

คุณสมบัติ



- **IO-Link Compatible Non-Contact Thermometer : TI-S Series** เป็นอุปกรณ์วัดอุณหภูมิแบบไม่สัมผัส โดยอาศัยหลักการตรวจจับรังสีอินฟราเรด (รังสีความร้อน) ที่ปล่อยออกมาจากวัตถุ
- **TI-S Series** จะประกอบด้วย **Controller (TI-SC)** และ **Sensor Head (TI-S30)** พร้อม **Laser**
- **Field of view : $\varnothing 30/500$ mm.**
- **สามารถวัดอุณหภูมิวัตถุได้ $-40 - 500^{\circ}\text{C}$**
- **Emissivity adjustment : 0.100 to 1.200**
- **Response time** เลือกได้ 50ms, 100ms, 200ms, 500ms, 1s, 2s, 5s, 10s, 20s
- **Output : NPN หรือ PNP/4-20mA หรือ 0-10V (General-purpose I/O cable : TI-SCA09-G3K)**
- **Output IO-Link (IO-Link cable : TI-SCA03-G3K)**

ข้อมูลทางเทคนิค

[Controller]

Model		TI-SC (E)
Rating	Supply voltage	24 VDC $\pm 10\%$ (when using a general-purpose I/O cable) 18 to 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 to 2 s: 5.0 ms 5 s to 20 s: 100 ms
Analog output	Resolution	10,801 steps
	Accuracy	
	Voltage	$\pm 0.2\%$ of F.S. (at ambient temperature of 25°C) Temperature coefficient (typical): ± 22 ppm/°C ($\pm 0.0022\%$ /°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 Current output Voltage	4 to 20 mA load impedance: 150 to 500 ohm 0 to 10 V output impedance: 200 ohm or less
Timer mode		One shot/delay (ON delay, OFF delay) One shot: 0.01 to 10.00 sec, Delay: 0.00 to 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
Connection type	General-purpose I/O cable	3 m cable 9 wires, Minimum bending radius: R 42 mm
	IO-Link Open-end cable	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 to +50°C
	Ambient humidity	35 to 85% RH (no condensation)
	Storage temperature	-20 to +70°C
	Vibration resistance	10 to 55 Hz Double amplitude 1.5 mm 2 hours in each of the X,Y and Z directions
	Shock resistance	500 m/s ² (Approx. 50 G) 3 times in each of the X,Y and Z directions

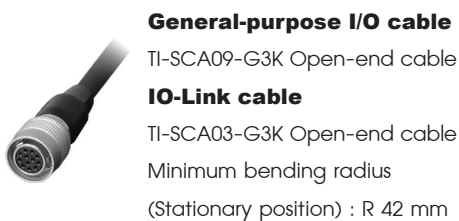
Model		TI-SC (E)
Applicable regulations	EMC	EMC Directive (2014/30/EU) UK EMC (The Electromagnetic Compatibility Regulations 2016) FCC Part 15 subpart B
	Environment	RoHS Directive (2011/65/EU) UK RoHS (The Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment Regulations 2012) China RoHS (MIIT Order No. 32)
Applicable standards		EN/IEC 61326-1
Material		Case: ABS
Weight		Approx. 80 g

[Sensor Head]

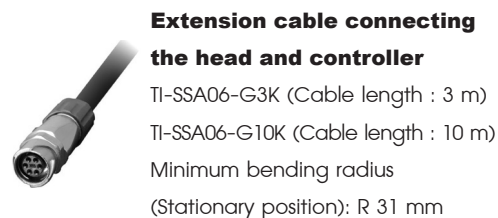
Model		TI-S30
Measurement range		-40 to +500°C
Field of view		$\varnothing 30$ mm at 500 mm
Optics		Silicon lens
Sensing element/spectral response		Thermopile 8 to 14 μm
Response time (operating mode)		High speed response, 50 ms, 100 ms, 200 ms, 500 ms, 1 s, 2 s, 5 s, 10 s, 20 s * Output response 90% ¹
Accuracy ²		-40 to 0°C: $\pm 1.5^{\circ}\text{C}$ +1 to +200°C: $\pm 1^{\circ}\text{C}$ +201 to +500°C: $\pm 0.5\%$ of reading value
Repeatability		$\pm 0.5^{\circ}\text{C}$ (when operating mode is 100 ms)
Temperature drift		Within $\pm 0.25^{\circ}\text{C}/^{\circ}\text{C}$
Emissivity adjustment		0.100 to 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		Maximum 13 m (pigtail cable 3 m + extension cable 10 m)
Laser marker	Medium	Red semiconductor laser
	Wavelength	663 nm
	Maximum output	1 mW
Laser class (JIS/IEC/FDA) ³		CLASS 2
Environmental resistance	Degree of protection	IP67 (IEC 60529)
	Ambient temperature	0 to +80°C (up to +70°C during laser emission)
	Ambient humidity	35 to 85% RH (no condensation)
	Storage temperature	-20 to +80°C
	Vibration resistance	10 to 55 Hz Double amplitude 1.5 mm 2 hours in each of the X,Y and Z directions
	Shock resistance	500 m/s ² (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 ⁴)
Applicable standards		EN/IEC 61326-1
Material		Case: Aluminum, Front plate: Stainless steel
Weight		Approx. 180 g (including connector cable)

Options

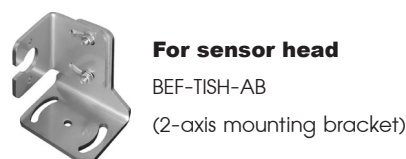
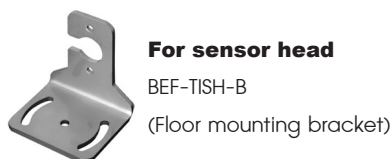
• Connection cables



• Extension cables



• Mounting brackets



• Air purge kit for TI-S30



Air purge kit installation image



• Mounting bracket

BEF-TISC-BKT

For controller



Mounting image



Application



Detecting presence of hot-melt adhesive



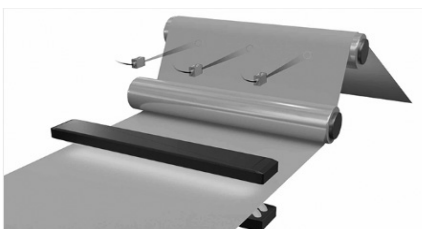
Evaluating solar panel lamination



Controlling heating time in tire vulcanization processes



Measuring temperature of chamber top plate

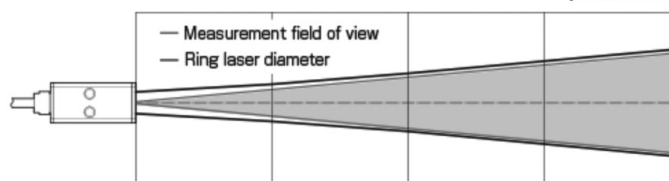


Measuring temperature of plastic



Measuring temperature in rubber extrusion processes

• Field of view

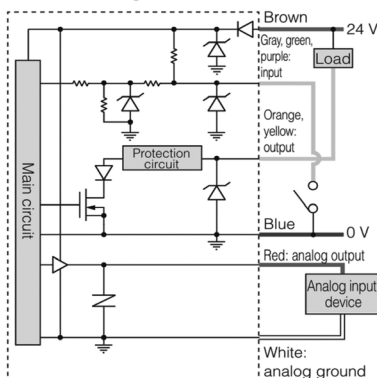


Distance	0	250	500	750	1000
Field of view	φ 12	φ 21	φ 30	φ 45	φ 60
Ring laser diameter	φ 1	φ 15	φ 30	φ 45	φ 60

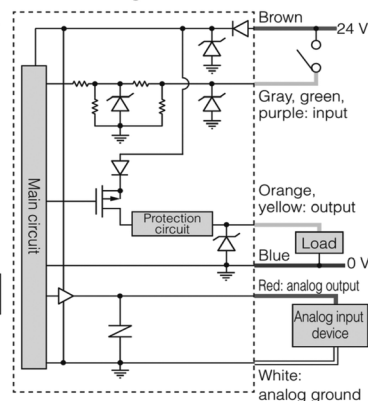
การต่อใช้งาน

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

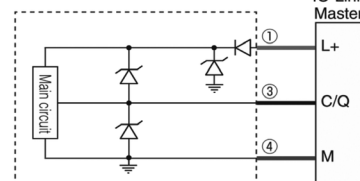
* Operates as bank select input when Measurement mode is set to Normal.

Lead wire functions during bank select

Bank number	Lead wire color	Bank select
1	OFF	OFF
2	OFF	ON
3	ON	OFF
4	ON	ON

IO-Link cable

IO-Link connection

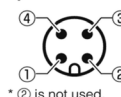


IO-Link cable lead wire/connector pin functions

No.	Wire color	M12 connector pin No.	Description
①	Brown	①	L+
②	-	-	*1
③	Black	④	C/Q
④	Blue	③	M

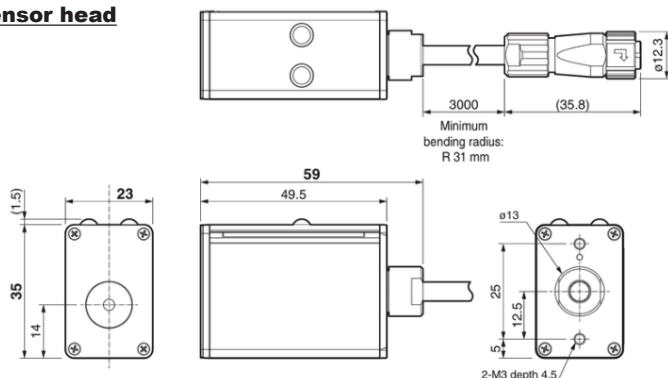
*1 The input line is replaced with process output data.

M12 connector pin No.

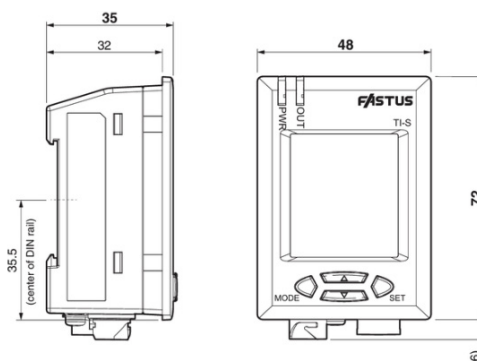


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• Sensor head

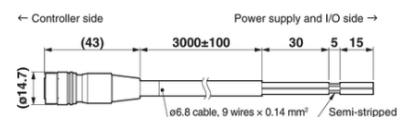


• Controller

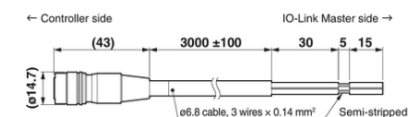


• Connection cable (Option)

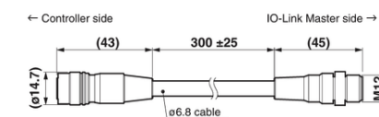
General-purpose I/O cable: TI-SCA09-G3K
Minimum bending radius (Stationary position): R 42 mm



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

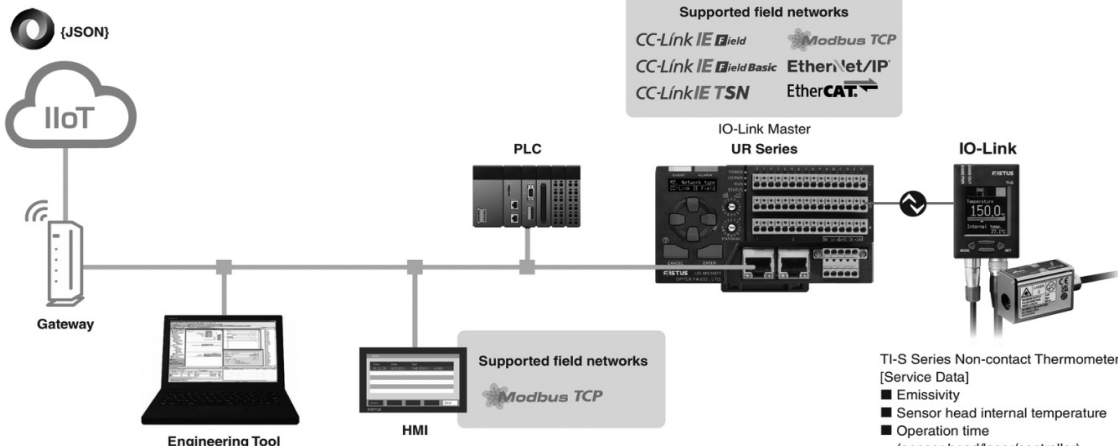


IO-Link cable: TI-SM1203-G03K
Minimum bending radius (Stationary position): R 42 mm

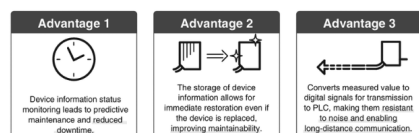


IO-Link communication supported IO-Link

System overview



Three advantages of introducing IO-Link



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.

TI-S Series Non-contact Thermometer [Service Data]
■ Emissivity
■ Sensor head internal temperature
■ Operation time (sensor head/laser/controller)
■ Maintenance prediction, etc.