

**IWATSU**



## Semiconductor Curve Tracer CS-8000 series

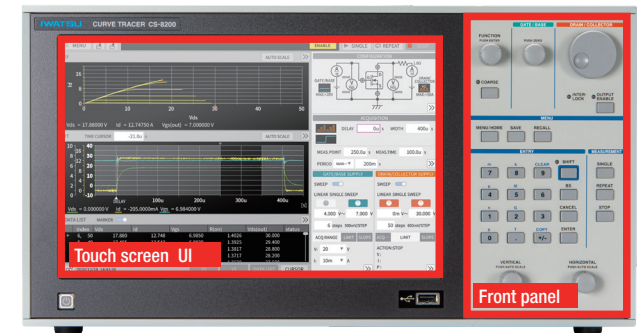
# CS-8000 Series Technical datasheet

The CS-8000 series are equipped with a high voltage source of up to 5kV and a high current source of 2000A. With an optional SMU, the CS-8000 series can be used to measure the static characteristics of any power semiconductor. Equipped with pulse output, gate pattern, and very small current measurement functions, the CS-8000 series strongly supports design evaluation of wide bandgap semiconductors such as SiC and GaN.



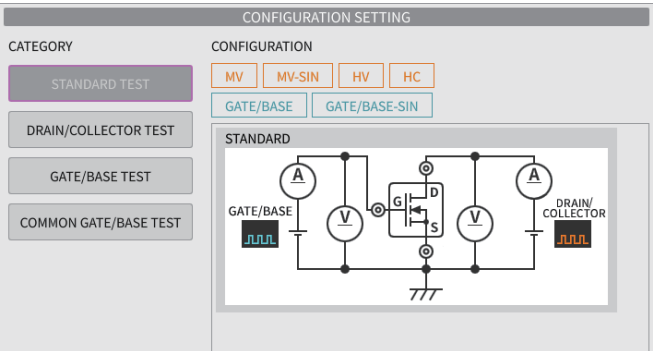
- Up to 5kV, 2kA High-Power Test
- Easy-to-operate graphical user interface
- Accurate very small current measurement (Resolution 250fA)
- Large 12.1-inch Touch Screen
- Variety of GATE Signal Output
- Enhanced Temperature Characteristic Measurement Option
- On-Wafer High-Power Testing with Wafer-Prober

## UI designed for ease of use



The 12.1 inch Touch Screen, front panel buttons and rotary knob provide intuitive operation. The on-screen keyboard on the screen and the numeric keypad on the front panel allow you to enter settings, limit values, and so on. To enable operation by USB mouse/keyboard.

## Configuration for various experiment



The graphical display of the measurement configuration makes easy to set various settings. The test fixture CS-322 HV/HC automatically switches the internal matrix switch to match the configuration settings, eliminating the need for a wiring swap. It is also not necessary to switch the connection between HV and HC units manually. Because the internal relay automatically switches through the configuration settings. These functions prevent incorrect wiring during measurement.

## Improved on-wafer testing affinity

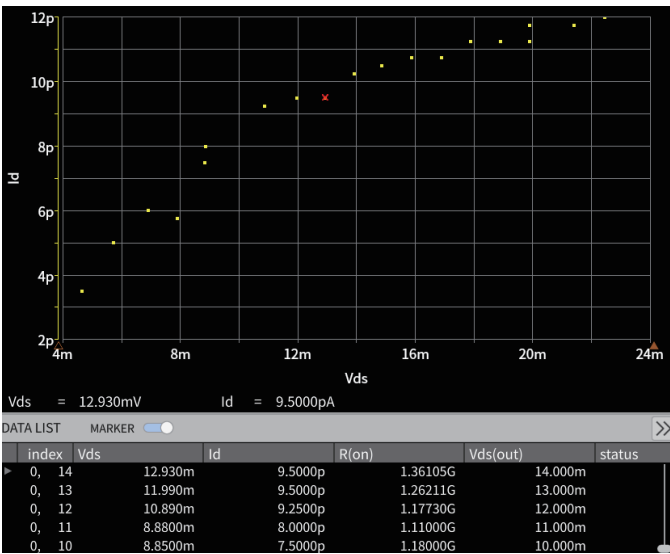
The output terminals are fitted with noise resistant triaxial for easy connection to wafer-prober.



## Output sources for your application

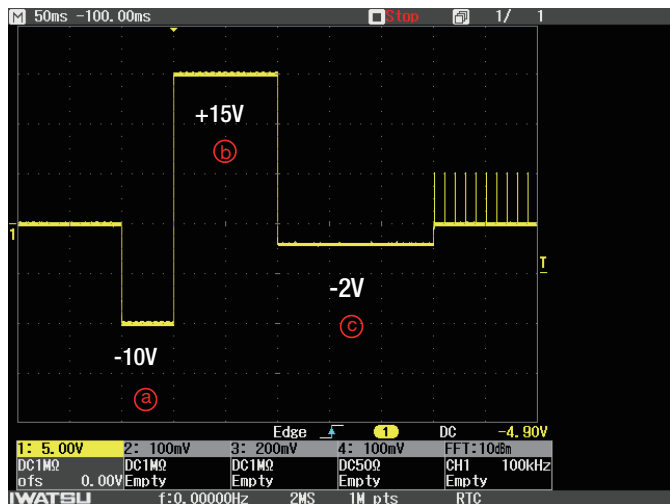
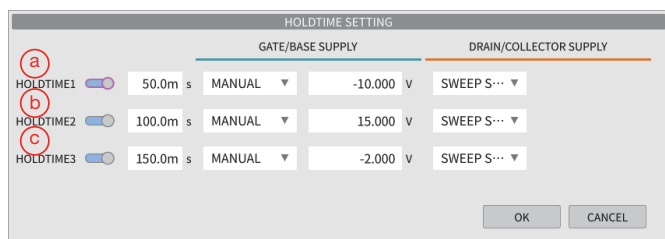
High-current SMU up to 2000 A. Because of the HC unit with the high current mode, high current measurements up to 2kA can be performed. The pulse width, measuring period and measuring range can be varied. Pulse width, measurement cycle, and measurement range can be varied. SMU can be selected as desired for measurements of Ultra-high voltage SMU up to 15 kV, temperature sensors, backgates, etc.

## Minimum current resolution 250fA



The use of triaxial and the optimization of the measurement system has reduced leakage and noise in the equipment, so the stable measurement of very small currents can be performed.

## Flexible GATE signal output

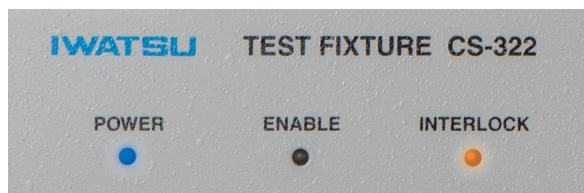


The gate signal can be sequenced and applied.

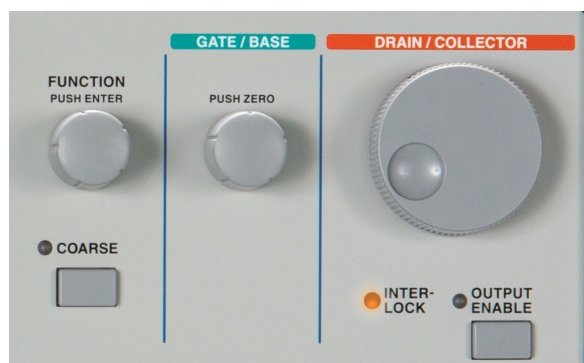
Hold-time variable range 0.000[s] ~ 5.000[s]

Pre-signal GATE voltage -40[V] ~ +40[V]

## Interlock Function



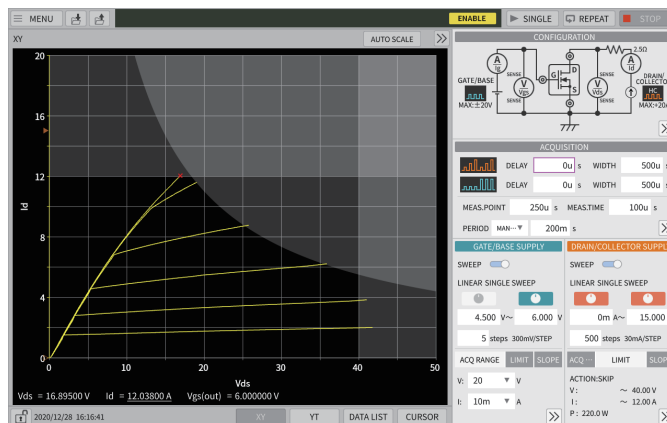
TEST FIXTURE



MAIN UNIT

An interlock function is linked to the cover of the fixture. During interlock operation, the output is turned off to avoid the electric shock, and the curve tracer keeps safe measurements. Even when you use the probe or temperature chambers, the curve tracer keeps safe measurement in conjunction with external interlock terminal. The LEDs in main unit and test fixture indicate the state of the interlock.

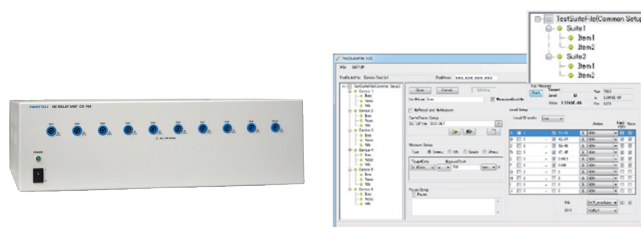
## Output Limit Function



Voltage, current, and power limits can be set to prevent damage to the target.

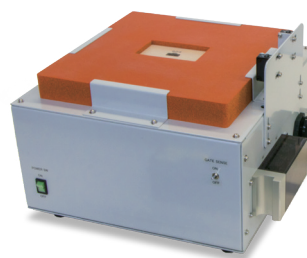
In addition, the hardware overcurrent protection function shuts off current when 1.4 times the current flow of the measuring range.

## Automatic measurement for the multiple devices



The optional scanner system CS-700 series enables measurement of multiple devices. Automatic measurement is possible by controlling the curve tracer and scanner system with the automatic measurement software CS-830.

## Temperature characteristic measurement



Evaluation of temperature characteristics is required for targets used in high and low temperature environments during actual operation. CS-8000 can be used in combination with hotplate and Thermo Stream to measure temperature characteristics. The use of Thermo Stream requires test fixture and adapters. Automatic measurement is also possible with software CS-830.

## CS-830 Software

The CS-830 automatic measurement software enables automatic measurement of semiconductor parameters, temperature control of thermostreamers, thermostatic chambers, and hot plates, and automatic measurement by controlling the CS-700 scanner system.

## ■ Main Unit



Three types of main units can be selected depending on the required measurement voltage. The main unit includes the HV unit (not included in the CS-8020), MV unit, and gate unit. The high current unit, fixture, and optional SMU are operated from the main unit.

| Model     | CS-8500  | CS-8200   | CS-8020 |
|-----------|----------|-----------|---------|
| HV UNIT   | 5kV(8mA) | 2kV(20mA) | -       |
| MV UNIT   | 200V(2A) |           |         |
| GATE UNIT | 40V(1A)  |           |         |

## ■ HV UNIT(5kV)

### OUTPUT PART

| OUTPUT VOLTAGE |                    |          |          |                   |
|----------------|--------------------|----------|----------|-------------------|
| Voltage Range  | Setting Resolution | Mode     | Polarity | Max. Peak Current |
| • 5kV          | 250mV              | DC/PULSE | + / -    | 8mA               |
| • 2kV          | 100mV              | DC/PULSE | + / -    | 8mA               |
| • 1kV          | 50mV               | DC/PULSE | + / -    | 8mA               |
| • 500V         | 25mV               | DC/PULSE | + / -    | 8mA               |
| • 200V         | 10mV               | DC/PULSE | + / -    | 8mA               |

| PULSE      |             |             |
|------------|-------------|-------------|
| Pulse Mode | Pulse Width | Duty Cycle  |
| PULSE      | 20mS ~ 1.6S | ≤ 50% ~ 80% |

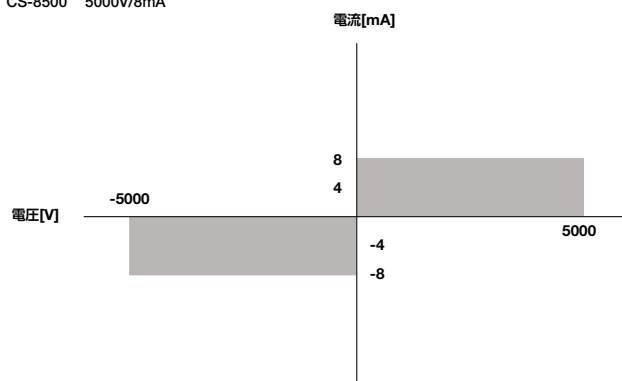
※ It may not be possible to output up to the Max. voltage/current if the pulse width is narrow.

### Setting Accuracy

DC/PULSE :  $\pm (\text{Set Value} \times 1.5\% + \text{Set Range} \times 0.5\%)$

### OUTPUT RANGE

■ HV UNIT  
CS-8500 5000V/8mA



### MEASUREMENT PART

| MEASUREMENT VOLTAGE |                    |               |                    |
|---------------------|--------------------|---------------|--------------------|
| Voltage Range       | Setting Resolution | Voltage Range | Setting Resolution |
| • 5kV               | 250mV              | 200V          | 10mV               |
| • 2kV               | 100mV              | 100V          | 5mV                |
| • 1kV               | 50mV               | 50V           | 2.5mV              |
| • 500V              | 25mV               | -             | -                  |

### Voltage Measurement Accuracy

DC/PULSE :  $\pm (\text{Set Value} \times 1.5\% + \text{Set Range} \times 0.5\%)$

| MEASUREMENT CURRENT |                    |               |                    |
|---------------------|--------------------|---------------|--------------------|
| Current Range       | Setting Resolution | Current Range | Setting Resolution |
| • 10mA              | 500nA              | 500μA         | 25nA               |
| • 5mA               | 250nA              | 200μA         | 10nA               |
| • 2mA               | 100nA              | 100μA         | 5nA                |
| • 1mA               | 50nA               | 50μA          | 2.5nA              |

| MEASUREMENT CURRENT (LEAKAGE MODE) |                    |               |                    |
|------------------------------------|--------------------|---------------|--------------------|
| Current Range                      | Setting Resolution | Current Range | Setting Resolution |
| • 2mA                              | 100nA              | 1μA           | 50pA               |
| • 1mA                              | 50nA               | 500nA         | 25pA               |
| • 500μA                            | 25nA               | 200nA         | 10pA               |
| • 200μA                            | 10nA               | 100nA         | 5pA                |
| • 100μA                            | 5nA                | 50nA          | 2.5pA              |
| • 50μA                             | 2.5nA              | 20nA          | 1pA                |
| • 5μA                              | 250pA              | 10nA          | 500fA              |
| • 2μA                              | 100pA              | 5nA           | 250fA              |

### MEASUREMENT CURRENT ACCURACY

2A ~ 10μA range :

$\pm (\text{Measured value} \times 1.5\% + \text{Measurement range} \times 0.5\%) \pm (\text{Measurement range} \times 0.002\% \times \text{Output voltage})$

20nA ~ 5nA range :

$\pm (\text{Measured value} \times 1.5\% + \text{Measurement range} \times 0.5\%) \pm (\text{Measurement range} \times 0.002\% \times \text{Output voltage}) \pm 200\text{pA}$

### DYNAMIC RANGE (MEASUREMENT CURRENT)

It is possible to measure within measurement current range.

## ■ HV UNIT(2kV)

### OUTPUT PART

| OUTPUT VOLTAGE |                    |          |          |                   |
|----------------|--------------------|----------|----------|-------------------|
| Voltage Range  | Setting Resolution | Mode     | Polarity | Max. Peak Current |
| • 2kV          | 100mV              | DC/PULSE | + / -    | 20mA              |
| • 1kV          | 50mV               | DC/PULSE | + / -    | 20mA              |
| • 500V         | 25mV               | DC/PULSE | + / -    | 20mA              |
| • 200V         | 10mV               | DC/PULSE | + / -    | 20mA              |

| PULSE      |             |             |
|------------|-------------|-------------|
| Pulse Mode | Pulse Width | Duty Cycle  |
| PULSE      | 20mS ~ 1.6S | ≤ 50% ~ 80% |

\*It may not be possible to output up to the Max. voltage/current if the pulse width is narrow.

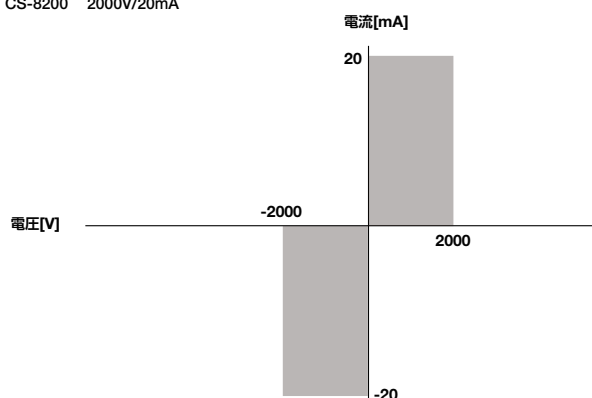
### Setting Accuracy

DC/PULSE :  $\pm$  (Set Value x 1.5% + Set Range x 0.5%)

### OUTPUT RANGE

#### ■ HV UNIT

CS-8200 2000V/20mA



### MEASUREMENT CURRENT

| Current Range | Setting Resolution | Current Range | Setting Resolution |
|---------------|--------------------|---------------|--------------------|
| • 20mA        | 1μA                | 500μA         | 25nA               |
| • 10mA        | 500nA              | 200μA         | 10nA               |
| • 5mA         | 250nA              | 100μA         | 5nA                |
| • 2mA         | 100nA              | 50μA          | 2.5nA              |
| • 1mA         | 50nA               | -             | -                  |

### MEASUREMENT CURRENT (LEAKAGE MODE)

| Current Range | Setting Resolution | Current Range | Setting Resolution |
|---------------|--------------------|---------------|--------------------|
| • 2mA         | 100nA              | 1μA           | 50pA               |
| • 1mA         | 50nA               | 500nA         | 25pA               |
| • 500μA       | 25nA               | 200nA         | 10pA               |
| • 200μA       | 10nA               | 100nA         | 5pA                |
| • 100μA       | 5nA                | 50nA          | 2.5pA              |
| • 50μA        | 2.5nA              | 20nA          | 1pA                |
| • 5μA         | 250pA              | 10nA          | 500fA              |
| • 2μA         | 100pA              | 5nA           | 250fA              |

### Current Measurement Accuracy

2mA ~ 50nA Range :

$\pm$  (Set Value x 1.5% + Set Range x 0.5%)  $\pm$  (Measurement range x 0.002% x Vo) (Vo is the output voltage [V])

20nA ~ 5nA Range :

$\pm$  (Set Value x 1.5% + Set Range x 0.5%)  $\pm$  (Measurement Range x 5.0% + 200pA)

### Dynamic Range (Measurement Current)

It is possible to measure within measurement current range.

### MEASUREMENT PART

| MEASUREMENT VOLTAGE |                    |               |                    |
|---------------------|--------------------|---------------|--------------------|
| Voltage Range       | Setting Resolution | Voltage Range | Setting Resolution |
| • 2kV               | 100mV              | 200V          | 10mV               |
| • 1kV               | 50mV               | 100V          | 5mV                |
| • 500V              | 25mV               | 50V           | 2.5mV              |

### Voltage Measurement Accuracy

DC/PULSE :  $\pm$  (Set Value x 1.5% + Set Range x 0.5%)

### Dynamic Range (Measurement Voltage)

It is possible to measure up to 125% of the measurement voltage range.



# ■ MV UNIT(200W)

## OUTPUT PART

| OUTPUT VOLTAGE |                    |             |           |                   |
|----------------|--------------------|-------------|-----------|-------------------|
| Voltage Range  | Setting Resolution | Mode        | Polarity  | Max. Peak Current |
| • 200V         | 10mV               | DC/AC/PULSE | + / -     | 1A                |
| • 100V         | 5mV                | DC/AC/PULSE | + / - / ± | 2A                |
| • 50V          | 2.5mV              | DC/AC/PULSE | + / - / ± | 2A                |
| • 20V          | 1mV                | DC/AC/PULSE | + / - / ± | 2A                |

| OUTPUT CURRENT |                    |             |           |                   |
|----------------|--------------------|-------------|-----------|-------------------|
| Current Range  | Setting Resolution | Mode        | Polarity  | Max. Peak Voltage |
| • 2A           | 100μA              | PULSE       | + / -     | 100V              |
| • 1A           | 50μA               | PULSE       | + / - / ± | 100V              |
| • 500mA        | 25μA               | PULSE       | + / - / ± | 100V              |
| • 200mA        | 10μA               | DC/AC/PULSE | + / - / ± | 100V              |
| • 100mA        | 5μA                | DC/AC/PULSE | + / - / ± | 100V              |
| • 50mA         | 2.5μA              | DC/AC/PULSE | + / - / ± | 100V              |
| • 20mA         | 1μA                | DC/AC/PULSE | + / - / ± | 100V              |
| • 10mA         | 500nA              | DC/AC/PULSE | + / - / ± | 100V              |
| • 5mA          | 250nA              | DC/AC/PULSE | + / - / ± | 100V              |
| • 2mA          | 100nA              | DC/AC/PULSE | + / - / ± | 100V              |
| • 1mA          | 50nA               | DC/AC/PULSE | + / - / ± | 100V              |
| • 500μA        | 25nA               | DC/AC/PULSE | + / - / ± | 100V              |
| • 200μA        | 10nA               | DC/AC/PULSE | + / - / ± | 100V              |
| • 100μA        | 5nA                | DC/AC/PULSE | + / - / ± | 100V              |
| • 50μA         | 2.5nA              | DC/AC/PULSE | + / - / ± | 100V              |
| • 20μA         | 1nA                | DC/AC/PULSE | + / - / ± | 100V              |
| • 10μA         | 500pA              | DC/AC/PULSE | + / - / ± | 100V              |
| • 5μA          | 250pA              | DC/AC/PULSE | + / - / ± | 100V              |
| • 2μA          | 100pA              | DC/AC/PULSE | + / - / ± | 100V              |
| • 1μA          | 50pA               | DC/AC/PULSE | + / - / ± | 100V              |
| • 500nA        | 25pA               | DC/AC/PULSE | + / - / ± | 100V              |
| • 200nA        | 10pA               | DC/AC/PULSE | + / - / ± | 100V              |
| • 100nA        | 5pA                | DC/AC/PULSE | + / - / ± | 100V              |
| • 50nA         | 2.5pA              | DC/AC/PULSE | + / - / ± | 100V              |
| • 20nA         | 1pA                | DC/AC/PULSE | + / - / ± | 100V              |
| • 10nA         | 500fA              | DC/AC/PULSE | + / - / ± | 100V              |
| • 5nA          | 250fA              | DC/AC/PULSE | + / - / ± | 100V              |

| PULSE OUTPUT |             |             |
|--------------|-------------|-------------|
| Pulse Mode   | Pulse Width | Duty Cycle  |
| PULSE        | 20mS ~ 1.6S | ≤ 50% ~ 80% |

\*When the pulse width is narrow, it may not be possible to output up to the maximum voltage / current.

## SINE OUTPUT

MODE: AC, Rectified (Full wave (1/1), Half wave (1/2), 1/3 ~ 1/50)

## SETTING RESOLUTION

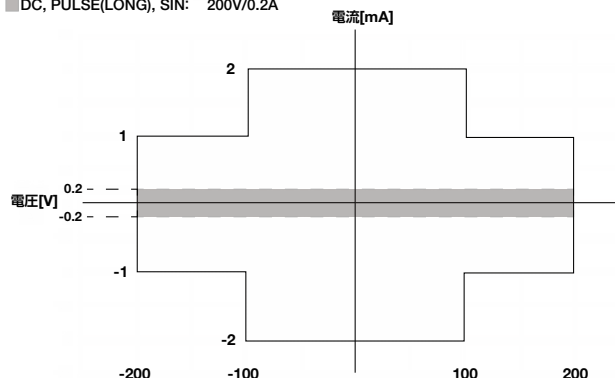
DC / PULSE: 1/ ± 20000 of Set range

AC: 1/ ± 1000 of Set range

## OUTPUT RANGE

### ■ MV UNIT

PULSE 100V/2A, 200V/1A  
■ DC, PULSE(LONG), SIN: 200V/0.2A



## MEASUREMENT PART

| MEASUREMENT CURRENT |                    |               |                    |
|---------------------|--------------------|---------------|--------------------|
| Current Range       | Setting Resolution | Current Range | Setting Resolution |
| • 2A                | 100μA              | PULSE         | + / -              |
| • 1A                | 50μA               | PULSE         | + / - / ±          |
| • 500mA             | 25μA               | PULSE         | + / - / ±          |
| • 200mA             | 10μA               | DC/AC/PULSE   | + / - / ±          |
| • 100mA             | 5μA                | DC/AC/PULSE   | + / - / ±          |
| • 50mA              | 2.5μA              | DC/AC/PULSE   | + / - / ±          |
| • 20mA              | 1μA                | DC/AC/PULSE   | + / - / ±          |
| • 10mA              | 500nA              | DC/AC/PULSE   | + / - / ±          |
| • 5mA               | 250nA              | DC/AC/PULSE   | + / - / ±          |
| • 2mA               | 100nA              | DC/AC/PULSE   | + / - / ±          |
| • 1mA               | 50nA               | DC/AC/PULSE   | + / - / ±          |
| • 500μA             | 25nA               | DC/AC/PULSE   | + / - / ±          |
| • 200μA             | 10nA               | DC/AC/PULSE   | + / - / ±          |
| • 100μA             | 5nA                | DC/AC/PULSE   | + / - / ±          |
| • 50μA              | 2.5nA              | DC/AC/PULSE   | + / - / ±          |
| • 20μA              | 1nA                | DC/AC/PULSE   | + / - / ±          |
| • 10μA              | 500pA              | DC/AC/PULSE   | + / - / ±          |
| • 5μA               | 250pA              | DC/AC/PULSE   | + / - / ±          |
| • 2μA               | 100pA              | DC/AC/PULSE   | + / - / ±          |
| • 1μA               | 50pA               | DC/AC/PULSE   | + / - / ±          |
| • 500nA             | 25pA               | DC/AC/PULSE   | + / - / ±          |
| • 200nA             | 10pA               | DC/AC/PULSE   | + / - / ±          |
| • 100nA             | 5pA                | DC/AC/PULSE   | + / - / ±          |
| • 50nA              | 2.5pA              | DC/AC/PULSE   | + / - / ±          |
| • 20nA              | 1pA                | DC/AC/PULSE   | + / - / ±          |
| • 10nA              | 500fA              | DC/AC/PULSE   | + / - / ±          |
| • 5nA               | 250fA              | DC/AC/PULSE   | + / - / ±          |

## ■ MV UNIT(200W)

| MEASUREMENT VOLTAGE |                    |               |                    |
|---------------------|--------------------|---------------|--------------------|
| Voltage Range       | Setting Resolution | Voltage Range | Setting Resolution |
| • 200V              | 10mV               | 5V            | 250μV              |
| • 100V              | 5mV                | 2V            | 100μV              |
| • 50V               | 2.5mV              | 1V            | 50μV               |
| • 20V               | 1mV                | 500mV         | 25μV               |
| • 10V               | 500μV              | 200mV         | 10μV               |

### MEASUREMENT VOLTAGE ACCURACY

DC/Pulse (200 m V range except) :

$\pm (\text{Measured value} \times 1.2\% + \text{Measurement range} \times 0.4\%)$

DC/Pulse (200 m V range) :

$\pm (\text{Measured value} \times 1.2\% + \text{Measurement range} \times 0.4 \pm 10\text{mV})$

AC :  $\pm (\text{Measured value} \times 2\% + \text{Measurement range} \times 0.5\%)$

### DYNAMIC RANGE (MEASUREMENT CURRENT)

Up to 125% of the measurement range can be measured.

\*Accuracy is specified only in the measurement range.

### MEASUREMENT CURRENT ACCURACY

DC/Pulse (2A ~ 10μA range)

$\pm (\text{Measured value} \times 1.2\% + \text{Measurement range} \times 0.4\%)$

$\pm (\text{Measurement range} \times 0.002\% \times \text{Output voltage})$

DC/Pulse (200mV range)

$\pm (\text{Measured value} \times 1.2\% + \text{Measurement range} \times 0.4\%)$

$\pm (\text{Measurement range} \times 0.002\% \times \text{Output voltage}) \pm 50\text{pA}$

AC :  $\pm (\text{Measured value} \times 2\% + \text{Measurement range} \times 0.5\%)$

### DYNAMIC RANGE (MEASUREMENT CURRENT)

Up to 125% of the measurement range can be measured.

\*Accuracy is specified only in the measurement range.

## ■ GATE UNIT(40W)

### OUTPUT PART

| OUTPUT VOLTAGE |                    |             |           |                   |
|----------------|--------------------|-------------|-----------|-------------------|
| Voltage Range  | Setting Resolution | Mode        | Polarity  | Max. Peak Current |
| • 40V          | 2mV                | DC/AC/PULSE | + / - / ± | 1A                |
| • 20V          | 1mV                | DC/AC/PULSE | + / - / ± | 1A                |
| • 10V          | 500μV              | DC/AC/PULSE | + / - / ± | 1A                |
| • 5V           | 200μV              | DC/AC/PULSE | + / - / ± | 1A                |
| • 2V           | 100μV              | DC/AC/PULSE | + / - / ± | 1A                |
| • 1V           | 50μV               | DC/AC/PULSE | + / - / ± | 1A                |

| PULSE OUTPUT |             |                       |
|--------------|-------------|-----------------------|
| Pulse Mode   | Pulse Width | Duty Cycle            |
| PULSE        | 50μS ~ 10mS | $\leq 10\%$           |
| PULSE(LONG)  | 50μS ~ 1.6S | $\leq 50\% \sim 80\%$ |

\*When the pulse width is narrow, it may not be possible to output up to the maximum voltage / current.

| OUTPUT CURRENT |                    |             |           |                   |
|----------------|--------------------|-------------|-----------|-------------------|
| Current Range  | Setting Resolution | Mode        | Polarity  | Max. Peak Voltage |
| • 1A           | 50μA               | PULSE       | + / - / ± | 40V               |
| • 500mA        | 25μA               | PULSE       | + / - / ± | 40V               |
| • 200mA        | 10μA               | PULSE       | + / - / ± | 40V               |
| • 100mA        | 5μA                | DC/AC/PULSE | + / - / ± | 40V               |
| • 50mA         | 2.5μA              | DC/AC/PULSE | + / - / ± | 40V               |
| • 20mA         | 1μA                | DC/AC/PULSE | + / - / ± | 40V               |
| • 10mA         | 500nA              | DC/AC/PULSE | + / - / ± | 40V               |
| • 5mA          | 250nA              | DC/AC/PULSE | + / - / ± | 40V               |
| • 2mA          | 100nA              | DC/AC/PULSE | + / - / ± | 40V               |
| • 1mA          | 50nA               | DC/AC/PULSE | + / - / ± | 40V               |
| • 500μA        | 25nA               | DC/AC/PULSE | + / - / ± | 40V               |
| • 200μA        | 10nA               | DC/AC/PULSE | + / - / ± | 40V               |
| • 100μA        | 5nA                | DC/AC/PULSE | + / - / ± | 40V               |
| • 50μA         | 2.5nA              | DC/AC/PULSE | + / - / ± | 40V               |
| • 20μA         | 1nA                | DC/AC/PULSE | + / - / ± | 40V               |
| • 10μA         | 500pA              | DC/AC/PULSE | + / - / ± | 40V               |
| • 5μA          | 250pA              | DC/AC/PULSE | + / - / ± | 40V               |
| • 2μA          | 100pA              | DC/AC/PULSE | + / - / ± | 40V               |
| • 1μA          | 50pA               | DC/AC/PULSE | + / - / ± | 40V               |
| • 500nA        | 25pA               | DC/AC/PULSE | + / - / ± | 40V               |
| • 200nA        | 10pA               | DC/AC/PULSE | + / - / ± | 40V               |
| • 100nA        | 5pA                | DC/AC/PULSE | + / - / ± | 40V               |
| • 50nA         | 2.5pA              | DC/AC/PULSE | + / - / ± | 40V               |
| • 20nA         | 1pA                | DC/AC/PULSE | + / - / ± | 40V               |
| • 10nA         | 500fA              | DC/AC/PULSE | + / - / ± | 40V               |
| • 5nA          | 250fA              | DC/AC/PULSE | + / - / ± | 40V               |

## ■ GATE UNIT(40W)

### SINE OUTPUT

MODE: AC

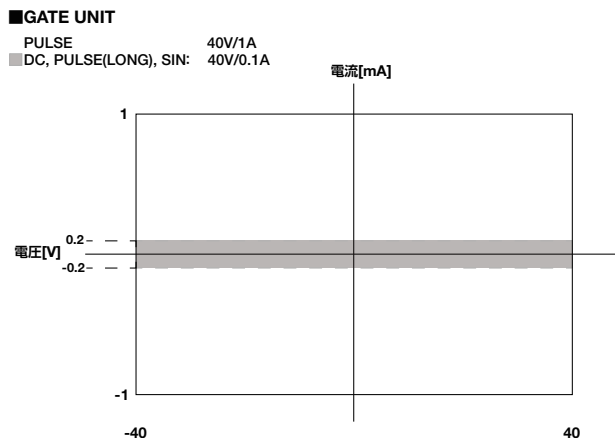
FREQUENCY: 50Hz (AC)

### SETTING ACCURACY

DC / PULSE:  $\pm (\text{Set value} \times 1.2\% + \text{Set range} \times 0.4\%)$

AC :  $\pm (\text{Set value} \times 2\% + \text{Set range} \times 0.5\%)$

### OUTPUT RANGE



### OUTPUT PART

| OUTPUT VOLTAGE |                    |               |                    |
|----------------|--------------------|---------------|--------------------|
| Voltage Range  | Setting Resolution | Voltage Range | Setting Resolution |
| • 50V          | 2.5mV              | 5V            | 250μV              |
| • 20V          | 1mV                | 2V            | 100μV              |
| • 10V          | 500μV              | 1V            | 50μV               |

### SETTING ACCURACY

DC / PULSE:  $\pm (\text{Set value} \times 1.2\% + \text{Set range} \times 0.4\%)$

AC :  $\pm (\text{Set value} \times 2\% + \text{Set range} \times 0.5\%)$

## ■ GND UNIT

### GND UNIT

Output voltage 0 V  $\pm 100 \mu V$

Maximum sink current  $\pm 2.5 A$

Connecting terminal FORCE、SENSE (Triaxial)

### AUX

Output voltage(※ 1)  $\pm 40 V$

Output current  $\pm 50 mA$  (TYP)

※ 1: Output only during measurement

### TRIG OUT

Output voltage 3.3 V CMOS output

Output at the start of the measurement cycle

### DISPLAY

Display 12.1 inch TFT-LCD with touch panel

Dimensions (H  $\times$  V) 261.12 mm  $\times$  163.2 mm

Number of pixels 1280  $\times$  800 (WXGA)

Screen display XY, YT, DATA LIST, CURSOR

### Power Source

Power Voltage Range AC100V  $\sim 240 V \pm 10\%$

Frequency 50/60Hz

Power line consumption 220 VA max (CS-8200/8500)

200 VA max (CS-8020)

### DYNAMIC RANGE (MEASUREMENT CURRENT)

Up to 125% of the measurement range can be measured.

\*Accuracy is specified only in the measurement range.

### MEASUREMENT PART

| MEASUREMENT CURRENT |                    |               |                    |
|---------------------|--------------------|---------------|--------------------|
| Current Range       | Setting Resolution | Current Range | Setting Resolution |
| • 1A                | 50μA               | 50μA          | 2.5nA              |
| • 500mA             | 25μA               | 20μA          | 1nA                |
| • 200mA             | 10μA               | 10μA          | 500pA              |
| • 100mA             | 5μA                | 5μA           | 250pA              |
| • 50mA              | 2.5μA              | 2μA           | 100pA              |
| • 20mA              | 1μA                | 1μA           | 50pA               |
| • 10mA              | 500nA              | 500nA         | 25pA               |
| • 5mA               | 250nA              | 200nA         | 10pA               |
| • 2mA               | 100nA              | 100nA         | 5pA                |
| • 1mA               | 50nA               | 50nA          | 2.5pA              |
| • 500μA             | 25nA               | 20nA          | 1pA                |
| • 200μA             | 10nA               | 10nA          | 500fA              |
| • 100μA             | 5nA                | 5nA           | 250fA              |

### MEASUREMENT CURRENT ACCURACY

2A  $\sim$  50μA range:

$\pm (\text{Measured value} \times 1.2\% + \text{Measurement range} \times 0.4\%)$

$\pm (\text{Measurement range} \times 0.002\% \times \text{Output voltage})$

20μA  $\sim$  5nA range:

$\pm (\text{Measured value} \times 1.2\% + \text{Measurement range} \times 0.4\%)$

$\pm (\text{Measurement range} \times 0.002\% \times \text{Output voltage})$

$\pm 50pA$

### DYNAMIC RANGE (MEASUREMENT CURRENT)

Up to 125% of the measurement range can be measured.

※ Accuracy is specified only in the measurement range.

### Physical characteristics

Dimensions W424 mm  $\times$  H221 mm  $\times$  D556 mm

Weight About 21 kg (CS-8200/8500)

About 19 kg (CS-8020)

### Accessory

Control interface terminator

Protective cover right

Protective cover left

Fixed belt

Instruction manual (this manual)

CD (Instruction Manual / Remote Control Manual)

Power Cord

Cord Strap

### Compliance Information Low Voltage Directive (Safety)

EN61010-1: 2010/A1: 2019

Pollution degree 2

Overvoltage category (installation category) II

EMC Directive

EN61326-1: 2013 (Group1, ClassA)

RoHS Directive

EN IEC 63000: 2018



## Accessory

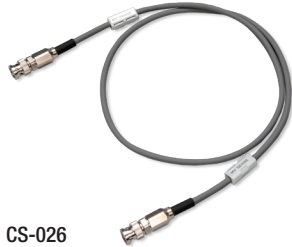
### Option cable

The cable will be required when connecting with HC unit, test fixture and CS-8000.

| Cable set                                                 | Model  | Item                            |
|-----------------------------------------------------------|--------|---------------------------------|
| CS-020<br>MV Standard cable set (recommended for CS-320)  | CS-026 | Triaxial cable (L=1.0m) 7       |
|                                                           | CS-027 | Control I/F cable (L=1.0m) 1    |
|                                                           | CS-028 | Interlock/Sense cable(L=1.0m) 1 |
| CS-021<br>HV Standard cable set (recommended for CS-322)  | CS-025 | HV cable(L=1.0m) 2              |
|                                                           | CS-026 | Triaxial cable (L=1.0m) 7       |
|                                                           | CS-027 | Control I/F cable (L=1.0m) 1    |
| CS-022<br>HC Standard cable set (recommended for HC unit) | CS-028 | Interlock/Sense cable(L=1.0m) 1 |
|                                                           | CS-027 | Control I/F cable (L=1.0m) 1    |



CS-025  
HV cable



CS-026  
Triaxial Cable



CS-027  
Control I/F cable



CS-028  
Interlock/Sense cable

### CS-520 Patch panel

It does not come with CS-32x test fixture.



Adaptor installation image

### Adapter CS-500 series

Installation to test fixture and patch panel.

**Heat resistance  
TO socket**  
200°C, 350A (500μs)



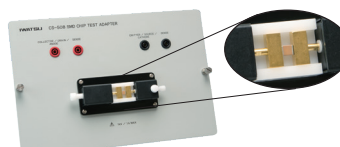
**CS-501A**  
TO

**Test Fixture for  
TSSOP 14**



**CS-502**  
AXIAL

**SMD type adaptor  
CS-508**  
Adaptor for SMD type



**CS-504**  
TO-252-3

Bottom view  
Banana plug



**CS-506**  
TO-252-5



**CS-507**  
SC-70-3/ SOT-323-3



**CS-509**  
SC-59A/ SOT-23-3L



**CS-510**  
SC-62/ SOT-89



**CS-512**  
TO-247-4L



**CS-513**  
DFN-8(5×6)



Coming soon

# CS-401 LPSMU(4W)

## LPSMU CS-401

CS-401 is a Low Power SMU (LPSMU), which can output 100V / 200mA as maximum and can be operated from the main unit. CS-401 can be used as multiple additional SMUs for Emitter sense, Temperature sensor diode, Back-gate etc.

## OUTPUT PART

| OUTPUT VOLTAGE |                    |      |           |                   |
|----------------|--------------------|------|-----------|-------------------|
| Voltage Range  | Setting Resolution | Mode | Polarity  | Max. Peak Current |
| • 100V         | 5mV                | DC   | + / -     | 40mA              |
| • 50V          | 2.5mV              | DC   | + / - / ± | 80mA              |
| • 20V          | 1mV                | DC   | + / - / ± | 200mA             |
| • 10V          | 500μV              | DC   | + / - / ± | 200mA             |
| • 5V           | 250μV              | DC   | + / - / ± | 200mA             |
| • 2V           | 100μV              | DC   | + / - / ± | 200mA             |
| • 1V           | 50μV               | DC   | + / - / ± | 200mA             |
| • 500mV        | 25μV               | DC   | + / - / ± | 200mA             |

| OUTPUT CURRENT |                    |      |           |                   |
|----------------|--------------------|------|-----------|-------------------|
| Current Range  | Setting Resolution | Mode | Polarity  | Max. Peak Voltage |
| • 200mA        | 10μA               | DC   | + / - / ± | 20V               |
| • 100mA        | 5μA                | DC   | + / - / ± | 20V               |
| • 50mA         | 2.5μA              | DC   | + / - / ± | 50V               |
| • 20mA         | 1μA                | DC   | + / - / ± | 50V               |
| • 10mA         | 500nA              | DC   | + / - / ± | 50V               |
| • 5mA          | 250nA              | DC   | + / - / ± | 50V               |
| • 2mA          | 100nA              | DC   | + / - / ± | 50V               |
| • 1mA          | 50nA               | DC   | + / - / ± | 50V               |
| • 500μA        | 25nA               | DC   | + / - / ± | 50V               |
| • 200μA        | 10nA               | DC   | + / - / ± | 50V               |
| • 100μA        | 5nA                | DC   | + / - / ± | 50V               |
| • 50μA         | 2.5nA              | DC   | + / - / ± | 50V               |
| • 20μA         | 1nA                | DC   | + / - / ± | 50V               |
| • 10μA         | 500pA              | DC   | + / - / ± | 50V               |
| • 5μA          | 250pA              | DC   | + / - / ± | 50V               |
| • 2μA          | 100pA              | DC   | + / - / ± | 50V               |
| • 1μA          | 50pA               | DC   | + / - / ± | 50V               |
| • 500nA        | 25pA               | DC   | + / - / ± | 50V               |
| • 200nA        | 10pA               | DC   | + / - / ± | 50V               |
| • 100nA        | 5pA                | DC   | + / - / ± | 50V               |
| • 50nA         | 2.5pA              | DC   | + / - / ± | 50V               |
| • 20nA         | 1pA                | DC   | + / - / ± | 50V               |
| • 10nA         | 500fA              | DC   | + / - / ± | 50V               |
| • 5nA          | 250fA              | DC   | + / - / ± | 50V               |

\*Max. voltage is 50V when polarity is set to BIPOLAR ( ± ).

## SETTING RESOLUTION

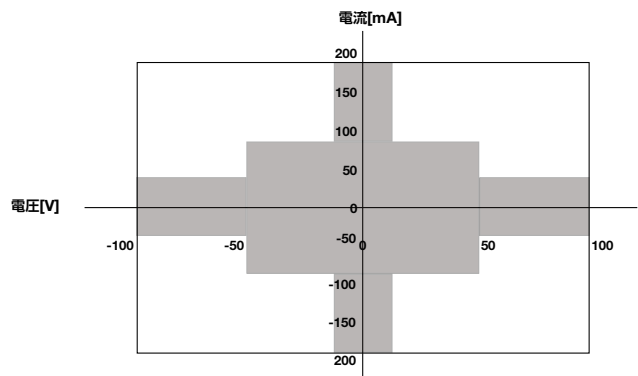
1/ ± 20000 of Set range

## SETTING ACCURACY

± (Set value × 1.2% + Set range × 0.4%)

## OUTPUT RANGE

### LP SMU



## MEASUREMENT PART

| MEASUREMENT VOLTAGE |                    |               |                    |
|---------------------|--------------------|---------------|--------------------|
| Current Range       | Setting Resolution | Current Range | Setting Resolution |
| • 100V              | 5mV                | 10V           | 500μV              |
| • 50V               | 2.5mV              | 5V            | 250μV              |
| • 20V               | 1mV                | 10V           | 500μV              |
| • 5V                | 250μV              | 2V            | 100μV              |
| • 1V                | 50μV               | 500mV         | 25μV               |

## MEASUREMENT VOLTAGE ACCURACY

± (Measured value × 1.2%  
+ Measurement Range × 0.4%)

## DYNAMIC RANGE (MEASUREMENT VOLTAGE)

Up to 125% of the measurement range can be measured.  
\* Accuracy is specified only in the measurement range.

| MEASUREMENT CURRENT |                    |               |                    |
|---------------------|--------------------|---------------|--------------------|
| Current Range       | Setting Resolution | Current Range | Setting Resolution |
| • 200mA             | 10μA               | 20μA          | 1nA                |
| • 100mA             | 5μA                | 10μA          | 500pA              |
| • 50mA              | 2.5μA              | 5μA           | 250pA              |
| • 20mA              | 1μA                | 2μA           | 100pA              |
| • 10mA              | 500nA              | 1μA           | 50pA               |
| • 5mA               | 250nA              | 500nA         | 25pA               |
| • 2mA               | 100nA              | 200nA         | 10pA               |
| • 1mA               | 50nA               | 100nA         | 5pA                |
| • 500μA             | 25nA               | 50nA          | 2.5pA              |
| • 200μA             | 10nA               | 20nA          | 1pA                |
| • 100μA             | 5nA                | 10nA          | 500fA              |
| • 50μA              | 2.5nA              | 5nA           | 250fA              |

## ■ CS-401 LPSMU(4W)

### MEASUREMENT CURRENT ACCURACY

200mA ~ 50nA range:

$\pm (\text{Measured value} \times 1.2\% + \text{Measurement range} \times 0.4\%)$

$\pm (\text{Measurement range} \times 0.002\% \times \text{Output Voltage})$

20nA ~ 5nA range:

$\pm (\text{Measured value} \times 1.2\% + \text{Measurement range} \times 0.4\%)$

$\pm (\text{Measurement range} \times 0.002\% \times \text{Output voltage}) \pm 50\text{pA}$

### POWER SOURCE

Feed from Control Interface Input.

### PHYSICAL

Dimensions (W × H × D)

424 mm × 44 mm × 220 mm

Weight

About 3 kg

Accessory

User's Guide

### DYNAMIC RANGE (MEASUREMENT CURRENT)

Up to 125% of the measurement range can be measured.

\* Accuracy is specified only in the measurement range.

## ■ CS-402 SEMU(4W)

### SEMU CS-402

CS-402 is a measurement unit for Drain current (Sense Emitter output etc.), output current of current monitor from Collector etc. Measurement Sense current at same time as Main current enables to get several parameters, which includes Diversion ratio of current sense terminal, threshold voltage and saturation voltage.

### MEASUREMENT UNIT

| MEASUREMENT CURRENT RANGE |                    |               |                    |
|---------------------------|--------------------|---------------|--------------------|
| Current Range             | Setting Resolution | Current Range | Setting Resolution |
| • 200mA                   | 10μA               | 20μA          | 1nA                |
| • 100mA                   | 5μA                | 10μA          | 500pA              |
| • 50mA                    | 2.5μA              | 5μA           | 250pA              |
| • 20mA                    | 1μA                | 2μA           | 100pA              |
| • 10mA                    | 500nA              | 1μA           | 50pA               |
| • 5mA                     | 250nA              | 500nA         | 25pA               |

※1: Up to 125% of the measurement range can be measured.

※2: Specified within the measurement range.

### MEASUREMENT CURRENT ACCURACY

$\pm (\text{Measured value} \times 1.2\% + \text{Measurement range} \times 0.4\%)$

### DYNAMIC RANGE (MEASUREMENT CURRENT)

Up to 125% of the measurement range can be measured.

\* Accuracy is specified only in the measurement range.

### PHYSICAL

Dimensions (W × H × D)

424 mm × 44 mm × 220 mm

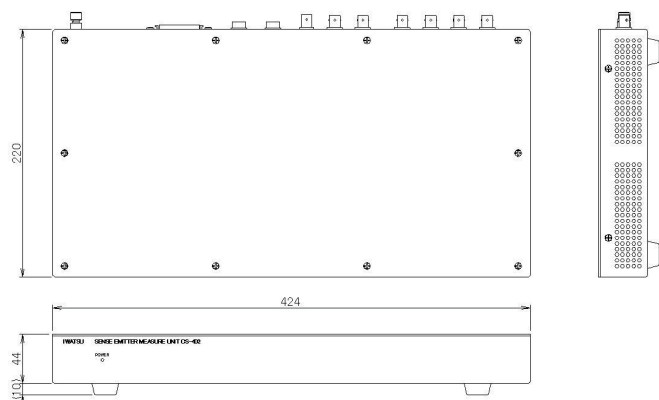
Weight

About 2.5 kg

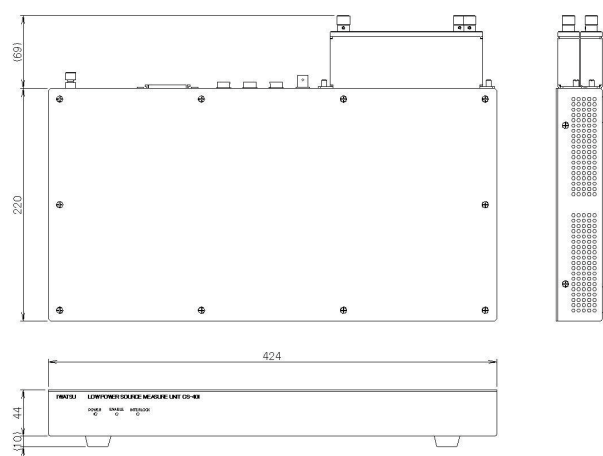
Accessory

User's Guide

### SEMU External dimensions



### LPSMU External dimensions



## ■ CS-403 CMU

### CMU CS-403

CS-403 provides capacitance measurement function with CS-8000 series. Main unit, CS-403 and CS-323 test fixture constitute High voltage CV measurement system.

### MEASUREMENT UNIT

#### MEASUREMENT FREQUENCY RANGE

1 kHz ~ 100 kHz

| MEASUREMENT ACCURACY |                   |                            |
|----------------------|-------------------|----------------------------|
| Frequency            | Measurement range | Accuracy(Additional error) |
| • 1kHz               | 100pF ~ 100nF     | ± 5% ( ± 20pF)             |
| • 10k ~ 100kHz       | 10pF ~ 100nF      | ± 5% ( ± 2pF)              |

### MEASUREMENT VOLTAGE RANGE

20 mV, 100 mV

### POWER SOURCE

Feed from Control Interface Input.

### PHYSICAL

Dimensions (W × H × D)

424 mm × 44 mm × 220 mm

Weight

About 2.2 kg

### Accessories

User's Guide

CV cable

## ■ CS-404 SENSE SELECTOR UNIT

### SENSE SELECTOR UNIT CS-404

CS-404 provides seamless measurement without re-wiring when using multiple optional units.

### POWER SOURCE

Fed from Control Interface Input.

### PHYSICAL

Dimensions (W × H × D)

424 mm × 44 mm × 220 mm

Weight

About 3 kg

Accessory

User's Guide

## ■ CS-405 POWER EXPANDER UNIT

### POWER EXPANDER UNIT CS-405

CS-405 feeds power to other CS-8000 series optional units. If a number of using optional units is over the limit, which is from power feeding from CS-8000 Series main unit, CS-405 can expand the feeding power and the maximum number. Power is fed to each optional unit via a control cable.

### POWER SOURCE

|                   |                      |
|-------------------|----------------------|
| Voltage range     | AC 100 ~ 240 V ± 10% |
| Frequency         | 50/60Hz              |
| Power Consumption | 50 VA max            |

### PHYSICAL

Dimensions (W × H × D)

424 mm × 44 mm × 220 mm

Weight

About 3 kg

Accessories

Instruction Manual (CD)

User's Guide

Power code

# CS-200 series HC UNIT



CS-200 (High Current Unit) is a high current SMU with a maximum current of 2000A and a maximum current of 40V. This unit is operated by the main unit. Three types of lineups can be selected to match the DUT to be measured.

| Model  | Max Current | Max. Peak Power |
|--------|-------------|-----------------|
| CS-220 | 2kA         | 25kW            |
| CS-210 | 1kA         | 12.5kW          |
| CS-205 | 500A        | 6.25kW          |

## OUTPUT PART

| Output Current |                    |       |          |                   |
|----------------|--------------------|-------|----------|-------------------|
| Current Range  | Setting Resolution | Mode  | Polarity | Max. Peak Voltage |
| • 2kA ※1       | 100mA              | PULSE | + / -    | 41V ※4            |
| • 1kA ※2       | 50mA               | PULSE | + / -    | 50V               |
| • 500A         | 25mA               | PULSE | + / -    | 50V               |
| • 200A         | 10mA               | PULSE | + / -    | 50V               |
| • 100A         | 5mA                | PULSE | + / -    | 50V               |
| • 50A          | 2.5mA              | PULSE | + / -    | 50V               |
| • 10A          | 1mA                | PULSE | + / -    | 50V               |
| • 5A           | 500μA              | PULSE | + / -    | 50V               |

※1: The 2kA range is available on CS-220 only.

※2: 1kA range is available on CS-220 and CS-210.

※3: Voltage setting is specified with no load.

※4: Output setting is limited to 41V only when the 2kA current range is used.

## Setting Accuracy

± (Set value × 2% + Set range × 0.1%)

## Measurement Cycle

2ms ~ 5ms

## Measurement Point

Arbitrary settings

## Pulse Width

10μs ~ 500μs (2kA · 1kA range)

10μs ~ 1ms (500 ~ 5A range)

\*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 ~ 5 A)

## Output Resistance

25 mΩ (2 kA Range) (Typical value)

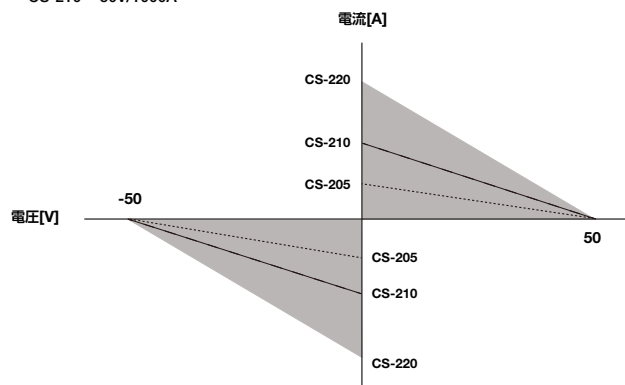
50 mΩ (1 kA Range) (Typical value)

100 mΩ (500 A Range) (Typical value)

## Output Range

### HC UNIT

--- CS-205 50V/500A    — CS-220 50V/2000A  
 --- CS-210 50V/1000A



## MEASUREMENT PART

| Measurement Voltage |                    |               |                    |
|---------------------|--------------------|---------------|--------------------|
| Voltage Range ※1    | Setting Resolution | Voltage Range | Setting Resolution |
| • 50V               | 2.5mV              | 2V            | 100μV              |
| • 20V               | 1mV                | 1V            | 50μV               |
| • 10V               | 500μV              | 500mV         | 25μV               |
| • 5V                | 250μV              | 200mV         | 10μV               |

## Current Measurement Accuracy ※2 ※3

± (Set value × 2% + Set range × 0.1%)

## Dynamic Range (Measurement voltage)

Can measure up to 125% of the measurement range.

※1: Voltage measurement is measured at MAIN UNIT (using MV SENSE terminal).

※2: Specified within the measurement range.

※3: Specified in combination with MAIN UNIT.

| Measurement Current |                    |               |                    |
|---------------------|--------------------|---------------|--------------------|
| Current Range       | Setting Resolution | Current Range | Setting Resolution |
| • 1A                | 50μA               | 50μA          | 2.5nA              |
| • 500mA             | 25μA               | 20μA          | 1nA                |
| • 200mA             | 10μA               | 10μA          | 500pA              |
| • 100mA             | 5μA                | 5μA           | 250pA              |

※1: The 2kA range is available only on the CS-220.

※2: The 1kA range is available on the CS-220 and CS-210.

## Current Measurement Accuracy

± (Set value × 2% + Set range × 0.1%) ※1 ※2

## Dynamic Range (Measurement current)

Can measure up to 125% of the measurement range.



Power Source

Power voltage range  
AC 100 ~ 240 V ± 10%、50/60Hz

Power Consumption

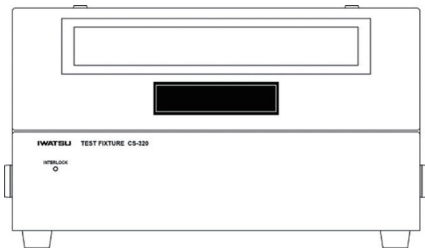
300 VA max (CS-220)  
270 VA max (CS-210/CS-205)

Physical Characteristics

Dimensions(W x H x D, Excluding accessories and projection)  
424 mm x 176 mm x 556 mm (CS-220)  
424 mm x 132 mm x 556 mm (CS-210/CS-205)  
Weight  
About 22kg (CS-220)  
About 21kg (CS-210/CS-205)

CS-32x series Test Fixture

Test Fixture CS-320



This product is a cutting-edge test fixture capable of operating at a maximum peak voltage of 200V and a maximum peak current of 2 A in combination with the CS-8000 series curve tracer and the CS-200 series HC unit. It is useful not only for measuring the characteristics of high-voltage, high-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. It can also be combined with the CS-400 series using AUX.

Rear Terminal

| Item            | Specification                    |
|-----------------|----------------------------------|
| DRAIN/COLLECTOR | 200 Vpk : FOURCE, SENSE(THIAHAL) |
| GATE/BASE       | 40 Vpk : FOURCE, SENSE(THIAHAL)  |
| SOURCE/EMITTER  | 40 Vpk : FOURCE, SENSE(THIAHAL)  |
| AUX1            | 40 Vpk : BNC                     |
| AUX2            | 40 Vpk : BNC                     |

Terminal inside the cover

| Item            | Specification                                                                            |
|-----------------|------------------------------------------------------------------------------------------|
| DRAIN/COLLECTOR | 5 kVpk : FORCE(4 ϕ Banana terminal & 6 ϕ Screw terminal)<br>: SENSE(4 ϕ Banana terminal) |
| GATE/BASE       | 200 Vpk : FOURCE, SENSE(4 ϕ Banana terminal)                                             |
| SOURCE/EMITTER  | 40 Vpk : FOURCE, SENSE(4 ϕ Banana terminal)                                              |
| AUX1            | 40 Vpk : 4 ϕ Banana terminal                                                             |
| AUX2            | 40 Vpk : 4 ϕ Banana terminal                                                             |
| GNDU            | - : 4 ϕ Banana terminal                                                                  |

Indicator(LED)

Interlock • ENABLE

Control signal

Control interface input / output  
Interlock  
External interlock (HR10 connector: 10 pins)  
Physical characteristics  
Dimension(W × H × D) 330mm × 180mm × 370mm (Excluding accessories and projection)  
Weight About 10 kg (Excluding accessories and options)

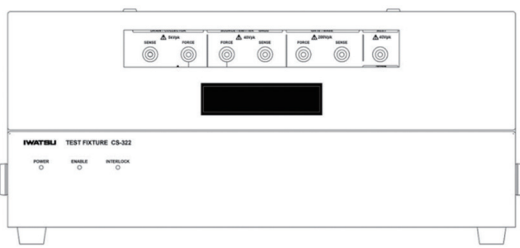
Accessory

HC-FIXTURE Connection Unit : 1  
Connecting Brackets : 4  
Power Cord : 1  
Cord Strap : 1  
Instruction Manual : 1  
Sales Network : 1

Notice:

HC standard cable set CS-022 is required to connect to CS-8000.

Test Fixture CS-322



This product is a cutting-edge test fixture capable of operating at a maximum peak voltage of 5 kV and a maximum peak current of 2 kA in combination with the CS-8000 series curve tracer and the CS-200 series HC unit. It is useful not only for measuring the characteristics of high-voltage, high-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. By placing the device to be measured inside the cover of the test fixture and making basic connections, the CS-8000 series can perform measurements while automatically switching the connection with the applied power supply by command from the CS-8000 series for each circuit to be measured. It can also be combined with the CS-400 series using AUX.

Rear terminal

| Item            | Specification                           |
|-----------------|-----------------------------------------|
| DRAIN/COLLECTOR |                                         |
| MIDDLE VOLTAGE  | 200 Vpk : FOURCE, SENSE(triaxial)       |
| HIGH VOLTAGE    | 5 kVpk : FORCE,SENSE(HV)                |
| HIGH CURRENT    | 50 Vpk : HIGH, LOW(6 ϕ Banana terminal) |
| GATE/BASE       | 40 Vpk : FOURCE, SENSE(triaxial)        |
| SOURCE/EMITTER  | 40 Vpk : FOURCE, SENSE(triaxial)        |
| GNDU            | FORCE, SENSE(triaxial)                  |
| AUX1            | 40 Vpk : BNC                            |
| AUX2            | 40 Vpk : BNC                            |

Terminal inside the cover

| Item            | Specification                                                                            |
|-----------------|------------------------------------------------------------------------------------------|
| DRAIN/COLLECTOR | 5 kVpk : FORCE(4 ϕ Banana terminal & 6 ϕ Screw terminal)<br>: SENSE(4 ϕ Banana terminal) |
| GATE/BASE       | 200 Vpk : FOURCE, SENSE(4 ϕ Banana terminal)                                             |
| SOURCE/EMITTER  | 40 Vpk : FOURCE, SENSE(4 ϕ Banana terminal)                                              |
| AUX1            | 40 Vpk : 4 ϕ Banana terminal                                                             |
| AUX2            | 40 Vpk : 4 ϕ Banana terminal                                                             |
| GND             | - : 4 ϕ Banana terminal                                                                  |

## CONFIGURATION

Internal wiring switching function

GATE / BASE RESISTOR connection function

### Indicator(LED)

Interlock · ENABLE

### Control signal

Control interface input / output

Interlock

External interlock (HR10 connector: 10 pins)

### Power Source

Power Voltage Range AC 100 ~ 240 V ± 10%

Frequency 50/60Hz

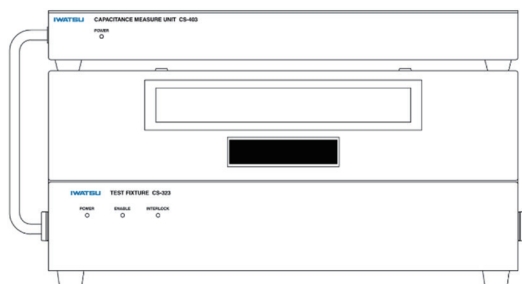
Power line consumption 50 VA max

### Physical characteristics

Dimension(W × H × D) 424mm × 180mm × 555mm (Excluding accessories and projection)

Weight About 10 kg (Excluding accessories and options)

## Test Fixture CS-323



The High Voltage C-V Measurement System consists of the CS-8000 series curve tracer, CS-403 and CS-323 test fixtures, and the CV Measurement Tool for CS-8000 application that remotely controls them.

The CS-8000 changes the DC bias voltage and measures the capacitance and resistance of the device with an LCR meter.

The CS-8000 can sweep the drain (collector) or gate (base) bias voltage values. This allows the user to examine the characteristics of the change in measured values due to changes in each DC bias. In addition, the CS-8000 can perform C-Time measurement, in which a constant DC bias voltage is applied at a specified time and the change in capacitance and resistance over time is measured, and Frequency Sweep measurement, in which the measurement frequency is swept.

### Rear terminal

| Item                | Specification                           |                                           |
|---------------------|-----------------------------------------|-------------------------------------------|
| DRAIN/COLLECTOR     |                                         |                                           |
| MIDDLE VOLTAGE      | 200 Vpk : FOURCE, SENSE(triaxial)       |                                           |
| HIGH VOLTAGE        | 5 kVpk : FORCE,SENSE(HV)                |                                           |
| HIGH CURRENT        | 50 Vpk : HIGH, LOW(6 φ Banana terminal) |                                           |
| GATE/BASE           | 40 Vpk : FOURCE, SENSE(triaxial)        |                                           |
| SOURCE/EMITTER      | 40 Vpk : FOURCE, SENSE(triaxial)        |                                           |
| GNDU                | FORCE, SENSE(triaxial)                  |                                           |
| LCUR,LPOT,HPOT,HCUR | -                                       | Connect to LCR meter through CV CABLE     |
| J1 TERMINAL         | -                                       | Detects if CV CABLE is properly installed |
| AUX1                | 40 Vpk : BNC                            |                                           |
| AUX2                | 40 Vpk : BNC                            |                                           |

### Terminal inside the cover

| Item                    | Specification                                                                            |
|-------------------------|------------------------------------------------------------------------------------------|
| DRAIN/COLLECTOR         | 5 kVpk : FORCE(4 φ Banana terminal & 6 φ Screw terminal)<br>: SENSE(4 φ Banana terminal) |
| GATE/BASE               | 200 Vpk : FOURCE, SENSE(4 φ Banana terminal)                                             |
| SOURCE/EMITTER          | 40 Vpk : FOURCE, SENSE(4 φ Banana terminal)                                              |
| CV                      |                                                                                          |
| DRAIN/COLLECTOR/CATHODE | 5 kVpk : SHV-Banana cable                                                                |
| SOURCE/EMITTER/ANODE    | BNC-Banana cable                                                                         |
| GATE/BASE               | 40 Vpk : BNC-Banana cable                                                                |
| AUX1                    | 40 Vpk : 4 φ Banana terminal                                                             |
| AUX2                    | 40 Vpk : 4 φ Banana terminal                                                             |
| GND                     | - : 4 φ Banana terminal                                                                  |

## CONFIGURATION

Internal wiring switching function

GATE / BASE RESISTOR connection function

### Indicator(LED)

Interlock · ENABLE

### Control signal

Control interface input / output

Interlock

External interlock (HR10 connector: 10 pins)

### Power Source

Power Voltage Range AC 100 ~ 240 V ± 10%

Frequency 50/60Hz

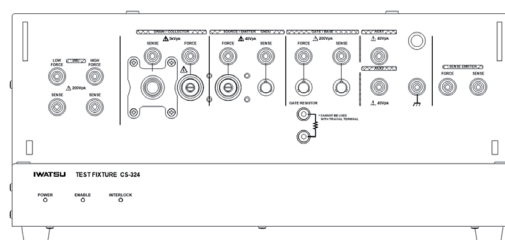
Power line consumption 50 VA max

### Physical characteristics

Dimension(W × H × D) 424mm × 180mm × 555mm (Excluding accessories and projection)

Weight About 10 kg (Excluding accessories and options)

## Test Fixture CS-324



This product is a unit designed to be used in conjunction with the CS-8000 series and to connect to test fixtures other than ours, such as probers. It can be used in combination with the CS-8000 series curve tracer and the CS-200 series HC unit to handle peak voltages up to 5 kV and peak currents up to 2 kA. The CS-8000 series can automatically switch the connection with the applied power supply according to the circuit to be measured. The Test Fixture CS-324 is a test fixture with dedicated connection terminals for use with the CS-401 and CS-402. It can also be combined with CS-400 series using SMU and AUX.

## Rear terminal

| Item            | Specification                                |
|-----------------|----------------------------------------------|
| DRAIN/COLLECTOR |                                              |
| MIDDLE VOLTAGE  | 200 Vpk : FOURCE, SENSE(triaxial)            |
| HIGH VOLTAGE    | 5 kVpk : FORCE,SENSE(HV)                     |
| HIGH CURRENT    | 50 Vpk : HIGH, LOW(6 $\phi$ Banana terminal) |
| GATE/BASE       | 40 Vpk : FOURCE, SENSE(triaxial)             |
| SMU             | 200 Vpk : FOURCE, SENSE(triaxial)            |
| SOURCE/EMITTER  | 40 Vpk : FOURCE, SENSE(triaxial)             |
| GNDU            | FORCE, SENSE(triaxial)                       |
| AUX1            | 40 Vpk : BNC                                 |
| AUX2            | 40 Vpk : BNC                                 |

## Terminal inside the cover

| Item            | Specification                                                                                           |
|-----------------|---------------------------------------------------------------------------------------------------------|
| DRAIN/COLLECTOR | 5 kVpk : FORCE(4 $\phi$ Banana terminal & 6 $\phi$ Screw terminal)<br>: SENSE(4 $\phi$ Banana terminal) |
| GATE/BASE       | 200 Vpk : FOURCE, SENSE(4 $\phi$ Banana terminal & triaxial)                                            |
| SOURCE/EMITTER  | 40 Vpk : FOURCE, SENSE(4 $\phi$ Banana terminal & triaxial)                                             |
| SMU             | 200 Vpk : FOURCE, SENSE(4 $\phi$ Banana terminal & triaxial)                                            |
| AUX1            | 40 Vpk : 4 $\phi$ Banana terminal                                                                       |
| AUX2            | 40 Vpk : 4 $\phi$ Banana terminal                                                                       |
| GND             | - : 4 $\phi$ Banana terminal                                                                            |

## CONFIGURATION

Internal wiring switching function

GATE / BASE RESISTOR connection function

## Indicator(LED)

Interlock • ENABLE

## Control signal

Control interface input / output

Interlock

External interlock (HR10 connector: 10 pins)

## Power Source

Power Voltage Range AC 100  $\sim$  240 V  $\pm$  10%

Frequency 50/60Hz

Power line consumption 50 VA max

## Physical characteristics

Dimension(W  $\times$  H  $\times$  D) 424mm  $\times$  180mm  $\times$  555mm (Excluding accessories and projection)

Weight About 9 kg (Excluding accessories and options)

Distribution in the UK & Ireland



**Lambda Photometrics Limited**

Lambda House Batford Mill

Harpenden Herts AL5 5BZ

United Kingdom

**E: info@lambdaphoto.co.uk**

**W: www.lambdaphoto.co.uk**

**T: +44 (0)1582 764334**

**F: +44 (0)1582 712084**

## Test Fixture CS-325

This product is a cutting-edge test fixture capable of operating at a maximum peak voltage of 5 kV and a maximum peak current of 2 kA in combination with the CS-8000 series curve tracer and the CS-200 series HC unit. It is useful not only for measuring the characteristics of high-voltage, high-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.

By placing the device to be measured inside the cover of the test fixture and making basic connections, the CS-8000 series can perform measurements while automatically switching the connection with the applied power supply by command from the CS-8000 series for each circuit to be measured.

Test Fixture CS-325 is a test fixture with dedicated connection terminals for use with CS-401 and CS-402. It can also be combined with the CS-400 series using SMU and AUX.

## Rear terminal

| Item            | Specification                                |
|-----------------|----------------------------------------------|
| DRAIN/COLLECTOR |                                              |
| MIDDLE VOLTAGE  | 200 Vpk : FOURCE, SENSE(triaxial)            |
| HIGH VOLTAGE    | 5 kVpk : FORCE,SENSE(HV)                     |
| HIGH CURRENT    | 50 Vpk : HIGH, LOW(6 $\phi$ Banana terminal) |
| GATE/BASE       | 40 Vpk : FOURCE, SENSE(triaxial)             |
| SMU             | 200 Vpk : FOURCE, SENSE(triaxial)            |
| SOURCE/EMITTER  | 40 Vpk : FOURCE, SENSE(triaxial)             |
| GNDU            | FORCE, SENSE(triaxial)                       |
| AUX1            | 40 Vpk : BNC                                 |
| AUX2            | 40 Vpk : BNC                                 |

## Terminal inside the cover

| Item            | Specification                                                                                           |
|-----------------|---------------------------------------------------------------------------------------------------------|
| DRAIN/COLLECTOR | 5 kVpk : FORCE(4 $\phi$ Banana terminal & 6 $\phi$ Screw terminal)<br>: SENSE(4 $\phi$ Banana terminal) |
| GATE/BASE       | 200 Vpk : FOURCE, SENSE(4 $\phi$ Banana terminal)                                                       |
| SOURCE/EMITTER  | 40 Vpk : FOURCE, SENSE(4 $\phi$ Banana terminal)                                                        |
| SMU             | 200 Vpk : FOURCE, SENSE(4 $\phi$ Banana terminal)                                                       |
| AUX1            | 40 Vpk : 4 $\phi$ Banana terminal                                                                       |
| AUX2            | 40 Vpk : 4 $\phi$ Banana terminal                                                                       |
| GND             | - : 4 $\phi$ Banana terminal                                                                            |

## CONFIGURATION

Internal wiring switching function

GATE / BASE RESISTOR connection function

## Indicator(LED)

Interlock • ENABLE

## Control signal

Control interface input / output

Interlock

External interlock (HR10 connector: 10 pins)

## Power Source

Power Voltage Range AC 100  $\sim$  240 V  $\pm$  10%

Frequency 50/60Hz

Power line consumption 50 VA max

## Physical characteristics

Dimension(W  $\times$  H  $\times$  D) 424mm  $\times$  180mm  $\times$  555mm (Excluding accessories and projection)

Weight About 11 kg (Excluding accessories and options)