

The logo for CHINO, consisting of the word "CHINO" in a bold, white, sans-serif font with a black outline, set against a dark gray rectangular background.

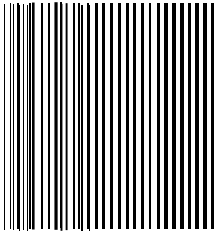
IR-SA Series

Infrared radiation thermometer for
Processing

Model : IR-SAI

IR-SAS

IR-SAH



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

◆ 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

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Preface

To use infrared radiation thermometer for processing (Model IR-SAI, IR-SAS, IR-SAH) correctly and safely, please keep the following safety measures for the operation and storage of the thermometer.

1 Working conditions and environment


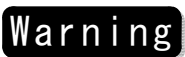

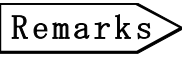
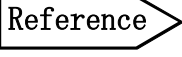
- The working temperature range of the thermometer is 0 to 90 °C. (No dew condensation)
- Do not use the thermometer in dusty places, etc. Remove the dust after using it.
- Be careful not to give vibration or impact to the thermometer. Install the thermometer as far as possible from an inductive oscillator 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 cable connector, 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.	
	Using "telescope" (Model: IR-ZYTS), do not see the object exceeding 1500°C directly.	
	Using "Laser pointer" (Model: IR-ZYLZ1) 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

The IR-SA series is an infrared radiation thermometer.

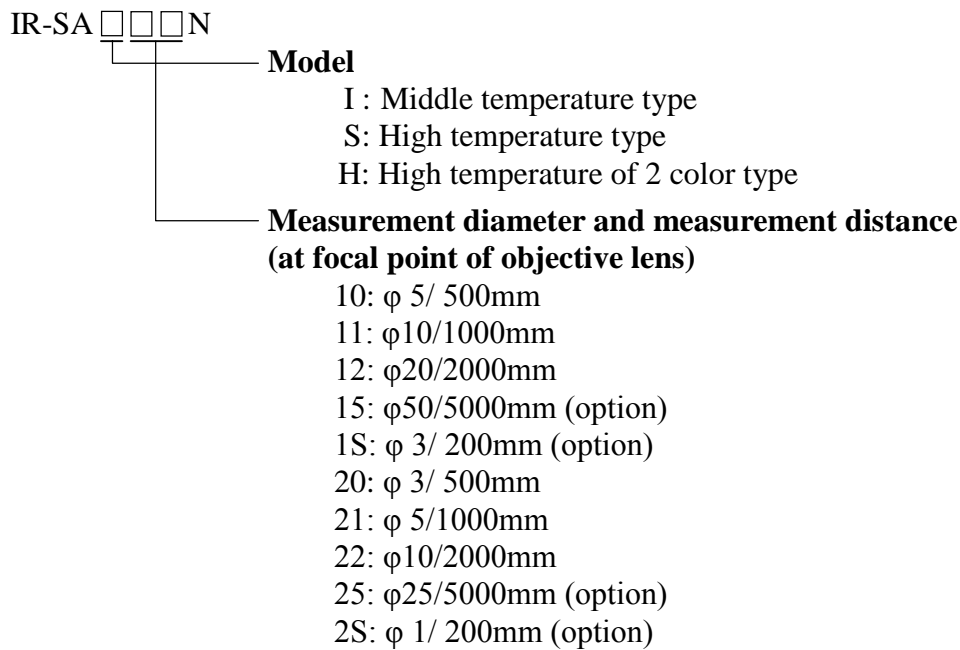
These thermometers has fixed focusing of long-distance factor, ability of working in 0 to 90°C ambient temperature, for free installation.

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, linealizer and modulation. The standardized final output is 4 to 20mA DC. Connected to “Setting display unit” (Model: IR-GZ), make programming or selection of emissivity, signal modulation and alarm function easy.

Various options and accessories are prepared for every kind of applications.

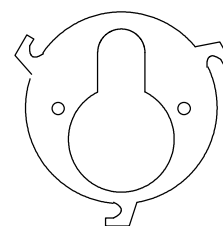
2. Model

2.1 Model



2.2 Belongings

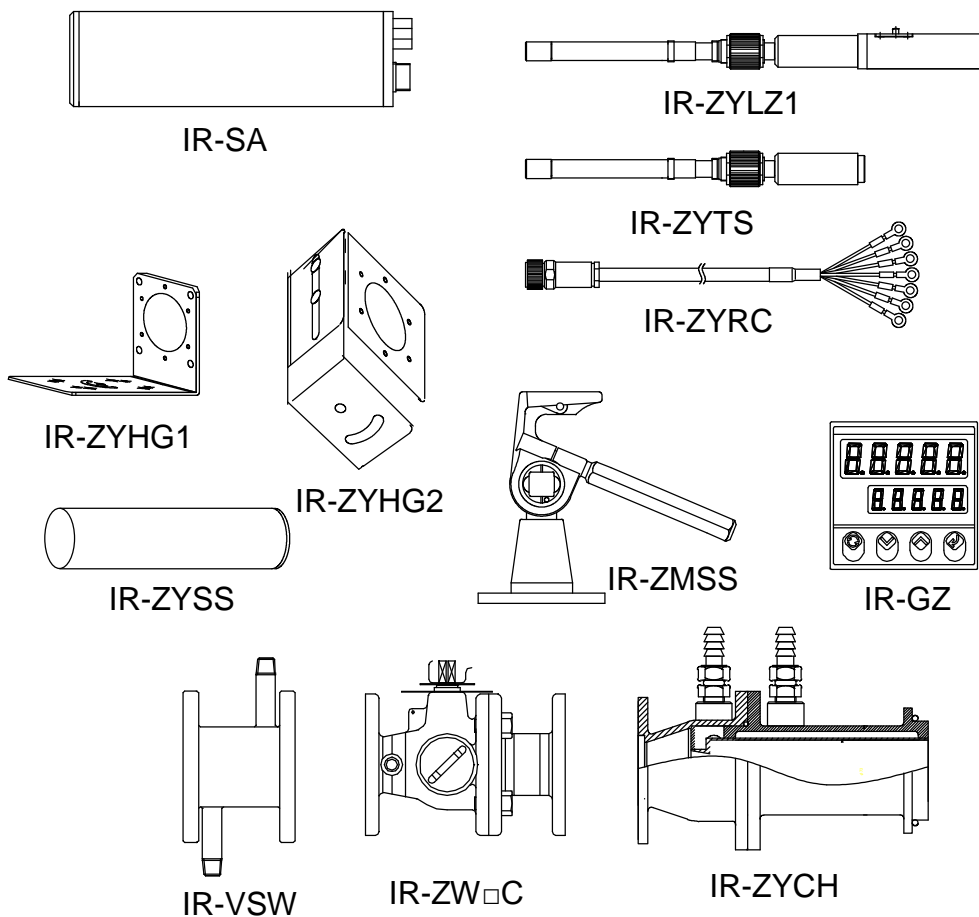
- Installation fittings 1piece
- Screw for Installation fittings 2piece



Installation fittings

2.3 Accessories Model

Accessories	Model	Reference
Setting display unit	IR-GZ	Setting Parameter, display measurement value, and power supply to IR-SA
Connecting cable	IR-ZYRC□□□	□□□:length (m) 002:2m,005:5m,010:10m,020:20m,100:100m
Telescope	IR-ZYTS	Insert to IR-SA, and bring the object into focus
Laser pointer	IR-ZYLZ1	
Protective case	IR-ZYCH	With water-cooling and air-purge
Sealing window	IR-ZW□C	
Water-cooling flange	IR-VSW	
Sighting tube	IR-ZYSS	
Setting plate	IR-ZYHG1	L type
Setting plate	IR-ZYHG2	L×2 type
Universal head	IR-ZMSS	



Reference

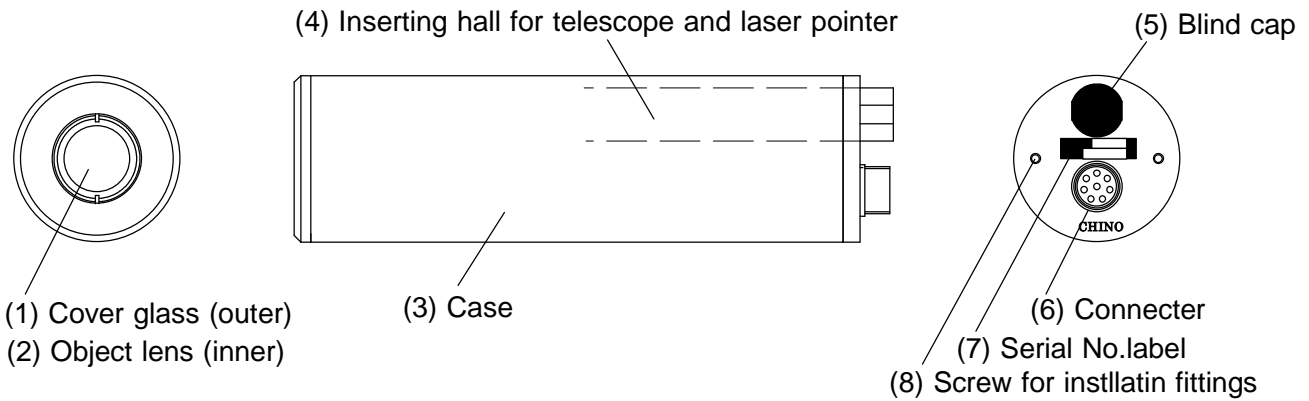
Accessories have many kinds of combinations for applications. Refer to a separate instruction manual for each accessory.

Caution

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

3. Names and functions of component parts

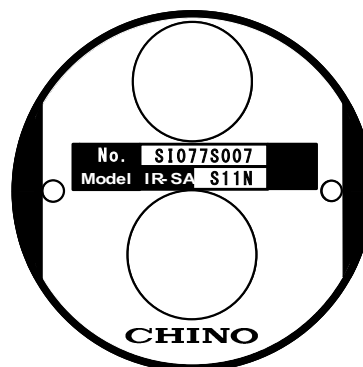
3.1 Overview



(1) Cover glass	An optical glass for protecting the objective lens from scratches, smudges, etc.
(2) Object lens	For focusing in a measuring area.
(3) Case	φ50mm stainless tube
(4) Inserting hall for telescope, laser pointer	A hall of Optical pass for inserting telescope(model : IR-ZYTS), Laser pointer (model:IR-ZYLZ1)
(5) Blind cap	For protecting inserting hall from water, dust
(6) Connector	Connect the thermometer by using exclusive cable (model : IR-ZYRC)
(7) Serial No. label	A label for indication of Model No., Serial No. For your inquiries, inform us of items.
(8) Screw for installation fittings	Two screws (2-M3, depth 6mm) for mounting installation fittings

3.2 Serial No. Label

Serial No. label indicates Model No. and Serial No.



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

4.1 Precautions in Installation

This IR-SA 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 90°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

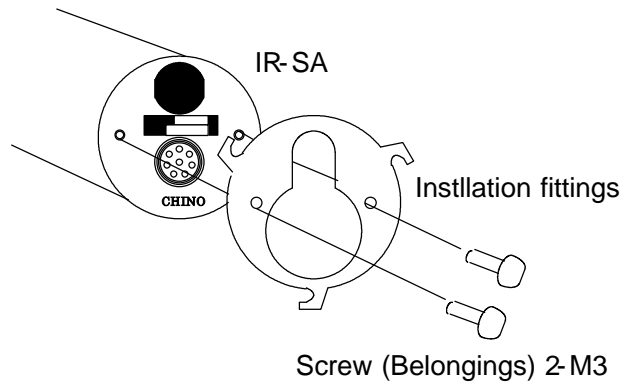
- **Disturbances to make indication of measured value higher**
Select a place for installation of the thermometer, where sunlight, light of incandescent lamp, flame, heat radiation from a high temperature substance, etc. is not reflected to the measured surface and the cover glass of the thermometer. 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

Before install the thermometer, mount the installation fittings to the thermometer by using screw.

And install the thermometer by using installation fittings.

Please read the operation manual for an accessory when installing 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 90°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.

Reference

There is top and bottom on attached installation fittings, install the wide one of the hole in the connector side.

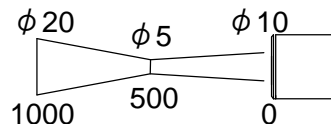
Reference

When you use protective case (model: IR-ZYCH), please mount the installation fittings belonged to the protective case. In details, refer to instruction manual of IR-ZYCH.

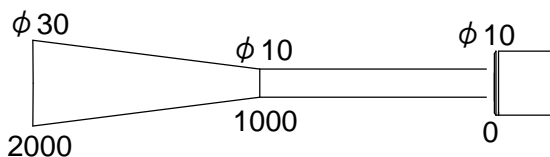
4.3 Measuring distance and measuring diameter

The relation of the measuring distance and the measuring diameter is indicated in figure below.

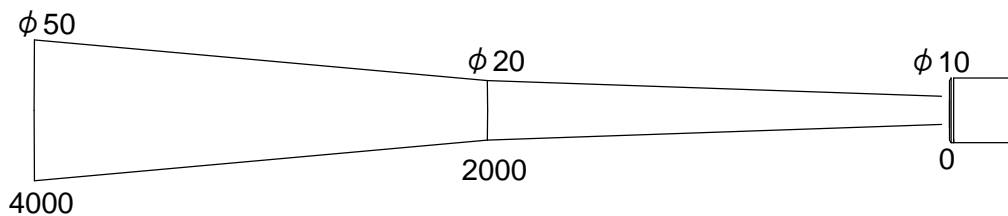
IR-SA□10N



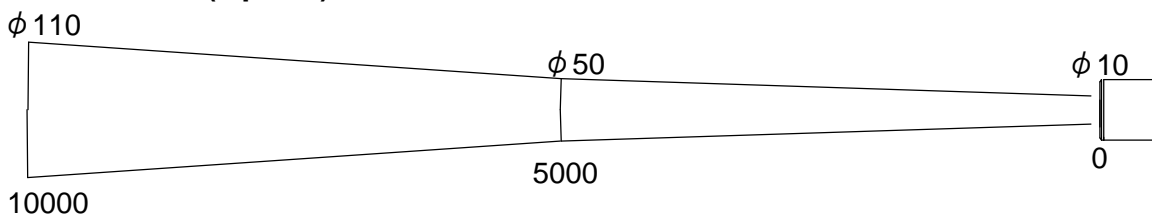
IR-SA□11N



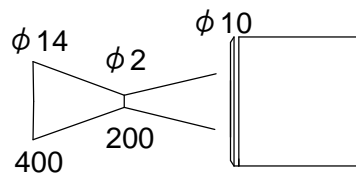
IR-SA□12N



IR-SA□15N (Option)

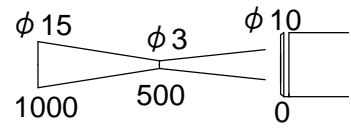


IR-SA□1SN (Option)

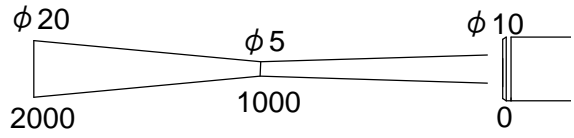


[Unit mm]

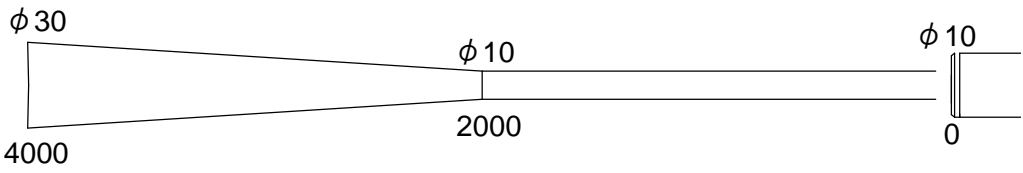
IR-SA□20N



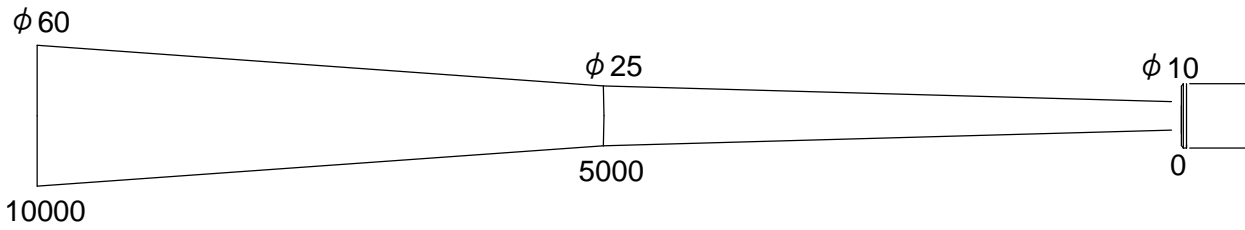
IR-SA□21N



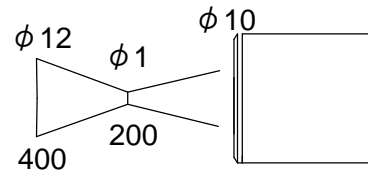
IR-SA□I22N



IR-SA□25N (Option)



IR-SA□2SN (Option)

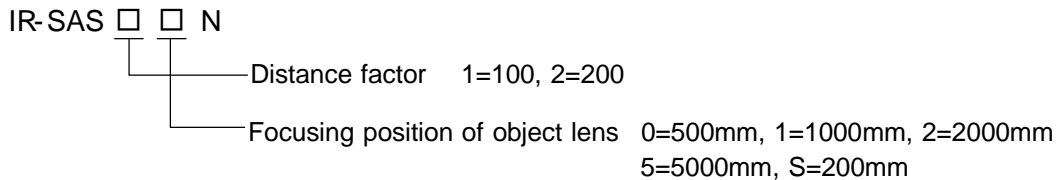


[Unit mm]

At focusing position of object lens, the relation of measuring distance and the measuring diameter are defined by the distance factor as shown in the following formula.

$$\text{Measuring diameter (mm)} = \text{Measuring distance (mm)} / \text{distance factor}$$

In case of IR-SA, distance factor and focusing position of object lens are shown in model name, the number of next beginning of alphabet shows it, and next number shows focusing position of object lens.



In position that does not focus, the relation of measuring distance and the measuring diameter are different. In this case, the relation of measuring distance and the measuring diameter are defined as shown in the following formula, assumed distance of focusing position of object lens from the thermometer is A, measuring diameter at focusing position is B.

When measuring distance is nearer than the focusing position of object lens
 $\text{Measuring diameter} = (B - 10) \times \text{Measuring distance} / A + 10$

When measuring distance is longer than the focusing position of object lens
 $\text{Measuring diameter} = (B + 10) \times \text{Measuring distance} / A - 10$

Unit (mm)

It is an upper figure to have shown these expressions of relations to the figure. 10 of the whole expression of relations is an object lens diameter.

Place the thermometer at the measuring distance, confirmed measuring diameter by an upper figure or formula.

Reference

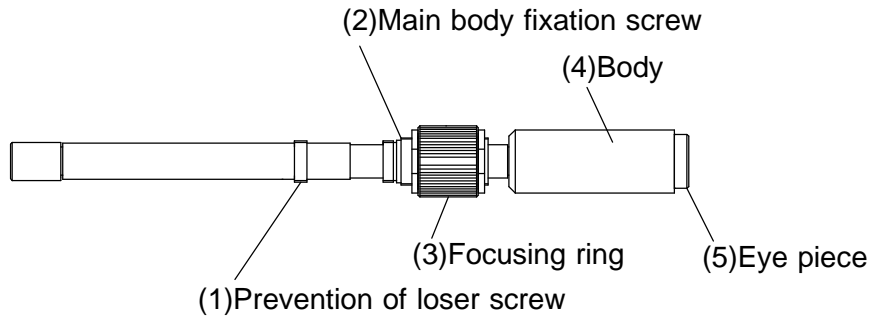
Considering the dislocation of the optical axis, take the measuring area more than 1.5 times the measuring diameter.

4.4 Targeting

Before beginning the measurement, please point the thermometer to the measurement object and install it. Telescope (model: IR-ZYTS (option)) and laser pointer (model: IR-ZYLZ1(option)) enable more correct targeting.

You can confirm the center of the measurement object, by using telescope or laser pointer.

4.4.1 Telescope (Model : IR-ZYTS)



- 1) Please remove blind cap of the thermometer counterclockwise, and insert telescope to insert hall for telescope and laser pointer.
- 2) Screw prevention of loser screw clockwise by operating body.
- 3) Screw main body fixation screw clockwise, and fix it in the thermometer.
- 4) See measurement object from eye piece and focus it by adjustment focusing ring.
- 5) Adjust installing to be able to see the center of measurement object.
- 6) If it is finished, remove telescope and install blind cap as before.

Warning

- Using “telescope”(Model: IR-ZYTS),do not see the object exceeding 1500 °C directly.

Caution

- When screw prevention of loser screw and main body fixation screw, do not operate the focusing ring, operate body for avoiding trouble.

Reference

Telescope (model: IR-ZYTS) is a instrument to confirm the center of the measurement object, and is not related with the measuring diameter to show by the telescope directly. (Refer to 4.3 measuring distance and measuring diameter)

Reference

Please turn focus ring counterclockwise to focus it near, adversely clockwise to focus it in the distance.

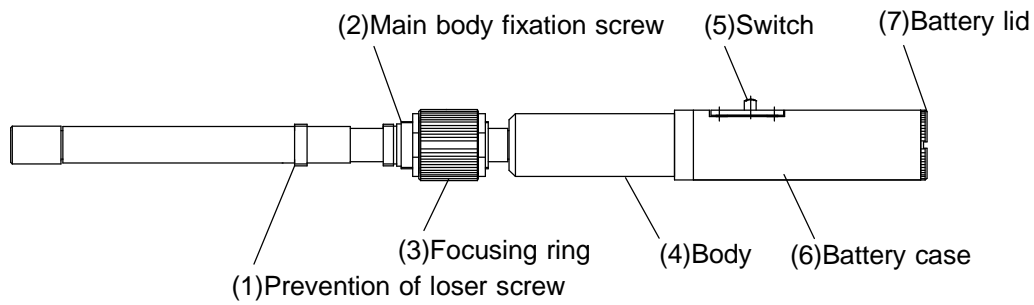
Reference

Waterproofing structure is not realized in the state that you used telescope. If it is finished, remove telescope and install blind cap as before.

Reference

Please refer to an individual instruction manual for details.

4.4.2 Laser pointer (MODEL : IR-ZYLZ1)



- 1) Please remove blind cap of the thermometer counterclockwise, and insert laser to insert hall for telescope and laser pointer.
- 2) Screw prevention of loser screw clockwise by operating body.
- 3) Screw main body fixation screw clockwise, and fix it in the thermometer.
- 4) Turn on the switch and bring the object into focus by adjustment focusing ring.
- 5) Adjust installing to be able to see the center of measurement object.
- 6) If it is finished, remove telescope and install blind cap as before.

Warning

●Using “Laser pointer”(Model:IR-ZYLZ1) 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.

Caution

●When screw prevention of loser screw and main body fixation screw, do not operate the focusing ring, operate body for avoiding trouble.

Reference

Please turn focus ring counterclockwise to focus it near, adversely clockwise to focus it in the distance. You can make laser beam a point.

Reference

Laser pointer (model: IR-ZYLZ1) is a instrument to confirm the center of the measurement object. (Refer to 4.3 Measuring distance and measuring diameter)

Reference

Waterproofing structure is not realized in the state that you used laser. If it is finished, remove laser pointer and install blind cap as before.

Reference

If it is finished, turn off the switch to avoid consumption of the battery. The battery to use is CR2 lithium battery for camera.

Reference

Please refer to an individual instruction manual for details.

5. Connections and wirings

Warning

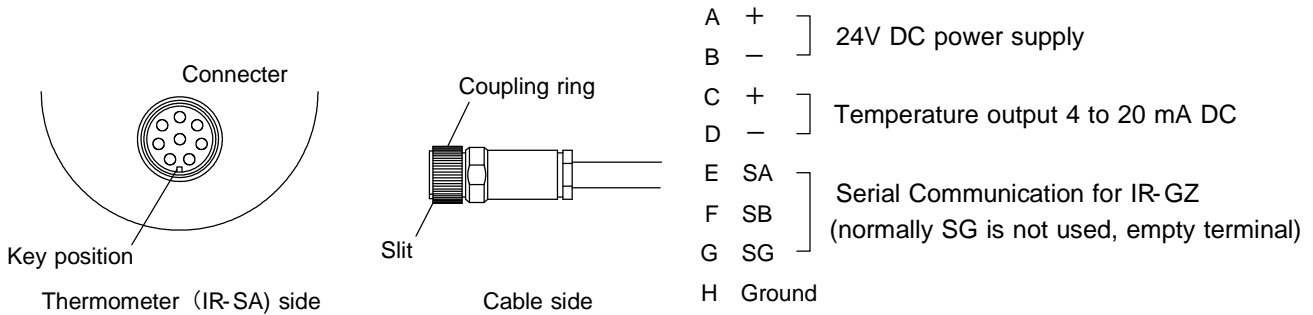
Make sure to turn off the power supply for preventing an electric shock when connecting and wiring.

5.1 Connections and wirings

5.1.1 Connection of the exclusive cable IR-ZYRC to IR-SA

The connections are completed by simply connecting the connector of the cable (IR-ZYRC) 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.

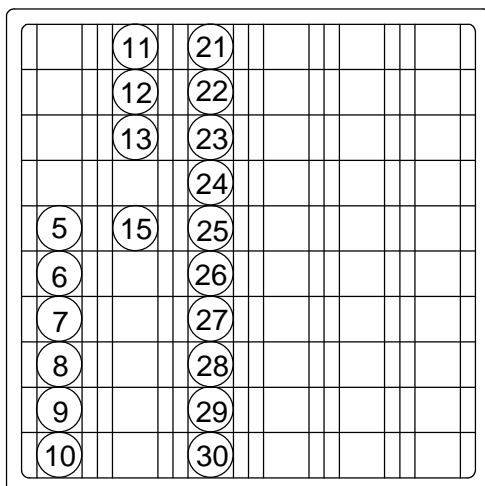


Caution

When the connector of the cable (IR-ZYRC) is connected, and the coupling ring is tightened, the waterproof of the IR-SA series is achieved. There is no waterproof property in the connector of the thermometer in the state that the cable is not connected.

5.1.2 Connection of the exclusive cable IR-ZYRC to IR-GZ

The other side of IR-ZYRC, connect to setting display unit (model: IR-GZ). For details, refer to instruction manual of IR-GZ.



Rear view of IR-GZ

Terminal No.	IR-ZYRC
21	Signal +
22	Signal -
23	RS485 SA
24	RS485 SB
25	Earth
26	Power +
27	Power -

6. Operation

In case of IR-SA, parameter setting, the measurements indication are performed entirely setting display unit (model : IR-GZ). For details, refer to instruction manual of setting display unit (model : IR-GZ).

6.1 Self-diagnostic function

In IR-SA, self-diagnosis function is built-in.

On abnormal conditions, an ERR00 will be displayed in IR-GZ. ERR00 means inside error of thermometer.

Inside error of thermometer

- The ambient temperature is abnormal
- E2PROM abnormal (Writing and reading impossible)
- Analog output correction data abnormal (Same data before correction existed.)
- Zero/Span adjustment abnormal.

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.

7.2 Trouble shooting

7.2.1 Measuring value not displayed or displayed lower

Checking item	Countermeasure
1) The power voltage is not in the allowable range.	Supply the power with the correct voltage.
2) The Connection cable is not connected firmly.	For the disconnection of the cable, replace it.
3) The view field is interfered.	Make the view field not interfered by referring to [4. Installation].
4) 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.
5) The emissivity value programmed is too high.	Program the emissivity value by using setting display unit (model : IR-GZ)
6) 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 using setting display unit (model : IR-GZ)
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. Emissivity value is changeabing.	Program the emissivity value and the modulation degree by referring to the following paragraphs. [Emissivity programming] [Signal modulation mode selection] [Modulation degree programming] Refer to instruction manual of setting display unit (model : IR-GZ)

8. Reference

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 Emissivity table

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 ($\lambda = 0.9\mu\text{m}$)

Metal	Emissivity
Aluminum	0.10 to 0.23
Gold	0.015 to 0.02
Chrome	0.36
Cobalt	0.28 to 0.30
Iron	0.33 to 0.36
Copper	0.03 to 0.06
Tungsten	0.38 to 0.42
Titanium	0.50 to 0.62
Nickel	0.26 to 0.35
Platinum	0.25 to 0.30
Molybdenum	0.28 to 0.36

Alloy	Emissivity
Inconel X	0.40 to 0.60
Inconel 600	0.28
Inconel 617	0.29
Inconel	0.85 to 0.93
Incoloy 800	0.29
Kanthal	0.80 to 0.90
Stainless steel	0.30
Hastelloy X	0.3

Semi conductor	Emissivity
Silicon	0.69 to 0.71
Germanium	0.60
Gallium arsenic	0.68

Ceramics	Emissivity
Silicon carbide	0.80 to 0.83
Titanium carbide	0.47 to 0.50
Silicon nitride	0.89 to 0.90

Other	Emissivity
Carbon pigment	0.90 to 0.95
Graphite	0.87 to 0.92

8.1.3 Emissivity table ($\lambda = 1.55\mu\text{m}$)

Metal	Emissivity
Aluminum	0.09 to 0.40
Chrome	0.34 to 0.80
Cobalt	0.28 to 0.65
Copper	0.05 to 0.80
Gold	0.02
Steel plate	0.30 to 0.85
Lead	0.28 to 0.65
Magnesium	0.24 to 0.75
Molybdenum	0.25 to 0.80
Nickel	0.25 to 0.85
Palladium	0.23
Platinum	0.22
Rhodium	0.18
Silver	0.04 to 0.10
Tantalum	0.20 to 0.80
Tin	0.28 to 0.60
Titanium	0.50 to 0.80
Tungsten	0.30
Zinc	0.32 to 0.55

Alloy	Emissivity
Brass	0.18 to 0.70
Chromel, Alumel	0.30 to 0.80
Constantan, Manganin	0.22 to 0.60
Inconel	0.30 to 0.85
Monel	0.22 to 0.70
Nickel Chrome	0.28 to 0.85

Ceramics	Emissivity
Alumina ceramics	0.30
Red brick	0.80
White brick	0.35
Silicon brick	0.60
Sillimanite brick	0.60
Ceramics	0.50

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.

8.1.4 Emissivity table ($\lambda=2.0\mu\text{m}$)

Metal	Emissivity	Oxide	Emissivity
Aluminum	0.08	Aluminum	0.40
Copper	0.04	Copper	0.80
Gold	0.02	Lead	0.65
Magnesium	0.20	Magnesium	0.75
Silver	0.04	Molybdenum	0.80
		Nickel	0.85
		Silver	0.10
		Tin	0.60
		Brass	0.70
		Chromel, Alumel	0.80
		Inconel	0.80
		Monel	0.70
		Constantan, Manganin	0.85
		Copper board	0.85
		Constantan, Manganin	0.85
Alloy	Emissivity	Other	Emissivity
Chromel, Alumel	0.30	Asbestos	0.90
Inconel	0.30	Asphalt	0.85
Monel	0.20	Carbon	0.85
Constantan, Manganin	0.20	Graphite	0.80
		Soot	0.95
		Cloth	0.80-0.95
Ceramics	Emissivity		
Alumina ceramics	0.30		
Red brick	0.80		
Resin	Emissivity		
Rubber (Hard, Black)	0.95		

Reference

Use the above tables as a reference.

9. General specifications

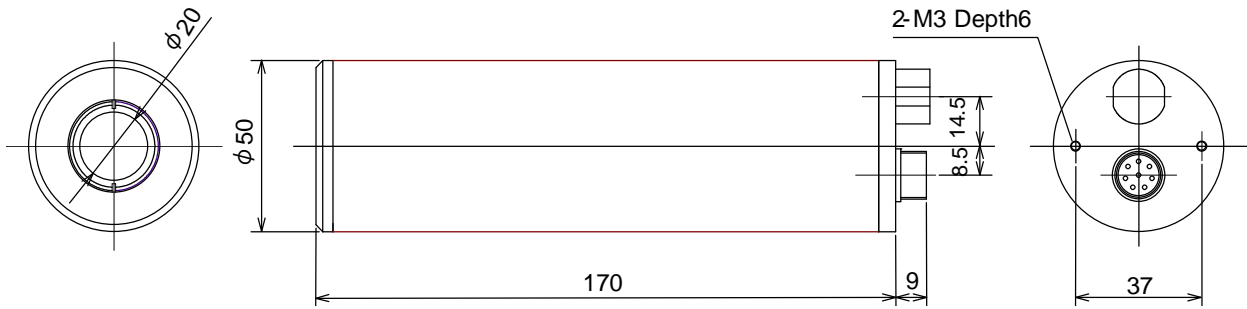
9.1 Thermometer

Model		IR-SAI	IR-SAS	IR-SAH
Measuring system		Single-color radiation thermometer		2-color radiation thermometer
Detecting element		InGaAs	Si	InGaAs/Si
Measuring wavelength		1.55 μ m	0.9 μ m	1.55 μ m/0.9 μ m
Measuring range		300 to 1600°C	600 to 2500°C	900 to 2500°C
Accuracy ratings *1		Less than 1000°C : $\pm 0.2\%$ of readings $\pm 2^\circ\text{C}$ 1000 to 1500°C : $\pm 0.4\%$ of readings More than 1500°C : $\pm 0.5\%$ of reading		Less than 1500°C : $\pm 0.5\%$ of reading More than 1500°C : $\pm 0.6\%$ of reading
Repeatability		Within 0.2°C		Within 1°C
Stability	Temperature drift	0.1°C/°C or 0.015%/°C of measured value, whichever larger		0.2°C/°C or 0.02%/°C of measured value, whichever larger
Resolution		0.5°C		1°C
Response Time (95%)		0.002s		0.01s
Emissivity (ratio) compensation		Emissivity range 1.999 to 0.050		Emissivity ratio range 1.250 to 0.750
Signal modulation		DELAY: First-order lag tracing (Modulation time constant: 0.0 to 99.9s, 0.1s increment) PEAK: Peak tracing (Damping degree 0, 2, 5, 10 °C/s, selection)		
Optical method		Fixed focus method		
Lens Aperture		\varnothing 10mm		
Analog output		4 to 20mA DC, Isolated output, Load resistance: less than 780 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 top 100% of analog output)		
Parameter settings		By using serial communication with setting display unit (model : IR-GZ)		
Self-diagnostic		Thermometer temperature abnormal, parameter error		
Ambient Temperature		0 to 90°C		
Rated power supply		24V DC(22 to 28V), supplied setting display unit (model:IR-GZ)		
Power consumption		About 2.4VA		
Connections		Exclusive water proof connector		
Housing material		Stainless		
Weight		About 0.7kg		
Waterproofing		Equivalent to IP67 (Depth of water 1m, 30 minutes, No inundation)		
Accessories		Installation fittings, screw (M3 xL5 2piece)		
CE Marking		EN61326-1 Class A		

*1: At $\varepsilon=1.0$ reference operating conditions; 23°C \pm 5°C. At relative humidity; 35 to 75%RH.

9.2 IR-SAI□□N, IR-SAS□□N

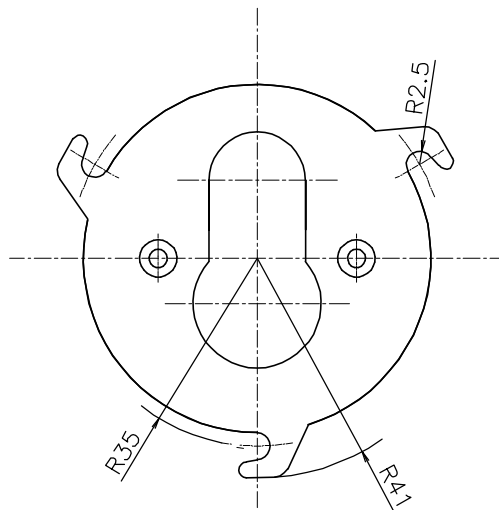
Outside dimensions



Unit : mm

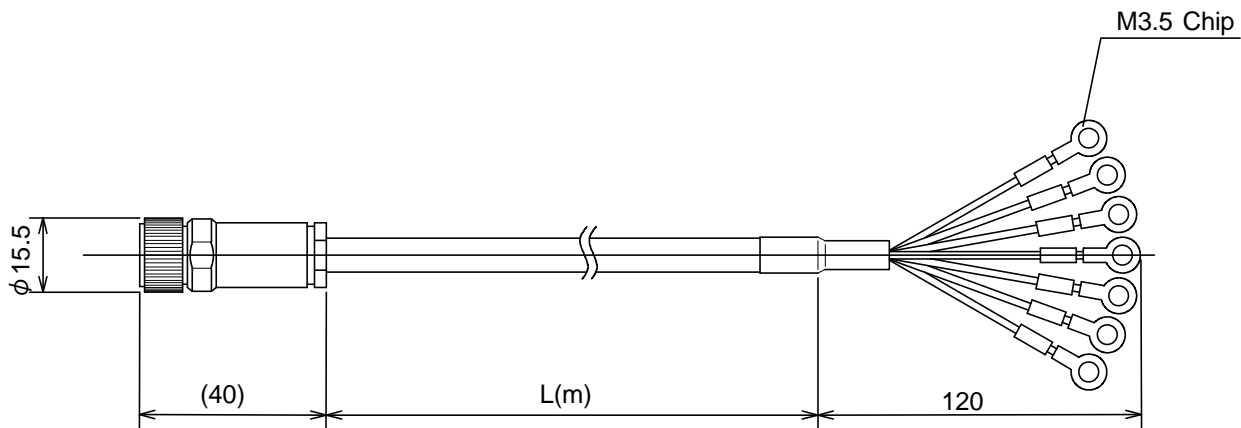
9.3 Accessories outside dimensions

9.3.1 Installation fittings (MODEL : IR-ZYHAW : BELONGINGS)



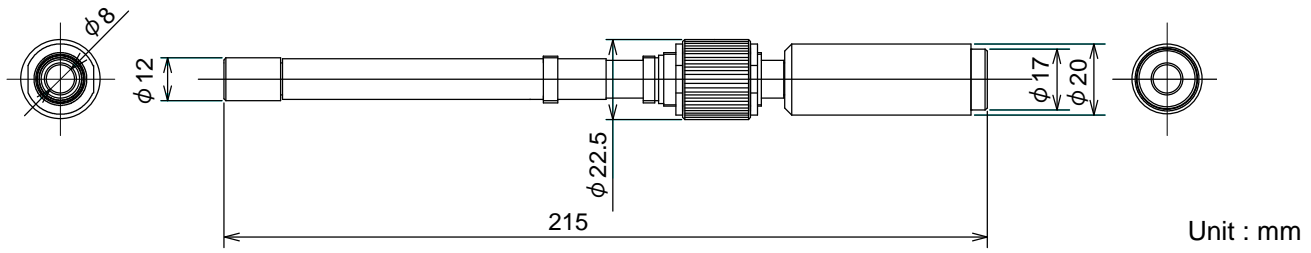
Unit : mm

9.3.2 Connection cable (MODEL : IR-ZYRC)

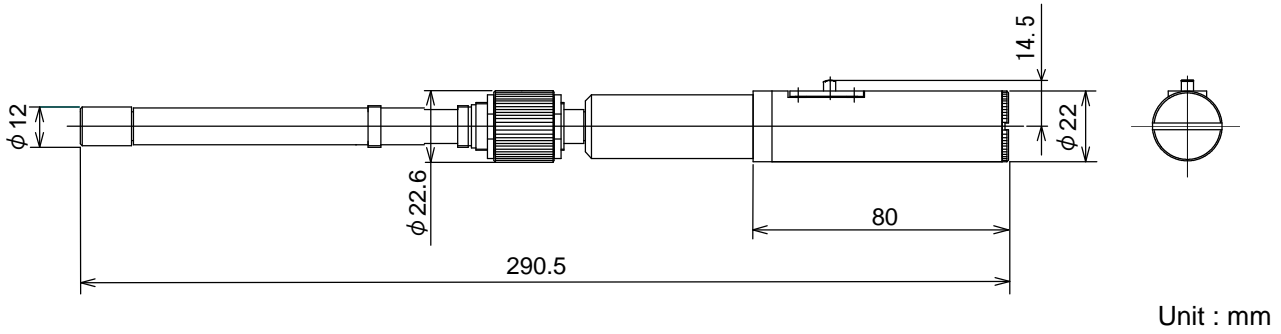


Unit : mm

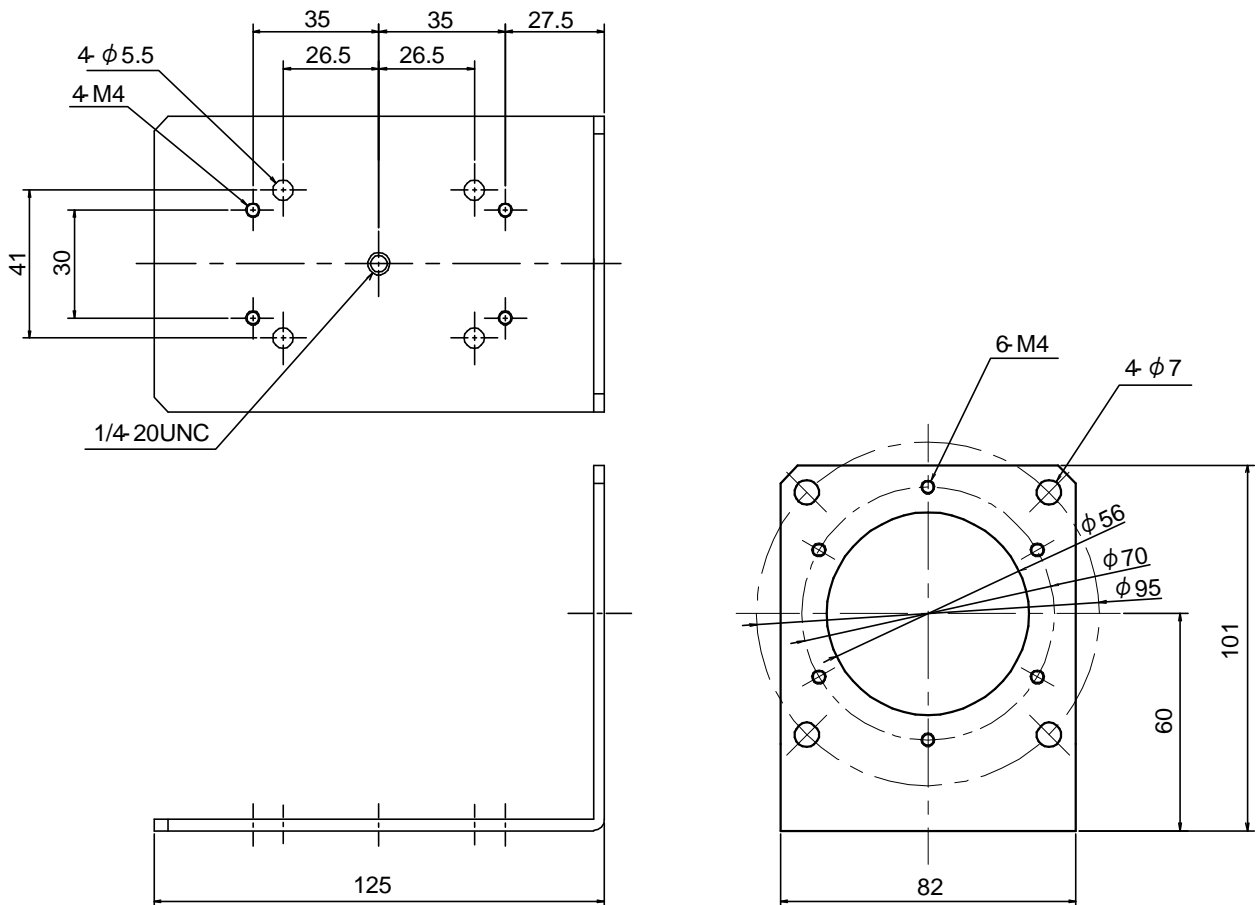
9.3.3 Telescope (MODEL : IR-ZYTS)



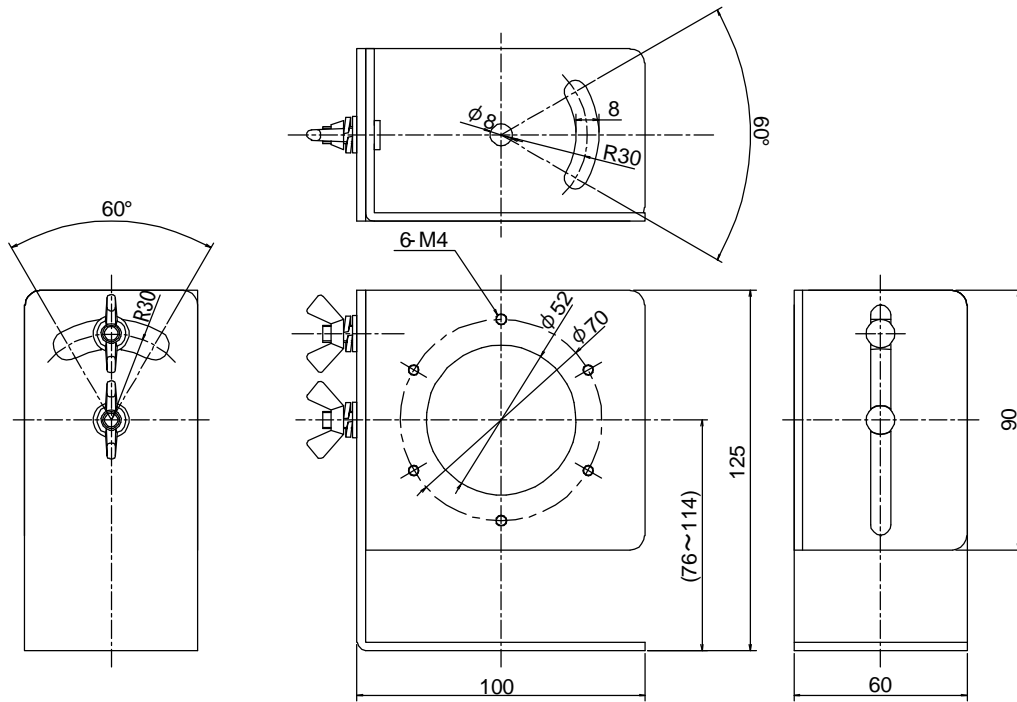
9.3.4 Laser pointer (MODEL : IR-ZYLZ1)



9.3.5 Fitting (MODEL : IR-ZYHG1)

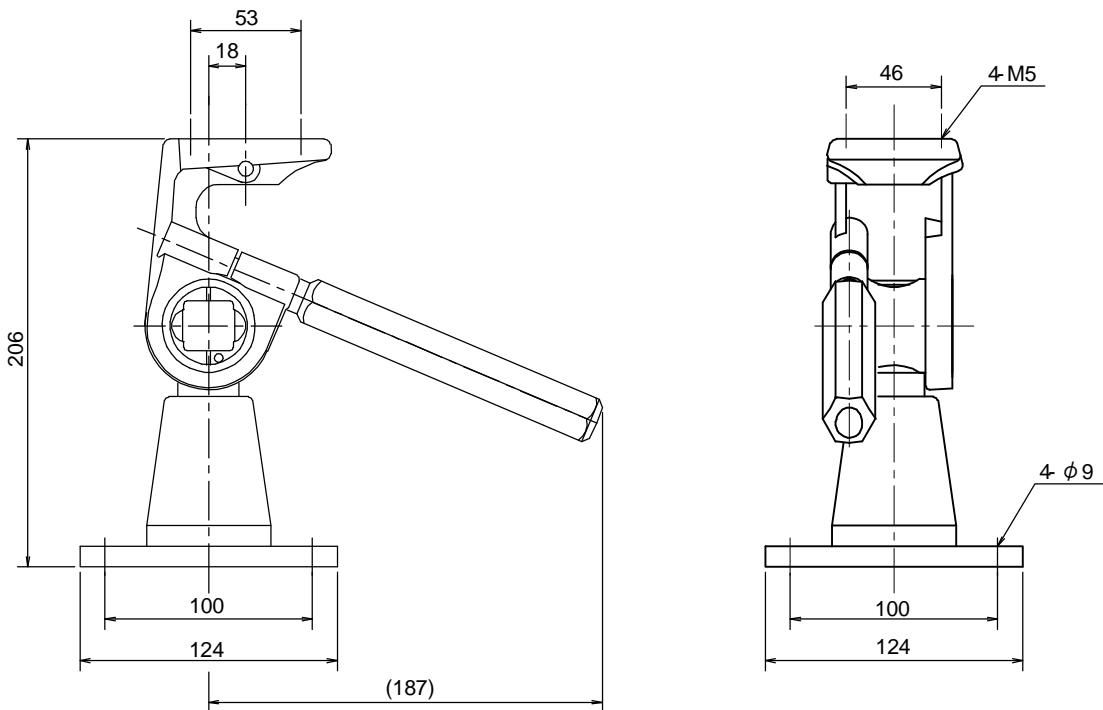


9.3.6 Fitting (MODEL : IR-ZYHG2)



Unit : mm

9.3.7 Universal head (MODEL : IR-ZMSS)



Unit : mm

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