

# TP, TPD, TPE, TPED, TPE2, TPE2 D, TPE3, TPE3 D

In-line circulator pumps

50 Hz



be  
think  
innovate

**GRUNDFOS** 

<b>1. Pump data</b>	<b>5</b>
Introduction .....	5
Identification .....	7
<b>2. Performance range</b>	<b>9</b>
Performance range, TPE2, TPE3, PN 6, 10, 16 .....	9
Performance range, TPE2 D, TPE3 D, twin-head operation, PN 6, 10, 16 .....	9
Performance range, 2-pole, PN 6, 10, 16 .....	10
Performance range, 2-pole, PN 25 .....	11
Performance range, 4-pole, PN 6, 10, 16 .....	12
Performance range, 4-pole, PN 25 .....	13
Performance range, 6-pole, PN 16 .....	14
<b>3. Product range</b>	<b>15</b>
Product range, 4-pole, PN 6, 10, 16, 25 .....	18
Product range, 6-pole, PN 16 .....	20
<b>4. Operating conditions</b>	<b>21</b>
Ambient temperature .....	21
Installation altitude .....	22
<b>5. Pumped liquids</b>	<b>23</b>
Pumped liquids .....	23
Liquid temperature .....	23
List of pumped liquids .....	24
Recommended shaft seal for water-glycol mixture .....	26
<b>6. TP Series 100 and 200 pumps</b>	<b>27</b>
<b>7. TP Series 300 pumps</b>	<b>29</b>
<b>8. TPE Series 1000 pumps</b>	<b>32</b>
<b>9. TPE Series 2000 pumps</b>	<b>35</b>
<b>10. TPE2</b>	<b>39</b>
<b>11. TPE3</b>	<b>43</b>
<b>12. User interfaces for TPE pumps 0.12 - 22 kW, 2-pole and 0.12 - 18.5 kW, 4-pole</b>	<b>47</b>
Control panel for TPE2 and TPE Series 1000 pumps, 0.12 - 11 kW, 2-pole and 0.12 - 7.5 kW, 4-pole .....	47
Control panel for TPE Series 1000 pumps, 15-22 kW, 2-pole and 11 - 18.5 kW, 4-pole .....	49
Control panel for TPE Series 2000 pumps, 15-22 kW, 2-pole and 11 - 18.5 kW, 4-pole .....	50
Advanced control panel for TPE3 and TPE Series 2000 pumps, 0.12 - 11 kW, 2-pole and 0.12 - 7.5 kW, 4-pole ...	52
Grundfos GO .....	57
Description of selected functions .....	61
Priority of settings .....	94
Grundfos Eye .....	95
Indicator lights and signal relays .....	96
<b>13. User interfaces for TPE pumps 30-55 kW, 2-pole and 22-55 kW, 4-pole</b>	<b>99</b>
Menu overview .....	99
Setting by means of the control panel .....	101
Priority of settings .....	114
External control signals .....	115
Fault finding .....	117
<b>14. Factory settings of E-pumps</b>	<b>118</b>
<b>15. Communication</b>	<b>120</b>
Communication with TPE2, TPE2 D, TPE3, TPE3 D, TPE, TPED pumps .....	120
<b>16. Speed regulation of TPE, TPED, TPE2, TPE2 D, TPE3, TPE3 D pumps</b>	<b>121</b>
Affinity equations .....	121

<b>17. Control of pumps in parallel</b>	<b>122</b>
<b>18. Grundfos CUE</b>	<b>124</b>
TP pumps connected to Grundfos CUE, external frequency converters	124
<b>19. Motor data</b>	<b>125</b>
Motors	125
Electrical data, mains-operated motors	126
Electrical data, speed-controlled motors	129
<b>20. Installation</b>	<b>131</b>
Mechanical installation	131
Electrical installation	138
<b>21. Motors with built-in frequency converters</b>	<b>139</b>
Motors for TPE, TPE2 and TPE3 pumps fitted with 2-pole motors from 0.12 - 11 kW and 4-pole motors from 0.12 - 7.5 kW	139
MGE motors, 11 to 18.5 kW, 4-pole, and 15 to 22 kW, 2-pole	145
Identification of functional module	148
<b>22. Siemens motors with integrated CUE frequency converters 30-55 kW, 2-pole and 22-55 kW, 4-pole</b>	<b>149</b>
Technical data	149
Electrical connection	150
<b>23. Electromagnetic compatibility, EMC</b>	<b>156</b>
Electromagnetic compatibility and proper installation	156
<b>24. Flanges for TP pumps</b>	<b>158</b>
Flange dimensions	158
<b>25. Curve charts</b>	<b>159</b>
How to read the curve charts	159
Curve conditions	160
<b>26. Performance curves and technical data</b>	<b>162</b>
TPE2, TPE2 D, TPE3, TPE3 D, PN 6, 10, 16	162
TP, TPD, TPE, TPED, 2-pole, PN 6, 10, 16, 25	174
TP, TPD, TPE, TPED, 4-pole, PN 6, 10, 16, 25	200
TP, TPD, TPE, TPED, 6-pole, PN 16	238
<b>27. Weights and shipping volume</b>	<b>242</b>
TPE2, TPE2 D, TPE3, TPE3 D, PN 6, 10, 16	242
TP, TPD, TPE, TPED, 2-pole, PN 6, 10, 16, 25	243
TP, TPD, TPE, TPED, 4-pole, PN 6, 10, 16, 25	245
TP, TPD, 6-pole, PN 6, 10, 16	247
<b>28. Minimum efficiency index</b>	<b>248</b>
TPE2, TPE2 D, TPE3, TPE3 D	248
TP, TPD, TPE, TPED, 2-pole, PN 6, 10, 16	248
TP, TPD, TPE, TPED, 4-pole, PN 6, 10, 16	250
TP, TPD, 6-pole, PN 16	252
TP, PN 25	252
<b>29. Accessories</b>	<b>253</b>
Unions and valves, TP Series 100	253
Counterflanges	254
Base plates	257
Blanking flanges	260
Insulating kits	264
Sensors	265
External Grundfos sensors	269
Potentiometer	270
Grundfos GO	270
CIU communication interface units	271

CIM communication interface modules .....	271
EMC filter .....	272
<b>30. Minimum inlet pressure - NPSH</b>	<b>273</b>
TPE2, TPE2 D, TPE3, TPE3 D .....	274
TP, TPE, TPD, TPED, 2-pole, PN 6, 10, 16, 25 .....	275
TP, TPE, TPD, TPED, 4-pole, PN 6, 10, 16, 25 .....	276
TP, TPD, 6-pole, PN 16 .....	277
<b>31. Key application data</b>	<b>278</b>
Operating conditions .....	278
<b>32. Grundfos Product Center</b>	<b>280</b>

# 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, TPE2, TPE2 D, TPE3, TPE3 D).

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

### TP, mains-operated pumps

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

#### TP Series 100 with union or flange connection

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

For further information, see page 27.

#### 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 27.

#### TP Series 300 with flange connection

We offer two versions:

- 16-bar version with DN 32 to DN 350 flanges and motor sizes from 0.25 to 315 kW
- 25-bar version with DN 100 to DN 400 flanges and motor sizes from 5 to 630 kW.

For further information, see page 29.

### TPE, TPE2 and TPE3 speed-controlled pumps

We offer the following speed-controlled 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.
- TPE2 pumps without built-in differential-pressure sensor and temperature sensor.
- TPE3 pumps with built-in differential-pressure sensor and temperature sensor.

All pumps with 2-pole motors up to 11 kW and 4-pole motors up to 7.5 kW are fitted with Grundfos permanent-magnet MGE motors with motor efficiency class IE5 according to IEC 60034-30-2.

#### TPE Series 1000 pumps

The motors have a built-in frequency converter.

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

For further information, see page 32.

#### TPE Series 2000 pumps

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

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

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

The range is recognised as a preset solution for quick and safe installation. Pumps fitted with 2-pole motors below 15 kW and 4-pole motors below 11 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 35.

TM05 8893 2813

## TPE2 pumps

The permanent-magnet motors have a built-in frequency converter and the hydraulic components have been specially designed for optimum efficiency. Via an external signal from a sensor or a controller, the pumps allow for any configuration and control method required, that is constant pressure, temperature, flow or level. For further information, see page 39.

## TPE3 pumps

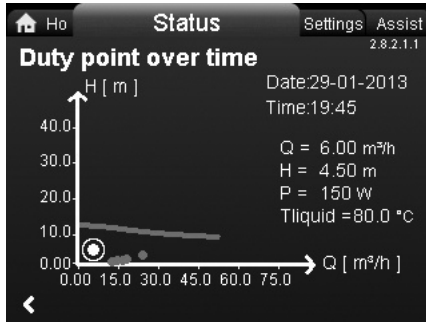


Fig. 2 Example of status display for TPE3 pumps

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

The pumps are factory-set to  $AUTO_{ADAPT}$  control.

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

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

- $AUTO_{ADAPT}$
- $FLOW_{ADAPT}$
- automatic night setback
- $FLOW_{LIMIT}$
- heat energy monitor
- flow rate estimation
- proportional pressure
- constant pressure
- constant differential temperature control
- constant temperature control.

For further information, see page 43.

## Why select a TPE pump

A pump with electronic speed control offers these benefits:

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

## ATEX-approved TP pumps

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

See 31. *Key application data* on page 278.

## High-efficiency motors, IE3 and IE4

TP pumps are fitted with high-efficiency motors.

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

The pumps are also available with motors from 2.2 to 132 kW that meet the legislative requirements of the EuP IE4 grade. For further information, see *Motors* on pages 125 to 130.

## Energy-optimised pumps

TP pumps are energy-optimised and comply with the EuP Directive (Commission Regulation (EC) No 547/2012) in which most pumps are classified or graduated in an energy efficiency index, MEI. See also page 248.

TP pump is delivered with a separate frequency converter.

On request, it is possible to get a TP pump delivered with a separate CUE or Danfoss frequency converter. The pump will be tested and setup together with the frequency converter at the factory.

Possible sizes: 30-55 kW 2-pole and 22-55 kW 4-pole.

TM06 0883 1114

## Identification

### Type key for TP, TPD, TPE, TPED

Code	Example	TP	E	D	65	-120	/2	-S	-A	-F	-A	-BQBE
	Pump range											
	Electronically speed-controlled pump, Series 1000, 2000											
	Twin-head pump											
	Nominal diameter of inlet and outlet ports, DN											
	Maximum head [dm]											
	Pole number											
S	TPE Series 2000 with factory-fitted differential-pressure sensor											
NC	TPE Series 1000 with Siemens motor with integrated CUE											
SC	TPE series 2000 with built-in differential-pressure sensor and Siemens motor with integrated CUE											
	Code for pump version. The codes may be combined:											
A	Basic version											
A3	PN 25 flange											
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 pipe connection:											
F	DIN flange											
O	Union											
	Code for materials:											
A	Basic version											
I	Stainless steel 1.4308 pump housing and motor stool											
Z	Bronze pump housing and motor stool											
B	Bronze impeller											
S	Stainless steel 1.4408 impeller											
O	Ductile cast-iron pump housing with cast-iron impeller											
Y	Ductile cast-iron pump housing with bronze impeller											
Q	Ductile cast-iron pump housing with stainless steel 1.4408 impeller											
	Code for shaft seal including other plastic and rubber pump parts, except the neck ring											

### Type key for TPE2, TPE3

Code	Example	TPE3	D	65	-120	-S	-A	-F	-A	-BQBE
	Pump range, electronically speed-controlled pump									
TPE2	Without built-in sensor									
TPE3	Built-in differential-pressure and temperature sensor									
	Twin-head pump									
	Nominal diameter of inlet and outlet ports, DN									
	Maximum head [dm]									
S	Built-in differential-pressure and temperature sensor									
N	Without built-in sensor									
	Code for pump version:									
A	Basic version									
I	PN 6 flange									
X	Special version									
	Code for pipe connection:									
F	DIN flange									
	Code for materials:									
A	Basic version									
I	Stainless steel 1.4308 pump housing and motor stool									
	Code for shaft seal including other plastic and rubber pump parts, except the neck ring									

## Codes for shaft seal

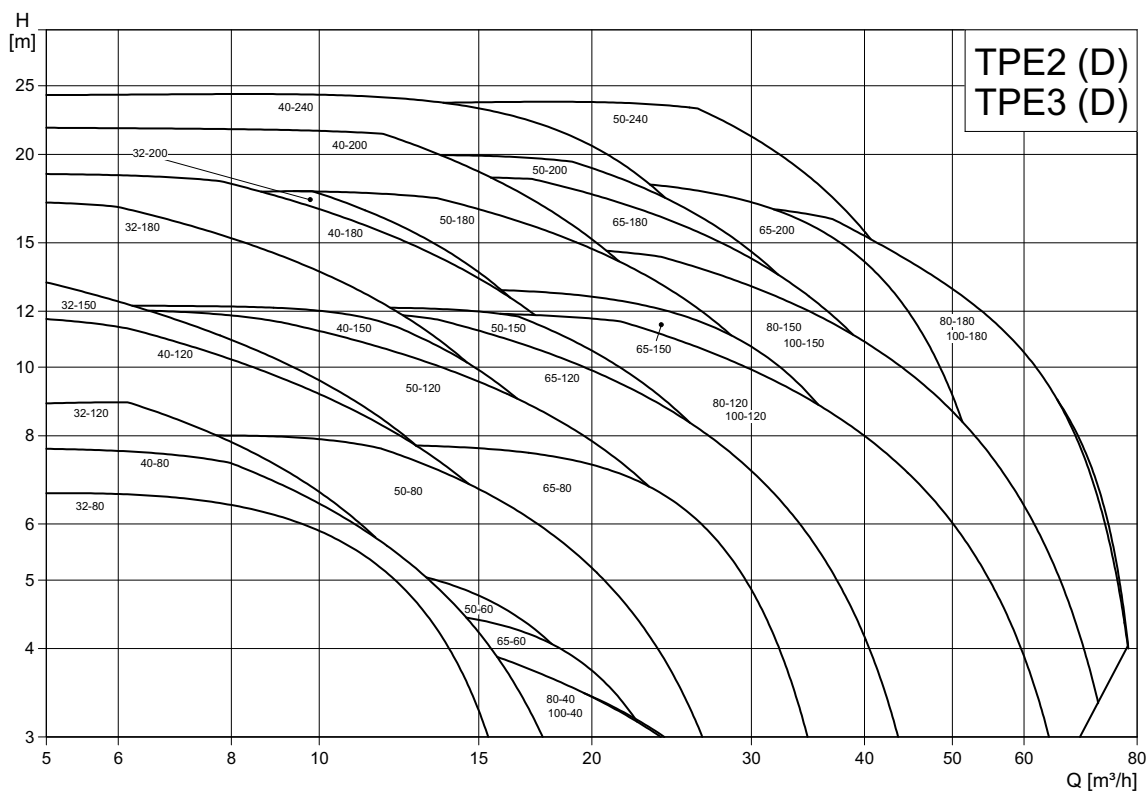
Code	Example	B	Q	B	E
	Grundfos type designation				
A	O-ring seal with fixed seal driver				
B	Rubber bellows seal				
D	O-ring seal, balanced				
G	Bellows seal with reduced seal faces				
R	O-ring seal with reduced seal faces				
	Material of rotating face				
A	Carbon, antimony-impregnated				
B	Carbon, resin-impregnated				
Q	Silicon carbide				
	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				
F	FXM				



## 2. Performance range

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

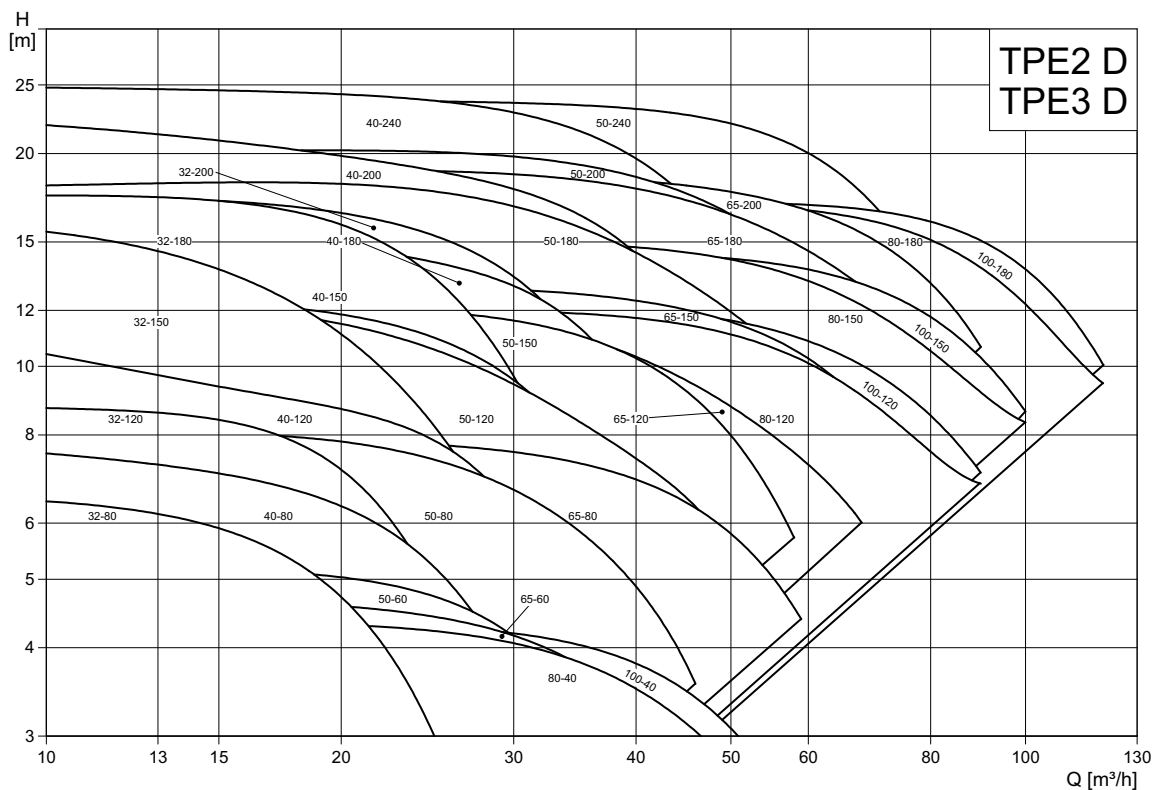
See page 162 for performance curves.



TM05 8177 4914

### Performance range, TPE2 D, TPE3 D, twin-head operation, PN 6, 10, 16

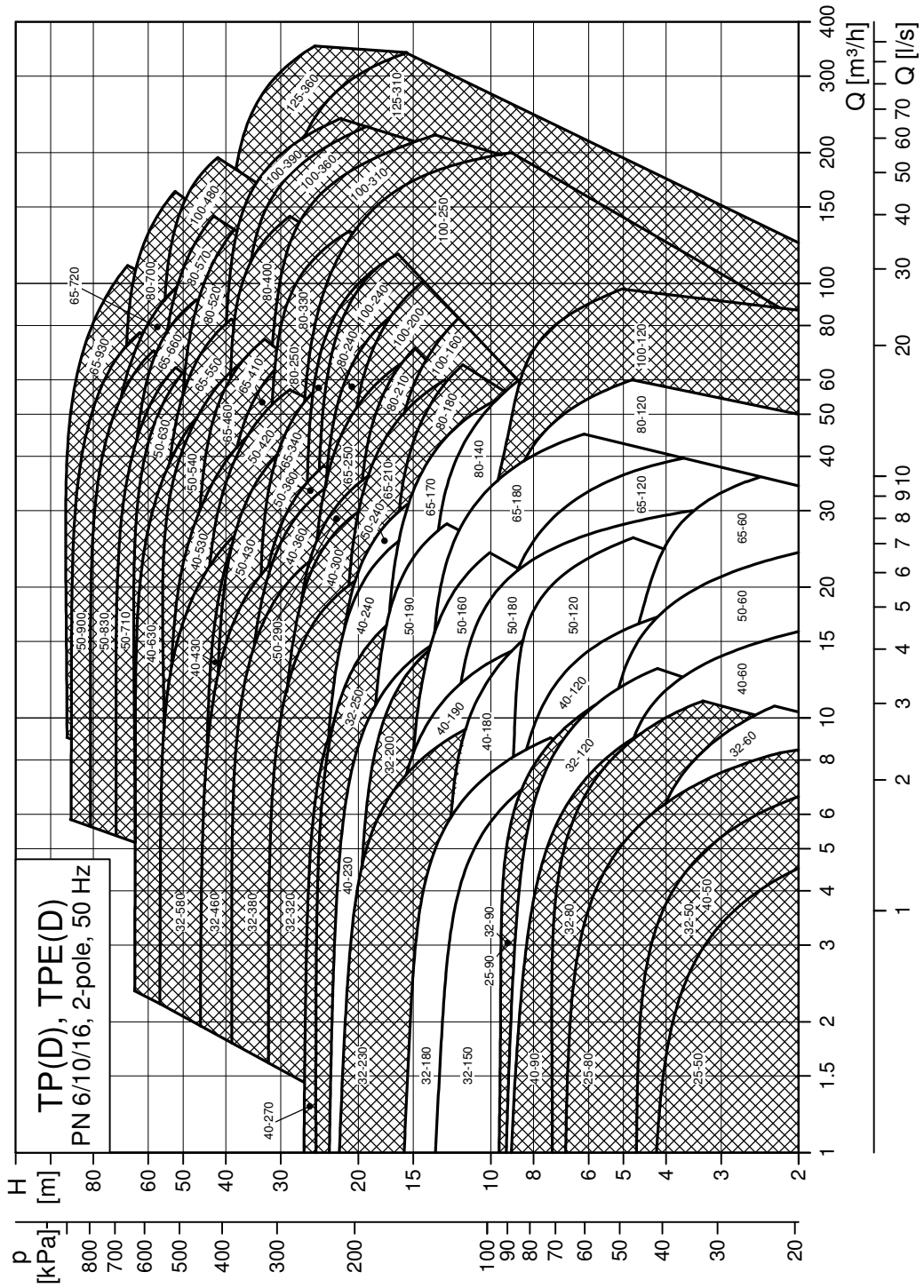
See page 162 for performance curves.



TM05 8198 4914

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

See page 174 for performance curves.

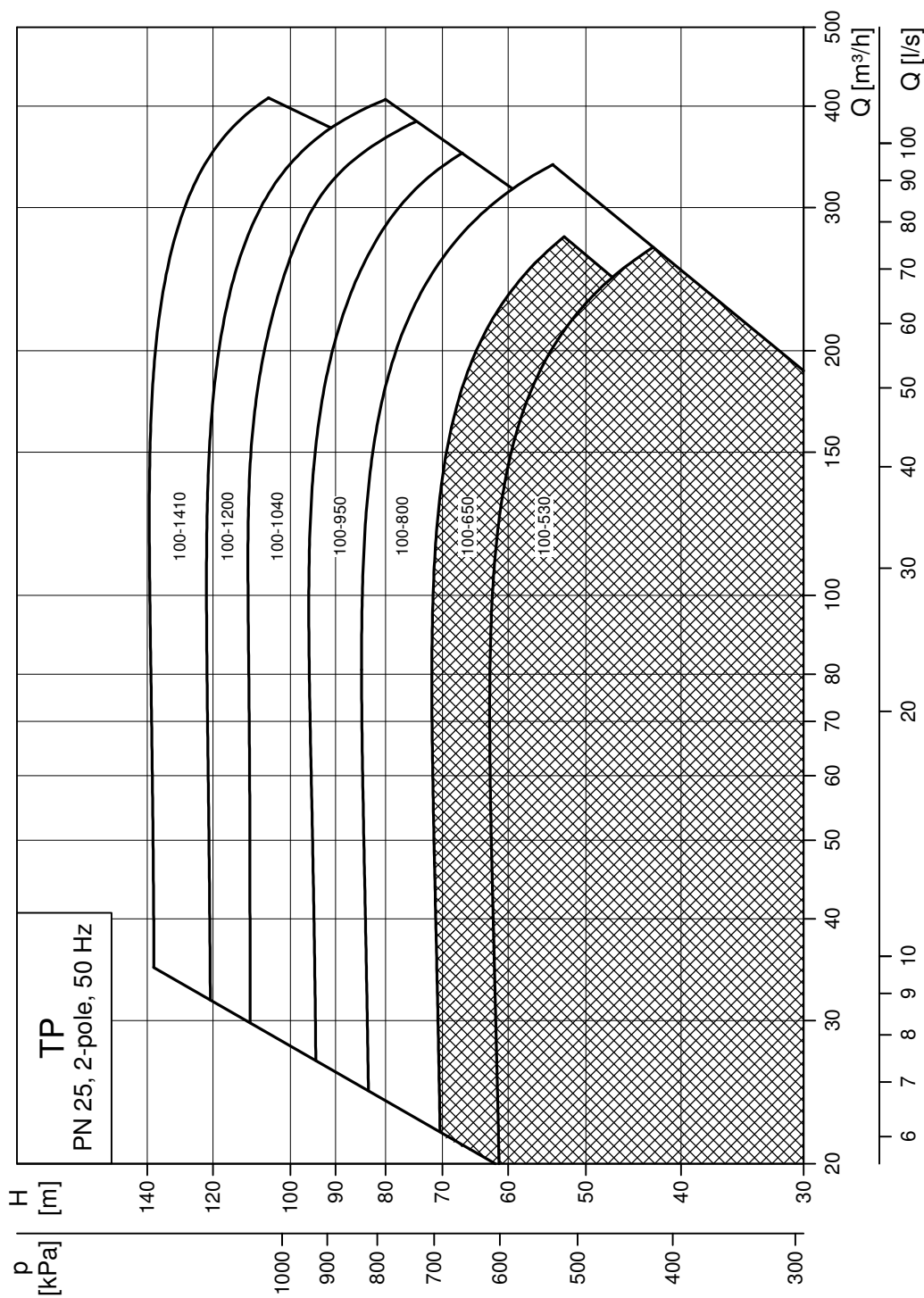


Note: All QH curves apply to single-head pumps. For further information about curve conditions, see page 160. The hatched area shows the performance range of TPE pumps.

TM02 7550 2218

### Performance range, 2-pole, PN 25

See page 196 for performance curves.

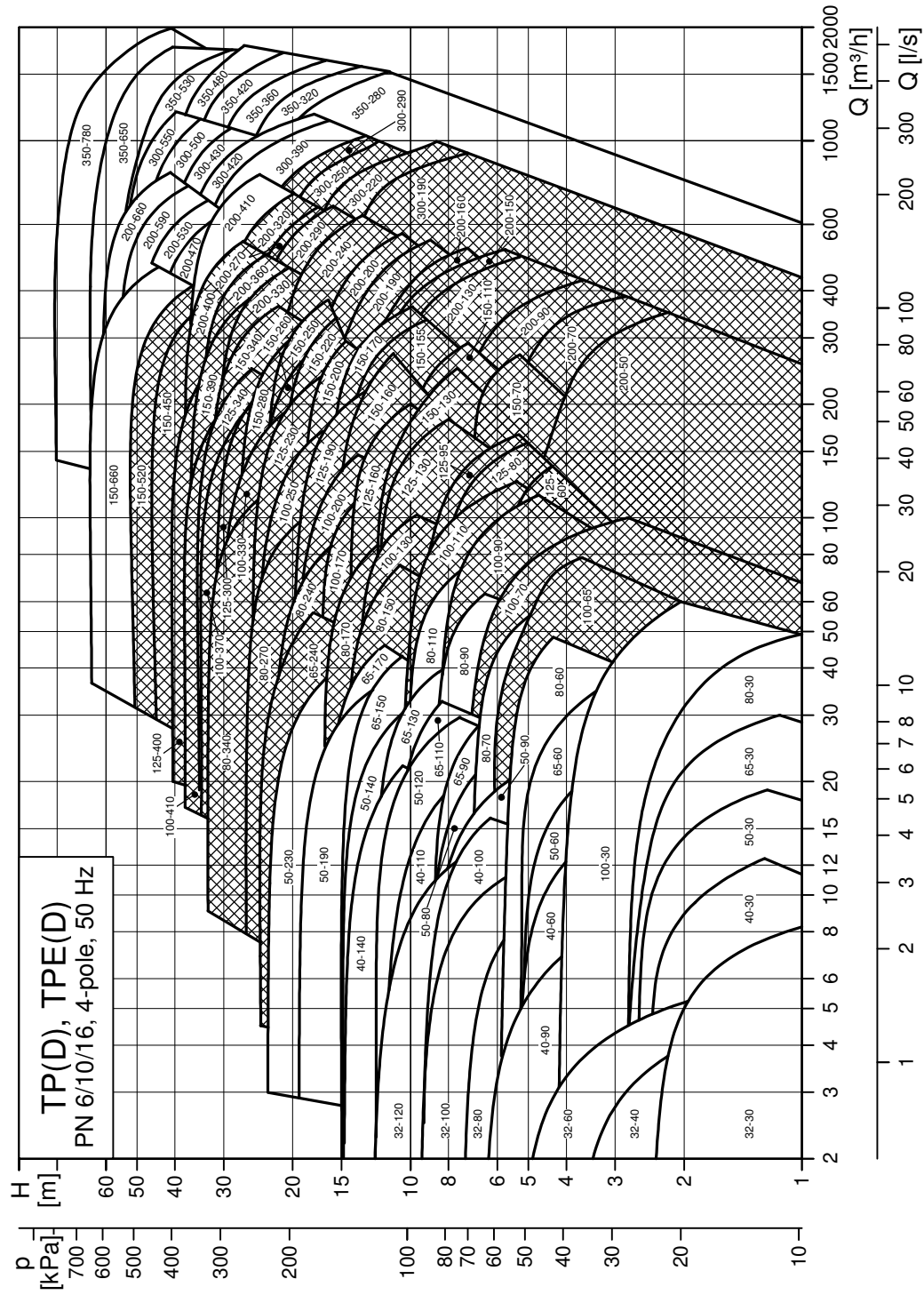


**Note:** All QH curves apply to single-head pumps. For further information about curve conditions, see page 160.

TM06 6533 2218

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

See page 200 for performance curves.

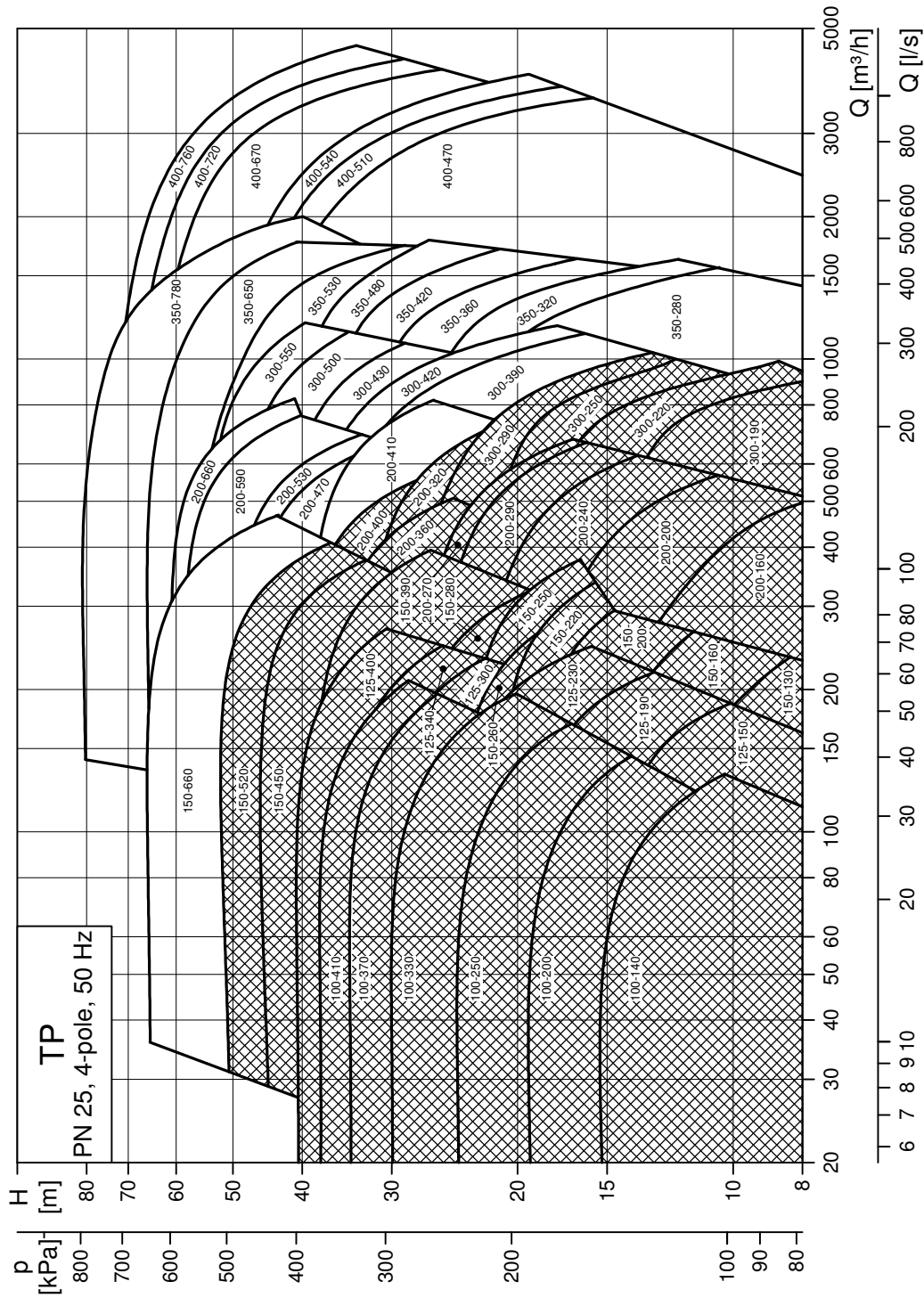


**Note:** All QH curves apply to single-head pumps. For further information about curve conditions, see page 160. The hatched area shows the performance range of TPE pumps.

TM02 7551 2218

### Performance range, 4-pole, PN 25

See page 200 for performance curves.

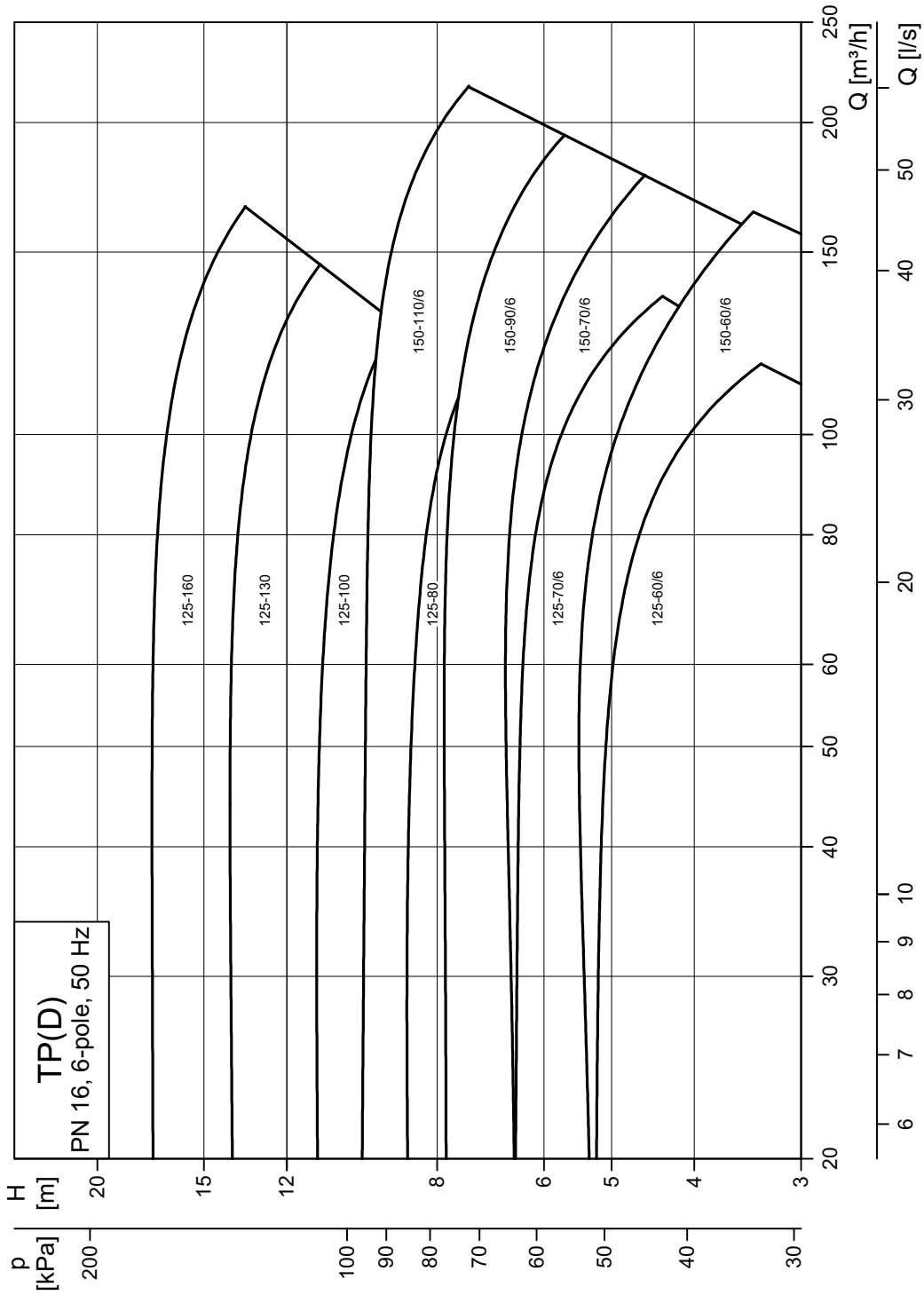


**Note:** All QH curves apply to single-head pumps. For further information about curve conditions, see page 160.

TM02 6869 2218

### Performance range, 6-pole, PN 16

See page 238 for performance curves.



**Note:** All QH curves apply to single-head pumps. For further information about curve conditions, see page 160.

TM02 8768 3814

### 3. Product range

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

Pump type	Design		Shaft seal				Pressure stage				Materials			Electronically speed-controlled motor	
	TPE2, TPE2 D	TPE3, TPE3 D	BQBE	BAQE	BQQE	DBUE	PN 6/10	PN 6	PN 10	PN 16	Pump housing		Impeller	Voltage [V]	
											Cast iron EN-GJL-250	Stainless steel <sup>1)</sup>		Composite PES-GF30	1 x 200-240 V
													P2 [kW]	P2 [kW]	
TPE2, TPE2 D, TPE3 TPE3 D 32-80	•	•	•		•		•			•	•	•	•	0.25	0.25
TPE2, TPE2 D, TPE3 TPE3 D 32-120	•	•	•		•		•			•	•	•	•	0.25	0.25
TPE2, TPE2 D, TPE3 TPE3 D 32-150	•	•	•		•		•			•	•	•	•	0.37	0.37
TPE2, TPE2 D, TPE3 TPE3 D 32-180	•	•	•		•		•			•	•	•	•	0.55	0.55
TPE2, TPE2 D, TPE3 TPE3 D 32-200	•	•	•		•		•			•	•	•	•	0.75	0.75
TPE2, TPE2 D, TPE3 TPE3 D 40-80	•	•	•		•		•			•	•	•	•	0.25	0.25
TPE2, TPE2 D, TPE3 TPE3 D 40-120	•	•	•		•		•			•	•	•	•	0.37	0.37
TPE2, TPE2 D, TPE3 TPE3 D 40-150	•	•	•		•		•			•	•	•	•	0.55	0.55
TPE2, TPE2 D, TPE3 TPE3 D 40-180	•	•	•		•		•			•	•	•	•	0.75	0.75
TPE2, TPE2 D, TPE3 TPE3 D 40-200	•	•	•		•		•			•	•	•	•	1.1	1.1
TPE2, TPE2 D, TPE3 TPE3 D 40-240	•	•	•		•		•			•	•	•	•	1.5	1.5
TPE2, TPE2 D, TPE3 TPE3 D 50-60	•	•	•		•		•			•	•	•	•	0.37	0.37
TPE2, TPE2 D, TPE3 TPE3 D 50-80	•	•	•		•		•			•	•	•	•	0.37	0.37
TPE2, TPE2 D, TPE3 TPE3 D 50-120	•	•	•		•		•			•	•	•	•	0.55	0.55
TPE2, TPE2 D, TPE3 TPE3 D 50-150	•	•	•		•		•			•	•	•	•	0.75	0.75
TPE2, TPE2 D, TPE3 TPE3 D 50-180	•	•	•		•		•			•	•	•	•	1.1	1.1
TPE2, TPE2 D, TPE3 TPE3 D 50-200	•	•	•		•		•			•	•	•	•	1.5	1.5
TPE2, TPE2 D, TPE3 TPE3 D 50-240	•	•	•		•		•			•	•	•	•		2.2
TPE2, TPE2 D, TPE3 TPE3 D 65-60	•	•	•		•		•			•	•	•	•	0.37	0.37
TPE2, TPE2 D, TPE3 TPE3 D 65-80	•	•	•		•		•			•	•	•	•	0.55	0.55
TPE2, TPE2 D, TPE3 TPE3 D 65-120	•	•	•		•		•			•	•	•	•	0.75	0.75
TPE2, TPE2 D, TPE3 TPE3 D 65-150	•	•	•		•		•			•	•	•	•	1.1	1.1
TPE2, TPE2 D, TPE3 TPE3 D 65-180	•	•	•		•		•			•	•	•	•	1.5	1.5
TPE2, TPE2 D, TPE3 TPE3 D 65-200	•	•	•		•		•			•	•	•	•		2.2
TPE2, TPE2 D, TPE3 TPE3 D 80-40	•	•	•		•			•	•	•	•	•	•	0.25	0.25
TPE2, TPE2 D, TPE3 TPE3 D 80-120	•	•	•		•			•	•	•	•	•	•	1.1	1.1
TPE2, TPE2 D, TPE3 TPE3 D 80-150	•	•	•		•			•	•	•	•	•	•	1.5	1.5
TPE2, TPE2 D, TPE3 TPE3 D 80-180	•	•	•		•			•	•	•	•	•	•		2.2
TPE2, TPE2 D, TPE3 TPE3 D 100-40	•	•	•		•			•	•	•	•	•	•	0.25	0.25
TPE2, TPE2 D, TPE3 TPE3 D 100-120	•	•	•		•			•	•	•	•	•	•	1.1	1.1
TPE2, TPE2 D, TPE3, TPE3 D 100-150	•	•	•		•			•	•	•	•	•	•	1.5	1.5
TPE2, TPE2 D, TPE3, TPE3 D 100-180	•	•	•		•			•	•	•	•	•	•		2.2

<sup>1)</sup> Stainless-steel versions are only available as single-head pumps and with a combined PN 6/10/16 flange.

Product range, 2-pole, PN 6, 10, 16, 25

Pump type	Design		Shaft seal				Pressure stage				Materials						Mains-operated motor			Electronically speed-controlled motor														
	TPE Series 1000	TPE Series 2000	TP Series 100	TP Series 200	TP Series 300	BQBE	BAQE	BQQE	DQQE	DAQF	PN 6	PN 10	PN 16	PN 25	Pump housing						Voltage [V]			Voltage [V]										
															Cast iron EN-GJL-150	Cast iron EN-GJL-200	Cast iron EN-GJL-250	Nodular cast iron EN-GJS-400-18-LT	Bronze <sup>1)</sup>	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 <sup>2)</sup>		1 x 200-240 V	3 x 380-480 V		3 x 380-420 V
																									P2 [kW]	P2 [kW]	P2 [kW]	P2 [kW]	P2 [kW]	P2 [kW]	P2 [kW]	P2 [kW]	P2 [kW]	P2 [kW]
TP 25-50/2	•		•			•	•							•							0.12	0.12		0.12										
TP 25-80/2	•		•			•	•							•								0.18	0.18		0.18									
TP 25-90/2	•		•			•	•							•								0.37	0.37		0.37									
TP 32-50/2	•		•			•	•							•								0.12	0.12		0.12									
TP 32-80/2	•		•			•	•							•								0.25	0.25		0.25									
TP 32-90/2	•		•			•	•							•								0.37	0.37		0.37									
TP, TPD 32-60/2			•			•	•			•	•					•						0.25	0.25											
TP, TPD 32-120/2			•			•	•			•	•					•						0.37	0.37											
TP, TPD 32-150/2			•			•	•			•	•					•						0.37	0.37											
TP, TPD 32-180/2			•			•	•			•	•					•						0.55	0.55											
TP, TPD 32-230/2	•	•	•			•	•			•	•					•						0.75	0.75		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	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											
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											
TP 40-180/2			•			•	•			•	•					•						0.55	0.55											
TP, TPD 40-190/2			•			•	•			•	•					•						0.75	0.75											
TP, TPD 40-230/2			•			•	•			•	•					•						1.1	1.1											
TP, TPD 40-270/2	•	•	•			•	•			•	•					•						1.5	1.5		1.5	1.5								
TP, TPD 40-240/2			•			•	•			•	•					•						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											
TP, TPD 50-120/2			•			•	•			•	•					•						0.75	0.75											
TP, TPD 50-180/2			•			•	•			•	•					•						0.75	0.75											
TP, TPD 50-160/2			•			•	•			•	•					•						1.1	1.1											
TP, TPD 50-190/2			•			•	•			•	•					•						1.5	1.5											
TP, TPD 50-240/2			•			•	•			•	•					•						2.2	2.2											
TP, TPD 50-290/2	•	•	•			•	•			•	•					•						3.0	3.0		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											
TP, TPD 65-120/2			•			•	•			•	•					•						1.1	1.1											
TP, TPD 65-180/2			•			•	•			•	•					•						1.5	1.5											
TP, TPD 65-170/2			•			•	•			•	•					•						2.2	2.2											
TP, TPD 65-210/2	•	•	•			•	•			•	•					•						3.0	3.0		3.0									
TP, TPD 65-250/2	•	•	•			•	•			•	•					•						4.0	4.0		4.0									
TP, TPD 65-340/2	•	•	•			•	•			•	•					•						5.5	5.5		5.5									
TP, TPD 65-410/2	•	•	•			•	•			•	•					•						7.5	7.5		7.5									
TP, TPD 65-460/2	•	•	•			•	•			•	•					•						11.0	11.0		11.0									
TP, TPD 65-550/2	•	•	•			•	•			•	•					•						15.0	15.0		15.0									





Product range, 4-pole, PN 6, 10, 16, 25

Pump type	Design		Shaft seal			Pressure stage			Materials				Mains-operated motor			Electronically speed-controlled motor																	
	TPE Series 1000	TPE Series 2000	TP Series 100	TP Series 200	TP Series 300	BQBE	BAQE	BQQE	DBUE	DQQE	DAQF	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-LT	Bronze <sup>1)</sup>	Stainless steel	Cast iron	Nodular cast iron EN-GJS-400-15	Bronze	1 x 220-230 ΔV/240 YV	P2 [kW]	3 x 220-240 ΔV/380-415 YV	P2 [kW]	3 x 380-415 ΔV/660-690 YV <sup>2)</sup>	P2 [kW]	1 x 200-240 V	P2 [kW]	3 x 380-480 V	P2 [kW]	3 x 380-420 V
TP, TPD 32-30/4			•																		0.12	0.12											
TP, TPD 32-40/4			•																			0.25	0.25										
TP, TPD 32-60/4			•																			0.25	0.25										
TP, TPD 32-80/4				•																		0.25	0.25										
TP, TPD 32-100/4				•																		0.37	0.37										
TP, TPD 32-120/4				•																		0.55	0.55										
TP, TPD 40-30/4			•																			0.12	0.12										
TP 40-60/4			•																			0.25	0.25										
TP, TPD 40-90/4			•																			0.25	0.25										
TP, TPD 40-100/4				•																		0.55	0.55										
TP, TPD 40-110/4				•																		0.75	0.75										
TP, TPD 40-140/4				•																		1.1	1.1										
TP, TPD 50-30/4			•																			0.25	0.25										
TP, TPD 50-60/4			•																			0.37	0.37										
TP, TPD 50-90/4				•																		0.55	0.55										
TP, TPD 50-80/4				•																		0.75	0.75										
TP, TPD 50-120/4				•																		1.1	1.1										
TP, TPD 50-140/4				•																		1.5	1.5										
TP, TPD 50-190/4				•																			2.2	2.2									
TP, TPD 50-230/4				•																			3.0	3.0									
TP, TPD 65-30/4			•																			0.25	0.25										
TP, TPD 65-60/4			•																			0.55	0.55										
TP, TPD 65-90/4				•																		0.75	0.75										
TP, TPD 65-110/4				•																		1.1	1.1										
TP, TPD 65-130/4				•																		1.5	1.5										
TP, TPD 65-150/4				•																			2.2	2.2									
TP, TPD 65-170/4				•																			3.0	3.0									
TP, TPD 65-240/4	•	•		•																			4.0	4.0									4.0
TP, TPD 80-30/4			•																			0.37	0.37										
TP, TPD 80-60/4			•																			0.75	0.75										
TP, TPD 80-70/4				•																		1.1	1.1										
TP, TPD 80-90/4				•																		1.5	1.5										
TP, TPD 80-110/4				•																			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										
TP, TPD 100-65/4	•	•		•																			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 100-140/4	•	•		•																			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									22.0
TP 125-60/4	•	•		•																			2.2	2.2									2.2
TP 125-80/4	•	•		•																			3.0	3.0									3.0
TP 125-95/4	•	•		•																			4.0	4.0									4.0
TP, 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



Pump type	Design		Shaft seal					Pressure stage				Materials					Mains-operated motor			Electronically speed-controlled motor																							
	TPE Series 1000	TPE Series 2000	TP Series 100	TP Series 200	TP Series 300	BQBE	BAQE	BQQE	DBUE	DQQE	DAQF	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-LT	Bronze <sup>1)</sup>	Stainless steel	Cast iron	Nodular cast iron EN-GJS-400-15	Bronze	1 x 220-230 ΔV/ 240 YV	P2 [kW]	3 x 220-240 ΔV/ 380-415 YV	P2 [kW]	3 x 380-415 ΔV/ 660-690 YV <sup>2)</sup>	P2 [kW]	1 x 200-240 V	P2 [kW]	3 x 380-480 V	P2 [kW]	3 x 380-420 V										
TP 400-470/4																																											
TP 400-510/4																																											
TP 400-540/4																																											
TP 400-670/4																																											
TP 400-720/4																																											
TP 400-760/4																																											

• Standard.

<sup>1)</sup> Bronze versions are only available as single-head pumps.

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

### Product range, 6-pole, PN 16

Pump type	Design		Shaft seal					Pressure stage				Materials					Mains-operated motor			Electronically speed-controlled motor																													
	TPE Series 1000	TPE Series 2000	TP Series 100	TP Series 200	TP Series 300	BQBE	BAQE	BQQE	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 <sup>1)</sup>	Stainless steel	Cast iron	Nodular cast iron EN-GJS-400-15	Bronze	1 x 220-230 ΔV/ 240 YV	P2 [kW]	3 x 220-240 ΔV/ 380-415 YV	P2 [kW]	3 x 380-415 ΔV/ 660-690 YV	P2 [kW]	1 x 200-240 V	P2 [kW]	3 x 380-480 V	P2 [kW]	3 x 380-420 V																		
TP, TPD 125-60/6																																																	
TP, TPD 125-70/6																																																	
TP, TPD 125-80/6																																																	
TP, TPD 125-100/6																																																	
TP, TPD 125-130/6																																																	
TP, TPD 125-160/6																																																	
TP, TPD 150-60/6																																																	
TP, TPD 150-70/6																																																	
TP, TPD 150-90/6																																																	
TP, TPD 150-110/6																																																	

• Standard.

<sup>1)</sup> Bronze versions are only available as single-head pumps.

## 4. Operating conditions

### System and test pressures

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

### Sound pressure level

Single-phase: Maximum 70 dB(A).

Three-phase: See table below.

Motor [kW]	Maximum sound pressure level [dB(A)] - ISO 3743		
	Three-phase motors		
	2-pole	4-pole	6-pole
0.12	-	-	-
0.18	-	-	-
0.25	56	41	-
0.37	56	45	-
0.55	57	42	-
0.75	53	59.5	-
1.1	53	49.5	-
1.5	58	50	47
2.2	60	51	52
3.0	59.5	53	63
4.0	63	54	63
5.5	62	50	63
7.5	60	51	66
11.0	60	53	-
15.0	60	54	-
18.5	60.5	60	-
22.0	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 run at a lower speed. Possible flow noise from control valves is also reduced at partial load in the case of the TPE, TPE2, and TPE3 pumps.

### Ambient temperature

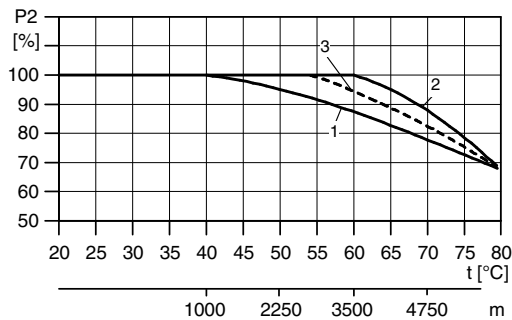
MG IE3 motors: 0.75 - 22 kW motors, 2-pole 0.75 - 15 kW motors, 4-pole	-20 to +60 °C
Siemens IE3 motors: 30-90 kW motors, 2-pole 18.5 - 90 kW motors, 4-pole	-20 to +55 °C
MGE motors: 0.12 - 11 kW, 2-pole 0.12 - 7.5 kW, 4-pole	-20 to +50 °C
MGE motors: 15-22 kW, 2-pole 11 - 18.5 kW, 4-pole	-20 to +40 °C
Siemens motor with integrated CUE	0 to +45 °C
Other motor sizes:	-20 to +40 °C
Storage	Down to -30 °C

## Installation altitude

### Pump with standard motor

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

Pos.	Description
3	Siemens IE3 motors: 30-90 kW motors, 2-pole 18.5 - 90 kW motors, 4-pole
2	MG IE3 motors: 0.75 - 22 kW motors, 2-pole 0.75 - 15 kW motors, 4-pole
1	Other motor sizes



**Fig. 3** Maximum motor output in relation to ambient temperature and altitude

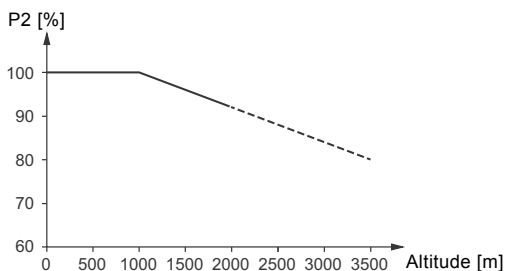
### Pump with Grundfos MGE motor

Description
MGE motors: 0.12 - 11 kW, 2-pole 0.12 - 7.5 kW, 4-pole

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

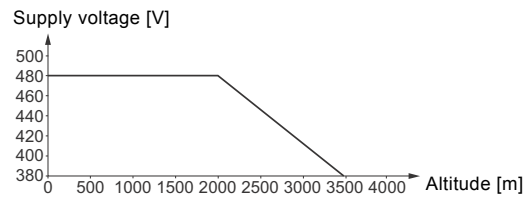
Motors installed up to 1000 m above sea level can be loaded 100 %.

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

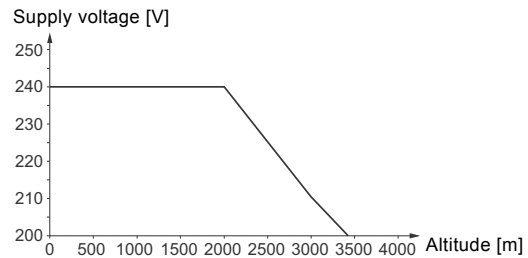


**Fig. 4** Motor output power in relation to altitude

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



**Fig. 5** Supply voltage for three-phase motor in relation to altitude



**Fig. 6** Supply voltage for single-phase motor in relation to altitude

#### Note:

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

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

#### Pump with Siemens motor with integrated CUE

Maximum altitude above sea level without performance reduction: 1000 m.

Maximum altitude above sea level with performance reduction: 3000 m.

## 5. Pumped liquids

### Pumped liquids

The pump is suitable for thin, clean, non-aggressive and non-flammable liquids, not containing solid particles or fibres that may attack the pump mechanically or chemically. See *List of pumped liquids* on page 24.

#### Examples

- Central heating system water. The water must 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 or DQQE type. See *Recommended shaft seal for water-glycol mixture* on page 26.

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

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

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

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

### Liquid temperature

Liquid temperature: -40 to +150 °C.

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

Pump type	Shaft seal	Temperature
TP Series 100	BQBE	0 to +120 °C
	BQQE	-25 to +120 °C
TP Series 200	BQBE	0 to +140 °C
	BQQE	-25 to +120 °C
TP Series 300, 16-bar version	BAQE	0 to +120 °C (140 °C) <sup>1)</sup>
	BQQE	-25 to +120 °C
TP Series 300, 25-bar version	DQQE	-40 to +120 °C
	DAQF	0 to +140 °C <sup>3)</sup>
TP Series 300, DN400 version	DBUE	0 to +150 °C <sup>2)</sup>
	BQBE	0 to +120 °C <sup>4)</sup>
TPE2, TPE3	BQBE	0 to +120 °C <sup>4)</sup>
	BQQE	-25 to +120 °C

<sup>1)</sup> TP Series 300, PN 16 pumps are designed for a maximum operating temperature of 140 °C. For operation above 120 °C, select an alternative shaft seal. Contact Grundfos.

<sup>2)</sup> At 120 to 150 °C, the maximum operating pressure is less than 23 bar.

<sup>3)</sup> For operation above 140 °C, contact Grundfos. At 120 to 150 °C, the maximum operating pressure is less than 23 bar.

<sup>4)</sup> 140 °C for a short period.

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

## List of pumped liquids

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

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

A number of typical liquids are listed below.

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

The list is intended as a general guide only, and it cannot replace actual testing of the pumped liquids and pump materials under specific working conditions. If in doubt, we recommend that you fill in the form shown on page 278 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

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

Pumped liquids	Notes	Additional information	Shaft seal					
			TPE2, TPE3	TP Series 100	TP Series 200	TP Series 300 PN 16	TP Series 300 PN 25	TP Series 300 DN 400
<b>Water</b>								
Groundwater		< 120 °C	BQBE BQQE	BQBE BQQE	BQBE BQQE	BQQE	DQQE DAQF <sup>4)</sup>	DBUE
		> 120 °C			BQBE	DAQF <sup>2) + 4)</sup>	DAQF <sup>4)</sup>	
Boiler-feed water		< 120 °C	BQBE BQQE	BQBE BQQE	BQBE BQQE	BAQE BQQE	DQQE DAQF	DBUE
		< 140 °C			BQBE	DAQF <sup>2)</sup>	DAQF	
		< 150 °C					DAUE <sup>2)</sup>	
District-heating water		< 120 °C	BQBE BQQE	BQBE BQQE	BQBE BQQE	BAQE BQQE	DQQE DAQF	DBUE
Condensate		< 120 °C	BQBE BQQE	BQBE BQQE	BQBE BQQE	BAQE BQQE	DQQE DAQF	DBUE
		> 120 °C			BQBE	DAQF <sup>2)</sup>	DAQF	
Softened water	C	< 120 °C	BQBE BQQE	BQBE BQQE	BQBE BQQE	BQQE BAQE	DQQE DAQF	DBUE
		> 120 °C			BQBE	DAQF <sup>2)</sup>	DAQF	
Brackish water	G	pH > 6.5, 40 °C, 1000 ppm Cl <sup>-</sup>	BQBE BQQE	BQBE BQQE	BQBE BQQE	BQQE	DQQE	DBUE
<b>Coolants</b>								
Ethylene glycol	B, D, H	< 120 °C	BQQE	BQQE	BQQE	BQQE	DQQE	DQQE <sup>2)</sup>
		< 90 °C						
Glycerine (glycerol)	B, D, H	< 120 °C	BQQE	BQQE	BQQE	BQQE	DQQE	DQQE <sup>2)</sup>
		< 90 °C						
Potassium acetate	B, D, C, H	< 120 °C	BQQE	BQQE	BQQE	BQQE	DQQE	DQQE <sup>2)</sup>
		< 110 °C		BQQE				
		< 90 °C						
Potassium formate	B, D, C, H	< 120 °C	BQQE	BQQE	BQQE	BQQE	DQQE	DQQE <sup>2)</sup>
		< 90 °C						
Propylene glycol	B, D, H	< 120 °C	BQQE	BQQE	BQQE	BQQE	DQQE	DQQE <sup>2)</sup>
		< 90 °C						
Brine sodium chloride	B, D, C, H	< 5 °C, 30 %	BQQE	BQQE	BQQE	BQQE	DQQE	DQQE <sup>2)</sup>

(To be continued)



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

- 1) Do not use BAQE for potable water. For potable water, we recommend that you use a BQQE shaft seal.
- 2) The shaft seal is not standard, but available on request.
- 3) Applies only for TPE2.
- 4) Do not use for potable water.

## Recommended shaft seal for water-glycol mixture

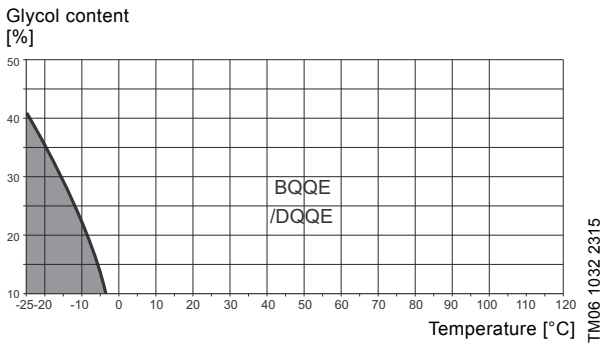


Fig. 7 Operating range of EPDM shaft seals

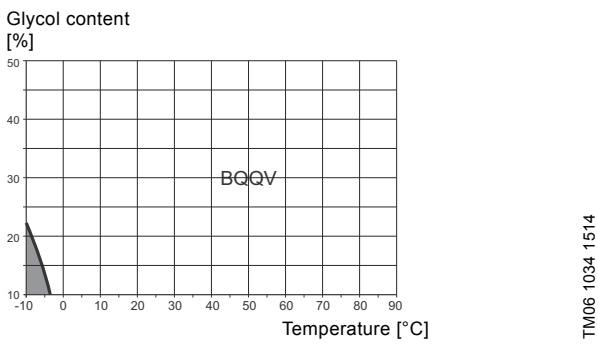


Fig. 8 Operating range of FKM shaft seals

## 6. TP Series 100 and 200 pumps



Fig. 9 TP Series 100 and TP Series 200

GrB2650 - GrB261

### Technical data

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

### Construction

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

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

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

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

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

The pumps are fitted with an unbalanced mechanical shaft seal.

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

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

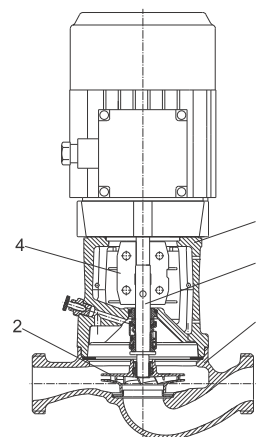
As radial and axial forces are absorbed by the fixed bearing in the motor drive-end, the pump requires no bearing.

The pumps are fitted with high-efficiency motors.

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

### Materials

#### TP Series 100



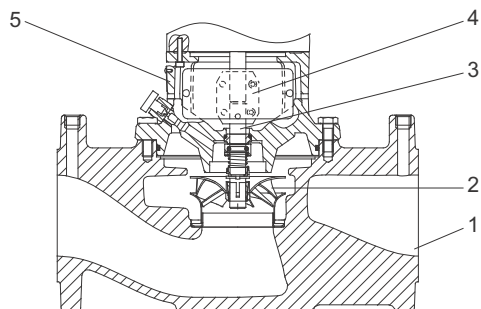
TM03 1210 2612

Fig. 10 Sectional drawing of TP Series 100 with union connection

#### Material specification, Series 100

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

## TP Series 200



TM03 1211 4715

Fig. 11 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	Silicon carbide	
	Stationary seat	Carbon (resin-impregnated), silicon carbide	

### Mechanical shaft seal

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

- **BQBE**

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

- **BQQE**

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

For more information about common pumped liquids with recommended shaft seals, see page 24.

### Shaft seal specification

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

Special shaft seals are available for partly conditioned water or other liquids containing abrasive or crystallising particles. See page 24.

### Connections

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

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

### Features and benefits

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

#### Optimised hydraulics for high efficiency

- Reduced power consumption.

#### High-efficiency motors

- TP pumps are fitted with high-efficiency motors. High-efficiency motors offer reduced energy consumption. TP pumps are primarily fitted with motors that meet the legislative requirements of the EuP IE3 grade. For further information, see *Motors*, pages 125 to 130.

#### Top-pull-out design

- Easy dismantling in case of service.

#### In-line design

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

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

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

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

#### Stainless-steel impeller and neck ring

- Wear-free operation with high efficiency.

## 7. TP Series 300 pumps



Gr8259

Fig. 12 TP Series 300

### Technical data

	PN 16 version	PN 25 version
Flow rate [m <sup>3</sup> /h]	Up to 2000	Up to 4500
Head [m]	Up to 93	Up to 140
Liquid temperature [°C]	-25 to +140	-40 to +150*
Maximum operating pressure [bar]	16	25
Direction of rotation	Clockwise	

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

### Construction

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

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

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

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

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

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

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

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

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

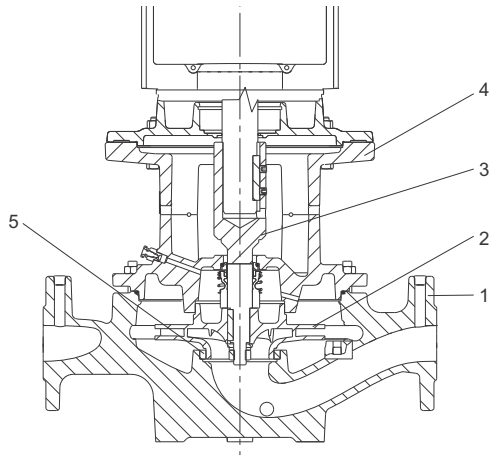
As radial and axial forces are absorbed by the fixed bearing in the motor drive-end, the pump requires no bearing.

The impeller is hydraulically balanced to minimise axial forces.

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

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

## Materials



TM04 9586 2115

Fig. 13 Sectional drawing of TP Series 300

### Material specification

#### TP Series 300, PN 16

Pos.	Component	Material	EN/DIN
1	Pump housing	Cast iron EN-GJL-250	EN-JL 1040
2	Impeller	Cast iron EN-GJL-200, bronze CuSn10	EN-JL 1030 2.1093
3	Stub shaft	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 ring	Bronze CuSn10/brass CuZn34Mn3Al2Fe1-C	2.1093

#### TP Series 300, PN 25

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

#### TP Series 300, DN 400, PN 25

Pos.	Component	Material	EN/DIN
1	Pump housing	Ductile cast iron EN-GJS-400-18 (A-LT)	EN-JS1020
2	Impeller	Ductile cast iron EN-GJS-400	EN-JS1030
		Bronze CuSn10	2.1093
3	Pump shaft	Stainless steel	1.4436
4	Coupling	Cast iron EN-GJL-250	EN-JL 1040
5	Motor stool	Cast iron EN-GJL-250	EN-JL 1040
	Secondary seals	EPDM rubber	
	Rotating seal face	Resin-impregnated carbon	
	Stationary seat	Tungsten carbide	

### Mechanical shaft seal

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

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

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

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

For further information about common pumped liquids with recommended shaft seals, see page 24.

Special shaft seals are available for partly conditioned water or other liquids containing abrasive or crystallising particles. See page 24.

### Connections

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

## Features and benefits

TP Series 300 pumps have these features and benefits:

### Optimised hydraulics for high efficiency

- Reduced power consumption.

### High-efficiency motors

- TP pumps are fitted with high-efficiency motors. High-efficiency motors offer reduced energy consumption. TP pumps are primarily fitted with motors that meet the legislative requirements of the EuP IE3 grade. TP pumps are also available with motors from 2.2 to 132 kW that meet the legislative requirements of the EuP IE4 grade. For further information, see *Motors* on pages 125 to 130.

### Top-pull-out design

- Easy dismantling in case of service.

### In-line design

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

### Motor-pump shaft with sleeve coupling

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

### Hydraulically and mechanically balanced impeller

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

### Surface treatment

TP Series 300 pumps are given the following surface treatment:

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

Electrocoating includes:

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

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

## 8. TPE Series 1000 pumps



Fig. 14 TPE Series 1000

TM06 7383 3416 - TM06 7385 3416  
TM07 1983 2518

### Technical data

Flow rate:	Up to 340 m <sup>3</sup> /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 55 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 motor of TPE Series 1000 pumps has a built-in frequency converter for continuous adjustment of the pressure to the flow rate. All pumps with 2-pole motors up to 11 kW and 4-pole motors up to 7.5 kW are fitted with Grundfos permanent-magnet MGE motors with motor efficiency class IE5 according to IEC 60034-30-2.

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

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

For further information on construction and materials of the pumps, see pages 27 to 31.

### Applications

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

The energy consumption is thus kept at a minimum.

The pumps can operate at any duty point within the range between 25 and 100 % speed. In a part of the duty range, the pumps with MGE motor can operate at speeds up to 110 %.

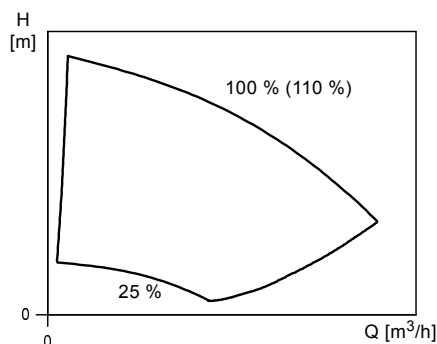


Fig. 15 Duty range of TPE Series 1000 pumps

TM01 4916 1099

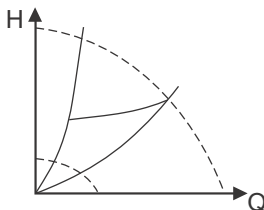
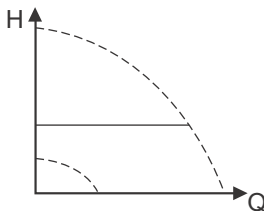
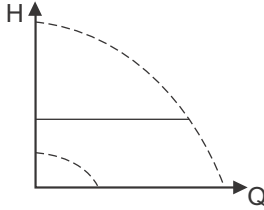
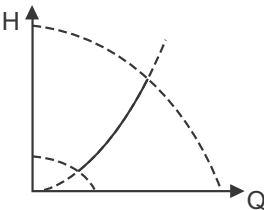
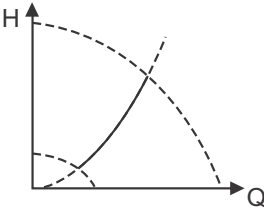
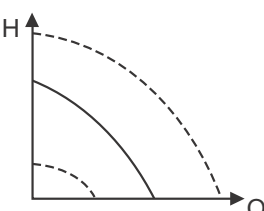
The 100 % curve corresponds to the curve of a pump with a mains-operated motor.

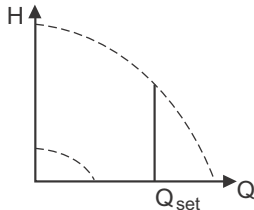
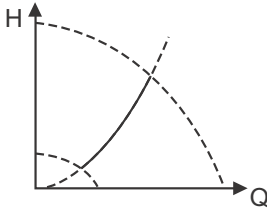
Depending on the application, the pumps offer energy savings, increased comfort or improved processing.

The pumps can be fitted with sensor types meeting the requirements mentioned in 29. *Accessories* on page 253.



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

System application	Select this control mode	Pump type
<p>In systems with relatively large pressure losses in the distribution pipes and in air-conditioning and cooling systems.</p> <ul style="list-style-type: none"> <li>Two-pipe heating systems with thermostatic valves and the following:                             <ul style="list-style-type: none"> <li>very long distribution pipes</li> <li>strongly throttled pipe balancing valves</li> <li>differential-pressure regulators</li> <li>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.</li> </ul> </li> <li>Primary circuit pumps in systems with large pressure losses in the primary circuit.</li> <li>Air-conditioning systems with the following:                             <ul style="list-style-type: none"> <li>heat exchangers (fan coils)</li> <li>cooling ceilings</li> <li>cooling surfaces.</li> </ul> </li> </ul>	<p><b>Constant differential pressure with differential-pressure sensor located in the system</b></p> 	<p>All</p>
<p>In systems with relatively small pressure losses in the distribution pipes.</p> <ul style="list-style-type: none"> <li>Two-pipe heating systems with thermostatic valves and the following:                             <ul style="list-style-type: none"> <li>sized for natural circulation</li> <li>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.</li> </ul> </li> <li>Underfloor heating systems with thermostatic valves.</li> <li>One-pipe heating systems with thermostatic valves or pipe balancing valves.</li> <li>Primary circuit pumps in systems with small pressure losses in the primary circuit.</li> </ul>	<p><b>Constant differential pressure</b></p> 	<p>All</p>
<p>In pressure boosting systems.</p>	<p><b>Constant pressure</b></p> 	<p>All</p>
<p>In systems with a fixed system characteristic.</p> <p>Examples:</p> <ul style="list-style-type: none"> <li>one-pipe heating systems</li> <li>boiler shunts</li> <li>systems with three-way valves</li> <li>domestic hot-water circulation.</li> </ul>	<p><b>Constant temperature</b></p> 	<p>All</p>
	<p><b>Constant differential temperature</b></p> 	<p>0.12 - 11 kW, 2-pole 0.12 - 7.5 kW, 4-pole</p>
<p>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:</p> <ul style="list-style-type: none"> <li>Use the maximum-curve mode in periods in which a maximum flow rate is required. This operating mode is for instance suitable for hot-water priority.</li> <li>Use the minimum-curve mode in periods in which a minimum flow rate is required.</li> </ul>	<p><b>Constant curve</b></p> 	<p>All</p>

System application	Select this control mode	Pump type
<p>In systems requiring a constant flow rate, independently of pressure drop.</p> <p>Examples:</p> <ul style="list-style-type: none"> <li>• chillers for air-conditioning</li> <li>• heating surfaces</li> <li>• cooling surfaces.</li> </ul>	<p>Constant flow rate</p> 	All
<p>In systems requiring a constant tank level, independently of the flow rate.</p> <p>Examples:</p> <ul style="list-style-type: none"> <li>• process water tanks</li> <li>• boiler condensate tanks.</li> </ul>	<p>Constant level</p> 	<p>0.12 - 11 kW, 2-pole 0.12 - 7.5 kW, 4-pole</p>
<p>In systems with pumps operating in parallel.</p> <p>The multipump function enables the control of single-head pumps connected in parallel (two to four pumps) and 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.</p>	"Assist" menu, "Multipump setup"	<p>0.12 - 11 kW, 2-pole 0.12 - 7.5 kW, 4-pole</p>

## TPE, TPED pumps with extended performance range

Standard TPE, TPED pumps with MGE motor, 50 Hz, are able to operate in a range above the 100 % curve. See fig. 16.

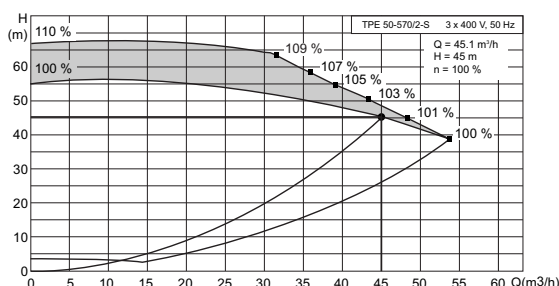


Fig. 16 TPE and TPED pumps with extended performance range

The extended range is provided by means of optimised software which utilises the MGE motor in an optimum way. The result is that the 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 % QH curve.

Grundfos Product Center shows the extended performance range of the pumps. See page 280.

## 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 starts.

### Standby operation

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

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

## Control options

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

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

For further information on control options of the pumps, see page 120.

## 9. TPE Series 2000 pumps



TM06 7382 3416 - TM06 7384 3416  
TM07 1984 2518

Fig. 17 TPE Series 2000

### Technical data

Flow rate:	Up to 340 m <sup>3</sup> /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 55 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 motor of TPE Series 2000 pumps has a built-in frequency converter for continuous adjustment of the pressure to the flow rate. All pumps with 2-pole motors up to 11 kW and 4-pole motors up to 7.5 kW are fitted with Grundfos permanent-magnet MGE motors that have motor efficiency class IE5 according to IEC 60034-30-2.

The range is a preset solution for quick and safe installation. The pumps fitted with 2-pole motors below 15 kW and 4-pole motors below 11 kW have a colour display for easy and intuitive pump setup and with full access to all functions.



TM05 8893 2813

Fig. 18 Example of main display on a TPE Series 2000 with advanced control panel

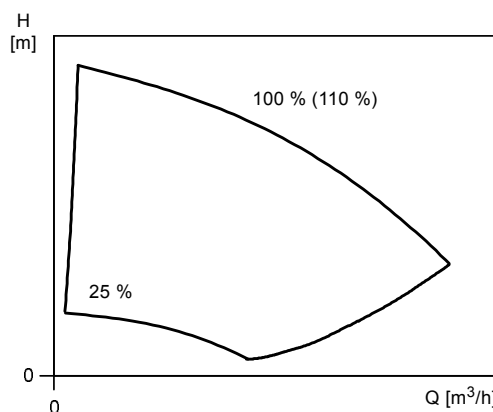
For further information on construction and materials of the pumps, see pages 27 to 31.

### Applications

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

The energy consumption is thus kept at a minimum.

The pumps can operate at any duty point within the range between 25 and 100 % speed. In a part of the duty range, the pumps with MGE motor can operate at speeds up to 110 %.



TM01 4916 1099

Fig. 19 Duty range of TPE Series 2000 pumps

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

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

The pumps are suitable for applications requiring pressure control.

### Proportional pressure

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

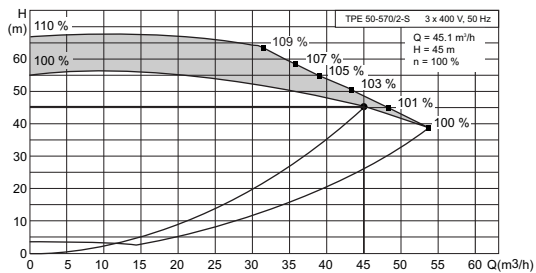
The charts below show possible control modes of the pumps in different applications.

System application	Select this control mode	Pump type
<p>In systems with relatively large pressure losses in the distribution pipes and in air-conditioning and cooling systems.</p> <ul style="list-style-type: none"> <li>Two-pipe heating systems with thermostatic valves and the following:                             <ul style="list-style-type: none"> <li>very long distribution pipes</li> <li>strongly throttled pipe balancing valves</li> <li>differential-pressure regulators</li> <li>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.</li> </ul> </li> <li>Primary circuit pumps in systems with large pressure losses in the primary circuit.</li> <li>Air-conditioning systems with the following:                             <ul style="list-style-type: none"> <li>heat exchangers (fan coils)</li> <li>cooling ceilings</li> <li>cooling surfaces.</li> </ul> </li> </ul>	<p><b>Proportional pressure</b></p>	All
<p>In systems with relatively large pressure losses in the distribution pipes and in air-conditioning and cooling systems.</p> <ul style="list-style-type: none"> <li>Two-pipe heating systems with thermostatic valves and the following:                             <ul style="list-style-type: none"> <li>very long distribution pipes</li> <li>strongly throttled pipe balancing valves</li> <li>differential-pressure regulators</li> <li>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.</li> </ul> </li> <li>Primary circuit pumps in systems with large pressure losses in the primary circuit.</li> <li>Air-conditioning systems with the following:                             <ul style="list-style-type: none"> <li>heat exchangers (fan coils)</li> <li>cooling ceilings</li> <li>cooling surfaces.</li> </ul> </li> </ul>	<p><b>Constant differential pressure with differential-pressure sensor located in the system</b></p>	0.12 - 11 kW, 2-pole 0.12 - 7.5 kW, 4-pole
<p>In systems with relatively small pressure losses in the distribution pipes.</p> <ul style="list-style-type: none"> <li>Two-pipe heating systems with thermostatic valves and the following:                             <ul style="list-style-type: none"> <li>sized for natural circulation</li> <li>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.</li> </ul> </li> <li>Underfloor heating systems with thermostatic valves.</li> <li>One-pipe heating systems with thermostatic valves or pipe balancing valves.</li> <li>Primary circuit pumps in systems with small pressure losses in the primary circuit.</li> </ul>	<p><b>Constant differential pressure</b></p>	All
<p>In pressure boosting systems.</p>	<p><b>Constant pressure</b></p>	0.12 - 11 kW, 2-pole 0.12 - 7.5 kW, 4-pole
<p>In systems with a fixed system characteristic.</p> <p>Examples:</p> <ul style="list-style-type: none"> <li>one-pipe heating systems</li> <li>boiler shunts</li> <li>systems with three-way valves</li> <li>domestic hot-water circulation.</li> </ul>	<p><b>Constant temperature</b></p>	0.12 - 11 kW, 2-pole 0.12 - 7.5 kW, 4-pole
	<p><b>Constant differential temperature</b></p>	0.12 - 11 kW, 2-pole 0.12 - 7.5 kW, 4-pole

System application	Select this control mode	Pump type
<p>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:</p> <ul style="list-style-type: none"> <li>• Use the maximum curve mode in periods in which a maximum flow rate is required.</li> <li>• Use the minimum curve mode in periods in which a minimum flow rate is required.</li> </ul> <p>This operating mode is for instance suitable for hot-water priority.</p>	<p><b>Constant curve</b></p>	All
<p>In systems requiring a constant flow, independently of pressure drop.</p> <p>Examples:</p> <ul style="list-style-type: none"> <li>• chillers for air-conditioning</li> <li>• heating surfaces</li> <li>• cooling surfaces.</li> </ul>	<p><b>Constant flow rate</b></p>	<p>0.12 - 11 kW, 2-pole 0.12 - 7.5 kW, 4-pole</p>
<p>In systems requiring a constant tank level, independently of the flow rate.</p> <p>Examples:</p> <ul style="list-style-type: none"> <li>• process water tanks</li> <li>• boiler condensate tanks.</li> </ul>	<p><b>Constant level</b></p>	<p>0.12 - 11 kW, 2-pole 0.12 - 7.5 kW, 4-pole</p>
<p>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.</p>	<p><b>"Assist" menu, "Multipump setup"</b></p>	<p>0.12 - 11 kW, 2-pole 0.12 - 7.5 kW, 4-pole</p>

## TPE, TPED pumps with extended performance range

Standard TPE, TPED pumps with MGE motor, 50 Hz, are able to operate in a range above the 100 % curve. See fig. 20.



TM04 6324 0110

**Fig. 20** TPE and TPED pumps with extended performance range

The extended range is provided by means of optimised software which uses the MGE motor in an optimum way. The result is that the 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 % QH curve.

Grundfos Product Center shows the extended performance range of the pumps. See page 280.

## 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 starts.

### Standby operation

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

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

## Control options

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

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

For further information on control options of the pumps, see page 120.

## 10. TPE2



Fig. 21 TPE2 and TPE2 D pumps

TM06 7378 3416 - TM06 7379 3416

### Technical data

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

### Construction

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

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

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

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

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

The pumps are fitted with an unbalanced mechanical shaft seal.

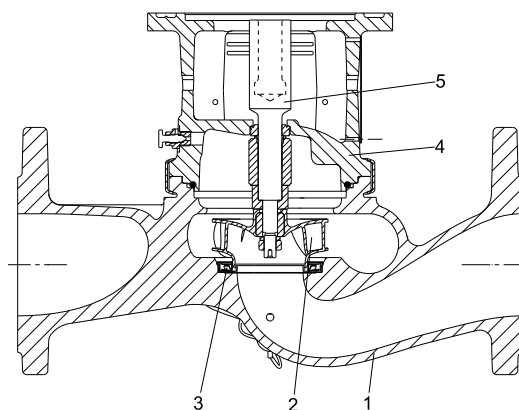
The power head (motor, pump head and impeller) and pump housing are held together by a specially designed clamp. The clamp allows for fast repositioning of the pump housing and fast service of the pump.

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

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

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

### Materials



TM05 8200 2113

Fig. 22 Sectional drawing of a TPE2 pump

### Material specification

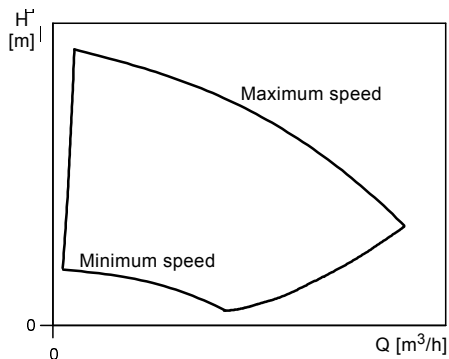
Pos.	Component	Material	EN/DIN
1	Pump housing	Cast iron EN-GJL-250 Stainless steel	EN1561 EN 1.4308
2	Impeller	Composite PES-GF30	
3	Neck ring	Stainless steel	EN 1.4404
4	Pump head/motor stool	Cast iron EN-GJL-250 Stainless steel	EN1561 EN 1.4308
	Secondary seals	EPDM	
	Rotating seal face	Silicon carbide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

### Applications

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

The energy consumption is thus kept at a minimum.

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



TM01 4916 1099

Fig. 23 Duty range of TPE2

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

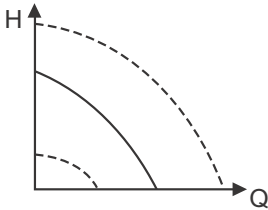
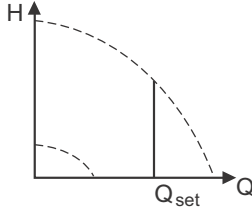
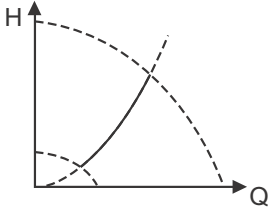
The pumps can be fitted with sensor types meeting the requirements mentioned in 29. *Accessories* on page 253.

### Constant curve

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

System application	Select this control mode	Pump type
<p>In systems with relatively large pressure losses in the distribution pipes and in air-conditioning and cooling systems.</p> <ul style="list-style-type: none"> <li>Two-pipe heating systems with thermostatic valves and the following:                             <ul style="list-style-type: none"> <li>very long distribution pipes</li> <li>strongly throttled pipe balancing valves</li> <li>differential-pressure regulators</li> </ul> </li> <li>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</li> <li>primary circuit pumps in systems with large pressure losses in the primary circuit</li> <li>air-conditioning systems with the following:                             <ul style="list-style-type: none"> <li>heat exchangers (fan coils)</li> <li>cooling ceilings</li> <li>cooling surfaces.</li> </ul> </li> </ul>	<p><b>Constant differential-pressure with differential pressure sensor located in the system</b></p>	All
<p>In systems with relatively small pressure losses in the distribution pipes.</p> <ul style="list-style-type: none"> <li>Two-pipe heating systems with thermostatic valves and the following:                             <ul style="list-style-type: none"> <li>sized for natural circulation</li> <li>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.</li> </ul> </li> <li>Underfloor heating systems with thermostatic valves.</li> <li>One-pipe heating systems with thermostatic valves or pipe balancing valves.</li> <li>Primary circuit pumps in systems with small pressure losses in the primary circuit.</li> </ul>	<p><b>Constant differential pressure</b></p>	All
<p>In pressure boosting systems.</p>	<p><b>Constant pressure</b></p>	All
<p>In systems with a fixed system characteristic.</p> <p>Examples:</p> <ul style="list-style-type: none"> <li>one-pipe heating systems</li> <li>boiler shunts</li> <li>systems with three-way valves</li> <li>domestic hot-water circulation.</li> </ul>	<p><b>Constant temperature and constant differential temperature</b></p>	All



System application	Select this control mode	Pump type
<p>If an external controller is installed, the pump is able to change from one constant curve to another, depending on the value of the external signal. The pump can also be set to operate according to the maximum or minimum curve, like an uncontrolled pump:</p> <ul style="list-style-type: none"> <li>• Use the maximum curve mode in periods in which a maximum flow rate is required. This operating mode is for instance suitable for hot-water priority.</li> <li>• Use the minimum curve mode in periods in which a minimum flow rate is required. This operating mode is for instance suitable for manual night setback instead of automatic night setback.</li> </ul>	<p style="text-align: center;"><b>Constant curve</b></p> 	All
<p>In systems requiring a constant flow rate, independently of pressure drop.</p> <p>Examples:</p> <ul style="list-style-type: none"> <li>• chillers for air-conditioning</li> <li>• heating surfaces</li> <li>• cooling surfaces.</li> </ul>	<p style="text-align: center;"><b>Constant flow rate</b></p> 	All
<p>In systems requiring a constant tank level, independently of the flow rate.</p> <p>Examples:</p> <ul style="list-style-type: none"> <li>• process water tanks</li> <li>• boiler condensate tanks.</li> </ul>	<p style="text-align: center;"><b>Constant level</b></p> 	All
<p>In systems with pumps operating in parallel. The multipump function enables the control of single-head pumps connected in parallel (two to four pumps) and twin-head pumps without the use of external controllers. The pumps in a multipump system communicate with each other via the wireless GENIair connection or the wired GENI connection.</p>	<p style="text-align: center;"><b>"Assist" menu "Multipump setup"</b></p>	All

## Multipump system

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 GENIair connection or the wired GENI connection.

You set a multipump system via a selected pump, that is the master pump which is the first selected pump.

If you configure two pumps in the system with an outlet-pressure sensor, both pumps can function as master pumps and take over the master pump function if the other fails. This provides additional redundancy in the multipump system.

You can connect all Grundfos pumps with a wireless GENIair connection to the multipump system.

The multipump functions are described in the following sections.

### Alternating operation

Alternating operation functions as a duty-standby operating mode and is possible with two pumps of same size and type connected in parallel. The main purpose of the function is to ensure an even amount of running hours and to ensure that the standby pump takes over if the running pump stops due to an alarm. Each pump requires a non-return valve in series with the pump.

You can choose between two alternating operation modes:

- Alternating operation, time  
Pump changeover to the other is based on time.
- Alternating operation, energy  
Pump changeover to the other is based on energy consumption.

If the duty pump fails, the other pump takes over automatically.

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

Backup operation is possible with two pumps of same size and type connected in parallel. Each pump requires a non-return valve in series with the pump.

One pump is operating continuously. The backup pump is operated for a short time each day 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.

When a twin-head pump is running in constant-pressure control mode, the second pump head starts at 90 % and stops at 50 % performance.

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

Pump system:

- Twin-head pump.
- 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" or "Const. curve".

### Control options

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

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

For further information on control options of TPE2 pumps, see page 120.

# 11. TPE3



TM06 7380 3416 - TM06 7381 3416

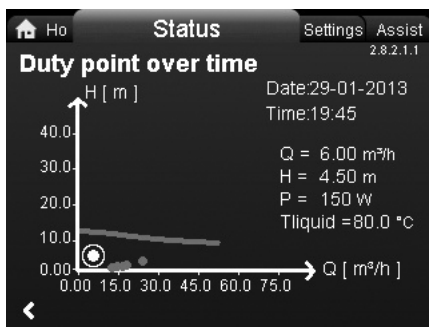
Fig. 24 TPE3 and TPE3 D pumps

## Technical data

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

## Construction

The pumps have built-in differential-pressure and temperature sensor.  
 The permanent-magnet motor has a built-in frequency converter for continuous adjustment of the pressure to the flow rate. All pumps are fitted with Grundfos permanent-magnet MGE motors that have motor efficiency class IE5 according to IEC 60034-30-2.  
 The range is a preset solution for quick and safe installation.  
 The pump has a colour display for easy and intuitive pump setup and with full access to all functions.



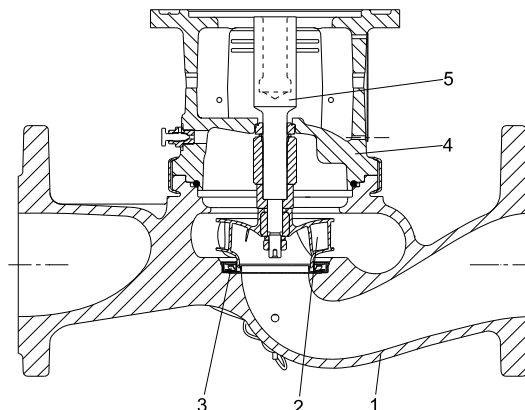
TM06 0883 1114

Fig. 25 Example of status display for TPE3 pumps

The pumps are available as single-head, TPE3, and twin-head, TPE3 D, pumps.  
 The pumps have PN 6, PN 10 or PN 16 flanges.  
 The pumps are fitted with an unbalanced mechanical shaft seal.  
 The power head (motor, pump head and impeller) and pump housing are held together by a specially designed clamp. The clamp allows for fast repositioning of the pump housing and fast service of the pump.

The twin-head pumps are designed with two parallel power heads. A flap valve in the common outlet port is opened by the flow of the pumped liquid and prevents backflow of liquid into the idle pump head.  
 As radial and axial forces are absorbed by the fixed bearing in the motor drive-end, the pump requires no bearing.  
 Pumps with stainless-steel pump housing, version I, are suitable for circulation of domestic hot water.

## Materials



TM05 8200 2113

Fig. 26 Sectional drawing of a TPE3 pump

## Material specification

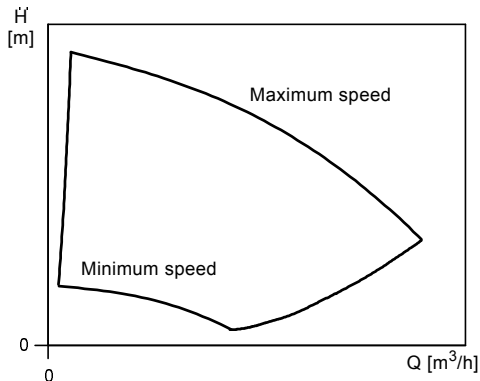
Pos.	Component	Material	EN/DIN
1	Pump housing	Cast iron EN-GJL-250	EN1561
		Stainless steel	EN 1.4308
2	Impeller	Composite PES-GF30	
3	Neck ring	Stainless steel	EN 1.4404
4	Pump head/motor stool	Cast iron EN-GJL-250	EN1561
		Stainless steel	EN 1.4308
	Secondary seals	EPDM	
	Rotating seal face	Silicon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

### Applications

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

The energy consumption is thus kept at a minimum.

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



TM01 4916 1099

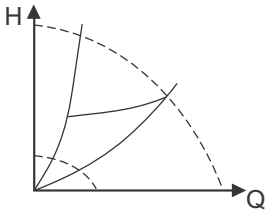
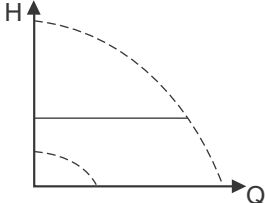
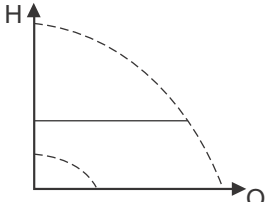
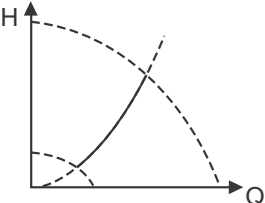
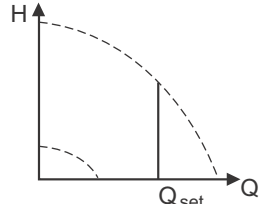
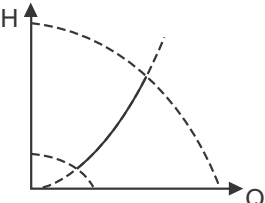
**Fig. 27** Duty range of TPE3

Depending on the application, the pumps offer energy savings, increased comfort or improved processing. The pumps are suitable for applications requiring pressure control.

### AUTO<sub>ADAPT</sub>

TPE3 pumps are factory-set to AUTO<sub>ADAPT</sub> which continuously adapts the pump performance according to the actual system characteristic.

System application	Select this control mode	Pump type
<p>Recommended for most heating systems, especially in systems with relatively large pressure losses in the distribution pipes. See description under proportional pressure. In replacement situations where the proportional-pressure duty point is unknown. The duty point has to be within the "AUTO<sub>ADAPT</sub>" operating range. During operation, the pump automatically makes the necessary adjustment to the actual system characteristics. This setting ensures minimum energy consumption and low noise level from the valves, and therefore reduces operating costs and increases comfort.</p>	<p>"AUTO<sub>ADAPT</sub>"</p>	<p>All</p>
<p>The FLOW<sub>ADAPT</sub> control mode is a combination of AUTO<sub>ADAPT</sub> and FLOW<sub>LIMIT</sub>. This control mode is suitable for systems where a maximum flow rate limit, FLOW<sub>LIMIT</sub> is desired. The pump continuously monitors and adjusts the flow rate, thus ensuring that the selected FLOW<sub>LIMIT</sub> is not exceeded. Main pumps in boiler applications where a steady flow through the boiler is required. No extra energy is used for pumping too much liquid into the system. In systems with mixing loops, the control mode can control the flow rate in each loop. Benefits:</p> <ul style="list-style-type: none"> <li>• Enough water for all loops at peak load conditions if each loop has been set to the right maximum flow rate.</li> <li>• The dimensioned flow rate for each zone, required heat energy, is determined by the flow from the pump. This value can be set precisely in the FLOW<sub>ADAPT</sub> control mode without the use of pump throttling valves.</li> <li>• When the flow rate is set lower than the balancing valve setting, the pump ramps down instead of losing energy by pumping against a balancing valve.</li> <li>• Cooling surfaces in air-conditioning systems operate at high pressure and low flow rate.</li> </ul>	<p>FLOW<sub>ADAPT</sub></p>	<p>All</p>
<p>In systems with relatively large pressure losses in the distribution pipes and in air-conditioning and cooling systems.</p> <ul style="list-style-type: none"> <li>• Two-pipe heating systems with thermostatic valves and the following:                             <ul style="list-style-type: none"> <li>– very long distribution pipes</li> <li>– strongly throttled pipe balancing valves</li> <li>– differential-pressure regulators</li> <li>– 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.</li> </ul> </li> <li>• Primary circuit pumps in systems with large pressure losses in the primary circuit.</li> <li>• Air-conditioning systems with the following:                             <ul style="list-style-type: none"> <li>– heat exchangers (fan coils)</li> <li>– cooling ceilings</li> <li>– cooling surfaces.</li> </ul> </li> </ul>	<p>Proportional pressure</p>	<p>All</p>

System application	Select this control mode	Pump type
<p>In systems with relatively large pressure losses in the distribution pipes and in air-conditioning and cooling systems.</p> <ul style="list-style-type: none"> <li>Two-pipe heating systems with thermostatic valves and the following:                             <ul style="list-style-type: none"> <li>very long distribution pipes</li> <li>strongly throttled pipe balancing valves</li> <li>differential-pressure regulators</li> <li>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.</li> </ul> </li> <li>Primary circuit pumps in systems with large pressure losses in the primary circuit.</li> <li>Air-conditioning systems with the following:                             <ul style="list-style-type: none"> <li>heat exchangers (fan coils)</li> <li>cooling ceilings</li> <li>cooling surfaces.</li> </ul> </li> </ul>	<p><b>Constant differential pressure with differential-pressure sensor located in the system</b></p> 	<p>All</p>
<p>In systems with relatively small pressure losses in the distribution pipes.</p> <ul style="list-style-type: none"> <li>Two-pipe heating systems with thermostatic valves and the following:                             <ul style="list-style-type: none"> <li>dimensioned for natural circulation</li> <li>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.</li> </ul> </li> <li>Underfloor heating systems with thermostatic valves.</li> <li>One-pipe heating systems with thermostatic valves or pipe balancing valves.</li> <li>Primary circuit pumps in systems with small pressure losses in the primary circuit.</li> </ul>	<p><b>Constant differential pressure</b></p> 	<p>All</p>
<p>In pressure boosting systems.</p>	<p><b>Constant pressure</b></p> 	<p>All</p>
<p>In systems with a fixed system characteristic.</p> <p>Examples:</p> <ul style="list-style-type: none"> <li>one-pipe heating systems</li> <li>boiler shunts</li> <li>systems with three-way valves</li> <li>domestic hot-water circulation.</li> </ul> <p>You can use FLOW<sub>LIMIT</sub> to control the maximum circulation flow rate.</p>	<p><b>Constant temperature and constant differential temperature</b></p> 	<p>All</p>
<p>In systems requiring a constant flow rate, independently of pressure drop.</p> <p>Examples:</p> <ul style="list-style-type: none"> <li>chillers for air-conditioning</li> <li>heating surfaces</li> <li>cooling surfaces.</li> </ul>	<p><b>Constant flow rate</b></p> 	<p>All</p>
<p>In systems requiring a constant tank level, independently of the flow rate.</p> <p>Examples:</p> <ul style="list-style-type: none"> <li>process water tanks</li> <li>boiler condensate tanks.</li> </ul>	<p><b>Constant level</b></p> 	<p>All</p>
<p>In systems with pumps operating in parallel.</p> <p>The multipump function enables the control of single-head pumps connected in parallel (two to four pumps) and twin-head pumps without the use of external controllers. The pumps in a multipump system communicate with each other via the wireless GENair connection or the wired GENi connection.</p>	<p><b>"Assist" menu "Multipump setup"</b></p>	<p>All</p>

## Multipump system

The multipump function enables the control of two pumps connected in parallel 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 via a selected pump, that is the master pump, which is the first selected pump. If two pumps in the system are configured with an outlet-pressure sensor, both pumps can function as master pumps and take over the master pump function if the other fails. This provides additional redundancy in the multipump system.

The multipump functions are described in the following sections.

### Alternating operation

Alternating operation functions as a duty-standby operating mode and is possible with two pumps of same size and type connected in parallel. The main purpose of the function is to ensure an even amount of running hours and to ensure that the standby pump takes over if the running pump stops due to an alarm. Each pump requires a non-return valve in series with the pump.

You can choose between two alternating operation modes:

- Alternating operation, time  
Pump changeover to the other is based on time.
- Alternating operation, energy  
Pump changeover to the other is based on energy consumption.  
If the duty pump fails, the other pump takes over automatically.  
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

Backup operation is possible with two pumps of same size and type connected in parallel. Each pump requires a non-return valve in series with the pump.

One pump is operating continuously. The backup pump is operated for a short time each day 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. When a twin-head pump is running in constant-pressure control mode, the second pump head starts at 90 % and stops at 50 % performance. All pumps in operation run at equal speed. Pump changeover is automatic and depends on energy, operating hours and fault.

Pump system:

- Twin-head pump.
- 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" or "Const. curve".

### Control options

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

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

For further information on control options of the pumps, see page 120.

## 12. User interfaces for TPE pumps 0.12 - 22 kW, 2-pole and 0.12 - 18.5 kW, 4-pole

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

### Control panels

- TPE2 and TPE Series 1000 pumps, 0.12 - 11 kW, 2-pole and 0.12 - 7.5 kW, 4-pole. See page 47.
- TPE Series 1000 pumps, 15-22 kW, 2-pole and 11 - 18.5 kW, 4-pole. See page 49.
- TPE Series 2000 pumps, 15-22 kW, 2-pole and 11 - 18.5 kW, 4-pole. See page 50.
- Advanced control panel for TPE3 and TPE Series 2000 pumps, 0.12 - 11 kW, 2-pole and 0.12 - 7.5 kW, 4-pole. See page 52.

### Remote controls

- Grundfos GO.  
See *Grundfos GO* on page 57.

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

### Control panel for TPE2 and TPE Series 1000 pumps, 0.12 - 11 kW, 2-pole and 0.12 - 7.5 kW, 4-pole

Pump variant	Fitted as standard	Option
TPE3, TPE3 D	-	-
TPE2, TPE2 D	•	-
TPE Series 2000	0.12 - 11 kW, 2-pole	-
	0.12 - 7.5 kW, 4-pole	-
TPE Series 1000	15-22 kW, 2-pole	-
	11 - 18.5 kW, 4-pole	-
TPE Series 1000	0.12 - 11 kW, 2-pole	•
	0.12 - 7.5 kW, 4-pole	-
TPE Series 1000	15-22 kW, 2-pole	-
	11 - 18.5 kW, 4-pole	-

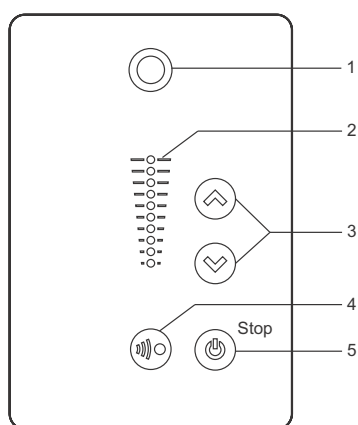


Fig. 28 Standard control panel

TM05 4848 3512

Pos.	Symbol	Description
1		Grundfos Eye The indicator light shows the operating status of the pump. See page 94 for further information.
2	-	Light fields for indication of setpoint.
3		Up and down. The buttons change the setpoint.
4		The button allows radio communication with Grundfos GO and other products of the same type. When you try to establish radio communication between the pump and Grundfos GO or another pump, the green indicator light in Grundfos Eye flashes continuously. Press  on the pump control panel to allow radio communication with Grundfos GO and other products of the same type.
5		The button makes the pump ready for operation and starts and stops the pump. <b>Start:</b> If you press the button when the pump is stopped, the pump only starts if no other functions with higher priority have been enabled. <b>Stop:</b> If you press the button when the pump is running, the pump always stops. The "Stop" text next to the button is on.

### Setpoint setting

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

### Pump in differential-pressure control mode

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

Figure 29 shows that light fields 5 and 6 are activated, indicating a desired setpoint of 3 m with a sensor measuring range from 0 to 6 m. The setting range is equal to the sensor measuring range.

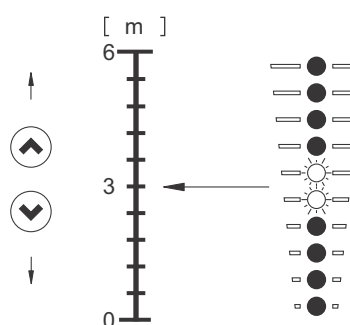


Fig. 29 Setpoint set to 3 m, differential-pressure control

TM05 4894 3512

### Pump in constant-curve control mode

In constant-curve control mode, the pump performance is between the maximum and minimum curve of the pump. See fig. 30.

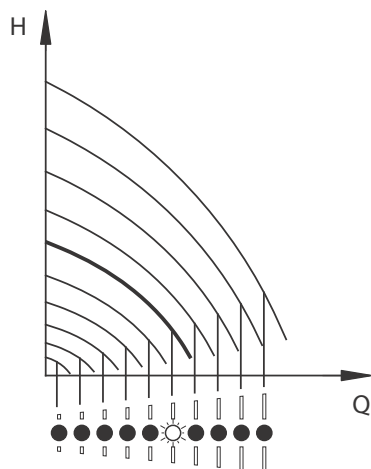


Fig. 30 Pump in constant-curve control mode

Setting to maximum curve:

- Press continuously to change over to the maximum curve of the pump. The 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 31 shows that the top light field is flashing, indicating maximum curve.

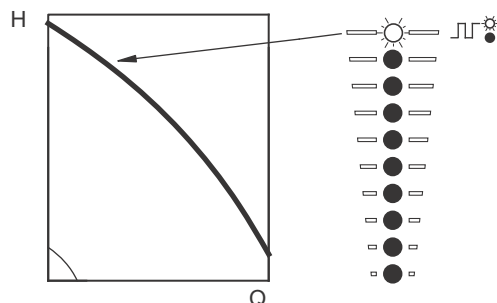


Fig. 31 Maximum curve duty

Setting to minimum curve:

- Press continuously to change over to the minimum curve of the pump. The 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 light field starts flashing.

**Example:** Pump set to minimum curve.

Figure 32 shows that the bottom light field is flashing, indicating minimum curve.

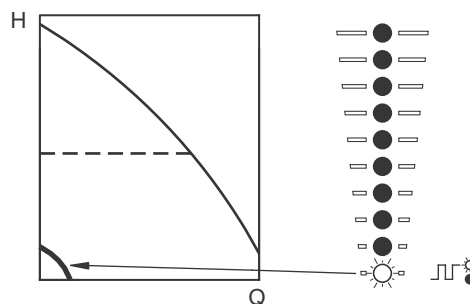


Fig. 32 Minimum curve duty

### Start and stop of pump

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

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

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.

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

### Resetting of fault indications

Reset a fault indication in one of the following ways:

- Via the digital input if it has been set to "Alarm resetting".
- Briefly press or on the pump. This will not change the setting of the pump. You cannot reset a fault indication 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 Grundfos GO.

TM05 4895 2812

TM05 4896 2812

TM05 4897 2812

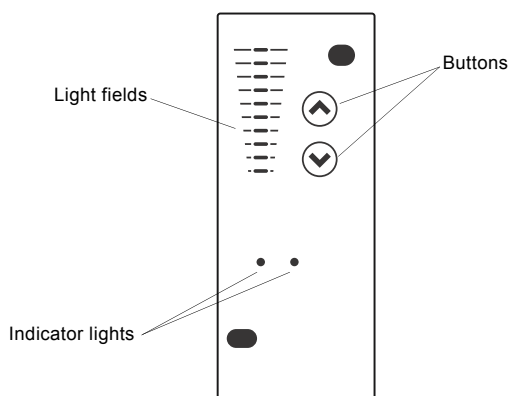


### Control panel for TPE Series 1000 pumps, 15-22 kW, 2-pole and 11 - 18.5 kW, 4-pole

Pump variant	Fitted as standard	Option
TPE3, TPE3 D	-	-
TPE2, TPE2 D	-	-
TPE Series 2000	0.12 - 11 kW, 2-pole 0.12 - 7.5 kW, 4-pole	-
TPE Series 1000	15-22 kW, 2-pole 11 - 18.5 kW, 4-pole	-
TPE Series 1000	0.12 - 11 kW, 2-pole 0.12 - 7.5 kW, 4-pole	-
TPE Series 1000	15-22 kW, 2-pole 11 - 18.5 kW, 4-pole	•

The control panel incorporates the following buttons and indicator lights:

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



TM05 8590 2613

Fig. 33 Control panel for TPE Series 1000 pumps, 15-22 kW, 2-pole and 11 - 18.5 kW, 4-pole

### Setpoint setting

**Note:** You can only set the setpoint when the operating mode is "Normal".

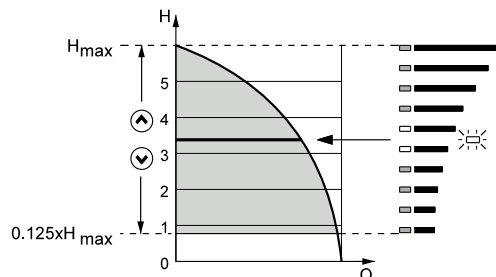
Set the desired setpoint by pressing  $\odot$  or  $\ominus$ .

The light fields on the control panel indicates the setpoint set.

### Control mode "Differential-pressure control"

#### Example

Figure 34 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 the sensor nameplate.



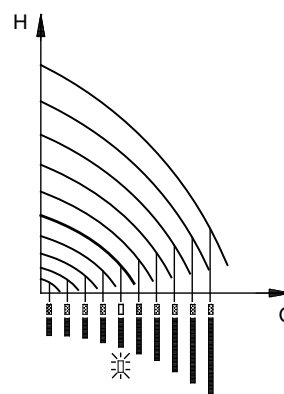
TM03 5845 4006

Fig. 34 Setpoint set to 3.4 m, control mode "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. 35.



TM00 7746 1304

Fig. 35 Pump performance setting, control mode "Constant curve"

### Setting to maximum curve duty

Press  $\odot$  continuously to change to the maximum curve of the pump. The top light field flashes. See fig. 36.

To change back, press  $\ominus$  continuously until the desired setpoint is indicated.

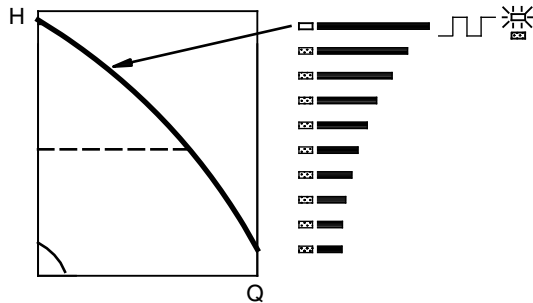


Fig. 36 Maximum curve duty

TM00 7345 1304

### Setting to minimum curve duty

Press  $\ominus$  continuously to change to the minimum curve of the pump. The bottom light field flashes. See fig. 37.

To change back, press  $\odot$  continuously until the desired setpoint is indicated.

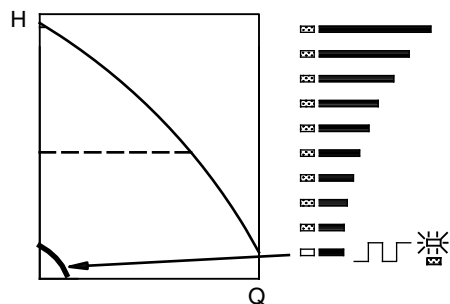


Fig. 37 Minimum curve duty

TM00 7346 1304

### Start-stop of pump

Press  $\odot$  continuously until the desired setpoint is indicated to start the pump.

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

## Control panel for TPE Series 2000 pumps, 15-22 kW, 2-pole and 11 - 18.5 kW, 4-pole

Pump variant	Fitted as standard	Option
TPE3, TPE3 D	-	-
TPE2, TPE2 D	-	-
TPE Series 2000	0.12 - 11 kW, 2-pole 0.12 - 7.5 kW, 4-pole 15-22 kW, 2-pole 11 - 18.5 kW, 4-pole	- - • -
TPE Series 1000	0.12 - 11 kW, 2-pole 0.12 - 7.5 kW, 4-pole 15-22 kW, 2-pole 11 - 18.5 kW, 4-pole	- - - -

The pump control panel incorporates the following buttons and indicator lights. See fig. 38:

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

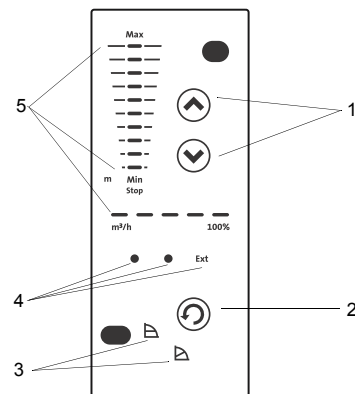


Fig. 38 Control panel, TPE Series 2000 pumps, 15-22 kW, 2-pole and 11 - 18.5 kW, 4-pole

TM05 8591 2613

Pos.	Description
1 and 2	Buttons for setting
3 and 5	Light fields for indication of: <ul style="list-style-type: none"> <li>• control mode (3)</li> <li>• head, performance and operating mode (5).</li> </ul>
4	Indicator lights for indication of: <ul style="list-style-type: none"> <li>• operation and fault</li> <li>• external control, EXT.</li> </ul>

### Setting of control mode

Change the control mode by pressing  $\odot$  (2) according to the following cycle:

- constant differential pressure,  $\Delta$
- proportional pressure,  $\Delta$ .



Fig. 39 Setting the control mode

TM03 9061 3307

### Setting of pump head

Set the pump head by pressing  $\odot$  or  $\ominus$ .

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

#### Proportional pressure

Figure 40 shows that light fields 5 and 6 are activated, indicating a desired head of 3.4 m at maximum flow rate. The setting range is between 25 and 90 % of maximum head.

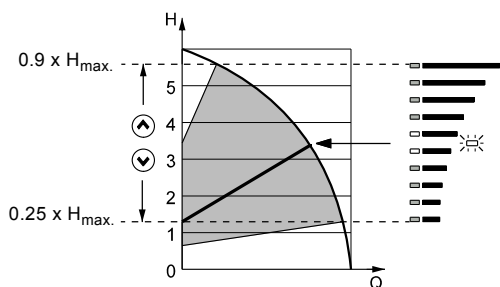


Fig. 40 Pump in "Proportional-pressure" control mode

TM03 5846 4006

#### Constant differential pressure

Figure 41 shows that light fields 5 and 6 are activated, indicating a desired head of 3.4 m. The setting range is between 1/8, 12.5 %, of maximum head and maximum head.

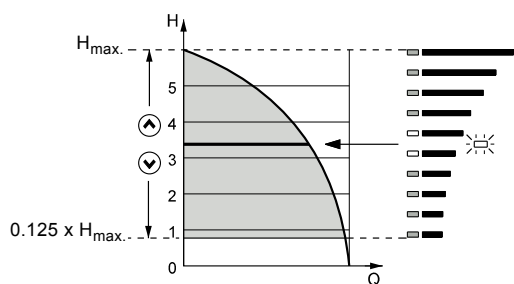


Fig. 41 Pump in "Constant differential pressure" control mode

TM03 5845 4006

### Setting to maximum curve duty

Press  $\odot$  continuously to change to the maximum curve of the pump and MAX illuminates. See fig. 42.

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

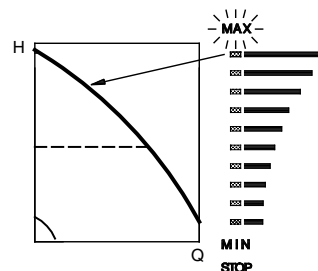


Fig. 42 Maximum curve duty

TM03 0289 4704

### Setting to minimum curve duty

Press  $\ominus$  continuously to change to the minimum curve of the pump and MIN illuminates. See fig. 43.

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

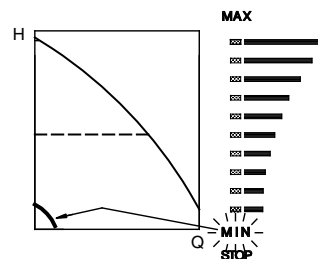


Fig. 43 Minimum curve duty

TM03 0290 4704

### Start-stop of pump

Press  $\odot$  continuously until the desired head is indicated to start the pump.

- Press  $\ominus$  continuously until STOP is on and the green indicator light flashes to stop the pump.

## Advanced control panel for TPE3 and TPE Series 2000 pumps, 0.12 - 11 kW, 2-pole and 0.12 - 7.5 kW, 4-pole

Pump variant	Fitted as standard	Option
TPE3, TPE3 D	•	-
TPE2, TPE2 D	-	•
TPE Series 2000	0.12 - 11 kW, 2-pole	•
	0.12 - 7.5 kW, 4-pole	-
	15-22 kW, 2-pole	-
TPE Series 1000	11 - 18.5 kW, 4-pole	-
	0.12 - 11 kW, 2-pole	-
	0.12 - 7.5 kW, 4-pole	•
	15-22 kW, 2-pole	-
	11 - 18.5 kW, 4-pole	-

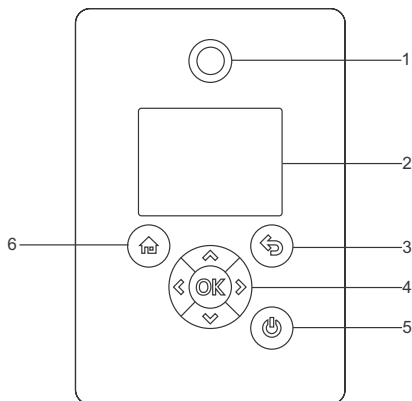


Fig. 44 Advanced control panel

TM05 4849 1013

Pos.	Symbol	Description
1		Grundfos Eye The indicator light shows the operating status of the pump. See <i>Priority of settings</i> on page 94 for further information.
2	-	Graphical colour display.
3		Press the button to go one step back.
4		Press the button to navigate between main menus, displays and digits. When you change the menu, the display always shows the top display of the new menu.  Press the buttons to navigate between submenus or change value settings. <b>Note:</b> If you have disabled the possibility to make settings with the "Enable/disable settings" function, then you can enable it again temporarily by pressing these buttons simultaneously for at least 5 seconds. See "Buttons on product" ("Enable/disable settings") on page 85.
5		Press the button to save changed values, reset alarms and expand the value field. The button enables radio communication with Grundfos GO and other products of the same type. When you try to establish radio communication between the pump and Grundfos GO or another pump, the green indicator light in Grundfos Eye flashes. A note also appears in the pump display stating that a wireless device wants to connect to the pump. Press  on the pump control panel to allow radio communication with Grundfos GO and other products of the same type.  Press the button to make the pump ready for operation and starts and stops the pump. <b>Start:</b> 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. <b>Stop:</b> If you press the button when the pump is running, the pump is always stopped. When you stop the pump via this button, the  icon appears in the bottom of the display.
6		Press the button to go to the "Home" menu.

"Home" display

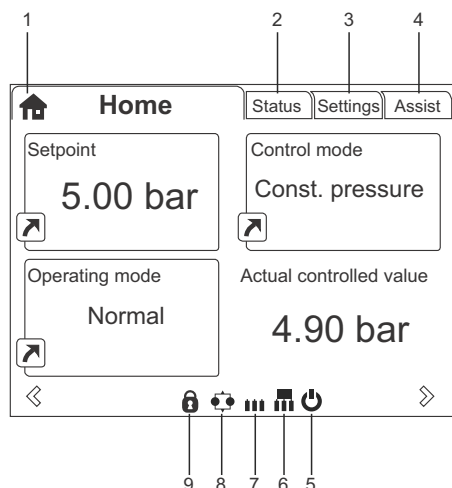


Fig. 45 Example of "Home" display

Pos.	Symbol	Description
1		"Home" This menu shows up to four user-defined parameters. You can select parameters shown as shortcut icon , and when pressing  you go directly to the "Settings" display for the selected parameter.
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. You can make detailed settings of the pump in this menu. See <i>Description of selected functions</i> on page 61.
4	-	"Assist" This menu enables "Assisted Pump Setup", provides a short description of the control modes and offers fault advice. See "Assist" on page 88.
5		This symbol indicates that the pump has been stopped via the  button.
6		This symbol indicates that the pump is functioning as master pump in a multipump system.
7		This symbol indicates that the pump is functioning as a slave pump in a multipump system.
8		This symbol indicates that the pump is operating in a multipump system. See "Multipump setup" ("Setup of multi-pump system") on page 90.
9		This symbol indicates that the possibility to make settings has been disabled for protective reasons. See "Buttons on product" ("Enable/disable settings") on page 85.

Startup guide

The pump incorporates a startup guide which is started at the first startup. See "Run startup guide" on page 88. After the startup guide, the main menus appear in the display.

## Menu overview for advanced control panel

### Main menus

Home	TPE3, TPE3 D	TPE2, TPE2 D	TPE Series 2000 0.12 - 11 kW, 2-pole 0.12 - 7.5 kW, 4-pole	TPE Series 1000 0.12 - 11 kW, 2-pole 0.12 - 7.5 kW, 4-pole	Multipump system <sup>2)</sup>	Section	Page
•	•	•	•	•	•		
•	•	•	•	•	•		
Status	TPE3, TPE3 D	TPE2, TPE2 D	TPE Series 2000 0.12 - 11 kW, 2-pole 0.12 - 7.5 kW, 4-pole	TPE Series 1000 0.12 - 11 kW, 2-pole 0.12 - 7.5 kW, 4-pole	Multipump system <sup>2)</sup>	Section	Page
"Operating status"	•	• <sup>1)</sup>	•	• <sup>1)</sup>	•		
"Operating mode, from"	•	• <sup>1)</sup>	•	• <sup>1)</sup>	•		
"Control mode"	•	• <sup>1)</sup>	•	• <sup>1)</sup>	•		
"Pump performance"	•	• <sup>1)</sup>	•	• <sup>1)</sup>	•		
"Actual controlled value"	•	• <sup>1)</sup>	•	• <sup>1)</sup>	•		
"Max. curve and duty point"	•	•	•	•	•		
"Resulting setpoint"	•	• <sup>1)</sup>	•	• <sup>1)</sup>	•		
"Liquid temperature"	•	•	•	•	•		
"Speed"	•	• <sup>1)</sup>	•	• <sup>1)</sup>	•		
"Acc. flow, specific energy"	•	• <sup>1)</sup>	•	• <sup>1)</sup>	•		
"Power and energy consumption"	•	• <sup>1)</sup>	•	• <sup>1)</sup>	•		
"Measured values"	•	• <sup>1)</sup>	•	• <sup>1)</sup>	•		
"Analog input 1"	•	• <sup>1)</sup>	•	• <sup>1)</sup>	•		
"Analog input 2"	•	• <sup>1)</sup>	•	• <sup>1)</sup>	•		
"Analog input 3"	•	• <sup>1)</sup>	•	• <sup>1)</sup>	•		
"Pt100/1000 input 1"	•	• <sup>1)</sup>	•	• <sup>1)</sup>	•		
"Pt100/1000 input 2"	•	• <sup>1)</sup>	•	• <sup>1)</sup>	•		
"Analog output"	•	• <sup>1)</sup>	•	• <sup>1)</sup>	•		
"Warning and alarm"	•	• <sup>1)</sup>	•	• <sup>1)</sup>	•		
"Actual warning and alarm"	•	• <sup>1)</sup>	•	• <sup>1)</sup>	•		
"Warning log"	•	• <sup>1)</sup>	•	• <sup>1)</sup>	•		
"Alarm log"	•	• <sup>1)</sup>	•	• <sup>1)</sup>	•		
"Heat energy monitor"	•	•	•	•	•	"Heat energy monitor"	61
"Heat power"	•	•	•	•	•		
"Heat energy"	•	•	•	•	•		
"Flow rate"	•	•	•	•	•		
"Volume"	•	•	•	•	•		
"Hour counter"	•	•	•	•	•		
"Temperature 1"	•	•	•	•	•		
"Temperature 2"	•	•	•	•	•		
"Differential temp."	•	•	•	•	•		
"Operating log"	•	• <sup>1)</sup>	•	• <sup>1)</sup>	•		
"Operating hours"	•	• <sup>1)</sup>	•	• <sup>1)</sup>	•		
"Trend data"	•	•	•	•	•		
"Fitted modules"	•	• <sup>1)</sup>	•	• <sup>1)</sup>	•		
"Date and time"	•	• <sup>1)</sup>	•	• <sup>1)</sup>	•		
"Product identification"	•	• <sup>1)</sup>	•	• <sup>1)</sup>	•		
"Motor bearing monitoring"	•	• <sup>1)</sup>	•	• <sup>1)</sup>	•		
"Multipump system"	•	•	•	•	•		
"System operating status"	•	•	•	•	•		
"System performance"	•	•	•	•	•		
"System input power and energy"	•	•	•	•	•		
"Pump 1, multipump sys."	•	•	•	•	•		
"Pump 2, multipump sys."	•	•	•	•	•		
"Pump 3, multipump sys."	•	•	•	•	•		

• Available.

<sup>1)</sup> The advanced control panel is available as an option on TPE2 and TPE Series 1000 pumps, 0.12 - 11 kW, 2-pole and 0.12 - 7.5 kW, 4-pole.

<sup>2)</sup> Pumps above 11 kW, 2-pole and 7.5 kW, 4-pole have no multipump function.

Settings	TPE3, TPE3 D	TPE2, TPE2 D	TPE Series 2000 0.12 - 11 kW, 2-pole 0.12 - 7.5 kW, 4-pole	TPE Series 1000 0.12 - 11 kW, 2-pole 0.12 - 7.5 kW, 4-pole	Multipump system <sup>2)</sup>	Section	Page
"Setpoint"	•	• <sup>1)</sup>	•	• <sup>1)</sup>	•	"Setpoint"	61
"Operating mode"	•	• <sup>1)</sup>	•	• <sup>1)</sup>	•	"Operating mode"	62
"Set manual speed"	•	• <sup>1)</sup>	•	• <sup>1)</sup>	•	"Set manual speed"	62
"Set user-defined speed"	•	• <sup>1)</sup>	•	• <sup>1)</sup>	•	"Set user-defined speed"	62
"Control mode"	•	• <sup>1)</sup>	•	• <sup>1)</sup>	•	"Control mode"	62
"Flow limit"	•				•	"FLOW <sub>LIMIT</sub> "	69
"Automatic night setback"	•				•	"Automatic night setback"	70
"Analog inputs"	•	• <sup>1)</sup>	•	• <sup>1)</sup>	•		
"Analog input 1, setup"	•	• <sup>1)</sup>	•	• <sup>1)</sup>	•	"Analog inputs"	70
"Analog input 2, setup"	•	• <sup>1)</sup>	•	• <sup>1)</sup>	•		
"Analog input 3, setup"	•	• <sup>1)</sup>	•	• <sup>1)</sup>	•		
"Built-in Grundfos sensor"	•		•		•	"Built-in Grundfos sensor"	72
"Pt100/1000 inputs"	•	• <sup>1)</sup>	•	• <sup>1)</sup>	•		
"Pt100/1000 input 1, setup"	•	• <sup>1)</sup>	•	• <sup>1)</sup>	•	"Pt100/1000 inputs"	72
"Pt100/1000 input 2, setup"	•	• <sup>1)</sup>	•	• <sup>1)</sup>	•		
"Digital inputs"	•	• <sup>1)</sup>	•	• <sup>1)</sup>	•		
"Digital input 1, setup"	•	• <sup>1)</sup>	•	• <sup>1)</sup>	•	"Digital inputs"	73
"Digital input 2, setup"	•	• <sup>1)</sup>	•	• <sup>1)</sup>	•		
"Digital inputs/outputs"	•	• <sup>1)</sup>	•	• <sup>1)</sup>	•		
"Digital input/output 3, setup"	•	• <sup>1)</sup>	•	• <sup>1)</sup>	•	"Digital inputs/outputs"	74
"Digital input/output 4, setup"	•	• <sup>1)</sup>	•	• <sup>1)</sup>	•		
"Relay outputs"	•	• <sup>1)</sup>	•	• <sup>1)</sup>	•		
"Relay output 1"	•	• <sup>1)</sup>	•	• <sup>1)</sup>	•	"Signal relays 1 and 2" ("Relay outputs")	75
"Relay output 2"	•	• <sup>1)</sup>	•	• <sup>1)</sup>	•		
"Analog output"	•	• <sup>1)</sup>	•	• <sup>1)</sup>	•		
"Output signal"	•	• <sup>1)</sup>	•	• <sup>1)</sup>	•	"Analog output"	76
"Function of analog output"	•	• <sup>1)</sup>	•	• <sup>1)</sup>	•		
"Controller settings"	•	• <sup>1)</sup>	•	• <sup>1)</sup>	•	"Controller" ("Controller settings")	77
"Operating range"	•	• <sup>1)</sup>	•	• <sup>1)</sup>	•	"Operating range"	78
"Setpoint influence"	•	• <sup>1)</sup>	•	• <sup>1)</sup>	•	"Setpoint influence"	79
"External setpoint function"	•	• <sup>1)</sup>	•	• <sup>1)</sup>	•	"External setpoint influence"	78
"Predefined setpoints"	•	• <sup>1)</sup>	•	• <sup>1)</sup>	•	"Predefined setpoints"	80
"Temperature influence"	•				•	"Temperature influence"	81
"Monitoring functions"	•	• <sup>1)</sup>	•	• <sup>1)</sup>	•		
"Motor bearing monitoring"	•	• <sup>1)</sup>	•	• <sup>1)</sup>	•	"Motor bearing monitoring"	83
"Motor bearing maintenance"	•	• <sup>1)</sup>	•	• <sup>1)</sup>	•	"Bearings replaced" ("Motor bearing maintenance")	84
"Limit-exceeded function"	•	• <sup>1)</sup>	•	• <sup>1)</sup>	•	"Limit-exceeded function"	81
"Special functions"	•	• <sup>1)</sup>	•	• <sup>1)</sup>	•	Special functions	82
"Pulse flowmeter setup"	•	• <sup>1)</sup>	•	• <sup>1)</sup>	•	"Pulse flowmeter setup"	82
"Ramps"	•	• <sup>1)</sup>	•	• <sup>1)</sup>	•	"Ramps"	83
"Standstill heating"	•	• <sup>1)</sup>	•	• <sup>1)</sup>	•	"Standstill heating"	83
"Communication"	•	• <sup>1)</sup>	•	• <sup>1)</sup>	•	Communication	84
"Pump number"	•	• <sup>1)</sup>	•	• <sup>1)</sup>	•	"Number" ("Pump number")	84
"Enable/disable radio communication"	•	• <sup>1)</sup>	•	• <sup>1)</sup>	•	"Radio communication" ("Enable/disable radio comm.")	84
"General settings"	•	• <sup>1)</sup>	•	• <sup>1)</sup>	•	General settings	85
"Language"	•	• <sup>1)</sup>	•	• <sup>1)</sup>	•	"Language"	85
"Set date and time"	•	• <sup>1)</sup>	•	• <sup>1)</sup>	•	"Date and time"	85
"Units"	•	• <sup>1)</sup>	•	• <sup>1)</sup>	•	"Unit configuration" ("Units")	85
"Enable/disable settings"	•	• <sup>1)</sup>	•	• <sup>1)</sup>	•	"Buttons on product" ("Enable/disable settings")	85
"Delete history"	•	• <sup>1)</sup>	•	• <sup>1)</sup>	•	"Delete history"	86
"Define Home display"	•	• <sup>1)</sup>	•	• <sup>1)</sup>	•	"Define Home display"	86
"Display settings"	•	• <sup>1)</sup>	•	• <sup>1)</sup>	•	"Display settings"	86
"Store actual settings"	•	• <sup>1)</sup>	•	• <sup>1)</sup>	•	"Store settings" ("Store actual settings")	86
"Recall stored settings"	•	• <sup>1)</sup>	•	• <sup>1)</sup>	•	"Recall settings" ("Recall stored settings")	87
"Run startup guide"	•	• <sup>1)</sup>	•	• <sup>1)</sup>	•	"Run startup guide"	88

<sup>1)</sup> The advanced control panel is available as an option on TPE2 and TPE Series 1000 pumps, 0.12 - 11 kW, 2-pole and 0.12 - 7.5 kW, 4-pole.

<sup>2)</sup> Pumps above 11 kW, 2-pole and 7.5 kW, 4-pole have no multipump function.

Assist	TPE3, TPE3 D	TPE2, TPE2 D	TPE Series 2000 0.12 - 11 kW, 2-pole 0.12 - 7.5 kW, 4-pole	TPE Series 1000 0.12 - 11 kW, 2-pole 0.12 - 7.5 kW, 4-pole	Multipump system <sup>1)</sup>	Section	Page
"Assisted pump setup"	•	•	•	•	•	"Assisted pump setup"	89
"Setup, analog input"	•	•	•	•	•	"Setup, analog input"	89
"Setting of date and time"	•	•	•	•	•	"Date and time"	85
"Multipump setup"	•	•	•	•	•	"Multipump setup" ("Setup of multi-pump system")	90
"Description of control mode"	•	•	•	•	•	"Description of control mode"	93
"Assisted fault advice"	•	•	•	•	•	"Assisted fault advice"	93

<sup>1)</sup> Pumps above 11 kW, 2-pole and 7.5 kW, 4-pole have no multipump function.

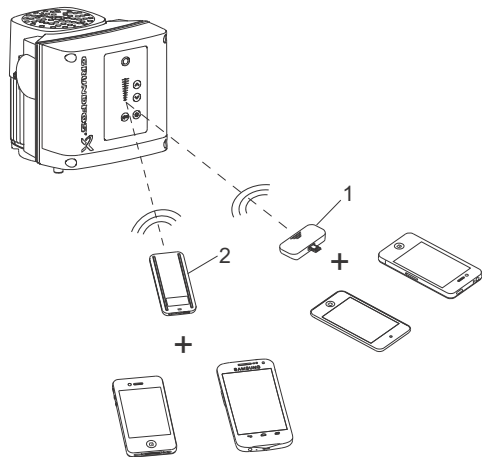


## Grundfos GO

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

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

Grundfos GO offers the following mobile interfaces, MI.



TM06 6256 09 16

**Fig. 46** Grundfos GO communicating with the pump via radio or infrared connection, IR

Pos.	Description
1	Grundfos MI 204: Add-on module enabling radio or infrared communication. You can use MI 204 in conjunction with an Apple iPhone or iPod with Lightning connector, for example fifth generation or later iPhone or iPod. MI 204 is also available together with an Apple iPod touch and a cover.
2	Grundfos MI 301: Separate module enabling radio or infrared communication. You can use the module in conjunction with an Android or iOS-based smart device with Bluetooth connection.

## Communication

When Grundfos GO initiates communication with the pump, the indicator light in the middle of Grundfos Eye flashes green. See *Grundfos Eye* on page 95.

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

Establish communication using one of these communication types:

- radio communication
- infrared communication.

### Radio communication

Radio communication can take place at distances up to 30 metres. The first time Grundfos GO communicates with the pump, you must enable communication by pressing **🔊** or **OK** on the pump control panel. Later when communication takes place, the pump is recognized by Grundfos GO and you can select the pump from the "List" menu.

### Infrared communication

When communicating via infrared light, Grundfos GO must be pointed at the pump control panel.

## Menu overview for Grundfos GO

### Main menus

Dashboard	TPE3, TPE3 D	TPE2, TPE2 D	TPE Series 2000 0.12 - 11 kW, 2-pole 0.12 - 7.5 kW, 4-pole	TPE Series 2000 15-22 kW, 2-pole 11 - 18.5 kW, 4-pole	TPE Series 1000 0.12 - 11 kW, 2-pole 0.12 - 7.5 kW, 4-pole	TPE Series 1000 15-22 kW, 2-pole 11 - 18.5 kW, 4-pole	Multipump system <sup>1)</sup>	Section	Page
"System mode"	•						•		
"Resulting setpoint"	•	•	•		•				
"Resulting system setpoint"							•		
"Actual setpoint"					•		•		
"External setpoint"					•		•		
"Actual controlled value"	•	•	•		•		•		
"Sensor value"					•		•		
"Motor speed (rpm. %)"	•	•	•	•	•	•	•		
"Power consumption"	•	•	•	•	•	•	•		
"Power consumption, system"							•		
"Energy consumption"	•	•	•	•	•	•	•		
"Energy consumption, system"							•		
"Acc. flow, specific energy"	•	•	•		•		•		
"Operating hours, system"							•		
"Operating hours"	•	•	•	•	•	•	•		
"Motor current"	•	•	•	•	•	•	•		
"Number of starts"	•	•	•	•	•	•	•		
"Liquid temperature"	•								
"Analog input 1"	•	•	•		•				
"Analog input 2"	•	•	•		•				
"Analog input 3"	•	•	•		•				
"Pt100/1000 input 1"	•	•	•		•				
"Pt100/1000 input 2"	•	•	•		•				
"Analog output"	•	•	•		•				
"Digital input 1"	•	•	•		•				
"Digital input 2"	•	•	•	•	•	•	•		
"Digital in/output 3"	•	•	•		•				
"Digital in/output 4"	•	•	•		•				
"Motor bearing service"	•	•	•	•	•	•	•		
"Fitted modules"	•	•	•	•	•	•	•		
"Trend data"	•								
"Heat energy monitor"	•							"Heat energy monitor"	61
"Controlled from"				•		•			
"Pump1"							•		
"Pump2"							•		
"Pump3"							•		
"Pump4"							•		

<sup>1)</sup> Pumps above 11 kW, 2-pole and 7.5 kW, 4-pole have no multipump function.

Settings	TPE3, TPE3 D	TPE2, TPE2 D	TPE Series 2000 0.12 - 11 kW, 2-pole 0.12 - 7.5 kW, 4-pole	TPE Series 2000 15-22 kW, 2-pole 11 - 18.5 kW, 4-pole	TPE Series 1000 0.12 - 11 kW, 2-pole 0.12 - 7.5 kW, 4-pole	TPE Series 1000 15-22 kW, 2-pole 11 - 18.5 kW, 4-pole	Multipump system <sup>1)</sup>	Section	Page
"Setpoint"	•	•	•	•	•	•	•	"Setpoint"	61
"Operating mode"	•	•	•	•	•	•	•	"Operating mode"	62
"Set user-defined speed"	•	•	•	•	•	•	•	"Set user-defined speed"	62
"Control mode"	•	•	•	•	•	•	•	"Control mode"	62
"Proportional-pressure setup"	•		•					"Proportional-pressure setup"	69
"Flow limit"	•							"FLOW <sub>LIMIT</sub> "	69
"Automatic night setback"	•							"Automatic night setback"	70
"Temperature influence"	•							"Temperature influence"	81
"Buttons on product"	•	•	•	•	•	•	•	"Buttons on product" ("Enable/disable settings")	85
"Controller"	•	•	•		•	•	•	"Controller" ("Controller settings")	77
"Operating range"	•	•	•		•	•	•	"Operating range"	78
"Ramps"	•	•	•		•	•	•	"Ramps"	83
"Number"	•	•	•	•	•	•	•	"Number" ("Pump number")	84
"Radio communication"	•	•	•		•			"Radio communication" ("Enable/disable radio comm.")	84
"Sensor type"							•	"Sensor type"	70
"Analog input 1"	•	•	•		•				
"Analog input 2"	•	•	•		•			"Analog inputs"	70
"Analog input 3"	•	•	•		•				
"Built-in Grundfos sensor"	•		•					"Built-in Grundfos sensor"	72
"Pt100/1000 input 1"	•	•	•		•				
"Pt100/1000 input 2"	•	•	•		•			"Pt100/1000 inputs"	72
"Digital input 1"	•	•	•		•				
"Digital input 2"	•	•	•	•	•	•		"Digital inputs"	73
"Digital in/output 3"	•	•	•		•				
"Digital in/output 4"	•	•	•		•			"Digital inputs/outputs"	74
"Pulse flowmeter"	•	•	•		•			"Pulse flowmeter setup"	82
"Predefined setpoint"	•	•	•		•		•	"Predefined setpoints"	80
"Analog output"	•	•	•		•			"Analog output"	76
"External setpoint funct."	•	•	•	•	•	•		"External setpoint influence"	78
"Signal relay 1"	•	•	•	•	•	•			
"Signal relay 2"	•	•	•	•	•	•		"Signal relays 1 and 2" ("Relay outputs")	75
"Limit 1 exceeded"	•	•	•		•		•		
"Limit 2 exceeded"	•	•	•		•		•	"Limit-exceeded function"	81
"Alternating operation, time"							•		
"Time for pump change over"							•		
"Standstill heating"	•	•	•	•	•	•		"Standstill heating"	83
"Motor bearing monitoring"	•	•	•	•	•	•		"Motor bearing monitoring"	83
"Service"	•	•	•		•			"Service"	84
"Date and time"	•	•	•		•		•	"Date and time"	85
"Store settings"	•	•	•	•	•	•		"Store settings" ("Store actual settings")	86
"Recall settings"	•	•	•	•	•	•		"Recall settings" ("Recall stored settings")	87
"Undo"	•	•	•	•	•	•	•	"Undo"	87
"Pump name"	•	•	•		•		•	"Pump name"	87
"Connection code"	•	•	•		•		•	"Connection code"	87
"Unit configuration"	•	•	•		•		•	"Unit configuration" ("Units")	85

<sup>1)</sup> Pumps above 11 kW, 2-pole and 7.5 kW, 4-pole have no multipump function.

Alarms and warnings	TPE3, TPE3 D	TPE2, TPE2 D	TPE Series 2000 0.12 - 11 kW, 2-pole 0.12 - 7.5 kW, 4-pole	TPE Series 2000 15-22 kW, 2-pole 11 - 18.5 kW, 4-pole	TPE Series 1000 0.12 - 11 kW, 2-pole 0.12 - 7.5 kW, 4-pole	TPE Series 1000 15-22 kW, 2-pole 11 - 18.5 kW, 4-pole	Multipump system <sup>1)</sup>	Section	Page
"Alarm log"	•	•	•	•	•	•	•	"Alarm log"	88
"Warning log"	•	•	•	•	•	•	•	"Warning log"	88
"Reset alarm" button	•	•	•	•	•	•	•		

<sup>1)</sup> Pumps above 11 kW, 2-pole and 7.5 kW, 4-pole have no multipump function.

Assist	TPE3, TPE3 D	TPE2, TPE2 D	TPE Series 2000 0.12 - 11 kW, 2-pole 0.12 - 7.5 kW, 4-pole	TPE Series 2000 15-22 kW, 2-pole 11 - 18.5 kW, 4-pole	TPE Series 1000 0.12 - 11 kW, 2-pole 0.12 - 7.5 kW, 4-pole	TPE Series 1000 15-22 kW, 2-pole 11 - 18.5 kW, 4-pole	Multipump system <sup>1)</sup>	Section	Page
"Assisted pump setup"	•	•	•	•	•	•	•	"Assisted pump setup"	89
"Assisted fault advice"	•	•	•	•	•	•	•	"Setup, analog input"	89
"Multipump setup"	•	•	•	•	•	•	•	"Multipump setup" ("Setup of multi-pump system")	90

<sup>1)</sup> Pumps above 11 kW, 2-pole and 7.5 kW, 4-pole have no multipump function.

## Description of selected functions

### "Heat energy monitor"

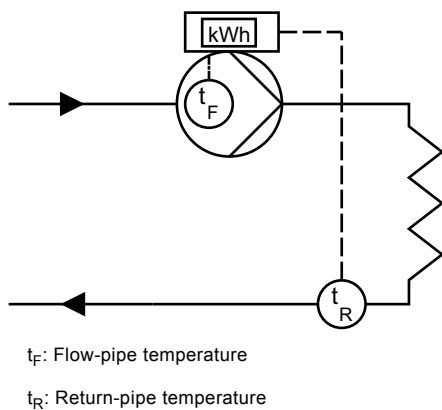
Pump variant	"Heat energy monitor"	
TPE3, TPE3 D	•	
TPE2, TPE2 D	-	
TPE Series 2000	0.12 - 11 kW, 2-pole	-
	0.12 - 7.5 kW, 4-pole	-
TPE Series 1000	15-22 kW, 2-pole	-
	11 - 18.5 kW, 4-pole	-

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

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

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

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



**Fig. 47 Example:** Pump installed in the flow pipe and additional temperature sensor installed in the return pipe

### "Setpoint"

Pump variant	"Setpoint"	
TPE3, TPE3 D	•	
TPE2, TPE2 D	•	
TPE Series 2000	0.12 - 11 kW, 2-pole	•
	0.12 - 7.5 kW, 4-pole	•
	15-22 kW, 2-pole 11 - 18.5 kW, 4-pole	•
TPE Series 1000	0.12 - 11 kW, 2-pole	•
	0.12 - 7.5 kW, 4-pole	•
	15-22 kW, 2-pole 11 - 18.5 kW, 4-pole	•

You can set the setpoint for all control modes, except  $AUTO_{ADAPT}$  and  $FLOW_{ADAPT}$ , in this submenu when you have selected the desired control mode. See "Control mode" on page 62.

### Factory setting

See 14. Factory settings of E-pumps on page 118.

## "Operating mode"

Pump variant	"Operating mode"	
TPE3, TPE3 D	•	
TPE2, TPE2 D	•	
TPE Series 2000	0.12 - 11 kW, 2-pole	•
	0.12 - 7.5 kW, 4-pole	•
	15-22 kW, 2-pole 11 - 18.5 kW, 4-pole	•
TPE Series 1000	0.12 - 11 kW, 2-pole	•
	0.12 - 7.5 kW, 4-pole	•
	15-22 kW, 2-pole 11 - 18.5 kW, 4-pole	•

Possible operating modes:

- "Normal"  
The pump runs according to the selected control mode.
- "Stop"  
The pump stops.
- "Min."  
Use the minimum-curve mode in periods in which a minimum flow is required.  
This operating mode is for instance suitable for manual night setback if you do not want to use automatic night setback.
- "Max."  
Use the maximum-curve mode 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.  
In "Manual" the setpoint via bus is overruled. See "Set manual speed" on page 62.
- "User-defined speed"  
The motor is operating at a speed set by the user.  
See "Set user-defined speed" on page 62.

All operating modes are illustrated in the fig. 48.

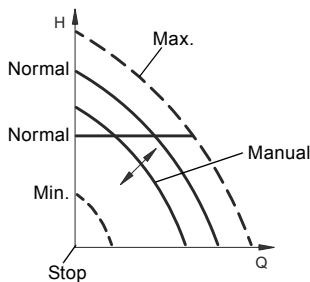


Fig. 48 Operating modes

### Factory setting

See 14. Factory settings of E-pumps on page 118.

## "Set manual speed"

Pump variant	"Set manual speed"	
TPE3, TPE3 D	•	
TPE2, TPE2 D	•	
TPE Series 2000	0.12 - 11 kW, 2-pole	•
	0.12 - 7.5 kW, 4-pole	•
	15-22 kW, 2-pole 11 - 18.5 kW, 4-pole	-
TPE Series 1000	0.12 - 11 kW, 2-pole	•
	0.12 - 7.5 kW, 4-pole	•
	15-22 kW, 2-pole 11 - 18.5 kW, 4-pole	-

This menu is only available in the advanced control panel. With Grundfos GO, you set the speed via the "Setpoint" menu.

You can set the pump speed in % of the maximum speed. When you have set the operating mode to "Manual", the pump starts running at the set speed. The speed can then be changed manually via Grundfos GO or via the advanced control panel.

## "Set user-defined speed"

You can set the motor speed in % of the maximum speed. When you have set the operating mode to "User-defined speed", the motor runs at the set speed.

## "Control mode"

Pump variant	"Control mode"	
TPE3, TPE3 D	•	
TPE2, TPE2 D	•	
TPE Series 2000	0.12 - 11 kW, 2-pole	•
	0.12 - 7.5 kW, 4-pole	•
	15-22 kW, 2-pole 11 - 18.5 kW, 4-pole	•
TPE Series 1000	0.12 - 11 kW, 2-pole	•
	0.12 - 7.5 kW, 4-pole	•
	15-22 kW, 2-pole 11 - 18.5 kW, 4-pole	•

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

Possible control modes:

- "AUTO<sub>ADAPT</sub>"
- "FLOW<sub>ADAPT</sub>"
- "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).

You can change the setpoint for all control modes, except AUTO<sub>ADAPT</sub> and FLOW<sub>ADAPT</sub>, in the "Setpoint" submenu under "Settings" when you have selected the desired control mode.

### Factory setting

See 14. Factory settings of E-pumps on page 118.

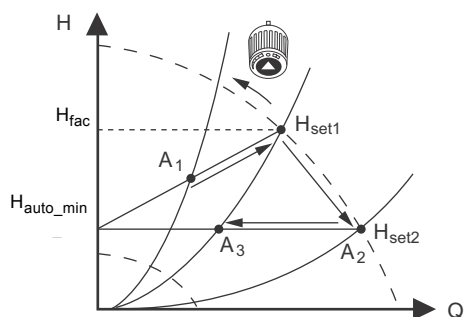
TM06 4024 1515

**"AUTO<sub>ADAPT</sub>"**

Pump variant	"AUTO <sub>ADAPT</sub> "	
TPE3, TPE3 D	•	
TPE2, TPE2 D	-	
TPE Series 2000	0.12 - 11 kW, 2-pole	-
	0.12 - 7.5 kW, 4-pole	-
	15-22 kW, 2-pole 11 - 18.5 kW, 4-pole	-
TPE Series 1000	0.12 - 11 kW, 2-pole	-
	0.12 - 7.5 kW, 4-pole	-
	15-22 kW, 2-pole 11 - 18.5 kW, 4-pole	-

The AUTO<sub>ADAPT</sub> control mode continuously adapts the pump performance according to the actual system characteristic.

Manual setting of the setpoint is not possible.



TM05 7910 1613

**Fig. 49** AUTO<sub>ADAPT</sub>

When the AUTO<sub>ADAPT</sub> control mode has been enabled, the pump will start with the factory setting, H<sub>fac</sub> is equal to H<sub>set1</sub>, and then adjust its performance to A<sub>1</sub>. See fig. 49.

When the pump registers a lower head on the maximum curve, A<sub>2</sub>, the AUTO<sub>ADAPT</sub> function automatically selects a correspondingly lower control curve, H<sub>set2</sub>. If the valves in the system close, the pump adjusts its performance to A<sub>3</sub>.

- A<sub>1</sub>: Original duty point.
- A<sub>2</sub>: Lower registered head on the maximum curve.
- A<sub>3</sub>: New duty point after AUTO<sub>ADAPT</sub> control.
- H<sub>set1</sub>: Original setpoint setting.
- H<sub>set2</sub>: New setpoint after AUTO<sub>ADAPT</sub> control.
- H<sub>fac</sub>: Factory setting.
- H<sub>auto\_min</sub>: A fixed value of 1.5 m.

The AUTO<sub>ADAPT</sub> control mode is a form of proportional-pressure control where the control curves have a fixed origin, H<sub>auto\_min</sub>.

The AUTO<sub>ADAPT</sub> control mode has been developed specifically for heating systems and we do not recommend that you use it for air-conditioning and cooling systems.

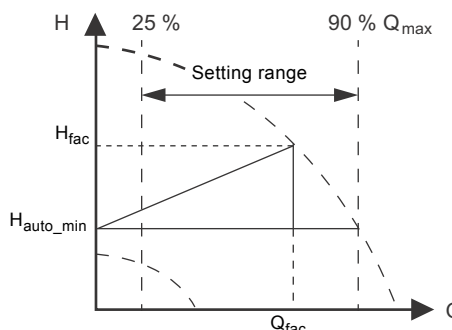
**"FLOW<sub>ADAPT</sub>"**

Pump variant	"FLOW <sub>ADAPT</sub> "	
TPE3, TPE3 D	•	
TPE2, TPE2 D	-	
TPE Series 2000	0.12 - 11 kW, 2-pole	-
	0.12 - 7.5 kW, 4-pole	-
	15-22 kW, 2-pole 11 - 18.5 kW, 4-pole	-
TPE Series 1000	0.12 - 11 kW, 2-pole	-
	0.12 - 7.5 kW, 4-pole	-
	15-22 kW, 2-pole 11 - 18.5 kW, 4-pole	-

When you select FLOW<sub>ADAPT</sub>, the pump runs AUTO<sub>ADAPT</sub> and ensures that the flow rate never exceeds the entered FLOW<sub>LIMIT</sub> value.

The setting range for FLOW<sub>LIMIT</sub> is 25 to 90 % of the maximum flow rate of the pump.

The factory setting of the FLOW<sub>LIMIT</sub> is the flow rate where the AUTO<sub>ADAPT</sub> factory setting meets the maximum curve. See fig. 50.



TM05 7912 1613

**Fig. 50** FLOW<sub>ADAPT</sub>

**"Proportional pressure"**

Pump variant	"Proportional pressure"
TPE3, TPE3 D	•
TPE2, TPE2 D	-
TPE Series 2000	•
0.12 - 11 kW, 2-pole	•
0.12 - 7.5 kW, 4-pole	•
15-22 kW, 2-pole	•
11 - 18.5 kW, 4-pole	•
TPE Series 1000	-
0.12 - 11 kW, 2-pole	-
0.12 - 7.5 kW, 4-pole	-
15-22 kW, 2-pole	-
11 - 18.5 kW, 4-pole	-

The head of the pump is reduced at decreasing water demand and increased at rising water demand. See fig. 51.

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

You can set the setpoint with an accuracy of 0.1 m. The head against a closed valve is half the setpoint.

For more information about settings, see *"Proportional-pressure setup"* on page 69.

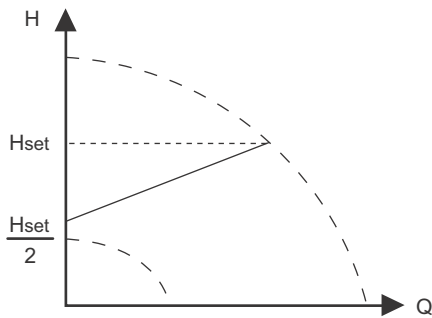


Fig. 51 "Proportional pressure"

**Example**

- Factory-fitted differential-pressure sensor.

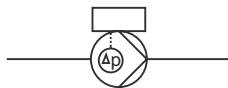


Fig. 52 "Proportional pressure"

**Controller settings**

For recommended controller settings, see *"Controller" ("Controller settings")* on page 77.

**"Constant pressure"**

Pump variant	"Constant pressure"
TPE3, TPE3 D	•
TPE2, TPE2 D	•
TPE Series 2000	•
0.12 - 11 kW, 2-pole	•
0.12 - 7.5 kW, 4-pole	•
15-22 kW, 2-pole	-
11 - 18.5 kW, 4-pole	-
TPE Series 1000	•
0.12 - 11 kW, 2-pole	•
0.12 - 7.5 kW, 4-pole	•
15-22 kW, 2-pole	•
11 - 18.5 kW, 4-pole	•

We recommend this control mode if the pump is to deliver a constant pressure, independently of the flow in the system. The pump maintains a constant pressure independently of the flow rate. See fig. 53.

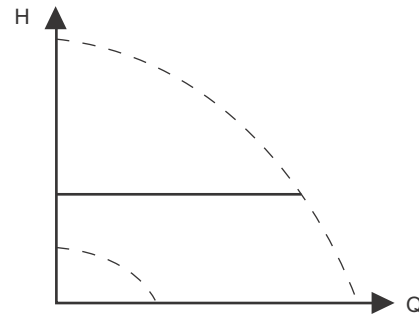


Fig. 53 "Constant pressure"

This control mode requires an external pressure sensor as shown in the examples below. You can set the pressure sensor in the "Assist" menu. See *"Assisted pump setup"* on page 89.

**Examples**

- One external pressure sensor.

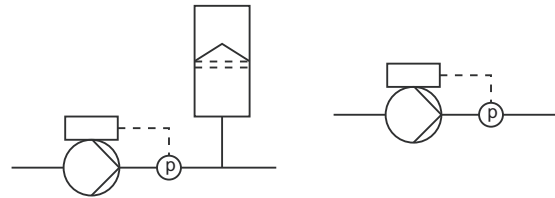


Fig. 54 "Constant pressure"

**Controller settings**

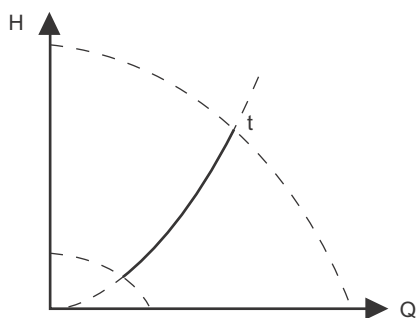
For recommended controller settings, see *"Controller" ("Controller settings")* on page 77.



**"Constant temperature"**

Pump variant	"Constant temperature"	
TPE3, TPE3 D	•	
TPE2, TPE2 D	•	
TPE Series 2000	0.12 - 11 kW, 2-pole	•
	0.12 - 7.5 kW, 4-pole	•
	15-22 kW, 2-pole 11 - 18.5 kW, 4-pole	-
TPE Series 1000	0.12 - 11 kW, 2-pole	•
	0.12 - 7.5 kW, 4-pole	•
	15-22 kW, 2-pole 11 - 18.5 kW, 4-pole	•

This control mode ensures a constant temperature. Constant temperature is a comfort control mode that you can use in domestic hot-water systems to control the flow rate to maintain a fixed temperature in the system. See fig. 55.



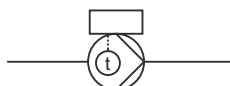
TM05 7900 1613

Fig. 55 "Constant temperature"

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

**Examples**

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



- One external temperature sensor.

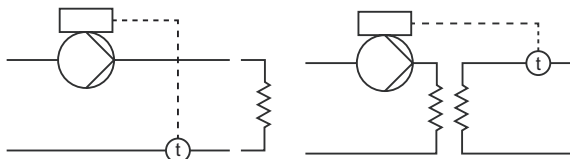


Fig. 56 "Constant temperature"

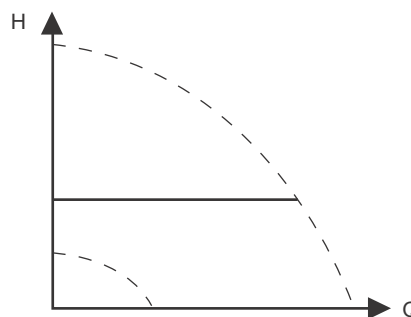
**Controller settings**

For recommended controller settings, see "Controller" ("Controller settings") on page 77.

**"Constant differential pressure"**

Pump variant	"Constant differential pressure"	
TPE3, TPE3 D	•	
TPE2, TPE2 D	•	
TPE Series 2000	0.12 - 11 kW, 2-pole	•
	0.12 - 7.5 kW, 4-pole	•
	15-22 kW, 2-pole 11 - 18.5 kW, 4-pole	•
TPE Series 1000	0.12 - 11 kW, 2-pole	•
	0.12 - 7.5 kW, 4-pole	•
	15-22 kW, 2-pole 11 - 18.5 kW, 4-pole	•

The pump maintains a constant differential pressure, independently of the flow rate in the system. See fig. 57. This control mode is primarily suitable for systems with relatively small pressure losses.



TM05 7901 1613

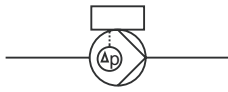
Fig. 57 "Constant differential pressure"

This control mode requires either an internal or external differential-pressure sensor or two external pressure sensors. See the examples below.

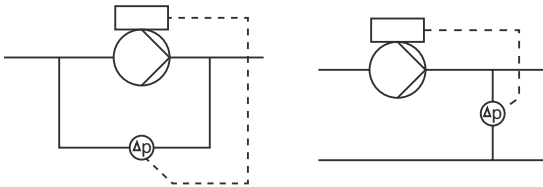
User interfaces for TPE pumps 0.12 - 22 kW, 2-pole and 0.12 - 18.5 kW, 4-pole

**Examples**

- Factory-fitted differential-pressure sensor, only TPE3, TPE3 D and TPE, TPED Series 2000.



- One external differential-pressure sensor. The pump uses the input from the sensor to control the differential pressure. You can set the sensor manually or by using the "Assist" menu. See "Assisted pump setup" on page 89.



- Two external pressure sensors. Constant differential-pressure control is achievable with two pressure sensors. The pump uses the inputs from the two sensors and calculates the differential pressure. The sensors must have the same unit and must be set as feedback sensors. You can set the sensors manually, sensor by sensor, or by using the "Assist" menu. See "Assisted pump setup" on page 89.

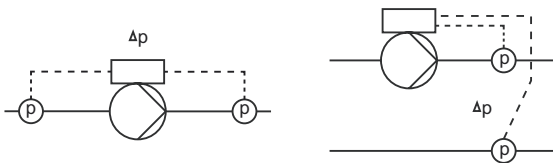


Fig. 58 "Constant differential pressure"

**Controller settings**

For recommended controller settings, see "Controller" ("Controller settings") on page 77.

**"Constant differential temperature"**

Pump variant	"Constant differential temperature"
TPE3, TPE3 D	•
TPE2, TPE2 D	•
TPE Series 2000	0.12 - 11 kW, 2-pole 0.12 - 7.5 kW, 4-pole
	15-22 kW, 2-pole 11 - 18.5 kW, 4-pole
TPE Series 1000	0.12 - 11 kW, 2-pole 0.12 - 7.5 kW, 4-pole
	15-22 kW, 2-pole 11 - 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. 59.

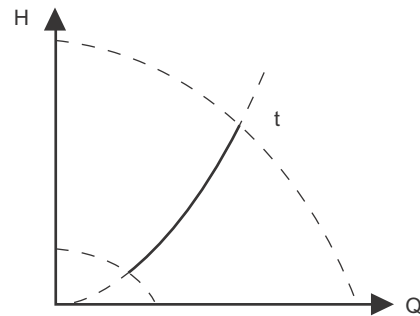


Fig. 59 "Constant differential temperature"

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

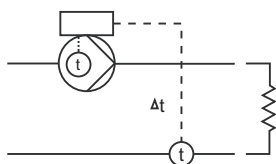
The temperature sensors can either be analog sensors connected to two of the analog inputs or two Pt100/Pt1000 sensors connected to the Pt100/1000 inputs, if these are available on the specific pump.

Set the sensor in the "Assist" menu under "Assisted pump setup". See "Assisted pump setup" on page 89.

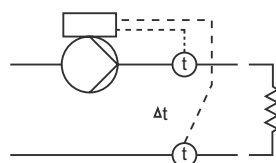
TM05 7954 1713

**Examples**

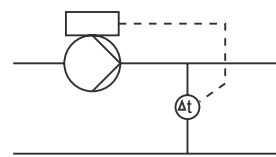
- Factory-fitted temperature sensor and an external temperature sensor. Only TPE3, TPE3 D.



- Two external temperature sensors. Not available for TPE 15-22 kW 2-pole and 11 - 18.5 kW 4-pole. Constant differential-temperature control is achievable with two temperature sensors. The pump uses the inputs from the two sensors and calculates the differential temperature. The sensors must have the same unit and must be set as feedback sensors. You can set the sensors manually, sensor by sensor, or by using the "Assist" menu. See "Assisted pump setup" on page 89.



- One external differential-temperature sensor. The pump uses the input from the sensor to control the differential temperature. You can set the sensor manually or by using the "Assist" menu. See "Assisted pump setup" on page 89.



**Fig. 60** Constant differential temperature

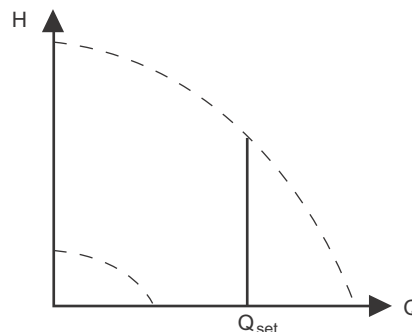
**Controller settings**

For recommended controller settings, see "Controller" ("Controller settings") on page 77.

**"Constant flow rate"**

Pump variant	"Constant flow rate"	
TPE3, TPE3 D	•	
TPE2, TPE2 D	•	
TPE Series 2000	0.12 - 11 kW, 2-pole	•
	0.12 - 7.5 kW, 4-pole	•
	15-22 kW, 2-pole	-
TPE Series 1000	11 - 18.5 kW, 4-pole	-
	0.12 - 11 kW, 2-pole	•
	0.12 - 7.5 kW, 4-pole	•
	15-22 kW, 2-pole	•
	11 - 18.5 kW, 4-pole	•

The pump maintains a constant flow rate in the system, independently of the head. See fig. 61.



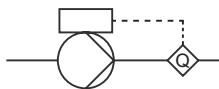
TM05 7955 1713

**Fig. 61** Constant flow rate

This control mode requires an external flow sensor. See the example below.

**Example**

- One external flow sensor.



**Fig. 62** Constant flow rate

**Controller settings**

For recommended controller settings, see "Controller" ("Controller settings") on page 77.

**"Constant level"**

Pump variant	"Constant level"	
TPE3, TPE3 D	•	
TPE2, TPE2 D	•	
TPE Series 2000	0.12 - 11 kW, 2-pole	•
	0.12 - 7.5 kW, 4-pole	•
	15-22 kW, 2-pole	-
TPE Series 1000	11 - 18.5 kW, 4-pole	-
	0.12 - 11 kW, 2-pole	•
	0.12 - 7.5 kW, 4-pole	•
TPE Series 1000	15-22 kW, 2-pole	-
	11 - 18.5 kW, 4-pole	-

The pump maintains a constant level, independently of the flow rate. See fig. 63.

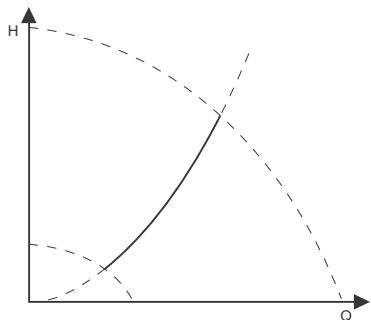


Fig. 63 "Constant level"

This control mode requires an external level sensor. The pump can control the level in a tank in two ways:

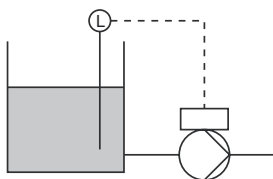
- As an emptying function where the pump draws the liquid from the tank.
- As a filling function where the pump pumps the liquid into the tank.

See fig. 64.

The type of level control function depends on the setting of the built-in controller. See "Controller" ("Controller settings") on page 77.

**Examples**

- One external level sensor.
  - emptying function.



- One external level sensor.
  - filling function.

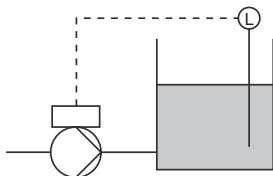


Fig. 64 Constant level

**Controller settings**

For recommended controller settings, see "Controller" ("Controller settings") on page 77.

**"Constant other value"**

Pump variant	"Constant other value"	
TPE3, TPE3 D	•	
TPE2, TPE2 D	•	
TPE Series 2000	0.12 - 11 kW, 2-pole	•
	0.12 - 7.5 kW, 4-pole	•
	15-22 kW, 2-pole	-
TPE Series 1000	11 - 18.5 kW, 4-pole	-
	0.12 - 11 kW, 2-pole	•
	0.12 - 7.5 kW, 4-pole	•
TPE Series 1000	15-22 kW, 2-pole	-
	11 - 18.5 kW, 4-pole	-

Any other value is kept constant.

Use this control mode if you want to control a value which is not available in the "Control mode" menu. Connect a sensor measuring the controlled value to one of the analog inputs of the pump. The controlled value will be shown in percentage of sensor range.

**Constant curve**

Pump variant	"Constant curve"	
TPE3, TPE3 D	•	
TPE2, TPE2 D	•	
TPE Series 2000	0.12 - 11 kW, 2-pole	•
	0.12 - 7.5 kW, 4-pole	•
	15-22 kW, 2-pole	•
TPE Series 1000	11 - 18.5 kW, 4-pole	•
	0.12 - 11 kW, 2-pole	•
	0.12 - 7.5 kW, 4-pole	•
TPE Series 1000	15-22 kW, 2-pole	•
	11 - 18.5 kW, 4-pole	•

You can set the pump to operate according to a constant curve, like an uncontrolled pump. See fig. 65. You can set the desired speed in % of maximum speed in the range from 13 to 100 %.

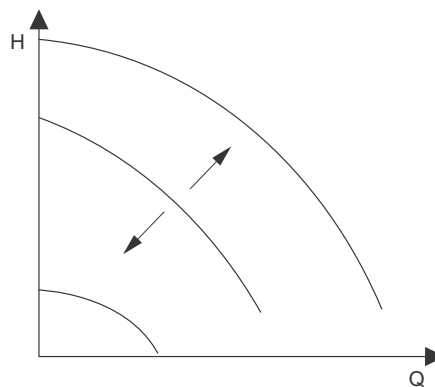
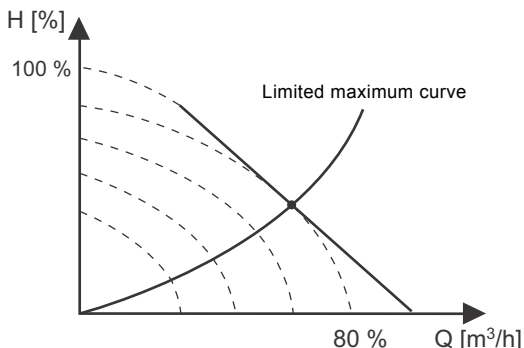


Fig. 65 Constant curve

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



TM05 7913 1613

Fig. 66 Power and pressure limitations influencing the maximum curve

**Controller settings**

For recommended controller settings, see "Controller" ("Controller settings") on page 77.

**"Proportional-pressure setup"**

Pump variant	"Proportional-pressure setup"	
TPE3, TPE3 D	•	
TPE2, TPE2 D	-	
TPE Series 2000	0.12 - 11 kW, 2-pole	•
	0.12 - 7.5 kW, 4-pole	•
	15-22 kW, 2-pole 11 - 18.5 kW, 4-pole	-
TPE Series 1000	0.12 - 11 kW, 2-pole	-
	0.12 - 7.5 kW, 4-pole	-
	15-22 kW, 2-pole 11 - 18.5 kW, 4-pole	-

**"Control-curve function"**

You can set the curve either to quadratic or linear.

**"Zero-flow head"**

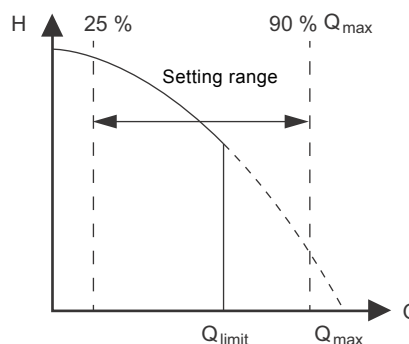
You can set this value in % of the setpoint. With a setting of 100 %, the control mode is equal to constant differential pressure.

**"FLOW<sub>LIMIT</sub>"**

Pump variant	"FLOW <sub>LIMIT</sub> "	
TPE3, TPE3 D	•	
TPE2, TPE2 D	-	
TPE Series 2000	0.12 - 11 kW, 2-pole	-
	0.12 - 7.5 kW, 4-pole	-
	15-22 kW, 2-pole 11 - 18.5 kW, 4-pole	-
TPE Series 1000	0.12 - 11 kW, 2-pole	-
	0.12 - 7.5 kW, 4-pole	-
	15-22 kW, 2-pole 11 - 18.5 kW, 4-pole	-

**FLOW<sub>LIMIT</sub>**

- Enable the FLOW<sub>LIMIT</sub> function.
- Set the FLOW<sub>LIMIT</sub>.



TM05 7908 1613

Fig. 67 "FLOW<sub>LIMIT</sub>"

You can combine the FLOW<sub>LIMIT</sub> function with the following control modes:

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

A flow-limiting function ensures that the flow rate never exceeds the entered FLOW<sub>LIMIT</sub> value.

The setting range for FLOW<sub>LIMIT</sub> is 25 % to 90 % of the Q<sub>max</sub> of the pump.

The factory setting of the FLOW<sub>LIMIT</sub> is the flow rate where the AUTO<sub>ADAPT</sub> factory setting meets the maximum curve. See fig. 50.

## "Automatic night setback"

Pump variant	"Automatic night setback"	
TPE3, TPE3 D	•	
TPE2, TPE2 D	-	
TPE Series 2000	0.12 - 11 kW, 2-pole	-
	0.12 - 7.5 kW, 4-pole	-
	15-22 kW, 2-pole	-
	11 - 18.5 kW, 4-pole	-
TPE Series 1000	0.12 - 11 kW, 2-pole	-
	0.12 - 7.5 kW, 4-pole	-
	15-22 kW, 2-pole	-
	11 - 18.5 kW, 4-pole	-

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

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

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

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

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

## "Sensor type"

Pump variant	"Sensor type"	
TPE3, TPE3 D	-	
TPE2, TPE2 D	-	
TPE Series 2000	0.12 - 11 kW, 2-pole	-
	0.12 - 7.5 kW, 4-pole	-
	15-22 kW, 2-pole	-
	11 - 18.5 kW, 4-pole	-
TPE Series 1000	0.12 - 11 kW, 2-pole	-
	0.12 - 7.5 kW, 4-pole	-
	15-22 kW, 2-pole	•
	11 - 18.5 kW, 4-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, m<sup>3</sup>/h, m<sup>3</sup>/s, l/s, gpm, °C, °F, %.
- Sensor measuring range.

## "Analog inputs"

Pump variant	"Analog inputs"	
TPE3, TPE3 D	•	
TPE2, TPE2 D	•	
TPE Series 2000	0.12 - 11 kW, 2-pole	-
	0.12 - 7.5 kW, 4-pole	•
	15-22 kW, 2-pole	-
	11 - 18.5 kW, 4-pole	-
TPE Series 1000	0.12 - 11 kW, 2-pole	-
	0.12 - 7.5 kW, 4-pole	•
	15-22 kW, 2-pole	-
	11 - 18.5 kW, 4-pole	-

Function	Terminals*
"Analog input 1, setup"	4
"Analog input 2, setup"	7
"Analog input 3, setup"	14

\* See *Connection terminals, advanced functional module, FM 300* on page 143.

Set the analog input for a feedback sensor via the "Assisted pump setup" menu. See *"Assisted pump setup"* on page 89.

If you want to set an analog input for other purposes, you can do this manually.

You can set the analog inputs via the "Setup, analog input" menu. See *"Setup, analog input"* on page 89.

If you perform the manual setting via Grundfos GO, you need to enter the menu for the analog input under the "Settings" menu.

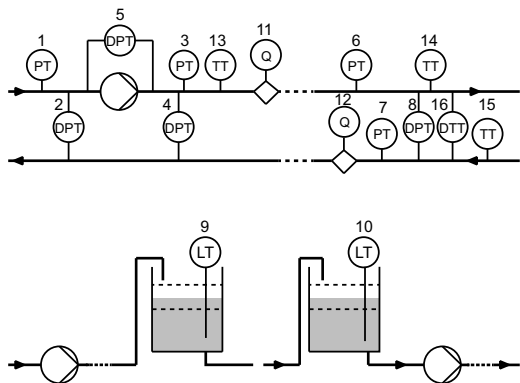
### Function

You can set the analog inputs to these functions:

- "Not active"
- "Feedback sensor"
- "Ext. setpoint infl."
  - See *"External setpoint influence"* on page 78.
- "Other function".

**Measured parameter**

Select one of the parameters, that is the parameter to be measured in the system by the sensor connected to the actual analog input. See fig. 68.



TM06 2328 3914

**Fig. 68** Overview of sensor locations

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

**"Unit"**

Available measuring units:

Parameter	Possible measuring units
Pressure	bar, m, kPa, psi, ft
Level	m, ft, in
"Flow rate"	m <sup>3</sup> /h, l/s, yd <sup>3</sup> /h, gpm
"Liquid temp."	°C, °F
"Other parameter"	%

**Electrical signal**

Select signal type:

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

**Sensor range, minimum value**

Set the minimum value of the connected sensor.

**Sensor range, maximum value**

Set the maximum value of the connected sensor.

**Factory setting**

See 14. *Factory settings of E-pumps* on page 118.

**Setting two sensors for differential measurement**

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

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

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

## "Built-in Grundfos sensor"

Pump variant	"Built-in Grundfos sensor"	
TPE3, TPE3 D	•	
TPE2, TPE2 D	-	
TPE Series 2000	0.12 - 11 kW, 2-pole	•
	0.12 - 7.5 kW, 4-pole	•
	15-22 kW, 2-pole 11 - 18.5 kW, 4-pole	-
TPE Series 1000	0.12 - 11 kW, 2-pole	-
	0.12 - 7.5 kW, 4-pole	-
	15-22 kW, 2-pole 11 - 18.5 kW, 4-pole	-

You can select the function of the built-in sensor in the "Built-in Grundfos sensor" menu.

Set the "Built-in Grundfos sensor" via the "Assisted pump setup" menu. See "Assisted pump setup" on page 89.

If you perform the setting manually in the advanced control panel, you must enter the "Analog inputs" menu under the "Settings" menu in order to access the "Built-in Grundfos sensor" menu.

If you perform the setting manually via Grundfos GO, you need to enter the menu for the "Built-in Grundfos sensor" under the "Settings" menu.

### Function

You can set the built-in sensor to these functions:

- "Grundfos diff.-pressure sensor"
  - "Not active"
  - "Feedback sensor"
  - "Setpoint influence"
  - "Other function".
- "Grundfos temperature sensor"
  - "Not active"
  - "Feedback sensor"
  - "Setpoint influence"
  - "Other function".

### Factory setting

See 14. *Factory settings of E-pumps* on page 118.

## "Pt100/1000 inputs"

Pump variant	"Pt100/1000 inputs"	
TPE3, TPE3 D	•	
TPE2, TPE2 D	•	
TPE Series 2000	0.12 - 11 kW, 2-pole	•
	0.12 - 7.5 kW, 4-pole	•
	15-22 kW, 2-pole 11 - 18.5 kW, 4-pole	-
TPE Series 1000	0.12 - 11 kW, 2-pole	•
	0.12 - 7.5 kW, 4-pole	•
	15-22 kW, 2-pole 11 - 18.5 kW, 4-pole	-

Function	Terminals*
"Pt100/1000 input 1, setup"	17 and 18
"Pt100/1000 input 2, setup"	18 and 19

\* See *Connection terminals, advanced functional module, FM 300* on page 143.

Set the Pt100/1000 input for a feedback sensor via the "Assisted pump setup" menu. See "Assisted pump setup" on page 89.

If you want to set a Pt100/1000 input for other purposes, you can do this manually.

You can set the analog inputs via the "Setup, analog input" menu. See "Setup, analog input" on page 89.

If you perform the manual setting via Grundfos GO, you need to enter the menu for the Pt100/1000 input under the "Settings" menu.

### Function

You can set the Pt100/1000 inputs to these functions:

- "Not active"
- "Feedback sensor"
- "Ext. setpoint infl."
  - See "External setpoint influence" on page 78.
- "Other function".

### Measured parameter

Select one of the parameters, such as the parameter to be measured in the system by the Pt100/1000 sensor connected to the actual Pt100/1000 input. See fig. 69.

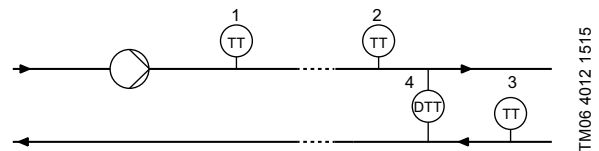


Fig. 69 Overview of Pt100/1000 sensor locations

Parameter	Pos.
"Liquid temp."	1
"Temperature 1"	2
"Temperature 2"	3
"Ambient temp."	Not shown

### Measuring range

-50 to +204 °C.

### Factory setting

See 14. *Factory settings of E-pumps* on page 118.



### "Digital inputs"

Pump variant	"Digital inputs"	
TPE3, TPE3 D	•	
TPE2, TPE2 D	•	
TPE Series 2000	0.12 - 11 kW, 2-pole	•
	0.12 - 7.5 kW, 4-pole	•
	15-22 kW, 2-pole 11 - 18.5 kW, 4-pole	•
TPE Series 1000	0.12 - 11 kW, 2-pole	•
	0.12 - 7.5 kW, 4-pole	•
	15-22 kW, 2-pole 11 - 18.5 kW, 4-pole	•

### TPE2, TPE3 pumps and TPE Series 1000 and TPE Series 2000 0.12 - 11 kW, 2-pole and 0.12 - 7.5 kW, 4-pole pumps

Function	Terminals*
"Digital input 1, setup"	2 and 6
"Digital input 2, setup"	1 and 9

\* See *Connection terminals, advanced functional module, FM 300* on page 143.

To set 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.", minimum speed  
When the input is activated, the pump runs at the set minimum speed.
- "Max.", maximum speed  
When the input is activated, the pump runs at the set maximum speed.
- "User-defined speed"  
When the input is activated. the motor runs at a speed set by the user.
- "External fault"  
When the input is activated, a timer starts. If the input is activated for more than 5 seconds, the pump stops and a fault is indicated. This function depends on input from external equipment.
- "Alarm resetting"  
When the input is activated, a possible fault indication is reset.
- "Dry running"  
When this function has been selected, lack of inlet pressure or water shortage can be detected. 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 inlet side of the pump
  - a float switch installed on the inlet side of the pump.

- "Accumulated flow"  
When this function has been selected, the accumulated flow rate can be registered. This requires the use of a flowmeter which can give a feedback signal as a pulse per defined flow of water.  
See *"Pulse flowmeter setup"* on page 82.
- "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 *"Predefined setpoints"* on page 80.

The priority of the selected functions in relation to each other appears from section *Priority of settings* on page 94.

A stop command always has the highest priority.

#### Activation delay

Pump variant	Activation delay	
TPE3, TPE3 D	-	
TPE2, TPE2 D	•	
TPE Series 2000	0.12 - 11 kW, 2-pole	•
	0.12 - 7.5 kW, 4-pole	•
	15-22 kW, 2-pole 11 - 18.5 kW, 4-pole	-
TPE Series 1000	0.12 - 11 kW, 2-pole	•
	0.12 - 7.5 kW, 4-pole	•
	15-22 kW, 2-pole 11 - 18.5 kW, 4-pole	-

Select the activation delay, T1.

It is the time between the digital signal and the activation of the selected function.

Range: 0 to 6000 seconds.

#### Duration timer mode

Select the mode. See fig. 70.

- "Not active"
- active with interrupt, mode A
- active without interrupt, mode B
- active with after-run, mode C.

Select the duration time, T2.

It is the time which, together with the mode, determines how long the selected function is active.

Range: 0 to 15,000 seconds.

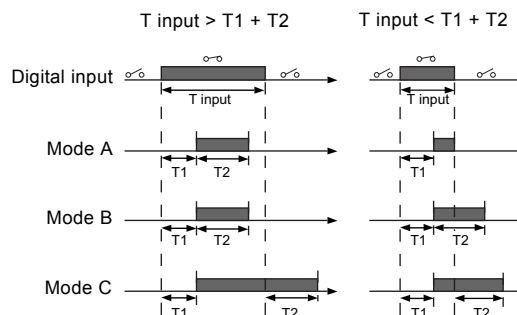


Fig. 70 Duration timer function of digital inputs

#### Factory setting

See 14. *Factory settings of E-pumps* on page 118.

TM06 4949 3415

**Motors from 15-22 kW, 2-pole and 11 - 18.5 kW, 4-pole**

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

- "Min.", minimum curve
- "Max.", maximum 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"	
TPE3, TPE3 D	•	
TPE2, TPE2 D	•	
TPE Series 2000	0.12 - 11 kW, 2-pole	•
	0.12 - 7.5 kW, 4-pole	•
TPE Series 1000	15-22 kW, 2-pole	-
	11 - 18.5 kW, 4-pole	-
TPE Series 1000	0.12 - 11 kW, 2-pole	•
	0.12 - 7.5 kW, 4-pole	•
TPE Series 1000	15-22 kW, 2-pole	-
	11 - 18.5 kW, 4-pole	-

Function	Terminals*
"Digital input/output 3, setup"	10 and 16
"Digital input/output 4, setup"	11 and 18

\* See *Connection terminals, advanced functional module, FM 300* on page 143.

You can select if the interface must be used as input or output. The output is an open collector and you can connect it to for example an external relay or controller such as a PLC.

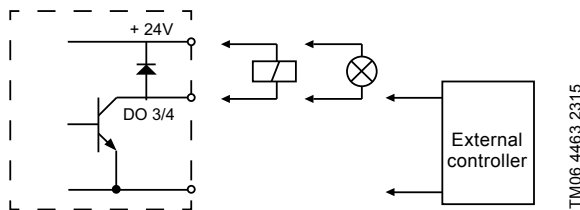


Fig. 71 Example of configurable digital inputs or outputs

TM06 4463 2315

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

**Mode**

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

- "Digital input"
- "Digital output".

**Function**

You can set the digital input or output 3 and 4 to the functions mentioned below.

**Possible functions, digital input or output 3**

"Function if input" See details in section "Digital inputs" on page 73	"Function if output" See details in section "Signal relays 1 and 2" ("Relay outputs") on page 75
<ul style="list-style-type: none"> <li>• "Not active"</li> <li>• "External stop"</li> <li>• "Min."</li> <li>• "Max."</li> <li>• "User-defined speed"</li> <li>• "External fault"</li> <li>• "Alarm resetting"</li> <li>• "Dry running"</li> <li>• "Accumulated flow"</li> <li>• "Predefined setpoint 2"</li> </ul>	<ul style="list-style-type: none"> <li>• "Not active"</li> <li>• "Ready"</li> <li>• "Alarm"</li> <li>• "Operation"</li> <li>• "Pump running"</li> <li>• "Warning"</li> <li>• "Limit 1 exceeded"</li> <li>• "Limit 2 exceeded"</li> </ul>

**Possible functions, digital input or output 4**

"Function if input" See details in section "Digital inputs" on page 73	"Function if output" See details in section "Signal relays 1 and 2" ("Relay outputs") on page 75
<ul style="list-style-type: none"> <li>• "Not active"</li> <li>• "External stop"</li> <li>• "Min."</li> <li>• "Max."</li> <li>• "User-defined speed"</li> <li>• "External fault"</li> <li>• "Alarm resetting"</li> <li>• "Dry running"</li> <li>• "Accumulated flow"</li> <li>• "Predefined setpoint 3"</li> </ul>	<ul style="list-style-type: none"> <li>• "Not active"</li> <li>• "Ready"</li> <li>• "Alarm"</li> <li>• "Operation"</li> <li>• "Pump running"</li> <li>• "Warning"</li> <li>• "Limit 1 exceeded"</li> <li>• "Limit 2 exceeded"</li> </ul>

**Activation delay**

Pump variant	Activation delay	
TPE3, TPE3 D	-	
TPE2, TPE2 D	•	
TPE Series 2000	0.12 - 11 kW, 2-pole	•
	0.12 - 7.5 kW, 4-pole	•
TPE Series 1000	15-22 kW, 2-pole	-
	11 - 18.5 kW, 4-pole	-
TPE Series 1000	0.12 - 11 kW, 2-pole	•
	0.12 - 7.5 kW, 4-pole	•
TPE Series 1000	15-22 kW, 2-pole	-
	11 - 18.5 kW, 4-pole	-

Select the activation delay, T1.

It is the time between the digital signal and the activation of the selected function.

Range: 0 to 6000 seconds.

**Duration timer mode**

Select the mode. See fig. 72.

- "Not active"
- active with interrupt, mode A
- active without interrupt, mode B
- active with after-run, mode C.

Select the duration time, T2.

It is the time which, together with the mode, determines how long the selected function is active.

Range: 0 to 15,000 seconds.

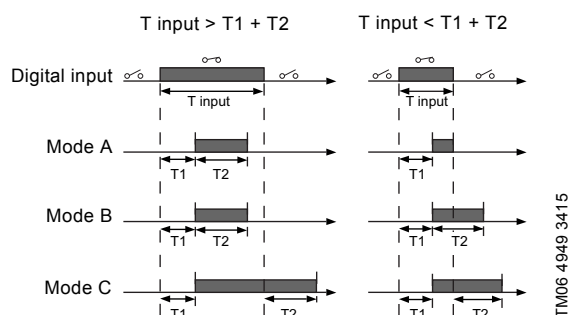


Fig. 72 Duration timer function of digital inputs

**Factory setting**

See 14. Factory settings of E-pumps on page 118.

**"Signal relays 1 and 2" ("Relay outputs")**

Pump variant	Relay outputs	
	Signal relay 1	Signal relay 2
TPE3, TPE3 D	•	•
TPE2, TPE2 D	•	•
TPE Series 2000	0.12 - 11 kW, 2-pole	•
	0.12 - 7.5 kW, 4-pole	•
	3 - 7.5 kW, 2-pole	•
	1.5 - 7.5 kW, 4-pole	•
TPE Series 1000	11-22 kW, 2-pole	•
	11 - 18.5 kW, 4-pole	•
	0.12 - 11 kW, 2-pole	•
	0.12 - 7.5 kW, 4-pole	•
TPE Series 1000	3 - 7.5 kW, 2-pole	•
	1.5 - 7.5 kW, 4-pole	•
	11-22 kW, 2-pole	•
	11 - 18.5 kW, 4-pole	•

Function	Terminals*
"Relay output 1"	NC, C1, NO
"Relay output 2"	NC, C2, NO

\* See Connection terminals, advanced functional module, FM 300 on page 143.

The pump incorporates two signal relays for potential-free signalling. For further information, see Indicator lights and signal relays on page 96.

**Function**

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

- "Not active".
- "Ready"
  - The pump can be running or is ready to run and no alarms are present.
- "Alarm"
  - There is an active alarm and the pump is stopped.
- "Operating" ("Operation")
  - "Operating" equals "Running" but the pump is still in operation when it has been stopped due to a warning.
- "Running" ("Pump running")
- "Warning"
  - There is an active warning.
- "Limit 1 exceeded"\*
  - When the "Limit 1 exceeded" function is activated, the signal relay is activated. See "Limit-exceeded function" on page 81.
- "Limit 2 exceeded"\*
  - When the "Limit 2 exceeded" function is activated, the signal relay is activated. See "Limit-exceeded function" on page 81.
- "Relubricate"
- "External fan control" ("Control of external fan")
  - When you select "External fan control", the relay is activated if the internal temperature of the motor electronics reach a preset limit value.

\* This function is only available for TPE3, TPE2, TPE Series 2000 and TPE Series 1000 pumps with motor sizes from 0.12 to 11 kW, 2-pole and 0.12 - 7.5 kW, 4-pole.

**Factory setting**

See 14. Factory settings of E-pumps on page 118.

## "Analog output"

Pump variant	"Analog output"	
TPE3, TPE3 D	•	
TPE2, TPE2 D	•	
TPE Series 2000	0.12 - 11 kW, 2-pole	•
	0.12 - 7.5 kW, 4-pole	•
	15-22 kW, 2-pole 11 - 18.5 kW, 4-pole	-
TPE Series 1000	0.12 - 11 kW, 2-pole	•
	0.12 - 7.5 kW, 4-pole	•
	15-22 kW, 2-pole 11 - 18.5 kW, 4-pole	-

Function	Terminals*
"Analog output"	12

\* See *Connection terminals, advanced functional module, FM 300* on page 143.

The analog output enables the transfer of certain operating data to external control systems.

To set the analog output, make the settings below.

### "Output signal"

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

### "Function of analog output"

- "Actual speed"

Signal range [V, mA]	"Actual speed" [%]		
	0	100	200
"0-10 V"	0 V	5 V	10 V
"0-20 mA"	0 mA	10 mA	20 mA
"4-20 mA"	4 mA	12 mA	20 mA

The reading is a percentage of nominal speed.

- "Actual value"

Signal range [V, mA]	"Actual value"	
	Sensor <sub>min</sub>	Sensor <sub>max</sub>
"0-10 V"	0 V	10 V
"0-20 mA"	0 mA	20 mA
"4-20 mA"	4 mA	20 mA

The reading is a percentage of the range between sensor<sub>min</sub> and sensor<sub>max</sub>.

- "Resulting setpoint"

Signal range [V, mA]	"Resulting setpoint" [%]	
	0	100
"0-10 V"	0 V	10 V
"0-20 mA"	0 mA	20 mA
"4-20 mA"	4 mA	20 mA

The reading is a percentage of the external setpoint range.

- "Motor load"

Signal range [V, mA]	"Motor load" [%]	
	0	100
"0-10 V"	0 V	10 V
"0-20 mA"	0 mA	20 mA
"4-20 mA"	4 mA	20 mA

The reading is a percentage of the range between 0 and 200 % of the maximum permissible load at the actual speed.

- "Motor current"

Signal range [V, mA]	"Motor current" [%]		
	0	100	200
0-10 V	0 V	5 V	10 V
0-20 mA	0 mA	10 mA	20 mA
4-20 mA	4 mA	12 mA	20 mA

The reading is a percentage of the range between 0 and 200 % of the rated current.

- "Limit 1 exceeded" and "Limit 2 exceeded"

Signal range [V, mA]	"Limit-exceed function"	
	Output not active	Output active
"0-10 V"	0 V	10 V
"0-20 mA"	0 mA	20 mA
"4-20 mA"	4 mA	20 mA

The "Limit-exceeded function" is typically used for monitoring of secondary parameters in the system. If the limit is exceeded, an output, warning or alarm is activated.

- "Flow rate"

Signal range [V, mA]	"Flow rate" [%]		
	0	100	200
"0-10 V"	0 V	5 V	10 V
"0-20 mA"	0 mA	10 mA	20 mA
"4-20 mA"	4 mA	12 mA	20 mA

The reading is a percentage of the range between 0 and 200 % of the nominal flow.

### Factory setting

See 14. *Factory settings of E-pumps* on page 118.

**"Controller" ("Controller settings")**

Pump variant	"Controller settings"	
TPE3, TPE3 D	•	
TPE2, TPE2 D	•	
TPE Series 2000	0.12 - 11 kW, 2-pole	•
	0.12 - 7.5 kW, 4-pole	•
	15-22 kW, 2-pole 11 - 18.5 kW, 4-pole	-
TPE Series 1000	0.12 - 11 kW, 2-pole	•
	0.12 - 7.5 kW, 4-pole	•
	15-22 kW, 2-pole 11 - 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, you can change the gain and the integral time:

- Set the gain within the range from 0.1 to 20.
- Set the integral time within the range from 0.1 to 3600 seconds.

If you select 3600 seconds, the controller functions as a P controller.

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

**Guidelines for setting of PI controller**

The tables below show the recommended controller settings:

"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 in metres between pump and sensor.

"Temperature control"	$K_p$		$T_i$
	Heating system <sup>1)</sup>	Cooling system <sup>2)</sup>	
	0.5	-0.5	10 + 5L2
	0.5	-0.5	30 + 5L2

- <sup>1)</sup> In heating systems, an increase in pump performance results in a rise in temperature at the sensor.
- <sup>2)</sup> In cooling systems, an increase in pump performance results in a drop in temperature at the sensor.

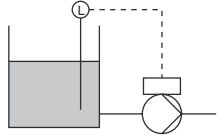
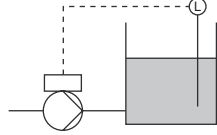
L2: Distance in metres between heat exchanger and sensor.

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

L2: Distance in metres 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

**Rules of thumb**

If the controller is too slow-reacting, increase the gain.  
If the controller is hunting or unstable, dampen the system by reducing the gain or increasing the integral time.

**Factory setting**

See 14. *Factory settings of E-pumps* on page 118.

**"Operating range"**

Pump variant	"Operating range"	
TPE3, TPE3 D	•	
TPE2, TPE2 D	•	
TPE Series 2000	0.12 - 11 kW, 2-pole	•
	0.12 - 7.5 kW, 4-pole	•
	15-22 kW, 2-pole 11 - 18.5 kW, 4-pole	-
TPE Series 1000	0.12 - 11 kW, 2-pole	•
	0.12 - 7.5 kW, 4-pole	•
	15-22 kW, 2-pole 11 - 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. 73.

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

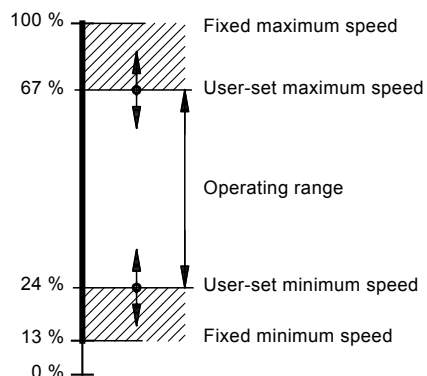


Fig. 73 Example of minimum and maximum settings

**Factory setting**

See 14. *Factory settings of E-pumps* on page 118.

**"External setpoint influence"**

Pump variant	"External setpoint influence"	
TPE3, TPE3 D	•	
TPE2, TPE2 D	•	
TPE Series 2000	0.12 - 11 kW, 2-pole	•
	0.12 - 7.5 kW, 4-pole	•
	15-22 kW, 2-pole 11 - 18.5 kW, 4-pole	•
TPE Series 1000	0.12 - 11 kW, 2-pole	•
	0.12 - 7.5 kW, 4-pole	•
	15-22 kW, 2-pole 11 - 18.5 kW, 4-pole	•

**TPE2, TPE3 pumps and 0.12 - 11 kW, 2-pole and 0.12 - 7.5 kW, 4-pole motors**

You can 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 you can enable the "External setpoint function", set one of the analog inputs or Pt100/1000 inputs to "Setpoint influence".

See *"Analog inputs"* on page 70 and *"Pt100/1000 inputs"* on page 72.

If more than one input has been set to "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 15-22 kW, 2-pole and 11 - 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.

TM00 6785 5095

**Example with constant pressure with linear influence**

Actual setpoint: actual input signal x (setpoint - sensor min.) + sensor min.

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

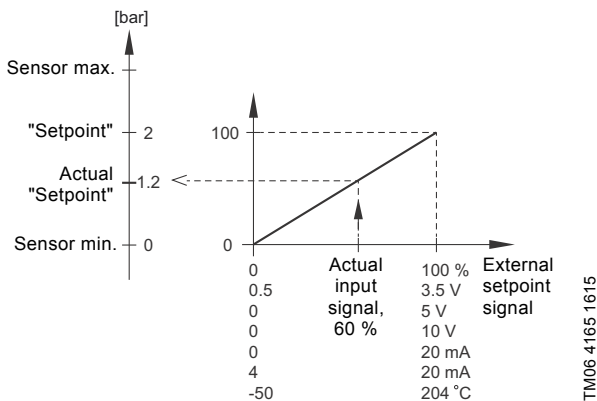


Fig. 74 Example of setpoint influence with sensor feedback

**Example with constant curve with linear influence**

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

At a user-set minimum speed of 25 %, a setpoint of 85 % and an external setpoint of 60 %, the actual setpoint is  $0.60 \times (85 - 25) + 25 = 61$  %. See fig. 75.

In some cases, the maximum curve is limited to a lower speed. See fig. 75.

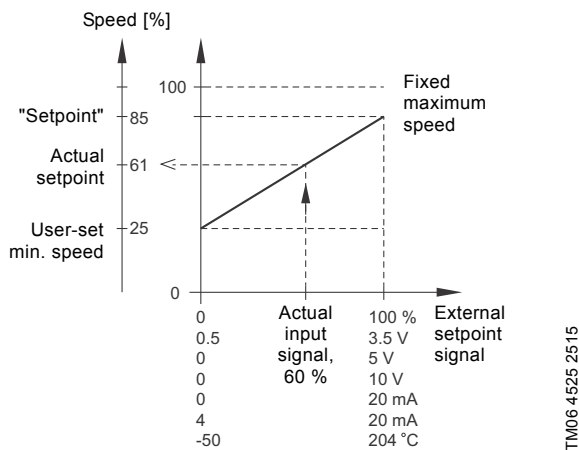


Fig. 75 Example of setpoint influence with constant curve

**Factory setting**

See 14. Factory settings of E-pumps on page 118.

**"Setpoint influence"**

Pump variant	"Setpoint influence"
TPE3, TPE3 D	•
TPE2, TPE2 D	•
TPE Series 2000	•
0.12 - 11 kW, 2-pole	•
0.12 - 7.5 kW, 4-pole	•
15-22 kW, 2-pole	•
11 - 18.5 kW, 4-pole	•
TPE Series 1000	•
0.12 - 11 kW, 2-pole	•
0.12 - 7.5 kW, 4-pole	•
15-22 kW, 2-pole	•
11 - 18.5 kW, 4-pole	•

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

Type of setpoint influence	Pump type					
	TPE3		TPE Series 2000		TPE Series 1000	
	TPE3	TPE2	0.12 - 11 kW, 2-pole	0.12 - 7.5 kW, 4-pole	15-22 kW, 2-pole	11 - 18.5 kW, 4-pole
"Not active"	•	•	•	•	•	•
"Linear function"	•	•	•	•	•	•
"Linear with Stop"	•	•	•	-	•	-
"Influence table"	•	•	•	-	•	-

You can select these functions:

- "Not active" When set to "Not active", the setpoint is not influenced from any external function.
- "Linear function" The setpoint is influenced linearly from 0 to 100 %. See fig. 76.

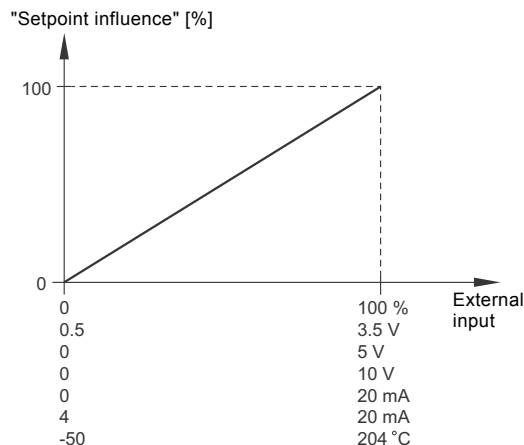


Fig. 76 "Linear function"

- "Linear with Stop"  
In the input signal range from 20 to 100 %, the setpoint is influenced linearly.  
If the input signal is below 10 %, the pump changes to operating mode "Stop".  
If the input signal is increased above 15 %, the operating mode is changed back to "Normal". See fig. 77.

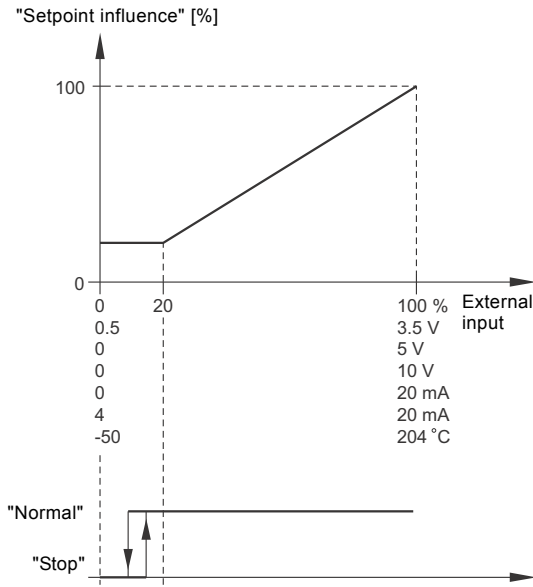


Fig. 77 "Linear with Stop"

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

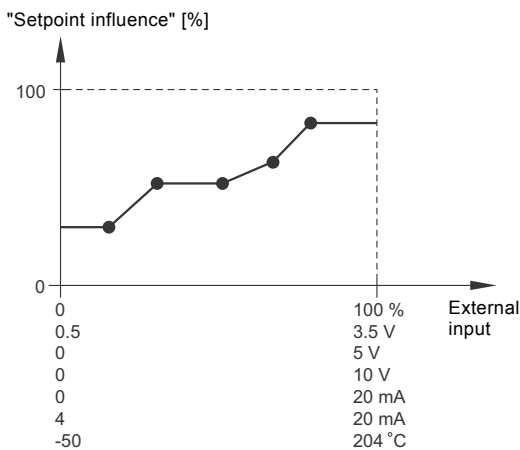


Fig. 78 "Influence table", example with five points

"Predefined setpoints"

Pump variant	"Predefined setpoints"	
TPE3, TPE3 D	•	
TPE2, TPE2 D	•	
TPE Series 2000	0.12 - 11 kW, 2-pole	•
	0.12 - 7.5 kW, 4-pole	•
TPE Series 1000	15-22 kW, 2-pole	-
	11 - 18.5 kW, 4-pole	-
TPE Series 1000	0.12 - 11 kW, 2-pole	•
	0.12 - 7.5 kW, 4-pole	•
TPE Series 1000	15-22 kW, 2-pole	-
	11 - 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.

Set the digital inputs 2, 3 and 4 to "Predefined setpoints" if all seven predefined setpoints are to be used. You can also set one or two of the digital inputs to "Predefined setpoints" but this will limit the number of predefined setpoints available.

"Digital inputs"			"Setpoint"
2	3	4	
0	0	0	Normal setpoint or stop
1	0	0	Predefined setpoint 1
0	1	0	Predefined setpoint 2
1	1	0	Predefined setpoint 3
0	0	1	Predefined setpoint 4
1	0	1	Predefined setpoint 5
0	1	1	Predefined setpoint 6
1	1	1	Predefined setpoint 7

0: Open contact  
1: Closed contact

Example

Figure 79 shows how you can use the digital inputs to set seven predefined setpoints. Digital input 2 is open and digital inputs 3 and 4 are closed. If you compare with the table above, you can see that "Predefined setpoint 6" is activated.

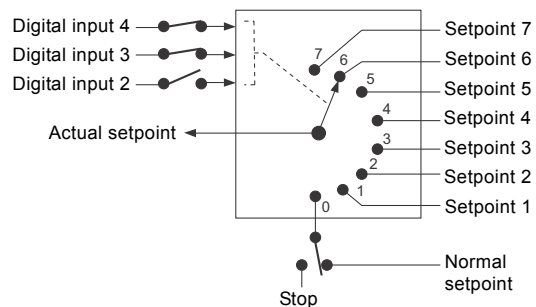


Fig. 79 Principle sketch showing how predefined setpoints function

If all digital inputs are open, the pump either stops or runs at the normal setpoint. Set the desired action with Grundfos GO or with the advanced control panel.

Factory setting

See 14. Factory settings of E-pumps on page 118.

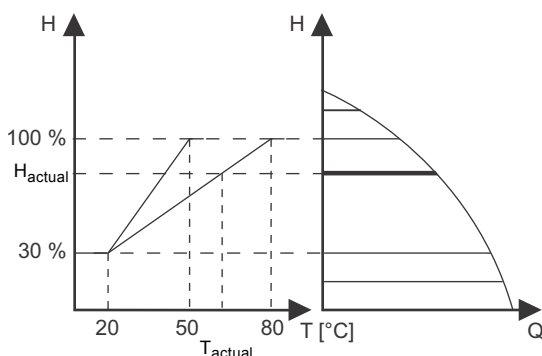


### "Temperature influence"

Pump variant	"Temperature influence"	
TPE3, TPE3 D	•	
TPE2, TPE2 D	-	
TPE Series 2000	0.12 - 11 kW, 2-pole	-
	0.12 - 7.5 kW, 4-pole	-
	15-22 kW, 2-pole 11 - 18.5 kW, 4-pole	-
TPE Series 1000	0.12 - 11 kW, 2-pole	-
	0.12 - 7.5 kW, 4-pole	-
	15-22 kW, 2-pole 11 - 18.5 kW, 4-pole	-

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

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



TM05 7911 1613

**Fig. 80** "Temperature influence"

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

The temperature influence function requires the following:

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

Temperature influence is suitable for the following systems:

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

### Selection of the maximum temperature

In systems with a dimensioned flow-pipe temperature of:

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

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

### Factory setting

See 14. *Factory settings of E-pumps* on page 118.

### "Limit-exceeded function"

Pump variant	"Limit-exceeded function"	
TPE3, TPE3 D	•	
TPE2, TPE2 D	•	
TPE Series 2000	0.12 - 11 kW, 2-pole	•
	0.12 - 7.5 kW, 4-pole	•
	15-22 kW, 2-pole 11 - 18.5 kW, 4-pole	-
TPE Series 1000	0.12 - 11 kW, 2-pole	•
	0.12 - 7.5 kW, 4-pole	•
	15-22 kW, 2-pole 11 - 18.5 kW, 4-pole	-

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

The function requires setting of the following:

#### Measured

Here you set the measured parameter to be monitored.

#### "Limit"

Here you set the limit which activates the function.

#### "Hysteresis band"

Here you set the hysteresis band.

#### "Limit exceeded when"

Here you can set if you want the function to be activated when the selected parameter exceeds or drops below the set limit.

- "Above limit"  
The function is activated if the measured parameter exceeds the set limit.
- "Below limit"  
The function is activated if the measured parameter drops below the set limit.

## Action

If the value exceeds a limit, you can define an action. You can select the following actions:

- "No action"  
The pump remains in its current state. Use this setting if you only want to have a relay output when the limit is reached. See "Signal relays 1 and 2" ("Relay outputs") on page 75.
- "Warning/alarm"  
There is a warning.
- "Stop"  
The pump stops.
- "Min."  
The pump reduces speed to minimum.
- "Max."  
The pump increases speed to maximum.
- "User-defined speed"  
The pump runs at a speed set by the user.

## "Detection delay"

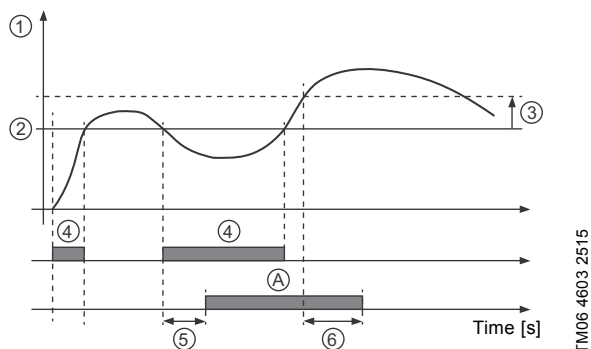
You can set a detection delay which ensures that the monitored parameter stays above or below a set limit in a set time before the function is activated.

## "Resetting delay"

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

## Example

The function is to monitor the outlet pressure of a pump. If the pressure is below 5 bar for more than 5 seconds, a warning must be given. If the outlet pressure is above 7 bar for more than 8 seconds, you must reset the warning.



TM06 4603 2515

Fig. 81 Limit exceeded (example)

Pos.	Setting parameter	Setting
1	Measured	Outlet pressure
2	"Limit"	5 bar
3	"Hysteresis band"	2 bar
4	"Limit exceeded when"	Below limit
5	"Detection delay"	5 seconds
6	"Resetting delay"	8 seconds
A	Limit-exceeded function active	-
-	Action	Warning

## Factory setting

See 14. Factory settings of E-pumps on page 118.

## Special functions

### "Pulse flowmeter setup"

Pump variant	"Pulse flowmeter setup"	
TPE3, TPE3 D	•	
TPE2, TPE2 D	•	
TPE Series 2000	0.12 - 11 kW, 2-pole	•
	0.12 - 7.5 kW, 4-pole	•
	15-22 kW, 2-pole 11 - 18.5 kW, 4-pole	-
TPE Series 1000	0.12 - 11 kW, 2-pole	•
	0.12 - 7.5 kW, 4-pole	•
	15-22 kW, 2-pole 11 - 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.

To enable a pulse flowmeter, set one of the digital inputs to "Accumulated flow" and set the pumped volume per pulse. See "Digital inputs" on page 73.

**"Ramps"**

Pump variant	"Ramps"	
TPE3, TPE3 D	•	
TPE2, TPE2 D	•	
TPE Series 2000	0.12 - 11 kW, 2-pole	•
	0.12 - 7.5 kW, 4-pole	•
	15-22 kW, 2-pole 11 - 18.5 kW, 4-pole	-
TPE Series 1000	0.12 - 11 kW, 2-pole	•
	0.12 - 7.5 kW, 4-pole	•
	15-22 kW, 2-pole 11 - 18.5 kW, 4-pole	-

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

You can set the following:

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

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

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.

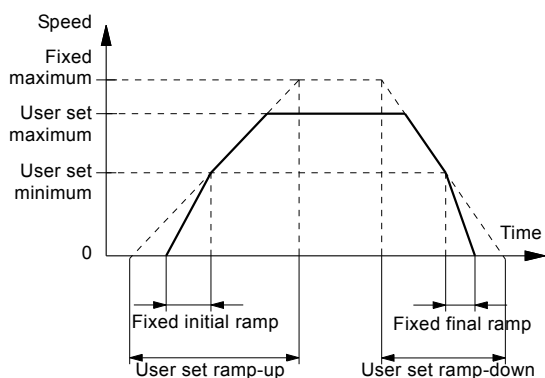


Fig. 82 Ramp-up and ramp-down

**Factory setting**

See 14. *Factory settings of E-pumps* on page 118.

**"Standstill heating"**

Pump variant	"Standstill heating"	
TPE3, TPE3 D	•	
TPE2, TPE2 D	•	
TPE Series 2000	0.12 - 11 kW, 2-pole	•
	0.12 - 7.5 kW, 4-pole	•
	15-22 kW, 2-pole 11 - 18.5 kW, 4-pole	•
TPE Series 1000	0.12 - 11 kW, 2-pole	•
	0.12 - 7.5 kW, 4-pole	•
	15-22 kW, 2-pole 11 - 18.5 kW, 4-pole	•

You can use this function to avoid condensation in humid environments. When you set the function to "Active" and the pump is in operating mode "Stop", a low AC voltage will be applied to the motor windings. The voltage is not high enough to make the motor rotate but ensures that sufficient heat is generated to avoid condensation in the motor including the electronic parts in the drive.

**Note:** Remember to remove the drain plugs and fit a cover over the motors.

**Factory setting**

See 14. *Factory settings of E-pumps* on page 118.

**"Motor bearing monitoring"**

Pump variant	"Motor bearing monitoring"	
TPE3, TPE3 D	•	
TPE2, TPE2 D	•	
TPE Series 2000	0.12 - 11 kW, 2-pole	•
	0.12 - 7.5 kW, 4-pole	•
	15-22 kW, 2-pole 11 - 18.5 kW, 4-pole	•
TPE Series 1000	0.12 - 11 kW, 2-pole	•
	0.12 - 7.5 kW, 4-pole	•
	15-22 kW, 2-pole 11 - 18.5 kW, 4-pole	•

You can set the motor bearing monitoring function to these values:

- "Active"
- "Not active"

When the function is set to "Active", a counter in the controller will start counting the mileage of the bearings.

The counter continues counting even if the function is changed to "Not active", but a warning is not given when it is time for replacement or relubrication.

When the function is changed to "Active again", the accumulated mileage is again used to calculate the replacement or relubrication time.

**Factory setting**

See 14. *Factory settings of E-pumps* on page 118.

## "Service"

Pump variant	"Service"	
TPE3, TPE3 D	•	
TPE2, TPE2 D	•	
TPE Series 2000	0.12 - 11 kW, 2-pole	•
	0.12 - 7.5 kW, 4-pole	•
	15-22 kW, 2-pole 11 - 18.5 kW, 4-pole	-
TPE Series 1000	0.12 - 11 kW, 2-pole	•
	0.12 - 7.5 kW, 4-pole	•
	15-22 kW, 2-pole 11 - 18.5 kW, 4-pole	-

"Motor bearing monitoring" must be activated in order for the motor to indicate that bearings must be replaced or relubricated. See *"Motor bearing monitoring"* on page 83.

For motors of 7.5 kW and below, it is not possible to relubricate the bearings.

Bearings on motors of 11 kW and above can be relubricated.

## "Time until next service" ("Motor bearing service")

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

Displayable values:

- "in 2 years"
- "in 1 year"
- "in 6 months"
- "in 3 months"
- "in 1 month"
- "in 1 week"
- "Now".

## "Bearing replacements"

This display shows the number of bearing replacements that have been done during the lifetime of the motor.

## "Bearings replaced" ("Motor bearing maintenance")

When the bearing monitoring function is active, the controller gives a warning when the motor bearings are to be replaced.

When you have replaced the motor bearings, confirm this action by pressing [Bearings replaced].

## "Bearing relubrications"

The following applies only for 11 kW motors.

This display shows the number of bearing relubrications that have been done since the last bearing replacement.

## "Bearings relubricated" (Motor bearing maintenance)

The following applies only for 11 kW motors.

When the bearing monitoring function is active, the controller gives a warning when the motor bearings are due to be relubricated.

When you have relubricated the motor bearings, press [Bearings relubricated].

The factory-set interval between relubrications is stated on the bearing nameplate which is placed on the motor. The relubrication interval can be changed by a Grundfos service technician.

It is possible to relubricate the bearings five times according to the preset interval. When the preset interval has been reached after the fifth relubrication, a warning will be given to replace the bearings.

## Communication

### "Number" ("Pump number")

Pump variant	Number	
TPE3, TPE3 D	•	
TPE2, TPE2 D	•	
TPE Series 2000	0.12 - 11 kW, 2-pole	•
	0.12 - 7.5 kW, 4-pole	•
	15-22 kW, 2-pole 11 - 18.5 kW, 4-pole	•
TPE Series 1000	0.12 - 11 kW, 2-pole	•
	0.12 - 7.5 kW, 4-pole	•
	15-22 kW, 2-pole 11 - 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.

### Factory setting

See 14. *Factory settings of E-pumps* on page 118.

### "Radio communication" ("Enable/disable radio comm.")

Pump variant	"Radio communication"	
TPE3, TPE3 D	•	
TPE2, TPE2 D	•	
TPE Series 2000	0.12 - 11 kW, 2-pole	•
	0.12 - 7.5 kW, 4-pole	•
	15-22 kW, 2-pole 11 - 18.5 kW, 4-pole	-
TPE Series 1000	0.12 - 11 kW, 2-pole	•
	0.12 - 7.5 kW, 4-pole	•
	15-22 kW, 2-pole 11 - 18.5 kW, 4-pole	-

You can set the radio communication to either enabled or disabled. You can use this function in areas where radio communication is not allowed.

IR communication remains active.

### Factory setting

See 14. *Factory settings of E-pumps* on page 118.

## General settings

### "Language"

Pump variant	"Language"
TPE3, TPE3 D	•
TPE2, TPE2 D	•
TPE Series 2000	0.12 - 11 kW, 2-pole 0.12 - 7.5 kW, 4-pole
	•
	15-22 kW, 2-pole 11 - 18.5 kW, 4-pole
	-
TPE Series 1000	0.12 - 11 kW, 2-pole 0.12 - 7.5 kW, 4-pole
	•
	15-22 kW, 2-pole 11 - 18.5 kW, 4-pole
	-

This menu is only available in the advanced control panel.

In this menu you can select the desired language. A number of languages are available.

### "Date and time"

Pump variant	"Date and time"
TPE3, TPE3 D	•
TPE2, TPE2 D	•
TPE Series 2000	0.12 - 11 kW, 2-pole 0.12 - 7.5 kW, 4-pole
	•
	15-22 kW, 2-pole 11 - 18.5 kW, 4-pole
	-
TPE Series 1000	0.12 - 11 kW, 2-pole 0.12 - 7.5 kW, 4-pole
	•
	15-22 kW, 2-pole 11 - 18.5 kW, 4-pole
	-

You can set date and time as well as how they are to be shown in the display:

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

### "Unit configuration" ("Units")

Pump variant	"Unit configuration"
TPE3, TPE3 D	•
TPE2, TPE2 D	•
TPE Series 2000	0.12 - 11 kW, 2-pole 0.12 - 7.5 kW, 4-pole
	•
	15-22 kW, 2-pole 11 - 18.5 kW, 4-pole
	-
TPE Series 1000	0.12 - 11 kW, 2-pole 0.12 - 7.5 kW, 4-pole
	•
	15-22 kW, 2-pole 11 - 18.5 kW, 4-pole
	-

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

### Factory setting

See 14. *Factory settings of E-pumps* on page 118.

### "Buttons on product" ("Enable/disable settings")

Pump variant	"Buttons on product"
TPE3, TPE3 D	•
TPE2, TPE2 D	•
TPE Series 2000	0.12 - 11 kW, 2-pole 0.12 - 7.5 kW, 4-pole
	•
	15-22 kW, 2-pole 11 - 18.5 kW, 4-pole
	•
TPE Series 1000	0.12 - 11 kW, 2-pole 0.12 - 7.5 kW, 4-pole
	•
	15-22 kW, 2-pole 11 - 18.5 kW, 4-pole
	•


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



### Grundfos GO

If you set the buttons to "Not active", the buttons on the standard control panel are disabled. If you set the buttons to "Not active" on pumps with an advanced control panel, see below.


### Advanced control panel

If you have disabled the settings, you can still use the buttons to navigate through the menus but you cannot make changes in the "Settings" menu.

When you have disabled the possibility to make settings, the  symbol appears in the display.

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

### Standard control panel

The  button always remains active but you can only unlock all other buttons on the pump with Grundfos GO.

### "Delete history"

Pump variant	"Delete history"	
TPE3, TPE3 D	•	
TPE2, TPE2 D	•	
TPE Series 2000	0.12 - 11 kW, 2-pole	•
	0.12 - 7.5 kW, 4-pole	•
	15-22 kW, 2-pole	-
TPE Series 1000	11 - 18.5 kW, 4-pole	-
	0.12 - 11 kW, 2-pole	•
	0.12 - 7.5 kW, 4-pole	•
	15-22 kW, 2-pole	-
	11 - 18.5 kW, 4-pole	-

This menu is only available in the advanced control panel.

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

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

### "Define Home display"

Pump variant	"Define Home display"	
TPE3, TPE3 D	•	
TPE2, TPE2 D	•	
TPE Series 2000	0.12 - 11 kW, 2-pole	•
	0.12 - 7.5 kW, 4-pole	•
	15-22 kW, 2-pole	-
TPE Series 1000	11 - 18.5 kW, 4-pole	-
	0.12 - 11 kW, 2-pole	•
	0.12 - 7.5 kW, 4-pole	•
	15-22 kW, 2-pole	-
	11 - 18.5 kW, 4-pole	-

This menu is only available in the advanced control panel.

In this menu, you can set the "Home" display to show up to four user-set parameters.

### "Display settings"

Pump variant	"Display settings"	
TPE3, TPE3 D	•	
TPE2, TPE2 D	•	
TPE Series 2000	0.12 - 11 kW, 2-pole	•
	0.12 - 7.5 kW, 4-pole	•
	15-22 kW, 2-pole	-
TPE Series 1000	11 - 18.5 kW, 4-pole	-
	0.12 - 11 kW, 2-pole	•
	0.12 - 7.5 kW, 4-pole	•
	15-22 kW, 2-pole	-
	11 - 18.5 kW, 4-pole	-

This menu is only available in the advanced control panel.

In this menu you can adjust the display brightness and set whether or not the display is to turn off if no buttons have been activated for a period of time.

### "Store settings" ("Store actual settings")

Pump variant	"Store settings"	
TPE3, TPE3 D	•	
TPE2, TPE2 D	•	
TPE Series 2000	0.12 - 11 kW, 2-pole	•
	0.12 - 7.5 kW, 4-pole	•
	15-22 kW, 2-pole	•
TPE Series 1000	11 - 18.5 kW, 4-pole	•
	0.12 - 11 kW, 2-pole	•
	0.12 - 7.5 kW, 4-pole	•
	15-22 kW, 2-pole	•
	11 - 18.5 kW, 4-pole	•

### Grundfos GO

In this menu, you can store the actual settings for later use in the same pump or in other pumps of the same type.

#### Advanced control panel

In this menu, you can store the actual settings for later use in the same pump.

**"Recall settings" ("Recall stored settings")**

Pump variant	"Recall settings"	
TPE3, TPE3 D	•	
TPE2, TPE2 D	•	
TPE Series 2000	0.12 - 11 kW, 2-pole	•
	0.12 - 7.5 kW, 4-pole	•
	15-22 kW, 2-pole 11 - 18.5 kW, 4-pole	•
TPE Series 1000	0.12 - 11 kW, 2-pole	•
	0.12 - 7.5 kW, 4-pole	•
	15-22 kW, 2-pole 11 - 18.5 kW, 4-pole	•

**Grundfos GO**

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

**Advanced control panel**

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

**"Undo"**

Pump variant	"Undo"	
TPE3, TPE3 D	•	
TPE2, TPE2 D	•	
TPE Series 2000	0.12 - 11 kW, 2-pole	•
	0.12 - 7.5 kW, 4-pole	•
	15-22 kW, 2-pole 11 - 18.5 kW, 4-pole	•
TPE Series 1000	0.12 - 11 kW, 2-pole	•
	0.12 - 7.5 kW, 4-pole	•
	15-22 kW, 2-pole 11 - 18.5 kW, 4-pole	•

This menu is only available in Grundfos GO. In this display, you can undo all settings that have been made with Grundfos GO in the current communication session. You cannot undo a "Recall stored settings" action.

**"Pump name"**

Pump variant	"Pump name"	
TPE3, TPE3 D	•	
TPE2, TPE2 D	•	
TPE Series 2000	0.12 - 11 kW, 2-pole	•
	0.12 - 7.5 kW, 4-pole	•
	15-22 kW, 2-pole 11 - 18.5 kW, 4-pole	-
TPE Series 1000	0.12 - 11 kW, 2-pole	•
	0.12 - 7.5 kW, 4-pole	•
	15-22 kW, 2-pole 11 - 18.5 kW, 4-pole	-

This menu is only available in Grundfos GO. In this display, you can give the pump a name. In this way, you can easily identify the pump when connecting with Grundfos GO.

**Factory setting**

See 14. *Factory settings of E-pumps* on page 118.

**"Connection code"**

Pump variant	"Connection code"	
TPE3, TPE3 D	•	
TPE2, TPE2 D	•	
TPE Series 2000	0.12 - 11 kW, 2-pole	•
	0.12 - 7.5 kW, 4-pole	•
	15-22 kW, 2-pole 11 - 18.5 kW, 4-pole	-
TPE Series 1000	0.12 - 11 kW, 2-pole	•
	0.12 - 7.5 kW, 4-pole	•
	15-22 kW, 2-pole 11 - 18.5 kW, 4-pole	-

This menu is only available in Grundfos GO. You can set a connection code to avoid having to press the connection button each time and to restrict remote access to the product.

**Setting the code in the product using Grundfos GO**

1. Connect Grundfos GO to the product.
2. In the product dashboard, select "Settings".
3. Choose "Connection code".
4. Enter the wanted code and press [OK].  
The code must be a character string, ASCII. You can always modify the code. The old code is not needed.

**Setting the code in Grundfos GO**

You can set a default connection code in Grundfos GO so that it automatically attempts to connect to the selected product via this code.

When you select a product with the same connection code in Grundfos GO, Grundfos GO automatically connects to the product and you do not have to press the connection button on the module.

Set the default code in Grundfos GO in this way:

1. In the main menu, under "General", select "Settings".
2. Choose "Remote".
3. Enter the connection code in the field "Preset connection code". The field now says "Connection code set".

You can always modify the default connection code by pressing [Delete] and entering a new one.

If Grundfos GO fails to connect and ask you to press the connection button on the product, it means that the product has no connection code or has a different connection code. In this case, you can only establish connection via the connection button.

After setting a connection code, you must switch off the product until the light in Grundfos Eye turns off before you can use the new connection code.

**Factory setting**

See 14. *Factory settings of E-pumps* on page 118.

### "Run startup guide"

Pump variant	"Run startup guide"	
TPE3, TPE3 D	•	
TPE2, TPE2 D	•	
TPE Series 2000	0.12 - 11 kW, 2-pole	•
	0.12 - 7.5 kW, 4-pole	•
	15-22 kW, 2-pole 11 - 18.5 kW, 4-pole	-
TPE Series 1000	0.12 - 11 kW, 2-pole	•
	0.12 - 7.5 kW, 4-pole	•
	15-22 kW, 2-pole 11 - 18.5 kW, 4-pole	-

This menu is only available in the advanced control panel.

The startup guide automatically starts when you start the pump for the first time.

You can always run the startup guide later via this menu.

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

- "Language". See "*Language*" on page 85.
- "Select date format".\*  
See "*Date and time*" on page 85.
- "Set date".\*  
See "*Date and time*" on page 85.
- "Select time format".\*  
See "*Date and time*" on page 85.
- "Set time".\*  
See "*Date and time*" on page 85.
- "Setting of pump"
  - "Go to Home"
  - "Run with Constant curve" / "Run with Constant pressure".  
See "*Control mode*" on page 62
  - "Go to Assisted pump setup".  
See "*Assisted pump setup*" on page 89.
  - "Return to factory settings".

\* Applies only for pumps with advanced functional module, FM 300. For further information, see *Identification of functional module* on page 148.

### "Alarm log"

Pump variant	"Alarm log"	
TPE3, TPE3 D	•	
TPE2, TPE2 D	•	
TPE Series 2000	0.12 - 11 kW, 2-pole	•
	0.12 - 7.5 kW, 4-pole	•
	15-22 kW, 2-pole 11 - 18.5 kW, 4-pole	-
TPE Series 1000	0.12 - 11 kW, 2-pole	•
	0.12 - 7.5 kW, 4-pole	•
	15-22 kW, 2-pole 11 - 18.5 kW, 4-pole	-

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

### "Warning log"

Pump variant	"Warning log"	
TPE3, TPE3 D	•	
TPE2, TPE2 D	•	
TPE Series 2000	0.12 - 11 kW, 2-pole	•
	0.12 - 7.5 kW, 4-pole	•
	15-22 kW, 2-pole 11 - 18.5 kW, 4-pole	-
TPE Series 1000	0.12 - 11 kW, 2-pole	•
	0.12 - 7.5 kW, 4-pole	•
	15-22 kW, 2-pole 11 - 18.5 kW, 4-pole	-

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

### "Assist"

Pump variant	"Assist"	
TPE3, TPE3 D	•	
TPE2, TPE2 D	•	
TPE Series 2000	0.12 - 11 kW, 2-pole	•
	0.12 - 7.5 kW, 4-pole	•
	15-22 kW, 2-pole 11 - 18.5 kW, 4-pole	-
TPE Series 1000	0.12 - 11 kW, 2-pole	•
	0.12 - 7.5 kW, 4-pole	•
	15-22 kW, 2-pole 11 - 18.5 kW, 4-pole	-

The menu consist of functions which take you through the steps needed to set the pump.



**"Assisted pump setup"**

Pump variant	"Assisted pump setup"	
TPE3, TPE3 D	•	
TPE2, TPE2 D	•	
TPE Series 2000	0.12 - 11 kW, 2-pole	•
	0.12 - 7.5 kW, 4-pole	•
	15-22 kW, 2-pole 11 - 18.5 kW, 4-pole	-
TPE Series 1000	0.12 - 11 kW, 2-pole	•
	0.12 - 7.5 kW, 4-pole	•
	15-22 kW, 2-pole 11 - 18.5 kW, 4-pole	-

The menu guides you through the following:

**Setting of pump**

- Selection of control mode. See page 62.
- Configuration of feedback sensors.
- Adjusting the setpoint. See page 61.
- Controller settings. See page 77.
- Summary of settings.

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

**Grundfos GO**

1. Open the "Assist" menu.
2. Select "Assisted pump setup".
3. Select the control mode "Constant pressure".
4. Read the description of this control mode.
5. Select which analog input to use as sensor input.
6. Select sensor function according to where the sensor is installed in the system. See fig. 68.
7. Select electrical input signal according to the sensor specifications.
8. Select measuring unit according to the sensor specifications.
9. Set the minimum and maximum sensor values according to the sensor specifications.
10. Set the desired setpoint.
11. Set the controller settings  $K_p$  and  $T_i$ . See the recommendations in section "Controller" ("Controller settings") on page 77.
12. Type the pump name.
13. Check the summary of settings and confirm them.

**Advanced control panel**

1. Open the "Assist" menu.
2. Select "Assisted pump setup".
3. Select the control mode "Const. pressure".
4. Select which analog input to use as sensor input.
5. Select the measured parameter to be controlled. See fig. 68.
6. Select measuring unit according to the sensor specifications.
7. Set the minimum and maximum sensor values according to the sensor specifications.
8. Select electrical input signal according to the sensor specifications.
9. Set the setpoint.
10. Set the controller settings  $K_p$  and  $T_i$ . See recommendations in section "Controller" ("Controller settings") on page 77.
11. Check the summary of settings and confirm them by pressing [OK].

**"Setup, analog input"**

Pump variant	"Setup, analog input"	
TPE3, TPE3 D	•	
TPE2, TPE2 D	•	
TPE Series 2000	0.12 - 11 kW, 2-pole	•
	0.12 - 7.5 kW, 4-pole	•
	15-22 kW, 2-pole 11 - 18.5 kW, 4-pole	-
TPE Series 1000	0.12 - 11 kW, 2-pole	•
	0.12 - 7.5 kW, 4-pole	•
	15-22 kW, 2-pole 11 - 18.5 kW, 4-pole	-

This menu is only available in the advanced control panel.

The menu guides you through the following:

**"Setup, analog input"**

- Analog inputs 1 to 3. See page 70.
- Pt100/1000 input 1 and 2. See page 72.
- Adjusting the setpoint. See page 61.
- Summary.

### "Setting of date and time"

Pump variant	"Setting of date and time"	
TPE3, TPE3 D	•	
TPE2, TPE2 D	•	
TPE Series 2000	0.12 - 11 kW, 2-pole	•
	0.12 - 7.5 kW, 4-pole	•
	15-22 kW, 2-pole 11 - 18.5 kW, 4-pole	-
TPE Series 1000	0.12 - 11 kW, 2-pole	•
	0.12 - 7.5 kW, 4-pole	•
	15-22 kW, 2-pole 11 - 18.5 kW, 4-pole	-

This menu guides you through the following:

- "Select date format". See *"Date and time"* on page 85.
- "Set date". See *"Date and time"* on page 85.
- "Select time format". See *"Date and time"* on page 85.
- "Set time". See *"Date and time"* on page 85.

### "Multipump setup" ("Setup of multi-pump system")

Pump variant	"Multipump setup"	
TPE3, TPE3 D	•	
TPE2, TPE2 D	•	
TPE Series 2000	0.12 - 11 kW, 2-pole	•
	0.12 - 7.5 kW, 4-pole	•
	15-22 kW, 2-pole 11 - 18.5 kW, 4-pole	-
TPE Series 1000	0.12 - 11 kW, 2-pole	•
	0.12 - 7.5 kW, 4-pole	•
	15-22 kW, 2-pole 11 - 18.5 kW, 4-pole	-

The multipump function enables the control of two pumps connected in parallel 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.

A multipump system is set via a selected pump, that is the master pump, which is the first selected pump.

If two pumps in the system are configured with an outlet-pressure sensor, both pumps can function as master pumps and take over the master pump function if the other fails. This provides additional redundancy in the multipump system.

The multipump functions are described in the following sections.

### Alternating operation

Alternating operation functions as a duty-standby operating mode and is possible with two pumps of same size and type connected in parallel. The main purpose of the function is to ensure an even amount of running hours and to ensure that the standby pump takes over if the running pump stops due to an alarm. Each pump requires a non-return valve in series with the pump.

You can choose between two alternating operation modes:

- Alternating operation, time  
Pump changeover to the other is based on time.
- Alternating operation, energy  
Pump changeover to the other is based on energy consumption.

If the duty pump fails, the other pump takes over automatically.

### Backup operation

Backup operation is possible with two pumps of same size and type connected in parallel. Each pump requires a non-return valve in series with the pump.

One pump is operating continuously. The backup pump is operated for a short time each day to prevent seizing up. If the duty pump stops due to a fault, the backup pump starts automatically.

### 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.

When a twin-head pump is running in constant-pressure control mode, the second pump head starts at 90 % and stops at 50 % performance.

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

Pump system:

- Twin-head pump.
- Two or 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" or "Const. curve".

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

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


### Setting a multipump system

You can set a multipump system in the following ways:

- Grundfos GO and wireless pump connection
- Grundfos GO and wired pump connection
- Advanced control panel and wireless pump connection
- Advanced control panel and wired pump connection.


See step-by-step descriptions below.

#### Grundfos GO and wireless pump connection

1. Power on both pumps.
2. Establish contact to one of the pumps with Grundfos GO.
3. Set the needed analog and digital inputs via Grundfos GO according to the connected equipment and the required functionality. See "*Assisted pump setup*" on page 89.
4. Assign a pump name to the pump using Grundfos GO. See "*Pump name*" on page 87.
5. Disconnect Grundfos GO from the pump.
6. Establish contact to the other pump.
7. Set the needed analog and digital inputs via Grundfos GO according to the connected equipment and the required functionality. See "*Assisted pump setup*" on page 89.
8. Assign a pump name to the pump using Grundfos GO. See "*Pump name*" on page 87.
9. Select the "Assist" menu and "Multipump setup".
10. Select the desired multipump function. See "*Alternating operation*" on page 90, "*Backup operation*" on page 90 and "*Cascade operation*" on page 91.
11. Press [>] to continue.
12. Set the time for pump changeover such as the time at which the alternation between the two pumps is to take place. This step applies only if you have selected "Alternating operation, time" and if the pumps are fitted with FM 300.
13. Press [>] to continue.
14. Select "Radio" as the communication method to be used between the two pumps.
15. Press [>] to continue.
16. Press "Select pump 2".
17. Select the pump from the list.  
Use the [OK] or  button to identify the pump.
18. Press [>] to continue.
19. Confirm the multipump setup by pressing [Send].
20. Press [Finish] in the "Setup complete" dialog box.
21. Wait for the green indicator light in the middle of Grundfos Eye to light up.

The multipump system has now been set.

**Grundfos GO and wired pump connection**

1. Connect the two pumps with each other with a 3-core screened cable between the GENIbus terminals A, Y, B.
  2. Power on both pumps.
  3. Establish contact to one of the pumps with Grundfos GO.
  4. Set the needed analog and digital inputs via Grundfos GO according to the connected equipment and the required functionality. See "*Assisted pump setup*" on page 89.
  5. Assign a pump name to the pump using Grundfos GO. See "*Pump name*" on page 87.
  6. Assign pump number 1 to the pump. See "*Number*" ("*Pump number*") on page 84.
  7. Disconnect Grundfos GO from the pump.
  8. Establish contact to the other pump.
  9. Set the needed analog and digital inputs via Grundfos GO according to the connected equipment and the required functionality. See "*Assisted pump setup*" on page 89.
  10. Assign a pump name to the pump using Grundfos GO. See "*Pump name*" on page 87.
  11. Assign pump number 2 to the pump. See "*Number*" ("*Pump number*") on page 84.
  12. Select the "Assist" menu and choose "Multipump setup".
  13. Select the desired multipump function. See *Alternating operation* on page 90, *Backup operation* on page 90 and *Cascade operation* on page 91.
  14. Press [>] to continue.
  15. Set the time for pump changeover such as the time at which the alternation between the two pumps is to take place. This step applies only if you have selected "Alternating operation, time" and if the pumps are fitted with FM 300.
  16. Press [>] to continue.
  17. Select "BUS cable" as the communication method to be used between the two pumps.
  18. Press [>] to continue.
  19. Press "Select pump 2".
  20. Select the additional pump from the list.  
Use the [OK] or  button to identify the additional pump.
  21. Press [>] to continue.
  22. Press [Send].
  23. Press [Finish] in the "Setup complete" dialog box.
  24. Wait for the green indicator light in the middle of Grundfos Eye to light up.
- The multipump system has now been set.

**Advanced control panel and wireless pump connection**

1. Power on both pumps.
  2. On both pumps, set the needed analog and digital inputs according to the connected equipment and the required functionality. See "*Assisted pump setup*" on page 89.
  3. Select the "Assist" menu on one of the pumps and choose "Setup of multi-pump system".
  4. Press [>] to continue.
  5. Select "Wireless" as the communication method to be used between the two pumps.
  6. Press [>] to continue.
  7. Select the desired multipump function. See *Alternating operation* on page 90, *Backup operation* on page 90 and *Cascade operation* on page 91.
  8. Press [>] three times to continue.
  9. Press [OK] to search for other pumps.  
The green indicator light in the middle of Grundfos Eye flashes on the other pumps.
  10. Press the connect button on the pump which is to be added to the multipump system.
  11. Press [>] to continue.
  12. Set the time for pump changeover i.e. the time at which the alternation between the two pumps is to take place. This step applies only if you have selected "Alternating operation, time" and if the pumps are fitted with FM 300.
  13. Press [>] to continue.
  14. Press [OK].  
The multipump function icons appear in the bottom of the control panels.
- The multipump system has now been set.

**Advanced control panel and wired pump connection**

1. Connect the two pumps with each other with a 3-core screened cable between the GENIbus terminals A, Y, B.
2. Set the needed analog and digital inputs according to the connected equipment and the required functionality. See *"Assisted pump setup"* on page 89.
3. Assign pump number 1 to the first pump. See *"Number" ("Pump number")* on page 84.
4. Assign pump number 2 to the other pump. See *"Number" ("Pump number")* on page 84.
5. Select the "Assist" menu on one of the pumps and choose "Setup of multi-pump system".
6. Press [>] to continue.
7. Select "Wired GENIbus" as the communication method to be used between the two pumps.
8. Press [>] twice to continue.
9. Select the desired multipump function. See *Alternating operation* on page 90, *Backup operation* on page 90 and *Cascade operation* on page 91.
10. Press [>] to continue.
11. Press [OK] to search for other pumps.
12. Select the additional pump from the list.
13. Press [>] to continue.
14. Set the time for pump changeover i.e. the time at which the alternation between the two pumps is to take place.  
This step applies only if you have selected "Alternating operation, time" and if the pumps are fitted with FM 300.
15. Press [>] to continue.
16. Press [OK].  
The multipump function icon appears in the bottom of the control panels.

The multipump system has now been set.

**Disabling the multipump function via Grundfos GO**

1. Select the "Assist" menu.
2. Select "Multipump setup".
3. Select "Disable".
4. Press [>] to continue.
5. Confirm the multipump setup by pressing [Send].
6. Press [Finish].

The multipump function has now been disabled.

**Disabling a multipump via advanced control panel**

1. Select the "Assist" menu.
2. Select "Setup of multi-pump system".
3. Press [>] to continue.
4. Confirm "No multi-pump function" by pressing [OK].
5. Press [>] to continue.
6. Press [OK].

The multipump system has now been disabled.

**"Description of control mode"**

Pump variant	"Description of control mode"
TPE3, TPE3 D	•
TPE2, TPE2 D	•
TPE Series 2000	0.12 - 11 kW, 2-pole
	0.12 - 7.5 kW, 4-pole
	15-22 kW, 2-pole
TPE Series 1000	11 - 18.5 kW, 4-pole
	0.12 - 11 kW, 2-pole
	0.12 - 7.5 kW, 4-pole
	15-22 kW, 2-pole
	11 - 18.5 kW, 4-pole
	-

This menu is only available in the advanced control panel.




This menu describes each of the possible control modes. See also section *"Control mode"* on page 62.

**"Assisted fault advice"**

Pump variant	"Assisted fault advice"
TPE3, TPE3 D	•
TPE2, TPE2 D	•
TPE Series 2000	0.12 - 11 kW, 2-pole
	0.12 - 7.5 kW, 4-pole
	15-22 kW, 2-pole
TPE Series 1000	11 - 18.5 kW, 4-pole
	0.12 - 11 kW, 2-pole
	0.12 - 7.5 kW, 4-pole
	15-22 kW, 2-pole
	11 - 18.5 kW, 4-pole
	-

This menu gives guidance and corrective actions in case of pump failures.

## Priority of settings

You can always set the pump to stop by pressing  on the pump control panel. When the pump is not in "Stop" mode, you can always stop the pump by continuously pressing . Furthermore, you can set the pump to maximum speed by continuously pressing . You can always set the pump to operation at maximum speed or to stop with Grundfos GO.

If two or more functions are enabled at the same time, the pump will operate according to the function with the highest priority.

### Example

If you have set the pump to maximum speed via the digital input, the pump control panel or Grundfos GO can only set the pump to "Manual" or "Stop".

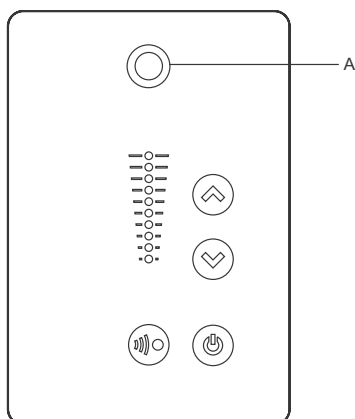
The priority of the settings appears from the table below.

Priority	Start-stop button	Grundfos GO or control panel on the motor	Digital input	Bus communication
1	"Stop"			
2		"Stop"*		
3		"Manual"		
4		"Max. speed"*/ "User-defined speed"		
5			"Stop"	
6			"User-defined speed"	
7				"Stop"
8				"Max. speed"
9				"Min. speed"
10				"Start"
11			"Max. speed"	
12		"Min. speed"		
13			"Min. speed"	
14			"Start"	
15		"Start"		

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

## Grundfos Eye

The operating condition of the motor is indicated by Grundfos Eye on the control panel. See fig. 83 (A).



TM05 5993 4312

Fig. 83 Grundfos Eye

Grundfos Eye	Indication	Description
	No lights are on.	The power is off. The pump is not running.
	The two opposite green indicator lights are rotating in the direction of rotation of the pump when seen from the non-drive end.	The power is on. The pump is running.
	The two opposite green indicator lights are permanently on.	The power is on. The pump is not running.
	One yellow indicator light is rotating in the direction of rotation of the pump when seen from the non-drive end.	Warning. The pump is running.
	One yellow indicator light is permanently on.	Warning. The pump has stopped.
	The two opposite red indicator lights flash simultaneously.	Alarm. The pump has stopped.
	The green indicator light in the middle flashes quickly four times.	This is a feedback signal which the pump gives in order to ensure identification of itself.
	The green indicator light in the middle flashes continuously.	Grundfos GO or another pump is trying to communicate with the pump. Press  on the pump control panel to allow communication.
	The green indicator light in the middle is permanently on.	Remote control with Grundfos GO via radio. The pump is communicating with Grundfos GO via radio connection.
	The green indicator light in the middle flashes quickly while Grundfos Go is exchanging data with the pump. It takes a few seconds.	Remote control with Grundfos GO via infrared light. The pump is receiving data from Grundfos GO via infrared communication.

## Indicator lights and signal relays





























































The following applies to the pumps below:

- TPE3, TPE3 D pumps
- TPE2, TPE2 D pumps
- TPE Series 1000 and 2000 pumps with the following motor sizes:  
0.12 - 11 kW, 2-pole  
0.12 - 7.5 kW, 4-pole.

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

You can set the signal outputs to "Operation", "Pump running", "Ready", "Alarm" and "Warning".

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

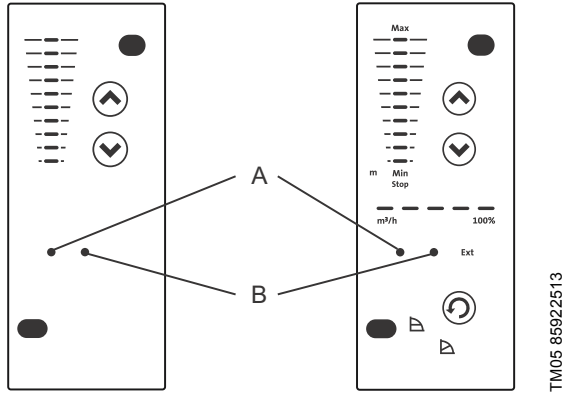
Description	Grundfos Eye	Contact position for signal relays when activated					"Operating mode"
		"Operation"	"Pump running"	"Ready"	"Alarm"	"Warning"	
The power is off.	 Off						-
The pump runs in "Normal" mode.	 Green, rotating						"Normal", "Min." or "Max."
The pump runs in "Manual" mode.	 Green, rotating						"Manual"
The pump is in operating mode "Stop".	 Green, steady						"Stop"
Warning, but the pump runs.	 Yellow, rotating						"Normal", "Min." or "Max."
Warning, but the pump runs in "Manual" mode.	 Yellow, rotating						"Manual"
Warning, but the pump was stopped via "Stop" command.	 Yellow, steady						"Stop"
Alarm, but the pump runs.	 Red, rotating						"Normal", "Min." or "Max."
Alarm, but the pump runs in "Manual" mode.	 Red, rotating						"Manual"
The pump has 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:  
 15-22 kW, 2-pole  
 11 - 18.5 kW, 4-pole.

The operating condition of the pump is indicated by the green (A) and red (B) indicator lights on the pump control panel and inside the terminal box. See fig. 84.



**Fig. 84** 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 runs.
Off	Flashing					The pump has been set to stop.
Permanently on	Off					The pump has stopped because of a "Fault" or "Alarm". Or the pump runs 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 runs, but it has or has had a "Fault" or "Alarm" allowing the pump to continue operation. Or the pump runs with a "Warning" or "Relubricate" indication. If the cause is "Sensor signal outside signal range", the pump continues to run according to the maximum curve, and you cannot reset the fault indication until the signal is inside the signal range. If the cause is "Setpoint signal outside signal range", the pump continues to run according to the minimum curve, and you cannot reset the fault indication 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 Grundfos GO.

# 13. User interfaces for TPE pumps 30-55 kW, 2-pole and 22-55 kW, 4-pole

TPE pumps 30-55 kW, 2-pole and 22-55 kW, 4-pole have Siemens motors with integrated CUE frequency converters. The frequency converter part of the TPE Series 2000 and TPE Series1000 will in the following descriptions be named as CUE.

## Menu overview

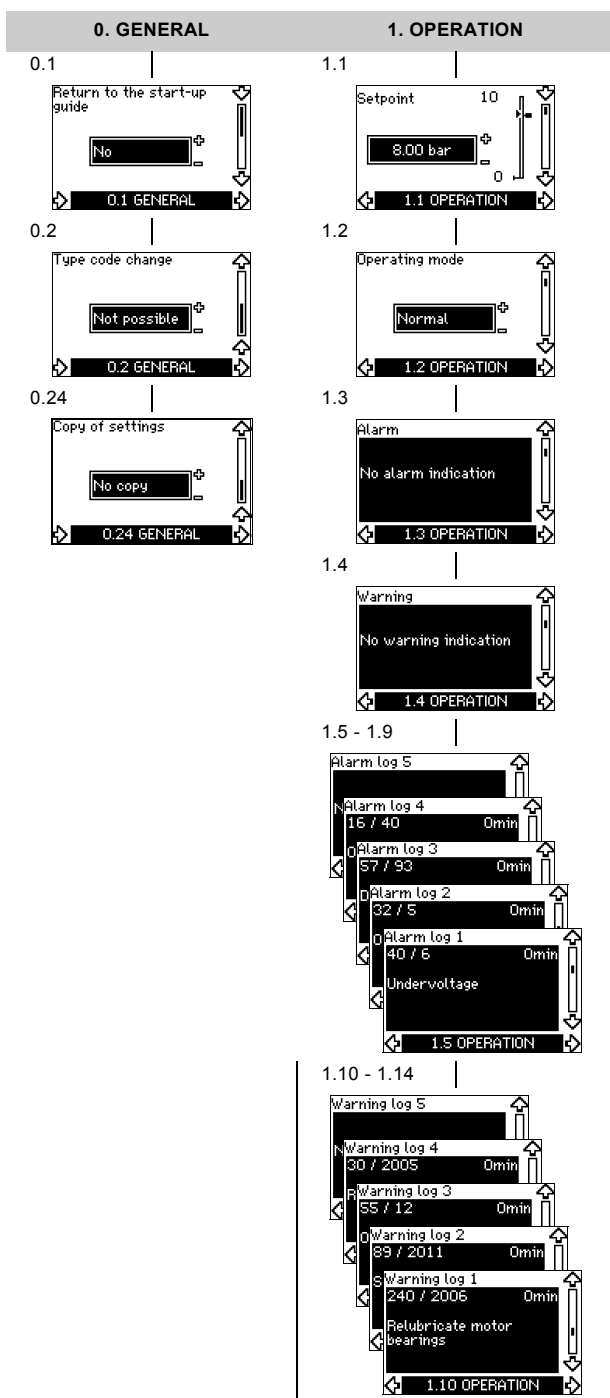
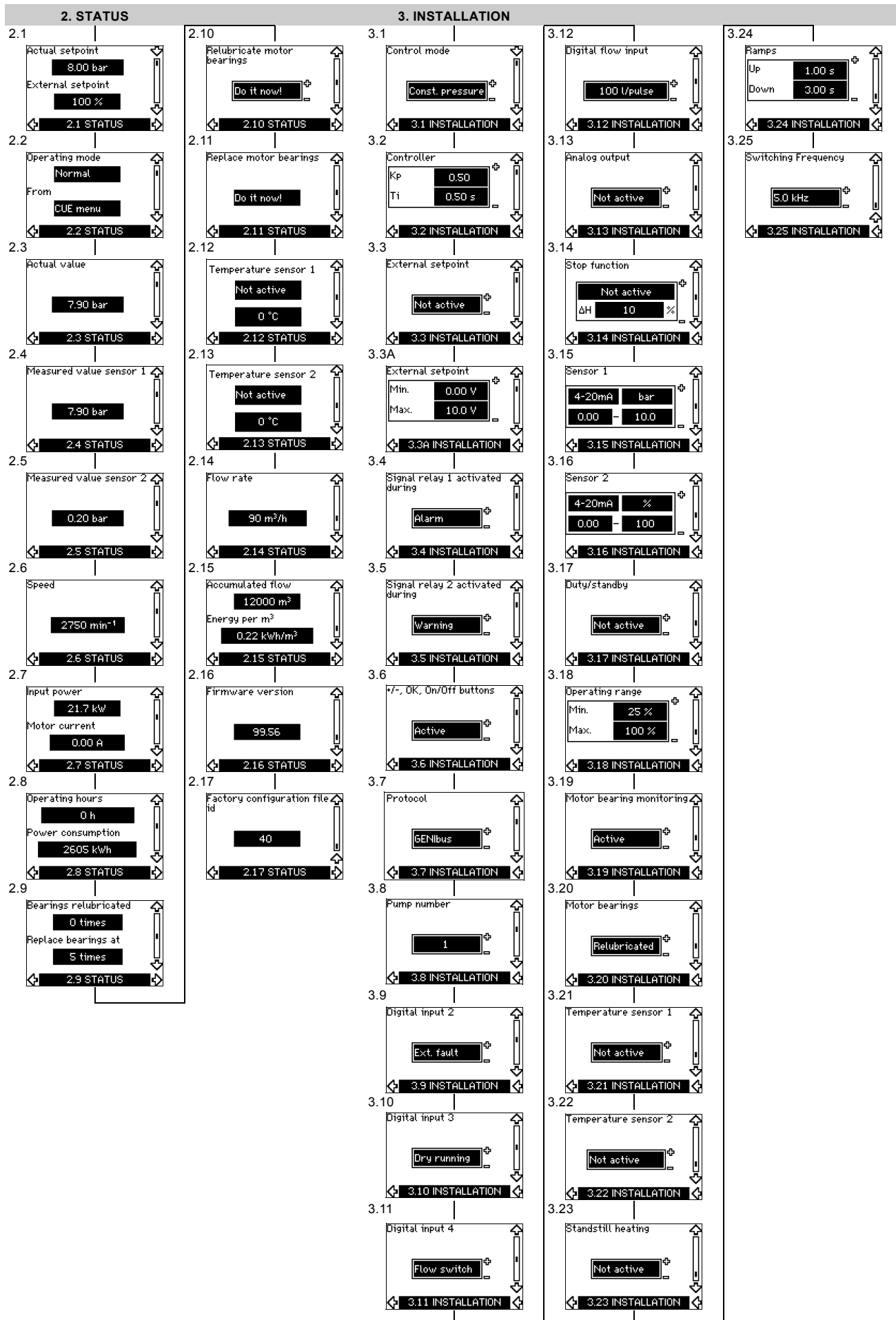


Fig. 85 Menu overview

## Menu structure

The CUE has a menu structure divided into four main menus:

1. "GENERAL" gives access to the startup guide for the general setting of the CUE.
2. "OPERATION" enables the setting of setpoint, selection of operating mode and resetting of alarms. It is also possible to see the latest five warnings and alarms.
3. "STATUS" shows the status of the CUE and the pump. It is not possible to change or set values.
4. "INSTALLATION" gives access to all parameters. Here a detailed setting of the CUE can be made.



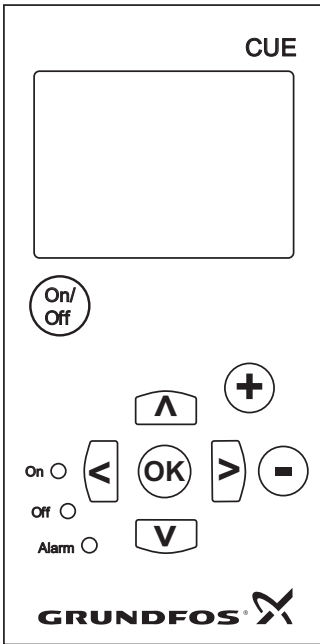
## Setting by means of the control panel

### Control panel

The on/off button on the control panel does not disconnect the CUE from the power supply and must therefore not be used as a safety switch.

The on/off button has the highest priority. In "off" condition, pump operation is not possible.

The control panel is used for local setting of the CUE. The functions available depend on the pump family connected to the CUE.



TM03 8719 2507

Fig. 86 Control panel of the CUE

### Editing buttons

Button	Function
	Makes the pump ready for operation/starts and stops the pump.
	Saves changed values, resets alarms and expands the value field.
	Changes values in the value field.

### Navigating buttons

Button	Function
	Navigates from one menu to another. When the menu is changed, the display shown will always be the top display of the new menu.
	Navigates up and down in the individual menu.

The editing buttons of the control panel can be set to these values:

- Active
- Not active.

When set to "Not active" (locked), the editing buttons do not function. It is only possible to navigate in the menus and read values.

Activate or deactivate the buttons by pressing the arrow up and arrow down buttons simultaneously for 3 seconds.

### Adjusting the display contrast

Press [OK] and [+] for darker display.

Press [OK] and [-] for brighter display.

### Indicator lights

The operating condition of the pump is indicated by the indicator lights on the front of the control panel. See fig. 86.

The table shows the function of the indicator lights.

Indicator light	Function
On (green)	The pump is running or has been stopped by a stop function. If flashing, the pump has been stopped by the user (CUE menu), external start/stop or bus.
Off (orange)	The pump has been stopped with the on/off button.
Alarm (red)	Indicates an alarm or a warning.

### Displays, general terms

Figures 87 and 88 show the general terms of the display.

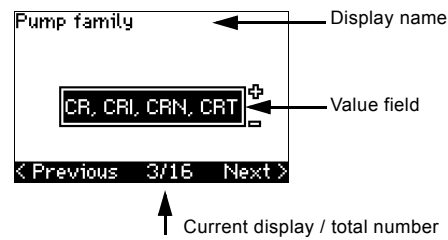


Fig. 87 Example of display in the startup guide

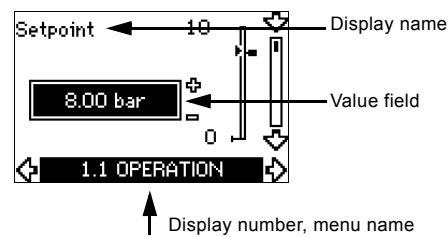


Fig. 88 Example of display in the user menu

## GENERAL

If the startup guide is started, all previous settings will be erased!

The startup guide must be carried out on a cold motor! Repeating the startup guide may lead to heating of the motor.

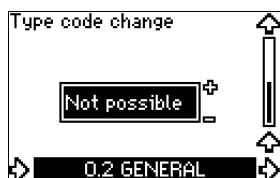
The menu makes it possible to return to the startup guide, which is usually only used during the first startup of the CUE.

### Return to startup guide (0.1)



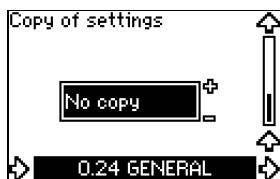
No function.

### Type code change (0.2)



This display is for service use only.

### Copy of settings



It is possible to copy the settings of a CUE and reuse them in another one.

Options:

- No copy.
- to CUE (copies the settings of the CUE).
- to control panel (copies the settings to another CUE).

The CUE units must have the same firmware version. See *Firmware version (2.16)* on page 105.

## OPERATION

### Setpoint (1.1)



- ▶ Setpoint set
- ▶ Actual setpoint
- Actual value

Set the setpoint in the units of the feedback sensor.

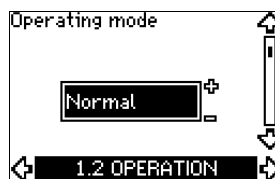
In "Open loop" control mode, the setpoint is set in % of the maximum performance. The setting range will be between the minimum and maximum curves. See fig. 95.

In all other control modes except proportional differential pressure, the setting range is equal to the sensor measuring range. See fig. 96.

In "Proportional differential pressure" control mode, the setting range is equal to 25 % to 90 % of the maximum head. See fig. 97.

If the pump is connected to an external setpoint signal, the value in this display will be the maximum value of the external setpoint signal. See *External setpoint (3.3)* on page 108.

### Operating mode (1.2)



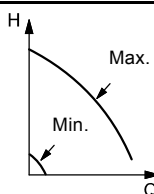
Set one of the following operating modes:

- **Normal** (duty)
- Stop
- Min.
- Max.

The operating modes can be set without changing the setpoint setting.

The following operating modes are set on the control panel in the "OPERATION" menu, display 1.2. See *Operating mode (1.2)* on page 102.

Operating mode	Description
Normal	The pump is running in the control mode selected
Stop	The pump has been stopped (green indicator light is flashing)
Min.	The pump is running at minimum speed
Max.	The pump is running at maximum speed



TM03 8813 2507

Min. and max. curves.  
The pump speed is kept at a given set value for minimum and maximum speed.

**Example:** Maximum curve operation can for instance be used in connection with venting the pump during installation.

**Example:** Minimum curve operation can for instance be used in periods with a very small flow requirement.

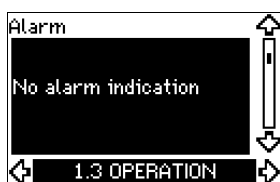
**Fault indications**

Faults may result in two types of indication: Alarm or warning.

An alarm will activate an alarm indication in CUE and cause the pump to change operating mode, typically to stop. However, for some faults resulting in alarm, the pump is set to continue operating even if there is an alarm.

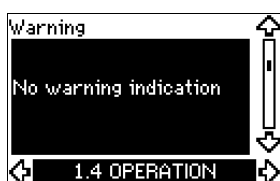
A warning will activate a warning indication in CUE, but the pump will not change operating or control mode.

**Alarm (1.3)**



In case of an alarm, the cause will appear in the display. See *Warning and alarm list* on page 117.

**Warning (1.4)**

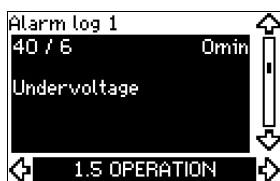


In case of a warning, the cause will appear in the display. See *Warning and alarm list* on page 117.

**Fault log**

For both fault types, alarm and warning, the CUE has a log function.

**Alarm log (1.5 - 1.9)**

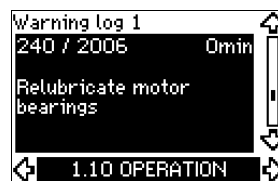


In case of an alarm, the last five alarm indications will appear in the alarm log. "Alarm log 1" shows the latest alarm, "Alarm log 2" shows the latest alarm but one, etc.

The display shows three pieces of information:

- the alarm indication
- the alarm code
- the number of minutes the pump has been connected to the power supply after the alarm occurred.

**Warning log (1.10 - 1.14)**



In case of a warning, the last five warning indications will appear in the warning log. "Warning log 1" shows the latest fault, "Warning log 2" shows the latest fault but one, etc.

The display shows three pieces of information:

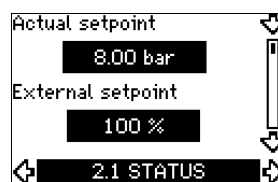
- the warning indication
- the warning code
- the number of minutes the pump has been connected to the power supply after the warning occurred.

**STATUS**

The displays appearing in this menu are status displays only. It is not possible to change or set values.

The tolerance of the displayed value is stated under each display. The tolerances are stated as a guide in % of the maximum values of the parameters.

**Actual setpoint (2.1)**

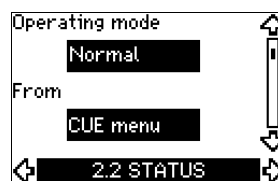


This display shows the actual setpoint and the external setpoint.

The actual setpoint is shown in the units of the feedback sensor.

The external setpoint is shown in a range of 0 to 100 %. If the external setpoint influence is deactivated, the value 100 % is shown. See *External setpoint (3.3)* on page 108.

**Operating mode (2.2)**



This display shows the actual operating mode (Normal, Stop, Min. or Max.). Furthermore, it shows where this operating mode was selected (CUE menu, Bus, External or On/off button).

### Actual value (2.3)



This display shows the actual value controlled.

If no sensor is connected to the CUE, "-" will appear in the display.

### Measured value, sensor 1 (2.4)



This display shows the actual value measured by sensor 1 connected to terminal 54.

If no sensor is connected to the CUE, "-" will appear in the display.

### Measured value, sensor 2 (2.5)

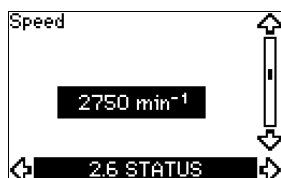


This display is only shown if an MCB 114 sensor input module has been installed.

The display shows the actual value measured by sensor 2 connected to an MCB 114.

If no sensor is connected to the CUE, "-" will appear in the display.

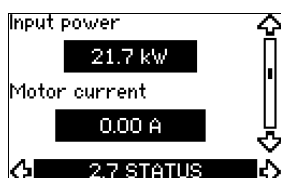
### Speed (2.6)



Tolerance:  $\pm 5\%$

This display shows the actual pump speed.

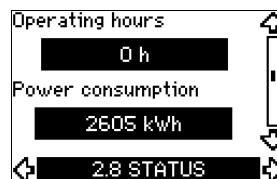
### Input power and motor current (2.7)



Tolerance:  $\pm 10\%$

This display shows the actual pump input power in W or kW and the actual motor current in ampere [A].

### Operating hours and power consumption (2.8)



Tolerance:  $\pm 2\%$

This display shows the number of operating hours and the power consumption. The value of operating hours is an accumulated value and cannot be reset. The value of power consumption is an accumulated value calculated from the unit's birth, and it cannot be reset.

### Lubrication status of motor bearings (2.9)



This display shows how many times the user has given the lubrication stated and when to replace the motor bearings.

When the motor bearings have been relubricated, confirm this action in the "INSTALLATION" menu. See *Confirming relubrication/replacement of motor bearings (3.20)* on page 113. When relubrication is confirmed, the figure in the above display will be increased by one.

### Time until relubrication of motor bearings (2.10)



This display is only shown if display 2.11 is not shown.

The display shows when to relubricate the motor bearings. The controller monitors the operating pattern of the pump and calculates the period between bearing lubrications. If the operating pattern changes, the calculated time until relubrication may change as well.

The estimated time until relubrication takes into account if the pump has been running with reduced speed.

See *Confirming relubrication/replacement of motor bearings (3.20)* on page 113.



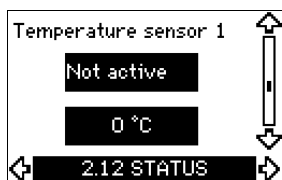
**Time until replacement of motor bearings (2.11)**



This display is only shown if display 2.10 is not shown. The display shows when to replace the motor bearings. The controller monitors the operating pattern of the pump and calculates the period between bearing replacements. The estimated time until replacement of motor bearings takes into account if the pump has been running with reduced speed.

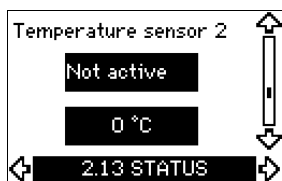
See *Confirming relubrication/replacement of motor bearings (3.20)* on page 113.

**Temperature sensor 1 (2.12)**



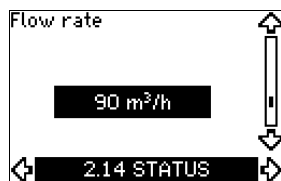
This display is only shown if an MCB 114 sensor input module has been installed. The display shows the measuring point and the actual value measured by a Pt100/Pt1000 temperature sensor 1 connected to the MCB 114. The measuring point is selected in display 3.21. If no sensor is connected to the CUE, "-" will appear in the display.

**Temperature sensor 2 (2.13)**



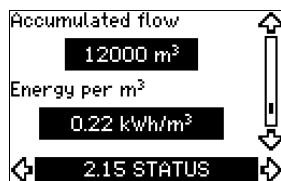
This display is only shown if an MCB 114 sensor input module has been installed. The display shows the measuring point and the actual value measured by a Pt100/Pt1000 temperature sensor 2 connected to the MCB 114. The measuring point is selected in display 3.22. If no sensor is connected to the CUE, "-" will appear in the display.

**Flow rate (2.14)**



This display is only shown if a flowmeter has been configured. The display shows the actual value measured by a flowmeter connected to the digital pulse input (terminal 33) or the analog input (terminal 54).

**Accumulated flow (2.15)**



This display is only shown if a flowmeter has been configured. The display shows the value of the accumulated flow and the specific energy for the transfer of the pumped liquid. The flow rate measurement can be connected to the digital pulse input (terminal 33) or the analog input (terminal 54).

**Firmware version (2.16)**



This display shows the version of the software.

**Configuration file (2.17)**



This display shows the configuration file.

## INSTALLATION

### Control mode (3.1)



Select one of the following control modes:

- Open loop
- Constant pressure
- Constant differential pressure
- Proportional differential pressure
- Constant flow rate
- Constant temperature
- Constant level
- Constant other value.

Default control mode made in TPE Series 1000:

- Open loop.

Default control mode made in TPE Series 2000:

- Proportional differential pressure.

If the pump is connected to a bus, the control mode cannot be selected via the CUE. See *GENibus signal* on page 116.

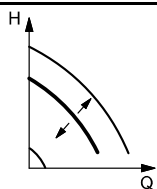
The control mode is set on the control panel in the "INSTALLATION" menu, display 3.1.

There are two basic control modes:

- Uncontrolled operation (open loop).
- Controlled operation (closed loop) with a sensor connected.

Sees *Uncontrolled operation (open loop)* on page 106 and *Controlled operation (closed loop)* on page 106.

### Uncontrolled operation (open loop)



Constant curve.  
The speed is kept at a set value in the range between the min. and max. curves.  
The setpoint is set in % corresponding to the required speed.

TM03 8479 1607

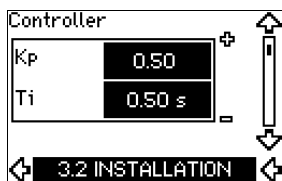
**Example:** Operation on constant curve can for instance be used for pumps with no sensor connected.

**Example:** Typically used in connection with an overall control system such as the MPC or another external controller.

### Controlled operation (closed loop)

		<p>Proportional differential pressure. The differential pressure is reduced at falling flow rate and increased at rising flow rate.</p>
		<p>Constant differential pressure, pump. The differential pressure is kept constant, independently of the flow rate.</p>
		<p>Constant differential pressure, system. The differential pressure is kept constant, independently of the flow rate.</p>
		<p>Constant pressure. The pressure is kept constant, independently of the flow rate.</p>
		<p>Constant pressure with stop function. The outlet pressure is kept constant at high flow rate. On/off operation at low flow rate.</p>
		<p>Constant level. The liquid level is kept constant, independently of the flow rate.</p>
		<p>Constant level with stop function. The liquid level is kept constant at high flow rate. On/off operation at low flow rate.</p>
		<p>Constant flow rate. The flow rate is kept constant, independently of the head.</p>
		<p>Constant temperature. The liquid temperature is kept constant, independently of the flow rate.</p>

**Controller (3.2)**



The CUE has a factory 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 in the display.

- The gain ( $K_p$ ) can be set within the range from 0.1 to 20.
- The integral time ( $T_i$ ) can be set within the range from 0.1 to 3600 s. If you select 3600 s, the controller will function as a P controller.
- Furthermore, it is possible to set the controller to inverse control, meaning 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.

The table below shows the suggested controller settings:

System/application	$K_p$		$T_i$
	Heating system <sup>1)</sup>	Cooling system <sup>2)</sup>	
	0.2		0.5
	0.2		0.5
	0.2		0.5
	-2.5		100
	0.5	-0.5	$10 + 5L_2$
	0.5		$10 + 5L_2$
	0.5	-0.5	$30 + 5L_2^*$
	0.5		0.5 *
	0.5		$L_1 < 5 \text{ m: } 0.5^*$ $L_1 > 5 \text{ m: } 3^*$ $L_1 > 10 \text{ m: } 5^*$

\*  $T_i = 100$  seconds (factory setting).

1. Heating systems are systems in which an increase in pump performance will result in a rise in temperature at the sensor.
  2. Cooling systems are systems in which an increase in pump performance will result in a drop in temperature at the sensor.
- $L_1$  Distance in [m] between pump and sensor.  
 $L_2$  Distance in [m] between heat exchanger and sensor.

### How to set the PI controller

For most applications, the factory setting of the controller constants  $K_p$  and  $T_i$  will ensure optimum pump operation. However, in some applications an adjustment of the controller may be needed.

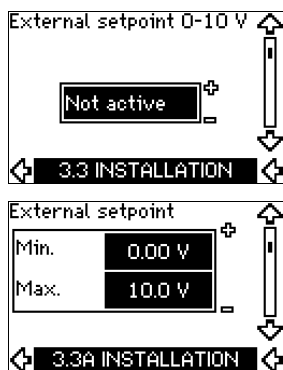
Proceed as follows:

1. Increase the gain ( $K_p$ ) until the motor becomes unstable. Instability can be seen by observing if the measured value starts to fluctuate. Furthermore, instability is audible as the motor starts hunting up and down.  
As some systems, such as temperature controls, are slow-reacting, it may be difficult to observe that the motor is unstable.
2. Set the gain ( $K_p$ ) to half the value of the value which made the motor unstable. This is the correct setting of the gain.
3. Reduce the integral time ( $T_i$ ) until the motor becomes unstable.
4. Set the integral time ( $T_i$ ) to twice the value which made the motor unstable. This is the correct setting of the integral time.

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  $T_i$ .

### External setpoint (3.3)



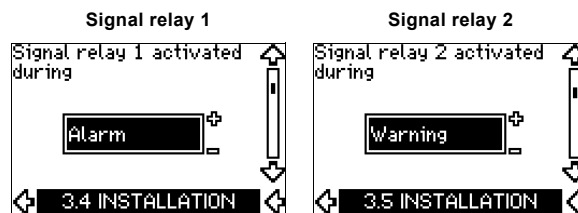
The input for external setpoint signal (terminal 53) can be set to the following types:

- Active
- Not active.

If you select "Active", the actual setpoint is influenced by the signal connected to the external setpoint input. See *External setpoint (3.3)* on page 108.

### Signal relays 1 and 2 (3.4 and 3.5)

The CUE has two signal relays. In the display below, select in which operating situations the signal relay should be activated.



- |  |  |
|--|--|
| <ul style="list-style-type: none"> <li>• Ready</li> <li>• Alarm</li> <li>• Operation</li> <li>• Pump running</li> <li>• Not active</li> <li>• Warning</li> <li>• Relubricate.</li> </ul> | <ul style="list-style-type: none"> <li>• Ready</li> <li>• Alarm</li> <li>• Operation</li> <li>• Pump running</li> <li>• Not active</li> <li>• Warning</li> <li>• Relubricate.</li> </ul> |
|--|--|

For the distinction between alarm and warning, See *Fault indications* on page 103.

### Buttons on the CUE (3.6)



The editing buttons (+, -, On/Off, OK) on the control panel can be set to these values:

- Active
- Not active.

When set to "Not active" (locked), the editing buttons do not function. Set the buttons to "Not active" if the pump should be controlled via an external control system.

Activate the buttons by pressing the arrow up and arrow down buttons simultaneously for 3 seconds.

### Protocol (3.7)



This display shows the protocol selection for the RS-485 port of the CUE. The protocol can be set to these values:

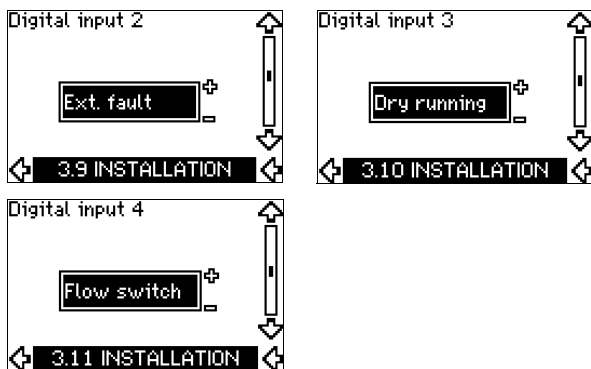
- GENIbus
- FC
- FC MC.

If you select "GENIbus", the communication is set according to the Grundfos GENIbus standard. FC and FC MC are for service purposes only.

**Pump number (3.8)**

This display shows the GENIbus number. A number between 1 and 199 can be allocated to the pump. In the case of bus communication, a number must be allocated to each pump.

The factory setting is "-".

**Digital inputs 2, 3 and 4 (3.9 to 3.11)**

The digital inputs of the CUE (terminal 19, 32 and 33) can be set individually to different functions.

Select one of the following functions:

- Min. (min. curve)
- Max. (max. curve)
- Ext. fault (external fault)
- Flow switch
- Alarm reset
- Dry running (from external sensor)
- Accumulated flow (pulse flow, only terminal 33)
- Not active.

The selected function is active when the digital input is activated (closed contact). See also section *Digital inputs* on page 115.

**Min.**

When the input is activated, the pump will operate according to the min. curve.

**Max.**

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

**Ext. fault**

When the input is activated, a timer will be started. If the input is activated for more than 5 seconds, an external fault will be indicated. If the input is deactivated, the fault condition will cease and the pump can only be restarted manually by resetting the fault indication.

**Flow switch**

When this function is selected, the pump will be stopped when a connected flow switch detects low flow rate.

It is only possible to use this function if the pump is connected to a pressure sensor or a level sensor, and the stop function is activated. See *Constant pressure with stop function (3.14)* on page 110 and *Constant level with stop function (3.14)* on page 111.

**Alarm reset**

When the input has been activated, the alarm is reset if the cause of the alarm no longer exists.

**Dry running**

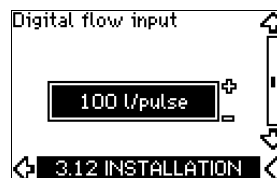
When this function is selected, lack of inlet pressure or water shortage can be detected. This requires the use of an accessory, such as:

- a Grundfos Liqtec® dry-running switch
- a pressure switch installed on the inlet side of a pump
- a float switch installed on the inlet side of a pump.

When lack of inlet pressure or water shortage (dry running) is detected, the pump will be stopped. The pump cannot restart as long as the input is activated. Restarts may be delayed by up to 30 minutes, depending of the pump family.

**Accumulated flow**

When this function is set for digital input 4 and a pulse sensor is connected to terminal 33, the accumulated flow can be measured.

**Digital flow input (3.12)**

This display appears only if a flowmeter has been configured in display 3.11.

The display is used for setting the volume for every pulse for the "Accumulated flow" function with a pulse sensor connected to terminal 33.

Setting range:

- 0-1000 litres/pulse.

The volume can be set in the unit selected in the startup guide.

### Analog output (3.13)



The analog output can be set to show one of the following options:

- Feedback
- Power input
- Speed
- Output frequency
- External sensor
- Limit 1 exceeded
- Limit 2 exceeded
- Not active.

### Constant pressure with stop function (3.14)



#### Settings

The stop function can be set to these values:

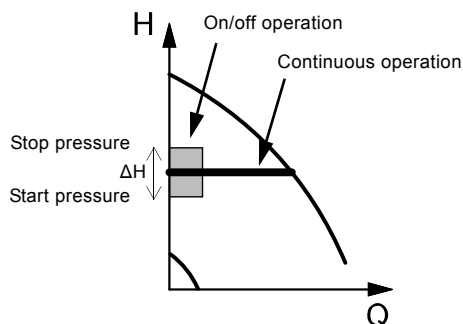
- Active
- Not active.

The on/off band can be set to these values:

- $\Delta H$  is factory-set to 10 % of the actual setpoint.
- $\Delta H$  can be set within the range from 5 % to 30 % of the actual setpoint.

#### Description

The stop function is used for changing between on/off operation at low flow and continuous operation at high flow.



TM03 8477 1607

**Fig. 89** Constant pressure with stop function.  
Difference between start and stop pressures ( $\Delta H$ )

Low flow can be detected in two different ways:

1. A built-in "low-flow detection function" which functions if the digital input is not set up for flow switch.
2. A flow switch connected to the digital input.

#### 1. Low-flow detection function

The pump will check the flow regularly by reducing the speed for a short time. If there is no or only a small change in pressure, this means that there is low flow.

The speed will be increased until the stop pressure (actual setpoint + 0.5 x  $\Delta H$ ) is reached and the pump will stop after a few seconds. The pump will restart at the latest when the pressure has fallen to the start pressure (actual setpoint - 0.5 x  $\Delta H$ ).

If the flow in the off period is higher than the low-flow limit, the pump will restart before the pressure has fallen to the start pressure.

When restarting, the pump will react in the following way:

1. If the flow is higher than the low-flow limit, the pump will return to continuous operation at constant pressure.
2. If the flow is lower than the low-flow limit, the pump will continue in start/stop operation. It will continue in start/stop operation until the flow is higher than the low-flow limit. When the flow is higher than the low-flow limit, the pump will return to continuous operation.

#### 2. Low-flow detection with flow switch

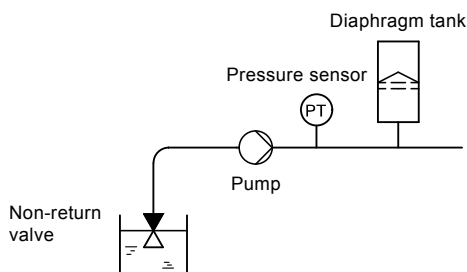
When the digital input is activated because there is low flow, the speed will be increased until the stop pressure (actual setpoint + 0.5 x  $\Delta H$ ) is reached, and the pump will stop. When the pressure has fallen to start pressure, the pump will start again. If there is still no flow, the pump will reach the stop pressure and stop. If there is flow, the pump will continue operating according to the setpoint.

### Operating conditions for the stop function

It is only possible to use the stop function if the system incorporates a pressure sensor, a non-return valve and a diaphragm tank.

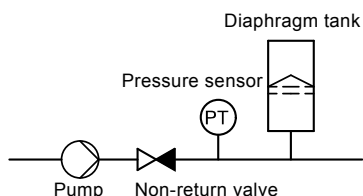
The non-return valve must always be installed before the pressure sensor. See figures 90 and 91.

If a flow switch is used to detect low flow, the switch must be installed on the system side after the diaphragm tank.



**Fig. 90** Position of the non-return valve and pressure sensor in system with suction lift operation

TM03 8582 1907



**Fig. 91** Position of the non-return valve and pressure sensor in system with positive inlet pressure

TM03 8583 1907

### Diaphragm tank

The stop function requires a diaphragm tank of a certain minimum size. The tank must be installed as close as possible after the pump and the precharge pressure must be 0.7 x actual setpoint.

Recommended diaphragm tank size:

Rated flow rate of pump [m <sup>3</sup> /h]	Typical diaphragm tank size [litres]
0-6	8
7-24	18
25-40	50
41-70	120
71-100	180

If a diaphragm tank of the above size is installed in the system, the factory setting of ΔH is the correct setting.

If the tank installed is too small, the pump will start and stop too often. This can be remedied by increasing ΔH.

### Constant level with stop function (3.14)



#### Settings

The stop function can be set to these values:

- Active
- **Not active.**

The on/off band can be set to these values:

- ΔH is factory-set to 10 % of the actual setpoint.
- ΔH can be set within the range from 5 % to 30 % of the actual setpoint.

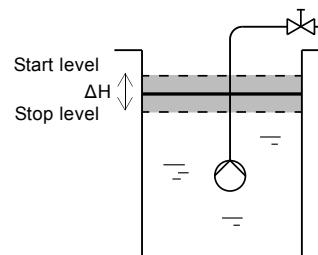
A built-in low-flow detection function will automatically measure and store the power consumption at approx. 50 % and 85 % of the rated speed.

If you select "Active", proceed as follows:

1. Close the isolating valve to create a no-flow condition.
2. Press [OK] to start the auto-tuning.

#### Description

The stop function is used for changing between on/off operation at low flow and continuous operation at high flow.



**Fig. 92** Constant level with stop function. Difference between start and stop levels (ΔH)

TM03 9099 3307

Low flow can be detected in two different ways:

1. With the built-in low-flow detection function.
2. With a flow switch connected to a digital input.

#### 1. Low-flow detection function

The built-in low-flow detection is based on the measurement of speed and power.

When low flow is detected, the pump will stop. When the level has reached the start level, the pump will start again. If there is still no flow, the pump will reach the stop level and stop. If there is flow, the pump will continue operating according to the setpoint.

#### 2. Low-flow detection with flow switch

When the digital input is activated because of low flow, the speed will be increased until the stop level (actual setpoint - 0.5 x ΔH) is reached, and the pump will stop. When the level has reached the start level, the pump will start again. If there is still no flow, the pump will reach the stop level and stop. If there is flow, the pump will continue operating according to the setpoint.

### Operating conditions for the stop function

It is only possible to use the constant level stop function if the system incorporates a level sensor, and all valves can be closed.

#### Sensor 1 (3.15)

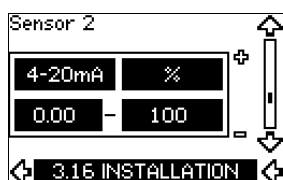


Setting of sensor 1 connected to terminal 54. This is the feedback sensor.

Select among the following values:

- Sensor output signal:  
0-20 mA  
4-20 mA.
- Sensor unit of measurement:  
bar, mbar, m, kPa, psi, ft, m<sup>3</sup>/h, m<sup>3</sup>/s, l/s, gpm, °C, °F, %.
- Sensor measuring range.

#### Sensor 2 (3.16)



Setting of sensor 2 connected to an MCB 114 sensor input module.

Select among the following values:

- Sensor output signal:  
0-20 mA  
**4-20 mA.**
- Sensor unit of measurement:  
bar, mbar, m, kPa, psi, ft, m<sup>3</sup>/h, m<sup>3</sup>/s, l/s, gpm, °C, °F, %.
- Sensor measuring range:  
0-100 %.

#### Duty/standby (3.17)



#### Settings

The duty/standby function can be set to these values:

- Active
- **Not active.**

Activate the duty/standby function as follows:

1. Connect one of the pumps to the mains supply. Set the duty/standby function to "Not active". Make the necessary settings in the "OPERATION" and "INSTALLATION" menus.
2. Set the operating mode to "Stop" in the "OPERATION" menu.
3. Connect the other pump to the mains supply. Make the necessary settings in the "OPERATION" and "INSTALLATION" menus. Set the duty/standby function to "Active".

The running pump will search for the other pump and automatically set the duty/standby function of this pump to "Active". If it cannot find the other pump, a fault will be indicated.

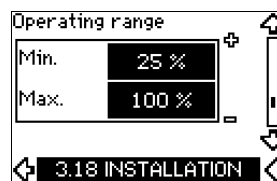
The two pumps must be connected electrically via the GENIbus, and nothing else must be connected on the GENIbus.

The duty/standby function applies to two pumps connected in parallel and controlled via GENIbus. Each pump must be connected to its own CUE and sensor.

The primary targets of the function is the following:

- To start the standby pump if the duty pump is stopped due to an alarm.
- To alternate the pumps at least every 24 hours.

#### Operating range (3.18)



How to set the operating range:

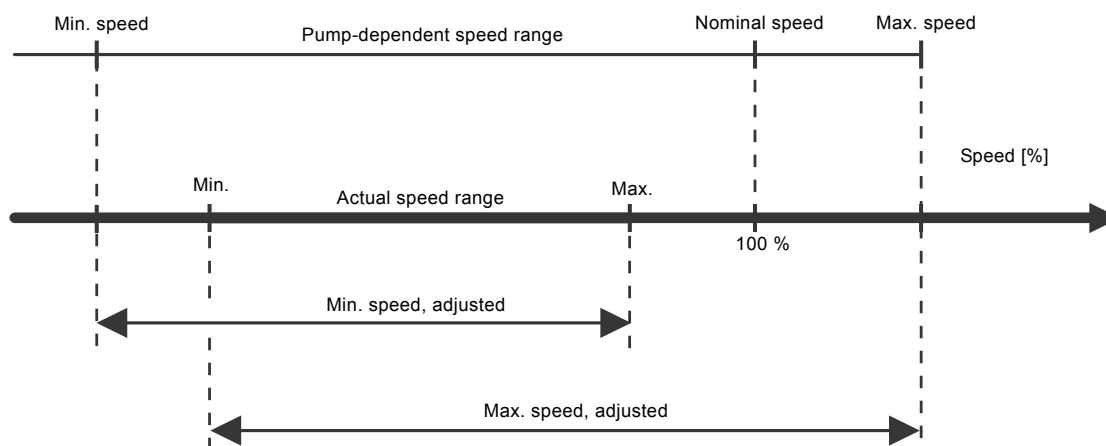
- Set the minimum speed within the range from a pump-dependent minimum speed to the adjusted maximum speed. The factory setting depends on the pump family.
- Set the maximum speed within the range from adjusted minimum speed to the pump-dependent maximum speed. The factory setting will be equal to 100 %, i.e. the speed stated on the pump nameplate.

The area between the minimum and maximum speed is the actual operating range of the pump.

The operating range can be changed by the user within the pump-dependent speed range.

For some pump families, oversynchronous operation (max. speed above 100 %) will be possible. This requires an oversize motor to deliver the shaft power required by the pump during oversynchronous operation.





TM04 3581 4608

Fig. 93 Setting of the min. and max. curves in % of maximum performance

**Motor bearing monitoring (3.19)**



The motor bearing monitoring function can be set to these values:

- Active
- Not active.

When the function is set to "Active", the CUE will give a warning when the motor bearings are due to be relubricated or replaced.

**Description**

The motor bearing monitoring function is used to give an indication when it is time to relubricate or replace the motor bearings. See displays 2.10 and 2.11.

The warning indication and the estimated time take into account if the pump has been running with reduced speed. The bearing temperature is included in the calculation if temperature sensors are installed and connected to an MCB 114 sensor input module.

The counter will continue counting even if the function is switched to "Not active", but a warning will not be given when it's time for relubrication.

**Confirming relubrication/replacement of motor bearings (3.20)**



This function can be set to these values:

- Relubricated
- Replaced
- Nothing done.

When the motor bearings have been relubricated or replaced, confirm this action in the above display by pressing [OK].

Relubricated cannot be selected for a period of time after confirming relubrication.

**Relubricated**

When the warning "Relubricate motor bearings" has been confirmed,

- the counter is set to 0.
- the number of relubrications is increased by 1.

When the number of relubrications has reached the permissible number, the warning "Replace motor bearings" appears in the display.

**Replaced**

When the warning "Replace motor bearings" has been confirmed,

- the counter is set to 0.
- the number of relubrications is set to 0.
- the number of bearing changes is increased by 1.

**Temperature sensor 1 (3.21)**

This display is only shown if an MCB 114 sensor input module has been installed.

Select the function of a Pt100/Pt1000 temperature sensor 1 connected to an MCB 114:

- D-end bearing
- ND-end bearing
- Other liq. temp. 1
- Other liq. temp. 2
- Motor winding
- Pumped liq. temp.
- Ambient temp.
- Not active.

**Temperature sensor 2 (3.22)**

This display is only shown if an MCB 114 sensor input module has been installed.

Select the function of a Pt100/Pt1000 temperature sensor 2 connected to an MCB 114:

- D-end bearing
- ND-end bearing
- Other liq. temp. 1
- Other liq. temp. 2
- Motor winding
- Pumped liq. temp.
- Ambient temp.
- Not active.

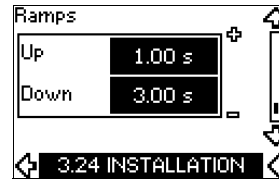
**Standstill heating (3.23)**

The standstill heating function can be set to these values:

- Active
- Not active.

When the function is set to "Active" and the pump is stopped by a stop command, a current will be applied to the motor windings.

The standstill heating function pre-heats the motor to avoid condensation.

**Ramps (3.24)**

Set the time for each of the two ramps, ramp-up and ramp-down:

- Factory setting:  
Depending on power size.
- The range of the ramp parameter:  
1-3600 s.

The ramp-up time is the acceleration time from  $0 \text{ min}^{-1}$  to the rated motor speed. Choose a ramp-up time such that the output current does not exceed the maximum current limit for the CUE.

The ramp-down time is the deceleration time from rated motor speed to  $0 \text{ min}^{-1}$ . Choose a ramp-down time such that no overvoltage arises and such that the generated current does not exceed the maximum current limit for the CUE.

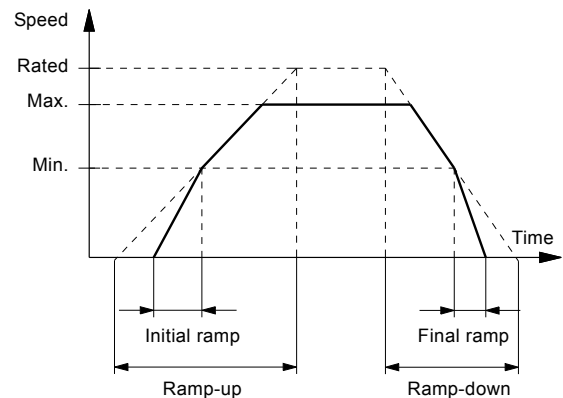


Fig. 94 Ramp-up and ramp-down, display 3.24

**Switching frequency (3.25)**

The switching frequency can be changed. The options in the menu depend on the power size of the CUE. Changing the switching frequency to a higher level will increase the losses and thus increase the temperature of the CUE.

We do not recommend increasing the switching frequency if the ambient temperature is high.

TM03 9439 0908

## Priority of settings

The on/off button has the highest priority. In "off" condition, pump operation is not possible.

The CUE can be controlled in various ways at the same time. If two or more operating modes are active at the same time, the operating mode with the highest priority will be in force.

### Control without bus signal, local operating mode

Priority	CUE menu	External signal
1	Stop	
2	Max.	
3		Stop
4		Max.
5	Min.	Min.
6	Normal	Normal

**Example:** If an external signal has activated the "Max." operating mode, it will only be possible to stop the pump.

### Control with bus signal, remote-controlled operating mode

Priority	CUE menu	External signal	Bus signal
1	Stop		
2	Max.		
3		Stop	Stop
4			Max.
5			Min.
6			Normal

**Example:** If the bus signal has activated the "Max." operating mode, it will only be possible to stop the pump.

## External control signals

### Digital inputs

The overview shows functions in connection with closed contact.

Terminal	Type	Function
18	DI 1	<ul style="list-style-type: none"> <li>Start/stop of pump</li> </ul>
19	DI 2	<ul style="list-style-type: none"> <li>Min. (min. curve)</li> <li>Max. (max. curve)</li> <li>Ext. fault (external fault)</li> <li>Flow switch</li> <li>Alarm reset</li> <li>Dry running (from external sensor)</li> <li>Not active.</li> </ul>
32	DI 3	<ul style="list-style-type: none"> <li>Min. (min. curve)</li> <li>Max. (max. curve)</li> <li>Ext. fault (external fault)</li> <li>Flow switch</li> <li>Alarm reset</li> <li>Dry running (from external sensor)</li> <li>Not active.</li> </ul>
33	DI 4	<ul style="list-style-type: none"> <li>Min. (min. curve)</li> <li>Max. (max. curve)</li> <li>Ext. fault (external fault)</li> <li>Flow switch</li> <li>Alarm reset</li> <li>Dry running (from external sensor)</li> <li>Accumulated flow (pulse flow)</li> <li>Not active.</li> </ul>

The same function must not be selected for more than one input.

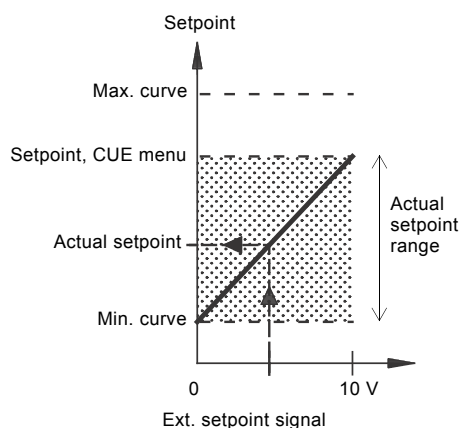
### External setpoint

Terminal	Type	Function
53	AI 1	<ul style="list-style-type: none"> <li>External setpoint (0-10 V)</li> </ul>

The setpoint can be remote-set by connecting an analog signal transmitter to the setpoint input (terminal 53).

### Open loop

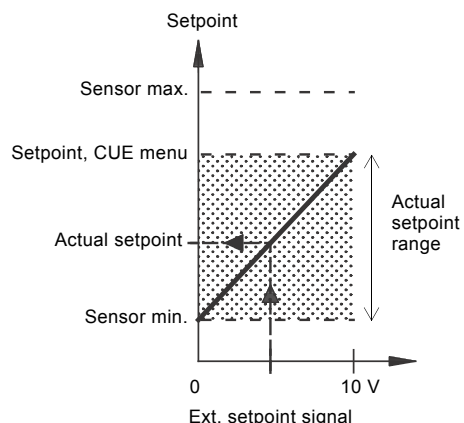
In "Open loop" control mode (constant curve), the actual setpoint can be set externally within the range from the minimum curve to the setpoint set via the CUE menu. See fig. 95.



**Fig. 95** Relation between the actual setpoint and the external setpoint signal in "Open loop" control mode

### Closed loop

In all other control modes, except proportional differential pressure, the actual setpoint can be set externally within the range from the lower value of the sensor measuring range (sensor min.) to the setpoint set via the CUE menu. See fig. 96.



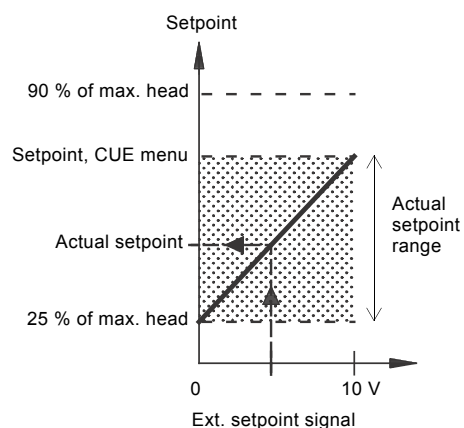
**Fig. 96** Relation between the actual setpoint and the external setpoint signal in "Controlled" control mode

**Example:** At a sensor min. value of 0 bar, a setpoint set via the CUE menu of 3 bar and an external setpoint of 80 %, the actual setpoint will be as follows:

$$\begin{aligned}
 \text{Actual setpoint} &= (\text{setpoint set via the CUE menu} - \text{sensor min.}) \times \\
 &\quad \% \text{ external setpoint signal} + \text{sensor min.} \\
 &= (3 - 0) \times 80 \% + 0 \\
 &= 2.4 \text{ bar}
 \end{aligned}$$

### Proportional differential pressure

In "Proportional differential pressure" control mode, the actual setpoint can be set externally within the range from 25 % of maximum head to the setpoint set via the CUE menu. See fig. 97.



**Fig. 97** Relation between the actual setpoint and the external setpoint signal in "Proportional differential pressure" control mode

**Example:** At a maximum head of 12 metres, a setpoint of 6 metres set via the CUE menu and an external setpoint of 40 %, the actual setpoint will be as follows:

$$\begin{aligned}
 \text{Actual setpoint} &= (\text{setpoint, CUE menu} - 25 \% \text{ of maximum head}) \\
 &\quad \times \% \text{ external setpoint signal} + 25 \% \text{ of maximum head} \\
 &= (6 - 12 \times 25 \%) \times 40 \% + 12/4 \\
 &= 4.2 \text{ m}
 \end{aligned}$$

### GENIbus signal

The CUE supports serial communication via an RS-485 input. The communication is carried out according to the Grundfos GENIbus protocol and enables connection to a building management system or another external control system.

Operating parameters, such as setpoint and operating mode, can be remote-set via the bus signal. At the same time, the pump can provide status information about important parameters, such as actual value of control parameter, input power and fault indications. Contact Grundfos for further details.

If a bus signal is used, the number of settings available via the CUE will be reduced.

### Other bus standards

Grundfos offers various bus solutions with communication according to other standards.

Contact Grundfos for further details.

## Fault finding

### Warning and alarm list

Code and display text	Status			Operating mode	Resetting
	Warning	Alarm	Locked alarm		
1 Too high leakage current			•	Stop	Man.
2 Mains phase failure		•		Stop	Aut.
3 External fault		•		Stop	Man.
16 Other fault		•		Stop	Aut.
30 Replace motor bearings	•			-	Man. <sup>3)</sup>
32 Overvoltage	•			-	Aut.
40 Undervoltage	•			-	Aut.
48 Overload		•		Stop	Aut.
49 Overload		•	•	Stop	Man.
55 Overload	•			-	Aut.
57 Dry running		•		Stop	Aut.
64 Too high CUE temperature		•		Stop	Aut.
70 Too high motor temperature		•		Stop	Aut.
77 Communication fault, duty/standby	•			-	Aut.
89 Sensor 1 outside range		•		1)	Aut.
91 Temperature sensor 1 outside range	•			-	Aut.
93 Sensor 2 outside range	•			-	Aut.
96 Setpoint signal outside range		•		1)	Aut.
148 Too high bearing temperature	•			-	Aut.
149 Too high bearing temperature	•			Stop	Aut.
155 Inrush fault		•		Stop	Aut.
175 Temperature sensor 2 outside range	•			-	Aut.
240 Relubricate motor bearings	•			-	Man. <sup>3)</sup>
241 Motor phase failure	•			-	Aut.
242 AMA did not succeed <sup>2)</sup>	•			Stop	Aut.
				-	Man.

1) In case of an alarm, the CUE will change the operating mode depending on the pump type.

2) AMA, Automatic Motor Adaptation. Not active in the present software.

3) Warning is reset in display 3.20.

### Resetting of alarms

In case of a fault or malfunction of the CUE, check the alarm list in the "OPERATION" menu. The latest five alarms and latest five warnings can be found in the log menus.

Contact a Grundfos technician if an alarm occurs repeatedly.

### Warning

The CUE will continue the operation as long as the warning is active. The warning remains active until the cause no longer exists. Some warnings may switch to alarm condition.

### Alarm

In case of an alarm, the CUE will stop the pump or change the operating mode depending on the alarm type and pump type. See *Warning and alarm list* on page 117.

Pump operation will be resumed when the cause of the alarm has been remedied and the alarm has been reset.

### Resetting an alarm manually

- Press [OK] in the alarm display.
- Press [On/Off] twice.
- Activate a digital input DI 2-DI 4 set to "Alarm reset" or the digital input DI 1 (start/stop).

If it is not possible to reset an alarm, the reason may be that the fault has not been remedied, or that the alarm has been locked.

### Locked alarm

In case of a locked alarm, the CUE will stop the pump and become locked. Pump operation cannot be resumed until the cause of the locked alarm has been remedied and the alarm has been reset.

### Resetting a locked alarm

- Switch off the power supply to the CUE for about 30 seconds. Switch on the power supply, and press OK in the alarm display to reset the alarm.

### Indicator lights

The table shows the function of the indicator lights.

Indicator light	Function
On (green)	The pump is running or has been stopped by a stop function. If flashing, the pump has been stopped by the user (CUE menu), external start/stop or bus.
Off (orange)	The pump has been stopped with the on/off button.
Alarm (red)	Indicates an alarm or a warning.

### Signal relays

The table shows the function of the signal relays.

Type	Function
Relay 1	<ul style="list-style-type: none"> <li>• Ready</li> <li>• Alarm</li> <li>• Operation</li> </ul> Pump running Warning Relubricate
Relay 2	<ul style="list-style-type: none"> <li>• Ready</li> <li>• Alarm</li> <li>• Operation</li> </ul> Pump running Warning Relubricate

See also fig. 138.

## 14. Factory settings of E-pumps

- Function is enabled.
- Function is disabled.
- Function is not available.

Settings	TPE3, TPE3 D	TPE2, TPE2 D	TPE Series 2000 0.12 - 11 kW, 2-pole 0.12 - 7.5 kW, 4-pole	TPE Series 2000 15-22 kW, 2-pole 11 - 18.5 kW, 4-pole	TPE Series 1000 0.12 - 11 kW, 2-pole 0.12 - 7.5 kW, 4-pole	TPE Series 1000 15-22 kW, 2-pole 11 - 18.5 kW, 4-pole	Comments	Function description
"Setpoint"	Auto	67 %	58 %	58 %	67 %	67 %		Page 61
"Operating mode"	Normal	Normal	Normal	Normal	Normal	Normal		Page 62
"Control mode"	AutoAdapt	Constant curve	Proportional pressure	Proportional pressure	Constant curve	Constant curve		Page 62
"Date and time"	•	•	•	-	•	-		Page 85
"FLOW <sub>LIMIT</sub> "	○	-	-	-	-	-		Page 69
"Automatic night setback"	○	-	-	-	-	-		Page 70
"Temperature influence"	○	-	-	-	-	-		Page 81
"Buttons on product"	•	•	•	•	•	•		
"Controller"								
"Kp"	1.0	0.5	0.5	-	0.5	0.5		Page 77
"Ti"	8.0	0.5	0.5	-	0.5	0.5		
"Operating range"								
"Min."	25 %	25 %	25 %	25 %	25 %	25 %		Page 78
"Max."	100 %	100 %	110 %	110 %	110 %	110 %		
"Ramps"	○	○	○	-	○	-		Page 83
"Pump number"	1	1	1	1	1	1		Page 84
"Radio communication"	•	•	•	-	•	-		Page 84
"Sensor type"	-	-	-	-	-	○		Page 70
"Analog input 1"	○	○	○	-	○	-		
"Analog input 2"	○	○	○	-	○	-		Page 70
"Analog input 3"	○	○	○	-	○	-		
"Built-in Grundfos sensor"	•	-	•	-	-	-		Page 72
"Pt100/1000 input 1"	○	○	○	-	○	-		Page 72
"Pt100/1000 input 2"	○	○	○	-	○	-		
"Digital input 1"	○	○	○	-	○	-		Page 73
"Digital input 2"	○	○	○	○	○	○		
"Digital in/output 3"	○	○	○	-	○	-		Page 74
"Digital in/output 4"	○	○	○	-	○	-		
"Pulse flowmeter"	○	○	○	-	○	-		Page 82
"Predefined setpoint"	○	○	○	-	○	-		Page 80
"Analog output" <sup>1)</sup>	○	○	○	-	○	-		Page 76
"External setpoint funct."	○	○	○	○	○	○		Page 78
"Signal relay 1"	○	○	○	Alarm	○	Alarm		Page 74
"Signal relay 2"	○	○	○	Operation	○	Operation		
"Limit 1 exceeded"	○	○	○	-	○	-		Page 81
"Limit 2 exceeded"	○	○	○	-	○	-		
"Standstill heating"	○	○	○	○	○	○		Page 83
"Motor bearing monitoring"	○	○	○	○	○	○		Page 83
"Pump name"	Grundfos	Grundfos	Grundfos	-	Grundfos	-		Page 87
"Connect code"	-	-	-	-	-	-		Page 87
"Unit configuration"	SI units	SI units	SI units	SI units	SI units	SI units		Page 85

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

Settings	TPE Series 2000 30-55 kW, 2-pole 22-55 kW, 4-pole	TPE Series 1000 30-55 kW, 2-pole 22-55 kW, 4-pole	Comments	Function description
"Setpoint"	58 %	67 %		
"Operating mode"	Normal	Normal		
"Control mode"	Proportional pressure	Open loop		
"Date and time"	-	-		
"FLOW <sub>LIMIT</sub> "	-	-		
"Automatic night setback"	-	-		
"Temperature influence"	-	-		
"Buttons on product"	•	•		
"Controller"				
"Kp"	-	0.5		
"Ti"	-	0.5		
"Operating range"				
"Min."	25 %	25 %		
"Max."	100 %	100 %		
"Ramps"	-	-		
"Pump number"	1	1		
"Radio communication"	-	-		
"Sensor type"	•	○		
"Analog input 1"	-	-		
"Analog input 2"	-	-		
"Analog input 3"	-	-		
"Built-in Grundfos sensor"	-	-		
"Pt100/1000 input 1"	-	-		
"Pt100/1000 input 2"	-	-		
"Digital input 1"	○	○		
"Digital input 2"	○	○		
"Digital in/output 3"	○	○		
"Digital in/output 4"	○	○		
"Pulse flowmeter"	○	○		
"Predefined setpoint"	-	-		
"Analog output" <sup>1)</sup>	○	○		
"External setpoint funct."	○	○		
"Signal relay 1"	○	○		
"Signal relay 2"	○	○		
"Limit 1 exceeded"	-	-		
"Limit 2 exceeded"	-	-		
"Standstill heating"	○	○		
"Motor bearing monitoring"	○	○		
"Pump name"	-	-		
"Connect code"	-	-		
"Unit configuration"	SI units	SI units		

## 15. Communication

### Communication with TPE2, TPE2 D, TPE3, TPE3 D, TPE, TPED pumps

Communication with TPE2, TPE2 D, TPE3, TPE3 D, TPE, TPED pumps is possible via a central building management system, remote control, Grundfos GO, or control panel.

#### Central building management system

The operator can communicate with a TPE2, TPE2 D, TPE3, TPE3 D, 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.

The CIM module cannot be used in TPED Series 1000 and 2000 pumps with the following motor sizes:

- 15-22 kW, 2-pole
- 11 - 18.5 kW, 4-pole.

The CIM module cannot be used in TPE Series 1000 and 2000 pumps with the following motor sizes:

- 30-55 kW, 2-pole
- 22-55 kW, 4-pole.

#### Remote control

The operator can monitor and change control modes and settings of the pump with Grundfos GO. See *Grundfos GO* on page 57.

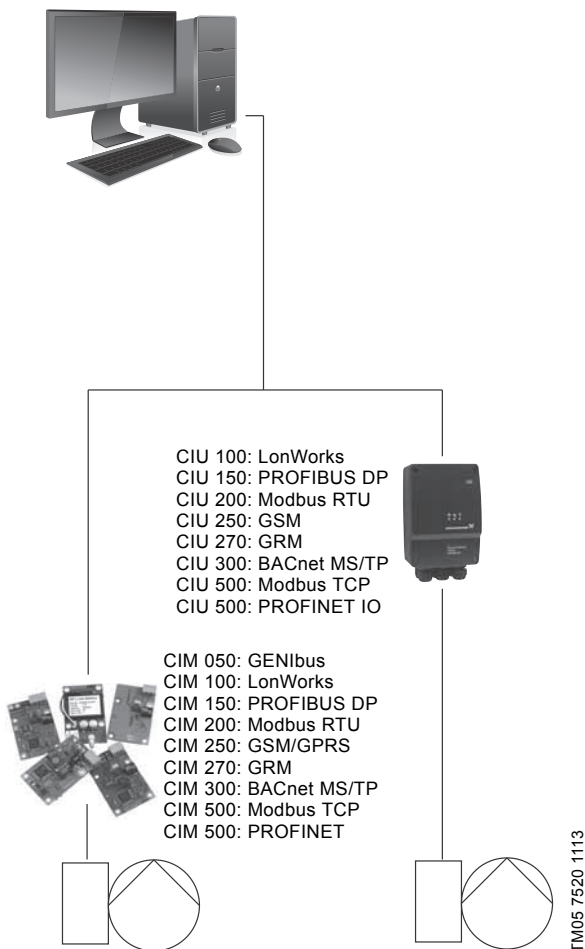


Fig. 98 Structure of a central building management system



## 16. Speed regulation of TPE, TPED, TPE2, TPE2 D, TPE3, TPE3 D pumps

### Affinity equations

Normally, the pumps are used in applications characterised by a variable flow rate. Consequently, you cannot select a pump that is constantly operating at its optimum efficiency.

In order to achieve optimum operating economy, the duty point must be close to the optimum efficiency, eta, for most operating hours.

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

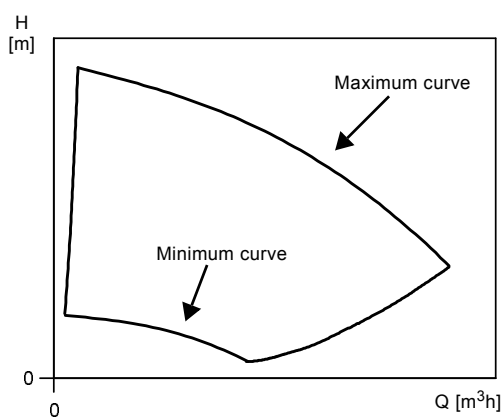


Fig. 99 Minimum and maximum performance curves

In situations where you can select a duty point close to the maximum curve, use the affinity equations below. The head, H, the flow rate, Q and the input power, P, are the appropriate variables you need for calculating the motor speed, n.

**Note:** The approximated formulas apply on condition that the system characteristic remains unchanged for the rated motor speed and the current motor speed, and that it is based on the following formula: H is equal to  $k \times Q^2$  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 efficiencies of the frequency converter and the motor must also be taken into account if you want a precise calculation of the power saving resulting from a reduction of the pump speed.

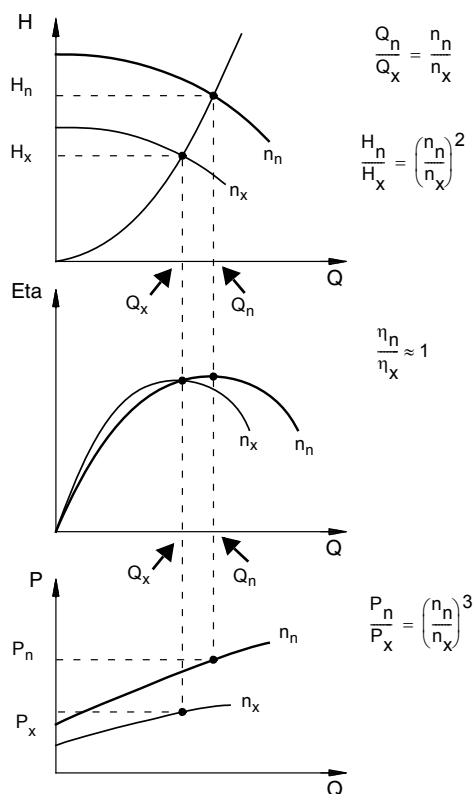


Fig. 100 Affinity equations

#### Legend

- $H_n$  Rated head in metres
- $H_x$  Current head in metres
- $Q_n$  Rated flow rate in  $m^3/h$
- $Q_x$  Current flow rate in  $m^3/h$
- $n_n$  Rated motor speed in  $min^{-1}$
- $n_x$  Current motor speed in  $min^{-1}$
- $\eta_n$  Rated efficiency in %
- $\eta_x$  Current efficiency in %
- $P_n$  Rated power in kW
- $P_x$  Current power in kW

#### Grundfos Product Center

Grundfos Product Center can help you select the right pump according to your requirements. See page 280.

TM01 4916 4803



TM00 8720 3496

## 17. Control of pumps in parallel

In some applications, parallel pump operation is required for one or more of the following reasons:

- One pump cannot achieve the required performance, flow rate.
- Standby performance is required to ensure reliability of supply.
- Overall efficiency needs to be improved in case of big variations in the flow demand.

The table below lists the different possibilities of controlling pumps connected in parallel.

Parallel-operation control possibilities	TP	TPE2	TPE2 D	TPE3	TPE3 D	TPE, TPED Series 2000		TPE, TPED Series 1000		TPE Series 2000 TPE Series 1000
						0.12 - 11 kW, 2-pole 0.12 - 7.5 kW, 4-pole	15-22 kW, 2-pole 11 - 18.5 kW, 4-pole	0.12 - 11 kW, 2-pole 0.12 - 7.5 kW, 4-pole	15-22 kW, 2-pole 11 - 18.5 kW, 4-pole	30-55 kW, 2-pole 22-55 kW, 4-pole
Built-in alternation/standby function		•	•	•	•	•	○	•	○	•
Built-in parallel operation function		•	•	•	•	•		•		
Control MPC 	•	•						•	•	•
Control MPC Series 2000 			•	•	•					

- Available.
- Available on request.

### Alternation/standby function

The alternation/standby function is activated from factory and "Alternating" mode is selected as default. See pages 34 and 38.

### Pumps connected to Control MPC

You can connect TP, TPE Series 1000, TPE2 pumps directly to Grundfos Control MPC.

Control MPC incorporates a CU 352 control unit that can control up to six pumps.

By means of an external sensor, Control MPC can ensure optimum adaptation of the performance to the demand by closed-loop control of these parameters:

- proportional differential pressure
- constant differential pressure
- differential pressure (remote)
- flow rate
- temperature.

CU 352 incorporates features such as those below:

#### Startup wizard

Correct installation and commissioning is a prerequisite for attaining optimum performance of the system and trouble-free operation year in and year out.

During commissioning of the system, a startup wizard is shown on the display of CU 352. The wizard guides the operator through the various steps via a series of dialogue boxes to ensure that all settings are done in the correct sequence.

#### Application-optimised software

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

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

#### Ethernet connection

CU 352 incorporates an ethernet connection which makes it possible to get full and unlimited access to the setting and monitoring of the system via a remote PC.

#### Service port, GENI TTL

The service port of CU 352 enables easy access to updating software and data logging in service situations.

#### External communication

Control MPC enables communication with other fieldbus protocols. In order to communicate with other fieldbus protocols, a GENIbus module and a gateway are required.

Control MPC can communicate with LonWorks, PROFIBUS, Modbus, BACnet, GSM/GPRS or GRM via Grundfos CIU.

## Pumps connected to Control MPC Series 2000

TPE Series 2000, TPE3 pumps are connected directly to Grundfos Control MPC Series 2000 via GENibus.

Control MPC Series 2000 incorporates a CU 352 control unit that can control up to six pumps.

All pumps must be of the same type and size.

Control MPC Series 2000 is used for controlling circulator pumps in heating and air-conditioning applications.

Control MPC Series 2000 ensures optimal adaptation of the performance to the demand by closed-loop control of these parameters:

- proportional differential pressure
- constant differential pressure.

By means of an external sensor Control MPC Series 2000 can also ensure optimum adaptation of the performance to the demand by closed-loop control of these parameters:

- differential pressure (remote)
- flow rate
- temperature.

**Note:** For further information about Control MPC and Control MPC Series 2000, see the data booklet "Control MPC". The data booklet is available online in Grundfos Product Center. See page 280.

## 18. Grundfos CUE

### TP pumps connected to Grundfos CUE, external frequency converters



Fig. 101 Grundfos CUE

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

The frequency converter provides a variety of benefits, such as these:

- Grundfos E-pump functionality and user interface
- application- and pump family-related functions
- increased comfort compared to fixed-speed pump solutions
- simple installation and commissioning compared to standard frequency converters
- speed control of pumps up to 250 kW.

### Functions

#### Intuitive startup guide

The startup guide enables easy installation and commissioning as well as plug-and-pump convenience. Few settings need to be made by the installer as the rest is done automatically or preset from the factory.

#### Smart user interface



Fig. 102 Grundfos CUE user interface

The frequency converter features a unique user-friendly control panel with graphic display and easy-to-use buttons.

#### Controlling the value you choose

The frequency converter has a built-in PI controller offering closed-loop control of a desired value, such as these:

- constant differential pressure
- proportional pressure
- constant temperature
- constant pressure
- constant flow rate.

#### Wide product range

The CUE product range is quite comprehensive, covering five different voltage ranges, enclosure classes IP20/21 (Nema 1) and IP54/55 (Nema 12), and a wide range of output powers.

The table below provides a general overview.

Input voltage [V]	Output voltage [V]	Motor [kW]
1 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

The frequency converter can communicate with LonWorks, PROFIBUS, Modbus, BACnet or GSM/GPRS via Grundfos CIU.

GRA 4404

TM04 3283 4108

# 19. 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	IM 3601 (IM B 14) / IM 3611 (IM V 18)
TP Series 200	
TP Series 300	IM 3001 (IM B 5) / IM 3011 (IM V 1)

Relative humidity:	Maximum 95 %
Enclosure class:	IP55
Insulation class:	F (IEC 85)
Ambient temperature:	Maximum 55 °C, Siemens motors Maximum 60 °C, MG motors Maximum 50 °C, 2-pole MGE motors below 11 kW and 4-pole MGE motors below 7.5 kW Maximum 40 °C, other motors Maximum 45 °C, Siemens motors with integrated CUE Minimum -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. TP, TPD pumps are also available with IE4 motors from 2.2 to 132 kW.

TPE2, TPE2 D, TPE3, TPE3 D pumps are fitted with Grundfos permanent-magnet MGE motors that have motor efficiency class IE5 according to IEC 60034-30-2.

TPE, TPED pumps with 2-pole motors up to 11 kW and 4-pole motors up to 7.5 kW are fitted with Grundfos permanent-magnet MGE motors that have motor efficiency class IE5 according to IEC 60034-30-2.

TPE, TPED pumps with three-phase 2-pole motors from 15 to 22 kW are fitted with motors equivalent to IE3.

TPE, TPED pumps with three-phase 4-pole motors from 11 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.

TPE pumps with three-phase 2-pole motors from 30 to 55 kW are fitted with motors equivalent to IE3 or IE4.

TPE pumps with three-phase 4-pole motors from 22 to 55 kW are fitted with motors equivalent to IE3 or IE4.

## Motor range

kW	Mains-operated motors			Electronically speed-controlled motors	
	2-pole	4-pole	6-pole	2-pole	4-pole
0.12	1-phase MG, 3-phases Siemens	1-phase MG, 3-phases Siemens			
0.18		MG	MG	MGE*	MGE*
0.25					
0.37					
0.55					
0.75					
1.1					
1.5					
2.2					
3.0					
4.0	Siemens				
5.5					
7.5	Siemens	Siemens	MGE	MGE	
11.0					
15.0					
18.5					
22.0					
30.0					
37.0					
45.0					
55.0					
75.0					
90.0	Siemens	Siemens	Siemens with integrated CUE	Siemens with integrated CUE	
110					
132					
160					
200					
250					
315					
355					
400					
500					
560					
630					

\* IE5 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

### 2-pole, 1 x 220-230/240 V

Motor [kW]	I <sub>1/1</sub> [A]	Cos φ 1/1	η [%]	n [min <sup>-1</sup> ]	I <sub>Start</sub> /I <sub>1/1</sub>
0.12	1.05	1.0	65	2800-2840	3.2 - 3.6
0.18	1.34	0.94	62	2895	4.3
0.25	2.05 / 2	0.99	58	2800	-
0.37	2.95 / 2.7	0.99	60	2770	2.8
0.55	4 / 3.65	0.99	66	2750	2.8
0.75	5.1 / 4.75	0.99	69	2780	3.0
1.1	7.4 / 6.7	0.98 - 0.99	-	2770	3.9 / 3.9
1.5	9.9 / 8.9	0.98 - 0.99	72-74	2750-2740	3.9 / 3.9

### 2-pole, 3 x 220-240/380-415 V, IE3 from 0.75 kW

Motor [kW]	I <sub>1/1</sub> [A]	Cos φ 1/1	η [%]	n [min <sup>-1</sup> ]	I <sub>Start</sub> /I <sub>1/1</sub>
0.12	0.59 / 0.34	0.8 - 0.72	71	2800-2850	4.2 - 4.6
0.18	0.9 / 0.52	0.79 - 0.71	67	2800-2850	4.5
0.25	1.18 / 0.68	0.81 - 0.72	73	2800-2850	4.0 - 4.4
0.37	1.74 / 1	0.8 - 0.7	78.5	2850-2880	4.9 - 5.3
0.55	2.5 / 1.44	0.8 - 0.7	80	2830-2850	1.9
0.75	3.3 / 1.9	0.81 - 0.71	80.7	2840-2870	5.8 - 6.2
1.1	4.35 - 2.5	0.83 - 0.76	82.7	2840-2870	4.5 - 5.0
1.5	5.45 / 3.15	0.87 - 0.82	84.2	2890-2910	8.5 - 9.3
2.2	7.70 / 4.45	0.89 - 0.87	85.9	2890-2910	8.5 - 9.5
3.0	11.0 / 6.3	0.87 - 0.82	87.1	2900-2920	8.4 - 9.2
4.0	13.6 / 7.9	0.87	88.1	2920-2940	10 - 11.1
5.5	19.0 - 11.0	0.87 - 0.82	89.2	2920-2940	10.8 - 11.8
7.5	25.0 - 24.2 / 14.4 - 14.0	0.88 - 0.82	90.4	2910-2920	7.8 - 9.1
11.0	36.0 - 34.5 / 20.8 - 19.8	0.88 - 0.84	91.2	2940-2950	6.6 - 7.8
15.0	48.5 - 45.0 / 28.0 - 26.0	0.89 - 0.87	91.9	2930-2950	6.6 - 7.8
18.5	59.0 - 53.5 / 34.0 - 31.0	0.90 - 0.89	92.4	2930-2950	7.1 - 8.5
22.0	68.5 / 39.5	0.90	92.7	2950	8.3

### 2-pole, 3 x 220-240/380-420 V, IE3

Motor [kW]	I <sub>1/1</sub> [A]	Cos φ 1/1	η [%]	n [min <sup>-1</sup> ]	I <sub>Start</sub> /I <sub>1/1</sub>
30.0	94.0 - 54.0	0.9	93.3	2955	6.6
37.0	114.0 - 66.0	0.9	93.7	2955	6.7
45.0	136.0 - 78.0	0.9	94.0	2960	6.9
55.0	166.0 - 95.0	0.9	94.3	2975	6.7
75.0	220.0 - 128.0	0.9	94.7	2975	6.8

### 2-pole, 3 x 380-415/660-690 V, IE3

Motor [kW]	I <sub>1/1</sub> [A]	Cos φ 1/1	η [%]	n [min <sup>-1</sup> ]	I <sub>Start</sub> /I <sub>1/1</sub>
2.2	4.45	0.89 - 0.87	85.9	2890-2910	8.5 - 9.5
3.0	6.3	0.87 - 0.82	87.1	2900-2920	8.4 - 9.2
4.0	7.9	0.87	88.1	2920-2940	10 - 11
5.5	11.0	0.87 - 0.82	89.2	2920-2940	10.8 - 11.8
7.5	14.4 - 14.0 / 8.3 - 8.1	0.88 - 0.82	90.4	2910-2920	7.8 - 9.1
11.0	20.8 - 19.8 / 12.0 - 11.8	0.88 - 0.84	91.2	2940-2950	6.6 - 7.8
15.0	28.0 - 26.0 / 16.2 - 15.6	0.89 - 0.87	91.9	2930-2950	6.6 - 7.8
18.5	34.0 - 31.0 / 19.6 - 18.8	0.90 - 0.89	92.4	2930-2950	7.1 - 8.5
22.0	39.5 / 22.8	0.90	92.7	2950	8.3

### 2-pole, 3 x 380-420/660-725 V, IE3

Motor [kW]	I <sub>1/1</sub> [A]	Cos φ 1/1	η [%]	n [min <sup>-1</sup> ]	I <sub>Start</sub> /I <sub>1/1</sub>
30.0	54.0 - 31.0	0.9	93.3	2955	6.6
37.0	66.0 - 38.0	0.9	93.7	2955	6.7
45.0	78.0 - 45.0	0.9	94.0	2960	6.9
55.0	95.0 - 55.0	0.9	94.3	2975	6.7
75.0	128.0 - 74.0	0.9	94.7	2975	6.8
90.0	152.0 - 88.0	0.9	95.0	2975	7.2
110.0	184.0 - 106.0	0.9	95.2	2980	7.1
132.0	220.0 - 128.0	0.9	95.4	2980	7.2
160.0	265.0 - 154.0	0.9	95.6	2980	7.8

### 4-pole, 1 x 220-230/240 V

Motor [kW]	I <sub>1/1</sub> [A]	Cos φ 1/1	η [%]	n [min <sup>-1</sup> ]	I <sub>Start</sub> /I <sub>1/1</sub>
0.12	0.99	0.99	53.1	1434	2.58
0.18	1.62	0.97	54	1350-1370	2.0
0.25	2.14	0.97	57	1350-1370	2.2
0.37	2.85	0.97	62	1350-1370	2.4
0.55	4	0.97	66	1350-1370	2.6
0.75	5.45	0.96	71	1390-1410	3.2
1.1	7	0.96	75	1420-1430	3.9

**4-pole, 3 x 220-240/380-415 V, IE3 from 0.75 kW**

Motor [kW]	I <sub>1/1</sub> [A]	Cos φ 1/1	η [%]	n [min <sup>-1</sup> ]	I <sub>Start</sub> / I <sub>1/1</sub>
0.12	0.78 / 0.45	0.67	54	1380	3.2
0.25	1.48 / 0.85	0.75 - 0.65	69	1400-1420	4.0 - 4.4
0.37	1.9 / 1.1	0.77 - 0.67	71	1400-1420	4.0 - 4.4
0.55	2.6 / 1.5	0.79 - 0.7	77	1390-1410	4.3 - 4.7
0.75	3.3 / 1.9	0.76 - 0.71	82.5	1440-1450	6.6 - 7.2
1.1	4.85 / 2.0	0.71 - 0.64	84.1	1450-1460	8.2 - 9.0
1.5	6.15 - 6.3 / 3.55 - 3.65	0.75 - 0.68	85.3	1450-1460	7.3 - 7.9
2.2	8.5 / 4.9	0.79 - 0.73	86.7	1450	6.0 - 6.6
3.0	11.0 / 6.3	0.82 - 0.76	87.7	1440-1450	7.0 - 7.7
4.0	16.2 / 9.3	0.75 - 0.68	88.6	1460	7.9 - 8.7
5.5	19.0 / 11.0	0.86 - 0.80	89.6	1460	7.6
7.5	26.0 - 24.6 / 14.9 - 14.2	0.86 - 0.82	90.4	1460	6.8 - 7.8
11.0	36.5 - 35.5 / 21.2 - 20.4	0.86 - 0.81	91.4	1470-1470	7.1 - 8.1
15.0	50.0 - 48.5 / 29.0 - 28.0	0.86 - 0.82	92.1	1460-1470	7.6 - 8.7

**4-pole, 3 x 220-240/380-420 V, IE3**

Motor [kW]	I <sub>1/1</sub> [A]	Cos φ 1/1	η [%]	n [min <sup>-1</sup> ]	I <sub>Start</sub> / I <sub>1/1</sub>
18.5	60.0 - 34.5	0.8	92.4	1765	6.2
22.0	71.0 - 41.0	0.8	92.4	1765	6.0
30.0	95.5 - 55.0	0.9	93.0	1765	6.1

**4-pole, 3 x 380-415/660-690 V, IE3**

Motor [kW]	I <sub>1/1</sub> [A]	Cos φ 1/1	η [%]	n [min <sup>-1</sup> ]	I <sub>Start</sub> / I <sub>1/1</sub>
2.2	1.9	0.76 - 0.71	82.5	1440-1450	6.6 - 7.2
3.0	6.3	0.82 - 0.76	87.7	1440-1450	7.0 - 7.7
4.0	9.3	0.75 - 0.68	88.6	1460	7.9 - 8.7
5.5	11.0 - 11.0 / 6.35 - 6.35	0.86 - 0.80	89.6	1460	7.0 - 7.6
7.5	14.9 - 14.2 / 8.6 - 8.4	0.86 - 0.82	90.4	1460	6.8 - 7.8
11.0	21.2 - 20.4 / 12.2 - 12.0	0.86 - 0.81	91.4	1460-1470	7.1 - 8.1
15.0	29.0 - 28.0 / 16.8 - 16.4	0.86 - 0.82	92.1	1460-1470	7.6 - 8.7

**4-pole, 3 x 380-420/660-725 V, IE3 up to 355 kW**

Motor [kW]	I <sub>1/1</sub> [A]	Cos φ 1/1	η [%]	n [min <sup>-1</sup> ]	I <sub>Start</sub> / I <sub>1/1</sub>
18.5	35.0 - 20.6	0.8	92.6	1470	6.9
22.0	41.0 - 24.0	0.8	93.0	1470	6.8
30.0	55.0 - 32.0	0.8	93.6	1470	6.9
37.0	66.0 - 38.5	0.9	93.9	1480	6.4
45.0	80.0 - 46.5	0.9	94.2	1480	6.4
55.0	96.0 - 56.0	0.9	94.6	1480	6.8
75.0	134.0 - 77.0	0.9	95.0	1485	6.9
90.0	158.0 - 91.0	0.9	95.2	1485	7.2
110.0	192.0 - 112.0	0.9	95.4	1490	6.8
132.0	230.0 - 134.0	0.9	95.6	1490	7.3
160.0	275.0 - 162.0	0.9	95.8	1490	7.3
200.0	340.0 - 198.0	0.9	96.0	1490	7.4
250.0	430.0 - 250.0	0.9	96.0	1490	7.7
315.0	550.0 - 320.0	0.9	96.0	1490	7.9
355.0	630.0 - 365.0	0.9	96.1	1490	6.5
400.0	690.0 / 400.0	0.87	-	1488	-
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	-

**6-pole, 3 x 220-240/380-415 V, IE3**

Motor [kW]	I <sub>1/1</sub> [A]	Cos φ 1/1	η [%]	n [min <sup>-1</sup> ]	I <sub>Start</sub> / I <sub>1/1</sub>
1.5	6.6 - 5.9 / 3.8 - 3.4	0.79	86.5	1160	5.6
2.2	9.17 - 8.3 / 5.3 - 4.8	0.79	87.5	1160	6.8
3.0	12.0 - 11.0 / 7.0 - 6.4	0.78	87.5	1165	6.9
4.0	15.7 - 14.2 / 9.1 - 8.2	0.79	87.5	1160	6.5
5.5	21.0 - 19.3 / 12.2 - 11.0	0.81	89.5	1180	6.6
7.5	27.7 - 25.4 / 16.0 - 14.5	0.82	89.5	1165	6.3

**6-pole, 3 x 380-415/660-690 V, IE3**

Motor [kW]	I <sub>1/1</sub> [A]	Cos φ 1/1	η [%]	n [min <sup>-1</sup> ]	I <sub>Start</sub> / I <sub>1/1</sub>
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

**2-pole, 3 x 220-240/380-415 V, IE4**

Motor [kW]	I <sub>1/1</sub> [A]	Cos φ 1/1	η [%]	n [min <sup>-1</sup> ]	I <sub>Start</sub> /I <sub>1/1</sub>
3	9.90 - 5.70	0.86	89.1	2.920	9.8
4	12.6 - 7.20	0.89	90.0	2.955	10.2
5.5	18.0 - 10.4	0.84	90.9	2.960	10.1
7.5	22.8 - 13.2	0.90	91.7	2.955	10.3
11	33.5 - 19.2	0.89	92.6	2.960	9.0
15	45.0 - 26.0	0.90	93.3	2.960	10.4
18.5	54.5 - 31.5	0.91	93.7	2.960	10.5
22	66.5 - 38.0	0.88	94.0	2.955	9.5
30	93.5 - 53.5	0.85	94.5	2.955	8.4

**2-pole, 3 x 380-420/660-725 V, IE4**

Motor [kW]	I <sub>1/1</sub> [A]	Cos φ 1/1	η [%]	n [min <sup>-1</sup> ]	I <sub>Start</sub> /I <sub>1/1</sub>
3	5.70 - 3.30	0.86	89.1	2.920	9.8
4	7.20 - 4.15	0.89	90.0	2.955	10.2
5.5	10.4 - 6.00	0.84	90.9	2.960	10.1
7.5	13.2 - 7.60	0.90	91.7	2.955	10.3
11	19.4 - 11.2	0.89	92.6	2.960	9.0
15	26.0 - 15.0	0.90	93.3	2.960	10.4
18.5	31.5 - 18.2	0.91	93.7	2.960	10.5
22	38.5 - 22.0	0.88	94.0	2.955	9.5
30	54.0 - 31.0	0.85	94.5	2.955	8.4
37	64.0 - 37.0	0.88	94.8	2.955	8.9
45	80.0 - 46.5	0.85	95.0	2.970	8.8
55	95.0 - 55.0	0.88	95.3	2.975	7.5
75	128 - 74.0	0.89	95.6	2.980	8.3
90	152 - 88.0	0.89	95.8	2.980	8.2
110	184 - 108	0.90	96.0	2.985	8.7
132	220 - 128	0.90	96.2	2.990	10.5
160	260 - 152	0.92	96.3	2.990	10.3
200	325 - 188	0.92	96.6	2.985	9.9
250	430 - 250	0.88	96.5	2.986	9.3
315	550 - 320	0.87	96.5	2.986	9.9
355	610 - 350	0.89	96.5	2.988	8.9
400	660 - 380	0.92	96.5	2.986	8.5
500	850 - 495	0.89	96.5	2.988	8.9

**4-pole, 3 x 220-240/380-415 V, IE4**

Motor [kW]	I <sub>1/1</sub> [A]	Cos φ 1/1	η [%]	n [min <sup>-1</sup> ]	I <sub>Start</sub> /I <sub>1/1</sub>
2.2	7.8 - 4.5	0.8	89.5	1465	10.2
3	10.2 - 5.9	0.8	90.4	1460	8.8
4	13.6 - 7.8	0.8	91.1	1465	8.3
5.5	18.0 - 10.4	0.8	91.9	1470	8.4
7.5	25.0 - 14.4	0.8	92.6	1470	8.4
11	36.5 - 20.8	0.8	93.3	1480	9.0
15	50.0 - 29.0	0.8	93.9	1480	9.3
18.5	60.5 - 34.5	0.8	94.2	1470	8.2
22	72.5 - 42.5	0.8	94.5	1475	8.6
30	98.5 - 57.0	0.8	94.9	1480	9.3

**4-pole, 3 x 380-420/660-725 V, IE4**

Motor [kW]	I <sub>1/1</sub> [A]	Cos φ 1/1	η [%]	n [min <sup>-1</sup> ]	I <sub>Start</sub> /I <sub>1/1</sub>
2.2	4.5 - 2.6	0.79	89.5	1.465	10.2
3	5.9 - 3.4	0.81	90.4	1.460	8.8
4	7.8 - 4.5	0.81	91.1	1.465	8.3
5.5	10.4 - 6.0	0.83	91.9	1.470	8.4
7.5	14.4 - 8.3	0.81	92.6	1.470	8.9
11	21.0 - 12.0	0.8	93.3	1.480	9.0
15	29.0 - 16.6	0.8	93.9	1.480	9.3
18.5	35.0 - 20.0	0.8	94.2	1.470	8.2
22	41.5 - 24.0	0.8	94.5	1.475	8.6
30	57.0 - 33.0	0.8	94.9	1.480	9.3
37	68.0 - 39.0	0.8	95.2	1.485	9.0
45	81.0 - 47.5	0.8	95.4	1.485	8.2
55	96.0 - 56.0	0.9	95.7	1.485	8.2
75	134 - 77	0.9	96.0	1.490	9.0
90	158 - 91	0.9	96.1	1.490	8.9
110	192 - 112	0.9	96.3	1.490	8.6
132	226 - 132	0.9	96.4	1.490	8.7
160	280 - 162	0.9	96.6	1.490	8.8
200	345 - 200	0.9	96.7	1.490	8.9
250	445 - 260	0.85	96.7	1.490	7.9
315	580 - 335	0.83	96.7	1.490	8.5
355	630 - 360	0.86	96.7	1.492	7.9
400	720 - 420	0.84	96.7	1.492	8.4
500	880 - 510	0.86	96.7	1.491	8.1



## Electrical data, speed-controlled motors

### 1 x 200-240 V, TPE2, TPE2 D, TPE3, TPE3 D pumps

Pump type	Motor [kW]	$I_{1/1}$ [A]
TPE2, TPE2 D, TPE3, TPE3 D 32-80	0.25	1.56
TPE2, TPE2 D, TPE3, TPE3 D 32-120	0.25	1.56
TPE2, TPE2 D, TPE3, TPE3 D 32-150	0.37	2.29
TPE2, TPE2 D, TPE3, TPE3 D 32-180	0.55	3.15
TPE2, TPE2 D, TPE3, TPE3 D 32-200	0.75	4.17
TPE2, TPE2 D, TPE3, TPE3 D 40-80	0.25	1.56
TPE2, TPE2 D, TPE3, TPE3 D 40-120	0.37	2.17
TPE2, TPE2 D, TPE3, TPE3 D 40-150	0.55	3.04
TPE2, TPE2 D, TPE3, TPE3 D 40-180	0.75	4.17
TPE2, TPE2 D, TPE3, TPE3 D 40-200	1.1	5.97
TPE2, TPE2 D, TPE3, TPE3 D 40-240	1.5	8.00
TPE2, TPE2 D, TPE3, TPE3 D 50-60	0.37	2.17
TPE2, TPE2 D, TPE3, TPE3 D 50-80	0.37	2.17
TPE2, TPE2 D, TPE3, TPE3 D 50-120	0.55	3.04
TPE2, TPE2 D, TPE3, TPE3 D 50-150	0.75	4.1
TPE2, TPE2 D, TPE3, TPE3 D 50-180	1.1	5.97
TPE2, TPE2 D, TPE3, TPE3 D 50-200	1.5	8.00
TPE2, TPE2 D, TPE3, TPE3 D 65-60	0.37	2.17
TPE2, TPE2 D, TPE3, TPE3 D 65-80	0.55	3.04
TPE2, TPE2 D, TPE3, TPE3 D 65-120	0.75	4.10
TPE2, TPE2 D, TPE3, TPE3 D 65-150	1.1	5.97
TPE2, TPE2 D, TPE3, TPE3 D 65-180	1.5	8.00
TPE2, TPE2 D, TPE3, TPE3 D 80-40	0.25	1.46
TPE2, TPE2 D, TPE3, TPE3 D 80-120	1.1	5.88
TPE2, TPE2 D, TPE3, TPE3 D 80-150	1.5	7.97
TPE2, TPE2 D, TPE3, TPE3 D 100-40	0.25	1.46
TPE2, TPE2 D, TPE3, TPE3 D 100-120	1.1	5.88
TPE2, TPE2 D, TPE3, TPE3 D 100-150	1.5	7.97

### 3 x 380-500 V, TPE2, TPE2 D, TPE3, TPE3 D pumps

Pump type	Motor [kW]	$I_{1/1}$ [A]
TPE2, TPE2 D, TPE3, TPE3 D 32-80	0.25	0.88
TPE2, TPE2 D, TPE3, TPE3 D 32-120	0.25	0.88
TPE2, TPE2 D, TPE3, TPE3 D 32-150	0.37	1.09
TPE2, TPE2 D, TPE3, TPE3 D 32-180	0.55	1.34
TPE2, TPE2 D, TPE3, TPE3 D 32-200	0.75	1.68
TPE2, TPE2 D, TPE3, TPE3 D 40-80	0.25	0.88
TPE2, TPE2 D, TPE3, TPE3 D 40-120	0.37	1.09
TPE2, TPE2 D, TPE3, TPE3 D 40-150	0.55	1.34
TPE2, TPE2 D, TPE3, TPE3 D 40-180	0.75	1.68
TPE2, TPE2 D, TPE3, TPE3 D 40-200	1.1	2.26
TPE2, TPE2 D, TPE3, TPE3 D 40-240	1.5	2.96
TPE2, TPE2 D, TPE3, TPE3 D 50-60	0.37	1.04
TPE2, TPE2 D, TPE3, TPE3 D 50-80	0.37	1.04
TPE2, TPE2 D, TPE3, TPE3 D 50-120	0.55	1.34
TPE2, TPE2 D, TPE3, TPE3 D 50-150	0.75	1.68
TPE2, TPE2 D, TPE3, TPE3 D 50-180	1.1	2.26
TPE2, TPE2 D, TPE3, TPE3 D 50-200	1.5	2.96
TPE2, TPE2 D, TPE3, TPE3 D 50-240	2.2	4.22
TPE2, TPE2 D, TPE3, TPE3 D 65-60	0.37	1.04
TPE2, TPE2 D, TPE3, TPE3 D 65-80	0.55	1.34
TPE2, TPE2 D, TPE3, TPE3 D 65-120	0.75	1.68
TPE2, TPE2 D, TPE3, TPE3 D 65-150	1.1	2.15
TPE2, TPE2 D, TPE3, TPE3 D 65-180	1.5	2.96
TPE2, TPE2 D, TPE3, TPE3 D 65-200	2.2	4.22
TPE2, TPE2 D, TPE3, TPE3 D 80-40	0.25	0.82
TPE2, TPE2 D, TPE3, TPE3 D 80-120	1.1	2.15
TPE2, TPE2 D, TPE3, TPE3 D 80-150	1.5	2.82
TPE2, TPE2 D, TPE3, TPE3 D 80-180	2.2	4.03
TPE2, TPE2 D, TPE3, TPE3 D 100-40	0.25	0.82
TPE2, TPE2 D, TPE3, TPE3 D 100-120	1.1	2.15
TPE2, TPE2 D, TPE3, TPE3 D 100-150	1.5	2.82
TPE2, TPE2 D, TPE3, TPE3 D 100-180	2.2	4.03

**4-pole, 1 x 200-240 V, 2000 min<sup>-1</sup>**

Motor [kW]	I <sub>1/1</sub> [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

**2-pole, 1 x 200-240 V, 4000 min<sup>-1</sup>**

Motor [kW]	I <sub>1/1</sub> [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

**4-pole, 3 x 380-500 V, 2000 min<sup>-1</sup>**

Motor [kW]	I <sub>1/1</sub> [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
1.5	2.90 - 2.50
2.2	4.30 - 3.60
3	5.80 - 4.60
4	7.70 - 6.00
5.5	10.5 - 8.40
7.5	14.1 - 11.1

**2-pole, 3 x 380-500 V, 4000 min<sup>-1</sup>**

Motor [kW]	I <sub>1/1</sub> [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
3	5.80 - 4.80
4	7.60 - 6.20
5.5	10.3 - 8.20
7.5	14.1 - 11.2
11	20.3 - 16.0

**2-pole, 1 x 200-240 V, 2900 min<sup>-1</sup>**

Motor [kW]	I <sub>1/1</sub> [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

**2-pole, 3 x 380-480 V, 2900 min<sup>-1</sup>**

Motor [kW]	I <sub>1/1</sub> [A]
15.0	30.0 - 26.0
18.5	37.0 - 31.0
22.0	43.5 - 35.0

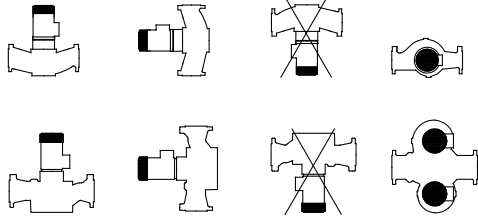
**4-pole, 3 x 380-480 V, 1450 min<sup>-1</sup>**

Motor [kW]	I <sub>1/1</sub> [A]
11.0	22.0 - 17.8
15.0	30.0 - 25.4
18.5	37.0 - 30.0

## 20. Installation

### Mechanical installation

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

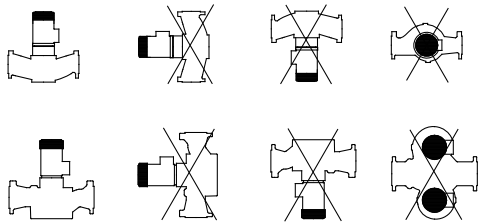


TM00 3734 0897

**Fig. 103** Installation of motor sizes smaller than 11 kW

You can suspend pumps with motors smaller than 11 kW directly in the pipes, provided the pipes can support the pump. If not, install the pump on a mounting bracket or base plate.

Only install TP pumps with motors of 11 kW and up in horizontal pipes with the motor in vertical position. Always install the pump on an even and rigid foundation.



TM00 3735 0897









**Fig. 104** Installation of motor sizes of 11 kW and up

**Note:** The motor must never point downwards.

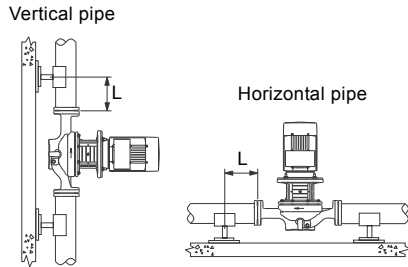
Install the pumps in such a way that strain from the pipes is not transferred to the pump housing.

However, you can suspend some TP, TPE pumps of 11 kW and up directly in the pipes, either horizontally or vertically. See the table *TP, TPE pumps from 11 kW and up suspended in the pipes* on page 132.

## TP, TPE pumps from 11 kW and up suspended in the pipes

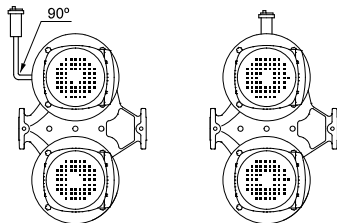
Pump type	PN 16	PN 25	P2 [kW]	   	   
<b>50 Hz</b>					
TP, TPE 65-460/2	•	-	11	-	•
TP, TPE 65-550/2	•	-	15	-	•
TP, TPE 65-660/2	•	-	18.5	-	•
TP, TPE 65-720/2	•	-	22	-	•
TP, TPE 80-330/2	•	-	11	-	•
TP, TPE 80-400/2	•	-	15	-	•
TP, TPE 80-520/2	•	-	18.5	-	•
TP, TPE 80-570/2	•	-	22	-	•
TP, TPE 100-250/2	•	•	11	-	•
TP, TPE 100-310/2	•	•	15	-	•
TP, TPE 100-360/2	•	•	18.5	-	•
TP, TPE 100-390/2	•	•	22	-	•
TP, TPE 80-340/4	•	-	11	-	•
TP, TPE 100-250/4	•	•	11	-	•
TP, TPE 100-330/4	•	•	15	-	•
TP, TPE 100-370/4	•	•	18.5	-	•
TP 100-410/4	•	•	22	-	•
TP, TPE 125-190/4	•	•	11	-	•
TP, TPE 125-230/4	•	•	15	-	•
TP, TPE 125-300/4	•	•	18.5	-	•
TP 125-340/4	•	•	22	-	•
TP, TPE 150-200/4	•	•	15	-	•
TP, TPE 150-220/4	•	•	18.5	-	•
TP 150-250/4	•	•	22	-	•
TP, TPE 150-260/4	-	•	18.5	•	-
TP 150-280/4	-	•	22	•	-
TP 150-340/4	-	•	30	•	-
TP 150-390/4	-	•	37	•	-
TP 150-450/4	-	•	45	•	-
TP 150-520/4	-	•	55	•	-
TP 150-660/4	-	•	75	•	-
TP, TPE 200-160/4	-	•	15	•	-
TP, TPE 200-190/4	-	•	18.5	•	-
TP 200-200/4	-	•	22	•	-
TP 200-240/4	-	•	30	•	-
TP 200-270/4	-	•	45	•	-
TP 200-320/4	-	•	55	•	-
TP 200-330/4	-	•	37	•	-
TP 200-360/4	-	•	45	•	-
TP 200-400/4	-	•	55	•	-
TP 200-410/4	-	•	75	•	-
TP 200-470/4	-	•	75	•	-
TP 300-190/4	-	•	30	•	-
TP 300-220/4	-	•	37	•	-
TP 300-250/4	-	•	45	•	-
TP 300-290/4	-	•	55	•	-
TP 300-390/4	-	•	75	•	-
TP 300-420/4	-	•	90	•	-
TP 300-430/4	-	•	110	•	-
TP 300-500/4	-	•	132	•	-
TP 300-550/4	-	•	160	•	-
TP 350-280/4	-	•	75	•	-
TP 350-320/4	-	•	90	•	-
TP 350-360/4	-	•	110	•	-
TP 350-420/4	-	•	132	•	-
TP 350-480/4	-	•	160	•	-
TP 350-530/4	-	•	200	•	-
TP 350-650/4	-	•	250	•	-
TP 350-780/4	-	•	315	•	-

In installations where the pump is suspended directly in the pipes, the pump can support the pipe length L on both sides of the pump. L is less than 3 x DN. See fig. 105. In installations where the pump is suspended directly in the pipes, the pump must be lifted and held in correct position by means of ropes or similar until both pump flanges are completely fastened to the pipe flanges.



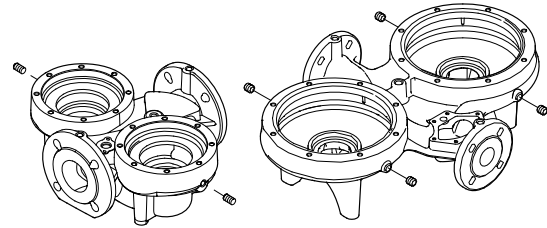
**Fig. 105** Pump suspended directly in the pipes

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



**Fig. 106** Twin-head pumps with automatic vent

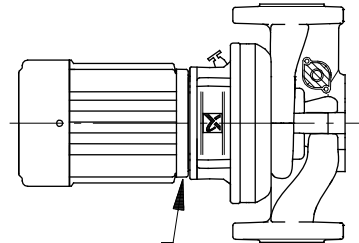
Twin-head pump housings have two Rp 1/4" tapping, TP Series 200, TPE2 D, TPE3 D, or four Rp 1/8" tapping, TP Series 300 for mounting of automatic vents.



**Fig. 107** Tappings for mounting of automatic vents in TP Series 200, TPE2 D, TPE3 D and TP Series 300

For further information about identification of TP Series 200 and TP Series 300 models, see pages 28 to 30.

If the liquid temperature falls below the ambient temperature or if the pump is installed outside, condensation may form in the motor during inactivity. In this case, the drain hole in the motor flange must be open and point downwards. See fig. 108.



**Fig. 108** Drain hole

TM06 3518 0615

TM03 8127 0507

TM02 7533 3703

TM00 9831 3202

If twin-head pumps are used for pumping liquids with a temperature below 0 °C / 32 °F, condensed water may freeze and cause the coupling to get stuck. You can remedy the problem by installing heating elements. Whenever possible, install pumps with motors smaller than 11 kW with horizontal motor shaft. See fig. 106.

### Cooling

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

- Place the pump in such a way that sufficient cooling is ensured.
- Keep the motor cooling fins, holes in fan cover and fan blades clean.
- Make sure that the frequency for the motor is at least 6 Hz, 12 % of maximum speed. The shaft seal may generate noise at speeds below 25 % of maximum speed.

### Condensation cover

When installing the pumps outdoors, provide the motor with a suitable cover to protect the pump and motor against the direct effects of the elements.

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

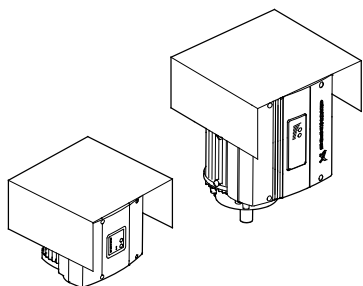


Fig. 109 Motors with condensation cover

TM02 8514 0304

### 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.

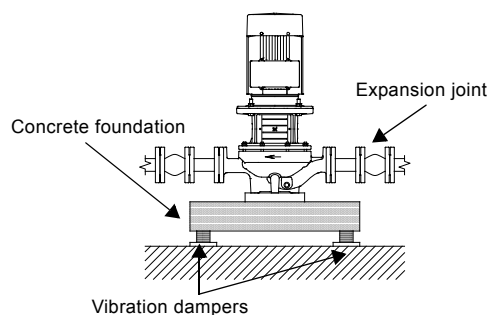


Fig. 110 Foundation of TP pump

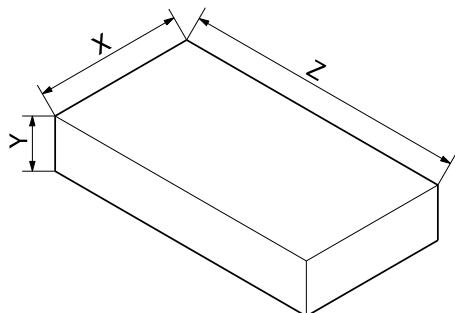
TM02 4993 2102

**Concrete foundation**

Install the pump on a plane and rigid concrete foundation. This is the optimum solution for vibration dampening. As a rule of thumb, the weight of a concrete foundation must be 1.5 times the pump weight.

**Recommended concrete foundations for TP, TPD Series 300 pumps**

For TP Series 300 pumps with weights of 150 kg or more, we recommend that you mount the pump on a concrete foundation with the dimensions stated in the table below. The same recommendation applies for TPD Series 300 pumps with weights of 300 kg or more.



TMO3 9190 3507

**Fig. 111** Foundation for TP, TPD 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	1010	1010
900	510	1030	1030
950	520	1050	1050
1000	530	1060	1060
1050	540	1080	1080
1100	550	1100	1100
1150	560	1100	1100
1200	560	1130	1130
1250	570	1150	1150
1300	580	1160	1160
1350	590	1180	1180
1400	600	1190	1190
1450	600	1200	1200
1500	610	1220	1220
1550	620	1230	1230
1600	620	1250	1250
1650	630	1250	1250
1700	635	1270	1270

≤ DN 200

Concrete foundation dimensions			
Pump mass [kg]	Y (height) [mm]	Z (length) [mm]	X (width) [mm]
800	450	1400	800
1000	450	1400	1000
1200	450	1400	1200
1400	500	1600	1200
1600	500	1600	1350
1800	500	1600	1500
2000	550	1600	1600
2200	550	1700	1700
2400	550	1800	1800
2600	600	1800	1800
3000	600	2000	2000
3400	680	2000	2000
3800	760	2000	2000
4200	840	2000	2000
4600	920	2000	2000
5000	1000	2000	2000
5400	1080	2000	2000

DN 300 /  
DN 350 /  
DN 400

**Vibration dampers**

To prevent the transmission of vibrations to buildings, we recommend that you isolate the pump foundation from building parts by means of vibration dampers.

The selection of the right vibration damper requires the following data:

- Forces transmitted through the damper.
- Motor speed considering speed control, if any.
- Required dampening in %. The suggested value is 70 %.

The right damper varies from installation to installation, and a wrong damper may increase the vibration level. Vibration dampers must therefore be sized by the supplier.

If you install the pump on a foundation with vibration dampers, always fit expansion joints on the pump flanges. This is important to prevent the pump from "hanging" in the flanges.

## Expansion joints

Expansion joints do the following:

- absorb expansions or contractions in the pipes caused by changing liquid temperature.
- reduce mechanical strains in connection with pressure surges in the pipes.
- isolate mechanical structure-borne noise in the pipes. Only rubber bellows expansion joints.

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

Fit expansion joints at a distance of minimum 1 to 1.5 times the nominal flange diameter away from the pump on the inlet as well as on the outlet side. This prevents the development of turbulence in the expansion joints, resulting in better suction conditions and a minimum pressure loss on the outlet side. At high water velocities, greater than 5 m/s, we recommend that you install larger expansion joints corresponding to the pipes. See fig. 112.

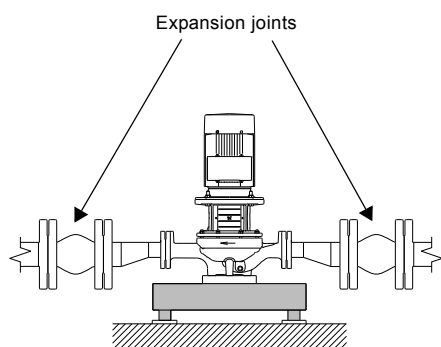


Fig. 112 TP pump installed with larger expansion joints

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

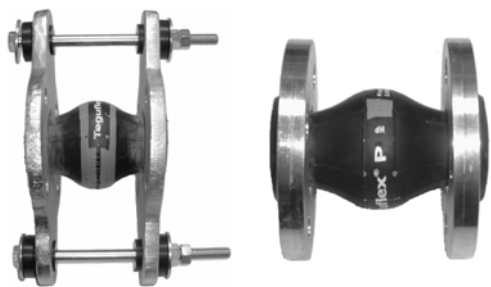


Fig. 113 Examples of rubber bellows expansion joints

You can use expansion joints with limit rods to reduce the effects of the expansion or contraction forces on the pipes. We always recommend expansion joints with limit rods for flanges larger than DN 100.

Anchor the pipes in such a way that they do not stress the expansion joints and the pump. Follow the supplier's instructions and pass them on to advisers or pipe installers.

The illustration below shows an example of a metal bellows expansion joint with limit rods.

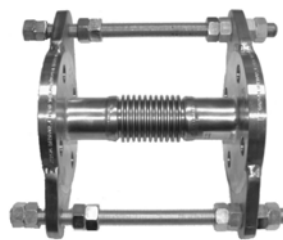


Fig. 114 Example of metal expansion joint

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

## Terminal box positions

### TP single-head pumps

As standard, the terminal boxes of TP and TPE, TPE2, TPE3 pumps are mounted in 9 o'clock position.

The possible terminal box positions are shown below.

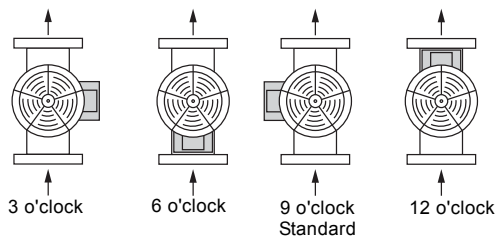


Fig. 115 Possible terminal box positions

TPE pumps with Siemens motors with integrated CUE can deviate up to 30 degrees from the 9 o'clock position.

**Note:** Due to the motor construction, the terminal boxes of some TP pumps with motor sizes above 250 kW are mounted in 10:30 position.

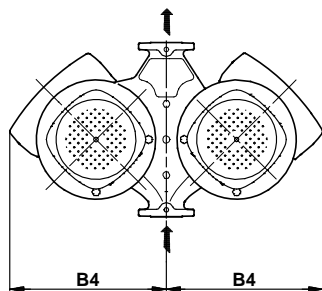


**TPD twin-head pumps**

As standard, the terminal boxes of all TPD and most TPED pumps are mounted in 12 o'clock position. See fig. 115.

On TPE2 D, TPE3 D pumps, the terminal box is installed in a position different from 12 o'clock.

The TPED pumps with terminal boxes installed in other positions are listed in the table. See example in fig. 116.



TM02 8630 0604

**Fig. 116** Terminal box positions of TPED pumps

**Note:** You can find the B4 dimension in the tables of technical data of the individual pump. See 26. *Performance curves and technical data* on page 162.

TPED pumps with terminal boxes installed in positions different from 12 o'clock	
Three-phase TPED pump	P2 [kW]
TPED 32-230/2	0.75
TPED 32-200/2	1.1
TPED 32-250/2	1.5
TPED 32-320/2	2.2
TPED 32-380/2	3.0
TPED 32-460/2	4.0
TPED 32-580/2	5.5
TPED 40-270/2	1.5
TPED 40-300/2	3.0
TPED 40-360/2	4.0
TPED 40-430/2	5.5
TPED 40-530/2	7.5
TPED 40-630/2	11
TPED 50-290/2	3.0
TPED 50-360/2	4.0
TPED 50-430/2	5.5
TPED 50-420/2	7.5
TPED 50-540/2	11
TPED 50-630/2	15
TPED 50-710/2	15
TPED 50-830/2	18.5
TPED 50-900/2	22
TPED 65-210/2	3.0
TPED 65-250/2	4.0
TPED 65-340/2	5.5
TPED 65-410/2	7.5
TPED 65-460/2	11
TPED 65-550/2	15
TPED 65-660/2	18.5
TPED 65-720/2	22
TPED 80-180/2	3.0
TPED 80-210/2	4.0
TPED 80-240/2	5.5
TPED 80-250/2	7.5
TPED 80-330/2	11
TPED 80-400/2	15
TPED 80-520/2	18.5
TPED 80-570/2	22
TPED 100-120/2	2.2
TPED 100-160/2	4.0
TPED 100-200/2	5.5
TPED 100-240/2	7.5
TPED 100-250/2	11
TPED 65-240/4	4.0
TPED 80-150/4	3.0
TPED 80-170/4	4.0
TPED 80-240/4	5.5
TPED 80-270/4	7.5
TPED 100-60/4	1.1
TPED 100-70/4	1.5
TPED 100-90/4	2.2
TPED 100-110/4	3.0
TPED 100-130/4	4.0
TPED 100-170/4	5.5
TPED 100-200/4	7.5
TPED 125-110/4	4.0
TPED 125-130/4	5.5
TPED 125-160/4	7.5
TPED 150-130/4	7.5

## 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 must be protected against voltage peaks higher than 650 V between the supply terminals. See the motor nameplate.

Grundfos motors:

You can connect all three-phase Grundfos motors from frame size 90 and up to a frequency converter.

The connection of a frequency converter often has the effect that the motor insulation system is loaded more and that the motor is 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 37 kW and 6-pole motors from 30 kW, one of the motor bearings must be electrically isolated to prevent damaging currents from passing through the motor bearings.

In the case of noise-critical applications, reduce the motor noise by fitting a dU/dt filter between the motor and the frequency converter. In particularly noise-critical applications, we recommend that you fit a sinusoidal filter.

The length of the cable between the motor and frequency converter affects the motor load. Therefore, check that the cable length meets the specifications laid down by the frequency converter supplier.

For supply voltages between 500 and 690 V, fit either a dU/dt filter to reduce voltage peaks or use a motor with reinforced insulation.

For supply voltages of 690 V, use a motor with reinforced insulation, and fit a dU/dt filter.

For other motor makes than Grundfos, contact Grundfos or the motor manufacturer.

## 21. Motors with built-in frequency converters

### Motors for TPE, TPE2 and TPE3 pumps fitted with 2-pole motors from 0.12 - 11 kW and 4-pole motors from 0.12 - 7.5 kW

#### Single-phase supply voltage

1 x 200-240 V - 10 %/+ 10 %, 50/60 Hz, PE.

#### Recommended fuse size

Motor size [kW]	Min. [A]	Max. [A]
0.12 - 0.75	6	10
1.1 - 1.5	10	16

You can use standard as well as quick-blow or slow-blow fuses.

#### Leakage current

Earth leakage current less than 3.5 mA, AC.

Earth leakage current less than 10 mA, DC.

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

#### Three-phase supply voltage

3 x 380-500 V - 10 %/+ 10 %, 50/60 Hz, PE.

#### Recommended fuse size

Motor size [kW]	Min. [A]	Max. [A]
0.12 - 1.1	6	6
1.5	6	10
2.2	6	16
3	10	16
4	13	16
5.5	16	32
7.5	20	32
11	32	32

You can use standard as well as quick-blow or slow-blow fuses.

#### Leakage current, AC

Speed [min <sup>-1</sup> ]	Power [kW]	Mains voltage [V]	Leakage current [mA]
1400-2000 1450-2200	0.12 - 1.5	≤ 400	< 3.5
		> 400	< 5
	2.2 - 4	≤ 400	< 3.5
		> 400	< 3.5
5.5 - 7.5	≤ 400	< 3.5	
	> 400	< 5	
2900-4000	0.25 - 2.2	≤ 400	< 3.5
		> 400	< 5
	3 - 5.5	≤ 400	< 3.5
		> 400	< 3.5
	7.5 - 11	≤ 400	< 3.5
		> 400	< 5
4000-5900	0.25 - 2.2	≤ 400	< 3.5
		> 400	< 5
	3 - 5.5	≤ 400	< 3.5
		> 400	< 3.5
	7.5 - 11	≤ 400	< 3.5
		> 400	< 5

The leakage currents are measured without any load on the shaft and in accordance with EN 61800-5-1:2007.

#### Inputs and outputs

##### Earth reference, GND

All voltages refer to GND.

All currents return to GND.

##### Absolute maximum voltage and current limits

Exceeding the following electrical limits may result in severely reduced operating reliability and motor life:

Relay 1:

Maximum contact load: 250 VAC, 2 A or 30 VDC, 2 A.

Relay 2:

Maximum contact load: 30 VDC, 2 A.

GENI terminals: -5.5 to 9.0 VDC or less than 25 mADC.

Other input or output terminals: -0.5 to 26 VDC or less than 15 mADC.

**Digital inputs, DI**

Internal pull-up current greater than 10 mA at  $V_i$  equal to 0 VDC.

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

Low logic level:  $V_i$  less than 1.5 VDC.

High logic level:  $V_i$  greater than 3.0 VDC.

Hysteresis: No.

Screened cable: 0.5 - 1.5 mm<sup>2</sup>, 28-16 AWG.

Maximum cable length: 500 m.

**Open-collector digital outputs, OC**

Current sinking capability: 75 mADC, no current sourcing.

Load types: Resistive or/and inductive.

Low-state output voltage at 75 mADC: Maximum 1.2 VDC.

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

Overcurrent protection: Yes.

Screened cable: 0.5 - 1.5 mm<sup>2</sup>, 28-16 AWG.

Maximum cable length: 500 m.

**Analog inputs, AI**

Voltage signal ranges:

- 0.5 - 3.5 VDC, AL AU.
- 0-5 VDC, AU.
- 0-10 VDC, AU.

Voltage signal:  $R_i$  greater than 100 k $\Omega$  at 25 °C.

Leak currents may occur at high operating temperatures. Keep the source impedance low.

Current signal ranges:

- 0-20 mADC, AU.
- 4-20 mADC, AL AU.

Current signal:  $R_i$  equal to 292  $\Omega$ .

Current overload protection: Yes. Change to voltage signal.

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

Screened cable: 0.5 - 1.5 mm<sup>2</sup>, 28-16 AWG.

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

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

Use maximum 10 k $\Omega$ .

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 k $\Omega$ .
- Short-circuit protection: Yes.

Current signal:

- Ranges: 0-20 and 4-20 mADC.
- Maximum load between AO and GND: 500  $\Omega$ .
- Open-circuit protection: Yes.

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

Screened cable: 0.5 - 1.5 mm<sup>2</sup>, 28-16 AWG.

Maximum cable length: 500 m.

**Pt100/1000 inputs, PT**

Temperature range:

- Minimum -30 °C. 88  $\Omega$  / 882  $\Omega$ .
- Maximum 180 °C. 168  $\Omega$  / 1685  $\Omega$ .

Measurement tolerance:  $\pm$  1.5 °C.

Measurement resolution: < 0.3 °C.

Automatic range detection, Pt100 or Pt1000: Yes.

Sensor fault alarm: Yes.

Screened cable: 0.5 - 1.5 mm<sup>2</sup>, 28-16 AWG.

Use Pt100 for short wires.

Use Pt1000 for long wires.

**LiqTec sensor inputs\***

Use Grundfos LiqTec sensor only.

Screened cable: 0.5 - 1.5 mm<sup>2</sup>, 28-16 AWG.

**Grundfos Digital Sensor input and output, GDS\***

Use Grundfos Digital Sensor only.

\* Only applicable for TPE, TPED Series 2000 and TPE3, TPE3 D pumps.

**Power supplies****+5 V:**

- Output voltage: 5 VDC - 5 %/+ 5 %.
- Maximum current: 50 mADC, sourcing only.
- Overload protection: Yes.

**+24 V:**

- Output voltage: 24 VDC - 5 %/+ 5 %.
- Maximum current: 60 mADC, sourcing only.
- Overload protection: Yes.

**Digital outputs, relays**

Potential-free changeover contacts.

Minimum contact load when in use: 5 VDC, 10 mA.

Screened cable: 0.5 - 2.5 mm<sup>2</sup>, 28-12 AWG.

Maximum cable length: 500 m.

**Bus input**

Grundfos GENIbus protocol, RS-485.

Screened 3-core cable: 0.5 - 1.5 mm<sup>2</sup>, 28-16 AWG.

Maximum cable length: 500 m.

### EMC, electromagnetic compatibility

Standard used: EN 61800-3.

The table below shows the emission category of the motor.

C1 fulfils the requirements for residential areas.

**Note:** When connected to a public network, 11 kW motors do not comply with the partial weighted harmonic distortion (PWHd) requirements of EN 61000-3-12. If required by the distribution network operator, compliance can be obtained in the following way:

The impedance of the mains cables between the motor and the point of common coupling (PCC) must be equivalent to the impedance of a 50 m cable with a cross-section of 0.5 mm.

C3 fulfils the requirements for industrial areas.

**Note:** When the motors are installed in residential areas, supplementary measures may be required as the motors may cause radio interference.

Motor [kW]	Emission category	
	1450-2000 min <sup>-1</sup>	2900-4000 min <sup>-1</sup> 4000-5900 min <sup>-1</sup>
0.12	C1	C1
0.25	C1	C1
0.37	C1	C1
0.55	C1	C1
0.75	C1	C1
1.1	C1	C1
1.5	C1	C1
2.2	C1	C1
3	C1	C1
4	C1	C1
5.5	C3/C1*	C1
7.5	C3/C1*	C3/C1*
11	-	C3/C1*

\* C1, if equipped with an external Grundfos EMC filter.

Immunity: The motor fulfils the requirements for industrial areas.

Contact Grundfos for further information.

### Enclosure class

Standard: IP55 (IEC 34-5).

Optional: IP66 (IEC 34-5).

### Insulation class

F (IEC 85).

### Ambient temperature

During operation: -20 to 50 °C.

During storage and transportation: -30 to 60 °C.

### Standby power consumption

5-10 W.

### Cable entries

Motor [kW]	Number and size of cable entries		
	TPE, TPED Series 1000 and 2000		TPE2, TPE2 D, TPE3, TPE3 D
	1400-2000 min <sup>-1</sup> 1450-2200 min <sup>-1</sup>	2900-4000 min <sup>-1</sup>	
0.12 - 1.5	4 x M20	4 x M20	4 x M20
2.2	1 x M25 + 4 x M20	4 x M20	
3.0 - 4.0	1 x M25 + 4 x M20	1 x M25 + 4 x M20	4 x M20
5.5	1 x M32 + 5 x M20	1 x M25 + 4 x M20	
7.5 - 11	1 x M32 + 5 x M20	1 x M32 + 5 x M20	

### Sound pressure level

#### TPE, TPED Series 1000 and 2000

Motor [kW]	Maximum speed stated on nameplate [min <sup>-1</sup> ]	Speed [min <sup>-1</sup> ]	Sound pressure level ISO 3743 [dB(A)]	
			1-phase motors	3-phase motors
			0.12 - 0.75	2000
2000	43	43		
1.1	2000	3000	50	50
		4000	60	60
	4000	1500	37	37
		2000	43	43
1.5	2000	3000	50	50
		4000	60	60
	4000	1500	42	42
		2000	47	47
2.2	2000	3000	57	57
		4000	64	64
	4000	1500	48	48
		2000	55	55
3	2000	3000	60	60
		4000	69	69
	4000	1500	48	48
		2000	55	55
4	2000	3000	61	61
		4000	69	69
	4000	1500	58	58
		2000	61	61
5.5	2000	3000	61	61
		4000	69	69
	4000	1500	58	58
		2000	61	61
7.5	2000	3000	66	66
		4000	73	73
	4000	1500	58	58
		2000	61	61
11	4000	3000	66	66
		4000	73	73

The grey fields indicate that the motor is not available in this MGE motor range.

**TPE2, TPE2 D, TPE3, TPE3 D**

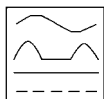
Pump size	Sound pressure level ISO 3743 [dB(A)]
TPE2/TPE3 32-80	55
TPE2/TPE3 32-120	60
TPE2/TPE3 32-150	65
TPE2/TPE3 32-180	66
TPE2/TPE3 32-200	66
TPE2/TPE3 40-80	52
TPE2/TPE3 40-120	59
TPE2/TPE3 40-150	60
TPE2/TPE3 40-180	63
TPE2/TPE3 40-200	65
TPE2/TPE3 40-240	66
TPE2/TPE3 50-60	48
TPE2/TPE3 50-80	56
TPE2/TPE3 50-120	60
TPE2/TPE3 50-150	60
TPE2/TPE3 50-180	63
TPE2/TPE3 50-200	64
TPE2/TPE3 50-240	66
TPE2/TPE3 65-60	44
TPE2/TPE3 65-80	51
TPE2/TPE3 65-120	59
TPE2/TPE3 65-150	62
TPE2/TPE3 65-180	62
TPE2/TPE3 65-200	62
TPE2/TPE3 80-40	43
TPE2/TPE3 80-120	53
TPE2/TPE3 80-150	62
TPE2/TPE3 80-180	64
TPE2/TPE3 100-40	43
TPE2/TPE3 100-120	53
TPE2/TPE3 100-150	62
TPE2/TPE3 100-180	64

**Motor protection**

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

**Additional protection**

The residual-current circuit breaker must be marked with the following symbol:



The total leakage current of all the electrical equipment in the installation must be taken into account. You find the leakage current of the motor in *Leakage current* and *Leakage current, AC*, see page 139.

This product can cause a direct current in the protective-earth conductor.

**Overvoltage and undervoltage protection**

Overvoltage and undervoltage may occur in case of unstable power supply or a faulty installation. The motor is stopped if the voltage falls outside the permissible voltage range. The motor restarts automatically when the voltage is again within the permissible voltage range. Therefore, no additional protection relay is required.

**Note:** The motor is protected against transients from the power supply according to EN 61800-3. In areas with high lightning intensity, we recommend external lightning protection.

**Overload protection**

If the upper load limit is exceeded, the motor automatically compensates for this by reducing the speed and stops if the overload condition persists.

The motor remains stopped for a set period. After this period, the motor automatically attempts to restart. The overload protection prevents damage to the motor. Consequently, no additional motor protection is required.

**Overtemperature protection**

The electronic unit has a built-in temperature sensor as an additional protection. When the temperature rises above a certain level, the motor automatically compensates for this by reducing the speed and stops if the temperature keeps rising. The motor remains stopped for a set period. After this period, the motor automatically attempts to restart.

**Protection against phase unbalance**

Three-phase motors must be connected to a power supply with a quality corresponding to IEC 60146-1-1, class C, to ensure correct motor operation at phase unbalance. This also ensures long life of the components.

**Maximum number of starts and stops**

The number of starts and stops via the power supply must not exceed four times per hour.

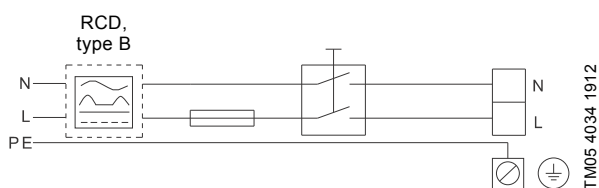
When switched on via the power supply, the pump starts after approximately 5 seconds.

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

When you start a pump via an external on/off switch, the pump starts immediately.

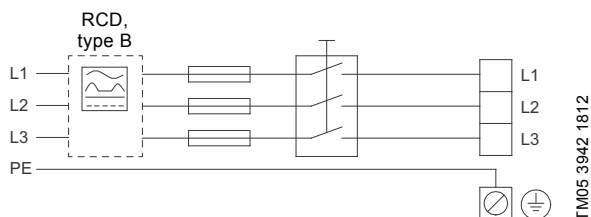
## Wiring diagrams

Single-phase supply:



**Fig. 117** Example of a mains-connected motor with main switch, backup fuse and additional protection

Three-phase supply:



**Fig. 118** Example of a mains-connected motor with main 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.

### Connection terminals, advanced functional module, FM 300

The advanced module has these connections:

- three analog inputs
- one analog output
- two dedicated digital inputs
- two configurable digital inputs or open-collector outputs
- Input and output for Grundfos Digital Sensor  
Not applicable for TPE, TPED Series 1000 and TPE2, TPE2 D pumps.  
The factory-fitted differential-pressure sensor for TPE, TPED Series 2000 and TPE3, TPE3 D pumps is connected to this input.
- two Pt100/1000 inputs
- two LiqTec sensor inputs
- two signal relay outputs
- GENIbus connection.

See fig. 119.

**Note:** Digital input 1 is factory-set to be start-stop input where open circuit results in stop. A jumper has been factory-fitted between terminals 2 and 6. Remove the jumper if digital input 1 is to be used as external start-stop or any other external function.

### Inputs and outputs

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

### Signal relay outputs

– Signal relay 1:

LIVE:

You can connect supply voltages up to 250 VAC.

PELV:

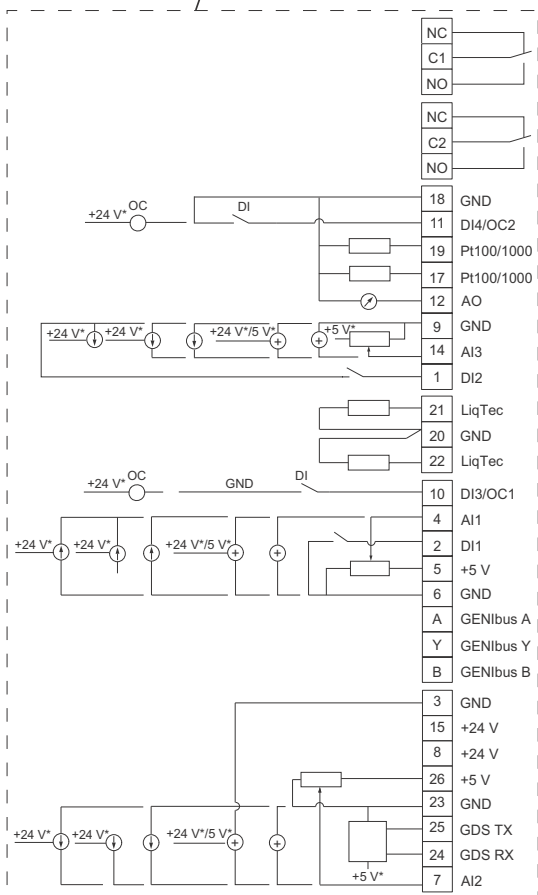
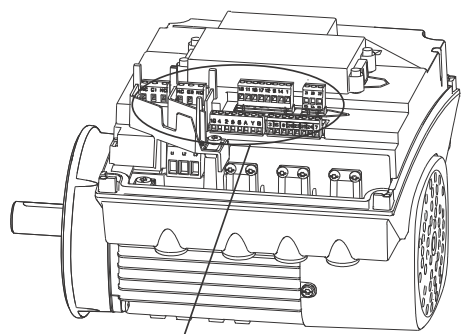
The output is galvanically separated from other circuits. Therefore, you can connect the supply voltage or protective extra-low voltage to the output as desired.

– Signal relay 2:

PELV:

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

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



TM05 3509 3512

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

Fig. 119 Connection terminals, FM 300, option

Terminal	Type	Function
NC	Normally closed contact	Signal relay 1 LIVE or PELV
C1	Common	
NO	Normally open contact	
NC	Normally closed contact	Signal relay 2 PELV only
C2	Common	
NO	Normally open contact	
18	GND	Earth
11	DI4/OC2	Digital input/output, configurable. Open collector: Maximum 24 V resistive or inductive.
19	Pt100/1000 input 2	Pt100/1000 sensor input
17	Pt100/1000 input 1	Pt100/1000 sensor input
12	AO	Analog output: 0-20 mA / 4-20 mA 0-10 V
9	GND	Earth
14	AI3	Analog input: 0-20 mA / 4-20 mA 0-10 V
1	DI2	Digital input, configurable
21	LiqTec sensor input 1	LiqTec sensor input White conductor
20	GND	Earth Brown and black conductors
22	LiqTec sensor input 2	LiqTec sensor input Blue conductor
10	DI3/OC1	Digital input/output, configurable. Open collector: Max. 24 V resistive or inductive.
4	AI1	Analog input: 0-20 mA / 4-20 mA 0.5 - 3.5 V / 0-5 V / 0-10 V
2	DI1	Digital input, configurable
5	+5 V	Supply to potentiometer and sensor
6	GND	Earth
A	GENIbus, A	GENIbus, A (+)
Y	GENIbus, Y	GENIbus, GND
B	GENIbus, B	GENIbus, B (-)
3	GND	Earth
15	+24 V	Supply
8	+24 V	Supply
26	+5 V	Supply to potentiometer and sensor
23	GND	Earth
25	GDS TX	Grundfos Digital Sensor output
24	GDS RX	Grundfos Digital Sensor input
7	AI2	Analog input: 0-20 mA / 4-20 mA 0.5 - 3.5 V / 0-5 V / 0-10 V



## MGE motors, 11 to 18.5 kW, 4-pole, and 15 to 22 kW, 2-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 11 to 18.5 kW, 4-pole, and 15 to 22 kW, 2-pole.

### Supply voltage

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

### Backup fuse

Motor size [kW]	Maximum fuse [A]
11	26
15	36
18.5	43
22	51

You can use standard as well as quick-blow or slow-blow fuses.

### Leakage current

Motor size [kW]	Leakage current [mA]
11-22	> 10

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

## Input and output

### Start-stop

- External potential-free switch.  
Voltage: 5 VDC.  
Current: Less than 5 mA.  
Screened cable: 0.5 - 1.5 mm<sup>2</sup>, 28-16 AWG.

### Digital input

- External potential-free switch.  
Voltage: 5 VDC.  
Current: Less than 5 mA.  
Screened cable: 0.5 - 1.5 mm<sup>2</sup>, 28-16 AWG.

### Setpoint signals

- Potentiometer  
0-10 VDC, 10 kΩ via internal voltage supply.  
Screened cable: 0.5 - 1.5 mm<sup>2</sup>, 28-16 AWG.  
Maximum cable length: 100 m.
- Voltage signal  
0-10 VDC, R<sub>i</sub> greater than 50 kΩ.  
Tolerance: + 0/- 3 % at maximum voltage signal.  
Screened cable: 0.5 - 1.5 mm<sup>2</sup>, 28-16 AWG.  
Maximum cable length: 500 m.
- Current signal  
DC 0-20 mA / 4-20 mA, R<sub>i</sub> equal to 175 Ω.  
Tolerance: + 0/- 3 % at maximum current signal.  
Screened cable: 0.5 - 1.5 mm<sup>2</sup>, 28-16 AWG.  
Maximum cable length: 500 m.

### Sensor signals

- Voltage signal  
0-10 VDC, R<sub>i</sub> greater than 50 kΩ via internal voltage supply.  
Tolerance: + 0/- 3 % at maximum voltage signal.  
Screened cable: 0.5 - 1.5 mm<sup>2</sup>, 28-16 AWG.  
Maximum cable length: 500 m.
- Current signal  
DC 0-20 mA / 4-20 mA, R<sub>i</sub> equal to 175 Ω.  
Tolerance: + 0/- 3 % at maximum current signal.  
Screened cable: 0.5 - 1.5 mm<sup>2</sup>, 28-16 AWG.  
Maximum cable length: 500 m.
- Power supply to sensor  
+24 VDC, maximum 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 mm<sup>2</sup>, 28-16 AWG.  
Maximum cable length: 500 m.

### Bus input

- Grundfos GENIbus protocol, RS-485.  
Screened cable: 0.5 - 1.5 mm<sup>2</sup>, 28-16 AWG.  
Maximum cable length: 500 m.

## EMC, electromagnetic compatibility to EN 61800-3

Motor [kW]	Emission/immunity
11	<b>Emission:</b>
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	When the motors are installed in residential areas, <b>Note:</b> supplementary measures may be required as the motors may cause radio interference.
	<b>Immunity:</b> The motors fulfil the requirements for both the first and second environment.

For further information about EMC, see *Electromagnetic compatibility, EMC*, page 156.

### Enclosure class

Standard: IP55 (IEC34-5).

### Insulation class

F (IEC 85).

### Ambient temperature

During operation: -20 to +40 °C.

During storage/transport: -25 to +70 °C.

### Relative humidity

Maximum 95 %.

### Sound pressure level

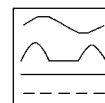
Motor [kW]	Speed stated on the nameplate [min <sup>-1</sup> ]	Sound pressure level [dB(A)]
11	1400-1500	54
	1700-1800	59
15	1400-1500	54
	1700-1800	59
	2800-3000	65
	3400-3600	70
18.5	1400-1500	65
	1700-1800	69
	2800-3000	69
	3400-3600	74
22	2800-3000	73
	3400-3600	78

### Motor protection

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

### Additional protection

The residual-current circuit breaker must be marked with the following symbol:



The total leakage current of all the electrical equipment in the installation must be taken into account. You find the leakage current of the motor in *Leakage current* and *Leakage current, AC*, see page 139.

This product can cause a direct current in the protective-earth conductor.

### Overvoltage and undervoltage protection

Overvoltage and undervoltage may occur in case of unstable power supply or a faulty installation. The motor is stopped if the voltage falls outside the permissible voltage range. The motor restarts automatically when the voltage is again within the permissible voltage range. Therefore, no additional protection relay is required.

**Note:** The motor is protected against transients from the power supply according to EN 61800-3. In areas with high lightning intensity, we recommend external lightning protection.

### Overload protection

If the upper load limit is exceeded, the motor automatically compensates for this by reducing the speed and stops if the overload condition persists. The motor remains stopped for a set period. After this period, the motor automatically attempts to restart. The overload protection prevents damage to the motor. Consequently, no additional motor protection is required.

### Overtemperature protection

The electronic unit has a built-in temperature sensor as an additional protection. When the temperature rises above a certain level, the motor automatically compensates for this by reducing the speed and stops if the temperature keeps rising. The motor remains stopped for a set period. After this period, the motor automatically attempts to restart.

### Protection against phase unbalance

Three-phase motors must be connected to a power supply with a quality corresponding to IEC 60146-1-1, class C, to ensure correct motor operation at phase unbalance. This also ensures long life of the components.

## Maximum number of starts and stops

The number of starts and stops via the power supply must not exceed four per hour.

When switched on via the power supply, the pump starts after approximately 5 seconds.

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

When you start the pump via an external on/off switch, the pump starts immediately.

## Wiring diagram, 11-22 kW

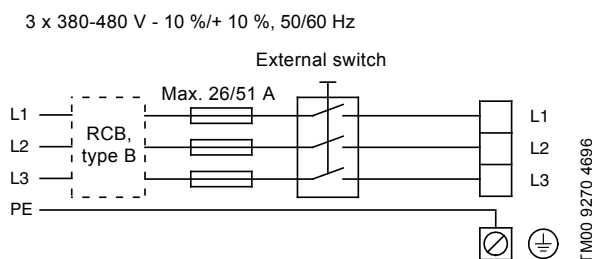


Fig. 120 Wiring diagram, three-phase MGE motors, 11-22 kW

## Other connections

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

### Group 1: Inputs

- Start or 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, you can connect the supply voltage or protective extra-low voltage 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".

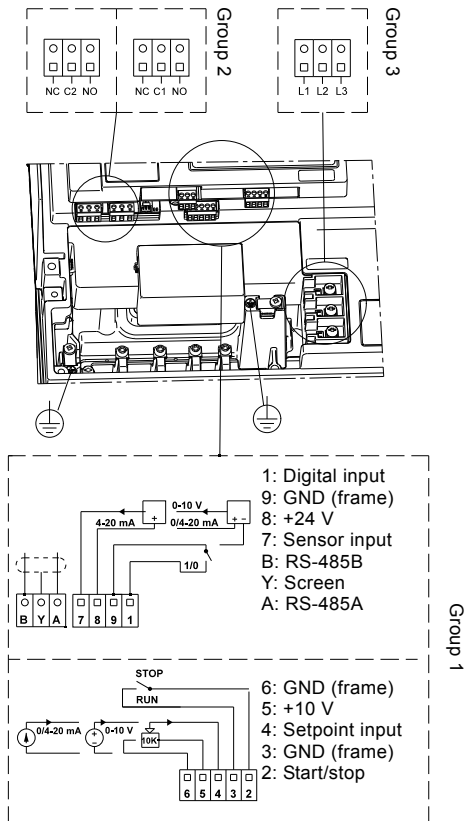


Fig. 121 Connection terminals

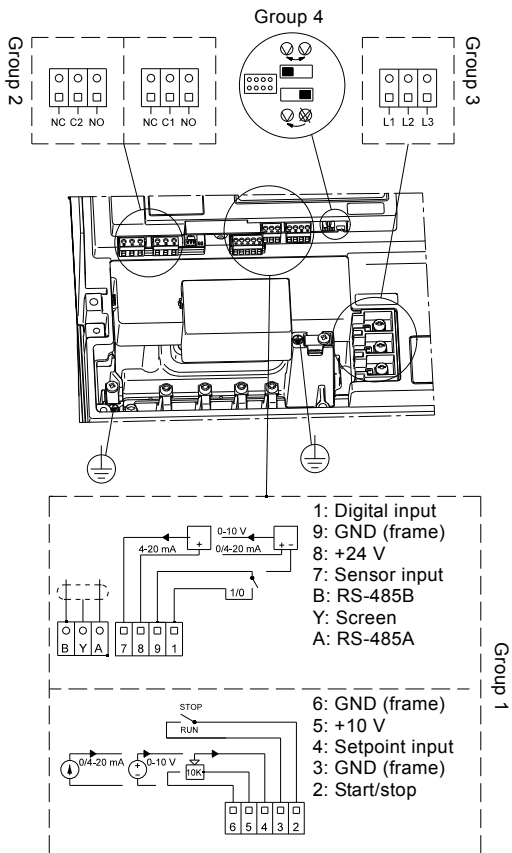


Fig. 122 Connection terminals, TPED Series 2000

### Identification of functional module

You can identify the module in one of the following ways:

#### Grundfos GO

Select the "Fitted modules" menu under "Status".

#### Pump display

If the pump is fitted with the advanced control panel, select "Fitted modules" menu under "Status".

#### Motor nameplate

You can identify the fitted module on the motor nameplate. See fig. 123.

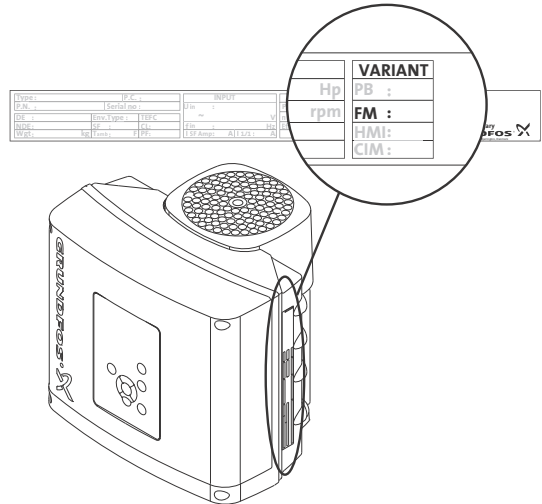


Fig. 123 Identification of functional module

Variant	Description
FM 200	Standard functional module
FM 300	Advanced functional module

TM03 8608 2007

TM03 9134 3407

TM06 1889 3314

## 22. Siemens motors with integrated CUE frequency converters 30-55 kW, 2-pole and 22-55 kW, 4-pole

TPE pumps 30-55 kW, 2-pole and 22-55 kW, 4-pole have Siemens motors with integrated CUE frequency converters. The frequency converter part of the TPE Series 2000 and TPE Series1000 will in the following descriptions be named as CUE.

### Technical data

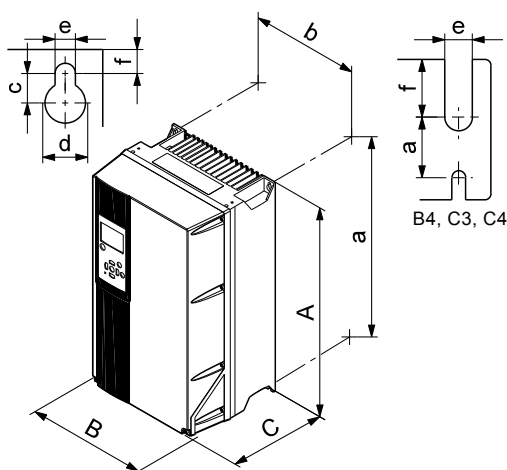
#### Enclosure

P2 [kW]	Enclosure
22	B2
30	
37	
45	C1
55	

Enclosure	Standard gland holes
B2 IP55	1 x 21.5
	1 x 26.3
	1 x 33.1
	2 x 42.9

#### Main dimensions and weights



TM03 9002 2807

Fig. 124 Enclosures B2 and C1

1) The dimensions are maximum height, width and depth.

#### Surroundings

Relative humidity	5-95 % RH
Ambient temperature	Max. 50 °C
Average ambient temperature over 24 hours	Max. 45 °C
Minimum ambient temperature at full operation	0 °C
Minimum ambient temperature at reduced operation	-10 °C
Temperature during storage and transportation	-25 to 65 °C
Storage duration	Max. 6 months
Maximum altitude above sea level without performance reduction	1000 m
Maximum altitude above sea level with performance reduction	3000 m

The CUE comes in a packaging which is not suitable for outdoor storage.

#### Terminal torques

Enclosure	Torque [Nm]			
	Mains	Motor	Earth	Relay
B2	4.5	4.5	3	0.6
C1	10	10	3	0.6

#### Fuses and cable cross-section

Always comply with local regulations as to cable cross-sections.

#### Cable cross-section to signal terminals

Maximum cable cross-section to signal terminals, rigid conductor	1.5 mm <sup>2</sup>
Maximum cable cross-section to signal terminals, flexible conductor	1.0 mm <sup>2</sup>
Minimum cable cross-section to signal terminals	0.5 mm <sup>2</sup>

#### Non-UL fuses and conductor cross-section to mains and motor

Typical shaft power P2 [kW]	Maximum fuse size [A]	Fuse type	Maximum conductor cross-section [mm <sup>2</sup> ]
3 x 380-420 V			
22	63	gG	35
30	80	gG	35
37	100	gG	50
45	125	gG	50
55	160	gG	50

#### Inputs and outputs

##### Mains supply (L1, L2, L3)

Supply voltage	380-420 V ± 10 %
Supply frequency	50/60 Hz
Maximum temporary imbalance between phases	3 % of rated value
Leakage current to earth	> 3.5 mA
Number of cut-ins, enclosure A	Max. 2 times/min.
Number of cut-ins, enclosures B and C	Max. 1 time/min.

Do not use the power supply for switching the CUE on and off.

##### Motor output (U, V, W)

Output voltage	0-100 % <sup>1)</sup>
Output frequency	0-100 Hz <sup>2)</sup>
Switching on output	Not recommended

1) Output voltage in % of supply voltage.

2) Depending on the pump family selected.

#### RS-485 GENibus connection

Terminal number	68 (A), 69 (B), 61 GND (Y)
-----------------	----------------------------

The RS-485 circuit is functionally separated from other central circuits and galvanically separated from the supply voltage (PELV).

## Digital inputs

Terminal number	18, 19, 32, 33
Voltage level	0-24 VDC
Voltage level, open contact	> 19 VDC
Voltage level, closed contact	< 14 VDC
Maximum voltage on input	28 VDC
Input resistance, $R_i$	Approx. 4 k $\Omega$

All digital inputs are galvanically separated from the supply voltage (PELV) and other high-voltage terminals.

## Signal relays

Relay 01, terminal number	1 (C), 2 (NO), 3 (NC)
Relay 02, terminal number	4 (C), 5 (NO), 6 (NC)
Maximum terminal load (AC-1) <sup>1)</sup>	240 VAC, 2 A
Maximum terminal load (AC-15) <sup>1)</sup>	240 VAC, 0.2 A
Maximum terminal load (DC-1) <sup>1)</sup>	50 VDC, 1 A
Minimum terminal load	24 VDC 10 mA 24 VAC 20 mA

<sup>1)</sup> IEC 60947, parts 4 and 5.

C Common

NO Normally open

NC Normally closed

The relay contacts are galvanically separated from other circuits by reinforced insulation (PELV).

## Analog inputs

Analog input 1, terminal number	53
Voltage signal	A53 = "U" <sup>1)</sup>
Voltage range	0-10 V
Input resistance, $R_i$	Approx. 10 k $\Omega$
Maximum voltage	$\pm 20$ V
Current signal	A53 = "I" <sup>1)</sup>
Current range	0-20, 4-20 mA
Input resistance, $R_i$	Approx. 200 $\Omega$
Maximum current	30 mA
Maximum fault, terminals 53, 54	0.5 % of full scale
Analog input 2, terminal number	54
Current signal	A54 = "I" <sup>1)</sup>
Current range	0-20, 4-20 mA
Input resistance, $R_i$	Approx. 200 $\Omega$
Maximum current	30 mA
Maximum fault, terminals 53, 54	0.5 % of full scale

<sup>1)</sup> The factory setting is voltage signal "U".

All analog inputs are galvanically separated from the supply voltage (PELV) and other high-voltage terminals.

## Analog output

Analog output 1, terminal number	42
Current range	0-20 mA
Maximum load to frame	500 $\Omega$
Maximum fault	0.8 % of full scale

The analog output is galvanically separated from the supply voltage (PELV) and other high-voltage terminals.

## Electrical connection

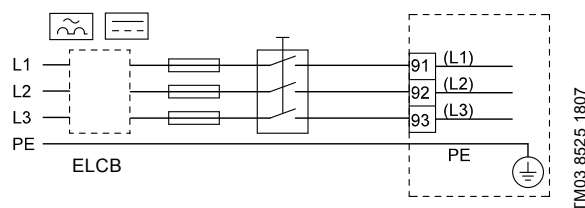


Fig. 125 Example of three-phase mains connection of the CUE with mains switch, backup fuses and additional protection

## Electrical protection

### Protection against electric shock, indirect contact

The leakage current to earth exceeds 3.5 mA, and a reinforced earth connection is required.

Protective conductors must always have a yellow/green (PE) or yellow/green/blue (PEN) colour marking.

Instructions according to EN IEC 61800-5-1:

- The CUE must be stationary, installed permanently and connected permanently to the mains supply.
- The earth connection must be carried out with duplicate protective conductors or with a single reinforced protective conductor with a cross-section of minimum 10 mm<sup>2</sup>.

### Protection against short-circuit, fuses

The CUE and the supply system must be protected against short-circuit.

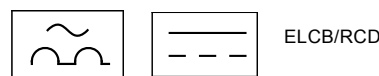
Grundfos demands that the backup fuses mentioned in section *Fuses and cable cross-section* on page 149 are used for protection against short-circuit.

The CUE offers complete short-circuit protection in case of a short-circuit on the motor output.

### Additional protection

The leakage current to earth exceeds 3.5 mA.

If the CUE is connected to an electrical installation where an earth leakage circuit breaker (ELCB) is used as additional protection, the circuit breaker must be of a type marked with the following symbols:



The circuit breaker is type B.

The total leakage current of all the electrical equipment in the installation must be taken into account.

The leakage current of the CUE in normal operation can be seen in section *Mains supply (L1, L2, L3)* on page 149.

During startup and in asymmetrical supply systems, the leakage current can be higher than normal and may cause the ELCB/RCD to trip.

**Motor protection**

The motor requires no external motor protection. The CUE protects the motor against thermal overloading and blocking.

**Protection against overcurrent**

The CUE has an internal overcurrent protection for overload protection on the motor output.

**Protection against mains voltage transients**

The CUE is protected against mains voltage transients according to EN 61800-3, second environment.

**Mains and motor connection**

The supply voltage and frequency are marked on the CUE nameplate. Make sure that the CUE is suitable for the power supply of the installation site.

**Mains switch**

A mains switch can be installed before the CUE according to local regulations. See fig. 125.

**Wiring diagram**

The wires in the terminal box must be as short as possible. Excepted from this is the protective conductor which must be so long that it is the last one to be disconnected in case the cable is inadvertently pulled out of the cable entry.

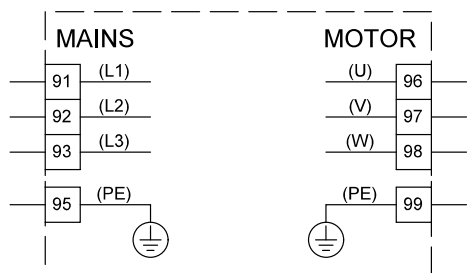


Fig. 126 Wiring diagram, three-phase mains connection

Terminal	Function
91	(L1)
92	(L2)
93	(L3)
95/99	(PE) Earth connection
96	(U)
97	(V)
98	(W)
Three-phase motor connection, 0-100 % of mains voltage	

**Enclosures B2 (22, 30 kW)**

For information about enclosures, see table in section Enclosure on page 149.

**Mains connection**

Check that mains voltage and frequency correspond to the values on the nameplate of the CUE and the motor.

1. Connect the earth conductor to terminal 95 (PE). See fig. 127.
2. Connect the mains conductors to terminals 91 (L1), 92 (L2), 93 (L3).
3. Fix the mains cable with a cable clamp.

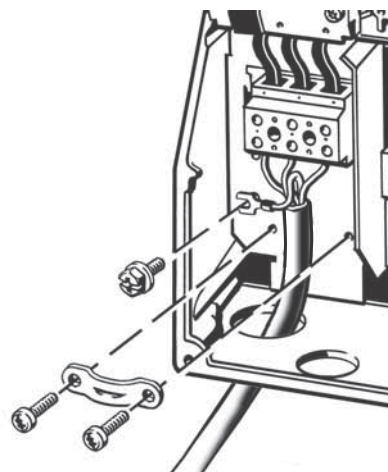


Fig. 127 Mains connection, B1 and B2

For single-phase connection, use L1 and L2.

**Motor connection (pre-installed)**

The motor cable must be screened for the CUE to meet EMC requirements.

1. Connect the earth conductor to terminal 99 (PE). See fig. 128.
2. Connect the motor conductors to terminals 96 (U), 97 (V), 98 (W).
3. Fix the screened cable with a cable clamp.

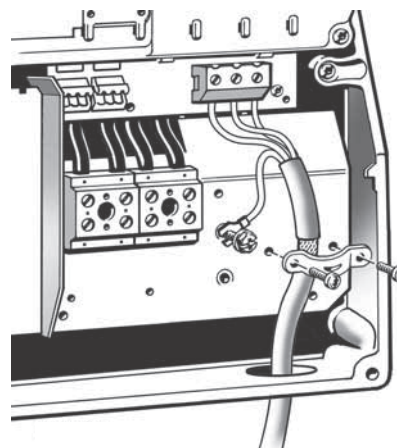


Fig. 128 Motor connection, B1 and B2

Siemens motors with integrated CUE frequency converters 30-55 kW, 2-pole and 22-55 kW, 4-pole

TM03 9019 2807

TM03 8799 2507

TM03 9020 2807

**Enclosures C1 (37, 45 and 55 kW)**

For information about enclosures, see table in section *Enclosure* on page 149.

**Mains connection**

Check that mains voltage and frequency correspond to the values on the nameplate of the CUE and the motor.

1. Connect the earth conductor to terminal 95 (PE). See fig. 129.
2. Connect the mains conductors to terminals 91 (L1), 92 (L2), 93 (L3).

**Motor connection (pre-installed)**

The motor cable must be screened for the CUE to meet EMC requirements.

1. Connect the earth conductor to terminal 99 (PE). See fig. 129.
2. Connect the motor conductors to terminals 96 (U), 97 (V), 98 (W).
3. Fix the screened cable with a cable clamp.

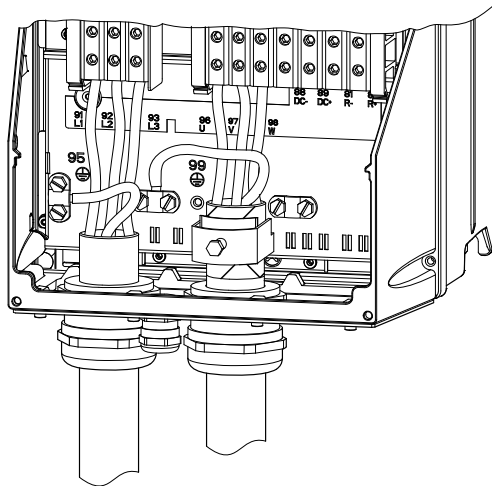


Fig. 129 Mains and motor connection, C1 and C2

TM03 9016 2807

**Connecting the signal terminals**

As a precaution, signal cables must be separated from other groups by reinforced insulation in their entire lengths.

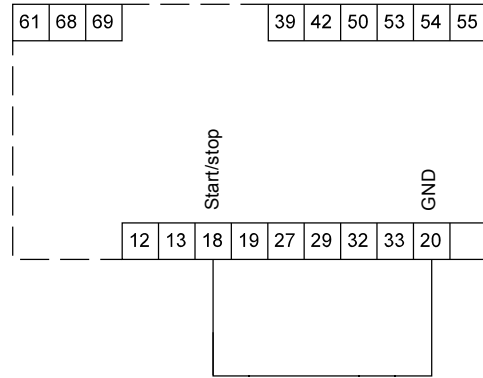
If no external on/off switch is connected, short-circuit terminals 18 and 20 using a short wire.

Connect the signal cables according to the guidelines for good practice to ensure EMC-correct installation. See *EMC-correct installation* on page 155.

- Use screened signal cables with a conductor cross-section of min. 0.5 mm<sup>2</sup> and max. 1.5 mm<sup>2</sup>.
- Use a 3-conductor screened bus cable in new systems.

**Minimum connection, signal terminal**

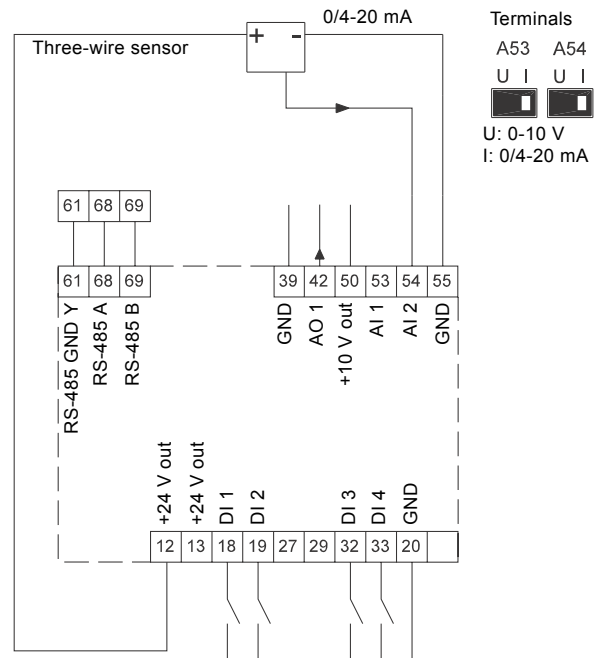
Operation is only possible when terminals 18 and 20 are connected, for instance by means of an external on/off switch or a short wire.



TM03 9057 3207

Fig. 130 Required minimum connection, signal terminal

**Wiring diagram, signal terminals**



TM06 2048 3614

Fig. 131 Wiring diagram, signal terminals

Default connections made in TPE series 1000:

- DI1 connected to GND.

Default connections made in TPE series 2000:

- DI1 connected to GND.

Three wire sensor connected, see fig. 131.



Terminal	Type	Function
12	+24 V out	Supply to sensor
13	+24 V out	Additional supply
18	DI 1	Digital input, start/stop
19	DI 2	Digital input, programmable
20	GND	Common frame for digital inputs
32	DI 3	Digital input, programmable
33	DI 4	Digital input, programmable
39	GND	Frame for analog output
42	AO 1	Analog output, 0-20 mA
50	+10 V out	Supply to potentiometer
53	AI 1	External setpoint, 0-10 V, 0/4-20 mA
54	AI 2	Sensor input, sensor 1, 0/4-20 mA
55	GND	Common frame for analog inputs
61	RS-485 GND Y	GENIbus, frame
68	RS-485 A	GENIbus, signal A (+)
69	RS-485 B	GENIbus, signal B (-)

Terminals 27 and 29 are not used.

Connect the signal cables according to the guidelines for good practice to ensure EMC-correct installation. See *EMC-correct installation* on page 155.

- Use screened signal cables with a conductor cross-section of min. 0.5 mm<sup>2</sup> and max. 1.5 mm<sup>2</sup>.

Use a 3-conductor screened bus cable in new systems.

The RS-485 screen must be connected to frame.

### Access to signal terminals

All signal terminals are behind the terminal cover of the CUE front. Remove the terminal cover as shown in figures 132.

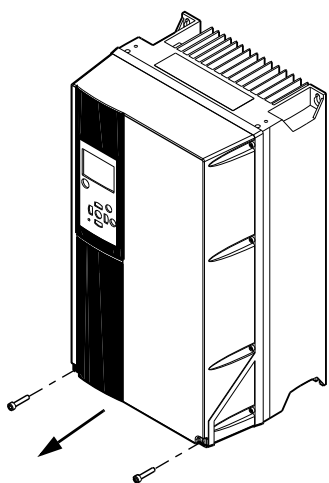


Fig. 132 Access to signal terminals, B2 and C1

TM03 9004 2807

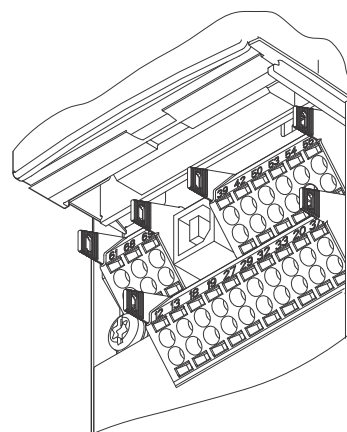


Fig. 133 Signal terminals (all enclosures)

TM03 9025 2807

### Fitting the conductor

1. Remove the insulation at a length of 9 to 10 mm.
2. Insert a screwdriver with a tip of maximum 0.4 x 2.5 mm into the square hole.
3. Insert the conductor into the corresponding round hole. Remove the screwdriver. The conductor is now fixed in the terminal.

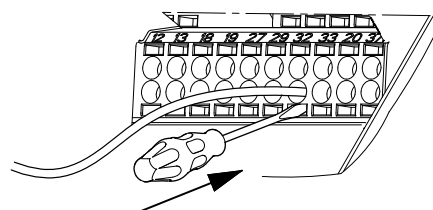


Fig. 134 Fitting the conductor into the signal terminal

TM03 9026 2807

### Setting the analog inputs, terminals 53 and 54

Contacts A53 and A54 are positioned behind the control panel and used for setting the signal type of the two analog inputs.

The factory setting of the inputs is voltage signal "U". If a 0/4-20 mA sensor is connected to terminal 54, the input must be set to current signal "I".

Switch off the power supply before setting contact A54. Remove the control panel to set the contact. See fig. 135.

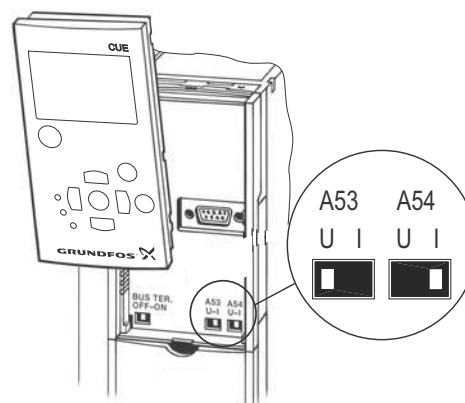
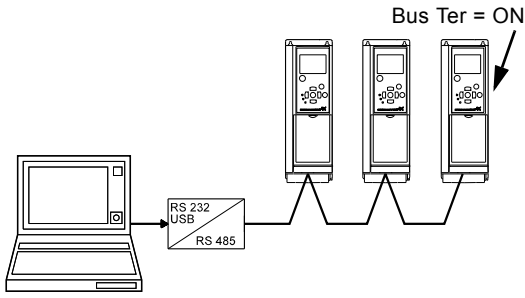


Fig. 135 Setting contact A54 to current signal "I"

TM03 9104 3407

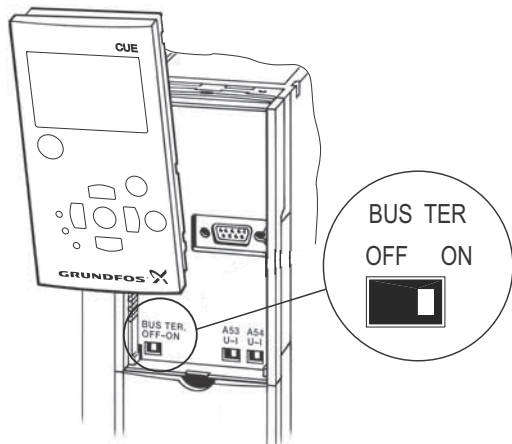
**RS-485 GENIbus network connection**

One or more CUE units can be connected to a control unit via GENIbus. See the example in fig. 136.



**Fig. 136** Example of an RS-485 GENIbus network

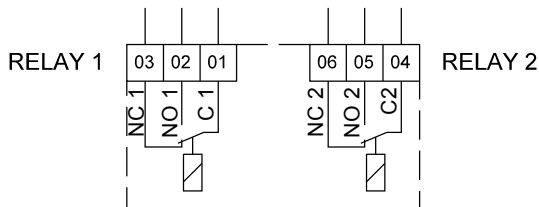
The reference potential, GND, for RS-485 (Y) communication must be connected to terminal 61. If more than one CUE unit is connected to a GENIbus network, the termination contact of the last CUE must be set to "ON" (termination of the RS-485 port). The factory setting of the termination contact is "OFF" (not terminated). Remove the control panel to set the contact. See fig. 137.



**Fig. 137** Setting the termination contact to "ON"

**Connecting the signal relays**

As a precaution, signal cables must be separated from other groups by reinforced insulation in their entire lengths.

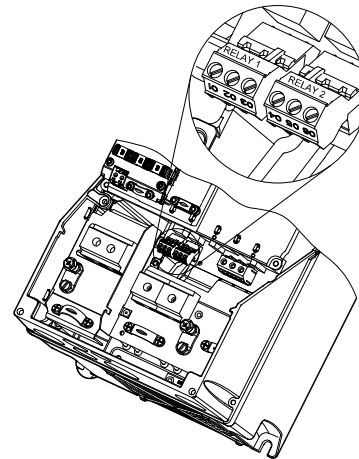


**Fig. 138** Terminals for signal relays in normal state (not activated)

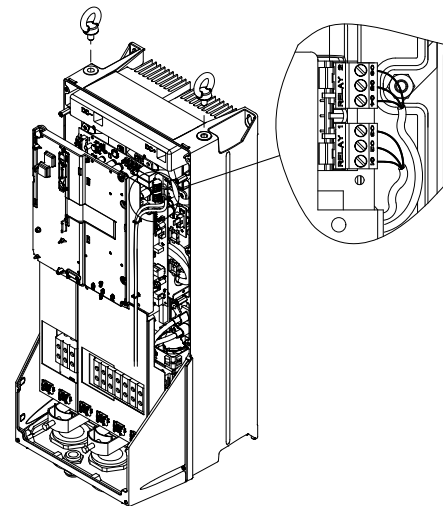
Terminal	Function	
C 1	C 2	Common
NO 1	NO 2	Normally open contact
NC 1	NC 2	Normally closed contact

**Access to signal relays**

The relay outputs are positioned as shown in figures 139 to 140.



**Fig. 139** Terminals for relay connection, A4, A5, B1 and B2



**Fig. 140** Terminals for relay connection, C1 and C2

### EMC-correct installation

This section provides guidelines for good practice when installing the CUE. Follow these guidelines to meet EN 61800-3, first environment.

- Use only motor and signal cables with a braided metal screen in applications without output filter.
- There are no special requirements to supply cables, apart from local requirements.
- Leave the screen as close to the connecting terminals as possible. See fig. 141.
- Avoid terminating the screen by twisting the ends. See fig. 142. Use cable clamps or EMC screwed cable entries instead.
- Connect the screen to frame at both ends for both motor and signal cables. See fig. 143. If the controller has no cable clamps, connect only the screen to the CUE. See fig. 144.
- Avoid unscreened motor and signal cables in electrical cabinets with frequency converters.
- Make the motor cable as short as possible in applications without output filter to limit the noise level and minimise leakage currents.
- Screws for frame connections must always be tightened whether a cable is connected or not.
- Keep main cables, motor cables and signal cables separated in the installation, if possible.

Other installation methods may give similar EMC results if the above guidelines for good practice are followed.

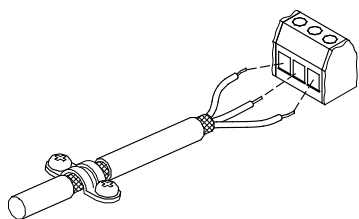


Fig. 141 Example of stripped cable with screen

TM02 1325 0901

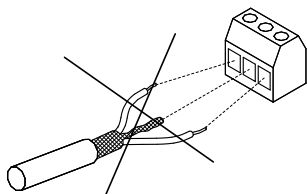


Fig. 142 Do not twist the screen ends

TM03 8812 2507

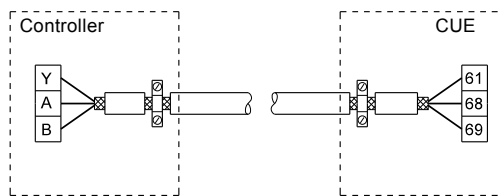


Fig. 143 Example of connection of a 3-conductor bus cable with screen connected at both ends

TM03 8732 2407

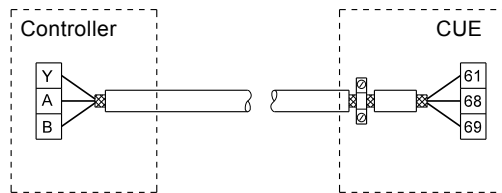


Fig. 144 Example of connection of a 3-conductor bus cable with screen connected at the CUE (controller with no cable clamps)

TM03 8731 2407

### RFI filters

To meet the EMC requirements, the CUE comes with the following types of built-in radio frequency interference filter (RFI).

Voltage [V]	Typical shaft power P2 [kW]	RFI filter type
3 x 380-500	22-55	C1

#### Description of RFI filter types

C1: For use in domestic areas.

## 23. Electromagnetic compatibility, EMC

### Electromagnetic compatibility and proper installation

#### General information

The growing use of electric or electronic controls and electronic equipment including PLCs and computers within all business areas require these products to fulfil the existing standards within electromagnetic compatibility. Make sure that the equipment is mounted properly.

This section deals with these issues.

#### What is electromagnetic compatibility

Electromagnetic compatibility is the ability of an electric or electronic device to function in a given electromagnetic environment without disturbing the surroundings and without being disturbed by other devices in the surroundings. Electromagnetic compatibility 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 or TV.

#### Immunity

Immunity is the ability of a device 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 or mobile phones.

### E-pumps and electromagnetic compatibility

All Grundfos E-pumps are CE- and C-tick-marked indicating that the product is designed to meet the EMC requirements defined by the 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 limits the amount of electrical noise which the E-pump emits to the mains supply network (emission). All remaining inputs included in the electronic unit are also 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 to install E-pumps

You can use all E-pumps with built-in frequency converter motors 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 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.

## Electromagnetic compatibility 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

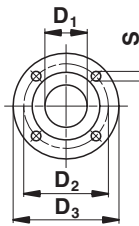
Practice shows that large cable loops are often made inside the terminal box to get some "spare cable". Of course, this can be useful. However, with regard to electromagnetic compatibility, it is a poor solution as these cable loops will function as antennas inside the terminal box.

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

# 24. Flanges for TP pumps

## Flange dimensions

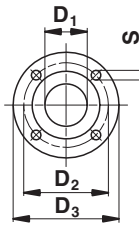
### PN 6 and PN 10 flanges



	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
<b>D<sub>1</sub></b>	32	40	50	65	80	100	32	40	50	65	80	100	125	150	200	250
<b>D<sub>2</sub></b>	90	100	110	130	150	170	100	110	125	145	160	180	210	240	295	350
<b>D<sub>3</sub></b>	120	130	140	160	190	210	140	150	165	185	200	220	250	285	340	395
<b>S</b>	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

TM02 7720 3803

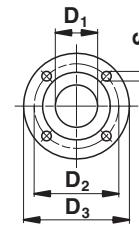
### PN 16 and PN 25 flanges



	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
<b>D<sub>1</sub></b>	32	40	50	65	80	100	125	150	200	100	125	150	200	250	300	350
<b>D<sub>2</sub></b>	100	110	125	145	160	180	210	240	295	190	220	250	310	370	430	490
<b>D<sub>3</sub></b>	140	150	165	185	200	220	250	285	340	235	270	300	360	425	485	555
<b>S</b>	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

TM02 7720 3803

### PN 40 flanges

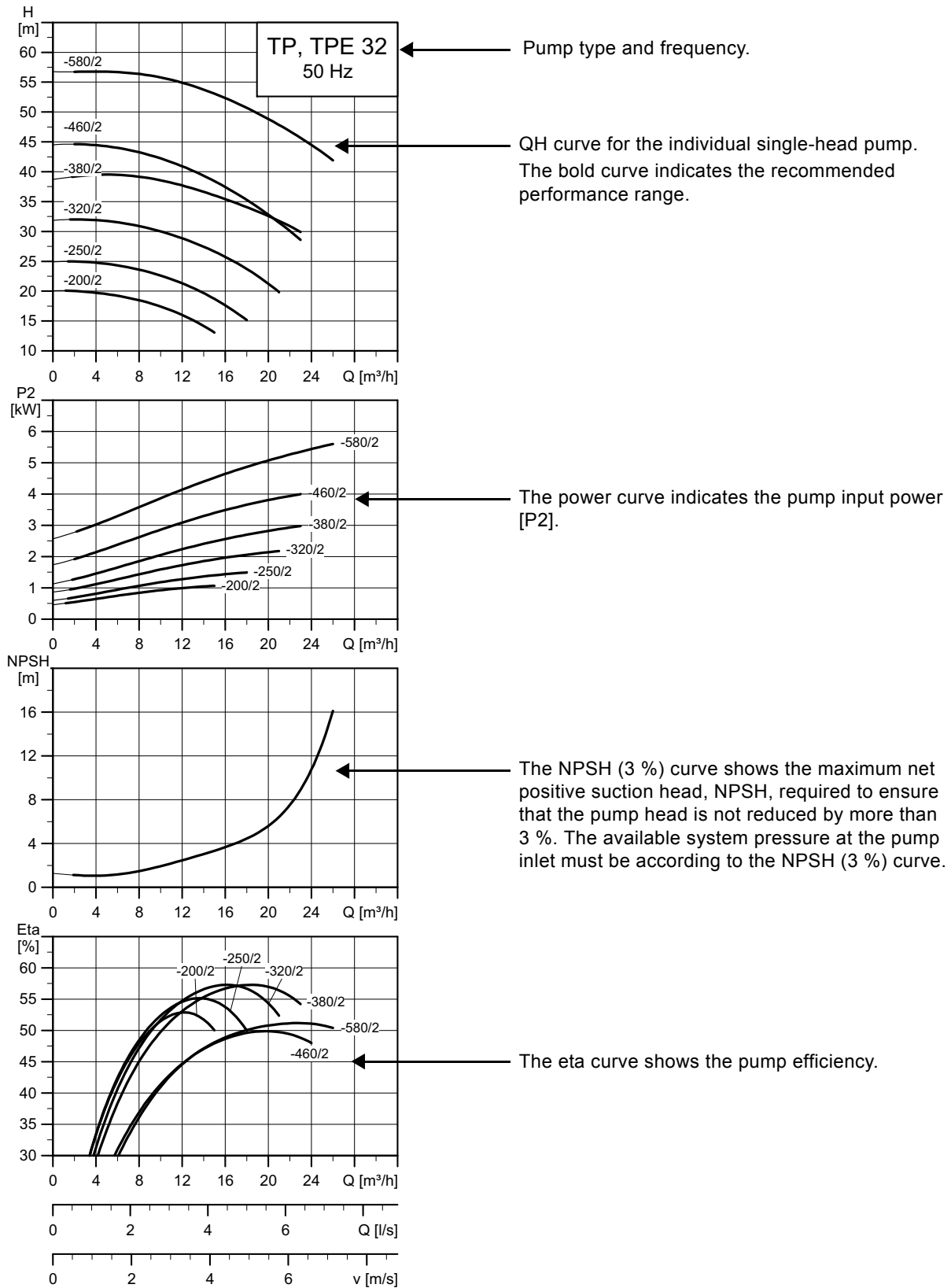


	EN/DIN 2635 PN 40 (4.0 MPa)	
	Nominal diameter (DN)	
	400	500
<b>D<sub>1</sub></b>	400	500
<b>D<sub>2</sub></b>	585	670
<b>D<sub>3</sub></b>	660	755
<b>S</b>	16 x 39	20 x 42

TM02 7720 3803

## 25. Curve charts

### How to read the curve charts



TM02 5017 2115

## Curve conditions

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

- Tolerances to ISO 9906:2012 Grade 3B.
- The curves apply to the performance of **single-head three-phase pumps**. For other pump versions, please see the exact curves in Grundfos Product Center. See page 280. For other pump versions, the performance may differ for the following reasons:
  - The valve in twin-head pumps may cause losses.
  - Single-phase motors run at lower speed.

**Note:** Grundfos does not recommend continuous parallel operation of twin-head pumps, except TPE2 D, TPE3 D, due to the increased flow rate in the pump. A too high flow rate results in noisy operation, increased wear of the impeller due to cavitation, etc.
- QH curves of the individual single-head pumps are shown with expected speed of a three-phase mains-operated motor. For further information, see the tables of technical data on the following pages. The performance of the single-phase motor is slightly reduced. Please refer to Grundfos Product Center for the exact single-phase curves. See page 280.
- Curves of TPE Series 1000 pumps and TPE Series 2000 pumps are shown as nominal curves (100 % curves) only. Please refer to Grundfos Product Center for the exact curves. See page 280.
- Measurements have been made with airless water at a temperature of 20 °C.
- The curves apply to a kinematic viscosity of  $\nu$  equal to 1 mm<sup>2</sup>/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.

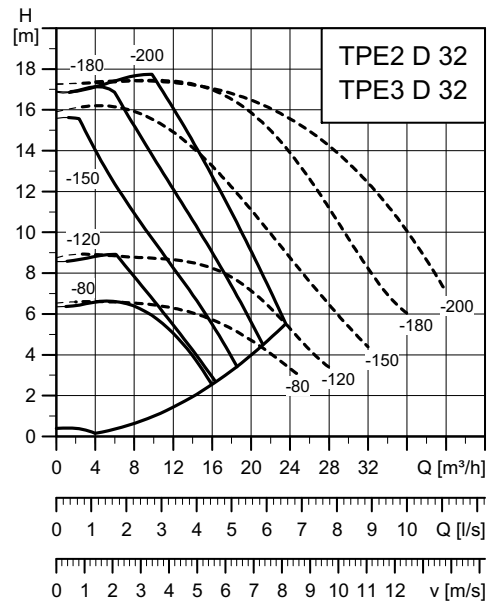
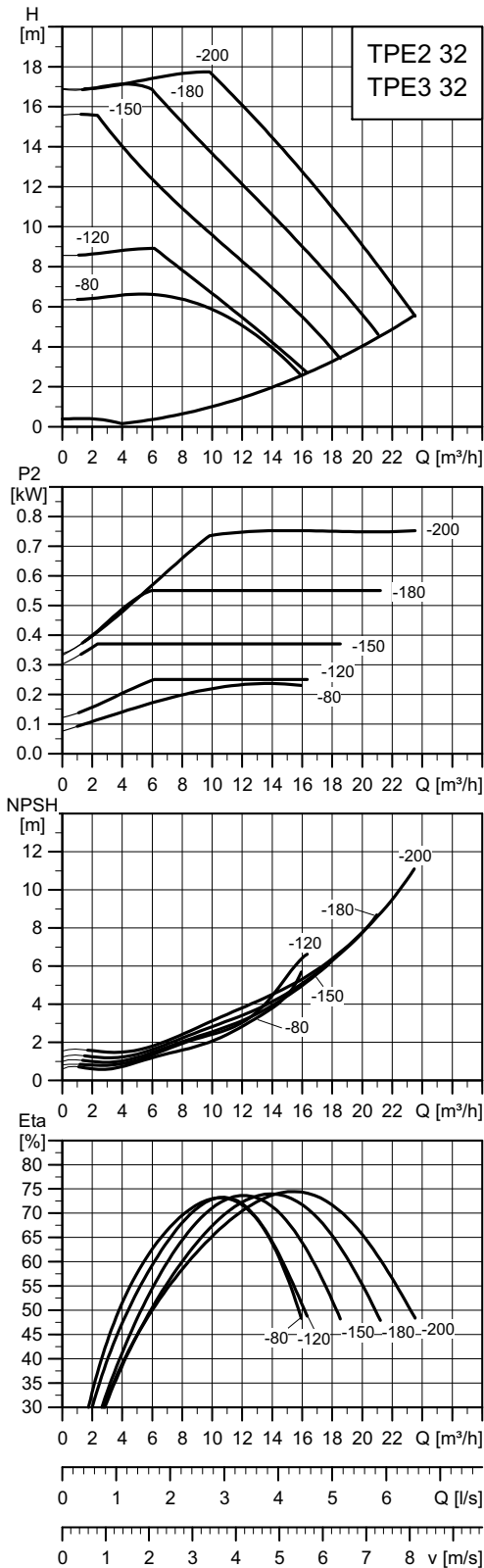




## 26. Performance curves and technical data

### TPE2, TPE2 D, TPE3, TPE3 D, PN 6, 10, 16

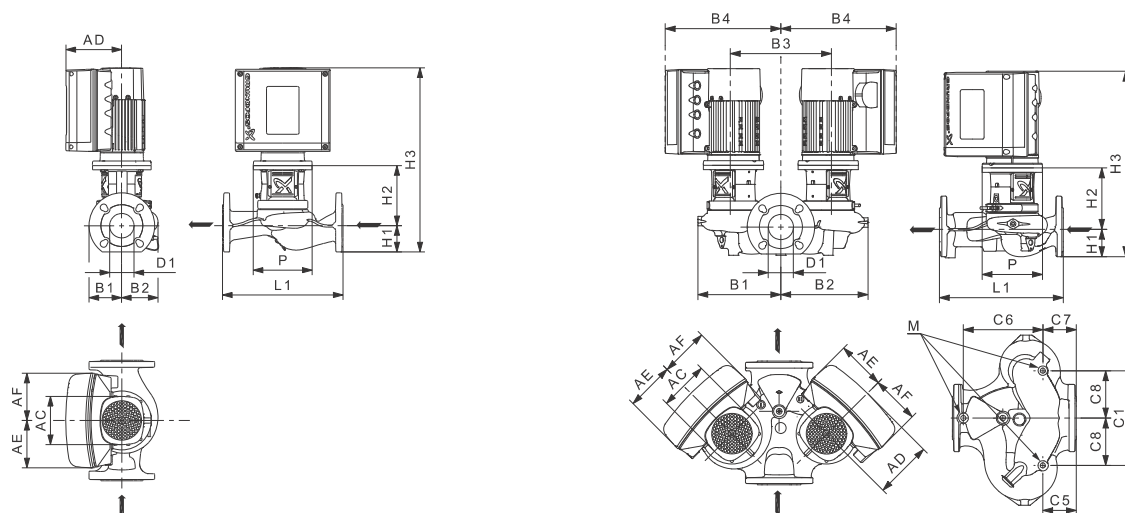
#### TPE2, TPE2 D, TPE3, TPE3 D 32



TM05 8191 2115

TM05 8171 2115

Note: The dotted QH curves apply to TPE2 D, TPE3 D in parallel operation.



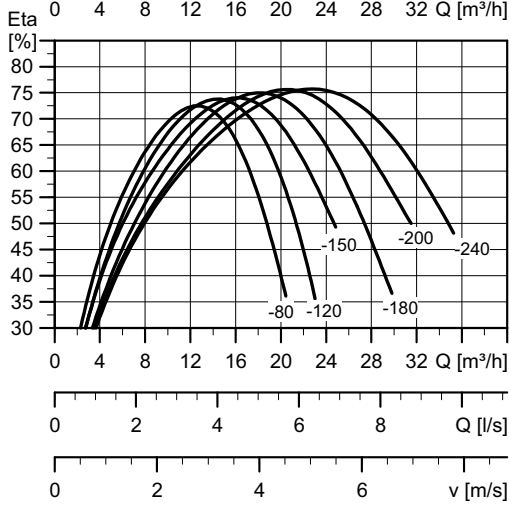
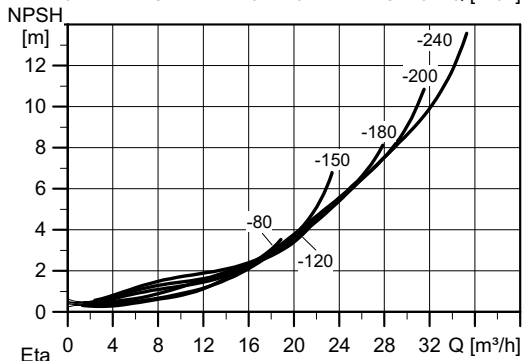
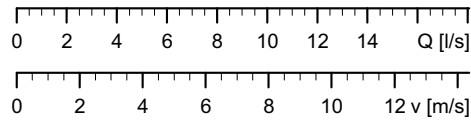
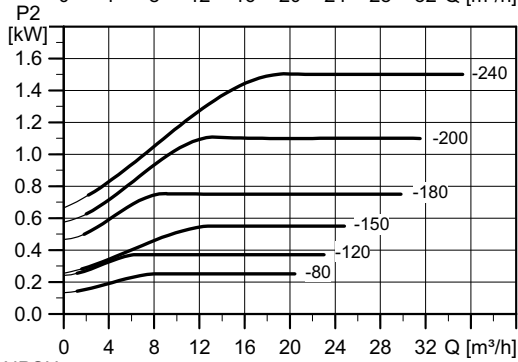
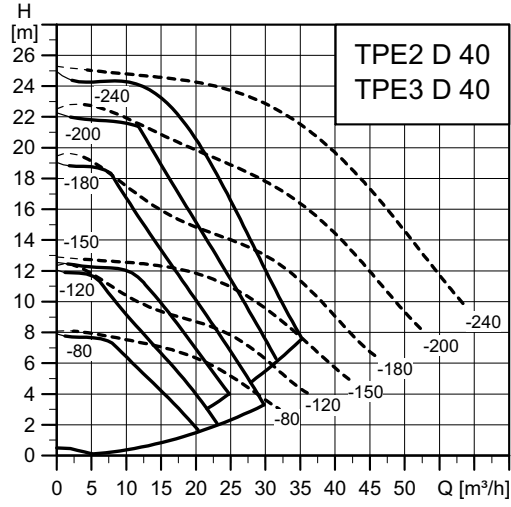
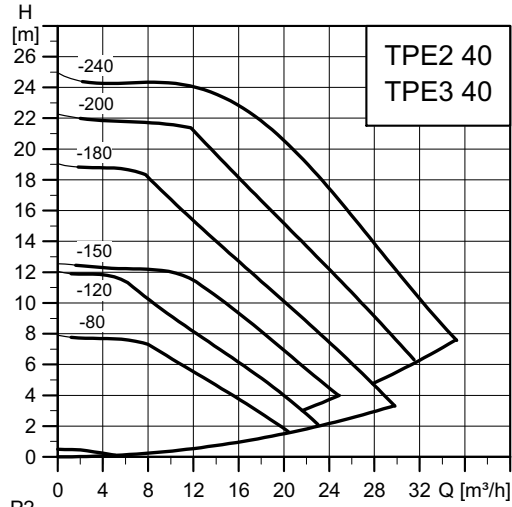
TM05 8182 4514 - TM05 8183 4514

### Technical data

TPE2, TPE3 32		-80	-120	-150	-180	-200	
TPE2, TPE3		•	•	•	•	•	
TPE2 D, TPE3 D		•	•	•	•	•	
P2	1~/3~	kW	0.25	0.25	0.37	0.55	0.75
PN			PN 6/10/16	PN 6/10/16	PN 6/10/16	PN 6/10/16	PN 6/10/16
$T_{min}; T_{max}$		[°C]	[-25;120]	[-25;120]	[-25;120]	[-25;120]	[-25;120]
D1		[mm]	32	32	32	32	32
AC	1~/3~	[mm]	122/122	122/122	122/122	122/122	122/122
AD	1~/3~	[mm]	158/158	158/158	158/158	158/158	158/158
AE	1~/3~	[mm]	106/134	106/134	106/134	106/134	106/134
AF	1~/3~	[mm]	106/134	106/134	106/134	106/134	106/134
P		[mm]	165	165	165	165	165
B1★		[mm]	73/210	73/210	73/210	73/210	73/210
B2★		[mm]	73/209	73/209	73/209	73/209	73/209
B3		[mm]	260	260	260	260	260
B4★	1~	[mm]	-/317	-/317	-/317	-/317	-/317
	3~	[mm]	-/337	-/337	-/337	-/337	-/337
C1★		[mm]	-/263	-/263	-/263	-/263	-/263
C5★		[mm]	-/50	-/50	-/50	-/50	-/50
C6★		[mm]	-/97	-/97	-/97	-/97	-/97
C7★		[mm]	-/90	-/90	-/90	-/90	-/90
C8★		[mm]	-/130	-/130	-/130	-/130	-/130
L1		[mm]	220	220	220	220	220
H1★		[mm]	65/68	65/68	65/68	65/68	65/68
H2		[mm]	159	159	159	159	159
H3★	1~	[mm]	439/442	439/442	439/442	439/442	439/442
	3~	[mm]	479/482	479/482	479/482	479/482	479/482
M			M12	M12	M12	M12	M12

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

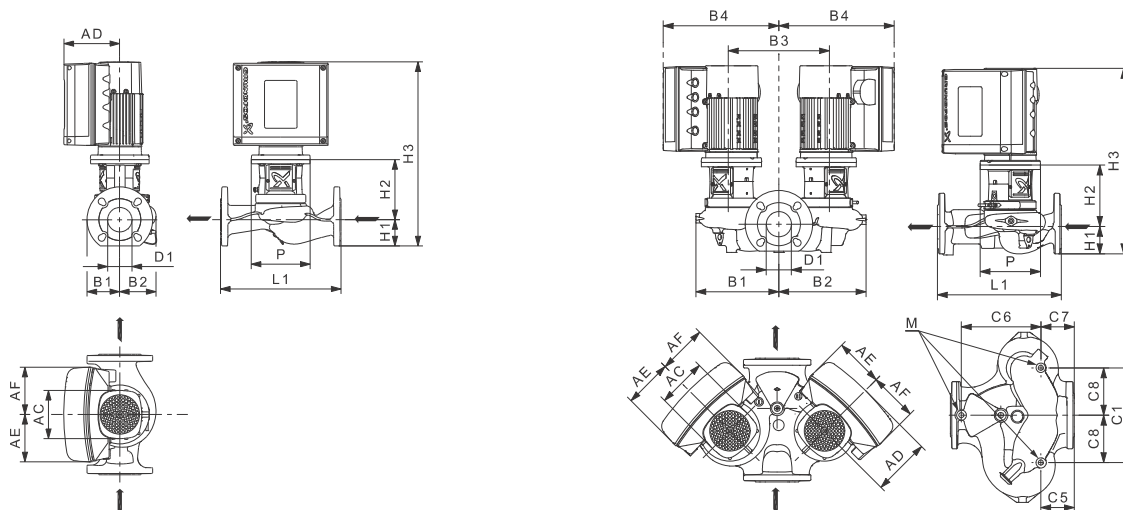
TPE2, TPE2 D, TPE3, TPE3 D 40



TM05 8192 2115

TM05 8172 2115

Note: The dotted QH curves apply to TPE2 D, TPE3 D in parallel operation.



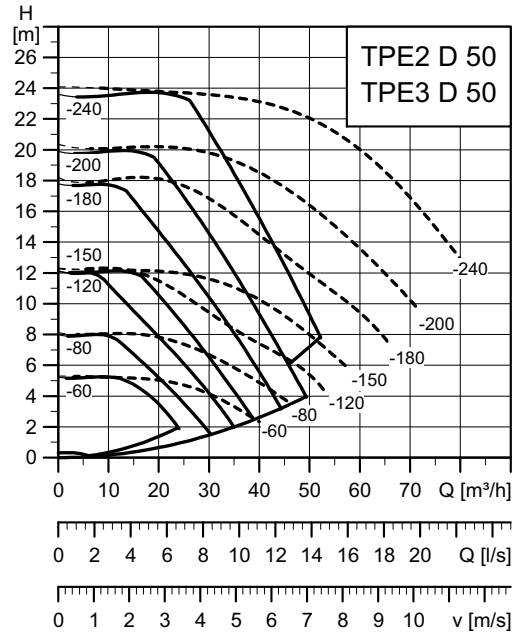
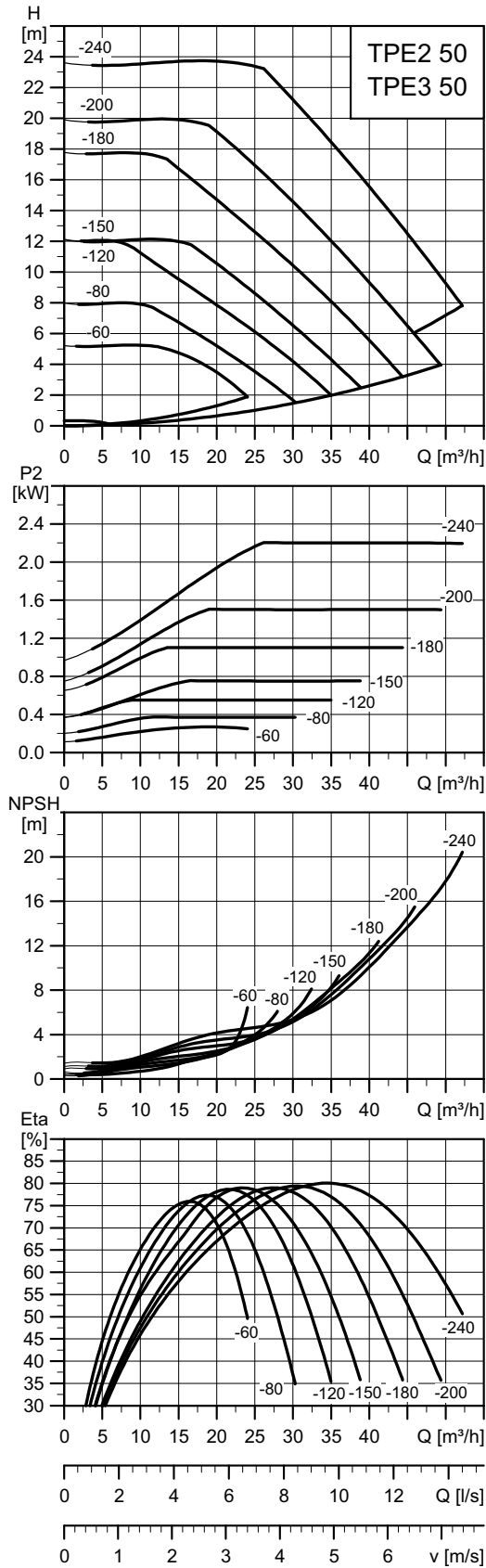
TM05 8182 4514 - TM05 8183 4514

### Technical data

TPE2, TPE3 40		-80	-120	-150	-180	-200	-240	
TPE2, TPE3		•	•	•	•	•	•	
TPE2 D, TPE3 D		•	•	•	•	•	•	
P2	1~/3~	kW	0.25	0.37	0.55	0.75	1.1	1.5
PN			PN 6/10/16	PN 6/10/16	PN 6/10/16	PN 6/10/16	PN 6/10/16	PN 6/10/16
T <sub>min</sub> ; T <sub>max</sub>		[°C]	[-25;120]	[-25;120]	[-25;120]	[-25;120]	[-25;120]	[-25;120]
D1		[mm]	40	40	40	40	40	40
AC	1~/3~	[mm]	122/122	122/122	122/122	122/122	122/122	122/122
AD	1~/3~	[mm]	158/158	158/158	158/158	158/158	158/158	158/158
AE	1~/3~	[mm]	106/134	106/134	106/134	106/134	106/134	106/134
AF	1~/3~	[mm]	106/134	106/134	106/134	106/134	106/134	106/134
P		[mm]	165	165	165	165	165	165
B1★		[mm]	72/218	72/218	72/218	72/218	72/218	72/218
B2★		[mm]	82/220	82/220	82/220	82/220	82/220	82/220
B3		[mm]	260	260	260	260	260	260
B4★	1~	[mm]	-/317	-/317	-/317	-/317	-/317	-/317
	3~	[mm]	-/337	-/337	-/337	-/337	-/337	-/337
C1★		[mm]	-/260	-/260	-/260	-/260	-/260	-/260
C5★		[mm]	-/75	-/75	-/75	-/75	-/75	-/75
C6★		[mm]	-/58	-/58	-/58	-/58	-/58	-/58
C7★		[mm]	-/155	-/155	-/155	-/155	-/155	-/155
C8★		[mm]	-/130	-/130	-/130	-/130	-/130	-/130
L1		[mm]	250	250	250	250	250	250
H1★		[mm]	65/69	65/69	65/69	65/69	65/69	65/69
H2		[mm]	162	162	162	162	162	162
H3★	1~	[mm]	442/446	442/446	442/446	442/446	442/446	462/466
	3~	[mm]	482/486	482/486	482/486	482/486	482/486	502/506
M			M12	M12	M12	M12	M12	M12

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

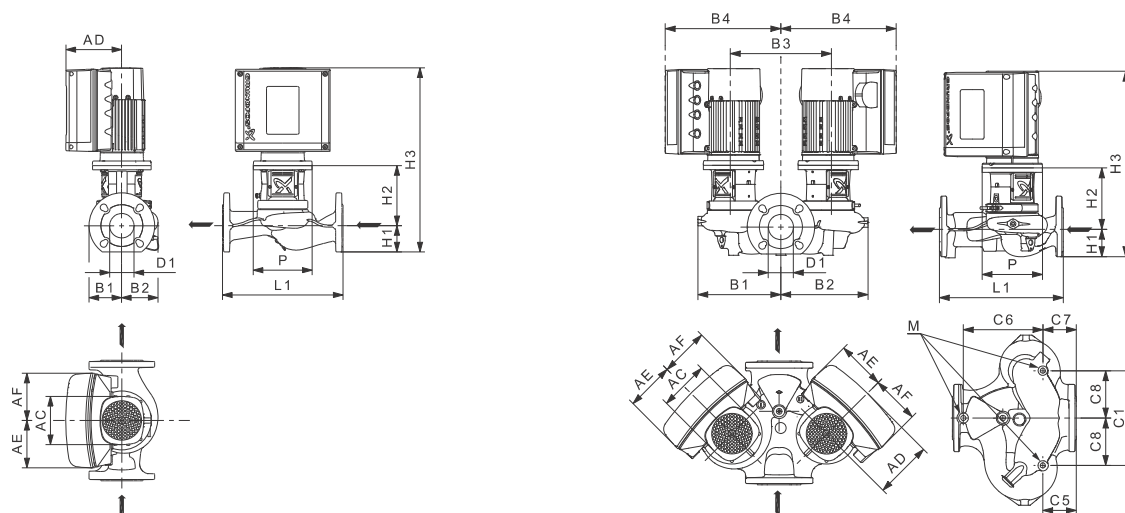
TPE2, TPE2 D, TPE3, TPE3 D 50



TM05 8193 2115

TM05 8173 2115

Note: The dotted QH curves apply to TPE2 D, TPE3 D in parallel operation.



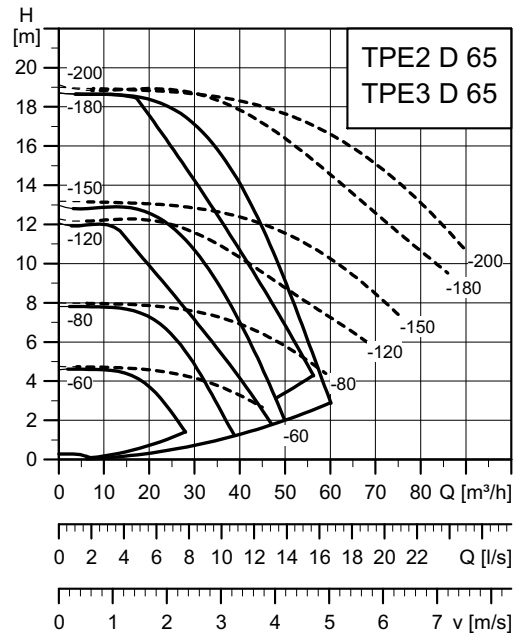
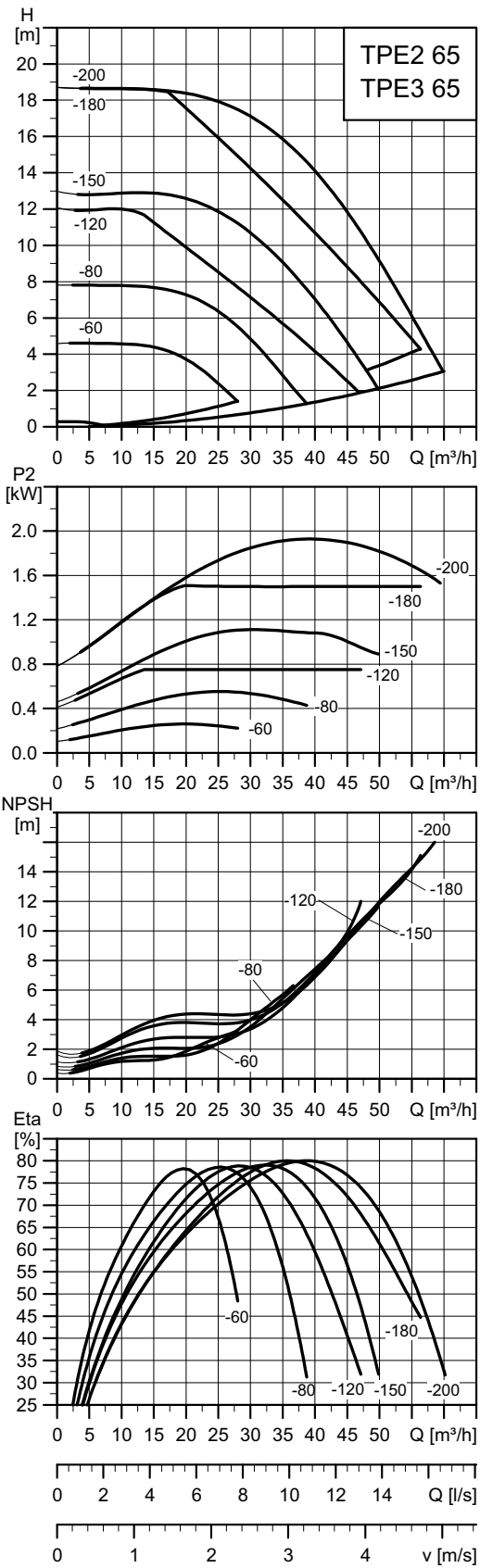
TM05 8182 4514 - TM05 8183 4514

### Technical data

TPE2, TPE3 50			-60	-80	-120	-150	-180	-200	-240
TPE2, TPE3			•	•	•	•	•	•	•
TPE2 D, TPE3 D			•	•	•	•	•	•	•
P2	1~/3~	kW	0.37	0.37	0.55	0.75	1.1	1.5	2.2
PN			PN 6/10/16	PN 6/10/16	PN 6/10/16	PN 6/10/16	PN 6/10/16	PN 6/10/16	PN 6/10/16
T <sub>min</sub> ; T <sub>max</sub>		[°C]	[-25;120]	[-25;120]	[-25;120]	[-25;120]	[-25;120]	[-25;120]	[-25;120]
D1		[mm]	50	50	50	50	50	50	50
AC	1~/3~	[mm]	122/122	122/122	122/122	122/122	122/122	122/122	122/122
AD	1~/3~	[mm]	158/158	158/158	158/158	158/158	158/158	158/158	158/158
AE	1~/3~	[mm]	106/134	106/134	106/134	106/134	106/134	106/134	-/134
AF	1~/3~	[mm]	106/134	106/134	106/134	106/134	106/134	106/134	-/134
P		[mm]	165	165	165	165	165	165	165
B1★		[mm]	75/223	75/223	75/223	75/223	75/223	75/223	75/223
B2★		[mm]	91/227	91/227	91/227	91/227	91/227	91/227	91/227
B3		[mm]	260	260	260	260	260	260	260
B4★	1~	[mm]	-/317	-/317	-/317	-/317	-/317	-/317	-/317
	3~	[mm]	-/337	-/337	-/337	-/337	-/337	-/337	-/337
C1★		[mm]	-/260	-/260	-/260	-/260	-/260	-/260	-/260
C5★		[mm]	-/75	-/75	-/75	-/75	-/75	-/75	-/75
C6★		[mm]	-/175	-/175	-/175	-/175	-/175	-/175	-/175
C7★		[mm]	-/75	-/75	-/75	-/75	-/75	-/75	-/75
C8★		[mm]	-/130	-/130	-/130	-/130	-/130	-/130	-/130
L1		[mm]	280	280	280	280	280	280	280
H1★		[mm]	72/75	72/75	72/75	72/75	72/75	72/75	72/75
H2		[mm]	162	162	162	162	162	162	162
H3★	1~	[mm]	449/451	449/451	449/451	449/451	449/451	469/471	-
	3~	[mm]	489/491	489/491	489/491	489/491	489/491	509/511	509/511
M			M12	M12	M12	M12	M12	M12	M12

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

TPE2, TPE2 D, TPE3, TPE3 D 65

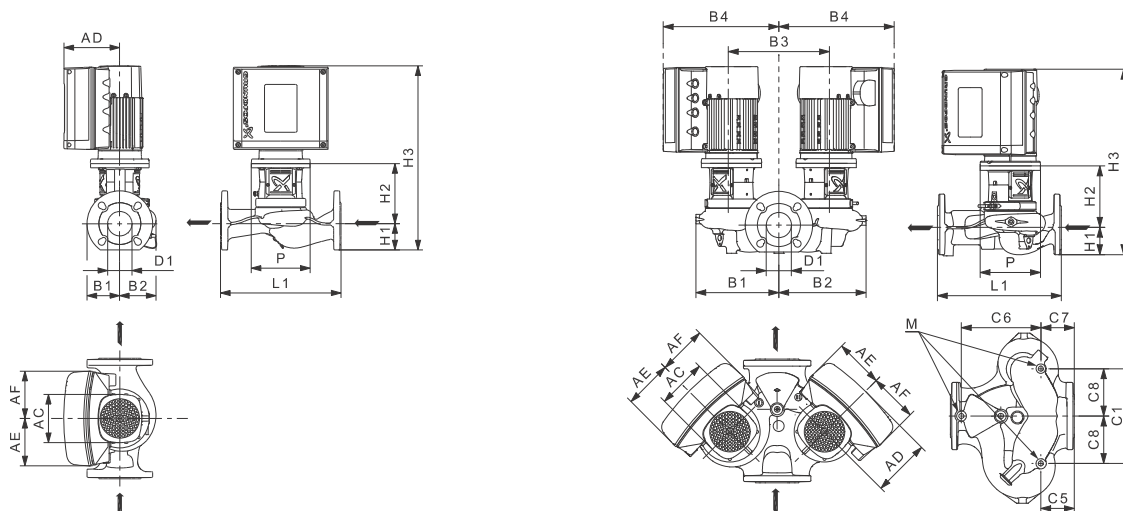


TM05 8194 2115

Note: The dotted QH curves apply to TPE2 D, TPE3 D in parallel operation.

TM05 8174 2115





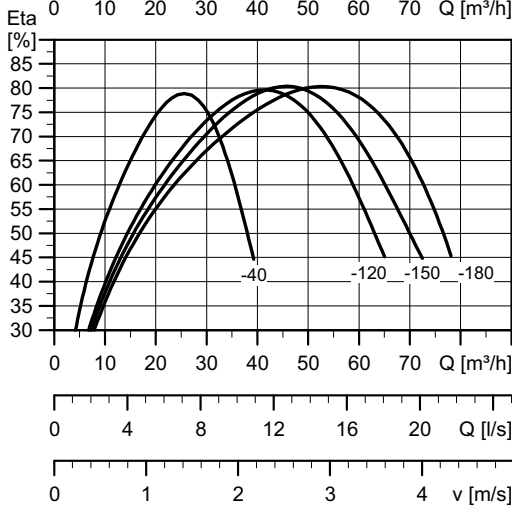
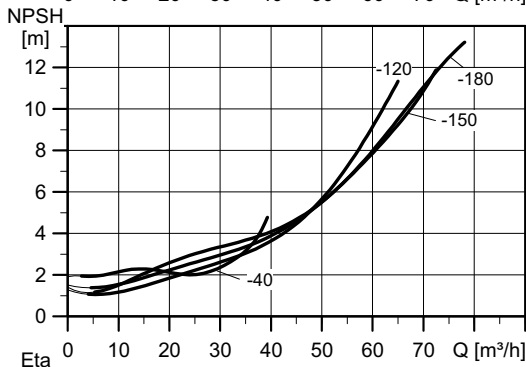
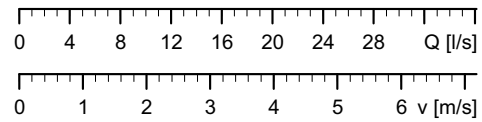
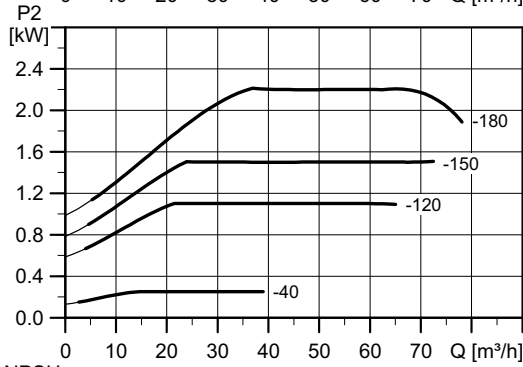
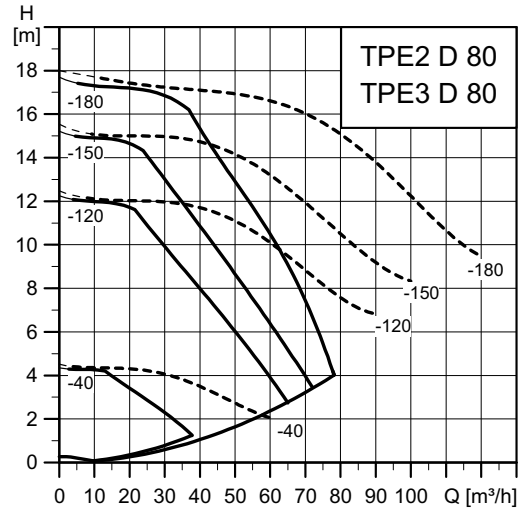
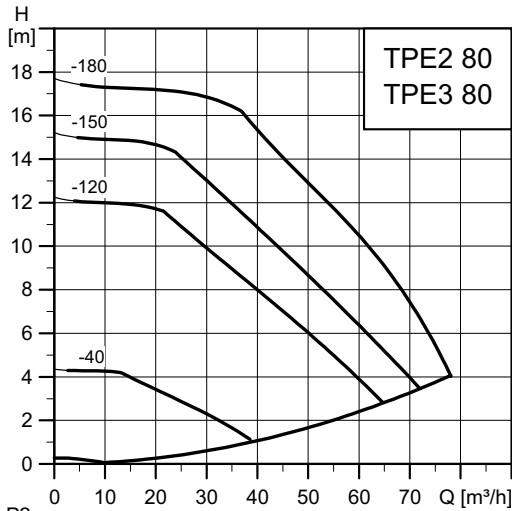
TM05 8182 4514 - TM05 8183 4514

### Technical data

TPE2, TPE3 65			-60	-80	-120	-150	-180	-200
TPE2, TPE3			•	•	•	•	•	•
TPE2 D, TPE3 D			•	•	•	•	•	•
P2	1~/3~	kW	0.37	0.55	0.75	1.1	1.5	2.2
PN			PN 6/10/16	PN 6/10/16	PN 6/10/16	PN 6/10/16	PN 6/10/16	PN 6/10/16
T <sub>min</sub> ; T <sub>max</sub>		[°C]	[-25;120]	[-25;120]	[-25;120]	[-25;120]	[-25;120]	[-25;120]
D1		[mm]	65	65	65	65	65	65
AC	1~/3~	[mm]	122/122	122/122	122/122	122/122	122/122	122/122
AD	1~/3~	[mm]	158/158	158/158	158/158	158/158	158/158	158/158
AE	1~/3~	[mm]	106/134	106/134	106/134	106/134	106/134	-/134
AF	1~/3~	[mm]	106/134	106/134	106/134	106/134	106/134	-/134
P		[mm]	165	165	165	165	165	165
B1★		[mm]	81/228	81/228	81/228	81/228	81/228	81/228
B2★		[mm]	102/240	102/240	102/240	102/240	102/240	102/240
B3		[mm]	260	260	260	260	260	260
B4★	1~	[mm]	-/317	-/317	-/317	-/317	-/317	-/317
	3~	[mm]	-/337	-/337	-/337	-/337	-/337	-/337
C1★		[mm]	-/260	-/260	-/260	-/260	-/260	-/260
C5★		[mm]	-/92	-/92	-/92	-/92	-/92	-/92
C6★		[mm]	-/218	-/218	-/218	-/218	-/218	-/218
C7★		[mm]	-/92	-/92	-/92	-/92	-/92	-/92
C8★		[mm]	-/130	-/130	-/130	-/130	-/130	-/130
L1		[mm]	340	340	340	340	340	340
H1★		[mm]	74/78	74/78	74/78	74/78	74/78	74/78
H2		[mm]	169	169	169	169	169	169
H3★	1~	[mm]	458/462	458/462	458/462	458/462	478/482	-
	3~	[mm]	498/502	498/502	498/502	498/502	518/522	518/522
M			M12	M12	M12	M12	M12	M12

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

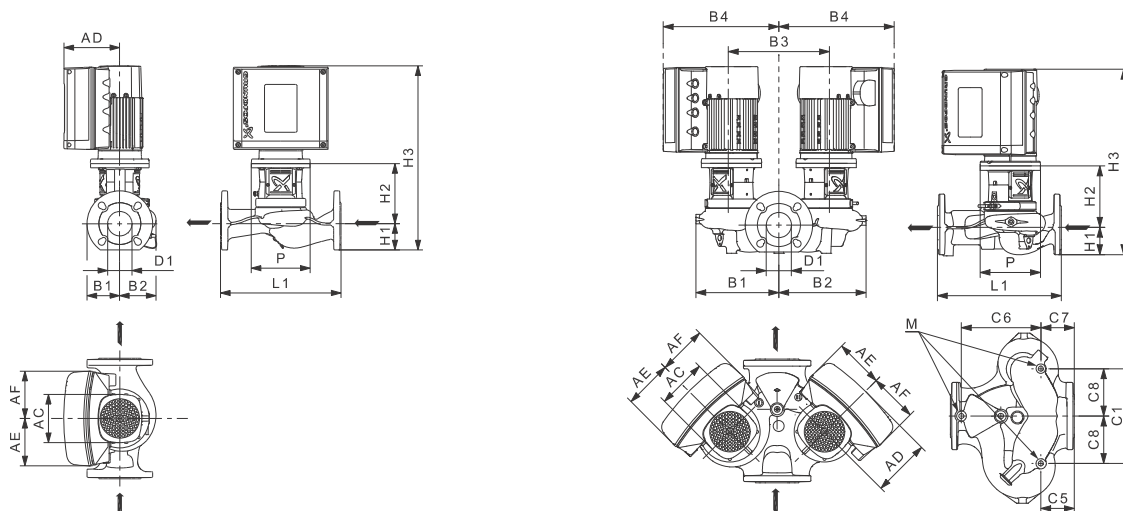
TPE2, TPE2 D, TPE3, TPE3 D 80



TM05 8195 2115

TM05 8175 2115

Note: The dotted QH curves apply to TPE2 D, TPE3 D in parallel operation.



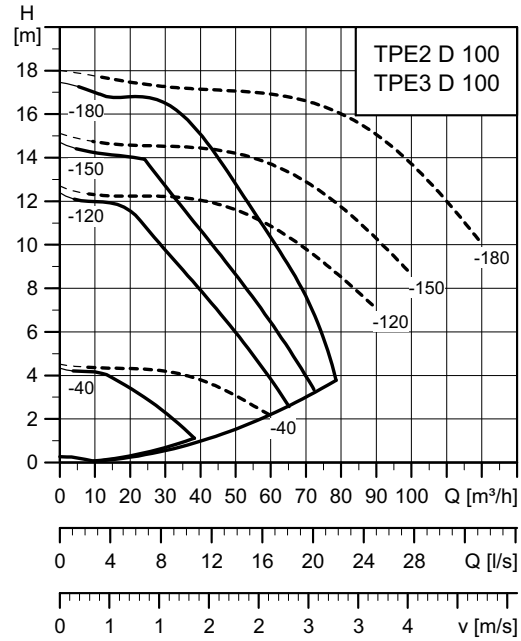
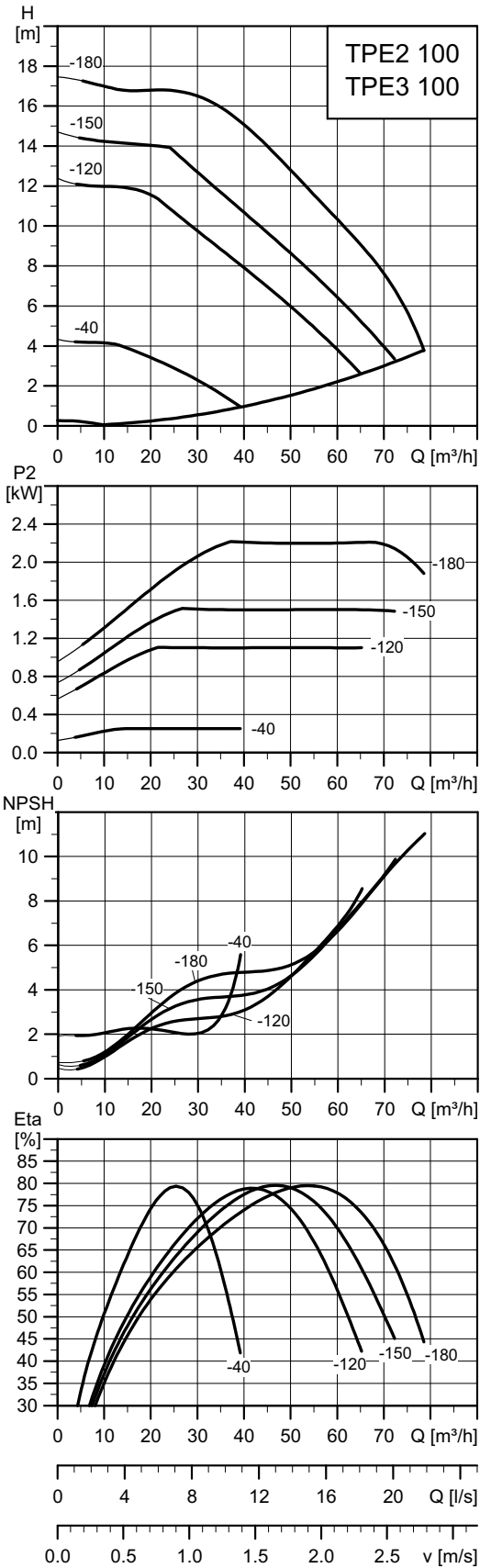
TM05 8182 4514 - TM05 8183 4514

### Technical data

TPE2, TPE3 80			-40	-120	-150	-180
TPE2, TPE3			•	•	•	•
TPE2 D, TPE3 D			•	•	•	•
P2	1~/3~	kW	0.25	1.1	1.5	2.2
PN			PN 6/10/16	PN 6/10/16	PN 6/10/16	PN 6/10/16
$T_{min}; T_{max}$		[°C]	[-25;120]	[-25;120]	[-25;120]	[-25;120]
D1		[mm]	80	80	80	80
AC	1~/3~	[mm]	122/122	122/122	122/122	122/122
AD	1~/3~	[mm]	158/158	158/158	158/158	158/158
AE	1~/3~	[mm]	106/134	106/134	106/134	-/134
AF	1~/3~	[mm]	106/134	106/134	106/134	-/134
P		[mm]	165	165	165	165
B1★		[mm]	97/244	97/244	97/244	97/244
B2★		[mm]	123/254	123/254	123/254	123/254
B3		[mm]	260	260	260	260
B4★	1~	[mm]	-/317	-/317	-/317	-/317
	3~	[mm]	-/337	-/337	-/337	-/337
C1★		[mm]	-/260	-/260	-/260	-/260
C5★		[mm]	-/102	-/102	-/102	-/102
C6★		[mm]	-/218	-/218	-/218	-/218
C7★		[mm]	-/102	-/102	-/102	-/102
C8★		[mm]	-/130	-/130	-/130	-/130
L1		[mm]	360	360	360	360
H1★		[mm]	94/97	94/97	94/97	94/97
H2		[mm]	176	176	176	176
H3★	1~	[mm]	485/488	485/488	505/508	-
	3~	[mm]	525/528	525/528	545/548	545/548
M			M12	M12	M12	M12

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

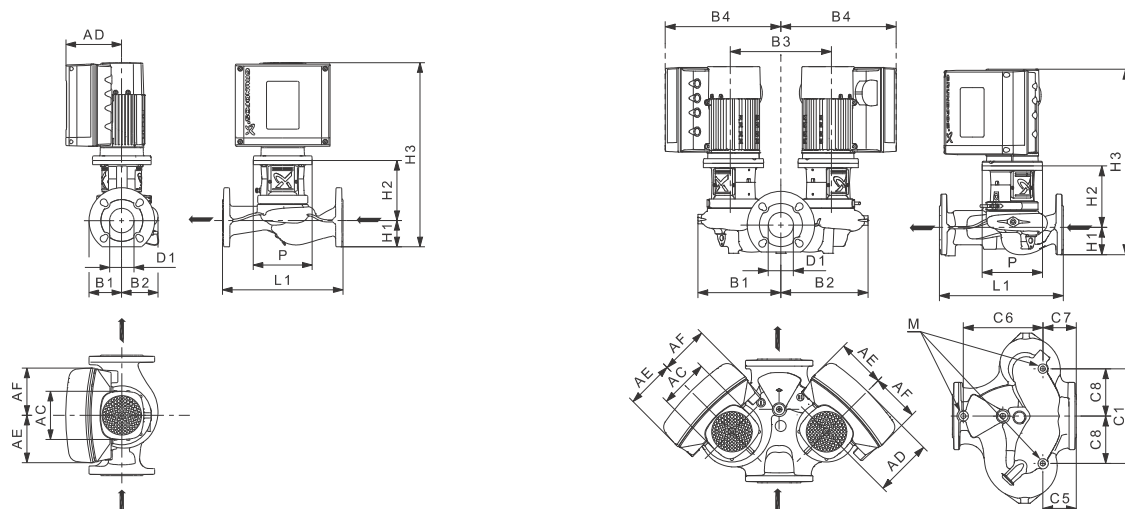
TPE2, TPE2 D, TPE3, TPE3 D 100



TM05 8196 2115

TM05 8176 2115

Note: The dotted QH curves apply to TPE2 D, TPE3 D in parallel operation.



TM05 8182 4514 - TM05 8183 4514

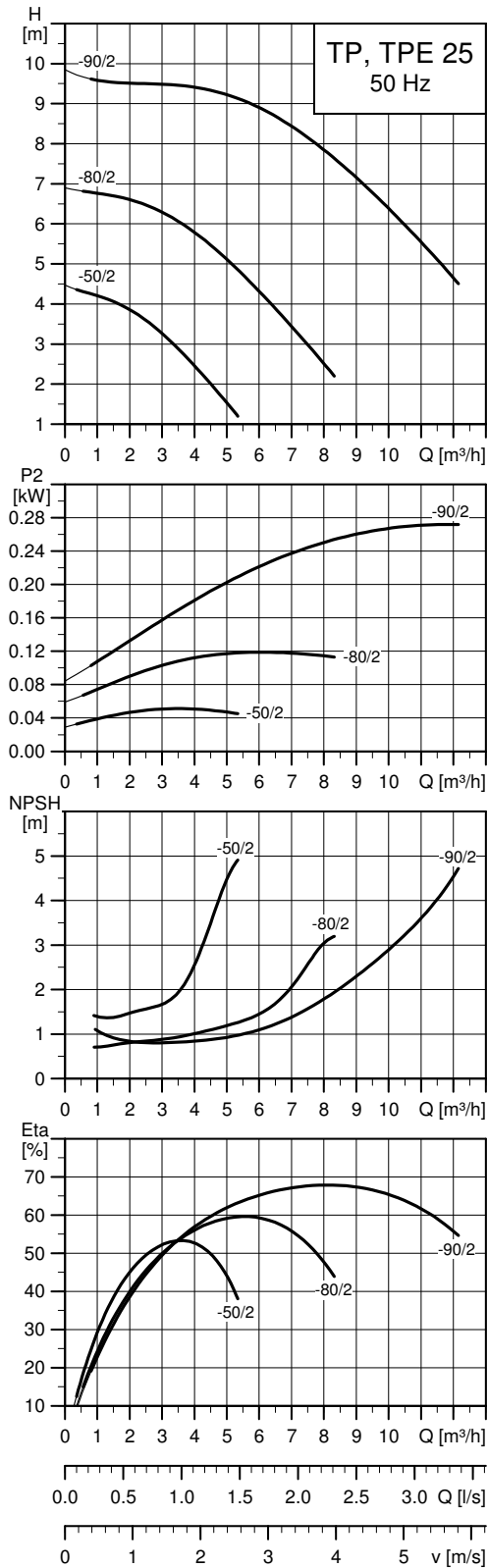
### Technical data

TPE2, TPE3 100			-40	-120	-150	-180
TPE2, TPE3			•	•	•	•
TPE2 D, TPE3 D			•	•	•	•
P2	1~3~	kW	0.25	1.1	1.5	2.2
PN			PN 6/10/16	PN 6/10/16	PN 6/10/16	PN 6/10/16
T <sub>min</sub> :T <sub>max</sub>		[°C]	[-25;120]	[-25;120]	[-25;120]	[-25;120]
D1		[mm]	100	100	100	100
AC	1~3~	[mm]	122/122	122/122	122/122	122/122
AD	1~3~	[mm]	158/158	158/158	158/158	158/158
AE	1~3~	[mm]	106/134	106/134	106/134	-134
AF	1~3~	[mm]	106/134	106/134	106/134	-134
P		[mm]	165	165	165	165
B1★		[mm]	98/252	98/252	98/252	98/252
B2★		[mm]	125/265	125/265	125/265	125/265
B3		[mm]	270	270	270	270
B4★	1~	[mm]	-/322	-/322	-/322	-/322
	3~	[mm]	-/342	-/342	-/342	-/342
C1★		[mm]	-/270	-/270	-/270	-/270
C5★		[mm]	-/147	-/147	-/147	-/147
C6★		[mm]	-/243	-/243	-/243	-/243
C7★		[mm]	-/147	-/147	-/147	-/147
C8★		[mm]	-/135	-/135	-/135	-/135
L1		[mm]	450	450	450	450
H1★		[mm]	102/104	102/104	102/104	102/104
H2		[mm]	189	189	189	189
H3★	1~	[mm]	506/508	506/508	526/528	-
	3~	[mm]	546/548	546/548	566/568	566/568
M			M12	M12	M12	M12

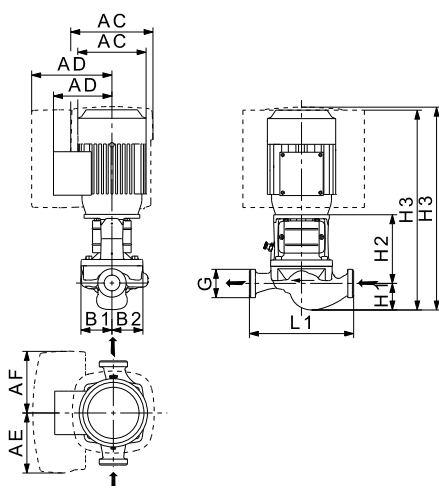
★ The dimension before the slash applies to the single-head pump, and the dimension after the slash applies to the twin-head pump.

**TP, TPD, TPE, TPED, 2-pole, PN 6, 10, 16, 25**

**TP, TPE 25-XX/2**



TM02 5014 4617

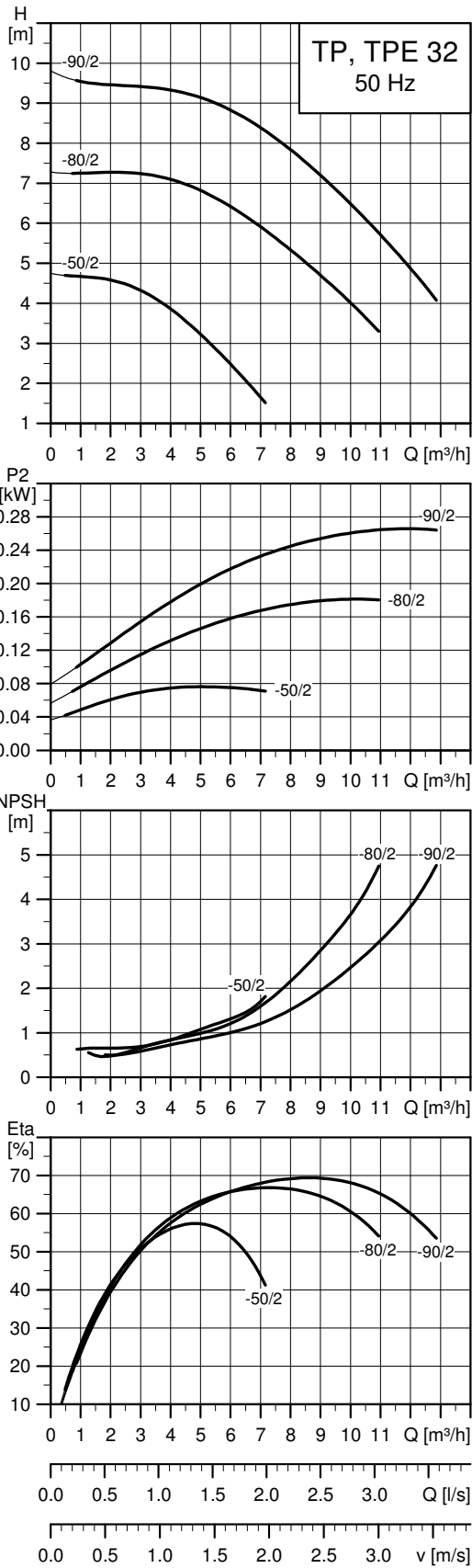


TM02 8348 2614

### Technical data

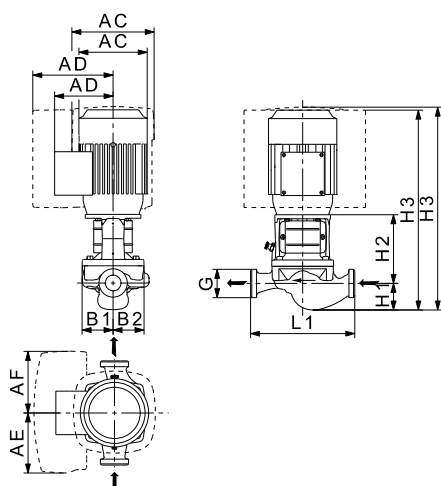
TP 25	-50/2	-80/2	-90/2	
TPD	-	-	-	
TPE	•	•	•	
TPED	-	-	-	
Series	100	100	100	
IEC size	1~ TP	63	71	
	3~ TP	63	71	
	1~ TPE	71	71	
	3~ TPE	-	-	
P2	1~/3~ TP [kW]	0.12/0.12	0.18/0.18	0.37/0.37
	1~/3~ TPE [kW]	0.12/-	0.18/-	0.37/-
PN	10	10	10	
T <sub>min</sub> :T <sub>max</sub>	[°C]	[-25;110]	[-25;110]	[-25;110]
G	G 1 1/2 G 1 1/2 G 1 1/2			
AC	1~/3~ TP [mm]	141/124	141/124	141/141
	1~/3~ TPE [mm]	122/-	122/-	122/-
AD	1~/3~ TP [mm]	133/101	133/101	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]	357/345	357/345	358/358
	1~/3~ TPE [mm]	380/-	380/-	381/-

TP, TPE 32-XX/2



TM02 5015 4617



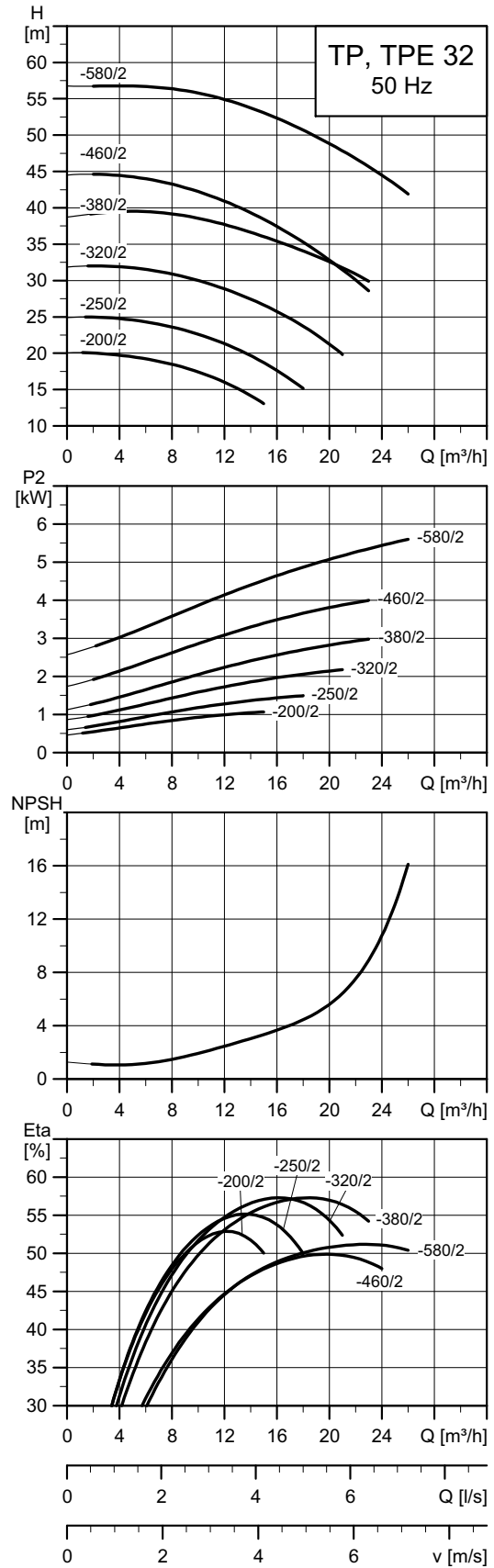
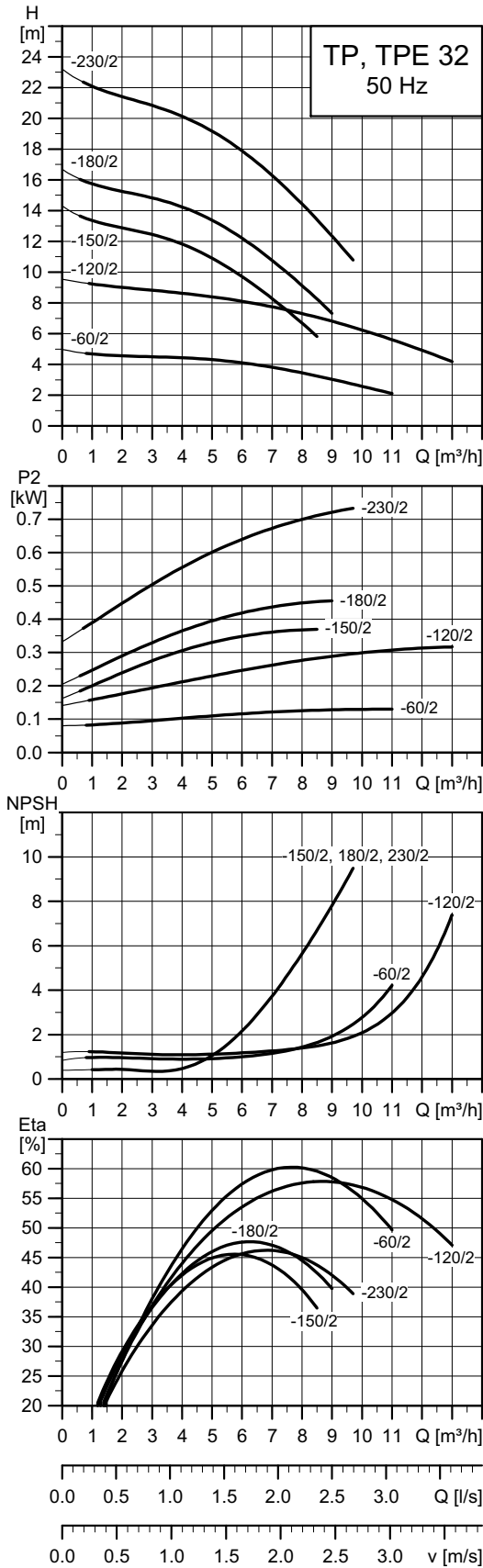


TM02 8348 2614

### Technical data

TP 32		-50/2	-80/2	-90/2
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 <sub>min</sub> :T <sub>max</sub>	[°C]	[-25;110]	[-25;110]	[-25;110]
G		G 2	G 2	G 2
AC	1~/3~ TP [mm]	141/124	141/124	141/141
	1~/3~ TPE [mm]	122/-	122/-	122/-
AD	1~/3~ TP [mm]	133/101	133/101	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]	359/347	359/347	357/357
	1~/3~ TPE [mm]	382/-	382/-	380/-

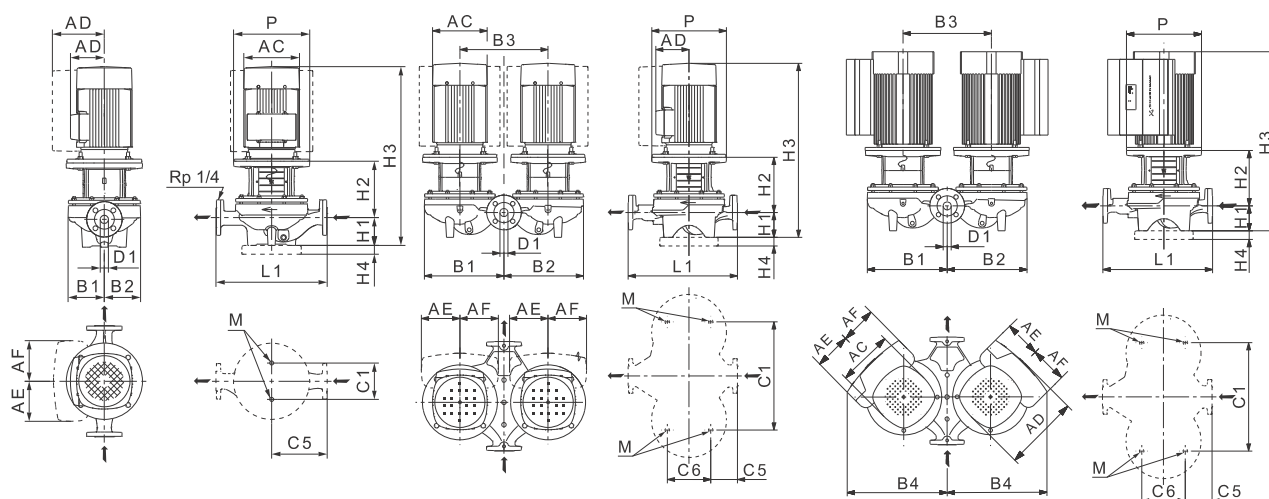
TP, TPE 32-XX/2



Note: All curves apply to single-head pumps. For further information, see page 160.

TM02 5016 2115

TM02 5017 2115



TM02 8632 2614 - TM02 8631 2614 - TM06 2653 4614

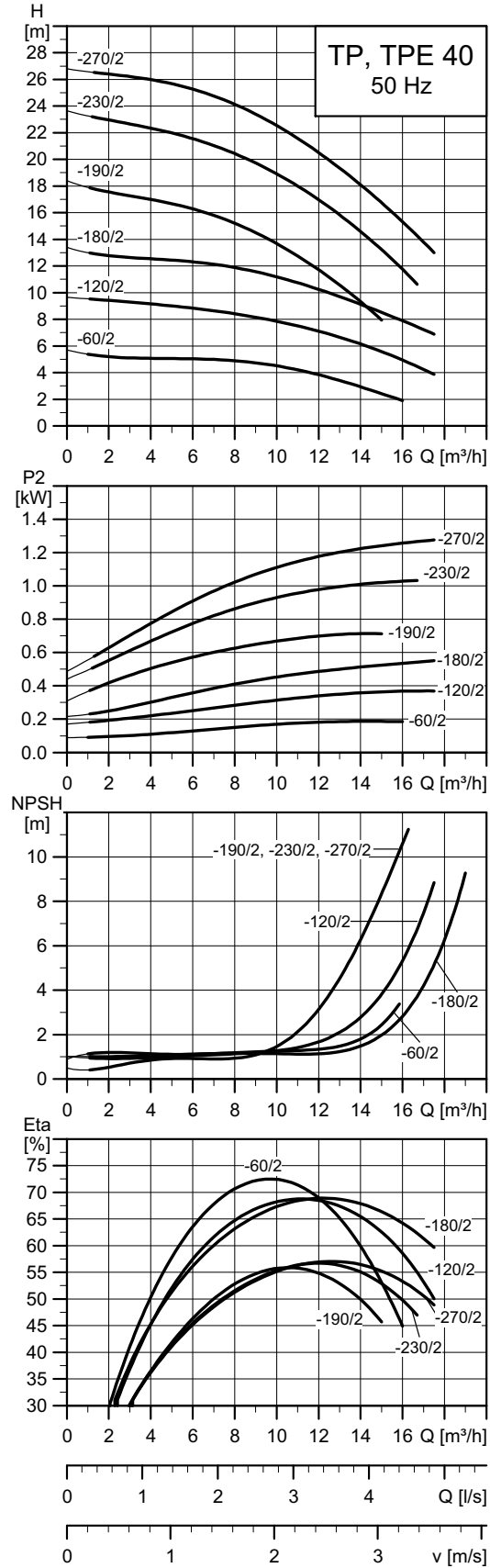
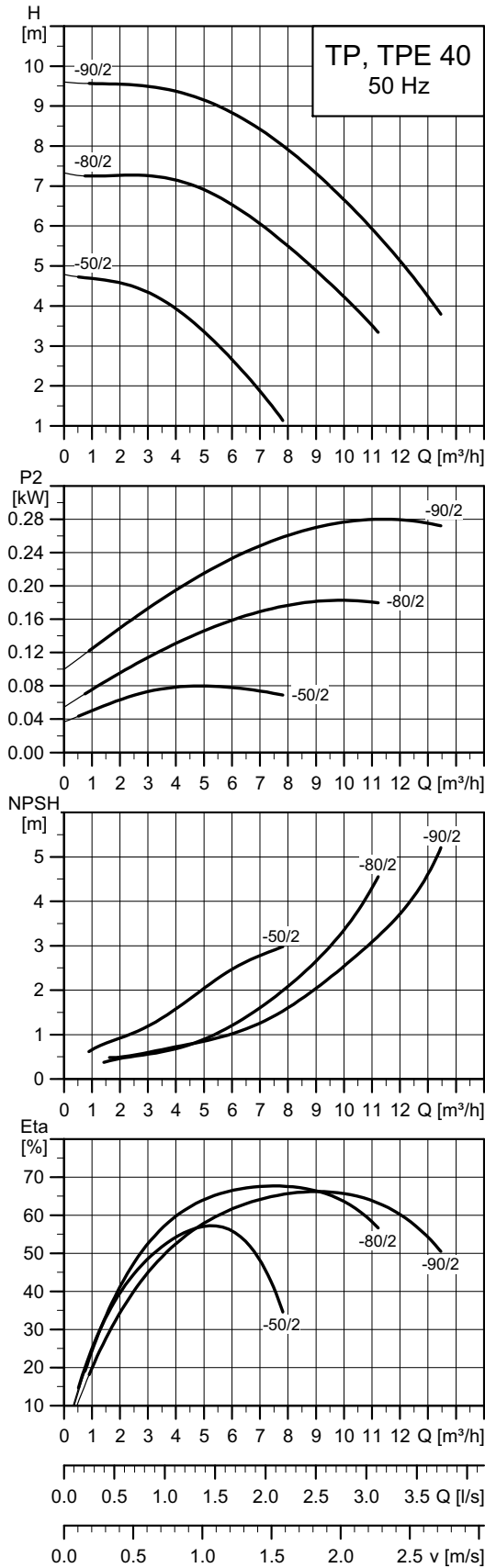
## Technical data

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	80	90	-	-	-
	3~ TP	63	71	71	71	80	80	90	90	100	112
	1~ TPE	-	-	-	-	80	80	90	-	-	-
	3~ TPE	-	-	-	-	80	80	90	90	100	112
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
	1~/3~ TPE [kW]	-	-	-	-	0.75/0.75	1.1/1.1	1.5/1.5	-2.2	-3	-4
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 <sub>min</sub> , T <sub>max</sub>	[°C]	[-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
AC	1~/3~ TP [mm]	124/124	141/142	141/141	141/141	141/141	-141	-178	-178	-198	-220
	1~/3~ TPE [mm]	-	-	-	-	122/122	122/122	122/122	-122	-191	-191
AD	1~/3~ TP [mm]	101/101	133/133	133/109	133/109	133/109	-109	-110	-110	-120	-134
	1~/3~ TPE [mm]	-	-	-	-	158/158	158/158	158/158	-158	-201	-201
AE	1~/3~ TPE [mm]	-	-	-	-	106/134	106/134	106/130	-130	-146	-146
AF	1~/3~ TPE [mm]	-	-	-	-	106/134	106/134	106/130	-130	-146	-146
P	[mm]	90	-	-	-	120	200	200	200	250	300
B1 ★★	[mm]	75/176	75/180	102/222	102/222	102/222	125/260	125/260	125/260	125/260	144/321
B2 ★★	[mm]	75/176	75/180	102/222	102/222	102/222	117/257	117/257	117/257	117/257	144/321
B3	[mm]	200	200	240	240	240	276	276	276	276	355
B4 ★★	[mm]	-	-	-	-	-327	-345	-338	-334	-384	-421
C1 ★★	[mm]	80/200	80/200	80/240	80/240	80/240	144/356	144/356	144/356	144/356	144/435
C5 ★★	[mm]	110/52	110/52	140/82	140/82	140/82	170/45	170/45	170/45	170/45	220/46
C6	[mm]	103	103	103	103	103	175	175	175	175	175
L1	[mm]	220	220	280	280	280	340	340	340	340	440
H1	[mm]	68	68	79	79	79	100	100	100	100	100
H2	[mm]	140/139	126	125	125	137	154	154	154	183	184
H3	1~/3~ TP [mm]	387/386	385/385	395/395	447/395	447/447	-505	-535	-575	-618	-656
	1~/3~ TPE [mm]	-	-	-	-	430/470	488/528	488/488	-528	-616	-618
H4	[mm]	-	-	-	-	-	-	-	-	-	-
M		M12	M12	M12	M12	M12	M16	M16	M16	M16	M16

★ TP, TPD pumps are primarily fitted with IE3 motors. See *Motor data* on page 125.

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

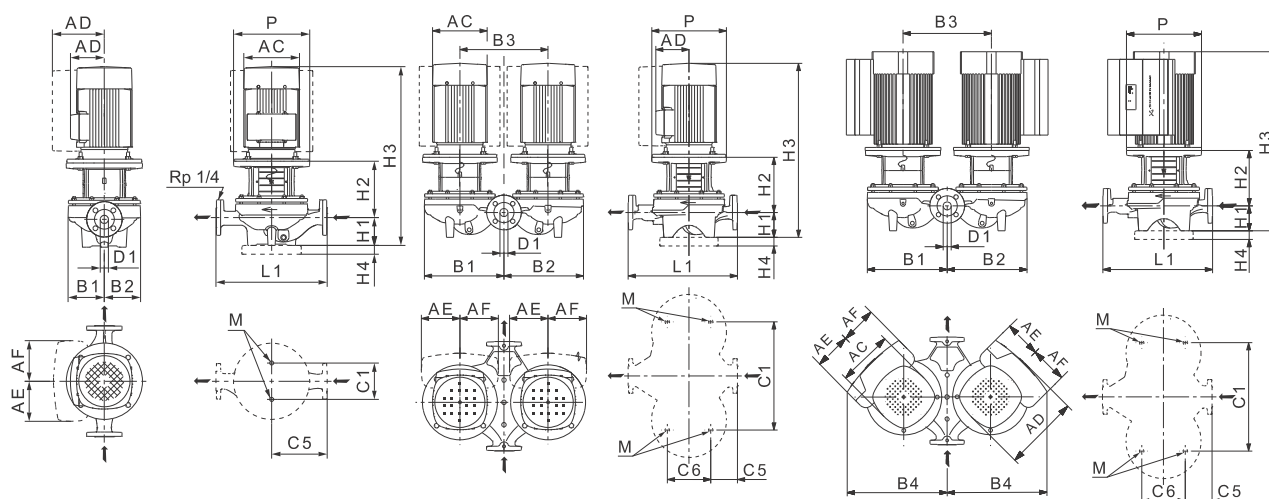
TP, TPE 40-XX/2



Note: All curves apply to single-head pumps. For further information, see page 160.

TM02 5018 2115

TM02 5019 2115



TM02 8632 2614 - TM02 8631 2614 - TM06 2653 4614

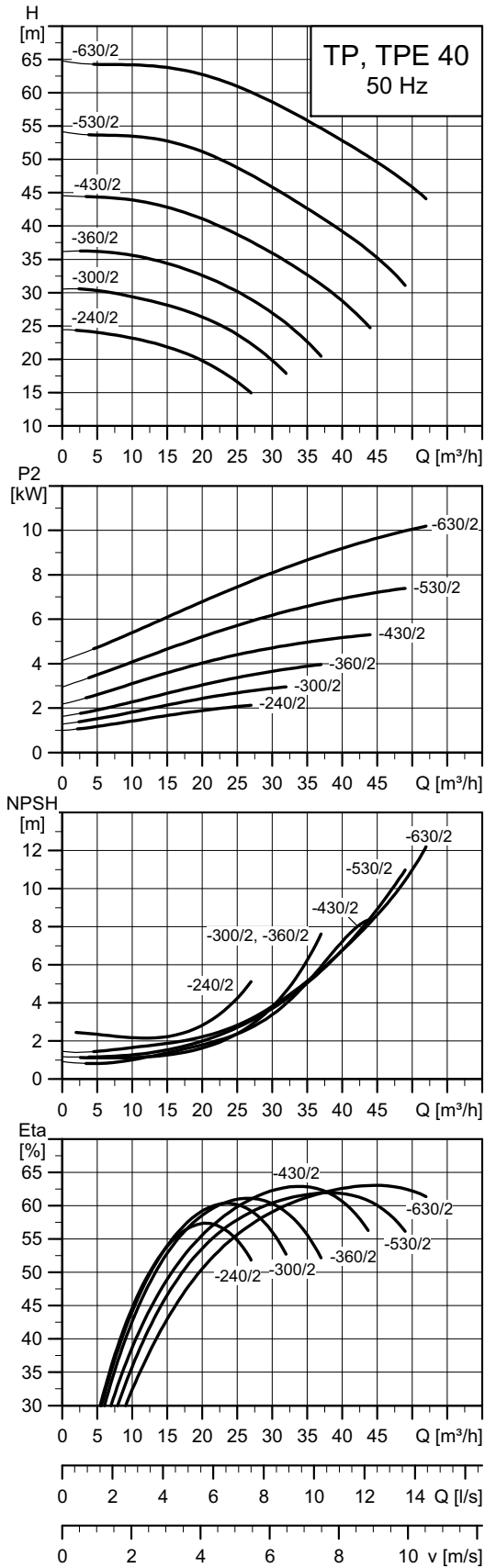
## Technical data

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	90
	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]	-	-	-	-	-	-	-	-	1.5/1.5
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 <sub>min</sub> , T <sub>max</sub>	[°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]	141/124	141/141	141/124	141/141	141/141	141/141	141/141	178/141	178/178
	1~/3~ TPE [mm]	-	-	-	-	-	-	-	-	122/122
AD	1~/3~ TP [mm]	133/101	133/109	133/101	133/109	133/109	133/109	133/109	139/109	139/110
	1~/3~ TPE [mm]	-	-	-	-	-	-	-	-	158/158
AE	1~/3~ TPE [mm]	-	-	-	-	-	-	-	-	106/134
AF	1~/3~ TPE [mm]	-	-	-	-	-	-	-	-	106/134
P	[mm]	-	-	-	-	-	-	-	-	135
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
B4 ★★	[mm]	-	-	-	-	-	-	-	-	-/327
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]	378/366	387/366	378/366	373/373	387/387	442/390	439/439	499/510	539/500
	1~/3~ TPE [mm]	-	-	-	-	-	-	-	-	453/493
H4	[mm]	-	-	-	-	-	-	-	-	-
M		-	M12	-	-	M12	M12	M12	M12	M12

★ TP, TPD pumps are primarily fitted with IE3 motors. See *Motor data* on page 125.

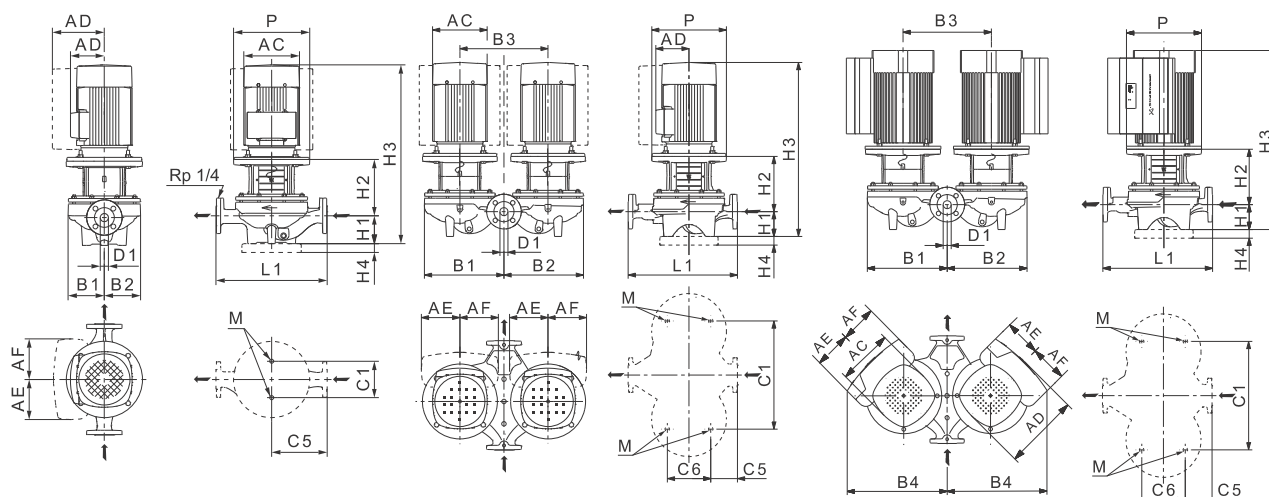
★★ The dimension before the slash applies to the single-head pump, and the dimension after the slash applies to the twin-head pump.

TP 40-XX/2



TM02 5020 2115

Note: All curves apply to single-head pumps. For further information, see page 160.



TM02 8632 2614 - TM02 8631 2614 - TM06 2653 4614

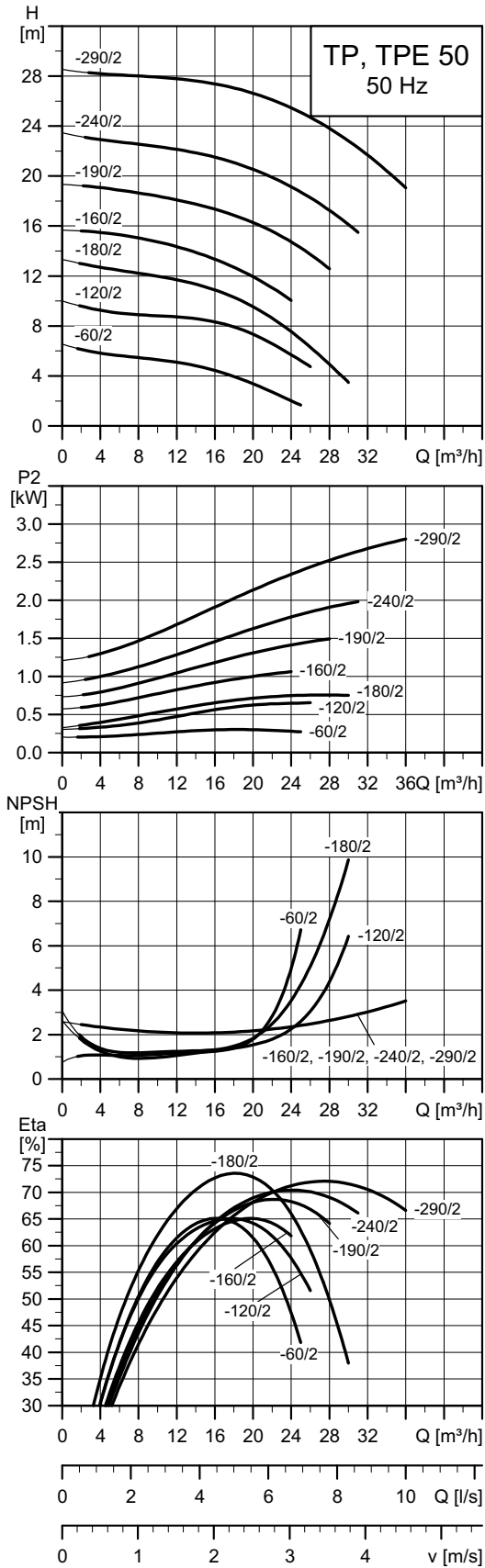
### Technical data

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	-	100	112	132	132	160
P2	1~/3~ TP ★ [kW]	-/2.2	-/3	-/4	-/5.5	-/7.5	-/11.0
	1~/3~ TPE [kW]	-	-/3	-/4	-/5.5	-/7.5	-/11.0
PN		PN 16	PN 16	PN 16	PN 16	PN 16	
T <sub>min</sub> , T <sub>max</sub>	[°C]	[-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	-/314
	1~/3~ TPE [mm]	-	-/191	-/191	-/191	-/255	-/255
AD	1~/3~ TP [mm]	-/110	-/120	-/134	-/134	-/159	-/204
	1~/3~ TPE [mm]	-	-/201	-/201	-/201	-/237	-/237
AE	1~/3~ TPE [mm]	-	-/146	-/146	-/146	-/173	-/173
AF	1~/3~ TPE [mm]	-	-/146	-/146	-/146	-/173	-/173
P	[mm]	200	250	250	300	300	350
B1 ★★	[mm]	130/273	130/273	130/273	150/325	150/325	150/325
B2 ★★	[mm]	117/267	117/267	117/267	147/325	147/325	147/325
B3	[mm]	290	290	290	355	355	355
B4 ★★	[mm]	-	-/391	-/391	-/424	-/469	-/415
C1 ★★	[mm]	144/400	144/400	144/400	144/435	144/435	144/435
C5 ★★	[mm]	170/45	170/45	170/45	220/105	220/105	220/105
C6	[mm]	175	175	175	175	175	175
L1	[mm]	340	340	340	440	440	440
H1	[mm]	100	100	100	110	110	110
H2	[mm]	166	194	194	223	223	253
H3	1~/3~ TP [mm]	-/587	-/629	-/666	-/724	-/724	-/832
	1~/3~ TPE [mm]	-	-/628	-/628	-/722	-/746	-/769
H4	[mm]	-	-	-	-	-	35
M		M16	M16	M16	M16	M16	M16

★ TP, TPD pumps are primarily fitted with IE3 motors. See *Motor data* on page 125.

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

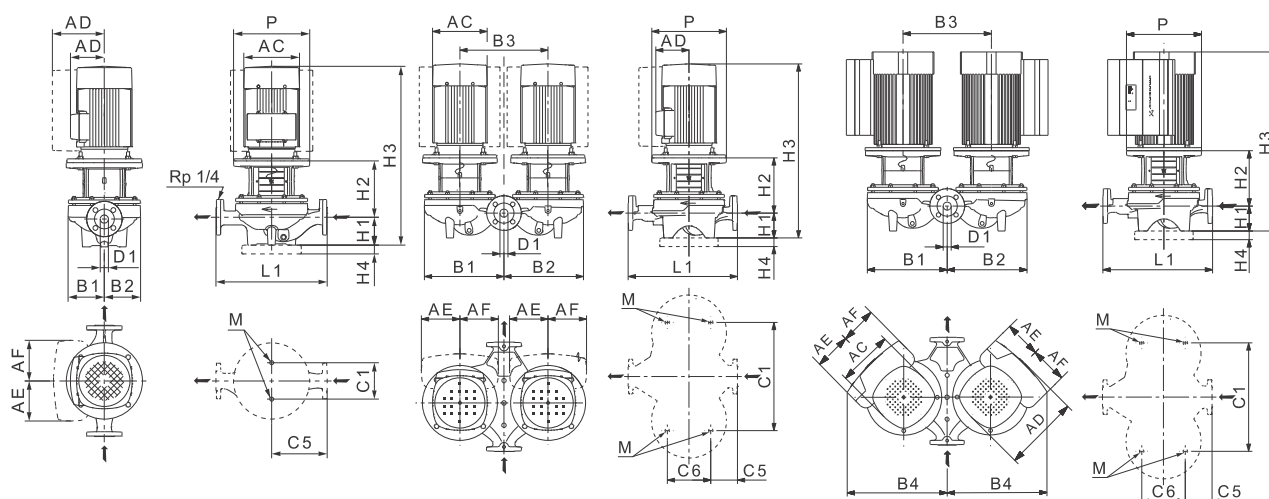
TP 50-XX/2



TM02 5021 2 115

Note: All curves apply to single-head pumps. For further information, see page 160.





TM02 8632 2614 - TM02 8631 2614 - TM06 2653 4614

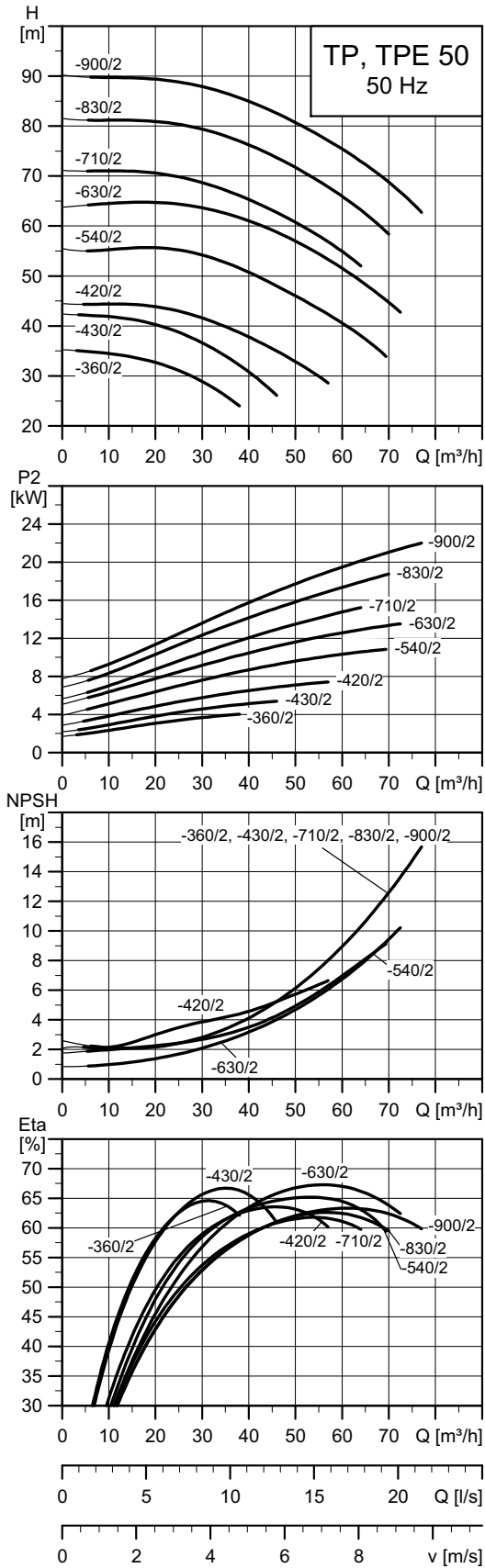
### Technical data

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	100
	1~ TPE	-	-	-	-	-	-
	3~ TPE	-	-	-	-	-	100
P2	1~/3~ TP ★ [kW]	0.37/0.37	0.75/0.75	0.75/0.75	-1.1	-1.5	-2.2
	1~/3~ TPE [kW]	-	-	-	-	-	-3
PN	PN 6/10	PN 6/10	PN 6/10	PN 16	PN 16	PN 16	PN 16
T <sub>min</sub> :T <sub>max</sub>	[°C]	[-25;140]	[-25;140]	[-25;140]	[-25;120]	[-25;120]	[-25;120]
D1	[mm]	50	50	50	50	50	50
AC	1~/3~ TP [mm]	141/141	141/141	141/141	-141	-178	-198
	1~/3~ TPE [mm]	-	-	-	-	-	-191
AD	1~/3~ TP [mm]	133/133	133/133	133/109	-109	-110	-120
	1~/3~ TPE [mm]	-	-	-	-	-	-201
AE	1~/3~ TPE [mm]	-	-	-	-	-	-146
AF	1~/3~ TPE [mm]	-	-	-	-	-	-146
P	[mm]	105	120	-	200	200	250
B1 ★★	[mm]	90/177	100/221	100/225	117/252	117/252	117/252
B2 ★★	[mm]	75/188	100/221	100/225	117/252	117/252	117/252
B3	[mm]	200	240	240	270	270	270
B4 ★★	[mm]	-	-	-	-	-	-381
C1 ★★	[mm]	120/200	120/240	120/240	144/350	144/350	144/350
C5 ★★	[mm]	140/60	140/60	140/60	170/60	170/60	170/60
C6	[mm]	125	126	126	175	175	175
L1	[mm]	280	280	280	340	340	340
H1	[mm]	75	75/61	75	115	115	115
H2	[mm]	137	135/141	135	152	152	180
H3	1~/3~ TP [mm]	403/403	441/441	441/441	-518	-548	-588
	1~/3~ TPE [mm]	-	-	-	-	-	-629
H4	[mm]	-	-	-	-	-	-
M		M12	M12	M12	M16	M16	M16

★ TP, TPD pumps are primarily fitted with IE3 motors. See *Motor data* on page 125.

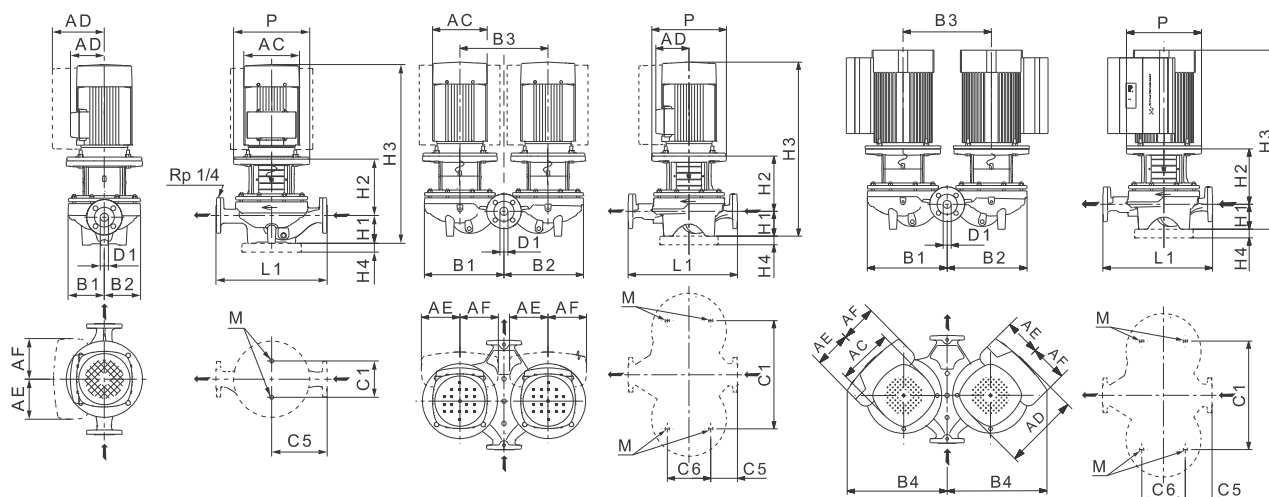
★★ The dimension before the slash applies to the single-head pump, and the dimension after the slash applies to the twin-head pump.

TP 50-XX/2



TM02 5022 2 115

Note: All curves apply to single-head pumps. For further information, see page 160.



TM02 8632 2614 - TM02 8631 2614 - TM06 2653 4614

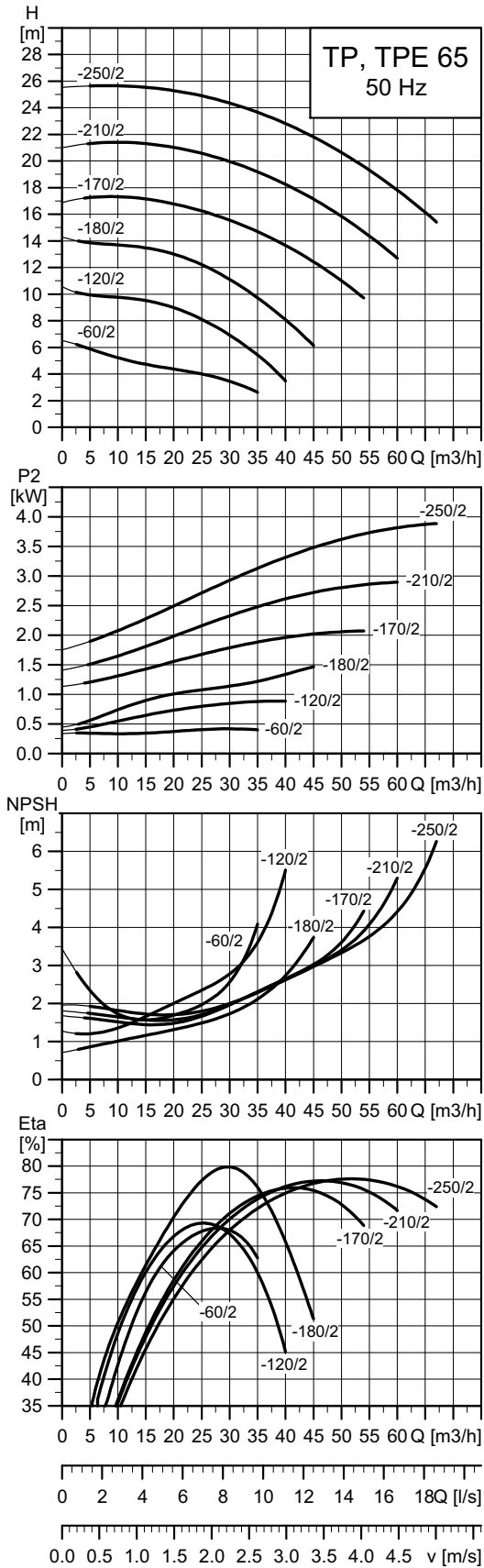
### Technical data

		-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	160	180
	1~ TPE	-	-	-	-	-	-	-	-
	3~ TPE	112	132	132	160	161	160	160	180
P2	1~/3~ TP ★ [kW]	-/4	-/5.5	-/7.5	-/11	-/15	-/15	-/18.5	-/22
	1~/3~ TPE [kW]	-/4	-/5.5	-/7.5	-/11	-/15	-/15	-/18.5	-/22
PN		PN 16	PN 16	PN 16	PN 16	PN 16	PN 16	PN 16	PN 16
T <sub>min</sub> , T <sub>max</sub>	[°C]	[-25;120]	[-25;120]	[-25;120]	[-25;120]	[-25;120]	[-25;120]	[-25;120]	[-25;120]
D1	[mm]	50	50	50	50	50	50	50	50
AC	1~/3~ TP [mm]	-/220	-/220	-/260	-/314	-/314	-/314	-/314	-/314
	1~/3~ TPE [mm]	-/191	-/191	-/255	-/255	-/314	-/314	-/314	-/314
AD	1~/3~ TP [mm]	-/134	-/134	-/159	-/204	-/204	-/204	-/204	-/204
	1~/3~ TPE [mm]	-/201	-/201	-/237	-/237	-/308	-/308	-/308	-/308
AE	1~/3~ TPE [mm]	-/146	-/146	-/173	-/173	-/210	-/210	-/210	-/210
AF	1~/3~ TPE [mm]	-/146	-/146	-/173	-/173	-/210	-/210	-/210	-/210
P	[mm]	250	300	300	350	350	350	350	350
B1 ★★	[mm]	133/290	133/290	162/373	162/373	162/373	180/386	180/386	180/386
B2 ★★	[mm]	119/284	119/284	162/373	162/373	162/373	164/379	164/379	164/379
B3	[mm]	320	320	420	420	420	420	420	420
B4 ★★	[mm]	-/406	-/406	-/383	-/501	-/385	-/555	-/555	-/555
C1 ★★	[mm]	144/400	144/400	144/500	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	220/123
C6	[mm]	175	175	175	175	175	175	175	175
L1	[mm]	340	340	440	440	440	440	440	440
H1	[mm]	115	115	115	115	115	115	115	115
H2	[mm]	189	228	227	257	257	264	264	264
H3	1~/3~ TP [mm]	-/676	-/734	-/721	-/843	-/843	-/850	-/894	-/894
	1~/3~ TPE [mm]	-/638	-/708	-/738	-/785	-/843	-/850	-/894	-/920
H4	[mm]	-	-	-	35	35	35	35	35
M		M16	M16	M16	M16	M16	M16	M16	M16

★ TP, TPD pumps are primarily fitted with IE3 motors. See *Motor data* on page 125.

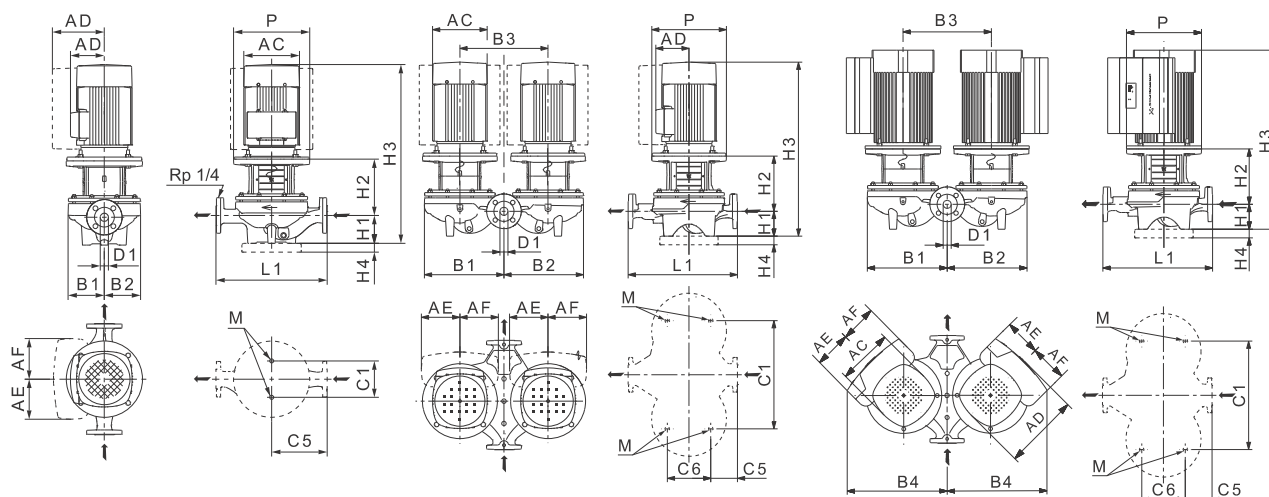
★★ The dimension before the slash applies to the single-head pump, and the dimension after the slash applies to the twin-head pump.

TP 65-XX/2



TM02 5023 2 115

Note: All curves apply to single-head pumps. For further information, see page 160.



TM02 8632 2614 - TM02 8631 2614 - TM06 2653 4614

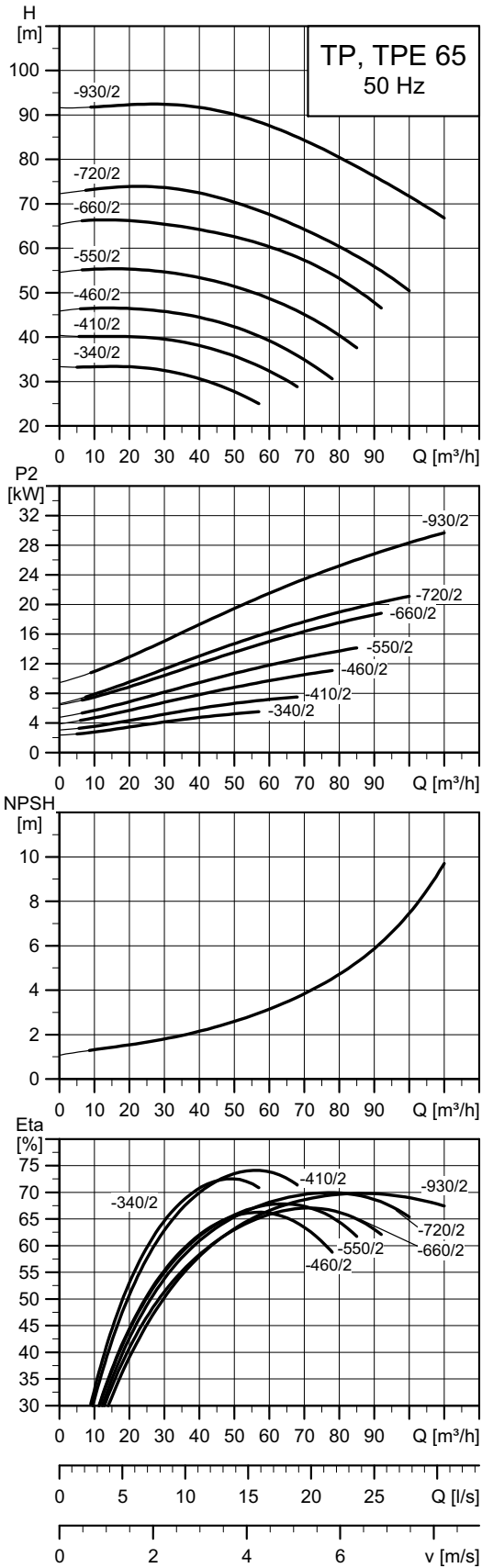
### Technical data

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
	1~ TPE	-	-	-	-	-
	3~ TPE	-	-	-	-	100
P2	1~/3~ TP ★ [kW]	0.55/0.55	1.1/1.1	1.5/1.5	-/2.2	-/3
	1~/3~ TPE [kW]	-	-	-	-	-/3
PN	PN 6/10	PN 6/10	PN 6/10	PN 16	PN 16	PN 16
T <sub>min</sub> , T <sub>max</sub>	[°C]	[-25;140]	[-25;140]	[-25;140]	[-25;120]	[-25;120]
D1	[mm]	65	65	65	65	65
AC	1~/3~ TP [mm]	141/141	178/141	178/178	-/178	-/220
	1~/3~ TPE [mm]	-	-	-	-/191	-/191
AD	1~/3~ TP [mm]	133/109	139/109	139/110	-/110	-/120
	1~/3~ TPE [mm]	-	-	-	-	-/201
AE	1~/3~ TPE [mm]	-	-	-	-	-/146
AF	1~/3~ TPE [mm]	-	-	-	-	-/146
P	[mm]	-	-	-	200	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
B4 ★★	[mm]	-	-	-	-	-/406
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	164	193
H3	1~/3~ TP [mm]	468/418	517/532	557/507	-/590	-/633
	1~/3~ TPE [mm]	-	-	-	-	-/631
H4	[mm]	-	-	-	-	-
M		M12	M12	M12	M16	M16

★ TP, TPD pumps are primarily fitted with IE3 motors. See *Motor data* on page 125.

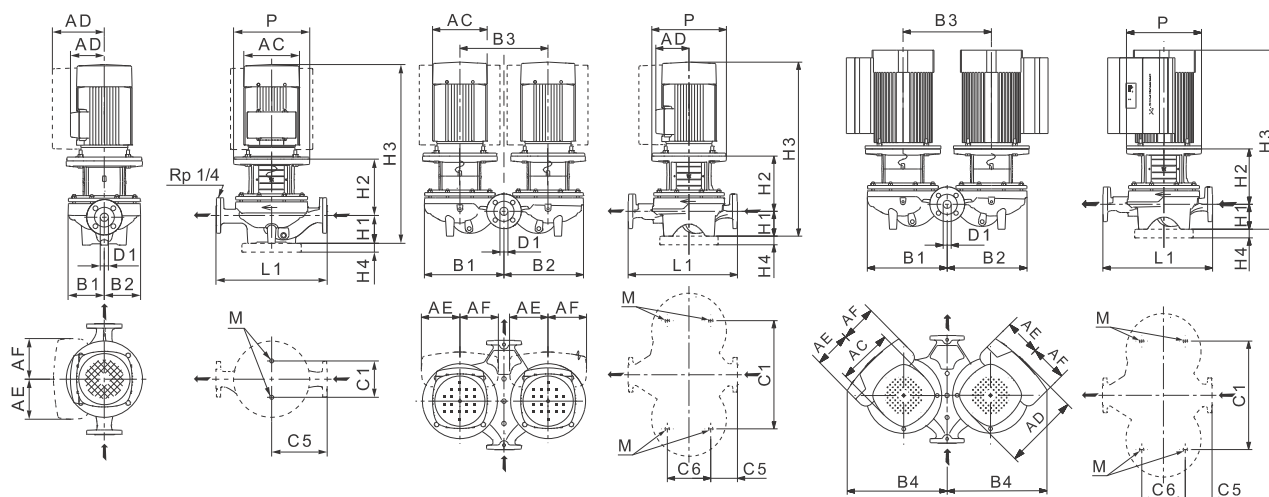
★★ The dimension before the slash applies to the single-head pump, and the dimension after the slash applies to the twin-head pump.

TP 65-XX/2



TM02 5024 2 115

Note: All curves apply to single-head pumps. For further information, see page 160.



TM02 8632 2614 - TM02 8631 2614 - TM06 2653 4614

## Technical data

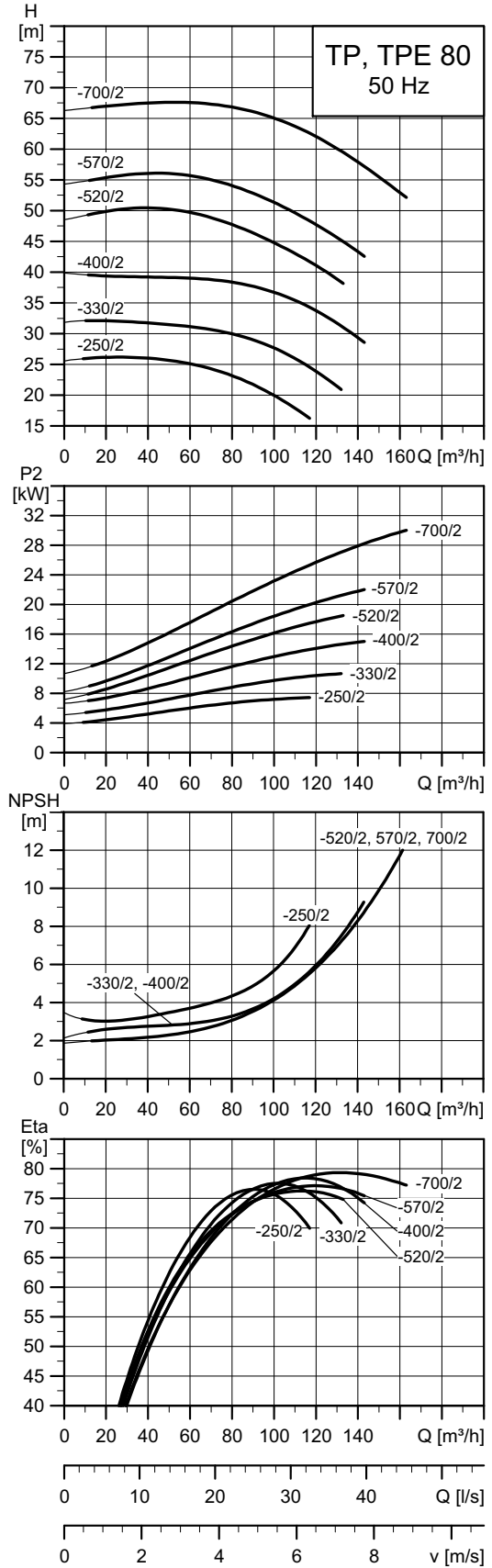
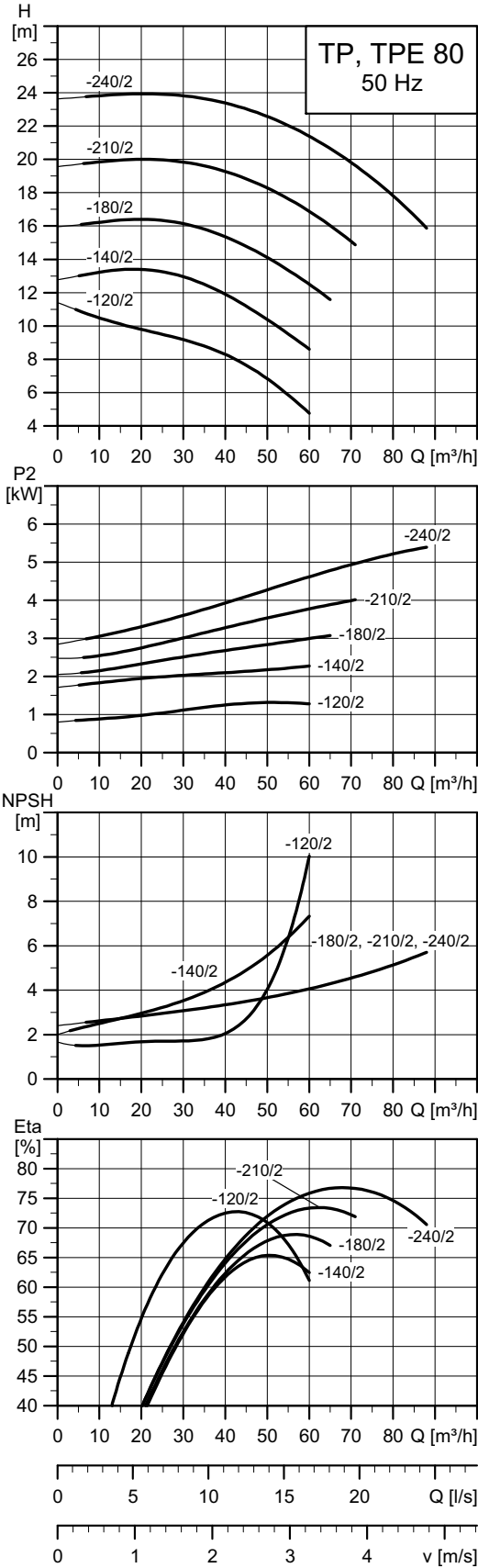
TP 65	-340/2	-410/2	-460/2	-550/2	-660/2	-720/2	-930/2
TPD	•	•	•	•	•	•	•
TPE	•	•	•	•	•	•	•***
TPED	•	•	•	•	•	•	-
Series	300	300	300	300	300	300	300
IEC size	1~ TP	-	-	-	-	-	-
	3~ TP	132	132	160	160	160	180
	1~ TPE	-	-	-	-	-	-
	3~ TPE	132	132	160	160	160	180
P2	1~/3~ TP ★ [kW]	-/5.5	-/7.5	-/11	-/15	-/18.5	-/22
	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 <sub>min</sub> , T <sub>max</sub>	[°C]	[-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	-/314
	1~/3~ TPE [mm]	-/191	-/255	-/255	-/314	-/314	-/314
AD	1~/3~ TP [mm]	-/134	-/159	-/204	-/204	-/204	-/315
	1~/3~ TPE [mm]	-/201	-/237	-/237	-/308	-/308	-/480
AE	1~/3~ TPE [mm]	-/146	-/173	-/173	-/210	-/210	-/126
AF	1~/3~ TPE [mm]	-/146	-/173	-/173	-/210	-/210	-/126
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
B4 ★★	[mm]	-/406	-/451	-/511	-/558	-/558	-
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]	-/709	-/733	-/794	-/859	-/903	-/929
H4	[mm]	-	-	35	35	35	35
M		M16	M16	M16	M16	M16	M16

★ TP, TPD pumps are primarily fitted with IE3 motors. See *Motor data* on page 125.

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

★★★ The integrated CUE can be positioned in an angle deviating from this drawing with up to 30 degrees. For further information look in Grundfos Product Center.

TP 80-XX/2

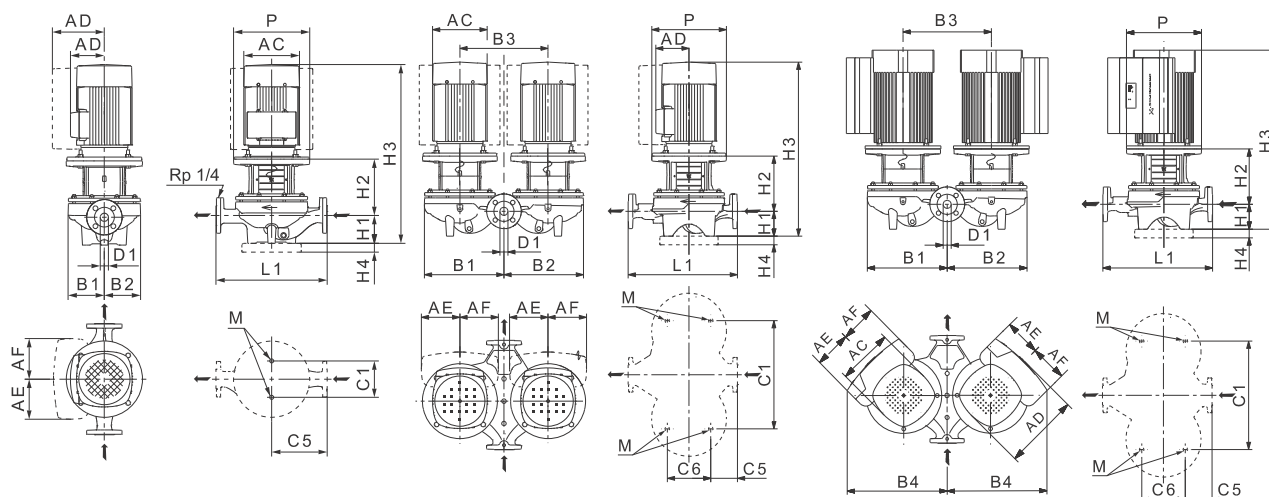


Note: All curves apply to single-head pumps. For further information, see page 160.

TM02 5025 2 115

TM02 8750 2 115





TM02 8632 2614 - TM02 8631 2614 - TM06 2653 4614

## Technical data

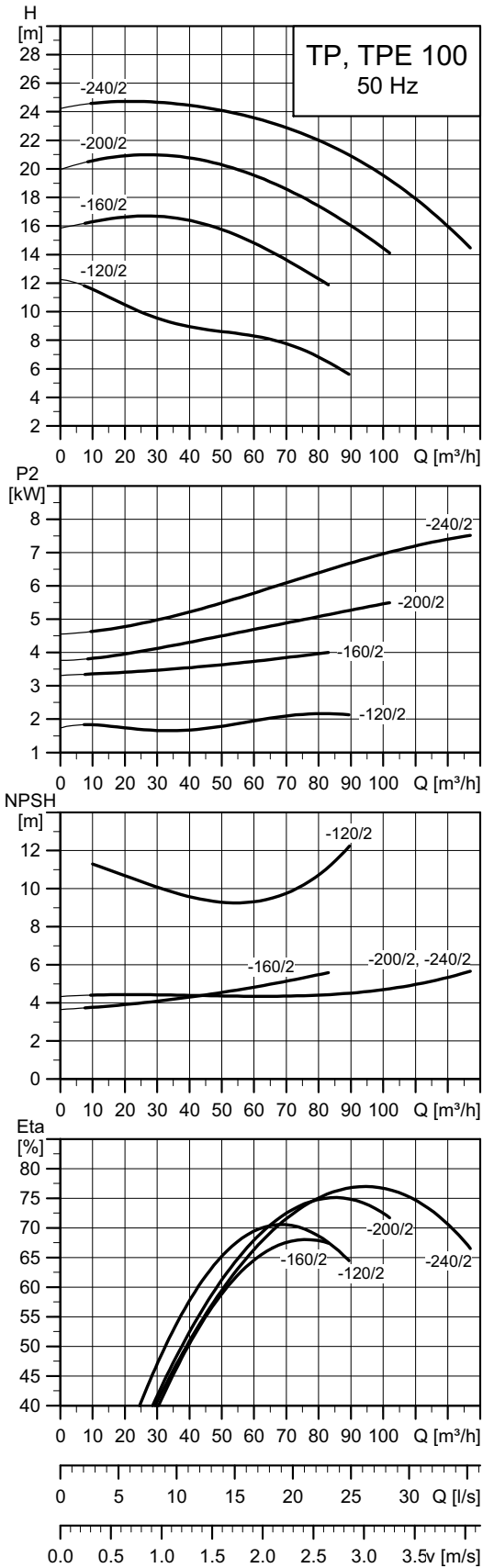
TP 80	-120/2	-140/2	-180/2	-210/2	-240/2	-250/2	-330/2	-400/2	-520/2	-570/2	-700/2
TPD	•	•	•	•	•	•	•	•	•	•	•
TPE	-	-	•	•	•	•	•	•	•	•	•***
TPED	-	-	•	•	•	•	•	•	•	•	-
Series	200	300	300	300	300	300	300	300	300	300	300
IEC size	1~ TP	90	-	-	-	-	-	-	-	-	-
	3~ TP	90	90	100	112	132	132	160	160	160	180
	1~ TPE	-	-	-	-	-	-	-	-	-	-
	3~ TPE	-	-	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
	1~/3~ TPE [kW]	-	-	-/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 <sub>min</sub> , T <sub>max</sub>	[°C]	[-25;140]	[-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
AC	1~/3~ TP [mm]	178/178	-/178	-/198	-/220	-/220	-/260	-/314	-/314	-/314	-/402
	1~/3~ TPE [mm]	-	-	-/191	-/191	-/191	-/255	-/255	-/314	-/314	-/402
AD	1~/3~ TP [mm]	139/139	-/110	-/120	-/134	-/134	-/159	-/204	-/204	-/204	-/315
	1~/3~ TPE [mm]	-	-	-/201	-/201	-/201	-/237	-/237	-/308	-/308	-/470
AE	1~/3~ TPE [mm]	-	-	-/146	-/146	-/146	-/173	-/173	-/210	-/210	-/126
AF	1~/3~ TPE [mm]	-	-	-/146	-/146	-/146	-/173	-/173	-/210	-/210	-/126
P	[mm]	135	200	250	250	300	300	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
B2 ★★	[mm]	100/225	119/290	119/290	119/290	119/290	144/354	144/354	144/354	162/405	162/405
B3	[mm]	240	340	340	340	340	400	400	400	470	470
B4 ★★	[mm]	-	-	-/416	-/416	-/416	-/491	-/491	-/538	-/573	-/573
C1 ★★	[mm]	160/240	144/420	144/420	144/420	144/420	144/480	144/480	144/480	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
C6	[mm]	173	175	175	175	175	175	175	175	350	350
L1	[mm]	360	360	360	360	360	440	440	440	500	500
H1	[mm]	97	105	105	105	105	115	115	115	115	115
H2	[mm]	163	176	204	204	243	243	273	273	273	273
H3	1~/3~ TP [mm]	581/581	-/602	-/644	-/681	-/739	-/737	-/859	-/859	-/903	-/999
	1~/3~ TPE [mm]	-	-	-/643	-/643	-/713	-/747	-/794	-/859	-/903	-/929
H4	[mm]	-	-	-	-	-	-	35	35	35	35
M		M16	M16	M16	M16	M16	M16	M16	M16	M16	M16

★ TP, TPD pumps are primarily fitted with IE3 motors. See *Motor data* on page 125.

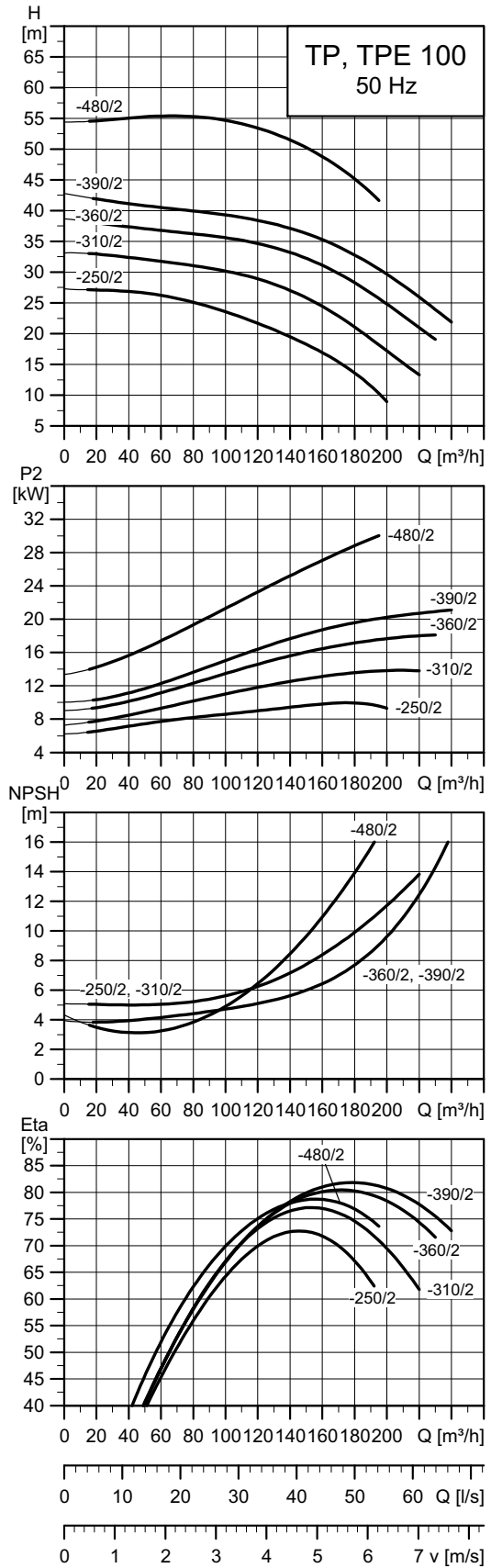
★★ The dimension before the slash applies to the single-head pump, and the dimension after the slash applies to the twin-head pump.

★★★ The integrated CUE can be positioned in an angle deviating from this drawing with up to 30 degrees. For further information look in Grundfos Product Center.

TP 100-XX/2

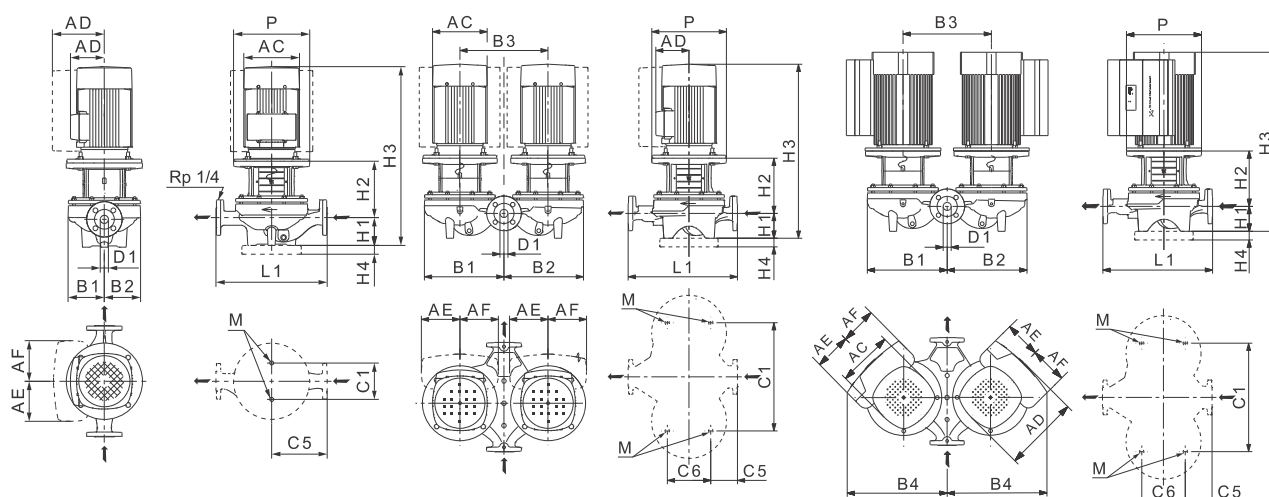


TM02 5026 4715



TM02 8751 2115

Note: All curves apply to single-head pumps. For further information, see page 160.



TM02 8632 2614 - TM02 8631 2614 - TM06 2653 4614

## Technical data

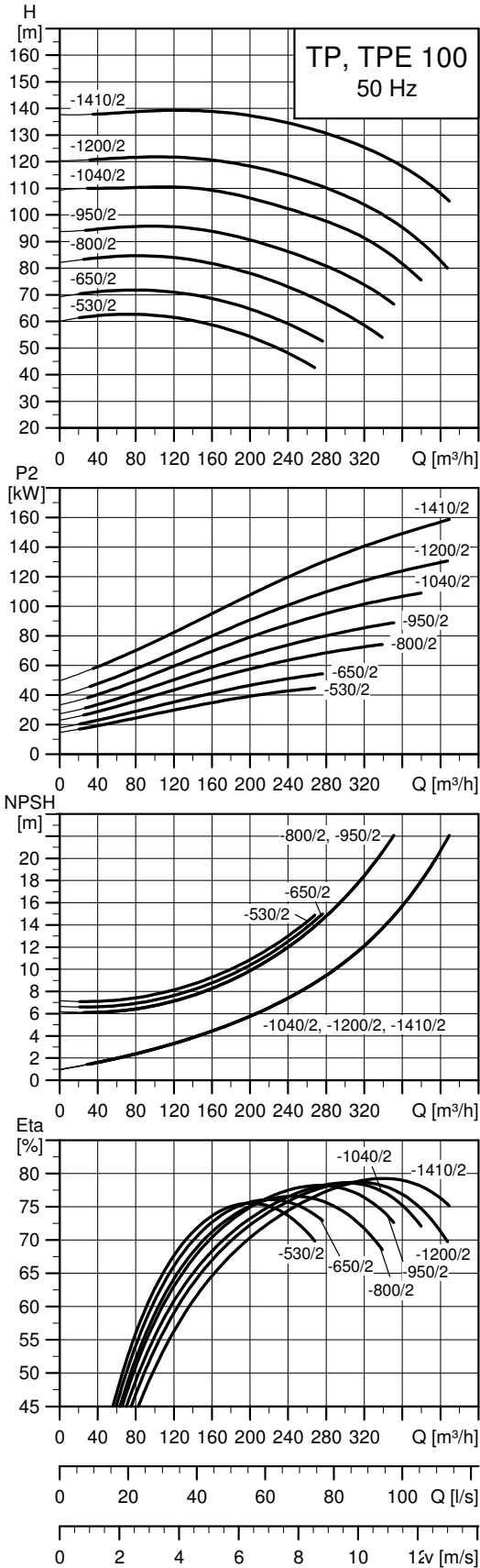
TP 100	-120/2	-160/2	-200/2	-240/2	-250/2	-310/2	-360/2	-390/2	-480/2	
TPD	•	•	•	•	•	•	•	•	•	
TPE	•	•	•	•	•	•	•	•	•***	
TPED	•	•	•	•	•	•	•	•	-	
Series	200	300	300	300	300	300	300	300	300	
IEC size	1~ TP	-	-	-	-	-	-	-	-	
	3~ TP	90	112	132	132	160	160	160	180	
	1~ TPE	-	-	-	-	-	-	-	-	
	3~ TPE	90	112	132	132	160	160	160	180	
P2	1~/3~ TP ★ [kW]	-/2.2	-/4	-/5.5	-/7.5	-/11	-/15	-/18.5	-/22	-/30
	1~/3~ TPE [kW]	-/2.2	-/4	-/5.5	-/7.5	-/11	-/15	-/18.5	-/22	-/30
PN	PN 6/10	PN 16	PN 16	PN 16	PN 16	PN 16	PN 16	PN 16	PN 16	
T <sub>min</sub> , T <sub>max</sub>	[°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	-/191	-/191	-/255	-/255	-/314	-/314	-/407	
AD	1~/3~ TP [mm]	-/110	-/134	-/134	-/159	-/204	-/204	-/204	-/315	
	1~/3~ TPE [mm]	-/158	-/201	-/201	-/237	-/237	-/308	-/308	-/470	
AE	1~/3~ TPE [mm]	-/134	-/146	-/146	-/173	-/173	-/210	-/210	-/126	
AF	1~/3~ TPE [mm]	-/134	-/146	-/146	-/173	-/173	-/210	-/210	-/126	
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	
B4 ★★	[mm]	-/340	-/481	-/481	-/526	-/541	-	-	-	
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	-/680	-/750	-/774	-/816	-/881	-/925	-/1058	
H4	[mm]	-	-	-	-	35	35	35	35	
M		M16	M16	M16	M16	M16	M16	M16	M16	

★ TP, TPD pumps are primarily fitted with IE3 motors. See *Motor data* on page 125.

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

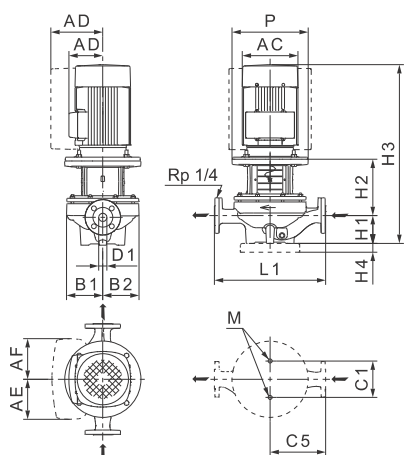
★★★ The integrated CUE can be positioned in an angle deviating from this drawing with up to 30 degrees. For further information look in Grundfos Product Center.

TP 100-XX/2



TM06 6592 4217

Note: All curves apply to single-head pumps. For further information, see page 160.



TM02 8632 2614

### Technical data

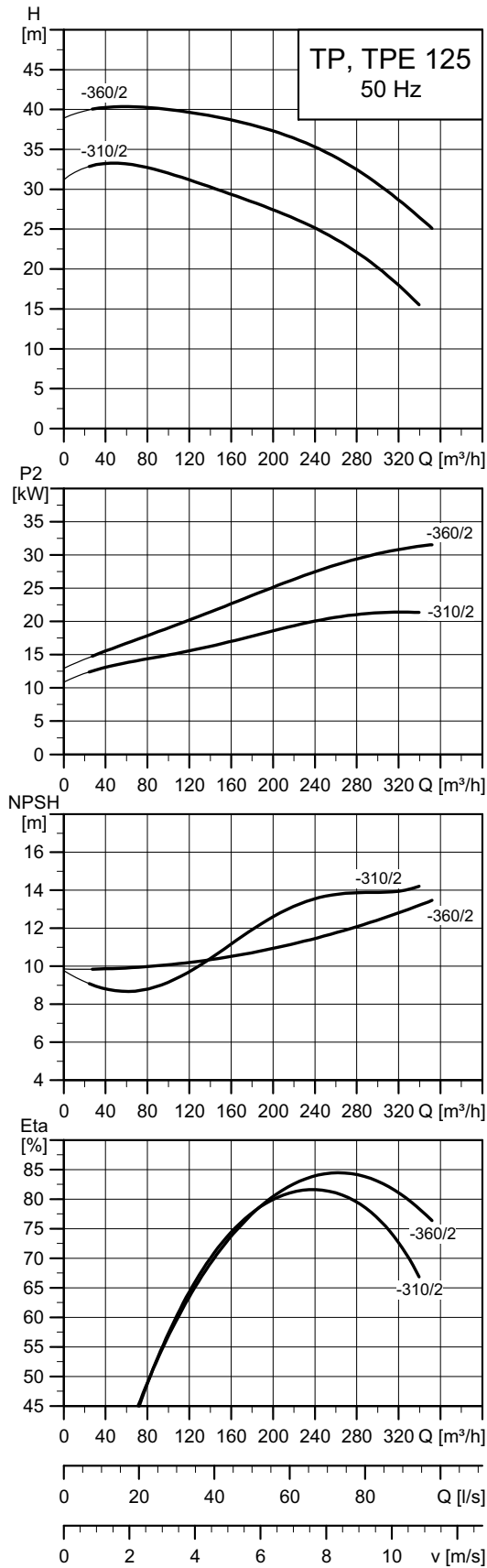
TP 100	-530/2	-650/2	-800/2	-950/2	-1040/2	-1200/2	-1410/2
TPD	-	-	-	-	-	-	-
TPE	● ★★★	● ★★★	-	-	-	-	-
TPED	-	-	-	-	-	-	-
Series	300	300	300	300	300	300	300
IEC size	1~ TP	-	-	-	-	-	-
	3~ TP	250	250	280	280	315	315
	1~ TPE	-	-	-	-	-	-
	3~ TPE	250	250	-	-	-	-
P2	1~/3~ TP ★ [kW]	/45	/55	/75	/90	/110	/132
	1~/3~ TPE [kW]	/45	/55	-	-	-	-
PN	PN25	PN25	PN25	PN25	PN25	PN25	PN25
T <sub>min</sub> :T <sub>max</sub>	[°C] [-40;150]	[-40;150]	[-40;150]	[-40;150]	[-40;150]	[-40;150]	[-40;150]
D1	[mm]	100	100	100	100	100	100
AC	1~/3~ TP [mm]	/442	/495	/555	/555	/610	/610
	1~/3~ TPE [mm]	/442	/495	-	-	-	-
AD	1~/3~ TP [mm]	/325	/392	/432	/432	/495	/495
	1~/3~ TPE [mm]	/558	/604	-	-	-	-
AE	1~/3~ TPE [mm]	/159	/159	-	-	-	-
AF	1~/3~ TPE [mm]	/159	/159	-	-	-	-
P	[mm]	450	550	550	550	660	660
B1 ★★	[mm]	281/-	281/-	281/-	281/-	281/-	281/-
B2 ★★	[mm]	246/-	246/-	246/-	246/-	246/-	246/-
B3	[mm]	-	-	-	-	-	-
B4 ★★	[mm]	-	-	-	-	-	-
C1 ★★	[mm]	230/-	230/-	230/-	230/-	230/-	230/-
C5 ★★	[mm]	335/-	335/-	335/-	335/-	335/-	335/-
C6	[mm]	-	-	-	-	-	-
L1	[mm]	670	670	670	670	670	670
H1	[mm]	175	175	175	175	175	175
H2	[mm]	333	338	338	338	366	366
H3	1~/3~ TP [mm]	/1220	/1330	/1333	/1443	/1473	/1633
	1~/3~ TPE [mm]	/1220	/1330	-	-	-	-
H4	[mm]	35	35	35	35	35	35
M		M16	M16	M16	M16	M16	M16

★ TP, TPD pumps are primarily fitted with IE3 motors. See *Motor data* on page 125.

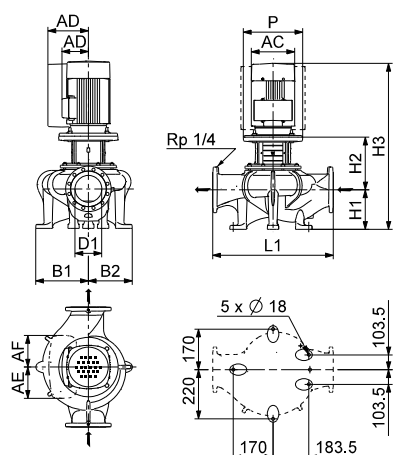
★★ The dimension before the slash applies to the single-head pump, and the dimension after the slash applies to the twin-head pump.

★★★ The integrated CUE can be positioned in an angle deviating from this drawing with up to 30 degrees. For further information look in Grundfos Product Center.

TP 125-XX/2



TM06 6868 2516



TM05 0660 2614

### Technical data

TP 125		-310/2	-360/2
TPD		-	-
TPE		●	● ★★★
TPED		-	-
Series		300	300
IEC size	1~ TP	-	-
	3~ TP	100	100
	1~ TPE	-	-
	3~ TPE	100	100
P2	1~/3~ TP ★ [kW]	-/22	-/30
	1~/3~ TPE [kW]	-/22	-/30
PN		PN 16	PN 16
T <sub>min</sub> :T <sub>max</sub>	[°C]	[-25;120]	[-25;120]
D1	[mm]	125	125
AC	1~/3~ TP [mm]	-/314	-/407
	1~/3~ TPE [mm]	-/314	-/407
AD	1~/3~ TP [mm]	-/204	-/315
	1~/3~ TPE [mm]	-/308	-/462
AE	1~/3~ TPE [mm]	-/210	-/126
AF	1~/3~ TPE [mm]	-/210	-/126
P	[mm]	350	400
B1 ★★	[mm]	243/-	243/-
B2 ★★	[mm]	193/-	193/-
B3	[mm]	-	-
L1	[mm]	620	620
H1	[mm]	210	210
H2	[mm]	275	275
H3	1~/3~ TP [mm]	-/1065	-/1145
	1~/3~ TPE [mm]	-/1091	-/1145

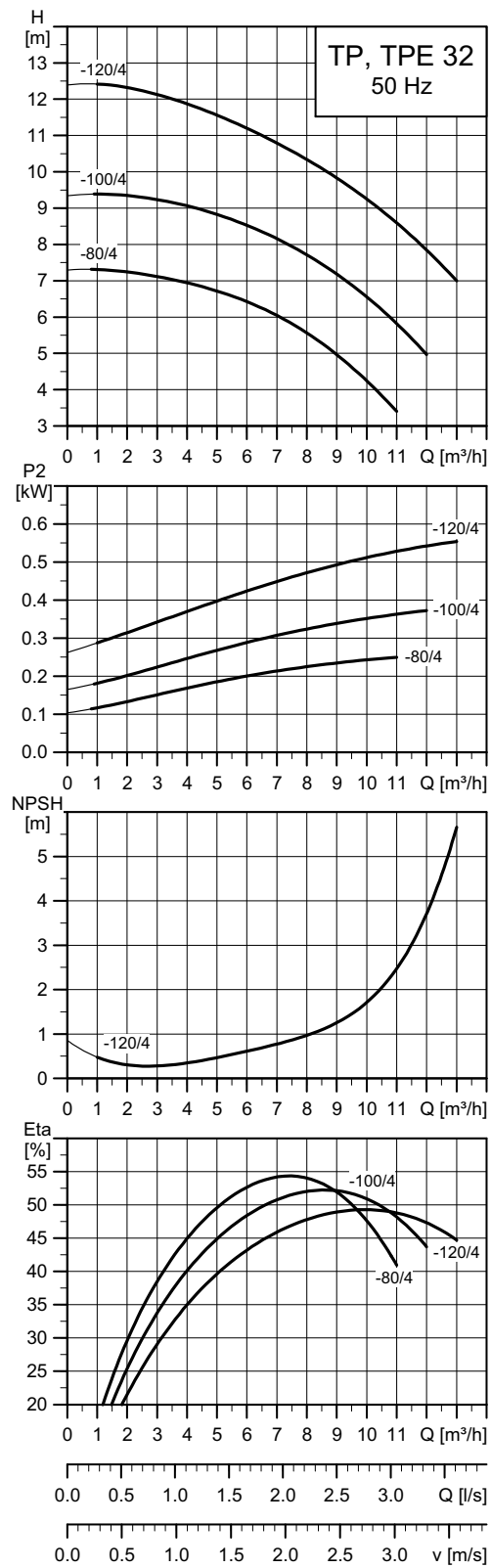
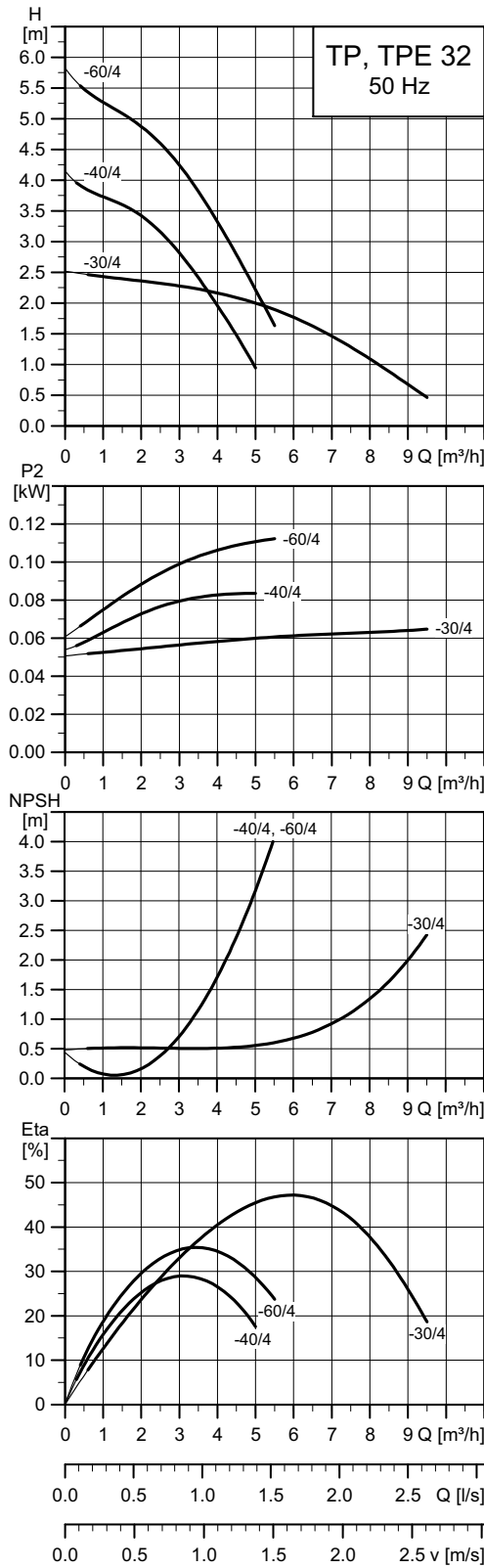
★ TP, TPD pumps are primarily fitted with IE3 motors. See *Motor data* on page 125.

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

★★★ The integrated CUE can be positioned in an angle deviating from this drawing with up to 30 degrees. For further information look in Grundfos Product Center.

**TP, TPD, TPE, TPED, 4-pole, PN 6, 10, 16, 25**

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

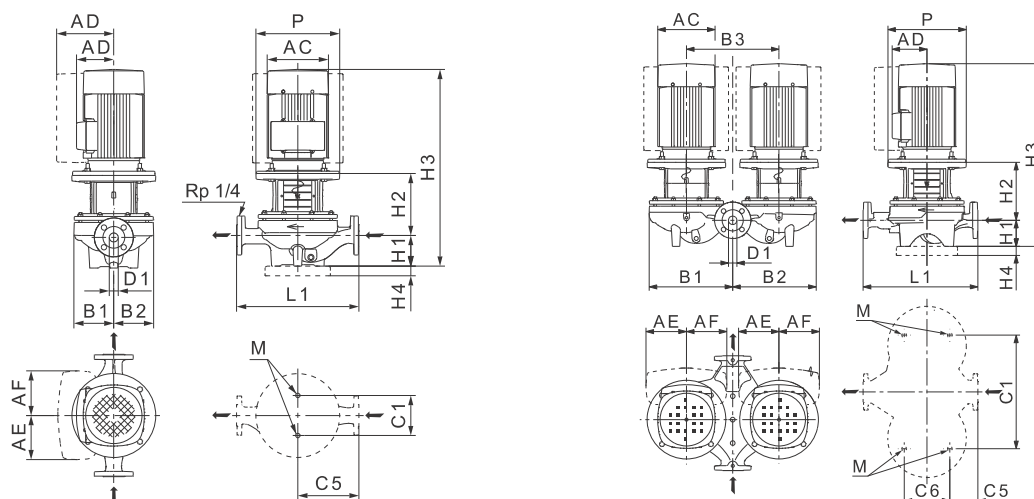


Note: All curves apply to single-head pumps. For further information, see page 160.

TM02 5027 2115

TM02 5028 2115





TM02 8632 2614 - TM02 8631 2614

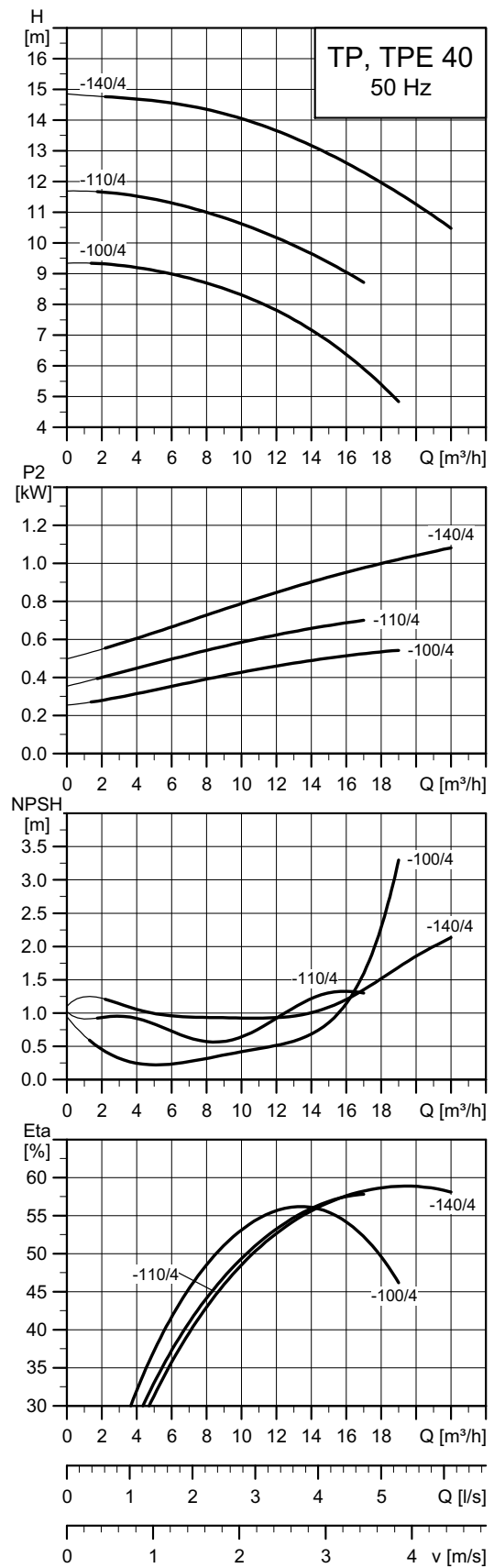
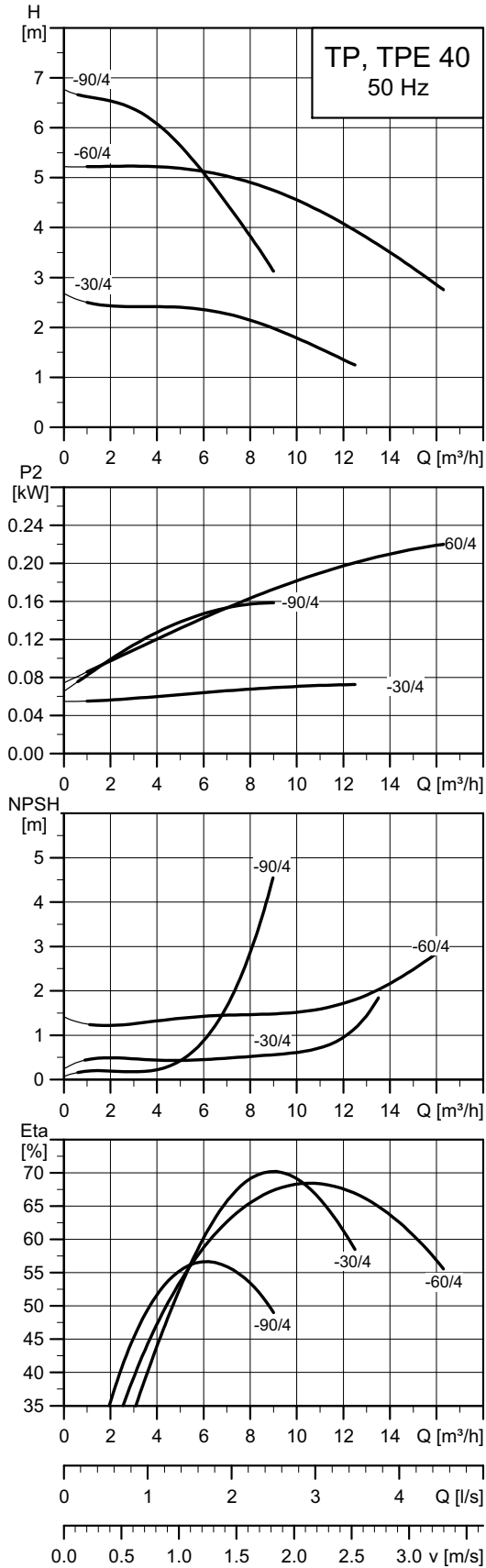
### Technical data

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	-	-	-	-	-	-
	3~ TPE	-	-	-	-	-	-
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]	-	-	-	-	-	-
PN		PN 6/10	PN 6/10	PN 6/10	PN 16	PN 16	PN 16
T <sub>min</sub> , T <sub>max</sub>	[°C]	[-25;140]	[-25;140]	[-25;140]	[-25;120]	[-25;120]	[-25;120]
D1	[mm]	32	32	32	32	32	32
AC	1~/3~ TP [mm]	141/118	141/141	141/141	-/141	-/141	-/141
	1~/3~ TPE [mm]	-	-	-	-	-	-
AD	1~/3~ TP [mm]	133/101	133/133	133/133	-/109	-/109	-/109
	1~/3~ TPE [mm]	-	-	-	-	-	-
AE	1~/3~ TPE [mm]	-	-	-	-	-	-
AF	1~/3~ TPE [mm]	-	-	-	-	-	-
P	[mm]	-	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]	401/390	395/395	395/395	-/420	-/420	-/487
	1~/3~ TPE [mm]	-	-	-	-	-	-
H4	[mm]	-	-	-	-	-	-
M		M12	M12	M12	M16	M16	M16

★ TP, TPD pumps are primarily fitted with IE3 motors. See *Motor data* on page 125.

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

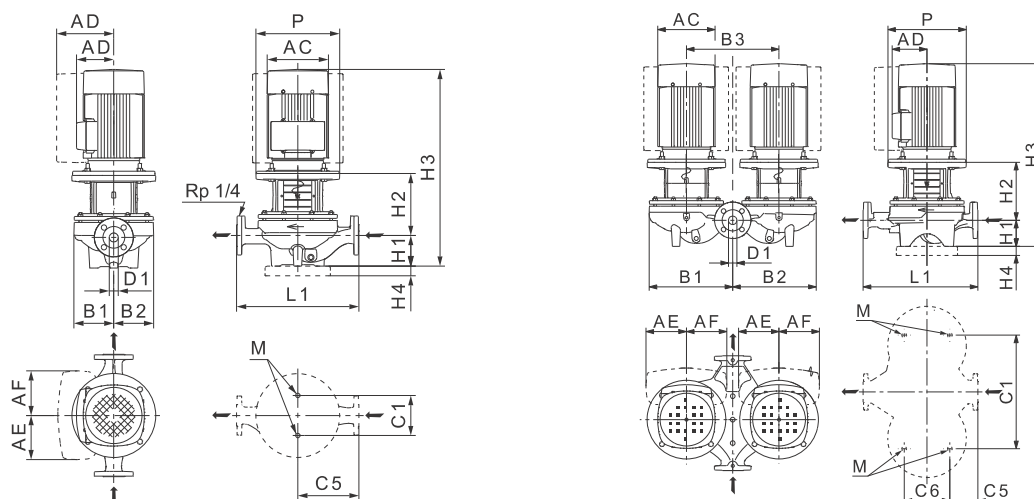
TP 40-XXX/4



TM02 5029 2115

TM02 5030 3315

Note: All curves apply to single-head pumps. For further information, see page 160.



TM02 8632 2614 - TM02 8631 2614

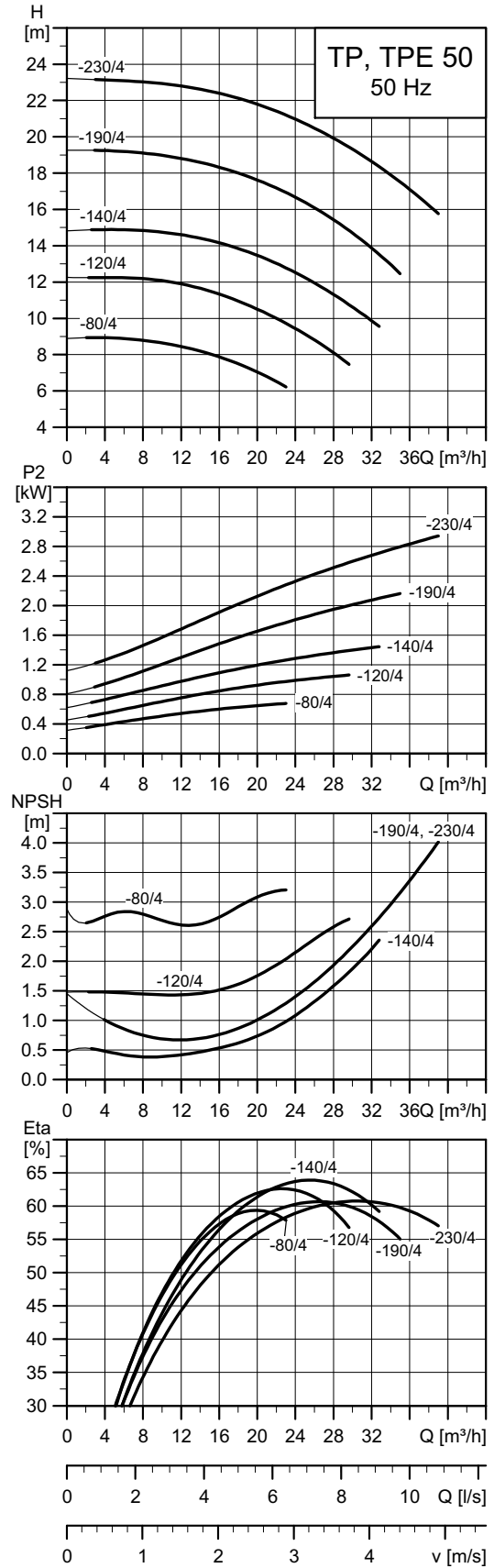
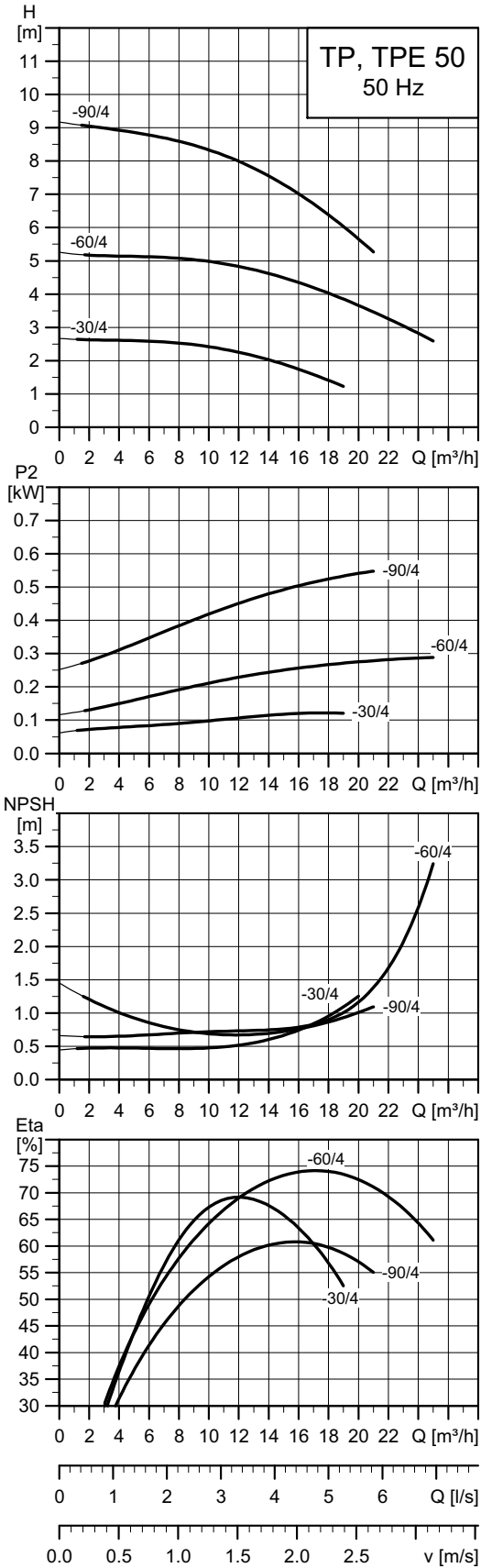
### Technical data

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	90
	1~ TPE	-	-	-	-	-	-
	3~ TPE	-	-	-	-	-	-
P2	1~/3~ TP ★ [kW]	0.12/0.12	0.25/0.25	0.25/0.25	-/0.55	-/0.75	-/1.1
	1~/3~ TPE [kW]	-	-	-	-	-	-
PN		PN 6/10	PN 6/10	PN 16	PN 16	PN 16	PN 16
T <sub>min</sub> , T <sub>max</sub>	[°C]	[-25;140]	[-25;140]	[-25;140]	[-25;120]	[-25;120]	[-25;120]
D1	[mm]	40	40	40	40	40	40
AC	1~/3~ TP [mm]	141/118	141/141	141/141	-/141	-/178	-/178
	1~/3~ TPE [mm]	-	-	-	-	-	-
AD	1~/3~ TP [mm]	133/101	133/109	133/133	-/109	-/110	-/110
	1~/3~ TPE [mm]	-	-	-	-	-	-
AE	1~/3~ TPE [mm]	-	-	-	-	-	-
AF	1~/3~ TPE [mm]	-	-	-	-	-	-
P	[mm]	-	-	105	200	200	200
B1 ★★	[mm]	85/180	100/-	100/222	130/273	150/325	150/325
B2 ★★	[mm]	75/180	100/-	100/222	117/267	147/325	147/325
B3	[mm]	200	-	240	290	355	355
C1 ★★	[mm]	120/200	120/-	120/240	144/400	144/435	144/435
C5 ★★	[mm]	125/45	125/-	160/95	170/45	220/108	220/108
C6	[mm]	125	-	125	175	175	175
L1	[mm]	250	250	320	340	440	440
H1	[mm]	67	75	68/79	100	110	110
H2	[mm]	146	123	128	166	156	156
H3	1~/3~ TP [mm]	404/393	389/389	388/398	-/497	-/547	-/587
	1~/3~ TPE [mm]	-	-	-	-	-	-
H4	[mm]	-	-	-	-	-	-
M		M12	M12	M12	M16	M16	M16

★ TP, TPD pumps are primarily fitted with IE3 motors. See *Motor data* on page 125.

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

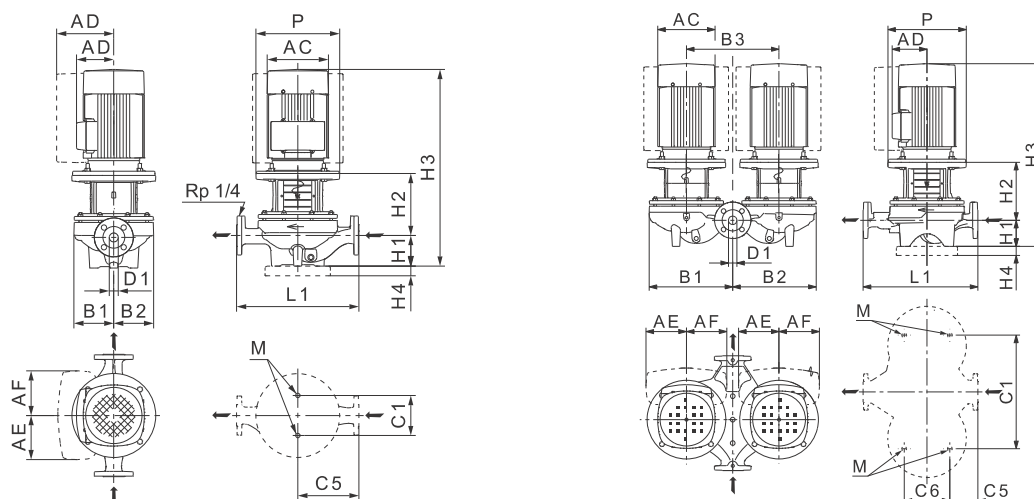
TP 50-XXX/4



Note: All curves apply to single-head pumps. For further information, see page 160.

TM02 5031 2115

TM02 5032 3315



TM02 8632 2614 - TM02 8631 2614

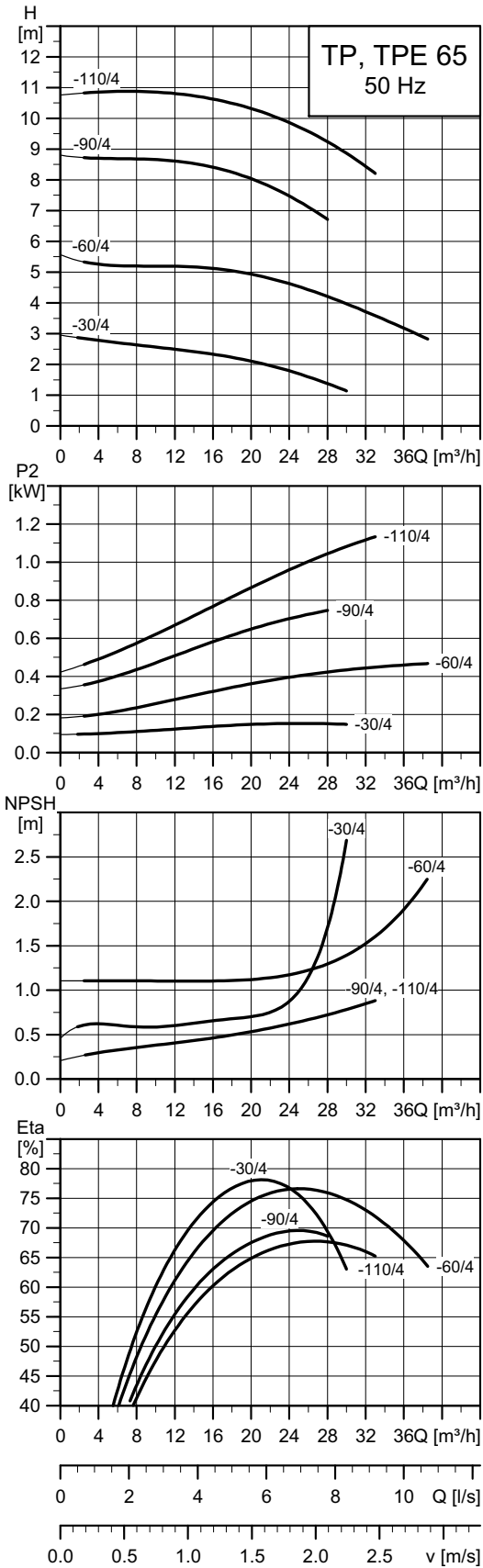
### Technical data

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	100
	1~ TPE	-	-	-	-	-	-	-	-
	3~ TPE	-	-	-	-	-	-	-	-
P2	1~/3~ TP ★ [kW]	0.25/0.25	0.37/0.37	-/0.55	-/0.75	-/1.1	-/1.5	-/2.2	-/3
	1~/3~ TPE [kW]	-	-	-	-	-	-	-	-
PN		PN 6/10	PN 6/10	PN 16	PN 16	PN 16	PN 16	PN 16	PN 16
T <sub>min</sub> , T <sub>max</sub>	[°C]	[-25;140]	[-25;140]	[-25;120]	[-25;120]	[-25;120]	[-25;120]	[-25;120]	[-25;120]
D1	[mm]	50	50	50	50	50	50	50	50
AC	1~/3~ TP [mm]	141/142	141/141	-/141	-/178	-/178	-/178	-/198	-/198
	1~/3~ TPE [mm]	-	-	-	-	-	-	-	-
AD	1~/3~ TP [mm]	133/133	133/109	-/109	-/110	-/110	-/110	-/120	-/120
	1~/3~ TPE [mm]	-	-	-	-	-	-	-	-
AE	1~/3~ TPE [mm]	-	-	-	-	-	-	-	-
AF	1~/3~ TPE [mm]	-	-	-	-	-	-	-	-
P	[mm]	-	-	200	200	200	200	250	250
B1 ★★	[mm]	75/181	110/225	133/290	162/373	162/373	162/373	180/386	180/386
B2 ★★	[mm]	90/186	100/225	119/284	162/373	162/373	162/373	164/379	164/379
B3	[mm]	200	240	320	420	420	420	420	420
C1 ★★	[mm]	120/200	120/240	144/400	144/500	144/500	144/500	144/500	144/500
C5 ★★	[mm]	140/60	140/60	170/52	220/123	220/123	220/123	220/123	220/123
C6	[mm]	125	125	175	175	175	175	175	175
L1	[mm]	280	280	340	440	440	440	440	440
H1	[mm]	82/90	82	115	115	115	115	115	115
H2	[mm]	135	127	161	160	160	160	195	195
H3	1~/3~ TP [mm]	408/416	452/400	-/507	-/546	-/596	-/596	-/645	-/645
	1~/3~ TPE [mm]	-	-	-	-	-	-	-	-
H4	[mm]	-	-	-	-	-	-	-	-
M		M12	M12	M16	M16	M16	M16	M16	M16

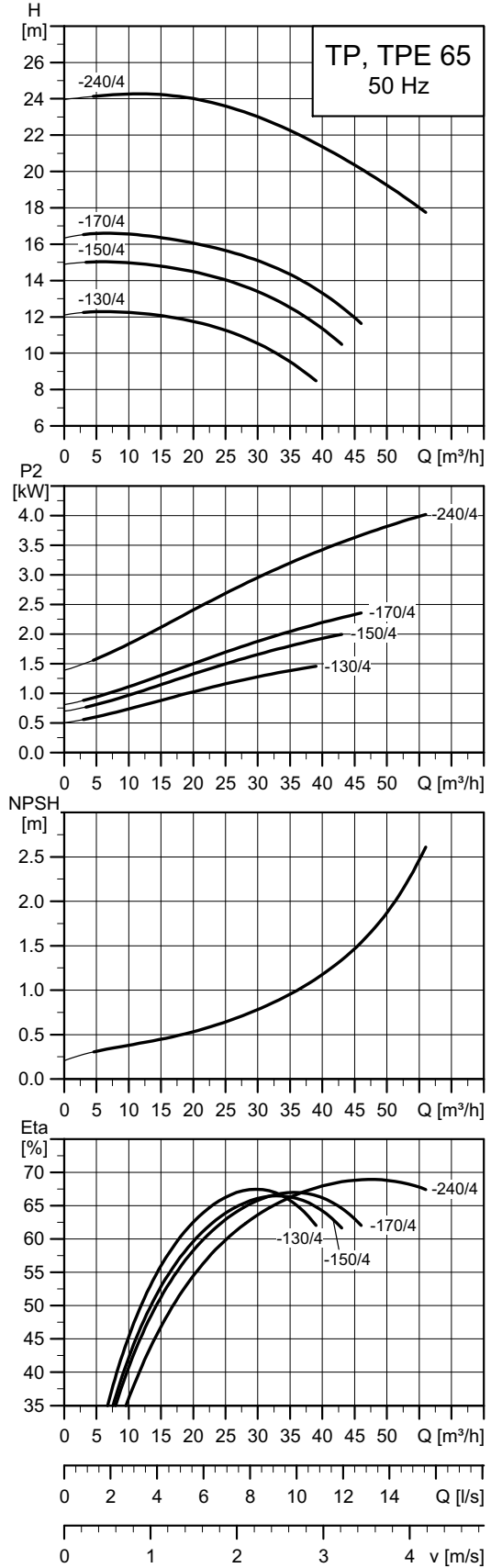
★ TP, TPD pumps are primarily fitted with IE3 motors. See *Motor data* on page 125.

★★ 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

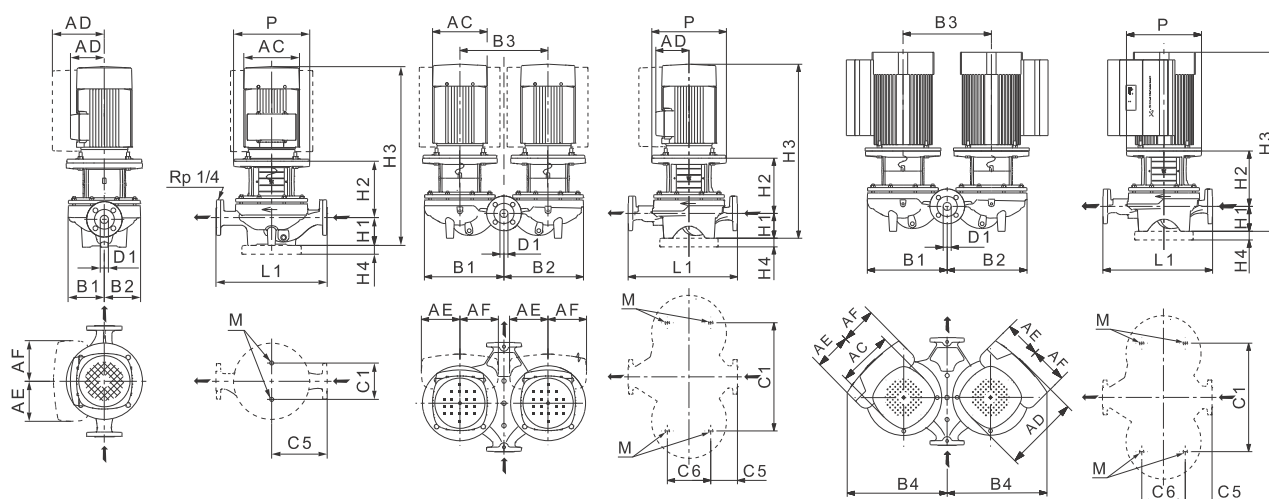


TM02 5033 2115



TM02 5043 2115

Note: All curves apply to single-head pumps. For further information, see page 160.



TM02 8632 2614 - TM02 8631 2614 - TM06 2653 4614

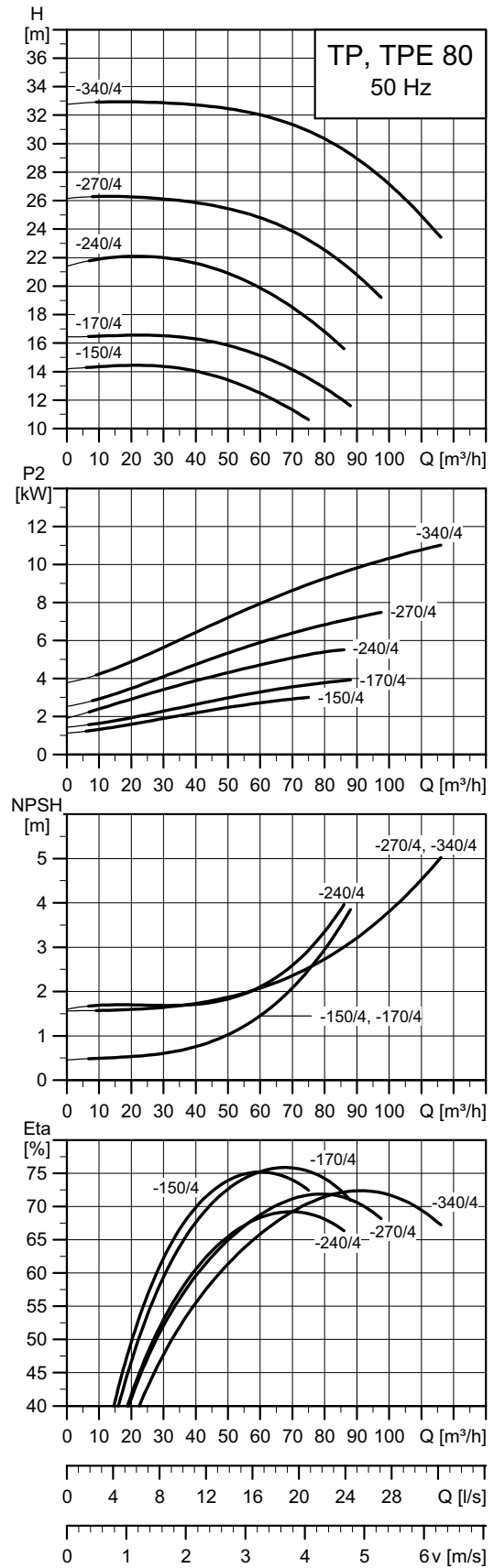
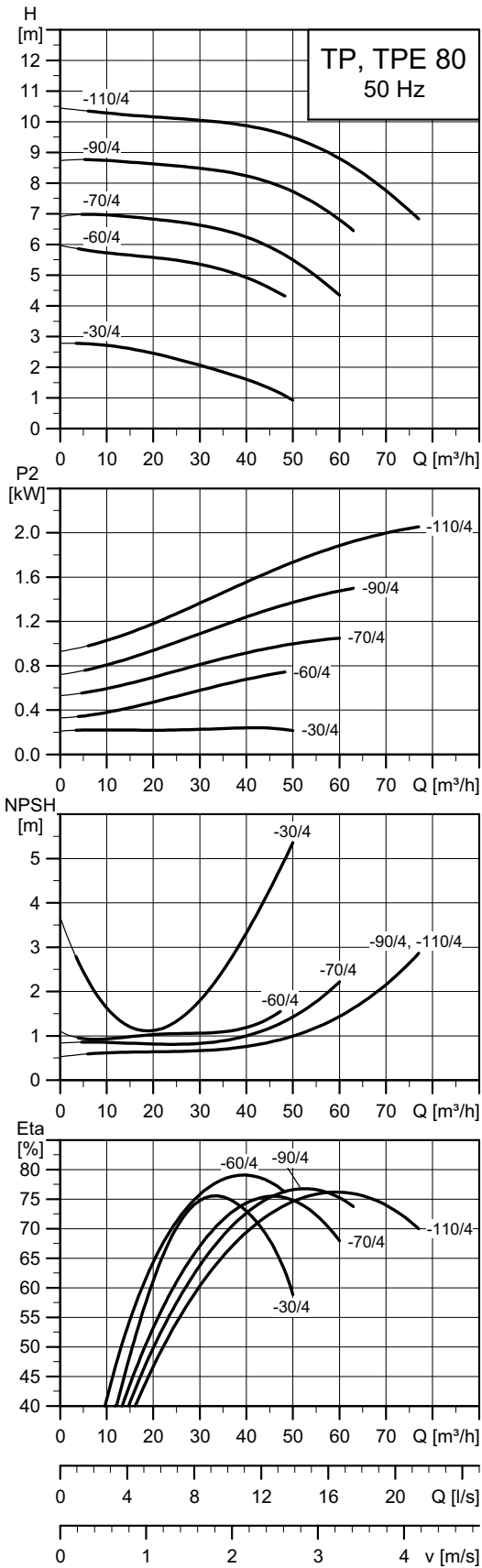
### Technical data

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	112
	1~ TPE	-	-	-	-	-	-	-
	3~ TPE	-	-	-	-	-	-	112
P2	1~/3~ TP ★ [kW]	0.25/0.25	0.55/0.55	-/0.75	-/1.1	-/1.5	-/2.2	-/3
	1~/3~ TPE [kW]	-	-	-	-	-	-	-/4
PN	PN 6/10	PN 6/10	PN 16	PN 16	PN 16	PN 16	PN 16	PN 16
T <sub>min</sub> , T <sub>max</sub>	[°C]	[-25;140]	[-25;140]	[-25;120]	[-25;120]	[-25;120]	[-25;120]	[-25;120]
D1	[mm]	65	65	65	65	65	65	65
AC	1~/3~ TP [mm]	141/141	141/141	-/178	-/178	-/178	-/198	-/220
	1~/3~ TPE [mm]	-	-	-	-	-	-	-/191
AD	1~/3~ TP [mm]	133/109	133/109	-/110	-/110	-/110	-/120	-/134
	1~/3~ TPE [mm]	-	-	-	-	-	-	-/201
AE	1~/3~ TPE [mm]	-	-	-	-	-	-	-/146
AF	1~/3~ TPE [mm]	-	-	-	-	-	-	-/146
P	[mm]	-	-	200	200	200	250	250
B1 ★★	[mm]	125/230	125/230	142/298	178/349	178/349	178/349	178/349
B2 ★★	[mm]	100/240	100/240	124/290	164/383	164/383	164/0	164/383
B3	[mm]	240	240	320	440	440	440	440
B4 ★★	[mm]	-	-	-	-	-	-	-/466
C1 ★★	[mm]	160/240	160/240	144/400	144/520	144/520	144/520	144/520
C5 ★★	[mm]	170/63	170/63	180/65	238/111	238/111	238/111	238/111
C6	[mm]	153	153	175	175	175	175	175
L1	[mm]	340	340	360	475	475	475	475
H1	[mm]	97	97	105	125	125	125	125
H2	[mm]	135	147	172	166	166	194	194
H3	1~/3~ TP [mm]	423/423	475/475	-/558	-/612	-/612	-/654	-/691
	1~/3~ TPE [mm]	-	-	-	-	-	-	-/653
H4	[mm]	-	-	-	-	-	-	-
M		M16	M16	M16	M16	M16	M16	M16

★ TP, TPD pumps are primarily fitted with IE3 motors. See *Motor data* on page 125.

★★ 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

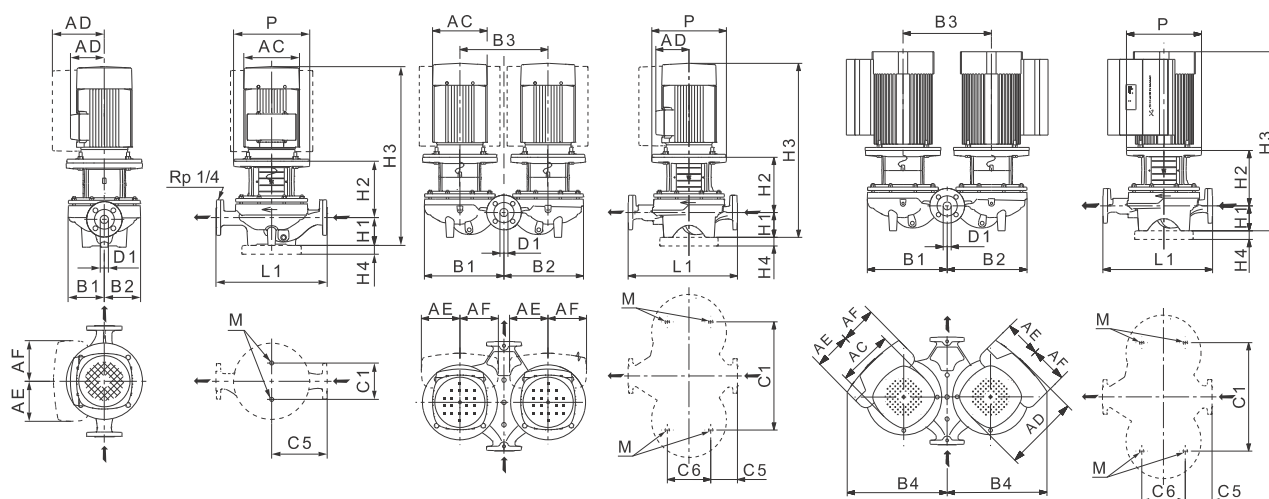


Note: All curves apply to single-head pumps. For further information, see page 160.

TM02 5044 2115

TM02 8752 2115





TM02 8632 2614 - TM02 8631 2614 - TM06 2653 4614

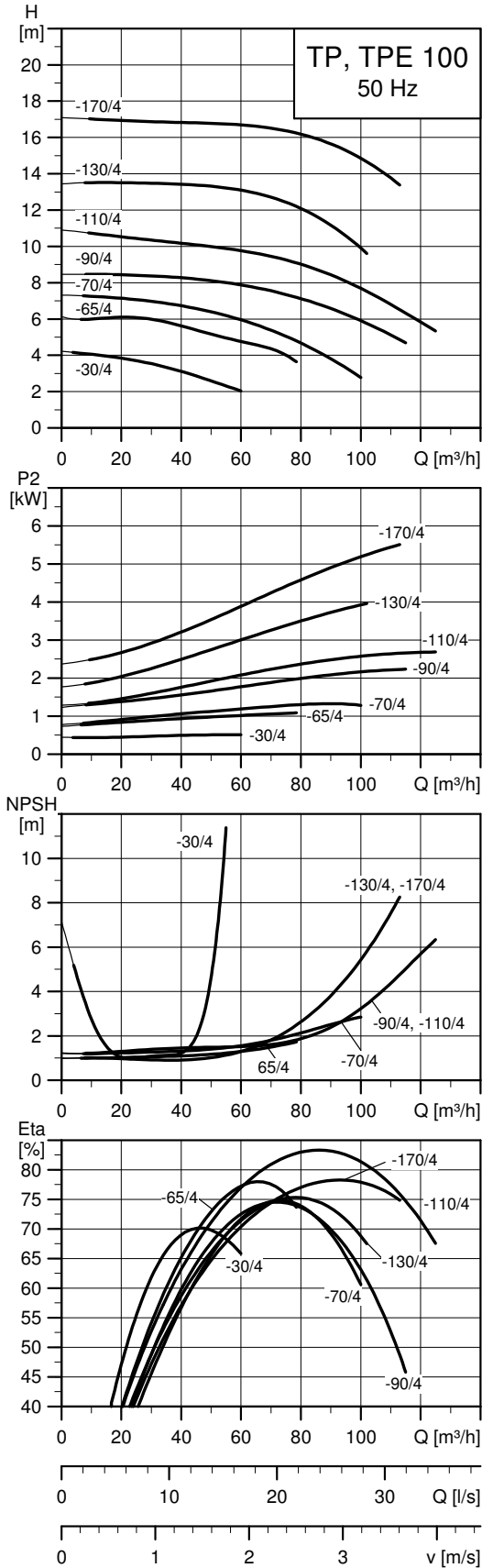
## Technical data

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	132	160
	1~ TPE	-	-	-	-	-	-	-	-	-	-
	3~ TPE	-	-	-	-	-	112	112	132	132	160
P2	1~/3~ TP ★ [kW]	0.37/0.37	0.75/0.75	-1.1	-1.5	-2.2	-3	-4	-5.5	-7.5	-11
	1~/3~ TPE [kW]	-	-	-	-	-	-3	-4	-5.5	-7.5	-11
PN		PN 6/PN 10	PN 6/PN 10	PN 16	PN 16	PN 16	PN 16	PN 16	PN 16	PN 16	PN 16
T <sub>min</sub> , T <sub>max</sub>	[°C]	[-25;140]	[-25;140]	[-25;120]	[-25;120]	[-25;120]	[-25;120]	[-25;120]	[-25;120]	[-25;120]	[-25;120]
D1	[mm]	80	80	80	80	80	80	80	80	80	80
AC	1~/3~ TP [mm]	142/141	178/178	-178	-178	-198	-198	-220	-260	-260	-314
	1~/3~ TPE [mm]	-	-	-	-	-	-191	-191	-255	-255	-314
AD	1~/3~ TP [mm]	133/109	139/110	-110	-110	-120	-120	-134	-159	-159	-204
	1~/3~ TPE [mm]	-	-	-	-	-	-201	-201	-237	-237	-308
AE	1~/3~ TPE [mm]	-	-	-	-	-	-146	-146	-173	-173	-210
AF	1~/3~ TPE [mm]	-	-	-	-	-	-146	-146	-173	-173	-210
P	[mm]	-	-	200	200	250	250	250	300	300	350
B1 ★★	[mm]	130/230	135/240	176/366	176/366	176/366	187/416	187/416	243/491	243/491	243/491
B2 ★★	[mm]	100/240	100/250	144/354	144/354	144/354	162/405	162/405	226/480	226/480	226/480
B3	[mm]	240	240	400	400	400	470	470	500	500	500
B4 ★★	[mm]	-	-	-	-	-	-481	-481	-541	-541	-
C1 ★★	[mm]	160/240	160/240	144/480	144/480	144/480	144/550	144/550	230/550	230/550	230/550
C5 ★★	[mm]	180/53	180/53	220/93	220/93	220/93	250/133	250/133	310/105	310/105	310/105
C6	[mm]	173	173	175	175	175	175	175	350	350	350
L1	[mm]	360	360	440	440	440	500	500	620	620	620
H1	[mm]	107	107	115	115	115	115	115	140	140	140
H2	[mm]	163	153	176	176	204	204	204	273	273	303
H3	1~/3~ TP [mm]	513/461	551/541	-612	-612	-654	-654	-691	-792	-842	-914
	1~/3~ TPE [mm]	-	-	-	-	-	-654	-654	-802	-802	-914
H4	[mm]	-	-	-	-	-	-	-	-	-	35
M		M16	M16	M16	M16	M16	M16	M16	M16	M16	M16

★ TP, TPD pumps are primarily fitted with IE3 motors. See *Motor data* on page 125.

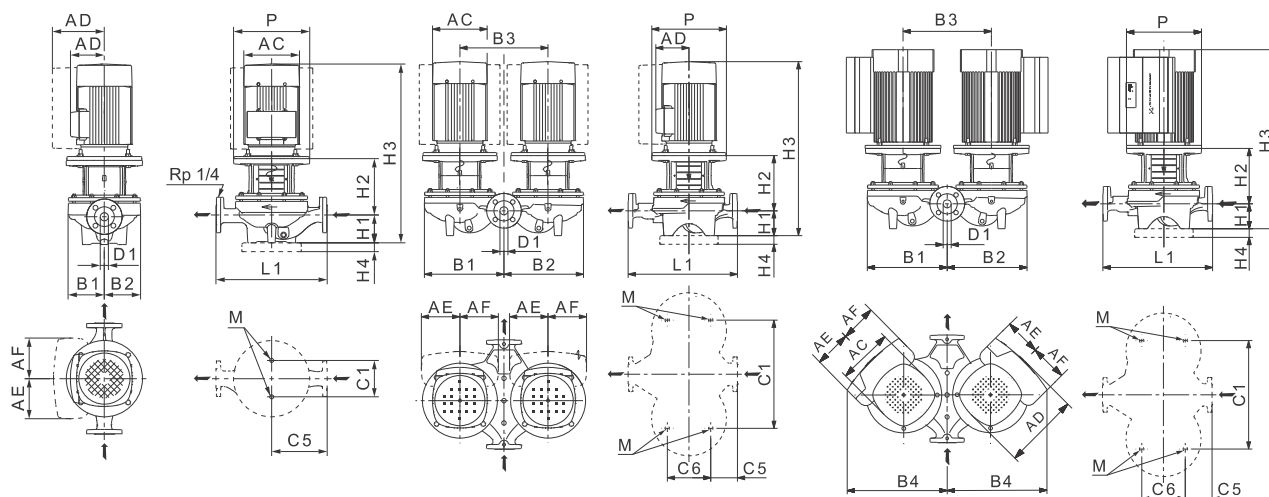
★★ The dimension before the slash applies to the single-head pump, and the dimension after the slash applies to the twin-head pump.

TP 100-XXX/4



TM02 5045 2118

Note: All curves apply to single-head pumps. For further information, see page 160.



TM02 8632 2614 - TM02 8631 2614 - TM06 2653 4614

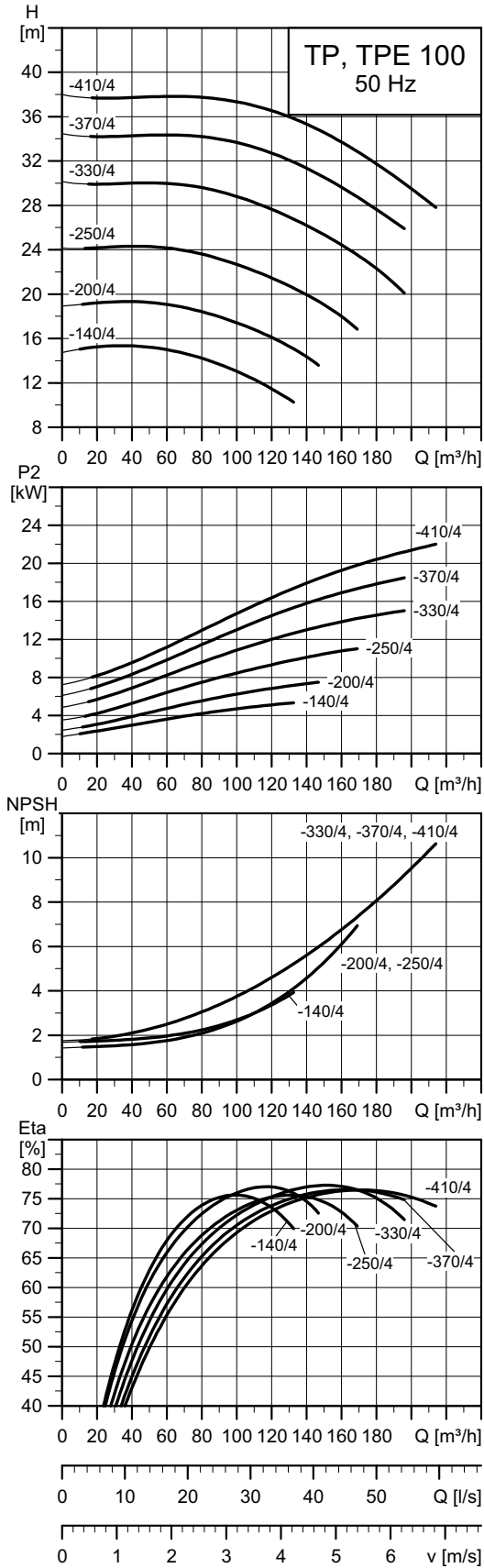
### Technical data

TP 100		-30/4	-65/4	-70/4	-90/4	-110/4	-130/4	-170/4
TPD		•	•	•	•	•	•	•
TPE		-	•	•	•	•	•	•
TPED		-	•	•	•	•	•	•
Series		200	300	300	300	300	300	300
IEC size	1~ TP	80	90	-	-	-	-	-
	3~ TP	80	90	90	100	100	112	132
	1~ TPE	-	-	-	-	-	-	-
	3~ TPE	-	90	90	100	112	112	132
P2	1~3~ TP ★ [kW]	0.55/0.55	-1.1	-1.5	-2.2	-3	-4	-5.5
	1~3~ TPE [kW]	-	-1.1	-1.5	-2.2	-3	-4	-5.5
PN		PN 6/PN 10	PN 16	PN 16	PN 16	PN 16	PN 16	PN 16
T <sub>min</sub> , T <sub>max</sub>	[°C]	[-25;140]	[-25;120]	[-25;120]	[-25;120]	[-25;120]	[-25;120]	[-25;120]
D1	[mm]	100	100	100	100	100	100	100
AC	1~3~ TP [mm]	141/141	-178	-178	-198	-198	-220	-260
	1~3~ TPE [mm]	-	-122	-122	-191	-191	-191	-255
AD	1~3~ TP [mm]	133/109	-110	-110	-120	-120	-134	-159
	1~3~ TPE [mm]	-	-158	-158	-201	-201	-201	-237
AE	1~3~ TPE [mm]	-	-134	-134	-146	-146	-146	-173
AF	1~3~ TPE [mm]	-	-134	-134	-146	-146	-146	-173
P	[mm]	-	200	200	250	250	250	300
B1 ★★	[mm]	175/280	190/414	190/414	190/414	190/414	201/443	201/443
B2 ★★	[mm]	125/305	151/395	151/395	151/395	151/395	173/429	173/429
B3	[mm]	280	280	470	470	470	500	500
B4 ★★	[mm]	-	-457	-457	-496	-496	-496	-541
C1 ★★	[mm]	200/280	230/550	230/550	230/550	230/550	230/550	230/550
C5 ★★	[mm]	225/83	250/110	250/110	275/110	275/110	275/110	275/110
C6	[mm]	221	230	230	230	230	230	230
L1	[mm]	450	550	550	550	550	550	550
H1	[mm]	122	140	140	140	140	140	140
H2	[mm]	172	173	173	201	201	261	277
H3	1~3~ TP [mm]	525/525	-634	-634	-676	-676	-773	-796
	1~3~ TPE [mm]	-	-587	-587	-675	-675	-731	-806
H4	[mm]	-	-	-	-	-	-	-
M		M16	M16	M16	M16	M16	M16	M16

★ TP, TPD pumps are primarily fitted with IE3 motors. See *Motor data* on page 125.

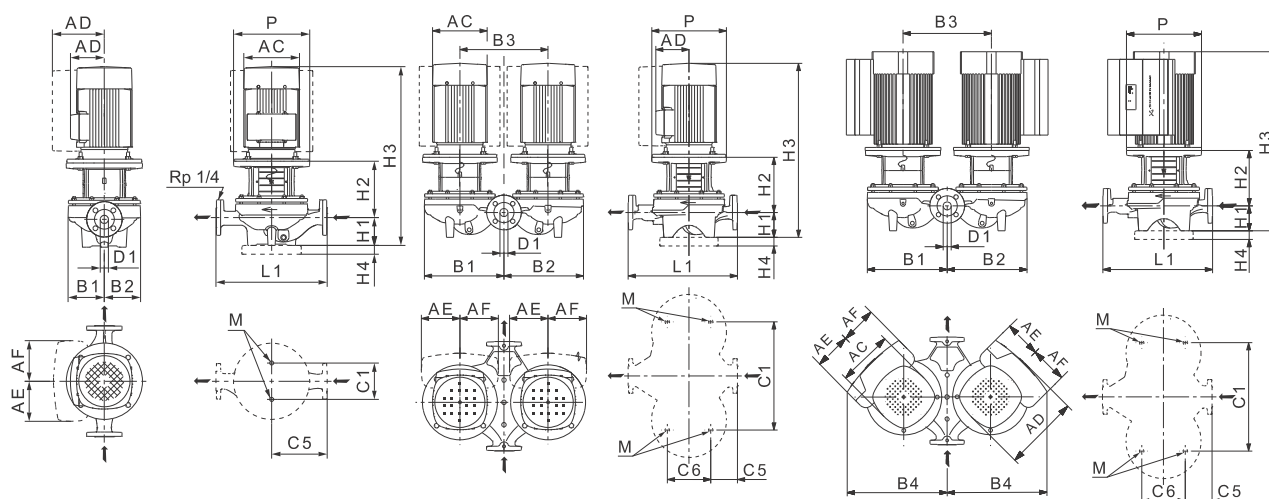
★★ The dimension before the slash applies to the single-head pump, and the dimension after the slash applies to the twin-head pump.

TP 100-XXX/4



TM02 8753 1816

Note: All curves apply to single-head pumps. For further information, see page 160.



TM02 8632 2614 - TM02 8631 2614 - TM06 2653 4614

### Technical data

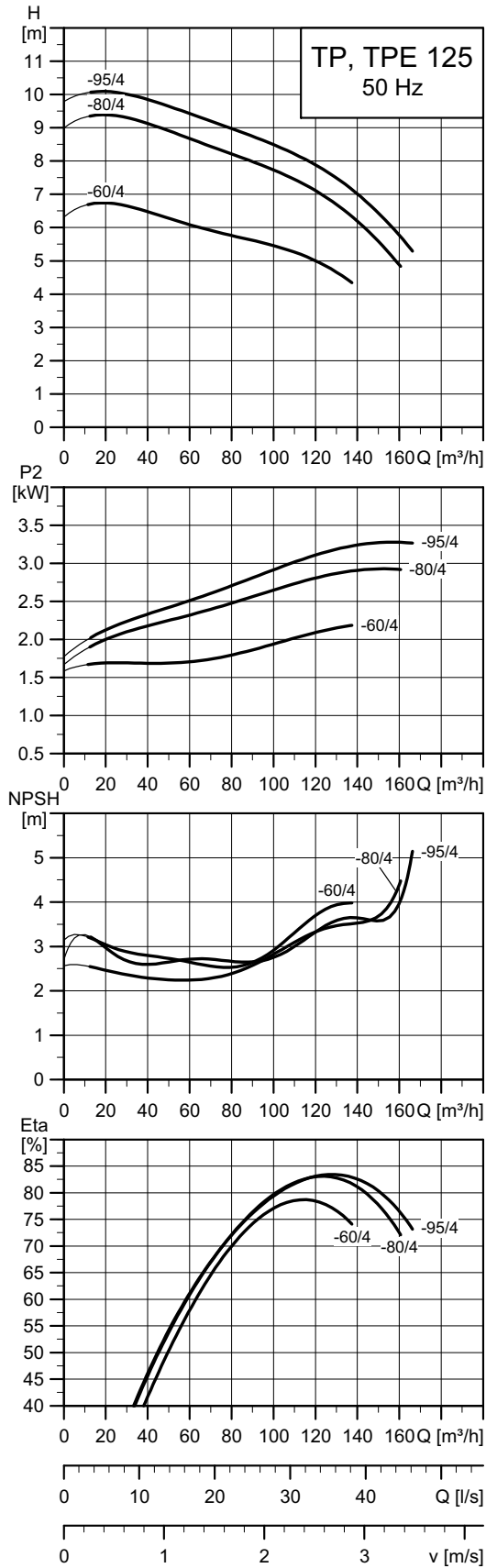
TP 100	-140/4	-200/4	-250/4	-330/4	-370/4	-410/4
TPD	-	•	•	•	•	•
TPE	•	•	•	•	•	•***
TPED	-	•	•	•	•	-
Series	300	300	300	300	300	300
IEC size	1~ TP	-	-	-	-	-
	3~ TP	132	132	160	160	180
	1~ TPE	-	-	-	-	-
	3~ TPE	132	132	160	160	180
P2	1~3~ TP ★ [kW]	-/5.5	-/7.5	-/11	-/15	-/18.5
	1~3~ TPE [kW]	-/5.5	-/7.5	-/11	-/15	-/18.5
PN	PN25	PN16/25	PN16/25	PN16/25	PN16/25	PN16/25
T <sub>min</sub> :T <sub>max</sub>	[°C]	[-40;150]	[-40;150]	[-40;150]	[-40;150]	[-40;150]
D1	[mm]	100	100	100	100	100
AC	1~3~ TP [mm]	-/267	-/260	-/314	-/314	-/368
	1~3~ TPE [mm]	-/255	-/255	-/314	-/314	-/368
AD	1~3~ TP [mm]	-/167	-/159	-/204	-/204	-/286
	1~3~ TPE [mm]	-/237	-/237	-/308	-/308	-/501
AE	1~3~ TPE [mm]	-/173	-/173	-/210	-/210	-/126
AF	1~3~ TPE [mm]	-/173	-/173	-/210	-/210	-/126
P	[mm]	300	300	350	350	350
B1 ★★	[mm]	290/-	290/579	290/579	290/579	290/579
B2 ★★	[mm]	249/-	249/561	249/561	249/561	249/561
B3	[mm]	-	600	600	600	600
B4 ★★	[mm]	-	-/591	-	-	-
C1 ★★	[mm]	230/-	230/680	230/680	230/680	230/680
C5 ★★	[mm]	335/-	335/110	335/110	335/110	335/110
C6	[mm]	-	350	350	350	350
L1	[mm]	670	670	670	670	670
H1	[mm]	175	175	175	175	175
H2	[mm]	254	254	308	308	308
H3	1~3~ TP [mm]	-/820	-/858	-/954	-/1028	-/998
	1~3~ TPE [mm]	-/842	-/842	-/954	-/998	-/1024
H4	[mm]	-	-	35	35	35
M		M16	M16	M16	M16	M16

★ TP, TPD pumps are primarily fitted with IE3 motors. See *Motor data* on page 125.

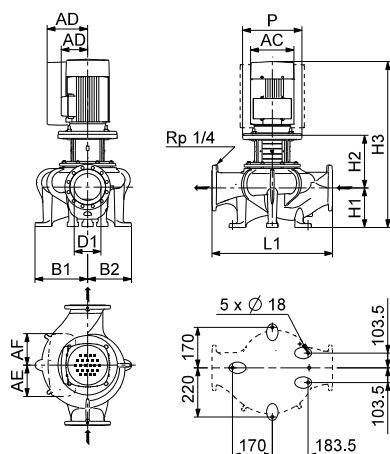
★★ The dimension before the slash applies to the single-head pump, and the dimension after the slash applies to the twin-head pump.

\*\*\* The integrated CUE can be positioned in an angle deviating from this drawing with up to 30 degrees. For further information look in Grundfos Product Center.

TP 125-XXX/4



TM06 3849 2115



TM05 0660 2614

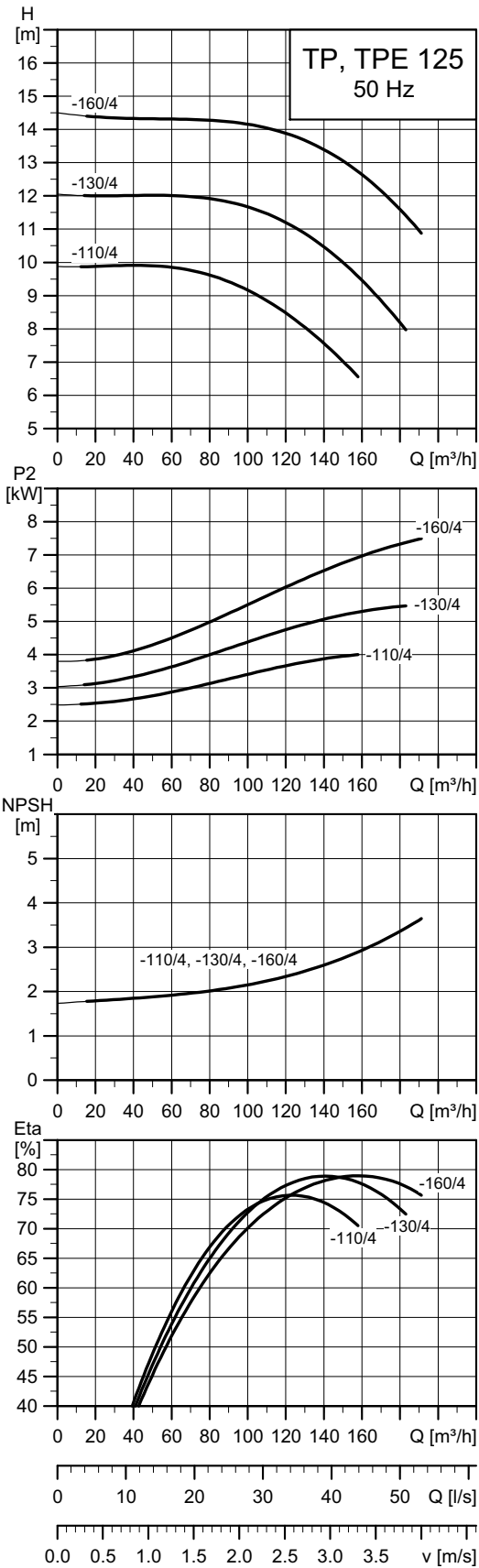
**Technical data**

TP 125		-60/4	-80/4	-95/4
TPD		-	-	-
TPE		•	•	•
TPED		-	-	-
Series		300	300	300
IEC size	1~ TP	-	-	-
	3~ TP	100	100	112
	1~ TPE	-	-	-
	3~ TPE	100	100	112
P2	1~/3~ TP ★ [kW]	-/2.2	-/3	-/4
	1~/3~ TPE [kW]	-/2.2	-/3	-/4
PN		PN 16	PN 16	PN 16
T <sub>min</sub> , T <sub>max</sub>	[°C]	[-25;120]	[-25;120]	[-25;120]
D1	[mm]	125	125	125
AC	1~/3~ TP [mm]	-/198	-/198	-/220
	1~/3~ TPE [mm]	-/191	-/191	-/191
AD	1~/3~ TP [mm]	-/120	-/120	-/134
	1~/3~ TPE [mm]	-/201	-/201	-/201
AE	1~/3~ TPE [mm]	-/146	-/146	-/146
AF	1~/3~ TPE [mm]	-/146	-/146	-/146
P	[mm]	250	250	250
B1 ★★	[mm]	243/-	243/-	243/-
B2 ★★	[mm]	193/-	193/-	193/-
B3	[mm]	-	-	-
L1	[mm]	620	620	620
H1	[mm]	210	210	210
H2	[mm]	-/225	-/225	-/225
H3	1~/3~ TP [mm]	-/770	-/770	-/807
	1~/3~ TPE [mm]	-/769	-/769	-/769

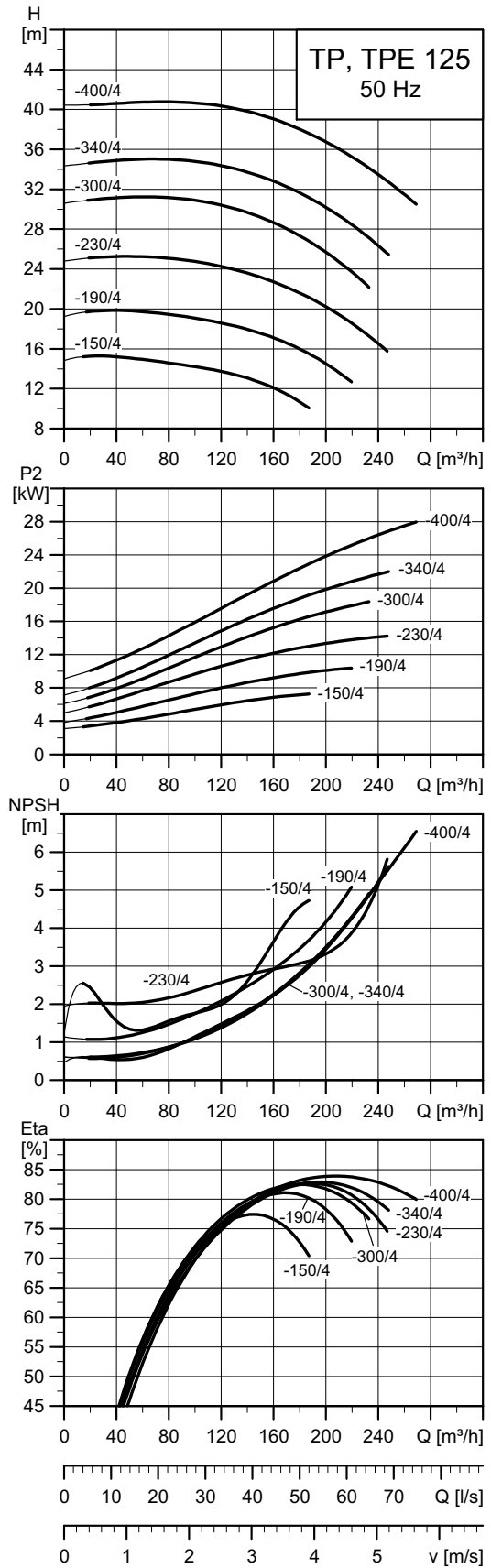
★ TP, TPD pumps are primarily fitted with IE3 motors. See *Motor data* on page 125.

★★ 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



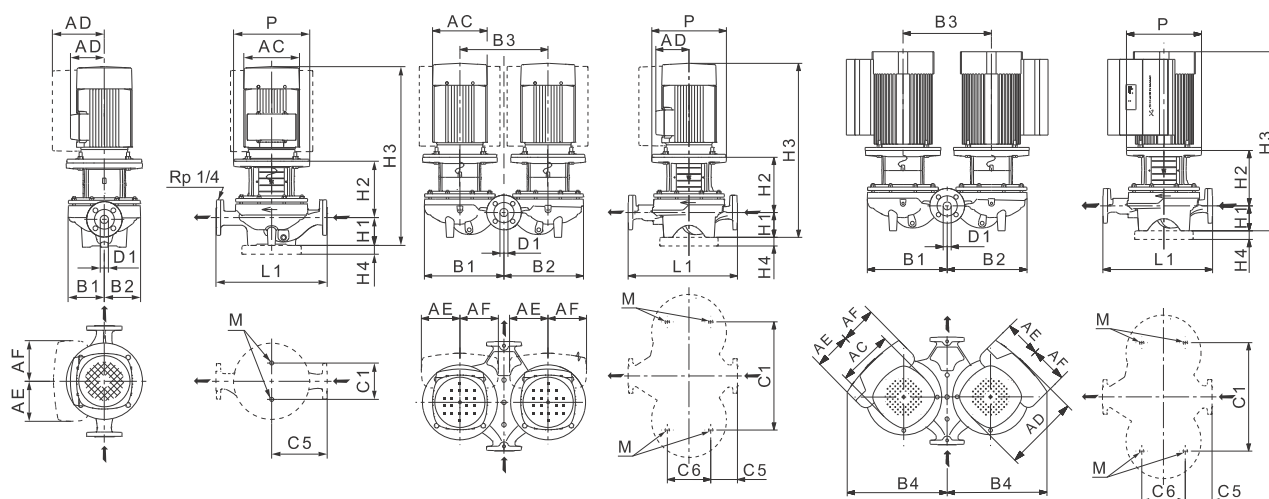
TM02 8755 2 115



TM02 8756 1816

Note: All curves apply to single-head pumps. For further information, see page 160.





TM02 8632 2614 - TM02 8631 2614 - TM06 2653 4614

## Technical data

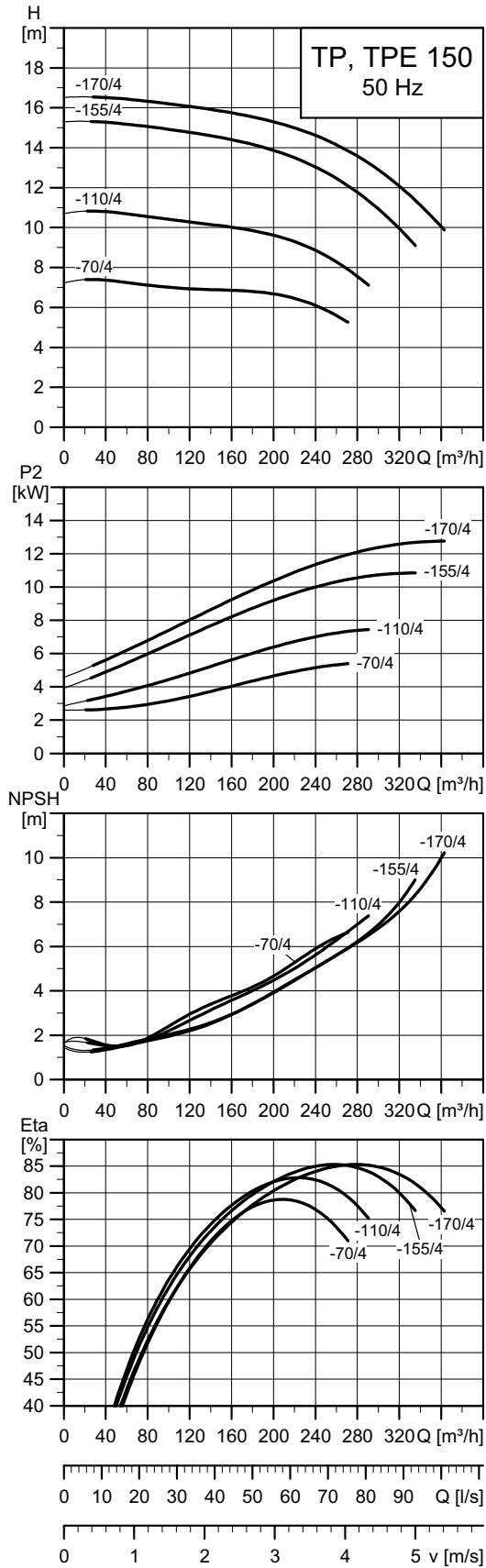
TP 125		-110/4	-130/4	-160/4	-150/4	-190/4	-230/4	-300/4	-340/4	-400/4
TPD		•	•	•	-	•	•	•	•	•
TPE		•	•	•	•	•	•	•	•***	•***
TPED		•	•	•	-	•	•	•	-	-
Series		300	300	300	300	300	300	300	300	300
IEC size	1~ TP	-	-	-	-	-	-	-	-	-
	3~ TP	112	132	132	132	160	160	180	180	200
	1~ TPE	-	-	-	-	-	-	-	-	-
	3~ TPE	112	132	132	132	160	160	180	180	200
P2	1~/3~ TP ★ [kW]	-/4	-/5.5	-/7.5	-/7.5	-/11	-/15	-/18.5	-/22	-/30
	1~/3~ TPE [kW]	-/4	-/5.5	-/7.5	-/7.5	-/11	-/15	-/18.5	-/22	-/30
PN		PN 16	PN 16	PN 16	PN 25	PN 16/25	PN 16/25	PN 16/25	PN 16/25	PN 16/25
T <sub>min</sub> :T <sub>max</sub>	[°C]	[-25;120]	[-25;120]	[-25;120]	[-40;150]	[-40;140]	[-40;140]	[-40;140]	[-40;140]	[-40;140]
D1	[mm]	125	125	125	125	125	125	125	125	125
AC	1~/3~ TP [mm]	-/220	-/260	-/260	-/267	-/314	-/314	-/368	-/368	-/408
	1~/3~ TPE [mm]	-/191	-/255	-/255	-/255	-/314	-/314	-/314	-/368	-/408
AD	1~/3~ TP [mm]	-/134	-/159	-/159	-/167	-/204	-/204	-/286	-/286	-/315
	1~/3~ TPE [mm]	-/201	-/237	-/237	-/237	-/308	-/308	-/308	-/501	-/511
AE	1~/3~ TPE [mm]	-/146	-/173	-/173	-/173	-/210	-/210	-/210	-/126	-/126
AF	1~/3~ TPE [mm]	-/146	-/173	-/173	-/173	-/210	-/210	-/210	-/126	-/126
P	[mm]	250	300	300	300	350	350	350	350	400
B1 ★★	[mm]	-/537	250/537	250/537	244/-	244/537	244/537	273/568	273/568	273/568
B2 ★★	[mm]	-/518	202/518	202/518	220/-	220/516	220/516	236/545	236/545	236/545
B3	[mm]	600	600	600	-	600	600	600	600	600
B4 ★★	[mm]	-/546	-/591	-/591	-	-	-	-	-	-
C1 ★★	[mm]	-/680	230/680	230/680	230/-	230/680	230/680	230/680	230/680	230/680
C5 ★★	[mm]	-/84	310/84	310/84	400/-	400/175	400/175	400/175	400/175	400/175
C6	[mm]	300	300	300	-	350	350	350	350	350
L1	[mm]	620	620	620	800	800	800	800	800	800
H1	[mm]	215	215	215	215	215	215	215	215	215
H2	[mm]	267	283	283	318	315	315	312	312	312
H3	1~/3~ TP [mm]	-/854	-/877	-/927	-/906	-/1075	-/1105	-/1085	-/1115	-/1163
	1~/3~ TPE [mm]	-/812	-/887	-/887	-/889	-/1045	-/1045	-/1068	-/1115	-/1163
H4	[mm]	-	-	-	-	35	35	35	35	35
M		M16	M16	M16	M16	M16	M16	M16	M16	M16

★ TP, TPD pumps are primarily fitted with IE3 motors. See *Motor data* on page 125.

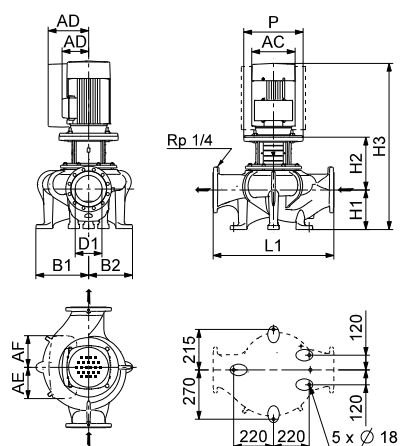
★★ The dimension before the slash applies to the single-head pump, and the dimension after the slash applies to the twin-head pump.

★★★ The integrated CUE can be positioned in an angle deviating from this drawing with up to 30 degrees. For further information look in Grundfos Product Center.

TP 150-XXX/4



TM06 3850 2 115



TM05 0661 2614

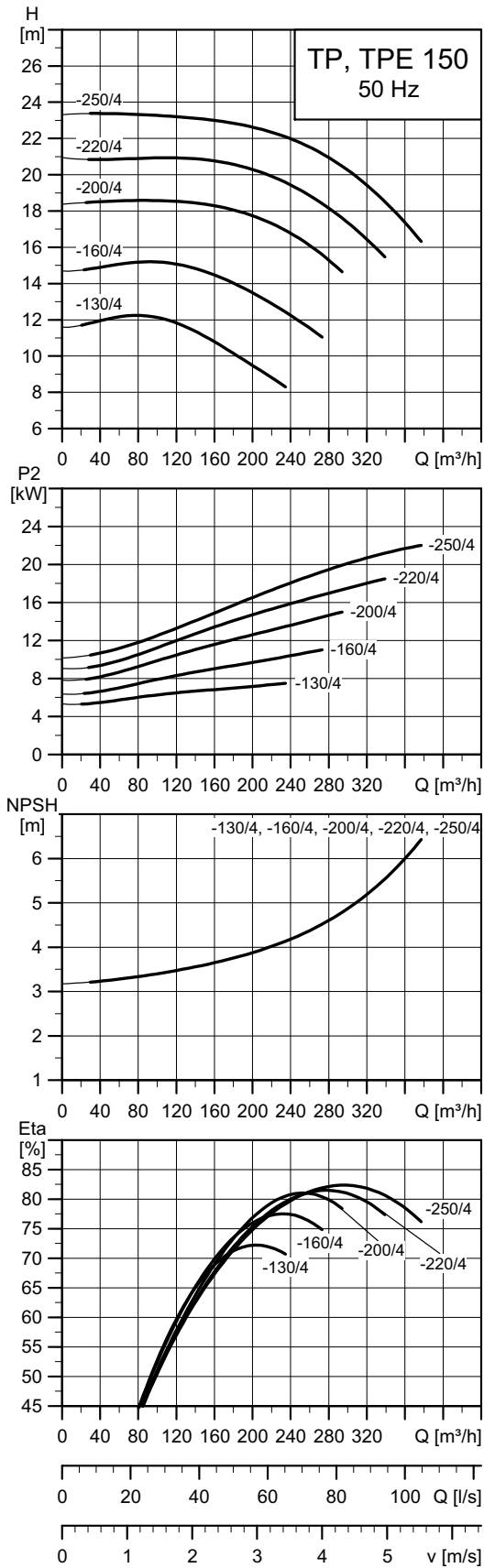
### Technical data

TP 150		-70/4	-110/4	-155/4	-170/4
TPD		-	-	-	-
TPE		•	•	•	•
TPED		-	-	-	-
Series		300	300	300	300
IEC size	1~ TP	-	-	-	-
	3~ TP	132	132	160	160
	1~ TPE	-	-	-	-
	3~ TPE	132	160	160	160
P2	1~3~ TP ★ [kW]	-/5.5	-/7.5	-/11	-/15
	1~3~ TPE [kW]	-/5.5	-/7.5	-/11	-/15
PN		PN 16	PN 16	PN 16	PN 16
T <sub>min</sub> :T <sub>max</sub>	[°C]	[-25;120]	[-25;120]	[-25;120]	[-25;120]
D1	[mm]	150	150	150	150
AC	1~3~ TP [mm]	-/267	-/267	-/320	-/320
	1~3~ TPE [mm]	-/255	-/255	-/314	-/314
AD	1~3~ TP [mm]	-/167	-/167	-/197	-/197
	1~3~ TPE [mm]	-/237	-/237	-/308	-/308
AE	1~3~ TPE [mm]	-/173	-/173	-/210	-/210
AF	1~3~ TPE [mm]	-/173	-/173	-/210	-/210
P	[mm]	300	300	350	350
B1 ★★	[mm]	295/-	295/-	295/-	295/-
B2 ★★	[mm]	240/-	240/-	240/-	240/-
L1	[mm]	800	800	800	800
H1	[mm]	250	250	250	250
H2	[mm]	284	284	314	314
H3	1~3~ TP [mm]	-/913	-/963	-/1109	-/1139
	1~3~ TPE [mm]	-/923	-/923	-/1079	-/1130

★ TP, TPD pumps are primarily fitted with IE3 motors. See *Motor data* on page 125.

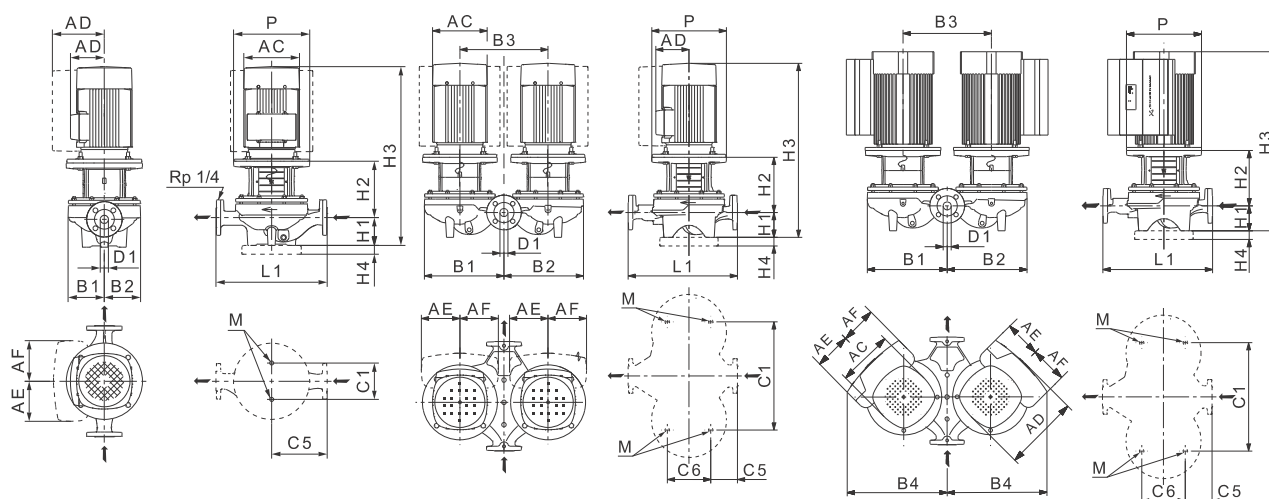
★★ The dimension before the slash applies to the single-head pump, and the dimension after the slash applies to the twin-head pump.

TP 150-XXX/4



TM02 8754 2 115

Note: All curves apply to single-head pumps. For further information, see page 160.



TM02 8632 2614 - TM02 8631 2614 - TM06 2653 4614

### Technical data

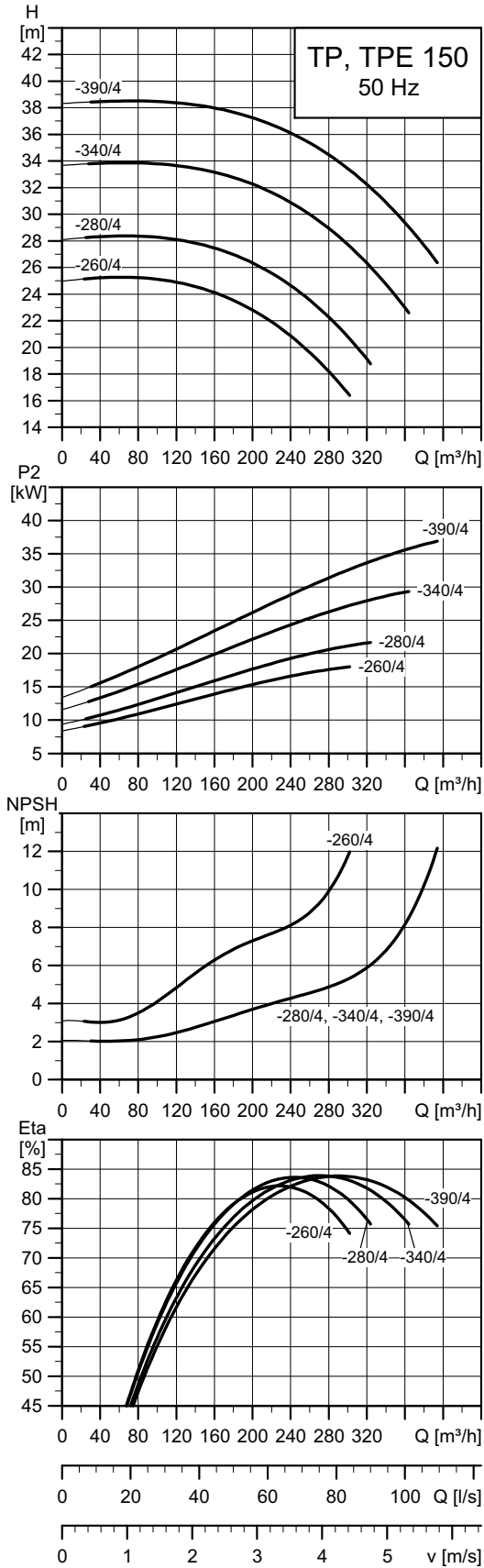
TP 150		-130/4	-160/4	-200/4	-220/4	-250/4
TPD		•	•	•	•	•
TPE		•	•	•	•	•***
TPED		•	•	•	•	-
Series		300	300	300	300	300
IEC size	1~ TP	-	-	-	-	-
	3~ TP	132	160	160	180	180
	1~ TPE	-	-	-	-	-
	3~ TPE	132	160	160	180	180
P2	1~/3~ TP ★ [kW]	-/7.5	-/11	-/15	-/18.5	-/22
	1~/3~ TPE [kW]	-/7.5	-/11	-/15	-/18.5	-/22
PN		PN 16/25	PN 16/25	PN 16/25	PN 16/25	PN 16/25
T <sub>min</sub> :T <sub>max</sub>	[°C]	[-40;140]	[-40;140]	[-40;140]	[-40;140]	[-40;140]
D1	[mm]	150	150	150	150	150
AC	1~/3~ TP [mm]	-/267	-/314	-/314	-/368	-/368
	1~/3~ TPE [mm]	-/255	-/314	-/314	-/314	-/368
AD	1~/3~ TP [mm]	-/167	-/204	-/204	-/286	-/286
	1~/3~ TPE [mm]	-/237	-/308	-/308	-/308	-/492
AE	1~/3~ TPE [mm]	-/173	-/210	-/210	-/210	-/126
AF	1~/3~ TPE [mm]	-/173	-/210	-/210	-/210	-/126
P	[mm]	300	350	350	350	350
B1 ★★	[mm]	296/583	296/583	296/583	296/583	296/583
B2 ★★	[mm]	237/553	237/553	237/553	237/553	237/553
B3	[mm]	600	600	600	600	600
B4 ★★	[mm]	-/591	-	-	-	-
C1 ★★	[mm]	230/680	230/680	230/680	230/680	230/680
C5 ★★	[mm]	400/153	400/153	400/153	400/153	400/153
C6	[mm]	350	350	350	350	350
L1	[mm]	800	800	800	800	800
H1	[mm]	215	215	215	215	215
H2	[mm]	291	321	321	321	321
H3	1~/3~ TP [mm]	-/917	-/1008	-/1082	-/1052	-/1133
	1~/3~ TPE [mm]	-/896	-/1008	-/1052	-/1078	-/1125
H4	[mm]	-	35	35	35	35
M		M16	M16	M16	M16	M16

★ TP, TPD pumps are primarily fitted with IE3 motors. See *Motor data* on page 125.

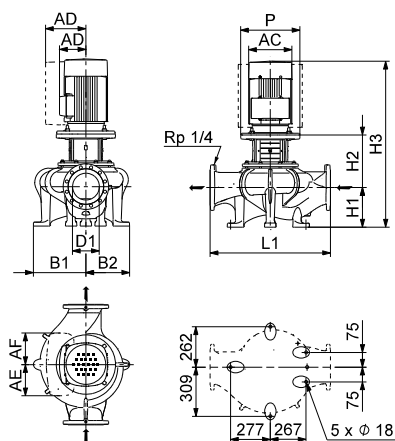
★★ The dimension before the slash applies to the single-head pump, and the dimension after the slash applies to the twin-head pump.

★★★ The integrated CUE can be positioned in an angle deviating from this drawing with up to 30 degrees. For further information look in Grundfos Product Center.

TP 150-XXX/4



TM03 4548 2 115



TM03 8623 2614

### Technical data

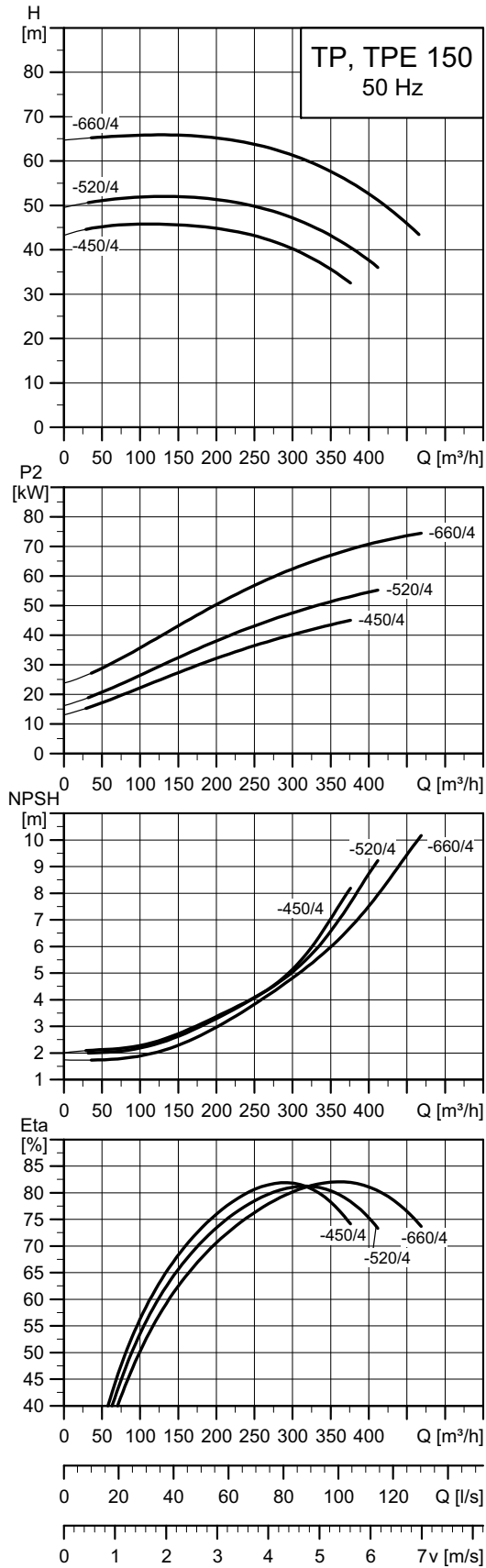
TP 150		-260/4	-280/4	-340/4	-390/4
TPD		-	-	-	-
TPE		•	•***	•***	•***
TPED		-	-	-	-
Series		300	300	300	300
IEC size	1~ TP	-	-	-	-
	3~ TP	180	180	200	225
	1~ TPE	-	-	-	-
	3~ TPE	180	180	200	225
P2	1~3~ TP ★ [kW]	-/18.5	-/22	-/30	-/37
	1~3~ TPE [kW]	-/18.5	-/22	-/30	-/37
PN		PN 16/25	PN 16/25	PN 16/25	PN 16/25
T <sub>min</sub> :T <sub>max</sub>	[°C]	[-40;140]	[-40;140]	[-40;140]	[-40;140]
D1	[mm]	150	150	150	150
AC	1~3~ TP [mm]	-/368	-/368	-/408	-/449
	1~3~ TPE [mm]	-/314	-/368	-/408	-/449
AD	1~3~ TP [mm]	-/286	-/286	-/315	-/338
	1~3~ TPE [mm]	-/308	-/501	-/511	-/558
AE	1~3~ TPE [mm]	-/210	-/126	-/126	-/159
AF	1~3~ TPE [mm]	-/210	-/126	-/126	-/159
P	[mm]	350	350	400	450
B1 ★★	[mm]	335/-	335/-	335/-	335/-
B2 ★★	[mm]	288/-	288/-	288/-	288/-
L1	[mm]	800	800	800	800
H1	[mm]	235	235	235	235
H2	[mm]	319	319	319	349
H3	1~3~ TP [mm]	-/1069	-/1150	-/1199	-/1232
	1~3~ TPE [mm]	-/1095	-/1150	-/1199	-/1232

★ TP, TPD pumps are primarily fitted with IE3 motors. See *Motor data* on page 125.

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

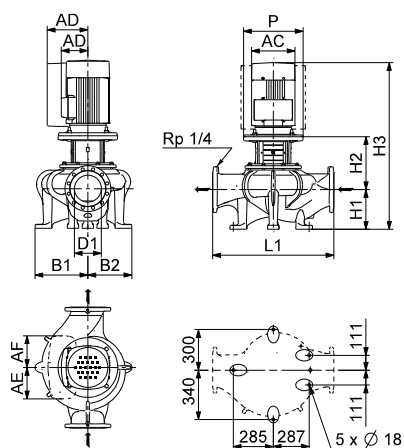
★★★ The integrated CUE can be positioned in an angle deviating from this drawing with up to 30 degrees. For further information look in Grundfos Product Center.

TP 150-XXX/4



TM05 0538 2115





TM05 0662 2614

**Technical data**

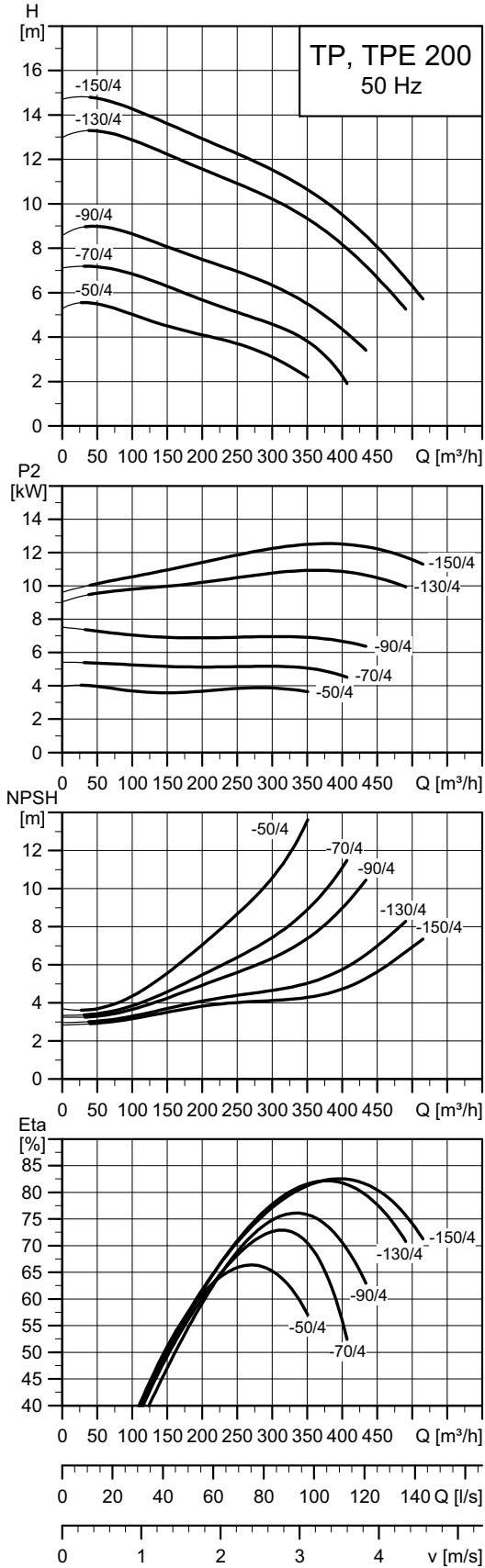
<b>TP 150</b>	<b>-450/4</b>	<b>-520/4</b>	<b>-660/4</b>
TPD	-	-	-
TPE	● ★★★	● ★★★	-
TPED	-	-	-
Series	300	300	300
IEC size	1~ TP	-	-
	3~ TP	225	250
	1~ TPE	-	-
	3~ TPE	225	250
P2	1~/3~ TP ★ [kW]	-/45	-/55
	1~/3~ TPE [kW]	-/45	-/55
PN	PN 16/25	PN 16/25	PN 16/25
T <sub>min</sub> :T <sub>max</sub>	[°C]	[-40;140]	[-40;140]
D1	[mm]	150	150
AC	1~/3~ TP [mm]	-/442	-/495
	1~/3~ TPE [mm]	-/442	-/495
AD	1~/3~ TP [mm]	-/325	-/392
	1~/3~ TPE [mm]	-/600	-/600
AE	1~/3~ TPE [mm]	-/159	-/159
AF	1~/3~ TPE [mm]	-/159	-/159
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
	1~/3~ TPE [mm]	-/1316	-/1419

★ TP, TPD pumps are primarily fitted with IE3 motors. See *Motor data* on page 125.

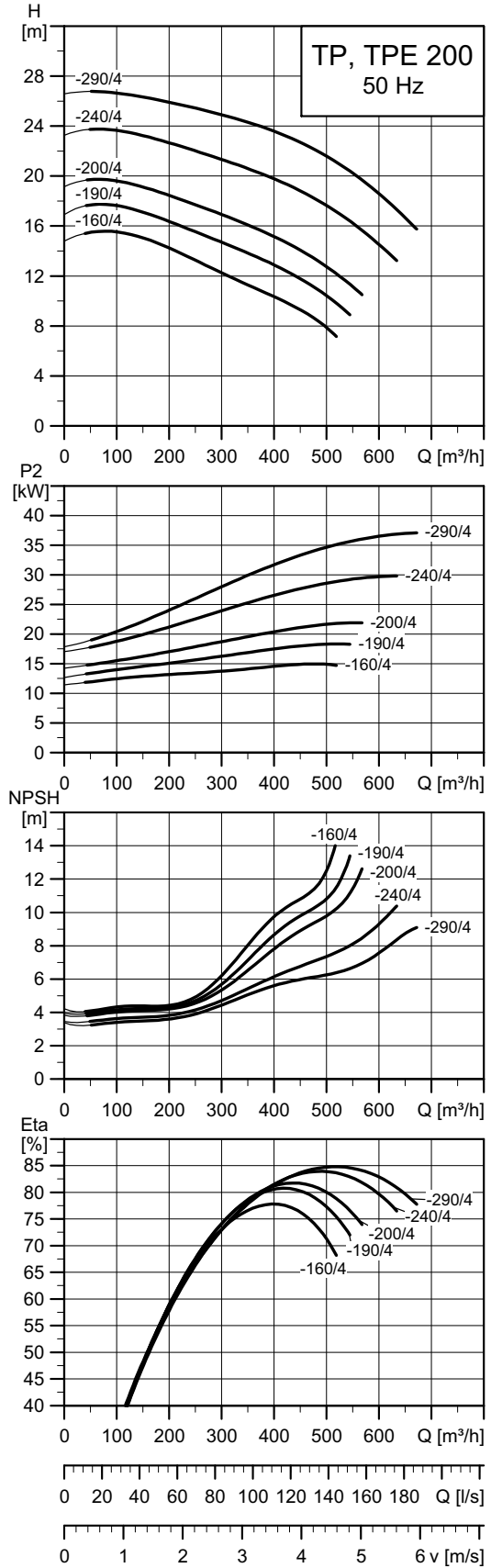
★ ★ The dimension before the slash applies to the single-head pump, and the dimension after the slash applies to the twin-head pump.

★ ★ ★ The integrated CUE can be positioned in an angle deviating from this drawing with up to 30 degrees. For further information look in Grundfos Product Center.

TP 200-XXX/4



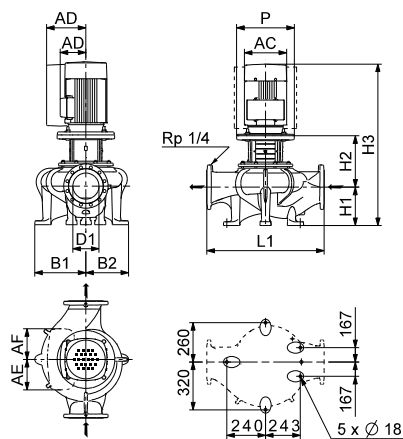
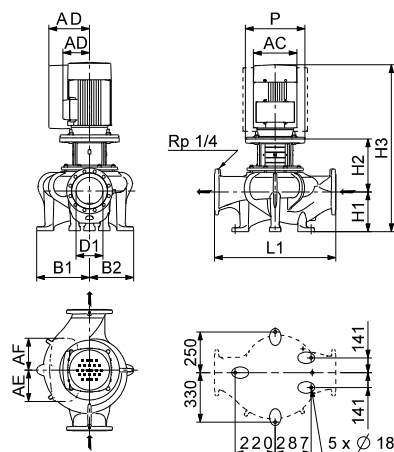
TM05 0540 2115



TM05 0542 2115

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

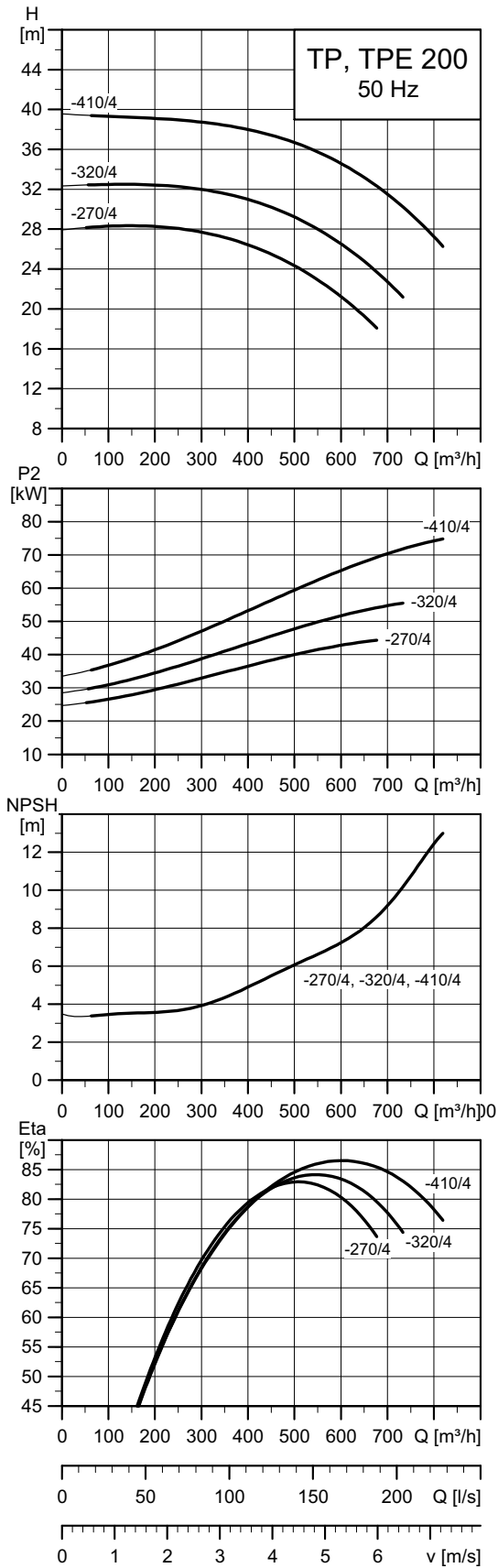
TP 200		-50/4	-70/4	-90/4	-130/4	-150/4	-160/4	-190/4	-200/4	-240/4	-290/4
TPD		-	-	-	-	-	-	-	-	-	-
TPE		•	•	•	•	•	•	•	•***	•***	•***
TPED		-	-	-	-	-	-	-	-	-	-
Series		300	300	300	300	300	300	300	300	300	300
IEC size	1~ TP	-	-	-	-	-	-	-	-	-	-
	3~ TP	112	132	132	160	160	160	180	180	200	225
	1~ TPE	-	-	-	-	-	-	-	-	-	-
	3~ TPE	112	132	160	160	160	160	180	180	200	225
P2	1~/3~ TP ★ [kW]	-/4	-/5.5	-/7.5	-/11	-/15	-/15	-/18.5	-/22	-/30	-/37
	1~/3~ TPE [kW]	-/4	-/5.5	-/7.5	-/11	-/15	-/15	-/18.5	-/22	-/30	-/37
PN		PN 16	PN 16	PN 16	PN 16	PN 16	PN 16/25	PN 16/25	PN 16/25	PN 16/25	PN 16/25
T <sub>min</sub> -T <sub>max</sub>	[°C]	[-25;120]	[-25;120]	[-25;120]	[-25;120]	[-25;120]	[-40;140]	[-40;140]	[-40;140]	[-40;140]	[-40;140]
D1	[mm]	200	200	200	200	200	200	200	200	200	200
AC	1~/3~ TP [mm]	-/220	-/267	-/267	-/320	-/320	-/320	-/368	-/368	-/408	-/449
	1~/3~ TPE [mm]	-/191	-/255	-/255	-/314	-/314	-/314	-/314	-/368	-/408	-/449
AD	1~/3~ TP [mm]	-/134	-/167	-/167	-/197	-/197	-/197	-/286	-/286	-/315	-/338
	1~/3~ TPE [mm]	-/201	-/237	-/237	-/308	-/308	-/308	-/308	-/492	-/480	-/557
AE	1~/3~ TPE [mm]	-/146	-/173	-/173	-/210	-/210	-/210	-/210	-/126	-/159	-/159
AF	1~/3~ TPE [mm]	-/146	-/173	-/173	-/210	-/210	-/210	-/210	-/126	-/159	-/159
P	[mm]	250	300	300	350	350	350	350	350	400	450
B1 ★★	[mm]	363/-	363/-	363/-	363/-	363/-	348/-	348/-	348/-	348/-	348/-
B2 ★★	[mm]	283/-	283/-	283/-	283/-	283/-	288/-	288/-	288/-	288/-	288/-
L1	[mm]	900	900	900	900	900	900	900	900	900	900
H1	[mm]	280	280	280	280	280	280	280	280	280	280
H2	[mm]	273	293	293	336	336	331	331	331	331	361
H3	1~/3~ TP [mm]	-/925	-/945.5	-/984	-/1094	-/1134	-/1050	-/1090	-/1120	-/1256	-/1298
	1~/3~ TPE [mm]	-/900	-/975	-/975	-/1094	-/1134	-/1050	-/1134	-/1199	-/1256	-/1298

★ TP, TPD pumps are primarily fitted with IE3 motors. See *Motor data* on page 125.

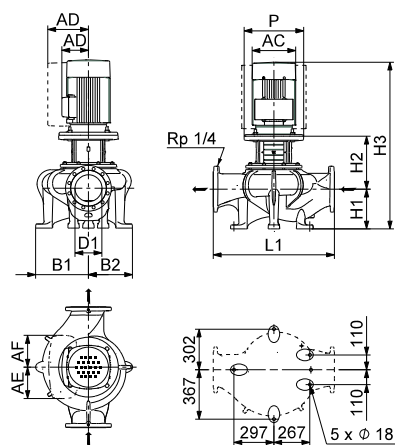
★★ The dimension before the slash applies to the single-head pump, and the dimension after the slash applies to the twin-head pump.

\*\*\*The integrated CUE can be positioned in an angle deviating from this drawing with up to 30 degrees. For further information look in Grundfos Product Center.

TP 200-XXX/4



TM03 4650 2 115



TM03 8621 2614

### Technical data

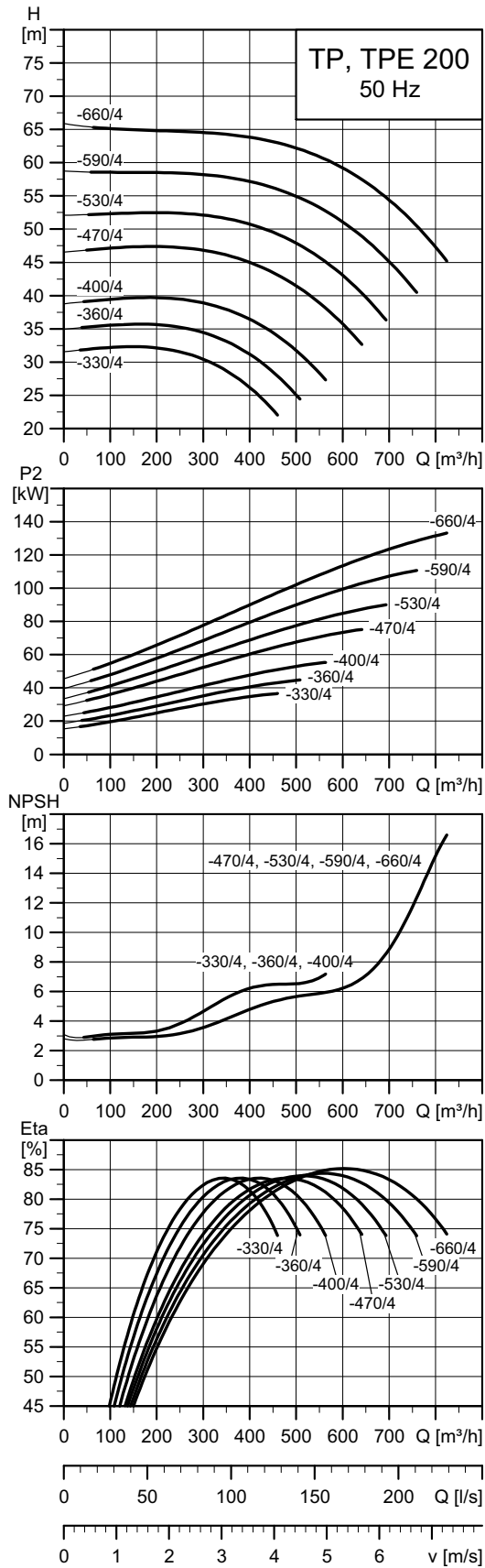
TP 200		-270/4	-320/4	-410/4
TPD		-	-	-
TPE		● ★★★	● ★★★	-
TPED		-	-	-
Series		300	300	300
IEC size	1~ TP	-	-	-
	3~ TP	225	250	280
	1~ TPE	-	-	-
	3~ TPE	225	250	-
P2	1~/3~ TP ★ [kW]	-/45	-/55	-/75
	1~/3~ TPE [kW]	-/45	-/55	-
PN		PN 16/25	PN 16/25	PN 16/25
T <sub>min</sub> , T <sub>max</sub>	[°C]	[-40;140]	[-40;140]	[-40;140]
D1	[mm]	200	200	200
AC	1~/3~ TP [mm]	-/449	-/497	-/551
	1~/3~ TPE [mm]	-/449	-/497	-
AD	1~/3~ TP [mm]	-/338	-/410	-/433
	1~/3~ TPE [mm]	-/558	-/614	-
AE	1~/3~ TPE [mm]	-/159	-/159	-
AF	1~/3~ TPE [mm]	-/159	-/159	-
P	[mm]	450	550	550
B1 ★★	[mm]	393/-	393/-	393/-
B2 ★★	[mm]	328/-	328/-	328/-
L1	[mm]	900	900	900
H1	[mm]	295	295	295
H2	[mm]	377	377	377
H3	1~/3~ TP [mm]	-/1380	-/1429	-/1492
	1~/3~ TPE [mm]	-/1380	-/1429	-

★ TP, TPD pumps are primarily fitted with IE3 motors. See *Motor data* on page 125.

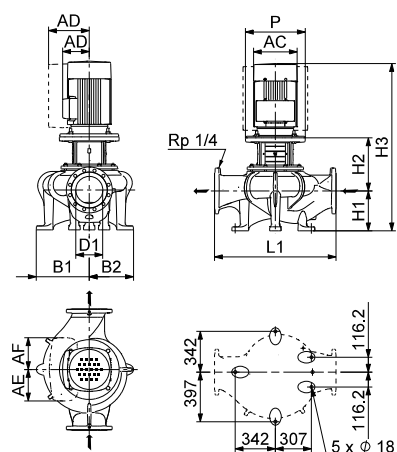
★★ The dimension before the slash applies to the single-head pump, and the dimension after the slash applies to the twin-head pump.

★★★ The integrated CUE can be positioned in an angle deviating from this drawing with up to 30 degrees. For further information look in Grundfos Product Center.

TP 200-XXX/4



TM03 4651 2115



TM03 8622 2614

### Technical data

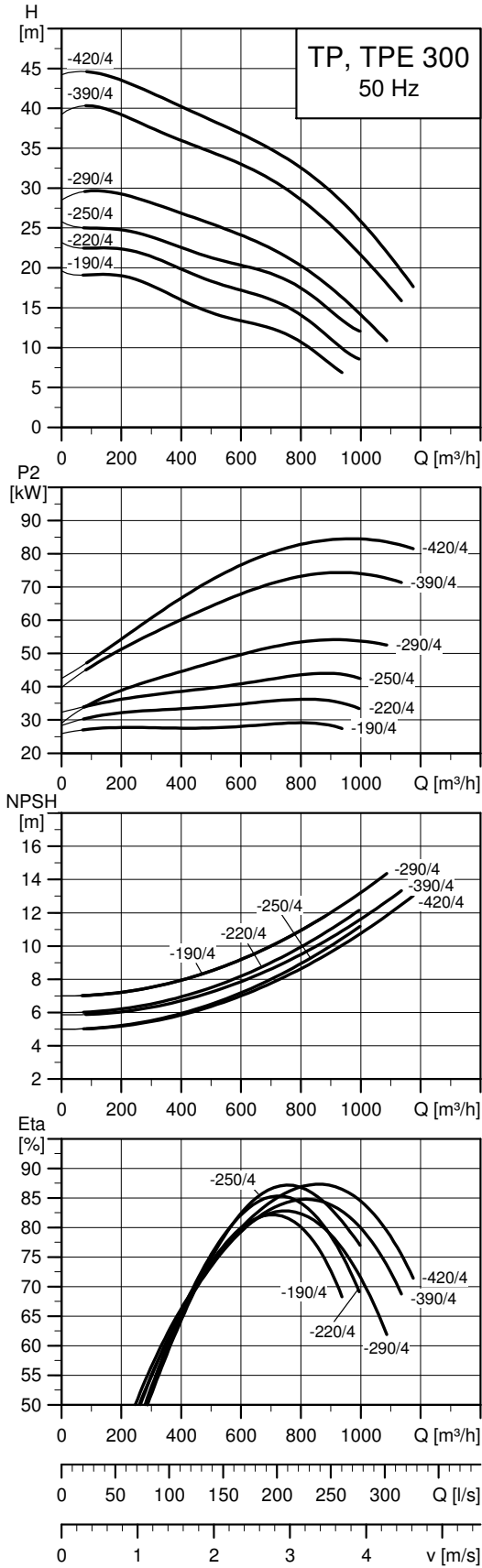
TP 200		-330/4	-360/4	-400/4	-470/4	-530/4	-590/4	-660/4
TPD		-	-	-	-	-	-	-
TPE		● ★★★	● ★★★	● ★★★	-	-	-	-
TPED		-	-	-	-	-	-	-
Series		300	300	300	300	300	300	300
IEC size	1~ TP	-	-	-	-	-	-	-
	3~ TP	225	225	250	280	280	315	315
	1~ TPE	-	-	-	-	-	-	-
	3~ TPE	225	225	250	-	-	-	-
P2	1~3~ TP ★ [kW]	-/37	-/45	-/55	-/75	-/90	-/110	-/132
	1~3~ TPE [kW]	-/37	-/45	-/55	-	-	-	-
PN		PN 16/25	PN 16/25	PN 16/25	PN 16/25	PN 16/25	PN 16/25	PN 16/25
T <sub>min</sub> :T <sub>max</sub>	[°C]	[-40;140]	[-40;140]	[-40;140]	[-40;140]	[-40;140]	[-40;140]	[-40;140]
D1	[mm]	200	200	200	200	200	200	200
AC	1~3~ TP [mm]	-/449	-/449	-/497	-/551	-/551	-/616	-/616
	1~3~ TPE [mm]	-/449	-/449	-/497	-	-	-	-
AD	1~3~ TP [mm]	-/338	-/338	-/410	-/433	-/433	-/515	-/515
	1~3~ TPE [mm]	-/600	-/597	-/600	-	-	-	-
AE	1~3~ TPE [mm]	-/159	-/159	-/159	-	-	-	-
AF	1~3~ TPE [mm]	-/159	-/159	-/159	-	-	-	-
P	[mm]	450	450	550	550	550	660	660
B1 ★★	[mm]	423/-	423/-	423/-	423/-	423/-	423/-	423/-
B2 ★★	[mm]	368/-	368/-	368/-	368/-	368/-	368/-	368/-
L1	[mm]	1000	1000	1000	1000	1000	1000	1000
H1	[mm]	295	295	295	295	295	295	295
H2	[mm]	382	382	382	382	382	412	412
H3	1~3~ TP [mm]	-/1325	-/1385	-/1424	-/1497	-/1607	-/1619	-/1784
	1~3~ TPE [mm]	-/1325	-/1385	-/1424	-	-	-	-

★ TP, TPD pumps are primarily fitted with IE3 motors. See *Motor data* on page 125.

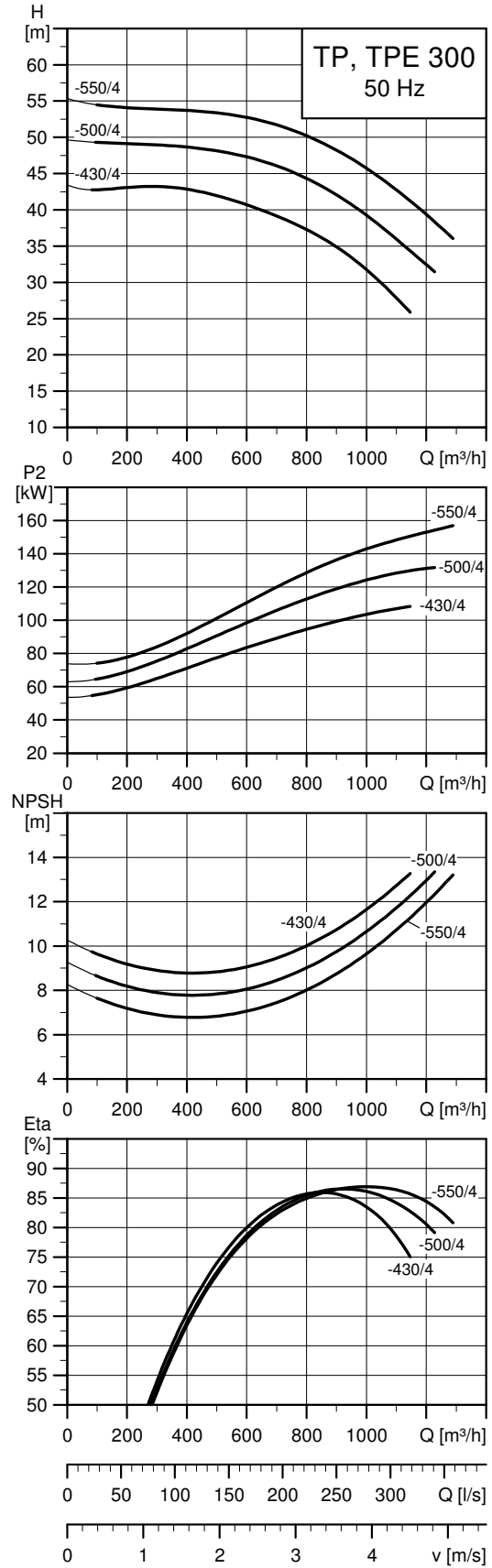
★★ The dimension before the slash applies to the single-head pump, and the dimension after the slash applies to the twin-head pump.

★★★ The integrated CUE can be positioned in an angle deviating from this drawing with up to 30 degrees. For further information look in Grundfos Product Center.

TP 300-XXX/4

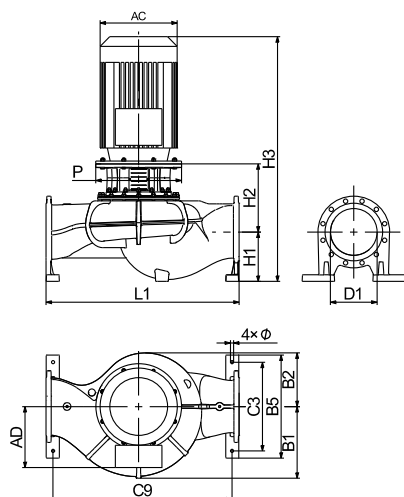


TM06 6593 4217



TM06 6620 4217





TM06 6532 1716

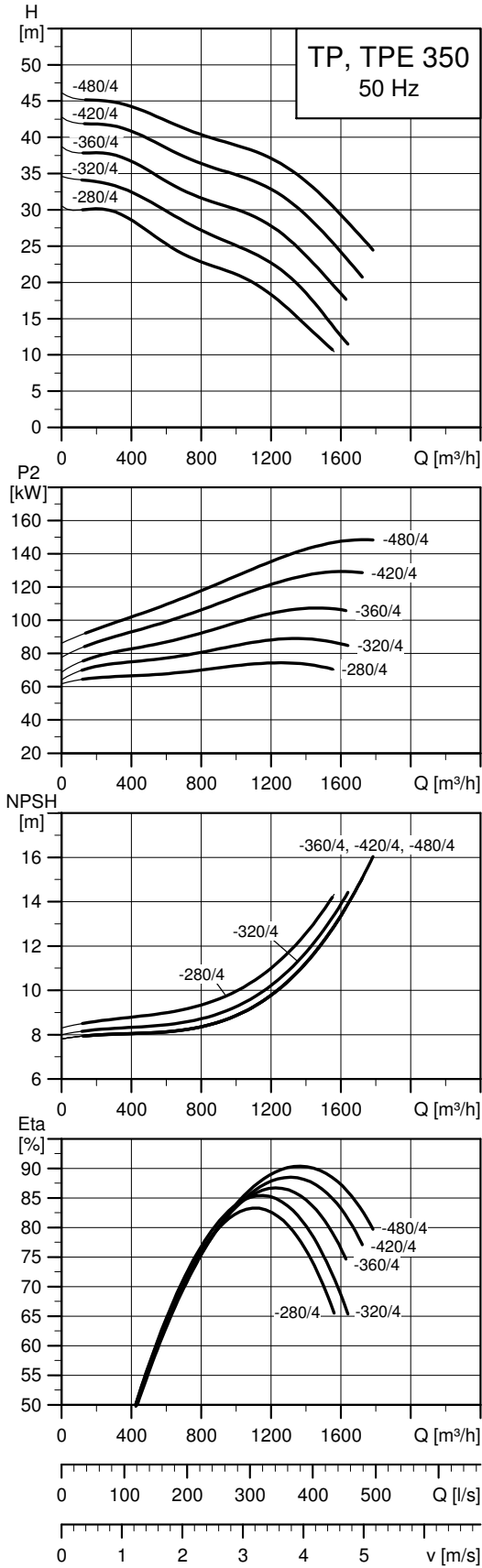
## Technical data

TP 300		-190/4	-220/4	-250/4	-290/4	-390/4	-420/4	-430/4	-500/4	-550/4
TPD		-	-	-	-	-	-	-	-	-
TPE		●★★	●★★	●★★	●★★	-	-	-	-	-
TPED		-	-	-	-	-	-	-	-	-
Series		300	300	300	300	300	300	300	300	300
IEC size	1~ TP	-	-	-	-	-	-	-	-	-
	3~ TP	200L	225S	225M	250M	280S	280M	315S	315M	315M
	1~ TPE	-	-	-	-	-	-	-	-	-
	3~ TPE	200L	225S	225M	250M	-	-	-	-	-
P2	3~ TP ★ [kW]	30	37	45	55	75	90	110	132	160
	3~ TPE [kW]	30	37	45	55	-	-	-	-	-
PN		PN16/25	PN16/25	PN16/25	PN16/25	PN16/25	PN16/25	PN16/25	PN16/25	PN16/25
T <sub>min</sub> :T <sub>max</sub>	[°C]	[-40;150]	[-40;150]	[-40;150]	[-40;150]	[-40;150]	[-40;150]	[-40;150]	[-40;150]	[-40;150]
D1	[mm]	300	300	300	300	300	300	300	300	300
AC	1~/3~ TP [mm]	-/402	-/442	-/442	-/495	-/555	-/555	-/610	-/610	-/610
	1~/3~ TPE [mm]	-/402	-/442	-/442	-/495	-	-	-	-	-
AD	1~/3~ TP [mm]	-/305	-/325	-/325	-/392	-/432	-/432	-/495	-/495	-/495
	1~/3~ TPE [mm]	-/511	-/560	-/561	-/600	-	-	-	-	-
P	[mm]	394	450	450	550	550	550	660	660	660
B1	[mm]	438	438	438	460	460	460	438	438	438
B2	[mm]	320	320	320	345	345	345	338	338	338
B5	[mm]	663	663	663	663	663	663	666	666	666
C3	[mm]	570	570	570	570	570	570	570	570	570
C9	[mm]	1150	1150	1150	1150	1150	1150	1150	1150	1150
L1	[mm]	1240	1240	1240	1240	1240	1240	1240	1240	1240
H1	[mm]	348	348	348	317	317	317	340	340	340
H2	[mm]	393	423	423	438	443	443	460	460	455
H3	[mm]	1400	1420	1480	1572	1580	1690	1732	1892	1892
∅	[mm]	20	20	20	20	20	20	20	20	20

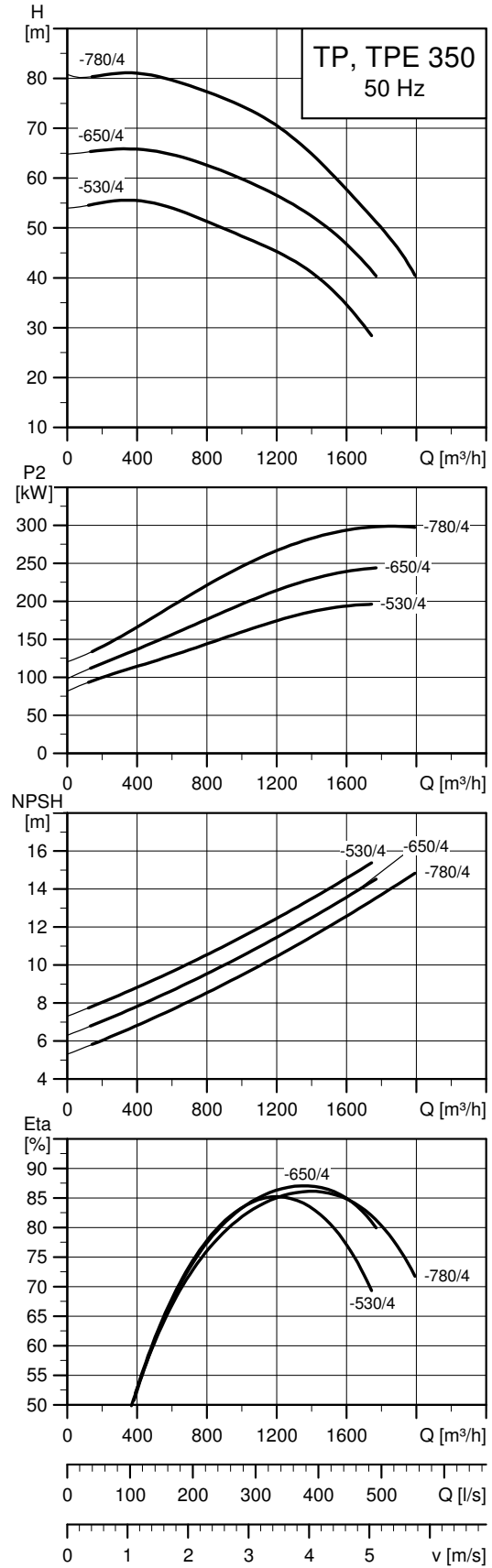
★ TP, TPD pumps are primarily fitted with IE3 motors. See *Motor data* on page 125.

★★ The integrated CUE can be positioned in an angle deviating from this drawing with up to 30 degrees. For further information look in Grundfos Product Center.

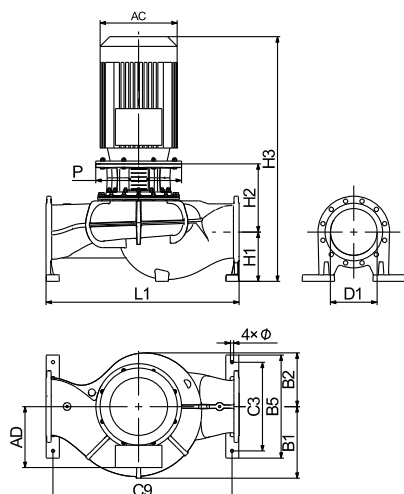
TP 350-XXX/4



TM06 6594 4217



TM06 6621 4217



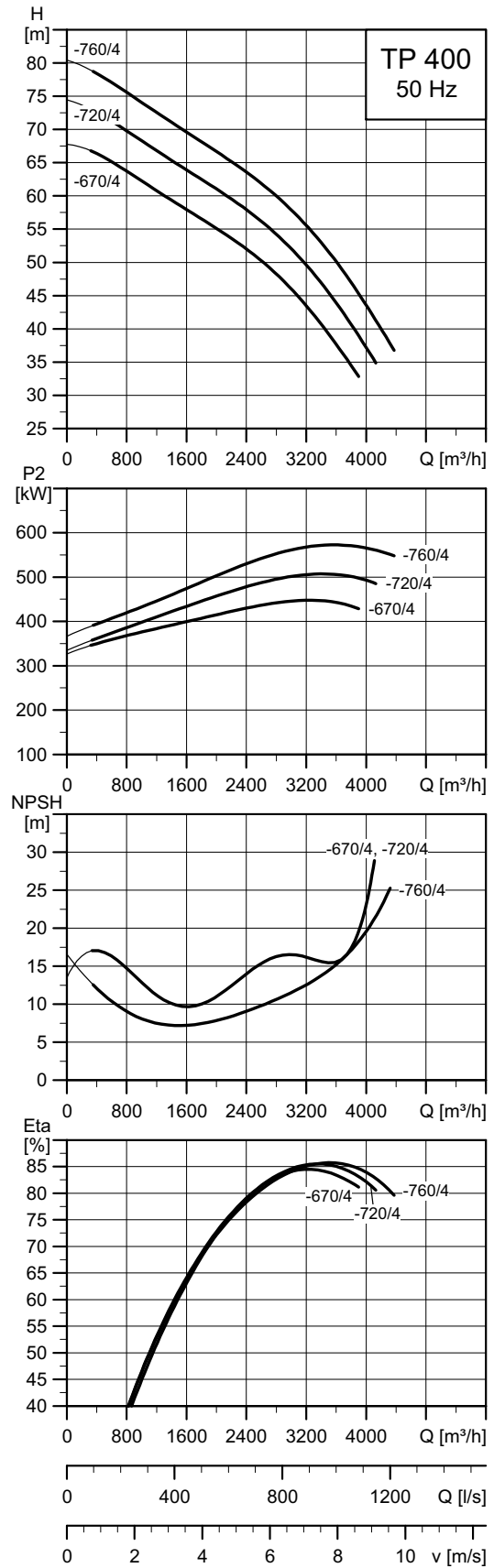
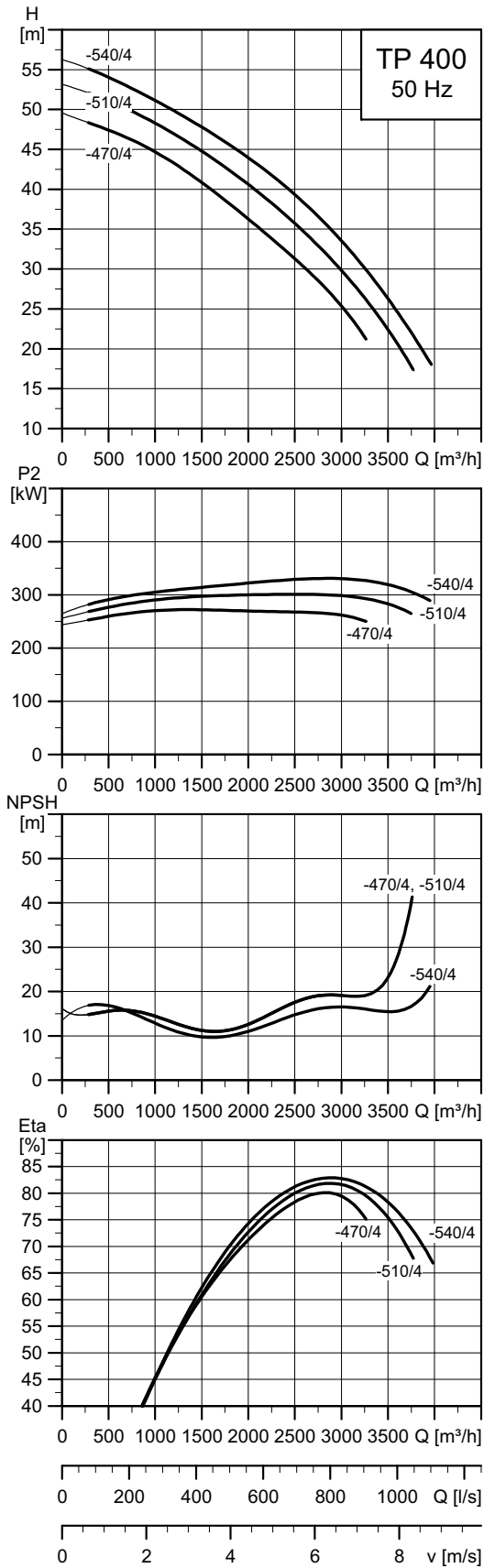
TM06 6532 1716

## Technical data

TP 350		-280/4	-320/4	-360/4	-420/4	-480/4	-530/4	-650/4	-780/4
TPD		-	-	-	-	-	-	-	-
TPE		-	-	-	-	-	-	-	-
TPED		-	-	-	-	-	-	-	-
Series		300	300	300	300	300	300	300	300
IEC size	1~ TP	-	-	-	-	-	-	-	-
	3~ TP	280S	280M	315S	315M	315M	315L	315L	315L
	1~ TPE	-	-	-	-	-	-	-	-
	3~ TPE	-	-	-	-	-	-	-	-
P2	3~ TP ★ [kW]	75	90	110	132	160	200	250	315
	3~ TPE [kW]	-	-	-	-	-	-	-	-
PN		PN16/25	PN16/25	PN16/25	PN16/25	PN16/25	PN16/25	PN16/25	PN16/25
T <sub>min</sub> :T <sub>max</sub>	[°C]	[-40;150]	[-40;150]	[-40;150]	[-40;150]	[-40;150]	[-40;150]	[-40;150]	[-40;150]
D1	[mm]	350	350	350	350	350	350	350	350
AC	1~/3~ TP [mm]	555	555	610	610	-/610	-/610	-/702	-/702
	1~/3~ TPE [mm]	-	-	-	-	-	-	-	-
AD	1~/3~ TP [mm]	432	432	495	495	-/495	-/495	-/619	-/619
	1~/3~ TPE [mm]	-	-	-	-	-	-	-	-
P	[mm]	550	550	660	660	660	798	798	798
B1	[mm]	521	521	521	521	521	475	475	475
B2	[mm]	373	373	373	373	373	374	374	374
B5	[mm]	735	735	735	735	735	740	740	740
C3	[mm]	660	660	660	660	660	660	660	660
C9	[mm]	1310	1310	1310	1310	1310	1310	1310	1310
L1	[mm]	1400	1400	1400	1400	1400	1400	1400	1400
H1	[mm]	361	361	361	361	361	385	385	385
H2	[mm]	509	509	509	509	509	514	519	519
H3	[mm]	1689	1799	1802	1962	1962	2259	2272	2272
∅	[mm]	20	20	20	20	20	20	20	20

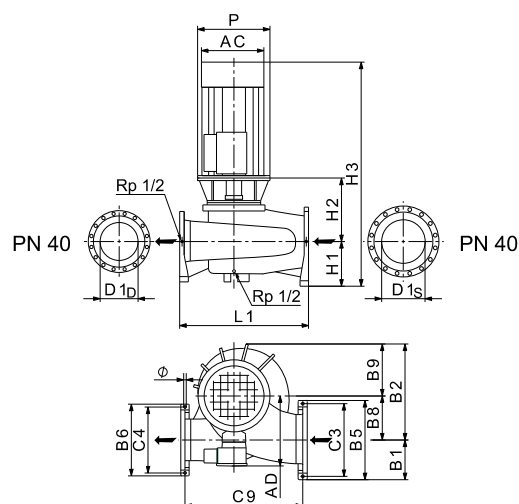
★ TP, TPD pumps are primarily fitted with IE3 motors. See *Motor data* on page 125.

TP 400-XXX/4



TM02 6848 3615

TM02 6848 3615



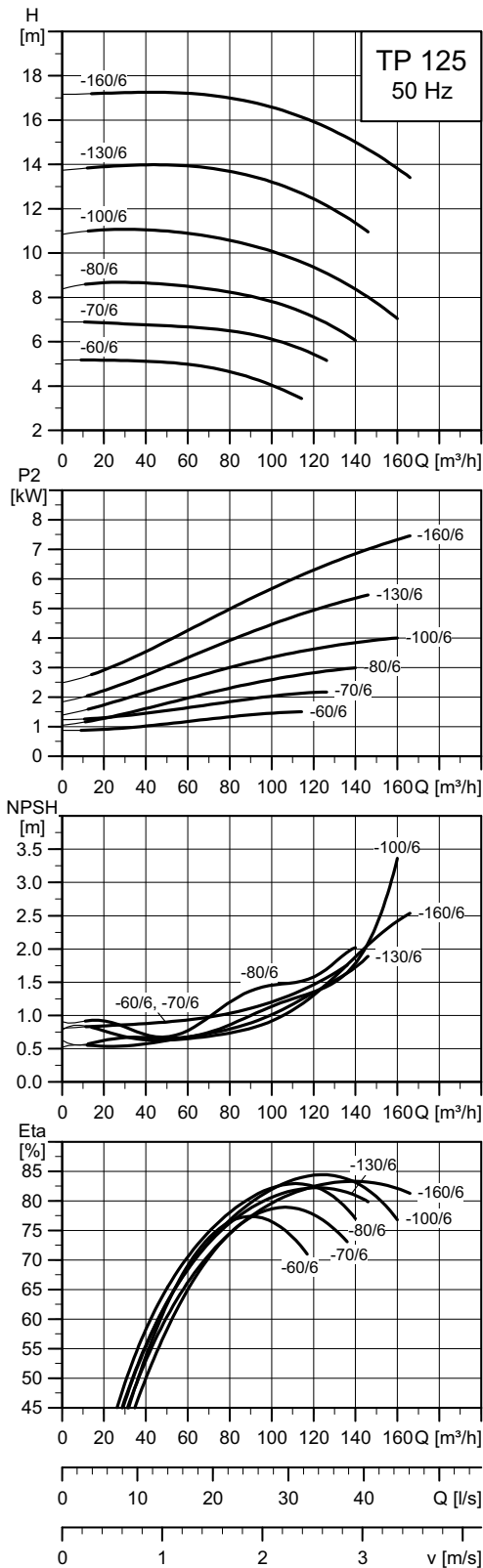
TM02 8351 2614

### 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	
	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 <sub>min</sub> , T <sub>max</sub>	[°C]	[0;150]	[0;150]	[0;150]	[0;150]	[0;150]	[0;150]
D <sub>1D</sub> /D <sub>1S</sub>	[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
∅	[mm]	27	27	27	27	27	27
L1	[mm]	1400	1400	1400	1400	1400	1400
H1	[mm]	450	450	450	450	450	450
H2	[mm]	706	706	706	706	706	706
H3	[mm]	2522	2611	2611	2611	2771	2771

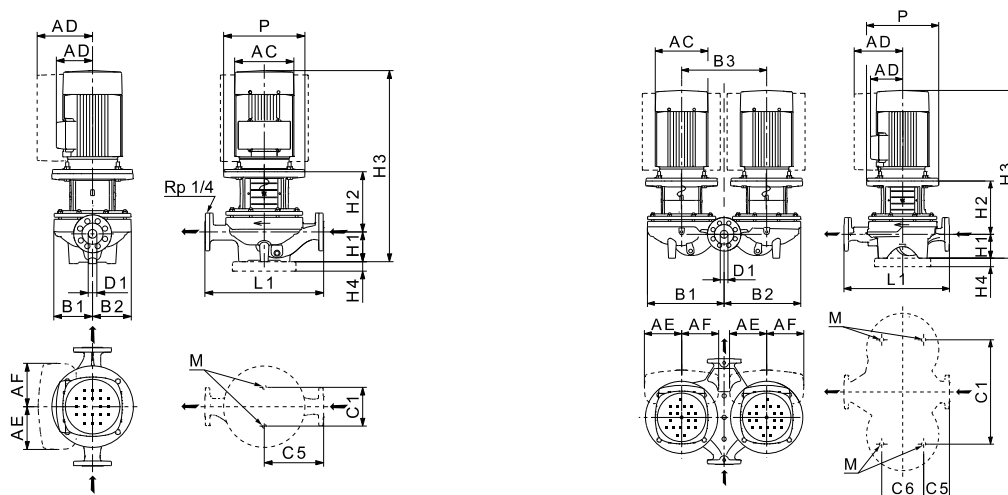
TP, TPD, TPE, TPED, 6-pole, PN 16

TP, TPD 125-XXX/6



TM02 8757 2115

Note: All curves apply to single-head pumps. For further information, see page 160.



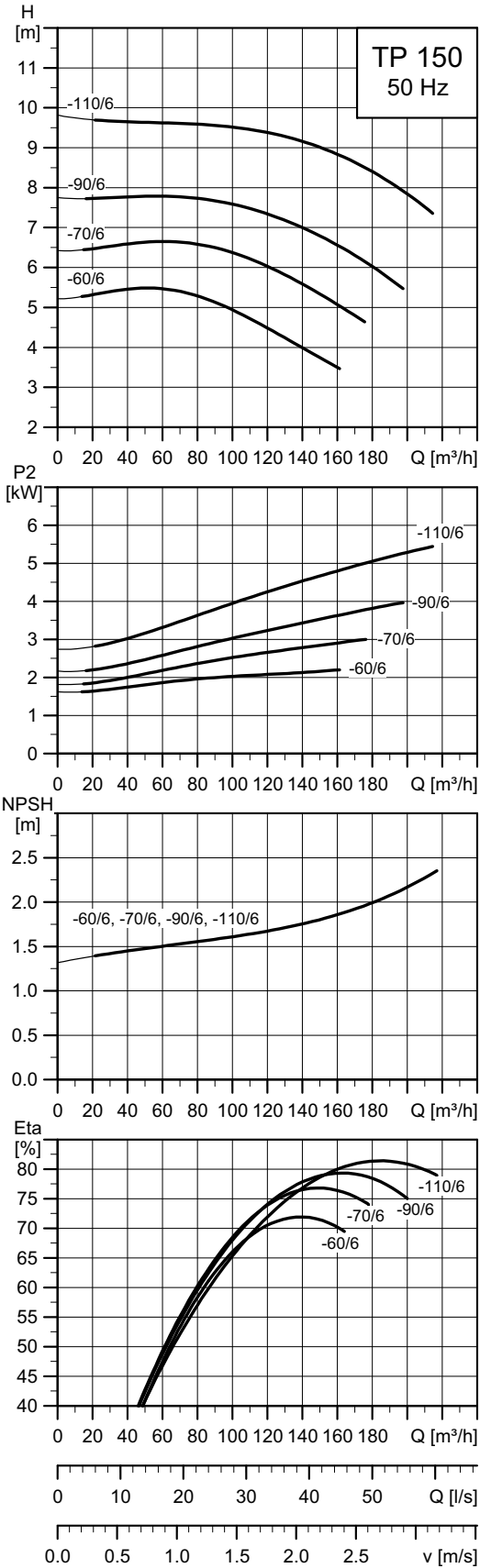
TM03 5348 2614 - TM03 5349 2614

### 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 <sub>min</sub> , T <sub>max</sub>	[°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	285	285	282	312
H3	1~/3~ TP [mm]	-818	-836	-885	-885	-932	-1021
	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.

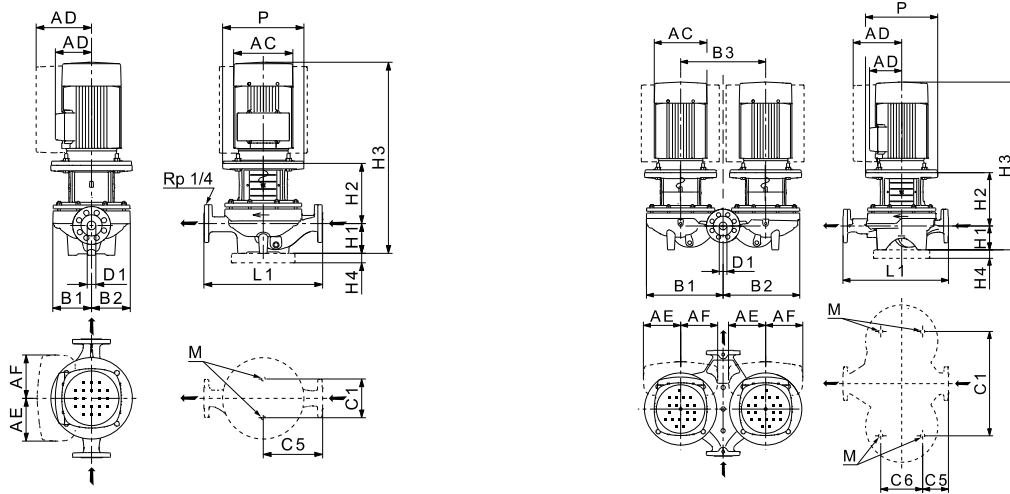
TP, TPD 150-XXX/6



TM02 8758 2115

Note: All curves apply to single-head pumps. For further information, see page 160.





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 <sub>min</sub> :T <sub>max</sub>	[°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.

## 27. Weights and shipping volume

### TPE2, TPE2 D, TPE3, TPE3 D, PN 6, 10, 16

Pump type	Connection		Weights				Shipping volume [m <sup>3</sup> ]	
	D1 <sub>D</sub>	D1 <sub>S</sub>	Net [kg]		Gross [kg]		TPE2, TPE3	TPE2 D, TPE3 D
			TPE2, TPE3	TPE2 D, TPE3 D	TPE2, TPE3	TPE2 D, TPE3 D		
TPE2, TPE2 D, TPE3, TPE3 D 32-80	DN 32	DN 32	24	44	32	53	0.034	0.104
TPE2, TPE2 D, TPE3, TPE3 D 32-120	DN 32	DN 32	24	44	32	53	0.034	0.104
TPE2, TPE2 D, TPE3, TPE3 D 32-150	DN 32	DN 32	24	44	32	53	0.034	0.104
TPE2, TPE2 D, TPE3, TPE3 D 32-180	DN 32	DN 32	24	44	32	53	0.034	0.104
TPE2, TPE2 D, TPE3, TPE3 D 32-200	DN 32	DN 32	24	44	32	53	0.034	0.104
TPE2, TPE2 D, TPE3, TPE3 D 40-80	DN 40	DN 40	25	46	33	54	0.035	0.105
TPE2, TPE2 D, TPE3, TPE3 D 40-120	DN 40	DN 40	25	46	33	54	0.035	0.105
TPE2, TPE2 D, TPE3, TPE3 D 40-150	DN 40	DN 40	25	46	33	54	0.035	0.105
TPE2, TPE2 D, TPE3, TPE3 D 40-180	DN 40	DN 40	25	46	33	55	0.035	0.105
TPE2, TPE2 D, TPE3, TPE3 D 40-200	DN 40	DN 40	25	46	33	55	0.035	0.105
TPE2, TPE2 D, TPE3, TPE3 D 40-240	DN 40	DN 40	27	49	35	58	0.035	0.105
TPE2, TPE2 D, TPE3, TPE3 D 50-60	DN 50	DN 50	27	49	35	57	0.036	0.109
TPE2, TPE2 D, TPE3, TPE3 D 50-80	DN 50	DN 50	27	49	35	57	0.036	0.109
TPE2, TPE2 D, TPE3, TPE3 D 50-120	DN 50	DN 50	27	49	35	57	0.036	0.109
TPE2, TPE2 D, TPE3, TPE3 D 50-150	DN 50	DN 50	27	49	35	57	0.036	0.109
TPE2, TPE2 D, TPE3, TPE3 D 50-180	DN 50	DN 50	27	49	35	58	0.036	0.109
TPE2, TPE2 D, TPE3, TPE3 D 50-200	DN 50	DN 50	29	52	37	61	0.036	0.109
TPE2, TPE2 D, TPE3, TPE3 D 50-240	DN 50	DN 50	30	54	38	63	0.036	0.109
TPE2, TPE2 D, TPE3, TPE3 D 65-60	DN 65	DN 65	29	52	38	61	0.044	0.117
TPE2, TPE2 D, TPE3, TPE3 D 65-80	DN 65	DN 65	29	52	38	61	0.044	0.117
TPE2, TPE2 D, TPE3, TPE3 D 65-120	DN 65	DN 65	29	52	38	61	0.044	0.117
TPE2, TPE2 D, TPE3, TPE3 D 65-150	DN 65	DN 65	30	54	39	62	0.044	0.117
TPE2, TPE2 D, TPE3, TPE3 D 65-180	DN 65	DN 65	31	56	40	65	0.044	0.117
TPE2, TPE2 D, TPE3, TPE3 D 65-200	DN 65	DN 65	32	57	41	66	0.044	0.117
TPE2, TPE2 D, TPE3, TPE3 D 80-40	DN 80	DN 80	35	60	44	68	0.049	0.129
TPE2, TPE2 D, TPE3, TPE3 D 80-120	DN 80	DN 80	36	61	45	70	0.049	0.129
TPE2, TPE2 D, TPE3, TPE3 D 80-150	DN 80	DN 80	38	65	46	73	0.049	0.129
TPE2, TPE2 D, TPE3, TPE3 D 80-180	DN 80	DN 80	39	67	48	76	0.049	0.129
TPE2, TPE2 D, TPE3, TPE3 D 100-40	DN 100	DN 100	40	68	48	78	0.064	0.168
TPE2, TPE2 D, TPE3, TPE3 D 100-120	DN 100	DN 100	40	70	49	79	0.064	0.168
TPE2, TPE2 D, TPE3, TPE3 D 100-150	DN 100	DN 100	42	73	51	83	0.064	0.168
TPE2, TPE2 D, TPE3, TPE3 D 100-180	DN 100	DN 100	43	76	52	85	0.064	0.168

**TP, TPD, TPE, TPED, 2-pole, PN 6, 10, 16, 25**

Pump type	Connection		Weights				Shipping volume [m <sup>3</sup> ]	
	D <sub>1D</sub>	D <sub>1S</sub>	Net [kg] ★		Gross [kg] ★		TP/TPD	TPE/TPED
			TP/TPD	TPE/TPED	TP/TPD	TPE/TPED		
TP 25-50/2	G 1/2	G 1/2	8/-	13/-	9/-	15/-	0.022/-	0.039/-
TP 25-80/2	G 1/2	G 1/2	8/-	13/-	9/-	15/-	0.022/-	0.039/-
TP 25-90/2	G 1/2	G 1/2	11/-	13/-	12/-	15/-	0.039/-	0.039/-
TP 32-50/2	G 2	G 2	9/-	13/-	10/-	15/-	0.022/-	0.039/-
TP 32-80/2	G 2	G 2	9/-	13/-	11/-	15/-	0.039/-	0.039/-
TP 32-90/2	G 2	G 2	11/-	14/-	13/-	16/-	0.039/-	0.039/-
TP, TPD 32-60/2	DN 32	DN 32	16/32	-	17/33	-	0.036/0.072	-
TP, TPD 32-120/2	DN 32	DN 32	19/38	-	20/40	-	0.036/0.072	-
TP, TPD 32-150/2	DN 32	DN 32	23/54	-	26/57	-	0.064/0.082	-
TP, TPD 32-180/2	DN 32	DN 32	24/54	-	27/57	-	0.064/0.082	-
TP, TPD 32-230/2	DN 32	DN 32	25/54	29/63	28/57	34/70	0.064/0.082	0.12/0.22
TP, TPD 32-200/2	DN 32	DN 32	42/86	43/87	47/101	52/101	0.138/0.3912	0.13/0.39
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	55/111	68/144	63/131	0.184/0.4584	0.180/0.520
TP, TPD 32-460/2	DN 32	DN 32	76/151	65/132	82/169	79/156	0.2176/0.4584	0.390/0.640
TP, TPD 32-580/2	DN 32	DN 32	90/180	86/173	106/198	100/197	0.2176/0.4584	0.390/0.640
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	-	21/43	-	0.036/0.072	-
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	-	21/43	-	0.036/0.072	-
TP 40-180/2	DN 40	DN 40	24/-	-	25/-	-	0.036/-	-
TP, TPD 40-190/2	DN 40	DN 40	29/54	-	32/59	-	0.064/0.151	-
TP, TPD 40-230/2	DN 40	DN 40	36/56	-	39/61	-	0.064/0.151	-
TP, TPD 40-270/2	DN 40	DN 40	39/70	35/69	42/75	41/85	0.064/0.151	0.16/0.39
TP, TPD 40-240/2	DN 40	DN 40	53/107	-	58/124	-	0.184/0.3912	-
TP, TPD 40-300/2	DN 40	DN 40	65/130	57/117	70/148	65/137	0.184/0.4584	0.180/0.520
TP, TPD 40-360/2	DN 40	DN 40	70/140	60/123	75/158	68/143	0.184/0.4584	0.180/0.520
TP, TPD 40-430/2	DN 40	DN 40	91/186	87/175	106/204	101/199	0.2176/0.4584	0.390/0.640
TP, TPD 40-530/2	DN 40	DN 40	105/214	93/188	120/231	107/219	0.2176/0.4584	0.390/1.120
TP, TPD 40-630/2	DN 40	DN 40	141.2/-	119/236	172.0/-	150/260	0.58/-	1.120/0.640
TP, TPD 50-60/2	DN 50	DN 50	20/45	-	21/48	-	0.056/0.072	-
TP, TPD 50-120/2	DN 50	DN 50	28/56	-	29/58	-	0.056/0.072	-
TP, TPD 50-180/2	DN 50	DN 50	28/56	-	29/58	-	0.056/0.072	-
TP, TPD 50-160/2	DN 50	DN 50	47/94	-	52/111	-	0.138/0.3912	-
TP, TPD 50-190/2	DN 50	DN 50	48/98	-	53/114	-	0.138/0.3912	-
TP, TPD 50-240/2	DN 50	DN 50	54/108	-	59/125	-	0.184/0.3912	-
TP, TPD 50-290/2	DN 50	DN 50	65/131	58/117	70/149	66/137	0.184/0.4584	0.180/0.520
TP, TPD 50-360/2	DN 50	DN 50	71/144	61/127	76/161	69/147	0.184/0.4584	0.180/0.520
TP, TPD 50-430/2	DN 50	DN 50	86/174	82/166	101/191	96/186	0.184/0.4584	0.390/0.520
TP, TPD 50-420/2	DN 50	DN 50	112/230	102/209	127/248	116/229	0.2176/0.5184	0.390/0.520
TP, TPD 50-540/2	DN 50	DN 50	149/304	127/257	166/325	158/288	0.7248/0.6507	1.120/1.120
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	-	27/56	-	0.056/0.140	-
TP, TPD 65-120/2	DN 65	DN 65	31/63	-	32/65	-	0.056/0.140	-
TP, TPD 65-180/2	DN 65	DN 65	38/76	-	41/79	-	0.066/0.140	-
TP, TPD 65-170/2	DN 65	DN 65	56/118	-	62/134	-	0.184/0.3912	-
TP, TPD 65-210/2	DN 65	DN 65	68/141	62/124	73/158	70/144	0.184/0.4584	0.180/0.520
TP, TPD 65-250/2	DN 65	DN 65	73/151	65/130	78/168	73/150	0.184/0.4584	0.180/0.520
TP, TPD 65-340/2	DN 65	DN 65	89/178	85/172	104/196	99/192	0.184/0.4584	0.390/0.520
TP, TPD 65-410/2	DN 65	DN 65	103/206	92/186	118/224	106/217	0.184/0.4584	0.390/1.120
TP, TPD 65-460/2	DN 65	DN 65	151/310	127/265	168/331	158/296	0.7248/0.6507	1.120/1.120
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	374/-	364/725	424/-	0.7248/1.524	1.5/-

Pump type	Connection		Weights				Shipping volume [m <sup>3</sup> ]	
	D1 <sub>D</sub>	D1 <sub>S</sub>	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	-	44/86	-	0.066/0.140	-
TP, TPD 80-140/2	DN 80	DN 80	61/124	-	74/141	-	0.184/0.3912	-
TP, TPD 80-180/2	DN 80	DN 80	65/132	64/139	78/149	72/159	0.184/0.4584	0.180/0.520
TP, TPD 80-210/2	DN 80	DN 80	78/157	67/139	90/174	75/159	0.184/0.4584	0.180/0.520
TP, TPD 80-240/2	DN 80	DN 80	93/187	87/176	105/204	101/196	0.184/0.4584	0.390/0.520
TP, TPD 80-250/2	DN 80	DN 80	101/211	101/214	115/230	115/245	0.2176/0.5184	0.390/1.120
TP, TPD 80-330/2	DN 80	DN 80	148/304	126/262	169/334	157/293	0.7248/0.6507	1.120/1.120
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	378/-	371/747	428/-	0.7248/1.524	1.5/-
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	82/179	107/246	96/216	0.2176/0.5184	0.390/1.120
TP, TPD 100-200/2	DN 100	DN 100	108/226	102/216	122/276	116/247	0.7248/0.5184	0.390/1.120
TP, TPD 100-240/2	DN 100	DN 100	122/254	108/234	136/304	139/265	0.7248/0.5184	1.120/1.120
TP, TPD 100-250/2	DN 100	DN 100	175/351	153/311	199/401	184/342	0.7248/1.524	1.120/1.120
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	412/-	425/828	462/-	0.797/1.800	1.5/-
TP 100-530/2	DN 100	DN 100	530/-	604/-	650/-	698/-	2.05 /-	2.98/-
TP 100-650/2	DN 100	DN 100	660/-	732/-	780/-	826/-	2.05 /-	2.98/-
TP 100-800/2	DN 100	DN 100	775/-	-	895/-	-	2.05 /-	-
TP 100-950/2	DN 100	DN 100	874/-	-	994/-	-	2.05 /-	-
TP 100-1040/2	DN 100	DN 100	1065/-	-	1185/-	-	2.05 /-	-
TP 100-1200/2	DN 100	DN 100	1220/-	-	1340/-	-	2.05 /-	-
TP 100-1410/2	DN 100	DN 100	1360/-	-	1480/-	-	2.05 /-	-
TP 125-310/2	DN 125	DN 125	301/-	327/-	332/-	358/-	1.12/-	1.12/-
TP 125-360/2	DN 125	DN 125	357/-	418/-	388/-	468/-	1.12/-	1.5/-

★ 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, 25**

Pump type	Connection		Weights				Shipping volume [m³]★	
	D1 <sub>D</sub>	D1 <sub>S</sub>	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	-	16/31	-	0.036/0.072	-
TP, TPD 32-40/4	DN 32	DN 32	25/32	-	28/33	-	0.064/0.072	-
TP, TPD 32-60/4	DN 32	DN 32	25/50	-	28/53	-	0.036/0.082	-
TP, TPD 32-80/4	DN 32	DN 32	35/69	-	40/86	-	0.138/0.3912	-
TP, TPD 32-100/4	DN 32	DN 32	36/71	-	41/88	-	0.138/0.3912	-
TP, TPD 32-120/4	DN 32	DN 32	49/94	-	55/110	-	0.1632/0.3912	-
TP, TPD 40-30/4	DN 40	DN 40	17/33	-	18/34	-	0.036/0.072	-
TP 40-60/4	DN 40	DN 40	22/42	-	23/43	-	0.036/0.072	-
TP, TPD 40-90/4	DN 40	DN 40	28/50	-	32/56	-	0.076/0.151	-
TP, TPD 40-100/4	DN 40	DN 40	41/83	-	45/99	-	0.138/0.3912	-
TP, TPD 40-110/4	DN 40	DN 40	48/101	-	54/117	-	0.1632/0.3912	-
TP, TPD 40-140/4	DN 40	DN 40	54/113	-	60/129	-	0.2176/0.3912	-
TP, TPD 50-30/4	DN 50	DN 50	24/46	-	25/48	-	0.036/0.072	-
TP, TPD 50-60/4	DN 50	DN 50	25/50	-	26/52	-	0.056/0.072	-
TP, TPD 50-90/4	DN 50	DN 50	43/87	-	47/103	-	0.138/0.3912	-
TP, TPD 50-80/4	DN 50	DN 50	55/116	-	61/135	-	0.1632/0.5184	-
TP, TPD 50-120/4	DN 50	DN 50	61/128	-	67/147	-	0.1632/0.5184	-
TP, TPD 50-140/4	DN 50	DN 50	64/133	-	70/152	-	0.2176/0.5184	-
TP, TPD 50-190/4	DN 50	DN 50	69/142	-	75/162	-	0.2176/0.5184	-
TP, TPD 50-230/4	DN 50	DN 50	80/165	-	87/181	-	0.2176/0.5184	-
TP, TPD 65-30/4	DN 65	DN 65	33/56	-	35/59	-	0.056/0.140	-
TP, TPD 65-60/4	DN 65	DN 65	33/63	-	34/66	-	0.056/0.140	-
TP, TPD 65-90/4	DN 65	DN 65	46/92	-	51/109	-	0.1632/0.3912	-
TP, TPD 65-110/4	DN 65	DN 65	63/134	-	69/150	-	0.2176/0.3912	-
TP, TPD 65-130/4	DN 65	DN 65	65/138	-	71/155	-	0.2176/0.3912	-
TP, TPD 65-150/4	DN 65	DN 65	70/160	-	76/166	-	0.2176/0.4584	-
TP, TPD 65-170/4	DN 65	DN 65	81/171	-	87/188	-	0.2176/0.4584	-
TP, TPD 65-240/4	DN 65	DN 65	80/169	81/176	87/186	95/213	0.2176/0.4584	0.390/1.120
TP, TPD 80-30/4	DN 80	DN 80	37/68	-	39/71	-	0.056/0.140	-
TP, TPD 80-60/4	DN 80	DN 80	37/70	-	39/72	-	0.066/0.140	-
TP, TPD 80-70/4	DN 80	DN 80	67/141	-	80/159	-	0.2176/0.3912	-
TP, TPD 80-90/4	DN 80	DN 80	70/148	-	83/165	-	0.2176/0.4584	-
TP, TPD 80-110/4	DN 80	DN 80	73/153	-	86/170	-	0.2176/0.4584	-
TP, TPD 80-150/4	DN 80	DN 80	88/172	82/176	102/192	96/213	0.2176/0.5184	0.390/1.120
TP, TPD 80-170/4	DN 80	DN 80	101/199	85/182	115/218	99/219	0.2176/0.5184	0.390/1.120
TP, TPD 80-240/4	DN 80	DN 80	194/393	170/356	218/443	201/387	0.9696/1.524	1.120/1.120
TP, TPD 80-270/4	DN 80	DN 80	205/415	178/371	229/465	209/402	0.9696/1.524	1.120/1.120
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
TP, TPD 100-30/4	DN 100	DN 100	41/85	-	44/90	-	0.140/0.213	-
TP, TPD 100-65/4	DN 100	DN 100	94/189	87/181	108/206	101/214	0.7248/0.6507	0.390/1.120
TP, TPD 100-70/4	DN 100	DN 100	95/191	88/183	109/208	102/216	0.7248/0.6507	0.390/1.120
TP, TPD 100-90/4	DN 100	DN 100	97/196	98/204	122/246	112/241	0.7248/0.6507	0.390/1.120
TP, TPD 100-110/4	DN 100	DN 100	107/215	101/209	131/265	115/245	0.7248/0.6507	0.390/1.120
TP, TPD 100-130/4	DN 100	DN 100	139/282	124/256	164/332	138/287	0.7248/1.524	0.390/1.120
TP, TPD 100-170/4	DN 100	DN 100	168/340	147/303	192/390	178/334	0.7248/1.524	1.120/1.120
TP 100-140/4	DN 100	DN 100	210/-	203/-	225/-	234/-	0.97/-	1.120/-
TP, TPD 100-200/4	DN 100	DN 100	239/499	209/448	264/549	240/479	0.9696/1.524	1.120/1.120
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	415/-	422/831	509/-	0.9696/1.800	2.98/-
TP 125-60/4	DN 125	DN 125	125/-	125/-	144/-	156/-	0.969/-	1.12/-
TP 125-80/4	DN 125	DN 125	129/-	128/-	148/-	159/-	0.969/-	1.12/-
TP 125-95/4	DN 125	DN 125	125/-	131/-	144/-	162/-	0.969/-	1.12/-
TP, TPD 125-110/4	DN 125	DN 125	179/393	164/360	210/443	195/391	0.96/1.524	1.12/1.12
TP, TPD 125-130/4	DN 125	DN 125	212/450	187/407	242/501	218/438	0.9696/1.524	1.12/1.12
TP, TPD 125-160/4	DN 125	DN 125	222/471	193/418	252/522	224/449	0.9696/1.524	1.12/1.12
TP 125-150/4	DN 125	DN 125	300/-	227/-	315/-	258/-	0.97/-	1.12/-
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	452/-	462/874	502/-	0.9696/1.800	1.5/-
TP, TPD 125-400/4	DN 125	DN 125	500/1008	515/-	557/1065	565/-	1.800/1.800	1.5/-

Pump type	Connection		Weights				Shipping volume [m <sup>3</sup> ]*	
	D1 <sub>D</sub>	D1 <sub>S</sub>	Net [kg] ★		Gross [kg] ★		TP/TPD	TPE/TPED
			TP/TPD	TPE/TPED	TP/TPD	TPE/TPED		
TP 150-70/4	DN 150	DN 150	199/-	222/-	372/-	377/-	2.3/-	2.3/-
TP 150-110/4	DN 150	DN 150	214/-	228/-	387/-	383/-	2.3/-	2.3/-
TP 150-155/4	DN 150	DN 150	236/-	255/-	409/-	428/-	2.3/-	2.3/-
TP 150-170/4	DN 150	DN 150	258/-	310/-	431/-	483/-	2.3/-	2.3/-
TP, TPD 150-130/4	DN 150	DN 150	270/574	250/537	301/624	281/620	1.12/1.524	1.12/1.52
TP, TPD 150-160/4	DN 150	DN 150	318/643	325/631	349/693	356/681	1.12/1.524	1.12/1.52
TP, TPD 150-200/4	DN 150	DN 150	330/663	336/675	380/714	386/756	0.97/1.8	0.97/1.8
TP, TPD 150-220/4	DN 150	DN 150	415/833	375/753	472/891	425/804	0.97/1.8	0.97/1.8
TP, TPD 150-250/4	DN 150	DN 150	426/854	490/-	483/912	540/-	0.97/1.8	1.5/-
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/-	472/-	689/-	602/-	2.3/-	2.38/-
TP 150-340/4	DN 150	DN 150	502/-	540/-	672/-	670/-	2.3/-	2.38/-
TP 150-390/4	DN 150	DN 150	550/-	623/-	719/-	788/-	2.3/-	3.55/-
TP 150-450/4	DN 150	DN 150	672/-	770/-	870/-	935/-	3.1/-	3.55/-
TP 150-520/4	DN 150	DN 150	827/-	900/-	1025/-	1065/-	3.1/-	3.55/-
TP 150-660/4	DN 150	DN 150	942/-	-	1140/-	-	3.1/-	-
TP 200-50/4	DN 200	DN 200	272/-	254/-	445/-	409/-	2.3/-	2.3/-
TP 200-70/4	DN 200	DN 200	279/-	277/-	452/-	432/-	2.3/-	2.3/-
TP 200-90/4	DN 200	DN 200	294/-	282/-	467/-	437/-	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/-	550/-	587/-	680/-	2.3/-	2.38/-
TP 200-240/4	DN 200	DN 200	520/-	581/-	718/-	771/-	3.1/-	2.38/-
TP 200-270/4	DN 200	DN 200	671/-	741/-	840/-	906/-	2.3/-	3.55/-
TP 200-290/4	DN 200	DN 200	588/-	677/-	786/-	842/-	3.1/-	3.55/-
TP 200-320/4	DN 200	DN 200	797/-	891/-	996/-	1056/-	3.1/-	3.55/-
TP 200-330/4	DN 200	DN 200	730/-	821/-	933/-	986/-	3.1/-	3.55/-
TP 200-360/4	DN 200	DN 200	766/-	858/-	969/-	1023/-	3.1/-	3.55/-
TP 200-400/4	DN 200	DN 200	891/-	982/-	1090/-	1147/-	3.1/-	3.55/-
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 300-190/4	DN 300	DN 300	765/-	864/-	895/-	947/-	2.82/-	3.77/-
TP 300-220/4	DN 300	DN 300	865/-	948/-	995/-	1031/-	2.82/-	3.77/-
TP 300-250/4	DN 300	DN 300	905/-	983/-	1035/-	1066/-	2.82/-	3.77/-
TP 300-290/4	DN 300	DN 300	1115/-	1188/-	1275/-	1271/-	3.24/-	3.77/-
TP 300-390/4	DN 300	DN 300	1230/-	-	1390/-	-	3.24/-	-
TP 300-420/4	DN 300	DN 300	1330/-	-	1490/-	-	3.24/-	-
TP 300-430/4	DN 300	DN 300	1500/-	-	1660/-	-	3.24/-	-
TP 300-500/4	DN 300	DN 300	1660/-	-	1820/-	-	3.24/-	-
TP 300-550/4	DN 300	DN 300	1795/-	-	1955/-	-	3.24/-	-
TP 350-280/4	DN 350	DN 350	1385/-	-	1555/-	-	3.77/-	-
TP 350-320/4	DN 350	DN 350	1485/-	-	1655/-	-	3.77/-	-
TP 350-360/4	DN 350	DN 350	1715/-	-	1885/-	-	3.77/-	-
TP 350-420/4	DN 350	DN 350	1870/-	-	2120/-	-	5.26/-	-
TP 350-480/4	DN 350	DN 350	2010/-	-	2260/-	-	5.26/-	-
TP 350-530/4	DN 350	DN 350	2230/-	-	2550/-	-	6.46/-	-
TP 350-650/4	DN 350	DN 350	2405/-	-	2725/-	-	6.46/-	-
TP 350-780/4	DN 350	DN 350	2455/-	-	2775/-	-	6.46/-	-
TP 400-470/4	DN 400	DN 500	3680/-	-	4120/-	-	10.76/-	-
TP 400-510/4	DN 400	DN 500	4200/-	-	4640/-	-	10.76/-	-
TP 400-540/4	DN 400	DN 500	4200/-	-	4640/-	-	10.76/-	-
TP 400-670/4	DN 400	DN 500	4400/-	-	4840/-	-	10.76/-	-
TP 400-720/4	DN 400	DN 500	5000/-	-	5440/-	-	10.76/-	-
TP 400-760/4	DN 400	DN 500	5200/-	-	5640/-	-	10.76/-	-

★ 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 [m <sup>3</sup> ]*	
	D <sub>1D</sub>	D <sub>1S</sub>	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.

## 28. Minimum efficiency index

Minimum efficiency index, MEI, means the dimensionless scale unit for hydraulic pump efficiency at best efficiency point, part load and overload. The Commission Regulation, EU, sets efficiency requirements to MEI greater than or equal to 0.10 as from 1 January 2013 and MEI greater than or equal to 0.40 as from 1 January 2015. An indicative benchmark for the best-performing water pump available on the market as from 1 January 2013 is determined in the regulation.

- The benchmark for the most efficient water pumps is MEI greater than or equal to 0.70.
- The efficiency of a pump with a trimmed impeller is usually lower than that of a pump with the full impeller diameter. The trimming of the impeller will adapt the pump to a fixed duty point, leading to reduced energy consumption. The minimum efficiency index, MEI, is based on the full impeller diameter.
- The operation of this water pump with variable duty points may be more efficient and economic when controlled, for example, by the use of a variable-speed drive that matches the pump duty to the system.
- Information on benchmark efficiency is available at <http://europump.eu/efficiencycharts>.

### TPE2, TPE2 D, TPE3, TPE3 D

TPE2, TPE2 D, TPE3, TPE3 D	P2 [kW]	Nominal impeller size / actual impeller size	Trimmed impeller	Maximum impeller	MEI
TPE2, TPE2 D, TPE3, TPE3 D	All			•	≥ 0.70

### 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	Maximum impeller	MEI
TP, TPE 25-50/2	0.12			•	*
TP, TPE 25-80/2	0.18			•	≥ 0.55
TP, TPE 25-90/2	0.37			•	≥ 0.70
TP, TPE 32-50/2	0.12			•	*
TP, TPE 32-80/2	0.25			•	≥ 0.70
TP, TPE 32-90/2	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 rate at best efficiency point is less than 6 m<sup>3</sup>/h.

TP Series 200, 2-pole	P2 [kW]	Nominal impeller size / actual impeller size	Trimmed impeller	Maximum impeller	MEI
TP, TPD 32-60/2	0.25			•	≥ 0.56
TP, TPD 32-120/2	0.37			•	≥ 0.40
TP, TPD 32-150/2	0.37	32-136 / 111	•		
TP, TPD 32-180/2	0.55	32-136 / 118	•		≥ 0.64
TP, TPD 32-230/2	0.75	32-136 / 136		•	
TP, TPD 40-60/2	0.25			•	≥ 0.70
TP, TPD 40-120/2	0.37			•	≥ 0.70
TP 40-180/2	0.55			•	≥ 0.70
TP, TPD 40-190/2	0.75			•	≥ 0.44
TP, TPD 40-230/2	1.1			•	≥ 0.61
TP, TPD 40-270/2	1.5			•	≥ 0.70
TP, TPD 50-60/2	0.37			•	≥ 0.60
TP, TPD 50-120/2	0.75			•	≥ 0.45
TP, TPD 50-180/2	0.75			•	≥ 0.70
TP, TPD 65-60/2	0.55			•	≥ 0.70
TP, TPD 65-120/2	1.1			•	≥ 0.59
TP, TPD 65-180/2	1.5			•	≥ 0.70
TP, TPD, 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	Maximum impeller	MEI
TP, TPD 32-200/2	1.1	32-160.1 / 129	•		
TP, TPD, TPE, TPED 32-250/2	1.5	32-160.1 / 140	•		≥ 0.70
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		•	
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		•	≥ 0.50
TP, TPD 40-240/2	2.2	32-160 / 137	•		
TP, TPD, TPE, TPED 40-300/2	3	32-160 / 151	•		≥ 0.52
TP, TPD, TPE, TPED 40-360/2	4	32-160 / 163		•	
TP, TPD, TPE, TPED 40-430/2	5.5	32-200 / 186	•		
TP, TPD, TPE, TPED 40-530/2	7.5	32-200 / 202	•		≥ 0.70
TP, TPD, TPE, TPED 40-630/2	11	32-200 / 219		•	
TP, TPD 50-160/2	1.1	32-125 / 110	•		
TP, TPD 50-190/2	1.5	32-125 / 120	•		≥ 0.70
TP, TPD 50-240/2	2.2	32-125 / 130	•		
TP, TPD, TPE, TPED 50-290/2	3	32-125 / 142		•	
TP, TPD, TPE, TPED 50-360/2	4	32-160 / 163	•		
TP, TPD, TPE, TPED 50-430/2	5.5	32-160 / 177		•	≥ 0.70
TP, TPD, TPE, TPED 50-420/2	7.5	40-200 / 187	•		
TP, TPD, TPE, TPED 50-540/2	11	40-200 / 207	•		≥ 0.57
TP, TPD, TPE, TPED 50-630/2	15	40-200 / 210		•	
TP, TPD, TPE, TPED 50-710/2	15	40-250 / 230	•		
TP, TPD, TPE, TPED 50-830/2	18.5	40-250 / 245	•		≥ 0.70
TP, TPD, TPE, TPED 50-900/2	22	40-250 / 255		•	
TP, TPD, TPE, TPED 65-170/2	2.2	40-125 / 116	•		
TP, TPD, TPE, TPED 65-210/2	3	40-125 / 127	•		≥ 0.70
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	•		≥ 0.70
TP, TPD, TPE 65-930/2	30	50-250 / 257		•	
TP, TPD 80-140/2	2.2	50-125 / 105	•		
TP, TPD, TPE, TPED 80-180/2	3	50-125 / 115	•		≥ 0.69
TP, TPD, TPE, TPED 80-210/2	4	50-125 / 125	•		
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	•		≥ 0.68
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	•		≥ 0.70
TP, TPD, TPE 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	•		≥ 0.58
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	•		≥ 0.70
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, TPE 100-480/2	30	80-200 / 200		•	≥ 0.65
TP, TPE 125-310/2	22	125-176 / 160	•		≥ 0.70
TP, TPE 125-360/2	30	125-176 / 174		•	

## 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	Maximum impeller	MEI
TP, TPD 32-30/4	0.12		•	•	*
TP, TPD 32-40/4	0.25		•	•	*
TP, TPD 32-60/4	0.25		•	•	*
TP, TPD 40-30/4	0.12		•	•	≥ 0.70
TP 40-60/4	0.25		•	•	≥ 0.70
TP, TPD 40-90/4	0.25		•	•	≥ 0.70
TP, TPD 50-30/4	0.25		•	•	≥ 0.70
TP, TPD 50-60/4	0.37		•	•	≥ 0.70
TP, TPD 65-30/4	0.25		•	•	≥ 0.70
TP, TPD 65-60/4	0.55		•	•	≥ 0.70
TP, TPD 80-30/4	0.37		•	•	≥ 0.70
TP, TPD 80-60/4	0.75		•	•	≥ 0.70
TP, TPD 100-30/4	0.55		•	•	≥ 0.45

\* Not in MEI classification because flow rate at best efficiency point is less than 6 m<sup>3</sup>/h.

TP Series 300, 4-pole	P2 [kW]	Nominal impeller size / actual impeller size	Trimmed impeller	Maximum impeller	MEI
TP, TPD 32-80/4	0.25	32-160.1 / 152	•	•	≥ 0.70
TP, TPD 32-100/4	0.37	32-160.1 / 169	•	•	≥ 0.69
TP, TPD 32-120/4	0.55	32-200.1 / 196	•	•	≥ 0.40
TP, TPD 40-100/4	0.55	32-160 / 169	•	•	≥ 0.70
TP, TPD 40-110/4	0.75	32-200 / 194	•	•	≥ 0.70
TP, TPD 40-140/4	1.1	32-200 / 212	•	•	≥ 0.50
TP, TPD 50-90/4	0.55	32-160 / 169	•	•	≥ 0.70
TP, TPD 50-80/4	0.75	40-200 / 176	•	•	≥ 0.70
TP, TPD 50-120/4	1.1	40-200 / 198	•	•	≥ 0.70
TP, TPD 50-140/4	1.5	40-200 / 215	•	•	≥ 0.70
TP, TPD 50-190/4	2.2	40-250 / 240	•	•	≥ 0.70
TP, TPD 50-230/4	3	40-250 / 260	•	•	≥ 0.70
TP, TPD 65-90/4	0.75	40-160 / 166	•	•	≥ 0.70
TP, TPD 65-110/4	1.1	50-200 / 180	•	•	≥ 0.70
TP, TPD 65-130/4	1.5	50-200 / 190	•	•	≥ 0.70
TP, TPD 65-150/4	2.2	50-200 / 210	•	•	≥ 0.70
TP, TPD 65-170/4	3	50-200 / 219	•	•	≥ 0.70
TP, TPD, TPE, TPED 65-240/4	4	50-250 / 263	•	•	≥ 0.68
TP, TPD 80-70/4	1.1	65-160 / 149	•	•	≥ 0.70
TP, TPD 80-90/4	1.5	65-160 / 165	•	•	≥ 0.70
TP, TPD 80-110/4	2.2	65-160 / 177	•	•	≥ 0.70
TP, TPD, TPE, TPED 80-150/4	3	65-200 / 205	•	•	≥ 0.60
TP, TPD, TPE, TPED 80-170/4	4	65-200 / 219	•	•	≥ 0.70
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, TPE, TPED 100-65/4	1.1	80-160 / 146	•	•	≥ 0.70
TP, TPD, TPE, TPED 100-70/4	1.5	80-160 / 150	•	•	≥ 0.70
TP, TPD, TPE, TPED 100-90/4	2.2	80-160 / 161	•	•	≥ 0.70
TP, TPD, TPE, TPED 100-110/4	3	80-160 / 177	•	•	≥ 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, TPE 100-410/4	22	80-315 / 334	•	•	≥ 0.70
TP, TPE 125-60/4	2.2	100-160 / 160-140	•	•	≥ 0.70
TP, TPE 125-80/4	3	100-160 / 172	•	•	≥ 0.70
TP, TPE 125-95/4	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, TPE 125-340/4	22	100-315 / 312	•	•	≥ 0.70
TP, TPD, TPE 125-400/4	30	100-315 / 334	•	•	≥ 0.70

TP Series 300, 4-pole	P2 [kW]	Nominal impeller size / actual impeller size	Trimmed impeller	Maximum impeller	MEI
TP, TPE 150-70/4	5.5	125-200 / 172-150	•		
TP, TPE 150-110/4	7.5	125-200 / 196-178	•		≥ 0.70
TP, TPE 150-155/4	11	125-200 / 218	•		
TP, TPE 150-170/4	15	125-200 / 226		•	
TP, TPD, TPE, TPED 150-130/4	7.5	125-250 / 198	•		
TP, TPD, TPE, TPED 150-160/4	11	125-250 / 220	•		
TP, TPD, TPE, TPED 150-200/4	15	125-250 / 243	•		≥ 0.65
TP, TPD, TPE, TPED 150-220/4	18.5	125-250 / 256	•		
TP, TPD, TPE 150-250/4	22	125-250 / 266		•	
TP, TPE 150-260/4	18.5	125-315 / 275	•		
TP, TPE 150-280/4	22	125-315 / 290	•		
TP, TPE 150-340/4	30	125-315 / 315	•		≥ 0.70
TP, TPE 150-390/4	37	125-315 / 333		•	
TP, TPE 150-450/4	45	125-400 / 358	•		
TP, TPE 150-520/4	55	125-400 / 382	•		≥ 0.70
TP 150-660/4	75	125-400 / 432		•	
TP 200-50/4	4	150-200 / 192-121	•		
TP 200-70/4	5.5	150-200 / 200-130	•		
TP 200-90/4	7.5	150-200 / 210-156	•		≥ 0.70
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	•		
TP 200-190/4	18.5	150-250 / 236	•		
TP, TPE 200-200/4	22	150-250 / 248	•		≥ 0.70
TP, TPE 200-240/4	30	150-250 / 272	•		
TP, TPE 200-290/4	37	150-250 / 285		•	
TP, TPE 200-270/4	45	150-315 / 293	•		
TP, TPE 200-320/4	55	150-315 / 311	•		≥ 0.70
TP 200-410/4	75	150-315 / 338		•	
TP, TPE 200-330/4	37	150-400 / 310	•		
TP, TPE 200-360/4	45	150-400 / 326	•		
TP, TPE 200-400/4	55	150-400 / 343	•		
TP 200-470/4	75	150-400 / 373	•		≥ 0.70
TP 200-530/4	90	150-400 / 391	•		
TP 200-590/4	110	150-400 / 412	•		
TP 200-660/4	132	150-400 / 432		•	
TP, TPE 300-190/4	30	250-315 / 251	•		
TP, TPE 300-220/4	37	250-315 / 272	•		≥ 0.70
TP, TPE 300-250/4	45	250-315 / 286		•	
TP, TPE 300-290/4	55	250-350 / 308	•		
TP 300-390/4	75	250-350 / 351	•		≥ 0.70
TP 300-420/4	90	250-350 / 370		•	
TP 300-430/4	110	250-400 / 358	•		
TP 300-500/4	132	250-400 / 382	•		≥ 0.70
TP 300-550/4	160	250-400 / 402		•	
TP 350-280/4	75	300-350 / 308	•		
TP 350-320/4	90	300-350 / 324	•		
TP 350-360/4	110	300-350 / 343	•		≥ 0.70
TP 350-420/4	132	300-350 / 359	•		
TP 350-480/4	160	300-350 / 372		•	
TP 350-530/4	200	300-400 / 394	•		
TP 350-650/4	250	300-400 / 433	•		≥ 0.70
TP 350-780/4	315	300-400 / 480		•	

**TP, TPD, 6-pole, PN 16**

TP Series 300, 6-pole	P2 [kW]	Nominal impeller size / actual impeller size	Trimmed impeller	Maximum impeller	MEI
TP, TPD 125-60/6	1.5	100-200 / 197	•		≥ 0.62
TP, TPD 125-70/6	2.2	100-200 / 216		•	
TP, TPD 125-80/6	3	100-250 / 236	•		≥ 0.70
TP, TPD 125-100/6	4	100-250 / 267		•	
TP, TPD 125-130/6	5.5	100-315 / 295	•		≥ 0.70
TP, TPD 125-160/6	7.5	100-315 / 326		•	
TP, TPD 150-60/6	2.2	125-250 / 204	•		
TP, TPD 150-70/6	3	125-250 / 220	•		≥ 0.62
TP, TPD 150-90/6	4	125-250 / 238	•		
TP, TPD 150-110/6	5.5	125-250 / 262		•	

**TP, PN 25**

PN 25	P2 [kW]	Nominal impeller size / actual impeller size	Trimmed impeller	Maximum impeller	MEI
TP Series 300, PN 25	All				**

\*\* Not in MEI classification because PN 25 is not a part of the MEI classification.

## 29. Accessories

### Unions and valves, TP Series 100

A union kit consists of two cast-iron union tails, two cast-iron union nuts and two EPDM gaskets.

Pump type, union connection	Pressure stage	Size	Product number
TP, TPE 25	PN 10	Rp 3/4	529921
		Rp 1	529922
		Rp 1 1/4	529924
TP, TPE 32	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 made of pressure die-cast brass.

Pump type, valve connection	Pressure stage	Size	Product number
TP, TPE 25	PN 10	Rp 3/4	519805
		Rp 1	519806
		Rp 1 1/4	519807
TP, TPE 32	PN 10	Rp 1 1/4	505539

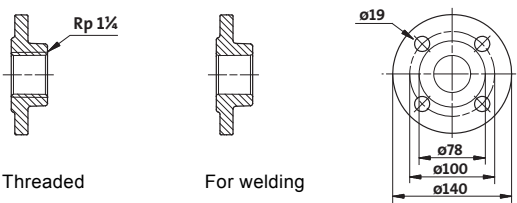
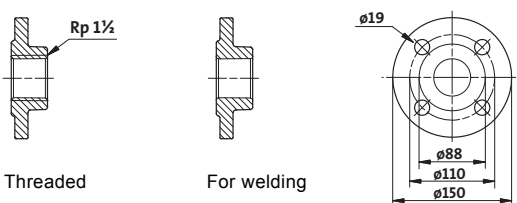
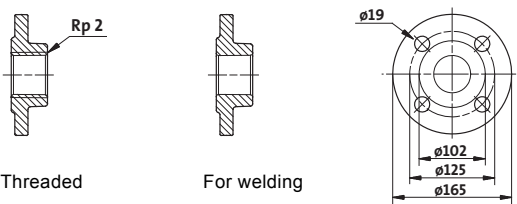
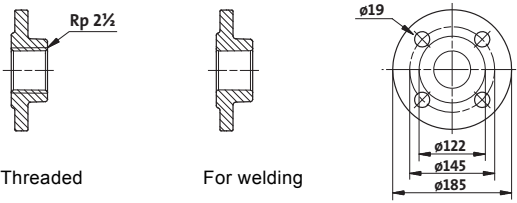
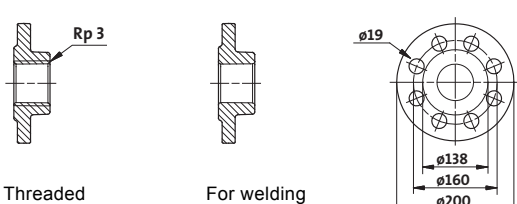
A union kit consists of two bronze union tails, two brass union nuts and two EPDM gaskets.

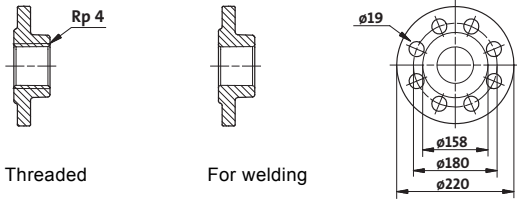
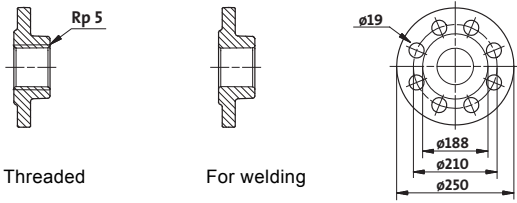
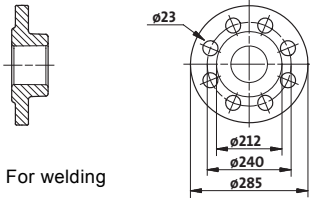
The valve housing is made of pressure die-cast brass.

Pump type, union connection	Pressure stage	Size	Product number
TP, TPE 25	PN 10	Rp 3/4	529971
		Rp 1	529972
TP, TPE 32	PN 10	Rp 1 1/4	509971








## Counterflanges

A flange kit consists of two steel flanges, two gaskets of asbestos-free material IT 200, and the requisite number of bolts.

Counterflange	Pump type	Description	Rated pressure	Pipe connection	Product number
 <p>Threaded</p> <p>For welding</p>	<b>TP, TPE 32 TPD, TPED 32</b>	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
 <p>Threaded</p> <p>For welding</p>	<b>TP, TPE 40 TPD, TPED 40</b>	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
 <p>Threaded</p> <p>For welding</p>	<b>TP, TPE 50 TPD, TPED 50</b>	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
 <p>Threaded</p> <p>For welding</p>	<b>TP, TPE 65 TPD, TPED 65</b>	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
 <p>Threaded</p> <p>For welding</p>	<b>TP, TPE 80 TPD, TPED 80</b>	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

Counterflange	Pump type	Description	Rated pressure	Pipe connection	Product number
 <p>Threaded</p> <p>For welding</p>	<p><b>TP, TPE 100</b> <b>TPD, TPED 100</b></p> <p>TM03 0483 5204</p>	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	98999516
		For welding	10 bar, EN 1092-2	100 mm, nominal	579802
		Threaded	16 bar, EN 1092-2	Rp 4	98999516
		For welding	16 bar, EN 1092-2	100 mm, nominal	579802
 <p>Threaded</p> <p>For welding</p>	<p><b>TP, TPE 125</b> <b>TPD, TPED 125</b></p> <p>TM03 0484 5204</p>	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
 <p>For welding</p>	<p><b>TP, TPE 150</b> <b>TPD, TPED 150</b></p> <p>TM03 0485 5204</p>	For welding	10 bar, EN 1092-2	150 mm, nominal	S1111600
		For welding	16 bar, EN 1092-2	150 mm, nominal	S1111600

## Adapter flanges for various port-to-port lengths

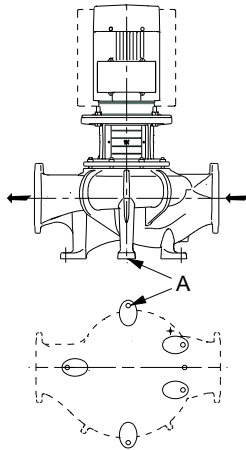
DN	Height (H) [mm]	Diameter, D [mm]		Pitch-circle diameter, D1 [mm]		Adapter flange	Product number	
		PN 6	PN 10/16	PN 6	PN 10/16		PN 6	PN 10/16
32	1 x 220	-	-	90	100		98848068	98848069
	1 x 120	-	-	90	100		98387529	98387530
32	1 x 60	70	78	-	-		98387527	98387528
	1 x 30	70	78	-	-		98387531	98387588
40	1 x 70	-	-	100	110		539921	539721
	1 x 90	-	-	100	110		98387590	98387591
	1 x 190	-	-	100	110		98387592	98387593
50	1 x 160	-	-	110	125		98387594	98387595
	1 x 60	-	-	110	125		549924	549824
	1 x 40	90	102	-	-		96281077	96608516
65	1 x 135	-	-	130	145		98391271	98391272
	1 x 20	110	122	-	-		98391273	98391274
80	1 x 80	-	-	150	160		98391275	98391276
100	1 x 100	-	-	170	180		98391277	98391278



### Base plates

**Note:** TPE2, TPE3 and TP Series 100 pumps are not designed to be supplied with a base plate. Base plates are supplied as standard with TP and TPE pumps with 11 kW motors and above.

Some of the TP Series 300 pumps are provided with mounting feet and cannot be supplied with a base plate. See fig. 145.

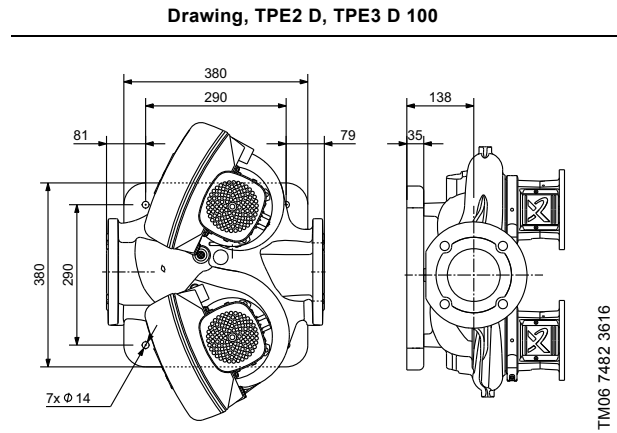
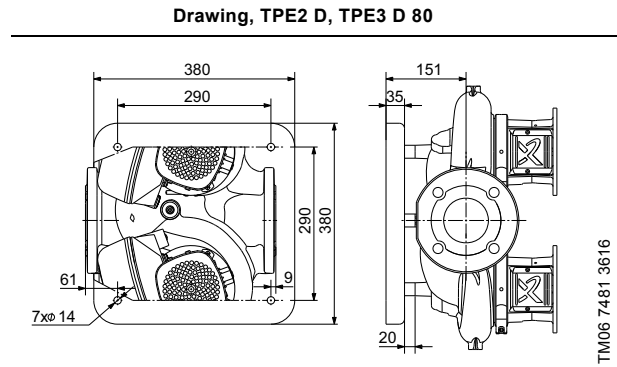
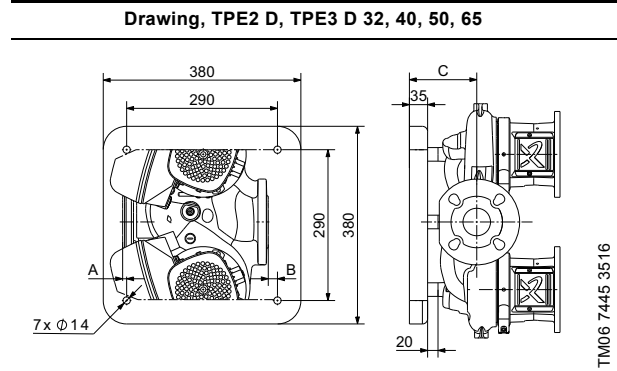


TM06 1083 1614

**Fig. 145** Principal sketch of a Series 300 pump designed with mounting feet (A)

#### TPE2 D, TPE3 D

Pump type	Hexagon head screws	Product number
TPE2 D, TPE3 D 32		99150053
TPE2 D, TPE3 D 40		99150054
TPE2 D, TPE3 D 50	3 x M12 x 40 mm	99150055
TPE2 D, TPE3 D 65		99150056
TPE2 D, TPE3 D 80		99150056
TPE2 D, TPE3 D 100	3 x M12 x 16 mm	99150057



Pump type	Dimensions [mm]			Product number
	A	B	C	
TPE2 D, TPE3 D 32	0	69	123	99150053
TPE2 D, TPE3 D 40	5	45	124	99150054
TPE2 D, TPE3 D 50	8	18	130	99150055
TPE2 D, TPE3 D 65	50	0	132	99150056
TPE2 D, TPE3 D 80				99150056
TPE2 D, TPE3 D 100				99150057

**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

**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

**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 100-530/2 TP 100-650/2 TP 100-800/2 TP 100-950/2 TP 100-1040/2 TP 100-1200/2 TP 100-1410/2 TP, TPE 100-xx/4 TP, TPE 125-xx/4 TP, TPE 150-xx/4 TP 125-xx/6 TP 150-xx/6	2 x M16 x 30 mm	96536246

Drawing	Product number
	96536246

**TPD, TPED Series 300**

Pump type	Hexagon head screws	Product number
TPD, TPED 32 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	4 x M16 x 30 mm	96489381

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 100-65/4		
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		

Drawing	Product number
	96536247

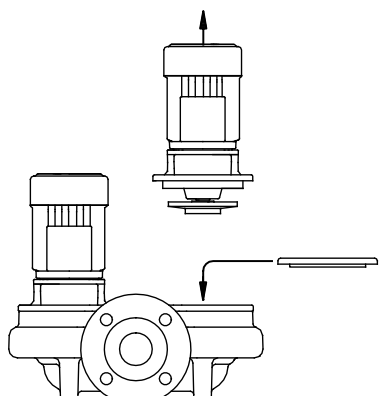
**TPD, TPED Series 300**

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		
TPD 125-xx/6		
TPD 150-xx/6		

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. 146 Blanking flange

### TPE2 D, TPE3 D

Pump type	Product number
All TPE2 D, TPE3 D pumps	98159372

### 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 100-65/4			•					
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**

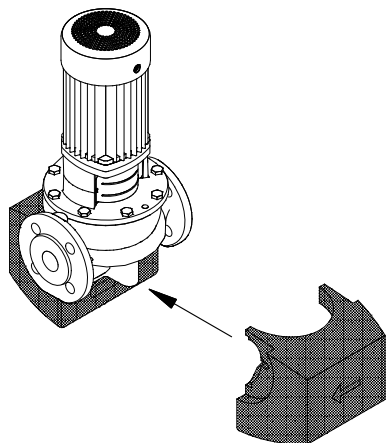
Pump type	96591261	00565055	96495694	96495695	96495696	96525962	96525963	96525964
TPD 125-60/6						•		
TPD 125-70/6						•		
TPD 125-80/6								•
TPD 125-100/6								•
TPD 125-130/6								•
TPD 125-160/6								•
TPD 150-60/6							•	
TPD 150-70/6							•	
TPD 150-90/6							•	
TPD 150-110/6							•	

## Insulating kits

Insulating kits are available for TPE2 and TPE3 pumps.

The insulating kit consists of two shells.

The insulating kit is tailored to the individual pump model and encloses the entire pump housing, thus providing optimum insulation.



TM00 8095 2496

Fig. 147 Insulating kit


### Kits for TPE2, TPE3 pumps

Pump type	Product number
TPE2, TPE3 32-80/120/150/180/200	98159366
TPE2, TPE3 40-80/120/150/180/200/240	98159368
TPE2, TPE3 50-60/80/120/150/180/200/240	98159367
TPE2, TPE3 65-60/80/120/150/180/200	98159361
TPE2, TPE3 80-40/120/150/180	98159363
TPE2, TPE3 100-40/120/150/180	98159362



## Sensors

## Flow sensors

Grundfos Vortex flow sensor, VFI <sup>1</sup>	Type	Flow range [m <sup>3</sup> /h]	Pipe connection	O-ring		Connection type		Product number
				EPDM	FKM	Cast-iron flange	Stainless-steel flange	
	VFI 1.3-25 DN32 020 E	1.3 - 25	DN 32	•		•		97686141
	VFI 1.3-25 DN32 020 F				•		97686142	
	VFI 1.3-25 DN32 020 E						•	97688297
	VFI 1.3-25 DN32 020 F						•	97688298
	VFI 2-40 DN40 020 E	2-40	DN 40	•		•		97686143
	VFI 2-40 DN40 020 F				•		97686144	
	VFI 2-40 DN40 020 E						•	97688299
	VFI 2-40 DN40 020 F						•	97688300
	VFI 3.2-64 DN50 020 E	2-64	DN 50	•		•		97686145
	VFI 3.2-64 DN50 020 F				•		97686146	
	VFI 3.2-64 DN50 020 E						•	97688301
	VFI 3.2-64 DN50 020 F						•	97688302
	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	

- 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.

<sup>1</sup> 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 a G 1/2 connection.

Cutting ring bush or protecting tube must be ordered separately.

### Technical data

Type	TTA (-25) 25	TTA (0) 25	TTA (0) 150	TTA (50) 100
Product number	96430194	96432591	96430195	96432592
Measuring range	-25 to +25 °C	0 to +25 °C	0 to +150 °C	50 to +100 °C
Measuring accuracy	According to IEC 751, class B, 0.3 °C at 0 °C			
Response time, $\tau$ (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.

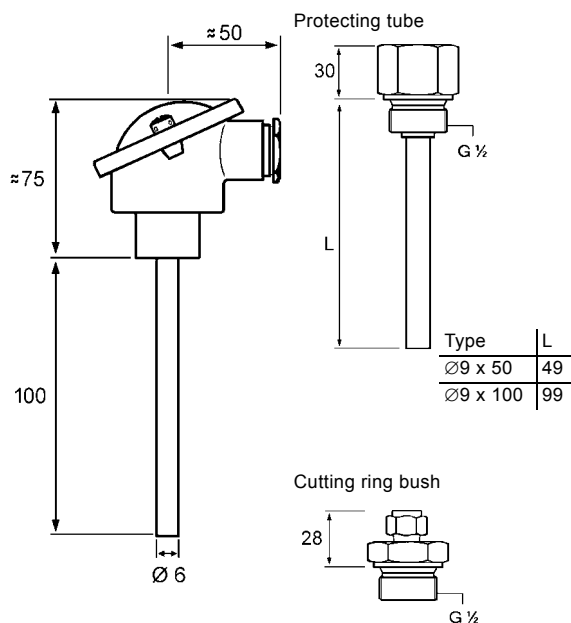


Fig. 148 Dimensional sketch

**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 appears from fig. 149, 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 to +20 °C	0 to +50 °C
Supply voltage	15-30 VDC	
Output signal	4-20 mA	
Measuring accuracy	± 0.3 % FS	
Repeatability	± 1 % FS	
Response time, τ (0.9)	2 minutes	
Ambient temperature	-25 to +85 °C	
Operating temperature of T1 and T2	-25 to +105 °C	
Maximum distance between T1 and T2	300 m with screened cable	
Electrical connection	Between T1 and T2: M12 x 1 plug, output signal with DIN 43650-A plug type	
Storage temperature	-45 to +125 °C	
Short-circuit-proof	Yes	
Protected against polarity reversal	Yes, up to 40 V	
Materials in contact with liquid	Stainless steel, DIN 1.4571	
Enclosure class	IP65	
EMC, electromagnetic compatibility	Emission: According to EN 50081	
	Immunity: According to EN 50082	

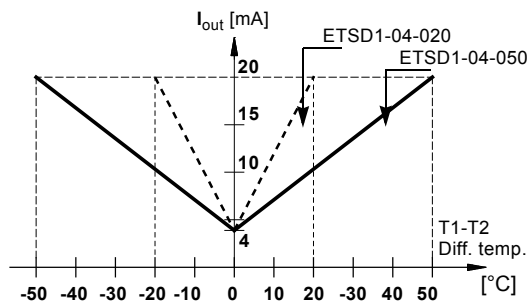


Fig. 149 Sensor characteristics

TM02 1339 1001

ETSD1- 04- 020 K 045	Specification
ETSD1-	Reference temperature, T1.
04-	0 °C corresponds to 4 mA.
020	20 °C corresponds to 20 mA.
050	50 °C corresponds to 20 mA.
K	Material in contact with liquid: Stainless steel, DIN 1.4571.
045	Length of sensing element: 45 mm.

ETSD2- K 045	Specification
ETSD2-	Reference temperature, T2.
K	Material in contact with liquid: Stainless steel, DIN 1.4571.
045	Length of sensing element: 45 mm.

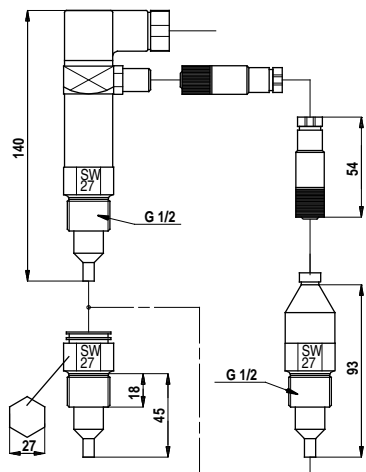
**Installing the sensor**

Fit the two sensors in such a way that the sensing elements are located in the middle of the flow of the liquid to be measured.

For tightening, use only the hexagon nut.

You can turn the upper part of the sensors to any position suitable for the connection of cables.

The sensors have a G 1/2 thread. See fig. 150.



TM02 0705 5000

Fig. 150 Dimensional sketch

**Ambient temperature sensor**

Sensor type	Type	Supplier	Measuring range	Product number
Temperature sensor, ambient temperature	WR 52	tmg DK: Plesner	-50 to +50 °C	ID8295

## Pressure sensors

### Sensors for boosting applications

Danfoss pressure sensor kit	Pressure range [bar]	Product number
<ul style="list-style-type: none"> <li>• Connection: G 1/2 A, DIN 16288 - B6kt</li> <li>• Electrical connection: plug DIN 43650</li> </ul>	0 - 2.5	96478188
	0-4	91072075
	0-6	91072076
	0-10	91072077
	0-16	91072078
<ul style="list-style-type: none"> <li>• Pressure sensor, type MBS 3000, with 2 m screened cable</li> <li>• Connection: G 1/4 A, DIN 16288 - B6kt</li> <li>• 5 cable clips, black</li> <li>• Fitting instructions PT, 00400212</li> </ul>	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	
<ul style="list-style-type: none"> <li>• 1 sensor including 0.9 m screened cable, 7/16" connections</li> <li>• 1 original DPI bracket for wall mounting</li> <li>• 1 Grundfos bracket for mounting on motor</li> <li>• 2 M4 screws for mounting of sensor on bracket</li> <li>• 1 M6 screw, self-cutting, for mounting on MGE 90/100</li> <li>• 1 M8 screw, self-cutting, for mounting on MGE 112/132</li> <li>• 1 M10 screw, self-cutting, for mounting on MGE 160</li> <li>• 1 M12 screw, self-cutting, for mounting on MGE 180</li> <li>• 3 capillary tubes, short/long</li> <li>• 2 fittings, 1/4" - 7/16"</li> <li>• 5 cable clips, black</li> <li>• Installation and operating instructions</li> <li>• Service kit instruction</li> </ul>	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

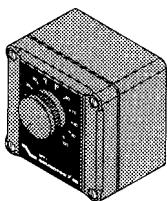
Sensor	Type	Supplier	Measuring range [bar]	Transmitter output [mA]	Power supply [VDC]	Process connection	Product number
Pressure transmitter	RPI	Grundfos	0 - 0.6	4-20	12-30	G 1/2	97748907
			0-1				97748908
			0 - 1.6				97748909
			0 - 2.5				97748910
			0-4				97748921
			0-6				97748922
			0-12				97748923
0-16	97748924						

### Sensor interface

Sensor interface, SI 001 PSU <sup>1</sup>	Description	Product number
	Grundfos Direct Sensors™, type SI 001 PSU, is an external power supply for the VFI, DPI and other transmitters with 24 VDC supply voltage. The power supply is used when the cable between transmitter and controller is more than 30 m long.	96915820

<sup>1</sup> For further information about the PSU sensor interface, see the installation and operating instructions "SI 001 PSU - sensor interface", publication number 96944355, or quick guide, publication number 96944356.

## Potentiometer



TM02 1630 5102

**Fig. 151** Potentiometer

Potentiometer for setpoint setting and start/stop of the pump.

Product	Product number
External potentiometer with cabinet for wall mounting	625468

## Grundfos GO

Grundfos GO is used for wireless infrared or radio communication with the pumps.

Various Grundfos GO variants are available. The variants are described in the following.

### MI 204

MI 204 is an add-on module with built-in infrared and radio communication.

You can use MI 204 in conjunction with an Apple iPhone or iPod with Lightning connector.

MI 204 is also available together with an Apple iPod touch and a cover.



TM05 7704 1513

**Fig. 152** MI 204

Supplied with the product:

- Grundfos MI 204
- sleeve
- quick guide
- charger cable.

### MI 301

MI 301 is a module with built-in infrared and radio communication. Use MI 301 in conjunction with Android or iOS-based smart devices with a Bluetooth connection. MI 301 has rechargeable Li-ion battery and you must charge it separately.



TM05 3890 1712

**Fig. 153** MI 301

Supplied with the product:

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

### Product numbers

Grundfos GO variant	Product number
Grundfos MI 204	98424092
Grundfos MI 204 including iPod touch	98612711
Grundfos MI 301	98046408

## CIU communication interface units



GrA 6118

**Fig. 154** 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. You can mount the CIU unit on a DIN rail or on a wall. For further information See 15. *Communication* on page 120.

We offer the following CIU units:

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 270*	GRM	96898819
CIU 300	BACnet MS/TP	96893769
CIU 500	BACnet IP	
CIU 500	Modbus TCP	96753894
CIU 500	PROFINET IO	

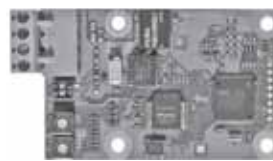
\* Antenna not included. See below.

### 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 Grundfos Product Center. See page 280.

## CIM communication interface modules



GrA6121

**Fig. 155** 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 15. *Communication* on page 120.

**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
CIM 500	BACnet IP	
CIM 500	Modbus TCP	98301408
CIM 500	PROFINET	

\* 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 Grundfos Product Center. See page 280.

## 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	-	
-	5.5	Emission: The motors are category C3, corresponding to CISPR11, group 2, class A, and may be installed in industrial areas (second environment). 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).
7.5	7.5	
11	11	
15	15	
18.5	18.5	
22	-	



TM02 9198 1203

Fig. 156 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, 4-pole and 7.5 kW	96041047
EMC filter, TPE 11-22 kW	96478309



### 30. Minimum inlet pressure - NPSH

To ensure optimum and noiseless operation, we recommend that you use the minimum inlet pressure values shown on pages 275 to 278.

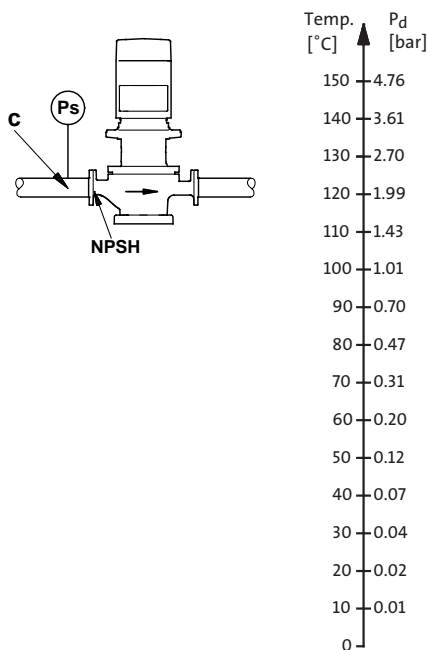
A minimum inlet pressure is required to avoid pressure drop that may cause cavitation.

Use the following formula to calculate the minimum inlet pressure,  $p_s$  in bar relative. The pressure gauge value on the pump inlet side.

**Note:** Base the calculation of the minimum inlet pressure on the maximum required flow.

$$p_s \geq \left( \text{NPSH}_R \times \rho \times g - \frac{1}{2} \times \rho \times c^2 \right) \times 0,00001 - p_b + p_d \quad [\text{bar relative}]$$

- $p_s$  = Minimum inlet pressure in bar.
- $\text{NPSH}_R$  = The required Net Positive Suction Head in m head, to be read from the NPSH curve at the highest flow the pump will be delivering.
- $\rho$  = Density of the pumped liquid measured in  $\text{kg/m}^3$ .
- $g$  = Gravitational acceleration measured in  $\text{m/s}^2$ . For estimated calculations use the value  $9.81 \text{ m/s}^2$ .
- $c$  = Flow velocity of the pumped liquid at the pressure gauge. Insert the flow velocity as the unit [m/s].  
See individual curve charts from page 159.
- $p_b$  = 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. 157.



TM02 8491 0204 - TM03 0371 5004

Fig. 157 Minimum inlet pressure

**TPE2, TPE2 D, TPE3, TPE3 D**

Pump type	p [bar]				
	20 °C	60 °C	90 °C	110 °C	120 °C
TPE2, TPE2 D, TPE3, TPE3 D 32-80	0.1	0.1	0.2	0.9	1.5
TPE2, TPE2 D, TPE3, TPE3 D 32-120	0.1	0.1	0.2	0.9	1.5
TPE2, TPE2 D, TPE3, TPE3 D 32-150	0.1	0.1	0.4	1.1	1.7
TPE2, TPE2 D, TPE3, TPE3 D 32-180	0.1	0.2	0.6	1.3	1.9
TPE2, TPE2 D, TPE3, TPE3 D 32-200	0.2	0.4	0.9	1.6	2.2
TPE2, TPE2 D, TPE3, TPE3 D 40-80	0.1	0.1	0.2	0.9	1.5
TPE2, TPE2 D, TPE3, TPE3 D 40-120	0.1	0.1	0.2	0.9	1.5
TPE2, TPE2 D, TPE3, TPE3 D 40-150	0.1	0.1	0.5	1.2	1.8
TPE2, TPE2 D, TPE3, TPE3 D 40-180	0.1	0.1	0.6	1.3	1.9
TPE2, TPE2 D, TPE3, TPE3 D 40-200	0.1	0.2	0.7	1.4	2.0
TPE2, TPE2 D, TPE3, TPE3 D 40-240	0.1	0.3	0.8	1.5	2.1
TPE2, TPE2 D, TPE3, TPE3 D 50-60	0.1	0.1	0.5	1.2	1.8
TPE2, TPE2 D, TPE3, TPE3 D 50-80	0.1	0.3	0.8	1.5	2.1
TPE2, TPE2 D, TPE3, TPE3 D 50-120	0.4	0.6	1.1	1.8	2.4
TPE2, TPE2 D, TPE3, TPE3 D 50-150	0.6	0.8	1.3	2.0	2.6
TPE2, TPE2 D, TPE3, TPE3 D 50-180	0.7	0.9	1.4	2.1	2.7
TPE2, TPE2 D, TPE3, TPE3 D 50-200	0.9	1.1	1.6	2.3	2.9
TPE2, TPE2 D, TPE3, TPE3 D 50-240	0.9	1.1	1.6	2.3	2.9
TPE2, TPE2 D, TPE3, TPE3 D 65-60	0.1	0.1	0.2	0.9	1.5
TPE2, TPE2 D, TPE3, TPE3 D 65-80	0.1	0.1	0.3	1.1	1.7
TPE2, TPE2 D, TPE3, TPE3 D 65-120	0.1	0.2	0.6	1.4	2.0
TPE2, TPE2 D, TPE3, TPE3 D 65-150	0.1	0.2	0.7	1.5	2.1
TPE2, TPE2 D, TPE3, TPE3 D 65-180	0.3	0.5	1.0	1.8	2.4
TPE2, TPE2 D, TPE3, TPE3 D 65-200	0.6	0.8	1.3	2.1	2.7
TPE2, TPE2 D, TPE3, TPE3 D 80-40	0.1	0.1	0.3	1	1.6
TPE2, TPE2 D, TPE3, TPE3 D 80-120	0.1	0.3	0.9	1.5	2.1
TPE2, TPE2 D, TPE3, TPE3 D 80-150	0.1	0.3	0.9	1.5	2.1
TPE2, TPE2 D, TPE3, TPE3 D 80-180	0.3	0.5	1.1	1.7	2.3
TPE2, TPE2 D, TPE3, TPE3 D 100-40	0.1	0.1	0.4	1.1	1.7
TPE2, TPE2 D, TPE3, TPE3 D 100-120	0.1	0.1	0.6	1.3	1.9
TPE2, TPE2 D, TPE3, TPE3 D 100-150	0.1	0.2	0.7	1.4	2.0
TPE2, TPE2 D, TPE3, TPE3 D 100-180	0.1	0.3	0.8	1.5	2.1

**TP, TPE, TPD, TPED, 2-pole, PN 6, 10, 16, 25**

Pump type	p [bar]						
	20 °C	60 °C	90 °C	110 °C	120 °C	140 °C	150 °C
TP 25-50/2	0.1	0.1	0.2	0.5	-	-	-
TP 25-80/2	0.1	0.1	0.1	0.3	-	-	-
TP 25-90/2	0.1	0.1	0.2	0.5	-	-	-
TP 32-50/2	0.1	0.1	0.1	0.2	-	-	-
TP 32-80/2	0.1	0.1	0.2	0.5	-	-	-
TP 32-90/2	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 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 40-60/2	0.1	0.1	0.5	1.2	1.8	3.5	-
TP, TPD 40-120/2	0.1	0.1	0.4	1.2	1.7	3.4	-
TP 40-180/2	0.1	0.2	0.7	1.5	2.0	3.7	-
TP, TPD 40-190/2	0.1	0.3	0.8	1.6	2.1	3.8	-
TP, TPD 40-230/2	0.7	0.9	1.4	2.2	2.7	4.4	-
TP, TPD 40-270/2	0.7	0.9	1.4	2.2	2.7	4.4	-
TP, TPD 40-240/2	0.1	0.1	0.4	1.1	1.7	3.3	-
TP, TPD 40-300/2	0.1	0.1	0.4	1.1	1.6	3.3	-
TP, TPD 40-360/2	0.2	0.4	0.9	1.6	2.1	3.8	-
TP, TPD 40-430/2	0.1	0.1	0.5	1.2	1.8	3.4	-
TP, TPD 40-530/2	0.1	0.1	0.6	1.3	1.9	3.5	-
TP, TPD 40-630/2	0.1	0.3	0.8	1.5	2.1	3.7	-
TP, TPD 50-60/2	0.1	0.1	0.4	1.1	1.7	3.4	-
TP, TPD 50-120/2	0.1	0.2	0.7	1.5	2.0	3.7	-
TP, TPD 50-180/2	0.1	0.2	0.7	1.4	2.0	3.7	-
TP, TPD 50-160/2	0.1	0.1	0.1	0.8	1.4	3.0	-
TP, TPD 50-190/2	0.1	0.1	0.1	0.8	1.4	3.0	-
TP, TPD 50-240/2	0.1	0.1	0.1	0.8	1.4	3.0	-
TP, TPD 50-290/2	0.1	0.1	0.2	0.9	1.5	3.1	-
TP, TPD 50-360/2	0.1	0.1	0.2	1.0	1.5	3.1	-
TP, TPD 50-430/2	0.1	0.1	0.4	1.1	1.6	3.3	-
TP, TPD 50-420/2	0.1	0.1	0.3	1.1	1.6	3.2	-
TP, TPD 50-540/2	0.1	0.1	0.5	1.3	1.8	3.4	-
TP, TPD 50-630/2	0.1	0.1	0.6	1.4	1.9	3.6	-
TP, TPD 50-710/2	0.6	0.8	1.3	2.0	2.6	4.2	-
TP, TPD 50-830/2	0.5	0.7	1.2	2.0	2.5	4.1	-
TP, TPD 50-900/2	1.0	1.2	1.7	2.4	3.0	4.6	-
TP, TPD 65-60/2	0.1	0.3	0.8	1.5	2.1	3.8	-
TP, TPD 65-120/2	0.5	0.7	1.2	2.0	2.5	4.2	-
TP, TPD 65-180/2	0.3	0.5	1.0	1.8	2.3	4.0	-
TP, TPD 65-170/2	0.1	0.1	0.1	0.9	1.4	3.1	-
TP, TPD 65-210/2	0.1	0.1	0.2	0.9	1.5	3.1	-
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	150 °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	0.5	1.3	1.8	3.4	-
TP, TPD 80-250/2	0.1	0.3	0.8	1.6	2.1	3.7	-
TP, TPD 80-330/2	0.1	0.2	0.7	1.4	2.0	3.6	-
TP, TPD 80-400/2	0.2	0.4	0.9	1.6	2.2	3.8	-
TP, TPD 80-520/2	0.1	0.1	0.6	1.4	1.9	3.5	-
TP, TPD 80-570/2	0.1	0.3	0.8	1.6	2.1	3.7	-
TP, TPD 80-700/2	0.6	0.8	1.3	2.1	2.6	4.2	-
TP, TPD 100-120/2	1.9	2.1	2.6	3.4	3.9	5.6	-
TP, TPD 100-160/2	0.1	0.1	0.6	1.3	1.9	3.5	-
TP, TPD 100-200/2	0.1	0.1	0.4	1.2	1.7	3.3	-
TP, TPD 100-240/2	0.1	0.1	0.5	1.3	1.8	3.4	-
TP, TPD 100-250/2	0.6	0.8	1.3	2.0	2.5	4.2	-
TP, TPD 100-310/2	0.6	0.8	1.3	2.0	2.6	4.2	-
TP, TPD 100-360/2	0.6	0.8	1.3	2.0	2.5	4.2	-
TP, TPD 100-390/2	1.0	1.2	1.7	2.4	3.0	4.6	-
TP, TPD 100-480/2	1.5	1.7	2.2	2.9	3.5	5.1	-
TP 100-530/2	1.6	1.8	2.2	3.2	3.7	5.3	6.6
TP 100-650/2	1.4	1.6	2.0	3.0	3.5	5.1	6.4
TP 100-800/2	1.3	1.5	1.9	2.9	3.4	5.0	6.3
TP 100-950/2	1.3	1.5	1.9	2.9	3.4	5.0	6.3
TP 100-1040/2	1.2	1.4	1.8	2.8	3.3	4.9	6.2
TP 100-1200/2	1.2	1.4	1.8	2.8	3.3	4.9	6.2
TP 100-1410/2	1.2	1.4	1.8	2.8	3.3	4.9	6.2
TP 125-310/2	0.4	0.5	1.0	1.7	2.3	3.9	-
TP 125-360/2	0.5	0.6	1.1	1.8	2.4	4.0	-

## TP, TPE, TPD, TPED, 4-pole, PN 6, 10, 16, 25

Pump type	p [bar]						
	20 °C	60 °C	90 °C	110 °C	120 °C	140 °C	150 °C
TP, TPD 32-30/4	0.1	0.1	0.1	0.8	1.4	3.1	-
TP, TPD 32-40/4	0.1	0.1	0.1	0.9	1.4	3.1	-
TP, TPD 32-60/4	0.1	0.1	0.3	1.1	1.6	3.3	-
TP, TPD 32-80/4	0.1	0.1	0.1	0.5	1.0	2.7	-
TP, TPD 32-100/4	0.1	0.1	0.1	0.5	1.1	2.7	-
TP, TPD 32-120/4	0.1	0.1	0.1	0.6	1.1	2.7	-
TP, TPD 40-30/4	0.1	0.1	0.2	0.9	1.5	3.2	-
TP 40-60/4	0.1	0.1	0.1	0.8	1.4	3.1	-
TP, TPD 40-90/4	0.1	0.1	0.3	1.0	1.6	3.3	-
TP, TPD 40-100/4	0.1	0.1	0.2	0.9	1.5	3.1	-
TP, TPD 40-110/4	0.1	0.1	0.1	0.6	1.2	2.8	-
TP, TPD 40-140/4	0.1	0.1	0.1	0.7	1.3	2.9	-
TP, TPD 50-30/4	0.1	0.1	0.1	0.9	1.4	3.1	-
TP, TPD 50-60/4	0.1	0.1	0.2	0.9	1.5	3.2	-
TP, TPD 50-90/4	0.1	0.1	0.1	0.6	1.1	2.8	-
TP, TPD 50-80/4	0.1	0.1	0.1	0.8	1.3	3.0	-
TP, TPD 50-120/4	0.1	0.1	0.1	0.7	1.3	2.9	-
TP, TPD 50-140/4	0.1	0.1	0.1	0.7	1.3	2.9	-
TP, TPD 50-190/4	0.1	0.1	0.1	0.9	1.4	3.0	-
TP, TPD 50-230/4	0.1	0.1	0.2	1.0	1.5	3.1	-
TP, TPD 65-30/4	0.1	0.2	0.7	1.5	2.0	3.7	-
TP, TPD 65-60/4	0.2	0.4	0.9	1.6	2.2	3.9	-
TP, TPD 65-90/4	0.1	0.1	0.1	0.6	1.1	2.7	-
TP, TPD 65-110/4	0.1	0.1	0.1	0.6	1.1	2.7	-
TP, TPD 65-130/4	0.1	0.1	0.1	0.6	1.1	2.8	-
TP, TPD 65-150/4	0.1	0.1	0.1	0.6	1.2	2.8	-
TP, TPD 65-170/4	0.1	0.1	0.1	0.6	1.2	2.8	-
TP, TPD 65-240/4	0.1	0.1	0.1	0.8	1.3	2.9	-
TP, TPD 80-30/4	0.8	1.0	1.5	2.2	2.8	4.5	-
TP, TPD 80-60/4	0.8	1.0	1.5	2.3	2.8	4.5	-
TP, TPD 80-70/4	0.1	0.1	0.1	0.8	1.3	2.9	-
TP, TPD 80-90/4	0.1	0.1	0.1	0.7	1.2	2.8	-
TP, TPD 80-110/4	0.1	0.1	0.1	0.8	1.4	3.0	-
TP, TPD 80-150/4	0.1	0.1	0.1	0.8	1.3	2.9	-
TP, TPD 80-170/4	0.1	0.1	0.2	1.0	1.5	3.1	-
TP, TPD 80-240/4	0.1	0.1	0.3	1.0	1.5	3.2	-
TP, TPD 80-270/4	0.1	0.1	0.2	0.9	1.5	3.1	-
TP, TPD 80-340/4	0.1	0.1	0.3	1.1	1.6	3.2	-
TP, TPD 100-30/4	0.8	1.0	1.5	2.2	2.8	4.5	-
TP, TPD 100-65/4	0.1	0.1	0.1	0.8	1.3	3.0	-
TP, TPD 100-70/4	0.1	0.1	0.1	0.8	1.3	3.0	-
TP, TPD 100-90/4	0.1	0.1	0.1	0.9	1.4	3.0	-
TP, TPD 100-110/4	0.1	0.1	0.2	1.0	1.5	3.1	-
TP, TPD 100-130/4	0.1	0.1	0.6	1.3	1.9	3.5	-
TP, TPD 100-170/4	0.3	0.5	1.0	1.7	2.3	3.9	-
TP 100-140/4	0.2	0.4	0.8	1.8	2.3	3.9	5.2
TP, TPD 100-200/4	0.1	0.1	0.5	1.2	1.8	3.4	4.7
TP, TPD 100-250/4	0.1	0.2	0.7	1.4	2.0	3.6	4.9
TP, TPD 100-330/4	0.3	0.5	1.0	1.7	2.3	3.9	5.2
TP, TPD 100-370/4	0.3	0.5	1.0	1.7	2.3	3.9	5.2
TP, TPD 100-410/4	0.5	0.7	1.2	1.9	2.5	4.1	5.4
TP 125-60/4	0.1	0.1	0.1	0.8	1.4	3.0	-
TP 125-80/4	0.1	0.1	0.1	0.9	1.4	3.1	-
TP 125-95/4	0.1	0.1	0.2	0.9	1.5	3.1	-
TP, TPD 125-110/4	0.1	0.1	0.1	0.9	1.4	3.0	-
TP, TPD 125-130/4	0.1	0.1	0.2	0.9	1.5	3.1	-
TP, TPD 125-160/4	0.1	0.1	0.2	1.0	1.5	3.1	-
TP 125-150/4	0.2	0.4	0.8	1.8	2.3	3.9	5.2
TP, TPD 125-190/4	0.1	0.1	0.2	0.9	1.5	3.1	4.4
TP, TPD 125-230/4	0.1	0.1	0.3	1.0	1.6	3.2	4.5
TP, TPD 125-300/4	0.1	0.1	0.2	0.9	1.5	3.1	4.4
TP, TPD 125-340/4	0.1	0.1	0.3	1.0	1.5	3.2	4.5
TP, TPD 125-400/4	0.1	0.1	0.3	1.0	1.6	3.2	4.5

Pump type	p [bar]						
	20 °C	60 °C	90 °C	110 °C	120 °C	140 °C	150 °C
TP 150-70/4	0.1	0.1	0.3	1.1	1.6	3.2	-
TP 150-110/4	0.1	0.1	0.4	1.1	1.7	3.3	-
TP 150-155/4	0.1	0.1	0.5	1.2	1.8	3.4	-
TP 150-170/4	0.1	0.1	0.6	1.3	1.9	3.5	-
TP, TPD 150-130/4	0.1	0.1	0.4	1.1	1.6	3.3	4.6
TP, TPD 150-160/4	0.1	0.1	0.4	1.1	1.7	3.3	4.6
TP, TPD 150-200/4	0.1	0.1	0.4	1.1	1.7	3.3	4.6
TP, TPD 150-220/4	0.1	0.1	0.5	1.2	1.8	3.4	4.7
TP, TPD 150-250/4	0.1	0.1	0.6	1.3	1.9	3.5	4.8
TP 150-260/4	0.1	0.1	0.5	1.2	1.8	3.4	4.7
TP 150-280/4	0.1	0.3	0.8	1.5	2.1	3.7	5.0
TP 150-340/4	0.1	0.2	0.7	1.5	2.0	3.6	4.9
TP 150-390/4	0.1	0.2	0.7	1.4	2.0	3.6	4.9
TP 150-450/4	0.1	0.1	0.5	1.2	1.8	3.4	4.7
TP 150-520/4	0.1	0.1	1.0	1.5	1.9	3.5	4.8
TP 150-660/4	0.1	0.2	0.7	1.4	1.9	3.6	4.9
TP 150-680/4	0.1	0.2	0.7	1.4	2.0	3.6	-
TP 200-50/4	0.3	0.4	0.9	1.7	2.2	3.8	-
TP 200-70/4	0.1	0.3	0.8	1.5	2.1	3.7	-
TP 200-90/4	0.1	0.2	0.7	1.4	2.0	3.6	-
TP 200-130/4	0.1	0.1	0.5	1.2	1.8	3.4	-
TP 200-150/4	0.1	0.1	0.4	1.2	1.7	3.3	-
TP 200-160/4	0.3	0.5	1.0	1.7	2.3	3.9	5.2
TP 200-190/4	0.2	0.4	0.9	1.6	2.2	3.8	5.1
TP 200-200/4	0.2	0.4	0.9	1.6	2.1	3.8	5.1
TP 200-240/4	0.1	0.2	0.7	1.4	2.0	3.6	4.9
TP 200-270/4	0.1	0.1	0.4	1.1	1.7	3.3	4.6
TP 200-290/4	0.1	0.1	0.6	1.3	1.9	3.5	4.8
TP 200-320/4	0.1	0.1	0.5	1.2	1.8	3.4	4.7
TP 200-330/4	0.1	0.1	0.3	1.1	1.6	3.2	4.5
TP 200-360/4	0.1	0.1	0.3	1.1	1.6	3.2	4.5
TP 200-400/4	0.1	0.1	0.3	1.0	1.6	3.2	4.5
TP 200-410/4	0.1	0.2	0.7	1.4	1.9	3.6	4.9
TP 200-470/4	0.1	0.1	0.4	1.1	1.6	3.3	4.6
TP 200-530/4	0.1	0.1	0.4	1.1	1.7	3.3	4.6
TP 200-590/4	0.1	0.2	0.7	1.4	2.0	3.6	4.9
TP 200-660/4	0.2	0.4	0.9	1.7	2.2	3.8	5.1
TP 300-190/4	0.5	0.7	1.1	2.1	2.6	4.2	5.5
TP 300-220/4	0.3	0.5	0.9	1.9	2.4	4.0	5.3
TP 300-250/4	0.1	0.3	0.7	1.7	2.2	3.8	5.1
TP 300-290/4	0.5	0.7	1.1	2.1	2.6	4.2	5.5
TP 300-390/4	0.5	0.7	1.1	2.1	2.6	4.2	5.5
TP 300-420/4	0.5	0.7	1.1	2.1	2.6	4.2	5.5
TP 300-430/4	0.5	0.7	1.1	2.1	2.6	4.2	5.5
TP 300-500/4	0.4	0.6	1.0	2.0	2.5	4.1	5.4
TP 300-550/4	0.3	0.5	0.9	1.9	2.4	4.0	5.3
TP 350-280/4	1.7	1.9	2.3	3.3	3.8	5.4	6.7
TP 350-320/4	1.6	1.8	2.2	3.2	3.7	5.3	6.6
TP 350-360/4	1.5	1.7	2.1	3.1	3.6	5.2	6.5
TP 350-420/4	1.4	1.6	2.0	3.0	3.5	5.1	6.4
TP 350-480/4	1.3	1.5	1.9	2.9	3.4	5.0	6.3
TP 350-530/4	0.5	0.7	1.1	2.1	2.6	4.2	5.5
TP 350-650/4	0.4	0.6	1.0	2.0	2.5	4.1	5.4
TP 350-780/4	0.3	0.5	0.9	1.9	2.4	4.0	5.3
TP 400-470/4	0.7	0.7	1.4	2.1	2.6	4.3	5.6
TP 400-510/4	1.6	1.7	2.3	3.1	3.6	5.2	6.5
TP 400-540/4	0.8	0.9	1.5	2.2	2.8	4.4	5.7
TP 400-670/4	0.8	0.8	1.5	2.2	2.8	4.4	5.7
TP 400-720/4	0.9	0.9	1.5	2.3	2.8	4.5	5.8
TP 400-760/4	1.4	1.5	2.1	2.8	3.4	5.0	6.3

**TP, TPD, 6-pole, PN 16**

Pump type	p [bar]					
	20 °C	60 °C	90 °C	110 °C	120 °C	140 °C
TP, TPD 125-60/6	0.1	0.1	0.1	0.7	1.2	2.8
TP, TPD 125-70/6	0.1	0.1	0.1	0.7	1.3	2.9
TP, TPD 125-80/6	0.1	0.1	0.1	0.7	1.2	2.9
TP, TPD 125-100/6	0.1	0.1	0.1	0.8	1.4	3.0
TP, TPD 125-130/6	0.1	0.1	0.1	0.7	1.3	2.9
TP, TPD 125-160/6	0.1	0.1	0.1	0.7	1.3	2.9
TP, TPD 150-60/6	0.1	0.1	0.1	0.7	1.3	2.9
TP, TPD 150-70/6	0.1	0.1	0.1	0.7	1.3	2.9
TP, TPD 150-90/6	0.1	0.1	0.1	0.8	1.3	2.9
TP, TPD 150-110/6	0.1	0.1	0.1	0.8	1.3	3.0

## 31. Key application data

Dear customer,

If you need an ATEX certificate or if you cannot select the pump on the basis of the guidelines in *Pumped liquids* on page 23, please fill in the following form in cooperation with a Grundfos representative. This will help to ensure that Grundfos supplies you with a pump solution adapted to meet exactly your needs in terms of pump type, pump materials, shaft seal type, elastomers and accessories.

### Customer information

Company name:	Project title:
Customer number:	Reference number:
Phone number:	Customer contact:
Fax number:	
Email address:	

### Quotation made by:

Company name:	Prepared by:
Phone number:	Date: <span style="float: right;">Page 1 of</span>
Fax number:	Quotation number:
Email address:	

## Operating conditions

### Pumped liquid

Type of liquid:	_____
Chemical composition, if available:	_____
Distilled/demineralised water?	Yes: _____ No: _____
Conductivity of distilled or demineralised water:	_____ [μS/cm]
Minimum liquid temperature:	_____ [°C]
Maximum liquid temperature:	_____ [°C]
Vapour pressure of liquid:	_____ [bar]
Liquid concentration:	_____ %
Liquid pH value:	_____
Dynamic liquid viscosity:	_____ [cP] = [mPa s]
Kinematic liquid viscosity:	_____ [cSt] = [mm <sup>2</sup> /s]
Liquid density:	_____ [kg/m <sup>3</sup> ]
Specific heat capacity of liquid:	_____ [kJ/(kg·K)]
Air or gas in liquid?	Yes: _____ No: _____
Solids in liquid?	Yes: _____ No: _____
Contents of solids in liquid, if available:	_____ % of mass
Additives in liquid?	Yes: _____ No: _____
Does the liquid crystallise?	Yes: _____ No: _____
When does crystallisation happen?	_____

Does the liquid get sticky when volatiles evaporate from the pumped liquid? Yes: \_\_\_\_\_ No: \_\_\_\_\_

Description of 'sticky' circumstances: \_\_\_\_\_

Is the liquid hazardous or poisonous? Yes: \_\_\_\_\_ No: \_\_\_\_\_

Special measures to be taken into account when dealing with this hazardous or poisonous liquid: \_\_\_\_\_

Special measures for handling this liquid: \_\_\_\_\_

### CIP liquid, cleaning-in-place

Type of liquid:	_____
Chemical composition, if available:	_____
Liquid temperature during operation:	_____ [°C]
Maximum liquid temperature:	_____ [°C]
Vapour pressure of liquid:	_____ [bar]
Liquid concentration:	_____ %
Liquid pH value:	_____

**Pump sizing**

Main duty point: Q: \_\_\_\_\_ [m<sup>3</sup>/h] H: \_\_\_\_\_ [m]  
 Maximum duty point: Q: \_\_\_\_\_ [m<sup>3</sup>/h] H: \_\_\_\_\_ [m]  
 Minimum duty point: Q: \_\_\_\_\_ [m<sup>3</sup>/h] H: \_\_\_\_\_ [m]

**Ambient operating conditions**

Ambient temperature: \_\_\_\_\_ [°C]  
 Altitude above sea level: \_\_\_\_\_ [m]

**Pressure**

Minimum inlet pressure: \_\_\_\_\_ [bar]  
 Maximum inlet pressure: \_\_\_\_\_ [bar]  
 Outlet pressure, inlet pressure and head: \_\_\_\_\_ [bar]

**ATEX marking**

**Required marking of the pump**

Customer's equipment group, e.g. II: \_\_\_\_\_  
 Customer's equipment category, e.g. 2, 3: \_\_\_\_\_  
 Gas, G, and/or dust, D: Gas (G): \_\_\_\_\_ Dust (D): \_\_\_\_\_ Gas and dust (G/D): \_\_\_\_\_

**Required marking of the motor**

Protection type, e.g. d, de, e, nA: \_\_\_\_\_  
 Maximum experimental safe gap, e.g. B, C: \_\_\_\_\_  
 Temperature class  
 - gas, e.g. T3, T4, T5: \_\_\_\_\_  
 - dust, e.g. 125 °C: \_\_\_\_\_ [°C]

**Description/sketch**

Detailed description of ATEX application  
 Attach a drawing, if possible: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

ATEX certificate required Yes: \_\_\_\_\_ No: \_\_\_\_\_

**Frequency converter**

Frequency converter option wanted? Yes: \_\_\_\_\_ No: \_\_\_\_\_  
 Control parameter: Pressure: \_\_\_\_\_ Temperature: \_\_\_\_\_ Flow rate: \_\_\_\_\_ Other: \_\_\_\_\_  
 Detailed description of requirements  
 Attach a drawing, if possible: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

**System information**

Please provide us with information about your system and a simple sketch, if possible. This gives us an idea as to whether you need accessories or monitoring equipment, or whether you already have a suitable system which makes it unnecessary to attach any further equipment.

## 32. Grundfos Product Center

Online search and sizing tool to help you make the right choice.

<http://product-selection.grundfos.com>



"SIZING" enables you to size a pump based on entered data and selection choices.

"REPLACEMENT" enables you to find a replacement product. Search results will include information on the following:

- the lowest purchase price
- the lowest energy consumption
- the lowest total life cycle cost.

www.grundfos.com Login

**GRUNDFOS** | PRODUCT CENTER Product range: United Kingdom | 50 Hz | Language: English  
Change settings

HOME FIND PRODUCT COMPARE YOUR PROJECTS SAVED ITEMS HELP 1.4.23

### FIND PRODUCTS AND SOLUTIONS

Input product number or a whole or partial product name

**SIZING** Enter pump sizing

**CATALOGUE** Products and services

**REPLACEMENT** Replace an old pump with a new

**LIQUIDS** Find pump by liquid

**QUICK SIZING**

Enter duty point:

Flow (Q)\*  m<sup>3</sup>/h

Head (H)\*  m

Select what to size by:

Size by application

Size by pump design

Size by pump family

**START SIZING**

ADVANCED SIZING:  Advanced sizing by application  Guided selection

"CATALOGUE" gives you access to the Grundfos product catalogue.

"LIQUIDS" enables you to find pumps designed for aggressive, flammable or other special liquids.

### All the information you need in one place

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

### Downloads

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









V7124417 0618

ECM: 1237841

**GRUNDFOS A/S**  
DK-8850 Bjerringbro . Denmark  
Telephone: +45 87 50 14 00  
[www.grundfos.com](http://www.grundfos.com)

**GRUNDFOS** 