

Safety Standards for Laser Beams

● Laser Radiation Safety Standards

The power density of laser beams emitted from a laser is significant regardless of the amount emitted, and may be harmful to the human body. In order to prevent laser products from causing harms on the user, the Japanese Industrial Standard “Laser Product Radiation Safety Standards” (JIS C 6802) has been prescribed in Japan based on the standards of the International Electrical Commission (IEC). JIS C 6802 subdivides laser products into different classes according to the level of risk, and safety measures are prescribed accordingly for each of the classes. The table on the right shows the different classes.

Class	Risk Assessment Description
Class 1	Primarily safe in design.
Class 1M	Low output (wavelength of 302.5 to 4,000 nm). Safe under specific conditions, including intrabeam viewing. May be hazardous if the user looks into the beam using optical means.
Class 2	Low output (wavelength of 400 to 700 nm) in visible radiation. Eye protection is normally afforded by aversion responses, including direct intrabeam viewing.
Class 2M	Low output (wavelength of 400 to 700 nm) in visible radiation. Eye protection is normally afforded by aversion responses. However, it may be hazardous if the user looks into the beam using optical means.
Class 3R	Output is 5 times lower than Class 2 (wavelength of 400 to 700 nm) for visible radiation, and 5 times lower than Class 1 (wavelength of 302.5 nm or longer) for other types of radiation. Direct intrabeam viewing may be hazardous.
Class 3B	Output of 0.5 W or lower. Direct intrabeam viewing may be hazardous. However, viewing of pulse laser radiation by diffuse reflection, which does not focus on one point, is normally safe under specific conditions.
Class 4	High output. Capable of producing hazardous diffuse reflections, which may cause skin injuries or fire hazard.

● Definition of Laser Classes

The safety standards for laser radiation differ among countries and regions. Below is an outline of the definition of laser classes in Europe and U.S.

Europe (EN60825-1)

The classification criteria under the European standard EN60825-1:1994 A1:2002 A2:2001 is consistent with JIS C 6802:2005. However, users need to read through the actual standard document before using.

U.S.

* The text below is a translation of the original document (English) by our firm, and we shall not be liable for the content. Make sure to refer to the original document before applying them.

Class	FDA Definition	ANSI Definition
Class I / 1	Limited to devices that emit ultraviolet, visible, or infrared radiation, as well as devices for which no biological hazards are found.	Laser products that do not emit radiation, which may cause damages during operation or maintenance. In other words, control devices of any kind are not required, and monitoring in other forms is also not necessary,
Class IIa / 2a	Limited to devices that emit radiation of 1,000 seconds or less, for which the visible radiation does not exceed the Class I limit, and those that are not intended for viewing.	Class 2 is further subdivided into Class 2 and Class 2a. For Class 2 laser radiation, eye protection is normally afforded by aversion responses within the visible radiation wavelength range (0.4 to 0.7 μm), including the blink reflex.
Class II / 2	Limited to devices with a visible radiation wavelength (400 to 710 nm) and a radiation time not exceeding 0.25 seconds, or those that do not exceed the Class I limit for other time periods or wavelengths. For Class II products, direct eye exposure for a prolonged period of time may be hazardous.	
Class IIIa / 3a	Limited to devices with a visible radiation wavelength, and a total collected radiation power that does not exceed 5 mW.	Class 3 is further subdivided into Class 3a and Class 3b. Class 3 laser may be hazardous if the user looks into the direct radiation or specular reflection. However, diffuse reflections are normally not hazardous.
Class IIIb / 3b	Limited to devices that emit ultraviolet, visible, or infrared radiation. Class IIIb products include laser systems with a radiation power at a visible radiation wavelength of 5 to 500 mW. For devices in the entire range of the Class IIIb level, eye exposure with the direct radiation is hazardous, and devices at the higher level may be hazardous to the skin.	
Class IV / 4	Devices that exceed Class IIIb limit. Both dot reflection and direct radiation are hazardous.	Class 4 laser is hazardous to the eyes and skin and may also cause fire regardless of whether it is a direct radiation or diffuse reflection. Class 4 laser may even cause air pollution or plasma emission.

Information

Information

Index

Safety Standards for Laser Beams

● Prevention of Hazards Caused by Laser Radiation

The Industrial Safety and Health Law has prescribed the “Prevention of Hazards Caused by Laser Radiation”, which describes the detailed safety precautionary measures for labor that use laser devices other than Class 1 and Class 2 devices.

Countermeasure (Item)			Countermeasure (Description)	Laser Device Class				
				4	3B	3R	2M	1M
Appointment of Laser Device Supervisor			Select a supervisor who possesses adequate knowledge and experience on the handling of laser devices as well as prevention of laser radiation hazards	○	○	○		
Controlled Area (Sign, No Entry)			Separate from other areas using signs, and entry of unauthorized personnel shall be prohibited	○	○			
Laser Device	Laser Optical Path	Optical Path Position	Prevent setting at a position at the height of the operator's eye level	○	○	○	○	○
		Appropriate Optical Path Design/ Shielding	Minimize the number of bends as far as possible, prevent intersection with walkways, and shield if possible	○	○	○		
		Appropriate Termination	Terminate using a reflecting diffuser or absorber with an appropriate degree of reflectance or heat resistance	○	○	○	○	○
	Key Control		Mechanism that is operated using keys	○	○			
	Emergency Stop Switches, etc.	Emergency Stop Switch	Emergency stop switch that can be used to stop laser emission immediately	○	○			
		Alarm Equipment	Alarm equipment such as automatic indicators that can be identified easily	○	○	○		
		Shutter	Shutter that prevents unexpected emission from the outlet	○	○			
	Interlock System, etc.		System that automatically stops laser emission when the controlled area is open or when optical path shielding is removed	○	○			
	Radiation Outlet Label		Label the laser radiation outlet	○	○	○		
Work Management, etc.	Operating Position		Operate the laser device from a position that is as far away from the laser optical path as possible	○				
	Optical System Adjustment		Use the minimum power requirement during optical adjustment	○	○	○	○	○
	Protective Equipment	Protective Eyewear	Wear appropriate laser protection eyewear according to the type of laser	○	○	○		
		Protective Clothing	Wear work clothing with minimum skin exposure	○	○			
		Use of Fire-resistant Materials	Wear work clothing made of fire-resistant material. Artificial fibers that form the shape of beads after melting is not appropriate.	○				
	Inspection and Maintenance		Startup inspections, and inspections as well as adjustments periodically	○	○	○	○	○
	Health and Safety Education		Education when new workers are employed, and when work details or laser devices are changed	○	○	○	○	○
	Health Management	Anterior Eye Examination	Cornea and lens tests together with the eye test for newly employed or transferred workers	○	○	○		
		Funduscopy Examination	Funduscopy examination together with eye test for newly employed or transferred workers	○				
Others	Display	Supervisor Name	Name of supervisor for laser device	○	○	○		
		Hazard Display	Indicate the danger and hazardous property of laser radiation as well as the safety precautions at an easily identifiable location	○	○	○	○	○
		Installation Display	Signs for laser equipment	○	○			
	High Voltage Label		Labels indicating high voltage units and measures to prevent electric shock	○	○	○	○	○
	Prohibition of Hazardous Materials	Within Controlled Area	Explosive and inflammable substances	○				
		Near Laser Optical Path	Explosive and inflammable substances	○	○			
	Harmful Gases and Dusts		Measures as prescribed by the Industrial Safety and Health Law	○	○			
	Doctor's Diagnosis and Actions on Personnel Suspected of Injury Caused by Laser Radiation		Immediate diagnosis by doctors or actions on workers suspected of injuries caused by laser radiation	○	○	○	○	○

Information

Information

Index

Safety Standards for Laser Beams

European Regulations

Requirements on Laser Equipment Manufacturers

EN60825-1

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Requirement	Laser Device Classification						
	Class 1	Class 1M	Class 2	Class 2M	Class 3R	Class 3B	Class 4
Hazard Class Description	Safe under reasonable and foreseeable conditions.	Same as Class 1 except that risk is involved during optical design by the user.	Low power: Eye protection by aversion responses is normally required.	Same as Class 2 except that it involves a higher risk during optical design by the user.	Viewing of direct laser beams may be hazardous.	Viewing of direct laser beams is normally hazardous.	High power: May be hazardous even for diffuse reflections.
Protective Case		Required for individual laser devices: Access restriction on the functioning of the devices					
Safety Interlock	Design that prevents the removal of the panel is required so that the emitted value during radiation (on human body) does not exceed the Class 3R limit.				Design that prevents the removal of the panel is required so that the emitted value during radiation does not exceed the Class 3B limit.		
Remote Control	Not required					Easy addition of external interlock through installation of the device.	
Key Control	Not required					Laser does not operate when the key is removed.	
Light-emitting Alarm Device	Not required				Clean auditory and visual alarm when the laser is ON or when the condenser of the pulse laser is charging. Invisible light is applicable only for Class 3R devices.		
Dimming Device	Not required					Other means are available besides the ON/OFF switch for temporarily interrupting the laser beam.	
Position Control	Not required				Position is controlled such that there is no danger of exposure beyond the accessible emission limit of Class 1 or Class 2 after adjusting.		
Optical System for Viewing	Not required	Emission from all viewing systems does not exceed the accessible emission limit of Class 1M.					
Scanning	Devices are not classified into other laser classes due to scanning errors.						
Laser Class Label	Classification label (in wordings) is required.		Diagram A (* Note) and classification label (in wordings) are required.				
Emission Outlet Label	Not required				Labeling in the specified words is required.		
Servicing (Maintenance) Inlet Label	Appropriate labeling according to the accessible emission is required.						
Deactivated Interlock Label	Appropriate labeling according to the laser type in use is required under specific conditions.						
Wavelength Range Indication	Required for specific wavelength ranges						
LED Display	Labeling in wordings is required for use of alternative LED equipment.						
Information for Users	Instruction manual must contain precautions for safe use. Additional precautions are applicable for Class 1M and Class 2M products.						
Product and Servicing Information	Class type must be specified in promotional documents. Servicing manual must contain safety information.						

Note:

1. The above table is a simplified summary of the basic requirements. Refer to the original standard documents to obtain a proper understanding of and before applying these standards.
2. The safety of medical laser equipment is subject to the IEC60601-2-22 standard.
3. Accessible Emission Limit (AEL) is the maximum allowable laser emission level for the respective laser classes. Reference: Section 2, ANSI Z136.1-1993.

Sign and Border: Black
Background: Yellow

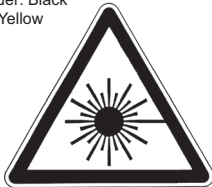


Diagram A: Warning Level / Danger Symbol

Sign and Border: Black
Background: Yellow



Diagram B: Description Label

Safety Standards for Laser Beams

Precautions for Laser Device Users

EN60825-1

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Measure	Laser Device Classification						
	Class 1	Class 1M	Class 2	Class 2M	Class 3R	Class 3B	Class 4
Laser Safety Officer	Not required Recommended for applications that required direct viewing of laser beams.				Not required for visible light. Required for invisible light.	Required	
Remote Interlock	Not required					Connection to circuit of room or door	
Key Control	Not required					Unplug key when not in use	
Beam Dimming	Not required					Prevent accidental exposure during use	
Radiation Display	Not required				Indication that laser with invisible wavelength is activated	Indication that laser is activated	
Warning Sign	Not required					Observance of the precautions stated in the warning display	
Optical Path Position	Not required	Class 1M products that behave like Class 3B (* Note 2)	Not required	Class 2M products that behave like Class 3B (* Note 3)	End beam at the end of the effective length		
Specular Reflection	Not specified	Class 1M products that behave like Class 3B (* Note 2)	Not specified	Class 2M products that behave like Class 3B (* Note 3)	Prevention of unintended reflection		
Eye Protection	Not specified				Not required for visible light. Required for invisible light.	Required when engineering and management procedures are not executable and maximum allowable exposure level is exceeded	
Protective Clothing	Not specified					Sometimes required	Special requirement
Training	Not specified	Class 1M products that behave like Class 3R (* Note 2)	Not specified	Class 2M products that behave like Class 3R (* Note 3)	Required on all operators and maintenance personnel		

Note:

1. The above table is a simplified summary of the basic requirements. Refer to the original standard documents to obtain a proper understanding of and before applying these standards.
2. Refers to Class 1M laser products that do not conform to Requirement 1 in Table 10 of the standard. Not required for Class 1M laser products that do not conform to Requirement 2 in Table 10 of the standard. For details, refer to the original document.
3. Refers to Class 2M laser products that do not conform to Requirement 1 in Table 10 of the standard. Not required for Class 2M laser products that do not conform to Requirement 2 in Table 10 of the standard. For details, refer to the original document.

Information

Information

Index

Safety Standards for Laser Beams

U.S. Regulations

Requirements on Laser Equipment Manufacturers

U.S. (FDA (Laser Device Compliance Guide, 1985, 21CFR1040.10))

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Requirement	Laser Device Classification (Note 1)					
	Class I	Class IIa	Class II	Class IIIa	Class IIIb	Class IV
Operation/Performance (All Laser Devices)						
Protective Case	Required (Note 2)	Required (Note 2)	Required (Note 2)	Required (Note 2)	Required (Note 2)	Required (Note 2)
Safety Interlock	Required (Note 3, 4)	Required (Note 3, 4)	Required (Note 3, 4)	Required (Note 3, 4)	Required (Note 3, 4)	Required (Note 3, 4)
Position Control	N.A.	Required	Required		Required	Required
Optical Restrictions During Viewing	Required	Required	Required	Required	Required	Required
Measures During Scanning	Required	Required	Required	Required	Required	Required
Operation/Performance (Laser System)						
Remote Control Connector	N.A.	N.A.	N.A.	N.A.	Required	Required
Key Control	N.A.	N.A.	N.A.	N.A.	Required	Required
Radiation Display	N.A.	N.A.	Required	Required	Required (Note 10)	Required (Note 10)
Beam Dimming	N.A.	N.A.	Required	Required	Required	Required
Reset	N.A.	N.A.	N.A.	N.A.	N.A.	Required (Note 13)
Operation/Performance (Special Purpose Products)						
Medical	Same class as other products	Same class as other products	Same class as other products	Same class as other products (Note 8)	Same class as other products (Note 8)	Same class as other products (Note 8)
Measurement, Averaging, Alignment	Same class as other products	Same class as other products	Same class as other products	Same class as other products	Not allowed	Not allowed
Demonstration	Same class as other products	Same class as other products	Same class as other products	Same class as other products	Same class as other products (Note 11)	Same class as other products (Note 11)
Labeling (All Laser Devices)						
Certificate and ID	Required	Required	Required	Required	Required	Required
Protective Case	Dependent on the internal radiation level (Note 5)	Dependent on the internal radiation level (Note 5)	Dependent on the internal radiation level (Note 5)	Dependent on the internal radiation level (Note 5)	Dependent on the internal radiation level (Note 5)	Dependent on the internal radiation level (Note 5)
Emission Outlet	N.A.	N.A.	Required	Required	Required	Required
Laser Classification Warning	N.A.	Required (Note 6)	Required (Note 7)	Required (Note 9)	Required (Note 12)	Required (Note 12)
Information (All Laser Devices)						
Information for Users	Required	Required	Required	Required	Required	Required
Product Document	N.A.	Required	Required	Required	Required	Required
Servicing Information	Required	Required	Required	Required	Required	Required

Note:

- Depending on the maximum accessible emission level during operation.
- Required in all cases in order to deliver the product's performance, except when the user does not need to access laser radiation of Class I and above.
- Required when constant access by users is not necessary if the case is open, or when the protective case needs to be kept open during operation or maintenance.
- Necessity of interlock varies according to the internal radiation of the laser glass.
- Indication varies according to the laser radiation level and wavelength inside the protective case.
- Warning description label.
- "CAUTION" in the form of a logo.
- "Required" in this case refers to the measurement of the laser radiation level when it is intended for use on human bodies.
- Labeled as "CAUTION" for value not more than 2.5 mWcm², and "DANGER" for value a larger than 2.5 mWcm².
- Time lag is required between display and radiation.
- Different methods are required for demonstration of Class IIIb or IV products, and for simply showing the laser light.
- "DANGER" in the form of a logo.
- Required with effect from August 20, 1986.

Information

Information

Index

Safety Standards for Laser Beams

Precautions for Laser Device Users

ANSI Z136.1: 1993

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Measure	Laser Device Classification					
	Class 1	Class 2a	Class 2	Class 3a	Class 3b	Class 4
Protective Case (4.3.1)	Required	Required	Required	Required	Required	Required
No Protective Case (4.3.1.1)	Alternative control by appointing a laser safety officer (Note 2)					
Interlock of Protective Case (4.3.2)	Required for Class 3B or 4	Required for Class 3B or 4	Required for Class 3B or 4	Required for Class 3B or 4	Required	Required
Access Panel for Servicing (4.3.3)	Required for Class 3B or 4	Required for Class 3B or 4	Required for Class 3B or 4	Required for Class 3B or 4	Required	Required
Key Control (4.3.4)	Not required	Not required	Not required	Not required	Recommended	Recommended
Inlet for Viewing (4.3.5.1)	Not required	Not required	Required if maximum allowable exposure level is exceeded	Required if maximum allowable exposure level is exceeded	Required if maximum allowable exposure level is exceeded	Required if maximum allowable exposure level is exceeded
Dust Collection Optics (4.3.5.2)	Required if maximum allowable exposure level is exceeded	Required if maximum allowable exposure level is exceeded	Required if maximum allowable exposure level is exceeded	Required if maximum allowable exposure level is exceeded	Required if maximum allowable exposure level is exceeded	Required if maximum allowable exposure level is exceeded
Full Opening of Beam Optical Path (4.3.6.1)	Not required	Not required	Not required	Not required	Required: Analysis of nominal value for dangerous zone is required.	Required: Analysis of nominal value for dangerous zone is required.
Restrictive Opening of Beam Optical Path (4.3.6.2)	Not required	Not required	Not required	Not required	Required: Analysis of nominal value for dangerous zone is required.	Required: Analysis of nominal value for dangerous zone is required.
Closing of Beam Optical Path (4.3.6.3)	Not required if Items 4.3.1 and 4.3.2 are satisfied.					
Remote Interlock Connector (4.3.7)	Not required	Not required	Not required	Not required	Recommended	Required
Beam Stoppage or Dimming (4.3.8)	Not required	Not required	Not required	Not required	Recommended	Required
Activation of Warning System (4.3.9)	Not required	Not required	Not required	Not required	Recommended	Required
Radiation Delay (4.3.9.1)	Not required	Not required	Not required	Not required	Not required	Required
Indoor Laser Control Area (4.3.10)	Not required	Not required	Not required	Not required	Required: Analysis of nominal value for dangerous zone is required	Required: Analysis of nominal value for dangerous zone is required
Class 3B Laser Control Area (4.3.10.1)	Not required	Not required	Not required	Not required	Required	Not required
Class 4 Laser Control Area (4.3.10.2)	Not required	Not required	Not required	Not required	Not required	Required
Outdoor Laser Control (4.3.11)	Not required	Not required	Not required	Not required	Required: Analysis of nominal value for dangerous zone is required	Required: Analysis of nominal value for dangerous zone is required
Laser in Navigable Airspace (4.3.11.2)	Not required	Not required	Not required	Recommended	Recommended	Recommended
Temporary Laser Control Area (4.3.12)	Required for Classes 3b and 4, and if maximum allowable exposure level is exceeded	Required for Classes 3b and 4, and if maximum allowable exposure level is exceeded	Required for Classes 3b and 4, and if maximum allowable exposure level is exceeded	Required for Classes 3b and 4, and if maximum allowable exposure level is exceeded	Not required	Not required
Remote Ignition and Monitoring (4.3.13)	Not required	Not required	Not required	Not required	Not required	Recommended
Labeling (4.3.14 and 4.7)	Required	Required	Required	Required	Required	Required
Area Display (4.3.15)	Not required	Not required	Not required	Recommended	Required: Analysis of nominal value for dangerous zone is required	Required: Analysis of nominal value for dangerous zone is required
Standardized Operation Procedures (4.4.1)	Not required	Not required	Not required	Not required	Recommended	Required
Output Radiation Restriction (4.4.2)	Not required	Not required	Not required	To be determined by laser safety officer		
Education and Training (4.4.3)	Not required	Not required	Recommended	Recommended	Required	Required
Specification of Certified Personnel (4.4.4)	Not required	Not required	Not required	Not required	Required	Required
Positioning Procedures (4.4.5)	Not required	Not required	Required	Required	Required	Required
Protective Equipment (4.4.6)	Not required	Not required	Not required	Not required	Recommended	Required
Supervisor (4.4.7)	Not required	Not required	Not required	Not required	Recommended	Required
Servicing Personnel (4.4.7)	Required for Classes 3b and 4, and if the maximum allowable exposure level is exceeded	Required for Classes 3b and 4, and if the maximum allowable exposure level is exceeded	Required for Classes 3b and 4, and if the maximum allowable exposure level is exceeded	Required for Classes 3b and 4, and if the maximum allowable exposure level is exceeded	Required	Required

Information

Information

Index

Safety Standards for Laser Beams

Measure	Laser Device Classification					
	Class 1	Class 2a	Class 2	Class 3a	Class 3b	Class 4
General Demonstration (4.5.1)	Required if maximum allowable exposure level is exceeded. Applicable only to UV and infrared lasers.	Not required	Required	Required	Required	Required
Laser Optic Fiber System (4.5.2)	Required if maximum allowable exposure level is exceeded	Required if maximum allowable exposure level is exceeded	Required if maximum allowable exposure level is exceeded	Required if maximum allowable exposure level is exceeded	Required	Required
Laser Robot Installation (4.5.3)	Not required	Not required	Not required	Not required	Required: Analysis of nominal value for dangerous zone is required	Required: Analysis of nominal value for dangerous zone is required
Eye Protection (4.6.2)	Not required	Not required	Not required	Not required	Recommended: Required if maximum allowable exposure level is exceeded.	Recommended: Required if maximum allowable exposure level is exceeded.
Protective Window (4.6.3)	Not required	Not required	Not required	Not required	Required: Analysis of nominal value for dangerous zone is required	Required: Analysis of nominal value for dangerous zone is required
Protective Barrier and Curtain (4.6.4)	Not required	Not required	Not required	Not required	Recommended	Recommended
Skin Protection (4.6.5)	Not required	Not required	Not required	Not required	Required: Required if maximum allowable exposure level is exceeded	Required: Required if maximum allowable exposure level is exceeded
Other Protective Equipment (4.6.5)	Use may be required					
Warning Signs and Labels (4.7) (Design Requirement)	Not required	Not required	Recommended	Recommended	Required: Analysis of nominal value for dangerous zone is required	Required: Analysis of nominal value for dangerous zone is required
Servicing and Repair (4.8)	To be determined by laser safety officer					
Laser System Modification (4.9)	To be determined by laser safety officer					

Note:

1. Requirement Level - Required: Shall, Recommended: Should

2. Laser Safety Officer (LSO)

An individual who is assigned with the responsibility and authority to monitor and implement laser hazard control, perform evaluation using knowledge on the source of laser hazards, and effectuate the necessary countermeasures. Refer to Item 1.3 of ANSI Z136.1993.

Classification of Sensors Using Laser

JIS/IEC/EN	FDA	Product Name	Model	Maximum Laser Beam Output	Refer to (Page) *
Class	Class				
Class 1	Class II	Smart Sensor, Laser Type	ZX-LT001/030	0.2mW	426
	Class II		ZX-LT005/010	0.35mW	
	Class II	Photoelectric Sensor with Separate Digital Amplifier (Laser Type)	E3C-LR12	1mW	118
	Class II	Parallel Beam Line Sensor with Separate Amplifier	Z4LC-S2840	50μW	Web
	Class II		Z4LC-S28		
	Class II	Photoelectric Sensor with Built-in Amplifier (Laser Type)	E3Z-L□	4.5mW	186
	Class II	Laser Photoelectric Sensor	E3L-DS50E4	0.12mW	Web
Class 2	Class II	Smart Sensor, Laser CCD Length Measuring Sensor	ZX-GT	0.3mW	470
	Class II	Smart Sensor, Laser Type	ZS-HLDS□	1.0mW	394
	Class II	Smart Sensor (2-D CMOS Laser Type)	ZS-LD□□	1.0mW	412
	Class II	Smart Sensor, Laser Type	ZX-LD□□ (Excluding ZX-LT series)	1.0mW	426
	Class II	Photoelectric Sensor with Separate Digital Amplifier (Laser Type)	E3C-LD11/21/31	3mW	118
	Class II	Photoelectric Sensor with Separate Digital Amplifier (Laser Type)	E3C-LR11	2.5mW	
	Class II	Profile Measuring Sensor	Z500-SW2	1.0mW	Web
	-	Laser Micrometer	3Z4L-S5□□RV2	1.0mW	Web
	Class II	Laser Photoelectric Sensor	E3L-2RC4	0.48mW	Web
	Class II	Distance-settable Laser Photoelectric Sensor	F3C-AL	1.0mW	322
	Class II	Smart Sensor, 2-D Profile Measuring Sensor	ZG-WDS3	1mW	480
	Class II	Smart Sensor, 2-D Profile Measuring Sensor	ZG-WDS70/WDS22/WDS8	5mW	480
Class 2M	Class IIIb	Smart Sensor, 2-D Profile Measuring Sensor	Z500-SW6/SW17	15mW	Web
Class 3B	Class IIIb	Profile Measuring Sensor	Z550-SW70		Web

* Refer to www.omron-ap.com for items indicated with "Web".

Information

Information

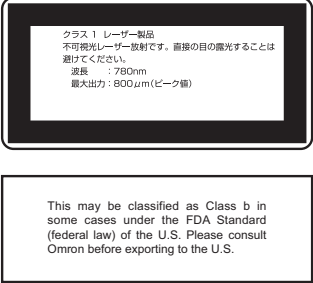
Index

Safety Standards for Laser Beams

● Safety Precautions During Use of Laser Radiation

- (1) Make sure that the eye does not come into contact with the laser radiation directly or through reflection from a mirror surface.
- (2) The labels illustrated below are attached to sensors using laser (Representative Example).

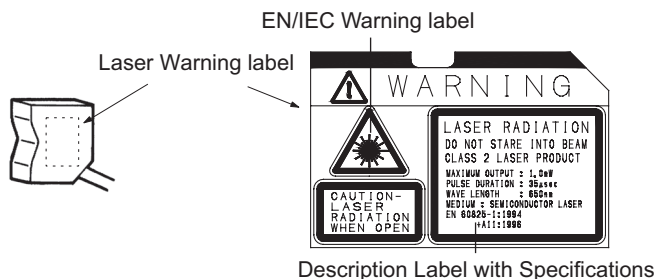
Handle the equipment according to the stated instructions.

Class 1 Type	Class 2 Type	Class 3B Type
		

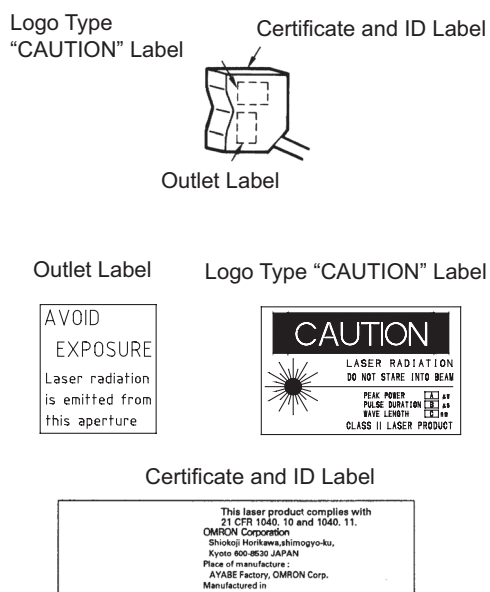
- (3) When adjusting the optical axis, make use of an IR scope or fluorescent screen that converts infrared light to visible light.

When exporting to Europe and the U.S., attach the labels illustrated below, which are supplied with the product. Labels for the U.S. (FDA) are only available if application or registration has been made with FDA for the product in question.

Europe (EN Standard)



U.S. (FDA)



Information

Information

Index