

■ Features

- Low power consumption
- Compact, lightweight
- Maintenance free
- Optical fiber less
- Cooling water temperature 25 °C

■ Applications

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

■ Outline

A laser light source that condense light beams emitted from the internal LD stack module and directly irradiate them onto a target object. Since the converging 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 a gap. In addition, since the cooling water temperature is 25 °C, there is little condensation even in a high temperature and high humidity environment, making it easy to handle. L14133-025/-05 are equipped with a laser focusing unit, protection glass unit.



L14133-025/-05



L14133-025N/-05N

■ Specification

Parameter	Specification				Unit
	L14133-025	L14133-025N	L14133-05	L14133-05N	
Operation mode	CW				—
Laser class	Class 4				—
Lens	F=100	—	F=100	—	mm
Dimensions (W × H × D) *1	Approx. 165 × 160 × 414	Approx. 165 × 160 × 388	Approx. 165 × 160 × 414	Approx. 165 × 160 × 388	mm
Weight *2	Approx. 12	Approx. 11	Approx. 13	Approx. 12	kg

*1 Excluding projecting parts.

*2 Excluding cooling water.

■ Recommended operating condition

Parameter	Specification		Unit
	L14133-025/-025N	L14133-05/-05N	
Cooling water condition (cooling water inlet)	Conductivity	1	μS/cm
	Temperature	+25	°C
	Flow rate	12	25
Dry air condition *1 *2 *3	Flow rate	1.5	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)

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Absolute maximum rating

Parameter		Value		Unit
		L14133-025/-025N	L14133-05/-05N	
Radiant power		3	6	kW
Forward current		130		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		$\mu\text{S/cm}$
	Particles	10		μm
	Temperature *1	+20 to +27		$^{\circ}\text{C}$
	Pressure	0.7		MPa
	Flow rate	10 to 14	21 to 29	L/min
Dry air condition *2	Injection pressure	0.05		MPa
	Flow rate	1.0 to 2.0		L/min
	Temperature	+5 to +40		$^{\circ}\text{C}$
	Humidity	20		%
	Filtration rating	0.01		μm
Oil mist concentration		0.1 (ANR)		mg/m^3
Operating temperature *3		+5 to +40		$^{\circ}\text{C}$
Storage temperature (recommended) *3*4*5		0 to +50 (+5 to +35)		$^{\circ}\text{C}$

*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 (± 1 $^{\circ}\text{C}$ or less) 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/m^3 [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

L14133-025/-025N

Parameter	Condition	Value			Unit	
		Min.	Typ.	Max.		
Operating current	Radiant power: 2.5 kW	97	102	107	A	
Operating voltage		43	47	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	

*1 L14133-025N: specification when focusing lens A12124-70-0100, laser focusing unit A12125, protection glass unit A12126, and protection glass J9929 are mounted.

*2 L14133-025: 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.

* Cooling water volume: approx. 12 L/min, cooling water temperature (at DDL inlet): $25.0 \text{ }^{\circ}\text{C} \pm 0.5 \text{ }^{\circ}\text{C}$

L14133-05/-05N

Parameter	Condition	Value			Unit	
		Min.	Typ.	Max.		
Operating current	Radiant power: 5.0 kW	103	108	113	A	
Operating voltage		90	95	100	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 L14133-05N: specification when focusing lens A12124-70-0100, laser focusing unit A12125, protection glass unit A12126, and protection glass J9929 are mounted.

*2 L14133-05: 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.

* Cooling water volume: approx. 25 L/min, cooling water temperature (at DDL inlet): $25.0 \text{ }^{\circ}\text{C} \pm 0.5 \text{ }^{\circ}\text{C}$

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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 Radio 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 $\pm 5\%$, ripple $\pm 10\%$ or less, humidity sensor: current consumption 17 mA or less
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 *2 *3 Setting · Detecting resistor (adjust vr) setting: maximum · Range: 0 M Ω to 50 M Ω
5	Output	Water leak sensor level 1	
6	Output	Water leak sensor level 2	
7	—	FG	—

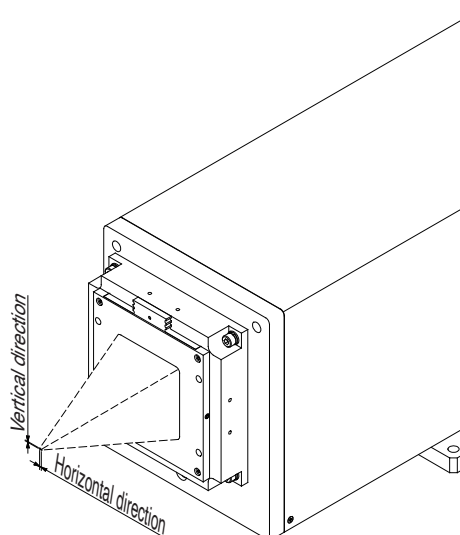
*1 Please prepare it separately by the customer.

*2 See instruction manual section of K7L-AT50 for the setting procedure.

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

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

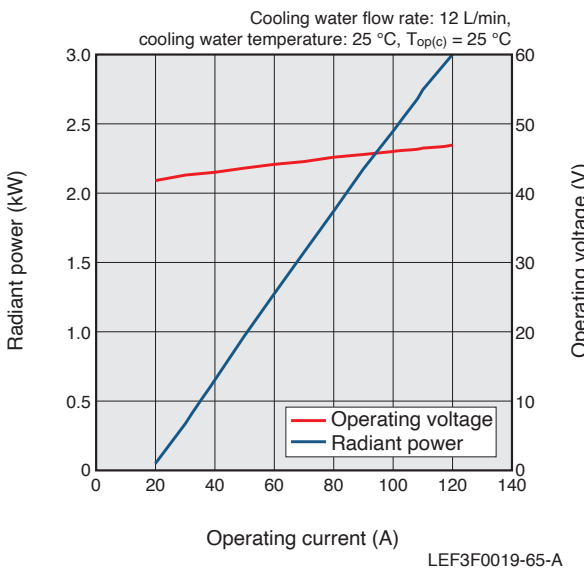
Figure 1: Schematic view of main laser beam directions (L14133-025/-05)



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

● L14133-025/-025N



● L14133-05/-05N

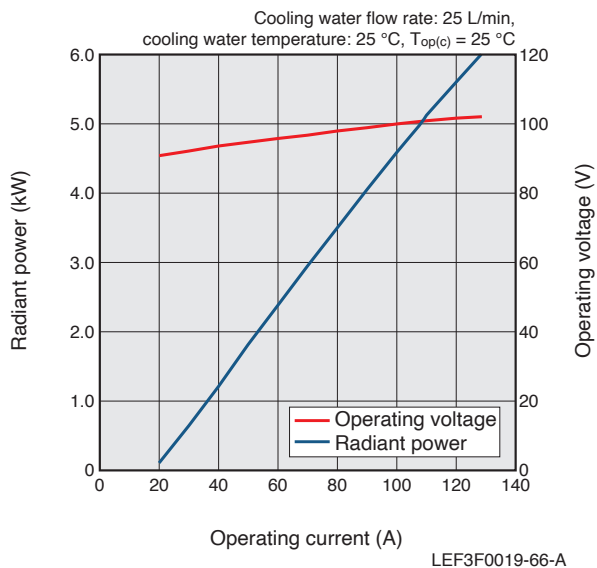
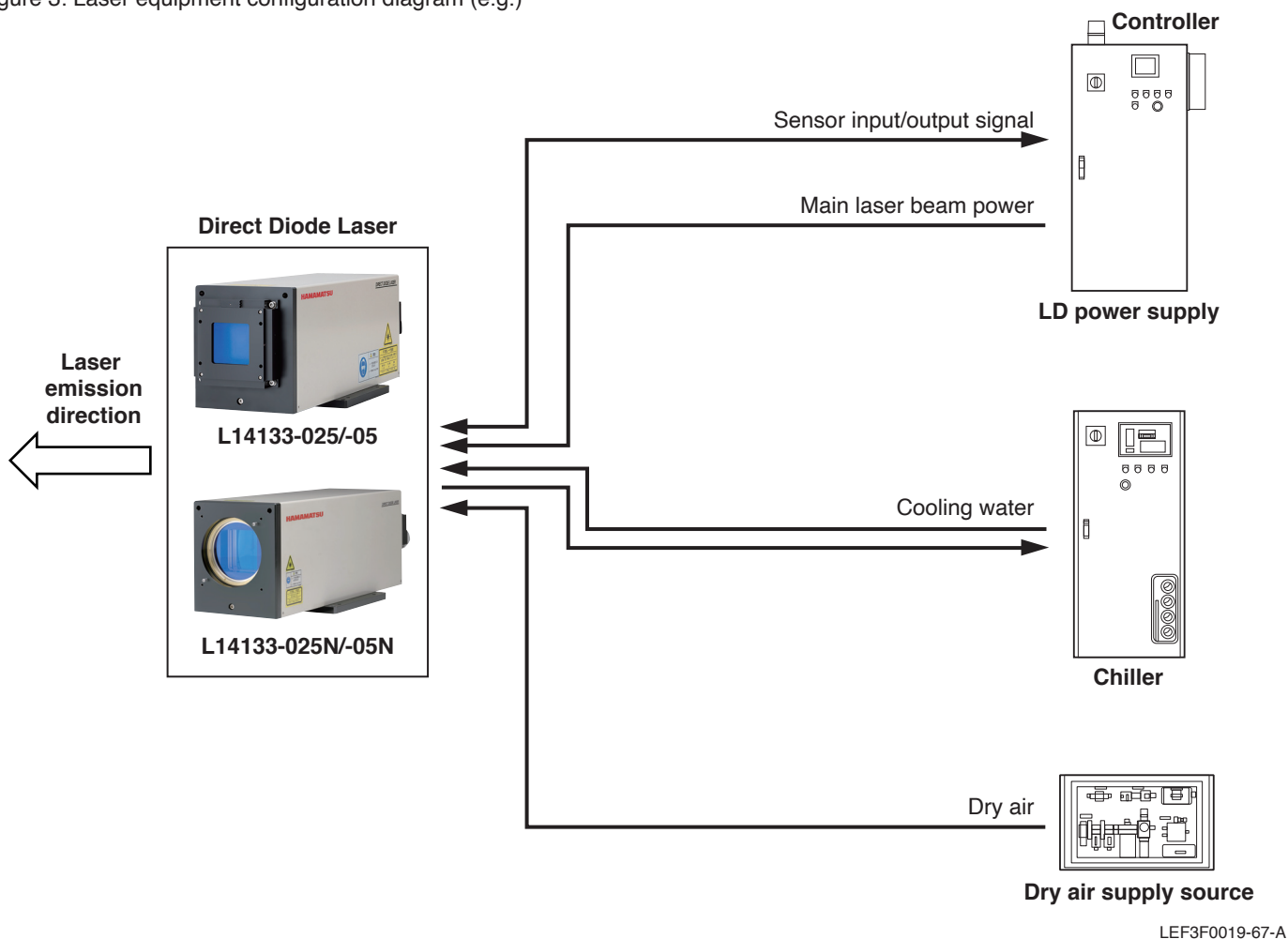


Figure 3: Laser equipment configuration diagram (e.g.)



* 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 I/O specification and signal connector (SENSOR)".

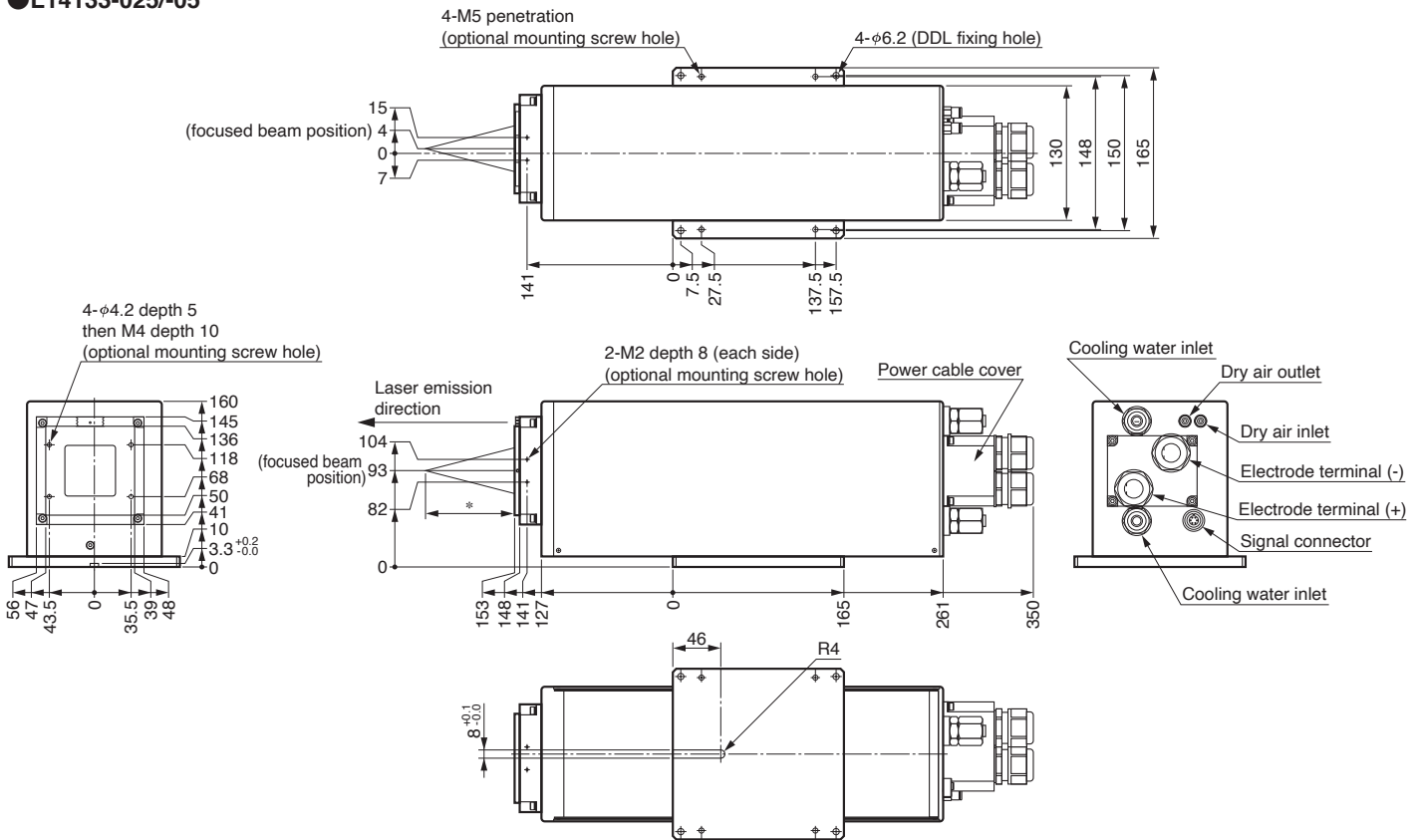
* For the current and voltage specification of the LD power supply, see "■ Absolute maximum rating". For the voltage specification, also consider the voltage drop in the power cable connecting the LD power supply and the DDL.

* Cooling capacity of the chiller should be at least 1.5 times laser beam power.

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Figure 4: Dimensions (unit: mm)

●L14133-025/-05

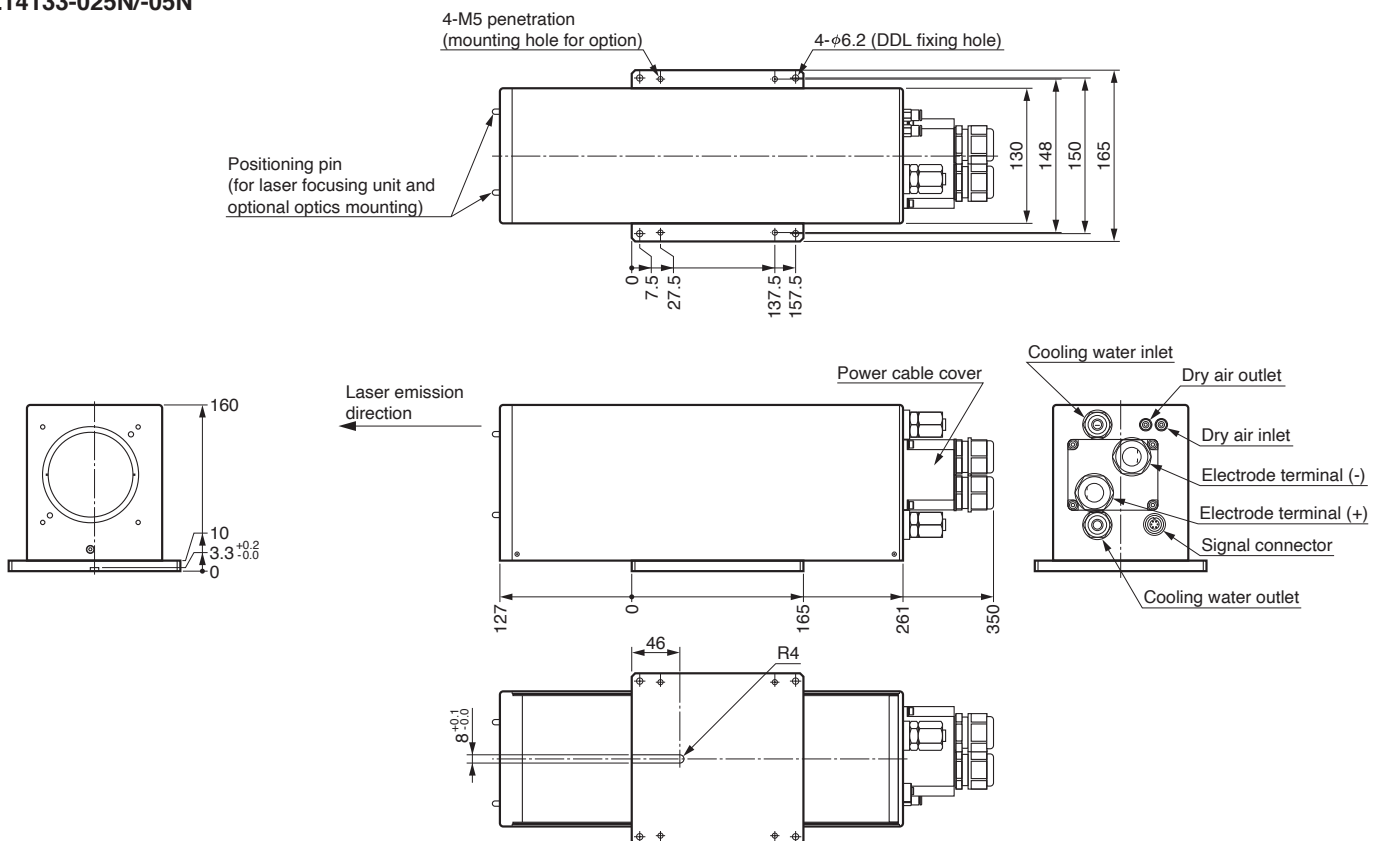


LEF3F0002-02-A

* See specification for working distance.

* Tolerances without indication are ISO2768-1-m.

●L14133-025N/-05N



LEF3F0009-34-1

* 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.

Examples of labels



Warning label



Explanatory label

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

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