Non-Contact Thermometer

Instruction Manual

THERMO-HUNTER BUILT-IN

CS-30TAC, CS-40TAC
CS-30TAC-HT, CS-40TAC-HT

OPTEX FA CO.,LTD.

91 Chudoji-Awata-cho Shimogyo-ku Kyoto 600-8815 JAPAN
TEL +81-75-325-1314 FAX +81-75-325-2936

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Thank you very much for purchasing OPTEX FA products.
This device is a non-contact thermometer to convert the infrared energy emitted from the surface of an object into temperature. This thermometer measures the surface temperature of solid and liquid without contacting them. The temperature of gas cannot be measured by this thermometer.

Contents

Introduction

- ○ Please make sure the model you purchased is the one you specified.
- ○ Please read the manual thoroughly before using the device for correct usage.
- ○ After reading this manual, please retain it for future reference.
- ○ OPTEX FA is not liable for any incidental or consequential damages or losses including losses of data or changes of measurement, arising from accident, misuse or abnormal conditions of operation or handling.

Safe Usage

This instruction manual contains various warnings for your safety and proper usage to avoid possible personal injury. Please be sure to heed the warnings and strictly follow safety instructions.

⚠ Caution This symbol signifies that improper usage may result in injuries or damage.

⚠ Caution

This product is not a clinical thermometer and therefore, cannot be used for medical purposes.

⚠ Caution

Use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure.

Environmental Warnings ⃠ - Warning ❗ - Caution

⃠ DO NOT USE THERMOMETER WHEN IT IS WET OR SOAKED IN LIQUID.
Although the product is water-resistant, using it with water drops on its lens or in wet conditions may cause incorrect measurement.

❗ KEEP THE THERMOMETER AWAY FROM DIRECT SUNLIGHT, DUST, HIGH TEMPERATURES AND HIGH HUMIDITY DURING USE AND STORAGE.
Otherwise it may cause irreparable damage or incorrect measurement.

❗ KEEP THE THERMOMETER AWAY FROM SUDDEN CHANGE IN AMBIENT TEMPERATURE.
Sudden temperature change may cause incorrect measurement. Start measurement when temperature has become stable after leaving the meter for a while.

❗ KEEP THE THERMOMETER AWAY FROM PRODUCTS WHICH PRODUCE STRONG ELECTROMAGNETIC WAVES. DO NOT USE IN AN ATMOSPHERE CONTAINING CORROSIVE GASES OR EXPLOSIVE GASES.
Otherwise it may cause irreparable damage or incorrect measurement.

Usage Warnings ⃠ - Warning ❗ - Caution

❗ AVOID MEASURING SHINY OBJECTS.
Shiny objects reflect surrounding temperatures. Incorrect measurement may occur although specifying the emissivity rate can correct it.

⃠ DO NOT DROP THIS THERMOMETER NOR GIVE A STRONG IMPACT TO IT, WHICH MAY CAUSE IRREPARABLE DAMAGE OR INCORRECT MEASUREMENT.
Otherwise it may cause irreparable damage or incorrect measurement.

⃠ DO NOT USE WITH NON-STANDARD VOLTAGE.
Using the unit out of 12 to 24 VDC range may result in damage to the unit, shorts, fires and injuries. In such cases, immediately switch the unit off.

⃠ DO NOT LET THE THERMOMETER TOUCH THE OBJECT THAT IS BEING MEASURED.
This product is a non-contact thermometer. Touching high-temperature object may cause deformation of the meter, irreparable damage or incorrect measurement.

⃠ DO NOT TOUCH THE LENS.
Do not touch the lens with hard or sharp objects. Do not insert foreign objects into the light receiving part. Otherwise incorrect measurement will occur.

❗ DO NOT BRING THE THERMOMETER CLOSE TO ELECTRICALLY CHARGED OBJECTS.
Otherwise it may cause irreparable damage or incorrect measurement.

Specifications

Model	CS-30TAC-HT	CS-40TAC-HT	CS-30TAC	CS-40TAC
Temperature range	0°C to 1000°C		-40°C to 500°C	
Area size	ϕ 30/500 mm 22:1	ϕ 40/500 mm 15:1	ϕ 30/500 mm 22:1	ϕ 40/500 mm 15:1
Optics	Silicon lens(Water-repellent coat, Oil-repellent coat)			
Detection element / Wavelength	Thermopile/ 8 to 14 µm			
Response speed	150 msec/90%			
Accuracy	0 to 200°C: ± 2°C 201 to 1000°C: Reading value ± 1%		-40 to 0°C: ± 3°C 1 to 200°C: ± 2°C 201 to 500°C: Reading value ± 1%	
	Measurement condition: ε=1.0, 23 ± 5°C, Measurement distance 250 mm, Target size ϕ 100 mm			
Repeatability	Up to 200°C: ± 1.0°C 201°C and more : ± 0.5%			
Emissivity rate adjustment	0.1 to 1.2			
Power supply	12 to 24 VDC ± 10%			
Consumption	120 mA (Max. load), 80 mA (Eco mode)			
Ambient temperature	Sensor head: 0 to 180°C, Amplifier: 0 to 65°C		Sensor head: 0 to 100°C, Amplifier: 0 to 65°C	
Ambient humidity	35 to 85% (without condensation)			
Storage temperature	0 to 70°C			
Water resistance	Sensor head: IP69K, Amplifier: IP40			
Vibration resistance	10 to 55 Hz, 1.5 mm amplitude, 2 hours each for XYZ directions			
Main material	Sensor head: SUS, Amplifier: ABS			
Dimensions	Sensor head : Approx. ϕ 14 (M12)×34 mm, Amplifier : Approx. 35×52×39 mm			
Weight	Sensor head: Approx. 100 g (including a cable of 3 m), Amplifier: Approx. 200 g (including a cable of 2 m)			
Display	LED			
Resolution	1°C			
Analog output	4 to 20 mA			
Analog output resolution	0.5°C			
Analog output accuracy	± 0.5% or ± 1.0°C			
Analog output updating time	10 msec			
Analog output allowable load	250 Ω			
Analog output impedance	47 Ω			
Contact output	Photo MOS FET×2(c contact×2), 300 mA/30 VDC or less			
Others	Trigger input			
	Bank ×4			
Applicable regulations	EMC Directive (2014/30/EU), RoHS Directive (2011/65/EU), China RoHS (MIIT Order No.32)			
Applicable standards	EN 61326-1: 2013			

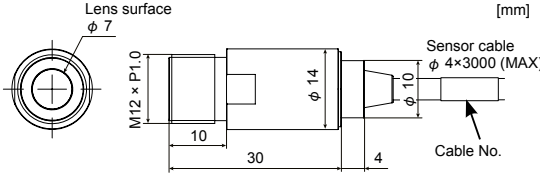
Accessories: Mounting Nut (M12 × P1.0) × 2

Options: Black Body Tape HB-250, Mounting Fitting CS-FB12, Changeable Laser Marker CS-LDP, Air Purge Collar CS-AP1, CF Lens CS-CF01, Massive Housing Unit CS-MH01

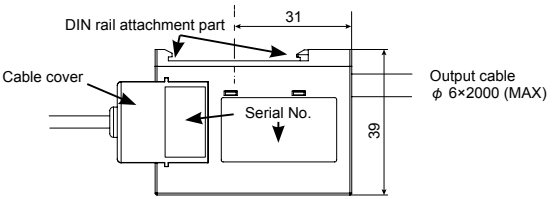
* The specifications are subject to change without notice for product improvement.
* For China RoHS, please refer to https://www.optex-fa.com/rohs_cn/

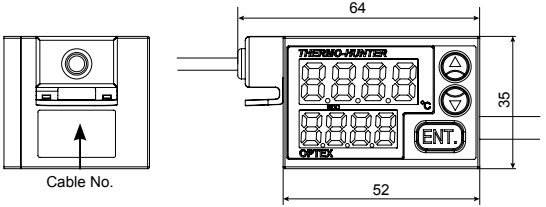
External Dimensions/Part Name

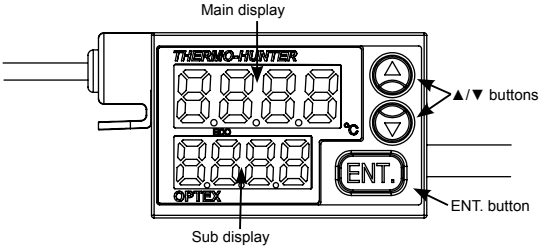
● Sensor head



● Amplifier

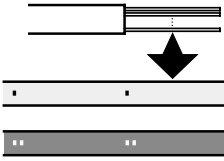




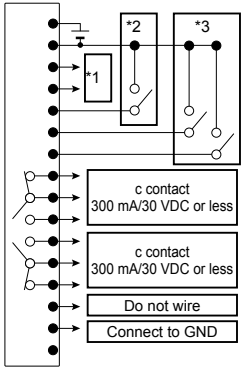


Wiring Diagram

● Output cable



No.	Output cable			Descriptions	
	Line color	Dot mark			
		Color	Quantity		
1	Pink	Red	1	Power supply	12 to 24 VDC
2	Gray	Black	1		GND
3	White	Red	1	Analog output 4-20 mA	+
4	White	Black	1		–
5	Pink	Black	1	External trigger	Input
6	Gray	Black	2	Bank switch	(1)
7	White	Red	2		(2)
8	Yellow	Red	1	Alarm output H	N.C.
9	Gray	Red	1		COM
10	Yellow	Black	1		N.O.
11	Orange	Red	1	Alarm output L	N.O.
12	Gray	Red	2		COM
13	Orange	Black	1		N.C.
14	Orange	Red	2	Do not wire	
15	Orange	Black	2	Connect to GND	
16	*4 (Shielded cable)			-	



*1 Connect to the 4-20 mA input of an analog device.
Analog output allowable load 250Ω and analog output impedance 47 Ω

*2 External trigger: Switches on/off in the range from 2 to 5.

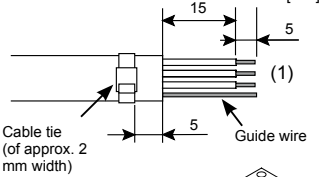
*3 Bank switch: Switches OPEN/CLOSE in the range from 2 to 6 or from 2 to 7 to select a bank.

BANK	(1)	(2)
1	OPEN	OPEN
2	CLOSE	OPEN
3	OPEN	CLOSE
4	CLOSE	CLOSE

*4 When you cut the output cables shorter, a shielded cable for reinforcement will come out. Cut the shielded cable to prevent it from contacting with other cables.

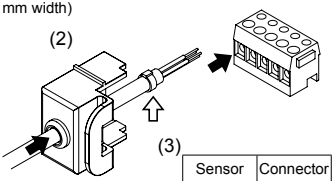
* Cables not used should be cut so that they do not contact with other cables, and insulated with adhesive tape or by other methods.

●Sensor cable

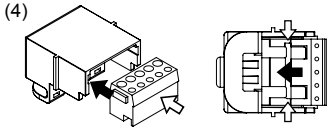


When you cut the sensor cables, ensure to perform end treatment and connection of the cables. In the case of the short circuit of the sensor cables, the sensor can not measure precisely.

(1) Cut the cables to a desired length and treat their end as shown in the left figure.
A guide wire is sheathed in the shielded mesh cable. Cut the other cables than the guide wire at their base.
(2) Pass the sensor cable bundle through the hole of the cable cover and tighten the cable tie at the point shown in the left figure.
* The serial numbers are printed on the cable cover. Make sure to put each sensor cables back to the same holes that you removed.
(3) Connect the cables and shielded cable (guide wire) to the connector.
(4) Insert the connector to the cable cover.
*The metal plate of connector should be placed onto the clasp in the cable cover.

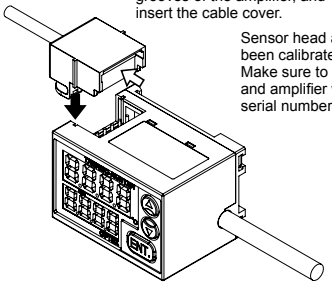


Sensor cable	Connector No.
Green	1
Yellow	2
Brown	3
Shield	4
—	5

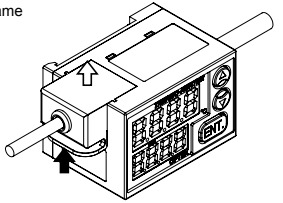


○ Connecting the sensor cables
Keeping the connector pushed in, fit the cable cover to the grooves of the amplifier, and insert the cable cover.

○ Removing the sensor cables
Pinch the tab of the cable cover and pull the cable cover upward.



Sensor head and amplifier has been calibrated as a set.
Make sure to use sensor head and amplifier with the same serial number.

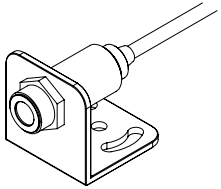


Amplifier has not a protective structure. When you connect the output cable and the sensor cable, make sure that the water or oil does not penetrate to amplifier along the cable. When used in such an environment where water or oil might get in to the amplifier, please use optional protective case. (Equivalent to IP65)
Please noted that continuous hot water with high pressure may cause breakage of the cable or covering.

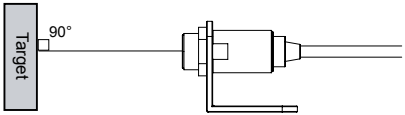
Mounting/Installation

●Sensor head

The external screw is M12 × P1.0.
Fix securely into the hole of ϕ 12 mm or more using the attached hexagon nut.
The optional mounting fitting can help you adjust the angle easily.



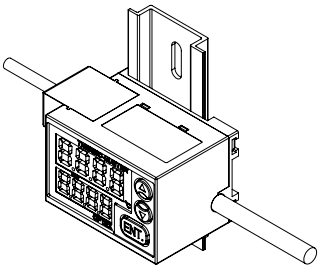
○ Mounting
Mount the sensor head perpendicular to the target.
Avoid a location where the sensor head may be exposed to vibration or impact.
The ambient temperature should not rapidly change and should be within the operating temperature range.
Do not fix the cable when it is bent or excessive load is applied to it.
Although the sensor head is water-resistant, water drops on the lens may cause an error.

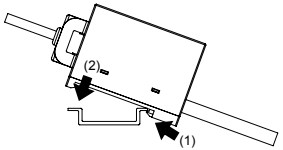


●Amplifier

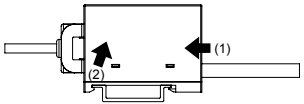
Mount the amplifier on the DIN rail using the hooks on its bottom.
Avoid a location where water or oil may spill on it.

○ Mounting
Make the two hooks on the SW side catch the DIN rail and push in to set the amplifier.

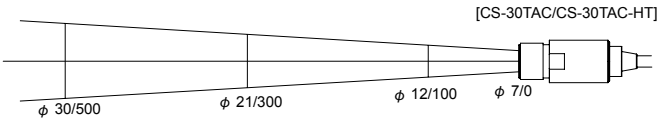




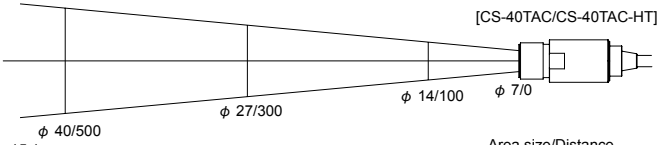
○ Removing
Push the two hooks on the SW side to the opposite direction and raise the amplifier.



Field of View



D (distance) : S (area) = 22:1



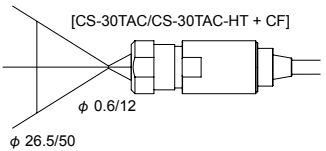
D:S = 15:1

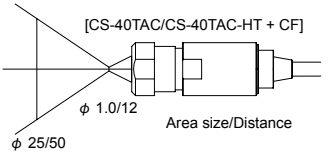
Area size/Distance

[mm]

[For correct measurement]
The range of field of view is equivalent to 90% of optical response (energy).
The target should be sufficiently larger than the field of view shown above.
When measuring a high-temperature target, keep as much distance from it as possible within the range of the field of view. Otherwise it may cause incorrect measurement.

●When using the optional CF lens



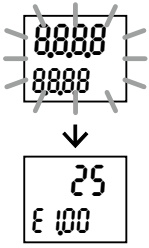


Area size/Distance

[mm]

* When the CF lens is attached, correction is necessary because light intensity received from the target decreases by 20 to 30%.
When measuring a minute spot, the recommended target size is approximately 1.5 times of the field of view shown above.

How to Use



Normal Operation

(1) Confirm the wirings and then turn the power on.
The display flashes and then temperature measurement starts (Normal Operation).
(2) Confirm that the measurement value changes when you put your hand into the field of view.
* Leave the Unit for a while after the sensor head is mounted. Temperature change may cause incorrect measurement.

ENT.
Press 3 sec. or more

(3) To confirm or change the settings press the ENTER button for three seconds or more.
The display flashes and then Setting Operation starts.
(4) Select the function with ▲/▼ buttons.

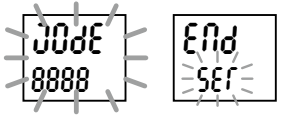
▲ button :
▼ button :

❶ Bank Setting
❷ Response Time Setting
❸ Adjustment Setting
❹ Analog Output Setting
❺ Alarm Output Setting
❻ Trigger Input Setting
❼ Display Off Setting
Save Settings

* Make sure to perform Save Settings.
If you cancel in Save Settings, all settings entered are not saved.

Function List

To change the settings, press the ENTER button for three seconds or more.
The settable items are shown below.
Change the settings as necessary.
While the indication flashes, the settings are being read or written and the button operation is not available.



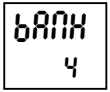
Flashing / Button operation is not available Lighting / Button operation is available

If the unit is left unoperated for 60 seconds or more, it returns to Normal Operation. In this case, the settings are cancelled. Make sure to perform Save Settings.

No.	Function	Descriptions
❶	Bank Setting	Select the bank (1 to 4) to change the setting. Settings of Response Time, Adjustment, Analog Output, Alarm Output, Trigger Input, and Display Off can be saved in each bank. Select the bank by cable connections.
❷	Response Time Setting	Select the response time. You can select 1 to 200 of the moving average times. The larger number, the longer response time and the smoother fluctuation.
❸	Adjustment Setting	Adjust the measurement value. The Unit has 3 methods for the adjustment as below; TEACH Adjustment : Adjust the measurement value to the temperature value of the target. Emissivity Rate Adjustment : Input the emissivity rate directly. 2 Point Adjustment : Adjust the measurement values (2 points) to the temperature values (2 points) of the target.
❹	Analog Output Setting	Adjust the analog output (4-20 mA) range. You can setup higher limit value (value for 20 mA) and lower limit value (value for 4 mA).
❺	Alarm Output Setting	Make the alarm output settings. Alarm Output Mode, temperature of alarm output and alarm ON/OFF can be set. The Unit has 3 Alarm Output Modes as below; NORMAL Mode : Alarm output is kept on as long as the value is above or below the limit value. DELAY Mode : Alarm output turns on when a specific time period passes after the value exceeds or falls below the limit value. ONE-SHOT Mode : Alarm output turns on when the value exceeds or falls below the limit value and is kept for a specific time.
❻	Trigger Input Setting	Make the trigger input settings. Trigger input mode, analog output type, and trigger ON/OFF can be set. The Unit has 2 Trigger Modes as below; External Mode : Analog Output is controlled by External Trigger. WAVE Mode : Analog Output is controlled by the judgment criterion value (WAVE LIMIT). The Unit has 4 analog output types as below; MAX HOLD : The maximum value between the triggers is output. MIN HOLD : The minimum value between the triggers is output. P-P HOLD : The difference between the maximum and minimum values between the triggers is output. (For External Mode only) SAMPLE HOLD : The value at the moment of the trigger is output. (For External Mode only)
❼	Display Off Setting	Make the display off settings. You can reduce consumption current by turning off the display during Normal Operation.

Setup of Functions

❶ Bank Setting



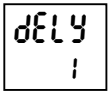
Select the bank (1 to 4) to change the setting.
Settings of Response Time, Adjustment, Analog Output, Alarm Output, Trigger Input, and Display Off can be saved in each bank.

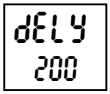
(1) In the Setting Operation select the Bank Setting, and then press Enter button.

(2) Select the bank number, and then press Enter button.

* Make sure to perform Save Settings and select the bank by cable connection.

❷ Response Time Setting





Increasing the moving average times suppresses scattering of measured values.
The value of times: 1 to 200 (response time: approx. 0.15 to 2 sec.)

(1) Select "Response Time Setting" in Setup of Functions, and then press Enter button.

(2) Select the moving average times, and then press Enter button.

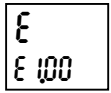
Make sure to perform Save Settings.

❸ Adjustment Setting

Adjust the temperature measurement value.
The Unit has 3 methods for the adjustment as below;

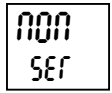
TEACH Adjustment	: Adjust the measurement value to the temperature value of the target. The measurement value is output based on the emissivity rate calculated automatically in TEACH Adjustment.
Emissivity Rate Adjustment	: Input the emissivity rate directly.
2 Point Adjustment	: Adjust the measurement values (2 points) to the temperature values (2 points) of the target.
Cancel	: Cancel the Adjustment Setting. The unit returns to the Setting Operation.

TEACH Adjustment



Emissivity Rate Adjustment

2 Point Adjustment

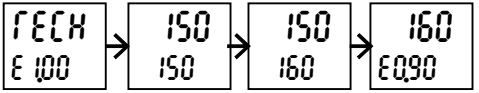


Cancel

* Setting Cancel with SET returns the unit to the state of before making the setting.

◯ TEACH Adjustment

Adjust the measurement value to the temperature value of the target.
The emissivity ratio is calculated automatically.



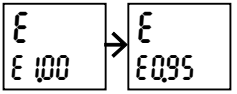
(1) Aim the sensor head to the target.
Confirm the target is sufficiently larger than the field of view.
(2) In the Setting Operation select the Adjustment Setting, and then press Enter button.
(3) Select the TEACH Adjustment, and then press the ENTER button.
(4) The current measurement value is displayed.
Input the temperature of the target, and then press the ENTER button.
(5) Confirm that the measurement value and emissivity rate have been changed.
Make sure to perform Save Settings.

▸ Error indication

If the emissivity rate calculated automatically in the TEACH Adjustment is out of the setting range(0.1 to 1.2), an error(Err1) is displayed.
In this case, TECH Adjustment is cancelled. Perform Emissivity Rate Adjustment.

◯ Emissivity Rate Adjustment

Input the emissivity rate directly.



(1) In the Setting Operation select the Adjustment Setting, and then press Enter button.
(2) Select the Emissivity Rate Adjustment, and then press the ENTER button.
(3) Input the emissivity rate, and then press the ENTER button.
(4) Confirm that the measurement value and emissivity rate have been changed.
Make sure to perform Save Settings.

Emissivity rate (ε)

The emissivity rate is the rate of energy emitted from the surface of an object. Every object has a unique emissivity rate which is variable according to the surface condition and temperature of the object. This product allows for setting a desired emissivity rate, which can enable even more precise measurement by adjusting the emissivity rate according to that of the target.
An object with low emissivity rate (e.g. a shiny metallic object) reflects the surrounding temperature since it is highly reflective. If the surrounding objects have greatly different temperature from that of the main unit, their temperatures are reflected resulting in incorrect measurement. Therefore it is necessary to block out such effect.
The maximum emissivity rate is normally 1.00, but this unit is designed to accept up to 1.20 for practical convenience.

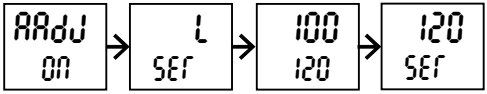
Setup of Functions

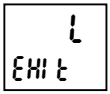
◯ 2 Point Adjustment

Adjust the measurement values (2 points) to the temperature values (2 points) of the target.

This setting is for adjusting the measurement value with the specified value according to the measuring targets. A intended value can be output by setting L (lower value) and H (higher value) conforming to the both specified value.

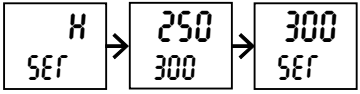
* Measurement accuracy can not be guaranteed for the value made by 2 Point Adjustment.
* Do not change the emissivity rate after setting in 2 Point Adjustment, otherwise the adjusted value will be changed.

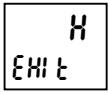




EXIT

(1) Aim the sensor head to the target. Confirm the target is sufficiently larger than the field of view.
(2) In the Setting Operation select the Adjustment Setting, and then press Enter button.
(3) Select the 2 Point Adjustment, and then press the ENTER button.
(4) Select ON, and then press the ENTER button.
(5) Select SET, and then press the ENTER button.
* To set the temperature H (higher value) first, select EXIT.
(6) The current measurement value is displayed.
Input the temperature L (lower value) of the target, and then press the ENTER button.



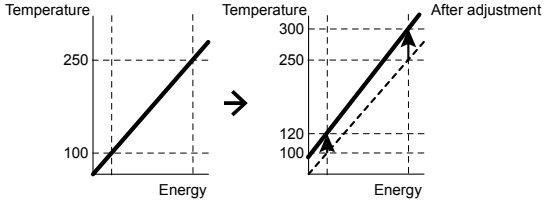


(7) Aim the sensor head to the target. Confirm the target is sufficiently larger than the field of view.
(8) Select SET, and then press the ENTER button.
* To input the temperature H (higher value) later, select EXIT.
(9) The current measurement value is displayed.
Input the temperature H (higher value) of the target, and then press the ENTER button.
Make sure to perform Save Settings.

* If the timings to set temperature L and H are different (e.g., when using the same target for setting L and H), set either of them first and perform Save Settings. Otherwise the 2 Point Adjustment will be cancelled.
* The adjusted value are effective after the both of temperature L and H are saved.

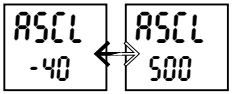
While 2 Point Adjustment is on, 2 Point Adjustment indicator is displayed on sub display.
If the setting of temperature L or H value is not saved, the measurement value is output based on the setting stored previously. But 2 Point Adjustment indicator is displayed on the sub display.

The minimum temperature width for higher value and lower value is 10 degrees.

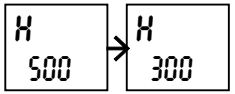


❹ Analog Output Setting

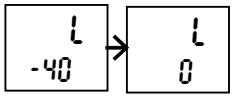
You can setup higher limit value (value for 20 mA) and lower limit value (value for 4 mA).



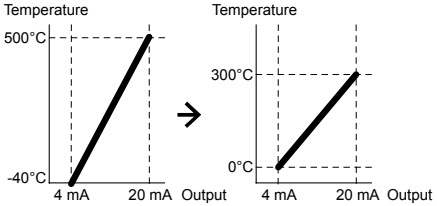
H (higher limit value) : Value for 20 mA
L (lower limit value) : Value for 4 mA
* The current Setting value is displayed first on sub display.



(1) In the Setting Operation select the Analog Output Setting, and then press Enter button.
(2) H (higher limit value) is displayed. Input the temperature H (higher limit value), and then press Enter button.



(3) L (Lower limit value) is displayed. Input the temperature L (lower limit value), and then press Enter button.
Make sure to perform Save Settings.

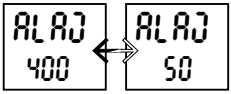


* The minimum width of output range is 100 degrees.
0 to 1000°C: 4 – 20 mA -> 100 to 200°C: 4 – 20 mA ○
-> 100 to 180°C: 4 – 20 mA ×

Setup of Functions

❺ Alarm Output Setting

Alarm output mode, temperature of alarm output and alarm ON/OFF can be set.

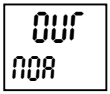


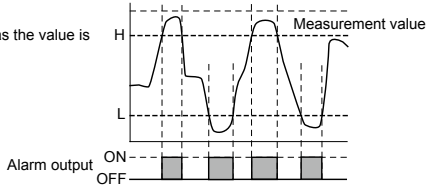
H (higher limit value): Alarm output turns on when the measurement value exceeds the Setting value.
L (lower limit value) : Alarm output turns on when the measurement value falls below the Setting value.

The Unit has 3 Alarm Output Modes as below;

NORMAL Mode

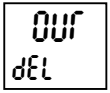
Alarm output is kept on as long as the value is above or below the limit value.

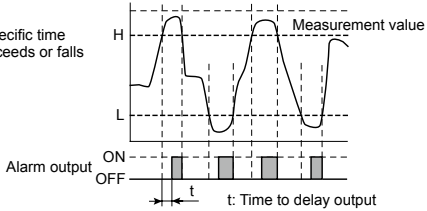




DELAY Mode

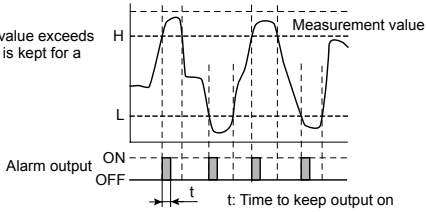
Alarm output turns on when a specific time period passes after the value exceeds or falls below the limit value.

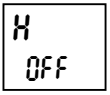




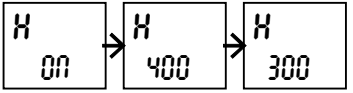
ONE-SHOT Mode

Alarm output turns on when the value exceeds or falls below the limit value and is kept for a specific time.

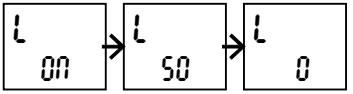




(1) In the Setting Operation select the Alarm Output Setting, and then press Enter button.
(2) Select ON, and then press the ENTER button.
* To cancel the setting, select OFF and press the ENTER button.
(3) The H (higher limit value) is displayed.
Input the temperature H (higher limit value), and then press the ENTER button.

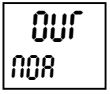


(4) Select ON, and then press the ENTER button.
* To cancel the setting, select OFF and press the ENTER button.
(5) The L (lower limit value) is displayed. Input the temperature L (higher limit value), and then press the ENTER button.



◯ Output mode

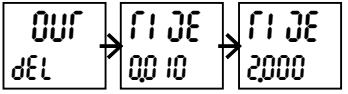
To setup NORMAL Mode



(6) Select NORMAL Mode, and then press the ENTER button.

Make sure to perform Save Settings.

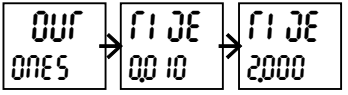
To setup DELAY Mode



(6) Select DELAY Mode, and then press the ENTER button.
(7) The DELAY Time is displayed.
Input the DELAY Time, and then press the ENTER button.
The DELAY Time range is 0.01 to 2.00 seconds.

Make sure to perform Save Settings.

To setup ONE-SHOT Mode

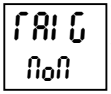


(6) Select ONE-SHOT Mode, and then press the ENTER button.
(7) ONE-SHOT Time is displayed.
Input the ONE-SHOT Time, and then press the ENTER button.
The ONE-SHOT Time range is 0.01 to 2.00 seconds.

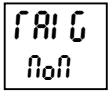
Make sure to perform Save Settings.

Setup of Functions

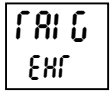
❻ Trigger Input Setting



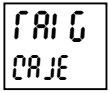
Trigger input mode, analog output type, and trigger ON/OFF can be set.
External Mode : Analog Output is controlled by External Trigger.
WAVE Mode : Analog Output is controlled by the judgment criterion value (WAVE LIMIT).



No setting



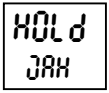
External Mode



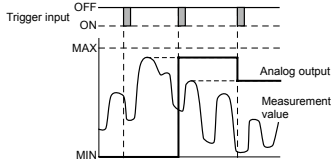
WAVE Mode

The Unit has 4 analog output types as below;

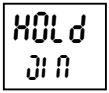
MAX HOLD :
The maximum value between the triggers is output.



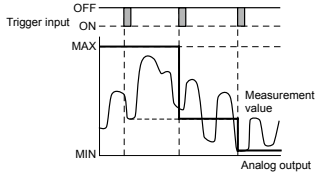
MAX



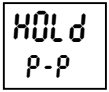
MIN HOLD :
The minimum value between the triggers is output.



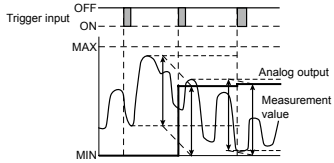
MIN



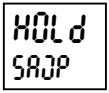
P-P HOLD :
The P-P value (maximum minus minimum) between the triggers is output. (For External Mode only)



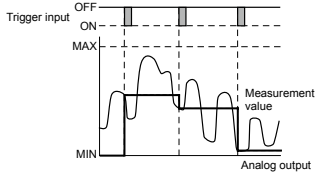
P-P



SAMPLE HOLD :
The value at the moment of the trigger is output.
(For External Mode only)

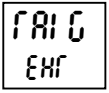


SAMPLE

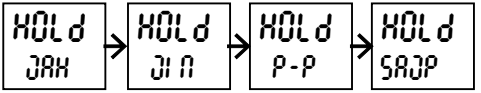


◯ External Mode

Analog Output is controlled by External Trigger.

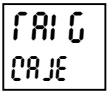


(1) In the Setting Operation select the Trigger Input Setting, and then press Enter button.
(2) Select the External Mode, and then press Enter button.
(3) Select the analog output type, and then press Enter button.
Make sure to perform Save Settings.

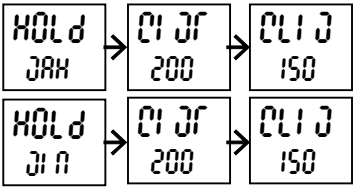


◯ WAVE Mode

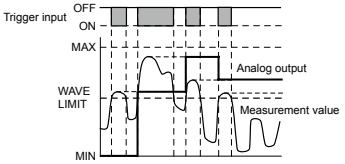
Analog Output is controlled by the judgment criterion value (WAVE LIMIT).



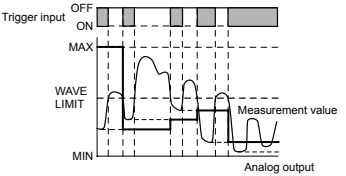
(1) In the Setting Operation select the Trigger Input Setting, and then press Enter button.
(2) Select the WAVE Mode, and then press Enter button.
(3) Select the analog output type, and then press Enter button.
* In the WAVE Mode, MAX HOLD or MIN HOLD is available for the analog output type.
(4) Input the judgment criterion value (WAVE LIMIT), and then press Enter button.
Make sure to perform Save Settings.



WAVE MAX HOLD



WAVE MIN HOLD



* In the MAX HOLD, P-P HOLD and SAMPLE HOLD analog output remain the minimum value (4 mA) until the first trigger.
In the MIN HOLD analog output remain the maximum value (20 mA) until the first trigger.
Sampling starts at the first trigger, and the analog output control starts at the second trigger.

* If the Alarm Output Setting has been set, the judgment criterion will be the analog output controlled by the Trigger Input Setting. -> Page 20

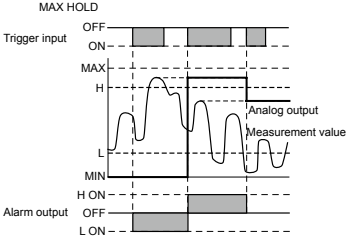
Setup of Functions

● Combination of alarm output and trigger input

This unit allows individual setting for each function.
The behavior when the alarm output and trigger input are combined is as described below.
The alarm output uses the analog output value as the judgment criterion, so when the trigger input is set, the controlled analog output will be the judgment criterion.

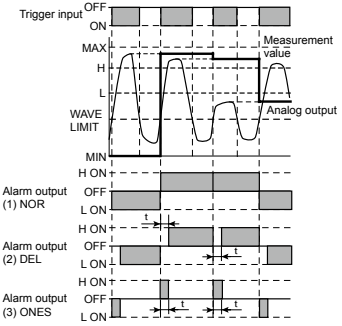
Setting value
Alarm: H/L setting NOR output
Trigger: External trigger MAX HOLD

According to the analog output of MAX HOLD set by the trigger input, alarm is output while the value is outside the range between H and L.



Setting value
Alarm: (1) H/L setting NOR output
(2) H/L setting DEL output
(3) H/L setting ONES output
Trigger: WAVE trigger MAX HOLD

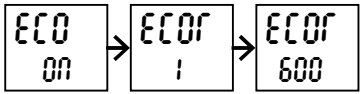
According to the analog output of MAX HOLD set by the trigger input, alarm is output while the value is outside the range between H and L.

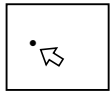


❼ Display Off Setting

You can reduce consumption current by turning off the display during Normal Operation.

(1) In the Setting Operation select the Display Off Setting, and then press Enter button.
(2) Select ON, and then press the ENTER button.
* To cancel the setting, select OFF and press the ENTER button.
(3) Input the Display OFF Time, and then press Enter button.
The Display OFF Time range is 1 to 600 seconds.
Make sure to perform Save Settings.

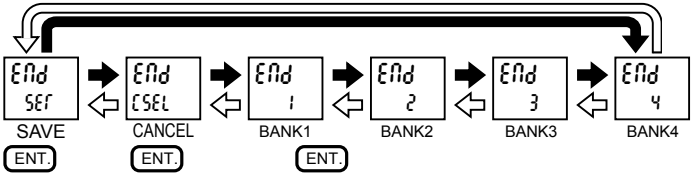




When ECO is ON
A single dot is lighting.

● Save Settings

Save or cancel the settings entered in the Setting Operation.
Switch other bank to change the settings in succession.
(1) In the Setting Operation select the Save Settings, and then press Enter button.
(2) Select Save, Cancel or the bank number, and then press the ENTER button.



Make sure to perform Save Settings.
If you cancel in Save Settings, all settings entered are not saved.

● Setting Initialization

Press ▼and Enter buttons for 2 seconds or more. Then Setting Initialization Indicator is displayed and all settings initialized to the default settings.

[Note of the settings]

		User Settings				Default Settings CS-30TAC（CS-30TAC-HT） CS-40TAC（CS-40TAC-HT）
Bank		1	2	3	4	1
Response Time	Moving average times					1
TEACH Adjustment	Display value before adjustment	(℃)	(℃)	(℃)	(℃)	—
	Temperature value of the target	(℃)	(℃)	(℃)	(℃)	—
Emissivity Rate Adjustment						1.00
2 Point Adjustment	Lower value	(℃)	(℃)	(℃)	(℃)	—
	Lower temperature of the target	(℃)	(℃)	(℃)	(℃)	—
	Higher value	(℃)	(℃)	(℃)	(℃)	—
	Higher temperature of the target	(℃)	(℃)	(℃)	(℃)	—
Analog Output	Higher limit value(20 mA)	(℃)	(℃)	(℃)	(℃)	1000℃（500℃）
	Lower limit value (4 mA)	(℃)	(℃)	(℃)	(℃)	0℃（-40℃）
Alarm Output	Higher limit value	(℃)	(℃)	(℃)	(℃)	400℃（400℃）
	Lower limit value	(℃)	(℃)	(℃)	(℃)	50℃（50℃）
	Output Mode	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
		DELAY	DELAY	DELAY	DELAY	
		ONE-SHOT	ONE-SHOT	ONE-SHOT	ONE-SHOT	
	Delay output time	(s)	(s)	(s)	(s)	0.01 (s)
External Trigger Input	Trigger mode	MAX. MIN.	MAX. MIN.	MAX. MIN.	MAX. MIN.	—
		P-P SAMPLE	P-P SAMPLE	P-P SAMPLE	P-P SAMPLE	
WAVE Trigger Input	Trigger mode	MAX. MIN.	MAX. MIN.	MAX. MIN.	MAX. MIN.	—
	Trigger temperature	(℃)	(℃)	(℃)	(℃)	—
Display Off	Time to turn off	(s)	(s)	(s)	(s)	OFF

Troubleshooting

Problem	Cause	Action
Cannot measure.	The power is not applied.	Confirm the wirings and connections.
	The power voltage is low.	Confirm the power voltage and adjust it to the 12 to 24 VDC range.
The measurement value is incorrect.	The lens is dirty.	Clean the lens referring to the Lens section under “Maintenance”.
	The measurement area is off center.	Adjust the mounting position so that the target comes to the center of the area.
	A high-temperature object is near the target affecting the measurement.	Block the heat source using a board, etc.
	The emissivity rate is incorrect.	Set the emissivity rate to that of the target.
The measurement value is not stable.	The sensor head is affected by vibration.	Prevent vibration.
	The sensor head is affected by rapid temperature change.	Leave the sensor head for a while until the temperature becomes stable.

* If the problem persists even after taking the actions above or the problem is not listed here, contact the sales distributor.

Maintenance

Lens	Dust, dirt and scratches on the lens can cause incorrect measurement. If the lens is dirty, remove the dust using a blower for cleaning lens. For stubborn dirt, apply a small amount of ethyl alcohol to a cotton swab or special lens cleaning cloth and gently wipe off the dirt.
Amplifier	For heavy dirt on the amplifier, use a lightly moistened cloth to wipe it off. Do not use alcohol or such other material because it may damage the surface or fade the printing.
Calibration	Yearly calibration is recommended. The sensor head and amplifier cannot be separately calibrated. Always calibrate them together. For details, contact the sales distributor.

You can rinse the sensor head with water because it is water-resistant. However, water drops remaining on the lens will cause incorrect measurement. Be sure to wipe them off with a soft cloth or blow them off with air.
You can easily remove water or oil by using air as the water/oil-repellent coat is applied on the surface of lens.
If the unit may be exposed to splash of water or oil or located in a dusty place during measurement, use the optional air purge collar.