

TP, TPD, TPE, TPED

In-line circulator pumps
50 Hz



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1. Pump data

Introduction

TP pumps are designed for applications such as

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

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

The pumps are all single-stage, in-line centrifugal pumps with mechanical shaft seal. The pumps are of the close-coupled type, i.e. pump and motor are separate units. Consequently, the pumps are less sensitive to impurities in the pumped liquid than similar pumps of the canned rotor type.

TP, mains-operated pumps

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

TP Series 100 with union or flange connection

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

For further information, see page 21.

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 21.

TP Series 300 with flange connection

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

For further information, see page 23.

TP Series 400 with flange connection

Grundfos offers two TP Series 400 versions:

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

For further information, see page 25.

TPE, speed-controlled pumps

Based on the construction and choice of material of TP pumps, Grundfos offers the following two series of speed-controlled TPE pumps:

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

TPE Series 1000 pumps

The difference between the TP and the TPE Series 1000 pump range is the motor. The motors of TPE Series 1000 pumps have built-in frequency converter.

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

For further information, see page 27.

TPE Series 2000 pumps

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

TPE Series 2000 pumps are factory-set to proportional-pressure control.

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

The TPE Series 2000 range is recognised as a preset solution for quick and safe installation.

For further information, see page 46.

Why select a TPE pump?

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

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

ATEX-approved TP pumps

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

See *Key application data*, page 198.

High-efficiency motors, IE3

TP pumps are fitted with high-efficiency motors.

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

For further information, see *Motors*, pages 72 to 75.

Energy-optimised pumps

TP pumps are energy-optimised and comply with the EuP Directive (Commission Regulation (EC)

No 547/2012) in which most pumps are classified/graduated in an energy efficiency index (MEI). See also page 173.

Type key

Example	TP	E	D	65	-120	/2	-S	-A	-F	-A	-BUBE
Pump range											
Electronically speed-controlled pump (Series 1000, 2000)											
Twin-head pump											
Nominal diameter of suction and discharge ports (DN)											
Maximum head [dm]											
Pole number											
S = TPE Series 2000 (with factory-fitted differential pressure sensor)											
Code for pump version: A = Basic version I = PN 6 flange X = Special version											
Code for pipework connection: F = DIN flange O = Union											
Code for materials: A = Basic version I = Stainless steel 1.4308 pump housing and pump head Z = Bronze pump housing and pump head B = Bronze impeller											
Code for shaft seal (incl. other plastic and rubber pump parts, except the neck ring)											

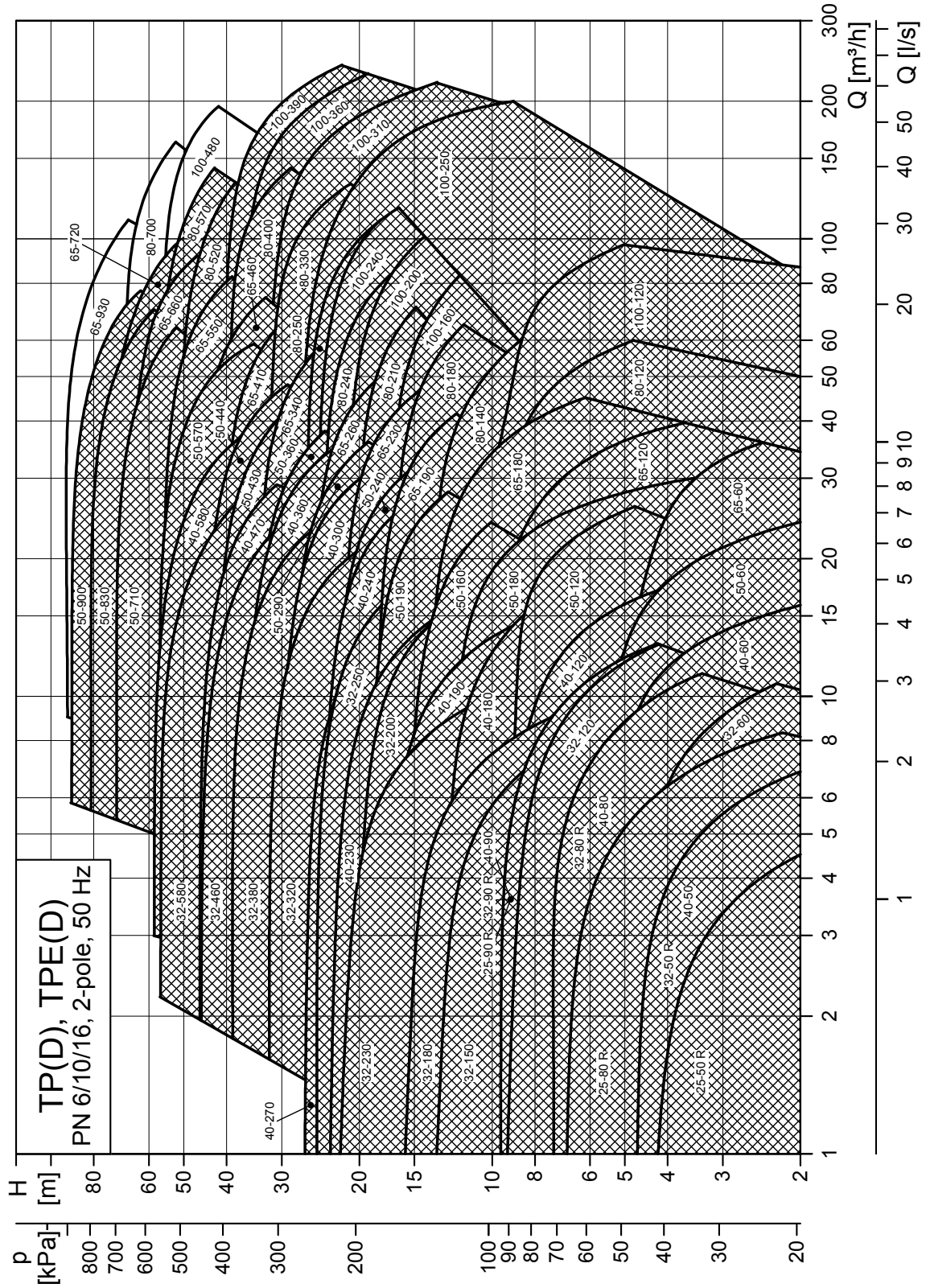
Codes for shaft seal

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

2. Performance range

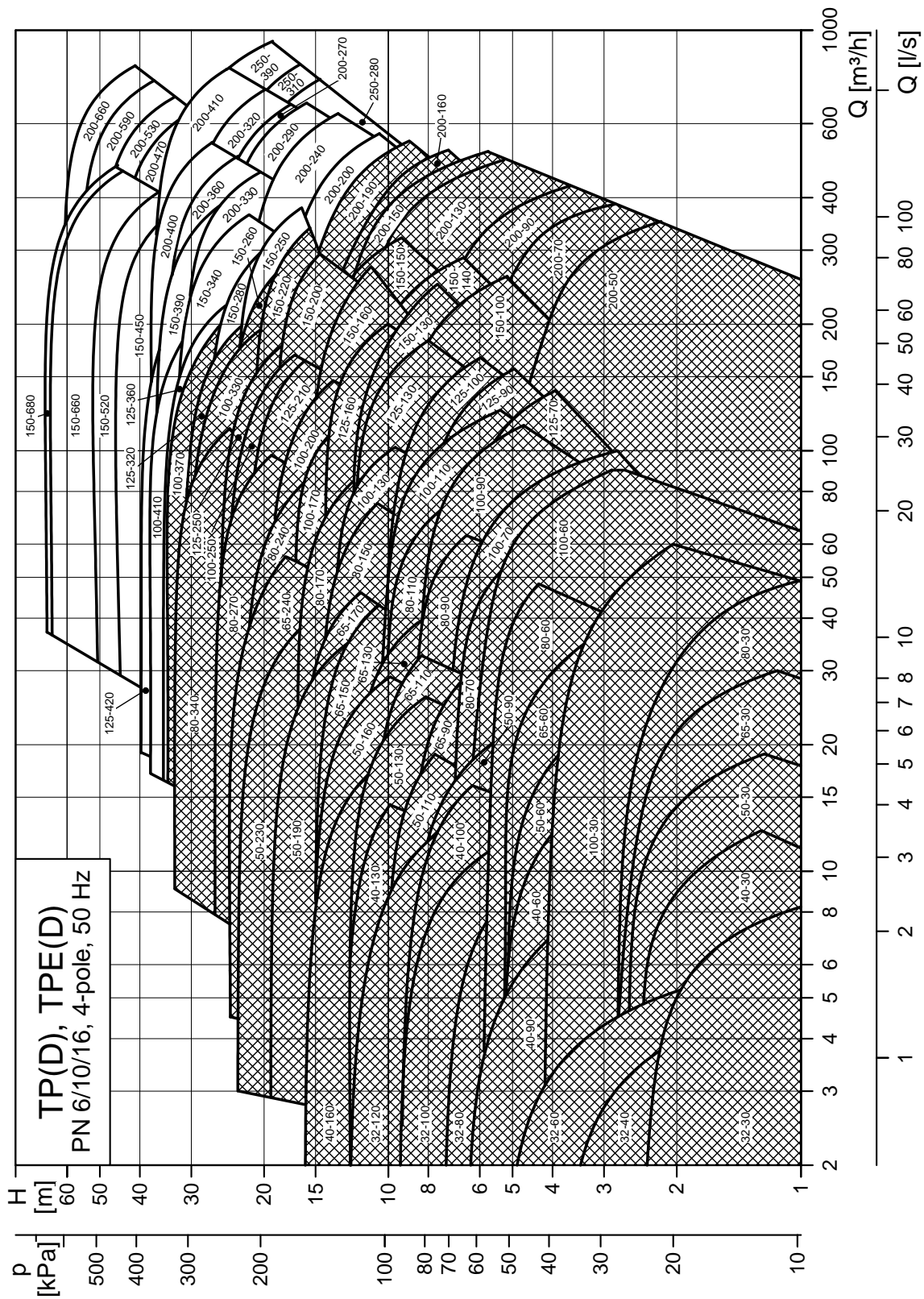
Performance range, 2-pole, PN 6, 10, 16

(See page 94 for performance curves)



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

(See page 116 for performance curves)



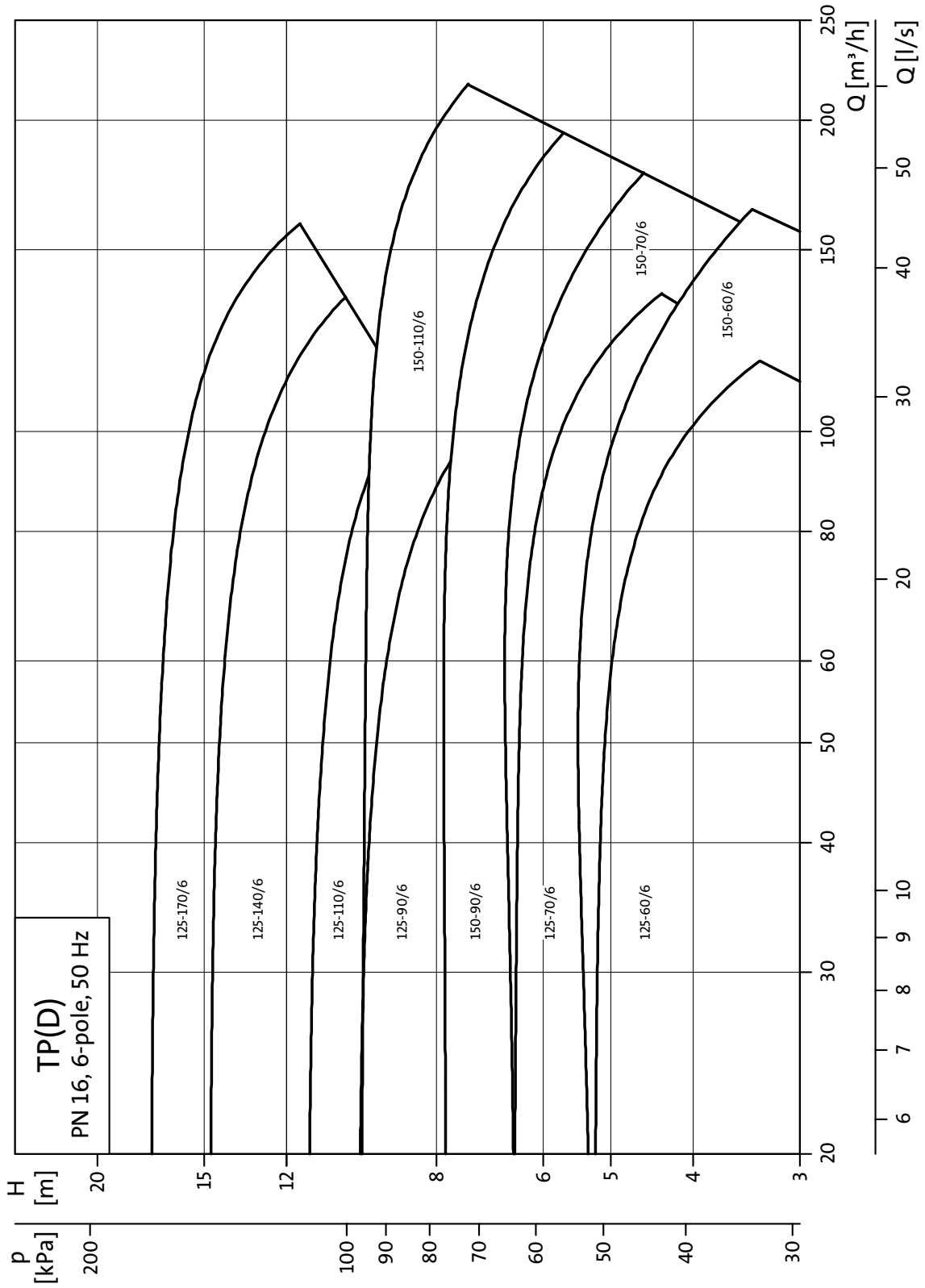
Note: All QH curves apply to single-head pumps. For further information about curve conditions, see page 93. The hatched area shows the performance range of TP pumps.

TM02 7551 5010

Performance range

Performance range, 6-pole, PN 16

(See page 148 for performance curves)

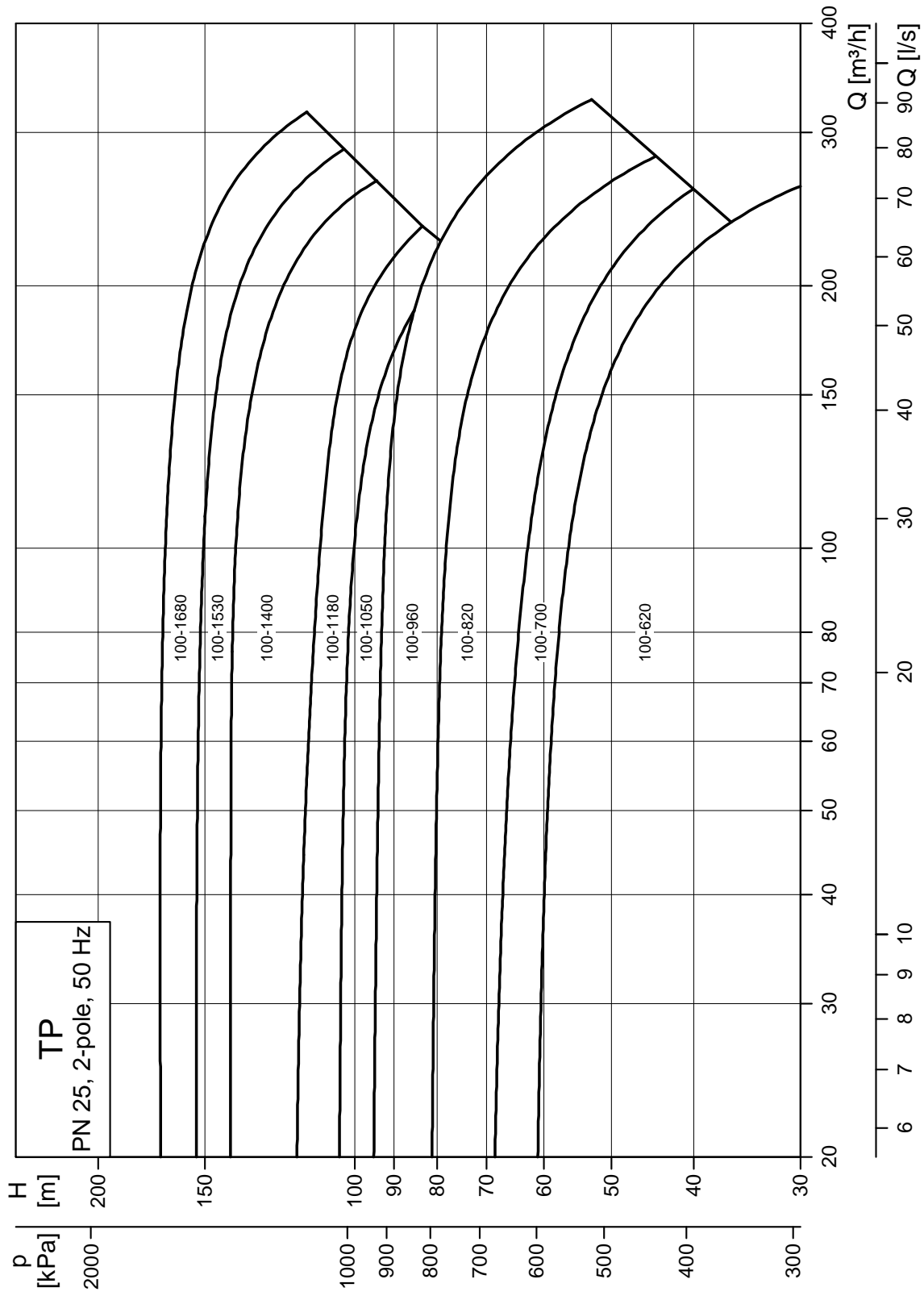


Note: All QH curves apply to single-head pumps. For further information about curve conditions, see page 93.

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Performance range, 2-pole, PN 25

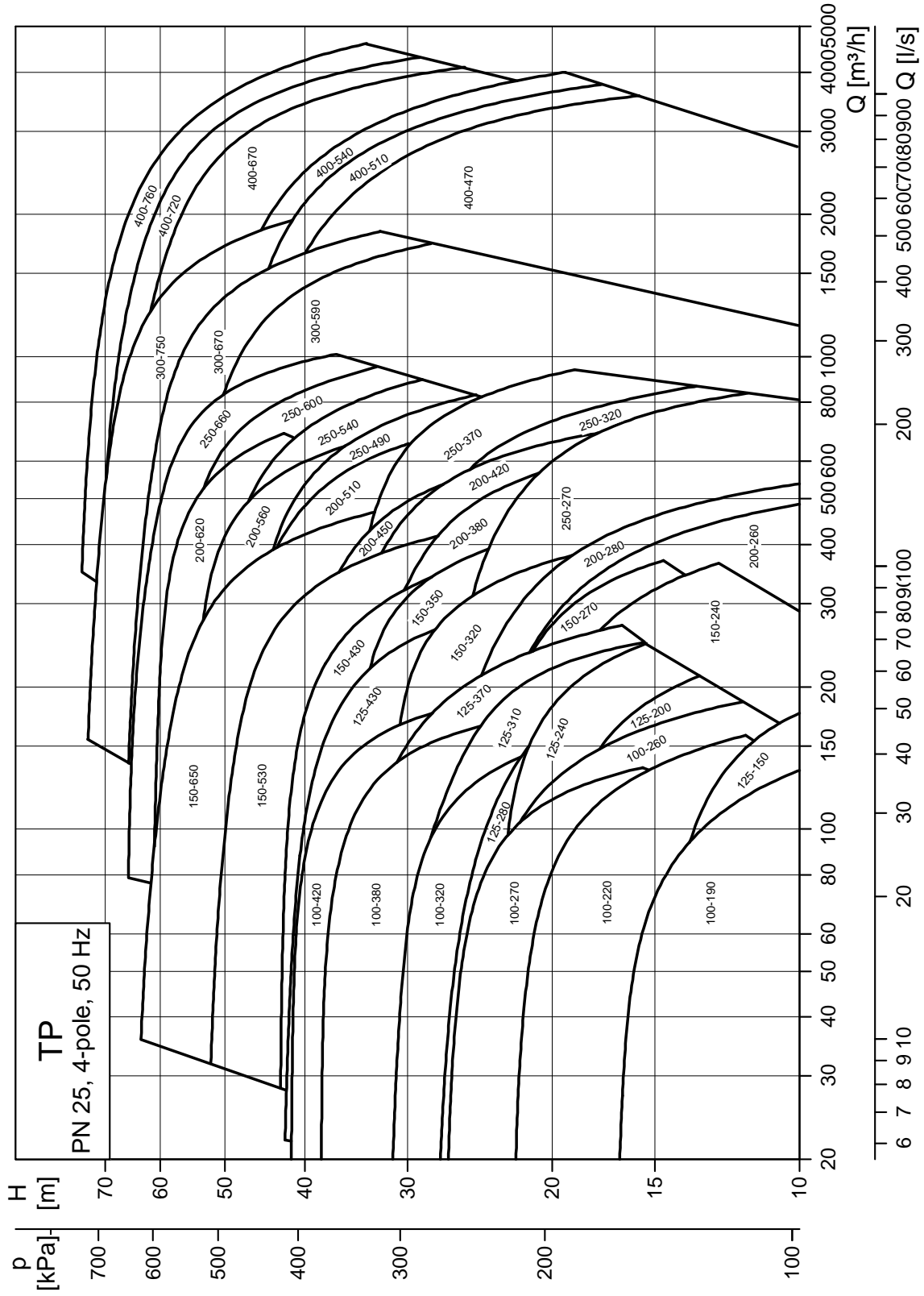
(See page 152 for performance curves)



TM02 6868 50/10

Performance range, 4-pole, PN 25

(See page 154 for performance curves)



TM02 6869 5010

Product range, 6-pole, PN 16

Pump type	Design						Shaft seal						Pressure stage				Materials						Mains-operated motor			Electronically speed-controlled motor						
	Design						Shaft seal						Pressure stage				Pump housing			Impeller			Voltage [V]			Voltage [V]						
	TPE Series 1000	TPE Series 2000	TP Series 100	TP Series 200	TP Series 300	TP Series 400	BUBE	AUUE	RUUE	BAGE	BQQE	GQQE	DBUE	PN 6	PN 10	PN 16	PN 25	Cast iron EN-GJL-250	Nodular cast iron EN-GJS-400-18	Bronze ¹⁾	Stainless steel	Cast iron	Nodular cast iron EN-GJS-400-15	Bronze	1 x 220-230 ΔV/240 YV	3 x 220-240 ΔV/380-415 YV	3 x 380-415 ΔV/660-690 YV	1 x 200-240 V	3 x 380-480 V	3 x 380-415 V		
TP, TPD 125-60/6																											1.5					
TP, TPD 125-70/6																											2.2	2.2				
TP, TPD 125-90/6																											3.0	3.0				
TP, TPD 125-110/6																											4.0	4.0				
TP, TPD 125-140/6																											5.5	5.5				
TP, TPD 125-170/6																											7.5	7.5				
TP, TPD 150-60/6																											2.2	2.2				
TP, TPD 150-70/6																											3.0	3.0				
TP, TPD 150-90/6																											4.0	4.0				
TP, TPD 150-110/6																											5.5	5.5				

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

Product range, 2-pole, PN 25

Pump type	Design						Shaft seal						Pressure stage				Materials						Mains-operated motor			Electronically speed-controlled motor						
	Design						Shaft seal						Pressure stage				Pump housing			Impeller			Voltage [V]			Voltage [V]						
	TPE Series 1000	TPE Series 2000	TP Series 100	TP Series 200	TP Series 300	TP Series 400	BUBE	AUUE	RUUE	BAGE	BQQE	GQQE	DBUE	PN 6	PN 10	PN 16	PN 25	Cast iron EN-GJL-250	Nodular cast iron EN-GJS-400-18	Bronze	Stainless steel	Cast iron	Nodular cast iron EN-GJS-400-15	Bronze	1 x 220-230 ΔV/240 YV	3 x 220-240 ΔV/380-415 YV	3 x 380-415 ΔV/660-690 YV	1 x 200-240 V	3 x 380-480 V	3 x 380-415 V		
TP 100-620/2																														37.0		
TP 100-700/2																														45.0		
TP 100-820/2																														55.0		
TP 100-960/2																														75.0		
TP 100-1050/2																														75.0		
TP 100-1180/2																														90.0		
TP 100-1400/2																														110.0		
TP 100-1530/2																														132.0		
TP 100-1680/2																														160.0		

- Standard.

4. Operating conditions

System and test pressures

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

Sound pressure level

Single-phase: Max. 70 dB(A).

Three-phase: See table below.

Motor [kW]	Maximum sound pressure level [dB(A)] - ISO 3743		
	Three-phase motors		
	2-pole	4-pole	6-pole
0.12	-	-	-
0.18	-	-	-
0.25	56	41	-
0.37	56	45	-
0.55	57	42	-
0.75	53	59.5	-
1.1	53	49.5	-
1.5	58	50	47
2.2	60	51	52
3.0	59.5	53	63
4.0	63	54	63
5.5	62	50	63
7.5	60	51	66
11.0	60	53	-
15.0	60	54	-
18.5	60.5	60	-
22.0	65.5	60	-
30.0	70	62	-
37.0	71	66	-
45.0	67	66	-
55.0	72	67	-
75.0	74	70	-
90.0	73	70	-
110.0	76	70	-
132.0	76	70	-
160.0	76	70	-
200.0	-	70	-
250.0	-	73	-
315.0	-	73	-
355.0	-	75	-
400.0	-	75	-
500.0	-	75	-
560.0	-	78	-
630.0	-	78	-

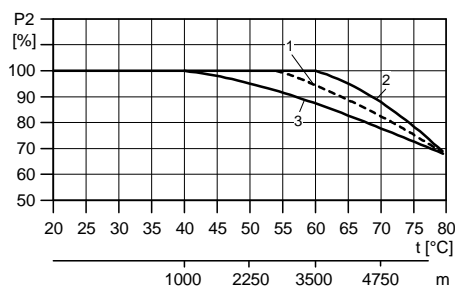
The values apply only to MG and Siemens motors. The values have a tolerance of 3 dB according to EN ISO 4871; the tolerance is not added to the values in the table.

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

Ambient temperature

MG IE2 and IE3 motors: 0.75 - 22 kW motors, 2-pole 0.75 - 15 kW motors, 4-pole	-30 °C to +60 °C
Siemens IE2 and IE3 motors: 30 - 90 kW motors, 2-pole 18.5 - 90 kW motors, 4-pole	-30 °C to +55 °C
MGE and other motor sizes	-30 °C to +40 °C
Storage	Down to -30 °C

If the ambient temperature exceeds maximum values or if the motor is located more than 1000 metres above sea level, the motor output (P_2) 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.



TM03 2479 4405

Fig. 1 Relationship between motor output (P_2) and altitude

Key

Pos.	Description
1	Siemens IE2 and IE3 motors: 30 - 90 kW motors, 2-pole 18.5 - 90 kW motors, 4-pole
2	MG IE2 and IE3 motors: 0.75 - 22 kW motors, 2-pole 0.75 - 15 kW motors, 4-pole
3	MGE and other motor sizes

5. Pumped liquids

Pumped liquids

Thin, clean, non-aggressive and non-explosive liquids, not containing solid particles or fibres that may mechanically or chemically attack the pump. See "List of pumped liquids" on page 19.

Examples of liquids

- Central heating system water (the water should meet the requirements of accepted standards on water quality in heating systems)
- cooling liquids
- domestic hot water
- industrial liquids
- softened water.

If glycol or another antifreeze agent is added to the pumped liquid, the pump must have a shaft seal of the RUUE or GQQE type.

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

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

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

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

Liquid temperature

Liquid temperature: -25 °C to +150 °C.

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

Pump type	Shaft seal	Temperature
TP Series 100	BUBE	0 °C to +110 °C
	BQQE	0 °C to +90 °C
	GQQE	-25 °C to +90 °C
TP Series 200	BUBE	0 °C to +140 °C
	AUUE	0 °C to +90 °C
	RUUE	-25 °C to +90 °C
TP Series 300	BAQE	0 °C to +120 °C (140 °C) ¹⁾
	BQQE	0 °C to +90 °C
	GQQE	-25 °C to +90 °C (60 °C) ²⁾
TP Series 400, 10 bar version	BAQE	0 °C to +120 °C
	BQQE	0 °C to +90 °C
	GQQE	-25 °C to +90 °C
TP Series 400, 25 bar version	DBUE	0 °C to +150 °C ³⁾

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

²⁾ The TP Series 300 pumps with GQQE shaft seals listed below are designed for a maximum operating temperature of 60 °C.

TP 150-260/4	TP 200-160/4
TP 150-280/4	TP 200-190/4
TP 150-340/4	TP 200-200/4
TP 150-390/4	TP 200-240/4
TP 150-450/4	TP 200-270/4
TP 150-520/4	TP 200-290/4
TP 150-660/4	TP 200-320/4
TP 150-680/4	TP 200-330/4
	TP 200-360/4
	TP 200-400/4
	TP 200-410/4
	TP 200-470/4
	TP 200-530/4
	TP 200-590/4
	TP 200-660/4

³⁾ At +120 °C to +150 °C, the maximum operating pressure is ≤ 23 bar.

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

List of pumped liquids

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

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

A number of typical liquids are listed below.

Other pump versions may be used, but we consider the ones stated in the list to be the best choices.

The list is intended as a general guide only, and it cannot replace actual testing of the pumped liquids and pump materials under specific working conditions. If in doubt, we recommend that you fill in the form shown on page 198 and contact Grundfos.

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

Legend

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

Pumped liquids	Notes	Additional information	Shaft seal				
			TP Series 100	TP Series 200	TP Series 300	TP Series 400 PN 10	TP Series 400 PN 25
Water							
Groundwater		< +90 °C	BQQE	AUUE	BQQE		
		> +90 °C	BUBE	BUBE	BAQE ¹⁾ BBQE ²⁾	BAQE	DBUE
Boiler-feed water		< +120 °C	BUBE ³⁾	BUBE	BAQE	BAQE	DBUE
		< +140 °C		BUBE	DAQF ²⁾		DBUE
		< +150 °C					DBUE
District heating water		< +120 °C	BUBE	BUBE	BAQE	BAQE	DBUE
Condensate		< +90 °C	BQQE	AUUE	BQQE	BAQE	DBUE
		> +90 °C	BUBE	BUBE	BAQE		
Softened water	C	> +90 °C	BQQE	AUUE	BQQE	BAQE	DBUE
Brackish water	G	> +90 °C	BUBE	BUBE	BAQE	BAQE	DBUE
		pH > 6.5, +40 °C, 1000 ppm Cl ⁻	BUBE BQQE	BUBE AUUE	BQQE	BQQE	DBUE
Coolants							
Ethylene glycol	B, D, H	< +120 °C			DQQE		
		< +90 °C	GQQE	RUUE	GQQE	GQQE	DQQE ²⁾
Glycerine (glycerol)	B, D, H	< +120 °C			DQQE		
		< +90 °C	GQQE	RUUE	GQQE	GQQE	DQQE ²⁾
Potassium acetate	B, D, C, H	< +120 °C			DQQE		
		< +90 °C	GQQE	RUUE	GQQE	GQQE	DQQE ²⁾
Potassium formate	B, D, C, H	< +120 °C			DQQE		
		< +90 °C	GQQE	RUUE	GQQE	GQQE	DQQE ²⁾
Propylene glycol	B, D, H	< +120 °C			DQQE		
		< +90 °C	GQQE	RUUE	GQQE	GQQE	DQQE ²⁾
Brine sodium chloride	B, D, C, H	< +5 °C, 30 %	GQQE	RUUE	GQQE	GQQE	DQQE ²⁾
Synthetic oils							
Silicone oil	B, E		BUBE BQQE	BUBE AUUE	BAQE BQQE	BAQE	DBUE

(To be continued)

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

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

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

3) Maximum +110 °C.

6. TP Series 100 and 200 pumps



GrB2850 - Gr8261

Fig. 2 TP Series 100 and TP Series 200

Technical data

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

Construction

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

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

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

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

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

The pumps are fitted with an unbalanced mechanical shaft seal.

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

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

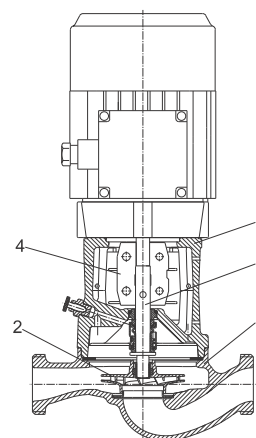
As radial and axial forces are absorbed by the fixed bearing in the motor drive-end, the pump requires no bearing.

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

Pumps with bronze pump housing (version B) are suitable for circulation of domestic hot water.

Materials

TP Series 100



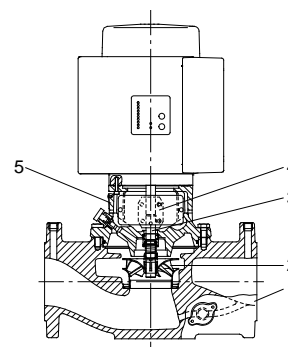
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Fig. 3 Sectional drawing of TP Series 100 (with union connection)

Material specification, Series 100

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

TP, TPE Series 200



TM03 1211 1405

Fig. 4 Sectional drawing of TP Series 200 (with flange connection)

Material specification, Series 200

Pos.	Component	Material	EN/DIN
1	Pump housing	Cast iron EN-GJL-250, bronze CuSn10	EN-JL 1040 2.1093
2	Impeller	Stainless steel	1.4301
3	Shaft	Stainless steel	1.4305
4	Coupling	Cast iron EN-GJL-400	0.7040
5	Pump head	Cast iron EN-GJL-250, bronze	0.6025 2.1093
Secondary seals		EPDM	
Rotating seal face		Tungsten carbide	
Stationary seat		Carbon (resin-impregnated), tungsten carbide	

Mechanical shaft seal

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

- **BUBE**

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

- **RUUE/GQQE**

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

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

- **AUUE/BQQE**

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

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

Information on a selection of common pumped liquids with recommended shaft seals is shown on page 19.

Shaft seal specification

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

Special shaft seals are available for partly conditioned water or other liquids containing abrasive or crystallising particles. See page 19.

Connections

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

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

Features and benefits

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

Optimised hydraulics for high efficiency

- Reduced power consumption.

High-efficiency motors

- TP pumps are fitted with high-efficiency motors. High-efficiency motors offer reduced energy consumption. TP pumps are primarily fitted with motors that meet the legislative requirements of the EuP IE3 grade. For further information, see *Motors*, pages 72 to 75.

Top-pull-out design

- Easy dismantling in case of service.

In-line design

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

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

- Electrocoating includes:
 1. Alkaline cleaning.
 2. Pretreatment with zinc phosphate coating.
 3. Cathodic electrocoating (epoxy).
 4. Curing of paint film at 200-250 °C.
 For low-temperature applications at a high humidity, Grundfos offers TP pumps with extra surface treatment to avoid corrosion. These pumps are available on request.

Stainless-steel impeller and neck ring

- Wear-free operation with high efficiency.

TPE, TPED - pumps with built-in frequency converter

- 2-pole and 4-pole TP pumps from 0.12 kW and upwards are available as TPE pumps with built-in frequency converter. See pages 4 and 11-14.

7. TP Series 300 pumps



Fig. 5 TP Series 300

Technical data

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

Construction

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

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

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

TP Series 300 pumps have PN 16 flanges.

The pumps are fitted with an unbalanced mechanical shaft seal.

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

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

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

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

The impeller is hydraulically balanced to minimise axial forces.

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

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

Materials

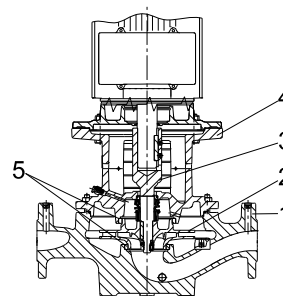


Fig. 6 Sectional drawing of TP Series 300

Material specification

Pos.	Component	Material	EN/DIN
1	Pump housing	Cast iron EN-GJL-250	EN-JL 1040
2	Impeller	Cast iron EN-GJL-200, bronze CuSn5Zn5Pb	EN-JL 1030 2.1096.01
3	Stub shaft	Stainless steel	1.4301
	Two-part stub shaft	Stainless steel/steel	1.4301/1.0301
4	Pump head/motor stool	Cast iron EN-GJL-250	EN-JL 1040
	Secondary seals	EPDM	
	Rotating seal face	Metal-impregnated carbon Silicon carbide	
	Stationary seat	Silicon carbide	
5	Wear rings	Bronze CuSn10	2.1093

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Mechanical shaft seal

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

- **BAQE**

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

- **GQQE**

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

- **BQQE**

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

Information on a selection of common pumped liquids with recommended shaft seals is shown on page 19.

Shaft seal specification

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

Special shaft seals are available for partly conditioned water or other liquids containing abrasive or crystallising particles. See page 19.

Connections

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

Features and benefits

TP Series 300 pumps have these features and benefits:

Optimised hydraulics for high efficiency

- Reduced power consumption.

High-efficiency motors

- TP pumps are fitted with high-efficiency motors. High-efficiency motors offer reduced energy consumption. TP pumps are primarily fitted with motors that meet the legislative requirements of the EuP IE3 grade. For further information, see *Motors*, pages 72 to 75.

Top-pull-out design

- Easy dismantling in case of service.

In-line design

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

Motor-pump shaft with sleeve coupling

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

Hydraulically and mechanically balanced impeller

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

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

- Electrocoating includes:
 1. Alkaline cleaning.
 2. Pretreatment with zinc phosphate coating.
 3. Cathodic electrocoating (epoxy).
 4. Curing of paint film at 200-250 °C.
 For low-temperature applications at a high humidity, Grundfos offers TP pumps with extra surface treatment to avoid corrosion. These pumps are available on request.

TPE, TPED - pumps with built-in frequency converter

- 2-pole TP pumps from 0.37 to 22 kW and 4-pole TP pumps from 0.25 to 18.5 kW are available as TPE pumps with built-in frequency converter. See pages 4 and 11-14.

8. TP Series 400 pumps



Fig. 7 TP Series 400

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Technical data

- Flow rate: PN 10 version: Up to 950 m³/h
 PN 25 version: Up to 4500 m³/h
- Head: PN 10 version: Up to 38 m
 PN 25 version: Up to 170 m
- Liquid temperature: PN 10 version: -25 to +120 °C
 PN 25 version: 0 to +150 °C*
- * From +120 °C to +150 °C, max. 23 bar
- Maximum operating pressure:
 10 bar version: 10 bar
 25 bar version: 25 bar
- Direction of rotation: Clockwise

Construction

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

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

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

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

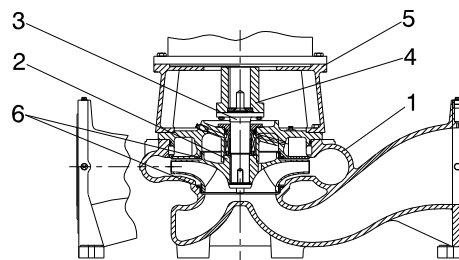
The pumps are of the top-pull-out design, i.e. the power head (motor, motor stool and impeller) can be removed for maintenance or service while the pump housing remains in the pipework.

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

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

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

Materials



TM04 9587 4610

Fig. 8 Sectional drawing of TP Series 400

Material specification

TP Series 400, PN 10

Pos.	Component	Material	EN/DIN
1	Pump housing	Cast iron EN-GJL-250	EN-JL 1040
2	Impeller	Ductile cast iron EN-GJS-400	EN-JL 1030
		Bronze	2.1096.01
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	Metal-impregnated carbon Silicon carbide	
	Stationary seat	Silicon carbide	
6	Wear rings	Bronze CuSn10	2.1093

TP Series 400, PN 25

Pos.	Component	Material	EN/DIN
1	Pump housing	Ductile cast iron EN-GJS-400-18 (A-LT)	EN-JS1020
2	Impeller	Ductile cast iron EN-GJS-400	EN-JS1030
		Bronze	2.1096.01
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 10 bar versions, the following three types of unbalanced mechanical shaft seal are available as standard:

- **BAQE**

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

- **GQQE**

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

- **BQQE**

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

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

- **DBUE**

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

Information on a selection of common pumped liquids with recommended shaft seals is shown on page 19.

Special shaft seals are available for partly conditioned water or other liquids containing abrasive or crystallising particles. See page 19.

Connections

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

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

Features and benefits

TP Series 400 pumps have the following features and benefits:

Optimised hydraulics for high efficiency

- Reduced power consumption.

High-efficiency motors

- TP pumps are fitted with high-efficiency motors. High-efficiency motors offer reduced energy consumption. TP pumps are primarily fitted with motors that meet the legislative requirements of the EuP IE3 grade. For further information, see *Motors*, pages 72 to 75.

Top-pull-out design

- Easy dismantling in case of service.

In-line design

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

Motor-pump shaft with flange coupling

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

Supported flange connection

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

Surface treatment

TP Series 400 pumps are given the following surface treatment:

Pump type	Electrocoating	Spray painting
TP Series 400 (from DN 100 to DN 300)	x	x
TP Series 400 (DN 400)		2x

Electrocoating includes:

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

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

These pumps are available on request.

9. TPE Series 1000 pumps



Fig. 9 TPE and TPED Series 1000

Technical data

Flow rate:	Up to 340 m ³ /h
Head:	Up to 90 m
Liquid temperature:	-25 °C to +140 °C
Maximum operating pressure:	16 bar
Motor sizes (single-phase):	0.37 to 1.1 kW
Motor sizes (three-phase):	0.55 to 22 kW

Construction

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

The main difference between the TP and the TPE Series 1000 pump range is the motor. The motor of TPE Series 1000 pumps has a built-in frequency converter for continuous adjustment of the pressure to the flow rate.

TPE Series 1000 pumps are suitable for applications where the pressure, temperature, flow rate or another parameter is to be controlled on the basis of signals from a sensor at some point in the system.

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

For further information on construction and materials of TPE Series 1000 pumps, see pages 21 to 24.

Applications

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

The energy consumption is thus kept at a minimum.

TPE Series 1000 pumps can operate at any duty point within the range between 25 % and 100 % speed (11 to 22 kW TPE(D) pumps up to 110 % speed).

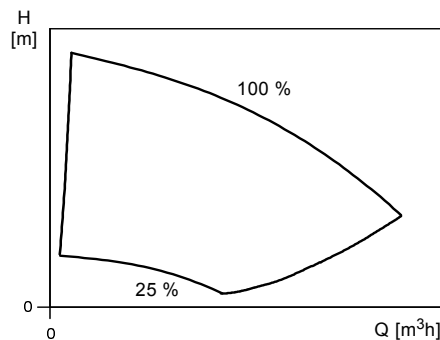


Fig. 10 Duty range of TPE Series 1000 pumps

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

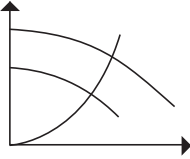
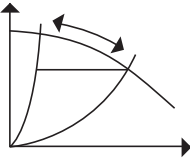
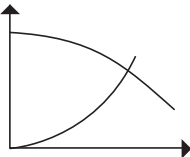
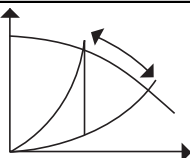
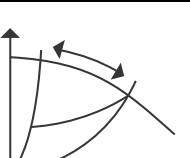
Depending on the application, TPE Series 1000 pumps offer energy savings, increased comfort or improved processing.

The pumps can be fitted with sensor types meeting the requirements mentioned in the data booklet titled "Grundfos E-pumps".

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TM01 4916 1099

The charts below show possible control modes of TPE Series 1000 pumps in different applications.

Control mode	Application
Constant curve	
	Single-pipe heating systems. Systems with three-way valves. Heating and cooling surfaces. Chiller pumps.
Constant differential pressure	
	Systems with two-way valves. (Sensor is needed.)
Temperature control	
	Single-pipe heating systems. Systems with three-way valves. Cooling towers. Chiller pumps. Domestic hot-water recirculation systems. (Sensor is needed.)
Constant flow rate	
	Heating and cooling surfaces. Cooling towers. Flow filters. (Sensor is needed.)
Proportional differential pressure (measured)	
	System with two-way valves. (The differential pressure sensor is located in the system.)

TPE(D) pumps with extended performance range

Standard TPE(D) pumps, 50 Hz, with three-phase MGE motors are able to operate in a range above the 100 % curve. See fig. 31.

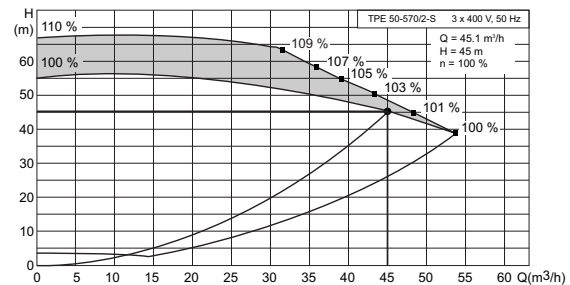


Fig. 11 Three-phase TPE(D) pumps with extended performance range

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

WinCAPS and WebCAPS show the extended performance range of TPE(D) pumps with three-phase MGE motors.

Operating modes of twin-head pumps

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

Alternating operation

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

Standby operation

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

The operating mode is selected by means of a selector switch in each terminal box.

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

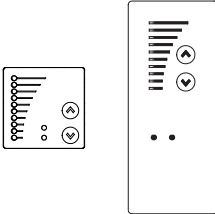
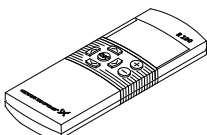
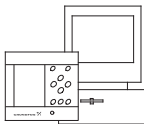
Control options

Communication with TPE, TPED Series 1000 pumps is possible via a central building management system, remote control (Grundfos R100) or control panel.

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

For further information on control options of TPE pumps, see page 67.

Overview of functions

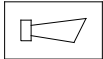

E-pump functions	E-pump type		
	TPE, TPED Series 1000 (without sensor)	TPE, TPED Series 1000 (without sensor)	
	Single-phase	Three-phase	
	Motor sizes [kW]	0.12 - 1.1	0.55 - 22
	Setting via control panel		
	Setpoint	•	•
	Start/stop	•	•
	Max. curve	•	•
	Min. curve	•	•
	Alarm reset	•	•
	Reading via control panel		
	Setpoint	•	•
	Operating indication	•	•
	Fault indication	•	•
	Setting via the R100 and Grundfos GO Remote		
	Setpoint	•	•
	Start/stop	•	•
	Max. curve	•	•
	Min. curve	•	•
	Alarm reset	•	•
	Warning reset	•	•
	Digital input	•	•
	Motor bearing monitoring		•
	Motor bearings changed or lubricated		• ³⁾
	Standstill heating		•
	Controlled or uncontrolled	•	•
	Controller constants, K_p , T_i	•	•
	External setpoint signal	•	•
	Signal relay 1	•	•
	Signal relay 2		• ²⁾
	Buttons on pump	•	•
	Pump number (for bus communication)		•
	Sensor range and signal	•	•
	Operating range (min./max. speed)	•	•
Reading via the R100 and Grundfos GO Remote			
Setpoint	•	•	
Operating mode	•	•	
Actual sensor value	•	•	
Pump speed	•	•	
Power input	•	•	
Power consumption	•	•	
Operating hours	•	•	
Lubrication status (bearings)		• ²⁾	
Replacement status (bearings)		•	
	Setting via GENIbus		
	Setpoint	•	•
	Start/stop	•	•
	Max. curve	•	•
	Min. curve	•	•
	Controlled or uncontrolled	•	•
	Reading via GENIbus		
	Setpoint	•	•
	Operating indication	•	•
	Pump status	•	•

• Available.

1) Only TPED.

2) Only 11-22 kW.

3) Lubricated, only 11-22 kW.

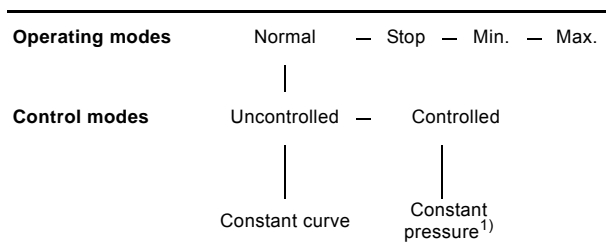
E-pump functions	E-pump type	
	TPE, TPED Series 1000 (without sensor)	TPE, TPED Series 1000 (without sensor)
	Single-phase	Three-phase
Motor sizes [kW]	0.12 - 1.1	0.55 - 22
 Setting via external signal	Setpoint	•
	Start/stop	•
	Min./max. curve via digital input	•
	Reading via external signal	
	Fault, Operation or Ready signal (relay)	•
	Fault, Operation, Ready, Pump running, Bearing lubrication, Warning, Limit exceeded 1 and 2	•
Additional functions	Additional functions	
	Twin-head pump function	• ¹⁾

- Available.
- 1) Only TPED.
- 2) Only 11-22 kW.
- 3) Lubricated, only 11-22 kW.

Modes

Grundfos E-pumps are set and controlled according to operating and control modes.

Overview of modes



¹⁾ In this example, the pump is fitted with a differential-pressure sensor. The pump may also be fitted with a temperature sensor in which case the description would be constant temperature in "Controlled" control mode.

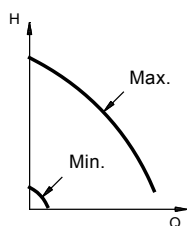
Operating mode

When the operating mode is set to "Normal", the control mode can be set to "Controlled" or "Uncontrolled".

The other operating modes that can be selected are "Stop", "Min." or "Max.".

- Stop: The pump has been stopped.
- Min.: The pump is operating at its minimum speed.
- Max.: The pump is operating at its maximum speed.

Figure 12 is a schematic illustration of min. and max. curves.



TM00 5547 0995

Fig. 12 Min. and max. curves

The max. curve can be used e.g in connection with the venting procedure during installation.

The min. curve can be used during periods when a minimum flow is required.

If the power supply to the pump is disconnected, the mode setting will be stored.

The R100 remote control and Grundfos GO Remote offer additional settings and status displays. See *Setting via the R100 and Grundfos GO Remote*, page 33.

Additional operating modes, TPED pumps

The TPED pumps offer the following additional operating modes:

- **Alternating operation.**
Pump operation alternates every 24 hours. If the duty pump stops due to a fault, the other pump will start.
- **Standby operation.**
One pump is operating continuously. In order to prevent seizing-up, the other pump is started for 10 seconds every 24 hours. If the duty pump stops due to a fault, the other pump will start.

Select the operating mode by means of the selector switch in the terminal box.

The selector switch enables changeover between the operating modes "Alternating operation" (left position) and "Standby operation" (right position).

The switches in the two terminal boxes must be set to the same position. If the switches are positioned differently, the pump will be in "Standby operation".

Twin-head pumps can be set and operated in the same way as single-head pumps. The duty pump uses its setpoint setting whether it is set via the control panel, the R100 or via bus.

Note: Both pumps should be set to the same setpoint and control mode. Different settings will result in different operation when changing between the two pumps.

If the power supply to the pump is disconnected, the pump setting will be stored.

The R100 remote control offers additional settings and status displays.

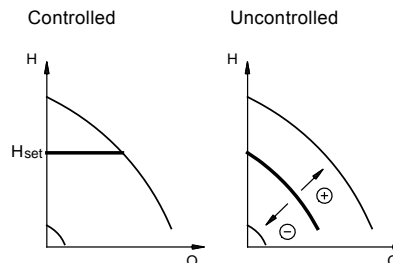
Control modes

The pump can be set to two control modes:

- Controlled
- Uncontrolled.

In "Controlled" control mode, the pump will adjust its performance to the desired setpoint for the control parameter (pressure, differential pressure, temperature, differential temperature or flow).

In "Uncontrolled" control mode, the pump will operate according to the constant curve set.



TM00 7668 0404

Fig. 13 Pump in "Controlled" control mode (differential-pressure control) and in "Uncontrolled" control mode

The pumps have been factory-set to "Uncontrolled" control mode.

Setting up the pump

Factory setting

TPE pumps

The pumps have been factory-set to uncontrolled operation.

The setpoint value corresponds to 100 % of the maximum pump performance. See data sheet for the pump.

In *OPERATION menu* (page 35) and *INSTALLATION menu* (page 38), the factory setting is marked with **bold-faced type** under each individual display.

TPED pumps

The pumps have been factory-set to uncontrolled operation and the additional operating mode "Alternating operation".

The setpoint value corresponds to 100 % of the maximum pump performance. See data sheet for the pump.

In *OPERATION menu* (page 35) and *INSTALLATION menu* (page 38), the factory setting is marked with **bold-faced type** under each individual display.

Setting via the control panel

The pump control panel (figs 14 or 15) incorporates the following buttons and indicator lights:

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

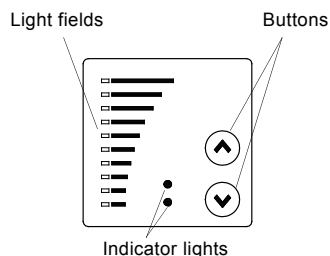


Fig. 14 Control panel, single-phase pumps, 0.37 - 1.1 kW

TM00 7600 0304

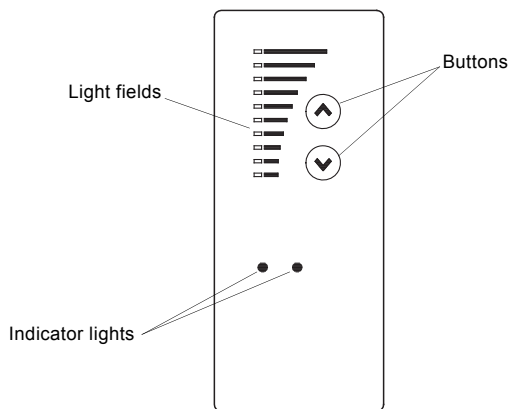


Fig. 15 Control panel, three-phase pumps, 0.55 - 22 kW

TM02 8513 0304

Setpoint setting

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

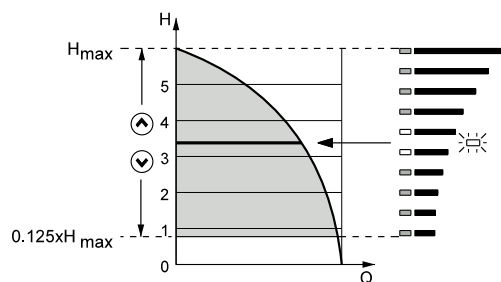
Set the desired setpoint by pressing ⬆ or ⬇.

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

Pump in "Controlled" control mode (differential-pressure control)

Example

Figure 16 shows that light fields 5 and 6 are activated, indicating a desired setpoint of 3.4 m. The sensor measuring range is 0 to 6 m. The setting range is equal to the sensor measuring range (see sensor nameplate).



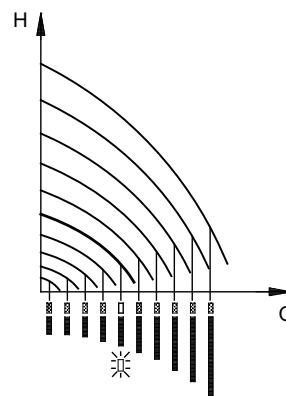
TM03 5845 4006

Fig. 16 Setpoint set to 3.4 m (differential-pressure control)

Pump in "Uncontrolled" control mode

Example

In "Uncontrolled" control mode, the pump performance is set within the range from min. to max. curve. See fig. 17.



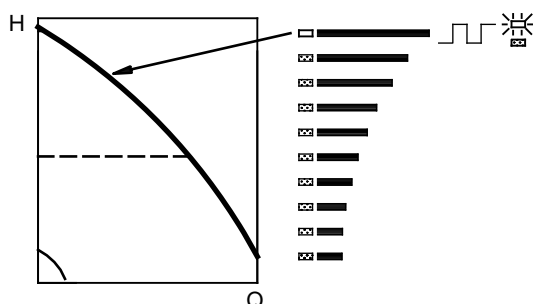
TM00 7746 1304

Fig. 17 Pump performance setting, "Uncontrolled" control mode

Setting to max. curve duty

Press \odot continuously to change to the max. curve of the pump (top light field flashes). See fig. 18.

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



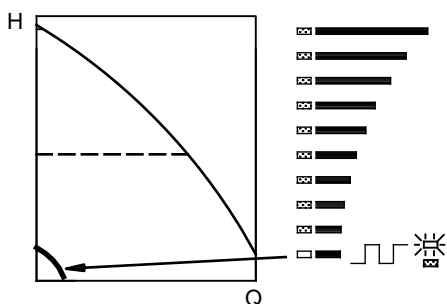
TM00 7345 1304

Fig. 18 Max. curve duty

Setting to min. curve duty

Press \odot continuously to change to the min. curve of the pump (bottom light field flashes). See fig. 19.

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



TM00 7346 1304

Fig. 19 Min. curve duty

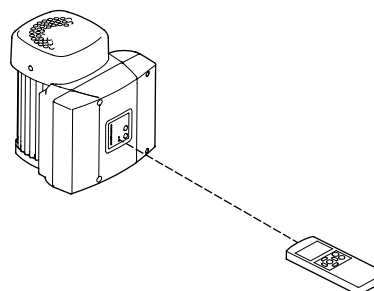
Start/stop of pump

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

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

Setting via the R100 and Grundfos GO Remote

The pump is designed for wireless communication with the Grundfos R100 remote control and Grundfos GO Remote.



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Fig. 20 R100 communicating with the pump via infrared light

During communication, the R100 and Grundfos GO Remote must be pointed at the control panel. When the R100 communicates with the pump, the red indicator light will flash rapidly. Keep pointing the R100 at the control panel until the red indicator light stops flashing.

The R100 offers setting and status displays for the pump.

The displays are divided into four parallel menus, see fig. 21:

- 0. GENERAL (see operating instructions for the R100)
- 1. OPERATION
- 2. STATUS
- 3. INSTALLATION

The figure above each individual display in fig. 21 refers to the section in which the display is described.

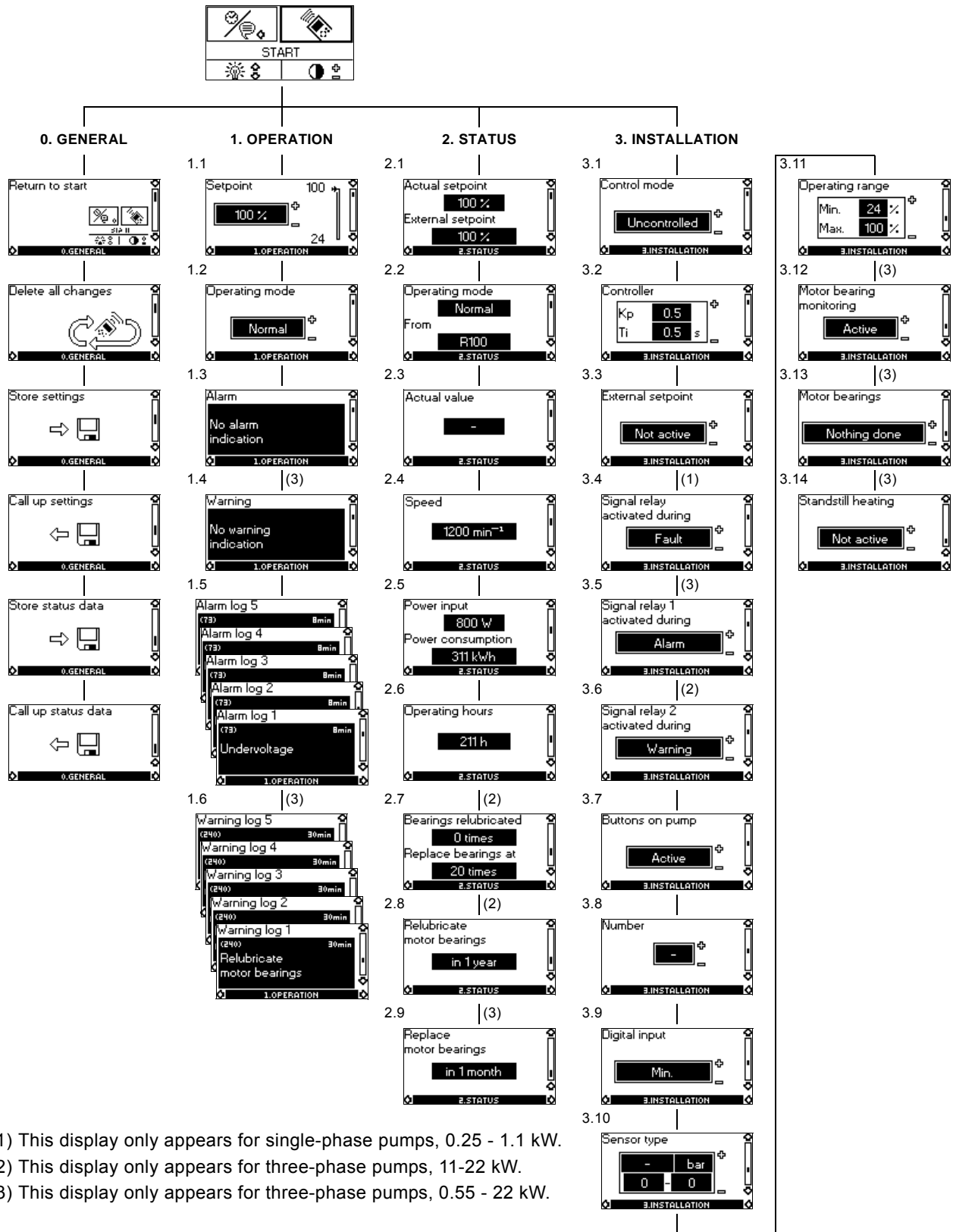
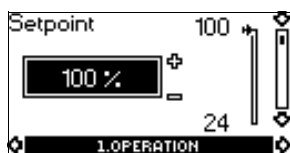


Fig. 21 Menu overview

OPERATION menu

This is the first display in this menu:

Setpoint



- ▶ Setpoint set
- Actual setpoint
- Actual value

Set the desired setpoint in this display.

In "Controlled" control mode, the setting range is equal to the sensor measuring range, e.g. 0 to 25 m.

In "Uncontrolled" control mode, the setpoint is set in % of the maximum performance. The setting range will be between the min. and max. curves.

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.

Setpoint and external signal

The setpoint cannot be set if the pump is controlled via external signals (Stop, Min. or Max.). The R100 will give this warning: External control!

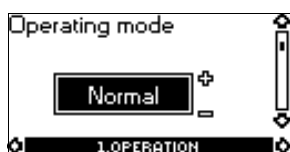
Check if the pump is stopped via terminals 2 and 3 (open circuit) or set to min. or max. via terminals 1 and 3 (closed circuit).

Setpoint and bus communication

The setpoint cannot be set if the pump is controlled from an external control system or via bus communication. The R100 will give this warning: Bus control!

To override bus communication, disconnect the bus connection.

Operating mode



Select one of the following operating modes:

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

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

Fault indications

In E-pumps, faults may result in two types of indications: alarm or warning.

An "Alarm" fault will activate an alarm indication in the R100 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" fault will activate a warning indication in the R100, but the pump will not change operating or control mode.

Note: The indication "Warning" only applies to pumps of 11 kW and up.

Alarm



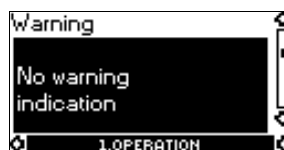
In case of alarm, the cause will appear in this display.

Possible causes:

- No alarm indication
- Too high motor temperature
- Undervoltage
- Mains voltage asymmetry (11-22 kW)
- Overvoltage
- Too many restarts (after faults)
- Overload
- Underload (11-22 kW)
- Sensor signal outside signal range
- Setpoint signal outside signal range
- External fault
- Other fault.

If the pump has been set up to manual restart, an alarm indication can be reset in this display if the cause of the fault has disappeared.

Warning (only three-phase pumps)



In case of warning, the cause will appear in this display.

Possible causes:

- No warning indication
- Sensor signal outside signal range
- Relubricate motor bearings (11-22 kW)
- Replace motor bearings
- Replace varistor (11-22 kW)*

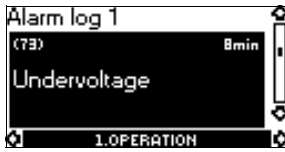
A warning indication will disappear automatically once the fault has been remedied.

* The varistor protects the pump against mains voltage transients. If voltage transients occur, the varistor will be worn over time and need to be replaced. The more transients, the more quickly the varistor will be worn. A Grundfos technician is required for replacement of the varistor.

Fault log

For both fault types, alarm and warning, the R100 has a log function.

Alarm log



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

The example above gives this information:

- The alarm indication "Undervoltage".
- The fault code (73).
- The number of minutes the pump has been connected to the power supply after the fault occurred, 8 min.

Warning log (only three-phase pumps)



In case of "Warning" faults, 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 example above gives this information:

- The warning indication "Relubricate motor bearings".
- The fault code (240).
- The number of minutes the pump has been connected to the power supply since the fault occurred, 30 min.

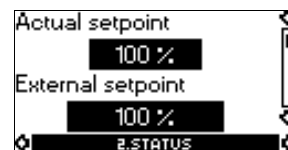
STATUS menu

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

The displayed values are the values that applied when the last communication between the pump and the R100 took place. If a status value is to be updated, point the R100 at the control panel, and press [OK]. If a parameter, e.g. speed, should be called up continuously, press [OK] constantly during the period in which the parameter in question should be monitored.

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.

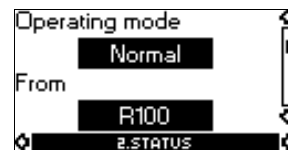
Actual setpoint



Tolerance: $\pm 2\%$

This display shows the actual setpoint and the external setpoint in % of the range from minimum value to the setpoint set.

Operating mode



This display shows the actual operating mode (Stop, Min., Normal (duty) or Max.). Furthermore, it shows where this operating mode was selected (R100, Pump, Bus or External).

Actual value



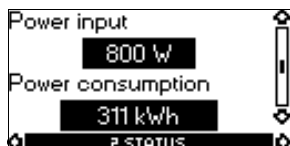
This display shows the value actually measured by a connected sensor.

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

Speed

Tolerance: $\pm 5\%$

The actual pump speed will appear in this display.

Power input and power consumption

Tolerance: $\pm 10\%$

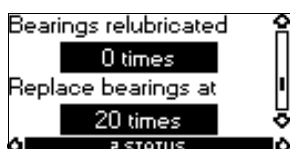
This display shows the actual pump input power from the mains supply. The power is displayed in W or kW.

The pump power consumption can also be read from this display. The value of power consumption is an accumulated value calculated from the pump's birth, and it cannot be reset.

Operating hours

Tolerance: $\pm 2\%$

The value of operating hours is an accumulated value, and it cannot be reset.

Lubrication status of motor bearings (only 11-22 kW)

This display shows how many times the motor bearings have been relubricated 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 (only three-phase pumps)*, page 40.

When relubrication has been confirmed, the figure in the above display will be increased by one.

Time till relubrication of motor bearings (only 11-22 kW)

This display shows when to relubricate the motor bearings. The controller monitors the operating pattern of the pump and calculates the period between bearing relubrications. If the operating pattern changes, the calculated time till relubrication may change as well.

Displayable values:

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

Time till replacement of motor bearings (only three-phase pumps)

When the motor bearings have been relubricated a prescribed number of times stored in the controller, the display in the previous section will be replaced by the display below.



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

Displayable values:

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

INSTALLATION menu

Control mode



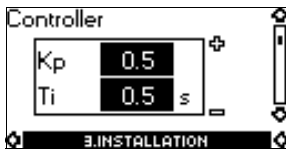
Select one of the following control modes, see fig. 13:

- Controlled
- **Uncontrolled.**

Note: If the pump is connected to a bus, the control mode cannot be selected via the R100.

Controller

E-pumps have a factory default setting of gain (K_p) and integral time (T_i). However, if the factory setting is not the optimum setting, the gain and the integral time can be changed in the display below.



- 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 "3600 s" is selected, 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.

External setpoint



The input for external setpoint signal can be set to different signal types.

Select one of the following types:

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

If "Not active" is selected, the setpoint set via the R100 or on the control panel will apply.

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

Signal relay

Pumps of 0.25 to 7.5 kW have one signal relay. The factory setting of the relay will be "Fault".

Pumps of 11 to 22 kW have two signal relays. Signal relay 1 is factory-set to "Alarm" and signal relay 2 to "Warning".

In one of the displays below, select in which one of three or six operating situations the signal relay should be activated.

Single-phase pumps 0.25 - 1.1 kW



- Ready
- **Fault**
- Operation.

Three-phase pumps 0.55 - 22 kW



- Ready
- **Alarm**
- Operation
- Pump running
- Warning
- Relubricate.

Three-phase pumps 11-22 kW



- Ready
- Alarm
- Operation
- Pump running
- **Warning**
- Relubricate.

Note: "Fault" and "Alarm" cover faults resulting in "Alarm".

"Warning" covers faults resulting in "Warning".

"Relubricate" covers only that one individual event.

For distinction between alarm and warning, see *Fault indications*, page 35.

Buttons on pump



The operating buttons \odot and \ominus on the control panel can be set to these values:

- **Active**
- Not active.

When set to "Not active" (locked), the buttons do not function. Set the buttons to "Not active" if the pump should be controlled via an external control system.

Pump number



A number between 1 and 64 can be allocated to the pump. In the case of bus communication, a number must be allocated to each pump.

Digital input



The digital input of the pump (terminal 1, fig. 23, page 41) can be set to different functions.

Select one of the following functions:

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

The selected function is activated by closing the contact between terminals 1 and 9.

See fig. 23, page 41.

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 max. curve.

Sensor

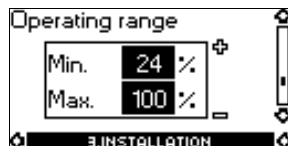


The setting of the sensor is only relevant in the case of controlled operation.

Select among the following values:

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

Operating range



How to set the operating range:

- Set the min. curve within the range from max. curve to 12 % of maximum performance. The pump has been factory-set to 24 % of maximum performance.
- Set the max. curve within the range from maximum performance (100 %) to min. curve.

The area between the min. and max. curves is the operating range.

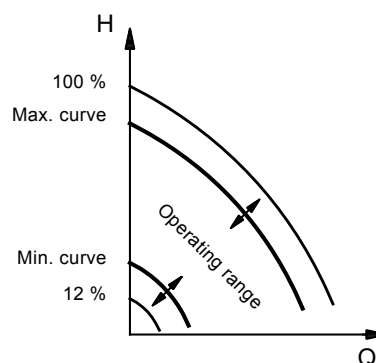


Fig. 22 Setting of the min. and max. curves in % of maximum performance

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Motor bearing monitoring (only three-phase pumps)



The motor bearing monitoring function can be set 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. See *Lubrication status of motor bearings (only 11-22 kW)*, page 37.

Note: The counter will continue counting even if the function is switched to "Not active", but a warning will not be given when it is time for relubrication.

When the function is switched to "Active" again, the accumulated mileage will again be used to calculate the relubrication time.

Confirming relubrication/replacement of motor bearings (only three-phase pumps)



This function can be set to these values:

- Relubricated
- Replaced
- **Nothing done.**

When the bearing monitoring function is "Active", the controller will give a warning indication when the motor bearings are due to be relubricated or replaced.

See *Fault indications*, page 35.

When the motor bearings have been relubricated or replaced, confirm this action in the above display by pressing [OK].

Note: "Relubricated" cannot be selected for a period of time after confirming relubrication.

Standstill heating (only three-phase pumps)



The standstill heating function can be set to these values:

- Active
- **Not active.**

When the function is set to "Active", an AC voltage will be applied to the motor windings when the pump is not operating. The applied AC voltage will ensure that sufficient heat is generated to avoid condensation in the motor.

Setting via the PC Tool E-products

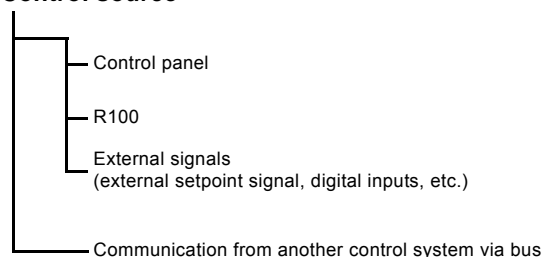
Special setup requirements differing from the settings available via the R100 require the use of Grundfos PC Tool E-products. This again requires the assistance of a Grundfos service technician or engineer. Contact your local Grundfos company for more information.

Priority of settings

The priority of settings depends on two factors:

1. control source
2. settings.

1. Control source



2. Settings

- "Stop" operating mode
- "Max." operating mode (max.curve)
- "Min." operating mode (min. curve)
- setpoint setting.

An E-pump can be controlled by different control sources at the same time, and each of these sources can be set differently. **Consequently, it is necessary to set an order of priority of the control sources and the settings.**

Note: If two or more settings are activated at the same time, the pump will operate according to the function with the highest priority.

Priority of settings without bus communication

Priority	Control panel or R100	External signals
1	Stop	
2	Max.	
3		Stop
4		Max.
5	Min.	Min.
6	Setpoint setting	Setpoint setting

Example: If the E-pump has been set to "Max." operating mode (max. frequency) via an external signal, such as digital input, the control panel or the R100 can only set the E-pump to "Stop" operating mode.

Priority of settings with bus communication

Priority	Control panel or R100	External signals	Bus communication
1	Stop		
2	Max.		
3		Stop	Stop
4			Max.
5			Min.
6			Setpoint setting

Example: If the E-pump is operating according to a setpoint set via bus communication, the control panel or the R100 can set the E-pump to "Stop" or "Max." operating mode, and the external signal can only set the E-pump to "Stop" operating mode.

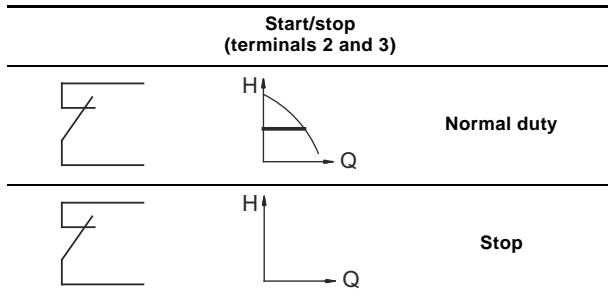
External forced-control signals

The pump has inputs for external signals for these forced-control functions:

- start/stop of pump
- digital function.

Start/stop input

Functional diagram: Start/stop input

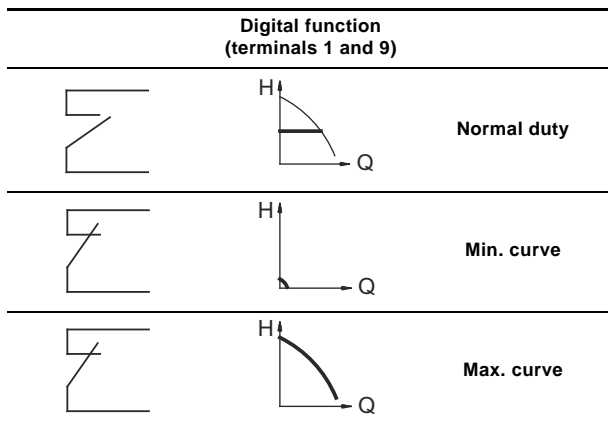


Digital input

Via the R100, one of the following functions can be selected for the digital input:

- Normal (duty)
- Min. (curve)
- Max. (curve).

Functional diagram: Input for digital function



Connection terminals

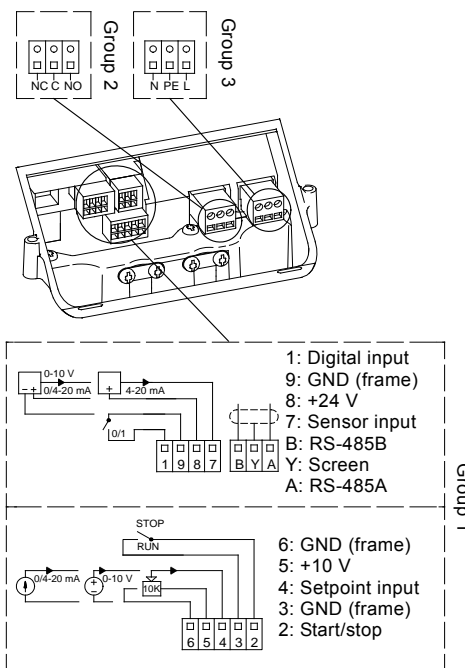


Fig. 23 Connection terminals

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External setpoint signal

The setpoint can be remote-set by connecting an analog signal transmitter to the input for the setpoint signal (terminal 4).

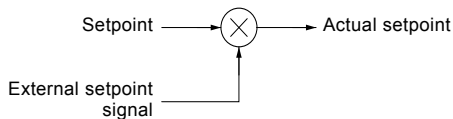


Fig. 24 Actual setpoint as a product (multiplied value) of setpoint and external setpoint signal

Select the actual external signal, 0-10 V, 0-20 mA, 4-20 mA, via the R100. See *External setpoint*, page 38.

If "Uncontrolled" control mode is selected via the R100, the pump can be controlled by any controller. In "Controlled" control mode, the setpoint can be set externally within the range from sensor_{min} to the setpoint set on the pump or via the R100.

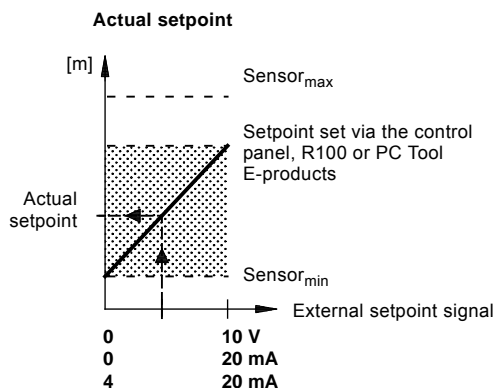


Fig. 25 Relation between the actual setpoint and the external setpoint signal in "Controlled" control mode

Example: At a sensor_{min} value of 0 m, a setpoint set of 20 m and an external setpoint of 80 %, the actual setpoint will be as follows:

$$\begin{aligned}
 H_{\text{actual}} &= (H_{\text{set}} - H_{\text{min}}) \times \%_{\text{external setpoint}} + H_{\text{min}} \\
 &= (20-0) \times 80 \% + 0 \\
 &= 16 \text{ m}
 \end{aligned}$$

In "Uncontrolled" control mode, the setpoint can be set externally within the range from the min. curve to the setpoint set on the pump or via the R100.

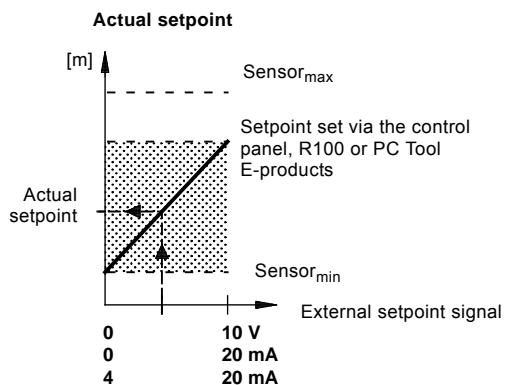


Fig. 26 Relation between the actual setpoint and the external setpoint signal in "Open loop" control

mode

Bus signal

The pump supports serial communication via an RS-485 input. The communication is carried out according to the Grundfos bus protocol, GENIbus, and enables connection to a building management system or another external control system.

Operating parameters, such as setpoint, operating mode, etc. 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, fault indications, etc. Contact Grundfos for further details.

Note: If a bus signal is used, the number of settings available via the R100 will be reduced.

Other bus standards

Grundfos offers various bus solutions with communication according to other standards. Contact Grundfos for further details.

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Indicator lights and signal relay

The operating condition of the pump is indicated by the green and red indicator lights on the pump control panel and inside the terminal box. See figs 27 and 28.

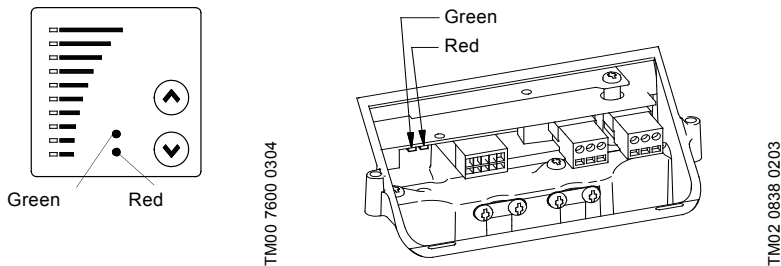


Fig. 27 Position of indicator lights on single-phase pumps

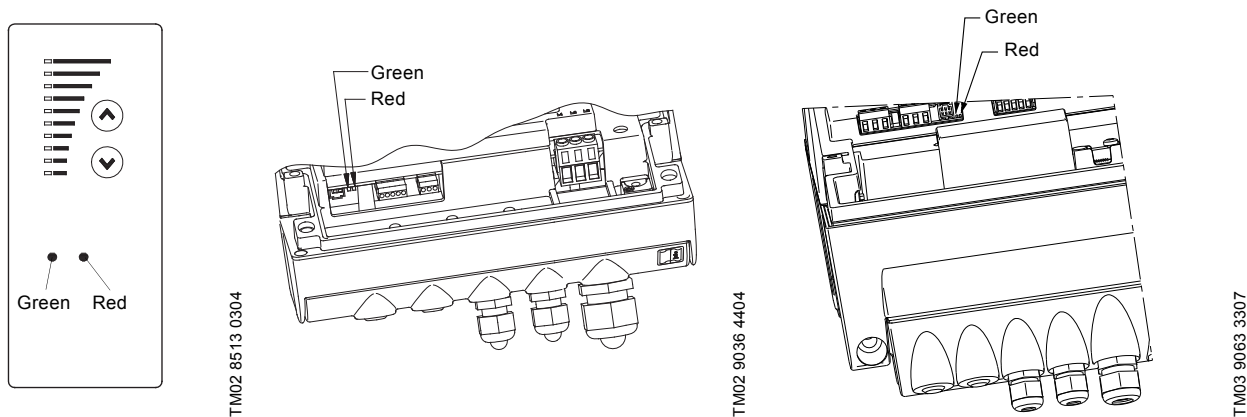


Fig. 28 Position of indicator lights on three-phase pumps

Furthermore, the pump incorporates an output for a potential-free signal via an internal relay. For signal relay output values, see *Signal relay*, page 38.

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

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

Resetting of fault indication

A fault indication can be reset in one of the following ways:

- Briefly press or on the pump. This will not change the setting of the pump. A fault indication cannot be reset by means of or if the buttons have been locked.
- Switch off the power supply until the indicator lights are off.
- Switch the external start/stop input off and then on again.
- Use the R100. See *Fault indications*, page 35.

When the R100 communicates with the pump, the red indicator light will flash rapidly.

Insulation resistance

0.25 - 7.5 kW

Do not measure the insulation resistance of motor windings or an installation incorporating E-pumps using high-voltage megging equipment, as this may damage the built-in electronics.

11-22 kW

Do not measure the insulation resistance of an installation incorporating E-pumps using high-voltage megging equipment, as this may damage the built-in electronics.

The motor conductors can be disconnected separately and the insulation resistance of the motor windings can be tested.

Further product documentation

Specific data booklets are also available on www.grundfos.com > WebCAPS. For further information on WebCAPS, see page 200.

10. TPE Series 2000 pumps



Fig. 29 TPE Series 2000

Technical data

Flow rate:	Up to 340 m ³ /h
Head:	Up to 90 m
Liquid temperature:	-25 °C to +140 °C
Maximum operating pressure:	16 bar
Motor sizes (single-phase):	0.37 to 1.1 kW
Motor sizes (three-phase):	0.55 to 22 kW

Construction

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

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

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

The TPE Series 2000 range is a preset solution for quick and safe installation.

For further information on construction and materials of TPE Series 2000 pumps, see pages 21 to 24.

Applications

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

The energy consumption is thus kept at a minimum.

TPE Series 2000 pumps can operate at any duty point within the range between 25 % and 100 % speed (11 to 22 kW, TPE(D) pumps up to 110 % speed).

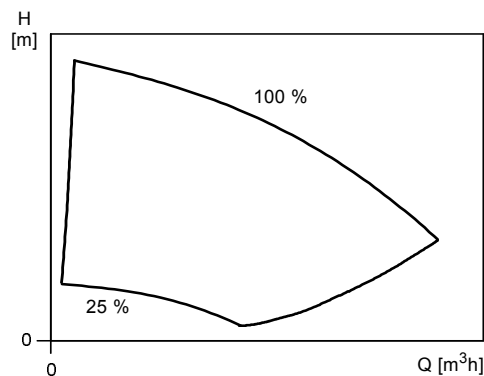


Fig. 30 Duty range of TPE Series 2000 pumps

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

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

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

Proportional pressure

TPE Series 2000 pumps are factory-set to proportional pressure control. We recommend proportional pressure control in systems with relatively large pressure losses, as it is the most economical control mode.

TPE Series 2000 pumps set to proportional pressure control continuously adjust the pump head to the water requirement of the system. The setpoint is factory-set to 50 % of the maximum pump head.

The pumps can be retrofitted with sensor types meeting the requirements mentioned in the data booklet titled 'Grundfos E-pumps'.

The charts below show possible control modes of TPE Series 2000 pumps in different applications.

Control mode	Application
Proportional pressure	Systems with two-way valves. - The head against a closed valve is 50 % of the setpoint.
Constant pressure	Systems with two-way valves.
Constant curve	Single-pipe heating system. Systems with three-way valves. Heating and cooling surfaces. Chiller pumps.

TPE(D) pumps with extended performance range

Standard TPE(D) pumps, 50 Hz, with three-phase MGE motors from 11 to 22 kW are able to operate in a range above the 100 % curve. See fig. 31.

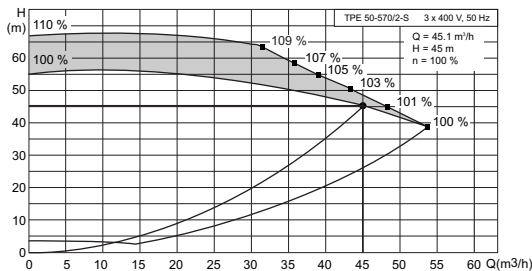


Fig. 31 11 to 22 kW three-phase TPE(D) pumps with extended performance range

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

WinCAPS and WebCAPS show the extended performance range of the 11 to 22 kW TPE(D) pumps with three-phase MGE motors.

Operating modes of twin-head pumps

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

Alternating operation

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

Standby operation

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

The operating mode is selected by means of a selector switch in each terminal box.

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


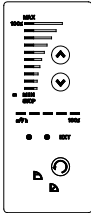
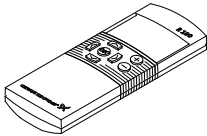
Control options

Communication with TPE, TPED Series 2000 pumps is possible via a central building management system, remote control (Grundfos R100) or control panel.

The purpose of controlling TPE, TPED Series 2000 pumps is to monitor and control the pressure, temperature, flow rate and liquid level of the system.

For further information on control options of TPE pumps, see page 67.

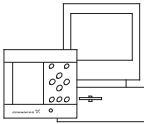
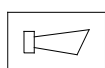
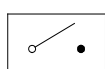
Overview of functions

E-pump functions	E-pump type		
	TPE, TPED Series 2000 with single-phase MGE	TPE, TPED Series 2000 with three-phase MGE	
Motor sizes [kW]	0.12 - 1.1	0.55 - 22	
	Setting via control panel		
	Setpoint	•	
	Start/stop	•	
	Max. curve	•	
	Min. curve	•	
	Alarm reset	•	
	Constant or proportional pressure	•	
	Reading via control panel		
	Setpoint	•	
	Operating indication	•	
Fault indication	•		
	Setting via control panel		
	Setpoint		•
	Start/stop		•
	Max. curve		•
	Min. curve		•
	Alarm reset		•
	Constant or proportional pressure		•
	Reading via control panel		
	Setpoint		•
	Operating indication		•
Fault indication		•	
Operating mode: MIN, MAX, STOP		•	
Flow in %		•	
External control		•	
	Setting via the R100 and Grundfos GO Remote		
	Setpoint	•	•
	Start/stop	•	•
	Max. curve	•	•
	Min. curve	•	•
	Alarm reset	•	•
	Warning reset		•
	Digital input	•	•
	Motor bearing monitoring		•
	Motor bearings changed or lubricated		• ²⁾
Standstill heating		•	
Constant pressure, proportional pressure or constant curve	•	•	
External setpoint signal	•	•	
Signal relay 1	•	•	
Signal relay 2		• ¹⁾	
Buttons on pump	•	•	
Pump number (for bus communication)	•	•	
Reading via the R100 and Grundfos GO Remote			
Setpoint	•	•	
Operating mode	•	•	
Actual sensor value	•	•	
Pump speed	•	•	
Power input	•	•	
Power consumption	•	•	
Operating hours	•	•	
Lubrication status (bearings)		• ¹⁾	
Replacement status (bearings)		•	

• Available

¹⁾ Only 11-22 kW

²⁾ Lubricated, only 11-22 kW

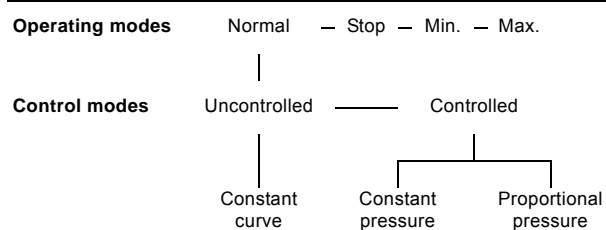
E-pump functions	E-pump type		
	TPE, TPED Series 2000 with single-phase MGE	TPE, TPED Series 2000 with three-phase MGE	
	Motor sizes [kW]	0.12 - 1.1	0.55 - 22
	Setting via GENIBus		
	Setpoint	•	•
	Start/stop	•	•
	Max. curve	•	•
	Min. curve	•	•
	Constant pressure, proportional pressure or constant curve	•	•
	Reading via GENIBus		
	Setpoint	•	•
	Operating indication	•	•
	Pump status	•	•
	Setting via external signal		
	Setpoint	•	•
	Start/stop	•	•
	Min./max. curve via digital input	•	•
	Reading via external signal		
	Fault signal (relay)	•	
	Fault, Operation, Ready, Pump running, Bearing lubrication, Warning, Limit exceeded 1 and 2		•
Additional functions	Additional functions		
	Twin-head pump function	•	•

- Available
- 1) Only 11-22 kW
- 2) Lubricated, only 11-22 kW

Modes

Grundfos E-pumps are set and controlled according to operating and control modes.

Overview of modes



Operating mode

When the operating mode is set to "Normal", the control mode can be set to "Constant curve", "Constant pressure" or "Proportional pressure".

The other operating modes that can be selected are "Stop", "Min." or "Max.".

- Stop: The pump has been stopped.
- Min.: The pump is operating at its minimum speed.
- Max.: The pump is operating at its maximum speed.

Figure 12 is a schematic illustration of min. and max. curves.

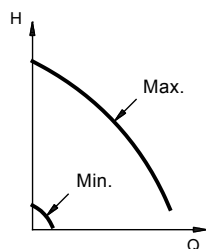


Fig. 32 Min. and max. curves

The max. curve can for instance be used in connection with the venting procedure during installation.

The min. curve can be used during periods when a minimum flow is required.

If the power supply to the pump is disconnected, the mode setting will be stored.

The R100 remote control offers additional settings and status displays. See *Setting via the R100 and Grundfos GO Remote*, page 33.

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Additional operating modes, TPED pumps

The TPED pumps offer the following additional operating modes:

- **Alternating operation.**
Pump operation alternates every 24 hours. If the duty pump stops due to a fault, the other pump will start.
- **Standby operation.**
One pump is operating continuously. In order to prevent seizing-up, the other pump is started for 10 seconds every 24 hours. If the duty pump stops due to a fault, the other pump will start.

Select the operating mode by means of the selector switch in the terminal box.

The selector switch enables changeover between the operating modes "Alternating operation" (left position) and "Standby operation" (right position).

The switches in the two terminal boxes must be set to the same position. If the switches are positioned differently, the pump will be in "Standby operation".

Twin-head pumps can be set and operated in the same way as single-head pumps. The duty pump uses its setpoint setting whether it is set via the control panel, the R100 or via bus.

Note: Both pumps should be set to the same setpoint and control mode. Different settings will result in different operation when changing between the two pumps.

If the power supply to the pump is disconnected, the pump setting will be stored.

The R100 remote control offers additional settings and status displays.

Control modes

The pump can be set to two primary control modes:

- Proportional pressure
- Constant pressure.

Furthermore, the pump can be set to constant curve.

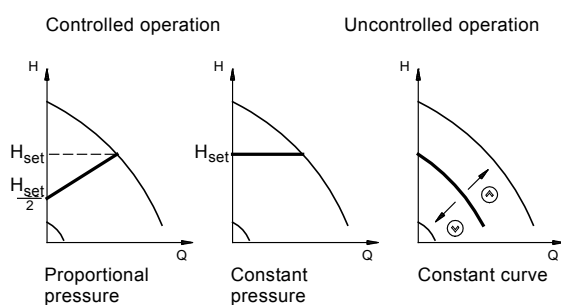


Fig. 33 Controlled and uncontrolled operation

Proportional-pressure control

The pump head is reduced at falling water demand and increased at rising water demand. See fig. 33.

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Constant-pressure control



The pump maintains a constant pressure, irrespective of water demand. See fig. 33.

Constant-curve mode

The pump is not controlled. The curve can be set within the range from min. curve to max. curve. See fig. 33.

The pumps have been factory-set to proportional pressure. See *Factory setting*, page 32. In most cases, this is the optimum control mode, and at the same time it consumes the least energy.

Guide to the selection of control mode based on system type

System type	System description	Select this control mode
Relatively large pressure losses in the boiler, chiller or heat exchanger circuit and the pipes.	1. Two-pipe heating systems with thermostatic valves <ul style="list-style-type: none"> with a dimensioned pump head higher than 4 metres very long distribution pipes strongly throttled pipe balancing valves differential-pressure regulators large pressure losses in those parts of the system through which the total quantity of water flows (e.g. boiler, chiller, heat exchanger and pipes up to the first branching). 	Proportional pressure 
	2. Primary circuit pumps in systems with large pressure losses in the primary circuit.	
Relatively small pressure losses in the boiler, chiller or heat exchanger circuit and the pipes.	1. Two-pipe heating or cooling systems with thermostatic valves <ul style="list-style-type: none"> with a dimensioned pump head lower than 2 metres sized for natural circulation with small head losses in those parts of the system through which the total quantity of water flows (e.g. boiler, chiller, heat exchanger and pipes up to the first branching) modified to a high differential temperature between flow pipe and return pipe (e.g. district heating). 	Constant pressure 
	2. Floor heating systems with thermostatic valves.	
	3. One-pipe heating systems with thermostatic valves or pipe balancing valves.	
	4. Primary circuit pumps in systems with small pressure losses in the primary circuit.	

Setting up the pump

Factory setting

TPE pumps

The pumps have been factory-set to proportional pressure.

The head corresponds to 50 % of the maximum pump head. See data sheet for the pump.

Many systems will operate satisfactorily with the factory setting, but most systems can be optimised by changing this setting.

In *OPERATION menu* (page 35) and *INSTALLATION menu* (page 38), the factory setting is marked with **bold-faced type** under each individual display.

TPED pumps

The pumps have been factory-set to proportional pressure and the additional operating mode "Alternating operation".

The head corresponds to 50 % of the maximum pump head. See data sheet for the pump.

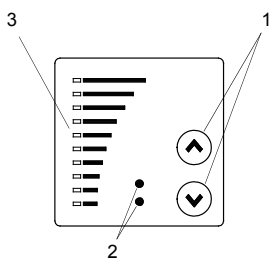
Many systems will operate satisfactorily with the factory setting, but most systems can be optimised by changing this setting.

In *OPERATION menu* (page 35) and *INSTALLATION menu* (page 38), the factory setting is marked with **bold-faced type** under each individual display.

Setting via the control panel, single-phase pumps

The pump control panel (fig. 34) incorporates the following buttons and indicator lights:

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



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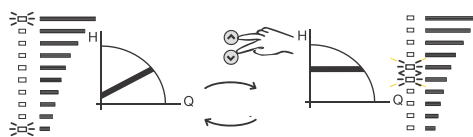
Fig. 34 Control panel, single-phase pumps, 0.37 - 1.1 kW

Pos.	Description
1	Buttons for setting
2	Indicator lights for indication of operation and fault
3	Light fields for indication of head and performance

Setting of control mode

Description of function, see *Control modes*, page 50.

Change the control mode by pressing the two setting buttons simultaneously for 5 seconds. The control mode will change from constant pressure \square to proportional pressure \triangle or vice versa.



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Fig. 35 Setting the control mode

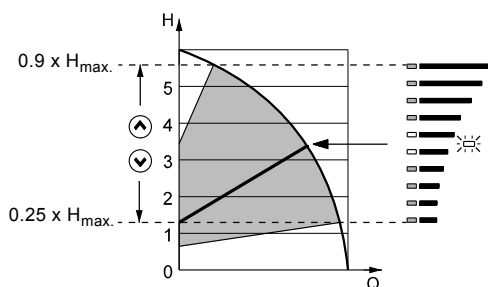
Setting of pump head

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

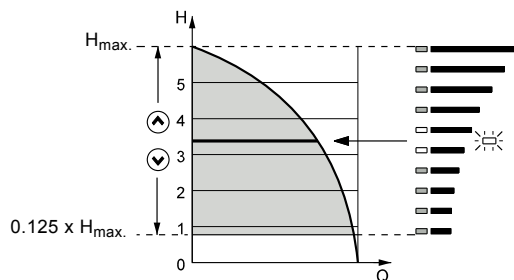


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Fig. 36 Pump in "Proportional pressure" control mode

Constant pressure

Figure 37 shows that light fields 5 and 6 are activated, indicating a desired head of 3.4 metres. The setting range is between 1/8 (12.5 %) of maximum head and maximum head.



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Fig. 37 Pump in "Constant pressure" control mode

Setting to max. curve duty

Press \odot continuously to change to the max. curve of the pump (top light field flashes). See fig. 38.

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

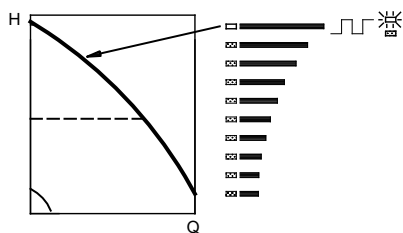


Fig. 38 Max. curve duty

Setting to min. curve duty

Press \ominus continuously to change to the min. curve of the pump (bottom light field flashes). See fig. 39.

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

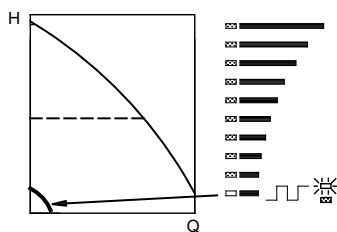


Fig. 39 Min. curve duty

Start/stop of pump

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

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

Setting via the control panel, three-phase pumps

The pump control panel (fig. 40) incorporates the following buttons and indicator lights:

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

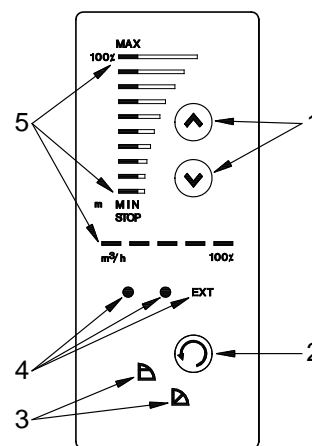


Fig. 40 Control panel, three-phase pumps, 0.55 - 22 kW

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

Setting of control mode

Description of function, see *Control modes*, page 50.

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

- constant pressure, \square
- proportional pressure, \triangle .

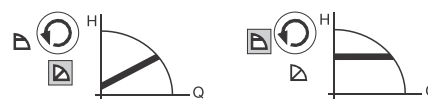


Fig. 41 Setting the control mode

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TM00 7346 1196

TM03 0177 4304

TM03 9061 3307

Setting of pump head

Set the pump head by pressing \uparrow or \downarrow .

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

Proportional pressure

Figure 42 shows that light fields 5 and 6 are activated, indicating a desired head of 3.4 metres at maximum flow. The setting range is between 25 % to 90 % of maximum head.

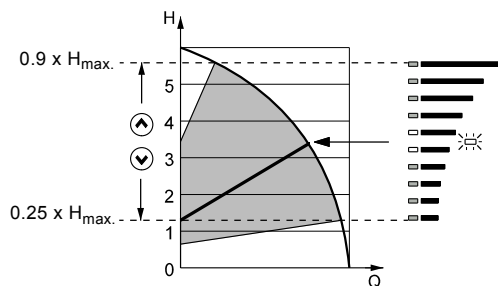


Fig. 42 Pump in "Proportional pressure" control mode

Constant pressure

Figure 43 shows that light fields 5 and 6 are activated, indicating a desired head of 3.4 metres. The setting range is between 1/8 (12.5 %) of maximum head and maximum head.

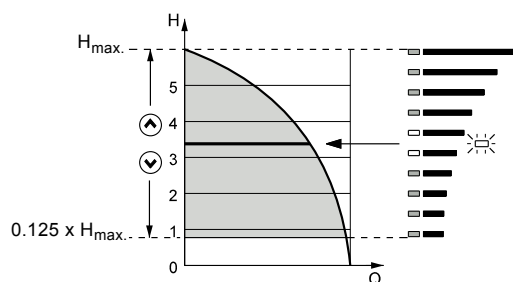


Fig. 43 Pump in "Constant pressure" control mode

Setting to max. curve duty

Press \uparrow continuously to change to the max. curve of the pump (MAX illuminates). See fig. 44.

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

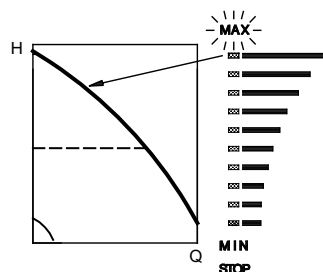


Fig. 44 Max. curve duty

Setting to min. curve duty

Press \downarrow continuously to change to the min. curve of the pump (MIN illuminates). See fig. 45.

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

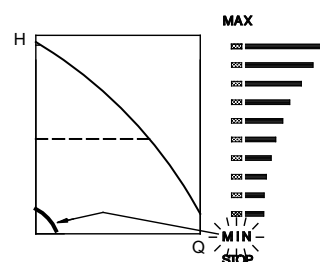


Fig. 45 Min. curve duty

Start/stop of pump

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

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

Setting via the R100 and Grundfos GO Remote

The pump is designed for wireless communication with the Grundfos R100 remote control and Grundfos GO Remote.

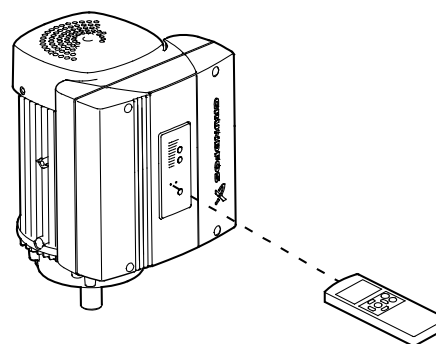


Fig. 46 R100 communicating with the pump via infrared light

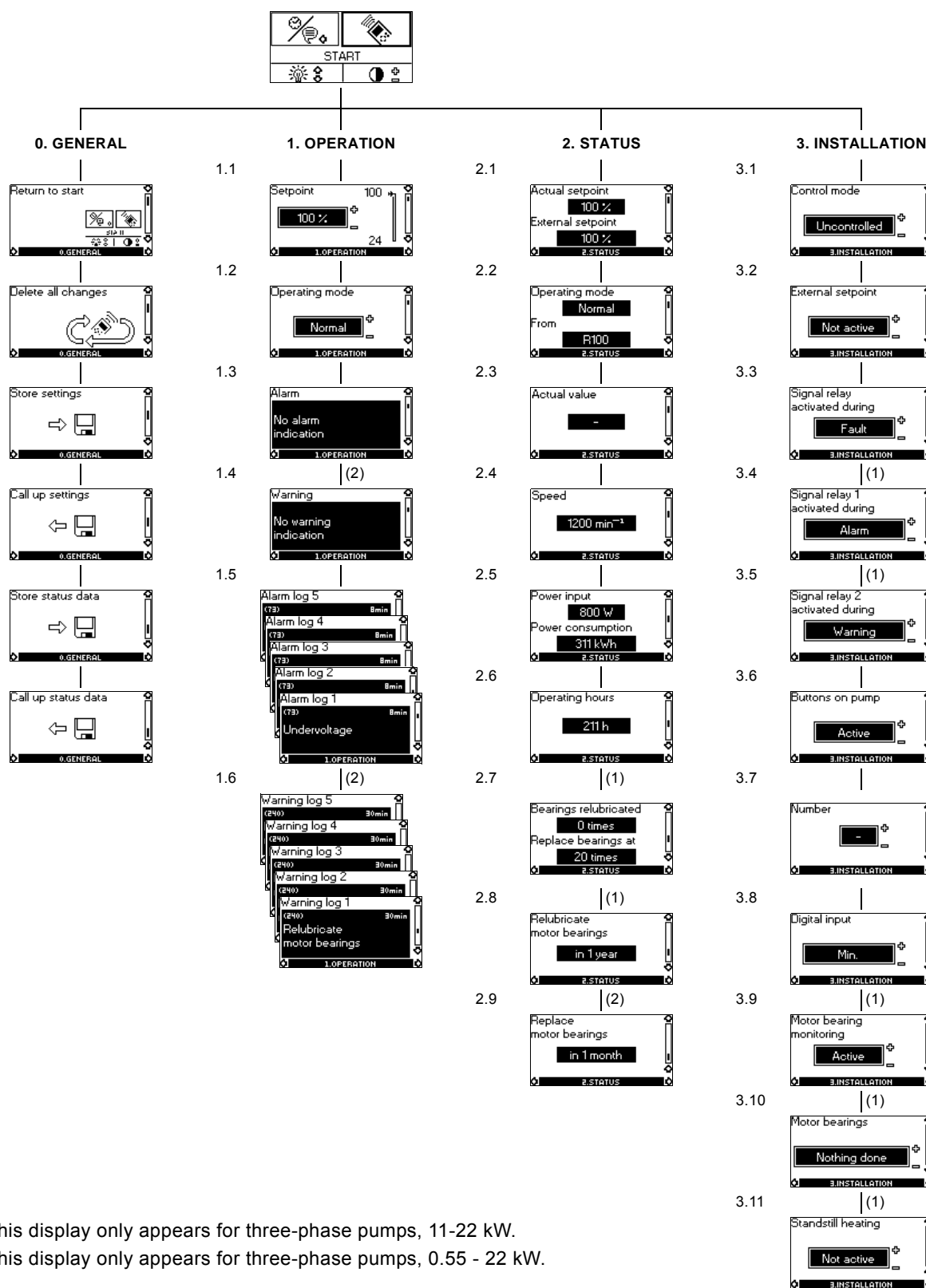
During communication, the R100 must be pointed at the control panel. When the R100 communicates with the pump, the red indicator light will flash rapidly. Keep pointing the R100 at the control panel until the red indicator light stops flashing.

The R100 offers setting and status displays for the pump.

The displays are divided into four parallel menus, see fig. 21:

0. GENERAL (see operating instructions for the R100)
1. OPERATION
2. STATUS
3. INSTALLATION

The figure above each individual display in fig. 21 refers to the section in which the display is described.



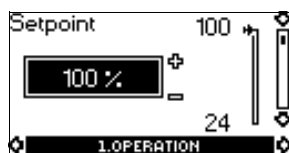
(1) This display only appears for three-phase pumps, 11-22 kW.
 (2) This display only appears for three-phase pumps, 0.55 - 22 kW.

Fig. 47 Menu overview

OPERATION menu

This is the first display in this menu:

Setpoint



- ▶ Setpoint set
- Actual setpoint
- Actual head

Set the desired setpoint in [m] in this display.

In "Prop. pressure" control mode, the setting range is from 1/4 to 3/4 of maximum head.

In "Const. pressure" control mode, the setting range is from 1/8 of maximum head to maximum head.

In "Const. curve" control mode, the setpoint is set in % of the maximum curve. The curve can be set within the range from min. curve to max. curve.

Select one of the following operating modes:

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

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.

Setpoint and external signal

The setpoint cannot be set if the pump is controlled via external signals (Stop, Min. or Max.). The R100 will give this warning: External control!

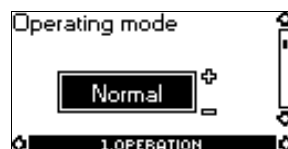
Check if the pump is stopped via terminals 2 and 3 (open circuit) or set to min. or max. via terminals 1 and 3 (closed circuit).

Setpoint and bus communication

The setpoint cannot be set if the pump is controlled from an external control system or via bus communication. The R100 will give this warning: Bus control!

To override bus communication, disconnect the bus connection.

Operating mode



Select one of the following operating modes:

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

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

Fault indications

In E-pumps, faults may result in two types of indication: Alarm or Warning.

An "Alarm" fault will activate an alarm indication in the R100 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" fault will activate a warning indication in the R100, but the pump will not change operating or control mode.

Note: The indication "Warning" only applies to three-phase pumps.

Alarm



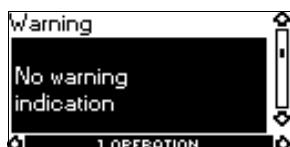
In case of alarm, the cause will appear in this display.

Possible causes:

- No alarm indication
- Too high motor temperature
- Undervoltage
- Mains voltage asymmetry (11-22 kW)
- Overvoltage
- Too many restarts (after faults)
- Overload
- Underload (11-22 kW)
- Sensor signal outside signal range
- Setpoint signal outside signal range
- External fault
- Other fault.

If the pump has been set up to manual restart, an alarm indication can be reset in this display if the cause of the fault has disappeared.

Warning (only three-phase pumps)



In case of warning, the cause will appear in this display.

Possible causes:

- No warning indication
- Sensor signal outside signal range
- Relubricate motor bearings (11-22 kW)
- Replace motor bearings
- Replace varistor (11-22 kW)*

A warning indication will disappear automatically once the fault has been remedied.

* The varistor protects the pump against mains voltage transients. If voltage transients occur, the varistor will be worn over time and need to be replaced. The more transients, the more quickly the varistor will be worn. A Grundfos technician is required for replacement of the varistor.

Fault log

For both fault types, alarm and warning, the R100 has a log function.

Alarm log

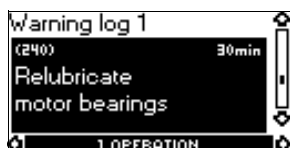


In case of "Alarm" faults, the last five alarm indications will appear in the alarm log. "Alarm log 1" shows the latest fault, "Alarm log 2" shows the latest fault but one, etc.

The example above gives this information:

- The alarm indication "Undervoltage".
- The fault code (73).
- The number of minutes the pump has been connected to the power supply after the fault occurred, 8 min.

Warning log (only three-phase pumps)



In case of "Warning" faults, 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 example above gives this information:

- The warning indication "Relubricate motor bearings"
- The fault code (240)
- The number of minutes the pump has been connected to the power supply since the fault occurred, 30 min.

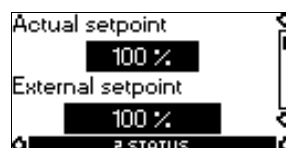
STATUS menu

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

The displayed values are the values that applied when the last communication between the pump and the R100 took place. If a status value is to be updated, point the R100 at the control panel, and press [OK]. If a parameter, e.g. speed, should be called up continuously, press [OK] constantly during the period in which the parameter in question should be monitored.

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



Tolerance: $\pm 2\%$

This display shows the actual setpoint and the external setpoint in % of the range from minimum value to the setpoint set.

Operating mode



This display shows the actual operating mode (Stop, Min., Normal (duty) or Max.). Furthermore, it shows where this operating mode was selected (R100, Pump, Bus or External).

Actual value



This display shows the value actually measured by a connected sensor.

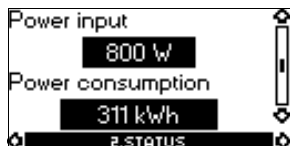
Speed



Tolerance: $\pm 5\%$

The actual pump speed will appear in this display.

Power input and power consumption



Tolerance: $\pm 10\%$

This display shows the actual pump input power from the mains supply. The power is displayed in W or kW. The pump power consumption can also be read from this display. The value of power consumption is an accumulated value calculated from the pump's birth, and it cannot be reset.

Operating hours



Tolerance: $\pm 2\%$

The value of operating hours is an accumulated value, and it cannot be reset.

Lubrication status of motor bearings (only 11-22 kW)



This display shows how many times the motor bearings have been relubricated 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 (only three-phase pumps)*. When relubrication has been confirmed, the figure in the above display will be increased by one.

Time till relubrication of motor bearings (only 11-22 kW)



This display shows when to relubricate the motor bearings. The controller monitors the operating pattern of the pump and calculates the period between bearing relubrications. If the operating pattern changes, the calculated time till relubrication may change as well.

Displayable values:

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

Time till replacement of motor bearings (only three-phase pumps)

When the motor bearings have been relubricated a prescribed number of times stored in the controller, the display in the previous section will be replaced by the display below.



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

Displayable values:

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

INSTALLATION menu

Control mode

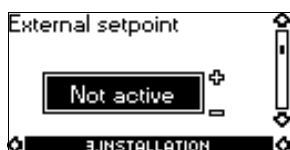


Select one of the following control modes, see fig. 33:

- **Prop. pressure** (proportional pressure)
- Const. pressure (constant pressure)
- Const. curve (constant curve).

Note: If the pump is connected to a bus, the control mode cannot be selected via the R100.

External setpoint



The input for external setpoint signal can be set to different signal types.

Select one of the following types:

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

If "Not active" is selected, the setpoint set via the R100 or on the control panel will apply.

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

Signal relay

Pumps of 0.37 to 7.5 kW have one signal relay. The factory setting of the relay will be "Fault".

Pumps of 11-22 kW have two signal relays. Signal relay 1 is factory-set to "Alarm" and signal relay 2 to "Warning".

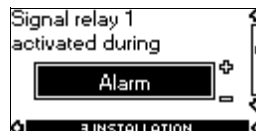
In one of the displays below, select in which one of three or six operating situations the signal relay should be activated.

Single-phase pumps 0.25 - 1.1 kW



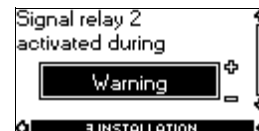
- Ready
- **Fault**
- Operation.

Three-phase pumps 0.55 - 22 kW



- Ready
- **Alarm**
- Operation
- Pump running
- Warning
- Relubricate (11-22 kW).

Three-phase pumps 11-22 kW



- Ready
- Alarm
- Operation
- Pump running
- **Warning**
- Relubricate.

Note: "Fault" and "Alarm" cover faults resulting in "Alarm".

"Warning" covers faults resulting in "Warning".

"Relubricate" covers only that one individual event.

For distinction between alarm and warning, see *Fault indications*, page 35.

Buttons on pump



The operating buttons ⊕ and ⊙ on the control panel can be set to these values:

- **Active**
- Not active.

When set to "Not active" (locked), the buttons do not function. Set the buttons to "Not active" if the pump should be controlled via an external control system.

Pump number



A number between 1 and 64 can be allocated to the pump. In the case of bus communication, a number must be allocated to each pump.

Digital input



The digital input of the pump (terminal 1, fig. 78, page 84) can be set to different functions.

Select one of the following functions:

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

The selected function is activated by closing the contact between terminals 1 and 9. See fig. 78, page 84.

Min.:

When the input is activated, the pump is operating according to the min. curve.

Max.:

When the input is activated, the pump is operating according to the max. curve.

Motor bearing monitoring (only three-phase pumps)



The motor bearing monitoring function can be set 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. See *Lubrication status of motor bearings (only 11-22 kW)*, page 37.

Note: The counter will continue counting even if the function is switched to "Not active", but a warning will not be given when it is time for relubrication.

When the function is switched to "Active" again, the accumulated mileage will again be used to calculate the relubrication time.

Confirming relubrication/replacement of motor bearings (only three-phase pumps)



This function can be set to these values:

- Relubricated (11-22 kW)
- Replaced
- **Nothing done.**

When the bearing monitoring function is "Active", the controller will give a warning indication when the motor bearings are due to be relubricated or replaced. See *Fault indications*, page 35.

When the motor bearings have been relubricated or replaced, confirm this action in the above display by pressing [OK].

Note: "Relubricated" cannot be selected for a period of time after confirming relubrication.

Standstill heating (only three-phase pumps)



The standstill heating function can be set to these values:

- Active
- **Not active.**

When the function is set to "Active", a DC voltage will be applied to the motor windings. The applied DC voltage will ensure that sufficient heat is generated to avoid condensation in the motor.

Setting via the PC Tool E-products

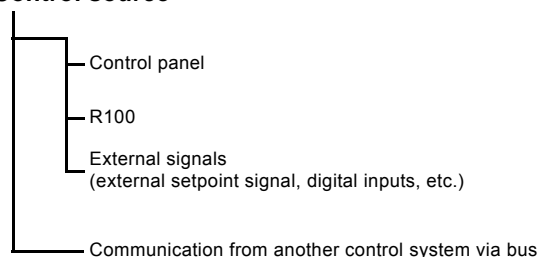
Special setup requirements differing from the settings available via the R100 require the use of Grundfos PC Tool E-products. This again requires the assistance of a Grundfos service technician or engineer. Contact your local Grundfos company for more information.

Priority of settings

The priority of settings depends on two factors:

1. control source
2. settings.

1. Control source



2. Settings

- "Stop" operating mode
- "Max." operating mode (max. curve)
- "Min." operating mode (min. curve)
- setpoint setting.

An E-pump can be controlled by different control sources at the same time, and each of these sources can be set differently. **Consequently, it is necessary to set an order of priority of the control sources and the settings.**

Note: If two or more settings are activated at the same time, the pump will operate according to the function with the highest priority.

Priority of settings without bus communication

Priority	Control panel or R100	External signals
1	Stop	
2	Max.	
3		Stop
4		Max.
5	Min.	Min.
6	Setpoint setting	Setpoint setting

Example: If the E-pump has been set to "Max." operating mode (max. frequency) via an external signal, such as digital input, the control panel or the R100 can only set the E-pump to "Stop" operating mode.

Priority of settings with bus communication

Priority	Control panel or R100	External signals	Bus communication
1	Stop		
2	Max.		
3		Stop	Stop
4			Max.
5			Min.
6			Setpoint setting

Example: If the E-pump is operating according to a setpoint set via bus communication, the control panel or the R100 can set the E-pump to "Stop" or "Max." operating mode, and the external signal can only set the E-pump to "Stop" operating mode.

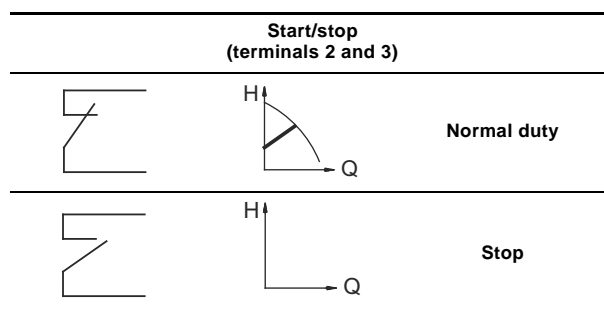
External forced-control signals

The pump has inputs for external signals for these forced-control functions:

- start/stop of pump
- digital function.

Start/stop input

Functional diagram: Start/stop input



Digital input

Via the R100, one of the following functions can be selected for the digital input:

- Normal (duty)
- Min. (curve)
- Max. (curve).

Functional diagram: Input for digital function

Digital function (terminals 1 and 9)		
		Normal duty
		Min. curve
		Max. curve

Connection terminals

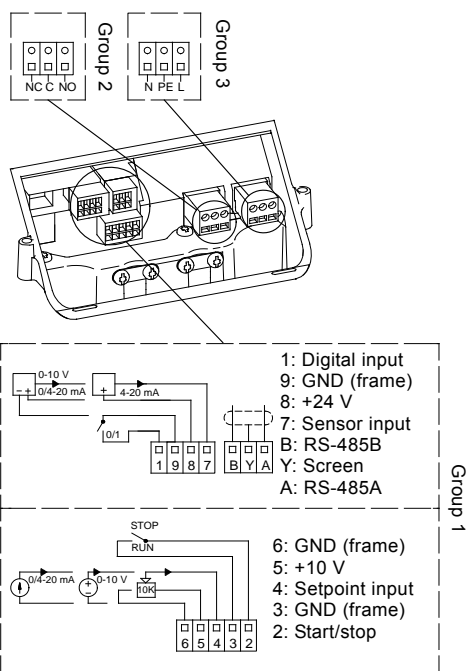


Fig. 48 Connection terminals, TPE Series 2000

External setpoint signal

The setpoint can be remote-set by connecting an analog signal transmitter to the input for the setpoint signal (terminal 4).

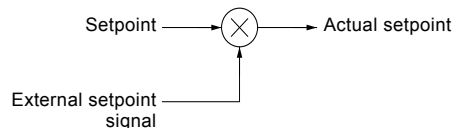


Fig. 49 Actual setpoint as a product (multiplied value) of setpoint and external setpoint signal

Select the actual external signal, 0-10 V, 0-20 mA, 4-20 mA, via the R100.

"Controlled" control mode

If "Controlled" control mode is selected via the R100, the pump can be controlled to the following:

- proportional pressure
- constant pressure.

In "Prop. pressure" control mode, the setpoint can be set externally within the range from 25 % of maximum head to the setpoint set on the pump or with the R100. See fig. 50.

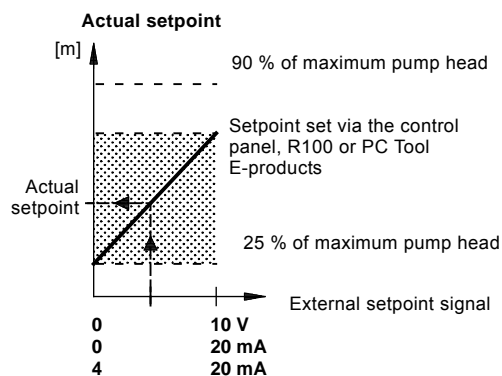


Fig. 50 Relation between the actual setpoint and the external setpoint signal in "Proportional pressure" control mode

Example: At a maximum head of 12 metres, a setpoint of 6 metres and an external setpoint of 40 %, the actual setpoint will be as follows:

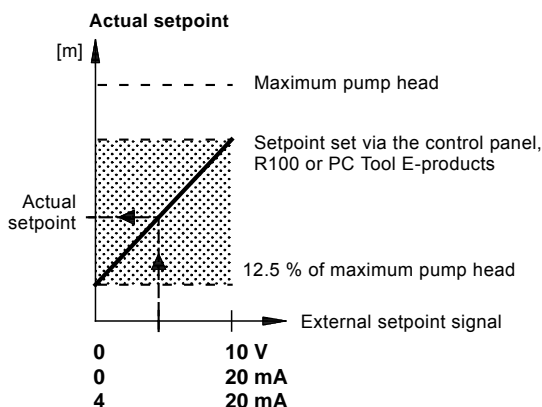
$$\begin{aligned}
 H_{\text{actual}} &= (H_{\text{set}} - 1/4 H_{\text{max}}) \times \%_{\text{external setpoint}} + 1/4 H_{\text{max}} \\
 &= (6 - 12/4) \times 40 \% + 12/4 \\
 &= 4.2 \text{ m}
 \end{aligned}$$

TM03 8601 2007

TM02 8988 1304

TM02 0795 0304

In "Const. pressure" control mode, the setpoint can be set externally within the range from 12.5 % of maximum head to the setpoint set on the pump or with the R100. See fig. 51.



TM02 8988 1304

Fig. 51 Relation between the actual setpoint and the external setpoint signal in "Constant pressure" control mode

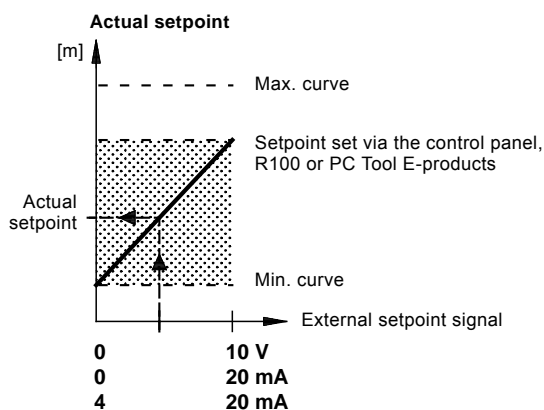
Example: At a maximum head of 12 metres, a setpoint of 6 metres and an external setpoint of 80 %, the actual setpoint will be as follows:

$$\begin{aligned}
 H_{\text{actual}} &= (H_{\text{set}} - 1/8 H_{\text{max}}) \times \%_{\text{external setpoint}} + 1/8 H_{\text{max}} \\
 &= (6 - 12/8) \times 80 \% + 12/8 \\
 &= 5.1 \text{ m}
 \end{aligned}$$

"Uncontrolled" control mode

If "Uncontrolled" control mode is selected via the R100, the pump is controlled to a constant curve and can be controlled by any (external) controller. See control hierarchy in *Overview of modes*, page 31.

In "Const. curve" control mode, the setpoint can be set externally within the range from the min. curve to the setpoint set on the pump or with the R100. See fig. 52.



TM02 8988 1304

Fig. 52 Relation between the actual setpoint and the external setpoint signal in "Constant curve" control mode

Bus signal

The pump supports serial communication via an RS-485 input. The communication is carried out according to the Grundfos bus protocol, GENIbus, and enables connection to a building management system or another external control system.

Operating parameters, such as setpoint, operating mode, etc. 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, fault indications, etc. Contact Grundfos for further details.

Note: If a bus signal is used, the number of settings available via the R100 will be reduced.

Other bus standards

Grundfos offers various bus solutions with communication according to other standards. Contact Grundfos for further details.

Indicator lights and signal relay

The operating condition of the pump is indicated by the green and red indicator lights on the pump control panel and inside the terminal box. See figs 53 and 54.

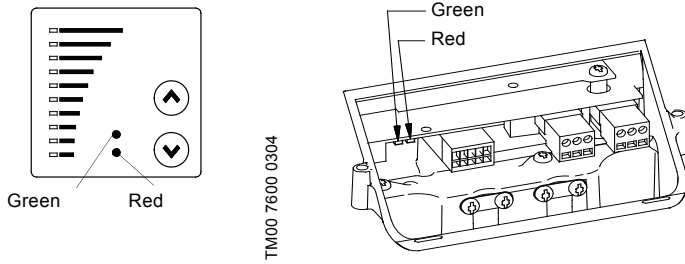


Fig. 53 Position of indicator lights on single-phase pumps

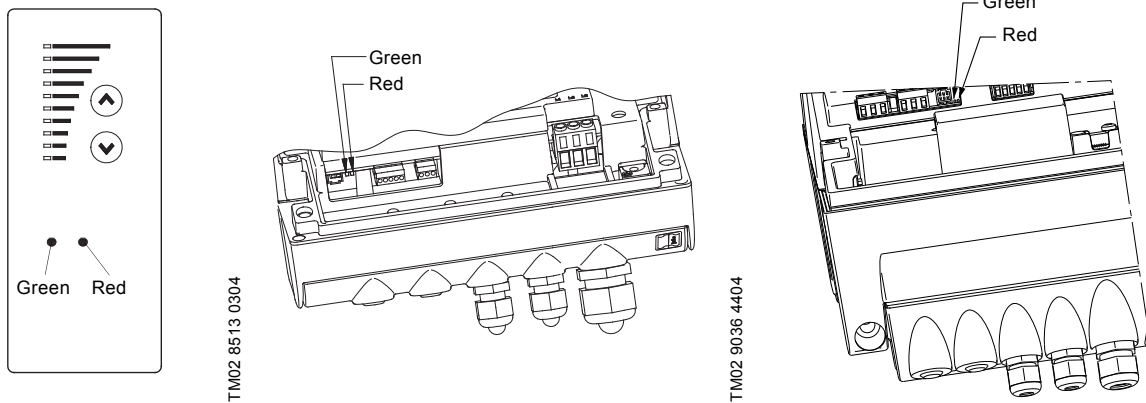


Fig. 54 Position of indicator lights on three-phase pumps

Furthermore, the pump incorporates an output for a potential-free signal via an internal relay. For signal relay output values, see *Signal relay*, page 38.

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

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

Resetting of fault indication

A fault indication can be reset in one of the following ways:

- Briefly press or on the pump. This will not change the setting of the pump. A fault indication cannot be reset by means of or if the buttons have been locked.
- Switch off the power supply until the indicator lights are off.
- Switch the external start/stop input off and then on again.
- Use the R100. See *Fault indications*, page 35.

When the R100 communicates with the pump, the red indicator light will flash rapidly.

Insulation resistance

0.25 - 7.5 kW

Do not measure the insulation resistance of motor windings or an installation incorporating E-pumps using high-voltage megging equipment, as this may damage the built-in electronics.

11-22 kW

Do not measure the insulation resistance of an installation incorporating E-pumps using high-voltage megging equipment, as this may damage the built-in electronics.

The motor conductors can be disconnected separately and the insulation resistance of the motor windings can be tested.

Further product documentation

Specific data booklets are also available on www.grundfos.com > WebCAPS. For further information on WebCAPS, see page 200.

11. Communication

Communication with TPE, TPED pumps

Communication with TPE, TPED pumps is possible via a central building management system, remote control (Grundfos R100) or control panel.

Central building management system

The operator can communicate with a TPE, TPED pump at a distance. Communication can take place via a central building management system allowing the operator to monitor and change control modes and setpoint settings.

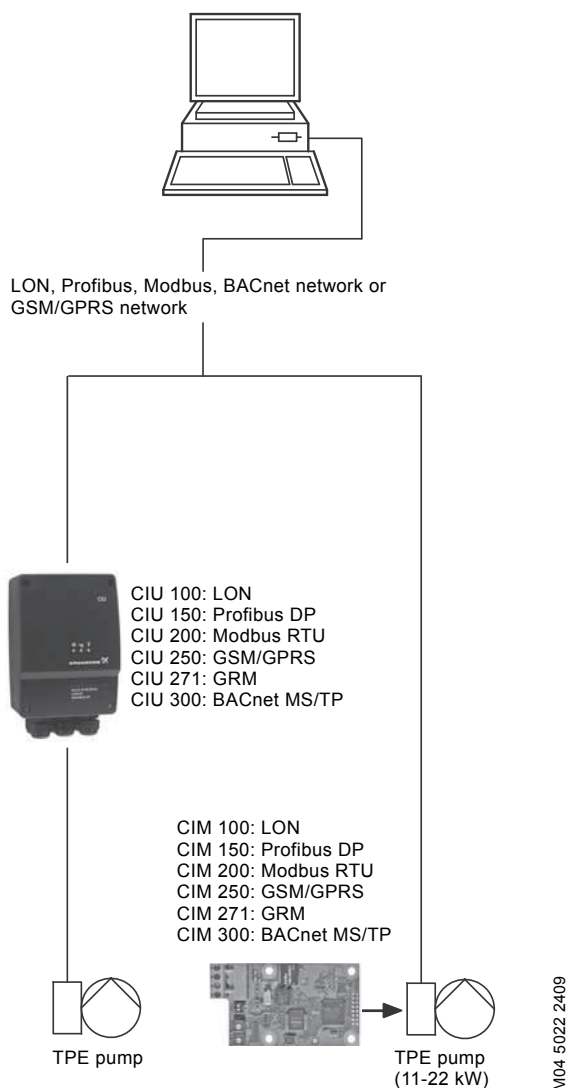
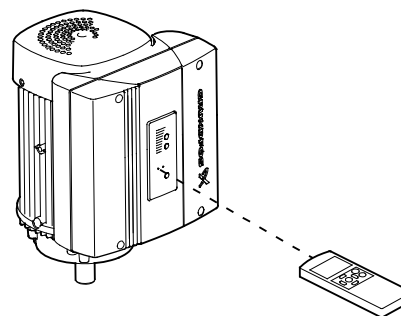


Fig. 55 Structure of a central building management system

Remote control

The Grundfos R100 remote control and Grundfos GO Remote is available as an accessory. See page 191. The operator can communicate with the TPE, TPED pump by pointing the IR-signal transmitter at the control panel of the terminal box.



TM03 0141 4104

Fig. 56 R100 remote control

The operator can monitor and change control modes and settings of the TPE, TPED pump via the R100 or Grundfos GO Remote.

Control panel

The operator can change the setpoint settings manually on the control panel of the TPE, TPED pump terminal box.



TM00 7600 0404

Fig. 57 Control panel of a TPE pump

12. Speed regulation of TPE pumps

Affinity equations

Normally, TPE, TPED pumps are used in applications characterised by a variable flow. Consequently, it is not possible to select a pump that is constantly operating at its optimum efficiency.

In order to achieve optimum operating economy, the duty point should be close to the optimum efficiency (η) for most operating hours.

Between the min. and max. performance curves, TPE, TPED pumps have an infinite number of performance curves each representing a specific speed. It may therefore not be possible to select a duty point close to the max. curve.

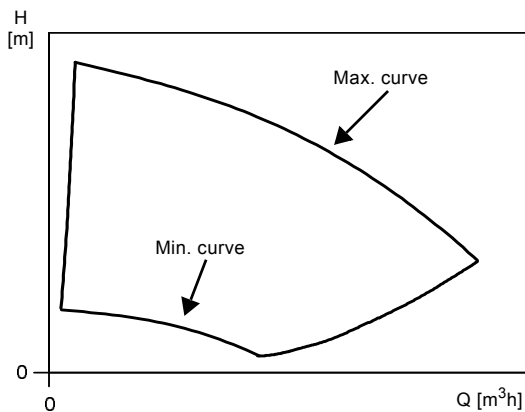


Fig. 58 Min. and max. performance curves

In situations where it is not possible to select a duty point close to the max. curve, use the affinity equations below. The head (H), the flow rate (Q) and the input power (P) are the appropriate variables you need for calculating the motor speed (n).

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

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

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

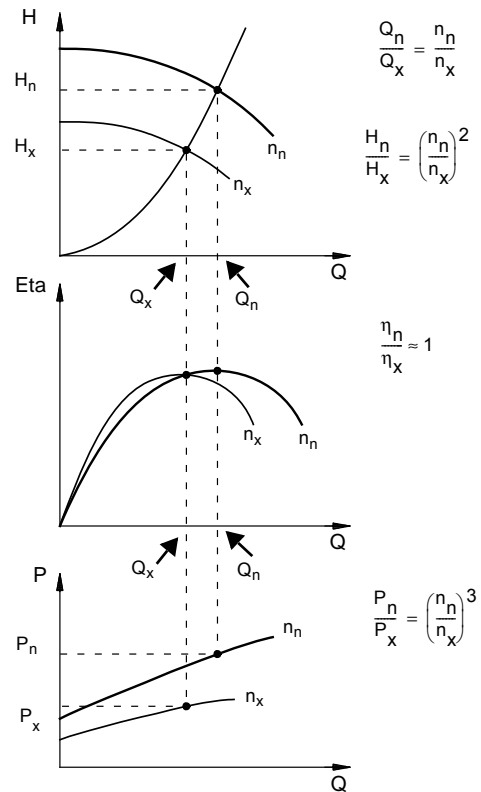


Fig. 59 Affinity equations

Legend

H_n	Rated head in metres
H_x	Current head in metres
Q_n	Rated flow rate in m^3/h
Q_x	Current flow rate in m^3/h
n_n	Rated motor speed in min^{-1}
n_x	Current motor speed in min^{-1}
η_n	Rated efficiency in %
η_x	Current efficiency in %

WinCAPS and WebCAPS

WinCAPS and WebCAPS are selection programs offered by Grundfos.

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

When you enter the dimensions of the pump, WinCAPS and WebCAPS can calculate the exact duty point and energy consumption. For further information, see page 200.

TM01 4916 4803

TM00 8720 3496




13. TP, TPE pumps in parallel

Control of TP, TPE pumps connected in parallel

In some applications, parallel pump operation is required for one or more of the following reasons:

- One pump cannot achieve the required performance (flow rate).
- Standby capacity is required to ensure reliability of supply.
- Overall efficiency needs to be improved in case of big variations in the flow demand.

The table below lists the different possibilities of controlling TP, TPE pumps connected in parallel.

Parallel-operation control possibilities	TP, TPE	TPE Series 2000
Built-in alternation/standby function		
	• ¹⁾	• ¹⁾
Control MPC		
	•	
Control MPC Series 2000		
		•

• Available.
¹⁾ Applies only to TPED pumps.

Alternation/standby function of TPED pumps

All TPED pumps have built-in alternation/standby function. The pumps are supplied with a special cable for the communication between the two power heads. The function is activated from factory and "Alternating" mode is selected as default. See pages 28 and 47.



Fig. 60 TPED Series 2000

TMD03 0413 5004

TP, TPE pumps connected to Control MPC

TP, TPE pumps can be connected directly to Grundfos Control MPC.

Control MPC incorporates a CU 351 controller that can control up to six pumps.

By means of an external sensor, Control MPC can ensure optimum adaptation of the performance to the demand by closed-loop control of these parameters:

- proportional differential pressure
- constant differential pressure
- differential pressure (remote)
- flow rate
- temperature.

The CU 351 incorporates features such as those below:

Start-up 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 start-up wizard is shown on the display of the CU 351. The wizard will guide the operator through the various steps via a series of dialogue boxes to ensure that all settings are done in the correct sequence.

Application-optimised software

The CU 351 incorporates application-optimised software which helps you set up your system to the application in question.

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

Ethernet connection

The CU 351 incorporates an Ethernet connection which makes it possible to get full and unlimited access to the setting and monitoring of the system via a remote PC.

Service port (GENI TTL)

The service port of the CU 351 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 LON, Profibus, Modbus, BACnet, GSM/GPRS or GRM via a Grundfos CIU.

TPE Series 2000 pumps connected to Control MPC Series 2000

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

Control MPC Series 2000 incorporates a CU 351 controller that can control up to six pumps.

All pumps must be of the same type and size.

Control MPC Series 2000 is used for controlling circulator pumps in heating and air-conditioning applications.

Control MPC Series 2000 ensures optimal adaptation of the performance to the demand by closed-loop control of these parameters:

- proportional differential pressure
- constant differential pressure.

By means of an external sensor Control MPC Series 2000 can also ensure optimum adaptation of the performance to the demand by closed-loop control of these parameters:

- differential pressure (remote)
- flow rate
- temperature.

Note: For further information about Control MPC and Control MPC Series 2000, see the data booklet titled "Control MPC". The data booklet is available in WebCAPS, on www.grundfos.com. For further information on WebCAPS, see page 200.

14. Grundfos CUE

TP pumps connected to Grundfos CUE, external frequency converters



GrA 4404

Fig. 61 Grundfos CUE

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

Grundfos CUE provides a variety of benefits, such as these:

- Grundfos E-pump functionality and user interface
- application- and pump family-related functions
- increased comfort compared to fixed-speed pump solutions
- simple installation and commissioning compared to standard frequency converters
- speed control of pumps up to 250 kW.

Functions

Intuitive start-up guide

The start-up guide enables easy installation and commissioning as well as plug-and-pump convenience. Few settings need to be made by the installer as the rest is done automatically or preset from the factory.

Smart user interface



TM04 3283 4108

Fig. 62 Grundfos CUE user interface

Grundfos CUE features a unique user-friendly control panel with graphic display and easy-to-use buttons. Panel layout resembles the well-known Grundfos R100 remote control, which is used with Grundfos E-pumps.

Controlling the value you choose

Grundfos CUE has a built-in PI controller offering closed-loop control of a desired value, such as these:

- constant differential pressure
- proportional pressure
- constant temperature
- constant differential pressure
- constant flow rate.

Wide product range

The CUE product range is quite comprehensive, covering five different voltage ranges, enclosure classes IP20/21 (Nema 1) and IP54/55 (Nema 12), and a wide range of output powers.

The table below provides a general overview.

Input voltage [V]	Output voltage [V]	Motor [kW]
1 x 200-240	3 x 200-240	1.1 - 7.5
3 x 200-240	3 x 200-240	0.75 - 45
3 x 380-500	3 x 380-500	0.55 - 250
3 x 525-600	3 x 525-600	0.75 - 7.5
3 x 525-690	3 x 525-690	11 - 250

External communication

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

15. 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)
TP Series 400	IM 3001 (IM B 5) / IM 3011 (IM V 1)

Relative humidity: Max. 95 %

Enclosure class: IP55

Insulation class: F (IEC 85)

Ambient temperature: Max. +55 °C (Siemens motors)
Max +60 °C (MG motors)
Max. +40 °C (other motors)
Min. -30 °C

If the pump is installed in humid locations, open the lowest drain hole in the motor. This will reduce the motor enclosure class to IP44.

High-efficiency motors

TP pumps are fitted with high-efficiency motors.

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

TPE, TPED pumps with three-phase motors from 0.75 to 22 kW are fitted with motors equivalent to IE3.

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

Motor range

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

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

Electrical data, mains-operated motors

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

Motor [kW]	I _{1/1} [A]	Cos φ 1/1	η [%]	n [min ⁻¹]	$\frac{I_{Start}}{I_{1/1}}$
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

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

Motor [kW]	I _{1/1} [A]	Cos φ 1/1	η [%]	n [min ⁻¹]	$\frac{I_{Start}}{I_{1/1}}$
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

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

Motor [kW]	I _{1/1} [A]	Cos φ 1/1	η [%]	n [min ⁻¹]	$\frac{I_{Start}}{I_{1/1}}$
30.0	98.0 - 91.0 / 56.0 - 53.0	0.86	93.3	2955	7.8
37.0	118 - 110 / 68.0 - 64.0	0.86	93.7	2950	7.6
45.0	140 - 132 / 81.0 - 76.0	0.89	94	2960	7.3
55.0	172 - 160 / 99.0 - 92.0	0.89	94.3	2975	7.0
75.0	236 - 220 / 136 - 126	0.89	94.7	2975	7.2

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

Motor [kW]	I _{1/1} [A]	Cos φ 1/1	η [%]	n [min ⁻¹]	$\frac{I_{Start}}{I_{1/1}}$
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
30.0	55.0 - 51.0 / 31.5 - 30.0	0.88	93.5	2960	7.0
37.0	67.0 - 63.0 / 38.5 - 36.0	0.89	94.1	2960	7.2
45.0	77 / 44.5	0.89	94.9	2970	7.3
55.0	93 / 53.7	0.9	95.3	2980	6.8
75.0	128 / 73.9	0.89	95.2	2980	7.0
90.0	147.0 / 85.0	0.90	95.0	2975	7.2
110.0	176.0 / 102.0	0.91	95.2	2982	7.1
132.0	210.0 / 121.0	0.91	95.4	2982	7.2
160.0	255.0 / 147.0	0.92	95.6	2982	7.8

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

Motor [kW]	I _{1/1} [A]	Cos φ 1/1	η [%]	n [min ⁻¹]	$\frac{I_{Start}}{I_{1/1}}$
30.0	56.0 - 52.0 / 32.5 - 30.0	0.86	93.3	2955	7.8
37.0	68.0 - 63.0 / 39.0 - 36.5	0.86	93.7	2950	7.6
45.0	81.0 - 75.0 / 47.0 - 43.5	0.89	94.0	2960	7.3
55.0	99.0 - 91.0 / 57.0 - 53.0	0.89	94.3	2975	7.0
75.0	136 - 126 / 78.0 - 73.0	0.89	94.7	2975	7.2

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

Motor [kW]	I _{1/1} [A]	Cos φ 1/1	η [%]	n [min ⁻¹]	I _{Start} /I _{1/1}
0.12	0.99	0.99	53.1	1434	2.58
0.18	1.62	0.97	54	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

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

Motor [kW]	I _{1/1} [A]	Cos φ 1/1	η [%]	n [min ⁻¹]	I _{Start} /I _{1/1}
0.12	0.78 / 0.45	0.67	54	1380	3.2
0.25	1.48 / 0.85	0.75 - 0.65	69	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
18.5	64.0 - 58.0 / 37.0 - 33.5	0.82	92.6	1470	6.9
22.0	73.5 - 70.0 / 42.5 - 40.5	0.83	93.0	1470	6.8
30.0	99.5 - 93.5 / 57.5 - 54.0	0.84	93.6	1470	6.9

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

Motor [kW]	I _{1/1} [A]	Cos φ 1/1	η [%]	n [min ⁻¹]	I _{Start} /I _{1/1}
2.2	1.9	0.76 - 0.71	82.5	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
18.5	37.0 - 33.5 / 21.5 - 20.5	0.82	92.6	1470	6.9
22.0	42.5 - 40.5 / 24.5 - 24.0	0.83	93.0	1470	6.8
30.0	57.5 - 54.0 / 33.5 - 32.0	0.84	93.6	1470	6.9
37.0	69.0 - 64.0 / 39.5 - 38.5	0.86	93.9	1478	6.4
45.0	83.0 - 77.0 / 48.0 - 46.5	0.86	94.2	1478	6.4
55.0	100.0 - 93.0 / 58.0 - 56.0	0.87	94.6	1482	6.8
75.0	139.0 - 129.0 / 80.0 - 77.0	0.86	95.0	1485	6.9
90.0	165.0 - 152.0 / 95.0 - 91.0	0.87	95.2	1485	7.2
110.0	200.0 - 185.0 / 115.0 - 111.0	0.87	95.4	1488	6.8
132.0	240.0 - 220.0 / 139.0 - 133.0	0.87	95.6	1490	7.3
160.0	285.0 - 265.0 / 166.0 - 161.0	0.87	95.8	1490	7.3
200.0	355.0 - 330.0 / 205.0 - 198.0	0.88	96.0	1490	7.4
250.0	455.0 - 420.0 / 260.0 - 250.0	0.87	96.0	1488	7.7
315.0	570.0 - 550.0 / 330.0 - 320.0	0.86	96.0	1488	7.9
355.0	650.0 - 610.0 / 375.0 - 365.0	0.85	96.1	1489	6.5
400.0	690.0 / 400.0	0.87	-	1488	-
500.0	850.0 / 490.0	0.88	-	1488	-
560.0	950.0 / 550.0	0.88	-	1492	-
630.0	1060.0 / 610.0	0.88	-	1492	-

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

Motor [kW]	I _{1/1} [A]	Cos φ 1/1	η [%]	n [min ⁻¹]	$\frac{I_{Start}}{I_{1/1}}$
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

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

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

Electrical data, speed-controlled motors

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

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

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

Motor [kW]	I _{1/1} [A]
0.75	2.0 - 1.8
1.1	2.6 - 2.3
1.5	3.3 - 2.7
2.2	4.6 - 3.8
3.0	6.2 - 5.0
4.0	8.1 - 6.6
5.5	11.0 - 8.8
7.5	14.8 - 11.6
11.0	22.5 - 18.8
15.0	30 - 26.0
18.5	37 - 31.0
22.0	43.5 - 35.0

Electrical data, 4-pole 1 x 200-240 V, 1450 min⁻¹

Motor [kW]	I _{1/1} [A]
0.12	2.2 - 1.9
0.25	2.2 - 1.9
0.37	2.8 - 2.6
0.55	4.0 - 3.6
0.75	5.3 - 4.85

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

Motor [kW]	I _{1/1} [A]
0.55	1.5 - 1.6
0.75	1.8 - 1.9
1.1	2.5 - 2.2
1.5	3.3 - 2.9
2.2	4.6 - 3.8
3.0	6.2 - 5.0
4.0	8.1 - 6.6
5.5	11 - 9.0
7.5	15.0 - 12.0
11.0	22.0 - 17.8
15.0	30.0 - 25.4
18.5	37.0 - 30.0

16. Installation

Mechanical installation

TP pumps with motors smaller than 11 kW can be installed in horizontal or vertical pipework.

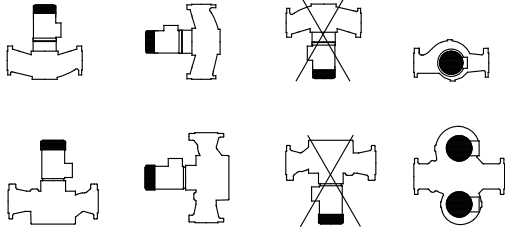


Fig. 63 Installation of motor sizes smaller than 11 kW

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

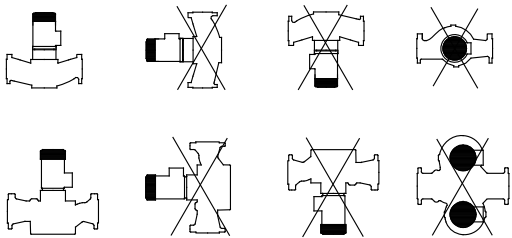


Fig. 64 Installation of motor sizes of 11 kW and up

Note: The motor must never point downwards.

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

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

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

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

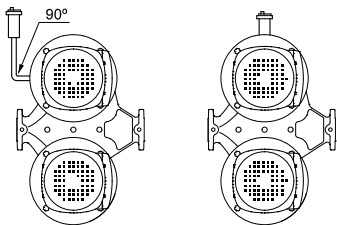


Fig. 65 Twin-head pumps with automatic air vent

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

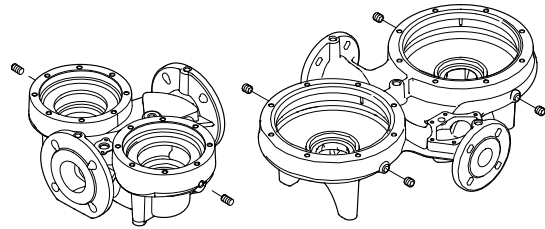


Fig. 66 Tappings for mounting of automatic air vents in TP Series 200 and TP Series 300

For further information about identification of TP Series 200 and TP Series 300 models, see pages 21 to 23.

If the liquid temperature falls below the ambient temperature, condensation may form in the motor during inactivity. In this case, the drain hole in the motor flange must be open and point downwards. See fig. 67.

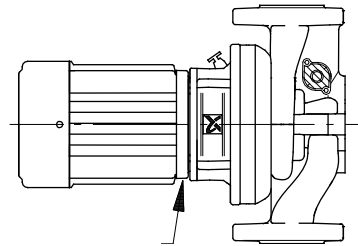


Fig. 67 Drain hole

If twin-head pumps are used for pumping liquids with a temperature below 0 °C/32 °F, condensed water may freeze and cause the coupling to get stuck.

The problem can be remedied by installing heating elements. Whenever possible, pumps with motors smaller than 11 kW should be installed with horizontal motor shaft. See fig. 65.

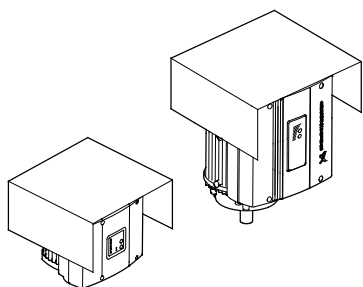
Cooling

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

- Place the pump in such a way that sufficient cooling is ensured.
- Make sure that the temperature of the cooling air does not exceed +40 °C.
- Keep the motor cooling fins, holes in fan cover and fan blades clean.
- Make sure the frequency for the motor is at least 6 Hz (12 % of maximum speed). The shaft seal may generate noise at speeds below 25 % of maximum speed.

Condensation cover for TPE pumps

When installing TPE pumps outdoors, provide the motor with a suitable cover to avoid condensation on the electronic components and to protect the pump and motor against the direct effects of the elements. When mounting the condensation cover on top of the motor, make sure to leave enough space for the air to cool the motor.



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Fig. 68 Speed-controlled motors with condensation cover

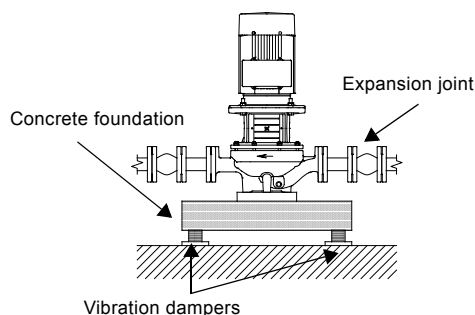
Elimination of noise and vibrations

In order to achieve optimum operation and minimum noise and vibration, consider vibration dampening of the pump. Generally, always consider this for pumps with motors of 11 kW and up, but for motors of 90 kW and up as well as the pump stated in the table below, vibration dampening is mandatory. Smaller motor sizes, however, may also cause undesirable noise and vibration.

Pump type	Frequency [Hz]
TP 200-290/4	50 Hz

Noise and vibration are generated by the revolutions of the motor and pump and by the flow in pipes and fittings. The effect on the environment is subjective and depends on correct installation and the state of the remaining system.

Elimination of noise and vibrations is best achieved by means of a concrete foundation, vibration dampers and expansion joints.



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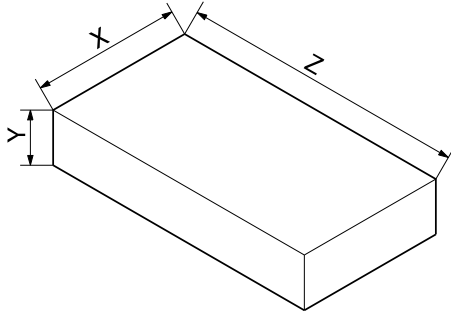
Fig. 69 Foundation of TP pump

Concrete foundation

Install the pump on a plane and rigid concrete foundation. This is the optimum solution for vibration dampening. As a rule of thumb, the weight of a concrete foundation should be 1.5 times the pump weight.

Recommended concrete foundations for TP(D) Series 300 pumps

For TP Series 300 pumps with weights of 150 kg or more, we recommend mounting 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.



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Fig. 70 Foundation for TP(D) Series 300 pumps

Concrete foundation dimensions			
Pump mass [kg]	Y (height) [mm]	Z (length) [mm]	X (width) [mm]
150	280	565	565
200	310	620	620
250	330	670	670
300	360	710	710
350	375	750	750
400	390	780	780
450	410	810	810
500	420	840	840
550	440	870	870
600	450	900	900
650	460	920	920
700	470	940	940
750	480	970	970
800	490	990	990
850	500	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

Vibration dampers

To prevent the transmission of vibrations to buildings, we recommend isolating the pump foundation from building parts by means of vibration dampers.

The selection of the right vibration damper requires the following data:

- forces transmitted through the damper
- motor speed considering speed control, if any
- required dampening in % (suggested value is 70 %).

The right damper varies from installation to installation, and a wrong damper may increase the vibration level. Vibration dampers should therefore be sized by the supplier.

If you install the pump on a foundation with vibration dampers, always fit expansion joints on the pump flanges. This is important to prevent the pump from "hanging" in the flanges.

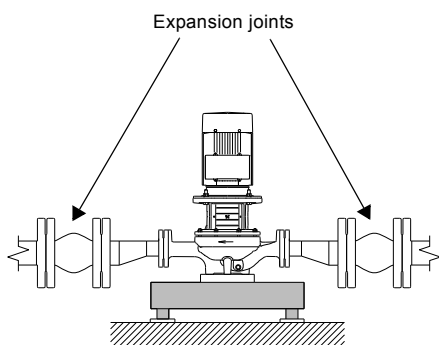
Expansion joints

Install expansion joints to

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

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

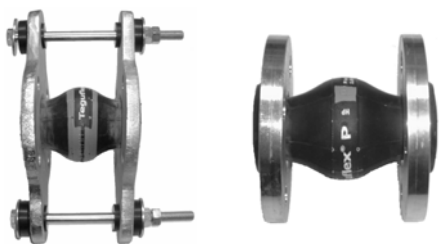
Fit expansion joints at a distance of minimum 1 to 1.5 times the nominal flange diameter away from the pump on the suction as well as on the discharge side. This will prevent the development of turbulence in the expansion joints, resulting in better suction conditions and a minimum pressure loss on the pressure side. At high water velocities (> 5 m/s) we recommend installing larger expansion joints corresponding to the pipework. See fig. 71.



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Fig. 71 TP pump installed with larger expansion joints

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



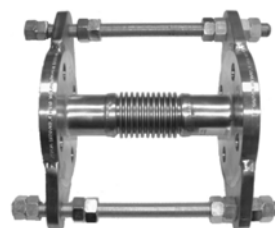
TM02 4979 1902 - TM02 4981 1902

Fig. 72 Examples of rubber bellows expansion joints

Expansion joints with limit rods can be used to reduce the effects of the expansion/contraction forces on the pipework. We always recommend expansion joints with limit rods for flanges larger than DN 100.

Anchor the pipes in such a way that they do not stress the expansion joints and the pump. Follow the supplier's instructions and pass them on to advisers or pipe installers.

The illustration below shows an example of a metal bellows expansion joint with limit rods.



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Fig. 73 Example of metal expansion joint

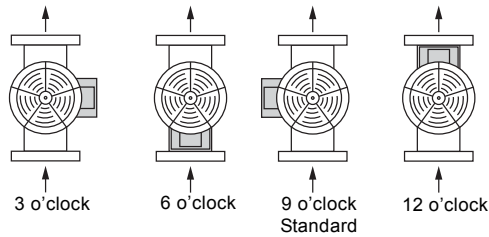
Due to the risk of rupture of the rubber bellows, metal bellows expansion joints may be preferred at temperatures above +100 °C combined with high pressure.

Terminal box positions

TP single-head pumps

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

The possible terminal box positions are shown below.



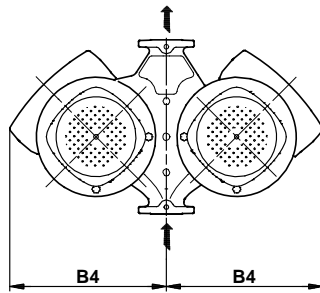
TM03 0565 2005

Fig. 74 Possible terminal box positions

Note: Due to the motor construction, the terminal boxes of some TP pumps with motor sizes above 250 kW are mounted in 10:30 position.

TPD twin-head pumps

As standard, the terminal boxes of all TPD and most TPED pumps are mounted in 12 o'clock position. See fig. 74. The TPED pumps with terminal boxes installed in other positions are listed in the table. See example in fig. 75.



TM02 8630 0604

Fig. 75 Terminal box positions of TPED pumps

Note: The B4 dimension can be seen in the tables of technical data of the individual pump. See the sections on performance curves and technical data.

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

Single-phase [kW]	Three-phase [kW]
TPED 32-60/2 0.37	TPED 32-230/2 0.75
TPED 32-120/2 0.37	TPED 32-200/2 1.1
TPED 40-60/2 0.37	TPED 32-250/2 1.5
TPED 40-120/2 0.37	TPED 32-320/2 2.2
TPED 50-60/2 0.37	TPED 32-380/2 3.0
TPED 32-30/4 0.37	TPED 32-460/2 4.0
TPED 40-30/4 0.37	TPED 32-580/2 5.5
TPED 50-30/4 0.37	TPED 40-190/2 0.75
	TPED 40-230/2 1.1
	TPED 40-270/2 1.5
	TPED 40-240/2 2.2
	TPED 40-300/2 3.0
	TPED 40-360/2 4.0
	TPED 40-470/2 5.5
	TPED 40-580/2 7.5
	TPED 50-120/2 0.75
	TPED 50-160/2 1.1
	TPED 50-180/2 0.75
	TPED 50-190/2 1.5
	TPED 50-240/2 2.2
	TPED 50-290/2 3.0
	TPED 50-360/2 4.0
	TPED 50-430/2 5.5
	TPED 50-570/2 11
	TPED 50-710/2 15
	TPED 50-830/2 18.5
	TPED 50-900/2 22
	TPED 65-120/2 1.1
	TPED 65-180/2 1.5
	TPED 65-190/2 2.2
	TPED 65-230/2 3.0
	TPED 65-260/2 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 80-120/2 1.5
	TPED 80-210/2 4.0
	TPED 80-240/2 5.5
	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 65-60/4 0.55
	TPED 65-90/4 0.75
	TPED 80-60/4 0.75
	TPED 100-30/4 0.55
	TPED 100-60/4 1.1

Electrical installation

The electrical connection should be carried out in accordance with local regulations.

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 should be carried out as shown in the diagram inside the terminal box cover.

The motors of twin-head pumps are to be connected separately.

Frequency converter operation

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

Grundfos motors:

All three-phase Grundfos motors from frame size 90 and up can be connected to a frequency converter.

The connection of a frequency converter will often have the effect that the motor insulation system is loaded more and that the motor will be 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, the following should be considered:

In 2-, 4- and 6-pole motors of 45 kW and up, one of the motor bearings should be electrically isolated to prevent damaging currents from passing through the motor bearings.

In the case of noise-critical applications, the motor noise can be reduced by fitting a dU/dt filter between the motor and the frequency converter. In particularly noise-critical applications, it is recommended to fit a sinusoidal filter.

The length of the cable between motor and frequency converter affects the motor load. It should therefore be checked that the cable length meets the specifications laid down by the frequency converter supplier.

For supply voltages between 500 and 690 V, either a dU/dt filter should be fitted to reduce voltage peaks or a motor with reinforced insulation should be used.

For supply voltages of 690 V, a motor with reinforced insulation should be used, and a dU/dt filter should be fitted.

For other motor makes than Grundfos, contact Grundfos or the motor manufacturer.

E-pumps with single-phase MGE motors

Grundfos MGE 71 and MGE 80 motors offer these features:

- Single-phase mains connection.
- Single-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 0.25 to 0.75 kW, 4-pole, and 0.37 to 1.1 kW, 2-pole.



TM02 1502 0101

Fig. 76 Single-phase MGE motor

Supply voltage

- 1 x 200-240 V - 10 %/+ 10 %, 50/60 Hz, PE.
- 1 x 208-230 V - 10 %/+ 10 %, 50/60 Hz, PE.

Back-up fuse

Motor sizes from 0.25 to 1.1 kW: Max. 10 A.

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

Leakage current

Earth leakage current: < 3.5 mA.

The leakage currents are measured in accordance with EN 60355-1.

Input/output

Start/stop

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

Digital input

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

Setpoint signals

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

Sensor signals

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

Signal output

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

Bus input

- Grundfos GENIbus protocol, RS-485.
Screened 2-core cable: 0.5 - 1.5 mm² / 28-16 AWG.
Maximum cable length: 500 m.

EMC (electromagnetic compatibility)

Emission

Comply with the limits in EN 61800-3 for the first environment (residential areas), unrestricted distribution, corresponding to CISPR11, group 1, class B.

Immunity

Fulfil the requirements for both the first and the second environment according to EN 61800-3.

For further information about EMC, see *E-pumps with single-phase MGE motors*, page 81.

Enclosure class

Standard enclosure class: IP55.

Insulation class

F (IEC 85).

Ambient temperature

During operation: -20 °C to +40 °C.

During storage/transport: -40 °C to +60 °C.

Relative air humidity

Maximum 95 %.

Sound pressure level

Motor [kW]	Speed as stated on the nameplate [min ⁻¹]	Sound pressure level [dB(A)]
0.37	1400-1500	< 70
	1700-1800	
	2800-3000	
	3400-3600	
0.55	1400-1500	
	1700-1800	
	2800-3000	
	3400-3600	
0.75	1400-1500	
	1700-1800	
	2800-3000	
	3400-3600	
1.1	2800-3000	
	3400-3600	

Motor protection

The motor requires no external motor protection.
The motor incorporates thermal protection against slow overloading and blocking (TP 211 to IEC 34-11).

Additional protection

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



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

Start/stop of pump

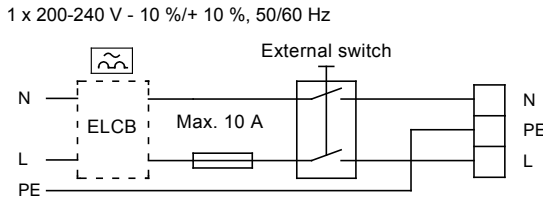
The number of starts and stops via the mains voltage must not exceed 4 times per hour.

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

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

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

Wiring diagram



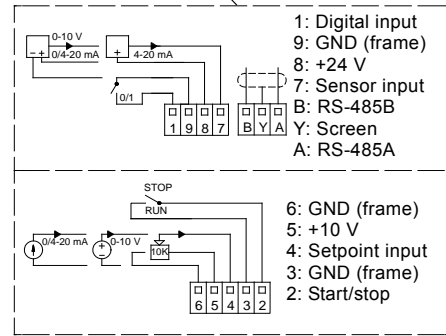
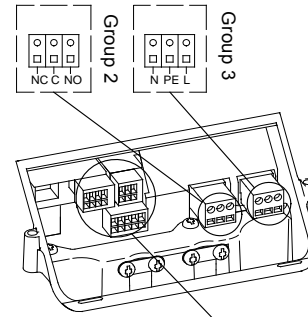
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Fig. 77 Wiring diagram, single-phase MGE motors

Other connections

Figure 78 shows the connection terminals of external potential-free contacts for start/stop and digital function, setpoint and sensor signals, sensor signal, GENibus and relay signal.

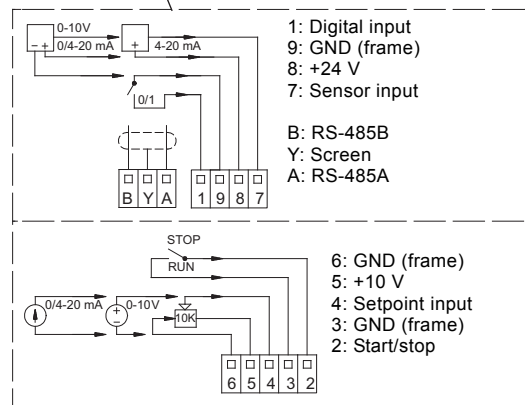
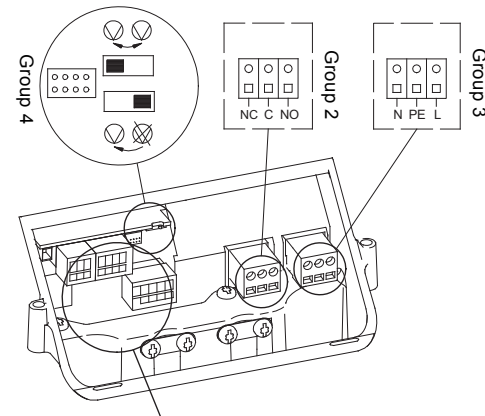
- Group 1: Inputs** (external start/stop, digital function, setpoint and sensor signals, terminals 1-9, and bus connection, terminals B, Y, A). All inputs (group 1) are internally separated from the mains-conducting parts by reinforced insulation and galvanically separated from other circuits. All control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



Group 1

TM02 0795 0904

Fig. 78 Connection terminals



Group 1

TM02 6009 0703

Fig. 79 Connection terminals, TPED Series 2000

17. Three-phase MGE motors

E-pumps with three-phase MGE motors

Grundfos MGE 90, 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 0.55 to 18.5 kW, 4-pole, and 0.75 to 22 kW, 2-pole.



GR8275

Fig. 80 Three-phase MGE motor

Supply voltage

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

Back-up fuse

Motor size [kW]	Max. fuse [A]
0.55 - 5.5	16
7.5	32
11	26
15	36
18.5	43
22	51

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

Leakage current

Motor size [kW]	Leakage current [mA]
0.55 - 3.0	< 3.5
4.0 - 5.5	< 5
5.5, 1400-1800 min ⁻¹	< 10
7.5	< 10
11-22	>10

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

Input/output

Start/stop

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

Digital input

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

Setpoint signals

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

Sensor signals

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

Signal output

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

Bus input

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

EMC (electromagnetic compatibility to EN 61800-3)

Motor [kW]	Emission/immunity
0.55	
0.75	Emission:
1.1	The motors may be installed in residential areas
1.5	(first environment), unrestricted distribution, corresponding to CISPR11, group 1, class B.
2.2	
3.0	Immunity:
4.0	The motors fulfil the requirements for both the first and second environment.
5.5	
7.5	
11	Emission:
15	The motors are category C3, corresponding to CISPR11, group 2, class A, and may be installed in industrial areas
18.5	(second environment).
22	If fitted with an external Grundfos EMC filter, the motors are category C2, corresponding to CISPR11, group 1, class A, and may be installed in residential areas (first environment).
	Note: When the motors are installed in residential areas, supplementary measures may be required as the motors may cause radio interference.
	Immunity: The motors fulfil the requirements for both the first and second environment.

For further information about EMC, see *E-pumps with single-phase MGE motors*, page 81.

Enclosure class

Standard: IP55 (IEC34-5).

Insulation class

F (IEC 85).

Ambient temperature

During operation: -20 °C to +40 °C

During storage/transport:

0.25 to 7.5 kW: -40 °C to 60 °C

11 to 22 kW: -25 °C to 70 °C.

Relative air humidity

Maximum 95 %.

Sound pressure level

Motor [kW]	Speed stated on the nameplate [min ⁻¹]	Sound pressure level [dB(A)]
0.55	1400-1500	47
	1700-1800	52
	2800-3000	60
	3400-3600	65
0.75	1400-1500	47
	1700-1800	52
	2800-3000	60
	3400-3600	65
1.1	1400-1500	49
	1700-1800	53
	2800-3000	60
	3400-3600	65
1.5	1400-1500	53
	1700-1800	57
	2800-3000	65
	3400-3600	70
2.2	1400-1500	50
	1700-1800	52
	2800-3000	65
	3400-3600	70
3.0	1400-1500	55
	1700-1800	60
	2800-3000	65
	3400-3600	70
4.0	1400-1500	58
	1700-1800	63
	2800-3000	70
	3400-3600	75
5.5	1400-1500	52
	1700-1800	56
	2800-3000	75
	3400-3600	80
7.5	1400-1500	54
	1700-1800	58
	2800-3000	65
	3400-3600	69
11	1400-1500	54
	1700-1800	59
	2800-3000	65
	3400-3600	70
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 (TP 211 to IEC 34-11).

Additional protection

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

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

For these pumps, an earth leakage circuit breaker **type B** must be used.

This circuit breaker must be marked with the following symbols:



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

Start/stop of pump

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

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

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

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

Wiring diagram, 0.55 - 7.5 kW

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

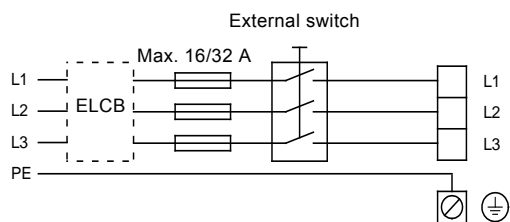


Fig. 81 Wiring diagram, three-phase MGE motors, 0.75 - 7.5 kW

Other connections

Figure 82 shows the connection terminals of external potential-free contacts for start/stop and digital function, external setpoint signal, sensor signal, GENIbus and relay signal.

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

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

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

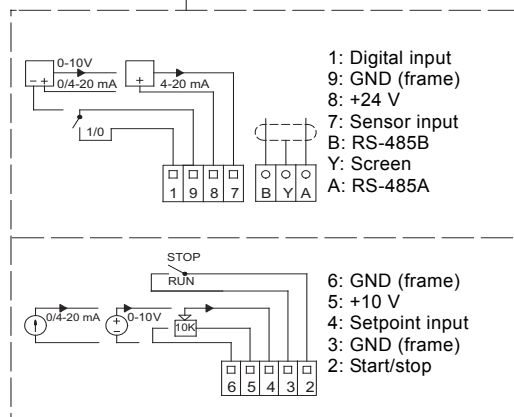
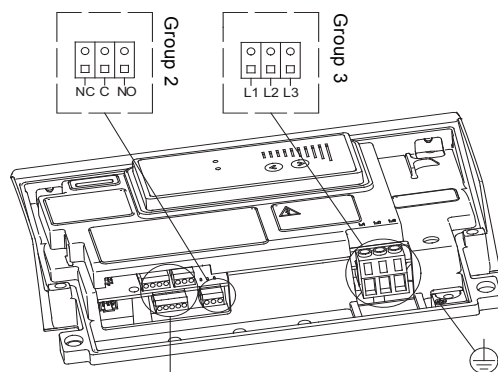


Fig. 82 Connection terminals

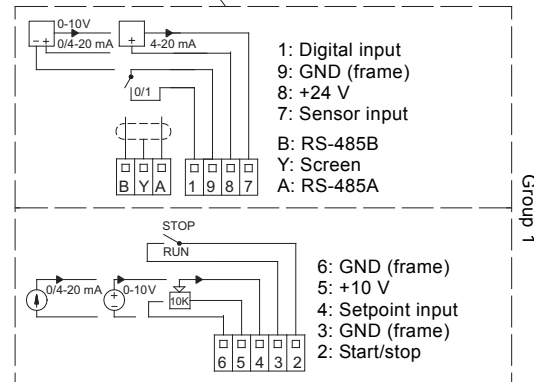
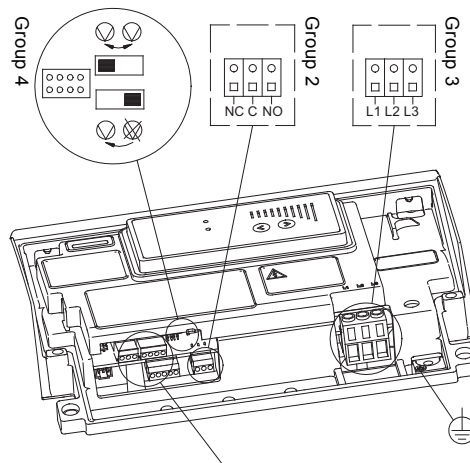


Fig. 83 Connection terminals, TPED Series 2000

Wiring diagram, 11-22 kW

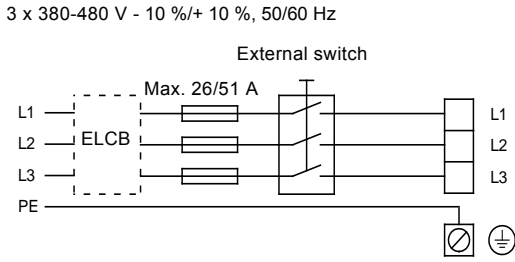


Fig. 84 Wiring diagram, three-phase MGE motors, 11-22 kW

Other connections

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

Group 1: Inputs

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

All inputs (group 1) are internally separated from the mains-conducting parts by reinforced insulation and galvanically separated from other circuits.

All control terminals are supplied by protective extra-low voltage (PELV), thus ensuring protection against electric shock.

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

TM00 9270 4696

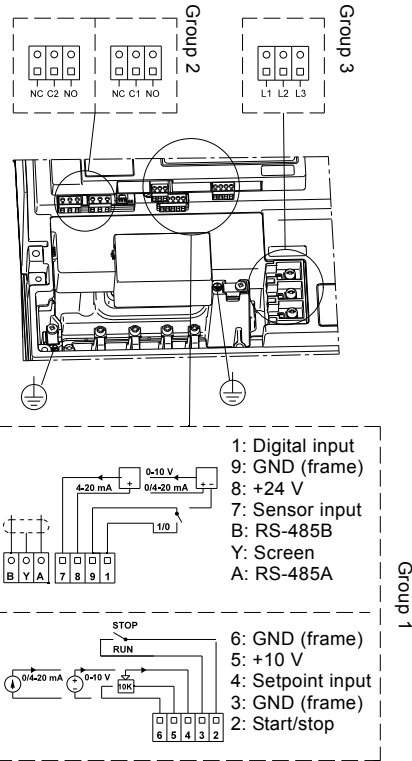


Fig. 85 Connection terminals

TM03 8608 2007

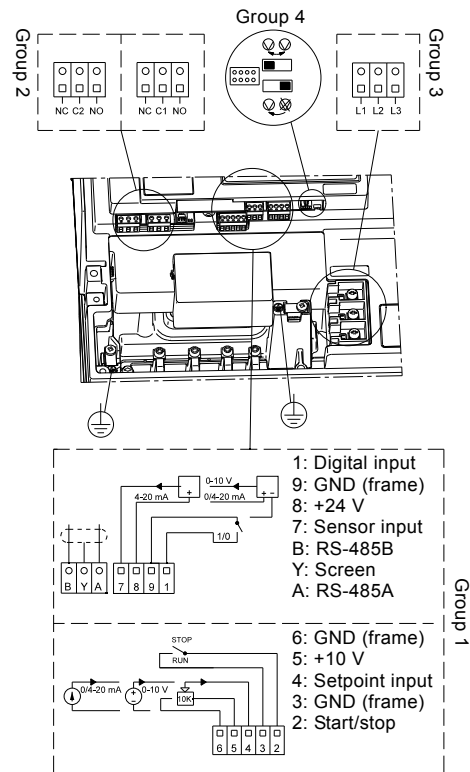


Fig. 86 Connection terminals, TPED Series 2000

TM03 9134 3407

18. EMC

EMC and proper installation

General information

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

This section deals with these issues.

What is EMC?

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

Emission

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

Immunity

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

E-pumps and EMC

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

EMC and CE



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

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

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

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

Where can E-pumps be installed?

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

What is meant by the first and the second environment?

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

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

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

EMC and C-tick



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

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

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

The C-tick only covers emission.

EMC and proper installation

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

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

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

Connection of mains supply in MGE

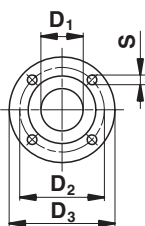
Practice shows that large cable loops are often made inside the terminal box to get some "spare cable". Of course, this can be useful. However, with regard to EMC, it is a poor solution as these cable loops will function as antennas inside the terminal box.

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

19. Flanges for TP pumps

Flange dimensions

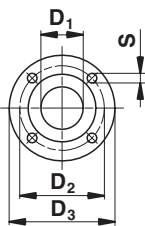
PN 6 and PN 10 flanges



	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
D₁	32	40	50	65	80	100	32	40	50	65	80	100	125	150	200	250
D₂	90	100	110	130	150	170	100	110	125	145	160	180	210	240	295	350
D₃	120	130	140	160	190	210	140	150	165	185	200	220	250	285	340	395
S	4x14	4x14	4x14	4x14	4x19	4x19	4x19	4x19	4x19	8x19	8x19	8x19	8x19	8x23	8x23	12x23

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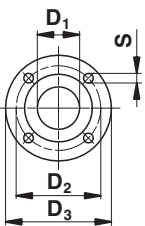
PN 16 and PN 25 flanges



	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
D₁	32	40	50	65	80	100	125	150	200	100	125	150	200	250	300	350
D₂	100	110	125	145	160	180	210	240	295	190	220	250	310	370	430	490
D₃	140	150	165	185	200	220	250	285	340	235	270	300	360	425	485	555
S	4x19	4x19	4x19	4x19	8x19	8x19	8x19	8x23	12x23	8x23	8x28	8x28	12x28	12x31	16x31	16x34

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PN 40 flanges

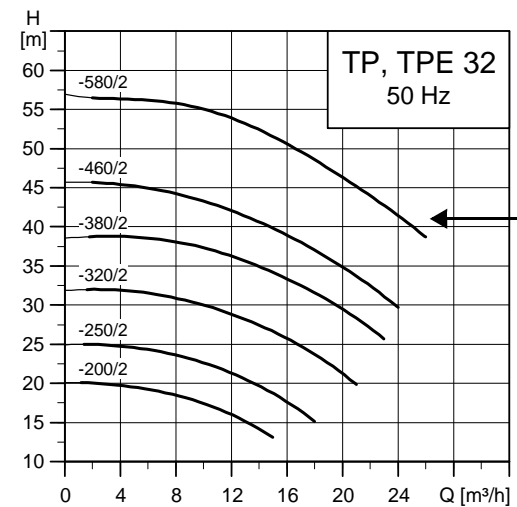


	EN/DIN 2635 PN 40 (4.0 MPa)	
	Nominal diameter (DN)	
	400	500
D₁	400	500
D₂	585	585
D₃	660	660
S	16x42	20x42

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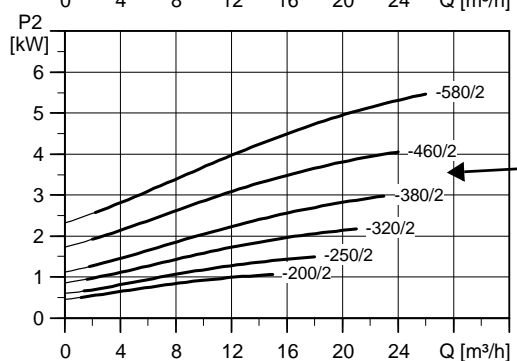
20. Curve charts

How to read the curve charts

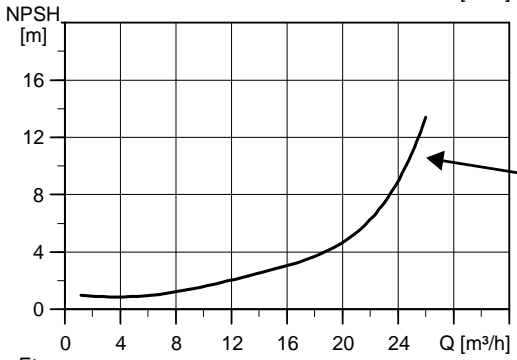


← Pump type and frequency

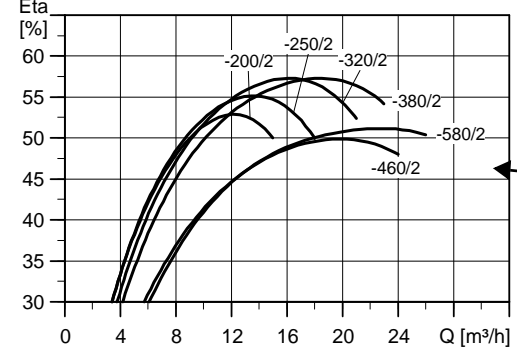
QH curve for the individual single-head pump.
The bold curve indicates the recommended performance range.



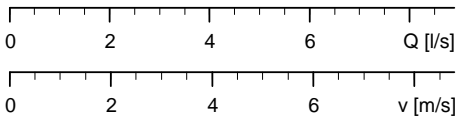
← The power curve indicates pump input power [P₂].



← The NPSH (3 %) curve shows the required net positive suction head (NPSH) to ensure that the pump head is not reduced by more than 3 %. The available system pressure at the pump inlet must be according to the NPSH (3 %) curve + a safety margin of at least 0.5 m.



← The eta curve shows the pump efficiency.



TM02 5017 2102

Curve conditions

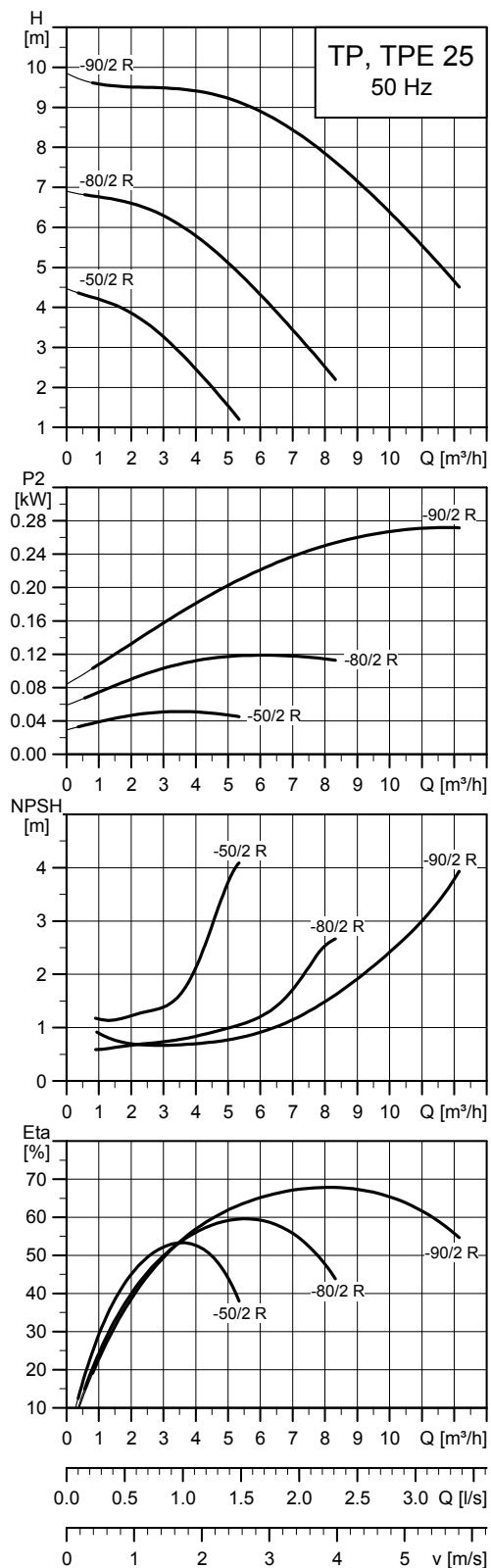
The guidelines below apply to the curves shown on the following pages:

- Tolerances to ISO 9906:2012 Grade 3B.
- The curves apply to the performance of single-head three-phase pumps. For other pump versions, please see the exact curves in WinCAPS or WebCAPS. For other pump versions, the performance may differ for the following reasons:
 - The valve in twin-head pumps may cause losses.
 - Single-phase motors run at lower speed.
- **Note:** Grundfos does not recommend continuous parallel operation of twin-head pumps due to the increased flow in the pump. A too high flow results in noisy operation, increased wear of the impeller due to cavitation, etc.
- QH curves of the individual single-head pumps are shown with expected speed of a three-phase mains-operated motor. For further information, see the tables of technical data on the following pages. The performance of the single-phase motor is slightly reduced. Please refer to WinCAPS or WebCAPS for the exact single-phase curves.
- Curves of TPE Series 1000 pumps and TPE Series 2000 pumps are shown as nominal curves (100 % curves) only. Please refer to WinCAPS for the exact curves.
- Measurements have been made with airless water at a temperature of +20 °C.
- The curves apply to a kinematic viscosity of $\nu = 1 \text{ mm}^2/\text{s}$ (1 cSt).
- Due to the risk of overheating, the pump must not run constantly below the minimum flow rate indicated by the bold curves.
- If the pumped liquid density and/or viscosity are higher than those of water, it may be necessary to use a motor with a higher performance.

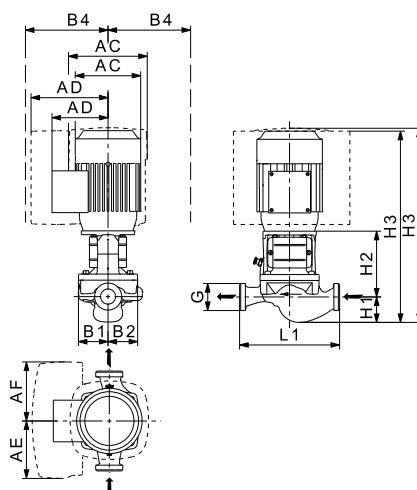
21. Performance curves and technical data

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

TP, TPE 25-XX /2 R



TM02 5014 4509

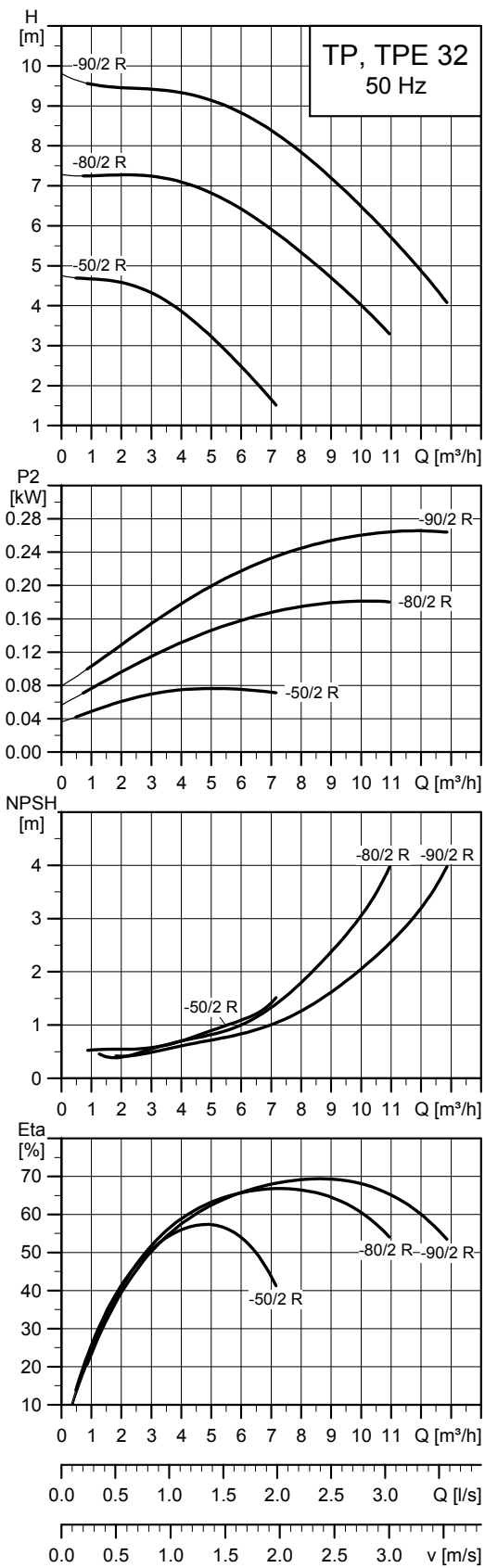


TM02 8348 4512

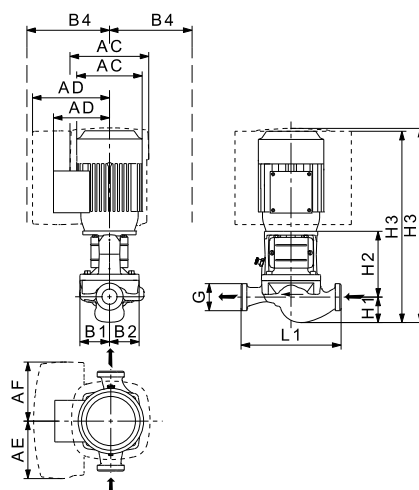
Technical data

TP 25			-50/2 R	-80/2 R	-90/2 R
TPD			-	-	-
TPE			•	•	•
TPED			-	-	-
Series			100	100	100
IEC size	1~ TP		63	63	71
	3~ TP		63	63	71
	1~ TPE		71	71	71
	3~ TPE		-	-	-
P2	1~/3~ TP	[kW]	0.12/0.12	0.18/0.18	0.37/0.37
	1~/3~ TPE	[kW]	0.12/-	0.18/-	0.37/-
PN			10	10	10
T _{min} , T _{max}		[°C]	[-25;110]	[-25;110]	[-25;110]
G			G 1 ½	G 1 ½	G 1 ½
AC	1~/3~ TP	[mm]	118/124	118/124	141/141
	1~/3~ TPE	[mm]	141/-	141/-	141/-
AD	1~/3~ TP	[mm]	101/101	101/101	133/109
	1~/3~ TPE	[mm]	140/-	140/-	140/-
AE	1~/3~ TPE	[mm]	105/-	105/-	105/-
AF	1~/3~ TPE	[mm]	105/-	105/-	105/-
B1		[mm]	54	54	60
B2		[mm]	62	62	68
B4	1~/3~ TP	[mm]	101/-	101/-	133/-
	1~/3~ TPE	[mm]	140/-	140/-	140/-
L1		[mm]	180	180	180
H1		[mm]	46	46	48
H2		[mm]	120	120	120
H3	1~/3~ TP	[mm]	345/345	345/345	358/358
	1~/3~ TPE	[mm]	357/-	357/-	358/-

TP, TPE 32-XX/2



TM02 5015 4509

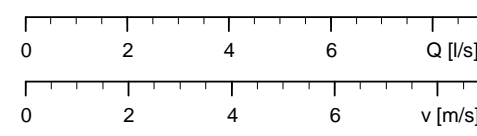
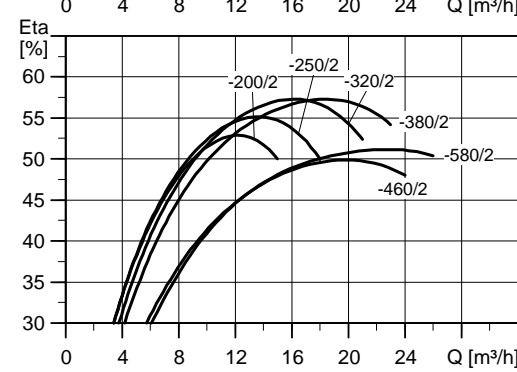
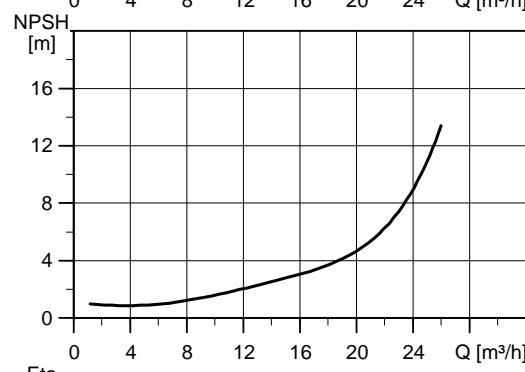
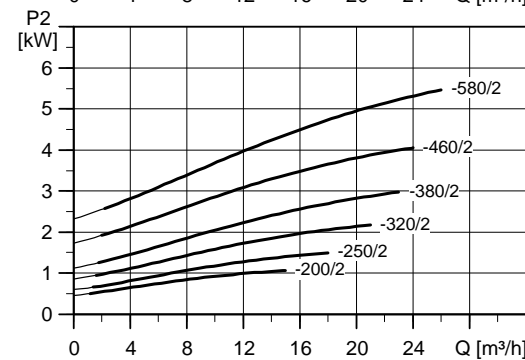
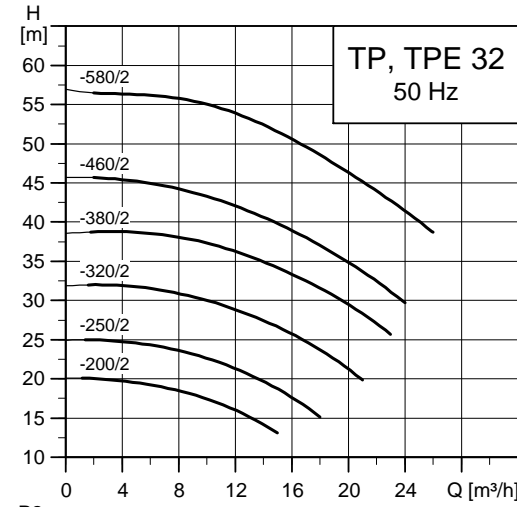
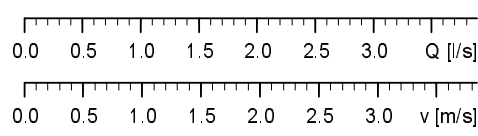
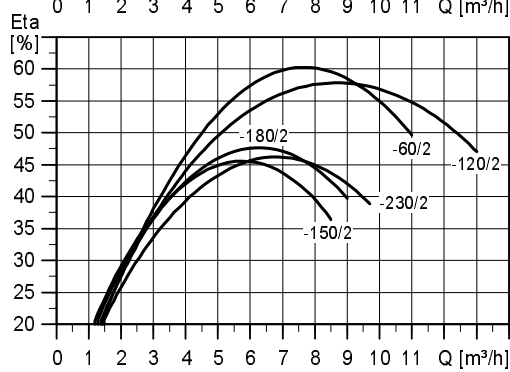
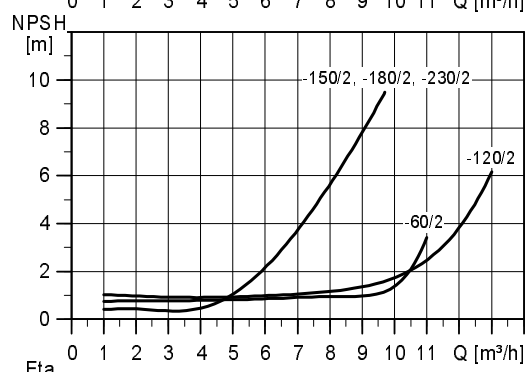
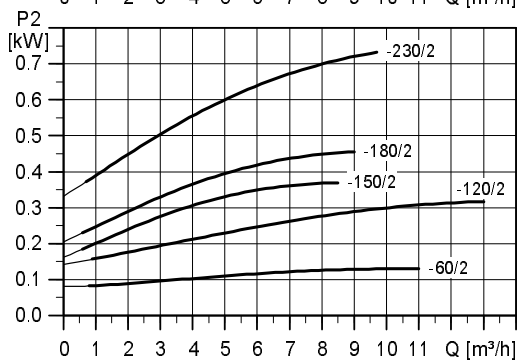
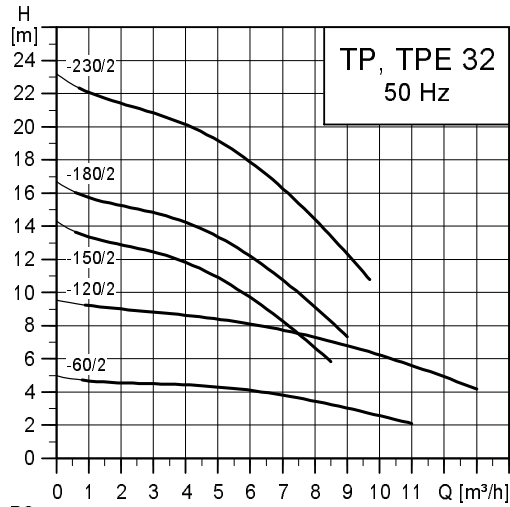


TM02 8348 4512

Technical data

TP 32			-50/2 R	-80/2 R	-90/2 R
TPD			-	-	-
TPE			•	•	•
TPED			-	-	-
Series			100	100	100
IEC size	1~ TP		63	63	71
	3~ TP		63	63	71
	1~ TPE		71	71	71
	3~ TPE		-	-	-
P2	1~/3~ TP	[kW]	0.12/0.12	0.25/0.25	0.37/0.37
	1~/3~ TPE	[kW]	0.12/-	0.25/-	0.37/-
PN			10	10	10
T_{min}, T_{max}		[°C]	[-25;110]	[-25;110]	[-25;110]
G			G 2	G 2	G 2
AC	1~/3~ TP	[mm]	118/124	139/124	141/141
	1~/3~ TPE	[mm]	141/-	141/-	141/-
AD	1~/3~ TP	[mm]	101/101	111/101	133/109
	1~/3~ TPE	[mm]	140/-	140/-	140/-
AE	1~/3~ TPE	[mm]	105/-	105/-	105/-
AF	1~/3~ TPE	[mm]	105/-	105/-	105/-
B1		[mm]	54	54	60
B2		[mm]	62	62	68
B4	1~/3~ TP	[mm]	101/-	111/-	133/-
	1~/3~ TPE	[mm]	140/-	140/-	140/-
L1		[mm]	180	180	180
H1		[mm]	48	48	47
H2		[mm]	120	120	120
H3	1~/3~ TP	[mm]	347/347	378/347	357/357
	1~/3~ TPE	[mm]	359/-	359/-	357/-

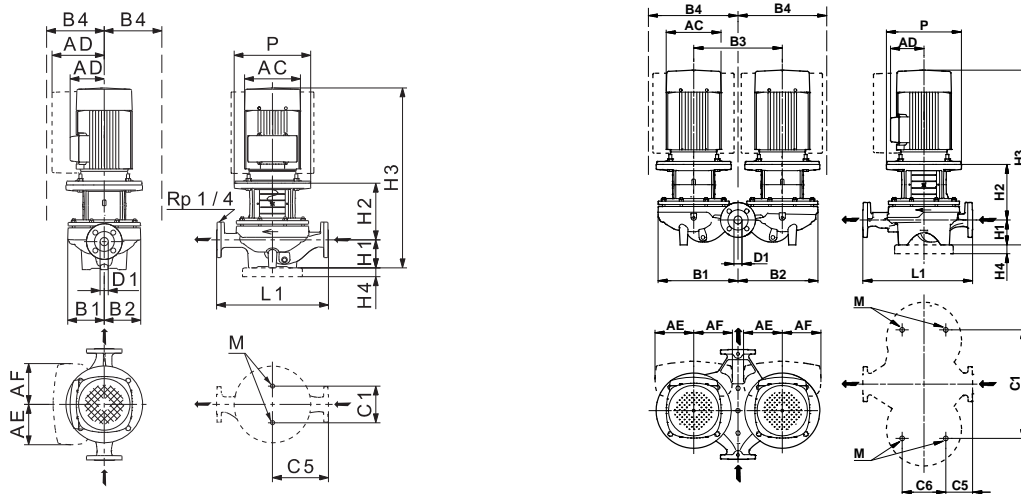
TPED 32-XX/2



Note: All curves apply to single-head pumps. For further information, see page 93.

TM02 5016 4509

TM02 5017 4810



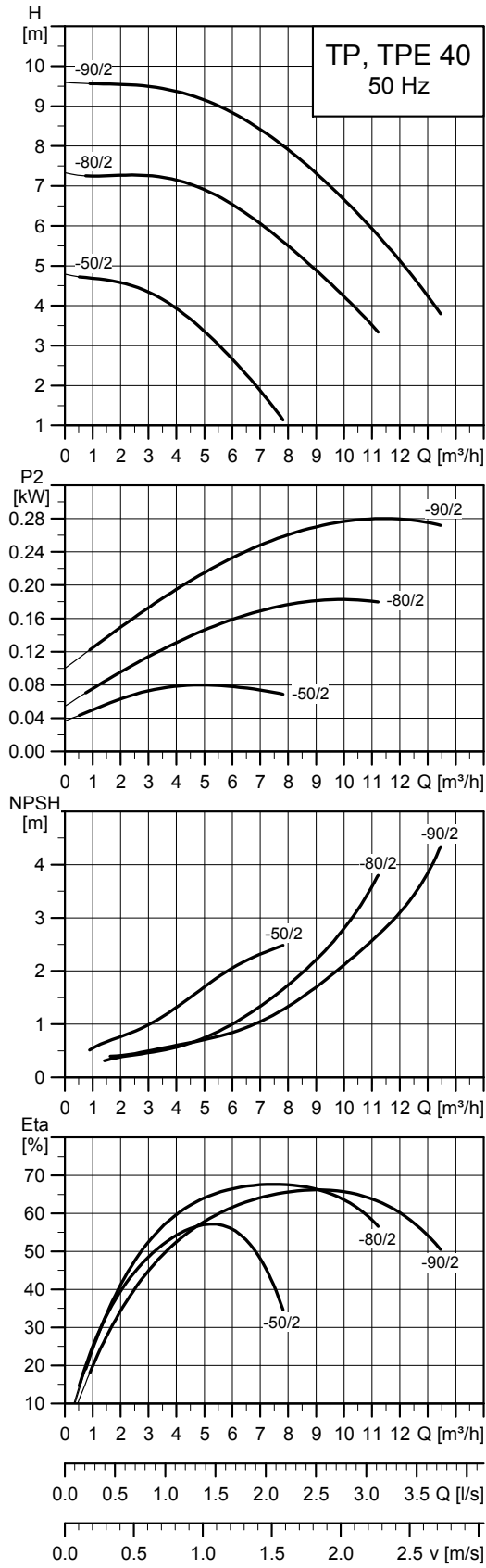
TM02 8632 5004 - TM02 8631 5004

Technical data

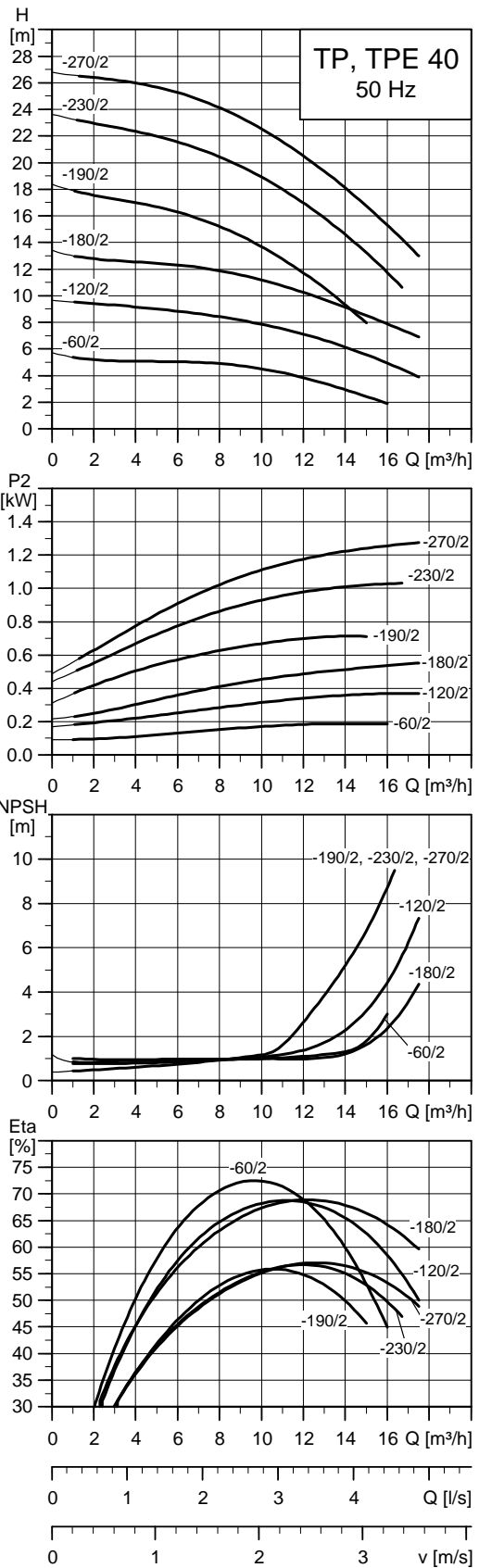
TP 32		-60/2	-120/2	-150/2	-180/2	-230/2	-200/2	-250/2	-320/2	-380/2	-460/2	-580/2
TPD		•	•	•	•	•	•	•	•	•	•	•
TPE		•	•	•	•	•	•	•	•	•	•	•
TPED		•	•	•	•	•	•	•	•	•	•	•
Series		200	200	200	200	200	300	300	300	300	300	300
IEC size	1~ TP	71	71	71	80	80	-	-	-	-	-	-
	3~ TP	63	71	71	71	80	80	90	90	100	112	132
	1~ TPE	71	71	71	71	80	80	-	-	-	-	-
	3~ TPE	-	-	-	-	90	80	90	90	100	112	132
P2	1~3~ TP ★ [kW]	0.25/0.25	0.37/0.37	0.37/0.37	0.55/0.55	0.75/0.75	-1.1	-1.5	-2.2	-3	-4	-5.5
	1~3~ TPE [kW]	0.25/-	0.37/-	0.37/-	0.55/-	0.75/0.75	1.1/1.1	-1.5	-2.2	-3	-4	-5.5
PN		PN 6/10	PN 6/10	PN 6/10	PN 6/10	PN 6/10	PN 16	PN 16	PN 16	PN 16	PN 16	PN 16
T _{min} :T _{max}	[°C]	[-25;140]	[-25;140]	[-25;140]	[-25;140]	[-25;140]	[-25;120]	[-25;120]	[-25;120]	[-25;120]	[-25;120]	[-25;120]
D1	[mm]	32	32	32	32	32	32	32	32	32	32	32
AC	1~3~ TP [mm]	124/124	141/142	141/141	141/141	141/141	-141	-178	-178	-198	-220	-220
	1~3~ TPE [mm]	141/-	141/-	141/-	141/-	141/178	141/178	-178	-178	-198	-220	-220
AD	1~3~ TP [mm]	101/101	133/133	133/109	133/109	133/109	-109	-110	-110	-120	-134	-134
	1~3~ TPE [mm]	140/-	140/-	140/-	140/-	140/167	140/167	-167	-167	-177	-188	-188
AE	1~3~ TPE [mm]	105/-	105/-	105/-	105/-	105/132	105/105	-132	-132	-132	-145	-145
AF	1~3~ TPE [mm]	105/-	105/-	105/-	105/-	105/132	105/105	-132	-132	-132	-145	-145
P	[mm]	90/90	-	-	-	-	200	200	200	250	250	300
B1 ★★	[mm]	75/176	75/180	102/222	102/222	102/222	125/260	125/260	125/260	125/260	144/321	144/321
B2 ★★	[mm]	75/176	75/180	102/222	102/222	102/222	117/257	117/257	117/257	117/257	144/321	144/321
B3	[mm]	200	200	240	240	240	276	276	276	276	355	355
	TP [mm]	75/176	133/180	133/222	133/222	133/222	125/260	125/260	125/260	125/263	144/321	150/328
B4 ★★	1~ TPE [mm]	140/264	140/264	140/225	140/225	140/225	140/338	-	-	-	-	-
	3~ TPE [mm]	-	-	-	-	167/320	140/338	167/338	167/338	177/344	188/403	188/403
C1 ★★	[mm]	80/200	80/200	80/240	80/240	80/240	144/356	144/356	144/356	144/356	144/435	144/435
C5 ★★	[mm]	110/52	110/52	140/82	140/82	140/82	170/45	170/45	170/45	170/45	220/46	220/46
C6	[mm]	103	103	103	103	103	175	175	175	175	175	175
L1	[mm]	220	220	280	280	280	340	340	340	340	440	440
H1	[mm]	68	68	79	79	79	100	100	100	100	100	100
H2	[mm]	140/139	126	125	125	137	154	154	154	183	184	223
	1~3~ TP [mm]	387/386	385/385	395/395	447/395	447/447	-/505	-/535	-/575	-/618	-/656	-/714
H3	1~3~ TPE [mm]	407/-	385/-	395/-	395/-	447/497	485/535	-/535	-/575	-/618	-/656	-/714
	[mm]	-	-	-	-	-	-	-	-	-	-	-
M		M12	M12	M12	M12	M12	M16	M16	M16	M16	M16	M16

★ TP(E), TP(E)D pumps are primarily fitted with IE3 motors. See Motors on pages 72 to 75.
 ★★ 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

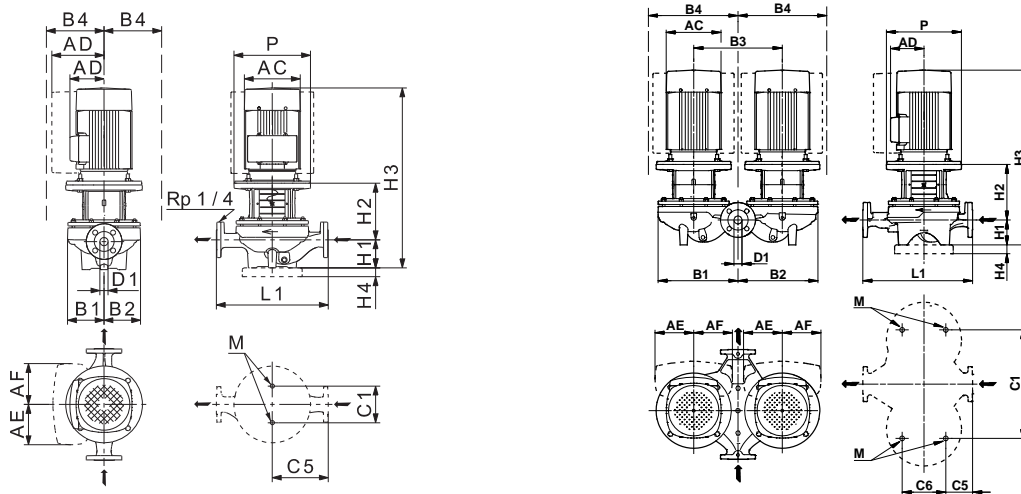


TM02 5018 4509



TM02 5019 4810

Note: All curves apply to single-head pumps. For further information, see page 93.



TM02 8632 5004 - TM02 8631 5004

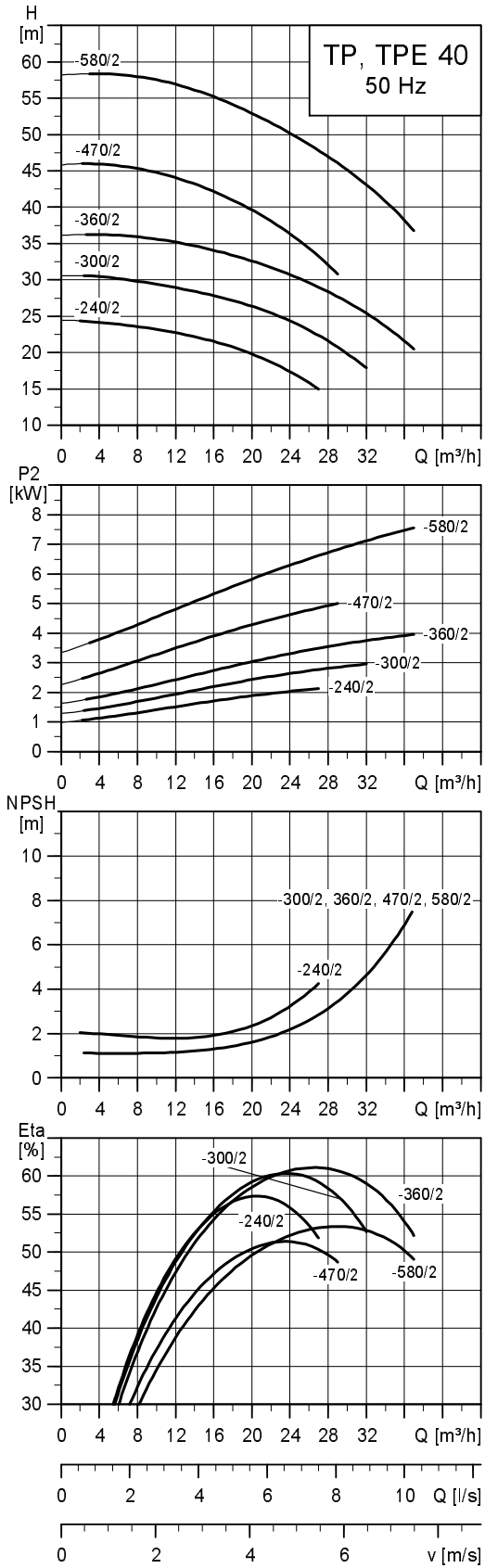
Technical data

TP 40		-50/2	-60/2	-80/2	-90/2	-120/2	-180/2	-190/2	-230/2	-270/2
TPD		-	•	•	-	•	-	•	•	•
TPE		-	•	•	•	•	•	•	•	•
TPED		-	•	-	-	•	-	•	•	•
Series		100	200	100	100	200	200	200	200	200
IEC size	1~ TP	63	71	63	71	71	80	80	90	90
	3~ TP	63	71	63	71	71	71	80	80	90
	1~ TPE	71	71	71	71	71	71	80	80	-
	3~ TPE	-	-	-	-	-	-	90	90	90
P2	1~3~ TP ★ [kW]	0.12/0.12	0.25/0.25	0.25/0.25	0.37/0.37	0.37/0.37	0.55/0.55	0.75/0.75	1.1/1.1	1.5/1.5
	1~3~ TPE [kW]	0.12/-	0.25/-	0.25/-	0.37/-	0.37/-	0.55/-	0.75/0.75	1.1/1.1	-/1.5
PN		PN 6/10	PN 6/10	PN 6/10	PN 6/10	PN 6/10	PN 6/10	PN 16	PN 16	PN 16
T _{min} :T _{max}		[°C] [-25;110]	[-25;140]	[-25;110]	[-25;110]	[-25;140]	[-25;140]	[-25;140]	[-25;140]	[-25;140]
D1		[mm]	40	40	40	40	40	40	40	40
AC	1~3~ TP [mm]	118/124	141/141	139/124	141/141	141/141	141/141	141/141	178/141	178/178
	1~3~ TPE [mm]	141/-	141/-	141/-	141/-	141/-	141/-	141/178	141/178	-/178
AD	1~3~ TP [mm]	101/101	133/109	111/101	133/109	133/109	133/109	133/109	139/109	139/110
	1~3~ TPE [mm]	140/-	140/-	140/-	140/-	140/-	141/-	140/167	140/167	-/167
AE	1~3~ TPE [mm]	105/-	105/-	105/-	105/-	105/-	105/-	105/132	105/132	-/132
AF	1~3~ TPE [mm]	105/-	105/-	105/-	105/-	105/-	105/-	105/132	105/132	-/132
P		[mm]	-	-	-	-	-	-	-	-
B1 ★★		[mm]	75/-	75/180	75/-	75/-	75/180	100/-	102/222	102/222
B2 ★★		[mm]	75/-	75/180	75/-	75/-	75/180	100/-	102/222	102/222
B3		[mm]	-	200	-	-	200	-	240	240
B4 ★★	TP [mm]	101/-	133/180	111/-	133/-	133/180	133/-	133/222	139/222	139/222
	1~ TPE [mm]	140/-	140/264	140/-	140/-	140/264	141/225	140/225	140/225	-
	3~ TPE [mm]	-	-	-	-	-	-	167/320	167/320	167/320
C1 ★★		[mm]	-/-	80/200	-/-	-/-	80/200	80/-	120/240	120/240
C5 ★★		[mm]	-/-	125/45	-/-	-/-	125/45	125/-	160/95	160/95
C6		[mm]	-	125	-	-	125	-	125	125
L1		[mm]	250	250	250	250	250	250	320	320
H1		[mm]	67	67	67	62	67	68	68	68
H2		[mm]	120	129	120	120	129	131	141	151
H3	1~3~ TP [mm]	366/366	387/366	397/366	373/373	387/387	442/390	439/439	499/510	539/500
	1~3~ TPE [mm]	378/-	395/-	378/-	373/-	388/-	390/-	320/490	439/490	-/500
H4		[mm]	-	-	-	-	-	-	-	-
M			-	M12	-	-	M12	M12	M12	M12

★ TP(E), TP(E)D pumps are primarily fitted with IE3 motors. See Motors, page 72.

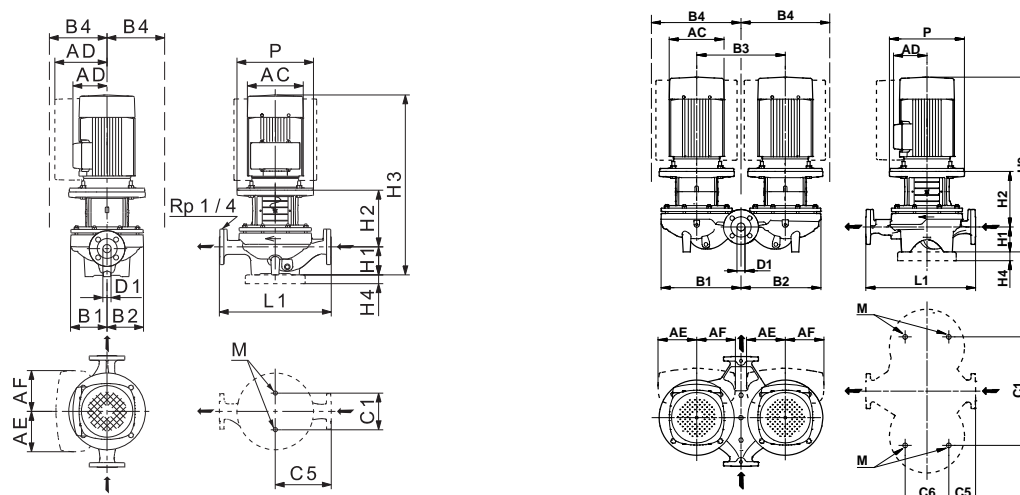
★★ The dimension before the slash applies to the single-head pump, and the dimension after the slash applies to the twin-head pump.

TP 40-XX/2



TM02 5020 0504

Note: All curves apply to single-head pumps. For further information, see page 93.



TM02 8632 5004 - TM02 8631 5004

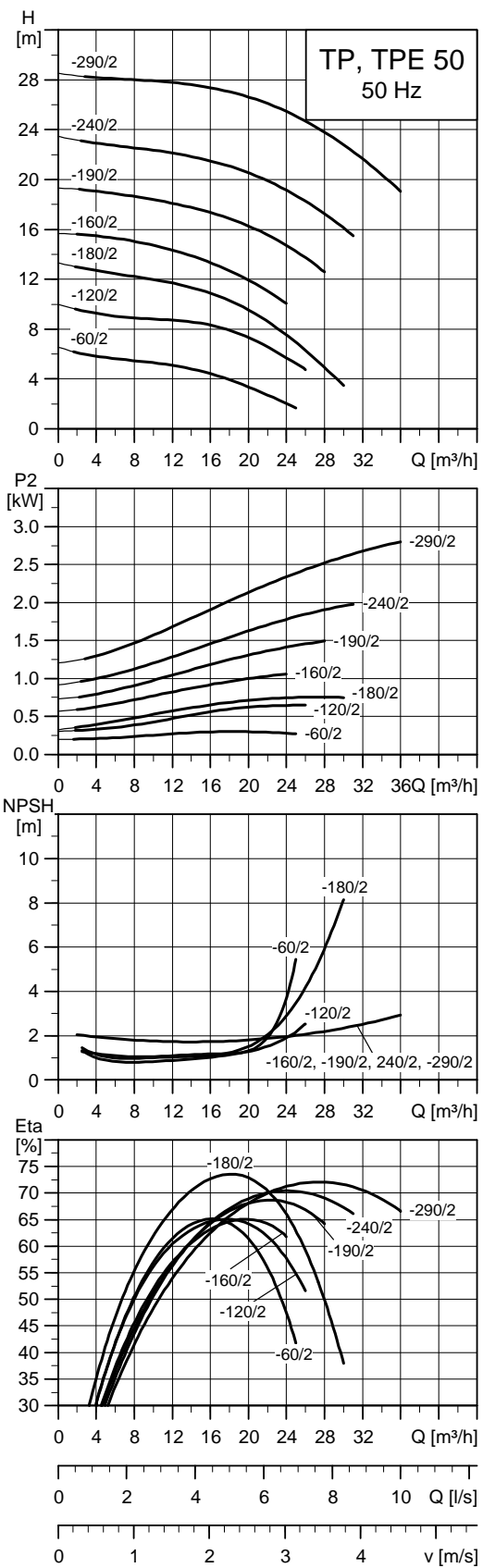
Technical data

TP 40			-240/2	-300/2	-360/2	-470/2	-580/2
TPD			•	•	•	•	•
TPE			•	•	•	•	•
TPED			•	•	•	•	•
Series			300	300	300	300	300
IEC size	1~ TP		-	-	-	-	-
	3~ TP		90	100	112	132	132
	1~ TPE		-	-	-	-	-
	3~ TPE		90	100	112	132	132
P2	1~3~ TP ★	[kW]	-/2.2	-/3	-/4	-/5.5	-/7.5
	1~3~ TPE	[kW]	-/2.2	-/3	-/4	-/5.5	-/7.5
PN			PN 16	PN 16	PN 16	PN 16	PN 16
T _{min} ·T _{max}		[°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
	1~3~ TPE	[mm]	-/178	-/198	-/220	-/220	-/260
AD	1~3~ TP	[mm]	-/110	-/120	-/134	-/134	-/159
	1~3~ TPE	[mm]	-/167	-/177	-/188	-/188	-/213
AE	1~3~ TPE	[mm]	-/132	-/132	-/145	-/145	-/145
AF	1~3~ TPE	[mm]	-/132	-/132	-/145	-/145	-/145
P		[mm]	200	250	250	300	300
B1 ★★		[mm]	130/273	130/273	130/273	149/325	149/325
B2 ★★		[mm]	117/267	117/267	117/267	144/321	144/321
B3		[mm]	290	290	290	355	355
	TP	[mm]	130/273	130/273	134/273	150/328	159/328
	1~ TPE	[mm]	-	-	-	-	-
B4 ★★	3~ TPE	[mm]	167/345	177/351	188/370	188/403	213/414
		[mm]	144/400	144/400	144/400	144/435	144/435
C5 ★★		[mm]	170/45	170/45	170/45	220/108	220/108
C6		[mm]	175	175	175	175	175
L1		[mm]	340	340	340	440	440
H1		[mm]	100	100	100	110	110
H2		[mm]	166	194	194	225	225
H3	1~3~ TP	[mm]	-/587	-/629	-/666	-/726	-/714
	1~3~ TPE	[mm]	-/587	-/629	-/666	-/726	-/714
H4		[mm]	-	-	-	-	-
M			M16	M16	M16	M16	M16

★ TP(E), TP(E)D pumps are primarily fitted with IE3 motors. See *Motors*, page 72.

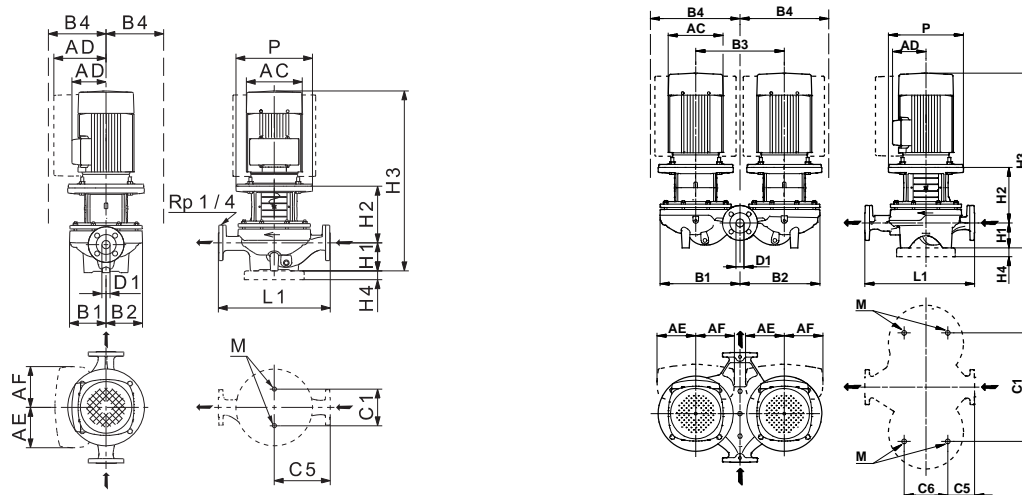
★★ The dimension before the slash applies to the single-head pump, and the dimension after the slash applies to the twin-head pump.

TP 50-XX/2



TM02 5021 4810

Note: All curves apply to single-head pumps. For further information, see page 93.



TM02 8632 5004 - TM02 8631 5004

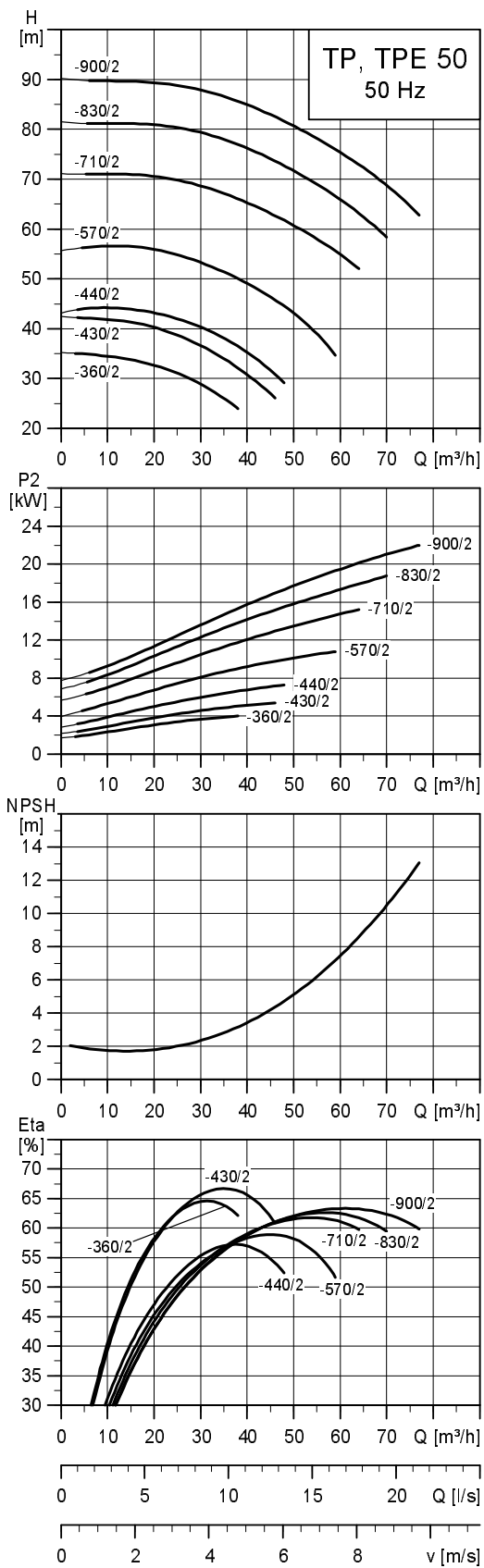
Technical data

TP 50		-60/2	-120/2	-180/2	-160/2	-190/2	-240/2	-290/2	
TPD		•	•	•	•	•	•	•	
TPE		•	•	•	•	•	•	•	
TPED		•	•	•	•	•	•	•	
Series		200	200	200	300	300	300	300	
IEC size	1~ TP	71	80	80	-	-	-	-	
	3~ TP	71	80	80	80	90	90	100	
	1~ TPE	71	80	80	80	-	-	-	
	3~ TPE	-	90	90	80	90	90	100	
P2	1~3~ TP ★	[kW]	0.37/0.37	0.75/0.75	0.75/0.75	-1.1	-1.5	-2.2	-3
	1~3~ TPE	[kW]	0.37/-	0.75/0.75	0.75/0.75	1.1/1.1	-1.5	-2.2	-3
PN		PN 6/10	PN 6/10	PN 6/10	PN 16	PN 16	PN 16	PN 16	
T _{min} :T _{max}		[°C]	[-25;140]	[-25;140]	[-25;140]	[-25;120]	[-25;120]	[-25;120]	
D1		[mm]	50	50	50	50	50	50	
AC	1~3~ TP	[mm]	141/141	141/141	141/141	-141	-178	-178	-198
	1~3~ TPE	[mm]	141/-	141/178	141/178	178/141	-178	-178	-198
AD	1~3~ TP	[mm]	133/133	133/133	133/109	-109	-110	-110	-120
	1~3~ TPE	[mm]	140/-	140/167	140/167	140/167	-167	-167	-177
AE	1~3~ TPE	[mm]	105/-	105/132	105/132	105/132	-132	-132	-132
AF	1~3~ TPE	[mm]	105/-	105/132	105/132	105/132	-132	-132	-132
P		[mm]	105/105	120/120	-	200	200	200	250
B1 ★★		[mm]	90/177	100/221	100/225	117/252	117/252	117/252	117/252
B2 ★★		[mm]	75/188	100/221	100/225	117/252	117/252	117/252	117/252
B3		[mm]	200	240	240	270	270	270	270
B4 ★★	TP	[mm]	90/188	100/221	133/225	117/252	117/252	117/252	125/260
	1~ TPE	[mm]	140/264	140/225	140/225	140/252	-	-	-
	3~ TPE	[mm]	-	167/320	167/320	140/335	167/335	167/335	177/335
C1 ★★		[mm]	120/200	120/240	120/240	144/350	144/350	144/350	144/350
C5 ★★		[mm]	140/60	140/60	140/60	170/60	170/60	170/60	170/60
C6		[mm]	125	126	126	175	175	175	175
L1		[mm]	280	280	280	340	340	340	340
H1		[mm]	75	75/61	75	115	115	115	115
H2		[mm]	137	135/141	135	152	152	152	180
H3	1~3~ TP	[mm]	403/403	441/441	441/441	-518	-548	-588	-630
	1~3~ TPE	[mm]	403/-	442/491	441/491	498/548	-548	-588	-630
H4		[mm]	-	-	-	-	-	-	
M			M12	M12	M12	M16	M16	M16	M16

★ TP(E), TP(E)D pumps are primarily fitted with IE3 motors. See *Motors*, page 72.

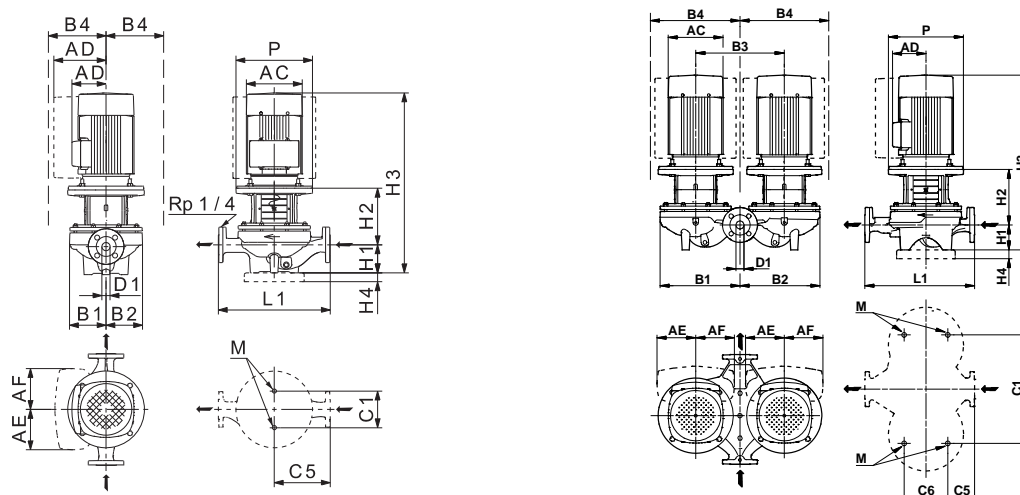
★★ The dimension before the slash applies to the single-head pump, and the dimension after the slash applies to the twin-head pump.

TP 50-XX/2



TM02 5022 0504

Note: All curves apply to single-head pumps. For further information, see page 93.



TM02 8632 5004 - TM02 8631 5004

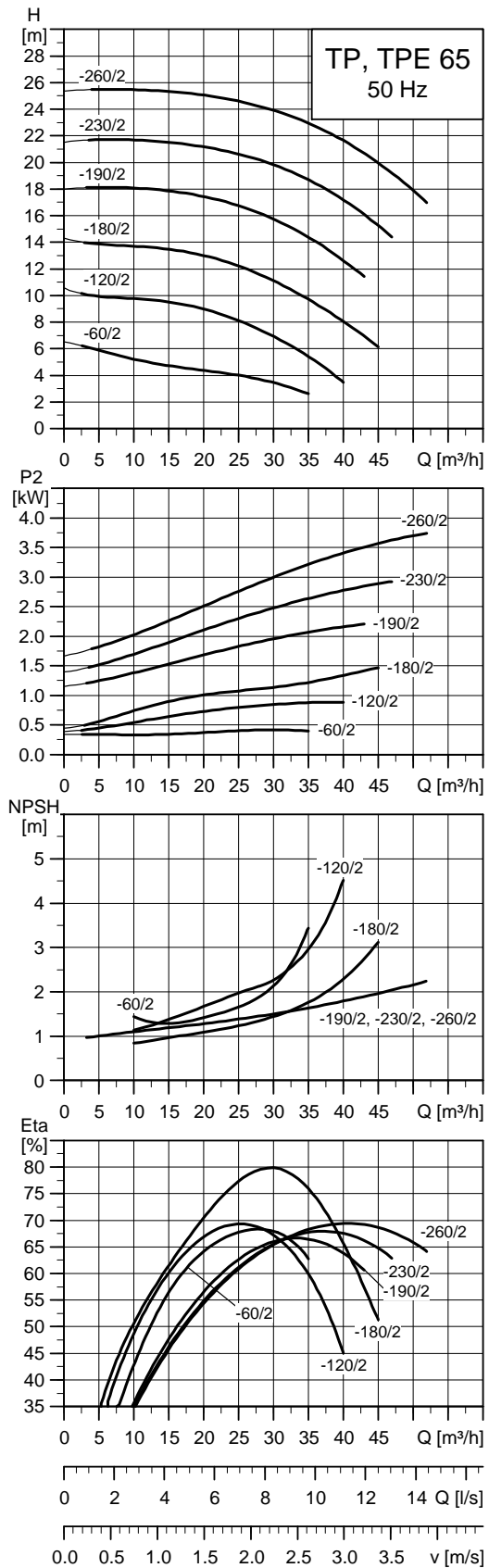
Technical data

TP 50		-360/2	-430/2	-440/2	-570/2	-710/2	-830/2	-900/2	
TPD		•	•	•	•	•	•	•	
TPE		•	•	•	•	•	•	•	
TPED		•	•	•	•	•	•	•	
Series		300	300	300	300	300	300	300	
IEC size	1~ TP	-	-	-	-	-	-	-	
	3~ TP	112	132	132	160	160	160	180	
	1~ TPE	-	-	-	-	-	-	-	
	3~ TPE	112	132	132	160	160	160	180	
P2	1~/3~ TP ★	[kW]	-/4	-/5.5	-/7.5	-/11	-/15	-/18.5	-/22
	1~/3~ TPE	[kW]	-/4	-/5.5	-/7.5	-/11	-/15	-/18.5	-/22
PN		PN 16	PN 16	PN 16	PN 16	PN 16	PN 16	PN 16	
T _{min} :T _{max}	[°C]	[-25;120]	[-25;120]	[-25;120]	[-25;120]	[-25;120]	[-25;120]	[-25;120]	
D1	[mm]	50	50	50	50	50	50	50	
AC	1~/3~ TP	[mm]	-/220	-/220	-/260	-/314	-/314	-/314	-/314
	1~/3~ TPE	[mm]	-/220	-/220	-/260	-/314	-/314	-/314	-/314
AD	1~/3~ TP	[mm]	-/134	-/134	-/159	-/204	-/204	-/204	-/204
	1~/3~ TPE	[mm]	-/188	-/188	-/213	-/308	-/308	-/308	-/308
AE	1~/3~ TPE	[mm]	-/145	-/145	-/145	-/210	-/210	-/210	-/210
AF	1~/3~ TPE	[mm]	-/145	-/145	-/145	-/210	-/210	-/210	-/210
P	[mm]	250	300	300	350	350	350	350	
B1 ★★	[mm]	133/290	133/290	180/386	180/386	180/386	180/386	180/386	
B2 ★★	[mm]	119/284	119/284	164/379	164/379	164/379	164/379	164/379	
B3	[mm]	320	320	420	420	420	420	420	
B4 ★★	TP	[mm]	134/290	150/310	180/386	204/386	204/386	204/386	
	1~ TPE	[mm]	-	-	-	-	-	-	
	3~ TPE	[mm]	188/385	188/385	213/386	308/548	308/548	308/548	308/548
C1 ★★	[mm]	144/400	144/400	144/500	144/500	144/500	144/500	144/500	
C5 ★★	[mm]	170/52	170/52	220/123	220/123	220/123	220/123	220/123	
C6	[mm]	175	175	175	175	175	175	175	
L1	[mm]	340	340	440	440	440	440	440	
H1	[mm]	115	115	115	115	115	115	115	
H2	[mm]	189	228	234	264	264	264	264	
H3	1~/3~ TP	[mm]	-/676	-/734	-/728	-/850	-/850	-/894	-/894
	1~/3~ TPE	[mm]	-/676	-/734	-/728	-/850	-/850	-/894	-/920
H4	[mm]	-	-	-	35	35	35	35	
M		M16	M16	M16	M16	M16	M16	M16	

★ TP(E), TP(E)D pumps are primarily fitted with IE3 motors. See *Motors*, page 72.

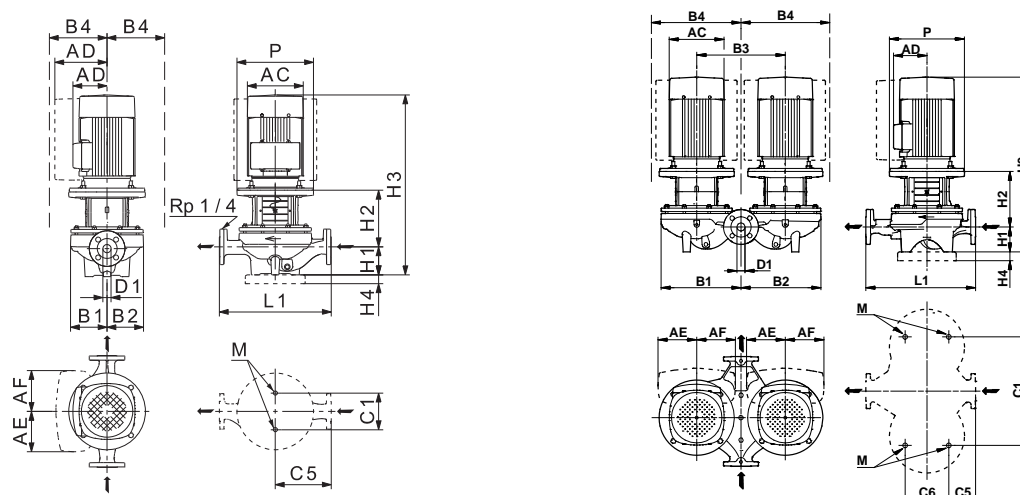
★★ The dimension before the slash applies to the single-head pump, and the dimension after the slash applies to the twin-head pump.

TP 65-XX/2



TM02 5023 4810

Note: All curves apply to single-head pumps. For further information, see page 93.



TM02 8632 5004 - TM02 8631 5004

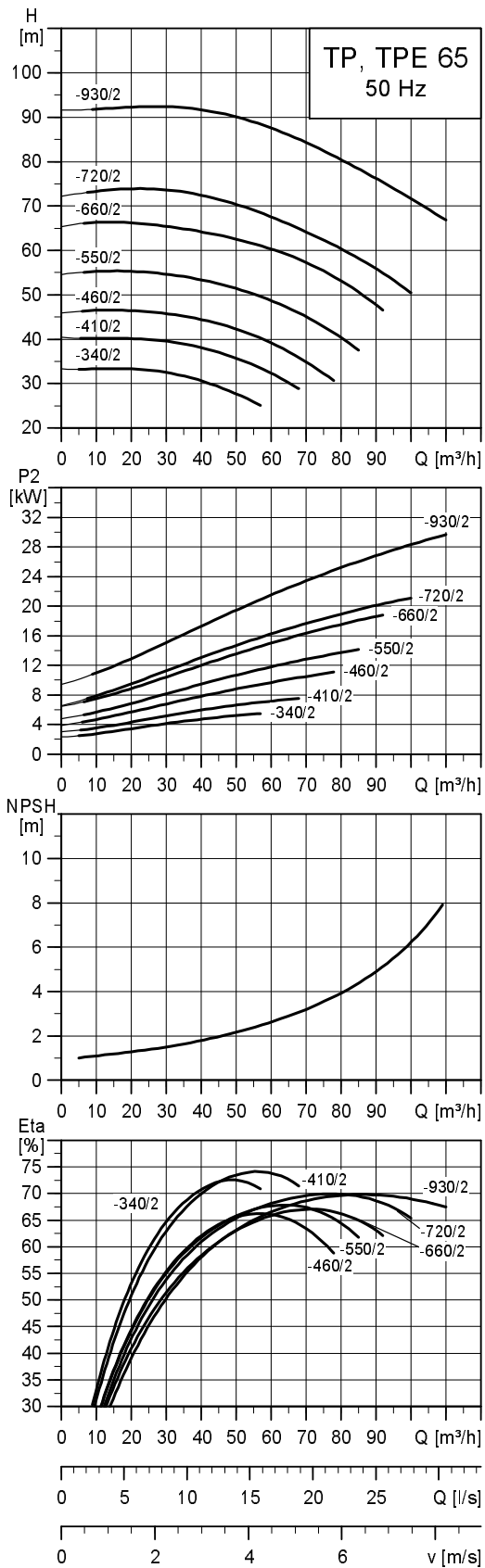
Technical data

TP 65			-60/2	-120/2	-180/2	-190/2	-230/2	-260/2
TPD			•	•	•	•	•	•
TPE			•	•	•	•	•	•
TPED			•	•	•	•	•	•
Series			200	200	200	300	300	300
IEC size	1~ TP		80	90	90	-	-	-
	3~ TP		71	80	90	90	100	112
	1~ TPE		71	80	-	-	-	-
	3~ TPE		-	90	90	90	100	112
P2	1~/3~ TP ★	[kW]	0.55/0.55	1.1/1.1	1.5/1.5	-/2.2	-/3	-/4
	1~/3~ TPE	[kW]	0.55/-	1.1/1.1	-/1.5	-/2.2	-/3	-/4
PN			PN 6/10	PN 6/10	PN 6/10	PN 16	PN 16	PN 16
T _{min} :T _{max}		[°C]	[-25;140]	[-25;140]	[-25;140]	[-25;120]	[-25;120]	[-25;120]
D1		[mm]	65	65	65	65	65	65
AC	1~/3~ TP	[mm]	141/141	178/141	178/178	-/178	-/198	-/220
	1~/3~ TPE	[mm]	141/-	141/178	-/178	-/178	-/198	-/220
AD	1~/3~ TP	[mm]	133/109	139/109	139/110	-/110	-/120	-/134
	1~/3~ TPE	[mm]	140/-	140/167	-/167	-/167	-/177	-/188
AE		[mm]	105/-	105/132	-/132	-/132	-/132	-/145
AF		[mm]	105/-	105/132	-/132	-/132	-/132	-/145
P		[mm]	-	-	-	200	250	250
B1 ★★		[mm]	93/195	100/225	100/225	142/298	142/298	142/298
B2 ★★		[mm]	93/210	100/225	100/225	124/290	124/290	124/290
B3		[mm]	240	240	240	320	320	320
B4 ★★	TP	[mm]	133/195	139/225	139/225	142/298	142/298	142/298
	1~ TPE	[mm]	140/225	140/225	-	-	-	-
	3~ TPE	[mm]	-	167/320	167/320	167/360	177/366	188/385
C1 ★★		[mm]	120/240	120/240	120/240	144/400	144/400	144/400
C5 ★★		[mm]	170/63	170/63	170/63	180/65	180/65	180/65
C6		[mm]	153	153	153	175	175	175
L1		[mm]	340	340	340	360	360	360
H1		[mm]	82	82	82	105	105	105
H2		[mm]	145	144	154	172	201	201
H3	1~/3~ TP	[mm]	468/418	517/532	557/507	-/598	-/641	-/678
	1~/3~ TPE	[mm]	418/-	462/512	-/517	-/598	-/641	-/678
H4		[mm]	-	-	-	-	-	-
M			M12	M12	M12	M16	M16	M16

★ TP(E), TP(E)D pumps are primarily fitted with IE3 motors. See *Motors*, page 72.

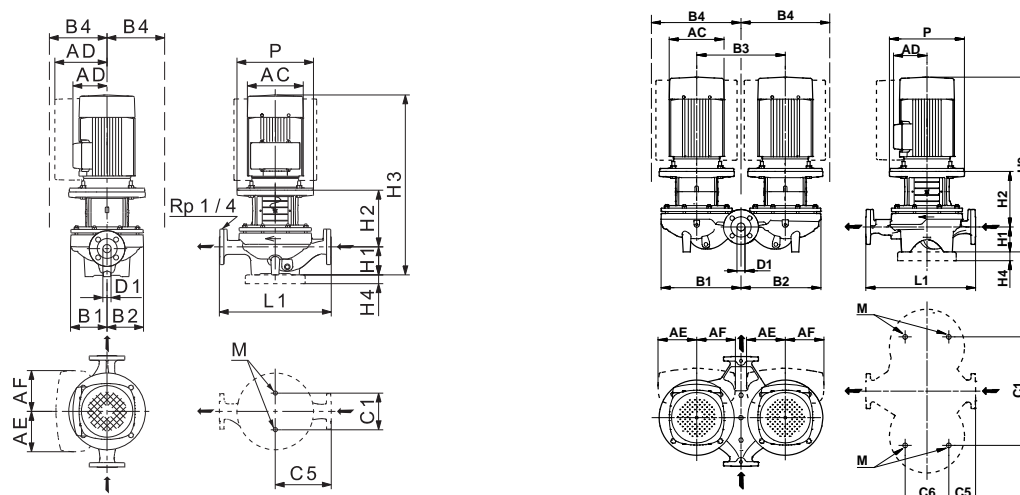
★★ The dimension before the slash applies to the single-head pump, and the dimension after the slash applies to the twin-head pump.

TP 65-XX/2



TM02 5024 0504

Note: All curves apply to single-head pumps. For further information, see page 93.



TM02 8632 5004 - TM02 8631 5004

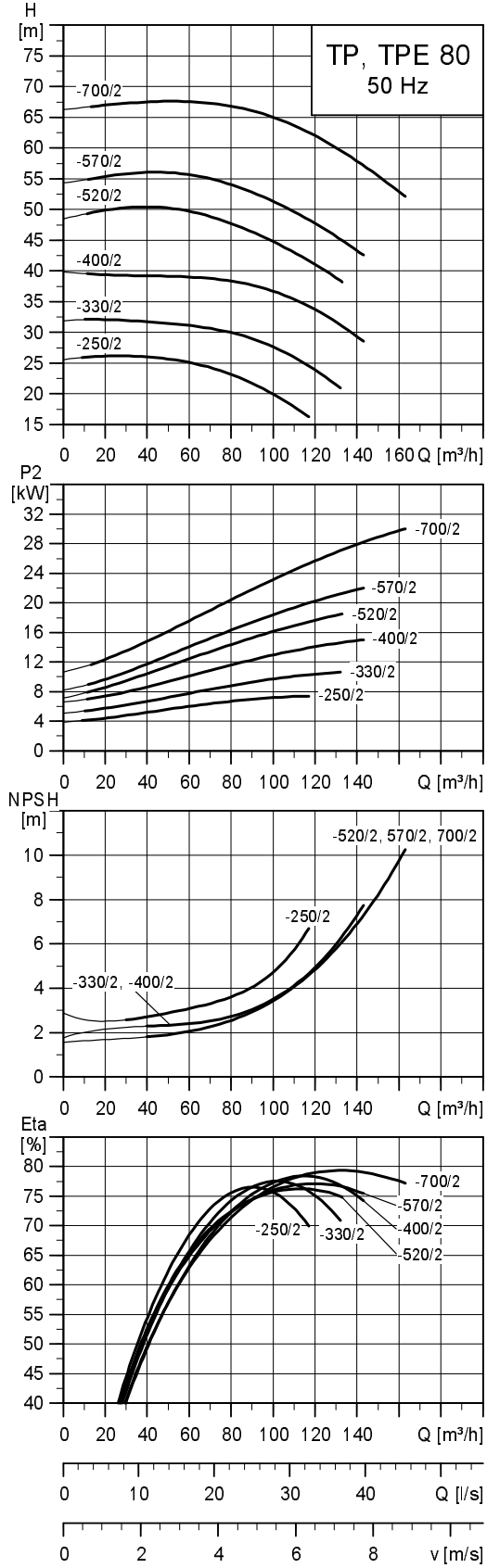
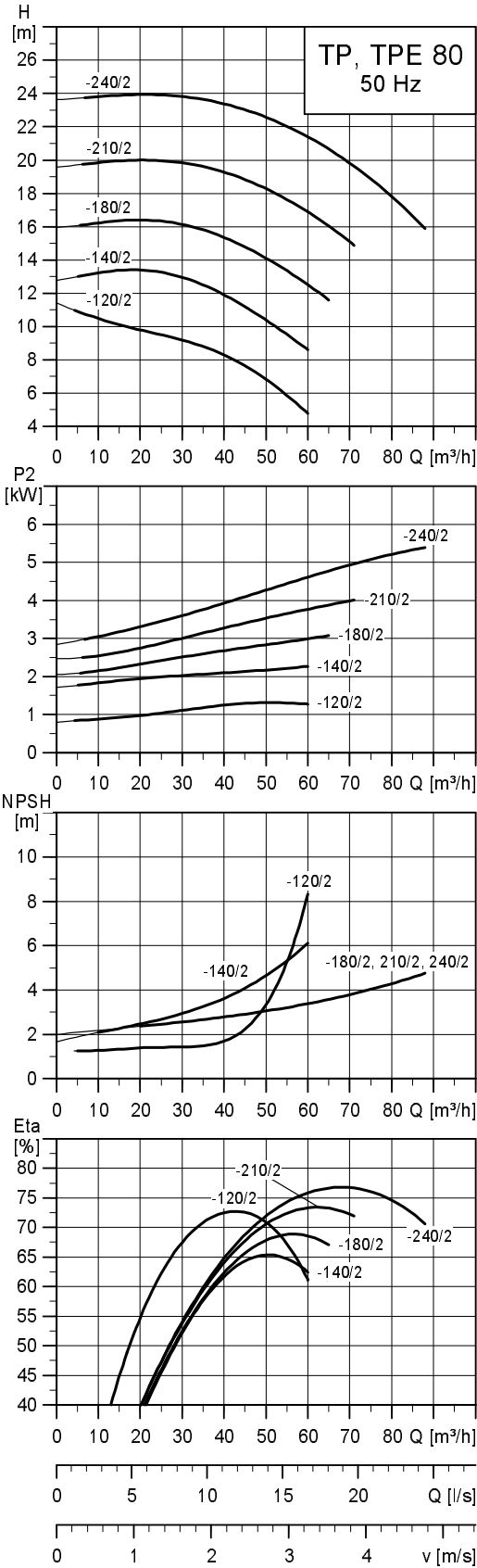
Technical data

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	200	
	1~ TPE	-	-	-	-	-	-	-	
	3~ TPE	132	132	160	160	160	180	-	
P2	1~/3~ TP ★	[kW]	-/5.5	-/7.5	-/11	-/15	-/18.5	-/22	-/30
	1~/3~ TPE	[kW]	-/5.5	-/7.5	-/11	-/15	-/18.5	-/22	-/-
PN		PN 16	PN 16	PN 16	PN 16	PN 16	PN 16	PN 16	
T _{min} , T _{max}	[°C]	[-25;120]	[-25;120]	[-25;120]	[-25;120]	[-25;120]	[-25;120]	[-25;120]	
D1	[mm]	65	65	65	65	65	65	65	
AC	1~/3~ TP	[mm]	-/220	-/260	-/314	-/314	-/314	-/314	-/407
	1~/3~ TPE	[mm]	-/220	-/260	-/314	-/314	-/314	-/314	-/-
AD	1~/3~ TP	[mm]	-/134	-/159	-/204	-/204	-/204	-/204	-/315
	1~/3~ TPE	[mm]	-/188	-/213	-/308	-/308	-/308	-/308	-/-
AE	1~/3~ TPE	[mm]	-/145	-/145	-/210	-/210	-/210	-/210	-
AF	1~/3~ TPE	[mm]	-/145	-/145	-/210	-/210	-/210	-/210	-
P	[mm]	300	300	350	350	350	350	400	
B1 ★★	[mm]	142/298	142/298	178/349	178/349	178/349	178/349	178/349	
B2 ★★	[mm]	124/290	124/290	164/383	164/383	164/383	164/383	164/383	
B3	[mm]	320	320	440	440	440	440	440	
B4 ★★	TP	[mm]	150/310	159/310	204/395	204/395	204/395	204/395	300/421
	1~ TPE	[mm]	-	-	-	-	-	-	-
	3~ TPE	[mm]	188/385	213/396	308/558	308/558	308/558	308/558	-
C1 ★★	[mm]	144/400	144/400	144/520	144/520	144/520	144/520	144/520	
C5 ★★	[mm]	180/65	180/65	238/111	238/111	238/111	238/111	238/111	
C6	[mm]	175	175	175	175	175	175	175	
L1	[mm]	360	360	475	475	475	475	475	
H1	[mm]	105	105	125	125	125	125	125	
H2	[mm]	239	239	263	263	263	263	263	
H3	1~/3~ TP	[mm]	-/735	-/723	-/859	-/859	-/903	-/903	-/999
	1~/3~ TPE	[mm]	-/735	-/723	-/859	-/859	-/903	-/929	-/-
H4	[mm]	-	-	35	35	35	35	35	
M		M16	M16	M16	M16	M16	M16	M16	

★ TP(E), TP(E)D pumps are primarily fitted with IE3 motors. See *Motors*, page 72.

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

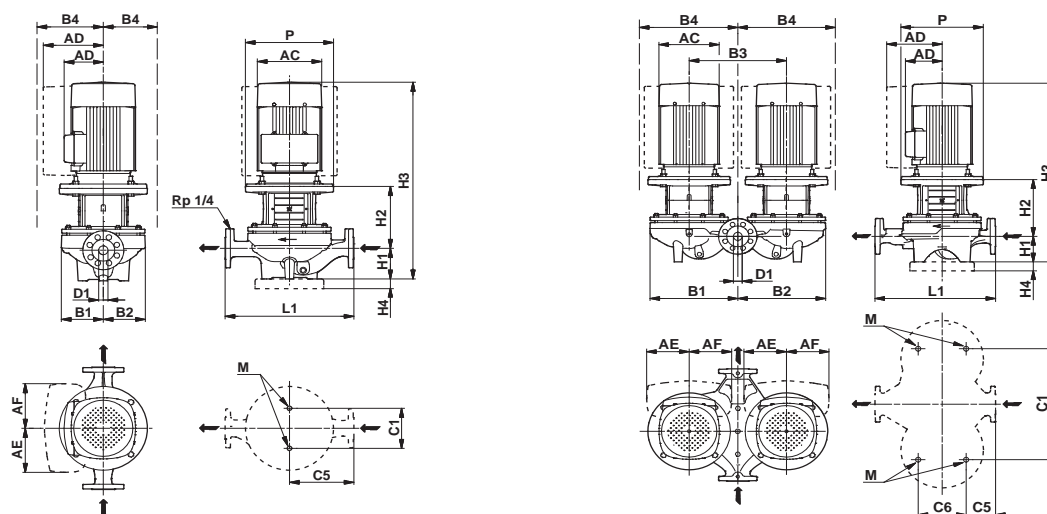
TP 80-XX/2



Note: All curves apply to single-head pumps. For further information, see page 93.

TM02 5025 4509

TM02 8750 0904



TM03 5348 3406 - TM03 6349 3406

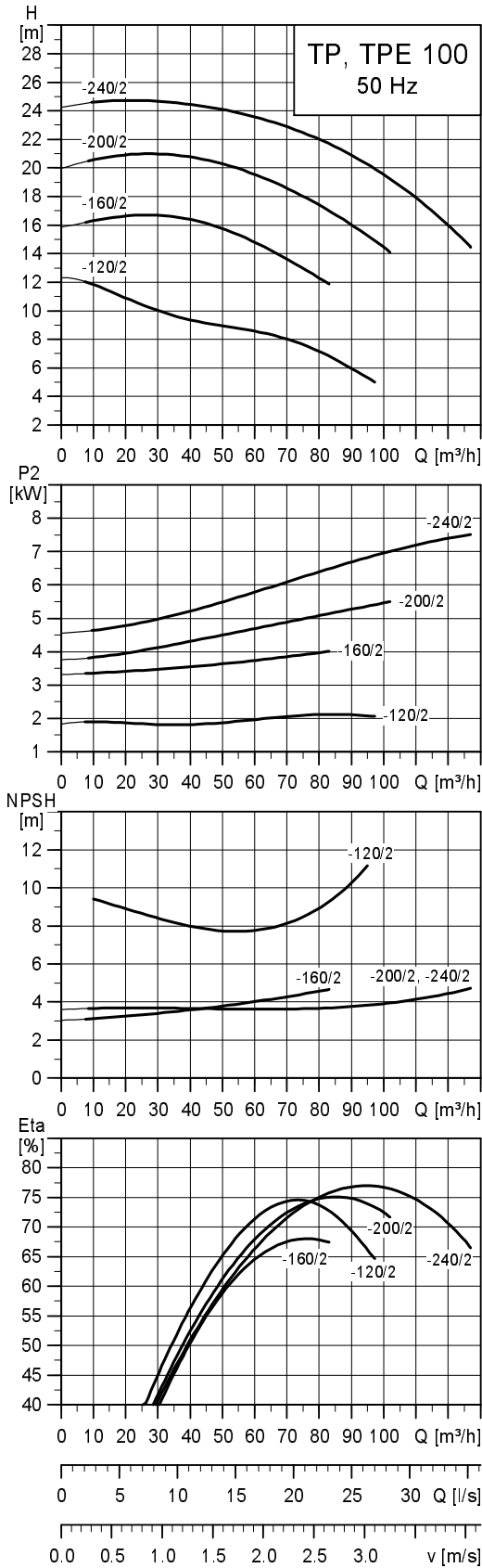
Technical data

TP 80		-120/2	-140/2	-180/2	-210/2	-240/2	-250/2	-330/2	-400/2	-520/2	-570/2	-700/2
TPD		•	•	•	•	•	•	•	•	•	•	•
TPE		•	•	•	•	•	•	•	•	•	•	-
TPED		•	•	•	•	•	•	•	•	•	•	-
Series		200	300	300	300	300	300	300	300	300	300	300
IEC size	1~ TP	90	-	-	-	-	-	-	-	-	-	-
	3~ TP	90	90	100	112	132	132	160	160	160	180	200
	1~ TPE	-	-	-	-	-	-	-	-	-	-	-
	3~ TPE	90	90	100	112	132	132	160	160	160	180	-
P2	1~3~ TP ★ [kW]	1.5/1.5	-2.2	-3	-4	-5.5	-7.5	-11	-15	-18.5	-22	-30
	1~3~ TPE [kW]	-1.5	-2.2	-3	-4	-5.5	-7.5	-11	-15	-18.5	-22	-
PN		PN 6/PN10	PN 16	PN 16	PN 16	PN 16	PN 16	PN 16	PN 16	PN 16	PN 16	PN 16
T _{min} -T _{max}	[°C]	[-25;140]	[-25;120]	[-25;120]	[-25;120]	[-25;120]	[-25;120]	[-25;120]	[-25;120]	[-25;120]	[-25;120]	[-25;120]
D1	[mm]	80	80	80	80	80	80	80	80	80	80	80
AC	1~3~ TP [mm]	178/178	-178	-198	-220	-220	-260	-314	-314	-314	-314	-402
	1~3~ TPE [mm]	-178	-178	-198	-220	-220	-260	-314	-314	-314	-314	-
AD	1~3~ TP [mm]	139/139	-110	-120	-134	-134	-159	-204	-204	-204	-204	-315
	1~3~ TPE [mm]	-167	-167	-177	-188	-188	-213	-308	-308	-308	-308	-
AE	1~3~ TPE [mm]	-132	132	132	145	145	145	210	210	210	210	-
AF	1~3~ TPE [mm]	-132	132	132	145	145	145	210	210	210	210	-
P	[mm]	135/135	200	250	250	300	300	350	350	350	350	400
B1 ★★	[mm]	120/134	125/296	125/296	125/296	125/296	176/366	176/366	176/366	187/416	187/416	187/416
	[mm]	100/225	119/290	119/290	119/290	119/290	144/354	144/354	144/354	162/405	162/405	162/405
B3	[mm]	240	340	340	340	340	400	400	400	470	470	470
	TP [mm]	120/225	125/296	125/296	134/296	150/320	176/366	204/375	204/375	204/416	204/416	300/436
B4 ★★	1~ TPE [mm]	-	-	-	-	-	-	-	-	-	-	-
	3~ TPE [mm]	167/320	167/296	177/296	188/395	188/395	213/366	308/538	308/538	308/573	308/573	-
C1 ★★	[mm]	160/240	144/420	144/420	144/420	144/420	144/480	144/480	144/480	144/550	144/550	144/550
C5 ★★	[mm]	180/53	180/78	180/78	180/78	180/78	220/93	220/93	220/93	250/133	250/133	250/133
C6	[mm]	173	175	175	175	175	175	175	175	350	350	350
L1	[mm]	360	360	360	360	360	440	440	440	500	500	500
H1	[mm]	97	105	105	105	105	115	115	115	115	115	115
H2	[mm]	163	176	204	204	243	243	273	273	273	273	273
	1~3~ TP [mm]	581/581	-/602	-/644	-/681	-/739	-/737	-/859	-/859	-/903	-/903	-/999
1~3~ TPE [mm]	-/541	-/602	-/644	-/681	-/739	-/737	-/859	-/859	-/903	-/929	-	
H4	[mm]	-	-	-	-	-	-	35	35	35	35	35
M		M16	M16	M16	M16	M16	M16	M16	M16	M16	M16	M16

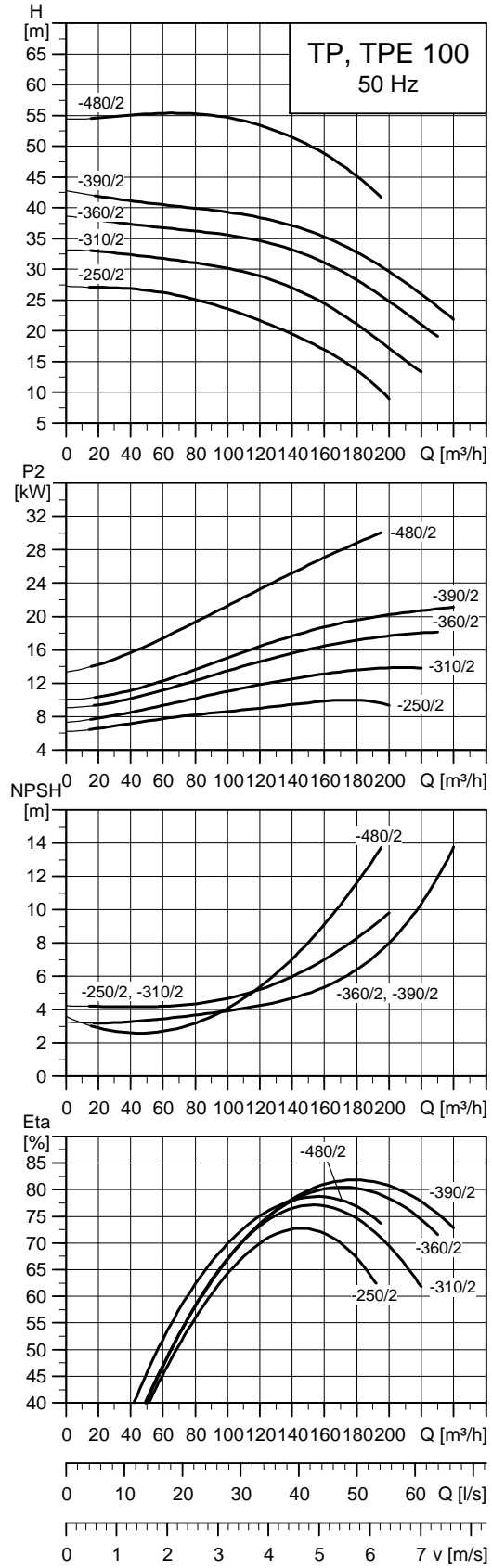
★ TP(E), TP(E)D pumps are primarily fitted with IE3 motors. See *Motors*, page 72.

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

TP 100-XX/2

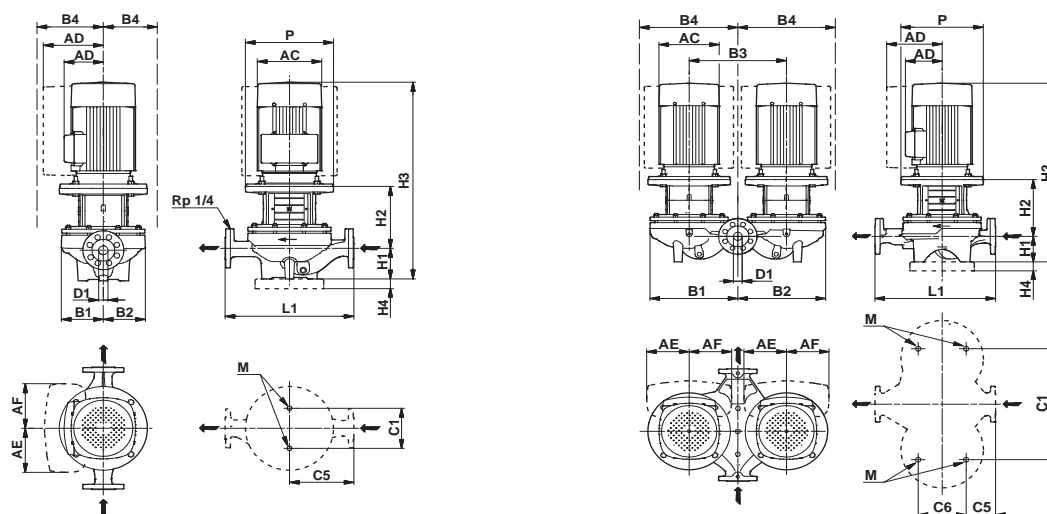


TM02 5026 4509



TM02 8751 4810

Note: All curves apply to single-head pumps. For further information, see page 93.



TM03 5348 3406 - TM03 6349 3406

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	200	
	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	-/-	
PN		PN 6/PN 10	PN 16	PN 16	PN 16	PN 16	PN 16	PN 16	PN 16	PN 16	
T _{min} -T _{max}	[°C]	[-25;140]	[-25;120]	[-25;120]	[-25;120]	[-25;120]	[-25;120]	[-25;120]	[-25;120]	[-25;120]	
D1	[mm]	100	100	100	100	100	100	100	100	100	
AC	1~/3~ TP [mm]	-178	-220	-220	-260	-314	-314	-314	-314	-407	
	1~/3~ TPE [mm]	-178	-220	-220	-260	-314	-314	-314	-314	-/-	
AD	1~/3~ TP [mm]	-110	-134	-134	-159	-204	-204	-204	-204	-315	
	1~/3~ TPE [mm]	-167	-188	-188	-213	-308	-308	-308	-308	-/-	
AE	1~/3~ TPE [mm]	-132	145	145	145	210	210	210	210	-/-	
AF	1~/3~ TPE [mm]	-132	145	145	145	210	210	210	210	-/-	
P	[mm]	-	250	300	300	350	350	350	350	400	
B1 ★★	[mm]	125/245	156/347	156/347	156/347	190/414	190/414	190/414	190/414	201/443	
B2 ★★	[mm]	100/265	124/332	124/332	124/332	151/395	151/395	151/395	151/395	173/429	
B4 ★★	B3	[mm]	280	470	470	470	470	500	500	500	
	TP	[mm]	125/265	156/360	156/385	159/385	204/425	204/425	204/425	204/425	300/451
	1~ TPE	[mm]	-	-	-	-	-	-	-	-	
	3~ TPE	[mm]	167/340	188/347	188/350	213/350	308/414	308/414	308/414	308/414	-
C1 ★★	[mm]	160/280	144/480	144/480	144/480	230/550	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	275/110	
C6	[mm]	221	175	175	175	230	230	230	230	230	
L1	[mm]	450	500	500	500	550	550	550	550	550	
H1	[mm]	107	140	140	140	140	140	140	140	140	
H2	[mm]	185	206	245	245	270	270	270	270	307	
	1~/3~ TP [mm]	-613	-718	-776	-764	-881	-881	-925	-925	-1058	
	1~/3~ TPE [mm]	-613	-718	-776	-764	-881	-881	-925	-951	-/-	
H4	[mm]	-	-	-	-	35	35	35	35	35	
M		M16	M16	M16	M16	M16	M16	M16	M16	M16	

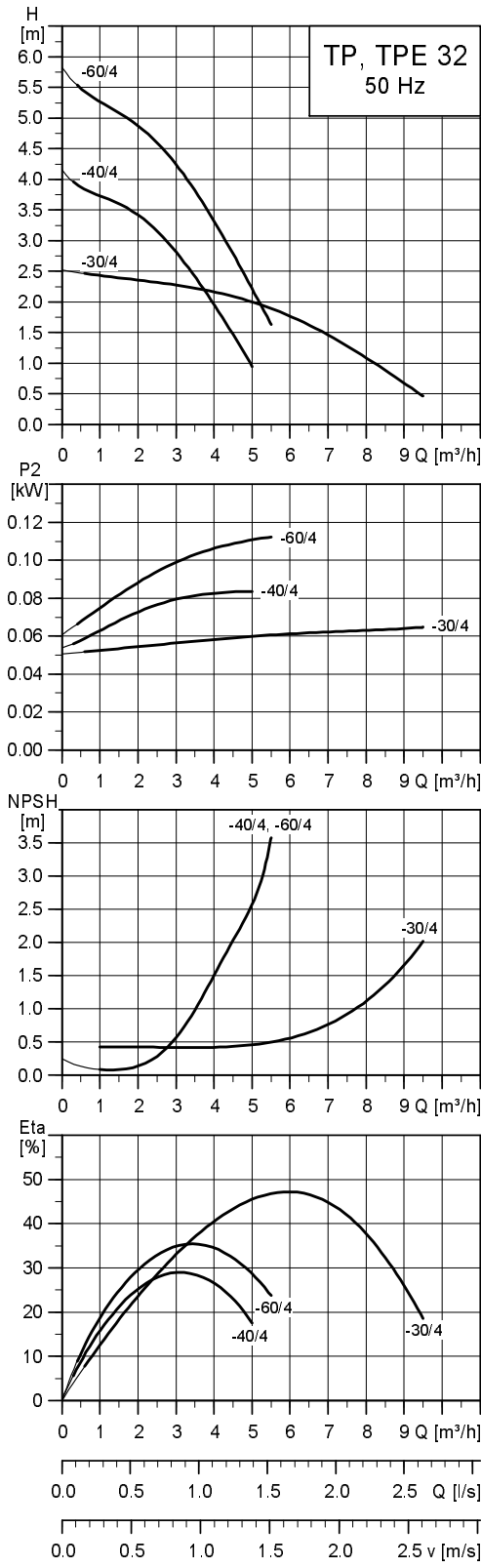
★ TP(E), TP(E)D pumps are primarily fitted with IE3 motors. See *Motors*, page 72.

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

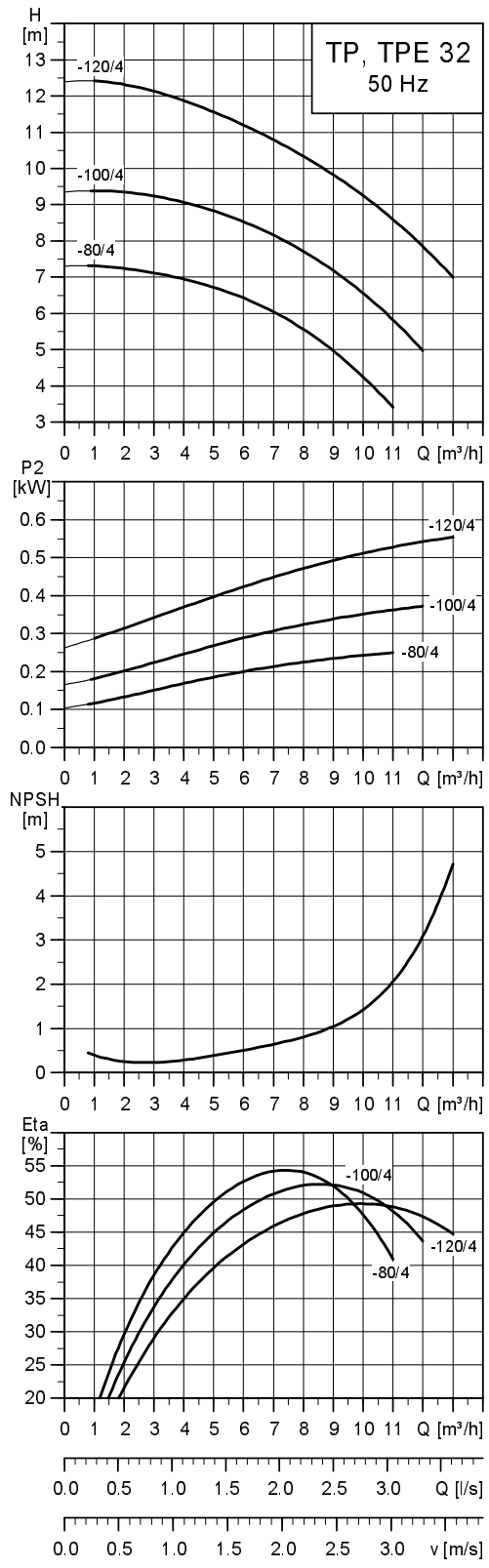
22. Performance curves and technical data

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

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

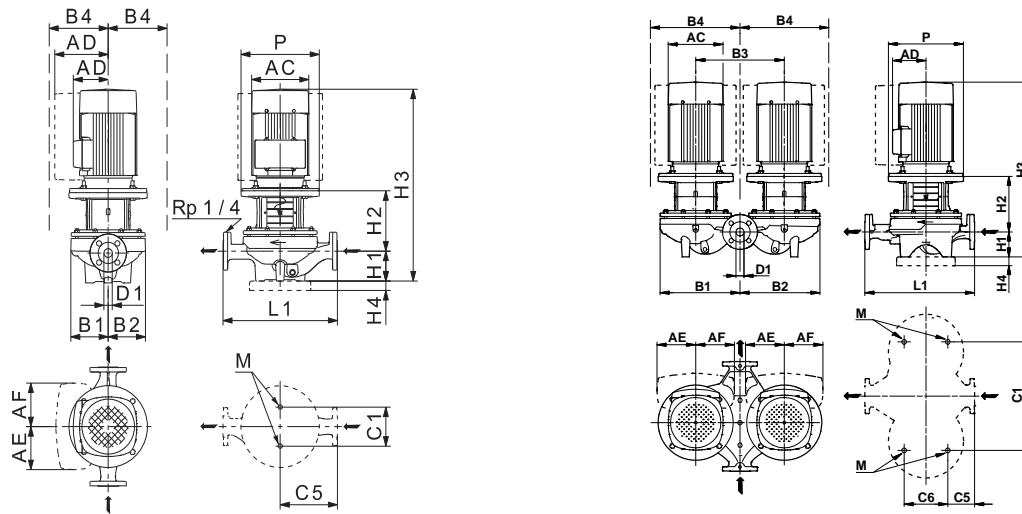


TM02 5027 4509



TM02 5028 0504

Note: All curves apply to single-head pumps. For further information, see page 93.



TM02 8632 5004 - TM02 8631 5004

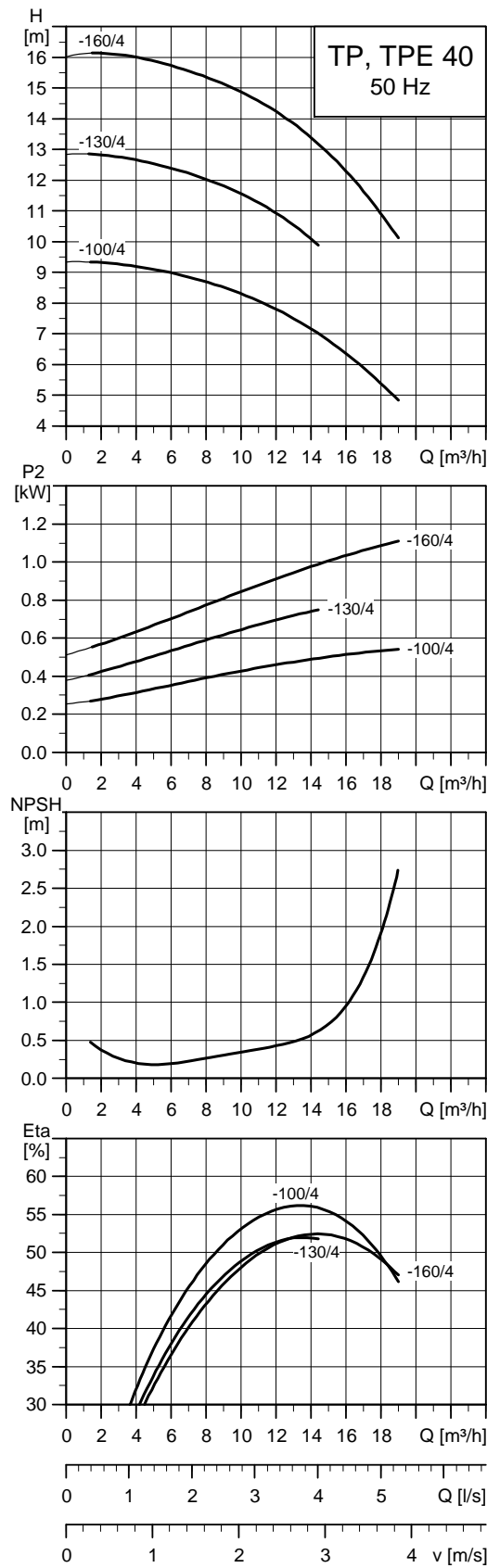
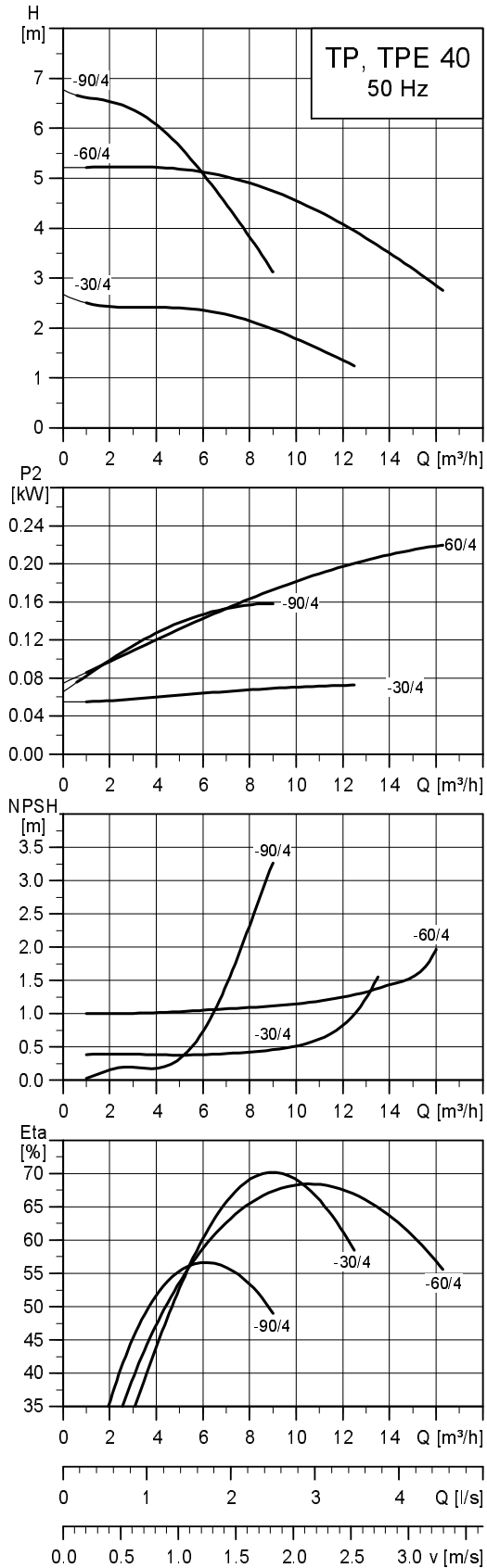
Technical data

TP 32			-30/4	-40/4	-60/4	-80/4	-100/4	-120/4
TPD			•	•	•	•	•	•
TPE			•	•	•	•	•	•
TPED			•	•	•	•	•	•
Series			200	200	200	300	300	300
IEC size	1~ TP		63	71	71	-	-	-
	3~ TP		63	71	71	71	71	80
	1~ TPE		71	71	71	71	71	80
	3~ TPE		-	-	-	-	-	80
P2	1~/3~ TP ★	[kW]	0.12/0.12	0.25/0.25	0.25/0.25	-/0.25	-/0.37	-/0.55
	1~/3~ TPE	[kW]	0.12/-	0.25/-	0.25/-	0.25/-	0.37/-	0.55/0.55
PN			PN 6/10	PN 6/10	PN 6/10	PN 16	PN 16	PN 16
$T_{min}; T_{max}$		[°C]	[-25;140]	[-25;140]	[-25;140]	[-25;120]	[-25;120]	[-25;120]
D1		[mm]	32	32	32	32	32	32
AC	1~/3~ TP	[mm]	118/118	141/141	141/141	-/141	-/141	-/141
	1~/3~ TPE	[mm]	141/-	141/-	141/-	141/-	141/-	141/178
AD	1~/3~ TP	[mm]	101/101	133/133	133/133	-/109	-/109	-/109
	1~/3~ TPE	[mm]	140/-	140/-	140/-	140/-	140/-	140/167
AE	1~/3~ TPE	[mm]	105/-	105/-	105/-	105/-	105/-	105/132
AF	1~/3~ TPE	[mm]	105/-	105/-	105/-	105/-	105/-	105/132
P		[mm]	-	105/105	-	170	170	200
B1 ★★		[mm]	75/180	100/222	100/222	125/260	125/260	144/321
B2 ★★		[mm]	75/180	100/222	100/222	117/257	117/257	144/321
B3		[mm]	200	240	240	276	276	355
	TP	[mm]	101/180	100/222	100/222	125/260	125/260	144/321
B4 ★★	1~ TPE	[mm]	140/264	140/225	140/225	140/260	140/260	144/321
	3~ TPE	[mm]	-/-	-/-	-/-	-/-	-/-	167/321
C1 ★★		[mm]	80/200	80/240	80/240	144/356	144/356	144/435
C5 ★★		[mm]	110/52	140/82	140/82	170/45	170/45	220/46
C6		[mm]	103	103	103	175	175	175
L1		[mm]	220	280	280	340	340	440
H1		[mm]	68	79	79	100	100	100
H2		[mm]	142	125	125	129	129	156
H3	1~/3~ TP	[mm]	416/390	395/395	395/395	-/420	-/420	-/487
	1~/3~ TPE	[mm]	408/-	395/-	395/-	420/-	420/-	487/537
H4		[mm]	-	-	-	-	-	-
M			M12	M12	M12	M16	M16	M16

★ TP(E), TP(E)D pumps are primarily fitted with IE3 motors. See *Motors*, page 72.

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

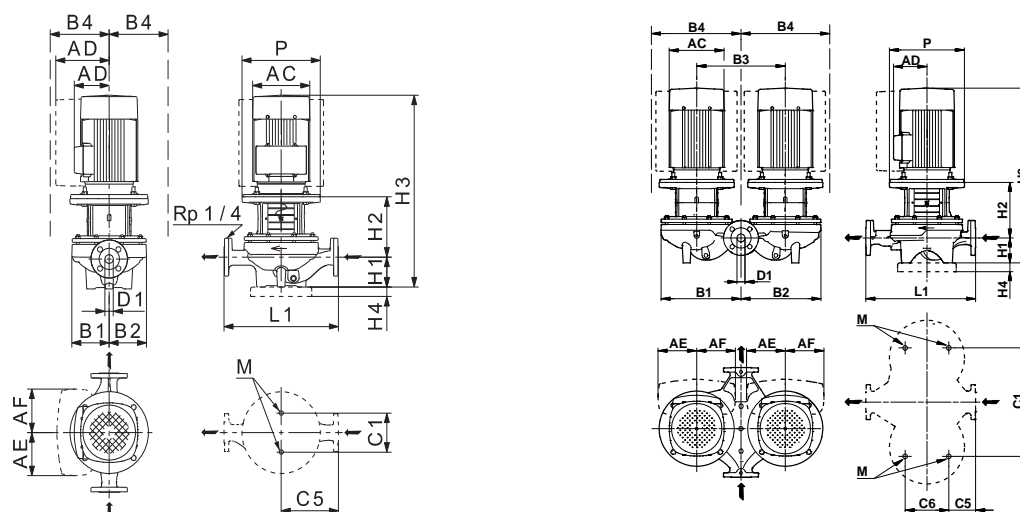
TP 40-XXX/4



Note: All curves apply to single-head pumps. For further information, see page 93.

TM02 5029 4509

TM02 5030 4810



TM02 8632 5004 - TM02 8631 5004

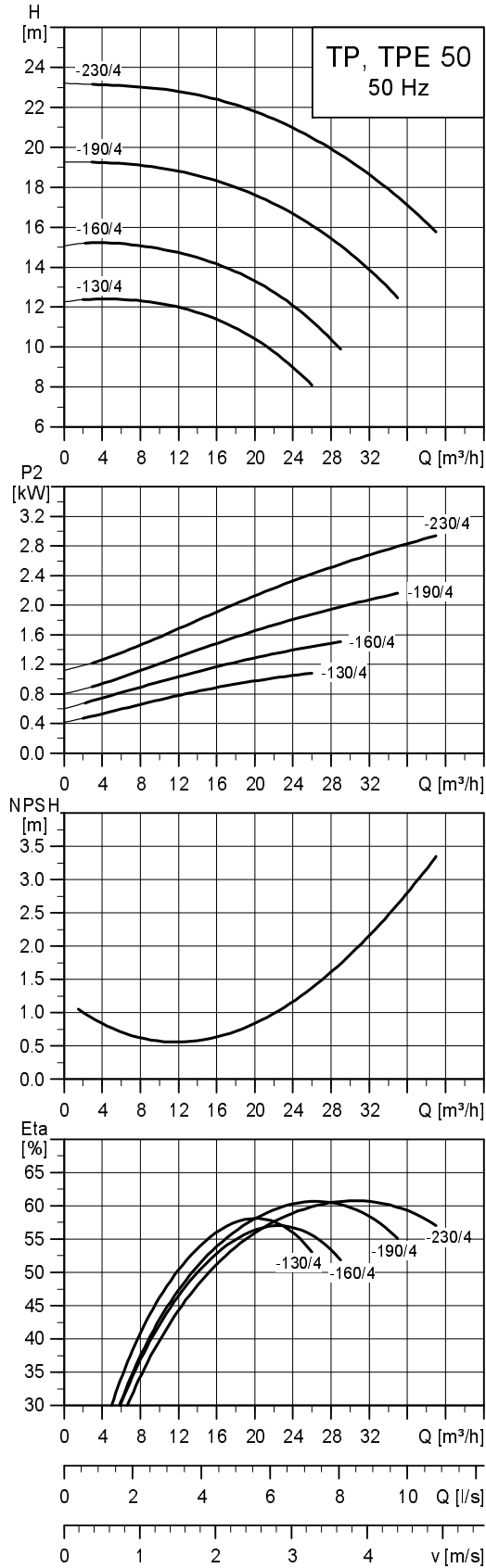
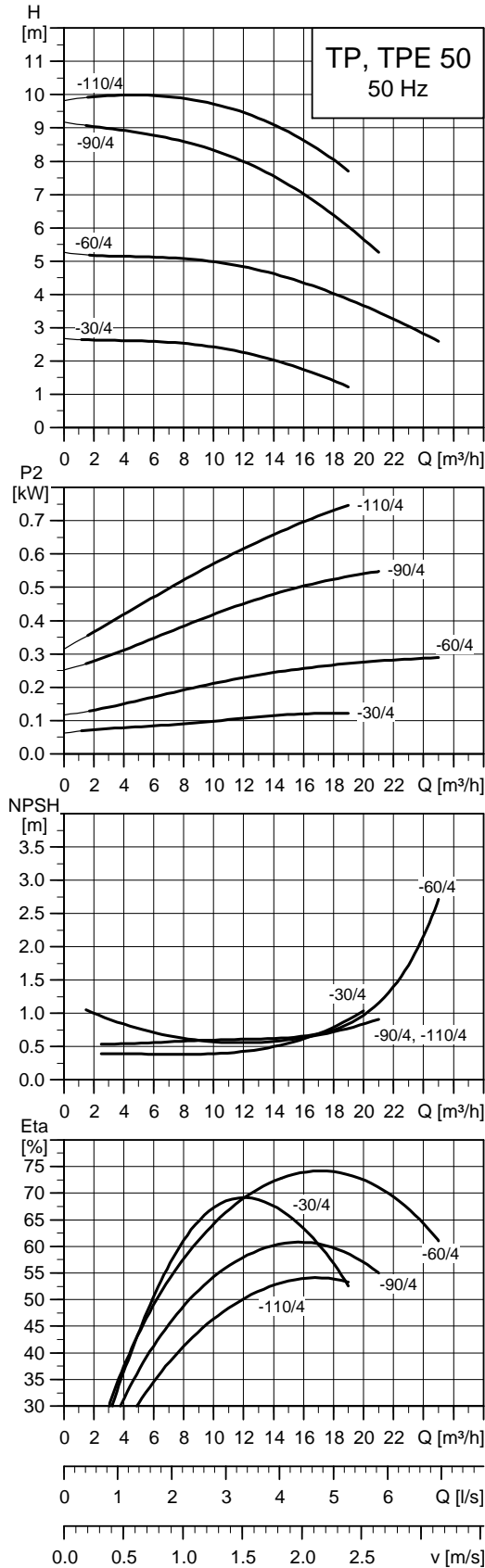
Technical data

TP 40			-30/4	-60/4	-90/4	-100/4	-130/4	-160/4
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		71	71	71	80	80	-
	3~ TPE		-	-	-	90	90	90
P2	1~3~ TP ★	[kW]	0.12/0.12	0.25/0.25	0.25/0.25	-0.55	-0.75	-1.1
	1~3~ TPE	[kW]	0.12/-	0.25/-	0.25/-	0.55/0.55	0.75/0.75	-1.1
PN			PN 6/10	PN 6/10	PN 16	PN 16	PN 16	PN 16
T _{min} :T _{max}		[°C]	[-25;140]	[-25;140]	[-25;140]	[-25;120]	[-25;120]	[-25;120]
D1		[mm]	40	40	40	40	40	40
AC	1~3~ TP	[mm]	118/118	141/141	141/141	-141	-178	-178
	1~3~ TPE	[mm]	141/-	141/-	141/-	141/178	141/178	-178
AD	1~3~ TP	[mm]	101/101	133/109	133/133	-109	-110	-110
	1~3~ TPE	[mm]	140/-	140/-	140/-	140/167	140/167	-167
AE	1~3~ TPE	[mm]	105/-	105/-	105/-	105/132	105/132	-132
AF	1~3~ TPE	[mm]	105/-	105/-	105/-	105/132	105/132	-132
P		[mm]	-	-	105	200	200	200
B1 ★★		[mm]	85/180	100/-	100/222	130/273	149/325	149/325
B2 ★★		[mm]	75/180	100/-	100/222	117/267	144/321	144/321
B3		[mm]	200	-	240	290	355	355
	TP	[mm]	101/180	133/-	100/222	130/273	149/325	149/325
B4 ★★	1~ TPE	[mm]	140/264	140/225	140/225	140/273	149/325	-/-
	3~ TPE	[mm]	-/-	-/-	-/-	167/277	167/325	167/325
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	158	158
	1~3~ TP	[mm]	419/393	389/389	388/398	-497	-549	-589
H3	1~3~ TPE	[mm]	411/-	389/-	388/-	507/547	499/549	-549
H4		[mm]	-	-	-	-	-	-
M			M12	M12	M12	M16	M16	M16

★ TP(E), TP(E)D pumps are primarily fitted with IE3 motors. See *Motors*, page 72.

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

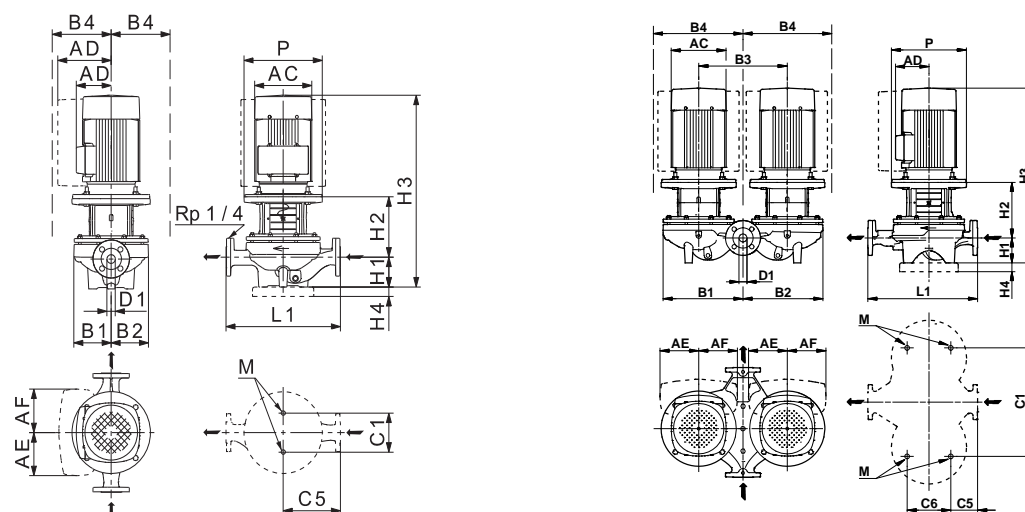
TP 50-XXX/4



Note: All curves apply to single-head pumps. For further information, see page 93.

TM02 5031 4810

TM02 5032 0504



TM02 8632 5004 - TM02 8631 5004

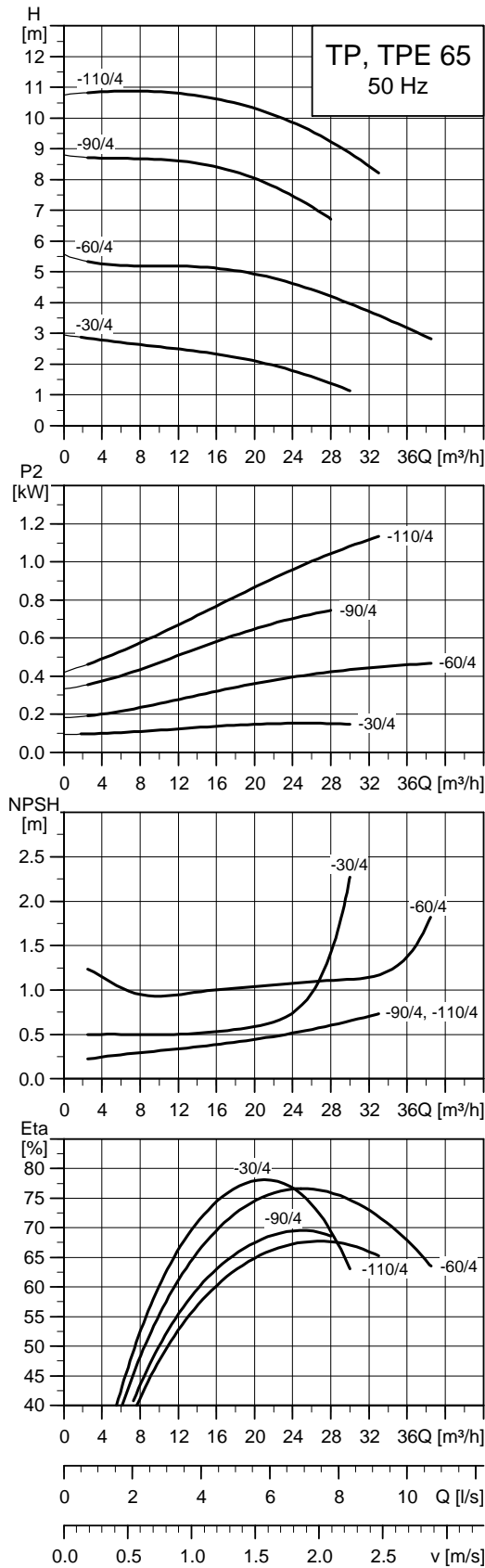
Technical data

		-30/4	-60/4	-90/4	-110/4	-130/4	-160/4	-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	71	71	80	80	-	-	-	-	
	3~ TPE	-	-	90	90	90	90	90	90	
P2	1~/3~ TP ★	[kW]	0.25/0.25	0.37/0.37	-/0.55	-/0.75	-/1.1	-/1.5	-/2.2	-/3
	1~/3~ TPE	[kW]	0.25/-	0.37/-	0.55/0.55	0.75/0.75	-/1.1	-/1.5	-/2.2	-/3
PN		PN 6/10	PN 6/10	PN 16	PN 16	PN 16	PN 16	PN 16	PN 16	
T _{min} :T _{max}	[°C]	[-25;140]	[-25;140]	[-25;120]	[-25;120]	[-25;120]	[-25;120]	[-25;120]	[-25;120]	
D1	[mm]	50	50	50	50	50	50	50	50	
AC	1~/3~ TP	[mm]	141/142	141/141	-/141	-/178	-/178	-/178	-/198	-/198
	1~/3~ TPE	[mm]	141/-	141/-	141/178	141/178	-/178	-/178	-/198	-/198
AD	1~/3~ TP	[mm]	133/133	133/109	-/109	-/110	-/110	-/110	-/120	-/120
	1~/3~ TPE	[mm]	140/-	140/-	140/167	140/167	-/167	-/167	-/177	-/177
AE	1~/3~ TPE	[mm]	105/-	105/-	105/132	105/132	-/132	-/132	-/132	-/132
AF	1~/3~ TPE	[mm]	105/-	105/-	105/132	105/132	-/132	-/132	-/132	-/132
P	[mm]	-	-	200	200	200	200	250	250	
B1 ★★	[mm]	75/181	110/225	133/290	180/386	180/386	180/386	180/386	180/386	
B2 ★★	[mm]	90/186	100/225	119/284	164/379	164/379	164/379	164/379	164/379	
B3	[mm]	200	240	320	420	420	420	420	420	
B4 ★★	TP	[mm]	133/186	133/225	133/290	180/386	180/386	180/386	180/386	
	1~ TPE	[mm]	140/264	140/225	140/290	180/386	-/-	-/-	-/-	
	3~ TPE	[mm]	-/-	-/-	167/290	180/386	180/386	180/386	180/386	
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	167	167	167	195	195	
H3	1~/3~ TP	[mm]	408/416	452/400	-/507	-/553	-/603	-/603	-/645	-/645
	1~/3~ TPE	[mm]	408/-	400/-	507/557	513/563	-/563	-/603	-/645	-/645
H4	[mm]	-	-	-	-	-	-	-	-	
M		M12	M12	M16	M16	M16	M16	M16	M16	

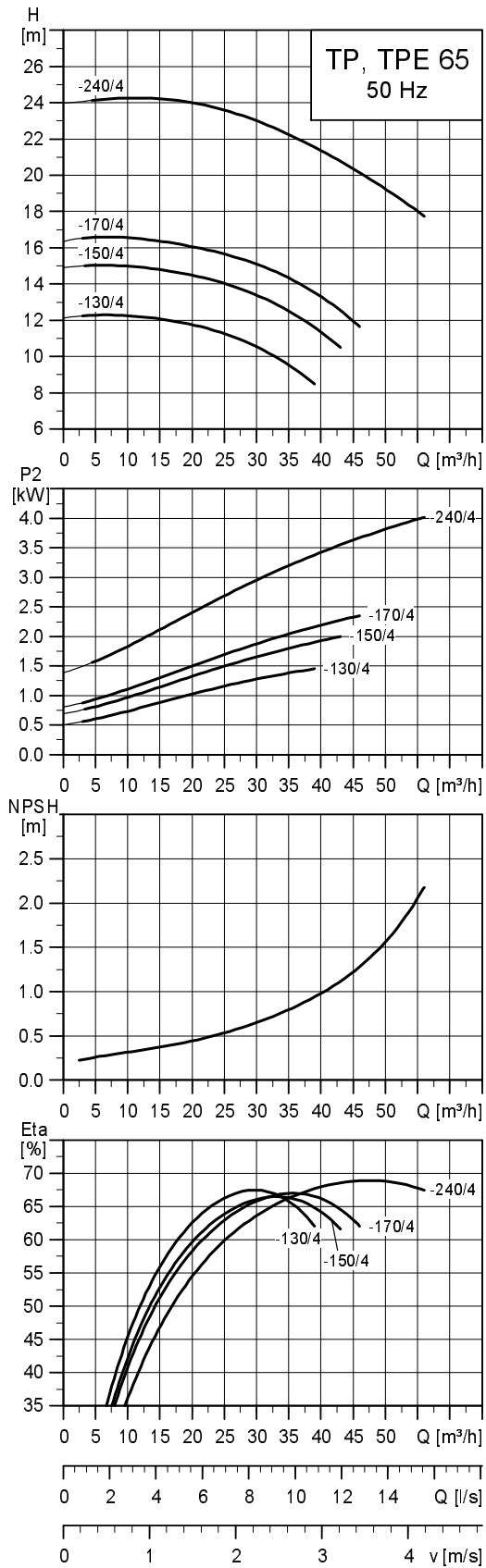
★ TP(E), TP(E)D pumps are primarily fitted with IE3 motors. See *Motors*, page 72.

★★ 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

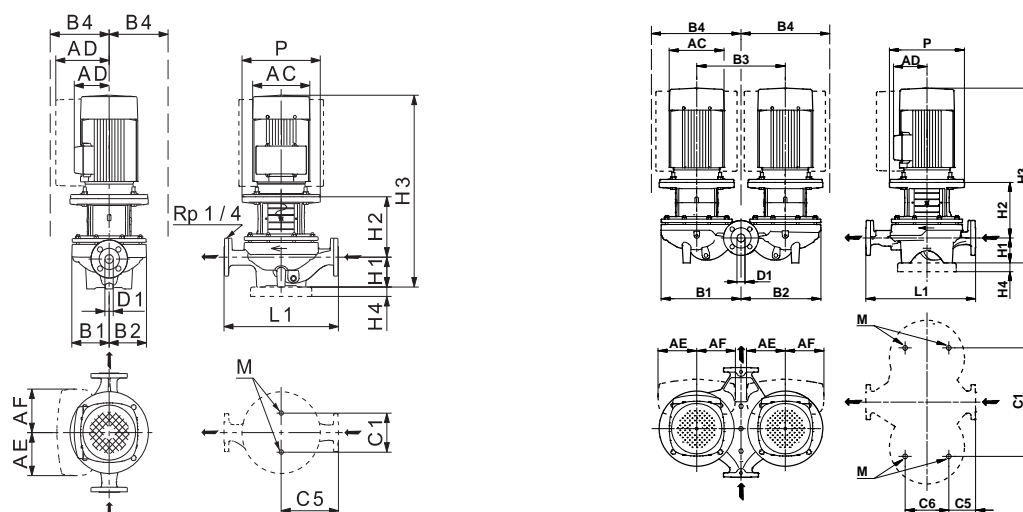


TM02 5033 4810



TM02 5043 0504

Note: All curves apply to single-head pumps. For further information, see page 93.



TM02 8632 5004 - TM02 8631 5004

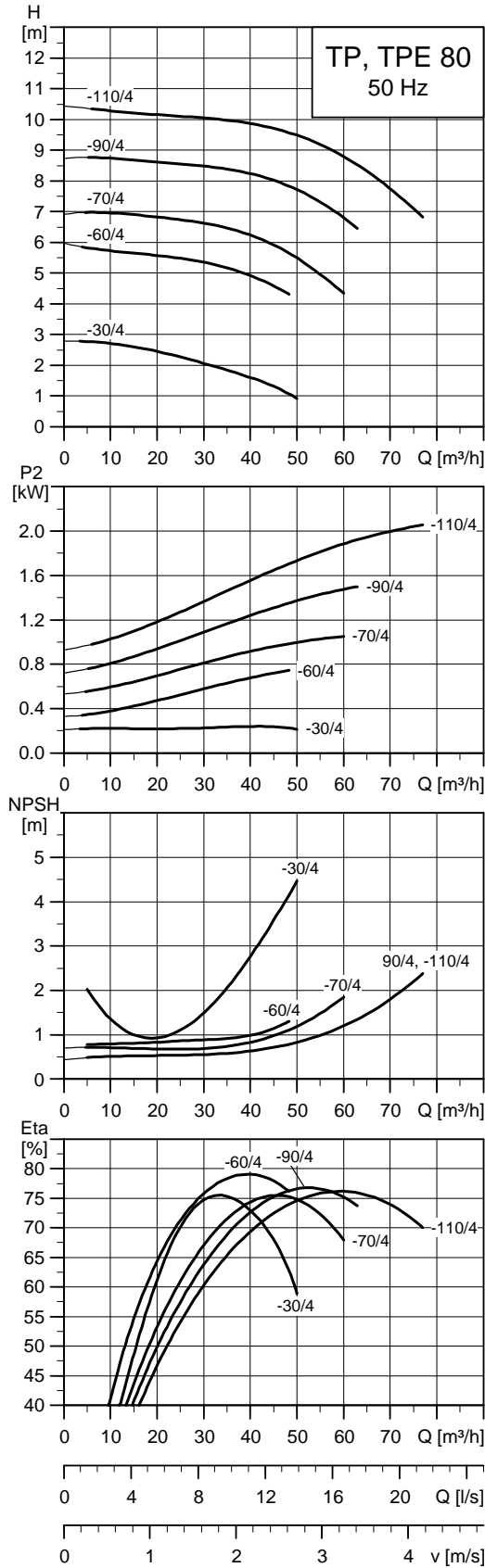
Technical data

TP 65		-30/4	-60/4	-90/4	-110/4	-130/4	-150/4	-170/4	-240/4	
TPD		•	•	•	•	•	•	•	•	
TPE		•	•	•	•	•	•	•	•	
TPED		•	•	•	•	•	•	•	•	
Series		200	200	300	300	300	300	300	300	
IEC size	1~ TP	71	80	-	-	-	-	-	-	
	3~ TP	71	80	80	90	90	100	100	112	
	1~ TPE	71	80	80	-	-	-	-	-	
	3~ TPE	-	90	90	90	90	100	100	112	
P2	1~/3~ TP ★	[kW]	0.25/0.25	0.55/0.55	-0.75	-1.1	-1.5	-2.2	-3	-4
	1~/3~ TPE	[kW]	0.25/-	0.55/0.55	0.75/0.75	-1.1	-1.5	-2.2	-3	-4
PN		PN 6/10	PN 6/10	PN 16	PN 16	PN 16	PN 16	PN 16	PN 16	
T _{min} :T _{max}	[°C]	[-25;140]	[-25;140]	[-25;120]	[-25;120]	[-25;120]	[-25;120]	[-25;120]	[-25;120]	
D1	[mm]	65	65	65	65	65	65	65	65	
AC	1~/3~ TP	[mm]	141/141	141/141	-178	-178	-178	-198	-198	-220
	1~/3~ TPE	[mm]	141/-	141/178	141/178	-178	-178	-198	-198	-220
AD	1~/3~ TP	[mm]	133/109	133/109	-110	-110	-110	-120	-120	-134
	1~/3~ TPE	[mm]	140/-	140/167	140/167	-167	-167	-177	-177	-188
AE	1~/3~ TPE	[mm]	105/-	105/132	105/105	-132	-132	-132	-132	-145
AF	1~/3~ TPE	[mm]	105/-	105/132	105/105	-132	-132	-132	-132	-145
P	[mm]	-	-	200	200	200	250	250	250	
B1 ★★	[mm]	125/230	125/230	142/298	178/349	178/349	178/349	178/349	178/349	
B2 ★★	[mm]	100/240	100/240	124/290	164/383	164/383	164/0	164/383	164/383	
B3	[mm]	240	240	320	440	440	440	440	440	
B4 ★★	TP	[mm]	133/240	133/240	142/298	178/383	178/383	178/349	178/383	178/383
	1~ TPE	[mm]	140/240	140/240	142/298	-/-	-/-	-/-	-/-	-/-
	3~ TPE	[mm]	-/-	167/320	167/360	178/383	178/383	178/383	178/383	188/365
C1 ★★	[mm]	160/240	160/240	144/400	144/520	144/520	144/520	144/520	144/520	
C5 ★★	[mm]	170/63	170/63	180/65	238/111	238/111	238/111	238/111	238/111	
C6	[mm]	153	153	175	175	175	175	175	175	
L1	[mm]	340	340	360	475	475	475	475	475	
H1	[mm]	97	97	105	125	125	125	125	125	
H2	[mm]	135	147	172	166	166	194	194	194	
H3	1~/3~ TP	[mm]	423/423	475/475	-/558	-/612	-/612	-/654	-/654	-/691
	1~/3~ TPE	[mm]	423/-	475/525	508/558	-/572	-/612	-/654	-/654	-/691
H4	[mm]	-	-	-	-	-	-	-	-	
M		M16	M16	M16	M16	M16	M16	M16	M16	

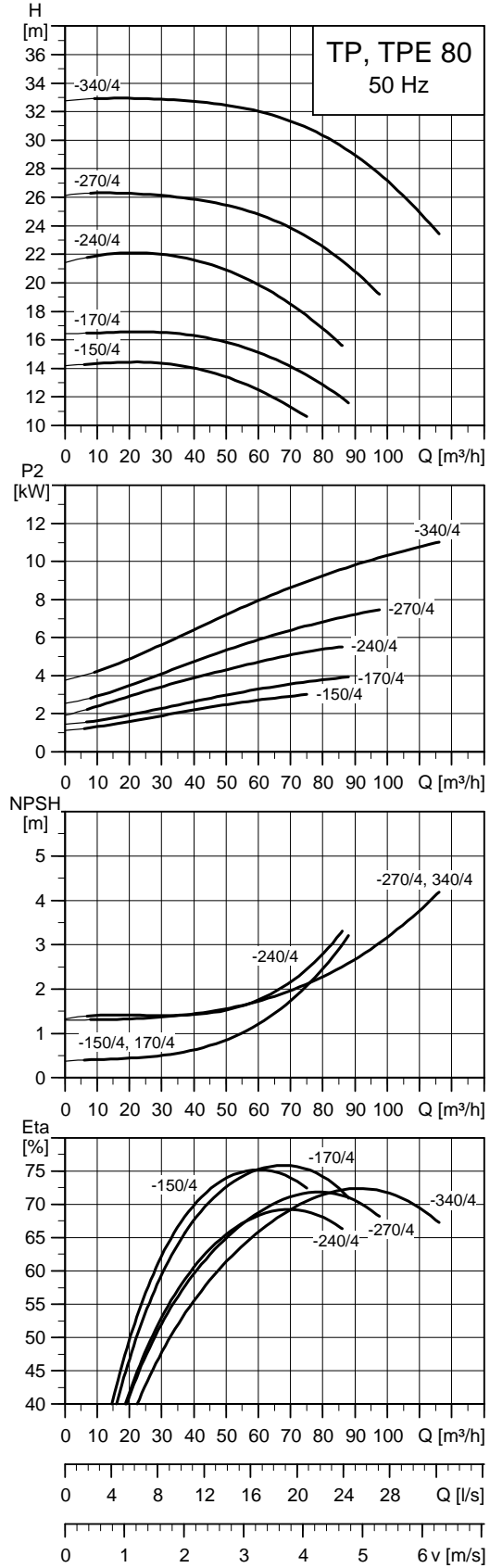
★ TP(E), TP(E)D pumps are primarily fitted with IE3 motors. See *Motors*, page 72.

★★ 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

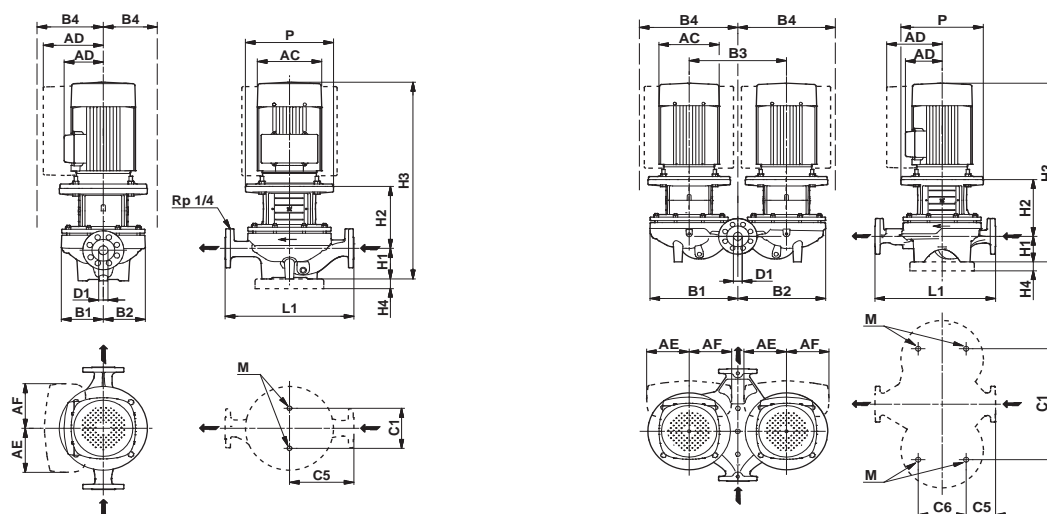


TM02 5044 4810



TM02 8752 4810

Note: All curves apply to single-head pumps. For further information, see page 93.



TM03 5348 - 3406 - TM03 6349 3406

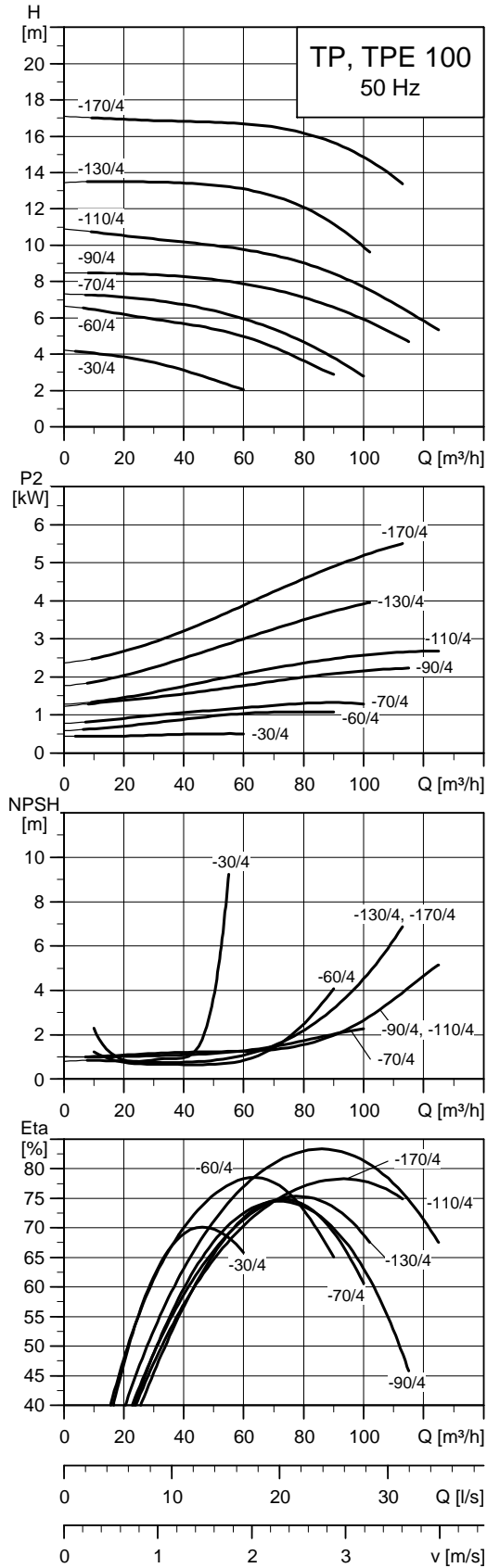
Technical data

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	71	80	-	-	-	-	-	-	-	-
	3~ TPE	-	90	90	90	100	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]	0.37/-	0.75/0.75	-1.1	-1.5	-2.2	-3	-4	-5.5	-7.5	-11
PN		PN 6/PN 10	PN 6/PN 10	PN 16	PN 16	PN 16	PN 16	PN 16	PN 16	PN 16	PN 16
T _{min} , T _{max}	[°C]	[-25;140]	[-25;140]	[-25;120]	[-25;120]	[-25;120]	[-25;120]	[-25;120]	[-25;120]	[-25;120]	[-25;120]
D1	[mm]	80	80	80	80	80	80	80	80	80	80
AC	1~3~ TP [mm]	142/141	178/178	-178	-178	-198	-198	-220	-260	-260	-314
	1~3~ TPE [mm]	141/-	141/178	-178	-178	-198	-198	-220	-260	-260	-314
AD	1~3~ TP [mm]	133/109	139/110	-110	-110	-120	-120	-134	-159	-159	-204
	1~3~ TPE [mm]	140/-	140/167	-167	-167	-177	-177	-188	-213	-213	-308
AE	1~3~ TPE [mm]	105/-	105/132	132	132	132	132	145	145	145	210
AF	1~3~ TPE [mm]	105/-	105/132	132	132	132	132	145	145	145	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 ★★	TP [mm]	133/230	139/240	176/366	176/366	176/366	187/416	187/416	243/491	243/491	243/491
	1~ TPE [mm]	140/240	140/250	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-
	3~ TPE [mm]	-/-	167/320	176/366	176/366	177/366	187/416	188/416	243/491	243/491	308/491
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]	461/-	491/541	-572	-612	-654	-654	-691	-792	-872	-914
H4	[mm]	-	-	-	-	-	-	-	-	-	35
M		M16	M16	M16	M16	M16	M16	M16	M16	M16	M16

★ TP(E), TP(E)D pumps are primarily fitted with IE3 motors. See *Motors*, page 72.

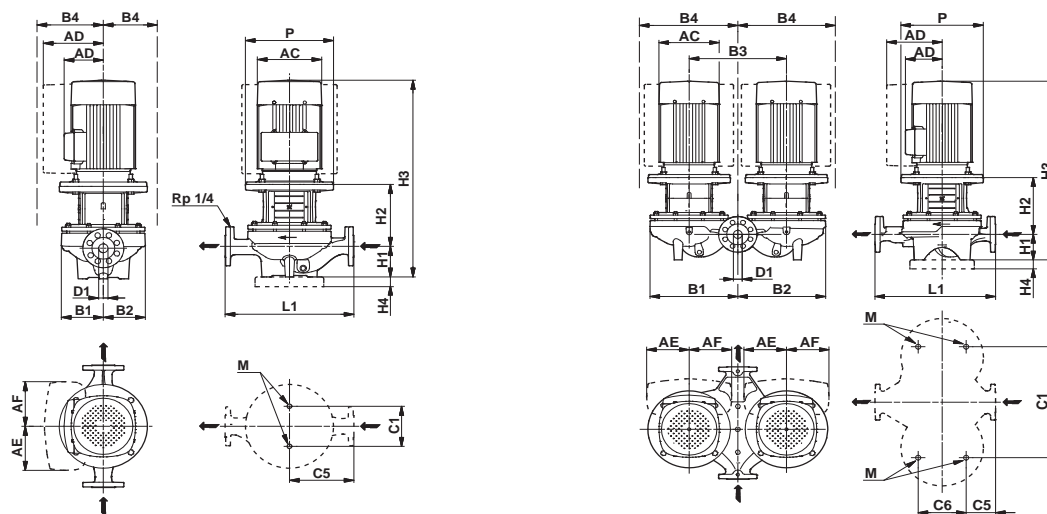
★★ The dimension before the slash applies to the single-head pump, and the dimension after the slash applies to the twin-head pump.

TP 100-XXX/4



TM02 5045 4509

Note: All curves apply to single-head pumps. For further information, see page 93.



TM03 5348 3406 - TM03 6349 3406

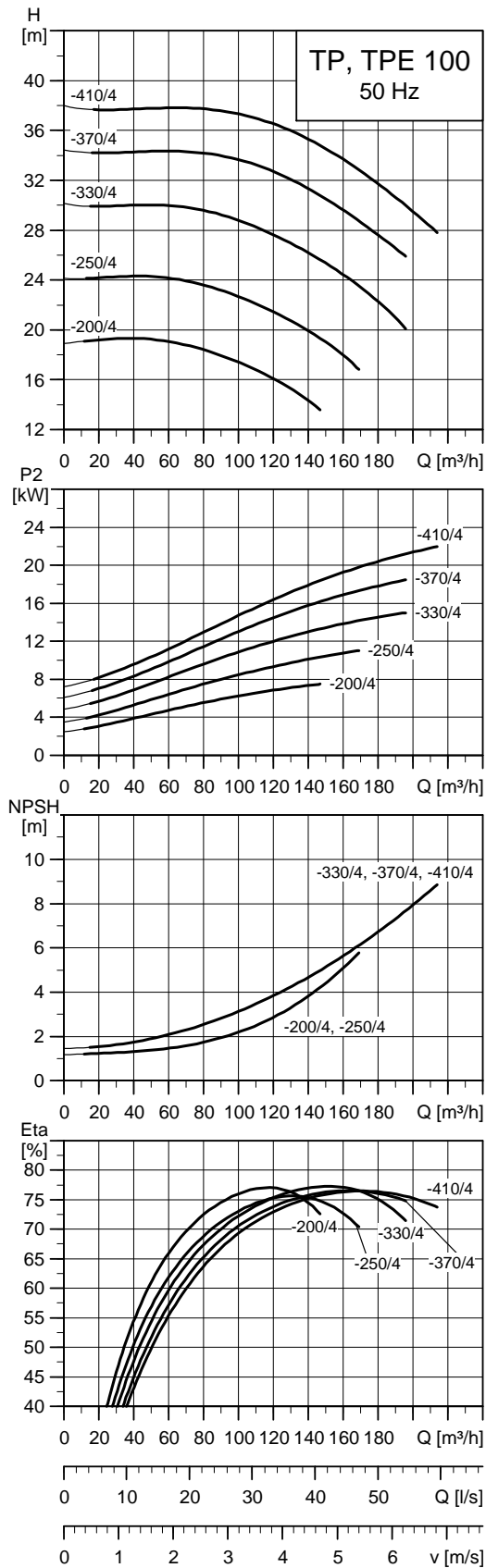
Technical data

TP 100		-30/4	-60/4	-70/4	-90/4	-110/4	-130/4	-170/4	
TPD		•	•	•	•	•	•	•	
TPE		•	•	•	•	•	•	•	
TPED		•	•	•	•	•	•	•	
Series		200	200	300	300	300	300	300	
IEC size	1~ TP	80	90	-	-	-	-	-	
	3~ TP	80	90	90	100	100	112	132	
	1~ TPE	80	-	-	-	-	-	-	
	3~ TPE	90	90	90	100	112	112	132	
P2	1~/3~ TP ★	[kW]	0.55/0.55	1.1/1.1	-/1.5	-/2.2	-/3	-/4	-/5.5
	1~/3~ TPE	[kW]	0.55/0.55	-/1.1	-/1.5	-/2.2	-/3	-/4	-/5.5
PN		PN 6/PN 10	PN 6/PN 10	PN 16	PN 16	PN 16	PN 16	PN 16	
T _{min} , T _{max}	[°C]	[-25;140]	[-25;140]	[-25;120]	[-25;120]	[-25;120]	[-25;120]	[-25;120]	
D1	[mm]	100	100	100	100	100	100	100	
AC	1~/3~ TP	[mm]	141/141	178/178	-/178	-/198	-/198	-/220	-/260
	1~/3~ TPE	[mm]	141/178	-/178	-/178	-/198	-/198	-/220	-/260
AD	1~/3~ TP	[mm]	133/109	139/110	-/110	-/120	-/120	-/134	-/159
	1~/3~ TPE	[mm]	140/167	-/167	-/167	-/177	-/177	-/188	-/213
AE	1~/3~ TPE	[mm]	105/132	-/132	132	132	132	145	145
AF	1~/3~ TPE	[mm]	105/132	-/132	132	132	132	145	145
P	[mm]	-	-	200	200	200	250	300	
B1 ★★	[mm]	175/280	175/280	190/414	190/414	190/414	201/443	201/443	
B2 ★★	[mm]	125/305	125/305	151/395	151/395	151/395	173/429	173/429	
B3	[mm]	280	280	470	470	470	500	500	
B4 ★★	TP	[mm]	175/280	175/280	190/414	190/414	190/414	201/443	201/443
	1~ TPE	[mm]	175/305	-/-	-/-	-/-	-/-	-/-	-/-
	3~ TPE	[mm]	175/340	175/340	190/414	190/414	190/414	201/443	213/443
C1 ★★	[mm]	200/280	200/280	230/550	230/550	230/550	230/550	230/550	
C5 ★★	[mm]	225/83	225/83	250/110	275/110	275/110	275/110	275/110	
C6	[mm]	221	221	230	230	230	230	230	
L1	[mm]	450	450	550	550	550	550	550	
H1	[mm]	122	122	140	140	140	140	140	
H2	[mm]	172	182	173	201	201	261	277	
H3	1~/3~ TP	[mm]	525/525	625/625	-/634	-/676	-/676	-/773	-/796
	1~/3~ TPE	[mm]	525/575	-/585	-/634	-/676	-/676	-/773	-/796
H4	[mm]	-	-	-	-	-	-	-	
M		M16	M16	M16	M16	M16	M16	M16	

★ TP(E), TP(E)D pumps are primarily fitted with IE3 motors. See *Motors*, page 72.

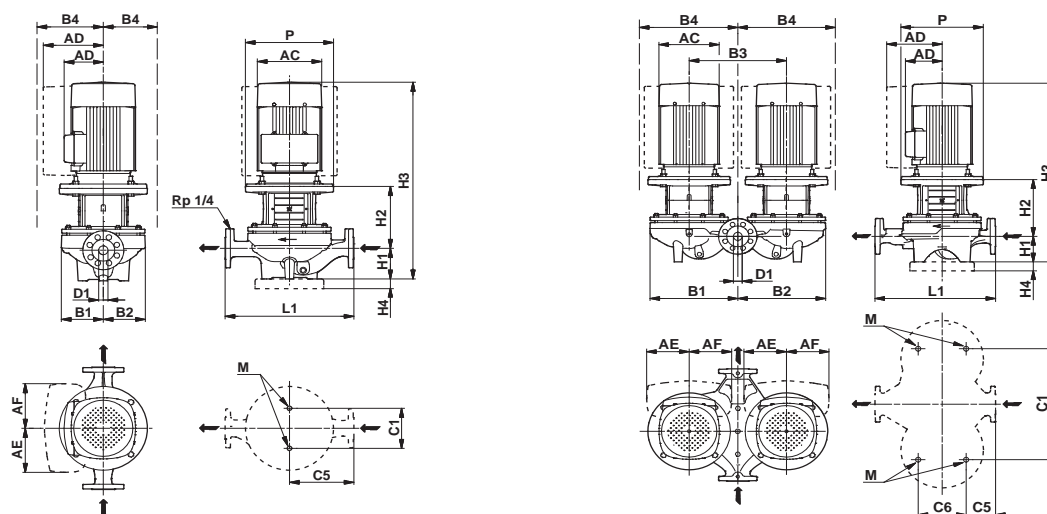
★★ The dimension before the slash applies to the single-head pump, and the dimension after the slash applies to the twin-head pump.

TP 100-XXX/4



TM02 8753 4810

Note: All curves apply to single-head pumps. For further information, see page 93.



TM03 5348 3406 - TM03 6349 3406

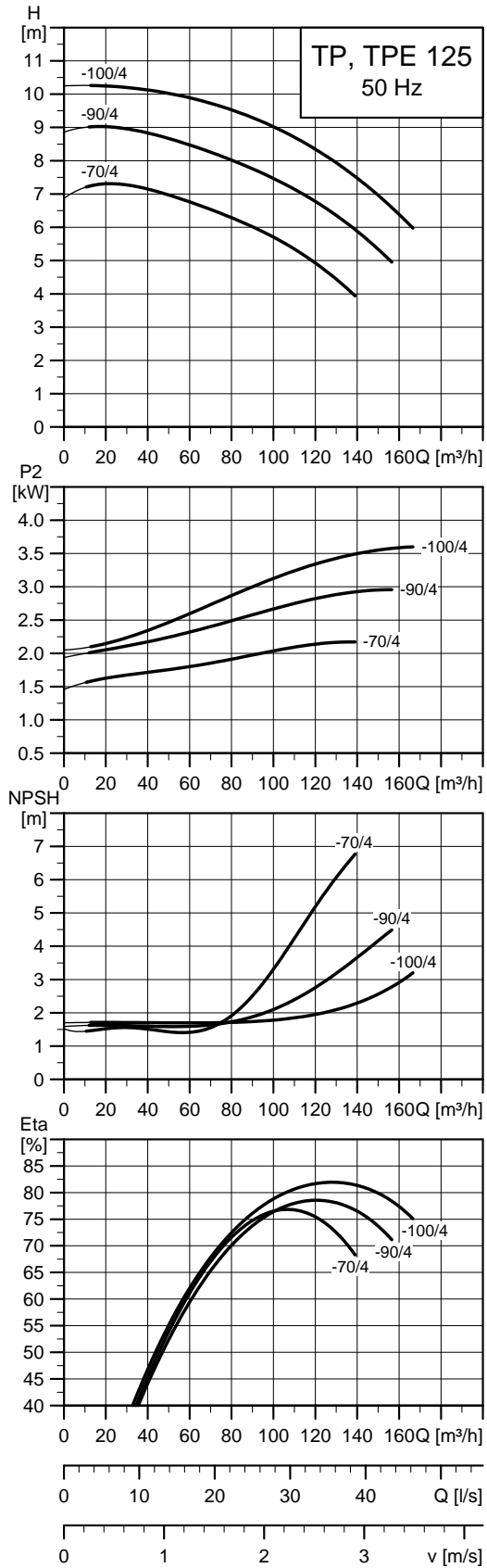
Technical data

TP 100			-200/4	-250/4	-330/4	-370/4	-410/4
TPD			•	•	•	•	•
TPE			•	•	•	•	-
TPED			•	•	•	•	-
Series			300	300	300	300	300
IEC size	1~ TP		-	-	-	-	-
	3~ TP		132	160	160	180	180
	1~ TPE		-	-	-	-	-
	3~ TPE		132	160	160	180	-
P2	1~/3~ TP ★	[kW]	-/7.5	-/11	-/15	-/18.5	-/22
	1~/3~ TPE	[kW]	-/7.5	-/11	-/15	-/18.5	-
PN			PN 16	PN 16	PN 16	PN 16	PN 16
T _{min} , T _{max}		[°C]	[-25;120]	[-25;120]	[-25;120]	[-25;120]	[-25;120]
D1		[mm]	100	100	100	100	100
AC	1~/3~ TP	[mm]	-/260	-/314	-/314	-/368	-/368
	1~/3~ TPE	[mm]	-/260	-/314	-/314	-/314	-
AD	1~/3~ TP	[mm]	-/159	-/204	-/204	-/286	-/286
	1~/3~ TPE	[mm]	-/213	-/308	-/308	-/308	-
AE	1~/3~ TPE	[mm]	145	210	210	210	-
AF	1~/3~ TPE	[mm]	145	210	210	210	-
P		[mm]	300	350	350	350	350
B1 ★★		[mm]	290/579	290/579	290/579	290/579	290/579
B2 ★★		[mm]	249/561	249/561	249/561	249/561	249/561
B3		[mm]	600	600	600	600	600
	TP	[mm]	290/579	290/579	290/579	290/579	290/579
	1~ TPE	[mm]	-/-	-/-	-/-	-/-	-/-
B4 ★★	3~ TPE	[mm]	290/579	308/579	308/579	308/579	-
		[mm]	230/680	230/680	230/680	230/680	230/680
C1 ★★		[mm]	335/110	335/110	335/110	335/110	335/110
C5 ★★		[mm]	335/110	335/110	335/110	335/110	335/110
C6		[mm]	350	350	350	350	350
L1		[mm]	670	670	670	670	670
H1		[mm]	175	175	175	175	175
H2		[mm]	254	308	308	308	308
H3	1~/3~ TP	[mm]	-/858	-/954	-/1028	-/998	-/1079
	1~/3~ TPE	[mm]	-/888	-/954	-/998	-/1024	-
H4		[mm]	-	35	35	35	35
M			M16	M16	M16	M16	M16

★ TP(E), TP(E)D pumps are primarily fitted with IE3 motors. See *Motors*, page 72.

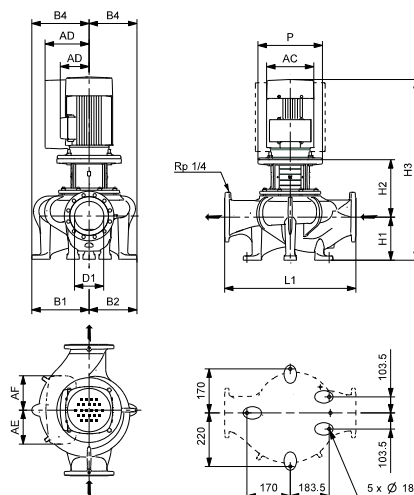
★★ The dimension before the slash applies to the single-head pump, and the dimension after the slash applies to the twin-head pump.

TP 125-XXX/4



TM05 0044 0611

Note: All curves apply to single-head pumps. For further information, see page 93.



TM05 0660 1411

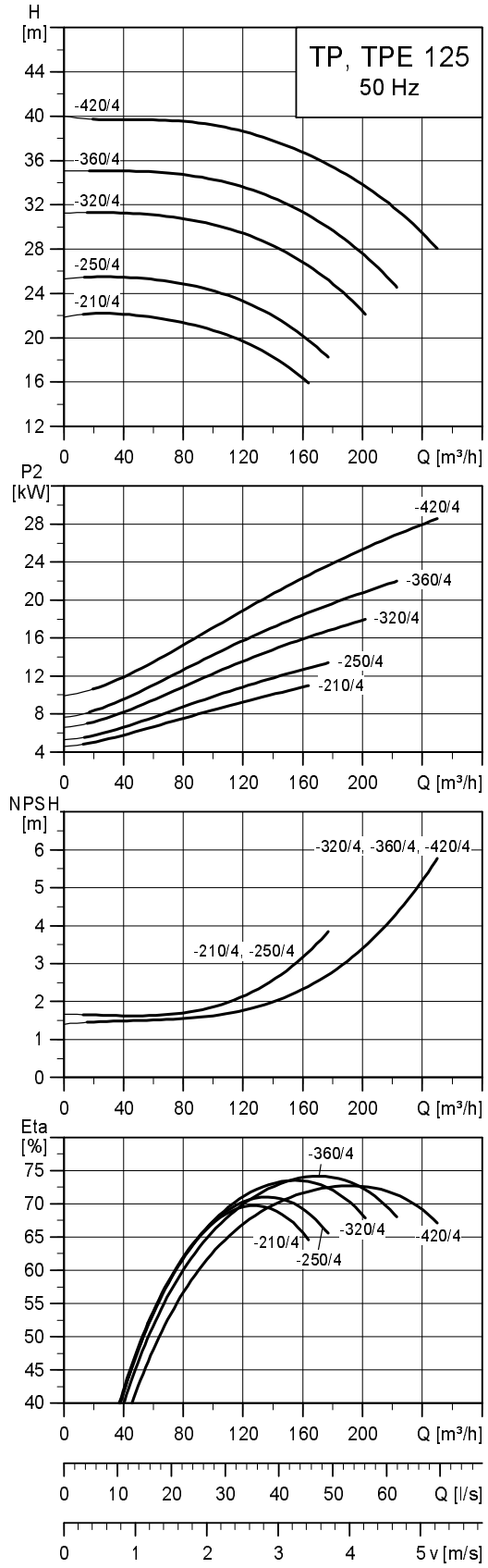
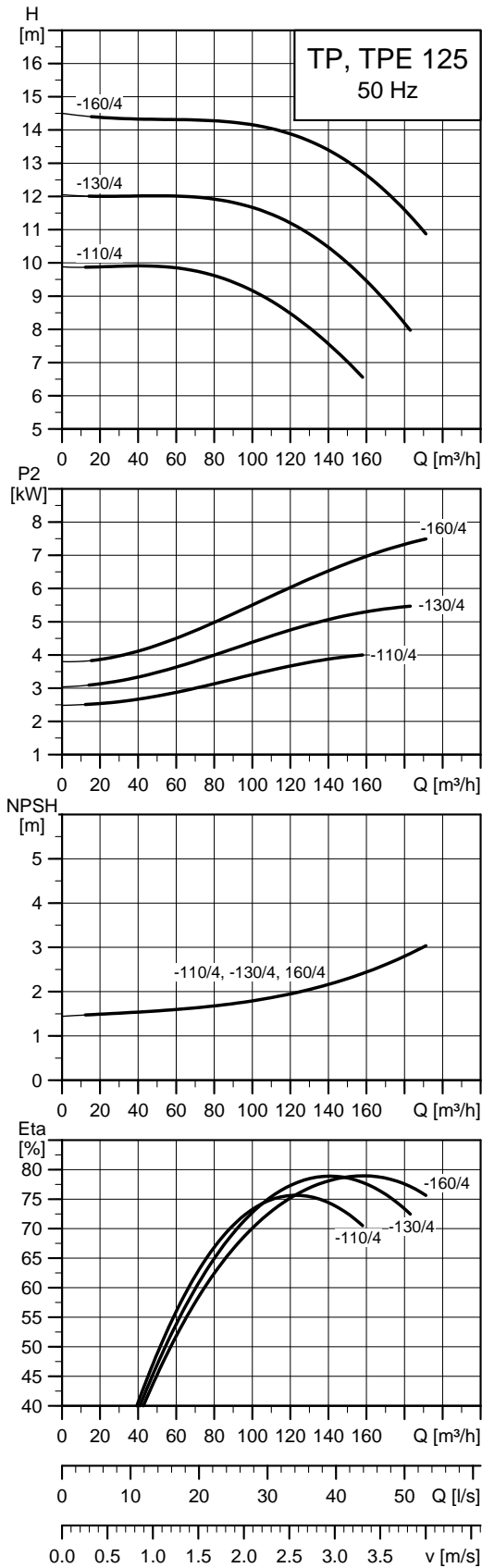
Technical data

TP 125			-70/4	-90/4	-100/4
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 _{min} , T _{max}		[°C]	[-25;120]	[-25;120]	[-25;120]
D1		[mm]	125	125	125
AC	1~/3~ TP	[mm]	-/198	-/198	-/220
	1~/3~ TPE	[mm]	-/198	-/198	-/220
AD	1~/3~ TP	[mm]	-/120	-/120	-/134
	1~/3~ TPE	[mm]	-/177	-/177	-/188
AE		[mm]	132	132	145
AF		[mm]	132	132	145
P		[mm]	250	250	250
B1 ★★		[mm]	243/-	243/-	243/-
B2 ★★		[mm]	193/-	193/-	193/-
B3		[mm]	-	-	-
B4 ★★	TP	[mm]	232/-	232/-	232/-
	1~ TPE	[mm]	-/-	-/-	-/-
	3~ TPE	[mm]	232/-	232/-	232/-
L1		[mm]	620	620	620
H1		[mm]	210	210	210
H2		[mm]	-/225	-/225	-/225
H3	1~/3~ TP	[mm]	-/771	-/771	-/808
	1~/3~ TPE	[mm]	-/771	-/771	-/808

★ TP(E), TP(E)D pumps are primarily fitted with IE3 motors. See *Motors*, page 72.

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

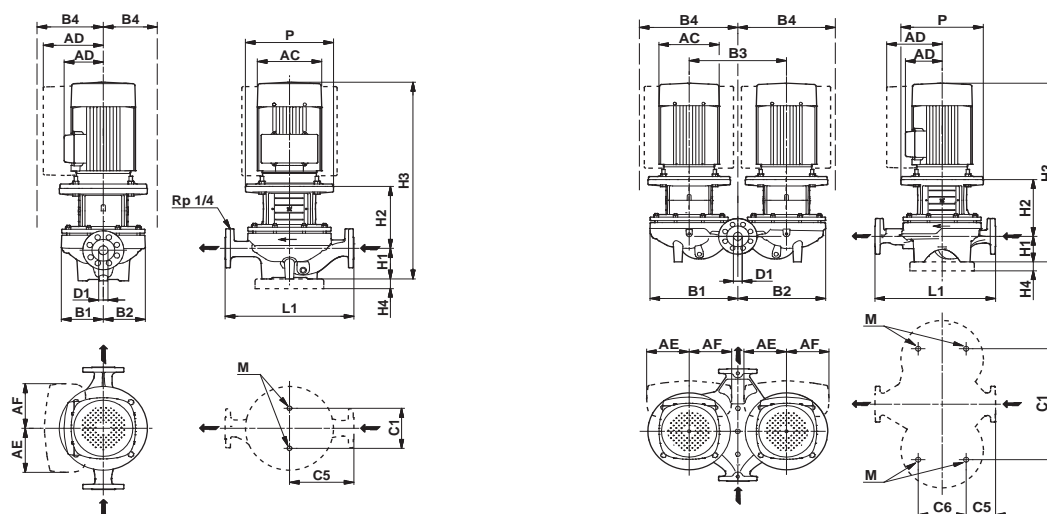
TP 125-XXX/4



Note: All curves apply to single-head pumps. For further information, see page 93.

TM02 8755 1511

TM02 8756 0904



TM03 5348 3406 - TM03 6349 3406

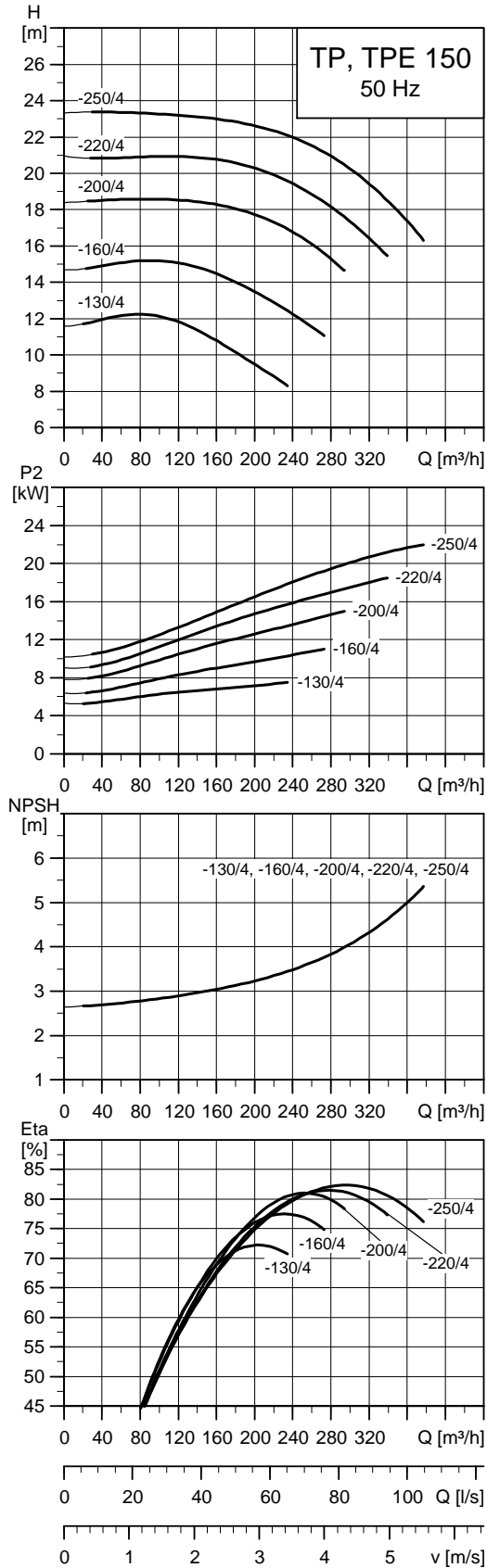
Technical data

TP 125		-110/4	-130/4	-160/4	-210/4	-250/4	-320/4	-360/4	-420/4	
TPD		•	•	•	•	•	•	•	•	
TPE		-	-	-	•	•	•	-	-	
TPED		•	•	•	•	•	•	-	-	
Series		300	300	300	300	300	300	300	300	
IEC size	1~ TP	-	-	-	-	-	-	-	-	
	3~ TP	112	132	132	160	160	180	180	200	
	1~ TPE	-	-	-	-	-	-	-	-	
	3~ TPE	112	132	132	160	160	180	-	-	
P2	1~/3~ TP ★	[kW]	-/4	-/5.5	-/7.5	-/11	-/15	-/18.5	-/22	-/30
	1~/3~ TPE	[kW]	-/4	-/5.5	-/7.5	-/11	-/15	-/18.5	-	-/-
PN		PN 16	PN 16	PN 16	PN 16	PN 16	PN 16	PN 16	PN 16	
T _{min} :T _{max}	[°C]	[-25;120]	[-25;120]	[-25;120]	[-25;120]	[-25;120]	[-25;120]	[-25;120]	[-25;120]	
D1	[mm]	125	125	125	125	125	125	125	125	
AC	1~/3~ TP	[mm]	-/220	-/260	-/260	-/314	-/314	-/368	-/368	-/408
	1~/3~ TPE	[mm]	-/220	-/260	-/260	-/314	-/314	-/314	-	-/-
AD	1~/3~ TP	[mm]	-/134	-/159	-/159	-/204	-/204	-/286	-/286	-/315
	1~/3~ TPE	[mm]	-/188	-/213	-/213	-/308	-/308	-/308	-	-/-
AE	1~/3~ TPE	[mm]	145	145	145	210	210	210	-	-/-
AF	1~/3~ TPE	[mm]	145	145	145	210	210	210	-	-/-
P	[mm]	250	300	300	350	350	350	350	400	
B1 ★★	[mm]	-/537	250/537	250/537	271/566	271/566	271/566	271/566	271/566	
B2 ★★	[mm]	-/518	202/518	202/518	243/552	243/552	243/552	243/552	243/552	
B3	[mm]	600	600	600	600	600	600	600	600	
B4 ★★	TP	[mm]	-/537	250/537	250/537	271/566	271/566	271/566	271/566	300/566
	1~ TPE	[mm]	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-
	3~ TPE	[mm]	-/537	250/537	250/537	308/566	308/566	308/566	-	-/-
C1 ★★	[mm]	-/680	230/680	230/680	230/680	230/680	230/680	230/680	230/680	
C5 ★★	[mm]	-/84	310/84	310/84	400/175	400/175	400/175	400/175	400/175	
C6	[mm]	300	300	300	350	350	350	350	350	
L1	[mm]	620	620	620	800	800	800	800	800	
H1	[mm]	215	215	215	215	215	215	215	215	
H2	[mm]	267	283	283	318	318	318	318	318	
H3	1~/3~ TP	[mm]	-/854	-/877	-/927	-/1004	-/1078	-/1048	-/1129	-/1178
	1~/3~ TPE	[mm]	-/854	-/877	-/969	-/1004	-/1048	-/1074	-/-	-/-
H4	[mm]	-	-	-	35	35	35	35	35	
M		M16	M16	M16	M16	M16	M16	M16	M16	

★ TP(E), TP(E)D pumps are primarily fitted with IE3 motors. See *Motors*, page 72.

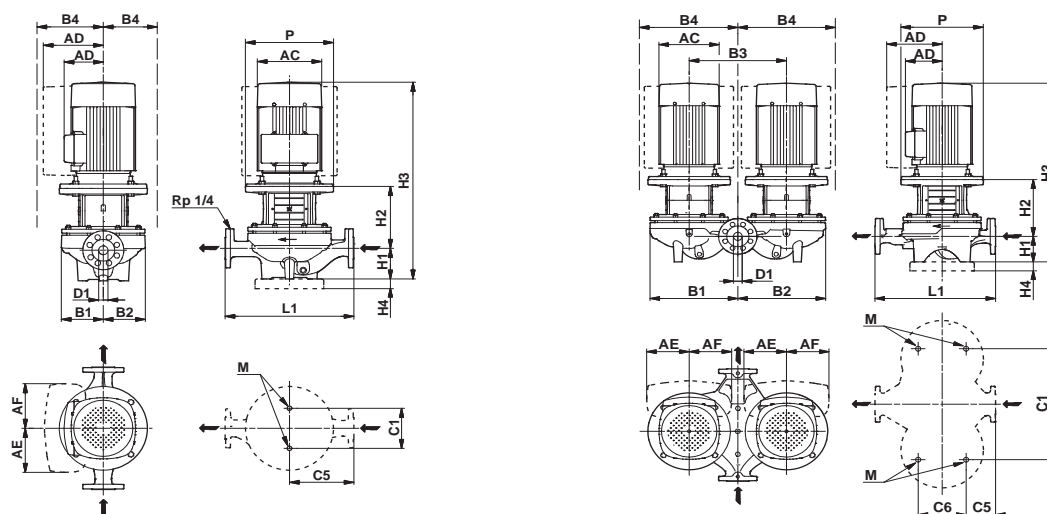
★★ The dimension before the slash applies to the single-head pump, and the dimension after the slash applies to the twin-head pump.

TP 150-XXX/4



TM02 8754 4810

Note: All curves apply to single-head pumps. For further information, see page 93.



TM03 5348 3406 - TM03 5349 3406

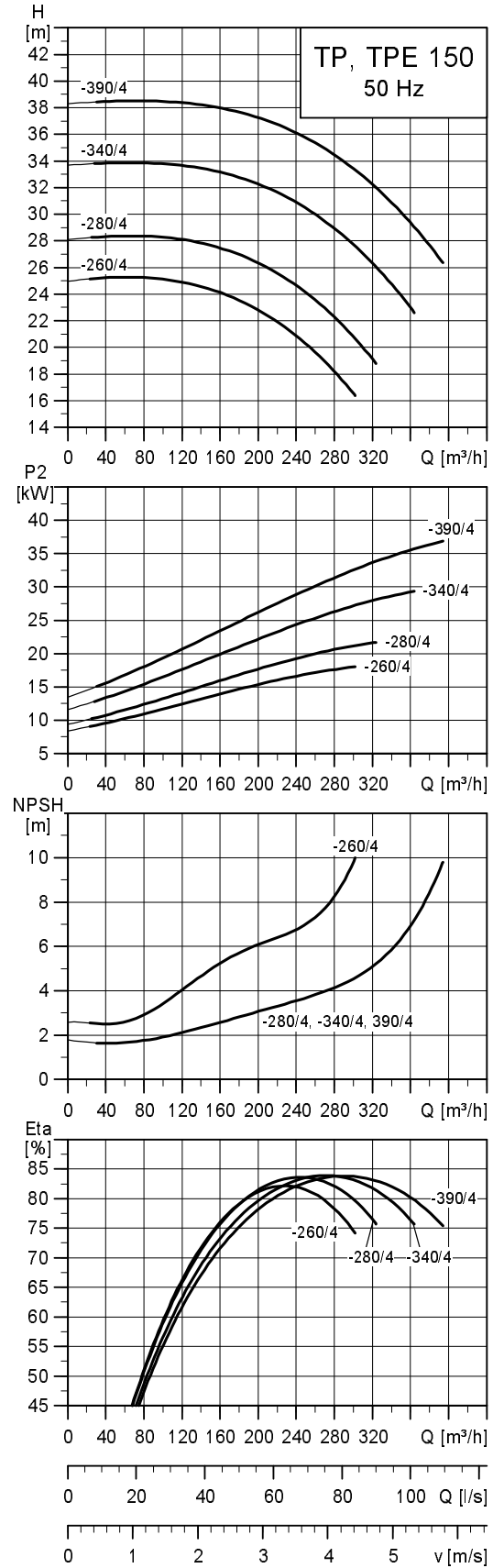
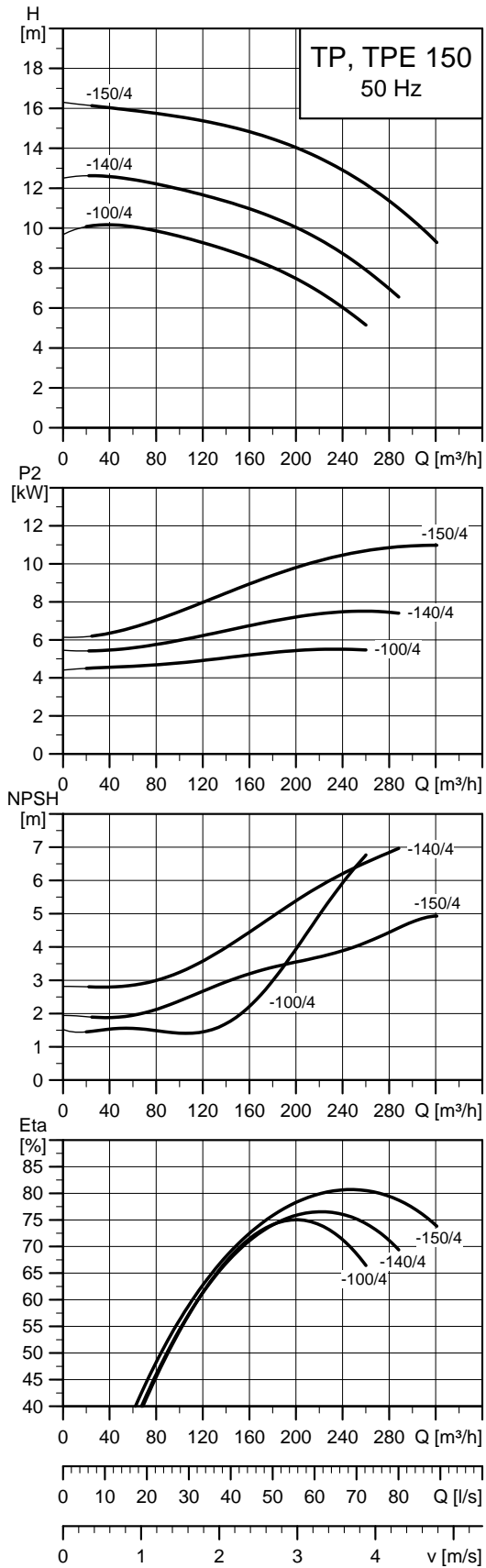
Technical data

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	-
P2	1~3~ TP ★	[kW]	-/7.5	-/11	-/15	-/18.5	-/22
	1~3~ TPE	[kW]	-/7.5	-/11	-/15	-/18.5	-
PN			PN 16	PN 16	PN 16	PN 16	PN 16
T _{min} ·T _{max}		[°C]	[-25;120]	[-25;120]	[-25;120]	[-25;120]	[-25;120]
D1		[mm]	150	150	150	150	150
AC	1~3~ TP	[mm]	-/267	-/314	-/314	-/368	-/368
	1~3~ TPE	[mm]	-/260	-/314	-/314	-/314	-
AD	1~3~ TP	[mm]	-/167	-/204	-/204	-/286	-/286
	1~3~ TPE	[mm]	-/213	-/308	-/308	-/308	-
AE		[mm]	145	210	210	210	-
AF		[mm]	145	210	210	210	-
P		[mm]	300	350	350	350	350
B1 ★★		[mm]	-/583	-/583	296/583	296/583	296/583
B2 ★★		[mm]	-/553	-/553	237/553	237/553	237/553
B3		[mm]	600	600	600	600	600
B4 ★★	TP	[mm]	-/583	-/583	296/583	296/583	296/583
	1~ TPE	[mm]	-/-	-/-	-/-	-/-	-/-
	3~ TPE	[mm]	-/583	-/583	308/583	308/583	-
C1 ★★		[mm]	-/680	-/680	230/680	230/680	230/680
C5 ★★		[mm]	-/153	-/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]	-/966	-/1008	-/1052	-/1078	-/-
H4		[mm]	-	35	35	35	35
M			M16	M16	M16	M16	M16

★ TP(E), TP(E)D pumps are primarily fitted with IE3 motors. See *Motors*, page 72.

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

TP 150-XXX/4

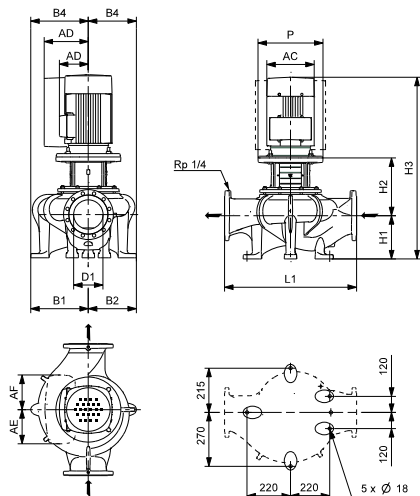


Note: All curves apply to single-head pumps. For further information, see page 93.

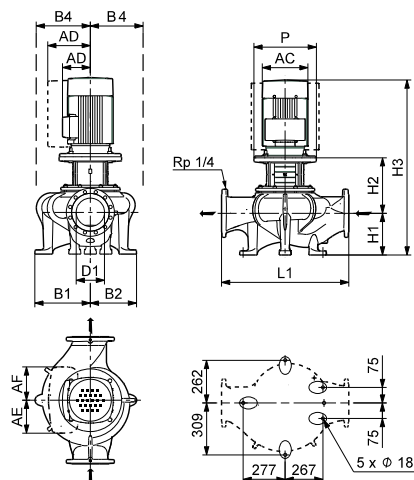
TM05 0046 0611

TM03 4548 2406

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



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



TM05 0661 1411 - TM03 8623 4008

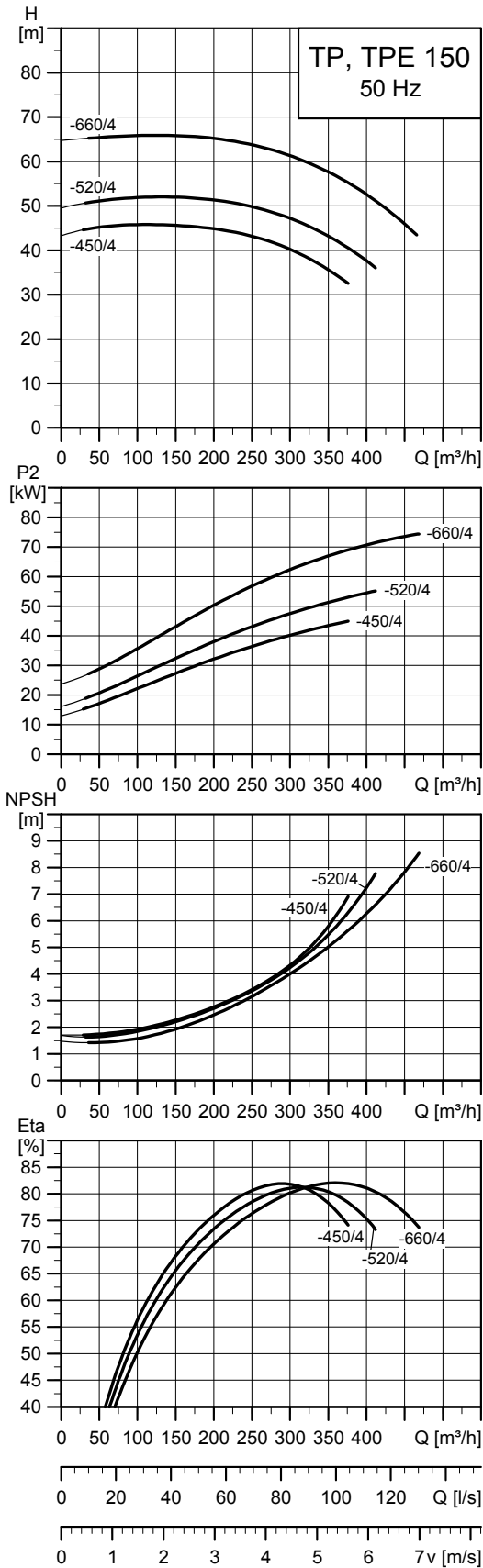
Technical data

TP 150		-100/4	-140/4	-150/4	-260/4	-280/4	-340/4	-390/4
TPD		-	-	-	-	-	-	-
TPE		•	•	•	•	-	-	-
TPED		-	-	-	-	-	-	-
Series		300	300	300	300	300	300	300
IEC size	1~ TP	-	-	-	-	-	-	-
	3~ TP	132	132	160	180	180	200	225
	1~ TPE	-	-	-	-	-	-	-
	3~ TPE	132	160	160	180	-	-	-
P2	1~/3~ TP ★	[kW]	-/5.5	-/7.5	-/11	-/18.5	-/22	-/30
	1~/3~ TPE	[kW]	-/5.5	-/7.5	-/11	-/18.5	-/-	-/-
PN		PN16	PN16	PN16	PN 16	PN 16	PN 16	PN 16
T _{min} , T _{max}	[°C]	[-25;120]	[-25;120]	[-25;120]	[-25;120]	[-25;120]	[-25;120]	[-25;120]
D1	[mm]	150	150	150	150	150	150	150
AC	1~/3~ TP	[mm]	-/267	-/267	-/320	-/368	-/368	-/449
	1~/3~ TPE	[mm]	-/260	-/260	-/314	-/314	-/-	-/-
AD	1~/3~ TP	[mm]	-/167	-/167	-/197	-/286	-/286	-/338
	1~/3~ TPE	[mm]	-/213	-/213	-/308	-/308	-/-	-/-
AE	[mm]	145	145	210	210	-/-	-/-	-/-
AF	[mm]	145	145	210	210	-/-	-/-	-/-
P	[mm]	300	300	350	350	350	400	450
B1 ★★	[mm]	295/-	295/-	295/-	335/-	335/-	335/-	335/-
B2 ★★	[mm]	240/-	240/-	240/-	288/-	288/-	288/-	288/-
B4 ★★	TP	[mm]	294/-	294/-	294/-	335/-	335/-	335/-
	1~ TPE	[mm]	-/-	-/-	-/-	-/-	-/-	-/-
	3~ TPE	[mm]	294/-	294/-	294/-	335/-	-/-	-/-
L1	[mm]	800	800	800	800	800	800	800
H1	[mm]	250	250	250	235	235	235	235
H2	[mm]	284	284	313	319	319	319	349
H3	1~/3~ TP	[mm]	-/906	-/944	-/1041	-/1069	-/1150	-/1199
	1~/3~ TPE	[mm]	-/906	-/944	-/1041	-/1095	-/-	-/-

★ TP(E), TP(E)D pumps are primarily fitted with IE3 motors. See *Motors*, page 72.

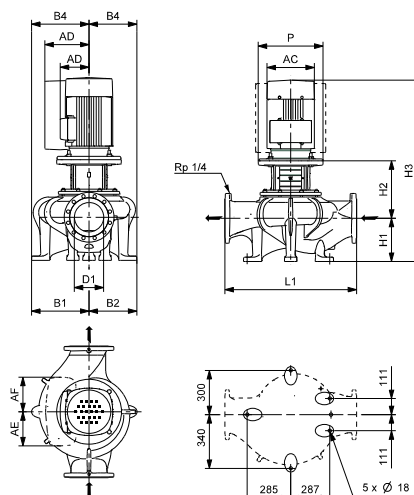
★★ The dimension before the slash applies to the single-head pump, and the dimension after the slash applies to the twin-head pump.

TP 150-XXX/4



TM05 0538 4812

Note: All curves apply to single-head pumps. For further information, see page 93.



TM05 0662 1411

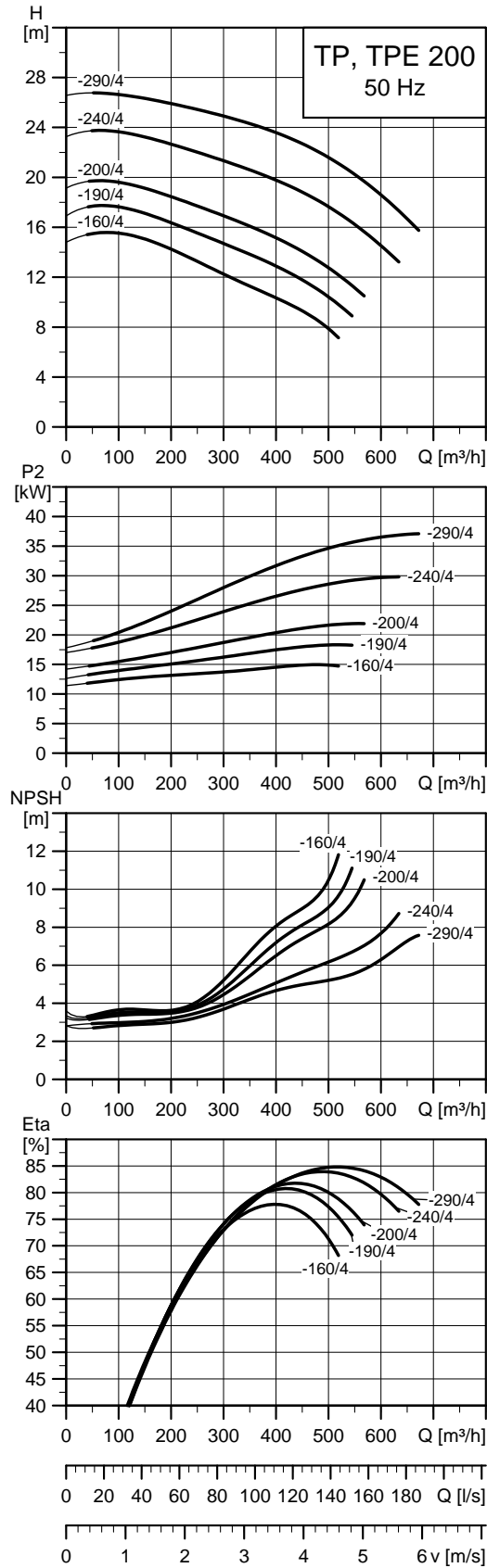
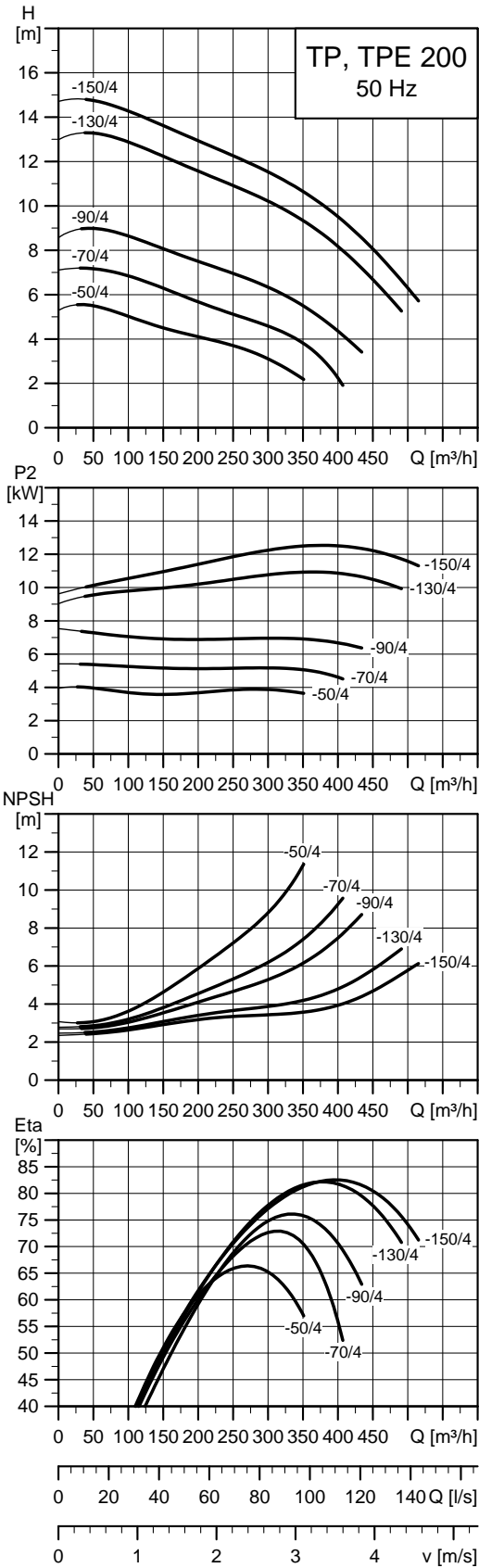
Technical data

TP 150			-450/4	-520/4	-660/4
TPD			-	-	-
TPE			●	●	●
TPED			-	-	-
Series			300	300	300
IEC size	1~ TP		-	-	-
	3~ TP		225	250	280
	1~ TPE		-	-	-
	3~ TPE		-	-	-
P2	1~/3~ TP ★	[kW]	-/45	-/55	-/75
	1~/3~ TPE	[kW]	-/-	-/-	-/-
PN			PN16	PN16	PN16
T _{min} ·T _{max}		[°C]	[-25..120]	[-25..120]	[-25..120]
D1		[mm]	150	150	150
AC	1~/3~ TP	[mm]	-/442	-/495	-/555
	1~/3~ TPE	[mm]	-/-	-/-	-/-
AD	1~/3~ TP	[mm]	-/325	-/392	-/432
	1~/3~ TPE	[mm]	-/-	-/-	-/-
AE		[mm]	-/-	-/-	-/-
AF		[mm]	-/-	-/-	-/-
P		[mm]	450	550	550
B1 ★★		[mm]	373/-	373/-	373/-
B2 ★★		[mm]	333/-	333/-	333/-
B4 ★★	TP	[mm]	388/-	388/-	388/-
	1~ TPE	[mm]	-/-	-/-	-/-
	3~ TPE	[mm]	-/-	-/-	-/-
L1		[mm]	1000	1000	1000
H1		[mm]	250	250	250
H2		[mm]	352	352	352
H3	1~/3~ TP	[mm]	-/1316	-/1419	-/1422
	1~/3~ TPE	[mm]	-/-	-/-	-/-

★ TP(E), TP(E)D pumps are primarily fitted with IE3 motors. See *Motors*, page 72.

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

TP 200-XXX/4



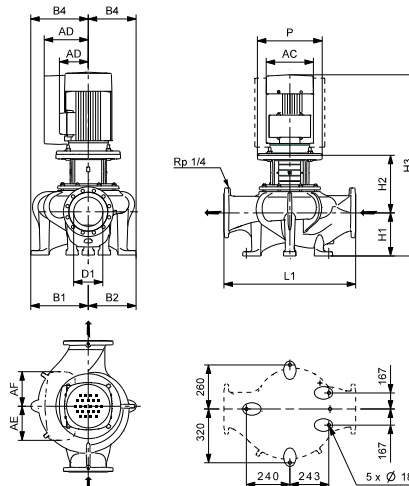
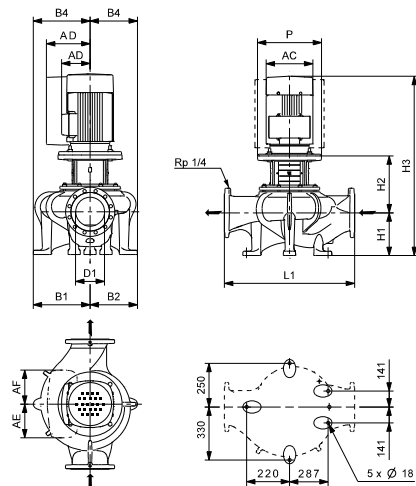
Note: All curves apply to single-head pumps. For further information, see page 93.

TM05 0540 1211

TM05 0542 1211

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 3212 - TM05 0664 1411

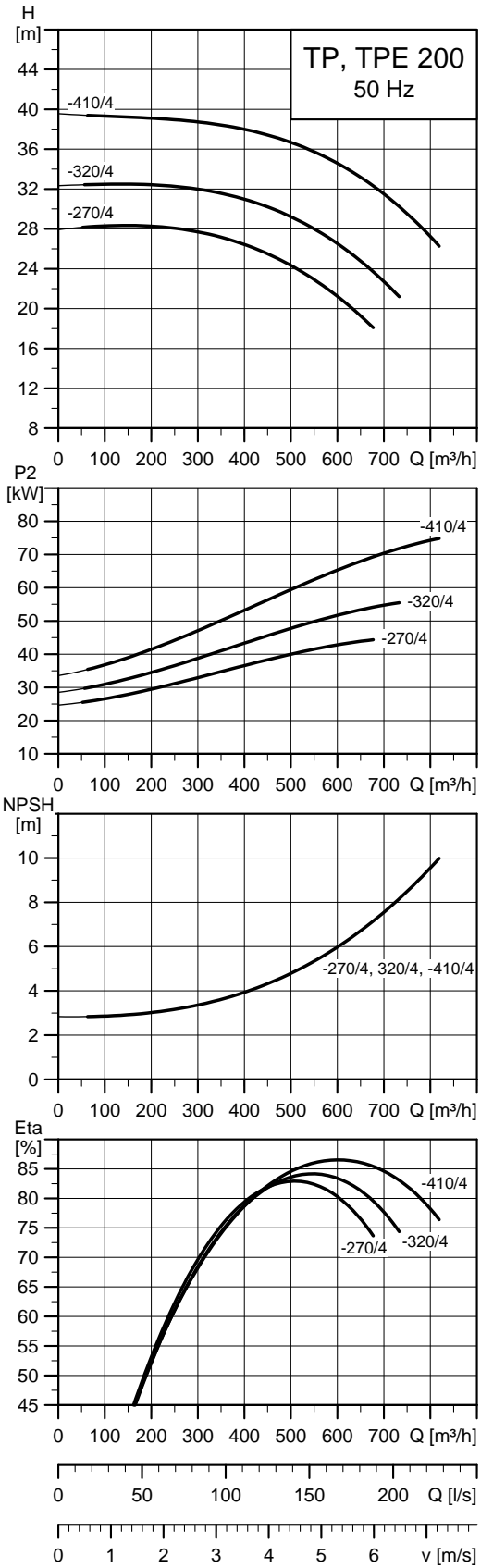
Technical data

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	-	-	-
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	-/-	-/-	-/-
PN		PN16	PN16	PN16	PN16	PN16	PN16	PN16	PN16	PN16	PN16
T _{min} , T _{max}	[°C]	[-25..120]	[-25..120]	[-25..120]	[-25..120]	[-25..120]	[-25..120]	[-25..120]	[-25..120]	[-25..120]	[-25..120]
D1	[mm]	200	200	200	200	200	200	200	200	200	200
AC	1~/3~ TP [mm]	-/220	-/267	-/267	-/320	-/320	-/320	-/368	-/368	-/408	-/449
	1~/3~ TPE [mm]	-/220	-/260	-/260	-/314	-/314	-/314	-/314	-/-	-/-	-/-
AD	1~/3~ TP [mm]	-/134	-/167	-/167	-/197	-/197	-/197	-/286	-/286	-/315	-/338
	1~/3~ TPE [mm]	-/188	-/213	-/213	-/308	-/308	-/308	-/308	-/-	-/-	-/-
AE	1~/3~ TPE [mm]	-/145	-/145	-/145	-/210	-/210	-/210	-/210	-/-	-/-	-/-
AF	1~/3~ TPE [mm]	-/145	-/145	-/145	-/210	-/210	-/210	-/210	-/-	-/-	-/-
P	[mm]	250	300	300	350	350	350	350	350	400	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/-
B4 ★★	TP [mm]	359/-	359/-	359/-	359/-	359/-	363/-	363/-	363/-	363/-	363/-
	1~ TPE [mm]	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-
	3~ TPE [mm]	359/-	359/-	359/-	359/-	359/-	363/-	363/-	-/-	-/-	-/-
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]	-/925	-/945.5	-/984	-/1094	-/1134	-/1050	-/1134	-/-	-/-	-/-

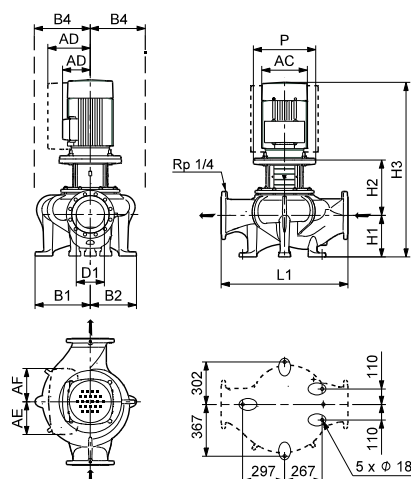
★ TP(E), TP(E)D pumps are primarily fitted with IE3 motors. See *Motors*, page 72.

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

TP 200-XXX/4



TM03 4650 1411



TM03 8621 4008

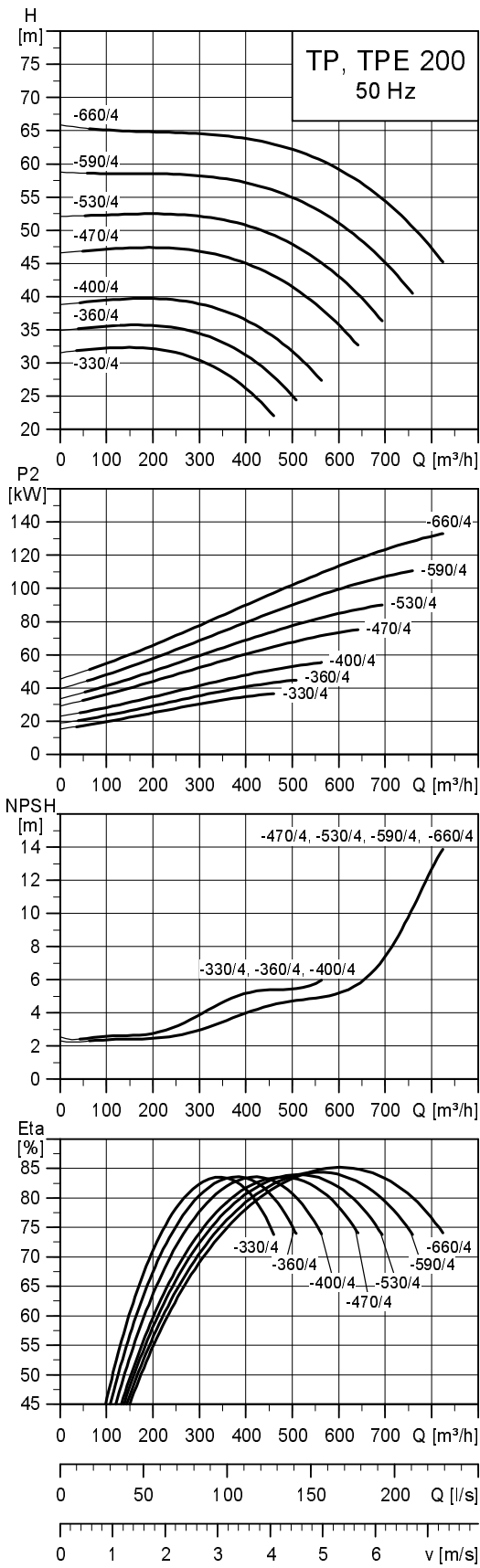
Technical data

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		-	-	-
P2	1~/3~ TP ★	[kW]	-/45	-/55	-/75
	1~/3~ TPE	[kW]	-/-	-/-	-/-
PN			PN 16	PN 16	PN 16
T _{min} :T _{max}		[°C]	[-25;120]	[-25;120]	[-25;120]
D1		[mm]	200	200	200
AC	1~/3~ TP	[mm]	-/449	-/497	-/551
	1~/3~ TPE	[mm]	-/-	-/-	-/-
AD	1~/3~ TP	[mm]	-/338	-/410	-/433
	1~/3~ TPE	[mm]	-/-	-/-	-/-
AE	1~/3~ TPE	[mm]	-/-	-/-	-/-
AF	1~/3~ TPE	[mm]	-/-	-/-	-/-
P		[mm]	450	550	550
B1 ★★		[mm]	393/-	393/-	393/-
B2 ★★		[mm]	328/-	328/-	328/-
B4 ★★	TP	[mm]	393/-	393/-	432/-
	1~ TPE	[mm]	-/-	-/-	-/-
	3~ TPE	[mm]	-/-	-/-	-/-
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]	-/-	-/-	-/-

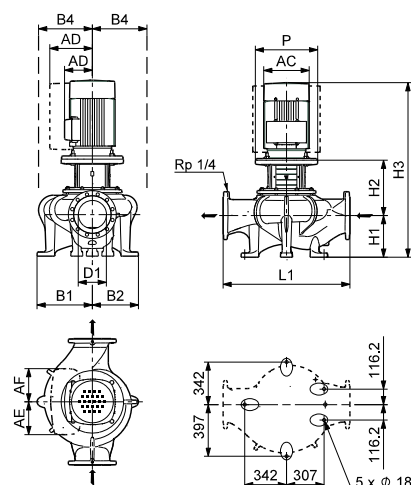
★ TP(E), TP(E)D pumps are primarily fitted with IE3 motors. See *Motors*, page 72.

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

TP 200-XXX/4



TM03 4651 2007



TM03 8622 4008

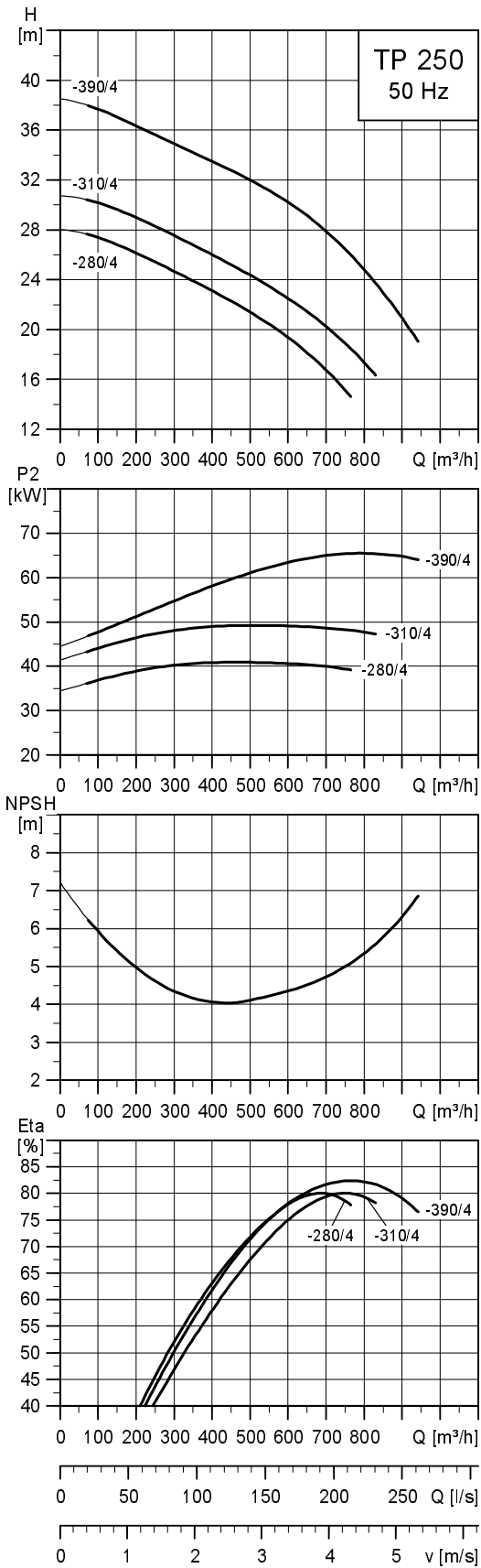
Technical data

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		-	-	-	-	-	-	-
P2	1~3~ TP ★	[kW]	-/37	-/45	-/55	-/75	-/90	-/110	-/132
	1~3~ TPE	[kW]	-/-	-/-	-/-	-/-	-/-	-/-	-/-
PN			PN 16	PN 16	PN 16	PN 16	PN 16	PN 16	PN 16
T _{min} :T _{max}		[°C]	[-25;120]	[-25;120]	[-25;120]	[-25;120]	[-25;120]	[-25;120]	[-25;120]
D1		[mm]	200	200	200	200	200	200	200
AC	1~3~ TP	[mm]	-/449	-/449	-/497	-/551	-/551	-/616	-/616
	1~3~ TPE	[mm]	-/-	-/-	-/-	-/-	-/-	-/-	-/-
AD	1~3~ TP	[mm]	-/338	-/338	-/410	-/433	-/433	-/515	-/515
	1~3~ TPE	[mm]	-/-	-/-	-/-	-/-	-/-	-/-	-/-
AE		[mm]	-/-	-/-	-/-	-/-	-/-	-/-	-/-
AF		[mm]	-/-	-/-	-/-	-/-	-/-	-/-	-/-
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/-
B4 ★★	TP	[mm]	423/-	423/-	423/-	432/-	432/-	495/-	495/-
	1~ TPE	[mm]	-/-	-/-	-/-	-/-	-/-	-/-	-/-
	3~ TPE	[mm]	-/-	-/-	-/-	-/-	-/-	-/-	-/-
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]	-/-	-/-	-/-	-/-	-/-	-/-	-/-

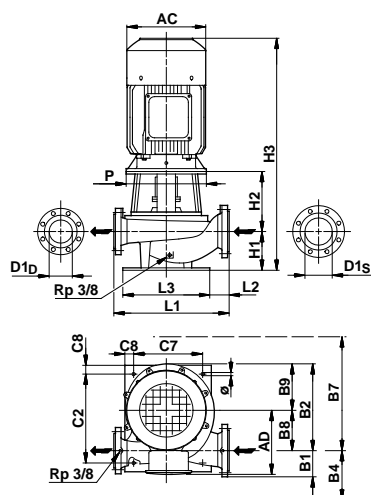
★ TP(E), TP(E)D pumps are primarily fitted with IE3 motors. See *Motors*, page 72.

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

TP 250-XXX/4



TM02 6816 0504



TM02 8349 5004

Technical data

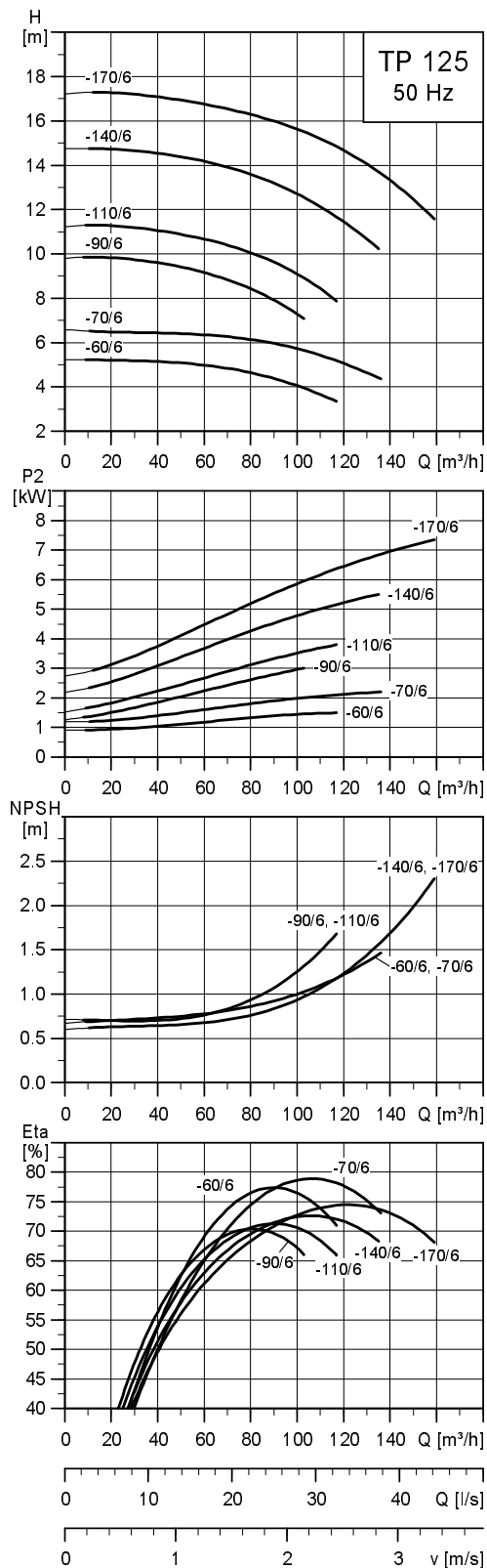
TP 250		-280/4	-310/4	-390/4	
TPD		-	-	-	
TPE		-	-	-	
TPED		-	-	-	
Series		400	400	400	
IEC size	1~ TP	-	-	-	
	3~ TP	225 M	250 M	280 S	
	1~ TPE	-	-	-	
	3~ TPE	-	-	-	
P2	[kW]	45	55	75	
PN		PN 10	PN 10	PN 10	
T _{min} , T _{max}		[°C]	[-25;120]	[-25;120]	[-25;120]
D _{1D} /D _{1S}		[mm]	250/300	250/300	250/300
AC		[mm]	449	449	551
AD		[mm]	338	338	433
P		[mm]	550	550	550
B1		[mm]	223	223	223
B2		[mm]	635	635	635
B4		[mm]	223	223	223
B7		[mm]	647	647	647
B8		[mm]	300	300	300
B9		[mm]	335	335	335
C2		[mm]	580	580	580
C7		[mm]	520	520	520
C8		[mm]	50	50	50
∅		[mm]	20	20	20
L1		[mm]	950	950	950
L2		[mm]	190	190	190
L3		[mm]	620	620	620
H1		[mm]	310	310	310
H2		[mm]	368	368	368
H3		[mm]	1386	1425	1498

★ TP(E), TP(E)D pumps are primarily fitted with IE3 motors. See *Motors*, page 72.

23. Performance curves and technical data

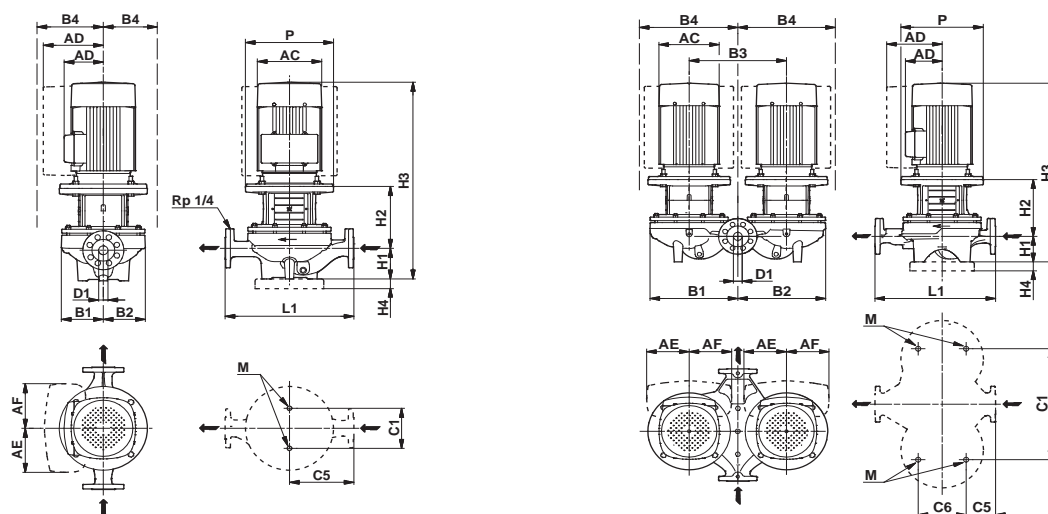
TP, TPD, TPE, TPED, 6-pole, PN 16

TP, TPD 125-XXX/6



TM02 8757 0904

Note: All curves apply to single-head pumps. For further information, see page 93.



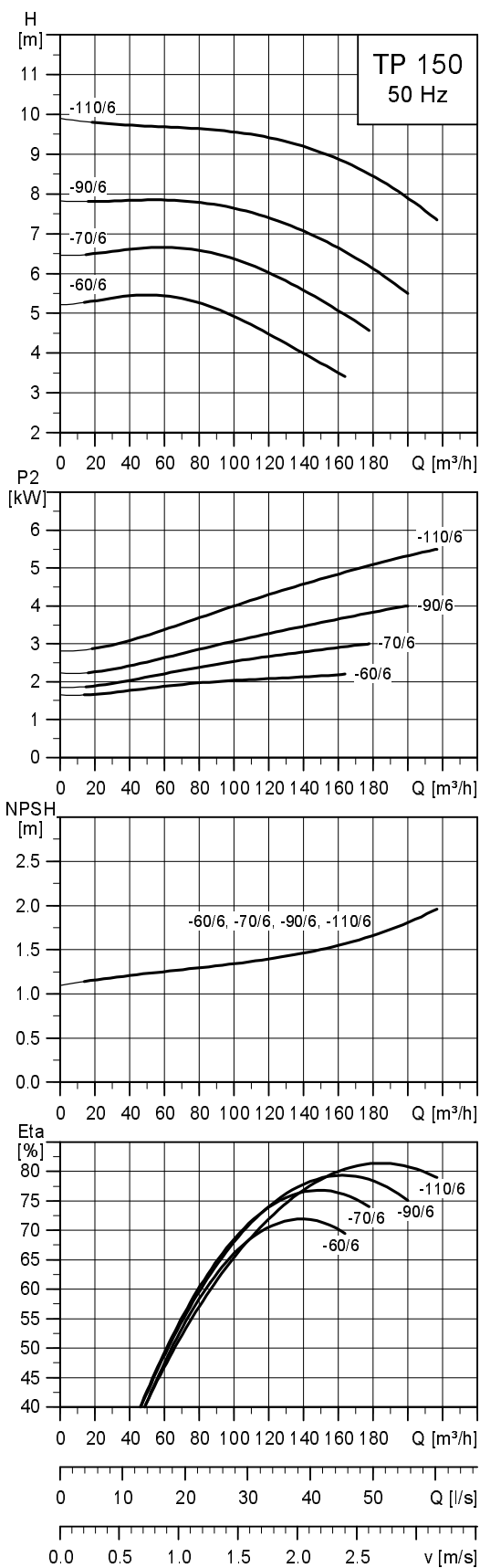
TM03 5348 3406 - TM03 5349 3406

Technical data

TP 125		-60/6	-70/6	-90/6	-110/6	-140/6	-170/6
TPD		•	•	•	•	•	•
TPE		-	-	-	-	-	-
TPED		-	-	-	-	-	-
Series		300	300	300	300	300	300
IEC size	1~ TP	-	-	-	-	-	-
	3~ TP	100	112	132	132	132	160
	1~ TPE	-	-	-	-	-	-
	3~ TPE	-	-	-	-	-	-
P2	1~3~ TP [kW]	-1.5	-2.2	-3	-4	-5.5	-7.5
	1~3~ TPE [kW]	-/-	-/-	-/-	-/-	-/-	-/-
PN		PN 16	PN 16	PN 16	PN 16	PN 16	PN 16
T _{min} , T _{max}	[°C]	[-25;120]	[-25;120]	[-25;120]	[-25;120]	[-25;120]	[-25;120]
D1	[mm]	125	125	125	125	125	125
AC	1~3~ TP [mm]	-198	-222	-262	-262	-262	-262
	1~3~ TPE [mm]	-/-	-/-	-/-	-/-	-/-	-/-
AD	1~3~ TP [mm]	-166	-177	-202	-202	-202	-237
	1~3~ TPE [mm]	-/-	-/-	-/-	-/-	-/-	-/-
AE	1~3~ TPE [mm]	-	-	-	-	-	-
AF	1~3~ TPE [mm]	-	-	-	-	-	-
P	[mm]	250	250	300	300	300	350
B1 ★★	[mm]	250/537	250/537	271/566	271/566	271/566	271/566
B2 ★★	[mm]	202/518	202/518	243/552	243/552	243/552	243/552
B3	[mm]	600	600	600	600	600	600
B4 ★★	TP [mm]	250/537	250/537	271/566	271/566	271/566	271/566
	1~ TPE [mm]	-	-	-	-	-	-
	3~ TPE [mm]	-	-	-	-	-	-
C1 ★★	[mm]	230/680	230/680	230/680	230/680	230/680	230/680
C5 ★★	[mm]	310/84	310/84	400/175	400/175	400/175	400/175
C6	[mm]	300	300	350	350	350	350
L1	[mm]	620	620	800	800	800	800
H1	[mm]	215	215	215	215	215	215
H2	[mm]	267	267	288	288	288	318
H3	1~3~ TP [mm]	-818	-836	-850	-888	-939	-1027
	1~3~ TPE [mm]	-/-	-/-	-/-	-/-	-/-	-/-
H4	[mm]	-	-	-	-	-	-
M		M16	M16	M16	M16	M16	M16

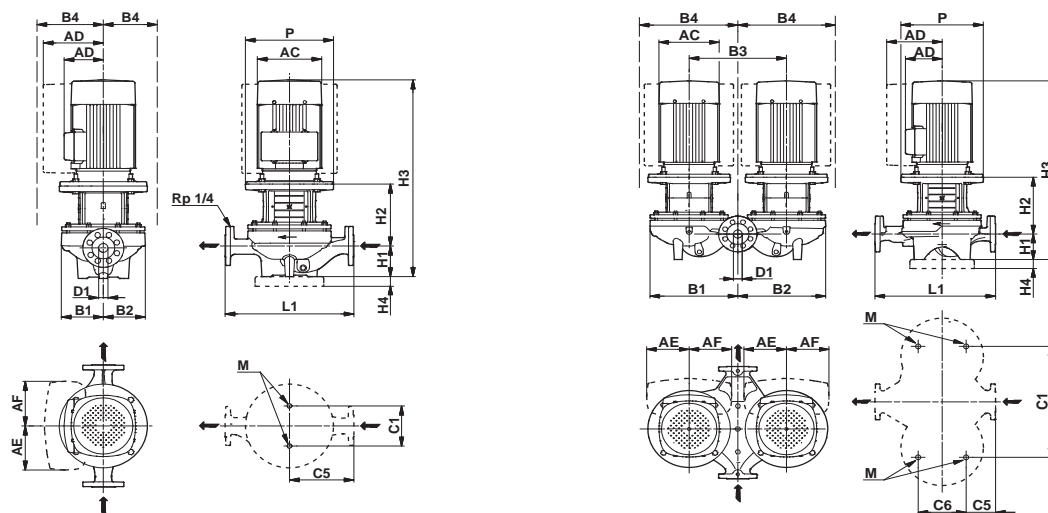
★★ The dimension before the slash applies to the single-head pump, and the dimension after the slash applies to the twin-head pump.

TP, TPD 150-XXX/6



TM02 8758 0904

Note: All curves apply to single-head pumps. For further information, see page 93.



TM03 5348 3406 - TM03 5349 3406

Technical data

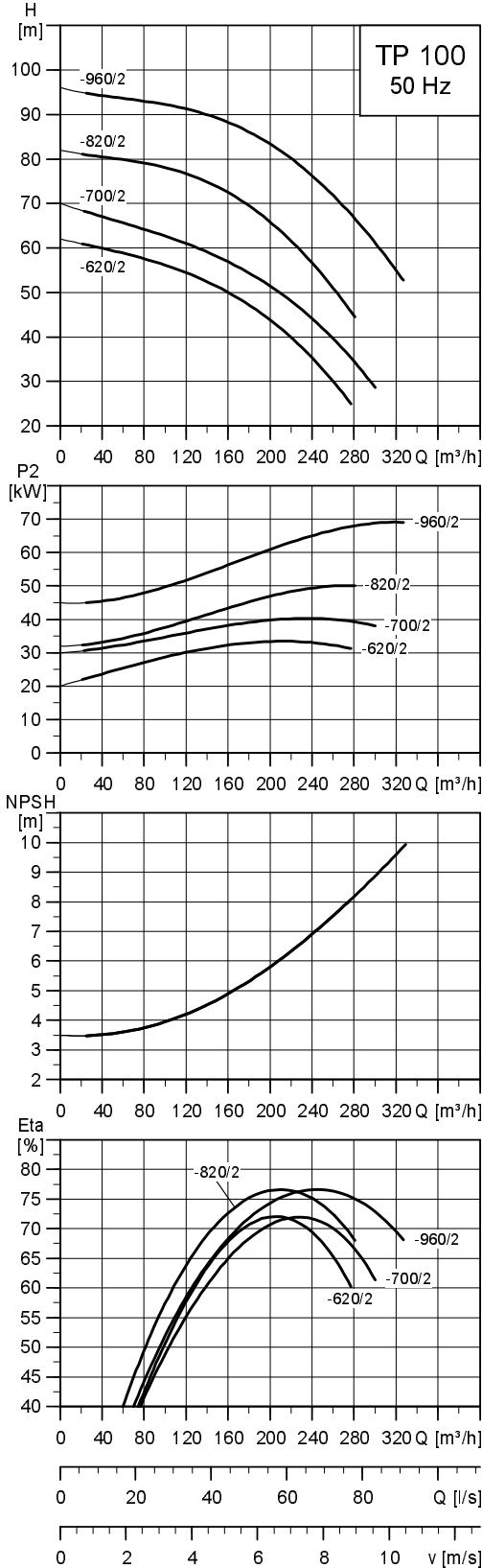
TP 150			-60/6	-70/6	-90/6	-110/6
TPD			•	•	•	•
TPE			-	-	-	-
TPED			-	-	-	-
Series			300	300	300	300
IEC size	1~ TP		-	-	-	-
	3~ TP		112	132	132	132
	1~ TPE		-	-	-	-
	3~ TPE		-	-	-	-
P2	1~/3~ TP	[kW]	-/2.2	-/3	-/4	-/5.5
	1~/3~ TPE	[kW]	-/-	-/-	-/-	-/-
PN			PN 16	PN 16	PN 16	PN 16
T _{min} , T _{max}		[°C]	[-25;120]	[-25;120]	[-25;120]	[-25;120]
D1		[mm]	150	150	150	150
AC	1~/3~ TP	[mm]	-/222	-/262	-/262	-/262
	1~/3~ TPE	[mm]	-/-	-/-	-/-	-/-
AD	1~/3~ TP	[mm]	-/177	-/202	-/202	-/202
	1~/3~ TPE	[mm]	-/-	-/-	-/-	-/-
AE		[mm]	-	-	-	-
AF		[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
B4 ★★	TP	[mm]	296/583	296/583	296/583	296/583
	1~ TPE	[mm]	-	-	-	-
	3~ TPE	[mm]	-	-	-	-
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.

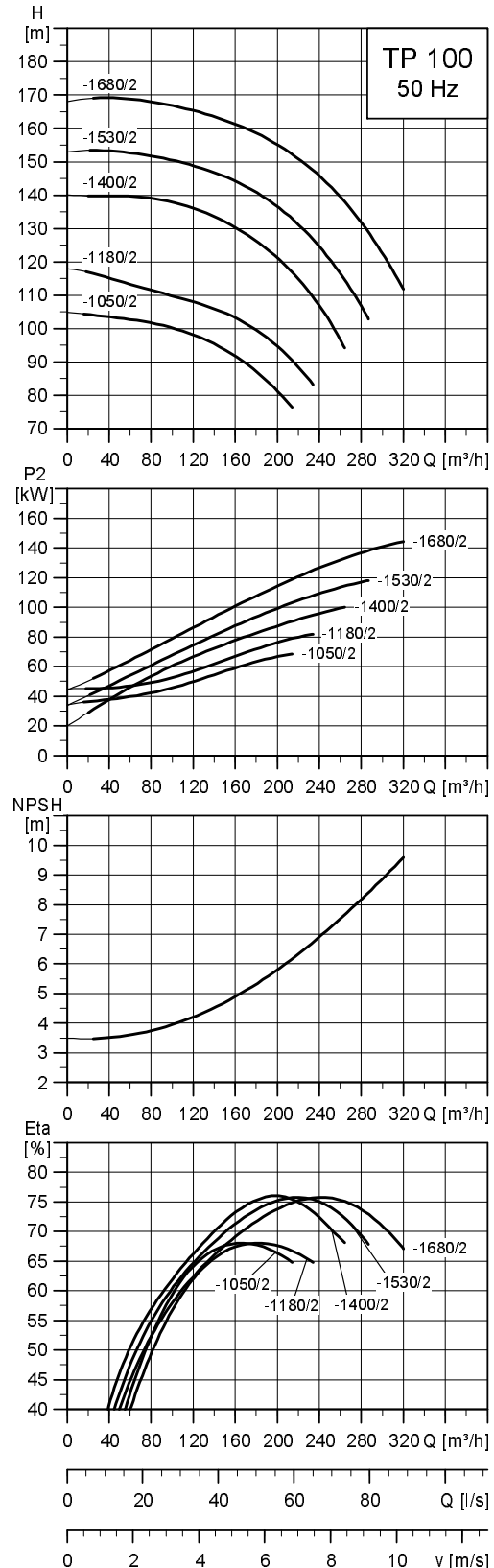
24. Performance curves and technical data

TP, 2-pole, PN 25

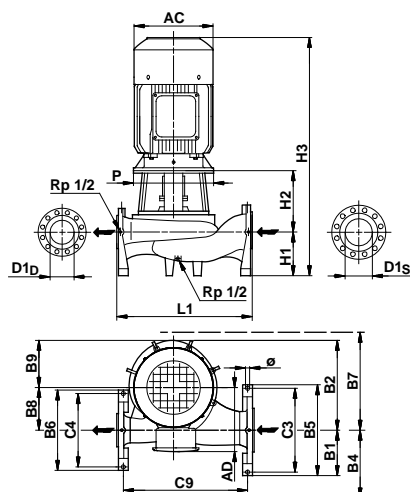
TP 100-XXX/2



TM02 6830 0504



TM02 6831 0504



TM02 8350 5004

Technical data

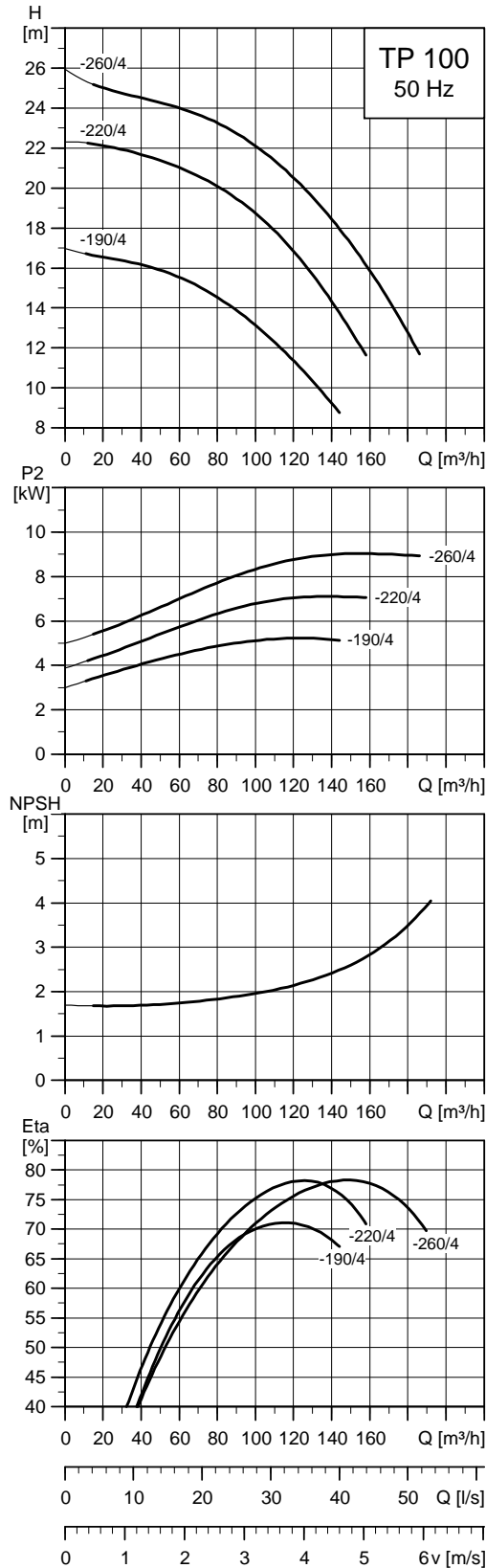
TP 100		-620/2	-700/2	-820/2	-960/2	-1050/2	-1180/2	-1400/2	-1530/2	-1680/2
TPD		-	-	-	-	-	-	-	-	-
TPE		-	-	-	-	-	-	-	-	-
TPED		-	-	-	-	-	-	-	-	-
Series		400	400	400	400	400	400	400	400	400
IEC size	1~ TP	-	-	-	-	-	-	-	-	-
	3~ TP	200 L	225 M	250 M	280 S	280 S	280 M	315 S	315 M	315 L
	1~ TPE	-	-	-	-	-	-	-	-	-
	3~ TPE	-	-	-	-	-	-	-	-	-
P2	[kW]	37	45	55	75	75	90	110	132	160
PN		PN 25	PN 25	PN 25	PN 25	PN 25	PN 25	PN 25	PN 25	PN 25
T _{min} , T _{max}	[°C]	[0;150]	[0;150]	[0;150]	[0;150]	[0;150]	[0;150]	[0;150]	[0;150]	[0;150]
D _{1p} /D _{1s}	[mm]	100/125	100/125	100/125	100/125	100/125	100/125	100/125	100/125	100/125
AC	[mm]	407	439	487	540	540	551	616	616	616
AD	[mm]	315	410	433	432	432	433	515	515	515
P	[mm]	550	550	550	550	550	550	800	800	800
B1	[mm]	180	180	180	180	180	180	180	180	180
B2	[mm]	407	407	407	407	425	425	425	425	425
B4	[mm]	180	180	193	227	219	219	312	312	312
B5	[mm]	360	360	360	360	360	360	360	360	360
B6	[mm]	335	335	335	335	335	335	335	335	335
B7	[mm]	467	467	467	467	475	475	600	600	600
B8	[mm]	192	192	192	192	200	200	200	200	200
B9	[mm]	215	215	215	215	225	225	225	225	225
C3	[mm]	320	320	320	320	320	320	320	320	320
C4	[mm]	295	295	295	295	295	295	295	295	295
C9	[mm]	489	489	489	489	606	606	606	606	606
∅	[mm]	20	20	20	20	20	20	20	20	20
L1	[mm]	543	543	543	543	660	660	660	660	660
H1	[mm]	160	160	160	160	170	170	170	170	170
H2	[mm]	315	315	315	315	300	300	303	303	303
H3	[mm]	1186	1183	1222	1295	1290	1400	1385	1550	1550

★ TP(E), TP(E)D pumps are primarily fitted with IE3 motors. See *Motors*, page 72.

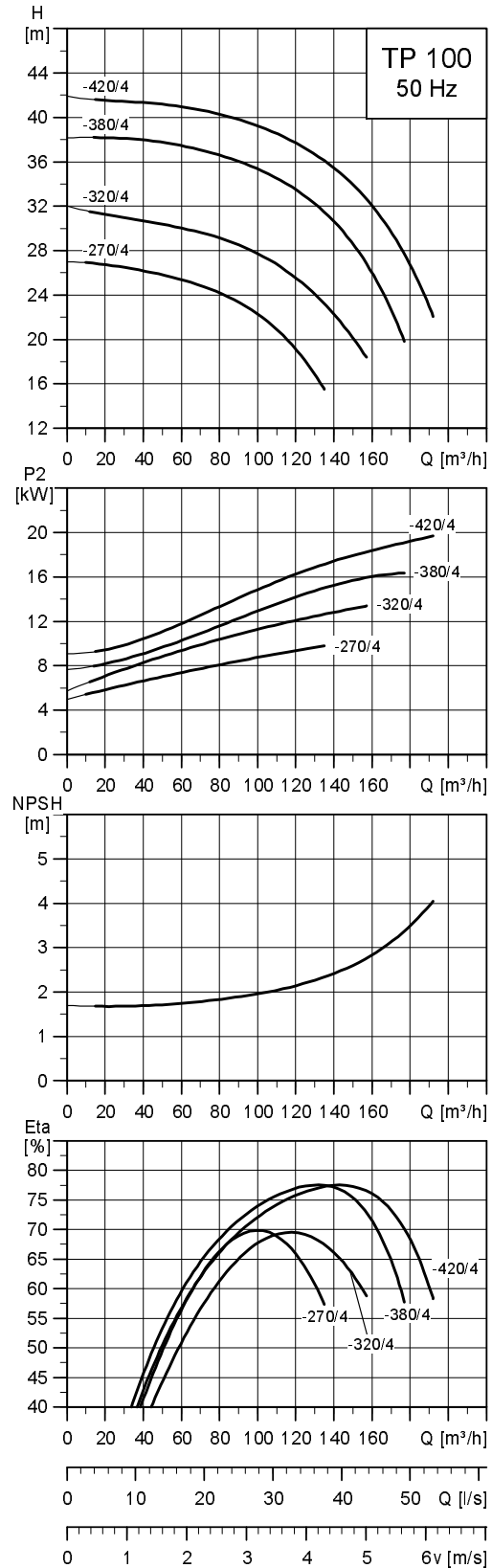
25. Performance curves and technical data

TP, 4-pole, PN 25

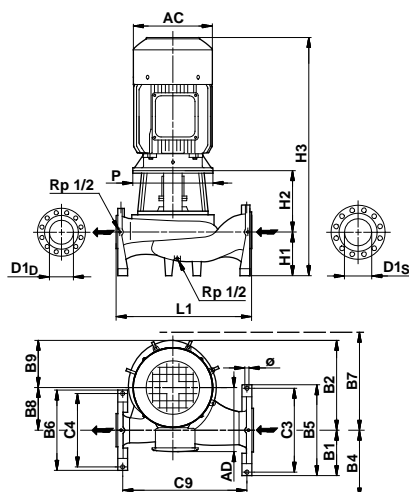
TP 100-XXX/4



TM02 6837 4810



TM02 6838 0504



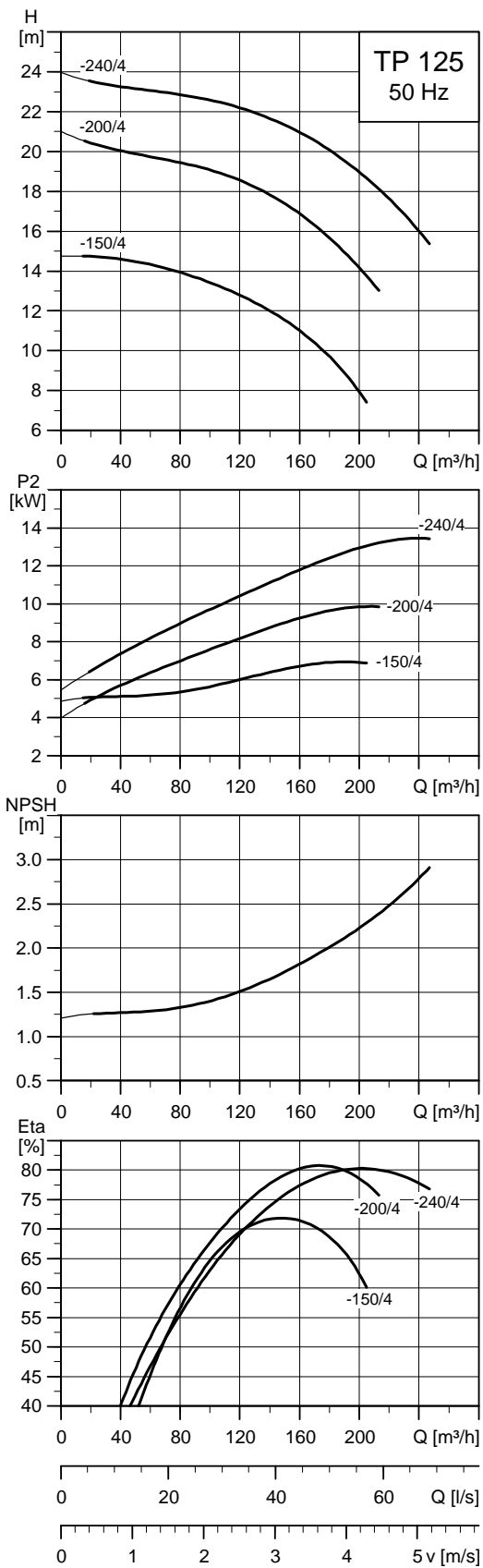
TM02 8350 5004

Technical data

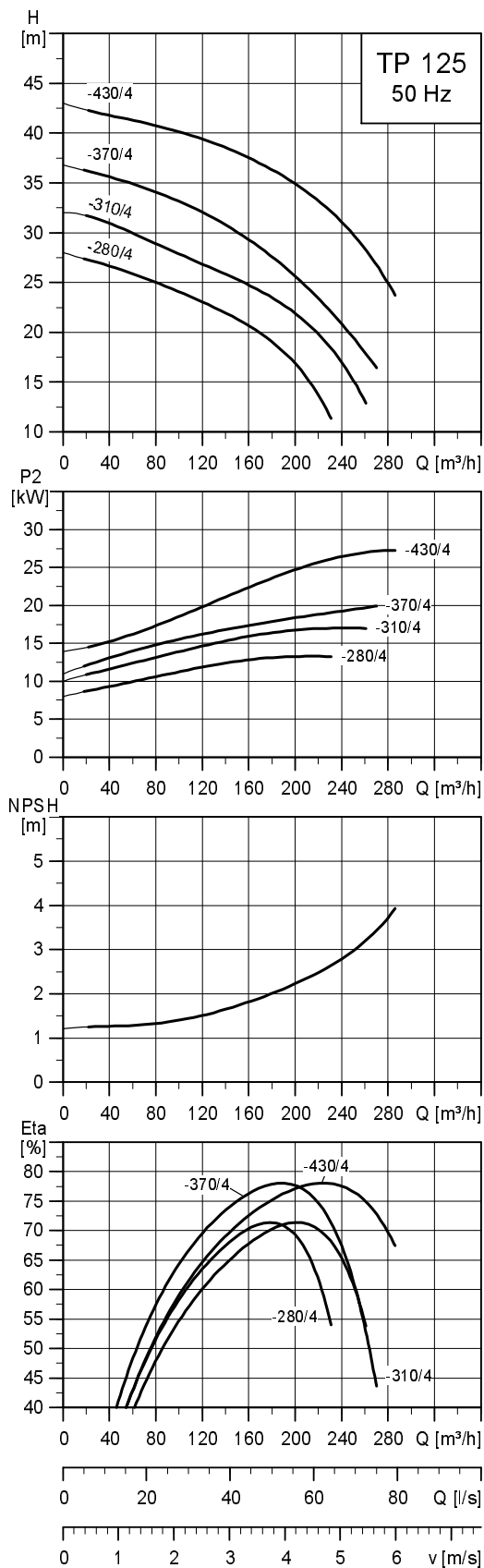
TP 100		-190/4	-220/4	-260/4	-270/4	-320/4	-380/4	-420/4
TPD		-	-	-	-	-	-	-
TPE		-	-	-	-	-	-	-
TPED		-	-	-	-	-	-	-
Series		400	400	400	400	400	400	400
IEC size	1~ TP	-	-	-	-	-	-	-
	3~ TP	132 S	132 M	160 M	160 M	160 L	180 M	180 L
	1~ TPE	-	-	-	-	-	-	-
	3~ TPE	-	-	-	-	-	-	-
P2	[kW]	5.5	7.5	11	11	15	18.5	22
PN		PN 25	PN 25	PN 25	PN 25	PN 25	PN 25	PN 25
T _{min} , T _{max}	[°C]	[0;150]	[0;150]	[0;150]	[0;150]	[0;150]	[0;150]	[0;150]
D _{1p} /D _{1s}	[mm]	100/125	100/125	100/125	100/125	100/125	100/125	100/125
AC	[mm]	260	260	314	314	314	368	368
AD	[mm]	159	159	204	204	204	286	286
P	[mm]	400	400	400	450	450	450	450
B1	[mm]	180	180	180	180	180	180	180
B2	[mm]	407	407	407	425	425	425	425
B4	[mm]	180	180	180	180	180	180	180
B5	[mm]	360	360	360	360	360	360	360
B6	[mm]	335	335	335	335	335	335	335
B7	[mm]	401	401	401	429	430	429	429
B8	[mm]	192	192	192	200	200	200	200
B9	[mm]	215	215	215	225	225	225	225
C3	[mm]	320	320	320	320	320	320	320
C4	[mm]	295	295	295	295	295	295	295
C9	[mm]	489	489	489	606	606	606	606
∅	[mm]	20	20	20	20	20	20	20
L1	[mm]	543	543	543	660	660	660	660
H1	[mm]	160	160	160	170	170	170	170
H2	[mm]	285	285	285	270	270	270	270
H3	[mm]	824	874	916	911	985	945	1036

★ TP(E), TP(E)D pumps are primarily fitted with IE3 motors. See *Motors*, page 72.

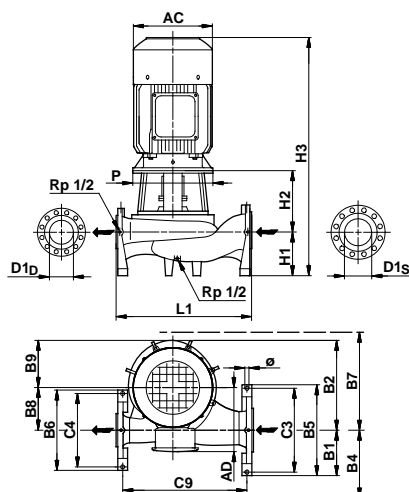
TP 125-XXX/4



TM02 6839 4810



TM02 6840 0805



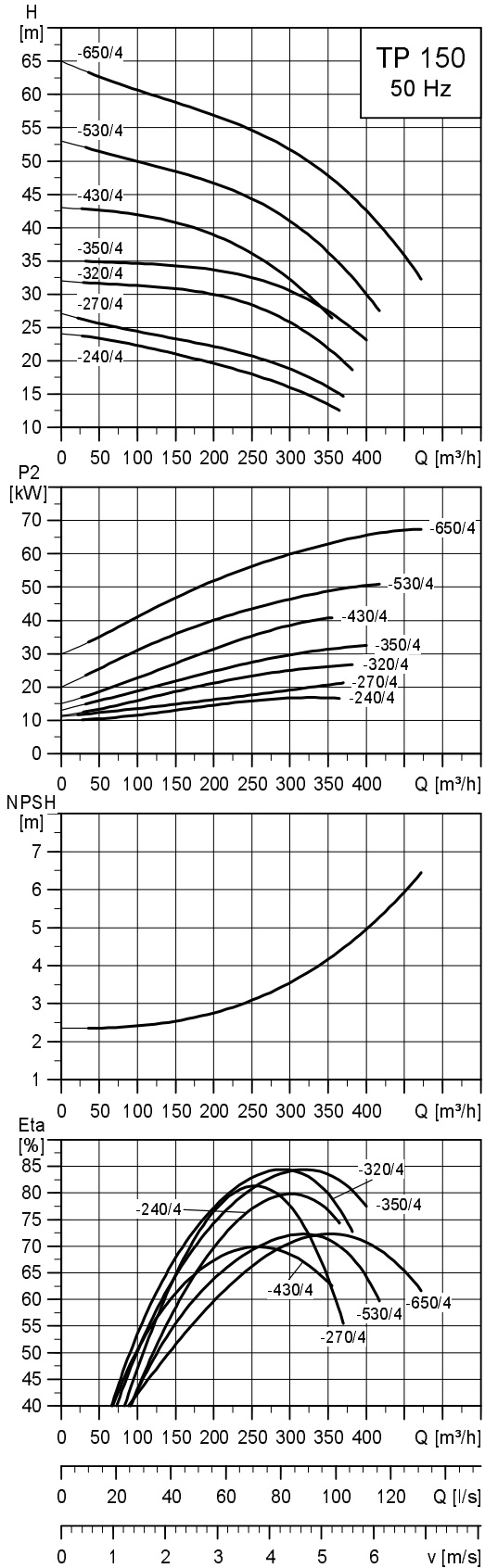
TM02 8350 5004

Technical data

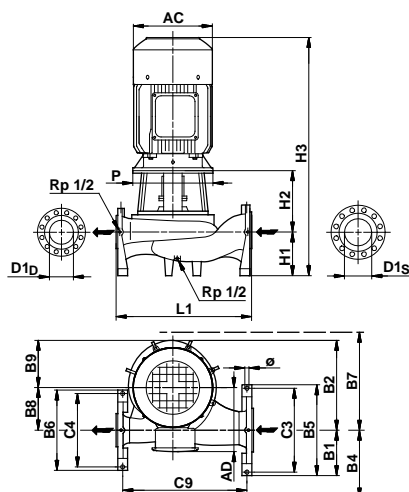
TP 125		-150/4	-200/4	-240/4	-280/4	-310/4	-370/4	-430/4
TPD		-	-	-	-	-	-	-
TPE		-	-	-	-	-	-	-
TPED		-	-	-	-	-	-	-
Series		400	400	400	400	400	400	400
IEC size	1~ TP	-	-	-	-	-	-	-
	3~ TP	132 M	160 M	160 L	160 L	180 M	180 L	200 L
	1~ TPE	-	-	-	-	-	-	-
	3~ TPE	-	-	-	-	-	-	-
P2	[kW]	7.5	11	15	15	18.5	22	30
PN		PN 25	PN 25	PN 25	PN 25	PN 25	PN 25	PN 25
T _{min} , T _{max}	[°C]	[0;150]	[0;150]	[0;150]	[0;150]	[0;150]	[0;150]	[0;150]
D _{1p} /D _{1s}	[mm]	125/150	125/150	125/150	125/150	125/150	125/150	125/150
AC	[mm]	260	314	314	314	368	368	408
AD	[mm]	159	204	204	204	286	286	315
P	[mm]	400	400	400	450	450	450	450
B1	[mm]	200	200	200	200	200	200	200
B2	[mm]	430	430	430	451	451	451	451
B4	[mm]	200	200	200	200	200	200	200
B5	[mm]	400	400	400	400	400	400	400
B6	[mm]	360	360	360	360	360	360	360
B7	[mm]	423	423	423	467	468	468	467
B8	[mm]	200	200	200	224	224	224	224
B9	[mm]	230	230	230	227	227	227	227
C3	[mm]	360	360	360	360	360	360	360
C4	[mm]	320	320	320	320	320	320	320
C9	[mm]	536	536	536	606	606	606	606
∅	[mm]	20	20	20	20	20	20	20
L1	[mm]	590	590	590	660	660	660	660
H1	[mm]	185	185	185	180	180	180	180
H2	[mm]	287	287	287	283	283	283	283
H3	[mm]	902	943	1017	1008	978	1059	1108

★ TP(E), TP(E)D pumps are primarily fitted with IE3 motors. See *Motors*, page 72.

TP 150-XXX/4



TM02 6842 0504



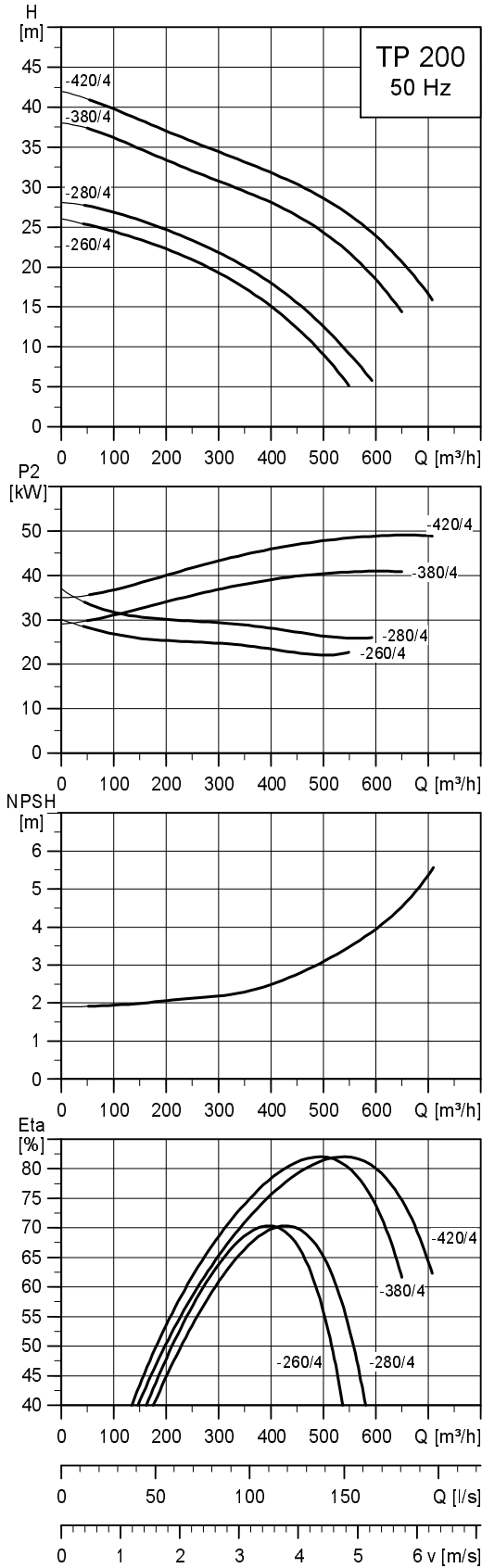
TM02 8350 5004

Technical data

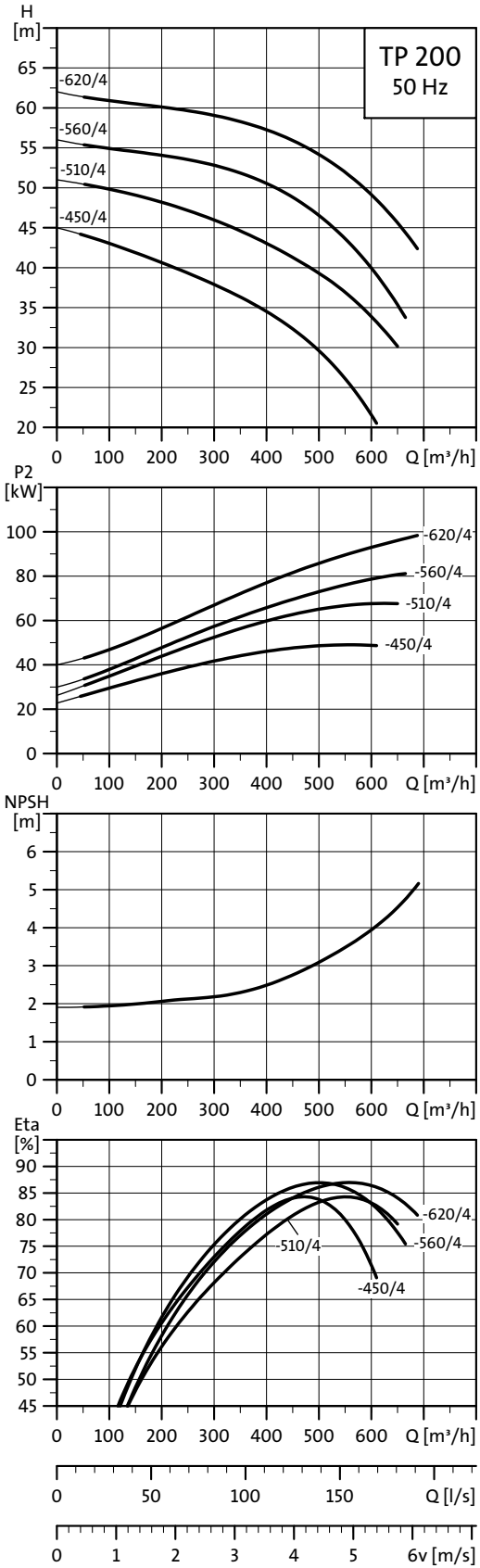
TP 150		-240/4	-270/4	-320/4	-350/4	-430/4	-530/4	-650/4
TPD		-	-	-	-	-	-	-
TPE		-	-	-	-	-	-	-
TPED		-	-	-	-	-	-	-
Series		400	400	400	400	400	400	400
IEC size	1~ TP	-	-	-	-	-	-	-
	3~ TP	180 M	180 L	200 L	225 S	225 M	250 M	280 S
	1~ TPE	-	-	-	-	-	-	-
	3~ TPE	-	-	-	-	-	-	-
P2	[kW]	18.5	22	30	37	45	55	75
PN		PN 25	PN 25	PN 25	PN 25	PN 25	PN 25	PN 25
T _{min} , T _{max}	[°C]	[0;150]	[0;150]	[0;150]	[0;150]	[0;150]	[0;150]	[0;150]
D _{1p} /D _{1s}	[mm]	150/200	150/200	150/200	150/200	150/200	150/200	150/200
AC	[mm]	368	368	408	449	449	497	551
AD	[mm]	286	286	315	338	338	410	433
P	[mm]	450	450	450	550	550	550	550
B1	[mm]	230	230	230	230	235	235	235
B2	[mm]	504	504	504	504	575	575	575
B4	[mm]	230	230	230	230	235	235	235
B5	[mm]	460	460	460	460	470	470	470
B6	[mm]	400	400	400	400	410	410	410
B7	[mm]	517	517	518	518	584	584	584
B8	[mm]	229	229	229	229	260	260	260
B9	[mm]	275	275	275	275	315	315	315
C3	[mm]	420	420	420	420	420	420	420
C4	[mm]	360	360	360	360	360	360	360
C9	[mm]	676	676	676	676	823	823	823
∅	[mm]	20	20	20	20	20	20	20
L1	[mm]	740	740	740	740	900	900	900
H1	[mm]	225	225	225	225	250	250	250
H2	[mm]	293	293	293	323	325	325	325
H3	[mm]	1033	1114	1164	1196	1283	1322	1395

★ TP(E), TP(E)D pumps are primarily fitted with IE3 motors. See *Motors*, page 72.

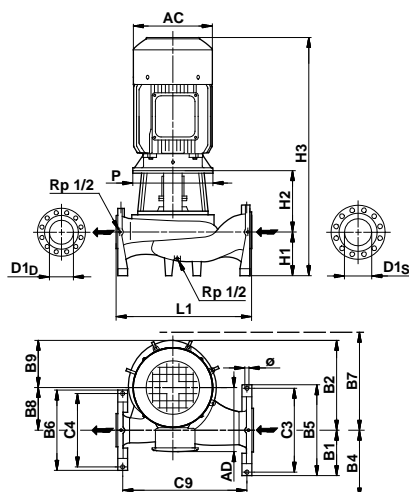
TP 200-XXX/4



TM02 6843 0805



TM02 6844 0504



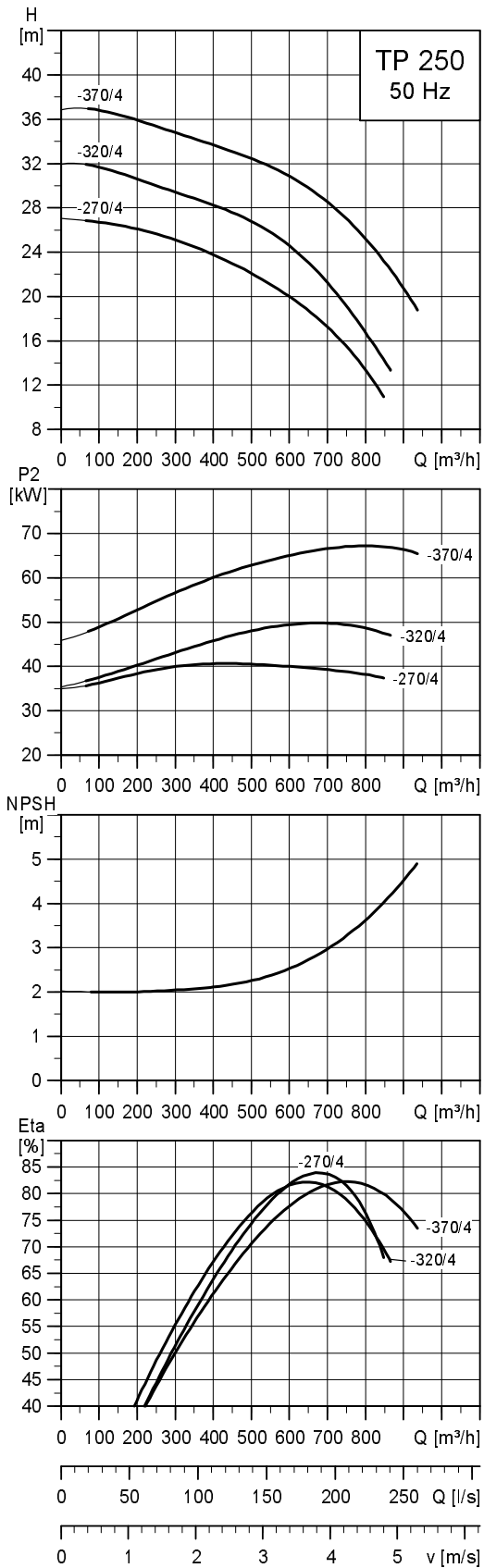
TM02 8350 5004

Technical data

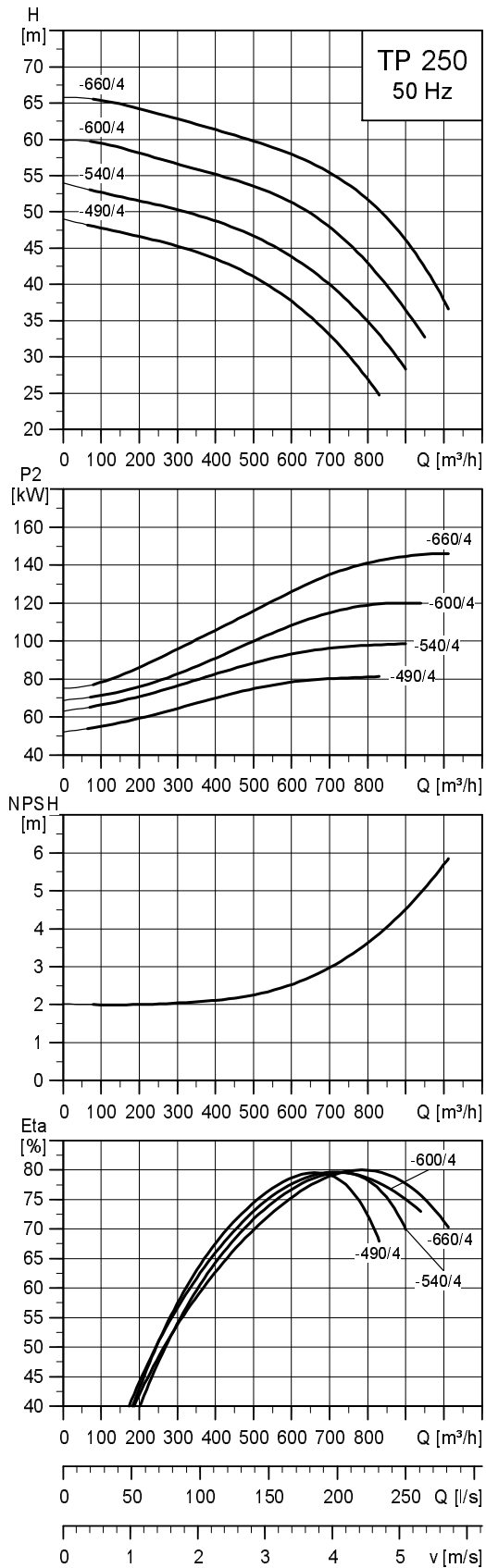
TP 200		-260/4	-280/4	-380/4	-420/4	-450/4	-510/4	-560/4	-620/4
TPD		-	-	-	-	-	-	-	-
TPE		-	-	-	-	-	-	-	-
TPED		-	-	-	-	-	-	-	-
Series		400	400	400	400	400	400	400	400
IEC size	1~ TP	-	-	-	-	-	-	-	-
	3~ TP	200 L	225 S	225 M	250 M	250 M	280 S	280 M	315 S
	1~ TPE	-	-	-	-	-	-	-	-
	3~ TPE	-	-	-	-	-	-	-	-
P2	[kW]	30	37	45	55	55	75	90	110
PN		PN 25	PN 25	PN 25	PN 25	PN 25	PN 25	PN 25	PN 25
T _{min} , T _{max}	[°C]	[0;150]	[0;150]	[0;150]	[0;150]	[0;150]	[0;150]	[0;150]	[0;150]
D _{1D} /D _{1S}	[mm]	200/250	200/250	200/250	200/250	200/250	200/250	200/250	200/250
AC	[mm]	408	449	449	497	497	551	551	616
AD	[mm]	315	338	338	410	410	433	433	515
P	[mm]	450	550	550	550	550	550	550	660
B1	[mm]	260	260	260	260	268	268	268	268
B2	[mm]	560	560	560	560	640	640	640	640
B4	[mm]	260	260	260	260	268	268	268	268
B5	[mm]	520	520	520	520	535	535	535	535
B6	[mm]	460	460	460	460	470	470	470	470
B7	[mm]	572	572	572	572	645	645	645	645
B8	[mm]	260	260	260	260	300	300	300	300
B9	[mm]	300	300	300	300	340	340	340	340
C3	[mm]	480	480	480	480	485	485	485	485
C4	[mm]	420	420	420	420	420	420	420	420
C9	[mm]	766	766	766	766	1013	1013	1013	1013
∅	[mm]	20	20	20	20	20	20	20	20
L1	[mm]	830	830	830	830	1100	1100	1100	1100
H1	[mm]	250	250	250	250	290	290	290	290
H2	[mm]	308	338	338	338	327	327	327	357
H3	[mm]	1186	1236	1296	1335	1364	1437	1547	1559

★ TP(E), TP(E)D pumps are primarily fitted with IE3 motors. See *Motors*, page 72.

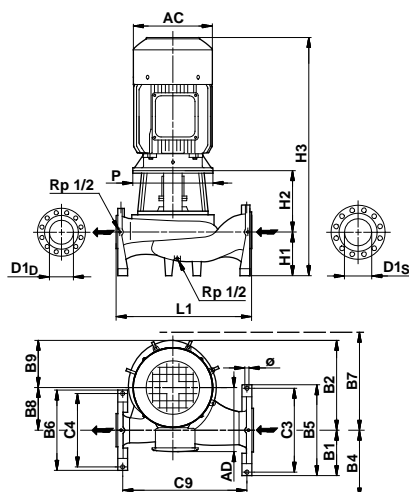
TP 250-XXX/4



TM02 6845 0504



TM02 6846 0504



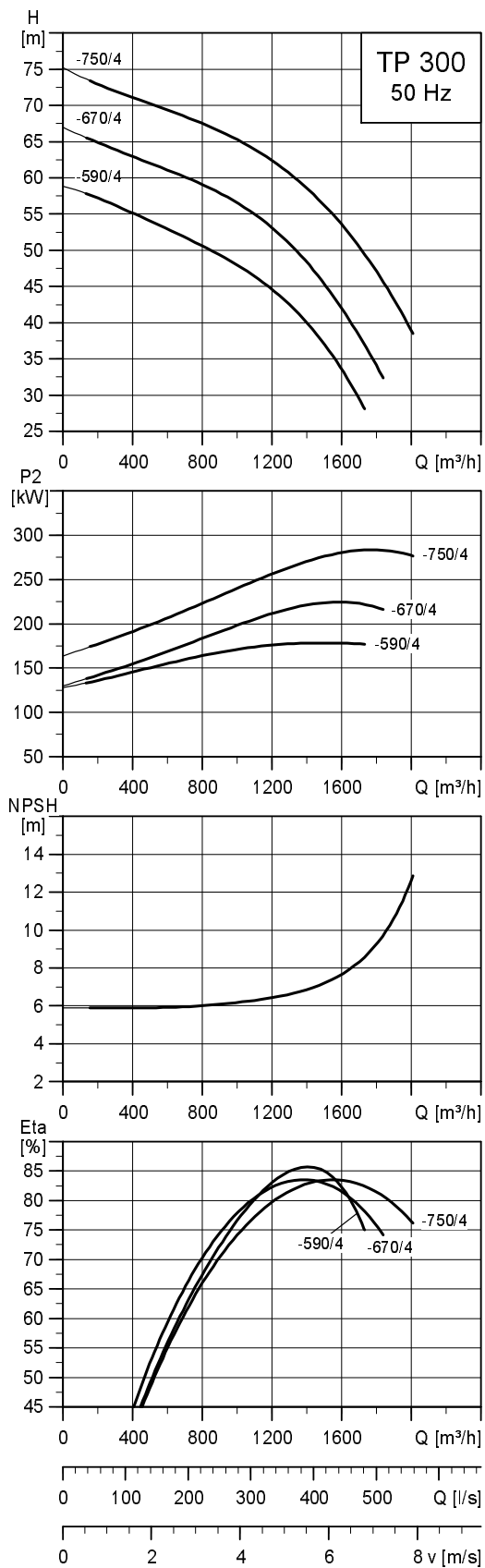
TM02 8350 5004

Technical data

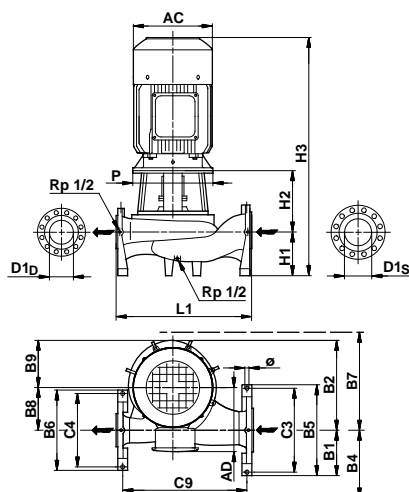
TP 250		-270/4	-320/4	-370/4	-490/4	-540/4	-600/4	-660/4
TPD		-	-	-	-	-	-	-
TPE		-	-	-	-	-	-	-
TPED		-	-	-	-	-	-	-
Series		400	400	400	400	400	400	400
IEC size	1~ TP	-	-	-	-	-	-	-
	3~ TP	225 M	250 M	280 S	280 M	315 S	315 M	315 M
	1~ TPE	-	-	-	-	-	-	-
	3~ TPE	-	-	-	-	-	-	-
P2	[kW]	45	55	75	90	110	132	160
PN		PN 25	PN 25	PN 25	PN 25	PN 25	PN 25	PN 25
T _{min} , T _{max}	[°C]	[0;150]	[0;150]	[0;150]	[0;150]	[0;150]	[0;150]	[0;150]
D1 _p /D1 _s	[mm]	250/300	250/300	250/300	250/300	250/300	250/300	250/300
AC	[mm]	449	497	551	551	616	616	616
AD	[mm]	338	410	433	433	515	515	515
P	[mm]	550	550	550	660	660	660	660
B1	[mm]	303	303	303	303	303	303	303
B2	[mm]	650	650	650	700	700	700	700
B4	[mm]	303	303	303	303	303	303	303
B5	[mm]	605	605	605	605	605	605	605
B6	[mm]	540	540	540	540	540	540	540
B7	[mm]	647	647	647	720	720	720	720
B8	[mm]	300	300	300	330	330	330	330
B9	[mm]	350	350	350	370	370	370	370
C3	[mm]	550	550	550	550	550	550	550
C4	[mm]	485	485	485	485	485	485	485
C9	[mm]	855	855	855	1106	1106	1106	1106
Ø	[mm]	24	24	24	24	24	24	24
L1	[mm]	950	950	950	1200	1200	1200	1200
H1	[mm]	300	300	300	350	350	350	350
H2	[mm]	368	368	368	373	373	358	358
H3	[mm]	1376	1415	1488	1653	1635	1785	1785

★ TP(E), TP(E)D pumps are primarily fitted with IE3 motors. See *Motors*, page 72.

TP 300-XXX/4



TM02 6847 0504

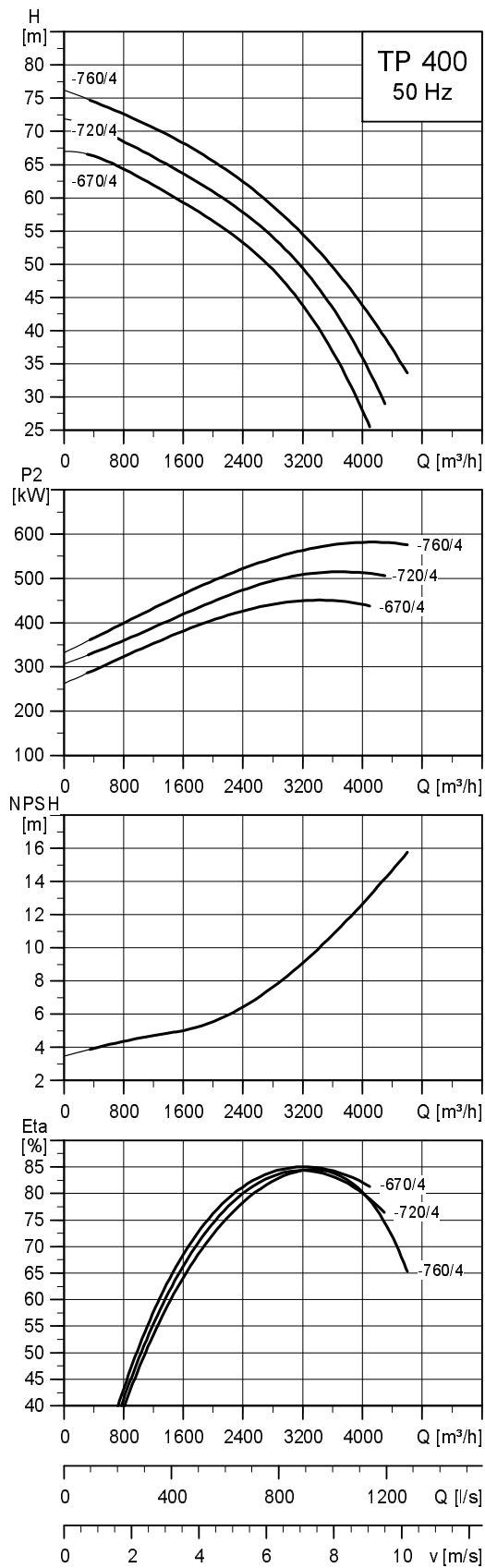
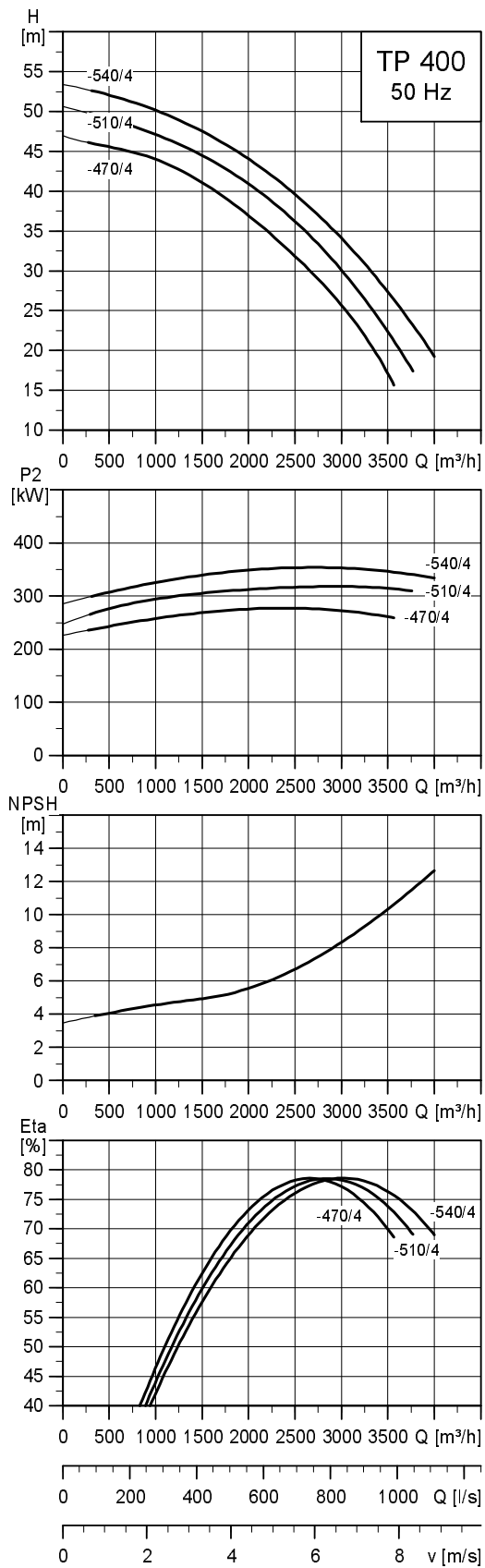


TM02 8350 5004

Technical data

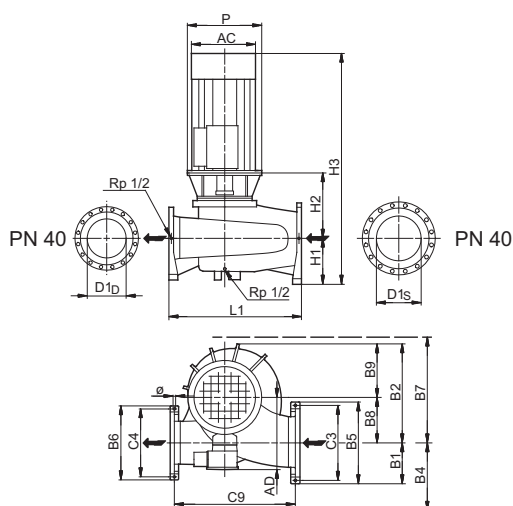
TP 300		-590/4	-670/4	-750/4	
TPD		-	-	-	
TPE		-	-	-	
TPED		-	-	-	
Series		400	400	400	
IEC size	1~ TP	-	-	-	
	3~ TP	315 L	315	315	
	1~ TPE	-	-	-	
	3~ TPE	-	-	-	
P2	[kW]	200	250	315	
PN		PN 25	PN 25	PN 25	
T _{min} , T _{max}		[°C]	[0;150]	[0;150]	[0;150]
D _{1D} /D _{1S}		[mm]	300/350	300/350	300/350
AC		[mm]	616	610	625
AD		[mm]	515	500	608
P		[mm]	660	1150	1150
B1		[mm]	338	338	338
B2		[mm]	790	790	790
B4		[mm]	338	338	338
B5		[mm]	675	675	675
B6		[mm]	605	605	605
B7		[mm]	817	817	817
B8		[mm]	370	370	370
B9		[mm]	420	420	420
C3		[mm]	620	620	620
C4		[mm]	550	550	550
C9		[mm]	1204	1204	1204
Ø		[mm]	24	24	24
L1		[mm]	1300	1300	1300
H1		[mm]	375	375	375
H2		[mm]	406	446	446
H3		[mm]	2013	2043	2187

TP 400-XXX/4



TM02 6848 0504

TM02 6849 0504



TM02 8351 3307

Technical data

TP 400		-470/4	-510/4	-540/4	-670/4	-720/4	-760/4
TPD		-	-	-	-	-	-
TPE		-	-	-	-	-	-
TPED		-	-	-	-	-	-
Series		400	400	400	400	400	400
IEC size	1~ TP	-	-	-	-	-	-
	3~ TP	315	355	355	355	400	400
	1~ TPE	-	-	-	-	-	-
	3~ TPE	-	-	-	-	-	-
P2	[kW]	315	355	400	500	560	630
PN		PN 25	PN 25	PN 25	PN 25	PN 25	PN 25
T _{min} , T _{max}	[°C]	[0;150]	[0;150]	[0;150]	[0;150]	[0;150]	[0;150]
D _{1D} /D _{1S}	[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
B4	[mm]	448	448	448	448	448	448
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

26. Weights and shipping volume

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

Pump type	Connection		Weights				Shipping volume [m ³]	
	D1 _D	D1 _S	Net [kg]★		Gross [kg]★		TP/TPD	TPE/TPED
			TP/TPD	TPE/TPED	TP/TPD	TPE/TPED		
TP 25-50/2 R	G 1/2	G 1/2	8/-	14/-	9/-	16/-	0.022/-	0.039/-
TP 25-80/2 R	G 1/2	G 1/2	8/-	14/-	9/-	16/-	0.022/-	0.039/-
TP 25-90/2 R	G 1/2	G 1/2	11/-	14/-	12/-	16/-	0.039/-	0.039/-
TP 32-50/2 R	G 2	G 2	9/-	14/-	10/-	16/-	0.022/-	0.039/-
TP 32-80/2 R	G 2	G 2	9/-	14/-	11/-	16/-	0.039/-	0.039/-
TP 32-90/2 R	G 2	G 2	11/-	15/-	13/-	17/-	0.039/-	0.039/-
TP, TPD 32-60/2	DN 32	DN 32	16/32	22/39	17/33	25/43	0.036/0.072	0.064/0.151
TP, TPD 32-120/2	DN 32	DN 32	19/38	21/42	20/40	22/44	0.036/0.072	0.056/0.072
TP, TPD 32-150/2	DN 32	DN 32	23/54	29/59	26/57	33/62	0.064/0.082	0.064/0.151
TP, TPD 32-180/2	DN 32	DN 32	24/54	29/59	27/57	32/62	0.064/0.082	0.064/0.082
TP, TPD 32-230/2	DN 32	DN 32	25/54	41/81	28/57	45/85	0.064/0.082	0.091/0.221
TP, TPD 32-200/2	DN 32	DN 32	42/86	50/101	47/101	62/118	0.138/0.3912	0.138/0.3912
TP, TPD 32-250/2	DN 32	DN 32	46/93	52/105	51/109	57/123	0.138/0.3912	0.184/0.3912
TP, TPD 32-320/2	DN 32	DN 32	51/104	57/114	57/120	62/133	0.184/0.3912	0.184/0.3912
TP, TPD 32-380/2	DN 32	DN 32	63/127	65/130	68/144	70/149	0.184/0.4584	0.184/0.5184
TP, TPD 32-460/2	DN 32	DN 32	76/151	79/157	82/169	85/176	0.2176/0.4584	0.2176/0.5184
TP, TPD 32-580/2	DN 32	DN 32	90/180	95/189	106/198	113/208	0.2176/0.4584	0.2176/0.5184
TP 40-50/2	DN 40	DN 40	12/-	17/-	13/-	19/-	0.022/-	0.039/-
TP, TPD 40-60/2	DN 40	DN 40	20/42	23/48	21/43	25/52	0.036/0.072	0.056/0.072
TP 40-80/2	DN 40	DN 40	12/-	17/-	14/-	19/-	0.039/-	0.039/-
TP 40-90/2	DN 40	DN 40	15/-	18/-	17/-	20/-	0.039/-	0.039/-
TP, TPD 40-120/2	DN 40	DN 40	20/41	22/46	21/43	24/50	0.036/0.072	0.056/0.072
TP 40-180/2	DN 40	DN 40	24/-	29/-	25/-	32/-	0.036/-	0.064/-
TP, TPD 40-190/2	DN 40	DN 40	29/54	44/82	32/59	48/87	0.064/0.151	0.091/0.221
TP, TPD 40-230/2	DN 40	DN 40	36/56	46/81	39/61	49/86	0.064/0.151	0.091/0.221
TP, TPD 40-270/2	DN 40	DN 40	39/70	37/75	42/75	40/80	0.064/0.151	0.091/0.221
TP, TPD 40-240/2	DN 40	DN 40	53/107	58/118	58/124	64/136	0.184/0.3912	0.184/0.3912
TP, TPD 40-300/2	DN 40	DN 40	65/130	66/133	70/148	72/152	0.184/0.4584	0.184/0.5184
TP, TPD 40-360/2	DN 40	DN 40	70/140	73/146	75/158	78/165	0.184/0.4584	0.184/0.5184
TP, TPD 40-470/2	DN 40	DN 40	90/183	95/192	105/201	113/211	0.2176/0.4584	0.2176/0.5184
TP, TPD 40-580/2	DN 40	DN 40	104/211	106/215	119/228	125/234	0.2176/0.4584	0.2176/0.5184
TP, TPD 50-60/2	DN 50	DN 50	20/45	24/50	21/48	28/53	0.056/0.072	0.064/0.151
TP, TPD 50-120/2	DN 50	DN 50	28/56	40/83	29/58	41/85	0.056/0.072	0.091/0.221
TP, TPD 50-180/2	DN 50	DN 50	28/56	41/83	29/58	45/86	0.056/0.072	0.091/0.221
TP, TPD 50-160/2	DN 50	DN 50	47/94	53/106	52/111	64/123	0.138/0.3912	0.184/0.3912
TP, TPD 50-190/2	DN 50	DN 50	48/98	54/110	53/114	60/128	0.138/0.3912	0.184/0.3912
TP, TPD 50-240/2	DN 50	DN 50	54/108	59/119	59/125	64/137	0.184/0.3912	0.184/0.3912
TP, TPD 50-290/2	DN 50	DN 50	65/131	67/134	70/149	72/153	0.184/0.4584	0.184/0.5184
TP, TPD 50-360/2	DN 50	DN 50	71/144	74/150	76/161	80/168	0.184/0.4584	0.184/0.5184
TP, TPD 50-430/2	DN 50	DN 50	86/174	91/182	101/191	109/201	0.184/0.4584	0.184/0.5184
TP, TPD 50-440/2	DN 50	DN 50	112/228	114/232	127/247	132/251	0.2176/0.5184	0.2176/0.5184
TP, TPD 50-570/2	DN 50	DN 50	149/303	181/366	166/324	199/392	0.7248/0.6507	0.7248/1.524
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	30/59	27/56	33/63	0.056/0.140	0.064/0.151
TP, TPD 65-120/2	DN 65	DN 65	31/63	40/86	32/65	42/90	0.056/0.140	0.091/0.221
TP, TPD 65-180/2	DN 65	DN 65	38/76	45/92	41/79	48/95	0.066/0.140	0.091/0.221
TP, TPD 65-190/2	DN 65	DN 65	57/116	63/126	63/132	68/145	0.184/0.3912	0.184/0.3912
TP, TPD 65-230/2	DN 65	DN 65	69/139	71/142	74/156	76/161	0.184/0.4584	0.184/0.5184
TP, TPD 65-260/2	DN 65	DN 65	74/149	77/155	79/166	82/173	0.184/0.4584	0.184/0.5184
TP, TPD 65-340/2	DN 65	DN 65	89/178	93/187	104/196	112/206	0.184/0.4584	0.184/0.5184
TP, TPD 65-410/2	DN 65	DN 65	103/206	105/210	118/224	123/229	0.184/0.4584	0.184/0.5184
TP, TPD 65-460/2	DN 65	DN 65	151/310	182/372	168/331	201/398	0.7248/0.6507	0.7248/1.524
TP, TPD 65-550/2	DN 65	DN 65	180/369	185/379	197/390	204/405	0.7248/0.6507	0.7248/1.524
TP, TPD 65-660/2	DN 65	DN 65	182/373	210/427	199/394	228/453	0.7248/0.6507	0.7248/1.524
TP, TPD 65-720/2	DN 65	DN 65	197/402	223/454	216/429	242/481	0.7248/1.524	0.7248/1.524
TP, TPD 65-930/2	DN 65	DN 65	345/699	-	364/725	-	0.7248/1.524	-
TP, TPD 80-120/2	DN 80	DN 80	43/83	52/100	44/86	57/106	0.066/0.140	0.091/0.370
TP, TPD 80-140/2	DN 80	DN 80	61/124	66/134	74/141	78/151	0.184/0.3912	0.184/0.3912
TP, TPD 80-180/2	DN 80	DN 80	65/132	74/150	78/149	88/180	0.184/0.4584	0.184/0.6507
TP, TPD 80-210/2	DN 80	DN 80	78/157	80/162	90/174	94/192	0.184/0.4584	0.184/0.5184

Pump type	Connection		Weights				Shipping volume [m ³]	
	D1 _D	D1 _S	Net [kg]★		Gross [kg]★		TP/TPD	TPE/TPED
			TP/TPD	TPE/TPED	TP/TPD	TPE/TPED		
TP, TPD 80-240/2	DN 80	DN 80	93/187	97/195	105/204	118/225	0.184/0.4584	0.7248/0.5184
TP, TPD 80-250/2	DN 80	DN 80	101/211	115/238	115/230	136/268	0.2176/0.5184	0.7248/0.5184
TP, TPD 80-330/2	DN 80	DN 80	148/304	181/370	169/334	203/420	0.7248/0.6507	0.7248/0.6507
TP, TPD 80-400/2	DN 80	DN 80	160/327	185/377	180/356	205/425	0.7248/0.6507	0.7248/0.6507
TP, TPD 80-520/2	DN 80	DN 80	176/349	215/427	197/379	236/477	0.7248/1.524	0.7248/1.524
TP, TPD 80-570/2	DN 80	DN 80	205/407	228/453	226/457	249/503	0.7248/1.524	0.7248/1.524
TP, TPD 80-700/2	DN 80	DN 80	350/697	-	371/747	-	0.7248/1.524	-
TP, TPD 100-120/2	DN 100	DN 100	53/108	61/124	55/113	66/130	0.140/0.213	0.120/0.370
TP, TPD 100-160/2	DN 100	DN 100	93/196	95/202	107/246	109/252	0.2176/0.5184	0.2176/0.6507
TP, TPD 100-200/2	DN 100	DN 100	108/226	112/235	122/276	134/285	0.7248/0.5184	0.7248/0.6507
TP, TPD 100-240/2	DN 100	DN 100	122/254	127/264	136/304	149/314	0.7248/0.5184	0.7248/0.6507
TP, TPD 100-250/2	DN 100	DN 100	175/351	206/413	199/401	230/463	0.7248/1.524	0.7248/1.524
TP, TPD 100-310/2	DN 100	DN 100	204/410	209/420	228/460	233/470	0.7248/1.524	0.7248/1.524
TP, TPD 100-360/2	DN 100	DN 100	207/414	234/468	230/464	257/518	0.7248/1.524	0.7248/1.524
TP, TPD 100-390/2	DN 100	DN 100	221/443	247/495	244/493	270/545	0.7248/1.524	0.7248/1.524
TP, TPD 100-480/2	DN 100	DN 100	384/771	-	425/828	-	0.797/1.800	-

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

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

Pump type	Connection		Weights				Shipping volume [m ³]★	
	D1 _D	D1 _S	Net [kg]★		Gross [kg]★		TP/TPD	TPE/TPED
			TP/TPD	TPE/TPED	TP/TPD	TPE/TPED		
TP, TPD 32-30/4	DN 32	DN 32	15/30	21/38	16/31	24/42	0.036/0.072	0.064/0.151
TP, TPD 32-40/4	DN 32	DN 32	25/32	29/54	28/33	32/58	0.064/0.072	0.064/0.151
TP, TPD 32-60/4	DN 32	DN 32	25/50	29/54	28/53	32/58	0.036/0.082	0.064/0.151
TP, TPD 32-80/4	DN 32	DN 32	35/69	36/74	40/86	48/92	0.138/0.3912	0.184/0.3912
TP, TPD 32-100/4	DN 32	DN 32	36/71	37/75	41/88	49/92	0.138/0.3912	0.184/0.3912
TP, TPD 32-120/4	DN 32	DN 32	49/94	48/96	55/110	61/113	0.1632/0.3912	0.2176/0.3912
TP, TPD 40-30/4	DN 40	DN 40	17/33	23/41	18/34	26/44	0.036/0.072	0.064/0.151
TP 40-60/4	DN 40	DN 40	22/42	27/-	23/43	30/-	0.036/0.072	0.064/-
TP, TPD 40-90/4	DN 40	DN 40	28/50	32/49	32/56	36/54	0.076/0.151	0.076/0.151
TP, TPD 40-100/4	DN 40	DN 40	41/83	42/85	45/99	54/103	0.138/0.3912	0.184/0.3912
TP, TPD 40-130/4	DN 40	DN 40	47/98	58/120	53/114	71/137	0.1632/0.3912	0.184/0.3912
TP, TPD 40-160/4	DN 40	DN 40	53/110	64/131	59/126	71/150	0.2176/0.3912	0.2176/0.3912
TP, TPD 50-30/4	DN 50	DN 50	24/46	30/51	25/48	33/55	0.036/0.072	0.064/0.151
TP, TPD 50-60/4	DN 50	DN 50	25/50	28/56	26/52	30/61	0.056/0.072	0.056/0.072
TP, TPD 50-90/4	DN 50	DN 50	43/87	44/89	47/103	56/106	0.138/0.3912	0.184/0.3912
TP, TPD 50-110/4	DN 50	DN 50	55/115	66/137	61/134	79/167	0.1632/0.5184	0.2176/0.5184
TP, TPD 50-130/4	DN 50	DN 50	61/127	72/149	67/146	79/167	0.1632/0.5184	0.2176/0.5184
TP, TPD 50-160/4	DN 50	DN 50	64/132	73/151	70/151	80/170	0.2176/0.5184	0.2176/0.5184
TP, TPD 50-190/4	DN 50	DN 50	69/142	83/171	75/162	90/190	0.2176/0.5184	0.2176/0.5184
TP, TPD 50-230/4	DN 50	DN 50	80/165	80/165	87/181	87/184	0.2176/0.5184	0.2176/0.5184
TP, TPD 65-30/4	DN 65	DN 65	33/56	37/62	35/59	41/65	0.056/0.140	0.064/0.151
TP, TPD 65-60/4	DN 65	DN 65	33/63	36/69	34/66	38/79	0.056/0.140	0.056/0.140
TP, TPD 65-90/4	DN 65	DN 65	46/92	57/115	51/109	69/132	0.1632/0.3912	0.184/0.3912
TP, TPD 65-110/4	DN 65	DN 65	63/134	74/155	69/150	80/174	0.2176/0.3912	0.2176/0.4584
TP, TPD 65-130/4	DN 65	DN 65	65/138	75/158	71/155	82/176	0.2176/0.3912	0.2176/0.4584
TP, TPD 65-150/4	DN 65	DN 65	70/160	84/177	76/166	91/195	0.2176/0.4584	0.2176/0.5184
TP, TPD 65-170/4	DN 65	DN 65	81/171	81/171	87/188	88/189	0.2176/0.4584	0.2176/0.5184
TP, TPD 65-240/4	DN 65	DN 65	80/169	101/210	87/186	108/229	0.2176/0.4584	0.2176/0.5184
TP, TPD 80-30/4	DN 80	DN 80	37/68	41/72	39/71	44/76	0.056/0.140	0.064/0.151
TP, TPD 80-60/4	DN 80	DN 80	37/70	50/95	39/72	53/100	0.066/0.140	0.091/0.370
TP, TPD 80-70/4	DN 80	DN 80	67/141	74/156	80/159	87/173	0.2176/0.3912	0.2176/0.4584
TP, TPD 80-90/4	DN 80	DN 80	70/148	75/158	83/165	88/175	0.2176/0.4584	0.2176/0.4584
TP, TPD 80-110/4	DN 80	DN 80	73/153	84/176	86/170	98/206	0.2176/0.4584	0.2176/0.5184
TP, TPD 80-150/4	DN 80	DN 80	88/172	87/171	102/192	101/201	0.2176/0.5184	0.2176/0.6507
TP, TPD 80-170/4	DN 80	DN 80	101/199	106/209	115/218	120/239	0.2176/0.5184	0.7248/0.6507
TP, TPD 80-240/4	DN 80	DN 80	194/393	180/366	218/443	204/417	0.9696/1.524	0.9696/1.524
TP, TPD 80-270/4	DN 80	DN 80	205/415	205/416	229/465	230/466	0.9696/1.524	0.9696/1.524
TP, TPD 80-340/4	DN 80	DN 80	239/484	233/472	263/534	258/522	0.9696/1.524	0.9696/1.524
TP, TPD 100-30/4	DN 100	DN 100	41/85	43/93	44/90	46/103	0.140/0.213	0.151/0.220
TP, TPD 100-60/4	DN 100	DN 100	52/107	63/122	55/113	67/127	0.140/0.213	0.120/0.370
TP, TPD 100-70/4	DN 100	DN 100	95/191	100/201	109/208	114/251	0.7248/0.6507	0.7248/0.6507
TP, TPD 100-90/4	DN 100	DN 100	97/196	109/218	122/246	133/268	0.7248/0.6507	0.7248/0.6507
TP, TPD 100-110/4	DN 100	DN 100	107/215	106/213	131/265	130/264	0.7248/0.6507	0.7248/0.6507

Pump type	Connection		Weights		Gross [kg]★		Shipping volume [m ³]★	
	D1 _D	D1 _S	Net [kg]★		TP/TPD	TPE/TPED	TP/TPD	TPE/TPED
			TP/TPD	TPE/TPED				
TP, TPD 100-130/4	DN 100	DN 100	139/282	144/292	164/332	169/342	0.7248/1.524	0.7248/1.524
TP, TPD 100-170/4	DN 100	DN 100	168/340	155/313	192/390	189/364	0.7248/1.524	0.7248/1.524
TP, TPD 100-200/4	DN 100	DN 100	239/499	240/500	264/549	290/550	0.9696/1.524	0.9696/1.524
TP, TPD 100-250/4	DN 100	DN 100	274/568	268/556	298/618	318/606	0.9696/1.524	0.9696/1.524
TP, TPD 100-330/4	DN 100	DN 100	285/589	291/601	309/640	341/652	0.9696/1.524	0.9696/1.524
TP, TPD 100-370/4	DN 100	DN 100	370/759	330/679	412/810	380/730	0.9696/1.524	0.9696/1.800
TP, TPD 100-410/4	DN 100	DN 100	380/781	-	422/831	-	0.9696/1.800	-
TP 125-70/4	DN 125	DN 125	125/-	131/-	144/-	150/-	0.969/-	0.969/-
TP 125-90/4	DN 125	DN 125	129/-	133/-	148/-	152/-	0.969/-	0.969/-
TP 125-100/4	DN 125	DN 125	144/-	148/-	163/-	167/-	0.969/-	0.969/-
TPD 125-110/4	DN 125	DN 125	-/393	-/403	-/443	-/453	-/1.524	-/1.524
TP, TPD 125-130/4	DN 125	DN 125	212/450	198/400	242/501	249/474	0.9696/1.524	0.9696/1.524
TP, TPD 125-160/4	DN 125	DN 125	222/471	223/472	252/522	273/523	0.9696/1.524	0.9696/1.524
TP, TPD 125-210/4	DN 125	DN 125	298/604	292/592	328/654	342/642	0.9696/1.524	0.9696/1.524
TP, TPD 125-250/4	DN 125	DN 125	308/623	314/635	358/674	364/686	0.9696/1.800	0.9696/1.524
TP, TPD 125-320/4	DN 125	DN 125	394/795	354/715	451/853	424/766	0.9696/1.800	0.9696/1.524
TP, TPD 125-360/4	DN 125	DN 125	404/817	-	462/874	-	0.9696/1.800	-
TP, TPD 125-420/4	DN 125	DN 125	500/1008	-	557/1065	-	1.800/1.800	-
TP 150-100/4	DN 150	DN 150	198/-	208/-	371/-	381/-	2.3/-	2.3/-
TPD 150-130/4	DN 150	DN 150	-/574	-/575	-/624	-/625	-/1.524	-/1.524
TP 150-140/4	DN 150	DN 150	213/-	221/-	386/-	394/-	2.3/-	2.3/-
TP 150-150/4	DN 150	DN 150	235/-	254/-	408/-	427/-	2.3/-	2.3/-
TPD 150-160/4	DN 150	DN 150	-/643	-/631	-/693	-/681	-/1.524	-/1.524
TP, TPD 150-200/4	DN 150	DN 150	330/663	336/675	380/714	386/756	0.9696/1.800	0.9696/1.800
TP, TPD 150-220/4	DN 150	DN 150	415/833	375/753	472/891	425/804	0.9696/1.800	0.9696/1.800
TP, TPD 150-250/4	DN 150	DN 150	426/854	-	483/912	-	0.9696/1.800	-
TP 150-260/4	DN 150	DN 150	424/-	388/-	592/-	561/-	2.3/-	2.3/-
TP 150-280/4	DN 150	DN 150	445/-	-	689/-	-	2.3/-	-
TP 150-340/4	DN 150	DN 150	502/-	-	672/-	-	2.3/-	-
TP 150-390/4	DN 150	DN 150	550/-	-	719/-	-	2.3/-	-
TP 150-450/4	DN 150	DN 150	672/-	-	870/-	-	3.1/-	-
TP 150-520/4	DN 150	DN 150	827/-	-	1025/-	-	3.1/-	-
TP 150-660/4	DN 150	DN 150	942/-	-	1140/-	-	3.1/-	-
TP 200-50/4	DN 200	DN 200	272/-	276/-	445/-	449/-	2.3/-	2.3/-
TP 200-70/4	DN 200	DN 200	279/-	289/-	452/-	462/-	2.3/-	2.3/-
TP 200-90/4	DN 200	DN 200	294/-	302/-	467/-	475/-	2.3/-	2.3/-
TP 200-130/4	DN 200	DN 200	343/-	362/-	516/-	535/-	2.3/-	2.3/-
TP 200-150/4	DN 200	DN 200	369/-	388/-	542/-	561/-	2.3/-	2.3/-
TP 200-160/4	DN 200	DN 200	336/-	355/-	509/-	528/-	2.3/-	2.3/-
TP 200-190/4	DN 200	DN 200	394/-	358/-	567/-	532/-	2.3/-	2.3/-
TP 200-200/4	DN 200	DN 200	409/-	-	587/-	-	2.3/-	-
TP 200-240/4	DN 200	DN 200	520/-	-	718/-	-	3.1/-	-
TP 200-270/4	DN 200	DN 200	671/-	-	840/-	-	2.3/-	-
TP 200-290/4	DN 200	DN 200	588/-	-	786/-	-	3.1/-	-
TP 200-320/4	DN 200	DN 200	797/-	-	996/-	-	3.1/-	-
TP 200-330/4	DN 200	DN 200	730/-	-	933/-	-	3.1/-	-
TP 200-360/4	DN 200	DN 200	766/-	-	969/-	-	3.1/-	-
TP 200-400/4	DN 200	DN 200	891/-	-	1090/-	-	3.1/-	-
TP 200-410/4	DN 200	DN 200	950/-	-	1148/-	-	3.1/-	-
TP 200-470/4	DN 200	DN 200	1044/-	-	1243/-	-	3.1/-	-
TP 200-530/4	DN 200	DN 200	1146/-	-	1379/-	-	4.6/-	-
TP 200-590/4	DN 200	DN 200	1311/-	-	1543/-	-	4.6/-	-
TP 200-660/4	DN 200	DN 200	1513/-	-	1745/-	-	4.6/-	-
TP 250-280/4	DN 250	DN 300	695/-	-	880/-	-	3.13/-	-
TP 250-310/4	DN 250	DN 300	800/-	-	985/-	-	3.13/-	-
TP 250-390/4	DN 250	DN 300	950/-	-	1135/-	-	3.13/-	-

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

TP, TPD, 6-pole, PN 6, 10, 16

Pump type	Connection		Weights				Shipping volume [m ³] ★	
	D1 _D	D1 _S	Net [kg] ★		Gross [kg] ★		TP/TPD	TPE/TPED
			TP/TPD	TPE/TPED	TP/TPD	TPE/TPED		
TP, TPD 125-60/6	DN 125	DN 125	158/343	-	188/393	-	0.9696/1.524	-
TP, TPD 125-70/6	DN 125	DN 125	164/355	-	194/405	-	0.9696/1.524	-
TP, TPD 125-90/6	DN 125	DN 125	238/485	-	268/535	-	0.9696/1.524	-
TP, TPD 125-110/6	DN 125	DN 125	245/498	-	275/549	-	0.9696/1.524	-
TP, TPD 125-140/6	DN 125	DN 125	246/500	-	276/550	-	0.9696/1.524	-
TP, TPD 125-170/6	DN 125	DN 125	284/575	-	314/626	-	0.9696/1.524	-
TP, TPD 150-60/6	DN 150	DN 150	227/457	-	257/508	-	0.9696/1.524	-
TP, TPD 150-70/6	DN 150	DN 150	261/524	-	291/574	-	0.9696/1.524	-
TP, TPD 150-90/6	DN 150	DN 150	267/538	-	297/588	-	0.9696/1.524	-
TP, TPD 150-110/6	DN 150	DN 150	267/538	-	297/588	-	0.9696/1.524	-

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

TP, 2-pole, PN 25

Pump type	Connection		Weights		Shipping volume [m ³]
	D1 _D	D1 _S	Net [kg]	Gross [kg]	
TP 100-620/2	DN 100	DN 125	425	580	2.29
TP 100-700/2	DN 100	DN 125	475	630	2.29
TP 100-820/2	DN 100	DN 125	580	735	2.29
TP 100-960/2	DN 100	DN 125	675	850	3.13
TP 100-1050/2	DN 100	DN 125	730	915	3.13
TP 100-1180/2	DN 100	DN 125	835	1020	3.13
TP 100-1400/2	DN 100	DN 125	995	1185	3.13
TP 100-1530/2	DN 100	DN 125	1125	1310	3.13
TP 100-1680/2	DN 100	DN 125	1225	1445	4.57

TP, 4-pole, PN 25

Pump type	Connection		Weights		Shipping volume [m ³]
	D1 _D	D1 _S	Net [kg]	Gross [kg]	
TP 100-190/4	DN 100	DN 125	227	257	0.72
TP 100-220/4	DN 100	DN 125	237	267	0.72
TP 100-260/4	DN 100	DN 125	260	290	0.72
TP 100-270/4	DN 100	DN 125	325	358	0.70
TP 100-320/4	DN 100	DN 125	344	377	0.70
TP 100-380/4	DN 100	DN 125	419	452	0.70
TP 100-420/4	DN 100	DN 125	439	472	0.70
TP 125-150/4	DN 125	DN 150	257	290	0.70
TP 125-200/4	DN 125	DN 150	280	313	0.70
TP 125-240/4	DN 125	DN 150	299	332	0.70
TP 125-280/4	DN 125	DN 150	299	332	0.70
TP 125-310/4	DN 125	DN 150	439	472	0.70
TP 125-370/4	DN 125	DN 150	464	492	0.70
TP 125-430/4	DN 125	DN 150	509	664	2.29
TP 150-240/4	DN 150	DN 200	479	634	2.29
TP 150-270/4	DN 150	DN 200	499	654	2.29
TP 150-320/4	DN 150	DN 200	549	704	2.29
TP 150-350/4	DN 150	DN 200	585	740	2.29
TP 150-430/4	DN 150	DN 200	660	815	2.29
TP 150-530/4	DN 150	DN 200	765	950	3.13
TP 150-650/4	DN 150	DN 200	915	1100	3.13
TP 200-260/4	DN 200	DN 250	604	759	2.29
TP 200-280/4	DN 200	DN 250	640	795	2.29
TP 200-380/4	DN 200	DN 250	675	830	2.29
TP 200-420/4	DN 200	DN 250	780	965	3.13
TP 200-450/4	DN 200	DN 250	840	1025	3.13
TP 200-510/4	DN 200	DN 250	960	1145	3.13
TP 200-560/4	DN 200	DN 250	1090	1275	3.13
TP 200-620/4	DN 200	DN 250	1190	1410	4.57
TP 250-270/4	DN 250	DN 300	785	970	3.13
TP 250-320/4	DN 250	DN 300	890	1075	3.13
TP 250-370/4	DN 250	DN 300	1040	1225	3.13
TP 250-490/4	DN 250	DN 300	1240	1460	4.57

Pump type	Connection		Weights		Shipping volume [m ³]
	D1 _D	D1 _S	Net [kg]	Gross [kg]	
TP 250-540/4	DN 250	DN 300	1340	1560	4.57
TP 250-600/4	DN 250	DN 300	1540	1760	4.57
TP 250-660/4	DN 250	DN 300	1575	1895	4.57
TP 300-590/4	DN 300	DN 350	1855	2165	5.88
TP 300-670/4	DN 300	DN 350	1900	2210	5.88
TP 300-750/4	DN 300	DN 350	2110	2420	5.88
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

27. Minimum efficiency index

Minimum efficiency index (MEI) means the dimensionless scale unit for hydraulic pump efficiency at best efficiency point (BEP), part load (PL) and overload (OL). The Commission Regulation (EU) sets efficiency requirements to $MEI \geq 0.10$ as from 1 January 2013 and $MEI \geq 0.40$ as from 1 January 2015. An indicative benchmark for best-performing water pump available on the market as from 1 January 2013 is determined in the Regulation.

- The benchmark for most efficient water pumps is $MEI \geq 0.70$.
- The efficiency of a pump with a trimmed impeller is usually lower than that of a pump with the full impeller diameter. The trimming of the impeller will adapt the pump to a fixed duty point, leading to reduced energy consumption. The minimum efficiency index (MEI) is based on the full impeller diameter.
- The operation of this water pump with variable duty points may be more efficient and economic when controlled, for example, by the use of a variable-speed drive that matches the pump duty to the system.
- Information on benchmark efficiency is available at <http://europump.eu/efficiencycharts>.

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

TP Series 100, 2-pole	P ₂ [kW]	Nominal impeller size/ actual impeller size	Trimmed impeller	Max. impeller	MEI
TP, TPE 25-50/2 R	0.12			•	*
TP, TPE 25-80/2 R	0.18			•	≥ 0.55
TP, TPE 25-90/2 R	0.37			•	≥ 0.70
TP, TPE 32-50/2 R	0.12			•	*
TP, TPE 32-80/2 R	0.25			•	≥ 0.70
TP, TPE 32-90/2 R	0.37			•	≥ 0.70
TP, TPE 40-50/2	0.12			•	*
TP, TPE 40-80/2	0.25			•	≥ 0.70
TP, TPE 40-90/2	0.37			•	≥ 0.70

* Not in MEI classification because flow at best efficiency point is less than 6 m³/h.

TP Series 200, 2-pole	P ₂ [kW]	Nominal impeller size/ actual impeller size	Trimmed impeller	Max. impeller	MEI
TP, TPD, TPE, TPED 32-60/2	0.25			•	≥ 0.56
TP, TPD, TPE, TPED 32-120/2	0.37			•	≥ 0.40
TP, TPD, TPE, TPED 32-150/2	0.37	32-136/111	•		
TP, TPD, TPE, TPED 32-180/2	0.55	32-136/118	•		≥ 0.64
TP, TPD, TPE, TPED 32-230/2	0.75	32-136/136		•	
TP, TPD, TPE, TPED 40-60/2	0.25			•	≥ 0.70
TP, TPD, TPE, TPED 40-120/2	0.37			•	≥ 0.70
TP, TPE 40-180/2	0.55			•	≥ 0.70
TP, TPD, TPE, TPED 40-190/2	0.75			•	≥ 0.44
TP, TPD, TPE, TPED 40-230/2	1.1			•	≥ 0.61
TP, TPD, TPE, TPED 40-270/2	1.5			•	≥ 0.70
TP, TPD, TPE, TPED 50-60/2	0.37			•	≥ 0.60
TP, TPD, TPE, TPED 50-120/2	0.75			•	≥ 0.45
TP, TPD, TPE, TPED 50-180/2	0.75			•	≥ 0.70
TP, TPD, TPE, TPED 65-60/2	0.55			•	≥ 0.70
TP, TPD, TPE, TPED 65-120/2	1.1			•	≥ 0.59
TP, TPD, TPE, TPED 65-180/2	1.5			•	≥ 0.70
TP, TPD, TPE, TPED 80-120/2	1.5			•	≥ 0.70
TP, TPD, TPE, TPED 100-120/2	2.2			•	≥ 0.70

TP Series 300, 2-pole	P ₂ [kW]	Nominal impeller size/ actual impeller size	Trimmed impeller	Max. impeller	MEI
TP, TPD, TPE, TPED 32-200/2	1.1	32-160.1/129	•		
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	•		≥ 0.50
TP, TPD, TPE, TPED 32-580/2	5.5	32-200.1/205		•	
TP, TPD, TPE, TPED 40-240/2	2.2	32-160/137	•		
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 40-470/2	5.5	32-200/190	•		≥ 0.36
TP, TPD, TPE, TPED 40-580/2	7.5	32-200/210		•	
TP, TPD, TPE, TPED 50-160/2	1.1	32-125/110	•		
TP, TPD, TPE, TPED 50-190/2	1.5	32-125/120	•		≥ 0.70
TP, TPD, TPE, TPED 50-240/2	2.2	32-125/130	•		
TP, TPD, TPE, TPED 50-290/2	3	32-125/142		•	

TP Series 300, 2-pole	P ₂ [kW]	Nominal impeller size/ actual impeller size	Trimmed impeller	Max. impeller	MEI
TP, TPD, TPE, TPED 50-360/2	4	32-160/163	•		≥ 0.70
TP, TPD, TPE, TPED 50-430/2	5.5	32-160/177		•	
TP, TPD, TPE, TPED 50-440/2	7.5	40-200/189	•		≥ 0.20
TP, TPD, TPE, TPED 50-570/2	11	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 65-190/2	2.2	40-125/120	•		
TP, TPD, TPE, TPED 65-230/2	3	40-125/130	•		≥ 0.48
TP, TPD, TPE, TPED 65-260/2	4	40-125/139		•	
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		•	≥ 0.70
TP, TPD, TPE, TPED 65-460/2	11	50-200/185	•		≥ 0.53
TP, TPD, TPE, TPED 65-550/2	15	50-200/200	•		
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 65-930/2	30	50-250/257		•	
TP, TPD, TPE, TPED 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 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 100-480/2	30	80-200/200		•	≥ 0.65

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

TP Series 200, 4-pole	P ₂ [kW]	Nominal impeller size/ actual impeller size	Trimmed impeller	Max. impeller	MEI
TP, TPD, TPE, TPED 32-30/4	0.12			•	*
TP, TPD, TPE, TPED 32-40/4	0.25			•	*
TP, TPD, TPE, TPED 32-60/4	0.25			•	*
TP, TPD, TPE, TPED 40-30/4	0.12			•	≥ 0.70
TP 40-60/4	0.25			•	≥ 0.70
TP, TPD, TPE, TPED 40-90/4	0.25			•	≥ 0.70
TP, TPD, TPE, TPED 50-30/4	0.25			•	≥ 0.70
TP, TPD, TPE, TPED 50-60/4	0.37			•	≥ 0.70
TP, TPD, TPE, TPED 65-30/4	0.25			•	≥ 0.70
TP, TPD, TPE, TPED 65-60/4	0.55			•	≥ 0.70
TP, TPD, TPE, TPED 80-30/4	0.37			•	≥ 0.70
TP, TPD, TPE, TPED 80-60/4	0.75			•	≥ 0.70
TP, TPD, TPE, TPED 100-30/4	0.55			•	≥ 0.45
TP, TPD, TPE, TPED 100-60/4	1.1			•	≥ 0.70

* Not in MEI classification because flow at best efficiency point is less than 6 m³/h.

TP Series 300, 4-pole	P ₂ [kW]	Nominal impeller size/ actual impeller size	Trimmed impeller	Max. impeller	MEI
TP, TPD, TPE, TPED 32-80/4	0.25	32-160.1/152	•		≥ 0.70
TP, TPD, TPE, TPED 32-100/4	0.37	32-160.1/169		•	
TP, TPD, TPE, TPED 32-120/4	0.55	32-200.1/196		•	≥ 0.69
TP, TPD, TPE, TPED 40-100/4	0.55	32-160/169		•	≥ 0.40
TP, TPD, TPE, TPED 40-130/4	0.75	32-200/200	•		≥ 0.70
TP, TPD, TPE, TPED 40-160/4	1.1	32-200/219		•	
TP, TPD, TPE, TPED 50-90/4	0.55	32-160/169		•	≥ 0.50
TP, TPD, TPE, TPED 50-110/4	0.75	40-200/182	•		
TP, TPD, TPE, TPED 50-130/4	1.1	40-200/200	•		≥ 0.39
TP, TPD, TPE, TPED 50-160/4	1.5	40-200/219		•	

TP Series 300, 4-pole	P ₂ [kW]	Nominal impeller size/ actual impeller size	Trimmed impeller	Max. impeller	MEI
TP, TPD, TPE, TPED 50-190/4	2.2	40-250/240	•		≥ 0.70
TP, TPD, TPE, TPED 50-230/4	3	40-250/260		•	
TP, TPD, TPE, TPED 65-90/4	0.75	40-160/166		•	≥ 0.70
TP, TPD, TPE, TPED 65-110/4	1.1	50-200/180	•		
TP, TPD, TPE, TPED 65-130/4	1.5	50-200/190	•		
TP, TPD, TPE, TPED 65-150/4	2.2	50-200/210	•		≥ 0.70
TP, TPD, TPE, TPED 65-170/4	3	50-200/219		•	
TP, TPD, TPE, TPED 65-240/4	4	50-250/263		•	≥ 0.70
TP, TPD, TPE, TPED 80-70/4	1.1	65-160/149	•		
TP, TPD, TPE, TPED 80-90/4	1.5	65-160/165	•		≥ 0.68
TP, TPD, TPE, TPED 80-110/4	2.2	65-160/177		•	
TP, TPD, TPE, TPED 80-150/4	3	65-200/205	•		≥ 0.70
TP, TPD, TPE, TPED 80-170/4	4	65-200/219		•	
TP, TPD, TPE, TPED 80-240/4	5.5	65-250/263		•	≥ 0.60
TP, TPD, TPE, TPED 80-270/4	7.5	65-315/279	•		
TP, TPD, TPE, TPED 80-340/4	11	65-315/309		•	≥ 0.70
TP, TPD, TPE, TPED 100-70/4	1.5	80-160/151-133	•		
TP, TPD, TPE, TPED 100-90/4	2.2	80-160/161	•		≥ 0.70
TP, TPD, TPE, TPED 100-110/4	3	80-160/175		•	
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		•	
TP, TPD, TPE, TPED 100-200/4	7.5	80-250/240	•		≥ 0.45
TP, TPD, TPE, TPED 100-250/4	11	80-250/270		•	
TP, TPD, TPE, TPED 100-330/4	15	80-315/299	•		
TP, TPD, TPE, TPED 100-370/4	18.5	80-315/320	•		≥ 0.69
TP, TPD 100-410/4	22	80-315/334		•	
TP, TPE 125-70/4	2.2	100-160/160-144	•		
TP, TPE 125-90/4	3	100-160/168	•		≥ 0.70
TP, TPE 125-100/4	4	100-160/176		•	
TP, TPD, TPED 125-110/4	4	100-200/180	•		
TP, TPD, TPED 125-130/4	5.5	100-200/197	•		≥ 0.46
TP, TPD, TPED 125-160/4	7.5	100-200/211		•	
TP, TPD, TPE, TPED 125-210/4	11	100-250/254	•		
TP, TPD, TPE, TPED 125-250/4	15	100-250/270		•	≥ 0.12
TP, TPD, TPE, TPED 125-320/4	18.5	100-315/300	•		
TP, TPD 125-360/4	22	100-315/316	•		≥ 0.30
TP, TPD 125-420/4	30	100-315/334		•	
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 150-250/4	22	125-250/266		•	
TP, TPE 150-100/4	5.5	125-200/196-172	•		
TP, TPE 150-140/4	7.5	125-200/202	•		≥ 0.62
TP, TPE 150-150/4	11	125-200/225		•	
TP, TPE 150-260/4	18.5	125-315/275	•		
TP 150-280/4	22	125-315/290	•		≥ 0.70
TP 150-340/4	30	125-315/315	•		
TP 150-390/4	37	125-315/333		•	
TP 150-450/4	45	125-400/358	•		
TP 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 200-200/4	22	150-250/248	•		≥ 0.70
TP 200-240/4	30	150-250/272	•		
TP 200-290/4	37	150-250/285		•	
TP 200-180/4	22	150-315/245	•		
TP 200-220/4	30	150-315/264	•		
TP 200-250/4	37	150-315/278	•		
TP 200-270/4	45	150-315/293	•		≥ 0.70
TP 200-320/4	55	150-315/311	•		
TP 200-410/4	75	150-315/338		•	

TP Series 300, 4-pole	P ₂ [kW]	Nominal impeller size/ actual impeller size	Trimmed impeller	Max. impeller	MEI
TP 200-330/4	37	150-400/310	•		≥ 0.70
TP 200-360/4	45	150-400/326	•		
TP 200-400/4	55	150-400/343	•		
TP 200-470/4	75	150-400/373	•		
TP 200-530/4	90	150-400/391	•		
TP 200-590/4	110	150-400/412	•		
TP 200-660/4	132	150-400/432		•	

TP Series 400, 4-pole, PN 10	P ₂ [kW]	Nominal impeller size/ actual impeller size	Trimmed impeller	Max. impeller	MEI
TP 250-280/4	45	250-350/294-302	•		≥ 0.48
TP 250-310/4	55	250-350/326-316	•		
TP 250-390/4	75	250-350/350-342		•	

TP, TPD, 6-pole, PN 16

TP Series 300, 6-pole	P ₂ [kW]	Nominal impeller size/ actual impeller size	Trimmed impeller	Max. impeller	MEI
TP, TPD 125-60/6	1.5	100-200/197	•		≥ 0.62
TP, TPD 125-70/6	2.2	100-200/216		•	
TP, TPD 125-90/6	3	100-250/254	•		≥ 0.21
TP, TPD 125-110/6	4	100-250/270		•	
TP, TPD 125-140/6	5.5	100-315/309	•		≥ 0.57
TP, TPD 125-170/6	7.5	100-315/330		•	
TP, TPD 150-60/6	2.2	125-250/204	•		≥ 0.62
TP, TPD 150-70/6	3	125-250/220	•		
TP, TPD 150-90/6	4	125-250/238	•		
TP, TPD 150-110/6	5.5	125-250/262		•	

TP, PN 25

TP Series 400, PN 25	P ₂ [kW]	Nominal impeller size/ actual impeller size	Trimmed impeller	Max. impeller	MEI
TP Series 400, PN 25	All				**

** Not in MEI classification because PN 25 is not a part of the MEI classification.

28. Accessories

Unions and valves

Cast-iron pumps

A union kit consists of two cast-iron union tails, two cast-iron union nuts and two EPDM gaskets.

Pump type, union connection	Pressure stage	Size	Product number
TP, TPE 25 R	PN 10	Rp 3/4	529921
		Rp 1	529922
		Rp 1 1/4	529924
TP, TPE 32 R	PN 10	Rp 1	509921
		Rp 1 1/4	509922

A valve kit consists of two brass valves, two brass union nuts and two EPDM gaskets.

The valve housing is of pressure die-cast brass.

Pump type, valve connection	Pressure stage	Size	Product number
TP, TPE 25 R	PN 10	Rp 3/4	519805
		Rp 1	519806
		Rp 1 1/4	519807
TP, TPE 32 R	PN 10	Rp 1 1/4	505539

Bronze pumps

A union kit consists of two bronze union tails, two brass union nuts and two EPDM gaskets.

The valve housing is of pressure die-cast brass.

Pump type, union connection	Pressure stage	Size	Product number
TP, TPE 25 R B	PN 10	Rp 3/4	529971
		Rp 1	529972
TP, TPE 32 R B	PN 10	Rp 1 1/4	509971

A valve kit consists of two brass valves, two brass union nuts and two EPDM gaskets.

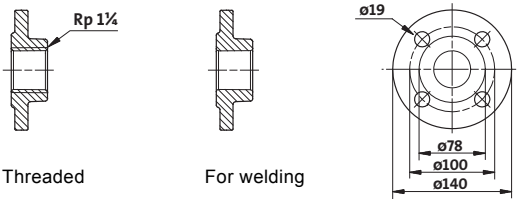
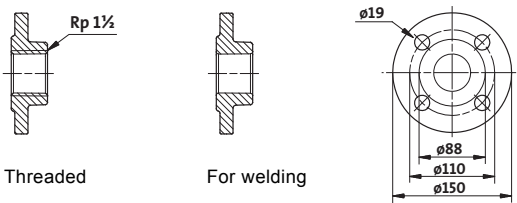
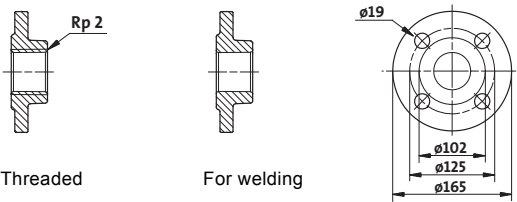
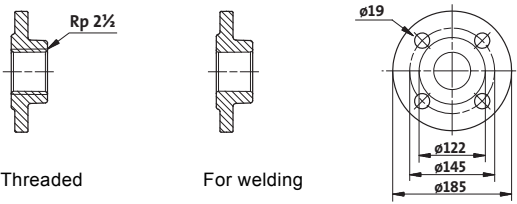
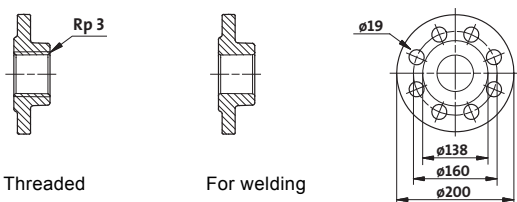
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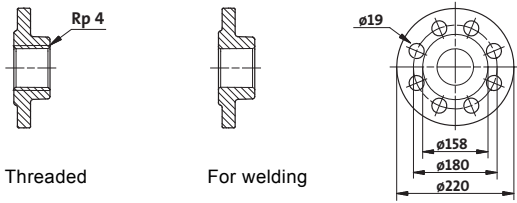
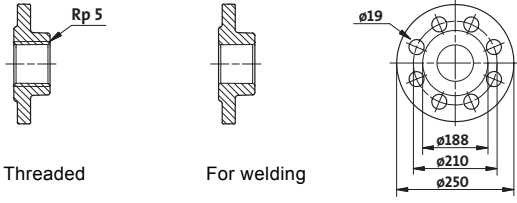
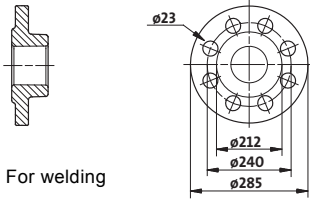
Pump type, valve connection	Pressure stage	Size	Product number
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		Rp 1	519806
		Rp 1 1/4	519807
TP, TPE 32 R B	PN 10	Rp 1 1/4	505539

Counter flanges

Cast-iron pumps

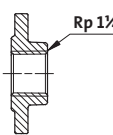
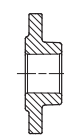
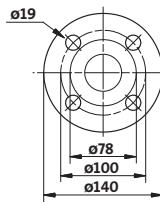
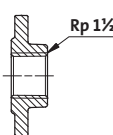
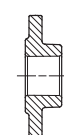
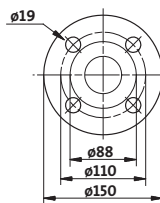
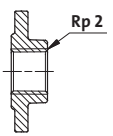
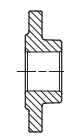
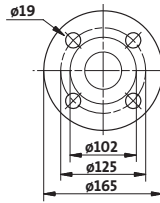
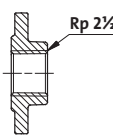
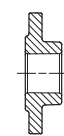
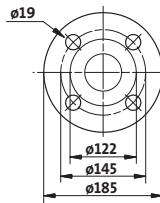
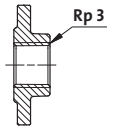
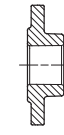
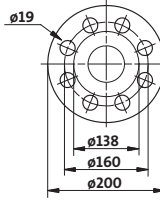
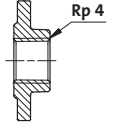
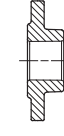
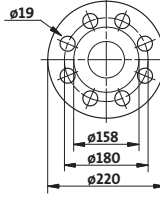
A flange kit consists of two steel flanges, two gaskets of asbestos-free material IT 200, and the requisite number of bolts.

Counter flange	Pump type	Description	Rated pressure	Pipework connection	Product number
 <p>Threaded</p> <p>For welding</p>	TP, TPE 32 TPD, TPED 32	Threaded	10 bar, EN 1092-2	Rp 1 1/4	539703
		For welding	10 bar, EN 1092-2	32 mm, nominal	539704
		Threaded	16 bar, EN 1092-2	Rp 1 1/4	539703
		For welding	16 bar, EN 1092-2	32 mm, nominal	539704
 <p>Threaded</p> <p>For welding</p>	TP, TPE 40 TPD, TPED 40	Threaded	10 bar, EN 1092-2	Rp 1 1/2	539701
		For welding	10 bar, EN 1092-2	40 mm, nominal	539702
		Threaded	16 bar, EN 1092-2	Rp 1 1/2	539701
		For welding	16 bar, EN 1092-2	40 mm, nominal	539702
 <p>Threaded</p> <p>For welding</p>	TP, TPE 50 TPD, TPED 50	Threaded	10 bar, EN 1092-2	Rp 2	549801
		For welding	10 bar, EN 1092-2	50 mm, nominal	549802
		Threaded	16 bar, EN 1092-2	Rp 2	549801
		For welding	16 bar, EN 1092-2	50 mm, nominal	549802
 <p>Threaded</p> <p>For welding</p>	TP, TPE 65 TPD, TPED 65	Threaded	10 bar, EN 1092-2	Rp 2 1/2	559801
		For welding	10 bar, EN 1092-2	65 mm, nominal	559802
		Threaded	16 bar, EN 1092-2	Rp 2 1/2	559801
		For welding	16 bar, EN 1092-2	65 mm, nominal	559802
 <p>Threaded</p> <p>For welding</p>	TP, TPE 80 TPD, TPED 80	Threaded	6 bar, EN 1092-2	Rp 3	569902
		For welding	6 bar, EN 1092-2	80 mm, nominal	569901
		Threaded	10 bar, EN 1092-2	Rp 3	569802
		For welding	10 bar, EN 1092-2	80 mm, nominal	569801
		Threaded	16 bar, EN 1092-2	Rp 3	569802
		For welding	16 bar, EN 1092-2	80 mm, nominal	569801

Counter flange		Pump type	Description	Rated pressure	Pipework connection	Product number
			Threaded	6 bar, EN 1092-2	Rp 4	579901
			For welding	6 bar, EN 1092-2	100 mm, nominal	579902
 <p>Threaded</p> <p>For welding</p>	<p>TM03 0483 5204</p>	TP, TPE 100 TPD, TPED 100	Threaded	10 bar, EN 1092-2	Rp 4	579801
		For welding	10 bar, EN 1092-2	100 mm, nominal	579802	
		Threaded	16 bar, EN 1092-2	Rp 4	579801	
		For welding	16 bar, EN 1092-2	100 mm, nominal	579802	
		Threaded	10 bar, EN 1092-2	Rp 5	485367	
		For welding	10 bar, EN 1092-2	125 mm, nominal	485368	
 <p>Threaded</p> <p>For welding</p>	<p>TM03 0484 5204</p>	TP, TPE 125 TPD, TPED 125	Threaded	16 bar, EN 1092-2	Rp 5	485367
		For welding	16 bar, EN 1092-2	125 mm, nominal	485368	
		For welding	10 bar, EN 1092-2	150 mm, nominal	S1111600	
		For welding	16 bar, EN 1092-2	150 mm, nominal	S1111600	
 <p>For welding</p>	<p>TM03 0485 5204</p>	TP, TPE 150 TPD, TPED 150	For welding	10 bar, EN 1092-2	150 mm, nominal	S1111600
		For welding	16 bar, EN 1092-2	150 mm, nominal	S1111600	

Bronze pumps

A flange kit consists of two bronze flanges, two gaskets of asbestos-free material IT 200, and the requisite number of bolts.

Counter flange		Pump type	Description	Rated pressure	Pipework connection	Product number
 <p>Threaded</p>	 <p>For welding</p>	 <p>TM03 0478 5204</p>	Threaded	10 bar, EN 1092-2	Rp 1 1/4	96427029
			For welding	10 bar, EN 1092-2	32 mm, nominal	96427030
			Threaded	16 bar, EN 1092-2	Rp 1 1/4	96427029
			For welding	16 bar, EN 1092-2	32 mm, nominal	96427030
 <p>Threaded</p>	 <p>For welding</p>	 <p>TM03 0479 5204</p>	Threaded	10 bar, EN 1092-2	Rp 1 1/2	539711
			For welding	10 bar, EN 1092-2	40 mm, nominal	539712
			Threaded	16 bar, EN 1092-2	Rp 1 1/2	539711
			For welding	16 bar, EN 1092-2	40 mm, nominal	539712
 <p>Threaded</p>	 <p>For welding</p>	 <p>TM03 0480 5204</p>	Threaded	10 bar, EN 1092-2	Rp 2	549811
			For welding	10 bar, EN 1092-2	50 mm, nominal	549812
 <p>Threaded</p>	 <p>For welding</p>	 <p>TM03 0481 5204</p>	Threaded	10 bar, EN 1092-2	Rp 2 1/2	559811
			For welding	10 bar, EN 1092-2	65 mm, nominal	559812
 <p>Threaded</p>	 <p>For welding</p>	 <p>TM03 0482 5204</p>	Threaded	6 bar, EN 1092-2	Rp 3	96405735
			For welding	6 bar, EN 1092-2	80 mm, nominal	569911
			Threaded	10 bar, EN 1092-2	Rp 3	569812
			For welding	10 bar, EN 1092-2	80 mm, nominal	569811
 <p>Threaded</p>	 <p>For welding</p>	 <p>TM03 0485 5204</p>	Threaded	6 bar, EN 1092-2	Rp 4	96405737
			Threaded	10 bar, EN 1092-2	Rp 4	96405738

Base plates

Note: Base plates are supplied as standard with TP pumps with 11 kW motors and above.

TP, TPE Series 100 and 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	96405915
TP 65-30/4 TP, TPE 65-60/4 TP, TPE 80 TP, TPE 100	2 x M16 x 30 mm	96405914

★ Except TPE 32-90.

Drawing	Product number
	96405915 96405914

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, TPE 100-xx/4 TP, TPE 125-xx/4 TP, TPE 150-xx/4 TP, TPE 125-xx/6 TP, TPE 150-xx/6	2 x M16 x 30 mm	96536246

Drawing	Product number
	96536246

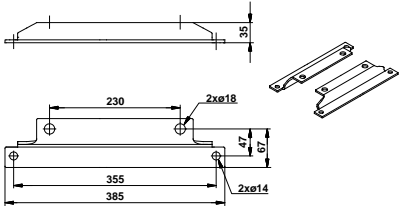
TPD, TPED Series 300

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

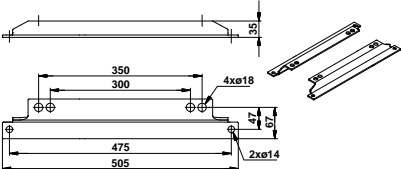
TPD, TPED Series 300

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 100-70/4		
TPD, TPED 100-90/4		
TPD, TPED 100-110/4		
TPD, TPED 100-130/4		
TPD, TPED 100-170/4		

Drawing	Product number
	96536247

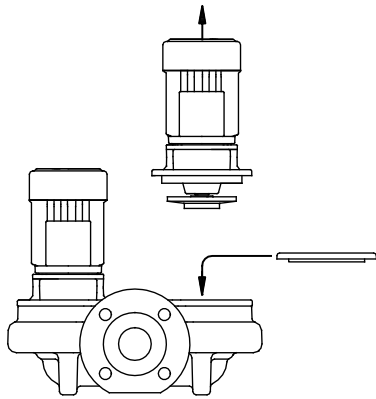
TPD, TPED Series 300

Pump type	Hexagon head screws	Product number
TPD, TPED 80-240/4	4 x M16 x 30 mm	96536248
TPD, TPED 80-270/4		
TPD, TPED 80-340/4		
TPD, TPED 100-200/4		
TPD, TPED 100-250/4		
TPD, TPED 100-330/4		
TPD, TPED 100-370/4		
TPD, TPED 100-410/4		
TPD, TPED 125-xx/4		
TPD, TPED 150-xx/4		

Drawing	Product number
	96536248

Blanking flanges

Normally used with twin-head pumps.



TM00 6360 3495

TPD, TPED, 2-pole

Pump type	00545048	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 40-470/2				•				
TPD, TPED 40-580/2				•				
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 50-440/2					•			
TPD, TPED 50-570/2					•			
TPD, TPED 50-710/2					•			
TPD, TPED 50-830/2					•			
TPD, TPED 50-900/2					•			

Pump type	00545048	00565055	96495694	96495695	96495696	96525962	96525963	96525964
TPD, TPED 65-60/2	•							
TPD, TPED 65-120/2		•						
TP, TPD 65-180/2		•						
TPD, TPED 65-190/2			•					
TPD, TPED 65-230/2			•					
TPD, TPED 65-260/2			•					
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				•				
TP, 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			•					
TP, TPD 100-480/2						•		

TPD, TPED, 4-pole

Pump type	00545048	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 40-130/4				•				
TPD, TPED 40-160/4				•				
TPD, TPED 50-30/4	•							
TPD, TPED 50-60/4		•						
TPD, TPED 50-90/4			•					
TPD, TPED 50-110/4					•			
TPD, TPED 50-130/4					•			
TPD, TPED 50-160/4					•			
TPD, TPED 50-190/4					•			
TPD, TPED 50-230/4					•			
TPD, TPED 65-30/4		•						
TPD, TPED 65-60/4		•						
TPD, TPED 65-90/4			•					
TPD, TPED 65-110/4					•			
TPD, TPED 65-130/4					•			
TPD, TPED 65-150/4					•			
TPD, TPED 65-170/4					•			
TPD, TPED 65-240/4					•			
TPD, TPED 80-30/4		•						
TPD, TPED 80-60/4		•						
TPD, TPED 80-70/4			•	•				
TPD, TPED 80-90/4			•					
TPD, TPED 80-110/4			•					
TPD, TPED 80-150/4				•				
TPD, TPED 80-170/4				•				
TPD, TPED 80-240/4								•
TPD, TPED 80-270/4								•
TPD, TPED 80-340/4								•
TPD, TPED 100-30/4		•						
TPD, TPED 100-60/4		•						
TPD, TPED 100-70/4			•					
TPD, TPED 100-90/4			•					
TPD, TPED 100-110/4			•					
TPD, TPED 100-130/4						•		
TPD, TPED 100-170/4						•		
TPD, TPED 100-200/4								•
TPD, TPED 100-250/4								•
TPD, TPED 100-330/4								•
TPD, TPED 100-370/4								•
TPD, TPED 100-410/4								•
TPD, TPED 125-110/4						•		
TPD, TPED 125-130/4						•		
TPD, TPED 125-160/4						•		
TPD, TPED 125-210/4								•
TPD, TPED 125-250/4								•
TPD, TPED 125-320/4								•
TPD, TPED 125-360/4								•
TPD 125-420/4								•
TPD, TPED 150-130/4							•	
TPD, TPED 150-160/4							•	
TPD, TPED 150-200/4							•	
TPD, TPED 150-220/4							•	
TPD, TPED 150-250/4							•	

TPD, 6-pole

Pump type	00545048	00565055	96495694	96495695	96495696	96525962	96525963	96525964
TP, TPD 125-60/6						•		
TP, TPD 125-70/6						•		
TP, TPD 125-90/6								•
TP, TPD 125-110/6								•
TP, TPD 125-140/6								•
TP, TPD 125-170/6								•
TP, TPD 150-60/6							•	
TP, TPD 150-70/6							•	
TP, TPD 150-90/6							•	
TPD 150-110/6							•	

Insulating kits

Insulating kits are only available for TP, TPE Series 200 pumps. An insulating kit consists of two or three insulating covers made of expanded polypropylene (EPP).

The insulating kit is tailored to the individual pump model and has an insulating thickness corresponding to the nominal diameter of the pump.

The thermal conductivity of EPP is very low (0.04 W/m °C), i.e. the insulating property is very good.

The insulating kit encloses the entire pump housing.

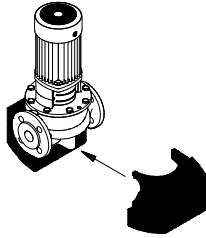


Fig. 87 Insulating kit

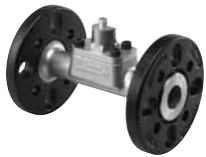
TM00 8095 2496

Product numbers of insulating kits

Single-head TP, TPE Series 200 pumps	
Pump type	Product number
TP, TPE 32-30/4	96405871
TP, TPE 32-40/4	96405880
TP, TPE 32-60/2	96405873
TP, TPE 32-60/4	96405880
TP, TPE 32-120/2	96405873
TP, TPE 32-150/2	96405880
TP, TPE 32-180/2	96405880
TP, TPE 32-230/2	96405880
TP, TPE 40-30/4	96405874
TP, TPE 40-60/4	96405875
TP, TPE 40-60/2	96405876
TP, TPE 40-90/4	96405880
TP, TPE 40-120/2	96405877
TP, TPE 40-180/2	96405878
TP, TPE 40-190/2	96405880
TP, TPE 40-230/2	96405880
TP, TPE 40-270/2	96405880
TP, TPE 50-30/4	96405879
TP, TPE 50-60/2	96405881
TP, TPE 50-60/4	96405880
TP, TPE 50-120/2	96405882
TP, TPE 50-180/2	96405883
TP, TPE 65-30/4	96405884
TP, TPE 65-60/2	96405886
TP, TPE 65-60/4	96405885
TP, TPE 65-120/2	96405887
TP, TPE 65-180/2	96405888
TP, TPE 80-30/4	96405889
TP, TPE 80-60/4	96405890
TP, TPE 80-120/2	96405891
TP, TPE 100-30/4	96405892
TP, TPE 100-60/4	96405892

Sensors

Flow sensors

Grundfos vortex flow sensor, VFI ¹	Type	Flow range [m ³ /h]	Pipe connection	O-ring		Connection type		Product number
				EPDM	FKM	Cast iron flange	Stainless steel flange	
	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.

¹ For more information about the VFI sensor, see the data booklet "Grundfos direct sensors", publication number 97790189.

Temperature sensors

Accessory	Type	Supplier	Measuring range	Product number
Temperature sensor	TTA (0) 25	Carlo Gavazzi	0 °C to +25 °C	96432591
Temperature sensor	TTA (-25) 25	Carlo Gavazzi	-25 °C to +25 °C	96430194
Temperature sensor	TTA (50) 100	Carlo Gavazzi	50 °C to +100 °C	96432592
Temperature sensor	TTA (0) 150	Carlo Gavazzi	0 °C to +150 °C	96430195
Accessory for temperature sensor. All with 1/2 RG connection.	Protecting tube ∅9 x 50 mm	Carlo Gavazzi		96430201
	Protecting tube ∅9 x 100 mm	Carlo Gavazzi		96430202
	Cutting ring bush	Carlo Gavazzi		96430203
Temperature sensor, ambient temperature	WR 52	tmg (DK: Plesner)	-50 °C to +50 °C	ID8295
Differential temperature sensor	ETSD	Honsberg	0 °C to +20 °C	96409362
Differential temperature sensor	ETSD	Honsberg	0 °C to +50 °C	96409363

Note: All sensors have 4-20 mA output signal.

Sensors for boosting applications


Danfoss pressure sensor kit	Pressure range	Product number
<ul style="list-style-type: none"> • Connection: G 1/2 A (DIN 16288 - B6kt) • Electrical connection: plug (DIN 43650) 	0 - 2.5 bar	96478188
	0 - 4 bar	91072075
	0 - 6 bar	91072076
	0 - 10 bar	91072077
	0 - 16 bar	91072078
<ul style="list-style-type: none"> • Pressure sensor, type MBS 3000, with 2 m screened cable • Connection: G 1/4 A (DIN 16288 - B6kt) • 5 cable clips (black) • Fitting instructions PT (00400212) 	0 - 2.5 bar	405159
	0 - 4 bar	405160
	0 - 6 bar	405161
	0 - 10 bar	405162
	0 - 16 bar	405163

Sensors for circulation applications

Grundfos differential pressure sensor, DPI	Pressure range	Product number
• 1 sensor incl. 0.9 m screened cable (7/16" connections)	0 - 0.6 bar	96611522
• 1 original DPI bracket (for wall mounting)	0 - 1.0 bar	96611523
• 1 Grundfos bracket (for mounting on motor)	0 - 1.6 bar	96611524
• 2 M4 screws for mounting of sensor on bracket	0 - 2.5 bar	96611525
• 1 M6 screw (self-cutting) for mounting on MGE 90/100	0 - 4.0 bar	96611526
• 1 M8 screw (self-cutting) for mounting on MGE 112/132	0 - 6.0 bar	96611527
• 1 M10 screw (self-cutting) for mounting on MGE 160	0 - 10 bar	96611550
• 1 M12 screw (self-cutting) for mounting on MGE 180		
• 3 capillary tubes (short/long)		
• 2 fittings (1/4" - 7/16")		
• 5 cable clips (black)		
• Installation and operating instructions		
• Service kit instruction		
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.

Sensor interface


Sensor interface, SI 001 PSU ¹	Description	Product number
	Grundfos Direct Sensors™, type SI 001 PSU, is an external power supply for the VFI, DPI and other transmitters with 24 VDC supply voltage. It is used when the cable between transmitter and controller is more than 30 metres long.	96915820

¹⁾ For more information about the PSU sensor interface, see the installation and operating instructions "SI 001 PSU - sensor interface", publication number 96944355, or quick guide, publication number 96944356.

MP 204 - advanced motor protection

The MP 204 is an electronic motor protection for pumps. One unit covers all electrical motors from 3 to 999 A as well as voltages from 100 to 480 VAC.

Installation of the MP 204 is by means of screws onto a wall or back plate, or on a mounting rail.


Component	Description	Functions
 <p>MP 204</p>	<p>The MP 204 is an electronic motor protector and data collecting unit. Apart from protecting the motor, it can also send information to a CIU unit via GENIbus, like for instance:</p> <ul style="list-style-type: none"> • trip • warning • energy consumption • input power • motor temperature. <p>The MP 204 protects the motor primarily by measuring the motor current by means of a true RMS measurement.</p> <p>The pump is protected secondarily by measuring the temperature with a Tempcon sensor, a Pt100/Pt1000 sensor and a PTC sensor/thermal switch.</p> <p>The MP 204 is designed for single- and three-phase motors.</p>	<p>Features</p> <ul style="list-style-type: none"> • Phase-sequence monitoring • indication of current or temperature • input for PTC sensor/thermal switch • indication of temperature in °C or °F • 4-digit, 7-segment display • setting and status reading with the Grundfos R100 remote control • setting and status reading via the Grundfos GENIbus fieldbus. <p>Tripping conditions</p> <ul style="list-style-type: none"> • Overload • underload (dry running) • temperature • missing phase • phase sequence • overvoltage • undervoltage • power factor (cos φ) • current unbalance. <p>Warnings</p> <ul style="list-style-type: none"> • Overload • underload • temperature • overvoltage • undervoltage • power factor (cos φ) • run capacitor (single-phase operation) • starting capacitor (single-phase operation) • loss of communication in network • harmonic distortion. <p>Learning function</p> <ul style="list-style-type: none"> • Phase sequence (three-phase operation) • run capacitor (single-phase operation) • starting capacitor (single-phase operation) • identification and measurement of Pt100/Pt1000 sensor circuit.

TM03 0150 4204

Control MP 204

The Control MP 204 is supplied as a plug-and-play control cabinet solution.

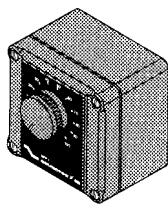
The main switch and LED panel showing power consumption are all you see on the front. Inside you find the MP 204 unit and optional communication interface units.

Cabinet type	Description	Functions
 <p>Control MP 204</p>	<p>The Control MP 204 control cabinets are supplied with all necessary components. Three types of control cabinets are available, depending on functions and starting method. The control cabinets are designed for installation in a control cabinet for outdoor use. The Control MP 204 control cabinets have a built-in main switch and a thermal magnetic circuit breaker.</p>	<p>Digital input</p> <ul style="list-style-type: none"> • Float switch or pressure relay (if no IO 112 is used). <p>Analog input</p> <ul style="list-style-type: none"> • Too high motor temperature (Tempcon) • thermistor/PTC, pump • pressure sensor, 4-20 mA (with IO 112). <p>Relay output</p> <ul style="list-style-type: none"> • Pump alarm. <p>Communication</p> <ul style="list-style-type: none"> • Grundfos Remote Management. • GSM/GPRS (IO 112 not supported) • Modbus RTU wired (IO 112 not supported) • PROFIBUS DP (IO 112 not supported). <p>Protection</p> <ul style="list-style-type: none"> • Protects the pump against short-circuit.

TM04 9512 4410

For more information about the MP 204 and Control MP 204, see the data booklet "Control MP 204", publication number 97770915.

Potentiometer



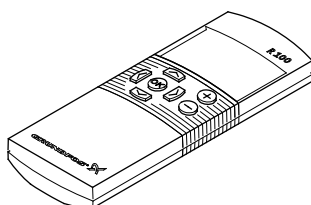
TM02 1630 5102

Fig. 88 Potentiometer

Potentiometer for setpoint setting and start/stop of the pump.

Product	Product number
External potentiometer with cabinet for wall mounting.	625468

R100



TM00 4498 2604

Fig. 89 R100 remote control

The R100 is used for wireless communication. Communication takes place by means of infrared light.

Product	Product number
R100	96615297

Grundfos GO Remote

The Grundfos GO Remote is used for wireless infrared or radio communication with the pumps. Various Grundfos GO Remote variants are available. The variants are described in the following.

MI 201

The MI 201 is a complete solution, consisting of an Apple iPod touch 4G and a Grundfos cover for infrared and radio communication with Grundfos pumps or systems.



TM05 3886 1712

Fig. 90 MI 201

Supplied with the product:

- Apple iPod touch 4G incl. accessories
- Grundfos MI 201 cover
- battery charger
- quick guide.

MI 202

The MI 202 is an add-on module with built-in infrared and radio communication. The MI 202 can be used in conjunction with Apple iPod Touch 4, iPhone 4 or later.



TM05 3887 1712

Fig. 91 MI 202

Supplied with the product:

- Grundfos MI 202
- quick guide.

MI 301

The MI 301 is a module with built-in infrared and radio communication. The MI 301 must be used in conjunction with an Android or iOS-based smartphone with a Bluetooth connection. The MI 301 has rechargeable Li-ion battery and must be charged separately.



TM05 3890 1712

Fig. 92 MI 301

Supplied with the product:

- Grundfos MI 301
- battery charger
- quick guide.

Product numbers

Grundfos GO Remote variant	Product number
Grundfos MI 201	98140638
Grundfos MI 202	98046376
Grundfos MI 301	98046408

Supported units

Make	Model	Operating system	MI 201	MI 202	MI 301
Apple	iPod touch 4G	iOS 5.0 or later	•	•	•
	iPhone 4G, 4GS		-	•	•
HTC	Desire S	Android 2.3.3 or later	-	-	•
	Sensation	Android 2.3.4 or later	-	-	•
Samsung	Galaxy S II	Android 2.3.4 or later	-	-	•

Note: Similar Android and iOS-based devices may work as well, but are not supported by Grundfos.

CIU communication interface units



GrA 6118

Fig. 93 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. It can either be mounted on a DIN rail or on a wall.

We offer the following CIU units:

CIU 100

For communication via LON.

CIU 150

For communication via Profibus DP.

CIU 200

For communication via Modbus RTU.

CIU 250

For wireless communication via GSM/GPRS.

CIU 271

For communication via Grundfos Remote Management (GRM).

CIU 300

For communication via BACnet MS/TP.

Description	Fieldbus protocol	Product number
CIU 100	LON	96753735
CIU 150	Profibus DP	96753081
CIU 200	Modbus RTU	96753082
CIU 250*	GSM/GPRS	96787106
CIU 271*	GRM	96898819
CIU 300	BACnet MS/TP	Contact Grundfos

* Antenna not included. See below.

Antennas for CIU 250 and 270

Description	Product number
Antenna for roof	97631956
Antenna for desk	97631957

For further information about data communication via CIU units and fieldbus protocols, see the CIU documentation available in WebCAPS.

CIM communication interface modules



GrA6121

Fig. 94 Grundfos CIM communication interface module

The CIM modules enable communication of operating data, such as measured values and setpoints, between TPE pumps of 11-22 kW and a building management system. The CIM modules are add-on communication modules which are fitted in the terminal box of TPE pumps of 11-22 kW.

Note: CIM modules must be fitted by authorised personnel.

We offer the following CIM modules:

CIM 100

For communication via LON.

CIM 150

For communication via Profibus DP.

CIM 200

For communication via Modbus RTU.

CIM 250

For wireless communication via GSM/GPRS.

CIM 271

For communication via Grundfos Remote Management (GRM).

CIM 300

For communication via BACnet MS/TP.

Description	Fieldbus protocol	Product number
CIM 100	LON	96824797
CIM 150	Profibus DP	96824793
CIM 200	Modbus RTU	96824796
CIM 250*	GSM/GPRS	96824795
CIU 271*	GRM	96898815
CIM 300	BACnet MS/TP	Contact Grundfos

* Antenna not included. See below.

Antennas for CIM 250 and 270

Description	Product number
Antenna for roof	97631956
Antenna for desk	97631957

For further information about data communication via CIM modules and fieldbus protocols, see the CIM documentation available in WebCAPS.

EMC filter

EMC (electromagnetic compatibility to EN 61800-3)

Motor [kW]		Emission/immunity	
2-pole	4-pole		
0.37	0.37	Emission: Motors may be installed in residential areas (first environment), unrestricted distribution, corresponding to CISPR11, group 1, class B.	
0.55	0.55		
0.75	0.75		
1.1	1.1		
1.5	1.5		
2.2	2.2		
3.0	3.0		Immunity: Motors fulfil the requirements for both the first and second environment.
4.0	4.0		
5.5	-		
7.5	-		
-	5.5	Emission: The motors are category C3, corresponding to CISPR11, group 2, class A, and may be installed in industrial areas (second environment).	
-	7.5		
11	11		
15	15		
18.5	18.5		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	-		



TM02 9198 1203

Fig. 95 EMC filter

The EMC filter for residential areas is available as a complete kit ready for installation.

Product	Product number
EMC filter (TPE 5.5 kW and 7.5 kW, 4-pole)	96041047
EMC filter (TPE 11-22 kW)	96478309

29. Minimum inlet pressure - NPSH

To ensure optimum and noiseless operation, we recommend the minimum inlet pressure values shown on pages 195 to 197.

A minimum inlet pressure is required to avoid pressure drop that may cause cavitation.

The minimum inlet pressure (p_s) in bar relative (pressure gauge value on the pump suction side) can be calculated using the following formula.

Note: Calculation of the minimum inlet pressure should be based on the maximum required flow.

$$p_s \geq \left((NPSH_R + H_S) \times \rho \times g - \left(\frac{1}{2} \times \rho \times c^2 \right) \right) \times 0.00001 - p_b + p_d \text{ [bar relative]}$$

p_s = Minimum inlet pressure in bar.

$NPSH_R$ = The required Net Positive Suction Head in metres head.

(To be read from the NPSH curve at the highest flow the pump will be delivering).

H_S = Safety margin = minimum 0.5 metres head.

Note: A safety margin of 0.5 metres prevents pressure drop.

ρ = Density of the pumped liquid measured in kg/m^3 .

g = Gravitational acceleration measured in m/s^2 . For estimated calculations use the value 9.81 m/s^2 .

c = Flow velocity of the pumped liquid at the pressure gauge. Insert the flow velocity as the unit $[\text{m/s}]$.

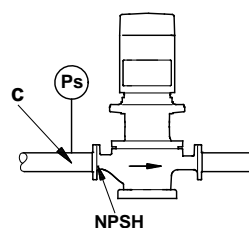
(See individual curve charts from page 92).

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. 96.



Temp. [°C]	p_d [bar]
150	4.76
140	3.61
130	2.70
120	1.99
110	1.43
100	1.01
90	0.70
80	0.47
70	0.31
60	0.20
50	0.12
40	0.07
30	0.04
20	0.02
10	0.01
0	

Fig. 96 Minimum inlet pressure

TM02 8491 0204 - TM03 0371 5004

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

Pump type	p [bar]					
	20 °C	60 °C	90 °C	110 °C	120 °C	140 °C
TP 25-50/2 R	0.1	0.1	0.2	0.5	-	-
TP 25-80/2 R	0.1	0.1	0.1	0.3	-	-
TP 25-90/2 R	0.1	0.1	0.2	0.5	-	-
TP 32-50/2 R	0.1	0.1	0.1	0.2	-	-
TP 32-80/2 R	0.1	0.1	0.2	0.5	-	-
TP 32-90/2 R	0.1	0.1	0.2	0.5	-	-
TP, TPD 32-60/2	0.1	0.1	0.2	1.0	1.5	3.2
TP, TPD 32-120/2	0.1	0.2	0.7	1.5	2.0	3.7
TP, TPD 32-150/2	0.1	0.3	0.8	1.6	2.1	3.8
TP, TPD 32-180/2	0.5	0.7	1.2	2.0	2.5	4.2
TP, TPD 32-230/2	0.7	0.9	1.4	2.2	2.7	4.4
TP, TPD 32-200/2	0.1	0.1	0.2	0.9	1.5	3.1
TP, TPD 32-250/2	0.1	0.1	0.3	1.0	1.6	3.2
TP, TPD 32-320/2	0.1	0.1	0.6	1.3	1.9	3.5
TP, TPD 32-380/2	0.1	0.2	0.7	1.4	2.0	3.6
TP, TPD 32-460/2	0.1	0.2	0.7	1.4	1.9	3.6
TP, TPD 32-580/2	0.2	0.4	0.9	1.6	2.2	3.8
TP 40-50/2	0.1	0.1	0.1	0.3	-	-
TP, TPD 40-60/2	0.1	0.1	0.5	1.2	1.8	3.5
TP 40-80/2	0.1	0.1	0.2	0.5	-	-
TP 40-90/2	0.1	0.1	0.2	0.5	-	-
TP, TPD 40-120/2	0.1	0.1	0.4	1.2	1.7	3.4
TP 40-180/2	0.1	0.2	0.7	1.5	2.0	3.7
TP, TPD 40-190/2	0.1	0.3	0.8	1.6	2.1	3.8
TP, TPD 40-230/2	0.7	0.9	1.4	2.2	2.7	4.4
TP, TPD 40-270/2	0.7	0.9	1.4	2.2	2.7	4.4
TP, TPD 40-240/2	0.1	0.1	0.4	1.1	1.7	3.3
TP, TPD 40-300/2	0.1	0.1	0.4	1.1	1.6	3.3
TP, TPD 40-360/2	0.2	0.4	0.9	1.6	2.1	3.8
TP, TPD 40-470/2	0.1	0.1	0.4	1.1	1.6	3.3
TP, TPD 40-580/2	0.2	0.4	0.9	1.6	2.1	3.8
TP, TPD 50-60/2	0.1	0.1	0.4	1.1	1.7	3.4
TP, TPD 50-120/2	0.1	0.2	0.7	1.5	2.0	3.7
TP, TPD 50-180/2	0.1	0.2	0.7	1.4	2.0	3.7
TP, TPD 50-160/2	0.1	0.1	0.1	0.8	1.4	3.0
TP, TPD 50-190/2	0.1	0.1	0.1	0.9	1.4	3.0
TP, TPD 50-240/2	0.1	0.1	0.1	0.8	1.4	3.0
TP, TPD 50-290/2	0.1	0.1	0.2	0.9	1.5	3.1
TP, TPD 50-360/2	0.1	0.1	0.2	1.0	1.5	3.1
TP, TPD 50-430/2	0.1	0.1	0.4	1.1	1.6	3.2
TP, TPD 50-440/2	0.1	0.1	0.4	1.1	1.6	3.3
TP, TPD 50-570/2	0.1	0.3	0.8	1.6	2.1	3.7
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 65-190/2	0.1	0.1	0.1	0.7	1.3	2.9
TP, TPD 65-230/2	0.1	0.1	0.1	0.8	1.4	3.0
TP, TPD 65-260/2	0.1	0.1	0.1	0.8	1.4	3.0
TP, TPD 65-340/2	0.1	0.1	0.2	0.9	1.4	3.1
TP, TPD 65-410/2	0.1	0.1	0.2	0.9	1.4	3.1
TP, TPD 65-460/2	0.1	0.1	0.2	1.0	1.5	3.1
TP, TPD 65-550/2	0.1	0.1	0.3	1.0	1.6	3.2
TP, TPD 65-660/2	0.1	0.1	0.4	1.1	1.6	3.3
TP, TPD 65-720/2	0.1	0.1	0.6	1.3	1.9	3.5
TP, TPD 65-930/2	0.6	0.8	1.3	2.0	2.6	4.2

Pump type	p [bar]					
	20 °C	60 °C	90 °C	110 °C	120 °C	140 °C
TP, TPD 80-120/2	1.2	1.4	1.9	2.7	3.2	4.9
TP, TPD 80-140/2	0.1	0.2	0.7	1.4	1.9	3.6
TP, TPD 80-180/2	0.1	0.1	0.3	1.1	1.6	3.2
TP, TPD 80-210/2	0.1	0.1	0.4	1.1	1.7	3.3
TP, TPD 80-240/2	0.1	0.1	0.6	1.3	1.8	3.5
TP, TPD 80-250/2	0.1	0.3	0.8	1.6	2.1	3.7
TP, TPD 80-330/2	0.1	0.2	0.7	1.4	2.0	3.6
TP, TPD 80-400/2	0.2	0.4	0.9	1.7	2.2	3.8
TP, TPD 80-520/2	0.1	0.2	0.7	1.4	1.9	3.6
TP, TPD 80-570/2	0.1	0.3	0.8	1.6	2.1	3.7
TP, TPD 80-700/2	0.6	0.8	1.3	2.1	2.6	4.2
TP, TPD 100-120/2	1.9	2.1	2.6	3.4	3.9	5.6
TP, TPD 100-160/2	0.1	0.1	0.6	1.3	1.9	3.5
TP, TPD 100-200/2	0.1	0.1	0.4	1.2	1.7	3.3
TP, TPD 100-240/2	0.1	0.1	0.5	1.3	1.8	3.4
TP, TPD 100-250/2	0.6	0.8	1.3	2.0	2.5	4.2
TP, TPD 100-310/2	0.6	0.8	1.3	2.0	2.6	4.2
TP, TPD 100-360/2	0.6	0.8	1.3	2.0	2.6	4.2
TP, TPD 100-390/2	1.0	1.2	1.7	2.4	3.0	4.6
TP, TPD 100-480/2	1.5	1.7	2.2	2.9	3.5	5.1

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

Pump type	p [bar]					
	20 °C	60 °C	90 °C	110 °C	120 °C	140 °C
TP, TPD 32-30/4	0.1	0.1	0.1	0.8	1.4	3.1
TP, TPD 32-40/4	0.1	0.1	0.1	0.9	1.4	3.1
TP, TPD 32-60/4	0.1	0.1	0.3	1.1	1.6	3.3
TP, TPD 32-80/4	0.1	0.1	0.1	0.5	1.1	2.7
TP, TPD 32-100/4	0.1	0.1	0.1	0.5	1.1	2.7
TP, TPD 32-120/4	0.1	0.1	0.1	0.6	1.1	2.7
TP, TPD 40-30/4	0.1	0.1	0.2	0.9	1.5	3.2
TP 40-60/4	0.1	0.1	0.1	0.8	1.4	3.1
TP, TPD 40-90/4	0.1	0.1	0.3	1.0	1.6	3.3
TP, TPD 40-100/4	0.1	0.1	0.2	0.9	1.5	3.1
TP, TPD 40-130/4	0.1	0.1	0.1	0.7	1.2	2.8
TP, TPD 40-160/4	0.1	0.1	0.2	0.9	1.5	3.1
TP, TPD 50-30/4	0.1	0.1	0.1	0.9	1.4	3.1
TP, TPD 50-60/4	0.1	0.1	0.2	0.9	1.5	3.2
TP, TPD 50-90/4	0.1	0.1	0.1	0.6	1.4	2.8
TP, TPD 50-110/4	0.1	0.1	0.1	0.6	1.4	2.8
TP, TPD 50-130/4	0.1	0.1	0.1	0.6	1.2	2.8
TP, TPD 50-160/4	0.1	0.1	0.1	0.7	1.3	2.9
TP, TPD 50-190/4	0.1	0.1	0.1	0.9	1.4	3.0
TP, TPD 50-230/4	0.1	0.1	0.1	1.0	1.5	3.2
TP, TPD 65-30/4	0.1	0.2	0.7	1.5	2.0	3.7
TP, TPD 65-60/4	0.2	0.4	0.9	1.6	2.2	3.9
TP, TPD 65-90/4	0.1	0.1	0.1	0.6	1.1	2.7
TP, TPD 65-110/4	0.1	0.1	0.1	0.6	1.1	2.7
TP, TPD 65-130/4	0.1	0.1	0.1	0.6	1.1	2.8
TP, TPD 65-150/4	0.1	0.1	0.1	0.6	1.2	2.8
TP, TPD 65-170/4	0.1	0.1	0.1	0.6	1.2	2.8
TP, TPD 65-240/4	0.1	0.1	0.1	0.8	1.3	2.9
TP, TPD 80-30/4	0.8	1.0	1.5	2.2	2.8	4.5
TP, TPD 80-60/4	0.8	1.0	1.5	2.3	2.8	4.5
TP, TPD 80-70/4	0.1	0.1	0.1	0.8	1.3	2.9
TP, TPD 80-90/4	0.1	0.1	0.1	0.7	1.2	2.8
TP, TPD 80-110/4	0.1	0.1	0.1	0.8	1.4	3.0
TP, TPD 80-150/4	0.1	0.1	0.1	0.8	1.3	3.0
TP, TPD 80-170/4	0.1	0.1	0.2	1.0	1.5	3.1
TP, TPD 80-240/4	0.1	0.1	0.3	1.0	1.5	3.2
TP, TPD 80-270/4	0.1	0.1	0.2	0.9	1.5	3.1
TP, TPD 80-340/4	0.1	0.1	0.3	1.1	1.6	3.2
TP, TPD 100-30/4	0.8	1.0	1.5	2.2	2.8	4.5
TP, TPD 100-60/4	0.6	0.8	1.3	2.0	2.6	4.3
TP, TPD 100-70/4	0.1	0.1	0.1	0.8	1.3	3.0
TP, TPD 100-90/4	0.1	0.1	0.1	0.9	1.4	3.0
TP, TPD 100-110/4	0.1	0.1	0.2	1.0	1.5	3.1
TP, TPD 100-130/4	0.1	0.1	0.6	1.3	1.9	3.5
TP, TPD 100-170/4	0.3	0.5	1.0	1.7	2.3	3.9
TP, TPD 100-200/4	0.1	0.1	0.5	1.2	1.8	3.4
TP, TPD 100-250/4	0.1	0.2	0.7	1.4	2.0	3.6
TP, TPD 100-330/4	0.3	0.5	1.0	1.7	2.3	3.9
TP, TPD 100-370/4	0.3	0.5	1.0	1.7	2.3	3.9
TP, TPD 100-410/4	0.5	0.7	1.2	1.9	2.5	4.1
TP 125-70/4	0.1	0.1	0.5	1.2	1.8	3.5
TP 125-90/4	0.1	0.1	0.3	1.0	1.6	3.2
TP 125-100/4	0.1	0.1	0.1	0.9	1.4	3.1
TP, TPD 125-110/4	0.1	0.1	0.1	0.9	1.4	3.0
TP, TPD 125-130/4	0.1	0.1	0.2	0.9	1.5	3.1
TP, TPD 125-160/4	0.1	0.1	0.3	1.0	1.5	3.2
TP, TPD 125-210/4	0.1	0.1	0.3	1.0	1.6	3.2
TP, TPD 125-250/4	0.1	0.1	0.4	1.1	1.7	3.3
TP, TPD 125-320/4	0.1	0.1	0.3	1.0	1.6	3.2
TP, TPD 125-360/4	0.1	0.1	0.4	1.2	1.7	3.3
TP, TPD 125-420/4	0.1	0.2	0.7	1.4	2.0	3.6
TP 150-100/4	0.1	0.2	0.7	1.4	2.0	3.6
TP, TPD 150-130/4	0.1	0.1	0.4	1.1	1.6	3.3
TP 150-140/4	0.1	0.1	0.5	1.2	1.8	3.4
TP 150-150/4	0.1	0.1	0.3	1.0	1.6	3.2
TP, TPD 150-160/4	0.1	0.1	0.4	1.1	1.7	3.3
TP, TPD 150-200/4	0.1	0.1	0.4	1.1	1.7	3.3

Pump type	p [bar]					
	20 °C	60 °C	90 °C	110 °C	120 °C	140 °C
TP, TPD 150-220/4	0.1	0.1	0.5	1.2	1.8	3.4
TP, TPD 150-250/4	0.1	0.1	0.6	1.3	1.9	3.5
TP 150-260/4	0.1	0.1	0.5	1.2	1.8	3.4
TP 150-280/4	0.1	0.3	0.8	1.5	2.1	3.7
TP 150-340/4	0.1	0.2	0.7	1.5	2.0	3.6
TP 150-390/4	0.1	0.2	0.7	1.4	2.0	3.6
TP 150-450/4	0.1	0.1	0.5	1.2	1.8	3.4
TP 150-520/4	0.1	0.1	1.0	1.5	1.9	3.5
TP 150-660/4	0.1	0.2	0.7	1.4	1.9	3.6
TP 150-680/4	0.1	0.2	0.7	1.4	2.0	3.6
TP 200-50/4	0.3	0.4	0.9	1.7	2.2	3.8
TP 200-70/4	0.1	0.3	0.8	1.5	2.1	3.7
TP 200-90/4	0.1	0.2	0.7	1.4	2	3.6
TP 200-130/4	0.1	0.1	0.5	1.2	1.8	3.4
TP 200-150/4	0.1	0.1	0.4	1.2	1.7	3.3
TP 200-160/4	0.3	0.5	1.0	1.7	2.3	3.9
TP 200-190/4	0.2	0.4	0.9	1.6	2.2	3.8
TP 200-200/4	0.2	0.4	0.9	1.6	2.1	3.8
TP 200-240/4	0.1	0.2	0.7	1.4	2.0	3.6
TP 200-270/4	0.1	0.1	0.4	1.1	1.7	3.3
TP 200-290/4	0.1	0.1	0.6	1.3	1.9	3.5
TP 200-320/4	0.1	0.1	0.5	1.2	1.8	3.4
TP 200-330/4	0.1	0.1	0.3	1.1	1.6	3.2
TP 200-360/4	0.1	0.1	0.3	1.1	1.6	3.2
TP 200-400/4	0.1	0.1	0.3	1.0	1.6	3.2
TP 200-410/4	0.1	0.2	0.7	1.4	1.9	3.6
TP 200-470/4	0.1	0.1	0.4	1.1	1.6	3.3
TP 200-530/4	0.1	0.1	0.4	1.1	1.7	3.3
TP 200-590/4	0.1	0.2	0.7	1.4	2.0	3.6
TP 200-660/4	0.2	0.4	0.9	1.7	2.2	3.8
TP 250-280/4	0.1	0.1	0.1	0.8	1.4	3.1
TP 250-310/4	0.1	0.1	0.1	0.8	1.4	3.1
TP 250-390/4	0.1	0.1	0.1	0.8	1.4	3.1

TP, TPD, 6-pole, PN 16

Pump type	p [bar]					
	20 °C	60 °C	90 °C	110 °C	120 °C	140 °C
TP, TPD 125-60/6	0.1	0.1	0.1	0.7	1.2	2.8
TP, TPD 125-70/6	0.1	0.1	0.1	0.7	1.3	2.9
TP, TPD 125-90/6	0.1	0.1	0.1	0.7	1.2	2.9
TP, TPD 125-110/6	0.1	0.1	0.1	0.8	1.3	2.9
TP, TPD 125-140/6	0.1	0.1	0.1	0.7	1.3	2.9
TP, TPD 125-170/6	0.1	0.1	0.1	0.8	1.4	3.0
TP, TPD 150-60/6	0.1	0.1	0.1	0.7	1.3	2.9
TP, TPD 150-70/6	0.1	0.1	0.1	0.7	1.3	2.9
TP, TPD 150-90/6	0.1	0.1	0.1	0.8	1.3	2.9
TP, TPD 150-110/6	0.1	0.1	0.1	0.8	1.3	3.0

TP Series 400, 2-pole, PN 25

Pump type	p [bar]					
	20 °C	60 °C	90 °C	110 °C	120 °C	140 °C
TP 100-620/2	0.2	0.4	0.9	1.6	2.2	3.9
TP 100-700/2	0.1	0.2	0.7	1.5	2.0	3.7
TP 100-820/2	0.1	0.2	0.7	1.4	2.0	3.7
TP 100-960/2	0.1	0.2	0.7	1.4	2.0	3.7
TP 100-1050/2	0.1	0.1	0.6	1.3	1.9	3.6
TP 100-1180/2	0.1	0.2	0.7	1.5	2.0	3.7
TP 100-1400/2	0.1	0.2	0.7	1.5	2.0	3.7
TP 100-1530/2	0.1	0.2	0.7	1.4	2.0	3.7
TP 100-1680/2	0.1	0.1	0.6	1.4	1.9	3.6

TP Series 400, 4-pole, PN 25

Pump type	p [bar]					
	20 °C	60 °C	90 °C	110 °C	120 °C	140 °C
TP 100-190/4	0.1	0.1	0.1	0.8	1.4	3.1
TP 100-220/4	0.1	0.1	0.1	0.8	1.4	3.1
TP 100-260/4	0.1	0.1	0.1	0.8	1.4	3.1
TP 100-270/4	0.1	0.1	0.1	0.8	1.4	3.1
TP 100-320/4	0.1	0.1	0.1	0.8	1.4	3.1
TP 100-380/4	0.1	0.1	0.1	0.8	1.4	3.1
TP 100-420/4	0.1	0.1	0.1	0.8	1.4	3.1
TP 125-150/4	0.1	0.1	0.1	0.8	1.4	3.1
TP 125-200/4	0.1	0.1	0.1	0.8	1.4	3.1
TP 125-240/4	0.1	0.1	0.1	0.8	1.4	3.1
TP 125-280/4	0.1	0.1	0.1	0.8	1.4	3.1
TP 125-310/4	0.1	0.1	0.1	0.8	1.4	3.1
TP 125-370/4	0.1	0.1	0.1	0.8	1.4	3.1
TP 125-430/4	0.1	0.1	0.1	0.8	1.4	3.1
TP 150-240/4	0.1	0.1	0.1	0.8	1.4	3.1
TP 150-270/4	0.1	0.1	0.1	0.8	1.4	3.1
TP 150-320/4	0.1	0.1	0.1	0.8	1.4	3.1
TP 150-350/4	0.1	0.1	0.1	0.8	1.4	3.1
TP 150-430/4	0.1	0.1	0.1	0.8	1.4	3.1
TP 150-530/4	0.1	0.1	0.1	0.8	1.4	3.1
TP 150-650/4	0.1	0.1	0.1	0.8	1.4	3.1
TP 200-270/4	0.1	0.1	0.1	0.8	1.4	3.1
TP 200-280/4	0.1	0.1	0.1	0.8	1.4	3.1
TP 200-380/4	0.1	0.1	0.1	0.8	1.4	3.1
TP 200-420/4	0.1	0.1	0.1	0.8	1.4	3.1
TP 200-450/4	0.1	0.1	0.1	0.8	1.4	3.1
TP 200-510/4	0.1	0.1	0.1	0.8	1.4	3.1
TP 200-560/4	0.1	0.1	0.1	0.8	1.4	3.1
TP 200-620/4	0.1	0.1	0.1	0.8	1.4	3.1
TP 250-270/4	0.1	0.1	0.1	0.8	1.4	3.1
TP 250-320/4	0.1	0.1	0.1	0.8	1.4	3.1
TP 250-370/4	0.1	0.1	0.1	0.8	1.4	3.1
TP 250-490/4	0.1	0.1	0.1	0.8	1.4	3.1
TP 250-540/4	0.1	0.1	0.1	0.8	1.4	3.1
TP 250-600/4	0.1	0.1	0.1	0.8	1.4	3.1
TP 250-660/4	0.1	0.1	0.1	0.8	1.4	3.1
TP 300-590/4	0.4	0.6	1.1	1.8	2.4	4.1
TP 300-670/4	0.4	0.6	1.1	1.8	2.4	4.1
TP 300-750/4	0.3	0.5	1.0	1.8	2.3	4.0
TP 400-470/4	0.1	0.3	0.8	1.6	2.1	3.8
TP 400-510/4	0.1	0.3	0.8	1.6	2.1	3.8
TP 400-540/4	0.1	0.3	0.8	1.5	2.1	3.8
TP 400-670/4	0.6	0.8	1.3	2.1	2.6	4.3
TP 400-720/4	0.6	0.8	1.3	2.1	2.6	4.3
TP 400-760/4	0.6	0.8	1.3	2.0	2.6	4.3

30. Key application data

Dear customer, if an ATEX certificate is needed or if pump selection cannot be made on the basis of the guidelines in *Pumped liquids*, please fill in the following form in cooperation with a Grundfos representative. This will help to ensure that Grundfos supplies you with a pump solution adapted to meet exactly your needs in terms of pump type, pump materials, shaft seal type, elastomers and accessories.

This form is also available under "Literature" in WebCAPS and WinCAPS.

Customer information

Company name:	Project title:
Customer number:	Reference number:
Phone number:	Customer contact:
Fax number:	
E-mail address:	

Quotation made by:

Company name:	Prepared by:
Phone number:	Date: Page 1 of
Fax number:	Quotation number:
E-mail address:	

Operating conditions

Pumped liquid

Type of liquid:	_____
Chemical composition (if available):	_____
Distilled/demineralised water?	Yes: _____ No: _____
Conductivity of distilled/demineralised water:	_____ [μS/cm]
Minimum liquid temperature:	_____ [°C]
Maximum liquid temperature:	_____ [°C]
Vapour pressure of liquid:	_____ [bar]
Liquid concentration:	_____ %
Liquid pH value:	_____
Dynamic liquid viscosity:	_____ [cP] = [mPa s]
Kinematic liquid viscosity:	_____ [cSt] = [mm ² /s]
Liquid density:	_____ [kg/m ³]
Specific heat capacity of liquid:	_____ [kJ/(kg·K)]
Air/gas in liquid?	Yes: _____ No: _____
Solids in liquid?	Yes: _____ No: _____
Contents of solids in liquid (if available):	_____ % of mass
Additives in liquid?	Yes: _____ No: _____
Does the liquid crystallise?	Yes: _____ No: _____
When does crystallisation happen?	_____

Does the liquid get sticky when volatiles evaporate from the pumped liquid? Yes: _____ No: _____

Description of 'sticky' circumstances: _____

Is the liquid hazardous/poisonous? Yes: _____ No: _____

Special measures to be taken into account when dealing with this hazardous/poisonous liquid: _____

Special measures for handling this liquid: _____

CIP liquid (cleaning-in-place)

Type of liquid:	_____
Chemical composition (if available):	_____
Liquid temperature during operation:	_____ [°C]
Maximum liquid temperature:	_____ [°C]
Vapour pressure of liquid:	_____ [bar]
Liquid concentration:	_____ %
Liquid pH value:	_____

Pump sizing

Main duty point: Q: _____ [m³/h] H: _____ [m]
 Max. duty point: Q: _____ [m³/h] H: _____ [m]
 Min. duty point: Q: _____ [m³/h] H: _____ [m]

Ambient operating conditions

Ambient temperature: _____ [°C]
 Altitude above sea level: _____ [m]

Pressure

Minimum inlet pressure: _____ [bar]
 Maximum inlet pressure: _____ [bar]
 Discharge pressure (inlet pressure + head): _____ [bar]

ATEX marking

Required marking of the pump

Customer's equipment group (e.g. II): _____
 Customer's equipment category (e.g. 2, 3): _____
 Gas (G) and/or dust (D): Gas (G): _____ Dust (D): _____ Gas and dust (G/D): _____

Required marking of the motor

Protection type (e.g. d, de, e, nA): _____
 Maximum experimental safe gap (e.g. B, C): _____
 Temperature class
 - gas (e.g. T3, T4, T5): _____
 - dust (e.g. 125 °C): _____ [°C]

Description/sketch

Detailed description of ATEX application (attach a drawing if possible):

ATEX certificate required Yes: _____ No: _____

Frequency converter

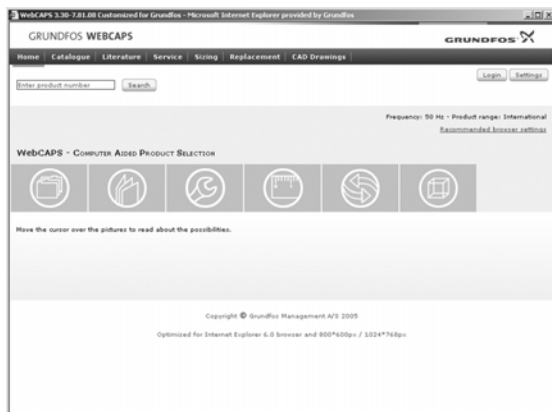
Frequency converter option wanted? Yes: _____ No: _____
 Control parameter: Pressure: _____ Temperature: _____ Flow rate: _____ Other: _____
 Detailed description of requirements (attach a drawing if possible):

System information

Please provide us with information about your system and maybe a simple sketch. This will give us hints as to whether you need accessories or monitoring equipment, or whether you already have a suitable system which makes it unnecessary to attach any further equipment.

31. Further product information

WebCAPS



WebCAPS is a **Web-based Computer Aided Product Selection** program available on www.grundfos.com.

WebCAPS contains detailed information on more than 220,000 Grundfos products in more than 30 languages.

Information in WebCAPS is divided into six sections:

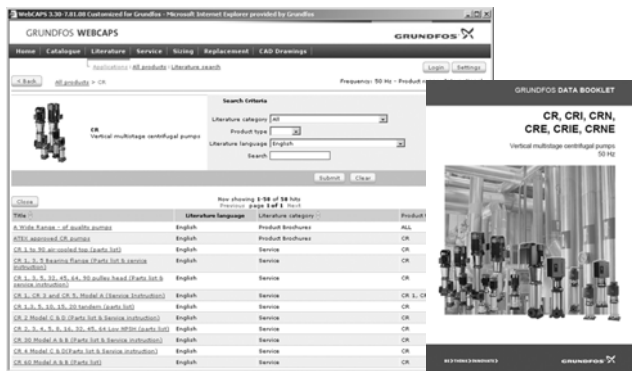
- Catalogue
- Literature
- Service
- Sizing
- Replacement
- CAD drawings.



Catalogue

Based on fields of application and pump types, this section contains the following:

- technical data
- curves (QH, Eta, P1, P2, etc.) which can be adapted to the density and viscosity of the pumped liquid and show the number of pumps in operation
- product photos
- dimensional drawings
- wiring diagrams
- quotation texts, etc.



Literature

This section contains all the latest documents of a given pump, such as

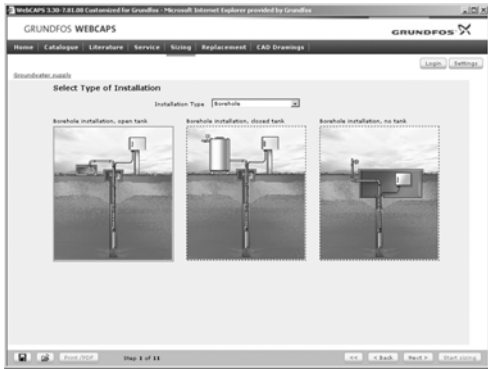
- data booklets
- installation and operating instructions
- service documentation, such as Service kit catalogue and Service kit instructions
- quick guides
- product brochures.



Service

This section contains an easy-to-use interactive service catalogue. Here you can find and identify service parts of both existing and discontinued Grundfos pumps.

Furthermore, the section contains service videos showing you how to replace service parts.



Sizing

This section is based on different fields of application and installation examples and gives easy step-by-step instructions in how to size a product:

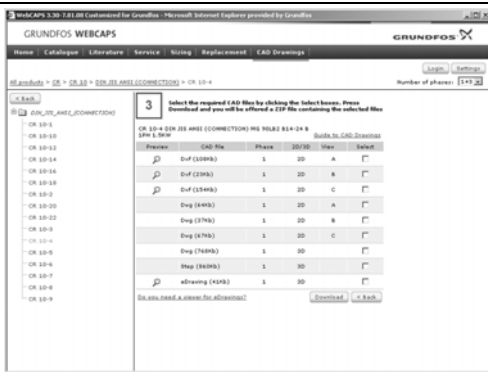
- Select the most suitable and efficient pump for your installation.
- Carry out advanced calculations based on energy, consumption, payback periods, load profiles, life cycle costs, etc.
- Analyse your selected pump via the built-in life cycle cost tool.
- Determine the flow velocity in wastewater applications, etc.



Replacement

In this section you find a guide to selecting and comparing replacement data of an installed pump in order to replace the pump with a more efficient Grundfos pump. The section contains replacement data of a wide range of pumps produced by other manufacturers than Grundfos.

Based on an easy step-by-step guide, you can compare Grundfos pumps with the one you have installed on your site. When you have specified the installed pump, the guide will suggest a number of Grundfos pumps which can improve both comfort and efficiency.



CAD drawings

In this section, it is possible to download 2-dimensional (2D) and 3-dimensional (3D) CAD drawings of most Grundfos pumps.

These formats are available in WebCAPS:

2-dimensional drawings:

- .dxf, wireframe drawings
- .dwg, wireframe drawings.

3-dimensional drawings:

- .dwg, wireframe drawings (without surfaces)
- .stp, solid drawings (with surfaces)
- .eprt, E-drawings.

WinCAPS



Fig. 97 WinCAPS DVD

WinCAPS is a **Windows-based Computer Aided Product Selection** program containing detailed information on more than 220,000 Grundfos products in more than 30 languages.

The program contains the same features and functions as WebCAPS, but is an ideal solution if no internet connection is available.

WinCAPS is available on DVD and updated once a year.

GO CAPS

Mobile solution for professionals on the GO!



CAPS functionality on the mobile workplace.



Subject to alterations.

V7124417 1212

ECM: 1106072

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