



Magnetic Stirrer

Mag-Mixer

MB800

Instruction Manual

First Edition

- Thank you for choosing Mag-Mixer MB800 from Yamato Scientific Co., Ltd.
- For proper equipment operation, please read and become thoroughly familiar with this instruction manual before use. Always keep equipment documentation safe and close at hand for convenient future reference.



Warning: Read instruction manual warnings and cautions carefully and completely before proceeding.

**Yamato Scientific America Inc.
Santa Clara, CA**

Printed on recycled paper

TABLE OF CONTENTS


1. SAFETY PRECAUTIONS	1
Explanation of Symbols	1
Symbol Glossary	2
Warnings and Cautions.....	3
List of Residual Risks.....	5
2. COMPONENT NAMES AND FUNCTIONS	6
Main Unit.....	6
3. PRE-OPERATION PROCEDURES	7
Installation Precautions	7
4. OPERATION PROCEDURES	8
Operating Instructions	8
5. HANDLING PRECAUTIONS	9
Warnings and Cautions.....	9
6. MAINTENANCE PROCEDURES	10
Precautions before Inspection	10
Precautions in Daily Maintenance.....	10
Maintenance and Inspection	10
7. EXTENDED STORAGE AND DISPOSAL	10
Extended Storage/Disposal	10
Disposal Considerations	10
8. TROUBLESHOOTING	11
Troubleshooting Guide.....	11
9. SERVICE & REPAIR	11
Requests for Repair	11
10. SPECIFICATIONS	12
Specifications.....	12
11. LIST OF HAZARDOUS SUBSTANCES	13


1. SAFETY PRECAUTIONS

Explanation of Symbols

A Word Regarding Symbols

Various symbols are provided throughout this text and on equipment to ensure safe operation. Failure to comprehend the operational hazards and risks associated with these symbols may lead to adverse results as explained below. Become thoroughly familiar with all symbols and their meanings by carefully reading the following text regarding symbols before proceeding

 **Warning** Signifies a situation which may result in serious injury or death (Note 1.)


 **Caution** Signifies a situation which may result in minor injury (Note 2) and/or property damage (Note 3.)


(Note 1) Serious injury is defined as bodily wounds, electrocution, bone breaks/fractures or poisoning, which may cause debilitation requiring extended hospitalization and/or outpatient treatment.


(Note 2) Minor injury is defined as bodily wounds or electrocution, which will not require extended hospitalization or outpatient treatment.

(Note 3) Property damage is defined as damage to facilities, equipment, buildings or other property.

Symbol Meanings

 Signifies warning or caution.
Specific explanation will follow symbol.

 Signifies restriction.
Specific restrictions will follow symbol.

 Signifies an action or actions which operator must undertake.
Specific instructions will follow symbol.

1. SAFETY PRECAUTIONS

Symbol Glossary

WARNING / CAUTION



General



Danger!
High Voltage



Danger!
Extremely Hot



Danger!
Moving Parts



Danger!
Blast Hazard



Caution:
Water Only



Caution:
Shock Hazard!



Caution:
Burn Hazard!



Caution:
Do Not Heat
Without Water!

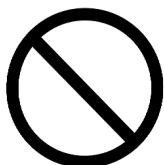


Caution:
May Leak Water!



Caution:
Toxic Chemicals

RESTRICTION



General
Restriction



No Open Flame



Do Not
Disassemble

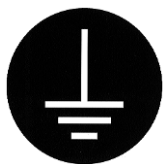


Do Not Touch

ACTION



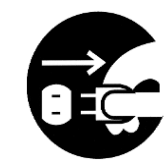
General Action
Required



Connect Ground
Wire



Level Installation



Disconnect Power



Inspect
Regularly

1. SAFETY PRECAUTIONS

Warnings and Cautions



Install in a location free of flammables and explosives.

Never install or operate unit in a flammable or explosive gas atmosphere. Unit is NOT fire or blast resistant. Simply switching the power switch "ON" or "OFF" can produce a spark, which can then be relayed during operation, causing fire or explosion when near flammable or explosive fluids, chemicals or gases/fumes.

See "11. LIST OF HAZARDOUS SUBSTANCES" (P.13) for information on flammable and explosive gases.



Ground wire **MUST** be connected properly



- Connect power cable to a grounded outlet in order to avoid electric shock.
- Never connect ground wire to gas lines or water pipes. Fire, accident or equipment malfunction may result.
- Never connect ground wire to telephone grounding lines or to lightning conductor rods. Doing so may cause fire and/or electric shock.
- Never insert multiple plugs into a single outlet. Doing so may result in power cable overheating, fire or drop in voltage.

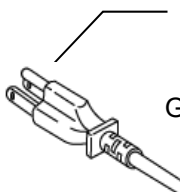
Connect to grounded outlet

Grounded outlet



Grounding prong

Grounded plug



When no ground terminal is found

Contact original dealer of purchase for location-specific electrical requirements.



Turn OFF (○) the power switch immediately when an abnormality occurs.



If unit begins emitting smoke or abnormal odors for reasons unknown, turn OFF (○) the power switch immediately, disconnect power cable from power supply, and contact original dealer of purchase for assistance. Continuing to operate without addressing abnormalities may cause fire or electric shock, resulting in serious injury or death. Never attempt to disassemble or repair unit. Repairs should always be performed by a certified technician.

1. SAFETY PRECAUTIONS

Warnings and Cautions



Handle power cable with care.

- Do not operate equipment with power cable bundled or tangled. Operating unit with power cable bundled or otherwise tangled, may cause power cable to overheat and catch fire.
- Do not modify, bend, forcibly twist or pull on power cable. Fire or electric shock may result.
Do not risk damage to power cable by positioning it under desks or chairs, or by allowing it to be pinched in between objects. Doing so may cause fire and/or electric shock.
- Do not place power cable near kerosene/electric heaters or other heat-generating devices. Doing so may cause power cable insulation to overheat, melt and/or catch fire, which may result in electric shock.
- Turn off the power switch immediately and disconnect from outlet, if power cable becomes partially severed or damaged in any way. Contact original dealer of purchase for information about replacing power cable. Failure to do so may result in fire or electric shock.
- Always connect power cable to appropriate facility outlet.



DO NOT disassemble or modify equipment.

Never attempt to disassemble or modify unit. Doing so may cause malfunction, fire, electric shock, or personal injury. Note that any malfunction resulting from unauthorized modifications or customizations to unit will void the warranty.



CAUTION



DO NOT operate equipment during thunderstorms.

In the event of a thunderstorm, turn OFF (○) the power switch and disconnect power cable immediately. A direct lightning strike may cause equipment damage, fire or electric shock, resulting in serious injury or death.

1. SAFETY PRECAUTIONS

List of Residual Risks

List of residual risks (instructions for risk avoidance)

This list summarizes residual risks to avoid personal injuries or damages to properties during or related to the use of equipment.

Be sure to fully understand or receive instructions on how to use, maintain and inspect equipment before starting operation.

Loading/Installation				
No.	Degree of risks	Risk description	Protective measures taken by the user	Relevant page
1	WARNING	Explosion/fire	Install in a location free of flammables and explosives.	3
2	WARNING	Fire/ Electric shock	Ground wire MUST be connected properly	3
3	WARNING	Fire/ Electric shock	Handle power cable with care.	4
4	WARNING	Fire/ Electric shock	Choose an appropriate installation site.	7
5	CAUTION	Injury	Install unit on a level surface.	7
6	WARNING	Fire/ Electric shock	Always connect power cable to appropriate facility outlet or terminal.	7

Use				
No.	Degree of risks	Risk description	Protective measures taken by the user	Relevant page
7	WARNING	Fire/ Electric shock	Turn OFF (○) the power switch immediately when an abnormality occurs.	3
8	WARNING	Fire	DO NOT operate equipment during thunderstorms.	4
9	WARNING	Explosion/fire	NEVER process explosive or flammable substances	9
10	WARNING	Burn	DO NOT touch hot surfaces.	9
11	WARNING	Burn	Avoid direct contact with unit surfaces other than control panel	9
12	WARNING	Electric shock	Exercise caution not to splash liquid over electrical part.	9

Daily inspection/maintenance				
No.	Degree of risks	Risk description	Protective measures taken by the user	Relevant page
13	WARNING	Fire/ Electric shock	DO NOT disassemble or modify equipment.	4
14	WARNING	Fire/ Electric shock	Be sure to disconnect power cable before daily inspection and maintenance.	10

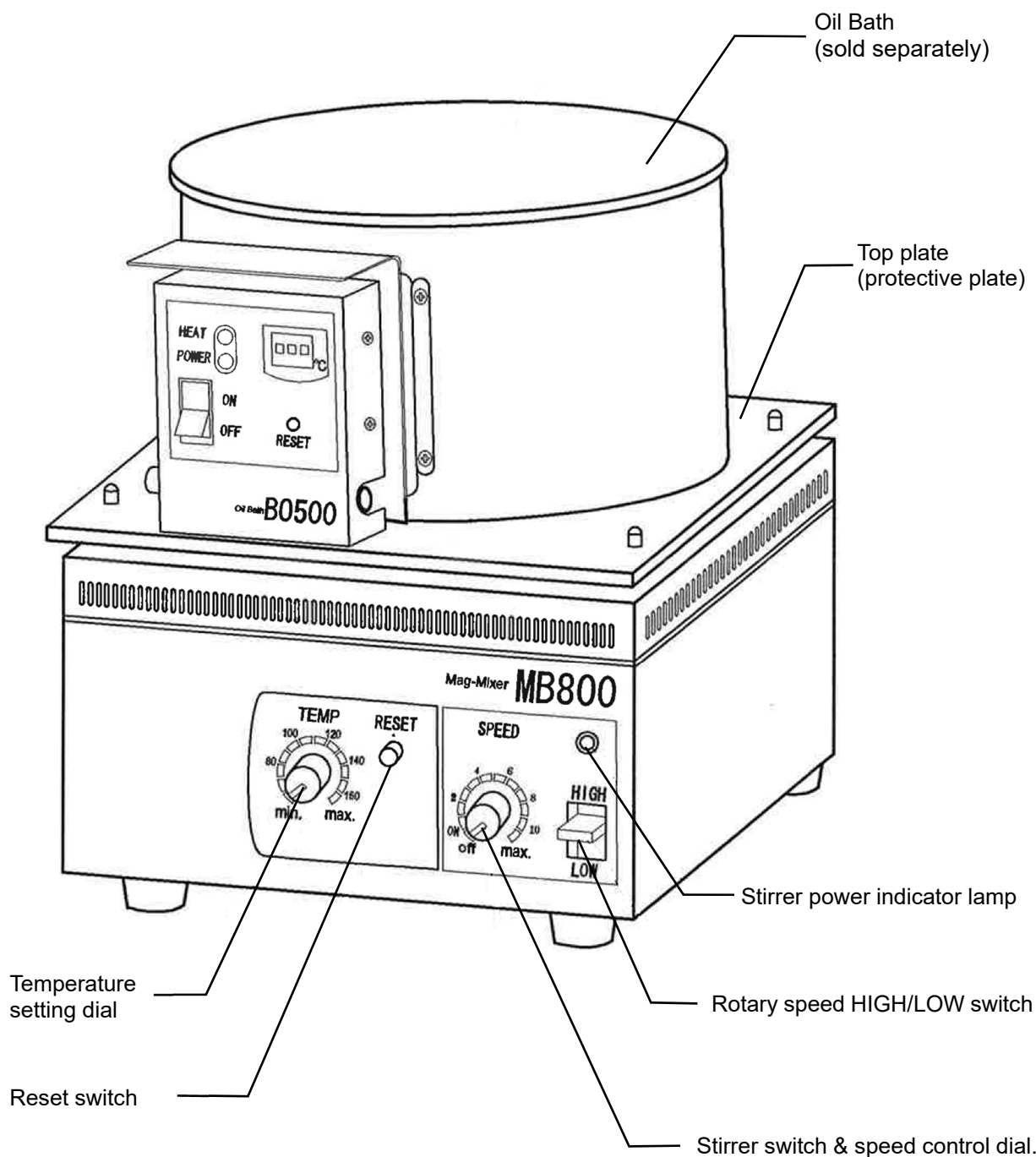
Extended storage/disposal				
No.	Degree of risks	Risk description	Protective measures taken by the user	Relevant page
15	WARNING	Fire/ Electric shock	If unit will be out of service for an extended period of time, turn off the power switch and disconnect power cable from outlet.	10
16	CAUTION	Injury	Do not leave unit where it may be unattended, or in a location where children may have access.	10

2. COMPONENT NAMES AND FUNCTIONS

Main Unit

■Main Unit

- Mag-Mixer MB800 employs magnetic stirrer bar to agitate solutions. A High-power electronic-controlled AC motor provides stable rotation, and top plate has good ventilation. It is suitable for stirring heating baths.
- Unit has a function of overheat prevention by sensing the excessive temperature of the oil bath on top plate, and a function of sensing electrical leakage of the bath. These functions shut off power supply to the bath when worked.



3. PRE-OPERATION PROCEDURES

Installation Precautions



Choose an appropriate installation site.

DO NOT install unit:

- where installation surface is not completely level, not even or not clean.
- where flammable or corrosive gases/fumes may be present
- where external temperature will exceed 35° C, will fall below 5° C or will fluctuate largely.
- where liquid is assumed to splash on unit
- in excessively humid or dusty locations.
- in direct sunlight or outdoors.
- where there is constant vibration.
- in direct contact with the outside air
- where power supply is erratic.



Install unit on a level surface.

Install unit on level and even surface. Failure to do so may cause abnormal vibrations or noise, possibly resulting in complications and/or malfunction.



Always connect power cable to appropriate facility outlet or terminal.

Connect power cable to a suitable facility outlet or terminal, according to the electrical requirements.

Electrical requirements MB800 100 V AC single phase 50/60 Hz 11 A

Inserting multiple cords into a single outlet, using branch outlets or extension cords, may cause a drop in voltage, which may affect performance, resulting in failure to control or maintain proper temperature.



Stabilize equipment properly to assure safe operation and a safe work area

Implement appropriate safety measures for the installation environment.

In the event of an earthquake or other unforeseen incident, equipment may unexpectedly shift or fall, causing serious injury.



Pay attention to the capacity of built-in outlet

The built-in outlet of this unit is rated max. 10 A (100 V AC) External devices that exceed this rating should not be connected. Doing so may cause unit to overheat, resulting in equipment malfunction.



Do not allow stirrer bar to contact bottom surface of oil bath.

Note that there is a risk of boring a hole in the bottom of oil bath by stirrer bar contacting the bottom surface. When stirring oil baths such as Yamato MO500, place a sheet of stainless steel or glass on the bath bottom so that the stirrer bar does not contact directly the bottom of the bath.

4. OPERATION PROCEDURES

Operating Instructions

See the figure on page 6 for location of each component

- ① Switch power supply frequency (50Hz/60Hz) with frequency selector switch in the rear of unit in accordance with power source.
- ② Ensure that earth leakage breaker is turned OFF (○), and stirrer switch & speed control dial is in OFF position. Connect power cable to a power outlet having capacity of 11 A or more.
- ③ Place an oil bath on top plate so that the undersurface of the bath surely contact temperature sensing part. Put supplied stirrer bar gently in the bath.

ATTN: · Temperature sensing part of this unit is normal to protrude through the surface of top plate. A spring brings the protrusion into intimate contact with oil bath.
· Note that there is a risk of boring a hole in the bottom of oil bath by stirrer bar contacting the bottom surface. When stirring oil baths such as Yamato MO500, place a sheet of stainless steel or glass on the bath bottom so that the stirrer bar does not contact directly the bottom of the bath.

- ④ Connect an oil bath to the built-in outlet in the rear of unit. Keep bath power cable from top plate.
- ⑤ Set temperature to shut off oil bath, by using temperature setting dial on the control panel. It is normally set 10 °C higher than that of oil bath. Once top plate temperature becomes stable after about an hour, be sure to check the operating status.

ATTN: · The dial reading of temperature setting dial is based on the overheat prevention device activation temperature under the conditions of 25 °C room temperature, BO500 oil bath filled with 4 liters of silicon oil, rotation speed set at 7 in LOW range. For operating unit under different conditions, determine preferable setting value at each condition.
· While making temperature setting, overheat prevention device may activate and shut off power. Press the reset switch and continue until appropriate setting is made.

- ⑥ When overheat prevention device is activated, power supply to the oil bath is shut off. Eliminate the causes and press the reset switch to resume operation.
- ⑦ Select the speed range of "HIGH" or "LOW" with the rotary speed HIGH/LOW switch.
- ⑧ Adjust speed as desired using the stirrer switch & speed control dial.
- ⑨ Always disconnect power cable when put unit in storage after operation.

5. HANDLING PRECAUTIONS

Warnings and Cautions



NEVER process explosive or flammable substances

Never attempt to process explosives, flammables or any items which contain explosives or flammables. Fire or explosion may result. See "11. LIST OF HAZARDOUS SUBSTANCES" (P.13)



DO NOT touch hot surfaces.

Use caution when handling unit during operation or immediately after operation. Fire or burn injury may result.



Avoid direct contact with unit surfaces other than control panel.

Do not touch hot surfaces especially top plate. Severe burns may result.



Exercise caution not to splash liquid over electrical part.

Failures in electrical components, or electric shock due to leakage may result.



Be aware of effects of magnetic force.

Stirrer bar is made of a strong magnet. Keep wrist watch, measuring instruments and other equipment subject to magnetic force away from the stirrer bar.



Start at low speed.

Gradually increase mixing speed. Increasing speed too quickly may send the stirrer bar off center and into the sides of the container, possibly causing damage or breakage.



Set the overheat prevention device activation temperature properly.

Dial reading of temperature setting dial is a guide for the overheat prevention device activation temperature. Make setting according to the temperature at which the overheat prevention device is activated, and temperature in the container.



Turn off power after use.

Stirring unit and overheat prevention device have separate electrical circuit. Be sure to turn off both switches.



Inspect equipment regularly.

Regular inspection and maintenance are highly recommended to ensure proper operation. See "6. MAINTENANCE PROCEDURES" (P.10) for inspection procedures.

6. MAINTENANCE PROCEDURES

Precautions before Inspection



- Be sure to disconnect power cable before conducting inspection and maintenance.
- Never attempt to disassemble unit.

Precautions in Daily Maintenance



- Clean the control panel surface using soft damp cloth. Never use benzene, paint thinner, scouring powder, scrubbing brush or other abrasives and solvents to clean unit. Superficial damage and/or discoloration, as well as deformity to some components may result.

Maintenance and Inspection

- Check power plug for damage
 - Check power plug for dust or dirt on its prongs, and clear off if any accretions found.
 - Confirm that the prongs of power plug are not bent or damaged. Replace if bent or damaged.
 - Check the power plug for discoloration or abnormal heat generation. If there is discoloration or abnormal heating, the internal contact of the outlet may be faulty.

◆Contact original dealer of purchase, if further questions arise concerning maintenance procedures.

7. EXTENDED STORAGE AND DISPOSAL

Extended Storage/Disposal



If unit will be out of service for an extended period of time, turn off the power switch and disconnect power cable from outlet.

Disposal Considerations

Do not leave unit where it may be unattended, or in a location where children may have access.

Dispose of this unit in accordance with local laws and regulations. Dispose of or recycle this unit in a responsible and environmentally friendly manner.

Yamato Scientific Co., Ltd. strongly recommends disassembling unit, as far as is possible, in order to separate parts and recycle them in contribution to preserving the global environment.

8. TROUBLESHOOTING

Troubleshooting Guide

Symptom	Possible causes
Unit does not turn on/no indicator lamps on the control panel illuminate when the power switch is turned "ON (I)".	<ul style="list-style-type: none">● Power cable is not properly connected to an outlet or terminal.● Power failure in progress
Temperature fluctuates during operation.	<ul style="list-style-type: none">● Steep change in ambient temperature

◆If problem persists, turn "OFF (O)" the power switch immediately, disconnect power cable from outlet or terminal and contact original dealer of purchase for assistance.

9. SERVICE & REPAIR

Requests for Repair

Requests for Repair

If abnormalities remain after confirming "Troubleshooting Guide", terminate operation, turn off the power switch, and disconnect power cable. Contact original dealer of purchase for assistance.

The following information is required for all repairs.

- Product Name
 - Model
 - Serial Number
 - Date (year/month/day) of Delivery
 - Description of problem in as much detail as possible
- } Refer to warranty card.
- Repair this equipment for free of charge according to the contents on warranty card.
Warranty period is 1 (one) year from date of purchase.
 - Consult with original dealer of purchase or Yamato sales office for any repair after warranty ended.
Charged repair service of this equipment will be available on customer's request when it can be maintained functional by its repair.

* Be sure to present warranty card to the service representative.

Guaranteed Supply Period for Repair Parts

Guaranteed maximum supply period for repair parts is 7 (seven) years from date of discontinuation for this equipment.

"Repair parts" is defined as components which, when installed, allow for continued unit operation.

10. SPECIFICATIONS

Specifications

Product name		Mag-Mixer (with overheat prevention function)
Model		MB800
Top plate	Material	Aluminum (anodized)
	Dimensions (mm)	W250 × D220
Stirring capacity		100 mL to 10 L
Motor rotation speed		70 to 1,200 rpm
Motor		AC motor, electronic control
Overheat prevention function		70 to 200 °C
Sensor		Thermistor
Built-in outlet (shut off at overheat prevention device activation)		100 V AC 50/60 Hz Max. 10 A
Safety devices		Earth leakage breaker, overheat prevention device for oil bath
Power supply		100 V AC 50/60 Hz 11 A (at max. with oil bath connected)
External dimensions (mm)		W250 × D270 × H150
Weight (Kg)		Approx. 4.2
Accessories		Magnetic stirrer bar 40 mm (1)

11. LIST OF HAZARDOUS SUBSTANCES



DO NOT use explosives, flammables or substances containing them for this unit.

Explosive substances	①Nitroglycol, Glycerine trinitrate, Cellulose Nitrate and other explosive nitrate esters
	②Trinitrobenzen, Trinitrotoluene, Picric Acid and other explosive nitro compounds
	③Acetyl Hydroperoxide, Methyl Ethyl Ketone Peroxide, Benzoyl Peroxide and other organic peroxides
	④Metallic Azide, including Sodium Azide, etc.
Combustible substances	①Metal "Lithium" ②Metal "Potassium" ③Metal "Natrium" ④Yellow Phosphorus
	⑤Phosphorus Sulfide ⑥Red Phosphorus⑦Phosphorus Sulfide
	⑧Celluloids, Calcium Carbide (a.k.a, Carbide)⑨Lime Phosphide⑩Magnesium Powder
	⑪Aluminum Powder ⑫Metal Powder other than Magnesium and Aluminum Powder
	⑬Sodium Dithionous Acid (a.k.a., Hydrosulphite)
Oxidizing substances	①Potassium Chlorate, Sodium Chlorate, Ammonium Chlorate, and other chlorates
	②Potassium Perchlorate, Sodium Perchlorate, Ammonium Perchlorate, and other perchlorates
	③Potassium Peroxide, Sodium Peroxide, Barium Peroxide, and other inorganic peroxides
	④Potassium Nitrate, Sodium Nitrate, Ammonium Nitrate, and other nitrates
	⑤Sodium Chlorite and other chlorites
	⑥Calcium Hypochlorite and other hypochlorites
Flammable substances	①Ethyl Ether, Gasoline, Acetaldehyde, Propylene Chloride, Carbon Disulfide, and other substances having ignition point of 30 or more degrees below zero.
	②n-hexane, Ethylene Oxide, Acetone, Benzene, Methyl Ethyl Ketone and other substances with ignition point between 30 degrees below zero and less than zero.
	③Methanol, Ethanol, Xylene, Pentyl n-acetate, (a.k.a. amyl n-acetate) and other substances having ignition point of between zero and less than 30 degrees.
	④Kerosene, Light Oil, Terebinth Oil, Isopenthy Alcohol (a.k.a. Isoamyl Alcohol), Acetic Acid and other substances having ignition point of between 30 degrees and less than 65 degrees.
Combustible gas	Hydrogen, Acetylene, Ethylene, Methane, Ethane, Propane, Butane and other gases combustible at 15°C, ambient air pressure.

Limited Liability

Always operate equipment in strict compliance to the handling and operation procedures set forth by this instruction manual.

Yamato Scientific Co., Ltd. assumes no responsibility for malfunction, damage, injury or death, resulting from negligent equipment use.

Never attempt to disassemble, repair or perform any procedure on Mag-Mixer MG800 which are not expressly mandated by this manual. Doing so may result in equipment malfunction, serious personal injury or death.

Notice

- **Instruction manual descriptions and specifications are subject to change without notice.**
- **Yamato Scientific Co., Ltd. will replace flawed instruction manuals (pages missing, pages out of order, etc.) upon request.**

Instruction Manual

Magnetic Stirrer

Mag-Mixer MG800

First Edition: May 17. 2019

Revised:

Yamato Scientific America, Inc.

925 Walsh Avenue, Santa Clara,
CA 95050, U.S.A

<http://www.yamato-usa.com>

Toll Free: 1-800-2-YAMATO (1-800-292-6286)