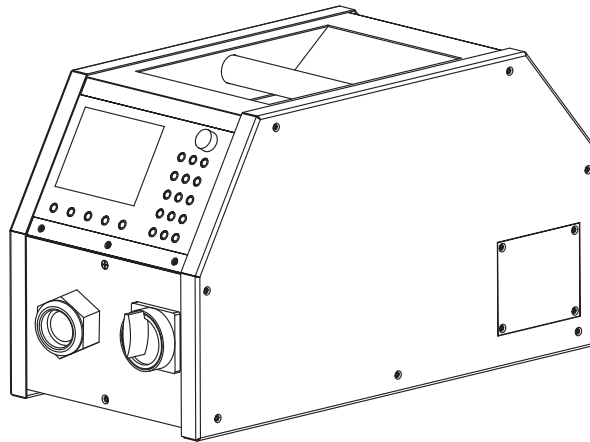


Canroon

CR2100 Intelligent Digital Induction Heating Power Source

PRODUCT MANUAL



Shenzhen Canroon Electrical Appliances Co., Ltd


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1. Safety Precautions – Read before Using

 Protect yourself and others from injury – read and follow these precautions

1.1 Symbol Usage


 **DANGER!** – Indicates a hazardous situation which, if not avoided, will result in death or serious injury. The possible hazards are shown in the adjoining symbols or explained in the text.


NOTICE – Indicates statements not related to personal injury. Indicates special instructions



This group of symbols means Warning! Watch Out! ELECTRIC, SHOCK, MOVING PARTS, and HOT PARTS hazards. Consult symbols and related instructions below for necessary actions to avoid the hazards.

1.2 Induction Heating Hazards Symbols Instructions and Precautions

 The symbols shown below are used throughout this manual to call attention to and identify possible hazards. When you see the symbol, watch out, and follow the related instructions to avoid the hazard. Please read and follow all Safety Standards.


 Only qualified persons should install, operate, maintain and repair this unit.

 During operation, keep everybody, especially children, away.



ELECTRIC SHOCK can kill.
Incorrectly installed or improperly grounded equipment is a hazard.

- (1) Do not touch live electrical parts.
- (2) Enclose any connecting bus bars and coolant fittings to prevent unintentional contact.
- (3) Wear dry, hole free insulating gloves and body protection.
- (4) Insulate yourself from work and ground using dry insulating mats or insulator big enough to prevent any physical contact with the work or ground.
- (5) Additional safety precautions are required when any of the following electrically hazardous conditions are present: in damp locations or while wearing wet clothing; on metal structures such as floors, gratings, or scaffolds; when in cramped positions such as sitting, kneeling, or lying; or when there is a high risk of unavoidable or accidental contact with the workpiece or ground. For these conditions, see ANSI Z49.1 listed in Safety Standards. And, do not work alone!
- (6) Disconnect input power before installing or servicing this equipment.
- (7) Properly install and ground this equipment according to its Owner's manual and national, state, and local codes.
- (8) Always verify the supply ground check and be sure that input power cord ground wire is properly connected to ground terminal in disconnect box or that cord plug is connected to a properly grounded receptacle outlet.
- (9) When making input connections attach proper grounding conductor first double check connections.
- (10) Keep cords dry, free of oil and grease, and protected from hot metal and sparks.
- (11) Frequently inspect input power cord for damage or bare wiring replace cord immediately if damaged bare wiring can kill.
- (12) Turn off all equipment when not in use.
- (13) Do not use worn, damaged, undersized, or poorly spliced cables.
- (14) Do not drape cables end your body.
- (15) Do not touch power circuit if you are in contact with the work, ground, or another power circuit from a different machine.
- (16) Use only well-maintained equipment. Repair or replace damaged parts at once. Maintain unit according to manual.
- (17) Wear a safety harness if working above floor level.
- (18) Keep all panels and outer cover securely in place.

 Significant dc voltage exists in inverter-type power sources after removal of input power. Turn Off inverter, disconnect input power, and discharge input capacitors according to instructions in Maintenance Section before touching any internal parts.



FUMES AND GASES can be hazardous.

Induction Heating of certain materials, adhesives, and fluxes can produce fumes and gases. Breathing these fumes and gases can be hazardous to your health.

- (1) Keep your head out of the fumes. Do not breathe the fumes.
- (2) If inside, ventilate the area and/or use local forced ventilation to remove fumes and gases.
- (3) If ventilation is poor, wear an approved air-supplied respirator.
- (4) Read and understand the Material Safety Data Sheets (MSDS) and The manufacturer's instruction for adhesives, fluxes, metals, coatings, cleaners, and degreasers.
- (5) Work in a confined space only if it is well ventilated, or while wearing an air-supplied respirator. Always have a trained watch person near-by. Fumes and gases from heating can displace air and lower the oxygen level causing injury or death. Be sure the breathing air is safe.
- (6) Do not heat in locations near degreasing, cleaning, or spraying operations. The heat can react with vapors to form highly toxic and irritating gases.
- (7) Do not heat coated metals, such as galvanized, lead, or cadmium plated steel, unless the coating is removed from the heated area, the area is well ventilated, and while wearing an air-supplied respirator. The coatings and any metals containing these elements can give off toxic fumes if heated. See coating MSDS for temperature information.



Fire or explosion hazard.

- (1) Watch out overheat parts.
- (2) Watch for fire; keep extinguisher nearby.
- (3) Keep flammables away from work area.
- (4) Do not locate unit on, end, or near combustible surfaces.
- (5) Do not install unit near flammables.
- (6) Do not operate where the atmosphere may contain flammable dust, gas, or liquid vapors (such as gasoline).
- (7) After completion of work, inspect area to ensure it is free of sparks, glowing embers, and flames.
- (8) Use only correct fuses or circuit breakers. Do not endsize or by-pass them.



INDUCTION HEATING can cause burns.

- (1) Hot parts and equipment can injure.
- (2) Don't touch the hot parts with bare hands.
- (3) Cooling for a period of time before handling parts or equipment.
- (4) Keep metal jewelry and other personal metal items away from the induction coil during operation.

1.3 Additional Symbols for Installation, Operation, and Maintenance



FALLING UNIT can cause injury.

- (1) Use handle and have person of adequate physical strength lift unit.
- (2) Move unit with hand cart or similar device.
- (3) For units without a handle, use equipment of adequate capacity to lift unit.
- (4) When using lift forks to move unit, be sure forks are long enough to extend beyond opposite side of unit.



FLYING METAL OR DIRT can injure eyes.

- (1) Wear approved safety glasses with side shields or wear face shield.



MOVING PARTS can cause injury.

- (1) Keep away from moving parts such as fans.
- (2) Keep all doors, panels, outer cover and guards closed and securely in place.



MAGNETIC FIELDS can affect Implanted medical devices.

- (1) Wearers of Pacemakers and other Implanted Medical Devices should keep away.
- (2) Implanted Medical Device wearers should consult their doctor and the device manufacturer before going near arc welding, spot welding, gouging, plasma arc cutting, or induction heating operations.



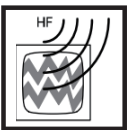
ENDUSE can cause ENDHEATING.

- (1) Allow cooling period.
- (2) Reduce output or reduce duty cycle before starting to heat again.
- (3) Follow rated duty cycle.



STATIC (ESD) can damage PC boards.

- (1) Put on grounded wrist strap BEFORE handling boards or parts.
- (2) Use proper static-proof bags and boxes to store, move, or ship PC boards.



H.F. RADIATION can cause interference.

- (1) High-frequency (H.F.) can interfere with radio navigation, safety services, computers, and communications equipment.
- (2) Have only qualified person familiar with electronic equipment perform this installation.
- (3) The user is responsible for having a qualified electrician promptly correct any interference problem resulting from the installation.
- (4) If notified by the FCC about interference, stop using the equipment at once.
- (5) Have the installation regularly checked and maintained.
- (6) Keep high-frequency source doors and panels tightly shut.



READ INSTRUCTIONS.

- (1) Read Owner's Manual before using or servicing unit.
- (2) Use only genuine replacement parts from the manufacturer.

1.4 Warning Label Definitions

1	1.1	1.2	2	2.1	2.2	2.3	
3	3.1	3.2	4	4.1	4.2		
5	5.1	5.2	6				

Warning! Watch Out! There are possible hazards as shown by the symbols.

- (1) Electric shock from wiring can kill.
 - a. Wear dry insulating gloves. Do not wear wet or damaged gloves.
 - b. Disconnect input plug or power before working on machine.

- (2) Breathing heating fumes can be hazardous to your health. Read Material Safety Data Sheets (MSDS) and manufacturer's instructions for material used.
 - a. Keep your head out of the fumes.
 - b. Use forced ventilation or local exhaust to remove the fumes.
 - c. Use ventilating fan to remove fumes.

- (3) Induction heating can cause injury or burns from hot items such as rings, watches, or parts.
 - a. Do not wear metal jewelry and other metal personal items such as rings and watches during operation.
 - b. Do not touch hot parts or hot head/coil.

- (4) Always wear safety glass or goggles during and around heating operations to prevent possible injury.
 - a. Wear either safety glasses or full goggles depending on type of operation and nearby processes.
 - b. Do not remove or paint over (cover) the label.

- (5) Induction heating sparks can cause fire. Do not overheat parts and adhesives.
 - a. Keep flammables away from heating operation. Do not heat near flammables.
 - b. Heating sparks can cause fires. Have a fire extinguisher nearby and have a watchperson ready to use it.

- (6) Become trained and read the before working on the machine or heating.

2. Safety Instructions and Maintenance

2.1 Safety Instructions

As the equipment working with 380 – 480V three – phase alternating voltage, the line voltage inside and outside is very high, when the equipment is running, any part of your body can not be close to the input and output terminals of the device. Though the induction heating equipment is not under work, the input and output terminals are still with dangerous voltage. Disconnecting power supply is a must if you need to check inside or maintenance. For purposes of safety, you must ensure the equipment without voltage several minutes after power off before unpacking maintenance.

2.2 Routine Maintenance



Disconnect power before maintaining

In order to ensure the induction heating power normal running and extend its life, regular maintenance is a must. Content of the maintenance is in the following table.

Item	Content
Temperature/humidity	Ensure the ambient temperature $-20^{\circ}\text{C}\sim+50^{\circ}\text{C}$, relative humidity: 20%~90%.
Oil mist and dust	Ensure no oil mist, dust and condensation in the equipment. no corrosive gas and liquid in the storage ambient.
Induction heating equipment	Check it whether abnormal hot or vibrate.
Cooling liquid	Check if cooling liquid is in accordance with requested (deionized purified water, PH 7.0~9.0).
Input power	Ensure the input power voltage and frequency within the permit scope.
Coil	Check the coil whether normal, it will show no oil mist, dust and condensation if it is not yellow.

In consideration of the running equipment easily to absorb dust, especial for the fan module, users should try to avoid the dust overstock which will affect the heat sink leading to any bad effects result from too high inside temperature. In order to extend the life of equipment, we suggest regular dedusting for the fan and radiator, at least one time within two months; regular dedusting for the equipment inside, at least one time within a year.

Notice: Ensure the power off before dedusting. Dedust with cloth and dry brush softly without water in case of damaging the components or even the complete set. While dedusting, ensuring the related plug-ins in good contact, avoid them loosening in case of affecting the equipment running.

3. Type and Specification

3.1 Unpacking Inspection

Unpack, take out the induction heating machine, please check the below items:

- ◆ ensure no damage after transportation(Visual inspection whether there is damage or gap)
- ◆ ensure package with manual
- ◆ check the nameplate and confirm your order (the nameplate is on the right side of the equipment)
- ◆ Any damage, please contact with our local dealers or our company.

3.2 Specification

Type	Model No.	Input	Output	Cooling System	IP
Portable Type	CR2100-010B-14TW	Power: 10KVA Voltage: 3-phase/ 400V (±20%) Frequency: 50-60Hz Current: 12-18A	Power: 8kW Duty cycle: 100% Frequency: 10-40KHz	Water pressure: 4~6bar Flow rate: ≥12L/min Water quality: PH 7.0~9.0 Cooling capacity: ≥4.5KW Water temperature: 25~35°C	IP54
Portable Type	CR2100-010H-14TW	Power: 10KVA Voltage: 3-phase/ 400V (±20%) Frequency: 50-60Hz Current: 12-18A	Power: 8kW Duty cycle: 100% Frequency: 50-200KHz	Water pressure: 4~6bar Flow rate: ≥12L/min Water quality: PH 7.0~9.0 Cooling capacity: ≥4.5KW Water temperature: 25~35°C	IP54
Portable Type	CR2100-020B-14TW	Power: 20KVA Voltage: 3-phase/ 400V (±20%) Frequency: 50-60Hz Current: 24-36A	Power: 16kW Duty cycle: 100% Frequency: 10-40KHz	Water pressure: 4~6bar Flow rate: ≥12L/min Water quality: PH 7.0~9.0 Cooling capacity: ≥9KW Water temperature: 25~35°C	IP54
Portable Type	CR2100-020H-14TW	Power: 20KVA Voltage: 3-phase/ 400V (±20%) Frequency: 50-60Hz Current: 24-36A	Power: 16kW Duty cycle: 100% Frequency: 50-200KHz	Water pressure: 4~6bar Flow rate: ≥12L/min Water quality: PH 7.0~9.0 Cooling capacity: ≥9KW Water temperature: 25~35°C	IP54
Portable Type	CR2100-030B-14TW	Power: 30KVA Voltage: 3-phase/ 400V (±20%) Frequency: 50-60Hz Current: 36-54A	Power: 24kW Duty cycle: 100% Frequency: 10-40KHz	Water pressure: 4~6bar Flow rate: ≥12L/min Water quality: PH 7.0~9.0 Cooling capacity: ≥13.5KW Water temperature: 25~35°C	IP54
Portable Type	CR2100-030H-14TW	Power: 30KVA Voltage: 3-phase/ 400V (±20%) Frequency: 50-60Hz Current: 36-54A	Power: 24kW Duty cycle: 100% Frequency: 50-200KHz	Water pressure: 4~6bar Flow rate: ≥12L/min Water quality: PH 7.0~9.0 Cooling capacity: ≥13.5KW Water temperature: 25~35°C	IP54
Portable Type	CR2100-040B-14TW	Power: 40KVA Voltage: 3-phase/ 400V (±20%) Frequency: 50-60Hz Current: 48-72A	Power: 32kW Duty cycle: 100% Frequency: 10-40KHz	Water pressure: 4~6bar Flow rate: ≥12L/min Water quality: PH 7.0~9.0 Cooling capacity: ≥18KW Water temperature: 25~35°C	IP54
Portable Type	CR2100-040H-14TW	Power: 40KVA Voltage: 3-phase/ 400V (±20%) Frequency: 50-60Hz Current: 48-72A	Power: 32kW Duty cycle: 100% Frequency: 50-200KHz	Water pressure: 4~6bar Flow rate: ≥12L/min Water quality: PH 7.0~9.0 Cooling capacity: ≥18KW Water temperature: 25~35°C	IP54
Portable Type	CR2100-050B-14TW	Power: 50KVA Voltage: 3-phase/ 400V (±20%) Frequency: 50-60Hz Current: 60-90A	Power: 40kW Duty cycle: 100% Frequency: 10-40KHz	Water pressure: 4~6bar Flow rate: ≥25L/min Water quality: PH 7.0~9.0 Cooling capacity: ≥22.5KW Water temperature: 25~35°C	IP54
Portable Type	CR2100-050H-14TW	Power: 50KVA Voltage: 3-phase/ 400V (±20%) Frequency: 50-60Hz Current: 60-90A	Power: 40kW Duty cycle: 100% Frequency: 50-200KHz	Water pressure: 4~6bar Flow rate: ≥25L/min Water quality: PH 7.0~9.0 Cooling capacity: ≥22.5KW Water temperature: 25~35°C	IP54

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Type	Model No.	Input	Output	Cooling System	IP
Portable Type	CR2100-060B-14TW	Power: 60KVA Voltage: 3-phase/ 400V (±20%) Frequency: 50-60Hz Current: 72-108A	Power: 48kW Duty cycle: 100% Frequency: 10-40KHz	Water pressure: 4~6bar Flow rate: ≥25L/min Water quality: PH 7.0~9.0 Cooling capacity: ≥27KW Water temperature: 25~35°C	IP54
Portable Type	CR2100-060H-14TW	Power: 60KVA Voltage: 3-phase/ 400V (±20%) Frequency: 50-60Hz Current: 72-108A	Power: 48kW Duty cycle: 100% Frequency: 50-200KHz	Water pressure: 4~6bar Flow rate: ≥25L/min Water quality: PH 7.0~9.0 Cooling capacity: ≥27KW Water temperature: 25~35°C	IP54
Cabinet Type	CR2100-080B-14TW	Power: 80KVA Voltage: 3-phase/ 400V (±20%) Frequency: 50-60Hz Current: 96-144A	Power: 64kW Duty cycle: 100% Frequency: 10-40KHz	Water pressure: 4~6bar Flow rate: ≥25L/min Water quality: PH 7.0~9.0 Cooling capacity: ≥27KW Water temperature: 25~35°C	IP23
Cabinet Type	CR2100-080H-14TW	Power: 80KVA Voltage: 3-phase/ 400V (±20%) Frequency: 50-60Hz Current: 96-144A	Power: 64kW Duty cycle: 100% Frequency: 50-200KHz	Water pressure: 4~6bar Flow rate: ≥25L/min Water quality: PH 7.0~9.0 Cooling capacity: ≥27KW Water temperature: 25~35°C	IP23
Cabinet Type	CR2100-100B-14TW	Power: 100KVA Voltage: 3-phase/ 400V (±20%) Frequency: 50-60Hz Current: 120-180A	Power: 80kW Duty cycle: 100% Frequency: 10-40KHz	Water pressure: 4~6 bar Flow rate: ≥35L/min Water quality: PH 7.0~9.0 Cooling capacity: ≥45KW Water temperature: 25~35°C	IP23
Cabinet Type	CR2100-100H-14TW	Power: 100KVA Voltage: 3-phase/ 400V (±20%) Frequency: 50-60Hz Current: 120-180A	Power: 80kW Duty cycle: 100% Frequency: 50-200KHz	Water pressure: 4~6 bar Flow rate: ≥35L/min Water quality: PH 7.0~9.0 Cooling capacity: ≥45KW Water temperature: 25~35°C	IP23
Cabinet Type	CR2100-120B-14TW	Power: 120KVA Voltage: 3-phase/ 400V (±20%) Frequency: 50-60Hz Current: 144-216A	Power: 96kW Duty cycle: 100% Frequency: 10-40KHz	Water pressure: 4~6 bar Flow rate: ≥35L/min Water quality: PH 7.0~9.0 Cooling capacity: ≥54KW Water temperature: 25~35°C	IP23
Cabinet Type	CR2100-120H-14TW	Power: 120KVA Voltage: 3-phase/ 400V (±20%) Frequency: 50-60Hz Current: 144-216A	Power: 96kW Duty cycle: 100% Frequency: 50-200KHz	Water pressure: 4~6 bar Flow rate: ≥35L/min Water quality: PH 7.0~9.0 Cooling capacity: ≥54KW Water temperature: 25~35°C	IP23
Cabinet Type	CR2100-160B-14TW	Power: 160KVA Voltage: 3-phase/ 400V (±20%) Frequency: 50-60Hz Current: 192-288A	Power: 128kW Duty cycle: 100% Frequency: 0.5-25KHz	Water pressure: 0.4~0.6Mpa Flow rate: >60L/min Water quality: PH 7.0~9.0 Cooling capacity: ≥72KW Water temperature: 25~35°C	IP23
Cabinet Type	CR2100-160H-14TW	Power: 160KVA Voltage: 3-phase/ 400V (±20%) Frequency: 50-60Hz Current: 192-288A	Power: 128kW Duty cycle: 100% Frequency: 50-200KHz	Water pressure: 0.4~0.6Mpa Flow rate: >60L/min Water quality: PH 7.0~9.0 Cooling capacity: ≥72KW Water temperature: 25~35°C	IP23
Cabinet Type	CR2100-200B-14TW	Power: 200KVA Voltage: 3-phase/ 400V (±20%) Frequency: 50-60Hz Current: 240-360A	Power: 160kW Duty cycle: 100% Frequency: 0.5-25KHz	Water pressure: 0.4~0.6Mpa Flow rate: >60L/min Water quality: PH 7.0~9.0 Cooling capacity: ≥90KW Water temperature: 25~35°C	IP23
Cabinet Type	CR2100-200H-14TW	Power: 200KVA Voltage: 3-phase/ 400V (±20%) Frequency: 50-60Hz Current: 240-360A	Power: 160kW Duty cycle: 100% Frequency: 50-200KHz	Water pressure: 0.4~0.6Mpa Flow rate: >60L/min Water quality: PH 7.0~9.0 Cooling capacity: ≥90KW Water temperature: 25~35°C	IP23
Cabinet Type	CR2100-250B-14TW	Power: 250KVA Voltage: 3-phase/ 400V (±20%) Frequency: 50-60Hz Current: 300-451A	Power: 200kW Duty cycle: 100% Frequency: 0.5-25KHz	Water pressure: 0.4~0.6Mpa Flow rate: >90L/min Water quality: PH 7.0~9.0 Cooling capacity: ≥112.5KW Water temperature: 25~35°C	IP23

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Type	Model No.	Input	Output	Cooling System	IP
Cabinet Type	CR2100-250H-14TW	Power: 250KVA Voltage: 3-phase/ 400V (±20%) Frequency: 50-60Hz Current: 300-451A	Power: 200kW Duty cycle: 100% Frequency: 50-200KHz	Water pressure: 0.4~0.6Mpa Flow rate: >90L/min Water quality: PH 7.0~9.0 Cooling capacity: ≥112.5KW Water temperature: 25~35°C	IP23
Cabinet Type	CR2100-300B-14TW	Power: 300KVA Voltage: 3-phase/ 400V (±20%) Frequency: 50-60Hz Current: 360-541A	Power: 240kW Duty cycle: 100% Frequency: 0.5-25KHz	Water pressure: 0.4~0.6Mpa Flow rate: >90L/min Water quality: PH 7.0~9.0 Cooling capacity: ≥135KW Water temperature: 25~35°C	IP23
Cabinet Type	CR2100-300H-14TW	Power: 300KVA Voltage: 3-phase/ 400V (±20%) Frequency: 50-60Hz Current: 360-541A	Power: 240kW Duty cycle: 100% Frequency: 50-200KHz	Water pressure: 0.4~0.6Mpa Flow rate: >90L/min Water quality: PH 7.0~9.0 Cooling capacity: ≥135KW Water temperature: 25~35°C	IP23
Cabinet Type	CR2100-400B-14TW	Power: 400KVA Voltage: 3-phase/ 400V (±20%) Frequency: 50-60Hz Current: 481-721A	Power: 340KW Duty cycle: 100% Frequency: 0.5-20KHz	Water pressure: 4~6bar Flow rate: ≥120L/min Water quality: PH 7.0~9.0 Cooling capacity: ≥180KW Water temperature: 25~35°C	IP23
Cabinet Type	CR2100-500B-14TW	Power: 500KVA Voltage: 3-phase/ 400V (±20%) Frequency: 50-60Hz Current: 601-902A	Power: 425KW Duty cycle: 100% Frequency: 0.5-20KHz	Water pressure: 4~6bar Flow rate: ≥120L/min Water quality: PH 7.0~9.0 Cooling capacity: ≥225KW Water temperature: 25~35°C	IP23
Cabinet Type	CR2100-600B-14TW	Power: 600KW Voltage: 3-phase/ 400V (±20%) Frequency: 50-60Hz Current: 721-1082A	Power: 510KW duty cycle: 100% Frequency: 0.5-20KHz	Water pressure: 4~6bar Flow rate: ≥120L/min Water quality: PH 7.0~9.0 Cooling capacity: ≥270KW Water temperature: 25~35°C	IP23
Cabinet Type	CR2100-800B-14TW	Power: 800KW Voltage: 3-phase/ 400V (±20%) Frequency: 50-60Hz Current: 962-1443A	Power: 680KW Duty cycle: 100% Frequency: 0.5-20KHz	Water pressure: 4~6bar Flow rate: ≥120L/min Water quality: PH 7.0~9.0 Cooling capacity: ≥360KW Water temperature: 25~35°C	IP23
All-in-one Type	CR2100-010E-14TW	Power: 10KVA Voltage: 3-phase/ 400V (±5%) Frequency: 50Hz Current: 13.7-15.2A	Power: 8kW Duty cycle: >25KVA=50% ≤25KVA=100% Frequency: 10-40KHz	Built-in	IP23
All-in-one Type	CR2100-010HE-14TW	Power: 10KVA Voltage: 3-phase/ 400V (±5%) Frequency: 50Hz Current: 13.7-15.2A	Power: 8kW Duty cycle: >25KVA=50% ≤25KVA=100% Frequency: 50-200KHz	Built-in	IP23
All-in-one Type	CR2100-020E-14TW	Power: 20KVA Voltage: 3-phase/ 400V (±5%) Frequency: 50Hz Current: 27.5-30.4A	Power: 16kW Duty cycle: >25KVA=50% ≤25KVA=100% Frequency: 10-40KHz	Built-in	IP23
All-in-one Type	CR2100-020HE-14TW	Power: 20KVA Voltage: 3-phase/ 400V (±5%) Frequency: 50Hz Current: 27.5-30.4A	Power: 16kW Duty cycle: >25KVA=50% ≤25KVA=100% Frequency: 50-200KHz	Built-in	IP23
All-in-one Type	CR2100-030E-14TW	Power: 30KVA Voltage: 3-phase/ 400V (±5%) Frequency: 50Hz Current: 41.2-45.6A	Power: 24kW Duty cycle: >25KVA=50% ≤25KVA=100% Frequency: 10-40KHz	Built-in	IP23
All-in-one Type	CR2100-030HE-14TW	Power: 30KVA Voltage: 3-phase/ 400V (±5%) Frequency: 50Hz Current: 41.2-45.6A	Power: 24kW Duty cycle: >25KVA=50% ≤25KVA=100% Frequency: 50-200KHz	Built-in	IP23

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Type	Model No.	Input	Output	Cooling System	IP
All-in-one Type	CR2100-040E-14TW	Power: 40KVA Voltage: 3-phase/ 400V (±5%) Frequency: 50Hz Current: 55-60.8A	Power: 32kW Duty cycle: > 25KVA=50% ≤25KVA=100% Frequency: 10-40KHz	Built-in	IP23
All-in-one Type	CR2100-040HE-14TW	Power: 40KVA Voltage: 3-phase/ 400V (±5%) Frequency: 50Hz Current: 55-60.8A	Power: 32kW Duty cycle: > 25KVA=50% ≤25KVA=100% Frequency: 50-200KHz	Built-in	IP23
All-in-one Type	CR2100-050E-14TW	Power: 50KVA Voltage: 3-phase/ 400V (±5%) Frequency: 50Hz Current: 68.7-76A	Power: 40kW Duty cycle: > 40KVA=50% ≤40KVA=100% Frequency: 10-40KHz	Built-in	IP23
All-in-one Type	CR2100-050HE-14TW	Power: 50KVA Voltage: 3-phase/ 400V (±5%) Frequency: 50Hz Current: 68.7-76A	Power: 40kW Duty cycle: > 40KVA=50% ≤40KVA=100% Frequency: 50-200KHz	Built-in	IP23
All-in-one Type	CR2100-060E-14TW	Power: 60KVA Voltage: 3-phase/ 400V (±5%) Frequency: 50Hz Current: 82.5-91.2A	Power: 48kW Duty cycle: > 40KVA=50% ≤40KVA=100% Frequency: 10-40KHz	Built-in	IP23
All-in-one Type	CR2100-060HE-14TW	Power: 60KVA Voltage: 3-phase/ 400V (±5%) Frequency: 50Hz Current: 82.5-91.2A	Power: 48kW Duty cycle: > 40KVA=50% ≤40KVA=100% Frequency: 50-200KHz	Built-in	IP23

3.3 Commissioning before Starting

- (1) Check the input terminals L、N、PE (single 220-240V) or R、S、T、PE (three-phase 400V (±20%)) and output terminals L1&L2 whether the connections are correct and screws are tight before power on.
- (2) Ensure the equipment reliable grounding.
- (3) Power on, LCD will display set screen.
- (4) Check whether there is abnormal sound or other equipment failures, if so, immediately cut off the input power supply.
- (5) Turn power switch on, system set screen start command as keyboard start command, then set output current as minimum value (such as 10A), no load running (press RUN to run), observe it whether normal.
- (6) After normally no-load running, stop it and cut off the power, then restart running with load.

4. Installation and Wiring

4.1 Installation Condition and Dismantle Cautions

! Induction heating machine should run with anti-flaming material, away from heat source and flammable objects in case of fire disaster.

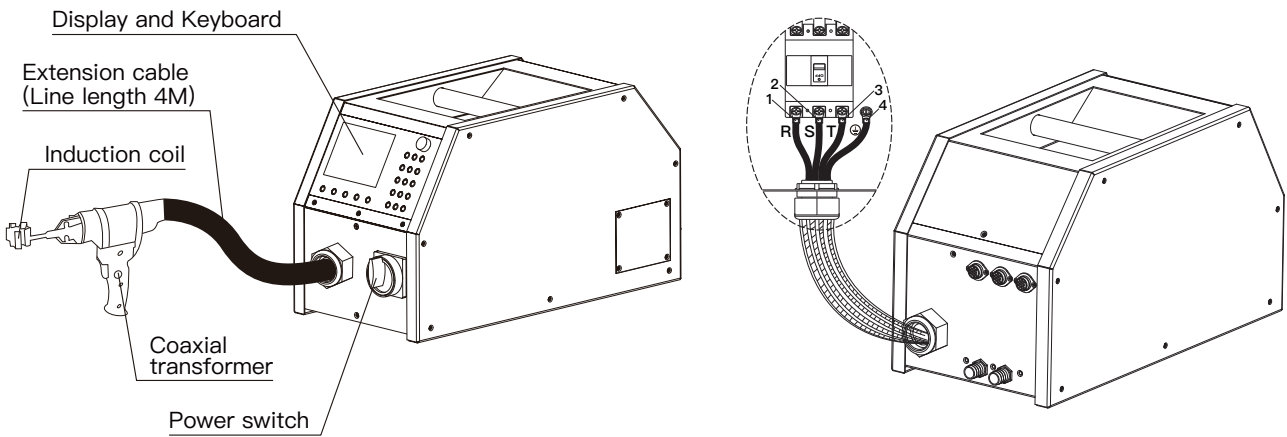
4.2 Equipment Wiring Notices

- (1) Ensure input power switch off before wiring.
- (2) Input power line must be permanently connected, equipment reliable grounding.
- (3) The ground terminal of the equipment must be reliable grounding or it could cause a electric shock and fire hazard.
- (4) Do not connect the input power line to the output terminals L1, L2 or it could damage the induction heating equipment.
- (5) Do not touch the power input terminals R、S、T、PE; output terminals L1, L2, meanwhile do not connect L1, L2 to the shell or short connect with line.

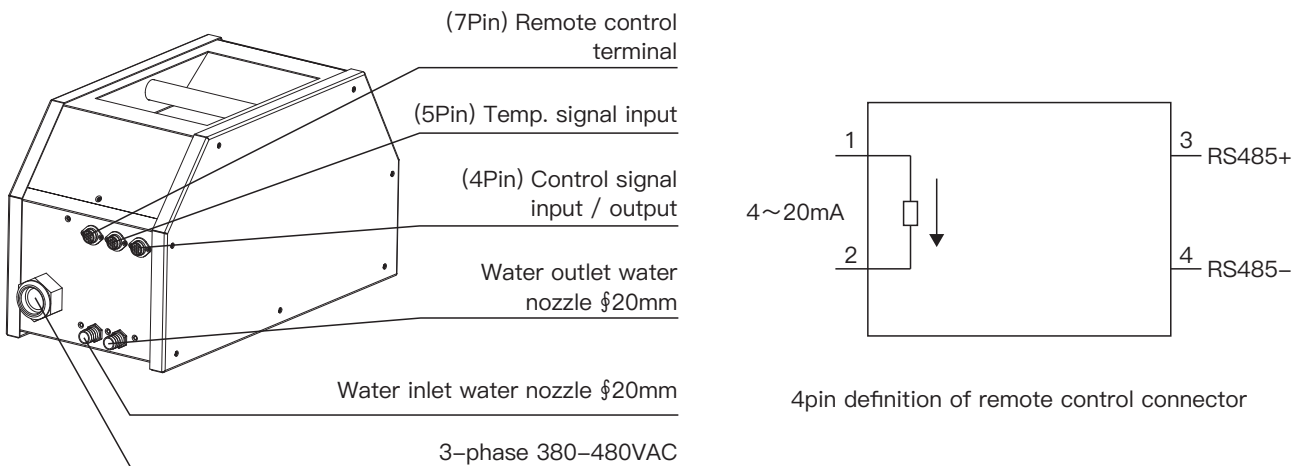
4.3 Equipment Appearance and Wiring

4.3.1 Portable Type System Wiring Diagram

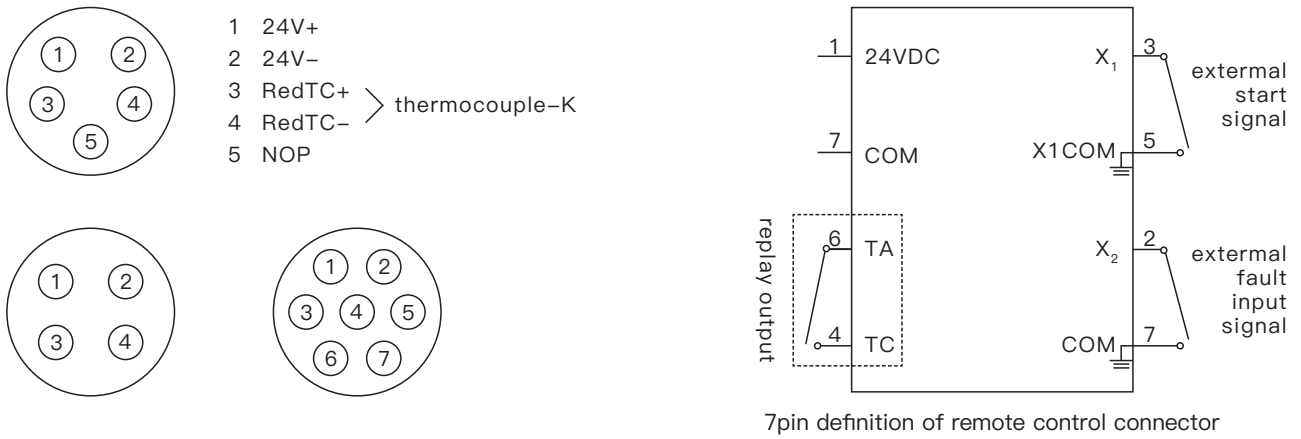
(1) Wiring Diagram of Electricity Input



(2) Wiring Diagram of External Control Port



CR2100 Intelligent Digital Induction Heating Power Source

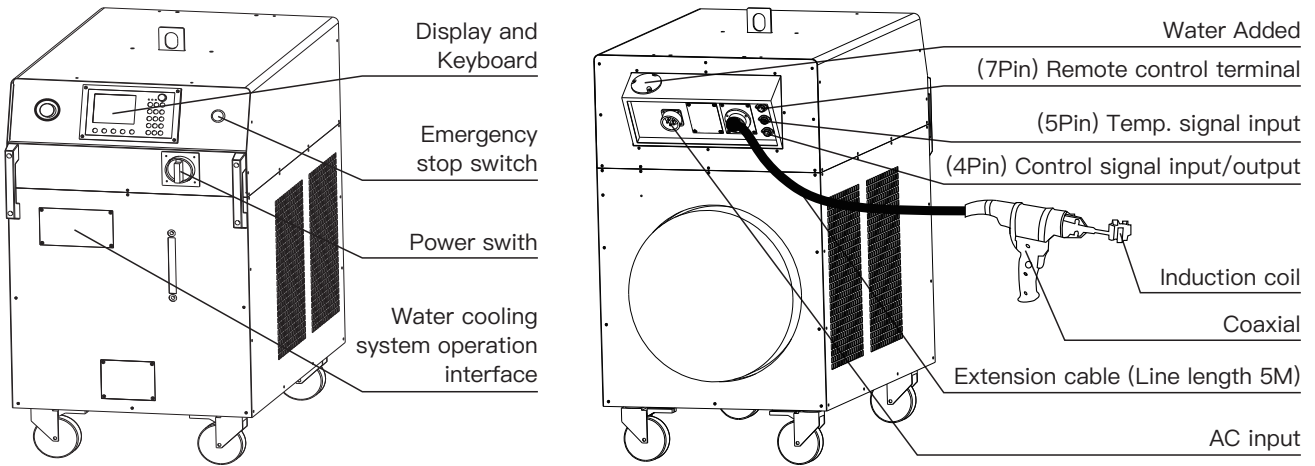


☞ Check input voltage. This unit supports 380~480VAC, 3-phase, 50~60Hz input. Check nameplate on the unit for rated value, see if input voltage adapts.

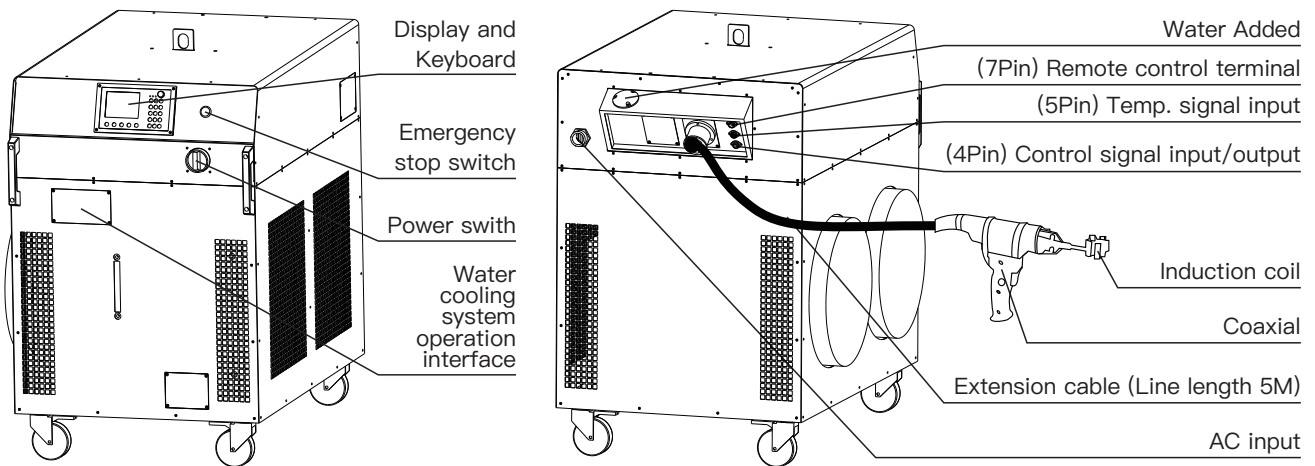
Marks for input power connection parts

- 1: red wire to terminal R
 - 2: black wire to terminal S
 - 3: blue wire to terminal T
 - 4: yellow wire to ground terminal PE
- Pass the wire through cable fixed head and tighten the screw.

4.3.2 All-in-one Type System Wiring Diagram (10~40KW)



4.3.3 All-in-one Type System Wiring Diagram (50~60KW)

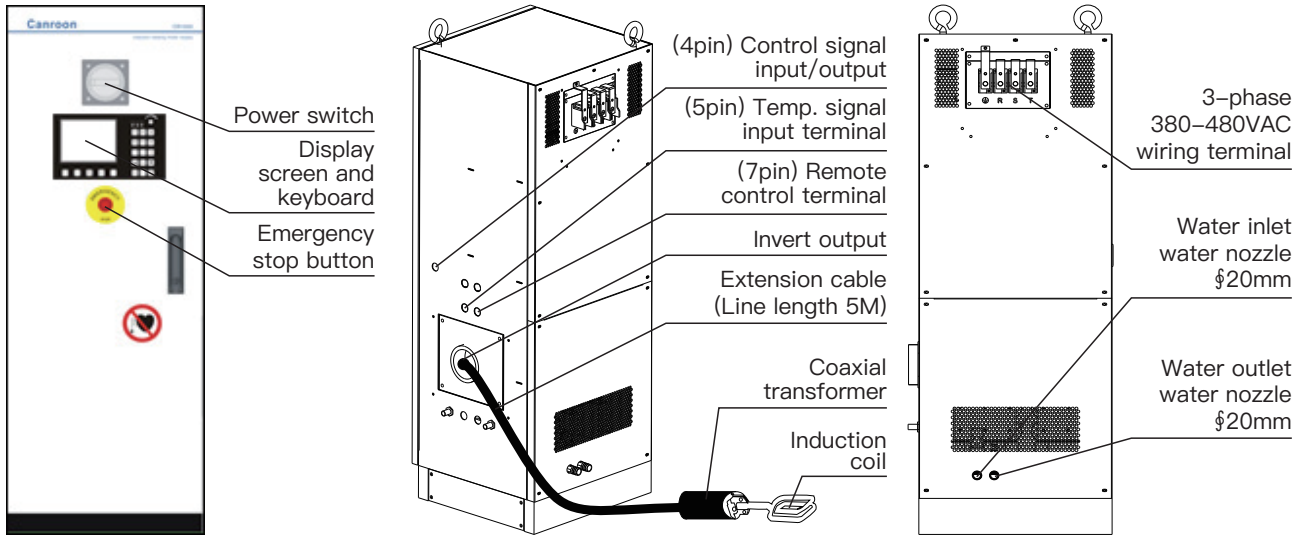


4.3.4 Power Input Wiring Diagram of Cabinet Type

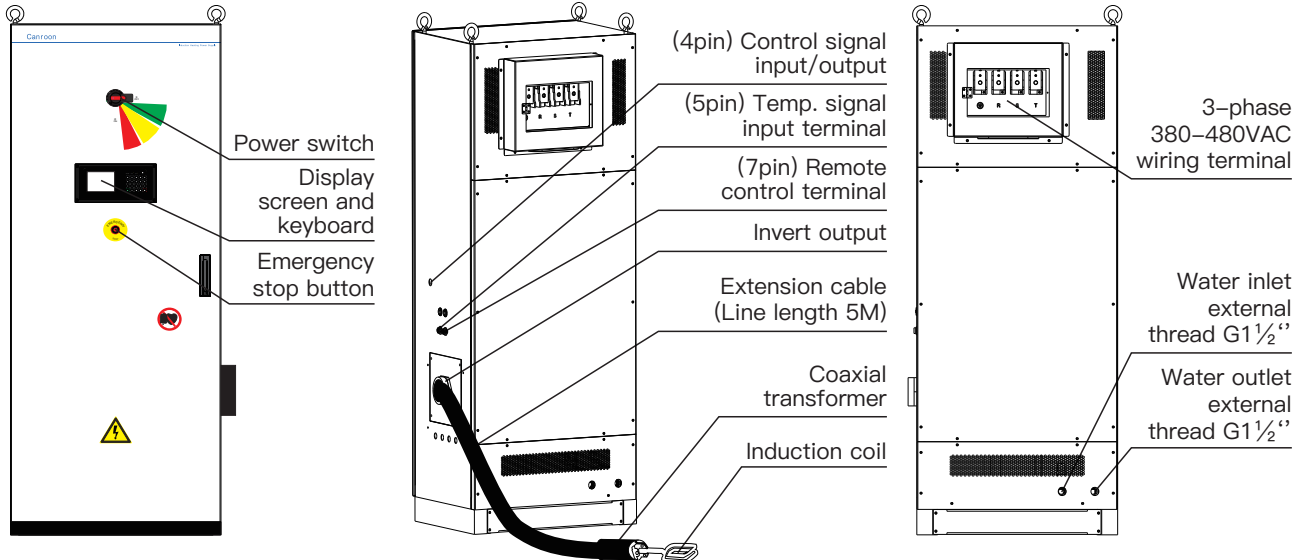
Marks for cutting off input power--- OFF: disconnect equipment; ON : connect equipment

CR2100 Intelligent Digital Induction Heating Power Source

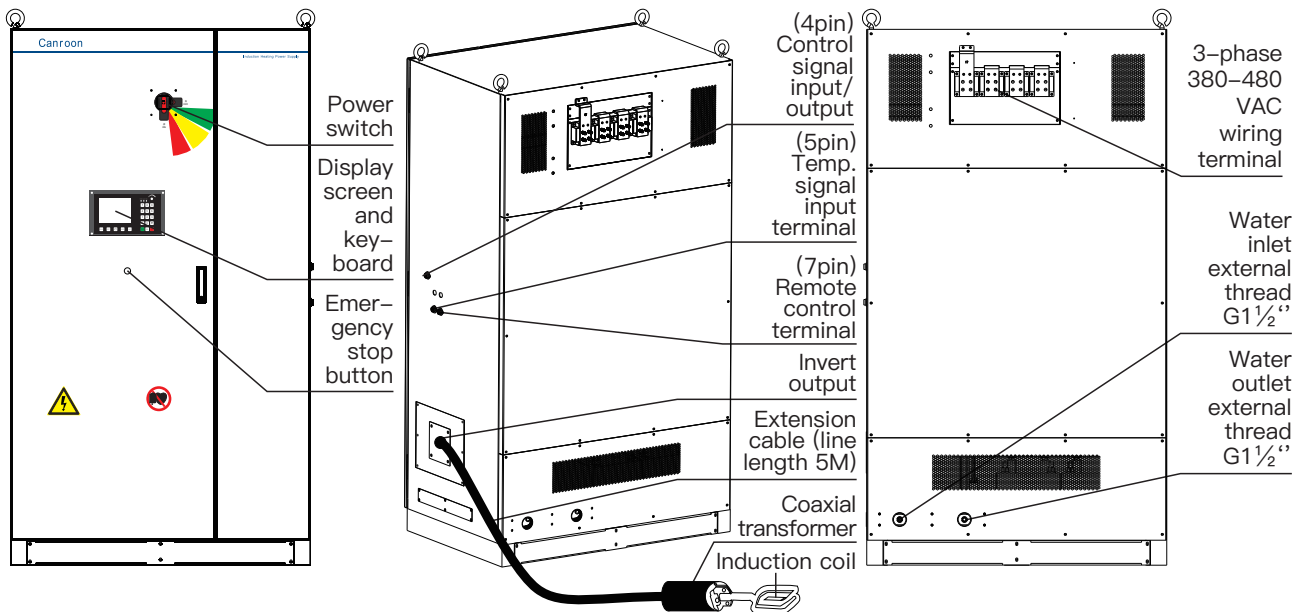
(1) CR2100-(080~120)B-14TW/CR2100-(080~120)H-14TW






(2) CR2100-(160~400)B-14TW/CR2100-(160~300)H-14TW



(3) CR2100-(500~800)B-14TW



-  Wiring should conform with national and local regulation – only the qualified can conduct the wiring.
-  Disconnect or turn off the power before connecting the input wire.
-  Check input voltage. This unit supports 380VAC, 3-phase, 50/60Hz input power.

Check nameplate on the unit for rated value, see if the input power adapts.

Marks for input power connection part

Connect input wire to terminal R, S, T, and tighten the screw.

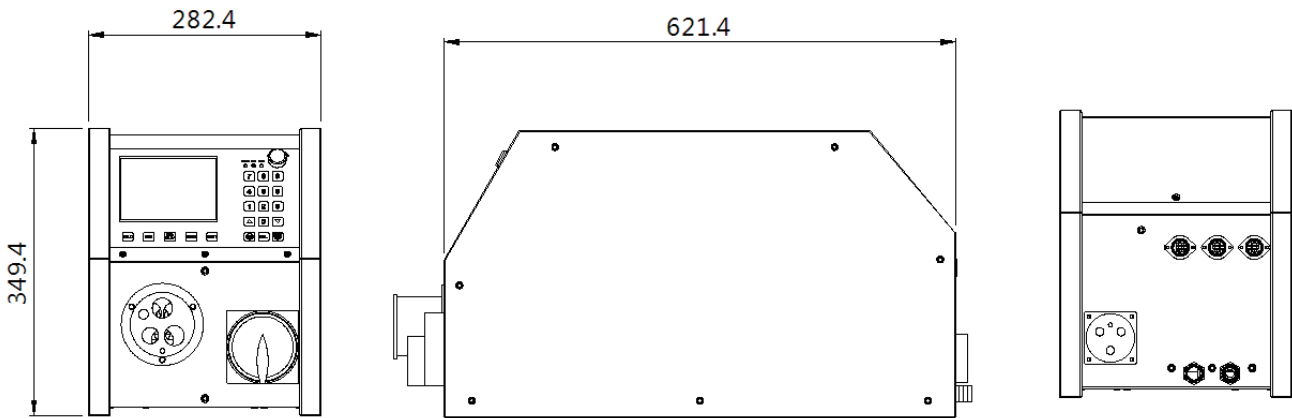
Marks for cutting off input power.

OFF: disconnect equipment

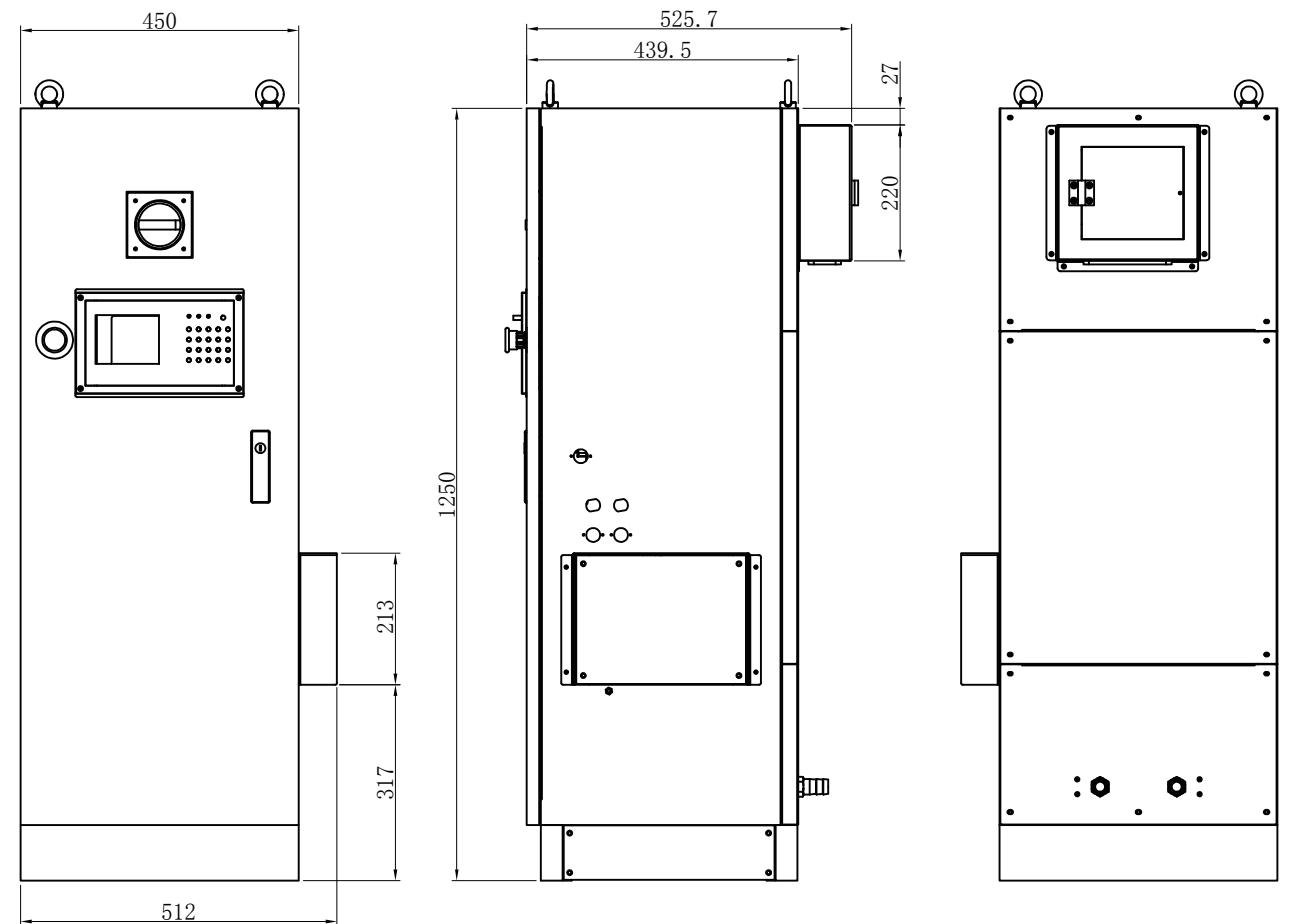
ON: connect equipment

4.3.5 Product Structure and Dimension Installation

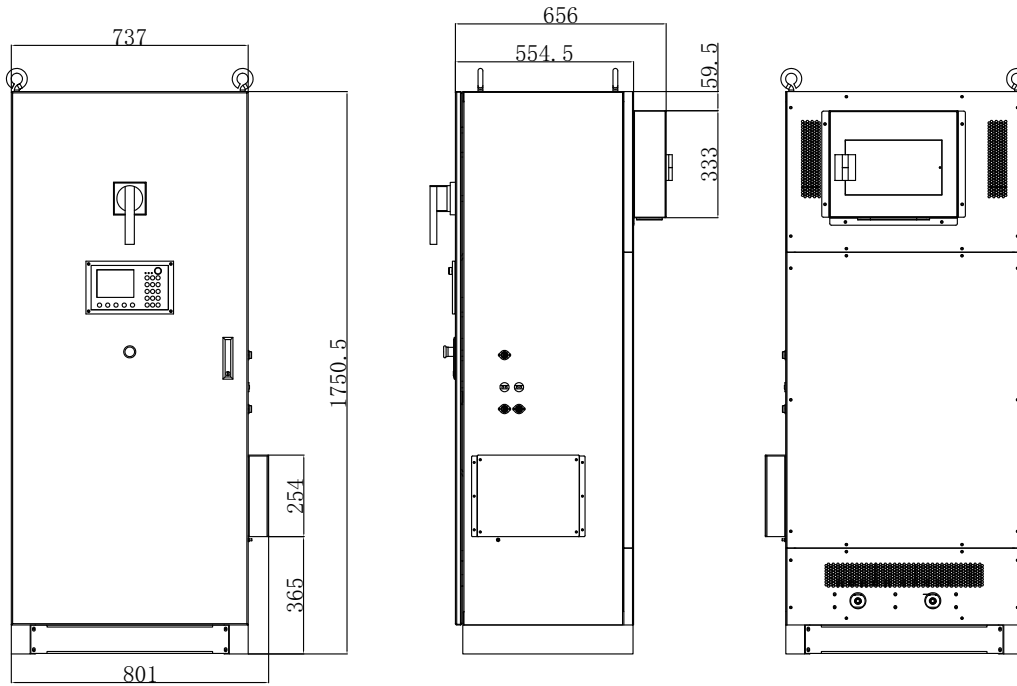
(1) CR2100-010B~060B-14TW/CR2100-010H~060H-14TW



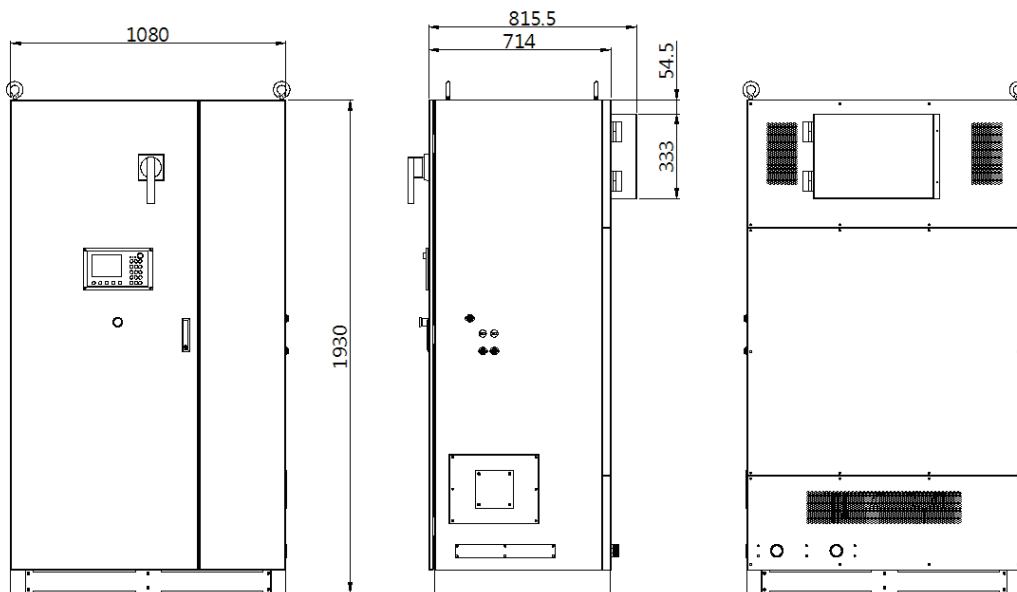
(2) CR2100-080B~120B-14TW/CR2100-080H~120H-14TW



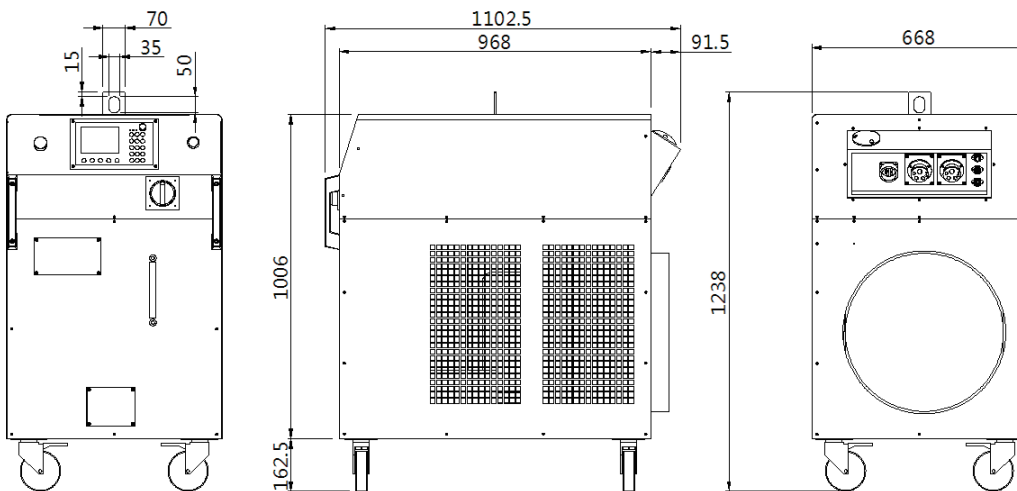
(3) CR2100-160B~400B-14TW/CR2100-160H~300H-14TW



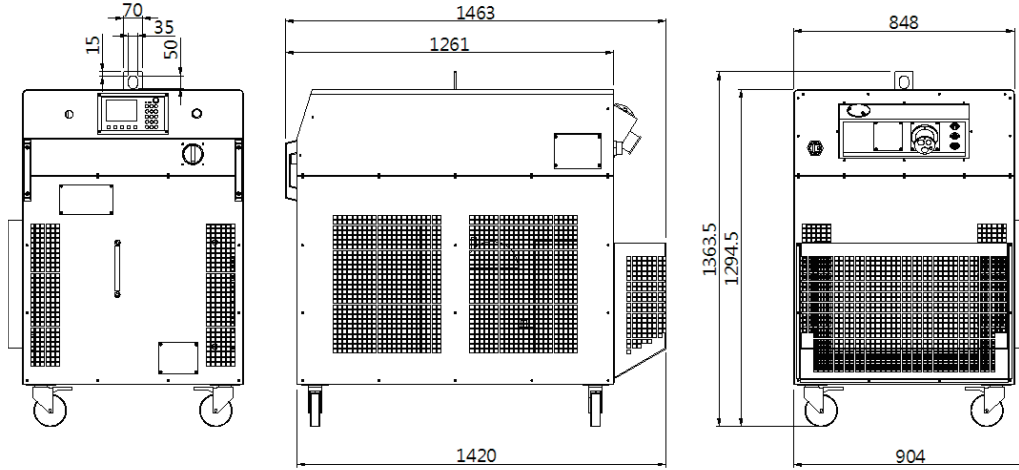
(4) CR2100-500B~800B-14TW



(5) CR2100-010E~040E-14TW/CR2100-010HE~040HE-14TW

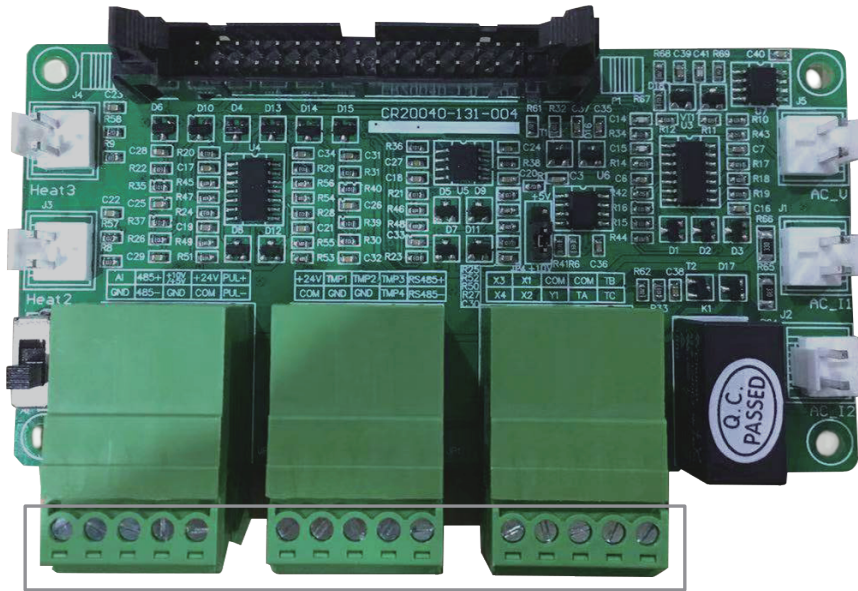


(6) CR2100-050E~060E-14TW/CR2100-050HE~060HE-14TW



4.4 Control Signal Terminal Instruction

Top view is as following:



AI	485+	+10V /+5V	+24V	PUL+	+24V	TMP1	TMP2	TMP3	RS485+	X3	X1	X1COM	COM	TB
GND	485-	GND	COM	PUL-	COM	GND	GND	TMP4	RS485-	X4	X2	YI	TA	TC
⊕	⊕	⊕	⊕	⊕	⊕	⊕	⊕	⊕	⊕	⊕	⊕	⊕	⊕	⊕
⊕	⊕	⊕	⊕	⊕	⊕	⊕	⊕	⊕	⊕	⊕	⊕	⊕	⊕	⊕

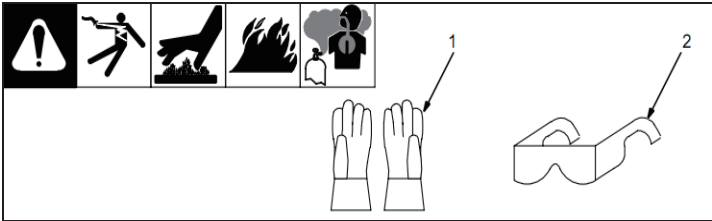
Category	Terminal NO.	Name	Description
Input terminal	X1	Input terminal 1~4	Common port: X1COM
	X2		Common port: COM
	X3		
	X4		
Power	+24V	+24V power	(Negative terminal: COM)
	+5V / +10V	+5V or+10V Power	(Negative terminal: GND) default: 5V X1 exclusive ground
	COM	24V ground	24V ground and common port
	X1COM	X1 exclusive ground	

CR2100 Intelligent Digital Induction Heating Power Source

Category	Terminal NO.	Name	Description
Power	GND	10V ground	10V ground and analog signal reference ground
Analog quantity input	AI	Analog quantity Current/voltage signal input	Reserved
	TMP1	Reserved	For details of temperature Current signal input, refer to P3.03 Negative terminal: GND
	TMP2		
	TMP3		
	TMP4		
	RS485+	Communication interface, positive terminal	When using as 485 upper computer communication (slave): Connect 485+ to external MODBUS communication equipment D+ or A Connect 485- to D- or B
RS485-	Communication interface, negative terminal		
Pulse input	PUL+	24V pulse positive	24V pulse voltage control for running
	PUL-	24V pulse negative	
Output terminal	Y1	Output terminal 1	
Relay output terminal	TA	Relay for fault output	
	TB		
	TC		
External communication terminal	485+	Communication interface, positive terminal	Only for manufacturer use
	485-	Communication interface, negative terminal	

5. Display and Operation Control

5.1 Safety Equipment



Wearing the following during operation:
 1: dry, insulating gloves
 2: safety glasses with side shields
 Do not wear rings or watches during operations.

5.2 LCD Keyboard Instructions

Equipment display and operation mainly on the LCD and keyboard. Following is the diagram and equipment display screen.

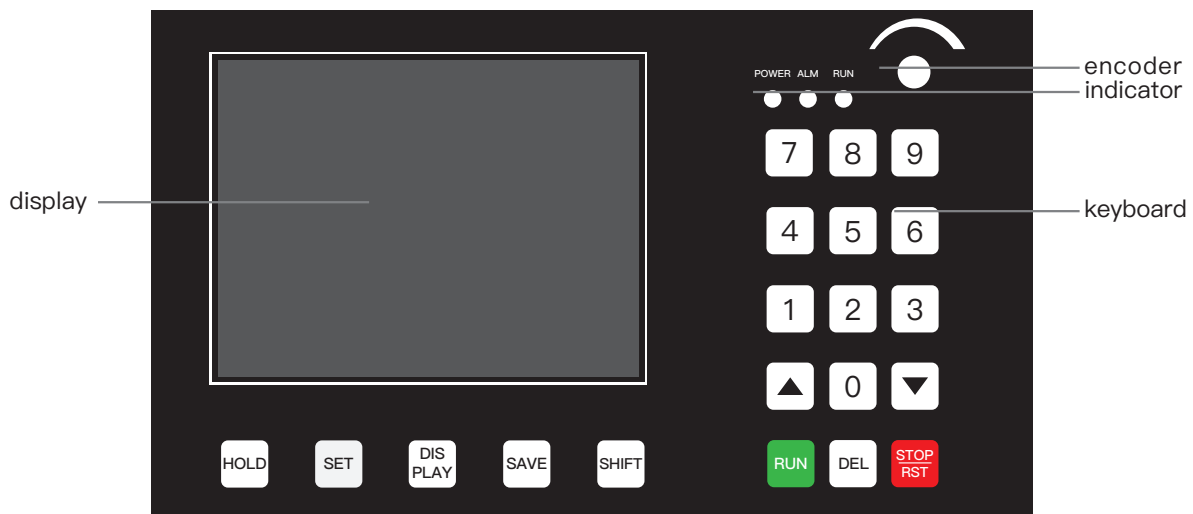


Chart 5-1 keyboard and LCD display diagram

Button function instructions:

Signal	Function	Instruction
	Shift Button	System set screen and control mode set screen cursor location; Basic parameters set screen and fault message screen backtrack, go back to the previous menu.
	Hold Button	Other interface besides faults alarm interface and code check interface, Hold function when running, skip to hold mode . Then RUN indicator, Green (blue) light flashing.
	Run	On the keyboard operation mode, press the button to start running. RUN indicator green (blue) light on.
	Stop/Reset	On the keyboard operation mode, press the button to stop running; After downtime, reset in case of fault RUN indicator light off.
	Increase/Up	Data or parameter code add-
	Decrease/Down	Data or parameter code reduce-
	Encoder	Add or reduce output power values when operation.
	Control Mode Parameter Set Button	Skip to control mode set screen, set relevant parameters.
	Control Mode running Status Display Button	Skip to running status screen, monitor running mode status.
















Signal	Function	Instruction
	Parameters Save Button	Save parameters, all set parameters must be saved before effective.
	System Set Screen Shortcut Button	SAVE+SET press both buttons simultaneously to skip to System set screen, Set temperature unit, control mode, start order, output current.
	Monitor Parameter Screen Shortcut Button	SAVE+DISPLAY press both buttons simultaneously to skip to monitor parameter screen, check output power, current, frequency, transmitter temperature.
	Basic Parameter Screen Shortcut Button	SAVE+SHIFT press both buttons simultaneously to skip to basic parameter screen, set parameter initialization, frequency range, running limitation time and so on.
	Digit 0	Digit code input
	Digit 1	Digit code input
	Digit 2	Digit code input
	Digit 3	Digit code input
	Digit 4	Digit code input
	Digit 5	Digit code input
	Digit 6	Digit code input
	Digit 7	Digit code input
	Digit 8	Digit code input
	Digit 9	Digit code input
	Delete	Delete digit values

Chart 5-1 Button function

5.3 Indicator and Display Mode

(1) indicator instructions:

Pattern		Function instruction
Status Indicator	POWER	Power indicator, light red when power on.
	RUN	light green (blue) when running, running indicate; green (blue) light flashing when device with hold status, hold status indicate.
	Alarm	Alarm indicator, light yellow when equipment with fault or alarm.



(2) display mode:

Basic parameter	Basic parameter code display: PX.XX
Monitoring Parameter	Monitoring parameter code display: D-XX
Fault Display	Fault code display: E-XX
Alarm Display	Alarm code display: A-XX

Latest fault code and then power, current and other values saved in the monitoring parameter D-22~D-31, check the monitoring parameter D-22~D-31 with the latest, second, third.....fault code and some other fault information. Check the basic parameter PX.XX specification refer to 7.1 basic parameter
 Check the basic parameter D.XX specification refer to 7.2 monitoring parameter
 Check the basic parameter E.XX and A-XX specification refer to 8.1 fault and fault Parameter.






5.4 Parameter Screen Display and Set

5.4.1 System Set Screen

Press set button  and save button  and popup system set screen, as on the right:


System Set Screen	
Degree Units	°C
Range	±10°C
Language:	English
Curve Number	1
Control Mode	Temperature
Start Command ...	Keyboard
Input Power	40.0KW
Output Current	233.0A


Alter Set:

- (1) Press shift button , move the cursor to the parameters to be altered;
- (2) Press increase button  or decrease button  to choose the value to be set (except the time value, only digit can be input in the time value);
- (3) Value parameters such as power, current, temperature difference value can be input with numeric button (0~9), use delete button  to delete;
- (4) Press save button , values will be saved.

Optional Items:

- Mode: °C/°F 【Factory Set °C】
- Range: ±1~55°C (±2~99°F) 【Factory Set 10°C】
- Language: English 【Factory Set English】
- Curve Number: 1/2/3 【Factory Set 1】
- Control Mode: temperature/power 【Factory Set power】
- Start Command: remote/keyboard 【Factory Set keyboard】
- Input Power: 0.0~Rated Input Power 【Factory Set Rated Input Power】
- Output Current: 1.0~Rated Output Current 【Factory Set Rated Output Current】

 Temperature difference range is to adjust temperature when set temperature and feedback temperature difference value deviate between positive and negative.
 All of the system parameters are global parameter, any system parameter to be altered will apply to all the programme.

when set input power, **【input power】** input value less than the set **【power】** value in the constant power set screen or power VS time set screen, then press save , it display as the below:

Never set system set screen **【input power】** value
 Less than the set **【power】** value in the constant power set screen or power VS time set screen.

5.4.2 Control Mode Set Screen

Allow users to set control procedure for specific heating procedure.
 Optional control procedure include temperature and power.

5.4.2.1 Temperature Control

Temperature control heating procedure is based on the thermocouple feedback temperature. Temperature control mode include four different procedures as the following: Constant Temp, Back-out, Heat Treatment (HT) and user-defined mode.

Press **SET** and **SAVE** button to popup the system set screen. Set **[control mode]** as **[temperature]**, press **save button SAVE** to save, then press set **SET** button to skip to temperature control set screen.

When skip to temperature control set screen, LCD will display as on the right:

Temperature Control Mode Set Interface	
>	Constant Temp Bake-Out HT Custom

Press shift button **SHIFT** to move the cursor to choose mode;

Use **SAVE** button to save chosen mode and skip to the set interface corresponding to the chosen temperature control mode.

5.4.2.1.1 Constant Temp

Constant Temp procedure is a simply method of heating the material to some temperature and keep constant for a time .

When the chosen temperature control mode in the temperature control mode set interface is Constant Temp, LCD will display as on the right:

Constant Temp Set Screen	
Mode	> Constant Temp
Control TC	1
Temperature	150°C
Soak Time	01:00:00

Alter Set:

- (1) Press shift button **SHIFT** to move the cursor to the parameters to be altered;
- (2) Press increase button **▲** or decrease button **▼** to choose designated value (except time value, only input digit with time value);
- (3) Numerical parameters, such as temperature, power, time, input the values with digit button (0~9), use delete button **DEL** to delete;
- (4) Press save button **SAVE**, values will be saved.

Optional Items:

Mode: **Constant Temp**

Control TC: 1, 1,2

Temperature: 0~1300°C (32~2372°F)

Soak time: 00:00:00~99:59:59

【Factory Set 1】

【Factory Set 150°C】

【Factory Set 00:00:00】

 TC1 must be controlling thermocouples and masterly controlling temperature.

5.4.2.1.2 Bake-Out

Bake-out mode is heating workpieces at a quick increase rate to a temperature and hold it for a while, then cool down to the specified temperature.

When the chosen temperature control mode in the temperature control mode set interface is bake-out, LCD will display as on the right:

Bake-out Set Screen	
Mode.....	> bake-out
Control TC	1
Soak Temperature:	600°C
Soak Time.....	02:00:00
Cool Temperature..	200°C
Cool Rate.....	80°C/hr

Alter Set:

- (1) Press shift button **SHIFT** to move the cursor to the parameters to be altered;
- (2) Press increase button **▲** or decrease button **▼** to choose designated value (except time value, only input digit with time value);
- (3) Numerical parameters, such as temperature, power, time, input the values with digit button (0~9), use delete button **DEL** to delete;
- (4) Press save button **SAVE**, values will be saved.

Optional Items:

Mode: **bake-out**

Control TC: 1, 1,2

Soak temperature: 0~1300°C (32-2372°F)

Soak time: 00:00:00~99:59:59

Cool temperature: 0~1300°C (32-2372°F)

Cool rate: 1~6000°C/hr (34 -10832°F/hr)

【Factory Set 1】

【Factory Set 600°C】

【Factory Set 02:00:00】

【Factory Set 200°C】

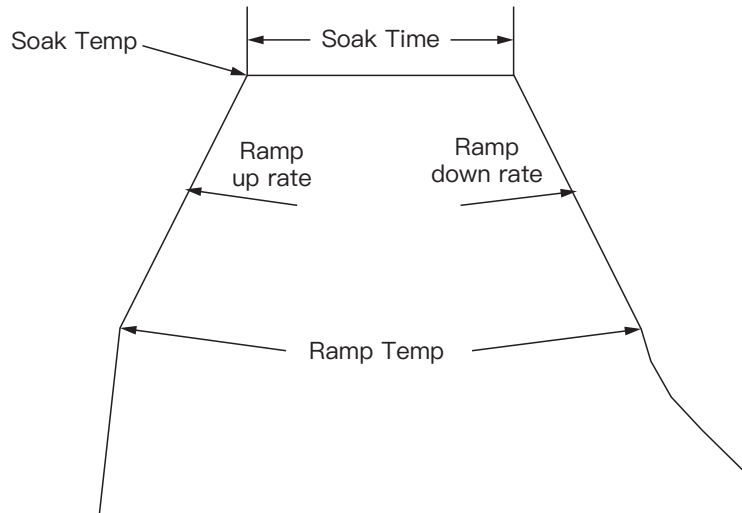
【Factory Set 8°C/hr】

 TC1 must be controlling thermocouples and masterly controlling temperature.

5.4.2.1.3 HT (Heat Treatment)

HT process:

- (1) heat workpiece from ramp temperature to soak temperature at ramp up rate.
- (2) hold workpiece temperature at soak temperature point for a while (soak time).
- (3) cool down workpiece from hold temperature to ramp temperature at ramp down rate.








HT Process Diagram

When the chosen temperature control mode in the temperature control mode set interface is HT, LCD will display as on the right:

HT Set Screen	
Mode.....	> HT
Control TC	1
Ramp Temp	200°C
Ramp Rate	80°C/hr
Soak Temp.....	600°C
Soak Time.....	02:00:00

Alter Set:

- (1) Press shift button  to move the cursor to the parameters to be altered;
- (2) Press increase button  or decrease button  to choose designated value (except time value, only input digit with time value);
- (3) Numerical parameters, such as temperature, power, time, input the values with digit button (0~9), use delete button  to delete;
- (4) Press save button , values will be saved.

Optional Items:

Mode: HT

Control TC: 1, 1, 2

Ramp temperature: 0~1300°C (32-2372°F)

Ramp rate: 1~6000°C/hr (34-10832°F/hr)

Soak temperature: 0~1300°C (32-2372°F)

Soak time: 00:00:00~99:59:59

【Factory Set 1】

【Factory Set 200°C】

【Factory Set 80°C/hr】

【Factory Set 600°C】

【Factory Set 02:00:00】

 TC1 must be controlling thermocouples and masterly controlling temperature.






5.4.2.1.4 Custom

Users can define procedure or dissymmetry heat treatment procedure, with which the heating rate, cooling rate and temperature can be different.

When the chosen temperature control mode in the temperature control mode set interface is custom, LCD will display as on the right:

Custom Set Screen	
Mode.....	> Custom
Curve Num.....	1
Segment.....	1
Type.....	END
Control TC.....	1

Alter Set:

- (1) Press shift button  to move the cursor to the parameters to be altered;
- (2) Press increase button  or decrease button  to choose designated value (except time value, only input digit with time value);
- (3) Numerical parameters, such as temperature, power, time, input the values with digit button (0~9), use delete button  to delete;
- (4) Press save button , values will be saved.

Optional Items:

- Mode: **Custom** 【Factory Set 1】
- Curve Num.: 1~3 【Factory Set 1】
- (curve no can not be set in this screen but can be in the **System set screen**)
- Segment: 1~10 【Factory Set 1】
- Type: **soak/ramp/step/end** 【Factory Set end】
- ◆for soak type:
 - Soak temperature: 0~1300°C (32-2372°F) 【Factory Set 0°C】
 - Soak time: 00:00:00~99:59:59 【Factory Set 00:00:00】
- ◆for ramp type:
 - Ramp temperature: 0~1300°C (32-2372°F) 【Factory Set 0°C】
 - Ramp rate: 1~6000°C/hr (34-10832°F/hr) 【Factory Set 0°C/hr】
- ◆for step function:
 - temperature: 0~1300°C (32-2372°F) 【Factory Set 0°C】
- ◆for end type:
 - Control TC: 1, 1,2 【Factory Set 1】

 TC1 must be controlling thermocouples and masterly controlling temperature.

Temperature controlling, ramp is calculated in °C/hr or °F/hr, programmable ramp minimum and maximum value is 1°C/hr (34°F/hr) and 6000°C/hr (10832°F/hr). Minimum and maximum programmable temperature is 0°C (32°F) and 1300°C (2372°F). Minimum and maximum soak time is 0 and 100 hours. user-defined function can set 3 curves at maximum, choose curve NO in the system set screen, each curve can set 10 segments at maximum, choose segment NO in the user-defined screen. When segment NO changed, it will display corresponding segment parameter information. End the programme indicate the completion of the cycle and the end of the output power. user-defined segment controlling heating procedure:

Type as **step function**:

Custom Set Screen	
Mode.....	> Custom
Curve Num.....	1
Segment.....	1
Type.....	Step
Temperature.....	200°C

Full power heating to 200°C

Type as **ramp**:

Custom Set Screen	
Mode.....	> Custom
Curve Num.....	1
Segment.....	2
Type.....	Ramp
Target Temperature:	600°C
Ramp Rate.....	600°C/hr

At 600°C/hr rate, controlling heating to 600°C

Type as **soak**:

Custom Set Screen	
Mode.....	> Custom
Curve Num.....	1
Segment.....	3
Type.....	Soak
Soak Temperature.....	600°C
Soak Time.....	01:00:00

600°C soak one hour

Type as **ramp**:

Custom Set Screen	
Mode.....	> Custom
Curve Num.....	1
Segment.....	4
Type.....	Ramp
Ramp Temperature..	400°C
Ramp Rate.....	600°C/hr

At 600°C/hr rate, controlling cooling to 400°C

Type as end:

Custom Set Screen	
Mode.....:	> Custom
Curve Num.....:	1
Segment.....:	5
Type.....:	END
Cotrol TC.....:	1

End segment end heating circle

5.4.2.2 Power Control

Power control mode is a method with output power. Power control mode include the following two different processes: constant power mode, power vs time, constant current, current vs time mode.

Press set button **SET** and save button **SAVE**, popup system set screen, set **[Control Mode] as [Power]**, press save button **SAVE** to save, then press set **SET** button, skip to power control mode set interface.

Power Control Mode Set Screen	
>	Constant Power
	Power vs Time
	Constant Current
	Current vs Time

When skip to power control mode set interface, LCD will display as on the right:

Press **SHIFT** to move the cursor to choose mode;

Press **SAVE** to save chosen mode and skip to the set interface corresponding to the chosen power control mode.

5.4.2.2.1 Constant Power

Constant power mode is running a certain time at a constant power (when running time is 00: 00:00:0 as infinite running mode).

When the chosen power control mode in the power control mode set interface is constant power, LCD will display as on the right:

Constant Power Set Screen	
Mode.....:	> Constant Power
Set Power.....:	40.0 KW
Run Time.....:	01:00:00:0
Power.....:	0.00 KW
Current.....:	0.0 A
Voltage.....:	0 V
Frequency.....:	0.00 KHz

Alter Set:

- (1) Press shift button **SHIFT** to move the cursor to the parameters to be altered;
- (2) Press increase button **▲** or decrease button **▼** to choose designated value (except time value, only input digit with time value);
- (3) Numerical parameters, such as temperature, power, time, input the values with digit button (0~9), use delete button **DEL** to delete;
- (4) Press save button **SAVE**, values will be saved.

Optional Items:

Mode: constant power

Set Power: 0~output power set value in System set screen **[factory set as 0 kW]**

Run Time: 00:00:00:0~99:59:59:9 **[factory set as 00:00:00:0]**

Last 4 parameters, power, current, voltage, frequency as device running monitoring parameters.

5.4.2.2.2 Power vs Time

Power vs Time mode is based on the relationship ratio between time and power.

When the chosen power control mode in the power control mode set interface is power vs time, LCD will display as on the right:

Power vs Time Set Screen	
Mode.....:	> Power vs Time
Curve Num.....:	1
Segment.....:	1
Type.....:	Power Soak
Power.....:	0.0 KW
Time.....:	01:00:00:0

Alter Set:

- (1) Press shift button **SET** to move the cursor to the parameters to be altered;
- (2) Press increase button **▲** or decrease button **▼** to choose designated value (except time value, only input digit with time value);
- (3) Numerical parameters, such as temperature, power, time, input the values with digit button (0~9), use delete button **DEL** to delete;
- (4) Press save button **SAVE** , values will be saved.

Optional Items:

Mode: **Power vs Time**

Curve Num.: 1~20

[factory set as 1]

Segment: 1~10

[factory set as 1]

Type: **power soak/power ramp/end**

[factory set as end]

◆ For type as **power soak/power ramp**, only power and time can be set:

Power: 0~Set output power set value in **system set screen**

[factory set as 0 kW]

time: 00:00:00:0~99:59:59:9

[factory set as 00:00:00:0]

power control mode can be set up to 20 curves, each curve can set 10 segments .When segment number changed, it will display corresponding segment parameter information.

For type as end, Indicates that the termination of the cycle of completion and output power.

5.4.2.2.3 Constant Current

Constant Current mode is running a certain time at a Constant Current (when running time is 00: 00:00 as infinite running mode).

When the chosen mode in the power control mode set interface is constant power, LCD will display as on the right:

Constant Current Set Screen	
Mode.....:	> Constant Current
Set Current	150.0 A
Run Time.....:	01:00:00:0
Power.....:	0.00 KW
Current	0.0 A
Voltage	500 V
Frequency.....:	0.00 KHz

Alter Set:

- (1) Press shift button **SHIFT** to move the cursor to the parameters to be altered;
- (2) Press increase button **▲** or decrease button **▼** to choose designated value (except time value, only input digit with time value);
- (3) Numerical parameters, such as temperature, power, time, input the values with digit button (0~9), use delete button **DEL** to delete;
- (4) Press save button **SAVE** , values will be saved.

Optional Items:

Mode: **Constant Current**

Set Current: 0~output current set value in **System set screen**

[factory set as the rated current value]

Run Time: 00:00:00:0~99:59:59:9

[factory set as 00:00:00:0]

Last 4 parameters, power, current, voltage, frequency as device running monitoring parameters.

5.4.2.2.4 Current vs Time

Current vs Time mode is based on the relationship ratio between time and current.

When the chosen mode in the power control mode set interface is current vs time, LCD will display as on the right:

Current vs Time Set Screen	
Mode.....:	> Current vs Time
Curve Num.....:	1
Segment.....:	1
Type.....:	Current Soak
Current	0.0 A
Time.....:	01:00:00:0

Alter Set:

- (1) Press shift button **SET** to move the cursor to the parameters to be altered;
- (2) Press increase button **▲** or decrease button **▼** to choose designated value (except time value, only input digit with time value);

(3) Numerical parameters, such as temperature, power, time, input the values with digit button (0~9), use delete button **DEL** to delete;

(4) Press save button **SAVE** , values will be saved.

Optional Items:

Mode: **Current vs Time**

Curve Num.: 1~40

【factory set as 1】

(curve no can not be set in this screen but can be in the **System set screen**)

Segment: 1~5

【factory set as 1】

Type: **current soak**

【factory set as soak】

◆ When the current is held, the curve number, current and time can be set:

Current: 0~Set output current set value in **system set screen**

【factory set as 0.0 A】

time: 00:00:00~99:59:59:9

【factory set as 00:00:00:0】

Current control mode can be set up to 40 curves, each curve can set 5 segments .When segment number changed, it will display corresponding segment parameter information.

5.4.3 Running Status Screen

With running status, users can monitor device running status during heating process. According to control mode (temperature or power), temperature mode (preheating, bake-out, HT or user-define) and power mode (constant power or power time), the display will show different screen.

With running status screen, just for monitoring but no optional or alterable parameters.

5.4.3.1 Temperature Control Status Screen

Press running status display button **DIS PLAY** , popup control mode running status screen, display as on the right:

Run Status Screen	
Mode.....:	Constant Temp TC1: 30.0
Target Temp:	150°C TC2: OPEN
Countdown...:	01:00:00
Status.....:	Stopped

(1) **Constant Temp, bake-out and HT running status screen**

Mode display the programme mode (Constant Tempt, Bake-out, HT, or Custom). During operation, Target Temp display present operation target temperature, Countdown display remaining time, present status (Running, Hold, Stoped). TC1~TC2 display thermocouple 1~2 temperature. The screen is hold for monitoring or present type (Soak, Step, ramp, end TC1~TC2 display thermocouple 1~2 temperature. The screen is just for monitoring.

(2) **User-defined running status screen:**

First Segment: Step

Run Status Screen	
Mode.....:	Custom TC1: 200.0
Target Temp:	200°C TC2: OPEN
Countdown...:	00:00:00
Type.....:	Step
Curve Num...:	1
Segment.....:	1

Second Segment: Ramp Up Temperature

Run Status Screen	
Mode.....:	Custom TC1: 200.0
Target Temp:	400°C TC2: OPEN
Countdown...:	00:03:20
Type.....:	Ramp
Curve Num...:	1
Segment.....:	2

Third Segment: Soak

Run Status Screen	
Mode.....:	Custom TC1: 400.0
Target Temp:	400°C TC2: OPEN
Countdown...:	00:05:00
Type.....:	Soak
Curve Num...:	1
Segment.....:	3

Fourth Segment: Ramp Down Temperature

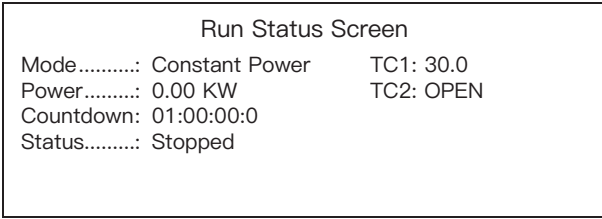
Run Status Screen	
Mode.....:	Custom TC1: 200.0
Target Temp:	200°C TC2: OPEN
Countdown...:	00:03:20
Type.....:	Ramp
Curve Num...:	1
Segment.....:	4

Fifth Segment: End Segment, device stop running, none screen display.

5.4.3.2 Power Control Status Screen

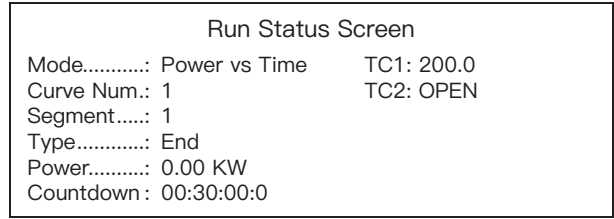
Press running status display button **DIS PLAY** , popup control mode running status screen, it displays as the followings:

(1) Constant Power running status screen:



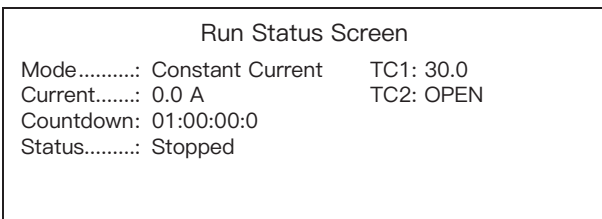
Power display present actual output power, Countdown display thermal cycle remaining time, Status indicate present work status running or stop. TC1~TC2 display thermocouple 1~2 temperature, the screen is just for monitoring.

(2) Power VS Time running status screen:



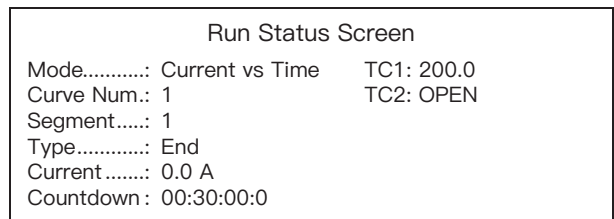
Mode display present working mode, Curve Num indicate curve NO, Segment indicate present working segment NO, Power display present actual output power, Countdown display remaining time, Type display present segment type (Power_Soak, Power_ramp, End). TC1~TC2 display thermocouple 1~2 temperature. The screen is just for Monitoring.

(3) Constant Current running status screen:



Current display present actual output current, Countdown display thermal cycle remaining time, Status indicate present work status running or stop. TC1~TC2 display thermocouple 1~2 temperature, the screen is just for monitoring.

(4) Current vs Time running status screen:

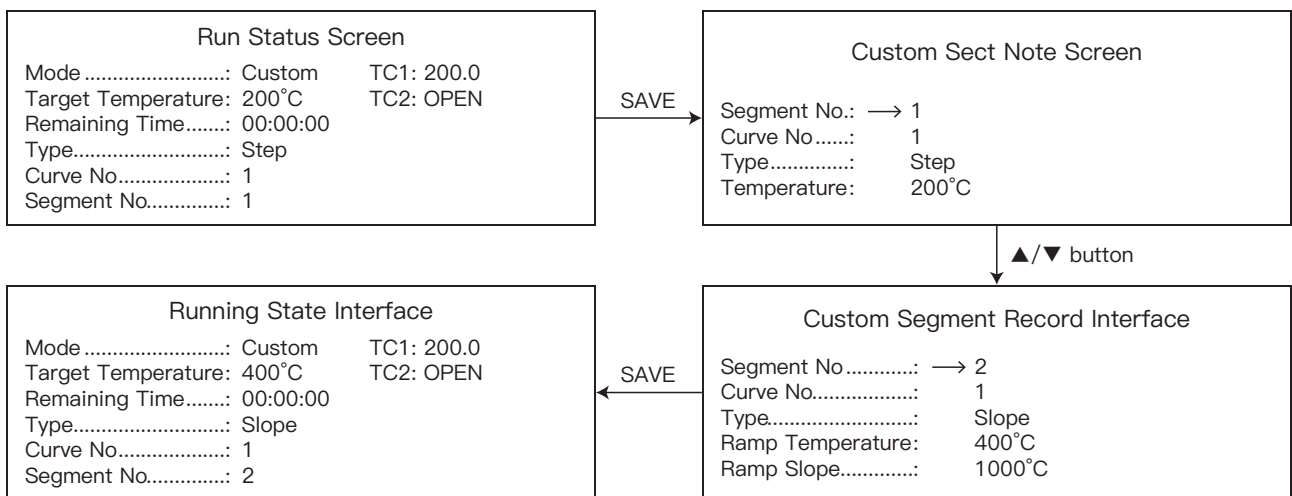


Mode display present working mode, Curve Num indicate curve NO, Segment indicate present working segment NO, Current display present actual output current, Countdown display remaining time, Type display present segment type (Current_Soak). TC1~TC2 display thermocouple 1~2 temperature. The screen is just for Monitoring.

5.4.4 Custom Segment Record Interface

In Custom Segment Record Interface, it is available for users to check Custom Mode set values in shutdown state or hold state and can choose needed segments to start running from chosen segment. This interface can be just entered from running state interface of Custom Mode in shutdown or hold state.

In Running State Interface of Custom Mode, press **SAVE** to skip to Custom Segment Record Interface in shutdown or hold state, display as the below:

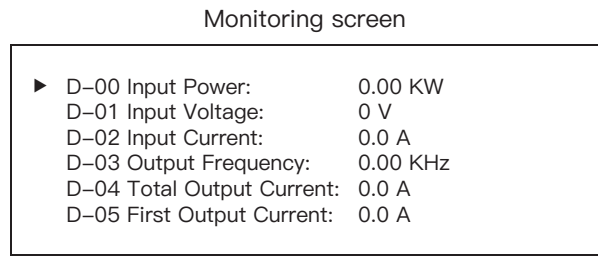


In Custom Segment Record Interface, each segment value can be checked by up and down button, press hold button to choose run initial segment and return to custom run interface. In this interface, segment value can just be checked but modified.

5.4.5 Monitoring Parameters, Fault Code Record Display

Monitoring screen:

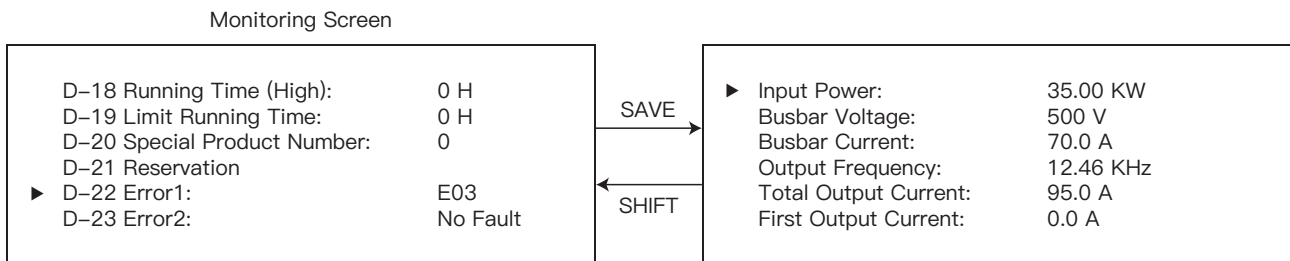
Simultaneously press save **SAVE** button + running status display button **DIS PLAY**, popup monitoring parameter screen, as on the right:



On the monitoring parameter screen, use UP **▲** and DOWN **▼** button to move the cursor up and down, 32 monitoring Parameters in total, for more monitoring parameters, refer to 7.3 monitoring Parameter. The specific values cant be modified but check.

Fault code display screen:

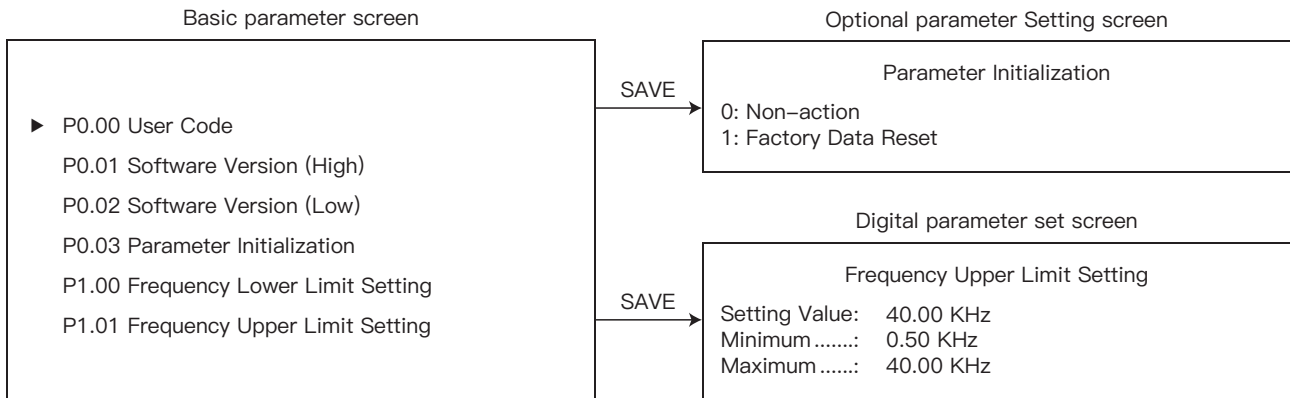
Skip to monitoring parameter screen, when cursor ▶ location to D-22~D-31 (fault code parameter), if the parameter display with fault (fault as: E03) press **SAVE** button to **fault message screen**, none faults, then can not skip to **fault message screen** (no fault display: No Fault), as the diagram below:



5.4.6 Basic Parameters Display

Basic parameter display screen:

Simultaneously press save button **SAVE** + shift button **SHIFT**, popup code check interface, code check correction then skip to basic parameter screen, in basic parameter screen can use **▲** / **▼** move cursor ▶ up and down, for more basic parameters, please check 7.1 basic parameter table as the following diagram:

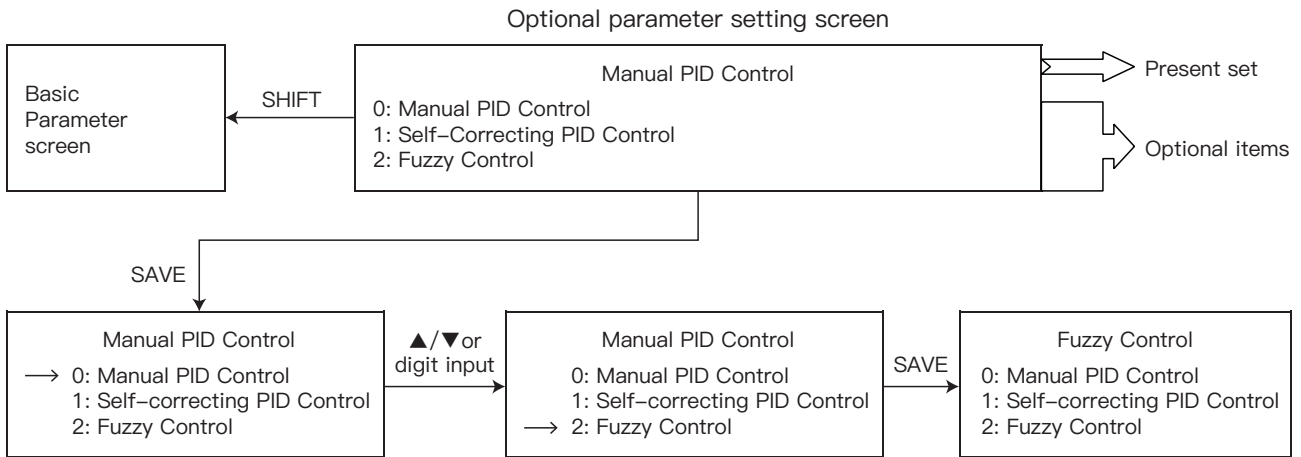


Basic parameter set screen:

(1) Optional parameter set screen:

Go to optional parameter set screen, press **SAVE** button, → **optional cursor** occurs before the below optional item, indicate can use **▲** / **▼** button to move cursor, choose needed item (as the below: Manual PID Control), Press **SAVE** to confirm, optional cursor→disappear and the present set item site display as a latest set item (as the below: Fuzzy Control), set is finished.

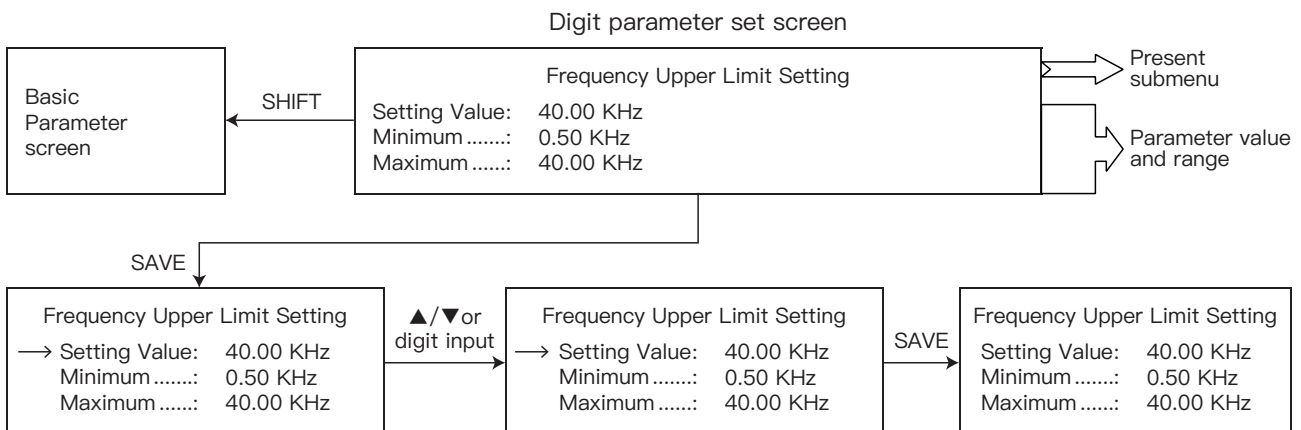
As the following diagram:



(2) Digit parameter set screen:

Go to digit parameter set screen, press **SAVE**, → **optional cursor** Occurs in front of the below optional item, indicate can use **▲ / ▼** button or fast input needed set value (as the below: 35.00KHz), Press **SAVE** to confirm, **optional cursor** → disappear, then set is inished, the maximum value and minimum value in the Chart 5-7 as input value range, they can not be modified. Use **SHIFT** to go back to basic parameter sub menu screen.

As the following diagram:

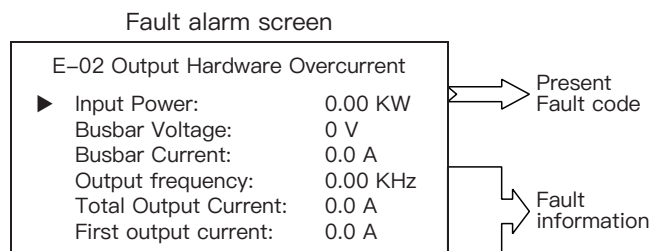


Note: some parameter modify with limitation, such as curve heat power and time, can not be modified under running but stop. More detailed information, refer to the sign instruction in the end of the basic parameter table.

5.4.7 Fault Alarm Screen Display

Fault alarm screen:

Fault alarm screen, display present fault code and the fault information, as on the right diagram:



5.5 Hold Button (Constant Temperature/Constant Power) Function

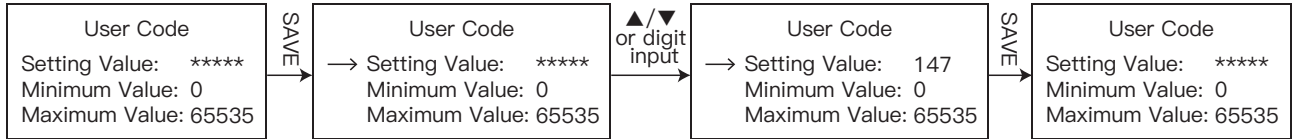
Other interface besides faults alarm interface and code check interface, can hold the present status during running. With running status, press hold button **HOLD**, it will start hold function, then RUN indicator green (blue) light flashing. On hold mode, programme parameters can be altered. Press hold button **HOLD** it will cancel hold function, RUN indicator green (blue) flashing disappears. On the hold mode, if some relevant parameters be altered, the the programme will continue heating with the latest altered parameters.

5.6 Code Set and Check

Code set:

From code parameter (P0.00, P3.02) to parameter set screen, press ▲, ▼ or fast digit input code, press SAVE then finish the code set and save it. As the following diagram:

Code set screen:



(1) User code (P0.00) function

User code factory value: 2014. After set user code, any tunable parameter can not be checked and modified.

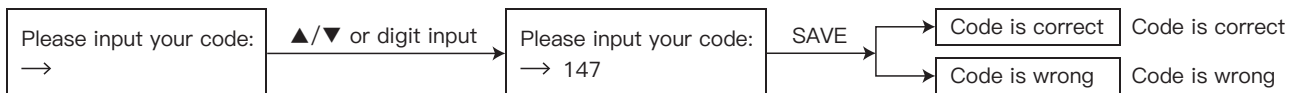
(2) Running limitation code (P3.02)

After set running limitation code, running limitation set (P3.03) parameter and running limitation time set (P3.04) parameter can not be modified.

Code check:

From other screens to basic parameter series screens, a code check screen will pop out if it has user code, press ▲, ▼ or input the code value digit, press SAVE to confirm code input check. It will display “code is correct” if input correctly or it will display “code is wrong” then back to the code check screen. as the following diagram:

Check code parameter screen:



Note: If you forget the code, please contact with the manufacturer.

6. Function Instruction

6.1 Parameters Initialization Function (P0.03)

Set parameters initialization (P0.03) as non action, then parameters can not be initialized.

Set parameters initialization (P0.03) as parameters P initialization, then parameters P can be initialized, parameters reset to Factory Defaults.

6.2 Temperature Control Option Parameters (P2.03/P2.04)

(1) system parameters self-test choice (parameter P2.04)

None-action:

Set system parameters self-test choice (P2.04) as non-action, then system parameters do not self-test.

System parameters test:

Set system parameters self-test choice (P2.04) as system parameters test, then the system will automatic test system parameters according to the load condition, make temperature control with optimal state.

(2) temperature adjustment method choice (parameter P2.03)

Manually set PID control:

Set temperature adjustment method choice (P2.03) as manually set PID control, then set the PID parameters according to the actual conditions (proportion gain high and low digit number (F2.07~F2.08)、integral time (F2.09)、differential time (F2.10)) value.

Self-Correcting PID control:

Set temperature control mode choice (P2.03) as self-correcting PID control, then machine will automatically self-correct parameters, on condition that PID actual parameters must pass system parameter self-inspect choice (P2.04) set as system parameters inspect acquire.

vague control:

Set temperature control mode choice (P2.03) as vague control, then machine inner regulation control load temperature. When temperature overshoot value do not meet the need, appropriately increase parameter (P2.05) value, but may affect the temperature rise speed. When stable deviation temperature do not meet the need, appropriately decrease parameter (P2.06) value.

6.3 Language Choice (P3.05)

Set language choice (P3.05) as English, then all screens display in English.

Set language choice (P3.05) as Chinese, then all screen display in Chinese.

6.4 TC Type Selection (P3.06)

Set the TC type selection (P3.06) as K type, and the input type selection of TC1~TC2 thermocouples to K type thermocouple detection.

Set the TC type selection (P3.06) as infrared thermocouple, and select the input type of TC1~TC2 thermocouple as infrared thermocouple detection.

7. Parameter Table

7.1 Basic Parameter Table

CR2100 Basic Parameter Table						
Label Instructions: “×” indicate the parameter can not be modified under running; “◆” indicate the parameter value is actual value, can not be modified; “○” indicate the parameter set value can be modified under running; “—” indicate the parameter can not be modified as a reservation; “◇” manufacturer parameter, only manufacturers modify, users are not permitted.						
P0: System Parameter						
Function	Instruction	Set Scope	Unit	Factory Set Value	Modbus Address	Modify
P0.00	User code	0~65535	1	****	41100	×
P0.01	Software version (high)	0000~FFFF	1	Machine type set	41101	◆
P0.02	Software version (low)	0000~FFFF	1	Machine type set	41102	◆
P0.03	Parameter initialization	0: Non-action 1: Factory data reset	1	0	41103	×
P1: Basic Running Parameter						
P1.00	Frequency lower limit setting	0.50KHz~ 【P1.01】	0.01KHz	Machine type set	41104	×
P1.01	Frequency upper limit setting	【P1.00】 ~40.00KHz	0.01KHz	Machine type set	41105	×
P1.02	Encoder power control speed	1~300	1	30	41106	○
P2: Control Parameter						
P2.00	The switch of E-24	0: Forbit 1: Valid	1	1	41107	○
P2.01	The switch of E-03	0: Forbit 1: Valid	1	1	41108	○
P2.02	Power ramp up time [constant power mode]	0.1~60.0s	0.1s	0.5s	41109	○
P2.03	Temperature control mode	0: Manual PID control 1: Self-correcting PID control 2: Fuzzy control	1	2	41110	×
P2.04	System parameter self-adjusting	0: Non-action 1: System parameter self-adjusting	1	0	41111	×
P2.05	Input quantization factor	0.1~10.0	0.1	5.0	41112	×
P2.06	Output proportion factor	0.0~6553.5	0.1	6.0	41113	○
P2.07	Proportion gain (high)	0~9999	1	0	41114	○
P2.08	Proportion gain (low)	0~99.99	0.01	50.00	41115	○
P2.09	Integral time	0.00s~655.35s	0.01s	0.00s	41116	○
P2.10	Differential time	0.00s~655.35s	0.01s	0.00s	41117	○
P2.11	Sampling cycle	0.01s~655.35s	0.01s	2.00s	41118	×
P2.12	Input current coefficient	50.00%~120.00%	0.01%	100.00%	41119	×
P2.13	Maximum permitted temperature	0.0~2000.0℃	0.1℃	2000.0℃	41120	×
P2.14	Integral mode	0: Normal mode 1: Integral separation mode	1	0	41121	×
P2.15	I separation minimum value	0.1℃~ 【P2.16】	0.1℃	0.1℃	41122	×

Function	Instruction	Set Scope	Unit	Factory Set Value	Modbus Address	Modify
P2.16	I separation maximum value	【P2.15】 ~2000.0℃	0.1℃	2000.0℃	41123	×
P2.17	Proportion–frequency adjuster	0.01 ~655.35	0.1	Machine leading	41124	×
P2.18	Integral–frequency adjuster	0.001 ~65.535	0.01	Machine leading	41125	×
P2.19	Proportion–power adjuster	0.01 ~655.35	0.1	Machine leading	41126	×
P2.20	Integral–power adjuster	0.001 ~65.535	0.01	Machine leading	41127	×
P2.21	Proportion–current adjuster	0.01 ~655.35	0.1	Machine leading	41128	×
P3: Advanced Function Parameter						
P3.00	X3 switch option	0: Forbid 1: Valid	1	1	41129	×
P3.01	Test mode	0~2	1	1	41130	×
P3.02	Running limit code	0~65535	1	*****	41131	×
P3.03	Running limit setting	0: Invalid 1: Valid	1	0	41132	×
P3.04	Limit running time setting	0~65535H (hour)	1H	0H	41133	×
P3.05	Language	0: English 1: Chinese	1	0	41134	×
P3.06	TC type selection	0: K type 1: Infrared	1	0	41135	×
P3.07	Voltage correction coefficient	80.00%~120.00%	0.01%	100.00%	41136	×
P3.08	Output current correction coefficient	80.00%~120.00%	0.01%	100.00%	41137	×
P3.09	Keyboard version	1.00~9.99	0.01	Keyboard set	41138	◆
P3.10	RS485	0: RS485 OFF 1: RS485 ON	1	0	41139	○
P3.11	Power regulation signal	0: TC 1: 4~20mA 2: 0~10V 3: RS485 communication given	1	0	41140	○
P3.12	The switch of A-07	0: Forbid 1: Valid	1	1	41141	○
P3.13	E-15 mode	0: Restart 1: Continue	1	0	41142	○
P3.14	Infrared min–temperature	0~2000℃	1℃	0℃	41143	○
P3.15	Infrared max–temperature	0~2000℃	1℃	1300℃	41144	○
P3.16	Infrared temperature correction	0.500~1.500	0.001	1.000	41145	○
P3.17	Max sink temperature	60.0~85.0℃	0.1℃	70.0℃	41146	○
P3.18	Modbus device address	1~127	1	1	41147	○

7.2 Monitoring Parameter Table

Users can observe induction heating equipment running parameters through the keyboard.

Monitoring Parameter			
Monitoring Code	Instructions	Range	Modbus Address
D-00	Input power	0.00~655.35KW	41000
D-01	Input voltage	0~1000V	41001

CR2100 Intelligent Digital Induction Heating Power Source

Monitoring Code	Instructions	Range	Modbus Address
D-02	Input current	0.1~6553.5A	41002
D-03	Output frequency	0.50~40.00KHz	41003
D-04	Total output current	0.1~6553.5A	41004
D-05	Output current 1	0.1~6553.5A	41005
D-06	Output current 2	0.1~6553.5A	41006
D-07	Resonant CAP volt	0~6000V	41007
D-08	Equal resistance (ESR)	0.0~100.0Ω	41008
D-09	Inductance	1~1000uH	41009
D-10	Output duty cycle	0.01%~100.00%	41010
D-11	Power factor angle	0.0~180.0°	41011
D-12	Quality factor Q	0.1~10.000	41012
D-13	Heat sink temperature	0.0~165.0°C	41013
D-14	AI State	0~4096	41014
D-15	Transformer TEMP	0.0~165.0°C	41015
D-16	Reservation		41016
D-17	Run time (low)	0~9999H	41017
D-18	Run time (high)	0~9999*10000H	41018
D-19	Limit run time	0~9999H	41019
D-20	Special product num	1~65535	41020
D-21	Reservation		41021
D-22	Error 1	0~33	41022
D-23	Error 2	0~33	41023
D-24	Error 3	0~33	41024
D-25	Error 4	0~33	41025
D-26	Error 5	0~33	41026
D-27	Error 6	0~33	41027
D-28	Error 7	0~33	41028
D-29	Error 8	0~33	41029
D-30	Error 9	0~33	41030
D-31	Error 10	0~33	41031

8. Protection、Alarm Code and Fault Check

8.1 Protection and Alarm Code Table

Fault Code			
Fault Code	Fault Instruction	Reason	Fault Inspection
E-00	No protection action		
E-01	Busbar overcurrent protection	Busbar overcurrent circuit protect action	1. Stop or single machine running with error code E-01, try to replace control board. 2. Multi heating machine with one load, try to increase the distance between coils.
E-02	Output overcurrent protection	Output overcurrent circuit protect	1. Inspect the output terminal and coil whether short or not. 2. Inspect output terminal, coil and machine inwall whether there are signs of ignition, or should strengthen the insulativity between output coil and connection point. 3. Multi heating machine with one load, try to increase the distance between coils.
E-03	VCE inspection protection	Drive circuit protection action	1. Inspect output terminal and coil whether short circuit or not. 2. Inspect output terminal, coil and machine inwall whether there are signs of ignition, or should strengthen the insulativity between output coil and connection point. 3. Inspect output terminal, coil and machine inwall whether there are signs of ignition, or should strengthen the insulativity between output coil and connection point. 4. Power on with error code E-03, contact with the manufacture.
E-04	Output software overcurrent	Output current overload protection software action	1. Inspect the output terminal and coil whether short or not. 2. Inspect output terminal, coil and machine inwall whether there are signs of ignition, or should strengthen the insulativity between output coil and connection point.
E-05	Input busbar overvoltage protection	Output overvoltage protection software action	1. After stop, use multimeter to measure input cable voltage, ensure it in the range of $V_e^* (1\pm 20\%)$. 2. After stop, use multimeter to measure input cable voltage, ensure it in the range of $\{V_e^* (1\pm 20\%)\}$, then adjust P3.07 value to ensure D-01value=cable voltage. 3. Multi heating machine with one load, error code with E-05, try to increase the distance between coils.
E-06	Input busbar undervoltage protection	Output undervoltage protectio software action	1. After stop, use multimeter to measure input cable voltage, ensure it in the range of $V_e^* (1\pm 20\%)$. 2. After stop, use multimeter to measure input cable voltage, ensure it in the range of $\{V_e^* (1\pm 20\%)\}$, then adjust P3.07 value to ensure D-01value=cable voltage.
E-07	Reservation		
E-08	Reservation		
E-09	Default phase protection (only for 3 phases input power)	3 Phases AC default phase protection action	1. Tighten the screws on the input terminal of the heating power machine, ensure contact between input line and input terminal well. 2. Check 3-phase input power line whether broken, or replace the lines. 3. Check creepage.
E-10	Radiator temperature overhigh	① The water temp. is too high ② The ambient temp. is too high	1. Improve the cooling conditions of the chiller. 2. Improve the heat dissipation environment.
E-11	Overload protection	Load power overhigh	Input power set value \leq rated power
E-12	Load temperature overhigh protection	Temperature adjustment not stable or temperature sensor broken	Inspect load temperature sampling channel.

Fault Code	Fault Instruction	Reason	Fault Inspection
E-13	Reservation		
E-14	Busbar current overload during running (software protection point) protection	Busbar end current protection software action	Inspect input voltage whether abnormal or not.
E-15	External equipment fault	External fault signal input	Inspect external equipment fault.
E-16	No-load running protection	No-load running	1. No-connect with heating coil. 2. Output coil and output terminal with poor contact.
E-17	Reservation		
E-18	Reservation		
E-19	Reservation		
E-20	Reservation		
E-21	Running time limitation protection	Limit running function in effect and set time up	Input running limit code (P3.02) to check and set P3.03 to 0.
E-22	Display panel communication fault	Display panel line connected bad, control board broken	1. Reinsert keyboard board and control board communication line. 2. Take keyboard board out from the slot and reinstall it. 3. Replace keyboard board and control board communication line. 4. Try to replace a new control board.
E-23	Load inductance overhigh protection	Load inductance overhigh	Reduce output coil inductance.
E-24	Load inductance End-Low protection	Load inductance end-low	Increase output coil inductance.
E-25	Creepage protection	Induction heating power creepage	1. Check whether the coil is creepage. 2. Check whether coil directly contact with iron material. 3. Check whether machine with signs of lighter.
E-26	Transformer TEMP overhigh protection	Hydraulic pressure low or temperature sensor broken	
E-27	Cooling system fault	Bad connect of transformer cooling pipe, or too many dirt, or water pressure switch fault	1. Check water quality and clean dirt; 2. Check water pressure switch.
E-28	Resonant CAP TEMP overhigh protection	CAP not matched	
E-29	Resonant CAP temperature measuring fault protection	Resonant capacitance temperature measuring line not connected well	
E-30	Load coil temperature measuring fault protection	Load coil temperature measuring line not connected well	
E-31	Transformer temperature measuring fault protection	Transformer temperature measuring line not connected well	
E-32	PID feedback fault	Temperature PID feedback line not connected well or disconnected	

Fault Code	Fault Instruction	Reason	Fault Inspection
E-33	Slave machine synchronization running fault protection	Slave machine under protection or without synchronous running mode	
P.oFF	Low Voltage	Busbar voltage too low, raise supply power voltage	1. After stop, use multimeter to measure input cable voltage, ensure it in the range of $V_e^* (1 \pm 20\%)$. 2. After stop, use multimeter to measure input cable voltage, ensure it in the range of $\{V_e^* (1 \pm 20\%)\}$, then adjust P3.07 value to ensure D-01 value=cable voltage.

NOTE: V_e as rated input voltage.

Alarm Code			
Alarm Code	Instruction	Reason	Fault Inspection
A1	No load or can not detect load		
A2	Current limit	Input (output) current higher than rated input (output) current protection	
A3	Derating power running	① Voltage low, in the scope of $\pm(20 \sim 30\%)$ ② Radiator temperature overhigh lead to forced derating power running	If the temperature of the chassis is too high, the ventilation volume of the heating power supply environment should be increased and check the cooling effect of the chiller.
A4	Voltage high alarm	Input voltage higher than input voltage protection value	Ensure D-02 value=cable voltage
A5	Voltage low alarm	Input voltage lower than input voltage protection value	Adjust P3.06, ensure D-02 value=cable voltage
A6	The user's 485 device and master control panel communication fault alarm	The user's 485 device and master control panel communication fault	1. Check The user's 485 device and master control panel connection well or not. 2. Check whether the user's 485 device is normal.
A7	Transformer and master control panel communication fault alarm	Transformer and master control panel communication fault	1. Check transformer and master control panel connection well or not. 2. Check transformer inductor Whether normal.
A8	Load coil temperature measuring offline		
A9	Transformer temperature measuring offline		
A10	Resonant CAP temperature measuring offline		
A11	Synchronous running mode communication fault alarm	Synchronous running mode communication line connected bad	Check synchronous running mode communication line

9. RS485 Communication Protocol

(1) Machine address: Set by P3.18, the default is 1

(2) Serial interface parameter:

Baud rate: 9600

Data bit: 8

Check bit: None

Shut down bit: 1

(3) Register address:

41000~41031—Monitoring parameter (D) address

41100~41299—Basic parameter (P) address

41300—Error address

41301—Warning address

41400—Shutdown running address

41401~41406—6 routes display temperature address

41407~41410—Machine status indicator parameter address

41500~41505—System interface parameter address

41600~41604—Preheat setting interface parameter address

41700~41706—Annealing setting interface parameter address

41800~41806—PWHT setting interface parameter address

41900~41904—Constant Power mode interface parameter address

42000~42059—Power vs time mode interface parameter address

42060~42064—Constant current mode interface parameter address

42065~42089—Current vs time mode interface parameter address

43001—RS485 Power given address

(4) Address table:

Monitoring Parameter (D)			
Address	Parameter	Range	Description
41000	Input power	0.00~655.35KW	
41001	Input voltage	0~1000V	
41002	Input current	0.1~6553.5A	
41003	Output frequency	0.50~40.00KHz	
41004	Total output current	0.1~6553.5A	
41005	Output current 1	0.1~6553.5A	
41006	Output current 2	0.1~6553.5A	
41007	Resonant CAP volt	0~6000V	
41008	Equal resistance (ESR)	0.0~100.0Ω	
41009	Inductance	1~1000uH	
41010	Output duty cycle	0.01%~100.00%	
41011	Power factor angle	0.0~180.0°	
41012	Quality factor Q	0.1~10.000	
41013	Heat sink temperature	0.0~165.0°C	
41014	AI state	0~4096	
41015	Transformer TEMP	0.0~165.0°C	
41016	Reservation		
41017	Run time (low)	0~9999H	
41018	Run time (high)	0~9999*10000H	
41019	Limit run time	0~9999H	
41020	Special product num	1~65535	
41021	Reservation		
41022	Error 1	0~33	0: No fault Other: Fault code

Address	Parameter	Range	Description
41023	Error 2	0~33	0: No fault Other: Fault code
41024	Error 3	0~33	0: No fault Other: Fault code
41025	Error 4	0~33	0: No fault Other: Fault code
41026	Error 5	0~33	0: No fault Other: Fault code
41027	Error 6	0~33	0: No fault Other: Fault code
41028	Error 7	0~33	0: No fault Other: Fault code
41029	Error 8	0~33	0: No fault Other: Fault code
41030	Error 9	0~33	0: No fault Other: Fault code
41031	Error 10	0~33	0: No fault Other: Fault code
Machine Status Indicator			
41407	Machine status indicator	bit0~bit7	bit0: Normal voltage indicator 0: Abnormal voltage 1: Normal voltage bit1: Running status indicator 0: No operation 1: Running bit2: Reserved bit3: Fault status 0: No fault 1: Faulty bit4: Warning status 0: No warning 1: Warning bit5: Reserved bit6: Reserved bit7: Reserved
41408	Heating indicator	0~1	0: No heating 1: Heating
41409	Fault indicator	0~1	0: No fault 1: Faulty
41410	Machine ready indicator	0~1	0: Not ready 1: Ready
System Interface			
41500	Maximum power	0.5~rated power	
41501	Maximum output current	5.0~maximum output current	
41502	Temperature control accuracy	0~255	The larger the value, the higher the accuracy and the slower the response, generally take 3~20
41503	Control mode	0~1	0: Temperature control 1: Power control
41504	Start mode	0~1	0: 485 start 1: Keyboard start
41505	Curve number selection	0~1	Temperature mode: 0~2 Power mode: 0~19
Constant Temperature Setting Interface			
41600	Control TC number	0~5	

Address	Parameter	Range	Description
41601	Preheat temperature	0~1300℃	
41602	Holding time (hour)	0~99	
41603	Holding time (minute)	0~59	
41604	Holding time (second)	1~59	
Annealing Setting Interface			
41700	Control TC number	0~5	
41701	Holding temperature	Cooling temperature~1300℃	
41702	cooling temperature	0~holding temperature	
41703	Cooling rate	1~6000℃/h	
41704	Holding time (hour)	0~99	
41705	Holding time (minute)	0~59	
41706	Holding time (second)	1~59	
PWHT Setting Interface			
41800	Control TC number	0~5	
41801	Ramp temperature	0~holding temperature	
41802	Ramp rate	1~6000℃/h	
41803	Holding temperature	Ramp temperature~1300℃	
41804	Holding time (hour)	0~99	
41805	Holding time (minute)	0~59	
41806	Holding time (second)	1~59	
Constant Power Mode Interface			
41900	Setting power	0.5~rated power	
41901	Running time (hour)	0~99	
41902	Running time (minute)	0~59	
41903	Running time (second)	0~59	
41904	Running time (0.1 second)	0~9	
41905	Remaining run time (hour)	0~99	
41906	Remaining run time (minute)	0~59	
41907	Remaining run time (second)	0~59	
41908	Remaining run time (0.1 second)	0~9	
Power VS Time Mode Interface			
42000	The first segment type	0~1	0: Hold 1: Ramp rate 3: End 20
42001	The first segment setting power	0.5~rated power	
42002	The first segment running time (hour)	0~99	
42003	The first segment running time (minute)	0~59	
42004	The first segment running time (second)	0~59	
42005	The first segment running time (0.1 second)	0~9	
42006	The second segment type	0~1	0: Hold 1: Ramp rate 3: End 20
42007	The second segment setting power	0.5~rated power	
42008	The second segment running time (hour)	0~99	
42009	The second segment running time (minute)	0~59	
42010	The second segment running time (second)	0~59	

Address	Parameter	Range	Description
42011	The second segment running time (0.1 second)	0~9	
42012	The third segment type	0~1	0: Hold 1: Ramp rate 3: End 20
42013	The third segment setting power	0.5~rated power	
42014	The third segment running time (hour)	0~99	
42015	The third segment running time (minute)	0~59	
42016	The third segment running time (second)	0~59	
42017	The third segment running time (0.1 second)	0~9	
42018	The forth segment type	0~1	0: Hold 1: Ramp rate 3: End 20
42019	The forth segment setting power	0.5~rated power	
42020	The forth segment running time (hour)	0~99	
42021	The forth segment running time (minute)	0~59	
42022	The forth segment running time (second)	0~59	
42023	The forth segment running time (0.1 second)	0~9	
42024	The fifth segment type	0~1	0: Hold 1: Ramp rate 3: End 20
42025	The fifth segment setting power	0.5~rated power	
42026	The fifth segment running time (hour)	0~99	
42027	The fifth segment running time (minute)	0~59	
42028	The fifth segment running time (second)	0~59	
42029	The fifth segment running time (0.1 second)	0~9	
42030	The sixth segment type	0~1	0: Hold 1: Ramp rate 3: End 20
42031	The sixth segment setting power	0.5~rated power	
42032	The sixth segment running time (hour)	0~99	
42033	The sixth segment running time (minute)	0~59	
42034	The sixth segment running time (second)	0~59	
42035	The sixth segment running time (0.1 second)	0~9	
42036	The seventh segment type	0~1	0: Hold 1: Ramp rate 3: End 20
42037	The seventh segment setting power	0.5~rated power	
42038	The seventh segment running time (hour)	0~99	
42039	The seventh segment running time (minute)	0~59	
42040	The seventh segment running time (second)	0~59	
42041	The seventh segment running time (0.1 second)	0~9	
42042	The eighth segment type	0~1	0: Hold 1: Ramp rate 3: End 20
42043	The eighth segment setting power	0.5~rated power	
42044	The eighth segment running time (hour)	0~99	
42045	The eighth segment running time (minute)	0~59	
42046	The eighth segment running time (second)	0~59	
42047	The eighth segment running time (0.1 second)	0~9	

Address	Parameter	Range	Description
42048	The ninth segment type	0~1	0: Hold 1: Ramp rate 3: End 20
42049	The ninth segment setting power	0.5~rated power	
42050	The ninth segment running time (hour)	0~99	
42051	The ninth segment running time (minute)	0~59	
42052	The ninth segment running time (second)	0~59	
42053	The ninth segment running time (0.1 second)	0~9	
42054	The tenth segment type	0~1	0: Hold 1: Ramp rate 3: End 20
42055	The tenth segment setting power	0.5~rated power	
42056	The tenth segment running time (hour)	0~99	
42057	The tenth segment running time (minute)	0~59	
42058	The tenth segment running time (second)	0~59	
42059	The tenth segment running time (0.1 second)	0~9	
Constant Current Mode Interface			
42060	Constant current value	0~rated current	
42061	Constant current setting time (hour)	0~99	
42062	Constant current setting time (minute)	0~59	
42063	Constant current setting time (second)	0~59	
42064	Constant current setting time (0.1 second)	0~9	
42065	Constant current remaining run time (hour)	0~99	
42066	Constant current remaining run time (minute)	0~59	
42067	Constant current remaining run time (second)	0~59	
42068	Constant current remaining run time (0.1 second)	0~9	
Current VS Time Mode Interface			
42069	The first segment current value	0~rated current	
42070	The first segment running time (hour)	0~99	
42071	The first segment running time (minute)	0~59	
42072	The first segment running time (second)	0~59	
42073	The first segment running time (0.1 second)	0~9	
42074	The second segment current value	0~rated current	
42075	The second segment running time (hour)	0~99	
42076	The second segment running time (minute)	0~59	
42077	The second segment running time (second)	0~59	
42078	The second segment running time (0.1 second)	0~9	
42079	The third segment current value	0~rated current	
42080	The third segment running time (hour)	0~99	
42081	The third segment running time (minute)	0~59	
42082	The third segment running time (second)	0~59	
42083	The third segment running time (0.1 second)	0~9	
42084	The fourth segment current value	0~rated current	
42085	The fourth segment running time (hour)	0~99	
42086	The fourth segment running time (minute)	0~59	
42087	The fourth segment running time (second)	0~59	

Address	Parameter	Range	Description
42088	The fourth segment running time (0.1 second)	0~9	
42089	The fifth segment current value	0~rated current	
42090	The fifth segment running time (hour)	0~99	
42091	The fifth segment running time (minute)	0~59	
42092	The fifth segment running time (second)	0~59	
42093	The fifth segment running time (0.1 second)	0~9	
RS485 Power Given			
43001	Percentage power/current adjustment	0~1000	

Note: 42000~42059 are the parameter addresses of the currently selected curve. When you need to set other curves, you need to set 41505 first, select the curve you want to set as the current curve, and then set the parameters of 42000~42059 to set the set parameters to the corresponding curve.

For example, curve 1 has been set by setting addresses 42000~42059. If you want to set curve 2, you should first set the value of 41505 to 1 (that is, select curve 2), then set the address 42000~42059 to realize setting the parameters of curve 2.

(5) Case (The following data are displayed in hexadecimal):

Write the preheat temperature value:

Send: 01 06 06 40 02 58 88 0C——Set P1.06 parameter value

Read error parameter:

Send: 01 03 05 13 00 01 75 03——read current error

Read warning parameter:

Send: 01 03 05 14 00 01 C4 C2——read current warning

Read output power parameter:

Send: 01 03 03 e7 00 01 34 79——read current output power

Read output current parameter:

Send: 01 03 03 eb 00 01 F4 7A——read current output current

Read output frequency parameter:

Send: 01 03 03 ea 00 01 A5 BA——read current output frequency

Running command (The running command cannot be written in 10):

Send: 01 06 05 77 00 01 F8 DC——run

Send: 01 06 05 77 00 02 B8 DD——stop

Write control board 6 routes temperature:

Send: 01 10 05 78 00 06 00 01 00 02 00 03 00 04 00 05 00 06 D0 35

——Set the 1~6 route temperature values respectively to 0.1、0.2、0.3、0.4、0.5、0.6

Read the 1 and 2 route temperature (Temperature data is signed 16-bit data):

Send: 02 03 05 78 00 02 44 ED

Read the 3 and 4 route temperature:

Send: 03 03 05 78 00 02 45 3C

Read the 3 and 4 route temperature:

Send: 04 03 05 78 00 02 44 8B

(6) Communication format

① 03: read multiple registers

Send data format:

Machine address 03 start address (16 bits) number of registers (16 bits) CRC check code (16 bits)

Receive data format:

Machine address 03 data length (8 bits) data (16 bits*number) CRC check code

② 13: read single register attributes

Send data format:

Machine address 13 register address (16 bits) number of data (16 bits) CRC check code

Receive data format:

Machine address 13 data length (8 bits) main parameter (16 bits) attribute (16 bits)

Minimum value (16 bits) Maximum value (16 bits) CRC check code

③ 06: Write one menu register

Send data format:

Machine address 06 register address (16 bits) data (16 bits) CRC check code

Receive data format:

Machine address 06 register address (16 bits) data (16 bits) CRC check code

④ 10: Write multiple menu registers

Send data format:

Machine address 10 start address (16 bits) number of registers (16 bits) data (16 bits) CRC check code

Receive data format:

Machine address 10 start address (16 bits) number of registers (16 bits)

(7) MODBUS communication error code:

Format:

Machine address 80+function code error code CRC check code

Code No.	Description	Reason
01	Illegal function	Command number error
02	Illegal address	Register address is incorrect
03	Illegal data	Data out of parameter data range
04	Illegal register length	The number of read/write registers is incorrect
05	CRC error	Send/receive data error
06	Parameters cannot be modified during operation	
07	Parameters cannot be modified	
08	The upper computer control command is invalid	
09	Parameters are password protected	
0A	Wrong password	

(8) Parameter attribute:

Bit	Meaning
Bit7~Bit5 (Read-write attribute)	00: Reserve or monitor parameters 01: Only read 10: Read-only when running 11: Can read and write in any state 101: Password parameters
Bit4~Bit2 (unit)	000: None 001: Hz 010: A 011: % 100: V 101: °C 110: TIME 111: KW
Bit1~Bit0 (number of point)	00: None 01: One point 10: Two points 11: Three points

10. Water Cooling System Operation Manual



10.1 Function Introduction

Below items introduction:

Ts: (water tank) setting temperature (this temperature is adjustable, please see below control panel introduction)

Tw: (water tank) real temperature

10.1.1 Operation

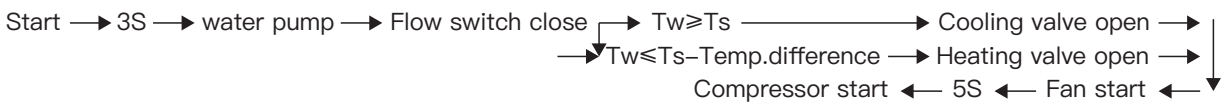
(1) Compressor start and stop:

Refrigeration mode: when $Tw \geq Ts$, compressor start.

when $Tw \leq Ts - \text{temp. difference}$ (temp. difference is adjustable)

Bypass mode: compressor stop time $\geq 60S$, the compressor start and running

(2) Chiller starting process:



(3) Chiller shut off process:

Shut off → all shut off

(4) Water pump running:

when chiller starting, the water pump running, it keeps running while chiller running.

(5) Fan start and stop:

5S before compressor start, the fan start running, 5S after compressor shut off, the fan shut off.

(6) Error output:

When error happened, the output error code will display on the control panel.

10.2 Protection

(1) Compressor start and stop protection

The compressor should restart again at least after 90S. The compressor running at least 60S to shut off except the chiller shut offer and error.

(2) High pressure protection

After compressor starting, then check the high pressure switch. If high pressure last break 1S to enter into alarm mode. once confirmed high pressure protection to lock this error and stop all signal output, no matter its reset or not will display the error code.

(4) Water flow protection

After water pump running 3S to check water flow switch, if water flow switch cut off to enter into alarm mode, once confirmed water flow protection to lock this error and stop all signals output, no matter its reset or not will display the error code.

(5) Water level protection

If water level switch shut off (or water lacking), the chiller unit will shut off.

(6) Compressor overload protection

After compressor starting 6S to check the Current, if Current over the setting value and last 5S to stop all signals output.

NOTE: If no need compressor overload protection can set the basic Current 0, please refer below parameter setting.

(7) Power supply 3 phases missing phase and reverse phase protection

When 3 phases power B phase, C phase out of phase or A B C wrong phase, stop all signals output. Error output and display error code.

NOTE: If single phase 220V usage, should set it into 00, please refer below parameter setting.

(8) Over temperature protection

When water temperature beyond up setting value or below down setting valve, stop all signals output. Error output and display error code.

(9) Temperature sensor protection

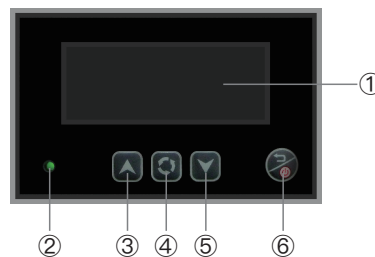
When temperature sensor short/off circuit, stop all chiller parts. Error output and display error code.

NOTE: Must shut off electricity power supply to stop chiller once alarming to check and prepare the chiller.

10.3 Control Panel Introduction

(1) Operation panel diagram and introduction

- ① — LED display window
- ② — Setting mode indicator
- ③ — Rising (+) keys
- ④ — Menu / confirm
- ⑤ — Falling (-) keys
- ⑥ — Return / start or stop keys



(2) ON/OFF operation process

Chiller power on, power supply indicator lighting, press ON/OFF to control chiller system start and stop. When chiller starting, PV display the real water temperature, SV display the setting water temperature. Running indicator light flashing, and after compressor starting, the running indicator keep lighting, chiller system enter into normal working state.

(3) Parameter setting

① User parameter setting

Press SET for 3 seconds, the control panel enter into water temperature setting, water temperature indicator light-ing, SV displays the setting number, press UP and DOWN to adjust, press SET to shift into DT setting.

After Parameter setting finished, press ON/OFF to confirm and exit. If there is no press within 5 seconds, the control panel will keep the setting number and exit the setting status.

② Administer parameters setting

Continuous Press FUNC for 5 seconds while chiller on power off status, PV display “cod” and SV display “000”to remind input the password, press UP and DOWN to input the password NO. and press SET to shift ten digit and single digit to input. After input correct password, press ON/OFF to enter into administer parameters setting. Meanwhile PV displays P1 means enter into Phase protection choice, SV displays setting value. Press UP or DOWN to adjust, press SET shift to next item parameter setting. Press ON/OFF to confirm and exit if parameter setting finished. Exit the setting If input wrong password. (Password 359).

Specifications Setting Table:

Specifications	NO.	Items	Unit	Setting Range		Step	Default Value
User parameters	1	Set temp.	℃	2.0~45.0		0.1	25.0
	2	Set diff.	℃	0.1~8.0		0.1	2
	3	Follow temp.	℃	-20.0~20.0		0.1	20
Admi. parameter	4	Phase enable		Disable			Enable
				Enable			
	5	1# Comp current	A	0~30	1	14	
	6	2# Comp current	A	0~30	1	14	
	7	Upper limit temp.	℃	25~75	0.1	50.0	
8	Lower limit temp.	℃	-20~10.0	0.1	5.0		

Specifications	NO.	Items	Unit	Setting Range	Step	Default Value
Admi. parameter	9	Comp. selection	Double head			Double head
			1# head			
			2# head			
	10	Liquid level detection	Disable			Enable
			Enable			
	11	Off state memory	No memory			No memory
Memory						
12	Compressor delay	S	60-600	1	90	
13	Mode selection	Temp. fixed			Temp. fixed	
		Envi foll mode				
Sys. parameter	14	Backlight time delay	S	0~600	1	60
	15	Date	2014-01-01~3000-12-31			2015-12-29
	16	Language select	Chinese			English
English						

Note: display water tank temp.= measure temp.+correction temp. value.

10.4 Compressor Current and Condensing Temp. Inquiry

Press UP and DOWN to checking compressor operating Current when chizller starting, Nixie tube ④ display the inquiry location, Nixie tube ⑤ display the inquiry value.if there is no press within 3 seconds, the control panel will auto-back to display water temp. and temp. setting status.

CH0 ----- water tank temp.

CH1 ----- compressor Current

10.5 Error Output

All stop and output the alarm signal if there is any error and display the error code.

Error code table:

NO.	Code	Error
1	E02	Temp. sensor error (open circuit or short circuit)
2	E08	Power supply phase missing or reverse phase
3	E09	Compressor Current beyond
4	E10	Water level switch cut off (water lacking error)
5	E11	Compressor low pressure error
6	E12	Compressor high pressure error
7	E13	Water flow switch error
8	E45	Water temp. beyond up limited value
9	E54	Water temp. lower than low limited value

Warranty Card

Product Information:

Product Name: _____

Customer Name: _____

Model Type: _____

Customer Address: _____

Purchase Date: _____

Contact Number: _____

Warranty Terms:

1. From the date of original shipment, we guarantee warranty of 12 months for free, and paid service for a lifetime;
2. Product failure caused by the following reasons are not included in 12 months warranty guarantee:
 - (1) Users didn't conduct right operation according to user's manual;
 - (2) Equipment has been repaired or modified by user's without consent of manufacturer;
 - (3) Fault caused by operation outside standard scope of application;
 - (4) Abnormal aging or fault result from bad operating environment;
 - (5) Damage caused by force majeure like earthquake, fire, flood, thunderstrike, abnormal voltage, or other natural disasters;
 - (6) Damage caused by improper delivery or external force.
3. Manufacturer preserves the right to refuse warranty service for the following condition:
 - (1) Damage of beyond recognition of brand, trade mark, serial number, nameplate, and other manufacturer marks;
 - (2) Payment is not finished according to contract;
 - (3) Intentional concealment to our after-sale service provider of wrong operation during setting, wiring, operation, maintenance or other process.
4. For failing products, Canroon preserve the right to entrust others for warranty issues.

Certificate

Inspector: _____ QC 001

The product is inspected according to the standard.

Canroon

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REV: V2.2