

High-efficiency Heating Circulator

Calio S Pro / Calio S BMS

Also Applies to Calio S

Type Series Booklet



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Type Series Booklet Calio S Pro / Calio S BMS

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Building Services: Heating

Variable Speed Circulator Pumps

Calio S Pro / Calio S BMS

 Also Applies to Calio S



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 glycol content equals or exceeds 20 %, check and verify operating data
- Pure, thin, non-aggressive, non-explosive and non-gaseous fluids not containing any mineral oil, solids or long fibres
- Fluids with a maximum viscosity of 10 mm²/s

Operating data

Table 1: Operating properties

Characteristic		Value	
		Calio S Pro	Calio S BMS
Flow rate	Q [m ³ /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	
Average sound pressure level	[dB (A)]	≤ 30	≤ 45
Screw-ended connection	G	1 - 2	1 1/2 - 2

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
- Enclosure IPX4D
- Interference emissions EN 55014-1, EN 61000-3-2, EN 61000-3-3
- Interference immunity EN 55014-2

Calio S Pro:

- Temperature class TF 95

Calio S BMS:

- Temperature class TF 110

Bearings

Calio S Pro:

- Ceramic bearings

Calio S BMS:

- Product-lubricated special plain bearing

Connections

- Screw-ended

Operating modes

Calio S Pro:

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

Calio S BMS:

¹ 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
- Eco Mode

Automatic functions

Calio S Pro:

- 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 Pro:

- Setting the operating mode
- Setting the discharge head setpoint
- Setting the speed level
- Vent function
- Deblocking the rotor

Calio S BMS:

- Setting the operating mode
- Setting the discharge head 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 Pro 25-40-130

Table 2: Designation key

Code	Description	
Calio S Pro	Type series	
25	Connection	
	15	G 1
	25	G 1 1/2
	30	G 2
40	Head H ²⁾ [m]	
	40	Head × 10 Example: 4 m × 10 = 40
130	Overall length	
	130	130 mm
	- ³⁾	See dimensions (⇒ Page 13)

Example: Calio S 25-40-130

Table 3: Designation key

Code	Description	
Calio S	Type series	
25	Connection	
	15	G 1
	25	G 1 1/2
	30	G 2
40	Head H ⁴⁾ [m]	
	40	Head × 10 Example: 4 m × 10 = 40
130	Overall length	
	130	130 mm
	- ³⁾	See dimensions (⇒ Page 13)

Example: Calio S 25-40 BMS

Table 4: Designation key

Code	Description	
Calio S	Type series	
25	Connection	
	25	G 1 1/2
	30	G 2
40	Head H ⁵⁾ [m]	
	40	Head H × 10 Example: 4 m × 10 = 40
BMS	Building Management System function	

²⁾ At flow rate Q = 0 m³/h

³⁾ Blank

⁴⁾ At flow rate Q = 0 m³/h

⁵⁾ At flow rate Q = 0 m³/h

Materials

Table 5: Overview of available materials

Part No.	Description	Material	
		Calio S Pro	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 Pro:

- **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 European chemicals regulation (EC) No. 1907/2006 (REACH) see <https://www.ksb.com/en-global/company/corporate-responsibility/reach>.

Certifications

Table 6: Overview

Label	Effective in:	Comment
	Europe	EEL ≤ 0,20

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.

Calio S Pro

Table 7: 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 95	0,4

Calio S BMS

Table 8: 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

Dynamic Control description

 For Calio S Pro only

Dynamic control (2) detects when the selected control curve (3) is higher than the minimum characteristic curve⁶ (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.

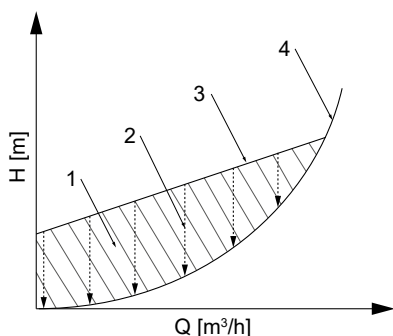


Fig. 1: Principle of dynamic control

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

⁶ Characteristic curve at fully open thermostatic valves

Description of the characteristic curve

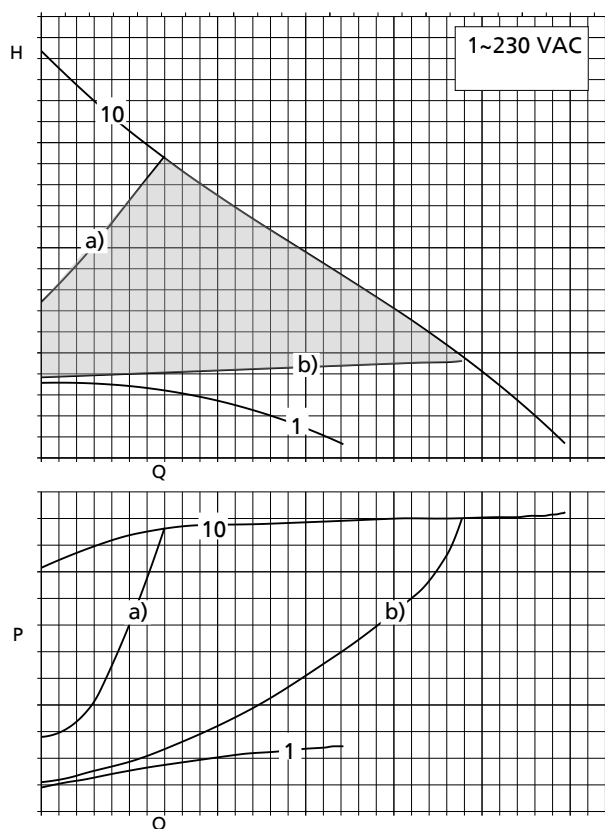


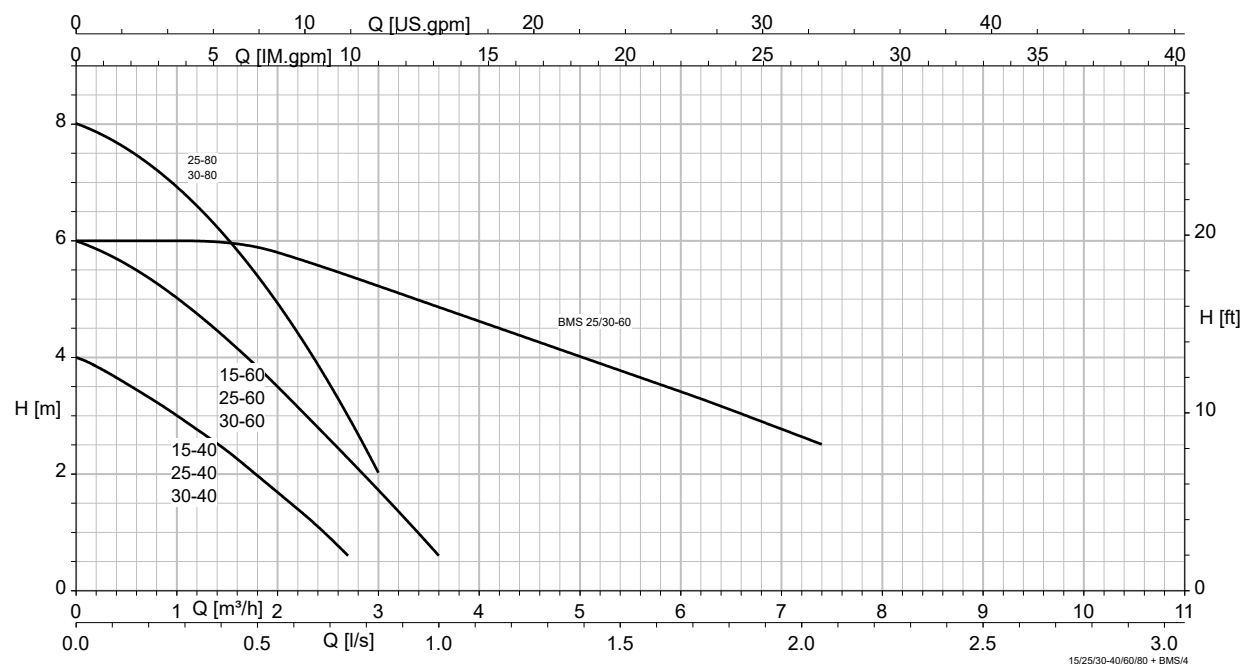
Fig. 2: Selection example

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 S Pro / Calio S BMS
Table 9: Technical data

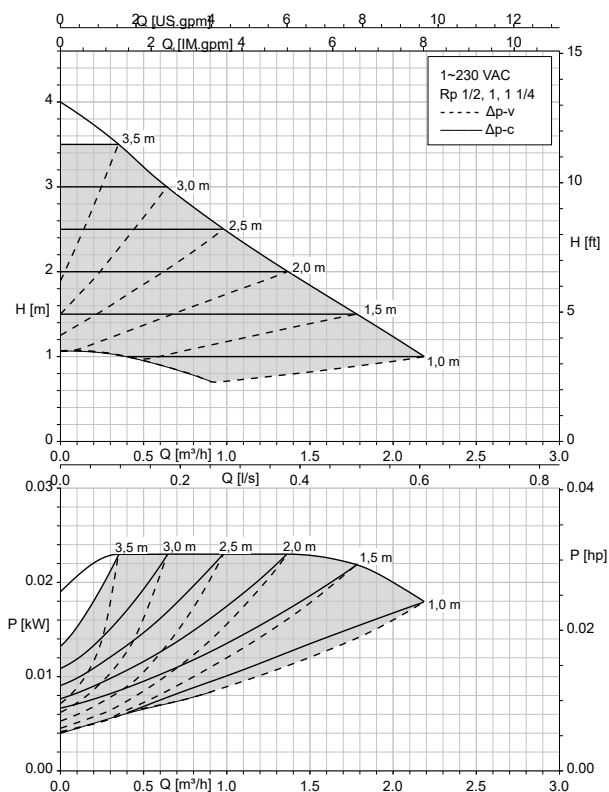
Size	Connection		PN	n		P ₁	Motor protection ⁷⁾	Signalling contacts ⁸⁾	I _N	Mat. No.	[kg]
	Piping	Pump	[bar]	Min.	Max.	[W]			1~230 V AC, 50 / 60 Hz		
				[rpm]	[rpm]				[A]		
Calio S Pro											
15-40-130	R 1/2	G 1	10	1400	2850	6 - 30	✗	-	0,06 - 0,26	29134987	2,7
15-60-130	R 1/2	G 1	10	1400	3400	6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

Selection chart
Calio S Pro / Calio S BMS

⁷⁾ Integrated motor protection

⁸⁾ General fault message relay and terminal pairs for 0 - 10 V input and external start/stop

Characteristic curves

Calio S Pro 15/25/30-40 Δp_v , Δp_c



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

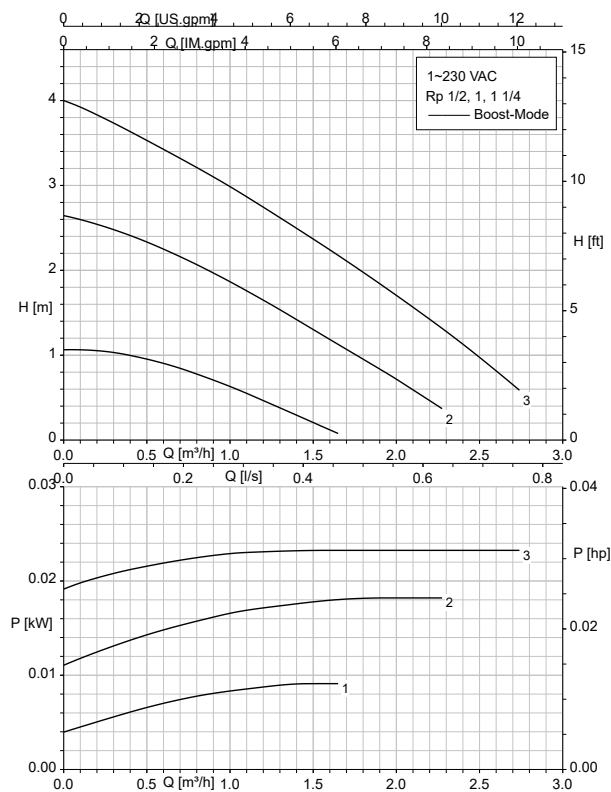
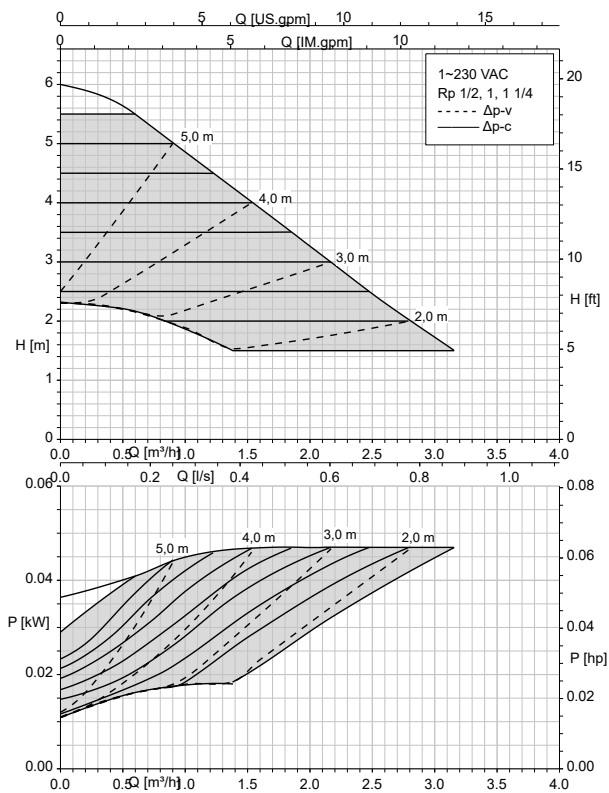


Fig. 3: 1, 2, 3 = speed level 1, 2, 3

Calio S Pro 15/25/30-60 Δp_v , Δp_c



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

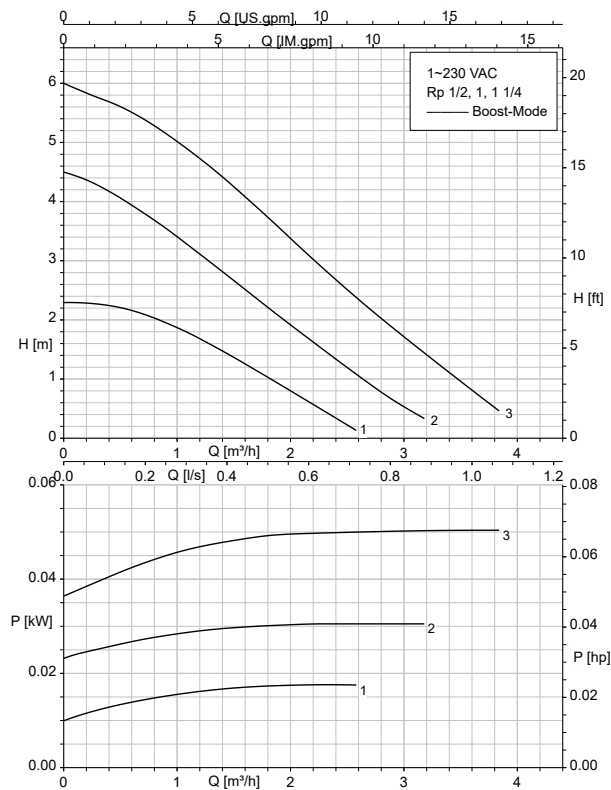
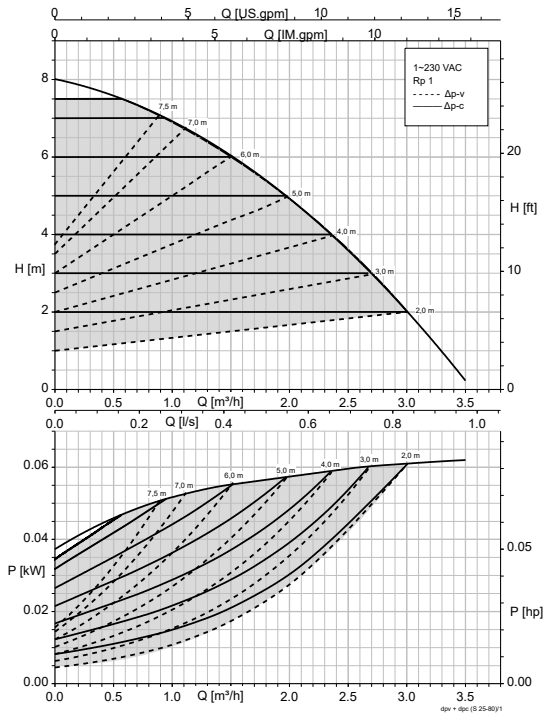


Fig. 4: 1, 2, 3 = speed level 1, 2, 3

Calio S Pro 25/30-80 Δp_v , Δp_c



Calio S Pro 25/30-80 open-loop control

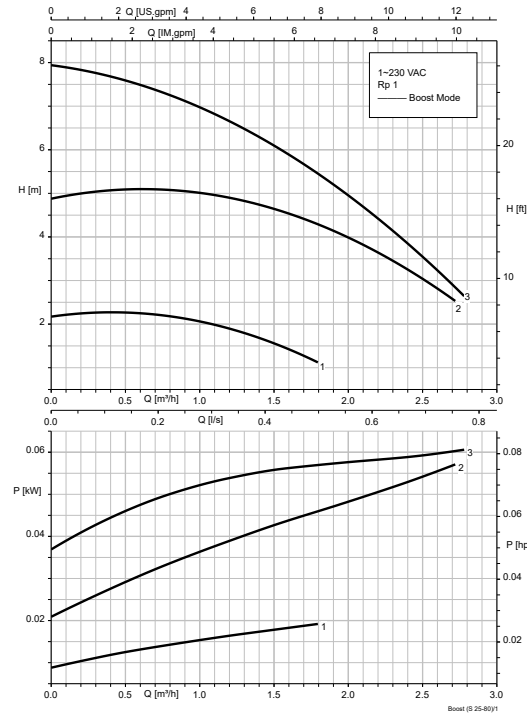
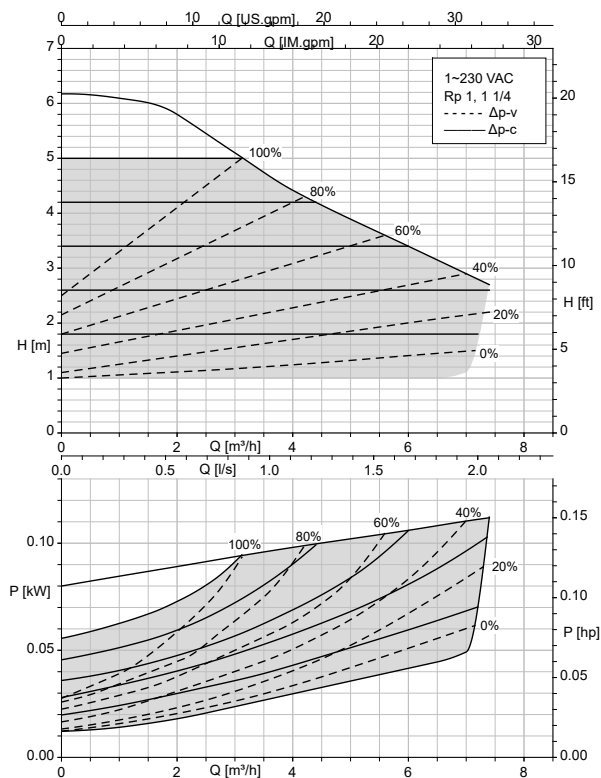
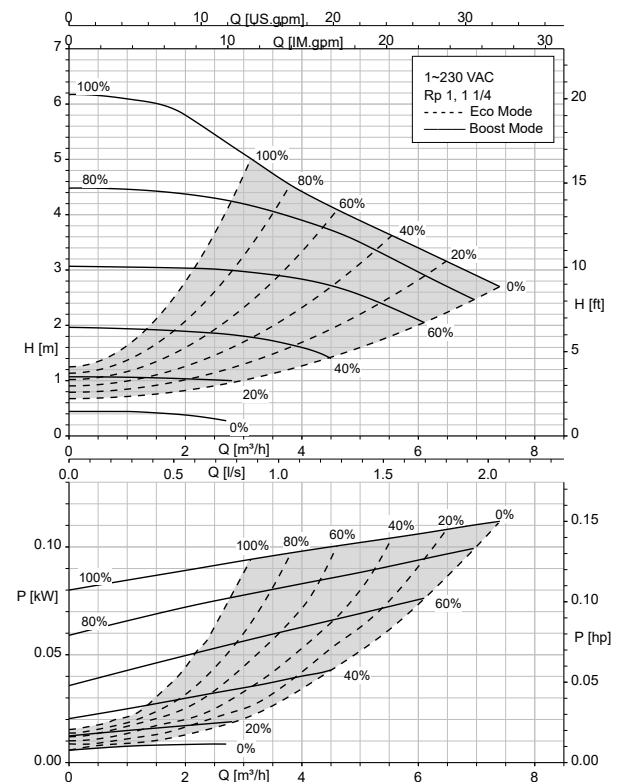


Fig. 5: 1, 2, 3 = speed level 1, 2, 3

Calio S BMS 25/30-60 Δp_v , Δp_c



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



Dimensions

Calio S Pro / Calio S BMS

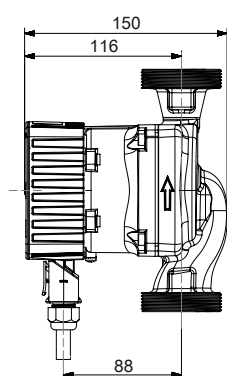


Fig. 6: Calio S Pro dimensions [mm]

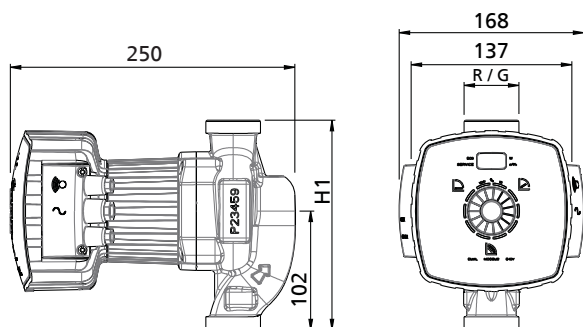
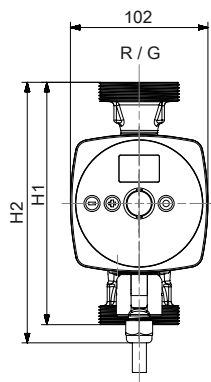


Fig. 7: Calio S BMS dimensions [mm]

Table 10: Dimensions

Size	Connection		H1	H2
	R	G	[mm]	[mm]
Calio S Pro				
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

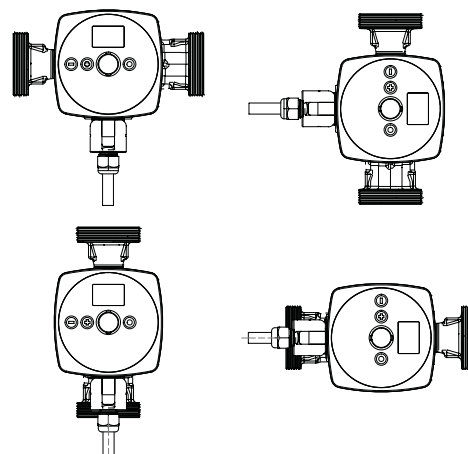


Fig. 8: Permissible installation positions of Calio S Pro

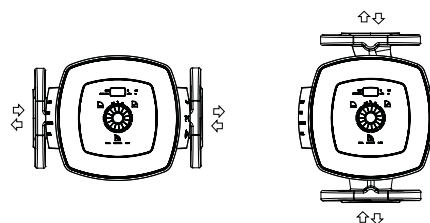


Fig. 9: Permissible installation positions of Calio S BMS

Scope of supply

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

- Pump set
- Sealing elements
- Electrical plug-type connector with straight and angled plug housing⁹⁾
- Two-piece thermal insulation shell (only for overall length ≥ 180 mm)
- Installation/operating manual

⁹ Calio S only

Accessories

Pipe unions / fittings

Table 11: Pipe unions / fittings

	Description	Mat. No.	[kg]
	2 pipe unions with G 1 1/2 union nut and insert with Rp 1 internal thread, steel for pumps with G 1 1/2 external thread / Rp 1 pipe connection	19075561	0,2
	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

Electrical accessories

Table 12: Electrical accessories

	Description	Mat. No.	[kg]
	Straight plug-type connector and angled connector for Calio S Pro / CalioTherm S Pro	01908056	0,1



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