

1. General Description

RT70 is an Infrared Radiation Thermometer which is capable of transmitting, type K thermocouple or linear voltage output signal corresponding to the temperature (10mV/°C).

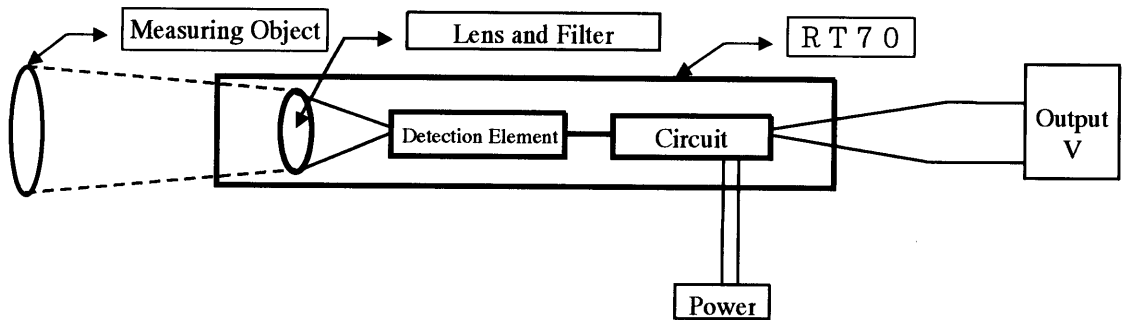
Features

- (1) Type K thermocouple or linear voltage output signal (10mV/°C)
- (2) Wide temperature measuring range of -20~+300°C
- (3) Wide allowable ambient temperature range of 0~+100°C
(Forced air cooling with cooling jacket is required at above 60°C)
- (4) Compact, light weight and low cost

2. Model Numbering System

Basic Model No.	Sight Ratio	Type of Output	Measuring Range	Additional Function	Description
RT70S					Radiation thermometer
	06				Target diameter vs. measuring distance= 6:1
		K			Type K Thermocouple output
		L			Linear voltage output (10mV/°C)
			2300		-20~+300°C
				00	Standard

2. Functional Block Diagram



Detection element (thermopile) detects 6.5~14μm wavelength parts in infrared ray radiated from object and generates thermoelectromotive force. This thermoelectromotive force is output as type K thermocouple or linear voltage output signal through the circuit.

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作成 DR.	①	尺度 SCALE	記入のない公差 TOL UNLESS NOTED
I. Harada		~	~
検図 CHK	形番	RT70 Series	
Ichida	MODEL		
認可 APPD	名称	Infrared Radiation	
Ichida	NAME	Thermometer	
日付 DATE	図番	改番 REV	1/8
5-15-'03	NO. AD13343E	00	

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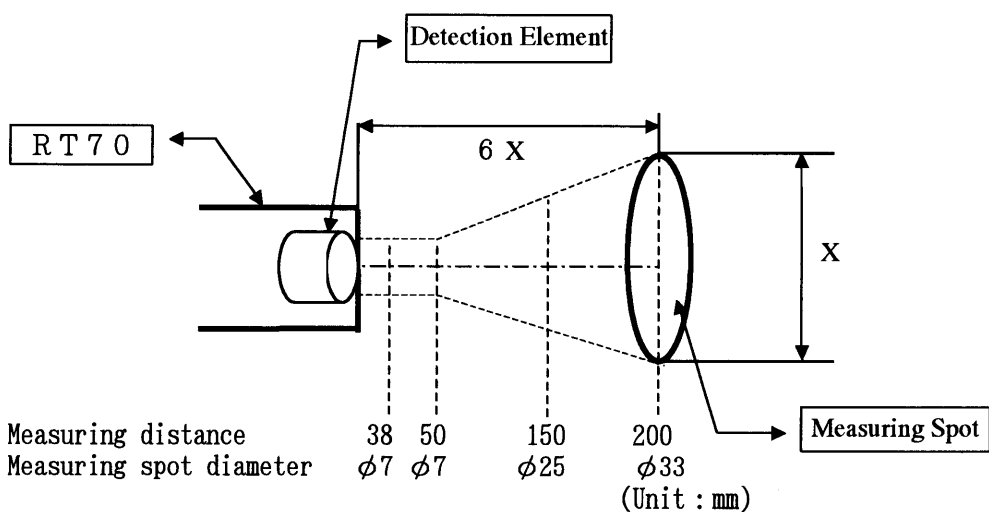
4. Functional Specifications

4. 1. Type of output
 · Type K Thermocouple
 · Linear voltage: 10mV/°C
 See Table 1.

Table 1

Temp. (°C)	-20	0	300
Output (V)	-0.2	0.0	3.0

4. 2. Accuracy: $\pm 6^{\circ}\text{C}$ (for emissivity: 0.95)
 4. 3. Measuring range: $-20 \sim +300^{\circ}\text{C}$
 4. 4. Repeatability: $\pm 0.25\% \text{FS}$
 4. 5. Temperature characteristics: $0.5^{\circ}\text{C}/^{\circ}\text{C}$ (under reference conditions)
 4. 6. Distance vs. target diameter: 6:1 (Refer to below)
 Min. target diameter $\phi 7\text{mm}$



4. 7. Response time: 120ms (63% value)
 4. 8. Characteristics by power supply voltage change: $\pm 0.3^{\circ}\text{C}/\text{V}$
 4. 9. Measuring wavelength: $6.5 \sim 14 \mu\text{m}$
 4. 10. Emissivity: 0.95 (Fix)

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認可 APPD	名 称	Infrared Radiation	
Ichida	NAME	Thermometer	
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5-15-'03	NO. AD13343E	00	

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5. Electrical Specifications

5. 1. Power supply voltage: DC10~15V
 5. 2. Current consumption: 10mA
 5. 3. Output impedance: Type K Thermocouple: 70Ω max.
 Linear type: 400Ω max.
 5. 4. Insulation resistance: 30MΩ min. (by DC500V megger), between body and leadwires
 5. 5. Dielectric strength: DC500V for 1 minute, between body and leadwires

6. Mechanical Specifications


6. 1. Vibration: 39.2m/s² max., X, Y and Z directions, for 2 hours each, 10~60Hz
 6. 2. Shock: 490m/s² max., X, Y and Z directions, 3 times each
 6. 3. Shipping drop: Height; 80cm
 1 corner and 2 edges radiating from the corner and all 3 sides
 (JIS Z 0200, Level 1)

7. General Specifications

7. 1. Detection element: Thermopile
 7. 2. Operating temperature range: 0~+60°C (Refer to Item 9, when above 60°C.)
 7. 3. Storage temperature range: -40~+70°C
 7. 4. Allowable humidity: Non-condensing
 7. 5. Material of lens: Germanium
 7. 6. Material of case: Stainless steel
 7. 7. Power cable: Red; positive, black; negative, shield of shield cables
 7. 8. Output cable (- side of output is internally connected to - side of power cable)
 Thermocouple output type: Yellow; +, red; -, shield of shield cables
 Linear type: Blue; +, white; -, shield of shield cables
 7. 9. Material of cable: Fluorine resin, heat-resistance 125°C
 7. 10. Weight (Mass): Approx. 85g

8. Attached

None

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認可 APPD	名称	Infrared Radiation	
Ichida	NAME	Thermometer	
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9. Optional Parts

9. 1. Cooling jacket (Model No.: 81409169)

Ambient temperature: 100°C max.

At 100°C ambient temperature, approx. 2.8m³/h 18°C air flow is required.

Air shall be oil-mist free.

10. Caution in Use


10. 1. Emissivity

- RT70 detects infrared ray radiated from the object. Even in same temperature, the amount of radiated infrared ray differs depend on the thickness or surface finish of objective material. This difference is called "Emissivity".
- RT70 is calibrated for emissivity of 0.95. As for the emissivity differs by object, calibration using another reference thermometer and adjustment by PV bias function, etc. of receiver are recommended. Following table shows reference emissivity by material.

Emissivity 0.8~1.0 (Suitable material for RT70)	All types of non-metal	Food, paper, plastic, painted metal, stone, soil, wood, glass, textile, water
Emissivity 0.4~0.7 (Slightly difficult material for RT70)	————	Metals with dully glossy Thin transparent plastic
Emissivity 0.0~0.3 (RT70 is not applicable)	Bare metal	Glossy and non-painted or coated metal

10. 2. Sight angle

- Select most suitable location for installation referring the relation between measuring distance vs. target diameter illustrated in 4.6.
- After installation, be sure to check that the target diameter is fully covered by the object.
- As RT70 measures average temperature of target area check if it is measuring target spot or area fully not partially.

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検図 CHK	形 番	RT70 Series	
Ichida	MODEL		
認可 APPD	名 称	Infrared Radiation	
Ichida	NAME	Thermometer	
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
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10.3. Installation

- Mount the instrument with lens cap attached to avoid contamination of lens and remove lens cap just before in use.
- To clean lens surface, use cloth/cleaner solution for camera lens. Special attention shall be paid not to scratch lens surface. Doing so, might result in low output signal.
- Allowable temp. of this instrument is 0~+100°C, however forced cooling using cooling jacket is required when used at above 60°C.
- Prevent entering of steam, dust and gases in the sight or smearing lens surface with those.
- Mount the instrument where adverse effect from disturbance of light (reflection or direct) or infrared heater may exist avoid inaccurate measurement.
- Mount the instrument where risk of noise interference from power line, etc. may exist to avoid failure.
- Installing near RF transmitter such as cellular phone may adversely affect.
- Ambient temperature limit for cables used in RT70 are 125°C regardless of ambient temp. ratings for body.

10.4. Wiring

- Check for correct wiring to power source or receiving instrument.
- Never connect power to output cable, this may cause failure.
- Set resolution of receiver 1°C.
- Power and output cable of RT70 shall be routed more than 50cm away from commercial power line.
- Negative side of output cable is internally connected to the negative side of power cable.
- Shield of shield cables are not connected to the case of RT70.
- To extend output cable of type K thermocouple output type use type K compensation cable.
- After wiring, check for correct output and adjust receiver referring indication of reference thermometer as the emissivity differs by object.

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
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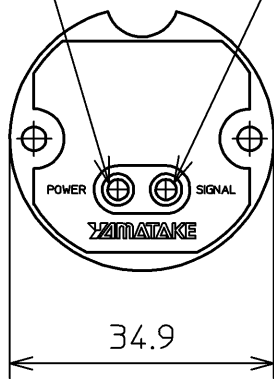
10. 5. Check

- Check for proper ambient temperature as follows. Cover front surface of RT70 with aluminum foil after several minutes receiver indication becomes stable at ambient temperature.
- Approximately once in six months or periodically depending on the user's condition, calibrate receiver using reference thermometer.
- If receiver indicate value exceeding tolerance, check and correct possible abnormal conditions (ambient temp. ambient gases and disturbing light).

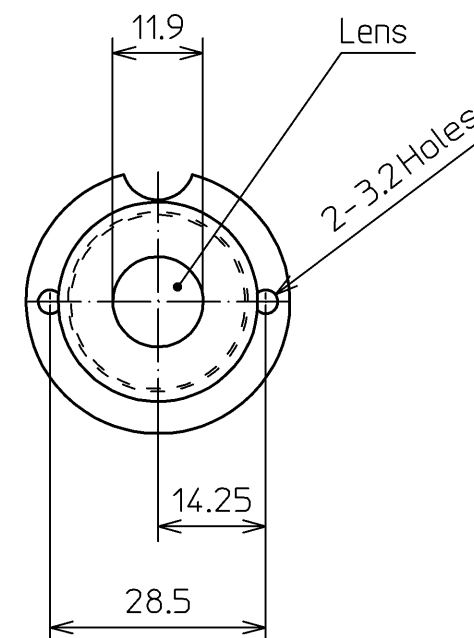
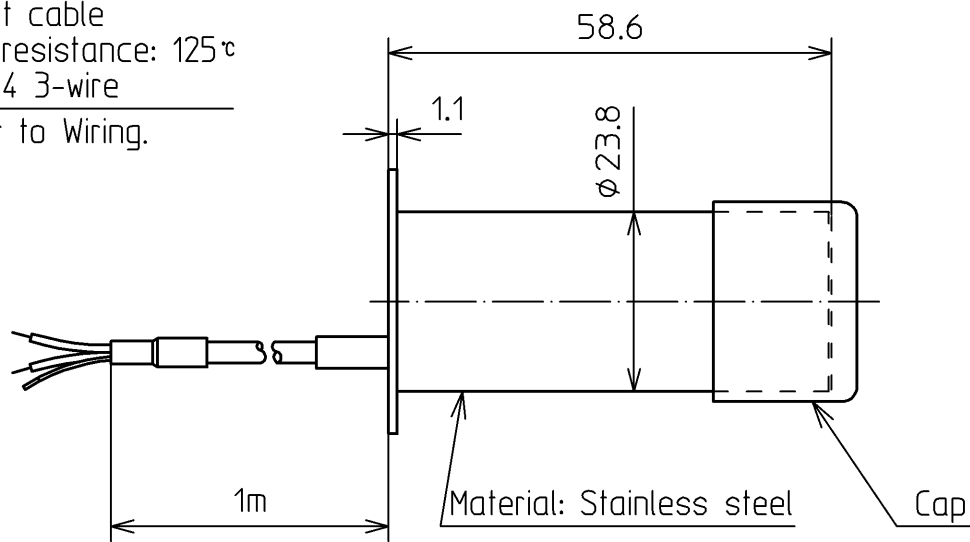
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I. Harada		~	~
検図 CHK Ichida	形 番 MODEL	RT70 Series	
認可 APPD Ichida	名 称 NAME	Infrared Radiation Thermometer	
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S.P. No.

Power cable
Heat-resistance: 125℃
AWG24 3-wire
Shield cable:
Red: +, Black: -

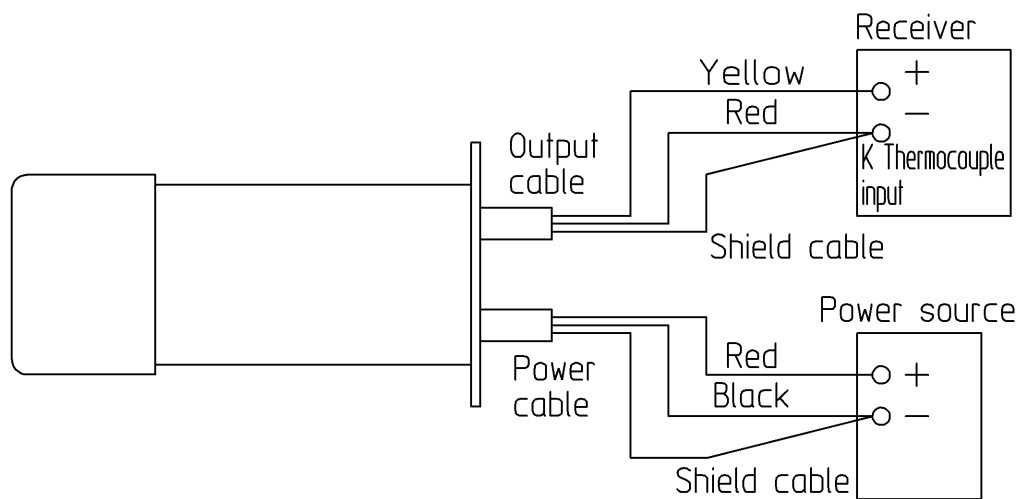


Output cable
Heat-resistance: 125℃
AWG24 3-wire
Refer to Wiring.

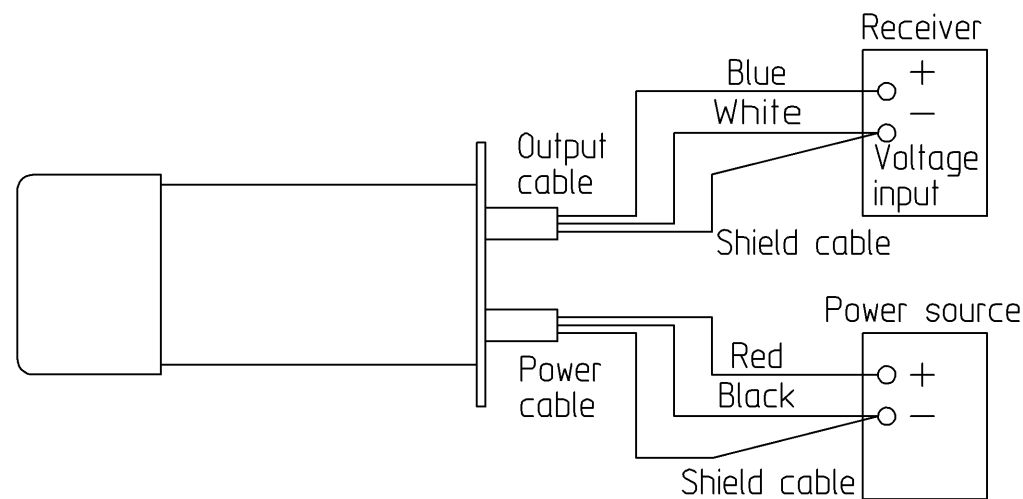


Wiring

RT70S06K



RT70S06L



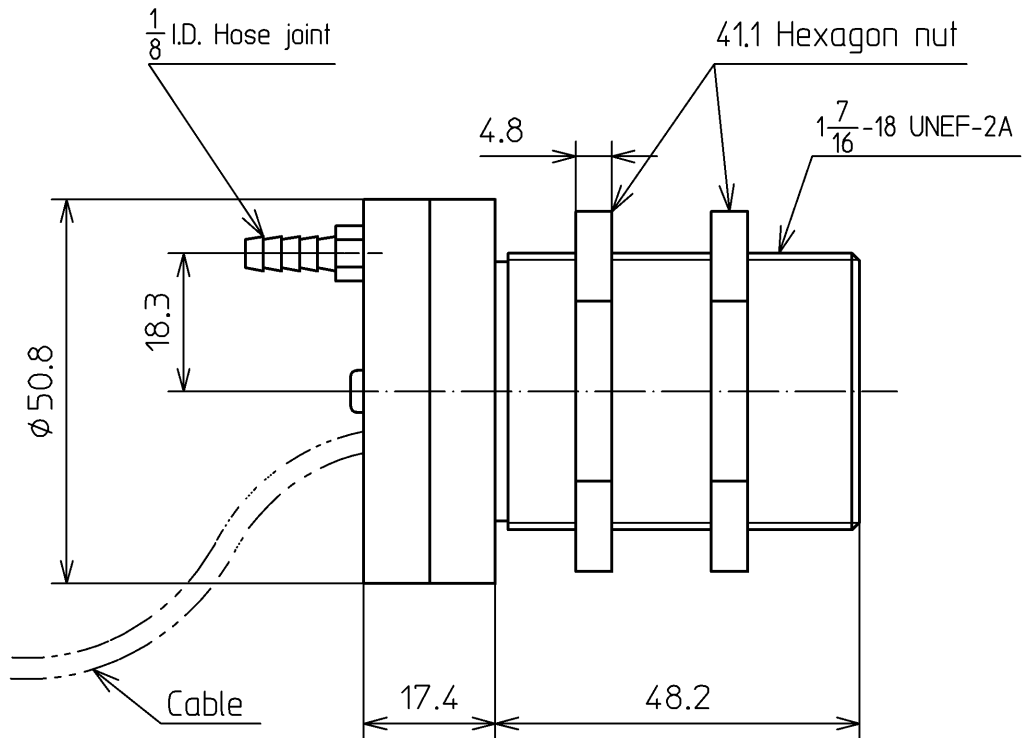
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形番 MODEL	RT70 Series				
名称 NAME	Infrared Radiation Thermometer				
図番 NO.	AD13343E	改番REV. 00	7/8		

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Model No.: 81409169



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検図CHK. S.Miura 5-7-'03	形番 MODEL	RT70 Series	
認可APPD. S.Miura 5-7-'03	名称 NAME	Cooling Jacket(for RT70)	
日付DATE 5-7-'03	図番 NO.	AD13343E	改番REV. 8/8

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“RESTRICTIONS ON USE”

This product has been designed, developed and manufactured for general-purpose application in machinery and equipment.

Accordingly, when used in applications outlined below, special care should be taken to implement a fail-safe and/or redundant design concept as well as a periodic maintenance program.

- Safety devices for plant worker protection
- Start/stop control devices for transportation and material handling machines
- Aeronautical/aerospace machines
- Control devices for nuclear reactors

Never use this product in applications where human safety may be put at risk.

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