Circulator for OEMs

Calio SI

Type Series Booklet

KSB

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Type Series Booklet Calio SI

Contents

Building Services: Heating

Variable Speed Circulator Pumps

Calio SI

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^2/s

Operating data

Operating properties

Characteristic		Value
Flow rate	Q [m^3/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

1) In the boiler

Design details

Design

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

Drive

- Brushless permanent magnet 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
- 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)
- Vent function
- Deblocking the rotor

Signalling functions and display functions

- Faults via PWM signal

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Designation

Example: Calio SI 15-70-130

Designation key

Code	Description	
SI	Type series	
15	Pipe 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

Overview of available materials

Part No.	Description	Material
102	Volute casing	Grey cast iron
210	Shaft	Ceramics
230	Impeller	Plastic (PES - 35 % glass fibre)
310	Bearings	Ceramics
360	Bearing plate	Stainless steel 1.4401
817	Can	Stainless steel 1.4401

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.
- PWM interface in accordance with VDMA-Einheitsblatt [Standard Sheet] on Communication with External Open-loop/ Closed-loop Control Systems
- High availability due to manual and integrated protective functions

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

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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.

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

Description of the characteristic curve

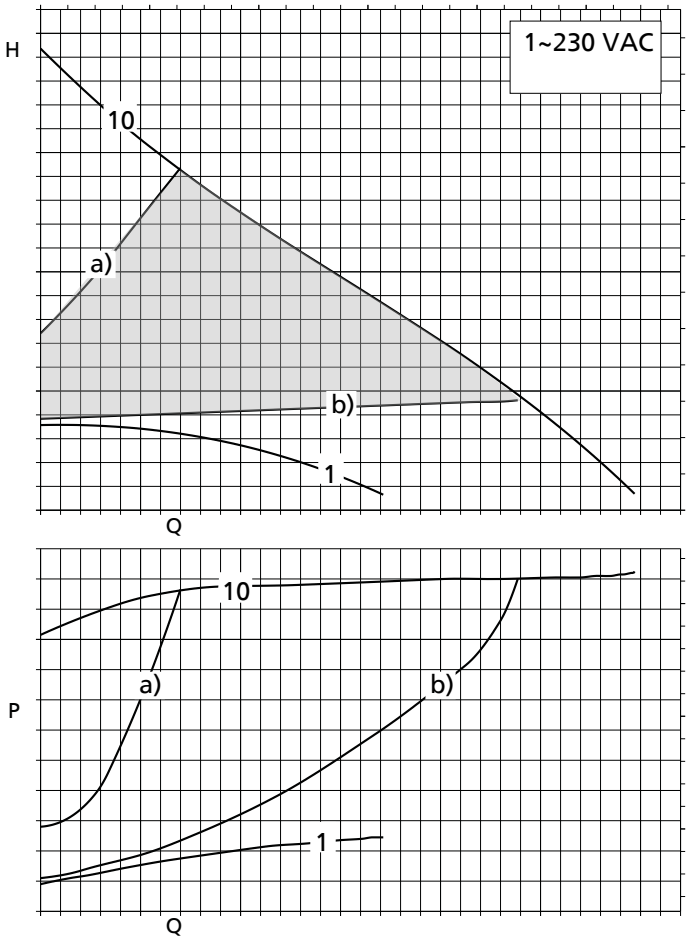

Fig. 1: Selection example

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

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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 sends the flow rate Q to the external control system and, in return, receives the maximum required differential pressure. The pump control system adjusts the speed to achieve the required differential pressure. Profile A for heating applications is stored in the pump software as standard. If no PWM signal is connected, the pump set is operated at maximum speed.

PWM profiles available for selection:

- Profile A for heating applications
- Profile C for solar applications

Operation with PWM profile A (heating applications)

Parameters / statuses sent

Parameter / function	PWM signal [%]	Comments
Parameters / statuses sent by external control system		
Maximum speed	99 - 100	No PWM signal connected: The pump set is operated at maximum speed.
Pump ID	0 - 4	-
Modulation	5 - 91	-
Stand-by	94 - 98	Pump set can still be controlled.

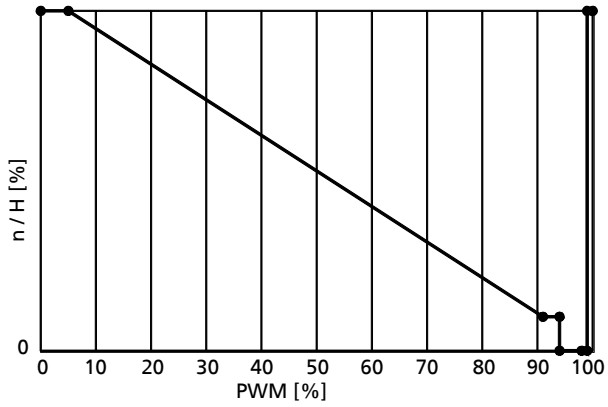

Fig. 2: PWM signal from external control system to pump control system

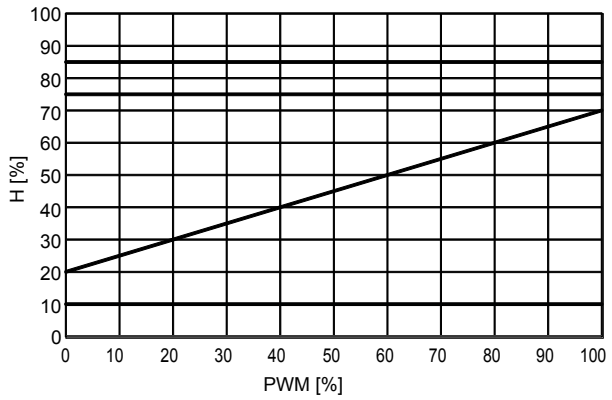

Fig. 3: PWM profile A, PWM signal from pump control system to external control system

Parameters / statuses 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)

Parameters / statuses sent

Parameter / function	PWM signal [%]	Comments
Parameters / statuses sent by external control system		
Maximum speed	91 - 94	No PWM signal connected: Pump set stops.
Pump ID	0 - 4	-
Modulation	5 - 91	-
Stand-by	94 - 100	Pump set can still be controlled.

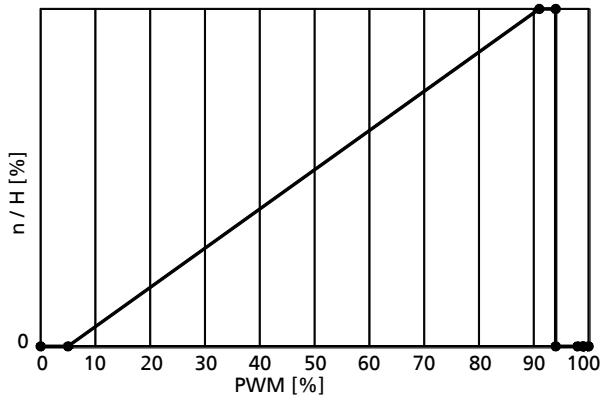

Fig. 4: PWM signal from external control system to pump control system

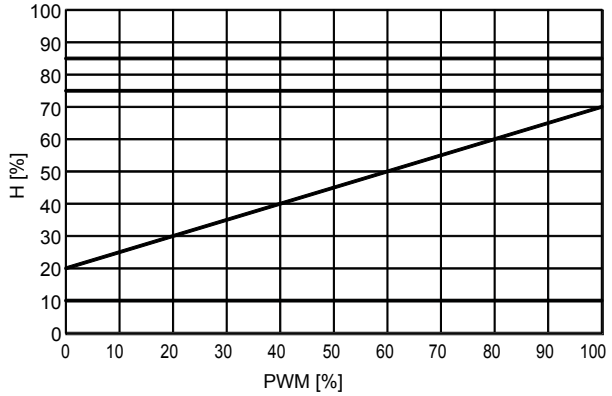

Fig. 5: PWM profile C, PWM signal from the pump to the external control system

Parameters / statuses sent by pump set

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

Speeds depending on the size

Size	Speed	
	Minimum [rpm]	Maximum [rpm]
15-40-130	800	3080
15-50-130	800	3080
15-60-130	800	3080
15-70-130	800	3650
15-75-130	800	3650
25-40-130	800	3080
25-40-180	800	3080
25-50-130	800	3080
25-50-180	800	3080

Size	Speed	
	Minimum [rpm]	Maximum [rpm]
25-60-130	800	3080
25-60-180	800	3080
25-70-130	800	3650
25-70-180	800	3650
25-75-130	800	3650
25-75-180	800	3650
25-80-180	800	4000
30-80-180	800	4000

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Technical data

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Symbols key

Symbol	Description
✗	Available
-	Not available

Technical data

Size	Connection		PN	P_1	Motor protection[2]	Interfaces	I_N	Mat. No.	[kg]
	Piping	Pump	[bar]	[W]			1~230 V AC, 50 / 60 Hz [A]		
15-40-130	R 1/2	G 1	10	25	✗	PWM	0,05 - 0,23	48272018	2,5
15-50-130	R 1/2	G 1	10	33	✗	PWM	0,05 - 0,23	48272019	2,5
15-60-130	R 1/2	G 1	10	39	✗	PWM	0,05 - 0,48	48272020	2,5
15-70-130	R 1/2	G 1	10	52	✗	PWM	0,05 - 0,48	48272021	2,5
15-75-130	R 1/2	G 1	10	62	✗	PWM	0,05 - 0,48	48272022	2,5
25-40-130	R 1	G 1 1/2	10	25	✗	PWM	0,05 - 0,23	48272023	2,5
25-40-180	R 1	G 1 1/2	10	25	✗	PWM	0,05 - 0,23	48272024	2,7
25-50-130	R 1	G 1 1/2	10	33	✗	PWM	0,05 - 0,23	48272025	2,5
25-50-180	R 1	G 1 1/2	10	33	✗	PWM	0,05 - 0,23	48272026	2,7
25-60-130	R 1	G 1 1/2	10	39	✗	PWM	0,05 - 0,48	48272027	2,5
25-60-180	R 1	G 1 1/2	10	39	✗	PWM	0,05 - 0,48	48272028	2,7
25-70-130	R 1	G 1 1/2	10	52	✗	PWM	0,05 - 0,48	48272029	2,5
25-70-180	R 1	G 1 1/2	10	52	✗	PWM	0,05 - 0,48	48272030	2,7
25-75-130	R 1	G 1 1/2	10	62	✗	PWM	0,05 - 0,48	48272031	2,7
25-75-180	R 1	G 1 1/2	10	62	✗	PWM	0,05 - 0,48	48272032	2,7
25-80-180	R 1	G 1 1/2	10	62	✗	PWM	0,05 - 0,48	48242090	2,7
30-80-180	R 1 1/4	G 2	10	62	✗	PWM	0,05 - 0,48	48242091	2,9

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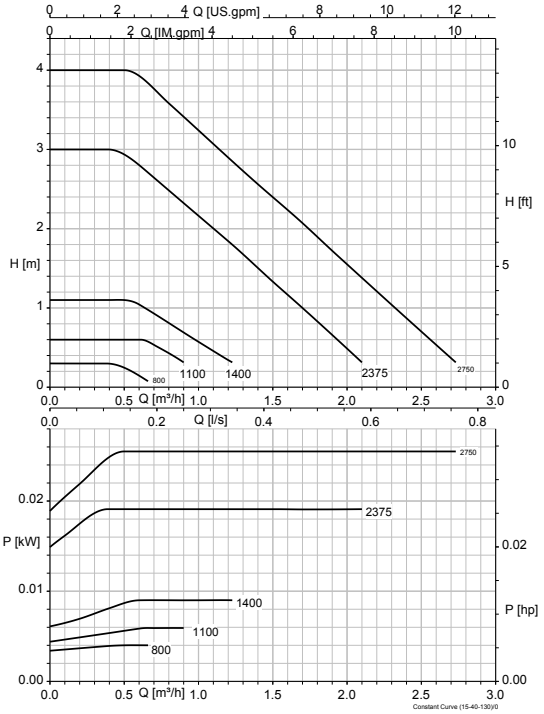
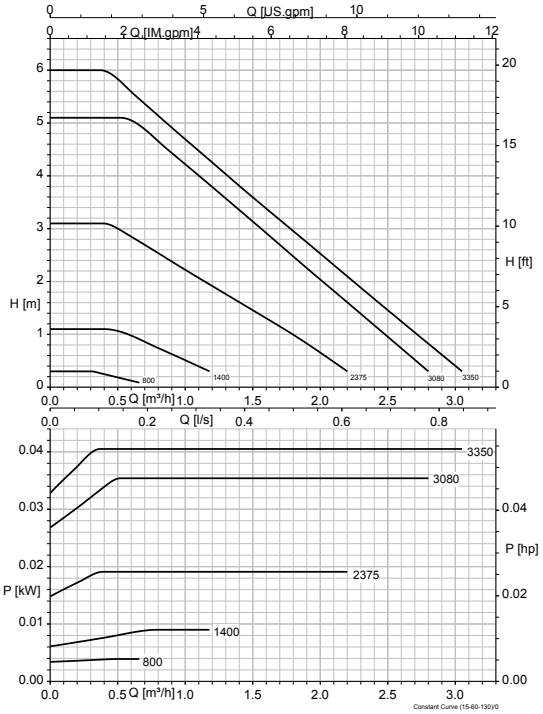
2) Integrated electronic motor protection

Characteristic curves

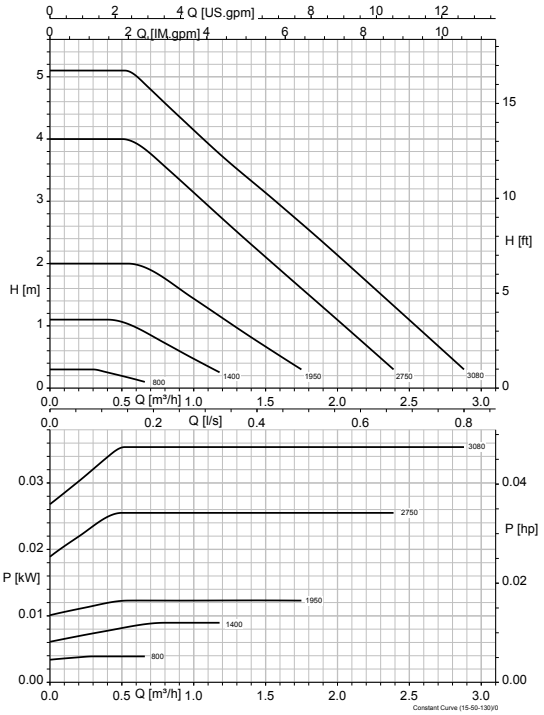
Calio SI 15/25-40 open-loop control



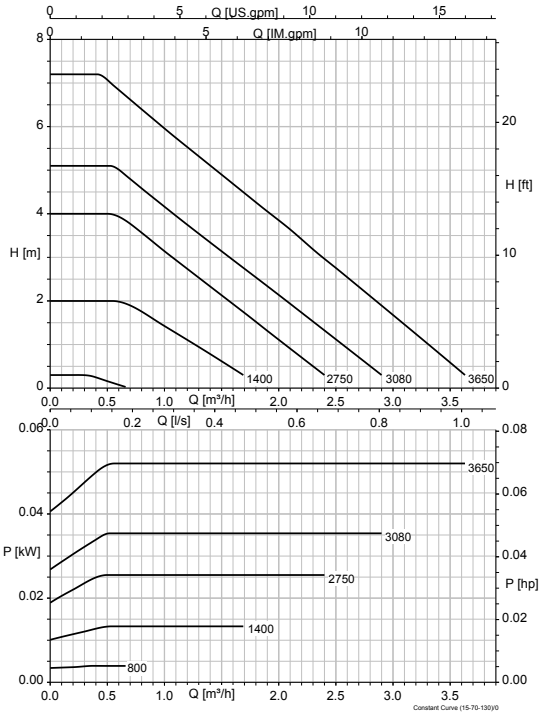
Calio SI 15/25-60 open-loop control



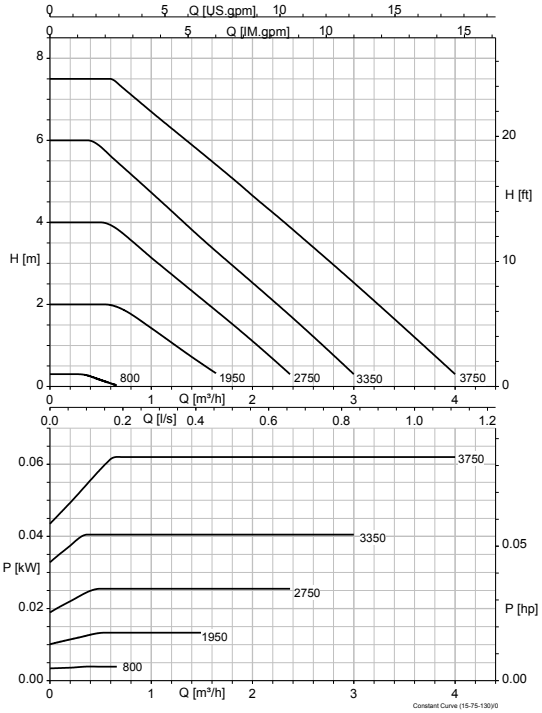
Calio SI 15/25-50 open-loop control



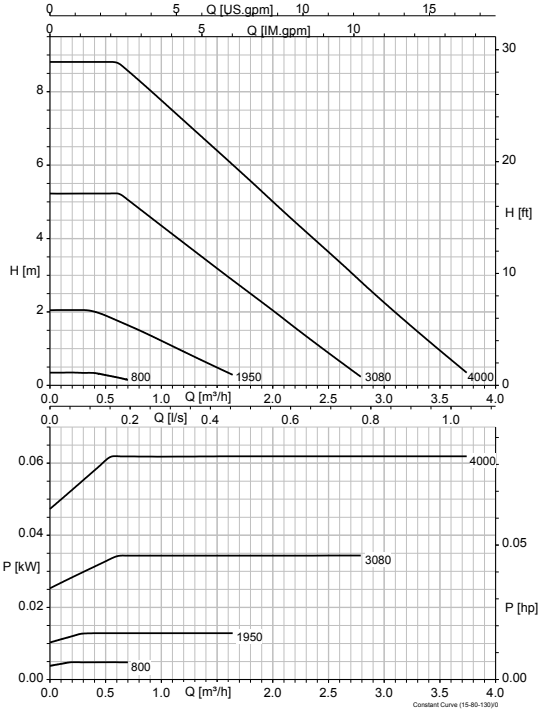
Calio SI 15/25-70 open-loop control



Calio SI 15/25-75 open-loop control



Calio SI 25/30-80 open-loop control



Dimensions

Pump set dimensions

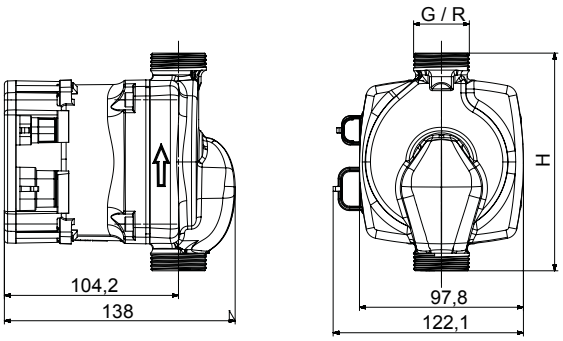


Fig. 6: Pump set dimensions

Pump set dimensions

Size	R	G	H
			[mm]
15-40-130	1/2	1	130
15-50-130	1/2	1	130
15-60-130	1/2	1	130
15-70-130	1/2	1	130
15-75-130	1/2	1	130
25-40-130	1	1 1/2	130
25-40-180	1	1 1/2	180
25-50-130	1	1 1/2	130
25-50-180	1	1 1/2	180
25-60-130	1	1 1/2	130
25-60-180	1	1 1/2	180
25-70-130	1	1 1/2	130
25-70-180	1	1 1/2	180
25-75-130	1	1 1/2	130
25-75-180	1	1 1/2	180
25-80-180	1	1 1/2	180
30-80-180	1 1/4	2	180

Installation information

Permissible installation positions

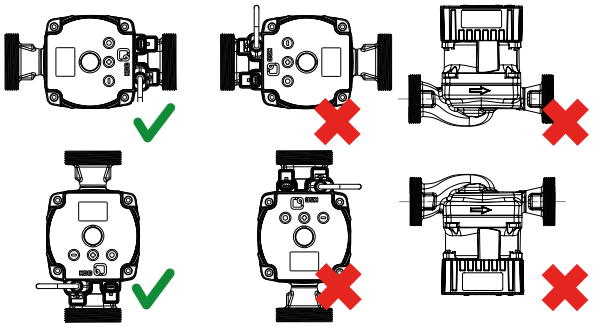


Fig. 7: Permissible installation positions

Scope of supply

- Pump set

Accessories

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 230 V	0,5	11009400
Control cable 230 V	1	11009401
Control cable 230 V	2	11009402
Control cable 230 V	3	11009403
Thermal insulation shell (left)		S9800214
Thermal insulation shell (right)		S9800217

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