

Infrared Thermometer IT-480 series



Infrared Thermometer

Made in Kyoto

HORIBA Quality



Pushing the limits of temperature measurement

Infrared thermometer **IT-480 series**

HORIBA infrared thermometers are highly accurate, easy to use, and provide the efficient temperature management and control required for various factory production lines, and as well as devices and plants.

Our new IT-480 series features a combination of our company's unique advanced technologies cultivated for many years in this field and the practical know-how we have obtained from information provided by users.

These infrared thermometers, with their industry's highest level of accuracy, can be used for a wide range of applications, including those in the manufacturing and industrial fields, as well as for R&D and testing by connecting them directly to a Windows® PC.



Enabling every production site to perform temperature measurements with the "highest level of accuracy"

Monitoring & Control



Painting process



Food production line



Equipment inspection

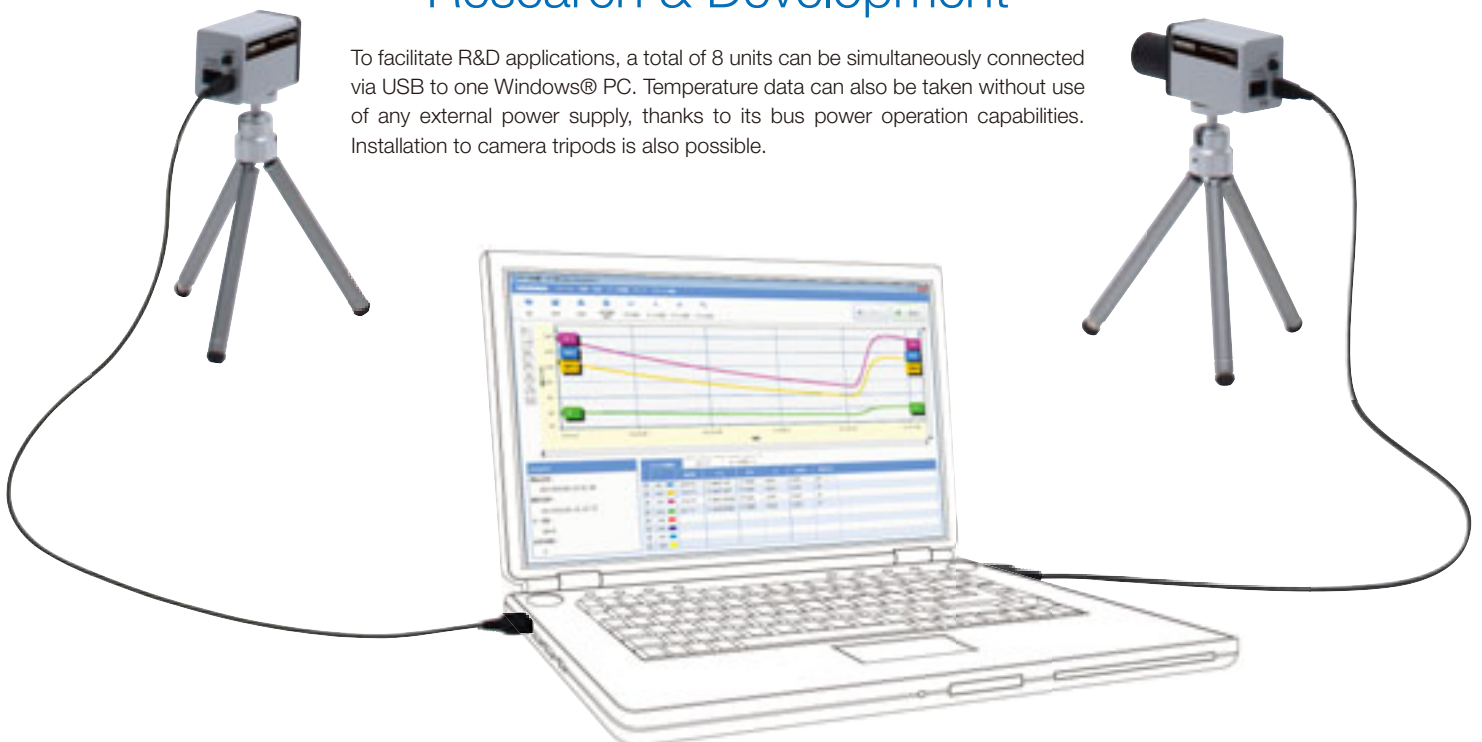


Vulcanization process

Usage is also possible for a wide range of testing and R&D scenarios

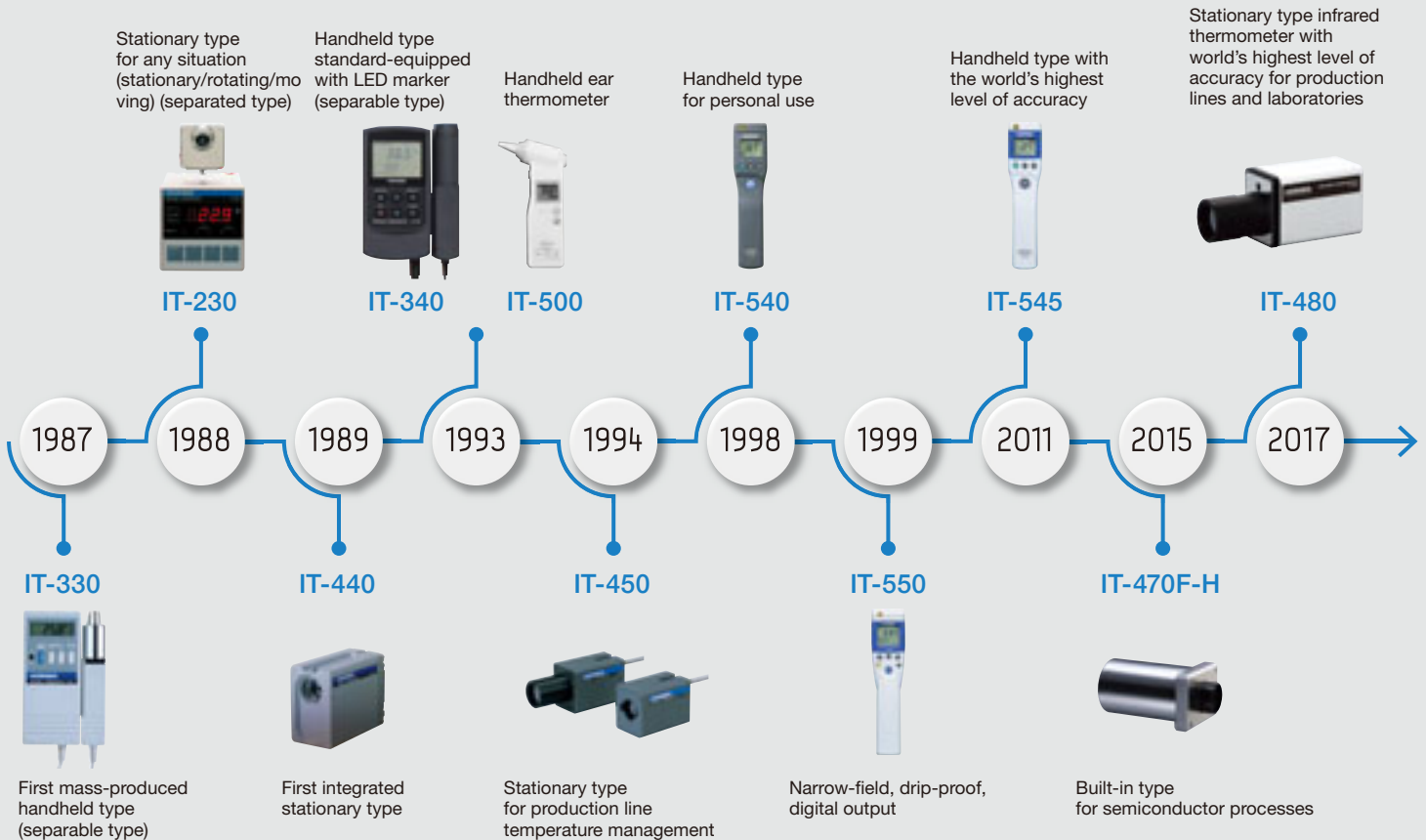
Research & Development

To facilitate R&D applications, a total of 8 units can be simultaneously connected via USB to one Windows® PC. Temperature data can also be taken without use of any external power supply, thanks to its bus power operation capabilities. Installation to camera tripods is also possible.



A culmination of 30 years of challenges and evolution

HORIBA entered the infrared thermometer field 30 years ago by applying its core infrared sensor technologies. Through many challenges we have taken on to make them easier to use and more accurate, including the equipping of LED markers that clarify measurement points, the integration of measurement and display parts, the provision of digital outputs, enabling narrow-field measurements. Over the years we strived to supply thermometers which provides constantly accurate temperatures. The IT-480 series is the culmination of these efforts.



Applications

From laboratories to production sites, these thermometers can be used in any scenario where accurate temperature measurements are a requirement.

IC, electronic devices

- ▶ IC heat generation temperature management
- ▶ Checking for abnormal heat generation from electronic components such as IC or motors
- ▶ Checking for abnormal heat generation from electronic components during substrate aging processes
- ▶ IC temperature measurements during near-infrared beam heating
- ▶ Temperature measurements during substrate preheating via soldering devices
- ▶ Temperature management during substrate preheating processes

Automobiles, motors, machinery

- ▶ Checking for heat generation from bearings
- ▶ Temperature measurements during baking finishing or drying processes for vehicles or molded parts, etc.
- ▶ Checking for heat generation from motors
- ▶ Inspection processes for heat generating parts of heaters

Material processing

- ▶ Temperature measurements during film heating or drying processes
- ▶ Temperature measurements during paper or laminate adhesion or drying processes
- ▶ Hot-melt temperature management
- ▶ Temperature management for electrical wires and tubing
- ▶ Temperature management during rubber mastication
- ▶ Measuring asphalt temperatures from rollers during paving
- ▶ Temperature management during mixing by concrete mixers
- ▶ Temperature management for tires during tire manufacturing processes (vulcanization processes)

Eliminating the effects of ambient temperature fluctuations

Patented “double-packaged structure”

The main obstacle in providing accurate temperature measurements is minimizing the effects of temperature fluctuations around the thermometer. In order to resolve this issue, HORIBA developed a “double-packaged structure” for the thermopile sensor located at the center of the thermometer — a totally new type of packaging structure. This development enables the temperature around the sensor chip to remain uniform, allowing it to quickly adapt to temperature fluctuations and provide stable temperature measurements.

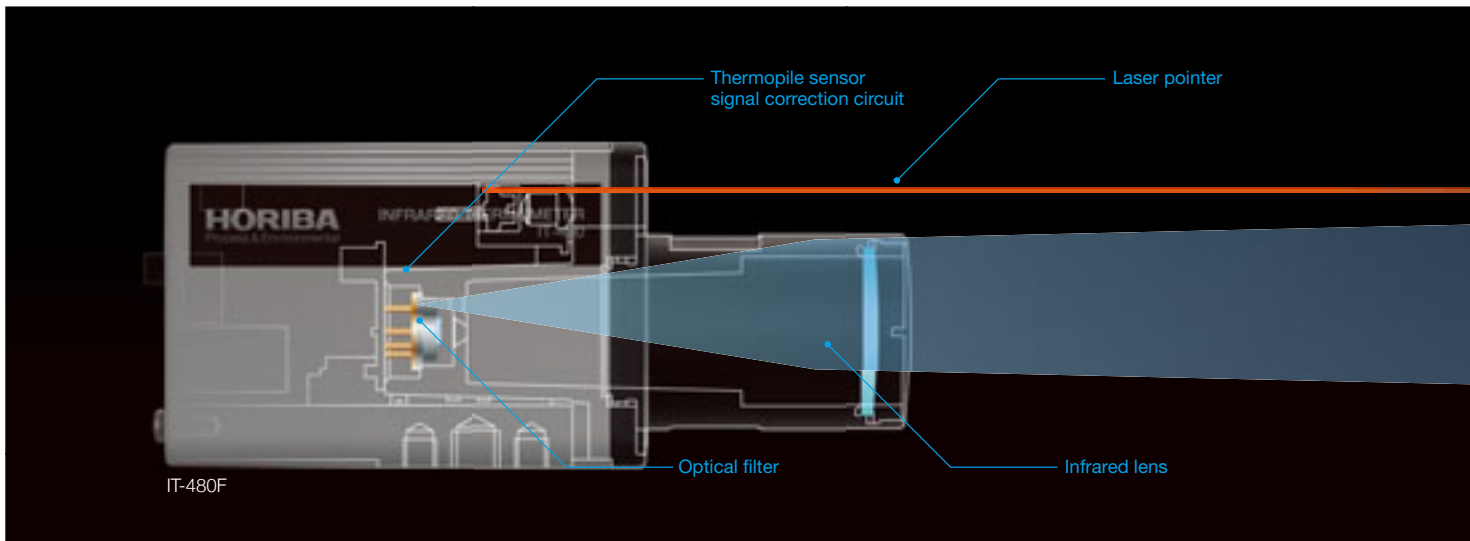
(Patent No. JP5658059)



Real-time correction of sensor internal “noise”

Built-in “signal correction circuit”

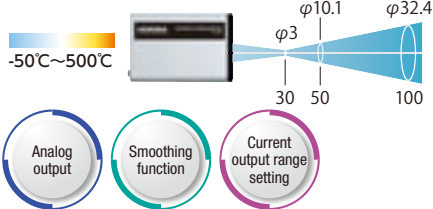
Another obstacle for accurate temperature measurements is the effects from temperatures inside the thermometer. For example, thermoelectromotive forces caused by differences between the temperature of the sensor part and the temperature of the signal processing circuit part, as well as effects generated by the temperature of the signal processing circuit, etc., can cause excessive signals (offset noise) that result in measurement errors. Our uniquely developed “signal correction circuit” resolves this issue. Offset noise inside the sensor is measured and corrected in real-time, enabling measurements with low levels of error to be achieved.



LINE UP We offer a line up that includes everything from micro-spot types to general purpose types to meet any application.

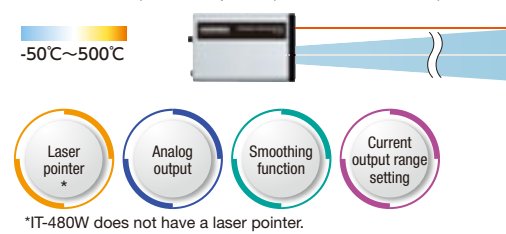
[Micro-spot type]

IT-480S



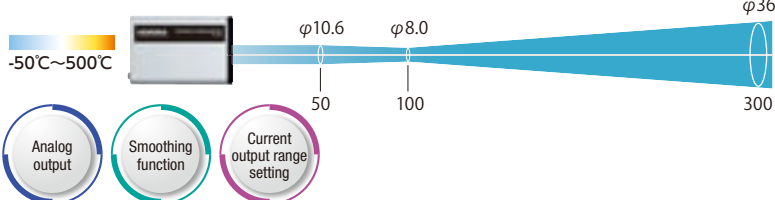
[General purpose type]

IT-480N (with laser pointer) / IT-480W (without laser pointer)



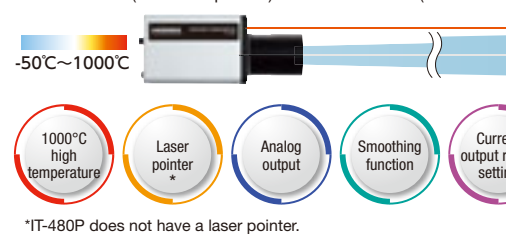
[Spot type]

IT-480L



[Narrow View Type]

IT-480F (with laser pointer) / IT-480P (without laser pointer)



Supporting high-accuracy sensor structures

Utilization of “diffusion bonding”

Production of IT-480 series models is performed using advanced technology born from HORIBA's unique fundamental research. The advanced technology employed is known as “diffusion bonding” and is that in which metallic materials are bonded at the atomic level. The double-packaged sensor part and the peripheral parts that support it are connected not via welding, but through “diffusion bonding”, enabling a high-quality structure to be created that is highly airtight and resistant to intrusion by foreign materials. This has resulted in measurement devices with more stable levels of quality, and has allowed us to create thermometers that feature the world's highest level of accuracy.

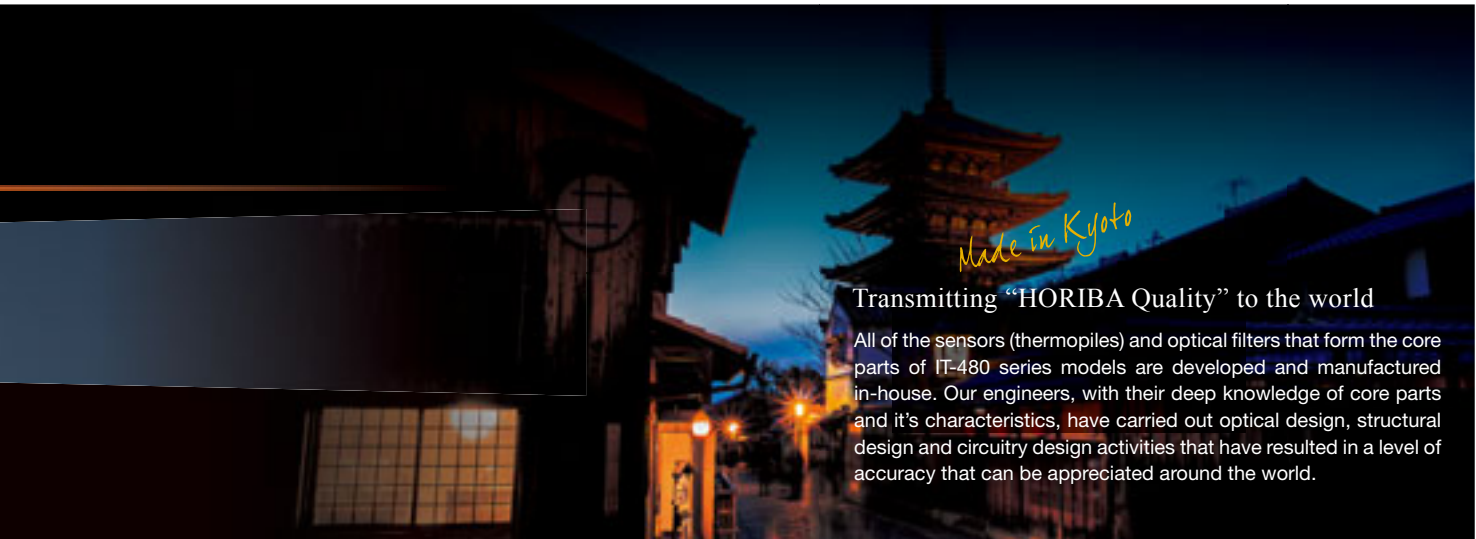
Infrared Multi-Layer Film Filter

Years of successful development of infrared multi-layer filters are leveraged to identify the best wavelength regions and filter designs matched to sensor performance to ensure high accuracy temperature measurements.



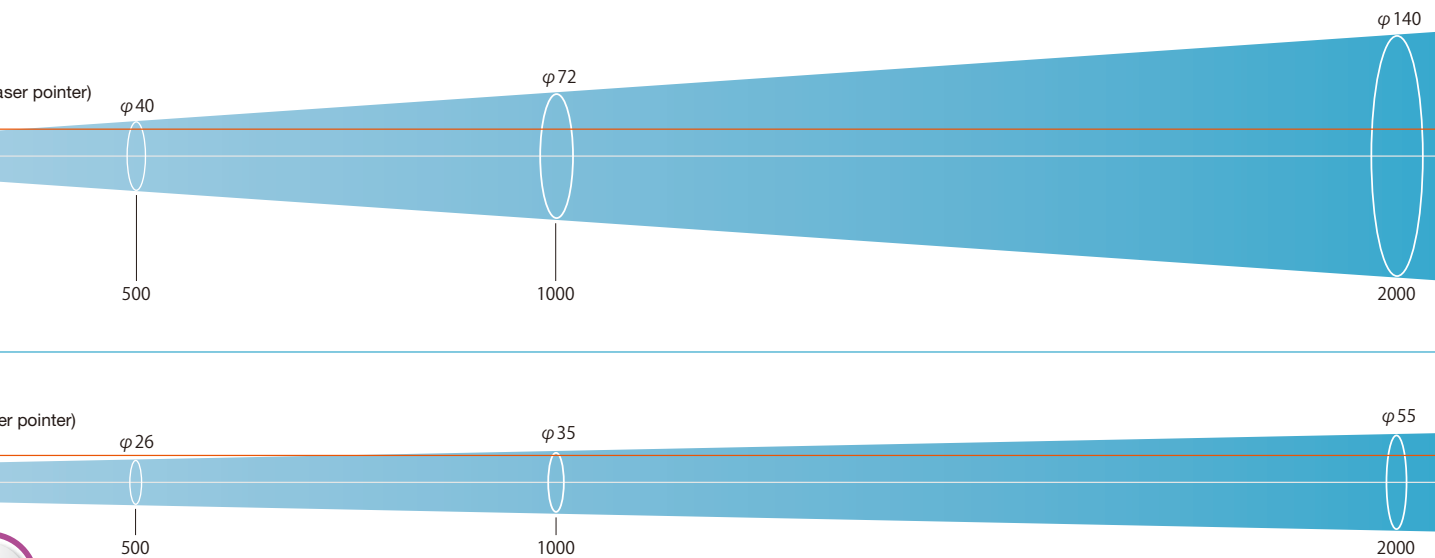
Stabilized Black Body Furnace

Exclusive in-house black body furnace technology produces superior uniform temperature conditions to deliver industry-leading characterization and calibration.







Transmitting “HORIBA Quality” to the world

All of the sensors (thermopiles) and optical filters that form the core parts of IT-480 series models are developed and manufactured in-house. Our engineers, with their deep knowledge of core parts and its characteristics, have carried out optical design, structural design and circuitry design activities that have resulted in a level of accuracy that can be appreciated around the world.



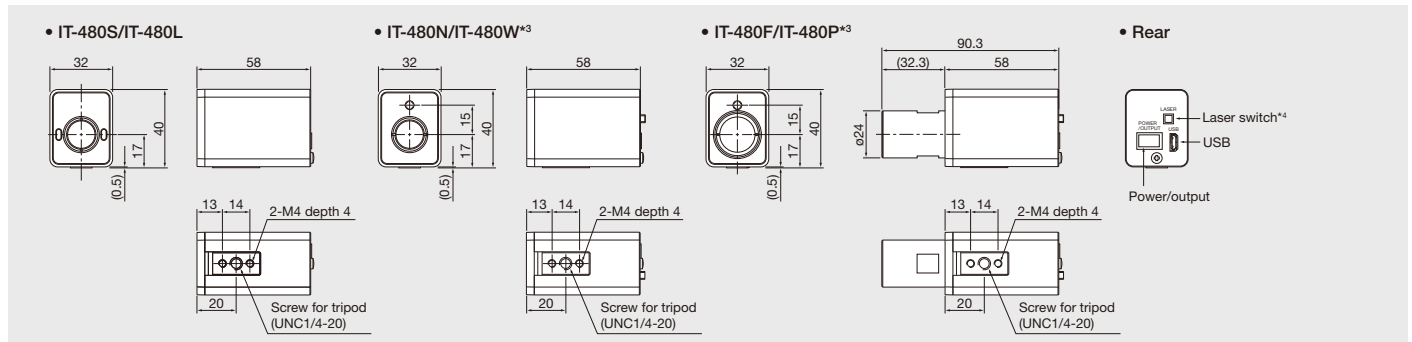
Note: The measurement target is a measurement diameter with a 90% energy limit. The size of the measurement target must be sufficiently larger than the measurement diameter (1.5x to 2x).

Specification

	Micro-spot type	Spot type	General purpose type	Narrow view type
Lineup	IT-480S 	IT-480L 	IT-480N (with laser pointer) IT-480W (without laser pointer) 	IT-480F (with laser pointer) IT-480P (without laser pointer) 
Spectral response	8μm to 14μm			
Measured temperature range	-50°C to 500°C			-50°C to 1000°C
Output	USB (resolution = 0.1°C) Current (4 mA to 20 mA, resolution = 0.24μA, non-insulated)			
Current output range	-50°C to 500°C (factory setting 0°C to 500°C)			-50°C to 1000°C (factory setting 0°C to 500°C)
Accuracy*1	[USB Output] Within ±(-8%rdg+1)°C [-50°C to 0°C] Within ±1°C [0°C to 200°C] Within ±0.5%rdg°C [200°C to 500°C] [Current Output] Difference from USB data is within ± (0.1% output range) °C			[USB Output] Within ±(-8%rdg+1)°C [-50°C to 0°C] Within ±1°C [0°C to 200°C] Within ±0.5%rdg°C [200°C to 1000°C] [Current Output] Difference from USB data is within ± (0.1% output range) °C
Repeatability	0.5°C or less			Within 1°C [-50°C to 0°C] Within 0.5°C [0°C to 500°C] Within 1°C [500°C to 1000°C]
Respose Time	Current output 0.14 s or less (95% response, moving average count is 1.)			
Measurement diameter	ø3 mm/ distance 30 mm	ø8 mm/ distance 100 mm	ø72 mm/ distance 1000 mm	ø35 mm/ distance 1000 mm
Temperature drift	Within ±0.5°C/°C [-50°C to 0°C] Within ±0.25°C/°C [0°C to 500°C]			Within ±0.5°C/°C [-50°C to 0°C] Within ±0.25°C/°C [0°C to 500°C] Within ±0.5°C/°C [500°C to 1000°C]
Emissivity	Factory setting: 0.950 (Setting range is 0.100 to 1.999)*2			
Ambient temperature/humidity	Temperature: 0°C to 55°C Humidity: 35% to 85% (No condensation)			
Power supply	USB bus power /12 V DC to 24 V DC			
Power consumption	30 mA or less (at 24 V DC)		30 mA or less (at 24 V DC, laser: OFF) 40 mA or less (at 24 V DC, laser: ON)	
Material of the body case	Aluminum			
Mass	Approx. 95 g (Body only. Excluding cable and metal brackets)			Approx. 115 g (Body only. Excluding cable and metal brackets)
Sight	Setting gauge		Laser (Class 1)*3	

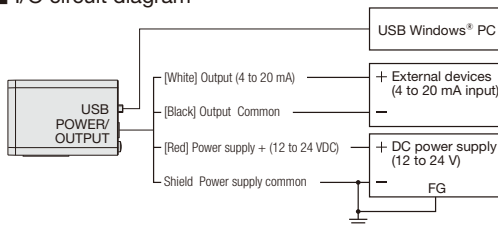
*1: rdg = Reading value *2: If aligning measurement indicated values with another type of thermometer, etc., is required, usage is possible by making corrections with emissivity in a range from 0.100 to 1.999. *3: IT-480W and IT-480P do not have laser pointers.

External Dimensions (Unit: mm)



*4: IT-480W and IT-480P do not have a front laser output port or rear laser switch.

I/O circuit diagram

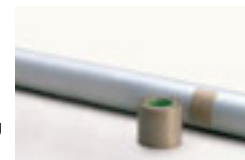


Accessory

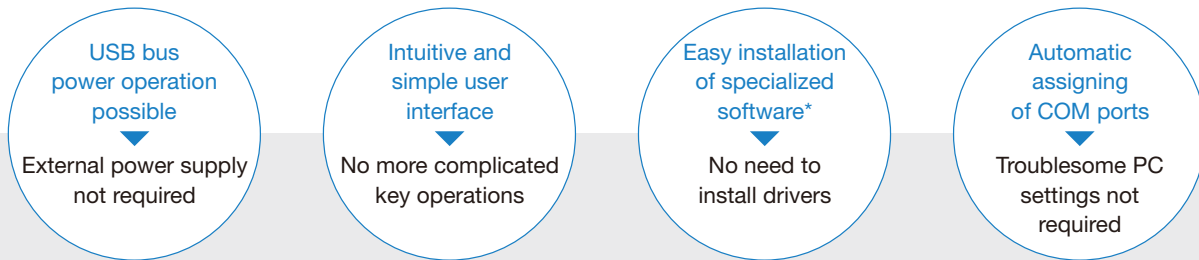
Black body tape

For measuring objects with unknown or low levels of emissivity or for determining emissivity

- Heatproof temperature : 180 °C
- Emissivity : 0.95
- Size : 50 mm wide, 10 m long



Easy setup and temperature data gathering via Windows® PC



IT-480 Data Acquisition

Free provision of viewer software useful for R&D

The IT-480 Data Acquisition application for Windows® PCs will be provided for free to IT-480 users. Setup only requires downloading the software from our website and installing it on your PC. Special drivers are not required. A total of eight IT-480 units can be connected via USB cable for simultaneous recording of temperature data. The only preparation necessary before taking measurements is the selection of devices and setting of measurement times. COM ports will be automatically assigned depending on the number of connections, eliminating the need for troublesome PC settings.

Main functions

[Auto emissivity setting function]

It is possible to set (Auto emissivity setting) the optimal emissivity by inputting the temperatures of objects measured using a contact thermometer.

[Real-time monitoring function]

Measurement results from IT-480 connected to a PC can be displayed in real-time. By performing simultaneous monitoring with up to 8 units, multi-point measurement needs can be addressed.

[Cursor function]

Average, max. and min. temperatures, etc., between cursors will be displayed.

[File output function]

Recorded data can be saved on PCs in CSV or Excel® format. These can then be used for creating test reports.

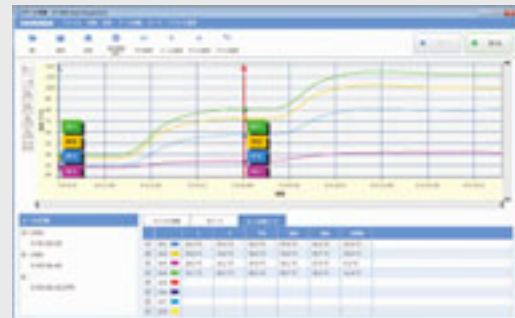
[Various setting functions]

Settings can be made for emissivity, moving average data numbers, and current output range.

[Example screen during device setup mode]



[Example screen during data acquisition mode]



*Usage supported for Windows® 7, 8, 8.1, and 10.

How to properly use an infrared thermometer

Setting the emissivity for measurement targets is required for accurate temperature measurements.

Emissivity can be determined by using the following methods.

- (1) Search using documentation
- (2) Comparison with contact thermometers
- (3) Using black tape or black spray

Usage of the [Auto emissivity setting function] is possible with the IT-480.

Measurement target	Emissivity
Ceramic	0.90
Human skin	0.98
Paint (black)	0.95
Paint (white)	0.8 to 0.95
Rubber (black, rigid)	0.94
Rubber (white, soft)	0.86
Concrete	0.94
Black tape	0.95

Infrared thermometers (Common Questions)

Q: Can it be used to measure the temperature of metals?

A: The emissivity of infrared rays is small in metals, due to this it is difficult to obtain accurate measurements. Please use either black tape or black spray to obtain more accurate temperature measurements.

Q: Can object of the same materials but with different colors be measured?

A: Yes, they can be measured. In principle, errors caused by colors will not occur.

Q: Can it be used to measure water temperature?

A: It is possible to measure the surface temperature of water. When stirred, the temperature difference between the surface and under the surface is minimal, enabling highly accurate measurements.

Q: Can it be used to measure inner part of vacuum chambers?

A: Measurements are possible as infrared rays permeate vacuums. However, when performing actual measurements, please use a barium fluoride (BaF₂) window for the chamber window material.

Traceability certification

HORIBA Techno Service provides traceability inspections and issues calibration certificates. In order to enable customers to use our devices with peace of mind, we perform our work using traceable measuring instruments that conform to standards established by the National Institute of Advanced Industrial Science and Technology. The measurement instruments we use are periodically calibrated to ensure the performance. Depending on the model, traceability certificates are issued for -50°C to 1000°C.

Product conformity according to various country standards.

CE, WEEE/RoHs, FCC, KC, laser pointer related (PSC, FDA)

- The "industry's highest level", "highest level of accuracy", and "industry's highest level of accuracy" mentioned in this catalog are the results of 2017 in-house study.
- "Windows" and "Excel" are registered trademarks or trademarks of Microsoft Corporation in the U.S. and other countries.



The HORIBA Group adopts IMS (Integrated Management System) which integrates Quality Management System ISO9001, Environmental Management System ISO14001, and Occupational Health and Safety Management System OHSAS18001. We have now integrated Business Continuity Management System ISO22301 in order to provide our products and services in a stable manner, even in emergencies.



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