

High-efficiency Circulator Pump

# Calio S / Calio S BMS

## Type Series Booklet



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Type Series Booklet Calio S / Calio S BMS

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## Building Services: Heating

### Variable Speed Circulator Pumps

# Calio S / Calio S BMS



#### Main applications

- Heating systems
- Ventilation systems
- Air-conditioning systems
- 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. If the glycol content equals or exceeds 20 %, check and verify the operating data.
- Pure, thin, non-aggressive, non-explosive and non-gaseous fluids not containing any mineral oil, solids or long fibres
- Fluids with a viscosity of max. 10 mm<sup>2</sup>/s

#### Operating data

##### Operating properties

Characteristic		Value	
		Calio S	Calio S BMS
Flow rate	Q [m <sup>3</sup> /h]	≤ 3,5	≤ 7
	Q [l/s]	≤ 1,0	≤ 1,9
Head	H [m]	≤ 8	≤ 6
Fluid temperature <sup>1)</sup>	T [°C]	≥ +2	≥ -10
		≤ +95	≤ +110
Ambient temperature	T [°C]	≥ 0	
		≤ +40	
Operating pressure	p [bar]	≤ 10	
Average sound pressure level	[dB (A)]	≤ 30	≤ 45
Piping connection	Rp	1/2 - 1 1/4	1 - 1 1/4

#### 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
- Thermal class F
- Energy efficiency index EEI ≤ 0.20

##### Calio S:

- IP42 enclosure
- Temperature class TF 95
- Interference emissions EN 55014-1
- Interference immunity EN 55014-2
- Interference immunity EN 60335-2-51

##### Calio S BMS:

- Enclosure IPX4D
- Temperature class TF 110
- Interference emissions EN 61000-6-3
- Interference immunity EN 61000-6-1

#### Bearings

##### Calio S:

- Ceramic bearings

##### Calio S BMS:

- Product-lubricated special plain bearing

#### Connections

- Screw-ended

#### Operating modes

##### Calio S:

<sup>1</sup> To prevent condensation in the terminal box and stator, the fluid temperature must always be equal to or higher than the ambient temperature.

- Automatic mode with constant-pressure control or proportional-pressure control
- Open-loop control via setpoint setting

**Calio S BMS:**

- Automatic mode with constant-pressure control or proportional-pressure control
- Open-loop control via setpoint setting
- Eco Mode

**Automatic functions**

**Calio S:**

- Continuously variable speed adjustment depending on the mode of operation
- Soft start (limitation of starting current)
- Full motor protection with integrated trip electronics
- Setback operation
- Dynamic Control in Proportional-pressure Control operating mode dp-v

**Calio S BMS:**

- Continuously variable speed adjustment depending on the mode of operation
- Soft start (limitation of starting current)
- Full motor protection with integrated trip electronics

- Setback operation
- 0 - 10 V with external differential pressure/speed setpoint
- Remote ON/OFF
- General fault message
- Self-venting function

**Manual functions**

**Calio S:**

- Setting the operating mode
- Setting the differential pressure setpoint
- Setting the speed level
- Vent function
- Deblocking the rotor

**Calio S BMS:**

- Setting the operating mode
- Setting the differential pressure setpoint
- Setting the speed level

**Signalling functions and display functions**

- Alternating display of flow rate, head and electrical input power
- Error messages on the display

**Designation**

**Example: Calio S 25-40-130**

Designation key

Code	Description	
Calio S	Type series	
25	Connection	
	15	Rp 1/2
	25	Rp 1
	30	Rp 1 1/4
40	Head H <sup>2)</sup> [m] × 10	
	40	Head H × 10 Example: 4 m × 10 = 40
130	Overall length	
	130	130 mm
	_3)	See dimensions (⇒ Page 12)
BMS	Building Management System function	

<sup>2</sup> At flow rate Q = 0 m<sup>3</sup>/h

<sup>3</sup> Blank

## Materials

Overview of available materials

Part No.	Description	Material	
		Calio S	Calio S BMS
102	Volute casing	Grey cast iron (EN-GJL-200) with cathodic electrocoating	
210	Shaft	Ceramics	Stainless steel 1.4034
230	Impeller	Polyether sulphone (PES)	Plastic with glass fibre content (PSU-GF30)
310	Bearing	Ceramics	Ceramics/carbon
360	Bearing plate	Stainless steel 1.4301	
689	Thermal insulation shell	Polypropylene	
817	Can	Stainless steel 1.4301	

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

## Product benefits

- Maximum savings of operating costs by high-efficiency technology combined with speed control
- Future-proof by maximum energy efficiency, exceeding current energy efficiency regulations such as ErP 2015.
- Easy-to-use combination of controls, integrated display and symbols to show the operating status

Calio S:

- **Dynamic Control** for efficiency
- High availability due to manual and integrated protective functions
- Compact dimensions and plug-type connector make the pumps easy to install.

Calio S BMS:

- Integrated 0 – 10 V DC, remote ON/OFF and general fault message functions
- New Eco Mode enables additional savings of more than 40 % compared to proportional-pressure control.

## Product information

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

For information as per chemicals Regulation (EC) No. 1907/2006 (REACH), see <http://www.ksb.com/reach>.

## Certifications

Overview

Label	Effective in:	Comment
	Europe	EEI ≤ 0,20

## Selection information

### Minimum inlet pressure

The minimum inlet pressure  $p_{min}$  at the pump suction nozzle serves to avoid cavitation noises at an ambient temperature of +40 °C and 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.

### Calio S

Minimum inlet pressure  $p_{min}$  specified for the fluid temperature  $T_{max}$ .

Fluid temperature [°C]	Minimum inlet pressure [bar]
5 to 75	0,05
76 to 110	0,4

### Calio S BMS

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

## Dynamic Control description

Calio S only

The dynamic control (2) system detects when the selected control curve (3) is higher than the minimum characteristic curve<sup>4</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.

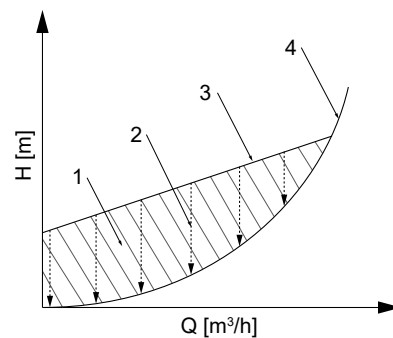


Fig. 1: Principle of dynamic control

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

<sup>4</sup> Characteristic curve at fully open thermostatic valves

Description of the characteristic curve

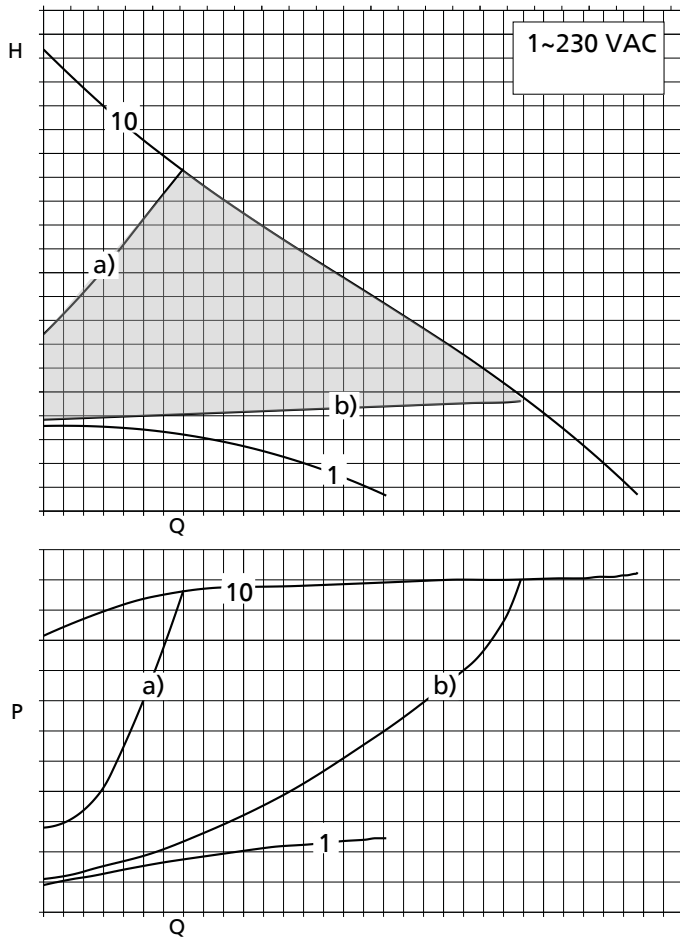


Fig. 2: Selection example

The characteristic curve can be adjusted between a) and b) in increments of 0.1 m by pressing the control keys.

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



Technical data

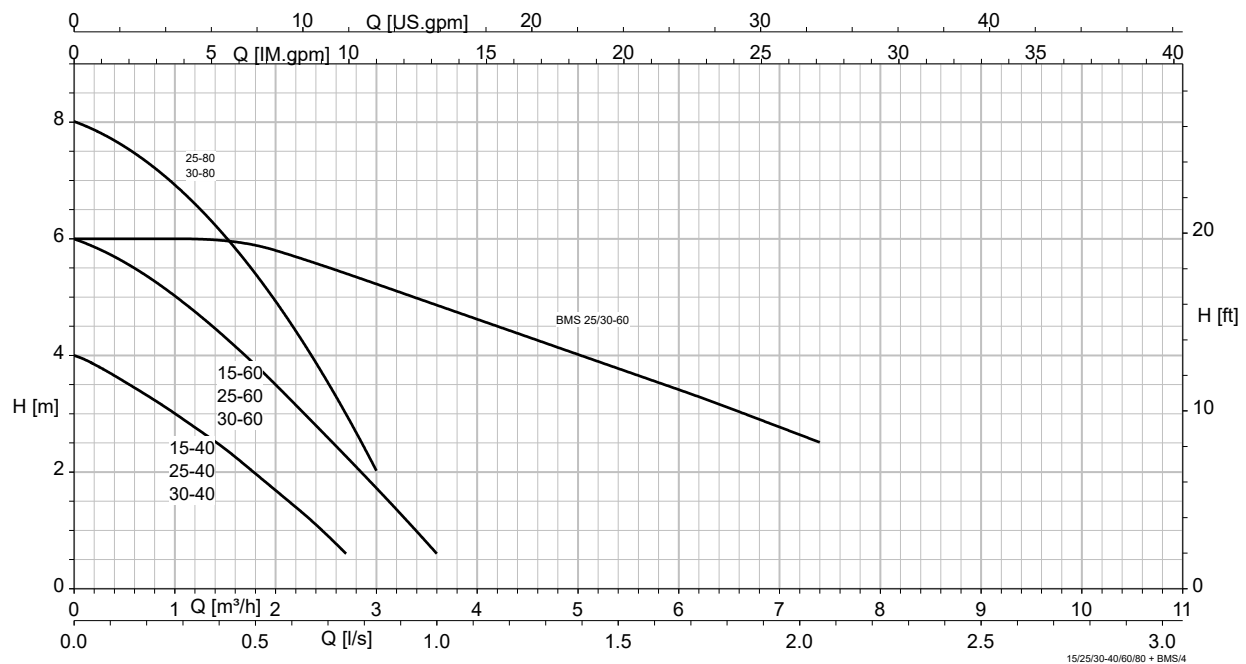
Calio S / Calio S BMS

Technical data

Size	Connection		PN [bar]	n		P <sub>1</sub> [W]	Motor protection <sup>5)</sup>	Signalling contacts <sup>6)</sup>	I <sub>N</sub> 1~230 V AC, 50 / 60 Hz [A]	Mat. No.	[kg]
	Piping	Pump		Min.	Max.						
				[rpm]	[rpm]						
<b>Calio S</b>											
15-40-130	Rp 1/2	G 1	10	1400	2850	6 - 30	✗	-	0,06 - 0,26	29134987	2,7
15-60-130	Rp 1/2	G 1	10	1400	3400	6 - 50	✗	-	0,06 - 0,43	29134988	2,7
25-40-130	Rp 1	G 1 1/2	10	1400	2850	6 - 30	✗	-	0,06 - 0,26	29134989	2,7
25-60-130	Rp 1	G 1 1/2	10	1400	3400	6 - 50	✗	-	0,06 - 0,43	29134990	2,7
25-40	Rp 1	G 1 1/2	10	1400	2850	6 - 30	✗	-	0,06 - 0,26	29134991	2,8
25-60	Rp 1	G 1 1/2	10	1400	3400	6 - 50	✗	-	0,06 - 0,43	29134992	2,8
25-80	Rp 1	G 1 1/2	10	1400	3900	6 - 60	✗	-	0,06 - 0,55	29134985	2,7
30-40	Rp 1 1/4	G 2	10	1400	2850	6 - 30	✗	-	0,06 - 0,26	29134993	2,9
30-60	Rp 1 1/4	G 2	10	1400	3400	6 - 50	✗	-	0,06 - 0,43	29134994	2,9
30-80	Rp 1 1/4	G 2	10	1400	3900	6 - 60	✗	-	0,06 - 0,55	29134986	2,7
<b>Calio S BMS</b>											
25-60	Rp 1	G 1 1/2	10	1000	3500	3,5 - 180	✗	✗	0,15 - 0,78	29134981	5,3
30-60	Rp 1 1/4	G 2	10	1000	3500	3,5 - 140	✗	✗	0,15 - 0,61	29134982	5,5

Selection chart

Calio S / Calio S BMS



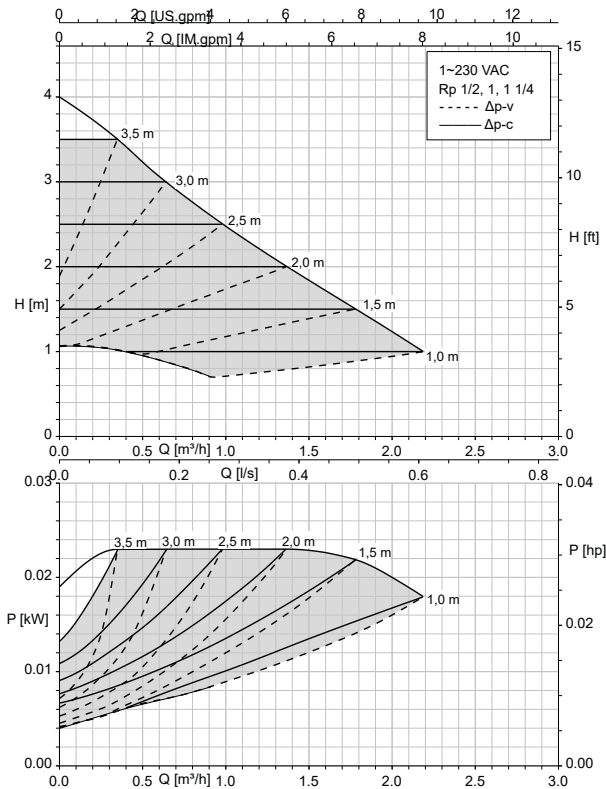
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<sup>5</sup> Integrated motor protection

<sup>6</sup> General fault message relay and terminal pairs for 0 - 10 V input and external start/stop

Characteristic curves

Calio S 15/25/30-40  $\Delta p_v$ ,  $\Delta p_c$



Calio S 15/25/30-40 open-loop control

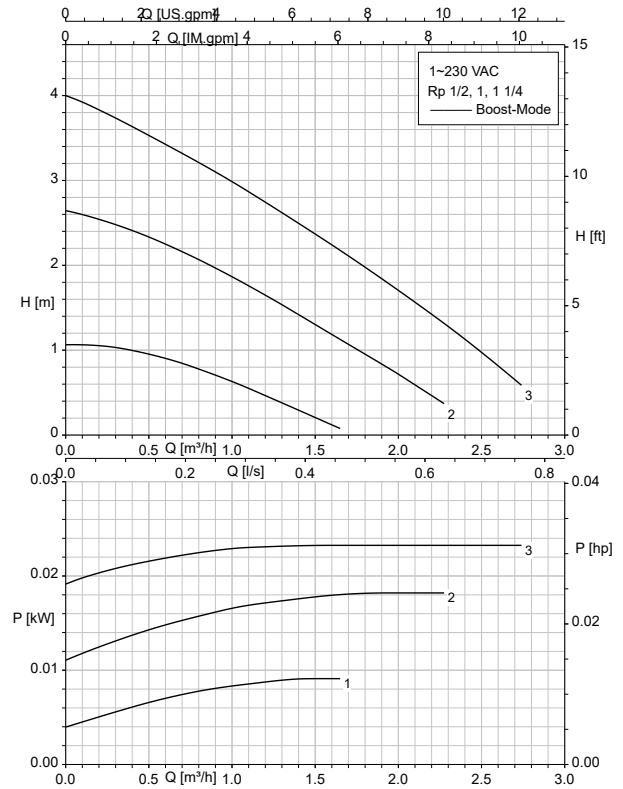
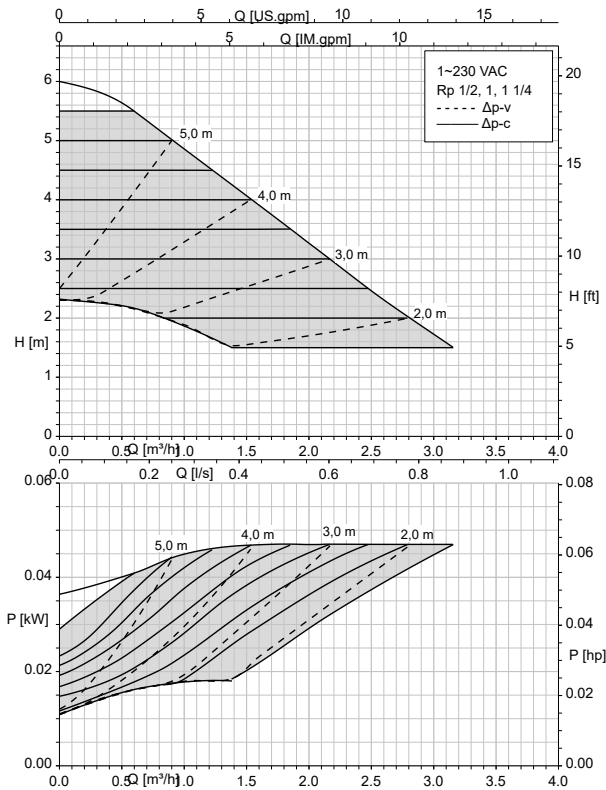


Fig. 3: 1, 2, 3 = speed level 1, 2, 3

Calio S 15/25/30-60  $\Delta p_v$ ,  $\Delta p_c$



Calio S 15/25/30-60 open-loop control

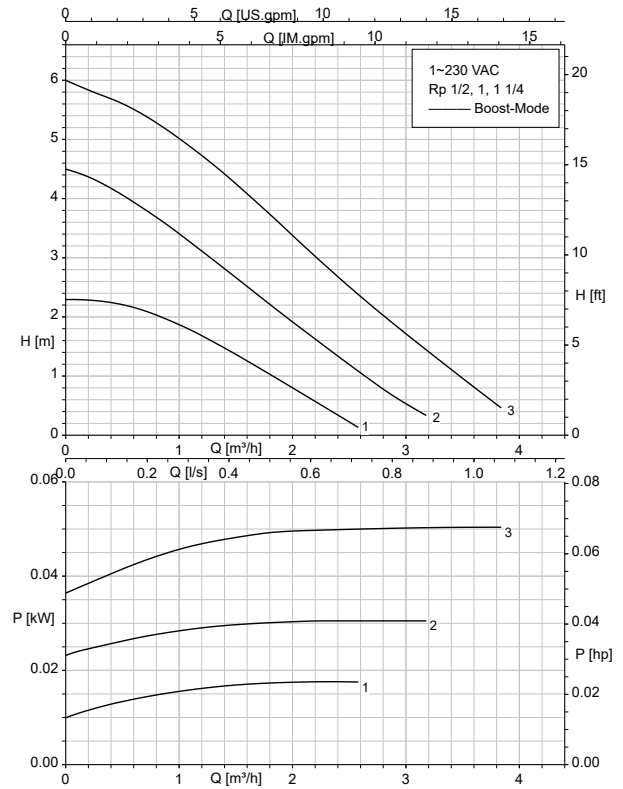
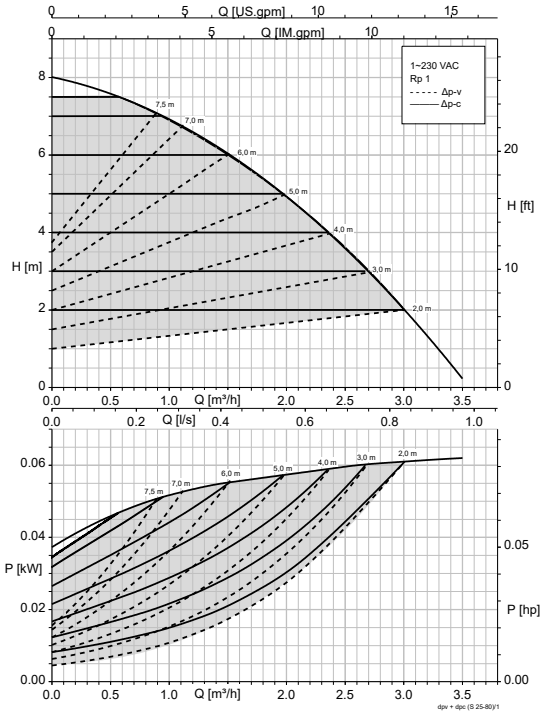


Fig. 4: 1, 2, 3 = speed level 1, 2, 3

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Calio S 25/30-80  $\Delta p_v$ ,  $\Delta p_c$



Calio S 25/30-80 open-loop control

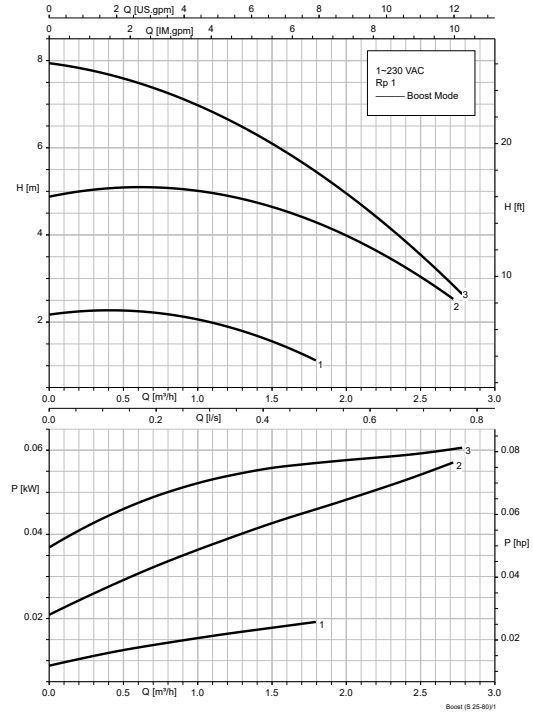
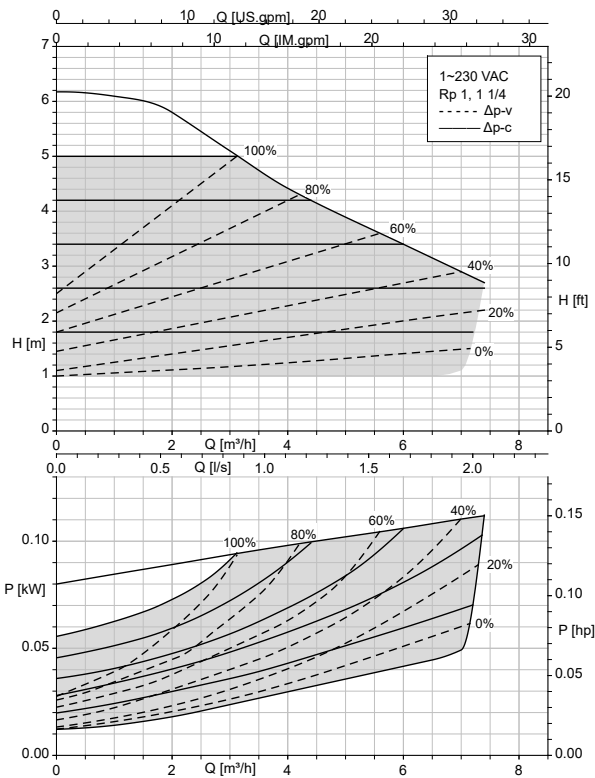
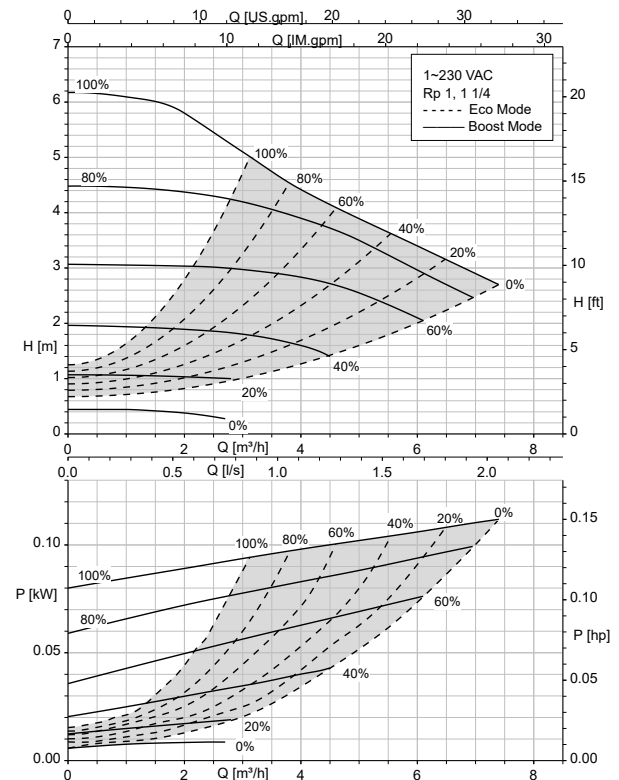


Fig. 5: 1, 2, 3 = speed level 1, 2, 3

Calio S BMS 25/30-60  $\Delta p_v$ ,  $\Delta p_c$



Calio S BMS 25/30-60 (open-loop control, Eco Mode)



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Dimensions

Calio S / Calio S BMS

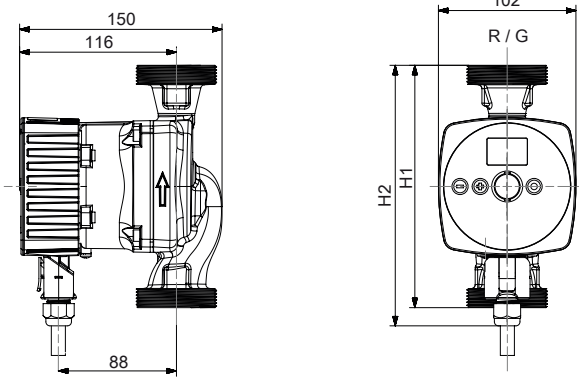


Fig. 6: Calio S dimensions [mm]

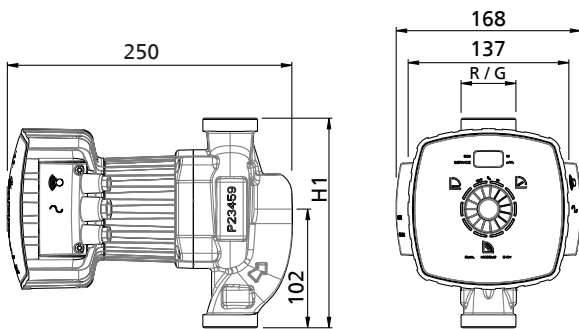


Fig. 7: Calio S BMS dimensions [mm]

Dimensions

Size	Connection		H1	H2
	Rp	G	[mm]	[mm]
<b>Calio S</b>				
15-40-130	1/2	1	130	170
15-60-130	1/2	1	130	170
25-40-130	1	1 1/2	130	170
25-60-130	1	1 1/2	130	170
25-40	1	1 1/2	180	200
25-60	1	1 1/2	180	200
25-80	1	1 1/2	180	200
30-40	1 1/4	2	180	200
30-60	1 1/4	2	180	200
30-80	1 1/4	2	180	200
<b>Calio S BMS</b>				
25-60	1	1 1/2	180	-
30-60	1 1/4	2	180	-

Installation information

Permissible installation positions

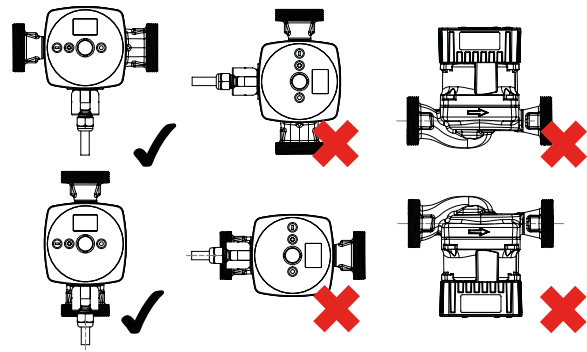


Fig. 8: Permissible installation positions

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<sup>7)</sup>
- Two-piece thermal insulation shell (only for overall length  $\geq 180$  mm)
- Installation/operating manual

<sup>7)</sup> Calio S only





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