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 mm²/s

Operating data

Operating properties

Characteristic		Value	
		Calio S	Calio S BMS
Flow rate	Q [m³/h]	≤ 3,5	≤ 7
	Q [l/s]	≤ 1,0	≤ 1,9
Head	H [m]	≤ 8	≤ 6
Fluid temperature[1)]	T [°C]	≥ +2	≥ -10
		≤ +95	≤ +110
Ambient temperature	T [°C]	≥ 0	
		≤ +40	
Operating pressure	p [bar]	≤ 10	
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:

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

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- 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 with dynamic differential pressure setpoint adjustment

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[2)] [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	

2) At flow rate Q = 0 m^3/h
3) 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	

The casing parts of the pump set that are in contact with the atmosphere and the fluid handled are free from paint wetting impairment substances..

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:

- 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
ErP 2015	Europe	EEI ≤ 0,20

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

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Description of the characteristic curve

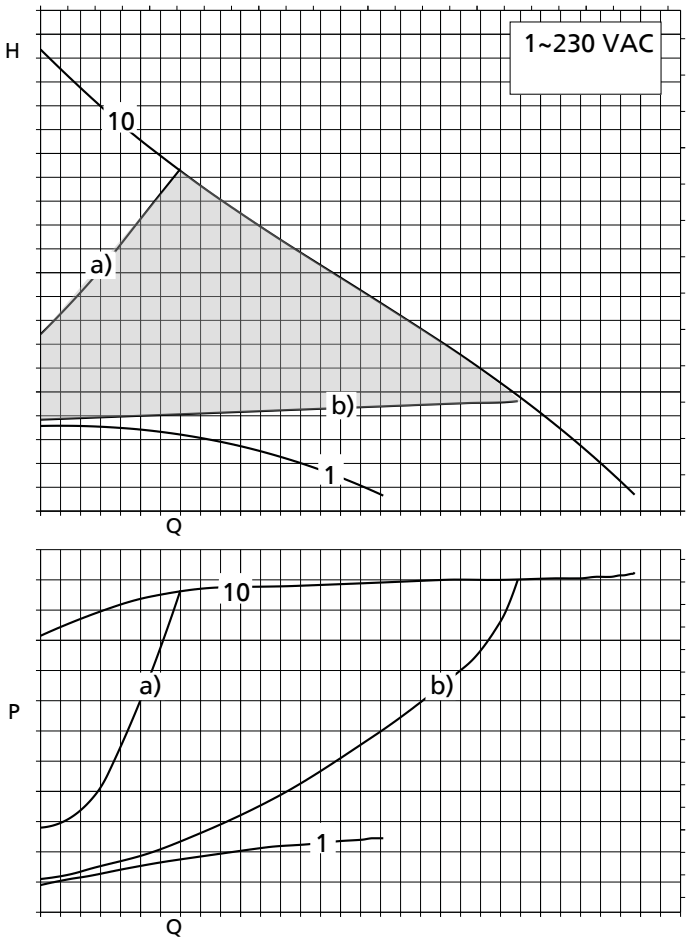


Fig. 1: Selection example

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

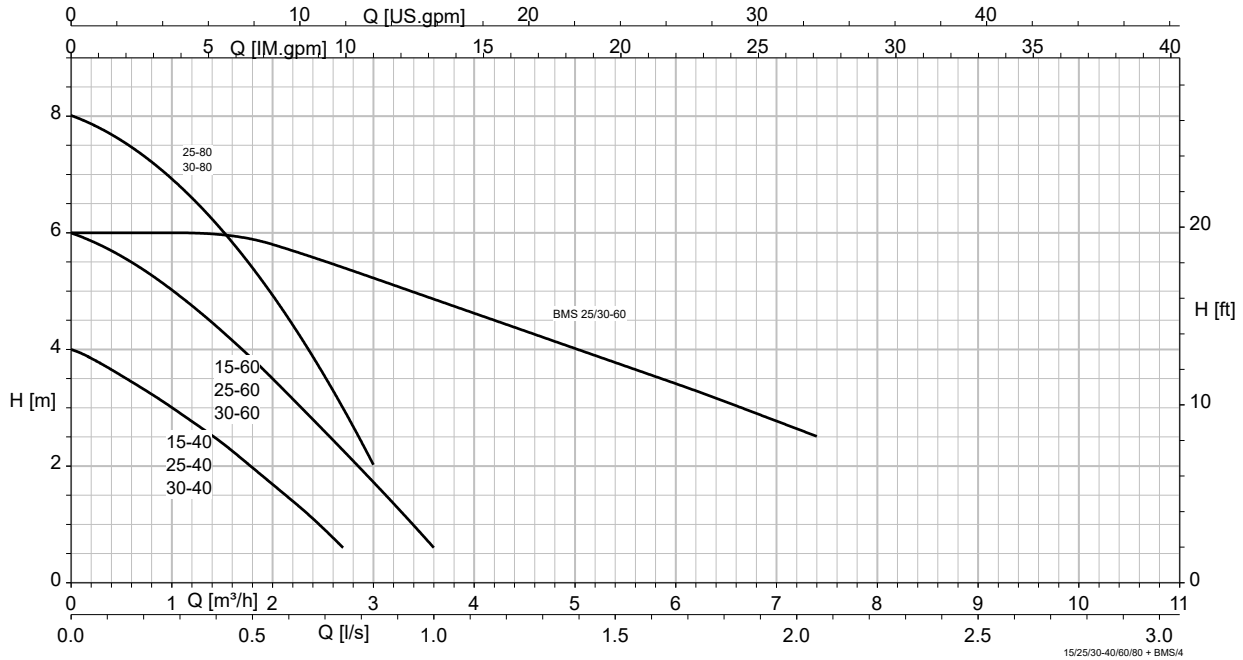
Calio S / Calio S BMS

Technical data

Size	Connection		PN	n		P_1	Motor protection[4]	Signalling contacts[5]	I_N	Mat. No.	[kg]
	Piping	Pump	[bar]	Min. [rpm]	Max. [rpm]	[W]			1~230 V AC, 50 / 60 Hz [A]		
Calio S											
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
Calio S BMS											
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

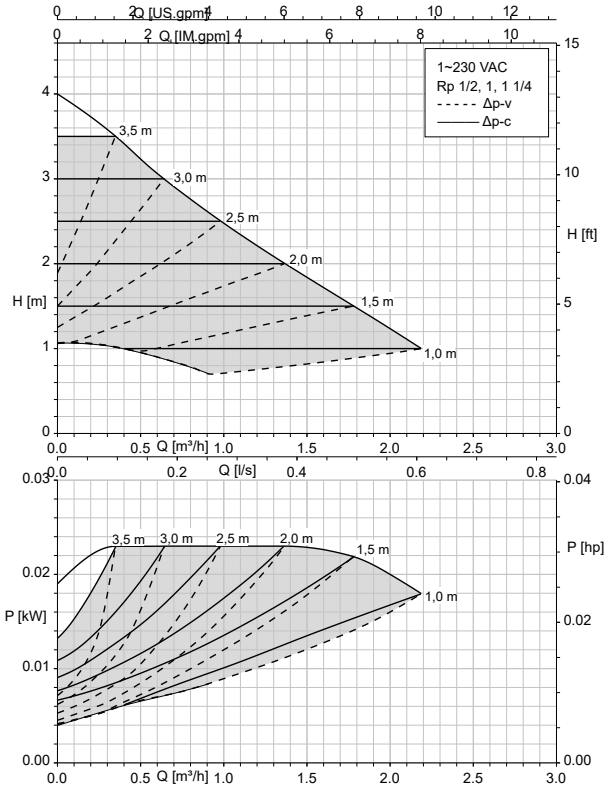
Calio S / Calio S BMS



4) Integrated motor protection
5) General fault message relay and terminal pairs for 0 - 10 V input and external start/stop

Characteristic curves

Calio S 15/25/30-40 Δpv, Δpc



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

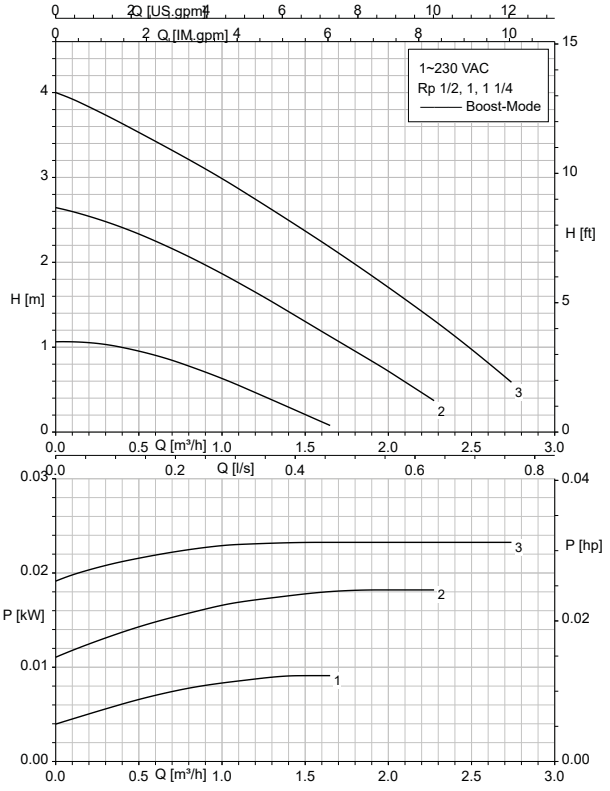
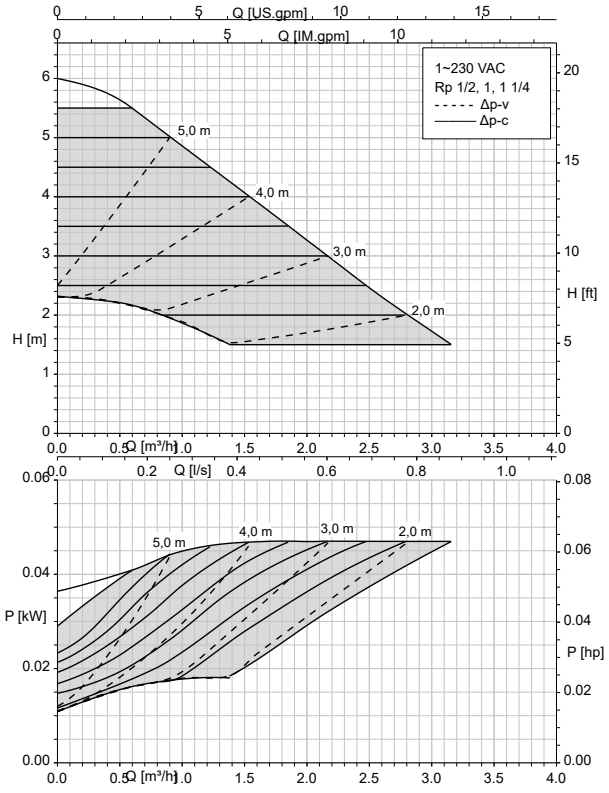


Fig. 2: 1, 2, 3 = speed level 1, 2, 3

Calio S 15/25/30-60 Δpv, Δpc



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

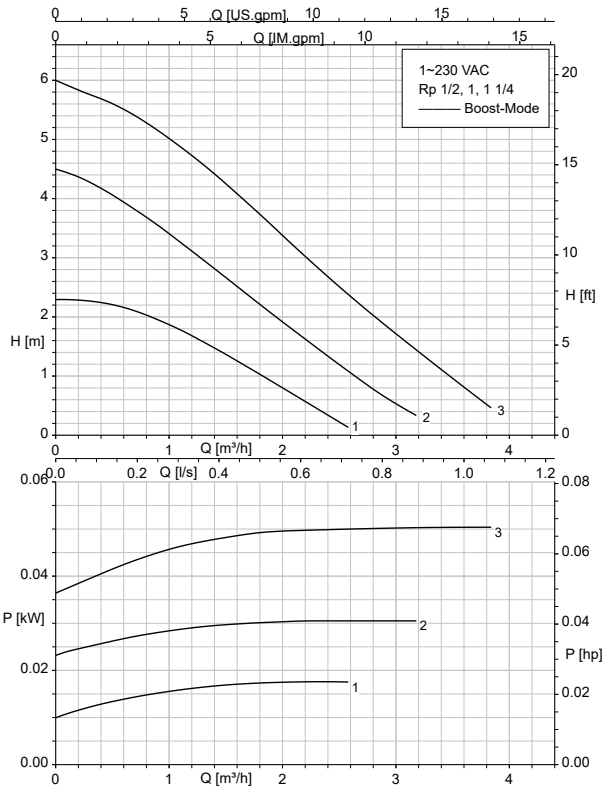


Fig. 3: 1, 2, 3 = speed level 1, 2, 3

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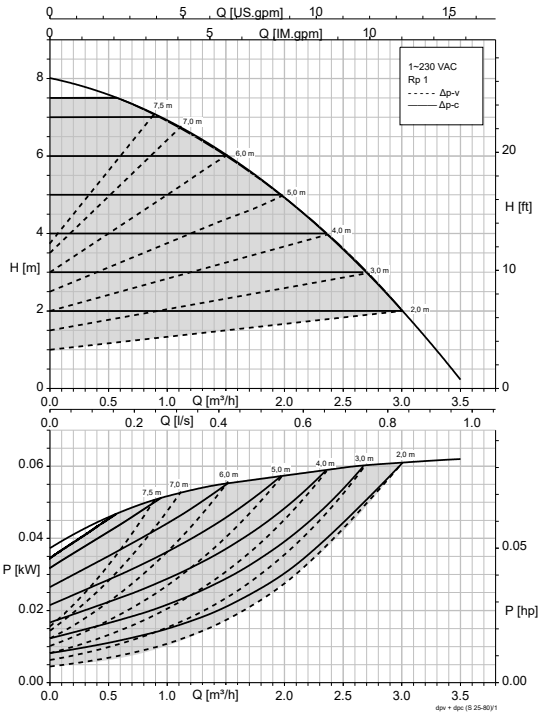
Calio S 25/30-80 Δpv, Δpc



Calio S 25/30-80 open-loop control

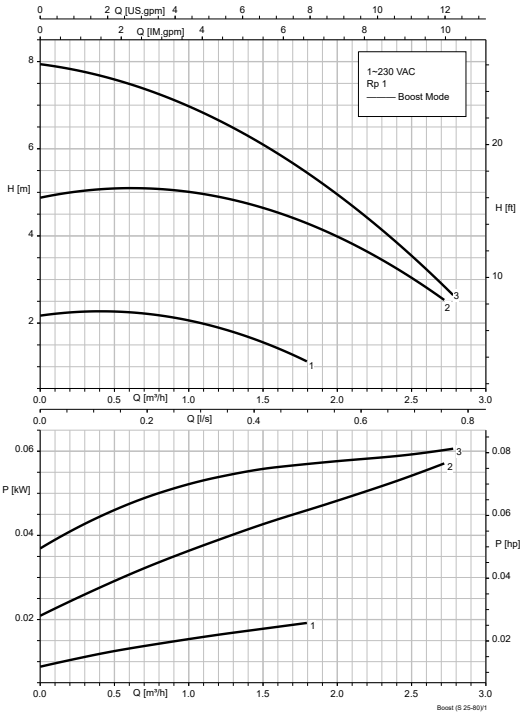
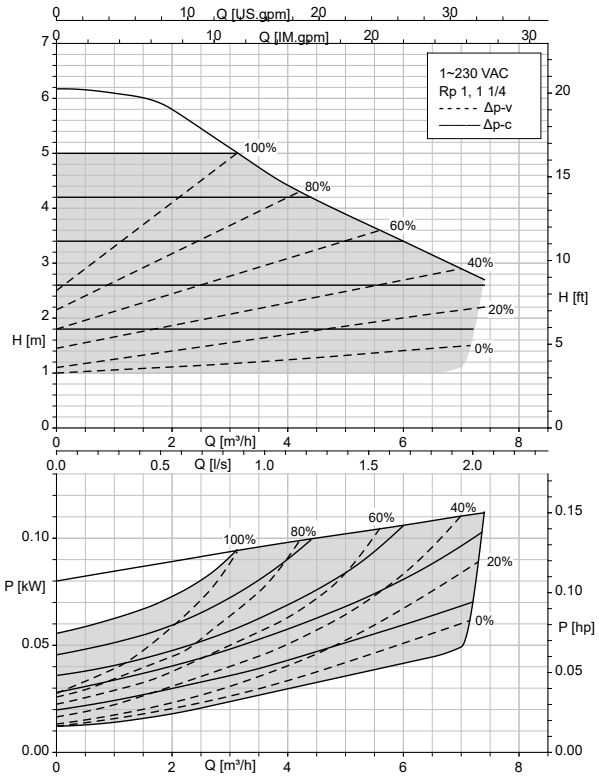
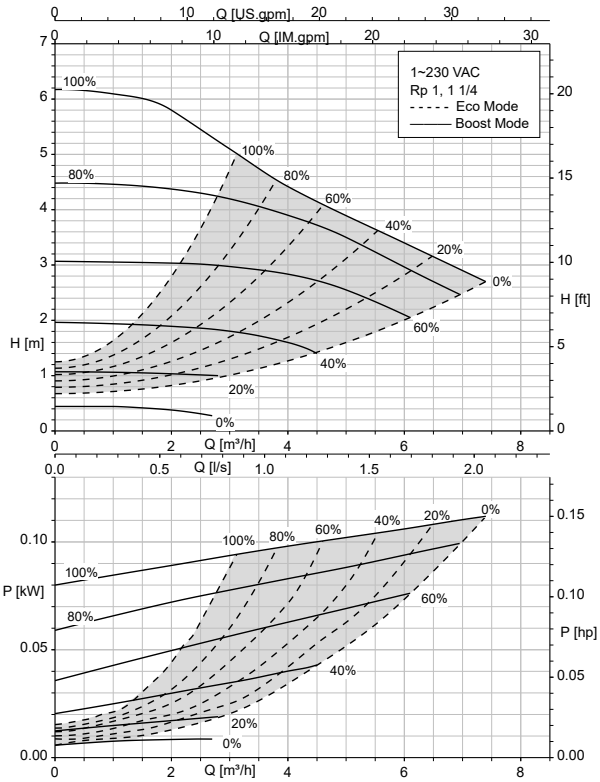


Fig. 4: 1, 2, 3 = speed level 1, 2, 3

Calio S BMS 25/30-60 Δpv, Δpc



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



Dimensions

Calio S / Calio S BMS

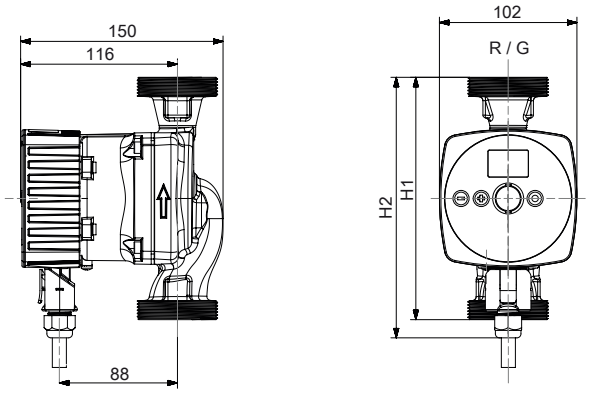


Fig. 5: Calio S dimensions [mm]

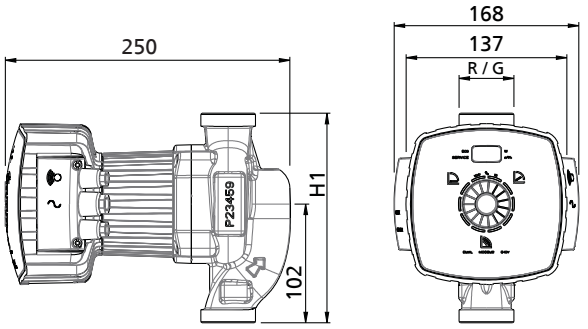


Fig. 6: Calio S BMS dimensions [mm]

Dimensions

Size	Connection		H1	H2
	Rp	G	[mm]	[mm]
Calio S				
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
Calio S BMS				
25-60	1	1 1/2	180	-
30-60	1 1/4	2	180	-

Installation information

Permissible installation positions

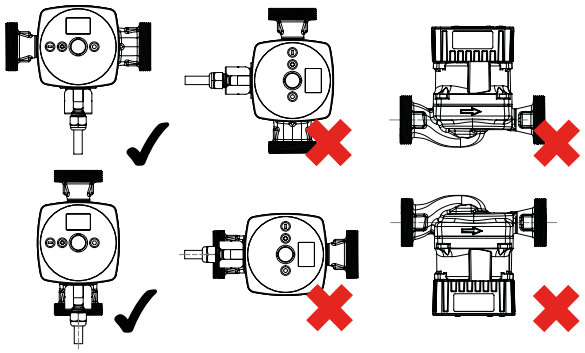


Fig. 7: Permissible installation positions

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[6)]
- Two-piece thermal insulation shell (only for overall length ≥ 180 mm)
- Installation/operating manual

6) Calio S only

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