SINCE 1889

Yamato Scientific
America

Yamato Baths

Contents

BATH OVERVIEW

SINCE 1889
Yamato

Water Bath

BM100 110

BM401

BM302A 312A

BM500 510

Water Bath Variation

Standard
Max. operating temperature
95°C
Temp. adjustment accuracy
±1~ ±2°C

Type	Series	Model No.	Operating temp. range	Capacity (L)	Operation	Characteristics
Standard	BM	100/110	RT+5~95°C	4	Fixed	● Analog set up system ● Thermometer included to verify actual temperature ● Protected water tank prevents burns caused by contact
		302A/312A	RT+10~90°C	5	Fixed	● White LED digital display, key entry ● Flat-shaped bath with no heater or sensor inside makes for ease in cleaning
		401	RT+5~95°C	7	Fixed	● Digital temperature setting and display ● Protected water tank prevents burns caused by contact ● Equipped with a drain
		500/510	RT+5~90°C	4	Fixed	● Digital temperature setting and display ● Removable water tank for convenient cleaning and changing of water ● Heated situated outside water tank

Oil Bath

BO500+MB800

MB800

BOA 201 301

BO302A 312A

BOG100 200

BO601

BOS100 200

Oil Bath Variation

Standard
Max. operating temperature
250°C
Temp. adjustment accuracy
±0.3~±2°C

Large capacity
Max. operating temperature
270°C
Temp. adjustment accuracy
±0.1°C

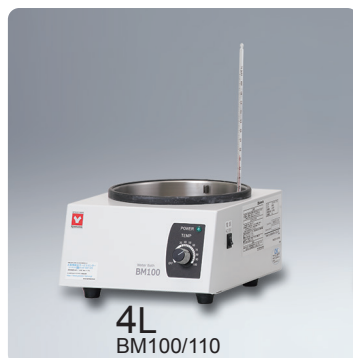| Type	Series	Model No.	Operating temp. range	Capacity (L)	Operation	Characteristics
Standard	BO	302A/312A	RT+10~180°C	5	Fixed	● White LED digital display, key entry, minimum digit of 1°C ● Flat-shaped bath with no heater or sensor inside makes for ease in cleaning
		500	RT+5~199°C	5.2	Fixed	● Digital temperature setting / Glass thermometer ● Must be used with MB800 magnetic stirrer
		601	RT+5~180°C	7	Fixed	● Digital temperature setting and display ● Protected oil tank prevents burns caused by contact ● Equipped with a drain
	BOG	100/200	RT+5~240°C	0.8/1.7	Fixed	● Choice between glass for high visibility or solid for good temperature stability ● Remote use of controller
	BOS	100/200	RT+5~250°C	0.8/1.7	Fixed	● Indent at the bottom of the bath allows integration of stirrer's hot plate.
Large capacity	BOA	201	RT+10~200°C	37	Fixed	● High temperature distribution accuracy by jet stirring ● Digital temperature setting and display
		311	RT+10~270°C	37	Fixed	● Equipped with six safety functions

Economy Constant Temp. Water Bath

BM Series

Setting system	Analog (BM100/110)	Digital (BM302A/312A/401/500/510)	Operating temp. range	RT +5~95°C (BM100/110/401)	RT+10~90°C (BM302A/312A)	RT+5~90°C (BM500/510)	Bath capacity	4L (BM100/110/500/510)	5L (BM302A/312A)	7L (BM401)

Easy to use, compact design water bath

4L
BM100/110

5L
BM302/312

7L
BM401

4L
BM500/510

BM100/110
- Analog set up system
- Thermometer is included to verify actual temperature
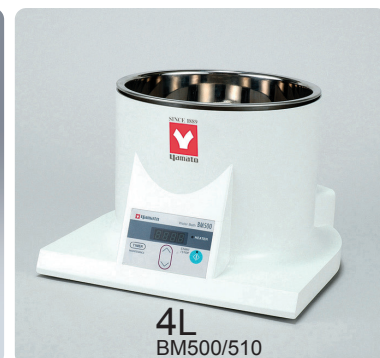- Protected water tank prevents burns caused by contact

BM302A/312A
- Digital temperature setting by ▲/▼ keys
- Flat-shaped bath with no heater or sensor inside for ease in cleaning
- Optional bath protection cover

BM401
- Digital temperature setting by ▲/▼ keys
- Protected water tank prevents
- burns caused by contact Equipped with a drain

BM500/510
- Digital temperature setting by ▲/▼ keys
- Removable water tank for convenient clean-ing and changing of water
- Heater situated outside the water tank

■ Specifications

Model	BM100	BM110	BM302-A	BM312-A	BM401	BM500	BM510
Operating temp. range *1	Room temp. +5~95°C		Room temp. +10~90°C		Room temp. +5~95°C	Room temp. +5~90°C	
Temp. adjustment accuracy*2	±2°C (at 60°C)		±1°C		±1°C (at 60°C)	±1.5°C (at agitation)	
Temp. control system	ON/OFF control		PID control by microprocessor				
Temp. setting / display method	Analog setting (Glass thermometer indication)		White LED digital display, key entry, min. digit of 1°C		Digital setting by ▲/▼ keys, LED display	Digital 7 segment LED Digital setting by ▲/▼ keys	
Operation function	Operation at fixed point				Fixed temperature, quick auto stop, auto stop, auto start	Fixed temperature, quick auto stop, auto stop, auto start	
Additional function	--		Overshoot alert, Auto-resume (selectable), calibration offset		Calibration offset, power failure prevention, keypad lock	Keypad lock, maintenance function (RE signal transmission and reception), calibration offset, power failure recovery	
Heater	SUS316 pipe heater 500W		1000W aluminum sheathed heater		SUS316 pipe heater 1kW	1kW (100V) 1.44kW (120V)	1kW (200V) 1.44kW (220V)
Sensor	Liquid expansion type		Pt100Ω			K thermocouple	
Safety device	Bath protection cover				Bath protection cover	Bath protection cover (ABS heat-resistant resin)	
	Overcurrent protection (fuse: 7A), thermal fuse		Automatic overheat prevention, independent overheat prevention (fixed temp.), temperature upper limit error, Overcurrent protection fuse		Self-diagnostic functions (Automatic overheat preven-tion, Sensor trouble, Triac short circuit, heater disconnection, main relay failure), circuit protector, thermal fuse	Self-diagnostic functions (Automatic overheat prevention, Sensor trouble, Triac short circuit, heater disconnecton, main relay failure), circuit protector, thermal fuse, micro switch to detect heating without water	
Water tank — Capacity	~4L		~5L		~7L	~4L	
Water tank — Dimensions	I.D.200 x D120mm					Max. I.D.240 x bottom dia165 x D122mm	
External dimensions*3	W240 x D300 x H150mm		φ262 (max. D286) x H240 mm		W310 x D360 x H230mm	W340 x D349 x H231mm	
Weight	~3.5kg		~4.5kg		~7kg	~5.5kg	
Power source (50/60 Hz)	AC115V 4.5A paddle switch	AC220V 2.3A paddle switch	100-115V, 10-12A	200-230V, 5-6A	AC115V 11A	AC100V~120V 12.5~10.5A	AC200~240V 6.5~5.5A
Accessories	Bar thermometer (10~110°C) with immersion line		Power cable (1), Spare fuse for main power (large)(1), Spare fuse for service outlet 2A for BM302A (small)(1), BC102 bath protection cover (optional)		Thermal fuse	--	
Country of Origin	Japan		China		Japan	Japan	

*1 No load operation of bath only. Maximum temperature varies based on different circumstances and operational conditions
*2 Measured under ambient temperature of 23°C±5°C, humidity of 65%RH±20%
*3 Dimensions excludes protrusions

NOTES

Economy Constant Temperature Oil Bath

BO Series

Operating temp. range	Room temp.+5~199°C (BO500)	Room temp.+5~180°C (BO601)

Bath capacity	5.2L (BO500)	7L (BO601)

Easy to use, digital setting, compact design oil bath

BO500 + MB800 (Magnetic Stirrer)

● Stainless steel oil bath
● Bath protection sheet to prevent operator from burning
● Must be used with MB800 magnetic stirrer

BO601

● Digital temperature setting by ▲/▼ keys
● Protected oil tank prevents burns caused by contact
● Equipped with a drain

■ Specifications

Model	BO500-115V*³ / BO500-220V*³	BO601-115V
Operating temp. range*¹	Room temp. +5~199°C	Room temp. +5~180°C
Temp. control accuracy*²	±0.5°C	±2°C (at 100°C)
Temp. control system	Proportional control	PID control by microprocessor
Temp. setting / display method	Digital / Glass thermometer	Digital setting by ▲/▼ keys
Operation function	--	Fixed temperature, quick auto-stop, auto stop, auto start
Additional function	--	Keypad lock, power failure recovery, calibration off-set
Heater	Pipe heater 700W	SUS316 pipeheater 1kW
Sensor	Pt100Ω	K thermocouple
Safety device	Bath protection sheet	Bath protection cover
		Self-diagnostic function (automatic overheat prevention, temperature sensor error, triac short circuit, heater disconnection, main relay failure), circuit protector, thermal fuse
Interlocking control function	--	--
Water tank — Capacity	~5.2L	~7L
Water tank — Dimensions	ø240 x 130mm	I.D.250 x D150mm
External dimensions	W250 x D290 x H130mm	W310 x D360 x H230mm
Weight	~1.4kg	~8kg
Power source (50/60 Hz)	AC115V 7A / AC220V 4A	AC115V 11A

*1. No load operation of bath only. Maximum temperature varies by different circumstances and operational conditions.
*2. Measured under ambient temperature at 23°C±5°C, humidity of 65%RH±20%.
*3. When combined with magnetic stirrer MB800, power source is from MB800 main unit outlet.

Model	MB800-115V / MB800-220V (in combination with BO500)
Stirring plate	Material: Aluminum, dimension: W250xD220mm
Stirring capacity	100ml~10L
Rotation speed	70~1200rpm
Motor	AC motor, Electronic control
Overheat prevention	70~200°C
Sensor	Thermistor
Safety device	Current leakage breaker, Oil bath power shutdown overheat prevention device
Power source (50/60Hz)	AC115V 10A / AC220V 5A (MB800+BO500 combined with oil bath)
External dimensions	W250xD270xH150mm
Weight	~4.2kg
Accessories	Stirrer 40mm 1pc.

BO500A-115V
BO500A-220V

Set of BO500 Oil Bath and MB800 Stirrer

Economy Constant Temperature Oil Bath

MADE IN CH

BO302-A/312-A

| Operating temp. range | Room temp. +10~180°C |
| Bath capacity | 5L |

Compatible with RE202-A/212-A REV-202M-A/212M-A

- Large capacity 5L with φ240 mm ID
- Flat-shaped bath with no heater or sensor inside makes for ease in cleaning
- Full range of safety functions such as automatic overheat prevention, upper temperature limit abnormality, and independent overheat prevention (fixed temperature type)

5L

BO302-A shown with rotary evaporator REV202MA

■ Specifications

Model		BO302-A	BO312-A
Performance*1	Operating ambient temp. range	5~35°C	
	Temperature control range	Room temp. +10~180°C	
	Temperature control accuracy	± 2.0°C	
Configuration	Temperature control system	PID control	
	Controller	White LED digital display, key entry, minimum digit of 1°C	
	Temperature sensor	Pt100Ω	
	Heater	1000W aluminum sheathed heater	
	Exterior	PBT (with fiber glass)	
	Bath reservoir	Stainless steel	
Safety functions		Automatic overheat prevention, independent overheat prevention (fixed temp.), temperature upper limit error, Overcurrent protection fuse	
Other functions		Overshoot alert, Auto resume (selectable), 2A service outlet, calibration offset	
Standard	External dimensions*2	φ262 (max. D286) x H240 mm	
	Reservoir capacity	~5L	
	Power supply (fuse capacity)	100-115V, 10-12A (Service outlet excluded) (15A)	200-230V, 5 6A (10 A)
	Power cable	3m long, with inlet plug *3	
	Weight	~4.5 kg	
Accessories		Power cable (1), Spare fuse for main power 15A (large)(1), Spare fuse for service outlet 2A (small)(1),	Power cable (1), Spare fuse for main power 10A (large)(1)

*1 Performance data above based on 95-120VAC (BO302)/ 90-241 VAC (BO312) supplied power, 23 ±5 °C room temperature, 65%RH ±20% humidity, and no process load. Operating temperature range for BM/BO series unit is between 5°C and 35°C. Be advised that maximum operating temperature may not be reached under low ambient temperatures, if source voltage is below.95V.(BO302)/190V (BO312)

*2 Dimensions do not include protrusions.

*3 BO302 is compatible with the voltage range of 100-115VAC and BO312 is compatible with the voltage range of 200-230VAC, by choosing a suitable power plug.

Control Panel

■ Optional accessory
BC102 Bath Protection Cover

Oil Bath for Synthetic Experiments

BOG100/110/200/210 BOS100/110/200/210

Operating temp. range	Room temp. +5~240°C BOG Series	Room temp. +5~250°C BOS Series

BOG100

BOS100

■ Operation and functions

- Safe and secure bath operation as controller can be safely operated from a distance
- Choice between glass oil bath for high visibility (BOG) or solid stainless oil bath for good temperature stability (BOS)
- Indent at the bottom of the bath allows integration of stirrer's hot plate. Also prevents bath from sliding or slipping off. Compatible with MFD800/MFH800 magnetic stirrers.
- Safety functions include independent overheat prevention device and heater guard
- Useless oil use and oil overflow are reduced as recommended amount of oil to use is indicated in the bath
- Highly accurate and rapid temperature control in the flask is possible with the use of the temperature sensor (optional) inserted into the flask and the in-tank sensor together
- Option for a triple system

■ Specifications

Model		BOG100/110	BOG200/210	BOS100/110	BOS200/210
Performance	Temperature setting range	0~260°C			
	Temperature control range	Room temp. +5~240°C		Room temp. +5~250°C	
	Temperature control accuracy	± 0.3°C (at 200°C, when stirring)			
Controller	Temperature control system	PID control			
	Temp. setting/display method	Digital setting using ▲ ▼ keys (display in units of 1°C)			
	Operation function	Fixed temperature operation			
	Additional functions	Calibration offset function, auto resume, LED brightness setting			
	Heater circuit control	Triac zero cross method			
	Temperature sensor	Pt100Ω			
Configuration	Exterior	Chromium-free electrogalvanized steel plate baked finish			
	Bath	Hard transparent glass		Stainless steel	
	Heater material	Stainless steel tube heater			
	Heater capacity	310W	425W	310W	425W
Safety devices	Controller	Self-diagnostic functions (temperature sensor error detection, automatic overheat prevention)			
	Fuse	6.3 A, short-circuit protection, overcurrent protection			
	Others	Independent overheat prevention device			
Standards	Internal dimension (mm)	φ140×100	φ170×140	φ140×100	φ170×140
	External dimension (mm)	φ150×205×140	φ 180×235×180	φ 155×210×140	φ 185×240×180
	Bath capacity — Recommended (no load)	~0.8L	~1.7L	~0.8L	~1.7L
	Bath capacity — Maximum (no load)	~1.0L	~2.2L	~1.0L	~2.2L
	Controller (W×D×H) mm	150×90×45mm			
	Power supply 50/60 Hz	115V 3.5A 220V 2.0A	115V 4.5A 220V 2.5A	115V 3.5A 220V 2.0A	115V 4.5A 220V 2.5A
	Weight — Bath and heater	~1.8 kg	~2.3 kg	~2.5 kg	~2.9 kg
	Weight — Single controller	~0.5 kg			
	Weight — Total weight	~2.3 kg	~2.8 kg	~3.0 kg	3.4 kg
Accessories		Heater guard (1 set), arbor (outer diameter φ12 x 90 mm: 1 pc.), PTFE stirrer (~ φ8 x 50 mm: 1 pc.), connector cap (1 pc.), tag attached cable ties (3)			

Remote use of controller

Controller

BOS200 triple system

Large Capacity Constant Temp. Oil Bath

MADE IN JP

BOA201-115V BOA201-220V / BOA311

Temperature control range	RT+10°C~200°C BOA201	RT+10°C~270°C BOA311	Bath capacity	37L

Large capacity 37L oil bath with temperature control of up to 200°/270°C

■ Operation and functions
● High temperature distribution accuracy thru jet stirring
● Advanced supportive functions
  Standard equipped with external alarm output, temperature output terminal (4~20mA, 1~5V adjustable) RS485 communication function, key lock function, calibration offset function

■ Safety features
● Triple overheating preventiom function (heater shuts off automatically at set temperature + 6°C, overheating prevention device, independent overheating prevention device)
● Emergency stop switch. Forcibly cuts off the overcurrent leakage breaker in an emergency
● Float switch to prevent empty heating and oil overflow
● Operation panel is protected by glass from liquid dripping
● Large indicator lamp lights up during operation
● Self diagnostic function, overheat prevention device, overcurrent leakage breaker, key lock function, power failure compensation function

■ Specifications

Model	BOA201-115V BOA201-220V	BOA311
Temp. control range*1	RT+10~200°C	RT+10~270°C
Temp. control accuracy*1	±0.1°C (at 200°C Silicone Oil)	
Temp. fluctuation*1	0.2°C (at 200°C Silicone Oil)	
Temp. distribution accuracy*1	±0.2°C (at 200°C Silicone Oil)	
Temp. gradient*1	0.5°C (at 200°C Silicone Oil)	
Temp. rise time*1	~120 min.	~70 min.
Temp. control system	PID control by microcomputer	
Temp. setting system	Digital setting with menu keys and the ▼▲ keys	
Temp. display system	Temp. reading display: Green 4-digit LED digital Temp. setting display: Red 4-digit LED digital	
Sensor	Platinum sensor Pt100Ω (for temperature control), Type-K thermocouple (for overheat prevention)	
Operation mode	Fixed operation (with operation indicator lamp)	
Stirring method	Jet agitation	
Heat insulator	Ceramic fiber	
Heater type / capacity	SUS316 Pipe Heater 2kW	SUS316 Pipe Heater 4.5kW
Agitator type / capacity	Vertical propeller agitation, induction motor 25W	
Safety device	Self-diagnostic functions (automatic overheat prevention, temperature sensor failure, heater disconnection, SSR short circuit, main relay failure, memory error, internal communication error, abnormal temperature reading, abnormal water level), overcurrent leakage breaker, overheating protector, independent overheating preventor, emergency stop button	
Other functions	Drain valve / operation indicator lamp / external alarm output terminal / temperature output terminal (with 1-5V, 4-20mA changeover switch) / external communication function (RS485) / calibration offset function / set value lock function / power failure recovery mode selection function	
External dimensions *2	531 x 520 x 578 mm (oil bath depth 397 mm)	
Inner bath dimensions *2	W296 x D340 x H270 mm (height when the lowest shelf board is installed from the upper edge in the bath)	
Bath capacity	~37L (when amount of oil is up to 50 mm from the upper edge of the bath)	
Effective bath capacity	~31.9L (when bottom shelf board is installed)	
Power source	AC115V 18.5A AC220V 10A	AC220V 21A *with external transformer*
Weight	~37kg	
Included accessories	Shelf 1pc., lid 1pc.	

*1 Performance data above based on 23 ±5 °C room temperature, 65%RH ±20% humidity, and no process load.
Temperature control accuracy, temperature fluctuation, temperature distribution accuracy, and temperature gradient are the values measured using Toshiba Silicone TSF485-50.

Performance varies depending on the environmental temperature, type of medium (water, silicone oil) used, and operating temperature.

*2 Protrusions excluded

Oil smoke such as silicone oil is flammable, recommended to use in a place with an exhaust device such as a fumehood.

■ Recommended silicone oil
Silicone oil is one of the heat transfer media. Please select silicone oil (heat resistant dimethyl silicone oil, viscosity 100mm^2/ s [cSt] or less)

Manufacturer	Toshiba Silicone (or equivalent)	
Product name	TSF458-50	TSF458-100
Recommended temp.	Below 200°C	200°C~270°C
Appearance	Light yellow transparent	Light yellow transparent
Specific gravity (25°C)	0.961	0.963
Viscosity (25°C)	50mm^2/s (cSt)	100mm^2/s (cSt)
Volatilizatioin (150°C, 24h)	0.3%	0.3%
Viscosity temperature coefficient	0.59	0.59
Flash point	325°C	342°C
Pour point	-50°C or less	-50°C or less
Viscosity increase rate (300°C, 168h)	40%	35%

Degradation rate (change in viscosity) of silicone oil varies depending on temperature used. Especially in the case of TSF485-100 used at a temperature exceeding 200°C, as a guide, almost no change in viscosity is seen at 200°C, but it is about 1000 hours at 250°C and 100 hours at 270°C.

For further details, please inquire with silicone oil manufacturer when purchasing.

Lid (standard accessory)