Panasonic

NEW

CMOS Type

Thru-beam Type
Digital Displacement Sensor

HG-T SERIES

CE (Excluding **SC-HG1-USB**) | FDA

The Industry's Highest-Class*
Measurement Accuracy Is
Now Yours.

* Among thru-beam type digital sensors, as of January 2019 in-company survey

Ultra-slim

HG-T series

8 mm 0.315 in

The ultra-slim unit with a thickness of 8 mm 0.315 in allows easy installation in a limited space such as the inside of equipment.
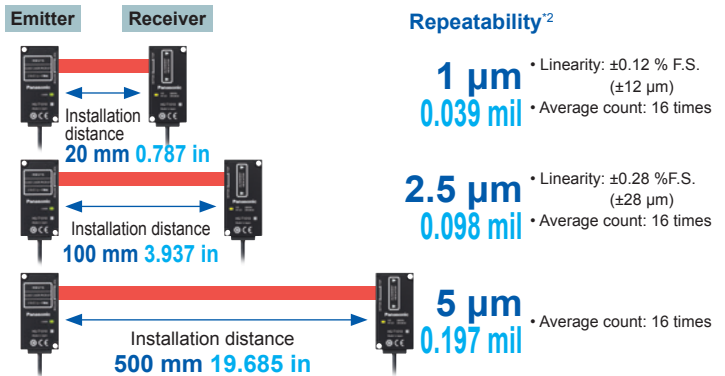
Wide-angle measurement

The belt-shaped laser beam with a measurement width of 10 mm 0.394 in is used for measurement of dimensions and positions.

Measurement width
10 mm
0.394 in

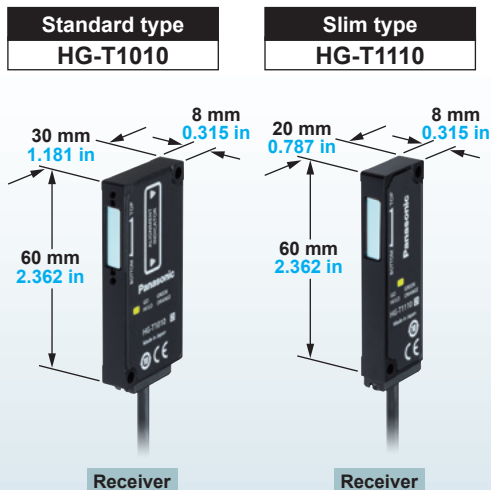## Industry's highest[1] measurement accuracy

The **HG-T** series boasts repeatability[2] of 1 μm 0.039 mil and offers the highest[1] measurement accuracy in the industry.

Emitter **Receiver**

Repeatability[2]

Installation distance
20 mm 0.787 in

1 μm
0.039 mil
• Linearity: ±0.12 % F.S. (±12 μm)
• Average count: 16 times

Installation distance
100 mm 3.937 in

2.5 μm
0.098 mil
• Linearity: ±0.28 %F.S. (±28 μm)
• Average count: 16 times

Installation distance
500 mm 19.685 in

5 μm
0.197 mil
• Average count: 16 times

● Sampling cycle setting can be selected from two options.
Standard: 1 ms, High speed: 0.5 ms.
● Average count setting can be selected from 11 options.
1 time, 2 times, 4 times, 8 times, 16 times, 32 times, 64 times, 128 times, 256 times, 512 times, 1,024 times

*1 As of January 2019, in-company survey
*2 This is the P-P value of digital measurement value with half shading at the middle position of the installation distance.
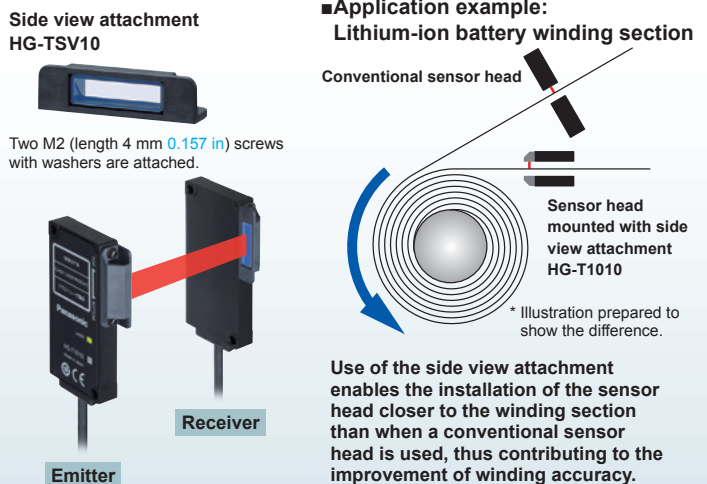
Two types of sensor heads are available.

Two types of sensor heads, one with a standard type receiver and the other with a slim type receiver, are available.

Standard type	Slim type
HG-T1010	HG-T1110

30 mm
1.181 in
8 mm
0.315 in
60 mm
2.362 in
Receiver

20 mm
0.787 in
8 mm
0.315 in
60 mm
2.362 in
Receiver

Side view attachment is available (optional). HG-T1010

Side view attachment (optional) is available for the standard type sensor head **HG-T1010**. This attachment can bend the laser beam at a right angle to allow flexible installation of the sensor head.
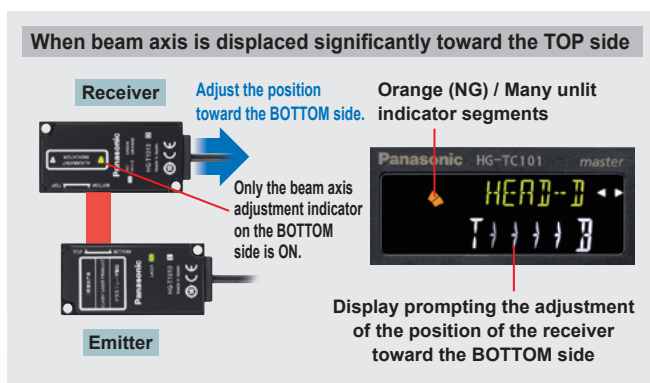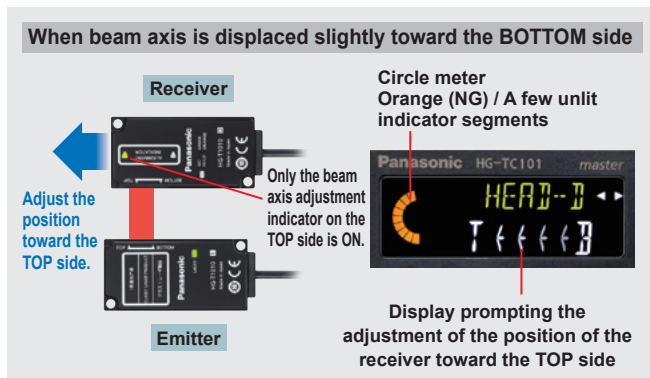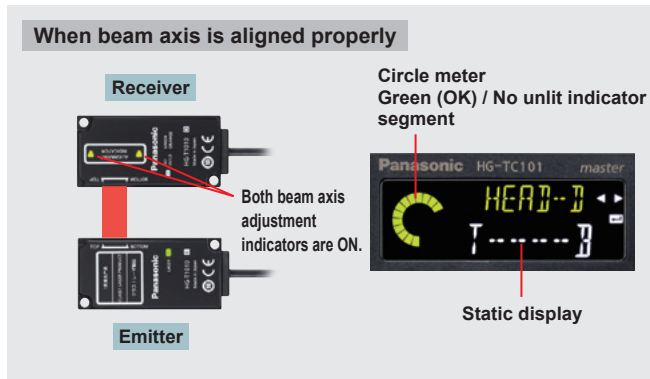
Side view attachment
HG-TSV10

Two M2 (length 4 mm 0.157 in) screws with washers are attached.

Receiver

Emitter

■ **Application example:**
Lithium-ion battery winding section

Conventional sensor head

Sensor head mounted with side view attachment HG-T1010

* Illustration prepared to show the difference.

Use of the side view attachment enables the installation of the sensor head closer to the winding section than when a conventional sensor head is used, thus contributing to the improvement of winding accuracy.

* Two side view attachment units are required when using the attachment on both emitter and receiver.
* The slim type sensor head **HG-T1110** cannot be mounted with the side view attachment.
* Be sure to confirm proper detection using actual equipment in advance when using the side view attachment.

Ease of Installation

▌▌▌ Beam axis adjustment assist function

The standard type sensor head **HG-T1010** indicates the direction of receiver displacement relative to the emitter on the controller's display screen and with the beam axis adjustment indicators on the receiver in an easy-to-understand fashion.

* The slim type sensor head **HG-T1110** displays the displacement information only on the controller's display section.

When beam axis is aligned properly

Receiver

Both beam axis adjustment indicators are ON.

Circle meter
Green (OK) / No unlit indicator segment

Static display

Emitter

When beam axis is displaced slightly toward the BOTTOM side

Receiver

Adjust the position toward the TOP side.

Circle meter
Orange (NG) / A few unlit indicator segments

Only the beam axis adjustment indicator on the TOP side is ON.

Display prompting the adjustment of the position of the receiver toward the TOP side

Emitter

When beam axis is displaced significantly toward the TOP side

Receiver

Adjust the position toward the BOTTOM side.

Orange (NG) / Many unlit indicator segments

Only the beam axis adjustment indicator on the BOTTOM side is ON.

Display prompting the adjustment of the position of the receiver toward the BOTTOM side

Emitter

▌▌▌ Automatic emitter / receiver cable recognition

The **HG-T** series automatically recognizes the positional relationship of the emitter and receiver connected to the sensor head connection cable at the time the controller is turned ON. This function eliminates the need for identifying the correct cables to connect to the emitter and receiver. Wiring can be completed by simply attaching the connectors to the emitter and receiver.

Controller

Sensor head connection cable

Sensor head

(1)
(2)

(1) Emitter and (2) Receiver
OR
(1) Receiver and (2) Emitter
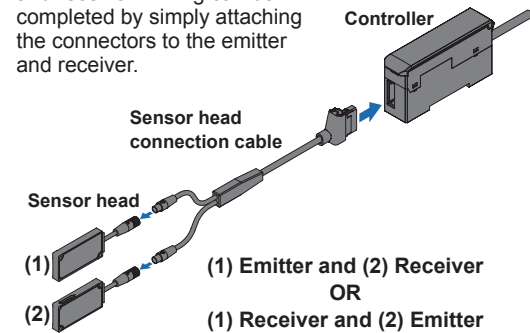
Emitter and receiver can be connected to either connectors!

* The sensor head connection cable is branched into two cables on the sensor head connecting side, but the two cables can be connected interchangeably to the emitter and receiver.

▌▌▌ Die-cast aluminum case

The sensor head case is made of light and strong die-cast aluminum. It minimizes measurement fluctuations due to temperature effects. The die-cast aluminum case does not easily become distorted in shape by tightening of mounting screws as compared to a resin case. It is highly resistant to deterioration due to ageing. This robust case helps prevent deviations of beam axis alignment.

Die-cast aluminum case
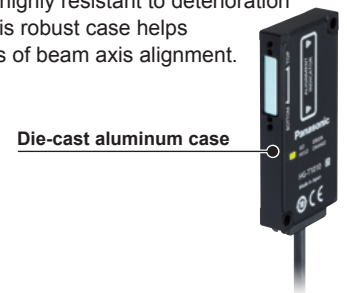
▌▌▌ IP67 protection

The **HG-T** series features a protection structure of IP67 (IEC) so it can be used in a place where the product may be exposed to water or large amounts of dust.

* Note that if the beam emitting / receiving surfaces of the sensor head are adhered with water or dust, correct measurements become inaccurate.
* The sensor head is watertight, but the connectors are not structurally resistant to dust, water or corrosion. Therefore, the **HG-T** series cannot be submerged in water or placed under falling water for measurement operation. Be sure to use the product in an appropriate environment.

3

High-performance Controller

▌▌▌ Dual display for added indication flexibility (equipped with NAVI function)

The 2-line digital display simultaneously shows head measurement (measured value) and judgment value (calculated value).

▌▌▌ All-direction LCD

The high-contrast LCD provides sharp and clear indications and wide viewing angle.

▌▌▌ Equipped with intuitive circle meter

Values between allowable maximum and minimum values are indicated in green. Values outside of the allowable range are indicated in orange. This provides at-a-glance understanding of the margin to the tolerance limits.

Higher than maximum value

Lower than minimum value

▌▌▌ Five types of detection modes

Industry's First!*
Auto edge detection mode

Edge detection can be started from either the TOP or BOTTOM without registering the detection direction. This eliminates the need for checking the detection direction.

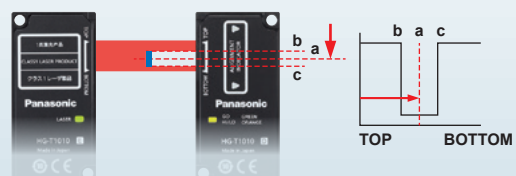* As of January 2019, according to in-company survey

TOP BOTTOM   TOP BOTTOM

Edge detection mode

TOP BOTTOM
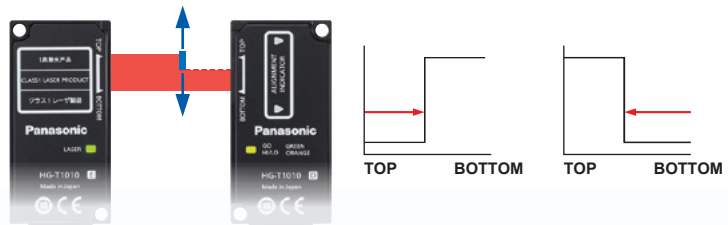
External form / width detection mode

TOP BOTTOM

Inside diameter / gap detection mode

TOP BOTTOM

Central position detection mode

b a c
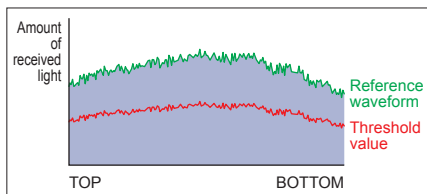
TOP BOTTOM

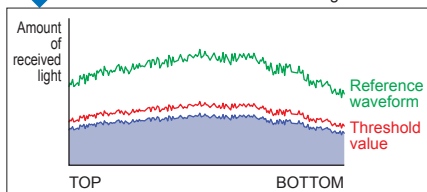## Monitoring of effects caused by stains

Notifies when the detection performance decreases due to accumulated stains.

Amount of received light

Reference waveform

Threshold value

TOP   BOTTOM

Decrease in the amount of received light due to accumulated stains

Amount of received light

Reference waveform

Threshold value

TOP   BOTTOM

An alarm is output when the amount of received light decreases below the threshold value, with the condition of the reference waveform considered as 100 %.

Alarm output

Checks the degree of contamination based on the amount of light of the reference waveform (considered as 100 %).

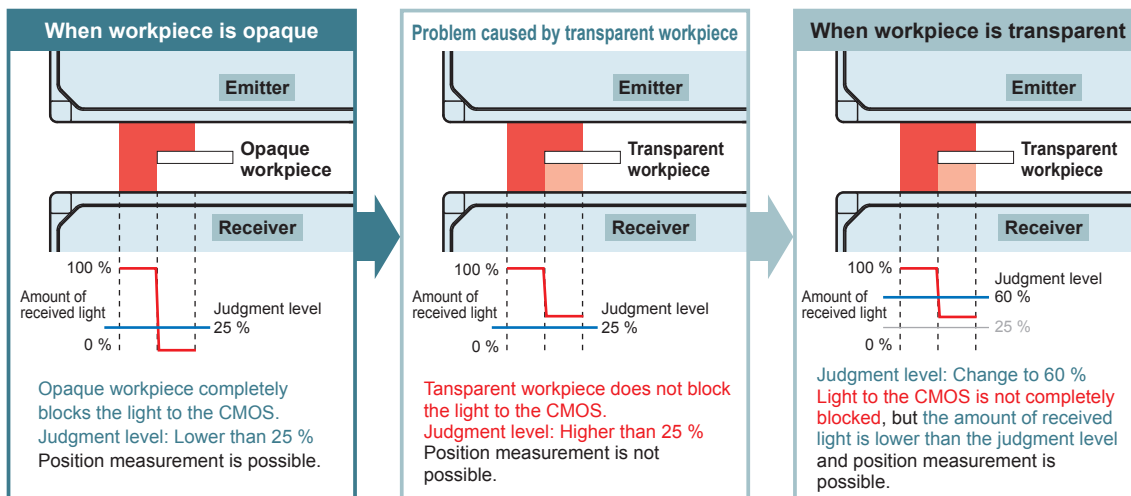Reference waveform
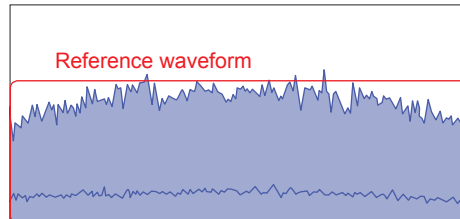
Stain check setting items
One of the following four settings can be selected.
• Low sensitivity setting ON (LOW) [default]
• High sensitivity setting ON (HIGH)
• User setting ON (USER)
  Adjustable in the range of 50 to 95 %
• Stain check OFF (OFF)

* The reference waveform can be confirmed by using the "**HG-T Configuration Tool**" USB-based PC setting software and **SC-HG1-USB** USB communication unit. For details, refer to page 6.

Stable measurement of even transparent workpieces

The judgment level can be adjusted according to the degree of transparency.

When workpiece is opaque	**Problem caused by transparent workpiece**	**When workpiece is transparent**
Emitter	**Emitter**	**Emitter**
Opaque workpiece	**Transparent workpiece**	**Transparent workpiece**
Receiver	**Receiver**	**Receiver**
100 % / Amount of received light / Judgment level 25 % / 0 %	100 % / Amount of received light / Judgment level 25 % / 0 %	100 % / Amount of received light / Judgment level 60 % / 25 % / 0 %
Opaque workpiece completely blocks the light to the CMOS. Judgment level: Lower than 25 % Position measurement is possible.	Tansparent workpiece does not block the light to the CMOS. Judgment level: Higher than 25 % Position measurement is not possible.	Judgment level: Change to 60 % Light to the CMOS is not completely blocked, but the amount of received light is lower than the judgment level and position measurement is possible.

## Elimination of effects caused by fine foreign matters

The judgment filter value can be adjusted for the prevention of erroneous detections due to fine foreign matters.
The judgment filter value can be set to a desired value between 3 and 50.

Foreign matter

Workpiece

Receiver

Emitter
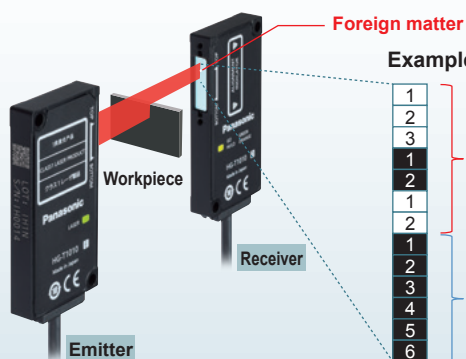
Example) Judgment filter value set to 3

| 1 |
| 2 |
| 3 |
| 1 |
| 2 |
| 1 |
| 2 |

Light interception section consists of only 2 continuous pixels, **judging that the light is received.**

| 1 |
| 2 |
| 3 |
| 4 |
| 5 |
| 6 |

Light interception section consists of 3 or more continuous pixels, **judging that the light is blocked.**

Accumulation of foreign matters

Increase the filter value!

Value resulting from foreign matters
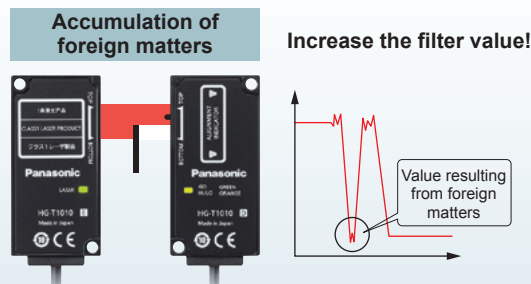
Increasing the filter value ignores values resulting from foreign matters.

Convenient Tool Software

Combined use of the USB-based PC setting software, "HG-T Configuration Tool," and the USB communication unit, "SC-HG1-USB," enables confirmation and change of current values and settings in the HG-T series using a PC.

USB-based PC setting software

HG-T Configuration Tool
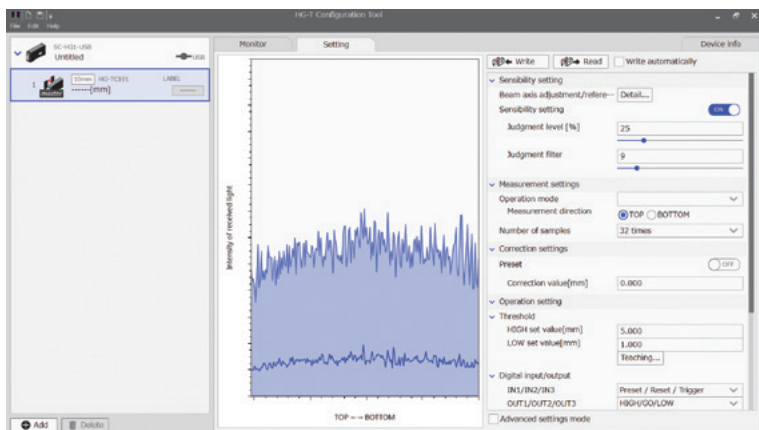
Settings such as name, judgment level and filter value can be changed for each controller while observing the waveform.
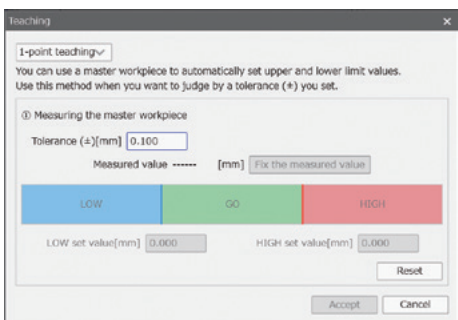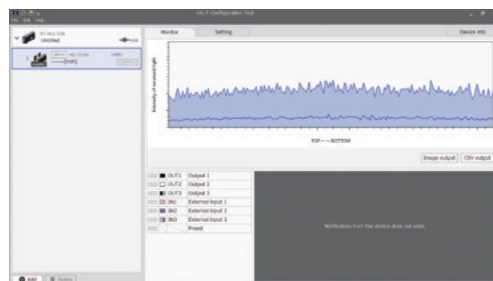
• Compatible communication unit: SC-HG1-USB
• Supported OS: Microsoft Windows® 7 (32-bit / 64-bit)*1,
                Microsoft Windows® 8 (8.1) (32-bit / 64-bit),
                Microsoft Windows® 10 (32-bit / 64-bit)
• Required hard disk space: 100 MB or more
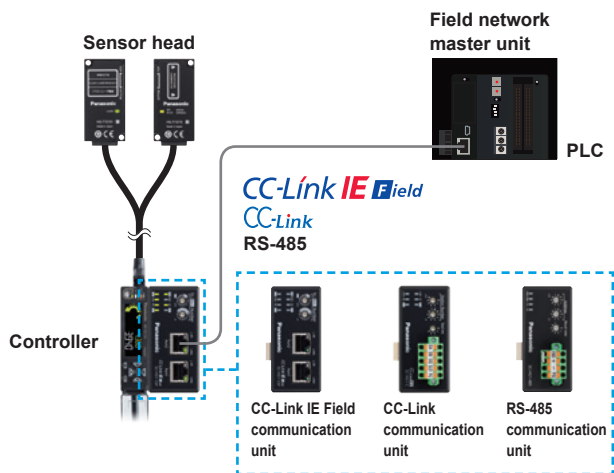• Required USB port: USB 2.0

*1 In the case of a PC running Microsoft Windows® 7, "Microsoft .NET Framework 4.5.1" is required.
*2 Microsoft and Windows are registered trademarks or trademarks of Microsoft Corporation in the U.S. and/or other countries.
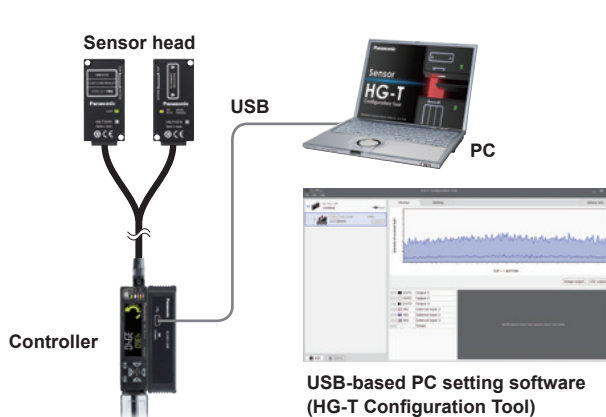
The USB-based PC setting software, "**HG-T Configuration Tool**," can be downloaded free from our website.

System configuration

Connecting to PLC

Sensor head

Field network master unit

PLC

CC-Link **IE** **F**ield
CC-Link
RS-485

Controller

CC-Link IE Field communication unit

CC-Link communication unit

RS-485 communication unit

Communication units for field networks such as CC-Link as CC-Link IE Field are available so the HG-T series can be linked with a production system for IoT application.

Connecting to PC

Sensor head

USB

PC

Controller

USB-based PC setting software (HG-T Configuration Tool)

Applications

Measurement of meandering on lithium-ion battery winding machine
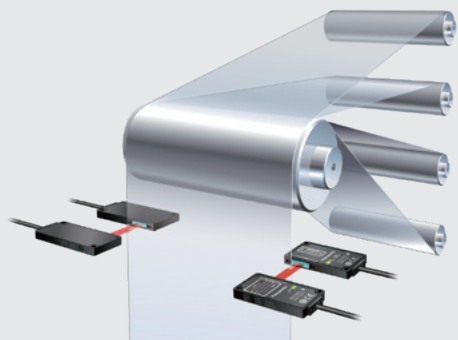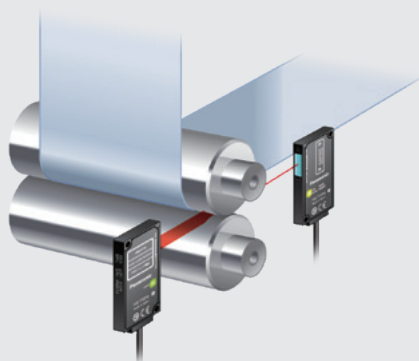
Thanks to the compact design, the sensor head can be installed at a location close to the winding core. This improves the meander measurement accuracy.
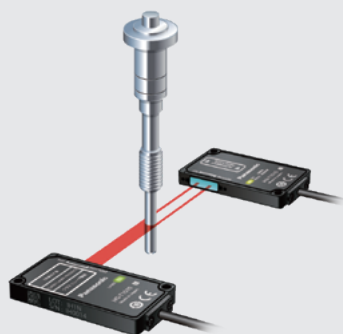
Glass substrate positioning
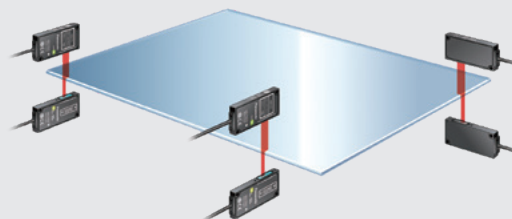
The judgment level adjustment function ensures stable detection and measurement of even transparent workpieces.

Detection of clearance between rollers

The clearance between rollers can be measured for stabilizing the workpiece quality. The compact head is easy to install.

Shaft diameter measurement

Shaft diameters can be measured. The original head structure and proprietary algorithm achieve stable detection without being affected by secondary reflections by metal surfaces.

Measurement of motor shaft eccentricity
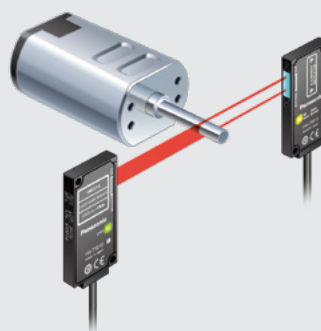
Shaft eccentricity can be measured by using the central position detection mode and measuring the distance to the shaft center.

Communication unit for digital displacement sensor

Directly send the measurement values of multiple sensors to a host!

CC-Link IE Field / CC-Link communication unit

The communication unit for digital displacement sensor can be used to connect directly to a CC-Link / CC-Link IE Field network. This lets you acquire digi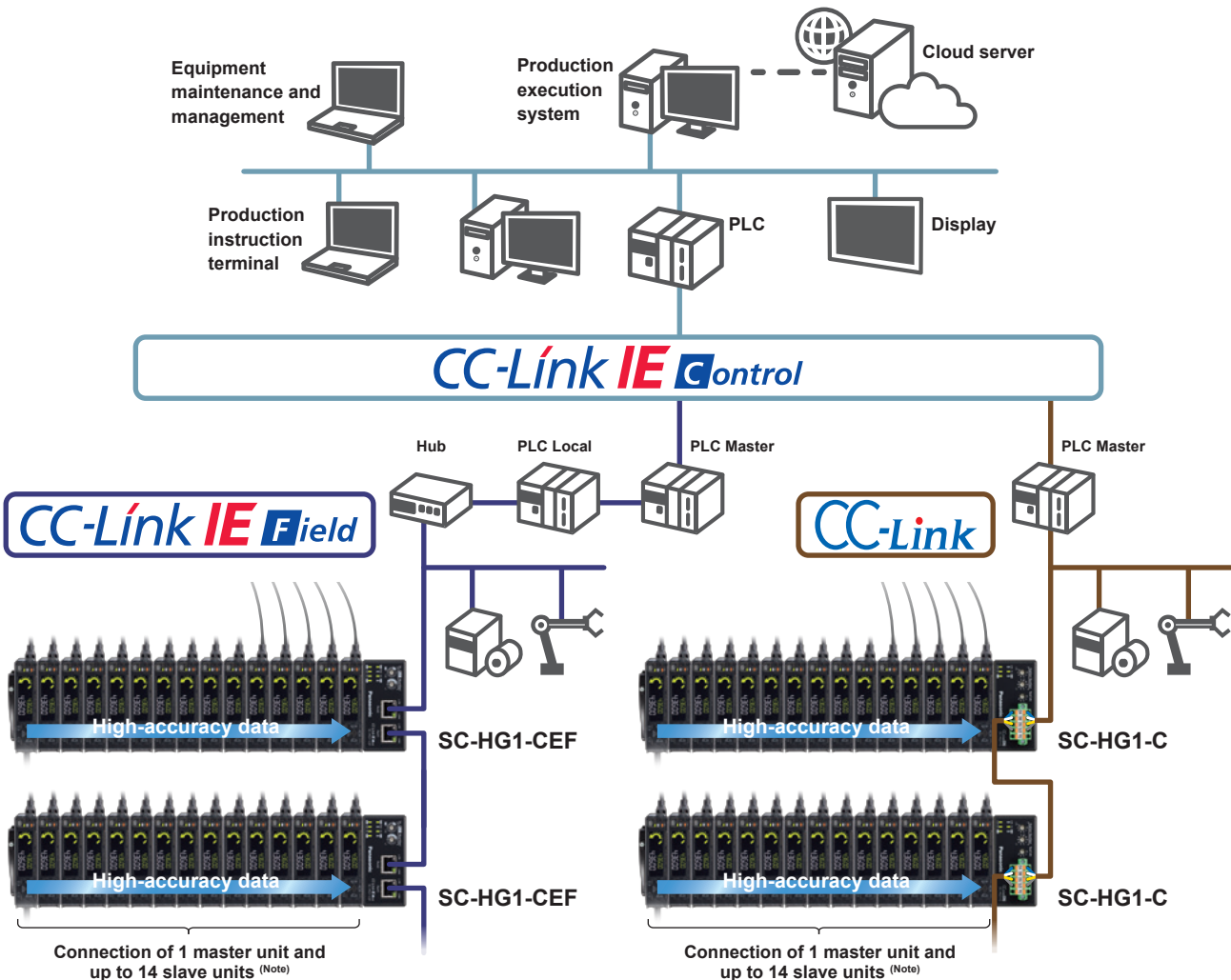tal data and ON / OFF information in real-time without a program. In addition, you can change controller settings and log measurement data via the CC-Link / CC-Link IE Field network, so you can also use the system for preventative maintenance of digital displacement sensors.

Equipment maintenance and management

Production execution system

Cloud server

Production instruction terminal

PLC

Display

CC-Link IE Control

Hub
PLC Local
PLC Master
PLC Master

CC-Link IE Field
CC-Link

High-accuracy data SC-HG1-CEF

High-accuracy data SC-HG1-C

High-accuracy data SC-HG1-CEF

High-accuracy data SC-HG1-C

Connection of 1 master unit and up to 14 slave units (Note)

Connection of 1 master unit and up to 14 slave units (Note)

Note: When connected to a communication unit for digital displacement sensor, up to 14 slave units can be connected per master unit

CC-Link IE Field communication unit
SC-HG1-CEF

CC-Link IE Field

Communication speed: 1 Gbps

iQSS support is planned

CC-Link communication unit
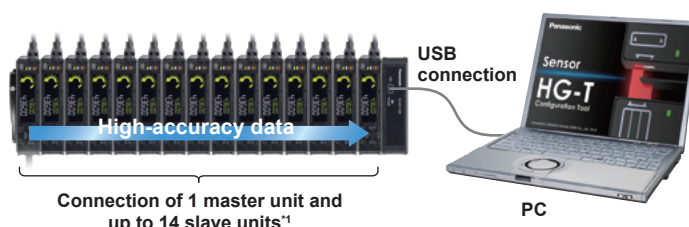## SC-HG1-C

CC-Link

Communication speed: 10 Mbps (max.)

Supports iQSS

USB communication unit

The USB communication unit provides convenient functions that facilitate the setting of the HG-T series while observing the waveform of received light by operating the dedicated USB-based PC setting software. The USB-based PC setting software can be downloaded free from our website.

High-accuracy data

USB connection

Connection of 1 master unit and up to 14 slave units*1

PC

USB communication unit
SC-HG1-USB

Communication specification: USB 2.0 Full Speed*2
Communication protocol: Proprietary protocol
USB port: USB Mini-B (1 port)

USB-based PC setting software

HG-T Configuration Tool

- Compatible communication unit:SC-HG1-USB
- Supported OSs: Microsoft Windows® 7 (32-bit / 64-bit)*3,
  Microsoft Windows® 8 (8.1) (32-bit / 64-bit),
  Microsoft Windows® 10 (32-bit / 64-bit)
- Required hard disk space: 100 MB or more
- Required USB port: USB 2.0

*1 When connected to the communication unit for digital displacement sensor, up to 14 slave units can be connected per master unit.
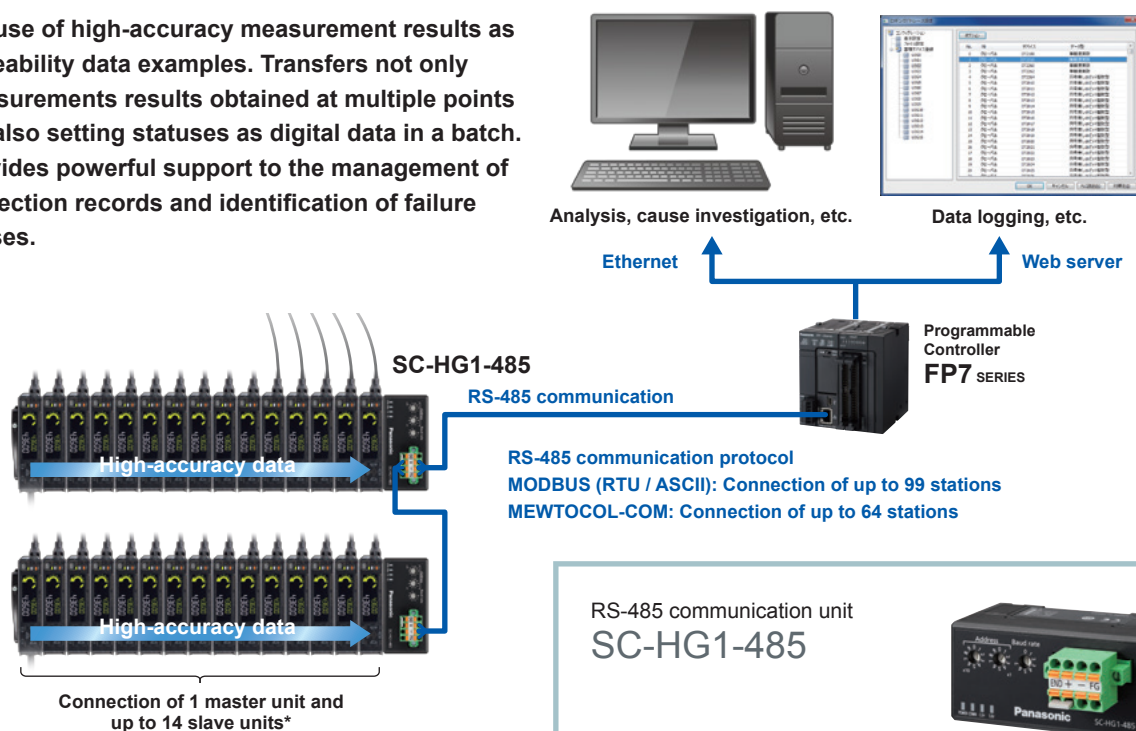*2 Dependent on PC environment.
*3 In the case of a PC running Microsoft Windows® 7, "Microsoft .NET Framework 4.5.1" is required.
*4 Microsoft and Windows are registered trademarks or trademarks of Microsoft Corporation in the U.S. and/or other countries.

RS-485 communication unit

For use of high-accuracy measurement results as traceability data examples. Transfers not only measurements results obtained at multiple points but also setting statuses as digital data in a batch. Provides powerful support to the management of inspection records and identification of failure causes.

Analysis, cause investigation, etc.

Data logging, etc.

Ethernet

Web server

Programmable Controller
FP7 SERIES

SC-HG1-485

RS-485 communication

High-accuracy data

High-accuracy data

RS-485 communication protocol
MODBUS (RTU / ASCII): Connection of up to 99 stations
MEWTOCOL-COM: Connection of up to 64 stations

Connection of 1 master unit and up to 14 slave units*

RS-485 communication unit
SC-HG1-485

Communication speed: 1.2 kbps / 2.4 kbps / 4.8 kbps / 9.6 kbps /
19.2 kbps / 38.4 kbps / 57.6 kbps / 115.2 kbps

* When connected to a communication unit for digital displacement sensor, up to 14 slave units can be connected per master unit.

HG-T

■ ORDER GUIDE

Sensor heads

Type	Appearance	Measurement width	Installation distance	Repeatability (Note 1)	Laser class	Model No.
Measurement width 10 mm 0.394 in	**Standard type** Emitter: 8 × 30 × 60 mm 0.315 × 1.181 × 2.362 in Receiver: 8 × 30 × 60 mm 0.315 × 1.181 × 2.362 in	10 mm 0.394 in	0 to 500 mm 0 to 19.685 in	1 μm 0.039 mil [Installation distance: 20 mm 0.787 in] 2.5 μm 0.098 mil [Installation distance: 100 mm 3.937 in] 5 μm 0.197 mil [Installation distance: 500 mm 19.685 in]	Class 1 IEC / JIS / GB / FDA (Note 2)	**HG-T1010**
	Slim type Emitter: 8 × 30 × 60 mm 0.315 × 1.181 × 2.362 in Receiver: 8 × 20 × 60 mm 0.315 × 0.787 × 2.362 in					**HG-T1110**

Notes: 1) This is the P-P value of digital measurement value with half shading at the middle position of the installation distance.
2) This product complies with 21 CFR 1040.10 and 1040.11 Laser Notice No. 50, dated June 24, 2007, issued by CDRH (Center for Devices and Radiological Health) under the FDA (Food and Drug Administration).

Sensor head connection cables

Type	Appearance	Model No.	Cable length	Description
Sensor head connection cables		**CN-HT-C2**	2 m 6.562 ft	This cable is used to connect the sensor head to the controller. The cable is branched into two cables on the sensor head connecting side, but the two cables can be connected interchangeably to the emitter and receiver.
		CN-HT-C5	5 m 16.404 ft	
		CN-HT-C10	10 m 32.808 ft	
		CN-HT-C20	20 m 65.617 ft	

Controllers

Type		Appearance	Model No.	Output	Maximum number of connectable controllers
Master unit	High performance type		**HG-TC101**	NPN open-collector transistor	
			HG-TC101-P	PNP open-collector transistor	
Slave units	High performance type		**HG-TC111**	NPN open-collector transistor	Up to 15 slave units can be connected per master unit (Note)
			HG-TC111-P	PNP open-collector transistor	
	Wire-saving type		**HG-TC113**	—	

Note: When connected to a communication unit for digital displacement sensor, up to 14 slave units can be connected per master unit.

ORDER GUIDE

Communication units for digital displacement sensors

Type	Appearance	Model No.	Description
USB communication unit (Note 1)		**SC-HG1-USB**	When used together with the "**HG-T Configuration Tool**" USB-based PC setting software, current values and settings in the **HG-T** series can be confirmed or changed on the PC screen. * The USB-based PC setting software, "**HG-T Configuration Tool**," can be downloaded free from our website. • Communication specification: USB 2.0 Full Speed (Note 2) • Communication protocol: Proprietary protocol • USB port: USB Mini-B (1 port) • Number of connectable units Controller: Up to 15 units (1 master unit, 14 slave units) per **SC-HG1-USB** unit
CC-Link IE Field communication unit		**SC-HG1-CEF**	Can directly send high-accuracy measurement values to a CC-Link IE Field host device. • Communication method CC-Link IE Field • Number of connected units Host (CC-Link IE Field): Max. 121 units (1 master station, 120 slave stations) Controllers: Maximum of 15 units (1 master, 14 slaves) per **SC-HG1-CEF** unit
CC-Link communication unit		**SC-HG1-C**	Can directly send high-accuracy measurement values to CC-Link Master. • Communication method Switchable CC-Link Ver.1.10 or 2.00 • Number of occupied station CC-Link Ver.1.10: 4 stations, CC-Link Ver.2.00: Switchable 2 or 4 stations • Number of connected units Controllers: Maximum of 15 units (1 master, 14 slaves) per **SC-HG1-C** unit
RS-485 communication unit		**SC-HG1-485**	Can directly send high-accuracy measurement values by RS-485 communication • Communication protocol MODBUS (RTU / ASCII) / MEWTOCOL-COM • Number of connected units Host (RS-485): 1 to 99 units when MODBUS (RTU / ASCII) is used, 1 to 64 units when MEWTOCOL-COM is used Controllers: Maximum of 15 units (1 master, 14 slaves) per **SC-HG1-485** unit

Notes: 1) The USB communication unit cannot be used with contact-type digital displacement sensors **HG-S** series.
2) Dependent on PC environment.

End plates

Type	Appearance	Model No.	Description
End plates		**MS-DIN-E** 2 pcs. per set	Always use this when connecting controllers and a digital displacement sensor communication unit.

OPTIONS

Type	Appearance	Model No.	Description
Side view attachment		**HG-TSV10**	Designed for exclusive use with the **HG-T1010** standard type sensor head. This attachment can bend the laser beam at a right angle, thus allowing flexible installation of the sensor head. Two M2 (length 4 mm 0.157 in) screws with washers are attached. * Two pieces of attachment are required when using the attachment on both emitter and receiver. * Be sure to confirm proper detection using actual equipment in advance when using the attachment.
Computer software for CC-Link IE Field / CC-Link		**SC-PC1**	A PC installed with this software can be used to monitor the current values of the digital displacement sensor, to create a CSV file of setting information, to display the log data, to create a CSV file of log data, etc. via Mitsubishi Electric PLC (MELSEC series). • Compatible communication units for digital displacement sensor: **SC-HG1-CEF**, **SC-HG1-C** • Supported OS: Microsoft Windows® 7 (32-bit), Japanese version • Required hard disk space: 50 MB or more

Note: Microsoft and Windows are registered trademarks or trademarks of Microsoft Corporation in the United States and/or other countries.

HG-T

■ SPECIFICATIONS

Sensor heads

	Type	Measurement width 10 mm 0.394 in / Standard type	Measurement width 10 mm 0.394 in / Slim type
Item	Model No.	HG-T1010	HG-T1110
Regulatory compliance		EMC Directive, RoHS Directive, FDA regulations	
Compatible controller		HG-TC101 (-P), HG-TC111 (-P), HG-TC113	
Position detection method		CMOS-based	
Installation distance		0 to 500 mm 0 to 19.685 in	
Measurement width		10 mm 0.394 in	
Light source		Red semiconductor laser: Class 1 [IEC / JIS / GB / FDA (Note 2)] Maximum output: 0.3 mW, Peak emission wavelength: 655 nm	
Repeatability (Note 3)		1 µm 0.039 mil (Installation distance: 20 mm 0.787 in) 2.5 µm 0.098 mil (Installation distance: 100 mm 3.937 in) 5 µm 0.197 mil (Installation distance: 500 mm 19.685 in)	
Linearity (Note 4)		±0.12 % F.S. (Installation distance: 20 mm 0.787 in) ±0.28 % F.S. (Installation distance: 100 mm 3.937 in)	
Minimum sensing object (Note 5)		ø0.5 mm ø0.020 in (Installation distance: 500 mm 19.685 in)	
Temperature characteristics (Note 6)		±0.03 % F.S./°C	
Operation indicator	Emitter	Laser radiation indicator (Green)	
	Receiver	Beam axis adjustment indicator (Orange / Green), Judgment output indicator (Orange / Green)	Judgment output indicator (Orange / Green)
Pollution degree		2	
Operating altitude		2,000 m 6,561.68 ft or less (Note 8)	
Environmental resistance	Protection	IP67 (IEC) (Excluding connectors)	
	Ambient temperature	-10 to +45 °C +14 to +113 °F (No dew condensation or icing allowed), Storage: -20 to +60 °C -4 to +140 °F	
	Ambient humidity	35 to 85 % RH, Storage: 35 to 85 % RH	
	Ambient illuminance	Incandescent light: 5,000 lx or less at the light-receiving face (Note 7)	
	Insulation resistance	20 MΩ or higher, using 250 V DC megger (between all terminals and case)	
	Vibration resistance	10 to 55 Hz frequency, 1.5 mm 0.059 in double amplitude in X, Y and Z directions for two hours each	
	Shock resistance	196 m/s^2 acceleration in X, Y and Z directions three times each	
Grounding method		Capacitor grounding	
Material		Case: Die-cast aluminum, Light emitting and light receiving surfaces: Glass	
Cable		0.2 m 0.656 ft 4-core shielded cable with round connectors	
Net weight		Emitter: 30 g approx., Receiver: 30 g approx.	Emitter: 30 g approx., Receiver: 25 g approx.

Notes: 1) Specification values are based on the digital measurement values obtained by the sensor head and controller **HG-TC□**. Where measurement conditions have not been specified precisely, the conditions used were as follows: ambient temperature = +20 °C +68 °F, controller's average count setting 16 times, measurement target = nontransparent knife edge, installation distance = 100 mm 3.937 in, positional condition of measurement target = Half shading at the middle position of installation distance.
2) This product complies with 21 CFR 1040.10 and 1040.11 Laser Notice No. 50, dated June 24, 2007, issued by CDRH (Center for Devices and Radiological Health) under the FDA (Food and Drug Administration).
3) This is the P-P value of digital measurement value with half shading at the middle position of the installation distance.
4) Indicates an error with the ideal straight line of digital measured values.
5) When the light is blocked at the center position of 500 mm 19.685 in installation distance
6) When the light is half-blocked at the center position of 100 mm 3.937 in installation distance
7) When the sampling cycle of the controller is set to "standard sampling"
8) Do not use or store in an environment that has been pressurized to an air pressure higher than the atmospheric pressure at 0 m.

■ SPECIFICATIONS

Controller

Item	Model No. Type		Master unit	Slave unit	
			High performance type	High performance type	Wire-saving type
	NPN output		**HG-TC101**	**HG-TC111**	**HG-TC113**
	PNP output		**HG-TC101-P**	**HG-TC111-P**	
Regulatory compliance			EMC Directive, RoHS Directive		
Compatible sensor head			**HG-T1010**, **HG-T1110**		
Number of connectable units			Up to 15 slave units can be connected to a master unit. (Note 2)		
Supply voltage			24 V DC ±10 %, including ripple 0.5 V (P-P)		
Current consumption (Note 3)			100 mA or less (when sensor head is connected)		
Analog outputs (Switching type) (Note 4)	Analog voltage output		• Voltage output range: 1 to 5 V/F.S. (default value) • Linearity: ±0.05 % F.S.	• Output when alarm occurs: 5.2 V • Output impedance: 100 Ω max.	—
	Analog current output		• Current output range: 4 to 20 mA/F.S. (default value) • Linearity: ±0.25 % F.S.	• Output when alarm occurs: 0 mA • Load impedance: 250 Ω max.	—
Control outputs (Output 1, Output 2, Output 3)			<NPN output type> NPN open-collector transistor • Maximum sink current: 50 mA (Note 5) • Applied voltage: 30 V DC or less (between output and 0 V) • Residual voltage: 1.5 V or less (at 50 mA sink current) • Leakage current: 0.1 mA or less	<PNP output type> PNP open-collector transistor • Maximum source current: 50 mA (Note 5) • Applied voltage: 30 V DC or less (between output and +V) • Residual voltage: 1.5 V or less (at 50 mA source current) • Leakage current: 0.1 mA or less	—
	Short-circuit protection		Incorporated (automatic reset type)		
	Judgment output		N.O. / N.C. switching type		
	Alarm output		Open when alarm occurs		
External output switching			Output 1, Output 2, and Output 3 can be switched to 3-value, 2-value, Logic, and Logic 2.		—

External inputs (Input 1, Input 2, Input 3)			<NPN output type>
			Non-contact input or NPN open-collector transistor
			• Input conditions
			  Invalid: +8 V to +V DC or open
			  Valid: 0 to +1.2 V DC
			• Input impedance: 10 kΩ approx.
				<PNP output type>
				Non-contact input or PNP open-collector transistor
				• Input conditions
				  Invalid: 0 to +0.6 V DC or open
				  Valid: +4 V to +V DC
				• Input impedance: 10 kΩ approx.
					—

	Trigger input		Input time 2 ms or more (ON)		
	Laser emission stop input		Input time 20 ms or more (ON)		
	Preset input		Input time 20 ms or more (ON)		
	Reset input		Input time 20 ms or more (ON)		
	Bank input A / B (Note 6)		Input time 20 ms or more (ON)		
External input switching			Input 1, Input 2, and Input 3 can be switched to "Preset / Reset / Trigger", "Bank Input A / Bank Input B / Select (Preset, Reset, Trigger)", or "Laser emission stop".		—
Sampling cycle			1 ms (standard sampling) / 0.5 ms (high-speed sampling)		
Average count (response time) (Note 6)			1 time (2 ms), 2 times (3 ms), 4 times (5 ms), 8 times (9 ms), 16 times (17 ms), 32 times (33 ms), 64 times (65 ms), 128 times (129 ms), 256 times (257 ms), 512 times (513 ms), and 1,024 times (1,025 ms) switching type		
Display resolution			1 µm 0.039 mil		
Display range			-199.999 to 199.999 mm -7.874 to 7.874 in		
Pollution degree			2		
Operating altitude			2,000 m 6561.68 ft or less (Note 7)		
Environmental resistance	Protection		IP40 (IEC)		
	Ambient temperature		-10 to +50 °C +14 to +122 °F (No dew condensation or icing allowed) (Note 5), Storage: -20 to +60 °C -4 to +140 °F		
	Ambient humidity		35 to 85 % RH, Storage: 35 to 85 % RH		
	Voltage withstandability		1,000 V AC for one minute between all supply terminals connected together and enclosure		
	Insulation resistance		20 MΩ, or more, with 250 V DC megger between all supply terminals connected together and enclosure		
	Vibration resistance		10 to 150 Hz frequency, 0.75 mm 0.030 in double amplitude (10 to 58 Hz), Maximum acceleration 49 m/s^2 (58 to 150 Hz) in X, Y and Z directions for two hours each		
	Shock resistance		98 m/s^2 acceleration (10 G approx.) in X, Y and Z directions five times each		
Material			Case: Polycarbonate, Cover: Polycarbonate, Switches: Polyacetal		
Cable			0.2 mm^2 2-core (brown and blue lead wires) / 0.15 mm^2 7-core composite cable, 2 m 6.562 ft long	0.15 mm^2 7-core composite cable, 2 m 6.562 ft long	—
Net weight			140 g approx.	140 g approx.	60 g approx.

Notes: 1) Where measurement conditions have not been specified precisely, the conditions used were as follows: supply voltage +24 V DC, ambient temperature +20 °C +68 °F.
2) When connected to a communication unit for digital displacement sensor, up to 14 slave units can be connected per master unit.
3) Current consumption does not include analog current output.
4) Linearity is a value calculated from digitally measured values at F.S. = 16 mA for current output or F.S. = 4 V for voltage output.
5) When slave units are connected to the master unit, the maximum sink current / source current of control output and ambient temperature vary depending on the number of connected slave units as shown below.

Number of connected slave units		Maximum sink current and source current of control output	Ambient temperature
	Wen communication unit is connected		
1 to 7 units	1 to 6 units	20 mA	-10 to +45 °C +14 to +113 °F
8 to 15 units	7 to 14 units	10 mA	

6) Average count (response time) is for when the sampling cycle is set to 1 ms (standard sampling). Response times differ when the sampling cycle is set to 0.5 ms (high-speed sampling).
7) Do not use or store in an environment that has been pressurized to an air pressure higher than the atmospheric pressure at 0 m.

HG-T

■ SPECIFICATIONS

Communication units for digital displacement sensors

Item	Designation / Model No.	USB communication unit / SC-HG1-USB
Compatible controllers		**HG-TC□**
Maximum number of connectable controllers		Maximum of 15 controllers (one master, 14 slaves) per **SC-HG1-USB** unit
Supply voltage (Note 3)		24 V DC ±10 %, including ripple 0.5 V (P-P) (Within specified power supply voltage range)
Current consumption		50 mA or less
Communication method		USB 2.0 Full Speed (Note 4)
Communication protocol		Our dedicated protocol
USB port		USB Mini-B (1 port)
Pollution degree / Operating altitude		2 / 2,000 m 6561.680 ft or less (Note 5)
Environmental resistance	Protection	IP40 (IEC)
	Ambient temperature	-10 to +45 °C +14 to +113 °F (No dew condensation or icing allowed), Storage: -20 to +60 °C -4 to +140 °F
	Ambient humidity	35 to 85 % RH, Storage: 35 to 85 % RH
	Voltage withstandability	1,000 V AC for one min. between all supply terminals connected together and enclosure
	Insulation resistance	20 MΩ or more, with 250 V DC megger
	Vibration resistance	10 to 150 Hz frequency, 0.75 mm 0.030 in double amplitude (10 to 58 Hz), Maximum acceleration 49 m/s² (58 to 150 Hz) in X, Y and Z directions for two hours each
	Shock resistance	98 m/s² acceleration (10 G approx.) in X, Y and Z directions five times each
Material		Enclosure: Polycarbonate
Weight		Net weight: 35 g approx., Gross weight: 95 g approx

Notes: 1) Where measurement conditions have not been specified precisely, the conditions used were an ambient temperature of +20 °C +68 °F.
2) USB 2.0 (Mini-B) cable for the connection of a PC is not provided with the product. Please purchase a USB 2.0 (Mini-B) cable.
3) Power is supplied from a connected controller / master unit.
4) Dependent on PC environment.
5) Do not use or store in an environment that has been pressurized to an air pressure higher than the atmospheric pressure at 0 m.

Item	Designation / Model No.	CC-Link IE Field communication unit / SC-HG1-CEF
Regulatory compliance		EMC Directive, RoHS Directive
Compatible controllers		**HG-TC□**, **HG-SC□**
Maximum number of connectable controllers		Maximum of 15 controllers (one master, 14 slaves) per **SC-HG1-CEF** unit
Supply voltage (Note 2)		24 V DC ±10 %, including ripple 0.5 V (P-P)
Current consumption		200 mA or less
Communication method		CC-Link IE Field
Remote station type		Remote device station
Network No. setting		1 to 239 (decimal) [1 to EF (hex)] (0 and 240 or more: Error) (Note 3)
Cyclic transmission (Maximum number of links per station)		RX / RY: 128 points each (128 bits), 16 bytes RWr / RWw: 64 points each (64 words), 128 bytes
Transient transmission		Server function only, data size 1,024 bytes
Station No.setting		1 to 120 (decimal) (0 and 121 or more: Error)
Baud rate		1 Gbps
Transmission line types		Line, star (mixing of line and star types is possible), ring
Maximum transmission distance		100 m 328.084 ft
Maximum number of connectable units		121 units (1 master station, 120 slave stations)
Cascade connection levels		Maximum 20
Pollution degree / Operating altitude		2 / 2,000 m 6561.680 ft or less (Note 4)
Environmental resistance	Protection	IP40 (IEC)
	Ambient temperature	-10 to +45 °C +14 to +113 °F (No dew condensation or icing allowed), Storage: -20 to +60 °C -4 to +140 °F
	Ambient humidity	35 to 85 % RH, Storage: 35 to 85 % RH
	Voltage withstandability	1,000 V AC for one min. between all supply terminals connected together and enclosure
	Insulation resistance	20 MΩ or more, with 250 V DC megger between all supply terminals connected together and enclosure
	Vibration resistance	10 to 150 Hz frequency, 0.75 mm 0.030 in double amplitude (10 to 58 Hz), Maximum acceleration 49 m/s² (58 to 150 Hz) in X, Y and Z directions for two hours each
	Shock resistance	98 m/s² acceleration (10 G approx.) in X, Y and Z directions five times each
Material		Enclosure: Polycarbonate
Communication cable		Ethernet cable that satisfies 1000BASE-T standard Category 5e or higher (Double-shielded / STP, straight cable) (Note 5)
Weight		Net weight: 100 g approx.,Gross weight: 150 g approx.

Notes: 1) Where measurement conditions have not been specified precisely, the conditions used were an ambient temperature of +20 °C +68 °F.
2) Power is supplied from a connected controller / master controller.
3) For the network No. setting on this product, convert the network number to hex and set the hex value.
4) Do not use or store in an environment that has been pressurized to an air pressure higher than the atmospheric pressure at 0 m.
5) Use CC-Link Partner Association recommended cable.

Item	Designation / Model No.	CC-Link communication unit / SC-HG1-C				
Regulatory compliance		EMC Directive (Note 2), RoHS Directive				
Compatible controllers		**HG-TC□**, **HG-SC□**				
Maximum number of connectable controllers		Maximum of 15 controllers (one master, 14 slaves) per **SC-HG1-C** unit				
Supply voltage (Note 3)		24 V DC ±10 %, including ripple 0.5 V (P-P)				
Current consumption		80 mA or less				
Communication method		Switchable CC-Link Ver.1.10 or 2.00				
Remote station type		Remote device station				
Number of occupied station		CC-Link Ver.1.10: 4 stations, CC-Link Ver.2.00: Switchable 2 or 4 stations				
Station No. setting		1 to 64 (0 and 65 or more: Error)				
Baud rate		10 Mbps	5 Mbps	2.5 Mbps	625 kbps	156 kbps
Maximum transmission distance		100 m 328.084 ft	160 m 524.934 ft	400 m 1,312.336 ft	900 m 2,952.756 ft	1,200 m 3,937.008 ft
Pollution degree / Operating altitude		2 / 2,000 m 6561.680 ft or less (Note 4)				
Environmental resistance	Protection	IP40 (IEC)				
	Ambient temperature	-10 to +45 °C +14 to +113 °F (No dew condensation or icing allowed), Storage: -20 to +60 °C -4 to +140 °F				
	Ambient humidity	35 to 85 % RH, Storage: 35 to 85 % RH				
	Voltage withstandability	1,000 V AC for one min. between all supply terminals connected together and enclosure				
	Insulation resistance	20 MΩ or more, with 250 V DC megger between all supply terminals connected together and enclosure				
	Vibration resistance	10 to 150 Hz frequency, 0.75 mm 0.030 in double amplitude (10 to 58 Hz), Maximum acceleration 49 m/s² (58 to 150 Hz) in X, Y and Z directions for two hours each				
	Shock resistance	98 m/s² acceleration (10 G approx.) in X, Y and Z directions five times each				
Material		Enclosure: Polycarbonate				
Communication cable		Specified cable (shielded twisted cable) (Note 5)				
Weight		Net weight: 80 g approx., Gross weight: 130 g approx.				

Notes: 1) Where measurement conditions have not been specified precisely, the conditions used were an ambient temperature of +20 °C +68 °F.
2) If our product will be incorporated in a customer product that will comply with the EMC Directive, install our product in a conductive box in accordance with "PLC User's Manual [Published by Mitsubishi Electric Corporation]".
3) Power is supplied from a connected controller / master controller.
4) Do not use or store in an environment that has been pressurized to an air pressure higher than the atmospheric pressure at 0 m.
5) Use only a special-use communication cable that is approved by the CC-Link Partner Association.

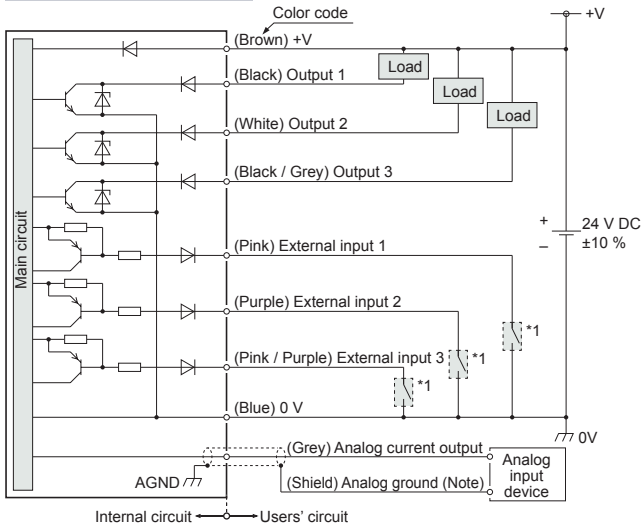| Item	Designation / Model No.	RS-485 communication unit / SC-HG1-485	
Regulatory compliance		EMC Directive, RoHS Directive	
Compatible controllers		**HG-TC□**, **HG-SC□**	
Supply voltage (Note 2)		24 V DC ±10 %, Ripple P-P 10 % or less (Within specified power supply voltage range)	
Current consumption		40 mA or less	
Communication method		Two-wire half duplex communication	
Synchronization method		Start-stop synchronization	
Communication protocol		MODBUS (RTU / ASCII) / MEWTOCOL-COM	
Baud rate		1.2 kbps / 2.4 kbps / 4.8 kbps / 9.6 kbps / 19.2 kbps / 38.4 kbps / 57.6 kbps / 115.2 kbps	
Electrical characteristics		Complies with EIA RS-485	
Number of connectable units	Host (RS-485)	1 to 99 units when MODBUS (RTU / ASCII) is used, 1 to 64 units when MEWTOCOL-COM is used	
	Sensors	Maximum of 15 controllers (1 master, 14 slaves) per **SC-HG1-485** unit	
Stop bit length		1 bit / 2 bits	
Parity check		Even / Odd / None	
Data bit length		8 bits (RTU) / 7 bits (ASCII)	
Pollution degree / Operating altitude		2 / 2,000 m 6561.680 ft or less (Note 3)	
Environmental resistance	Protection	IP40 (IEC)	
	Ambient temperature	-10 to +45 °C 14 to +113 °F (No dew condensation or icing allowed), Storage: -20 to +60 °C -4 to +140 °F	
	Ambient humidity	35 to 85 % RH, Storage: 35 to 85 % RH	
	Voltage withstandability	1,000 V AC for one min. between all supply terminals connected together and enclosure	
	Insulation resistance	20 MΩ or more, with 250 V DC megger between all supply terminals connected together and enclosure	
	Vibration resistance	10 to 150 Hz frequency, 0.75 mm 0.030 in double amplitude (10 to 58 Hz), Maximum acceleration 49 m/s² (58 to 150 Hz) in X, Y and Z directions for two hours each	
	Shock resistance	98 m/s² acceleration (10 G approx.) in X, Y and Z directions five times each	
Material		Enclosure: Polycarbonate	
Total extension distance		Communication cable: 1,200 m 3,937.008 ft or less between **SC-HG1-485** (terminal) and PLC	
Weight		Net weight: 75 g approx., Gross weght: 120 g approx.	
Accessory		Termination resistor switching jumper pin: 1 pc.	

Notes: 1) Where measurement conditions have not been specified precisely, the conditions used were an ambient temperature of +20 °C +68 °F.
2) Power is supplied from a connected controller / master controller.
3) Do not use or store in an environment that has been pressurized to an air pressure higher than the atmospheric pressure at 0 m.

I/O CIRCUIT DIAGRAMS

For communication unit for digital displacement sensors, refer to the instruction manual.
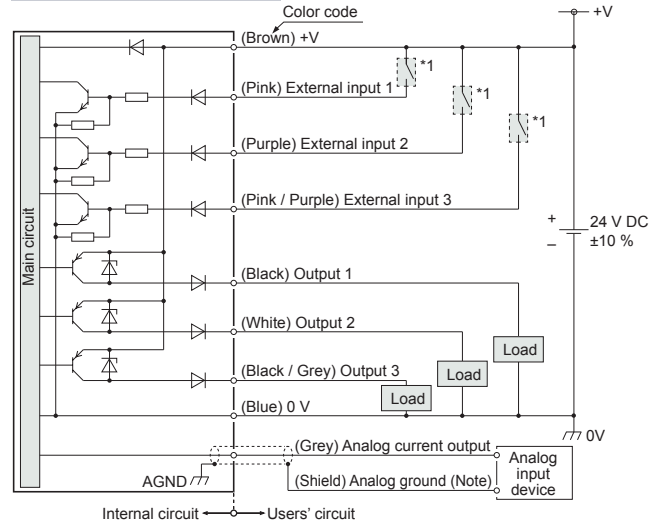The instruction manual can be downloaded from our website.
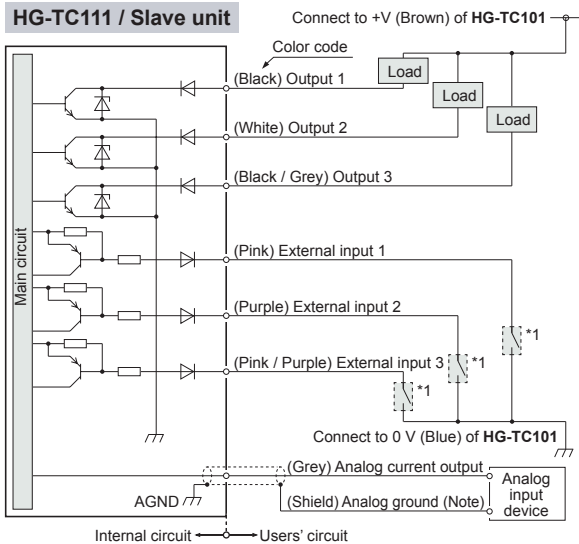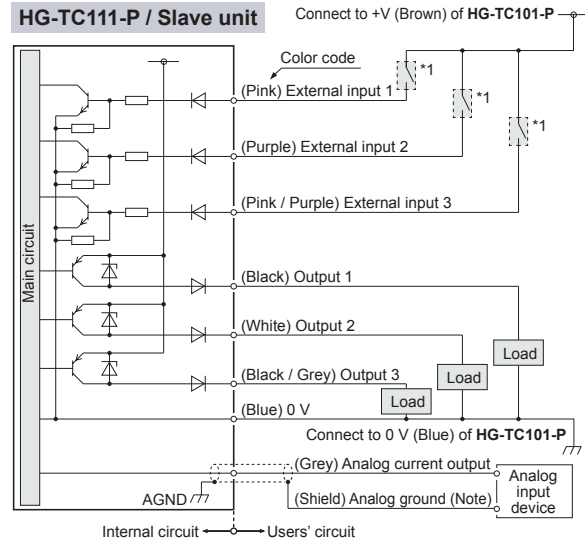
NPN output type

HG-TC101 / Master unit

Color code
(Brown) +V
(Black) Output 1 — Load
(White) Output 2 — Load
(Black / Grey) Output 3 — Load
(Pink) External input 1
(Purple) External input 2
(Pink / Purple) External input 3 *1
*1
*1
(Blue) 0 V
+V
+ 24 V DC ±10 %
−
0V
(Grey) Analog current output
AGND
(Shield) Analog ground (Note)
Analog input device
Main circuit
Internal circuit ⟷ Users' circuit

HG-TC111 / Slave unit

Connect to +V (Brown) of HG-TC101
Color code
(Black) Output 1 — Load
(White) Output 2 — Load
(Black / Grey) Output 3 — Load
(Pink) External input 1
(Purple) External input 2
(Pink / Purple) External input 3 *1
*1
Connect to 0 V (Blue) of HG-TC101
(Grey) Analog current output
AGND
(Shield) Analog ground (Note)
Analog input device
Main circuit
Internal circuit ⟷ Users' circuit

*1

Non-voltage contact or NPN open collector transistor

or

0 to +1.2 V DC: Effective
+8 V to +V DC or open: Ineffective

Note: Use shielded wire for the analog output.

PNP output type

HG-TC101-P / Master unit

Color code
(Brown) +V
(Pink) External input 1 *1
*1
(Purple) External input 2 *1
(Pink / Purple) External input 3
(Black) Output 1
(White) Output 2
(Black / Grey) Output 3 — Load
Load
Load
(Blue) 0 V
+V
+ 24 V DC ±10 %
−
0V
(Grey) Analog current output
AGND
(Shield) Analog ground (Note)
Analog input device
Main circuit
Internal circuit ⟷ Users' circuit

HG-TC111-P / Slave unit

Connect to +V (Brown) of HG-TC101-P
Color code
(Pink) External input 1 *1
*1
(Purple) External input 2 *1
(Pink / Purple) External input 3
(Black) Output 1
(White) Output 2
(Black / Grey) Output 3 — Load
Load
Load
(Blue) 0 V
Connect to 0 V (Blue) of HG-TC101-P
(Grey) Analog current output
AGND
(Shield) Analog ground (Note)
Analog input device
Main circuit
Internal circuit ⟷ Users' circuit

*1

Non-voltage contact or PNP open collector transistor

or

+4 V to +V DC: Effective
0 to +0.6 V DC or open: Ineffective

Note: Use shielded wire for the analog output.

Refer to the instruction manual for details.
The instruction manual can be downloaded from our website.

PRECAUTIONS FOR PROPER USE

- This catalog is a guide to select a suitable product. Be sure to read instruction manual attached to the product prior to its use.

- Never use this product as a sensing device for personnel protection.
- When using sensing devices for personnel protection, use products that meet the laws and standards for personnel protection that apply in each region or country, such as OSHA, ANSI and IEC.

Cautions for laser beams

- This product is classified as a Class 1 Laser Product in IEC / JIS / GB standards and in FDA* regulations. Do not look at the laser beam through optical system such as a lens.
- The warning label and the proof label are attached to the product. Handle the product according to the instruction given on the label.

* This product complies with 21 CFR 1040.10 and 1040.11 Laser Notice No. 50, dated June 24, 2007, issued by CDRH (Center for Devices and Radiological Health) under the FDA (Food and Drug Administration).

User's Manual available for download

The **HG-T** series User's Manual is available for download from our website.

HG-T

■ PRECAUTIONS FOR PROPER USE

Sensor head

Mounting

- The light emitting and receiving surfaces of the sensor head must be free of water, oil, fingerprints, and other substances that refract light as well as dust, grit, and other objects that intercept light.
- Do not allow ambient light such as sunlight to directly hit the light receiving section of the sensor head. In particular, if precision is required, use this product by mounting a douser (or similar material) on the sensor head.
- A serial number is marked on each opposite surface of the light emitting and receiving surfaces of the sensor head. Use a pair of emitter and receiver that have the same serial number.

- For the installation of sensor heads, use M3 screws and tighten to the torque of 0.5 N·m. M3 screws are not provided with the product.
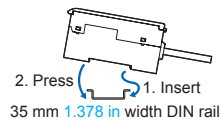

Beam axis

M3 screw
(Purchase separately.)

Serial number
(Marked on the opposite surface of light emitting or receiving surfaces)
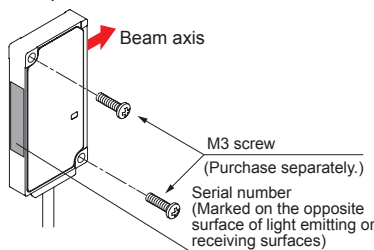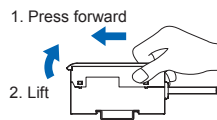
Controller

Mounting

Mounting

1. Insert the rear of the mounting part into the DIN rail.
2. While pressing down on the rear of the mounting part, insert the front of the mounting part into the DIN rail.
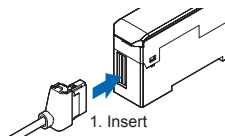

2. Press   1. Insert
35 mm 1.378 in width DIN rail

Removal method

1. Grasp the product and push forward.
2. Lift the front to remove.

1. Press forward

2. Lift

Attaching the sensor head connection cable

Mounting

1. Insert the sensor head connection cable into the connector for the sensor head connection cable on the controller.

1. Insert

Removal method

1. Grasp the controller, and while pressing on the lock release lever on the connector of the sensor head connection cable, pull toward you to disconnect.

Lock release lever

1. Pull out
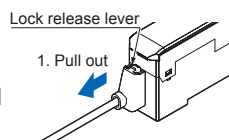
Note: If you attempt to disconnect the cable by pulling it without pressing the lock release lever, cable wire breakage and connector damage may occur.

Connection

- Always shut off the power before connecting a slave unit to or disconnecting a slave unit from the master unit. Risk of controller damage if you attempt connection with the power on.
- Insert the male connector firmly into the female connector. Risk of controller damage if not completely connected.
- When connecting slave units to a master unit, connect only NPN output types, or only PNP output types. Dissimilar output types cannot be connected together.

- To connect units, the units must be mounted on a DIN rail. Attach end plates **MS-DIN-E** (optional) so as to enclose the connected units at the ends.

- If the **HG-TC□** controller is used together with the **HG-SC□** controller for contact-type digital displacement sensor **HG-S** series, make sure to use the **HG-SC□** controller manufactured in and after February, 2019. Furthermore, connect the slaves units of the same series to the side closer to the master unit and the slave units of the other series to the far side.

Common

Wiring

- The product is designed to fulfill the specifications when combined with the **HG-T□** sensor head and **HG-TC□** controller. If the product is used in combination with other products, it not only fails to meet the specifications but also generates a malfunction in some cases.
- For the controller DC power supply, only use a power supply that is isolated by means of an isolation transformer or otherwise.
- Risk of short-circuiting and damage to the controller or power supply if a transformer such as an auto transformer is used. Risk of short-circuiting and damage to the controller or power supply if incorrectly mounted or connected.

- Make sure that the power supply is off while performing wiring or expansion work.
- After you have completed wiring work, check the wiring carefully before switching on the power.
- Do not run the wires together with high-voltage lines or power lines or put them in the same raceway. This can cause malfunction due to induction.
- Verify that the supply voltage variation is within the rating.
- If power is supplied from a commercial switching regulator, ensure that the frame ground (F.G.) terminal of the power supply is connected to an actual ground.
- Make sure that stress by forcible bend or pulling is not applied directly to the sensor cable joint.

Others

- This device has been developed / produced for industrial use only.
- Do not use this product outside the range of the specifications. Risk of an accident and product damage. There is also a risk of a noticeable reduction of service life.
- Do not use during the initial transient time after the power supply is switched on.
- To ensure performance, use the product at least 30 minutes (warm-up time) after the power is turned ON.
- This product (controller and sensor head receiver) uses an EEPROM. The EEPROM has a service life of one million setting operations.
- This product is suitable for indoor use only.
- Avoid dust, dirt, and steam.
- Take care that the product does not come in direct contact with organic solvents such as thinner.
- Take care that the product does not come in direct contact with strong acid or alkaline.
- Take care that the product does not come in direct contact with oil or grease.
- Do not use in an environment containing inflammable or explosive gases.
- Performance may not be satisfactory in a strong electromagnetic field.
- The sensor head is watertight, but the connector is not dustproof, waterproofing, or corrosion-resistant due to its structural reasons, so measurements cannot be taken under the water or in the rain. Pay attention to the environment where the product is used.
- This product is a precision device. Do not drop or otherwise subject to shock. Risk of product damage.
- Never attempt to disassemble, repair, or modify the product.

■ DIMENSIONS (Unit: mm in)

The CAD data can be downloaded from our website.

HG-T1010 — Sensor head (Standard type)

Laser radiation indicator (Green)
Judgment output indicator (Orange / Green)
Beam axis adjustment indicator (Orange / Green)
2-ø3.5 ø0.138 mounting holes
Beam axis
2-M2 × 0.4 0.016 depth 3 0.118
Side view lens mounting hole
ø3.8 ø0.150 cable, 0.2 m 0.656 ft long (with connector)
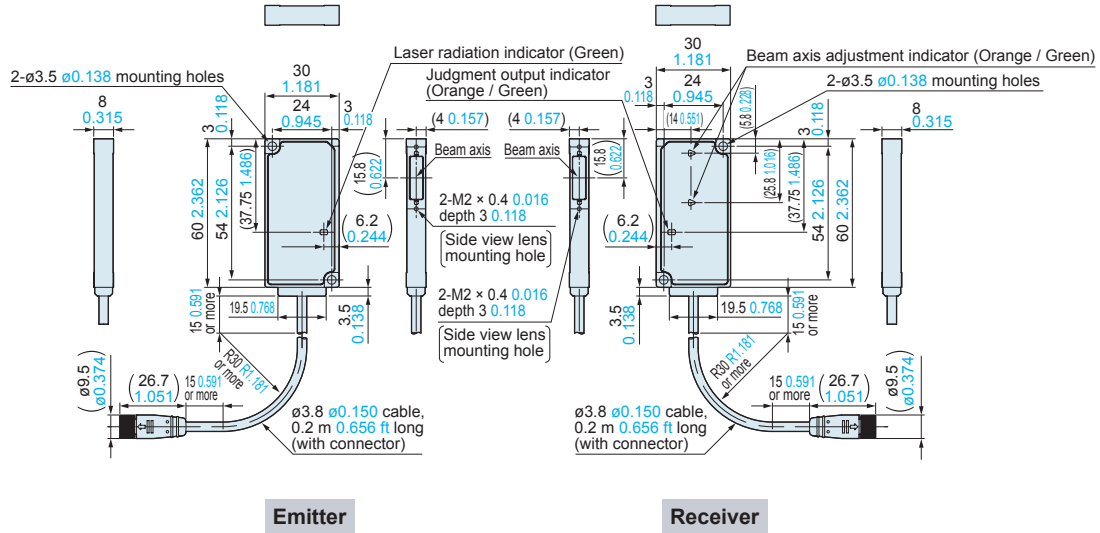
Emitter

Receiver

HG-T1110 — Sensor head (Slim type)

Laser radiation indicator (Green)
Judgment output indicator (Orange / Green)
2-ø3.5 ø0.138 mounting holes
2-ø3.3 ø0.130 mounting holes
Beam axis
ø3.8 ø0.150 cable, 0.2 m 0.656 ft long (with connector)
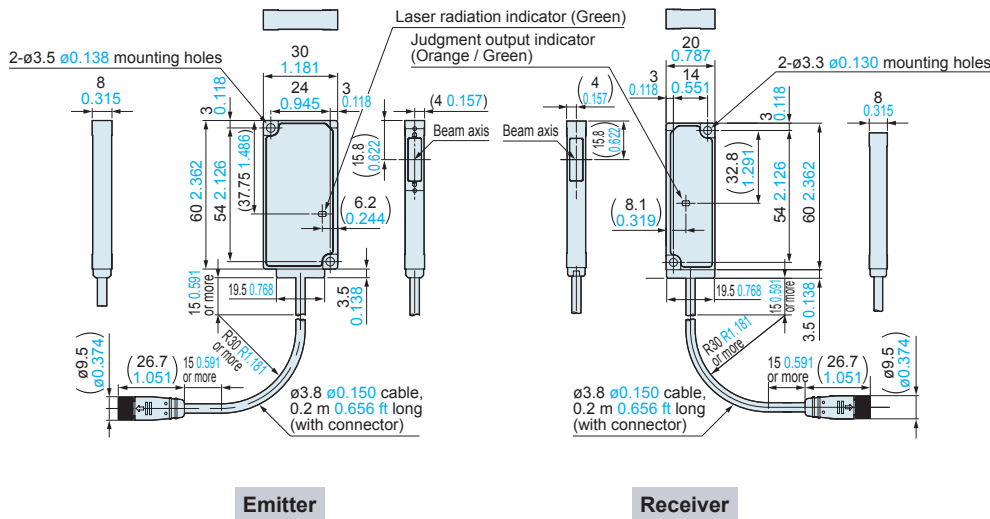
Emitter

Receiver

HG-TSV10 — Side view attachment (Optional)

HG-T1010 mounting surface
2-ø2.3 ø0.091 mounting holes

Two M2 (length 4 mm 0.157 in) screws with washers are attached.

Assembly dimensions

The diagram shows the attachment mounted on the receiver of the standard type sensor head **HG-T1010**.
Can be installed in either direction.

Beam axis
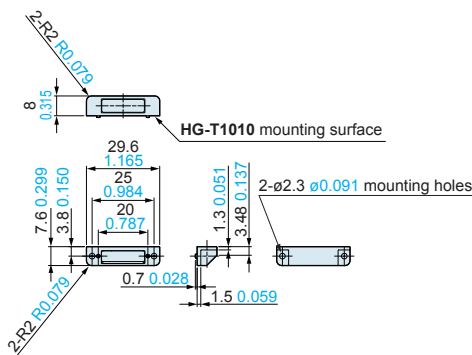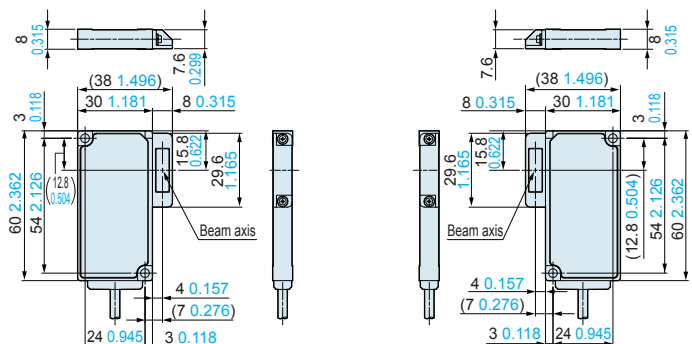
Notes: 1) The attachment cannot be installed to the slim type sensor head **HG-T1110**.
2) Be sure to confirm proper detection using actual equipment in advance when using the attachment.

HG-T

■ DIMENSIONS (Unit: mm in)

The CAD data can be downloaded from our website.

HG-TC101   HG-TC101-P　　　　　　　　　　　　　　　　　　　　Controller (Master unit)

- Output 1 indicator (Orange)
- Output 2 indicator (Orange)
- Output 3 indicator (Orange)
- Input indicator (White)
- Preset indicator (Green)
- Preset key
- LEFT key
- UP key
- RIGHT key
- DOWN key
- ENTER key
- EXIT key

21.1 (0.831)
19.9 (0.783)
5.9 0.232
6.5 0.256
14.3 0.563
43.1 (1.697)
13.8 (0.543)
15 0.591 or more
3.2 0.126
80 3.150
3 0.118
20 0.787 or more
20 0.787
23 (0.906)
R30 R1.181 or more
R30 R1.181 or more
73.6 (2.898)
21.5 0.846
36.5 1.437
58.5 (2.303)
3

ø5.5 ø0.217 cable, 2 m 6.562 ft long (9-core composite cable)

Sensor head connection cable (optional)
Suitable for 35 mm 1.378 in width DIN rail

HG-TC111   HG-TC111-P　　　　　　　　　　　　　　　　　　　　Controller (Slave unit)
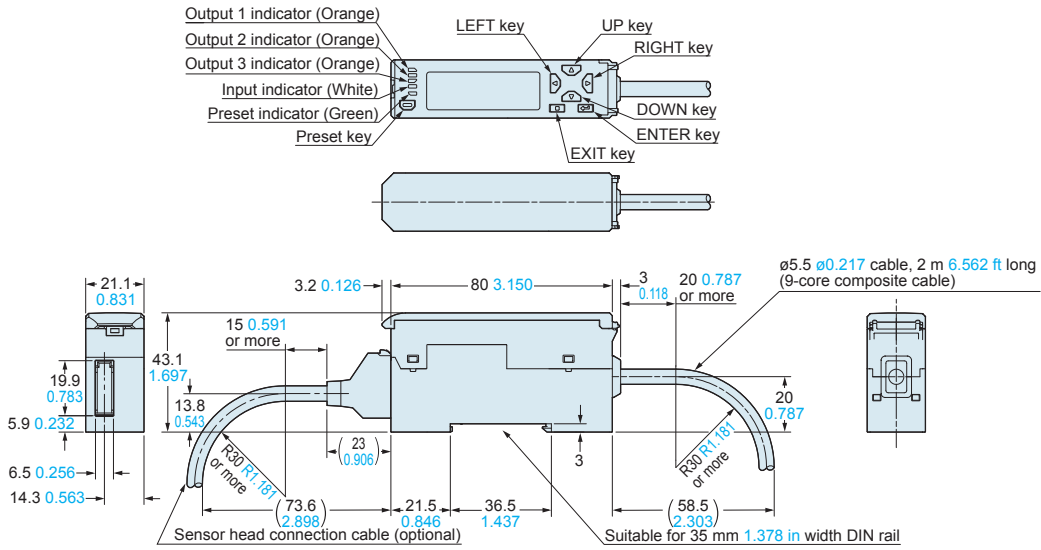

- Output 1 indicator (Orange)
- Output 2 indicator (Orange)
- Output 3 indicator (Orange)
- Input indicator (White)
- Preset indicator (Green)
- Preset key
- LEFT key
- UP key
- RIGHT key
- DOWN key
- ENTER key
- EXIT key

21.1 (0.831)
5.6 (0.220)
19.9 (0.783)
5.9 0.232
6.5 0.256
14.3 0.563
43.1 (1.697)
13.8 (0.543)
15 0.591 or more
3.2 0.126
80 3.150
3 0.118
20 0.787 or more
20 0.787
23 (0.906)
R30 R1.181 or more
R30 R1.181 or more
73.6 (2.898)
21.5 0.846
36.5 1.437
58.5 (2.303)
3

ø5.5 ø0.217 cable, 2 m 6.562 ft long (7-core composite cable)

Sensor head connection cable (optional)
Suitable for 35 mm 1.378 in width DIN rail

HG-TC113　　　　　　　　　　　　　　　　　　　　　　　　　　　Controller (Slave unit)

- Output 1 indicator (Orange)
- Output 2 indicator (Orange)
- Output 3 indicator (Orange)
- Input indicator (White)
- Preset indicator (Green)
- Preset key
- LEFT key
- UP key
- RIGHT key
- DOWN key
- ENTER key
- EXIT key

21.1 (0.831)
5.6 (0.220)
19.9 (0.783)
5.9 0.232
6.5 0.256
14.3 0.563
43.1 (1.697)
13.8 (0.543)
15 0.591 or more
3.2 0.126
80 3.150
2.6 0.102
23 (0.906)
R30 R1.181 or more
73.6 (2.898)
21.5 0.846
36.5 1.437
3 0.118

Sensor head connection cable (optional)
Suitable for 35 mm 1.378 in width DIN rail

■ DIMENSIONS (Unit: mm in)

The CAD data can be downloaded from our website.

CN-HT-C□ — Sensor head connection cable

M8 connector for connection of sensor head

23 (0.906)
(24.7 0.972)
26.5 (1.043)
15 0.591
ø5.6 ø0.220 cable
60 2.362
10 0.394

Connector for connection of controller

2-ø4.8 ø0.189 cables

Model No.	A	B
CN-HT-C2	2,000 78.740	500 19.685
CN-HT-C5	5,000 196.850	500 19.685
CN-HT-C10	10,000 393.701	1,000 39.370
CN-HT-C20	20,000 787.402	1,000 39.370

SC-HG1-USB — USB communication unit

USB port (Mini-B)　Power indicator (Green)

7 0.276
26.3 1.035
36.9 1.453
8.5 0.335
42.9 1.689
21.1 0.831
(5.6 0.220)
21.5 0.846
36.5 1.437
3 0.118
80 3.150

Suitable for 35 mm 1.378 in width DIN rail

SC-HG1-CEF — CC-Link IE Field communication unit

RD indicator (Green)
STS1 indicator (Green)
STS2 indicator (Red)
Upper communication connector
18 0.709
14 0.551
10 0.394
6 0.236
D LINK indicator (Green)
Power indicator (Green)
RUN indicator (Green)
16.6 0.654
16.6 0.654
22.65 0.892
14.6 0.575
13.3 0.524
6.4 0.252
25.35 0.998
Port1 LINK indicator (Green)
Port 1 ERR. indicator (Yellow)
Port 2 LINK indicator (Green)
Port 2 ERR. indicator (Yellow)
ERROR indicator (Red)
SD indicator (Green)
Station No. / Network No. setting switch
10.6 0.417
21.1 0.831
21.2 0.835
43.1 1.697
58 2.283
3 0.118
11.55 0.455
9.55 0.376
21.5 0.846
80 3.150
38 1.496
Setting switch cover

Suitable for 35 mm 1.378 in width DIN rail

SC-HG1-C — CC-Link communication unit

L_RUN (communication operation) indicator (Green)
RD (data reception) indicator (Green)
Power indicator (Green)
ERR. indicator (Red)
14 0.551
10 0.394
6 0.236
6.4 0.252
18 (14.3 0.563) 0.709
21 0.827
25.35 0.998
6.9 0.272
Upper communication connector
35.7 1.406
21.1 0.831
55.9 2.201
L_ERR (communication error) indicator (Red)
SD (data transmission) indicator (Green)
Communication setting switches

Communication setting switch cover
(61.1 2.406)
43 1.693
3 0.118
11.55 0.455
21.5 0.846
9.55 0.376
80 3.150
38 1.496

Suitable for 35 mm 1.378 in width DIN rail

SC-HG1-485 — RS-485 communication unit

Power indicator (Green)
Communication indicator (Green)
Upper communication error indicator (Red)
Lower communication error indicator (Red)
18 0.709
14 0.551
10 0.394
6 0.236
6.4 0.252
18 (14.8 0.583) 0.709
21 0.827
25.35 0.998
Upper communication connector
30.6 1.205
21.1 0.831
58.5 2.303
Communication setting switches

Communication setting switch cover
(61.1 2.406)
42.9 1.689
3 0.118
11.55 0.455
21.5 0.846
9.55 0.376
80 3.150
38 1.496
Termination resistor switching jumper pin (Note)

Suitable for 35 mm 1.378 in width DIN rail
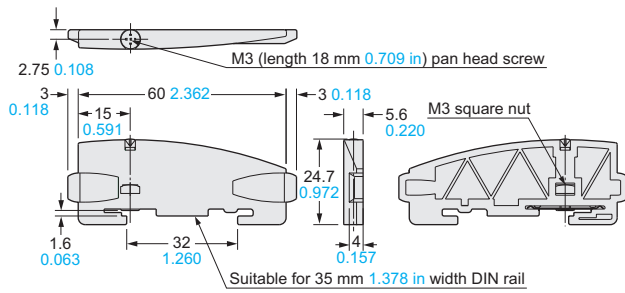
Note: The termination resistor switching jumper pin is not attached to the product at the factory. Attach the termination resistor switching jumper pin to the unit at the terminating end. Make sure that the termination resistor switching jumper pin have been removed from all units except the one at the terminating end.

19

HG-T

■ DIMENSIONS (Unit: mm in)

MS-DIN-E   End plates

2.75 0.108

M3 (length 18 mm 0.709 in) pan head screw

3 0.118

15 0.591

60 2.362

3 0.118

5.6 0.220

M3 square nut

24.7 0.972

1.6 0.063

32 1.260

4 0.157

Suitable for 35 mm 1.378 in width DIN rail

Material: Polycarbonate

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