



Induction Heating Equipment Manufacturer

# 3~5KW 380V Induction Heater

## Using Manual



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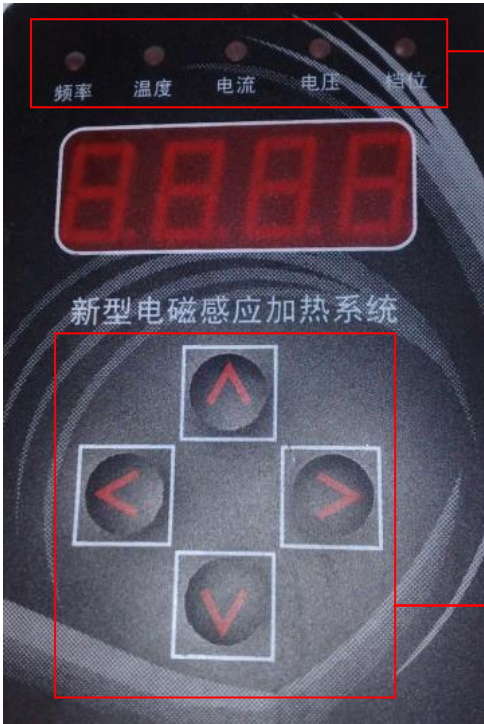
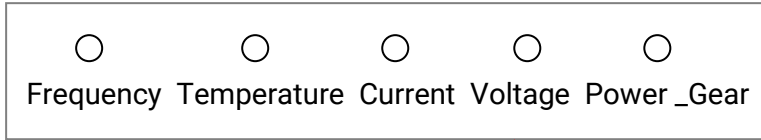
Website: [www.daobright.com](http://www.daobright.com)

# 1. Structural

## 1.1 Display key pad structural

The display key pad mainly used for installation and debugging, including four-digit display panel, status indicator light and control key. It is 2 types of display key pad, as following:

5 indicator light:



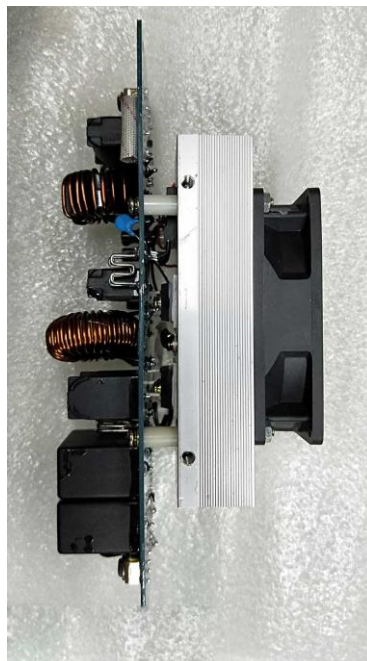
Key Pad Type 1

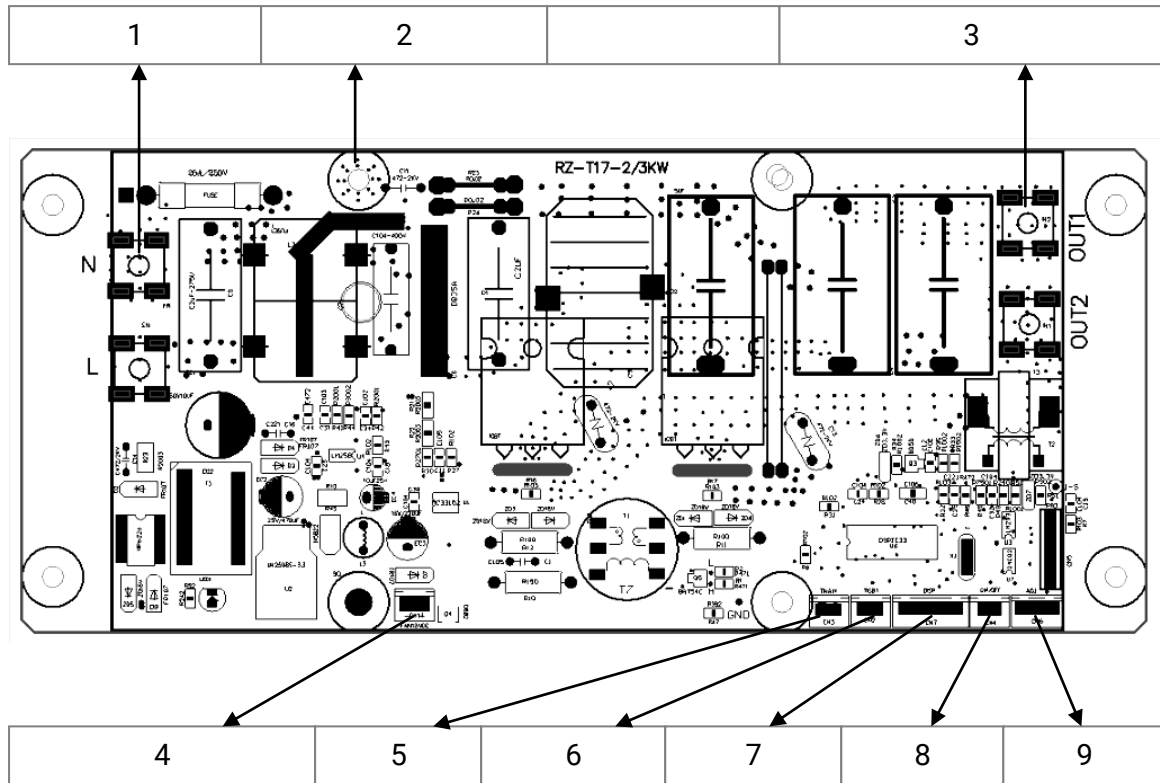


Key Pad Type 2

Keys

## 1.2 Heater card structural





1. Power input port: Connect 350~430VAC
2. Earth port: Connect ground wire
3. Output coil port: Connect output coil
4. 18V fan port: Connect DC18V cooling fan
5. Coil temperature sensor: Connect coil temperature detection sensor (optional)
6. Heat sink temperature sensor: Connect heat sink temperature detection sensor
7. Display key pad port: Connect display key pad (5 PIN plug)
8. Switch port: Connect switch or Temperature controller
9. Power regulator rheostat port: Connect the adjustable resistor, through adjustable resistor to regulation power.

## 2. Display key pad operation

### 2.1 Display status

The induction heater has 3 display status: Standby; Running; Alarm status.

1. **Standby status:** When AC power on, but switch is off, then heater in standby status, flash display “----”.
2. **Running status:** At standby status, then turn switch on or temperature controller output on signal, the heater in running status. Display power gear “-05-”.
3. **Alarm status:** Flash display error code. See blow error code instruction.

### 2.2 Key operation

**Key pad type 1 operation:** Left / Right key used for select display model, when press the key will change the indicator light; Up / Down key used for change parameters, can be select the power gear 1~5, if used Potentiometer adjust power then the Up / Down key disable.

**Key pad type 2 operation:** Left key for query parameters, when press the key will change the indicator light and display the parameters. ENT key for confirm setting. Up / Down key for change parameters.

**Power Gear setting:** Press left key to display gear and power gear indicator light on, then press Up / Down key to set power gear( then press ENT key). Within 3 seconds to confirm, otherwise do not set.

**Rated Current setting:** Press left key to display current and current indicator light on, press Up / Down key to set the max rated current. When setting the parameter value is flash display, within 3 seconds to confirm. After 3 seconds then disable setting. The rated current have finish setting by factory, user don't need to setting.

### 2.1 Query parameters

After power on, at standby or running status can press Left key to query parameters. The parameters from left to right is: Frequency, Temperature, Current, Voltage, Power Gear. See above display key pad structural. When press the key the indicator also change light on and display the parameter value.

**Frequency:** Display output frequency value, can check the coil is correct or not, non-work display -00-

**Temperature:** Display heat sink temperature value, if the value >65degs then alarm

**Current:** Display the input current value

**Voltage:** Display the input voltage value

**Gear:** Display the power gear, press Up / Down key to adjust power

### 3. Installation

#### 3.1 Wire connection

1. All connector must connection tight, to avoid the connector hot
2. The induction heater housing must connected ground wire
3. The control wire or signal wire need attention +- terminal, don't near to the AC power cable and coil wire.
4. Keep good air pass for cooling
5. Don't touch the heater card and change wires when power on and running

#### 3.2 Basic running parameter

Voltage range: 350~430VAC (50/60Hz)

Frequency: 5KHz ~ 40KHz

Rated input current: 4.5A(3kW), 6A(4kW), 7.5A(5kW)

Ambient temperature: -40°C ~ 45°C

#### 3.3 Coil inductance determination

Can reference the coil inductance value as below table to winding coils. The inductance too much or too less and the coil size not correct will due to the induction heater fault running. According to different application the parameters would different.

When multiple heater work together, the coils need have >20cm gap between different heater coil.

Winding the coils is reference the inductance value, same length wire but heating material or size different then the inductance value is different. Determine the inductance value is when the coil near the heating material, it is not the value of "no load coil" value.

Power	Inductance	Wire Diameter	Max Length
3KW	280-300UH	4mm <sup>2</sup>	55m
4KW	270-290UH	6mm <sup>2</sup>	50m
5KW	260-280UH	6mm <sup>2</sup>	45m

### 3.4 Winding coil

According to the application and different power, the coil type would different. In most cases, the make method is shown in fig(—), Wrapped about 25mm thickness insulation cotton on the heating object before winding coil. The coil turning section one by one, and 10~20cm gap between the sections.

The thermometer can be fixed in the interval zone of the gap of coil section.



(一)



(二)

### 3.5 Test running

1. Check the wire connected correct, all tight connection.
2. Turn the power on, the buzzer will ring one time, the induction heater at standby status.
3. Turn the switch on, the induction start running.
4. Press left key to check the frequency:
  - a. If the frequency < 12KHz, then recommend to reduce coil turns.
  - b. If the frequency >23KHz, then recommend to add more coil turns.

When full power running, the optimal frequency is about 17KHz.

### 3.6 Error Code

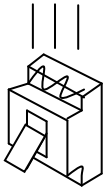
Error Code	Causation	Maintenance guidelines
- E 1 -	Short coil, insufficient inductance or short circuit;	Check whether the coil is damaged causing a short circuit; adjust the coil
	IGBT Module Damaged	Replacement IGBT module
- E 2 -	Environment temperature too high	Improving the Heat Dissipation Environment
	The fan is damaged; the fan control circuit is burnt out.	Repair or replace fans; replace circuit boards
	Loose or Short Circuit Plug of Temperature Sensor	Check whether the sensor plug on the TIGBT socket is loose or not; Check whether the sensor is short-circuited or open with a multi meter
- E 3 -	Over current	Check whether the coil is short-circuited; Increase the inductance coil
- E 4 -	Failure of coil connection or bad contact, damage of high frequency transformer	Check whether the coil is disconnected, check the high frequency transformer
- E 5 -	Short circuit or disconnection of coil	Check whether the coil is damaged, short circuit or disconnected
	Coil mismatch; high frequency	The frequency is judged by panel display, and coils are added when the frequency exceeds 23KHz.
- E 6 -	Low voltage	Check whether the input power supply is normal
- E 7 -	Coil temperature is too high	Improving the Insulation of Iron Pipe (Pot) and Coil
- E 8 -	Overvoltage	Shutdown
- E A -	Excessive input current	Check whether the coil is short-circuited or not; Check the current measuring circuit

## Typical induction heating system configuration

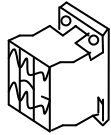
This device request following parts of a typical heating system. Choose correct external device and correct operation, it is goods for induction heater service life, otherwise will reduce the lifespan of the device.



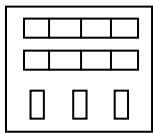
Power Source: AC350~380V



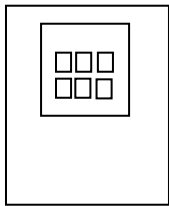
Earth Leakage Breaker or No Fuse Breaker: when the power voltage, the electromagnetic heater will flow into the great impact current, so need to pay attention circuit breaker.



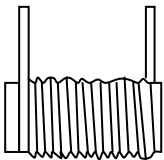
Magnetic contactor: No settings are necessary, but if set, do not use it to start and stop the electromagnetic heater, as this well reduce the heater's life.



Temperature controller and thermocouple: a device that detects the load temperature



Magnetic induction heater: the ambient temperature will affect the life of the induction heater, please avoid dust, moisture, over ambient temperature. The signal lines must be kept away from the main circuit cable and coil wire, in order to protect them from the noise.



Heating Coil: Do not short or open the output side, and can not connect the induction heater other than the specifications



Ground wire: In order to prevent electric shock, the induction heater housing must be well grounded.



# Safety Precautions

## 1. To prevent electric shock

- Do not open the cover when energizing or running, otherwise an electric shock occurs.
- Wiring or inspection Please turn off the power after ten minutes, with a multi meter to measure the remaining voltage.
- Electromagnetic heater shell please ground, so as not to touch the high frequency induction voltage.
- Work, including wiring or inspection work, should be a professional.
- Do not wet hands switching power supply to avoid electric shock or injury.
- For cables (including high frequency output cables) do not damage it, add too heavy stress to it. Otherwise it will cause electric shock.
- Do not clean or replace the cooling fan while power is on, otherwise cause harm.
- Keep people away from high frequency output ports and power input ports.

## 2. Prevent Fire

- Electromagnetic heaters should be installed on incombustible objects, installed directly in flammable or near flammable materials, will lead to fire.
- If the electromagnetic heater is faulty, disconnect the power supply and if it continuously flows through the high current, it may cause a fire.
- High-frequency output coil Do not short-circuit, or it may cause a fire.

## 3. Prevent damage

- Please provide the rated voltage to the electromagnetic heater in accordance with the provisions to prevent burst, in case of damage and so on.
- Make sure that the output coil is connected to the correct terminal of the power supply, otherwise it will cause burst and damage.

## Meet with low pressure specifications of the product affixed to the CE mark.

### EMC specifications

- 1) As part of the control box with other devices to control the operation of the device device.

Therefore, we believe that EMC directive is not directly applied to electromagnetic heaters.

For this reason, we do not attach the CE mark to the electromagnetic heater itself. (The CE mark on the electromagnetic heater is based on the low voltage command.)

The European Electric Drive Manufacturers Association (CEMEP) also holds the same view.

- 2) We believe that the EMC specification does not directly affect the transistor electromagnetic heater.

However, the EMC specifications apply to machines or equipment containing transistor electromagnetic heaters, and these machines and equipment must be marked with a CE mark.

Therefore, we have prepared the technical information "EMC Installation Guide", the installation of electromagnetic heaters of the machines and equipment can more easily meet the EMC specifications.

- 3) Installation method overview

Install the electromagnetic heater should use the following methods:

- \* Install a noise filter that complies with European standards.

- \* The connection between the electromagnetic heater and the induction heating coil should be made using a screen defect cable or installed in a metal casing, and the cables of the electromagnetic heaters and electromagnetic heaters should be as short as possible.

- \* A linear noise filter and ferrite core should be inserted in the power supply and control lines.

- \* For 220V class electromagnetic heaters set the rated input voltage range of 220V 50Hz / 60Hz.

- \* Ensure that the equipment is grounded and the equipment is not grounded. Use a leakage circuit breaker as an electromagnetic vibration protection.

- \* Ground terminal separately (do not connect 2 wires on one terminal).

- \* Please use the non-fuse circuit breaker to meet the requirements. Please use EN or ICE specifications for electromagnetic contactors.

- \* Fuseless circuit breakers and electromagnetic contactors that meet EN or IEC standards should be used. Use electromagnetic heaters in Class II overpressure and Class 2 contamination or higher levels specified in IEC 664.

- (A) When an overpressure is applied, an isolation transformer or surge suppressor conforming to the EN or IEC standard is installed on the input side of the electromagnetic heater.

- (B) In the case of Class 2 contamination, the electromagnetic heater is installed in a control box so that water, oil, toner, dust, etc. can not enter (IP54 or higher).