

■ Features

- Low power consumption
- Compact, lightweight
- Maintenance free
- Optical fiber less

■ Applications

- Metal processing
(hardening, blazing, cladding, etc.)
- Large area heat processing
- Pumping of solid state laser



■ Outline

Compared to solidstate laser and CO₂ laser, it does not require complex transmission optics, so it offers a compact, low-power feature. In addition, since the condensing beam shape is rectangular and the energy density is low, there are few splutters and blowholes, enabling welding with a large allowable range, such as clearance.

■ Specification

Parameter	Specification		Unit
	L11585-02	L11585-04	
Operation mode	CW		—
Laser class	Class 4		—
Lens	f = 100		mm
Dimensions (W × H × D) *1	Approx. 165 × Approx. 160 × Approx. 414		mm
Weight *2	Approx. 12	Approx. 13	kg

*1 Excluding projecting parts.

*2 Excluding cooling water.

■ Recommended operating condition

Parameter		Value		Unit
		L11585-02	L11585-04	
Cooling water condition (cooling water inlet)	Conductivity	1		μS/cm
	Temperature	+20		°C
Dry air condition *1 *2 *3	Flow rate	10	22	L/min
	Temperature	+25		°C

*1 A prefilter must be used to remove the oil, when using compressed air containing oil mist. (oil mist concentration of 30 mg/m³ [ANR] or more)

*2 If moisture might possibly contaminate the supply piping, a water separator must be used to remove water droplets.

*3 Constantly inject dry air into the DDL, regardless of whether it is operated or not. (except during transportation)

Direct Diode Laser L11585-02/-04

■ Absolute maximum rating

Parameter		Value		Unit
		L11585-02	L11585-04	
Radiant power		2.2	4.4	kW
Forward current		100		A
Forward voltage		60	120	V
Reverse voltage		2		V
Humidity inside DDL		30		%
Cooling water condition (cooling water inlet)	Conductivity	0.5 to 1.2		μS/cm
	Particles	10		μm
	Temperature *1	+15 to +25		°C
	Pressure	0.7		MPa
	Flow rate	8 to 12	18 to 26	L/min
Dry air condition *2	Injection pressure	0.05		MPa
	Flow rate	1.0 to 2.0		L/min
	Temperature	+5 to +40		°C
	Humidity	20		%
	Filtration rating	0.01		μm
	Oil mist concentration	0.1 (ANR)		mg/m ³
Operating temperature *3		+5 to +40		°C
Storage temperature (recommended) *3*4*5		0 to +50 (+5 to +35)		°C

*1 Available cooling water temperature range. Since the light output changes due to the fluctuation of the cooling water temperature, the cooling water temperature accuracy ($\leq \pm 1$ °C) of the cooling unit is required to obtain a stable light output. (output fluctuation ± 3 %)

*2 When using compressed air with high oil content (oil mist density of 30 mg/m³ [ANR] or more), remove with a pre filter. If there is a possibility that water may enter the supply piping, water droplets must be removed by the water separator. In addition, dry air shall be injected into the DDL internal not only during operation and non-operation. (except during transportation)

*3 No condensation

*4 Drain the water from DDL if there is a risk of freezing.

*5 Storage temperature is the temperature range for storing or transporting a DDL after installing it into equipment. Values in parentheses indicate the recommended temperature range for storing a DDL before installing it into equipment.

* Indicating limits that must not be exceeded instantaneously and shall not exceed any one value.

■ Electrical and optical properties

●L11585-02

Parameter		Condition	Value			Unit
			Min.	Typ.	Max.	
Operating current		Radiant power: 2.0 kW	73	80	87	A
Operating voltage			41	46	51	V
Peak emission wavelength			920	940	960	nm
Focused beam size *1 (FWHM)	Vertical *2		0.25	0.35	0.45	mm
	Horizontal *2		1.05	1.25	1.45	mm
Working distance (design value from housing tip)			85.5	87.0	88.5	mm

●L11585-04

Parameter		Condition	Value			Unit
			Min.	Typ.	Max.	
Operating current		Radiant power: 4.0 kW	78	88	98	A
Operating voltage			89	94	99	V
Peak emission wavelength			920	940	960	nm
Focused beam size *1 (FWHM)	Vertical *2		0.25	0.35	0.45	mm
	Horizontal *2		1.05	1.25	1.45	mm
Working distance (design value from housing tip)			85.5	87.0	88.5	mm

*1 The profile area shall be ± 15 % or less centered at 0.35 mm \times 1.25 mm = 0.44 mm².

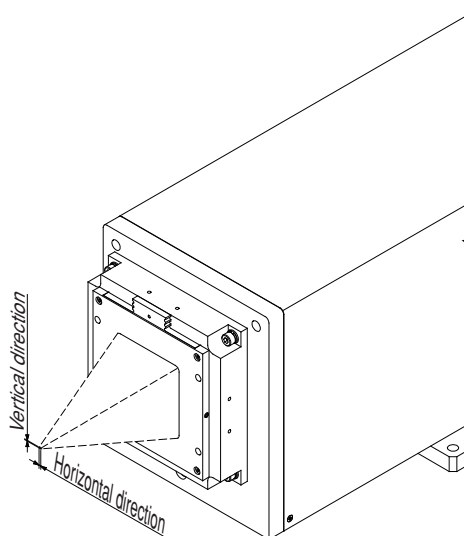
*2 Directions are relative to bottom of housing. The vertical direction of the focused beam size with respect to the bottom of housing is the short axis. (See the schematic view of main laser beam directions.) The focused beam size can be changed by replacing the condenser lens and laser focusing unit at the DDL tip.

* L11585-02 amount of cooling water: Approx. 10 L/min, coolant temperature (at DDL inlet): 20.0 °C \pm 0.5 °C

L11585-04 amount of cooling water: Approx. 22 L/min, coolant temperature (at DDL inlet): 20.0 °C \pm 0.5 °C

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Figure 1: Schematic view of main laser beam directions



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Other

Parameter		Specification	Unit
Adapt cooling water hose (for DDL)	Outer diameter	Approx. $\phi 16$	mm
	Inner diameter	Approx. $\phi 10$	mm
Recommended cooling water hose *1 (between DDL and chiller)	Outer diameter	Approx. $\phi 22$	mm
	Inner diameter	Approx. $\phi 15$	mm
Adapt dry air hose	Outer diameter	Approx. $\phi 6$	mm
Applicable sensor connector		1108-12B10-7F (manufactured by TAJIMI ELECTRONICS CO., LTD.)	—
Electrode terminal	Screw size	M6	—
	Number between terminals	1	—

*1 Recommended cooling water hoses should be used to connect DDL to the cooler. In addition, when connecting a compatible cooling water hose, the length of the hose shall be as short as possible. (If the unit is connected to the chiller with the original hose size, the pressure loss at the cooling water hose will be large and the pump pressure of the chiller will be very high.)

Sensor input/output specification and signal connector (SENSOR)

Pin no.	Input/Output	Name	Specification
1	Input	Sensor power supply (+)	DC 24 V $\pm 5\%$, \leq ripple $\pm 10\%$ humidity sensor: current consumption ≤ 17 mA
2	Input	Sensor power supply (-)	0 V (GND)
3	Output	Humidity sensor	Analogue out (0 V to 5 V / 0 % to 100 %)
4	Output	Water leak sensor signal	Amplifier K7L-AT50 (manufactured by OMRON corporation) *1 Setting · Detecting resistor (adjust vr) setting: maximum · Range: 0 M Ω to 50 M Ω Refer to the instruction manual of K7L-AT50 for the setting procedure.
5	Output	Water leak sensor level 1	
6	Output	Water leak sensor level 2	
7	—	FG	—

*1 Connector used: 1108-71B10-7M (manufactured by TAJIMI ELECTRONICS CO., LTD.)

* Use a shielded wire to prevent noise.

Use shielded cables for the signal cables and take measures against noise.

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Figure 2: Radiant power - operating current and operating voltage - operating current

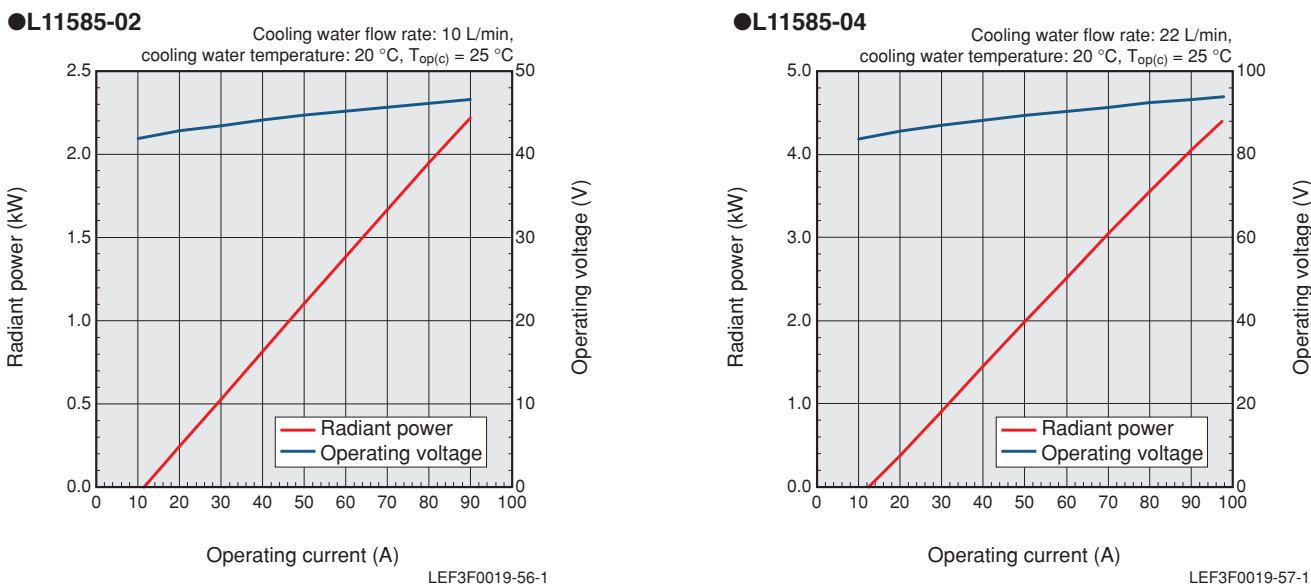
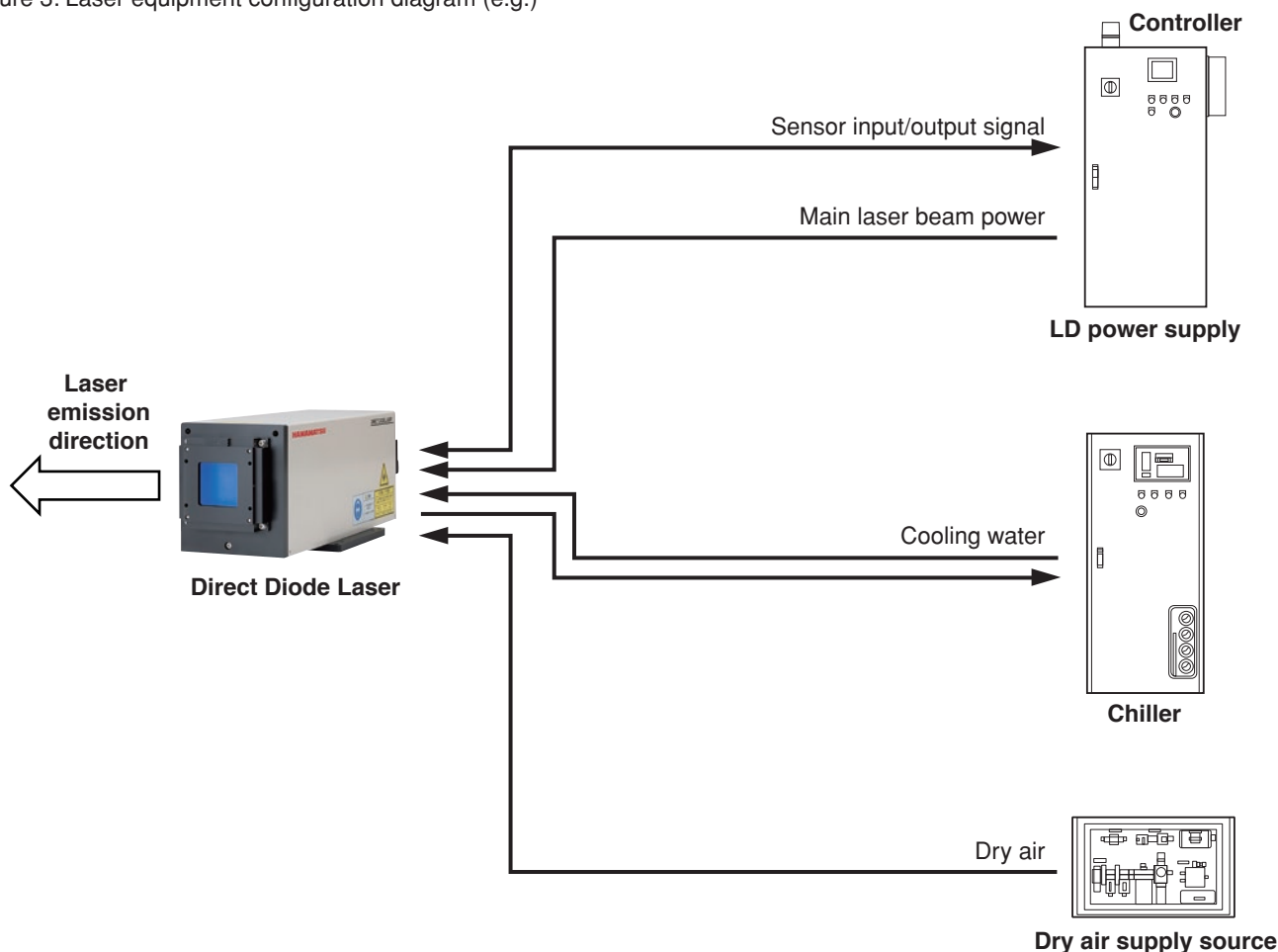


Figure 3: Laser equipment configuration diagram (e.g.)

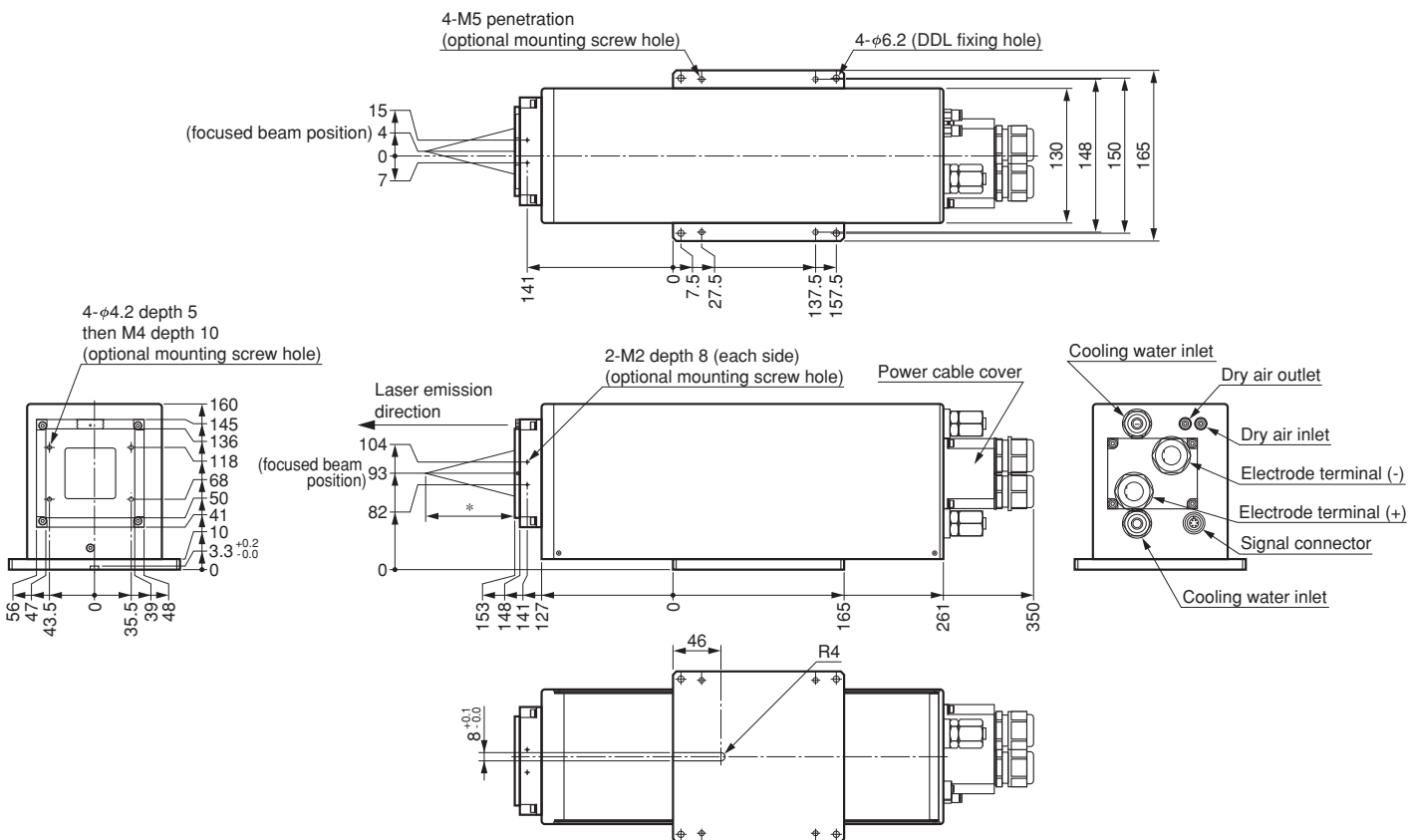


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- * Install an interlock function that cuts off power to the DDL if cooling water supply to DDL stops or falls below the specified flow rate.
- * For more information on sensor I/O signals, see "■ Sensor input/output specification and signal connector (SENSOR)".
- * For the current and voltage specification of the LD power supply, see "■ Absolute maximum rating". For the voltage specification, also consider the voltage drop in the power cable connecting the LD power supply and the DDL.
- * Cooling capacity of the chiller should be at least 1.5 times laser beam power.

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Figure 4: Dimensions (unit: mm)



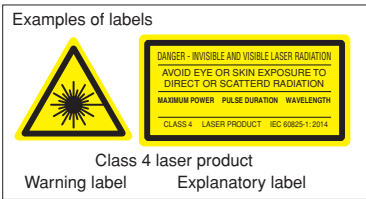
* See specification for working distance.
* Tolerances without indication are ISO2768-1-m.

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Danger (Class 4 Laser)

Invisible laser radiation: Avoid eye or skin exposure to direct or scattered radiation

●Laser beam emitted from this product is an invisible laser beam that cannot be seen by the naked eye. This product is a IEC 60825-1 classification of laser products. It corresponds to "Class 4 Laser". To use this product safely, follow IEC 60825-1 regulations, etc.



●Information described in this material current as of April 2021. Specifications are subject to change without notice.

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