



# HIGH EFFICIENCY INTELLIGENT CIRCULATING PUMP



**Model:GEM**

Read this manual carefully before installation. The product can not be used for medical industry which have the potential to cause personal injury, also can not be used for pumping other liquids than water.



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## 1. Instructions for use

Dear users, thank you for your trust and support. You are welcome to use our company's GEM series variable frequency shielded circulation pump (hereinafter referred to as pump) and we will wholeheartedly provide you with excellent service. Please carefully check whether the received product is consistent with the ordered product, whether the accessories and instruction manuals are complete, and whether there is any damage during transportation. If you find the above situation, please contact our sales department or local dealer in time.

In order to ensure the long-term stable operation of the product, before you install, operate, overhaul or maintain, please read this manual carefully, so as to fully understand the relevant safety issues and the technical parameters and operation methods of the pump.



### Warning

Indicates a clause that there is a possibility of endangering personal safety and must be strictly observed.



### Attention

Indicates a clause that requires special attention to prevent damage to the pump.



This warning label indicates that there may be a risk of electric shock. When wiring, repairing, or maintaining, please disconnect the



This warning label indicates that please do not touch the pump while the pump is running and when the temperature of the entire pump is still very high after the operation is stopped.



This warning label indicates that the piping inside the pump contains high-pressure liquid, and the valves on both sides need to be closed before operation during maintenance and disassembly.



### Attention

Before using this product, please be sure to read this manual carefully and follow the product operating procedures. Please note that the product (including the instruction manual) is subject to any future changes without notice.



## 2. Cautions

In order to ensure personal safety, please read the following information carefully before you install, operate, repair or maintain.



### Warning

The power supply used must be consistent with the power supply identified on the product. The user must confirm that only qualified personnel with professional certification and proficiency in this manual can install and maintain this product.



### Warning

When checking and repairing the pump, the power must be cut off before operation. This can avoid electric shock or sudden start of the pump, which may cause injury or death.



### Warning

Before starting the pump, the motor must be effectively grounded and a properly rated motor protection switch must be connected.



### Warning

The pump must not be installed in a wet or potentially splashable area.



### Attention

To facilitate maintenance, a shut-off valve should be installed on each side of the pump.



### Warning

The heating pipes should not be filled with non-softened water frequently to avoid the increase of calcium content in the circulating water in the pipes and blocking the impeller.



### Attention

The operating ambient temperature of the pump is 0~40°C. Storage ambient temperature is 0~70°C



### Attention

In summer or in hot environments, ventilation must be ensured to avoid possible failures caused by condensation.



### Attention

The liquid may be high temperature and high pressure, and the system must be completely drained of liquid or the valves on both sides must be closed before moving and dismantling the pump.



### Attention

Do not start the pump without fluid.



### Attention

In winter, when the pump system does not work or the ambient temperature drops below 0°C, the liquid in the system should be completely emptied to avoid freezing and cracking of the pump body.



### Attention

If the pump is not used for a long time, close the pump inlet and outlet pipe valves and disconnect the power supply.



### Attention

If the cable is damaged, it must be replaced by qualified personnel.



### Attention

If the pump overheats, close the pump inlet valve and cut off the power immediately. If you find that the motor is abnormal, please contact your supplier or service center immediately.



### Attention

If the fault cannot be solved according to the manual, please immediately close the inlet and outlet valves of the pump, cut off the power supply, and contact the supplier or service center immediately.



### Attention

This product should be placed out of the reach of children. After installation, take isolation measures to avoid children's proximity.



### Attention

This product should be stored in a dry, well-ventilated place with low temperature.



### 3. Product Overview

GEM series variable frequency shielded circulation pump(hereinafter referred to as electric pump), the electric pump is mainly composed of four parts: motor, pump, seal and controller. The motor is a shielded motor with a permanent magnet rotor, and the drive is controlled by a special inverter. The water pump and the motor are sealed by a shielding sleeve, and a rubber sealing ring is used for static sealing at the sealing part of the fixed stop. This product is suitable for the following systems:

- Stable variable flow heating system
- Variable temperature pipeline heating system
- HVAC system
- Industrial circulation system
- Domestic heating and domestic water supply system

The pump is equipped with a control panel and knob on the front for user-friendly operation.

#### Pumped liquids

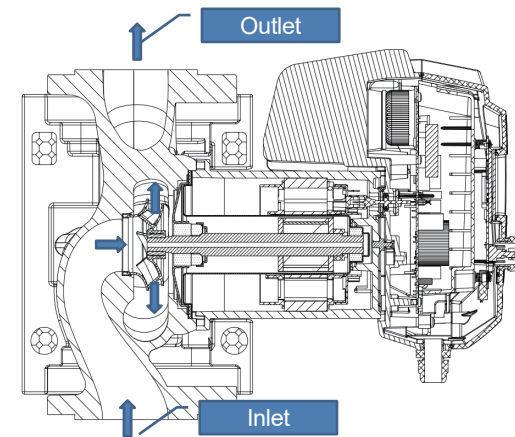
The pump is suitable for pumping liquids with easy flow, small viscosity, clean, non-corrosive and non-explosive, and the liquid must not contain solid particles or fibers that can cause mechanical or chemical damage to the pump.



### Outline structure diagram



### Internal structure diagram







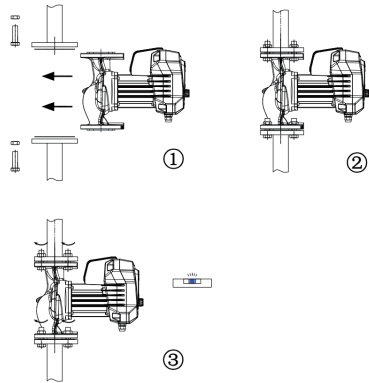
## 4. Product Installation

### 4.1 Installation location

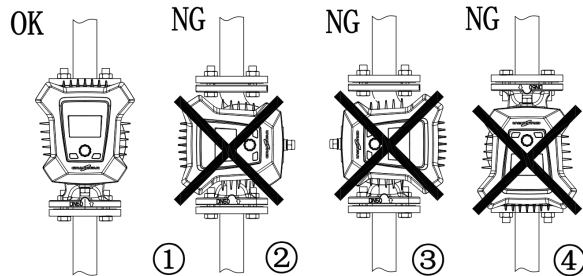
The pump should be installed indoors.

### 4.2 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.

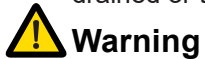


### 4.3 Installation direction



#### 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.

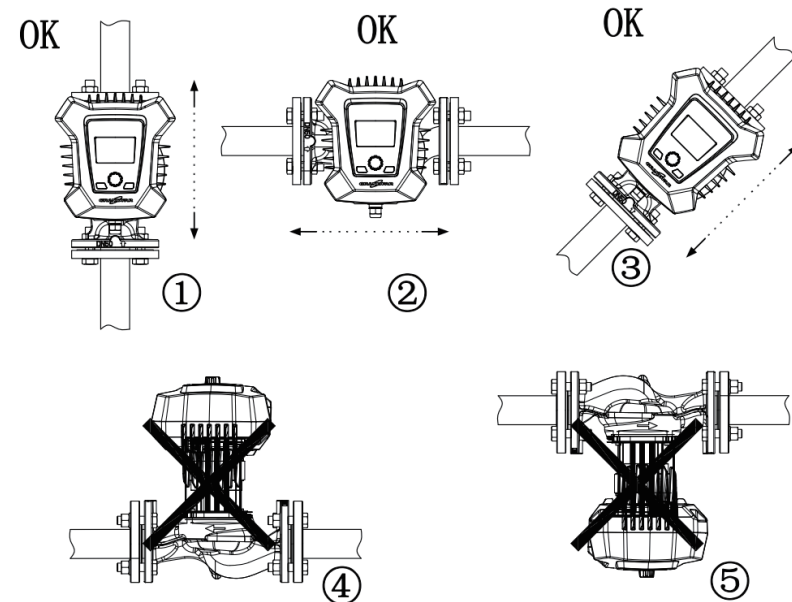


### 4.4 Control box position

Junction box can be rotated within 90°

The procedure for changing the position of the junction box is as follows:

- Close the inlet and outlet valves and relieve pressure;
- Unscrew and remove the four socket head cap screws securing the pump body;
- Rotate the motor to the desired position and align the four screw holes;
- Reinstall the screws and tighten them diagonally clockwise;
- Open the inlet and outlet valves.





#### 4.5 Electrical installation

##### Attention

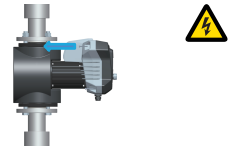
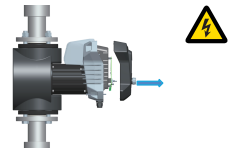
Perform electrical connection and protection according to local regulations. Check that the supply voltage and frequency values match those listed on the nameplate.

##### Warning

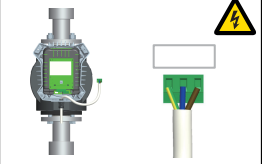
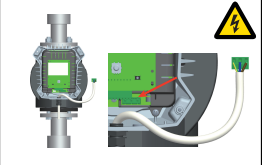
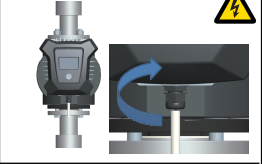
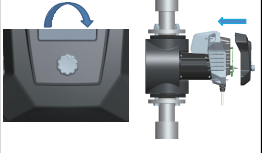
Electric shock  
Death or serious personal injury  
-Connect the pump to an external power switch with a minimum contact gap of 3mm between the electrodes.  
-Ground or electrical neutralization can be used for protection against non-direct contact.  
Make sure the pump is connected to the external main switch.  
The pump does not require an external motor switch.  
The motor is equipped with thermal protection device to avoid slow overload and stall.  
After powering up the pump, the pump will start in about 5 seconds.

##### Supply voltage

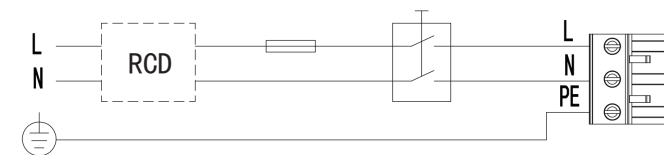
1x230V±10%, 50/60Hz, PE.  
The voltage tolerance is only for the variation range of the power supply voltage, and the pump must not be operated at a voltage other than the voltage indicated on the nameplate.

Step	Measures	Illustrations
1	Remove the screws from the housing and cover	
2	Removing the cover	



Step	Measures	Illustrations
3	Strip the cable conductor according to the diagram and connect the cable conductor to the plug.	
4	Insert the power plug into the female socket in the control box.	
5	Fasten the cable connector and reassemble the cover.	
6	Rotate the knob slowly, after the knob hole on the mask is aligned with the control rod, fasten the cover with the housing screw.	

#### Wiring Diagram



Example diagram of a plug-connected motor with mains switch, backup fuse and additional protective equipment



## 5. Product introduction

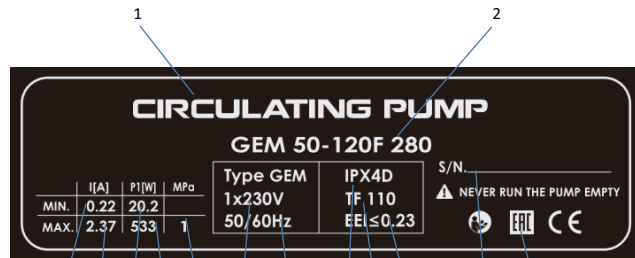
### 5.1 Model composition and meaning

Example: GME50-120F 280

GEM □□-□□□ □ □□□

Port-to-port length:280mm  
 Connector type: F indicates flange, no letter indicates thread  
 Max. head, Unit is dm  
 Nominal diameter of inlet and outlet, Unit is mm  
 Model number

### 5.2 Nameplate



No	Name
1	Product Name
2	Model
3	Minimum current(A)
4	Maximum current(A)
5	Minimum power(W)
6	Maximum power(W)
7	Maximum system pressure
8	Voltage(V)
9	Frequency(Hz)
10	Enclosure protection grade
11	Ambient temperature
12	Energy Efficiency Index, EEI
13	Serial number
14	CE mark and approvals

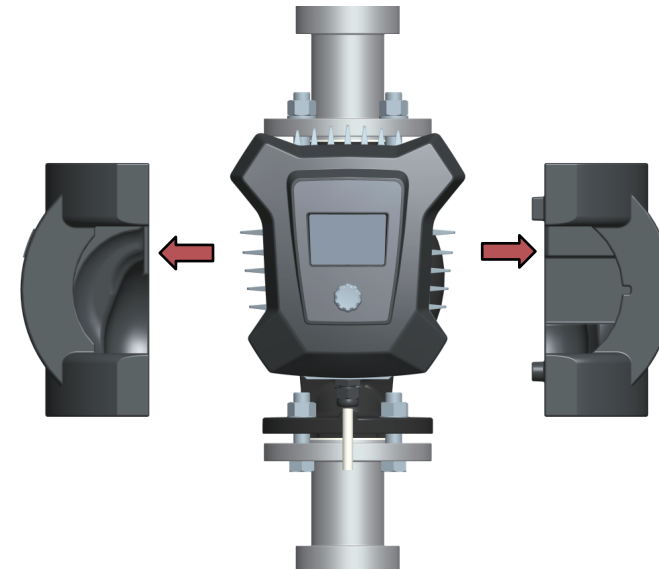


### 4.4 Insulation foam



#### Attention

Limit heat loss from the pump body.  
 Reduce heat loss from the pump by physically isolating the pump casing from the surrounding environment.



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.



#### 5.4 Control function(Take GEM50-120 as an example)

##### Proportional pressure curve(PP1,PP2 or PP3)

Proportional pressure control is used to adjust the pump performance according to the actual system heat demand, but the pump performance depends on the required pump curve PP1, PP2 or PP3. Three adjustable gears, low, medium ,high. Three adjustablegears, low, medium ,high.

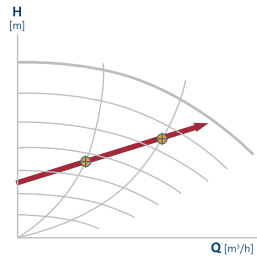


Figure1 Three proportional pressure curves/settings

Choosing the correct proportional pressure setting depends on the characteristics of the heating system and the actual heat demand.

##### Constant pressure curve

Constant pressure control is used to adjust pump performance based on actual system heat demand, but the pump performance curve will depend on the desired pump curve. The pressure setting range of the pump is 0-12m, which can be set by yourself.

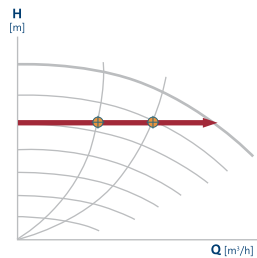


Figure2 Constant pressure curve/setting

Choosing the correct constant pressure setting depends on the characteristics of the heating system and the actual heat demand.



##### Constant speed curve

At constant speed, the pump operates at a constant speed, independent of the actual flow demand of the system, and the pump performance is determined according to the desired performance curve.Pump speed setting range 1200-4200rpm, 60rpm/grid, can be set by yourself.

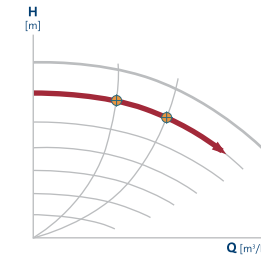


Figure3 Constant speed curve/setting

Choosing the correct constant speed setting depends on the characteristics of the heating system.



## 6. Initial startup and operation

### 6.1 Before start




#### Warning

Before starting the electric pump, make sure the system is full of liquid, air has been completely removed, and the inlet of the electric pump must reach the minimum inlet pressure.

### 6.2 Evacuate the pump

The electric pump is vented through the system, which must be vented at the highest point. The air in the electric pump can be noisy, which will disappear after a few minutes of operation.

### 6.3 Start-up products





Step	Measures	Illustrations
1	Turn on the power of the water pump, the water pump will start after about 5 seconds.	
2	LCD display starts and sets the language.	
3	The factory setting is medium proportional pressure curve, please select the control mode according to the system application.	



## 6.4 Product Setup

### 6.4.1 Operation Panel



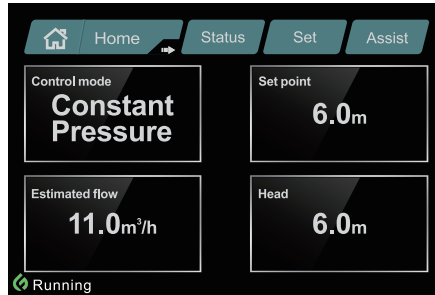
Button	Function
	Back to "Home" interface
	Return to the previous menu
	Navigate between the main menu, submenus, and numbers, adjust the numbers
	Press to save the changed settings and expand the menu

### 6.4.2 Menu Overview

Home	Status	Set	Assist
Control Mode	Running Status	Running mode	Date, time settings
Setpoint	Control Mode	Normal	Date Setting
Estimated flow	Motor speed	Stop	Time Setting
Head	Estimated flow	Min speed	Control mode instruction
		Max speed	Proportional pressure instruction
Power and power consumption	Warning and Alarms	Control Mode	Constant pressure instruction
		Proportional pressure	Constant speed instruction
Current Failure	Low	Auxiliary Failure Advice	
Fault Log	Medium	F0,F6,F8,F12,F14	
Fault Code	High	F1,F2,F3,F7,F13	
		Constant pressure	F9,F10,F11
	Constant pressure setting	F4	
	Constant speed	F5	
	Constant speed setting	Version	
	Language set		
	中文		
	English		
	Default set		
	LCD off time		



### 6.4.3 "Home"



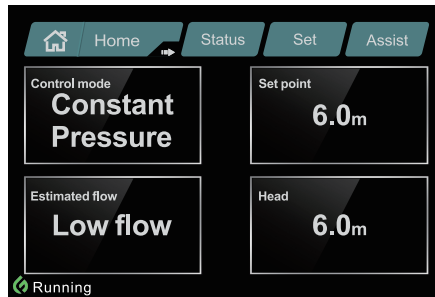
Index  
"Home"

Press Open the "Home" menu

This menu provides the following functions

- "Control Mode"
- "Set point"
- "Estimated Flow"
- "Head"

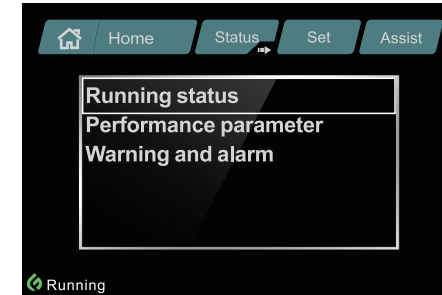
### "Low flow indication"



The pump may experience low flow due to, for example, closed valves. In the case of flow below 3m³/h, it will be displayed in the "Home" menu due to the large measurement error of the pump's algorithm. The speed is below the low flow indication indicating that the pump is still running. When the flow is high enough for the pump to measure, the "home" display will return to normal.



### 6.4.4 "Status"



Index

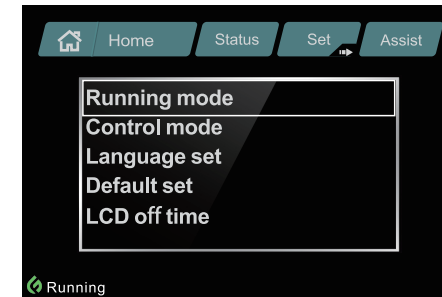
"Home">"Status"

Press and turn the knob clockwise to enter the "Status"

This menu provides the following functions

- "Running Status"
- "Performance Parameter"
- "Warnings and Alarms"

### 6.4.5 "Settings"



Index

"Home">"Status"

Press and turn the knob clockwise to enter the "Status"

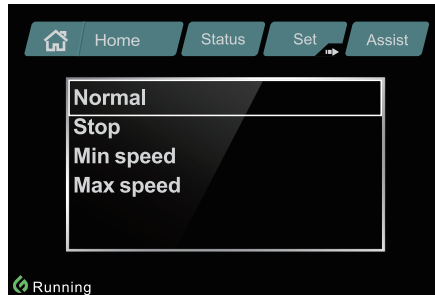
This menu provides the following functions

- "Running mode"
- "Control Mode"
- "Language set"
- "Default set"
- "LCD off time"





## Operation mode



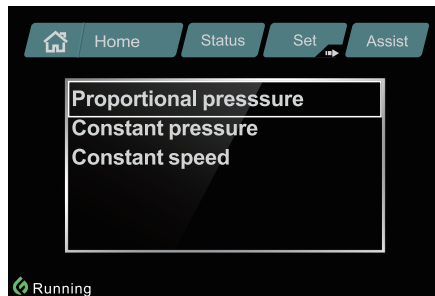
### Index

"Home">"Settings">"Operation mode"

This menu provides the following functions


- "Normal"
- "Stop"
- "Min speed"
- "Max speed"

## Control mode



### Index

"Home">"Status">"Control mode"

Prerss  and turn the knob clockwise to enter the "Status"

This menu provides the following functions

- "Proportional pressure"                      -"Constant speed"
- "Constant pressure"



## Language setting



### Index

"Home">"Set">Language setting

This menu provides the following functions

- "中文"
- "English"

Restore default settings

"Home">"Assist">Default set

This menu allows you to return to the default factory setting, which sets the proportional pressure of the control mode to "Medium".

### LCD off time

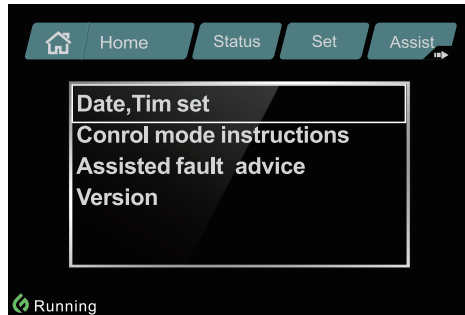
"Home">"Assist">LCD off time

This menu allows you to return to the default factory setting, which sets the LCD off time to 60s.





## 6.4.6 "Assisst"



Index

"Home">"Assist"

This menu provides the following functions

- "Date,time set"                      - "Assisted fault advice"
- "Control mode instruction"        - "Version"

### Date,time set

"Home">"Assist">Date,time set

This menu enables date and time setting.

### Control mode instruction

"Home">"Assist">Control mode instruction

This menu describes the characteristics of the control mode

### Assisted fault advice

"Home">"Help">Assisted fault advice

This menu gives instructions and corrective actions for pump failures.



## 7. Troubleshooting table

### 7.1 Operation Status

Status	Instructions	Reason
None displayed	Screen off	Power is off. Water pump is not running.
Power on	Green icon +Power on	Power on
Running	Green icon +Running	Power on (pump running)
Fault	Red icon +Fault	Alarm (pump stopped working)



### Warning

Electric shock

Death or more serious personal injury

The power must be disconnected for at least 3 minutes before any operation is performed on the product.



### Attention

Pressurization system

Mild or moderate personal injury

Before disassembling the pump, drain the system or close the isolation valves at both ends of the pump. The pumped liquid can be hot and under high pressure.





## 7.2 Fault Cause and Finding

Alarm Codes	Fault	Auto reset & restart	Exclusion method
F0	EEPROM failure	-	Contact the after-sales department
F1	Busbar overvoltage fault	YES	The alarm is automatically cleared within 30s, confirm whether the fault still exists.
F2	Busbar undervoltage fault	YES	The alarm is automatically cleared within 30s, confirm whether the fault still exists.
F3	Overcurrent	YES	The alarm is automatically cleared within 30s, confirm whether the fault still exists.
F4	Overheating	YES	Contact the after-sales department
F5	Stalled	-	Clean the pump and remove any foreign objects or impurities that prevent the pump from rotating.
F6	Phase loss	-	Contact the after-sales department
F7	Flux linkage out of control	YES	The alarm is automatically cleared within 30s, confirm whether the fault still exists.
F8	PFC over-current	YES	The alarm is automatically cleared within 30s, confirm whether the fault still exists.
F9	Input frequency fault	-	Check whether the input voltage frequency is 50Hz±3Hz, or 60Hz±3Hz.
F10	Input AC overvoltage	-	Check if the input voltage is too high.
F11	Input AC undervoltage	-	Check if the input voltage is too low.
F12	Communication failure	-	Contact factory for repair.
F13	PFC overvoltage	YES	The alarm is automatically cleared within 30s, confirm whether the fault still exists.
F14	PFC undervoltage	YES	The alarm is automatically cleared within 30s, confirm whether the fault still exists.



## 8. Technical Data

Voltage	1x230V±10%, 50/60Hz, PE	
Motor protection	The pump does not require external motor protection.	
Protection grade	IPX4D	
Insulation class	F	
Relative humidity	Max 95%	
Max. ambient temperature	0~+40°C	
Temperature environment	TF110 (EN60335-2-51)	
Liquid temperature	2~+110°C	
System pressure	1.0MPa	
Pumps can withstand the test pressure of EN 60335-2-51	PN10: 1.2MPa	
Inlet pressure	Liquid temperature	Min inlet pressure
	75°C	0.01Mpa
	95°C	0.05Mpa
	110°C	0.1MPa
Surface temperature	The maximum. surface temperature is not higher than 125°C	



### Attention

The actual inlet pressure plus the closing pressure of the pump should always be lower than the maximum system pressure allowed by the pump.

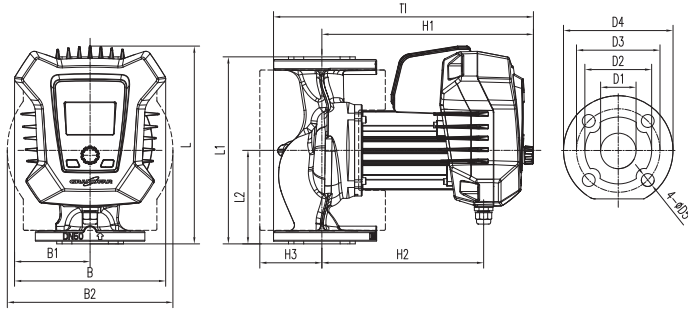


### Attention

The minimum relative inlet pressure applies to pumps installed at sea level up to 300 m. For altitudes above 300 m, the required relative inlet pressure must be increased by 0.01 bar for every 100 m of altitude.



## 9. Dimension



Pump type	Dimensions														
	L	L1	L2	B	B1	B2	H	H1	H2	H3	D1	D2	D3	D4	D5
GEM32-120F	266	220	110	226	113	212	379	312	242	79	32	76	100	140	19
GEM40-80F	266	220	110	226	113	212	382	312	242	79	40	84	110	150	19
GEM40-100F	266	220	110	226	113	212	382	312	242	79	40	84	110	150	19
GEM40-120F	281	250	125	226	113	212	382	312	242	79	40	84	110	150	19
GEM40-150F	281	250	125	226	113	212	382	312	242	79	40	84	110	150	19
GEM40-180F	281	250	125	226	113	212	382	312	242	79	40	84	110	150	19
GEM50-40F	276	240	120	226	113	248	387	312	242	93	50	102	125	164	19
GEM50-60F	276	240	120	226	113	248	387	312	242	93	50	102	125	164	19
GEM50-80F	276	240	120	226	113	248	387	312	242	93	50	102	125	164	19
GEM50-100F	296	280	140	226	113	248	389	312	242	93	50	102	125	164	19
GEM50-120F	296	280	140	226	113	248	389	312	242	93	50	102	125	164	19
GEM50-150F	296	280	140	226	113	248	389	312	242	93	50	102	125	164	19
GEM50-180F	296	280	140	226	113	248	389	312	242	93	50	102	125	164	19
GEM65-40F	326	340	170	226	113	266	399	320	250	90	65	119	145	185	19
GEM65-60F	326	340	170	226	113	266	399	320	250	90	65	119	145	185	19
GEM65-80F	326	340	170	226	113	266	399	320	250	90	65	119	145	185	19
GEM65-100F	326	340	170	226	113	266	399	320	250	90	65	119	145	185	19
GEM65-120F	326	340	170	226	113	266	399	320	250	90	65	119	145	185	19
GEM65-150F	326	340	170	226	113	266	399	320	250	90	65	119	145	185	19
GEM80-40F	336	360	180	226	113	326	426	326	256	111	80	128	160	200	19
GEM80-60F	336	360	180	226	113	326	426	326	256	111	80	128	160	200	19
GEM80-80F	336	360	180	226	113	326	426	326	256	111	80	128	160	200	19
GEM80-100F	336	360	180	226	113	326	426	326	256	111	80	128	160	200	19
GEM80-120F	336	360	180	226	113	326	426	326	256	111	80	128	160	200	19
GEM100-40F	381	450	225	226	113	356	446	338	268	116	100	170	170	220	19
GEM100-60F	381	450	225	226	113	356	446	338	268	116	100	170	170	220	19
GEM100-80F	381	450	225	226	113	356	446	338	268	116	100	170	170	220	19
GEM100-100F	381	450	225	226	113	356	446	338	268	116	100	170	170	220	19
GEM100-120F	381	450	225	226	113	356	446	338	268	116	100	170	170	220	19



## 10. Maintenance

After 2000 hours of normal use, the electric pump should be repaired and maintained according to the following steps:

- (1) Disassembly: Check whether there are knots or foreign objects inside the motor, and clean it up in time if there is.
- (2) Air tightness test: After disassembling the machine to repair or replace various seals, the water (air) pressure test must be carried out on the pump. The test pressure is 0.2Mpa (megapascal), and there should be no leakage and sweating for 3 minutes.
- (3) When the temperature is below 4°C, anti-freeze work should be done to avoid freezing and cracking the pump body.
- (4) If the electric pump is not used for a long time, the pipeline should be removed, the water accumulated in the pump should be drained, the main parts should be scrubbed clean, and rust-proof treatment should be carried out. Place the pump in a dry and ventilated place and keep it properly.

## 11. Warranty Terms

The warranty period of the GEM series canned pump is six months from the date of purchase. During the warranty period, the company will provide free maintenance services for failures that occur under normal use conditions as required by the instruction manual. If the fault is caused by the following conditions, the company needs to carry out paid repairs:

- (1) Failure caused by natural disasters or human factors.
- (2) Failure caused by special use environment.
- (3) Fault caused by incorrect wiring or abnormal power supply.
- (4) Identified by our technicians as a failure caused by abnormal operation or improper use.