Induction Melting Furnace

Manual Book

READ CAREFULLY THE INSTRUCTION BEFORE OPERATING THE FURNACE

(English)

1. Caution

2.1 Never leave hot graphite crucible with metal liquid cooling in the machine naturally, otherwise it will damage the machine.Grab the crucible out immediately when the melting is finished.

2.2 Anytime when the water circulation is stopped or failure (power failure, or the chiller is turned off, or you are changing water in the container for pump) If the crucible is hot and stay in the coil take it immediately out from the coil and switch off the machine otherwise the coil will be damage.

2.3 This melting furnace must use ceramic and graphite crucible together. Other kinds and shapes crucible should never be used. Do not use only graphite or ceramic crucible alone, must use both or the coil might be damaged.

2.4 Please turn off the working switch before pouring the liquid metal.

2.5 After completion of melting. Turn off the operating switch on the melting furnace. Keep the water cycle cooling system running for more than 20 seconds, then turn off the power switch on the melting furnace and water chiller.

2.6 When use machine with pump(without chiller) for cooling, do not reuse the outlet hot water, need to change new water every time when one crucible melting finishes.

2.Product Description

The machine adopts medium frequency induction , which can rapidly melt gold , silver, copper, stainless steel and other metals. Using this technology, the operation is simple, the melting speed is fast, low energy consumption.

System protection: IGBT overheating over-current protection, water-shortage protection, over voltage/low voltage, surge, coil open circuit/short circuit. Non-crucible circuit detection function, a variety of internal fault automatic detection procedures, such as driving frequency error. Automatic alarm protection, such as more than 30 kinds of protection procedures for error.

Product Advantages

①IGBT technology control

②Medium Frequency Induction

③Small in size

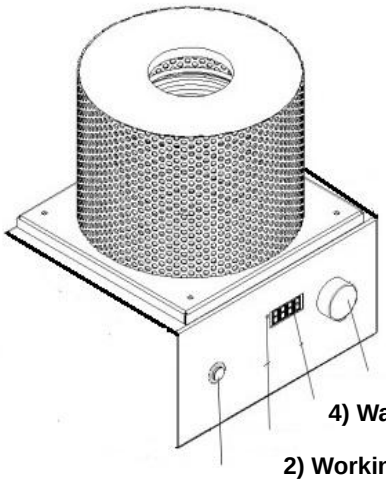
④High-speed melting

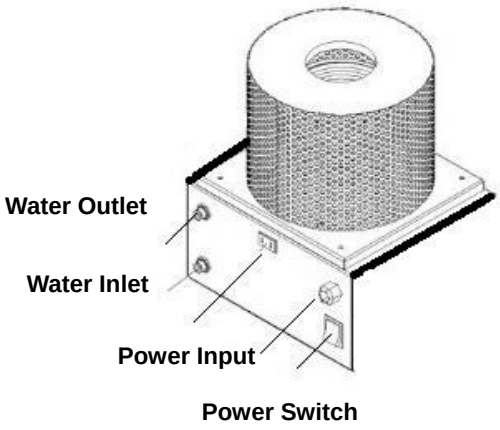
⑤Water circulation heat dissipation

⑥Low material losses

⑦Longer service life (No need to replace the heating element)

3.Technical Data



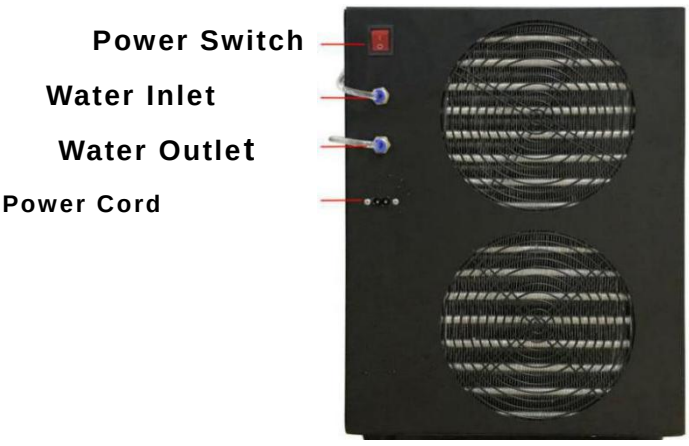


Technical Parameters

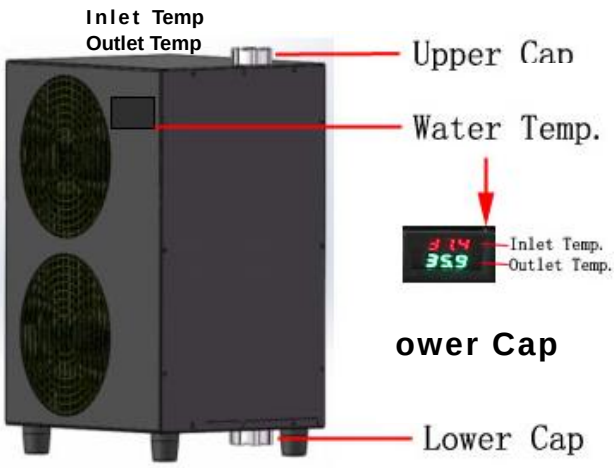
Heating Type	Induction (Medium Frequency)	**Model**	1 kg and 3 kg
Voltage	190-235V	**Metal Suitable**	Gold, Sliver, Copper, etc
Frequency	50-60Hz	**Working Time**	Continuous 24 Hours
Leakage Circuit Breaker Minimum	20A 1kg/25A 3kg	**Melting Speed**	5/8 Mins for 1kg gold, sliver, copper
Cross-sectional Area of Wire Minimum	1 kg 1.5mm^2 3 kg 2.5mm3^2	**Application**	Refining Precious Metal
Power	3500W/5000W 1 kg 3 kg	**Cooling Type**	Water cooling
Capacity	1Kg/3Kg	**Accessories**	Plier gloves
Dimension(L*W*H)	315*295*310(mm)	**Water cycle**	Needed 0.7L/Minute
Net Weight	7.5Kg	**Maximum Temp**	1600℃（2900℉）
Warranty	Machine warranty for 1 Year	**Core Component**	IGBT

Technical parameter of water chiller

Back side illustration



Front side illustration



Technical data of water chiller				
Power supply	Supplied by furnace		Power	130W
Water capacity	4 Liters		Water cycle	0.7L/MIN
Inlet temp.	Less than 70℃		Outlet temp.	35-40℃
Max inlet temp	80℃		Max Outlet Temp	45℃
Dimension	**345mm *316mm *495mm**		Net Weight	18KG

Attention :

(1） Water chiller (RACOMMENDED) is an optional part. Melting furnace can also be operated with a water pump **with a capacity of at least 0.7 LITER PER MINUTE**

(2) When first time use, add 2 liters water from the upper cap of the water chiller. Total water capacity inside is 4 liters, check every 3-4months from the upper cap if there is enough water inside. If not enough, refill from upper cap.

(3) when the room temperature is high (> 35℃), the normal water temperature will increase to 35-40℃.

(4) when the inlet temperature of the water chiller exceeds 80℃ or the outlet temperature exceeds 45℃ the melting shall be stopped immediately and the melting furnace working switch shall be closed. Keep the water cooler open and wait for more than 2 minutes. After the inlet and outlet water temperature drops, turn on the working switch again.

4.Operation Instructions

Step 1: Remove machine packing, put the furnace on draughty and smooth ground.

Step 2: Remove the sticks fixing the coil, check if the coil is at the correct position (Picture A). If not remove cover of furnace an pull up the coil very gently

Step 3:correctly connect the furnace and cooling system. Be careful of inlet tube and outlet tube, must not connect reversely..

Power requirement

Before operating the melting machine, when using the model of 3500W power, please confirm the leakage switch is over 20A and the electric cross-sectional area of wire is over 1.5mm^2. If use the model of 5000W power, please confirm the leakage switch is over 25A and the electric cross-sectional area of wire is over 2.5mm^2 of national standard.

Normal operation of machine:

Step 1: Turn on the main switch of power supply. Keep the water in the machine cycle flow normally for one minute, then machine is in normal standby condition.

Step 2: Put in the suitable crucibles (both graphite and ceramic), do not use only graphite or ceramic), do not use crucibles of unfit size.

Step 3: Put suitable metal into the crucible.(Gold, Silver, Brass, etc)

Step 4: Press the working switch (1). The working light is on (2), indicating that the machine can be heated normally. Next, adjust the power potentiometer (3), the actual power can be seen on the watt meter.(4)

Step 5: After few minutes the metal will turn into liquid (5mins for 1kg gold grains).The crucibles and liquid metal is dangerously hot (over 1000℃).The operator need to be very careful and do necessary protection (wear heat resistant glove and use suitable holder). Do not touch crucible and metal.

Step 6: When the metal complete melting, use suitable crucible tong to hold the two crucible together and pour the liquid metal into proper mould or container, then whole procedure is finished.

Finishing: When all jobs are done, turn off the working switch, move the crucibles out, keep water circulating for approximately 30 seconds, turn off the power switch. Then the whole operation is finished.

Continuous Working: To start second and more melting process, repeat step 2-6 to continue working. Please keep the power switch turned on. Ensure the water cooling system is working before start melting.

Maintenance suggestion:

Each time after melting operation is completed. It is necessary to turn off the work switch first, let the water cycle for 10 seconds, and then turn off the main power switch, this operation is a kind of care for the machine.

Use cover for the machine

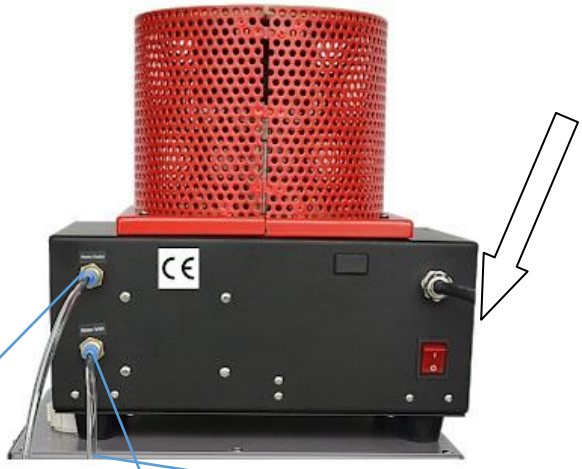
The cover can be put on during melting, so the melting effect is better and energy is saved.

Tips: do not touch the stainless steel part of the handle during melting to avoid hand scalding.

5.Connection

Connecting Illustration of Machine (Without Chiller)

MUST BE USE AN EXTERNAL PUMP AT LEAST 0,7 LITER PER MIN CAPACITY



⚠ 1. When doing continuous melting, do not turn off this switch.

⚠ 2. Before turn off this switch (or in case of power failure), must take out the crucibles.

Water outlet: Used water goes out from this tube. The water will be heated when machine is working, the water in this container can not recycle use. To start another melting process, please replace it with new water of normal temperature.

Water inlet: Prepare a container to store water. TAP CLEAN WATER, CONNECT THE OUTLET OF THE PUMP TO INLET OF THE MACHINE use a PVC tube and connect inlet of pump with a tube going on the water container Make sure there is adequate water in the container, which keeps the machine to work normally and continuously. Water consumption is 0.7L/min.

Connecting Illustration of Machine (with Chiller)

Error Code List of Machine Panel

Code	Error Description	Code	Error Description
E001	--	**E016**	Induction detection anomaly
E002	IGBT Over current / Peak current detected	**E017**	--
E003	--	**E018**	--
E004	IGBT Output overload	**E019**	Exterior fault
E005	Self-checking error， circuit board component error	**E020**	Over voltage
E006	Under voltage	**E021**	Output coil interference
E007	IGBT Over temperature / Peak current detected	**E022**	Crucible not detected
E008	Over 70℃ Water or machine case over temperature	**E023**	18V Fan fault
E009	Limited-time-operation finished	**E024**	--
E010	Storage error, internal arithmetic error	**E025**	Temperature sensor fault
E011	Coil fault	**E026**	--
E012	Output over current	**E027**	--
E013	Driver error	**E028**	--
E014	IGBT Temperature sensor fault	**E029**	--
E015	Communication error	**E030**	Crucible detection error
--	--	**E031**	In shutdown mode

No error code alarm

Melting Furnace has three condition when alarm without error code

(1). Press the operating switch to find no water circulation, and the working light is off. Fault inference: pump or power supply failure. Solution: replace the same type of pump or power supply. If there is water outlet, and the tube is with lots of bubbles inside, it may be a pump problem.

(2).Press the operating switch, the water circulation is normal, and the working light is off. Fault inference: the water flow is less than 0.7Lin one minute, which is below requirement.(To measure, user can put a bottle to collect water from the outlet point for one minute.)If this happen, check all wire connecting if it is tight and in correct position. If the problem is not solve, need to check the water flow sensing unit, or replace relevant parts.

(3). Press the operating switch, the water circulation is normal, and the working light is flashing. It may be no crucible, or there is cooled metal remaining inside the crucible. These situations may cause the starting frequency cannot be synchronized and the normal starting is not possible. Solution: Check the crucible and make appropriate change.

Attention: The system can self detect and show code on the screen .The meaning of the code can be check in the above table.

When error code shows up:1. If it shows up for few second, it is normal, the machine can work normally. 2. If it shows up for over 1 minute, please stop working and restart the machine. 3. If after restarting the code still exist, for E002 and E020, try to insert the plug to another socket or try another time of the day(Usually the voltage varies in different time periods). If these not help. Necessary maintenance measures should be taken according to the code table.