AMERICAN SENSORS CORP
THE ULTIMATE IN DETECTION

557 Long Road
Pittsburgh, PA 15235, USA
Email: sales@americansensors.com
www.americansensors.com
Tel: 412-242-5903 fax: 412-242-5908

PM-3000

MULTI-WAVELENGTH PYROMETER

NON-CONTACT,
TEMPERATURE MEASURMENT OF METALS,
FERROUS AND NON-FERROUS

FEATURES:

- **Higher Accuracy** -- Temperature measurements at a high accuracy level under rigorous production testing.
- **Environmental Immunity --** Measurement accuracy maintained under conditions of reasonable amounts of smoke, dust and water vapors.
- **Variable Emissivity** -- Measurement accuracy maintained under changes in target emissivity (for example, various shaped extrusions can be measured)
- **Fully Automatic Control --** Analog and digital outputs provide on-line feedback to process control systems

APPLICATIONS:

- **Aluminium extrusion-following the cooling run-table**
- **Aluminium extrusion-billets**
- **Aluminium extrusion- metal target**
- **Steel- melted and sold steel and gray iron**

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DESCRIPTION:

The quality of materials during the production process is affected by temperature. Due to the nature of some of the alloy manufacturing and production processes (target aggressiveness, high speed motion, etc.), non-contact measuring devices are required to ensure the correct temperature during the production process.

The results provided by conventional optics pyrometers are influenced by several factors: non-linear and unstable relationship between emissivity and temperature; variations in object surface conditions; variations in optical path transmission due to intermediate media such as dust, smoke and grease between the pyrometer and the measured object; and effect of light reflected from external radiation sources. Another factor that causes partial object sighting is the fluctuation of objects within optical pyrometer field of view.

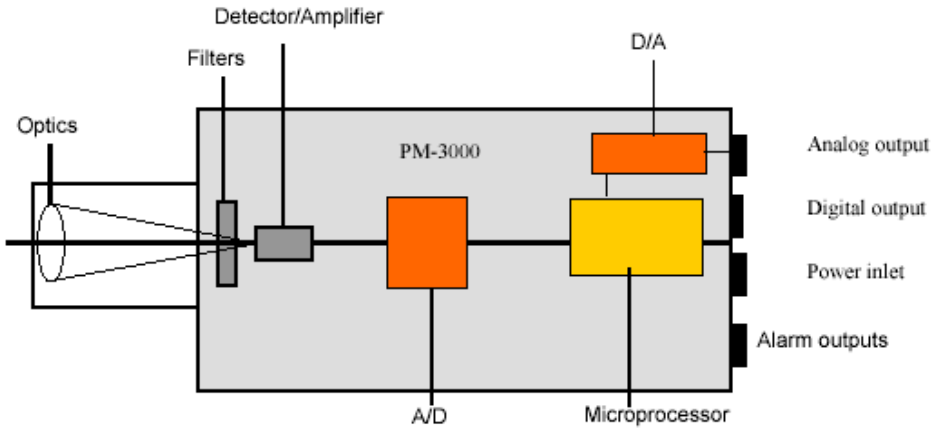
The PM-3000 pyrometer is specifically designed to overcome emissivity variations and environment problems and provide accurate continuous temperature measurements. This is done by utilizing measurements of infrared radiation emitted from the target at several wavelengths, analyzing the signal and calculating two parameters:

- Effective Emissivity (the product of emissivity and the medium)
- True Temperature

PRINCIPLE:

The pyrometer temperature measurement method utilizes the fact that objects emit thermal radiation in an amount that directly corresponds to their own temperature and surface emissivity.

The pyrometer detects the amount of infrared emitted by the measured object (target). The infrared signal is analyzed and the temperature it represents is analyzed by built-in microprocessor. The calculated value is transmitted to a PLC/PC, or displayed on the optional digital display. Below is a block diagram of the system.



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SENSOR:

The sensor consists of an optical system for detecting the thermal radiation that is emitted by the object, and a microprocessor for processing the signals.

- A red laser beam that is parallel to the optical path shows the target point and enables the user to accurately direct the sensor at the measured surface.
- The sensor is supplied with 50mm diameter objective lens with a focus setting of 100mm (D50/f100). It provides a measurement spot diameter of 2cm at distance of 1m and wider spots (Distance in mm/50 = spot diameter) for distances.
- For high temperature application spot diameter = distance in 400mm
- Process and route data to external devices (PC, PLC, Display, recorder)

SPECIFICATIONS:

TEMPERATURE RANGE	EMISSIVITY RANGE	SPOT FROM A DISTANCE OF 1M
200° to 600°C 392° to 1122°F	0.1 to 0.6	20mm
300° to 600°C 572° to 1110°F	0.1 to 1.0	20 mm
350° TO 650°C 662° TO 1202°F	0.1 to 0.6	20 mm
450° to 900°C 842° to 1652°F	0.1 to 1.0	20mm
300 to 1000°C 572° to 1830°F	0.1 to 1.0	20 mm
1000° to 2000°C 1830° to 3630°F	0.1 to 1.0	2.5 mm

NOTE: Other temperature ranges are available for special applications. Please call ASC for further information.

SYSTEM	
ACCURACY	± 1% of Measured Value
EMISSIVITY	Special Algorithm
SPECTRAL RANGE	Multiple Spectral Range
RESPONSE TIME	51ms up to 10s Adjustable
LASER SOURCE	Class II
SIGNALS	
ANALOG OUTPUT	4-20 mA, 0-20mA, or 0-10VDC
DIGITAL OUTPUT	RS232, RS422, RS485
ALARM OUTPUT	High and Low temperature limit

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ELECTRICAL	
POWER SUPPLY	100 to 240 VAC (50-60 Hz) or 24 VDC 1.3 TO 0.6A
SHIELDED CABLE	4 Meter, high-temperature
MECHANICAL	
HOUSING	Hermetically sealed cast metal housing rating: IP66 (NEMA 4 & NEMA 12)
WATER / AIR COOLING	Optional cooling system
MOUNTING	Fully Adjustable foot mount swivel stand
OPERATING TEMPERATURE	0°C to 70°C (41°F to 150° F) 0° to 70° C with optional cooling system
STORAGE TEMPERATURE	20° to 70°C

PC SOFTWARE

Advanced logging software enables cross profile temperature measurement and logging. Data may be used to control cooling sprinkles inside cooling system, thus achieving uniform cooling across the profile.

- Online process monitoring in real time
- Record values retrieval by date and time
- Sensor parameter control
- Scanning system control

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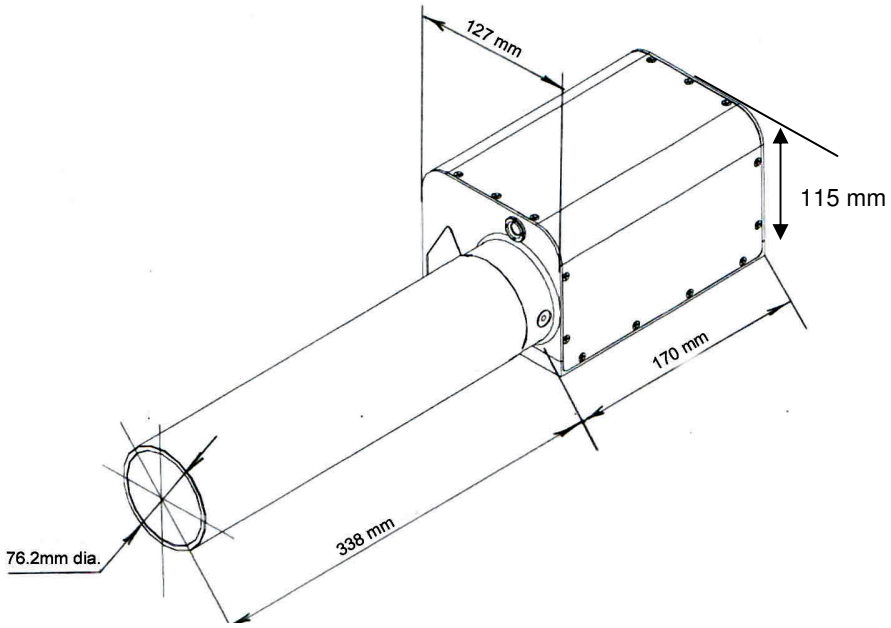
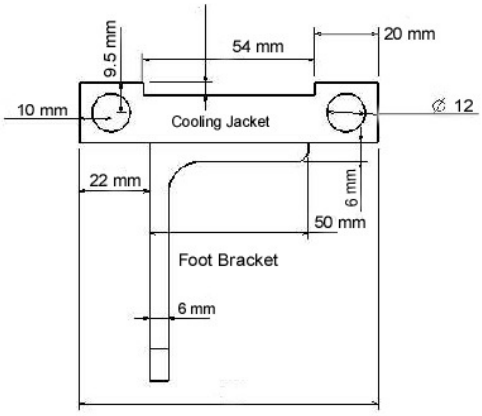
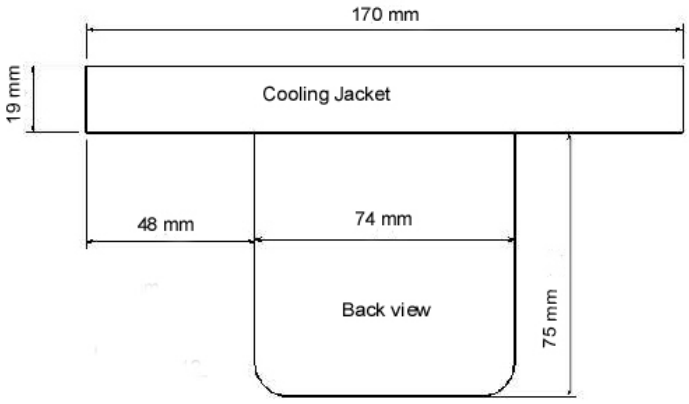
DIMENSIONS:

PM-3000 Pyrometer





Foot Bracket & Cooling Plate



Cooling Plate – Back View

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ORDERING INFORMATION:

Model	Type	Code - Temperature Range		Input Voltage
PM-3000	SC Scanner	LT	200° to 600°C	• 100-240 VAC
		LT2	300° to 600°C	• 24V DC
		M	350° to 650°C	
		A	450° to 900°C	
		HT2	300° to 1000°C	
		HT	1000° to 2000°C	

For Example:

PM-3000-M-24VDC

Model	Type	Code - Temperature Range		Input Voltage
PM-3000		M	350° to 650°C	24V DC

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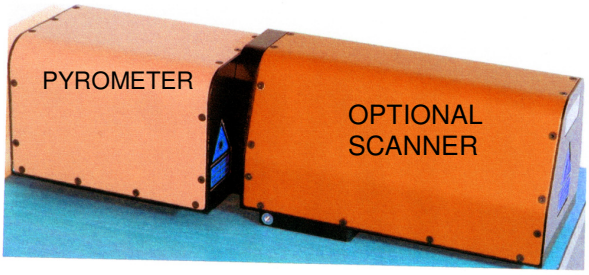
OPTIONS:

PM-3000-SC SCANNING SYSTEM

- Plug and Play, simple to install
- Fully automatic profile tracking
- Manual option of camera aiming
- Allows for continuous reliable temperature
- Tracking of individual profile temperatures in multi-cavity die



The precise placement of pyrometers in the extrusion line is essential in achieving continuous accurate results. The PM-3000-SC scanning pyrometer automatic aiming system ensures that the pyrometer camera is automatically locked onto the target at all the times – guaranteeing accurate results every time.

FEATURES:

- Adjustable scanning range up to ± 25°
- Adjustable scanning step from 0.10 to 5°
- Adjustable scanning time
- Minimum working distance: 1 meter
- Maximum working distance: dependent on target size

Selection of scanning modes:

- Hottest point
- Smooth point
- Program points (pendulum mode)
- Continuous scanning (pendulum mode)

APPLICATIONS:

Billet Furnace Exit / Billet Loader:

The system scans the billet along its length, providing the true temperature of the billet skin. The system operates in automatic mode and manual. This allows for temperature monitoring in isothermal extrusion, where taper heating/cooling of the billet along its longitudinal axis is a prerequisite.

Profile Temperature

The PM-3000-SC scanning pyrometer can be automatically or manually aimed at the profile. This feature is especially helpful for multi-cavity-dies where each profile temperature can be separately detected.

Cooling Table:

The accurate placement of the pyrometer above the cooling table has posed difficulties. The PM-3000-SC pyrometer scanner automatically locates the camera on the profile, which may move crosswise on the Running Table, thus ensure an accurate continuous reading.

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DIMENSIONS:

PM-3000-SC – Pyrometer with Scanner