

SYSTEM 4

STANDARD AND FIBRE-OPTIC
THERMOMETERS



0 °C to 4700 °C / 32 °F to 8492 °F



LAND
AMETEK®



QUALITY CUSTOMER SOLUTIONS

SYSTEM 4

STANDARD AND FIBRE-OPTIC THERMOMETERS

AMETEK LAND HAS BEEN MANUFACTURING PRECISION MEASURING EQUIPMENT SINCE 1947.

WE ARE SPECIALISTS IN NON-CONTACT TEMPERATURE MEASUREMENT AND COMBUSTION MONITORING WITH APPLICATIONS ACROSS DIVERSE INDUSTRIES SUCH AS STEEL AND GLASS MAKING, POWER GENERATION AND CEMENT MANUFACTURE.

As part of AMETEK Process & Analytical Instruments Division since 2006, our customers benefit from the worldwide AMETEK sales and service team.

System 4 comprises an advanced range of high precision radiation thermometers, LANDMARK® processors and a range of mounting accessories which combine to form a complete temperature measurement system.

System 4 thermometers offer exceptional flexibility with a choice of single wavelength, ratio, fibroptic and fibroptic ratio models.

Thermometer type, temperature range, spectral response and optical characteristics are chosen to suit any application from 0 to 2600°C/50 to 4700°F

- Focusable optics - standard and short focus versions with through-the-lens sighting providing clear and guaranteed definition of target
- Optional close-up lenses - giving measurement of targets as small as 0.45mm/0.02in
- Accurate, reliable, drift-free measurement
- Rugged design with a range of mounting options
- Flexible fiber optics light guide versions - with optional laser targeting system to define target spot
- High level linear output

RADIATION THERMOMETERS

Proven, reliable electronics and a high quality optical system combine to deliver accurate, dependable temperature measurement. A rugged die-cast aluminium body, with a high quality electrical connector, ensures reliable performance.

Standard bodied thermometers all feature through-the-lens sighting with a 6° field of view. Adjustable focus with a circular graticule gives precise alignment on to the smallest targets. Two optical variants are available: Standard focus - adjustable between 500mm/19.7in and infinity, and Short-focus - viewing from 350mm to 1m/13.8 to 39.4in. Close-up lenses are also available which can measure targets as small as 0.45mm/0.02in from as close as 90mm/3.5in.

FIBROPTIC THERMOMETERS

The use of flexible fiber optics allows the detector and electronics enclosure to be located in a less hostile environment, and enables access to difficult targets. The fibroptic thermometers are available with an optional integral laser targeting system which defines the target spot for accurate alignment.

The use of fiber optics permits viewing of normally inaccessible targets, where there are high magnetic fields or in high ambient temperatures up to 200°C/400°F without cooling of the optic head. There is a choice of three optic heads and three light guide lengths.

TYPICAL APPLICATIONS

Metal Production

Glass Production

Mineral Processing

Paper Production

Rubber Production

Chemical Processing

Food & Pharmaceuticals

Electronics

SYSTEM 4 MODELS

Thermometer Description	Model N ^o	Wavelength (μm)	Range	Minimum Target Dia*
M1 Thermometers M1 thermometers are for general purpose use in high temperature applications. They utilize a silicon cell detector and operate at short wavelengths around 1.0μm where emissivity errors are minimized. They have a fast response time of 5ms.	M1 450/1000C M1 600/1600C M1 800/2600C M1 850/1850F M1 1100/2900F M1 1500/4700F	1.0 1.0 1.0 1.0 1.0 1.0	450 to 1000 °C 600 to 1600 °C 800 to 2600 °C 850 to 1850 °F 1100 to 2900 °F 1500 to 4700 °F	3.0/0.12 0.9/0.04 0.45/0.02 3.2/0.13 0.9/0.04 0.45/0.02
M2 Thermometers M2 thermometers use the latest generation of germanium detectors and operate at a wavelength of 1.6μm. They extend the measurement range of short wavelength thermometers down to 300°C/600°F and have a fast response time of 5ms.	M2 300/1100C M2 600/2000F	1.6 1.6	300 to 1100 °C 600 to 2000 °F	0.9/0.04 0.9/0.04
M4 Thermometers M4 short wavelength thermometers are used on low temperature, low or uncertain emissivity surfaces such as bright or unoxidized metals. They use lead sulphide detectors in a unique null balance mode to guarantee stability. They have a response time of 100ms.	M4 50/250C M4 150/550C M4 150/500F M4 300/1000F	2.4 2.4 2.4 2.4	50 to 250 °C 150 to 550 °C 150 to 500 °F 300 to 1000 °F	3.2/0.13 1.0/0.04 3.2/0.13 1.0/0.04
M6 Thermometers M6 thermometers are designed specifically for lower temperature applications. Unique short wavelength operation minimizes errors where emissivity is low or variable.	M6 0/300C M6 100/700C M6 50/600F M6 200/1300F	3.0 to 5.0 3.0 to 5.0 3.0 to 5.0 3.0 to 5.0	0 to 300 °C 100 to 700 °C 50 to 600 °F 200 to 1300 °F	3.2/0.13 1.0/0.04 3.2/0.13 1.0/0.04
M7 Thermometers M7 thermometers operate at waveband selected especially for measurement on plastic films as thin as 20 micrometers (1 mil).	M7 25/375C M7 75/700F	3.43 3.43	25 to 375 °C 75 to 700 °F	3.2/0.13 3.2/0.13
M8 Thermometers M8 thermometers are designed for low temperature applications such as food, textiles, paper and plastics. They operate at a waveband which avoids the effects of atmospheric absorption.	M8 0/1000C M8 30/1830F	8.0 to 14.0 3.43	0 to 1000 °C 30 to 1830 °F	5.0/0.20 5.0/0.20
R1 Ratio Thermometers R1 ratio thermometers use dual silicon cell detectors operating at 0.85 to 1.1 μm. They are used for difficult, high temperature applications where the field of view is not fully filled or where the sight path is obscured. They can accurately measure temperature of targets with up to 95% obscuration.	R1 600/1600C R1 1000/2600C R1 1100/2900F R1 1800/4700F	0.85 to 1.1 0.85 to 1.1 0.85 to 1.1 0.85 to 1.1	600 to 1600 °C 1000 to 2600 °C 1100 to 2900 °F 1000 to 4700 °F	1.8/0.07 0.45/0.02 1.8/0.07 0.45/0.02
Fiberoptic M1 Thermometers Fiberoptic M1 thermometers combine the flexibility of fiber optics with short wavelength operation. They can be used in high temperature applications such as metals, glass, coke ovens and induction heating.	M1 600/1600CYL M1 800/2600CYL M1 1100/2900FYL M1 1500/4700FYL	1.0 1.0 1.0 1.0	600 to 1600 °C 800 to 2600 °C 1100 to 2900 °F 1500 to 4700 °F	4.0/0.15 1.3/0.05 4.0/0.15 1.3/0.05
Fiberoptic M2 Thermometers Fiberoptic M2 thermometers are used in applications such as glass mold temperatures where access to the target is restricted, or limited to a few milliseconds.	M2 300/1100CYL M2 600/2000FYL	1.6 1.6	300 to 1100 °C 600 to 2000 °F	4.0/0.15 4.0/0.15
Fiberoptic R1 Ratio Thermometers Fiberoptic R1 ratio thermometers provide accurate high temperature measurement of small intermittent targets, such as rod and wire, and tube welding. Other typical applications include kilns and vacuum furnaces.	R1 600/1600CYL R1 1100/2900FYL R1 1000/2600CYL R1 1800/4700FYL	0.85 to 1.1 0.85 to 1.1 0.85 to 1.1 0.85 to 1.1	600 to 1600 °C 1100 to 2900 °F 1000 to 2600 °C 1800 to 4700 °F	4.0/0.15 4.0/0.15 1.3/0.05 1.3/0.05
	Y denotes Laser Targeting Version			

SYSTEM 4

STANDARD AND FIBRE-OPTIC THERMOMETERS

THERMOMETER SPECIFICATIONS

	Model	Range	Wavelength μm	Field of View	Ambient Temperature	Response Time ⁽¹⁾	Interchangeability	Repeatability	Accuracy ⁽²⁾	Stability
STANDARD THERMOMETERS	M1 450/1000C M1 850/1850F	450 to 1000 °C 850 to 1850 °F	1 1	30:1 30:1	0 to 70 °C 32 to 158 °F	5ms	<1K	1K	0.4%K	<0.2K/K
	M1 600/1600C M1 1100/2900F	600 to 1600 °C 1100 to 2900 °F	1 1	100:1 100:1	0 to 70 °C 32 to 158 °F	5ms	<1K	<1K	0.4%K	<0.2K/K
	M1 800/2600C M1 1500/4700F	800 to 2600 °C 1500 to 4700 °F	1 1	200:1 200:1	0 to 70 °C 32 to 158 °F	5ms	<1K	2K	0.7%K	<0.3K/K
	M2 300/1100C M2 600/2000F	300 to 1100 °C 600 to 2000 °F	1.6 1.6	100:1 100:1	0 to 50 °C 32 to 122 °F	5ms	<1K	<1K	0.25% + 1K	<0.2K/K
	M4 50/250C ⁽³⁾ M4 150/500F ⁽³⁾	50 to 250 °C 150 to 500 °F	2.4 2.4	30:1 30:1	5 to 45 °C 41 to 113 °F	100ms	<1K	1K	3K	<0.1K/K
	M4 150/550C M4 300/1000F	150 to 550 °C 300 to 1000 °F	2.4 2.4	100:1 100:1	5 to 45 °C 41 to 113 °F	100ms	<1K	1K	4K	<0.1K/K
	M6 0/300C M6 50/600F	0 to 300 °C 50 to 600 °F	3 to 5 3 to 5	30:1 30:1	5 to 45 °C 41 to 113 °F	100ms	<1K	<1K	0.3% + 2.5K	<0.15K/K
	M6 100/700C M6 200/1300F	100 to 700 °C 200 to 1300 °F	3 to 5 3 to 5	100:1 100:1	5 to 45 °C 41 to 113 °F	100ms	<1K	1K	0.3% + 2K	<0.2K/K
	M7 25/375C ⁽³⁾ M7 75/700F ⁽³⁾	25 to 375 °C 75 to 700 °F	3.43 3.43	30:1 30:1	5 to 45 °C 41 to 113 °F	100ms	<1K	1.5K	3K	<0.1K/K
	M8 0/1000C M8 30/1830F	0 to 1000 °C 30 to 1830 °F	8 to 14 8 to 14	100:1 100:1	0 to 70 °C 32 to 158 °F	100ms	2K	<1K	1%K + 1K	<0.3K/K
	R1 600/1600C R1 1100/2900F	600 to 1600 °C 1100 to 2900 °F	0.85 to 1.1 0.85 to 1.1	50:1 50:1	0 to 50 °C 32 to 122 °F	15ms	0.25%K	1K	0.65% K	<0.05%K/K
	R1 1000/2600C R1 1800/4700F	1000 to 2600 °C 1800 to 4700 °F	0.85 to 1.1 0.85 to 1.1	200:1 200:1	0 to 50 °C 32 to 122 °F	15ms	0.45%K	2K	1.1% K	<0.1%K/K
	FIBROPTIC THERMOMETERS	M1 600/1600CYL M1 1100/2900FYL	600 to 1600 °C 1100 to 2900 °F	1 1	25:1 25:1	0 to 70 °C 32 to 158 °F	5ms	<1K	<1K	0.4%K
M1 800/2600CYL M1 1500/4700FYL		800 to 2600 °C 1500 to 4700 °F	1 1	75:1 75:1	0 to 70 °C 32 to 158 °F	5ms	<1K	2K	0.7%K	<0.3K/K
M2 300/1100CYL M2 600/2000FYL		300 to 1100 °C 600 to 2000 °F	1.6 1.6	25:1 25:1	0 to 50 °C 32 to 122 °F	5ms	<1K	<1K	0.25% + 1K	<0.2K/K
R1 600/1600CYL R1 1100/2900FYL		600 to 1600 °C 1100 to 2900 °F	0.85 to 1.1 0.85 to 1.1	25:1 25:1	0 to 50 °C 32 to 122 °F	15ms	0.25%K	1K	0.65% K	<0.05%K/K
R1 1000/2600CYL R1 1800/4700FYL		1000 to 2600 °C 1800 to 4700 °F	0.85 to 1.1 0.85 to 1.1	75:1 200:1	0 to 50 °C 32 to 122 °F	15ms	0.25%K	2K	1.1% K	<0.1%K/K

⁽¹⁾ Time quoted to 95% of step change

⁽²⁾ Accuracy quoted to ITS90

⁽³⁾ Above 75 °C/170 °F

⁽⁴⁾ Optimized for glass toughening = 3K at 630 °C/1170 °F

STANDARD OPTICAL SPECIFICATIONS

Focus Range	0.5m/19.7in to infinity (V version) 0.35 to 1.0m/13.8 to 39.4in (S version)
Sighting	6° graticule-defined field of view 1.8x magnification 30mm/1.2in eye relief (with or without spectacles/ safety glasses) At least 98% of energy detected is guaranteed to be within area defined by graticule

FIBROPTIC OPTICAL SPECIFICATIONS

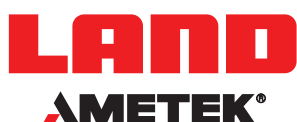
Focus Range	Determined by Spacer fitted
None	500mm/19.69in
Blue	250mm/9.84in
Red	100mm/3.94in
Lightguide length	1.0m/3ft 3in, 2.0m/6ft 6in and 3.5m/11ft 6in

ENVIRONMENTAL SPECIFICATIONS

Vibration	3g - 60 to 300Hz, 0.5mm - 10 to 60Hz
Humidity	0 to 99% non condensing
CE	EN 50-082-2 (immunity)
EN 50-081-1 (emission)	
Sealing	To IP54 requirements
Fiberoptic: Optic Head	200 °C/392 °F Maximum ambient temperature
Lightguide 200 °C/392 °F	Maximum ambient temperature

OPTIONAL EXTRAS

Standard Body	Close-up lenses
Fiberoptic	Laser targeting



CONTACT US



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We are fully committed to Quality Assurance. See all our accreditations at AMETEK-LAND.COM/QUALITY