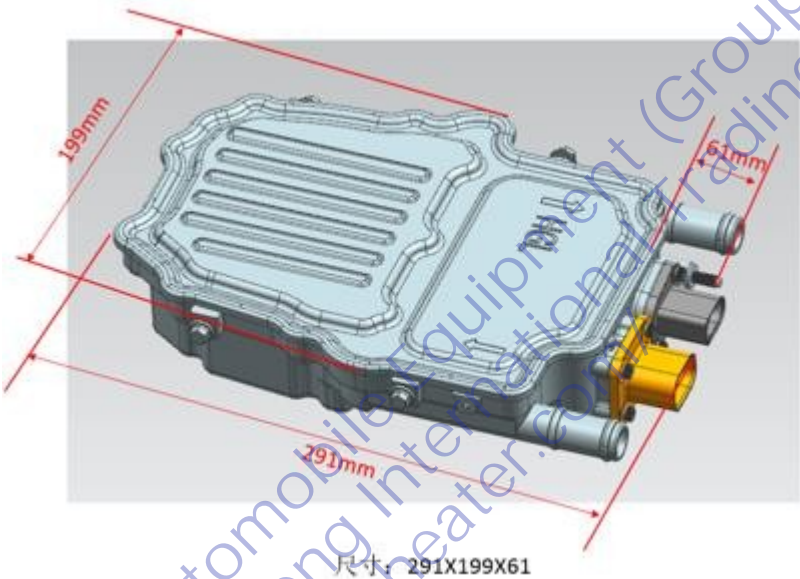
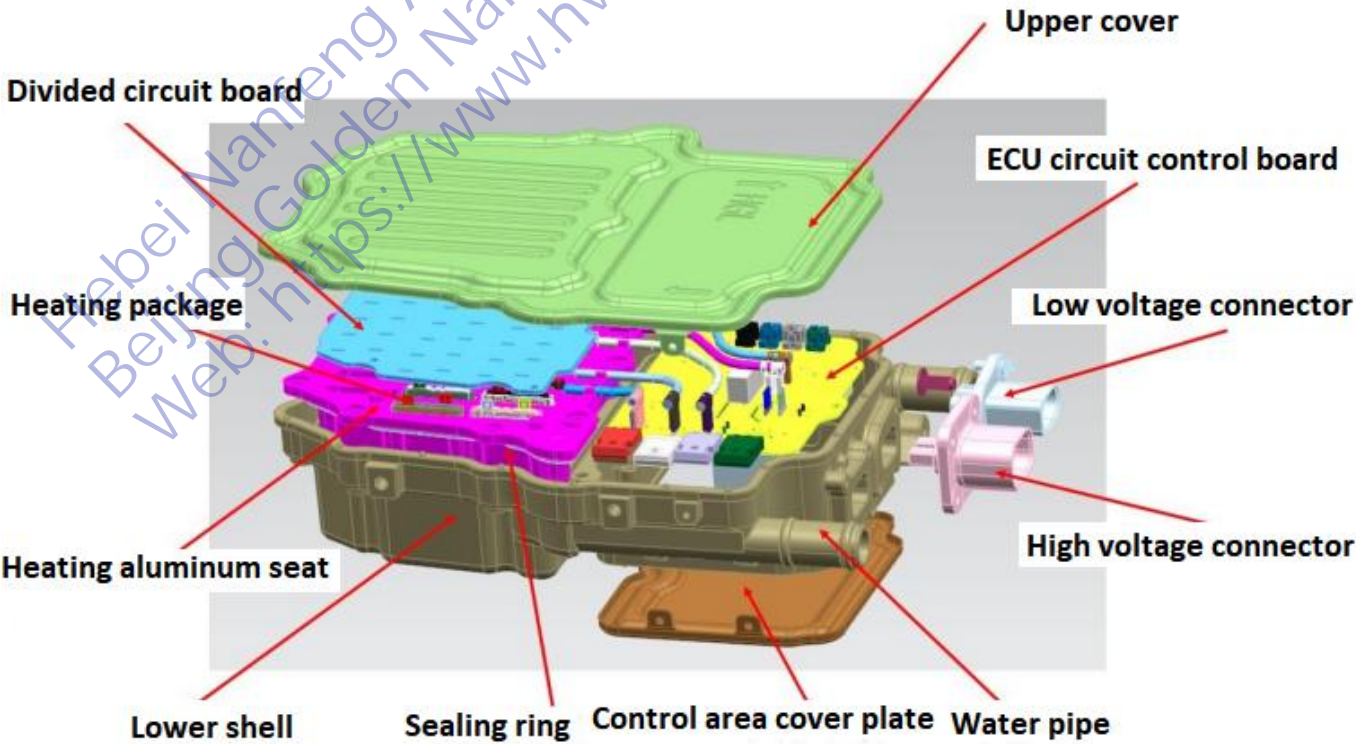


Product Name	SR02-2 7KW PTC water heating heater assembly				
Project code	SR02-2	Date	2019.03.12	Version	OR

Product size



Product explosion diagram



1 Scope

This technical specification specifies the terms and definitions, technical indicators, and product characteristics of SR02-2 water heating heaters. This technical specification is only applicable to SR02-2 PTC water heater.

2 Referenced standards and documents

GB/T 7153-2002 Direct heating step type positive temperature coefficient thermistors - Part 1: Generic specification

GB/T 4208-2008 Degrees of Protection Provided by Enclosures (IP Code) (eqv IEC529:1989)

GB/T 16935.1-2008 Insulation Coordination for Equipment within Low Voltage Systems - Part 1: Principles, Requirements, and Experiments

GB8410-2006 Combustion Characteristics of Automotive Interior Materials

GB/T 30512 Requirements for Prohibited Substances in Vehicles

3 Terminology

PTC heater: PTC heater is a heating device designed using the constant temperature heating characteristics of PTC thermistors. Curie temperature: When it exceeds a certain temperature (Curie temperature), its resistance value increases step by step with the increase of temperature.

Under dry burning conditions without controller intervention, the PTC stone temperature drops sharply after exceeding the Curie temperature. Impulse current: The maximum current at PTC startup.

4 Technical indicators

NO.	Project	Parameter	Unit
1	Power	7KW \pm 10%(350VDC,10L/min,60℃)	KW
2	High Voltage	250~490	VDC
3	Low Voltage	9~16	VDC
4	Impulse Current	<40	A
5	Heating Method	PTC positive temperature coefficient thermistor	\
6	Control Mode	PWM (LIN2.1 communication)	\
7	Electrical Strength	2150VDC, no Electrical breakdown	\
8	Insulation Resistance	1000VDC, >100MΩ	\
9	Ip Level	IP6K9K & IP67	\
10	Storage Temperature	-40~125	℃
11	Operating Temperature	-40~120	℃
12	Coolant Temperature	-40~90	℃
13	Coolant	50 (water)+50 (ethylene glycol)	%
14	Weight	≤2.7	Kg
15	EMC	IS07637/IS011452/IS010605/CISPR25	

5. Product Features

5.1 Identification

The high pressure warning label, QR code, and product label of the PTC water heater assembly are attached as shown in the following view.

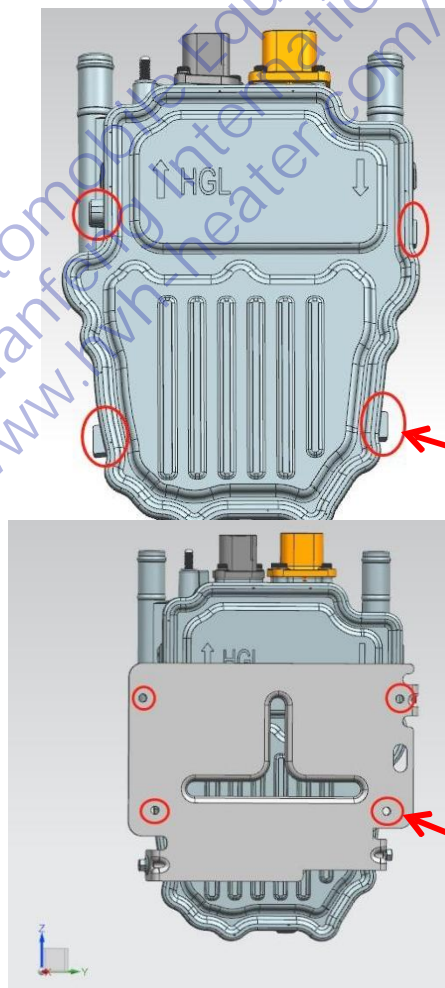
High voltage warning label



*The high-pressure warning label will be implemented from the sample stage, and the product label and QR code need to be confirmed with the customer before implementation.

5.2 Installation method

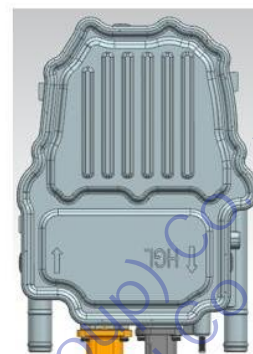
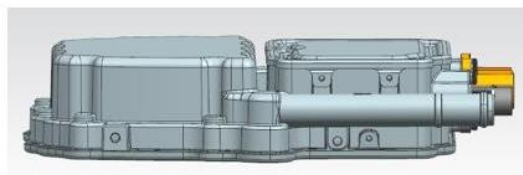
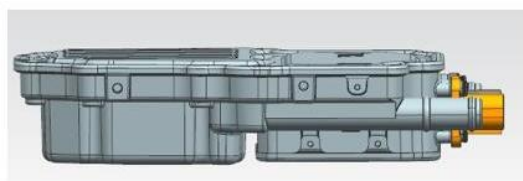
The PTC water heater base has 4 installation points, which are fixed to the mounting bracket through 4 M6 bolts. The mounting bracket can be customized according to the installation space of the entire vehicle, as shown in the following figure.



Install 4 fixing points

Install 4 fixing points
(indicated)

PTC recommends overall vehicle layout and installation



5.3 Material characteristics

All materials used in the PTC heater assembly can pass ELV testing. Before entering the mass production stage, all raw materials of PTC require suppliers to provide prohibited substance reports and material reports.

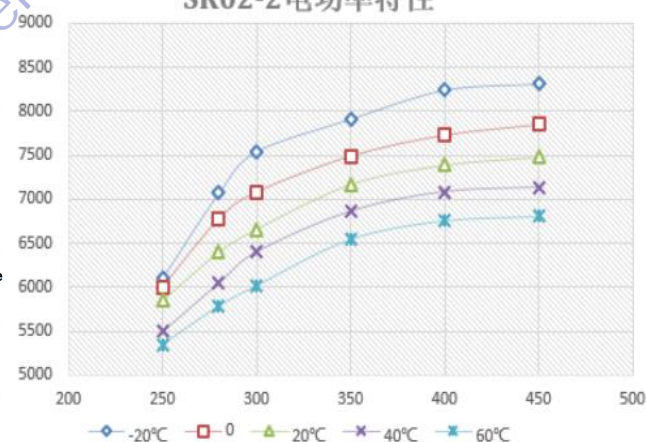
5.4 Functional characteristics

5.4.1 Power curve

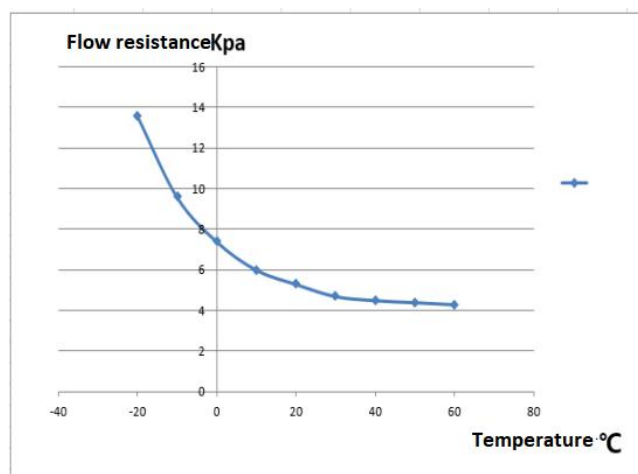
Temperature °C \ Voltage V	-20	0	20	40	60	Remarks
250	6100	6000	5850	5500	5350	Working condition: water flow rate of 10L/min, ambient temperature of 25 °C
280	7068	6776	6400	6048	5788	
300	7540	7080	6660	6400	6020	
350	7910	7490	7170	6860	6550	
400	8240	7730	7390	7080	6760	
450	8310	7850	7480	7130	6810	

SR02-2 Electrical Power Characteristics

SR02-2电功率特性



Temperature °C	Flow L/min	Flow resistance Kpa
-20	10	13.6
-10	10	9.6
0	10	7.4
10	10	6
20	10	5.3
30	10	4.7
40	10	4.5
50	10	4.4
60	10	4.3



6. Electrical control parameters and specifications

6.1 Characteristic parameters:

Low voltage side working voltage: 9-16VDC

High voltage side working voltage: High voltage 250~490VDC

Controller output power: 7000W \pm 10% (350VDC, inlet temperature 60 °C, flow rate 10L/min)

Controller working environment temperature: -40 °C~120 °C

Communication method: LIN bus communication, communication rate 19200bps, controller load control method:

a. The AC controller sends a power limited command to limit the maximum power of the load. b. PTC controller control method: By adjusting the duty cycle of IGBT activation, the power is adjusted.

c. The controller detects the actual effective current consumed by the load and calculates the heating power.

d. The controller adopts temperature closed-loop control to ensure that the water outlet reaches the target temperature.

e. When the outlet temperature reaches or approaches the target temperature point, the controller reduces power to control the power output of the load until it is turned off.

After receiving the start command, the PTC controller sends out the target power (calculated by the PTC controller based on the difference between the expected temperature and the outlet temperature), and the PTC assembly will adjust the power and operate according to the limited power.

Request power calculation:

(Target temperature actual temperature)>3 °C Request power=7000W

(Target temperature actual temperature)=3 °C Request power=4000W

(Target temperature actual temperature)=2 °C Request power=4000W

(Target temperature actual temperature)=1 °C Request power=3200W

(Target temperature actual temperature)=0 °C Request power=2500W

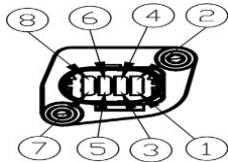
(Target temperature actual temperature)=-1 °C Request power=2000W

(Target temperature actual temperature)=-2 °C Request power=1600W

(Target temperature actual temperature)=-3 °C Request power=1000W

(Target temperature actual temperature) \leq -4 °C Request power=0W

6.2 Low voltage connectors::

Connector Name	View	Connector information (heater side)	Connector information (harness end)
Low voltage connector		Connector supplier: Amphenol MPS03-BSM00080	Connector supplier: FEP 42545500

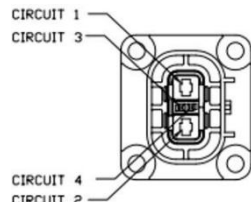
Definition of low-voltage connectors:

Note: Low voltage ground refers to the PTC metal casing.。

Pin NO.	Function	Characteristic	Remarks
1	12V +	Connected to the positive pole of the vehicle battery	

2	/	Reserved	
3	/	Reserved	
4	/	Reserved	
5	HVIL 1	High voltage interlock signal	
6	LIN	LIN communication	
7	HVIL 2	High voltage interlock signal	
8	/	Reserved	

6.3 High voltage connectors:

Connector Name	View	Connector information (heater side)	Connector information (harness end)
High voltage connector		Connector model: TE 2-2310540-1	Connector supplier: TE 4-2103177-1

Definition of high-voltage connectors:

Pin NO.	Function	Characteristic	Remarks
1	HV +	High voltage positive	
2	HV -	High voltage negative	
3	HV Interlock_in	High voltage interlock signal	
4	HV Interlock_in	High voltage interlock signal	