



# Primaflow™



## CPE series heating circulation pump

[primaflow.co.uk](http://primaflow.co.uk)

Installation, operation and maintenance guide

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# 1. Important information

## Please read before installing pump

- Primaflow will not be liable for damage or injury if the guidelines presented in this booklet are not complied with in all respects
- It is the responsibility of the installer to ensure that any local building regulations relating to the installation of this pump are fully complied with
- The pump must be installed by a competent person properly qualified to carry out such work
- The installer is responsible for advising the end user how the pump should be maintained with reference to this booklet. Failure to maintain the pump properly in accordance with these guidelines will invalidate the warranty
- The electrical supply must be isolated prior to installation and maintenance of the pump
- The pump must not be installed
  - in places subject to high humidity or near open sources of water
  - in poorly ventilated areas where condensation can occur causing potential damage to electrical components
  - outside or otherwise exposed to the elements
- The pump should be installed with service valves either side of the unit to facilitate maintenance
- The pump warranty will be invalid if the heating system is not protected with a suitable corrosion inhibitor
- The pump should not be operated without water in the system and should be primed with water by opening the service valves prior to switching on the electrical supply. Warranty will be invalid if a pump has been run dry
- To avoid burns and scalding the central heating system must be switched off and allowed to cool prior to any servicing of the pump
- To avoid frost damage the pump should be completely drained of water when exposed to a risk of freezing
- During long periods without use the electrical supply to the pump should be isolated and the service valves closed
- Any damaged cables must be replaced by a competent person
- In case of malfunction the pump should be isolated from the electrical supply and a competent heating engineer should be summoned
- The pump should be installed beyond the reach of small children
- This pump is not suitable for domestic drinking water

## 2. Overview

Primaflow CPE series pumps are designed to circulate hot water around a domestic heating system and are suitable for:

- Constant and variable flow
- Variable temperatures

These pumps use a permanent magnet motor and differential pressure controller that monitors and adjusts the pump performance to meet the system demands. The control panel allows the user to override the automatic settings to the desired performance levels if required.

Primaflow CPE series pumps offer:

- Easy installation and start up: the Auto setting allows the pump to be installed, bled and set to the desired performance level of the system without any adjustment by the installer
- Low power consumption: the pump complies with EC directive 641/2009
- Low noise
- 2 year warranty: subject to the return of the enclosed warranty card, see section 15

### 3. Operating environment

The CPE series pump is suitable for the following operating environment:

- Ambient temperature: 0°C to +40°C
- Maximum relative humidity: 95%
- Water temperature range: +2°C to +110°C
- Maximum pressure: 10 bar
- Protection grade: IP42

Outside of these conditions a premature failure may be anticipated and the warranty will be invalid.

In order to prevent condensation forming within the control box the water temperature in the pump must always be higher than the ambient temperature in the vicinity of the pump, see page 17.

To avoid cavitation corrosion within the pump the inlet pressure must be kept as low as possible. Recommended pressures at different temperatures are listed below:

Water temp	<85°C	90°C	110°C
Inlet pressure	0.05 bar	0.3 bar	1 bar

The water within the system and the pump must be:

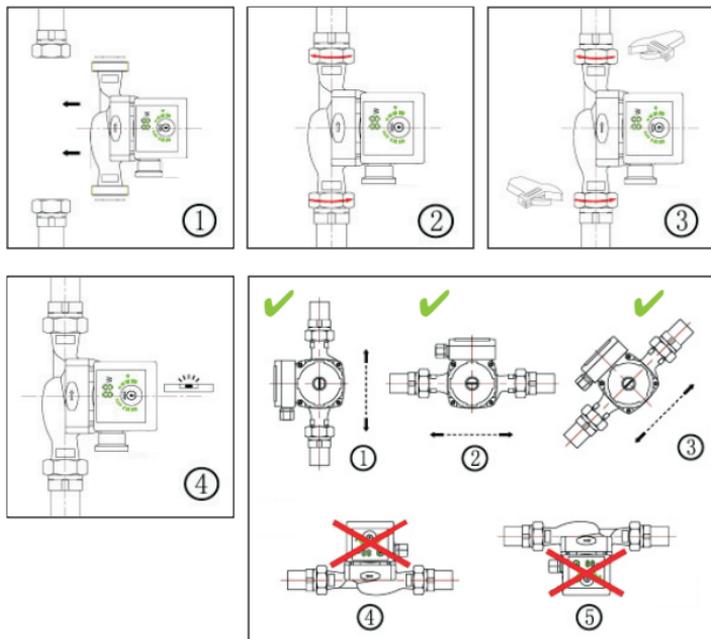
- Clean
- Non-corrosive
- Protected with a suitable corrosion inhibitor
- Non-viscous
- Free from solids and particles

Primaflow CPE pumps are not suitable for use with flammable liquids such as oil and petrol. Use of pumps for viscous liquids will lead to high power consumption and reduced service life.

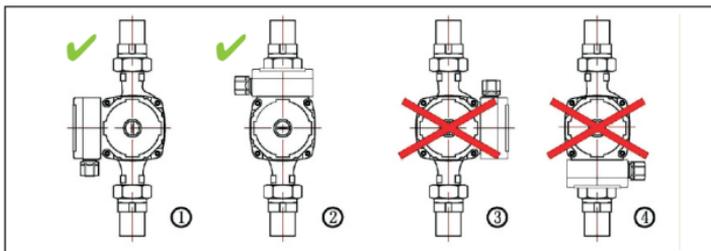
## 4. Installation

4.1 The pump shaft must be horizontal when installed as shown in the images below. Flow will be in the direction of the arrow shown on the pump body.

- Position the pump between 2 service valves and assemble with gaskets
- Hand tighten the union nuts ensuring that the pump is in the correct orientation for the shaft, control panel and direction of flow. Realign if required. The control panel can be adjusted as described in section 4.2
- Tighten the union nuts ensuring a watertight seal has been made using the gaskets provided
- Connect the electrical supply as described in section 5



4.2 The control panel can be oriented in 2 of the 4 positions shown below.



The panel can be adjusted to suit the requirement of the installation.

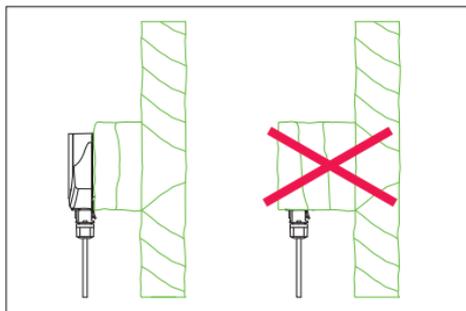
In order to do this the control panel can rotate through 90° as follows:

- If already installed:
  - Isolate the electrical supply and allow the pump and system to cool
  - Close the service valves on either side of the pump
  - Disconnect the cable from the control panel

Then follow instructions below:

- Loosen and remove the 4 hexagonal screws attaching the pump body to its base. **WARNING** – there will be some water leakage if the pump has been used
- Rotate the motor and control panel to the required position
- Replace the 4 hexagonal screws and tighten

In order to reduce heat loss through the pump it can be insulated as shown in the diagram below. **WARNING** - do not cover the control panel or electric connections.

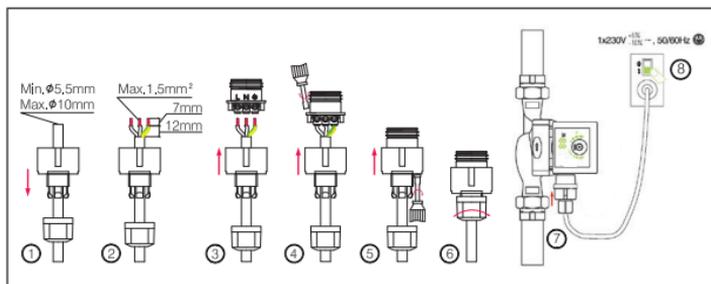


## 5. Electrical connection

### WARNING:

- Electrical connection must be carried out only by a competent person and the pump must be fitted in compliance with current electrical regulations
- Supply voltage and frequency must match those shown on the face plate
- The pump must be connected to the electrical supply using the connector provided
- The control panel light will indicate when connected to the power supply

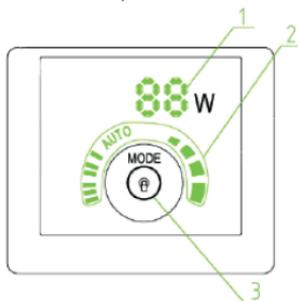
Connect the pump to the electrical supply in the following sequence.



Open the service valves to allow water into the pump before switching on the electrical supply. Failure to do so may damage the pump reducing its life and invalidating the warranty.

## 6. Control panel

The control panel and functions are as follows.



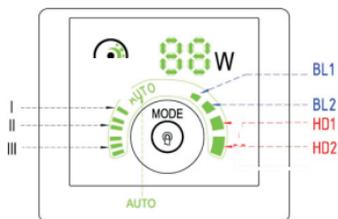
Label	Description
1	Power consumption (W)
2	Pump mode indicator
3	Pump mode button

**1. Power consumption:** When the pump is operating the power being consumed by the pump will be displayed. The power consumption will vary depending on the pump setting and the demand of the system. If the display shows “E” refer to the troubleshooting guide on page 18.

**2. Pump mode:** Press the mode button to advance the setting one step. Press eight times (with a 2 second gap) to cycle the pump through the range of settings.

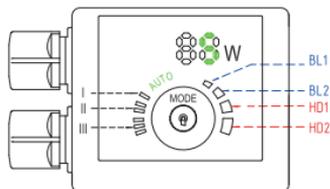
**3. Pump settings:** There are 8 settings as described below which can be selected by sequentially pressing the pump mode button.

### HE-5 and HE-6:



Label	Description
III	Highest constant speed curve
II	Medium constant speed curve
I	Lowest constant speed curve
Auto	Fully automatic for optimum efficiency
BL1	Lowest proportional pressure curve
BL2	Highest proportional pressure curve
HD1	Lowest constant pressure curve
HD2	Highest constant pressure curve

### HE-V:



Label	Description
III	6m Head
II	5m Head
I	4m Head

## 7. Pump settings

The pump should be set according to the type of heating system.

System type	Pump settings	
	Recommended	Alternative
Underfloor	Auto	HD1 / HD2
Two pipe	Auto	BL2
Single pipe	BL1	BL2

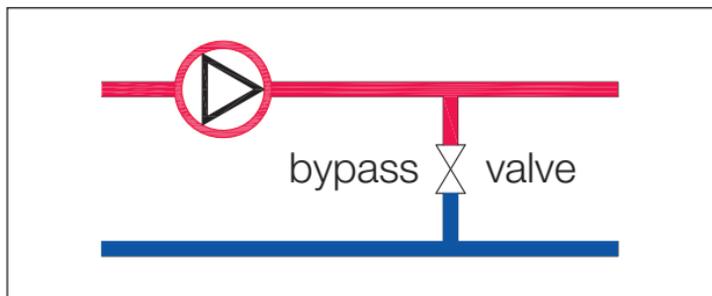
Auto mode automatically adjusts the pump performance according to the heating system demands. It is recommended the pump is set to Auto when initially installed. If the desired performance is not achieved then manual adjustment to the other settings can be considered.

Depending on the heat demand by the system the pump will adjust the power requirements according to proportional pressure control (BL) or constant pressure control curves (HD).

- Proportional Pressure Control: In this mode the pressure difference across the pump is determined by the flow and is indicated by curves BL1 and BL2 in the Q/H diagram shown in chapter 10
- Constant Pressure Control: In this mode the pressure difference across the pump is constant regardless of the flow conditions within the system and is indicated by HD1 and HD2 in the Q/H Diagram shown in chapter 10

## 8. Use with a bypass valve

**Installation and application:** The pump should be installed according to the diagram below.



If all the thermostatic radiator valves in the system are closed, a bypass valve allows water to continually circulate eliminating unnecessary heat and pressure build up.

If the system has a manual bypass valve (non TRV radiator) select speed I and adjust the flow rate of the system to the minimum specified by the boiler manufacturer's specifications. Once the flow is adjusted set the pump to AUTO.

For systems with a thermostatically controlled bypass valve select speed I and adjust the flow rate of the system to the minimum specified by the boiler manufacturer's specifications. Once the flow is adjusted set the pump to BL1 or BL2 to suit the system demands.

## 9. Commissioning

The liquid in the heating system must be clean. It is recommended that a proprietary magnetic filter be fitted to ensure that the system remains clear of potentially damaging contaminants and debris.

### **Before operating the pump:**

- Open both service valves and prime the system with water
- Bleed the system (not the pump) to ensure no air is trapped
- Pressurise the system to its lowest recommended level

**Bleeding the pump:** Although the CPE series pump has an automatic bleed function and does not require manual intervention, manual bleeding is recommended to reduce commissioning time.

In order to bleed the pump carry out the following steps:

- Connect the pump to the electrical supply and switch on
- The pump will now automatically vent any air within it. Whilst doing this the pump may appear as though it is not operating properly. However normal operation will begin once the air has been vented. This can take up to 30 minutes
- The venting time can be reduced by setting pump speed III and venting through the bleed screw on the front of the pump
- Once the air has been removed the pump display will begin to show that power is being used and the pump should be set up as in section 7

**NOTE:** Do not run the pump without water in the system as this will lead to premature failure and invalidation of the warranty.

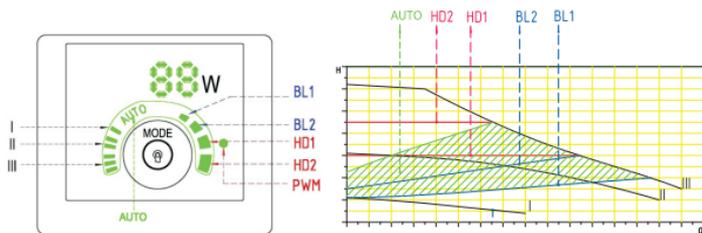
**NOTE:** Do not rely on the pump to vent air from the system once commissioned. It is recommended that an automatic air vent is installed to maintain an air free system.

## 10. Settings and pump performance

The table below describes each of the pump settings and its function.

Setting	Performance curve	Function	
Auto	Maximum rate to minimum rate	The auto function will adjust the pump performance to anywhere within the standard range to obtain the optimum setting for the demand of the system.	
BL1	Lowest proportional pressure curve	Dependant on the demand of the system the pump will adjust itself up and down this curve. As demand increases so does the pressure.	
BL2	Highest proportional pressure curve	Dependant on the demand of the system the pump will adjust itself up and down this curve. As demand increases so does the pressure.	
HD1	Minimum constant pressure curve	Dependant on the demand of the system the pump will adjust itself up and down this curve. The pump will maintain a constant pressure regardless of the system demands.	
HD2	Maximum constant pressure curve	Dependant on the demand of the system the pump will adjust itself up and down this curve. The pump will maintain a constant pressure regardless of the system demands.	
III	Speed III	The pump will operate on the maximum curve in all conditions.	HE-5 + HE-6 only
II	Speed II	The pump will operate on the medium curve in all conditions.	
I	Speed I	The pump will operate on the minimum curve in all conditions.	
III	6m head	The pump will operate at the maximum head in all conditions.	HE-V only
II	5m head		
I	4m head		

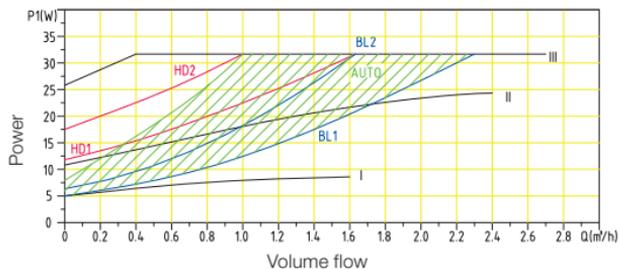
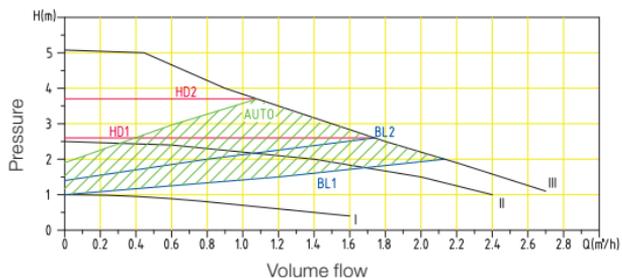
For each setting the pump has its own performance (Q/H) curve, but in Auto mode the pump can adjust to anywhere in its operating range within these curves. Input power curve P1 covers every Q/H curve, this is the power consumption in any given condition within the curves. Power consumption is measured in Watts (W) and displayed on the pump control panel.



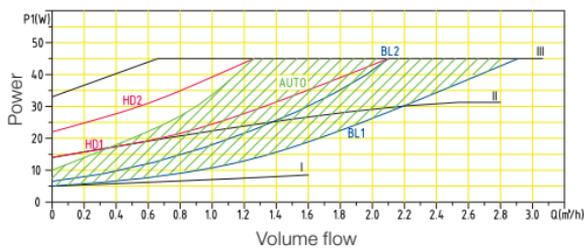
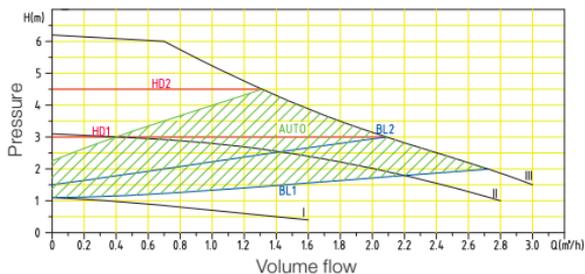
**The pump curves relate to the following characteristics:**

- Water with air fully vented from system
- Adaptive density ( $\rho$ ) is 983.2 kg/m<sup>3</sup> with a liquid temperature of +60°C
- All curves show average values and variation between pumps may exist. Tests should be conducted on individual pumps if a specific curve is required
- Adaptive kinematic viscosity is 0.474 mm<sup>2</sup>/s (0.474 cST)

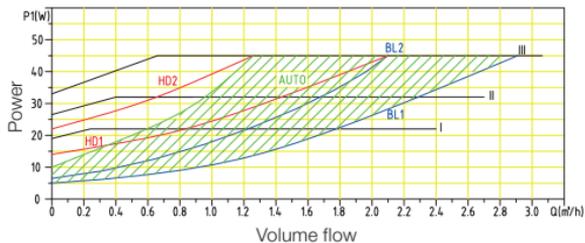
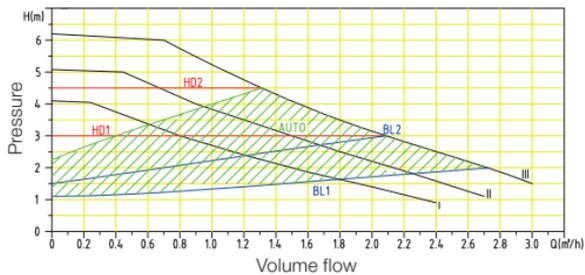
**Performance curve for HE-5 pump (5 bar)**



## Performance curve for HE-6 pump (6 bar)



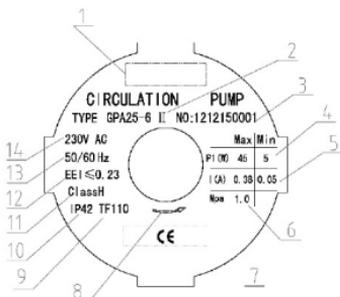
## Performance curve for HE-V



## 11. Features

Name plate information.

### HE-5 + HE-6



No.	Description
1	Primaflow
2	Pump model
3	Serial number
4	Power (Watts) Minimum/Maximum
5	Current (Amps) Minimum/Maximum
6	Maximum system pressure (MPa)
7	Certifications
8	Direction of rotation
9	Maximum temperature
10	Protection grade
11	Insulation class
12	Energy efficiency index
13	Power supply frequency
14	Power supply voltage

### HE-V

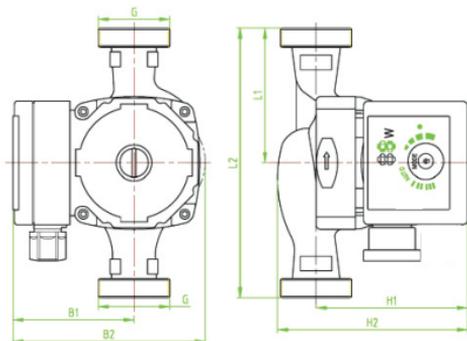


No.	Description
1	Primaflow
2	Pump model
3	Serial number
4	Power (Watts) Minimum/Maximum
5	Head (m)
6	Maximum system pressure (MPa)
7	Certifications
8	Direction of rotation
9	Maximum temperature
10	Protection grade
11	Insulation class
12	Energy efficiency index
13	Power supply frequency
14	Power supply voltage

## 12. Technical specifications

Voltage	230V +6% / -10%, 50Hz, PE	
Protection	No external protection	
Protection grade	IP42	
Insulation class	H	
Air humidity	Max 95%	
System pressure	1.0 Mpa	
Inlet pressure	Liquid temp	Min pressure at Inlet
	Up to 85°C	0.005 MPa
	Up to 90°C	0.028 MPa
	Up to 110°C	0.100 MPa
EMC standard	EN61000-6-1 and EN61000-6-3	
Acoustic level	<43dB (A)	
Ambient temperature	0°C to 40°C	
Temperature grade	TF110	
Surface temperature	<125°C	
Liquid temperature	2°C to 110°C	
In order to prevent condensation inside the control box and stator it is recommended the water being pumped is always at higher temperature than the ambient temperature.		
Ambient temperature (°C)	Minimum pumped temp (°C)	Maximum pumped temp (°C)
0	2	110
10	10	110
20	20	110
30	30	110
35	35	90
40	40	70
It is recommended that the water in domestic hot water systems is kept below 65°C to reduce the risk of scalding.		

### 13. Dimensions (in millimetres)



Model	L1	L2	B1	B2	H1	H2	G
CPE5	65	130	82	130	103	130	1.1/2"
CPE6	65	130	82	130	103	130	1.1/2"

### 14. Troubleshooting

Ensure the electrical power is isolated before carrying out any repairs.

Problem	Control panel	Possible reason	Actions
The pump is not running	Power indicator is not lit	Blown fuse	Replace fuse
		Circuit breaker has been tripped	Reset circuit breaker
	Faulty pump	Replace pump	
Display shows "E"	Normal	Low voltage	Check supply voltage
		Impeller is blocked	Clear impeller
Excessive noise in the system	Normal	Air in the system	Bleed system
		Excessive flow rate	Lower inlet pressure
Noisy pump	Normal	Air in the pump	Bleed air from pump
		Low inlet pressure	Increase inlet pressure
Insufficient heat from the system	Normal	Pump setting is too low	Adjust pump setting

Error codes – appearing in place of power consumption output.

E0	over voltage protection
E1	under voltage protection
E2	over current protection
E3	under load protection
E2<>E4	open phase protection

## 15. Warranty

The Primaflow CPE pump is sold with a 2 year warranty effective from the date of installation, subject to the return of the enclosed warranty card within 15 days of the installation date. If the warranty card has not been returned the warranty will expire 2 years after the date of manufacture.

This warranty covers any manufacturing defect which causes premature failure of the pump whilst within its warranty period. The warranty is valid on the assumption that:

- the product has been installed and used as specified in the **Installation, operation and maintenance guide**
- the installation complies with all local building regulations
- the installation was carried out by a competent and qualified person

The warranty is invalid if the pump:

- has not been installed by a competent person
- has been used other than for the purpose for which it was designed
- has not been used in accordance with the **Installation, operation and maintenance guide**
- has not been installed correctly in accordance with the **Installation, operation and maintenance guide**
- has not been removed from the heating system in a workmanlike fashion
- has been damaged by outside interference e.g. physical damage or inappropriate dismantling
- has failed outside the warranty period specified

Primaflow does not accept any liability for damage caused by a third party, nor will Primaflow be responsible for malfunction caused by inappropriate operating conditions or force majeure.

Primaflow reserves the right to reject any warranty claims not covered in this statement.

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