

**Cooled Incubators** MIR-153/253/553

**High-precision Temperature Environment**

**Microprocessor Control with Feedforward Function**  
SANYO Cooled Incubators incorporate a high precision microprocessor temperature control combined with a heater PID and compressor ON-OFF system. This system has a feedforward function that inputs the operating conditions of the compressor beforehand, ensuring accurate temperature control of the chamber. In a wide temperature range of from -10°C to 50°C, the heater PID exhibits temperature fluctuation of only ±0.2 degrees, and the Compressor ON-OFF controls only ±1 degree. In addition, the fluctuation of temperature uniformity in the chamber is within ±0.5 degrees, allowing a full range of precise experimentation from microorganism cultures to various types of incubation.

**Energy Savings**

Because heater output and compressor on/off are microprocessor controlled, optimum automatic operation according to ambient temperature and fluctuation of chamber load is possible, resulting in a high-energy savings.

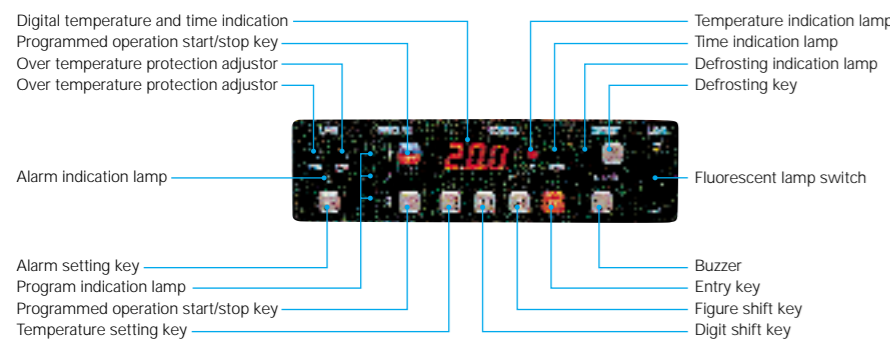
**CFC-free Foamed-in-place Rigid Polyurethane Insulator**

CFC-free Foamed-in-place polyurethane is used for the chamber because of its high thermal retention and energy saving properties.

**Triple-pane Glass Observation Window plus 15W Fluorescent Lamp**

An easy-to-observe triple-pane glass observation window and 15W fluorescent lamp are provided for sample observation during experimentation. When observation is not required, a light shielding plate (MIR-153/253) can be easily attached.

**Control panel**



**Alarm and Security System to Protect Sample Safety**

**Automatic Setting Temperature Alarm**

When the chamber temperature deviates more than ±2.5 degrees, all the digits of digital indicator flash and after 10 minutes a buzzer sounds to notify you. This system also automatically allows programmed operation or setting value changes.

**Independent Over-temperature Protection Device**

This incubator incorporates an excessive temperature prevention circuit that protects experimentation materials in the rare event that a temperature abnormality does occur. Isolated from the main circuit, this exclusive circuit and sensor operate even if the temperature sensor or micro-processor malfunction, activating an exclusive lamp and buzzer for notification. This system turns off the heater and chamber fan motor when over high temperature is detected (setting temperature range: 15°C-55°C), and turns off the compressor when over low temperature is detected (setting temperature range -15 to 20°C). Remote alarm contact is provided for monitoring alarm from a remote location.

**Programmed Memory Backup Mechanism**

Should the power source be interrupted due to power failure or other event, programmed data remains stored in memory for approx. 5 hours. When the power source is restored, operation can be continued according to the predetermined program.

**Automatic Return Buzzer Switch**

After an abnormality occurs, the alarm buzzer automatically switches to the ON mode, even if the operator forgets to return the alarm buzzer to the ON mode, thus ensuring safe and secure operation.

**Key Lock Switch**

A key lock switch is provided so that settings may not be changed unintentionally. This prevents the control key from operating unless the lock switch in the switch box is turned to the "OFF" position.

**Auto Return Mechanism**

This mechanism automatically returns the chamber temperature indicator to its normal indication when the control key is not operated for approx. 90 seconds at each setting mode. Thus, normal operation is ensured even if the operator forgets an operational procedure during setting.

**Trouble Monitor (Self Diagnostic Function)**

Should a malfunction occur, the location of the malfunction can be digitally indicated, allowing quick operator response.

**Heated Incubators** MIR-162/262

**Microcomputer PID Control-Air Jacketed System**

Microcomputer PID control and air jacketed system gives precise temperature control within the chamber. Temperature accuracy is within ±0.2 deg. (at 37°C) and temperature uniformity is within ±1 deg. (ambient temperature +5°C-60°C at 37°C).

**Microcomputer Timer Function**

An accurate microcomputer timer is fitted to allow experiments up to 99 hours and 59 minutes. Desired start time is set by an automatic start (delay function). An information function activates a buzzer when a set time is over and keeps a set temperature after an operation finishes. Various operation patterns can be set by utilizing these functions.

**Temperature Control Range— Ambient Temperature +5°C-80°C (at 20°C)**

SANYO heated incubators allow incubation at normal temperature to high temperature.

**Advanced Design**

Control panel uses a touch keyboard and an easy-to-read green LED display. Temperature and time are shown respectively by digital displays. Durable stainless steel (SUS-304) for interior cabinet.



**MIR-153/253/553/162/262**

**Specifications**

Model	Cooled Incubators					Heated Incubators																		
	MIR-153		MIR-253		MIR-553	MIR-162		MIR-262																
<b>Exterior dimensions (W x D x H)</b>	700 x 580 x 1018mm 27.6 x 22.8 x 40.1		700 x 580 x 1618mm 27.6 x 22.8 x 63.7		800 x 832 x 1810mm 31.5 x 32.8 x 71.3	580 x 595 x 820mm 22.8 x 23.4 x 32.3		730 x 645 x 870mm 28.7 x 25.4 x 34.3																
<b>Interior dimensions (W x D x H)</b>	620 x *386 x 555mm 24.4 x 15.2 x 21.9		620 x *386 x 1075mm 24.4 x 15.2 x 42.3		640 x 550 x 1160mm 25.2 x 21.7 x 45.7	450 x 460 x 450mm 17.7 x 18.1 x 17.7		600 x 510 x 500mm 23.6 x 20.1 x 19.7																
<b>Effective capacity</b>	126ℓ (4.5 cu.ft.)		254ℓ (9 cu.ft.)		406ℓ (14.3 cu.ft.)	93ℓ (3.3 cu.ft.)		153ℓ (5.4 cu.ft.)																
<b>Exterior finish</b>	Baked acrylic finish on galvanized steel																							
<b>Interior finish</b>	Stainless steel																							
<b>Door</b>	Baked acrylic finish on galvanized steel, triple-pane glass with key					Baked acrylic finish on galvanized steel, triple-pane glass with observation window and key		Baked acrylic finish on galvanized steel																
<b>Shelves</b>	P.E coated steel wire, adjustable																							
	3		5		5	2		3																
<b>Insulation</b>	Foamed-in-place rigid polyurethane																							
<b>Circulation system</b>	Forced air circulation					Natural convection																		
<b>Compressor</b>	Hermetic type																							
	Single phase, Output 180W		Single phase, Output 300W		Single phase, Output 300W	—		—																
<b>Evaporator</b>	Fin and tube type, forced circulation																							
<b>Condenser</b>	Wire and tube type natural air cooling system					Fin and tube type, forced air cooling system		—																
<b>Defrosting system</b>	Manual start, automatic finish, natural vaporization of drain water																							
<b>Heater</b>	Cord heater 141W		Cord heater 218W		Cord heater 332W	Sheathed heater 200W		Sheathed heater 300W																
<b>Temperature setting indication</b>	Digital setting with keylock, digital display																							
<b>Temperature control</b>	Microprocessor PID system (when compressor operates, ON-OFF control)					Microprocessor PID system																		
<b>Temperature sensor</b>	Thermistor																							
<b>Automatic setting temperature alarm</b>	When temperature deviates approx. ±2.5 deg., visual and audible alarm																							
<b>Over temperature protection device</b>	Visual and audible alarm																							
<b>Programmed operation</b>	3-step repeat from 1-99 times. Continuous repeat 1 step 0.5-99.5h (Program memory backup function—approx. 5 hours)					—																		
<b>Temperature range</b>	-10°C → +50°C					Ambient temperature +5°C-+80°C (Ambient temperature 20°C)																		
<b>Timer</b>	—																							
<b>Temperature controllability</b>	±0.2 deg. at Heater PID control (Temperature setting 50°C, Ambient temperature 20°C, No load) / 1 deg. at Compressor ON-OFF control (Temperature setting 5°C, Ambient temperature 20°C, No load)					±0.2 deg. (-60°C) ±0.5 deg. (60-80°C) at 37°C																		
<b>Temperature uniformity</b>	±0.5 deg. (Setting temperature 37°C, Ambient temperature 20°C, No load)																							
	—					±1.0 deg.																		
<b>Power source</b>	<b>Voltages</b>	A	B	C	D	E	A	B	C	D	E	A	C	D	E	A	C	D	E					
	<b>Amps</b>	2.2	—	1.5	1.1	1.4	2.5	—	1.7	1.3	1.2	3.5	—	2.2	1.8	2.1	1.8	0.9	0.9	0.9	2.7	1.4	1.4	1.4
	<b>Breaker</b>	15	—	15	15	15	15	—	15	15	15	15	—	15	15	15	15	15	15	15	15	15	15	15
<b>Power consumption</b>	224/232W					292/290W		384/415W			200W		300W											
<b>Interior lamp</b>	15W x 1, Fluorescent lamp										—													
<b>Net weight</b>	69 kg (152.3 lbs.)					104 kg (229.6 lbs.)		205 kg (452.5 lbs.)			44 kg (97 lbs.)		61 kg (135 lbs.)											
<b>Accessories</b>	Key 1 set Light shielding plate 1					Key 1 set Light shielding plate 1		Key 1 set			—		—											

\*Specifications subject to change without notice.  
\*MIR-153, MIR-253 minimum depth 370mm

**Option**

Voltage Code	Voltage	Hz	Phase
A	110/115	60	1ø
B	127	60	1ø
C	220	50	1ø
D	220	60	1ø
E	230/240	50	1ø

**Exclusive stand: MKD 3001**  
(For MIR-153)  
External dimensions: 820(W) x 750(D) x 750(H)mm (32.3" x 29.5" x 29.5")



SANYO Electric Biomedical Co., Ltd. as a member of the SANYO Electric Group, has received ISO14001 Certification for its environmental management system.

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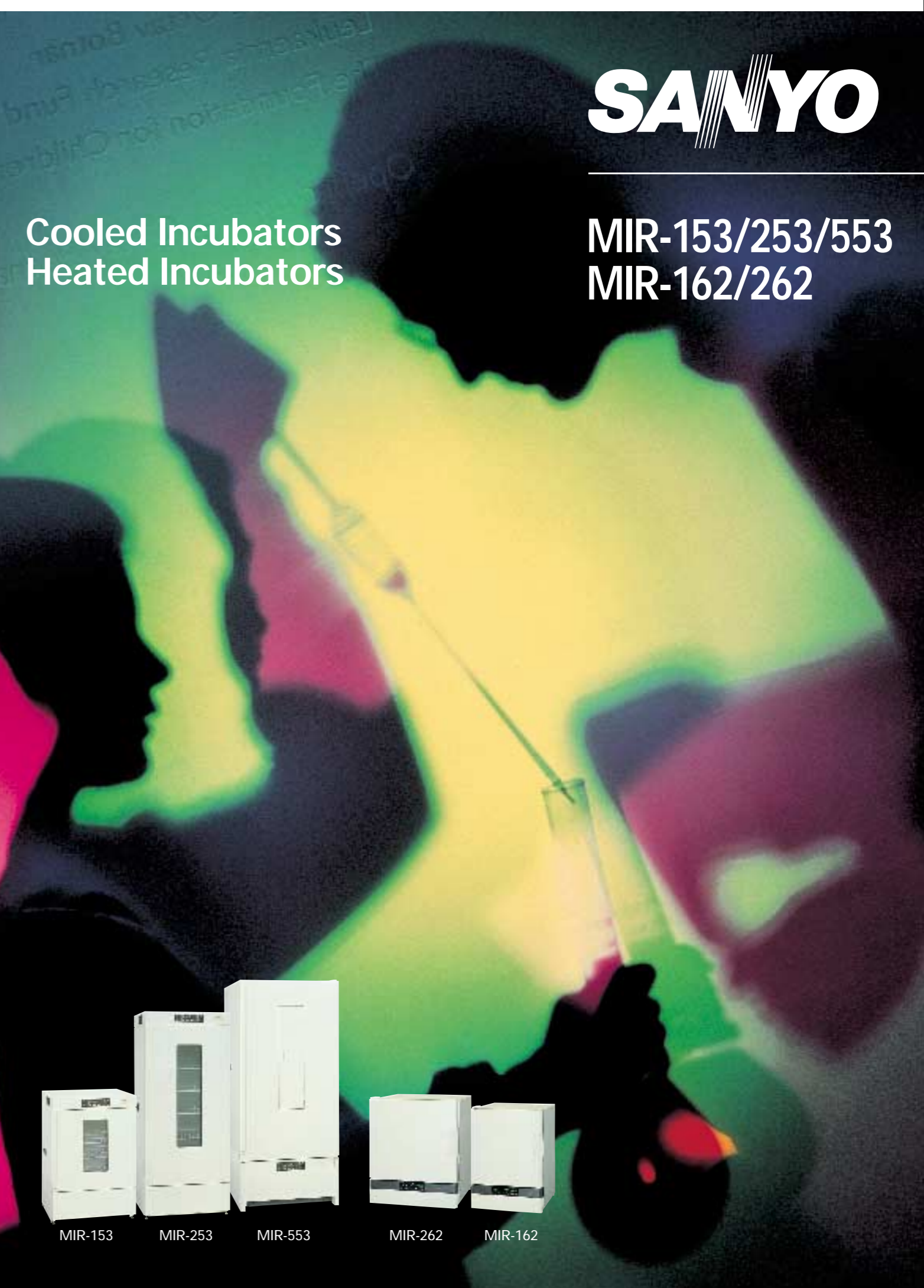


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**Cooled Incubators  
Heated Incubators**



**MIR-153/253/553  
MIR-162/262**



MIR-153 MIR-253 MIR-553 MIR-262 MIR-162

# SANYO Incubators

## MIR-153/253/553/162/262

SANYO's MIR series incubators have been recognized as exceptional units suitable for a wide range of applications by accommodating a temperature range of from  $-10^{\circ}\text{C}$  to  $50^{\circ}\text{C}$ . In pursuit of temperature precision and enhanced operability, the new MIR-153/253/553 series makes its debut. Incorporating an 8-bit microcomputer, these incubators control the heater and compressor within a precise  $\pm 0.2$  deg.

and  $\pm 1$  deg. range, respectively. In addition, they can be applied to a wide variety of experimentation patterns with the aid of a 3-step microcomputer program. These cooled incubators are designed to meet a variety of advanced experimental needs ranging from microorganism cultures and plant germination tests to various constant temperature experiments.

### Improved Experimentation of Repetitive Operation and Operability

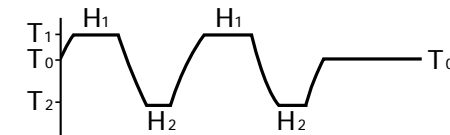
#### Programmable 3-step operational function with microcomputer control

Combining flexible Temperature (T) and Time (H) control, a maximum 3-step plus constant operation or max. 3-step repeating operation can be programmed according to the experimentation requirements. The one-step setting time ranges from 0.0 to 99.5 hours in increments of a half hour. A program can be set to repeat for a minimum of once up to a maximum of 99 times. Program input is simple and the steps during each operation are indicated by a lamp. This incubator accommodates a range of diversified experimentation requirements, and is ideal for experimentation during night time or holidays, experimentation that requires settings to be changed, and microorganism culture and preservation. Constant operation mode without step operation is also available.

#### 2 Step Repeating Operation

Using a temperature of  $T_1$  and  $T_2$ , operation is repeatedly conducted using time  $H_1$  and  $H_2$ . Application: Optimum for day and night cycle operations of plant material or quality testing for chemicals, foods and samples.

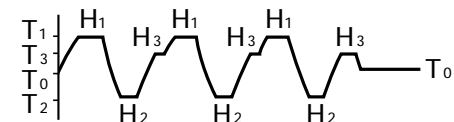
#### Application 3



#### 3 Step Repeat Operation

Temperature ( $T_1$ ,  $T_2$ ,  $T_3$ ) and Time ( $H_1$ ,  $H_2$ ,  $H_3$ ) are set. Then, limited repeating operations (from 1 to 99 timers) or continuously repeated operations are conducted. After a limited repeating operation has been completed, constant operating temperature  $T_0$  is retained.

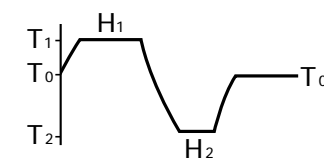
#### Application 1



#### 2 Step to Constant Operation

With a temperature of  $T_1$  and  $T_2$ , operation is conducted using time  $H_1$  and  $H_2$ . Then, constant operating temperature  $T_0$  is retained.

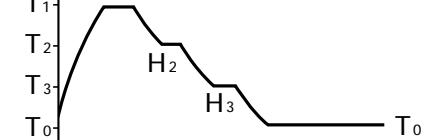
#### Application 4



#### 3 Step to Constant Operation

With a temperature of  $T_1$ ,  $T_2$ , and  $T_3$ , operation is conducted using time  $H_1$ ,  $H_2$ ,  $H_3$ , respectively. Then, constant operation temperature  $T_0$  is retained. Application: Optimum for experiments that require consistent 4-step temperature increases and decreases.

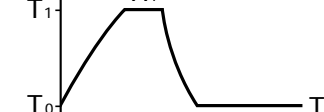
#### Application 2



#### 1 Step to Constant Operation

With a temperature of  $T_1$ , operation is conducted using time  $H_1$ . Then, constant operating temperature  $T_0$  is retained. Application: Optimum for automation and labor savings while performing bacteria inspection from culture to preservation, and from preservation to culture.

#### Application 5

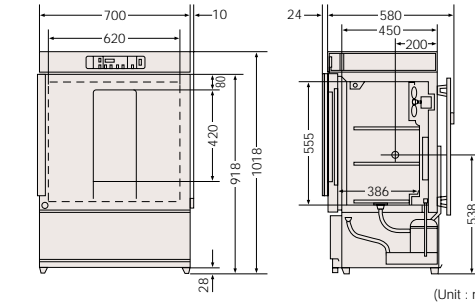


## Cooled Incubators



Effective capacity:

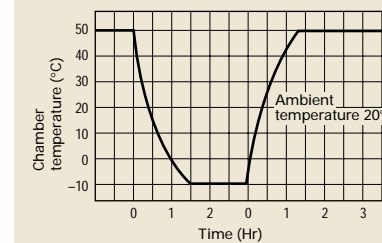
126 liters



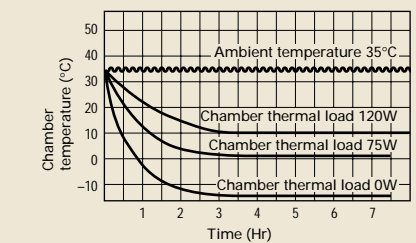
### MIR-153

**Performance**  
Temperature pull-down speed:  $50^{\circ}\text{C}$  to  $0^{\circ}\text{C}$   
Approx. 60 minutes.  
(Ambient temperature  $20^{\circ}\text{C}$ , No load)  
Temperature pull-up speed:  $0^{\circ}\text{C}$  to  $50^{\circ}\text{C}$   
Approx. 70 minutes.  
(Ambient temperature  $20^{\circ}\text{C}$ , No load)  
Power source: 100V/50Hz

**Performance Data**  
Chamber pull-down/pull-up characteristics  
(Outside air temperature  $20^{\circ}\text{C}$  Power source: AC 100V/50Hz)



Temperature pull-down characteristics for thermal load in chamber  
(Ambient temperature  $35^{\circ}\text{C}$  Power source: AC 100V/50Hz)

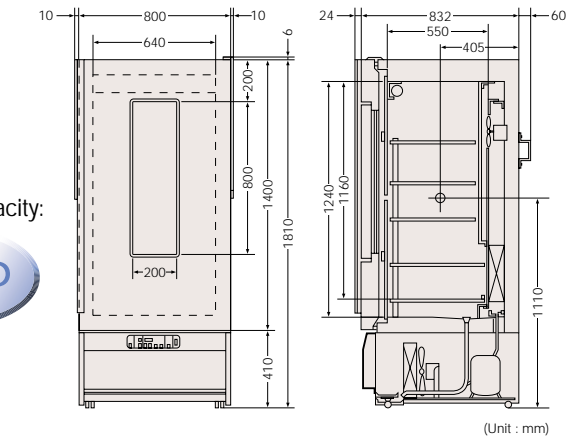


\*The data shown above are taken with the fluorescent lamp turned off.  
\*Characteristics may vary depending on the product or operating conditions.



Effective capacity:

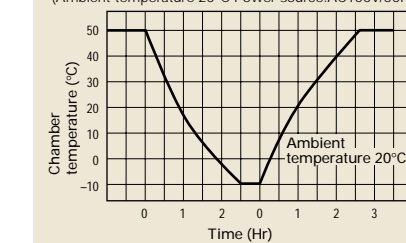
406 liters



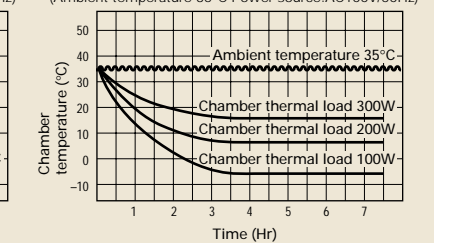
### MIR-553

**Performance**  
Temperature pull-down speed:  $50^{\circ}\text{C}$  to  $0^{\circ}\text{C}$   
Approx. 100 minutes.  
(Ambient temperature  $20^{\circ}\text{C}$ , No load)  
Temperature pull-up speed:  $0^{\circ}$  to  $50^{\circ}\text{C}$   
Approx. 140 minutes.  
(Ambient temperature  $20^{\circ}\text{C}$ , No load)  
Power source: 100V/50Hz

**Performance Data**  
Chamber pull-down/pull-up characteristics  
(Ambient temperature  $20^{\circ}\text{C}$  Power source: AC100V/50Hz)



Temperature pull-down characteristics for thermal load in chamber  
(Ambient temperature  $35^{\circ}\text{C}$  Power source: AC100V/50Hz)



\*The data shown above are taken with the fluorescent lamp turned off.  
\*Characteristics may vary depending on the product or operating conditions.

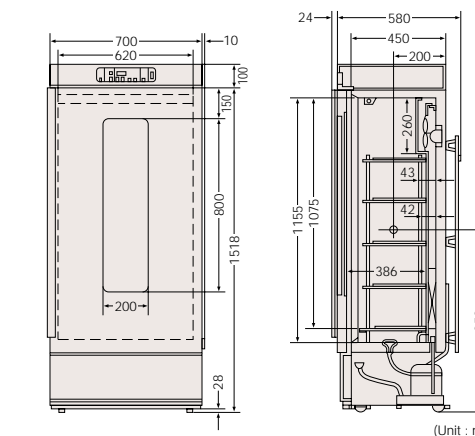


### MIR-253

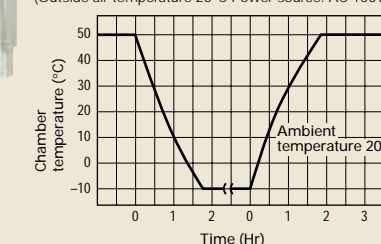
**Performance**  
Temperature pull-down speed:  $50^{\circ}\text{C}$  -  $0^{\circ}\text{C}$   
Approx. 86 minutes  
(Ambient temperature  $20^{\circ}\text{C}$ , No load)  
Temperature pull-up speed:  $0^{\circ}\text{C}$  to  $50^{\circ}\text{C}$   
Approx. 105 minutes.  
(Ambient temperature  $20^{\circ}\text{C}$ , No load)  
Power source: 100V/50Hz

Effective capacity:

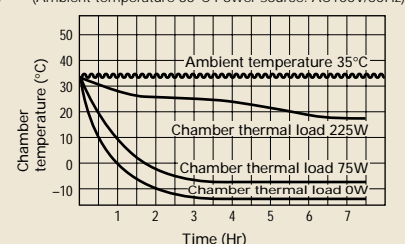
254 liters



**Performance Data**  
Chamber pull-down/pull-up characteristics  
(Outside air temperature  $20^{\circ}\text{C}$  Power source: AC 100V/50Hz)



Temperature pull-down characteristics for thermal load in chamber  
(Ambient temperature  $35^{\circ}\text{C}$  Power source: AC100V/50Hz)



\*The data shown above are taken with the fluorescent lamp turned off.  
\*Characteristics may vary depending on the product or operating conditions.

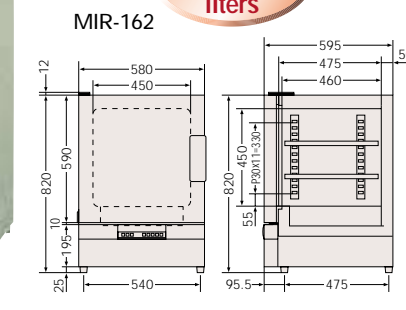
## Heated Incubators



MIR-262

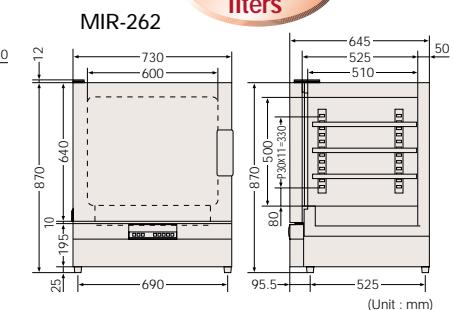
Effective capacity:

93 liters



Effective capacity:

153 liters



### MIR-162/262

**Performance**  
Temperature pull-up speed:  $60^{\circ}\text{C}$  to  $20^{\circ}\text{C}$   
Approx. 70 minutes.(MIR-162)  
Approx. 60 minutes.(MIR-262)  
(Ambient temperature  $20^{\circ}\text{C}$ , No load)

#### Temperature uniformity data

