

Instruction Manual

Curve Tracer CS-5000 series

CS-5100

CS-5200

CS-5300

CS-5400



Distribution in the UK & Ireland



IWATSU

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

Capter6 Specifications

6.1 Product specifications

Hereinafter, HIGH VOLTAGE will be expressed as HV and HIGH CURRENT as HC

(1/4)

Items		Product specifications				
Collector supply (HV mode)	Mode/polarity	AC ± full-wave rectified ±DC ±LEAKAGE				
	Max. peak voltage	30 V, 300 V, 5 kV (AC: 2.5 kV)				
	Max. peak current /pulse peak current	Max. peak voltage 30 V 300 V 5k V	Max. peak current 7.5 A 750 mA 25 mA	Pulse peak current 15 A 1.5 A 25 mA		
	Series resistance	Max. peak voltage Max. peak power 30 V 300 V 5 kV 390 W 200 mΩ 20Ω - 120 W 2Ω 200Ω - 12 W 20Ω 2 kΩ - 1.2 W 200Ω 20 kΩ - 120 mW 2 kΩ 200 kΩ - 32 W - - 200 kΩ 3.2 W - - 2 MΩ 320 mW - - 20 MΩ				
	Max. peak power Max. peak voltage: 30V,300V Max. peak voltage: 5kV	120 mW, 1.2 W, 12 W, 120 W, 390 W 320 mW、3.2 W、32 W				
	Variable collector supply	Continuously variable from 0% to 100.0% (in 0.1% step) Note: Output not calibrated				
	Output enabled/disabled	Collector supply can be set to output enabled/disabled.				
	Loop calibration	Hardware	Floating capacity between collector supply and ground can be calibrated.			
		Software	Software thinning pseudo-calibrates the loop.			
Collector supply (HC mode) *Specifications for CS-5200/5300/5400	Mode/polarity	±PULSE				
	Max. peak voltage	40 V (CS-5200/5300)、30 V (CS-5400)				
	Max. peak current	CS-5200/5300		CS-5400		
		10 kW 1 kA (CS-5300)		12 kW 1.5 kA		
		4 kW 400 A		4.5 kW 600 A		
		400 W 40 A		450 W 60 A		
	Output enabled/disabled	HC mode allows output from the collector supply to be ENABLE or DISABLE.				
	Pulse width	50 us to 400 us (in 10 us step) Note) If the pulse width is narrow, up to max. peak voltage may not be generated.				
	Pulse interval	CS-5200/5300 80 ms to 1000 ms (at 400 W) 160 ms to 1000 ms (at 4 kW) 320 ms to 1000 ms (at 10 kW)		CS-5400 100 ms to 1000 ms (at 450 W) 200 ms to 1000 ms (at 4.5 k W) 400 ms to 1000 ms (at 12 kW)		
Pulse measurement point	10 us to Pulse width setting value (in 10 us step)					
No. of data pieces	20 to 1000 points/trace					

Items		Product specifications
Step generator	Output accuracy	2 % of all output + 5 % $\times$ STEP AMPLITUDE setting + within (1 mV or 1 nA)
	Offset	
	Setting range	–10 times to +10 times of STEP AMPLITUDE setting
	Resolution	STEP AMPLITUDE setting $\times$ 1%
	Current mode	
	Amplitude range	50 nA to 200 mA per step, 21 steps, 1-2-5 switching
	Max. current	$\pm$ 2 A
	Max. voltage	10 V or more
	Voltage mode	
	Amplitude range	50 mV to 2 V per step, 6 steps, 1-2-5 switching
	Max. voltage	$\pm$ 40 V
	Max. current	At least 500 mA at 8 V or less, at least 200 mA at 15 V, at least 10 mA at 40 V
	Step 1/10	1/10 times of step current / voltage setting value
	Step rate	50 Hz or 60 Hz $\times$ 2 ($\times$ 1 when collector supply mode is set to AC) Pulse interval setting when collector supply is set to HC mode.
	Pulse step	
	Pulse width	50 μ s to 400 μ s (in 10 μ s step) When collector supply is in HC mode, pulse width is wider than that of the HC mode pulse; i.e., additional 100 μ s at each end Note) If the pulse width is narrow, to max. peak voltage may not be generated.
AUX output	No. of steps	0 step to 20 steps
AUX output	Range	Off, –40 V to +40 V, 100 mV step
	Accuracy	100 mV + 2% of setting value
Measurement	Mode	REPEAT, STOP / SINGLE, SWEEP
Vertical axis	Collector current	
	Range	HV: 1 μ A/div to 2 A/div, 20 steps, 1-2-5 switching (for all) HC: 100 mA/div to 200 A/div, 11 steps, 1-2-5 switching (CS-5400) HC: 100 mA/div to 100 A/div, 10 steps, 1-2-5 switching (CS-5300) HC: 100 mA/div to 50 A/div, 9 steps, 1-2-5 switching (CS-5200)
	Accuracy	2% of readout + 0.05 $\times$ VERT/div setting value or less Note 1: Internal loop calibration error below is added to the expression above. 5kV range: 12 μ A, 300V range: 1 μ A, 30V range: 0.5 μ A Note 2: Only areas of 30% or more in 5kV range and 10% or more in 300V/30V range are specified.
	Emitter current	
	Range	1 nA/div to 2 mA/div, 20 steps, 1-2-5 switching (Collector supply mode: $\pm$ LEAKAGE)
	Accuracy	2% of readout + 0.05 $\times$ VERT/div setting value + 1 nA or less
	Step generator display	
	Range	0.5 step/div
	POSITION	Inside of tube: 10 div
	Magnification display	$\times$ 2, $\times$ 5, $\times$ 10

Items		Product specifications
Horizontal axis	Collector voltage	
	Range	HV:50 mV/div to 500 V/div, 13 steps, 1-2-5 switching HC:50 mV/div to 5 V/div , 7 steps, 1-2-5 switching
	Accuracy	2% of readout + 0.05 × HORIZ/div setting value or less
	Base/emitter voltage	
	Range	50 mV/div to 5V/div, 7 steps, 1-2-5 switching
	Accuracy	2% of readout + 0.05 × HORIZ/div setting value or less
	Step generator display	
	Range	0.5 step/div
	POSITION	Inside of tube: 10 div
	Magnification display	×2, ×5, ×10
Display	Type	8.4-inch TFT-LCD
	Resolution	SVGA: 800 × 600 pixel
	No. of data pieces	1000 points / trace (AC full-wave rectified) 20 to 1000 points / trace (SWEEP mode)
	Trace display	Interpolation display between points, dot display
	Average	Off, 2 to 255 times
	Persistence	Off, Short, Long, infinite
	Internal waveform storage (REF)	4 screens can be saved.
Cursor measurement	DOT cursor	Vert, Horiz, β, or gm
	fLINE cursor	Vert, Horiz, 1/grad, intercept
	FREE cursor	Vert, Horiz , β, or gm
	WINDOW cursor	Vert, Horiz, β, or gm in WINDOW area
Built-in timer	Display	Year/month/day/hour/minute
Internal memory	Setup memory	256 memories
External memory	USB memory	USB1.1 Setup, waveform save/recall, screen hard copy (BMP,TIFF, PING)
Interface		10 Base-T/100 Base-TX Ethernet
Power supply	Power input range	AC 100-240 V, 50/60 Hz
	Power consumption(Operating)	500 VA (400 W) Max
	Power consumption(Standby)	50 VA (7 W) Max

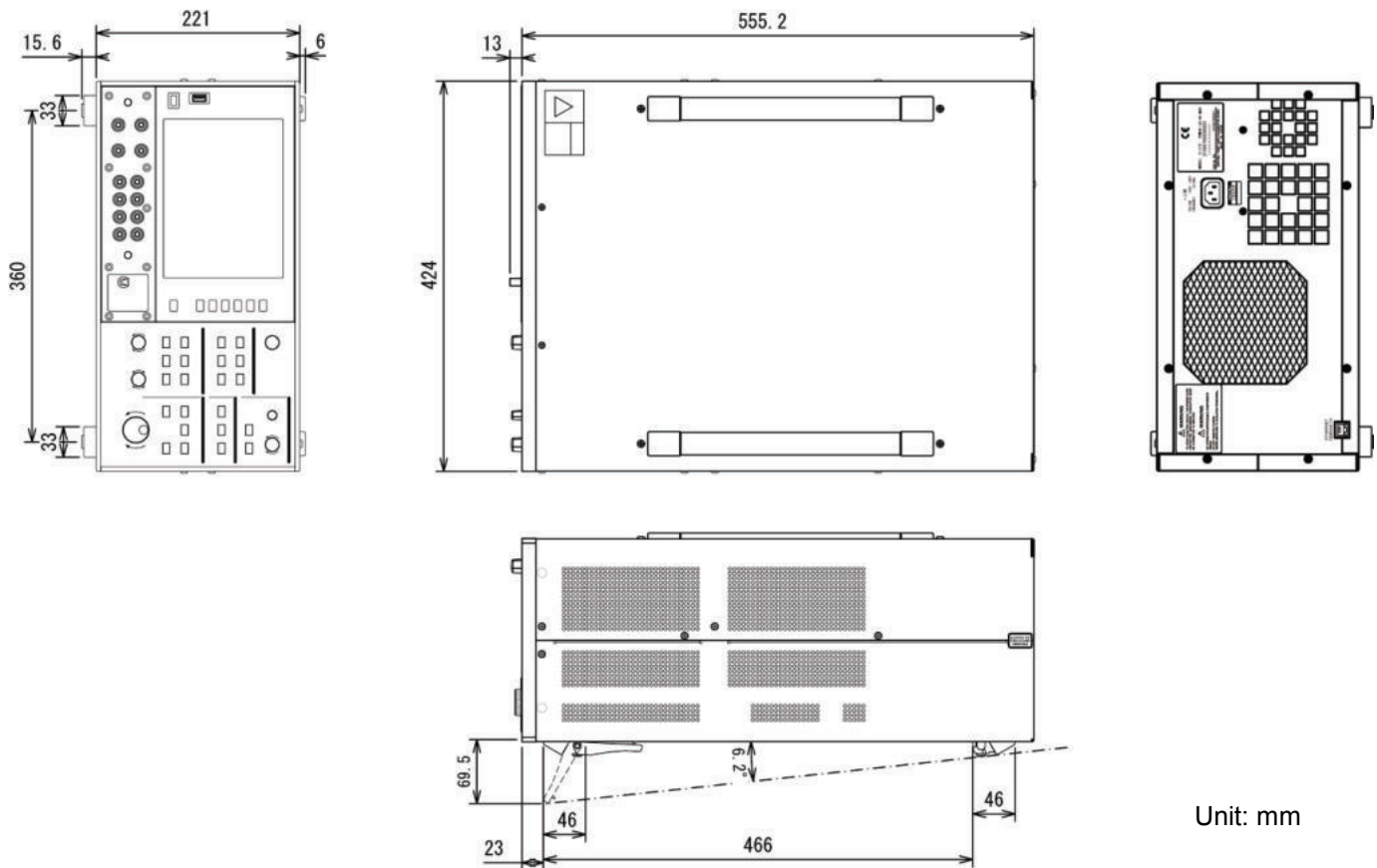
Items		Product specifications
Body	Outside dimensions (W × H × D)	424 mm × 220 mm × 555 mm (CS-5100) 424 mm × 354 mm × 555 mm (CS-5200/5300/5400) (Excluding attachment and projection)
	Mass	About 28 kg (CS-5100, excluding attachment and options) About 43 kg (CS-5200/5300/5400, excluding attachment and options)
Environment conditions	Performance ensured temperature range	+10°C to + 35°C
	Operation ensured temperature range	0°C to +40°C
	Operation ensured humidity range	0 to +40°C 5% to 80% RH (at 30°C or less) and no dew condensation allowed Upper limit value: 55% RH (at 40°C) and no dew condensation allowed
	Warming up time	30 minutes or more after powering on Note) The specifications standards are guarantee values after 30 minutes or more from turning on the power supply pass.
	Storage temperature range Storage humidity range	–20°C to +60°C, 5% to 80% RH (without dew condensation)
	Altitude (air pressure)	At operation: 2000 m or less (air pressure: about 79 kPa) At non-operation: 15000 m or less (air pressure: about 12 kPa)
	Pollution degree	2
	Power supply environment	IEC60364-4-443: For protection Against Overvoltage's of Atmospheric Origin or Due to Switching Power supply transient maximum voltage does not exceed IEC60364-4-443 CAT II. Temporary Overvoltages Short-term: 1440 V Long-term: 490 V
Accessories		Test fixture :1 - CS-303 : CS-5100/5200/5300 - CS-304 : CS-5400 Test adapter CS-500 (Blank adapter) :1 Wire set :1 set (7 wires) Instruction manual (Printed matter) :1 CD (Instruction manual / Remote control manual) :1 Power cord :1 Cord strap :1

6.2 Compliance standards

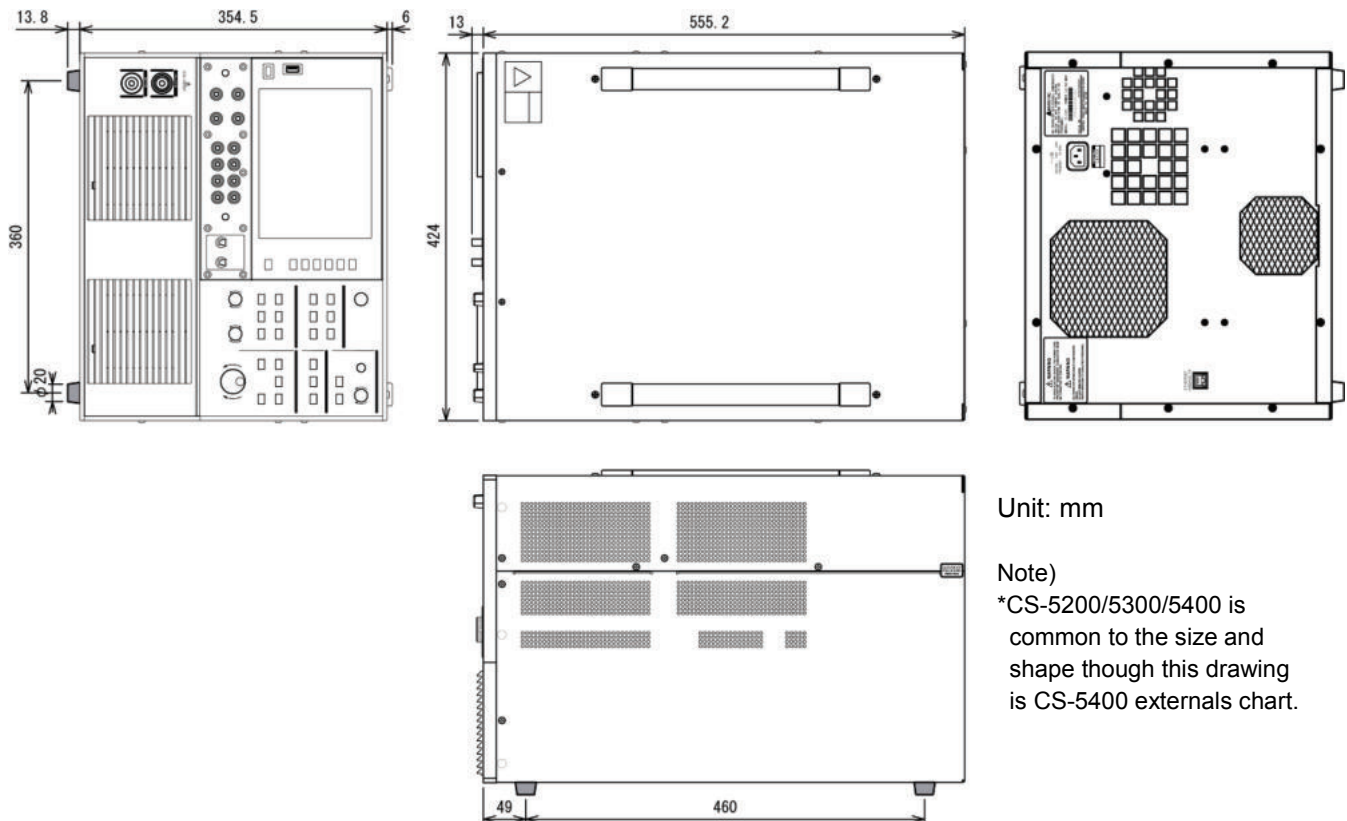
Items		Specifications
Compliance	CE marking	This instrument meets the requirements of EMC Directive 2014/30/EU for Electromagnetic Compatibility, Low Voltage Directive 2014/35/EU for Product Safety and RoHS Directive 2011/65/EU for restriction of the use of certain hazardous substances. Emission and Immunity standard EN61326-1: 2013 ClassA Safety standard EN61010-1: 2010 3rd Edition EN61010-2-30: 2010 1st Edition Environmental standard EN50581:2012 Monitoring and instruments

6.3 Outside view

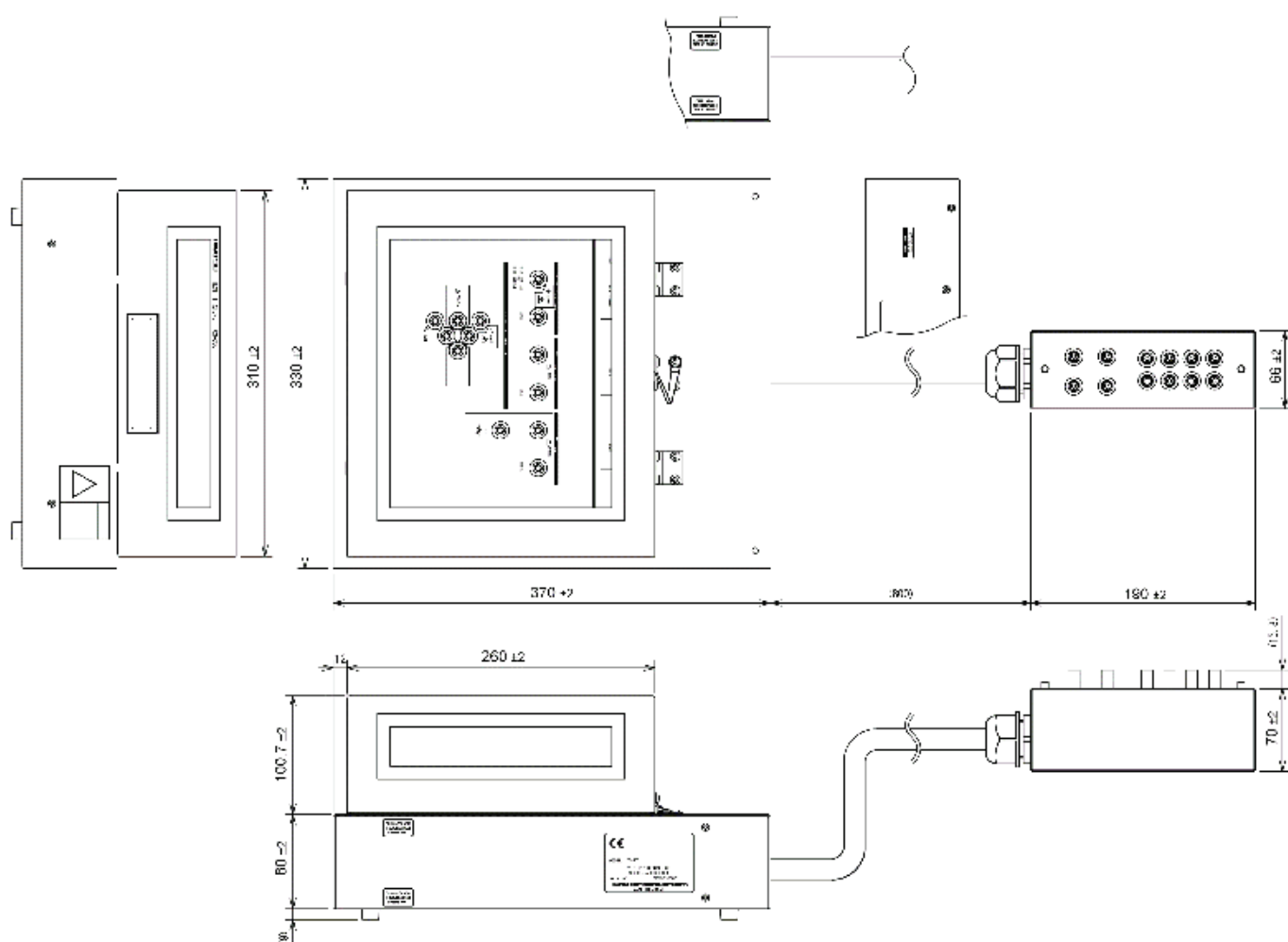
6.3.1 Main unit (CS-5100)



6.3.2 Main unit (CS-5200/CS-5300/CS-5400)

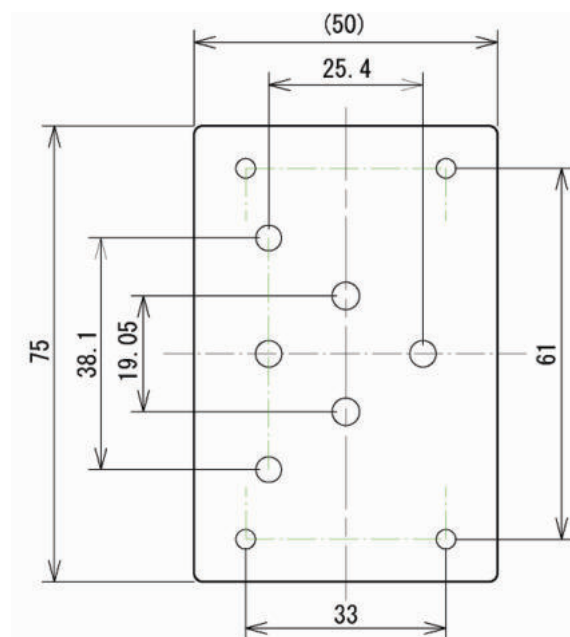
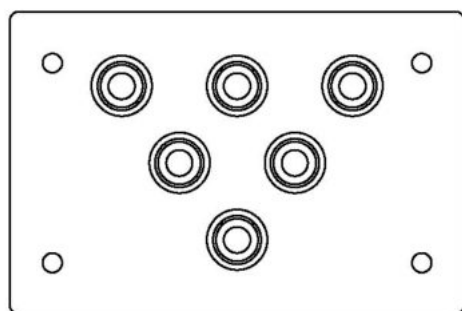
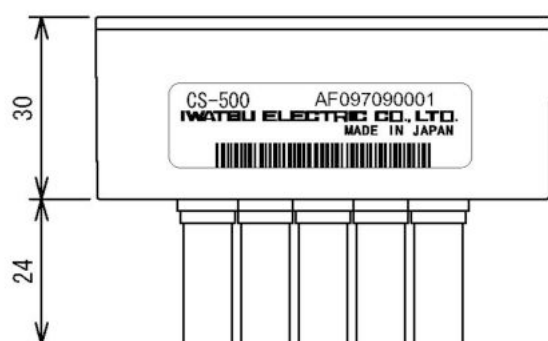
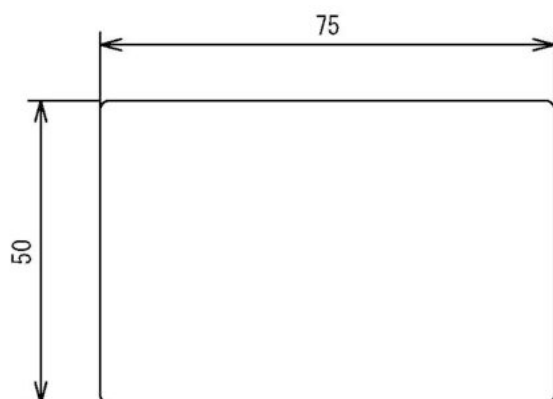


6.3.3 Test fixture CS-303 (For CS-5100/CS-5200/CS-5300)



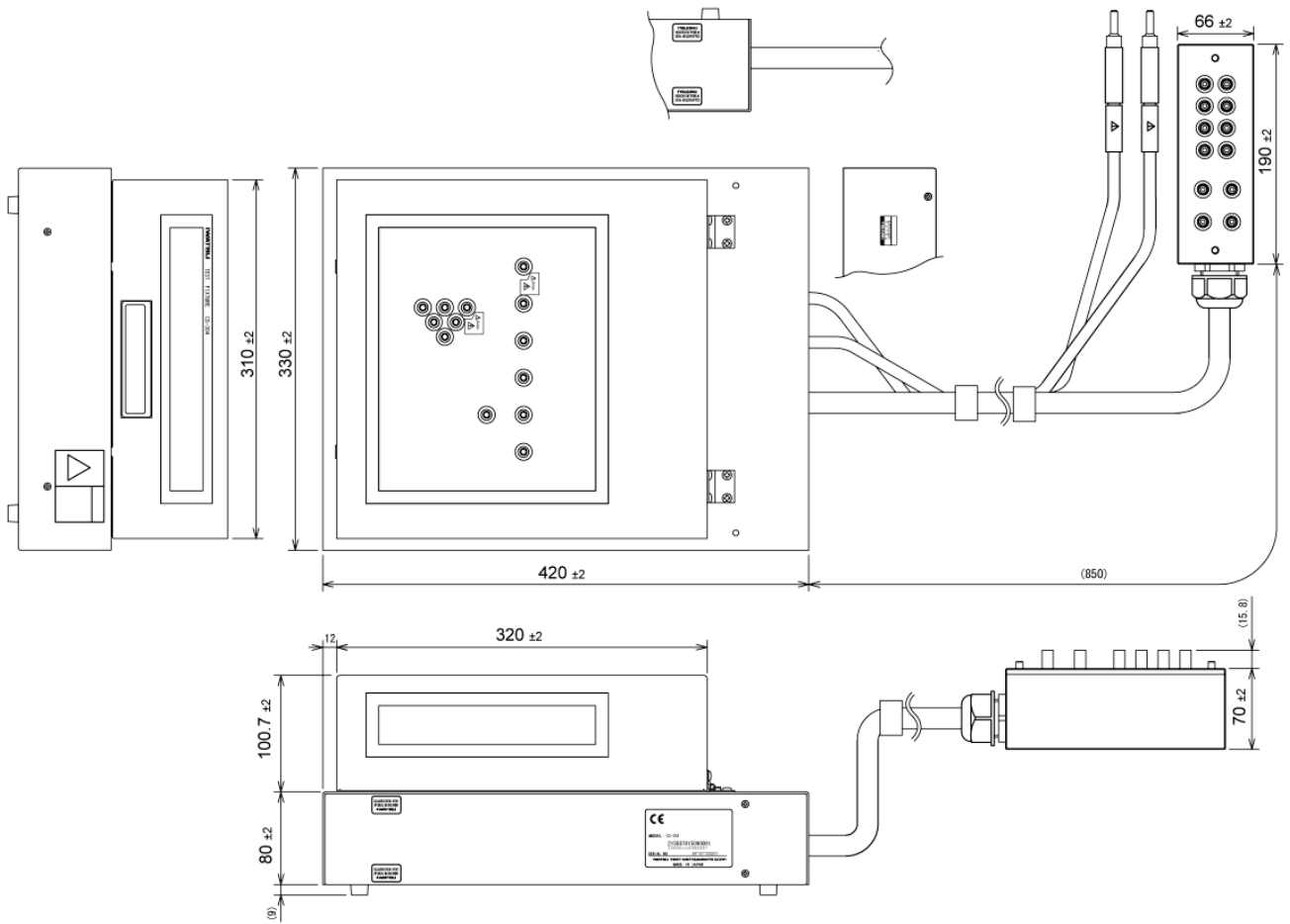
Unit: mm

6.3.4 Test adapter CS-500 (Blank adapter)



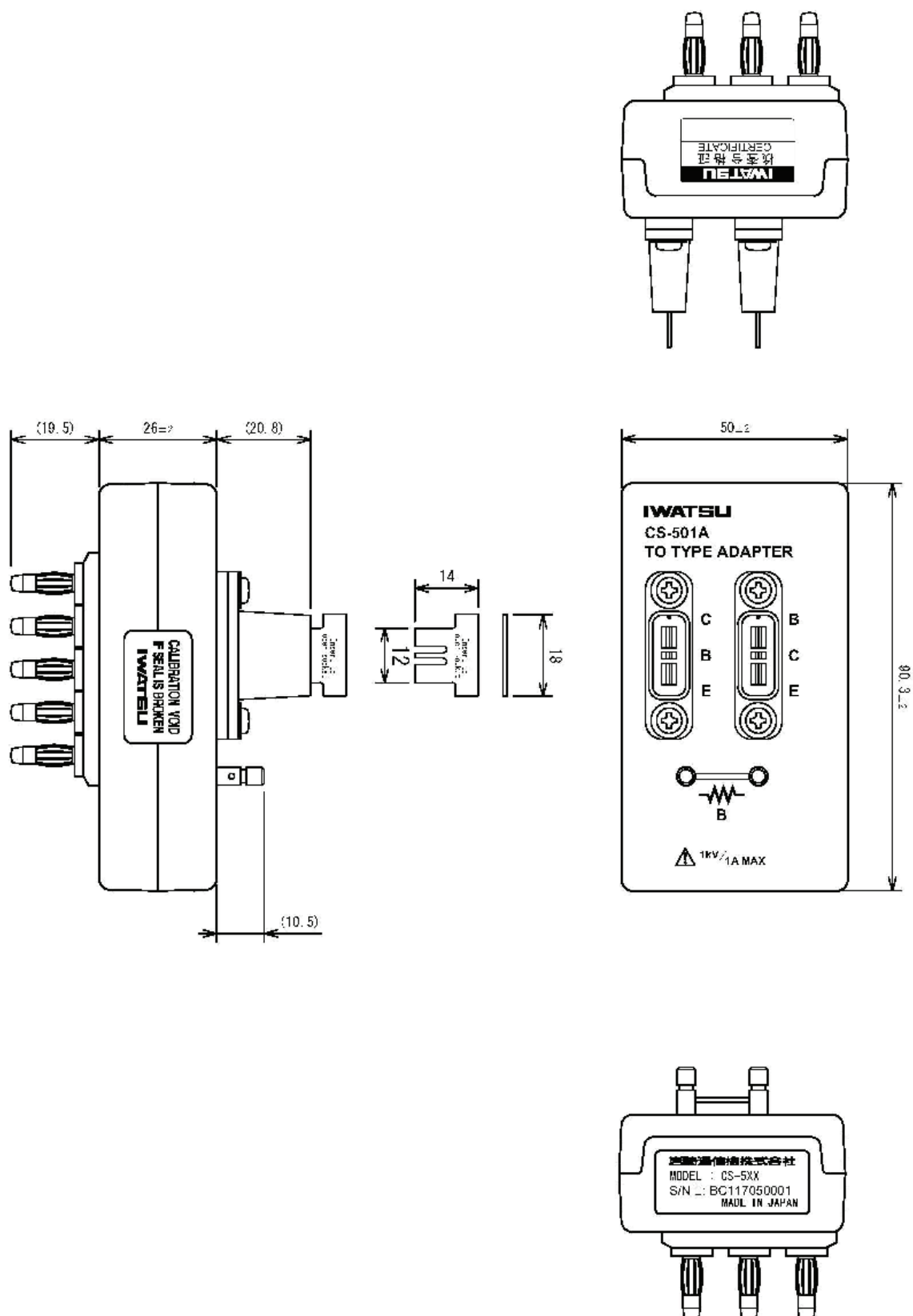
Unit: mm

6.3.5 Test fixture CS-304 (For CS-5400)



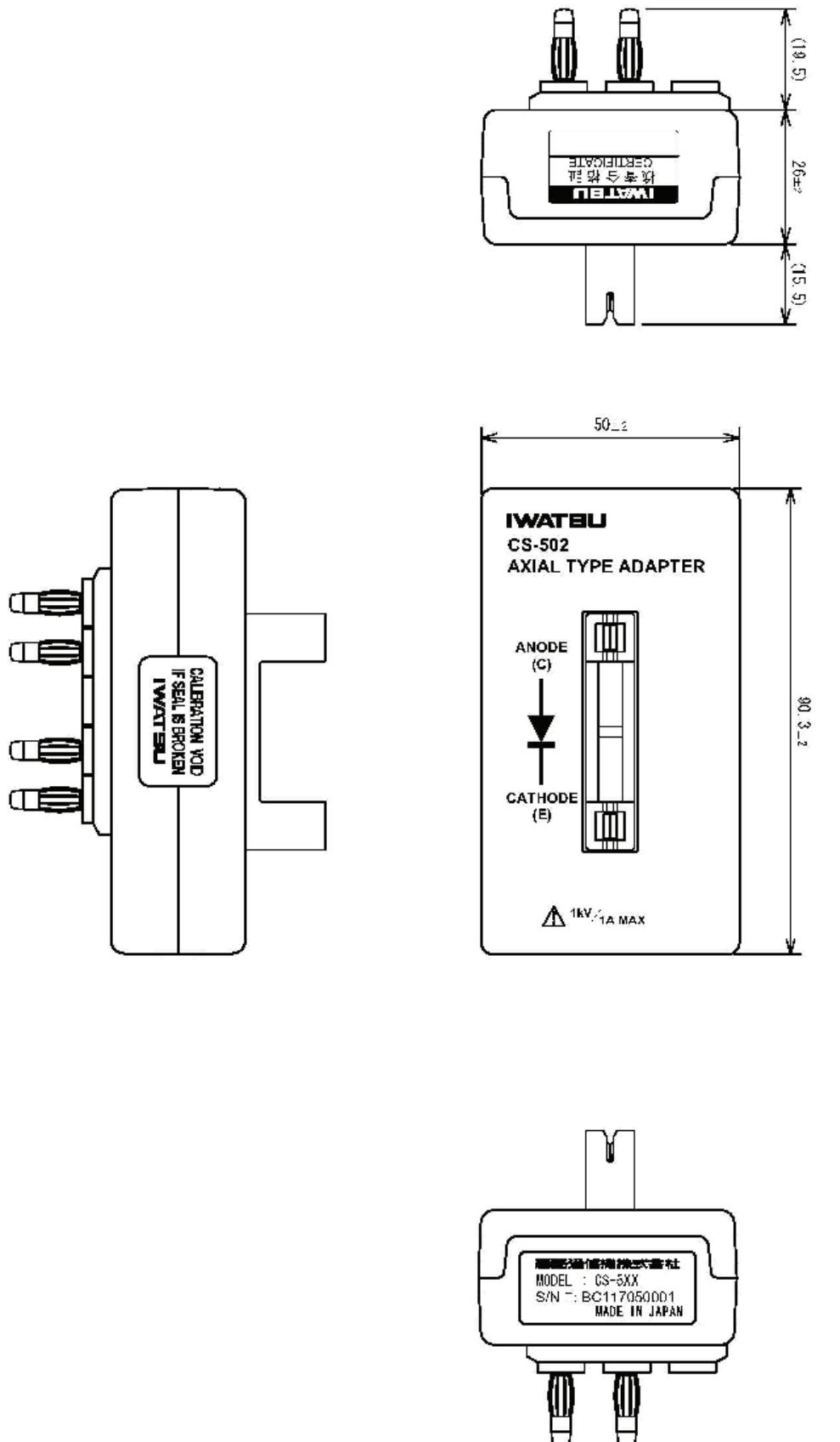
Unit: mm

6.3.6 Test adapter CS-501A (TO type adapter, option)



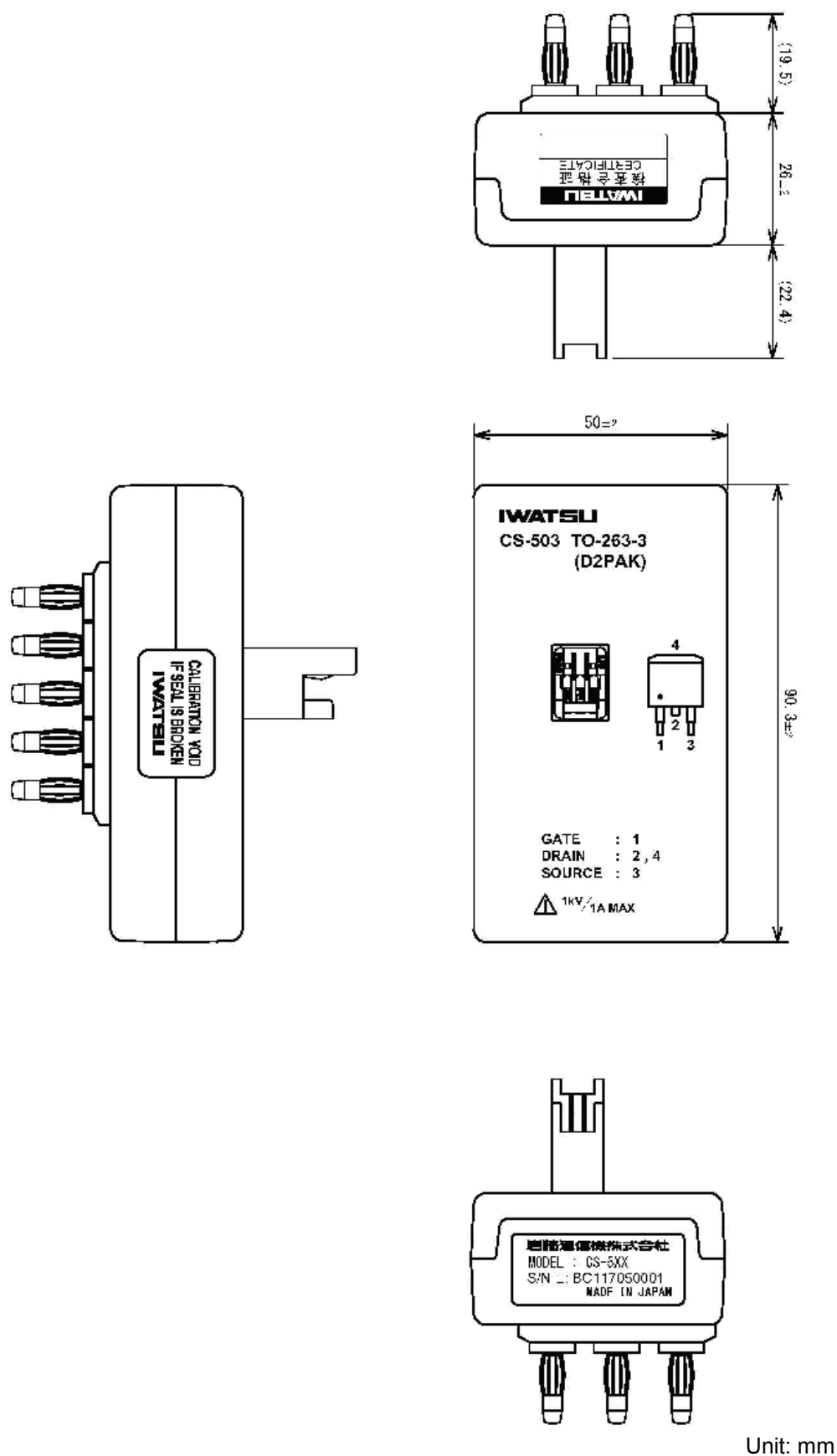
Unit: mm

6.3.7 Test adapter CS-502 (Axial type adapter, option)

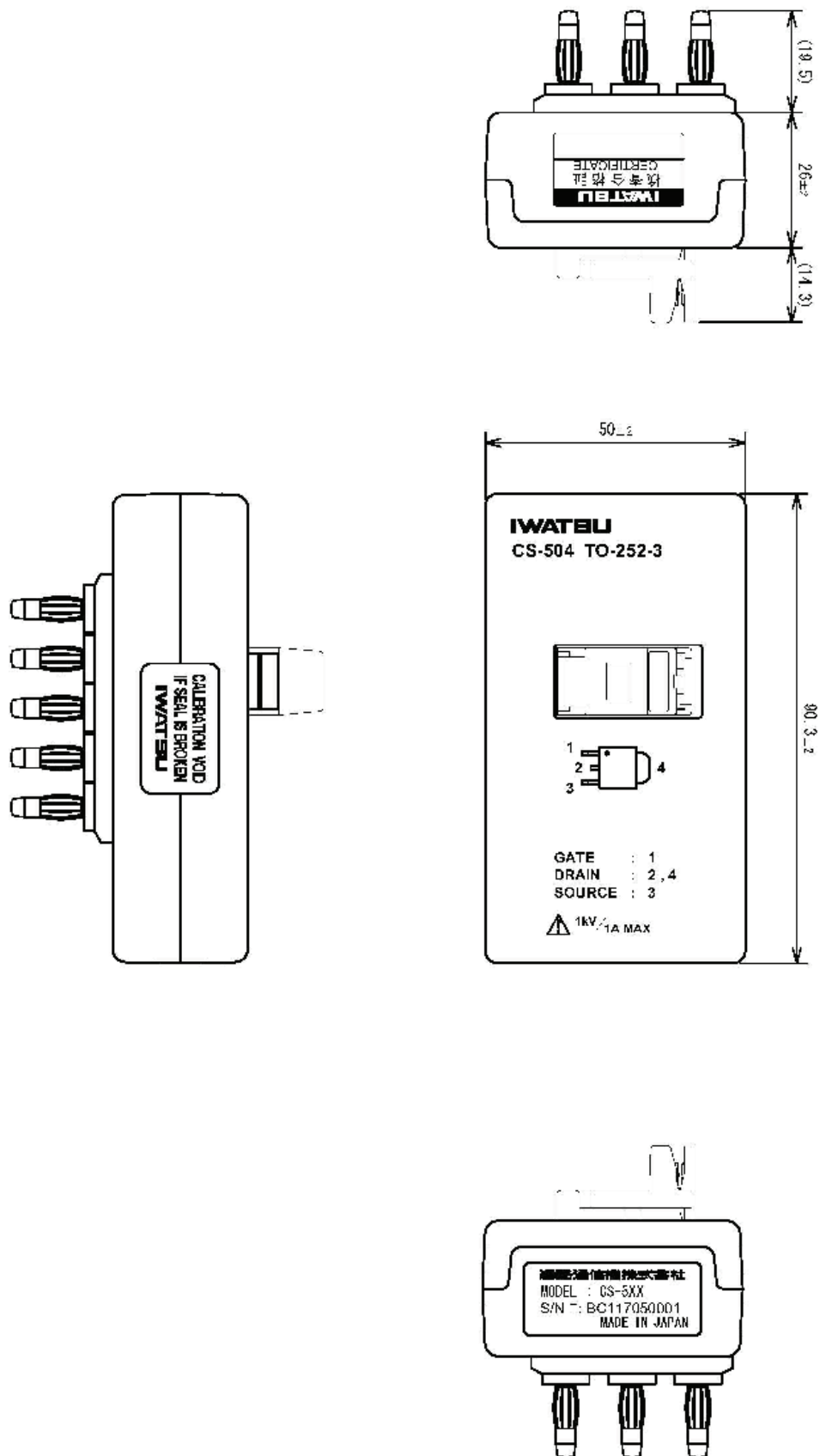


Unit: mm

6.3.8 Test adapter CS-503 (Surface Mount type adapter, option)

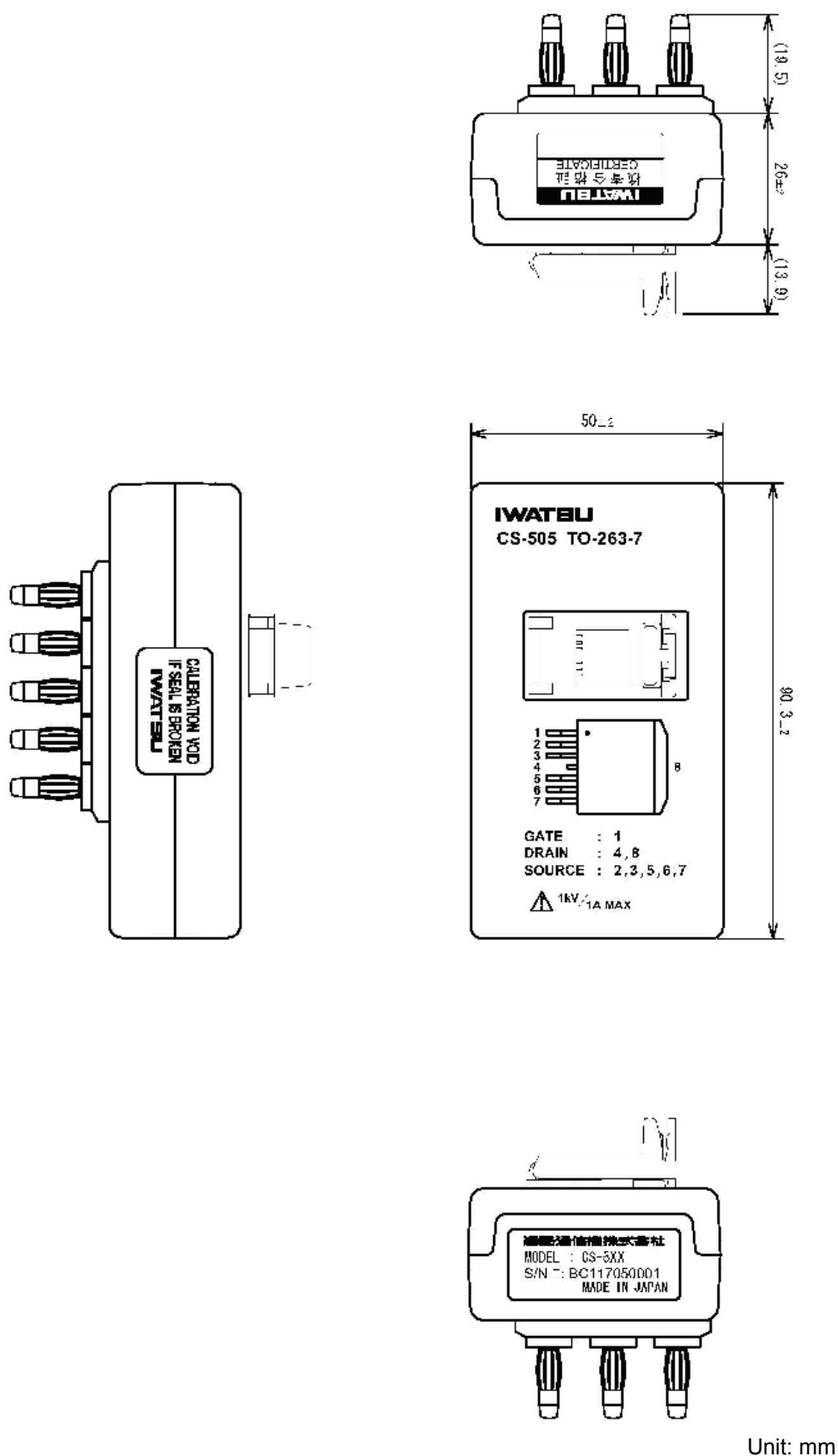


6.3.9 Test adapter CS-504 (Surface Mount type adapter, option)

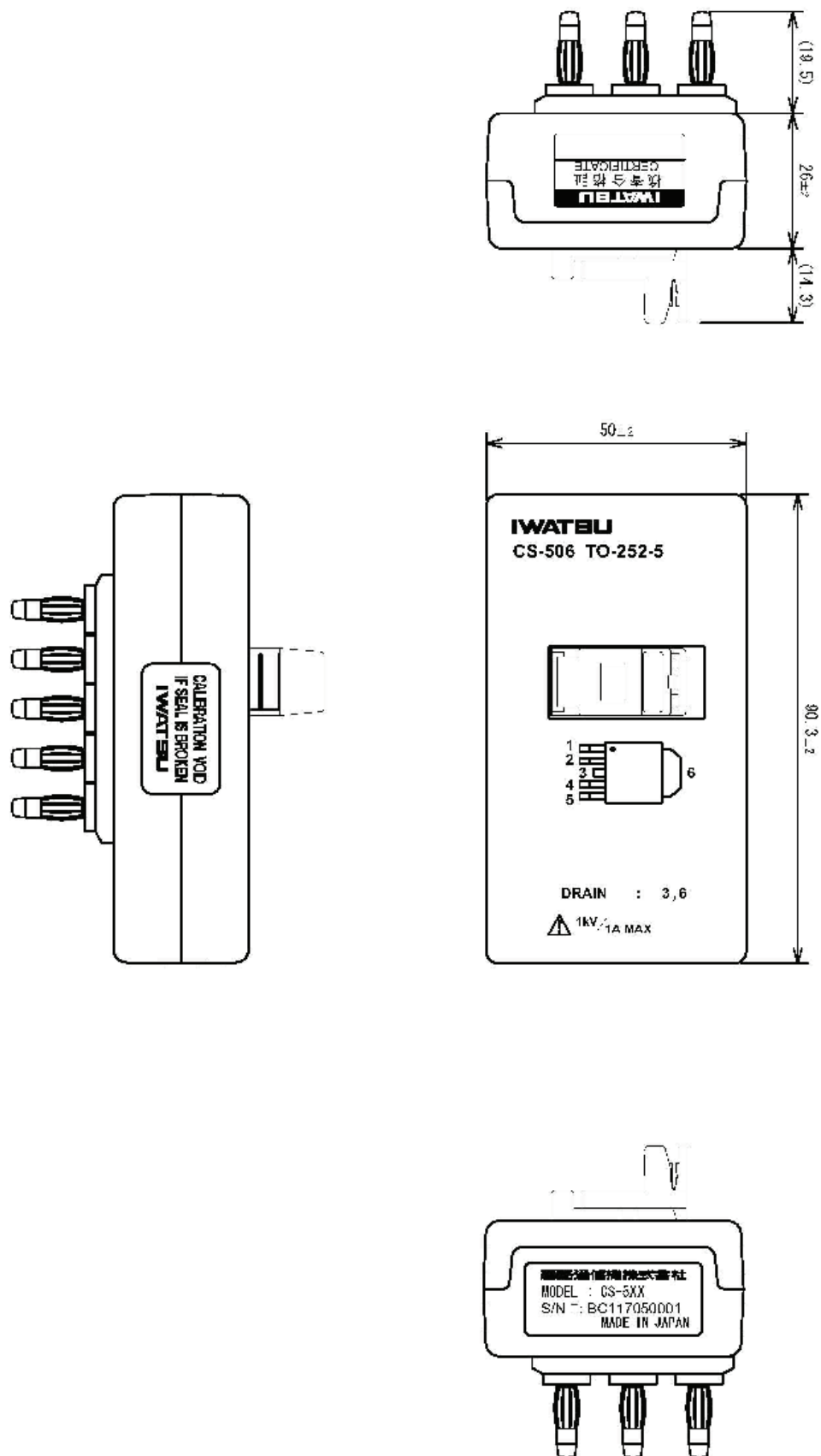


Unit: mm

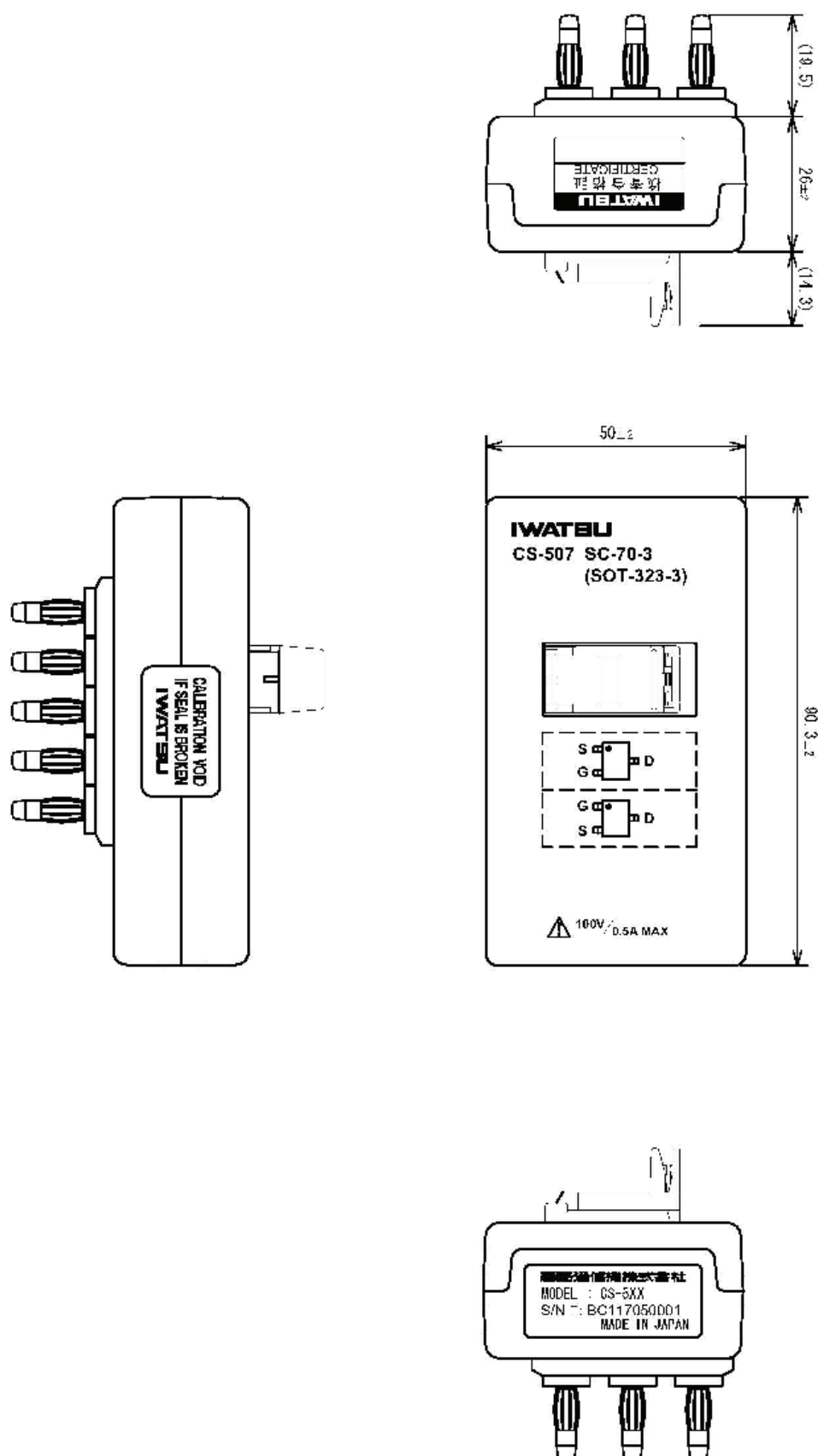
6.3.10 Test adapter CS-505 (Surface Mount type adapter, option)



6.3.11 Test adapter CS-506 (Surface Mount type adapter, option)

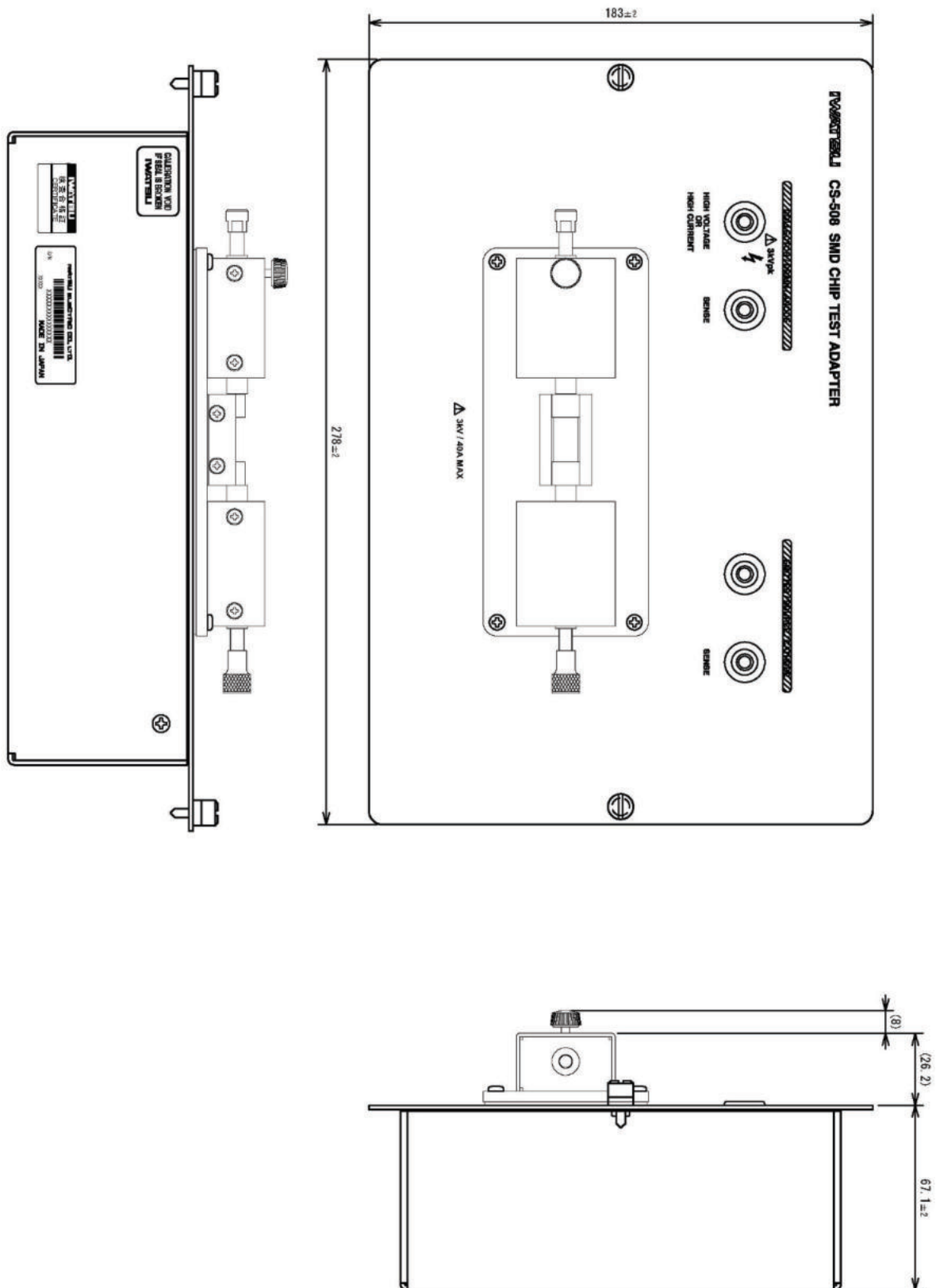


6.3.12 Test adapter CS-507 (Surface Mount type adapter, option)



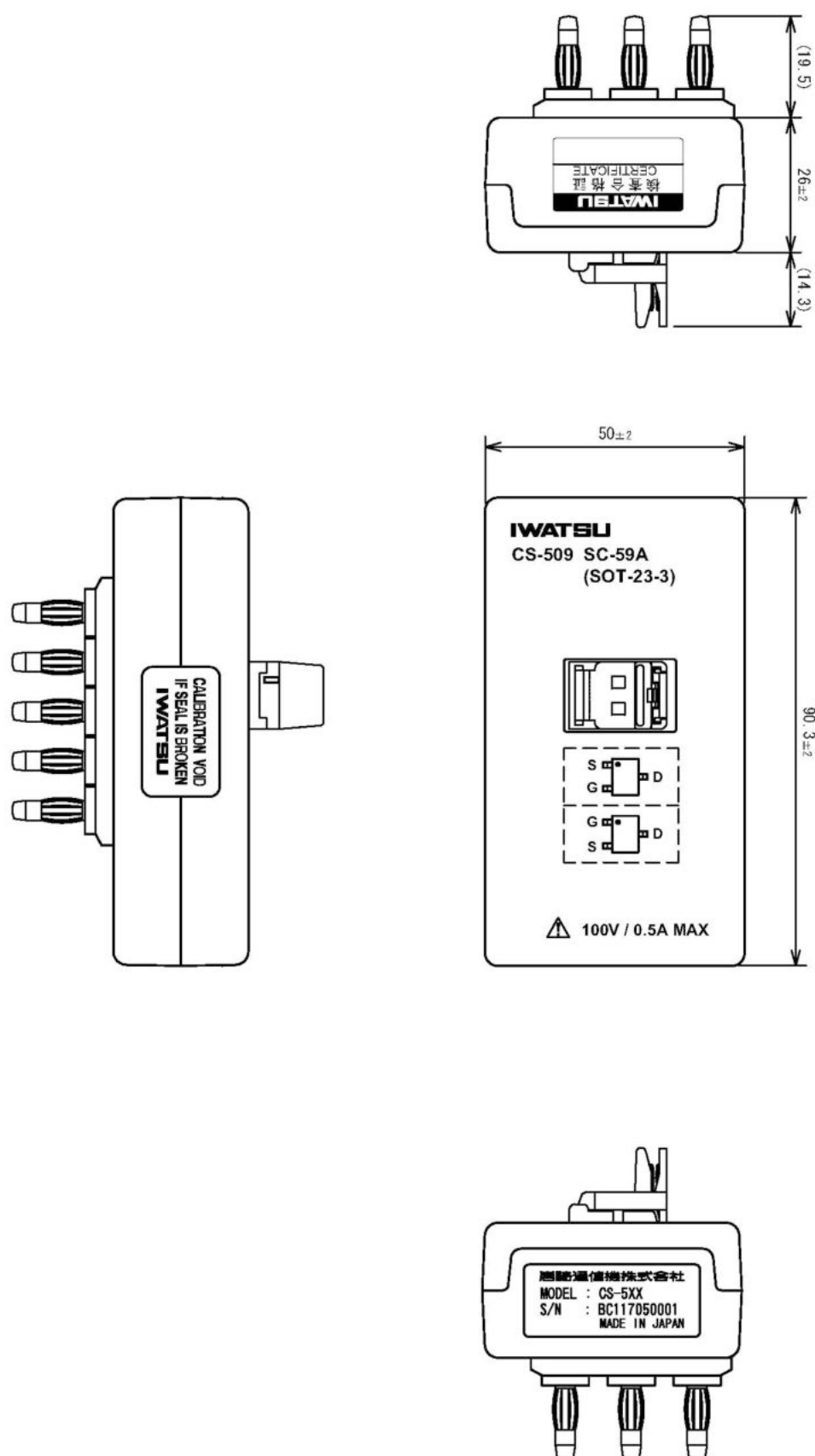
Unit: mm

6.3.13 Test adapter CS-508 (SMD CHIP type adapter, option)



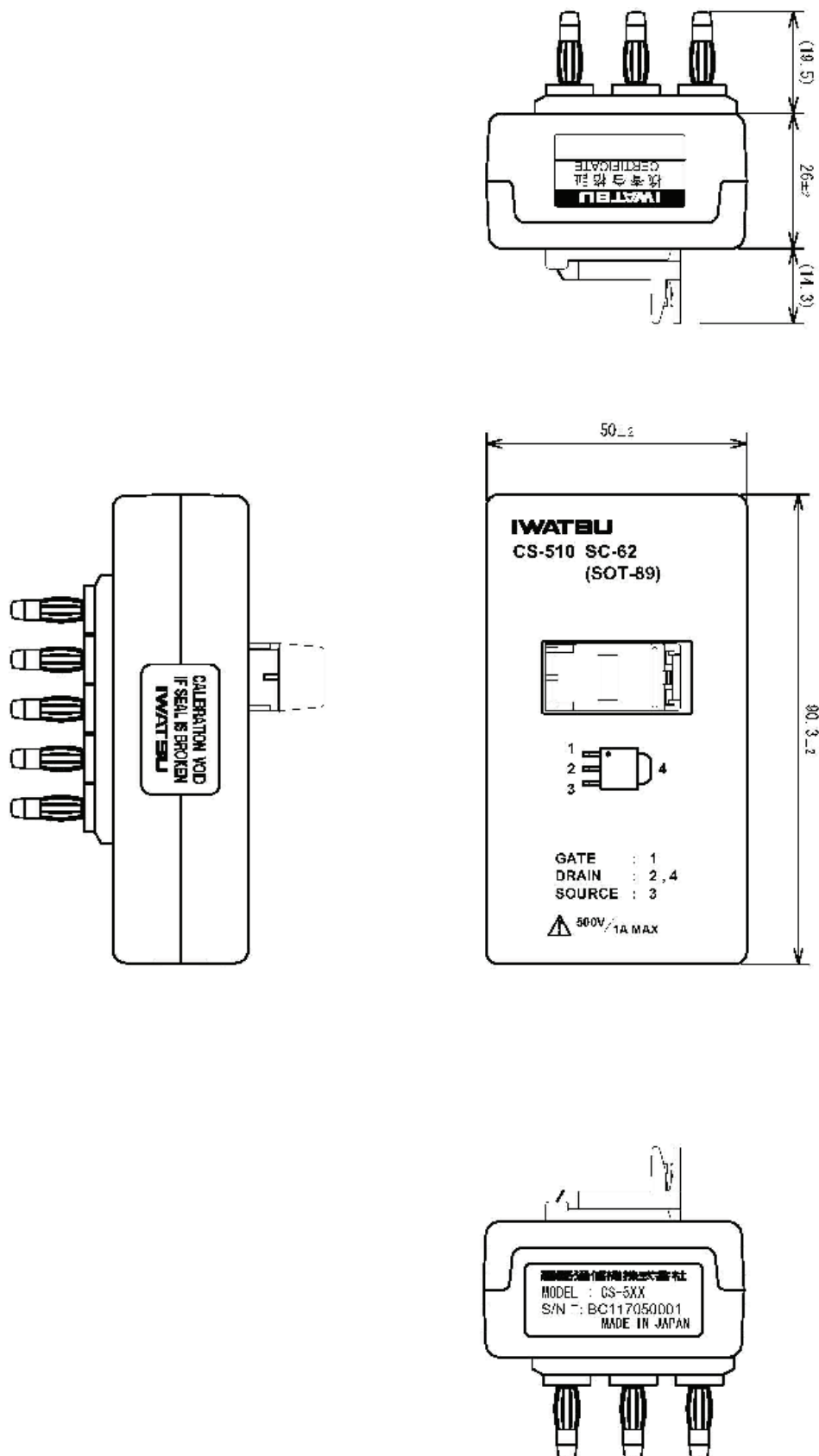
Unit: mm

6.3.14 Test adapter CS-509 (Surface Mount type adapter, option)



Unit: mm

6.3.15 Test adapter CS-510 (Surface Mount type adapter, option)



Unit: mm