Panasonic

INSTRUCTION MANUAL

Ultra High-Speed, High-Accuracy Laser Displacement Sensor **Sensor Head** HL-C203B(E), HL-C203B(E)-MK

M.IF-HI C203B No 0092-47V

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.

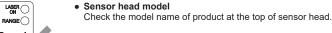
⚠ WARNING

- 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

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



package.

 Packing Check that all of the following components are included in the

- 1 sensor head unit
- · 1 Instruction manual
- · Laser warning labels

[JIS/IEC/KS: 1 set, GB: 1 set (E type only)]

 This product complies with CF 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-C203B(E), HL-C203B(E)-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

HL-C203B(E), HL-C203B(E)-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)

		9 ,
Class	Model	Description of hazardous evaluation
Class 2	HL-C203B(E) HL-C203B(E)-MK	Visible beam, low power. Blink response of eye affords protection.

WARNING label

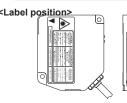
In Japanese / English / Korean

Λ	レーザ放射	LASER RADIATION	레이저 방사
	ビームをのぞき	DO NOT STARE	법을 주시하지
	込まないこと	INTO BEAM	마시오.
<u>/</u> *\	(最大比力) ImW	(MAXIMUM OUTPUT) 1:mW	(최대 중비) LmW
	レバルス値) 最大10ms	(PULSE DURATION) 10ms max.	(센스지수시선 최대전ms
	(経質) 半導体レーザ	(MEDIJM) SENCHOLICTORIASER	(배정) 반도체제이기
	(波長) 658mm	(WAVELENGTH) 658mm	(작정) 658nm
_	クラス2レーザ製品 (JBS C 6802 2014)	CLASS2 LASER PRODUCT	2등급 레이저 제품 (KS C EC66625-1 2013)

CAUTION - CLASS2 LAS	CAUTION - CLASS2 LASER RADIATION WHEN OPEN DO NOT STARE INTO BEAM					
주의 - 개방시 2성	J					
레이저 방사	LASER RADIATION	レーザ放射	1			
법을 주시하지 마시오.	DO NOT STARE INTO BEAM	ビームをのぞき 込まないこと	Λ			
(최대 순력) 1mW (데스 지수 시간) 최대(0ms	(MAXIMUM OUTPUT) 1mW (PULSE DURATION) 10mg max.	(最大出力) 1mW (水和2個) 最大10ms				
	(WAVELENGTH) 658nm	(議費) 半導体レーザ (液長) 658mm	<u> </u>			
2등압 레이거 제품 (KS C E093825-1 2013)	CLASS2 LASER PRODUCT (BCG0825-1 2014)	クラス2レーザ製品 (JES C 6802 2014)	١.,			
레이지 개구	LASER APERTURE	レーザ放射の出	□			











Install the product so the laser beam comes higher or lower than eve level in order not to watch the beam directly during operation.

- Laser safety distance (Nominal Ócular Hazard Distance: NOHD) is approx. 0.4m. The laser beam must be terminated at the end of its path by a diffuse reflector or an absorber • 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
- 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

• HL-C203B and HL-C203B-MK are subject to export control regulation by the Foreign Exchange and Foreign Trade Law. Export admission by Japanese government is required before the product is to be exported or brought out of the country. These products are also subject to Article 1.B.3.b.1 of Nuclear Suppliers Group in international export control regime and 2.B.6.b.1 of Wassenaar Arrangement.

 Please follow the export control regulations required. HL-C203BE and HL-C203BE-MK (E type) 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 required before the product is to be exported or brought out of the country.

4 SPECIFICATIONS

Model No.		HL-C203B(E)		HL-C203B(E)-MK		
		Diffuse Reflection	Specular Reflection	Diffuse Reflection	Specular Reflection	
Meas. method (Note 2)		Diffuse reflection / Specular reflection				
Measurement center distance		30mm	26.4mm	30mm	26.4mm	
Measurement range (Note 3)		±5mm	±4.6mm	±5mm	±4.6mm	
Beam source		Red semiconductor laser Class 2 (JIS/IEC/GB/KS) Max output: 1mW, Emission Peak wavelength: 658nm				
Beam diameter (Note 4)		Approx. ø30μm Approx. 30 × 1,200μm			× 1,200µm	
Beam receiving element		Linear image sensor				
Resolution		0.1µm / average times: 256, 0.025µm /average times: 4,096 [E type (Note 5) 0.25µm / average times 256]				
Linea	rity	±0.03%F.S.				
Temp	erature 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 range:Blink, beyond the range:OFF				
Prote	ctive structure	IP67 (except connector)				
Pollut	ion degree	2				
	ation resistance	20M ohms or more by 500V DC megger (between all the terminals and enclosure.)				
Dielectric withstand	Commercial Frequency	y AC 500V for 1min. (between all the terminals and end			nclosure.)	
Diele	Impulse	±1,000	±1,000V 1.2/50µs (between al		Il 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				
Ambient illuminance (Note 6)		3,000lx or less (illuminance at beam receiving surface using incandescent lamp)				
Ambie	ent temperature	0 to +45°C (No dew condensation or icing allowed), At storage: -20 to +70°C				
Ambient 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. 250g including cable weight				
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: 40 µs, 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 +0.0 and +5.0mm (in case the sampling cycle is 20µs at diffuse The measurement range is limites between +0.0 and +5.0mm (in case the sampling cycle is 20µs at diffuse reflection), between +0.0 and +4.6mm (in case the sampling cycle is 20µs at specular reflection), between +3.8 and +5.0mm (in case the sampling cycle is 10µs at diffuse reflection), or between +3.6 and +4.6mm (in case the sampling cycle is 10µs at specular reflection).
 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.
 The minimum resolution of 0.25µm can be achieved if the sensor head is connected to the controller that is not sublect to "Foreign Exchange and Foreign Trade Law".

 - not subject to "Foreign Exchange and Foreign Trade Law"

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

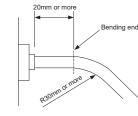
5 CAUTIONS

Connection

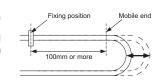
- Turn off the power of controller before connecting or disconnecting the connectors
- When connecting or disconnecting the connectors, be sure to hold the connector area not to apply extra force to the cable.
- Be careful not to touch terminals or to let foreign matter get in the connector after disconnecting 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.

Wiring

- 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.



- 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

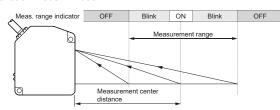
• Allow at least 30 minutes of warming up after turning on the power to ensure the performance of the product.

Environment

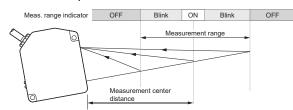
- The life of the semiconductor laser depends on the ambient temperature during use. When using the product near a heat source, take measures to lower the ambient temperature of the sensor head as possible. Mount the sensor on a device having good heat radiation because the sensor itself emits heat.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



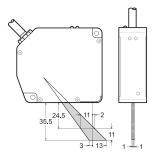
• Installation Mode: Specular



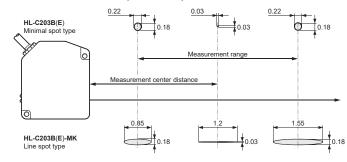
• The measurement range indicator at sampling cycle of 20µs or 10µs lights up at the center of limited measurement range.

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

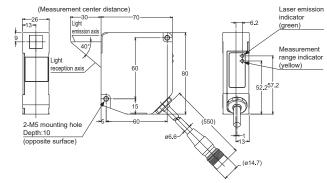


8 BEAM DIAMETER (Unit: mm)

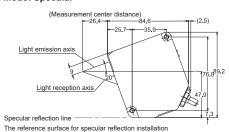


9 DIMENSIONS (Unit: mm)

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

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