High-efficiency Heating Circulator

Calio Pro

Type Series Booklet

KSB

Legal information/Copyright

Type Series Booklet Calio Pro

Contents

Building Services: Heating

Variable Speed Circulator Pumps

Calio Pro

Main applications

- Heating, ventilation, air-conditioning, cooling and 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
- Higher-viscosity fluids (water/glycol mixture up to a mixing ratio of 1:1)

Operating data

Table 1: Operating properties

Characteristic		Value
Flow rate	Q [m³/h]	≤ 24
	Q [l/s]	≤ 6,7
Head	H [m]	≤ 12
Fluid temperature	T [°C]	≥ -10
		≤ +110
Ambient temperature	T [°C]	≥ 0
		≤ +40[1)]
Operating pressure	p [bar]	≤ 16
Pressure class	PN [bar]	6/10/16
Average sound pressure level	[dB (A)]	< 40
Screw-ended connection	G	1 1/2 - 2
Flanged connection	DN	32 - 65

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
- Enclosure IPX4D
- Thermal class F
- Temperature class TF 110
- Energy efficiency index EEI ≤ 0.20
- Interference emissions EN 55014-1, EN 61000-3-2, EN 61000-3-3
- Interference immunity EN 55014-2

Bearings

- Product-lubricated special plain bearing

Connections

- Screw-ended or flanged

Operating modes

- Constant-pressure control
- Proportional-pressure control
- Dynamic Control
- Open-loop control with 3 speed levels

Automatic functions

- Continuously variable speed adjustment depending on the mode of operation
- Dual-pump operation
- Deblocking function
- Self-venting function of the pump casing
- Soft start
- Full motor protection with integrated trip electronics

Manual functions

- Setting the operating mode
- Setting the discharge head setpoint
- Setting the speed level
- Rotor space venting function
- Locking the control panel

1157.520/02-EN

1 Ambient temperature ≤ + 30 °C at a fluid temperature > 90 °C

Signalling functions and display functions

- Display of the set head
- Display of the speed level
- Display of the pump set status (running / not running)
- Error codes indicated on the display
- General fault message (volt-free changeover contact)

Designation

Example: Calio Pro 25-40

Table 2: Designation key

Code	Description	
Calio Pro	Type series	
	-[2]	Single pump
	Z	Twin pump
25	Connection	
	25	G 1 1/2
	30	G 2
	32	DN 32
	40	DN 40
	50	DN 50
	65	DN 65
40	Head H[3] [m]	
	40	Head × 10 Example: 4 m × 10 = 40

Materials

Table 3: Overview of available materials

Part No.	Description	Material
102	Volute casing	Grey cast iron with cathodic electrocoating (EN-GJL-200)
210	Shaft	Stainless steel 1.4034
230	Impeller	Glass fibre reinforced plastic (PSU-GF30)
310	Bearing	Ceramics / carbon
689	Thermal insulation shells	Polypropylene
817	Can	Glass fibre reinforced plastic (PPS-GF40)

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

Product benefits

- High-efficiency technology combined with speed control and efficient operation by means of **Dynamic Control** offer maximum savings.
- Future-proof by maximum energy efficiency, exceeding current energy efficiency regulations such as ErP 2015.
- All-in concept saves investment costs and commissioning costs.
- Easy-to-use combination of controls, integrated display and symbols to show the operating status
- High availability by dual-pump operation and integrated protective functions

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 4: Overview

Label	Effective in:	Comment
	Europe	EEI ≤ 0,20

2 Blank
3 At flow rate Q = 0 m³/h

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]
≤ 80	0,5
81 to 95	1,5
96 to 110	2,5

Permissible fluid temperature

Table 6: Temperature limits of the fluid handled

Permissible fluid temperature	Value
Maximum	+110 °C
Minimum	-10 °C

Permissible ambient temperature

Table 7: Permissible ambient temperatures specified for the fluid temperature

Fluid temperature	Permissible ambient temperature
[°C]	[°C]
≤ +90	+40
≤ +110	+30

Description of the Dynamic Control function

The dynamic control (2) system detects when the selected control curve (3) is higher than the minimum characteristic curve[4] (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.

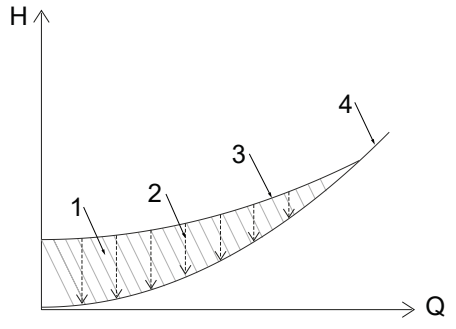


Fig. 1: Principle of Dynamic Control

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

4 Characteristic curve at fully open thermostatic valves

1157.520/02-EN

Description of the characteristic curve

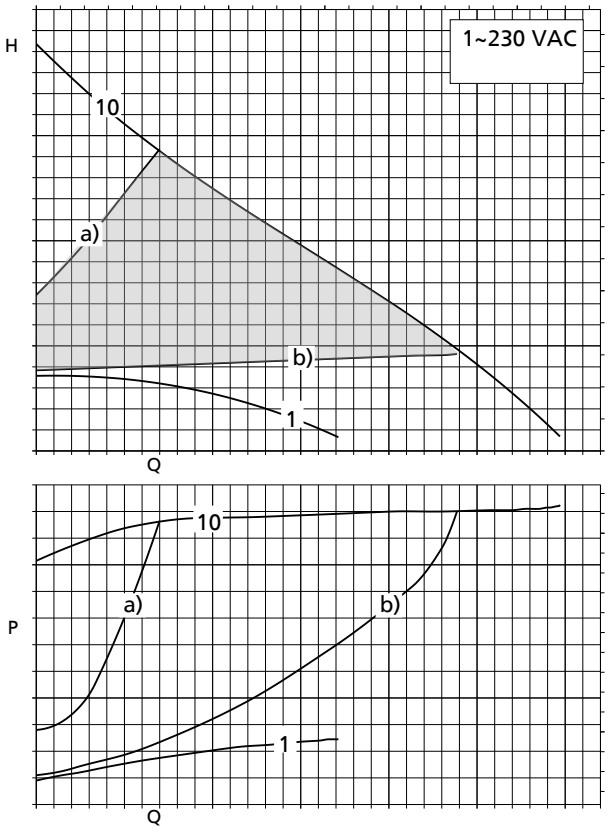


Fig. 2: Selection example

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

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 Pro

Table 8: Technical data

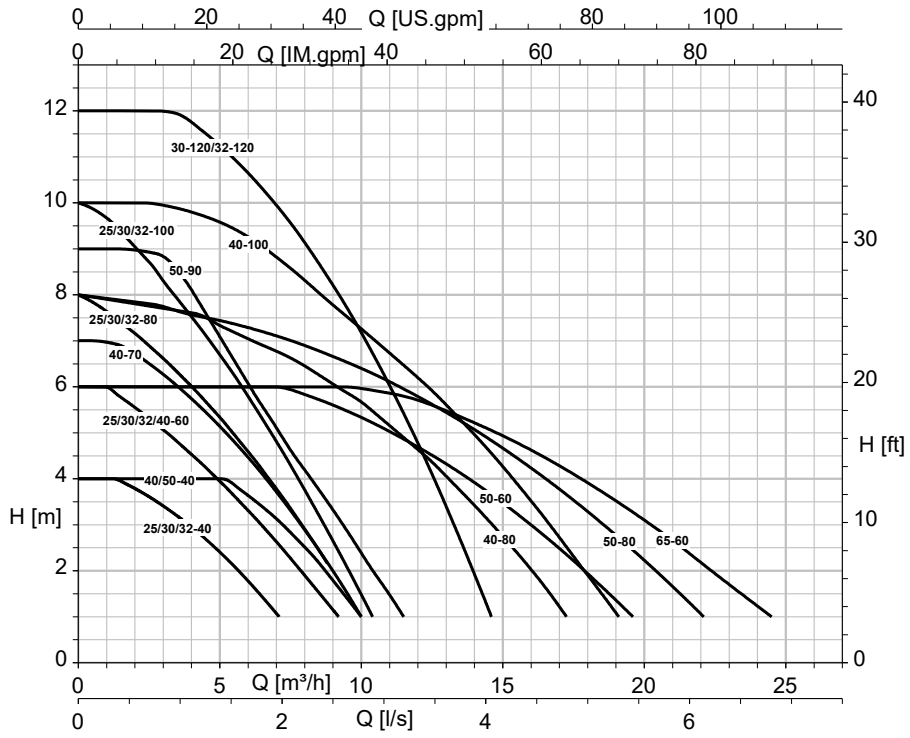
Size	Connection		PN	n		P_1	I_N	Mat. No.	[kg]
	Piping	Pump	[bar]	Min.	Max.	[W]	1~230 V AC, 50 Hz/60 Hz		
				[rpm]	[rpm]		[A]		
25-40	R 3/4, R 1[5)]	G 1 1/2	6/10/16	1000	3200	7 - 80	0,15 - 0,80	29135107	5,38
25-60	R 3/4, R 1[5)]	G 1 1/2	6/10/16	1000	3700	7 - 125	0,15 - 1,00	29135108	5,38
25-80	R 3/4, R 1[5)]	G 1 1/2	6/10/16	1000	4200	7 - 165	0,15 - 1,00	29135116	5,38
25-100	R 3/4, R 1[5)]	G 1 1/2	6/10/16	1000	4700	7 - 185	0,15 - 1,05	29135117	5,68
30-40	R 1 1/4[5)]	G 2	6/10/16	1000	3100	7 - 70	0,15 - 0,70	29135109	5,58
30-60	R 1 1/4[5)]	G 2	6/10/16	1000	3700	7 - 120	0,15 - 1,00	29135110	5,58
30-80	R 1 1/4[5)]	G 2	6/10/16	1000	4200	7 - 160	0,15 - 1,05	29135118	5,58
30-100	R 1 1/4[5)]	G 2	6/10/16	1000	4600	7 - 185	0,15 - 1,05	29135119	5,88
30-120	R 1 1/4[5)]	G 2	6/10/16	1000	4100	8 - 340	0,15 - 1,50	29135125	6,52
32-40	DN 32	DN 32	6/10/16	1000	3100	7 - 70	0,15 - 0,70	29135111	8,74
32-60	DN 32	DN 32	6/10/16	1000	3700	7 - 110	0,15 - 1,00	29135112	8,74
32-80	DN 32	DN 32	6/10/16	1000	4100	7 - 155	0,15 - 1,05	29135120	8,74
32-100	DN 32	DN 32	6/10/16	1000	4600	7 - 180	0,15 - 1,05	29135121	9,04
32-120	DN 32	DN 32	6/10/16	1000	4000	8 - 310	0,15 - 1,40	29135126	9,68
40-40	DN 40	DN 40	6/10/16	1000	3300	7 - 95	0,15 - 0,90	29135113	8,76
40-60	DN 40	DN 40	6/10/16	1000	3800	7 - 110	0,15 - 1,05	29135114	8,76
40-70	DN 40	DN 40	6/10/16	1000	4100	7 - 135	0,15 - 1,05	29135122	8,76
40-80	DN 40	DN 40	6/10/16	1000	3700	8 - 290	0,15 - 1,40	29135127	11,55
40-90	DN 40	DN 40	6/10/16	1000	4700	7 - 195	0,15 - 1,05	29135123	9,06
40-100	DN 40	DN 40	6/10/16	1000	4100	8 - 390	0,15 - 1,85	29135128	11,55
50-40	DN 50	DN 50	6/10/16	1000	3300	7 - 130	0,15 - 1,05	29135115	9,98
50-60	DN 50	DN 50	6/10/16	1000	3400	8 - 270	0,15 - 1,25	29135129	12,93
50-80	DN 50	DN 50	6/10/16	1000	3800	8 - 330	0,15 - 1,50	29135130	12,93
50-90	DN 50	DN 50	6/10/16	1000	4800	7 - 175	0,15 - 1,05	29135124	10,28
65-60	DN 65	DN 65	6/10/16	1000	3200	8 - 370	0,15 - 1,80	29135131	17,62

1157.520/02-EN

5 Connection using pump pipe unions (accessories)

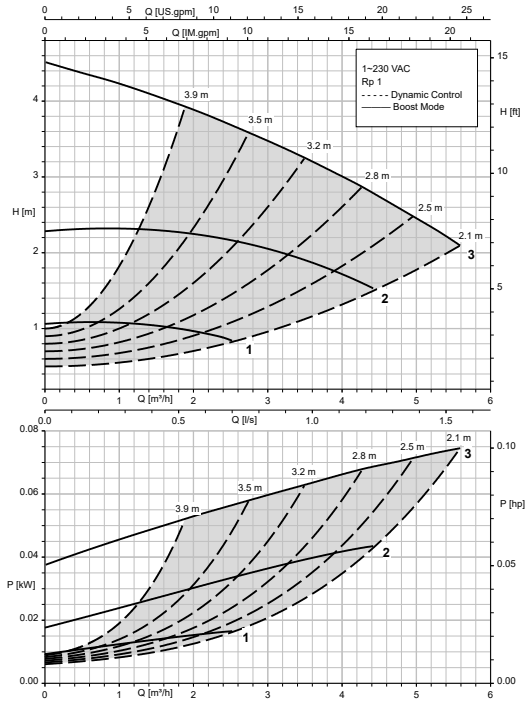
Selection chart

Calio Pro

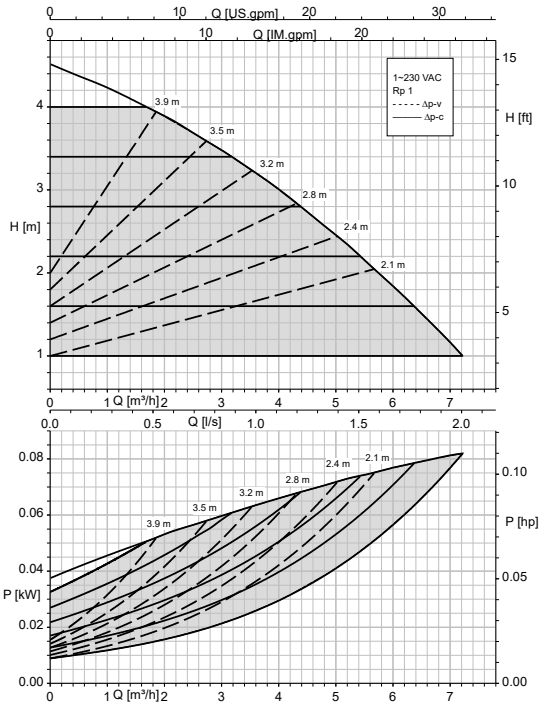


Characteristic curves

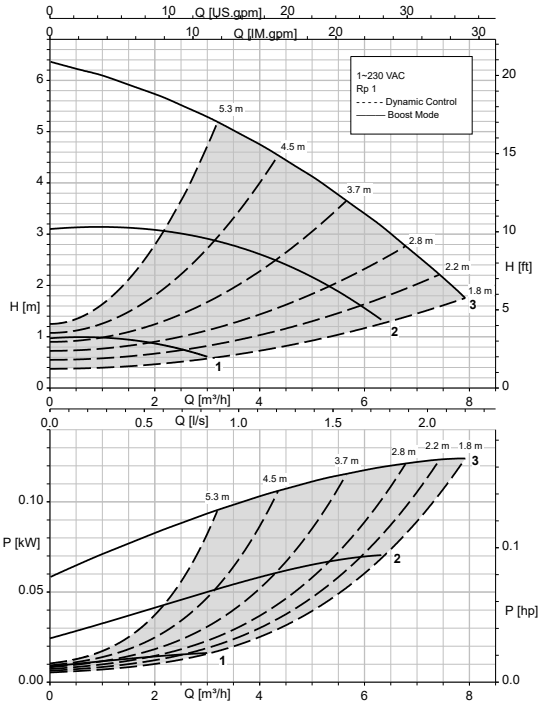
Calio Pro 25-40 Open-loop Control, Dynamic Control



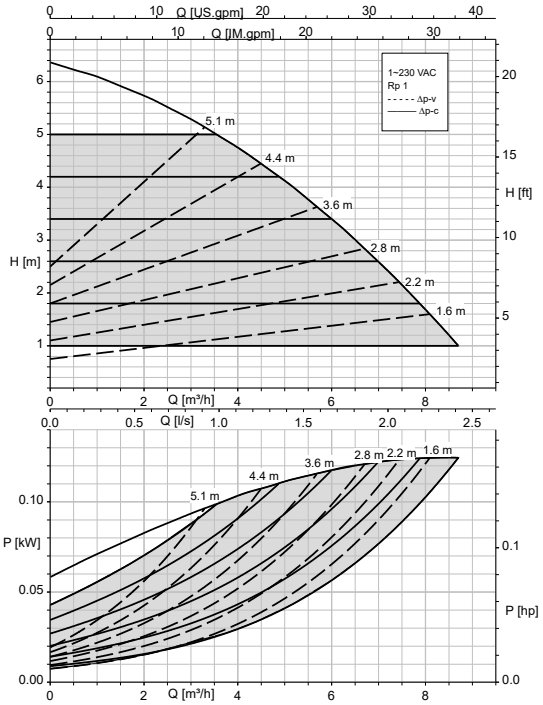
Calio Pro 25-40 Δpv, Δpc



Calio Pro 25-60 Open-loop Control, Dynamic Control

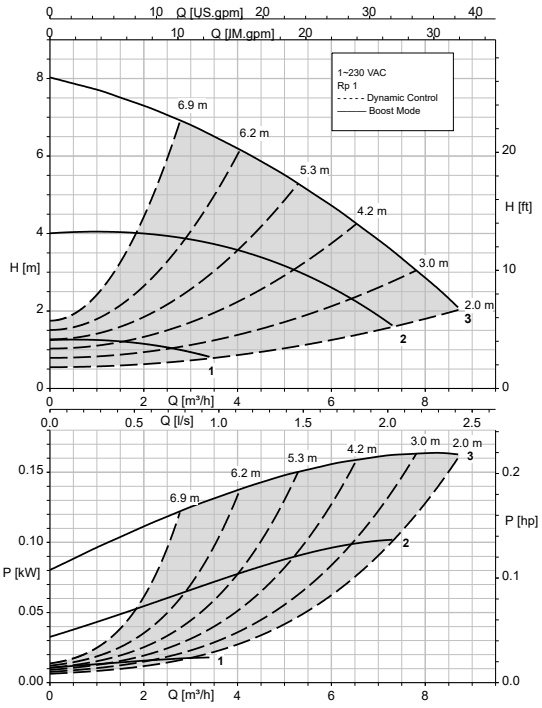


Calio Pro 25-60 Δpv, Δpc

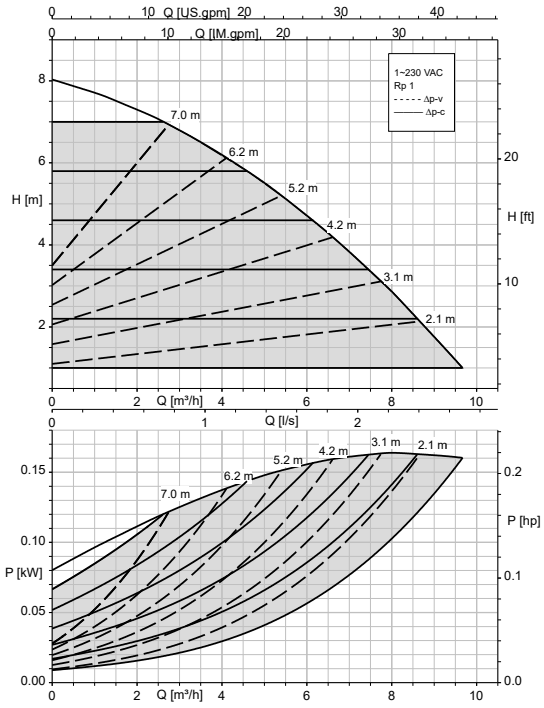


1157.520/02-EN

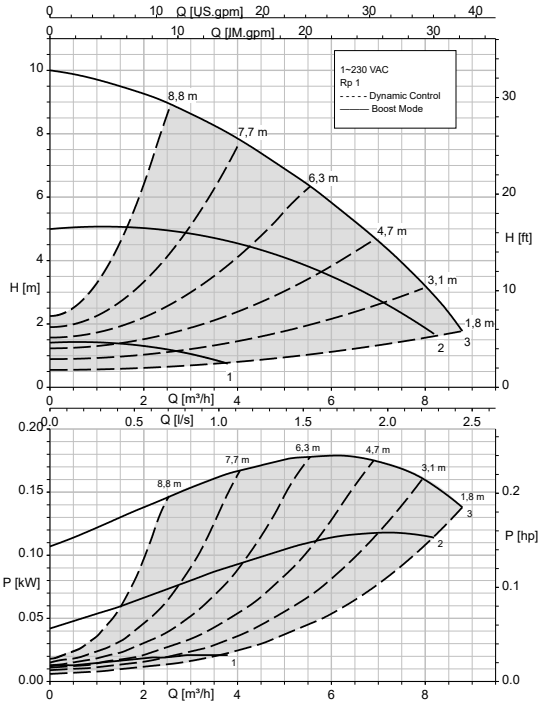
Calio Pro 25-80 Open-loop Control, Dynamic Control



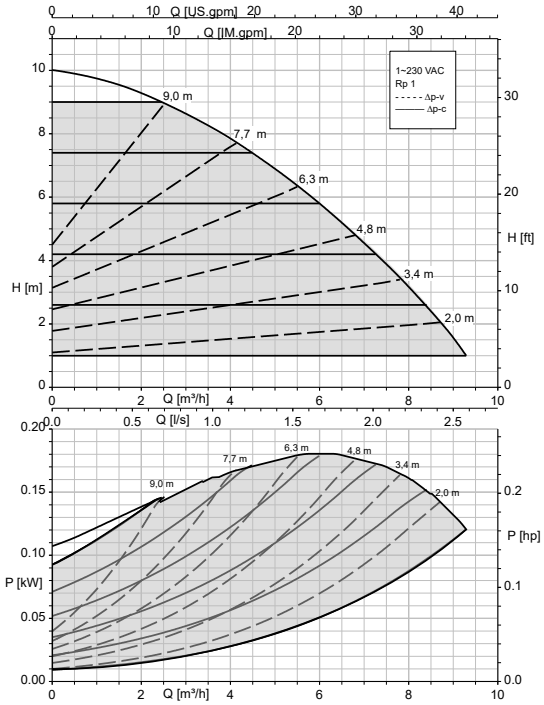
Calio Pro 25-80 Δpv, Δpc



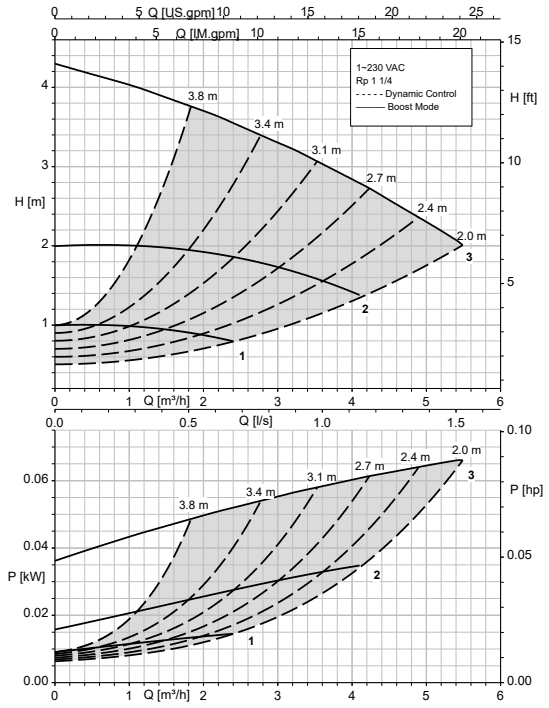
Calio Pro 25-100 Open-loop Control, Dynamic Control



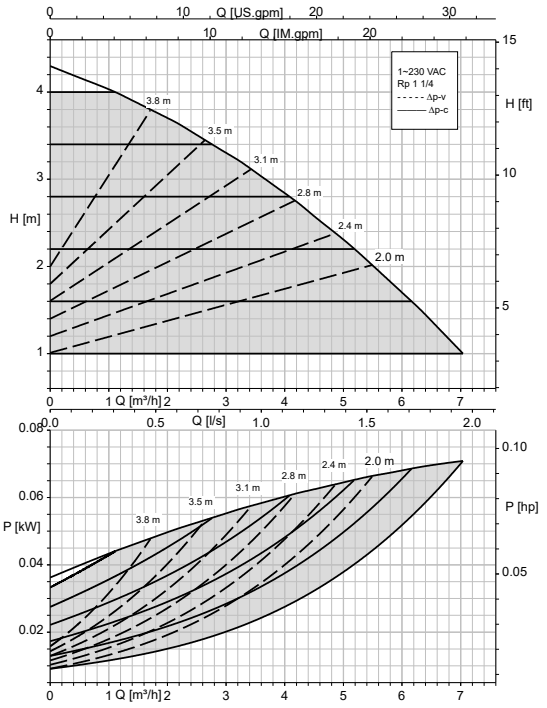
Calio Pro 25-100 Δpv, Δpc



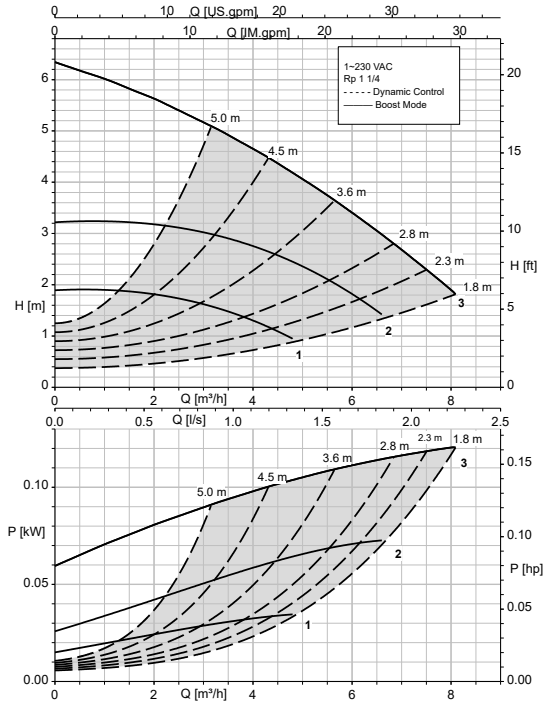
Calio Pro 30-40 Open-loop Control, Dynamic Control



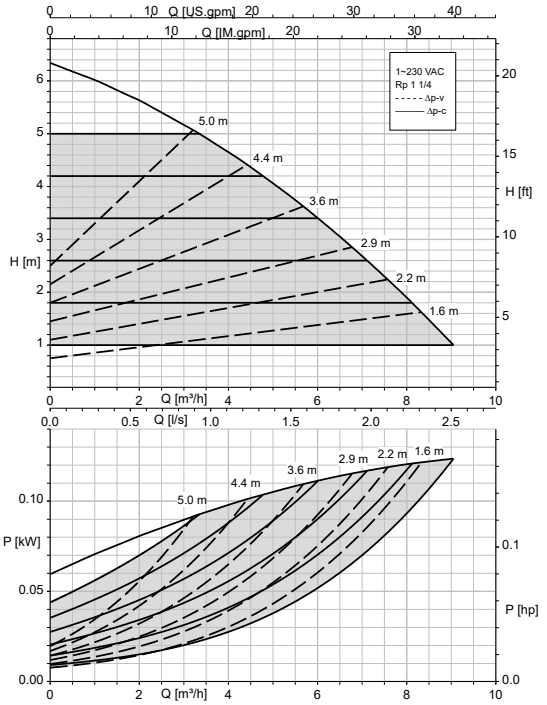
Calio Pro 30-40 Δpv, Δpc



Calio Pro 30-60 Open-loop Control, Dynamic Control

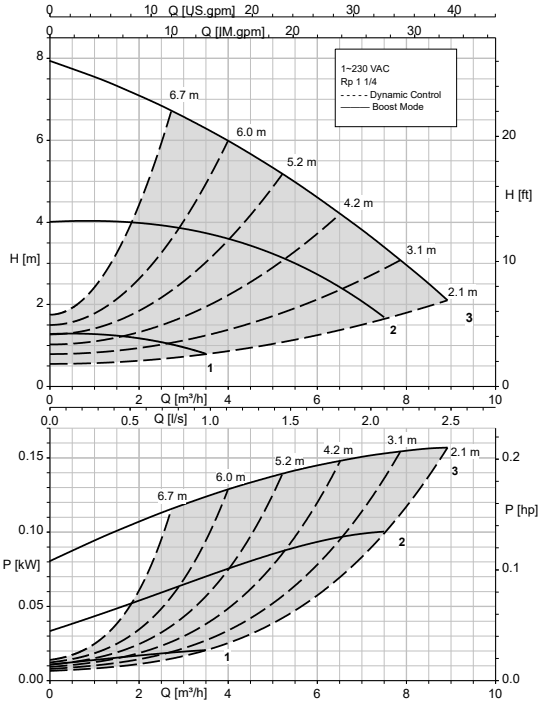


Calio Pro 30-60 Δpv, Δpc

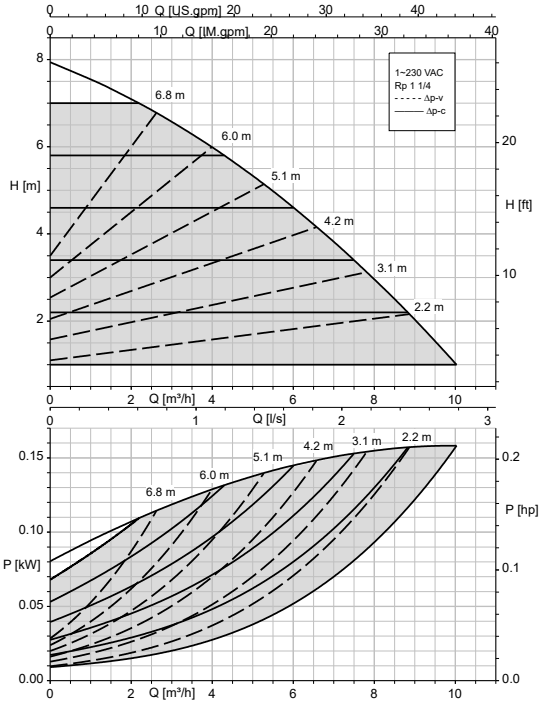


1157.520/02-EN

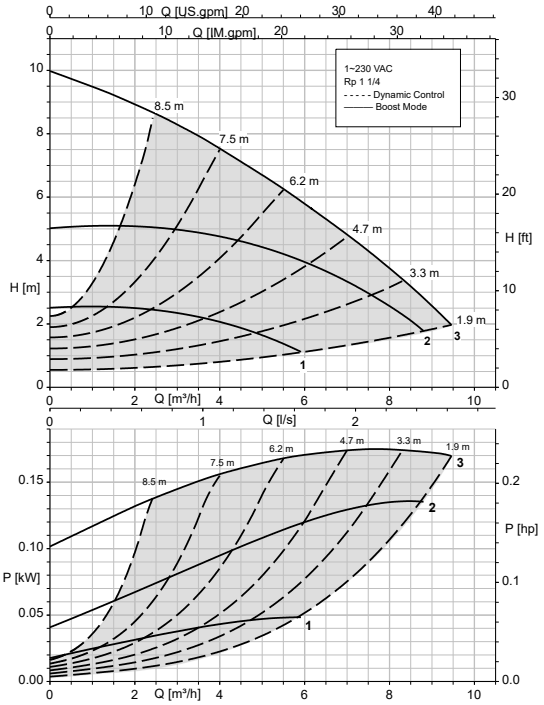
Calio Pro 30-80 Open-loop Control, Dynamic Control



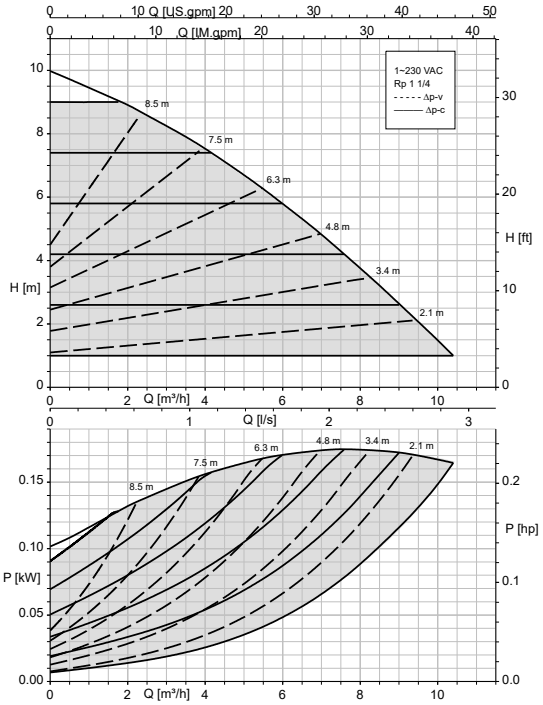
Calio Pro 30-80 Δpv, Δpc



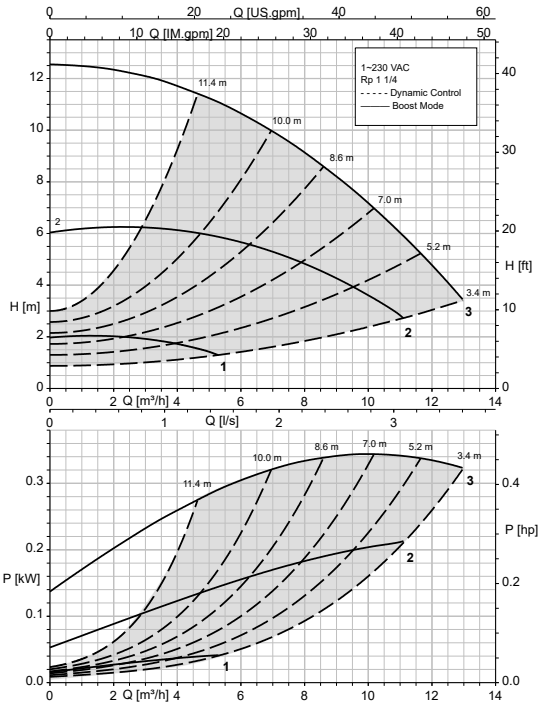
Calio Pro 30-100 Open-loop Control, Dynamic Control



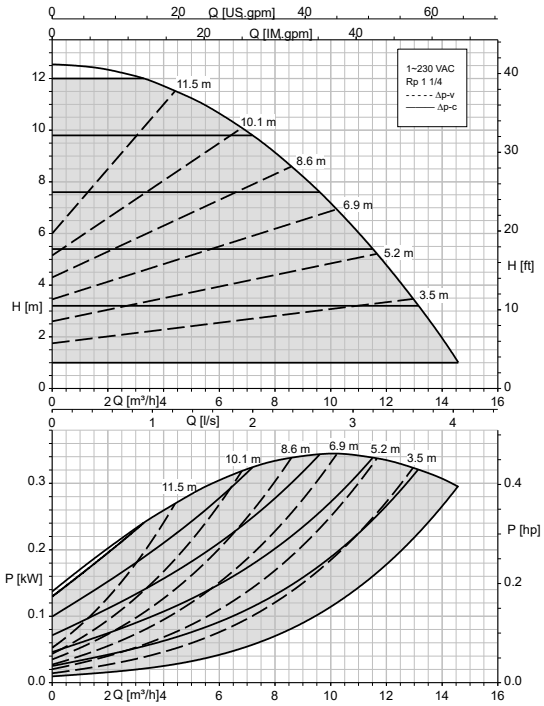
Calio Pro 30-100 Δpv, Δpc



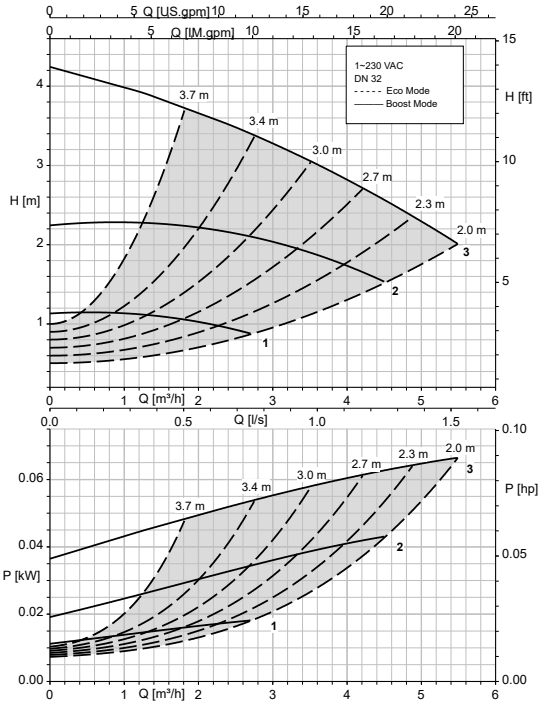
Calio Pro 30-120 Open-loop Control, Dynamic Control



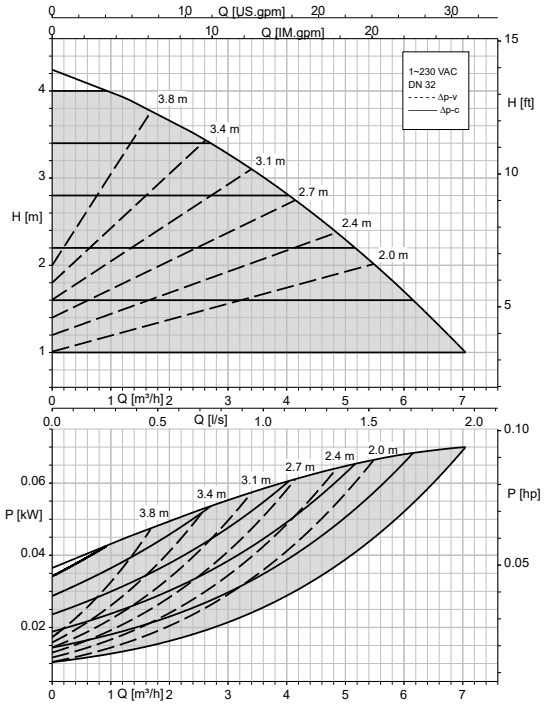
Calio Pro 30-120 Δpv, Δpc



Calio Pro 32-40 Open-loop Control, Dynamic Control

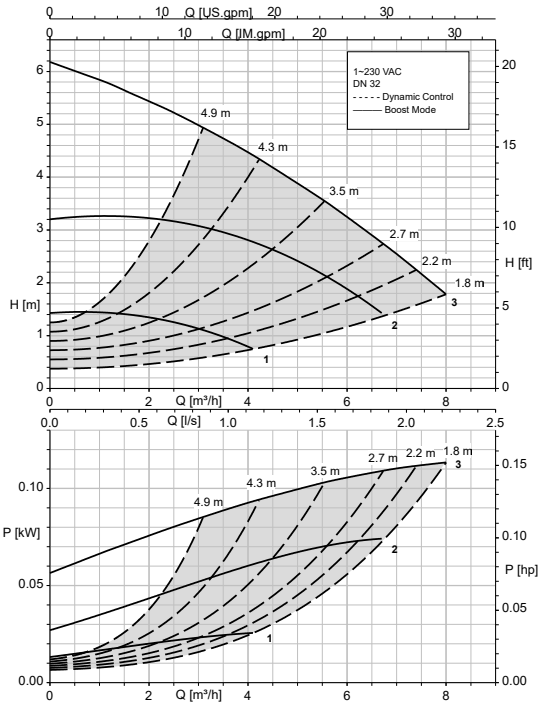


Calio Pro 32-40, Δpv, Δpc

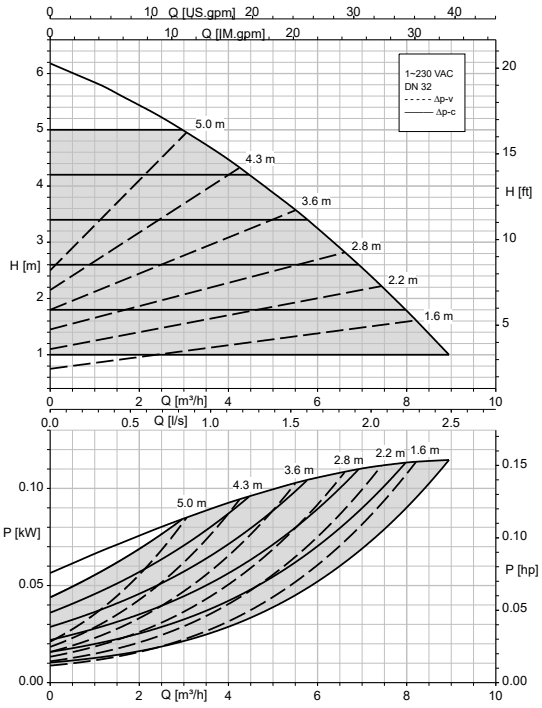


1157.520/02-EN

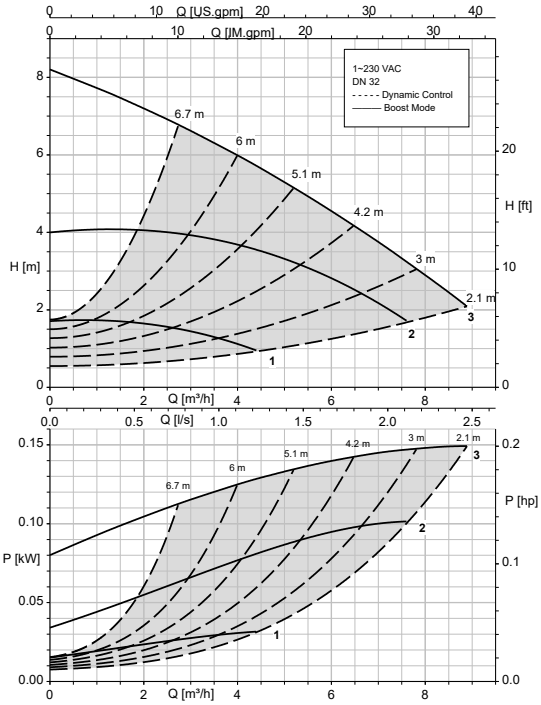
Calio Pro 32-60 Open-loop Control, Dynamic Control



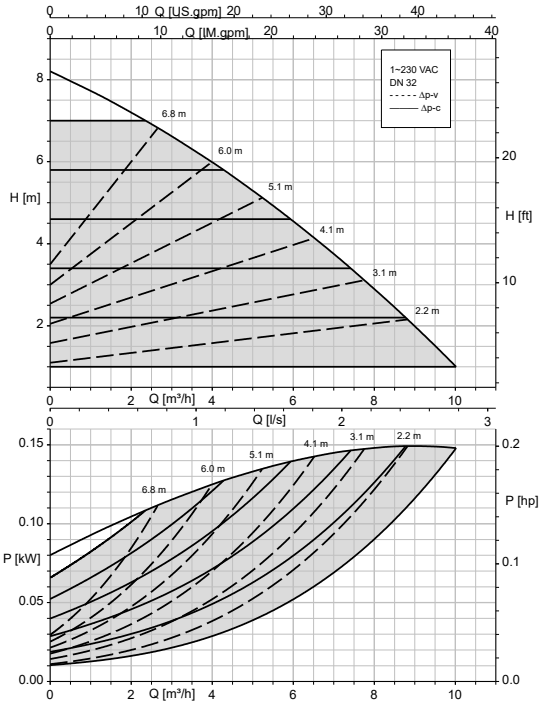
Calio Pro 32-60 Δpv, Δpc



Calio Pro 32-80 Open-loop Control, Dynamic Control

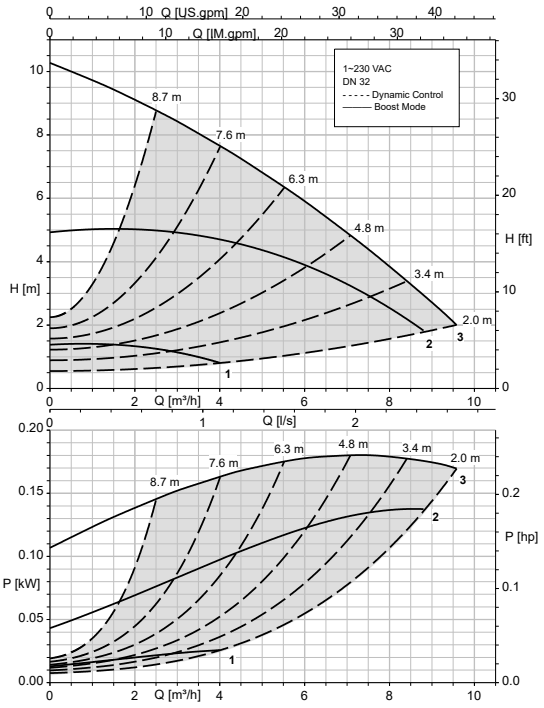


Calio Pro 32-80 Δpv, Δpc

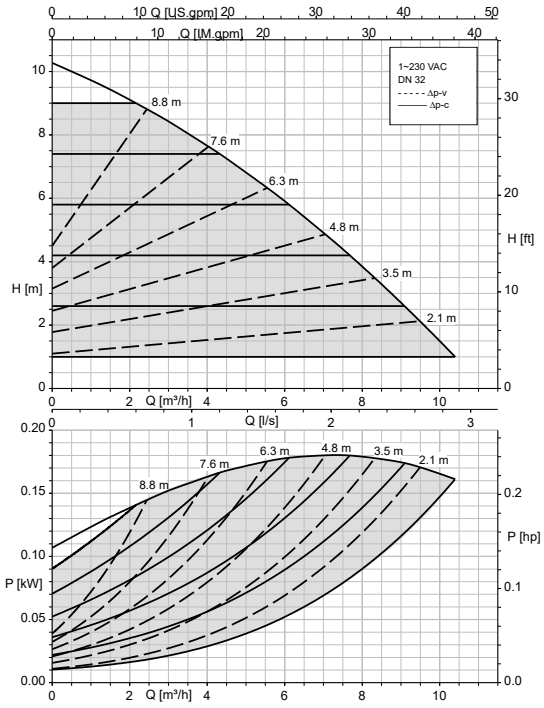


1157.520/02-EN

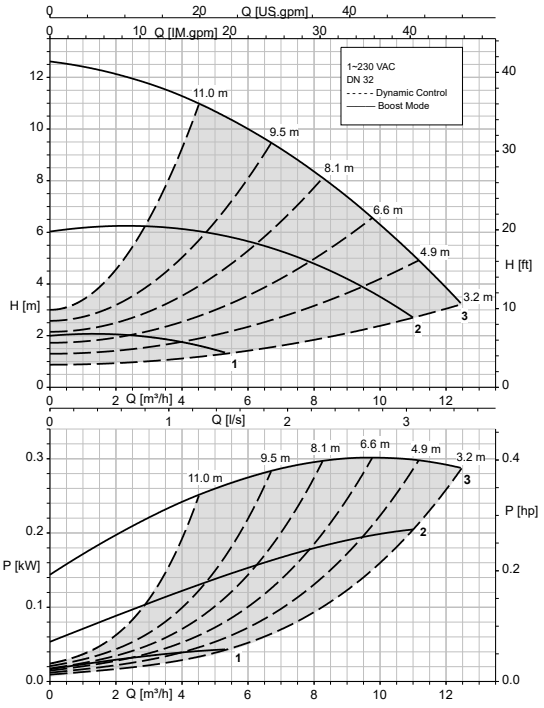
Calio Pro 32-100 Open-loop Control, Dynamic Control



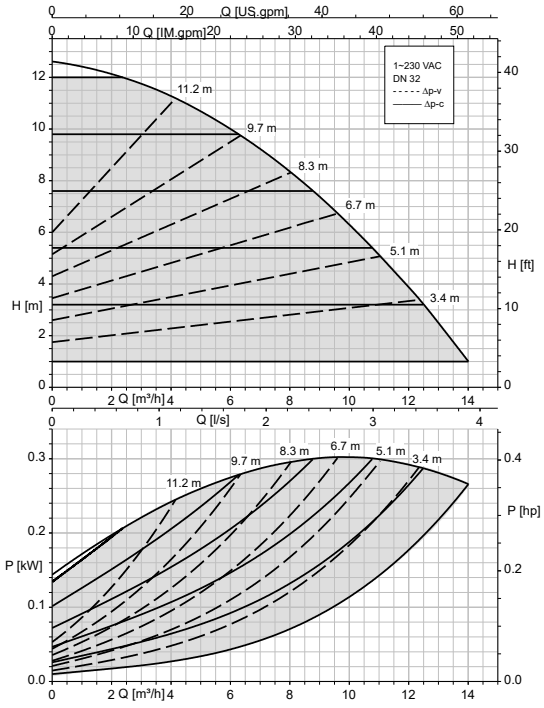
Calio Pro 32-100 Δpv, Δpc



Calio Pro 32-120 Open-loop Control, Dynamic Control

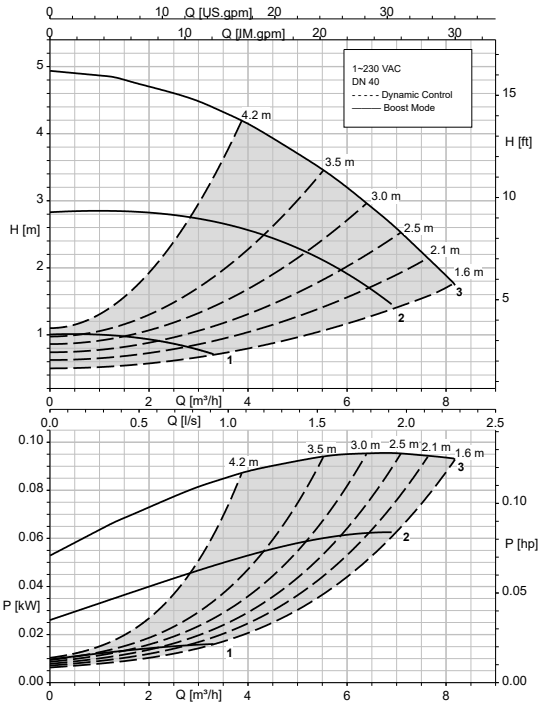


Calio Pro 32-120 Δpv, Δpc

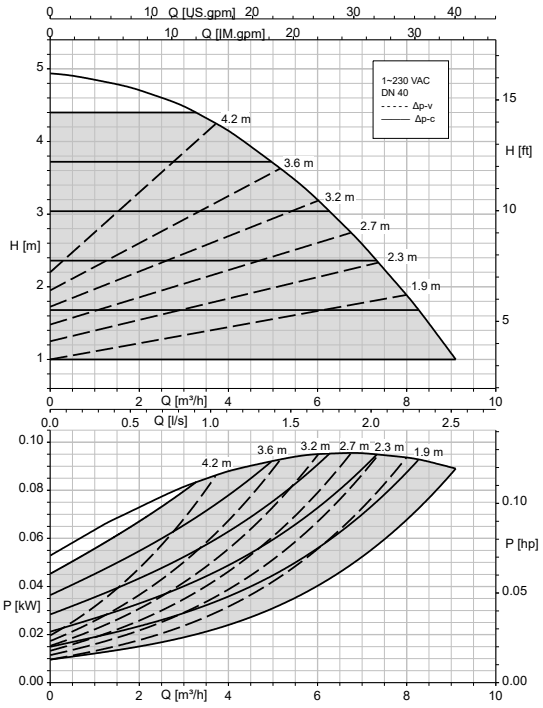


1157.520/02-EN

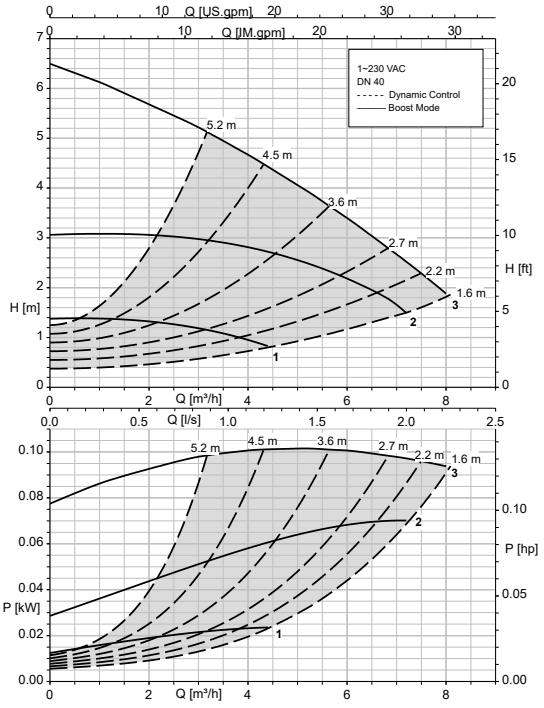
Calio Pro 40-40 Open-loop Control, Dynamic Control



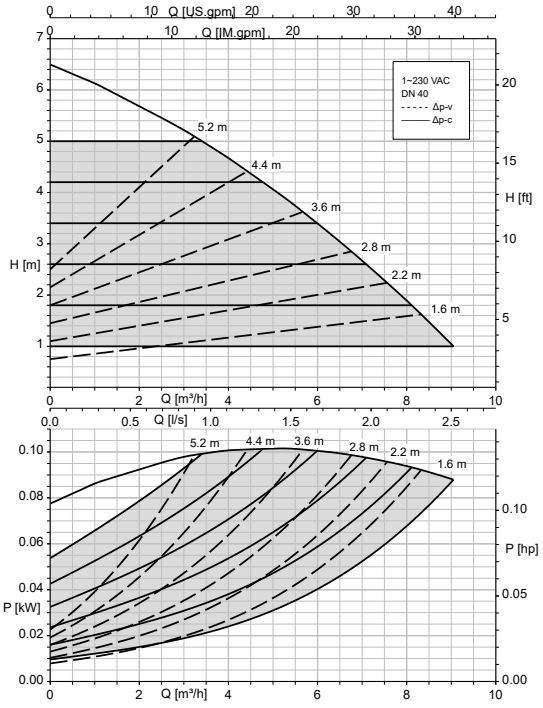
Calio Pro 40-40 Δpv, Δpc



Calio Pro 40-60 Open-loop Control, Dynamic Control

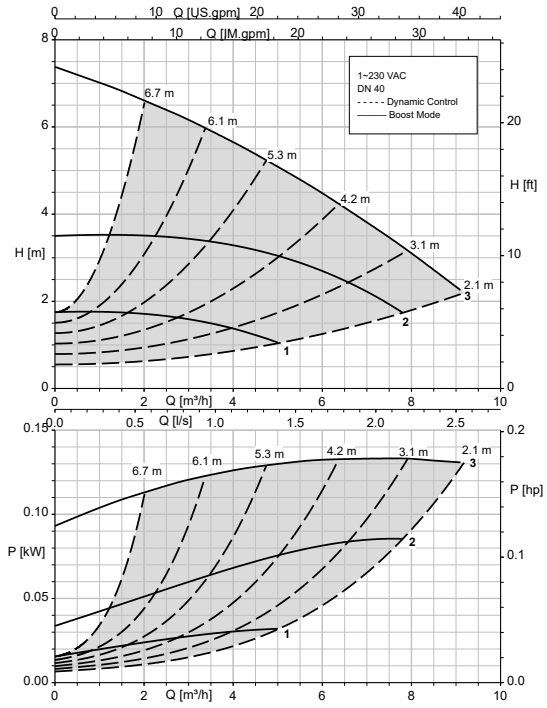


Calio Pro 40-60 Δpv, Δpc

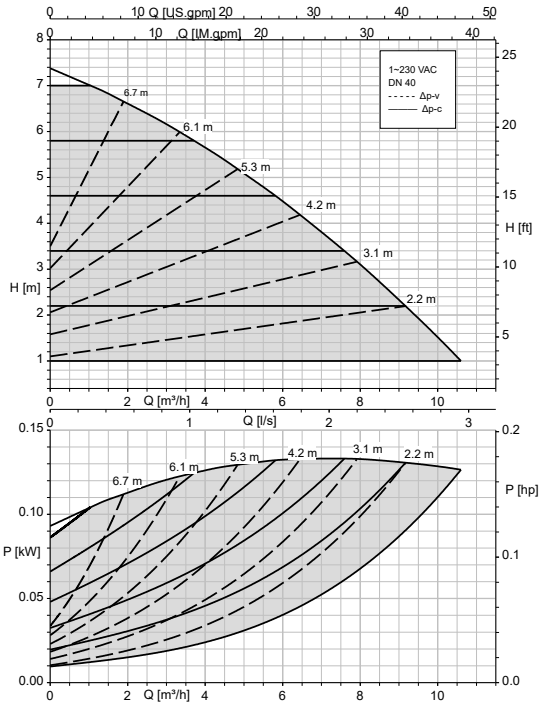


1157.520/02-EN

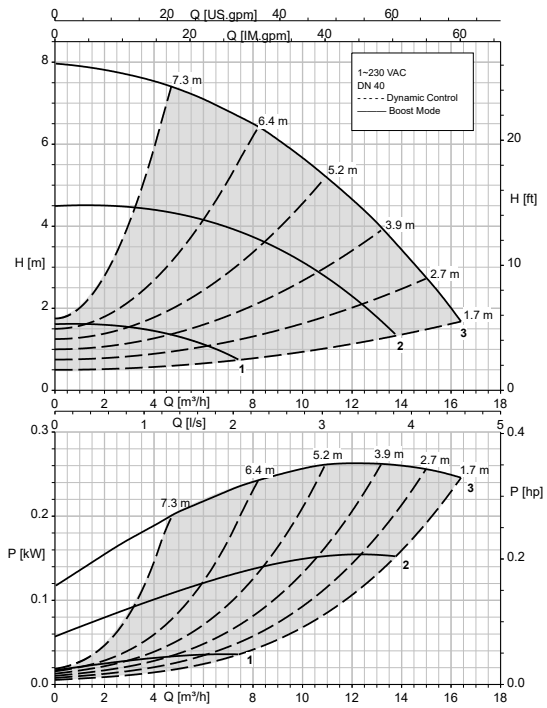
Calio Pro 40-70 Open-loop Control, Dynamic Control



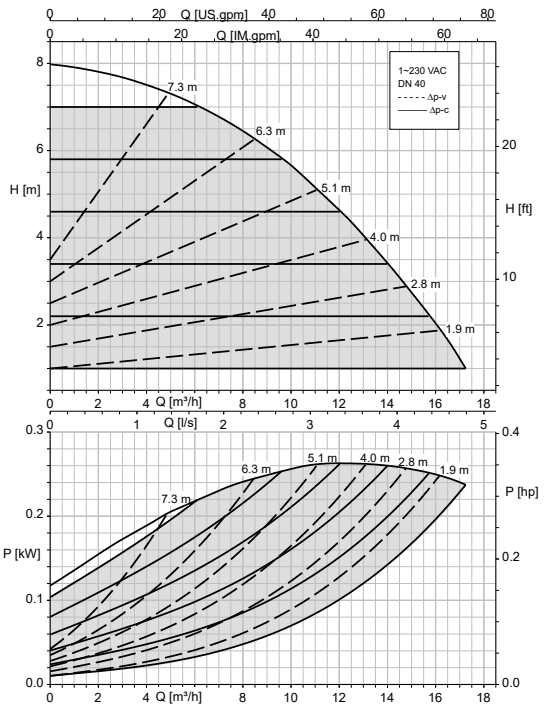
Calio Pro 40-70 Δpv, Δpc



Calio Pro 40-80 Open-loop Control, Dynamic Control

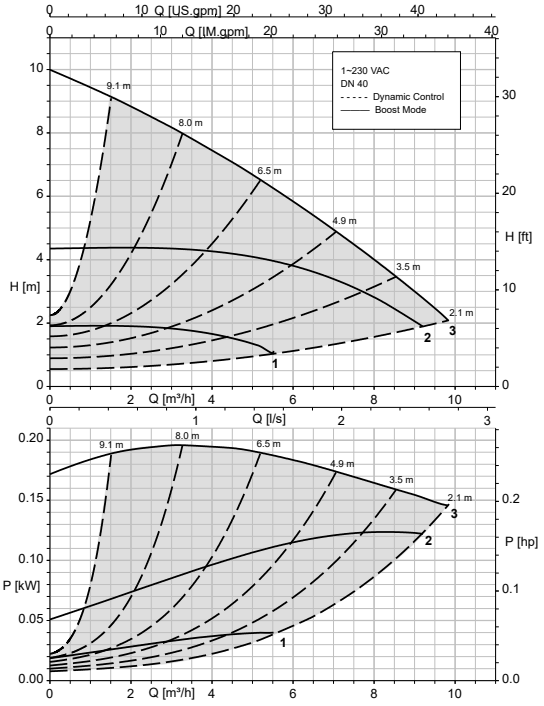


Calio Pro 40-80 Δpv, Δpc

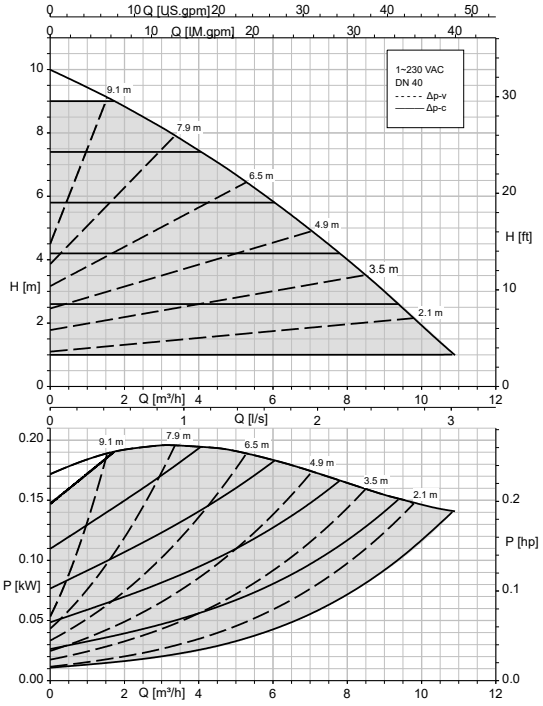


1157.520/02-EN

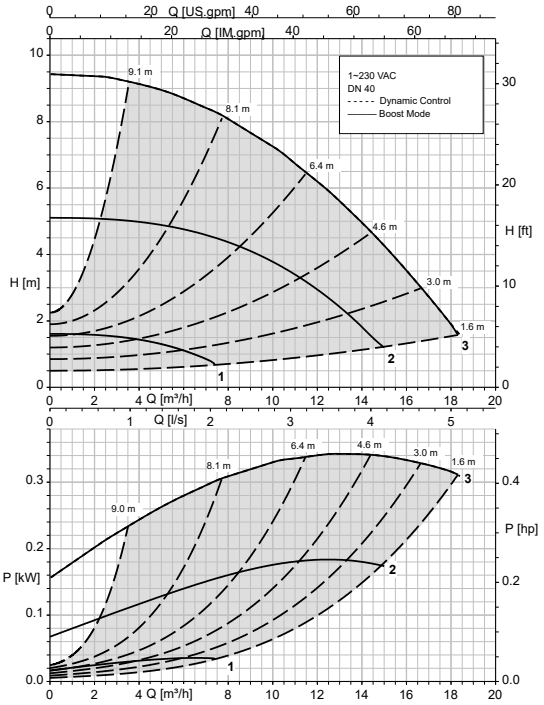
Calio Pro 40-90 Open-loop Control, Dynamic Control



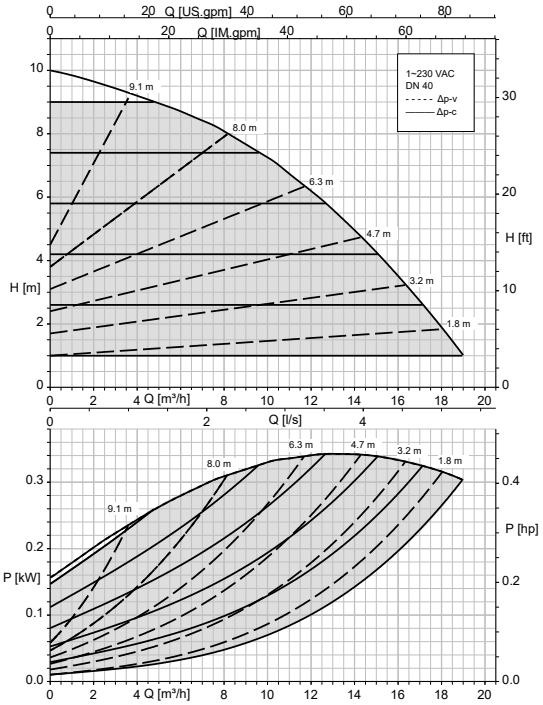
Calio Pro 40-90 Δpv, Δpc



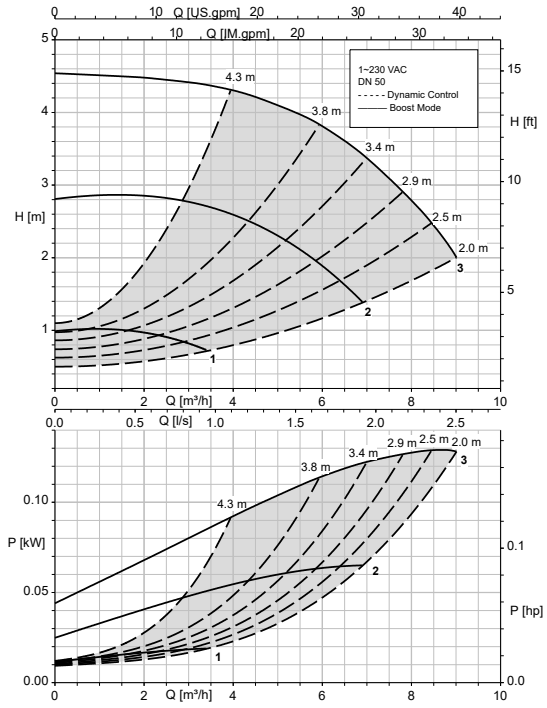
Calio Pro 40-100 Open-loop Control, Dynamic Control



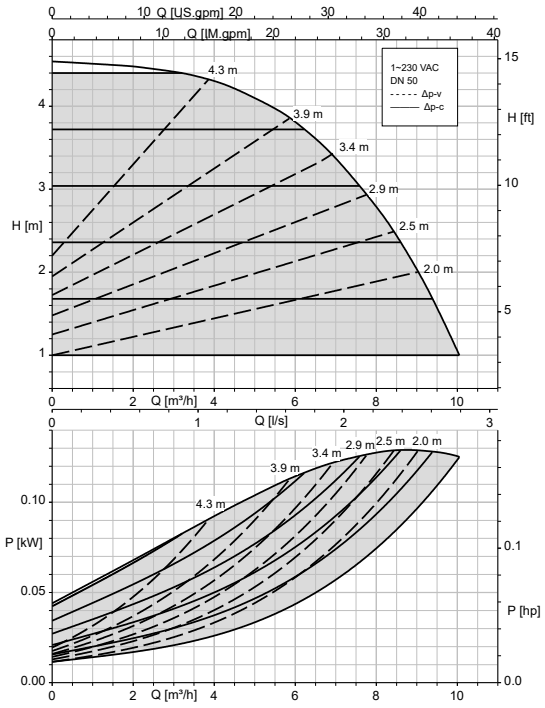
Calio Pro 40-100 Δpv, Δpc



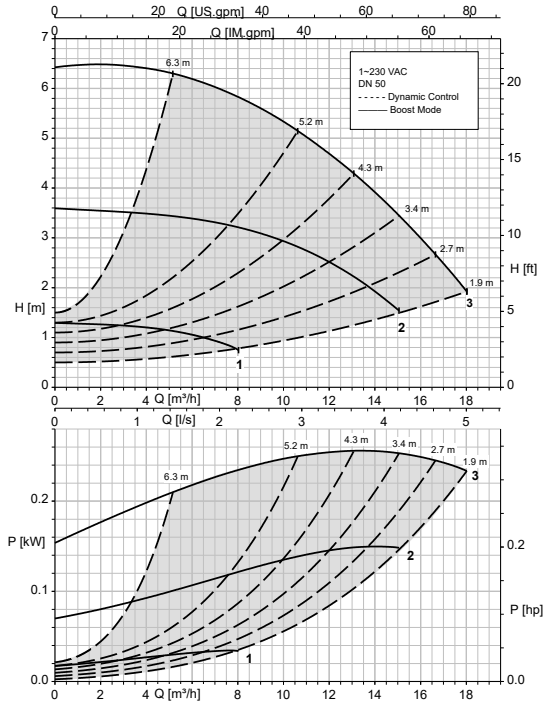
Calio Pro 50-40 Open-loop Control, Dynamic Control



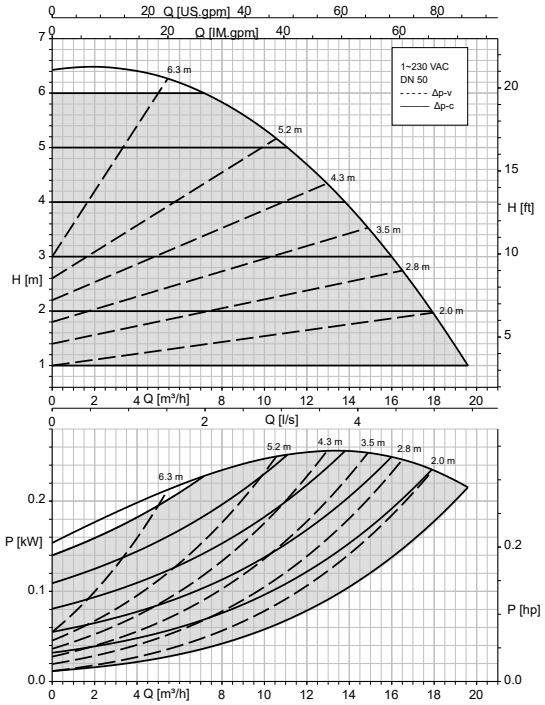
Calio Pro 50-40 Δpv, Δpc



Calio Pro 50-60 Open-loop Control, Dynamic Control

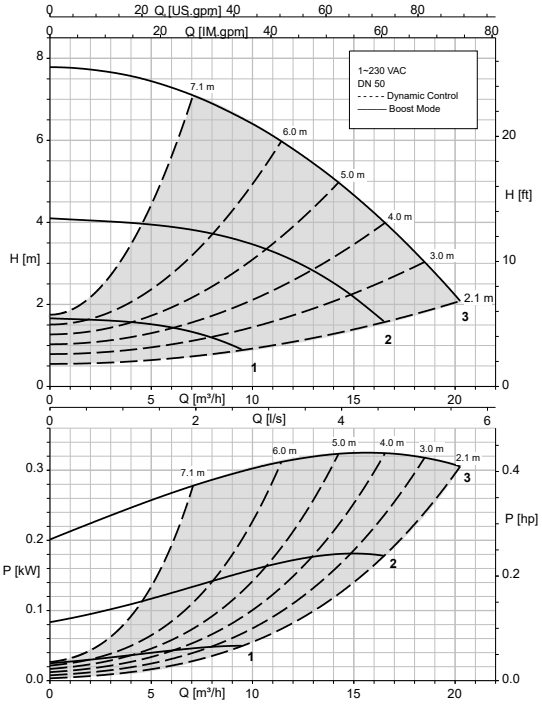


Calio Pro 50-60 Δpv, Δpc

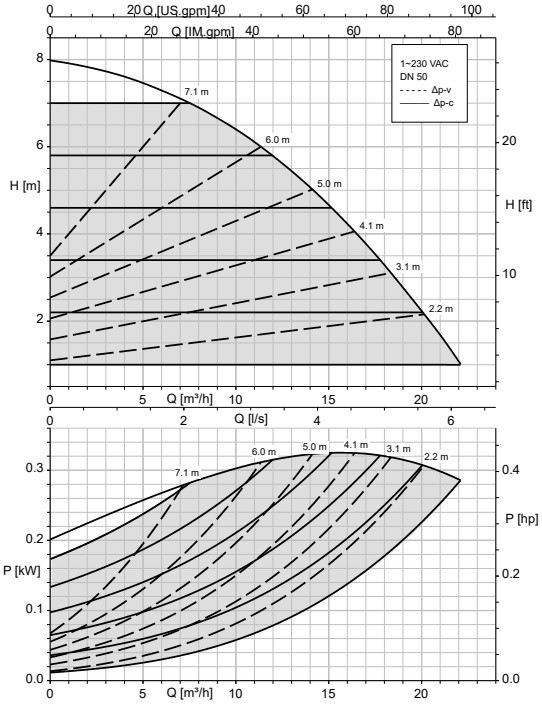


1157.520/02-EN

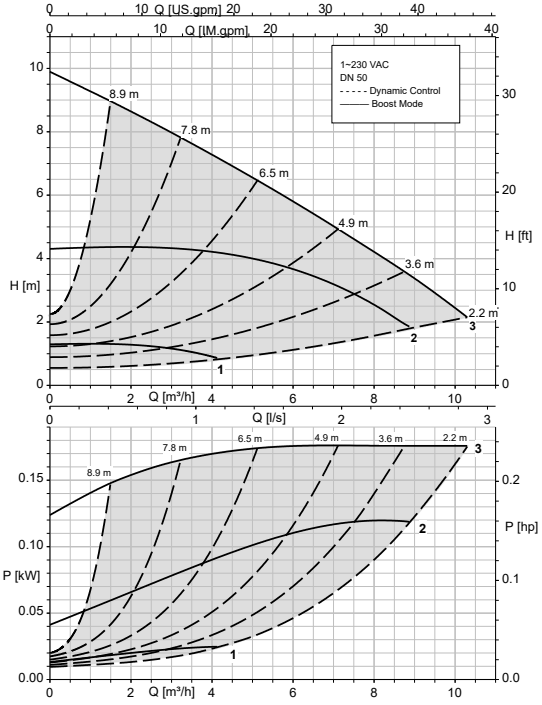
Calio Pro 50-80 Open-loop Control, Dynamic Control



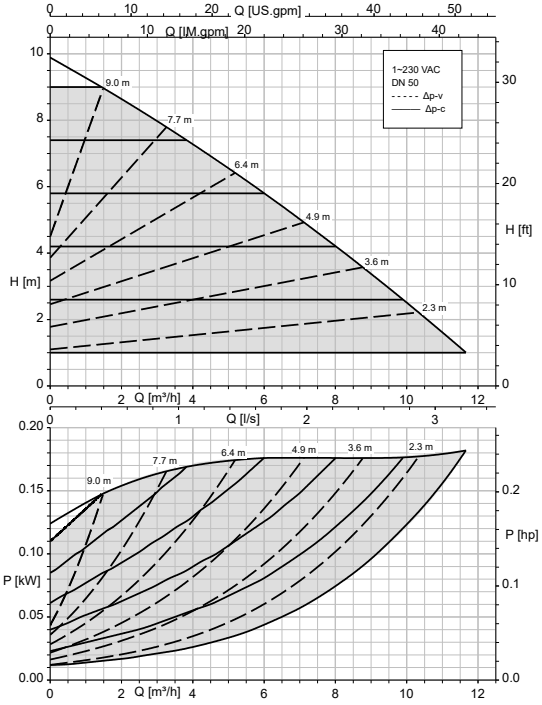
Calio Pro 50-80 Δpv, Δpc



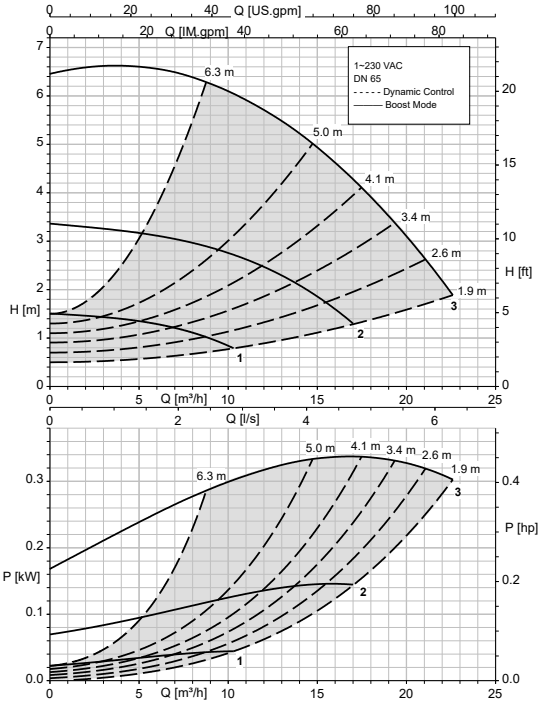
Calio Pro 50-90 Open-loop Control, Dynamic Control



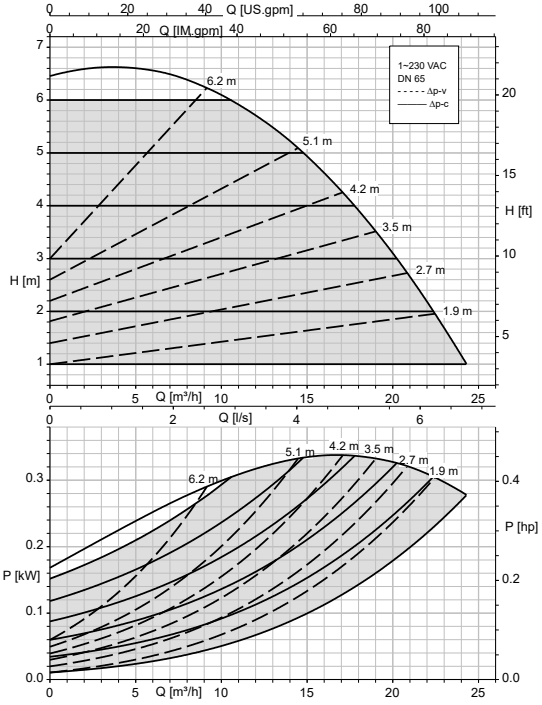
Calio Pro 50-90 Δpv, Δpc



Calio Pro 65-60 Open-loop Control, Dynamic Control



Calio Pro 65-60 Δpv, Δpc



Dimensions

Pump set dimensions

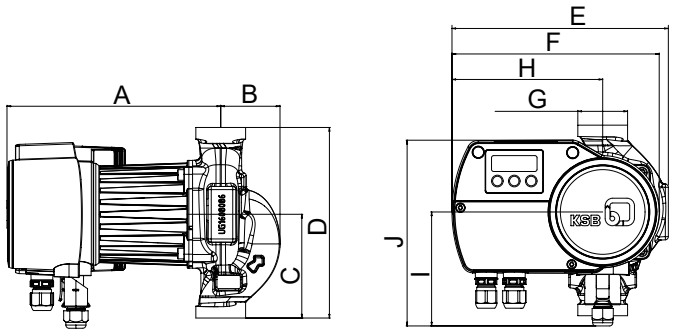


Fig. 3: Screw-ended pump set

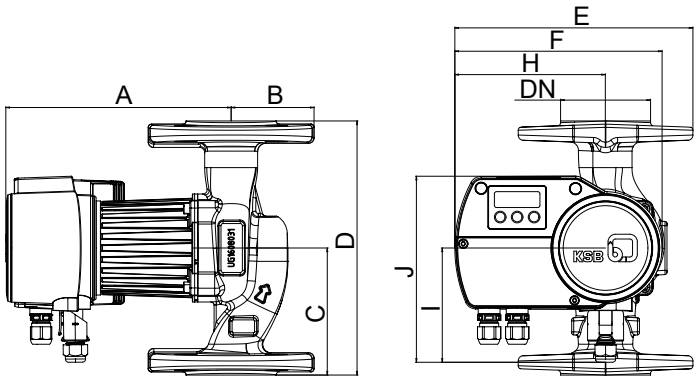


Fig. 4: Flanged pump set

Table 9: Pump set dimensions

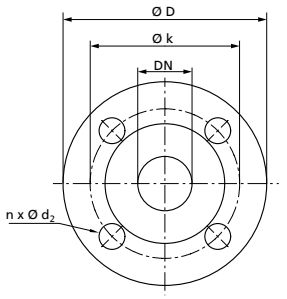
Size	Connection		A	B	C	D	E	F	H	I	J
	Piping	Pump	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
25-40	R 3/4, R 1[6)]	G 1 1/2	209	56	98	180	205	196	143	108	175
25-60	R 3/4, R 1[6)]	G 1 1/2	209	56	98	180	205	196	143	108	175
25-80	R 3/4, R 1[6)]	G 1 1/2	209	56	98	180	205	196	143	108	175
25-100	R 3/4, R 1[6)]	G 1 1/2	209	56	98	180	205	196	143	108	175
30-40	R 1 1/4[6)]	G 2	209	56	98	180	205	196	143	108	175
30-60	R 1 1/4[6)]	G 2	209	56	98	180	205	196	143	108	175
30-80	R 1 1/4[6)]	G 2	209	56	98	180	205	196	143	108	175
30-100	R 1 1/4[6)]	G 2	209	56	98	180	205	196	143	108	175
30-120	R 1 1/4[6)]	G 2	209	56	98	180	205	196	143	108	175
32-40	DN 32	DN 32	209	65	110	220	213	196	143	108	175
32-60	DN 32	DN 32	209	65	110	220	213	196	143	108	175
32-80	DN 32	DN 32	209	65	110	220	213	196	143	108	175
32-100	DN 32	DN 32	209	65	110	220	213	196	143	108	175
32-120	DN 32	DN 32	209	65	110	220	213	196	143	108	175
40-40	DN 40	DN 40	217	70	120	220	218	196	143	108	175
40-60	DN 40	DN 40	217	70	120	220	218	196	143	108	175
40-70	DN 40	DN 40	217	70	120	220	218	196	143	108	175
40-80	DN 40	DN 40	217	70	120	220	218	196	143	108	175
40-90	DN 40	DN 40	217	70	120	220	218	196	143	108	175
40-100	DN 40	DN 40	217	70	120	220	218	196	143	108	175
50-40	DN 50	DN 50	214	50	120	240	226	196	143	108	175
50-60	DN 50	DN 50	214	50	120	240	226	196	143	108	175

6 Connection using pump pipe unions (accessories)

Size	Connection		A	B	C	D	E	F	H	I	J
	Piping	Pump	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
50-80	DN 50	DN 50	214	50	120	240	226	196	143	108	175
50-90	DN 50	DN 50	214	50	120	240	226	196	143	108	175
65-60	DN 65	DN 65	221	65	170	340	236	196	143	108	175

Flange dimensions

Table 10: Flange dimensions

Size	PN 6			PN 10, PN 16			Outline drawing
	Ø D	Ø k	n × Ø d_2	Ø D	Ø k	n × Ø d_2	
	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	
DN 32	120	90	4 × Ø 14	140	100	4 × Ø 19	
DN 40	130	100	4 × Ø 14	150	110	4 × Ø 19	
DN 50	140	110	4 × Ø 14	165	125	4 × Ø 19	
DN 65	160	130	4 × Ø 14	185	145	4 × Ø 19	

Installation information

Permissible installation positions

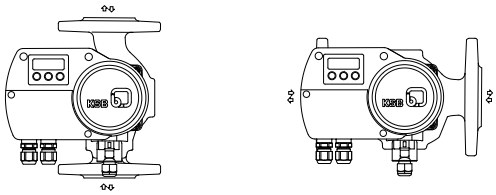


Fig. 5: Permissible installation positions

Scope of supply

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

- Pump set
- Two-piece thermal insulation shell
- Sealing elements
- Plug-type connector to power supply
- Installation/operating manual

1157.520/02-EN

Accessories

Pipe unions

Table 11: Pipe unions

	Description	Mat. No.	[kg]
	2 pipe unions with G 1 1/2 union nut and insert with Rp 3/4 internal thread, steel for pumps with G 1 1/2 external thread / Rp 3/4 pipe connection	19075560	0,2
	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

Spacers (flange)

Table 12: Spacers (flange)

	Description	Connection	PN	Length [mm]	Mat. No.	[kg]
	Spacer F16	DN 40	6/10/16	30	19075991	2
	Spacer F0	DN 40	6/10/16	70	19075566	2
	Spacer F1	DN 50	6/10/16	10	19075567	2
	Spacer F2	DN 50	6/10/16	20	19075568	2
	Spacer F3	DN 50	6/10/16	50	19075569	2
	Spacer F4	DN 50	6/10/16	60	19075570	2
	Spacer F5	DN 65	6/10/16	10	19075571	2
	Spacer F6	DN 65	6/10/16	25	19075572	2
	Spacer F7	DN 65	6/10/16	30	19075573	2

2022-11-17

1157.520/02-EN

KSB SE & Co. KGaA
Johann-Klein-Straße 9 • 67227 Frankenthal (Germany)
Tel. +49 6233 86-0
www.ksb.com