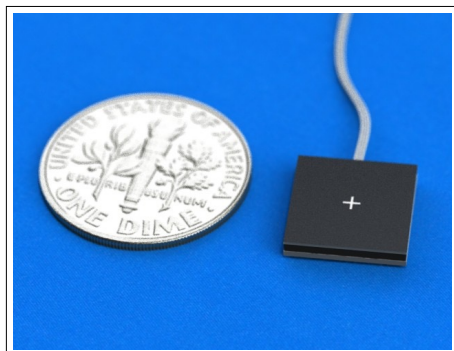


Thermoelectric Heat Flux Sensor

HFD04-097-05L10

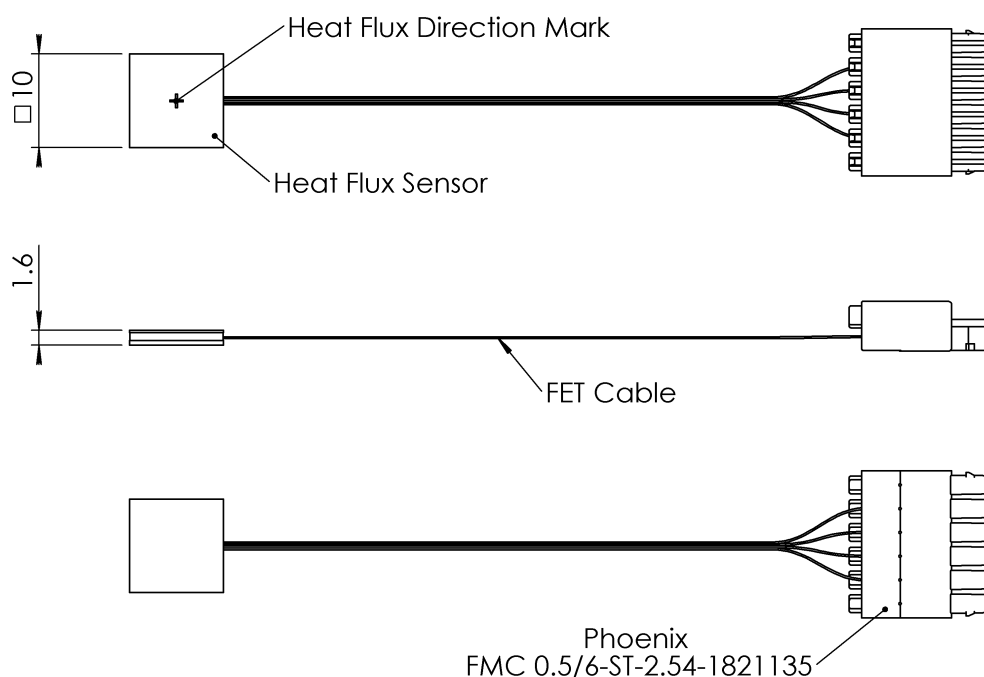


The HFD04-097-05L10 – high sensitive and self-calibrating sensor of conduction, convection and radiation heat fluxes in a wide range of heat flux intensities. Compatible with RMT Datalogger DX8140.

- Ultra-High Sensitivity
- Miniature Dimensions
- Self-calibrating
- FET cable
- Phoenix Connector

Sensitivity Se	$\mu\text{V}/(\text{W}/\text{m}^2)$	37
Integral sensitivity Sa	V/W	0.34
Heat Flux Range Pe	$\pm\text{W}/\text{m}^2$	8 500
Integral Heat Flux Range Pa	$\pm\text{W}$	0.85
Thermal Time Constant	s	1.6
Thermal Resistance RT	$\text{K}/(\text{W}/\text{m}^2)$	1.20E-03
Integral Thermal Resistance RT	K/W	12.0

Dimensions (mm)



Detailed Specification

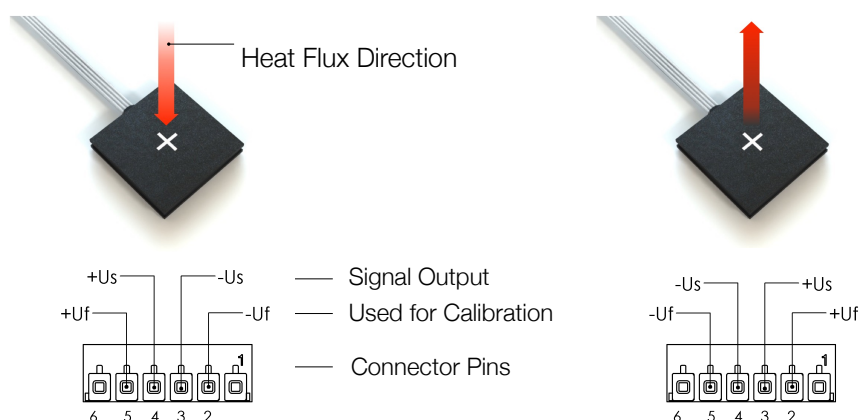
HFD04-097-05L10

Sensor Type		Thermoelectric
Surface material		Aluminum, painted black
Protection class ⁽²⁾		IP67
Surface dimensions AxB	mm ²	10x10
Thickness H	mm	1.6
Pellet pairs		97
Sensitivity Se	µV/(W/m ²)	37
Integral sensitivity Sa	V/W	0.34
Heat Flux Range Pe	±W/m ²	8 500
Integral Heat Flux Range Pa	±W	0.85
Thermal Time Constant	s	1.6
Thermal Resistance RT	K/(W/m ²)	1.20E-03
Integral Thermal Resistance RT	K/W	12.0
Electrical Resistance ACR	Ohm	6.08
Temperature Dependence ⁽³⁾ dS/dT	%/°C	0.25
Linearity with Power dS/dP	±%/(W/m ²)	0.03%
Homogeneity dS/dA	±%	1
Calibration Accuracy	±%	3
Calibration Temperature Range	°C	-40 ... +85
Operating Temperature Range	°C	-60 ... +150
Max. compressive Force for clamping	kg	31
Cable Length ⁽⁴⁾ L	cm	180
Connector type ⁽⁵⁾		FMC 0,5/6-ST-2,54-18211355
RoHS		Compliant

- Performance parameters shown in specifications are given for ambient temperature Ta=300 K (27 °C)
- Application in water - not more than 1 hour. Maximum temperature 100°C.
- Average value at Ta=300 K (27 °C). Detailed temperature dependence is given in table
- Sensor is equipped with thin FEP Flat Ribbon Cable, 0.025" Pitch, 32 AWG, 1,8 m.
Wire resistance 0.54Ohm/m
- Cable is ended by miniature connector FMC 0,5/6-ST-2,54-18211355 (Phoenix).
The reciprocal connector p/n is MCV 0,5/6-G-2,54 SMD R44-1821588

Pinout Configuration

HFD04-097-05L10



RMT Heat Flux Sensor Cable is ended by miniature connector FMC 0,5/6-ST-2,54-18211355 (Phoenix). The reciprocal connector p/n is MCV 0.5/6-G-2.54 SMD R44-1821588 (not included).

Self-Calibration Method

Sensitivity of thermoelectric heat flux sensor S_a [V/W]

$$S_a = \frac{U}{P} = N \times \alpha \times R_t$$

U – sensor signal at heat flux P_e ;
N – number of pellet pairs inside a sensor;
 R_t – thermal resistance;
 α – Seebeck coefficient (average value P-N pair)

Figure-of Merit Z of thermoelectric sensor

$$Z = \frac{(N \times \alpha)^2 \times R_t}{ACR}$$

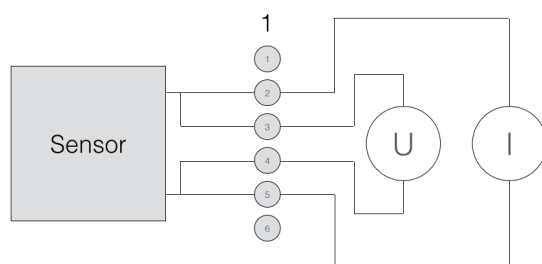
Calibration expression with use of Z, ACR and Seebeck coefficient α

$$S_a = \frac{1}{(\alpha \times N)} \times Z \times ACR$$

$$S_e = S_a \times S \quad \text{where } S - \text{surface area}$$

Measurement Scheme

Self-calibration to be made by measurement of Figure-of-Merit and ACR Resistance of thermoelectric heat flux sensor by four-wire method which is provided by four wires of the FET cable connected to the sensor.



Use series of Z-Meters made by RMT for measurement of Figure-of-Merit and ACR resistance of thermoelectric heat flux sensor.

Or RMT Datalogger DX8140 developed for HTX, HFX series of heat flux sensors.

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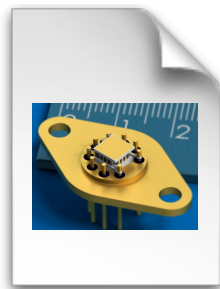
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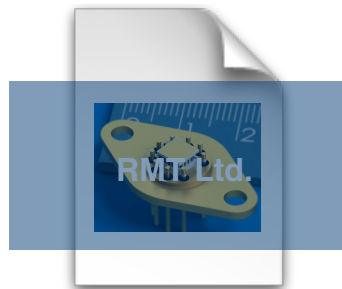
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