

# **Instruction Manual**

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## **Wide Range Chamber Scanner System SY-330**



**IWATSU ELECTRIC CO., LTD.**





# Preface

- ◇ Thank you for purchasing the Wide Range Chamber Scanner System SY-330 and please regularly use lastingly in future.
- ◇ Please read this instruction manual before using this instrument, then keep the manual handy for future reference.
- ◇ The manual describes operating precautions, operating procedures, and specifications of this instrument (Wide Range Chamber Scanner System SY-330). For B-H analyzer itself, the remote control software: SY-810, and the chamber, refer to the instruction manual for each.
- ◇ In this manual, the constant temperature chamber is written "chamber".

## Important Safety Precautions

To ensure safe operation of this instrument and to prevent injury to the user or damage to property, read and carefully observe the WARNING  and CAUTION  in the following sections.

### Definition of WARNING and CAUTION used in this manual

 <b>WARNING</b>	Incorrect operation or failure to observe the WARNING may result in death or serious injury.
 <b>CAUTION</b>	Incorrect operation or failure to observe the CAUTION may result in injury or damage to instrument.

### Notices

- ◇ Parts of the contents of this manual may be modified without notice for improvements in specifications and functions.
- ◇ Reproduction or reprinting of the contents of this manual without prior permission from IWATSU is prohibited.
- ◇ If any question about this instrument arises, contact Iwatsu at the address listed at the end of this manual or our sales distributors.
- ◇ For inquiry about options described in this manual, contact IWATSU listed at the end of this manual or our sales distributors.

### Revision History

- ◇ February 2019: 1st edition

## Read the following safety information.

Read the next page.



### WARNING

- **Never touch the connection cable during excitation; otherwise, an electric shock could occur.**

The measurement POD of the B-H analyzer is connected with this instrument (scanner unit) through the chamber cable SY-912.

If the power amplifier for excitation is used, the maximum voltage or current of it may be applied to the terminal of the measurement terminal base or the sample. To prevent the danger, put the provided POD cover on the POD of the B-H analyzer and close the door of the chamber before starting measurement.

If removal of the POD cover or open of the door is detected, supply of the excitation current is cut immediately and electricity to the sample stops.

- **Do not press the door switch on the chamber intentionally. If touching the inside of it while pressing the switch, an electric shock could occur.**

Intentional press of the door switch is recognized as the door closed, causing supply of the excitation current not to be cut; i.e. very dangerous.

- **Do not use in an environment with explosive gases.**

It may cause an explosion.

- **If you notice smoke, foul odor or abnormal noise, immediately power off this instrument and remove the power plug from the receptacle.**

Continued use under these circumstances may result in an electric shock or fire. Turn off the main power switch (on the right side) of the chamber, turn off the power switch of the scanner unit, remove each power plug from the receptacle and then contact IWATSU or our sales distributors for repair. Do not attempt to repair this instrument yourself.

- **Make sure no water gets on or inside this instrument.**

Do not use this instrument if wet, otherwise an electric shock or fire could occur. If water gets on or inside this instrument, turn off the main power switch (on the right side) of the chamber, turn off the power switch of the scanner unit, remove each power plug from the receptacle and then contact IWATSU or our sales distributors for repair.

- **Do not place this instrument on an unstable support such as shaky base or inclined plane.**

Dropping or falling-down of this instrument could result in an electric shock, injury, or fire. If this instrument is dropped or its cover is broken, turn off the main power switch (on the right side) of the chamber, turn off the power switch of the scanner unit, remove each power plug from the receptacle and then contact IWATSU or our sales distributors for repair.

## Read the following safety information.

Read the next page.



### **WARNING** (continued)

- **Do not expose this instrument to excessive vibration or shock.**

Dropping or falling-down of this instrument could result in injury.

- **An impact by dropping or falling-down of this instrument could result in injury to your body or damage to your property.**

The maximum weight of the chamber is about 135kg for SY-321A and about 85kg for SY-320A. When installing or transporting it, a hand cart should be used as much as possible and 4 persons or more should carry it.

When installing or transporting it by one person or a few people, an injury could occur.

In addition, when installing or transporting it, remove the sample, turn table, cable, and power cord and care should be taken not to drop it.

- **Use 3-Prong power cord.**

If not, an electric shock or fire may occur.

- If power is supplied from the 2-wire receptacle using the 3-Prong/2-Prong conversion adapter, connect the ground terminal of the 3-Prong/2-Prong conversion adapter to the ground.
- If power is supplied from the 3-wire receptacle using the provided 3-Prong power cord, grounding is made by the ground line of the power cord.

- **Always use this instrument with a specified power supply voltage.**

If not, an electric shock, fire, or failure may occur. The range of operating voltage to be used is stated on the rear panel.

Chamber part

Operates with single-phase power supply, 50/60Hz, and 100VAC.

Scanner unit part

Operates with single-phase power supply, 50/60Hz, and 100\_120VAC.

- **Strictly observe items below when handling the power cord.**

If not, an electric shock or fire may occur. If the power cord is damaged, contact IWATSU or our sales distributors for repair.

- Do not modify the power cord.
- Do not forcibly bend the power cord.
- Do not twist the power cord.
- Do not bundle the power cord.
- Do not pull the power cord.
- Do not heat the power cord.
- Do not let the power cord get wet.
- Do not put heavy objects on the power cord.

- **Do not touch the plug of the power cord with wet hands.**

If not, an electric shock may occur.

**Read the following safety information.**

Read the next page.

 **WARNING** (continued)

- **Do not make metal touch the blade of the power plug.**

If not, an electric shock or fire may occur.

- **Do not plug too many leads into a single receptacle.**

If not, a fire or overheating may occur.

- **If thunder sounds, remove the power plug of this instrument from the receptacle and do not use it.**

- **Do not remove the operation panel.**

Since a high-voltage part exists inside, touching it may result in an electric shock. When inspecting, calibrating, repairing this instrument, contact IWATSU or our sales distributors.

- **Do not modify this instrument.**

Modification of it could result in an electric shock, fire, or failure. Repair of a modified instrument may be refused.

- **Do not use this instrument when being failed.**

If not, an electric shock or fire may occur. For a failure, contact IWATSU or our sales distributors for repair.

- **Do not put any metallic material or inflammable object through the ventilation port.**

If any foreign object is put through the ventilation port, an electric shock, fire, or failure may occur. If any foreign object enters this instrument, turn off the main power switch (on the right side) of the chamber, turn off the power switch of the scanner unit, remove each power plug from the receptacle and then contact IWATSU or our sales distributors for repair.

- **Do not put any object near to the exhaust port or ventilation port of this instrument.**

If not, heat accumulates inside this instrument, causing an electric shock, fire, or failure.

- **Before inserting the power plug into the receptacle, confirm no dust attached to it. In addition, remove the power plug and adapter from the receptacle and inspect / clean them once a half year or a year.**

Dust may cause an electric shock, fire, or failure.

**Read the following safety information.**

Read the next page.



**WARNING** (continued)

- **For safety, do not open the door and do not work when the inside of the chamber scanner system is a high temperature.**

Work in a state where the chamber scanner system is a high temperature must cause a burn and never work in such a state.

- **For safety, work by bare-handed in the chamber scanner system.**

There is danger of causing the caught accident in the equipment etc. when working with cotton work gloves etc. Work by bare-handed.

- **For safety, bring neither finger nor the thing close to the turntable drive part (warm gear).**

The finger and the thing are rolled when driving part is moved by mistake and it causes the injury and the accident.

## Read the following safety information.

Read the next page.

### CAUTION

- **Turn off the main power switch (on the right side) of the chamber and turn off the power switch of the scanner unit before connecting or disconnecting the power cord.**

Connecting or disconnecting the power cord while the power switch of each is ON may result in an electric shock or failure.

- **Insert the power plug into the receptacle firmly.**

If not, an electric shock, fire, or failure may occur.

- **When disconnecting the power cord from the receptacle, pull it out by grasping the plug.**

If not, an electric shock or fire may occur.

- **Before moving this instrument, confirm that external connection lines such as the power cord and cables are removed.**

The power cord and cable may be damaged causing a fire or electric shock.

- **Never replace the fuse inside this instrument. Contact IWATSU or our sales distributors for replacement.**

- **Use 3-Prong power cord in accordance with the power supply voltage.**

If not, a fire may occur. In addition, if a 2-Prong power cord is used, a fire may occur.

Unless specified when purchasing this instrument, the power cord suitable for 100V system (center voltage: 100V to 120V) is attached. If the power supply voltage is 200V system (center voltage: 200V to 240V), the slide transformer (power supply voltage conversion) is required. If it is to be purchased, contact the IWATSU sales staffs.

- **Do not open the door of the chamber when the inside of the chamber is less than room temperature.**

The inside of the chamber builds up condensation, and it causes the corrosion of the metal part title. Confirm that the temperature in the chamber is the vicinity of the room temperature when you open the door of the chamber. Wipe off with a promptly dry cloth etc. when the inside of the chamber builds up condensation by any possibility.

- **Do not place any object on this instrument.**

Otherwise, the cover may contact the internal circuits causing an electric shock, fire, or failure.

- **Always use this instrument only within the rated operating range.**

If used over the rated range, a failure may occur. The allowable range is as follows:

- Only indoor use
- Temperature: +5°C to +35°C
- Humidity: 85% RH (+35°C, no condensation)

- **Do not expose this instrument to direct sunlight or high humidity.**

If not, heat may accumulate inside this instrument, resulting in a fire.



## Read the following safety information.



### **CAUTION** (continued)

- **Do not place this instrument in a location with excessive moisture or dust.**  
If not, an electric shock or fire may occur.
- **Do not expose this instrument to oil smoke or steam; e.g. beside cooking table or humidifier.**  
A fire or electric shock may occur.
- **Do not use any damaged cable or adaptor.**  
Otherwise, an electric shock or fire may occur.
- **If this instrument will not have been used for a long time, remove the power plug from the receptacle for safety.**
- **When transporting this instrument, remove the sample and the turn table from this instrument and use the packing material provided at the time of purchase or the packing material equivalent at least.**  
Excessive vibration or shock applied to this instrument during transportation may cause it to malfunction, resulting in a fire. The case where a failure or damage occurs when transporting this instrument with the sample or the turn table attached to it **shall not be guaranteed**.  
If there is not a proper packing material/ shock absorber, contact IWATSU or our sales distributors. When having this instrument transported by a shipping company, write "Precision Instrument - Handle With Care" on each side of the packing box.
- **When cleaning this instrument, remove the power plug from the receptacle for safety. Use dry cloth to wipe water drops away.**  
If not, an electric shock or failure may occur.
- **Normally, regular inspection and calibration per year are recommended.**  
If the inside of this instrument will not have been cleaned for a long time, a fire or failure could occur.  
For inspection and calibration, contact IWATSU or our sales distributors.

# Verify packed Items

When receiving this instrument, verify the packed items referring to components below (for the Unpacking chart, see the next page). If there is a lacked item or an item damaged during transportation, immediately contact IWATSU or our sales distributors.

## Components

### Wide Range Chamber Scanner System SY-330

Wide Range Chamber (see ① in Unpacking chart) .....	1
Scanner unit (see ① in Unpacking chart) .....	1
Turn table (see ② in Unpacking chart) .....	1

### Accessories

Standard sample (TypeC) .....	1
Knob screw .....	1
Nylon washer .....	1
Pusher .....	1
Chamber cable SY-912 (see ③ in Unpacking chart) .....	1
Power cord (for the scanner unit) .....	1
Cord strap .....	1
Instruction manual (this manual) .....	1
Accessories of ESPEC Corp. chamber .....	1 set

Note 1: The power supply cord of ESPEC Corp. chamber is put out from the inside of the chamber.

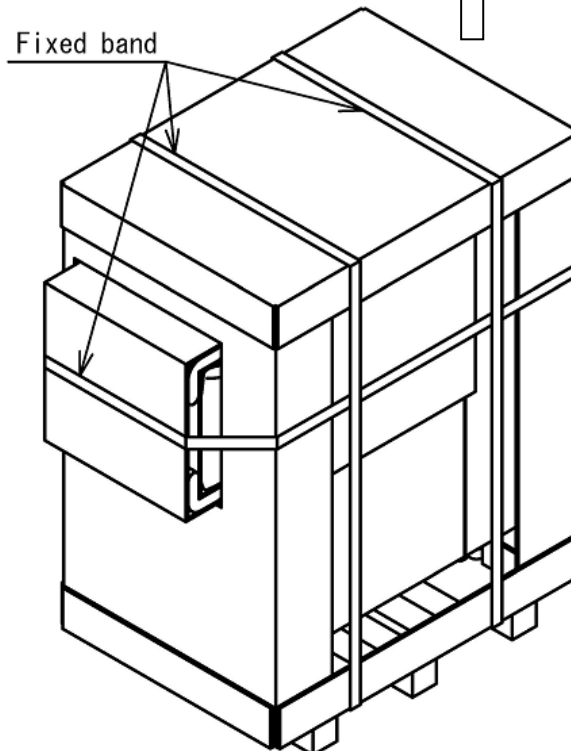
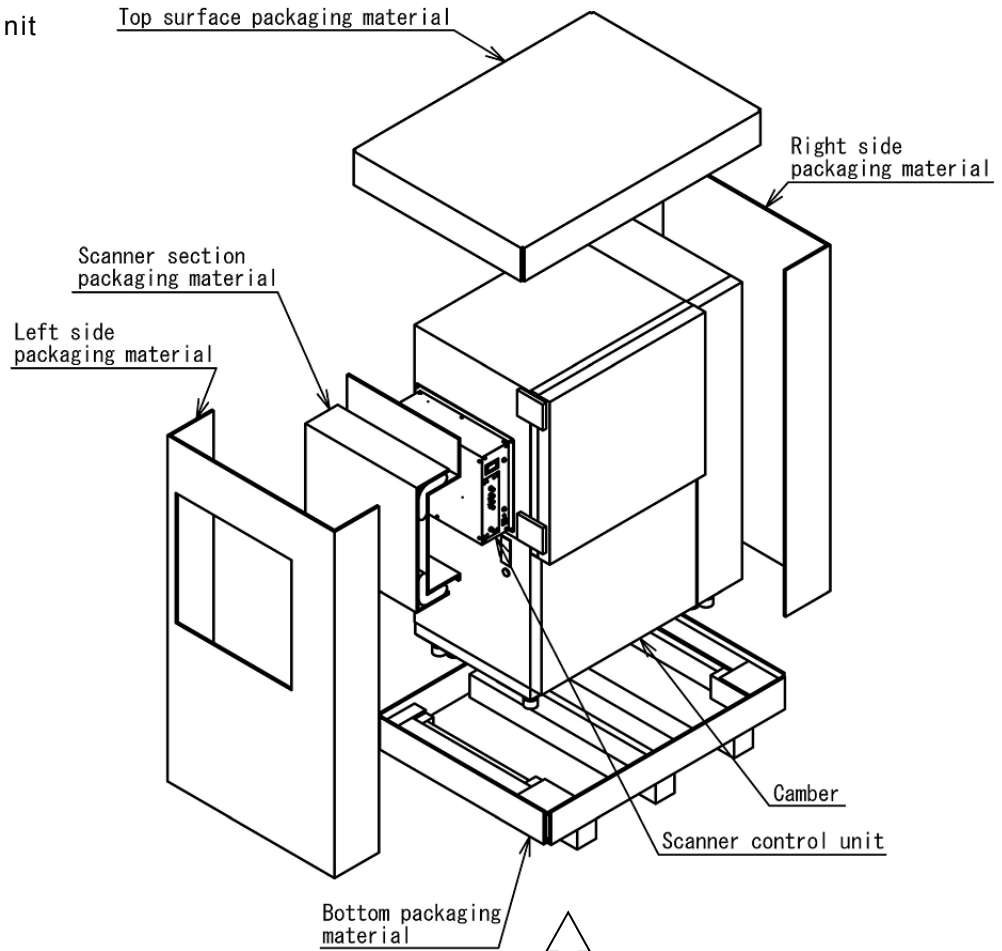
Note 2: ESPEC Corp. chamber includes its instruction manual; therefore for its accessories, see the manual.

Note 3: There are four packing boxes.

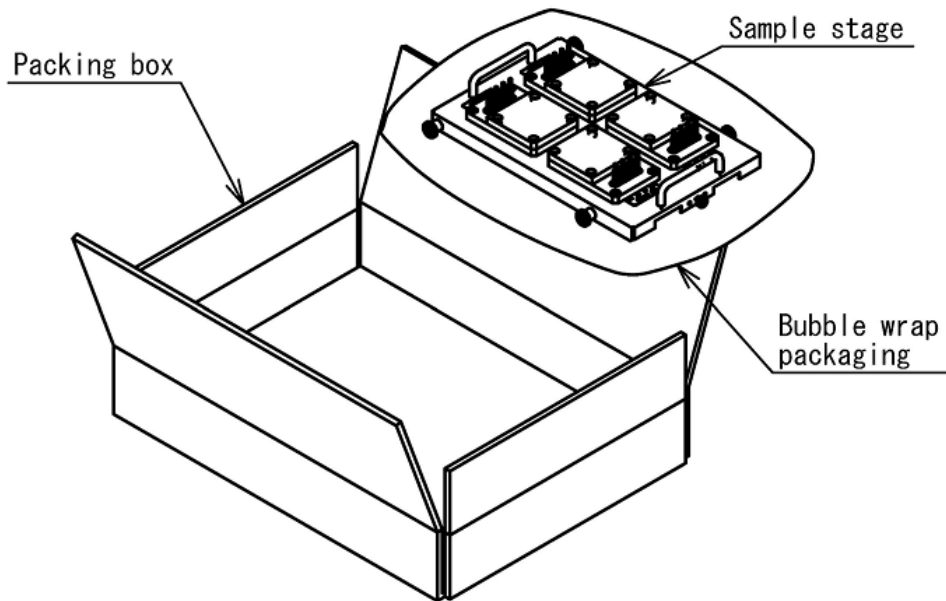
- Unpacking chart ① to ③ (See next pages.) : 3 boxes
- For accessories (excluding chamber cable SY-912) : 1 box

# Unpacking chart

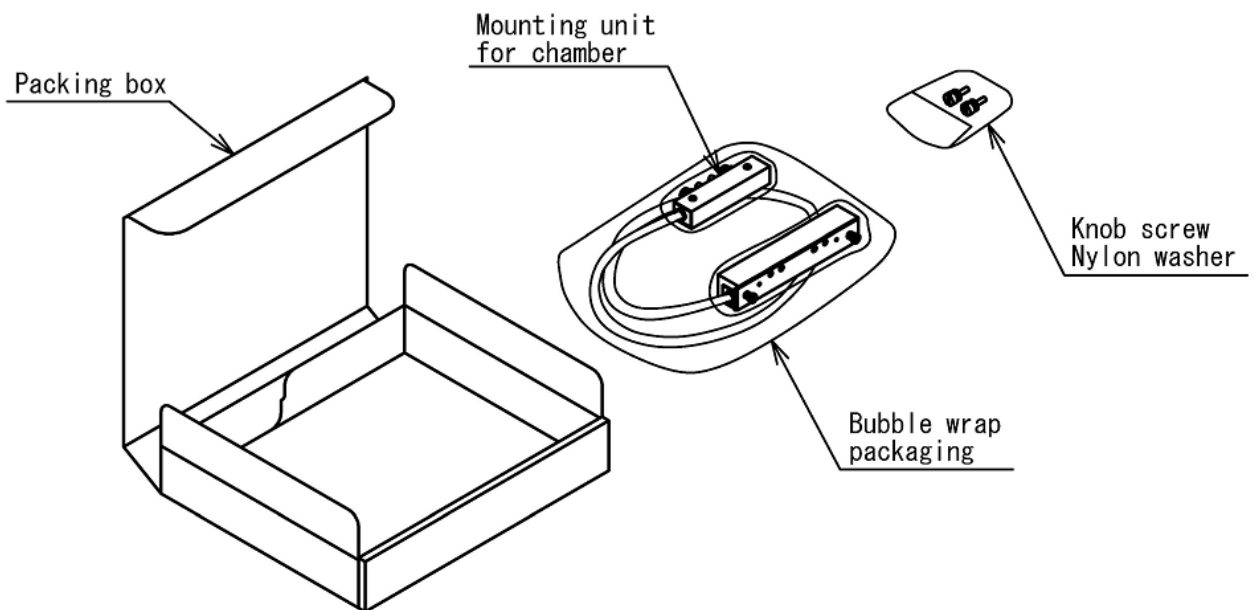
- ① Wide Range Chamber Scanner System
  - Wide range chamber
  - Scanner unit



② Sample Stage SY-515



③ Chamber Cable SY-912



## Management of instrument

When disposing of this instrument, it is necessary to recycle or dispose of it properly in accordance with a local law or regulation. When disposing of it, request a recycle company to dispose of it in accordance with a local law or regulation.

## Repair and sending of instrument

If a failure occurs, return this instrument to our service center. Any failure which occurs in the term of guarantee and for which IWATSU is responsible should be repaired without any cost.

When returning a instrument to be repaired, clearly write the instrument name, serial number (in the label on the rear of this instrument), and description of the failure, name, division, and telephone number of the responsible person.

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## Chapter 1 Introduction

This instruction manual describes only the functions of the Wide Range Chamber Scanner System SY-330; i.e. duplication of the standard measurement functions of the B-H analyzer is omitted. For them, refer to the Instruction manual of it.

### ■ 1.1 Outline

- Combination of the Wide Range Chamber Scanner System SY-330 with the B-H analyzer, PC, and the Remote Control Software SY-810 allows four samples in the chamber to be automatically measured while controlling the chamber and the B-H analyzer.

**Note:** This product does not support the B-H analyzer SY-8232, SY-8217, and SY-8258.

### ■ 1.2 Features

- The Wide Range Chamber Scanner System SY-330 has the features below:
  - ① Measurement can be made in the wide range of temperature from  $-55\text{ }^{\circ}\text{C}$  to  $+180\text{ }^{\circ}\text{C}$ . covering the passive component standard AEC-Q 200 Grade 0 for automotive applications.
  - ② SY-330 can automatically measure up to 4 samples in the chamber.  
(The remote control software SY-810 separately sold is required.)
  - ③ By correcting the influence of different wiring circuit constants for each sample channel, highly accurate measurement is realized.
  - ④ Adoption of the push clamp method connection terminals makes sample connection easy and ensures sure connection.

## Chapter 2 Connection of instruments and settings

### 2.1 Connection of instruments

- The following shows connection among measurement instruments including the Wide Range Chamber Scanner System.

**Note:** Broken lines show the recommended products which are required separately. (Please use the recommended items if there are description of recommended items.)

**Note:** The Wide Range Chamber Scanner System must be connected and used with the B-H analyzer which is combined and adjusted with it. Even if the other B-H analyzers are connected, the measurement accuracy is not guaranteed.

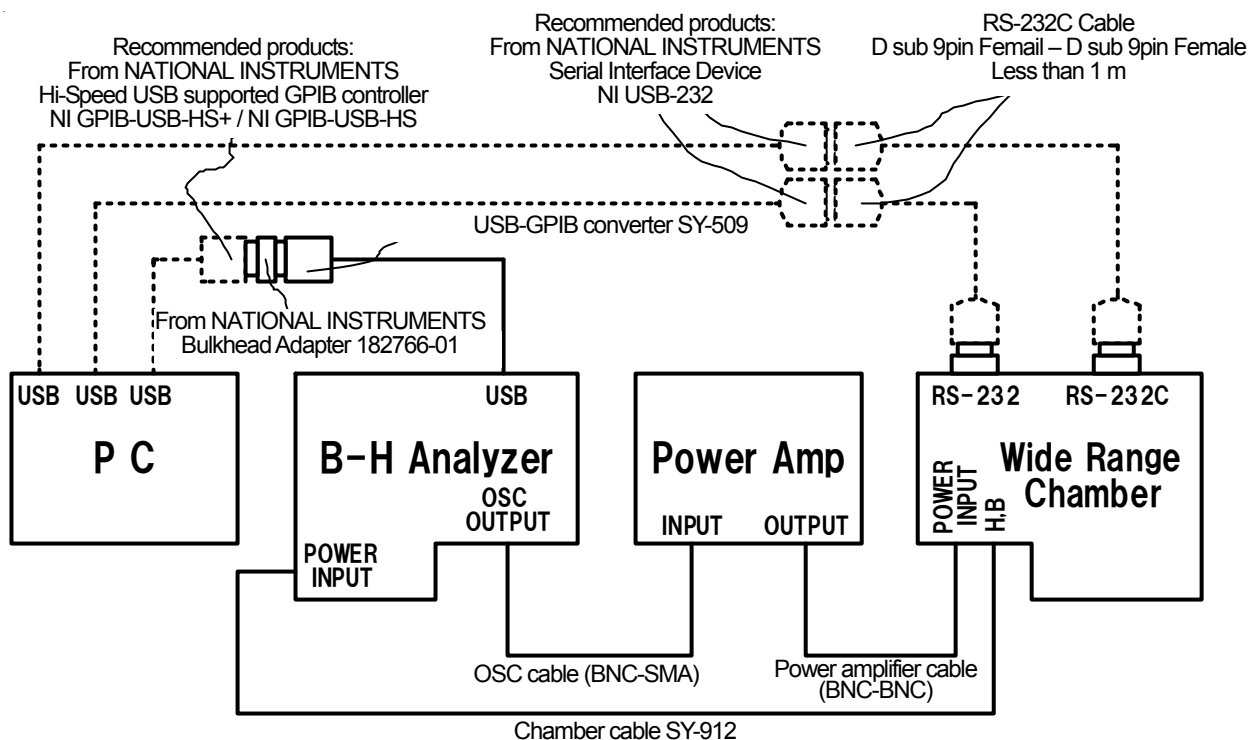


Fig.2-1 Connection of measurement instrument including the Wide Range Chamber Scanner System

## ■ 2.2 Names and functions of main parts

- Explain names and functions of main parts on the Wide Range Chamber Scanner System.

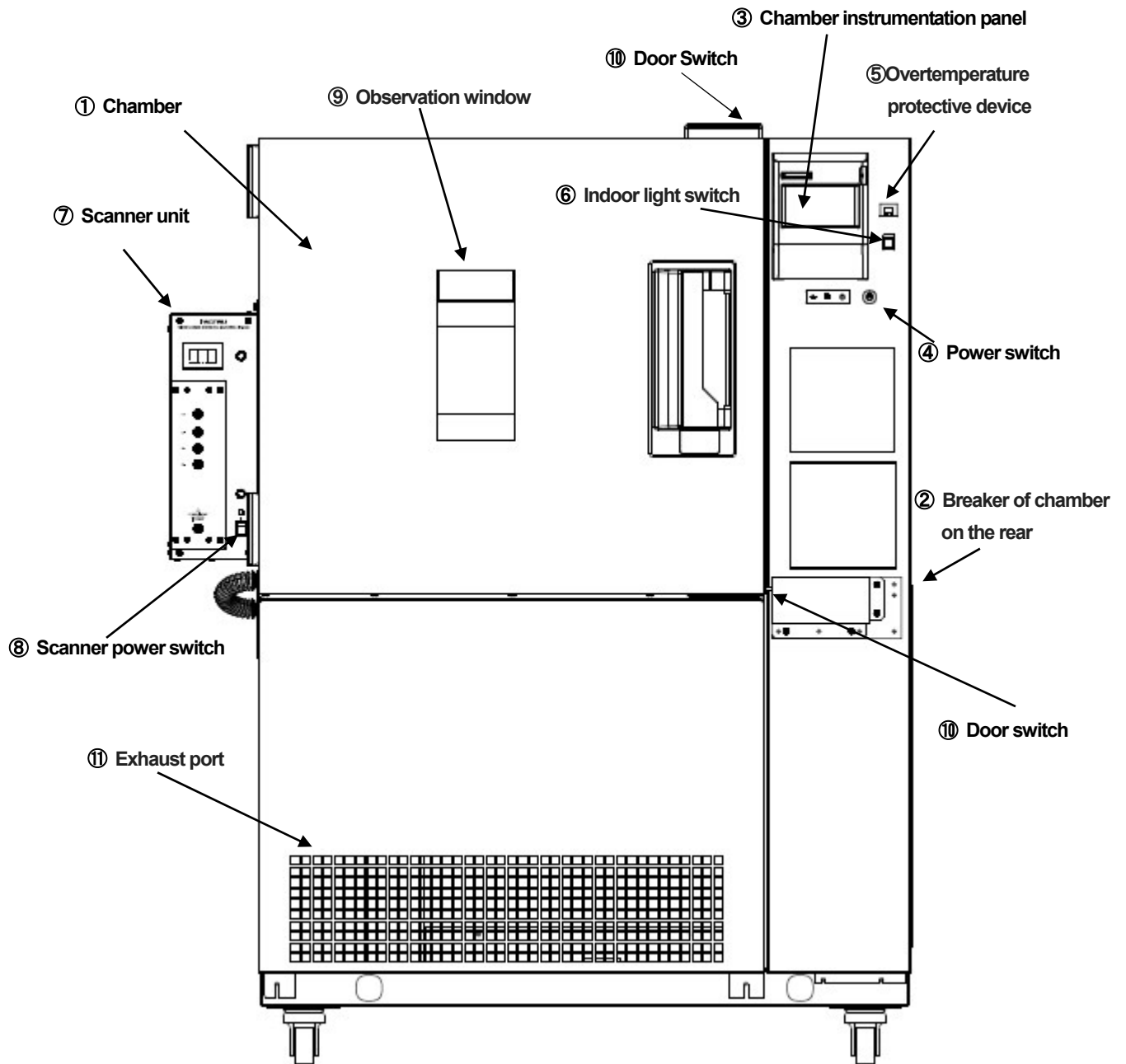


Fig.2-2 The front view of Wide Range Chamber Scanner System



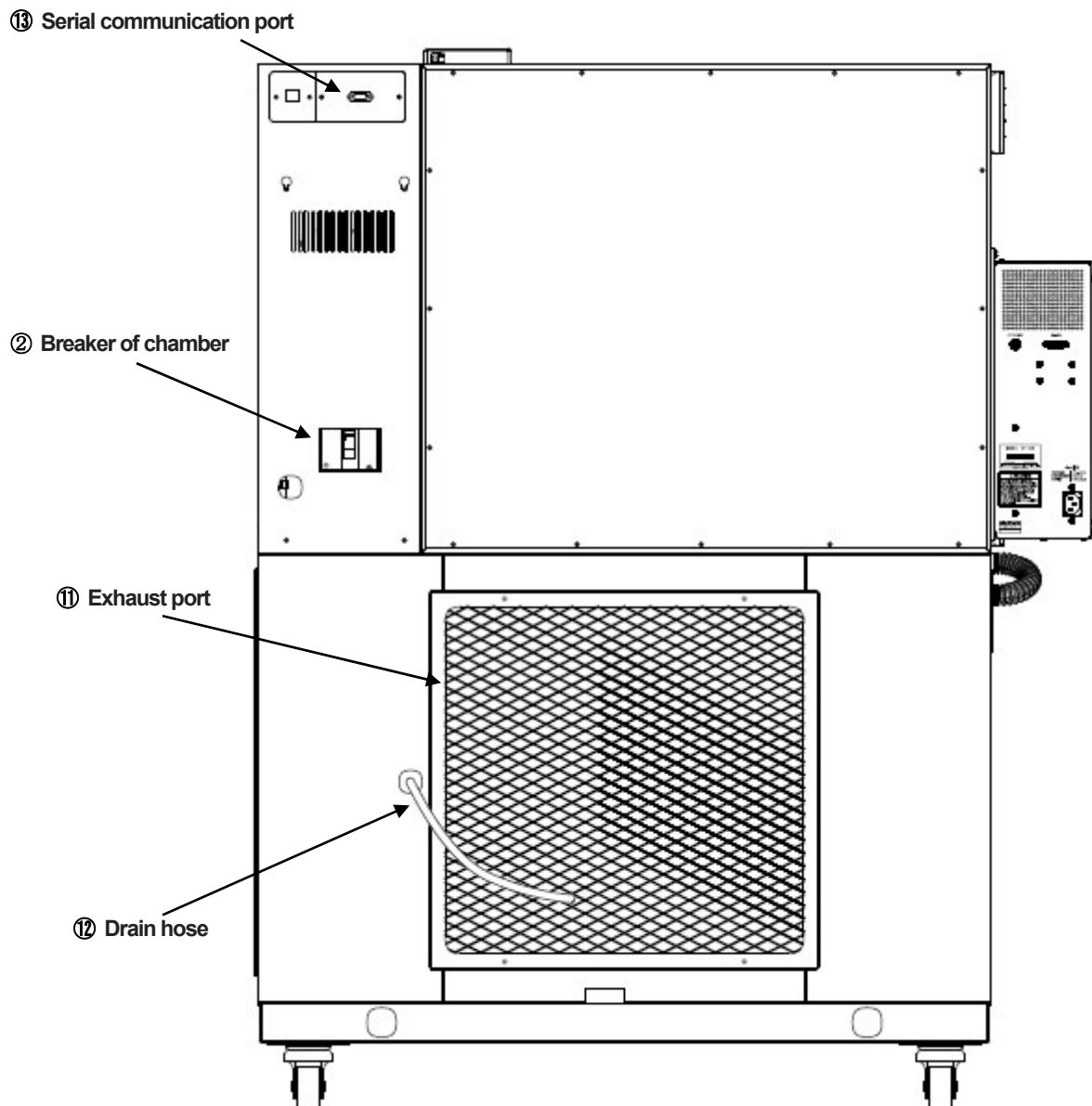


Fig.2-3 The rear view of Wide Range Chamber Scanner System

① **Chamber**

- It is the chamber with the turn table.

② **Breaker of chamber**

- The breaker is installed on the back. Turn main power on / off, and shut off main power at overcurrent.

**Note:** Please switch ON and OFF after 20 [sec] or more.

③ **Chamber instrumentation panel**

- It displays various settings and statuses of the chamber.

④ **Chamber main power switch**

- It is the power switch of the chamber.

⑤ **Overtemperature protective device**

- If the temperature in the chamber becomes higher than the temperature set by the overheat prevention device for some reason, operation stops. The factory setting temperature is 195 ° C. Please do not set it above this temperature.

⑥ **Indoor light switch**

- Turn on / off the indoor light installed above the inside of the chamber.

⑦ **Scanner unit**

- It controls the measurement system.

⑧ **Scanner power switch**

- It is the main power switch of the scanner unit.

⑨ **Observation window**

- It is a window to observe inside the chamber.

⑩ **Door switch**

- Detect opening and closing of the door. Each one of the top and bottom of the door is installed.

**Note:** If you open the door of the chamber once while measuring with the separately sold SY-810 remote control software, Electrical connection to the specimen is cut off for safety and measurement stops. When resuming measurement, close the door SY-810

⑪ **Exhaust port**

- It discharges exhaust heat air from the condenser and compressor.

⑫ **Drain hose**

- Drain moisture generated in the tank due to condensation or the like. The hose connects to the drainage facility. Alternatively, please receive it in a drain container.

**Note:** To prevent back flow, please open the tip of the hose to the atmosphere. Also please be careful not to overflow the container from the water etc.

⑬ **Serial communication port**

- When measuring with the separately sold SY-810 remote control software, connect the serial communication cable.

## ■ 2.3 Connection of Chamber Cable SY-912

- The following describes connection of the provided chamber cable SY-912.

- ① Confirm that the B-H analyzer is **powered OFF** surely.
- ② Remove the measurement terminal base from the measurement POD.  
Use the Phillips screwdriver to remove two M3 screws on the terminal base (see Fig.2-5).
- ③ Hold the terminal base knobs with both hands and pull up them (see Fig.2-5).

**Note:** Be sure to keep M3 screws.

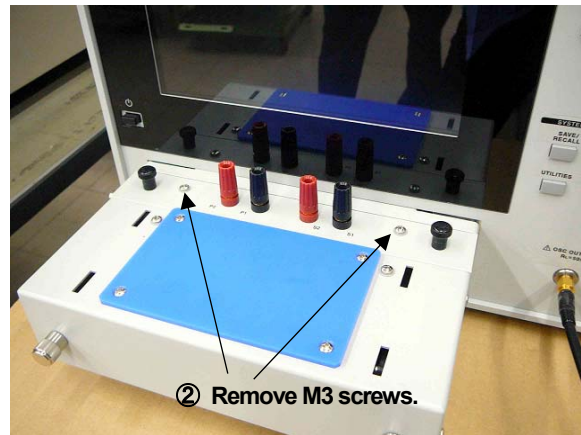


Fig.2-4 Connection of chamber cable

- ④ Install the measurement terminal base of the chamber cable SY-910.

Align the terminal base guide with the measurement POD guide (see Fig.2-6 and 2-7).

Push down the terminal base **slowly** along the guide vertically (see Fig.2-7).

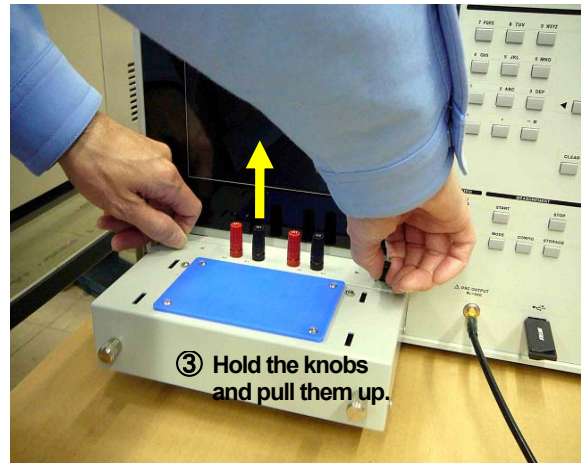


Fig.2-5 Connection of chamber cable

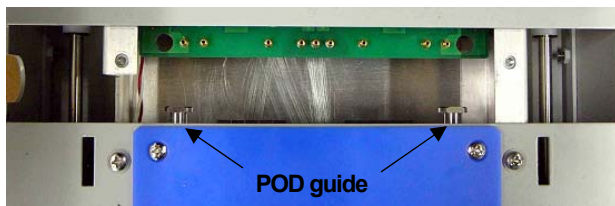


Fig.2-6 Connection of chamber cable

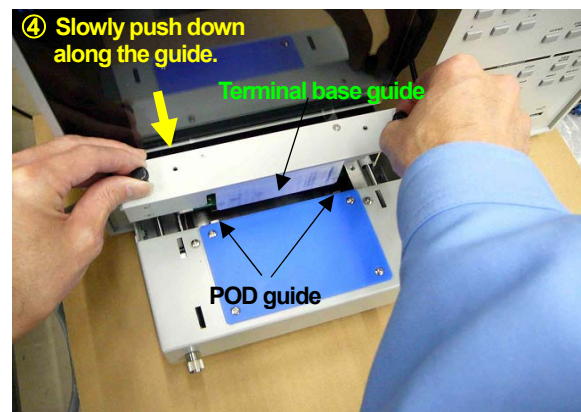


Fig.2-7 Connection of chamber cable

- ⑤ Confirm that the terminal base is surely installed on the measurement POD, and use provided two terminal base screws to fix the terminal base with the measurement POD (see Fig.2-8).
- ⑥ Install the chamber cable SY-912 measurement connector to the scanner unit. Mate four BNC connectors (see Fig 2-9).
- ⑦ Fix the connector by rotating the lever **clockwise** (See Fig.2-10.).

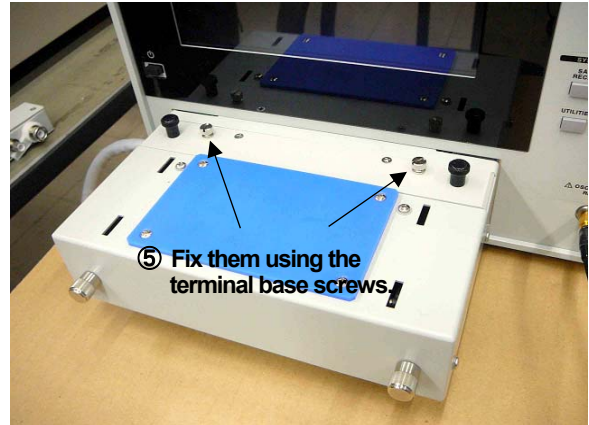


Fig.2-8 Connection of chamber cable



Fig.2-9 Connection of chamber cable



Fig.2-10 Connection of chamber cable

## ■ 2.4 Connection of Door switch (DOOR SW)

- Confirm connection of the door switch which detects open/close status of the chamber door.

① As shown in Fig.2-10, confirm that BNC cable is connected from the chamber to the door switch on **the rear of the scanner unit.**

**Note:** If used without connection, door open/close status **cannot be detected**; therefore, **very dangerous.**



Fig.2-11 Door switch (DOOR SW)

## ■ 2.5 Power supply of wide range chamber

- The following describes how to power on the chamber.

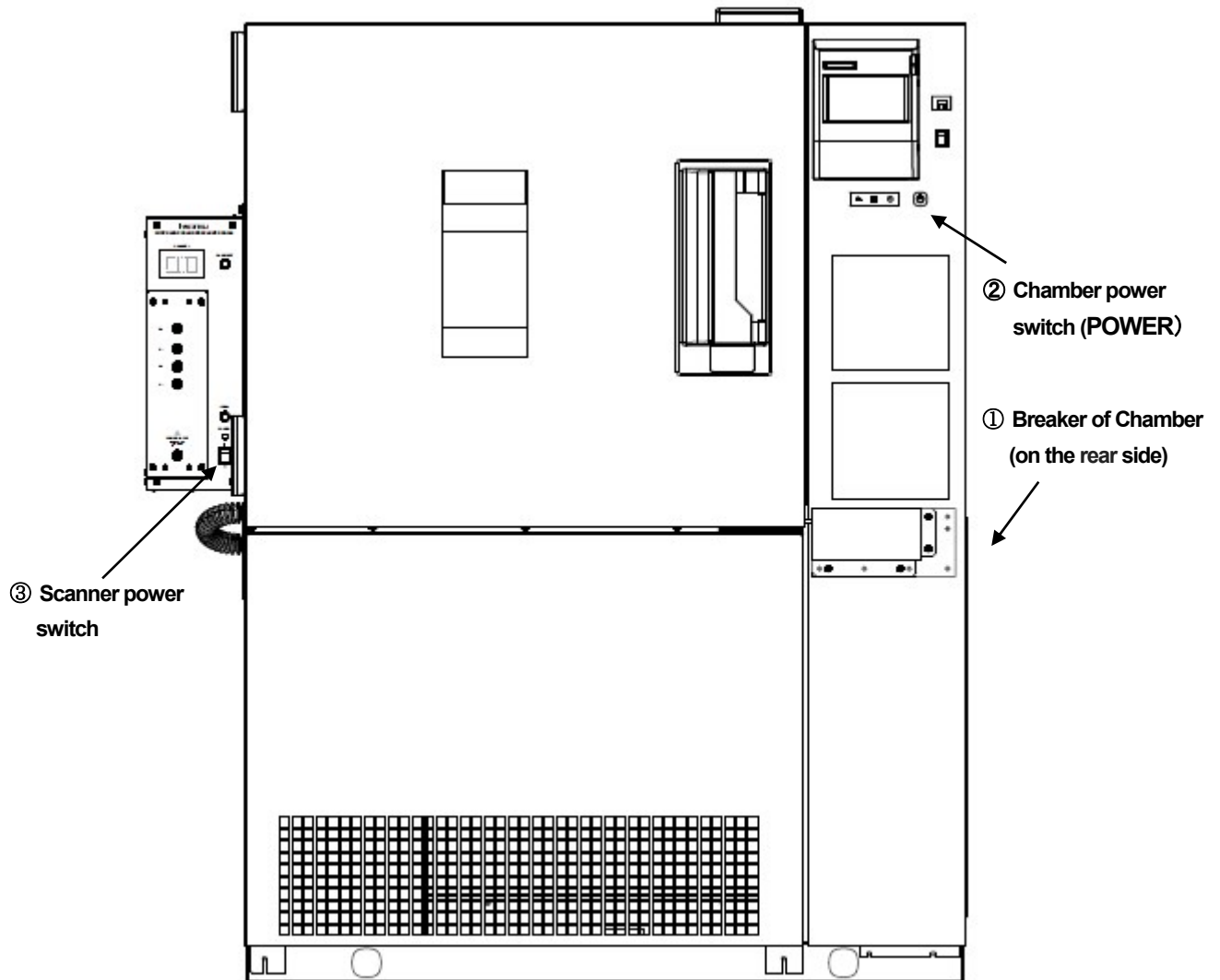


Fig.2-13 Power supply of chamber

- ① Turn on the breaker of chamber on the rear..

**Note:** Switch on and off after 20 [sec] or more has passed.

- ② Press the power switch (ON) on the instrumentation panel.

- ③ Press the scanner power switch (ON) on the scanner unit.

**Note:** To turn off the power supply, reverse the order of the above operation.



## ■ 2.6 Operation of Scanner Unit

- The following describes operation of the scanner unit .

### ① Scanner power switch (POWER)

- It powers ON/OFF the scanner. If this power supply is not ON, measurement and channel change can not be performed.

### ② Local switch (LOCAL)

- It makes change between local/ remote.
- When pressed, the switch lights up; i.e. local status allowing operation of ③ below.
- When pressed again, the switch goes off; i.e. remote status, allowing remote control by the remote control software SY-810 (option).

### ③ Channel select (CH SELECT)

- Every time you press this switch in local state, the channel switches And goes one step, repeating 1->2->3->4 ~~~ ->1->2->3->4 ~~~ is channel select OFF.
- Fig.2-15 is a top view of the sample stage, and the channel No. is 1 → 2 → 3 → 4 in the clockwise direction from the front left hand.

**Note:** The channel number when the scanner power is turned on is 1.

### ④ Channel display (CHANNEL)

- Normally, the currently selected channel No. is displayed. When a warning occurs, its warning No. flashes. In this case, if connected to the BH analyzer and operating on the remote, the corresponding message is also displayed on the measurement screen of the BH analyzer. Display examples and actions are shown in Table 2-1.

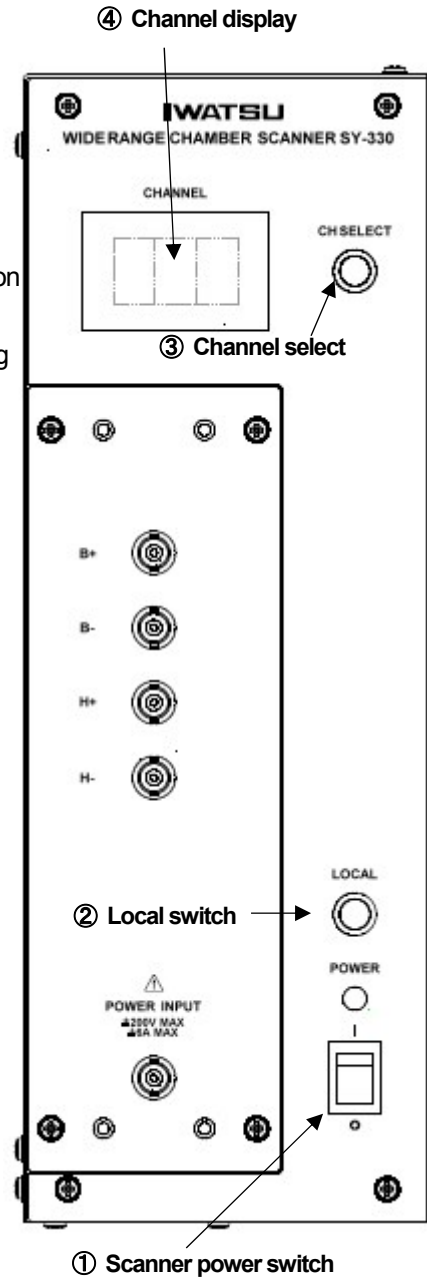
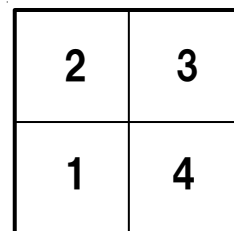


Fig. 2-14 Scanner unit




This side

Fig.2-15 Sample stage top view

Table 2-1 Channel display shows

SY-330 display	Status message of SY-821x	Description	Countermeasure
1~4	—	Channel No.	—
--	—	Channel select OFF	—
W12	W12: Temp. of the shunt resistance exceeds setting ! (Same as SY-951/955)	The temperature of the shunt resistor measuring excitation current exceeds 80 °C.	Confirm whether sample constant and excitation condition are appropriate.
W17	W17: Chamber door opens !	The door of the Chamber is open.	Close the door of the Chamber and repeat the measurement with SY - 810.
W21	W21 :Status is local !	Remote target optional equipment is in local state.	Press the local switch of the scanner unit and switch to remote.
W26	W26: Scanner serial communication is abnormal !	Serial communication with the scanner is not normal.	Confirm that the serial communication cable of the scanner is securely connected and restart this product and BH analyzer. If it occurs frequently, please contact IWATSU. Please tell us the message number
W27	W27: Chamber serial communication is abnormal !	Serial communication with the thermostat is not normal.	Confirm that the serial communication cable of the scanner is securely connected and restart this product and BH analyzer. If it occurs frequently, please contact IWATSU. Please tell us the message number

**Note:** Channel Display of SY-330 shows W is .



## Chapter 3 Connection of sample

### ■ 3.1 Removal of sample stage SY-515

- Describe the removal procedure of the sample stage SY-515.

- ① Confirm the temperature in the chamber is always near the room temperature.

**Note:** Removing the sample stage from a high temperature or low temperature chamber plastically deforms the sample stage due to sudden temperature change.. In addition, removing from a low temperature chamber causes **dew condensation** in the sample stage and the chamber, and **causes corrosion**. Moreover, work at high temperature **causes burns**, and never work.

- ② If the power amplifier is used, **be sure to turn off** the output of it.
- ③ Rotate counter clockwise and loosen four removal knobs (see Fig.3-1).
- ④ Surely grasp the front and back of the turn table with your both hands and while care is taken for the contact holder on the left, incline the turn table to the lower left a little along two guide pins and **slowly** pull it up vertically (see Fig.3-2).

**Note:** It is caught to the instrument etc. when working with **cotton work gloves** etc., and causes **the accident**.

- ⑤ After removing the sample stage from the stage guide, put the sample stage removed carefully on the electrode plate spring and place it on a stable base. (see Fig.3-3).

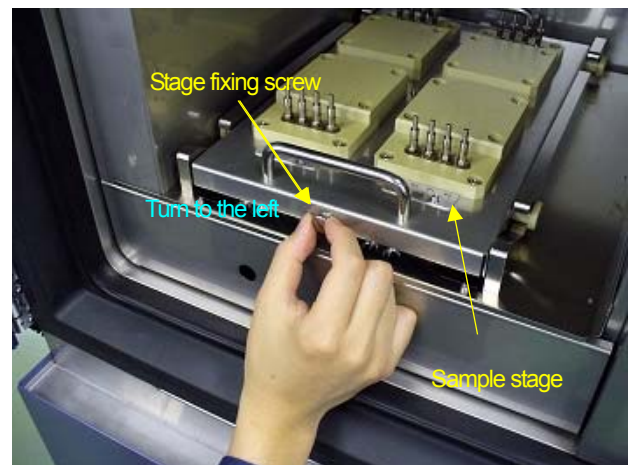


Fig.3-1 Removal of sample stage

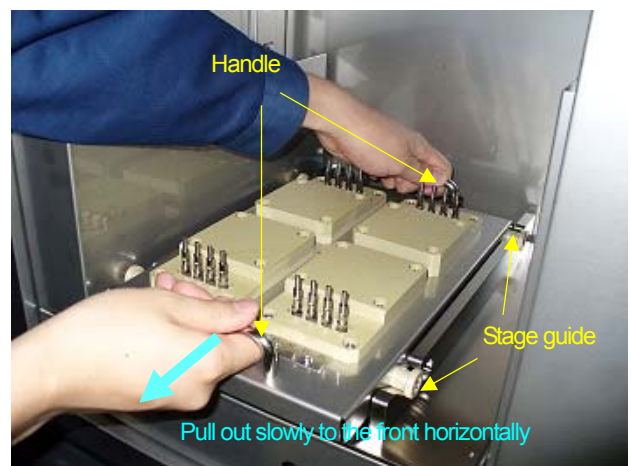


Fig.3-2 Removal of turn table



Fig.3-3 Removal of turn table

### ■ 3.2 Mounting sample

- SY-330 is used as an example to describe how to mount a sample.

- ① Confirm the channel number of the sample stage on which the sample is mounted. (see Fig.2-15).
- ② Connect the primary turn and the secondary turn wound on the sample to the connection terminals as shown in Table 3-1.

If the head of the connection terminal is pressed, the clamp groove opens. Surely insert the turns until the end of the turn passes through the opening completely. Using the pusher of the accessory will reduce the burden on the fingers pressing.

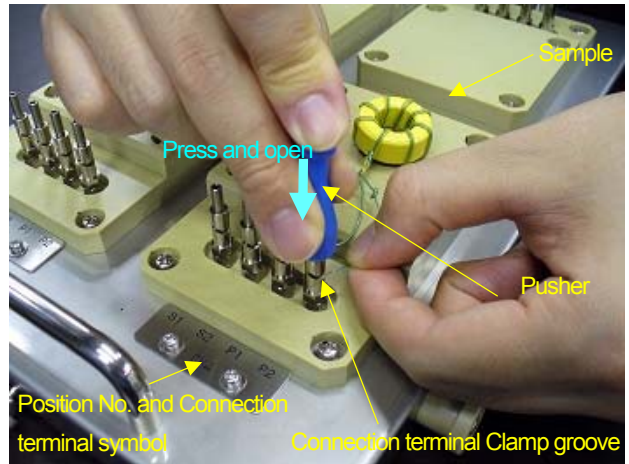


Fig.3-4 Mounting sample

When stopping press of the head, the turns are clamped to the connection terminal. Confirm that they are surely clamped by lightly pulling the turns.

Table 3-1 Connection method of samples

Terminal symbols	Connection 1	Connection 2
P2	Start of primary turn	End of primary turn
P1	End of primary turn	Start of primary turn
S2	Start of secondary turn	End of secondary turn
S1	End of secondary turn	Start of secondary turn

**Note:** When mounting the sample, **be sure to remove the turn table from the chamber** and place it on the stable support. Mounting of a sample in the chamber without removing the turn table is **very dangerous**.

**Note:** Do not come in contact the sample with other samples when installing it. It might be impossible to do a correct measurement because magnetic flux caused in the sample jumps into other samples.

### ■ 3.3 Installation of sample stage SY-515

- Describe the mounting sequence of the sample stage SY-515.

- ① Grab the handles at the front and back of the sample stage firmly with both hands and slide slowly backward along the four stage guides until they hit (see Fig.3-5).
- ② Turn the stage fixing screw to the right to fix the sample stage (see Fig. 3-6).

**Note:** If the sample stage does not properly hit the depth of the stage guide, the stage's fixing screw will idle.

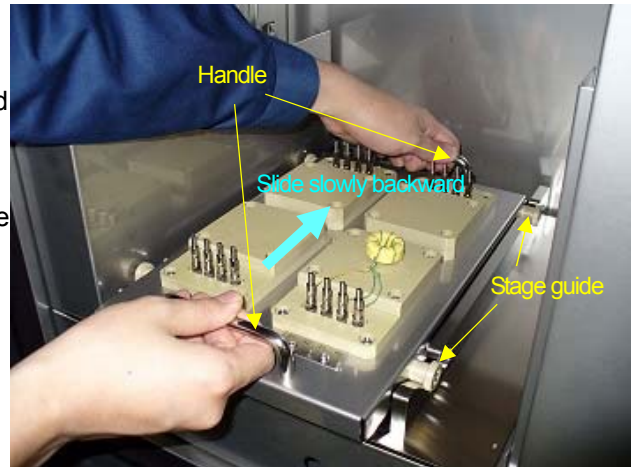


Fig.3-5 Installation of sample stage



Fig.3-6 Installation of sample stage

## Chapter 4 Maintenance

### ■ 4.1 Daily maintenance

- It is recommended to make daily maintenance as shown below in accordance with frequency of use.

① Diligently clean the inside of the chamber using a small cleaner. If a broken sample is left in it when using it, a **failure caused by a foreign object caught in the drive part of the turn table, wear on the electrode, or dirt could occur.**

② In particular, contamination of the electrode plate spring **cause an increase in contact resistance, leading to +variation in measured values.** Priodically wipe with a soft cloth soaked with ethyl alcohol to remove dirt.

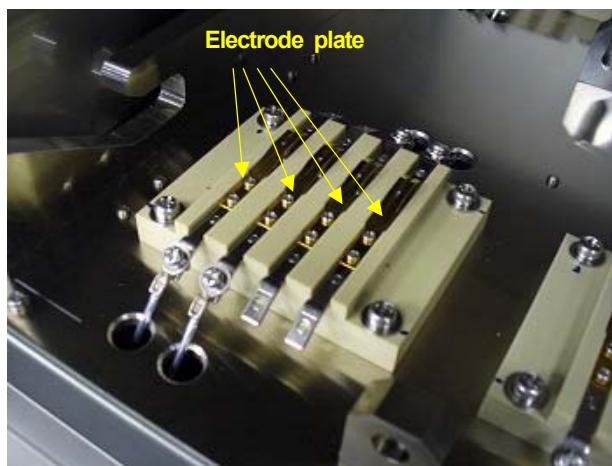


Fig.4-1 Electrode plate spring

③ If you are receiving a drain hose in a container, please discard the water accumulated in the container frequently.

## Chapter 5 Specifications

### ■ 5.1 Chamber part

Model	SY-330
Power supply voltage	AC200V 3φ 3W
Frequency range	50Hz/60Hz
Power supply current	Max. 14A
Temperature setting range	-55 °C to +180 °C
Interface	RS-232: Can be controlled by the remote control software SY-810.

### ■ 5.2 Scanner unit

	Model	SY-330
Power supply	Power supply voltage	AC100V to 240V
	Frequency range	50Hz/60Hz
	Power consumption	21VA
Measurement	Measurement frequency	10Hz to 3MHz (when SY-8218 is connected) 10Hz to 1MHz (when SY-8219 is connected)
	No. of measurement samples	Max. 4 samples
Signal detection	Current detection resistance	Approx. 1Ω
	Max. measurement current	±6A
	Max. measurement voltage	±200V
Measurement accuracy	Phase angle	±0.2 degrees (Typical value in f = 100 kHz, 200 mA, 200 mV range or more. Based on the SY-95x standard POD measurement value)
	Amplitude	±2 % (when SY-8219 is connected, typical value in f = 1 kHz, 200 mA, 200 mV range or more)
	Core loss	±6.1 % (Typical value ; presumption value of phase angle =80° in f = 100 kHz, 200 mA, 200 mV range or more)
Interface		RS-232. Can be controlled by the remote control software SY-810.

### ■ 5.3 Environmental conditions

Model	SY-330
Operating temperature	+5 °C to +35 °C
Performance ensured temperature	+18 °C to +28 °C
Operating humidity	85%RH (+35 °C, no condensation)

### ■ 5.4 Physical characteristics

Model	SY-330
Outside dimensions	1023(W)×607(L)×1220(H) (Excluding protrusions)
Weight	Approx. 190 kg

## ■ 5.5 Appearance View

SY-330

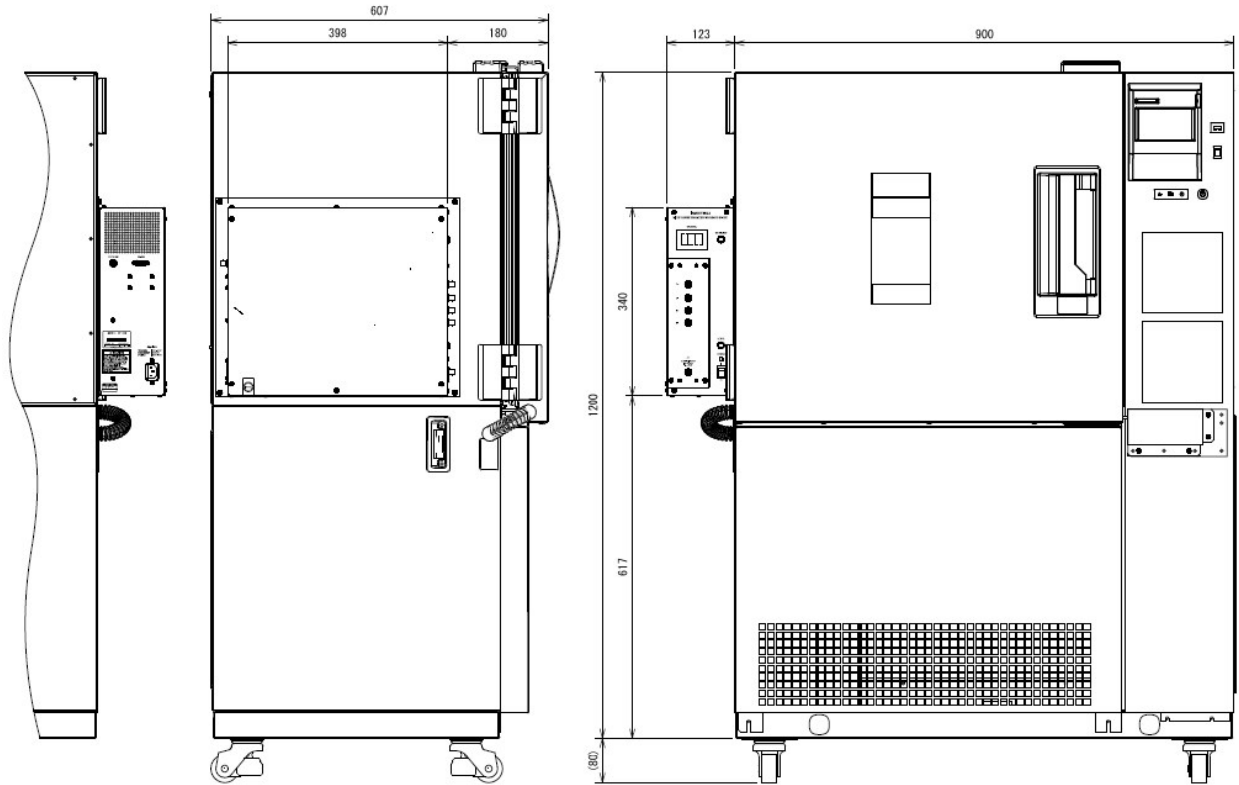


Fig.5-1 Appearance View

Unit: mm

## ■ 5.6 Reference material

For your information

Fig.5-2 and Fig.5-3 show the time change of the stage surface temperature for each sample stage CH relative to the set temperature of the thermostat measured by our company.

Fig.5-2 shows the temperature data set at the maximum temperature of 180 °C and heating from room temperature 23 °C.

Fig.5-3 is the temperature data set when the minimum temperature -55 °C, cooling from room temperature 23 °C.

**Note:** The temperature displayed on the Panel display is the temperature measured by the thermocouple located in the upper part of the thermostat, not the stage surface temperature.

As is evident from Fig.5-2 and Fig.5-3, the stage surface temperature on which the sample is placed does not match the instrument panel temperature. Also, the arrival time to the set temperature also shows a difference for each CH. Therefore, when measuring actual samples in a thermostatic chamber, please take these factors into consideration before conducting measurements.

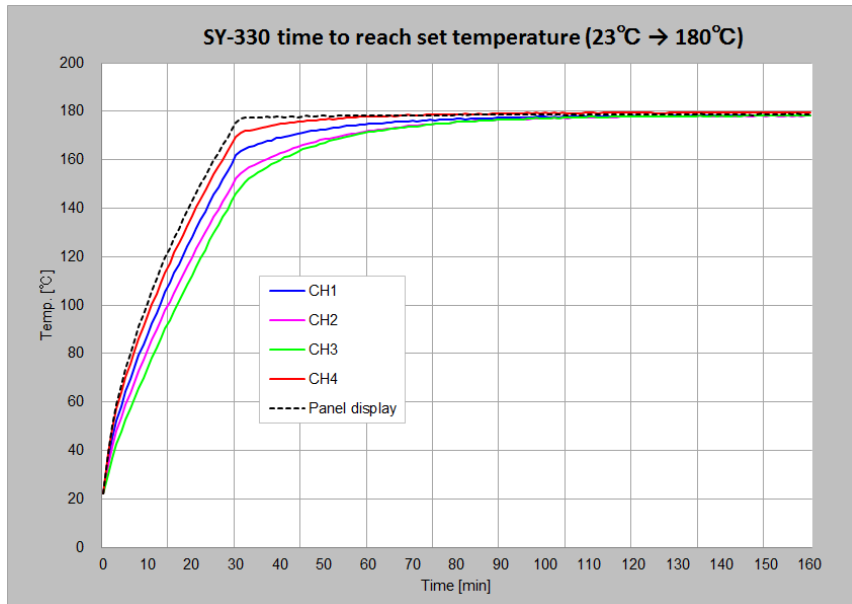


Fig.5-2 Temperature change from 23 °C to 180 °C

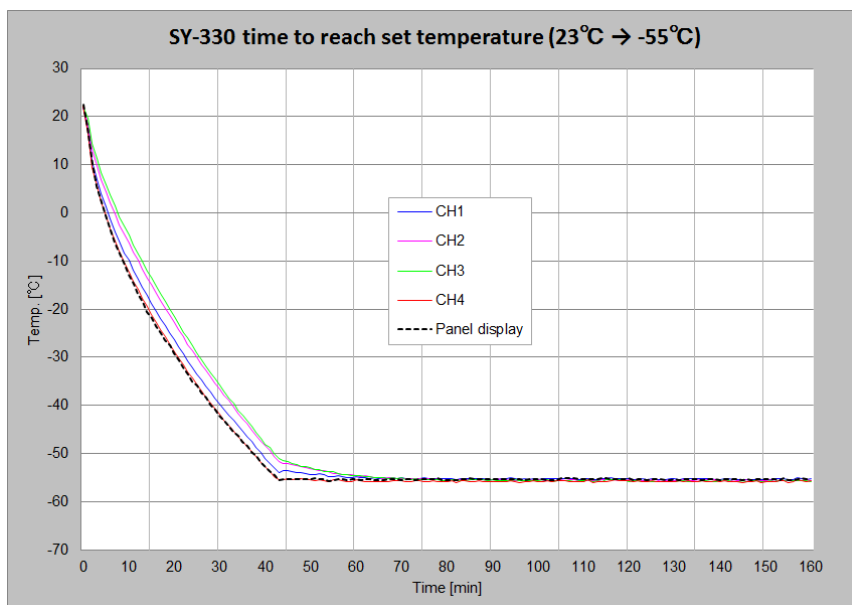


Fig.5-3 Temperature change from 23 °C to -55 °C

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**SY-330**

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