



TECHNOLOGY MANUAL  
INSTANTANEOUS GAS WATER HEATER  
MODEL: 5L/6L CF

---

EDITION: 01 / MAY, 2007  
ISSUED BY MTS (CHINA)



**INDEX**

**Characteristic & Function.....2 - - 4**

- Outlook & summary.....2
- General technology data.....3
- Function.....4

**Structure & Components.....5 - - 8**

- Structure & Main components list.....5
- Gas & water valve.....6
- Work and control program.....7
- Electric circuit.....8

**Installation.....9 - - 15**

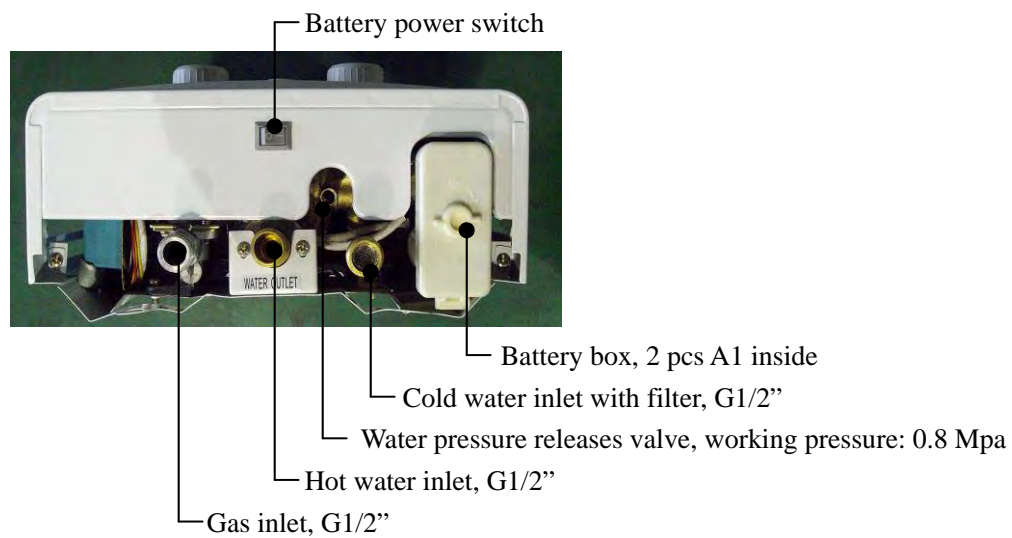
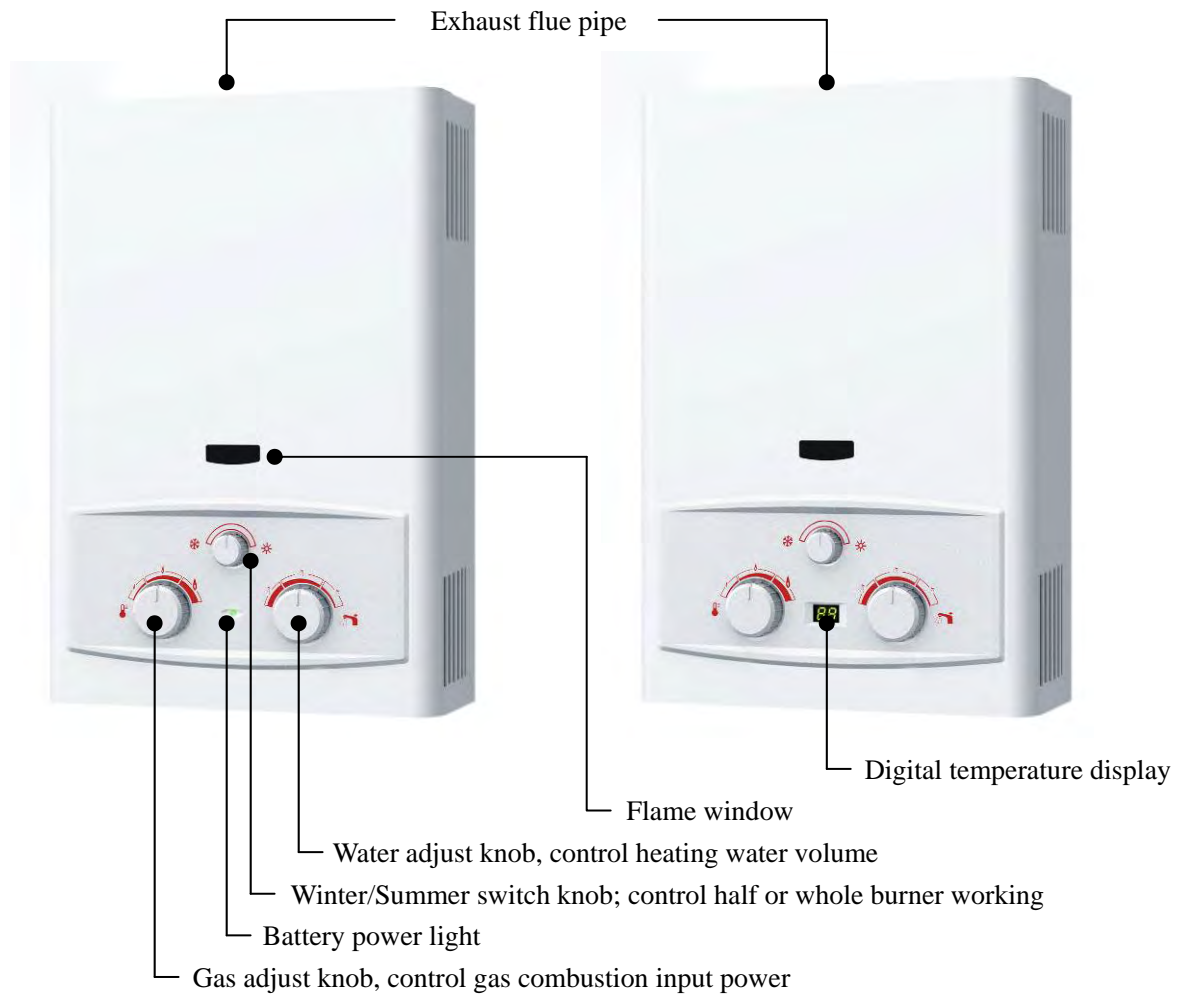
- Product dimension.....9
- Installation place requirement.....10
- Fixation of heater.....13
- Water pipe and gas pipe.....14
- Exhausting pipe.....15

**Use instruction.....16**

**General Safety instruction.....17 - - 18**

**General failure & Solution.....19 - - 23**

## OUTLOOK & SUMMARY



## GENERAL TECHNOLOGY DATA

Model	5L CF	6L CF
Hot water output(L/Min)	5	6
Heat input(KW)	10	12
Heat efficiency	>80%	
Gas type	Liquefied Petroleum Gas(LPG) / Natural gas (NG)	
Gas pressure (Kpa)	2.8---LPG / 2.0---NG	
Gas consume ( M3/h)	0.367-PG / 1.029- NG	0.424-LPG / 1.241-NG
Min.water start pressure (Mpa)	<0.025	
Water working pressure (Mpa)	0.025-0.1	
Installation place	Indoor	
Exhaust type	Natural flue	
Ignition	Electrical	
burning	Natural atmosphere burning	
Heat exchanger	Normal copper	
Safety protection	Electronic flame sensor	
Water temperature control	Mechanical	
Display	Light/LED	
Rated voltage	DC3V	
Water inlet / outlet	G1/2	
Gas inlet	G1/2	
Exhaust outlet	Φ 90mm	
Net weight(Kg)	5.0	5.2
Dimension (mm)	440×300×130	
Colour	White (paint)	

## **FUNCTION**

### **1. Convenient**

This water heater needs two A1 batteries to feed micro-computer(IC) power. You only need to turn on the power button, open the gas valve, cold water valve and hot water valve; warm water will be supplied continuously after several seconds. Whichever you turn off cold water valve, hot water valve or the power button the water heater will stop working.

### **2. Gas saving**

Advanced combustion system is used in the heater; the subsection switch device is designed for winter & summer type.

### **3. Dry burning proof protection**

It immediately closes the gas valve when there is no water flow.

### **4. 20 minutes timing protection**

After working for 20±3min, the heater will stop for self protection automatically. When user wants to go on using the heater, restarting it is enough.

### **5. Over-pressure protection**

When water pressure is too high, it will unload automatically to avoid heater damage.

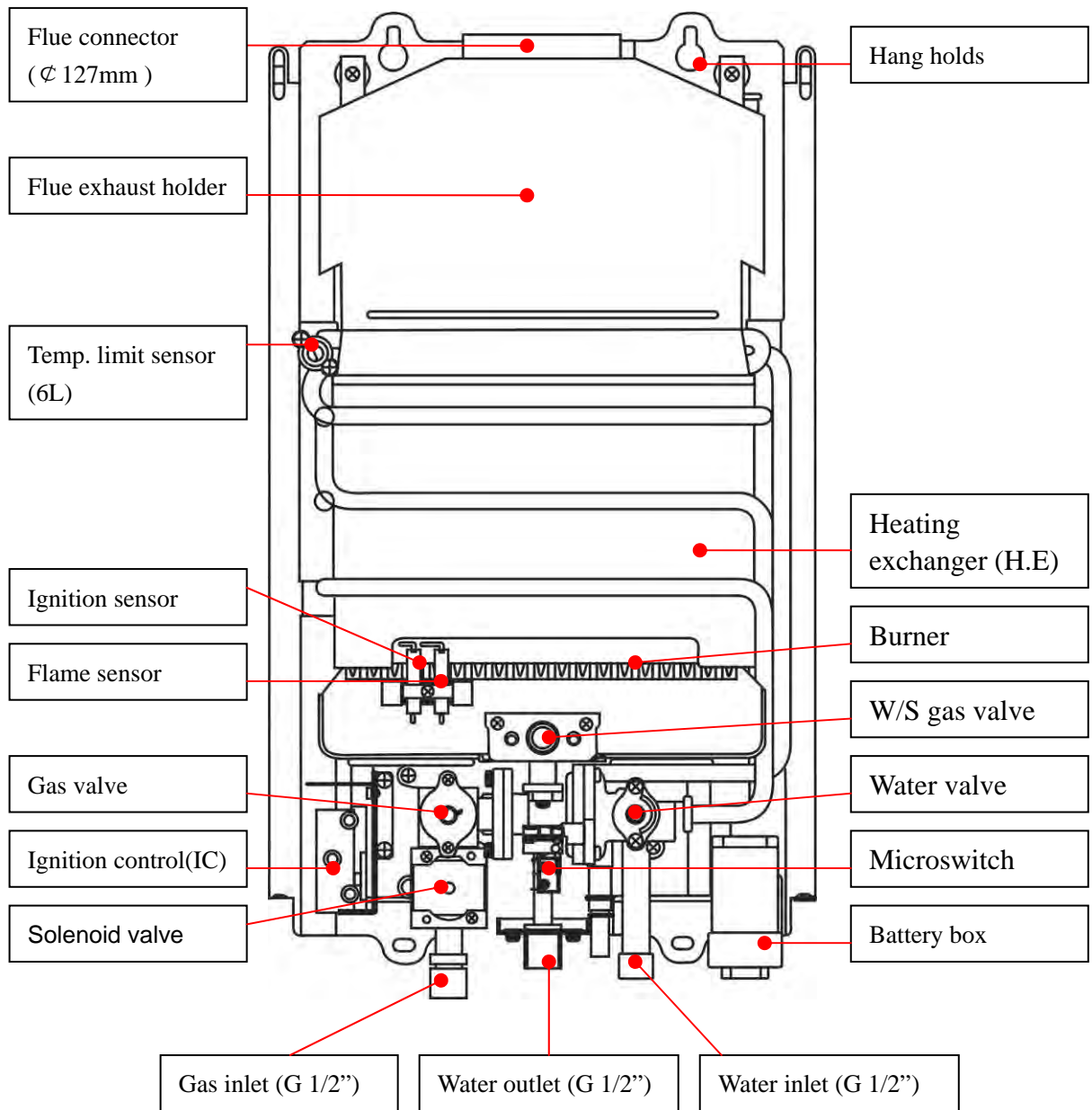
### **6. Hot water temperature display light(display light model)**

While working the display light can shine.

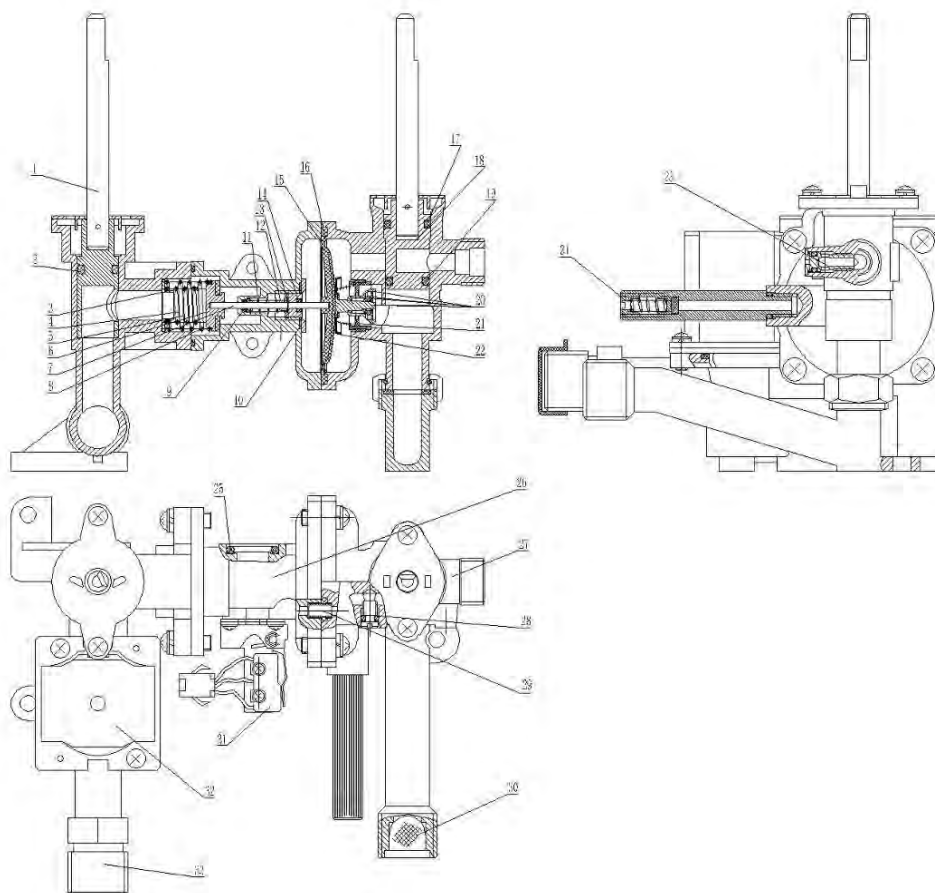
### **7. Hot water temperature display (LED model)**

While working the LED display window can show the hot water temperature.

## STRUCTURE & MAIN COMPONENTS

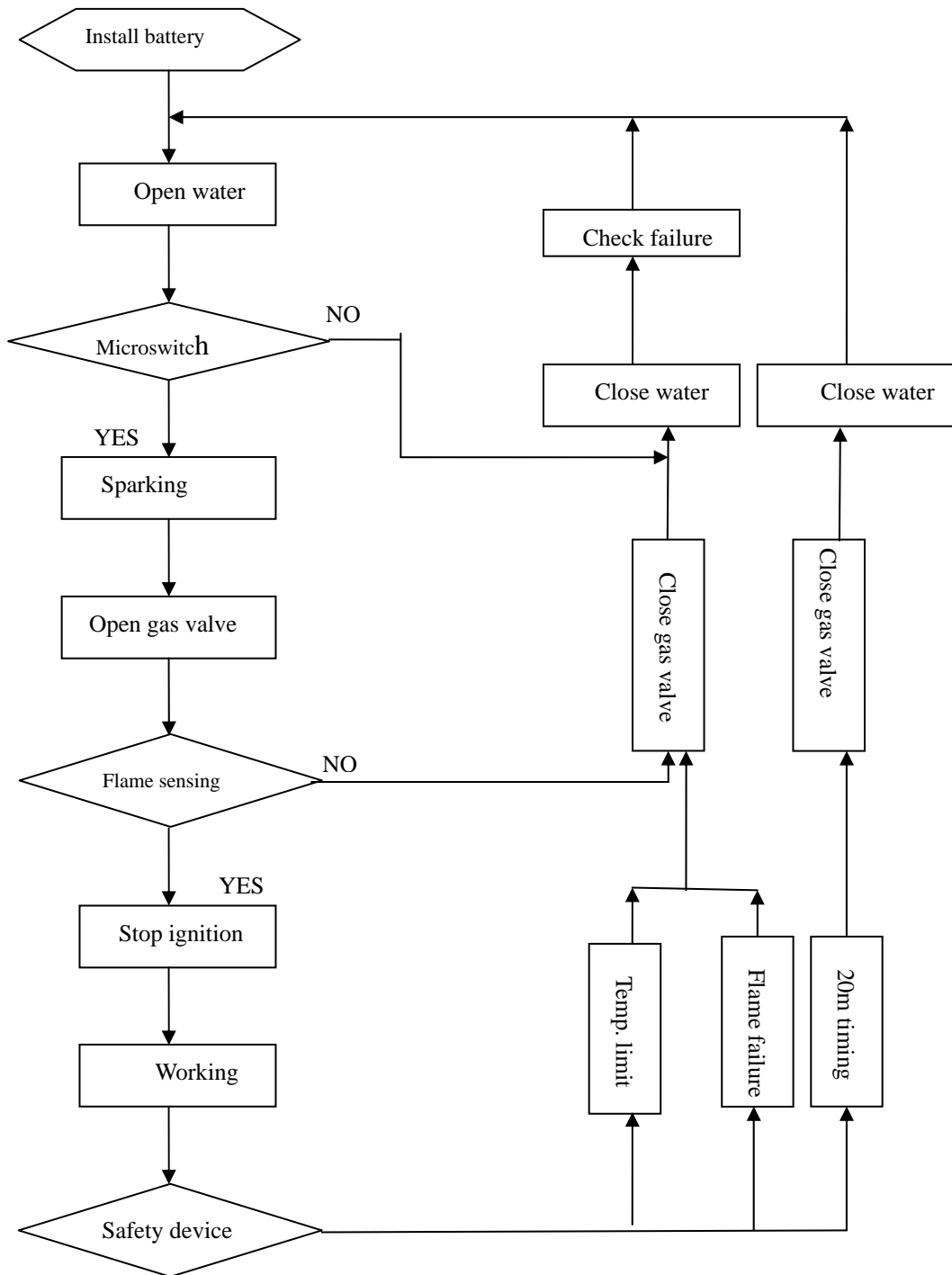


## GAS & WATER VALVE



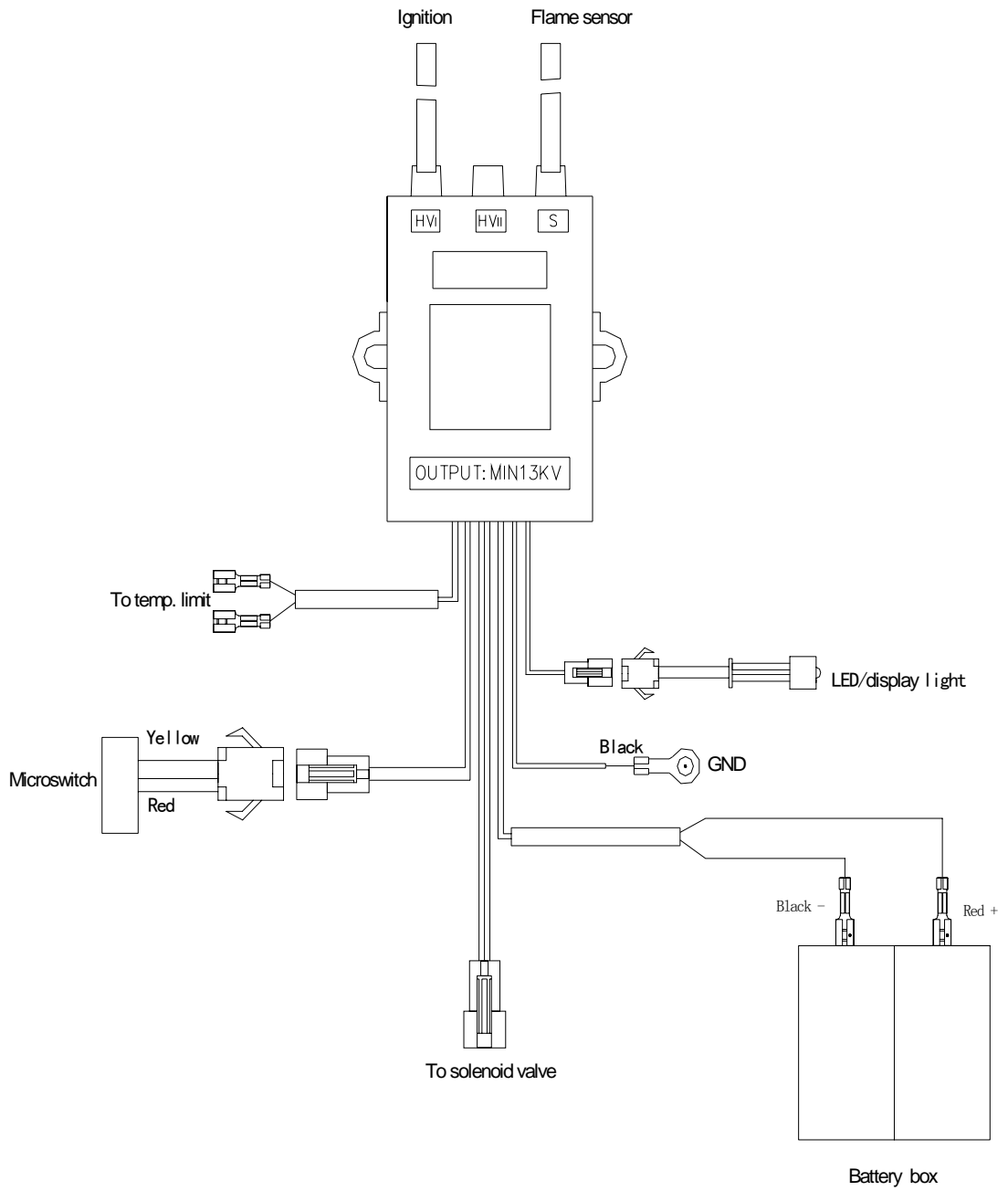
PART	DESCRIPTION	PART	DESCRIPTION
01	Gas adjust valve	18	Water tap
02	O ring 14.3*9*2.65	19	O ring
03	Mechanical gas valve ring base	20	Steady spring
04	Mechanical gas valve ring	21	Steady spring fixed support
05	Mechanical gas valve ring	22	Steady spring support
06	Ring base for driving axis	23	Regulative screw for Max. water flow
07	Driving axis	24	Safety valve
08	airproof	25	O ring
09	O ring	26	Water valve support
10	Rectangle airproof	27	Water valve
11	Spring support	28	Regulative screw for Min. water flow
12	Spring(small)	29	Anchor point for septum
13	5L Spring(small) support	30	Filter
14	O ring	31	Microswitch
15	Septum	32	Solenoid valve
16	Septum support	33	Gas valve
17	O ring		

**WORK AND CONTROL PROGRAM**

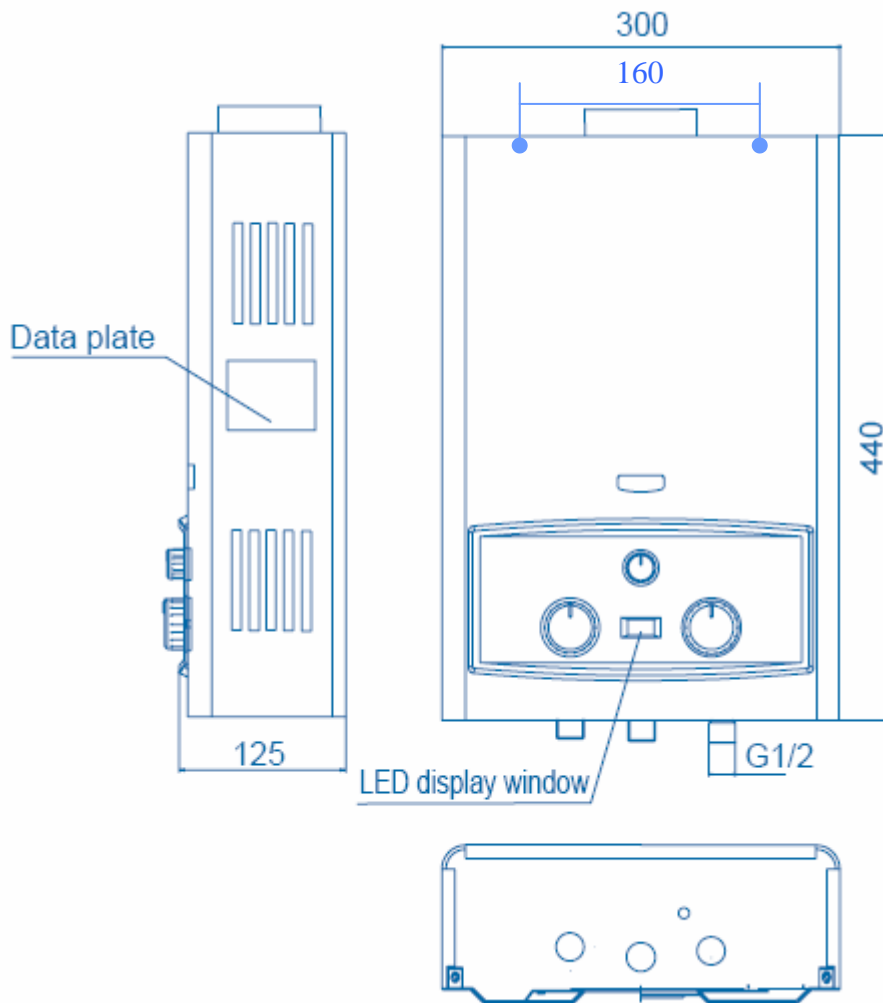




# ELECTRIC CIRCUIT



**PRODUCT DIMENSION**



## INSTALL PLACE REQUIREMENT

Installation should be conducted by certificated professionals.

### 1) Preparation before installation:

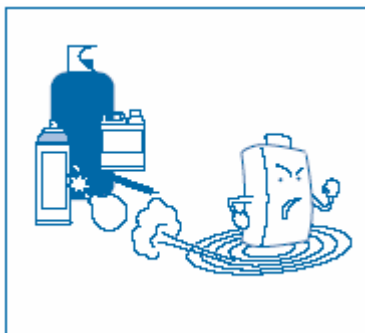
- Make sure of accordance of all the accessories with the provisions in the instruction



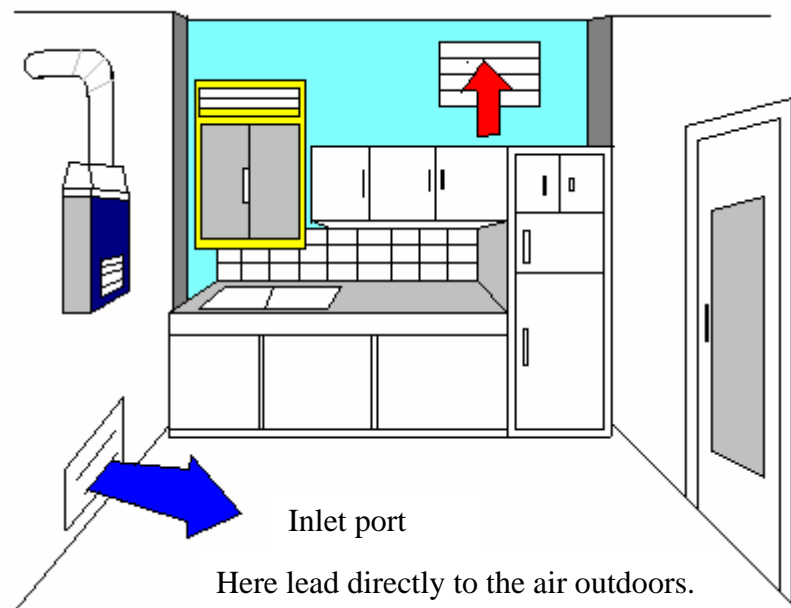
- Make sure of accordance of the gas to be applied with the requirement of nameplate

### 2) Installation place requirement

- The heater should be installed in a well ventilated place or room, such as: kitchen, a room not used for living, well ventilated corridor
- The height from floor to ceiling should be more than 2.4m
- The air inlet port should be built up directly through to the outdoor air, and its section area not less than  $0.02\text{m}^2$ , but must be more than that of exhaust tube. The height from the floor should not be less than 30mm.
- **Mind: It is strictly prohibited to install the heater at the places stated below:**
  - A. Bedroom, dressing-room, dark room, bathroom, living room
  - B. Basement, electrical appliance and meter room, boiler room
  - C. Sites where flammables, explosives or erosive material are located nearby.



- D. Sites where significant vibration occurs or any other factors that may affect the heater's normal operation.
- E. Kitchen cabinet
- F. Somewhere nearby stairs or exit.

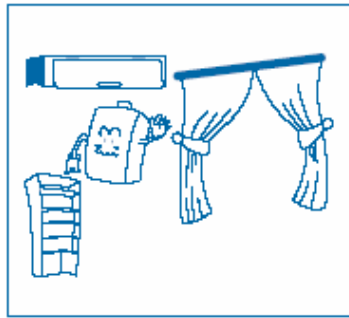


### 3) Position for installation

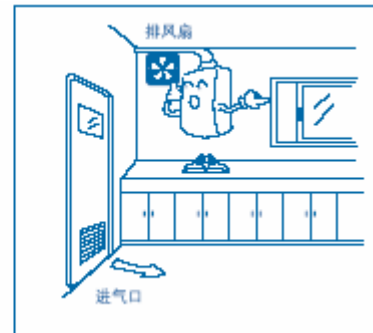
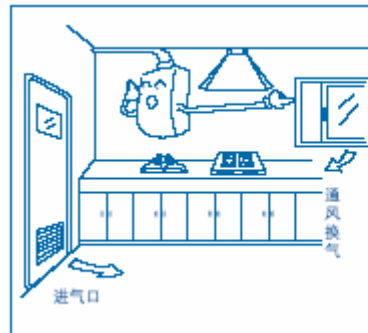
- Some effective measures must be taken if the heater is fixed on the wall, which is made up of some inflammable materials. The insulation board should be with a length of all sides 0.1m longer than that of the heater's casing.
- A door must separate the bedroom near or next to the room or kitchen where the heater is to be installed. The heater should be fixed at a position which is not only chosen considering maintenance and working capability but also far from places where it may be bumped or hit frequently, with more than 0.8m of space at the front and more than 0.1 m on both sides.
- It is suggested that the heater is fixed at such position that the fire observation window is kept on eye level with the user. This varies from user to user but generally it would be 1.5m high from the fire observation window to the floor.
- The heater must not be installed below the telephone wire or electrical appliance. Horizontally the area between the heater and any electrical appliances should be clear for no less than 0.3m.
- Horizontal distance between the heater and gas meter and gas cooker should be no less than 0.3m



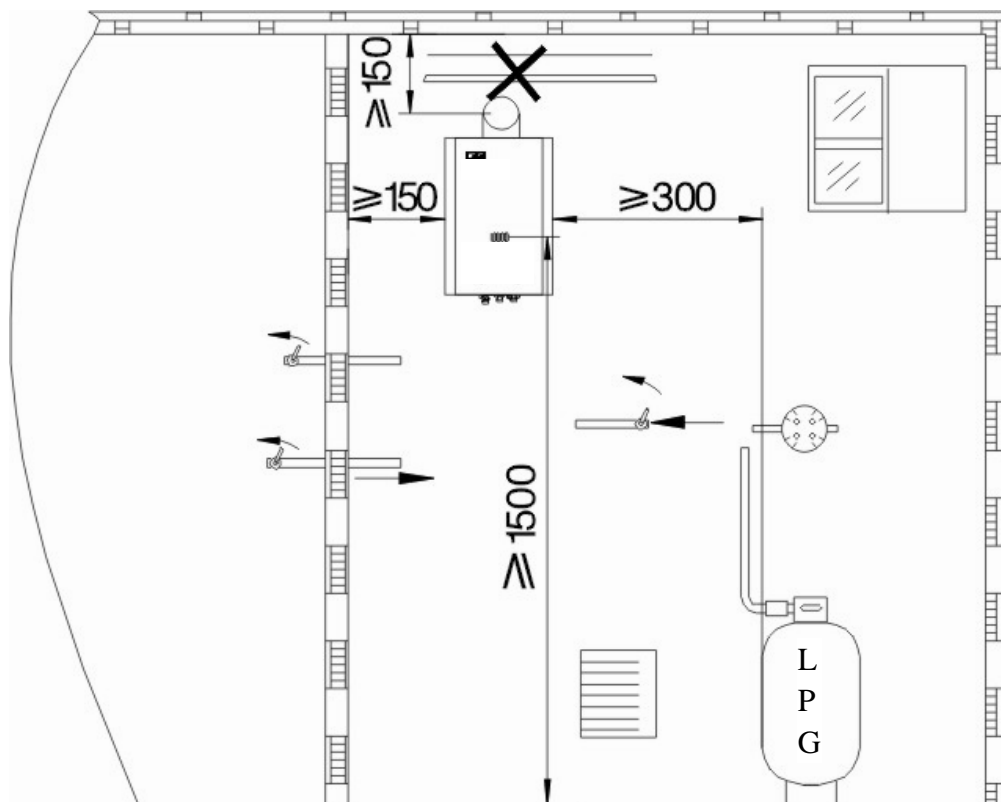
- It is prohibited to install the heater inside of or below a cabinet or a closet. A space no less than 0.2m must separate the heater from curtains, furniture or any other inflammable objects.



- It is not allowed to use the heater and the fan at the same time. If it is necessary, a window or door must be opened.

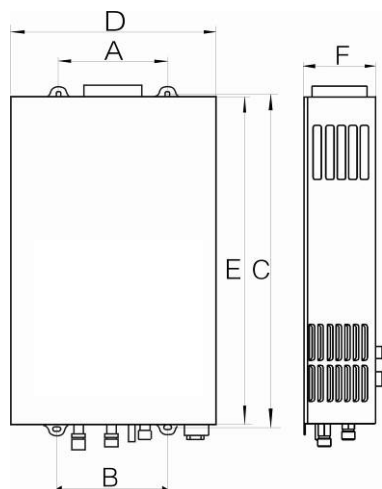


- The length of the gas tube which connects the heater to the gas pipe in the room or to a gas bottle filled with liquefied petroleum gas (LPG), must be less than 2 meters.
- Standard installation



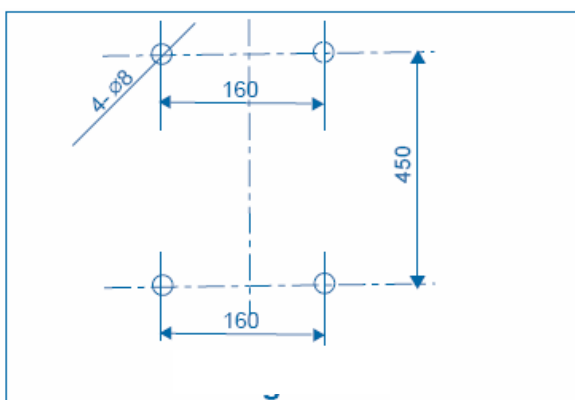
## FIXATION OF HEATER

- 1) The place and the size of water inlet, water outlet and gas inlet to see the heater.

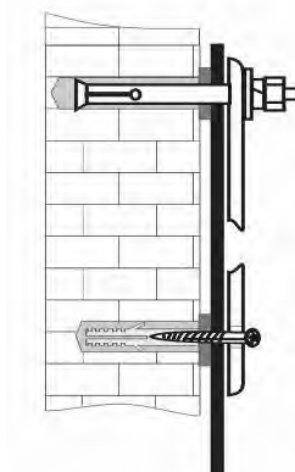


	MM
A	160
B	160
C	450
D	300
E	440
F	125

- 2) Drill two holes ( $\Phi 8$ , depth 50mm) in the wall according to the size of the A, and insert two  $\Phi 8$  plastic expansion bolt into the holes.

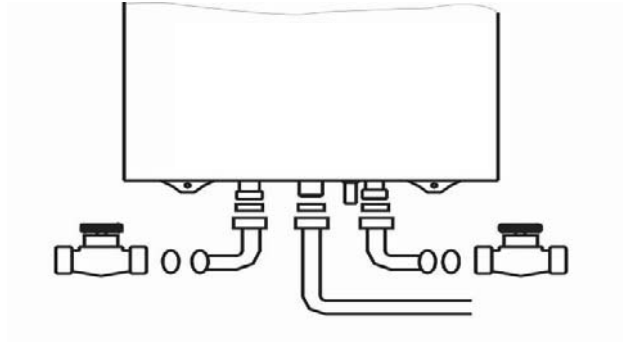


- 3) Hang on the heater to score the point below the heater (B), take down the heater. Drill two holes  $\Phi 6$ , depth 40mm, insert two  $\Phi 6$  plastic expansions bushing into the holes.
- 4) Hang on the heater and screw down the  $\Phi 8$  nut above the heater and the  $\Phi 6$  screw below the heater.
- 5) Check that the heater is fixed in a right position without any inclination, vertically and horizontally.

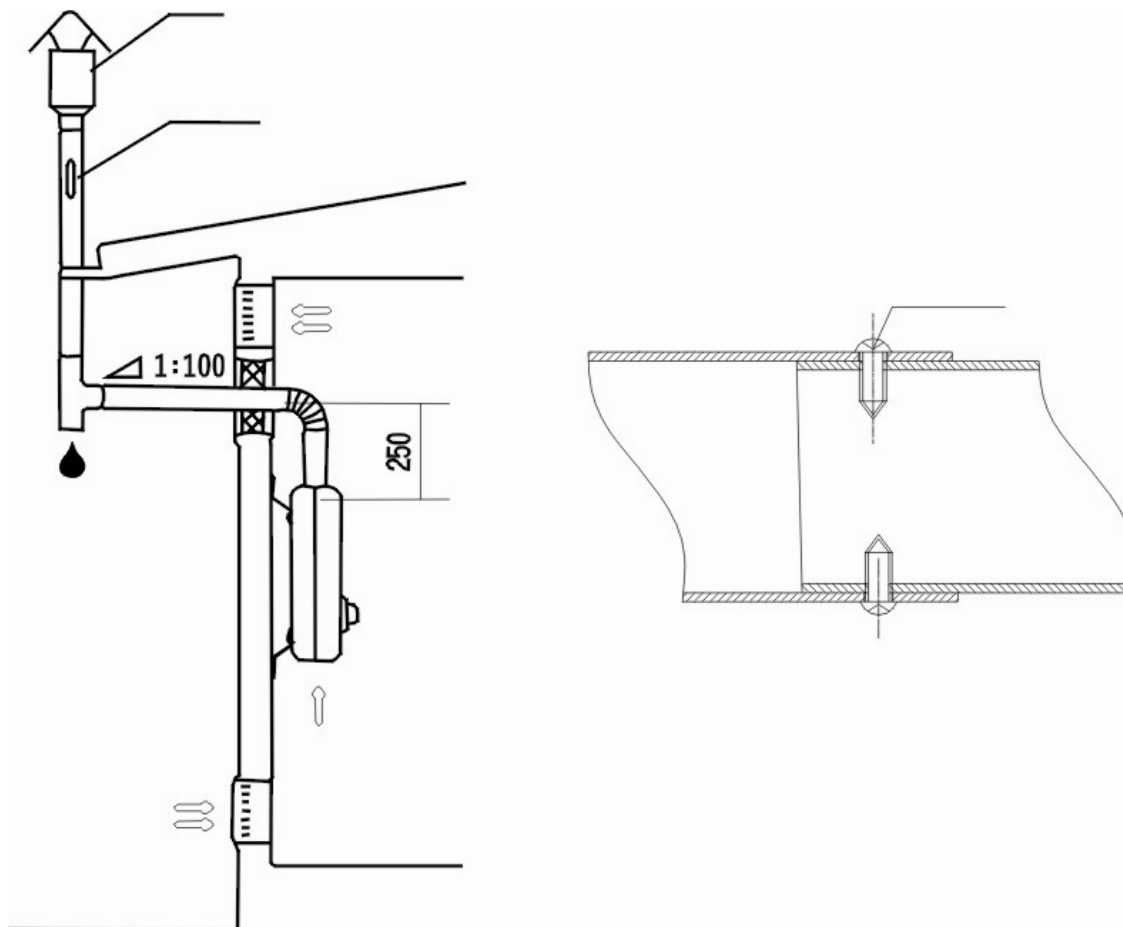


## WATER PIPE AND GAS PIPE

- 1) It must fix the controlling valves at the water inlet , outlet and gas pipe,
- 2) The wire and the gas pipe are not allowed behind or above the heater.
- 3) The length of the gas tube which connects the heater to the gas pipe in the room or to a gas bottle filled with liquefied petroleum gas (LPG), must be less than 2 meters.
- 4) Check is needed to ensure that the gas pipe and water pipe do not leak after the heater is installed.



## EXHAUSTING PIPE



- 1) This product is Natural-flue type. While operating it consumes oxygen from the air of the room and exhausts the fume out of the room by the flue pipe
- 2) The flue pipe must be fixed on the heater, and its installation should accord with the above drawing
- 3) The flue pipe should be made up of heat-resistant and corrosion-proof materials (stainless steel mainly employed by MTS). The joint of the flue should be reliably sealed without leakage.
- 4) The flue must have a capability sufficient to exhaust the fume, and the draft vacuity at the exit of the fume should be no less than 3Pa.
- 5) The horizontal part of the flue should be laid in a slope of 1%~2% down the outside, and its length must less than 3m.
- 6) There must be less than 4 elbows.
- 7) The vertical flue at the top part of the heater must be more than 250mm.
- 8) At the outlet of the flue, there should be a flue cap to prevent wind, snow and rain, and should not be placed at a windy spot with a distance of the nearby building of at least 600mm.
- 9) It forbids to install the flue pipe in the ventiduct or common flue.



## USE INSTRUCTION

### 1. Preparative

- 1) Fix 2pcs A1 dry battery into the battery box.
- 2) Open the gas valve and water inlet valve
- 3) Turn on the battery power switch which is located at the bottom of the heater

### 2. Ignition

Open the hot water valve, the heater will ignite automatically, but the water pressure must be more than 0.025MPa.

It may be quite hard to light up the first operation due to air in the gas pipe. Simple try a few times until operation starts.

### 3. Adjust the temperature of hot water

- 1) Adjust the water knob and the gas knob to reach the require temperature
- 2) Make sure the water pressure in the heater is more than 0.025MPa.
- 3) If the water pressure is too high the water will not be heated to the required temperature and therefore needs to turn down the water inlet valve.
- 4) Cut the hot water valve, the heater will be flameout automatically.
- 5) Cut the inlet water valve and gas valve after the heater is used.

#### **Mind:**

- 1) To assure a long life for the heater, please do not use it for an exaggerated amount of time
- 2) The following situation is normal, do not think it is a malfunction.

Protection	Situation	Remark
High water pressure protection	Safety valve will open when the pressure is more than 0.8MPa	To press down the pressure
20 minutes timing protection	After working for 20±3min, heater will stop for self protection automatically	To restart
Water pressure too low	The heater is not ignition when the pressure is less than 0.025MPa.	To restart after increase the pressure.
Too power pressure	It is not ignition after use the heater some time.	To exchange battery
Over-heating protection	The heater will stop automatically when the temperature of hot water is more than 77°C.	To restart after the water in heater cools down.

## GENERAL SAFETY INSTRUCTION

- **Make sure of accordance of the gas to be applied with the requirement of nameplate**

Example:

Gas type: NG (natural gas) 12T

Gas Pressure: 2000Pa

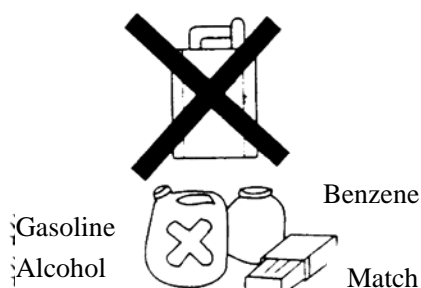
If the gas type of the heater needs to be exchanged, it must be conducted by certificated professionals

- **Check whether the gas pipe leaks or not**

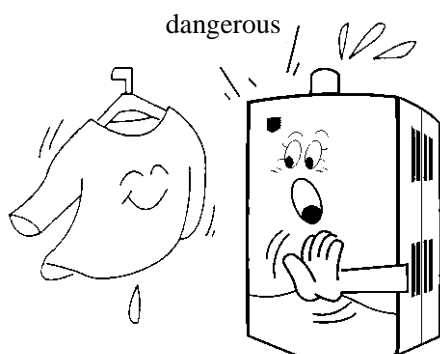
Please smear soap water on the connector, to check whether the gas pipe leaks or not.

If abnormal in daily use, the heater must not be used again until it is check professionally. If the gas pipe leaks, cut the valve, open the door or window immediately, do not use a lighter, cooker, gas water heater or start any electrical product.

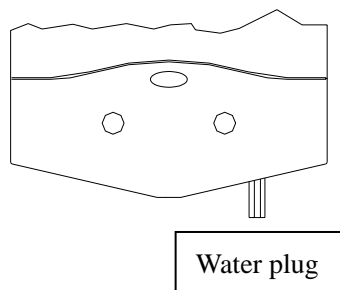
- **It is strongly prohibited to place flammables, explosives or corrosive material nearby the heater**



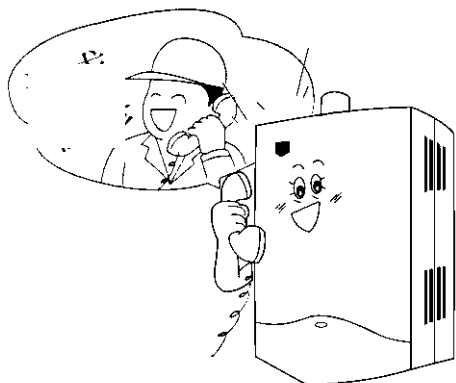
- **Do not use the heater for any other purposes other than heating water such as drinking water or drying clothing etc.**



- **If the air temperature falls below 0°C, unscrew the water plug near the inlet and let out the water in the heater, after that, screw down the plug. If the heater has not been used in a long time please let the water out of the heater too.**



- **Ask for examination or repair**



Do not use the heater if there is a malfunction. Do not take it apart without permission, but call the service center.

Check heater every 2-3 years.

- **Do not install the heater in a bathroom**

The heater must be installed at a place or a position of a room where it is well ventilated, to prevent a poisoning of carbon monoxide (CO), a colorless, odorless, highly poisonous gas, formed by the incomplete combustion of carbon or a carbonaceous material, such as gasoline, LPG, NG, etc.

- **Prevent scald by hot water**

Do not touch the hot water after restarting the heater to prevent scald by hot water.

Do not touch the cover of the heater except the knobs if the heater is in use or right after use.

- **Chose good LPG bottle reductor to ensure good work, and rated flux should be more than 1.2m<sup>3</sup>/hr when the heat rated power is more than 16KW.**

## General failure & Solution

### 1. If the water heater is only used occasionally, it may switch off suddenly.

#### Cause:

- Too low voltage of battery supplying for ignition control(IC) and gas solenoid valve.
- Too low water pressure. Microswitch is working on critical state of ON / OFF.
- Water leakage happen on plastic septum inside water volume, too weak moving to drive Microswitch steadily.
- IC doesn't work (failure);

#### Operation:

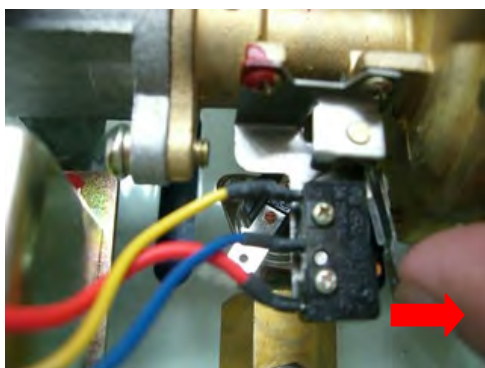
- 1> Check battery voltage and replace



#### ※Technology knowledge:

The working voltage of the battery (2 pcs, A1) needs to be more than **2.1V** DC.  
Electric meter like multimeter can be used to check battery.

- 2> Check ignition IC and solenoid valve



Close gas switch, push Microswitch, to make the power connect to IC, then check as following

- Ignition pole can spark or not;
- Solenoid valve can open (listen to the noise or touch to feel it shaking) or not;

If ignition and solenoid valve work correctly, open water tap (switch), check whether the microswitch is working or not, check water pressure by outlet water flow or pressure meter, then check water valve, change parts or the whole water valve;

If ignition can not spark properly, change IC.

※Technology knowledge:

- Min. working water pressure is 0.025 Mpa (0.25 kgf/cm<sup>2</sup>)
- The correct connection situation for microswitch and water driving axis is as shown in the following picture



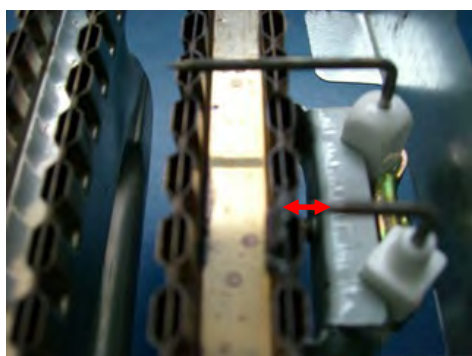
**2. When water tap is opened and sparking works, but the burner does not work. In this situation the Gas is not reaching the burner.**

**Cause:**

- Gas solenoid valve can not open;
- The distance between ignition pole and burner is not correct;
- Water driving axis can not open machine gas valve;
- Gas pipe has some air inside if the pipe is new;
- Gas pressure is too low or the gas switch hasn't opened;
- Make sure the spark current is right

**Operation:**

- 1> Check gas supply switch, check gas pressure meter from gas cylinder (LPG);
- 2> Check the sparking situation



※Technology knowledge:

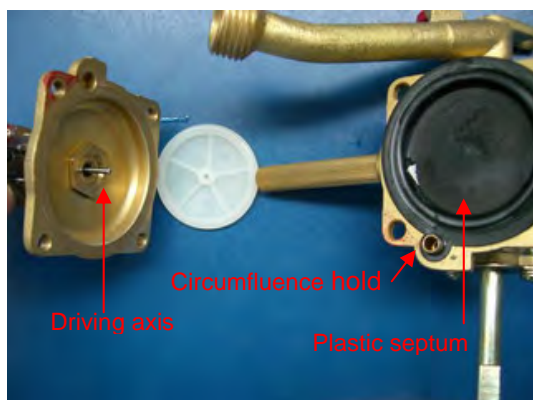
The proper distance between ignition pole and burner is 4.0mm -6.0mm.

- 3> Check whether gas solenoid valve can open or not when sparking;  
Listen the opening sound “Da” or touch to feel the opening vibration or measure the voltage at the gas valve with a multimeter.

If this isn't working, disconnect the solenoid valve from the base, remove any dirty on its surface and reassemble. Some dirt from the gas can stick to the valve preventing it from working properly. If the valve still doesn't open, replace the electric solenoid valve.



- 4> Open water valve, check plastic septum (in case there is a leakage), and replace driving axis or whole water valve.



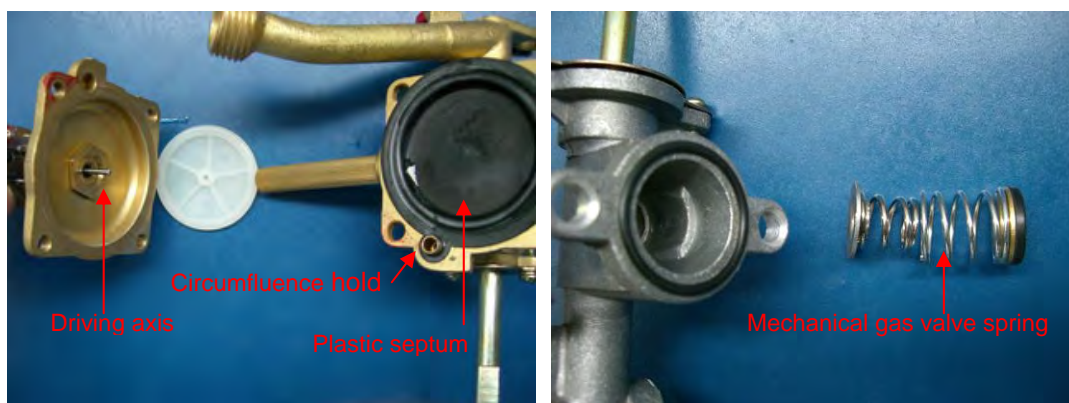
### 3. The flame continues to burn after closing the water tap.

#### Cause:

- Water driving axis can not move back when water is stopped;
- The circumfluence hold in water valve cavity jam;

#### Operation:

- 1> Open water valve, check and clear any dirt inside;
- 2> Check the rings of mechanical gas valve and water driving axis, replace if failure;
- 3> Add some solid oil on water driving axis's surface;



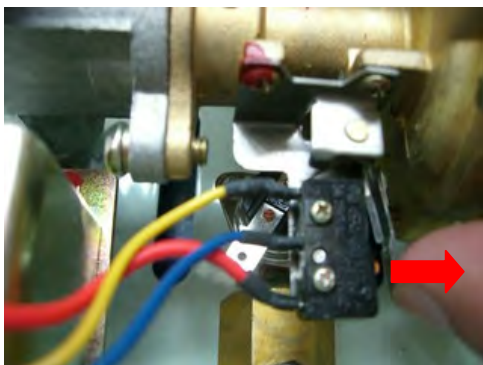
#### 4. Water heater can not spark (ignition)

##### Cause:

- Battery voltage is too low;
- Water pressure is too low. Microswitch can not drive(ON);
- Microswitch failure;
- IC failure;
- Temp. limit sensor failure (OFF);
- Power switch not closed (OFF);

##### Operation:

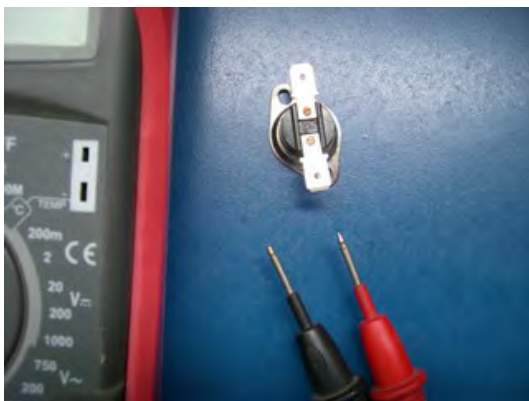
- 1> Check battery voltage and replace if needed;
- 2> Push Microswitch, to make the power connect to the IC, then check ignition pole whether it can spark or not;



If ignition works normally, the failure cause is from water valve's action, go to item 3>;

If ignition can not work normally, the failure cause is electric circuit (IC, Temp. limit sensor, Microswitch, power switch), go to item 4>;

- 3> Open water tap (switch), check whether the microswitch is working or not, check water pressure by outlet water flow or pressure meter, and then check water valve (sometime solid oil on driving axis is needed), change part inside or whole water valve;
- 4> Use multimeter to check Temp. limit sensor, microswitch, power switch, and then replace any malfunctioning parts.



Check that all electric connectors are ok or broken off.  
Finally replace IC.

## 5. Hot water does not reach the wished temperature.

### Cause:

- Gas pressure is too low;
- Gas switch is not opened enough;
- Mixing too much cold water;

### Operation:

- 1> Check switch and gas redactor connecting gas cylinder, adjust pressure;
- 2> Don't mix any cold water.

## 6. Gas water heater caught fire due to gas leakage inside.

### Cause:

- Airproof plastic ring is destroyed;
- Leakage split on gas holder (aluminium)

### Operation:

- 1> Open gas switch, and use brush with suds (soap mixed into water) to check gas connector and gas holder surface;
- 2> Replace plastic ring or gas holder.

## 7. Water leakage inside.

### Cause:

- Leakage split on water valve holder;
- Leakage split on heating exchanger;
- Leakage happening on connector from plastic ring destroyed

### Operation:

Check and replace components;