Modular design with a wide range of customer choices

Fiber-less infrared thermometers

FLHX *Series*

$C\epsilon$

Better control of temperature, better productivity.
This series is a built-to-order type product line to meet your various applications.

Infrared thermometers the FLHX *Series*

This FLHX series is a fiberless type infrared thermometer that can meet customer applications such as temperature ranges, measurement distances or spot sizes.
Because it is fiberless, this series is very cost-effective and represents the ideal choice for installing in assembly lines and first-time customer of our infrared thermometers.

You can customize and select from more than 110 patterns.

Temperature range

90 ～ 2000℃ (9 types) ※
※Max：3200℃ (special order)

Measuring range

25 ～ 1000mm

Spot size

Minimum φ0.15mm

Response speed

1ms (0.001s)

Sensor head

◎ Usable with small targets

Spot size ; Minimum φ0.15mm

## 🖊 The world's fastest response time

The world's fastest response time of 1ms (0.001s) allows detection of rapid temperature changes. The sensor head never misses sudden temperature changes.
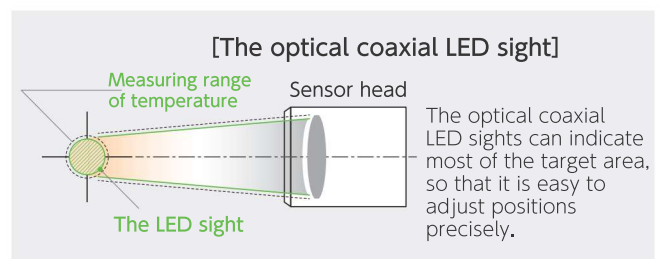
Response time

X axis: time (ms) — 0, 1, 2, 3, 4, 5
Y axis: temperature (℃) — 1000 to 2000
—1ms—

CE CE Mark Compliant
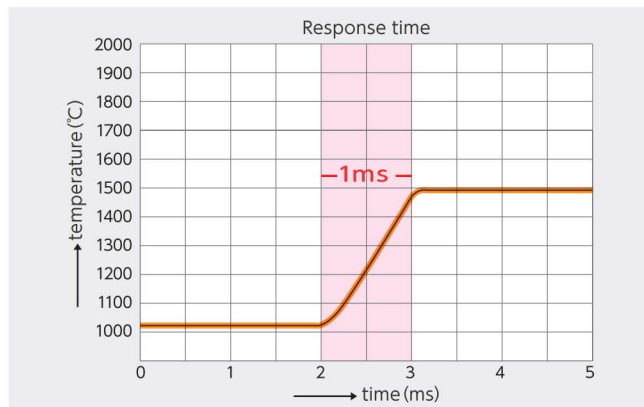
🪟 Measurable through glass

Using the quartz permeable wavelength, it allows measurement through glass.
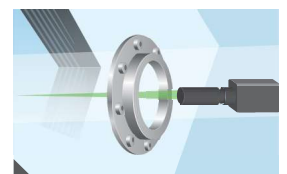
💡 Easy adjustment

The FLHX series is easy to position. This series of products uses the optical coaxial LED sights. It can measure the target precisely.

[The optical coaxial LED sight]

Measuring range of temperature
Sensor head
The LED sight

The optical coaxial LED sights can indicate most of the target area, so that it is easy to adjust positions precisely.

Ruggedized to work in an adverse environment with strong body

By using an aluminium body, enclosure strength, heat resistance and chemical resistance are improved. The enclosure is rated IP67.

Analog output and RS232 output

Analog output; 4 ～ 20mA, 0 ～ 20mA, 0 ～ 1V, mV/℃switchable

Usable in small gaps

Measurements can be taken even in small gaps. This series has a different type of lens for various optical paths.

Cost-effective

These products do not contain a fiber cable, which makes them cost-effective. Therefore, they are appropriate for installing in assembly lines as the entry-level infrared thermometers by entry-level customers.

Easy adjustment and accurate measurement

This series uses a green LED for the sight. Green LEDs are brighter than red LEDs, so they are much more visible.

CE

The laser sight is recommended when the target is at a distance from the thermometer.

It is possible to upgrade to the laser sight (option) from the LED sight (standard).
The laser sight is recommended when the target is at a distance of more than 500mm from the thermometer.

more distance than 500mm
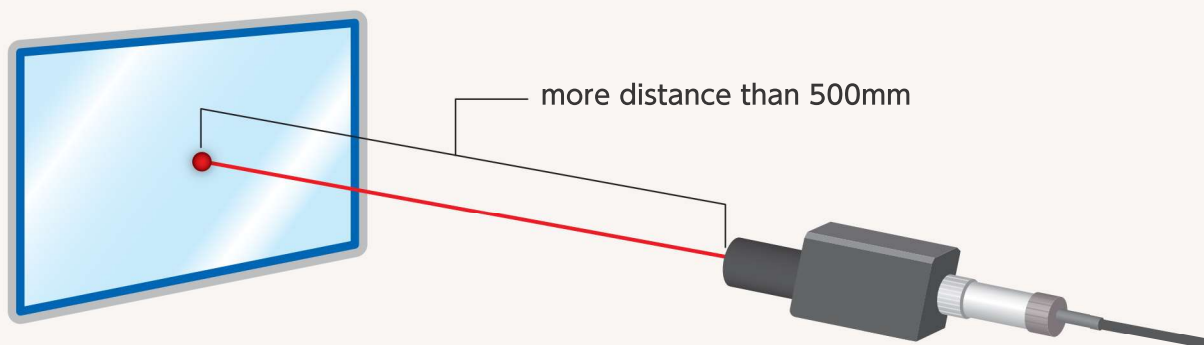
The laser sight shows the center of the detection area.
For your safety, we ship the thermometer with a switch to activate laser only when it is in operation.
  (this setting can be changed by the user. Optional tools are required.)
Class 1 (JIS C 6802) laser is used for eye safety.

Selection guide for infrared thermometers

The following four factors should be considered before making your selection.

1 Temperature range

What is the desired temperature range of operation?

2 Material of targets

You need to identify the wavelength of measurement according to the material of the target (film, glass or semiconductor).

3 Size of the spot

What is the target size? The spot size must be less than 80% of the diameter of the target.

4 Measurement of distance

Distance between the thermometer and the target. Generally, the longer the distance of measurement, the larger the spot size.

⠆ Recommended cases

We have to measure the target in a vacuum tank through the viewport.

Temperature range : 200 ～ 1200℃
Measurement distance : 500mm
Spot size : ϕ5mm

JS Temperature range : 160 ～ 2000℃
Measurement distance : 50mm
Spot size : ϕ3mm

Through glass

We recommend the FLHX-TNE0160-0500B003-000. This thermometer is able to measure the target through the viewport. Because a long distance and minute points can be measured by the FLHX series model, a small target can be measured accurately.

We have to measure the temperature regardless of the wavelength of the laser while using the laser.

Temperature range : 220 ～ 1600℃
Measurement distance : 200mm
Spot size : ϕ1mm

JS Temperature range : 220 ～ 2000℃
Measurement distance : 200mm
Spot size : ϕ0.7mm

Tiny spot

We recommend the FLHX-TNE0220-0200B0.7-000. This thermometer is able to measure the target regardless of the wavelength of the laser and it is able to measure minute points.

We have to measure the side of a heating crucible through a small hole in an insulating material placed in a vacuum tank. We use a two-color (dual-wavelength) thermometer. But if there is no problem of optical vignetting, costs can be reduced.

Temperature range : 700 ～ 2000℃
Measurement distance : 1000mm
Spot size : 8mm
The required optical path diameter from the lens to the target is smaller than Φ 8mm.

JS Temperature range : 700 ～ 2000℃
Measurement distance : 1000mm
Spot size : ϕ6.5mm

Thin optical path

We recommend the FLHX-ANE0700-1000S6.5-000. This thermometer is able to measure the target regardless of optical vignetting because the optical path has a diameter of 6.5mm over a distance of 1000mm.

Several heating checkpoints have to be measured and the thermometers have to be displacement. Fiber cable type thermometers are not used due to displacement.

Temperature range : 300 ～ 1200℃
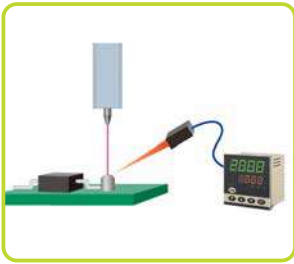Measurement distance : 500mm
Spot size : ϕ2mm

JS Temperature range : 300 ～ 2000℃
Measurement distance : 500mm
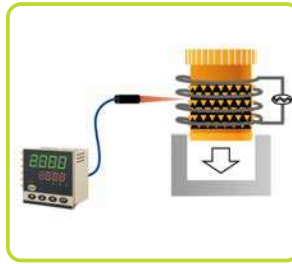Spot size : ϕ1.8mm

Use at movable areas

We recommend the FLHX-PNE0300-0300B1.8-000. Because this thermometer is a fiber-less and robot cable, it can be used at movable areas.
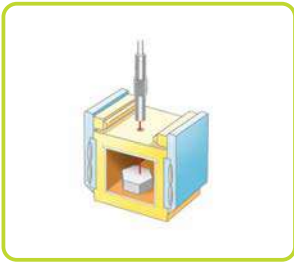
Application examples

Laser soldering equipment
· You need to monitor the temperature of soldering
· You need to check the point of laser welding.

Measuring the temperature before press-fitting of insert nut
· You need to make sure that the insert nut has been precisely heated at the right temperature.

Microwave burning furnace
· You need to monitor the temperature during (a) food processing, (b) tires and rubber processing, (c) powder of phosphor, plastic or chemical material, (d) heating and drying-out (e) heating, welding or drying-out of ceramic, (f) glass or hollow fiber membrane.
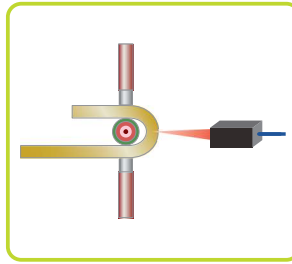
Measurement of fusing
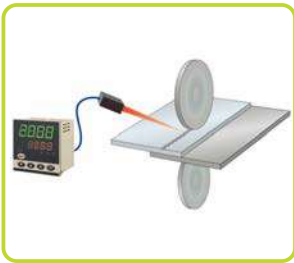· You need to measure the temperature during coils or inductors fusing.
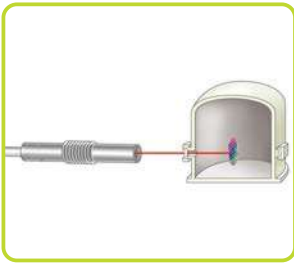
Inside of vacuum tank
· You need to measure the target's temperature inside of vacuum tank through glass window.

Metal forging
· You need to measure and monitor the temperature during metal forging.

Temperature control immediately after seam welding
· You need to monitor the temperature at seam welding used for products such as Steel cans.
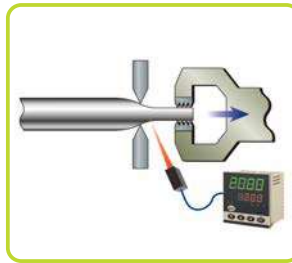
Metal drawing
· You need to monitor the temperature during metal drawing.
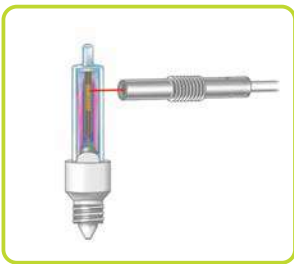
Temperature of filament or electrode in electric bulb.
· Measuring the temperature of filament in order to prolong electric bulb.
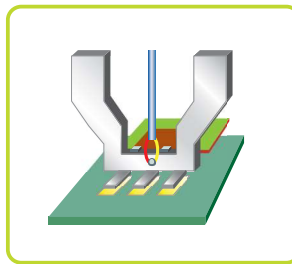
Thermode tip
· You need to monitor the temperature during thermode tip implanting.
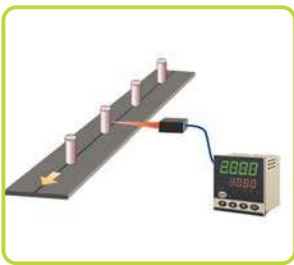
Product on conveyor
· You need to measure the temperature of products on conveyor belt.

Temperature control of Si/SiC/GaN single crystal production equipment
· You need to monitor the temperature of growing a silicon ingot.

Please contact us if you do not find your applications in the examples here.

Selections of Displays and Setting Units for your applications

Unit to be built into customer control panel

| Small type | → | **TMCX-N** | → | Analog output
Alarm output
Emissivity input |

| Large type | → | **TMCX-H** | → | Analog output
Alarm output
Emissivity input
RS485 |

Touch screen type to check on site

| Color LCD, The graph view shows the history of the measured temperature. | → | Touch screen tyape
TMCX-TDE-110 | → | Analog output
Alarm output
microSD card |

Portable type

| Configurable parameters for different types of thermometers | → | Parameter setting unit
PWCX
※Analog outputs via optional
branch cable
(Model : TMBX-B01) | Batteries type |

Monitoring on PC

| Parameters and the graph view of the measured temperature can be checked on your PC | → | Parameter setting kit
PC Software
  Licensed : **PWSX**
USB-RS232C Converter : **PWUX**
※Analog outputs via optional
branch cable
(Model : TMBX-B01) |

⫶ Accessories

Mounting bracket of sensor head	Protective window	Air purge hood to protect lens	Airless dust hood	Water cooling jacket for Sensor Head
TMAX-A	TMDX-06S、TMDX-15S	TMPX-06、TMPX-15	TMNX-06、TMNX-15	TMWX-A3、TMWX-A4

Right-angled mirror (90degrees)	Adjustment X-Y stage	Fine adjustment stage	Extension cable	Branch cable
TMLX-06S、TMLX-15S	TMMX-Y	FTT9-3	TMBX-E05	TMBX-B01

JS **JAPAN SENSOR CORPORATION**

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info@japansensor.co.jp

■If you have any questions, contact us at the address or links shown below.

JS
JAPAN SENSOR

Fiberless type Infrared thermometer

FLHX *Series*

Specifications Sheet
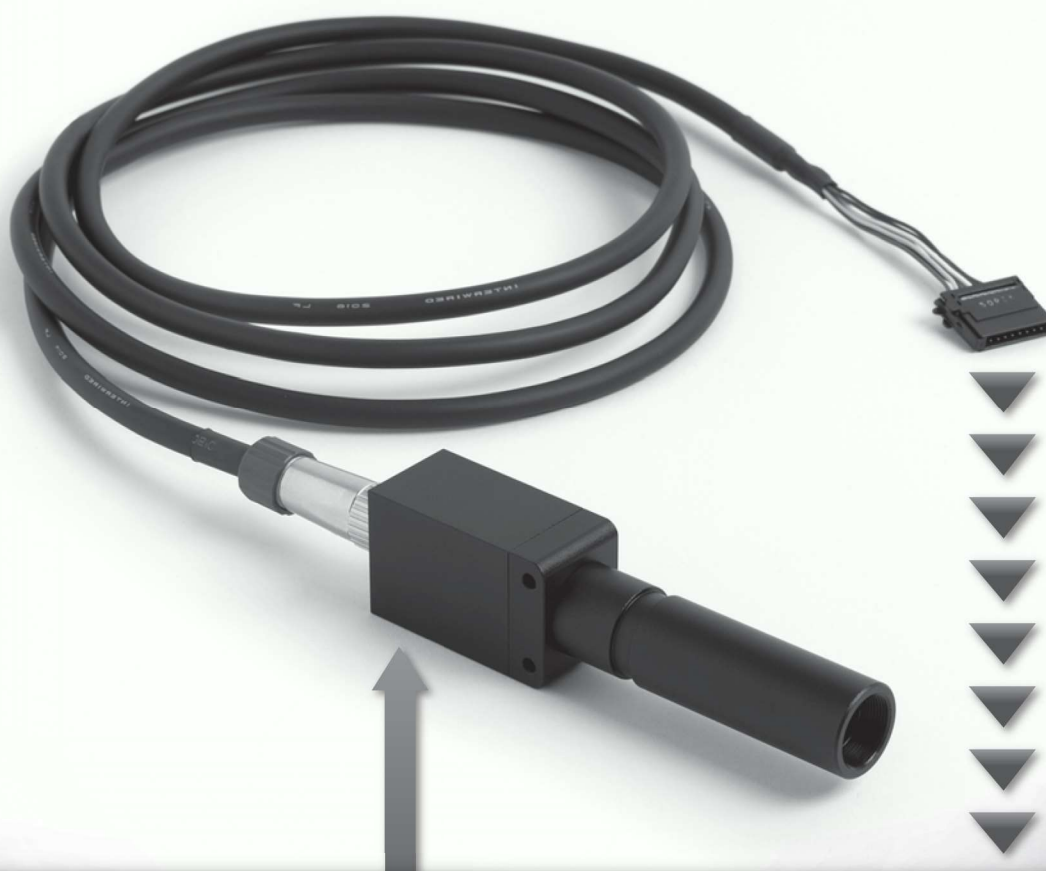
Sensor head

▶ Specifications: p2-5   ▶ Optics diagram: p4
▶ Selection chart: p3   ▶ Drawing and cable connections: p7

The sensor head has a built-in lens, which gathers infrared rays emitted from the target.
Amount of gathered infrared rays are converted into temperature and the sensor head outputs data as an analog output, RS232C, and an alarm output.

Displays, Setting Units and Accessories

▶ Display, Setting unit: p6
▶ Accessories: p8~10

We have various displays and parameter setting units for setting the temperature indications of the infrared thermometers.
We have a variety of options for different types of work sites and use, such as some type of air purge hoods or a protective window for lens for stain prevention.

Sensor Head Specifications

Series	Type T			Type P			Type A		
Model	FLHX-TNE0090	FLHX-TNE0160	FLHX-TNE0220	FLHX-PNE0220	FLHX-PNE0300	FLHX-PNE0400	FLHX-ANE0500	FLHX-ANE0600	FLHX-ANE0700
Temperature range	90~1500℃	160~2000℃	220~2000℃	220~1650℃	300~2000℃	400~2000℃	500~2000℃	600~2000℃	700~2000℃
Spectral range	1.95~2.6μm			0.8~1.6μm			0.8~1.0μm		
Detecting elements	InGaAs						Si		
Sight*3	green LED sight								
Accuracy*1	<800℃;±4℃, 800 ~ 1200℃; ±0.5% of measured value, 1200 ~ 2000℃; ±1.0% of measured value								
Repeatability*1	±0.2% of measured value ±2℃								
Resolution*1	lowest temperature+< 50℃ : ≦ 3℃, lowest temperature+<100℃: ≦ 1℃, lowest temperature+≧ 100℃: ≦ 0.5℃								
Response time*2	analog: 0.001 ~ 5sec (0 ~ 95%) configurable by smoothing function								

Output	Analogue output (non-isolated)		
	Output (switchable)	Output range	Output accuracy*1
	0 ~ 1V	≧30mV	±1.5mV
	mV / ℃	≧30mV(30℃)	±1.5mV
	0 ~ 20mA	≧0.2mA	±0.02mA
	4 ~ 20mA	≧4mA	±0.02mA
	RS232C output (non-isolated)		
	output swing range : approx.±4V baud rate: 4800, 9600, 19200, 38400, 57600, 115200bps		
	alarm output (non-isolated)		
	one open-drain: 27VDC, 0.2A hysteresis: 0 ~ 99.9℃		

Peak hold	reset (switchable)	time: 0.01 ~ 10s(configurable) , discharge: time 0.01 ~ 10s, level 0.2 ~ 1.0
Emissivity correction	guaranteed range: 0.3 ~ 1.0 , setting range: 0.050 ~ 1.000 (setting resolution: 0.001)	
Sensor correction function	span: 0.500 ~ 2.000, Zero: -50 ~ +50(℃ or ℉ selectable)	
Temperature indication	none	
Warm-up time	1min	
Protection class	equivalent to IP67, not included:e-con connector area	
Ambient temperature	0 ~ 50℃ 0 ~ 70℃ 0 ~ 70℃	
Ambient humidity	30 ~ 85%RH (non-condensing)	
Storage temperature	-15 ~ 70℃	
Supply voltage	DC4.7 ~ 27V, 0.1A max	
Material	aluminium (black alumite)	

CE CE mark certified (EMC EN61326-1: 2013, RoHS EN50581: 2012)
*1: Ambient temperature 23±5℃, Emissivity 1.0, Averaging time 0.05s.
*2: The response time may be longer by 0.002s when switching the internal range.
*3: Ambient temperature when the laser sight (option) is selected: Operational temperature is 0 to 50℃. CE marking certified only for the LED sight.

Selection list of sensor heads

Measurement distance (mm)	Spot size (mm)	Lens dia. (mm)	Model			Sensor head
			ANE0500 PNE0220 TNE0090	ANE0600 PNE0300 TNE0160	ANE0700 PNE0400 TNE0220 (Best seller)	
25	φ0.15	φ15			○	0025BZ15
	φ0.25			○		0025BZ25
	φ0.6		○			0025B0.6
50	φ0.3	φ15			○	0050B0.3
	φ0.4			○		0050B0.4
	φ1		○			0050B001
	φ0.5	φ6			○	0050S0.5
	φ0.8			○		0050S0.8
	φ2		○			0050S002
100	φ0.4	φ15			○	0100B0.4 (Best seller)
	φ0.6			○		0100B0.6 (Best seller)
	φ1.8		○			0100B1.8
	φ0.9	φ6			○	0100S0.9
	φ1.5			○		0100S1.5
	φ4.2		○			0100S4.2
200	φ0.7	φ15			○	0200B0.7
	φ1.1			○		0200B1.1
	φ3		○			0200B003
	φ1.4	φ6			○	0200S1.4 (Best seller)
	φ2.5			○		0200S2.5
	φ7		○			0200S007
300	φ1.1	φ15			○	0300B1.1
	φ1.8			○		0300B1.8
	φ5		○			0300B005
	φ2.2	φ6			○	0300S2.2
	φ3.5			○		0300S3.5
	φ11		○			0300S011
500	φ1.6	φ15			○	0500B1.6
	φ3			○		0500B003
	φ9		○			0500B009
	φ3.2	φ6			○	0500S3.2
	φ6			○		0500S006
	φ18		○			0500S018
1000	φ3.5	φ15			○	1000B3.5
	φ6			○		1000B006
	φ18		○			1000B018
	φ6.5	φ6			○	1000S6.5
	φ12			○		1000S012

The laser sight is recommended when the target is at a distance of more than 500mm from the thermometer. Check P.5 Ordering information about the selection.

Optics diagram

Lens dia. φ6mm

Lens dia. φ15mm
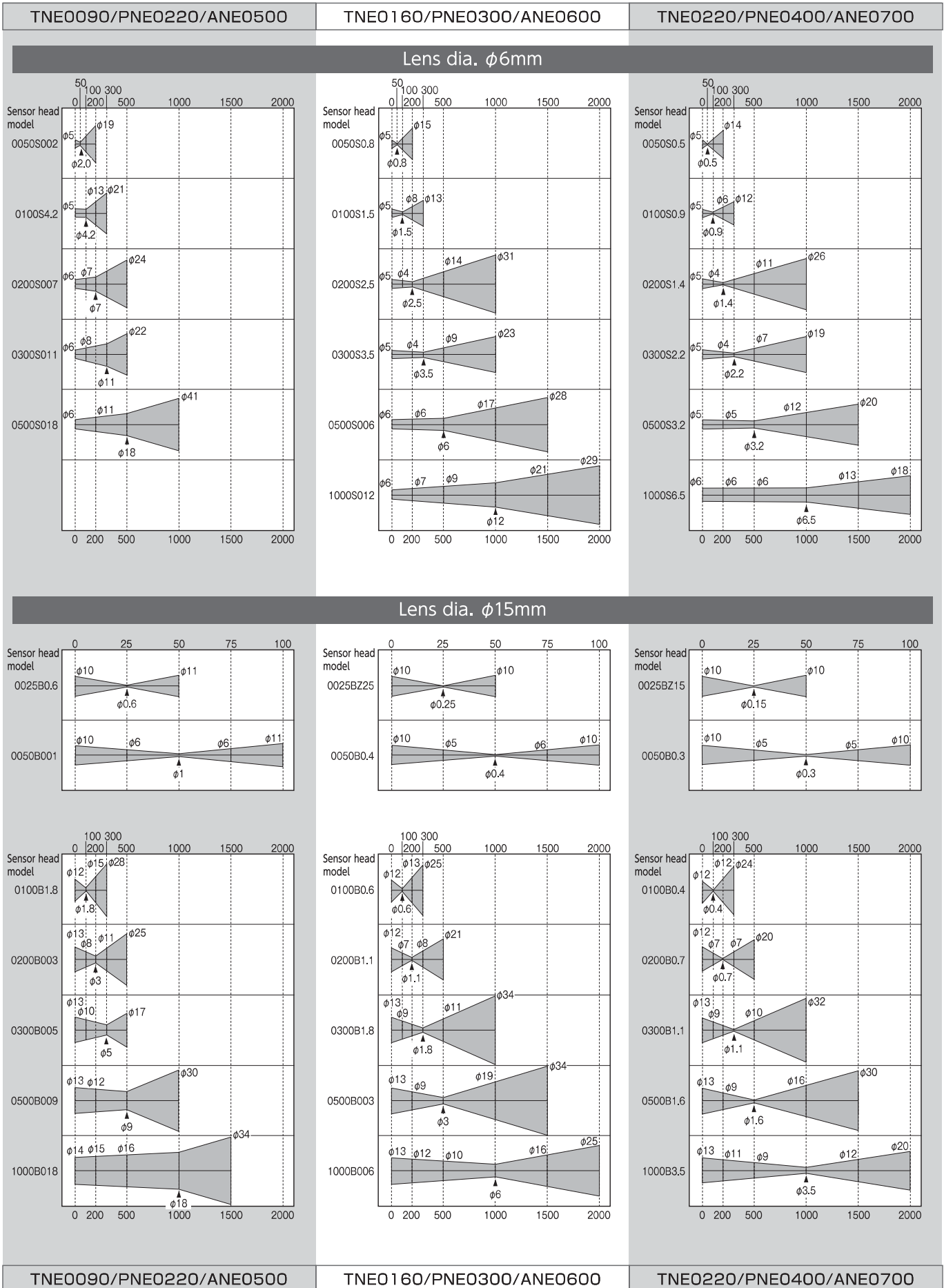
※: ▲= The standard spot size for measuring distance.

Ordering information

(example)

FLHX - A N E 0500 - 0300 B 0.9 - 00 0
    ①   ②③④⑤   ⑥   ⑦   ⑧   ⑨ ⑩   ⑪ ⑫

①	Fiberless type thermometer	Shows choice of sensor head
②	Special specification	"-" will be "S" when ordering special specification
③	Detecting elements	A = Si (silicon) P = InGaAs (Indium Gallium Arsenide : Wavelength 0.8 ~ 1.6µm) T = InGaAs (Indium Gallium Arsenide : Wavelength 1.95 ~ 2.6µm)
④	Response time	N = Normal, U = Ultra quick response time 0.0001s (option)
⑤	Applicable standard	E = CE Mark certified, N = None. * CE Mark is only for LED sight.
⑥	Temperature	Minimum measurable temperature. 0500 = 500℃
⑦	Sight	"_"= LED sight (standard), "L"= laser sight (option)
⑧	Measurement distance	This shows distance where the temperature is calibrated. This distance is shown on selection list of sensor head(P3). 0300 = 300mm.
⑨	Lens diameter, Head shape	B= φ15mm lens/square head, S= φ6mm lens, Please see P.7 for dimensions.
⑩	Target size	No decimal place : φ12mm = 012 One decimal place : φ1.5mm = 1.5 Two decimal places : φ0.25mm = Z25
⑪	Cable length	00=2m (standard), 05=5m, 10=10m. Please see below for length with decimal places. Ex. Z5=0.5m.
⑫	Analog voltage output	0 = 0 ~ 1V, 5 = 0 ~ 5V, 1 = 0 ~ 10V

Cable length decimal place table:

Z : 0	A : 1	B : 2	C : 3	D : 4
E : 5	F : 6	G : 7	H : 8	N : 9

※P/N of Cable alone is "FTBX-S□" □means cable length. Ex.: 02=2m, 10=10m.

Alarm outputs operation

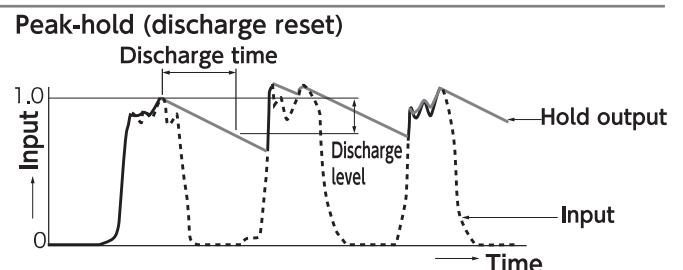| Mode No.	Alarm mode	Measurement temperature ⇐ Low Low set point High set point High ⇒
1	High ON	
2	High OFF	
3	Low ON	
4	Low OFF	
5	Band ON	
6	Band OFF	
7	Error ON	
8	Error OFF	

Error: an inner voltage malfunction   ON ▬

Averaging time

Peak-hold operation

Peak-hold (reset time)

Peak-hold (discharge reset)
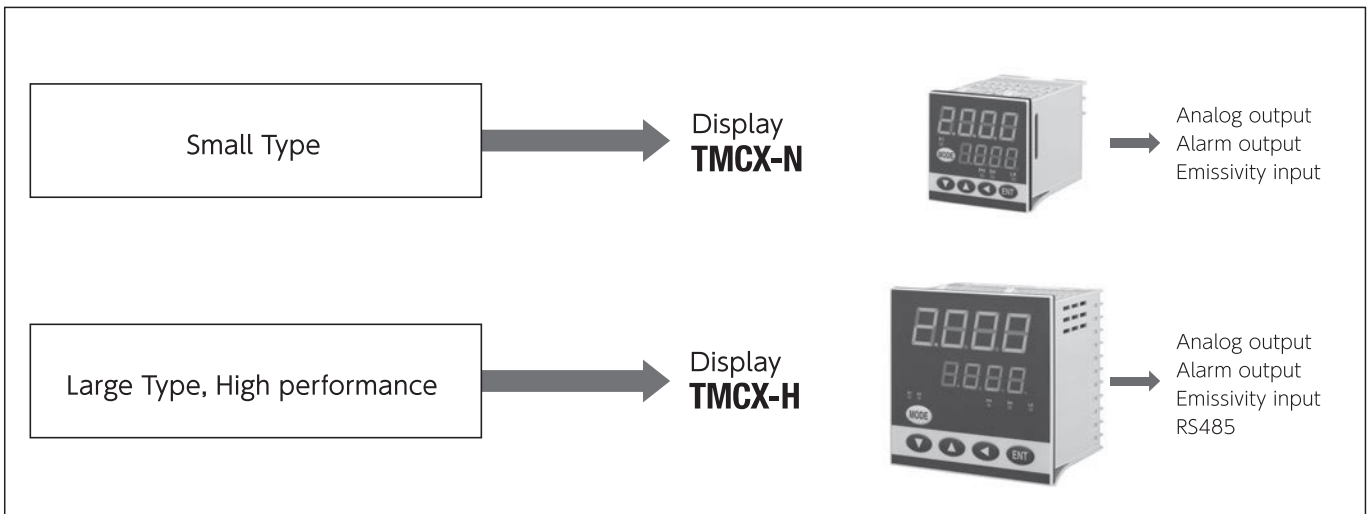
Displays and Setting units

Unit to be built into customer control panel

| Small Type | → | Display **TMCX-N** | | → | Analog output
Alarm output
Emissivity input |

| Large Type, High performance | → | Display **TMCX-H** | | → | Analog output
Alarm output
Emissivity input
RS485 |

Touch screen type to check on site

| The graph view shows the history of the measured temperature. | → | Touch screen type **TMCX-TDE-110** | | → | Analog output
Alarm output
microSD card |

Portable type

| Configurable parameters for different types of thermometers | → | Parameter setting unit **PWCX**

※Analog outputs available with an optional branch cable.
(Model : TMBX - B01) | | Batteries type |

Monitoring on PC

Parameter setting kit

| Configurable parameters and the graph view of the measured temperature | → | PC Software
Licensed ; **PWSX**
USB-RS232C Converter ; **PWUX**

※Analog outputs available with an optional branch cable.
(Model : TMBX - B01) | |

Sensor head dimensions

Type R: φ6 Lens dimensions

Lens (φ6)
37.5 48.5 44
4
φ20 φ15 20 φ15
Measurement distance
Mounting hole
2-φ3.5 counterbore φ6 depth3
Cable connector

24
12 12
30

Weight: 80g
(cable not included)

Type B: φ15 Lens Dimensions

Lens (φ15)
72.5 48.5 44
4
φ20 20 φ15
Measurement distance
Mounting hole
2-φ3.5 counterbore φ6
Cable connector

24
12 12
30

Weight: 105g
(cable not included)

Wiring

FLHX sensor head

Connection cable
Output connector
e-CON 8P

Analog output	Minimum power supply voltage
0～1V	more than 4.7V
0～5V	more than 8V
0～10V	more than 13V
mV/℃	more than 4.7V
4～20mA	as per terminator resistance
0～20mA	

DC+IN — Red — 1 + DC+4.7～27V
3.3V
Outside sighting input
Alarm output
TXD — Yellow — 2 → RXD RS232C
GND — Black — 3 — GND SG
RXD — Orange — 4 ← TXD
Analog output
White — 5 In case of outside sighting
Green — 6 + Load DC+2～27V
R
Purple — 7 Analog output
In case of alarm output
A.GND — Blue — 8 Attach in case of 0～5V or 0～10V
Resistor for 0～5V (TR-251N)
Resistor for 0～10V (TR-501N)
Unnecessary in case of built-in resistor

Accessories

Mounting bracket (for both φ6/φ15) — TMAX-A

Bracket for sensor head installation

Thickness: 2.0 mm

50
37
90°

20 6 φ4
32
90°
6
20
4

7
4
4
8
14
4

4-C3
3 8
27
φ4

Weight: 45g

Water cooling jacket — TMWX-A3 / TMWX-A4

Use for installing sensor heads where the ambient temperature is more than 50℃.

example

5 24 20 24
10
32
16.6
21 15

Cooling water inlet
for tube 6 × 4
0.5MPa Max

φ4 Tube fitting
Instrument air inlet
measurement distance
Sensor head
Measurement distance
10
φ22
24
nut
33
48
8.5
42 12

Air controller
for the
container
purge air inlet
Dried air for
4×2.5 tube
(to avoid
condensation)
42

Cooling water outlet
for tube 6 × 4

B A
Water cooling hood   Mounting bracket   Screw
TMPX-10W(option)   TMAX-B (option)   4-M3 depth4

Model	A	B	Hood model	Sensor head
TMWX-A3	98	35	TMPX-10W	Type S
TMWX-A4	133	50	TMPX-15W	Type B

Magnet stand with X-Y stage: for fine adjustment — TMMX-Y

Adjust the position of sensor head precisely. XY2 axis

example
sensor head: FTKX series

φ12
φ8
Weight: 1.8Kg
(part of arm: 280g)
Fiber cable clamp
250
200

30 30 27
Sensor head
4-M2 depth 5
30 30 27
XY stage amount of movement: ±10mm
Magnet holder stand
19
73
Base Plate (Steel) (option:370g)
55
100 200
2.3

Amount of movement:
each ±10mm
Weight: 1800g

Adjustment stage : for fine adjustment of sensor head — FTT9-3

25
10 10
10-M3
Depth5
50
5 10 10 10 5
113
88
12.5
25 32.5
4-φ4.5
Depth6
50 17.5

2-M4
1/4-20UNC depth6
12.5 12.5
40
35
4-φ4.5

Amount of movement: each ±10mm
Weight: 750g

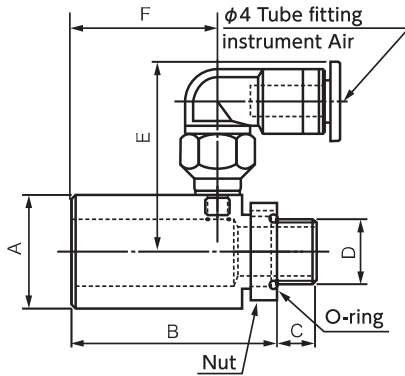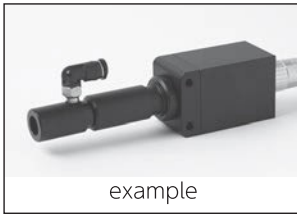# Accessories

Air purge hood   TMPX-06 / TMPX-15

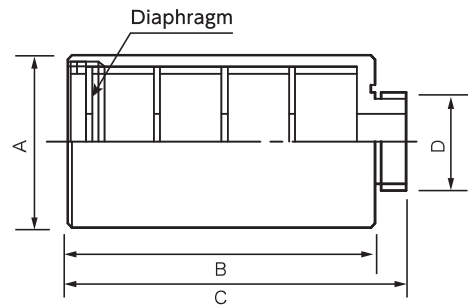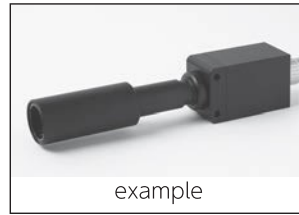Protection of sensor lens from fumes, dust and other airborne contaminants in the optical path.

example

φ4 Tube fitting instrument Air

O-ring

Nut

Model	A	B	C	D	E	F	Sensor head
TMPX-06	φ14	25.3	4.7	M8 P0.75	24	18	Type S
TMPX-15	φ20	50	3	M16 P0.75	27	41	Type B

Airless dust protector   TMNX-06 / TMNX-15

Use with the lens to prevent dust. No air supply required.

example

Diaphragm

Model	A	B	C	D	Sensor head
TMNX-06	φ22	50	54.5	M8 P0.75	Type S
TMNX-15	φ40	70.5	73.5	M16 P0.75	Type B

Protective window   TMDX-06S / TMDX-15S

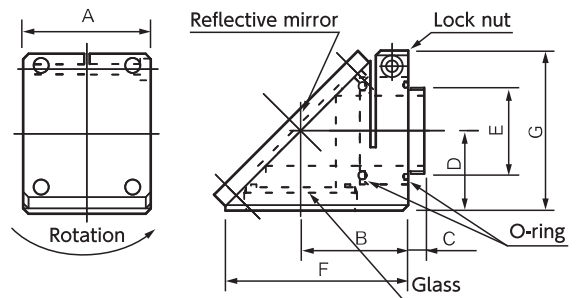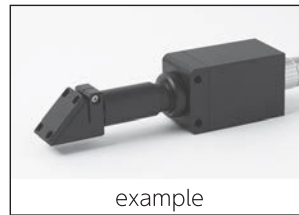Keep dust, fumes, moisture and other contaminants away from the lens.

example

Glass
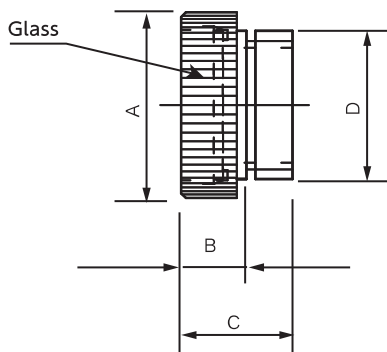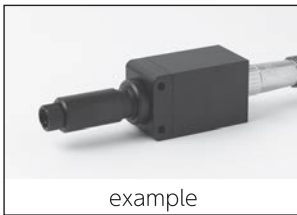
Model	A	B	C	D	Sensor head
TMDX-06S	φ11	7	12	M8 P0.75	Type S
TMDX-15S	φ20.5	7	10	M16 P0.75	Type B

Right-angled mirror   TMLX-06S / TMLX-15S

Reflects sensor field of view by 90 dgrees.

example

Reflective mirror   Lock nut

Rotation

O-ring

Glass
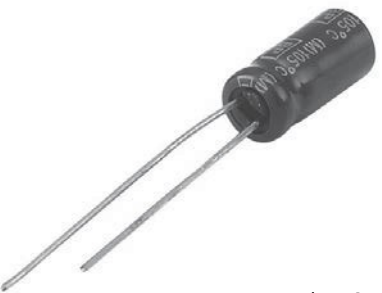
Model	A	B	C	D	E	F	G	Optical distance	Sensor head
TMLX-06S	14	15	5	9.5	M8 P0.75	24	19.4	24.5	Type S
TMLX-15S	23.8	20	3	14.9	M16 P0.75	34	29.8	34.9	Type B

Extension cable	TMBX-E05

Extension cable : 5 m
e-CON female /e-CON male

Weight: 390g

Branch cable	TMBX-B01

For setting unit when
thermometer is used alone.
e-con branch

Weight: 85g

Resistor	TR-251N / TR-501N

Analog output
TR-251N for 0 ～ 5V
TR-501N for 0 ～ 10V
Convert current 0 ～ 20mA
to voltage

Weight: 0.5g

Capacitor	TC-105N

For analog output noise.
Connect to analog signal receiver.

Weight: 0.5g

Ferrite Core	FC-2032

For power noise.
Install to cables

Weight: 23g

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■If you have any questions, contact us at the address
 or links shown below.