Cold Trap

CA801

Instruction Manual

First Edition

- **Thank you very much for purchasing this Yamato Cold Trap CA801.**
- **Please read the "Operating Instructions" and "Warranty" before operating this unit to assure proper operation. After reading these documents, be sure to store them securely together with the "Warranty" at a handy place for future reference.**

⚠Warning:

Before operating the unit, be sure to read carefully and fully understand important warnings in the operating instructions.

Yamato Scientific America Inc.

Santa Clara, CA

Contents

1. Safety precautions

Explanation of pictograms

About pictograms

A variety of pictograms are indicated in this operating instruction and on products for safe operation. Possible results from improper operation ignoring them are as follows.
Be sure to fully understand the descriptions below before proceeding to the text.

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

Caution Indicates a situation which may result in minor injury (Note 2) and property damages (Note 3.)

（Note 1）Serious injury means a wound, an electrical shock, a bone fracture or intoxication that may leave after effects or require hospitalization or outpatient visits for a long time.

（Note 2）Minor injury means a wound or an electrical shock that does not require hospitalization or outpatient visits for a long time.

（Note 3）Property damage means damage to facilities, devices and buildings or other properties.

Meanings of pictograms

This pictogram indicates a matter that encourages the user to adhere to warning (“caution” included).
Specific description of warning is indicated near this pictogram.

This pictogram indicates prohibitions
Specific prohibition is indicated near this pictogram.

This pictogram indicates matters that the user must perform
Specific instruction is indicated near this pictogram.

1.Safety precautions

List of symbols

Warning

General warnings

Danger!: High voltage

Danger!: High temperature

Danger!: Moving part

Danger!: Hazard of explosion

Caution

General cautions

Electrical shock!

Burning!

Caution for no liquid heating!

Caution for water leak!

For water only

Poisonous material

Prohibitions

General bans

Fire ban

Do not disassemble

Do not touch

Compulsions

General compulsions

Connect ground wire

Install levelly

Pull out the power plug

Regular inspection

1.Safety precautions

Warnings & Cautions

⚠ Warning

Never operate the unit in an atmosphere containing flammable or explosive gas

Never operate the unit in an atmosphere containing flammable or explosive gas.
Otherwise, an explosion or a fire may result since the unit is not explosion-proof.
See section "**13. List** of dangerous materials" on page 24.

Be sure to connect the ground wire.

Be sure to connect the ground wire correctly. Otherwise, electrical leak may result and cause an electrical shock or a fire.

Ban on operation when an abnormality occurs

When a smoke or an unusual odor is seen or sensed, immediately turn the ELB on the main unit off and pull out the power plug. A fire or an electrical shock may result.

Never use electrical power cords bundled.

When these are used bundled, they might overheat causing a fire.

Take care not to damage electrical power cords.

Avoid tightly bend, pull with a strong force or twist to prevent electrical power cords from damaging. A fire or an electrical shock may result.

Ensure sufficient ventilation when using flammable and combustible solutions.

If left at the room temperature (or below for certain solutions), flammable and combustible solutions (ethanol, etc.) may be vaporized and thus ignited and exploded by any ignition source (switch, etc.).

Never try to disassemble or alter the unit.

Never try to disassemble or alter the unit. A malfunction, a fire or an electrical shock may result.

Do not place the unit on its side.

Never place the unit on its side during transfer/transport because the refrigerator may suffer failure.
If the unit is to be tilted toward its side temporarily during carry-in, do not turn ON power supply for at least one day (24 hours) after completion of carry-in.

1.Safety precautions

Warnings & Cautions

⚠ Warning

When a thunder is heard.

When a thunder is heard, turn the main power off immediately. A malfunction, fire or an electrical shock may result.

Keep hands away from the condensate and wall surface of the trap tank.

Condensate and wall surface of the trap tank becomes cold during operation and for a certain period of time after operation. If you touch it, you will suffer frost bite. Never touch the condensate.

Do not touch the condenser fin with bare hands.

Never touch the condenser fin with bare hands during maintenance. The fin has sharp edge and may cut hands.

2. Before operating the unit

Cautions for installation

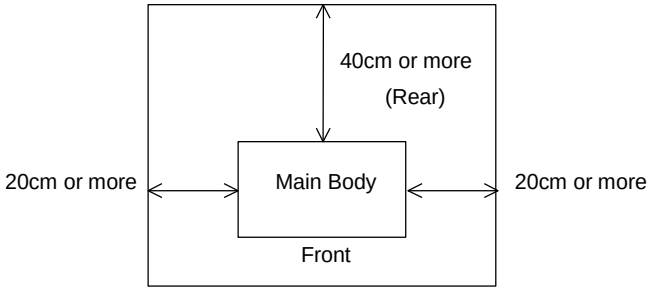
⚠ Warning

1. Take care to select an appropriate installation site.

Avoid installing the unit, above all, in places listed below:

- Uneven or dirty floor
- Where floor is not level.
- Where temperature may change widely.
- Where humidity is high.
- Where subject to direct sunlight.
- Place with unstable power supply.
- Where flammable gas or corrosive gas may exists.
- Where environmental temperature is 5℃ or less or 30℃ or over.
- Not well-ventilated place.
- Where vibrations are severe.
- Outdoor

Install this unit at a place with spaces shown below.



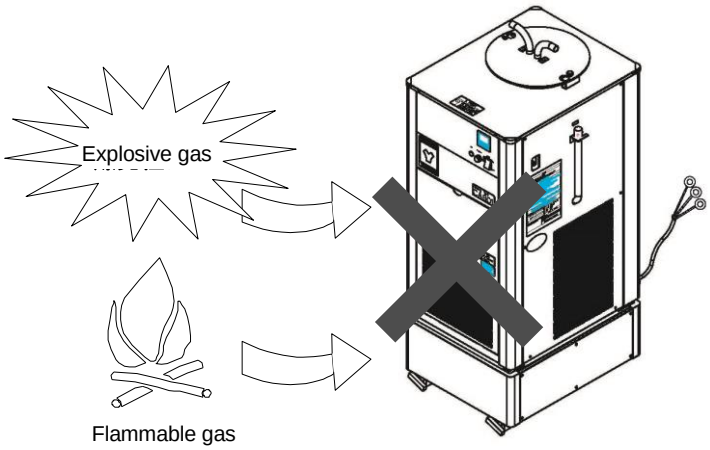
2. Installation

The unit might fall down or move by an earthquake or an impact resulting a personal injury. We recommend making safety measures such as to avoid installing the unit at a place other than busy places. This trap incorporates an air-cooling refrigerator, which produces waste heat. Use the trap in a well-ventilated or air conditioned place to prevent rising of the ambient temperature. Higher ambient temperature causes drop of operation efficiency. Moreover, the refrigerator is put into high-temperature high-pressure operation, resulting in failure.

3. Never operate the unit in an atmosphere containing flammable or explosive gas.

Never operate the unit in the flammable or combustible gas atmosphere. This unit is not of an explosion-proof structure, and ON/OFF switching and operation may cause arc, resulting in explosion and fire.

For flammable and explosive gas, refer to “13. List of Hazardous Materials” in page 24.



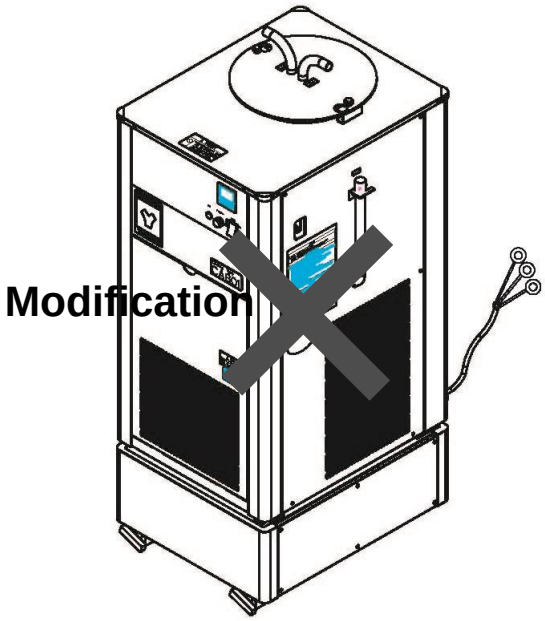
2. Before operating the unit

Precautions when installing the unit

⚠ Warning

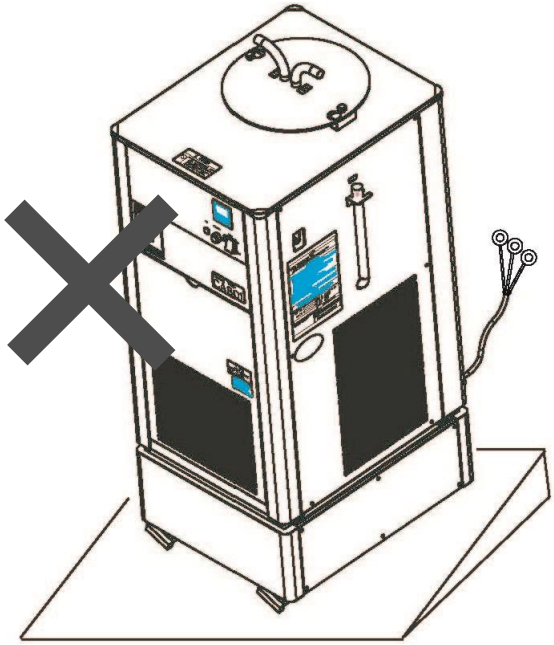
4. Never attempt modification.

Never attempt modification by the customer so as to prevent failure.



5. Install the unit on a level surface.

Install the unit on a level surface.
Accidental trouble or failure may occur unless the product is installed a level surface.



The product weighs about 65 kg. When lifting the unit for transportation and installation, carefully handle it by at least two people.

6. Secure sufficient ventilation for the unit.

Do not operate the unit when its front/side panels and vent holes are blocked.
Internal temperature of the unit will rise degrading the performance and an accident, a malfunction or a fire may result.

7. Do not operate the unit at such a place that may subject to splash.

Do not operate the unit at such a place that may subject to splash. Liquid entering the inside may cause an accident, a malfunction, an electrical shock or a fire.

2. Before operating the unit

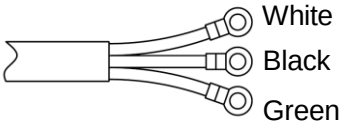
Precautions when installing the unit

⚠ Warning

8. Be sure to connect the earth wire.

- Grounding to Electrical Equipment Technical Standards, Section 19, class D (Grounding Resistance Max. 100Ω) is required in Japan when no grounding terminal is provided. Contact a local dealer, electrician, or Yamato Sales office for location-specific electrical requirements.
- Connect terminals securely to facility terminal or to an appropriate connector.
- Plugs and connectors are not included with this unit. Ground unit properly to facility outlet or terminal as required.
-

Single phase 220V AC



Wire Color	Facility Supply
White	Ground side
Black	Live side
Green	Ground

Do not connect the grounding wire to any parts or lines other than a correct grounding terminal such as a gas pipe, a water pipe or a telephone line.
Otherwise, an accident or a malfunction may result.

9. Use a dedicated outlet for the power supply.

Use a power supply that meets the electrical capacity of the unit.

Electrical capacity: : **AC220V±5%　50/60Hz　3.2A**

When the unit will not start even when you turn the power switch to “ON”, check for low main voltage or if the unit is connected to the same power supply line as other devices and connect it to another line if necessary. Avoid using wire extensions using a cord reel, which may result in degradation of freezing capacity or stoppage of refrigerator from possible voltage drops. Do not connect too many wires to a single outlet using a branching adaptor. Otherwise, a fire or an electric shock may result.

2. Before operating the unit

⚠ Warning

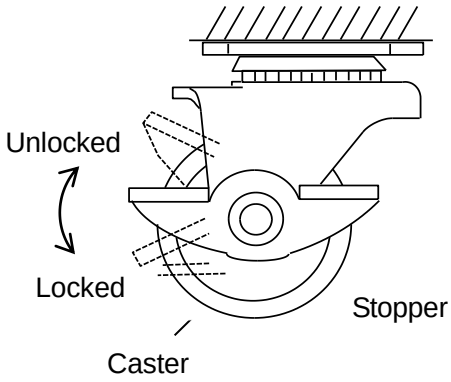
10. About handling of power cords

- Never use electrical power cords bundled. When these are used bundled, they might overheat causing a fire.
- Do not convert, forcibly bend, twist or pull the power cord. Otherwise, a fire or an electrical shock may result.
- Do not place the power cord under a desk or a chair, or sand between objects to avoid it from being damaged.
  Otherwise, a fire or an electrical shock may result.
- Do not place the power cord close to a stove or other heat generating device. Sheath of the cord may burn and result in a fire or an electrical shock.
- If the power cord should be damaged (exposure of core wire or disconnection), immediately turn the power switch of the main body off, pull off the power plug and ask your dealer to replace the cord. If the unit is operated with a damaged power cord, a fire or an electrical shock may result.
- Connect the power cord to an appropriate wall outlet.

2. Before operating the unit

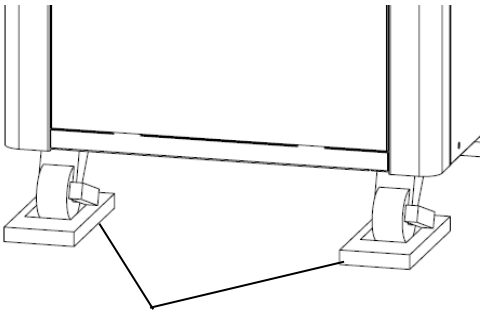
Installation procedures/precautions

(1) Release the stopper lock of the caster wheels.
Set the stoppers of the caster wheels to the high position as shown in the drawing in the right.
Now the lock is released.
（Only two caster wheels at the front of the unit have stoppers.）

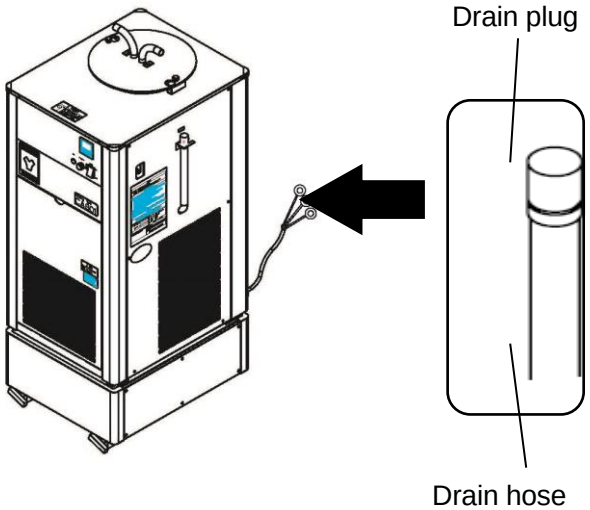


(2) Transport the unit to the installation place
※ Transporting the unit over a gap may give an excessive shock to the caster wheels and may damage them.
If such trouble is expected, lift the unit and transport it over the gap.
※ When lifting, never allow the product to tilt or lay on its side.

(3) When the installation place has been determined, lock the product by pressing down the caster stopper lever and set the caster fixing holders (accessories) under the casters.


Caster fixing holders

(4) Check the drain plug.
※ Confirm that the drain plug has not been removed.



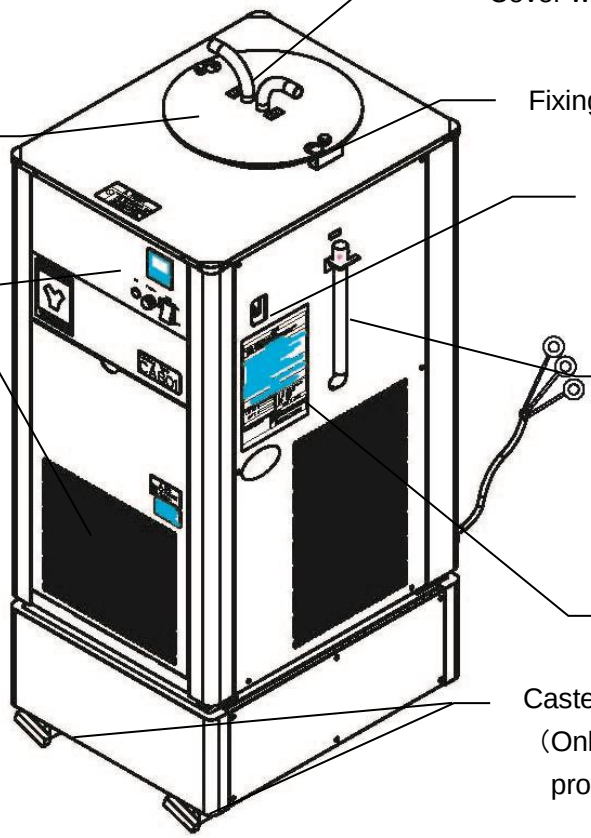
(5) Connect the power plug

Confirm that the power switch (earth leakage breaker) is OFF and the refrigerator switch is OFF. Connect the power plug to the socket outlet.

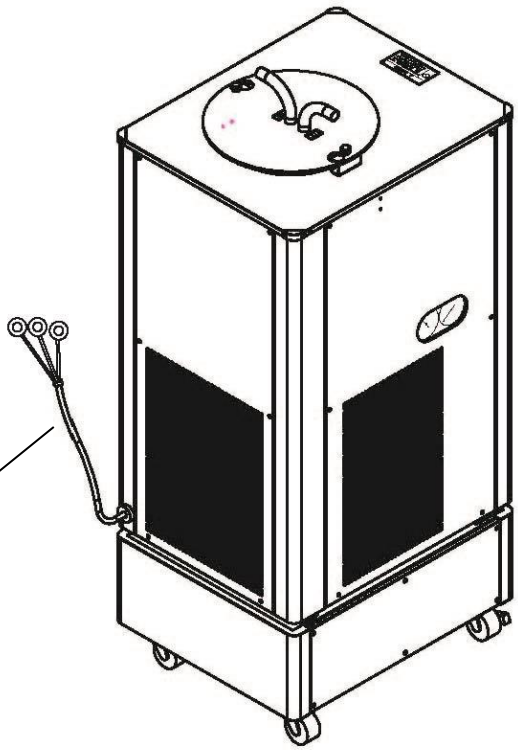
3. Name and Functions of each Part

Main body

Front view



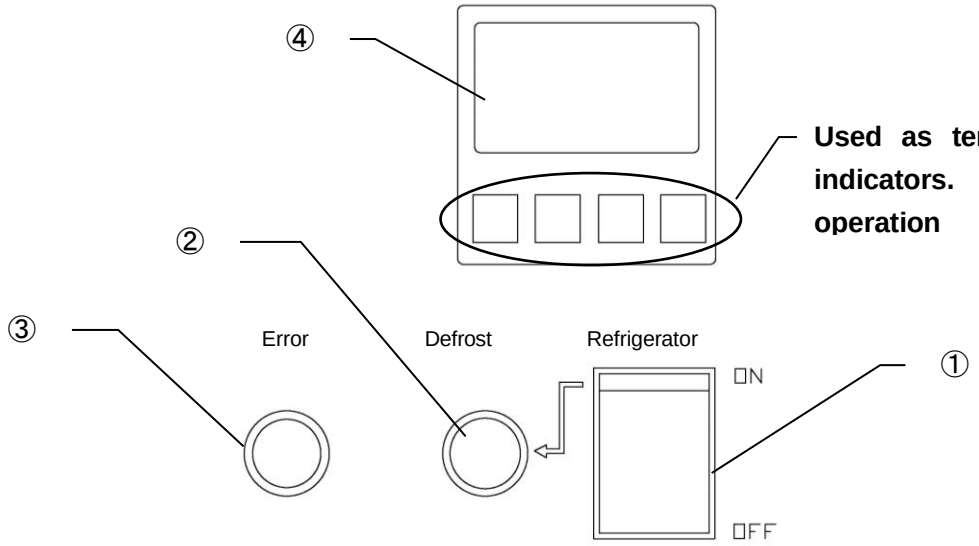
Back view



3. Name and Functions of each Part

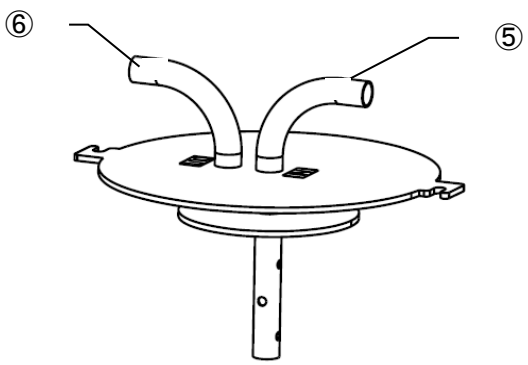
Details of each part

Operation panel



No	Nomenclature	Control/operation
①	Refrigerator switch	Starts/stops tank inside cooling operation by the refrigerator. ※ The protective delay timer allows operation start in three minutes after the switch ON. ※ Used also for stop of defrosting halfway of operation.
②	Defrost switch	Starts defrosting operation. This is to melt ice adhering to the inside wall surface of the trap tank. ※ Effective when the refrigerator switch is ON.
③	Error lamp	ON in case of overload to the refrigerator or disconnection of the temperature sensor.
④	Temperature indicator	Indicates the temperature of the inside wall of the cooling trap tank. ※ **This controller is used as the temperature indicator. The indicated temperature is used as a guideline.** ※ **Key operation is invalid and cannot be made.**

Cover with nozzle

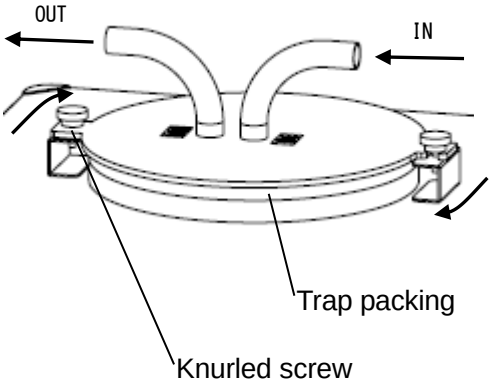
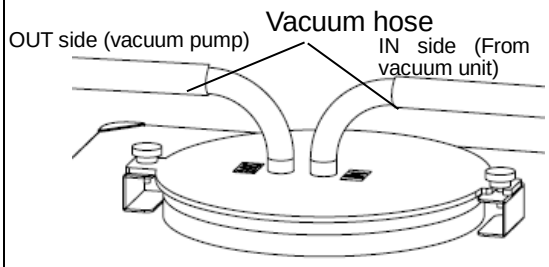
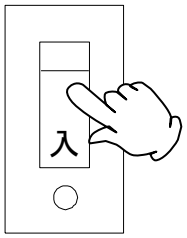
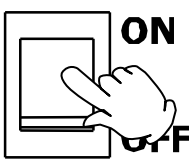


No.	Nomenclature	Control/operation
⑤	IN side	Connect to the vacuum equipment.
⑥	OUT side	Connect to the vacuum pump.

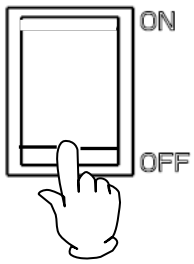
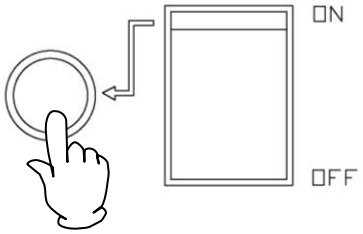
4. Operation Method

Operation method

For aqueous liquids to be trapped, take the following procedure.
Acids and organic solvents, if used, may cause corrosion and rust. Use an optional glass condenser.
For the connection method, refer to the manual attached to the glass condenser set.

1.	Set the lid with nozzle.  	① Confirm that the trap packing and the lid with nozzle are free from adhesion of any dust. ※ Damage or dust adhesion, if any, may deteriorate the degree of vacuum inside the trap tank. ② Set gently the lid with nozzle on the trap packing while ensuring that “IN” and “OUT” are in the correct direction. ③ Turn the cover with nozzles till it is caught by the knurled screw. Turn the knurled screw till the cover with nozzles will not move, then fix it temporarily. ※ The cover with nozzles is secured firmly when vacuuming is made. Excessive tightening of knurled screw may cause deformation of the cover and packing. Therefore, tighten moderately.
2.	Connect the vacuum hose.  	Connect the “IN” side of the lid with nozzle to the vacuum unit and the “OUT” side to the vacuum pump via the vacuum hose. ※ The nozzle of the lid is positioned on the “IN” side and the “OUT” side respectively. Take care to avoid wrong connection. ※ The vacuum hose is not included in accessories. Procure the vacuum hose of 12 mm or 15 mm in inside diameter separately.
3.	Turn ON the power switch (earth leakage breaker).  	Turn ON the power switch (earth leakage breaker) on the right side. The temperature indicator shows the current temperature.
4.	Turn ON the refrigerator switch. Refrigerator  	Turn ON the refrigerator switch. The switch lamp goes ON, and the refrigerator starts operation in three minutes. ※ The refrigerator is not started immediately even if the switch is turned ON. Since the three-minute delay timer is active for protection of the refrigerator, the refrigerator starts only after the set time of the timer.

4. Operation Method

5.	Run the vacuum pump.	When cooling of the trap tank is over, turn ON the vacuum pump. Vapor generated in the vacuum system is trapped in the trap tank.
6.	Operation stop ～For recovering liquid～ Refrigerator  ～For the case of ice accretion～ Defrost Refrigerator  	① Turn OFF the refrigerator switch to stop the trap. ② Carry out purging of the unit to which the product is to be connected. ④ Turn OFF the vacuum pump. ⑤ Remove the drain plug and drain the condensate completely from the trap tank. ※ To prevent oil backflow in the vacuum pump, return the vacuum pump switch to the atmospheric pressure once, then turn it OFF (this is to purge air). ① Carry out purging of the unit to which the product is to be connected. ② Turn OFF the vacuum pump. ③ Defrost icing within the trap. With the refrigerator switch left at ON, press the defrost switch. The switch lamp goes ON and defrosting begins. ※ Defrosting stops automatically after operation for 45 minutes, and the defrost lamp goes OFF. To interrupt defrosting halfway of operation, turn OFF the refrigerator switch to stop operation. ④ Remove a plug of drain hose and drain the condensate completely from the trap. ※ Defrosting cannot always remove the ice totally. Remaining ice must be removed manually by wearing gloves. ⑤ Turn OFF the refrigerator switch after automatic stop of defrosting.
7.	Turn OFF the power switch (leakage breaker).	Turn OFF the power switch (leakage breaker) on the right side.

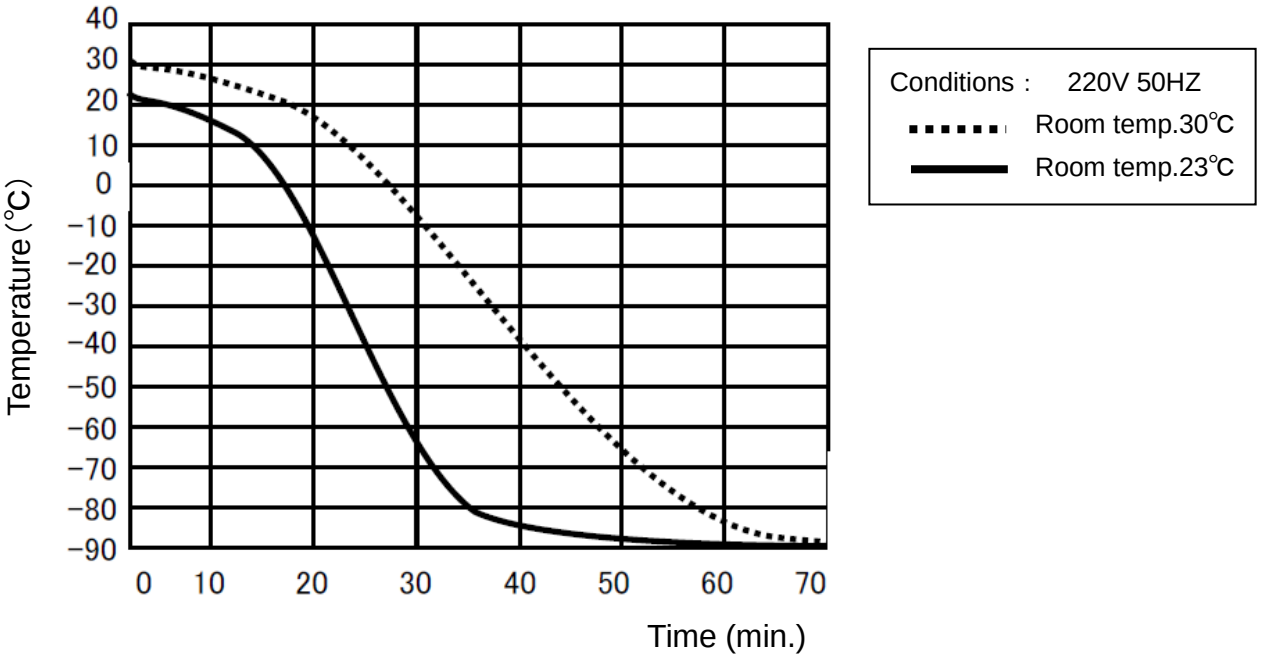
⚠ Caution

- Before operation, be sure to check if the vacuum hose has been connected to the cover with nozzles.

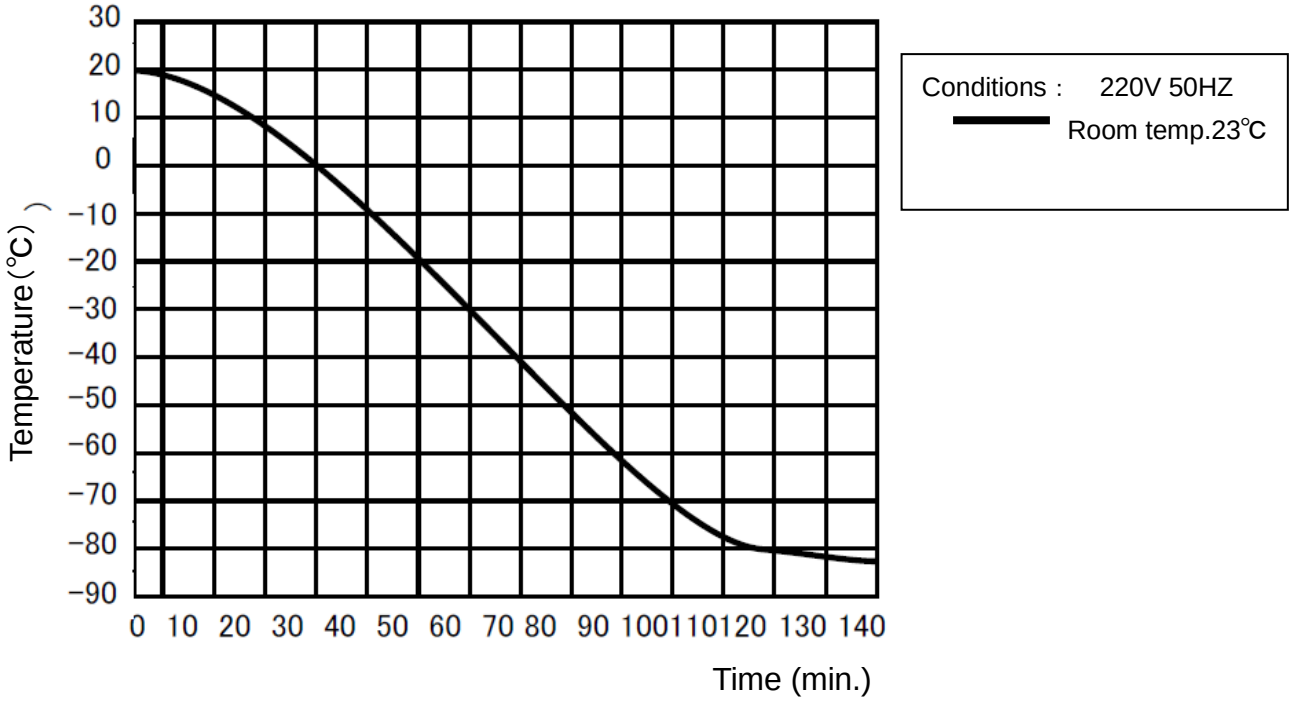
4. Operation Method

Cooling Curve（Reference data）

1. Temperature indicated when there is nothing in the trap (no-load)



2. Temperature indicated when the trap is filled by 2.5L of ethanol (with load)



⚠ Caution

- When the optional glass condenser is to be used, filling the trap with ethanol will help improving the solvent recovery rate. Fill ethanol by the amount of about 2.5 L. Ethanol is highly inflammable. Always use ethanol in a well-ventilated room and never attempt unmanned operation.

5. Cautions for Handling

⚠ Warning

1.Handling of flammable and combustible solutions

This product is not of an explosion-proof structure. For samples to be handled with this trap, specifically, for explosive and combustible substances and any substances containing these substances. pay particular attention. If left at the room temperature (or below for certain solutions), flammable and combustible solutions may be vaporized and thus ignited and exploded by any ignition source (switch, etc.). Ensure sufficient ventilation during operation. (See “13. List of Hazardous Substances” of P.24.)

2. Ban on use/countermeasures when an error occurs

If smoke is emerges on the unit or an odd odor is felt, immediately turn the ELB on the main unit off, turn the main power source off and contact your dealer, a Yamato sales office or our customer service center for inspection. Otherwise, a fire or an electrical shock may result. The user shall never attempt to repair the unit to avoid any possible dangers.

⚠ Caution

1. Maximum trap capacity

The maximum trap capacity for the aqueous system is about 1.0Kg. Filling the trap beyond this limit may cause clogging of “IN” and “OUT” nozzles.

2. Never climb on the unit.

Never climb on the unit. The unit may topple over or be damaged and a personal injury or a malfunction may result.

3.Do not place objects on the unit.

Do not place objects on the unit. They may fall and cause a personal injury.

4. When a thunder is heard.

When a thunder is heard, immediately turn the ELB of the main unit and the main power supply off. Leaving it as it is may cause a fire from lightening.

5.Recovery from power outage

In case of stop of operating unit due to power outage or in case of power recovery, this unit resets automatically to the state immediately before power outage and resumes operation. However, in case of power outage during defrosting, the refrigerator is operated after recover from power outage. Press the defrost button again to resume defrosting.
When resumption of operation after automatic reset is not favorable, turn OFF the power switch (earth leakage breaker).

6.Carry out thorough cleaning.

This unit has already been cleaned. However, for initial use after purchase or after long-time shutdown, clean the tank inside and the cover with nozzles thoroughly before use.

5. Cautions on handling

⚠ Caution

7. During nighttime and when the unit will be left stopped for an extended period.

⚠
- Turn the power switch (ELB) to “OFF” and remove the power plug from the receptacle during nighttime and when the unit will be left stopped for an extended period of time.
- Drain liquid at the drain cock from the circulation system if you are not going to use the unit for an extended period of time.

8. Supply voltage

❗ The operation voltage must be within ±5% or less of rated voltage.

9. Refrigerator pressure error

⚠ When the piping inside pressure becomes high due to overloading to the refrigerator, the circuit to protect the refrigerator pressure is activated, turning ON the refrigerator error lamp and shutting down the refrigerator. In this event, turn OFF the breaker immediately and refer to 8. Troubleshooting in page 19.

10. Refrigerator overload relay

⚠ Operation of the refrigerator in the high temperature range may activate the refrigerator overload relay, which shuts down the refrigerator. In such an event, turn OFF the breaker and refer to 8. Troubleshooting in page 19.

11. Cautions for restart

⚠ When the refrigerator switch is turn ON from the OFF state or the refrigerator is to be operated by turning ON the breaker, the delay timer operates for three minutes to protect the refrigerator. Note that this is not a failure.

12.Tank internal temperature upper-limit

⃠ If excessive amount of liquid is contained in the trap tank, the internal temperature rises, putting the refrigerator into the overload state.
Do not attempt continuous operation with the internal temperature higher than -40℃.

13. About condensation

⚠ Condensate may generate depending on the operating conditions or the environment. Wipe any condensate with a dry cloth or a rag.

14. When transporting the unit

⚠ Do not hold the unit on its side when you lift it for transportation.
Observe the installation procedures (P.5～9) when reinstalling the unit.

6. Maintenance

Daily inspection/maintenance

We strongly recommend daily inspection and maintenance to assure stable operation of the unit.

⚠ Warning

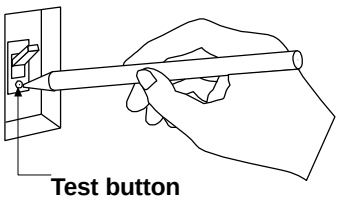
- Be sure to remove the power cord from plug socket before inspection or maintenance unless necessary.
- Start working after the unit temperature has returned to the normal temperature.
- Never attempt to disassemble devices.
- Never touch the condenser fins with bare hands. Personal injury may result.

⚠ Caution

- Wipe off any dirt with a well wrung out soft cloth. Never use benzene, thinner, or scorching powder or rub with a hard brush. Otherwise, deformation, deterioration, discoloration or vacuum Leak may result.

Monthly

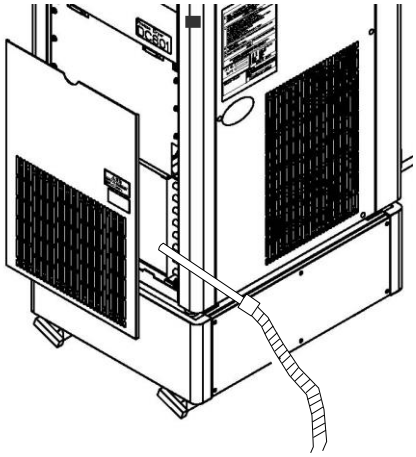
- Inspect the function of the ELB.
  - ・ Connect the power cord and conduct a test while it is activated.
  - ・ First turn the power switch (ELB) “ON”.
  - ・ Push the test button of the ELB with a pointed object such as a ball point pen and it is normal if it is turned off.



Test button

- Clean the condenser fins.

  Clogged filter and condenser fins will degraded cooling efficiency. It also may cause a malfunction of the refrigerator. Extent of clogging will differ depending on the environment or operating time and clean the filters at a regular interval appropriate for the specific operating conditions.
  - ・The filter cover upper portion is fixed by means of magnet. The filter can be removed with ease by pulling the upper portion.
  - ・The filter is inserted into the filter cover. Remove and clean it with a cleaner.



⚠	**Take care not to break the fins.**

Do not touch the condenser fin with bare hands.

During maintenance, do not touch the condenser fin with bare hands. The fin is extremely sharp and may cut the hand.

7. When the unit is not to be used for a long time or when disposing

When the unit is not to be used for a long time or when disposing

⚠ Caution

When the trap is not to be used for a long period of time

- Turn OFF the earth leakage breaker and disconnect the power cord from receptacle
- Wipe off moisture in the trap completely.

⚠ Warning

When you are going to discard the product

- Never leave the unit at a place where children may access.
- Normally, dispose of the trap as industrial waste.
- The refrigerator uses inflammable refrigerant. Dispose of refrigerant, small amount at a time, in a well-ventilated place while avoiding a place where fire is used.

Requests in case of disposal

Pay due attention on conservation of the global environment.

- When disposing, it is essential to disassemble as much as possible for segregated disposal or recycling by considering the environmental conservation. Principal components and materials used of this trap are as shown below.

Names of major parts	Major materials
Major components of the outer finish	
Outer finish	Chromium-free electro galvanized steel plate (SECC), Chemical-proof bake coating
Internal bath , lid with nozzle	SUS304 stainless steel
Nameplate	Vinyl Chloride (PVC), resin film
Corner	Alkyl benzene sulfide resin (ABS resin)
Trap packing	Silicon rubber
Principal components of electric system	
Switches, relays, temperature indicators	Resin and other synthetic materials
Power cord and wiring materials, others	Synthetic rubber cover, copper, nickel, and other compounds
Principal components of refrigerator system	
Refrigerator system	Ferrous and synthetic oil, etc.
Condenser fins	Al and copper
Principal components of piping system	
Drain hose	Natural rubber
Drain plug	Polyacetal resin
Drain plug holder	Chrome-free electrogalvanized steel plate (SECC). Chemical resistant baking finish
Pipe cover	Polyurethane sponge
Pipe	Copper pipe
Refrigerant filled in the refrigerator	
Refrigerant	Isobutane/methylene/methane

8.Troubleshooting Guide

Check list

For the following condition

Symptom	Check as follows
Refrigerator not operating even when the refrigerator switch is turned ON	● Check if the power cord is connected firmly to the receptacle. ● Check for power outage. ● Check if the power switch (earth leakage breaker) is OFF. ● Check if the delay timer is operating (refrigerator starts operation in three minutes after the refrigerator switch ON).
Refrigerator not operating with the switch ON	● Check if the refrigerator is in the state after completion of defrosting. → Turn OFF the refrigerator switch temporarily.
Temperature does not drop	● Check if the condenser filter or the condenser fin is clogged. ● Check if the coolant for sample to be trapped presents large thermal overload. ● Check if the ambient temperature is high (ambient temperature 5～30℃） ● Check the ventilating opening is not closed. ● Check if the voltage of master power supply is adequate（supply voltage AC220V±5% or less）
Ice not melted by defrosting	● Check if the ambient temperature is low (ambient temperature 5～30℃） ● Check if the defrost switch is pressed with the refrigerator switch OFF. ● Ice not melted completely → Defrosting is an auxiliary function to facilitate ice removal by separating ice from the trap wall. Ice cannot be removed totally by defrosting alone.

For error lamp ON

Error sign	Cause	Countermeasure
Error lamp ON and 「----」 shown in the indicator	Error in the refrigerator circuit	urn OFF power supply immediately and remove the cause of trouble in “Check list; Temperature does not drop.” After taking a certain time, turn ON power supply again. If the error lamp goes ON again, call our customer service center.
	Disconnection in temperature sensor	Call our customer service center.

If power outage occurs

When power supply is shutdown due to power outage during operation and is resumed again, this unit resets automatically to the state immediately before power outage and starts operation from this state. If power supply is shut down during defrosting, the refrigerator operates after recovery from power outage. In such an event, press the defrost button to resume defrosting.
When resumption of operation after automatic reset is not favorable, turn OFF the power switch (earth leakage breaker).

◆**If none of above factors are found applicable, turn OFF power switch immediately and shut off the master power supply. Contact the shop from which you have purchased the product or our sales office, or our customer service center.**

9. After sales service and warranty

When requesting a repair

If any trouble occurs, immediately stop operation, turn the power switch (ELB) off, pull out the power plug (power cord) from plug socket and contact your dealer or our sales office.

Information necessary for requesting a repair

- Model name of the product
- Serial number
- Date (y/m/d) of purchase

} See the warranty card or the nameplate on the unit.
} See the section “Names and Functins of Parts” on page 10

- Description of trouble (as in detail as possible)

Be sure to indicate the warranty card to our service representative.

Warranty card (attached separately)

- Warranty card is given by your dealer or one of our sales offices and please fill in your dealer, date of purchase and other information and fax it to our customer center (the number is described in the back cover), then store it securely.

- Warranty period is one full year from the date of purchase. Repair service for free is available according to the conditions written on the warranty card.

- For repairs after the warranty period consult your dealer or one of our sales offices. Paid repair service is available on your request when the product’s functionality can be maintained by repair.

Minimum holding period of repair parts

The minimum holding period of repair parts for this product is seven years after end of production.
Repair parts here refer to parts necessary for maintaining performance of the product.

10.Specifications

Main body specifications

Model		CA801
System		Direct trap or glass trap (optional)
Performance ※1	Dehumidification capacity	Max 1.0Kg（aqueous system）
	Lowest achieving temperature ※2,3	-85℃ or less
Composition	Refrigerator	Air-cooling type 350W
	Refrigerant	Isobutane/ethylene/methane
	Ld with nozzle	SUS304 O.D. φ17.6mm
	Tank shape and material	cylindrical SUS304
	Ambient temperature range	5～30℃
	Temperature indicator ※4	7-segment LED
	Temperature sensor	Platinum resistance temperature detector Pt100Ω
	Defrosting mechanism	Hot gas bypass type
Safety devices		Over-current (15A) earth-leakage breaker, refrigerator delay timer, refrigerator overload relay, refrigerator high-voltage error, sensor disconnection error
Other functions		Drain hose（vacuum hose with plug）
Standard	Trap tank size	I.D φ153mm× height 235mm
	Internal volume	About 4L（liquid level 3L）
	Power supply, rated current value※5	AC220V 50/60Hz 3.2A(15A)
	Outer size ※6	W405mm×D500mm×H1040mm
	Mass	About 65kg
Accessories		Instruction manual, guarantee card、four caster fixing holders

※1 The performance applies to the conditions with room temperature of 23℃±5℃, humidity of 65%RH±20%, rated supply voltage of AC220V/50Hz, and without load.

※2 The minimum achieving temperature is the temperature at 140 mm above the packing on the trap wall surface.

※3 The applies to the case when the cold trap is used as an air tank.

※4 The indicator temperature is the temperature of the cooling piping surface provided around the outside of the trap, and serves as the guideline temperature indication.

※5 The current value in () represents the breaker capacity.

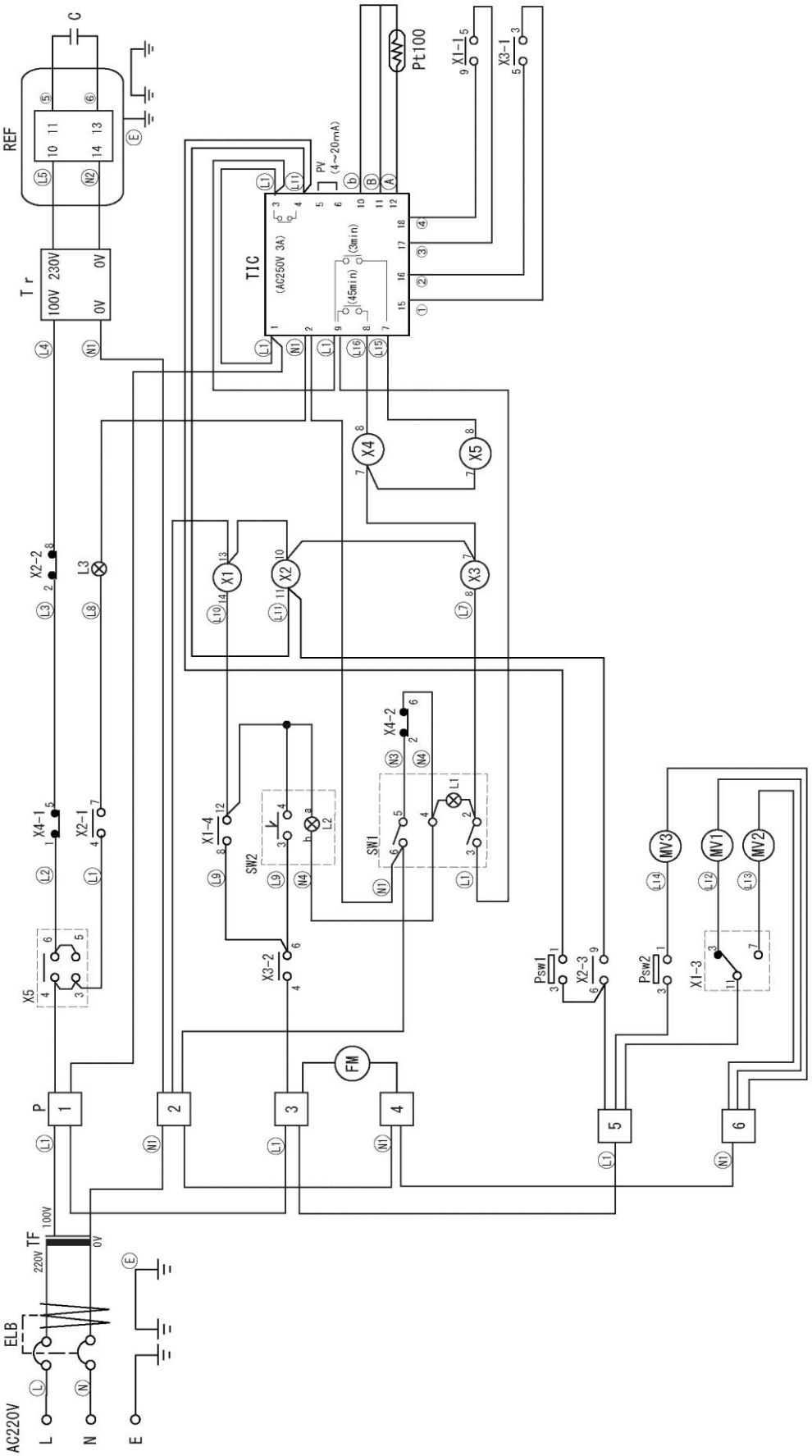
※6 Projection not included

Option

Nomenclature	Article No.	Features
Glass condenser set, type OCA10	221487	For trapping of acidic and organic solvents
Different-diameter pipe for rubber tube		Used when the connection size is different
Brass φ30×φ18	242185	
Brass φ30×φ12	242186	
SUS φ30×φ18	241496	
SUS φ30×φ12	241497	
SUS-made lid	281296	Lid of trap tank

11.Connection Diagram

Connection diagram



12. Replacement Parts List

Symbol	Name of parts	Code №.	Specifications	Manufacturer
ELB	Electric leakage breaker	LT00029774	NV-L22GR 15A	Mitsubishi
P	Terminal block	LT00031664	TFD250ABC-8P	Terminal
FM	Fan motor	3010060014	SE4-E11LP with 5 blades	Sanyo electric
TIC	Temperature indicator	LT00034914	TTM204-Q-RI-RUV	TOHO Electronics
Pt100	Temperature sensor	LT00009705	SB-6630-1A Pt100Ω	CHINO
Tr	Transformer	LT00035654	100V-230V 1KW	Yamato Scientific
TF	Transformer	LT00000982	AD21-015KB2	Toyozumi
REF	Refrigerator	LT00035655	SC12CNX	Danfoss
X1	Relay	LT00035664	LY4F AC100V	Omron
X2	Relay	LT00000993	LY3F AC100V	Omron
X3	Relay	2050000035	LY2F AC100V	Omron
X4	Relay	2050000035	LY2F AC100V	Omron
X5	Relay	LT00000992	LY1F AC100V	Omron
SW1	Switch	LT00021833	LLK35L1	OTAX
SW2	Switch	LT00014520	AH164-LS11H1	Fuji electric
Psw1/Psw 2	Pressure switch	3180000006	VHP-F	Fujikoki
L3	Lamp error	LT00021961	BN5665-AC100V Red	Sato parts
MV1	Electromagnetic valve	3020060004	NEV-603DXF	Saginomiya Sanki
MV2	Electromagnetic valve	3020060003	SEV-502DXF	Saginomiya Sanki
MV3	Electromagnetic valve	3020060004	NEV-603DXF	Saginomiya Sanki
	Filter	DC80140050		Yamato Scientific
	Packing	CA30030150	CA300-30151	Yamato Scientific
	Drain plug	LT00000949	CA300-40200	Yamato Scientific
	Vacuum hose (for drain)	W0040003	Φ6×Φ18×1m	Yamato Scientific
	Compound gauge	LT00007587	TA147W	TASCO
	Low-voltage container	DC80140000		Yamato Scientific
	Condenser	DC80130111		Yamato Scientific
	Dryer	3200036002	KC-10432	Meiko Kiki

13. List of dangerous materials

Never use an explosive substance a flammable substance or a atmosphere containing them for this device.

Explosive substance	Explosive substance	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.
Flammable substances	Explosive substances	①Metal “lithium” ②metal “potassium” ③metal “natrium” ④yellow phosphorus ⑤phosphorus sulfide ⑥red phosphorus ⑦phosphorus sulfide ⑧celluloids, calcium carbide (a.k.a, carbide)⑨lime phosphide⑩magnesium powder⑪aluminum powder ⑫metal powder other than magnesium and aluminum powder⑬sodium 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 with ignition point at a degree 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 with ignition point between zero and less than 30 degrees.
		④Kerosene, light oil, terebinth oil, isopenthyl alcohol(a.k.a. isoamyl alcohol), acetic acid and other substances with ignition point between 30 degrees and less than 65 degrees.
	Combustible gas	Hydrogen, acetylene, ethylene, methane, ethane, propane, butane and other gases combustible at 15℃ at one air pressure.

Excerpt from Table 1, Hazardous Substances, of the Cabinet Order of the Occupational Safety and Health Law (substances related to Articles 1, 6, and 9)

14. Standard installation manual

* Install the product according to the following: (Confirm separately for optional items or special specifications)

Model	Serial number	Date	Installation mgr.(company name)	Installation mgr.	Judgment

No.	Item	Implementation method	TOC No. Reference page of the operating instruction manual	Judgment
Delivery, installation place				
1	Accessories	Check for number of accessories on the basis of the column for accessories.	10. Specifications field P.21	
2	Installation	・ Visual check of environmental conditions Caution: Take care for environment	2. Before operating the unit ・On the installation site P.5	
		・Securing a space		
Operation-related matters				
1	Source voltage	・Measure the user side voltage (outlet, etc.) with a tester ・Measure voltage during operation (shall meet the specifications) Caution: Always use a plug that meets the specification for attaching to the ELB.	2. Before operating the unit ・Be sure to connect the ground wire. P.7 ・Power supply is …. P.4 10.Specifications ・Specification - power supply P.21	
2	Operation start	・Start operation.	4. Installation procedures P.9 5. Operation method P.12～ Operation method 13	
Description				
1	Operational descriptions	・ Explain the customer about each assembly as per the operation manual.	5. Operation method P.12～ Operation method 13 1. Safety precautions P.1～ ～13. List of dangerous materials 24	
2	Error codes	Explain the customer about error codes and procedures for release according to the operational instructions	8. Troubleshooting P.19	
3	Maintenance and inspection	Explain operations of each component according to the operational instructions	7. Maintenance procedures ・ Daily inspection/ maintenance P.17	
4	Completion of installation Entries	・Fill in the installation date and the installation mgr. on the nameplate of the main unit ・Fill in necessary information to the warranty card and hand it over to the customer ・Explanation of the route for after-sales service	9. After sales service and warranty P.20	

Limited liability

Be sure to use the unit strictly following the handling and operating instructions in this operating instruction.
Yamato Scientific Co., Ltd. assumes no responsibility for an accident or a malfunction caused by use of this product in any way not specified in this operating instruction.
Never attempt to perform matters prohibited in this operation instruction.
Otherwise, an unexpected accident may result.

Notice

- **Descriptions in this operating instruction are subject to change without notice.**
- **We will replace a manual with a missing page or paging disorder.**

Instruction Manual
Cold Trap CA801
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