APOLLO

Circulation Pump

Technical Manual

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CONTENT

1. INTRODUCTION

Apollo Circulating pumps are high-efficiency variable speed circulation pumps designed for circulating liquids in heating and domestic hot water recirculation systems. The pumps are simple, fast and easy to install and operation.

2. KEY BENEFITS

2.1. Low-energy Circulation Pump

Low-energy circulation pump is designed for the circulation of water in heating systems Install the low-energy circulation pumps in

- Underfloor heating systems
- One-pipe systems
- Two-pipe systems

Low-energy circulation pump incorporates a permanent-magnet motor and difference-pressure control enabling continuous adjustment of the pump performance to the actual requirements.

2.2. Easy Installation and Start-up

Low-energy circulation pumps is easy to install. With the factory setting, the pump can, in most cases be started without marking any setting.

2.3. High Degree of Comfort

Minimum noise from valves etc.

2.4. Low Energy Consumption

Low energy consumption compared to the convention circulation pumps.

3. SPECIFICATIONS

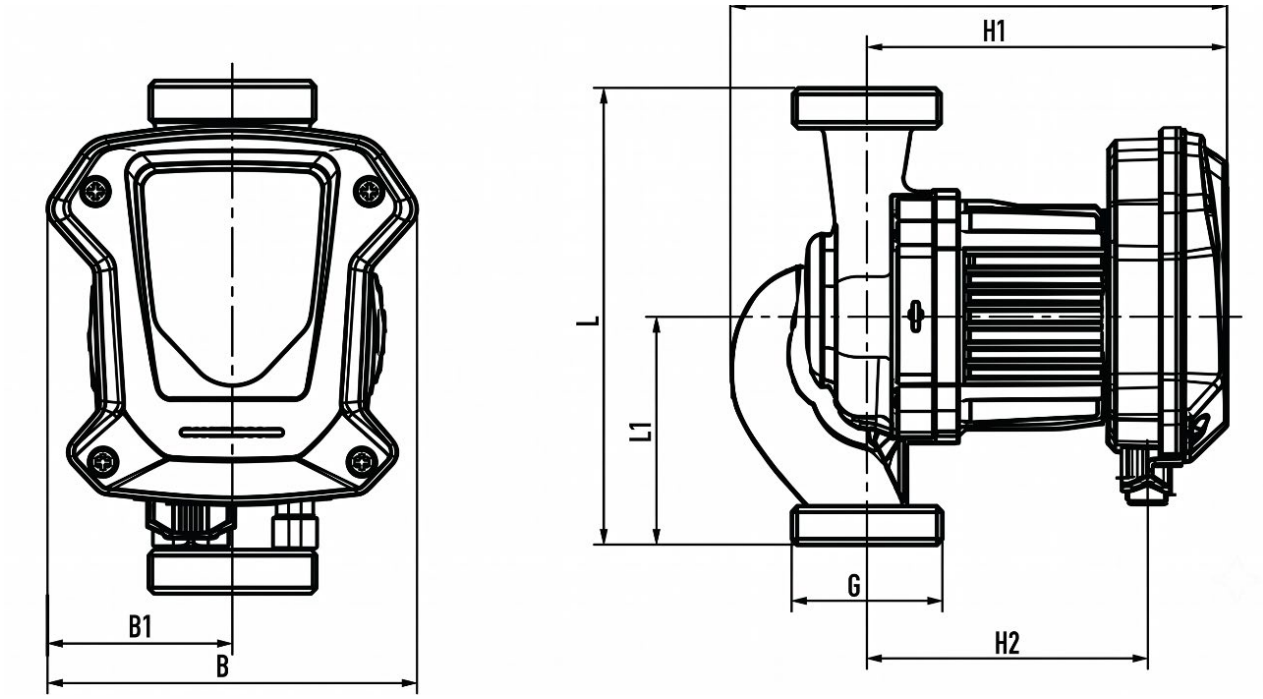
Maximum flow	43 GPM
Maximum head	39.37 ft
Ambient temperature	32°F – 104°F
Connection Type	Thread
Pressure level	145 psi
Size of suction port	2”
Size of outlet port	2”
Rated Voltage	230V/1/60 Hz
Rated Current	0.84 A
Protection level	IP44
Net Weight	3.3 Kg

3.1. Outline Structure Diagram

1	Inlet
2	Outlet
3	Cover
4	Display

5	Pump Body
6	Barrel
7	PWM Wiring Port
8	Power Plug

4. DIMENSION AND APPEARANCE



MODEL	PUMP BODY MATERIAL		DIMENSIONS							
	Cast iron	Stainless steel	L	L2	B	B1	H	H1	H2	G
AP-CR32-12-180	30,7	24,0	32,2	23,4	31,1	17,7	3,7	4,6	3,7	4,3

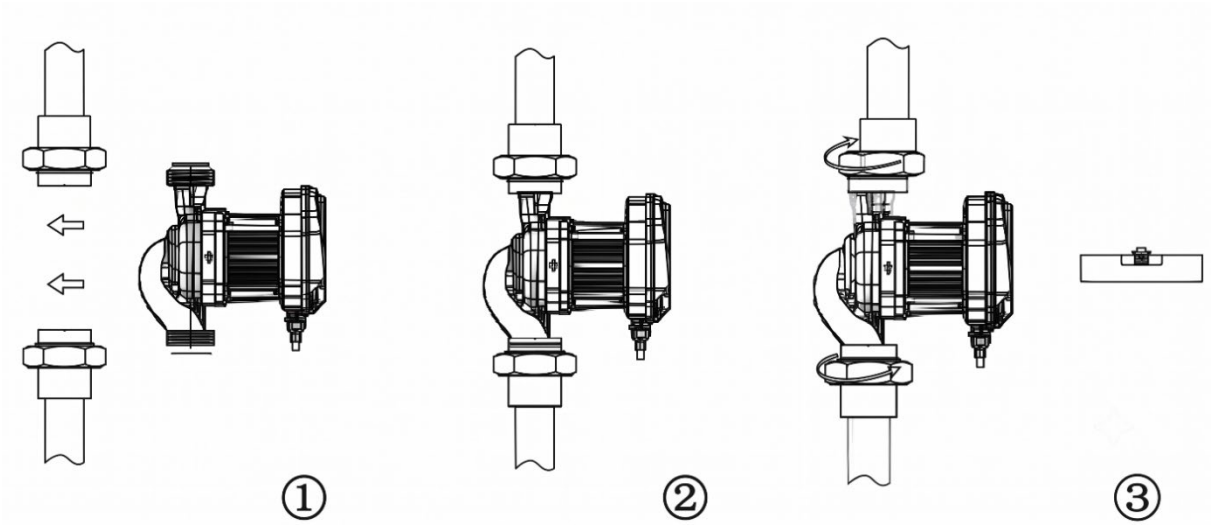
5. INSTALLATION

5.1. Installation Location

The pump should be installed indoors.

5.2. Installation

When installing a circulation pump, the arrow on the pump casing indicates the direction of flow of the liquid through the pump. When installed, the shaft of the electric pump must be horizontal.



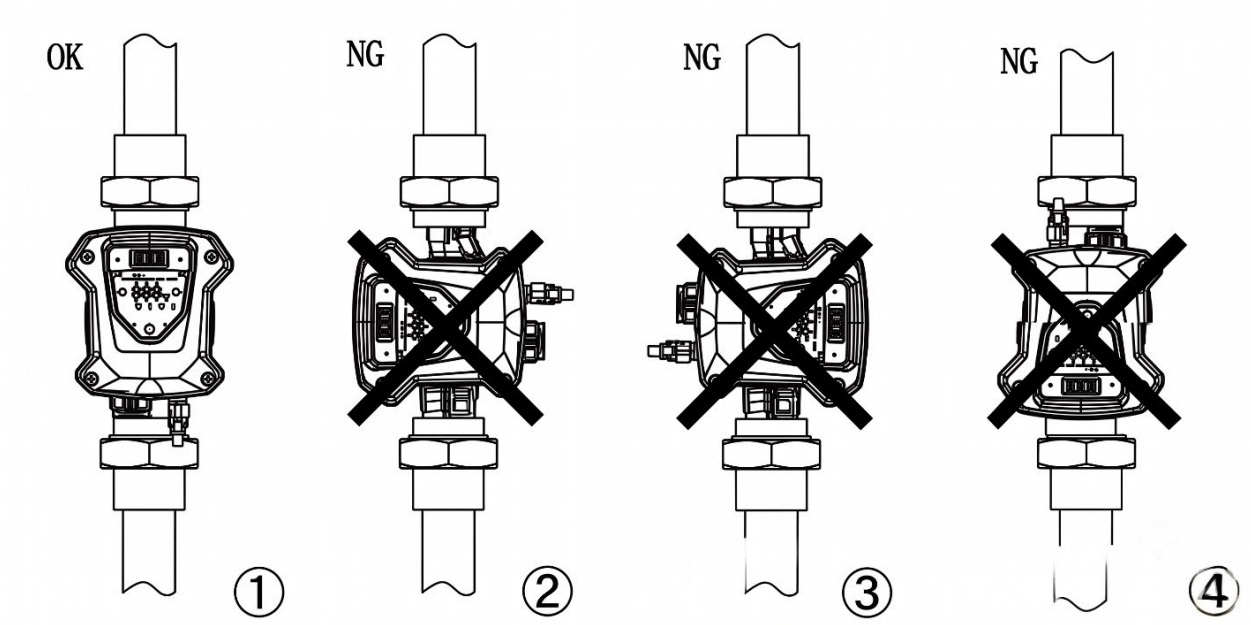
5.3. Installation Direction

5.3.1. Verify Flow Direction

Locate the directional arrow cast directly onto the iron or stainless steel pump housing. The pump must be installed so that this arrow points in the exact direction of the system's hydraulic flow.

5.3.2. Upright Display

The display should be horizontal and the electrical cable entry points downward, creating a natural drip loop to prevent water ingress.



⚠ Warning

The pumped liquid may be high temperature and high pressure. Before removing the socket head cap screws, the liquid in the system must be drained or the valves on both sides of the electric pump must be closed.

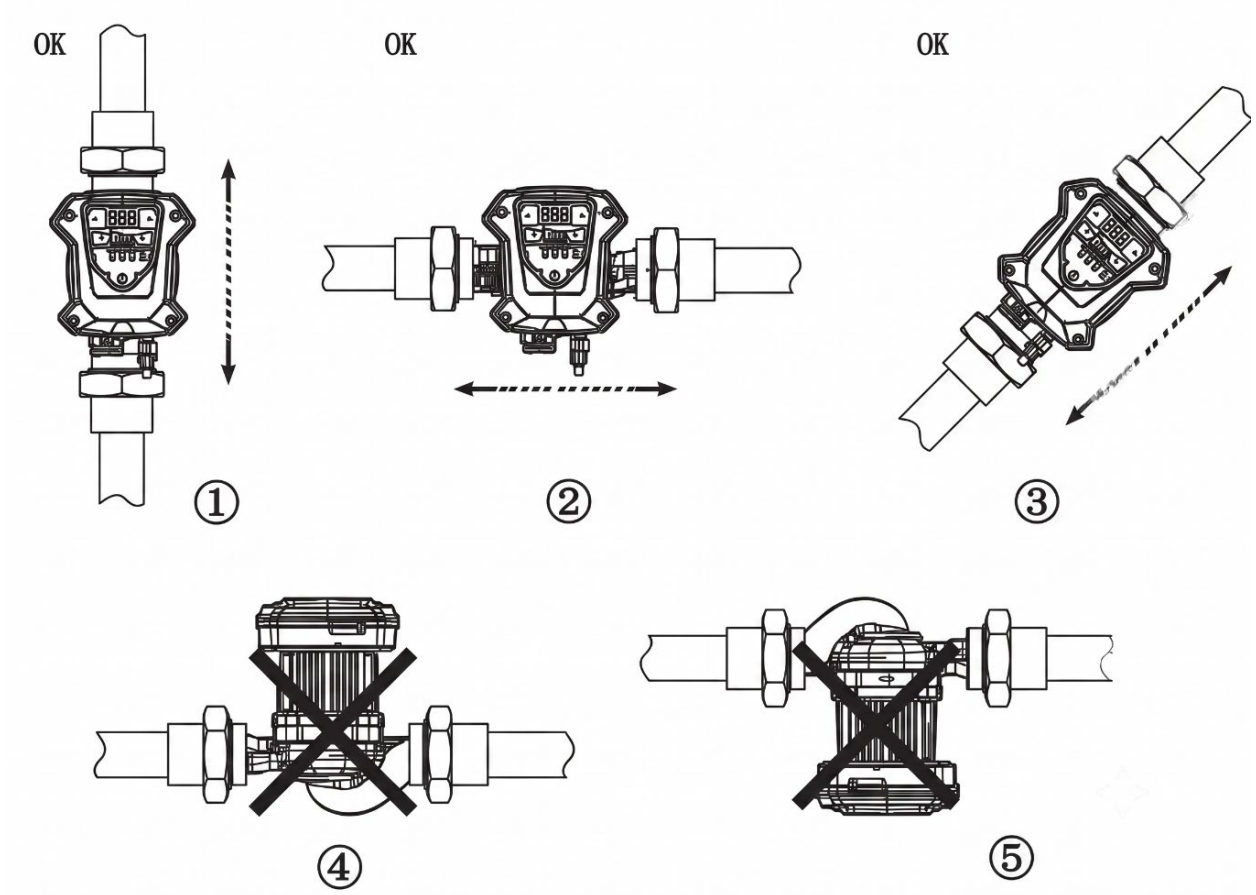
⚠ Warning

When changing the position of the junction box, the electric pump can only be started after the system is full of pumped liquid or the valves on both sides of the electric pump are open.

5.4. Control Box Position

Junction box can be rotated within 90°. The pump may be integrated into pipelines running at any angle, as long as the control box remains facing forward and the internal shaft is horizontal:

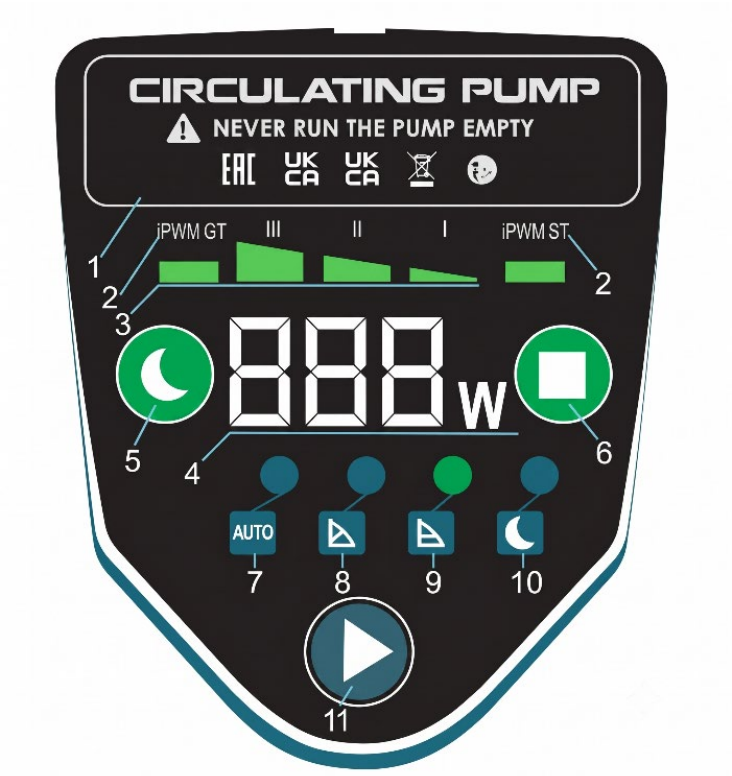
- **Vertical Piping:** Permissible for both upward and downward flow directions. The control box must remain upright with the electrical connections/cable entry pointing downward.
- **Horizontal Piping:** Permissible for both left-to-right and right-to-left flow directions.
- **Diagonal/Angled Piping:** Permissible for slanted pipe runs. The pump head must be oriented so that the control box interface remains accessible and properly aligned.



5.5. Insulation Foam

The water pump foam for the heating system is attached with the pump. Before installing the water pump, remove the heat insulating foam, and then put the foam on the pump body after the installation is completed.

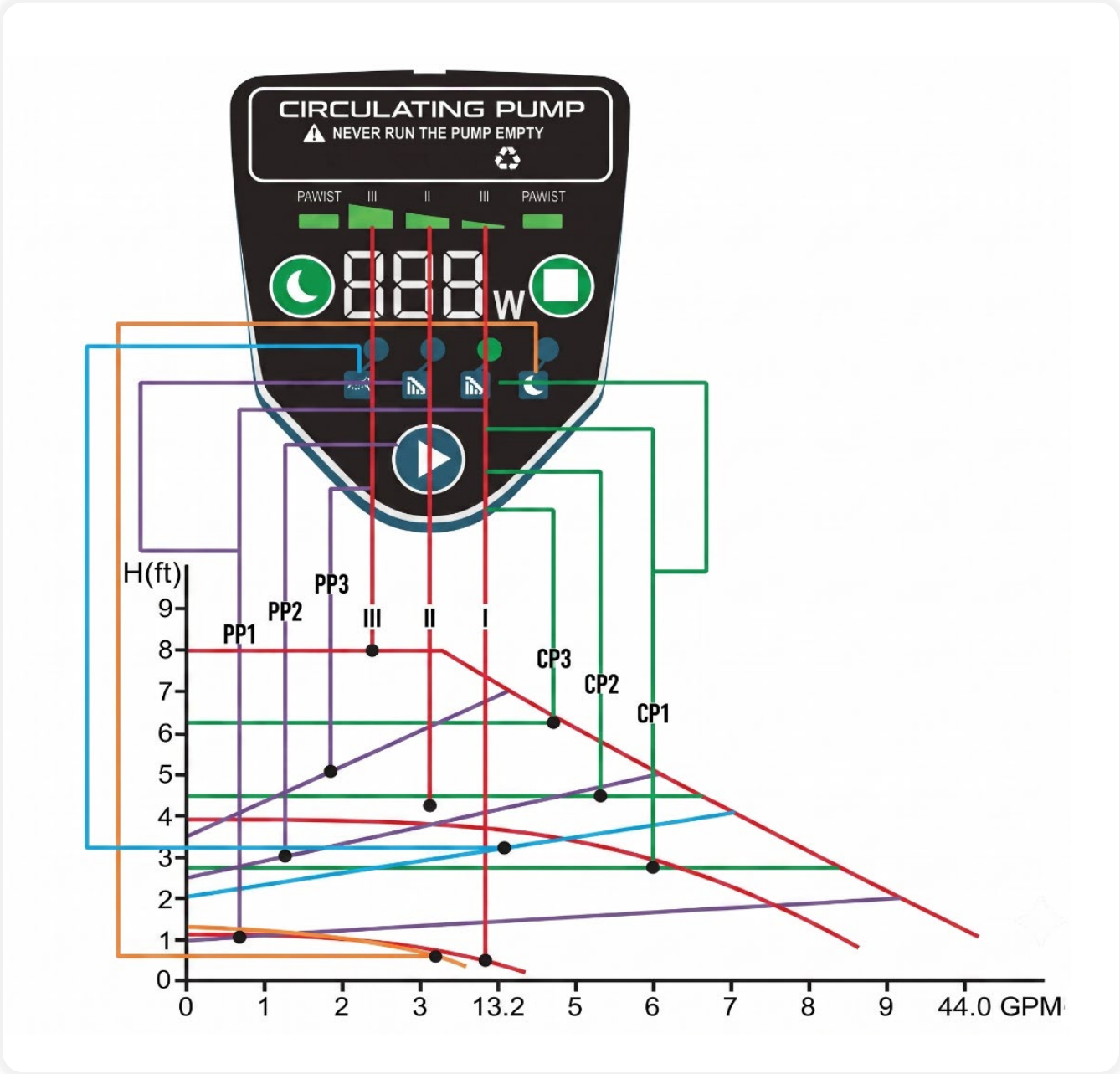
6.0. CONTROL PANEL

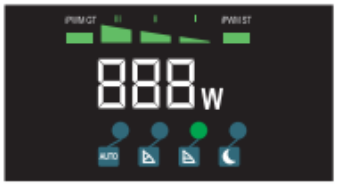
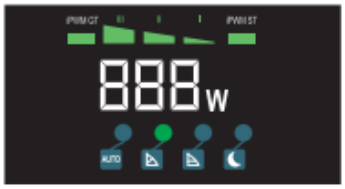
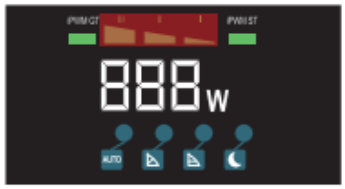
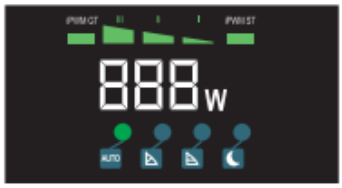
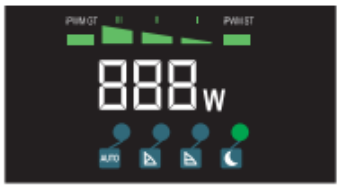


No.	FUNCTION
1	Product certification mark
2	PWM functions
3	Indicators for each gear. The three lights represent different operating conditions and can be switched between two modes (constant pressure and proportional pressure). When the mode indicator is not illuminated and only the gear indicator is illuminated, this means that it is in fixed speed mode.
4	Power indicator
5	Night mode start/stop
6	PWM function switch
7	AUTO mode indicator
8	Proportional pressure mode indicator
9	Constant pressure mode indicator
10	Night mode indicator
11	Setting button: This button is used to switch between modes and gears

7. RELATION BETWEEN PUMP SETTING AND PUMP PERFORMANCE

7.1. Basic Mode Introduction



CONTROL PANEL	DESCRIPTION
 CP1,CP2,CP3	The Operating Point moves back and forth on the curve according to the volume of flow from the system. As shown in the graph, the pump pressure remains constant, not affected by the volume demands of flow.
 PP1,PP2,PP3	The Operating Point moves back and forth on the Proportional Pressure curve according to the volume of flow from system. As shown in the graph. the pump pressure is directly proportional to the flow demands.
 I II III	In fixed speed mode, three pump motor speeds can be preset according to the specific pump system, SPD1, SPD2 and SPD3, which are characterized by the pump operating at a Predetermined constant speed curve.
 AUTO	In adaptive mode, the optimal proportional pressure curve (shaded part) is selected based on the system operating data collected over a period of time, which is used to analyze the current demand on the system.
 Night mode	The pump is changed to an automatic deceleration curve at night, so that it runs at low performance and low power consumption.
 iPWM ST	PWM EXTERNAL SPEED CONTROL (optional). See 7.2 for details.
 iPWM ST	PWM EXTERNAL SPEED CONTROL (optional). See 7.2 for details.

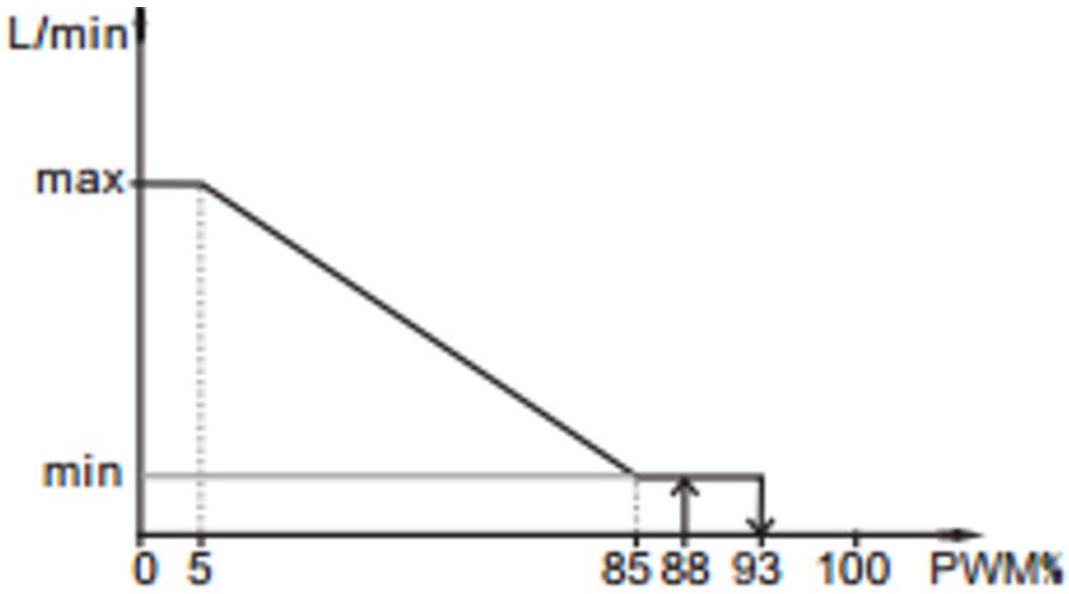
7.2. PWM Description

7.2.1. Control Principle

When PWM signal is connected, the operation of circulating pump is controlled by PWM signal, If there is no PWM signal, the operation of circulating pump is controlled by internal control logic.

7.2.2. iPWM GT

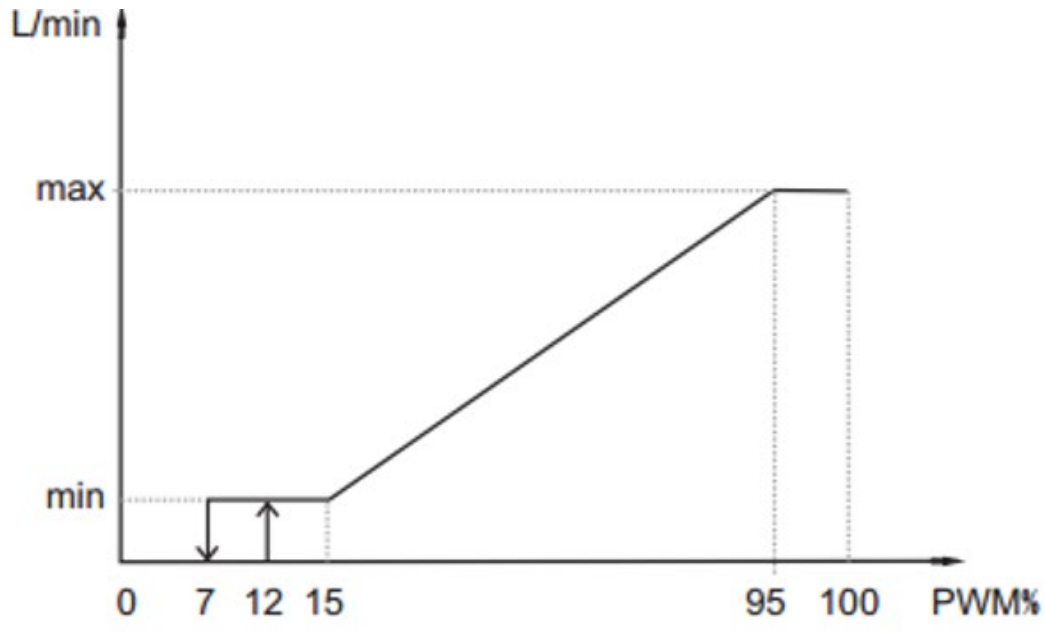
At high PWM signal percentages (duty cycles), a hysteresis prevents the circulating pump form starting and stopping if the input signal fluctuates around the shifting point. At low PWM signal percentages, the circulating pump speed is high for safety reasons. In case of a cable breakage in a gas boiler system, the circulating pump will continue to run at maximum speed to transfer heat from the primary heat exchanger. This is also suitable for heat circulating pumps to ensure that the circulating pump can transfer heat in case of a cable breakage.



PWM INPUT SIGNAL (%)	PUMP STATUS
0 ≤ PWM ≤ 5	Maximum Speed: Max.
5 < PWM ≤ 85	Variable Speed: Max. to Min.
85 < PWM ≤ 93	Minimum Speed: Min.
85 < PWM ≤ 88	Hysteresis area: ON/OFF
94 < PWM ≤ 100	Standby Mode: OFF

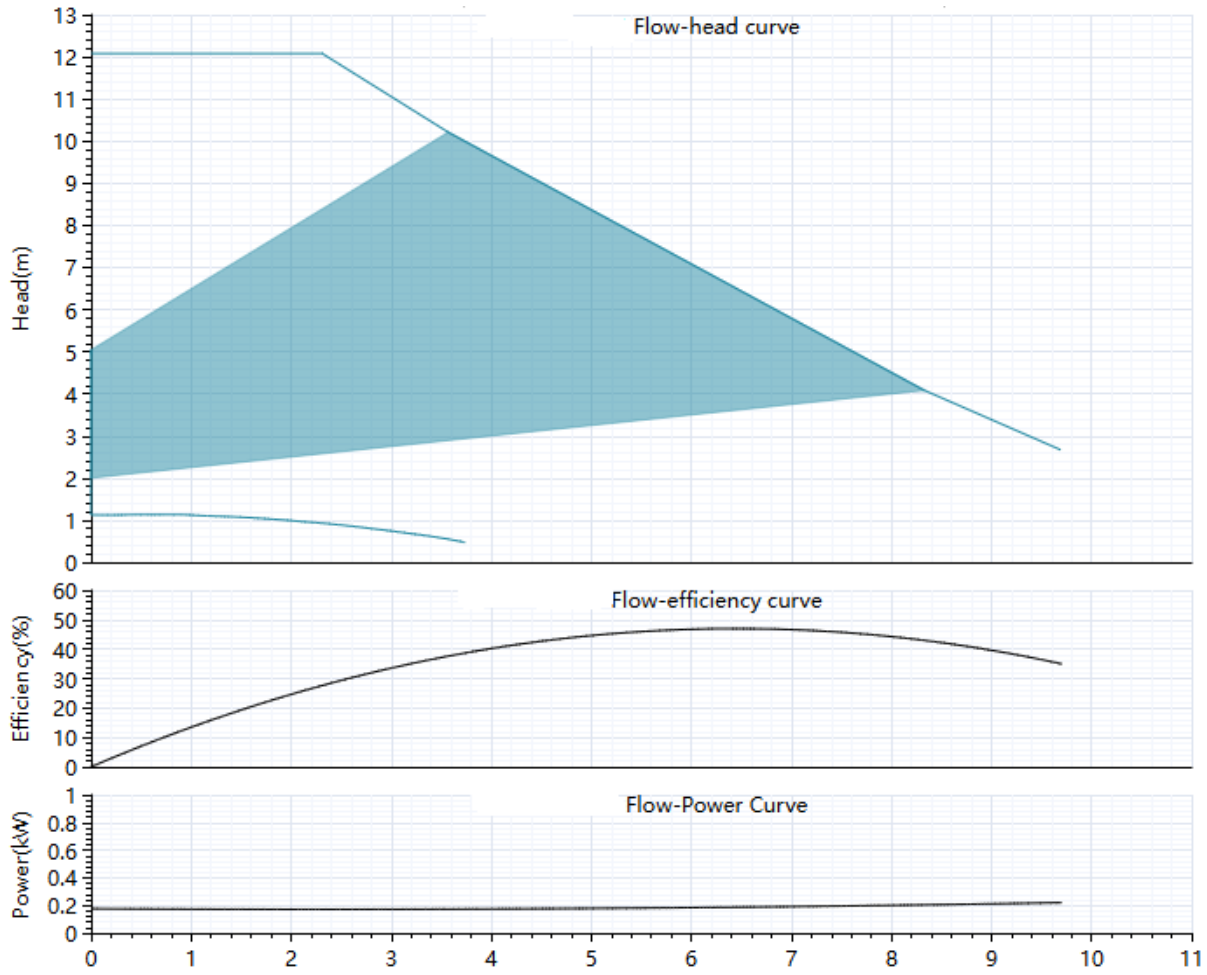
7.2.3. iPWM ST

At low PWM signal percentages (duty cycles), a hysteresis prevents the circulating pump form starting and stopping if the input signal fluctuates around the shifting point Without PWM signal percentages, the circulating pump will stop for safety reasons. If a signal missing, for example due to a cable breakage, the circulating pump will stop avoid overheating of the solar thermal system.



PWM INPUT SIGNAL (%)	PUMP STATUS
0 ≤ PWM < 7	Standby Mode: OFF
7 ≤ PWM ≤ 12	Hysteresis area: ON/OFF
12 < PWM ≤ 15	Minimum Speed: Min.
15 < PWM ≤ 95	Variable Speed: Max. to Min.
95 < PWM ≤ 100	Maximum Speed: Max.

8.0. PERFORMANCE CURVE



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