

# SANYO

---

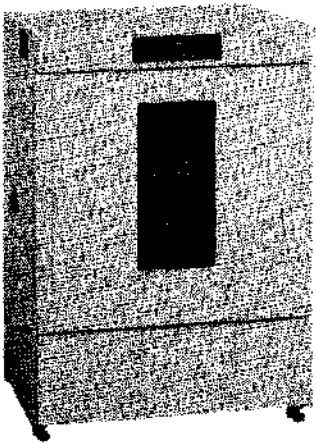
## INSTRUCTION MANUAL

Cooled Incubator

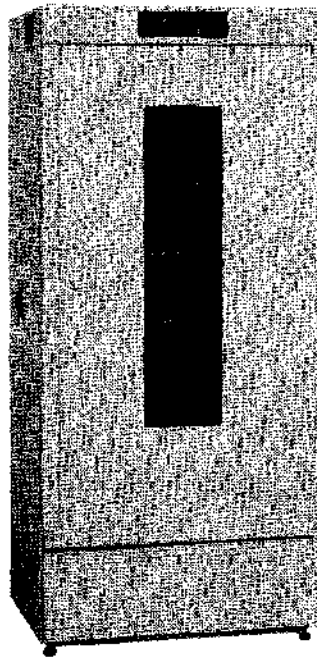
### MIR-153

### MIR-253

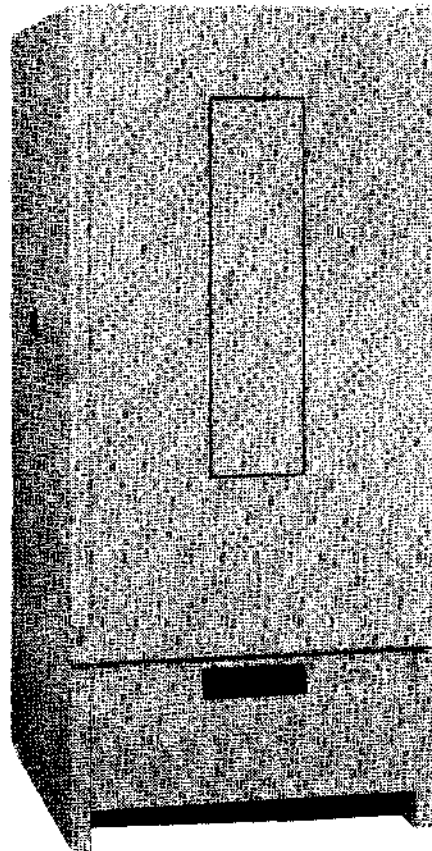
### MIR-553



MIR-153



MIR-253



MIR-553

CE

# Be sure to obey this manual for safety.

Thank you for your purchase of the Sanyo incubator. Please read these instructions carefully before using.

You must conform to this manual after reading throughout well, because this manual contains many important items for safety.

Be sure to obey this manual for safety.....	1-3
A Few Precautions.....	4
Cautions.....	5
Installation Site.....	5
Name and Function of Parts.....	6~7
Operating Instructions.....	8~13
Care and Maintenance.....	14~15
Trouble Shooting.....	16
Attention.....	17
Environmental Conditions.....	17
Specifications.....	18

Items are described so that you can use this unit safely and properly, and so that you can take precautions to prevent possible injury and damage to you and other people.

They are distinguished [WARNING] from [CAUTION] by its contents. Be sure to observe these contents because they contain many important items for safety operation.

Indication and meaning are as follows.


## **WARNING!**


This content means that it is possible to result in fatal injury or serious injury to human.


## **CAUTION!**

This content means that it is possible to result in injury to human and damage to thing.

Mark shows;

 A mark means caution.

 <9 mark means prohibition.

 • mark means instruction.

Be sure to keep this manual in the place can be read by the user at any time after you read.

# Keep these rules for safety by all means.

## WARNING!

**O** Don't use it outdoors. When is used at the place splashing the rainwater, this may cause electrical leak/shock.

The installation depends on store or specialty trader. When is done installation construction by oneself, if it is deficiency, this may cause gas leak, liquid leak, shock and fire.

The installation must be done in a place bearing weight enough surely. When strength lack and installation are incomplete, this may cause injury by falling and turning over the product.

**O** Don't install it in the place that is easy to be splashed and/or there is a lot of moisture. Deterioration of the insulation may cause electrical leak/shock.


Use an outlet more than rating 15A alone. When use it together with other appliance, abnormal heating around branch outlet may cause ignition.

**O** After removed dust from power supply plug, insert power supply plug to a root of blade surely. Dusty power supply plug and insufficient plug-inserting may cause ignition.

**O** Use outlet with ground to prevent a shock. If there is no outlet with ground, entrust specialty trader with ground construction.

**O** Don't connect the ground route of ground construction to ground route of gas pipe, water service pipe lightning rod and telephone. Incomplete ground can cause shock.

**O** Don't put a thing and foreign metal, such as pin and wire, in a vent and between gaps and discharging outlet for inner circulation. If shock occurs or driving section moves, which may cause injury.

 Don't put the volatile or inflammable article in the container. It may cause explosion/fire.



When the repair, maintenance and inspection is done, change the power supply switch to stop and disconnect the power supply plug. It may cause shock and injury.

Don't inhale medicine, steam and power dust stacked around when repairing the product. It may cause impairing the health.



Don't pour water directly on the product. It may cause short circuit/shock.



The person except service engineer must not disassemble and repair/modify. Catching fire and abnormal operation may cause injury.



Disconnect the power supply plug when the fluorescent lamp is replaced. It may cause shock.



Disconnect the power supply plug in abnormality. If hold abnormal operation, this may cause shock and fire.

Avoid store the product in the place for infant playing and avoid close the door tightly when shut down and store the product. It may cause shutting an infant in.













The dismantling/the disposal depend on a special manufacturer. Leaving the unit as it is may cause accident, such as shutting an infant in.

---

---

 **CAUTION!**

-  Place the unit on a level and strong place and perform the prevention of turning over. When installation is incomplete, this may cause injury by liquid leak, falling and turning over the product.
-  Don't use it besides rating frequency of rating label attached to the main body, the voltage. It may cause fire/shock.
-  Set the installation of shelf board surely justly. There may be the thing that it is caused of injury when fall off.
-  Don't put a thing more than 30 kg on shelf and don't throw a thing into. Falling may cause injury.
-  When a power supply disconnects the plug, I hold power supply plug of point by all means not to have power supply code, and pull it up. It may cause fire by shock and electrical leak.
-  Don't damage and injury the power cord and plug. And, don't use if loosen inlet of power supply plug. It may cause fire/shock.
-  Don't touch electrical parts such as power supply plug with wet hand. It may cause shock.
-  Use a power supply for this container from an outlet equipped with when use machinery in a container. It may cause fire.
-  Confirm the setting point if resumé operation after power failure or turning off. Changing of setting point may cause injury (harming) to contents.
-  Don't put a container which holds heavy thing or water on the product. Falling may cause injury and the insulation of electrical component may be deteriorated with the spilled water, and they may cause electrical leak.
-  Don't get onto and put a thing on the product. Turning over, damage and falling may cause injury.
-  Don't put bottles and cans in when used this container at setting temperature less than 0°C. It may cause injury by breaking the bottles due to freezing contents.
-  Don't touch a thing in a container (a thing made by metal in particular) with wet hand when used this container at setting temperature less than 0°C. It may cause frostbite.
-  Hold the handle when shut the door. Holding a place except the handle may cause injury by catching a finger in.
-  Don't place a hand on glass, and don't add strong power. Breaking of glass may cause injury.
-  Put on the gloves in repairing this product. It may cause injury by corner/edge of interior parts.
-  Pay attention to avoid damage to power supply cord after pulling out of outlet in moving the product. It may cause shock/fire.
-  Completely do drainage of water of evaporating dish when move a product. Leakage and splashing of water may cause electrical leak/shock.
-  Be careful not to turn over carefully when move the product. Pay attention not to turn over carefully when move the product. It may cause injury by turning over.
-  Pull power supply plug out of outlet when shut down the product for long time. Deterioration of insulation may cause shock, electrical leak and fire.

---

# A FEW PRECAUTIONS

---

- O Do not use two-way sockets etc, because it could cause problems. Also use an exclusive breaker.
- O Do not put volatile or inflammable chemicals (like ethanol, benzine, alcohol, propane or adhesive agents) in the box.
- Q When cleaning, do not pour water directly on the outside of the incubator (especially on control panel of the top surface). This could cause a short-circuit or other problems.
- O If a completely filled bottle of material is placed inside the cabinet and the inside temperature is lowered to below 0°C, freezing of the contents could break the bottle.
- O When cleaning, do not use brushes, acids, benzine, thinner, soap, cleaner or hot water. These will cause discoloring or damage to coated surfaces. On plastic or rubber parts, they will cause transformation, discoloration or degeneration. Never apply volatile chemicals (like benzine etc.) on plastic or rubber parts. When neutral detergent is used, be sure to rinse thoroughly with water afterwards.
- ⑥ The maximum heat load capacity acceptable to this incubator is shown in Figures 2, 3 and 4 under the heading "TROUBLE SHOOTING." If this limit should be exceeded, it may cause the unit to malfunction.

## How to ground earth wire

Equip with an earth plate to protect yourself against electric shock which could result from poor insulation. Consult our shops or electrician for these installation.

## Installing a leak breaker

When you use this incubator in humid or wet situations, you must install a leak breaker on the power supply side, as well as installing an earth plate. Consult our shops or an electrician for these installations.

---

# CAUTIONS

---

- If the temperature control is set for below 5°C, the incubator could frost up. If the cooler is obstructed by the accumulation of frost, its cooling capacity will be affected and there will be a rise in temperature. Check for frost accumulation periodically through the observation window. If an excessive amount of frost has accumulated, defrost. Any material high in water content that is kept in the incubator will contribute to the accumulation of frost. The defroster, however, cannot be actuated unless the inside temperature is below -5°C.
- ◎ Any heat load placed in the unit and switched on can cause a deviation of the inside temperature from the set value. If this is the case, measure the inside temperature with a precision thermometer placed in the center of the cavity and adjust the temperature control dial accordingly.
- ◎ The space in the cabinet is cooled by the forced circulation of chilled air. It is important that the air intake and exhaust ports not be obstructed in any way. Care should be taken to see that foreign matter doesn't enter the unit through the ports. This could cause a temperature deviation from the set value.
- For some time after the unit has been started or when the temperature is fairly high, the cabinet walls may heat up. This doesn't indicate a malfunction. It indicates that the condensation preventative/power economy function is performing satisfactorily. Hot gases are piped from the motor compressor along the front edges of the cabinet to prevent condensation.
- If dew accumulates on the front glass or the outer surface of the frame, wipe it off with a soft cloth.
- When it is desired to place an instrument requiring a measuring cable and power cord in the cabinet, the cable and cord can be led through the access hole provided on the left side wall of the cabinet. After installation, a rubber plug should be provided as an insulation device. Failure to use a rubber plug can interfere with the proper lowering of temperature and lead to condensation on the outside of the hole.
- ⑦ The acceptable ambient temperature range for this incubator is -10°C ~ +35°C.
- When replacing the glass protection plate, work carefully since it can be broken or damaged if subjected to excessive force. The replacement procedure can be found under the heading "Care and Maintenance." (MIR 152, MIR 252 only)
- ◎ Two control methods are available for the unit:
  - PID control...When the temperature is set about 15°C higher than the ambient temperature. There is little temperature cycle.
  - ON-OFF control...When the set temperature is not higher than the ambient temperature by about 15°C, inside temperature range is about 2°C, resulting from cycle running.
- ◎ For the method of setting the high/low temperature alarm, please refer to procedure under the head "OPERATING INSTRUCTIONS." An erroneous setting of either alarm can result in a temperature control error.
- ⓓ Check the set value in the case of power off or power failure. If the set value has been changed, there is possibility to give a damage to contents.

---

# INSTALLATION SITE

---

- Q The unit should not be exposed to direct sunlight. If the unit is installed in direct sunlight a proper sunshade or shield should be provided.
- ◎ Adequate ventilation is necessary. A space of, at least, 10 cm should be provided behind the unit. Poor ventilation can interfere with proper cooling.
- Installation should be done on a solid and level surface. Installation on a solid and level surface ensures against abnormal vibration and noise.
- The unit should not be installed in a damp area or near a sink or faucet.
- The unit should be kept away from heat sources such as a stove or heater.

# NAME AND FUNCTION OF PARTS

**○ Shade**

To protect the fluorescent lamp.

**○ Door**

The door opens to 130°. When closed, the door forms a perfect seal with the aid of magnet gasket.

**○ Door switch**

To stop the chilled air circulation fan when the door is opened so that the outflow of chilled air is minimized.

**○ Observation window**

A 3-ply heat ray absorbing glass panel which arrests incoming heat rays

(MIR-153 and 253 only)

The cabinet interior can be screened from light if the glass protection plate is substituted for one of black.

(MIR-553 only)

The window incorporates a small door, sealed with magnet gasket, which screens the inside of the cabinet from light.

**○ Shelves**

The shelves can be adjusted vertically.

**○ Lock**

To lock, this should be turned 180° counterclockwise.

**○ Adjustable legs**

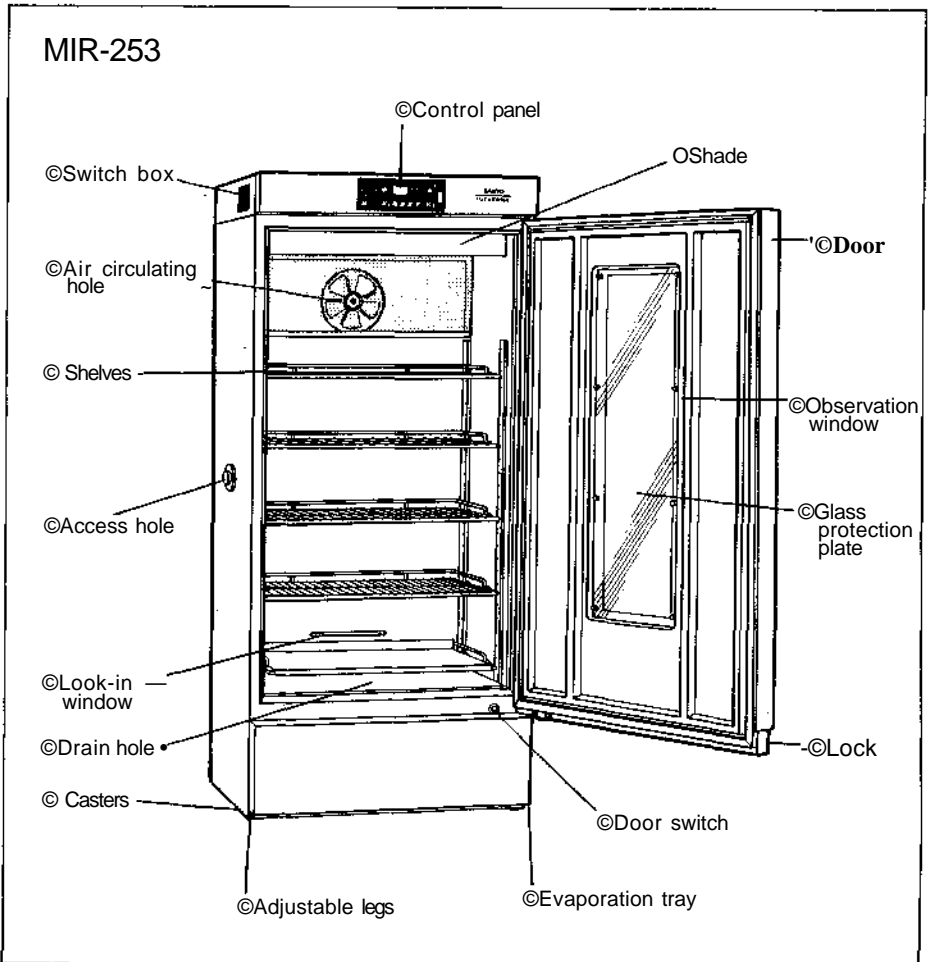
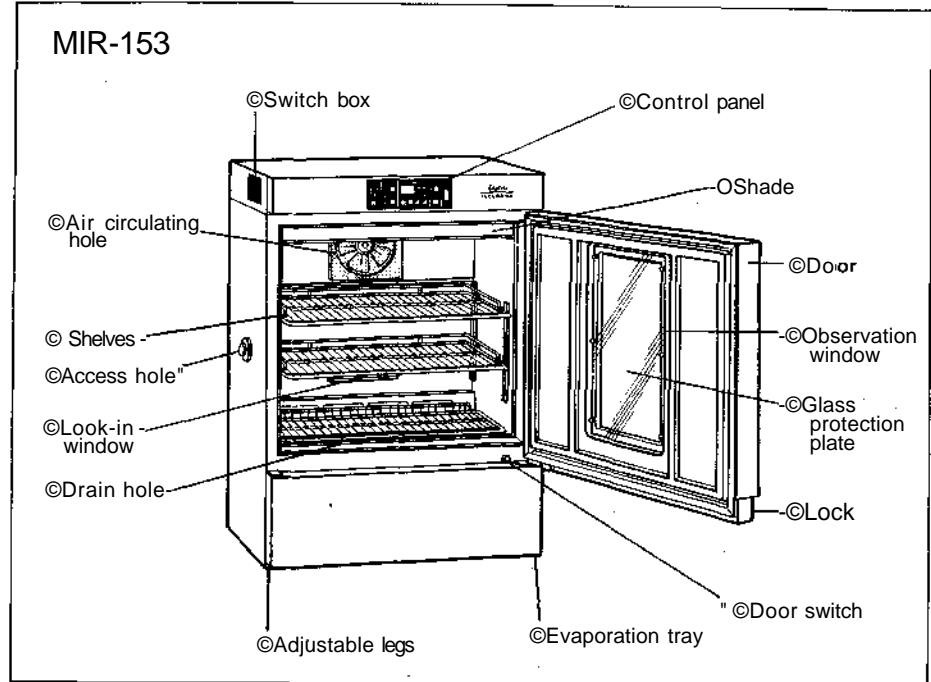
To secure the unit in place, turn the legs counterclockwise until the unit rests securely on the floor.

**○ Evaporation tray**

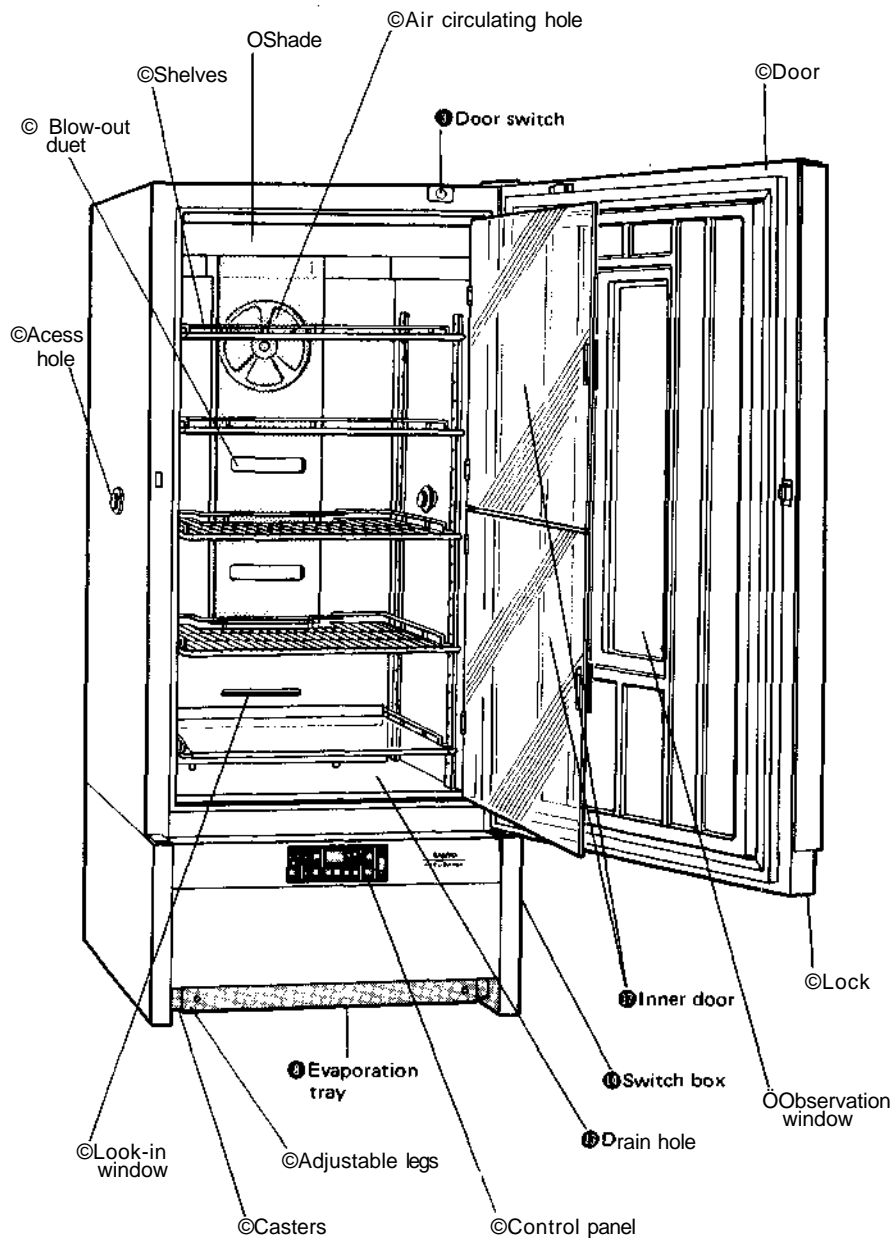
To catch melt water from automatic defrosting and to allow it to evaporate.

**○ Look-in window**

To check the frost condition of the cooler.



## MIR-553



### dD Access hole

When an instrument that requires a measuring cable and power cord is placed inside the cabinet, the cable and cord can be led through the access hole provided.

### © Blow-out duet (MIR-553 only)

The air is led through the heat exchanger and blown through the holes provided over the entire length of the duet.

### © Air circulation fan

Housed in blow-out duet.

### © Drain hole

Uncap when wiping clean the interior of the cabinet. Replace the cap after cleaning.

### © Switch box

### © Control panel

The control panel includes the temperature control dial, various alarm setting dials, the temperature indicator and program setting dial.

### © Glass protection plate

(MIR-153 and 253 only)  
A black plate may be substituted when it is desired that the interior of the cabinet be screened from light.

### © Inner door (MIR-553 only)

Using a transparent acryl board, this inner door minimizes the outflow of air when the cabinet door is opened.

### © Casters

Facilitates movement of the unit.



# OPERATING INSTRUCTIONS

## Name and Function of Each Operation Key and Lamp on the Control Panel

The operation keys on the front panel allow the following functions.

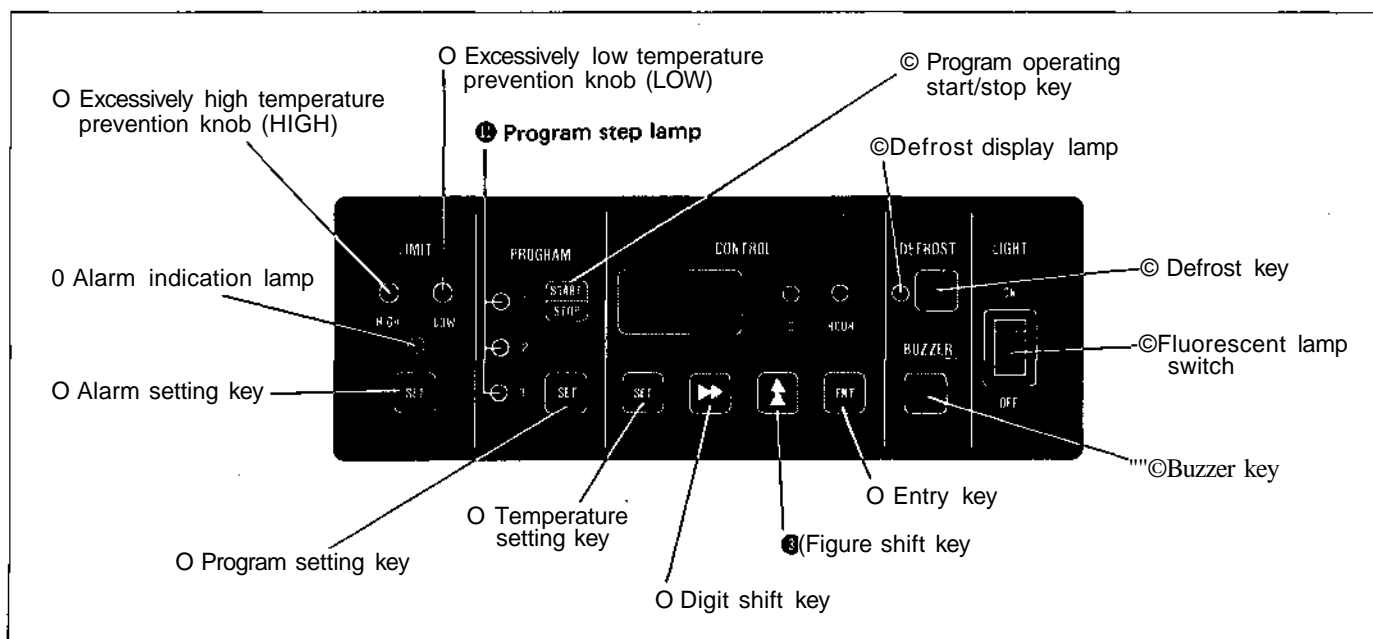
- (1) Setting of temperature.
- (2) High and low temperature prevention setting.
- (3) Operation can be programmed.
- (4) Start and stop of defrost.
- (5) Fluorescent lamp to be turned ON and OFF.

### • Control of Cabinet Interior Temperature (CONTROL)

- Temperature setting key (SET)  
When the temperature is adjusted, this key should be pressed. The digital display will display the temperature.
- ◎ Digit shift key (••)  
The digit of the figure displayed for temperature adjustment can be shifted using this key.
- Figure shift key (^)  
The figure that is displayed digitally can be changed by pressing this key.
- Entry key (ENT)  
When the desired temperature is reached, press this key. Operation will commence toward this new point.

### • Prevention of Extremities of Temperature Being Reached (LIMIT)

- Alarm setting key (SET)  
When setting the limits of excessively high and low temperatures for the cabinet interior temperature, press this key.  
The excessively high temperature will be displayed digitally in the temperature display section. To display the excessively low temperature, depress this key once more. To return the display to an indication of the current temperature conditions in the cabinet, press the key for a third time.
- Excessively high temperature prevention knob (HIGH)  
This knob is provided to set a temperature suitable for the prevention of excessively high heat levels being reached. Use a small screwdriver to set the temperature.
- Excessively low temperature prevention knob (LOW)  
This knob is provided to set a temperature suitable for the prevention of excessively low temperatures being reached. Use a small screwdriver to set the temperature.
- Alarm indicator lamp  
This lamp lights when the excessive temperature limits of the cabinet are reached.



## CAUTION

Make sure that the knobs  $O^{and}$   $O^{afe}$  effective in altering the values for the extremes of temperatures without pressing the alarm setting key  $O$ . The settings of the excessively high and low temperatures can then be confirmed by pressing the alarm setting key  $\odot$ .

### ● Key for Setting Programmed Operation (PROGRAM)

#### ⑨ Program setting key (SET)

This key sets the necessary components for programmed operation of the interior temperature of the cabinet. When the key is depressed, the desired values are displayed digitally in the order required.

The order is as follows:

- 1) Temperature
- 2) Time

To input the values, follow steps 1 to 3. At each step, press the  $\boxed{ENT}$  key  $O$  to enter each value.

#### ⑩ Programmed operation start/stop key (START/STOP)

Press the key once to initiate operation of the program, and again to stop the program. The start and stop operations are indicated by a lamp.

#### ⑪ Program step lamp

When this lamp is lit, each step of the programmed operation is conducted. When it flashes, the values for each step are displayed digitally.

### • Defrost (DE F ROST)

#### ⊙ Defrost key (DE F ROST)

Defrosting is initiated when this key is pressed. This should be conducted when frost is visible through the look-in window. Normal operation is resumed automatically when the unit has defrosted. To stop defrosting in mid-cycle, press the key once more.

Make sure that the cabinet interior temperature is below  $5^{\circ}C$  when defrosting is commenced.

#### ⊙ Defrost display lamp

This lamp lights during defrosting.

### • Fluorescent Lamp (LIGHT)

#### ⊙ Fluorescent lamp switch

When this switch is turned ON, the fluorescent lamp in the inner cabinet will be lit, and will be extinguished when the switch is turned OFF.

### • Other

#### ⊙ Buzzer (BUZZER)

To stop the alarm from sounding, press this key. Should a further abnormality occur, the buzzer will sound automatically.

## FUNCTION OF ITEMS IN THE SWITCH BOX

#### ⊙ Power source switch (POWER)

Circuit breaker for all power sources, including receptacles.

#### ⊙ Key lock switch (LOCK)

The keys on the control panel cannot be operated unless this switch is turned to the "OFF" position. This key prevents the setting points from being altered accidentally.

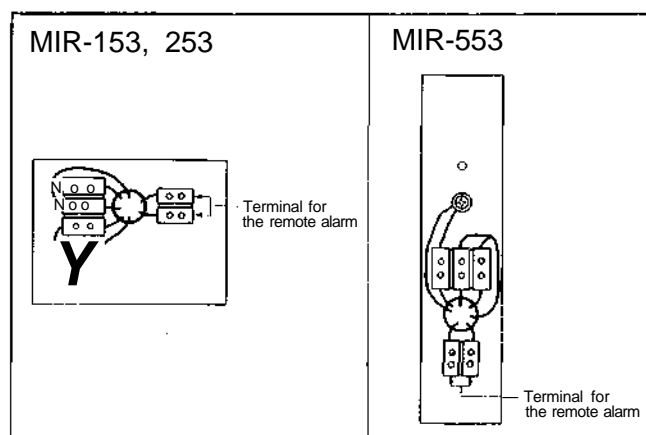
## REMOTE ALARM

The terminal for the remote alarm is located in the box at the rear top of the frame. (MIR-153, MIR-253)

The terminal of the remote alarm is located in the box at the rear bottom of the frame. (MIR-553)

The remote alarm terminal is a contact output. When high or low temperature alarm operates, contact is closed.

Contact capacity is 0.4A (AC -125V) or 2A (DC 30V).



# OPERATING INSTRUCTIONS

In this section, temperature settings for the incubator, excessively high/low temperature prevention settings, program settings, program change and start/stop for programmed operation will be explained. The incubator's alarm function will also be described.

## 1 Before Using Control Panel

### ① Digital display section

Be sure that the method of, and meanings of the digital display are fully understood before commencing operation.

**HOU** Displays values of excessively high temperature prevention.

**i nn  
L UU** Displays value of excessively low temperature prevention.

**nnn n** Number of times program is to be repeated.

**nnn  
uuu** All digits flashing. Indicates automatic temperature alarm is operated.

**nnn  
uuu** One digit flashing. Indicates values are in process of being set.

**nnn  
uuu** Interior temperature display.

O When the key understands the message input, a signal will sound to indicate that the value input has been set. Except in the temperature range  $-15.0^{\circ}\text{C} \sim +52^{\circ}\text{C}$ , an error signal will sound, and the value will be ineffective even when **[ENT]** is pressed.

## Q Key Operation Method

O Setting the constant operation temperature (CONTROL)

Table 1


		Key operation	Display after operation	Unit display
1	Press temperature setting key	CONTROL <b>[SET]</b>	$c^{in} u$ c flashes	$^{\circ}\text{C}$
2	Press shift key to adjust the display to the desired temperature.	<b>E</b>	When the key is depressed, the digits may be set.	$^{\circ}\text{C}$
			When this key is depressed, the figures to be set will be displayed in turn.	
3	Press the entry key.	<b>[ENT]</b>	When the digit display stops flashing, the cabinet interior temperature will be displayed.	$^{\circ}\text{C}$

Table 2

		Key operation	Display after operation	Unit display
1	Press alarm set key.	LIMIT <b>[SET]</b>	.455 Excessively high temperature set at $55^{\circ}\text{C}$ .	$^{\circ}\text{C}$
2	Adjust to desired point by rotating setting screw.	(SHIGH	After adjustment, display will be changed.	
3	Press SET key.	LIMIT <b>[SET]</b>	L-1S Excessively low temperature set at $-15^{\circ}\text{C}$ .	
4	Adjust to the desired point by rotating setting screw.	S>LOW	After adjustment, the display will be changed.	
5	Press SET key.	LIMIT <b>[SET]</b>	Interior temperature of cabinet will be displayed.	$^{\circ}\text{C}$

Set the temperature for the interior of the cabinet according to the procedure shown in Table 1. The temperature should be set within the range  $-15.0^{\circ}\text{C} \sim +52.0^{\circ}\text{C}$ . Temperature outside of this range cannot be set.

O Setting the extreme limits of temperature (LIMIT)

This incubator's temperature controller incorporates an automatic temperature alarm. This operates at  $\pm 2.5^{\circ}\text{C}$  of the temperature that has been set. Should the temperature adjustment mechanism fail, an independent circuit is provided to control the excessively high or low temperature limits being exceeded. This double prevention function is provided for the user's benefit.

The method for excessively high/low temperature prevention setting is shown here. The temperatures should be set at least  $5^{\circ}\text{C}$  higher and  $5^{\circ}\text{C}$  lower, respectively, than the cabinet interior setting temperature. Adjust the settings with a small screwdriver.

O Program Setting (PROGRAM)

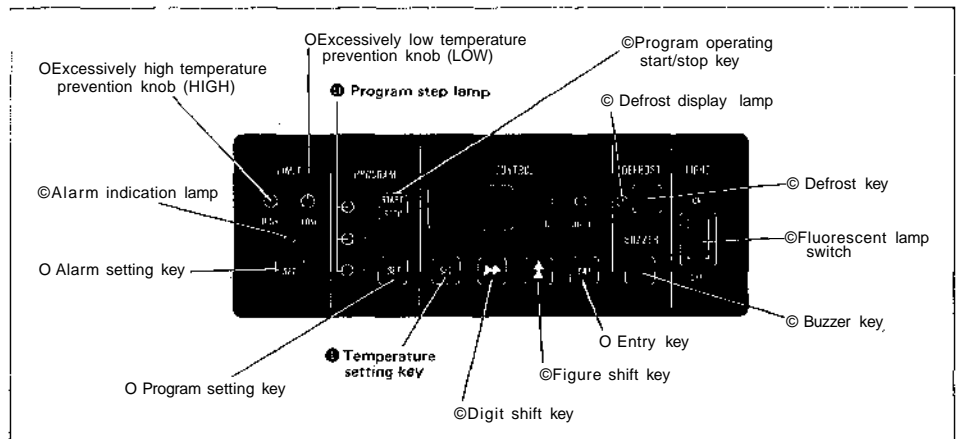
For programmed operation of the incubator, set the key operation as shown in Tables 3, 4 and 5.

**[Sample case]**

When the interior temperature of the cabinet is maintained at 10°C for one hour (Step 1), it must be maintained at 25°C for the next 2 hours (Step 2) and at 50°C for the next 30 hours (Step 3). In programmed operation, steps 1 to 3 are repeated 4 times.

**Reminders During Program Setting**

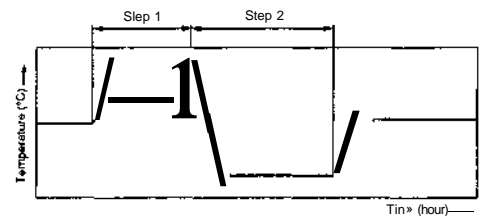
- The program for this incubator can be set in a maximum of 3 steps and a minimum of 1 step.
- The program setting time ranges from 0.0 to 99.5 hours, at increments of half hours. When setting the time to start from 0.0 hours, a step of approximately 15 seconds is made.



- A program can be set to repeat for a minimum of 1 time, and a maximum of 99 times. For continuous repetition, the display will record

$\frac{nn}{r'uu}$

<Program time>



**NOTES**

When the programmed temperatures have been set, be sure to reset the high and low temperature limits. The limit for the excessively high temperature should be set at least 5°C above the highest temperature of the programmed operation, and that for the excessively low temperature at least 5°C lower than the lowest temperature.

For example, set the cabinet interior temperature at 20°C, rising to 50°C, and then falling to 0°C at the end of the program. In such a case the upper temperature limit should be set at 55°C or above and the lower limit at -5°C, or below. Care should be taken that these extreme temperatures are beyond the ranges of the temperatures reached during normal operation of the program, because otherwise your required temperature will not be obtained.

Table 3

		Key operation	Display sample	Step display	Unit display
1	Press program setting key	PROGRAM [SET]	0 0 0	⊙ Flashing	°C
2	Temperature set in step 1	H °r VE	i 0. 0 (10°C)		
		[ENT]	0 0 0		Hour
3	Time set in step 1	▶▶ or ▲	0 / . 0 (1hour)		1
		[ENT]	00. 0	⊙ Flashing	°C

Table 4

4	Temperature set in step 2	▶▶ or ▲	5. 0 <5°C	⊙ Flashing	°C
		[ENT]	00. 0		Hour
5	Time set in step 2	▶▶ or ▲	2 / . 0 (2 hours)		
		[ENT]	0 0 0	⊙ Flashing	°C

Table 5

6	Temperature set in step 3	▶▶ or ▲	50. 0 <50°C	⊙ Flashing	°C
		[ENT]	00. 0		Hour
7	Time set in step 3	▶▶ or ▲	du. 0 (30 hours)		
		[ENT]	0 0 0		Light out
8	Set of recurring numbers	▶▶ or ▲	nu. 4 (4times)	⊙ Flashing	Light out
		[ENT]	Display of cabinet interior temperature	Light out	°C

# OPERATING INSTRUCTIONS

## ● Alteration of Program in Steps

To conduct program step 1 only, follow the procedure given in Table 6. For steps 1 and 2, follow the procedure given in Table 7.

Table 6

(For step 1, alter the procedure from \*4 onward.)

*4		Key operation	Display sample after operation	Step display	Unit display
4	Enter the recurrent number $n$ in the display		$\begin{matrix} \_ n n \\ 11 u u \end{matrix}$	Ⓢ Flashing	Light off
5	Set recurrent number	or	$n u' 11$ (once)		
			Cabinet interior temperature display	Light off	°C

## ● Starting and Stopping Programmed Operation

When programming of the operation is complete, press key to start. Press this key once more to stop the program. The programmed operation can be repeated by pressing this key each time. When the program has ended, operation will return to the constant temperature that has been entered previously.

Table 7

(For steps 1 and 2, alter the procedure from \*6.)

*6		Key operation	Display sample after operation	Step display	Unit display
6	Enter the recurrent number symbol $n$ in the display.		$n u' 0$	Ⓢ Flashing	Light off
7	Set recurrent number	or	$n l j' c'$ (twice)		
			Cabinet interior temperature display	Light off	°C

Table 8

		Key operation	Display sample after operation	Step display	Unit display
1	Press start key		Cabinet interior temperature display	Ⓢ Lighting	°C

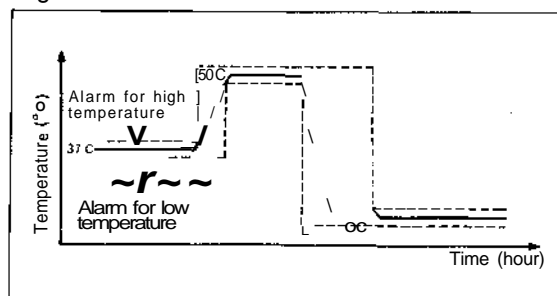
Table 9

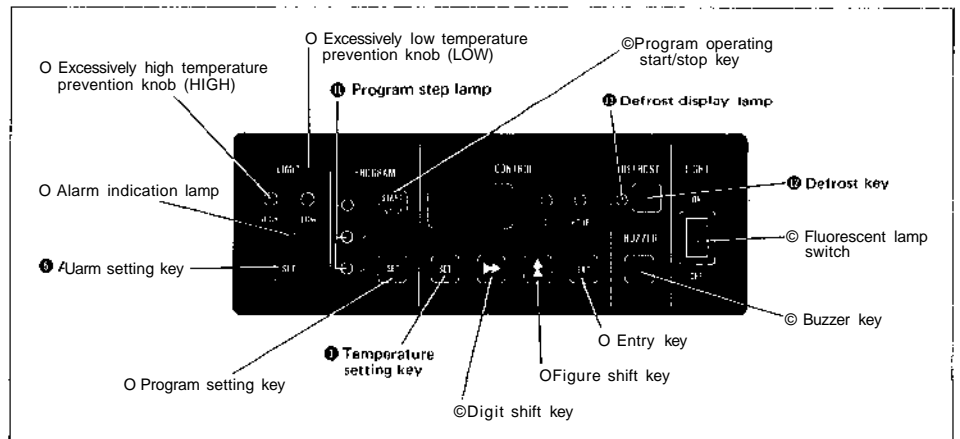
Categories of alarm	Condition	Display	Buzzer	Remote contact
Automatic alarm temperature setting	Cabinet interior temperature variation exceeds $\pm 2.5^{\circ}\text{C}$ .	All digits flashing on temperature display	10 minutes after occurrence of alarming condition, buzzer will sound intermittently.	—
Excessively high/low temperature alarm	When cabinet interior temperature exceeds the excessively high and low temperature limits set.	Alarm indicator lamp lights.	Continuous sound	ON
Trouble	<ul style="list-style-type: none"> <li>• Disconnection of sensors</li> <li>• Abnormality occurs after defrosting cycle.</li> <li>• Triac or compressor relay are short circuited.</li> <li>• Triac open, or in the condition of excessively high temperature prevention</li> <li>• Compressor relay open, or in the condition of excessively low temperature prevention</li> </ul>	E01		
		EDE		
		EU 3		
		EOH		
		EOS		

## H Alarm Function

Table 9 gives a summary of the alarm functions incorporated in this incubator. The temperature controller incorporates the automatic alarm function, which operates when the variation of the temperature of the interior of the cabinet exceeds  $\pm 2.5^{\circ}\text{C}$  from that set. This function operates even during programmed operation, in which case it will operate as shown in figure 1.

Fig. 1





## D Security Function

Not only is there an alarm to signify that the cabinet interior temperature is experiencing abnormality, but there is also a security system to prevent such a situation from occurring.

## B Defrosting (DE FROST)

When the cabinet interior temperature is set at less than 5°C, the cooler frosts up and defrosting will be required. Defrost should be started manually if frost can be seen through the look-in window.

The unit will defrost automatically, and normal operation will recommence 15-30 minutes later. While the unit is defrosting, the defrosting lamp will be lit.

Make sure that the cabinet interior temperature does not exceed the set limits when defrosting.

During a programmed operation, where the temperature is set at below 5°C for long periods of time, this operation cannot be conducted owing to frost.

In some cases, defrosting will not be conducted when the interior temperature does not fall below 5°C. The melt water will evaporate automatically from the drain.

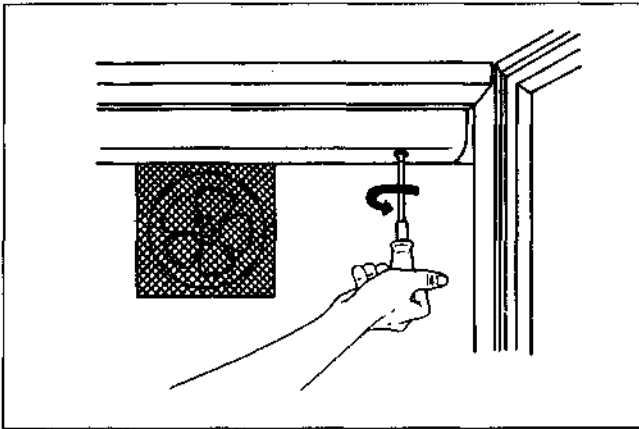
**Table 10**

Security categories	Conditions	Operation
Independent excessively high temperature prevention circuit	When cabinet interior temperature rises above the excessively high temperature setting	Heater OFF Inner cabinet fan OFF
Independent excessively low temperature prevention circuitry	When cabinet interior temperature falls below excessively low temperature prevention setting	Compressor OFF
Temperature fuse	70°C (MIR-153, 253) 76°C (MIR-553)	Blowout heater OFF Blowout heater OFF
Memory backup (about 5 hours)	Power failure or accidental disconnection of power source	Operation continues with memory backup
Auto PV	When any key is not pressed for more than one minute in any of the setting modes	Setting mode ends automatically and operation returns to constant cabinet interior temperature

# CARE AND MAINTENANCE

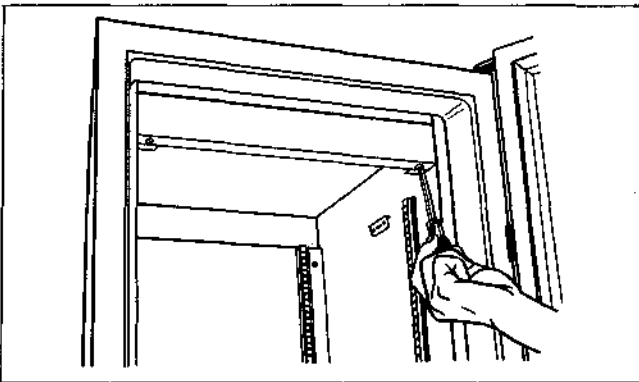
## 1 Replacing the fluorescent lamp [MIR-153, MIR-253]

Remove the 2 screws which hold the shade, working from underneath. The fluorescent lamp can now be easily removed. Replace the lamp, refit the shade and attach with the screws.

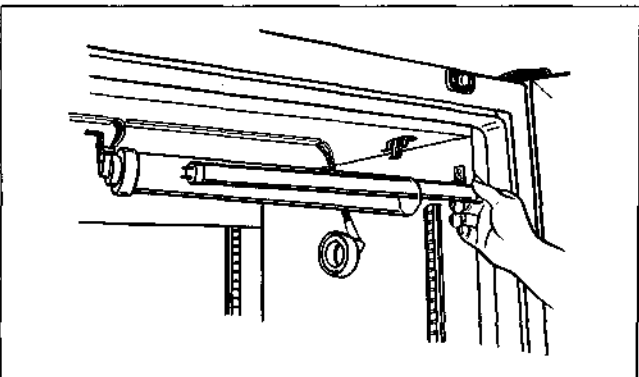


[MIR-553]

- Remove the 2 screws below the shade.



- Remove the lamp cover (tube made of transparent resin) from the clip manually. It will come off the frame by its sockets.



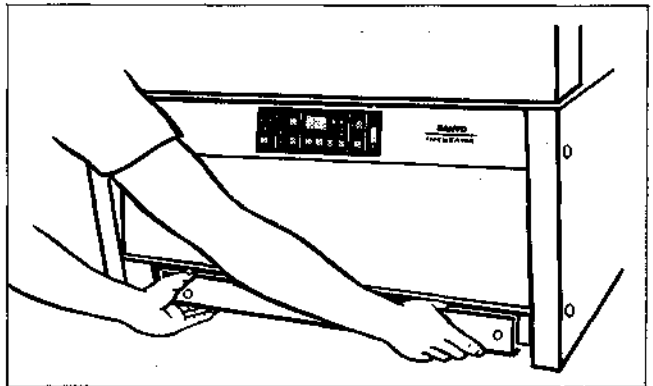
- Remove lamp cover and rubber cap. The fluorescent lamp will also be detached.
- Insert a new bulb into the lamp cover and adjust it so that the prongs can be inserted into the sockets.
- Push the lamp cover into the clip to secure it.
- Insert the guide on top of the frame into the hole in the frame and secure it with 2 screws.

## 2 Cleaning the evaporation tray [MIR-153, MIR-253]

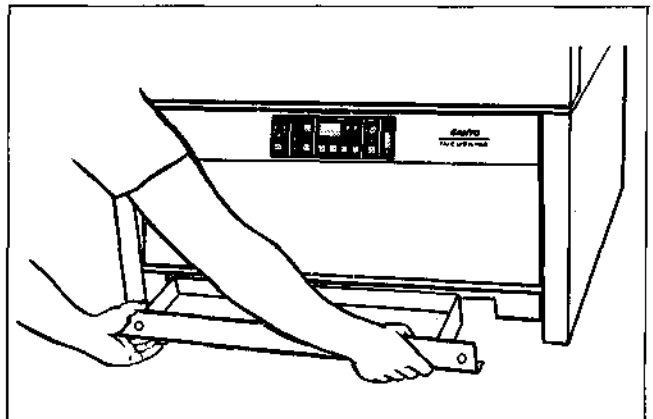
The evaporation tray is accessible from behind the machine section of the unit. It should be water-washed 2 or 3 times a year. Before removing the evaporation tray, soak up any water it might contain with a sponge or dry cloth. To remove the tray, lift it slightly to disconnect it from the fixing plate. Then lower the tray, disconnect the drain pipe and pull it toward side of access. To replace the tray, reverse the procedure.

[MIR-553]

- Remove the 2 black screws at the bottom front of the unit manually.



- Pull the tray forward so that it touches the floor and slide it out of the unit.



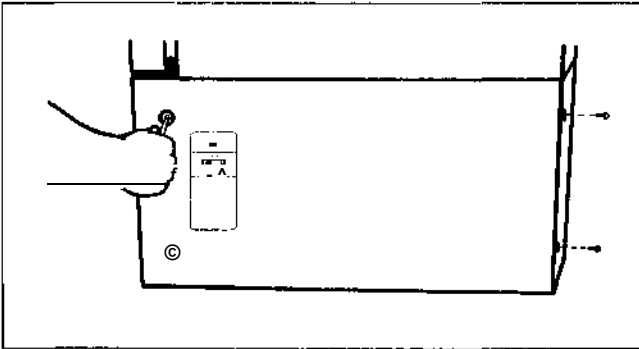
- To replace it, slide it from the floor into the unit, pushing it all the way in. Then, from beneath the unit, push the tray back farther by hand.
- Replace the 2 screws and secure tightly.

Q Cleaning the cabinet interior  
[MIR-153, MIR-253]

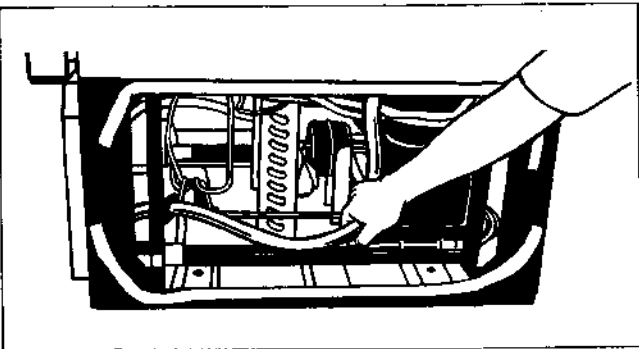
- Turn off the power switch.
- Remove the shelves.
- Remove the cap at the bottom of the cabinet.
- Pull out the end of the drain hose from under the cabinet and place it in a bucket.
- Wipe the cabinet clean with a soft cloth soaked in a neutral detergent solution. Wipe off the detergent solution with a cloth dampened in fresh water.

[MIR-553]

- Turn off the power switch.
- Remove the shelves.
- Remove the suction hole cover in the bottom of the cabinet by pulling it from the top.
- There is a slope provided under the hole to enable the water to drain. A drain plug is provided at the lower end. Remove it.
- Remove the 4 screws securing it, as illustrated.



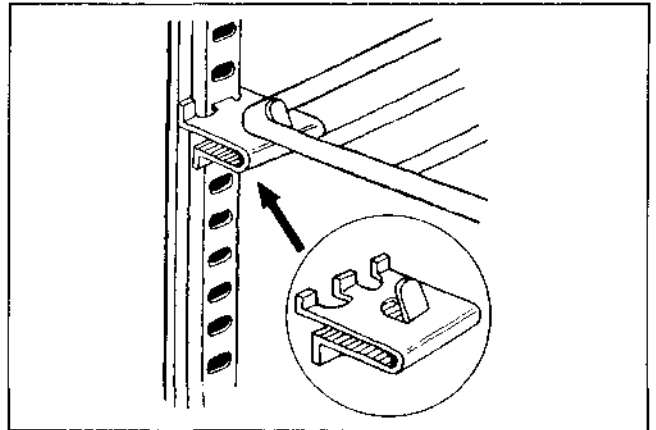
- The long hose extending from back to front as viewed from the right side, is for draining, see illustration below.



- Wipe the cabinet interior clean with a soft cloth soaked in a neutral detergent solution. Wipe off the detergent solution with a cloth dampened in fresh water.
- After cleaning, replace all the parts removed.

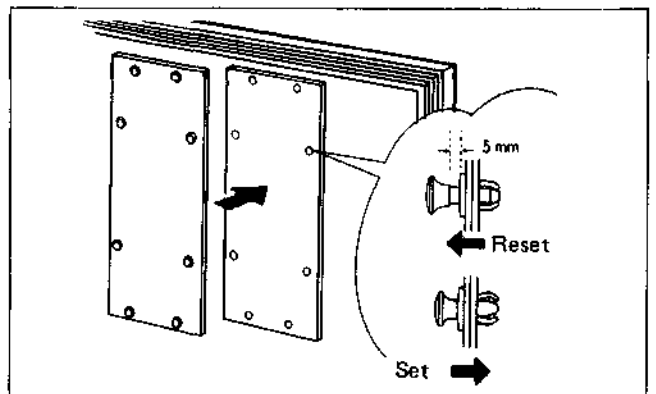
Q Setting the shelves

The shelves can be adjusted to the height of items placed inside. To adjust the height, insert the self-support clips (4 per shelf) into the slots at the desired height.



Q Replacing the glass protection plate  
[MIR-153, MIR-2531]

- Pull out the clip knobs mounted around the plate. The knobs are reset by pulling out of 5 mm. Reset all clip knobs. Be sure that knobs cannot be pulled out completely. (see figure)



- Take off the protection plate. The plate may be broken if the clip knobs are not reset completely.
- Place a new plate so that the clips can be compliance with the clip holes. Make sue the clips are in reset position.
- Insert the clips into the holes.
- Push in the clip knobs.



# TROUBLE SHOOTING

Should conditions worsen, check the following items:

## D When alarm lamp is lit

- O Excessively low temperature alarm operates.
  - Is the point set by the temperature controller lower than that set for excessively low temperature prevention?

In such case, lower the prevention setting for the excessively low temperature so that it is more than 5°C lower than that of the temperature controller.

- O Excessively high temperature alarm operates.
  - Is the point set by the temperature controller higher than that set for the excessively high temperature prevention?

In such case, raise the prevention setting for the excessively high temperature so that it is more than 5°C higher than that of the temperature controller.
- Is there a surplus heat source inside of the cabinet?
 

If there is, remove it. Refer to Figures 2, 3 and 4 for the acceptable limits for heat sources inside of the unit.

## Q When Programme! Operation is not Conducted Smoothly

- O The temperature does not change as it is set in the program.
  - Are the excessively high/low temperature prevention settings correct?
 

These temperatures should be set 5°C higher and lower than the upper and lower limits of the temperature controller respectively.

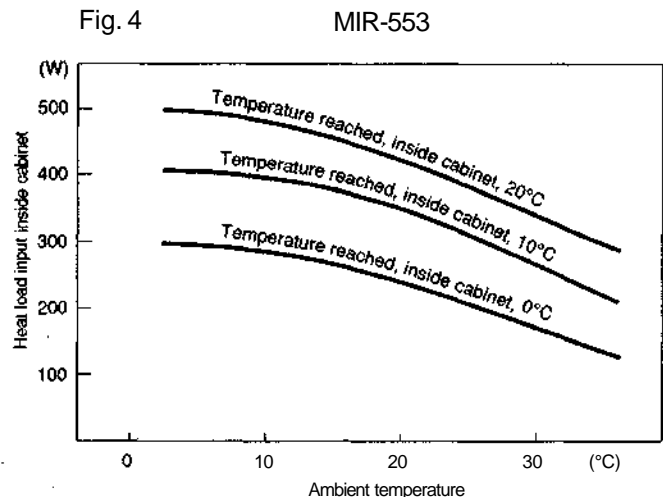
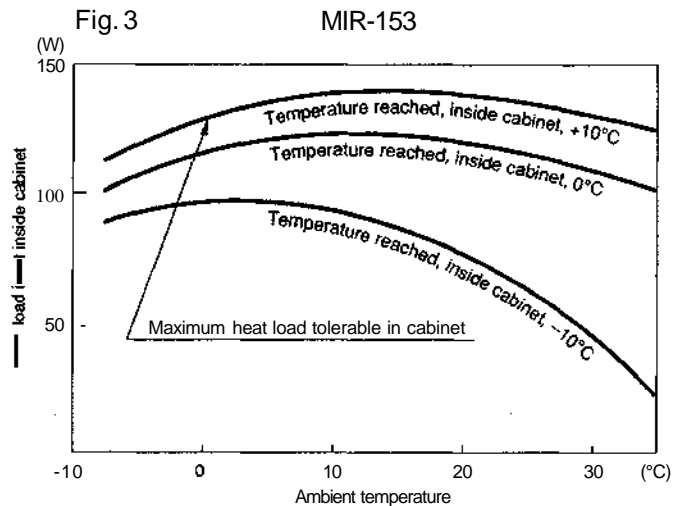
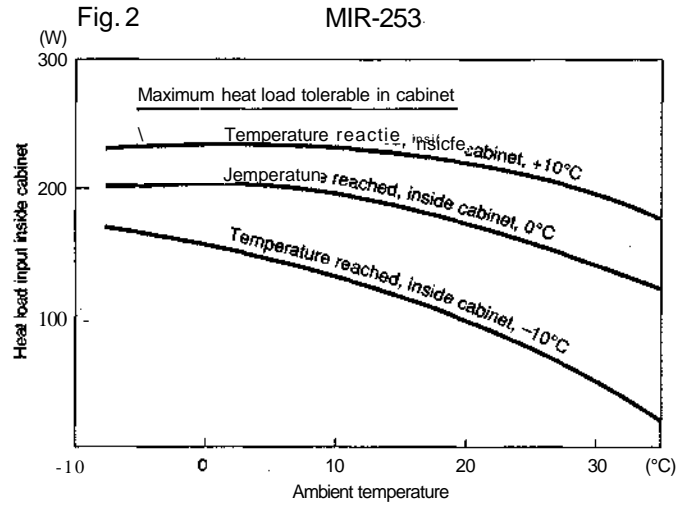
Once excessively high/low temperature prevention limits have been determined, the operation temperatures cannot be changed significantly owing to the existence of the limits for extremes of temperature. For this reason, the excessively high/low temperature prevention limits should be set at a wide range when the programmed operation is set.

If the unit does not function even after these changes have been made, contact your nearest Sanyo Service Center.

Details of the following items should accompany any enquires:

- (1) Condition of trouble
- (2) Model
- (3) Manufacturing number
- (4) Date of purchase

## Relationship between heat load inside cabinet and temperature reached

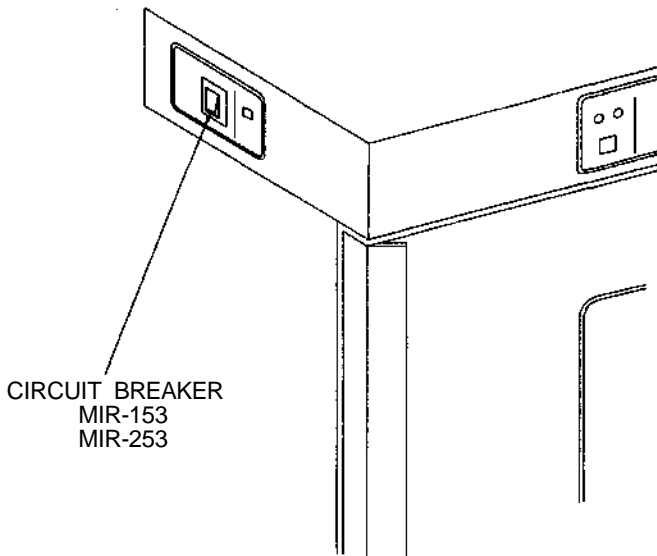


\* With fluorescent lamp OFF


# ATTENTION


This unit is equipped with the circuit breaker on the back. Please make sure this breaker is switched ON before the unit starts to run.

When the operation of the unit is stopped by this breaker, please contact with dealer or the service station after disconnecting the power supply plug.




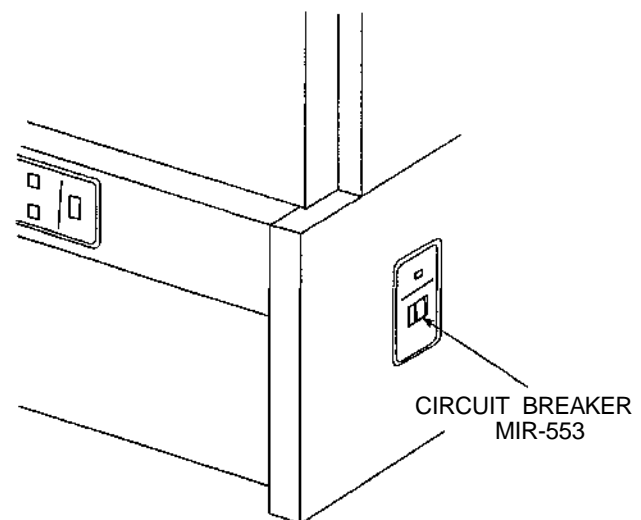
### AWARNING

 Never disassemble, repair, or modify the unit. Such works by an ineligible person may cause fire or injury by malfunction.

 Disconnect the power supply plug when there is something wrong with the unit. Holding abnormal operation may cause electric shock or fire.

### CAUTION

 Connect the unit to power source having the rated frequency and rated voltage indicated on the rating label attached to the unit. Use of other rating may cause fire or electric shock.



# ENVIRONMENTAL CONDITIONS

This equipment is designed to be safe at least under the following conditions:

- indoor use;
- altitude up to 2000 m;
- temperature 5°C to 40°C;
- maximum relative humidity 80% for temperatures up to 31°C decreasing linearly to 50% relative humidity at 40°C;
- mains supply voltage fluctuations not to exceed  $\pm 10\%$  of the nominal voltage;
- other supply voltage fluctuations as stated by the manufacturer;
- transient overvoltages according to INSTALLATION CATEGORIES (OVERVOLTAGE CATEGORIES) II. For mains supply the minimum and normal category is II;
- POLLUTION DEGREE 2 in accordance with IEC 664.

# SPECIFICATIONS

Model	MIR-153		MIR-253		MIR-553	
Exterior dimensions	700(W) x 580(D) x 1018(H)mm		700(W) x 580(D) x 1618(H)mm		800(W) x 832(D) x 1810(H)mm	
Interior dimensions	620(W) x 386(D) x 555(H)mm		620(W) x 386(D) x 1075(H)mm		640(W) x 550(D) x 1160(H)mm	
Effective capacity	126L		254L		406L	
Exterior	Baked-on acrylic finish on galvanized steel					
Interior	Stainless steel (SUS 304)					
Door	Baked-on acrylic finish on galvanized steel					
Observation window	Triple heat absorbing glass steel (with black panel to screen from light)			(with window cover door)		
Shelves	Polyethylene-coated steel wire					
Insulation	Rigid polyurethane foamed-in place (NON-CFC)					
Compressor	Hermetic type 175W		Hermetic type 300W		Hermetic type 300W	
Evaporator	Fin tube type (forced air circulation)					
Condenser	Wire & tube type			Fin tube type		
Refrigerant	R-134a					
Defrost	Automatic (manual start)					
Heater	141W		218W		322W	
Temperature controller	Microprocessor, PID control (compressor; ON-OFF), Digital display					
Sensor	Thermister					
Control range	-10°C~+50°C					
Temperature fluctuation	±1°C (ON-OFF control), ±0.2°C (PID control)					
Temperature uniformity	±0.5°C (set 37°C, ambient 20°C, no load)					
Low-temp. alarm	Range; -15°C~+20°C					
High-temp. alarm	Range; +15°C~+55°C					
Temp. program operation	3-steps, 0.5 hr ~ 99.5 hr 1-99 repeating, or unlimited					
Lighting	15W fluorescent lamp					
Accessories	shelves 3 (supports 8) key 1 set glass protect plate (black) 1		shelves 5 (supports 20) key 1 set glass protect plate (black 1)		shelves 5 (supports 20) key 1 set	
Weight	69kg		104 kg		205 kg	
Maximum pressure	1421 k.Pa		1548 kPa		1235 kPa	
Noise level	43dB (A scale)		43dB (A scale)		45dB (A scale)	
Rated voltage	AC230V	AC240V	AC230V	AC240V	AC230V	AC240V
Rated frequency	50Hz	50Hz	50Hz	50Hz	50Hz	50Hz
Rated power consumption	158W	173W	220W	245W	266W	292W

Note: Specifications will be changed without notice.

The unit with CE mark complies with EC directives 73/23/EEC, 89/336/EEC, 93/68/EEC.

7FB6P101192003

Recycled paper

**SANYO**

---

SANYO Electric Co., Ltd.  
Refrigeration Products Division  
1-1-1, SakataOizumi-Machi,  
Ora-Gun, Gunma 370-0596 Japan  
Printed in Japan