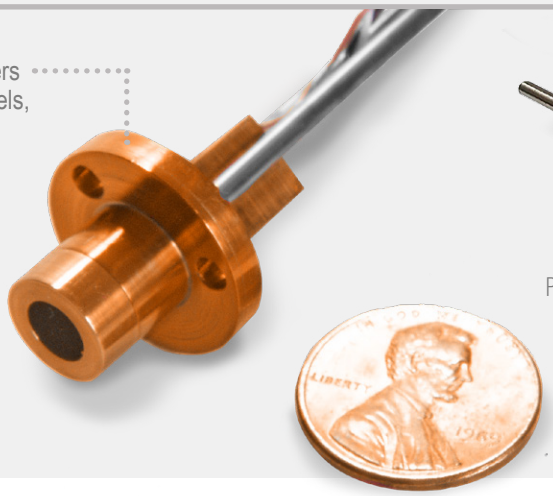
RAPTOR SCIENTIFIC

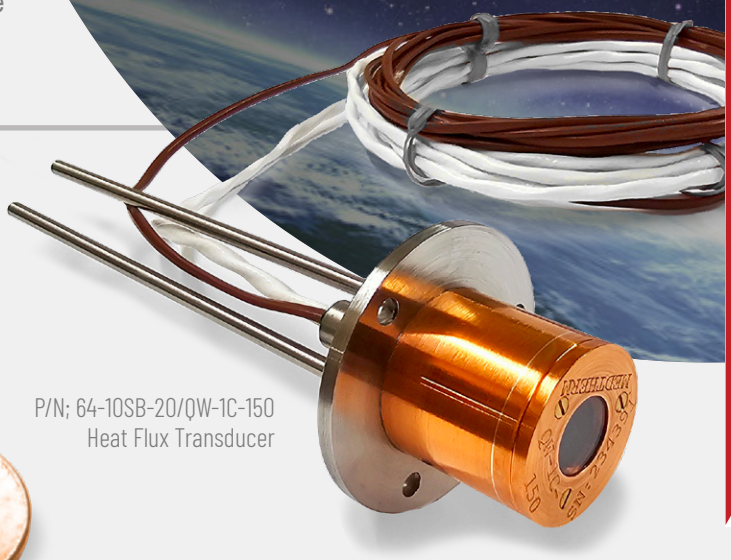
# 64 Series

Global Provider of Test & Measurement Solutions

MEDTHERM 64 Series Heat Flux Transducers offer dependable direct measurement of heat transfer rates in a variety of applications due to careful design, rugged quality construction and versatile mounting configurations. Each transducer will provide a self-generated 10-millivolt (nominal) output at the design heat flux level. Continuous readings from zero to 150%design heat flux are made with infinite resolution. The linear transducer output is directly proportional to the net heat transfer rate absorbed by the sensor.

Heat Flux transducers for use in wind tunnels, arc jet testing, high performance jet engines, internal combustion engines and fire prevention testing





P/N; 64-10SB-20/QW-1C-150
Heat Flux Transducer

## 64 Series Heat Flux Transducers

MEDTHERM 64 Series transducers are of two basic sensor types, the **Gardon type sensors**, standard in ranges from 5 to 4000 Btu/(ft²s) and **Schmidt-Boelter thermopile type sensors**, standard in the 0.2 to 4 Btu/(ft²s) ranges. In both type sensors heat flux is absorbed at the sensor surface and is transferred to an integral heat sink that remains at a different temperature than the sensor surface. The difference in temperature between two selected points along the path of the heat flow from the sensor to the sink is a function of the heat being transferred, and a function of the net absorbed heat flux. At two such points, our transducers have thermocouples/thermopiles to form a differential thermoelectric circuit, thus providing a self-generated emf at the output leads that is directly proportional to the heat transfer rate. No power supply or thermoelectric reference junction is needed.

Calibrations are radiant calibrations, referenced both to blackbody simulators as source standards and Kendall Absolute Cavity (ECR) Radiometers as detector standards, traceable to NIST.

### Construction

- Accuracy, Ruggedness And Reliability are provided by the thoroughly proven Gardon and Schmidt-Boelter sensors
- Long Transducer Life and Signal Stability are enhanced by the massive body of OFHC copper
- Protection against rough handling in mounting is provided by a stainless steel flange (when specified)
- SIGNAL INTEGRITY is protected by the use of welded connections, stranded lead wire with braided copper shielding and Teflon insulation firmly secured in the transducer body with strain relief to ensure resistance to rough handling and stray signals.

### Features

- Linear Output / Output Proportional to Heat Transfer Rate
- Uncooled, Water Cooled and Gas Purged models
- Radiometer and limited view accessories
- Convenient Mounting options
- Measure Total Heat Flux / Measure Radiant Heat Flux

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## Accessories

- **Removable Window Attachments**, with the standard sapphire or optional window materials, are available to limit the basic transducer to measurement of radiation heat flux only.
- **View Restrictor Attachments** are available to limit the angle of view for the basic transducer to 60°, 30°, 15°, or 7° for narrow view angle measurements.
- **Direct Reading Heat Flux Indicators** Models H-201, H-203, and H-204 are available for direct digital readout in any heat flux units from any linear heat flux transducer input. An amplified analog output is provided on some. Ask for Bulletin.
- **Body Temperature Thermocouple** measurement can be provided by an optional copper/constantan 24 AWG solid conductor thermocouple, with TIG welded junction and Teflon insulated duplex wire.

## Standard Configurations

The basic transducer may be selected with either of four mounting configurations and with or without provisions for water cooling of the transducer body. The listed radiometers are provided with gas purging to keep the radiation-transmitting window clean. When the purge provision is included, the window is installed internally and is not an accessory. Basic transducers can be converted to unpurged radiometers by addition of a window attachment, but the standard purged radiometers cannot be converted to basic transducers.

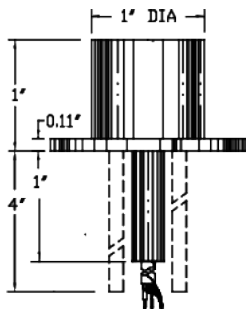
## Standard Mounting Configurations

There is the smooth body with flange, the threaded body with flange, the smooth body without flange, and the threaded body without flange. All mounting flanges are 1.73" dia. with 0.150" dia. mounting holes equally spaced on a 1.375" dia. bolt circle. Water-cooling tubes (when specified) and gas purge tubes are 1/8" dia. SST. All tubes are 4" long. (Other tube diameters, lengths, and fittings are available.) All threaded bodies have 1-12UNF-2A threads *(see configurations below)*

## Specifications

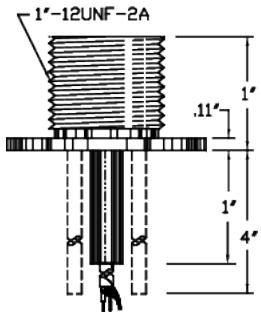
- **Standard Ranges available**: Full scale design heat flux level: 4000, 3000, 2500, 2000, 1500, 1000, 500, 250, 200, 100, 50, 30, 25, 20, 15, 10, 5, 2, 1, 0.5, 0.2 Btu/(ft²s) *custom ranges available*
- **Output Signal**: linear output, 10 millivolts nominal at full range.
- **Maximum Allowable Operating Body Temperature**: 400 °F.
- **Over Range Capability**: to 150% range for 2-1000 Btu/(ft²s) ranges.
- **Maximum Non-Linearity**: ±2% of full range.
- **Repeatability**: ±1/2%
- **Calibration Expanded Uncertainty**: ±3% for ranges to 250 Btu/(ft²s), coverage factor k=2, for approximate 95% confidence level.
- **Sensor Absorptance** (Hemispherical): Gardon gages, 0.92, nominal, from 0.6 to 15.0 µm. Thermopiles, .95, nominal, from 0.6 to 15.0 µm.
- **Time Constant**: (63.2% response to a step radiant heat Input)
  250 to 4000 Btu/(ft²s): less than 50 ms
  50 to 200 Btu/(ft²s): less than 100 ms
  2 to 30 Btu/(ft²s): less than 250 ms
- **Sensor Type**: (Standard, options available)
  5 to 4000 Btu/(ft²s): Gardon Gage (Except S-B for 64P-5 models)
  0.2 to 4 Btu/(ft²s): Schmidt-Boelter (Schmidt-Boelter sensors are also available as an option from 5 to 100 Btu/(ft²s) ranges.
- Nominal Impedance: (with standard leadwire)
  Less than 10 ohms on Gardon Gages
  Less than 250 ohms on Schmidt-Boelter Gages.
- **Heat Capacity of Uncooled Units**: Energy that can be absorbed by transducer in an adiabatic installation (defined as all surfaces perfectly thermally insulated except for 1-inch diameter sensor face) before exceeding the 400 °F maximum body temperature limitation: Model without water cooling provisions: 6.2 Btu, Models with water cooling provisions but without water: 4.2 Btu
- **Maximum Purge Gas Pressure**: 150 psi over ambient

### Smooth Body with Flange



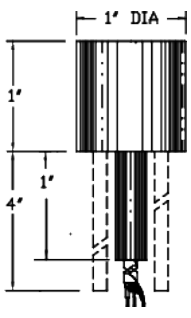

- Model No. 64-xx-16 Basic, uncooled
- Model No. 64-xx-20 Water cooled
- Model No. 64P-xx-24 Radiometer, Gas purged, cooled

### Threaded Body with Flange



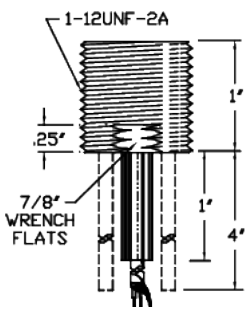

- Model No. 64-xx-17 Basic, uncooled
- Model No. 64-xx-21 Water cooled
- Model No. 64P-xx-25 Radiometer, gas purged, cooled

### Smooth Body, No Flange




- Model No. 64-Xx-14 Basic, uncooled
- Model No. 64-Xx-18 Water cooled
- Model No. 64P-xx-22 Radiometer, gas purged, cooled

### Threaded Body, No Flange




- Model No. 64-xx-15 Basic, uncooled
- Model No. 64-xx-19 Water cooled
- Model No. 64P-xx-23 Radiometer, gas purged, cooled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