HIGH-EFFICIENCY ELECTRONIC CIRCULATOR

GPA 11H

GPA-XX-11H-XXX | Port-to-port length 130 / 180 mm



Wet-rotor circulator with a permanent-magnet motor.

Self-adapting mode is enabled by default through the default speed setting; 9 control types are available.

When connected to the power supply, the pump starts and automatically adjusts its performance to the system requirements.

Speed can be controlled by a PWM signal. An optional module allows control with a 0-10 V signal.

ERP energy efficiency

EEI ≤ 0.21 - Part 2. The benchmark for the most efficient circulators is EEI ≤ 0.20.

Applications

Heat pumps, renewable energy systems, hydronic distribution kits and radiant panel heating.

Permitted fluids

Heating water to VDI 2035 and UNI 8065; water/glycol mixtures up to 50%. Clean, non-aggressive and non-explosive liquids, free from solid particles, fibres and mineral oils.

CIRCULATOR FEATURES

Technical data

Motor electrical data

Parameter	Value
Power supply	1 × 230 V (±10%); 50/60 Hz
Rated power input P1	Max 140 W
Rated current I1	Max 1.09 A
Insulation class	H
Protection rating	IP44

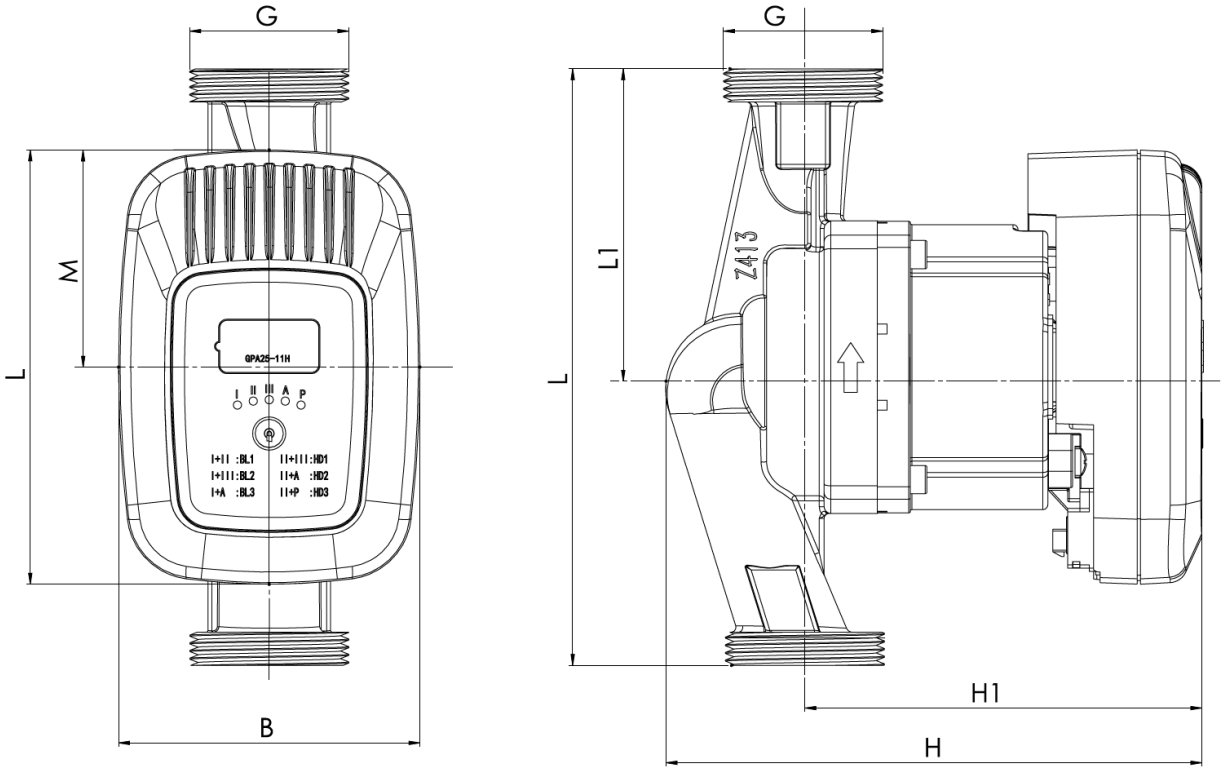
Operating conditions

Parameter	Value
Ambient temperature	-30 °C to +70 °C
Liquid temperature	-10 °C to +95 °C
Permitted liquid temperature range for continuous operation at maximum rated power	Ambient 50 °C: 0 °C to +95 °C Ambient 60 °C: 0 °C to +77 °C Ambient 70 °C: 0 °C to +60 °C
System pressure	Max 1.0 MPa (10 bar)
Minimum inlet pressure	0.05 bar at a fluid temperature of 75 °C 0.5 bar at a fluid temperature of 90 °C 1.08 bar at a fluid temperature of 95 °C
Maximum relative humidity	≤ 95%
Sound pressure level	< 42 dB(A)

INSTALLATION DIMENSIONS

Dimensions and models

Dimensions in millimetres; G connection size in inches.

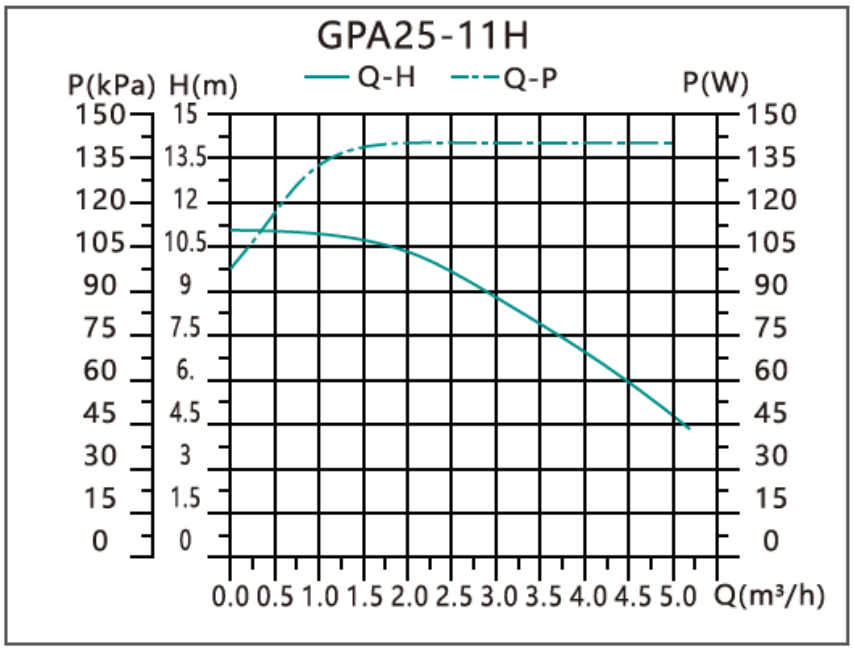


Model	G	L	B	M	A	L1	H	H1
GPA 25-11H-130	1½"	130	91	65.8	131.5	65	162	120
GPA 25-11H-180	1½"	180	91	65.8	131.5	65	162	120
GPA 32-11H-180	2"	180	91	65.8	131.5	65	162	120

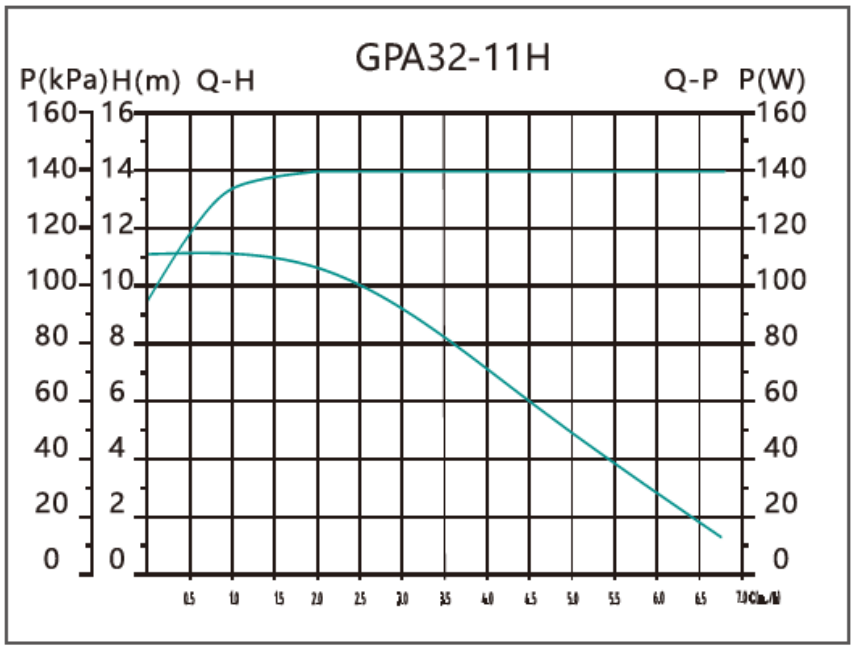
HYDRAULIC AND ELECTRICAL PERFORMANCE

GPA 25-11H and GPA 32-11H curves

GPA 25-11H



GPA 32-11H



CONTROLS AND INDICATIONS

Control modes

LED area	Mode	LEDs on
HS3	Maximum speed (factory setting)	○ ○ ● ○ ○
AUTO	Self-adapting function	○ ○ ○ ● ○
BL1	Proportional pressure, low speed	● ● ○ ○ ○
BL2	Proportional pressure, medium speed	● ○ ● ○ ○
BL3	Proportional pressure, high speed	● ○ ○ ● ○
HD1	Constant pressure, low speed	○ ● ● ○ ○
HD2	Constant pressure, medium speed	○ ● ○ ● ○
HD3	Constant pressure, high speed	○ ● ○ ○ ●
HS1	Low speed	● ○ ○ ○ ○
HS2	Medium speed	○ ● ○ ○ ○
P	PWM1 control	○ ○ ○ ○ ●

I II III A P

Filled dots indicate illuminated LEDs on the control panel.

OPERATION AND CERTIFICATIONS

Selectable curves

AUTO - proportional pressure Dp/Va

AUTO adjusts performance within the specified range according to the system size and changes in load over time. In self-adapting mode, the pump operates with proportional-pressure control.

BL 1-3 - proportional pressure Dp/V

The operating point moves along the curve according to flow requirements. Pressure decreases as flow demand decreases and increases as demand increases.

HD 1-3 - constant pressure Dp/C

The operating point moves along the curve according to the system flow requirements. Pressure remains constant as flow demand changes.

HS 1-3 - constant speed

The pump runs at a constant speed on the corresponding curve in all operating conditions. Briefly select HS3 to help vent air from the pump quickly.

Certifications

- CE marking and GS marking.
- Low Voltage Directive 2006/95/EC: EN 62233, EN 60335-1, EN 60335-2-51.
- EMC Directive 2004/108/EC: EN 61000-3-2, EN 61000-3-3, EN 55014-1, EN 55014-2.

FAULT INDICATIONS

Error codes and protection

Indication	Protection and reset
1 flash	Overvoltage: 270 ± 5 V. Restarts when the voltage returns to normal.
2 flashes	Undervoltage: 165 ± 5 V. Restarts when the voltage returns to normal.
3 flashes	Overcurrent. Restarts after 8 seconds.
4 flashes	Phase loss. Restarts after 8 seconds.
5 flashes	Locked rotor. Restarts after 8 seconds.
6 flashes	Light load. Restarts after 8 seconds.
7 flashes	Overtemperature. Restarts after the ambient temperature has returned to normal for 5 seconds.

Overheating protection

At rated voltage and frequency, with high water and ambient temperatures, pump operation is reduced when the IPM module surface temperature exceeds 120 ± 5 °C.

Before carrying out work

In the event of a fault, disconnect the power supply before checking the pump. After resolving the problem, reconnect the power supply and restart the pump.

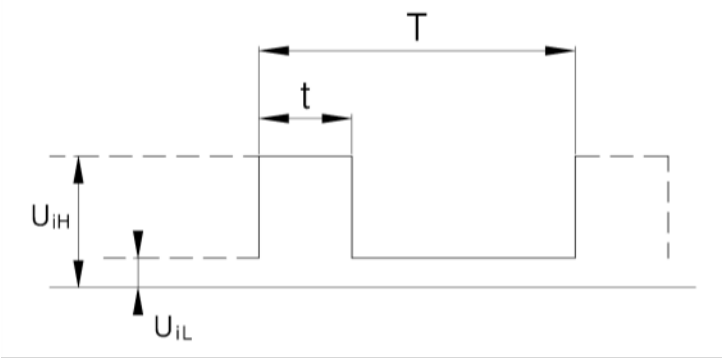
EXTERNAL PWM CONTROL

Signal characteristics

The rotational speed depends on the external PWM signal. The speed command is adjusted by varying the duty cycle of the digital LV PWM (Pulse Width Modulation) signal.

Parameter	Value / meaning
PWM IN frequency	40-4,000 Hz
PWM OUT frequency	75 Hz
T	Signal period
d	Duty cycle
UiH - high input voltage	4-24 V
UiL - low input voltage	≤ 1 V
IiH - input current	≤ 10 mA (depending on UiH)

Calculating the duty cycle

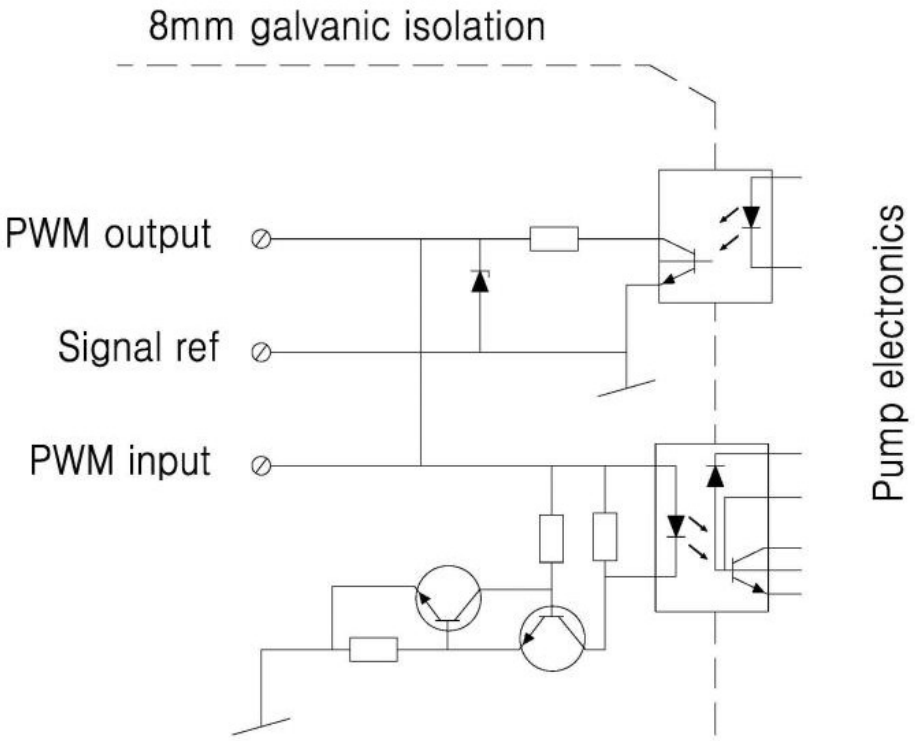


d = t / T

T = 2 ms (500 Hz)
t = 0.6 ms
d% = 100 × 0.6 / 2 = 30%

CONNECTION AND ISOLATION

PWM interface



The interface converts external electrical signals into signals recognised by the pump microprocessor. Galvanic isolation is 8 mm.

With a supply voltage between 220 V and 240 V, the interface protects against contact with high voltage through the signal cable.

Signal reference

“Signal Ref” is the signal ground reference and is not connected to protective earth.

SPEED CONTROL

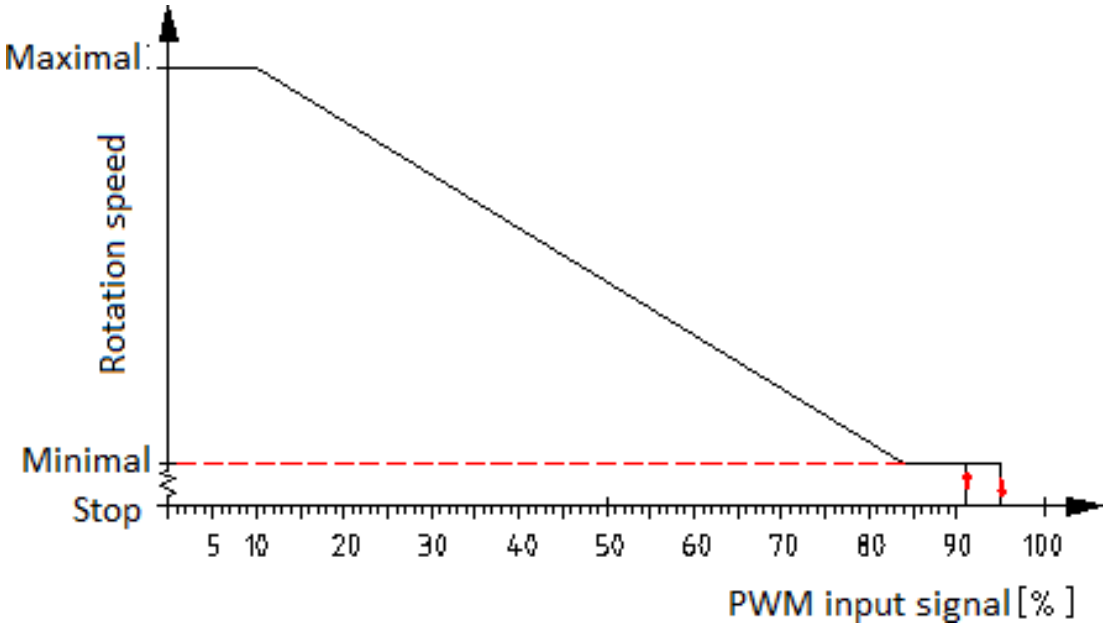
PWM signal logic

At a high duty cycle, a hysteresis zone prevents frequent starting and stopping when the signal fluctuates near the critical point.

At a low duty cycle, the circulator runs at high speed for system safety. If the boiler or heat pump signal cable is damaged, the pump continues to run at maximum speed to transfer heat through the main heat exchanger.

When the PWM input signal is 0% or 100%, the pump switches to non-PWM mode (normal mode) and the system considers the PWM signal absent.

Switching between PWM and non-PWM modes is automatic: when a PWM input signal is present, the system enters PWM mode.



SPEED CONTROL

PWM input signal

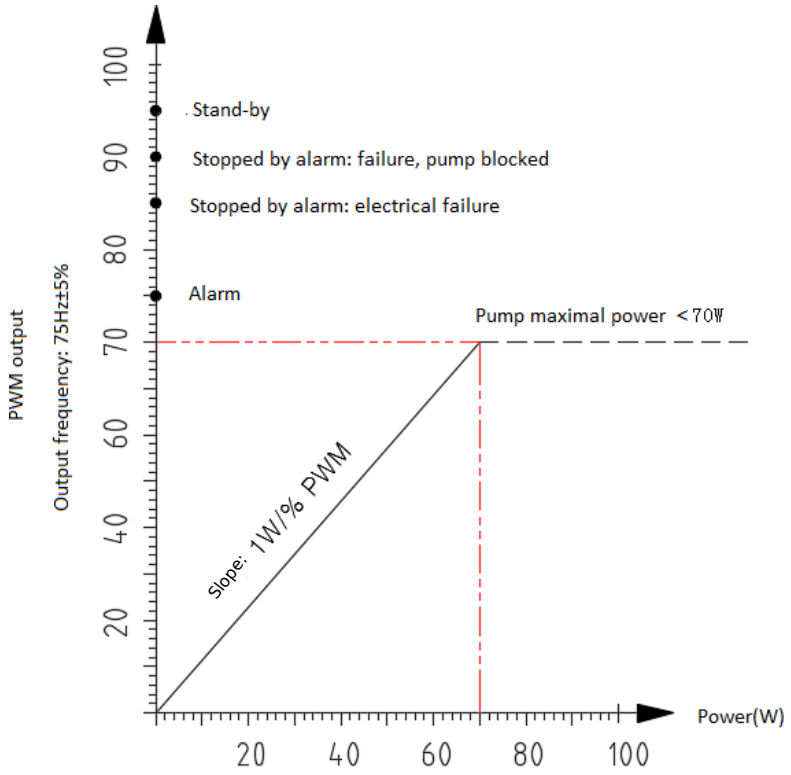
PWM input	Pump status
0%	Non-PWM mode; the system considers the PWM signal absent.
< 10%	Maximum rotational speed.
10-84%	The speed decreases from maximum to minimum.
85-91%	Minimum rotational speed.
91-95%	Hysteresis prevents frequent starting and stopping.
96-99%	Standby: the circulator stops.
100%	Standby: the circulator stops.

PWM feedback signal

Feedback indicates the operating status, power losses, faults and alarms. In the event of undervoltage, the output is set to 75%. If the rotor is blocked by impurities in the circuit, the output is set to 90%; this alarm has a higher priority.

STATUS SIGNAL

PWM feedback



PWM OUT	Status / description
95%	Standby: the circulator stops.
90%	Locked-pump alarm. Restarts only after the problem has been resolved.
85%	Electrical fault alarm. Restarts only after the problem has been resolved.
75%	Non-critical warning: the pump continues to run.
0-70%	Power 0-70 W; slope of 1 W per PWM percentage point.

The signal allows energy consumption to be measured and the actual system operating point to be determined. It also allows the speed setting to be compared with the feedback.

TROUBLESHOOTING | 1 OF 2

Diagnostics and remedies

Description	Remedy
Internal error	1. Disconnect the power supply to the system. 2. Wait until the panel indicator lights go out, then reconnect the power supply. 3. If the error persists, replace the circulator.
Low mains voltage (LP)	1. Disconnect the power supply to the system. 2. Wait until the panel indicator lights go out, then reconnect the power supply. 3. Check the mains voltage and restore it to the nameplate value.
High mains voltage (HP)	1. Disconnect the power supply to the system. 2. Wait until the panel indicator lights go out, then reconnect the power supply. 3. Check the mains voltage and restore it to the nameplate value.
Critical overheating of electronic components	1. Disconnect the power supply to the system. 2. Wait until the panel indicator lights go out, then reconnect the power supply. 3. Check that the ventilation ducts are unobstructed and the ambient temperature is within specifications.
Sensor signal missing	1. Check the sensor connection. 2. Replace the sensor if it is faulty.

TROUBLESHOOTING | 2 OF 2

Diagnostics and support

Description	Remedy
Overcurrent protection	1. Check that the circulator rotates freely. 2. Check that the glycol level is correct.
Voltage error	1. Disconnect the power supply to the system. 2. Wait until the panel indicator lights go out, then reconnect the power supply. 3. Check the mains voltage and restore it to the nameplate value.
Dry running	Indicated by all LEDs flashing. Add liquid.
Motor overtemperature	1. Disconnect the power supply to the system. 2. Wait for the motor to cool. 3. Reconnect the power supply. 4. Check the ventilation ducts and ambient temperature.
f < 100 Hz; f > 5 kHz	1. Check that the PWM signal is working and connected according to specification. 2. If the PWM controller malfunctions, the circulator runs at maximum speed (PWM1/A). In PWM2, it remains stopped, awaiting a control signal.
Circulator LED status	Refer to the operating and installation manual supplied in the box and the specific circulator instructions.

One Pump support

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