

High Performance Muffle Furnace

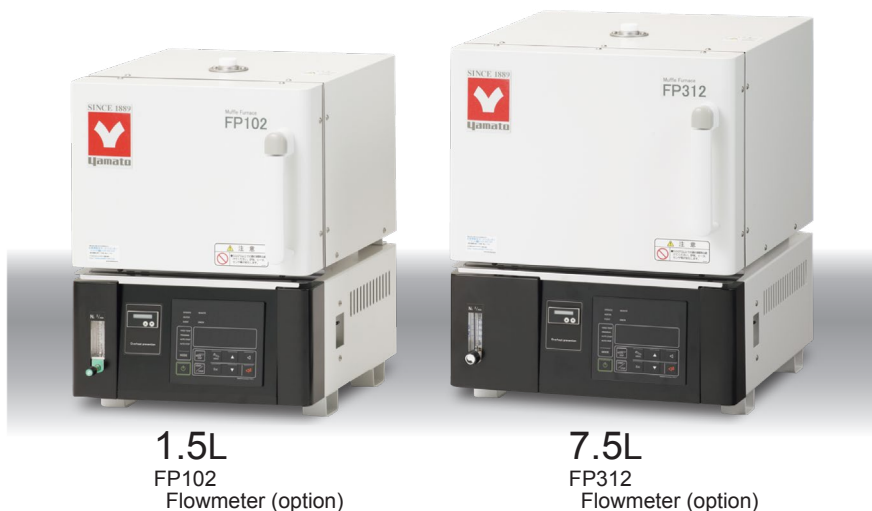
FP102/302/312/412

Operating temp. range 100~1150°C

Temp. control accuracy ±1.0°C

Internal capacity 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, N₂ 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



Specifications

Product code	214124	214128	214126	214127
Model	FP102	FP302	FP312	FP412
Operating temp. range	100~1150°C			
Temp. control accuracy (JTM K05)	±1.0°C (at 1150°C)			
Temp. fluctuation (JIS)	2.0°C (at 1150°C)			
Temp. distribution accuracy (JTM K05)	±4.0°C (at 1150°C)			
Temp. gradient (JIS)	14°C (at 1150°C)			
Max. temp. reaching time*1	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	1.1kW	2.4kW		3.25kW
Exhaust port	ø20mm I.D. (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	W100×D150×H100mm	W200×D250×H150mm		W300×D250×H150mm
External dimensions*2	W376×D404×H515mm	W446×D504×H565mm		W506×D504×H625mm
Internal capacity	1.5L	7.5L		11.3L
Power source (50/60Hz)	AC115V Single phase 10A	AC115V Single phase 21.5A	AC220V Single phase 12A	AC220V Single phase 15A
Weight	Approx. 29kg	Approx. 43kg		Approx. 51kg
Accessories	Exhaust port cap, fuse, furnace floor plate			

The length of the power cord is about 2 meters outside the unit

*1 Conditions: AC100V50Hz room temperature 23°C (FP102/302). AC200V50Hz room temperature 23°C (FP312/412)

*2 Do not include protrusions.



11.3L
FP412
Flowmeter (option)

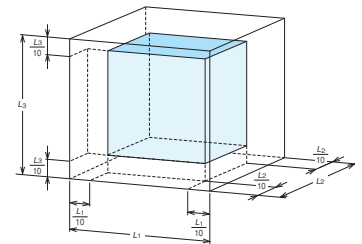
Control Panel



9 Point Temperature Distribution Ref. Data (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 left	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 down-scale by 10% (as the image on the right)
2. Room Temp. 23°C, AC200V, 50Hz.
Average temperature during stable setting temp. set at 1150°C
3. No load



Optional items

No.	Description		Applicable model	Product code
①	*Exhaust unit, 100V	OFP36	FP102/302	214160
②	*Exhaust unit, 200V	OFP38	FP312/412	214161
③	*Time up output terminal	OFP58	FP102/302/312/412	214168
④	*External alarm terminal	OFP56	FP102/302/312/412	214167
⑤	*Temp. output terminal (4-20mA)	OFP48	FP102/302/312/412	214166
⑥	*N ₂ gas inlet system (with flowmeter)	OFP24	FP102	214162
⑦	*N ₂ gas inlet system (with flowmeter)	OFP26	FP302/312	214163
⑧	*N ₂ gas inlet system (with flowmeter)	OFP28	FP412	214164
⑨	*External communication terminal	OFP46	FP102/302/312/412	214165
⑩	*External communication adapter set (RS485)	OIN90	FP102/302/312/412	211880
⑪	*Operating signal output terminal	OFP62	FP102/302/312/412	214169
⑫	*Event output terminal	OFP64	FP102/302/312/412	214170
⑬	Sample tray	OFP66	FP102/302/312/412	281310
⑭	Alumina hearth plate, 90×145mm×5pcs.	OFP68	FP102	214157
⑮	Alumina hearth plate, 190×245mm×5pcs.	OFP70	FP302/312	214158
⑯	Alumina hearth plate, 290×245mm×5pcs.	OFP72	FP412	214159

* Please specify when ordering main unit.

Interior



Insulation structure with no exposed heater increases heat insulation performance and temperature distribution accuracy.

Exhaust Unit



Gas generated with increasing temperature in the furnace can be efficiently exhausted.
Duct: Aluminum type flexible duct
Length 1.5m / Diameter 50mm
Power source of exhaust device :
AC100V 0.27A
Single phase AC200V 0.15A

Sample Tray



Dimensions (mm)

