	0.55	32-160 / 169	•	•	≥ 0.70
TP, TPD, TPE, TPED 50-80/4	0.75	40-200 / 176	•	•	≥ 0.70
TP, TPD, TPE, TPED 50-120/4	1.1	40-200 / 198	•	•	≥ 0.70
TP, TPD, TPE, TPED 50-140/4	1.5	40-200 / 215	•	•	≥ 0.70
TP, TPD, TPE, TPED 50-190/4	2.2	40-250 / 240	•	•	≥ 0.70
TP, TPD, TPE, TPED 50-230/4	3	40-250 / 260	•	•	≥ 0.70
TP, TPD, TPE, TPED 65-90/4	0.75	40-160 / 166	•	•	≥ 0.70
TP, TPD, TPE, TPED 65-110/4	1.1	50-200 / 180	•	•	≥ 0.70
TP, TPD, TPE, TPED 65-130/4	1.5	50-200 / 190	•	•	≥ 0.70
TP, TPD, TPE, TPED 65-150/4	2.2	50-200 / 210	•	•	≥ 0.70
TP, TPD, TPE, TPED 65-170/4	3	50-200 / 219	•	•	≥ 0.70
TP, TPD, TPE, TPED 65-240/4	4	50-250 / 263	•	•	≥ 0.68
TP, TPD, TPE, TPED 80-70/4	1.1	65-160 / 149	•	•	≥ 0.70
TP, TPD, TPE, TPED 80-90/4	1.5	65-160 / 165	•	•	≥ 0.70
TP, TPD, TPE, TPED 80-110/4	2.2	65-160 / 177	•	•	≥ 0.70
TP, TPD, TPE, TPED 80-150/4	3	65-200 / 205	•	•	≥ 0.70
TP, TPD, TPE, TPED 80-170/4	4	65-200 / 219	•	•	≥ 0.60
TP, TPD, TPE, TPED 80-240/4	5.5	65-250 / 263	•	•	≥ 0.70
TP, TPD, TPE, TPED 80-270/4	7.5	65-315 / 279	•	•	≥ 0.70
TP, TPD, TPE, TPED 80-340/4	11	65-315 / 309	•	•	≥ 0.70
TP, TPD 100-70/4	1.5	80-160 / 151-133	•	•	≥ 0.70
TP, TPD 100-90/4	2.2	80-160 / 161	•	•	≥ 0.70
TP, TPD, TPE, TPED 100-110/4	3	80-160 / 175	•	•	≥ 0.70
TP, TPD, TPE, TPED 100-130/4	4	80-200 / 200	•	•	≥ 0.70
TP, TPD, TPE, TPED 100-170/4	5.5	80-200 / 222	•	•	≥ 0.45
TP, TPD, TPE, TPED 100-200/4	7.5	80-250 / 240	•	•	≥ 0.69
TP, TPD, TPE, TPED 100-250/4	11	80-250 / 270	•	•	≥ 0.70
TP, TPD, TPE, TPED 100-330/4	15	80-315 / 299	•	•	≥ 0.70
TP, TPD, TPE, TPED 100-370/4	18.5	80-315 / 320	•	•	≥ 0.70
TP, TPD 100-410/4	22	80-315 / 334	•	•	≥ 0.70
TP, TPE 125-70/4	2.2	100-160 / 160-144	•	•	≥ 0.70
TP, TPE 125-90/4	3	100-160 / 168	•	•	≥ 0.70
TP, TPE 125-100/4	4	100-160 / 176	•	•	≥ 0.70
TP, TPD, TPED 125-110/4	4	100-200 / 180	•	•	≥ 0.46
TP, TPD, TPED 125-130/4	5.5	100-200 / 197	•	•	≥ 0.70
TP, TPD, TPED 125-160/4	7.5	100-200 / 211	•	•	≥ 0.70
TP, TPD, TPE, TPED 125-190/4	11	100-250 / 240	•	•	≥ 0.70
TP, TPD, TPE, TPED 125-230/4	15	100-250 / 269	•	•	≥ 0.70
TP, TPD, TPE, TPED 125-300/4	18.5	100-315 / 295	•	•	≥ 0.70
TP, TPD 125-340/4	22	100-315 / 312	•	•	≥ 0.70
TP, TPD 125-400/4	30	100-315 / 334	•	•	≥ 0.70

TP Series 300, 4-pole	P2 [kW]	Nominal impeller size / actual impeller size	Trimmed impeller	Max. impeller	MEI
TP, TPD, TPE, TPED 150-130/4	7.5	125-250 / 198	•		≥ 0.65
TP, TPD, TPE, TPED 150-160/4	11	125-250 / 220	•		
TP, TPD, TPE, TPED 150-200/4	15	125-250 / 243	•		
TP, TPD, TPE, TPED 150-220/4	18.5	125-250 / 256	•		
TP, TPD 150-250/4	22	125-250 / 266		•	
TP, TPE 150-100/4	5.5	125-200 / 196-172	•		≥ 0.62
TP, TPE 150-140/4	7.5	125-200 / 202	•		
TP, TPE 150-150/4	11	125-200 / 225		•	
TP, TPE 150-260/4	18.5	125-315 / 275	•		
TP 150-280/4	22	125-315 / 290	•		≥ 0.70
TP 150-340/4	30	125-315 / 315	•		
TP 150-390/4	37	125-315 / 333		•	
TP 150-450/4	45	125-400 / 358	•		≥ 0.70
TP 150-520/4	55	125-400 / 382	•		
TP 150-660/4	75	125-400 / 432		•	
TP 200-50/4	4	150-200 / 192-121	•		≥ 0.70
TP 200-70/4	5.5	150-200 / 200-130	•		
TP 200-90/4	75	150-200 / 210-156	•		
TP 200-130/4	11	150-200 / 218-210	•		
TP 200-150/4	15	150-200 / 224		•	
TP 200-160/4	15	150-250 / 226-220	•		≥ 0.70
TP 200-190/4	18.5	150-250 / 236	•		
TP 200-200/4	22	150-250 / 248	•		
TP 200-240/4	30	150-250 / 272	•		
TP 200-290/4	37	150-250 / 285		•	
TP 200-180/4	22	150-315 / 245	•		≥ 0.70
TP 200-220/4	30	150-315 / 264	•		
TP 200-250/4	37	150-315 / 278	•		
TP 200-270/4	45	150-315 / 293	•		
TP 200-320/4	55	150-315 / 311		•	
TP 200-410/4	75	150-315 / 338		•	≥ 0.70
TP 200-330/4	37	150-400 / 310	•		
TP 200-360/4	45	150-400 / 326	•		
TP 200-400/4	55	150-400 / 343	•		
TP 200-470/4	75	150-400 / 373	•		
TP 200-530/4	90	150-400 / 391	•		≥ 0.70
TP 200-590/4	110	150-400 / 412	•		
TP 200-660/4	132	150-400 / 432		•	
TP Series 400, 4-pole, PN 10	P2 [kW]	Nominal impeller size / actual impeller size	Trimmed impeller	Max. impeller	MEI
TP 250-280/4	45	250-350 / 294-302	•		≥ 0.48
TP 250-310/4	55	250-350 / 326-316	•		
TP 250-390/4	75	250-350 / 350-342		•	

TP, TPD, 6-pole, PN 16

TP Series 300, 6-pole	P2 [kW]	Nominal impeller size / actual impeller size	Trimmed impeller	Max. 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

TP Series 400, PN 25	P2 [kW]	Nominal impeller size / actual impeller size	Trimmed impeller	Max. impeller	MEI
TP Series 400, PN 25	All				**

** Not in MEI classification because PN 25 is not a part of the MEI classification.

30. Accessories

Unions and valves

Cast-iron pumps

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 R	PN 10	Rp 3/4	529921
		Rp 1	529922
		Rp 1 1/4	529924
TP, TPE 32 R	PN 10	Rp 1	509921
		Rp 1 1/4	509922

A valve kit consists of two brass valves, two brass union nuts and two EPDM gaskets.

The valve housing is of pressure die-cast brass.

Pump type, valve connection	Pressure stage	Size	Product number
TP, TPE 25 R	PN 10	Rp 3/4	519805
		Rp 1	519806
		Rp 1 1/4	519807
TP, TPE 32 R	PN 10	Rp 1 1/4	505539

Bronze pumps

A union kit consists of two bronze union tails, two brass union nuts and two EPDM gaskets.

The valve housing is of pressure die-cast brass.

Pump type, union connection	Pressure stage	Size	Product number
TP, TPE 25 R B	PN 10	Rp 3/4	529971
		Rp 1	529972
TP, TPE 32 R B	PN 10	Rp 1 1/4	509971

A valve kit consists of two brass valves, two brass union nuts and two EPDM gaskets.

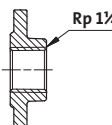
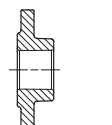
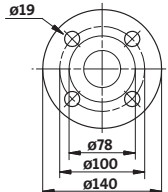
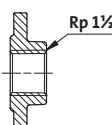
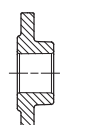
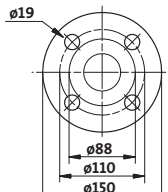
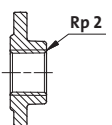
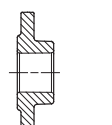
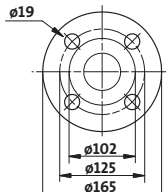
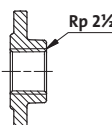
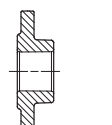
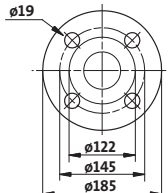
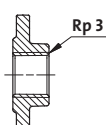
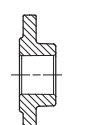
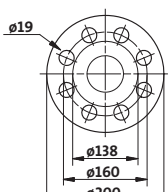
The valve housing is of pressure die-cast brass.

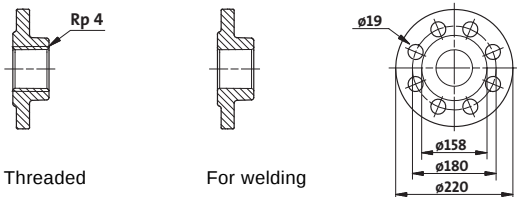
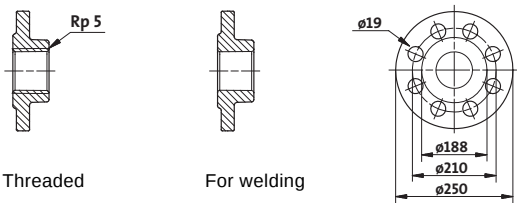
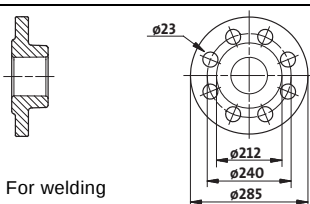
Pump type, valve connection	Pressure stage	Size	Product number
TP, TPE 25 R B	PN 10	Rp 3/4	519805
		Rp 1	519806
		Rp 1 1/4	519807
TP, TPE 32 R B	PN 10	Rp 1 1/4	505539

Counter-flanges

Cast-iron pumps

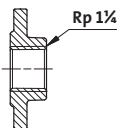
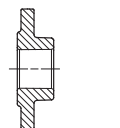
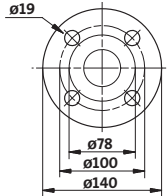
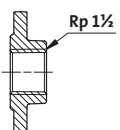
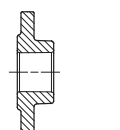
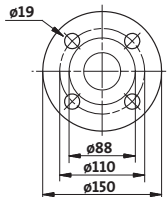
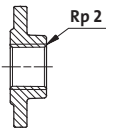
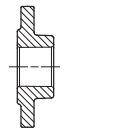
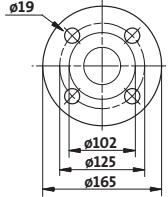
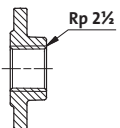
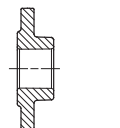
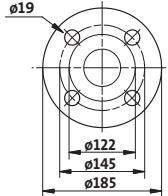
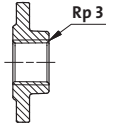
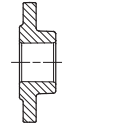
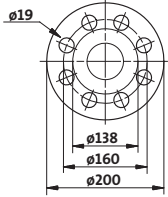
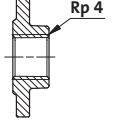
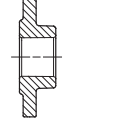
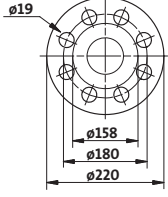
A flange kit consists of two steel flanges, two gaskets of asbestos-free material IT 200, and the requisite number of bolts.

Counter-flange	Pump type	Description	Rated pressure	Pipework connection	Product number
 Threaded  For welding  TM03 0478 5204	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
 Threaded  For welding  TM03 0479 5204	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
 Threaded  For welding  TM03 0480 5204	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
 Threaded  For welding  TM03 0481 5204	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
 Threaded  For welding  TM03 0482 5204	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

Counter-flange	Pump type	Description	Rated pressure	Pipework connection	Product number
 Threaded For welding	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	579801
		For welding	10 bar, EN 1092-2	100 mm, nominal	579802
		Threaded	16 bar, EN 1092-2	Rp 4	579801
		For welding	16 bar, EN 1092-2	100 mm, nominal	579802
 Threaded For welding	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
 For welding	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

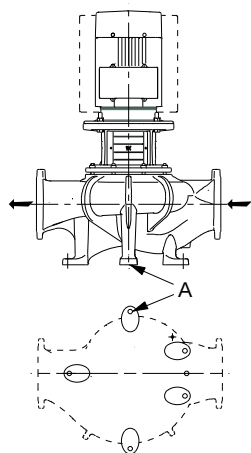
Bronze pumps

A flange kit consists of two bronze flanges, two gaskets of asbestos-free material IT 200, and the requisite number of bolts.

Counter-flange			Pump type	Description	Rated pressure	Pipework connection	Product number
 Threaded	 For welding	 TM03 0478 5204	TP, TPE 32 B	Threaded	10 bar, EN 1092-2	Rp 1 1/4	96427029
				For welding	10 bar, EN 1092-2	32 mm, nominal	96427030
				Threaded	16 bar, EN 1092-2	Rp 1 1/4	96427029
				For welding	16 bar, EN 1092-2	32 mm, nominal	96427030
 Threaded	 For welding	 TM03 0479 5204	TP, TPE 40 B	Threaded	10 bar, EN 1092-2	Rp 1 1/2	539711
				For welding	10 bar, EN 1092-2	40 mm, nominal	539712
				Threaded	16 bar, EN 1092-2	Rp 1 1/2	539711
				For welding	16 bar, EN 1092-2	40 mm, nominal	539712
 Threaded	 For welding	 TM03 0480 5204	TP, TPE 50 B	Threaded	10 bar, EN 1092-2	Rp 2	549811
				For welding	10 bar, EN 1092-2	50 mm, nominal	549812
 Threaded	 For welding	 TM03 0481 5204	TP, TPE 65 B	Threaded	10 bar, EN 1092-2	Rp 2 1/2	559811
				For welding	10 bar, EN 1092-2	65 mm, nominal	559812
 Threaded	 For welding	 TM03 0482 5204	TP, TPE 80 B	Threaded	6 bar, EN 1092-2	Rp 3	96405735
				For welding	6 bar, EN 1092-2	80 mm, nominal	569911
				Threaded	10 bar, EN 1092-2	Rp 3	569812
				For welding	10 bar, EN 1092-2	80 mm, nominal	569811
 Threaded	 For welding	 TM03 0485 5204	TP, TPE 100 B	Threaded	6 bar, EN 1092-2	Rp 4	96405737
				Threaded	10 bar, EN 1092-2	Rp 4	96405738

Base plates

Note: Base plates are supplied as standard with TP, TPD, TPE, TPED pumps with 11 kW motors and above. An exception from this are those pumps in the Series 300 range which are designed for foot mounting, see fig. 97.



TM06 1083 1614

Fig. 97 Principal sketch of a Series 300 pump designed with mounting feet (A)

TP, TPE Series 200

Pump type	Hexagon head screws	Product number
TP, TPE 32 TP, TPE 40 TP, TPE 50 TP 65-60/2 TP, TPE 65-120/2 TP 65-180/2	2 x M12 x 20 mm	96591246
TP 65-30/4 TP, TPE 65-60/4 TP, TPE 80 TP, TPE 100	2 x M16 x 30 mm	96591245

Drawing	Product number
	96591246 96591245
	TM00 9835 0497

TP, TPE Series 300

Pump type	Hexagon head screws	Product number
TP, TPE 32 TP, TPE 40 TP, TPE 50 TP, TPE 65 TP, TPE 80-xx/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	2 x M16 x 30 mm	00485031

Drawing	Product number
	00485031
	TM00 3755 2602

TP, TPE Series 300

Pump type	Hexagon head screws	Product number
TP, TPE 80-240/4 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, TPE 100-xx/4 TP, TPE 125-xx/4 TP, TPE 150-xx/4 TP, TPE 125-xx/6 TP, TPE 150-xx/6	2 x M16 x 30 mm	96536246

Drawing	Product number
	96536246
	TM02 8869 1004

TPD, TPED Series 300

Pump type	Hexagon head screws	Product number
TPD, TPED 32	4 x M16 x 30 mm	96489381
TPD, TPED 40		
TPD, TPED 50		
TPD, TPED 65		
TPD, TPED 80-xx/2		
TPD, TPED 80-70/4		
TPD, TPED 80-90/4		
TPD, TPED 80-110/4		
TPD, TPED 80-150/4		
TPD, TPED 80-170/4		
TPD, TPED 100-160/2		
TPD, TPED 100-200/2		
TPD, TPED 100-240/2		

Drawing	Product number
	96489381

TPD, TPED Series 300

Pump type	Hexagon head screws	Product number
TPD, TPED 100-250/2	4 x M16 x 30 mm	96536247
TPD, TPED 100-310/2		
TPD, TPED 100-360/2		
TPD, TPED 100-390/2		
TPD, TPED 100-70/4		
TPD, TPED 100-90/4		
TPD, TPED 100-110/4		
TPD, TPED 100-130/4		
TPD, TPED 100-170/4		

Drawing	Product number
	96536247

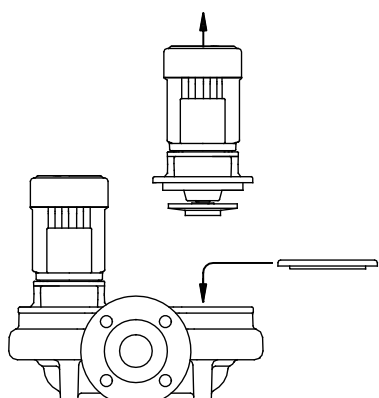
TPD, TPED Series 300

Pump type	Hexagon head screws	Product number
TPD, TPED 80-240/4	4 x M16 x 30 mm	96536248
TPD, TPED 80-270/4		
TPD, TPED 80-340/4		
TPD, TPED 100-200/4		
TPD, TPED 100-250/4		
TPD, TPED 100-330/4		
TPD, TPED 100-370/4		
TPD, TPED 100-410/4		
TPD, TPED 125-xx/4		
TPD, TPED 150-xx/4		

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.



TM00 6360 3495

Fig. 98 Blanking flange

TPD, TPED, 2-pole

Pump type	96591261	00565055	96495694	96495695	96495696	96525962	96525963	96525964
TPD, TPED 32-60/2	•							
TPD, TPED 32-120/2	•							
TPD, TPED 32-150/2		•						
TPD, TPED 32-180/2		•						
TPD, TPED 32-230/2		•						
TPD, TPED 32-200/2			•					
TPD, TPED 32-250/2			•					
TPD, TPED 32-320/2			•					
TPD, TPED 32-380/2			•					
TPD, TPED 32-460/2				•				
TPD, TPED 32-580/2				•				
TPD, TPED 40-60/2	•							
TPD, TPED 40-120/2	•							
TPD, TPED 40-190/2		•						
TPD, TPED 40-230/2		•						
TPD, TPED 40-270/2		•						
TPD, TPED 40-240/2			•					
TPD, TPED 40-300/2			•					
TPD, TPED 40-360/2			•					
TPD, TPED 40-430/2				•				
TPD, TPED 40-530/2				•				
TPD, TPED 40-630/2				•				
TPD, TPED 50-60/2	•							
TPD, TPED 50-120/2		•						
TPD, TPED 50-180/2		•						
TPD, TPED 50-160/2			•					
TPD, TPED 50-190/2			•					
TPD, TPED 50-240/2			•					
TPD, TPED 50-290/2			•					
TPD, TPED 50-360/2			•					
TPD, TPED 50-430/2			•					
TPD, TPED 50-420/2					•			
TPD, TPED 50-540/2					•			
TPD, TPED 50-630/2					•			
TPD, TPED 50-710/2					•			
TPD, TPED 50-830/2					•			
TPD, TPED 50-900/2					•			

Pump type	96591261	00565055	96495694	96495695	96495696	96525962	96525963	96525964
TPD, TPED 65-60/2	•							
TPD, TPED 65-120/2		•						
TPD, TPED 65-180/2		•						
TPD, TPED 65-170/2			•					
TPD, TPED 65-210/2			•					
TPD, TPED 65-250/2			•					
TPD, TPED 65-340/2			•					
TPD, TPED 65-410/2			•					
TPD, TPED 65-340/2			•					
TPD, TPED 65-410/2			•					
TPD, TPED 65-460/2					•			
TPD, TPED 65-550/2					•			
TPD, TPED 65-660/2					•			
TPD, TPED 65-720/2					•			
TPD 65-930/2					•			
TPD, TPED 80-120/2		•						
TPD, TPED 80-140/2			•					
TPD, TPED 80-180/2			•					
TPD, TPED 80-210/2			•					
TPD, TPED 80-240/2			•					
TPD, TPED 80-250/2			•					
TPD, TPED 80-330/2			•					
TPD, TPED 80-400/2			•					
TPD, TPED 80-520/2				•				
TPD, TPED 80-570/2				•				
TPD 80-700/2				•				
TPD, TPED 100-120/2		•						
TPD, TPED 100-160/2			•					
TPD, TPED 100-200/2			•					
TPD, TPED 100-240/2			•					
TPD, TPED 100-250/2			•					
TPD, TPED 100-310/2			•					
TPD, TPED 100-360/2			•					
TPD, TPED 100-390/2			•					
TPD 100-480/2						•		

TPD, TPED, 4-pole

Pump type	96591261	00565055	96495694	96495695	96495696	96525962	96525963	96525964
TPD, TPED 32-30/4	•							
TPD, TPED 32-40/4	•							
TPD, TPED 32-60/4		•						
TPD, TPED 32-80/4			•					
TPD, TPED 32-100/4			•					
TPD, TPED 32-120/4				•				
TPD, TPED 40-30/4	•							
TPD, TPED 40-90/4		•						
TPD, TPED 40-100/4			•					
TPD, TPED 40-110/4				•				
TPD, TPED 40-140/4				•				
TPD, TPED 50-30/4	•							
TPD, TPED 50-60/4		•						
TPD, TPED 50-90/4			•					
TPD, TPED 50-80/4					•			
TPD, TPED 50-120/4					•			
TPD, TPED 50-140/4					•			
TPD, TPED 50-190/4					•			
TPD, TPED 50-230/4					•			
TPD, TPED 65-30/4		•						
TPD, TPED 65-60/4		•						
TPD, TPED 65-90/4			•					
TPD, TPED 65-110/4					•			
TPD, TPED 65-130/4					•			
TPD, TPED 65-150/4					•			
TPD, TPED 65-170/4					•			
TPD, TPED 65-240/4					•			
TPD, TPED 80-30/4		•						
TPD, TPED 80-60/4		•						
TPD, TPED 80-70/4			•	•				
TPD, TPED 80-90/4			•					
TPD, TPED 80-110/4			•					
TPD, TPED 80-150/4				•				
TPD, TPED 80-170/4				•				
TPD, TPED 80-240/4								•
TPD, TPED 80-270/4								•
TPD, TPED 80-340/4								•
TPD, TPED 100-30/4		•						
TPD, TPED 100-60/4		•						
TPD, TPED 100-70/4			•					
TPD, TPED 100-90/4			•					
TPD, TPED 100-110/4			•					
TPD, TPED 100-130/4						•		
TPD, TPED 100-170/4						•		
TPD, TPED 100-200/4								•
TPD, TPED 100-250/4								•
TPD, TPED 100-330/4								•
TPD, TPED 100-370/4								•
TPD, 100-410/4								•
TPD, TPED 125-110/4						•		
TPD, TPED 125-130/4						•		
TPD, TPED 125-160/4						•		
TPD, TPED 125-190/4								•
TPD, TPED 125-230/4								•
TPD, TPED 125-300/4								•
TPD, 125-340/4								•
TPD 125-400/4								•
TPD, TPED 150-130/4							•	
TPD, TPED 150-160/4							•	
TPD, TPED 150-200/4							•	
TPD, TPED 150-220/4							•	
TPD 150-250/4							•	

TPD, 6-pole

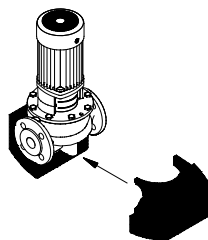
Pump type	96591261	00565055	96495694	96495695	96495696	96525962	96525963	96525964
TPD 125-60/6						•		
TPD 125-70/6						•		
TPD 125-80/6								•
TPD 125-100/6								•
TPD 125-130/6								•
TPD 125-160/6								•
TPD 150-60/6							•	
TPD 150-70/6							•	
TPD 150-90/6							•	
TPD 150-110/6							•	

Insulating kits

Insulating kits are available for TP, TPE Series 200 pumps.

The insulating kit consists of two or three insulating shells.

The insulating kit is tailored to the individual pump model and encloses the entire pump housing, thus providing optimum insulation.



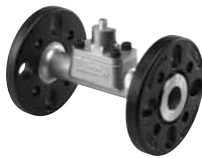
TM00 8095 2496

Fig. 99 Insulating kit

Pump type	Product number
TP, TPE 32-30/4	96405871
TP, TPE 32-40/4	96405880
TP, TPE 32-60/2	96405873
TP, TPE 32-60/4	96405880
TP, TPE 32-120/2	96405873
TP, TPE 32-150/2	96405880
TP, TPE 32-180/2	96405880
TP, TPE 32-230/2	96405880
TP, TPE 40-30/4	96405874
TP, TPE 40-60/4	96405875
TP, TPE 40-60/2	96405876
TP, TPE 40-90/4	96405880
TP, TPE 40-120/2	96405877
TP, TPE 40-180/2	96405878
TP, TPE 40-190/2	96405880
TP, TPE 40-230/2	96405880
TP, TPE 40-270/2	96405880
TP, TPE 50-30/4	96405879
TP, TPE 50-60/2	96405881
TP, TPE 50-60/4	96405880
TP, TPE 50-120/2	96405882
TP, TPE 50-180/2	96405883
TP, TPE 65-30/4	96405884
TP, TPE 65-60/2	96405886
TP, TPE 65-60/4	96405885
TP, TPE 65-120/2	96405887
TP, TPE 65-180/2	96405888
TP, TPE 80-30/4	96405889
TP, TPE 80-60/4	96405890
TP, TPE 80-120/2	96405891
TP, TPE 100-30/4	96405892
TP, TPE 100-60/4	96405892

Sensors

Flow sensors

Grundfos vortex flow sensor, VFI ¹	Type	Flow range [m ³ /h]	Pipe connection	O-ring		Connection type		Product number
				EPDM	FKM	Cast-iron flange	Stainless-steel flange	
 • Sensor tube with sensor sensor tube of 1.4408 and sensor of 1.4404 • 4-20 mA output signal • 2 flanges • 5 m cable with M12 connection in one end • quick guide.	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
	VFI 5.2-104 DN65 020 E	5.2 - 104	DN 65	•		•		97686147
	VFI 5.2-104 DN65 020 F				•	•		97686148
	VFI 5.2-104 DN65 020 E			•			•	97688303
	VFI 5.2-104 DN65 020 F				•		•	97688304
	VFI 8-160 DN80 020 E	8 - 160	DN 80	•		•		97686149
	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

¹ 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 $\varnothing 6 \times 100$ 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 $\varnothing 9 \times 100$ mm or $\varnothing 9 \times 50$ mm, respectively.

The protecting tube has 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 - 25 °C	0-25 °C	0-150 °C	50-100 °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 $\varnothing 9 \times 50$ mm	Protecting tube $\varnothing 9 \times 100$ mm	Cutting ring bush
Product number	96430201	96430202	96430203
Description	Protecting tube of stainless steel SINOX SSH 2 for $\varnothing 6$ mm measuring tube. Pipe connection G 1/2.		Cutting ring bush for $\varnothing 6$ mm measuring tube. Pipe connection G 1/2.

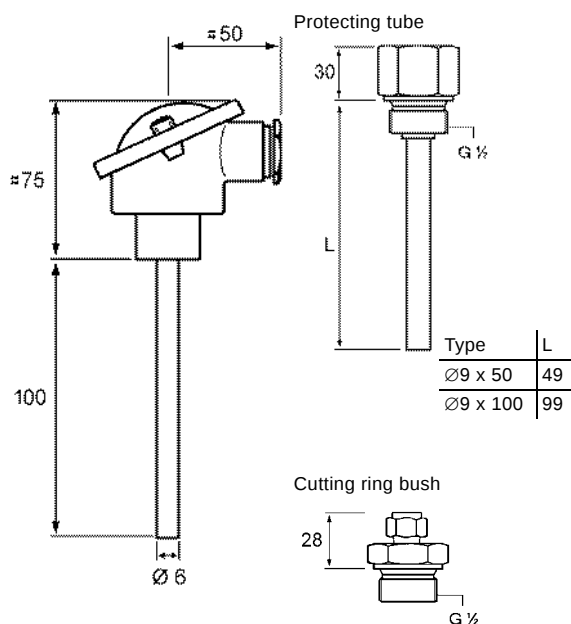


Fig. 100 Dimensional sketch

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 will appear from fig. 101, 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.

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)	0-20 °C	0-50 °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 - 85 °C	
Operating temperature of T1 and T2	-25 - 105 °C	
Maximum distance between T1 and T2	300 m with screened cable	
Electrical connection	Between T1 and T2: M12 x 1 plug (incl. in kit), output signal with DIN 43650-A plug type	
Storage temperature	-45 - 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	

Installation

The two sensors must be fitted 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.

The upper part of the sensors may be turned to any position suitable for the connection of cables.

The sensors have G 1/2 thread. See fig. 102.

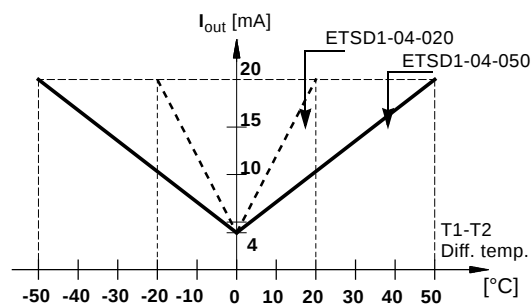


Fig. 101 Sensor characteristics

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.

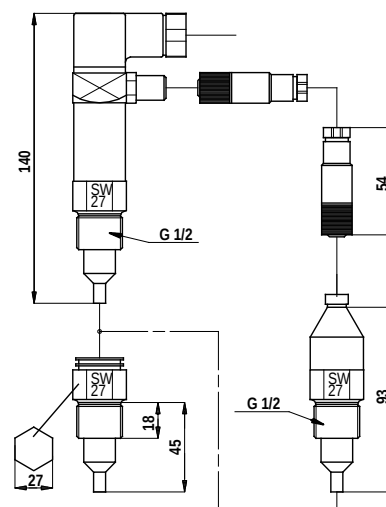


Fig. 102 Dimensional sketch

Ambient temperature sensor

Sensor type	Type	Supplier	Measuring range	Product number
Temperature sensor, ambient temperature	WR 52	tmg (DK: Plesner)	-50 - 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 incl. 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.

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 ¹	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 metres long.	96915820

¹ For more 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.

MP 204 - advanced motor protection

The MP 204 is an electronic motor protection for pumps. One unit covers all electrical motors from 3 to 999 A as well as voltages from 100 to 480 VAC. Installation of the MP 204 is by means of screws onto a wall or back plate, or on a mounting rail.



MP 204

TM03 0150 4204

The MP 204 is an electronic motor protector and data collecting unit. Apart from protecting the motor, it can also send information to a CIU unit via GENIbus, like for instance:

- trip
- warning
- energy consumption
- input power
- motor temperature.

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

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

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

Features

- Phase-sequence monitoring
- indication of current or temperature
- input for PTC sensor/thermal switch
- indication of temperature in °C or °F
- 4-digit, 7-segment display
- setting and status reading with the Grundfos R100 remote control
- setting and status reading via the Grundfos GENIbus fieldbus.

Tripping conditions

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

Warnings

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

Learning function

- Phase sequence (three-phase operation)
- run capacitor (single-phase operation)
- starting capacitor (single-phase operation)
- identification and measurement of Pt100/Pt1000 sensor circuit.

Control MP 204

The Control MP 204 is supplied as a plug-and-play control cabinet solution.

The main switch and LED panel showing power consumption are all you see on the front. Inside you find the MP 204 unit and optional communication interface units.



Control MP 204

TM04 9512 4410

The Control MP 204 control cabinets are supplied with all necessary components. Three types of control cabinets are available, depending on functions and starting method. The control cabinets are designed for installation in a control cabinet for outdoor use. The Control MP 204 control cabinets have a built-in main switch and a thermal magnetic circuit breaker.

Digital input

- Float switch or pressure relay (if no IO 112 is used).

Analog input

- Too high motor temperature (Tempcon)
- thermistor/PTC, pump
- pressure sensor, 4-20 mA (with IO 112).

Relay output

- Pump alarm.

Communication

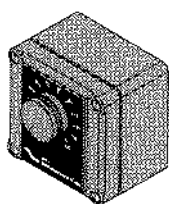
- Grundfos Remote Management.
- GSM/GPRS (IO 112 not supported)
- Modbus RTU wired (IO 112 not supported)
- PROFIBUS DP (IO 112 not supported).

Protection

- Protects the pump against short-circuit.

For more information about the MP 204 and Control MP 204, see the data booklet "Control MP 204", publication number 97770915.

Potentiometer



TM02 1630 5102

Fig. 103 Potentiometer

Potentiometer for setpoint setting and start/stop of the pump.

Product	Product number
External potentiometer with cabinet for wall mounting.	625468

Grundfos GO Remote

The Grundfos GO Remote is used for wireless infrared or radio communication with the pumps.

Various Grundfos GO Remote variants are available. The variants are described in the following.

MI 202 and MI 204

The MI 202 and MI 204 are an add-on modules with built-in infrared and radio communication. The MI 202 can be used in conjunction with an Apple iPhone or iPod with 30-pin connector and iOS 5.0 or later, e.g. fourth generation iPhone or iPod.

The MI 204 can be used in conjunction with an Apple iPhone or iPod with Lightning connector, e.g. fifth generation iPhone or iPod.

(The MI 204 is also available together with an Apple iPod touch and a cover.)



TM05 3887 1612 - TM05 7704 1513

Fig. 104 MI 202 and MI 204

Supplied with the product:

- Grundfos MI 202 or 204
- sleeve
- quick guide
- charger cable.

MI 301

The MI 301 is a module with built-in infrared and radio communication. The MI 301 must be used in conjunction with Android or iOS-based smart devices with a Bluetooth connection. The MI 301 has rechargeable Li-ion battery and must be charged separately.



TM05 3890 1712

Fig. 105 MI 301

Supplied with the product:

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

Product numbers

Grundfos GO Remote variant	Product number
Grundfos MI 202	98046376
Grundfos MI 204	98424092
Grundfos MI 204 including iPod touch	98612711
Grundfos MI 301	98046408

CIU communication interface units



GrA 6118

Fig. 106 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 and a CIM module. The CIU unit can either be mounted on a DIN rail or on a wall.

For further information see section 13. *Communication* on page 68.

We offer the following CIU units:

CIU 100

For communication via LonWorks.

CIU 150

For communication via PROFIBUS DP.

CIU 200

For communication via Modbus RTU.

CIU 250

For wireless communication via GSM/GPRS.

CIU 271

For communication via Grundfos Remote Management (GRM).

CIU 300

For communication via BACnet MS/TP.

Description	Fieldbus protocol	Product number
CIU 100	LonWorks	96753735
CIU 150	PROFIBUS DP	96753081
CIU 200	Modbus RTU	96753082
CIU 250*	GSM/GPRS	96787106
CIU 271*	GRM	96898819
CIU 300	BACnet MS/TP	96893769

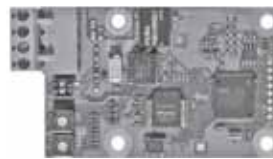
* Antenna not included. See below.

Antennas for CIU 250 and 270

Description	Product number
Antenna for roof	97631956
Antenna for desk	97631957

For further information about data communication via CIU units and fieldbus protocols, see the CIU documentation available in WebCAPS.

CIM communication interface modules



GrA6121

Fig. 107 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.

For further information see section 13. *Communication* on page 68.

Note: CIM modules must be fitted by authorised personnel.

We offer the following CIM modules:

Description	Fieldbus protocol	Product number
CIM 050	GENIbus	96824631
CIM 100	LonWorks	96824797
CIM 150	PROFIBUS DP	96824793
CIM 200	Modbus RTU	96824796
CIM 250*	GSM/GPRS	96824795
CIM 270*	GRM	96898815
CIM 300	BACnet MS/TP	96893770

* Antenna not included. See below.

Antennas for CIM 250 and 270

Description	Product number
Antenna for roof	97631956
Antenna for desk	97631957

For further information about data communication via CIM modules and fieldbus protocols, see the CIM documentation available in WebCAPS.

EMC filter

EMC (electromagnetic compatibility to EN 61800-3)

Motor [kW]		Emission/immunity
2-pole	4-pole	
0.37	0.37	Emission: Motors may be installed in residential areas (first environment), unrestricted distribution, corresponding to CISPR11, group 1, class B.
0.55	0.55	
0.75	0.75	
1.1	1.1	
1.5	1.5	
2.2	2.2	Immunity: Motors fulfil the requirements for both the first and second environment.
3.0	3.0	
4.0	4.0	
5.5	-	
7.5	-	
-	5.5	Emission: The motors are category C3, corresponding to CISPR11, group 2, class A, and may be installed in industrial areas (second environment).
-	7.5	
11	11	
15	15	
18.5	18.5	
22	-	If fitted with an external Grundfos EMC filter, the motors are category C2, corresponding to CISPR11, group 1, class A, and may be installed in residential areas (first environment).



TM02 9198 1203

Fig. 108 EMC filter

The EMC filter for residential areas is available as a complete kit ready for installation.

Product	Product number
EMC filter (TPE 5.5 kW and 7.5 kW, 4-pole)	96041047
EMC filter (TPE 11-22 kW)	96478309

31. Minimum inlet pressure - NPSH

To ensure optimum and noiseless operation, we recommend that you use the minimum inlet pressure values shown on pages 201 to 203.

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 (pressure gauge value on the pump suction side).

Note: Base the calculation of the minimum inlet pressure on the maximum required flow.

$$p_s \geq \left((NPSH_R + H_S) \times \rho \times g - \left(\frac{1}{2} \times \rho \times c^2 \right) \right) \times 0.00001 - p_b + p_d \text{ [bar relative]}$$

p_s = Minimum inlet pressure in bar.

$NPSH_R$ = The required Net Positive Suction Head in metres head.

(To be read from the NPSH curve at the highest flow the pump will be delivering).

H_S = Safety margin = minimum 0.5 metres head.

Note: A safety margin of 0.5 metres prevents pressure drop.

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 $[\text{m/s}]$.

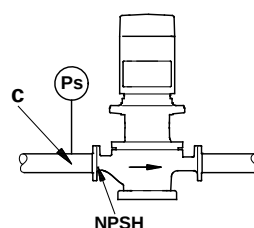
(See individual curve charts from page 114).

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 fig. 109.



Temp. [°C]	p_d [bar]
150	4.76
140	3.61
130	2.70
120	1.99
110	1.43
100	1.01
90	0.70
80	0.47
70	0.31
60	0.20
50	0.12
40	0.07
30	0.04
20	0.02
10	0.01
0	

Fig. 109 Minimum inlet pressure

TM02 8491 0204 - TM03 0371 5004

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

Pump type	p [bar]					
	20 °C	60 °C	90 °C	110 °C	120 °C	140 °C
TP 25-50/2 R	0.1	0.1	0.2	0.5	-	-
TP 25-80/2 R	0.1	0.1	0.1	0.3	-	-
TP 25-90/2 R	0.1	0.1	0.2	0.5	-	-
TP 32-50/2 R	0.1	0.1	0.1	0.2	-	-
TP 32-80/2 R	0.1	0.1	0.2	0.5	-	-
TP 32-90/2 R	0.1	0.1	0.2	0.5	-	-
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	-	-
TP, TPD 40-60/2	0.1	0.1	0.5	1.2	1.8	3.5
TP 40-80/2	0.1	0.1	0.2	0.5	-	-
TP 40-90/2	0.1	0.1	0.2	0.5	-	-
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	0.9	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	3.2
TP, TPD 50-4200/2	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
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

Pump type	p [bar]					
	20 °C	60 °C	90 °C	110 °C	120 °C	140 °C
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	0.6	1.3	1.8	3.5
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	1.7	2.2	3.8
TP, TPD 80-520/2	0.1	0.2	0.7	1.4	1.9	3.6
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	2.6	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(E), TP(E)D, 4-pole, PN 6, 10, 16

Pump type	p [bar]					
	20 °C	60 °C	90 °C	110 °C	120 °C	140 °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	1.1	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	1.4	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	0.1	1.0	1.5	3.2
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	3.0
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 100-60/4	0.6	0.8	1.3	2.0	2.6	4.3
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, TPD 100-200/4	0.1	0.1	0.5	1.2	1.8	3.4
TP, TPD 100-250/4	0.1	0.2	0.7	1.4	2.0	3.6
TP, TPD 100-330/4	0.3	0.5	1.0	1.7	2.3	3.9
TP, TPD 100-370/4	0.3	0.5	1.0	1.7	2.3	3.9
TP, TPD 100-410/4	0.5	0.7	1.2	1.9	2.5	4.1
TP 125-70/4	0.1	0.1	0.5	1.2	1.8	3.5
TP 125-90/4	0.1	0.1	0.3	1.0	1.6	3.2
TP 125-100/4	0.1	0.1	0.1	0.9	1.4	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	0.3	1.0	1.5	3.2
TP, TPD 125-190/4	0.1	0.1	0.2	0.9	1.5	3.1
TP, TPD 125-230/4	0.1	0.1	0.3	1.0	1.6	3.2
TP, TPD 125-300/4	0.1	0.1	0.2	0.9	1.5	3.1
TP, TPD 125-340/4	0.1	0.1	0.3	1.0	1.5	3.2
TP, TPD 125-400/4	0.1	0.1	0.3	1.0	1.6	3.2

Pump type	p [bar]					
	20 °C	60 °C	90 °C	110 °C	120 °C	140 °C
TP 150-100/4	0.1	0.2	0.7	1.4	2.0	3.6
TP, TPD 150-130/4	0.1	0.1	0.4	1.1	1.6	3.3
TP 150-140/4	0.1	0.1	0.5	1.2	1.8	3.4
TP 150-150/4	0.1	0.1	0.3	1.0	1.6	3.2
TP, TPD 150-160/4	0.1	0.1	0.4	1.1	1.7	3.3
TP, TPD 150-200/4	0.1	0.1	0.4	1.1	1.7	3.3
TP, TPD 150-220/4	0.1	0.1	0.5	1.2	1.8	3.4
TP, TPD 150-250/4	0.1	0.1	0.6	1.3	1.9	3.5
TP 150-260/4	0.1	0.1	0.5	1.2	1.8	3.4
TP 150-280/4	0.1	0.3	0.8	1.5	2.1	3.7
TP 150-340/4	0.1	0.2	0.7	1.5	2.0	3.6
TP 150-390/4	0.1	0.2	0.7	1.4	2.0	3.6
TP 150-450/4	0.1	0.1	0.5	1.2	1.8	3.4
TP 150-520/4	0.1	0.1	1.0	1.5	1.9	3.5
TP 150-660/4	0.1	0.2	0.7	1.4	1.9	3.6
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	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
TP 200-190/4	0.2	0.4	0.9	1.6	2.2	3.8
TP 200-200/4	0.2	0.4	0.9	1.6	2.1	3.8
TP 200-240/4	0.1	0.2	0.7	1.4	2.0	3.6
TP 200-270/4	0.1	0.1	0.4	1.1	1.7	3.3
TP 200-290/4	0.1	0.1	0.6	1.3	1.9	3.5
TP 200-320/4	0.1	0.1	0.5	1.2	1.8	3.4
TP 200-330/4	0.1	0.1	0.3	1.1	1.6	3.2
TP 200-360/4	0.1	0.1	0.3	1.1	1.6	3.2
TP 200-400/4	0.1	0.1	0.3	1.0	1.6	3.2
TP 200-410/4	0.1	0.2	0.7	1.4	1.9	3.6
TP 200-470/4	0.1	0.1	0.4	1.1	1.6	3.3
TP 200-530/4	0.1	0.1	0.4	1.1	1.7	3.3
TP 200-590/4	0.1	0.2	0.7	1.4	2.0	3.6
TP 200-660/4	0.2	0.4	0.9	1.7	2.2	3.8
TP 250-280/4	0.1	0.1	0.1	0.8	1.4	3.1
TP 250-310/4	0.1	0.1	0.1	0.8	1.4	3.1
TP 250-390/4	0.1	0.1	0.1	0.8	1.4	3.1

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 125-1000/6	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

TP Series 400, 2-pole, PN 25

Pump type	p [bar]					
	20 °C	60 °C	90 °C	110 °C	120 °C	140 °C
TP 100-620/2	0.2	0.4	0.9	1.6	2.2	3.9
TP 100-700/2	0.1	0.2	0.7	1.5	2.0	3.7
TP 100-820/2	0.1	0.2	0.7	1.4	2.0	3.7
TP 100-960/2	0.1	0.2	0.7	1.4	2.0	3.7
TP 100-1050/2	0.1	0.1	0.6	1.3	1.9	3.6
TP 100-1180/2	0.1	0.2	0.7	1.5	2.0	3.7
TP 100-1400/2	0.1	0.2	0.7	1.5	2.0	3.7
TP 100-1530/2	0.1	0.2	0.7	1.4	2.0	3.7
TP 100-1680/2	0.1	0.1	0.6	1.4	1.9	3.6

TP Series 400, 4-pole, PN 25

Pump type	p [bar]					
	20 °C	60 °C	90 °C	110 °C	120 °C	140 °C
TP 100-190/4	0.1	0.1	0.1	0.8	1.4	3.1
TP 100-220/4	0.1	0.1	0.1	0.8	1.4	3.1
TP 100-260/4	0.1	0.1	0.1	0.8	1.4	3.1
TP 100-270/4	0.1	0.1	0.1	0.8	1.4	3.1
TP 100-320/4	0.1	0.1	0.1	0.8	1.4	3.1
TP 100-380/4	0.1	0.1	0.1	0.8	1.4	3.1
TP 100-420/4	0.1	0.1	0.1	0.8	1.4	3.1
TP 125-150/4	0.1	0.1	0.1	0.8	1.4	3.1
TP 125-200/4	0.1	0.1	0.1	0.8	1.4	3.1
TP 125-240/4	0.1	0.1	0.1	0.8	1.4	3.1
TP 125-280/4	0.1	0.1	0.1	0.8	1.4	3.1
TP 125-310/4	0.1	0.1	0.1	0.8	1.4	3.1
TP 125-370/4	0.1	0.1	0.1	0.8	1.4	3.1
TP 125-430/4	0.1	0.1	0.1	0.8	1.4	3.1
TP 150-240/4	0.1	0.1	0.1	0.8	1.4	3.1
TP 150-270/4	0.1	0.1	0.1	0.8	1.4	3.1
TP 150-320/4	0.1	0.1	0.1	0.8	1.4	3.1
TP 150-350/4	0.1	0.1	0.1	0.8	1.4	3.1
TP 150-430/4	0.1	0.1	0.1	0.8	1.4	3.1
TP 150-530/4	0.1	0.1	0.1	0.8	1.4	3.1
TP 150-650/4	0.1	0.1	0.1	0.8	1.4	3.1
TP 200-270/4	0.1	0.1	0.1	0.8	1.4	3.1
TP 200-280/4	0.1	0.1	0.1	0.8	1.4	3.1
TP 200-380/4	0.1	0.1	0.1	0.8	1.4	3.1
TP 200-420/4	0.1	0.1	0.1	0.8	1.4	3.1
TP 200-450/4	0.1	0.1	0.1	0.8	1.4	3.1
TP 200-510/4	0.1	0.1	0.1	0.8	1.4	3.1
TP 200-560/4	0.1	0.1	0.1	0.8	1.4	3.1
TP 200-620/4	0.1	0.1	0.1	0.8	1.4	3.1
TP 250-270/4	0.1	0.1	0.1	0.8	1.4	3.1
TP 250-320/4	0.1	0.1	0.1	0.8	1.4	3.1
TP 250-370/4	0.1	0.1	0.1	0.8	1.4	3.1
TP 250-490/4	0.1	0.1	0.1	0.8	1.4	3.1
TP 250-540/4	0.1	0.1	0.1	0.8	1.4	3.1
TP 250-600/4	0.1	0.1	0.1	0.8	1.4	3.1
TP 250-660/4	0.1	0.1	0.1	0.8	1.4	3.1
TP 300-590/4	0.4	0.6	1.1	1.8	2.4	4.1
TP 300-670/4	0.4	0.6	1.1	1.8	2.4	4.1
TP 300-750/4	0.3	0.5	1.0	1.8	2.3	4.0
TP 400-470/4	0.1	0.3	0.8	1.6	2.1	3.8
TP 400-510/4	0.1	0.3	0.8	1.6	2.1	3.8
TP 400-540/4	0.1	0.3	0.8	1.5	2.1	3.8
TP 400-670/4	0.6	0.8	1.3	2.1	2.6	4.3
TP 400-720/4	0.6	0.8	1.3	2.1	2.6	4.3
TP 400-760/4	0.6	0.8	1.3	2.0	2.6	4.3

32. Key application data

Dear customer, if you need an ATEX certificate or if pump selection cannot be made on the basis of the guidelines in *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.

This form is also available under "Literature" in WebCAPS and WinCAPS.

Customer information

Company name:	Project title:
Customer number:	Reference number:
Phone number:	Customer contact:
Fax number:	
E-mail address:	

Quotation made by:

Company name:	Prepared by:	
Phone number:	Date:	Page 1 of
Fax number:	Quotation number:	
E-mail address:		

Operating conditions

Pumped liquid

Type of liquid:	
Chemical composition (if available):	
Distilled/demineralised water?	Yes: _____ No: _____
Conductivity of distilled/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] = [mm²/s]
Liquid density:	_____ [kg/m³]
Specific heat capacity of liquid:	_____ [kJ/(kg·K)]
Air/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/poisonous? Yes: _____ No: _____

Special measures to be taken into account when dealing with this hazardous/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: _____ [m³/h]

H: _____ [m]

Max. duty point:

Q: _____ [m³/h]

H: _____ [m]

Min. duty point:

Q: _____ [m³/h]

H: _____ [m]

Ambient operating conditions

Ambient temperature:

_____ [°C]

Altitude above sea level:

_____ [m]

Pressure

Minimum inlet pressure:

_____ [bar]

Maximum inlet pressure:

_____ [bar]

Discharge pressure (inlet pressure + 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/sketchDetailed 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: _____

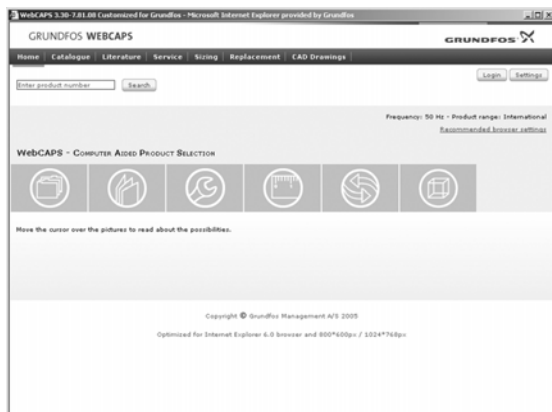
Detailed description of requirements
(attach a drawing if possible):

System information

Please provide us with information about your system and maybe a simple sketch. This will give us hints 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.

33. Further product information

WebCAPS



WebCAPS is a **Web**-based **Computer Aided Product Selection** program available on www.grundfos.com.

WebCAPS contains detailed information on more than 220,000 Grundfos products in more than 30 languages.

Information in WebCAPS is divided into six sections:

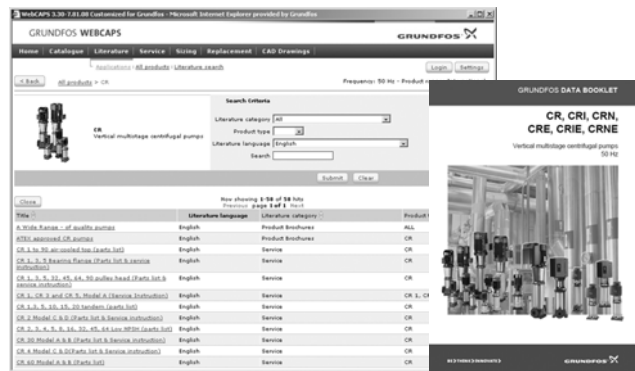
- Catalogue
- Literature
- Service
- Sizing
- Replacement
- CAD drawings.



Catalogue

Based on fields of application and pump types, this section contains the following:

- technical data
- curves (QH, Eta, P1, P2, etc.) which can be adapted to the density and viscosity of the pumped liquid and show the number of pumps in operation
- product photos
- dimensional drawings
- wiring diagrams
- quotation texts, etc.



Literature

This section contains all the latest documents of a given pump, such as

- data booklets
- installation and operating instructions
- service documentation, such as Service kit catalogue and Service kit instructions
- quick guides
- product brochures.



Service

This section contains an easy-to-use interactive service catalogue. Here you can find and identify service parts of both existing and discontinued Grundfos pumps. Furthermore, the section contains service videos showing you how to replace service parts.



Sizing

This section is based on different fields of application and installation examples and gives easy step-by-step instructions in how to size a product:

- Select the most suitable and efficient pump for your installation.
- Carry out advanced calculations based on energy, consumption, payback periods, load profiles, life cycle costs, etc.
- Analyse your selected pump via the built-in life cycle cost tool.
- Determine the flow velocity in wastewater applications, etc.

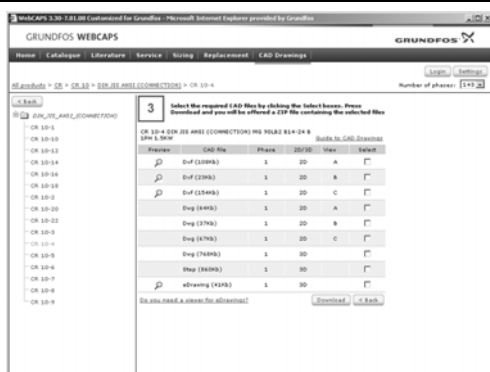


Replacement

In this section you find a guide to selecting and comparing replacement data of an installed pump in order to replace the pump with a more efficient Grundfos pump.

The section contains replacement data of a wide range of pumps produced by other manufacturers than Grundfos.

Based on an easy step-by-step guide, you can compare Grundfos pumps with the one you have installed on your site. When you have specified the installed pump, the guide will suggest a number of Grundfos pumps which can improve both comfort and efficiency.



CAD drawings

In this section, it is possible to download 2-dimensional (2D) and 3-dimensional (3D) CAD drawings of most Grundfos pumps.

These formats are available in WebCAPS:

2-dimensional drawings:

- .dxf, wireframe drawings
- .dwg, wireframe drawings.

3-dimensional drawings:

- .dwg, wireframe drawings (without surfaces)
- .stp, solid drawings (with surfaces)
- .eprt, E-drawings.

WinCAPS



Fig. 110 WinCAPS DVD

WinCAPS is a **Windows-based Computer Aided Product Selection** program containing detailed information on more than 220,000 Grundfos products in more than 30 languages.

The program contains the same features and functions as WebCAPS, but is an ideal solution if no internet connection is available.

WinCAPS is available on DVD and updated once a year.

GO CAPS

Mobile solution for professionals on the GO!



CAPS functionality on the mobile workplace.



Subject to alterations.

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ECM: 1142756