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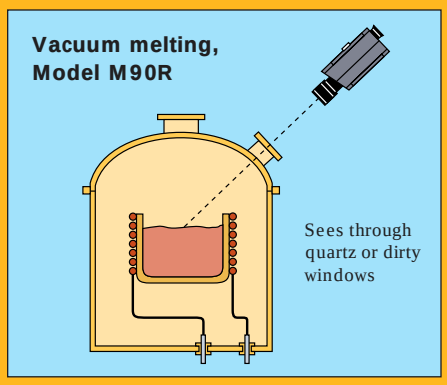
MIKRON®
INFRARED

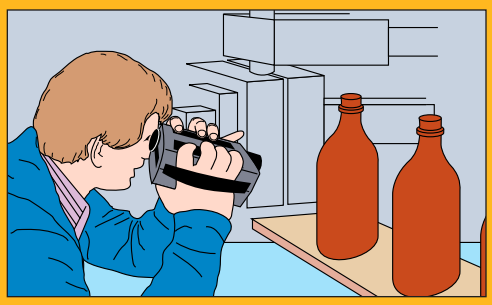
M90 Series
Portable Infrared Thermometers



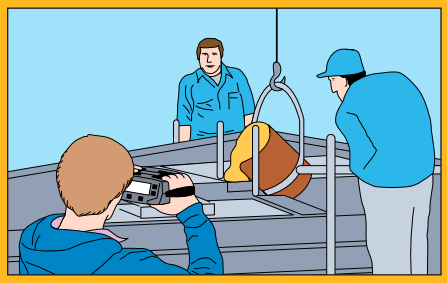
THE INFRARED PROS



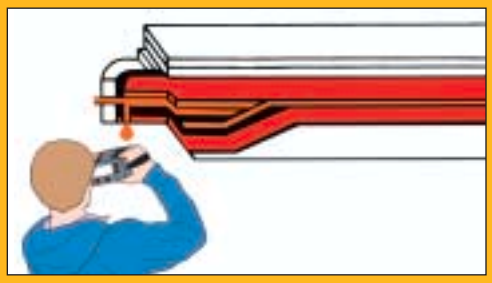




Measurement of glass and ceramic temperatures, Model M90E



Foundry (high temperature metals), Model M90R or M90V



Forehearth/Glass Furnace (Gob temperature) Model M90V or M90H

MIKRON M90 SERIES... the world's most

Mikron 90 Series Portable Infrared Thermometers use cutting edge technology to provide maximum operator convenience and application versatility for rapid and dependable temperature data gathering. Hand held for spot checks or tripod mounted for short term monitoring, these attractively designed instruments have widespread application throughout industry and research. Capability and versatility are expressed in these outstanding features.

- Sharp focussing on targets from 18cm (7.0") to infinity through precision optics.
- Temperature reading on large display in view finder and in window on rear of instrument.
- Emissivity and measurement mode information also displayed in rear window.
- Peak, Valley and Variable Averaging functions selected by push-button.
- Built-in data logging.
- Digital (RS232C) and analog (mV/° or 0-1VDC) outputs for remote recording, printing or computer interface.
- Computer controlled calibration and diagnostic functions.
- Digital emissivity/slope setting.
- Communication software.

Model M90R 2-Color Infrared Thermometer

This unique version utilizes the 2-color principle, in which the temperature measurement is made by ratioing the radiation intensities of two adjacent wavelengths rather than from absolute intensity as with single band (or single color) instruments. For surfaces behaving as grey bodies, this design approach eliminates a number of factors that degrade the accuracy of conventional instruments. For example, temperature measurements with the M90R are:

- Independent of emissivity
- Unaffected by dust and other contaminants in the field of view
- Unaffected by dirty viewing windows

User-oriented Design

The M90 is designed for user convenience and comfort through such features as a focussable view finder; built-in, selectable filter for hot, bright targets; wrist strap and knurled grips; and left-hand or right-hand operation.

Built-in Data Logging

The M90 can store up to 40 single readings in non-volatile memory. The readings are stored using the RUN/HOLD switch. Each time the button is pressed, the unit goes from RUN mode to HOLD mode, and the reading is stored. The button is pressed again to return to RUN and the counter is automatically incremented so the next reading may be stored in the next location. The user may single-step through the stored readings to review them. This allows for "snap-shot" readings to be taken in the field and analyzed in the lab or office.

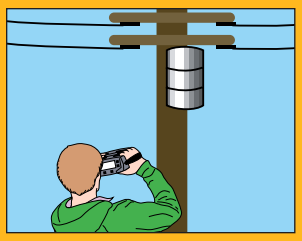
Variable Length Averaging

The averaging feature of the M90 allows the user to enter the number of readings to be averaged together. Up to 60 readings may be averaged to smooth readings from a noisy process. The average performed by the M90 is a running average. This means that each time a new reading is taken, the oldest reading is dropped, so the average is always the average of the most recent readings (the number of readings is determined by user from 2 to 60).

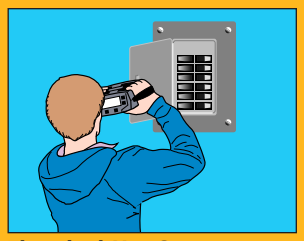
Battery Operation

Long life, rechargeable and replaceable batteries that provide up to 16 hours of continuous operation are enhanced by the M90 battery saver feature that automatically switches the instrument off after a spot check

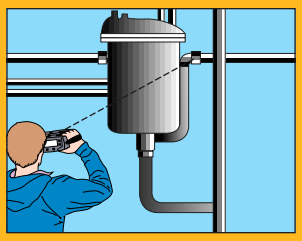
Typical Preventive Maintenance Applications, Model M90BT



Transformer



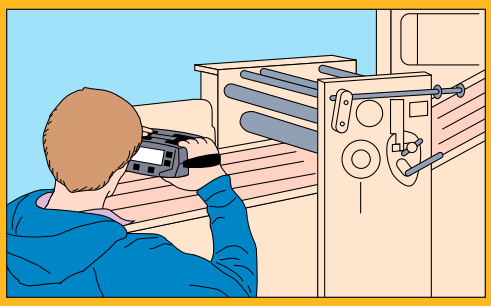
Electrical Hot Spots



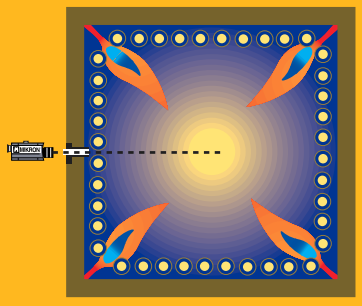
Steam Traps



M90 tripod mounted for precision aiming



Plastic industry, Model M90F or M90ZF



Cross section view of utility furnace, Model M90L

advanced portable infrared thermometer.

reading. The M90 can be continuously powered by the supplied battery charger and rechargeable or alkaline AA batteries may be field installed.

Calibration

Factory and field calibration is made easy by the built-in "learn" mode which instructs the M90 to match its calibration to laboratory standards. Initiated by easily accessed D.I.P. switch, the "learn mode" eliminates potentiometer adjustments.

Communication Software

The software for the M90 Series allows the instrument to be interfaced with any IBM personal computer or compatibles.
This software features:

Remote Emissivity Correction

When measuring targets whose emissivity is different from unity, the computer will automatically compute the corrected temperature for the emissivity entered.

Logging of Temperature Data

As each measurement is taken, it can be logged into a data file on disk compatible with Lotus 1-2-3, or printed on paper.



Capability-expanding Options

Optional accessories which enhance the capability and versatility of the M90 Series include a line printer for data logging, digital data logger, and close focus lens attachments.





Data Logger & Printer

With the addition of the optional Digital Data Logger and Printer, the M90 realizes its full potential as a powerful data capturing system. The printer formats alphanumeric data from the M90 RS232 output in 24 columns on demand or automatically at adjustable intervals. The data logger, with a memory capacity of 5200 readings, facilitates accumulation of temperature data from plant, building or field surveys for later examination or loading into a computer.

The Model DDL90 Digital Data Logger weighs only 400 grams (14 oz.) and the Model DLP Printer only 0.45 kg (1 lb.) Both fit neatly into the standard carrying case furnished with the M90 Infrared Thermometer.

Specifications

Digital Data Logger, Model DDL90

Memory Capacity: 5200 readings, temperature °C/°F, date, time, battery condition
Display: LCD 2 lines 16 alpha numeric characters/line
Sampling Interval: Continuous to 999 seconds in 1 second increments.
Log Mode: Manual or Auto. In Manual Mode, data is logged only when the Read button of M90 is pressed.
Software: Program supplied for IBM PC or compatible, data file is compatible with Lotus 1-2-3
Input: RS232C from M90 Series
Output: RS232C to computer, 1M (3.5') interface cable to DB-25 supplied
Battery Type: Rechargeable Ni-Cad 4 x Type AA, life 8 continuous hours
Battery Charger: 115/220VAC input 12VDC output at 200mA
Operating Temperature: -10° to 60°C (0.14 to 140°F)
Size: 100mm x 180mm x 35mm (3.9"W x 7.1"L x 1.4"D)
Weight: 400 grams (14 oz.)

To order specify Model No. DDL90-1 for 115VAC
DDL90-2 for 220VAC

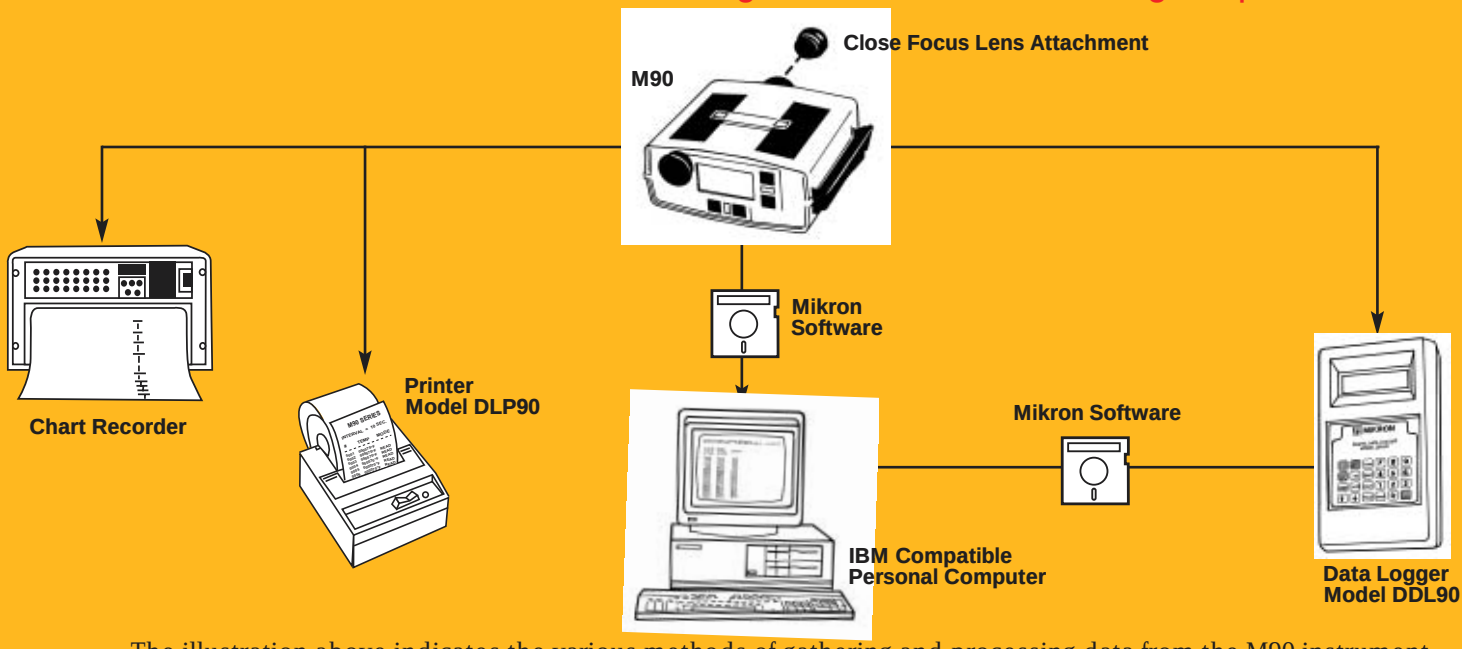
Digital Line Printer, Model DLP90

Paper: 70mm (2.25") wide
Mechanism: Impact dot matrix
Input: RS232, 2400 baud, Clear to Send (CTS) from M90
Format: 24 column (measurement mode and temperature)
Control: OFF/ON/PAPER FEED
Operating Temperature: 0 to 50°C (32 to 122°F)
Ribbon Life: 200,000 characters.
Power: 115VAC/220VAC converter supplied, 8.5 VAC output
Size: 100mm x 114mm x 51mm (4"W x 4.5"L x 2"H)
Weight: 0.450kg (1 lb.)
To order specify Part No. DLP80-1 for 115VAC
DLP90-2 for 220VAC



M90 portable system for temperature surveys.

Model M90 offers a full range of data handling capabilities.



The illustration above indicates the various methods of gathering and processing data from the M90 instrument.

Optional Close Focus Lens Attachment

With close focus lens attachment the focussable distance of the M90 series can be reduced to 178mm (7.0"). These lenses can be added in the field with no change in calibration accuracy. See table below for minimum measurable target diameters.

Close Focus Lens Part #	Useable with Models	Close Focus Working Distance	Minimum Measurable Target Diameter
14040-1H	M90Q, M90H-1, M90R-1	53.0cm (21.0") to 35.5cm (14.0")	6.0mm (0.24")
	M90H, M90R-2		2.0mm (0.08")
	M90V		1.2mm (0.05")
14040-2H	M90Q, M90H-1, M90R-1	33.0cm (13.0") to 21.5cm (8.5")	3.6mm (0.15")
	M90H, M90R-2		1.2mm (0.05")
	M90V		0.72mm(0.030")
14040-1H and 14040-2H	M90Q, M90H-1, M90R-1	24.0cm (9.5") to 17.8cm (7.0")	3.2mm (0.13")
	M90H, M90R-2		1.06mm(0.05")
	M90V		0.65mm(0.025")

Metallic Case

The standard M90 housing is manufactured from a rigid and durable ABS plastic, which is suitable for the large proportion of application environments. For more severe working conditions, such as glass works, foundries and steel mills, additional levels of protection are available. The first level is a cast metal housing in place of the standard ABS housing. This provides excellent protection against rough handling and incorporates rubber feet to buffer shock and vibration.

Dust-proof Soft Case

The second level of protection is a dust-proof soft case cover which fits over the M90 case and protects against dust, fumes and fingerprints, while still allowing all the controls to be operated.

Shoulder Strap

This accessory allows the Model M90 to be held by the shoulder for an extra measure of safety and convenience.

General Specifications, all Models

Focussing: 50cm (20") to infinity.

View Finder: 9° sighting, eye piece adjustable, illuminated temperature display in view finder. High temperature eye protection filter, built-in and selectable in high temperature models.

Operating Modes: Run, Peak, Valley, Average, Hold.

Emissivity Range: 0.1 to 1.00 in 0.01 steps, digitally set.

Slope Adjust: .850 to 1.150 in .001 step digitally set, for M90R Series only

Digital Output: RS-232, 2400 baud, to printer, data logger or computer.

Analog Output: 1mV/°C, 1mV/°F or 0-1 volt, field selectable.

Ambient Operating Temperature: 0 to 50°C (32 to 122°F). 0 to 90% R.H. non-condensing.

Storage Temperature: -20 to 65°C (-5 to 150°F).

Battery Type: Rechargeable Ni-Cad, type AA.

Battery Life: Continuous operation: 16 hours for type V, H and Q, 8 hours for others.

Weight: 1.1kg (2.5 lbs.) with lens and batteries.

Mounting: Built-in tripod socket 1/4-20 tapped hole.

Size: 165mm x 187mm x 76mm (6.5"W x 7.3"L x 3.0"H)

Standard Accessories



High-impact plastic fitted carrying case

Lens Cap

Ni-Cad batteries type AA

Battery Charger: plugs into front panel of M90 to recharge Ni-Cad batteries overnight. Can be used to power M90 Series directly from AC power source.

Output 12VDC, Input 100 or 115 or 220VAC

Analog Output Cable: provides link up to recorder or controller. 3m (10') long

Instruction Manual

Optional Features

1. Communications Software
2. RS232C Output Cable: provides cable for link up with PC or printer 3m (10') long
3. NIST traceable certificate

Unconditional Warranty

Every M90 Series Infrared Sensor is covered for all defective material and workmanship for one full year after shipment.

Made in U.S.A.

The M90 Series is designed and built by Mikron, the leading innovator in infrared thermometry. Manufacturing facility is located in Oakland, New Jersey.

Specifications

Typical Applications		Model	Temperature Range °C/°F (Field Selectable)	Spectral Response (µm)	Field of View for Measurement	Accuracy (NIST traceable) See option 3.	Temperature Resolution	Response Time
Hot and molten metals, foundries, ceramics, hardening, forging, annealing, induction heating, semi-conductor wafers.	2-color principle independent of emissivity	M90R-1	700° to 2000° C 1292° to 3632° F	2-color near 0.9µm	60:1 (1°)	±0.70% of reading	1°	0.5 sec.
		M90R-2	900° to 3000° C 1652° to 5432° F		180:1 (1/3°)			
		M90-R3	1200° to 3500° C 2192° to 6332° F		180:1 (1/3°)			
	Perfect replacement for optical pyrometers	M90V	800° to 3000° C 1472° to 5432° F	0.65 (same as optical pyrometers)	300:1 (1/5°)	±0.25 % of reading		
Semi-conductor wafers, induction heating, hot shiny metal surfaces.		M90H	600° to 3000° C 1112° to 5432° F	0.78 – 1.06	180:1 (1/3°)	±0.40% of reading		
Medium to high temperature for ferrous and non-ferrous metals. Sees through glass.		M90Q	250° to 2000° C 482° to 3632° F	1.0 – 1.60	60:1 (1°)	±0.50% of reading ±1°C	1°	0.5 sec.
*note: Special spectral response to avoid flame.		M90IN	350° to 2000° C 662° to 3632° F	*	180:1 (1/3°)	±0.50% of reading ±1°C	1°	0.5 sec.
Life sciences, such as biology, zoology, botany, veterinary medicine, heat loss and research.		M90G	0° to 500° C 32° to 932° F	8 – 14	20:1 (2 1/2°)	±0.8% of reading ±1°C	0.1°	1.0 sec.
General purpose for textile, printing, food, rubber, thick plastic, paints, laminating, maintenance.		M90B	–50° to 1000° C –58° to 1832° F	8 – 14	40:1 (1 1/2°)	±0.8% of reading ±2°C	1°	0.75 sec.
Small spot sizes at a distance. Excellent choice for pre-ventive maintenance and process monitoring 2.5cm (1") spot diameter at 2.3cm (90").		M90BT	-50° to 1000° C -58° to 1832° F	8 – 14	90:1	±1.0% of reading ±1°C	1°	0.75 sec.
Small spot sizes at long distances. preventive maintenance, hot spots on electrical switchgear and panels and power lines. 2.5cm spot diameter at 4.6 meters.		M90ZB	-50° to 1000° C -58° to 1832° F	8 – 14	180:1	±1.0% of reading ±1°C	1°	0.75 sec.
Thin film plastic, such as polyester, fluorocarbons, etc. Low temperature glass.		M90ZF	0° to 500° C 32° to 932° F	7.9	40:1 (1 1/2°)	±1.0% of reading ±2°C	1°	1.0 sec.
		M90F	50° to 600° C 122° to 1112° F					
Glass and ceramic surface such as tempering, annealing, sealing, bending and laminating.		M90E	300° to 1500° C 572° to 2732° F	4.8 – 5.2	60:1 (1°)	±1.0% of reading	1°	1.0 sec.
		M90E-1	800° to 2500° C 1472° to 4532° F		90:1 (2/3°)			
See through clean combustion flames and hot gases.		M90D	500° to 1500° C 932° to 2732° F	3.86	90:1 (2/3°)	±1.0% of reading	1°	1.0 sec.
		M90D-1	800° to 2500° C 1472° to 4532° F					
Combustion flames and hot gases containing CO_2.		M90L	600° to 2200° C 1112° to 3992° F	CO_2 absorption band	40:1 (1 1/2°)	±1.0% of reading	1°	1.0 sec.

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