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Vacuum Furnace Range

THERMIC EDGE 2100°C / 3000°C VACUUM FURNACE

The Range

The Thermic Edge Ltd range of furnaces are semi-automatic with a 9" touch-screen interface, PLC control and a graphite or Tungsten hot zone, that heats up different sample sizes up to 3000C. The atmosphere can be either vacuum or inert gas. This furnace is lightweight, by design, with a small footprint making it very simple and safe to operate, incorporating extensive safety features to ensure a durable and reliable product.

Advantages:

- 2100C standard sample heating (Max up to 3000C graphite hot zone or 2600C Tungsten hot zone).
- Safe and easy operation via touch screen: 1 button pump - 1 button vent.
- High vacuum pumping option via Diffusion pump or Turbo pump.
- High power density hot zone, giving fast ramping, 2100C in under 20 minutes.
- Low power consumption due to excellent hot zone insulation.
- Small footprint and lightweight design, using DC switch mode power supplies (no transfomers).
- Process in vacuum / inert gas (to slight over the atmospheric pressure <0.5 bar).
- Automatic pump / purge sequence to give low residual O2, using only rotary pump.
- Water cooled chamber and power feedthroughs, keeps furnace exterior at ambient temperature, stopping overheating and enabling unlimited running times.
- Low cost manual pressure / gas flow control, with needle flow valves on gas inlets and throttle valve on pumpinig outlet.
- Hydrogen option available with Tungsten hot zone

Doc Reference: *210.02-B*
Date of Issue: *25/04/19*

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Overview

- Max temperature: 2100C in vacuum, 2600c (Tungsten HZ) & 3000c (Graphite HZ) in inert atmosphere.
- Mitsubishi PLC and 9" touch screen for furnace control.
- Temperature measurement with C type thermocouple (up to 2100C).
- Vacuum port: ISO63 at fine pumping (turbopump) and KF25 at roughing pump line (RV8).
- 3 phase supply to DC power supplies giving a balanced load.
- All gas lines have 4VCR fittings, ensuring leak tight gas supply.
- Frame on four locking castor wheels available for easy movement.
- Dual heating zone option available to provide high uniformity.
- Pressure displayed on colour gauge display.
- All Graphite hot zone, with crucible or flat suceptor sample holders.
- Programmable PID temperature controller, with connection to laptop for data logging and control.
- Safety interlocks that deactivate the heating process according to: low water flow, over temperature, disruption in gas inlet, low vacuum, opened lid.
- Top loading with electric lid lift and manual lid clamp for over pressure operation to preserve security of the hot zone.
- Small footprint and light weight, using DC switch mode power supplies instead of heavy AC trans formers.
- High power density hot zone, giving fast ramping, 2100C in under 20 minutes.

Pumps Integrated:

- Edwards RV 8: Ultimate pressure: 2 x 10-3mbar (roughing pump).
- Optional Edwards Turbopump EXT75DX: Ultimate vacuum: 5 x 10-8mbar.
- Optional Diffusion pump: Ultimate vacuum: 5 x 10-7mbar.

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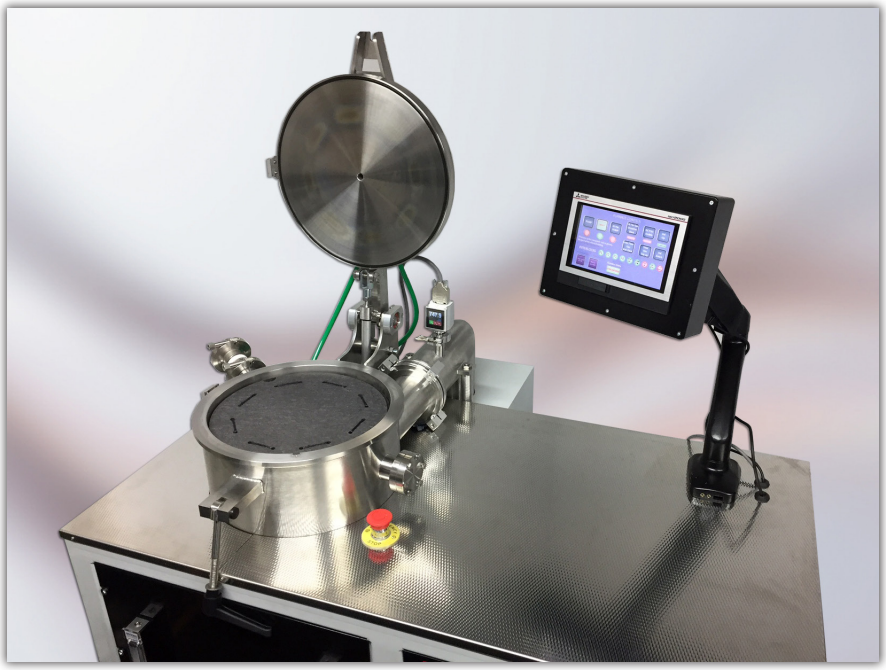
The Internals

The system consists of a vacuum chamber mounted in a wheeled frame. The vacuum chamber is designed to allow easy access to hot zone, with electric lid lift. A PLC is integrated to control the heating sequence, the pumping process, venting, gas admission and interlocks. The electric lid lift ensures the furnace cannot be opened if the hot zone temperature is too high.



DC Power Supplies

The latest range of furnaces are powered by the extremely lightweight and compact DC switch mode power supplies, which offer a significant weight and size reduction over the previous AC transformer / thyristor power supplies. The DC supplies also display hot zone power and current on digital displays, as well as having a manual current limit knob.

Ease of Use

Our furnaces are fitted with effective low cost manual gas pressure and gas flow control. Needle valves fitted to the gas inlets, control gas admission, and a speedy manual throttle valve on the pumping line, controls pumping speed, enabling furnace pressure to be easily controlled. MFC's can also be fitted for more accurate automated gas control.

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Furnace Connections

All services connect to the furnace from the rear. Services required are 3 phase power, cooling water, vent gas (can also operate pneumatic valves if required), process gas and Pneumatic gas (If not using vent gas for furnace pneumatic valves). See the schematic drawing on the right for furnace size and services layout.

Furnace Range

Small Furnace:
1cc crucibles (Ø11.5mm, h:20mm). Power 2400VA 208 / 240 volts.

Medium furnace:
Crucible inner dimensions: Ø60.5mm, height: 75mm, Power 5,000VA 208 / 240 volts.

Large furnace:
Crucible inner dimensions: Ø: 150mm, height: 75mm , Power 12,000VA 208 / 240 volts.

Extra Large furnace:
Crucible inner dimensions: Ø: 180mm, height: 140mm , Power 20,000VA 208 / 240 volts.

Ø4" x 2" high furnace:
Side and base heating for uniform heating of thick Ø4" samples. Power 5,000VA 208 / 240 volts 3 phase.

Ø4" Ø6" Ø8" flat furnace:
ideal to heat up several samples or single wafer up to 8 inch at the same time. The flat furnace can have single zone or dual zone (Ø8") for high thermal uniformity.
Power (2100C) :- Ø4" = 5,000VA, Ø6" = 10,000VA, Ø8" = 15,000VA, all 208 / 240 volts 3Phase.

Tungsten hot zone available for Hydrogen and Nitrogen environments. Graphite HZ max 1800c in Nitrogen.
SiC coated graphite hot zone available for O2 environments up to 1500C (atmospheric pressure)

Flexibility

As all of our customers have different processing requirements, we can be very flexible with regards to gas inlets, processing pressure and pumping. We can easily customise the gas handling and pumping methods to suit individual customers' requirements. The touch screen control makes it very easy to add process buttons, and customise gas handling, process pressures (from vacuum to <0.5 bar) and pumping. A strong lid lock means the furnace can be over pressurised without leaking. An automatic pressure relief valve will bleed over pressure gas directly into the pump exhaust.
Custom hot zone sizes available on request.

Tungsten Hot Zone Furnace

Thermic Edge can also supply vacuum furnaces with a Tungsten hot zone for heating up to 2600C with Nitrogen or Hydrogen process gas. The hot zone is heated using a Tungsten mesh or flat plate element, with heat shielding provided by Tungsten foil heat shields. with Alumina fibre insulation.