Panasonic

INSTRUCTION MANUAL

Ultra High-Speed, High-Accuracy Laser Displacement Sensor **Sensor Head** HL-C235BE. HL-C235BE-MK

MJF-HI C235BF No 0092-51V

Thank you very much for purchasing Panasonic products. Read this Instruction Manual carefully and thoroughly for the correct and optimum use of this product. Kindly keep this manual in a convenient place for quick reference.

⚠ WARNING

- This product is intended to detect the objects and does not have the control function to ensure safety such as accident prevention
- Do not use the product as a sensing device to protect human body.
- Be careful not to directly watch or touch the direct laser beam or reflected laser
- The product was developed and manufactured for industrial use.

BEFORE USE

• Before using the product, check the sensor head model and contents of packing.



Check the model name of product at the top of sensor head.

Packing

Check that all of the following components are included in the package.

1 sensor head unit

Sensor head model

- 1 Instruction manual
- · Laser warning labels
- [JIS/IEC/KS: 1 set, GB: 1 set]
- This product complies with CE Marking when used together with a controller and programmable display unit that are in compliance with CE Marking. Likewise, the product complies with UKCA Marking when used together with a controller and programmable display unit that are in compliance with UKCA Marking.

1 DESCRIPTION

- HL-C235BE, HL-C235BE-MK displacement sensor head achieves ultra highspeed and high-accurate measurement using linear image sensor as light receiving element to be used on equipment that require high-speed operation with high-
- The product is used at diffuse or specular reflection sensor head by installing and

2 CAUTIONS ON HANDLING LASER LIGHT

• In order to prevent the accident by laser product and protect the users, JIS C 6802-2014 "Safety of laser products" was established based on the regulation of IEC (International electrotechnical Commission). This regulation classifies laser products according to the level of hazard, and provides the safety measures for respective classes

HL-C235BE, HL-C235BE-MK are classified as "Class 2 laser products" according to IEC 60825-1-2014 (JIS C 6802-2014) "Safety of laser products

Laser hazardous class

Classification according to IEC 60825-1-2014 (JIS C 6802-2014)

Class	Model	Description of hazardous evaluation
Class 2	HL-C235BE HL-C235BE-MK	Visible beam, low power. Blink response of eye affords protection.

WARNING label

In Japanese / English / Korean

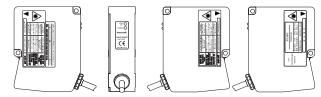


*\	(パルス値) 最大10ms	(MADIMON OUTPOT) THW (PULSE DURATION) TOTAL THE (MEDIAN) SENECEDICTORIASES (WAVELENGTH) 6581111			(영스지수기간 최대IOns (매진) 반도체레이기	IMAXIMUM OUTPUT) 1mW IPULSE DURATION) 10ms max. IMEDIUM, BBIDOIDUCTOR LASER (WAVELENGTH) 658mm	(最大出力) 1mW (パルス幅) 最大10ms (雑貨) 半導体レーデ (准長) 658mm	<u> </u>
	クラス2レーザ製品 UBS C 6802 2014)	CLASS2 LASER PRODUCT (BEO80625-1 2014)	2등급 레이저 제품 0KB C (EC60625-1 2013)		2등급 레이지 제품 (KS C EC99825-1 2013)	CLASS2 LASER PRODUCT (EC60825-1 2014)	クラス2レーザ製品 (JRS C 6802 2014)	
V	一ザ放射の出口	LASER APERTURE	레이저 개구	lJ (레이저 개구	LASER APERTURE	レーザ放射の出	
				,				

	激光辐射	注意 打开时有2类激光辐射
🛵	勿直视光束	
<u>/</u> 秦\	最大输出: 1mW 脉宽:最大10ms 媒体:半导体激光 波长:658nm	勿直视光束
_	2类激光产品 GB7247.1 2012	

注章	激光辐射
打开时有2类激光辐射	勿直视光束
勿直视光束	最大输出: 1mW 脉宽:最大10ms 媒体:半导体激光 波长:658nm
	2类激光产品 GB7247.1 2012

<Label position>



- Install the product so the laser beam comes higher or lower than eye level in order not to watch the beam directly during operation.
- Laser safety distance (Nominal Ocular Hazard Distance: NOHD) is approx. 1.4m. The laser beam must be terminated at the end of its path by a diffuse reflector or
- · Please contact our company if the system breaks down. It is not equipped with a function that stops laser radiation automatically during disassembling the sensor head. The users therefore may be exposed to laser beam in disassembling the sensor head.
- When this product is used in China, affix the Chinese warning label (accessory) on the label in the product.
- Do not use the system in the manner other than specified in this Instruction Manual.

3 EXPORT REGULATIONS BY JAPANESE GOVERNMENT

• Please follow the export control regulations required. HL-C235BE and HL-C235BE-MK are not subject to export control regulations under the condition that they are used combined with the non-pertinent controller to export control specified by Foreign Exchange and Foreign Trade Law. When they are combined with the pertinent controller to export control, they are subject to the Law. In this case export admission by Japanese government is re-

guired before the product is to be exported or brought out of the country.

4 SPECIFICATIONS

Model No.		HL-C2	235BE	HL-C235BE-MK			
		Diffuse Reflection	Specular Reflection	Diffuse Reflection	Specular Reflection		
Meas. method (Note 2)		Diffuse reflection / Specular reflection					
Measurement center distance		350mm	348mm	350mm	348mm		
Meas	surement range (Note 3)	±50mm	±42mm	±50mm	±42mm		
Beam source		Red semiconductor laser Class 2 (JIS/IEC/GB/KS) Max output: 1mW, Emission Peak wavelength: 658nm					
Beam diameter (Note 4)		Approx. ø250μm Approx. 250 × 3,500μm					
Beam	n receiving element	Linear image sensor					
Reso	lution	2.0µm / average times: 256, 0.5µm /average times: 4,096					
Linea	arity	±0.03%F.S.					
Temp	perature characteristics	0.01%F.S./°C					
ndicator	Laser emission	Green LED: Lights up during laser emission.					
Indic	Meas. range Yellow LED: Near measurement center:ON, within measurement ran				k, beyond the range:OFF		
Protective structure		IP67 (except connector)					
Pollut	tion degree	2					
Insulation resistance		20M ohms or more by 500V DC megger (between all the terminals and enclosure.)					
Dielectric withstand	Commercial Frequency	AC 500V for 1min. (between all the terminals and enclosure.)					
	Impulse	±1,000V 1.2/50μs (between all the terminals and enclosure.)					
Vibration resistance		Endurance: 10 to 55Hz (cycle: 1minute), Resistant amplitude of vibration: 1.5mm, in X, Y, and Z directions for 2 hours					
Shock resistance		196m/ s² in X, Y, and Z directions for 3 times					
Ambi	ient illuminance (Note 5)	3,000tx or less (illuminance at beam receiving surface using incandescent lamp)					
Ambient temperature		0 to +45°C (No dew condensation or icing allowed), At storage: -20 to +70°C					
Ambi	ent humidity	35 to 85%RH At storage: 35 to 85%RH					
Ambient Height		2,000m or less					
Material		Main unit case / cover: Die-cast aluminum, Front cover: Glass					
Cable length		0.5m					
Cable extension		Extendible to 30m long maximum using the optional extension cable.					
Weight		Approx. 450g including cable weight					
Suited controller (Note 6)		Controller ver. 2.00 or later					
Applicable Directives / Applicable Regulations		Compliant with EU Law: EMC Directive / British Legislation: EMC Regulation					

- Notes: 1) Measuring conditions are as follows unless otherwise specified; connection with controller, power voltage: 24V DC, ambient temperature: 20°C, sampling cycle; 40us, average times;256, at measurement center distance object substance; white ceramic, and digital measurement value
- 2) Use the external ND filter (optional) in case the amount of reflected beam is too large on Specular Reflection
- 3) The measurement range is limites between 0 and +50mm (in case the sampling cycle is 20µs at diffuse reflection), between 0 and +42mm (in case the sampling cycle is 20µs at specular reflection), between +36 and +50mm (in case the sampling cycle is 10µs at diffuse reflection), or between +36 and +42mm (in case the sampling cycle is 10us at specular reflection).
- 4) The figure shows the value at measurement center distance. It is determined by 1/e² (approximately 13.5%) of center beam intensity. Due to leak light outside the specified area, the reflectance around the detecting point may be higher than at the point and this may affect the measurement value.

 5) The variation in ambient illuminance is ±0.03%F.S. or less.

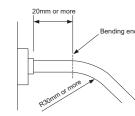
 6) It does not work properly in case connected to the controller ver. 1.**.

5 CAUTIONS

 It does not work properly in case connected to the controller ver. 1.** For proper use, connect to the controller ver, 2.00 or later.

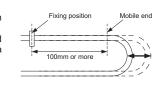
- Turn off the power of controller before connecting or disconnecting the connectors
- When connecting or disconnecting the connectors, be sure to hold the connector area not to apply extra force to the cable.
- · Be careful not to touch terminals or to let foreign matter get in the connector after disconnecting connectors.
- Be careful not to apply force to around the connector of standard cable and extension cable. Do not bend the cables near connectors. Failure to do so causes causes disconnection of the cable.

- Do not run the sensor cable along (bundled in parallel) with other wirings. Keep it at least 100mm away from other wires. Run the cable so it is separate from high voltage and power circuit lines. If it is necessary to run the cable in parallel with them, shield it by running through a grounded electrical conduit.
- Install the product as far away as possible from noise source such as high-voltage lines, high-voltage device, power lines, power device, machines which generate a large starting and stopping surge, welding machines and inverter motor.
- Do not pull the cable using a force more than 29.4N when routing the cable with the sensor head and controller fixed. At least 20 mm is required from the cable connection to the bend. The bending radius must be 30 mm or more.
- · When the sensor head is moved around while in use, the cable in the moving part may be damaged. Therefore, use an extension cable for the moving part and, when the extension cable is damaged, immediately replace it. Otherwise, it may result in failure



Cable Extension

- Use only one extension cable for connection between one sensor head and a controller.
- When the sensor head part is moved around while in use, fix the extension cable at a position 100 mm away from the mobile end.



Warming up time

• Allow at least 30 minutes of warming up after turning on the power to ensure the performance of the product.

Environment

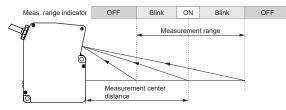
 The life of the semiconductor laser depends on the ambient temperature during use. When using the product near a heat source, take measures to lower the ambient temperature of the sensor head as possible. Mount the sensor on a device having good heat radiation because the sensor itself emits heat.

Notes: 1) When installing 2 sensor heads in parallel at a 20mm or less interval, mount each sensor head on an aluminum or iron plate having a 200cm2 surface area

- · Water, oil, or fingerprints on the emitter surface and receiver surface of sensor head reflects light. Dust and dirt on them block light. Keep them clean at all times. When cleaning these parts, wipe them off using a soft lint-free cloth or lens clean-
- Install the sensor head so ambient light such as sunlight or light with the same wavelength as laser beam should not enter the light receiver. If high accuracy is required, install a light shielding plate or the like on the sensor head.
- The controller and connectors are not structurally dustproof, waterproof, or corrosion-resistant. Do not use the product underwater or in the rain.
- Do not use the product in dusty places or that exposed to flammable or corrosive gases, droplet, direct sunlight, severe vibration or impact.

6 MEASUREMENT RANGE / INDICATOR

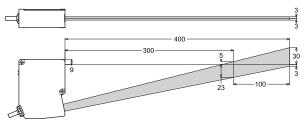
Installation Mode: Diffuse



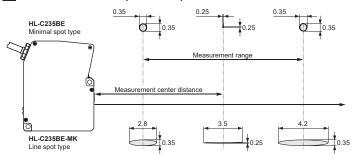
• The measurement range indicator at sampling cycle of 20µs or 10µs lights up at the center of limited measurement range

7 MUTUAL INTERFERENCE AREA (Unit: mm)

• When installing 2 or more sensor heads side by side, mutual interference occurs if the laser spots from other sensor heads fall within the shaded areas in the right figure. Install sensor heads so the laser spots from other sensor heads fall outside the shaded areas.

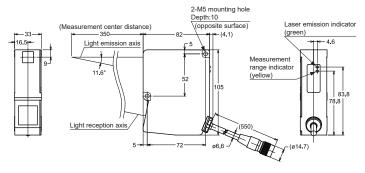


8 BEAM DIAMETER (Unit: mm)

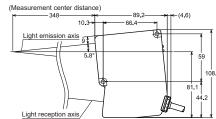


9 DIMENSIONS (Unit: mm)

• Installation Mode: Diffuse



· Installation Mode: Specular



10 OPTION

• ND filter (product code: **HL-C2F01**) is optionally available to adjust the excessive received light intensity to an optimum level. This is useful when mounting the sensor head for specular reflection

Panasonic Industry Co., Ltd. Panasonic Industrial Devices SUNX Co., Ltd. https://panasonic.net/id/pidsx/global

Please visit our website for inquiries and about our sales network

Panasonic Industrial Devices SUNX Co., Ltd. 2023 June, 2023

PRINTED IN JAPAN