

Ultra-high-temperature Furnace for Single Crystal Growth model CGF-27038U

[Outline]

This machine is a high-vacuum and high-frequency furnace that is specially designed to maintain ultra-high temperature around 3,000°C for a long time for single-crystal growth.

Because a special radiation shielding material such as PBN radiation shielding tube is used, this machine can minimize radiation loss from a crucible surface and can maintain precisely controlled high temperatures that are achieved using high frequencies.

[Machine overview]



GES CORPORATION

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URL <http://www.ges.co.jp>



Ultra-high-temperature Furnace for Single Crystal Growth model CGF-27038U

[Basic specifications]

1. Furnace for crystal growth

1) Furnace

Furnace Design dual pipe silica glass/ outside is water cooled.
 Pressure Range up to 10^{-7} torr (relative to absolute pressure)
 Vacuum Leak Rate less than 1×10^{-9} atm.cc/s (helium)

2) Casting Crucible

Material tungsten
 Size 5 mm thickness \times 20 mm diameter \times 100(80)mm length
 Required temperature 3000°C

3) Upper Shaft

Material stainless
 Travel Stroke 200 mm
 Normal Travel Speed 0.1–10 mm/Hr (stability $\pm 0.5\%$ FS)
 Fast-forward Speed 100 mm/min (fixed)
 p-BN Radiation Shielding Tube available
 Mounting Structure for Crucible hook type

4) Operation Board and Temperature Control System

Temperature Control System
 Temperature increasing pattern can be set with the program controller.
 Actual temperature is measured by two color radiation thermometer.
 Feedback adjustment for the generator output can be done.

5) Vacuum Evacuation System

Vacuum Pump Turbo molecular pump 160 L/s
 Rotary pump (with oil mist) 90 L/min
 Main Valve 4 inch manual gate valve
 Vacuum Gauge Pirani gauge / ion gauge with set point
 Piping SUS304

2. High-frequency Power Source (Heating Source)

Configuration High-frequency generator / Matching box / Heating coil
 Specification Nominal output 50 kW (planned)
 Maximum Input 65 kVA (planned)
 Output Variation Range 5–100%
 Output Adjustment Method Thyristor phase control method (planned)
 Generating System Bridge inverter system (planned)
 Frequency Range More than 200 kHz (planned)
 Rectifier Circuit Three-phase bridge rectifier circuit by thyristor
 Output Adjustment System Output variation range can be adjusted freely by turning SW for output adjustment under thyristor phase control.
 Automatic Voltage Control Circuit Output voltage can be reduced within $\pm 1\%$ against power source voltage $\pm 10\%$.
 Protective Device Each semiconductor and circuit part can be protected against malfunction.
 Heating Coil 1 pc



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