HFM-215N

Multipoint Heat Flow Meter
Simultaneous Measurement of up to 16 Channels

HFM-201

Portable Heat Flow Meter
Measure Anywhere. Compact and Light

KYOTO ELECTRONICS

A measurement of heat flow provides important and detailed thermal data that cannot be given by a measurement of temperature alone.
The HFM series have the highest accuracy and reproducibility of the measurement of such heat flow because of the absolute calibration device. And the operation is extremely simple and easy as well. The HFM series enjoy a very high reputation and are used in various fields.

Application

Heat Dissipation Measurement
Furnace Wall, Heat Exchanger

Heat Dissipation Designing
Electronic Device and Component

Thermal Environmental Property
Building Material, Thermal Insulation

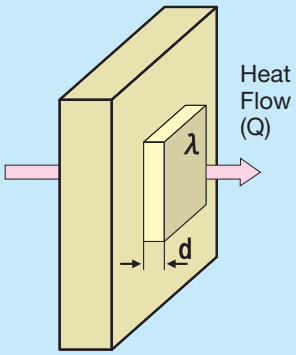
Clothes Performance Evaluation
Fiber, Clothes

Principle

The heal flow analysis is made based on the principle as shown below: If a thin plale wilh a Ihermal conduclivily of λ (kcal/m · h · °C) and a thickness of d (m) is contacted on a heat radiating surface as the figure shows. a heal flow Q (kcal/m² · h, or W/m²) which goes though the thin plale after it reaches to an equili-brium can be given by:

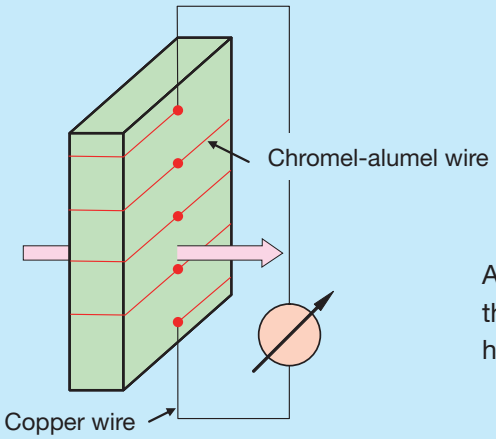
$$Q=\lambda/d \times \Delta T$$

Where : ΔT = Temperature difference between two sides of the thin plate, and λ and d are known values.



Principle of the Heat Flow

Heat Flow Sensor Structure

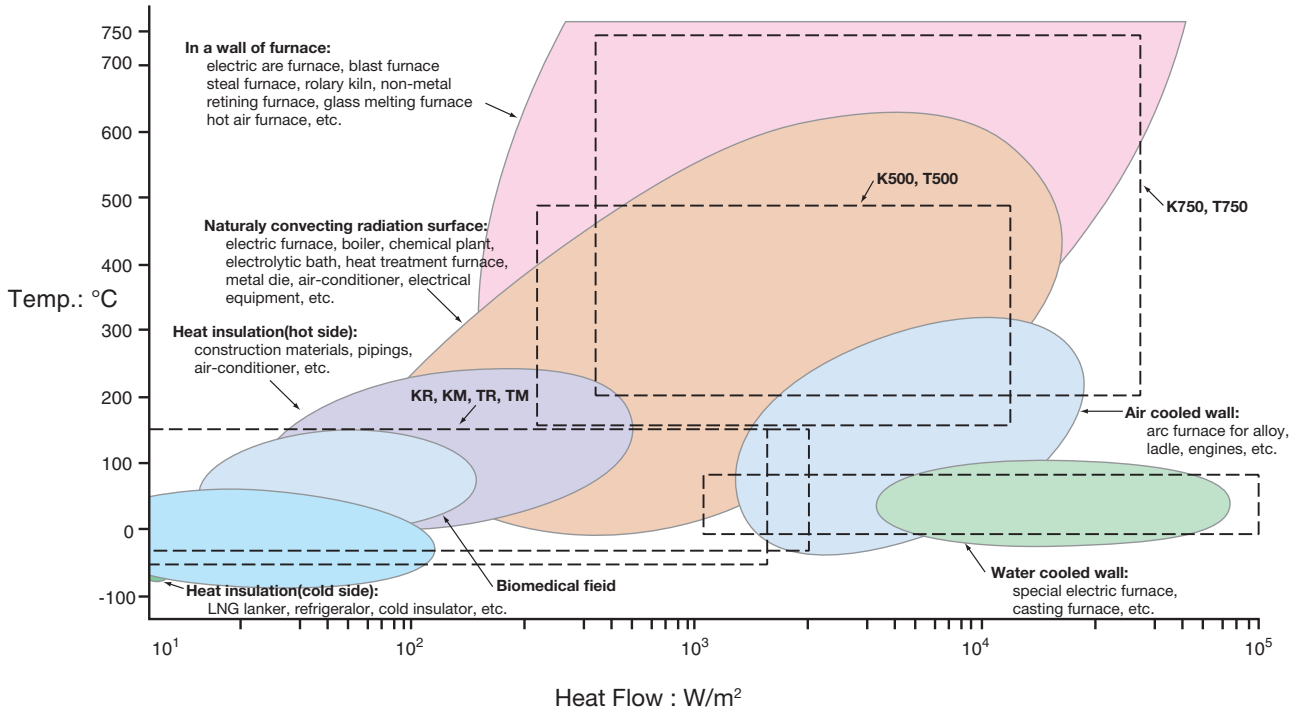


Construction of Heat Flow Sensor

A heat flow sensor is made of a thin material with a low thermal conductivity. And its differential ther-mocouple has multi-contacts to improve an overrall sensitivity.

There will be the most suitable sensor for every requirement!

A coverage of each sensosr (application, temp. and heat flow ranges)



Simultaneous Measurement of up to 16 Channels

Multipoint Heat Flow Meter
HFM-215N

High performance Heat Flow Meter with data logger. Easy measurement; just connect an appropriate heat flow sensor to what to measure and enter a sensor constant.

Connectable with All Heat Flow Sensors

Terminal block has 16 channels. Up to 16 sensors of sensor constant A type, or up to 8 sensors of sensor constant A/B type or sensor constant A type that requires temperature data can be connected.

3.5-inch Color TFT LCD

Waveform of collected data and bar chart can be shown. Heat flow value and temperature can digitally be shown, too, which may also be shown with waveform.

High Capacity External Memory

Internal memory (16 MB) can store data of 55 hours when eight sensors of sensor constant A/B type are connected and sampling rate is set at one second.
External memory media, CompactFlash or SD cards (1 to 2 GB), enable continuous measurement of some years at some sampling rates.

Equipped with Ethernet

Ethernet (10BASE-T/100BASE-TX) enables data collection through network.

Data Communication

Equipped with e-mail transmitting, Web server, FTP server and FTP client functions.
RS-485, RS-232C and USB communication devices can also be used.

Dual Power Supply

Both rechargeable battery and AC adapter can be used, making the HFM-215N compact and easy to carry.
Battery life for continuous use is seven hours. (May vary depending on conditions.)

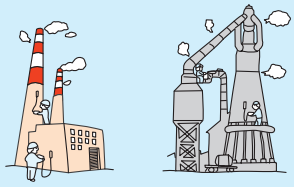
Enhanced Safety

Equipped with shock-resistant rubber cushions.

Item	Specifications	
Measurement Object	Heat Flow and Temperature	
Display Range	Heat Flow: 0 to ±99,999 W/m² Temperature:-40 to 750 °C	
Selectable Units	Heat Flow(W/m²) + Temperature(°C), Heat Flow(W/m²), Temperature(°C)	
Sampling Cycle	200/500 ms, 1/2/5/20/30 sec, 1/2/5/10/20/30 min, 1h	
Display Update	Approx. 1 sec	
What to Display	Waveform, bar chart, values of heat flow and temperature, and waveform plus such values.	
A and B Constants	A and B sensor constants can be input by key entry	
Number of Sensors	Sensor constant A / B type, sensor constant A type that requires temperature data	Up to eight (8)
	Sensor constant A type that requires no temperature data	Up to sixteen (16)
Internal Memory	16MB Stores data of 55 hours with eight (8) sensors of sensor constant A / B type at sampling rate of one (1) second	
External Memory Device	Compact Flash Type II, SD card, USB flash drive (copy only)	
External Communication	Ethernet (10BASE-T/100BASE-TX), Web server, FTP server, FTP client, e-mail transmitting functions, Compliant with USB Rev 1.1, RS-232C, RS-485	
Power Supply	Rechargeable battery: Lasts for approx. seven (7) hours of continuous use on a full charge of about eight (8) hours (RT 25°C, measurement cycle of five minutes or more, backlighting auto off in five minutes or less, data communication not in use) Comes with AC adapter (AC 100 to 240 V) as standard	
Ambient Conditions	Temperature: 0 to 50°C (0 to 40°C when using with battery) Humidity: 5 to 85 %RH	
Dimension	Approx. 155 (W) × 155 (H) × 55(D) mm (6.1 (W) × 6.1 (H) × 2.17(D) in) (Not including projection portions and rubber cushions)	
Weight	Approx. 800g (1.76 lbs) (Not including battery and rubber cushions)	
Accessories	AC Adapter ..... One Mini USB Cable ..... One Standard Software for PC ..... One Lithium-ion Battery ..... One Operation Manual..... One	
Options	Application Software <Enables real-time display and control>	

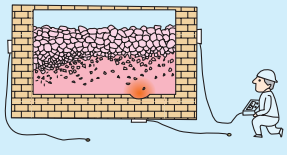
* Can be converted into waveform display and CSV file format through external memory.

For energy saving



"Isn't there any heat loss in the plant ?"

For safety control of furnace



"Something Is wrong here !?"

Measure Anywhere. Compact and Light.

Portable Heat Flow Meter
HFM-201

Easy to carry, a portable type Heat Flow Meter.
To check heat dissipation from boilers or steam piping, evaluate thermal insulation, measure heating value of electronic devices and components, detect flaws of blast furnaces, etc.
This Heat Flow Meter can be used at various sites on various occasions.

The Display

Heat flow level in W/m² or kcal/m²h and temperature °C can be switched and shown on display.

Selectable Sensor

Wide Selection of Sensor for Application.

Data Storage

Data memory can save 20 groups of files totaling 100 sets of data in storage

Power source

2-way power source from two AA dry cells (80-hour continuous run) or from AC adapter.

Carrying Case

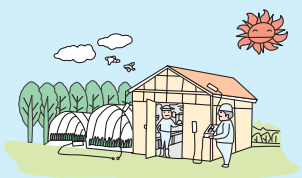
Carrying case is included in the package.

Printer Option

Optional printer is available.

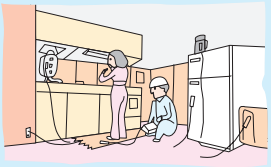
Item	Specifications
Measurement object	Heat flow and temperature
Measurement range	Heat flow: 0 to ±9999 W/m² or kcal/m²h Temperature: Chromel-Alumel thermocouple -99.9 to 999.9°C Temperature: Copper-Constantan thermocouple -199.9 to 400.0°C
Selectable units	Heat flow: W/m², kcal/m²h or Temperature: °C
Sampling cycle	Selectable from 1, 2, 5 or 10 seconds
Display update	Synchronized with sampling cycle
Determination of mean value	Selection from moving average of 1 set (When set at 'Off'), 2 sets, 10 sets and 30 sets of data
A and B Constants	A and B sensor constants are input by key entry.
Data memory	20 groups can be filed and total 100 sets of data are stored.
External communication	RS-232C port (one channel)
Ambient conditions	Temperature: 0 to 50°C Humidity: 20 to 80%RH (subject no condensation)
Power source	2 AA dry cells (80-hour continuous run) or AC adapter
Dimension	82(W) × 232(L) × 22(H) (mm)
Weight	Approx. 220g
Accessories	AA dry cell ..... Two AC adapter ..... One Operation manual ..... One Carrying case ..... One
Options	-Data Capture Software for PC -Connecting cable for PC -Printer IDP-100 -Connecting cable for printer

For development of solar & geothermal energy



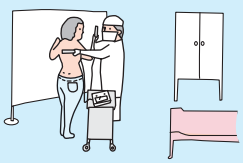
"Grow up, grow up !"

For measurement of thermal characteristics of houses



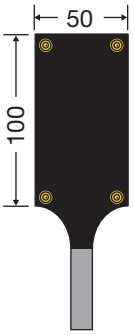
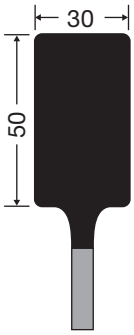
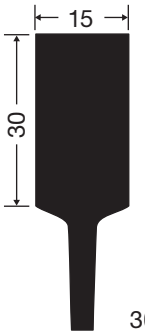
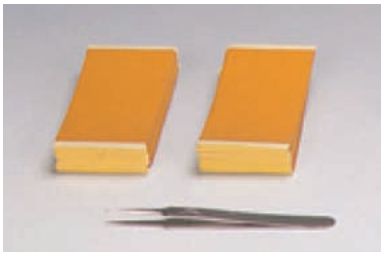
"For a comfortable living condition !"

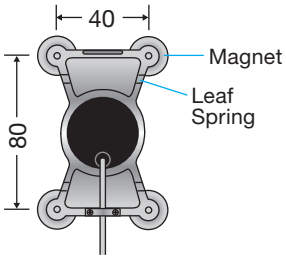
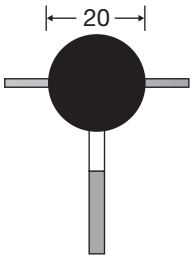
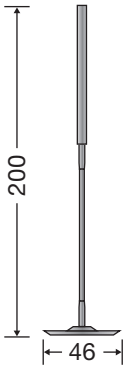
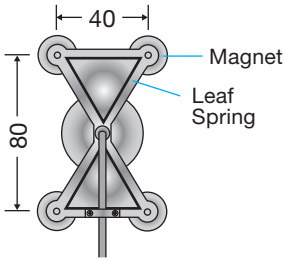
For medical research



"It can measure such a low heat flow generated by a human body."

Heat Flow Sensors

Sensor Name	General-purpose Low Heat Flow Sensor	General-purpose Low Heat Flow Sensor	Low Heat Flow Sensor
HFM-201	**TR2-B**	**TR6-B**	**TM1-B**
HFM-215N / 215	**KR2**	**KR6**	**KM1**
Sensor Image * Images for illustrative purposes only. Actual sensors may differ from the images shown.			
Normal heat flow range	12 to 3,500 W/m^2	12 to 3,500 W/m^2	12 to 3,500 W/m^2
Normal temperature range	-40 to 150 °C	-40 to 150 °C	-40 to 150 °C
Features & Applications	Being highly sensitive, the TR type sensor is capable of accurately measuring heat flow down to as low as 10 kcal/m^2•h. It can be easily mounted on the object; in view of its flexibility, this is true in the case of objects with curved surfaces as well. As the TR type sensor comes in various sizes, as can be seen from the listing below, it can be selected in accordance with the requirement of the objects to be measured. The TR type sensor can be used in a wide variety of applications including the measurement of heat loss from insulated piping and the testing of heat characteristic of buildings. It can also be embedded in insulating materials or soil. In this case, however, a special calibration (extra charge) is required for accurate measurement.		Although its characteristics are almost the same as those of the TR type, the TM type sensor is of small size so as to enable measurement of heat radiation from living bodies and small parts of equipment.
Core material	Sillicone rubber	Sillicone rubber	Sillicone rubber
Covering material	Sillicone rubber	Sillicone rubber	Sillicone rubber
Shape & Dimensions	 100 × 50 × t3 Silicone Rubber Lead Wire 5m	 50 × 30 × t3 Silicone Rubber Lead Wire 5m	 30 × 15 × t1.5 Silicone Rubber Lead Wire 5m
Others	HA2-H HA2-L  Pressure-sensitive adhesive sheet to place the sensor on where you wish to measure. (Option) Available in two types: for high temperature and for low temperature. HA2-H: Double-sided adhesive sheet for high temperature (70°C or above) HA2-L: Double-sided adhesive sheet for low temperature (70°C or below)		

Surface Type High Heat Flow Sensor	Surface Type High Heat Flow Sensor ø 20	Embedding Type High Heat Flow Sensor	Surface Type High Heat Flow Sensor
T500B-B	**T500B-20-B**	**T750-B**	**TW-B**
K500B	**K500B-20**	**K750**	**KW**
			Special Order Product 
350 to 17,000 W/m^2	350 to 17,000 W/m^2	580 to 58,000 W/m^2	1,200 to 120,000 W/m^2
70 to 500 °C	70 to 500 °C	200 to 750 °C	0 to 90 °C
Having excelling thermal resistance and durability, the T500 type sensor can be continuously used on surfaces having temperatures as high as 500°C. Since it is suited to measuring heat flow from high temperature surfaces, e.g., electric furnace walls, the T500 type sensor can be used in a wide variety of applications, ranging from energy saving to furnace operation control.	Having excelling thermal resistance and durability, the T500 type sensor can be continuously used on surfaces having temperatures as high as 500°C. Since it is suited to measuring heat flow from high temperature surfaces, e.g., electric furnace walls, the T500 type sensor can be used in a wide variety of applications, ranging from energy saving to furnace operation control. When measuring an iron furnace wall, put the supplied magnets on the side objects to fix the sensor. If magnets cannot be used, fix the sensor by welding or with screws.	The T750 type sensor was developed for embedding in furnace walls or insulating materials to measure heat flowing from them. As its excellent thermal resistance enables it to be continuously used on parts having temperatures as high as 750°C, the sensor is highly suited to measuring heat flow from electric furnace walls etc.	The TW type sensor is designed for measuring heat flow from water-cooled furnace walls. Although the large heat transfer coefficient at water-cooled surfaces usually makes it difficult to measure heat flow, development of the TW type sensor has solved this problem. The highly corrosion resistant mat-erial of the sensor enables it to be uses in seawater.
Air	Air	Air	Sillicone rubber
Stainless steel	Stainless steel	Stainless steel	Inconel
 80 × 40 Sensing Area ø 38 Silicone Rubber Lead Wire 5m	 Silicone Rubber Lead Wire 5m	 Silicone Rubber Lead Wire 5m	 80 × 40 Sensing Area ø 38 Silicone Rubber Lead Wire 5m
Although the T500B type sensor (color : black) is generally employed, use the T500S type sensor (color : silver) for surfaces that are silver color coated or have a metalic lusier (emissivity, 0.5 max for both). 	Although the K500B-20 or T500B-20-B type sensor (color : black) is generally employed, use the K500S-20 or T500S-20-B type sensor (color : silver) for surfaces that are silver color coated or have a metallic luster (emissivity, 0.5 max for both).	K750 and T750-B are for embedding measurement only. Contact KEM or your local agent should you wish to use them for other measurements. Surface Type High Heat Flow Sensors of the same form, K750S or T750S-B (color: silver), are also available.	The TV type sensor for water-cooled surfaces is particularly recommended for operation control of furnaces in view of its remarkable durability.  Special Order Product

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