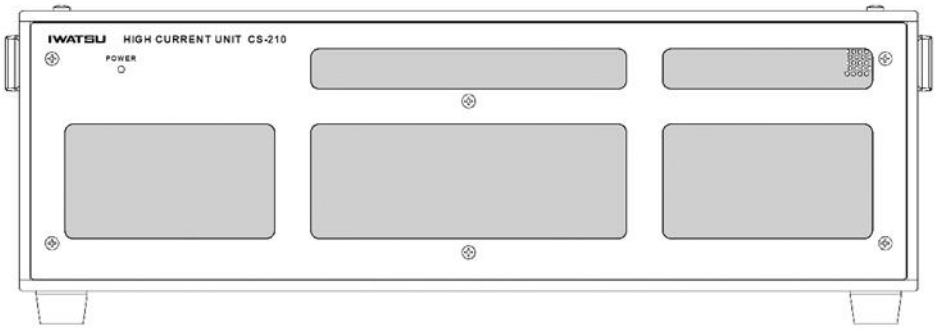
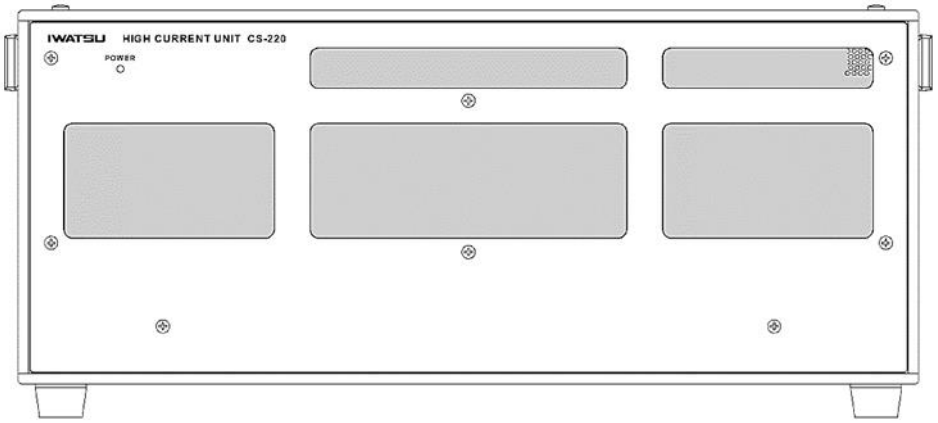
Instruction Manual

HC UNIT
CS-200 Series
CS-205 / CS-210 / CS-220





IWATSU

Preface

◇Thank you for purchasing the HC Unit CS-200 Series. We sincerely hope to continue using our instruments for a long time.

◇Please read this manual carefully and understand its contents before using this instrument, and then keep this manual handy for future reference.

◇This instrument is used by connecting it to Curve Tracer CS-8000 Series or Test Fixtures. Please read the instruction manual of the Curve Tracer CS-8000 Series or the Test Fixture CS-322 carefully and understand the contents before using it.

Important Safety Precautions

To ensure safe operation of this instrument and to prevent injury to the user or damage to property, items to be observed are written in the ⚠ WARNING and ⚠ CAUTION in this manual. Be sure to read them for safe operation. In addition, marks indicating attention are attached on the panel.

Definitions of ⚠ WARNING and ⚠ CAUTION used in this manual

⚠ **WARNING**	Incorrect operation or failure to observe the warning may result in death or serious injury.
⚠ **CAUTION**	Incorrect operation or failure to observe the caution may result in injury or damage to the instrument.

Explanation of symbols on panel.

ELCTRIC SHOCK	Incorrect operation may cause electric shock. This symbol calls attention. To protect the user, read items in this manual before using this instrument.
⚠ **WARNING**	To prevent injury to the user or damage to this instrument, read items in this manual before using this instrument.

Notice

◇ Parts of the contents of this manual may be modified without notice for improvements in performance and functions.

◇ Reproduction or reprinting of the contents of this manual without prior permission from IWATSU is pro habited.

◇ For questions about this instrument, contact IWATSU or our sales distributors.

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Document Number

◇ KMLA00542

Read this page to ensure proper safety. (Also read the following pages.)

⚠ WARNING

- **In measurement with this instrument, high voltage may be applied and high current may be supplied. Always close the cover before measurement after setting the DUT (Device Under Test) on the Test Fixture. Do not open the cover of the Test Fixture during measurement.**

  High voltage (max. 5 kV) may be applied and high current (max. 2 kA) may be supplied to the terminal to which the DUT is mounted. To prevent danger, if the cover of the Test Fixture is not closed, no voltage and current can be supplied to the terminal and no power can be applied to the DUT. And, do not remodel the switch for power supply shutoff or do not open the cover during measurement. If not, electric shock may be caused.

  When it is detected that the cover of the Test Fixture is opened during measurement, the supply of voltage and current to the terminals is immediately cut off, and the energization of the DUT is stopped. For your safety, do not open the cover during measurement.

- **After measurement, the DUT may be charged. Do not touch the DUT until discharging it through the grounding rod and confirming the safety.**

  Touching a charged or generated measurement DUT may cause electric shock or burns. Take measures such as using gloves and leaving it for a sufficient time.

- **When using anything other than the test wire lead or small crocodile that comes with the Test Fixture, pay attention to the withstand voltage and allowable current.**

  If the measurement is performed without considering the measurement potential, cable outer insulation, and GND cable outer insulation rating, it may cause a fire or malfunction. Use the specified cable that comes with the Test Fixture according to the measurement content.

- **If you notice smoke, abnormal smell or abnormal sound, immediately take measures below and unplug the power plug from the power outlet.**

  (1) Turn off the standby switch of the CS-8000 Series.
  (2) Turn off the main power switch of the CS-8000 Series.
  (3) Unplug the power plug of the instrument and CS-8000 Series from the power outlet.

  Continued use under these circumstances may result in electric shock or fire. After taking measures above, contact IWATSU or our sales distributors for repair. Repairing the instrument by yourself is very dangerous. Do not attempt to repair the instrument under any circumstances.

⚠ WARNING (Continued)

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

  This may result in explosion.

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

  Failure to observe this precaution may result in electric shock or fire. If water gets on or inside the unit, after making the power switch a standby, and pulling out the power plug from the power outlet, contact IWATSU or our sales distributors for repair.

- **Do not touch the plug of the power cord if your hands are wet.**

  This may result in electric shock.

- **Do not place this instrument on an unstable place such as a shaky stand or inclined place.**

  Letting this instrument fall or topple down may result in electric shock, fire or injury. If this instrument falls or its cover is damaged, after making the power switch a standby, and pulling out the power plug from the power outlet, contact IWATSU or our sales distributors for repair.

- **Surely insert the power plug into the power outlet after checking that any dust is not sticking to the power plug. Additionally, disconnect the power plug or power adaptor from the power outlet once every six months to one year, and inspect and/or clean the power plug.**

  If the power plug is contaminated, this may cause an electric shock, a fire, or a malfunction.

- **Do not put any foreign objects, such as metallic or flammable objects through the ventilation opening.**

  If any foreign object of metal and the combustible one, etc. is put through the ventilation opening, this may result in electric shock, fire, and/or malfunction.
  If any foreign object enters this instrument, after making the power switch a standby, and pulling out the power plug from the power outlet, contact IWATSU or our sales distributors for repair.

⚠ WARNING (Continued)

● Always use a 3-prong power cord that suits power supply voltage for this instrument.

Using a power cord that is incompatible with the power voltage may result in electric shock, fire and/or malfunction. Additionally, using a 2-prong power cord may result in electric shock.

- If the power is supplied from the 2-prong power outlet using the 3-prong/2-prong conversion adapter, ground the GND terminal of the adapter.
- When using the attached 3-prong power cord to supply the power from the 3-prong power outlet, grounding is made through the GND line of the power cord.

● Use this instrument at a specified supply voltage.

Using this instrument at a voltage other than specified may result in electric shock, fire or malfunction. Usable power supply voltage range is written on the rear panel.

● Do not remove the case, cover and panel.

Since there are parts with a high voltage in this instrument, touching the part may cause electric shock. When performing inspection, calibration, or repair, contact IWATSU or our sales distributors.

● When handling power cord, observe items below:

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

- Do not attempt to fabricate the power cord.
- Do not pull the power cord.
- Do not forcibly bend the power cord.
- Do not heat the power cord.
- Do not twist the power cord.
- Avoid getting the power cord wet.
- Do not bind the power cord together.
- Do not place heavy objects on the top of the power cord.

● Do not modify or repair this instrument.

Modifications or repairs made by users may result in an electric shock, a fire, or a malfunction. This instrument cannot be repaired by users. Do not open it to attempt repairs. For repairs, contact IWATSU or our sales distributors. Note that modified Instruments will not be accepted for repairs.

● If a lightning occurs near the instrument operation place, immediately make the power switch a standby and disconnect the power plug from the power outlet.

A lightning may cause an electric shock, a fire, or a malfunction.

⚠ WARNING (Continued)

- **Do not allow metal objects, etc., to touch the metal blades of the power plug.**

  Contact with a metal object, etc., may cause a fire or electric shock.

- **Do not use multiple-connection outlets.**

  Power strips and other multiple-connection outlets may cause a fire or overheating.

- **Do not place containers of water or chemicals, small metal objects, etc. near this instrument.**

  If the contents are spilled and enter the Instrument, it may cause a fire or an electric shock. If water, chemicals, or metal objects enter the Instrument, set the power switch to standby, remove the plug from the outlet, and then contact IWATSU or our sales distributors for repair.

- **Do not use this instrument if it is not functioning correctly.**

  Using a malfunctioning instrument (due to dropping, etc.) may cause an electric shock or a fire.
  If the instrument is not functioning correctly, set the power switch to standby, remove the plug from the outlet, and then contact IWATSU or our sales distributors for repair.

- **Do not place this instrument in an area where frequent vibrations or impacts occur.**

  If this instrument is dropped or overturned, it may cause a physical injury.

- **If this instrument is dropped, it may result in a physical injury or property damage.**

  Before transporting this instrument, remove all devices under testing, probes, and cables, and then carry it carefully by two people or more to avoid dropping.

Read this page to ensure proper safety. (Also read the following pages.)

⚠ CAUTION

- **Set the power supply cord up in the place where it is pulled out easily.**

  When this instrument is a dicey situation, it is necessary to cut power off promptly. Do not attempt to place this instrument in the location where difficult to unplug the power supply cord from the receptacle.

- **When disconnecting the power cord from the power outlet, hold the plug to pull it out.**

  Pulling the power cord may damage it, resulting in electric shock or fire.

- **Do not use the power cord attached to this instrument for other electric apparatuses.**

  The power cord attached to this instrument cannot be used for other electric apparatuses in accordance with the electric apparatus safety laws.

- **Before connecting or disconnecting the power cord, turn off the power switch of the CS-8000 Series.**

  If you do this while the power switch is on, you may get an electric shock or malfunction..

- **Do not short-circuit the blade of the power cord plug with metal and others.**

  If touched with metal, fire or electric shock may be caused.

- **Do not use any damaged power cord, cable or adaptor.**

  If any damaged power cord, cable or adaptor is used, this may result in electric shock and/or fire.

- **Do not use or store in a humid or dusty place (such as an underground warehouse).**

  Placing it in a damp place where condensation may form or where there is dust or dirt inside the case may cause an electric shock or fire..

⚠ CAUTION (Continued)

- **Do not expose this instrument to the direct sunlight or with much moisture.**

  Direct sunlight may the inner temperature to increase, resulting in fire

- **Do not place this instrument in a place exposed to oily smoke or steam..**

  It may cause electric shock or fire.

- **Before moving this instrument, remove the power cord and external connection cables from this instrument.**

  If not, the cord or the cable may be damaged, resulting in fire or electric shock.

- **When connecting the power cord or measurement cable, care should be taken so that you do not pull such cable. If such cable is pulled, this may cause the instrument to be laid down.**

  If this instrument is laid down, this may cause an electric shock, a personal injury, a fire.

- **Use this instrument within the specified operation and storage environment.**

  Using it out of the specified operating environment or keeping it out of the specified storage environment may cause malfunction.
  If not, an failure may be caused. Usable temperature range is as follows:
  Only indoor use.
  Operating temperature : 0 °C to +40 °C
  Operating humidity : 5 % to 80 %RH (at 30 °C or less) and no dew condensation allowed
  Upper bound value 55 %RH (at 40 °C) and no dew condensation allowed
  Storage temperature : -20 °C to +60 °C
  Storage humidity : 5 % to 80 %RH (no dew condensation allowed)

- **If not used for a long term, remove the power cord plug of this instrument from the receptacle for safety.**

- **When transporting this instrument, detach the power cord, the cable, and the adaptor, etc. and use the packing material provided at the time of purchase or packing material equivalent at least.**

  Excessive vibration or shock applied to this instrument during transportation may cause it to malfunction, resulting in fire. If you do not have the proper packing material or shock absorbing material, contact IWATSU or our sales distributors. When having the intrument transported by a shipping company, write "Precision Instrument - Handle With Care" on each side of the packing box.

⚠ CAUTION (Continued)

- **Prior to maintenance, unplug the power plug from the outlet for safety. Use a cloth to wipe away any moisture.**
  Cleaning this instrument while the power plug is connected to the outlet or while the instrument is wet may cause an electric shock or a malfunction.
- **Do not use the instrument without cleaning internal for a long term.**
  Long-term use of an instrument having a dirty or dusty interior may cause a fire or malfunction. It is recommended that you contact IWATSU or sales distributors to check and clean the interior, calibrate, etc., about once per year.
- **The weight of this instrument is about 22 kg. When moving or transporting it, two persons or more should carry it.**
  If not, injury may be caused.
- **Avoid measuring parts other than semiconductor devices as they may cause the Instrument to malfunction or the DUT to be damaged. If you want to measure a semiconductor device that is not described in this instruction manual, please contact us.**
- **Do not use this instrument by method of no regulations with this instruction manual.**
  If not, protection means does not function.
- **This instrument weighs approximately 22 kg. Be careful when moving or transporting this product, and handle it with two or more people.**
  If you handle this product by yourself when moving or transporting it, you may get injured.
- **Avoid measuring parts other than semiconductor devices as they may cause the product to malfunction or the device under test to be damaged. If you want to measure a semiconductor device that is not described in this instruction manual, please contact us.**
- **Do not use the product in any way not specified in the instruction manual.**
  If you use this product in a way that does not specify it, the protection provided by this product may be impaired.

Items

When receiving this instrument, please check parts in the package.

◆HC Unit CS-205 / CS-210 / CS-220 .....:1 Set

＜Accessories＞

- ・HC-FIXTURE connection unit .....: 1
- ・Connecting bracket .....: 4
- ・Power cord (3-prong) .....: 1
- ・Cord strap.....: 1
- ・Instruction Manual (this manual) ..... : 1

The following options are delivered when the purchase is specified

◆Option

- ・HC standard cable set CS-022 (configuration below) .....: 1
  - Control interface cable (length: 1.0 m) .....: 1
  - Interlock/Sense cable (length: 1.0m) .....: 1

Contact Us

IWATSU ELECTRIC CO., LTD.
Overseas Sales Sect., Sales Dept. No.2,
7-41, Kugayama 1-Chome, Suginami-ku, Tokyo, 168-8501 Japan
TEL: +81-3-5370-5483 **FAX:** +81-3-5370-5492
URL: https://www.iti.iwatsu.co.jp/index_e.html **E-mail:** info-tme@iwatsu.co.jp

How to use this document; Notation

It is recommended that the biginner of this instrument should use the instrument after reading this Instruction Manual carefully.

◆About the explanation method of each section

The structure is as follows for items with many explanations such as functions, operations, and specifications.

◇Overview

The purpose and main points (important items are in bold and large letters) are explained in the frame.

◇Operating procedure

The operation methods are listed in order.

◇Setting example, measurement example

It is explained by the operation method, explanatory diagram, and detailed explanation.

◇WARNING, CAUTION, notes

WARNING and CAUTION items such as electric shock, fire, and damage to this Instrument are summarized at the beginning of the Instruction Manual.

The explanations in each section are also shown as notes and memos (know-how, details, etc.) to explain the contents.

◆Examples of using CAUTION and Memo

◇Usage example of CAUTION

CAUTION ⚠

When you move instruments to an environment with different temperature and humidity, condensation may occur due to sudden temperature changes.

When there is a change in the environment, wait for a while until the environment inside the instruments become accustomed to the surrounding environment.

Then, turn on the main power switch of the CS-8000 Series before use.

◇Usage example of Memo

Memo

Kelvin Sense

Since the voltage drop caused by the contact resistance of contact point is not included in measured value, high accuracy measurement can be performed.

Contents

MEMO

Chapter 1 Overview

The development of semiconductor technology is remarkable and diverse, and the number of equipment such as heavy electric power (electric power), home appliances, air conditioning, and transportation that incorporate power devices such as inverters continues to increase, and the technological progress is remarkable. In power electronics technology, we are moving from the conventional pursuit of high efficiency of electric power to the one that tries to reduce the energy density (make it compact) or that is eco-friendly. In the transportation industry such as trains, the automobile industry, and power device manufacturers, the development of components for eco-friendly instruments is rapidly expanding.

Inverter technology used in many electronic devices such as air conditioners, refrigerators, elevators, trains, hybrid cars, solar power generation and wind power generation is a circuit technology that is indispensable for energy saving. The importance of evaluating next-generation power semiconductor devices such as SiC and GaN is increasing in order to improve the efficiency of these energy uses.

The Curve Tracer CS-8000 Series was developed by further enhancing the Curve Tracer CS-3000 Series and CS-5000 Series in order to evaluate power semiconductor devices in the power electronics market.

The HC Unit CS-200 Series was developed as a large current unit for the Curve Tracer CS-8000 Series, and you can select and use a model that matches the current of the measurement range of the Curve Tracer specifications and connection options.

1.1 Future

This instrument is a most-advanced device that can handle a maximum peak current of 2 kA. It can be used not only for measuring the characteristics of large-current power devices such as the latest IGBTs and power MOSFETs, but also for measuring the characteristics of various semiconductors such as transistors and diodes.

In the HV Unit CS-200 Series, there are three models: CS-205 / CS-210 / CS-220.

■CS-205

- Maximum measurement voltage up to 50 V is possible.
- maximum measurement current of 500 A is possible.

■CS-210

- Maximum measurement voltage up to 50 V is possible.
- Maximum measurement current up to 1 kA is possible.

■CS-220

- Maximum measurement voltage up to 50 V is possible.
  Note: CS-220 is limited to 41 V only when the output setting is voltage and the 2 kA range is used.
- Maximum measurement current up to 2 kA is possible.

■ Handling of the DUT

Set the large current measurement of the DUT by one of the following two methods.

- Connect the connection terminal of the Test Fixture CS-322 and the terminal of the DUT directly to the terminal of the Test Fixture with a test wire lead with a crocodile or an HV / HC cable.
- Place a dedicated measurement panel for each DUT to be measured in place of the patch panel, and wire directly between the patch panel connection and the measurement panel. Efficient measurement is possible by preparing a measurement panel that allows the device to be measured to be securely connected and easily attached and detached.

For the Test Fixture in which the DUT to be measured is set, close the cover before measuring.

Chapter 2 Names and Functions

This chapter describes the names and functions of each part of the HV Unit CS-210 as an example. Section 2.1 explains the names and functions of the front panel, Section 2.2 the rear panel, and Section 2.3 the connection ports of the connection terminals.

2.1 The Front panel of HC Unit

Figure 2.1 shows the front panel of the HC Unit CS-210 and explains the names and functions of each part.

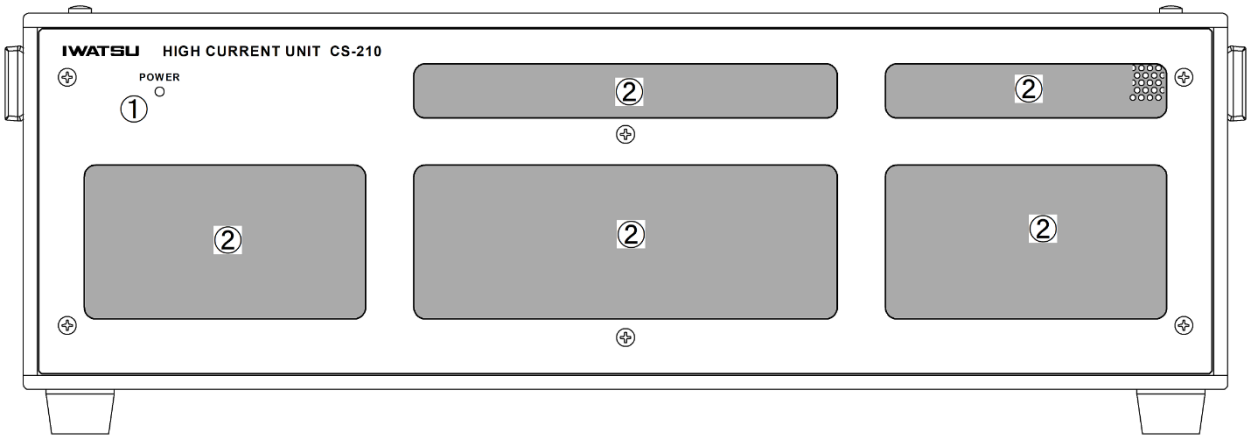

Figure 2.1 Front panel of HC Unit CS-210

① POWER LED

・Power is supplied to the AC LINE INPUT terminal on the rear of this Instrument.

・The cable from the CS-8000 Series CONTROL INTERFACE OUT connector is connected to the CONTROL INTERFACE IN connector on the rear.

・When the power of the CS-8000 Series is ON.

The LED Lights blue

The HC Unit CS-200 Series does not have an operation switch for turning the power on and off.

② Vent

The outside air is sucked in through this vent and exhausted by the fan motor on the rear.

Place something in front of the vent to prevent it from blocking.

2.2 The Rear Panel of HC Unit

Figure 2.2 shows the rear panel of the CS-210 and explains the names and functions of each part.

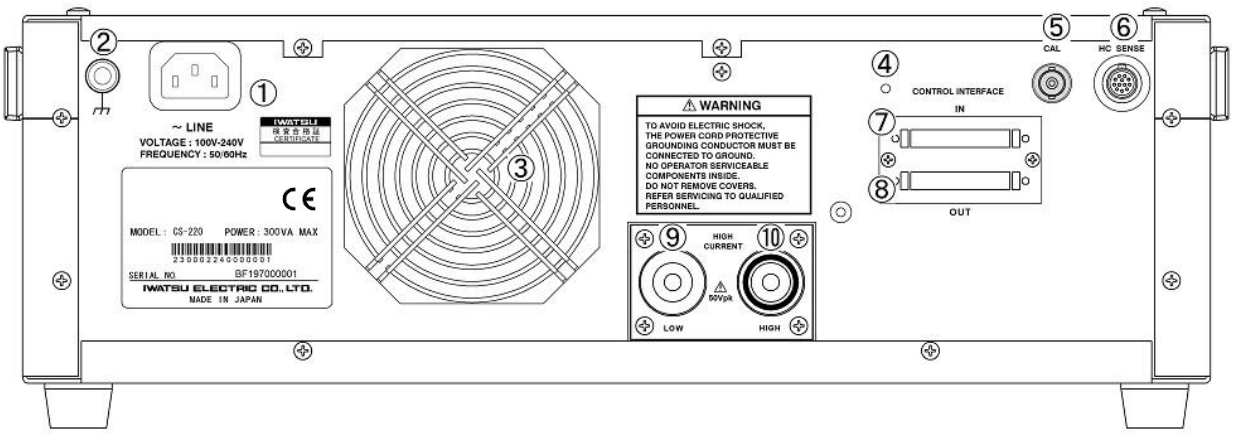

Figure 2.2　Rear panel view of HC Unit CS-210

① AC LINE INPUT

AC power input. Connect the included 3-prong power cord.

② Ground Terminal

The ground terminal for safety connected to the housing.

③ Fan Motor

The heat inside the instrument is exhausted by the fan motor.

④ CONTROL INTERFACE LED

You can confirm that it is blinking and communicating during the control operation from the CS-8000 Series.

⑤ CAL Connector

The BNC connector for inputting calibration voltage.

⑥ HC SENSE Connector

The amount of current output by this instrument is detected from this connector and the voltage is output to the CS-8000 Series.

Connect to the CS-8000 Series with the optional HC standard cable set CS-022 interlock / sense cable.

⑦ CONTROL INTERFACE (IN) Connector

The connector for controlling each unit from the CS-8000 Series. It is used by connecting to the OUT side of the CONTROL INTERFACE connector of the CS-8000 Series or the CONTROL INTERFACE connector of other units.

When using multiple units, connect them with a daisy chain.

⑧ CONTROL INTERFACE (OUT) Connector

The connector for controlling each unit from the CS-8000 Series. It is used by connecting to the IN side of the CONTROL INTERFACE connector of another unit.

When using multiple units, connect them with a daisy chain (chain of beads) and connect the terminator attached to the CS-8000 Series to the OUT side of the unit in the final stage.

⑨ HIGH CURRENT DRAIN/COLLECTOR LOW Connector

Use the included HC-FIXTURE Connection Unit to connect to the HIGH CURRENT DRAIN / COLLECTOR LOW connector on the CS-322 Test Fixture.

⑩ HIGH CURRENT DRAIN/COLLECTOR HIGH Connector

Use the included HC-FIXTURE Connection Unit to connect to the HIGH CURRENT DRAIN / COLLECTOR HIGH connector on the CS-322 Test Fixture.

MEMO

Chapter 3 Basic Operation

This chapter describes the precautions when installing the equipment in Section 3.1.
Section 3.2 describes the connection of the power cord and the connection with the CS-8000 Series and Test Fixtures as preparations before measurement.

3.1 Install the Instrument

When using this Instrument, install it in a place and environmental conditions that meet the following conditions.

☆ Flat and horizontal place

Install it in a stable place, keeping it horizontal on the left, right, front and rear. If you use it in an unstable place, it may fall or fall, resulting in injury or malfunction.

☆ Well-ventilated place

This Instrument has a vent on the front and an exhaust on the rear. To prevent the temperature inside the equipment from rising, leave sufficient space around it and do not block these vents and exhaust ports. Leave a space of about 100 mm on the left, right, and rear of the Instrument.

☆ Stacking with optional items

This Instrument is used by connecting to a Test Fixture. Overlay the Test Fixture on top of the HC unit
However, when using the CS-8000 Series with the HC unit stacked, the angle adjustment stand on the front side cannot be used upright. (The stand may be damaged)

☆ Performance ensured temperature, operation ensured temperature, humidity range

Performance ensured temperature range + 10 °C to + 35 °C (no condensation)
Ensured operation Temperature range, humidity range 0 ° C to + 40 °C, 5% to 80% RH, (30 °C, no condensation)
Upper limit 55% RH (40 °C, no condensation)

CAUTION ⚠

If you move to an environment with different temperature and humidity, condensation may occur due to sudden temperature changes.
If there is a change in the environment, wait for a while until the environment inside the Instruments become accustomed to the surrounding environment.
Turn on the main power switch of the CS-8000 Series.

3.2 Connect the Power Cord

Power connection, power cord WARNING and CAUTION are explained on pages ii to viii at the beginning of this instruction manual. Be sure to read the warnings and precautions before connecting the power supply. The procedure for connecting the power supply is explained in ① and ② below.

Connect the power cord

(1) Insert the connector of the accessory power cord into the AC LINE INPUT terminal for connecting the power cord on the rear panel of the HC Unit. (See Figure 3.1)

(2) Connect the plug of the power cord to the power outlet. (See Figure 3.1)
In addition, connect to the power outlet to which the power cord of CS-8000 Series or Test Fixture is connected and the power outlet as close as possible.

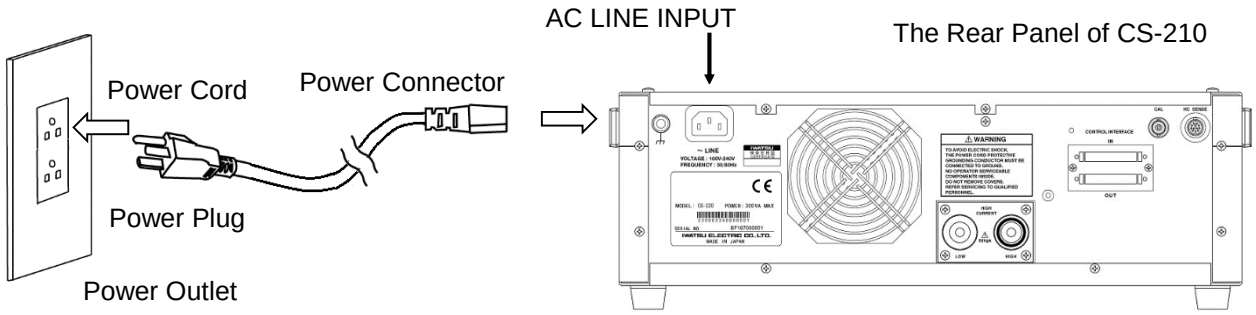

Figure 3.1 Connection of Power Cord (CS-210)

3.3 Connection with CS-8000 Series and Test Fixture CS-322

Explains how to connect the Curve Tracer CS-8000 Series and Test Fixture CS-322 to the HC Unit CS-200 Series.

As shown in Figures 3.2 and 3.3, place the Test Fixture CS-322 on the HC Unit CS-200 Series and fix it.

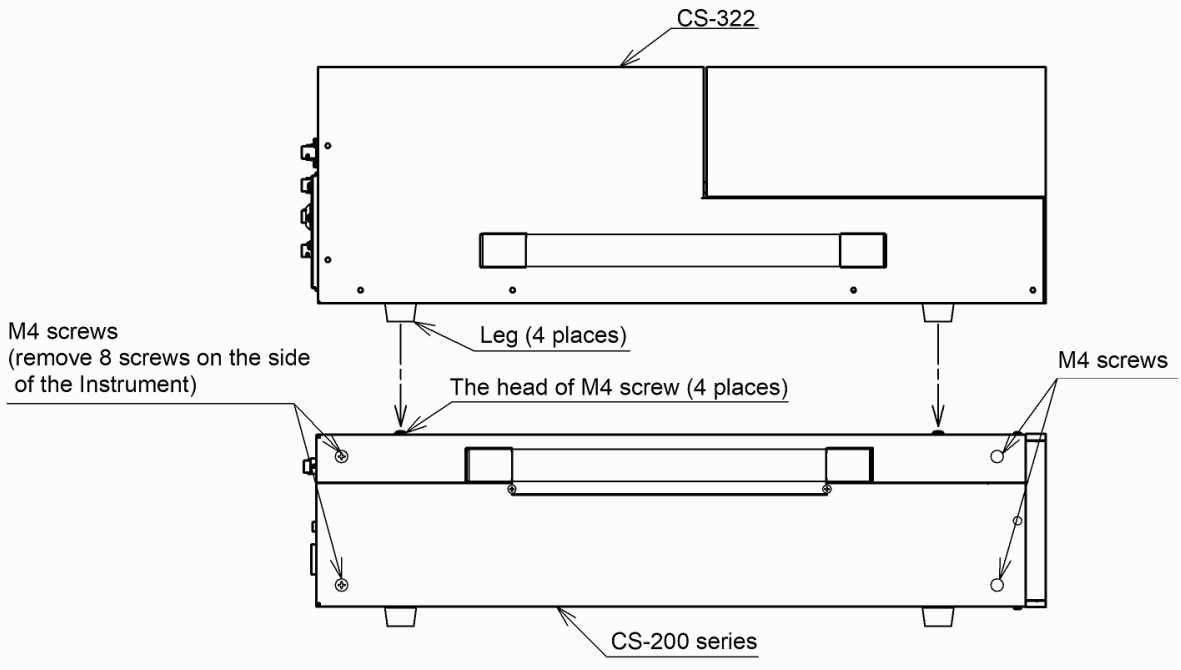

Figure 3.2 Connection with Test Fixture (a)

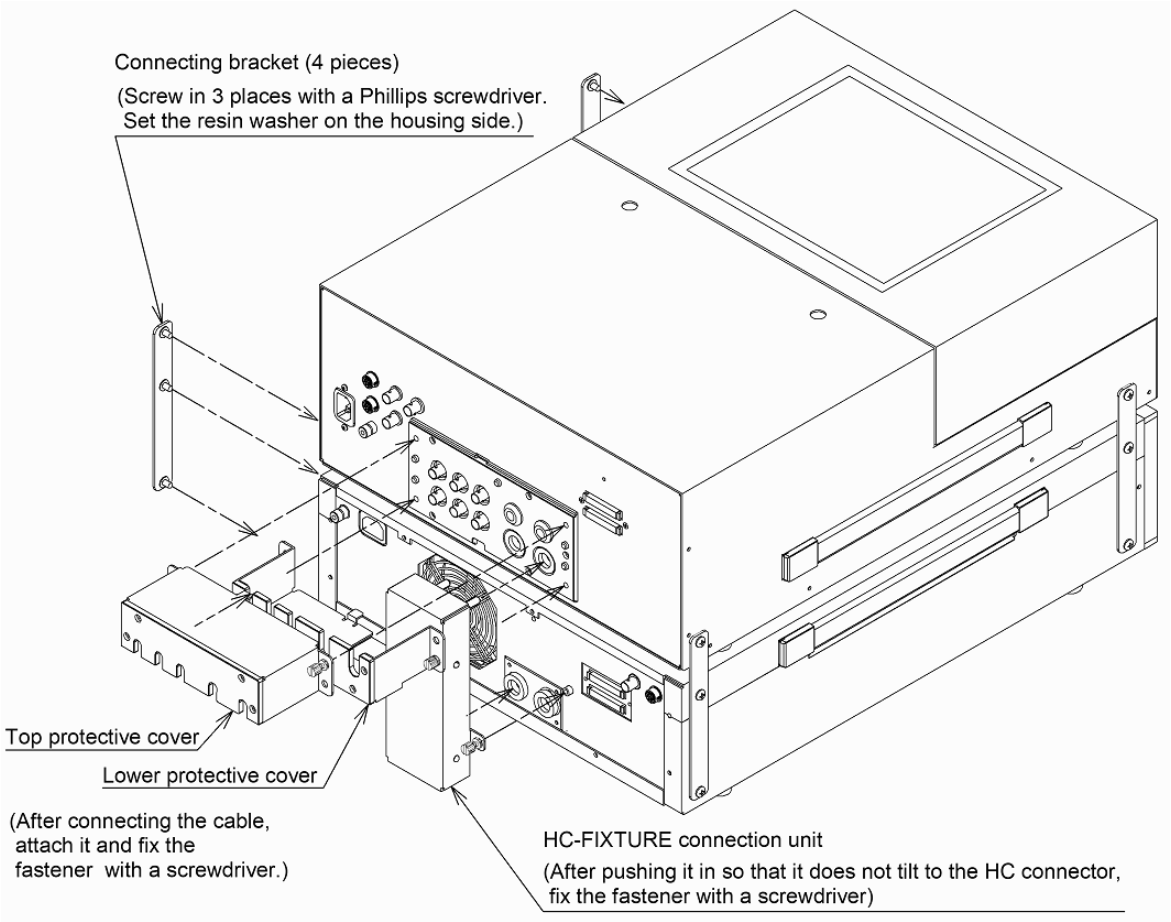

Figure 3.3 Connection with Test Fixture (b)

Figure 3.4 shows the numbered connector numbers on the rear panels of the CS-8000 Series, Test Fixtures, and HC Units. Connect with a cable that connects these connectors according to the display on the rear panel. Use the cables shown in Table 3.1, Table 3.2, and Table 3.3.
(Move the cable view tab to a position where you can easily see it and connect it.)

Table 3.1 Cable connection table between CS-8000 Series and Test Fixture

CS-8000 Series No.	Connector name	Cables to use, etc.	Test Fixture No	Remark
⑤	INTERLOCK	Interlock / sense cable	②	Mandatory
⑥	CONTROL INTERFACE (IN)	Control interface cable	⑧	Mandatory
⑨	AUX	coaxial cable	⑤	
⑩	GNDU	Triaxial cable	⑦	
⑪	HIGH VOLTAGE DRAIN / COLLECTOR FORCE	HV Cable	⑪	Excluding CS-8020
⑫	HIGH VOLTAGE DRAIN / COLLECTOR SENSE	HV Cable	⑫	Excluding CS-8020
⑬	MIDDLE VOLTAGE DRAIN / COLLECTOR FORCE	Triaxial cable	⑬	Mandatory
⑭	MIDDLE VOLTAGE DRAIN / COLLECTOR SENSE	Triaxial cable	⑭	Mandatory
⑮	GATE / BASE FORCE	Triaxial cable	⑮	Mandatory
⑯	GATE / BASE SENSE	Triaxial cable	⑯	Mandatory
⑰	SOURCE / EMITTER FORCE	Triaxial cable	⑰	Mandatory
⑱	SOURCE / EMITTER SENSE	Triaxial cable	⑱	Mandatory

Table 3.2 Cable connection between test fixture and HC Unit

Test Fixture No.	Connector name	Cables to use, etc.	HC Unit No.	Remark
⑲, ⑳	HIGH CURRENT DRAIN/ COLLECTOR (LOW / HIGH)	HC-FIXTURE Connection Unit	⑨, ⑩	Mandatory
⑨	CONTROL INTERFACE (IN)	Control interface Cable	⑦	Mandatory
—	CONTROL INTERFACE (OUT)	Control interface terminator	⑧	Mandatory

Table 3.3 Cable connection table between CS-8000 Series and HC Unit

CS-8000 Series No.	Connector name	Cables to use, etc.	HC Unit No.	Remark
④	HC SENSE	Interlock / sense Cable	⑥	Mandatory

Fig. 3.4 is a rear view of the CS-8000 Series and the Test Fixture with the protective cover removed.

After connecting each cable, attach the protective cover on the rear panel of the CS-8000 Series and the Test Fixture. If it is not installed correctly, the interlock cannot be released and measurement cannot be performed.

Be careful not to let the cable on the rear get caught in other heavy objects.

Not all of these wires are required, but connect them all until you are comfortable with the measurements.

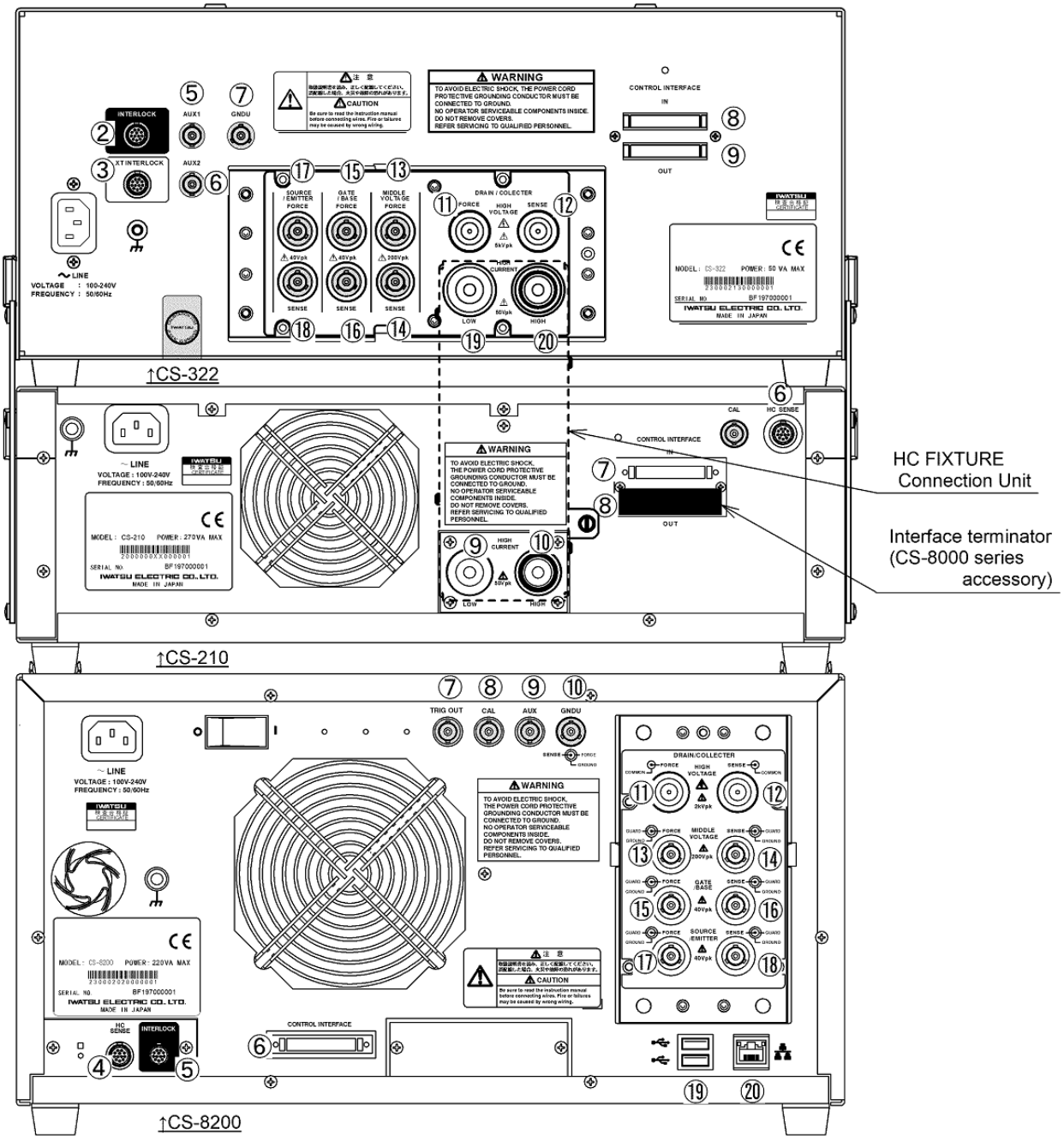

Figure 3.4 Cable connection diagram

Memo

Chapter 4 Daily Maintenance and Calibration

It explains maintenance and calibration.

4.1 Daily maintenance

CAUTION ⚠

Be sure to unplug the power cord before cleaning as there is a risk of electric shock.

If you continue to use it as it is, the date of the file saved by this Instrument may become abnormal and it may not be processed correctly by the application of the personal computer that processes the data.

Customers cannot replace the battery, please IWATSU or our sales distributors.

4.2 Calibration

It is recommended that the instrument be calibrated regularly for accurate measurement.

For regular calibration of the entire Instrument, contact IWATSU or our sales distributors. **Regular calibration once per year** is recommended.

4.3 Repair and sending of repaired Instrument

If a failure occurs, contact Iwatsu or our sales distributors. If an unexpected failure by our fault occurs during the warranty period, it can be repaired without charge.
When sending the Instrument, please write the Instrument name, production number, failure, name, place, and telephone number of the person in charge clearly.

To avoid an accident during transportation when sending it, use the corrugated carton box used for delivery or equivalent: i.e., having shock absorbing materials. If a proper packing box is not found, contact IWATSU or our sales distributors.

4.4 Storage and transportation

Do not store in the locations below:
- Direct sunlight is received.
- With much dirt
- Corrosive gas is generated.

Conditions to store CS-200 Series are as follows:
- Storage temperature: −20°C to +60°C
- Storage humidity: 5% to 80% RH (40°C, without dew condensation)

When transporting the instrument, use the packing materials attached when purchasing it or equivalent.

Memo

Chapter 5 Specifications

5.1 Specifications

(1/2)

Item		Specifications	
Output Part	Max. peak Power	25 kW (2 kA Range)	(CS-220)
		12.5 kW (1 kA Range)	(CS-210)
		6.25 kW (500A Range)	(CS-205)
	Voltage Range(Note1)	50 V (Note2)	
	Current Range	2 kA to 5 A (2/1/5 Step)	(CS-220)
		1 kA to 5 A (2/1/5 Step)	(CS-210)
		500 A to 5 A (2/1/5 Step)	(CS-205)
	Setting Resolution	1/±20000	
	Mode	PULSE	
	Polarity	POSITIVE, NEGATIVE	
	Setting Resolution	± (Set value x 2% + Set Range x 0.1%)	
		Note1: Voltage setting is specified with no load Note2: Limited to 40V at 2 kA setting in voltage mode	
Measure-ment Part	Voltage Range (Note1)	50 V to 200 mV (2/1/5 Step)	
	Current Range (Note1)	2 kA to 5 A (2/1/5 Step)	(CS-220)
		1 kA to 5 A (2/1/5 Step)	(CS-210)
		500 A to 5 A (2/1/5 Step)	(CS-205)
	Measurement Resolution	1/±20000	
	Measurement Accuracy (Note2,3,4)	± (Set value x 2% + Set Range x 0.1%)	
		Note1: Voltage measurement is measured at MAIN UNIT (using MV SENSE terminal) Note2: Can measure up to 125% of the measurement range Note3: Specified within the measurement range Note4: Specified in combination with MAIN UNIT	
Data Acqui-sition	Measurement cycle	2 ms to 5 s	
	Measuring point	Can be set	
	Measurement time	Can be set	
	Pulse Width (Note1)	10 μs to 500 μs (2 kA, 1 kA) 10 μs to 1 ms (500 A to 5 A) Note1: When the pulse width is narrow, it may not be possible to output up to the maximum voltage / current.	
	Duty Ratio	≦0.1% (2 kA) ≦0.25% (1 kA) ≦0.5% (500 A, 200 A) ≦1% (100 A to 5 A)	

(2/2)

Item		Specifications
Output Resistance		25 mΩ (2 kA Range) (Typical value) 50 mΩ (1 kA Range) (Typical value) 100 mΩ (500 A Range) (Typical value)
Control signal		Control interface input / output SENSE output Calibration CAL input
Power Source	Power Voltage Range / Frequency	AC 100 to 240 V ±10%, 50/60 Hz
	Power consumption	300 VA max (CS-220) 270 VA max (CS-210) 270 VA max (CS-205)
Physical characteris-tics	Dimensions (W×H×D)	424 mm×132 mm×556 mm (Excluding accessories and projection) (CS-220) 424 mm×132 mm×556 mm (Excluding accessories and projection) (CS-210 / CS-205)
	Weight	About 22 kg (Excluding accessories and options) (CS-220) About 21 kg (Excluding accessories and options) (CS-210) About 21 kg (Excluding accessories and options) (CS-205)
Environ-mental Condition	Performance ensured temperature	+10 °C to +35 °C
	Operating temperature	0 °C to +40 °C, 5% to 80% RH (30 °C, No condensation)
	Operation Humidity	upper limit 55% RH (40 °C, No condensation)
	Warm-up time	30 minutes from power on Note: The performance is the ensured value after the warm-up time.
	Storage Temperature/Humidity	-20 °C to +60 °C, 5% to 80% RH (No condensation)
	Altitude	Operating: Up to 2000 m
Accessory		HC-FIXTURE Connection unit : 1 Instruction manual (this manual) : 1 Power Cord : 1 Cord Strap : 1

5.2 Compliance information

Directive	Descriptions
Low Voltage Directive (Safety)	EN 61010-1: 2010/A1: 2019 Pollution degree 2 Overvoltage category (installation category) II
EMC Directive	EN 61326-1: 2013 (Group1,ClassA)
RoHS Directive	EN IEC 63000: 2018

5.3 External dimensions

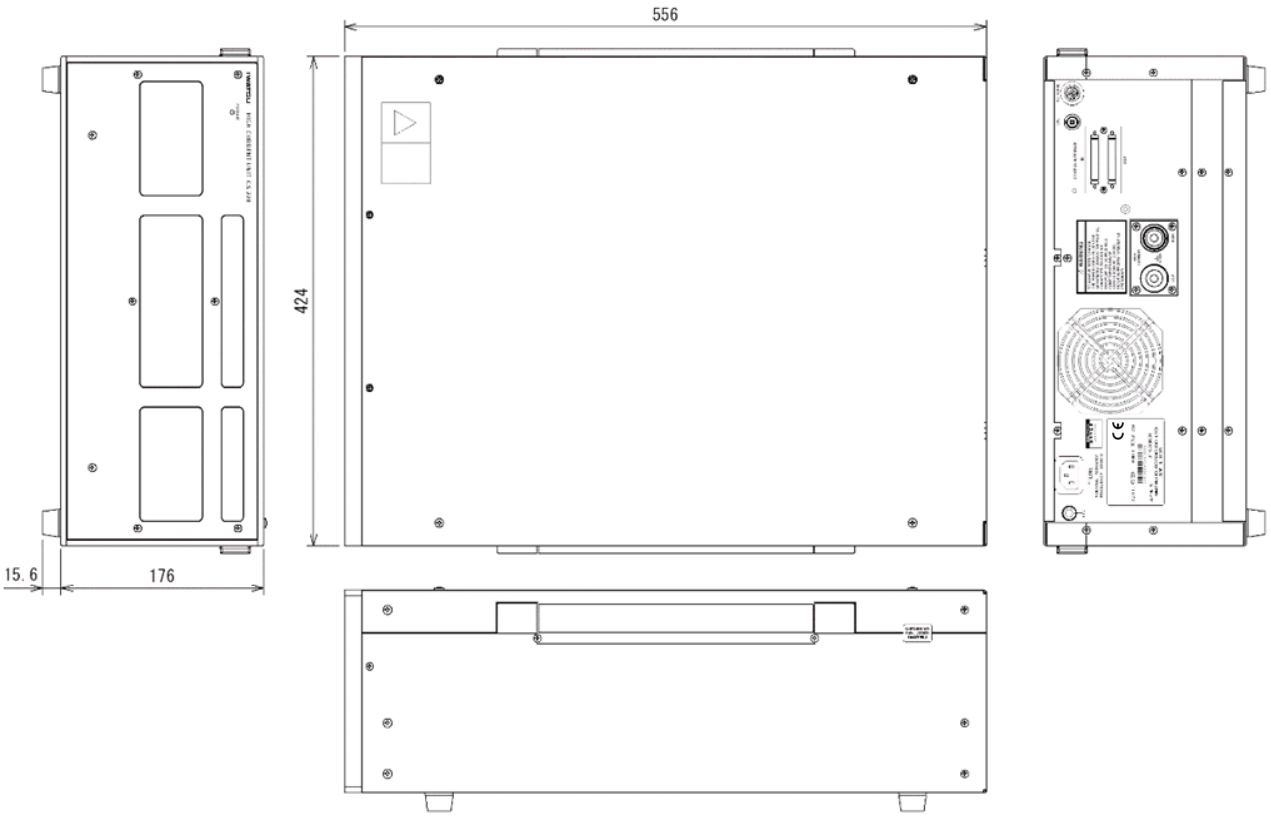

Figure 5.1 CS-220

Unit: mm Tolerance ± 3

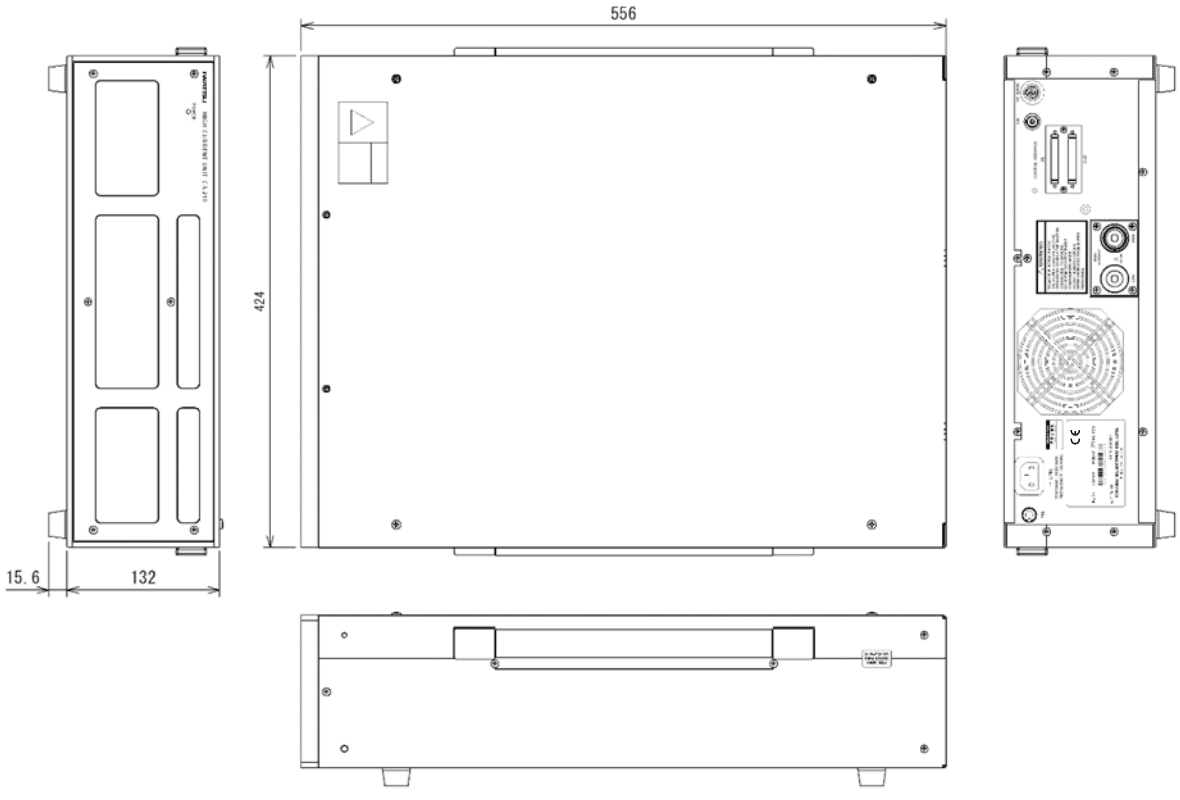

Figure 5.2 CS-210 / CS-205

Unit: mm Tolerance ± 3

CS-205 / CS-210 / CS-220

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