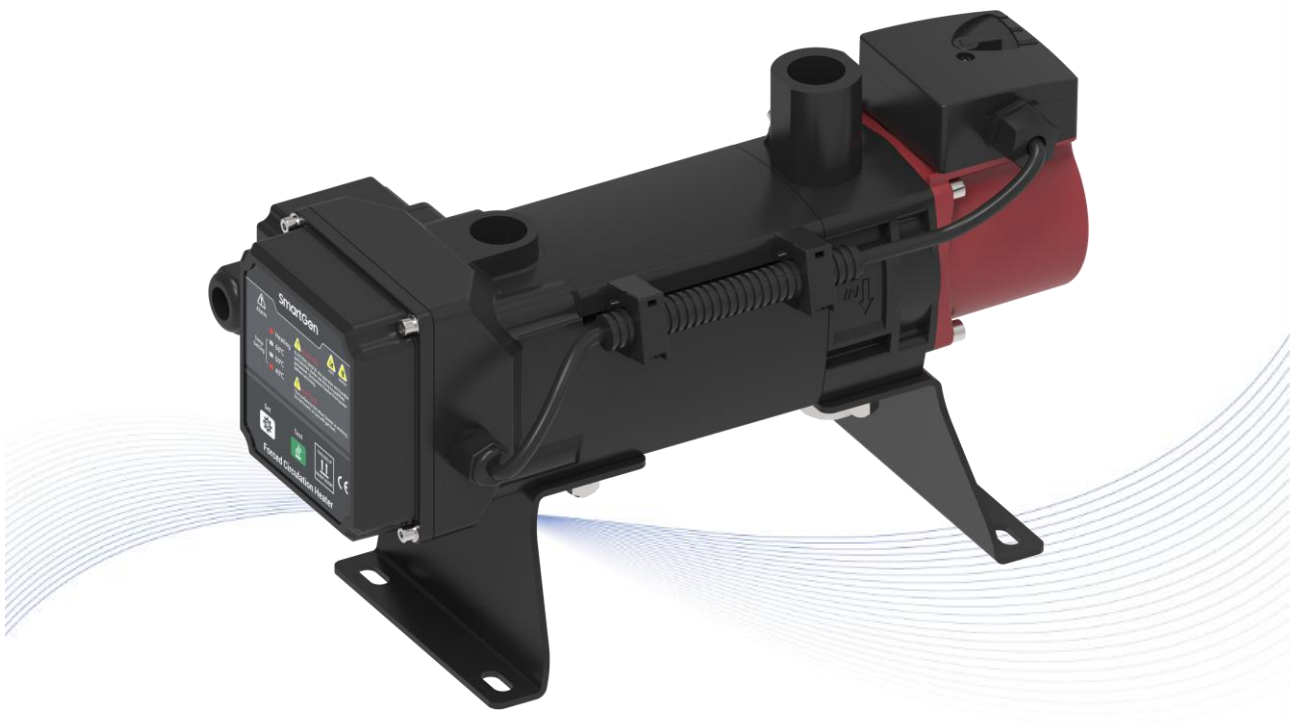


SmartGen

MAKING CONTROL SMARTER

HWP22 FORCED CIRCULATION HEATER USER MANUAL



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Table 1 Software Version

Date	Version	Content
2023-09-13	1.0	Original release.

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1. OVERVIEW

HWP22 is an intelligent forced circulation engine heater.

If the outside temperature is lower than 4°C, engine coolant or lubricant may condense into solid state and lose their lubricating and cooling properties during cranking, which can damage the engine. Thus heater should be installed to ensure normal starting and running of the engine.

It has light indicator function that can indicate various status of the heater. It also has three gears heating temperature can be set and dry burning and overheat protection functions.

This product is suitable for engine with a displacement of less than 15L.

Please login our company's official website (www.smartgen.com.cn/) to select heaters.

2. PERFORMANCE AND CHARACTERISTICS

- Two-way high-precision temperature sensor sampling is adopted and heating temperature can be set via control panel;
- Independent control of water pump and heater, which optimize working sequence and prolong the heater lifetime;
- Separate control of water pump and heater: power on the water pump and then power on the heater after 5s, once the set temperature has reached, heater will be powered off firstly, after 60s, following is water pump. The goal is to prevent heat concentration and prolong water pump lifetime;
- Manually test whether the heater and water pump are normal or not via panel button;
- Fine cast aluminum enclosure;
- Stainless steel inner pipes;
- There is a water drain valve on the bottom of the heater so as to be used when needed;
- This product can work normally at -40°C temperature.

3. SPECIFICATION

Table 2 Parameters Specification

Item	HWP22
Rated Power	2200W (220V1850W)
Rated Voltage	AC 240V
Rated Current	9.2A
Working Voltage	AC (168~264) V
Phase	Single Phase
Engine Displacement	≤15L
Temperature Range	Off: (40±3)°C On: (25±3)°C Off: (50±3)°C On: (35±3)°C Off: (60±3)°C On: (45±3)°C
Default Temp. Range	Off: (40±3)°C On: (25±3)°C
Temp. of Dry Burning Protection Action	Off: (95±3)°C On: (80±3)°C
Temp. Control Accuracy	±3°C
Insulating Resistance	≥50MΩ
Electrical Strength	AC 1.5kV 1min
Inlet/Outlet Size	G 3/4 female thread (Φ19.5mm Pagoda connector or G 3/4 male thread is available)
Max. Water Pressure	0.5MPa
Pump Flow Velocity	30L/min (1.5m of lift)
Protection Level	IP44
Vibration	(5~8)Hz displacement=±7.5mm (8~500)Hz a=±4g IEC 60068-2-6
Shock	50g, 11ms, half-sine, complete shock test from three directions, and 18 shocks for each test IEC 60068-2-27
Bump	25g, 16ms, half-sine IEC 60255-21-2
Working Temperature	-40°C~+70°C
Storage Temperature	-40°C~+80°C
Case Dimensions	356mm×175mm×162mm
Weight (fittings included)	4.9kg

4. HEATER INSTALLATION

Please install the heater vertically according to the diagram before use. Pay attention to the direction of heater inlet and outlet, and ensure that the heater position is below the lowest water level of the engine and that all the air is exhausted out of the heater and it is topped off with coolant.

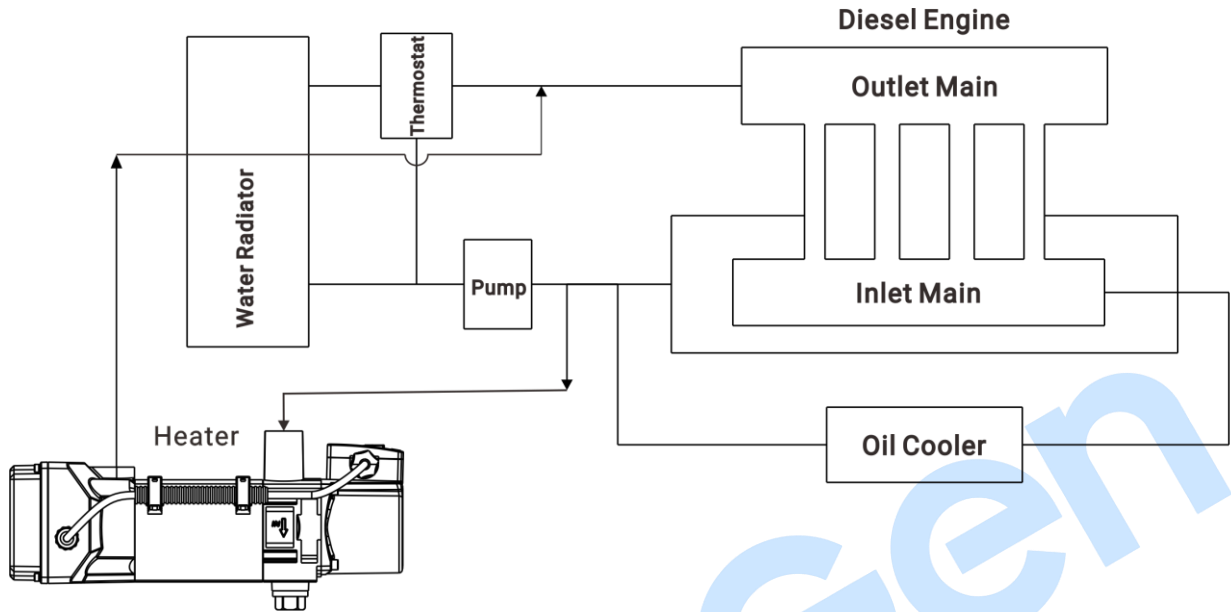


Fig.1 Installation Logic Schematic Diagram

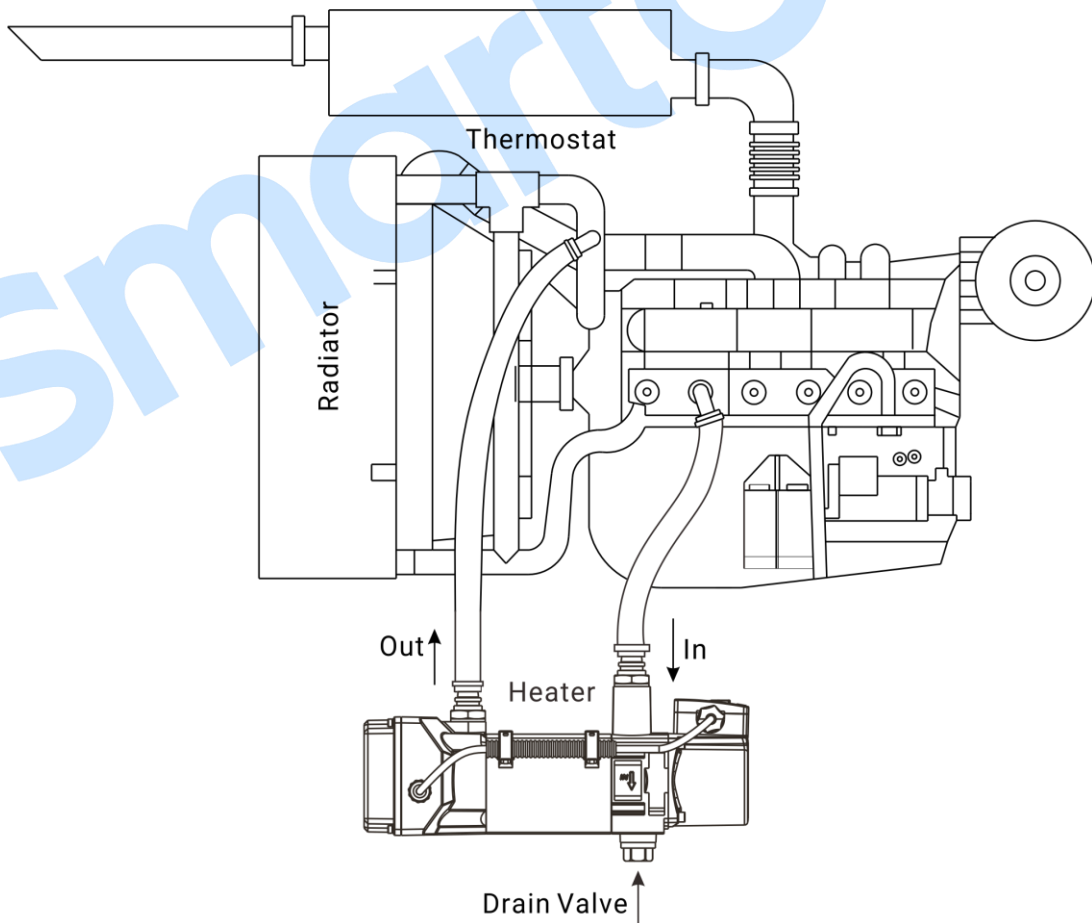


Fig.2 Installation Position Schematic Diagram

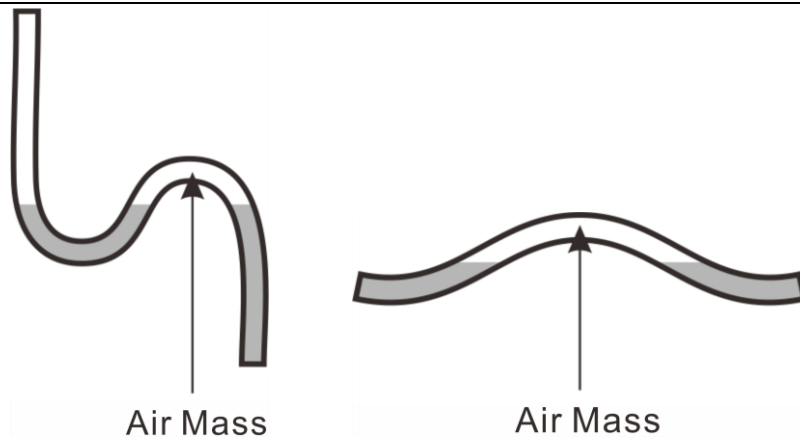


Fig.3 Incorrect Pipe Connection Method

NOTE: If there is a W-shaped bend or reverse U-shaped bend during pipe connection, the air accumulated in the pipe cannot be discharged normally, resulting in the liquid cannot be circulated properly. The air dissolved in the liquid will be precipitated during heating and retained in the bend, so on the condition of unsmoothed pipeline, even if by the manual exhaust, it will repeat in the next heating process of air collection. To ensure that the smooth liquid circulation, the hosepipe with an inner diameter of more than 20mm and pipe joints with an inner diameter of more than 15mm should be selected.

5. OPERATION DESCRIPTION

5.1 OPERATION PANEL

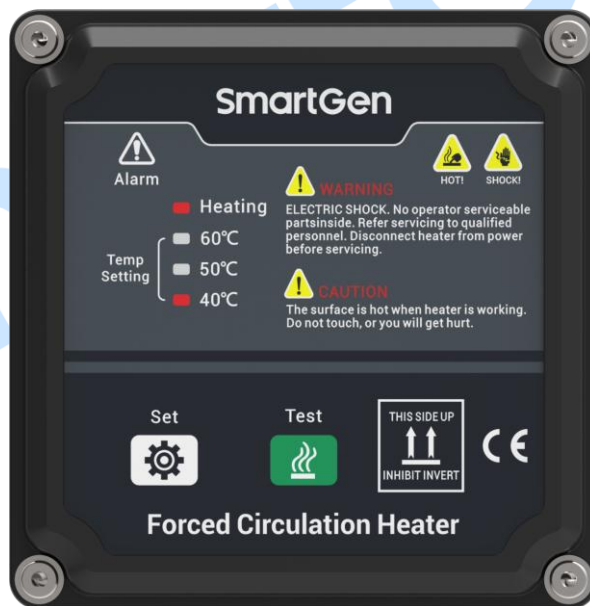


Fig.4 Operation Panel

5.2 KEY DESCRIPTION

Table 3 Key Description

Symbol	Definition	Description
	Test	Pressing it to enter testing status, heater runs in testing and enters auto status after 20s.
	Set	Pressing it 1s to set the temperature value.

5.3 INDICATOR DESCRIPTION

Table 4 Indicator Description

Symbol	Definition	Description
Alarm	Dry Burning/Sensor Open Alarm	When the indicator is always on, it represents that there is dry burning alarm; When the indicator is flashing, it represents that temperature sensor open alarm occurs.
Heating	Heating	When the indicator is illuminating, it represents that heating is ongoing; When the indicator is extinguishing, it represents that there is no heating.
40°C	Off Temp. Setting	When the indicator is illuminating, heater off temperature is 40°C, on temperature is 25°C.
50°C		When the indicator is illuminating, heater off temperature is 50°C, on temperature is 35°C.
60°C		When the indicator is illuminating, heater off temperature is 60°C, on temperature is 45°C.

6. WORKFLOW DESCRIPTION

6.1 HEATING WORKFLOW

When the heater is powered on, water pump will run 5s firstly, if the water temperature does not reach the set temperature and no dry burning for the heater, then heater will start to heat until the temperature reaches the set temperature, and then heater will enter auto status; when the temperature drops below the on-temperature, heater starts heating again.

6.2 DRY BURNING JUDGEMENT

When the sampling temperature of dry burning temperature sensor is higher than 95°C or the difference between it and the sampling temperature of water temperature sensor exceeds the normal value, it is considered that heater has dry burning phenomenon, Alarm light is illuminated, and heater stops heating. When the sampling temperature of dry burning temperature sensor is lower than 80°C or the difference between it and the sampling temperature of water temperature sensor is less than the normal value, Alarm light is extinguished, and heater enters auto status.

7. WIRING

The 2.5mm² 3-core cable is recommended for power line, the ground line must be well grounded. L-phase line, N-neutral line, PE-ground line.

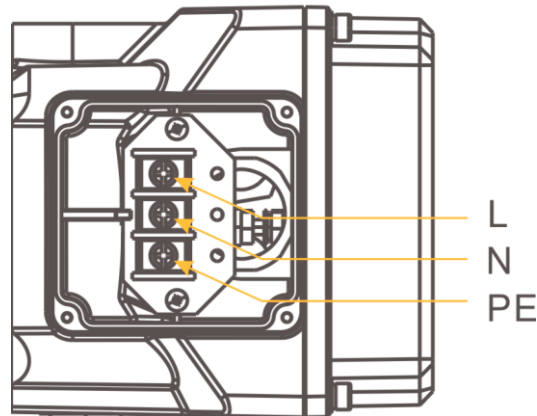


Fig.5 Wiring Indication

8. USE AND MAINTENANCE

- 1) Before starting the machine, ensure that all the air is exhausted out of the heater with vent valve and it is topped off with coolant.
- 2) It is strongly suggested to use antifreeze with corresponding mark number.
- 3) If ordinary water is used, please drain it off when temperature is lower than 0°C after stopping for avoiding heater bursting caused by frozen remaining water.
- 4) Ground line must be ground connected.
- 5) Drain valve: Can be opened or closed using hexagonal wrench, adjustable wrench, or a cross screwdriver.



Fig.6 Vent Valve Indication

Unit: mm

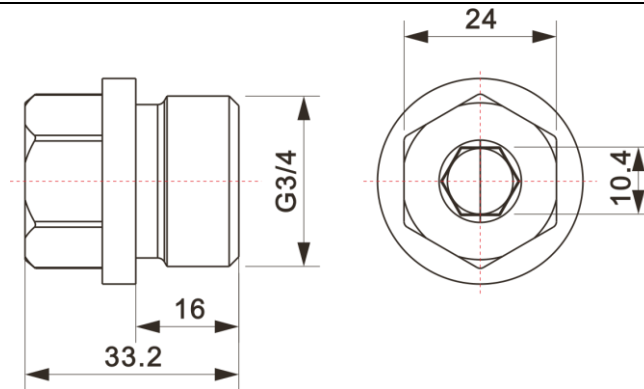


Fig.7 Water Drain Valve Size

Table 5 Common Faults and Solutions

No.	Faults	Faults Analysis	Solutions
1	Dry protection burning	Check the valve to assure whether it is opened and whether the heater is full of water	Shorten the hose length and optimize the hose trend
		Check whether the hose has an obvious W-shaped or reverse U-shaped trend, and whether there is an obvious hot and cold alternating area	
2	High temperature outlet	It occurs when the hose is too long, both the inner diameter of the hose and the inner diameter of the fitting joints are too small, as well as the water flow is not smooth so that the heat cannot be transferred properly	Shorten the hose length, using the hose with an inner diameter of more than 20mm, and the fitting joints with an inner diameter of more than 15mm
3	Cannot reach the preheating temperature	The heater power is not enough	Replace the heater whose power matches the engine
		The power cable is too long and result in dividing resistance of the cable	Shorten the power cable as possible and use power cable that matches the heater power

9. OVERALL DIMENSIONS

(Unit: mm)

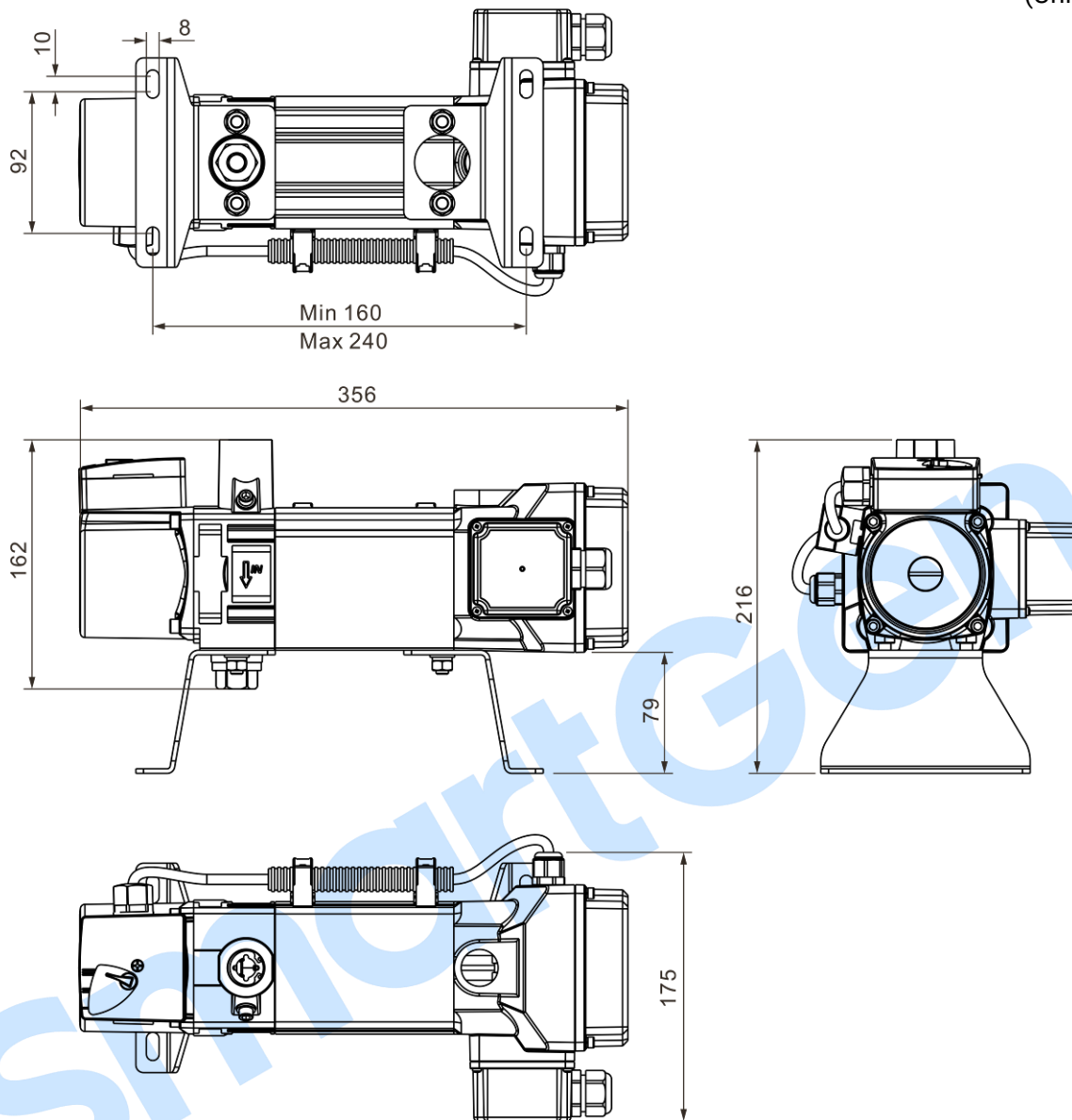


Fig.8 Overall Dimensions

NOTE: All the inlets/outlets connectors are female thread G 3/4.

10. PACKING LIST

Table 6 Packing List

No.	Item	Model	Qty./Unit
1	Product	HWP22	1
2	Holder	ZJ-HWP22-1	2
3	Flat Gasket	GB/T 95 8	8
4	Spring Washer	GB/T 93 8	8
5	Hexagon Nut	GB/T 41 M8	8
6	Hexagon Bolt	GB/T 5783 M8×40	4
7	Hexagon Bolt	GB/T 5783 M8×20	4
8	User Manual	HWP22 拼版 V1.0	1

Table 7 Inlet/Outlet Fittings (Optional)

No.	Item	Model	Qty./Unit
1	Φ19.5mm Pagoda Connector	BTJT-G3/4-Φ19.5	2
2	G 3/4 Stainless Steel Nipple	DU-G3/4-SS	2
3	ED Sealing Ring	ED-23.9x29.2x1.5	2

(Unit: mm)

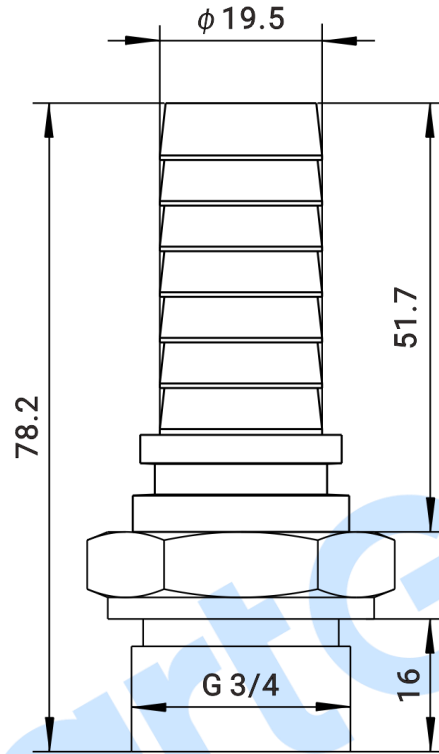


Fig.9 Pagoda Connector Dimensions

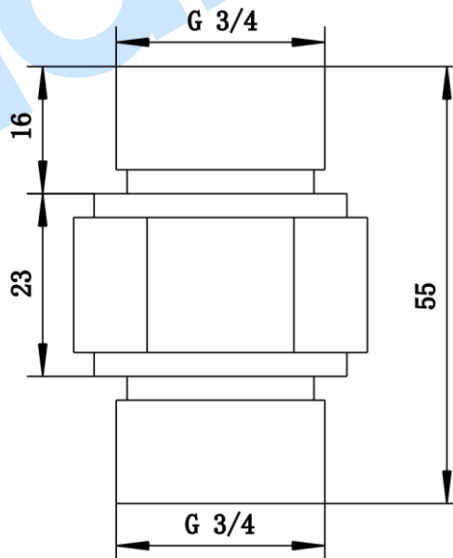


Fig.10 Nipple Dimensions