INSTALLATION AND OPERATING MANUAL

OPE 6 / 8

High-efficiency electronic circulators

6 m and 8 m models - PWM1 / PWM2 control



Installation and operating instructions

Thank you for choosing a One Pump product. Read the instructions carefully before installation and use, and keep this manual for future reference.

Before use

Earth the circulator. Do not touch it during operation and do not run it without water.

One Pump S.r.l. | Registered office: Via Tosarelli 67, 40055 CASTENASO (BO)
Operating office: Via P. Matteucci 4, 40057 GRANAROLO DELL'EMILIA (BO)
Tel.: +39 051 19616352 | Fax.: +39 051 531129
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USING THE MANUAL

Contents and product details

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Details of the purchased product

Model

Date

Serial number

Purchase

Use

Control setting

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PRODUCT DOCUMENTATION

Attestation of conformity

ATTESTATION ◆ ATTESTATO ◆ ATTESTACIÓN ◆ BESCHEINIGUNG ◆ ATTESTATION

Product Service

Attestation of Conformity

No. E8A 132161 0001 Rev. 00

Holder of Attestation: **ONE PUMP S.R.L.**
Via Tosarelli 67
40055 CASTENASO BO
ITALY

Name of Object: **Circulation pump**
High Efficiency Circulation Pump

This Attestation of Conformity is issued on a voluntary basis according to the Directive 2014/30/EU relating to electromagnetic compatibility. It confirms that the listed apparatus complies with the principal protection requirements of the directive and is based on the technical specifications applicable at the time of issuance. It refers only to the particular sample submitted for conformity assessment. For details see: www.tuvsud.com/ps-cert

Test report no.: 878802502560-00

Date, 2025-06-03

(Jun Bao)

Page 1 of 2

This Attestation does not replace the regulatory EU Declaration of Conformity (DoC) and does not allow for CE marking. After preparation of the necessary documentation and establishing compliance to requirements of all applicable directives, the manufacturer may sign a DoC and apply the CE marking. The DoC is issued under the sole responsibility of the manufacturer.

TÜV SÜD Product Service GmbH • Ridlerstraße 65 • 80339 Munich • Germany

PRODUCT DOCUMENTATION

Attestation - models and tests

ATTESTATION ◆ ATTESTATO ◆ ATTESTACIÓN ◆ BESCHEINIGUNG ◆ ATTESTATION

Product Service

Attestation of Conformity

No. E8A 132161 0001 Rev. 00

Model(s):

OPE 20-6-130 IPWM1-2,
OPE 25-6-130 IPWM1-2,
OPE 32-6-180 IPWM1-2,
OPE 20-8-130 IPWM1-2,
OPE 25-8-130 IPWM1-2,
OPE 25-8-180 IPWM1-2,
OPE 25-6-180 IPWM1-2,
OPE 32-8-180 IPWM1-2

Description of Object:

Rated voltage: 230V~
Rated frequency: 50/60Hz
Max. power: see the model list

Model list

Model	Max. power (W)
OPE 20-6-130 IPWM1-2	45
OPE 25-6-130 IPWM1-2	45
OPE 32-6-180 IPWM1-2	45
OPE 20-8-130 IPWM1-2	65
OPE 25-8-130 IPWM1-2	65
OPE 25-8-180 IPWM1-2	65
OPE 25-6-180 IPWM1-2	45
OPE 32-8-180 IPWM1-2	65

Tested according to:

EN IEC 55014-1:2021
EN IEC 55014-2:2021
EN IEC 61000-3-2:2019/A1:2021
EN 61000-3-3:2013/A2:2021

Page 2 of 2

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TÜV®

SAFETY

General warnings

Read and keep the manual

Read the instructions carefully before installation and use.

Earthing and protection

The circulator must be reliably earthed and fitted with protection against electrical leakage before use. Do not touch the circulator during operation.

Children and persons with reduced capabilities

Children and persons with reduced capabilities who have not received instructions on safe use or do not understand the risks must not use the product without adult supervision.

Electrical installation

The electrical installation must include the protective measures required by the regulations in force in the country of installation.

System pressure

The system must be able to withstand the maximum pressure of the circulator.

Modifications and improper use

One Pump is not responsible for consequences arising from modifications to the circulator or use outside the specified operating conditions.

Features and product range

1. Introduction

The OPE electronic circulator uses intelligent variable-frequency control. The stator is fully isolated; the rotating parts are immersed in clean water, which provides cooling and lubrication.

The thin-walled rotor can isolates the stator from the water and eliminates the conventional mechanical seal. Ceramic bearings and shaft resist wear and help reduce noise.

The circulator does not overload during full-load operation and, when used correctly, generally requires no maintenance.

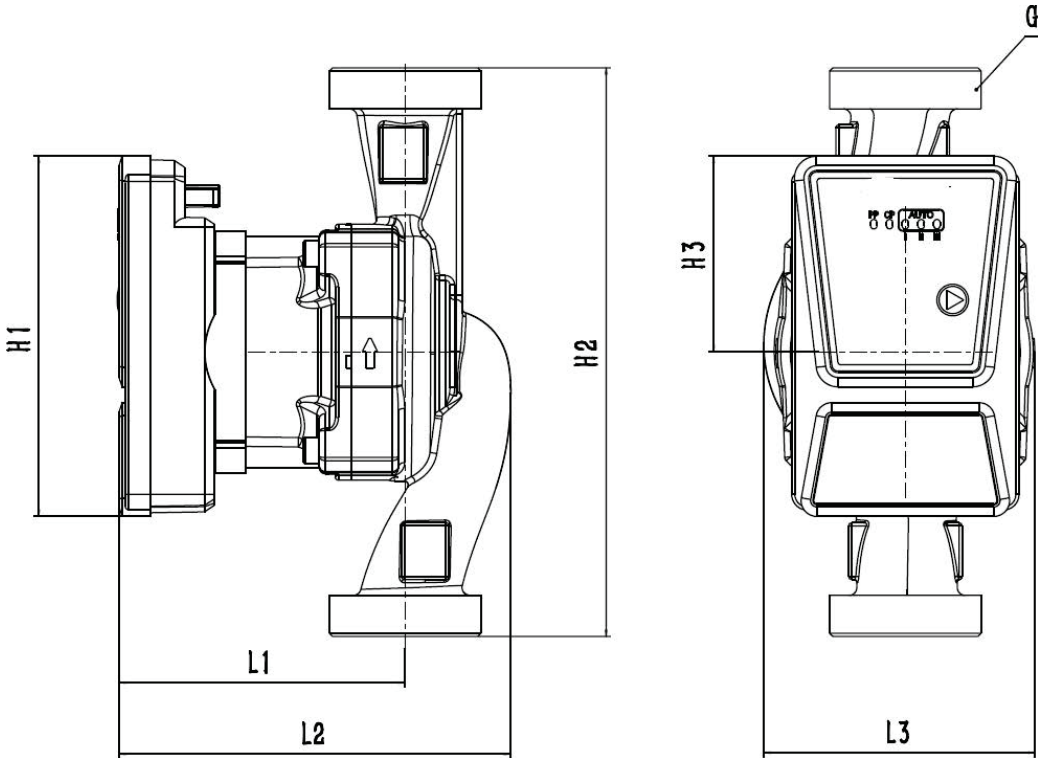
2.2 Product range - power supply: 230 V, 50/60 Hz

OPE model	Ø in/out (mm)	Thread	Q max (m^3/h)	H (m)	P (W)	I (A)
20-6-130	20	G 1	2.4	1-6	45	0.5
25-6-130	25	G 1 1/2	3.0	1-6	45	0.5
25-6-180	25	G 1 1/2	3.2	1-6	45	0.5
32-6-180	32	G 2	3.6	1-6	45	0.5
20-8-130	20	G 1	2.9	1-8	65	0.65
25-8-130	25	G 1 1/2	3.4	1-8	65	0.65
25-8-180	25	G 1 1/2	3.6	1-8	65	0.65
32-8-180	32	G 2	4.0	1-8	65	0.65

2.3 | INSTALLATION DIMENSIONS

Dimensions

Dimensions in mm. X identifies the 6 m or 8 m version.



Model	L1	L2	L3	H1	H2	H3	G
20-X-130	91	124	86	115	130	62	G 1
25-X-130	91	124	86	115	130	62	G 1 1/2
25-X-180	91	124	86	115	180	62	G 1 1/2
32-X-180	91	124	86	115	180	62	G 2

Warning

Earth the motor before connecting the power supply. Do not touch the circulator while it is running and do not start it without water.

Installation and start-up

3.4 Protection against water and moisture

For outdoor installation, provide a protective cover. Indoors, protect the circulator from splashing water to prevent electric shock. Do not install it in a bathroom: steam, water and moisture may enter the terminal box and cause electrical leakage.

3.5 Shut-off valves

Fit shut-off valves at the inlet and outlet to allow maintenance and servicing of the circulator.

3.6 Test start-up

After installation, connect the power supply and set the speed control to its highest level to check that the circulator starts correctly. The test must not exceed 10 seconds, to prevent unloaded operation from reducing bearing life.

3.7 Hot surfaces

When the circulator supplies a heating system, do not touch the circulator or the pipework: risk of burns.

3.8 Earthing

The power plug must be earthed. Securely connect the GND contact of the plug to the earth connection of the socket. Do not modify the GND contact of the circulator.

3 | OPERATING WARNINGS

Safety and maintenance

3.9 Safety signs

Provide clear safety signs during operation to prevent accidents.

3.10 Disconnecting the power supply

Disconnect the power supply before changing the circulator position or carrying out any work that may involve contact with the circulator while it is running.

3.11 Periodic checks

Check the circulator regularly and replace it promptly if damaged.

3.12 Power supply cable

Replace the power supply cable only with a matching cable or dedicated components.

3.13 Frost protection

In winter, when the ambient temperature is below 0 °C and the circulator is stopped, drain all water from the pipework to prevent frost damage.

3.14 Quality of make-up water

Avoid frequent replenishment of hot-water circuits with unsoftened water. Calcium deposits in the system may lock the rotor.

4.1 / 4.2 | OPERATING CONDITIONS

Liquids, pressure and temperatures

4.1 Pumped liquids

Use softened water or low-viscosity, clean, non-corrosive and non-explosive liquids, free from solids, fibres and mineral oil. Permitted pH: 6.5 to 8.5.

Pressure and suction

Maximum pressure: 1.0 MPa (10 bar). Maintain the minimum inlet pressure to prevent cavitation noise and bearing damage.

Liquid temperature	Inlet pressure
85 °C	0.5 m / 0.049 bar
90 °C	2.8 m / 0.27 bar
110 °C	11.0 m / 1.08 bar

4.2 Liquid and ambient temperature

Ambient (°C)	Min. liquid (°C)	Max. liquid (°C)
0	2	110
10	10	110
20	20	110
30	30	110
35	35	90
40	40	70

Specified relationship: $t_1 \geq t_2$. Temperature class TF110.

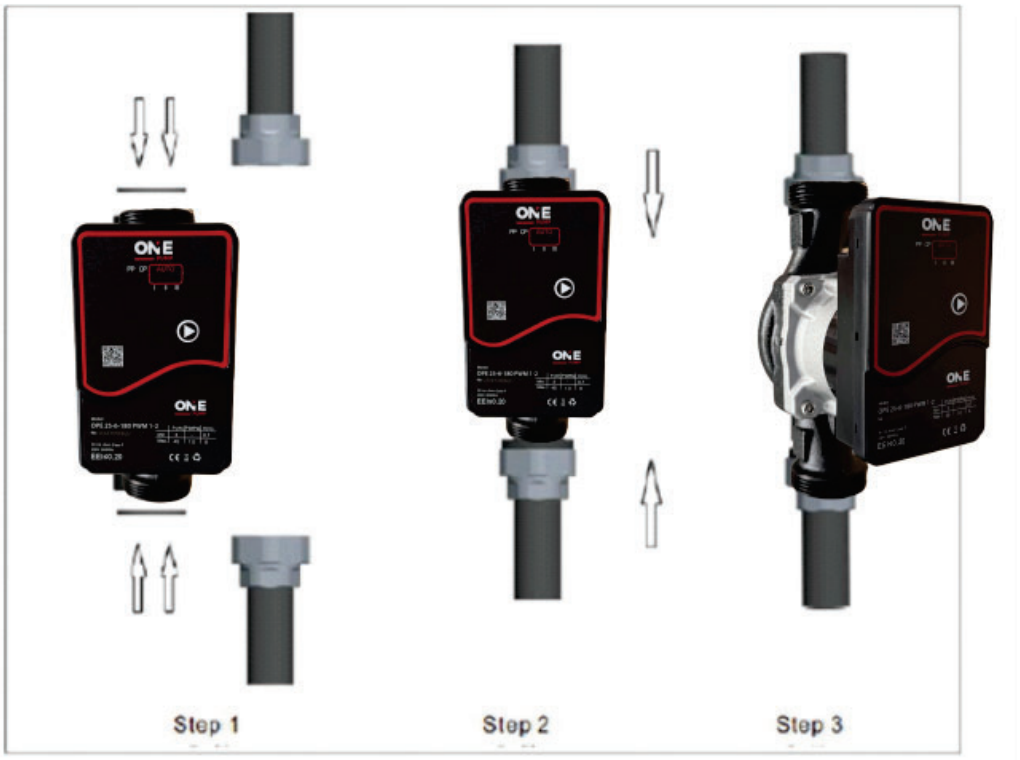
t_1 liquid (°C)	2	40	60	80	90	100	105	110
t_2 max. ambient (°C)	2	40	40	40	40	40	40	40

4.3 | INSTALLATION

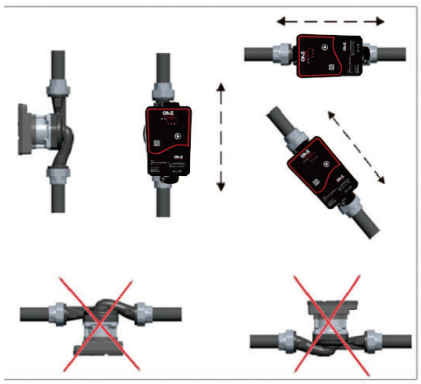
Installing the circulator

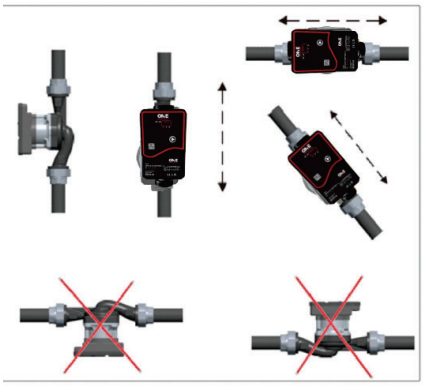
Install the circulator with the motor shaft horizontal. The liquid must flow in the direction indicated by the arrow on the pump body.

Assembly in the circuit



Permitted and prohibited positions





4.4 | CONTROL BOX ORIENTATION

Adjusting the position

These operations must be carried out by qualified personnel only.

Liquid at high temperature and pressure

Before removing the hexagon socket screws, drain the hot water from the system and close the shut-off valves on both sides of the circulator.



1. Check the installation direction.



2. Disconnect the power supply before adjustment.



3. Drain the liquid and close the valves.



4. Remove the hexagon socket bolts using an Allen key.



5. Reorient the control box and tighten the hexagon socket bolts.

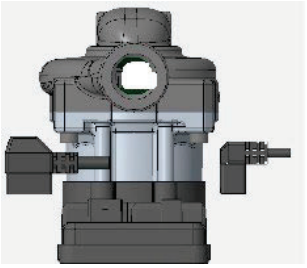


6. Open the valves and restore the power supply.

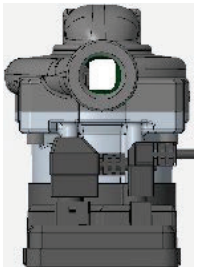
4.5 | ELECTRICAL CONNECTIONS

Power supply and connectors

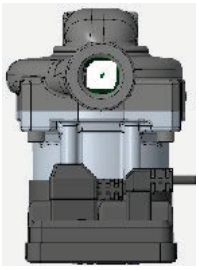
Inserting the connector



1. Installation position.



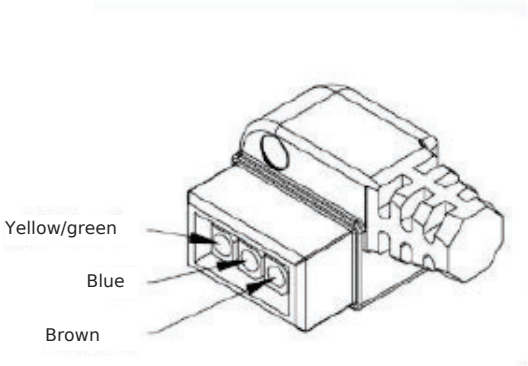
2. Align the plug with the socket and insert it.

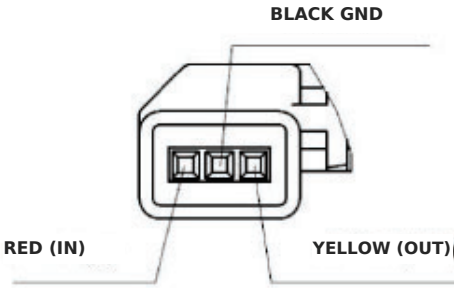


3. Assembly complete.

OPE power supply and signal cables





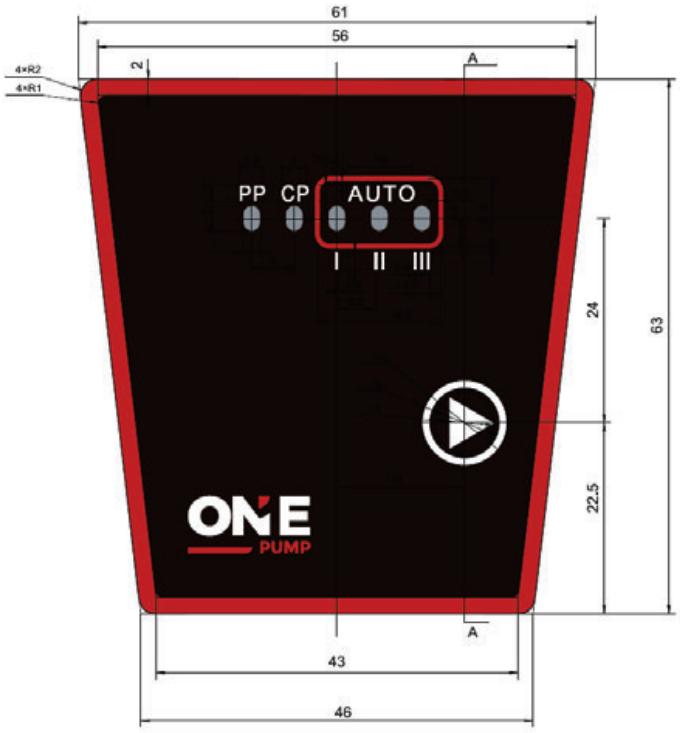


Connection	Conductor identification
Molex connector	Yellow/green - blue - brown
PWM connector	Black: GND Red: input (IN) Yellow: output (OUT)

5.1 | OPERATING INSTRUCTIONS

Control panel

The panel uses indicator lights to display the selected mode and its level.



Reading the indications

Code	Function
PP	Proportional pressure
CP	Constant pressure
AUTO	Automatic control
I / II / III	Selected level

5.3 | OPERATING MODES

Control sequence and LEDs

AUTO is the factory setting. Use the button to select the operating sequence.

Sequence	Mode / function	Indicators
0	AUTO - automatic control	
1	CS III - constant speed III	
2	CS II - constant speed II	
3	CS I - constant speed I	
4	PP III - proportional pressure III	
5	PP II - proportional pressure II	
6	PP I - proportional pressure I	
7	CP III - constant pressure III	
8	CP II - constant pressure II	
9	CP I - constant pressure I	
10	PWM1 without signal - heating	
Long press	PWM2 without signal - solar	
/	PWM signal connected	

5.3 / 5.4 | OPERATING FUNCTIONS

PWM selection and air venting

5.3 Selecting and exiting PWM modes

1. The input signal duty cycle is 1-100%. With the signal cable connected, the button cannot change the function.

2. The indicator lights flash for 1 second on and 1 second off.

3. The PWM signal is not recognised automatically when the cable is connected. Select the function manually using the button on the terminal box, according to the table on page 15.

4. To switch from PWM1 (heating) to PWM2 (solar), press and hold the button: the LEDs light up in sequence from left to right. Once the last LED lights up, release the button and connect the PWM cable to the circulator.

5. To exit PWM control, disconnect the cable and press the button until the desired manual mode is selected.

5.4 Automatic circulator air venting

Air venting removes air from the circulator; this function does not vent the heating system.

1. Press and hold the button for 8 seconds until LED1 + LED2 + LED3 light up, then release it.

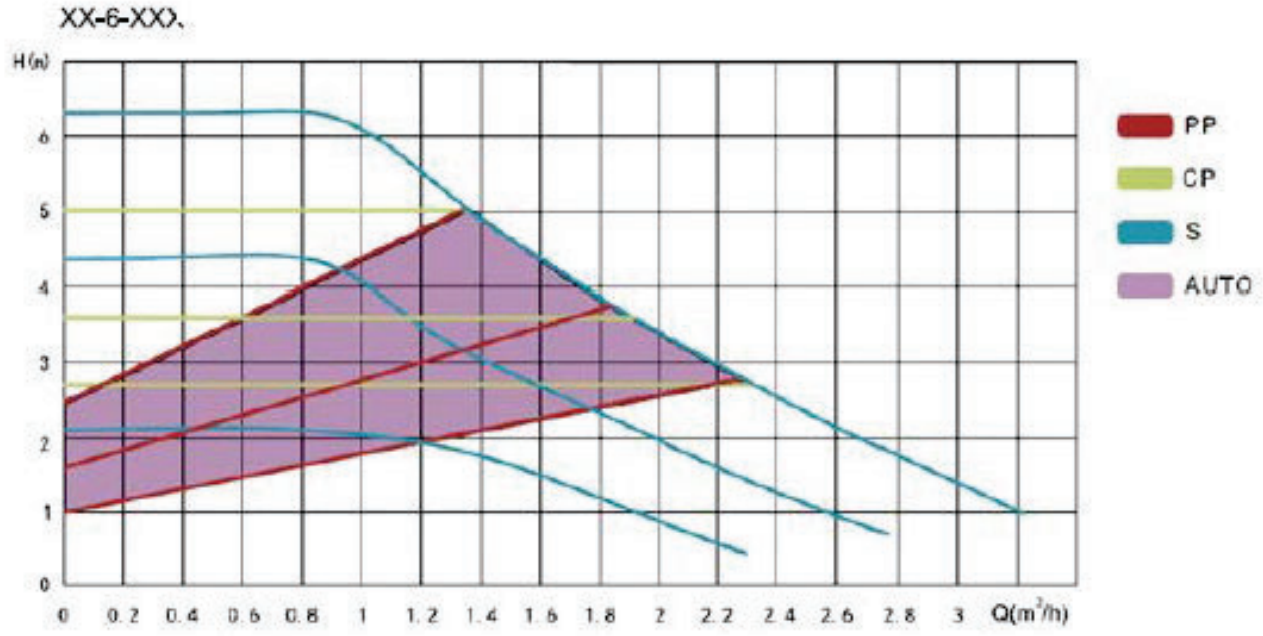
2. Air venting lasts 5 minutes. All LEDs flash slowly during the procedure.

3. At the end, the circulator returns to the previous mode and the LEDs stop flashing.

5.2 | PERFORMANCE CURVES

OPE 6 m

Head H in metres and flow rate Q in m³/h.



Control mode legend

PP: proportional pressure

CP: constant pressure

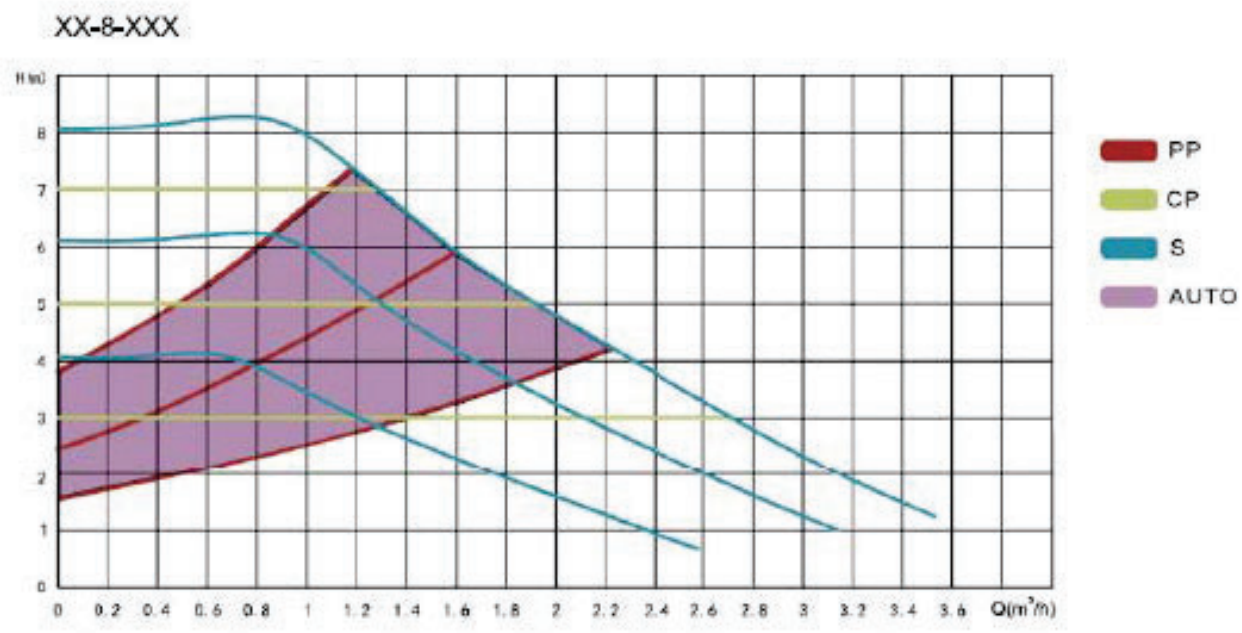
S: constant speed

AUTO: automatic control

5.2 | PERFORMANCE CURVES

OPE 8 m

Head H in metres and flow rate Q in m³/h.



Control mode legend

PP: proportional pressure

CP: constant pressure

S: constant speed

AUTO: automatic control

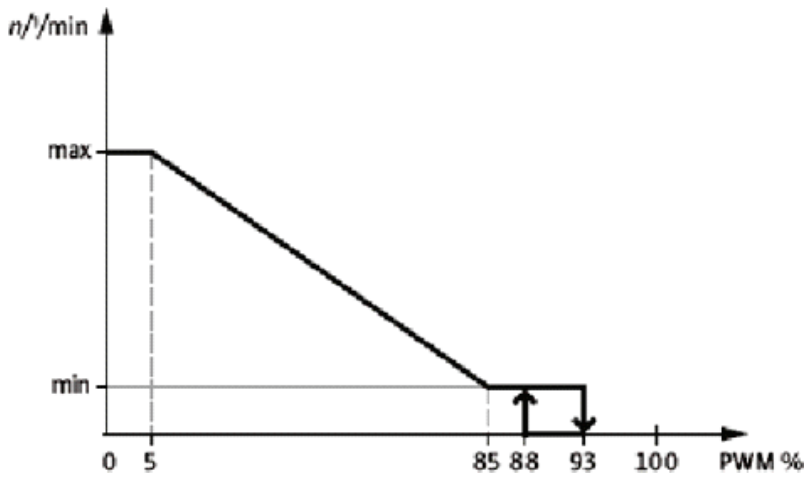
5.5.1 / 5.5.2 | PWM CONTROL

PWM1 - heating

5.5.1 Control principle

With a PWM signal connected, operation is controlled by the external signal. Without a PWM signal, the circulator uses its internal control logic.

At high PWM duty cycles, hysteresis prevents repeated starting and stopping around the switching point. At low duty cycles, the speed is high for safety: if the cable is interrupted, the circulator continues at maximum speed to transfer heat from the primary heat exchanger or the heating system.



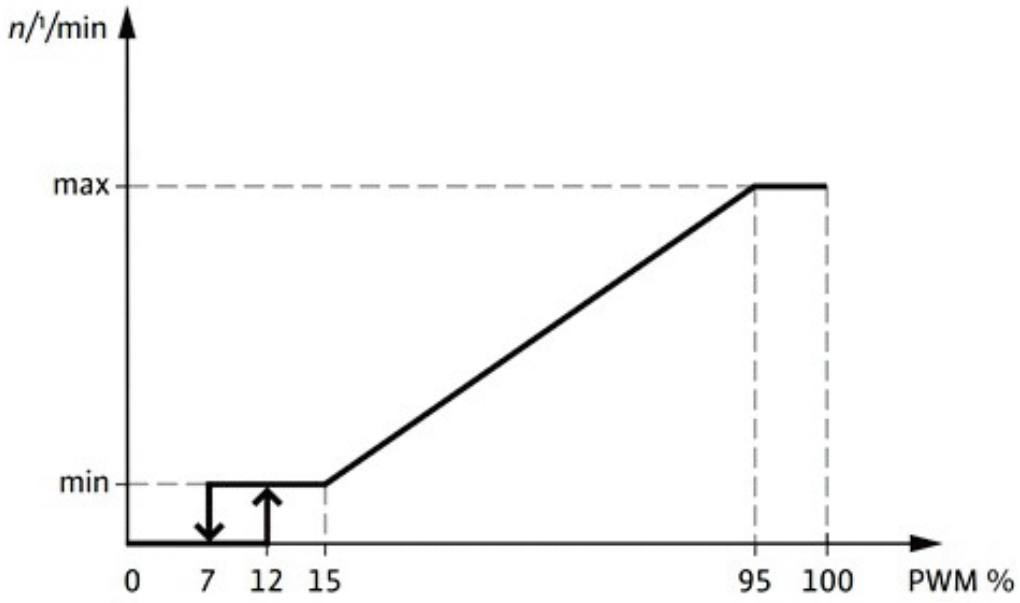
PWM input (%)	Pump status
0 ≤ PWM ≤ 5	Maximum speed
5 < PWM ≤ 85	Variable speed: maximum to minimum
85 < PWM ≤ 93	Minimum speed
85 < PWM ≤ 88	Hysteresis range: on/off
94 < PWM ≤ 100	Standby: off

5.5.3 | PWM CONTROL

PWM2 - solar

At low PWM duty cycles, hysteresis prevents repeated starting and stopping when the signal fluctuates around the switching point.

Without a signal, the circulator stops for safety reasons. If the cable is damaged, the pump stops to prevent overheating of the solar thermal system.



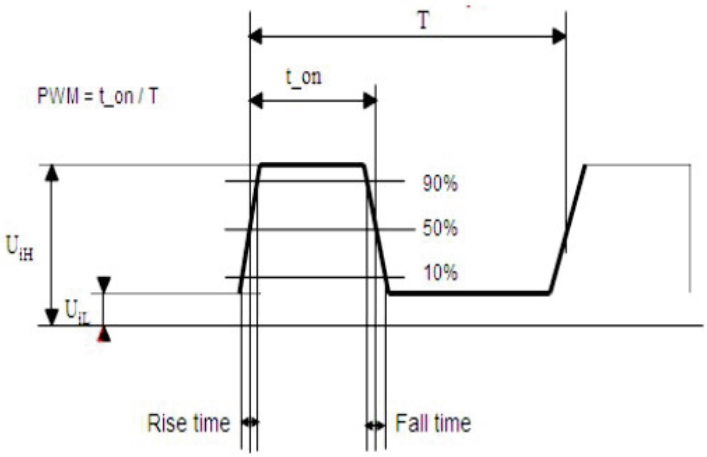
PWM input (%)	Pump status
0 ≤ PWM < 7	Standby: off
7 < PWM < 12	Hysteresis range: on/off
12 < PWM ≤ 15	Minimum speed
15 < PWM ≤ 95	Variable speed: minimum to maximum
95 < PWM ≤ 100	Maximum speed

5.5.4 | SIGNAL SPECIFICATIONS

PWM electrical parameters

Parameter	Specification
Galvanic isolation in the pump	Yes
PWM input frequency	100-5000 Hz
High-level input voltage U_h	3.3-24 V
Low-level input voltage U_l	< 0.7 V
High-level input current I_h	3.5-10 mA
PWM input duty cycle	0-100%
Signal polarity	Fixed
Signal cable length	< 3 m
Rise / fall time	< T/1000

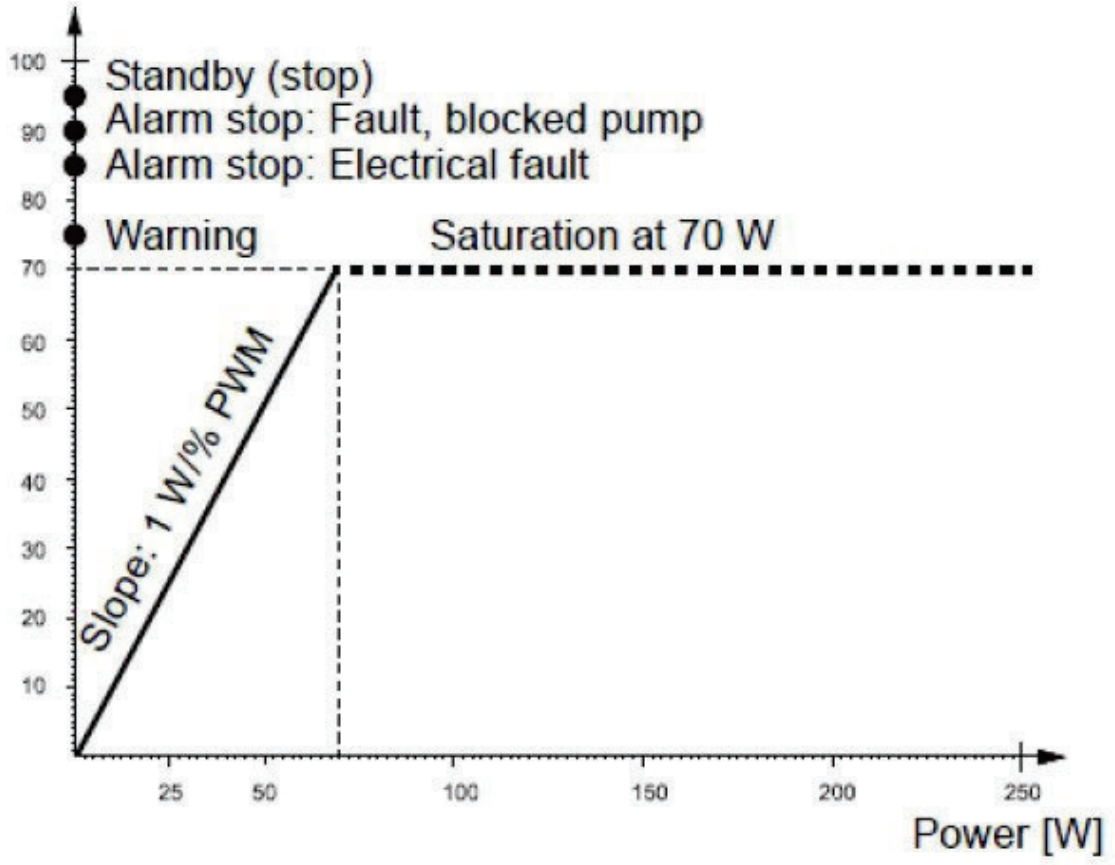
Signal waveform



5.5.4 | STATUS SIGNAL

PWM feedback curve

Relationship between the signal and circulator status



The graph relates the PWM signal to power and operating status. The specified slope is 1 W per 1% PWM, with saturation at 70 W.

Graph indication	Meaning
Standby (stop)	Stopped
Alarm stop: Fault, blocked pump	Stopped due to a fault / locked pump
Alarm stop: Electrical fault	Stopped due to an electrical fault
Warning	Warning

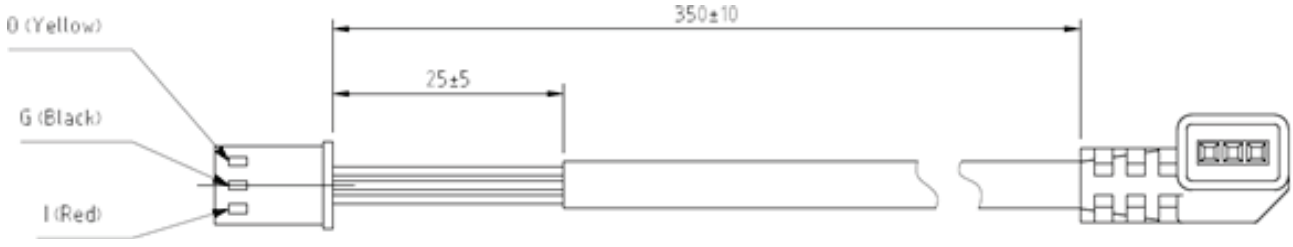
5.5.4 | CIRCULATOR STATUS

PWM signal table

PWM (%)	QT (s)	Pump information	DT (s)	Priority
100	0	PWM connection problem.	0	1
95	0-60	Pump stopped due to a permanent fault.	0-600	2
90	0-30	Abnormal operation: pump stopped but still functional. Check the installation and the fluid.	1-5	3
85	0	Abnormal operation: pump stopped but still functional.	0	4
80	0	Abnormal operation: pump running with reduced performance.	0	5
5-75	0	Normal operation; power information is provided.	0	7
2	0	Standby: pump ready to run.	0	6
0	0	PWM interface output damaged; operation at maximum speed.	0	8

QT: qualification time. DT: disqualification time. Output frequency: 75 Hz ± 5%.

Signal cable



Black: GND. Red: PWM input from the controller. Yellow: PWM output from the circulator. Cable dimensions: 350 ± 10 mm; marked section: 25 ± 5 mm.

6 | TECHNICAL SPECIFICATIONS

Technical data

Characteristic	Value
Power supply	230 V, 50/60 Hz
Motor protection	External motor protection is not required
Protection rating	IP44
Insulation class	F
Ambient relative humidity	Max 95%
System pressure	Max. 1.0 MPa (10 bar)
Minimum inlet pressure Liquid ≤ +75 °C	0.05 bar / 0.005 MPa
Minimum inlet pressure Liquid +90 °C	0.28 bar / 0.028 MPa
Minimum inlet pressure Liquid +110 °C	1.08 bar / 0.108 MPa
EMC standards	EN 61000-6-1; EN 61000-6-3
Sound pressure level	Less than 43 dB
Ambient temperature	0 °C to +40 °C
Temperature class	TF110
Surface temperature	Max +125 °C
Liquid temperature	-10 °C to +110 °C
EEI	Less than 0.20

7 | TROUBLESHOOTING

Troubleshooting

Circulator does not run

Probable cause	Action
Loose power supply cable	Connect the cable securely and correctly.
Damaged control electronics	Replace the control box.
Impeller or motor blocked by fibres or foreign bodies	Remove fibres and foreign bodies.

Noise in the system or pump body

Probable cause	Action
Impurities in the circulator	Dismantle the circulator and remove impurities.
Air or gas in the system or circulator	Vent the air and gas.

Pump runs but does not build pressure

Probable cause	Action
Closed inlet valve	Open the valve.
Air or gas in the pipes or pump	Open the valve to run the pump and loosen the outlet connection to allow gas to escape.

7 | DIAGNOSTICS

Protection functions and LED indications

Locked rotor



Cause: the rotor is locked.

Action: dismantle the motor and check that the rotor can turn freely. Remove impurities if necessary.

Overvoltage / undervoltage



Cause: the input voltage is too high or too low.

Action: check that the voltage is within the normal range. If it is not, restore the correct voltage.

Phase loss



Cause: one or more phases of the internal connection circuit are disconnected.

Action: replace the pump.

Overcurrent



Cause: a short circuit in the internal connection circuit.

Action: replace the pump.

Dry-running protection



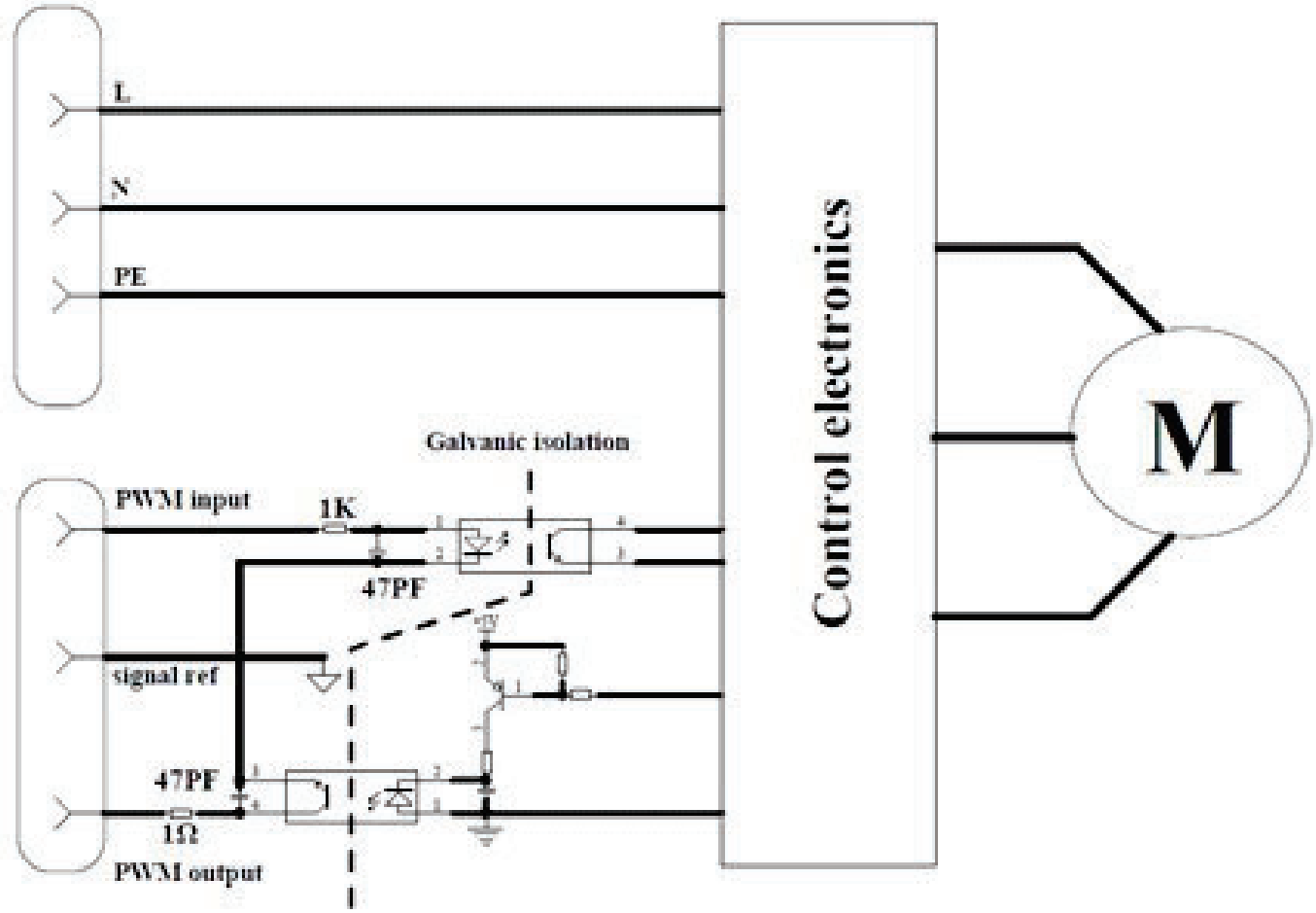
Cause: after 1 minute of operation without liquid, the pump enters dry-running protection and stops.

Action: replace the pump.

5.5.1 | CONTROL DIAGRAM

PWM interface and motor

Diagram of the electronic control, motor and PWM interface with galvanic isolation.



Indication	Meaning
L / N / PE	Live / neutral / protective conductor
PWM input / output	PWM input / output
Signal ref	Signal reference
M	Motor