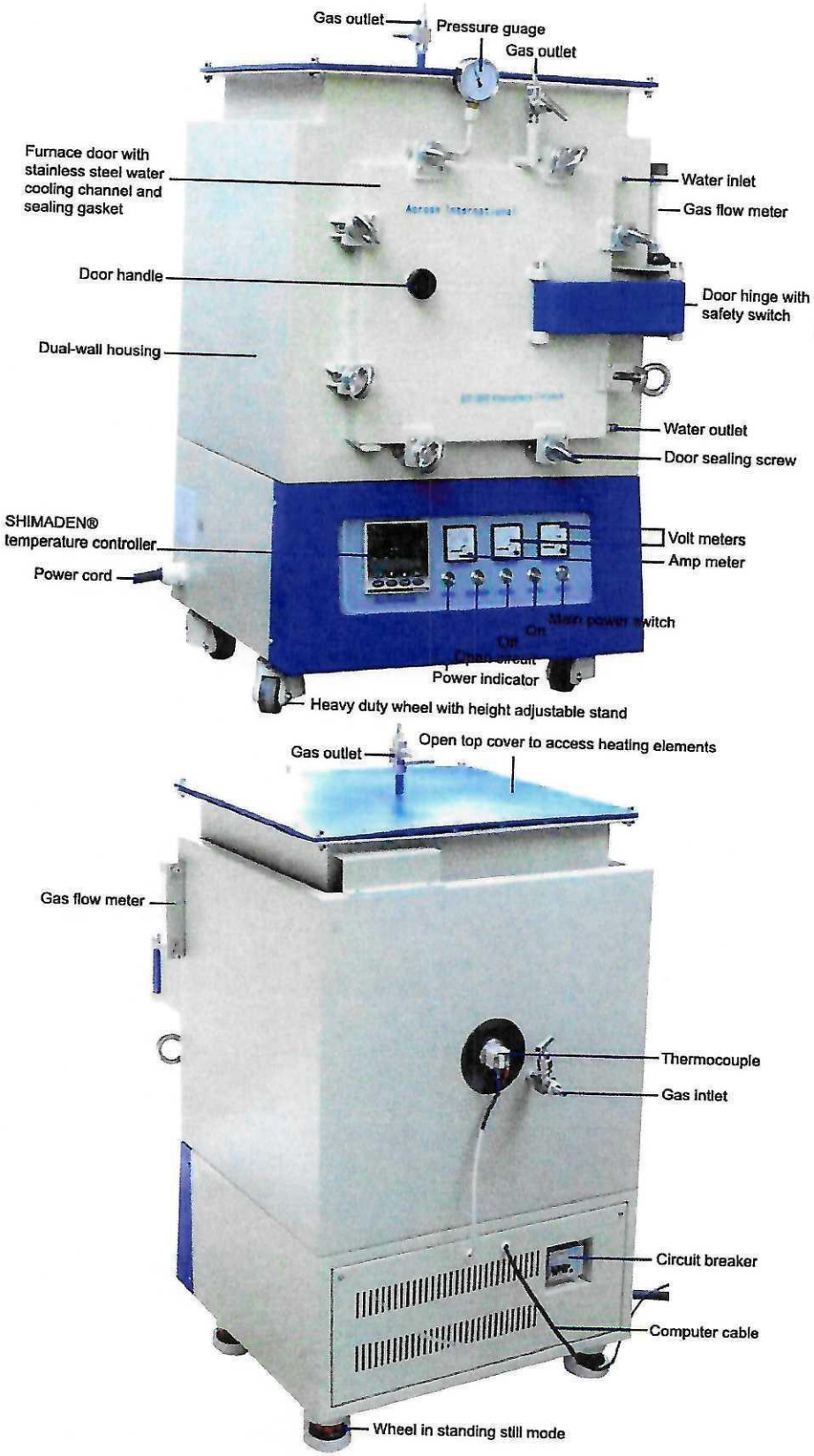
1. Specifications

		GCF1100B (stainless steel interior)	GCF1200
Item	UoM	Value	
Chamber Material		304 Stainless steel	Alumina fiber
Structure		Double-layer housing with air cooling system	
Max. Output	KW	11 x 7 x 4": 2.5 kW 11 x 7 x 7": 4 kW 11 x 9 x 9": 5 kW 15 x 11 x 11": 9 kW 17x14X14" 15KW	12 x 8 x 5": 2.5 kW 12 x 8 x 8": 4 kW 12 x 10 x 10": 5 kW 16 x 12 x 12": 9 kW 20 x 16 x 16": 15Kw 20X20X20" : 18KW
Voltage	V	220VAC	
Frequency	Hz	50/60	
Phase	Phase	Single	
Temp Range	℃	0-1100	0-1200
Constant Working Temp	℃	0-1000	0-1200
Heating Rate	℃/min	≤15	
Chamber Size (DxWxH)	Inch	11 x 7 x 4" 11 x 7 x 7" 11 x 9 x 9" 15 x 11 x 11"	12 x 8 x 5" 12 x 8 x 8" 12 x 10 x 10" 16 x 12 x 12" 20 x 16 x 16" 20 x 20 x 20"
Overall Size (DxWxH)	Inch	18 x 21 x 22" 18 x 21 x 25" 18 x 23 x 27" 24 x 26 x 31"	18 x 21 x 22" 18 x 21 x 25" 18 x 23 x 27" 24 x 26 x 31" 30 x 32 x 40" 38 x 37 x 50"
Temp Controller Precision	℃	±1	
Temp Controller		Shimaden fp93 (made in Japan), 4 programs and 40 segments (ie. 4 x 10 segments or 2 x 20 segments) with PID adjustment.	
Thermo Couple	Type	K	
Heating Element		Kanthal resistant coil wire	
Surface Temp	℃	≤45	
Built-In Circuit Breaker (220V single phase)		11 x 7 x 4": 16A 11 x 7 x 7": 25A 11 x 9 x 9": 32A 15 x 11 x 11": 50A 17x14X14" 100A	12 x 8 x 5": 16A 12 x 8 x 8": 25A 12 x 10 x 10": 32A 16 x 12 x 12": 40A 20 x 16 x 16": 80A

- Power failure protection resumes furnace operation right after the point of failure when
- power is reestablished.



	16 x 12 x 12": 63A	16 x 12 x 12": 100A 16 x 16 x 16": 120A
Communication Port	Serial or USB	
Certification	CE	

2. Introduction

GCF series controlled atmosphere furnaces feature a chamber with alumina fiber insulation or stainless steel interior (B models). A double walled steel internal housing helps minimize heat loss to exterior surface. Furnace operation is controlled by Shimaden 40-segment digital controller with built-in RS485 digital communications port and USB adaptor, allowing the user to connect to a PC for remote control and monitoring of the furnace. You can also save or export test results. All our furnaces are CE compliant.

The Benefits of a Controlled Atmosphere Furnace

An atmosphere furnace provides the perfect environment for various procedures in many laboratories, providing the controlled temperature and atmosphere specific projects require. The controlled atmosphere is desired to complete tasks that require exact temperatures with no room for error. This is the best way to ensure the successful outcome of your project because it is sealed tightly to ensure the proper environment.

Gases

One of the main components of the atmosphere furnace is the correct mixture of gases. The precise measurement of each gas is essential to the success of your project. You can use a separate chamber to mix the gases, which are then pumped into the furnace chamber where the work will be completed when they are done mixing. It is essential that the separate chamber that holds the gases does not receive any outside air because it could throw off the gas mixture and render your project useless.

Features

- Multiple gas inlets and outlets with stainless steel ball valves. Flow meter to control inbound and outbound gas flows. Outlets can be ignited to burn off gas.
- Furnace chamber is welded and oil leak tested to ensure air tightness. Furnace door is sealed with high temperature silicon gasket.
- Built-in stainless steel water-cooling panel protects door sealing gasket when furnace is under heavy use.
- Microprocessor based self-tuning PID control provides optimum thermal process with minimal overshoot.
- Multiple atmosphere processes in a single cycle are possible (ex: binder burn out in air and parts sintering under rough vacuum or inert gas environment.)
- Built-in ammeter and dual voltmeters for easy monitoring and troubleshooting.
- Built-in computer interface.
- Long life type S thermocouple.

Safety

- Overheat protection shuts down the furnace if temperature is outside of acceptable range (refer to controller's manual) or when the thermocouple is broken or malfunctions.

3. Gas Filling

1) Check furnace air tightness

a. Close furnace door, tighten all door screws and close all valves except one gas inlet

b. Fill the furnace with gas thru the gas inlet until pressure gauge reads 0.03MPa.

b. Hold this pressure for two hours and check if pressure gauge reading changes.

b. If pressure gauge reading drops, check and make sure all door screws are tightened properly and sealing gasket is clean and intact.

2) Outgas air in the chamber with inert gas

a. Inert gas should be filled into furnace before heating up

b. Inert gases can be filled into the furnace thru three gas inbound valves. Gas exhausting valves should be wide open during this operation to allow air to go out of the furnace quickly.

c. Generally, oxygen density will drop to 100ppm, if ten times of the volume of the furnace chamber inert gas is filled.

d. When oxygen density inside the furnace has reached the required level, close the gas exhausting valve to save inert gas.

e. During the furnace operation, a positive pressure must be maintained in the furnace chamber, to prevent air going into the furnace and allow gas to flow out. However, the positive pressure must be less than 3 PSI(1.5 PSI for GCF1100B) over 1ATM (pressure gauge reading 0 means 1 ATM).

3) Pre-vacuum the furnace chamber using a vacuum pump

a. Connect the pipe of the vacuum pump to any of the gas exhausting valves

b. Pre-vacuum the furnace chamber (to around -10 PSI)

c. Fill inert gas

d. Vacuum the furnace chamber again (to around -10 PSI)

e. Repeat this a few times until gas condition reach required level

f. However, the positive pressure must be less than 3 PSI (1.5 PSI for GCF1100B) over 1ATM (pressure gauge reading 0 means 1 ATM).

4) How to flow protection gas properly

After vacuum the chamber and fill in protection gas, try to keep chamber pressure slightly higher than ambient pressure. Gas should be filled from the inlet in the back and flow out from the valve on the top, to create a smooth gas flow. Try to keep chamber pressure within 0 to 0.02MPa, and do not let gas fill into the chamber too much that may create a dangerous high pressure. Try NOT to keep gas inside the furnace all the time, but let gas flow in and out smoothly.

For reference only: to keep monitoring a smooth gas flow, open the gas outlet all the way and connect it to a hose and then place the hose into a bucket with water (the bucket should be placed outdoor if you use dangerous or poison gas). Use the flow meter to adjust flow speed and make sure you see bubble coming out from the hose (otherwise water or air may back flow into the furnace) in the bucket. Bubble speed will give you an idea how well gas flows and also keep the furnace chamber not in high pressure.

5) Make sure gas is flowing properly before turning on the furnace

6) DO NOT turn off gas flow until your furnace is cooled down, otherwise air may flow into the

14. Package and Accessories

Please check and make sure you have all items listed below. If you see anything missing please contact our office.

Item	Name	Quantity
1	GCF controlled atmosphere furnace	1
2	Furnace manual	1
3	FP93 temp controller manual	1
4	Stainless steel tongs	1
5	Furnace door block	1
6	Flow meter	1
7	Thermocouple	1
8	Alumina cushion block	1
9	Thermal gloves	1
10	Alumina crucible	5
11	Fuse	2
12	Computer interface kit	1
13	Water pump	1
14	Spare heating element (except for GCF1100 series)	2