High Performance Muffle Furnace

FP102/302/312/412

| Operating temp. range | 100~1150°C | | Temp. control accuracy | ±1.0°C | | Internal capcaity | 1.5L FP102 | 7.5L FP302/312 | 11.3L FP412 |

- High accuracy controller for better operability and visibility
- Excellent heat tightness with a firmly sealed chamber door
- High temperature accuracy at ±1.0°C
- Upgraded with long life R-thermocouple sensors
- High quality alumina porcelain hot plate where heater is not exposed to the inner chamber preventing contamination of samples
- Program operation of maximum 99 steps, 99 patterns, with repeat operation function
- Safety features include self-diagnostic functions, calibration off-set, key lock function, auto recovery after power failure, earth leakage breaker, automatic overheat prevention device and independent overheat prevention device
- Optional items include exhaust system, N_2 gas loading device (with flow meter), temperature output terminal, time-up output terminal, sample tray, external communication terminal (RS232C), external communication adapter, event output terminal, operation signal output terminal and furnace floor plate

1.5L FP102   7.5L FP312

■ Specifications

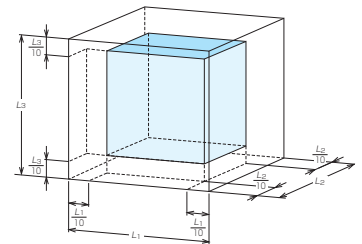| Model	FP102	FP302	FP312	FP412
Operating temp. range	100~1150°C			
Temp. control accuracy	±1.0°C (at 1150°C)			
Temp. fluctuation	±1.0°C (at 1150°C)			
Temp. distribution accuracy	±4.0°C (at 1150°C)			
Temp. gradient	14°C (at 1150°C)			
Max. temp. reaching time	Approx. 90 min.			Approx. 80 min.
Exterior material	Cold rolled steel plate with baked-on melamine resin finish			
Interior material	Ceramic fiber			
Sensor	R-thermocouple			
Heater	Iron-chrome wire			
	1.1kW	2.4kW		3.25kW
Exhaust port	ø20mm (top)			
Cooling fan	19/16W (50/60Hz)			
Temp. controller	PID control by microprocessor			
Temp. and timer setting	Digital setting by ▲/▼ keys			
Temp. display	Setting temperature: Orange 5-digit LED digital display (resolution: 1°C) Temperature display: Green 4-digit LED digital display (resolution: 1°C)			
Timer	1 min. to 99 Hrs. 59 min., Timer resolution 1 min. or 1 hr.			
Operation function	Fixed temperature, Quick auto stop, Auto start, Auto stop, Program (Maximum 99 steps, 99 patterns, Repeat operation)			
Additional functions	Power on / Operation time accumulation (up to 65535 hr.), Calendar (timer 24 hr.), Clock (24 hr. display), Calibration off-set, Display of power consumption, CO_2 emissions and heater operation, Power failure recovery options, User setting storage and recall			
Heater circuit control	Triac with zero cross control			
Safety device	Self diagnostic functions (Sensor error, Heater disconnection, Triac short circuit, Main relay failure disconnection, Automatic overheat prevention), Key lock function, Independent overheat prevention, Electric leakage breaker			
Internal dimensions (mm)	W100×D150×H100	W200×D250×H150		W300×D250×H150
External dimensions (mm)	W376×D404×H515	W446×D504×H565		W506×D504×H625
Internal capacity	1.5L	7.5L		11.3L
Power source (50/60Hz)	AC115V 10A	AC115V 21.5A	AC220V 13A	AC220V 18A
Weight	Approx. 29kg	Approx. 43kg		Approx. 51kg
Accessories	Exhaust port cap, fuse, furnace floor plate			

11.3L
FP412

Control Panel

9 Point Temperature Distribution (no load)

	Upper back right	Upper back left	Upper front right	Upper front left	Lower back right	Lower back left	Lower front right	Lower front right	Center
FP312	1150.0	1150.4	1147.0	1147.6	1145.2	1146.2	1144.4	1145.7	1146.6

1, Above 9 measurement points were taken from the effective internal capacity downscale by 10% (as the image on the right)
2. Room Temp. 23°C, AC220V, 50Hz. Average temperature during stable setting temp. set at 1150°C
3. No load

Optional items

Description	Product code
Exhaust unit, 115V	214160
Exhaust unit, 220V	214161
N_2 gas inlet system (with flow meter) for FP102	214162
for FP302/312	214163
for FP412	214164
Sample tray	281310
Seismic mat	296902
Alumina hearth plate for FP102, 90×145mm×5pcs.	214157
Alumina hearth plate for FP302/312, 190×245mm×5pcs.	214158
Alumina hearth plate for FP412, 290×245mm×5pcs.	214159
*Time up output terminal	214168
*Temp. output terminal (4-20mA)	214166
*External alarm terminal	214167
*External communication adapter (RC23)	281880

* Please specify when ordering main unit.

Interior

Heater is not exposed.
Adoption of optimal insulation structure increased heat insulation performance and temperature distribution accuracy.

Exhaust Unit

Gas generated with increasing temperature in the furnace can be efficiently exhausted.
Duct: Aluminum type fexible duct
Length 1.5m / Diameter 50mm
Power source of exhaust device :
AC115V 0.27A
Single phase AC220V 0.15A

Sample Tray

Dimensions (mm)

FP102 (1.5L)	FP302/312 (7.5L)	FP412 (11.3L)
376 — 405 / 515	446 — 504 / 565	507 — 504 / 625