

High-efficiency Circulator Pump

# Calio Pro Z

## Type Series Booklet



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Type Series Booklet Calio Pro Z

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## Building Services: Heating

### Variable Speed Circulator Pumps

# Calio Pro 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 <sup>3</sup> /h]	≤ 22
	Q [l/s]	≤ 6,11
Head	H [m]	≤ 12
Fluid temperature	T [°C]	≥ -10
		≤ +110
Ambient temperature	T [°C]	≥ 0
		≤ +40 <sup>1)</sup>
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

<sup>1</sup> Ambient temperature ≤ + 30 °C at a fluid temperature > 90 °C

<sup>2</sup> Calio Pro Z 30-100: EEI = 0.21

#### 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
- Energy efficiency index EEI ≤ 0.20<sup>2)</sup>
- Interference emissions EN 55014-1, EN 61000-3-2, EN 61000-3-3
- Interference immunity EN 55014-2

##### Bearings

- Product-lubricated special plain bearing

##### Connections

- Screw-ended or flanged

##### Operating modes

- Constant-pressure control
- Proportional-pressure control
- Dynamic Control
- Open-loop control with 3 speed levels

##### Automatic functions

- Continuously variable speed adjustment depending on the mode of operation
- Dual-pump operation
- Deblocking function
- Self-venting function of the pump casing
- Soft start
- Full motor protection with integrated trip electronics

##### Manual functions

- Setting the operating mode
- Setting the discharge head setpoint
- Setting the speed level
- Rotor space venting function
- Locking the control panel

### Signalling functions and display functions

- Display of the set head
- Display of the speed level
- Display of the pump set status (running / not running)
- Error codes indicated on the display
- General fault message (volt-free changeover contact)

### Designation

#### Example: Calio Pro Z 30-60

Table 2: Designation key

Code	Description	
Calio Pro	Type series	
	_3)	Single pump
	Z	Twin pump
25	Connection	
	30	G 2
	32	DN 32
	40	DN 40
	50	DN 50
	65	DN 65
40	Head H <sup>4)</sup> [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)
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 by maximum energy efficiency, exceeding current energy efficiency regulations such as ErP 2015.
- All-in concept saves investment costs and commissioning costs.
- Easy-to-use combination of controls, integrated display and symbols to show the operating status
- High availability by dual-pump operation and integrated protective functions

### Certifications

Table 4: Overview

Label	Effective in:	Comment
	Europe	EEl ≤ 0,20 <sup>5)</sup>

### 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>.

<sup>3</sup> Blank  
<sup>4</sup> At flow rate Q = 0 m<sup>3</sup>/h  
<sup>5</sup> Size 30-100: EEl = 0.21

**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**

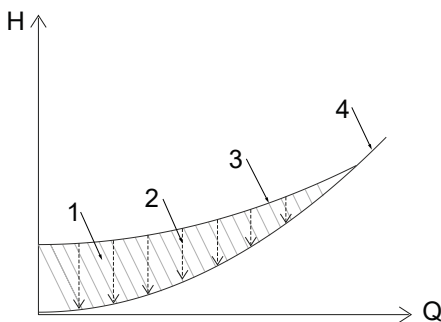
**Table 7:** Permissible ambient temperatures specified for the fluid temperature

Fluid temperature [°C]	Permissible ambient temperature [°C]
≤ +90	+40
≤ +110	+30

**Description of the Dynamic Control function**

The dynamic control (2) system detects when the selected control curve (3) is higher than the minimum characteristic curve<sup>6)</sup> (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

<sup>6</sup> Characteristic curve at fully open thermostatic valves

Description of the characteristic curve

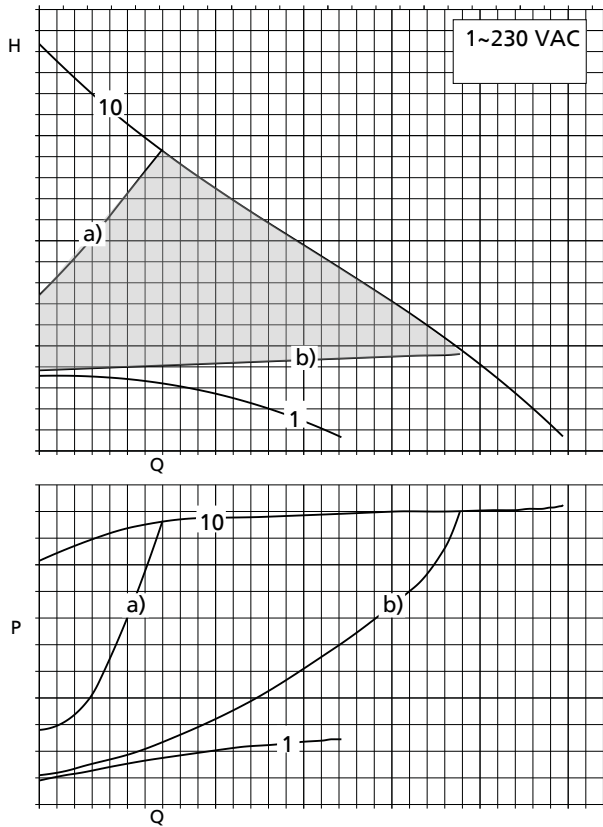


Fig. 2: Selection example

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

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

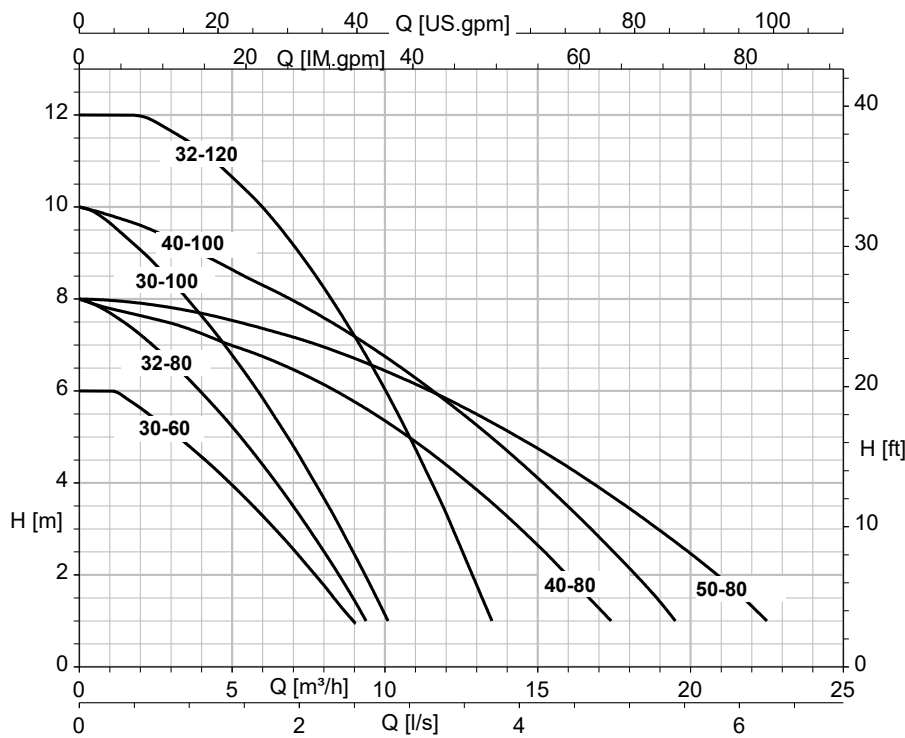
Calio Pro Z

Table 8: Technical data

Size	Connection		PN [bar]	n		P <sub>1</sub> [W]	I <sub>N</sub> 1-230 V AC, 50 Hz/60 Hz [A]	Mat. No.	[kg]
	Piping	Pump		Min.	Max.				
				[rpm]	[rpm]				
30-60	R 1 1/4 <sup>7)</sup>	G 2	6/10/16	1000	3700	7 - 140	0,15 - 1,05	29135132	13,61
30-100	R 1 1/4 <sup>7)</sup>	G 2	6/10/16	1000	4600	7 - 190	0,15 - 1,05	29135133	14,2
32-80	DN 32	DN 32	6/10/16	1000	4200	7 - 160	0,15 - 1,05	29135134	17,96
32-120	DN 32	DN 32	6/10/16	1000	4000	8 - 360	0,15 - 1,60	29135135	19,84
40-80	DN 40	DN 40	6/10/16	1000	3500	8 - 305	0,15 - 1,40	29135136	21,2
40-100	DN 40	DN 40	6/10/16	1000	4000	8 - 420	0,15 - 2,00	29135137	21,2
50-80	DN 50	DN 50	6/10/16	1000	3800	8 - 415	0,15 - 1,95	29135138	27,34

Selection chart

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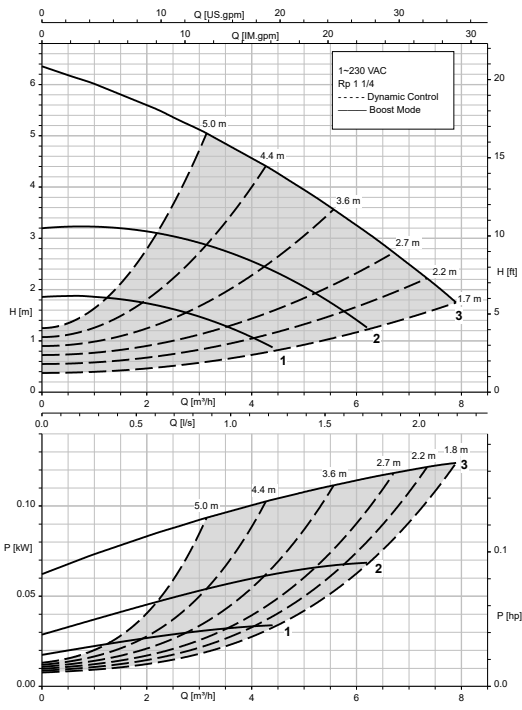


<sup>7</sup> Connection using pump pipe unions (accessories)

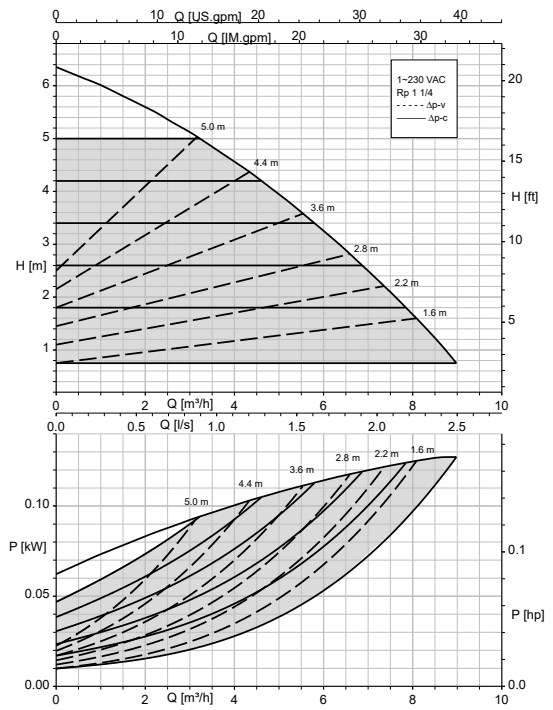


Characteristic curves

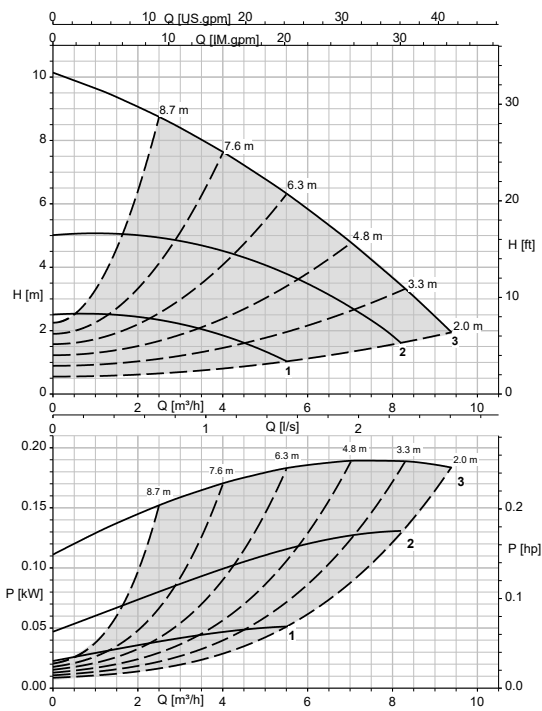
Calio Pro Z 30-60 Open-loop Control, Dynamic Control



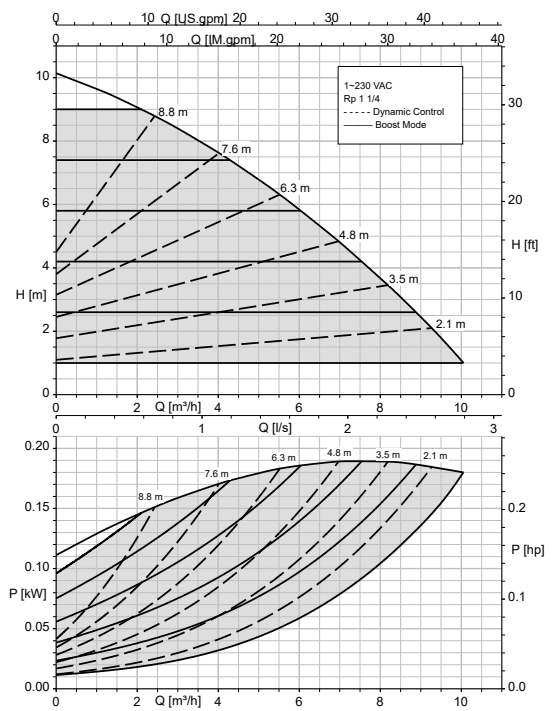
Calio Pro Z 30-60  $\Delta p_v$ ,  $\Delta p_c$



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

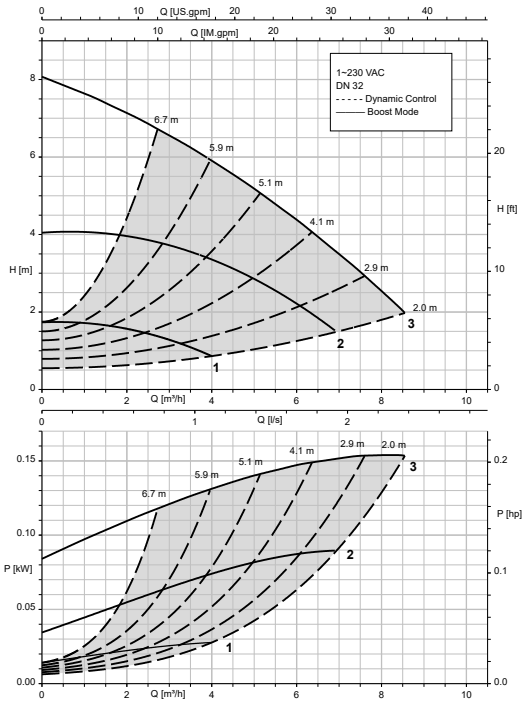


Calio Pro Z 30-100  $\Delta p_v$ ,  $\Delta p_c$

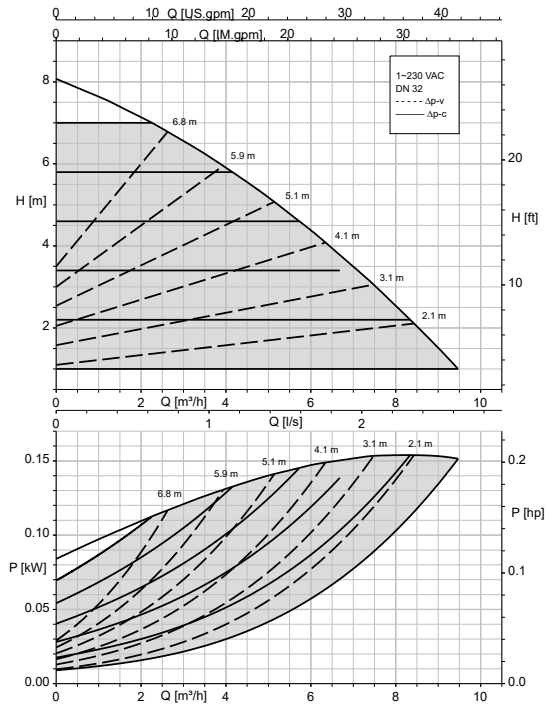


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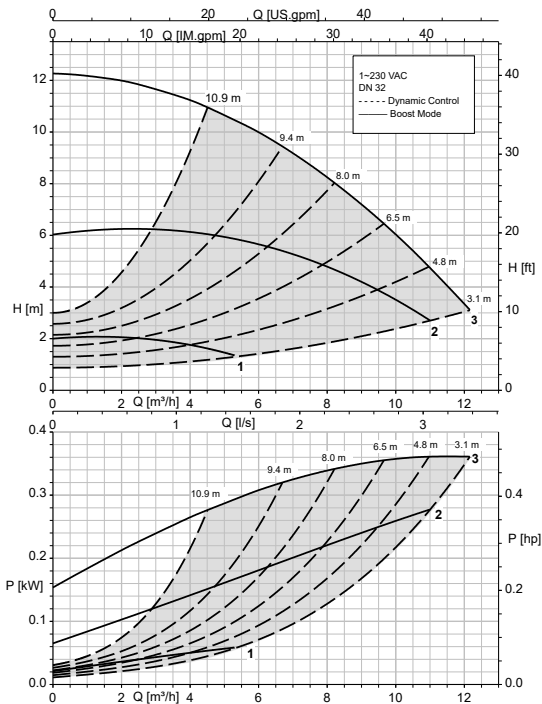
Calio Pro Z 32-80 Open-loop Control, Dynamic Control



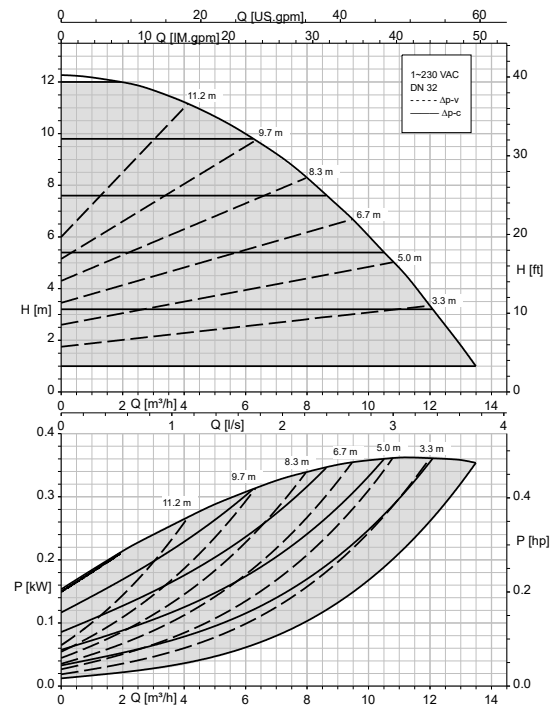
Calio Pro Z 32-80  $\Delta p_v$ ,  $\Delta p_c$



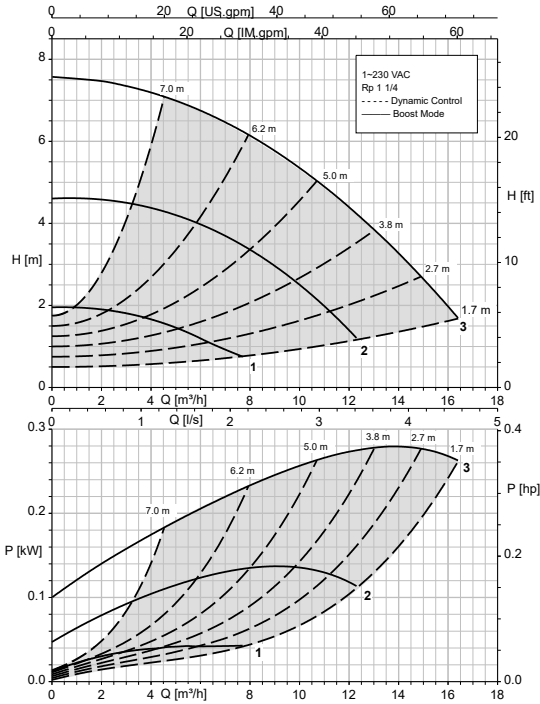
Calio Pro Z 32-120 Open-loop Control, Dynamic Control



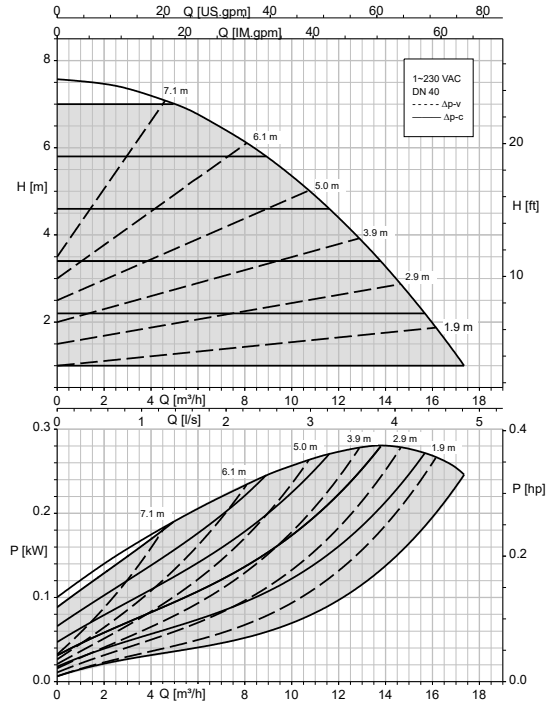
Calio Pro Z 32-120  $\Delta p_v$ ,  $\Delta p_c$



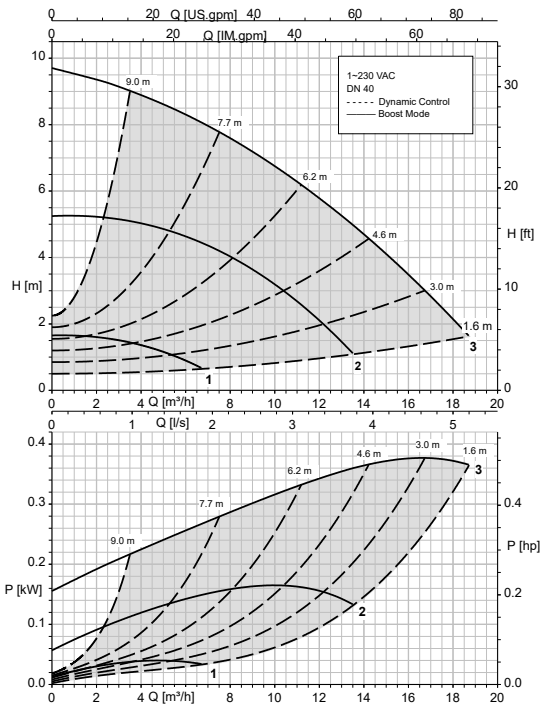
Calio Pro Z 40-80 Open-loop Control, Dynamic Control



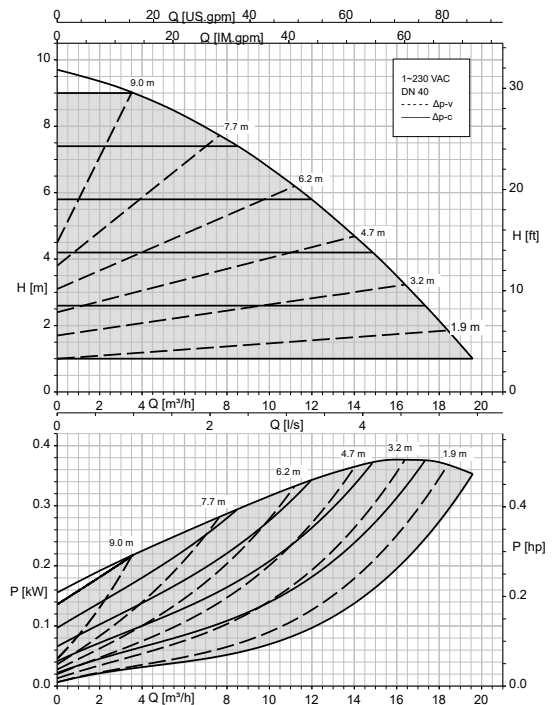
Calio Pro Z 40-80  $\Delta p_v$ ,  $\Delta p_c$



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

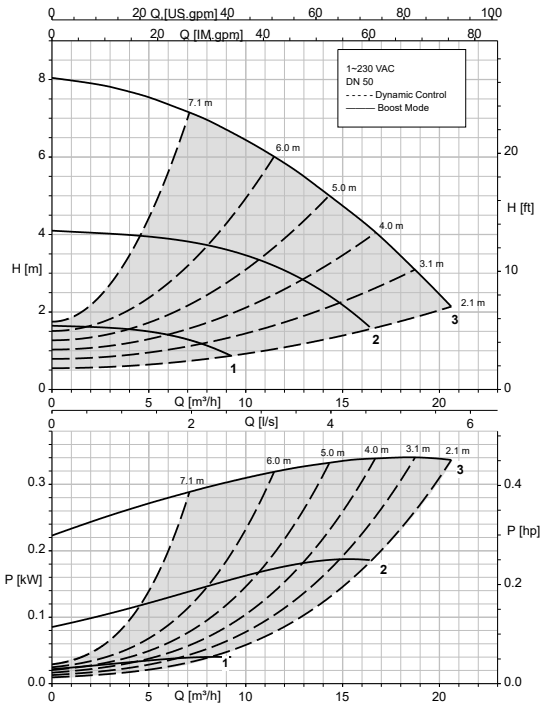


Calio Pro Z 40-100  $\Delta p_v$ ,  $\Delta p_c$

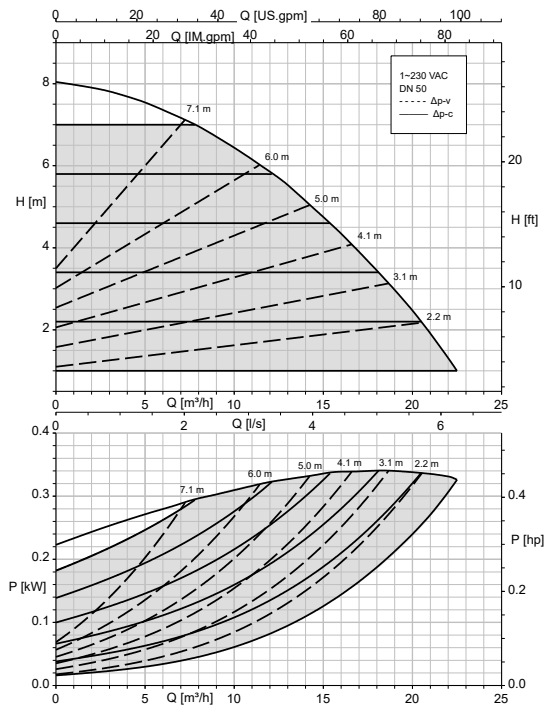


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Calio Pro Z 50-80 Open-loop control, Dynamic Control



Calio Pro Z 50-80  $\Delta p_v$ ,  $\Delta p_c$



Dimensions

Pump set dimensions

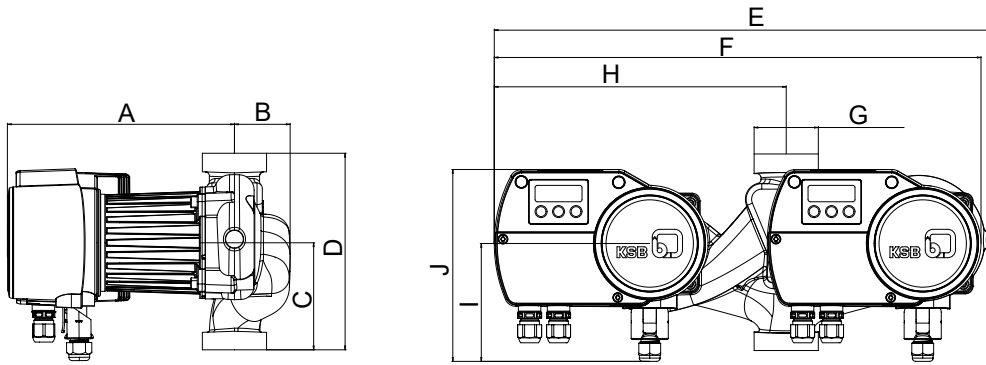


Fig. 3: Screw-ended pump set

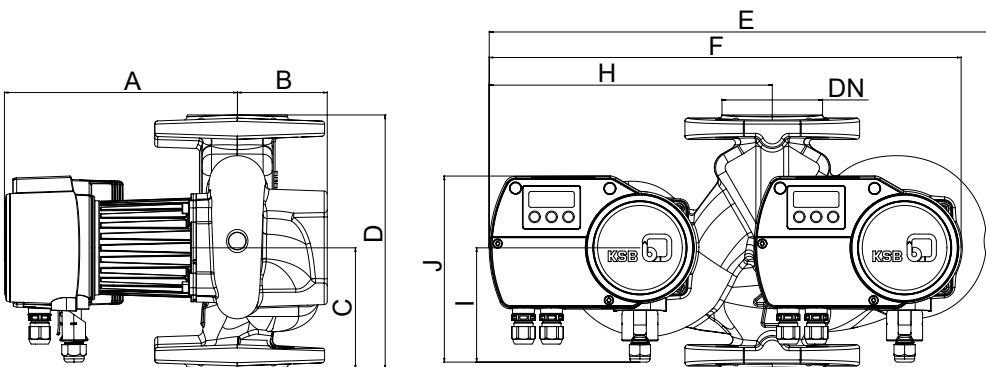


Fig. 4: Flanged pump set

Table 9: Pump set dimensions

Size	Connection		A [mm]	B [mm]	C [mm]	D [mm]	E [mm]	F [mm]	H [mm]	I [mm]	J [mm]
	Piping	Pump									
30-60	R 1 1/4 <sup>8)</sup>	G 2	209	51	82	180	460	446	268	108	175
30-100	R 1 1/4 <sup>8)</sup>	G 2	209	51	82	180	460	446	268	108	175
32-80	DN 32	DN 32	209	70	110	220	460	446	268	108	175
32-120	DN 32	DN 32	209	70	110	220	460	446	268	108	175
40-80	DN 40	DN 40	216	75	121	220	460	446	268	108	175
40-100	DN 40	DN 40	216	75	121	220	460	446	268	108	175
50-80	DN 50	DN 50	221	85	126	240	460	446	268	108	175

<sup>8)</sup> Connection using pump pipe unions (accessories)

## Flange dimensions

Table 10: 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 × $\varnothing 14$	140	100	4 × $\varnothing 19$	
DN 40	130	100	4 × $\varnothing 14$	150	110	4 × $\varnothing 19$	
DN 50	140	110	4 × $\varnothing 14$	165	125	4 × $\varnothing 19$	

## Installation information

### Permissible installation positions

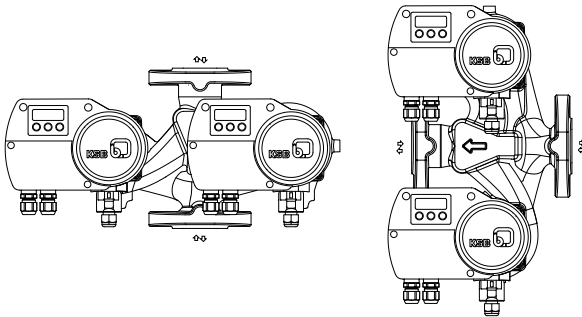


Fig. 5: Permissible installation positions

### 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
- Pre-configured dual connection cable
- Installation/operating manual

Accessories


Pipe unions

Table 11: 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 12: Spacers (flange)

	Description	Connection	PN	Length [mm]	Mat. No.	[kg]
	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









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