



High-efficiency Heating Circulator

Calio Pro Plus Z

Type Series Booklet



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Type Series Booklet Calio Pro Plus Z

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Contents

Heating	4
Variable Speed Heating Circulators	4
Calio Pro Plus Z	4
Main applications	4
Fluids handled	4
Operating data	4
Design details	4
Designation	5
Materials	5
Product benefits	6
Product information	6
Available software/apps	7
Selection information	8
Technical data	10
Selection chart	11
Characteristic curves	12
Dimensions	21
Installation information	23
Scope of supply	23
Accessories	24

Heating

Variable Speed Heating Circulators

Calio Pro Plus Z



Main applications

- Heating, ventilation, air-conditioning, cooling and circulation systems
- One-pipe systems and two-pipe systems
- Underfloor heating systems
- Boiler circuits or primary circuits
- Storage tank circuits
- Solar power systems
- Heat pumps

Fluids handled

- Heating water to VDI 2035
- Higher-viscosity fluids (water/glycol mixture up to a mixing ratio of 1:1)

Operating data

Table 1: Operating properties

Characteristic		Value
Flow rate	Q [m ³ /h]	≤ 22
	Q [l/s]	≤ 6,11
Head	H [m]	≤ 15
Fluid temperature	T [°C]	≥ -10
		≤ +110
Ambient temperature	T [°C]	≥ 0
		≤ +40
Relative humidity	rF [%]	≤ 95
Operating pressure	p [bar]	≤ 16
Pressure class	PN [bar]	6/10/16
Average sound pressure level	[dB (A)]	< 40
Screw-ended connection	G	2
Flanged connection	DN	32 - 50

Design details

Design

- Maintenance-free high-efficiency wet rotor pump (glandless)

Drive

- High-efficiency permanent magnet synchronous motor, brushless, self-cooling, with continuously variable differential pressure control
- 1~230 V AC +/- 10%
- Frequency 50 Hz/60 Hz
- Enclosure IPX4D
- Thermal class F
- Temperature class TF 110
- Interference emissions EN 55014-1, EN 61000-3-2, EN 61000-3-3
- Interference immunity
- Energy efficiency index EEI ≤ 0.19¹⁾

Bearings

- Product-lubricated special plain bearing

Connections

- Screw-ended or flanged

Operating modes

- Constant-pressure control
- Proportional-pressure control
- Dynamic Control
- Constant speed (open-loop control)
- Constant-flow-rate control

¹ The reference value for the most efficient of circulators is EEI ≤ 0.20.

- Constant-temperature control
- Temperature-governed differential pressure control (can only be activated via the FlowManager app or)
- Differential-temperature control (can only be activated via the FlowManager app or)²⁾

Automatic functions

- Continuously variable speed adjustment depending on the mode of operation
- Dual-pump operation
- Peak load operation (can only be activated via the FlowManager app or)
- Setback operation
- Calorimeter ²⁾
- Deblocking function
- Self-venting function of the pump casing
- Functional check run
- Soft start
- Full motor protection with integrated trip electronics

Manual functions

- Remote ON/OFF
- Setting the operating mode
- Setting the discharge head setpoint
- Setting the flow rate setpoint
- Setting the temperature setpoint
- Setting the speed
- Rotor space venting function
- Vent plug
- Locking the control panel
- 0/2 - 10 V with external differential pressure/speed setpoint
- 0 - 10 V as input of the actual value of the temperature or actual value of the differential pressure

Signalling functions and display functions

- Periodically alternating display of flow rate, head and electrical input power
- Operating condition and error codes shown on the display, in the FlowManager app or in the
- Configurable general fault message and "in operation" message (volt-free changeover contacts)
- Serial digital Modbus RTU interface
- Bluetooth interface for the FlowManager app or
- Service interface for

Designation

Example: Pro Plus Z 25-40

Table 2: Designation key

Code	Description	
Pro Plus	Type series	
	_3)	Single pump
	Z	Twin pump
25	Connection	
	25	G 1 1/2
	30	G 2
	32	DN 32
	40	DN 40
	50	DN 50
40	Head H ⁴⁾ [m]	
	40	Head × 10 Example: 4 m × 10 = 40

Materials

Table 3: Overview of available materials

Part No.	Description	Material
102	Volute casing	Grey cast iron with cathodic electrocoating (EN-GJL-200)
210	Shaft	Stainless steel 1.4034
230	Impeller	Glass fibre reinforced plastic (PSU-GF30)

2 One external temperature sensor is required as a minimum.
3 Blank
4 At flow rate Q = 0 m³/h

Part No.	Description	Material
310	Bearing	Ceramics / carbon
689	Thermal insulation shells	Polypropylene
817	Can	Glass fibre reinforced plastic (PPS-GF40)

Casing parts which are in contact with the atmosphere and with the fluid handled are free from paint-wetting impairment materials.

Product benefits

- High-efficiency technology combined with speed control and efficient operation by means of **Dynamic Control** offer maximum savings.
- Future-proof through maximum energy efficiency, exceeding current energy efficiency regulations
- All-in concept saves investment costs and commissioning costs.
- Fast and easy to commission; pump information displayed in the FlowManager app or

- Easy-to-use combination of controls, integrated display and symbols to show the operating status
- Serial digital Modbus RTU interface
- High availability by dual-pump operation and integrated protective functions

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>.

Data access and use in accordance with Regulation (EU) 2023/2854 (EU Data Act)

Table 4: Device data recorded

Data type	Format	Volume	Continuous generation/real-time generation	Data storage (Articles 3, 2c)		Duration of retention
				Device	Remote server	
(Art. 3, 2a)	(Art. 3, 2a)	(Art. 3, 2a)	(Art. 3, 2b)	Device	Remote server	(Art. 3, 2c)
Motor winding temperatures (NTC)	FLOAT32	4 bytes	Yes	Yes	No	Instantaneous value
SPM temperature (power electronics)	FLOAT32	4 bytes	Yes	Yes	No	Instantaneous value
Current measurement (motor end)	FLOAT32	4 bytes	Yes	Yes	No	Instantaneous value
DC link voltage	FLOAT32	4 bytes	Yes	Yes	No	Instantaneous value
Analog input	FLOAT32	4 bytes	Yes	Yes	No	Instantaneous value
Digital input	BOOL	1 byte	Yes	Yes	No	Instantaneous value
Pt1000	FLOAT32	4 bytes	Yes	Yes	No	Instantaneous value
Operating hours pump	UINT32	4 bytes	Yes	Yes	-	Unlimited
Ambient temperature	FLOAT32	4 bytes	Yes	Yes	-	Instantaneous value
Mains voltage	FLOAT32	4 bytes	Yes	Yes	-	Instantaneous value

Data access (Art. 3, 2d)

Authorised users can access the collected data in the following ways:

- Data that is stored on the device
 - **Access:** The data stored on the device can be accessed using the KSB ServiceTool.
 - **Interface:** The data stored on the device can be read out via an optional field bus interface.
- When an optional field bus interface is used, data may be stored on a **remote server** provided by the customer.
 - **Access:** The customer is responsible for managing, securing and updating the access data.
 - **Technical details:** The customer is responsible for access rights, data storage and data deletion.
 - **Data format:** Exported data can be processed in commonly used tools (e.g. Excel, ERP systems).
- When an optional field bus interface is used, data may be stored on a **KSB remote server**.
 - No data is stored on a KSB remote server.

- During use, related services such as the KSB ServiceTool and the KSB FlowManager store data from the connected product on a remote server in accordance with the terms and conditions of use.

The requirements regarding the information obligation under the EU Data Act for related services such as the KSB ServiceTool and the KSB FlowManager are set out in a separate document. Only the data of the connected product itself is shown here.

Available software/apps

KSB ServiceTool



PACTware™

This software can be used to change the settings for the pump set and carry out a firmware update.

<https://www.ksb.com/en-gb/software-and-know-how/operational-tools/ksb-servicetool>



KSB FlowManager 2.0



This app can be used to change the settings for the pump set and carry out a firmware update.



Selection information

Minimum inlet pressure

The minimum inlet pressure p_{min} at the pump suction nozzle serves to avoid cavitation noises at the indicated fluid temperature T_{max} .

The indicated values are applicable up to 300 m above sea level. For installation at altitudes > 300 m, an allowance of 0.01 bar / 100 m must be added.

Table 5: Minimum inlet pressure p_{min} specified for the fluid temperature T_{max} .

Fluid temperature [°C]	Minimum inlet pressure [bar]
≤ 80	0,5
81 to 95	1,5
96 to 110	2,5

Permissible fluid temperature

Table 6: Temperature limits of the fluid handled

Permissible fluid temperature	Value
Maximum	+110 °C
Minimum	-10 °C

Permissible ambient temperature

Table 7: Permissible ambient temperatures

Permissible ambient temperature	Value
Maximum	+40 °C
Minimum	0 °C

Description of the Dynamic Control function

The dynamic control (2) system detects when the selected control curve (3) is higher than the minimum characteristic curve⁵⁾ (4). The control system shifts the control curve downward, and power input is reduced automatically. To ensure sufficient supply the pump set switches to a higher control curve when the minimum characteristic curve is reached. The energy input is reduced (1) without any negative impact on the supply of the building. The pump set is operated in an optimised way, even if the system characteristic curve is unknown; the noise at the thermostatic valves is reduced.

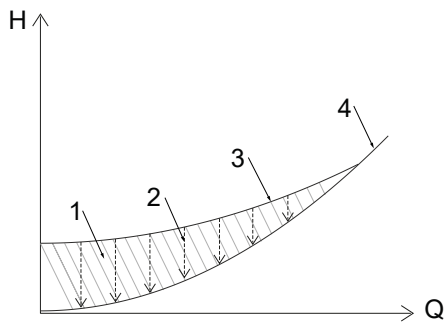


Fig. 1: Principle of Dynamic Control

1	Excess energy input	3	Control curve
2	Dynamic Control	4	Minimum characteristic curve

5 Characteristic curve at fully open thermostatic valves

Description of the characteristic curve

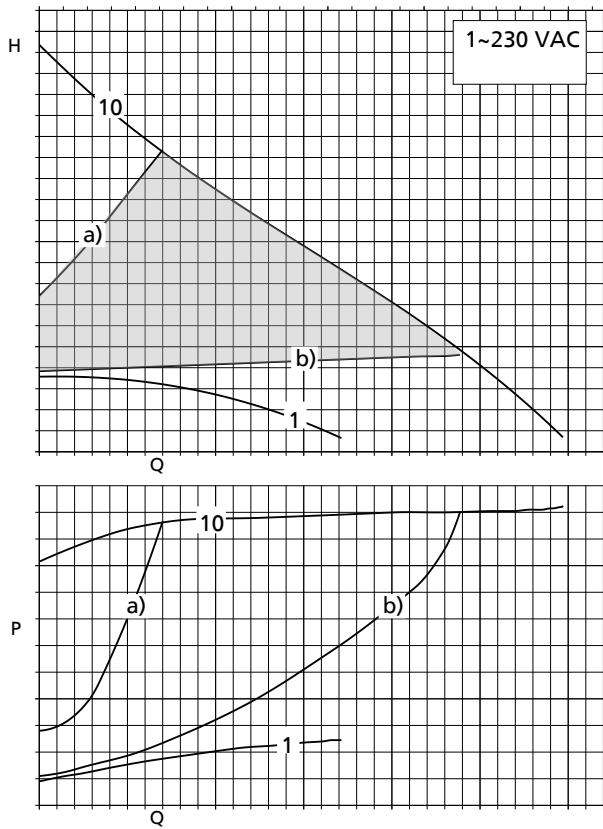


Fig. 2: Selection example

1	Minimum fixed speed operation
10	Maximum fixed speed operation
	Control range
a)	Control curve, maximum head
b)	Control curve, minimum head

i The characteristic curve can be adjusted between a) and b) in increments of 0.1 m. This adjustment can be made with the control buttons.

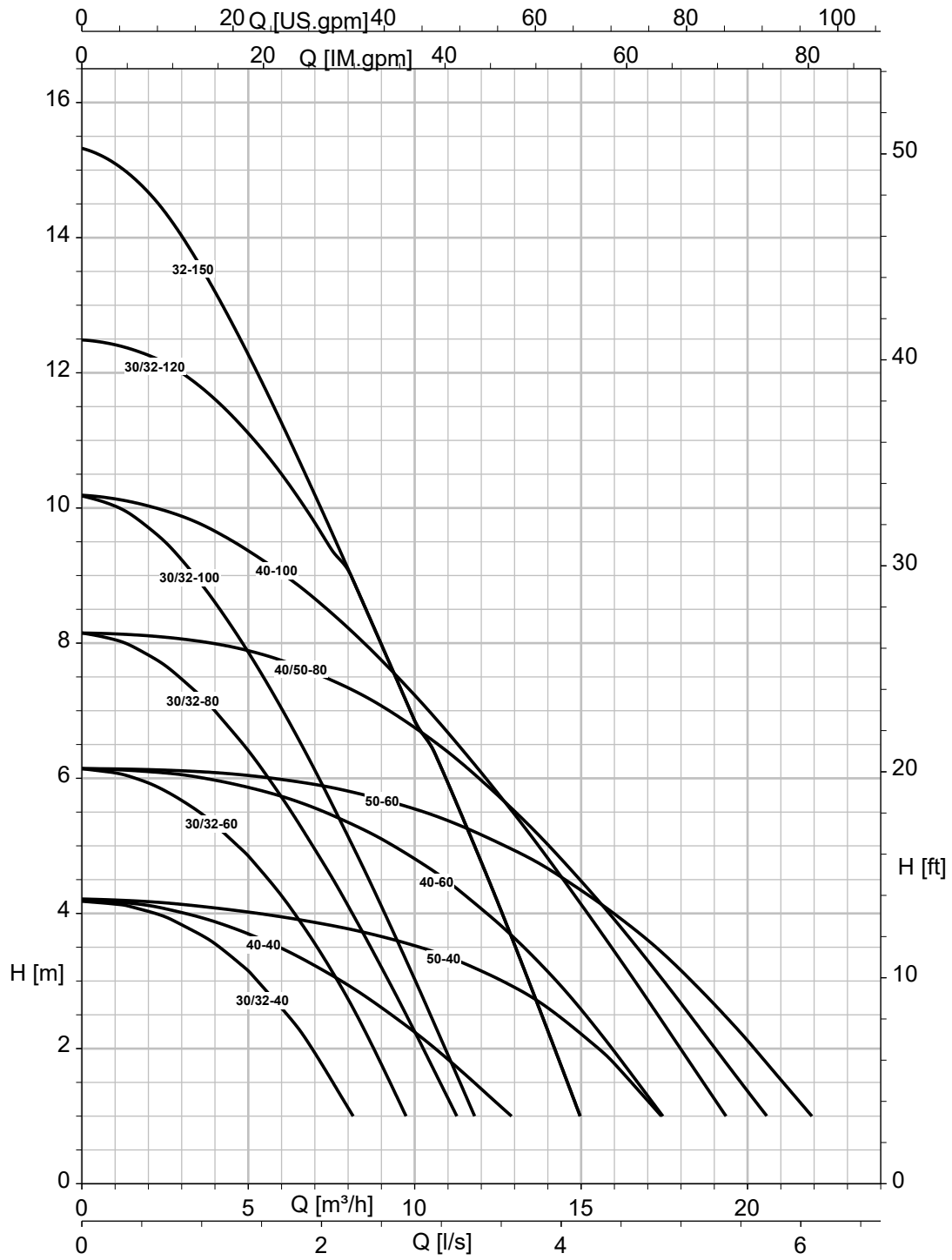
Technical data
Calio Pro Plus Z
Table 8: Technical data

Size	Connection		PN [bar]	n		P ₁ [W]	I _N 1~230 V AC, 50 Hz/60 Hz [A]	Mat. No.	[kg]
	Piping	Pump		Min.	Max.				
				[rpm]	[rpm]				
30-40	R 1 1/4 ⁶⁾	G 2	6/10/16	1000	3000	2,5 - 105	0,10 - 1,00	29135525	13.8
30-60	R 1 1/4 ⁶⁾	G 2	6/10/16	1000	3600	2,5 - 165	0,10 - 1,08	29135526	13.8
30-80	R 1 1/4 ⁶⁾	G 2	6/10/16	1000	4100	2,5 - 235	0,10 - 1,21	29135527	13.8
30-100	R 1 1/4 ⁶⁾	G 2	6/10/16	1000	4600	2,5 - 260	0,10 - 1,35	29135528	14.4
30-120	R 1 1/4 ⁶⁾	G 2	6/10/16	1000	4100	2,5 - 400	0,10 - 1,93	29135529	15.2
32-40	DN 32	DN 32	6/10/16	1000	3000	2,5 - 105	0,10 - 1,00	29135530	18.2
32-60	DN 32	DN 32	6/10/16	1000	3600	2,5 - 165	0,10 - 1,08	29135531	18.2
32-80	DN 32	DN 32	6/10/16	1000	4100	2,5 - 235	0,10 - 1,21	29135532	18.2
32-100	DN 32	DN 32	6/10/16	1000	4600	2,5 - 260	0,10 - 1,35	29135533	18.2
32-120	DN 32	DN 32	6/10/16	1000	4100	2,5 - 400	0,10 - 1,93	29135534	20
32-150	DN 32	DN 32	6/10/16	1000	4500	2,5 - 400	0,10 - 1,94	29135553	20
40-40	DN 40	DN 40	6/10/16	1000	2700	2,5 - 150	0,10 - 1,24	29135535	20.5
40-60	DN 40	DN 40	6/10/16	1000	3400	2,5 - 295	0,10 - 1,40	29135536	21.4
40-80	DN 40	DN 40	6/10/16	1000	3800	2,5 - 390	0,10 - 1,86	29135537	21.4
40-100	DN 40	DN 40	6/10/16	1000	4000	2,5 - 390	0,10 - 1,86	29135538	21.4
50-40	DN 50	DN 50	6/10/16	1000	3000	2,5 - 225	0,10 - 1,31	29135542	27.5
50-60	DN 50	DN 50	6/10/16	1000	3500	2,5 - 390	0,10 - 1,85	29135543	27.5
50-80	DN 50	DN 50	6/10/16	1000	3900	2,5 - 390	0,10 - 1,85	29135544	27.5

⁶ Connection using pump pipe unions (accessories)

Selection chart

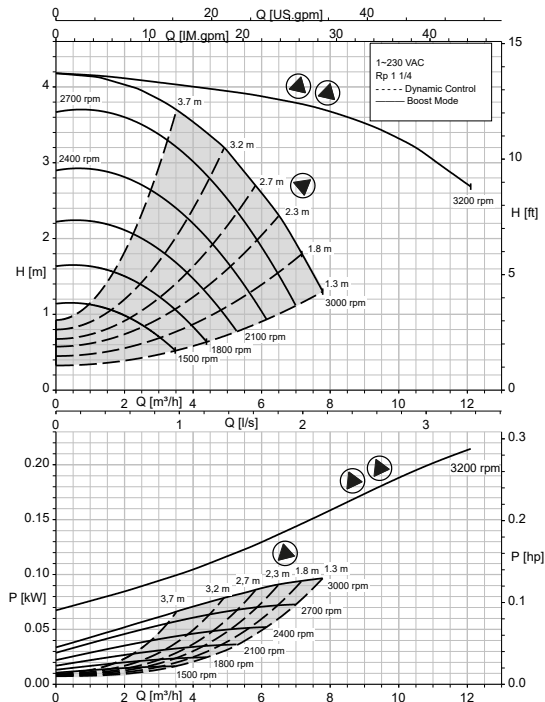
Calio Pro Plus Z



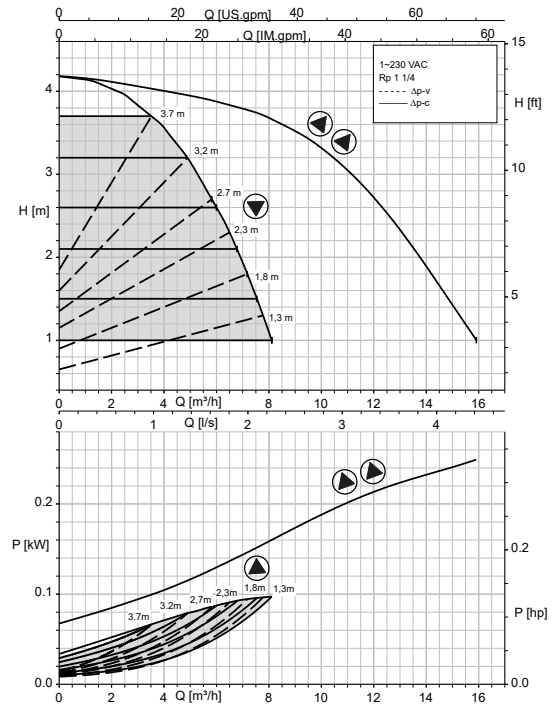
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Characteristic curves

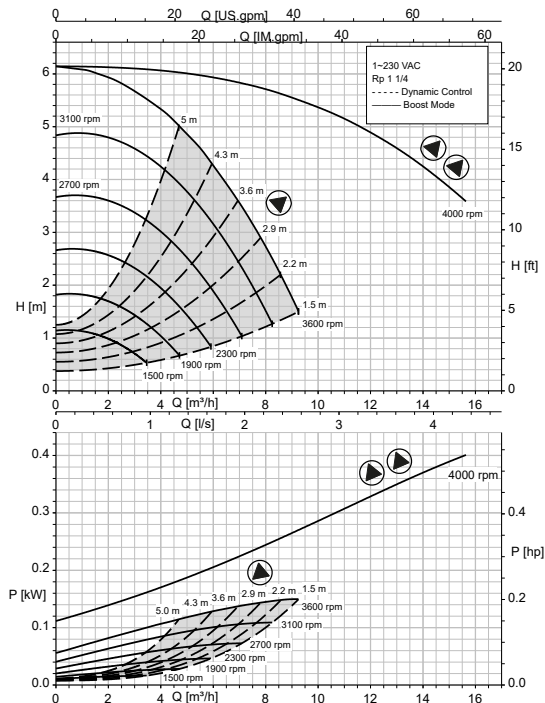
Calio Pro Plus Z 30-40 Open-loop Control, Dynamic Control



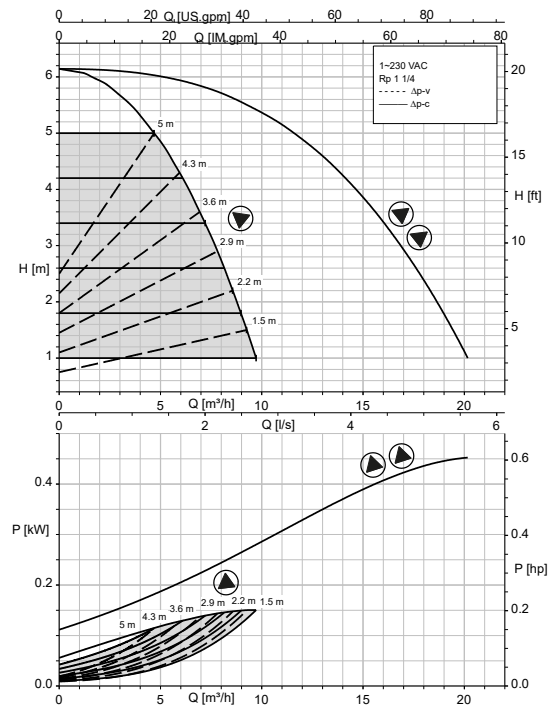
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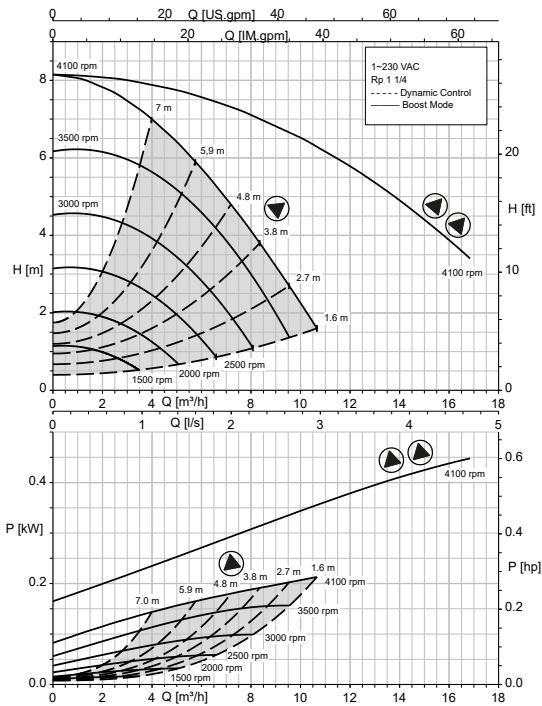
Calio Pro Plus Z 30-60 Open-loop Control, Dynamic Control



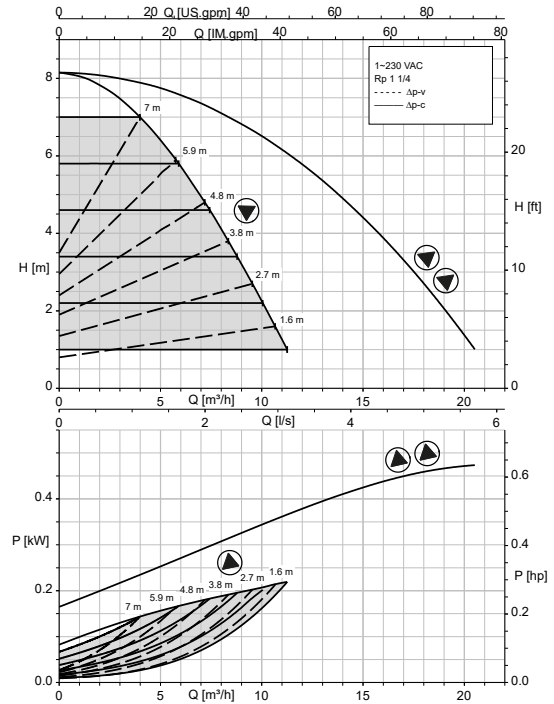
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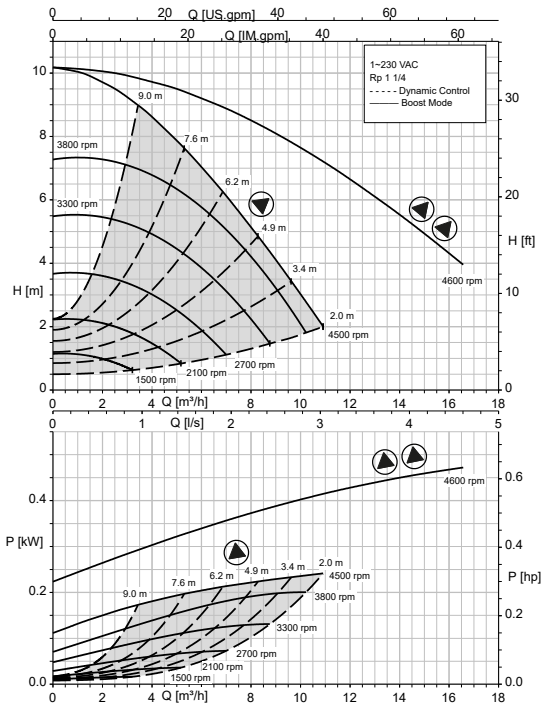
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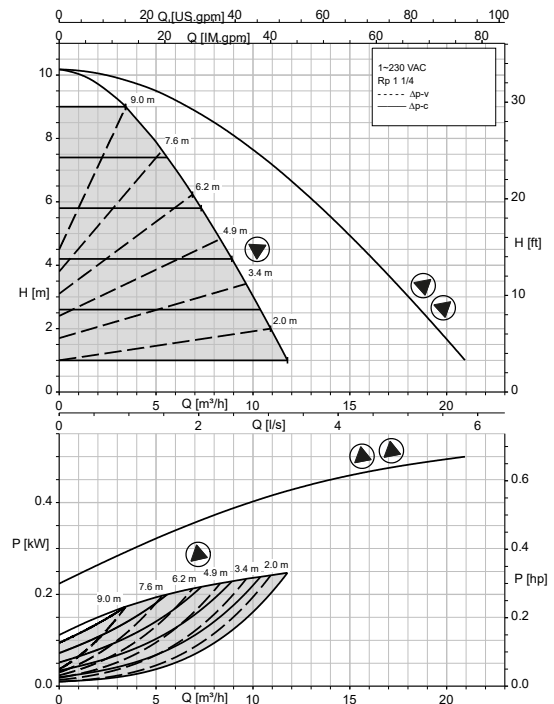
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Calio Pro Plus Z 30-100 Open-loop Control, Dynamic Control

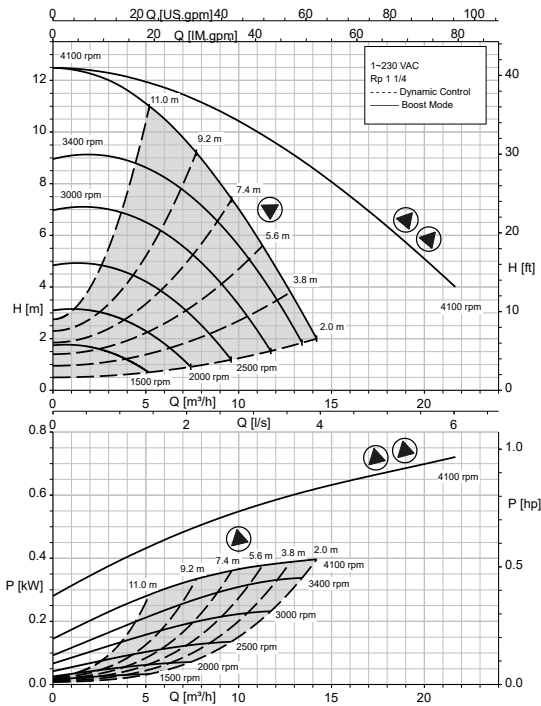


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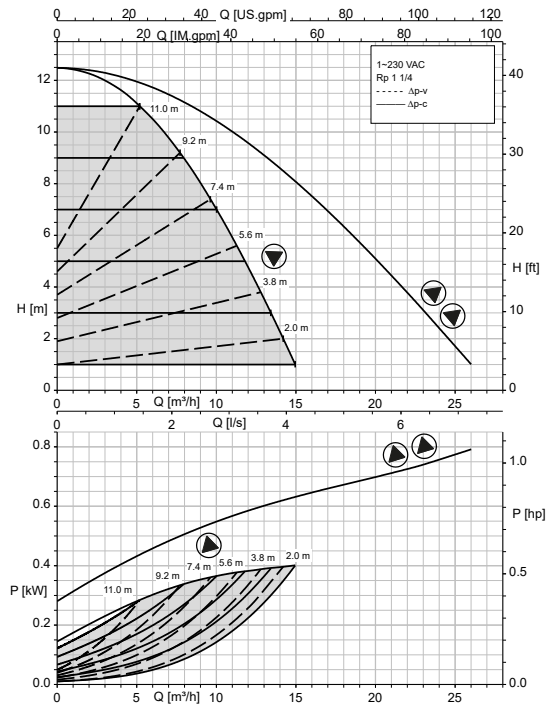


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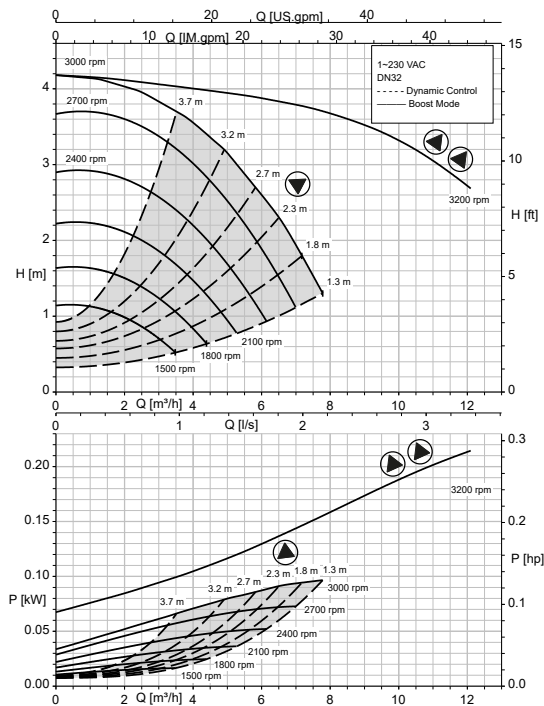
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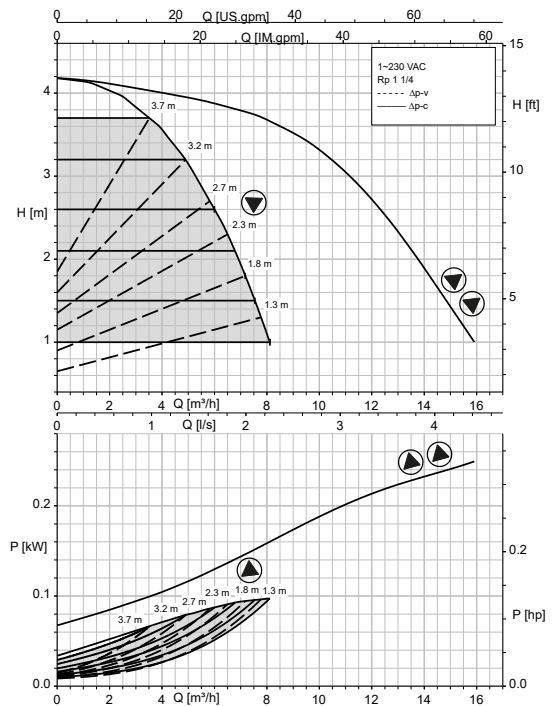
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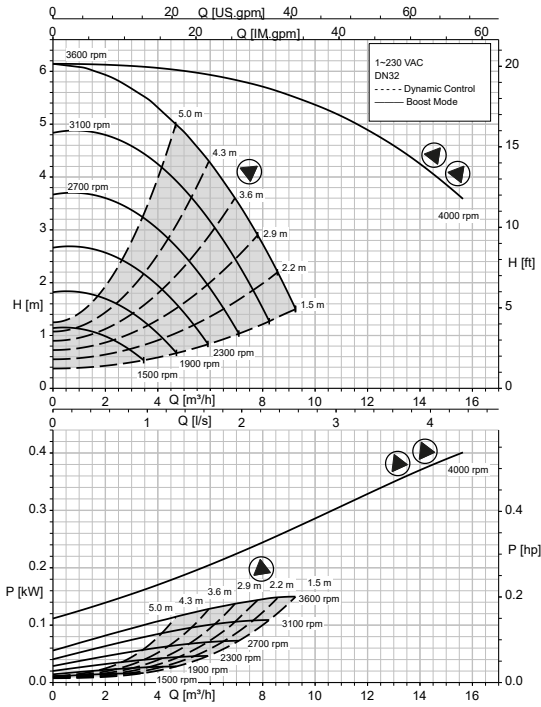
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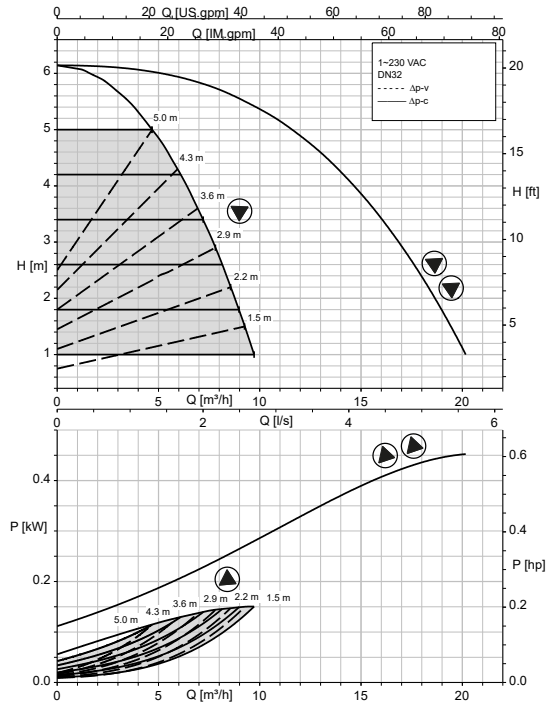
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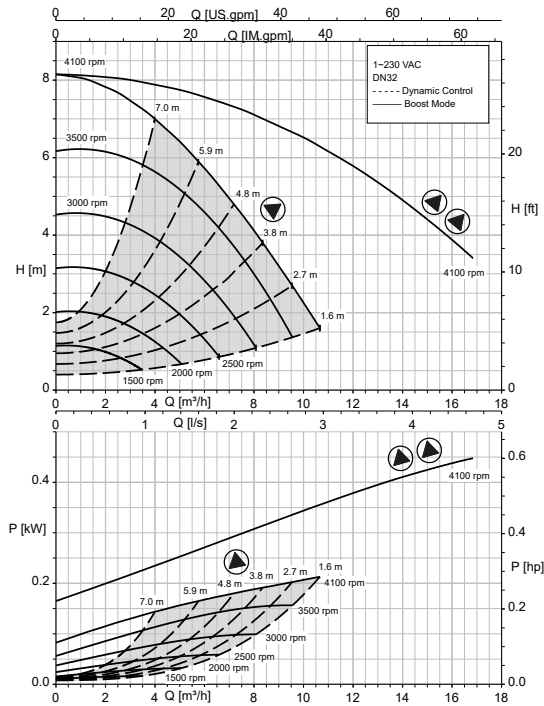
Calio Pro Plus Z 32-60 Open-loop Control, Dynamic Control



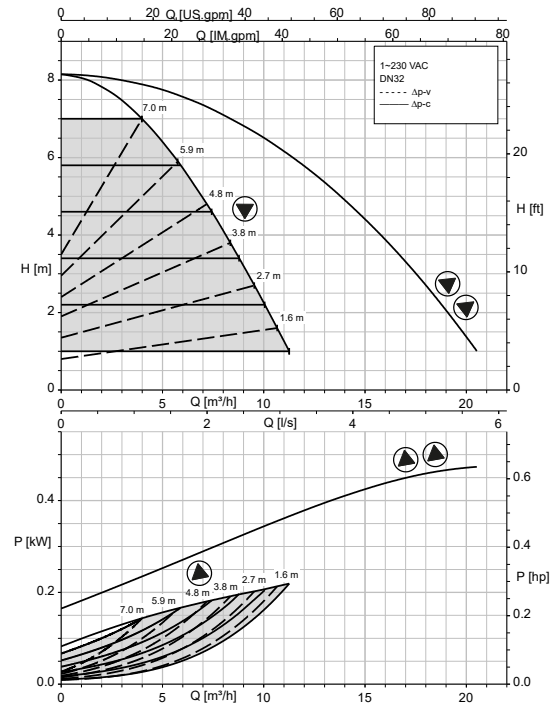
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Calio Pro Plus Z 32-80 Open-loop Control, Dynamic Control

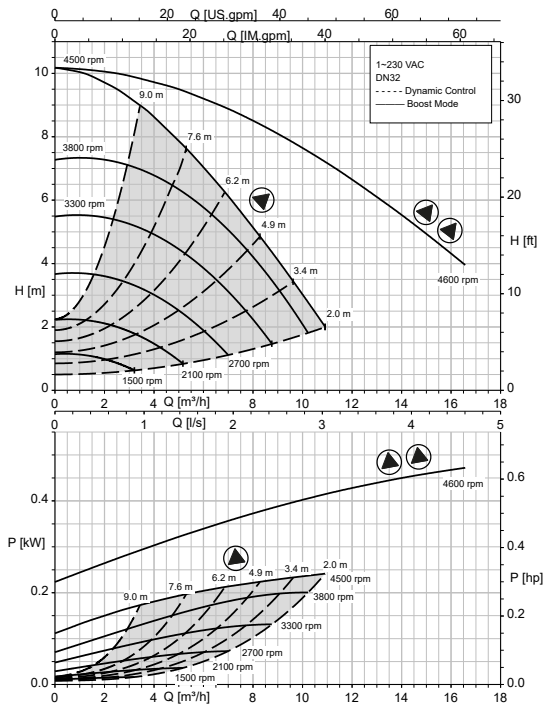


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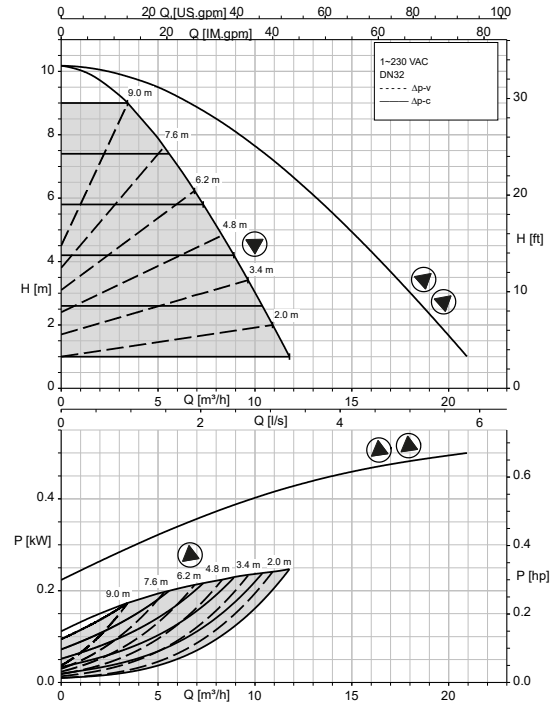


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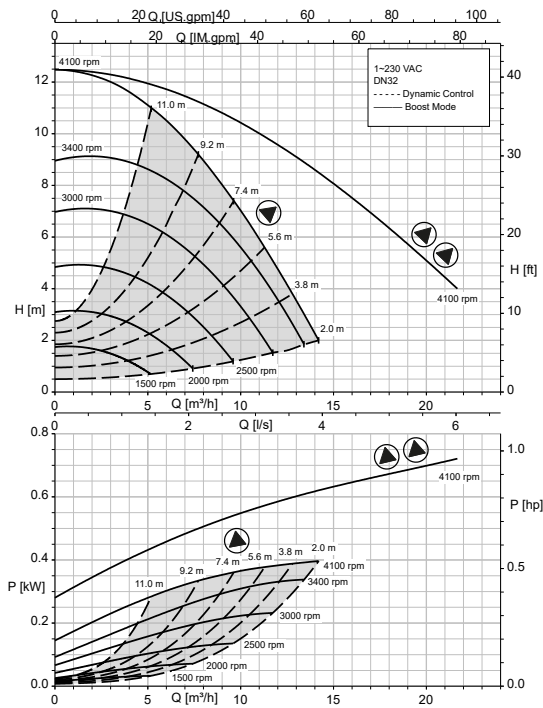
Calio Pro Plus Z 32-100 Open-loop Control, Dynamic Control



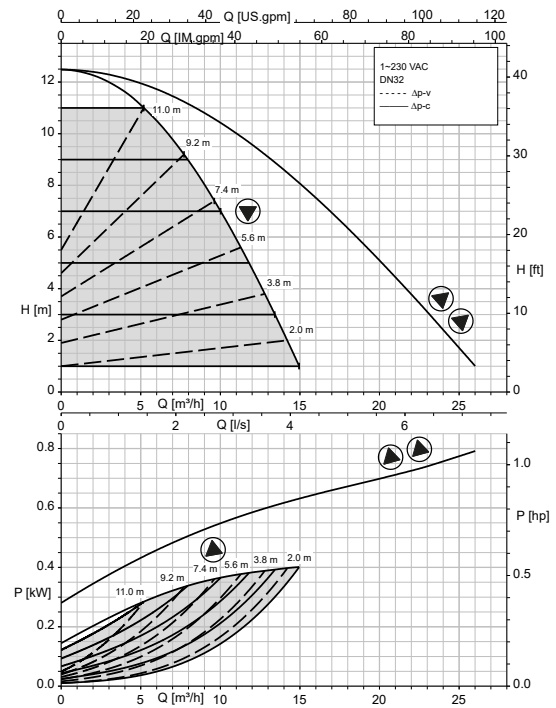
Calio Pro Plus Z 32-100 Δpv, Δpc



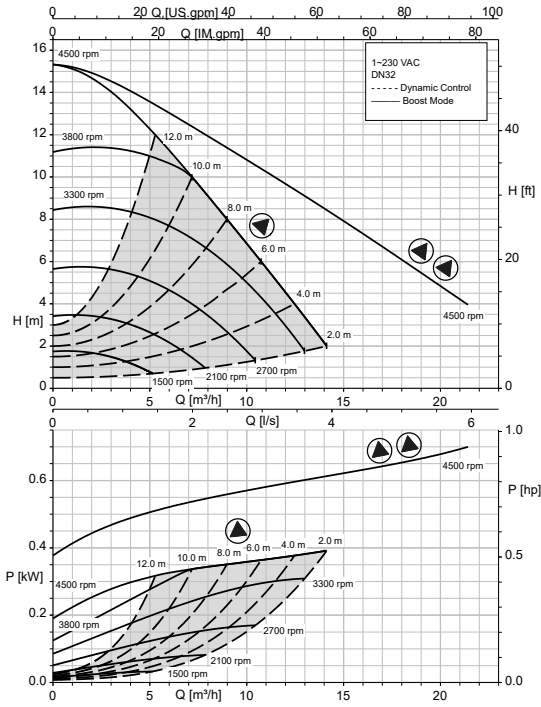
Calio Pro Plus Z 32-120 Open-loop Control, Dynamic Control



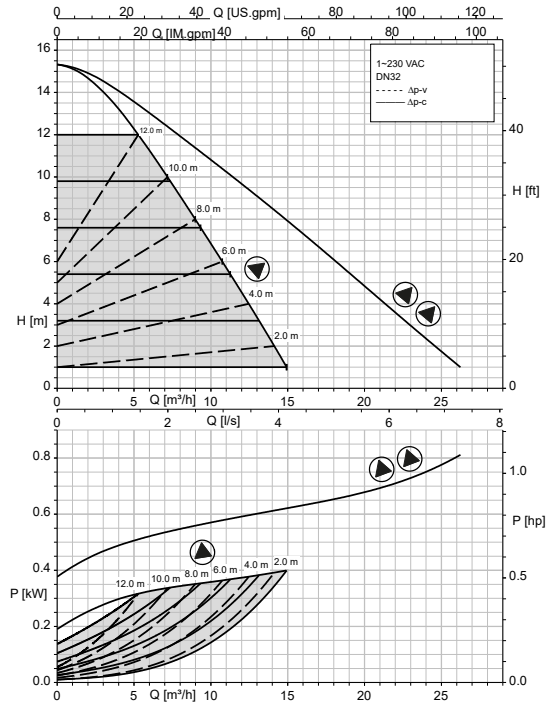
Calio Pro Plus Z 32-120 Δpv, Δpc



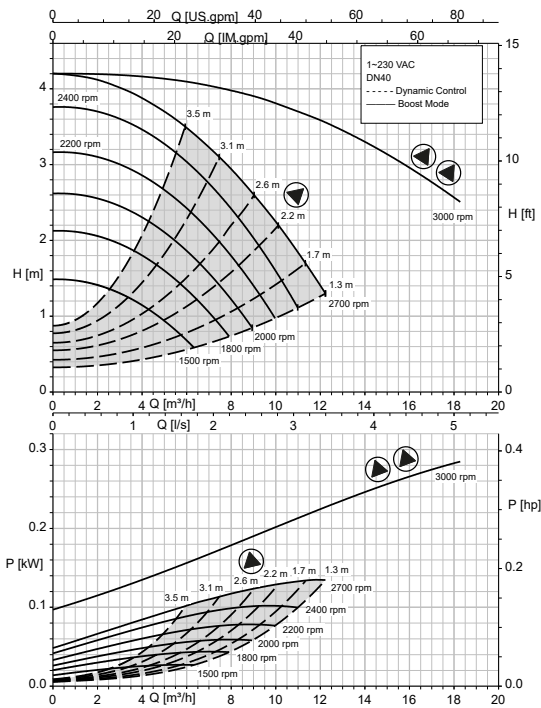
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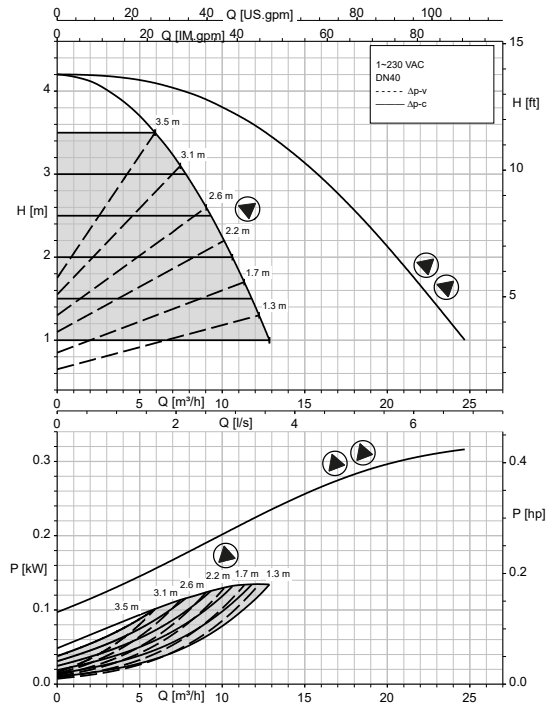
Calio Pro Plus Z 32-150 Δpv, Δpc



Calio Pro Plus Z 40-40 Open-loop Control, Dynamic Control

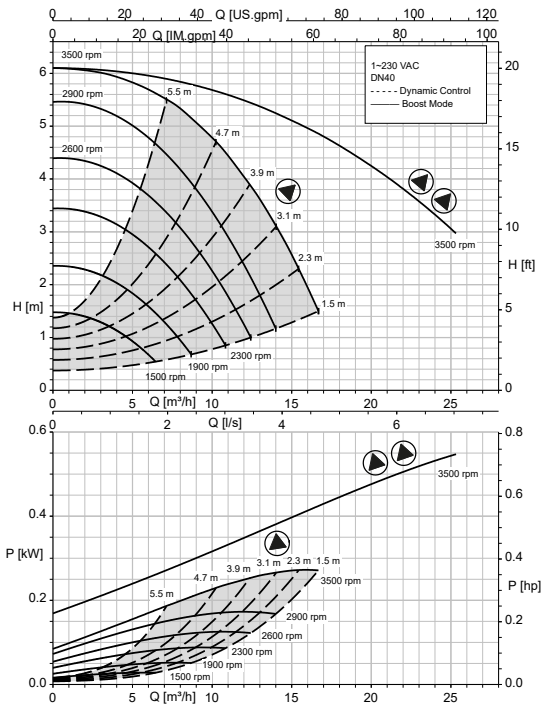


Calio Pro Plus Z 40-40 Δpv, Δpc

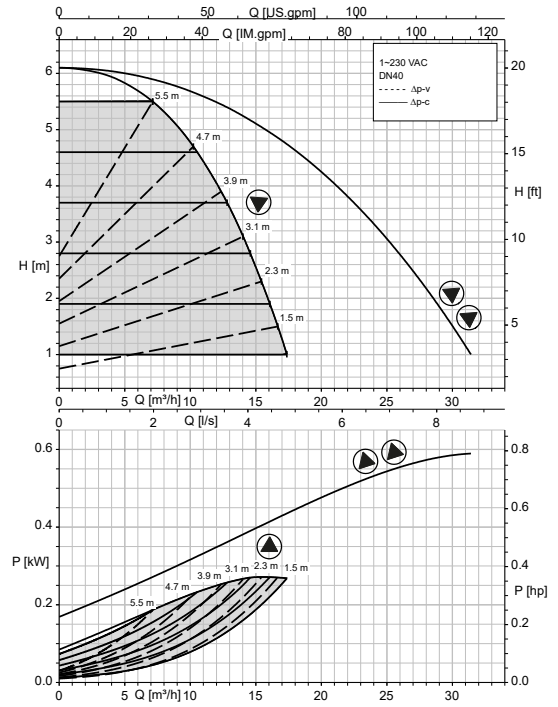


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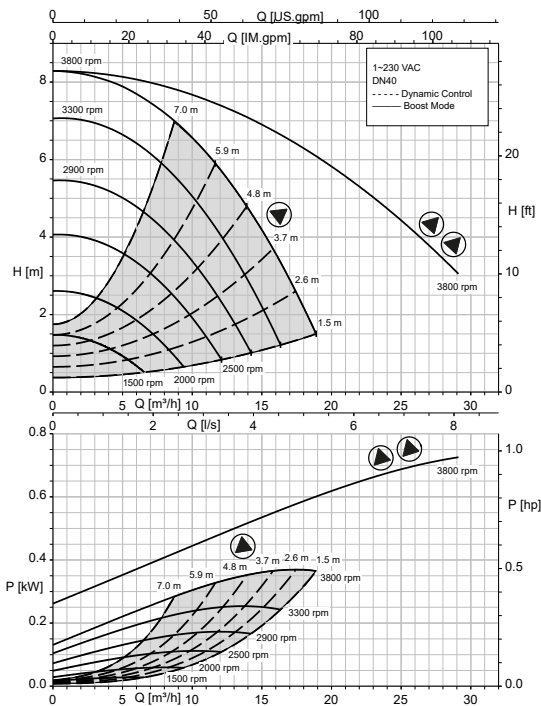
Calio Pro Plus Z 40-60 Open-loop Control, Dynamic Control



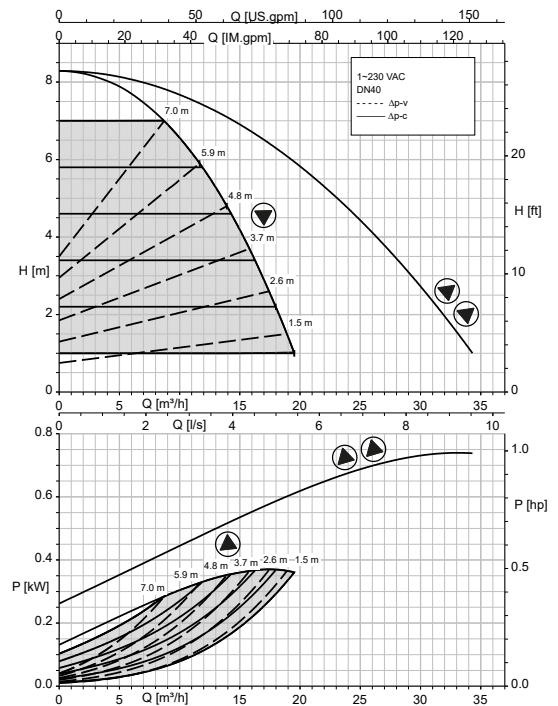
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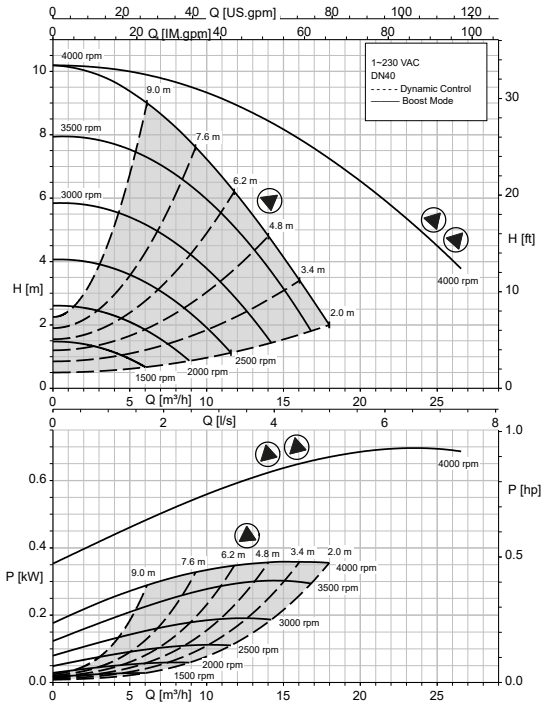
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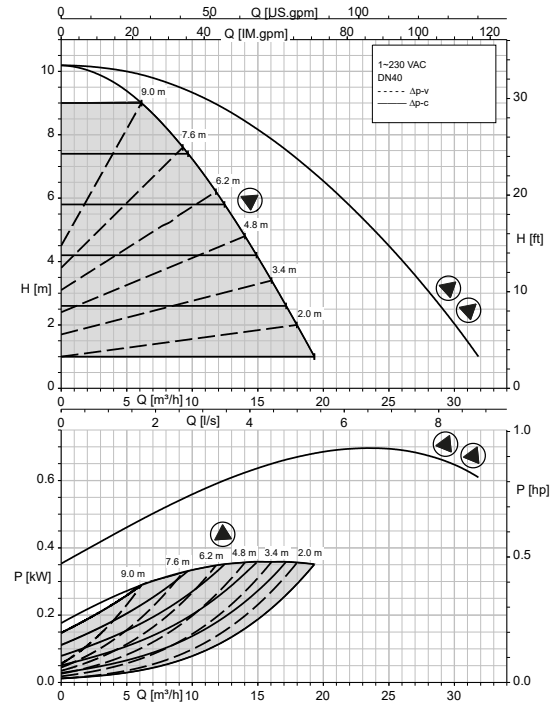
Calio Pro Plus Z 40-80 Δpv, Δpc



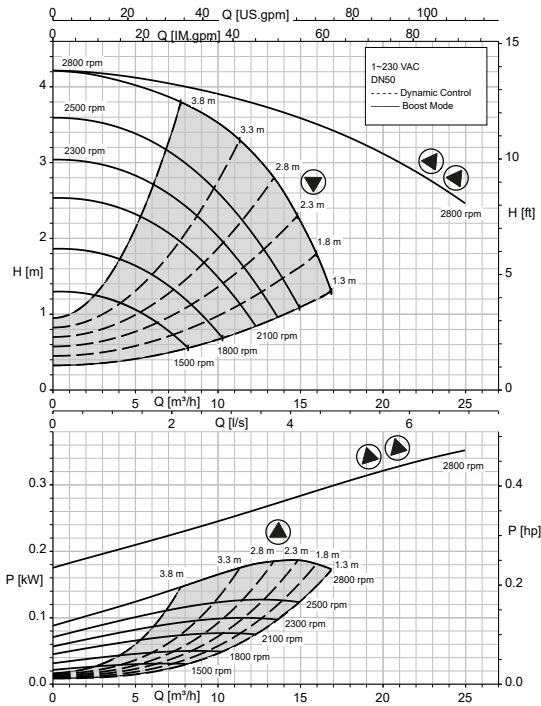
Calio Pro Plus Z 40-100 Open-loop Control, Dynamic Control



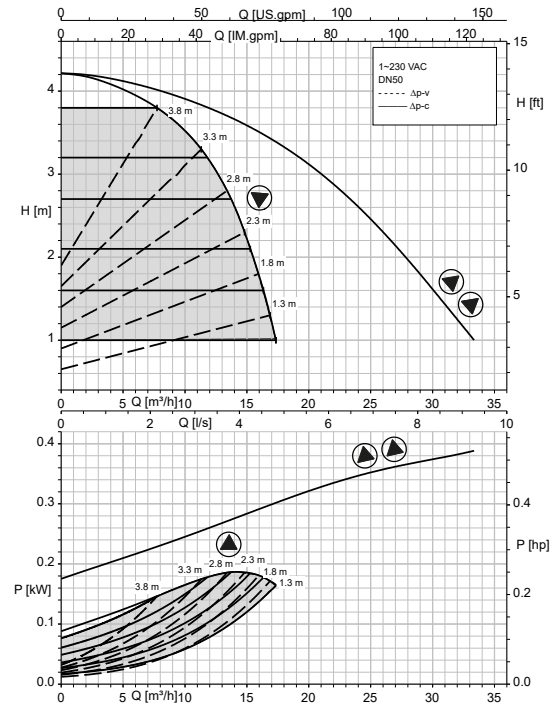
Calio Pro Plus Z 40-100 Δpv, Δpc



Calio Pro Plus Z 50-40 Open-loop Control, Dynamic Control

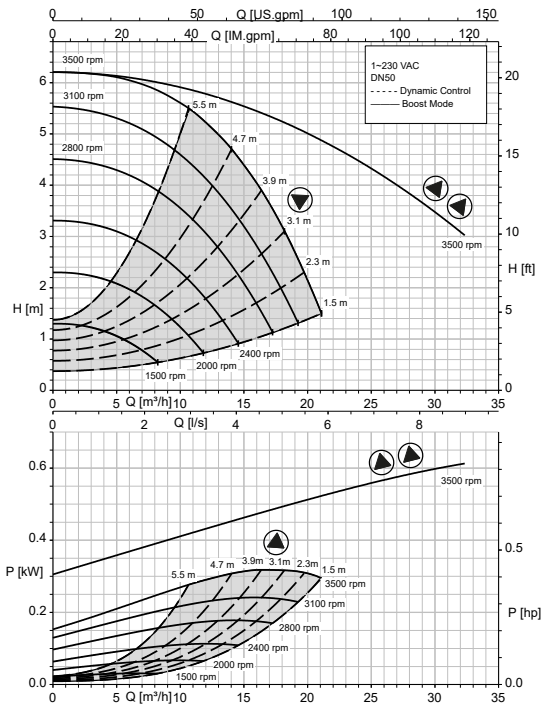


Calio Pro Plus Z 50-40 Δpv, Δpc

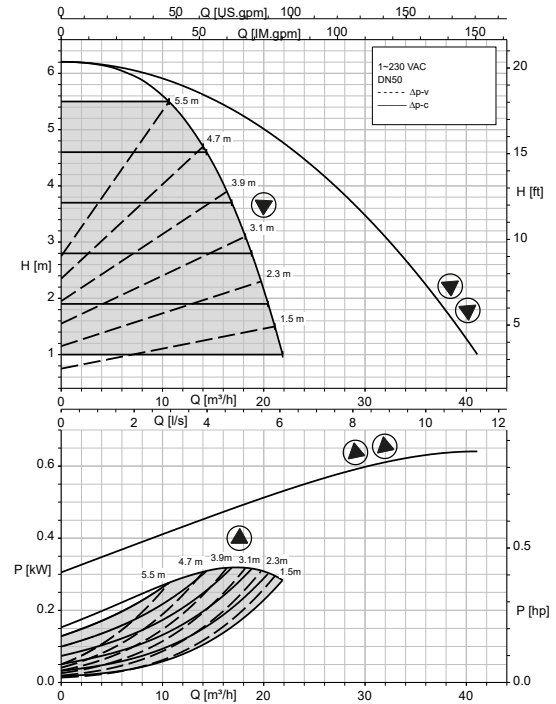


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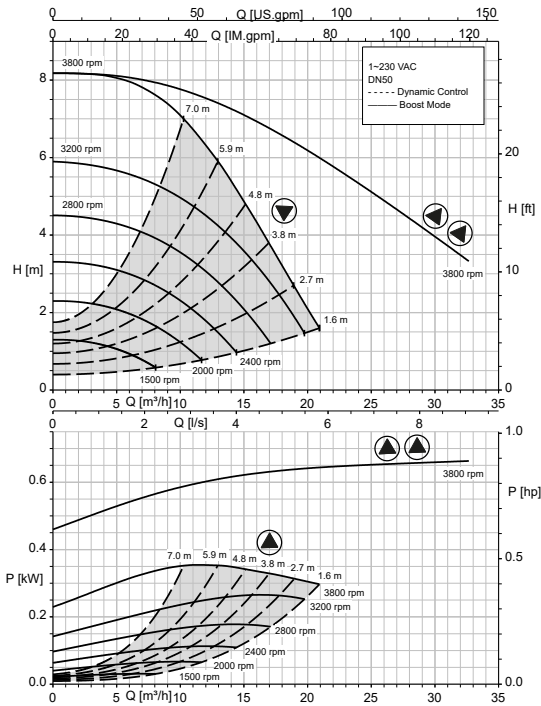
Calio Pro Plus Z 50-60 Open-loop Control, Dynamic Control



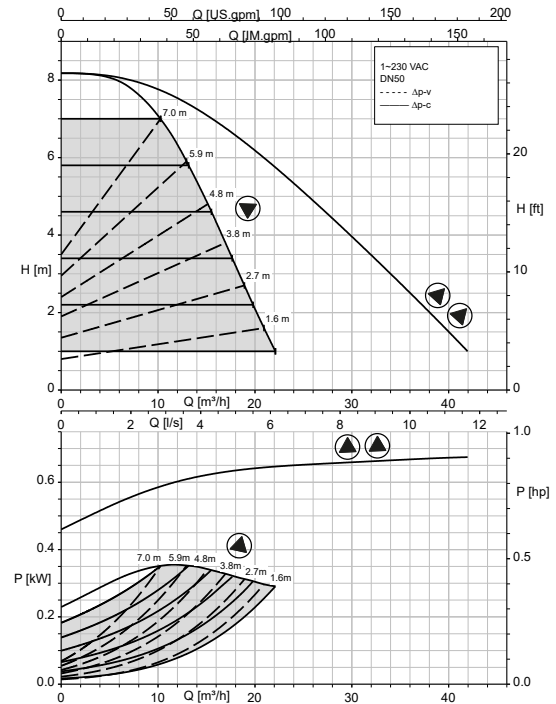
Calio Pro Plus Z 50-60 Δpv, Δpc



Calio Pro Plus Z 50-80 Open-loop Control, Dynamic Control



Calio Pro Plus Z 50-80 Δpv, Δpc



Dimensions

Pump set dimensions

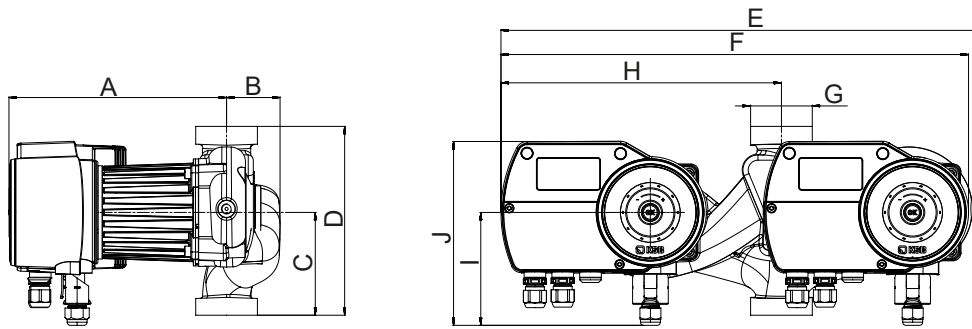


Fig. 3: Screw-ended pump set

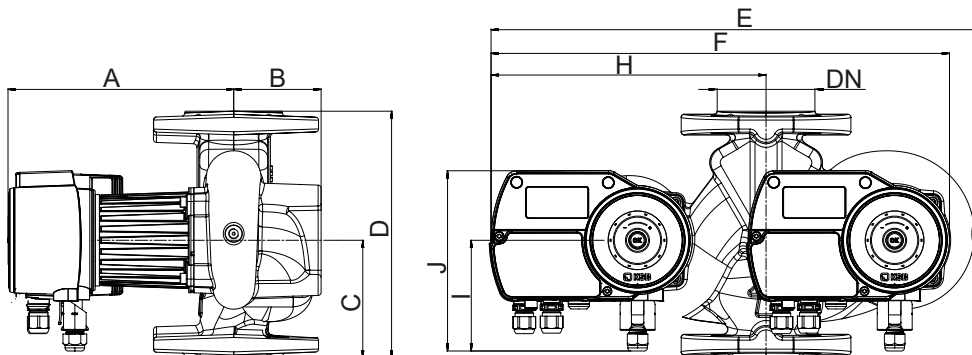


Fig. 4: Flanged pump set

Table 9: Pump set dimensions

Size	Connection		A [mm]	B [mm]	C [mm]	D [mm]	E ⁷⁾ [mm]	F [mm]	H [mm]	I [mm]	J [mm]
	Piping	Pump									
30-40	R 1 1/4 ⁸⁾	G 2	209	51	82	180	470	446	268	108	175
30-60	R 1 1/4 ⁸⁾	G 2	209	51	82	180	470	446	268	108	175
30-80	R 1 1/4 ⁸⁾	G 2	209	51	82	180	470	446	268	108	175
30-100	R 1 1/4 ⁸⁾	G 2	209	51	82	180	470	446	268	108	175
30-120	R 1 1/4 ⁸⁾	G 2	209	51	82	180	470	446	268	108	175
32-40	DN 32	DN 32	209	70	110	220	470	446	268	108	175
32-60	DN 32	DN 32	209	70	110	220	470	446	268	108	175
32-80	DN 32	DN 32	209	70	110	220	470	446	268	108	175
32-100	DN 32	DN 32	209	70	110	220	470	446	268	108	175
32-120	DN 32	DN 32	209	70	110	220	470	446	268	108	175
32-150	DN 32	DN 32	209	70	110	220	470	446	268	108	175
40-40	DN 40	DN 40	216	75	121	220	470	446	268	108	175
40-60	DN 40	DN 40	216	75	121	220	470	446	268	108	175
40-80	DN 40	DN 40	216	75	121	220	470	446	268	108	175
40-100	DN 40	DN 40	216	75	121	220	470	446	268	108	175
50-40	DN 50	DN 50	221	85	126	240	490	446	268	108	175
50-60	DN 50	DN 50	221	85	126	240	490	446	268	108	175
50-80	DN 50	DN 50	221	85	126	240	490	446	268	108	175

1157.532/02-EN

⁷ If the pump is in a horizontal installation position and the vent plug (if applicable) is fitted, dimension E increases by 30 mm.

⁸ Connection using pump pipe unions (accessories)

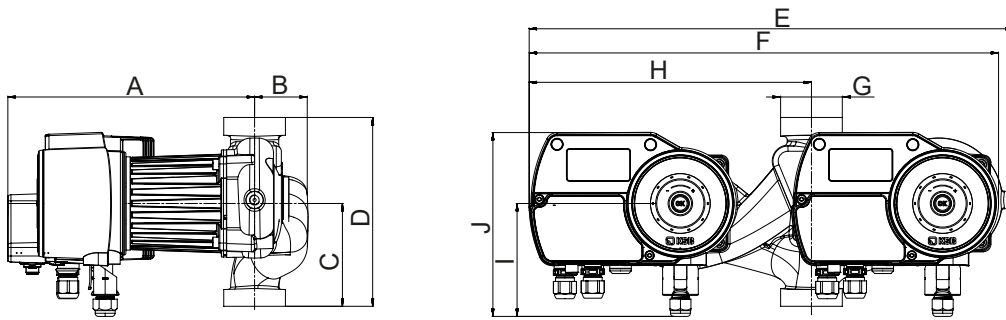


Fig. 5: Screw-ended pump set with field bus module (accessory)

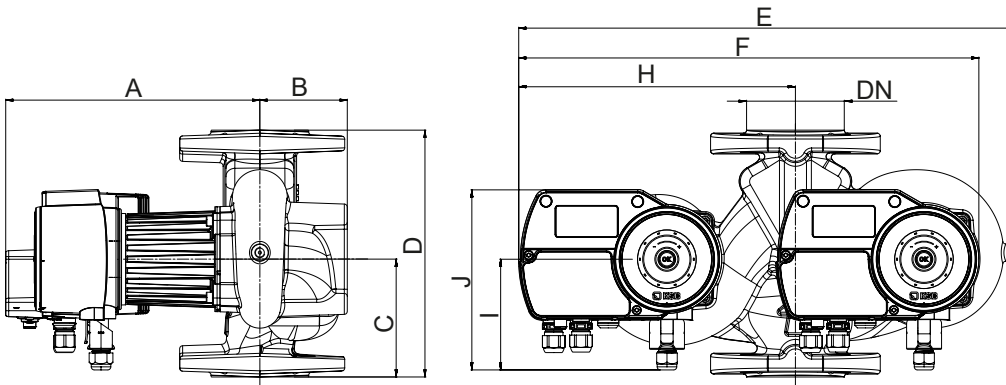


Fig. 6: Flanged pump set with field bus module (accessory)

Table 10: Dimensions of the pump set with field bus module (accessory)

Size	Connection		A [mm]	B [mm]	C [mm]	D [mm]	E ⁷⁾ [mm]	F [mm]	H [mm]	I [mm]	J [mm]
	Piping	Pump									
30-40	R 1 1/4 ⁸⁾	G 2	236	51	82	180	472	448	270	108	175
30-60	R 1 1/4 ⁸⁾	G 2	236	51	82	180	472	448	270	108	175
30-80	R 1 1/4 ⁸⁾	G 2	236	51	82	180	472	448	270	108	175
30-100	R 1 1/4 ⁸⁾	G 2	236	51	82	180	472	448	270	108	175
30-120	R 1 1/4 ⁸⁾	G 2	236	51	82	180	472	448	270	108	175
32-40	DN 32	DN 32	236	70	110	220	472	448	270	108	175
32-60	DN 32	DN 32	236	70	110	220	472	448	270	108	175
32-80	DN 32	DN 32	236	70	110	220	472	448	270	108	175
32-100	DN 32	DN 32	236	70	110	220	472	448	270	108	175
32-120	DN 32	DN 32	236	70	110	220	472	448	270	108	175
32-150	DN 32	DN 32	236	70	110	220	472	448	270	108	175
40-40	DN 40	DN 40	243	75	121	220	472	448	270	108	175
40-60	DN 40	DN 40	243	75	121	220	472	448	270	108	175
40-80	DN 40	DN 40	243	75	121	220	472	448	270	108	175
40-100	DN 40	DN 40	243	75	121	220	472	448	270	108	175
50-40	DN 50	DN 50	248	85	126	240	492	448	270	108	175
50-60	DN 50	DN 50	248	85	126	240	492	448	270	108	175
50-80	DN 50	DN 50	248	85	126	240	492	448	270	108	175

Flange dimensions

Table 11: Flange dimensions

Size	PN 6			PN 10, PN 16			Outline drawing
	$\varnothing D$	$\varnothing k$	$n \times \varnothing d_2$	$\varnothing D$	$\varnothing k$	$n \times \varnothing d_2$	
	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	
DN 32	120	90	$4 \times \varnothing 14$	140	100	$4 \times \varnothing 19$	
DN 40	130	100	$4 \times \varnothing 14$	150	110	$4 \times \varnothing 19$	
DN 50	140	110	$4 \times \varnothing 14$	165	125	$4 \times \varnothing 19$	

Installation information

Permissible installation positions

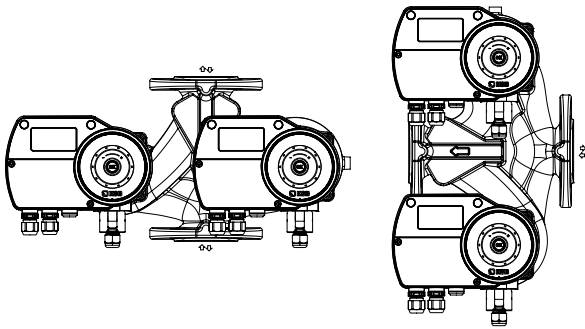


Fig. 7: Permissible installation positions

Scope of supply


Depending on the model, the following items are included in the scope of supply:

- Pump set
- Sealing elements
- Plug-type connector to power supply
- Washers
- Installation/operating manual
- Pre-configured dual connection cable
- Vent plug

Accessories


Pipe unions

Table 12: Pipe unions

	Description	Mat. No.	[kg]
	2 pipe unions with G 2 union nut and insert with Rp 1 1/4 internal thread, steel for pumps with G 2 external thread / Rp 1 1/4 pipe connection	19075562	0.2

Spacers (flange)

Table 13: Spacers (flange)

	Description	Connection	PN	Length	Mat. No.	[kg]
				[mm]		
	Spacer F16	DN 40	6/10/16	30	19075991	2
	Spacer F0	DN 40	6/10/16	70	19075566	2
	Spacer F1	DN 50	6/10/16	10	19075567	2
	Spacer F2	DN 50	6/10/16	20	19075568	2
	Spacer F3	DN 50	6/10/16	50	19075569	2
	Spacer F4	DN 50	6/10/16	60	19075570	2



KSB SE & Co. KGaA
Johann-Klein-Straße 9 • 67227 Frankenthal (Germany)
Tel. +49 6233 86-0
www.ksb.com

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1157.532/02-EN