# Air Heater Instruction

FJH－2.8AⅡ/5AⅡ

# Content

## Product Parameters

| | Quality | Dimensions | Heat Value | Hot air volume | rated power consumption | Power consumption for ignition | Oil consumption |
|---|---|---|---|---|---|---|---|
| units | Kg | mm | KW | M/h | W | W | L/h |
| FJH—2.8A II | 2.7 | 310×115×122 | 2.8 | 90 | 36 | ≤100 | 0.36 |
| FJH—5A II | 4.5 | 376×140×150 | 5 | 150 | 50 | ≤100 | 0.6 |

## Service Conditions

• Storage Temperature: -55℃ to +70℃

• Operating Temperature: -41℃ to +50℃

• It is recommended to use low temperature diesel oil that is compatible with the ambient temperature for the heater. Otherwise it will cause paraffin precipitation in the pipe and the heater will not work properly:

| Above 5℃ | Above -5℃ | Above -15℃ | Above -30℃ | Above -41℃ |
|---|---|---|---|---|
| 0# Diesel Oil | -10# Diesel Oil | -20# Diesel Oil | -35# Diesel Oil | -50# Diesel Oil |

● Applicable Altitude: Civil≤3000m, Military≤5500m

● Normal Vehicle Speed: 0-100km/h;

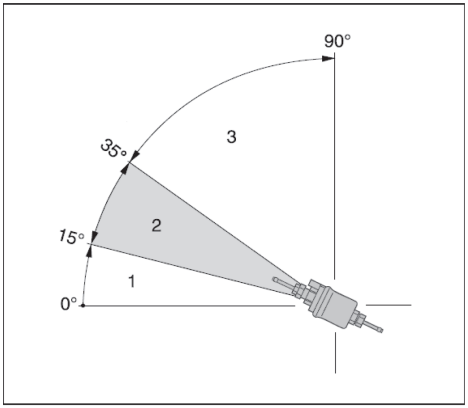
## Installation Guidance

1. Select the appropriate place to install the heater where it is away from vibration, rain and water. The heater shall be installed in a protective cover or inside a bin.

• Installation of Oil Tank: Fuel oil can be sucked directly from the vehicle's tank, however the pipe used must be independent and do not share oil pipes with other equipment inside the vehicle. The oil tank shall be arranged separately if the length between the tank and the heater is too long (exceeds

10m). The height difference between the oil level in the tank and the heater shall not exceed ± 500mm.

• A Φ4x1 nylon pipe and special joints shall be adopted for the oil pipe, and the pipe clamps must be fastened, and the oil pipe shall have protective casing around it. The oil outlet of the electromagnetic pump shall be installed upwardly. (It is best to tilt upwards to 15 ° to 35 ° as shown below, but not to tilt downwards.). The length of the oil pipe from the oil tank to the electromagnetic pump shall not exceed 2 m, and the length of the oil pipe from the oil pump to the heater shall not exceed 8m.




• Installation of Intake Pipe: the inlet of the combustion air shall be connected with a hose of 0.2m-2m to the outside of the vehicle to suck fresh air and the flexible pipe shall be fixed with clamps, the bending angle of the pipe shall not exceed 90°. Exhaust gas shall be prevented from being sucked into the air inlet. The direction of the air inlet shall not be the driving direction and there shall be no obstructions within 300 mm below the air inlet

• Installation of Exhaust pipe: The exhaust gas outlet shall be connected with a metal hose and fixed with a clamp, and horse's bending angle shall not

exceed 90°. To prevent the exhaust gas from entering into the air inlet, cold air inlet, and vehicle windows, the exhaust outlet of the hose must be outside the vehicle and not directly towards the driving direction of the vehicle and must not exceed the vehicle side limits. The temperatures of the exhaust pipe and exhaust gas can be up to about 400 ℃, which shall be kept at distance with the surrounding parts, and there shall be no obstructions within 300mm below it and blocking by debris and snow shall be avoided.

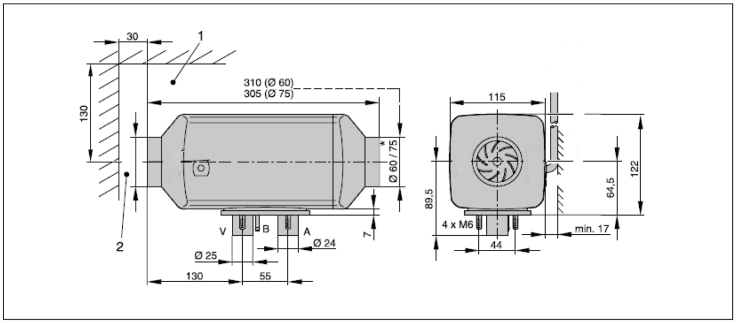
•Installation of Air Inlet Pipe: Circulating air is sucked from the cab by the cold air inlet, however, it will reduce the air volume if the pipe is too long or the suction speed is too fast, causing over-temperature of the heater body and automatic shutdown. The distance between the air inlet and the cab wall shall be equal to or greater than 50mm to avoid inadequate volume of air sucked.

•Installation of Air Outlet Pipe: the outlet of the hot air can be connected with an aluminum horse to the cab for heating and defrost and fixed with a clamp, however, it will reduce the air volume if the pipe is too long or the suction speed is too fast, causing over-temperature of the heater body and automatic shutdown. The distance between the air inlet and the cab wall shall be equal to or greater than 50mm to avoid inadequate volume of air sucked.

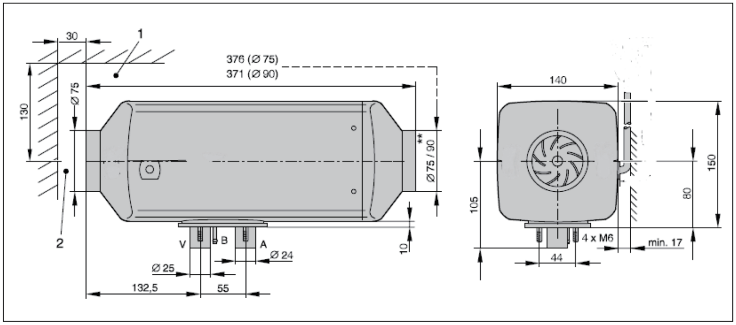
• Installation of Wiring Harnesses and Switches: drill a hole on the dashboard, insert the switch board into the hole, and tighten the harness connector. The control harness shall be added with rubber casing when going through a vehicle's body, one end of the control harness is connected to a switch or a switch transition line, one end is connected to the heater and one end is connected to the electromagnetic pump.

•☉Notice: Check whether the oil circuit connection and the electric circuit connection are correct before starting. Check whether there are foreign matters entering into the air inlet/outlet pipe and the intake/exhaust pipe. Do not place any combustible or flammable and explosive dangerous goods near the heater.

FJH-2.8AⅡ Outline Dimensional Drawing




FJH-5AⅡ Outline Dimensional Drawing

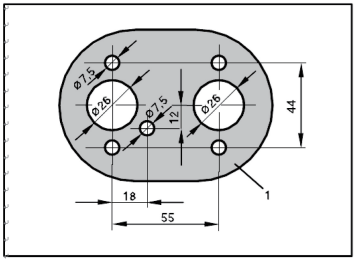



**1. The minimum installing spacing (free space) used to open the cover, remove the ignition plug and the controller**

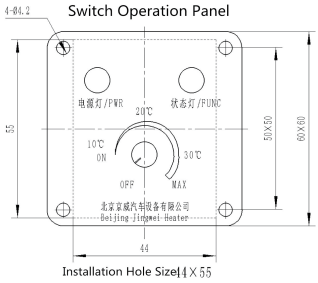
**2. The minimum installing spacing (free space) used to suck heated air**

A = **Exhaust Gas**
B = **Fuel**
V = **Combustion Air**

Installation Hole Drawing

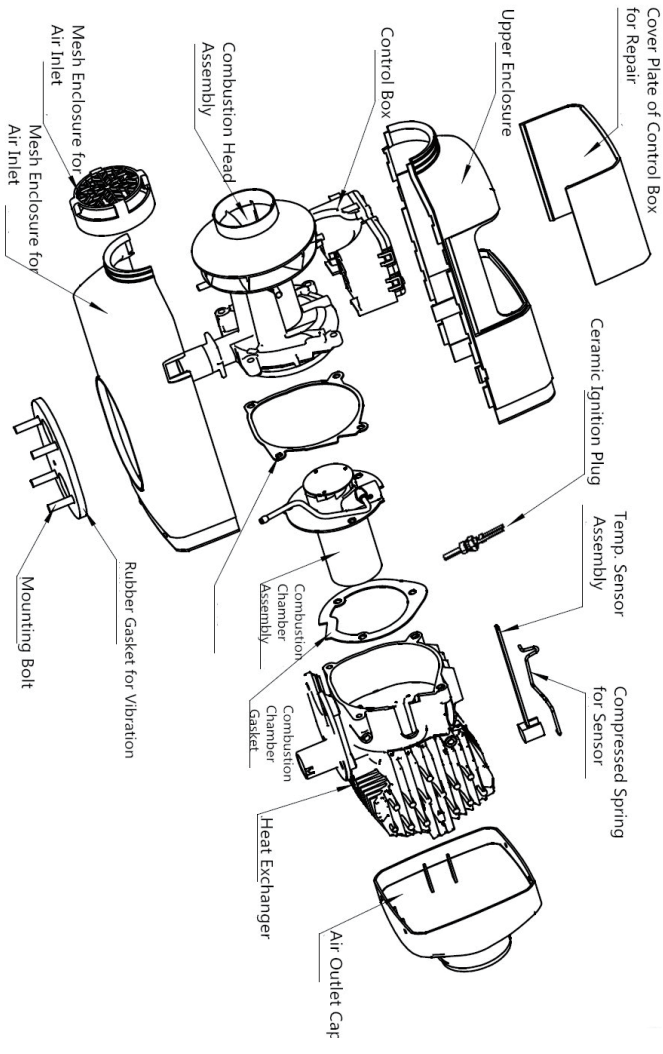



Switch Operation Panel

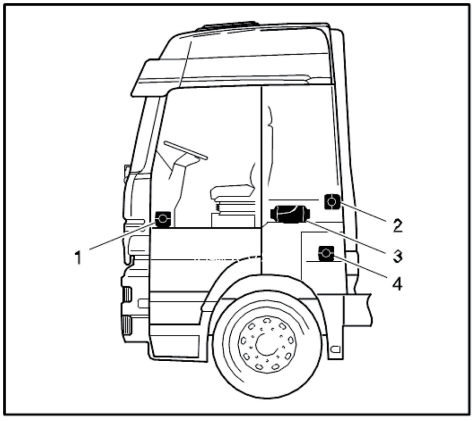



Installation Hole Size 44 X 55

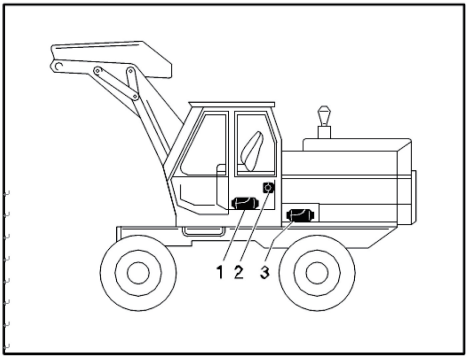
# Heater Body Structure Diagram



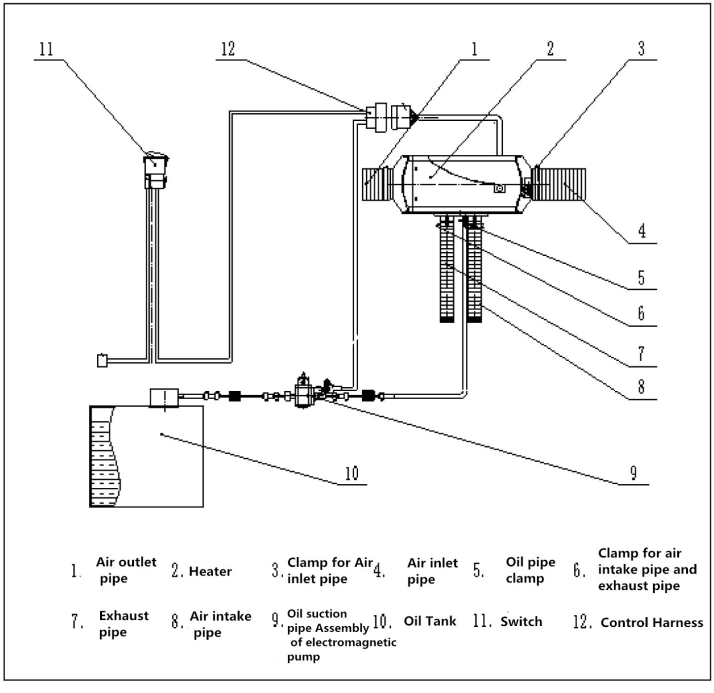
# Installation Position Diagram



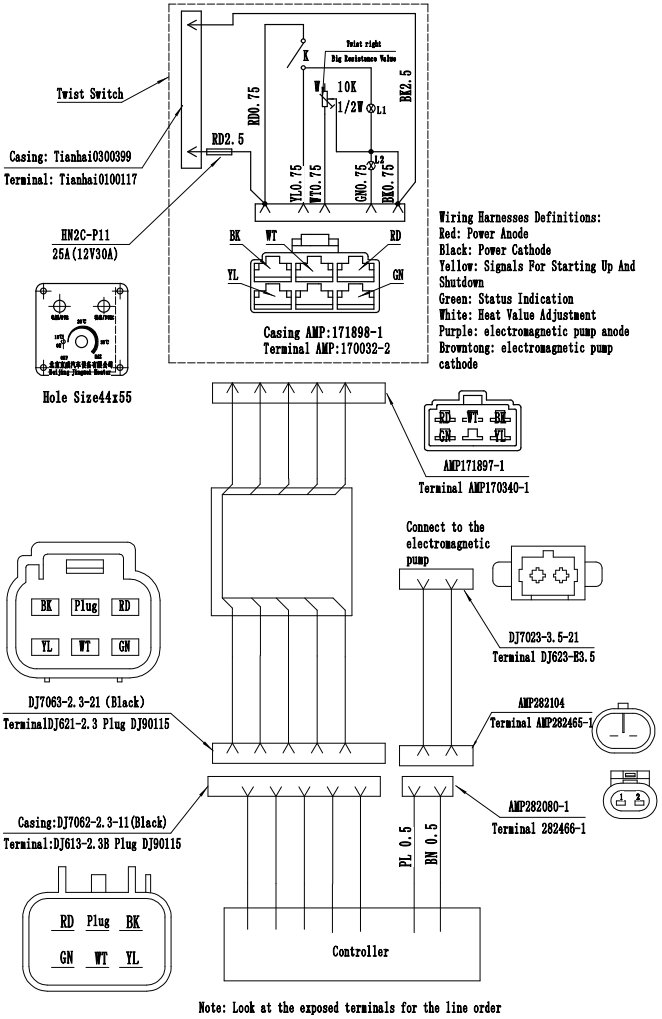

1 The heater is located below the front passage seat
2 The heater is located on the rear wall of the cab
3 The heater is located under driver’ s seat back
4 The heater is located in the tool box




1 The heater is located in the box of the driver’ s seat
2 The heater is located on the rear wall of the cab
3 The heater is located in the protection box




## Diagram of Accessories installation Structure




Note: Look at the exposed terminals for the line order

# Electric Schematic Diagram

## Operating Method

### Starting Up

As shown in the schematic diagram, the switch is a twist switch. Turn the knob to the maximum position, the status indicator light is on, and the heater startups. When the combustion indicator light is on the heater's working condition can be adjusted according to the comfort level.

### Shutdown

Turn the knob to the position NO, the indicator light is off, the heater stops burning. At this point the heater fan will continue to run for 3 minutes to cool the heater body, and then the heater shuts down.

### Notice

Before turning off the main power switch of the vehicle, please turn off the heater for more than three minutes in advance. Otherwise, the heat in the heater will not be released and the heater will be damaged.

## Maintenance

• Please, firstly, check the condition of the heater and make sure that the air inlet/outlet and the air intake and exhaust are unblocked when using the heater for the first time every year. Clean it, if necessary and start it for trail run to make sure whether it is normal.

• In the season when the heater is not used, please start it and keep working for 15 minutes each month to keep it in a good condition.

## Repair

**• When the switch power indicator light is not on, please check:**

- Please check whether the main power is on,
- Whether the heater fuse is blown,

- Whether the contact of the harness connector is good and solid;

**• The switch status indicator light flashes, please check:**

- Please check whether the power supply is stable,
- Whether the capacity of the regulated power supply is sufficient.
- Whether the control box is damaged.

**• The indicator light is on but the heater does not work after starting up**

- Start again, check whether the oil is not sufficient in the oil circuit when starting up for the first time.
- check whether there is fuel in the tank,
- check whether the oil circuit is loose,
- check whether the air inlet/outlet, air intake/exhaust port is blocked.
- Check whether the ignition plug is carbonized or blown
- Check whether the sensor and the control box is damaged.

**• Smoke is released when burning:**

- Check whether the residual fuel oil is excess due to the failure to start last time
- Check whether the voltage is normal.

**• When the combustion is unstable:**

- Check whether there are oil dripping and smoke in the exhaust port
- Check if the oil circuit is blocked or it is loose

**• Disruption in combustion and shutdown:**

- Start again, check whether the electric circuit and the oil circuit is normal.
- Check whether the sensor and control box are normal.

**• When the heater is self-cooled and shuts down**

- Check whether the air inlet and outlet are unblocked.
- Check if the inlet air temperature is too high.

## Fault Code

When a fault occurs, the switch indicator light will flashes and indicate a fault. The indicator light flashes 5 times each time, the flashing time is divided into two kinds of time: long time and short time, a long time is 1s which represents 1, and a short time is 0.2s which represents 0, the interval time is 0.5s, the interval time of each group is 3s. For example, a short time flash for five times means a fault code 00000.

00000: Open circuit of the combustion sensor

00010: Voltage of the power supply is too high

00011: Voltage of the power supply is too low

00100: Short circuit of the combustion sensor(the resistance value is too small)

00101: Open circuit of the overheating sensor

00110: Short circuit of the overheating sensor

01000: The self-checking current is large after the electromagnetic pump starts up

01101: Fail to ignite

10011: The self-checking current is large after the ignition plug starts up

10101: The self-checking current is large after the main motor starts up

11011: The heater is overheated (the temperature at the air outlet is too high)

11101:The Hall sensor does not detect the magnet(the motor dose not rotate, stall or the controller is not placed well)

## Service

If you have any questions, please contact our service department.

Tel:00861059711608/59711619

After-sales service department

# HX-2 Controller Manual

HX-2 controller is a kind of smart controller used as a supporting accessory of the heater equipped on military products, whose interfaces are all in Chinese or English. HX-2 controller is applicable for FJH, YJH and YJP series heaters made by GNF . HX-2 has a military OLED display, which is able to work normally at a superbly low temperature. If HX-2 controller is used to take place of the normal heater switch board, a real-time communication with the heater can be realized and multiple functions can be achieved.

# I. Functions

1. Timing start-up: the controller can be started up at a certain time once the time is pre-set.

2. Default diagnosis: once the heater suffers a default, what kind of default will be displayed automatically.

3. Status indication: show the current status of the heater.

4. Wireless control: the heater can be under the form of wireless remote control.

5. Thermostatic control (FJH series): the heater's calorific value can be automatically controlled according to the set temperature, keeping a constant temperature inside the vehicle. (If FJH series is used, this function is for your option).

6. Heater's caloric value can be manually controlled (FJH series): the heater has four different caloric values, which can be freely controlled. (If FJH series is used, this function is for your option).

# II. Working voltage and temperature: DC24V (or DC12V), -41℃ — 50℃

# III. Control Panel


Fig. 1

From Fig. 1, we can see that there are four buttons on the control panel (⏻, OK, SET, ↑) and one displayer. All the buttons are touch switches with indicating lights. Here below are the functions of the buttons:

"⏻", On / Off and log-out.

"OK", to confirm the settings (a switch-over button for manual-control caloric value and auto control of caloric value)

"SET", to set parameters and switch over the settings.

"↑" Adjust the set parameters

"⏻", the red light is to indicate the power, which will be on once the controller is connected with the power.

“OK” “SET” “↑”, the green light is to indicate the “on” or “off”, if it is on, it means that the controller is started up and begins to work.

“OK” “SET”, the indicating light in the middle (in the shape of fame, in blue); if the light is on, it means that the heater is being working normally; if the light is flashing, it means that the heater suffers a default.

## IV. On/Off

Once the heater is powered on, press “ ” then the heater is started. Under normal situation, the interfaces are shown in a good order like this:


Fig. 2


Fig. 3

When Fig. 3 is available, the heater is being working normally. If there is a default, you can see the interface as follows:


Fig. 4

If Fig. 4 is available, the “fame-shape” light (the blue light) will flash, which means that the heater suffers a default. (The default is not suffered by the controller).

After start-up, press “⏻” long for shut-down. On the display screen, you can see “Being shut down, please wait.” and “Do not turn off the main power”. Since the shut-down needs to have the heater cooled down, it is not allowed to turn off the main power. Once the heater is shut down, the fame-shape light (the blue light) will be off and the displayer closes automatically.

## V. Settings

### 1. Time setting

Power on the controller and long press “⏻” to start the controller. On the display, you can see “Being powered on or standby” or “the heater is being working normally”. Then press “SET” to set the time. See Fig. 5.


Fig. 5

Press "↑" to select the value for the flashing items, (press "SET" to switch over the flashing items, once the expected value is selected, press "OK" to confirm the setting.

**2. Set timing start-up**

The same as the operation mentioned above, press "SET" to switch over to "set timing start-up", see Fig. 6.

(When leaving the factory, the timing start-up is at 06:30).


Fig. 6

Press "↑" to select the value for the flashing items, (press "SET" to switch over the flashing items, once the expected value is selected, press "OK" to confirm the setting.

**3. Set constant temperature (for your option)**

For FJH series heaters, constant temperature control is for your option.

The same as the operation mentioned above, press "SET" to switch over to "set constant temperature", press "↑" to get the value that you want and then press "OK" to confirm. After this, the controller will adjust the caloric value automatically according to the set temperature, which will keep the temperature constant.

**Note: When setting the parameters, each parameter shall have its set value confirmed respectively by pressing "OK".**

Once the setting is confirmed by pressing "OK", there will be a reminder like "the time has been set" or "the timing start-up has been set". That is the button "OK" can only confirm the set parameters one by one.

For example, if two parameters, the time setting and timing start-up setting, are to be set, it is mandatory to:

1. Press "SET" and "↑" to set the time, then press "OK" to confirm the time;

2. Press "SET" and "↑" to set the start-up time, then press "OK" to confirm the start-up time.

The parameters can not be set in one go, which can not be confirmed by "OK" in one go either.

# VI. Timing start-up

When the heater is on, set the start-up time. (If there is no need to change the time after setting, a second setting is not required. That is the controller has a function of “power-off memory” --- after being powered off, the parameters will be saved). When heater is under “standby”, long press “↑” to access to timing start-up. See the interface shown in Fig. 7.


**Fig. 7**

The first time (06:30) is the timing start-up while the second time (07:01:45) is the current time. When start-up time is available, the heater will be started automatically, which will be shut down automatically after working for 55 minutes in total. (The shut-down will happen when the total working time is 55 minutes, if the heater has a standby because of high temperature, the standby period will not be included in the 55 minutes) .

## VII. Manually control caloric value of the heater (for your option)

For FJH series heater, the function "manually control caloric value of the heater" can be for your option.

Press "OK" to access to the interface "manually control caloric value of the heater", press "↑" to adjust the caloric value. There are four different grades of caloric value, which are shown via the icon "▂▄▆".

"▂" is the first grade (the lowest)

"▂▄" is the second grade.

"▂▄▆ " is the third grade (the highest)

## VIII. Wireless remote control (for your option)

Wireless remote control can be for your option according to actual demands. That is the heater can be under wireless remote control. The controller and the wireless receiving module shall be encrypted so that they will not be wrongly triggered. The remote control distance can be customized according to actual demands (the default distance is 100m at an open field).

Remote control: the heater shall be powered on, press the "ON" of the controller so the heater will be started; press "Off" of the controller or "standby" on HX-2, the heater will be stopped.

Note: If the remote controller is on, the heater can be stopped via remote control or pressing "standby" on HX-2; if the heater is started via HX-2 (press "standby" on HX-2), the heater shall be stopped by HX-2 (press "standby" on HX-2).

## IX. Tips and troubleshooting

1. If "timing start-up" is required, the power of heater can not be turned off after the timing start-up is available; **therefore, the heater's power can not be controlled by the vehicle key. It is suggested that the heater shall have its power supplied independently so that the power of other parts can be turned off when the driver leaves.**

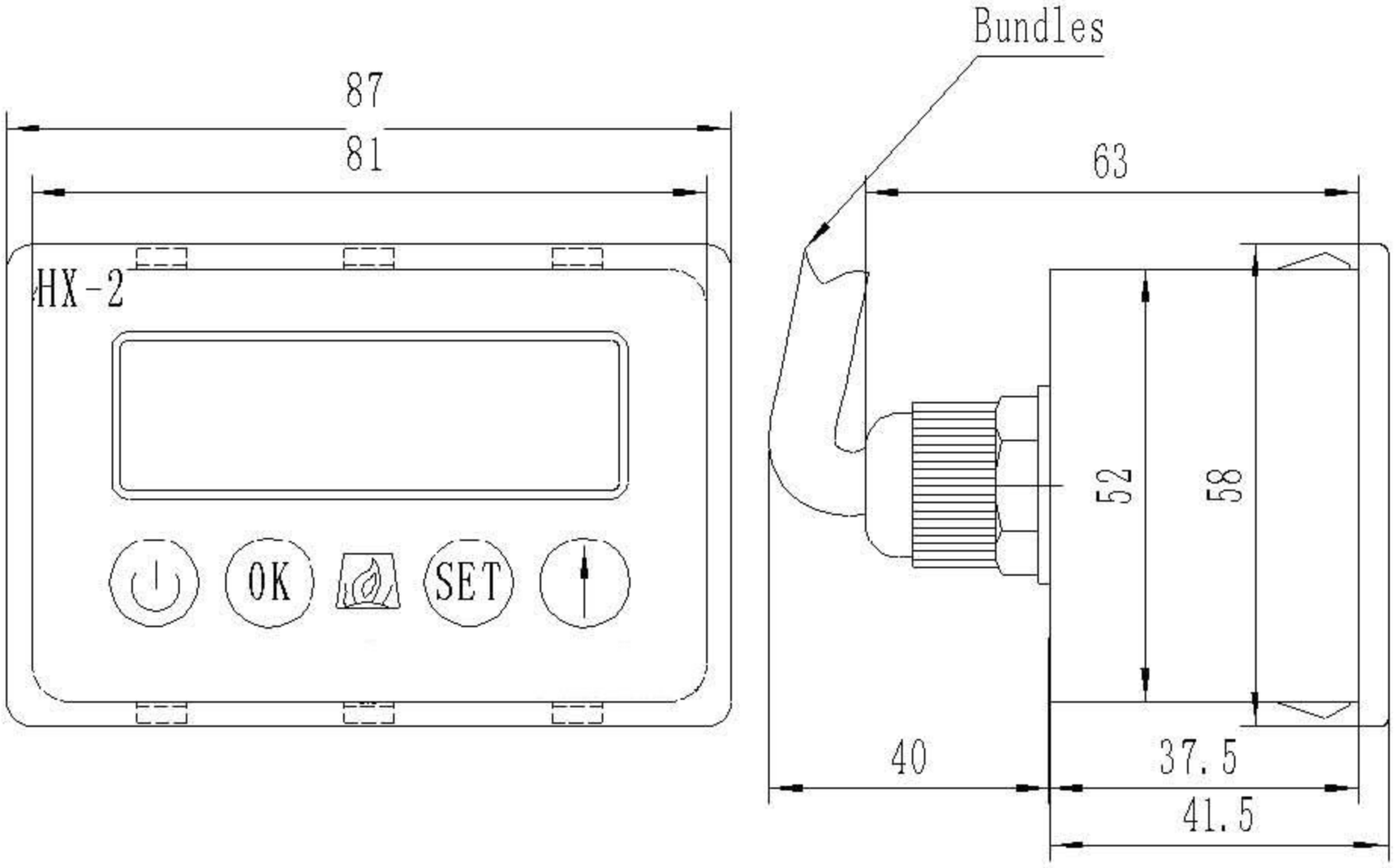
**2. Water-proof shall be highly cared about. Do not put a water cup near the display panel, otherwise, the controller will be damaged by water.**

3. In order not get the buttons wrongly touched and triggered (like they are triggered when mopping the panel), **please long press "⏻" to power on or power off. When start the timing start-up, it is required to long press "↑".**

4. If the power indicating light is not on after power-on, please check that whether the power is well connected. Besides, on the power positive wire, there is an inserted **insurance** for vehicle use. If the fuse is broken, there will be a short circuit or an over current.

5. The controller has a button-type battery CR2032, which will keep the time going when the storage battery is not available.

# X. Installation Drawing




Note: 1. It is suggested that the reserved height under the instrument platform shall be more than 85 so that the installation will be more convenient.

2. It is suggested that the opening of the instrument platform shall be 81.5*52.5.

| HX-2 Display Fault Code Table (The indicator light flashes in a binary code to indicate the type of fault. The indicator light flashes 5 times each time, the flashing time is divided into two kinds of time: long time and short time, a long time is 1s which represents 1, and a short time is 0.2s which represents 0, the interval time is 0.5s, the interval time of each group is 3s.) | | |
|---|---|---|
| Fault Type | Fault Code | Fault Description |
| FAULT 00 | 00000 | Open circuit of the combustion sensor |
| FAULT 01 | 00001 | Load short circuit |
| FAULT 02 | 00010 | The voltage of the power supply is too high |
| FAULT 03 | 00011 | The voltage of the power supply is too low |
| FAULT 04 | 00100 | Short circuit of the combustion sensor |
| FAULT 05 | 00101 | Open circuit of the overheating sensor |
| FAULT 06 | 00110 | Short circuit of the overheating sensor |
| FAULT 08 | 01000 | The self-checking current for the electromagnetic pump is too large |
| FAULT 11 | 01011 | Short circuit of the water temp. sensor |
| FAULT 12 | 01100 | Open circuit of the water temp. sensor |
| FAULT 13 | 01101 | Fail to ignite |
| FAULT 14 | 01110 | Disruption in combustion |
| FAULT 18 | 10010 | Open circuit of the ignition plug |
| FAULT 19 | 10011 | The self-checking current for the ignition plug is too large |
| FAULT 21 | 10101 | The self-checking current for the main motor is too large |
| FAULT 22 | 10110 | The loop current for the water pump is too large |
| FAULT 25 | 11001 | The air pressure value is too low |
| FAULT 26 | 11010 | The air pressure value is too high |
| FAULT 27 | 11011 | The heater is overheated |
| FAULT 29 | 11101 | Motor rotation is not detected |
| FAULT 30 | 11110 | Heater burns without cooling |
| FAULT 32 | 11111 | Feedback signal is not detected |