# Panasonic®

## **INSTRUCTION MANUAL**

## Ultra High-Speed, High-Accuracy Laser Displacement Sensor **Sensor Head** HL-C235CE-W□

MJE-HLC235CEW No.0084-21V

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.



Sensor head model

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
- 1 Instruction manual
- · Laser warning labels

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

• 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-W□, HL-C235CE-W□ 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-

### 2 CAUTIONS ON HANDLING LASER LIGHT

• For the purpose of preventing any injury which may occur to the user by the use of the laser product in advance, the following standards have been established by the IEC Standards, JIS Standards, GB Standards, KS Standards and FDA Stan-

IEC: IEC 60825-1-2014 JIS C 6802-2014 GB 7247.1-2012 KS C IEC 60825-1-2013 FDA · PART 1040 10

These standards classifies laser products according to the level of hazard and provide the safety measures for respective classes.

## Laser hazardous class

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

		· /
Class	Model	Description of hazardous evaluation
Class 3R	HL-C235CE-W HL-C235CE-WMK	Direct intrabeam viewing is hazardous, but risk is lower than for 3B.

#### WARNING label

### <HL-C235CE-W□>

### In Japanese / English / Korean

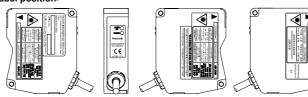


In Chi	In Chinese (E type only)						
	激光辐射 避免眼睛受到直接照射 最大输出: 5mW 脉宽: 最大10ms 媒体: 半导体激光 波长: 658nm 3R类激光产品 GB7247.1 2012 激 光 窗 口	注意 打开时有3P类当先辐射 能免用结受到直接钢射					



#### FDA certification label

#### <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 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 sensor head.
- . When this product is used in China, affix the Chinese warning label (accessory)
- Do not use the system in the manner other than specified in this Instruction Manual.

### 3 SPECIFICATIONS

Model No.		HL-C235CE-W	HL-C235CE-WMK	
Meas.	. method (Note 2)	Diffuse reflection		
Meas	urement center distance	350mm	350mm	
Meas	urement range (Note 3)	±200mm	±200mm	
Beam source		Red semiconductor laser Class 3R (JIS/IEC/GB/KS), Class IIIa (FDA) (Note 4) Max output: 5mW, Emission Peak wavelength: 658nm		
Beam	diameter (Note 5)	Approx. ø400µm	Approx. 400 × 6,500µm	
Beam	receiving element	Linear image sensor		
Resol	lution	8µm / average times: 256, 2µm /average times: 4,096		
Linea	rity	±0.04%F.S. (-200 to 0mm), ±0.08%F.S. (0 to +200mm) (F.S. = ±200mm)		
Temperature 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		
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.)		
Diele	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	k resistance	196m/ s <sup>2</sup> in X, Y, and Z directions for 3 times		
Ambie	ent illuminance (Note 6)	3,000tx 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		
Ambie	ent humidity	35 to 85%RH At storage:35 to 85%RH		
Ambie	ent Height	2,000m or less		
Mater	ial	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.		
Weigh	nt	Approx. 300g including cable weight		
	cable Directives / cable 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 1) Measuring continuous are as no inclines unless of unlesses speciment, continuous numbers of unlesses. 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 -70 and +200mm (in case the sampling cycle is 20µs), or between +100 and +200mm (in case the sampling cycle is 10µs).
- tween +1U0 and +2U0mm (in case the sampling cycle is 10µs).

  4) This is based on the FDA Standard, according to Laser Notice No. 50 of the FDA Standard.

  5) 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.

  6) The variation in ambient illuminance is ±0.08%F.S. or less.

## **4 EXPORT REGULATIONS BY JAPANESE GOVERNMENT**

• Please follow the export control regulations required.

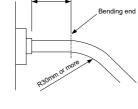
HL-C235CE-W(MK) (E type) are not subject to export control regulations under the condition that they are used combined with the non-pertinent controller to export control specified by Foreign Exchange and Foreign Trade Law. When they are combined with the pertinent controller to export control, they 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.

### 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

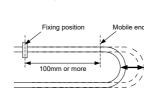
- Turn off the power of controller before connecting or disconnecting the connectors
- When connecting or disconnecting the connectors, be sure to hold the connector area not to apply extra force to the cable.
- . Be careful not to touch terminals or to let foreign matter get in the connector after disconnecting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

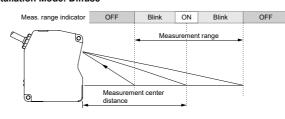


• Allow at least 30 minutes of warming up after turning on the power to ensure the performance of the product.

#### 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 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 corro-
- sion-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

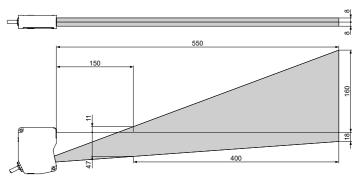


• The measurement range indicator at sampling cycle of 20µs or 10µs lights up at the center of limited measurement range.

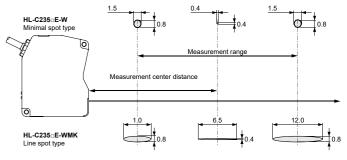
## 7 MUTUAL INTERFERENCE AREA (Unit: mm)

• 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

Install sensor heads so the laser spots from other sensor heads fall outside the shaded areas

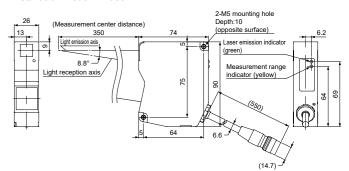


## 8 BEAM DIAMETER (Unit: mm)



## 9 DIMENSIONS (Unit: mm)

• Installation Mode: Diffuse



## 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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