Circulator for OEMs

Calio SI Dual / Calio SI Therm

Type Series Booklet



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Type Series Booklet Calio SI Dual / Calio SI Therm

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Building Services: Heating

Variable Speed Circulator Pumps

Calio SI Dual / Calio SI Therm



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

Table 1: Operating properties

Characteristic		Value
Flow rate	Q [m³/h]	≤ 3,6
	Q [l/s]	≤ 1,0
Head	H [m]	≤ 8,0
Fluid temperature	T [°C]	-10 to +110
Ambient temperature	T [°C]	0 to +70[1)]
Operating pressure	p [bar]	≤ 10
Sound pressure level	[dB(A)]	< 30
Connection	G	1, 1 $^{1}/_{2}$, 2

Design details

Design

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

Drive

- Brushless permanent magnet synchronous motor, self-cooling
- 1~230 V AC
- Frequency 50 Hz/60 Hz
- Starting current 3 A
- Enclosure IP44
- Thermal class F
- Temperature class TF 110
- Energy efficiency index EEI ≤ 0.20[2)]
- Interference emissions EN 55014-1
- Interference immunity EN 55014-2
- IEC 60335-2-51

Bearings

- Ceramic bearings

Connections

- Screw-ended

Operating modes

- Operation controlled by external input (PWM signal or 0 - 10 V)
- Constant-pressure control
- Proportional-pressure control
- EcoMatch: automatic adjustment of the operating point (optional)
- Setting the operating mode
- Setting the discharge head setpoint
- Setting the speed level
- Vent function
- Deblocking the rotor

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1 -20 °C to +75 °C on request
2 To EN 16297-3

Signalling functions and display functions

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

Designation

Example: Calio SI Dual 15-70-130

Table 2: Designation key

Code	Description	
Calio SI	Type series	
	Dual	High-efficiency circulator pump for heating systems
	Therm	High-efficiency circulator pump for drinking water applications / foodstuff applications
15	Connection	
	15	G 1
	25	G 1 $^{1}/_{2}$
	30	G 2
70	Head [m]	
	70	Head × 10 Example: 7 m × 10 = 70
130	Overall length [mm]	
	130	130 mm
	180	180 mm

Materials

Table 3: Overview of available materials

Part No.	Description	Material	
		Calio SI Dual	Calio SI Therm
102	Volute casing	Grey cast iron (EN-GJL-200) with cathodic electrocoating	Stainless steel 1.4401
210	Shaft	Ceramics	
230	Impeller	Polyether sulphone, glass fibre reinforced	
310	Plain bearing	Ceramics	
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
- High availability due to manual and integrated protective functions

Certifications

Table 4: Overview

Label	Effective in:	Comment
ErP 2015	Europe	EEI ≤ 0,20

Product information

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

For information as per chemicals Regulation (EC) No. 1907/2006 (REACH), see https://www.ksb.com/ksb-en/About-KSB/Corporate-responsibility/reach/ .

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	Minimum inlet pressure
[°C]	[bar]
5 to 75	0,05
76 to 95	0,4

Description of the characteristic curve

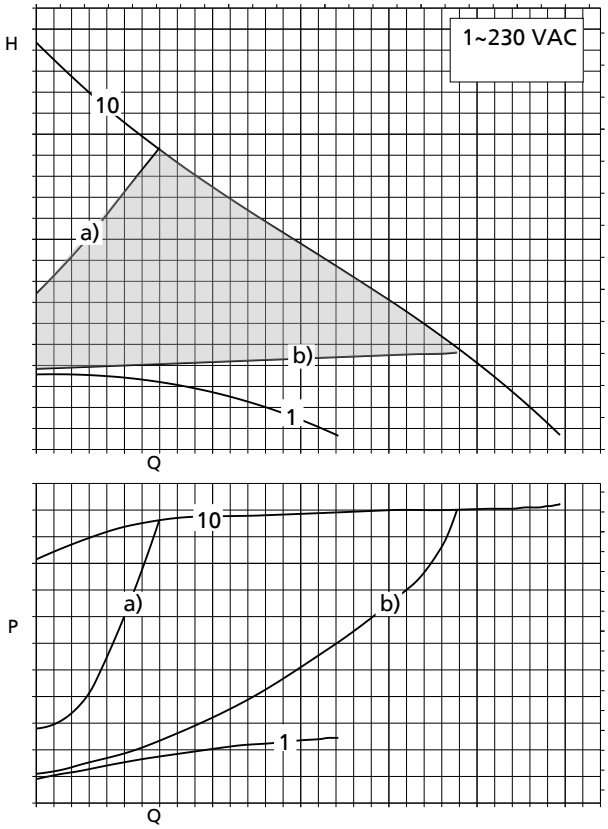


Fig. 1: Selection example

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.

Operation controlled by external input

PWM signal

The pump set communicates with an external control system via a pump-integrated 2-way PWM interface. The pump control system sends the estimated flow rate Q to the external control system and, in return, receives the maximum required differential pressure. Based on the value received, the pump control system adjusts the speed.

More information:

- PWM profile A (heating applications)
- PWM profile C (solar applications)

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Operation with PWM profile A (heating applications)

Table 6: Parameters sent by external control system

Parameter	PWM signal [%]	Comments
Maximum speed	0 - 5	No PWM signal connected: The pump set is operated at maximum speed.
Pump ID	95 - 100	-
Modulation	5 - 90	-
Stand-by	92 - 100	The pump set can also be controlled when in stand-by mode.

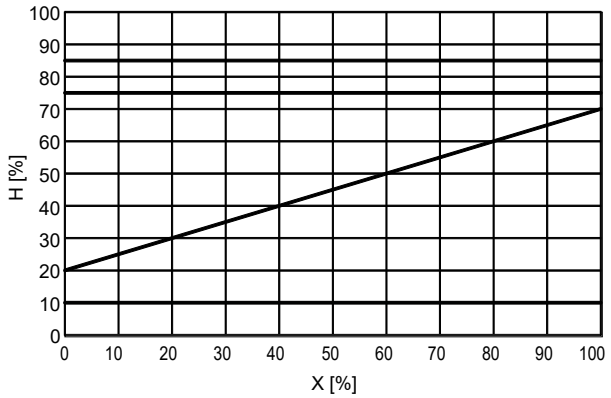


Fig. 2: PWM profile A, PWM signal from pump control system to external control system

H	Head	X	PWM

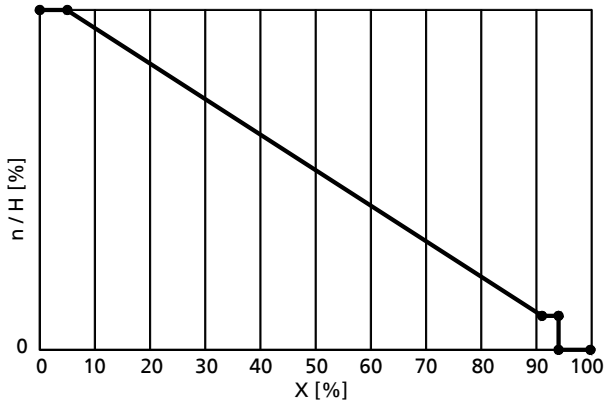


Fig. 3: PWM signal from external control system to pump control system

n	Speed	X	PWM

Table 7: Parameters sent by pump set

Parameter / function	PWM signal [%]	Comments
Pump ID	85	-
Blocked rotor	75	-
Modulation	20 - 70	Estimated flow rate
Dry running	10	-

Operation with PWM profile C (solar applications)

Table 8: Parameters sent by external control system

Parameter	PWM signal [%]	Comments
Maximum speed	90 - 94	No PWM signal connected: Pump set stops.
Pump ID	95 - 100	-
Modulation	5 - 90	-
Stand-by	94 - 100	The pump set can also be controlled when in stand-by mode.

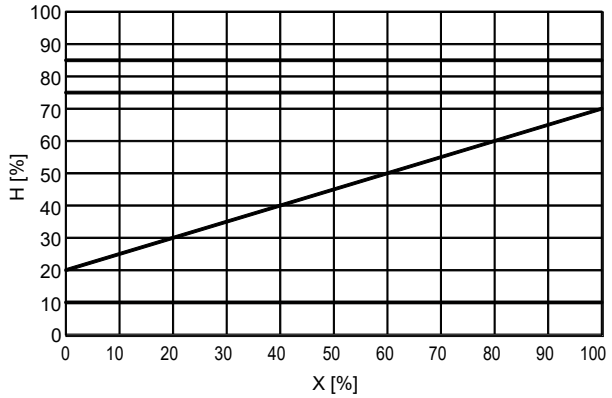


Fig. 4: PWM profile A, PWM signal from pump control system to external control system

n	Speed	X	PWM

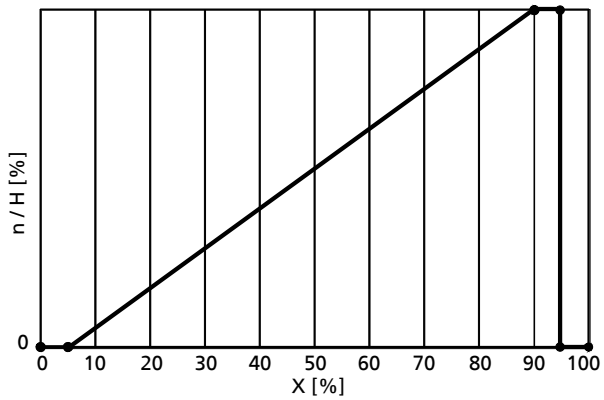


Fig. 5: PWM signal from external control system to pump control system

n	Speed	X	PWM

Table 9: Parameters sent by pump set

Parameter / function	PWM signal [%]	Comments
Pump ID	85	-
Blocked rotor	75	-
Modulation	20 - 70	Estimated flow rate
Dry running	10	-

Table 10: Speeds depending on the size

Size	Speed	
	Minimum [rpm]	Maximum [rpm]
15-50-130	800	3080
25-50-130	800	3080
25-50-180	800	3080
15-70-130	800	3650
25-70-130	800	3650
25-70-180	800	3650
15-80-130	800	4000
25-80-130	800	4000
25-80-180	800	4000
30-80-180	800	4000

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Operation controlled by analog signal 0 - 10 V

Operation of the pump set can be controlled by analog signal (0 - 10 V). For connecting the analog signal 0 to 10 V, use the same terminals as for the PWM signal.

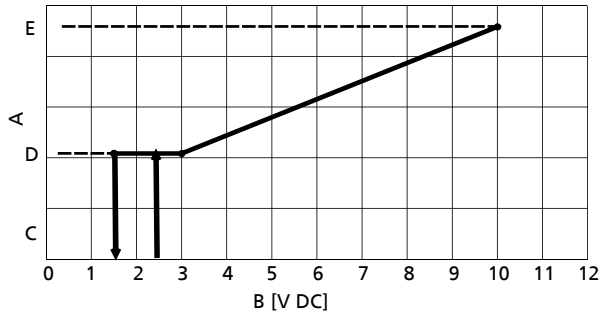


Fig. 6: Operation controlled by analog signal 0 - 10 V

A	Speed [rpm]
B	Voltage of input signal
C	Pump OFF
D	Minimum speed 800 rpm
E	Maximum speed [rpm]

Table 11: Speeds depending on the size

Size	Speed	
	Minimum	Maximum
	[rpm]	[rpm]
15-50-130	800	3080
25-50-130	800	3080
25-50-180	800	3080
15-70-130	800	3650
25-70-130	800	3650
25-70-180	800	3650
15-80-130	800	4000
25-80-130	800	4000
25-80-180	800	4000
30-80-180	800	4000

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Technical data

Calio SI Dual / Calio SI Therm

Table 12: Symbols key

Symbol	Description
✘	Available
-	Not available

Table 13: Technical data

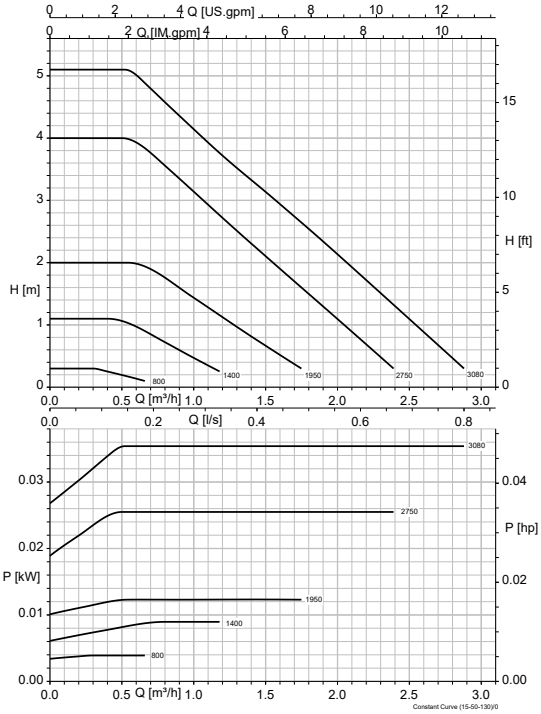
Size	Connection		PN	P_1	Motor protection[3]	Interfaces	I_N	Mat. No.	[kg]
	Piping	Pump	[bar]	[W]			1~230 V AC, 50 / 60 Hz [A]		
Calio SI Dual									
15-50-130 Dual	R 1/2	G 1	10	33	✘	PWM / 0 - 10 V	0,05 - 0,23	48242073	2,5
15-70-130 Dual	R 1/2	G 1	10	52	✘	PWM / 0 - 10 V	0,05 - 0,48	48242074	2,5
15-80-130 Dual	R 1/2	G 1	10	62	✘	PWM / 0 - 10 V	0,05 - 0,48	48242075	2,5
25-50-130 Dual	R 1	G 1 1/2	10	33	✘	PWM / 0 - 10 V	0,05 - 0,23	48242076	2,5
25-50-180 Dual	R 1	G 1 1/2	10	33	✘	PWM / 0 - 10 V	0,05 - 0,23	48242079	2,7
25-70-130 Dual	R 1	G 1 1/2	10	52	✘	PWM / 0 - 10 V	0,05 - 0,48	48242077	2,5
25-70-180 Dual	R 1	G 1 1/2	10	52	✘	PWM / 0 - 10 V	0,05 - 0,48	48242080	2,7
25-80-130 Dual	R 1	G 1 1/2	10	62	✘	PWM / 0 - 10 V	0,05 - 0,48	48242078	2,7
25-80-180 Dual	R 1	G 1 1/2	10	62	✘	PWM / 0 - 10 V	0,05 - 0,48	48242081	2,7
30-80-180 Dual	R 1 1/4	G 2	10	62	✘	PWM / 0 - 10 V	0,05 - 0,48	48242082	2,9
Calio SI Therm									
25-70-180 Therm	R 1	G 1 1/2	10	52	✘	PWM / 0 - 10 V	0,05 - 0,48	48242089	2,7

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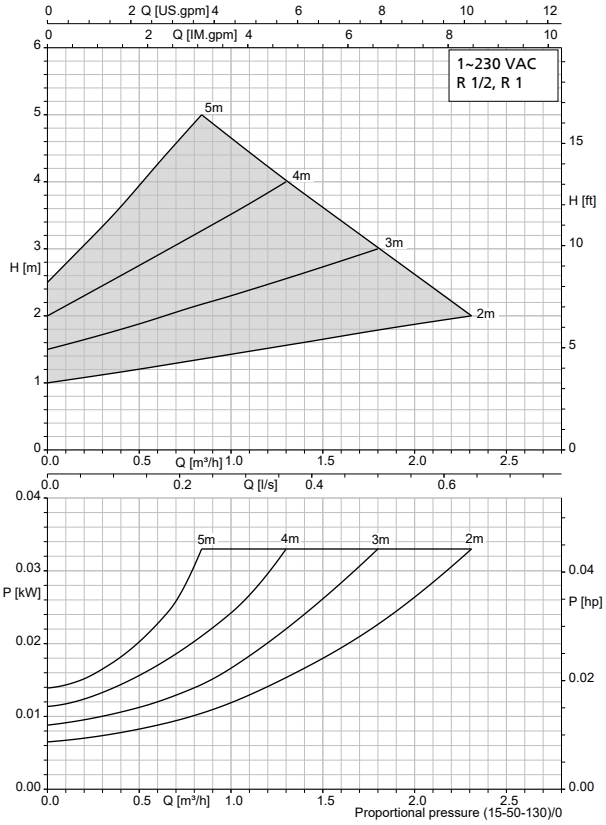
3 Integrated electronic motor protection

Characteristic curves

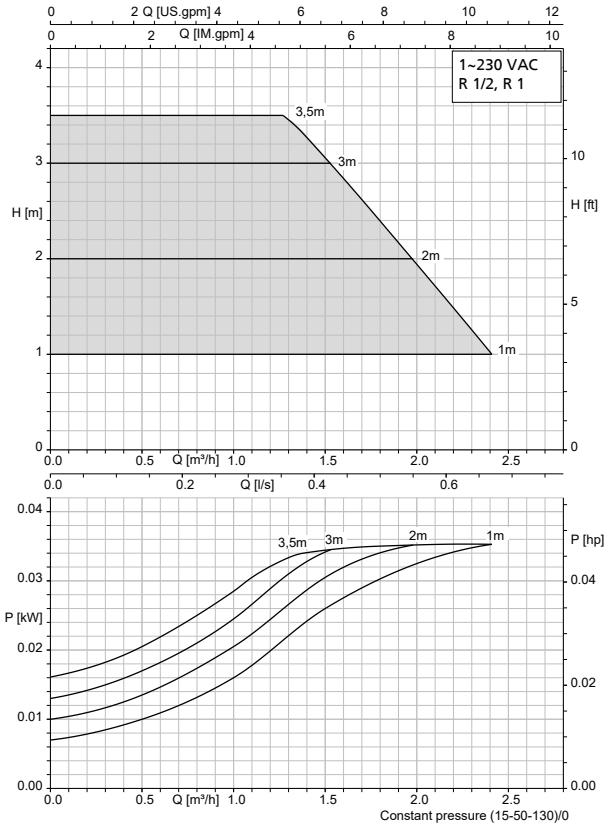
Calio SI 15/25-50 open-loop control



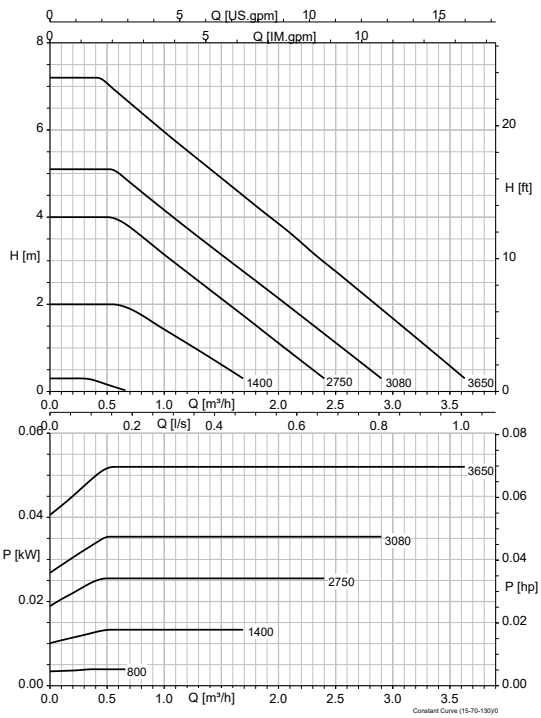
Calio SI 15/25-50 Δpv



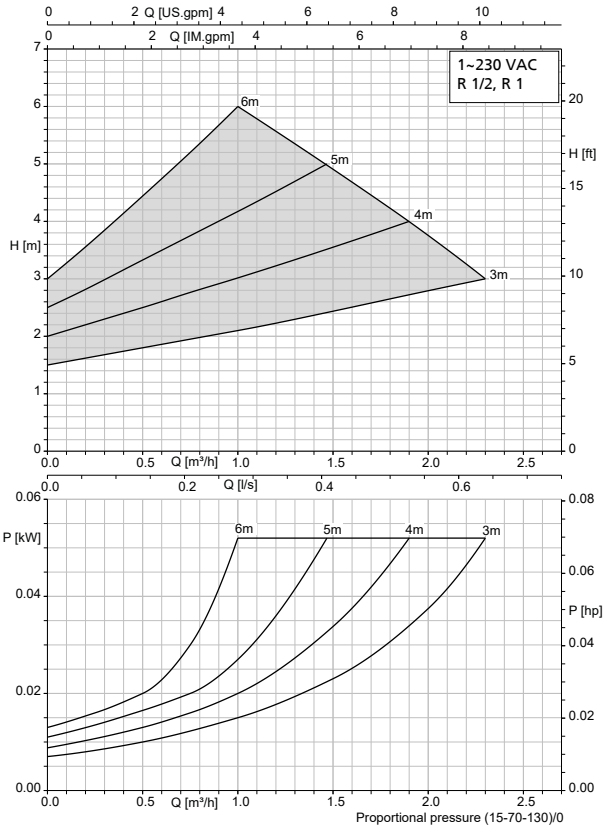
Calio SI 15/25-50 Δpc



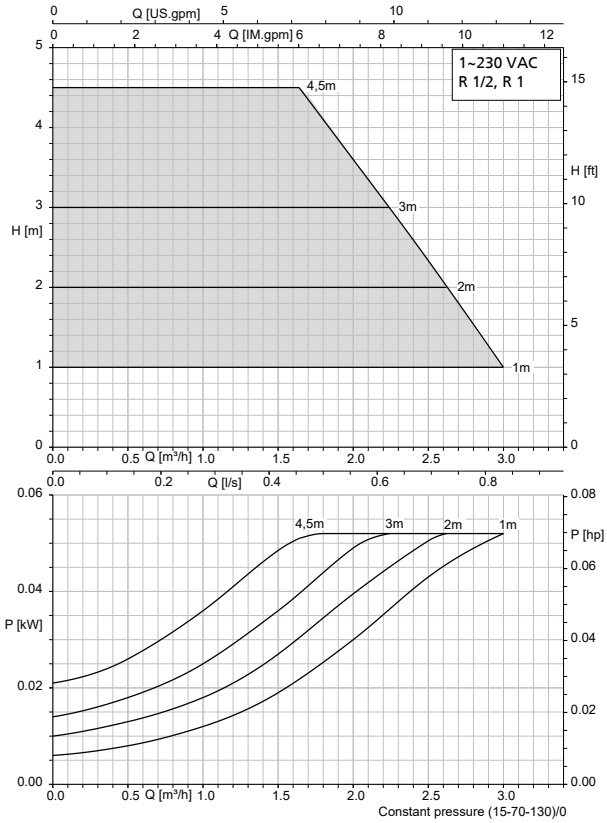
Calio SI 15/25-70 open-loop control



Calio SI 15/25-70 Δpv

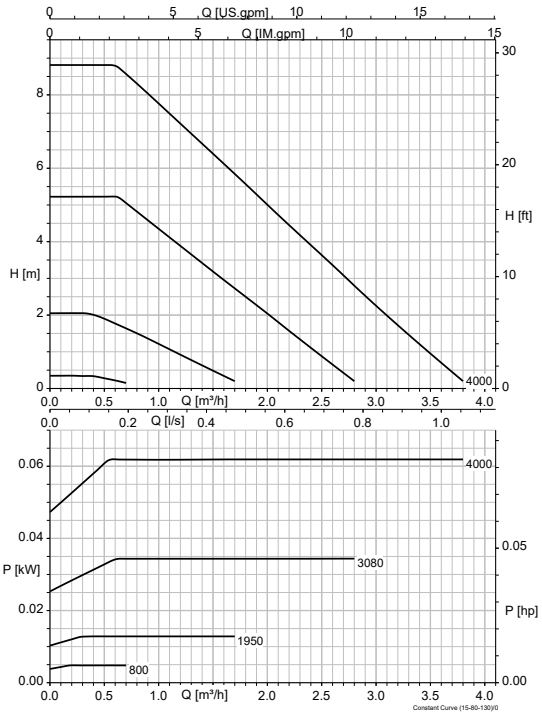


Calio SI 15/25-70 Δpc

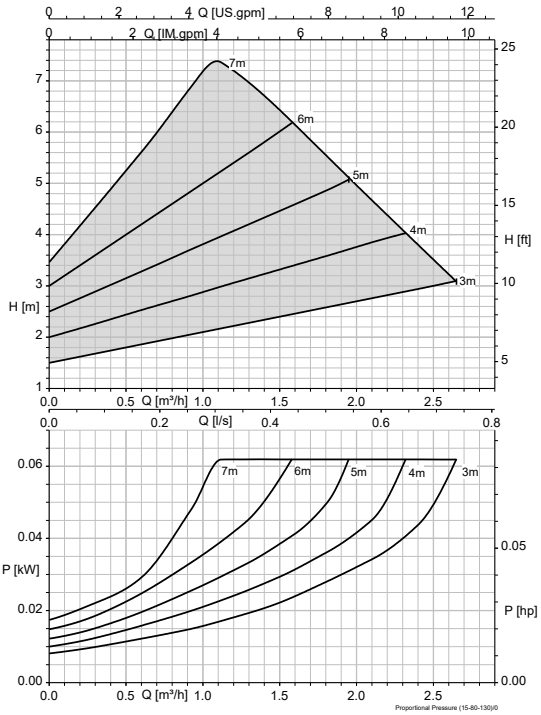


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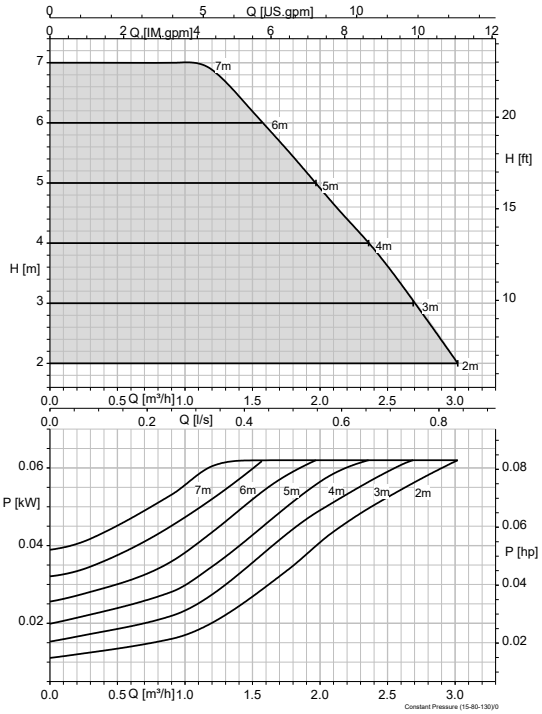
Calio SI 15/25/30-80 open-loop control (operation)



Calio SI 15/25/30-80 Δpv



Calio SI 15/25/30-80 Δpc



Dimensions

Dimensions of Calio SI Dual / Calio SI Therm

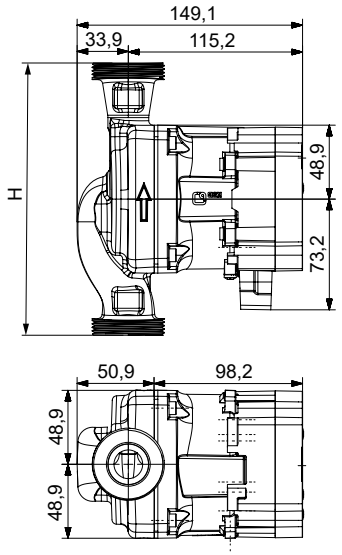


Fig. 7: Pump set dimensions

Table 14: Pump set dimensions

Size	R	G	H
			[mm]
Calio SI Dual			
15-50-130	1/2	1	130
15-70-130	1/2	1	130
15-80-130	1/2	1	130
25-50-130	1	1 1/2	130
25-50-180	1	1 1/2	180
25-70-130	1	1 1/2	130
25-70-180	1	1 1/2	180
25-80-130	1	1 1/2	130
25-80-180	1	1 1/2	180
30-80-180	1 1/4	2	180
Calio SI Therm			
25-70-180	1	1 1/2	180

Installation information

Permissible installation positions

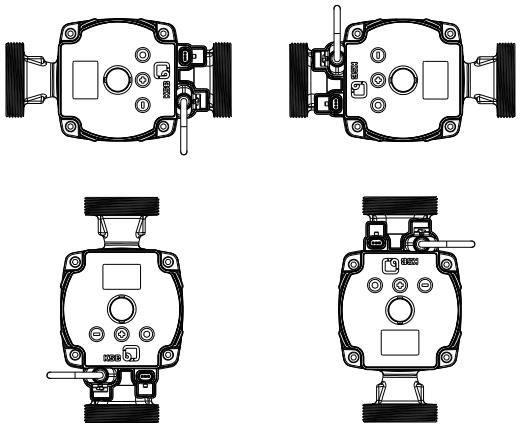


Fig. 8: Permissible installation positions

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Electrical connection

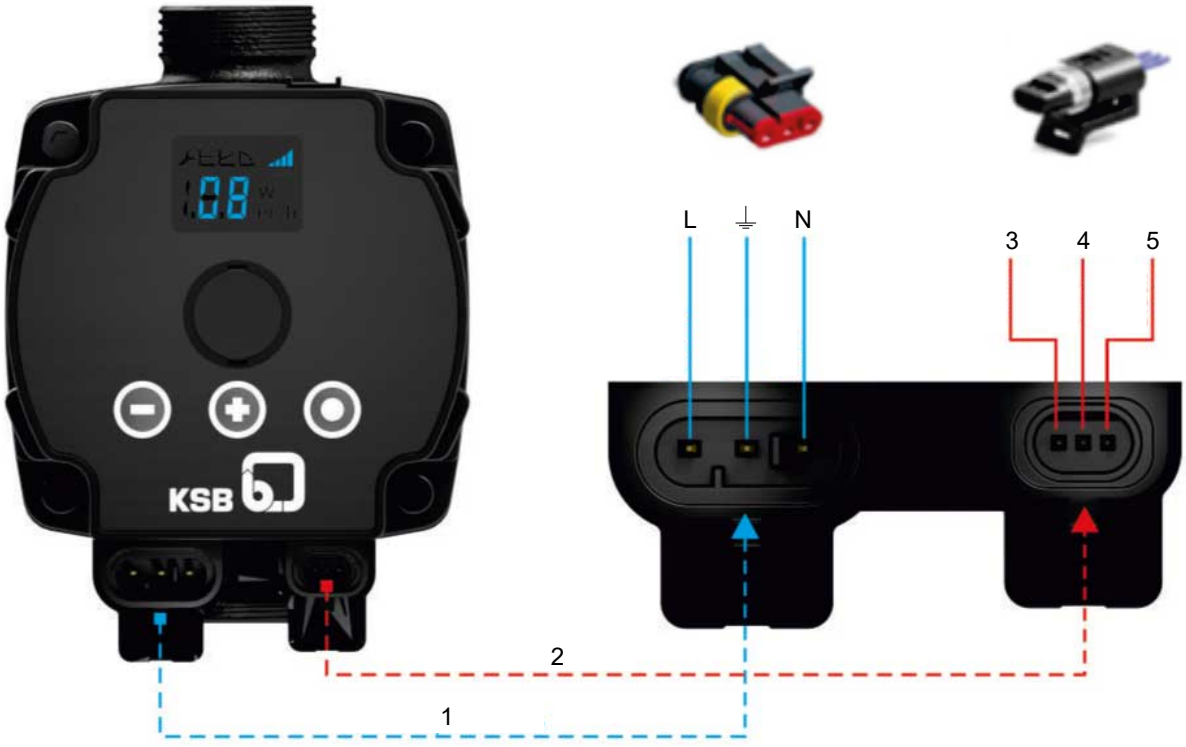


Fig. 9: Connecting the power cable and control cable

1	Connection for power cable	5	Connection for PWM signal (from pump control system to external control system)
2	Connection for control cable	L	Conductor / phase (230 V AC)
3	Connection for PWM signal (from external control system to pump control system)	N	Neutral conductor (230 V AC)
4	Earthing (PWM / analog signal 0 - 10 V)	⏚	Earthing

The pump set is connected to the power supply by means of pre-configured power cables (1).

The control cable connection (5) can be used to connect an external control system.

Scope of supply

- Pump set

Accessories

Table 15: Overview of accessories

Description	Length [m]	Mat. No.
Power cable 230 V	1	11009300
Power cable 230 V	2	11009301
Power cable 230 V	3	11009302
Control cable (PWM / 0-10 V)	0,5	11009400
Control cable (PWM / 0-10 V)	1	11009401
Control cable (PWM / 0-10 V)	2	11009402
Control cable (PWM / 0-10 V)	3	11009403
Thermal insulation shell (left)		S9800214
Thermal insulation shell (right)		S9800217

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