
General
Specifications

CSU-W1
Confocal Scanner Unit

CSU-W1

GS 80C01D01-01E

■ General description

The CSU-W1 is a confocal scanner unit which has evolved from the proven microlens array built-in Nipkow disk confocal system for live cell imaging, and features a wider field of view and higher quality of image than previous models. The CSU-W1 can be combined with various microscopes to build a confocal microscope system for cutting-edge research in biology and medicine, such as research on iPS cells.

The CSUW1 is not a medical device.

In principle, CSUW1 is intended to be used within the customer's facility for the customer's own research and development. Please contact us if you wish to use CSUW1 for contract research business, as a separate license may be required.



■ Features

1. Wide field of view

A larger Nipkow disk achieves the world's largest 17 × 16mm field of view among confocal microscopes, four times larger than that of previous models. Since it can capture the details of many cells or an entire tissue in a single view, responses involving many cells and phenomena rarely occurring over a wide area can be easily observed.

2. High quality of image

Arranging pinholes on the disk with wider space reduces crosstalk between pinholes and in the result bokeh often seen in thick samples, making images clearer. Thus, the CSU-W1 can observe much deeper areas of thick samples which were difficult to observe in the past.

3. Low photo toxicity

The CSU-W1 inherits the features of low photo bleaching and photo toxicity from the microlens array built-in Nipkow disk confocal system and thus can observe live cells for a long time without causing them any damage.

4. Three Basic models

Three basic models are available: a single camera model T1, a dual camera model T2 and a split view model T3.

5. Bright field light path

A bright field light path is provided as standard, which is achieved by moving the disk unit from the light path. This simple mechanism makes overlay of the bright field image on the confocal image accurate.

6. Confocal effect

In addition to an existing disk with $\phi 50 \mu\text{m}$ pinholes, a disk with $\phi 25 \mu\text{m}$ pinholes which has greater confocal effect is available. User can select one or both disk types.

7. Supporting near infrared light

Near infrared light excitation up to 785 nm is available with the NIR beam Port as an option. This enables the observation by near infrared light, which can reach deeper regions in live organisms than visible light.

8. Assisting laser stimulation

Introducing light from an external scanner is available with the External light path as an option. This enables laser stimulation such as FLIP, FRAP, photo-activation, photo-conversion, uncaging and so on.

9. Lens switcher

Two types of relay lens can be set on the Lens switcher at the camera port as an option. This enables variable magnification without changing objective lens.

10. Variable Aperture

Variable aperture is available as option in T1 and T2 to change aperture size.

11. Motorized switching

All switching mechanisms are motorized and controllable by commands.

12. SoRa optics

SoRa (Super resolution via Optical Re-Assignment) optics offers high-speed super-resolution observation. With the use of SoRa optics, emitted photons from specimen can be optically reassigned to the most probable locations they originate from. Consequently, the improvement in resolution is achieved preserving inherent advantages of spinning disk confocal microscope. All switching mechanisms are motorized and controllable by commands.

13. Uniformizer

Optional Uniformizer offers even illumination across the field of view and allows more precise imaging measurements.

■ Standard specifications

1. Confocal scanning method

Pinhole array disk (Nipkow disk) which contains numerous pinholes arranged in the special spiral pattern, and microlens array disk which contains numerous microlens arranged in the same pattern with the pinholes array disk, rotate together and realize the unique multi-points confocal scanning.

Dichroic mirror (DM) is set between the two disks and separates the fluorescent light from the excitation light.

Scanning Method	Microlens-enhanced dual Nipkow disk scanning
Disk Unit	Up to 2 disk units mountable. Disk type: Normal 50μm/25μm pinhole disks and SoRa 50μm pinhole disk. In the case of 2 disk units, switching time is 15sec max.
Effective FOV	17mm x 16mm *1
Scanning Speed	75Hz - 200Hz (Motor rotating speed 1500rpm - 4000rpm) No FOV reduction
External synchronization	Scanning speed synchronization via pulse signal INPUT/OUTPUT TTL 300Hz - 800Hz (1500rpm - 4000rpm)
Bright field	Motorized switching by moving the disk unit from the light path. Switching time between Bright field mode and Confocal mode: 500ms max.

*1 Actual FOV depends on the magnification of the lens at the camera port and the camera chip size.

2. Three basic models

A single camera model T1 which observes multiple wavelengths on a time-sharing basis, where wavelengths are changed by emission (EM) filters on a filter wheel; a dual cameras model T2 which simultaneously observes two wavelengths, where a dichroic mirror is used for fluorescence unmixing; and a split view model T3 which simultaneously observes two wavelengths, where the field of view is divided into two areas for each wavelength.

Single camera model T1	1 camera port, 1 10-position filter wheel
Dual camera model T2	2 camera ports, 2 10-position filter wheels, 3-position DM
Split View model T3	1 camera port, 1 6-position filter wheel, 2-position DM, Split view optics with switching aperture (Optional Variable Aperture is not available.)

3. Input of excitation laser

Excitation laser light is introduced via fiber into scanner unit and 2 beam ports can be set, standard Visible (VIS) beam Port and optional NIR beam Port. Either Visible (VIS) beam Port or Uniformizer can be selected for visible laser input. Input power in total must be less than 500mW to keep within Class 3B. The specific fibers are selectable on the type of connector at laser source and wavelength band to match up with each beam port from Yokogawa standard fibers. VIS beam and NIR beam can be combined inside for simultaneous excitation. Each beam port has own internal built-in shutter.

	Fiber connector	Shutter
VIS beam Port	Angled (8°) FC connector	Switching time: 30msec max., Repetition rate: 10Hz max.
NIR beam Port	Angled (8°) FC connector	Switching time: 30msec max., Repetition rate: 10Hz max.

Input power in total must be less than 500mW to keep within Class 3B

Yokogawa standard specific fibers

	Coupler-FCP8 fiber	APC-FCP8 fiber
VIS fiber	405nm - 647nm, 100mW max.*1	405nm - 647nm, 100mW max.*1
NIR fiber	685nm - 785nm, 100mW max.	685nm - 785nm, 100mW max.
Uniformizer	Angled (8°) FC connector	Switching time:30msec max., Repetition rate:10Hz max.

*1 50mW max. for 405nm laser

4. Fluorescent observation

Select Confocal DM and EM filter fit with the fluorescent protein/dye and wavelength of the excitation laser. Following DM and EM filters are available as an option. Multi filters can be set and switchable by command.

Observation Wavelength Range		420nm-850nm																											
Confocal DM	DM	Special size, Set on the specific DM block Standard: DM D405/488/561, DM D405/488/561/640, DM D445/514/640, DM A685, DM A785, Mirror(for Bright Field path)																											
	3-position slide mechanism	Switching time: adjacent position 500ms max., 2 position apart 700ms max.																											
EM filter	EM filter	Diameter:φ25mm Set on Filter Wheel Standard: EM B525/50, EM B617/73, EM B447/60, EM B482/35, EM B578/105, EM B685/40, EM B520/35, EM BR488/568, EM B732/68, EM B795/150, EM B835/70, EM B600/37																											
	T1、T2 10-position filter wheel	Switching time: <table><tr><td>Mode</td><td>High speed</td><td>High/Middle speed</td><td>Standard (Default)</td></tr><tr><td>Adjacent position</td><td>40ms max.</td><td>70ms max.</td><td>100ms max.</td></tr><tr><td>2 positions</td><td>70ms max.</td><td>110ms max.</td><td>160ms max.</td></tr><tr><td>3 positions</td><td>90ms max.</td><td>150ms max.</td><td>220ms max.</td></tr><tr><td>4 positions</td><td>110ms max.</td><td>200ms max.</td><td>270ms max.</td></tr><tr><td>5 positions</td><td>140ms max.</td><td>240ms max.</td><td>330ms max.</td></tr></table> Factory setting is standard mode. Above time is the filter wheel switching time only. Actual image switching time depends on the serial communication speed and installation status. In case of vibration by the filter wheel, please slow down the speed to reduce vibration. Wait at least 33ms to start next position change.				Mode	High speed	High/Middle speed	Standard (Default)	Adjacent position	40ms max.	70ms max.	100ms max.	2 positions	70ms max.	110ms max.	160ms max.	3 positions	90ms max.	150ms max.	220ms max.	4 positions	110ms max.	200ms max.	270ms max.	5 positions	140ms max.	240ms max.	330ms max.
	Mode	High speed	High/Middle speed	Standard (Default)																									
	Adjacent position	40ms max.	70ms max.	100ms max.																									
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4 positions	110ms max.	200ms max.	270ms max.																										
5 positions	140ms max.	240ms max.	330ms max.																										
T3 6-position filter wheel	Switching time <table><tr><td>Mode</td><td>Standard</td></tr><tr><td>Adjacent position</td><td>100ms max.</td></tr><tr><td>2 positions</td><td>150ms max.</td></tr><tr><td>3 positions</td><td>200ms max.</td></tr></table>				Mode	Standard	Adjacent position	100ms max.	2 positions	150ms max.	3 positions	200ms max.																	
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Adjacent position	100ms max.																												
2 positions	150ms max.																												
3 positions	200ms max.																												

In the dual camera model T2, image splitter DM separate wavelength range of fluorescence for simultaneous dual colors imaging. Following DMs are available as an option.

Image splitter DM	DM	Special size, Set on the specific DM block Standard: DM A561LP, DM A514LP, Dummy glass(for optical path switching), Mirror(for optical path switching)
	3-position slide mechanism	Switching time: 500ms max. @adjacent position, 850ms Max @2positions

In the Split-view model T3, image splitter DM separate wavelength range of fluorescence for simultaneous dual color imaging. Following DMs are available as an option.

Image splitter DM	DM	Special size, Set on the specific DM block Standard: DM A561LP, DM A514LP
	2-position slide mechanism	2 positions, use same 2 DMs in pair Switching time: 500ms max.

5. Camera port and Lens switcher

Magnification of internal relay lens in the camera port is selectable to match the effective FOV of CSU-W1 and the image area of the camera.

Optional Lens switcher in T1 and T2 models can use two types of relay lens by motorized switching. Lens switcher with 2x lens can observe the center area in close-up without changing objective lens.

Fixed lens	Selectable 1 from 1x or 0.83x
Lens switcher	Selectable from 1x, 0.83x or 2x. only for T1 and T2. Effective FOV: 17mm x 16mm (in the case of 1x)* ¹ , 2-position slide mechanism* ² : Switching time 500ms max.

*¹ Actual imaging area depends on magnification of the lens and image area of the camera.

*² There is no FOV adjustment function between 2 positions of the Lens switcher.

6. Introduction of external light

External light path, which introduces light directly to the microscope bypassing the Nipkow disk, is available as an option. This option is useful for photo bleaching and photo activation. DM must be selected to combine external light and excitation light.

External light DM	DM	Special size, fit on the dedicated DM block Standard: DM A415LP, DM A500LP
	2-position slide mechanism	Switching time: 500ms max.

7. Aperture size

In T1 and T2, Variable Aperture prevents the excitation on unwanted area of sample and reduces stray light reflected by peripheral area of imaging device, by limiting the FOV through changing its square size in accordance with both the imaging area of camera and magnification of internal relay lens.

This Variable Aperture isn't available in Split View model T3, where its own variable aperture between Full view and Split view is set as default.

T1 and T2	Adjustable step-by-step down to 5mm square from original FOV 17x16mm.
T3	Longer side 17mm of original FOV is adjustable step-by-step down to 3mm and the other side is 16mm fixed.

8. Magnification switcher for SoRa

By using an optional SoRa disk and magnification changer for SoRa, you can switch between super-resolution observation and confocal observation.

Super resolution method	SoRa (Super-resolution via Optical Re-Assignment)
Resolution of SoRa disk (for reference, in the case of 488nm excitation)	Optical super-resolution: XY: 150nm, Z: 320nm After deconvolution: XY: 120nm, Z: 300nm
Excitation Wavelength Range	400nm ~ 647nm
Magnification changer for SoRa	Motorized exchange (3 positions), less than 5sec. Up to 3 lenses selectable from 1x, 2.8x, 4x. (1x is available as default.) 1x is for normal confocal observation. 2.8x is for super-resolution observation with 100x objective. 4x is for super-resolution observation with 60x objective.

* Magnification changer for SoRa cannot be configured with External Light path.

9. Uniformizer

Optional Uniformizer offers even illumination across the field of view and allows more precise imaging measurements.

Uniformizer	Excitation wavelength	405 ~ 647nm
	Illumination roll off at CSU output	10% max. (5% typical)

* Uniformizer cannot be configured with NIR port and External Light path.

10. Connection to microscope

Specific microscope adapters are available to connect CSU-W1 to the microscopes of the 4 major microscope brands, ZEISS, OLYMPUS, Nikon and Leica as follows. In the case of the External light path option stated above, specific microscope adapters are available.

CSU-W1 is designed in combination with the inverted microscopes. In the case of connecting to upright microscope, supporting structure is necessary on the side.

Brand	Inverted microscope	Upright microscope
ZEISS	Axio Observer	Axio Imager 2, Axio Zoom.V16
OLYMPUS	IX1 series, IX3 series* ¹	BX1 series, BX3 series
Nikon	Eclipse Ti series	Eclipse Ni, FN1, only for trinocular
Leica	DMi8 * ²	-

*¹ Interlock mechanism for laser safety is necessary because the eyepiece-side port division is 50:50.

In the case of One-deck System with ZDC, Concave Panel option is necessary to avoid interference with ZDC.

In the case of Two-deck System, lower field number of IX3 raises the vignetting risk depending on camera sensor size and magnification of camera port.

*² To connect with DMi8, Leica made C-mount adapter 1x for sCMOS (Order No.: 11541551) and Yokogawa made C-mount Converter (/M9) shown in MS code are necessary. Field number of DMi8 side port is 19 and camera sensor bigger than this number, for example, Andar Neo (16.6 x 14.0mm, diagonal 21.8mm), causes vignetting. External light path option (/B) of CSU-W1 cannot be used with this connection.

11. AC power cord set

AC power cord set (PSE) is attached in MS code J (Japanese), but no AC power cord set is attached in MS code E (English). In the case of E, certified AC power cord set satisfying following condition has to be prepared according to the plug of main electricity and the safety regulations in the region where the system will be installed.

Rated voltage of 100 to 240V (different from the region)

Minimum Current of 3A

With protective earth

Maximum length of 3m

12. Command control

Command control is possible via Power unit from PC by RS232C communication.

Communication specification:

Baud Rate: 115,200bps, Data Bit: 8, Parity Check: None, Stop Bit: 1, Delimiter: CR

Case Sensitivity: On

Functions

Shutter Open/Close, DM Switching, FW control (max. 2 units), Disk rotation control,

Switching between Confocal and Bright field, Switching Sprit View, Switching External light path,

Lens switcher control, Variable aperture control, SoRa Magnification changer control.

13. Safety interlock

Condition:

- When the top panel of the scanner unit is open.
- When the Dichroic mirror exchange cover panel is open.

Function:

- Shutter closes and command control and external control of shutter becomes invalid.
- Disk motor stops and its command control becomes invalid.
- All actuators stop and their command control become invalid.
- Power LED repeats twice blinking.

Recovery from the interlocked condition:

- Close the top panel and the Dichroic mirror exchange panel.
- Then restart.

14. Remote interlock

Remote interlock is possible by means of connecting the external circuit to the remote interlock release connector. For example, with the switch on the door of the laboratory set, remote-interlock works when the door is open.

Condition:

- When the remote interlock release connector is unconnected to the remote interlock connector.
- When the external circuit which connected to the interlock release connector is open.

(Example: Door of the laboratory open)

Function:

- Shutter closes and command control and external control of shutter becomes invalid.
- Power LED repeats ten times blinking.

Recovery from the interlocked condition:

- Connect the remote interlock release connector(with no external circuit connected).
- When the external circuit which connected to the interlock release connector is closed. (Example: Door of the laboratory is closed)

15. Disk rotation control

Configurable from 1500rpm to 4000rpm by command control or external TTL pulse signal

16. Shutter control

Shutter OPEN/CLOSE can be controlled as follows. Continuous switching is possible up to 10 Hz.

- Manual switch on the scanner unit: Alternate action
- Command control: Switching frequency should be less than 10Hz.
- Hardware control: TTL signal input at the external INPUT terminal on the Power Unit, Switching frequency should be less than 10Hz.

17. Indication of laser radiation

Red LED is turned on when at least one shutter of VIS beam port, NIR beam port and Uniformizer is opened, and is turned off when all shutters are closed.

18. External dimensions (without Microscope adapter)

Single camera model T1	480(W) × 327(L) × 252(H) mm
Dual camera model T2	480(W) × 476(L) × 252(H) mm
Split view model T3	374(W) × 425(L) × 252(H) mm
NIR port, External light path, and lens switcher options in case of T2	533(W) × 534(L) × 252(H) mm
Power unit	225(W) × 378(L) × 152(H) mm
Magnification changer for SoRa	381(W) × 123(H) × 425(D) mm
Uniformizer and lens switcher options in case of T2	510(W) × 540(L) × 252(H) mm

19. Weight (without Microscope adapter)

Single camera model T1	18kg
Dual camera model T2	21.5kg
Split view model T3	19kg
NIR port, External light path, and lens switcher options in case of T2	29kg
Power unit	4kg
Magnification changer for SoRa	13kg
Uniformizer and lens switcher options in case of T2	29kg

20. Power source

Rated supply voltage	100 - 240VAC
Power voltage range	90 - 264VAC
Rated supply frequency	50/60Hz

21. Power consumption

Max. power consumption	250VA max.
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■ Operating environment

Temperature	15 - 35°C
Humidity	20 - 75%RH, No condensation
Altitude	Lower than 2000m
Vibration	Low vibration is desirable.
Installation site	Indoor only

■ Storage environment *1

Temperature	-20 - 55°C
Humidity	5 - 95%RH, No condensation

*1 Desirable environment for delivery, storage or whatever when the instrument is not in operation, under which the instrument may not suffer unrecoverable damages.

■ Conformity

CE Marking, UKCA Marking

■ EMC Directive

- EN 61326-1 Class A, Table 2

Electrical equipment for measurement, control and laboratory use – EMC requirements-
Part 1: General requirements

- EN 61000-3-2

Electromagnetic compatibility (EMC) — Part 3-2: Limits-Limits for harmonic current emissions (equipment input current ≤ 16 A per phase)

- EN 61000-3-3

Electromagnetic compatibility (EMC) — Part 3-2: Limits-Limitation of voltage changes, voltage fluctuations and flicker in public low-voltage supply systems, for equipment with rated current ≤ 16 A per phase and subject to conditional connection

■ Low Voltage Directive

- EN 61010-1

Safety requirements for electrical equipment for measurement, control, and laboratory use,
Part 1: General requirements

- EN 60825-1

Safety of Laser Products, Part 1: Equipment classification and requirements

■ RoHS Directive

- EN IEC 63000

Technical documentation for the assessment of electrical and electronic products with respect to the restriction of hazardous substances

KC Marking

■ EMC 한국 전자파적합성기준

A급 기기 (업무용 방송통신기자재)

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FDA Laser Safety Regulation

- Complies with 21 CFR 1040.10 except for deviations pursuant to Laser Notice No. 56.

General requirements for optical radiation safety *1

(光辐射安全通用要求)

- GB 44703

Safety of laser products—Part 1: Equipment classification and requirements *1

(激光产品的安全 第1部分:设备分类和要求)

■ GB/T 7247.1

*1

This requirement is applicable only in China.

(本要求仅适用于中国境内。)

China RoHS 電器電子製品有害物質使用制限管理弁法

Administrative Measure on the Control of Pollution Caused by Electronic Information

Products This is valid only in China.

产品中有害物质的名称及含量

部件名称	有害物质					
	铅 (Pb)	汞 (Hg)	镉 (Cd)	六价铬 (Cr(VI))	多溴联苯 (PBB)	多溴二苯醚 (PBDE)
金属零件	×	○	○	○	○	○
线路板组装	×	○	○	○	○	○
光学零件	×	○	×	○	○	○
螺丝	×	○	○	○	○	○
内置电源	×	○	×	○	○	○
传感器	×	○	○	○	○	○
电动机	×	○	○	○	○	○
电缆	×	○	○	○	○	○

部件名称	有害物质			
	邻苯二甲酸二正丁酯 (DBP)	邻苯二甲酸二异丁酯 (DIBP)	邻苯二甲酸丁基苄酯 (BBP)	邻苯二甲酸二(2-乙基)己酯 (DEHP)
金属零件	○	○	○	○
线路板组装	○	○	○	○
光学零件	○	○	○	○
螺丝	○	○	○	○
内置电源	○	○	○	○
传感器	○	○	○	○
电动机	○	○	○	○
电缆	○	○	○	○

注1：○：表示该有害物质在该部件所有均质材料中的含量均不超出电器电子产品有害物质限制使用国家标准要求。

×：表示该有害物质至少在该部件的某一均质材料中含量超出电器电子产品有害物质限制使用国家标准要求。

注2：以上未列出的部件，表明其有害物质含量均不超出电器电子产品有害物质限制使用国家标准要求。

环保使用期限：



该标识适用于SJ /T11364 中所述，在中华人民共和国销售的电器电子产品的环保使用期限。

注) 该年数为“环保使用期限”，并非产品的质量保证期。零件更换的推荐周期，请参照使用说明书。

■ Global Environmental Action

Lead free solder is used.

Lead free glass is used.

No use of Cr+6 for chromium plating

WEEE Directive marking requirement

TSCA: Does not contain the five PBT chemicals

■ Model and Suffix (MS) code

1. CSU-W1 (Scanner Unit) basic specification codes

Model code	Suffix code	Option code	Description
CSUW1			
Basic Configu - ration	-T1		1 Camera system with 10pFW
	-T2		2 Camera system with dual 10pFW
	-T3		Split View with 6pFW
Disk speed	N		Normal (4000rpm)
Disk type	10		1 Disk (Normal 50um pinhole disk)
	20		1 Disk (Normal 25um pinhole disk)
	12		2 Disks (Normal 50um pinhole disk and normal 25um pinhole disk)
	03		1 Disk (SoRa 50um pinhole disk)
	13		2 Disks (Normal 50um pinhole disk and SoRa 50um pinhole disk)
	23		2 Disks (Normal 25um pinhole disk and SoRa 50um pinhole disk)
1st Camera Port	-C1		C-mount with Lens 1x
	-C3		C-mount with Lens 0.83x
1st Lens Switcher	0		No Lens switcher. Necessary for T3, C4.
	1		Lens switcher with additional Lens 1x
	2		Lens switcher with additional Lens 2x
	3		Lens switcher with additional Lens 0.83x
2nd Camera Port	C0		No 2nd Camera port. Necessary to specify for T1, T3.
	C1		C-mount with Lens 1x
	C3		C-mount with Lens 0.83x
2nd Lens Switcher	0		No 2nd Lens switcher. Necessary to specify for T1, T3.
	1		Lens switcher with additional Lens 1x
	2		Lens switcher with additional Lens 2x
	3		Lens switcher with additional Lens 0.83x
Excitation light Path	-F0		BS lens without fiber
	-F1		BS lens with Coupler-FCP8 fiber for visible laser
	-F2		BS lens with APC-FCP8 fiber for visible laser
	-U1		Uniformizer Type A with Coupler-FCP8 fiber for visible laser
	-U2		Uniformizer Type A with APC-FCP8 fiber for visible laser
	-U3		Uniformizer Type B with Coupler-FCP8 fiber for visible laser
	-U4		Uniformizer Type B with APC-FCP8 fiber for visible laser
Language/AC power cord set	J		Japanese (with AC power cord set)
	E		English (without AC power cord set)
Dummy	N		Dummy
Variable Aperture	/A		Variable Aperture at Output, selectable for T1, T2 not for T3

Model code	Suffix code	Option code	Description
NIR Beam Port		/R1	NIR beam port with Coupler-FCP8 fiber for NIR laser
NIR Beam Port		/R2	NIR beam port with APC-FCP8 fiber for NIR laser
External light path		/B	External light path
Magnification changer for SoRa		/G1	1x-2.8x (For 100x Objective)
		/G2	1x-4x (For 60x Objective)
		/G3	1x-2.8x (For 100x Objective)-4x (For 60x Objective)
Microscope Adapter		/M9	C mount converter
		/N1	Zeiss Axio Observer without /B option, sealed type
		/N2	Olympus IX series without /B option, sealed type
		/N3	Nikon Eclipse Ti without /B option, sealed type
		/N4	Zeiss Axio Observer with /B option, sealed type
		/N5	Olympus IX series with /B option, sealed type
		/N6	Nikon Eclipse Ti with /B option, sealed type
		/N7	Nikon Eclipse Ni, FN1 trinocular without /B option, sealed type
		/N8	Nikon Eclipse Ni, FN1 trinocular with /B option, sealed type
		/N9	For Olympus IX series 2-deck without /B option, sealed type
		/N10	For Nikon Eclipse Ti2 no stage-up without /B option, sealed type
Panel		/V	Concave Panel (avoid ZDC in Olympus IX83-1deck, etc.)
Confocal DM (Dichroic Mirror) △: 3 Positions 1,2,3		/D△01	DM D405/488/561
		/D△02	DM D405/488/561/640
		/D△03	DM D445/514/640
		/D△04	DM A685
		/D△05	DM A785
		/D△06	Mirror
Warranty extension option		/W2	Warranty extension: 2 years
		/W4	Warranty extension: 4 years
		/W6	Warranty extension: 6 year2

2. Filters: Filter wheel T1(x1), T2(x2)

Model code	Suffix code	Option code	Description
CSUW1FW			
	-C□		□: Camera port No. 1-2
EM (Emission Filter) △: 10 Positions 1,2,3,4,5,6,7,8,9, A		/△01	EM B525/50 for 488nm
		/△02	EM B617/73 for 561nm
		/△03	EM B447/60 for 405nm
		/△04	EM B482/35 for 445nm
		/△05	EM B578/105 for 514nm
		/△06	EM B685/40 for 640nm
		/△08	EM B520/35 for 488nm
		/△09	EM BR488/568 for 488nm and 561nm
		/△10	EM B732/68 for 685nm
		/△11	EM B795/150 for 685nm
		/△12	EM B835/70 for 785nm
		/△13	EM B600/37 for 561nm

3. Filters: 2 Camera model T2

Model code	Suffix code	Option code	Description
CSUW1CA			
	-D		Dummy code
Image Splitter DM (Dichroic Mirror) △: 3 Positions 1,2,3		/C△01	DM A561LP
		/C△02	DM A514LP
		/C△03	Dummy Glass
		/C△04	Mirror

4. Filters: Split View model T3

Model code	Suffix code	Option code	Description
CSUW1SV			
	-D		Dummy code
Image Splitter DM (Dichroic Mirror), dual △: 2 Positions 1,2 EM (Emission Filter) △: 6 Positions 1,2,3,4,5,6		/S△01	DM A561LP
		/S△02	DM A514LP
		/△01	EM B525/50 for 488nm
		/△02	EM B617/73 for 561nm
		/△03	EM B447/60 for 405nm
		/△04	EM B482/35 for 445nm
		/△05	EM B578/105 for 514nm
		/△06	EM B685/40 for 640nm
		/△08	EM B520/35 for 488nm
		/△09	EM BR488/568 for 488nm and 561nm
		/△10	EM B732/68 for 685nm
		/△11	EM B795/150 for 685nm
		/△12	EM B835/70 for 785nm
		/△13	EM B600/37 for 561nm

5. Filters: NIR beam Port R1, R2

Model code	Suffix code	Option code	Description
CSUW1RR			
	-D		Dummy code
Beam Combiner DM (Dichroic Mirror) △: 1 Position 1		/R△01	DM A660LP

6. Filters: External light path B

Model code	Suffix code	Option code	Description
CSUW1EB			
	-D		Dummy code
External light path DM (Dichroic Mirror) △: 2 Positions 1,2		/B△01	DM A415LP
		/B△02	DM A500LP

7. Parts

Model code	Suffix code	Option code	Description
CSUW1PRT			
	-D		Dummy code
Microscope Adapter		/M9	C mount converter
		/N1	Zeiss Axio Observer without /B option, sealed type
		/N2	Olympus IX series without /B option, sealed type
		/N3	Nikon Eclipse Ti without /B option, sealed type
		/N4	Zeiss Axio Observer with /B option, sealed type
		/N5	Olympus IX series with /B option, sealed type
		/N6	Nikon Eclipse Ti with /B option, sealed type
		/N7	Nikon Eclipse Ni、FN1 trinocular without /B option, sealed type
		/N8	Nikon Eclipse Ni、FN1 trinocular with /B option, sealed type
		/N9	For Olympus IX series 2-deck without /B option, sealed type
		/N10	For Nikon Eclipse Ti2 no stage-up without /B option, sealed type
Panel		/V	Concave Panel (avoid ZDC in Olympus IX83-1deck, etc.)
Cables		/CD	AC power cord set (PSE, Japan only)
		/CM	Main cable
		/CS	Serial communication cable (RS232C female - female Cross)
		/CNR	Interlock release connector
		/CPU	Power unit (without AC power cord set)
Tools		/THW	Hex wrench
		/TFT	Filter exchange wrench (tube type)
		/TLS	Leg height adjuster wrench
		/TCH	Carrying handle
		/TFV	Fiber-in adjustment tool for Visible port
		/TFR	Fiber-in adjustment tool for NIR port
		/TRM	Interlock release block
		/THT	Torsion hex wrench
		/TCL	DM cleaning mount
Supplies		/SBS	Handle hole plate (a set of 4 pieces)
		/SFC	Fiber-in cap
		/SMA	C mount adapter
		/SMC	C mount cap female type
		/SMS	Set screw for C mount
		/SKY	Key
		/TCP	Table Clamp (4pcs)
Fiber cables		/FV1	Coupler-FCP8 fiber for visible laser
		/FV2	APC-FCP8 fiber for visible laser
		/FR1	Coupler-FCP8 fiber for NIR laser
		/FR2	APC-FCP8 fiber for NIR laser
		/FMP	Fiber manipulator
Confocal DM (Dichroic Mirror)		/D01	DM D405/488/561
		/D02	DM D405/488/561/640
		/D03	DM D445/514/640
		/D04	DM A685

Model code	Suffix code	Option code	Description
Confocal DM (Dichroic Mirror)		/D05	DM A785
		/D06	Mirror
		/DCL	DM clamps (a set of 6 pieces with 14 screws)
		/DBL	DM block
		/DCS	DM block case
		/DBS	DM block (a set with clamps, screws and case)
		/DST	DM installation fee per 1 DM
Image Splitter DM (Dichroic Mirror) 2 camera system T2 1 piece Sprit view system T3 2 pieces		/C01	DM A561LP
		/C02	DM A514LP
		/C03	Dummy Glass
		/C04	Mirror
Beam Combiner DM (Dichroic Mirror)		/R01	DM A660LP
External light path DM (Dichroic Mirror)		/B01	DM A415LP
		/B02	DM A500LP
EM (Emission Filter)		/E01	EM B525/50 for 488nm
		/E02	EM B617/73 for 561nm
		/E03	EM B447/60 for 405nm
		/E04	EM B482/35 for 445nm
		/E05	EM B578/105 for 514nm
		/E06	EM B685/40 for 640nm
		/E08	EM B520/35 for 488nm
		/E09	EM BR488/568 for 488nm and 561nm
		/E10	EM B732/68 for 685nm
		/E11	EM B795/150 for 685nm
		/E12	EM B835/70 for 785nm
		/E13	EM B600/37 for 561nm
		/EN5	FW EM Retaining Rings (a set of 5 pieces)
		/ED5	FW EM Dummy plates (a set of 5 pieces)
Magnification lens for SoRa		/MG0	1x lens (include holder)
		/MG1	2.8x lens (include holder)
		/MG2	4x lens (include holder)

8. Factory Upgrade

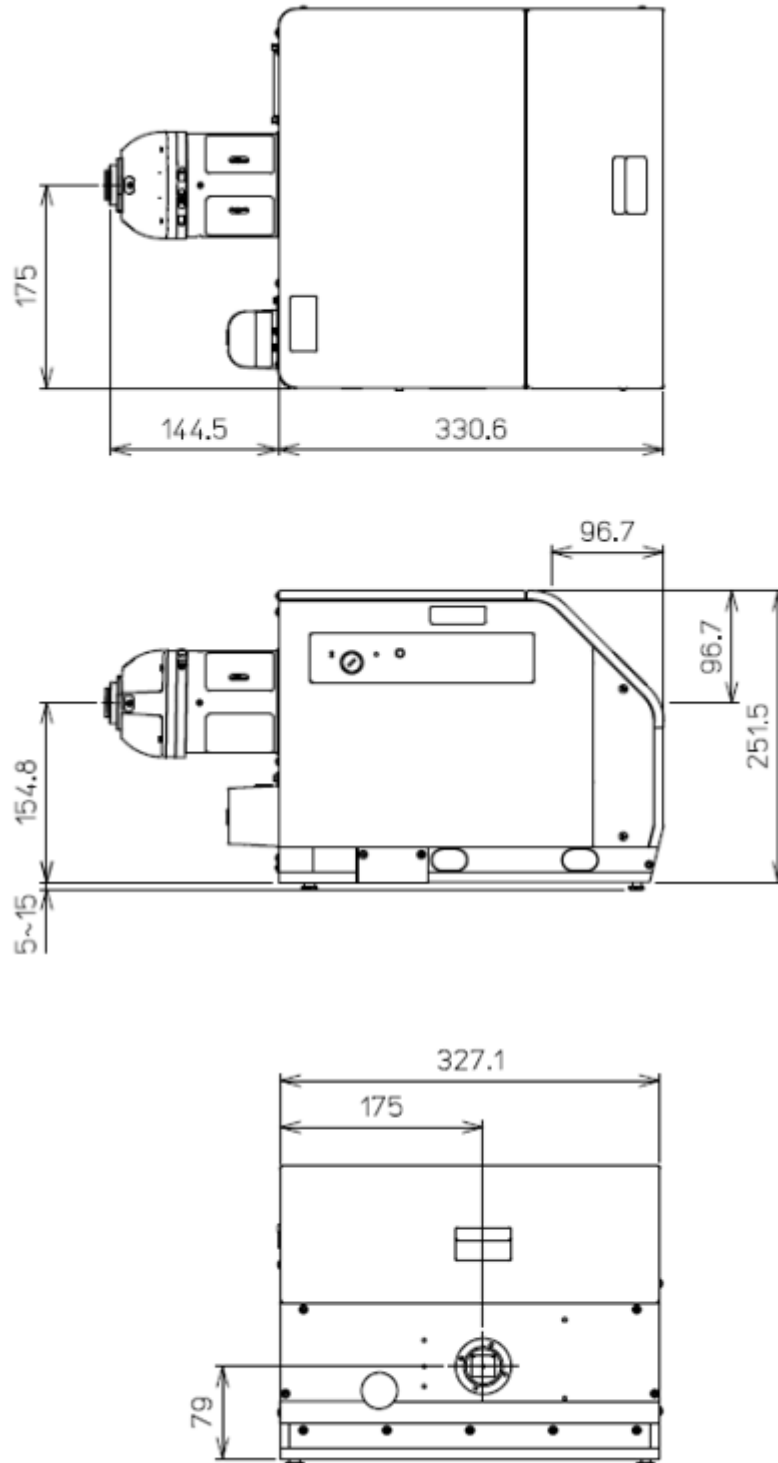
Model code	Suffix code	Option code	Description
CSUW1UP			
Language	-J		Japanese
	-E		English
Factory upgrade		/T21C10	Remodeling from T1 to T2 with additional Lens x1
		/T21C30	Remodeling from T1 to T2 with additional Lens x0.83
		/T23C10	Remodeling from T3 to T2 with additional Lens x1
		/T23C30	Remodeling from T3 to T2 with additional Lens x0.83
		/T31	Remodeling from T1 to T3 without Lens exchange
		/T32	Remodeling from T2 to T3 without Lens exchange
		/DC25	Disk exchange to 25μm Pinhole disk
		/DC50	Disk exchange to 50μm Pinhole disk
		/DA25	Addition of 25μm Pinhole disk
		/DA50	Addition of 50μm Pinhole disk
		/DASR	Addition of SR50um disk
		/DAS3	Addition of SoRa disk (T3)
		/DC50SR	Exchange of disk from dual disk to 1:50um 2:SR50um
		/DC50S3	Exchange of disk from dual disk to 1:50um 2:SoRa (T3)
		/DC25SR	Exchange of disk from dual disk to 1:25um 2:SR50um
		/DC25S3	Exchange of disk from dual disk to 1:25um 2:SoRa (T3)
		/G1	Addition of magnification changer 1x-2.8x
		/G2	Addition of magnification changer 1x-4x
		/G3	Addition of magnification changer 1x-2.8x-4x
		/L1	Exchange of Camera Port Lens to Lens 1x
		/L3	Exchange of Camera Port Lens to Lens 0.83x
		/LS1	Addition of Lens Switcher with additional Lens 1x
		/LS2	Addition of Lens Switcher with additional Lens 2x
		/LS3	Addition of Lens Switcher with additional Lens 0.83x
		/A	Addition of Variable Aperture
		/R1	Addition of NIR beam port with Coupler-FCP8 NIR Fiber
		/R2	Addition of NIR beam port with APC-FCP8 NIR Fiber
		/B	Addition of External light path
		/R1UB	Addition of NIR beam port with Coupler-FCP8 NIR Fiber and External light path
		/R2UB	Addition of NIR beam port with APC-FCP8 NIR Fiber and External light path
		/R1B	Addition of NIR beam port with Coupler-FCP8 NIR Fiber to External light path option
		/R2B	Addition of NIR beam port with APC-FCP8 NIR Fiber to External light path option
		/BR	Addition of External light path to NIR beam port option
		/UFZA	Addition of Uniformizer Type A
		/UFZB	Addition of Uniformizer Type B

9. Upgrade Kits

Model code	Suffix code	Option code	Description
CSUW1KT			
Language	-J		Japanese
	-E		English
Upgrade Kits		/T21C10	Remodeling from T1 to T2 with additional Lens x1
		/T21C30	Remodeling from T1 to T2 with additional Lens x0.83
		/G1	Addition of magnification changer 1x-2.8x
		/G2	Addition of magnification changer 1x-4x
		/G3	Addition of magnification changer 1x-2.8x-4x
		/L1	Exchange Camera Port Lens to 1x
		/L3	Exchange Camera Port Lens to 0.83x
		/LS1	Addition of Lens Switcher with additional Lens 1x
		/LS2	Addition of Lens Switcher with additional Lens 2x
		/LS3	Addition of Lens Switcher with additional Lens 0.83x
		/R1	Addition of NIR beam port with Coupler-FCP8 NIR Fiber
		/R2	Addition of NIR beam port with APC-FCP8 NIR Fiber
		/B	Addition of External light path
		/R1UB	Addition of NIR beam port with Coupler-FCP8 NIR Fiber and External light path
		/R2UB	Addition of NIR beam port with APC-FCP8 NIR Fiber and External light path
		/R1B	Addition of NIR beam port with Coupler-FCP8 NIR Fiber to External light path option
		/R2B	Addition of NIR beam port with APC-FCP8 NIR Fiber to External light path option
		/BR	Addition of External light path to NIR beam port option
		/UFZA	Addition of Uniformizer Type A
		/UFZB	Addition of Uniformizer Type B

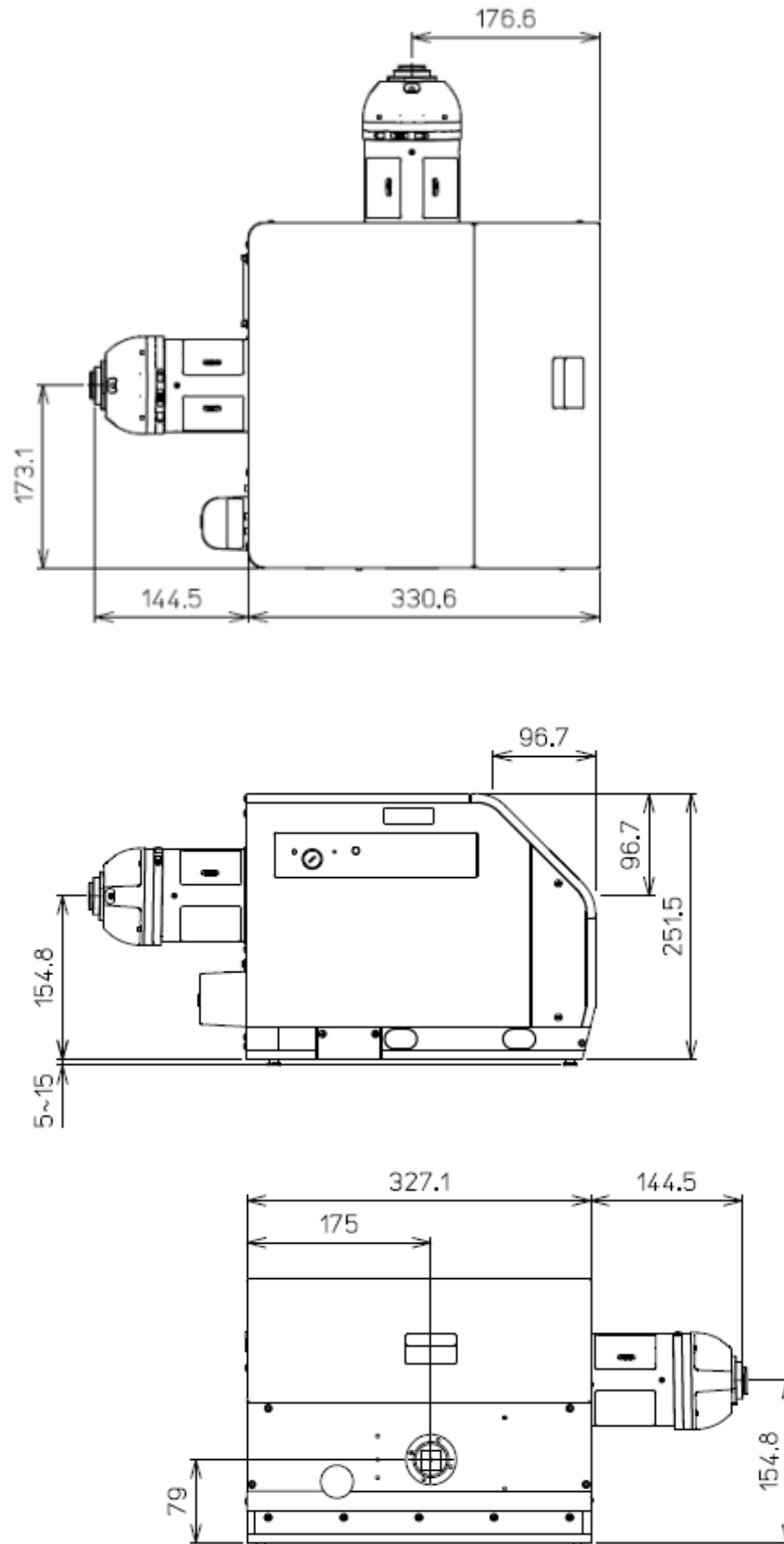
■ Dimensions

1 Camera model T1



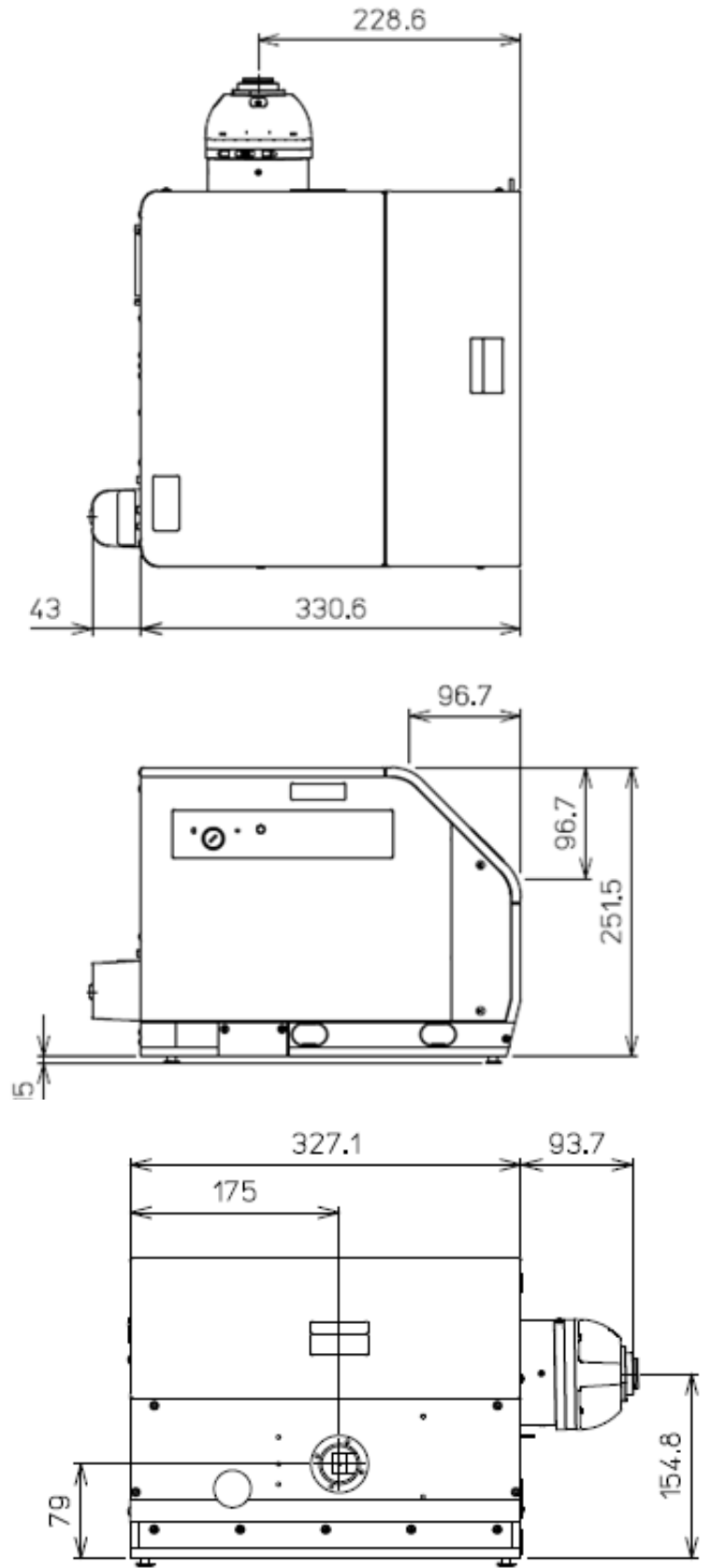
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2 Camera model T2



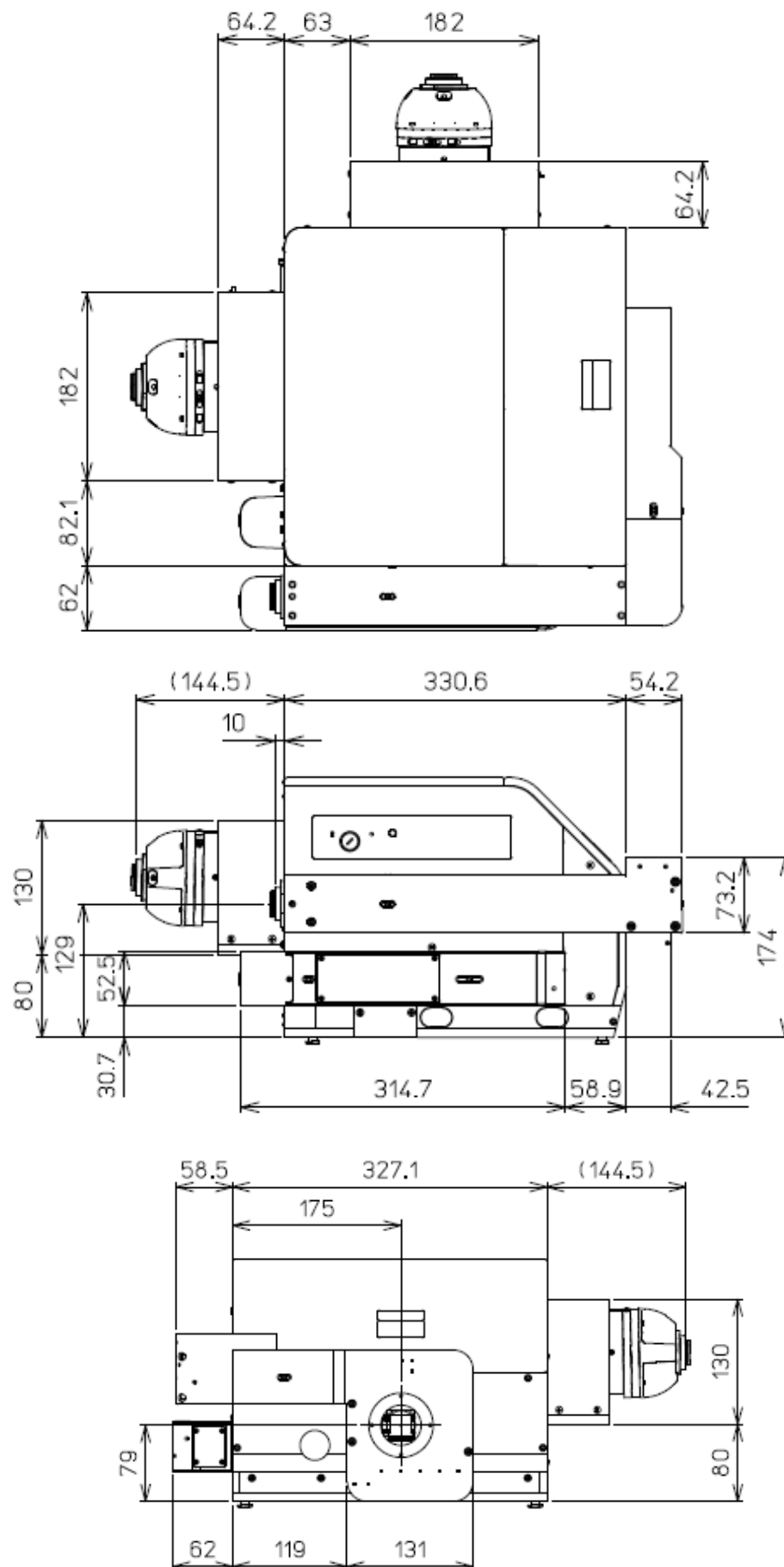
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Split View model T3



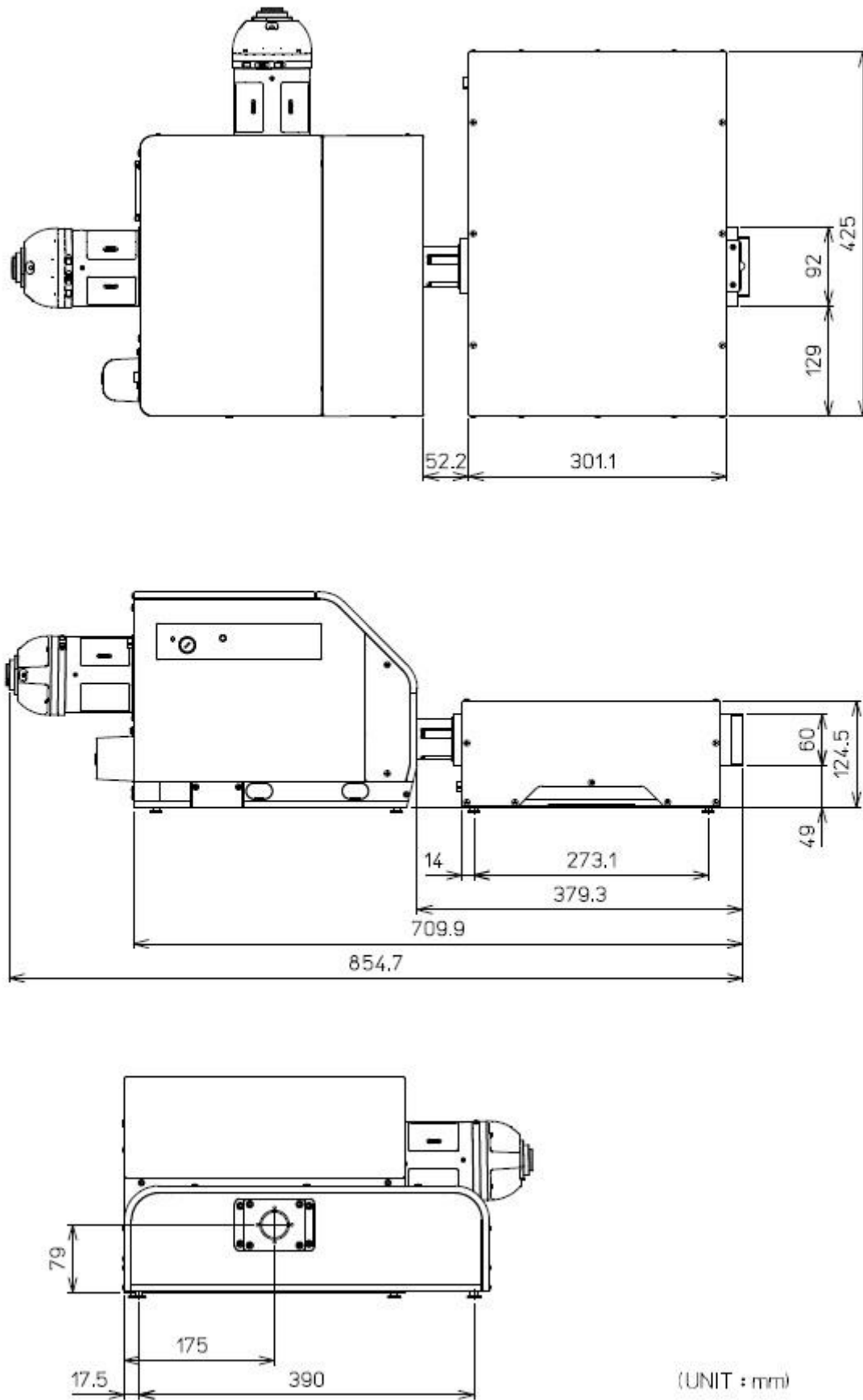
(UNIT : mm)

Full option (In case of T2 Base)

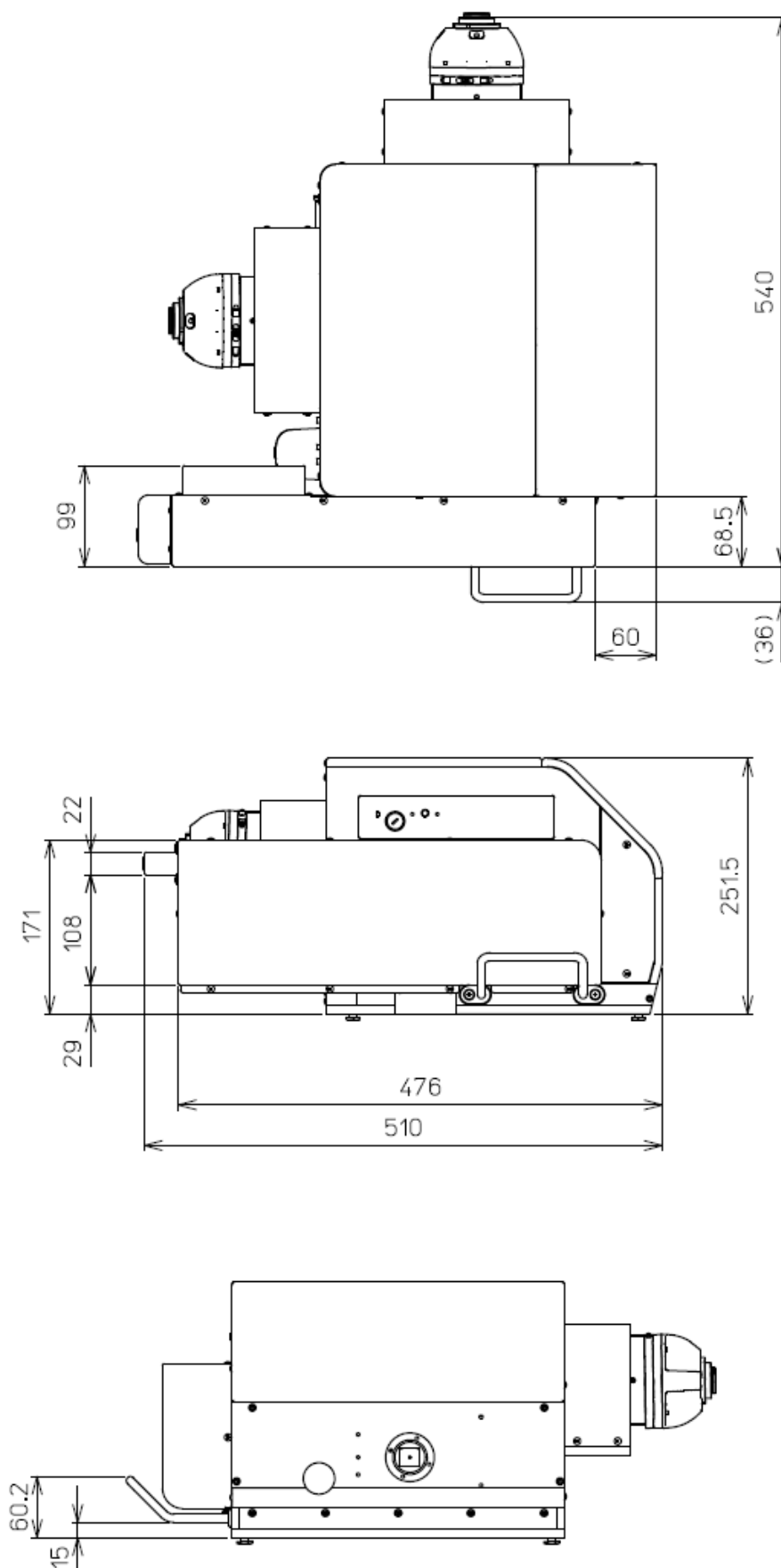


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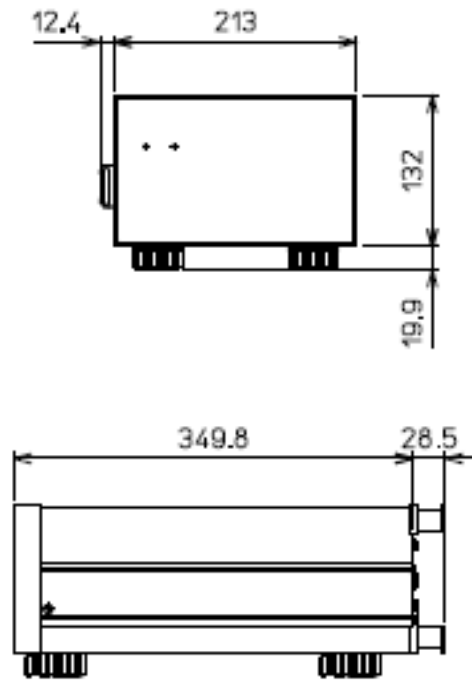
SoRa Option Model (in the case of T2 Base)



Uniformizer option (in case of T2 Base)



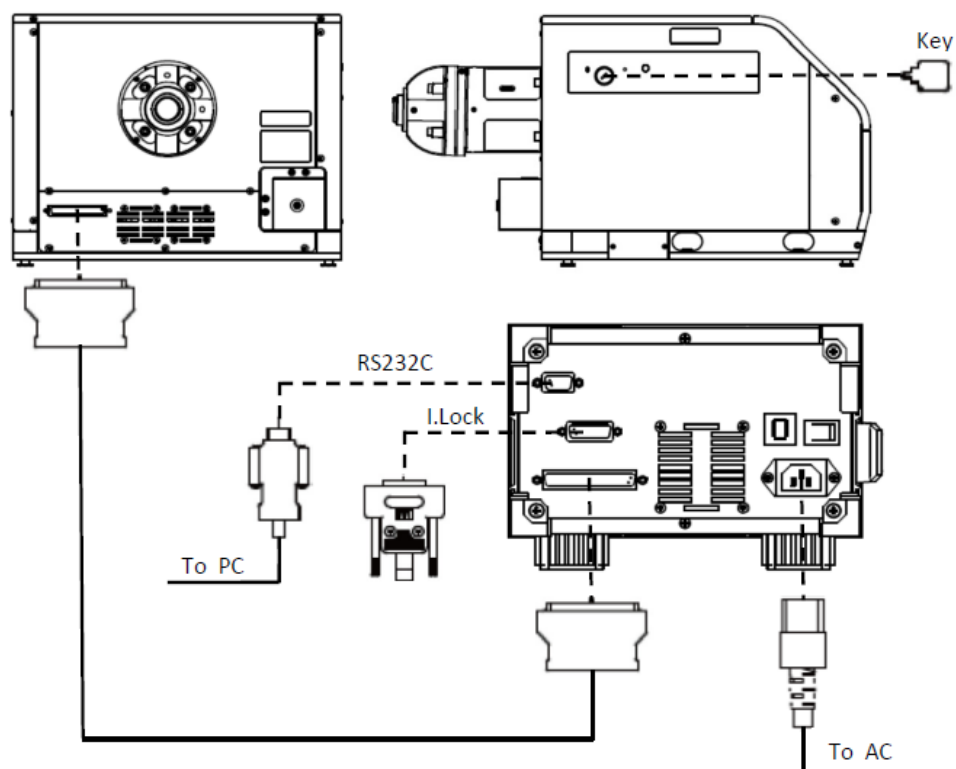
Power unit



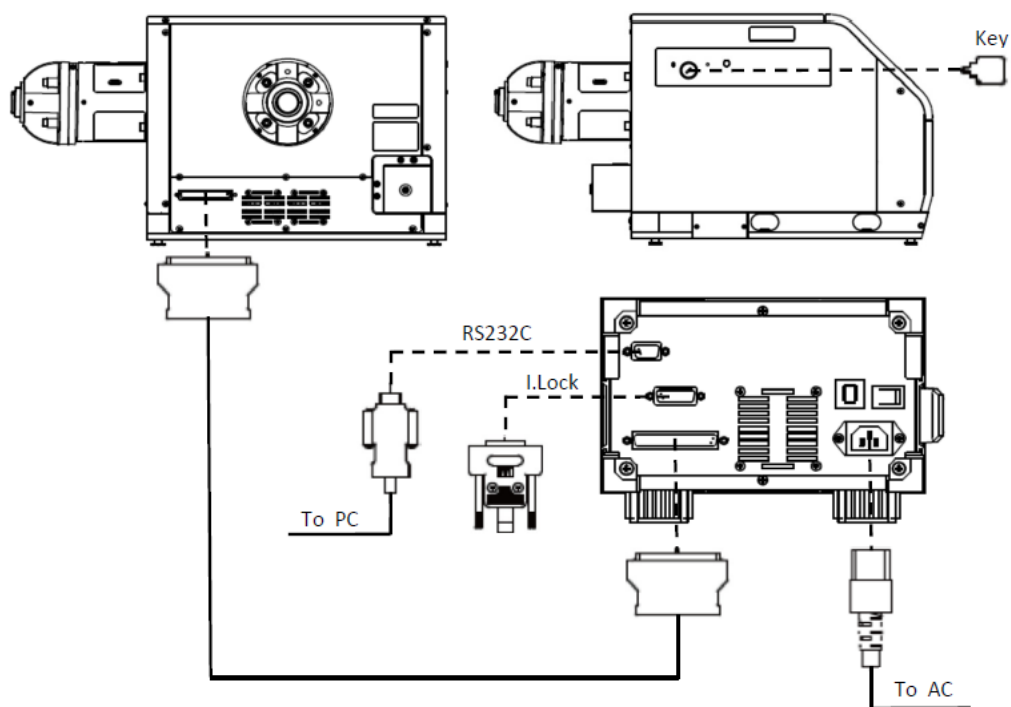
(UNIT : mm)

■ Wiring diagram

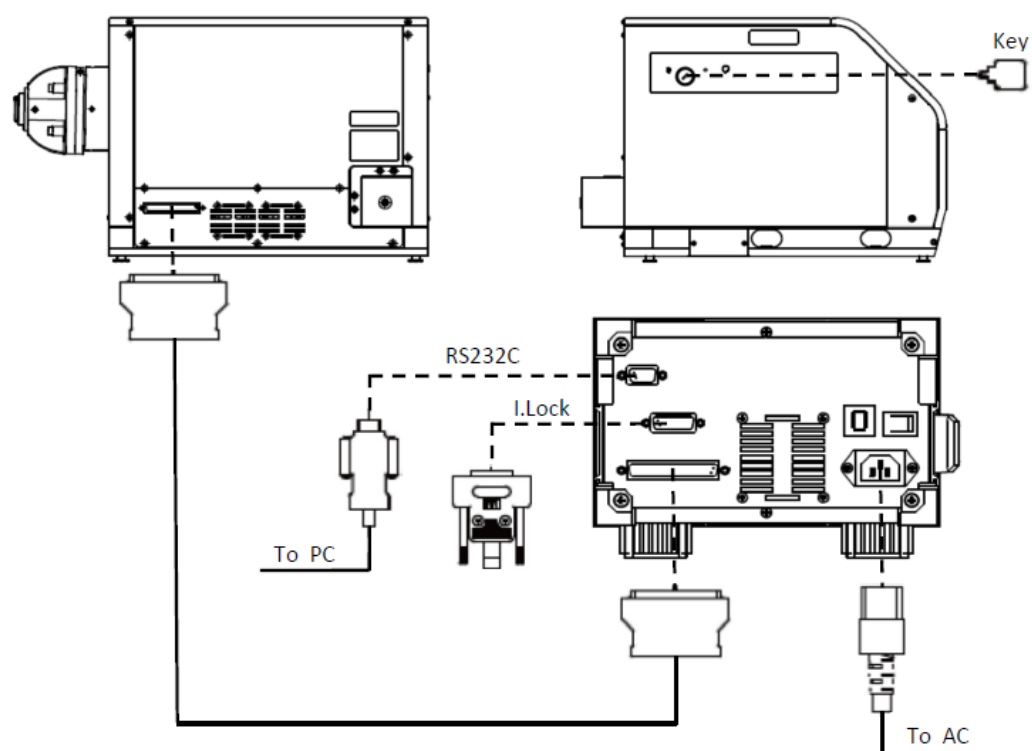
1 Camera model T1



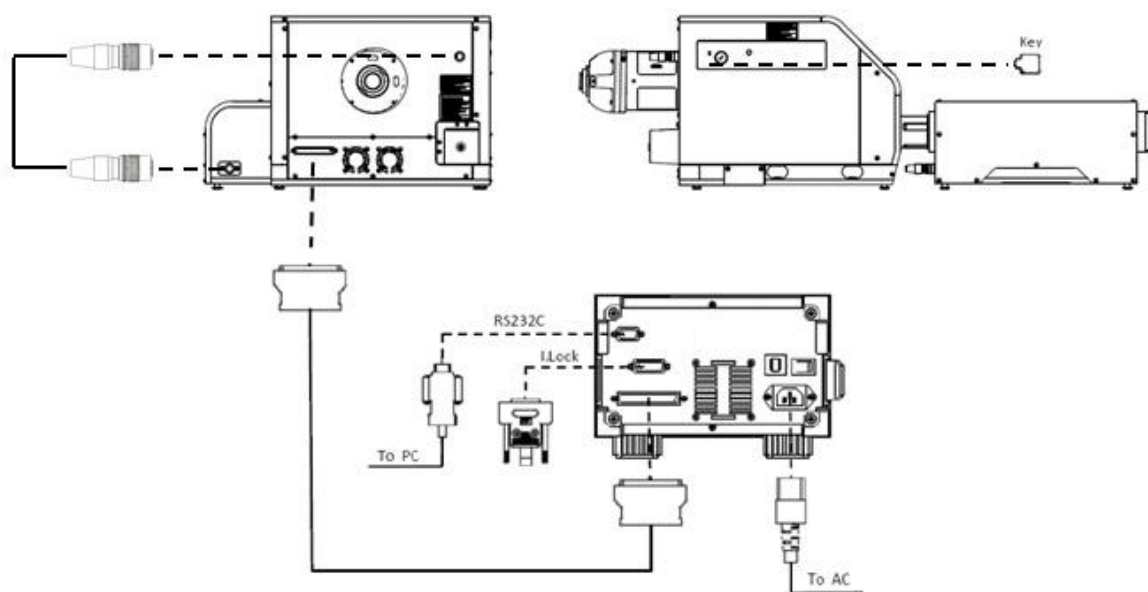
2 Camera model T2



Split View model T3



SoRa Option Model (in the case of T1 Base)



■ Laser safety precautions

This instrument is classified as CLASS 3B LASER PRODUCT.

■ Trademark

CSU-W1 is either a registered trademark or trademark of Yokogawa Electric Corporation.

The trademark symbols such as [™] and ® are not described in this document.

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