



**ORDER GUIDE****Controllers**

Type	Appearance	Model No.	Output
NPN output		<b>HL-AC1</b>	NPN open-collector transistor (Judgment output) Current / voltage output (Linear output)
PNP output		<b>HL-AC1P</b>	PNP open-collector transistor (Judgment output) Current / voltage output (Linear output)

**Calculation unit**

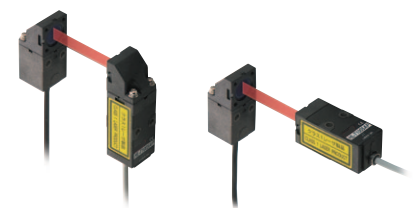
Appearance	Model No.
	<b>HL-AC1-CL</b>

**OPTIONS**

Designation	Model No.	Description	
Side-view attachment	HL-T1SV1	For HL-T1001A(F)/T1005A(F) (1 pc.)	The beam axis can be bent to a right angle making universal mounting possible.
	HL-T1SV2	For HL-T1010A(F) (1 pc.)	
Controller mounting bracket	MS-HLAC1-1	Use when mounting the controller with screws.	
Extension cable	HL-T1CCJ4	Length: 4 m 13.123 ft Net weight: 162 g approx.	Extension cable for use between the controller and its cable linking it with the sensor head. Cable type: cable with connectors on both ends Cable outer diameter: ø5.2 mm ø0.205 in Connector outer diameter: ø15.5 mm ø0.610 in max.
	HL-T1CCJ8	Length: 8 m 26.247 ft Net weight: 330 g approx.	

**Side-view attachment**

- HL-T1SV1
- HL-T1SV2

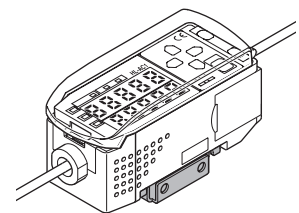


Mounted on both sides

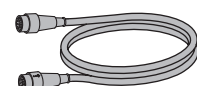
Mounted on one side only

**Controller mounting bracket**

- MS-HLAC1-1

**Extension cable**

- HL-T1CCJ4
- HL-T1CCJ8

FIBER  
SENSORSLASER  
SENSORSPHOTO-  
ELECTRIC  
SENSORSMICRO  
PHOTO-  
ELECTRIC  
SENSORSAREA  
SENSORSLIGHT  
CURTAINSPRESSURE /  
FLOW  
SENSORSINDUCTIVE  
PROXIMITY  
SENSORSPARTICULAR  
USE  
SENSORSSENSOR  
OPTIONSSIMPLE  
WIRE-SAVING  
UNITSWIRE-SAVING  
SYSTEMSMEASURE-  
MENT  
SENSORSSTATIC  
CONTROL  
DEVICES

ENDSCOPE

LASER  
MARKERSPLC /  
TERMINALSHUMAN  
MACHINE  
INTERFACESENERGY  
CONSUMPTION  
VISUALIZATION  
COMPONENTSFA  
COMPONENTSMACHINE  
VISION  
SYSTEMSUV  
CURING  
SYSTEMSSelection  
GuideLaser  
DisplacementMagnetic  
DisplacementCollimated  
BeamDigital Panel  
ControllerMetal-sheet  
Double-feed  
Detection**HL-T1****LA****LD**

## SPECIFICATIONS

### Sensor heads

Item	Model No.	Type	Beam diameter ø1 mm <b>ø0.039 in</b> type	Sensing width 5 mm <b>0.197 in</b> type	Sensing width 10 mm <b>0.394 in</b> type	
		IEC / JIS standards conforming type	<b>HL-T1001A</b>	<b>HL-T1005A</b>	<b>HL-T1010A</b>	
		FDA regulations conforming type	<b>HL-T1001F</b>	<b>HL-T1005F</b>	<b>HL-T1010F</b>	
Applicable controller			<b>HL-AC1, HL-AC1P</b>			
Sensing range			0 to 500 mm <b>0 to 19.685 in</b>	500 to 2,000 mm <b>19.685 to 78.74 in</b>	500 mm <b>19.685 in</b>	
Sensing width			ø1 mm <b>ø0.039 in</b>	ø1 to ø2.5 mm <b>ø0.039 to ø0.098 in</b>	5 mm <b>0.197 in</b>	10 mm <b>0.394 in</b>
Min. sensing object			ø8 µm <b>ø0.315 mil</b> opaque object	ø50 µm <b>ø1.969 mil</b> opaque object	ø0.05 mm <b>ø0.002 in</b> opaque object	ø0.1 mm <b>ø0.004 in</b> opaque object
Repeatability (During the state in which light is half blocked)			4 µm <b>0.157 mil</b> (Note 2)	_____	4 µm <b>0.157 mil</b> (Note 2)	
Linear output resolution (Note 3)			4 µm <b>0.157 mil</b> (Note 2, 4)	_____	4 µm <b>0.157 mil</b> (Note 2)	
Emission indicator			Green LED (lights up during laser emission)			
Interference prevention function			Two units of sensors can be mounted close together. (When the controller interference prevention function is used)			
Environmental resistance	Pollution degree		3 (industrial environment)			
	Ambient temperature		0 to +50 °C <b>+32 to +122 °F</b> (No dew condensation), Storage: -25 to +70 °C <b>-13 to +158 °F</b>			
	Ambient humidity		35 to 85 % RH, Storage: 35 to 85 % RH			
	Ambient illuminance		Incandescent light: 10,000 lx at the light-receiving face			
	EMC		EN 61000-6-2, EN 61000-6-4			
	Voltage withstandability		1,000 V AC for one min. between all supply terminals connected together and enclosure			
	Insulation resistance		100 MΩ, or more, with 250 V DC megger between all supply terminals connected together and enclosure			
	Vibration resistance		10 to 500 Hz frequency, 1.5 mm <b>0.059 in</b> amplitude in X, Y and Z directions for two hours each			
Emitting element	Shock resistance		300 m/s <sup>2</sup> acceleration (30 G approx.) in X, Y and Z directions for three times each			
	IEC / JIS standards conforming type		Red semiconductor laser Class 1 (IEC / JIS) (modulated, max. output: 0.2 mW, peak emission wavelength: 650 nm <b>0.026 mil</b> )	Red semiconductor laser Class 1 (IEC / JIS) (modulated, max. output: 0.35 mW, peak emission wavelength: 650 nm <b>0.026 mil</b> )		
	FDA regulations conforming type		Red semiconductor laser Class II (FDA) (modulated, max. output: 0.2 mW, peak emission wavelength: 650 nm <b>0.026 mil</b> ) (IEC / JIS: Class 1)	Red semiconductor laser Class II (FDA) (modulated, max. output: 0.35 mW, peak emission wavelength: 650 nm <b>0.026 mil</b> ) (IEC / JIS: Class 1)		
Material			Enclosure: Polyetherimide, Case cover: Polycarbonate, Front cover: Glass			
Cable			0.09mm <sup>2</sup> 3-core shielded cable with connector, 0.5 m <b>1.640 ft</b> long			
Cable extension			Extension up to total 10 m <b>32.808 ft</b> is possible, with the optional cable.			
Net weight			Emitter: 15 g approx., Receiver: 15 g approx.		Emitter: 30 g approx., Receiver: 20 g approx.	
Accessories			<b>MS-HLT1-1</b> (Sensor head mounting bracket): One set of two brackets for both the emitter and the receiver <b>CN-HLT1-1</b> (Sensor head to controller connection cable): 1 cable Laser beam alignment sticker: 2 pcs. Label set (FDA regulations conforming type only): 1 set		<b>MS-LA3-1</b> (Sensor head mounting bracket): One set of two brackets for both the emitter and the receiver <b>CN-HLT1-1</b> (Sensor head to controller connection cable): 1 cable Laser beam alignment sticker: 2 pcs. Label set (FDA regulations conforming type only): 1 set	

Notes: 1) Where measurement conditions have not been specified precisely, the conditions used were an ambient temperature of +20 °C **+68 °F**.

2) In case of an average sampling rate of 64 times.

3) Value calculated with the linear output allowance factor (±3 σ) when connected to the controller included in the calculation of the detection width.

4) This value was obtained by converting the range of linear output fluctuation (±3 σ) into a sensing width, assuming that the smallest sensing object blocks the beam at the approximate center of the beam diameter of ø1 mm **ø0.039 in**.

### Calculation unit

Model No.		HL-AC1-CL
Item		
Connected controller		HL-AC1, HL-AC1P
Current consumption		12 mA or less (supplied from the controller)
Connecting method		Connector
Connection indicator		Orange LED (lights up when connected to the controller)
Environmental resistance	Ambient temperature	0 to +50 °C +32 to +122 °F (No dew condensation), Storage: −15 to +60 °C +5 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	100 MΩ, or more, with 500 V DC megger between all supply terminals connected together and enclosure
	Vibration resistance	10 to 150 Hz frequency, 0.7 mm 0.028 in amplitude in X, Y and Z directions for 80 min.
	Shock resistance	300 m/s <sup>2</sup> acceleration (30 G approx.) in X, Y and Z directions for three times each
Material		Enclosure: ABS, Indicator part: Acrylic
Weight		Net weight: 50 g approx.

Note: Where measurement conditions have not been specified precisely, the conditions used were an ambient temperature of +20 °C **+68 °F**.

**SPECIFICATIONS****Controllers**

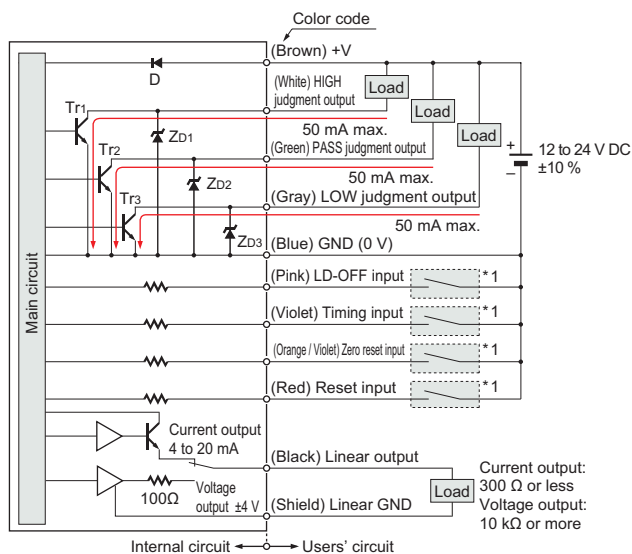
Type		NPN output		PNP output	
Item	Model No.	HL-AC1		HL-AC1P	
Applicable sensor head		HL-T1001A/T1001F, HL-T1005A/T1005F, HL-T1010A/T1010F			
Supply voltage / Current consumption		12 to 24 V DC $\pm$ 10 %    Ripple P-P 10 % or less / 190 mA or less (when connected to the sensor head)			
Measuring cycle		150 $\mu$ s			
Linear output		Current / voltage output switchable (Note 2) • During current output: 4 to 20 mA/F.S., Maximum load resistance: 300 $\Omega$ • During voltage output: $\pm$ 4 V/F.S., Output impedance 100 $\Omega$ (In the monitor focus function, it can also be set at $\pm$ 5 V, 0 to 5 V, etc.)			
Temperature characteristics		$\pm$ 0.2 % F.S./ $^{\circ}$ C (Note 3)			
Settable average sampling rate (Note 4)		1 / 2 / 4 / 8 / 16 / 32 / 64 / 128 / 256 / 512 / 1,024 / 2,048 / 4,096			
Judgment outputs (HIGH, PASS, LOW)		NPN open-collector transistor • Maximum sink current: 50 mA • Applied voltage: 30 V DC or less (between judgment output and 0 V) • Residual voltage: 1.2 V or less (at 50 mA sink current)		PNP open-collector transistor • Maximum source current: 50 mA • Applied voltage: 30 V DC or less (between judgment output and +V) • Residual voltage: 2 V or less (at 50 mA source current)	
Utilization category		DC-12 or DC-13			
Number of outputs		HIGH / PASS / LOW 3 values output			
Output operation		HIGH: ON when measured value > HIGH threshold value PASS: ON when HIGH threshold value $\geq$ measured value $\geq$ LOW threshold value LOW: ON when LOW threshold value > measured value			
Short-circuit protection		Incorporated			
Laser OFF input		0 V connection: Laser emission halt Open: Laser emission • Applied voltage: 30 V DC or less (leak current: 0.1 mA or less)		+V connection: Laser emission halt Open: Laser emission • Applied voltage: 30 V DC or less (leak current: 0.1 mA or less)	
Zero reset input		0 V connection: Zero reset operates Open: Zero reset ineffective • Applied voltage: 30 V DC or less (leak current: 0.1 mA or less)		+V connection: Zero reset operates Open: Zero reset ineffective • Applied voltage: 30 V DC or less (leak current: 0.1 mA or less)	
Timing input		0 V connection: Effective Open: Ineffective • Applied voltage: 30 V DC or less (leak current: 0.1 mA or less)		+V connection: Effective Open: Ineffective • Applied voltage: 30 V DC or less (leak current: 0.1 mA or less)	
Reset input		0 V connection: Effective Open: Ineffective • Applied voltage: 30 V DC or less (leak current: 0.1 mA or less)		+V connection: Effective Open: Ineffective • Applied voltage: 30 V DC or less (leak current: 0.1 mA or less)	
Indicators	Laser emitting (LD ON)	Green LED (lights up during laser emission)			
	Judgment outputs	HIGH: Orange LED (lights up when measured value > HIGH threshold value) PASS: Green LED (lights up when HIGH threshold value $\geq$ measured value $\geq$ LOW threshold value) LOW: Yellow LED (lights up when LOW threshold value > measured value)			
	Enable (ENABLE)	Green LED (lights up during normal operation)			
	Zero reset (ZERO)	Green LED (lights up when the zero reset function is enabled)			
Main digital display		5 digit red LED display $\left[ \begin{array}{l} \text{RUN mode: Either the measured value (mm) or the hold value will be displayed.} \\ \text{Reverse mode: The display orientation will be reversed.} \end{array} \right]$			
Sub-digital display		5 digit yellow LED display $\left[ \begin{array}{l} \text{RUN mode: Either the resolution or laser beam reception amount will be displayed.} \\ \text{THR mode: The threshold value will be displayed., Reverse mode: The display orientation will be reversed.} \end{array} \right]$			
Main functions		<div>• Measured value display</div> <div>• Setting value, light amount value resolution display</div> <div>• Standard received light setting</div> <div>• Automatic scaling</div> <div>• Scaling</div> <div>• Display reverse</div> <div>• ECO display</div> <div>• Display digits limitation</div> <div>• Sample hold</div> <div>• Peak hold</div> <div>• Bottom hold</div> <div>• Peak to peak hold</div> <div>• Self peak hold</div> <div>• Self bottom hold</div> <div>• Zero reset</div> <div>• Initial reset</div> <div>• ON-delay timer</div> <div>• OFF-delay timer</div> <div>• ONE SHOT timer</div> <div>• Differentiation</div> <div>• Sensitivity selection</div> <div>• Threshold value direct setting</div> <div>• Positioning teaching</div> <div>• 2-level teaching</div> <div>• Automatic teaching</div> <div>• Hysteresis width variability</div> <div>• Monitor focus</div> <div>• Non-measuring time setting</div> <div>• (A – B) calculation (Note 5)</div> <div>• (A + B) calculation (Note 5)</div> <div>• Mutual interference prevention (Note 5)</div> <div>• Laser deterioration detection</div> <div>• Key lock</div> <div>• Zero reset memory</div>			
Environmental resistance	Pollution degree	3 (industrial environment)			
	Ambient temperature	0 to +50 $^{\circ}$ C <b>+32 to +122 <math>^{\circ}</math>F</b> (No dew condensation), Storage: –25 to +65 $^{\circ}$ C <b>–13 to +149 <math>^{\circ}</math>F</b>			
	Ambient humidity	35 to 85 % RH, Storage: 35 to 85 % RH			
	EMC	EN 61000-6-2, EN 61000-6-4			
	Voltage withstandability	1,000 V AC for one min. between all supply terminals connected together and enclosure			
	Insulation resistance	20 M $\Omega$ , or more, with 500 V DC megger between all supply terminals connected together and enclosure			
	Vibration resistance	10 to 150 Hz frequency, 0.7 mm <b>0.028 in</b> amplitude in X, Y and Z directions for 80 min.			
Shock resistance		300 m/s <sup>2</sup> acceleration (30 G approx.) in X, Y and Z directions for three times each			
Material		Enclosure: Polybutylene terephthalate, Transparent cover: Polycarbonate			
I/O cable		0.09 mm <sup>2</sup> 10-core composite cable, 2 m <b>6.562 ft</b> long			
I/O cable extension		Extension up to total 10 m <b>32.808 ft</b> is possible, with 0.09 mm <sup>2</sup> or more, cable. (Note 6)			
Weight		Net weight: 140 g approx.			

- Notes: 1) Where measurement conditions have not been specified precisely, the conditions used were an ambient temperature of +20  $^{\circ}$ C **+68  $^{\circ}$ F**.  
2) Switching between current and voltage is accomplished by a switch on the bottom of the controller.  
3) These are the temperature characteristics of the linear output when the sensor head is connected.  
4) The judgment output and linear output and linear output response time is calculated by (Measuring cycle)  $\times$  (Set average sampling rate + 1).  
5) The calculation unit is necessary.  
6) If the extension cable is longer than 10 m **32.808 ft**, then it will not qualify for CE marking.

FIBER  
SENSORSLASER  
SENSORSPHOTO-  
ELECTRIC  
SENSORSMICRO  
PHOTO-  
ELECTRIC  
SENSORSAREA  
SENSORSLIGHT  
CURTAINSPRESSURE /  
FLOW  
SENSORSINDUCTIVE  
PROXIMITY  
SENSORSPARTICULAR  
USE  
SENSORSSENSOR  
OPTIONSSIMPLE  
WIRE-  
SAVING  
UNITSWIRE-  
SAVING  
SYSTEMSMEASURE-  
MENT  
SENSORSSTATIC  
CONTROL  
DEVICES

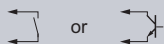
ENDOSCOPE

LASER  
MARKERSPLC /  
TERMINALSHUMAN  
MACHINE  
INTERFACESENERGY  
CONSUMPTION  
VISUALIZATION  
COMPONENTSFA  
COMPONENTSMACHINE  
VISION  
SYSTEMSUV  
CURING  
SYSTEMSSelection  
GuideLaser  
DisplacementMagnetic  
DisplacementCollimated  
BeamDigital Panel  
ControllerMetal-sheet  
Double-feed  
Detection**HL-T1****LA****LD**

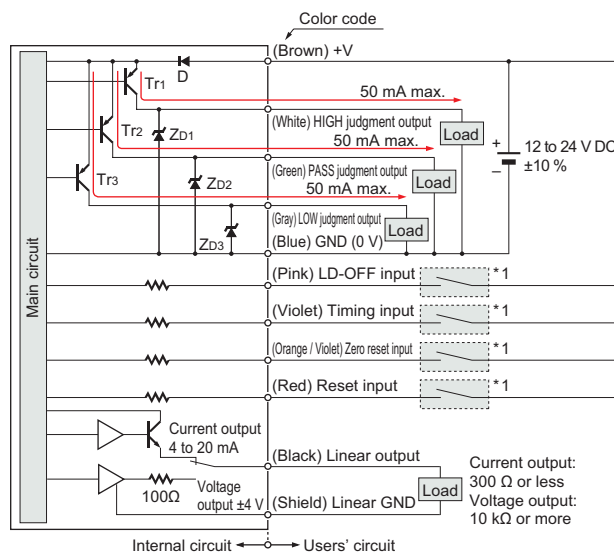
**I/O CIRCUIT DIAGRAMS****HL-AC1****NPN output type**

Symbols ... D: Reverse supply polarity protection diode  
ZD1, ZD2, ZD3: Surge absorption zener diode  
Tr1, Tr2, Tr3: NPN output transistor

\* 1  
Non-voltage contact or NPN open-collector transistor

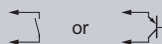


• LD-OFF input, Timing input, Zero reset input, Reset input  
Low (0 to 1.5 V): Effective  
High (+V or open): Ineffective

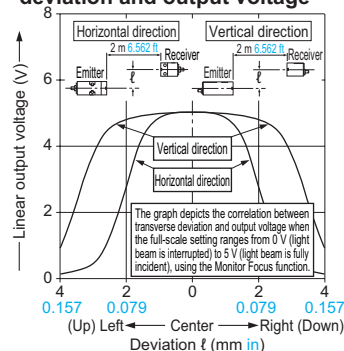
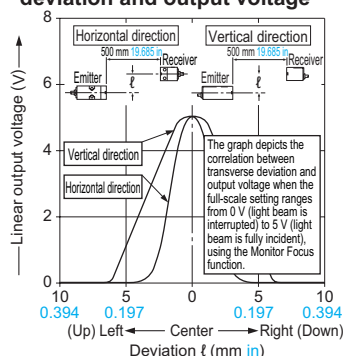
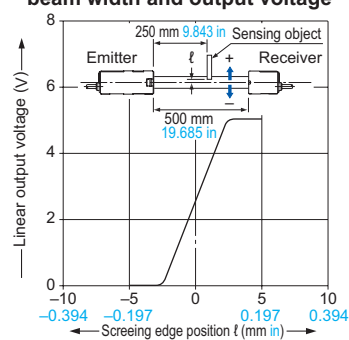
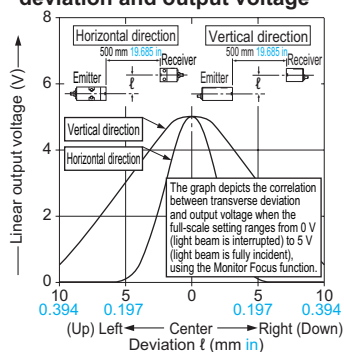
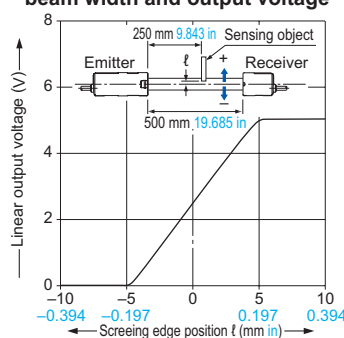
**HL-AC1P****PNP output type**

Symbols ... D: Reverse supply polarity protection diode  
ZD1, ZD2, ZD3: Surge absorption zener diode  
Tr1, Tr2, Tr3: PNP output transistor

\* 1  
Non-voltage contact or PNP open-collector transistor



• LD-OFF input, Timing input, Zero reset input, Reset input  
Low (0 V or open): Ineffective  
High [+V to (+V - 1.5 V)]: Effective

**SENSING CHARACTERISTICS (TYPICAL)****HL-T1001A HL-T1001F****Correlation between transverse deviation and output voltage****HL-T1005A HL-T1005F****Correlation between transverse deviation and output voltage****Correlation between interrupted beam width and output voltage****HL-T1010A HL-T1010F****Correlation between transverse deviation and output voltage****Correlation between interrupted beam width and output voltage**

**PRECAUTIONS FOR PROPER USE**

Refer to General precautions and About laser beam.

- 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.
- In case of using sensing devices for personnel protection, use products which meet laws and standards, such as OSHA, ANSI or IEC etc., for personnel protection applicable in each region or country.



- This product is classified as a Class 1 Laser Product in IEC / JIS regulations and a Class II Laser Product in FDA regulations 21 CFR 1040.10. Do not look at the laser beam through optical system such as a lens.
- The following label is attached to the product. Handle the product according to the instruction given on the warning label.



(The English warning label based on FDA regulations is pasted on the FDA regulations conforming type.)

**Safety standards for laser beam products**

- A laser beam can harm human being's eyes, skin, etc., because of its high energy density. IEC has classified laser products according to the degree of hazard and the stipulated safety requirements. The **HL-T1** series is classified as Class 1 laser. (Refer to About laser beam.)

**Classification by IEC 60825-1**

Classification	Description
Class 1	Lasers that are safe under reasonably foreseeable conditions of operation, including the use of optical instruments for intrabeam viewing.
Class 1M	Lasers emitting in the wavelength range from 302.5 nm to 4,000 nm which are safe under reasonably foreseeable conditions of operation, but may be hazardous if the user employs optics within the beam.
Class 2	Lasers that emit visible radiation in the wavelength range from 400 nm to 700 nm where eye protection is normally afforded by aversion responses, including the blink reflex. This reaction may be expected to provide adequate protection under reasonably foreseeable conditions of operation including the use of optical instruments for intrabeam viewing.
Class 2M	Lasers that emit visible radiation in the wavelength range from 400 nm to 700 nm where eye protection is normally afforded by aversion responses, including the blink reflex. However, viewing of the output may be more hazardous if the user employs optics within the beam.
Class 3R	Lasers that emit in the wavelength range from 302.5 nm to 10 <sup>6</sup> nm where direct intrabeam viewing is potentially hazardous but the risk is lower than for Class 3B lasers, and fewer manufacturing requirements and control measures for the user apply than for Class 3B lasers.
Class 3B	Lasers that are normally hazardous when direct intrabeam exposure occurs (i.e. within the NOHD). Viewing diffuse reflections is normally safe.
Class 4	Lasers that are also capable of producing hazardous diffuse reflections. They may cause skin injuries and could also constitute a fire hazard.

**Safe use of laser products**

- For the purpose of preventing users from suffering injuries by laser products, IEC 60825-1 "Safety of laser products". Kindly check the standards before use. (Refer to About laser beam.)

**Summary of user precautions (IEC 60825-1)**

\* Quoted from Safety of laser products, Annex Table D.3

Requirements subclause	Classification						
	Class 1	Class 1M	Class 2	Class 2M	Class 3R	Class 3B	Class 4
Laser safety officer	Not required but recommended for applications that involve direct viewing of the laser beam				Not required for visible emission Required for non-visible emission	Required	
Remote interlock	Not required					Connect to room or door circuits	
Key control	Not required					Remove key when not in use	
Beam attenuator	Not required					When in use prevents inadvertent exposure	
Emission indicator device	Not required				Indicates laser is energized for non-visible wavelengths	Indicates laser is energized	
Warning signs	Not required					Follow precautions on warning signs	
Beam path	Not required	Class 1M (Note 1) as for Class 3B	Not required	Class 2M (Note 2) as for Class 3B	Terminate beam at end of useful length		
Specular reflection	No requirements	Class 1M (Note 1) as for Class 3B	No requirements	Class 2M (Note 2) as for Class 3B	Prevent unintentional reflections		
Eye protection	No requirements					Required if engineering and administrative procedures not practicable and MPE exceeded	
Protective clothing	No requirements					Sometimes required	Specific requirements
Training	No requirements	Class 1M (Note 1) as for Class 3R	No requirements	Class 2M (Note 2) as for Class 3R	Required for all operator and maintenance personnel		

Notes: 1) Class 1M laser products that failed condition 1 of table 10. Not required for Class 1M laser products that failed condition 2 of table 10.

2) Class 2M laser products that failed condition 1 of table 10. Not required for Class 2M laser products that failed condition 2 of table 10.

Remarks: This table is intended to provide a convenient summary of precautions. See text of this standard for complete precautions.

FIBER SENSORS

LASER SENSORS

PHOTO-ELECTRIC SENSORS

MICRO PHOTO-ELECTRIC SENSORS

AREA SENSORS

LIGHT CURTAINS

PRESSURE / FLOW SENSORS

INDUCTIVE PROXIMITY SENSORS

PARTICULAR USE SENSORS

SENSOR OPTIONS

SIMPLE WIRE-SAVING UNITS

WIRE-SAVING SYSTEMS

MEASURE-MENT SENSORS

STATIC CONTROL DEVICES

ENDOSCOPE

LASER MARKERS

PLC / TERMINALS

HUMAN MACHINE INTERFACES

ENERGY CONSUMPTION VISUALIZATION COMPONENTS

FA COMPONENTS

MACHINE VISION SYSTEMS

UV CURING SYSTEMS

Selection Guide

Laser Displacement

Magnetic Displacement

Collimated Beam

Digital Panel Controller

Metal-sheet Double-feed Detection

**HL-T1****LA****LD**



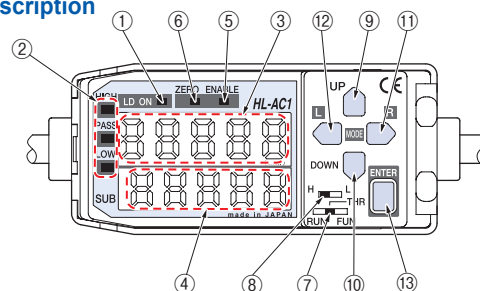
## PRECAUTIONS FOR PROPER USE

Refer to General precautions and About laser beam.

### Functions

Function	Details
Zero reset function	<p>The following tasks can be done by executing zero reset.</p> <ul style="list-style-type: none"> <li>The display value can be set at "0".</li> <li>The linear output when the display reads "0" is made the center output value of the 2 points set by monitor focus. (In the default state, the current output is 12 mA and the voltage output is 0 V.)</li> </ul>
Auto scaling function	<p>The auto scaling function selects whether to display the laser beam reception amount in the main-digital display in "mm" units or in "%" units, and determines whether the amount of laser beam received or the amount of laser beam interrupted is displayed. With the set standard laser beam reception amount as the reference value, the current laser beam reception amount (laser beam interrupted amount) is scaled automatically and is displayed as well as being output.</p>
Standard received light setting	<p>This function registers and stores the current laser beam reception amount in memory as the standard laser beam reception amount. The laser beam reception amount during full laser beam entry becomes the 100 % laser beam reception amount's full scale (F.S.). If this function is used, the display and the linear output are set on the full scale (F.S.) automatically. It can also be used to correct the laser beam reception amount when there is a change in the laser beam reception amount due to dirt, etc. on the front glass.</p>
Scaling function	<p>The scaling function is a function that changes the display value to the desired amount with respect to the setting value. At the desired distance, the display value can be input and changed.</p>
Hysteresis width setting function	<p>This function sets the hysteresis to the desired value.</p>
Monitor focus function	<p>With this function, the linear output range and inclination, etc. with respect to the display value can be specified. Setting is done by determining the 2 output values with respect to the desired display values.</p>
Differential function	<p>This function makes the amount of change in the measured value an output value. Use this function when measuring if you are paying attention to changes in measured values, as when counting the number of workpieces, etc.</p>
Display reverse function	<p>The digital display's direction can be selected. The forward direction or the reverse direction to match the direction of installation on the equipment can be selected.</p>
ECO display function	<p>This function makes the display dark and saves electric power.</p>
Display digits limitation function	<p>This determines the number of display digits in the main-digital and sub-digital displays. If the number of digits is limited, the digits are turned off beginning with the lowest order digit.</p>
Zero reset memory function	<p>This selects whether or not to save the zero reset level in memory when the power is turned OFF. If you desire to reproduce the zero reset level from the previous operating session when you turn the power ON again, then enable this function. If this function is enabled, the zero reset level data are written into the EEPROM each time.</p>
Key lock function	<p>The controller's key input can be disabled. Once the key input is disabled, the controller will not accept any key inputs until the key lock is released. Use this function to avoid changing the setting by mistake.</p>

### Functional description



	Description	Function
①	Laser emitting indicator (LD ON) (Green LED)	Lights up when the sensor head is emitting laser beam.
②	Judgment output indicators (HIGH / PASS / LOW) (Orange / Green / Yellow LED)	HIGH: Orange LED (lights up when measured value > HIGH threshold value) PASS: Green LED (lights up when HIGH threshold value ≥ measured value ≥ LOW threshold value) LOW: Yellow LED (lights up when LOW threshold value > measured value)
③	Main digital display (5 digit red LED)	When in the RUN mode, it displays the measured value (mm/%). During measurement hold, it displays the hold value (mm/%). In Reverse mode, the top and bottom are displayed in reverse.
④	Sub-digital display (5 digit yellow LED)	When in the RUN mode, it displays the threshold value, voltage / current value, light reception amount or resolution. When in the THR mode, it displays the respective threshold values. In reverse mode, the top and bottom are displayed in reverse.
⑤	Enable indicator (ENABLE) (Green LED)	Lights up when operation is normal. Goes off when operation is abnormal (if the sensor head is not connected when the power is turned on).
⑥	Zero reset indicator (ZERO) (Green LED)	Lights up when the zero reset function is enabled.
⑦	Mode selection switch	The following 3 modes can be selected. • RUN mode: Measuring mode • THR mode: The threshold values are set in this mode. • FUN mode: Each of the settings are set in this mode.
⑧	Threshold value select switch	When in the THR / RUN mode, this switches the set threshold value (HIGH / LOW).
⑨	UP key	• RUN mode: Timing input • THR mode: Changes the threshold value (forward direction) • FUN mode: Changes the function setting value (forward direction)
⑩	DOWN key	• RUN mode: Press for 3 sec. or more: Standard light reception amount setting input • THR mode: Changes the threshold value (reverse direction) • FUN mode: Changes the function setting value (reverse direction)
⑪	RIGHT key	• RUN mode: Changes the contents of the sub-digital display (forward direction) • THR mode: Changes the threshold value digit (forward direction) • FUN mode: Sets function selection (forward direction)
⑫	LEFT key	• RUN mode: Changes the contents of the sub-digital display (reverse direction) • THR mode: Changes the threshold value digit (reverse direction) • FUN mode: Sets function selection (reverse direction)
⑬	ENT key	• RUN mode: Pressing for 1 sec. or more, executes zero reset. Pressing together with the RIGHT key for 3 sec. or more, cancels zero reset. • THR mode: When threshold value is blinking, the threshold value is set. When the threshold value lights up, teaching is executed. • FUN mode: When the set value is blinking, the value is set. When the setting is being initialized, pressing for a long time executes initialization.

### Others

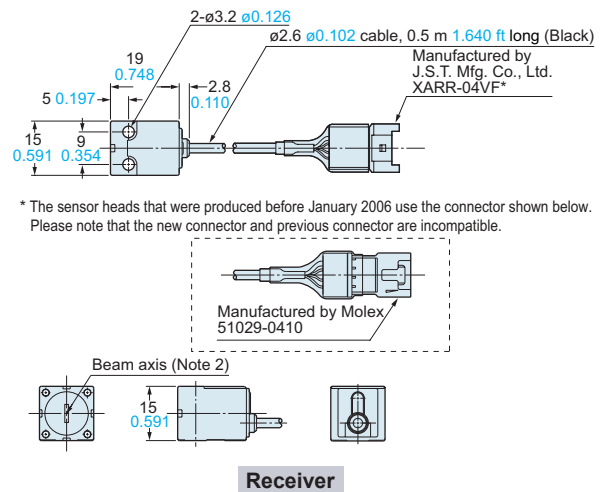
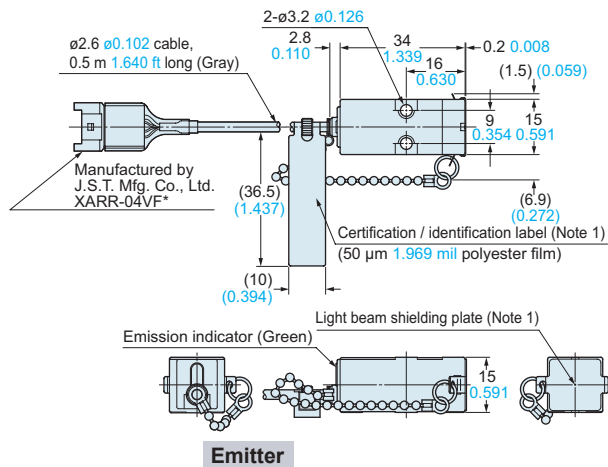
- This product outputs the judgment of the laser light analog quantity. Since there is variation in the light intensity between the center and the edges of the detection area, and the emitter side and the receiver side, the "display value" does not equal "the actual dimensions", so caution is necessary. Use the displayed dimensional value as a criterion.
- If the object being measured has a mirror surface or is a transparent body, it may be impossible to measure it accurately, so please exercise caution.
- Absolutely do not attempt to disassemble this product.

### Connection

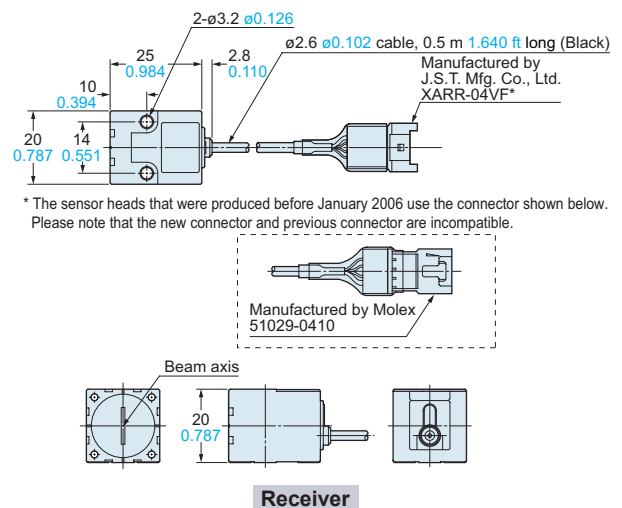
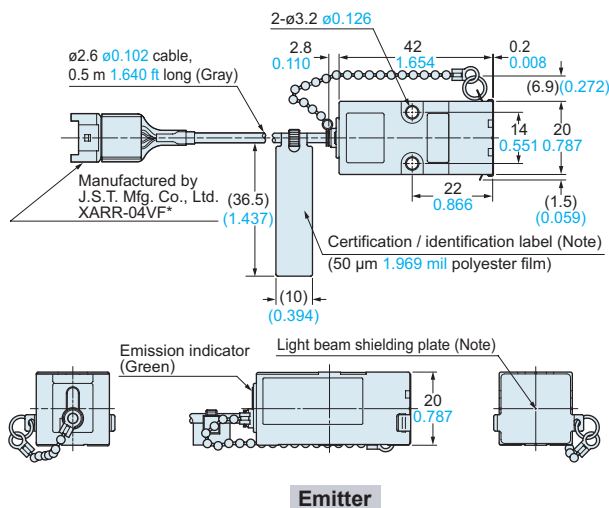
- This product is made to satisfy the specifications when the sensor head is combined with the controller. In any other combination, not only may it not satisfy the specifications, but could be the cause of breakdown. So by all means, use it so that there is a combination of the sensor head and the controller.

**DIMENSIONS (Unit: mm in)**

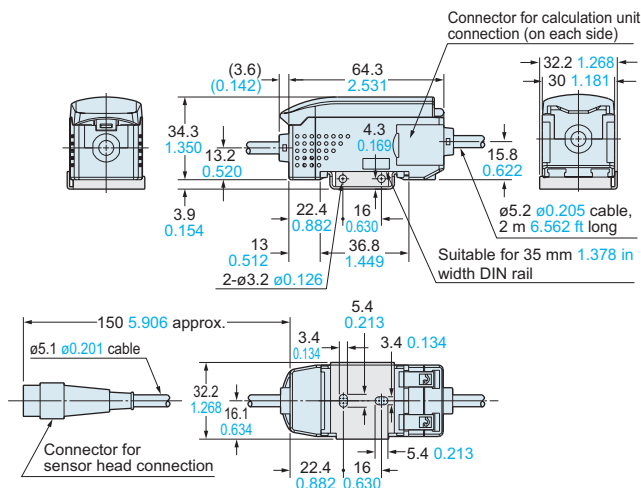
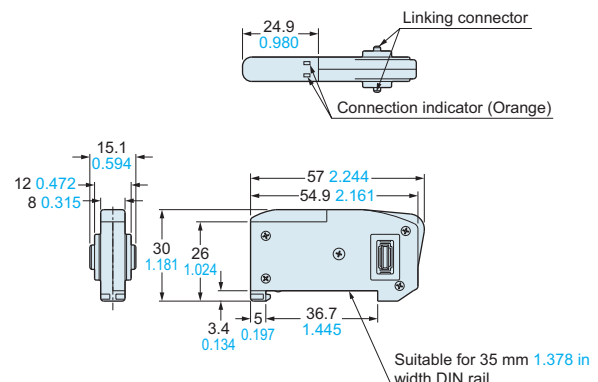
The CAD data in the dimensions can be downloaded from our website.

**HL-T1001A(F) HL-T1005A(F)****Sensor head**

Notes: 1) IEC / JIS conforming products do not contain light beam shielding plate, or certification / identification label.  
2) The receiver of **HL-T1001A(F)** does not incorporate a slit.

**HL-T1010A HL-T1010F****Sensor head**

Note: IEC / JIS conforming products do not contain light beam shielding plate, or certification / identification label.

**HL-AC1 HL-AC1P****Controller****Mounting drawing with a mounting bracket MS-HLAC1-1 (Optional)****HL-AC1-CL****Calculation unit (Optional)**

FIBER SENSORS

LASER SENSORS

PHOTO-ELECTRIC SENSORS

MICRO PHOTO-ELECTRIC SENSORS

AREA SENSORS

LIGHT CURTAINS

PRESSURE / FLOW SENSORS

INDUCTIVE PROXIMITY SENSORS

PARTICULAR USE SENSORS

SENSOR OPTIONS

SIMPLE WIRE-SAVING UNITS

WIRE-SAVING SYSTEMS

MEASURE-MINI SENSORS

STATIC CONTROL DEVICES

ENDOSCOPE

LASER MARKERS

PLC / TERMINALS

HUMAN MACHINE INTERFACES

ENERGY CONSUMPTION VISUALIZATION COMPONENTS

FA COMPONENTS

MACHINE VISION SYSTEMS

UV CURING SYSTEMS

Selection Guide

Laser Displacement

Magnetic Displacement

Collimated Beam

Digital Panel Controller

Metal-sheet Double-feed Detection

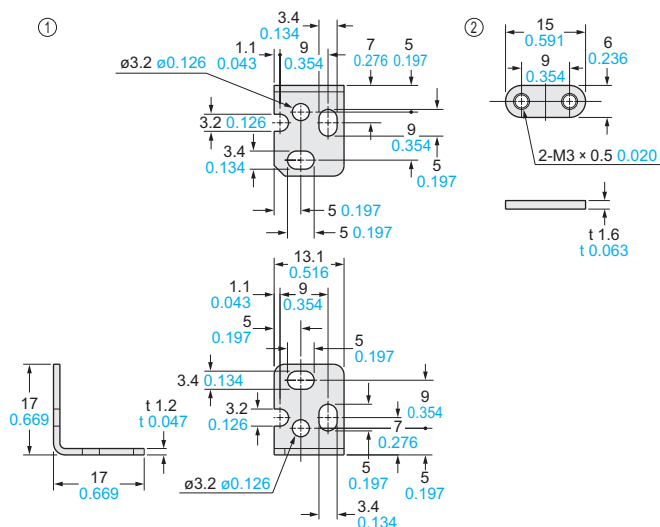
**HL-T1****LA****LD**

**DIMENSIONS (Unit: mm in)**

The CAD data in the dimensions can be downloaded from our website.

**MS-HLT1-1**

Sensor head mounting bracket for HL-T1001A(F) / HL-T1005A(F) [Accessory for HL-T1001A(F) / HL-T1005A(F)]

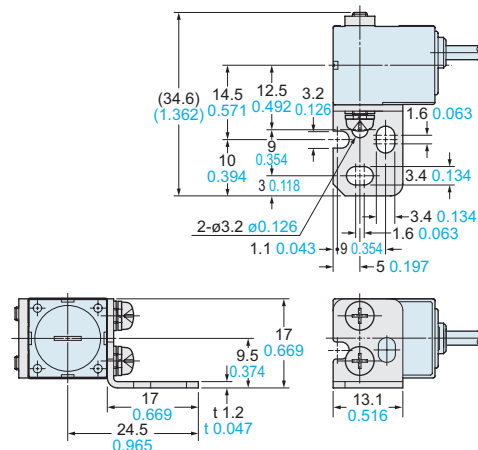


Material: Cold rolled carbon steel (SPCC) (Uni-chrome plated)

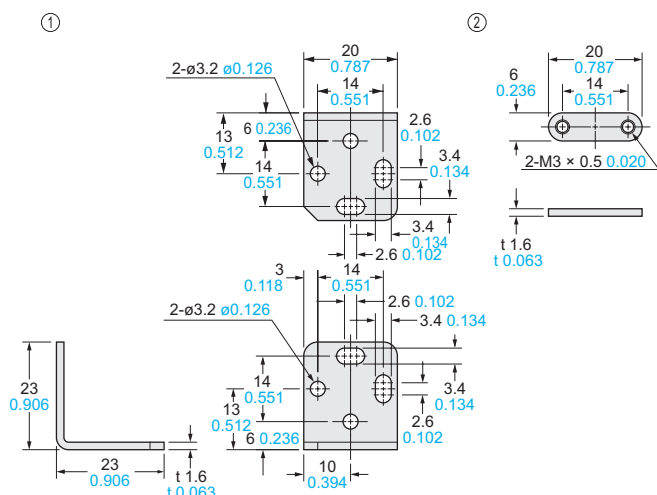
Two M3 (length 20 mm 0.787 in) screws with washers are attached.

**Assembly dimensions**

Mounting drawing with HL-T1005A's receiver

**MS-LA3-1**

Sensor head mounting bracket for HL-T1010A(F) [Accessory for HL-T1010A(F)]

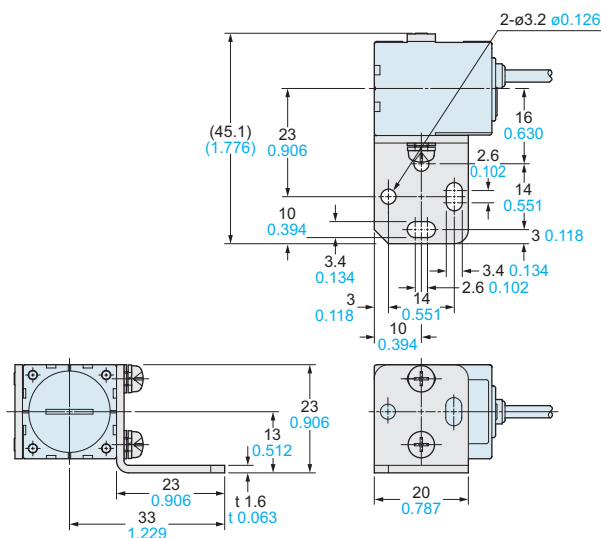


Material: Cold rolled carbon steel (SPCC) (Uni-chrome plated)

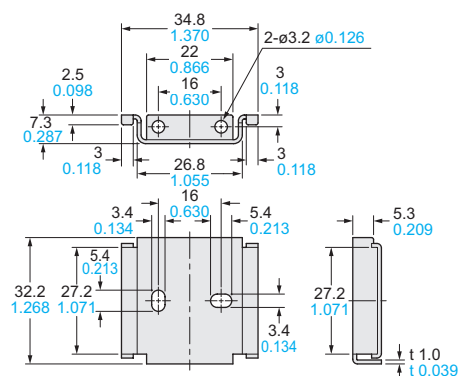
Two M3 (length 25 mm 0.984 in) screws with washers are attached.

**Assembly dimensions**

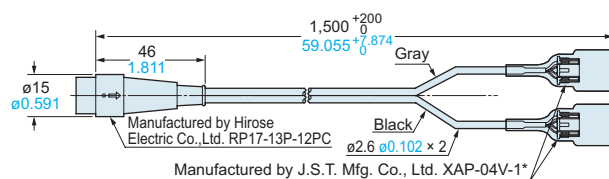
Mounting drawing with HL-T1010A's receiver

**MS-HLAC1-1**

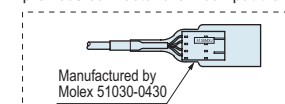
Controller mounting bracket (Optional)

**CN-HLT1-1**

Sensor head to controller connection cable (Accessory for sensor head)



\* The sensor heads that were produced before January 2006 use the connector shown below. Please note that the new connector and previous connector are incompatible.



HL-T1

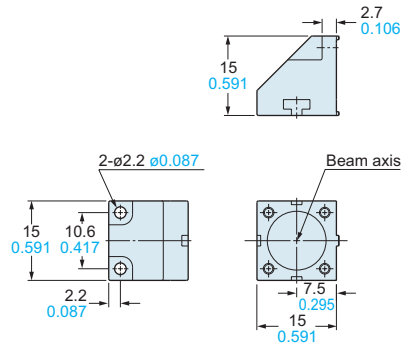
LA

LD



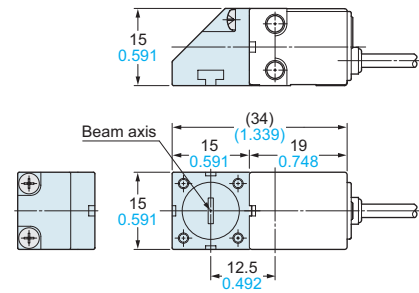
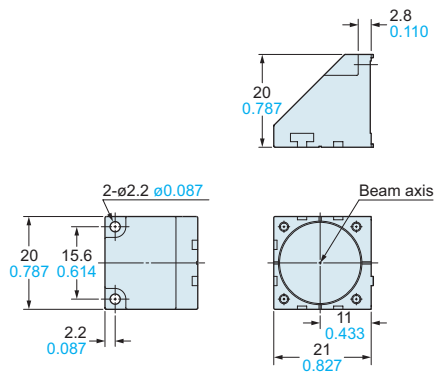
**DIMENSIONS (Unit: mm in)**

The CAD data in the dimensions can be downloaded from our website.

**HL-T1SV1**Side-view attachment for **HL-T1001A(F)** / **HL-T1005A(F)** (Optional)**Assembly dimensions**Mounting drawing with **HL-T1005A**'s receiver

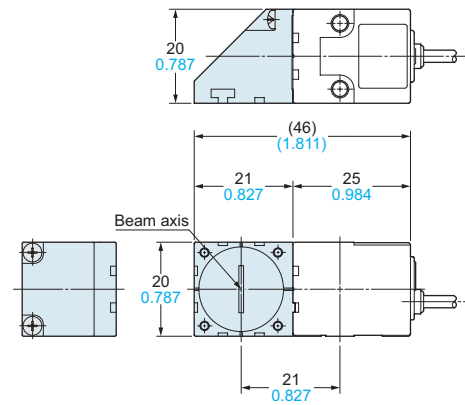
Material: Polyetherimide (Enclosure), Glass (Front cover)

Two M2 (length 6 mm 0.236 in) screws with washers are attached.

**HL-T1SV2**Side-view attachment for **HL-T1010A(F)** (Optional)**Assembly dimensions**Mounting drawing with **HL-T1010A**'s receiver

Material: Polyetherimide (Enclosure), Glass (Front cover)

Two M2 (length 6 mm 0.236 in) screws with washers are attached.

FIBER  
SENSORSLASER  
SENSORSPHOTO-  
ELECTRIC  
SENSORSMICRO  
PHOTO-  
ELECTRIC  
SENSORSAREA  
SENSORSLIGHT  
CURTAINSPRESSURE /  
FLOW  
SENSORSINDUCTIVE  
PROXIMITY  
SENSORSPARTICULAR  
USE  
SENSORSSENSOR  
OPTIONSSIMPLE  
WIRE-SAVING  
UNITSWIRE-SAVING  
SYSTEMSMEASURE-  
MENT  
SENSORSSTATIC  
CONTROL  
DEVICES

ENDOSCOPE

LASER  
MARKERSPLC /  
TERMINALSHUMAN  
MACHINE  
INTERFACESENERGY  
CONSUMPTION  
VISUALIZATION  
COMPONENTSFA  
COMPONENTSMACHINE  
VISION  
SYSTEMSUV  
CURING  
SYSTEMSSelection  
GuideLaser  
DisplacementMagnetic  
DisplacementCollimated  
BeamDigital Panel  
ControllerMetal-sheet  
Double-feed  
Detection**HL-T1****LA****LD**