Fully Integrated In-line Water Pump

EtaLine Pro

Type Series Booklet

KSB

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Type Series Booklet EtaLine Pro

Contents

Heating / Air-conditioning / Ventilation

In-line Pumps

EtaLine Pro

Main applications

- Service water supply systems
- Heating systems
- Industrial recirculation systems
- Air-conditioning systems
- Cooling circuits
- Water supply systems[1)]

Fluids handled

- Fluids not chemically or mechanically aggressive to the materials

Further information on fluids handled

Overview of fluids handled (⇨ Page 6)

Operating data

Table 1: Operating properties

Characteristic		Value
Flow rate	Q [m³/h]	≤ 63,6
	Q [l/s]	≤ 18
Head	H [m]	≤ 42,9
Fluid temperature	T [°C]	≥ -20
		≤ +120
Operating pressure	p [bar]	≤ 10

Design details

Design

- Compact pumps consisting of pump and drive unit
- Close-coupled design / in-line design
- Single-stage
- Horizontal installation / vertical installation
- Rigid connection between pump and motor
- Variable speed version

Pump casing

- Radially split volute casing
- In-line design

Drive

- Surface-cooled synchronous motor (TEFC), designed for operation in a compact pump set
- Efficiency class IE5 to IEC 60034-30
- Rated voltage of pump set 3 ~380 - 400 V +/-10 %, 50/60 Hz
- Enclosure IP55
- Duty type: continuous duty S1
- Thermal class F

Shaft seal

- KSB mechanical seal

Impeller type

- Closed radial impeller

Bearings

- Radial ball bearings in the motor housing
- Grease lubrication

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1 No drinking water in acc. with UBA (German drinking water regulations to German Environment Agency)

Designation

Table 2: Designation example

Position																				
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
E	3	0	B	-	H	0	6	5	G	P	S	V	1	1	3	5	0	7	5	O	O

Table 3: Designation key

Position	Code	Description		
1-4	Pump type series/generation			
	E30B	EtaLine Pro		
5	Model			
	-	Standard		
	P	Pro		
6	Installation position of control panel			
	H	Horizontal		
	V	Vertical		
7-9	Size [mm], e.g.			
	065	Nominal diameter of suction and discharge nozzles		
10	Pump casing material			
	G	Grey cast iron	EN-GJL-250/A48CL35	
11	Impeller material			
	P	PPS-GF40		
12	Design			
	S	Standard		
13	Shaft seal design			
	V	Single mechanical seal with vented chamber (A-type cover)		
14-15	Seal code, single mechanical seal			
	11	BQ1EGG	DIN 24960	≥ -20 - ≤ +120 [°C]
16-17	Nominal speed [rpm]			
	35	3500		
18-20	Rated output power [W]			
	075	750		
21	Field bus module			
	O	None		
22	Optional component			
	O	None		

Materials

Table 4: Materials

Part No.	Description	Material
102	Volute casing	Grey cast iron EN-GJL 250 with cathodic E-coating
161	Casing cover	Grey cast iron EN-GJL 250 with cathodic E-coating
230	Impeller	PPS-GF40/1.4021
411.01/.02	Joint ring	A4/AISI 316
411.03	Joint ring	DPAF
412	O-ring	EPDM
433	Mechanical seal	BQ1EGG
741	Vent valve	CUZN+GAL NI
903.01/.02	Screw plug	A4/AISI 316
920	Hexagon nut	A4/AISI 316
930	Lock washers	ST+FLZNNC
940	Key	1.4571+C/A276 TP 316 COND B

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Coating and preservation

- Coating and preservation to manufacturer's standard

Product benefits

- Improved efficiency and NPSHreq by experimentally verified hydraulic design of impellers (vanes)
- Little wear, low vibration levels and excellent smooth running characteristics thanks to good suction performance and virtually cavitation-free operation across a wide operating range
- Casing sealed reliably – even in varying operating conditions – by confined casing gasket
- Low-noise, low-vibration motors specially designed for EtaLine Pro
- Straightforward commissioning thanks to default factory parameter settings
- Space-saving thanks to integrated electronics and high output per size of the compact pump

Product information

Product information as per Regulation No. 1907/2006 (REACH)

For information as per European chemicals regulation (EC) No. 1907/2006 (REACH) see https://www.ksb.com/en-global/company/corporate-responsibility/reach.

Product information as per Regulation No. 547/2012 (for water pumps with a maximum shaft power of 150 kW) implementing "Ecodesign" Directive 2009/125/EC

- Minimum efficiency index: see name plate, key to the name plate
- The benchmark for the most efficient water pumps is MEI ≥ 0.70.
- Year of manufacture: see name plate, key to the name plate
- Manufacturer's name or trade mark, commercial registration number and place of manufacture: see data sheet or order documentation
- Product's type and size identificator: see name plate, key to the name plate
- Hydraulic pump efficiency (%) with trimmed impeller: see data sheet[2)]
- Pump performance curves, including efficiency characteristics: see documented characteristic curve
- The efficiency of a pump with a trimmed impeller is usually lower than that of a pump with the full impeller diameter.[2)] 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.
- 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 relevant for disassembly, recycling or disposal at end of life: see installation/operating manual
- Information on benchmark efficiency or benchmark efficiency graph for MEI = 0.70 (0.40) for the pump based on the model shown in the Figure are available at: www.europump.org/efficiencycharts

Acceptance tests and warranty

Materials inspection and testing

- Test report 2.2 on request

Hydraulic test

- The duty point of each pump with a delivery address or final destination in Europe is guaranteed to ISO 9906/3B.

Other inspections/tests on request

Warranty

- Warranties are given within the scope of the valid terms and conditions of sale and delivery.

Overview of fluids handled

Table 5: Excerpt from the overview of fluids handled with associated material variants

Fluid handled	Fluid temperature		Seal code
	Min.	Max.	BQ_1EGG
	[°C]		11
Service water	-	-	✗
Heating water[3)]	-	+120	✗
Condensate	-	-	✗
Cooling water without antifreeze	-	+60	✗
Cooling water with antifreeze, pH ≥ 7.5[4)]	-20	+110	✗
Pure water	-	+60	✗

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2 There is no trimmed impeller for this type series.

3 Treatment to VdTÜV 1466; additional requirement: O2 t ≤ 0.02 mg/l

4 The mechanical seal used as standard, type BQ1EGG, is suitable for antifreeze agents on ethylene glycol basis (not inhibited) and glycols (pure). In the case of applications involving antifreeze agents on ethylene glycol basis (inhibited, closed / open system) or on propylene glycol basis (inhibited, closed / open system) leakage may occur at the mechanical seal used. To prevent this, using an alternative pump type series with the option of selecting the mechanical seal material is recommended.

Overview of functions

Table 6: Overview of functions

Functions / firmware	EtaLine Pro
Protective functions	
Electronic motor protection	✗
Mains voltage monitoring	✗
Phase failure, motor side	✗
Short-circuit monitoring, motor side (phase to phase and phase to earth)	✗
Operating point estimation and characteristic curve control	✗
Detection of externally forced flow	✗
Deblocking function	✗
Adjustable parameters for service interval of pump and of motor bearings	✗
Broken wire detection	✗
Dry running protection and protection against hydraulic blockage	✗
Operating mode	
Open control loop	
Constant Speed	✗
Open control loop, variable speed with external setpoint	
External setpoint via analog input (0/2-10 V)	✗
Sensorless closed-loop control	
Constant-pressure Control (Δp-const.)	✗
Proportional-pressure Control (Δp-var.)	✗
Dynamic Control (Δp-var.)	✗
Constant-flow-rate Control (Q)	✗
Closed control loop with external sensor (⇨ Table 13)	
Constant-temperature Control via analog signal	✗
Constant-differential-temperature Control via analog signals	✗
Temperature-governed Differential Pressure Control via analog signal	✗
Operation and monitoring	
Display of process values (head, flow rate, speed, electric power)	✗
Error codes indicated on the display	✗
Fault history	✗
Operating hours counter	✗
Energy meter	✗
Flow rate meter	✗
"In operation" message and general fault message via volt-free relays (changeover contact)	✗
Pump set functions	
Parameterless hydraulic process controller	✗
Adjustable start ramp and operating ramp	✗
Field-oriented control (vector control)	✗
External message via digital input	✗
Generation of test alert	✗
Flow rate estimation	✗
Functional check run	✗
Setback operation	✗
Heat quantity measurement via analog signal	✗
Dual-pump operation with redundancy or peak load function and integrated multiple pump management	✗
Automatic intelligent pump changeover in dual-pump operation	✗
Speed equaliser for dual-pump operation	✗
Operation	
Control element	✗[5)]
Bluetooth LE interface	✗

5 Some functions can only be parameterised and/or displayed using the KSB FlowManager app or the KSB ServiceTool.

Pressure limits and temperature limits

Table 7: Pressure limits and temperature limits as a function of material variant

T[6)]	Test pressure[7)]	Operating pressure
[°C]	[bar]	[bar]
-20 to +120	≤ 15	≤ 10

Technical data

Technical data

Table 8: Technical data

Characteristic	EtaLine Pro
Power supply	
Mains voltage[8)]	380-480 V AC ±10 %
Voltage difference between the three phases	±2 % of the supply voltage
Mains frequency	50 - 60 Hz ± 2 %
Mains types	TN, TT and IT mains (to IEC/EN 60364)
Environment	
Enclosure	IP55 (to EN 60529)
In-service ambient temperature[9)]	0 °C to +40 °C, Class 3K3
In-service relative humidity	< 95 %, non-condensing
In-transport ambient temperature	-25 °C to + 70 °C, Class 2K3
In-transport relative humidity	< 95 %
In-storage ambient temperature	-25 °C to +55 °C, Class 1K3
In-storage relative humidity	< 95 %
Installation altitude	▪ ≤ 1000 m above MSL, or 1 % power derating per additional 100 m ▪ Maximum installation altitude 2000 m above MSL
Sound pressure level	≤ 68 dBA[10)]
Inputs and outputs	
Internal power supply	24 V DC
Analog inputs	
Number of parameterisable analog inputs	2 (configurable for current input or voltage input)
Voltage input	0/2...10 V
Current input	0/4...20 mA
Digital inputs	
Number of parameterisable digital inputs	2
Relay outputs	
Number of parameterisable relay outputs	2× change-over contact
Maximum contact rating	AC: max. 250 VAC / 1 A
	DC: max. 220 VDC / 1 A
Service interface	
Interface type	Bluetooth Low Energy (BLE 4.2) integrated

Technical data of the power cable

The power cable must meet the following requirements:

- Clamping range for M25 cable gland: 8 to 17 mm
- Maximum core cross-section: 2.5 mm²

6 Fluid temperature; for hot water heating systems to DIN 4752, Section 4.5, application limits must be observed.
7 The casing components are checked for leakage by means of internal pressure tests to AN 1897/75-03D00 with water.
8 If the mains voltage is low, the nominal torque of the motor will be lower.
9 Depending on the fluid temperature:
- Fluid temperature ≤ +90 °C: ambient temperature up to max. +40 °C
- Fluid temperature > +90 °C to 120 °C: ambient temperature up to max. +30 °C

10 For detailed information on the noise characteristics see the operating manual.

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Table 9: Technical data of the power cable

Size	Nominal speed	Current input I_1	Power input P_1	Weight
		3~ 400 V		
	[rpm]	[A]	[kW]	[kg]
025-025-090 0,8	5900	1,5	0,8	16
025-025-090 1,6	5900	3,8	1,6	16
032-032-070 0,8	6000	1,5	0,8	19
032-032-070 1,6	6000	3,8	1,6	19
040-040-090 0,8	3500	1,4	0,8	21,2
040-040-090 1,3	3500	3,1	1,3	21,2
040-040-090 1,6	4500	3	1,6	21,2
040-040-090 2,6	4500	4,7	2,6	22,6
050-050-090 0,8	3450	1,5	0,8	23,2
050-050-090 1,3	3500	3,1	1,3	23,2
050-050-090 2,3	3900	4,1	1,6	24,6
065-065-090 0,8	2850	1,5	0,8	28,8
065-065-090 1,2	3300	2,9	1,3	28,8
065-065-090 2,0	3300	3,6	1,6	30,2
065-065-090 2,6	3300	4,7	2,6	32,3

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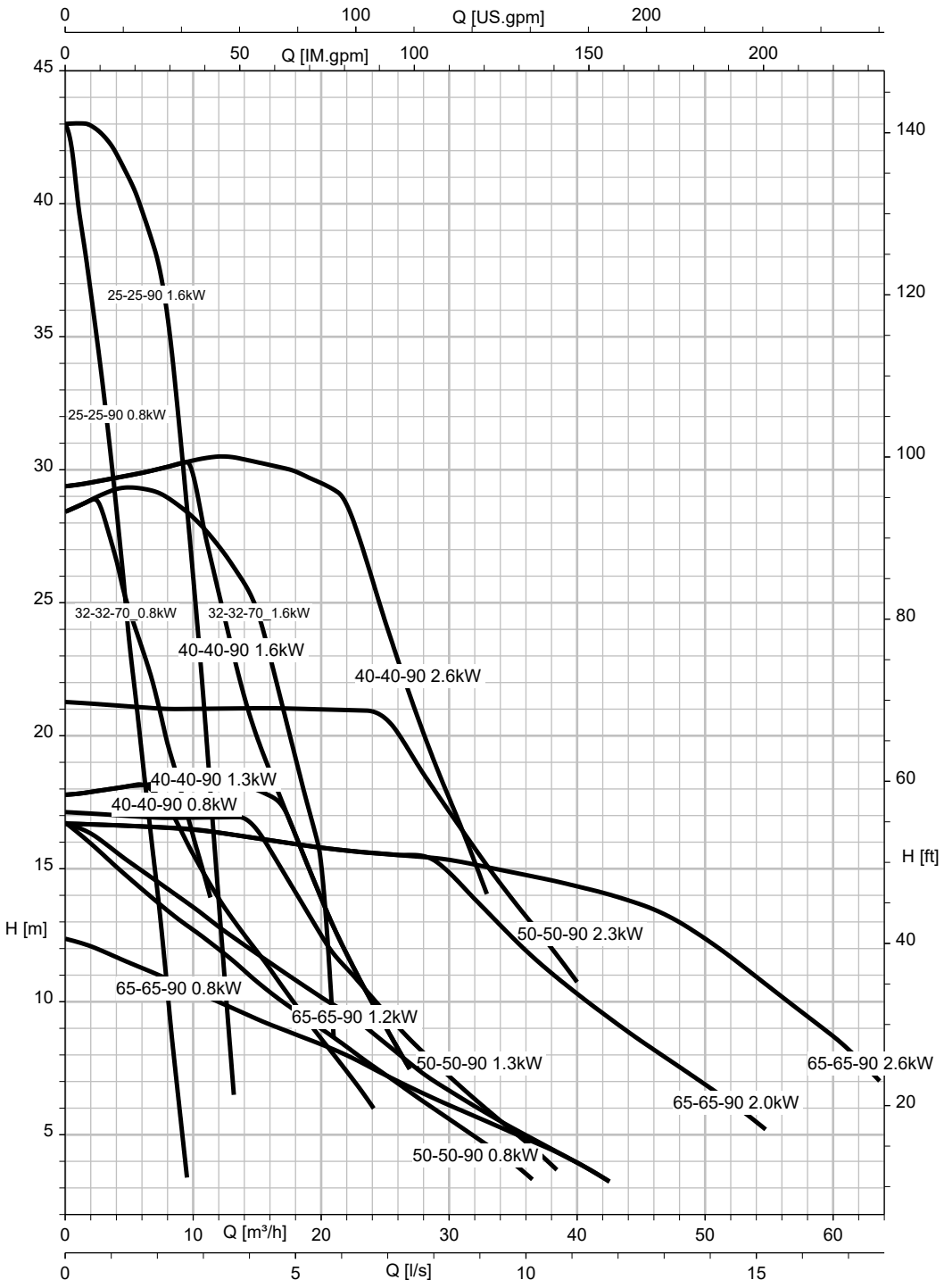
Selection charts

EtaLine Pro



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Characteristic curves

General

Test class
Characteristic curves to ISO 9906 Class 3B

Density of the fluid handled
The indicated heads and performance data apply to pumped fluids with a density ρ = 1.0 kg/dm³ and a kinematic viscosity of up to 20 mm²/s max. If the density ≠ 1.0, the performance data must be multiplied by ρ. For a viscosity > 20 mm²/s the corresponding data for cold water has to be calculated and the impact on the pump's performance has to be determined.

Correction factors
The characteristic curves apply to pumps with cast iron impellers, plastic impellers and bronze impellers.

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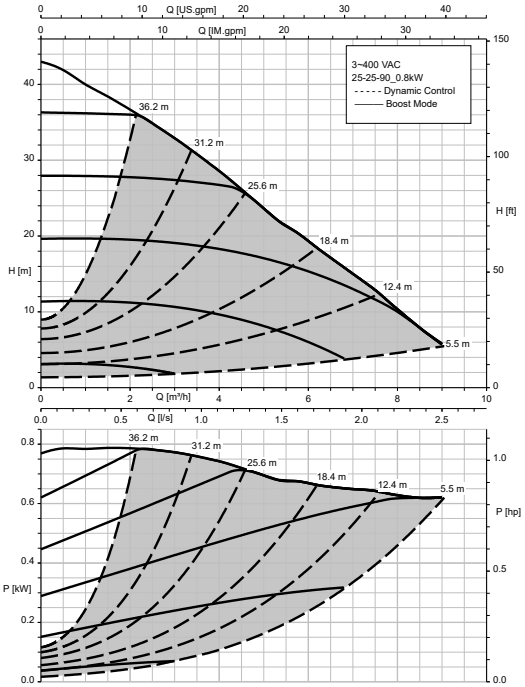
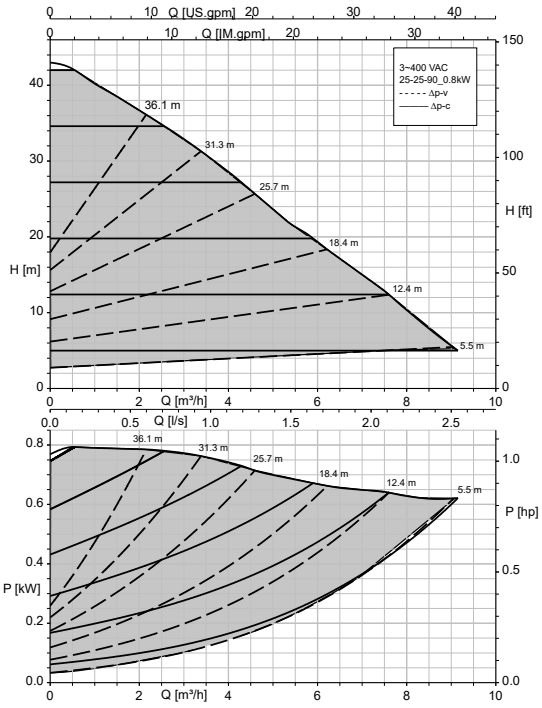
EtaLine Pro 025-025-090 0.8 kW, constant speed (open-loop control), Eco Mode



EtaLine Pro 025-025-090 0.8 kW, Δp-v, Δp-c



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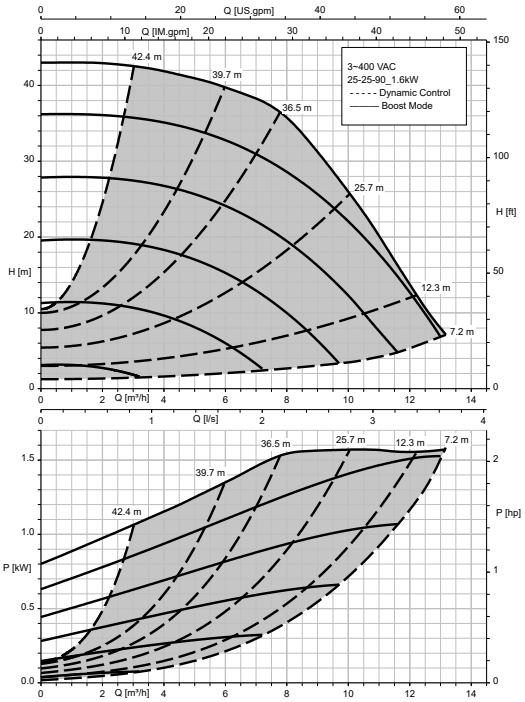

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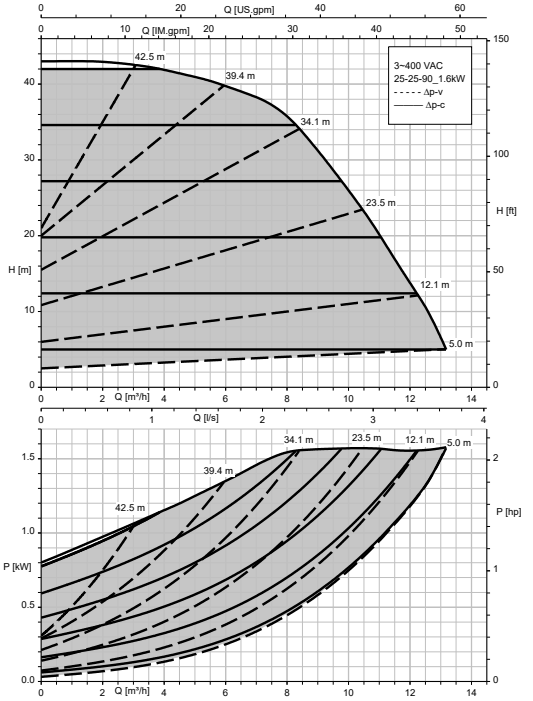

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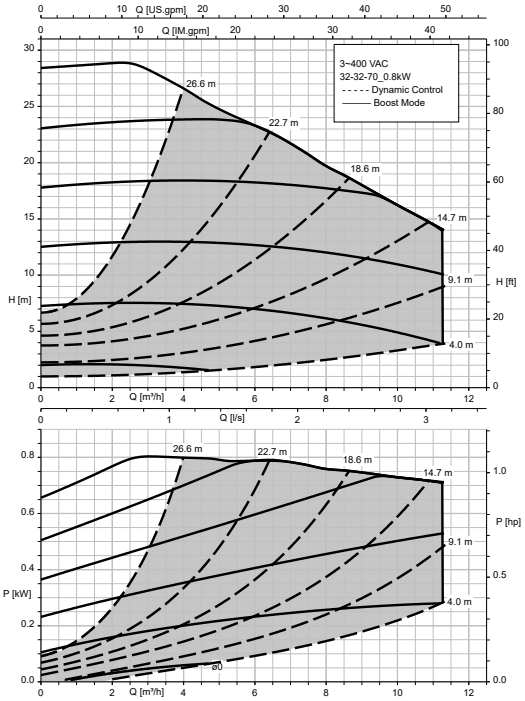

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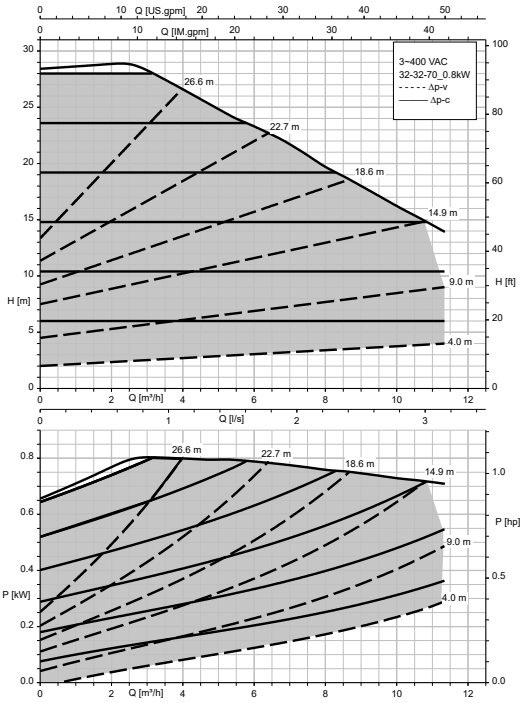

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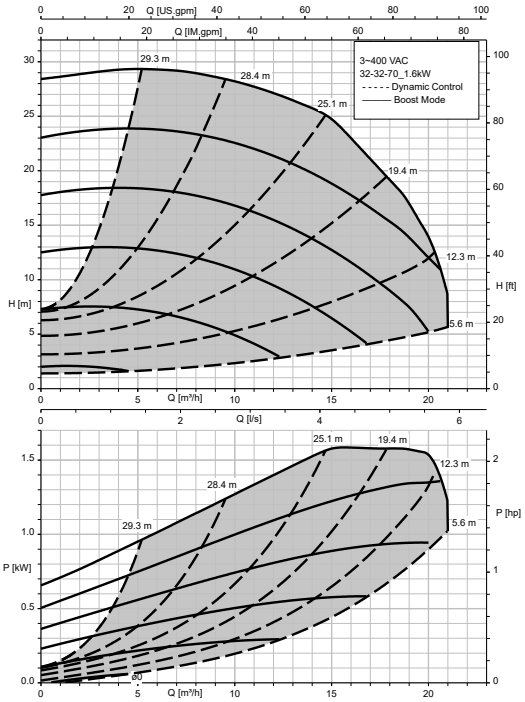

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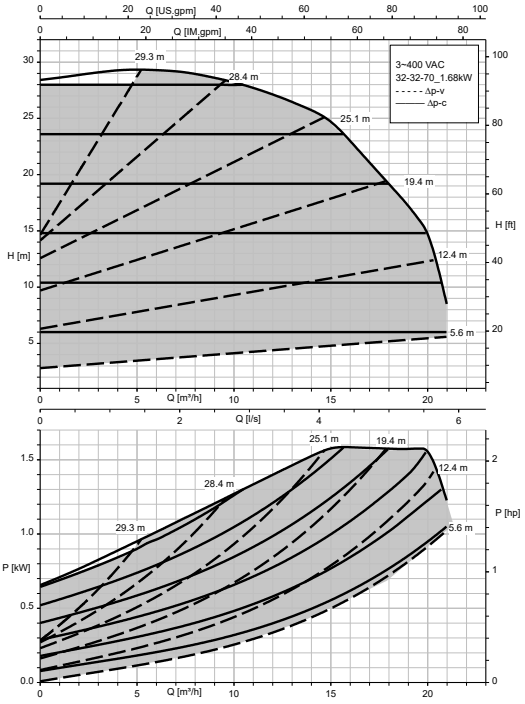
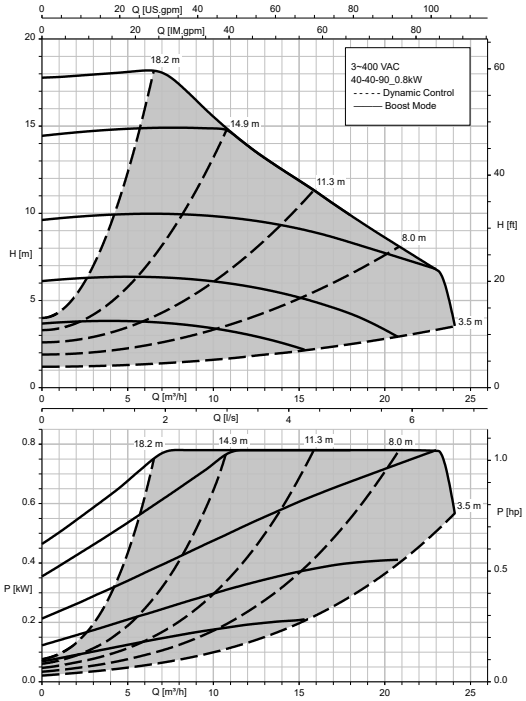


EtaLine Pro 040-040-090 0.8 kW, constant speed (open-loop control), Eco Mode



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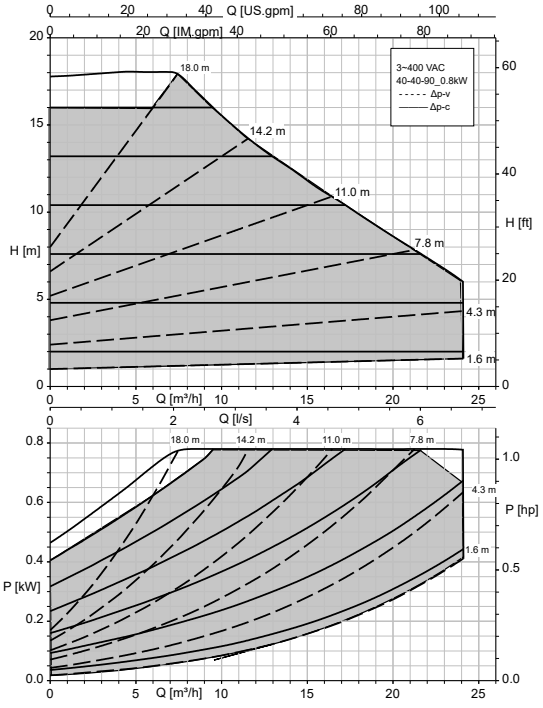

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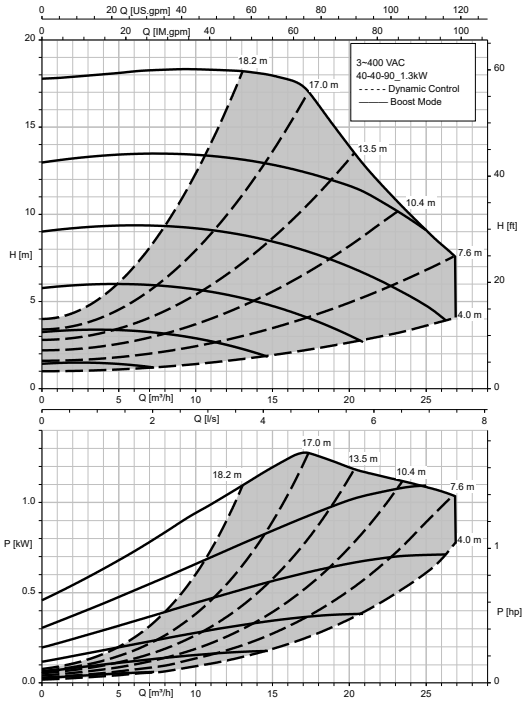

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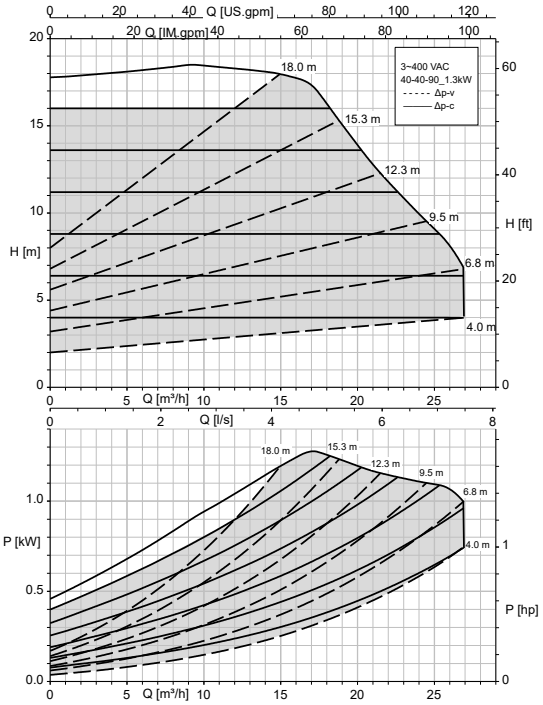

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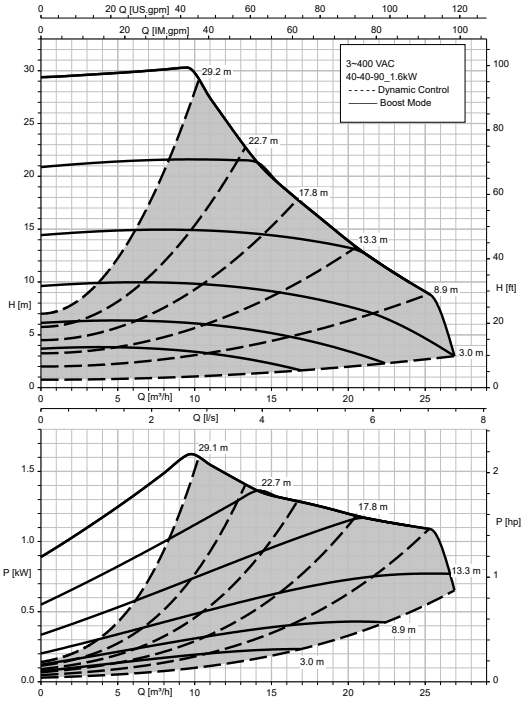

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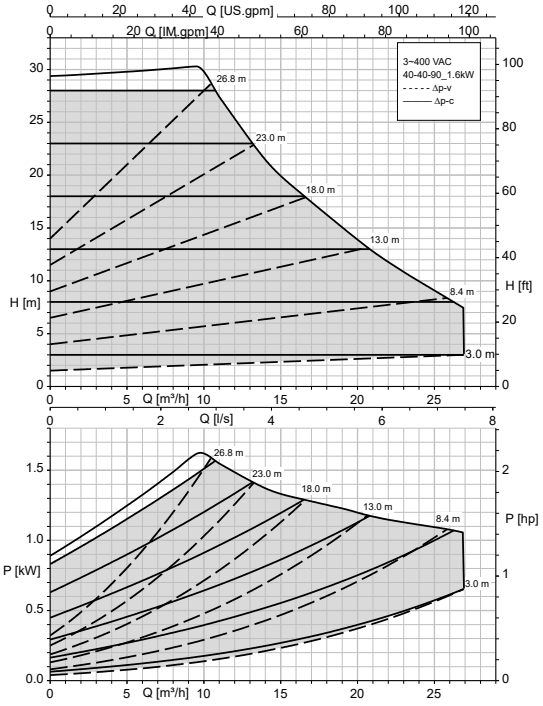

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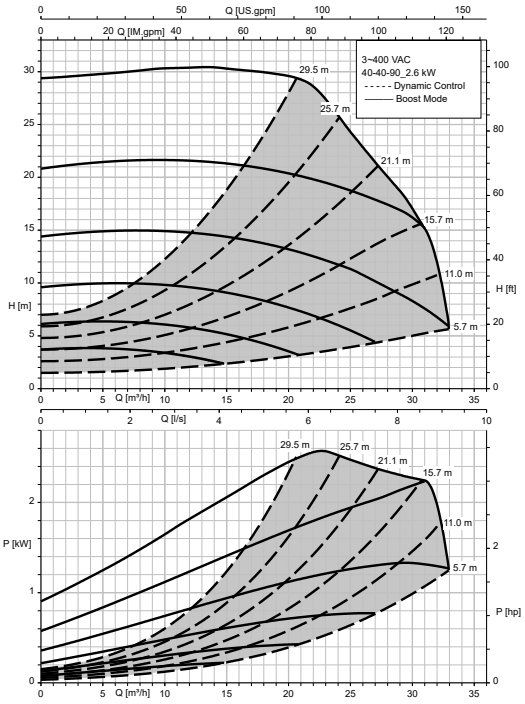

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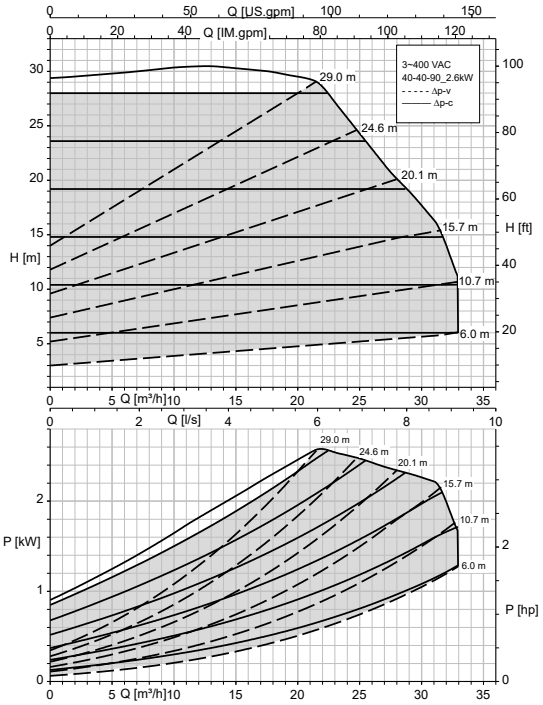

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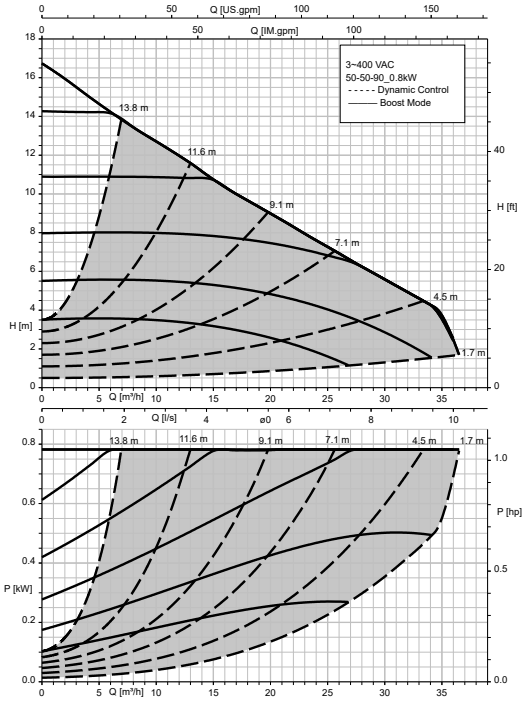

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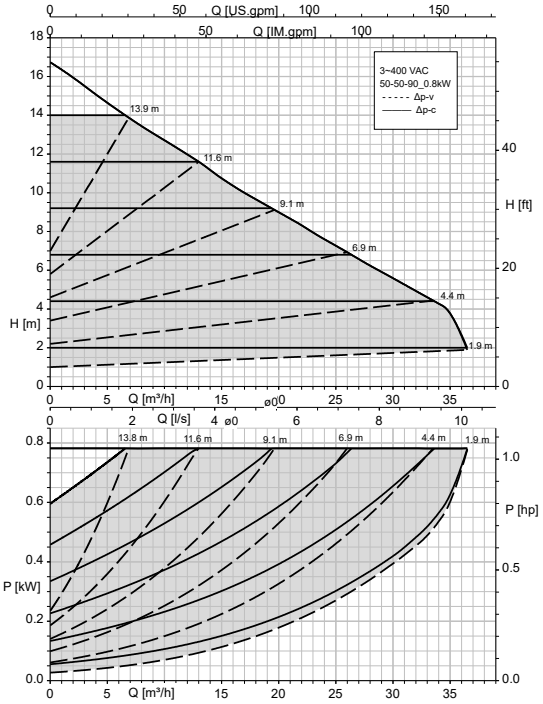

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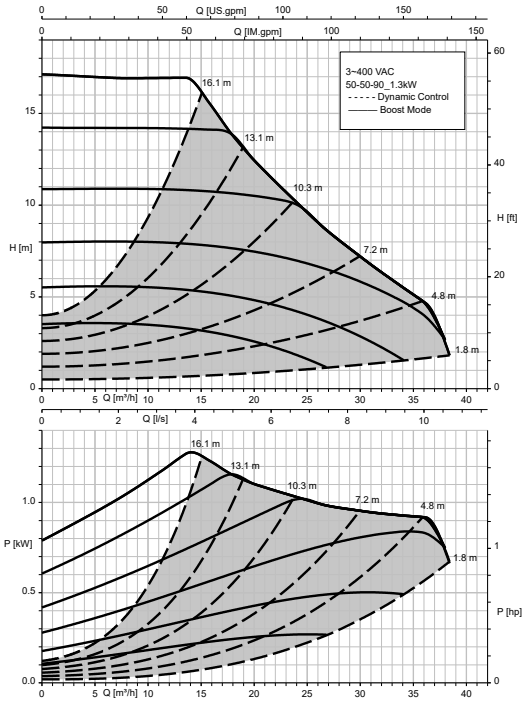

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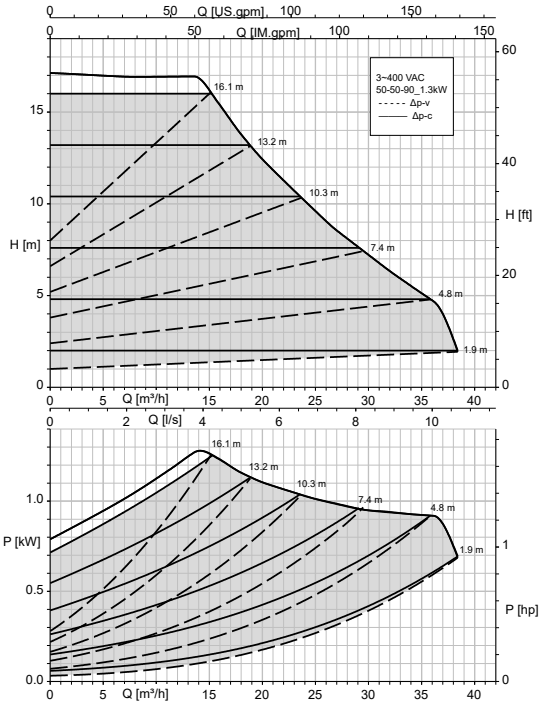

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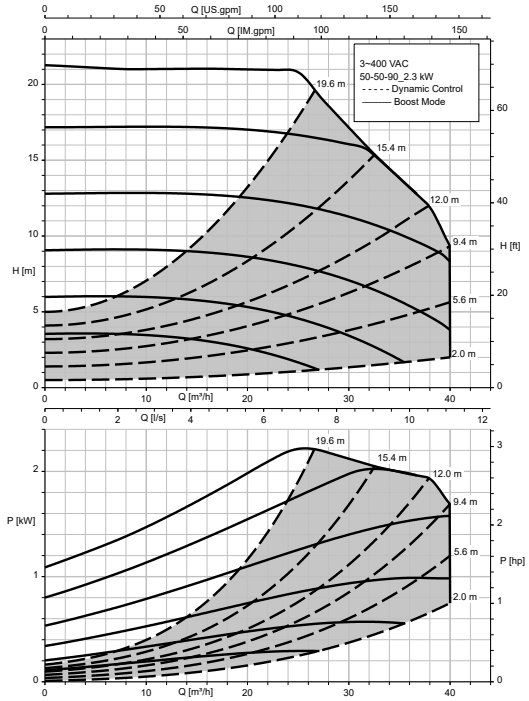
EtaLine Pro 050-050-090 2.3 kW, constant speed (open-loop control), Eco Mode



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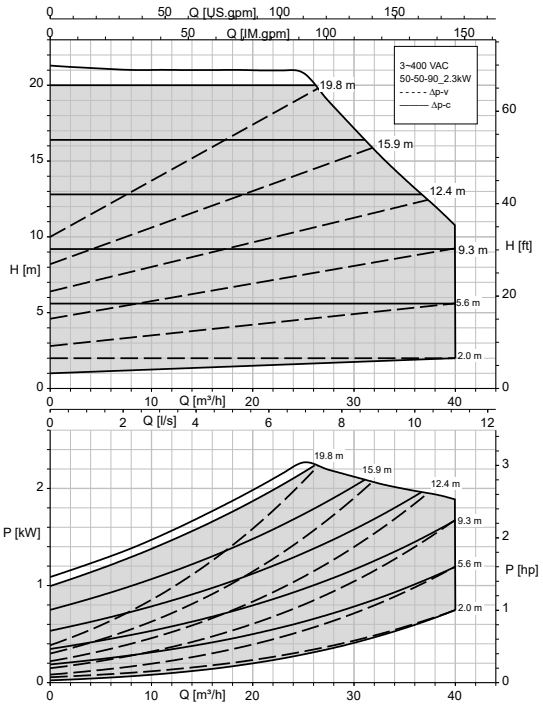
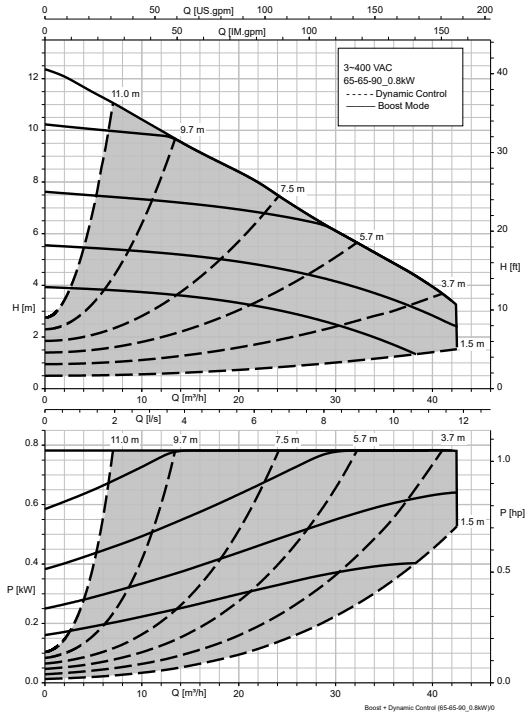
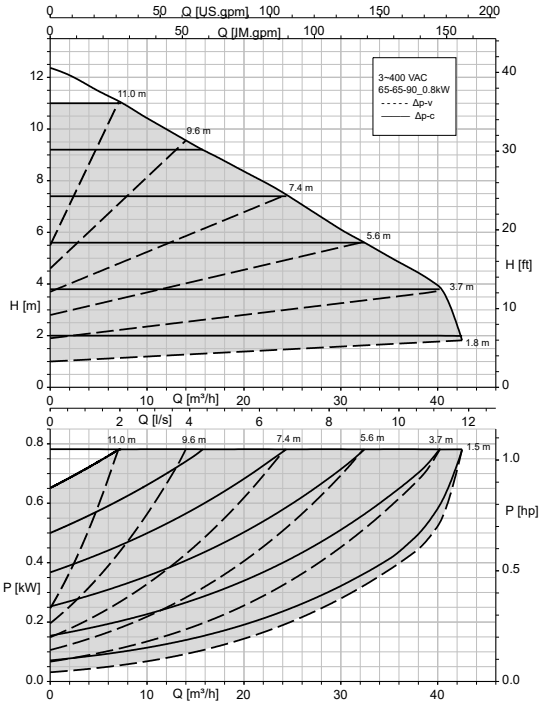


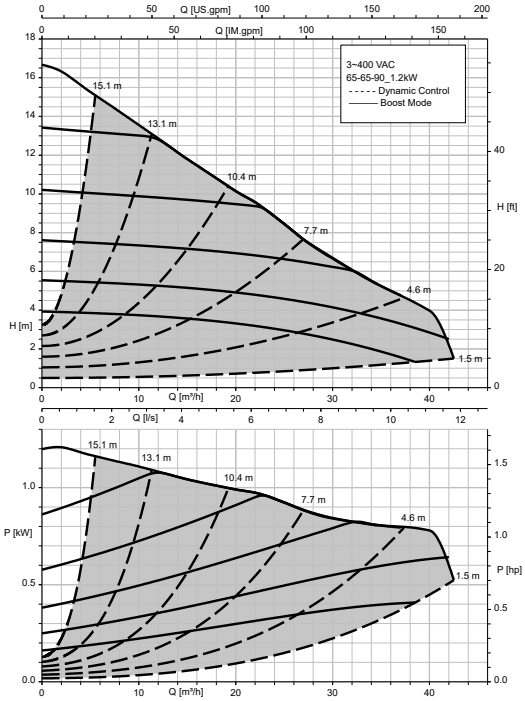
EtaLine Pro 065-065-090 0.8 kW, constant speed (open-loop control), Eco Mode



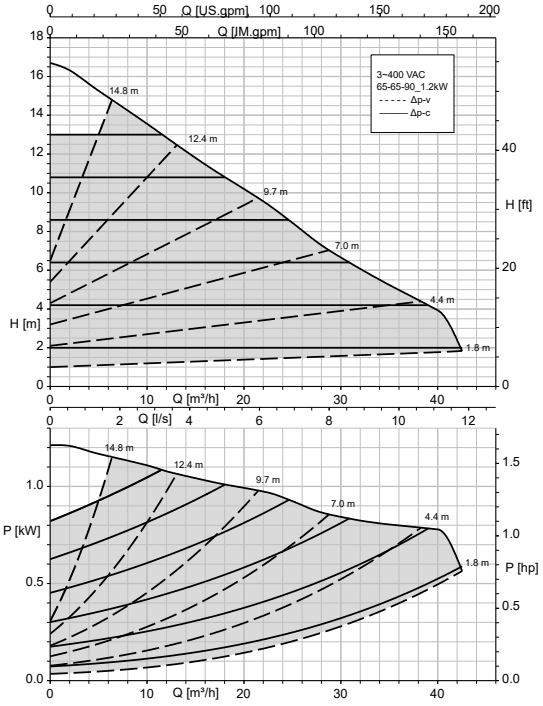
EtaLine Pro 065-065-090 0.8 kW, Δp-v, Δp-c



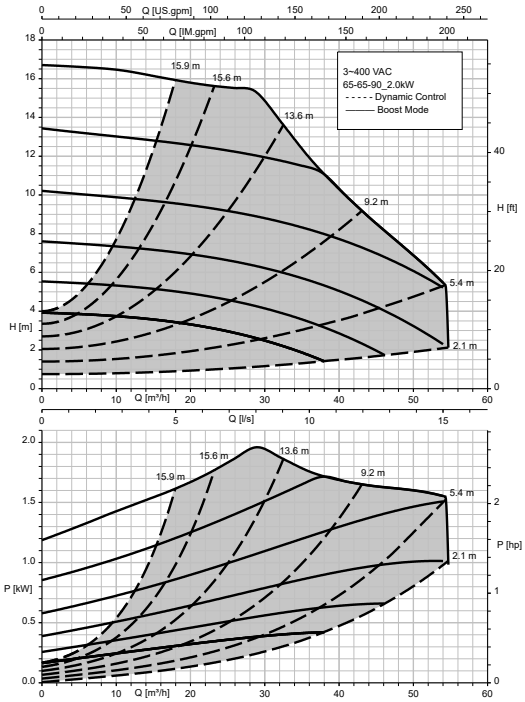
EtaLine Pro 065-065-090 1.2 kW, constant speed (open-loop control), Eco Mode



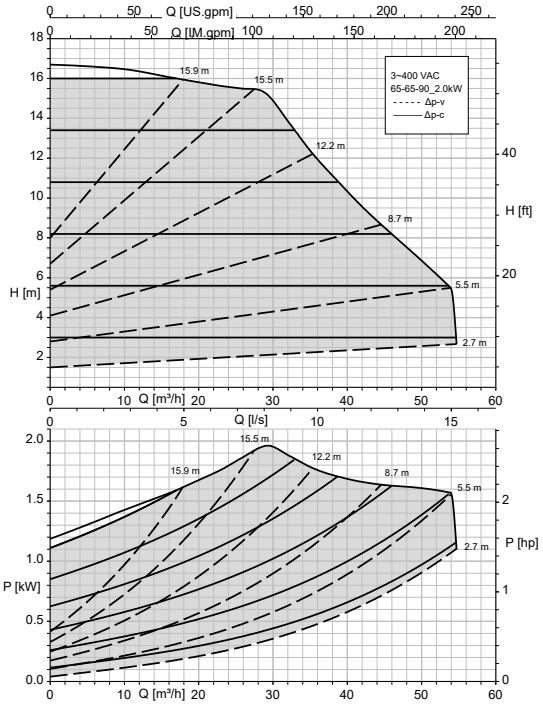
EtaLine Pro 065-065-090 1.2 kW, Δp-v, Δp-c



EtaLine Pro 065-065-090 2.0 kW, constant speed (open-loop control), Eco Mode



EtaLine Pro 065-065-090 2.0 kW, Δp-v, Δp-c



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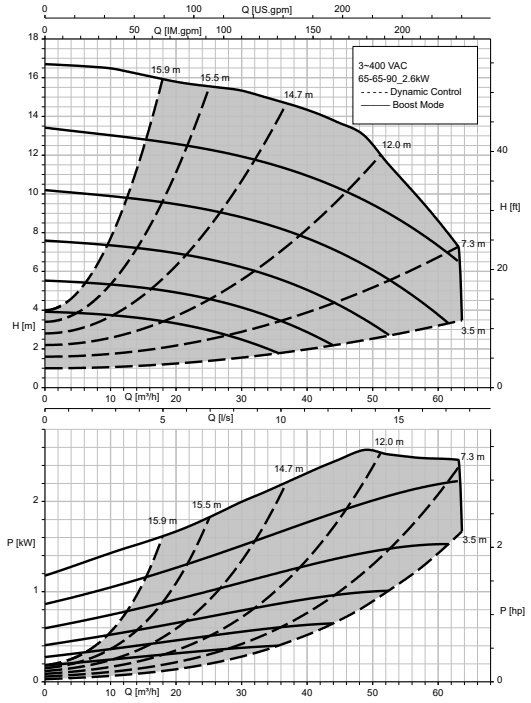
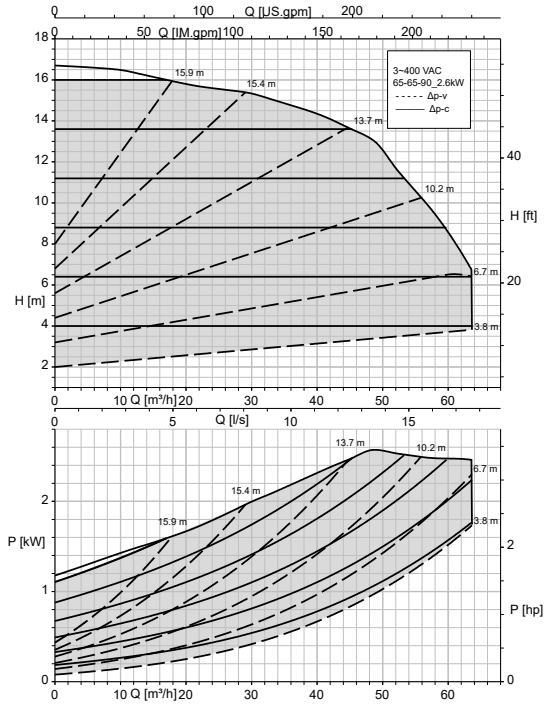
EtaLine Pro 065-065-090 2.6 kW, constant speed (open-loop control), Eco Mode



EtaLine Pro 065-065-090 2.6 kW, Δp-v, Δp-c



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Dimensions

Pump set dimensions

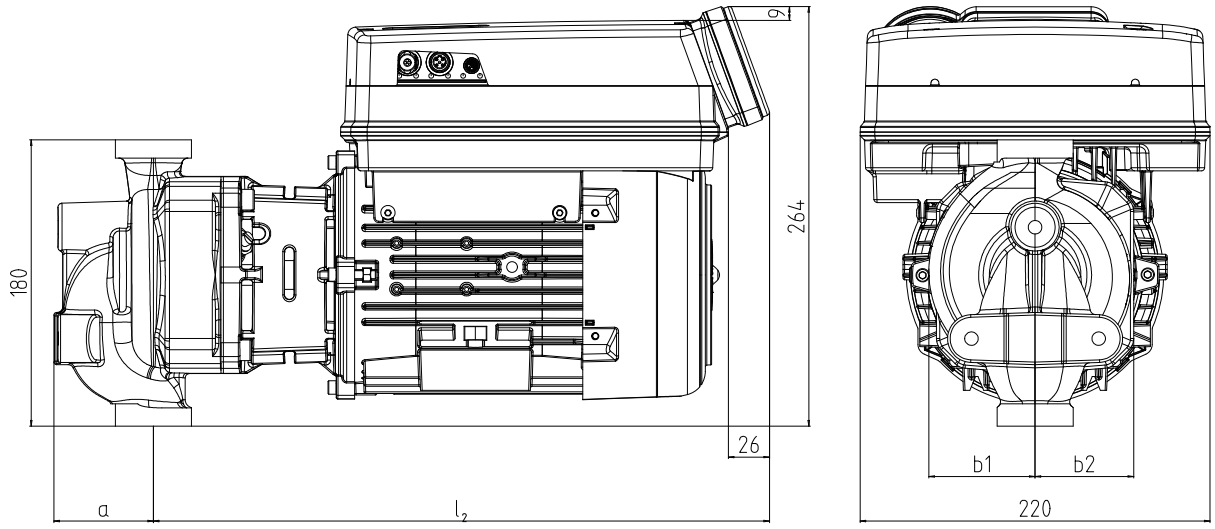

Fig. 1: Pump set dimensions DN 25

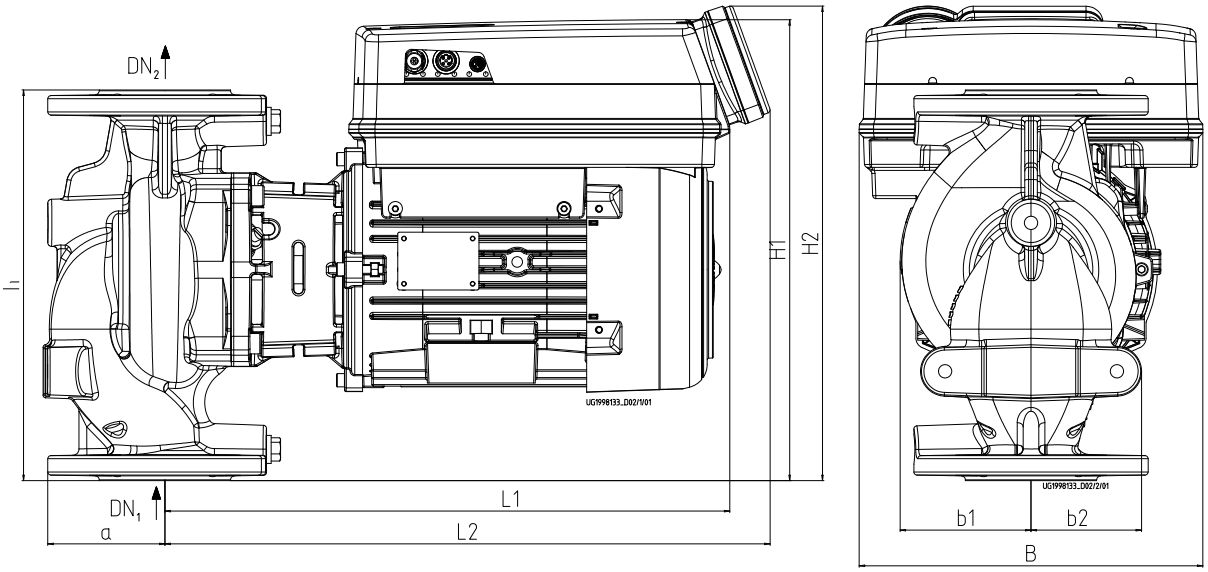

Fig. 2: Pump set dimensions DN 32 to DN 65

Table 10: Pump set dimensions

Nominal diameter DN of discharge nozzle	a[11)]	h	b1[11)]	b2[11)]	B	L1	H1	L2	H2
	[mm]								
25	63	180	67	62	220	362	255	388	264
32	63	220	63	63	220	362	270	388	279
40	78	250	84	70	220	362	295	388	304
50	103	280	90	70	220	366	320	392	329
65	123	340	114	90	220	369	340	395	349

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11 Pump body overhang without flange OD/ Flange, see flange dimensions

Connection types

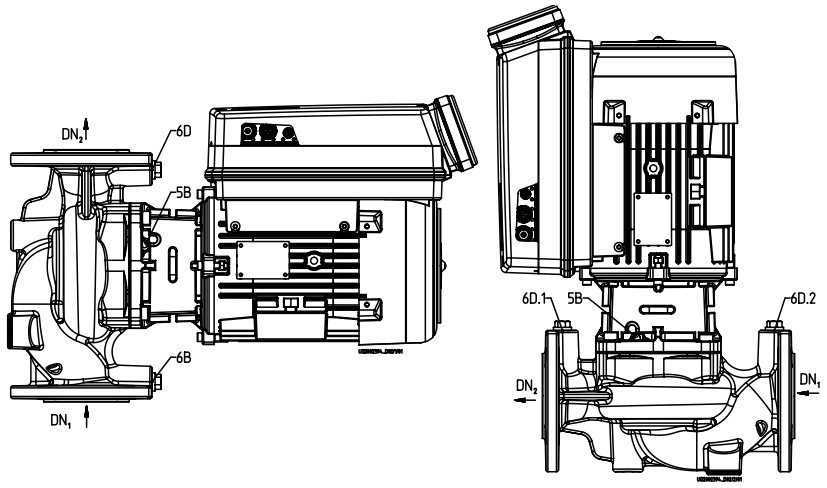

Fig. 3: Connections

Table 11: Connection type

Connection	Description	Configuration	Position
5B	Vent connection for the mechanical seal chamber	Plugged with vent plug	Casing cover
6B	Fluid drain	Drilled and closed	Volute casing
6D, 6D.1, 6D.2[12)]	Fluid priming and venting	Drilled and closed	Volute casing

Table 12: Connection

Size	6B, 6D, 6D.1, 6D.2
032-032-070	G 1/4
040-040-090	G 1/4
050-050-090	G 1/4
065-065-090	G 1/4

Table 13: Connecting external sensors

Size	Connecting external sensors
DN25 (Screw-ended pump)	No external sensors can be connected. A sensorless control system must always be used.
DN 32 to DN 65 (Flanged pump)	In the standard BT1 design the holes for the sensors are located on the side facing the motor. If, depending on the sensors used, space is tight at the discharge-side or suction-side connection (6B and 6D), we recommend using adjustable angles with a G1/4 thread. Alternatively, the pump can be supplied with the holes offset by 90° at the pump casing. This can only be processed using a BT3 special process.

12 On size DN25 connections 6B, 6D, 6D.1, 6D.2 are not available.

Flange design

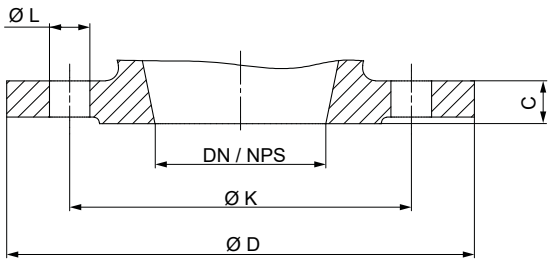

Fig. 4: Flange dimensions

Table 14: Flange dimensions [mm]

DN / NPS	Standard							Note
	EN 1092-2						DIN EN ISO 228-1	
	PN 10			PN 6			Thread	
	Ø K	Ø D	Number of holes L	Ø K	Ø D	Number of holes L		
25	-	-	-	-	-	-	G 1 1/2	-
32 / NPS11/4	100	140	4×∅19	90	140	4×∅14	-	Adapter flange PN6/ PN10
40 / NPS11/2	110	150	4×∅19	100	150	4×∅14	-	
50 / NPS2	125	165	4×∅19	110	165	4×∅14	-	
65 / NPS21/2	145	185	4×∅19	130	185	4×∅14	-	

Table 15: Flange design by materials

Material variant	Standard	Nominal size	Pressure class
GG, GP, BB, BP	Drilled to EN 1092-2	DN 32 - DN 65	PN 6 / PN 10

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Installation types

Horizontal installation

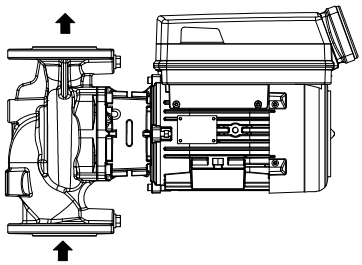


Fig. 5: Horizontal installation of pump set, direction of flow from bottom to top

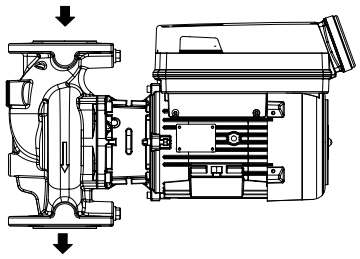


Fig. 6: Horizontal installation, direction of flow from top to bottom

Turn the volute casing and/or pull-out unit by 180° so that the electronic system and the control element remain in their current position on top and are easy to read.

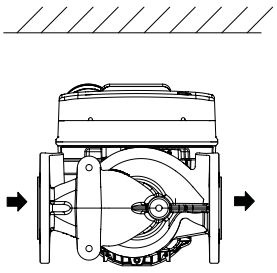


Fig. 7: Horizontal installation (for example under the ceiling)

Turn the volute casing and/or pull-out unit by 90° so that the frequency inverter remains in its current position on top.

Vertical installation

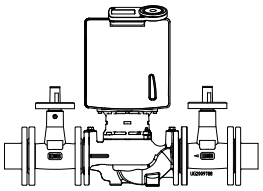


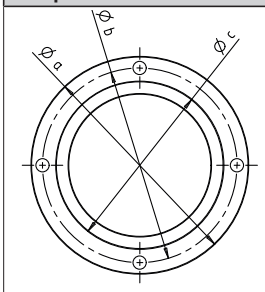
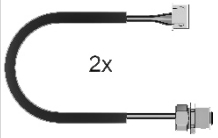
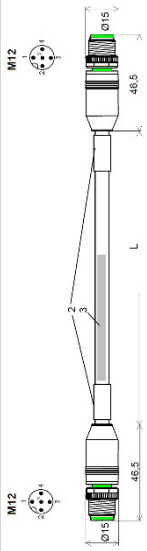
Fig. 8: Vertical installation / mounted without pump foot

In this installation position the mechanical seal must be vented via the vent valve.

Accessories

Pump accessories

Table 16: Pump accessories

Component	Description	Design	Mat. No.	[kg]
	Blind flange with sealing element DN25-DN65	150 / 134 / 115,8 [mm] (Ø a / Ø b / Ø c)	05184959	1,8
	Accessories set M12-Kit For physically connecting the pump sets in dual-pump operation Each pump set requires its own accessories set.	Two cables with M12 socket, two locknuts for M12 socket, one cable tie	05213248	0,05
	Terminating resistors CAN for bus termination of multiple pump configuration	Two M12 connectors with integrated CAN terminating resistor	01522993	0,3
	Bus cable, pre-configured, shielded For dual-pump operation For looping the KSB device bus from pump set to pump set using the accessories set M12-Kit Colour violet, M12 connector, A-coded, straight	Length 1 m	05238634	0,092
		Length 2 m	05238635	0,14
		Length 3 m	05238636	0,3
		Length 5 m	05238637	0,318
		Length 10 m	05238638	0,6
		Length 20 m	05238639	1,2

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Exploded view and list of components

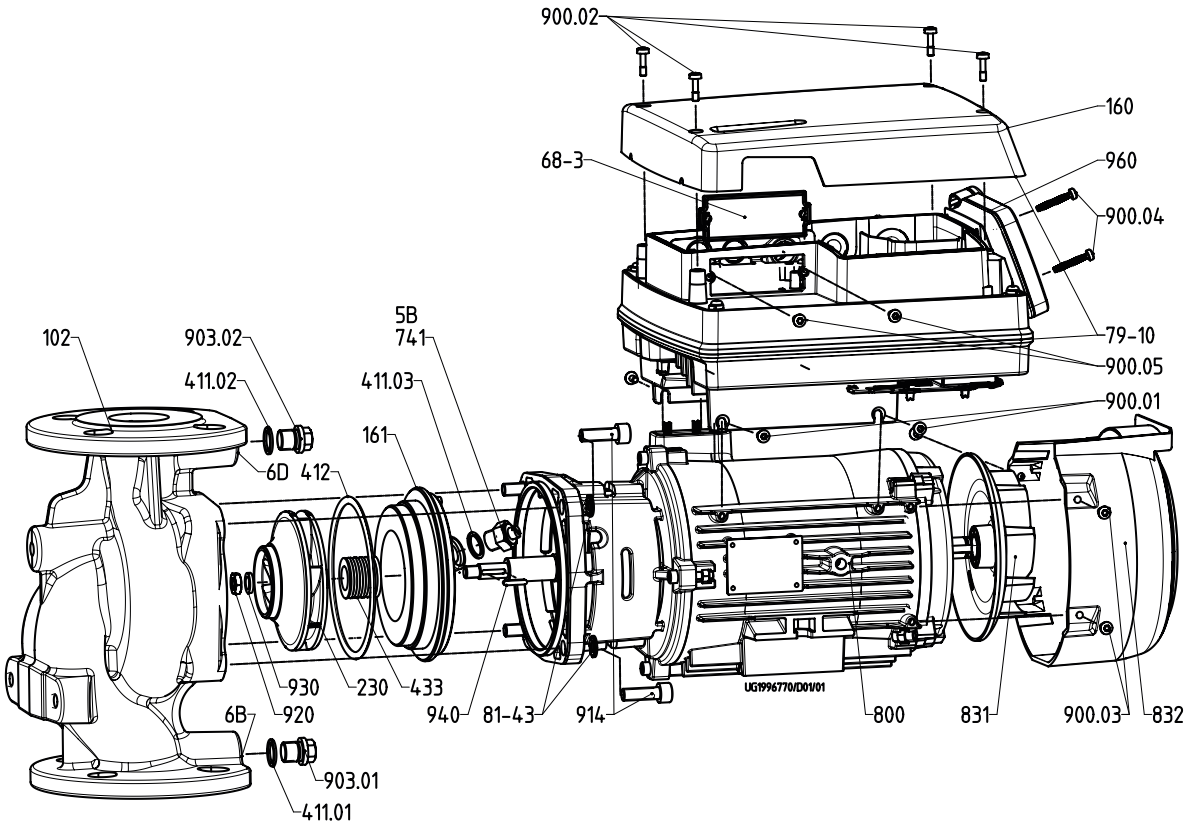

Fig. 9: Exploded view

Table 17: List of components

Part No.	Description	Part No.	Description
102	Volute casing	914	Hexagon socket head cap screw
161	Casing cover	920	Hexagon nut
160	Cover	930	Safety device
210	Shaft	940	Key
230	Impeller	960	Operating element
411.01/.02/.03	Joint ring	59-2	Fan impeller
412	O-ring	68-3	Cover plate
433	Mechanical seal	79-10	Frequency inverter
741	Vent valve	81-43	Connection disc
800	KSB motor		
831	Fan impeller	Auxiliary connections	
832	Fan hood	6B	Fluid drain
900.01/.02/.03/.04/.05	Bolt/screw	6D	Fluid priming and venting
903.01/02	Screw plug	5B	Fluid venting (vertical installation)

Glossary

Close-coupled design

Motor directly fitted to the pump via a flange or a drive lantern

IE5

Efficiency class for rotating electrical machinery to IEC TS 60034-30-2:2016 = Ultra Premium Efficiency (IE = International Efficiency)

In-line design

A pump whose suction and discharge nozzle are arranged opposite each other and have the same nominal diameter.

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