Service Manual

Incubator

MIR-162
MIR-262

FILE No.

SANYO Electric Co., Ltd.
Biomedical Business Division

This service manual is the revised and updated version of SM720061.

REVISION

SM9910256

Effective models

This service manual is effective for following models.

Model	Product code	Power source	
MIR-162	823 244 51	110V	60Hz
	823 244 52	220V	60Hz
	823 244 53	240V	50Hz
	823 244 54	230V	50Hz
	823 244 55	120V	60Hz
	823 244 56	220V	50Hz
	823 244 57	240V	50Hz
	823 244 58	220V	50Hz
	823 244 59	220V	60Hz
	823 244 60	115V	60Hz
	823 244 61	115V	60Hz
	823 244 62	230V	50Hz
	823 244 63	230V	50Hz
	823 244 64	240V	50Hz
	823 244 65	220V	50Hz
MIR-262	823 245 51	110V	60Hz
	823 245 52	220V	60Hz
	823 245 53	120V	60Hz
	823 245 54	220V	50Hz
	823 245 55	230V	50Hz
	823 245 56	220V	60Hz
	823 245 57	220V	50Hz
	823 245 58	240V	50Hz
	823 245 59	115V	60Hz
	823 245 60	220V	50Hz
	823 245 61	115V	60Hz
	823 245 62	240V	50Hz
	823 245 63	220V	50Hz
	823 245 64	230V	50Hz
	823 245 65	230V	50Hz
	823 245 66	240V	50Hz
	823 245 67	240V	50Hz
	823 245 68	220V	50Hz

Contents

Specifications

Structural specifications

Model	MIR-162	MIR-262
External dimensions	W580 x D595 x H820 (mm)	W730 x D645 x H870 (mm)
Internal dimensions	W450 x D460 x H450 (mm)	W600 x D510 x H500 (mm)
Effective capacity	93L	153L
Exterior	Painted steel	
Interior	Stainless steel	
Outer door	Painted steel	
Inner door	Tempered glass	
Insulation	Glass wool	
Shelf	Stainless steel plate, 2pcs.	Stainless steel plate, 3pcs.
Shelf support	4	6
Temperature controller	Sensor K, PID control	
Temperature display	Digital display	
Timer	Electronic timer with delay timer	
Circuit breaker	10A	
Overheat prevention mechanism	Built-in thermister (electric circuit), Thermal guard	
Heater	200W	300W
Weight	44 kg	61 kg

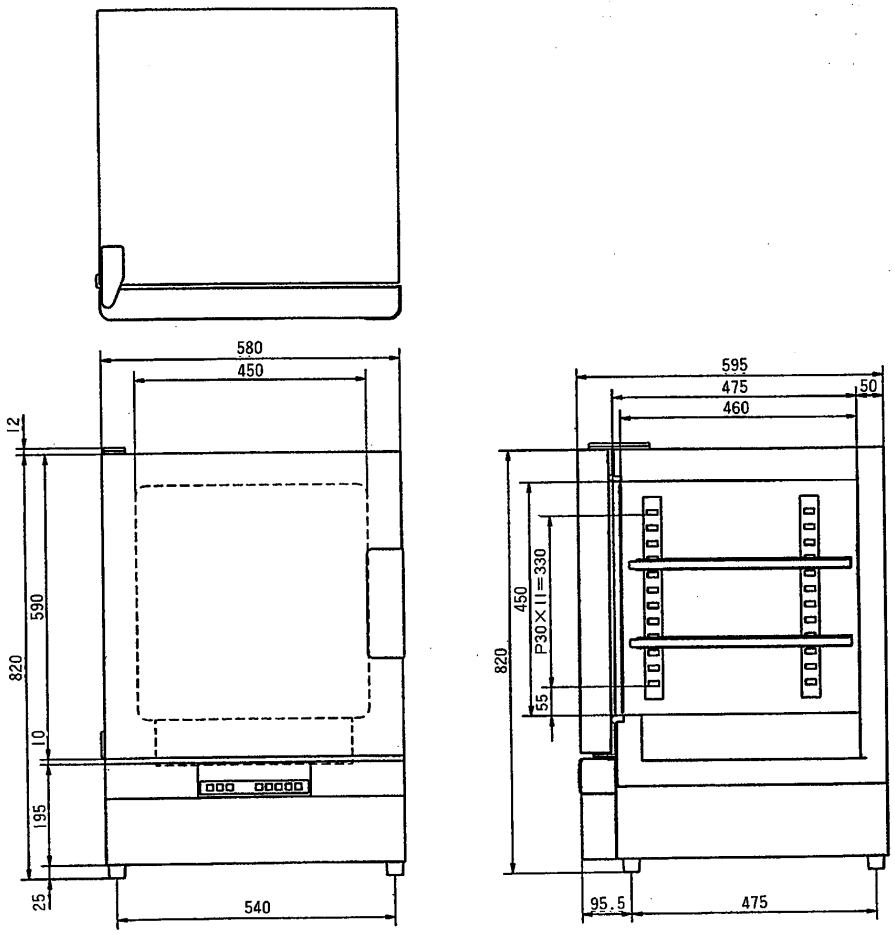
Performance specifications

Model	MIR-162					
Temperature control range	Ambient temperature +5℃to 60℃ (setting available to 80℃)					
Temperature fluctuation	+/- 0.5℃					
Temperature variation	+/- 1℃ (AT37℃)					
Rated voltage	AC110V	AC115V	AC220V	AC220V	AC230V	AC240V
Rated frequency	60Hz	60Hz	50Hz	60Hz	50Hz	50Hz
Rated power consumption	200W	200W	200W	200W	200W	200W

Model	MIR-262					
Temperature control range	Ambient temperature +5℃to 60℃ (setting available to 80℃)					
Temperature fluctuation	+/- 0.5℃					
Temperature variation	+/- 1℃ (AT37℃)					
Rated voltage	AC110V	AC115V	AC220V	AC220V	AC230V	AC240V
Rated frequency	60Hz	60Hz	50Hz	60Hz	50Hz	50Hz
Power consumption	300W	300W	300W	300W	300W	300W

Dimensions

<MIR-162>



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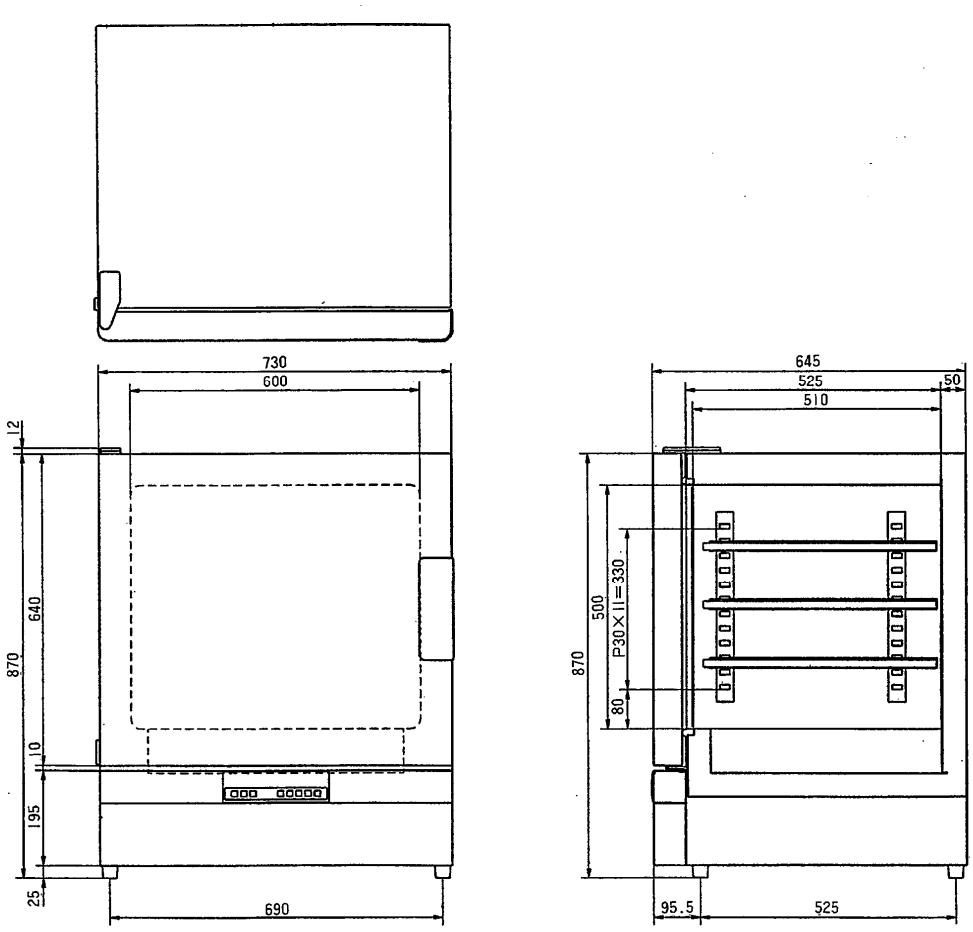
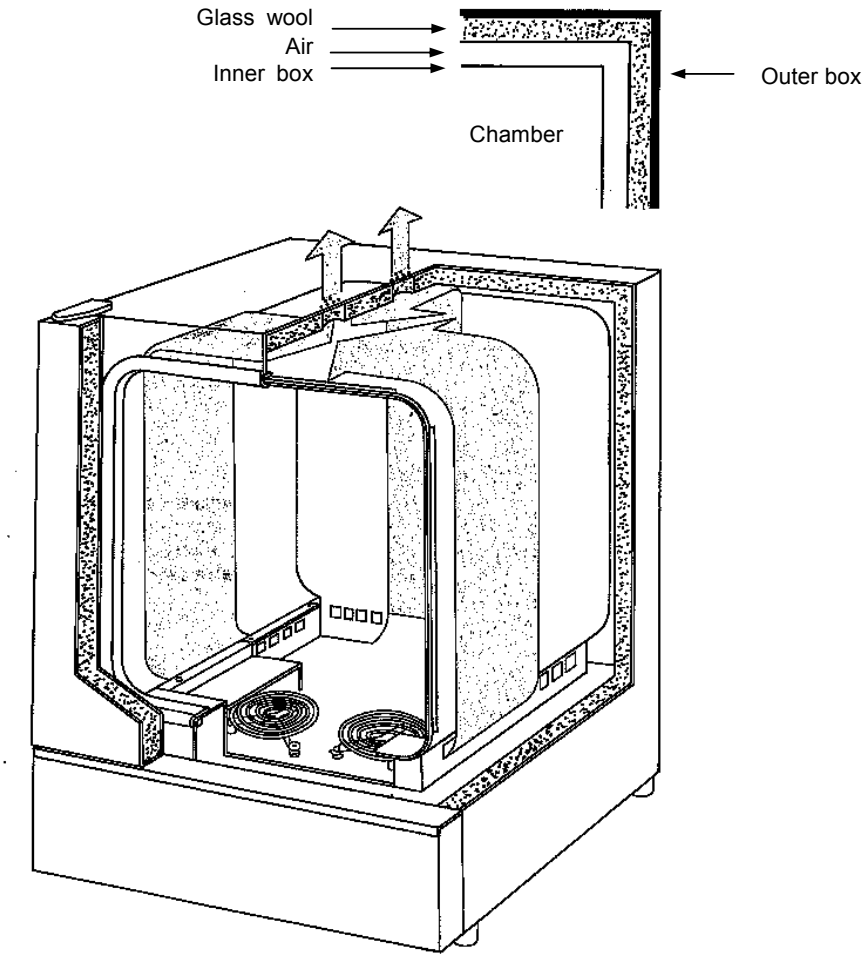
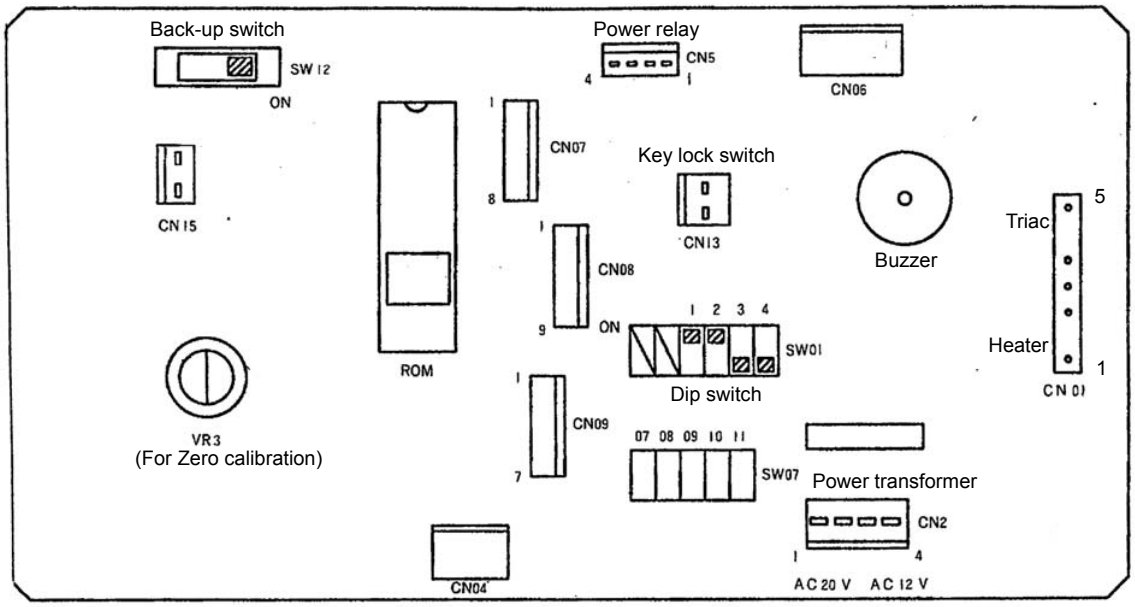


Air jacket

This model has air jacket temperature control system which making some space around cabinet and inside isolation, as figure shown.
Air jacket temperature control system enables to conduct heated air in the space.



Components on PCB



1. Mode of DIP switch (SW01)

MIR-162 MIR-262

a … Fan switch is used for fan motor

b … Capacity switch is used depend on cabinet capacity

c ... Adjust switch is used for shipping out only

2. How to initialize back-up memory

When you disconnect connecter(s) during power is given to PCB, and display and all switches are locked by miss-feeding of micro-processor, follow the procedure (1) to (4) to initialize back-up memory.

(1) Turn back-up switch off.

(2) Turn power switch off.

(3) Turn power switch on.

(4) Turn back-up switch on.

Connections on PCB

The following table shows the connections of connectors on main PCB.

Connector	Connects to	Usage
CN1	#1 - #2: Heater #5: Triac	To heat chamber. To control heater ON/OFF
CN2	#1 - #4: Power transformer	To supply the power to PCB.
CN5	#1 - #4: Thermal guard	To turn heater off when it detects abnormality in chamber temperature.
CN7	Front board (CN10)	
CN8	Front board (CN11)	
CN9	Front board (CN12)	
CN13	#1 – #2: Key lock switch	
CN14	#1 - #2: Thermister sensor	To detect chamber temperature.

Electric parts

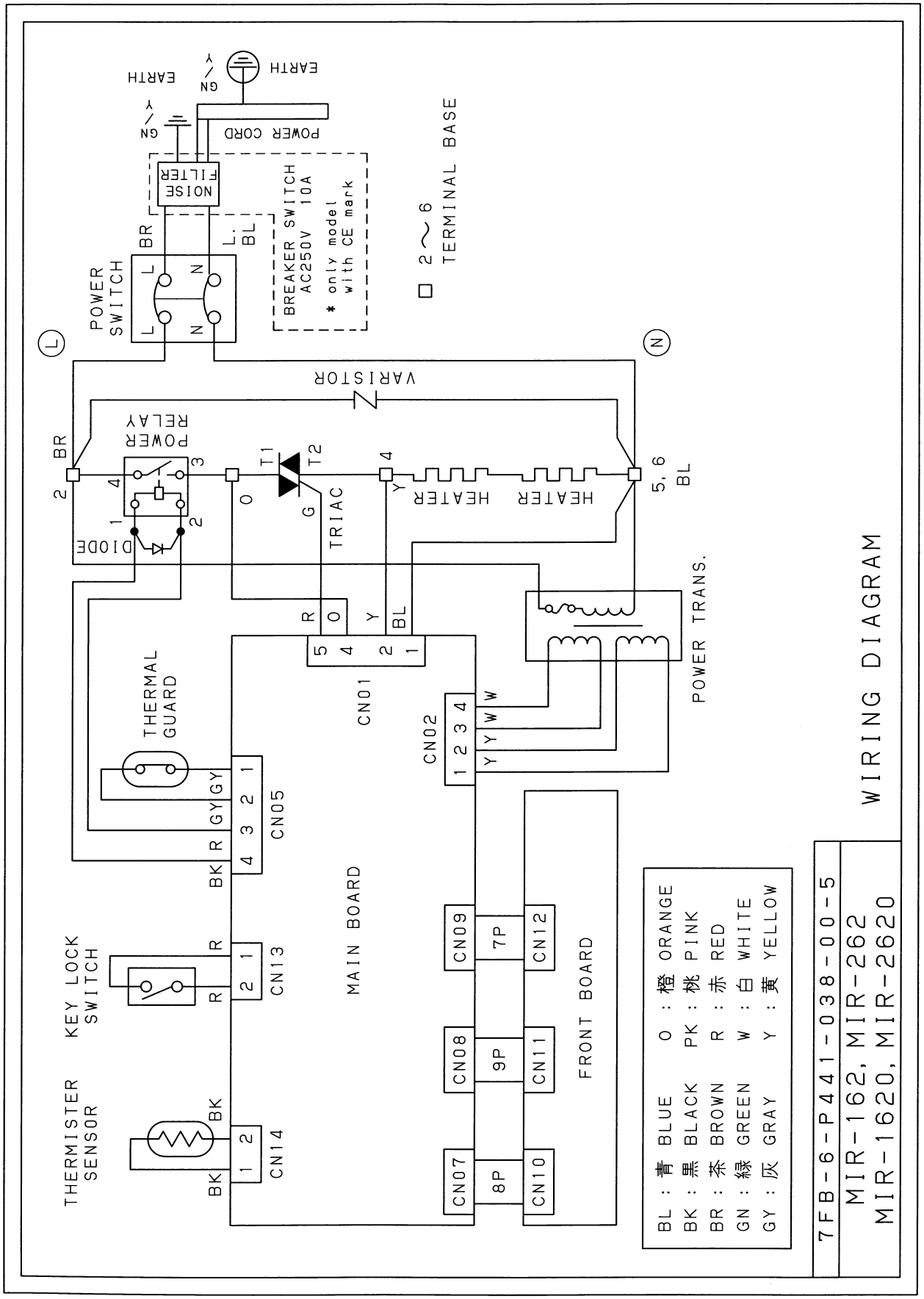
MIR-162/262		110/115V, 60Hz	220~240V, 50Hz	220V, 60Hz
Thermister sensor	Type	103AT-1	103AT-1	103AT-1
	Rating	10KΩ	10KΩ	10KΩ
Key lock switch	Type	MFS201N-Z	MFS201N-Z	MFS201N-Z
	Rating	AC125V, 1A	AC125V, 1A	AC125V, 1A
Thermal guard	Type	OHD3-85B	OHD3-85B	OHD3-85B
	Rating	85℃ OFF	85℃ OFF	85℃ OFF
Power relay	Type	G4F-11123T	G4F-11123T	G4F-11123T
	Rating	20A, DC12V	20A, DC12V	20A, DC12V
Circuit breaker	Type	BS-1110	IR11A2E101R	BS-1110
	Rating	110V, 10A	AC250V, 10A	110V, 10A
Triac	Type	TG16C60	TG16C60	TG16C60
	Rating	16A, 600V	16A, 600V	16A, 600V
Varistor	Type	ERZV14D241	ERZV14D511	ERZV14D511
Heater	Rating	57V, 100W	110V, 100W	110V, 100W
Power transformer	Type	GS-4891B	GS-4891A	GS-4891A
	Rating	110V, 7VA	AC200, 230V	AC200, 230V
Noise filter	Type		ZHG2206-11S	
(CE mark model only)	Rating		AC250V, 6A	
Breaker switch	Type		ZHG2206-11S	
(CE mark model only)	Rating		AC250V, 6A	

Specification of sensor

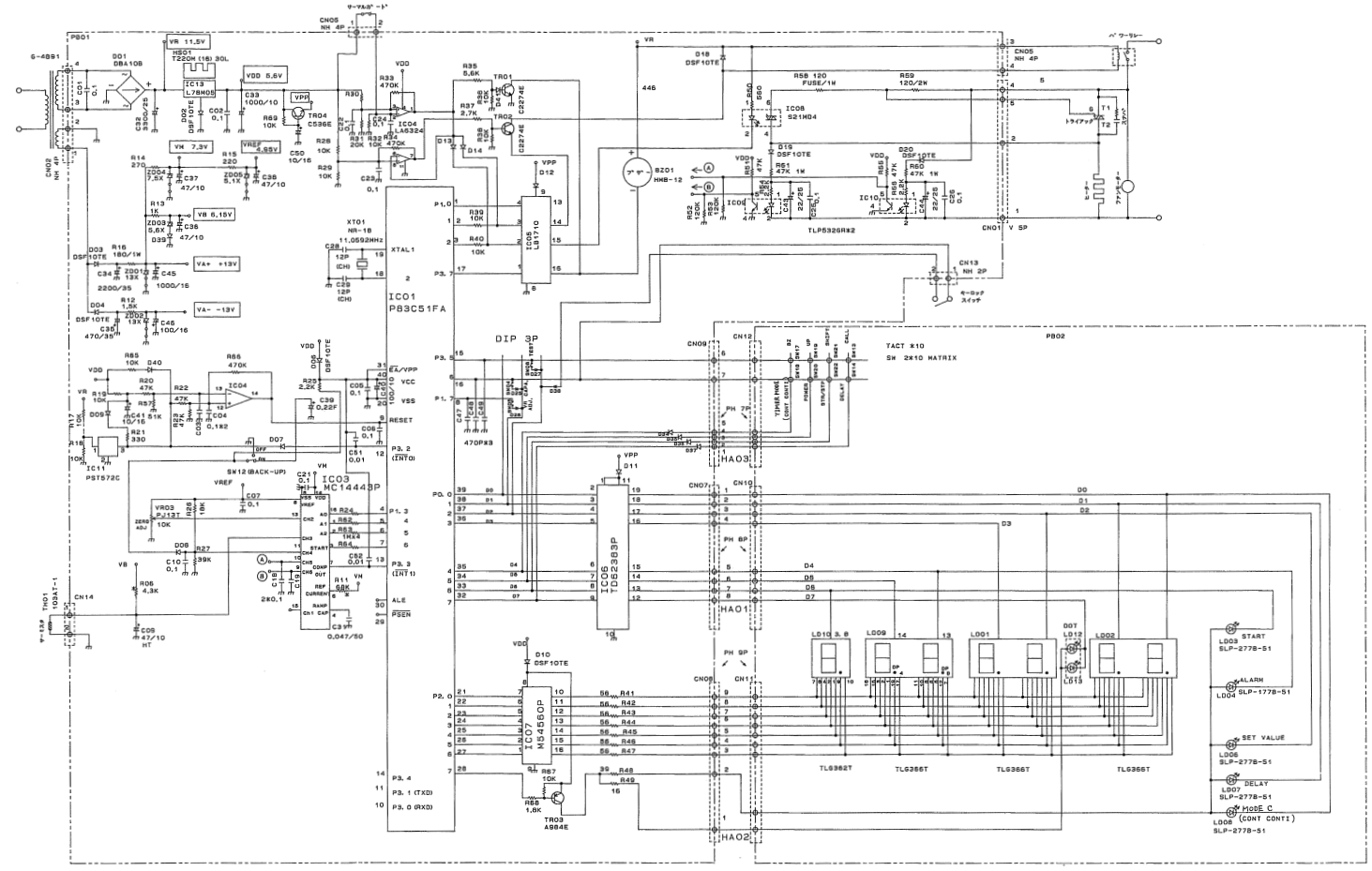
■ **Type:103AT-1**

Temperature (℃)	Resistance (℃)	Temperature (℃)	Resistance (℃)	Temperature (℃)	Resistance (℃)
-50	329.20	25	10.00	43	5.25
-40	188.40	26	9.63	44	5.08
-30	111.30	27	9.28	45	4.91
-20	67.64	28	8.94	46	4.74
-10	42.45	29	8.62	47	4.59
0	27.28	30	8.31	48	4.44
2	25.03	31	8.01	49	4.30
4	22.99	32	7.72	50	4.16
6	21.15	33	7.45	51	4.02
8	19.48	34	7.19	52	3.89
10	17.96	35	6.94	53	3.77
12	16.55	36	6.69	54	3.65
14	15.28	37	6.46	55	3.53
16	14.12	38	6.24	56	3.42
18	13.06	39	6.03	57	3.31
20	12.09	40	5.82	58	3.21
22	11.20	41	5.63	59	3.11
24	10.38	42	5.43	60	3.02

Wiring diagram



Circuit diagram



Control specifications

1. Keys and switches on control panel

BZ（Alarm stop key）	Audible alarm does not sound if this key is pressed during digital display does not flash. Audible alarm silences if this key is pressed during audible alarm sound (automatic set temperature alarm activates).
CALL（Call key）	Press this key to step in setting mode and digital display flashes. If this key is pressed during operation, setting value is displayed. If this key and DELAY key are pressed on the way of setting delay time, the delay time will be memorized.
POWER （Power switch）	If this key is pressed on the way of setting temperature or time, display will be disappeared but setting value will be memorized.
DELAY （Delay timer key）	Press this key to have unit start with delay. When setting delay time is displayed, press this key to clear current setting value. Press this key again to memorize new setting value and current temperature display appears.
TIMER MODE (Timer mode select key)	Press this key to select timer mode. Timer mode: Normal mode or Timer mode C

2. Temperature setting

Setting range:	Ambient temperature＋5℃～60℃（up to 80℃） Current chamber temperature will appear by Auto Return function after 45 seconds elapse during temperature is setting.
Calibration (F07):	Step to F07 to calibrate temperature by turning volume (VR3). Range: ±6.5℃
Calibration (F11):	Step to F11 to set zero calibration temperature. Range:±19.9℃

3. Time setting

Setting range:	00:01~99:59 Press CALL key to memorize a value. “__:__” will appear if you press numerical value shift key when “9” is displayed on the 2nd digit place. Then “00:00” will appear after “__:__” displaying. When “00:00” is displayed, setting value will not be changed even if CALL key is pressed to sound audible alarm and to display current temperature display. It is also impossible to change setting value during operation.

4. Alarms and safety function

Automatic set temperature alarm:	If a chamber temperature deviates from set temperature +/-2.5℃, all the digits will flash and audible alarm will sounds intermittently after 3seconds of delay. If a chamber temperature becomes set temperature +/-2.5℃ during alarm occurs, alarm operation will terminate.
Auto return:	If there is no key operation for approx. 45seconds in setting mode, current chamber temperature will appear on the display.
Key lock:	If Key lock switch is ON position, it is prevent the set condition from changing through control panel.
Memory back up:	A unit will restart operation after a power returns from a power failure and delay timer is active. If a unit operates by timer mode C, it will maintain this mode after a power returns from a power failure.

5. Error code

E01:	If a thermister sensor is open circuited (0.9484kΩ) or short circuited (27.28kΩ), “E01” will flash and ALARM lamp will illuminate, audible alarm will sound, and relay and heater will be inactive.
E02:	If a triac is open circuited, “E02” will flash and ALARM lamp will illuminate, audible alarm will sound, and relay and heater will be inactive.
E03:	If a triac is short circuited, “E03” will flash and ALARM lamp will illuminate, audible alarm will sound, and relay and heater will be inactive.
E04:	If a power relay is short circuited, “E04” will flash and ALARM lamp will illuminate, audible alarm will sound, and relay and heater will be inactive.
E05:	If a power relay is open circuited or one of heaters is short circuited or temperature around PCB becomes approx. 65℃ or higher, relay and heater will be inactive.

6. Function mode

How to access function mode:	In chamber temperature display, press numerical value shift key for 5seconds to display function code “F00”. Step to F06 and input service code “384” to utilize F07 to F22. If there are no key operation in function mode, chamber temperature display will appear (Auto return). function mode will not be active during operation.

F06: Setting of service code
Step to F06 and input selectable value “384” or “000”.
If you input “384”, service code will be active.
If you input “000” (Factory default setting), service code will be cancelled.
If there are no key operation, chamber temperature display will appear. (Auto return)
Service code will be cancelled if main power is turned off after inputting “384” or if you input "000”.

F07: Input service code “384” in F06 before utilizing F07.
Zero adjustment temperature in VR03 is displayed.
It is impossible to set zero adjustment value by control panel.
If there are no key operation for approx. 180seconds, chamber temperature display will appear. (Auto return)

F08: Input service code “384” in F06 before utilizing F08.
Input selectable value “000” or “001”.
“000” = Filtered temperature (Factory default) is displayed
“001” = Unfiltered temperature is displayed
If there are no key operations for approx. 40seconds, chamber temperature display will appear. (Auto return)

F09: Input service code “384” in F06 before utilizing F09.
Input selectable value “000” or “001”.
“000” = EEPROM data is uninitialized
“001” = EEPROM data excepting zero adjustment data is initialized
If there are no key operations for approx. 40seconds, chamber temperature display will appear. (Auto return)

F10: Input service code “384” in F06 before utilizing F10.
EEPROM version is displayed.
Press CALL key to display chamber temperature display.
Or if there are no key operations for approx. 40seconds, chamber temperature display will appear. (Auto return)

F11: Input service code “384” in F06 before utilizing F11.
Zero adjustment temperature can be set in F11.
Setting range; +19.9 to -19.9
Press CALL key to memorize the value and chamber temperature display will appear.
If there are no key operations for approx. 40seconds, chamber temperature display will appear.

F21: Input service code “384” in F06 before utilizing F21.
Communication ID can be set in F21.
Setting range; 000 to 255
Press CALL key to memorize the value and chamber temperature display will appear.
If there are no key operations for approx. 40seconds, chamber temperature display will appear.

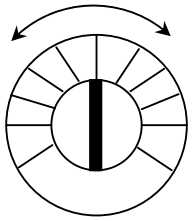
F22: Input service code “384” in F06 before utilizing F22.
Communication mode can be set in F22.
Setting range; “0” for 1st digit
“0” or “1” or “2” for 2nd digit
“0” or “1” for 3rd digit
Factory default setting is “000”.
Press CALL key to memorize the value and chamber temperature display will appear.
If there are no key operations for approx. 40seconds, chamber temperature display will appear.

7. Timer mode

If timer mode operation is complete, a unit will keep operation displaying “--:--“ in same setting temperature.

Temperature calibration

The procedure is explained as follow to calibrate temperature by turning VR03 on the PCB.
Step to function mode, F07 and adjust the difference between digital displayed temperature and actual temperature by using a screwdriver.



Turn VR03 by screwdriver.

VR03

<Ex.1>

In case digital displayed temperature is 100℃ and set temperature is 100℃, while the actual temperature reading is 99.74℃:

⇒ **Turn VR03 counterclockwise in 1 graduation.**

※ Temperature changes in every 0.26℃ graduation.

<Ex.2>

In case digital displayed temperature is 100℃ and SV is 100℃, while the actual temperature reading is 100.26℃:

⇒ **Turn VR03 clockwise in 1 graduation.**

※ Temperature changes in every 0.26℃ graduation.

Note:

1) When you complete calibration, ensure to see how it will go.
2) It is recommended that thermometer which has high accuracy should be used.
3) Difference between digital displayed temperature and actual temperature would be affected by internal temperature distribution or place where thermometer is located .

Test data

Note) Following data are the reference only, so they do not assure product's performance.

1. Pull-up test

- Test condition: AT20℃ with 1 Plastic dish (ϕ 90mm) placed in the center of chamber

MIR-162

SV	When unit is stabilized (℃)			Overshooting (℃)			Time to reach final value +/-1℃ (Min.)	
	Display	1/2H air	Dish	Display	1/2H air	Dish	Display	1/2H air
25℃	25.0	24.8	24.9	2.2	1.2	0.7	43	38
30℃	30.0	29.8	29.9	1.3	0	0	29	22
37℃	37.0	36.5	36.5	0.6	0	0	21	52
50℃	50.0	49.3	49.4	0.4	0	0	39	72
60℃	60.0	59.2	59.3	0.4	0	0	43	85

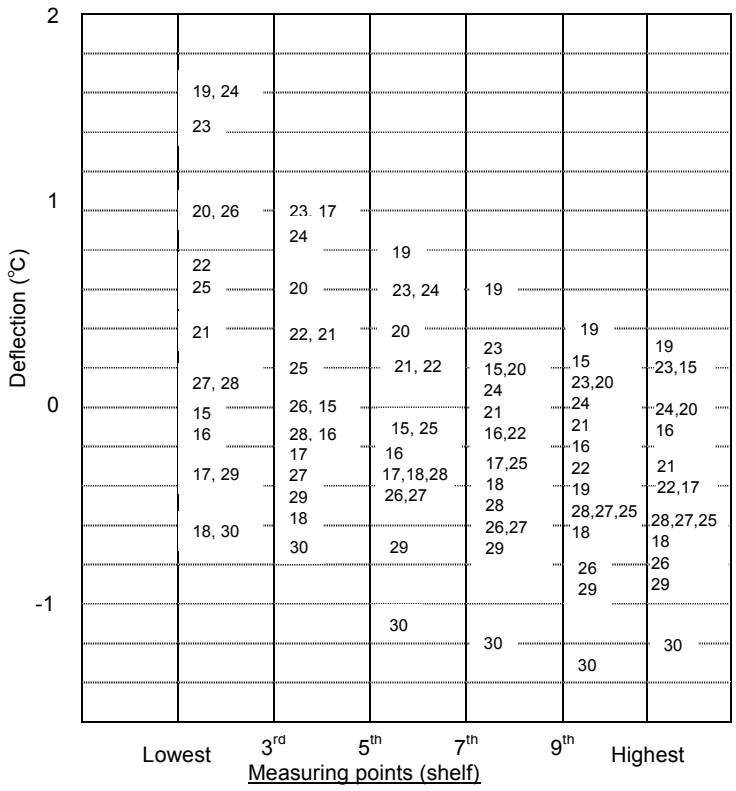
MIR-262

SV	When unit is stabilized (℃)			Overshooting (℃)			Time to reach final value +/-1℃ (Min.)	
	Display	1/2H air	Dish	Display	1/2H air	Dish	Display	1/2H air
25℃	25.0	25.1	25.0	1.3	0.2	0	35	22
30℃	30.0	30.2	30.0	0.4	0	0	19	58
37℃	37.0	37.3	37.3	0.4	0	0	24	82
50℃	50.0	50.3	50.3	0.5	0	0	49	97
60℃	60.0	60.6	60.6	0.5	0.1	0.1	68	104

2. Temperature distribution data

(1) MIR-162

* Condition: AT20℃, SV37℃, 16 dishes (#15 to #30, ϕ90mm) placed in each shelf



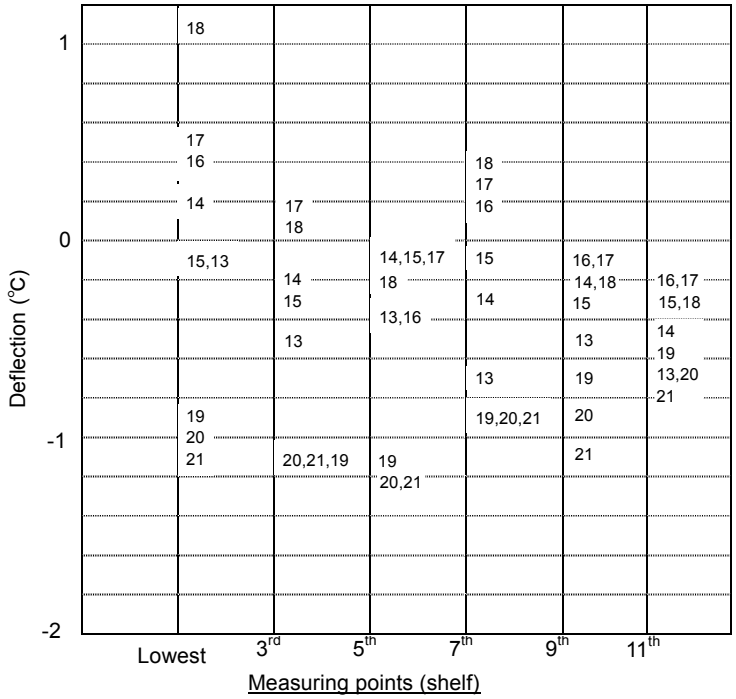
<Overlook view>

30	29	28	27
26	25	24	23
22	21	20	19
18	17	16	15

To the front

(2) MIR-262

* Condition: AT20℃, SV37℃, 9 dishes (#13 to #21, ϕ90mm) placed in each shelf



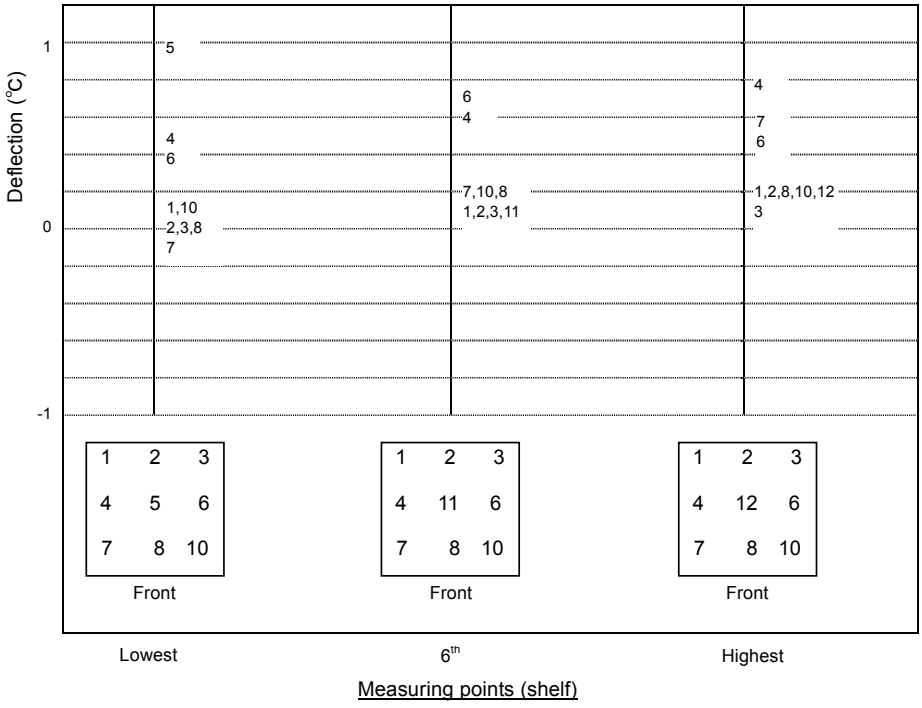
<Overlook view>

21	20	19
18	17	16
15	14	13

To the front

(3) MIR-162

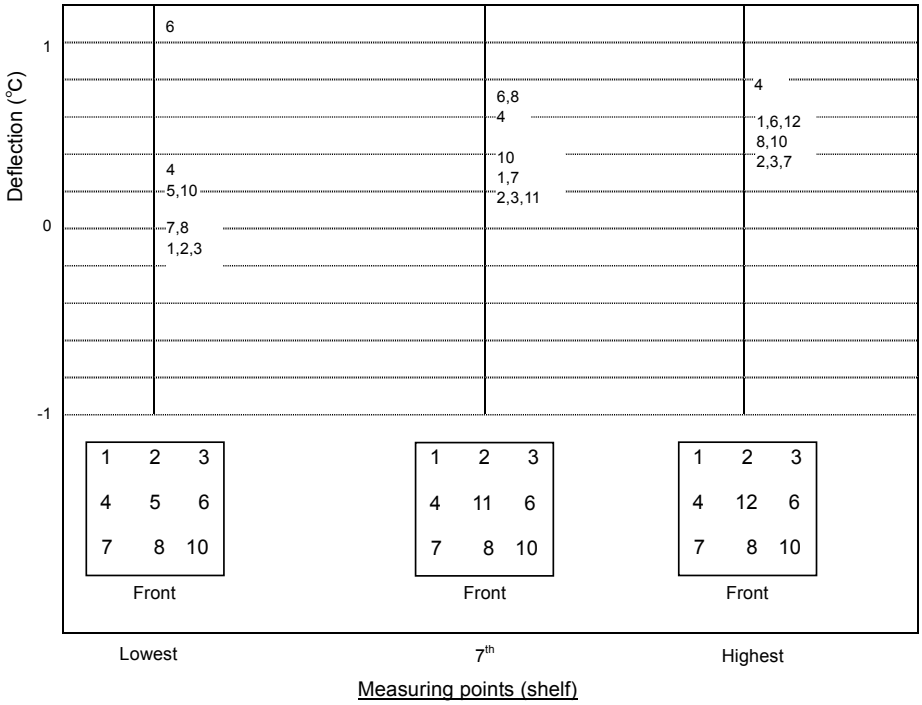
* Condition: AT20℃, SV37℃, No load



Measuring points (shelf)

(4) MIR-262

* Condition: AT20℃, SV37℃, No load

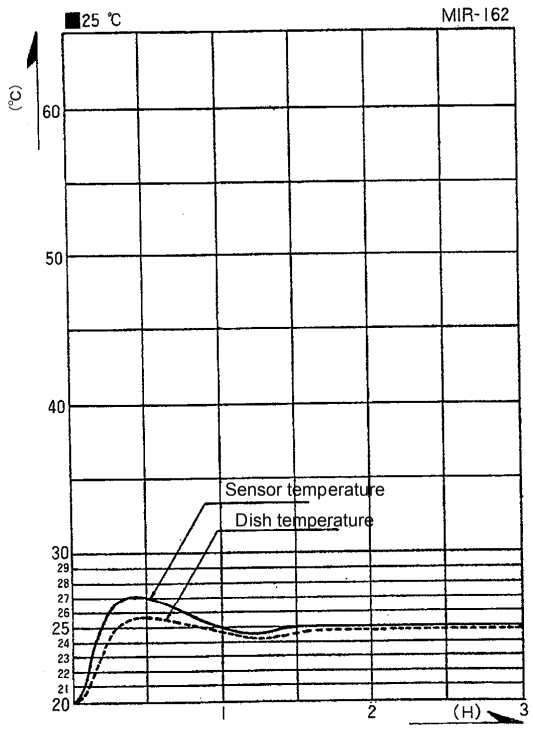


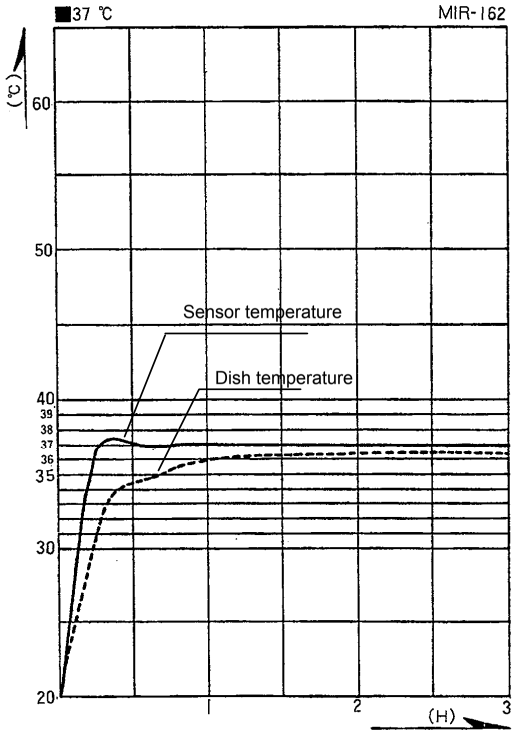
Measuring points (shelf)

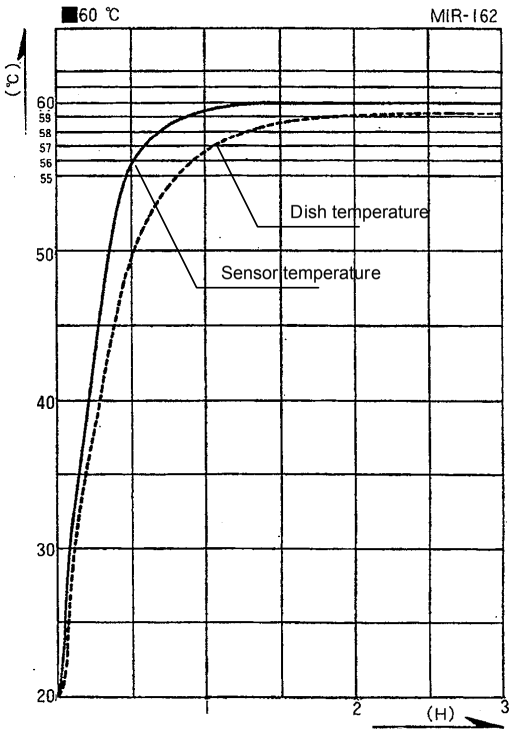
3. Pull-up graphs

* Condition: AT20℃, 1 plastic dish (ϕ 90mm) is placed in the center of chamber

<MIR-162>







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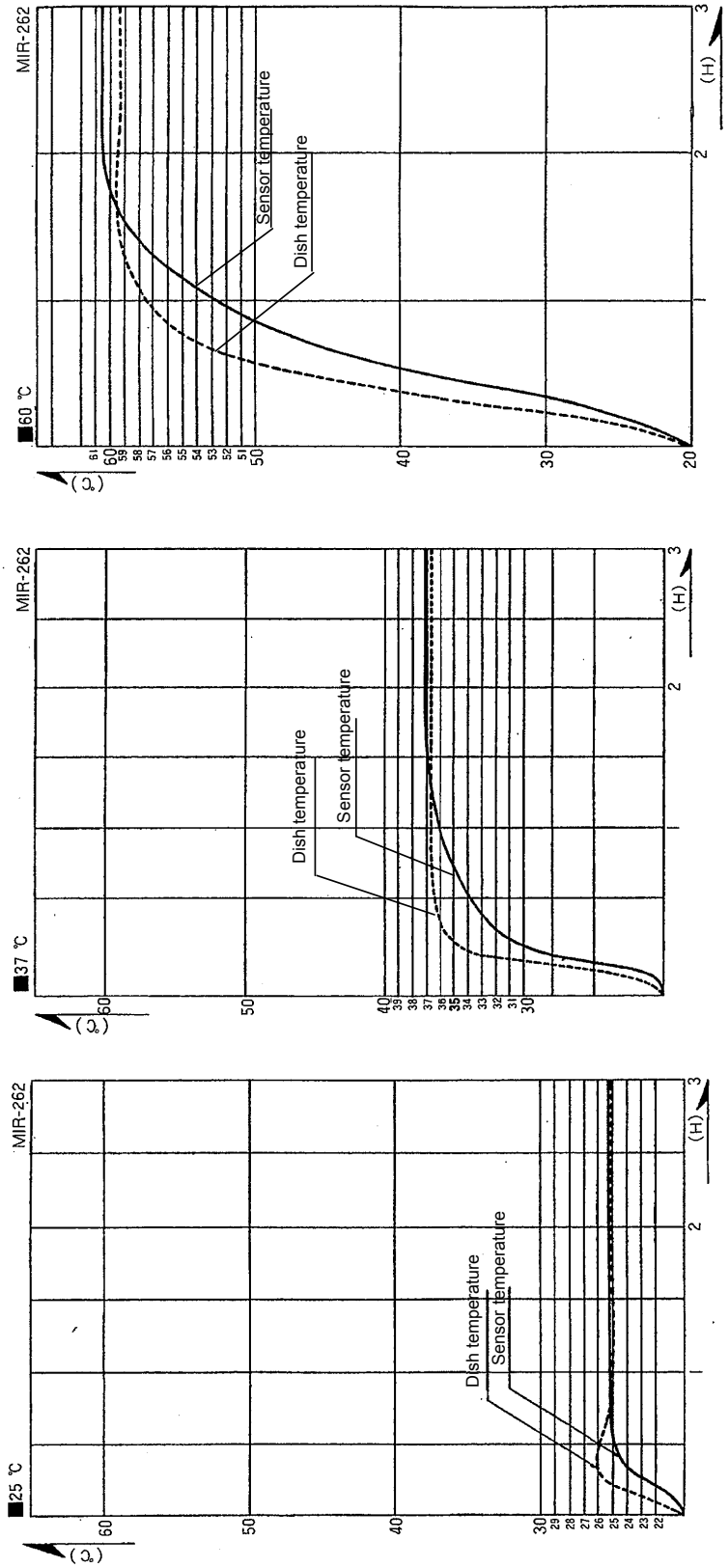
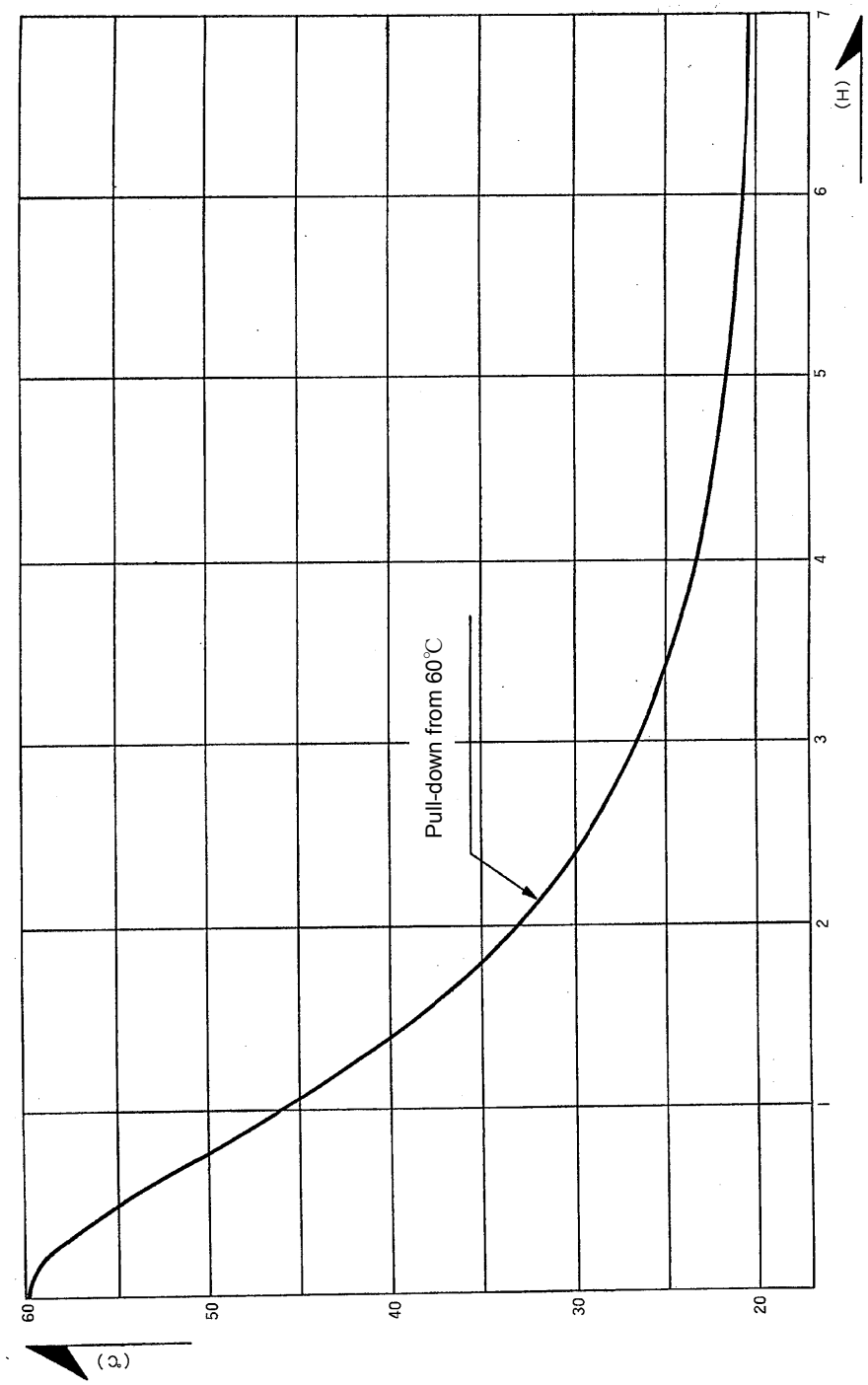


4. Pull-down graphs

* Condition: MIR-162, without heater being active



Instruction manual

•This section is extracted and printed from Instruction Manual.

• If you find out "Refer to page ●●" in them, this page means not page in Service manual but page in the lower corner of each page in the extract from Instruction Manual.
This page number is not corresponded with serial number in Service manual.

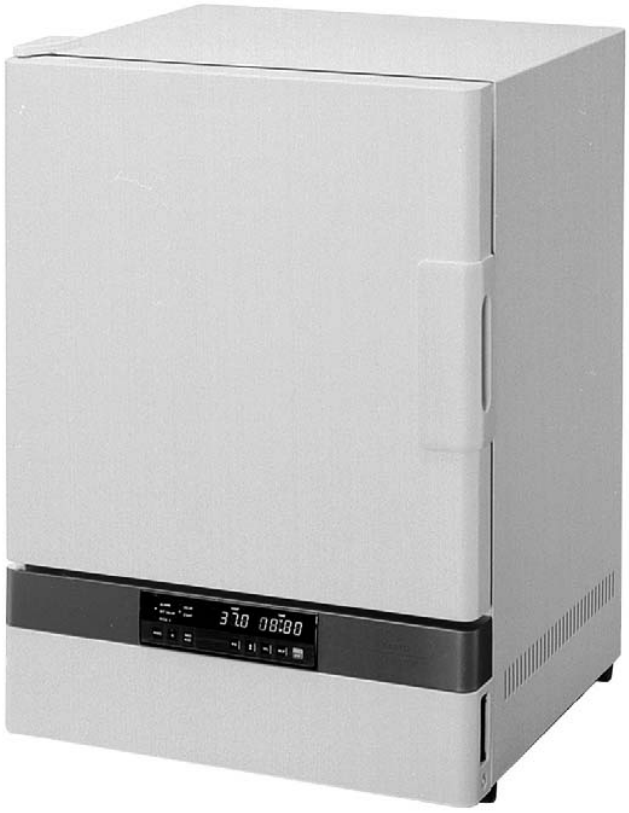
• **Please note the extracted Instruction Manual which corresponds to the initial unit production, so the contents may be revised in future.**

SANYO

INSTRUCTION MANUAL

MIR-162
MIR-262

Incubator



MIR-162

CONTENTS

INTRODUCTION

■ Read this manual carefully before using the appliance and follow the instructions for safety operation.

■ Sanyo never guarantee any safety if the appliance is used for any objects other than intended use or used by any procedures other than those mentioned in this manual.

■ Keep this manual in an adequate place to refer to it as necessary.

■ The contents of the manual will be subjected to change without notice due to the improvement of performance or functions.

■ Contact Sanyo sales representative or agent if any page of the manual is lost or page order is incorrect.

■ Contact Sanyo sales representative or agent if any point in this manual is unclear or if there are any inaccuracies.

PRECAUTIONS FOR SAFE OPERATION

It is imperative that the user complies with this manual as it contains important safety advice.

Items and procedures are described so that you can use this unit correctly and safely. If the precautions advised are followed, this will prevent possible injury to the user and any other person.

Precautions are illustrated in the following way:

⚠WARNING

Failure to observe WARNING signs could result in a hazard to personnel possibly resulting in serious injury or death.

⚠CAUTION

Failure to observe CAUTION signs could result in injury to personnel and damage to the unit and associated property.

Symbol shows;

△ this symbol means caution.

⃠ this symbol means an action is prohibited.

● this symbol means an instruction must be followed.

Be sure to keep this manual in a place accessible to users of this unit.

< Label on the unit >

This mark is labeled on the cover in which the electrical components of high voltage are enclosed to prevent the electric shock.

The cover should be removed by a qualified engineer or a service personnel only.

PRECAUTIONS FOR SAFE OPERATION

⚠WARNING

Do not use the unit outdoors. Current leakage or electric shock may result if the unit is exposed to rain water.

Only qualified engineers or service personnel should install the unit. The installation by unqualified personnel may cause electric shock or fire.

Install the unit on a sturdy floor and take an adequate precaution to prevent the unit from turning over. If the floor is not strong enough or the installation site is not adequate, this may result in injury from the unit falling or tipping over.

Never install the unit in a humid place or a place where it is likely to be splashed by water. Deterioration of the insulation may result which could cause current leakage or electric shock.

Never install the unit in a flammable or volatile location. This may cause explosion or fire.

Never install the unit where acid or corrosive gases are present as current leakage or electric shock may result due to corrosion.

Always ground (earth) the unit to prevent electric shock. If the power supply outlet is not grounded, it will be necessary to install a ground by qualified engineers.

Never ground the unit through a gas pipe, water main, telephone line or lightning rod. Such grounding may cause electric shock in the case of an incomplete circuit.

Connect the unit to a power source as indicated on the rating label attached to the unit. Use of any other voltage or frequency other than that on the rating label may cause fire or electric shock.

Never store volatile or flammable substances in this unit if the container cannot be sealed. These may cause explosion or fire.

Do not insert metal objects such as a pin or a wire into any vent, gap or any outlet on the unit. This may cause electric shock or injury by accidental contact with moving parts.

Use this unit in safe area when treating the poison, harmful or radiate articles. Improper use may cause bad effect on your health or environment.

Turn off the power switch (if provided) and disconnect the power supply to the unit prior to any repair or maintenance of the unit in order to prevent electric shock or injury.

Do not touch any electrical parts (such as power supply plug) or operate switches with a wet hand. This may cause electric shock.

PRECAUTIONS FOR SAFE OPERATION

⚠WARNING

Ensure you do not inhale or consume medication or aerosols from around the unit at the time of maintenance. These may be harmful to your health.

Never splash water directly onto the unit as this may cause electric shock or short circuit.

Never put containers with liquid on the unit as this may cause electric shock or short circuit when the liquid is spilled.

Never bind, process, or step on the power supply cord, or never damage or break the power supply plug. A broken supply cord or plug may cause fire or electric shock.

Do not use the supply cord if its plug is loose. Such supply cord may cause fire or electric shock.

Never disassemble, repair, or modify the unit yourself. Any such work carried out by an unauthorized person may result in fire, or electric shock or injury due to a malfunction.

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

When removing the plug from the power supply outlet, grip the power supply plug, not the cord. Pulling the cord may result in electric shock or fire by short circuit.

Disconnect the power supply plug before moving the unit. Take care not to damage the power cord. A damaged cord may cause electric shock or fire.

Disconnect the power plug when the unit is not used for long periods. Keeping the connection may cause electric shock, current leakage, or fire due to the deterioration of insulation.

If the unit is to be stored unused in an unsupervised area for an extended period, **ensure that children do not have access and that doors cannot be closed completely.**

The disposal of the unit should be accomplished by appropriate personnel. Remove doors to prevent accidents such as suffocation.

Do not put the packing plastic bag within reach of children as suffocation may result.

PRECAUTIONS FOR SAFE OPERATION

⚠CAUTION

Use a dedicated power source (a dedicated circuit with a breaker) as indicated on the rating label attached to the unit. A branched circuit may cause fire resulting from abnormal heating.

Connect the power supply plug to the power source firmly after removing the dust on the plug. A dusty plug or improper insertion may cause a heat or ignition.

Never store corrosive substances such as acid or alkali in this unit if the container cannot be sealed. These may cause corrosion of inner components or electric parts.

Check the setting when starting up of operation after power failure or turning off of power switch. The stored items may be damaged due to the change of setting.

Be careful not to tip over the unit during movement to prevent damage or injury.

Prepare a safety check sheet when you request any repair or maintenance for the safety of service personnel.

ENVIRONMENTAL CONDITIONS

This equipment is designed to be safe under the following conditions (based on the IEC 1010-1):

1. Indoor use;

2. Altitude up to 2000 m;

3. Ambient temperature 5°C to 35°C

4. Maximum relative humidity 80% for temperature up to 31°C decreasing linearly to 50% relative humidity at 40°C;

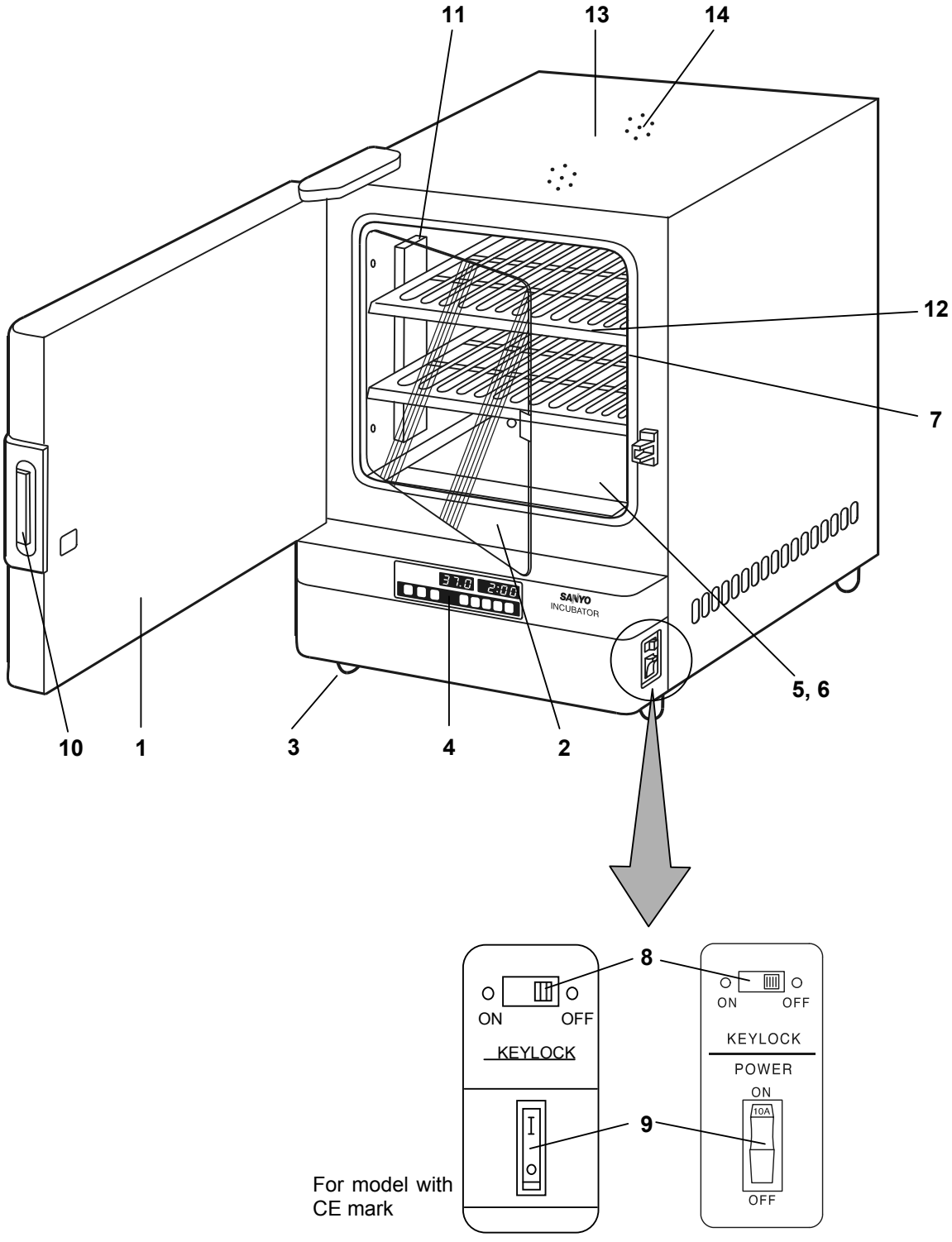
5. Mains supply voltage fluctuations not to exceed ±10% of the nominal voltage;

6. Other supply voltage fluctuations as stated by the manufacturer;

7. Transient overvoltages according to Installation Categories (Overvoltage Categories) II; For mains supply the minimum and normal category is II;

8. Pollution degree 2 in accordance with IEC 664.

INCUBATOR COMPONENTS



INCUBATOR COMPONENTS

1. Door:

2. Inner door: It is made of tempered glass. But do not force on the door.

3. Leveling foot: Can be adjusted by screws. When the screw is turned to the right, the leg becomes shorter.

4. Control panel: Refer to page 10.

5. Separation plate: Do not place objects directly on the plate.

6. Heater box (inside): The heater is attached under separation plate.

7. Gasket: Please be careful not to scratch.

8. Key lock switch: Put the switch to “OFF” when you set the operating condition. After the setting, put the switch to “ON” to prevent the set condition from changing by accidental contact.

9. Main power switch with circuit breaker: Main switch for all power. When the operation of the unit is stopped by this circuit breaker, contact with a dealer or a service station after disconnected the power supply plug.

10. Handle: Pull the knob of inside of the handle to open the door.

11. Shelf support: This can be adjusted to change the height.

12. Shelf: It can be slided forward.

13. Temperature sensor (installation position): Be careful not to allow objects to touch the sensor or scratch it.

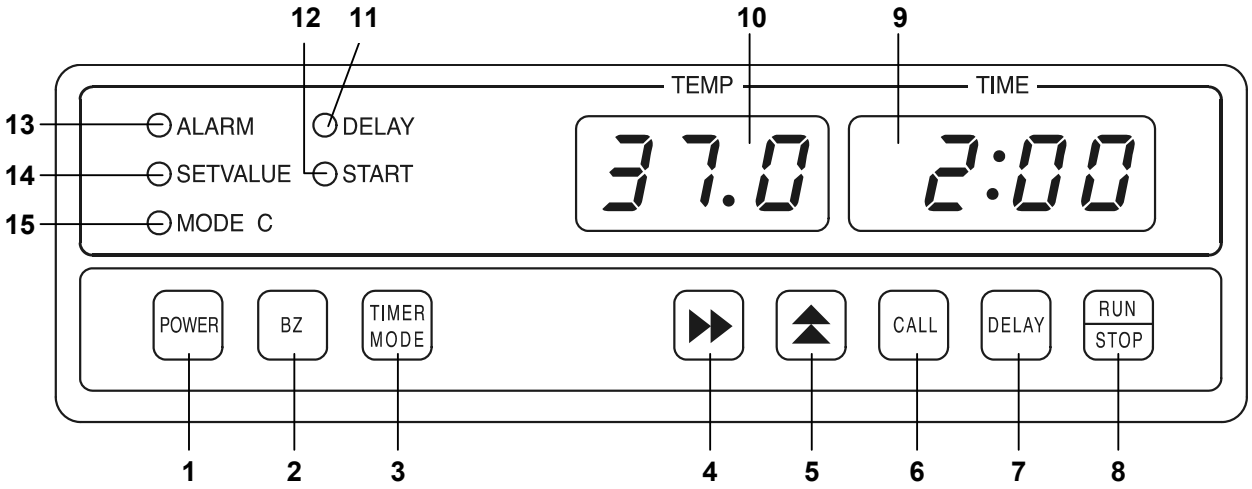
14. Exhaust air vent: During use, the temperature of this section is extremely high; please be careful.

⚠ CAUTION

Do not block the air intake vent on the chamber floor by the stocked articles. The blockage can cause unstable chamber temperature and shorten the heater life.

INCUBATOR COMPONENTS

Control panel and keypad



1. Power switch (POWER): Power switch of the control panel.

2. Alarm buzzer stop key (BZ): Press this key to silence the buzzer in the event that the alarm operates and the buzzer sounds. Press it once again to reactive the buzzer.

3. Timer mode select key (TIMER MODE): By pressing this key, the timer mode is selected. Refer to the "Timer function" on page 13.

4. Digit shift key (▶▶): Pressing this key in the setting mode causes the changeable digit to shift.

5. Numerical value shift key (▲): Pressing this key in the setting mode causes the numerical value to shift.

6. Call key (CALL): By pressing this key, the unit enters the setting mode, and the digits that can be set flash, except that only set value display mode is available when unit is running.

7. Delay timer key (DELAY): Pressing this key results in delayed starting of running.

8. Run/Stop key (RUN/STOP): This key is for start/stop the running.

9. Digital timer indicator (TIME): This indicator shows the time.

10. Digital temperature indicator (TEMP): This indicator shows the temperature.

11. Delay timer lamp: This lamp lights when the delay timer is active.

12. Start lamp: This lamp lights when the unit is running.

13. Alarm lamp: This lamp lights when the unit is warning condition.

14. Set value lamp: This lamp lights when setting mode or set value display mode as the unit is running.

15. Timer mode C lamp: This lamp lights when timer mode C is active.

INSTALLATION SITE

To operate this unit properly and to obtain maximum performance, install the unit in a location with the following conditions:

■ A location not subjected to direct sunlight

Do not install the unit under direct sunlight. Installation in a location subjected to direct sunlight cannot obtain the intended performance.

■ A location with adequate ventilation

Leave at least 30 cm around the unit for ventilation. Poor ventilation will result in a reduction of the performance.

■ A location away from heat generating sources

Avoid installing the unit near heat-emitting appliances such as a heater or a boiler etc. Heat can decrease the intended performance of the unit.

■ A location with a sturdy and level floor

Always install the unit on a sturdy and level floor. The uneven floor or tilted installation may cause failure or injury. Install the unit in stable condition to avoid the vibration or noise. Unstable condition may cause vibration or noise.

⚠ WARNING

Install the unit on a sturdy floor. If the floor is not strong enough or the installation site is not adequate, this may result in injury from the unit falling or tipping over.

Select a level and sturdy floor for installation. This precaution will prevent the unit from tipping. Improper installation may result in water spillage or injury from the unit tipping over.

■ A location not prone to high humidity

Install the unit in the ambient of 80% R.H. or less humidity. Installation under high humidity may cause current leakage or electric shock.

⚠ WARNING

Do not use the unit outdoors. Current leakage or electric shock may result if the unit is exposed to rain water.

Never install the unit in a humid place or a place where it is likely to be splashed by water. Deterioration of the insulation may result which could cause current leakage or electric shock.

■ A location without flammable or corrosive gas

Never install the unit in a flammable or volatile location. This may cause explosion or fire or may result in the current leakage or electric shock by the corrosion of the electrical components.

INSTALLATION

1. Remove the packaging materials and tapes

Remove all transportation packaging materials and tapes. Open the doors and ventilate the unit. If the outside panels are dirty, clean them with a neutral detergent and wipe it up with a wet cloth.

2. Adjust the leveling legs

Extend the leveling legs by rotating them counterclockwise so they contact the floor or bench. Ensure the unit is level.

3. Ground (earth)

⚠WARNING

Use a power supply outlet with ground (earth) to prevent electric shock. If the power supply outlet is not grounded, it is necessary to install a ground by qualified engineers.

Never ground the unit through a gas pipe, water main, telephone line or lightning rod. Such grounding may cause electric shock in the case of an incomplete circuit.

PRERUNNING

When using the unit for the first time after purchasing, operate the unit without objects inside.

1. Install the racks in the chamber.

2. Set the temperature at 60°C and operate the unit for 20 minutes.

3. Leave the unit as it is until the chamber temperature is cool enough.

4. Ventilate the room when opening the chamber door as the smoke with a strong odor is exhausted.

5. Keep the chamber door opened for a while until the odor is eliminated.

Note:

Some odor may be remained after prerunning. Such residue is eliminated gradually during usage.

• With use, the inner surfaces, shelves and the separation plate becomes lightly colored due to the smoke generated inside. This is a natural coloration; please acknowledge this.

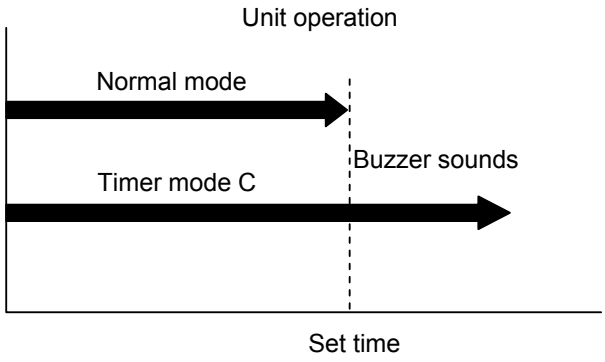
• This unit has been tested at the factory before shipping. Sometimes light lines and/or coloration can be detected inside; however, this is a new product, please acknowledge this.

TIMER FUNCTION

By pressing TIMER MODE key, the timer mode is changed. The timer function has two modes as follows:

1. Normal mode (the timer mode C lamp is not lighted)
When the set time ends, the buzzer starts ringing and the unit stops running.

2. Timer mode C (the timer mode C lamp is lighted):
When the set time ends, the buzzer starts ringing and the time indicator displays --:--, but the unit runs continuously. Before operating, refer to page 14 and 15.



STABLE RUNNING

Table 1 shows the basic procedure for setting the chamber temperature. Perform key operations in the sequence indicated in the table. The example in the table is based on the assumption that the desired temperature is 37°C and continuous running.

Note: The unit is set at the factory that the delay timer is OFF, the chamber temperature is 0°C , the running time is ever on, and the timer mode is normal mode.

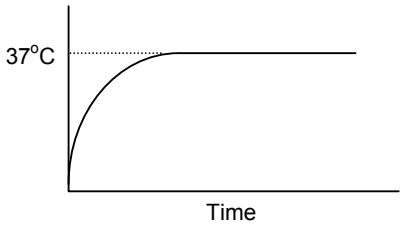


Table 1: Basic operation sequence (Example: Chamber temperature; 37°C, Continuous running)

	Description of operation	Key operated	Indication after operation
1	Press the power key.	POWER	The current chamber temperature is displayed. 20.0
2	Press the delay timer key.	DELAY	The current delay time is displayed. 00:00
3	Press the delay timer key to reset the delay time.	DELAY	Reset the delay time. 00:00
4	Press the delay timer key	DELAY	The current chamber temperature is displayed. 20.0
5	Press the call key.	CALL	The third digit of the temperature indicator flashes. 00.0
6	Set the temp. to 37.0 with the digit shift key and the numeric value shift key.	▶▶ ▲	37.0
9	Press the run/stop key.	RUN/STOP	The setting mode is finished and the unit runs.

STABLE RUNNING WITH DELAY TIME

Table 2 shows one of applications. Perform key operations in the sequence indicated in the table. The example in the table is the delay time that is 30 minutes, the chamber temperature is 50°C, the running time is 1 hour and the timer mode is Timer Mode C.

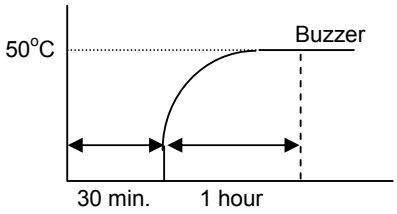


Table 2: Basic operation sequence (Example: Chamber temperature; 50°C, Delay time; 30 minuets, Running time; 1 hour, Timer mode; C)

	Description of operation	Key operated	Indication after operation
1	Press the power key.	POWER	The current chamber temperature is displayed. 20.0
2	Press the delay timer key.	DELAY	The current delay time is displayed. 00:00
3	Press the delay timer key to reset the delay time.	DELAY	Reset the delay time. 00:00
4	Set the delay time to 00:30 with the digit shift key and the numeric value shift key.	▶▶ ▲	00:30
5	Press the delay timer key.	DELAY	The current chamber temperature is displayed. 20.0
6	Press the call key.	CALL	The fourth digit of the indicator flashes. 00.0
7	Set the temp. to 50.0 and running time to 01:00 with the digit shift key and numeric value shift key.	▶▶ ▲	50.0 01:00
8	Press the timer mode key to select the time mode C.	TIMER MODE	By pressing the key, the timer mode C lamp is lighted.
9	Press the run/stop key.	RUN STOP	The setting mode is finished and the unit runs. 00:30

Note:

If there is no need to change the set value in each setting mode, press the call key (CALL) to activate the next mode.

If the unit runs every time, set the running time --:-- by pressing the numerical value shift key at the fourth digit of the time indicator.

Press the Run/Stop key (RUN/STOP) when cancellation is necessary while running.

If you don't need the delay time, set the delay time 00:00.

If you need to change the set value, key operate after the unit stops.

When no key is pressed within 45 seconds, displayed number is memorized, setting is over and indicator displays the current value.

ALARMS & SAFETY FUNCTIONS

This unit has the alarms and safety functions shown in table below, and also self diagnostic functions.

Alarms and safety functions

Alarm & Safety	Situation	Indication	Buzzer	Safety operation
Automatic set temperature Alarm	If the internal temperature deviates from the set temp. by +/-2.5°C or more.	Alarm lamp lights. All digits on the temp. indicator flash.	Intermittent tone	-----
Key lock switch	When the key lock switch is turned ON.	-----	-----	Key input is disabled.
Temperature sensor abnormality	If the temperature sensor goes open circuit.	Alarm lamp lights. E01 is displayed on the temp. indicator.	Intermittent tone	Heater OFF
Triac abnormality	If the triac goes open circuit.	Alarm lamp lights. E02 is displayed on the temp. indicator.	Intermittent tone	Heater OFF
	If the triac goes short circuit.	Alarm lamp lights. E03 is displayed on the temp. indicator.	Intermittent tone	Heater OFF
Relay abnormality	If the relay goes short circuit.	Alarm lamp lights. E04 is displayed on the temp. indicator.	Intermittent tone	Heater OFF
	If the relay goes open circuit or heater goes short circuit.	Alarm lamp lights. E05 is displayed on the temp. indicator.	Intermittent tone	Heater OFF
Independent over-heat protection	(when unit is not running) The security circuit is activated by independent temp. sensor if the chamber is abnormal over-heating.	Without display change.	Continuous tone	Heater OFF forcedly by external circuit.
	(When unit is running) The security circuit is activated by independent temp. sensor if the chamber is abnormal over-heating.	Alarm lamp lights. E05 is displayed on the temp. indicator.	Continuous tone (When the temp. is decreased, intermittent tone)	Heater OFF forcedly by external circuit.

* The buzzer tone resulting from the independent over-heat protection cannot be stopped with the alarm buzzer stop key (BZ). Turn off the main switch.

Operation after power failure

The set value is memorized by nonvolatile memory. Accordingly, the incubator resumes the operation with setting before power failure.

ROUTINE MAINTENANCE

⚠ WARNING

Always disconnect the power supply to the unit prior to any repair or maintenance of the unit in order to prevent electric shock or injury.

Ensure you do not inhale or consume medication or aerosols from around the unit at the time of maintenance. These may be harmful to your health.

⚠ CAUTION

Always put on dry gloves to protect hands at the time of maintenance. Failure to use gloves may result in cuts or abrasions from any sharp edges or corners.

Note:

Never attempt to directly spray water on the heater box or the inside of the oven as it is very dangerous. In addition, never use volatile or combustible chemicals to clean the inside.

Cleaning of unit

Cleaning the inside

• Remove all shelves from the inside.

• Clean the inside using a soft cloth damped with neutral detergent. Afterwards, wipe off with a cloth washed in clean water.

• Remove the separation plate at the bottom of the oven and wipe off any particles in the heater box, using a soft cloth damped with water.

Cleaning the frame

• Clean the frame using a soft cloth damped with neutral detergent. Afterwards, wipe it up the detergent with a wet cloth.

Cleaning the shelf

• To clean the shelf, place it in a tub of warm water mixed with neutral detergent and wipe with a sponge or a soft cloth. Shelves subject to high temperature will naturally become colored. This is a natural coloration, acknowledge this.

⚠CAUTION

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 wipe it up thoroughly with a wet cloth afterwards.

TROUBLE SHOOTING

If the unit malfunctions, check out the following before calling for service.

Malfunction	Check/Remedy
The unit does not operate at all.	• The unit is not plugged correctly into a power outlet. • The circuit breaker at the power source is active. • A power failure has occurred. • A fuse has blown.
The key operation is disable	• The key lock function is set in ON mode.
If the alarm function and the buzzer operates	[At the beginning of operation] • The chamber temperature is not equal to the set value. [During operation] • Was the set temperature value changed or the door left open for a long period? • Was a low temperature load placed inside the unit? In this case, if the unit is left as it is, the alarm will eventually clear itself.
If the chamber temperature is not equal to the set temperature	• Is the temperature in the vicinity too high? The ambient temperature must always be at least 5°C less than the set temperature. If the ambient temperature rises above this value, relook at the air conditioning of the room. • Is the unit installed tilted? Install the unit horizontally.

Note:

If the malfunction is not eliminated after checking the above items, or the malfunction is not shown in the above table, contact Sanyo sales representative or agent.

DISPOSAL OF UNIT

⚠WARNING

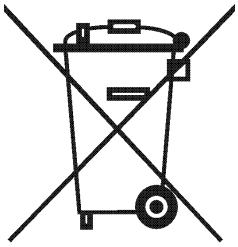
If the unit is to be stored unused in an unsupervised area for an extended period **ensure that children do not have access and doors cannot be closed completely.**

The disposal of the unit should be undertaken by appropriate personnel. Always remove doors to prevent accidents such as suffocation.

DISPOSAL OF UNIT

Note:
This symbol mark and recycle system are applied only to EU countries and not applied to the countries in the other area of the world.

Waste Electrical and Electronic Equipment (WEEE) Directive-2002/96/EC



(English)
Your SANYO product is designed and manufactured with high quality materials and components which can be recycled and reused.

This symbol means that electrical and electronic equipment, at their end-of-life, should be disposed of separately from your household waste.

Please dispose of this equipment at your local community waste collection/recycling centre.

In the European Union there are separate collection systems for used electrical and electronic products.

Please help us to conserve the environment we live in!

(German)
Ihr SANYO Produkt wurde entworfen und hergestellt mit qualitativ hochwertigen Materialien und Komponenten, die recycelt und wiederverwendet werden können.

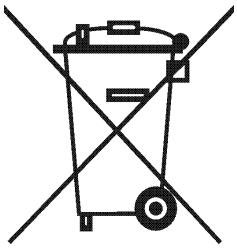
Dieses Symbol bedeutet, daß elektrische und elektronische Geräte am Ende ihrer Nutzungsdauer von Hausmüll getrennt entsorgt werden sollen.

Bitte entsorgen Sie dieses Gerät bei Ihrer örtlichen kommunalen Sammelstelle oder im Recycling Centre.

In der Europäischen Union gibt es unterschiedliche Sammelsysteme für Elektrik- und Elektronikgeräte.

Helfen Sie uns bitte, die Umwelt zu erhalten, in der wir leben!

DISPOSAL OF UNIT



(French)
Votre produit Sanyo est conçu et fabriqué avec des matèriels et des composants de qualité supérieure qui peuvent être recyclés et réutilisés.

Ce symbole signifie que les équipements électriques et électroniques en fin de vie doivent être éliminés séparément des ordures ménagères.

Nous vous prions donc de confier cet équipement à votre centre local de collecte/recyclage.
Dans l'Union Européenne, il existe des systèmes sélectifs de collecte pour les produits électriques et électroniques usagés.

Aidez-nous à conserver l'environnement dans lequel nous vivons !

Les machines ou appareils électriques et électroniques contiennent fréquemment des matières qui, si elles sont traitées ou éliminées de manière inappropriée, peuvent s'avérer potentiellement dangereuses pour la santé humaine et pour l'environnement.
Cependant, ces matières sont nécessaires au bon fonctionnement de votre appareil ou de votre machine. Pour cette raison, il vous est demandé de ne pas vous débarrasser de votre appareil ou machine usagé avec vos ordures ménagères.

(Spanish)
Los productos SANYO están diseñados y fabricados con materiales y componentes de alta calidad, que pueden ser reciclados y reutilizados.

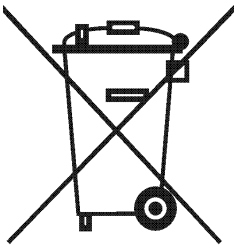
Este símbolo significa que el equipo eléctrico y electrónico, al final de su ciclo de vida, no se debe desechar con el resto de residuos domésticos.

Por favor, deposite su viejo "televisor" en el punto de recogida de residuos o contacte con su administración local.

En la Unión Europea existen sistemas de recogida específicos para residuos de aparatos eléctricos y electrónicos.

Por favor, ayúdenos a conservar el medio ambiente!

DISPOSAL OF UNIT



(Portuguese)
O seu produto SANYO foi concebido e produzido com materiais e componentes de alta qualidade que podem ser reciclados e reutilizados.

Este símbolo significa que o equipamento eléctrico e electrónico no final da sua vida útil deverá ser descartado separadamente do seu lixo doméstico.

Por favor, entregue este equipamento no seu ponto local de recolha/reciclagem.

Na União Europeia existem sistemas de recolha separados para produtos eléctricos e electrónicos usados.

Por favor, ajude-nos a conservar o ambiente em que vivemos!

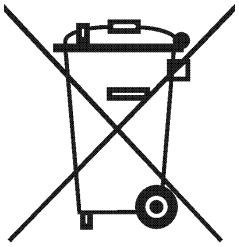
(Italian)
Il vostro prodotto SANYO è stato costruito da materiali e componenti di alta qualità, che sono riutilizzabili o riciclabili.

Prodotti elettrici ed elettronici portando questo simbolo alla fine dell'uso devono essere smaltiti separatamente dai rifiuti casalinghi.

Vi preghiamo di smaltire questo apparecchio al deposito comunale.
Nell'Unione Europea esistono sistemi di raccolta differenziata per prodotti elettrici ed elettronici.

Aiutateci a conservare l'ambiente in cui viviamo!

DISPOSAL OF UNIT



(Dutch)
Sanyo producten zijn ontwikkeld en gefabriceerd uit eerste kwaliteit materialen, de onderdelen kunnen worden gerecycled en weer worden gebruikt.

Het symbool betekent dat de elektrische en elektronische onderdelen wanneer deze vernietigd gaan worden , dit separaat gebeurt van het normale huisafval.

Zorg ervoor dat het verwijderen van de apparatuur bij de lokaal erkende instanties gaat gebeuren.
In de Europese Unie wordt de gebruikte elektrische en elektronische apparatuur bij de daarvoor wettelijke instanties aangeboden.

Alstublieft help allen mee om het milieu te beschermen.

(Swedish)
Din SANYO produkt är designad och tillverkad av material och komponenter med hög kvalitet som kan återvinnas och återanvändas.

Denna symbol betyder att elektriska och elektroniska produkter, efter slutanvändande, skall sorteras och lämnas separat från Ditt hushållsavfall.

Vänligen, lämna denna produkt hos Din lokala mottagningstation för avfall/återvinningsstation.

Inom den Europeiska Unionen finns det separata återvinningssystem för begagnade elektriska och elektroniska produkter.

Vänligen, hjälp oss att bevara miljön vi lever i!

SPECIFICATIONS

Name	Incubator	
Model	MIR-162	MIR-262
External dimensions	W580 x D595 x H820 (mm)	W730 x D645 x H870 (mm)
Internal dimensions	W450 x D460x H450 (mm)	W600 x D510x H500 (mm)
Effective capacity	93 L	153 L
Exterior	Painted steel	
Interior	Stainless steel plate (SUS 304)	
Outer door	Painted steel	
Inner door	Tempered glass	
Insulation	Glass wool	
Shelf	Stainless steel plate (SUS 304), 2 pcs.	Stainless steel plate (SUS 304), 3 pcs.
Shelf support	4	6
Temperature controller	Sensor K, PID control	
Temperature display	Digital display	
Timer	Electronic timer with delay timer	
Circuit breaker	10 A	
Overheat prevention mechanism	Built-in thermister (electric circuit), Thermal guard	
Heater	200 W	300 W
Weight	44 kg	61 kg

Note: Design or specifications will be subject to change without notice.

PERFORMANCE

MIR-162

Temperature control range	Ambient temperature +5°C to 60°C (setting available to 80°C)					
Temperature fluctuation	± 0.5°C					
Temperature variation	± 1°C (at 37°C)					
Rated voltage	AC 110 V	AC 115 V	AC 220 V	AC 220 V	AC 230 V	AC 240 V
Rated frequency	60 Hz	60 Hz	50 Hz	60 Hz	50 Hz	50 Hz
Rated power consumption	200 W	200 W	200 W	200 W	200 W	200 W

MIR-262

Temperature control range	Ambient temperature +5°C to 60°C (setting available to 80°C)					
Temperature fluctuation	± 0.5°C					
Temperature variation	± 1°C (at 37°C)					
Rated voltage	AC 110 V	AC 115 V	AC 220 V	AC 220 V	AC 230 V	AC 240 V
Rated frequency	60 Hz	60 Hz	50 Hz	60 Hz	50 Hz	50 Hz
Rated power consumption	300 W	300 W	300 W	300 W	300 W	300 W

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

⚠ CAUTION

Please fill in this form before servicing.
Hand over this form to the service engineer to keep for his and your safety.

Safety check sheet

☐Yes ☐No

1. Incubator contents : ☐Yes ☐No
   Risk of infection: ☐Yes ☐No
   Risk of toxicity: ☐Yes ☐No
   Risk from radioactive sources:

   (List all potentially hazardous materials that have been stored in this unit.)
   Notes :

2. Contamination of the unit ☐Yes ☐No
   Unit interior ☐Yes ☐No
   No contamination ☐Yes ☐No
   Decontaminated ☐Yes ☐No
   Contaminated
   Others:

3. Instructions for safe repair/maintenance of the unit ☐Yes ☐No
   a) The unit is safe to work on ☐Yes ☐No
   b) There is some danger (see below)
   Procedure to be adhered to in order to reduce safety risk indicated in b) below.

Date :
Signature :
Address, Division :
Telephone :

Product name :	Model :	Serial number :	Date of Installation :
Incubator	MIR-162, MIR-262		

Please decontaminate the unit yourself before calling the service engineer.

SANYO Electric Co., Ltd
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