

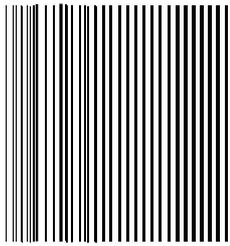


CHINO

IR-CA Series

Single color radiation thermometer
fixed focus lens type [Hardware volume]

Model: IR-CAK



INSTRUCTIONS

Always keep this instruction manual with the unit.

Please be sure to deliver this instruction manual
with the unit to the end user.

CHINO

Request and notices

This instruction manual is explaining only "Hardware volume" for using single color radiation thermometer fixed focus lens type (Model IR-CAK) correctly and safely, read the separate instruction manual [IR-CAK Software volume].

◆ Request to the operator of the thermometer

This instruction manual describes the maintenance of the thermometer, too.

Keep this instruction manual with the thermometer.

If you have unclear points or need technical assistance, please contact your sales agent of CHINO Corporation.

Notices

1. The information in this manual is subject to change without notice and does not represent a commitment on the part of CHINO Corporation.
2. No part of this manual may be reproduced or transmitted in any form or by any means, electronic or mechanical, including photocopying and recording, for any purpose other than the purchaser's personal use without permission of CHINO Corporation.
3. CHINO Corporation shall not be liable for any operation results.

Preface

To use single color radiation thermometer fixed focus lens type (Model IR-CAK) correctly and safely, please keep the following safety measures for the operation and storage of the thermometer.

1. Working conditions and environment

- The working temperature range of the thermometer is 0 to 50 °C. (No dew condensation)
- Do not use the thermometer in dusty places, etc. Remove the dust after using it.
- Be careful not to give vibration or impact to the thermometer. Install the thermometer as far as possible from an inductive oscillator or electric power line.

2. Storage

- Do not store the thermometer in hot and humid places.
- For failures of the thermometer, don't overhaul it by yourself, and contact your sales agent of CHINO Corporation.

3. Symbols in this instruction manual

The symbols shown below are used depending on important degrees for using the thermometer safely and avoiding unexpected situations.

Important degree	Symbols	Contents
1		This symbol is attached to a title for the sentence with Warning .
2		For avoiding dangerous accidents (may cause death or serious injury) like as electrical shock, fires, or troubles/damages of the thermometer.
3		For avoiding injury or in physical damage to the thermometer.
4		Information that we suggest to read carefully.
5		Information that you can use as a reference.

Warnings and Cautions

- ◆ Please use the thermometer correctly by keeping the following items.
In addition, please read this instruction manual carefully and keep it at the place where you can access easily.
- The  mark indicates prohibited operations.

 Warning (May cause death or serious injury)	
	Don't operate the thermometer in places where combustible or volatile gas is existed. It is extremely dangerous to use the thermometer in such environment. 
	When connecting power to the power terminals, make sure that all mains is turned off to prevent an electric shock. 
	Don't use the thermometer if it was broken, smoking or nasty smelling. These may cause fire. For such abnormal condition, turn off the power switch at once and contact your sales agent of CHINO Corporation. 
	Laser may damage your eyes. Don't stare into a laser beam. Make sure to target the laser when you want to decide the center of the measuring object only and to go off it after the center of the measuring object is decided. 
	Never take the thermometer apart or convert it. These may cause trouble and danger. 

 Caution (May cause injury or physical damage)	
	Be careful not to give vibration or impact to the thermometer. Install the thermometer by keeping it as far as possible from an inductive oscillator or electric power line. Do not use the thermometer in dusty places, noisy places and static electricity places.
	Do not wire the connection cable near a noise occurrence resource, relay drive line, high frequency line and power line. Do not bundle the connection cable with the line that noise is doubling, and do not store it into the same duct.
	Read the entire contents in this instruction manual to have the thermometer function perfectly.

1. Introduction

1.1 General

IR-CAK is single color radiation thermometer.

Converting functions enabling digital temperature display and parameter programming are built-in.

It is suitable for measuring especially a low-temperature region at high speed.

Also it is suited to measurement such as metal, by short measuring wavelength.

This thermometer is the high accuracy fixed focus type that adopted the front chop method.

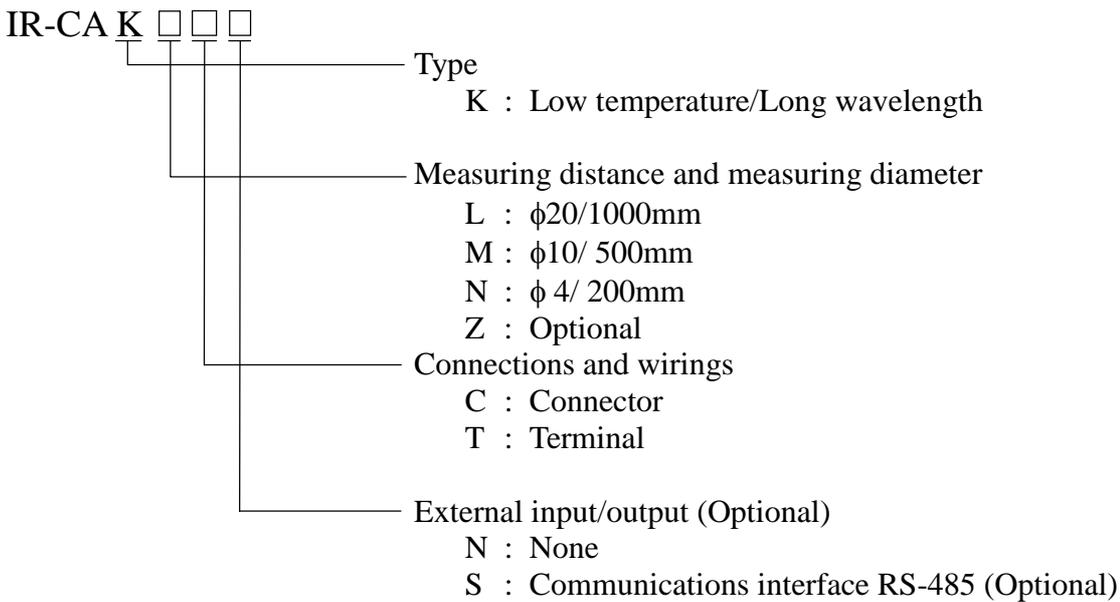
And this thermometer has laser targeting function for targeting to the measuring objects.

The radiation energy collected through the objective lens is transmitted to the element is converted into an electrical signal. The element output is digitally converted and processed through emissivity compensation, linearizer and modulation. The standardized final output is 4 to 20mA DC. Functional keys make programming or selection of emissivity, signal modulation and alarm function easy.

2 types of connection by terminals or a connector are available in this thermometer depending on a connection cable. Various options and accessories are prepared for every kind of applications.

2. Model

2.1 Models



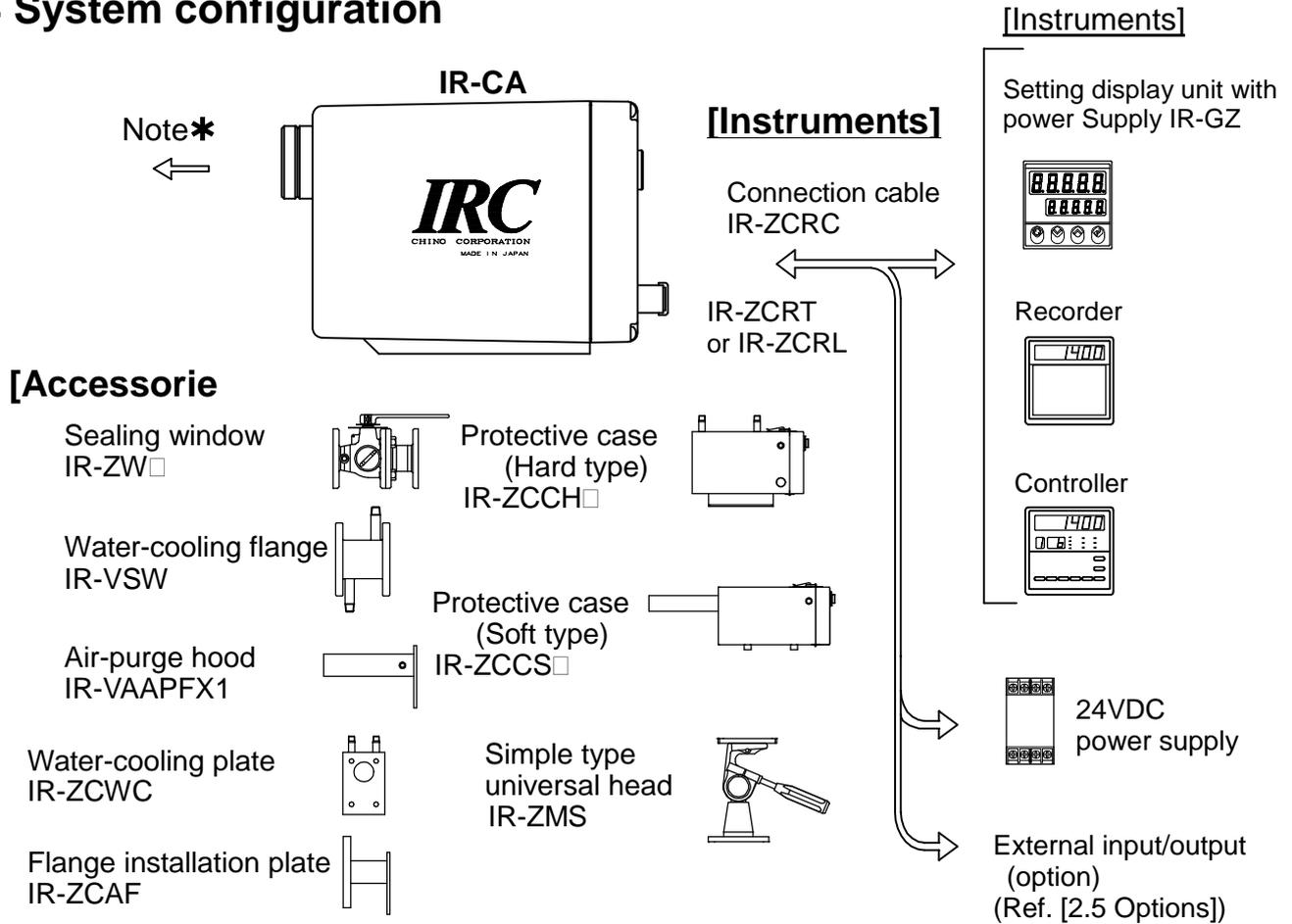
2.2 IR-CA series accessories models

Accessories	Model	Remarks
Protective case(Hard type)	IR-ZCCH□	C: Connector type T: Terminal type
Protective case(Soft type)	IR-ZCCS□	C: Connector type T: Terminal type
Sealing window	IR-ZW□	0: Quartz glass 1:CaF ₂ 2:BaF ₂
Water-cooling flange	IR-VSW	
Air-purge hood	IR-VAAPFX1	
Water-cooling plate	IR-ZCWC	
Flange installation plate	IR-ZCAF	
Simple type universal head	IR-ZMS	

2.3 Standard measuring Range

50 to 400°C

2.4 System configuration



Reference

Accessories have many kinds of combinations for applications. Refer to a separate instruction manual for each accessory.

Caution

Note*: The laser light is radiated from the point marked with*.

Caution

Make sure to light the laser when you want to target a measurement area only and to go off it after targeting.

2.5 Options

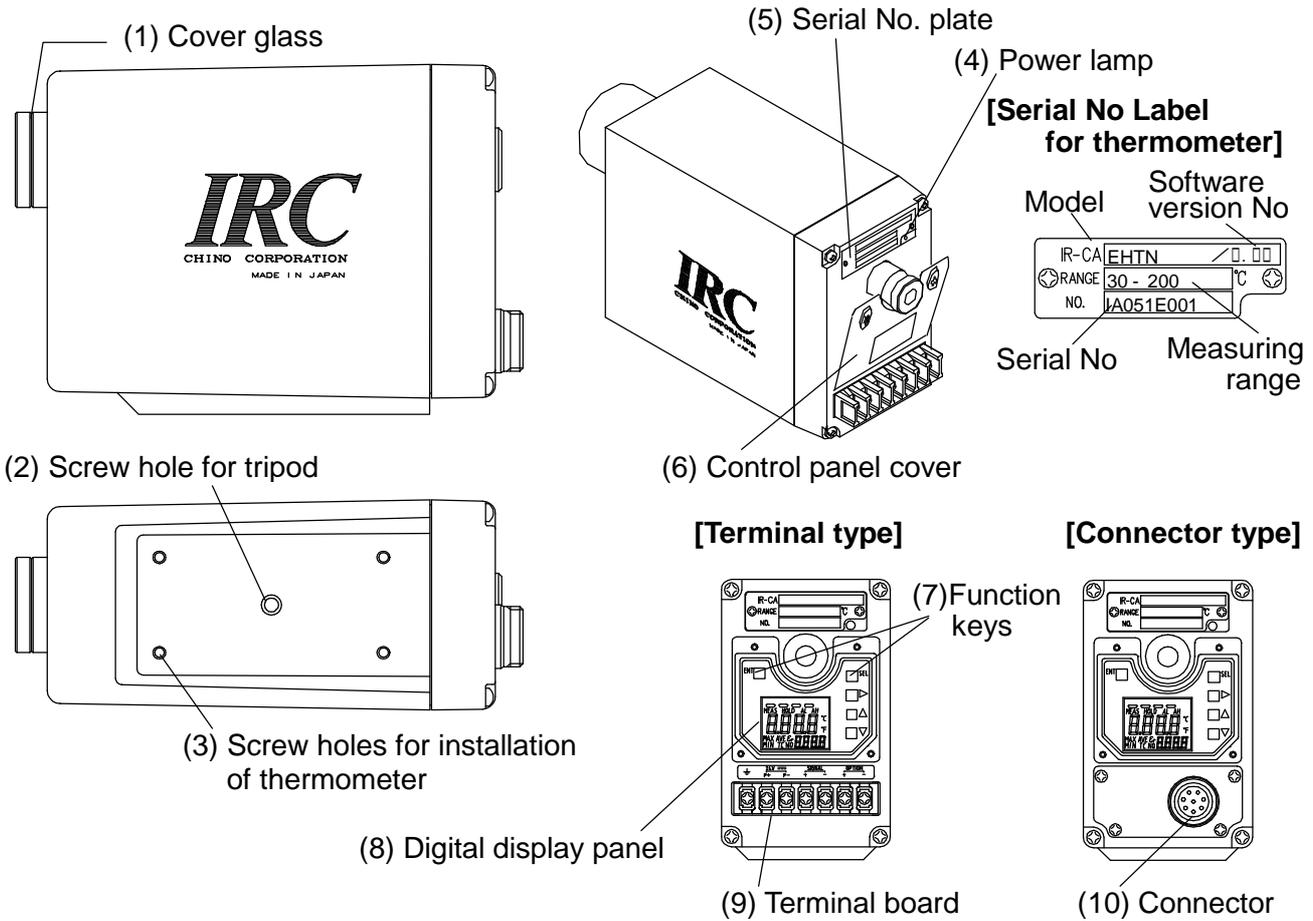
The following options can be added this thermometer.

Confirm what kinds of options have been added to your thermometer referring to [2.1 Models].

Options	Contents	Reference
Communications interface*	RS-485 Transmission of measured data (One decimal place) Transmission and also reception of parameter programming.	Refer to the separate instruction manual [IR-CA□□□S□]

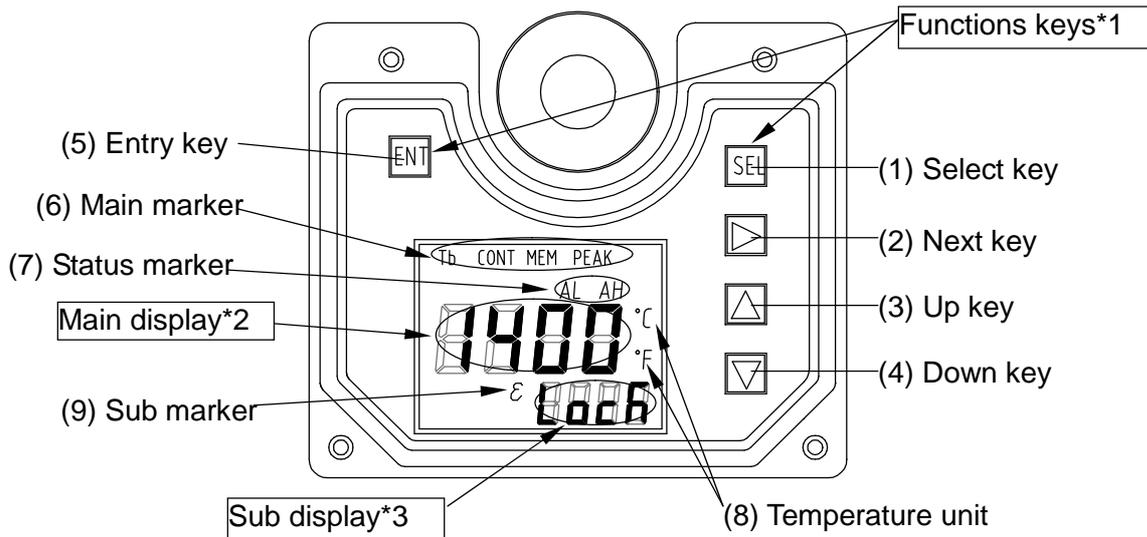
3. Names and functions of component parts

3.1 Overview



(1) Cover glass	An optical glass for protecting the objective lens from scratches, smudges, etc.
(2) Screw hole for tripod	A 1/4-20UNC screw hole for fixing a tripod or a simple type universal head
(3) Screw holes for installation of thermometer	M4 (depth 4mm) screw holes for installation of the thermometer Use these screw holes for housing the thermometer in a protective case.
(4) Power lamp	The red lamp lights when the power (24VDC) is supplied to the thermometer.
(5) Serial No. plate	A plate for indication of Model No., Software version No., Serial No., and Measuring range For your inquiries, inform us of all items.
(6) Control panel cover	The cover is for function keys and is fixed by M2.6 screws. For programming parameters, remove it.
(7) Function keys	5 function keys for programming parameters For programming, refer to [3.2.1 Function keys] and [6. Operation].
(8) Digital display panel	Main display: LCD 4 digits, Sub display: LCD 4 digits, Status marker, Alarm status Sub marker: Emissivity, Measuring unit: °C or °F Refer to [3.2 Function keys and digital display] and [3.2.2 Markers].
(9) Terminal board (Model IR-CA□□T□□ only)	Connect the thermometer by using the exclusive cable (IR-ZCRT) or the recommended cable. (Ref. [5.1.2 Terminal wirings]).
(10) Connector (Model IR-CA□□C□□ only)	Connect the thermometer by using the exclusive cable (IR-ZCRC or IR-ZCRL). (Ref. [5.1.1 Connector connections])

3.2 Function keys and digital display



3.2.1 Functions keys*1

Keys	Functions	Indications
(1): Select key	Used to select a parameter menu in the operating mode or the engineering mode.	SEL
(2): Next key	Used to select a parameter in the parameter selection mode or to shift a digit for numeric entries to the right in the parameters programming mode.	▶
(3): Up key (4): Down key	Used to select a parameter in the parameter selection mode or to scroll numeric characters in the parameters programming mode.	▲ ▼
(5): Entry key	Used to store the selected or programmed parameter.	ENT

3.2.2 Markers

Main display*2: Displays the measured value in the measurement mode, or a parameter in the parameter selection or programming mode.

Sub display*3: Displays the parameter menu selected by SEL key in the measurement mode, or a parameter menu in the parameter selection or programming mode.

Names	Markers	Major functions	Indications
(6): Main marker	Tb	Not used	“Tb”
	CONT	Not used	“CONT”
	MEM	Not used	“MEM”
	PEAK	Not used	“PEAK”
(7): Status marker	AL	Will light when the low alarm is activated.	“AL”
	AH	Will light when the high alarm is activated.	“AH”
(8): Temperature unit	C	Will light when a temperature is displayed in Celsius.	“C”
	F	Will light when a temperature is displayed in Fahrenheit.	“F”
(9): Sub marker	ε	Will light when the sub display shows an emissivity. ε (emissivity) is for single-color type.	“ε”

4. Installation (Refer to [3. Names and functions of component parts].)

4.1 Precautions in installation

This IR-CA series radiation thermometer is a sensitive instrument.

Install it by referring to the following cautions.

Caution

- **Vibration and impacts**
Vibration or impacts reduces the liability of the thermometer and causes an unstable measurement by the targeting shake to a measuring surface. If you install the thermometer in the place where vibration or impacts exist, its careful periodic inspection is requested.

Caution

- **Induction**
The thermometer is designed for anti-induction but install it as far as possible from an induction heating generator and power line distance factor.

Caution

- **Working temperature**
The working temperature of the thermometer is 0 to 50°C. If the ambient temperature is high or if the temperature of the thermometer exceeds the maximum working temperature by reflection from a high temperature substance, etc., water-cooling of the thermometer is absolutely necessary. When the temperature of the thermometer does not exceed but closely reaches to the maximum working temperature, water-cooling of the thermometer is recommended for maintaining of the reliability of the thermometer.

Caution

- **Optical path**
Select a place for installation of the thermometer, where water-drops, dust, smoke, steam, etc. would not enter between the thermometer and a measuring surface. If such place cannot be selected and the affection by existence of such substances cannot be ignored, blowing-out of such substance with air-purge is necessary.

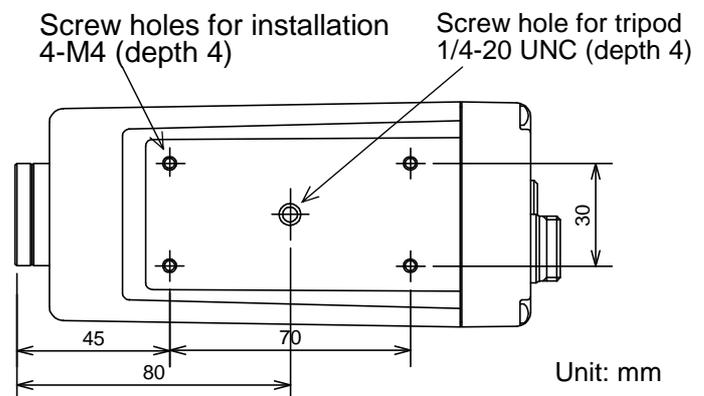
Caution

- **Disturbances to make indication of measured value higher**
Select a place for installation of the thermometer, where sunlight, light of incandescent lamp, flame, heat radiation from a high temperature substance, etc. is not reflected to the measured surface and the cover glass of the thermometer. When such light is reflected, higher temperature than the exact one will be indicated. (The affect by such reflection will be great for the measurement of low temperature.) If such place cannot be selected, shade the thermometer or take similar precautionary measures.

4.2 Installation

Install the thermometer to a tripod, universal head, protection case, or mounting plate etc., by using screw holes for tripod (1/4-20UNC) or screw holes for installation (4-M4) at the bottom side.

Please read the operation manual for an accessory when instilling it by using the exclusive accessories.



Caution

Don't use the thermometer in the following places.

- 1) Dusty place or a corrosive gas atmosphere.
- 2) Noisy and static electricity
- 3) Places where the ambient temperature is higher than 50°C or lower than 0°C.
- 4) Places where the ambient temperature changes abruptly, or high humid places.
- 5) Places where there are mechanical vibrations and impacts.
- 6) Places where combustible or volatile gas is existed.

4.3 Targeting

4.3.1 Measuring distance and measuring diameter

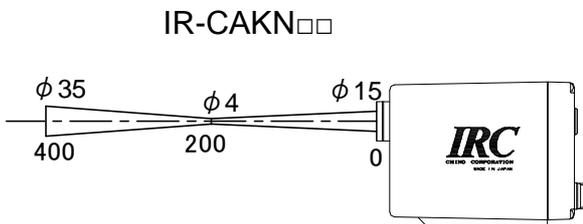
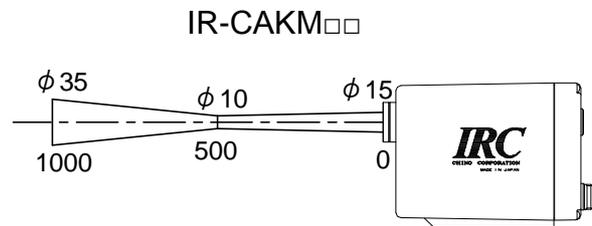
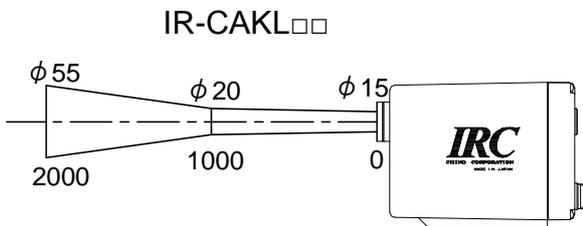
The relation of the measuring distance and the measuring diameter is defined by the distance factor as shown in the following table and figure.

Reference

Considering the dislocation of the optical axis, take the measuring area more than 1.5 times the measuring diameter.

[Measuring distance and measuring diameter table]

Models	Measuring distance and the measuring diameter
IR-CAKL□□	φ20/1000mm
IR-CAKM□□	φ10/500mm
IR-CAKN□□	φ4/200mm



Unit: mm

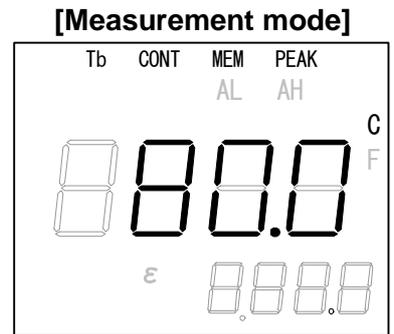
Caution

For the installation of the thermometer with a protective case, house the thermometer to the protective case after adjusting the focus of the thermometer.

4.3.2 Focusing of laser targeting function

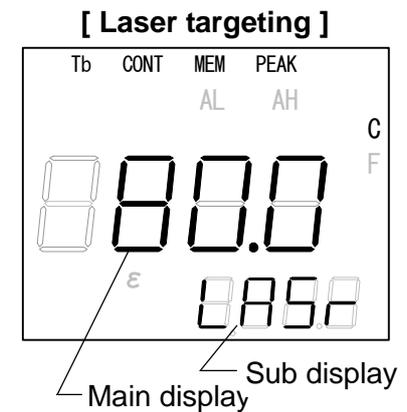
For the laser targeting, focus a measuring object by the procedure shown below after connections (Ref. [5. Connections and wirings]).

- (1) Open the control panel cover.
- (2) Measurement starts with the display of the measurement mode screen with a temperature value displayed in the main display part as shown right.
- (3) To activate the laser targeting, press **SEL** and  keys simultaneously for 2 seconds in the measurement mode screen until “LASr” appears in the sub display.



Reference

During the laser targeting, “LASr” is displayed in the sub display as shown in the right figure. Place the thermometer to make the laser light target the center of a measuring object.



- (4) To stop the laser targeting, press **SEL** and  keys simultaneously for 2 seconds in the condition that “LASr” is displayed in the sub display.
- (5) “LASr” will disappear and the screen will return to the measurement mode screen.



Warning

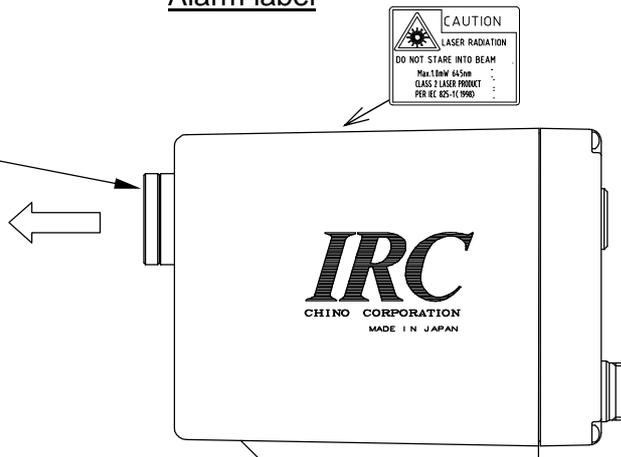
Laser may damage your eyes.
Don't stare into a laser beam.

Caution

1. Make sure to target the laser when you want to decide the center of the measuring object only and to keep on following the above procedure when you exactly target the laser.
2. Any adjustment or procedure other than specified here makes you expose in dangerous laser radiation.

Alarm label

Laser light is radiated here. (*)



Caution

Make sure to target the laser when you want to decide the center of the measuring object only and to go off it after the center of the measuring object is decided.



Warning

When the laser targeting is activated, the laser light is radiated from the place marked with (*). Make sure not to stare into a beam.

5 .Connections and wirings (Refer to [3. Names and functions of component parts].)

5.1 Connections

 **Warning**

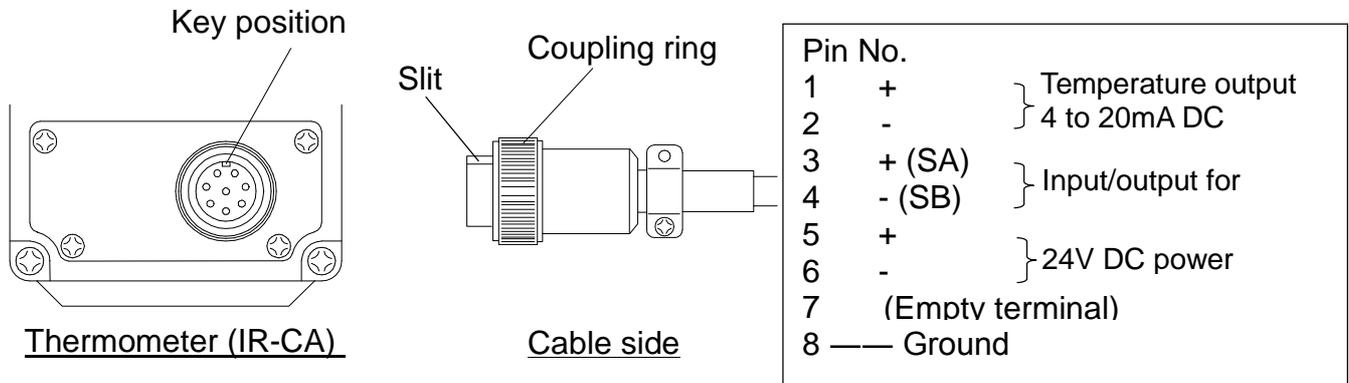
Make sure to turn off the power supply for preventing an electric shock when connecting and wiring.

5.1.1 Connector connections (For model IR-CAK□C□)

5.1.1-1 Connection of the exclusive cable IR-ZCRC□□□

The connections are completed by simply connecting the connector of the cable (IR-ZCRC) to the connector placed at the rear side of the thermometer.

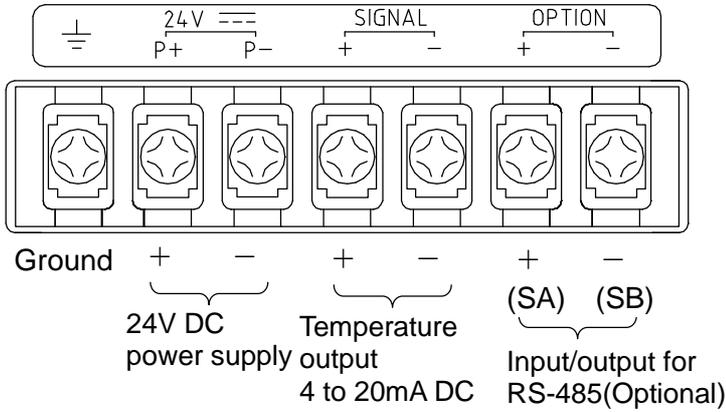
- (1) For the connection, align the slit in the connector of the cable and the key position in the connector of the thermometer, and firmly insert the cable connector, and then turn the coupling ring clockwise until it is locked.
- (2) For the disconnection, turn the coupling ring counterclockwise for releasing its locked status, and pull the connector of the cable forward.



5.1.2 Terminal wirings (For model IR-CAK□T□)

5.1.2-1 Wirings of the exclusive cable IR-ZCRT□□□

Connect the exclusive cable (IR-ZCRT) or a commercially available cable to the terminal board (Terminal screw size: M3) placed at the rear side of the thermometer.



Cable specifications

Shielded twisted pair cable

· Nominal sectional area: 0.5mm²

· Recommended cable: Sunlight SX
3P x 0.5mm²

5.1.2-2 Wirings to power terminals

Warning

Make sure to turn off the power supply for preventing an electric shock when connecting and wiring.

5.1.2-3 Wirings to ground terminals

Caution

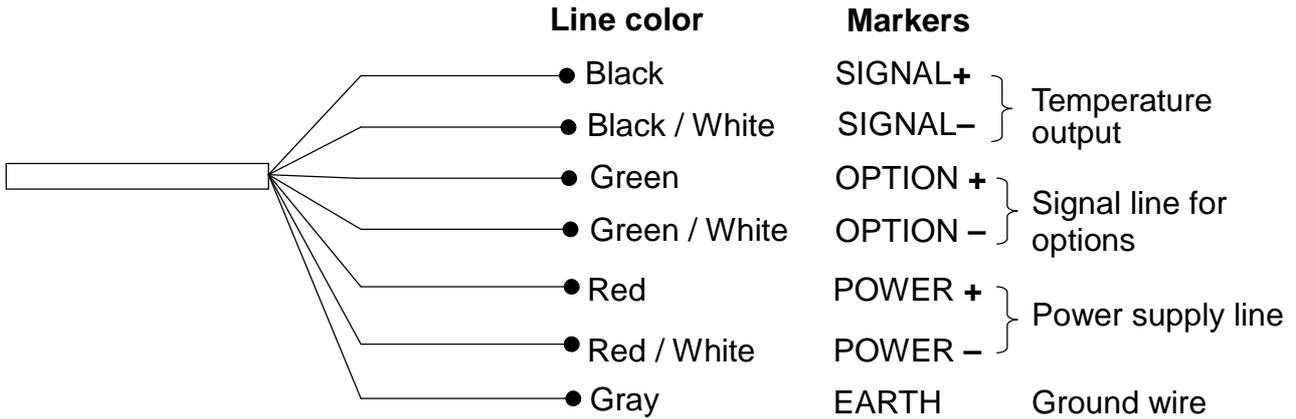
Provide a low impedance earth ground (lower than 100Ω) connection to the ground terminal.

5.1.3 Wirings to receiving instruments

Reference

The current output is 4 to 20mA DC and isolated.
 Connect the signal terminals and a receiving instrument.
 The contact output is the open collector output (photo-coupler).
 Use a receiving instrument under the ratings (30V, 50mA).

Connection cable detailed figure for receiving instrument side



5.1.4 Connections to option + and option - terminals

For IR-CA□□□S (RS-485 communications): Connect to SA and SB terminals.

Caution

For IR-CA□□□S, refer to the separate instruction manual [IR-CA Communications Instruction Manual].

6. Operation

6.1 Self-diagnostic function

This self-diagnosis function is built-in. An error No will be displayed on abnormal conditions.

Main display	Contents	Countermeasure	Output (Note*)
	Ambient temperature is abnormal	Use the thermometer in the environment from 0 to 50°C.	Yes
	Motor rotation is abnormal	Built-in motor is abnormal. Return to factory to us, and please order the repair Analog output is about 2mA DC.	Yes
	E ² PROM abnormal (Writing and reading impossible)	Return to factory to us.	Yes
	Analog output correction data abnormal (Same data before correction existed.)	Check the data before correction again.	No
	Zero/span adjustment abnormal (Data at zero > data at span)	Adjust zero and span again.	No
	Remote emissivity programming exceeding the programmable range	Program to 0.001 when the emissivity programming value is overshooting from the minimum value and 1.999when it is overshooting from the maximum value.	No
	Automatic emissivity calculation exceeding the programmable range	Program the emissivity value to1.000. However, this programming is not stored.	No

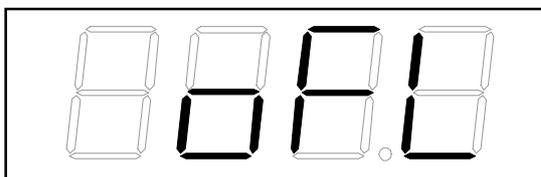
(Note*)

On the items with “Yes” in the output column, the contact signal for the abnormal condition is outputted from the contact output terminals (OFF at abnormal condition). This output is available when “Self-diagnostic abnormal” is selected in [Contacts output item selection] in the engineering mode.
(Refer to the separate instruction manual [IR-CA series Software volume])

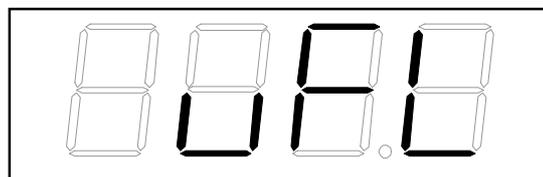
6.2 Overflow/underflow

- “oFL” is displayed when the measured temperature is higher than (420°C).
- “uFL” is displayed when the measured temperature is lower than (- 5°C).

[Overflow]



[Underflow]



7. Maintenance and check

7.1 Periodical checking...Check the followings periodically or if required.

•**Lens:** Check the objective lens for dust or dirty.

If dirt is present, remove it with a blower for camera lens. If the dirt cannot be removed with the blower, wipe the lens gently with cotton ball soaked in alcohol.

•**Connections and wirings:** Check all connections and wirings.

 **Warning**

1. Do not disassemble this thermometer. If you disassemble, it causes the obstacle to your eye because laser function is built-in.
2. Make sure to target the laser when you want to decide the center of the measuring object only and to keep on following the above procedure when you exactly target the laser. Any adjustment or procedure other than specified here makes you expose in dangerous laser radiation.

7.2 Trouble shooting

7.2.1 Measuring value not displayed or displayed lower

Checking item	Countermeasure
1) Is Er03' lighted' the error display of motor turn abnormality?	Built-in motor is abnormal. Return to factory to us, and please order the repair
2) The power voltage is not in the allowable range.	Supply the power with the correct voltage.
3) The Connection cable is not connected firmly.	For the disconnection of the cable, replace it.
4) The view field is interfered.	Make the view field not interfered by referring to [4.3 Targeting].
5) The measured temperature is lower than the minimum value of the measuring range.	It is necessary to use a thermometer with the measuring range covering the measured temperature.
6) The emissivity value programmed is too high.	Program the emissivity value by referring to [Emissivity programming]. (*)
7) The atmosphere temperature is low, the optic system is doing no dew .	It uses it in the place where does not do dew.

7.2.2 Measuring value displayed higher

Checking items	Countermeasure
1) The measured temperature is higher than the maximum value of the measuring range.	It is necessary to use a thermometer with the measuring range covering the measured temperature.
2) The emissivity value programmed is too low.	Program the emissivity value by referring to [Emissivity programming]. (*)
3) The heat radiation of the high temperature is shining to the measurement face or thermometer from the outside.	Heat is prevented with the board that does not pass the change or light of the place

7.2.3 Display fluctuated

Checking items	Countermeasure
1) The radiation thermometer is not fixed firmly or vibrated.	Fix the radiation thermometer firmly and install it in a place not vibrated.
2) The connector and terminal are not connected firmly.	Connect the connector and terminal firmly.
3) The power voltage is not in the allowable rang	Supply the power with the correct voltage.
4) The view field is interfered by steam.	Purge the steam by air.
5) The measured temperature is fluctuated exactly.	Program the emissivity value and the modulation degree by referring to the following paragraphs. [Emissivity programming](*) [Automatic emissivity calculation] (*) [Signal modulation mode selection] (*) [Modulation degree programming] (*)
6) Emissivity value is changeabing.	

(*): Refer to separate instruction manual [IR-CA series Software volume].

8. Reference

8.1 Emissivity table

The emissivity are values determined by the material of object, profile of its surface, surface roughness, oxidized or not, measuring temperature, measuring wavelength and other factors.

They are represented by the thermal radiation ratio " ε " when a black body furnace at the same temperature is measured in the same wavelength band.

The emissivity " ε " is generally known by a value at the wavelength of $0.65\mu\text{m}$ when an optical pyrometer is used. The emissivity changes according to the above factors even in case of the same material. Please use the following table as a reference.

8.1.1 Emissivity table ($\lambda = 0.65\mu\text{m}$)

Metal	Emissivity		Oxide	Emissivity
	Solid	Liquid		
Zinc	0.42	—	Alumel (*)	0.87
Alumel	0.37	—	Chromel(*)	0.87
Aluminum	0.17	0.12	Constantan (*)	0.84
Antimony	0.32	—	Ceramics	0.25 to 0.5
Iridium	0.30	—	Cast iron (*)	0.70
Yttrium	0.35	0.35	55Fe. 37.5Cr. 7.5Al (*)	0.78
Uranium	0.54	0.34	70Fe. 23Cr. 5Al. 2Co (*)	0.75
Gold	0.14	0.22	80Ni. 20Cr (*)	0.90
Silver	0.07	0.07	60Ni. 24Fe. 16Cr (*)	0.83
Chromium	0.34	0.39	Stainless steel (*)	0.85
Chromel P	0.35	—	Aluminum oxide	0.22 to 0.4
Cobalt	0.36	0.37	Yttrium oxide	0.60
Constantan	0.35	—	Uranium oxide	0.30
Zirconium	0.32	0.30	Cobalt oxide	0.75
Mercury	—	0.23	Columbium oxide	0.55 to 0.71
Tin	0.18	—	Zirconium oxide	0.18 to 0.43
Carbon	0.8 to 0.9	—	Tin oxide	0.32 to 0.60
Tungsten	0.43	—	Cerium oxide	0.58 to 0.82
Tantalum	0.49	—	Titanium oxide	0.50
Cast iron	0.37	0.40	Iron oxide	0.63 to 0.98
Titanium	0.63	0.65	Copper oxide	0.60 to 0.80
Iron	0.35	0.37	Thorium oxide	0.20 to 0.57
Copper	0.10	0.15	Vanadium oxide	0.70
Thorium	0.54	0.34	Beryllium oxide	0.07 to 0.37
Nickel	0.36	0.37	Magnesium oxide	0.10 to 0.43
80Ni /20Cr	0.35	—		
60Ni / 024Fe / 16Cr	0.36	—	(*) : Oxidized on surfaces	
Platinum	0.30	0.38		
90Pt / 10Rh	0.27	—		
Palladium	0.33	0.38		
Vanadium	0.35	0.35		
Bismuth	0.29	—		
Beryllium	0.61	0.61		
Manganese	0.59	0.59		
Molybdenum	0.37	0.40		
Rhodium	0.24	0.30		

8.1.2 Emissivity table ($\lambda = 8$ to $11.5\mu\text{m}$)

Metal	Emissivity
Aluminum	0.025 to 0.35
Chrome	0.07 to 0.85
Cobalt	0.35 to 0.44
Copper	0.03 to 0.80
Gold	0.02
Steel plate	0.10 to 0.80
Lead	0.13 to 0.65
Magnesium	0.07 to 0.0.75
Molybdenum	0.10 to 0.80
Nickel	0.04 to 0.85
Palladium	0.05
Platinum	0.07
Rhodium	0.05
Silver	0.02 to 0.12
Tantalum	0.08 to 0.75
Tin	0.06 to 0.60
Titanium	0.15 to 0.60
Tungsten	0.06
Zinc	0.04 to 0.30

Alloy	Emissivity
Brass	0.03 to 0.60
Chromel-Alumel	0.03 to 0.80
Constantan, Manganin	0.05 to 0.35
Inconel	0.10 to 0.85
Monel	0.10 to 0.70
Nichrome	0.20 to 0.85

Ceramics	Emissivity
Alumina ceramics	0.60
Red brick	0.90
White brick	0.80
Silicon brick	0.80
Sillimanite brick	0.60
Ceramics	0.90
Magnesite	0.60

Other	Emissivity
Asbestos	0.90
Asphalt	0.85
Carbon	0.85
Graphite	0.80
Soot	0.95
Cement, Concrete	0.70
Cloth	0.80

Reference

Use the above tables as a reference.

9. General Specifications

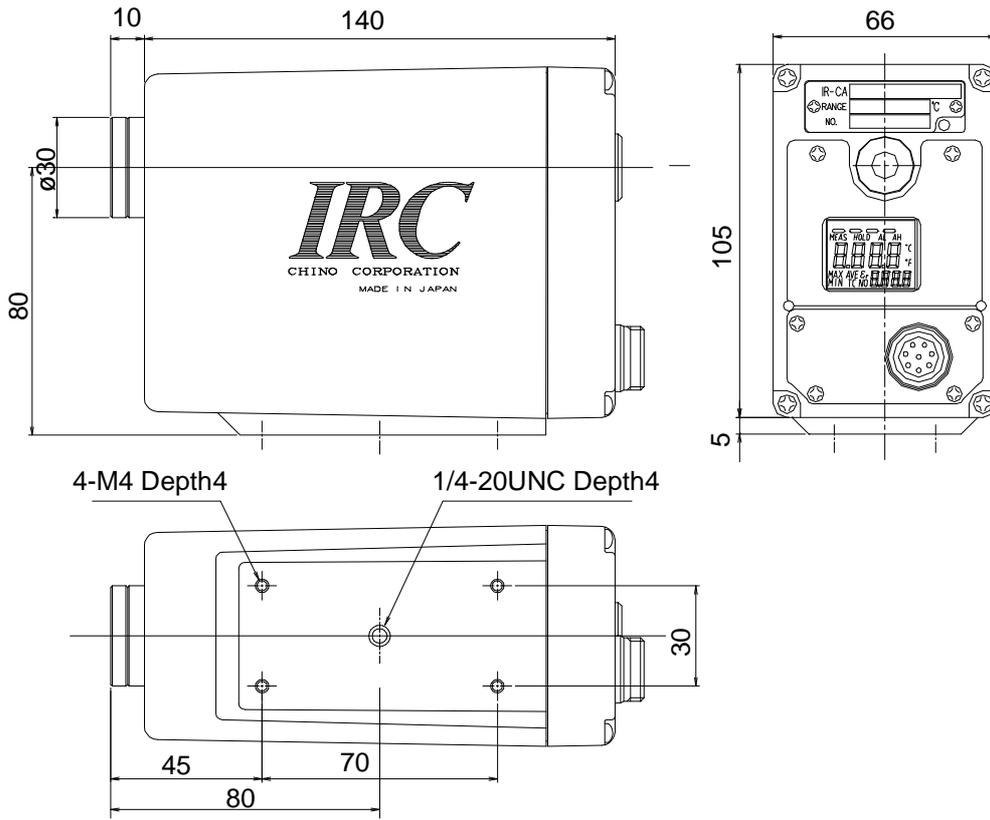
9.1 Thermometer

Model	IR-CAK
Measuring system	Single –color radiation thermometer
Detecting element	PbSe
Measuring wavelength	4 μ m
Measuring range	50 to 400°C*1
Accuracy ratings	$\pm 3.0^\circ\text{C}^{*1}$ (at $\varepsilon \doteq 1.0$ and reference operating conditions : $23\pm 5^\circ\text{C}$,35 to 75%RH)
Repeatability	Within 1.0°C
Stability	Temperature drift 0.15°C/°C
Resolution	1.0°C
Response time	1.5ms
Emissivity compensation	Emissivity range 1.999 to 0.050
Signal modulation	DELAY: First-order lag (Modulation time constant: 0.0 to 99.9s, 0.1s increment or 0.00 to 9.99s, 0.01s increment) Real signal must be set at 0 sec. PEAK: Peak tracing (Damping degree 0.1 to 10.0°C /s, 0.1s increment)
Display system	Temperature: LCD digital 4 digits Parameter: LCD digital 4 digits
Optical system	Fixed focus lens type
Measuring diameter	IR-CAKL□□ : $\phi 20\text{mm}/1000\text{mm}$ IR-CAKM□□ : $\phi 10\text{mm}/500\text{mm}$ IR-CAKN□□ : $\phi 4\text{mm}/200\text{mm}$
Sighting	Laser targeting without viewfinder
Analog output	4 to 20mADC, Isolated output, Load resistance: less than 500 Ω ·Accuracy: $\pm 0.2\%$ (to the full scale of scaling) ·Analog output resolution: 0.04% (to the full scale of scaling) ·Output scaling (optional programming in measuring temperature range) ·Dummy output (optional programming in 0 to 100% of analog output.) ·About 2mA DC output , when motor rotation error occurs.
Parameter settings by keys	·Operator mode: Emissivity, signal modulation, alarm and others ·Engineering mode: Measurement unit, output scaling, ZERO/SPAN, output correction and others including option-related-parameters
Calculation function	·ZERO/SPAN adjustment ·Automatic emissivity calculation ·Output correction
Self-diagnostic	Thermometer temperature abnormal, motor rotation abnormal, parameter error
Communications interface (Option)	RS-485 (option): Sending of measured data (up to 1-digit below decimal point), and sending/receiving of parameters
Ambient Temperature	0 to 50°C
Allowable vibration	Less than 3G
Rated power supply	24V DC $\pm 10\%$
Power consumption	About 12VA
Connections	Connector type or terminal type
Housing material	Aluminum
Weight	About 1.3kg

*1:Display 0 to 400°C , Accuracy rating is guarantee within the range from 50 to 400°C

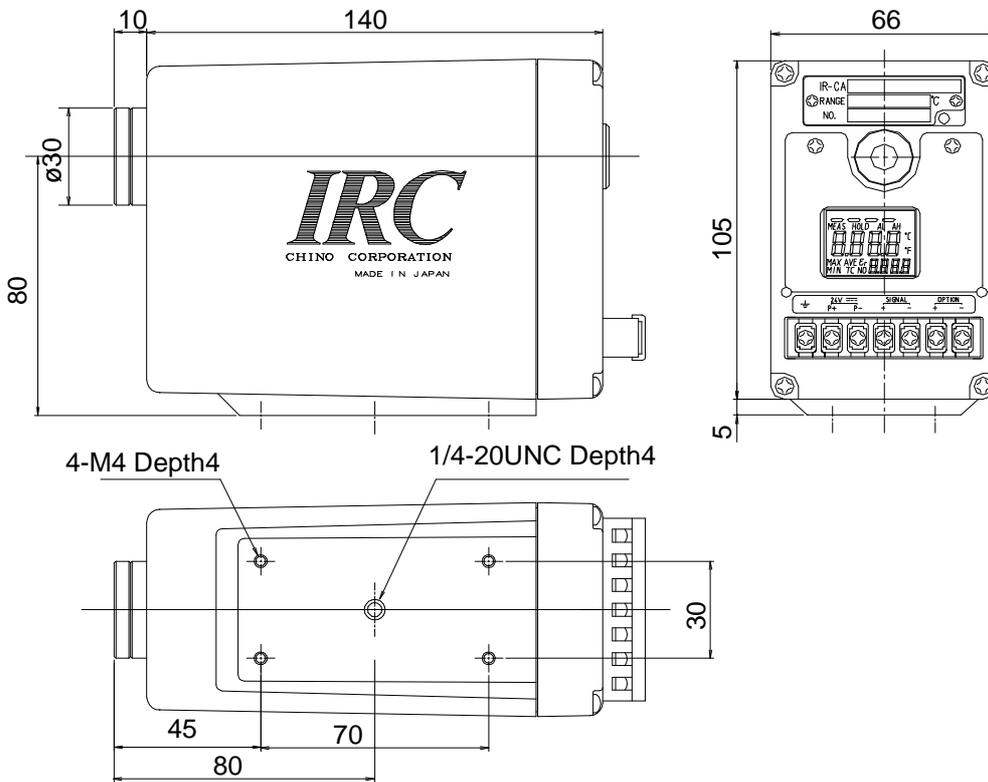
9.2 IR-CA□□□ outside dimensions

9.2.1 IR-CA□C□ (Connector type)



Unit: mm

9.2.2 IR-CA□T□ (Terminal type)

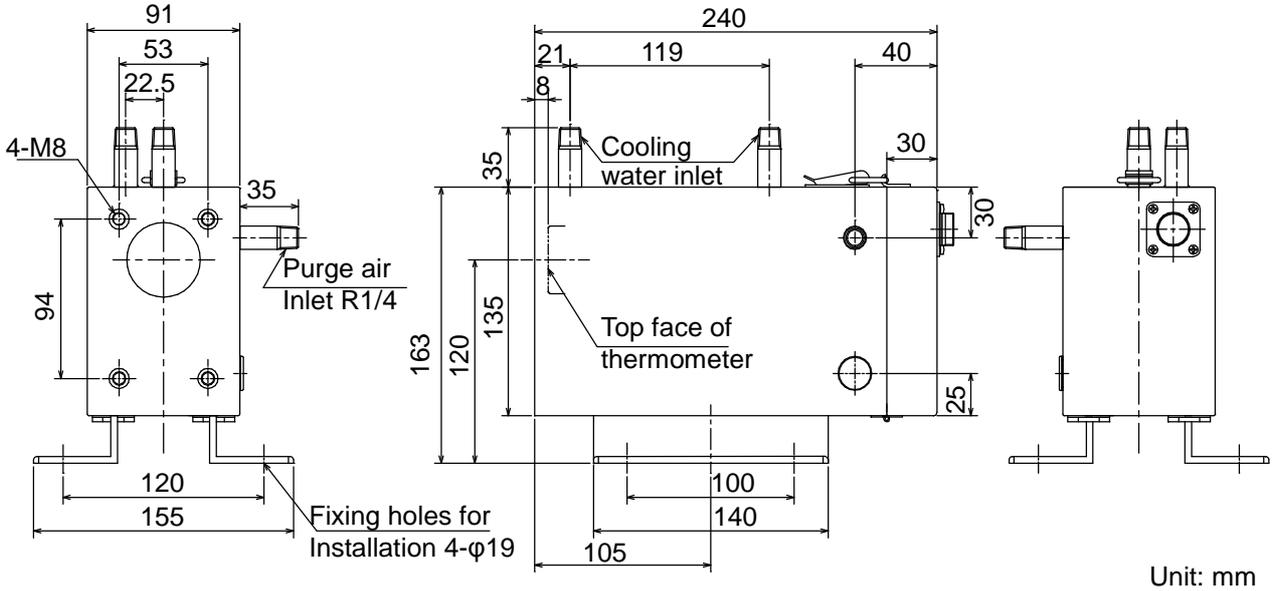


Unit: mm

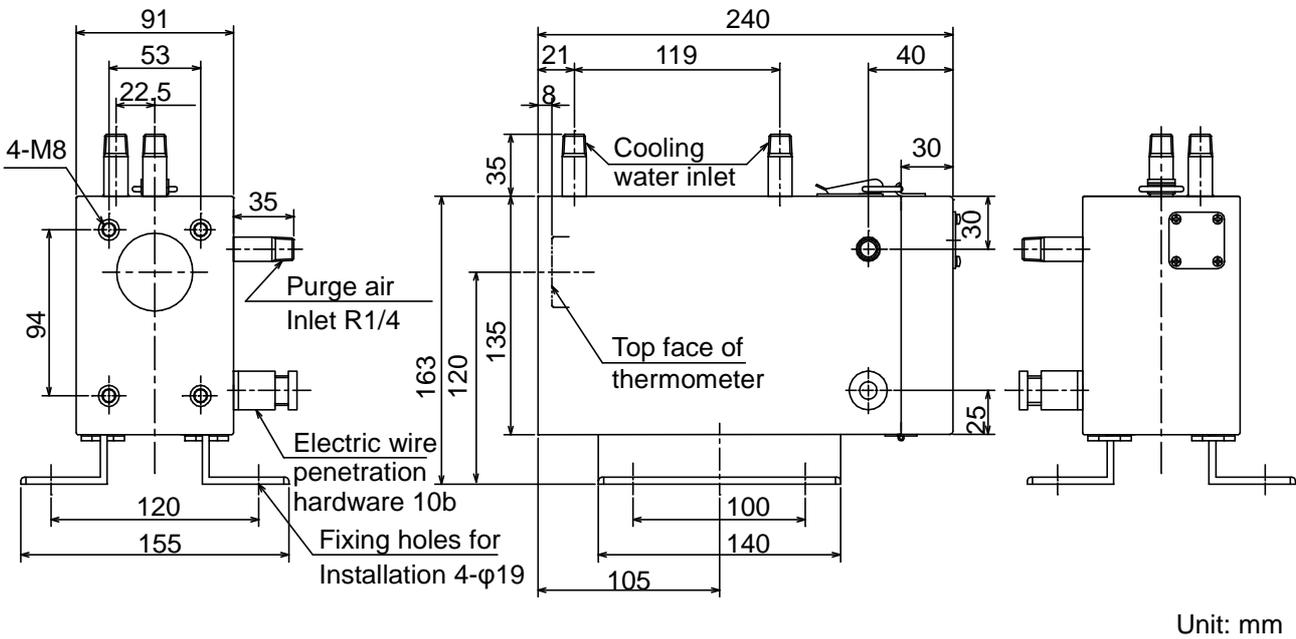
9.3 Accessories outside dimensions

9.3.1 Protective case (Hard type) IR-ZCCH□

9.3.1-1 IR-ZCCHC (Connector type)

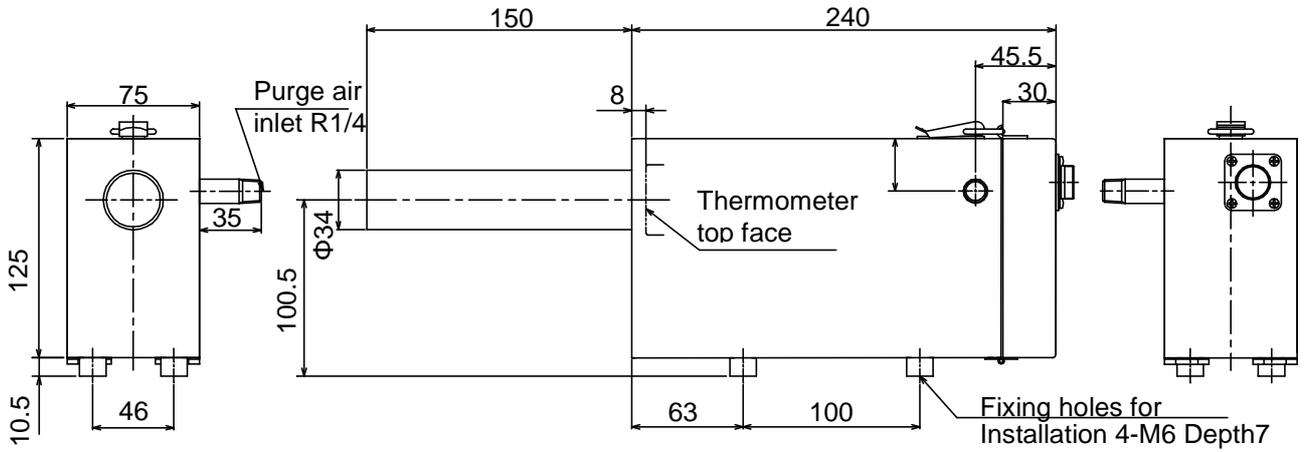


9.3.1-2 IR-ZCCHT (Terminal type)



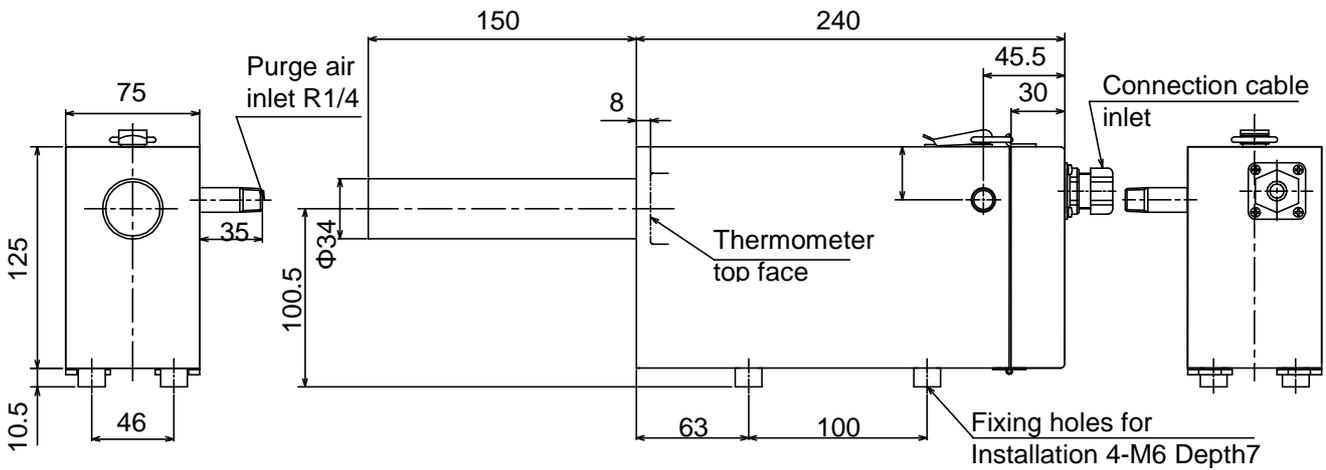
9.3.2 Protective case (Soft type) IR-ZCCS□

9.3.2-1 IR-ZCCSC (Connector type)



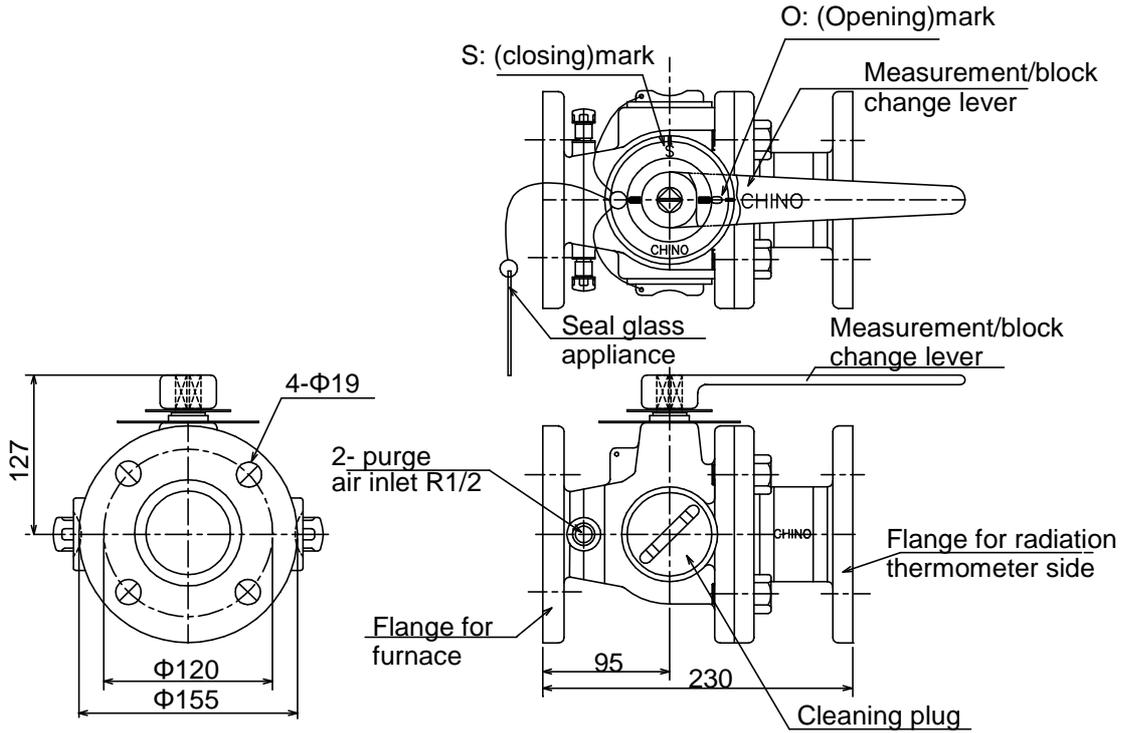
Unit: mm

9.3.2-2 IR-ZCCST (Terminal type)



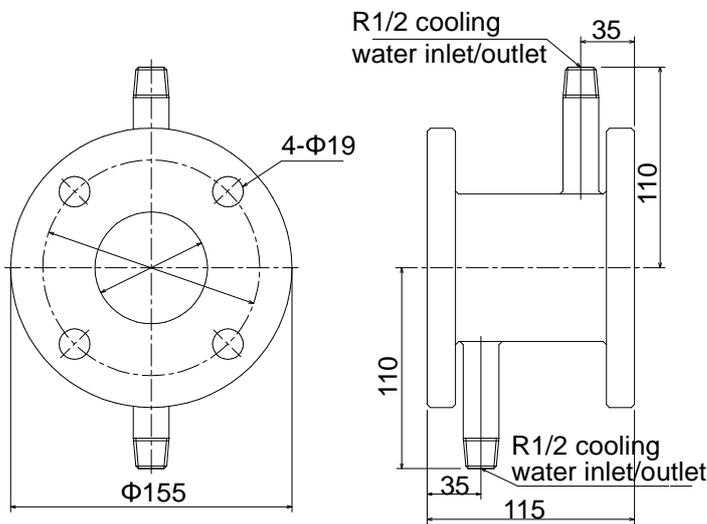
Unit: mm

9.3.3 Sealing window IR-ZW□



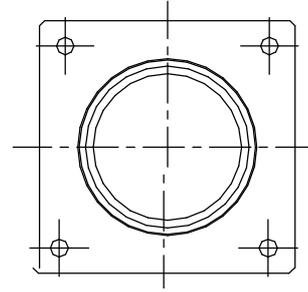
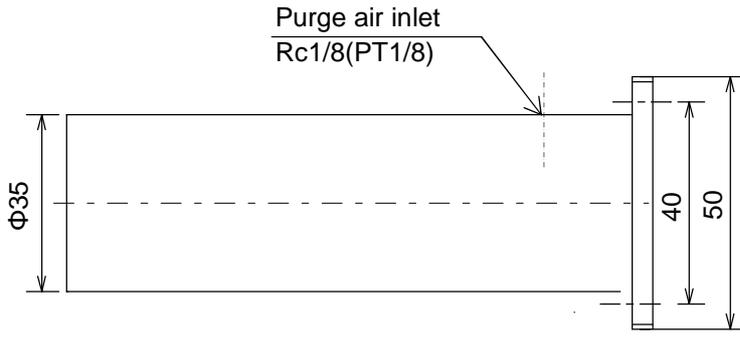
Unit: mm

9.3.4 Water-cooling flange IR-VSW



Unit: mm

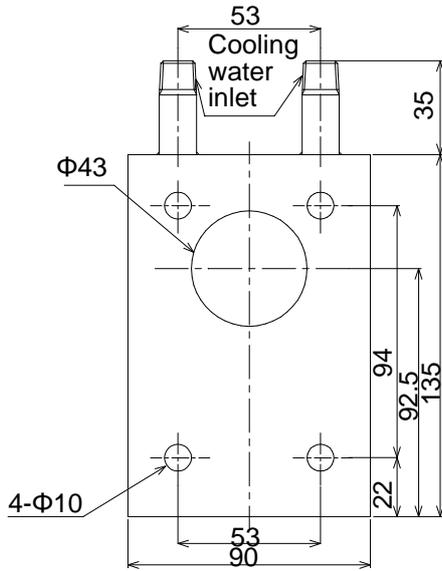
9.3.5 Air-purge hood IR-VAAPFX1



Purge air: Use clean air
Purge air flow: 0 to 200l/min

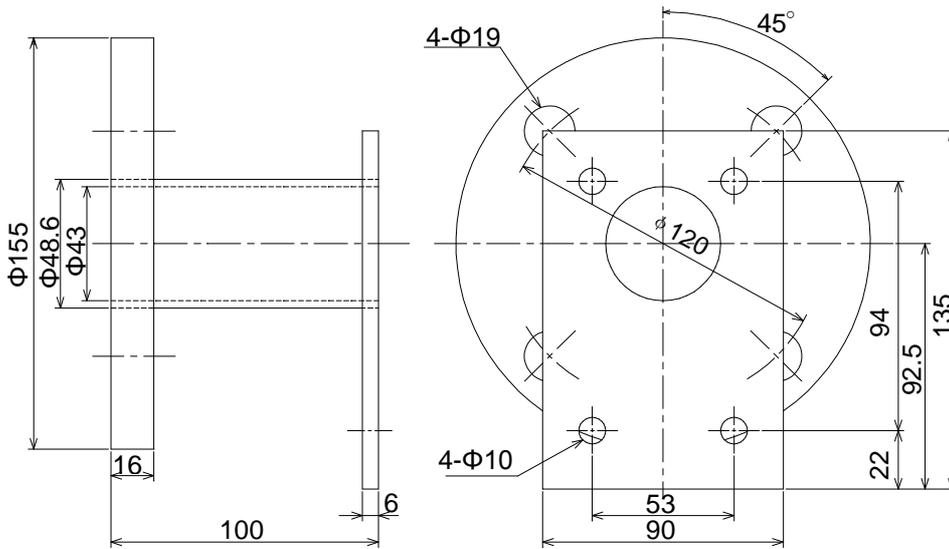
Unit: mm

9.3.6 Water-cooling plate IR-ZCWC



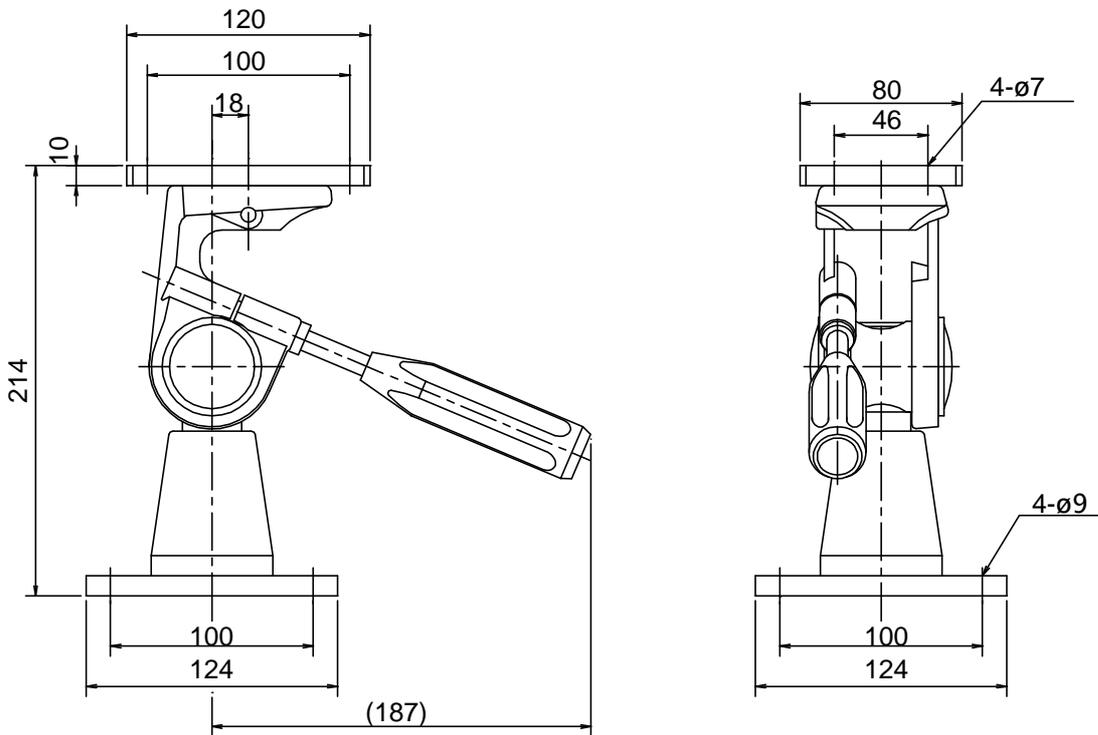
Unit: mm

9.3.7 Flange installation plate IR-ZCAF



Unit: mm

9.3.8 Simple type universal head IR-ZMS



Unit: mm

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