SINCE 1889

Yamato High Performance Muffle Furnace
Muffle Furnace FP Series

For Information and to Order
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LR TECHNOLOGIES

| Operating temp. range | 100~1150°C | | Temp. control accuracy | ±1.0°C | | Internal capacity | 1.5L (FP103) | 7.5L (FP303/313) | 11.3L (FP413) |

- 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

.05 CuFt
Model FP103

.26 CuFt
Model FP313

Inquire For For Discounted Prices

Yamato Muffle Furnace Specs:

Model	FP103	FP303	FP313	FP413
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	~90 min.			~80 min.
Exterior material	Cold rolled steel plate with baked-on melamine resin finish			
Interior material	Alumina fiber			
Sensor	R-thermocouple			
Heater	Iron-chrome wire			
	1.1kW	2.4kW		3.25kW
Exhaust port	.8" (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 function	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)	3.9"W x 5.9"D x 3.9"H	7.8"W x 9.8"D x 5.9"H		11.8"W x 9.8"D x 5.9"H
External dimensions (mm)*	14.8"W x 15.9"D x 20.2"H	17.5"W x 19.8"D x 22.2"H		19.9"W x 19.8"D x 24.6"H
Internal capacity	.05 Cubic Ft.	.26 Cubic Ft.		.4 Cubic Ft.
Power source (50/60Hz)	AC115V 10A	AC115V 21.5A	AC220V 13.5A	AC220V 18A
Weight	64 Lbs	95 Lbs		112 Lbs
Included accessories	Exhaust port cap, fuse, furnace floor plate			

* Protrusions excluded.

- Length of power cord outside the unit is about 2m
- Performance have been measured at the rated source voltage, single phase 115V or 220V±5%, room temperature of 23°C±5°C, humidity of 65%RH±20°C, voltage of 86 kPa~106kPa, no load.
- Measeurement conditions FP103 is at 3 points in the bath, FP303, 313 and 413 are compliant with JIS.
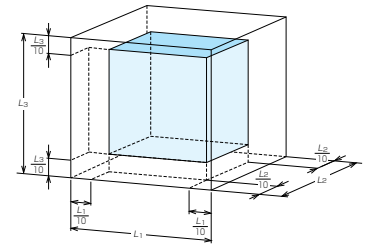
Control Panel

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
FP313	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, AC220V, 50Hz. Average temperature during stable setting temp. set at 1150°C
3. No load

.4 CuFt

Model FP413

■ **Optional items**

Description	Product code
Exhaust unit, 115V	214096
Exhaust unit, 220V	214097
N$_2$ gas inlet system (with flow meter) for FP103	214196
for FP303/313	214197
for FP413	214198
Sample tray	281310
Seismic mat	296902
Alumina hearth plate for FP103, 90 x 145mm x 5pcs.	214157
Alumina hearth plate for FP303/313, 190 x 245mm x 5pcs.	214158
Alumina hearth plate for FP413, 290 x 245mm x 5pcs.	214159
*Time up output terminal	214193
*Temp. output terminal (4-20mA)	214194
*External alarm terminal	214195
*External communication adapter (RC23)	281311

*** Please specify when ordering main unit**

Interior

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

Unit shown with optional front flow meter

Exhaust Unit

Gas generated with increasing temperature in the furnace can be efficiently exhausted.

Power source of exhaust device :
    AC115V 0.27A
    Single phase AC220V 0.15A

Aluminum flexible duct (*not included*)
Length 1.5m / Diameter 50mm

Sample Tray

Dimensions (mm)

FP103 (1.5L)	FP303/313 (7.5L)	FP413 (11.3L)