FASTUS vinapham®
YOUR NEEDS, OUR SOLUTIONS

* FASTUS is a product brand of OPTEX FA.

IO-Link Compatible Non-Contact Thermometer

TI-S Series

Measurement range:
–40 ... +500°C

Sensor Head	TI-S30
Controller	TI-SC (E)

IO-Link

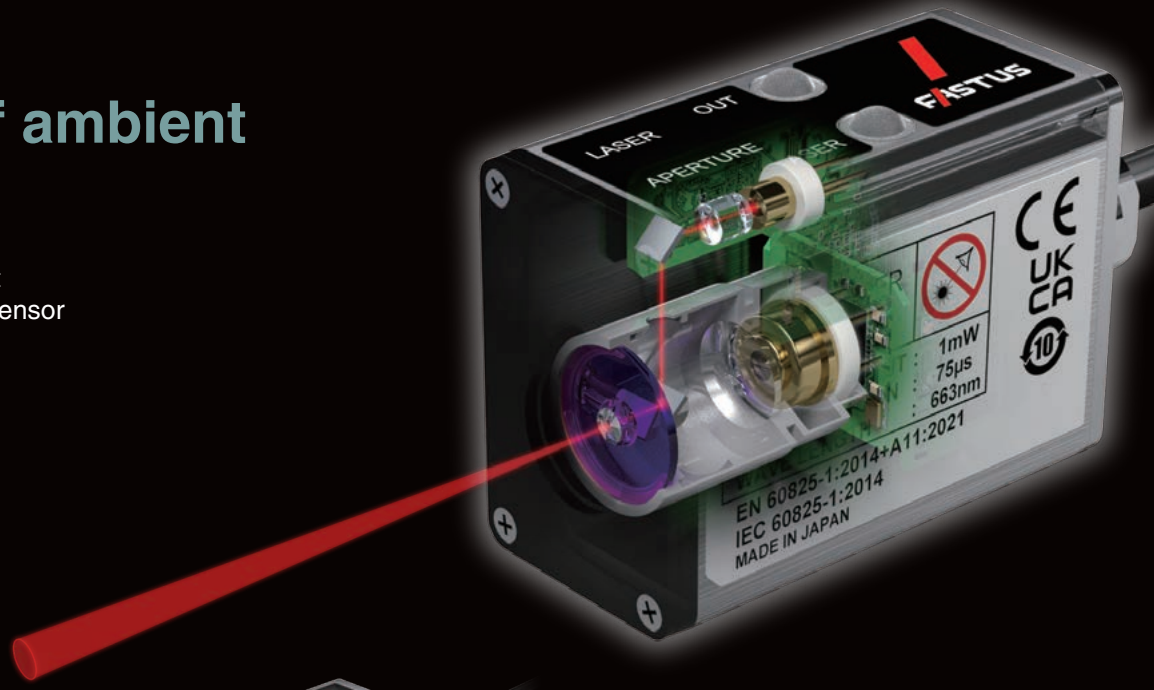
Non-Contact Thermometer

- Highly resistant to changes in ambient temperature
- Ring laser pointer for visual confirmation
- Easy-to-read full color display

OPTEX FA CO., LTD.

Designed to minimize the effects of ambient temperature changes

When designing non-contact thermometers that can perform accurate temperature measurements, one of the major challenges is making them susceptible to ambient temperature changes and to reduce temperature drift. OPTEX FA has designed a sensor head that is less susceptible to external and internal temperature changes.



Dual-layer metal construction

A dual heat-insulating structure is employed to suppress the effects of external temperature changes.

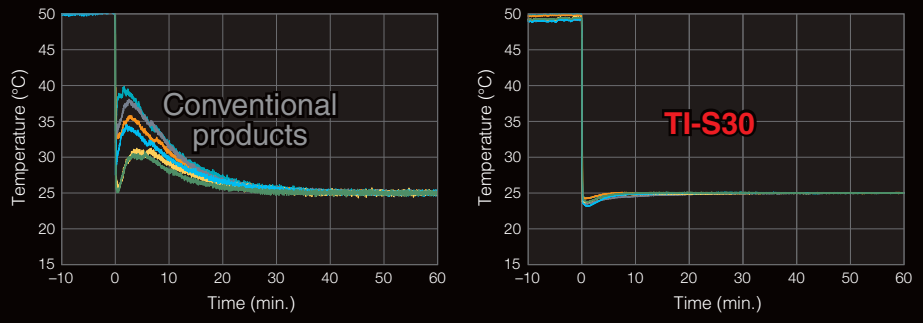
Split PCB Layout

The circuit board was separated to avoid heat and noise. This design enables stable and reliable measurements.

Measurement that is highly resistant to ambient temperature changes

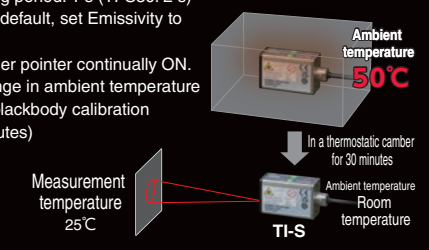
Temperature measurement in heating and cooling processes is often affected by temperature changes in the installation environment.
The TI-S Series provides stable measurement even when faced with changes in ambient temperature. The graph on the right compares measured temperatures using a conventional product and the TI-S30. For the comparison, the sensor head was held in a 50°C thermostatic chamber for 30 minutes, then moved to a room-temperature environment and measured against a blackbody at 25°C.

Comparison of conventional products and TI-S Series



■ **Measurement condition**

- Blackbody: 25°C
- Sampling period: 1 s (TI-S30: 2 s)
- Factory default, set Emissivity to "1.0."
- Ring laser pointer continually ON.
- No change in ambient temperature during blackbody calibration (60 minutes)



vinapham®
YOUR NEEDS, OUR SOLUTIONS

Equipped with a ring laser pointer

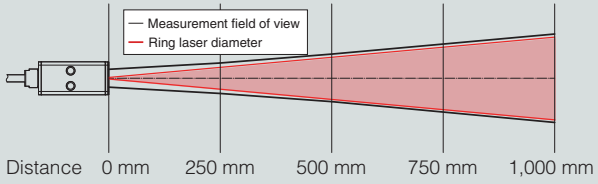
The ring laser pointer visually indicates the measurement position and measurement field of view. This allows you to make position adjustments easily while checking the measurement field of view, even in dark and small spaces. (Patent pending)

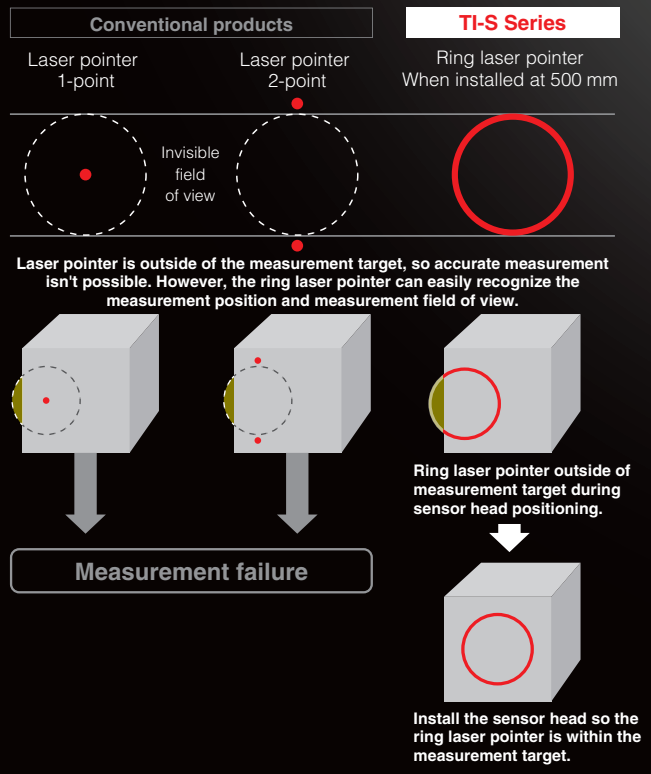
First in Industry

Ring laser pointer for visual confirmation of field of view

Non-contact thermometers that measure infrared energy cannot accurately measure temperatures if part of the field of view is outside of the measurement target. Conventional laser pointers have only one or two points, so the field of view was not clear. TI-S Series has a ring laser pointer that clearly visualizes the field of view.

■ Relationship between the field of view and the ring lase pointer





Flexible installation and easy operation

[Sensor Head]

Compact design

The compact (23 × 35 × 49.5 mm) size.

Environmental resistance

Heat resistance up to an ambient temperature of 80°C (70°C when using the laser pointer), and IP67 degree of protection.

Easy-to-understand indicators

Errors, warnings, and operating status are indicated by two indicators.

Calibrate sensor heads directly

TI-S Series allows sensor heads to be detached from controllers, so they can be calibrated directly.

[Controller]

1.8-inch full color TFT LCD

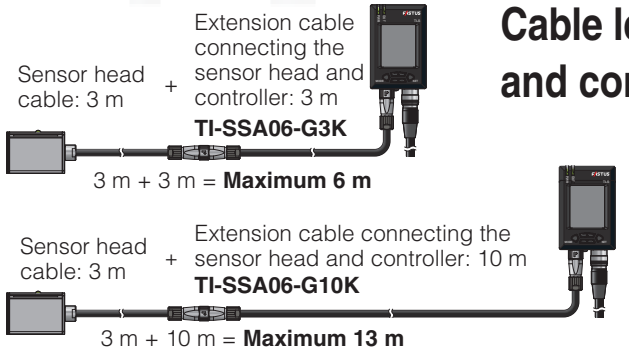
It is possible to display English, Simplified Chinese, and Japanese.

Screen display can be rotated

The controller screen display can be rotated 360° in 90° increments.

Cable length between sensor head and controller can be extended

Optional 3 m and 10 m extension cables are available.



Wide-ranging interface and measurement functions

Edge detection

Detection of rapid temperature changes

Edge detection is provided, and detects when rapid temperature changes occurred. It is possible to only detect errors caused by temperature changes occurring within a short period of time.

Analog output

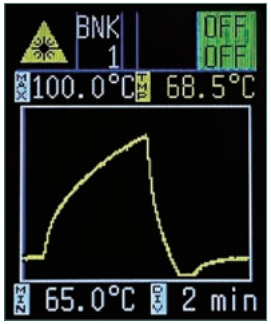
For analog output, current output (4 ... 20 mA) and voltage output (0 ... 10 V) can be selected.

Alarm output

(upper/lower limit settings)

An alarm can be output when the measured temperature is outside of the threshold.

Visible on sensor head status display



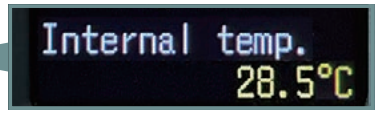
First in Industry

Trend graph

A trend graph of the measured temperature can be displayed covering up to 24 hours.

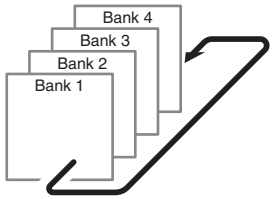
Head internal temperature display

The head internal temperature is also continuously displayed. This allows use while checking the effects of the ambient temperature.



Bank function (4 channels)

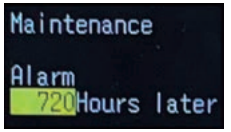
4 ch are installed for the bank function which can select (call) setting contents.



Up to four patterns can be saved for banks 1 to 4.

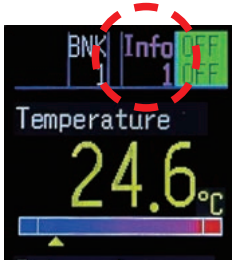
Maintenance alarm

Maintenance timing alerts can be provided.



Presetting of maintenance timing

Notifies by blinking

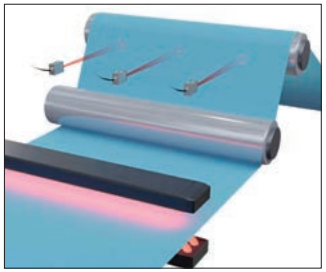


Notified automatically when the set time has elapsed.

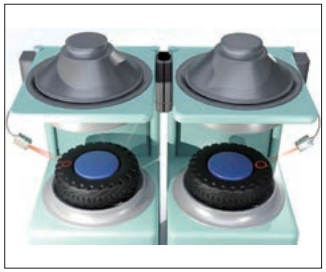
Applications

Evaluating solar panel lamination

Measuring temperature of chamber top plate



Measuring temperature of plastic



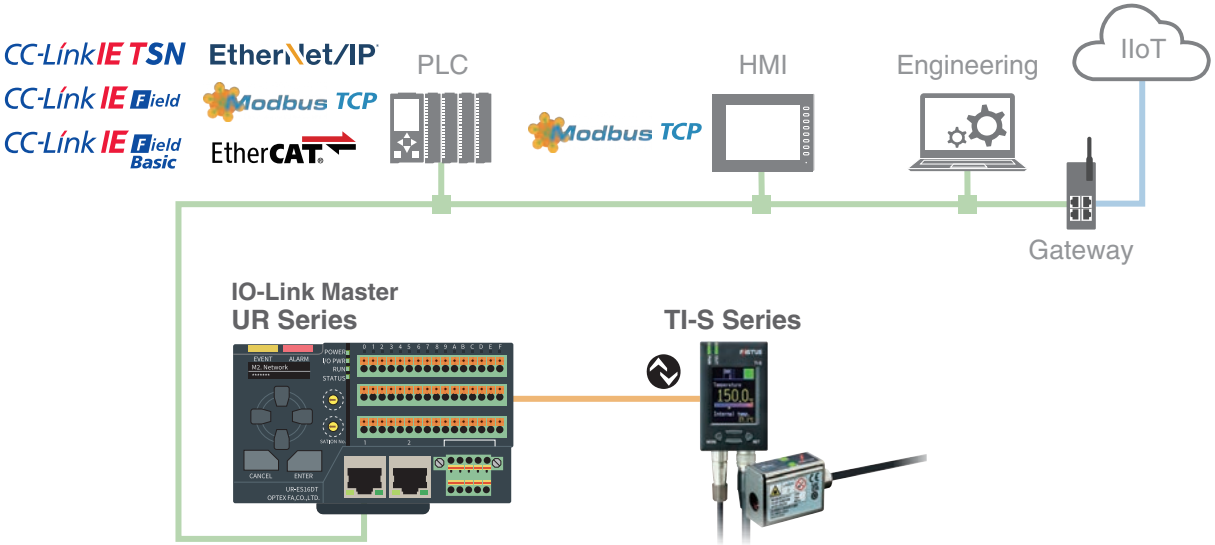
Controlling heating time in tire vulcanization processes

Measuring temperature in rubber extrusion processes

Detecting presence of hot-melt adhesive

IO-Link communication supported IO-Link

System overview



IO-Link is a technology that connects sensors and actuators to Industrial Ethernet using digital signals to promote smart factories. Measurements can be obtained directly as digital values, reducing the need for analog input. Noise resistance, cost reduction, and predictive maintenance are achieved.

Three advantages of introducing IO-Link

Advantage 1

Device information status monitoring leads to predictive maintenance and reduced downtime.

Advantage 2

The storage of device information allows for immediate restoration even if the device is replaced, improving maintainability.

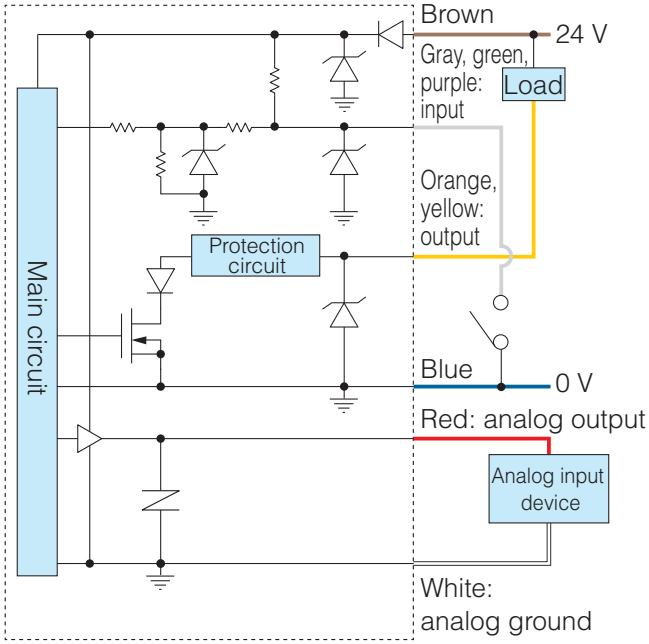
Advantage 3

Converts measured value to digital signals for transmission to PLC, making them resistant to noise and enabling long-distance communication.

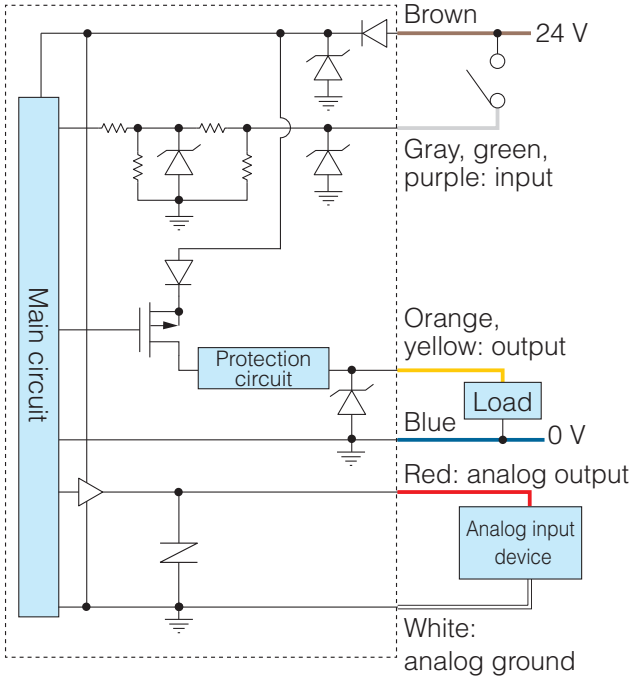
I/O circuit diagrams

General-purpose I/O cable

NPN setting



PNP setting



Lead wire functions

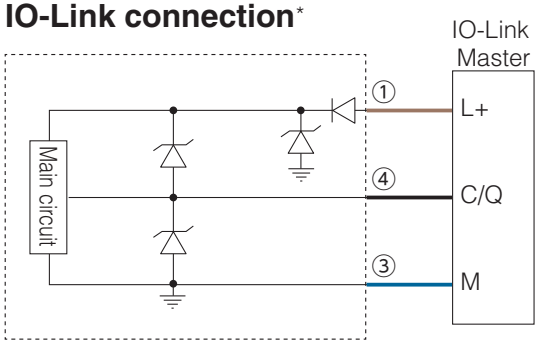
Wire color	Description
Brown	+V (24 VDC)
Gray	Laser control input
Green	Hold input/bank select*
Purple	Trigger input/bank select*
Orange	Upper limit alarm output
Yellow	Lower limit alarm output
Blue	Ground (0 V)
Red	Analog output
White	Analog ground

* Operates as bank select input when Measurement mode is set to Normal.

Lead wire functions during bank select

Bank number	Lead wire color	
	Green	Purple
1	OFF	OFF
2	OFF	ON
3	ON	OFF
4	ON	ON

IO-Link connection*

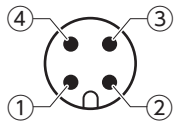


* When using NPN settings for an IO-Link connection, use OPTEX FA's IO-Link Master UR Series or IO-Link Master with sink support.

IO-Link cable lead wire/connector pin functions

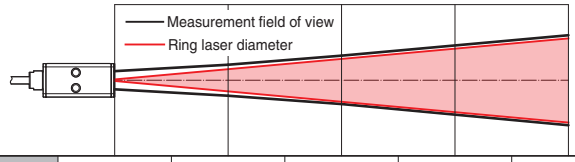
Wire color	M12 connector pin No.	Description
Brown	①	L+
Black	④	C/Q
Blue	③	M

M12 connector pin No.



* ② is not used.

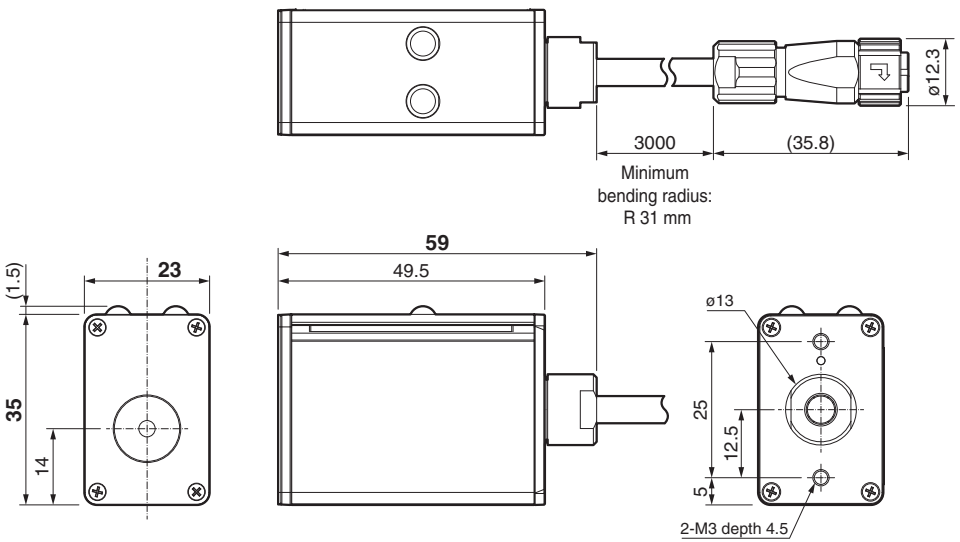
Field of view (Unit: mm)



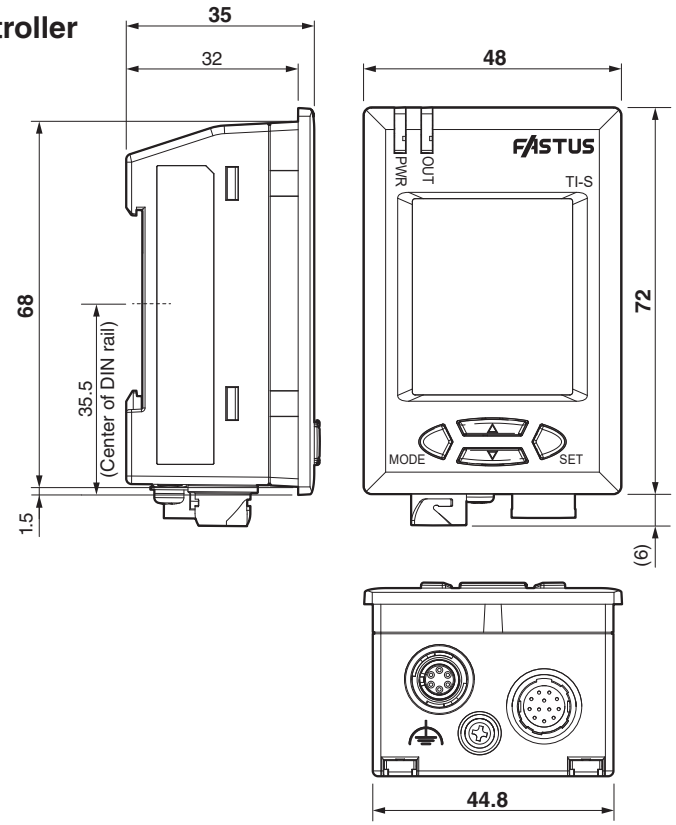
Distance	0	250	500	750	1,000
Field of view	ø12	ø21	ø30	ø45	ø60
Ring laser diameter	ø1	ø15	ø30	ø45	ø60

Dimensions (Unit: mm)

Sensor head



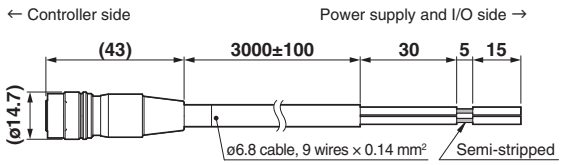
Controller



Connection cable (Option)

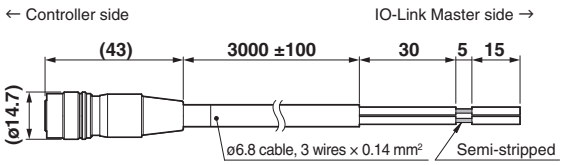
General-purpose I/O cable: TI-SCA09-G3K

Minimum bending radius (Stationary position): R 42 mm



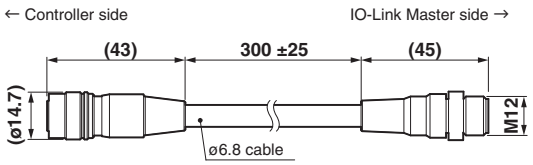
IO-Link cable: TI-SCA03-G3K

Minimum bending radius (Stationary position): R 42 mm



IO-Link cable: TI-SM1203-G03K

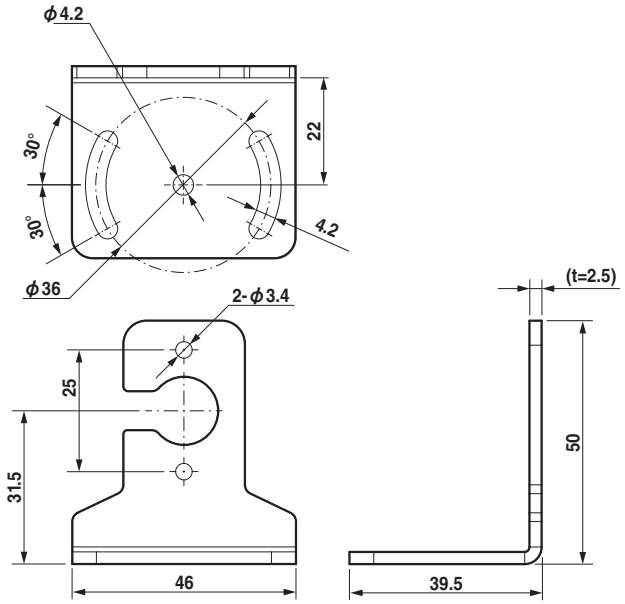
Minimum bending radius (Stationary position): R 42 mm



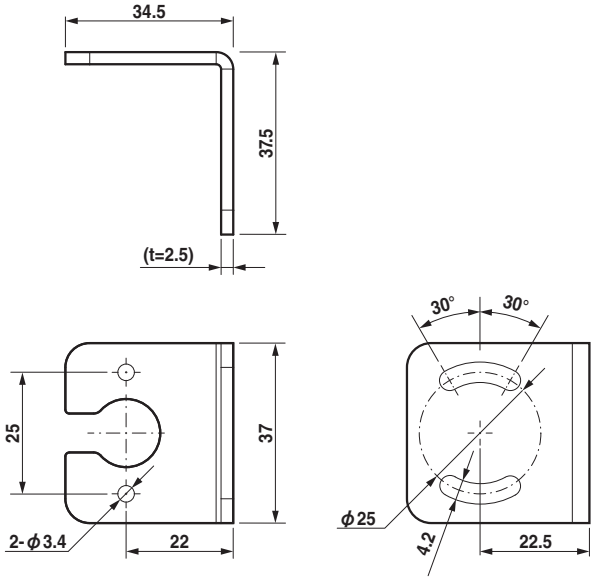
* For the dimensions of the extension cable and mounting brackets, refer to the OPTEX FA website.

Mounting brackets for sensor head

BEF-TISH-B (Option)

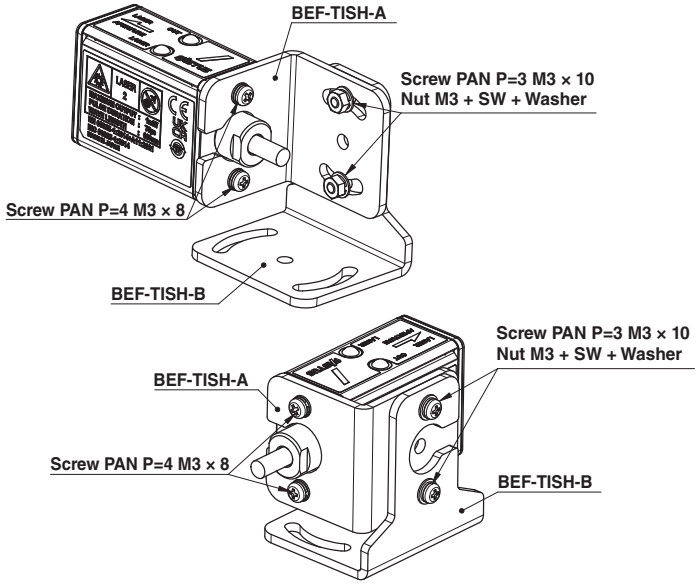


BEF-TISH-A (Option)



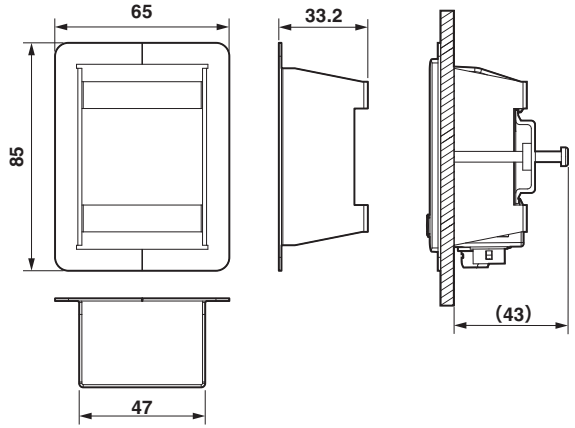
BEF-TISH-AB (Option)

2-axis mounting bracket assembly image



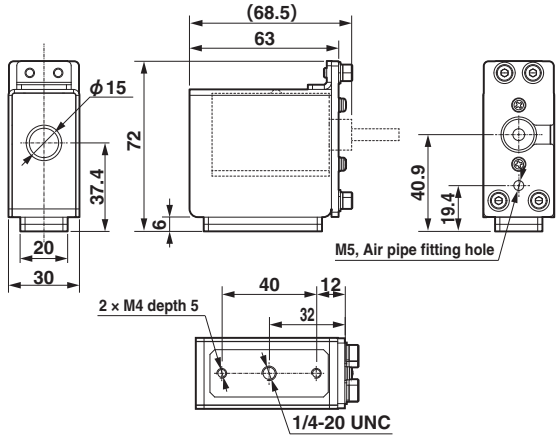
Mounting bracket for controller

BEF-TISC-BKT (Option)

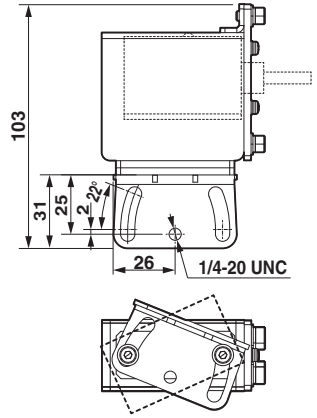


Air purge kit

TI-S30-AP (Option)



With mounting bracket



Options

Connection cables

* The controller does not come with a cable to connect an external device.
To connect the controller with an external device, please purchase one of the following connection cables.

General-purpose I/O cable
TI-SCA09-G3K Open-end cable

IO-Link cable
TI-SCA03-G3K Open-end cable
Minimum bending radius
(Stationary position):
R 42 mm

IO-Link cable
TI-SM1203-G03K
M12 4-pin plug
Minimum bending radius
(Stationary position):
R 42 mm

Air purge kit

Air purge kit for TI-S30
TI-S30-AP
Air purge kit for TI-S30 to prevent lens contamination
Air flows in front of the lens to protect it from dust and dirt

*Air pipe fitting are not included. Please attach a commercially available product.

Model	TI-S30-AP
Air flow rate	2 ... 10 L/min
Ambient temperature	0 ... +80°C
Ambient humidity	35 ... 85% RH (no condensation)
Applicable standards	EU RoHS (2011/65/EU)
Material	Stainless steel
Weight	Approx 300 g

Air purge kit assembly image

Extension cables

Extension cable connecting the head and controller
TI-SSA06-G3K (Cable length: 3 m)
TI-SSA06-G10K (Cable length: 10 m)
Minimum bending radius (Stationary position):
R 31 mm

Black body tape for non-contact thermometer

HB-250
Heat resistance temperature: 250°C
Tape width: 60 mm, Tape length: 2 m

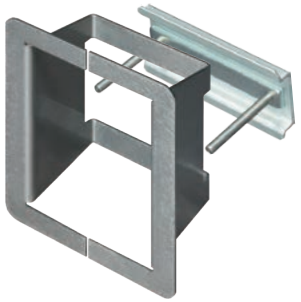
Mounting brackets

For sensor head
BEF-TISH-B
(Floor mounting bracket)

For sensor head
BEF-TISH-A
(Wall mounting bracket)

For sensor head
BEF-TISH-AB
(2-axis mounting bracket)

For controller
BEF-TISC-BKT
(Panel mounting bracket)



Panel mounting bracket installation image

Specifications

[Sensor Head]

Model		TI-S30
Measurement range*1		−40 ... +500°C
Display range*1		−50 ... +510°C
Field of view		ø30 mm at 500 mm
Optics		Silicon lens
Sensing element/spectral response		Thermopile 8 ... 14 µm
Response time (operating mode)		High speed, 50 ms, 100 ms, 200 ms, 500 ms, 1 s, 2 s, 5 s, 10 s, 20 s * Output response 90%*2
Accuracy*3		−40 ... 0°C: ±1.5°C +1 ... +200°C: ±1°C +201 ... +500°C: ±0.5% of reading value
Repeatability		±0.5°C (when operating mode is 100 ms)
Temperature drift		Within ±0.25°C/°C
Emissivity adjustment		0.100 ... 1.200
Supply voltage		5 VDC (Supplied from controller)
Current consumption		30 mA or less/5 VDC
Connection type		Pigtail cable 3 m
Minimum bending radius		R 31 mm
Total cable length		Max. 13 m (pigtail cable 3 m + extension cable 10 m)
Laser pointer	Medium	Red semiconductor laser
	Wavelength	663 nm
	Maximum output	1 mW
Laser class (JIS/IEC/FDA)*4		CLASS 2
Environmental resistance	Degree of protection	IP67 (IEC 60529)
	Ambient temperature	0 ... +80°C (up to +70°C during laser emission)
	Ambient humidity	35 ... 85% RH (no condensation)
	Storage temperature	−20 ... +80°C
	Vibration resistance	10 ... 55 Hz Double amplitude 1.5 mm 2 hours in each of the X,Y and Z directions
	Shock resistance	500 m/s² (Approx. 50 G) 3 times in each of the X,Y and Z directions
Applicable regulations	EMC	EMC Directive (2014/30/EU) UK EMC (The Electromagnetic Compatibility Regulations 2016) FCC Part 15 subpart B
	Environment	RoHS Directive (2011/65/EU), China RoHS (MIIT Order No. 32) UK RoHS (The Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment Regulations 2012)
	Safety	FDA Regulation (21 CFR 1040.10 and 1040.11*5)
Applicable standards		EN/IEC 61326-1
Material		Case: Aluminum, Front plate: Stainless steel
Weight		Approx. 180 g (including connector cable)

*1: If the measured temperature is below −50°C (lower limit display temperature), the displayed temperature is −50°C.
If the measured temperature is above 510°C (upper limit display temperature), the displayed temperature is 510°C.
*2: The response time is the time it takes for the output change to reach 90%.
*3: Measurement conditions: Emissivity; 1.000, Ambient temperature; 23 ±5°C, Size of the measurement target; sufficiently larger than the field of view.
*4: In accordance with the FDA provisions of Laser Notice No. 56, the laser is classified per the IEC 60825-1:2014 standard.
*5: Excluding differences per Laser Notice No. 56.
* To convert temperature values such as measurement temperature range and accuracy to Fahrenheit temperature, use (Fahrenheit temperature = Celsius temperature x 1.8 + 32).
* To convert relative values such as repeatability and temperature drift to Fahrenheit temperatures, use 1°C = 1.8°F.

● Specifications are subject to change without prior notice.

[Controller]

Model			TI-SC (E)
Rating	Supply voltage		24 VDC ±10% (when using a general-purpose I/O cable) 18 ... 30 VDC (when using an IO-Link cable)
	Current consumption		180 mA (when using a general-purpose I/O cable)*1 50 mA (when using an IO-Link cable)
Display resolution			0.1°C/°F
Temperature unit			Celsius "°C"/Fahrenheit "°F"
Measurement mode			Normal/Sample hold/Peak hold/Valley hold/Edge detection
Response time (operating mode)			High speed, 50 ms, 100 ms, 200 ms, 500 ms, 1 s, 2 s, 5 s, 10 s, 20 s Output response 90%*2
Analog output/ IO-Link update time			High speed: 2.5 ms 50 ms ... 2 s: 5.0 ms 5 s ... 20 s: 100 ms
Analog output	Resolution		10,801 steps
	Accuracy	Voltage	±0.2% of F.S. (at ambient temperature of 25°C) Temperature coefficient (typical): ±22 ppm/°C (±0.0022%/°C)
		Current	±0.2% of F.S. (at ambient temperature of 25°C) Temperature coefficient (typical): ±4 ppm/°C (±0.0004%/°C)
Indicator	Display		1.8-inch TFT LCD Display language: English, Simplified Chinese, Japanese
	Power indicator		When power is ON: lights in green, IO-Link communication: blinks in green
	Output indicator		Normal measurement alarm output is OFF: lights green Normal measurement alarm output is ON: lights red When minor warning occurs: blinks green When major warning occurs: blinks orange When error occurs: blinks red
Interface	Alarm output		NPN/PNP open collector (selectable by setting) 1 output: Max. 100 mA, 2 outputs: Max. 100 mA Residual voltage NPN: 1.6 V or less, PNP: 3.4 V or less
	Output mode		N.O./N.C.
	External input		Laser off, Hold, Trigger
	Analog output	Current	4 ... 20 mA load impedance: 150 ... 500 ohm
		Voltage	0 ... 10 V output impedance: 200 ohm or less
Timer mode			One shot/delay (ON delay, OFF delay) One shot: 0.01 ... 10.00 sec, Delay: 0.00 ... 10.00 sec
IO-Link	Revision		1.1.3
	Baud rate		COM 3 (230.4 kbps)
	Number of process input data bytes		4 bytes
	Number of process output data bytes		1 byte
	Minimum cycle time		0.5 ms
	Data storage class		Data Storage Class 1: automatic DS

Model			TI-SC (E)
Connection type	General-purpose I/O cable		3 m cable 9 wires, Minimum bending radius: R 42 mm
	IO-Link cable	Open-end	3 m cable 3 wires, Minimum bending radius: R 42 mm
		M12 4-pin connector	0.3 m cable, Minimum bending radius: R 42 mm
Environmental resistance	Degree of protection		IP40 (IEC 60529)
	Ambient temperature		0 ... +50°C
	Ambient humidity		35 ... 85% RH (no condensation)
	Storage temperature		−20 ... +70°C
	Vibration resistance		10 ... 55 Hz Double amplitude 1.5 mm 2 hours in each of the X,Y and Z directions
	Shock resistance		500 m/s² (Approx. 50 G) 3 times in each of the X,Y and Z directions
Applicable regulations	EMC		EMC Directive (2014/30/EU) UK EMC (The Electromagnetic Compatibility Regulations 2016) FCC Part 15 subpart B
	Environment		RoHS Directive (2011/65/EU) UK RoHS (The Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment Regulations 2012) China RoHS (MIIT Order No. 32)
Applicable standards			EN/IEC 61326-1
Material			Case: ABS
Weight			Approx. 80 g

*1: Includes alarm output load current and analog output current.
*2: The response time is the time it takes for the output change to reach 90%.
* To convert temperature values such as measurement temperature range and accuracy to Fahrenheit temperature, use (Fahrenheit temperature = Celsius temperature x 1.8 + 32).
* To convert relative values such as repeatability and temperature drift to Fahrenheit temperatures, use 1°C = 1.8°F.

VI NA PHAM.,JSC

Hotline: 0915 333 085 – 0989 302 853 – 0915 333 087

HỒ CHÍ MINH OFFICE:
1107/87F, Đường ĐT 743A, Khu Phố Chiêu Liêu A, Phường Dĩ An, TP. Hồ Chí Minh.
Tel/Fax: (84-274) 3775819 /(84-274) 2461300
Email: sales68@vinapham.com.vn
Email 2: vinaphamcompany@gmail.com
Website: www.vinapham.com

HÀ NỘI OFFICE:
HA02-83, Đường Hải Âu 02, Vinhomes Ocean Park, Xã Gia Lâm, Thành phố Hà Nội, Việt Nam.
Tel/Fax: (84-274) 3775819 /(84-274) 2461300
Email: info@vinapham.com.vn
Email 2: sales10@vinapham.com.vn
Website: www.vinapham.com