OMEGA ENGINEERING, INC.
An OMEGA Technologies Company

OMEGA ENGINEERING HEAT FLUX SENSOR CALIBRATION REPORT

Part Number HFS-4 Serial Number 00066663

Output at 70°F 7.22 μV/BTU/ft²•Hr

2.29 μV/W/m²

Polarity (for heat flow into surface): White, Positive (+); Red, Negative (–)

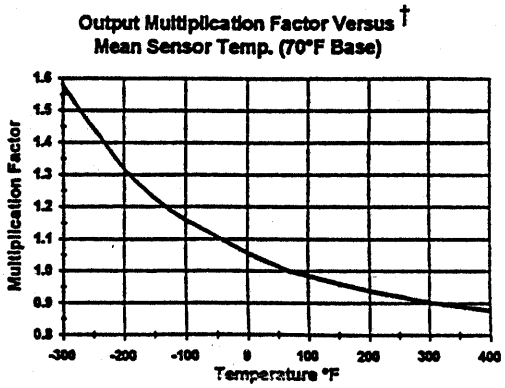
Thermal Properties (Typical)

Sensor	Thermal Resistance*		Thermal Capacitance**		Response††
	°F / BTU/ft²•hr	°C / W/m²	BTU / ft²•°F	W•s / m²•°C	Time (seconds)
HFS-1, HFS-3	0.01	0.002	0.03	600	0.60
HFS-2, HFS-4	0.02	0.004	0.05	1000	0.70

Thermocouple (optional):

Type K	Material	Polarity	Color
	CHROMEGA®	Positive (+)	Yellow
	ALOMEGA®	Negative (–)	Red

By: Date: 6-2-00



The HFS Series Heat Flux sensors are designed to measure heat flux to or from a surface with minimum disturbance of the existing heat flow pattern. The sensors are of the temperature gradient (Schmidt) type in which a self generating thermopile is arranged around a thin thermal barrier to produce a voltage that is a function of the thermal energy passing through the sensor.

Nominal thermal properties of the sensors are given in the table to permit estimation of the sensor effect in those instances where it may be useful.

* Thermal Resistance: Temperature drop through sensor per unit of heat flux.

** Thermal Capacitance: Heat energy required to raise mean temperature of sensor one degree.

†† Response Time: Time to 63% response to a step function.

† Output Multiplication Factor versus Sensor Temperature: Correction factor that can be applied to the sensor output when the mean sensor temperature is appreciably different from 70°F. Caused by the effect of temperature on the thermal conductivity of the thermal barrier and to the Seebeck coefficient of the thermopile.

OMEGA ENGINEERING, INC.
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OMEGA ENGINEERING HEAT FLUX SENSOR CALIBRATION REPORT

Part Number HFS-4 Serial Number 00034869

Output at 70°F 7.00 μV/BTU/ft²•Hr

2.22 μV/W/m²

Polarity (for heat flow into surface): White, Positive (+); Red, Negative (–)

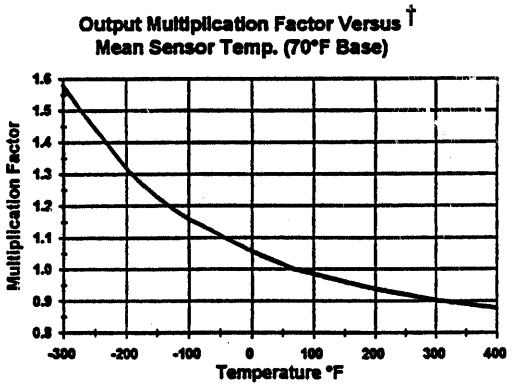
Thermal Properties (Typical)

Sensor	Thermal Resistance*		Thermal Capacitance**		Response††
	°F / BTU/ft²•hr	°C / W/m²	BTU / ft²•°F	W•s / m²•°C	Time (seconds)
HFS-1, HFS-3	0.01	0.002	0.03	600	0.60
HFS-2, HFS-4	0.02	0.004	0.05	1000	0.70

Thermocouple (optional):

Type K	Material	Polarity	Color
	CHROMEGA®	Positive (+)	Yellow
	ALOMEGA®	Negative (–)	Red

By: [signature] Date: 3-27-00



The HFS Series Heat Flux sensors are designed to measure heat flux to or from a surface with minimum disturbance of the existing heat flow pattern. The sensors are of the temperature gradient (Schmidt) type in which a self generating thermopile is arranged around a thin thermal barrier to produce a voltage that is a function of the thermal energy passing through the sensor.

Nominal thermal properties of the sensors are given in the table to permit estimation of the sensor effect in those instances where it may be useful.

* Thermal Resistance: Temperature drop through sensor per unit of heat flux.

** Thermal Capacitance: Heat energy required to raise mean temperature of sensor one degree.

†† Response Time: Time to 63% response to a step function.

† Output Multiplication Factor versus Sensor Temperature: Correction factor that can be applied to the sensor output when the mean sensor temperature is appreciably different from 70°F. Caused by the effect of temperature on the thermal conductivity of the thermal barrier and to the Seebeck coefficient of the thermopile.

OMEGA ENGINEERING, INC.
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OMEGA ENGINEERING HEAT FLUX SENSOR CALIBRATION REPORT

Part Number HFS-4 Serial Number 00066659

Output at 70°F 7.23 μV/BTU/ft²•Hr

229 μV/W/m²

Polarity (for heat flow into surface): White, Positive (+); Red, Negative (–)

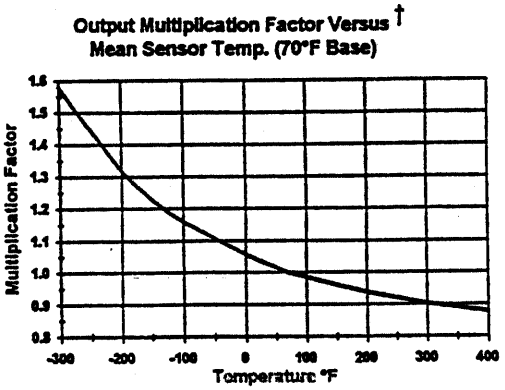
Thermal Properties (Typical)

Sensor	Thermal Resistance*		Thermal Capacitance**		Response††
	°F / BTU/ft²•hr	°C / W/m²	BTU / ft²•°F	W•s / m²•°C	Time (seconds)
HFS-1, HFS-3	0.01	0.002	0.03	600	0.60
HFS-2, HFS-4	0.02	0.004	0.05	1000	0.70

Thermocouple (optional):

Type K	Material	Polarity	Color
	CHROMEGA®	Positive (+)	Yellow
	ALOMEGA®	Negative (–)	Red

By: Date: 6-2-00



The HFS Series Heat Flux sensors are designed to measure heat flux to or from a surface with minimum disturbance of the existing heat flow pattern. The sensors are of the temperature gradient (Schmidt) type in which a self generating thermopile is arranged around a thin thermal barrier to produce a voltage that is a function of the thermal energy passing through the sensor.

Nominal thermal properties of the sensors are given in the table to permit estimation of the sensor effect in those instances where it may be useful.

* Thermal Resistance: Temperature drop through sensor per unit of heat flux.

** Thermal Capacitance: Heat energy required to raise mean temperature of sensor one degree.

†† Response Time: Time to 63% response to a step function.

† Output Multiplication Factor versus Sensor Temperature: Correction factor that can be applied to the sensor output when the mean sensor temperature is appreciably different from 70°F. Caused by the effect of temperature on the thermal conductivity of the thermal barrier and to the Seebeck coefficient of the thermopile.