

LAND



UNO

STAND ALONE RADIATION THERMOMETERS

AMETEK[®]
PROCESS & ANALYTICAL INSTRUMENTS

George R. Peters *Associates* ENGINEERING SALES REPRESENTATIVES

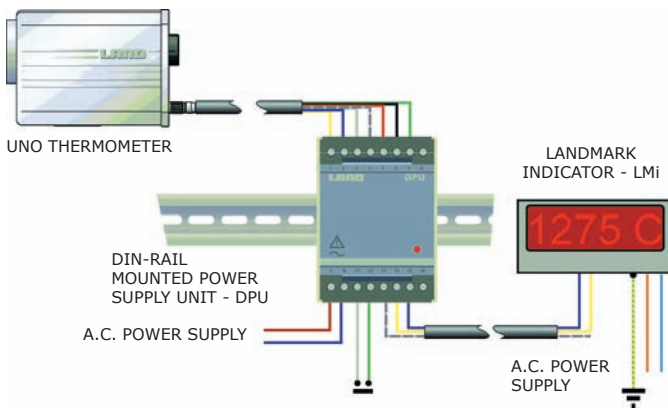
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High Precision Non-Contact Temperature Measurement

UNO is a range of high precision, stand-alone, non contact temperature measurement systems which benefit from a rugged and versatile design, extensive range of optional accessories and traceable calibration coupled with exceptional accuracy and reliability.

- Range of standard through-the-lens sighting thermometers
- Range of fibre-optic thermometers with optional laser targeting system
- Comprehensive range of thermometer mountings and accessories for complete environmental protection
- DIN-rail mounted power supply unit - DPU (optional)
- LANDMARK Indicator LMi - digital panel meter (optional)

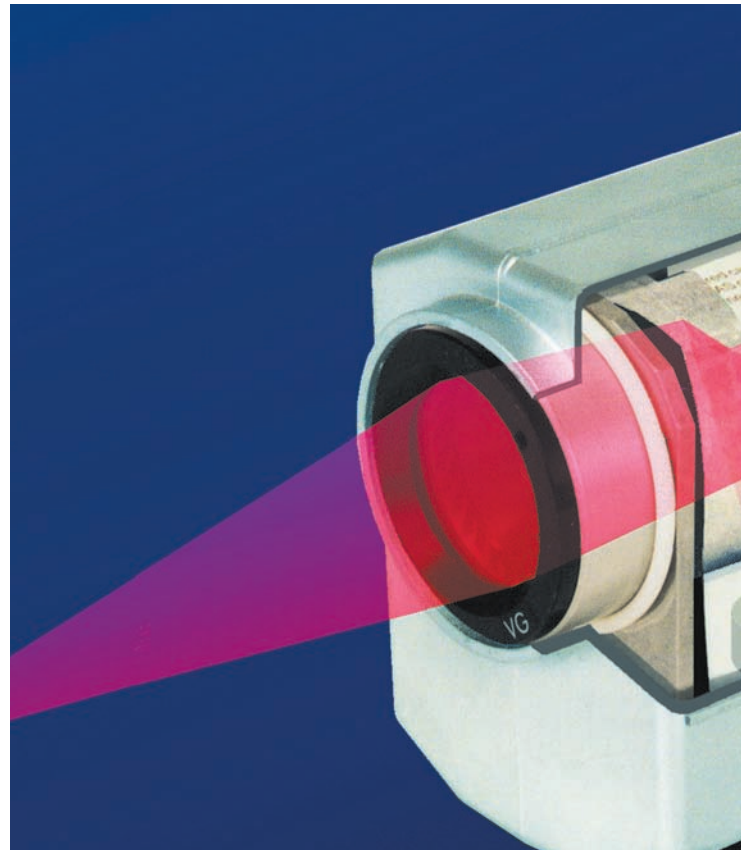


Note: The Fibroptic UNO thermometers can incorporate an optional laser targeting system for precise alignment.

Straightforward Integration

Each series of thermometers offers a choice of built-in time functions - peak picker or averager; and a range of temperature spans and operating wavebands to ensure optimum accuracy of measurement for the chosen industry and application. UNO thermometers will integrate directly into a 4 to 20mA measuring, monitoring or control loop.

The standard range of UNO thermometers feature precision through-the-lens sighting with focusable optics, which guarantees exact viewing and measurement of the smallest of target areas.



Benefits of non-contact measurement

UNO non contact thermometer systems measure continuously the temperature of hot, moving or inaccessible materials accurately and safely at a distance. The thermometers do not require contact with the target object, so they cannot interfere with, damage, or contaminate the product or process.

UNO thermometers do not remove heat or disturb the process being monitored and offer the only solution when the product is small, fragile, or in a vacuum or controlled atmosphere.

Meeting OEM Requirements

The UNO range of thermometers is designed to satisfy all OEM requirements and has a wide selection of infrared radiation thermometers available.

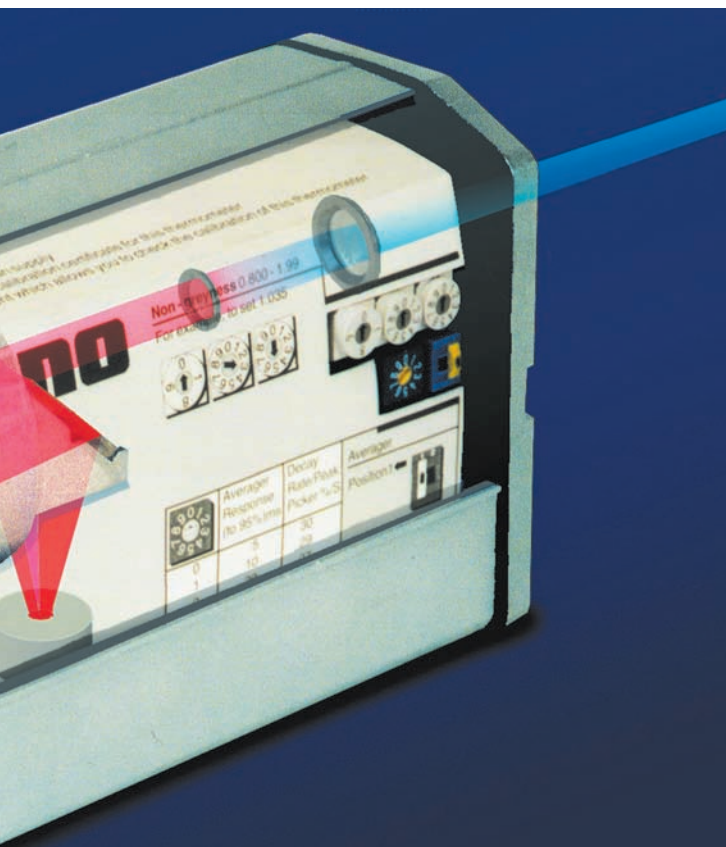


Standard bodied UNO thermometer with through-the-lens sighting



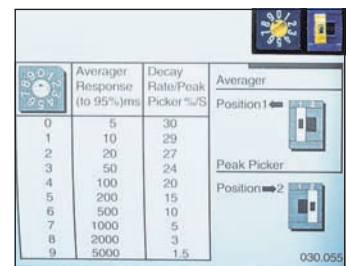
Fibroptic UNO thermometer with optional laser targeting

Total Industrial Process Monitoring and Control

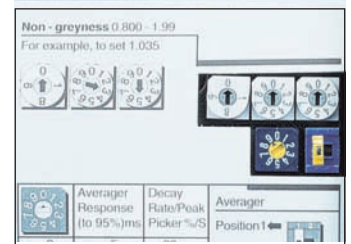


Thermometers

- Industry standard 4 to 20 mA linear output
- Choice of standard or fibroptic thermometers
- Accurate, reliable, drift-free measurement
- Traceable calibration, built within ISO 9001 QMS approval
- Simple trimpot controls are used to suit the application
- To set emissivity/non greyness for the material being measured
- To set the time function peak or averager
- To set the averager time constant or peak picker decay rate



Selectable peak picker/averager time functions



Emissivity or non-greyness compensation controls

Mountings and Accessories

A complete range of protection and mounting accessories is available which provides full mechanical and thermal protection for the thermometer to ensure continuous service with minimal maintenance in almost any environment.

Applications

UNO thermometer systems are designed for OEM installation where continuous operation, quality control and process monitoring are plant management requirements.

The rugged and versatile design satisfies end users in a wide range of industries including.

- Hot rolling
- Induction heating
- Heat treatment furnaces
- Foundry and forging
- Glass manufacture and processing
- Mineral processing
- Electrical and electronics
- Petrochemicals

The photograph below shows heat treatment of automotive components on an induction heating machine.



Thermometer Accessories
Purge, Jacket and Back Cap



Fibroptic Therm. Accessories
Adaptor, Air Purge and Mounting Bracket

Din Rail Mounted Power Supply

The optional DIN-rail mounted power supply unit DPU provides the d.c. voltage which UNO thermometers require.



Simple DIN-Rail mounted power supply unit - DPU

Landmark - LMi

An optional digital indicator provides a temperature display. LMi is 1/8 DIN size with 14.2mm/0.55in display and optional dual hi/lo alarm outputs/trans.



LANDMARK Indicator - LMi



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 the particular application.

RADIATION THERMOMETERS

The thermometers utilize proven reliable electronics combined with a high quality optical system to provide accurate, dependable temperature measurement.

They are housed in a rugged die cast body with a high quality electrical connector to provide reliable performance.

The single wavelength and ratio 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 of targets.

Two optical variants are available: Standard and Short-focus. Close focus lenses are also available permitting measurement of targets as small as 0.45mm/0.017in. Ask for separate leaflet for full information.

FIBROPTIC THERMOMETERS

Fibroptic thermometers utilize a flexible fibre optics light guide enabling the detector and electronics enclosure to be located in a less hostile environment.

The fibroptic thermometers are available with an optional built-in laser targeting system which defines the target spot for accurate sighting.

The use of fibre 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 standard light guide length of 3.5m/11½ ft. (Options of 6m/20ft & 10m/33ft.)

PEAK PICKER

The peak picker function is used when measuring the temperature of intermittent targets or where the hot target surface is obscured by cool areas such as scale on rolled steel.

The peak picker decay rate is adjustable from 1.5 to 30% of span per second.

The peak picker function can be reset from a remote switch connected to the DPU.

AVERAGER

The averager function is used to smooth unwanted variations or rapidly fluctuating changes in the thermometer signal to maintain a valid temperature reading.

The averager time constant can be adjusted on all UNO models to give a smooth temperature display.



U1 Thermometers

U1 thermometers are intended 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.

U2 Thermometers

U2 thermometers use the latest 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.

U4 Thermometers

U4 thermometers are used on low temperature, low or uncertain emissivity surfaces such as bright or unoxidized metals. They use an InGaAs detector and operate at a wavelength of 2.4µm. They have a response time of 100ms.

U5 Thermometers

U5 thermometers are specifically designed for glass surface temperature measurement. Fast speed of response, coupled with small target size and accurate sighting facility make it ideal for all flat glass, glass toughening and optical fibre preform applications.

U6 Thermometers

U6 thermometers are designed specifically for lower temperature applications. Unique short wavelength operation minimizes errors where emissivity is low or variable.

U8 Thermometers

U8 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.

V1 Ratio Thermometers

V1 ratio thermometers use dual silicon cell detectors operating at 0.85 to 1.1µm. They are intended 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.

Fibroptic U1 Thermometers

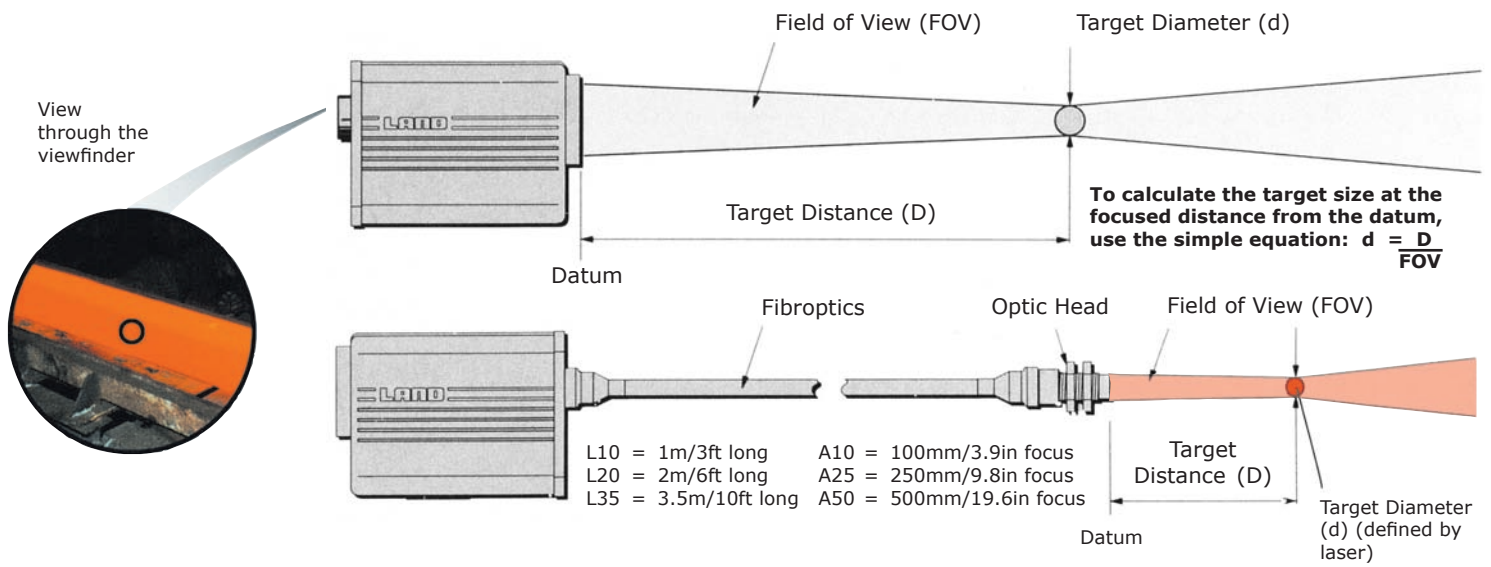
Fibroptic U1 thermometers combine the flexibility of fibre optics with short wavelength operation. They can be used in high temperature applications such as metals, glass, coke ovens and induction heating.

Fibroptic U2 Thermometers

Fibroptic U2 thermometers can be used in applications such as glass mold temperatures where access to the target is restricted, or limited to a few milliseconds.

Fibroptic V1 Ratio Thermometers

Fibroptic V1 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.



Model No.	Range	Wavelength	FOV*	Focus Version	Min Target Dia.	Focusing Distance §
U1 600/1600C U1 1100/2900F U1 800/2600C U1 1500/4700F	600 to 1600°C 1100 to 2900°F	1.0 μm	100:1	V S	5mm/0.19in 3.5mm/0.13in	500mm/19.6in to infinity 350mm/13.7in to 1m/39.3in
U2 300/1100C U2 600/2000F	300 to 1100°C 600 to 2000°F	1.6 μm	100:1	V S	5mm/0.19in 3.5mm/0.13in	500mm/19.6in to infinity 350mm/13.7in to 1m/39.3in
U4 50/250C U4 150/500F U4 150/550C U4 300/1000F	50 to 250°C 150 to 500°F	2.4 μm	30:1	V S	16.6mm/0.65in 11.7mm/0.46in	500mm/19.6in to infinity 350mm/13.7in to 1m/39.3in
U5 400/1300C U5 750/2400F U5 1000/2500C U5 1800/4500F	400 to 1300°C 750 to 2400°F	4.8 to 5.2 μm	100:1	V S	5mm/0.19in 3.5mm/0.13in	500mm/19.6in to infinity 350mm/13.7in to 1m/39.3in
U5 1000/2500C U5 1800/4500F	1000 to 2500°C 1800 to 4500°F	4.8 to 5.2 μm	100:1	V S	5mm/0.19in 3.5mm/0.13in	500mm/19.6in to infinity 350mm/13.7in to 1m/39.3in
U6 0/300C-V U6 100/700C-V	0 to 300°C 100 to 700°C	3 to 5 μm 3 to 5 μm	30:1 100:1	V V	16.6mm/0.65in 5mm/0.19in	500mm/19.6in to infinity 500mm/19.6in to infinity
U8 0/1000C-V	0 to 1000°C	8 to 14 μm	100:1	V	5mm/0.19in	500mm/19.6in to infinity
V1 600/1600C V1 1100/2900F V1 1000/2600C V1 1800/4700F	600 to 1600°C 1100 to 2900°F	0.85 to 1.1 μm	50:1	V S	10.0mm/0.39in 7.0mm/0.27in	500mm/19.6in to infinity 350mm/13.7in to 1m/39.3in
V1 1000/2600C V1 1800/4700F	1000 to 2600°C 1800 to 4700°F	0.85 to 1.1 μm	200:1	V S	2.5mm/0.1in 1.8mm/0.07in	500mm/19.6in to infinity 350mm/13.7in to 1m/39.3in

Model No.**	Range	Wavelength	FOV	Optic Head	Min Target Dia.	Focusing Distance
U1 600/1600CYL U1 1100/2900FYL	600 to 1600°C 1100 to 2900°F	1.0 μm	25:1	A10 A25 A50	4mm/0.15in 10mm/0.39in 23mm/0.90in	100mm/3.9in 250mm/9.8in 500mm/19.6in
U1 800/2600CYL U1 1500/4700FYL	800 to 2600°C 1500 to 4700°F	1.0 μm	75:1	A10 A25 A50	1.3mm/0.05in 3.3mm/0.12in 6.7mm/0.26in	100mm/3.9in 250mm/9.8in 500mm/19.6in
U2 300/1100CYL U2 600/2000FYL	300 to 1100°C 600 to 2000°F	1.6 μm	25:1	A10 A25 A50	4mm/0.15in 10mm/0.39in 23mm/0.90in	100mm/3.9in 250mm/9.8in 500mm/19.6in
V1 600/1600CYL V1 1100/2900FYL	600 to 1600°C 1100 to 2900°F	0.85 to 1.1μm	25:1	A10 A25 A50	4mm/0.15in 10mm/0.39in 23mm/0.90in	100mm/3.9in 250mm/9.8in 500mm/19.6in
V1 1000/2600CYL V1 1800/4700FYL	1000 to 2600°C 1800 to 4700°F	0.85 to 1.1μm	75:1	A10 A25 A50	1.3mm/0.05in 3.3mm/0.12in 6.7mm/0.26in	100mm/3.9in 250mm/9.8in 500mm/19.6in

* Nominal

§ Close focus lenses also available

** Y denotes optional laser targeting system fitted

STANDARD BODIED THERMOMETER SPECIFICATIONS

Model	U1 600/1600C U1 1100/2900F	U1 800/2600C U1 1500/4700F	U2 300/1100C U2 600/2000F	U4 50/250C U4 150/500F	U4 150/550C U4 300/1000F
Temp. range:	600 to 1600°C 1100 to 2900°F	800 to 2600°C 1500 to 4700°F	300 to 1100°C 600 to 2000°F	50 to 250°C 150 to 500°F	150 to 550°C 300 to 1000°F
Wavelength:	1µm		1.6µm		2.4µm
Averager:	Response time: Adjustable 5ms to 5s (0 to 95%)			Adjustable 100ms to 5s (0 to 95%)	
Peak Picker:	Adjustable 1.5 to 30%/s decay				
Emissivity/NG:	Emissivity adjustable 0.10 to 1.00				
Output:	4 to 20mA				
Sighting:	6°, through the lens				
Target size:	>98% of energy within graticule image				
Magnification:	1.8x				
Eye relief:	30mm/1.2in				
Field of view*:	100:1	200:1	100:1	30:1	100:1
Focus range:	0.5m/19.7in to infinity variable focus (standard) 0.35m/13.6in to 1m/39.3in (Short variable focus)				
Min target dia:	3.5mm/0.13in	1.8mm/0.07in	3.5mm/0.13in	11.7mm/0.46in	3.5mm/0.13in
Accuracy					
Repeatability:	±1°C/2°F	±2°C/4°F	±1°C/2°F	±1°C/2°F	±2°C/4°F
Absolute:	0.75%K	0.75%K	±1%K	±0.9%K	±1%K
Stability Temp:	0.2°/° amb	0.3°/° amb	0.2°/° amb	0.1°/° amb	
Stability Time:	2°C/4°F/year				
Power supply:	23 to 48V d.c., ±200mA				
Vibration:	3G, any axis, 10 to 300Hz				
Humidity:	0 to 99% non condensing				
Sealing:	To IP65 requirements				
Ambient temp.					
Specified:	0 to 70°C/32 to 158°F		0 to 50°C/32 to 122°F		5 to 45°C/40 to 115°F
Operating:	-10 to 80°C/14 to 176°F		-10 to 60°C/14 to 140°F		0 to 50°C/32 to 122°F
CE:	EN 50-082-2 (immunity), EN 50-081-1 (emission), IEC 1010 (safety)				

STANDARD BODIED THERMOMETER SPECIFICATIONS *continued*

Model	U5 400/1300CU U5 750/2400F	U5 1000/2500C U5 1800/4500F	U6 0/300-V	U6 100/700C-V	U8 0/1000C-V	V1 600/1600C V1 1100/2900F	V1 1000/2600C V1 1800/4700F
Temp. range:	400 to 1300°C 750 to 2400°F	1000 to 2500°C 1800 to 4500°F	0 to 300°C	100 to 700°C	0 to 1000°C	600 to 1600°C 1100 to 2900°F	1000 to 2600°C 1800 to 4700°F
Wavelength:	4.8 to 5.2µm		3 to 5µm		8 to 14µm	0.85 to 1.1µm	
Averager:	† Adjustable 100ms to 5s (0 to 95%)		† Adjustable 100ms to 5s (0 to 95%)		† Adjustable 100ms to 5s (0 to 95%)	Adjustable 15ms to 5s (0 to 95%)	
Peak Picker:	Adjustable 1.5 to 30%/s decay						
Emissivity/NG:	Emissivity adjustable 0.10 to 1.00					Non-greyness adjustable 0.8 to 1.199	
Output:	4 to 20mA						
Sighting:	6°, through the lens						
Target size:	>98% of energy within graticule image						
Magnification:	1.8x						
Eye relief:	30mm/1.2in						
Field of view*:	100:1		30:1		100:1	50:1	200:1
Focus range:	0.5m/19.7in to infinity variable focus (standard) 0.35m/13.6in to 1m/39.3in (Short variable focus)						
Min target dia:	3.5mm/0.13in		16.6mm/0.65in	5mm/0.2in	5mm/0.2in	7mm/0.27in	1.8mm/0.07in
Accuracy							
Repeatability:	±2°C/4°F	±1°C/2°F	±1°C/2°F	±1°C/2°F	±1°C/2°F	±1°C/2°F	±2°C/4°F
Absolute:	0.6%K	0.6%K	0.3%K+2.5K	0.3%K+2K	1%K+1K	0.75%K	1.25%K
Stability Temp:	>0.025%T(K)/°C		<0.15K/K	<0.2K/K	<0.3K/K	0.05%/°amb	0.1%/°amb
Stability Time:	2°C/4°F/year						
Power supply:	23 to 48V d.c., ±200mA						
Vibration:	3G, any axis, 10 to 300Hz						
Humidity:	0 to 99% non condensing						
Sealing:	To IP65 requirements						
Ambient temp.							
Specified:	0 to 70°C/32 to 158°F		5 to 45°C/41 to 113°F		0 to 45°C/ 32 to 113°F	0 to 50°C/32 to 122°F	
Operating:	-10 to 80°C/14 to 176°F					-10 to 60°C/14 to 140°F	
CE:	EN 50-082-2 (immunity), EN 50-081-1 (emission), IEC 1010 (safety)						
Response Time:			100ms-5s^	100ms-5s^	100ms-5s^		

FIBROPTIC THERMOMETER SPECIFICATIONS

Model **	U1 600/1600CYL U1 1100/2900FYL	U1 800/2600CYL U1 1500/4700FYL	U2 300/1100CYL U2 600/2000FYL	V1 600/1600CYL V1 600/1600CYL	1 1000/2600CYL V1 1800/4700FYL
Temp. range:	600 to 1600°C 1100 to 2900°F	800 to 2600°C 1500 to 4700°F	300 to 1100°C 600 to 2000°F	600 to 1600°C 1100 to 2900°F	1000 to 2600°C 1800 to 4700°F
Wavelength:	1µm		1.6µm	0.85 to 1.1µm	
Averager:	Adjustable 5ms to 5s (0 to 95%)			Adjustable 15ms to 5s (0 to 95%)	
Response time:	Adjustable 1.5 to 30%/s decay			Adjustable 1.5 to 30%/s decay	
Peak Picker:	Adjustable 1.5 to 30%/s decay			Adjustable 1.5 to 30%/s decay	
Emissivity/NG:	Emissivity adjustable 0.10 to 1.00			Non-greyness adjustable 0.8 to 1.199	
Output:	4 to 20mA			4 to 20 mA	
Field of view*:	25:1	75:1	25:1	25:1	75:1
Target dia.					
A10 optic head	4mm/0.15in at 100mm/3.9in	1.3mm/0.05in at 100mm/3.9in	4mm/0.15in at 100mm/3.9in	4mm/0.15in at 100mm/3.9in	1.3mm/0.05in at 100mm/3.9in
A25 optic head	10mm/0.39in at 250mm/9.8in	3.3mm/0.12in at 250mm/9.8in	10mm/0.39in at 250mm/9.8in	10mm/0.39in at 250mm/9.8in	3.3mm/0.12in at 250mm/9.8in
A25 optic head	23mm/0.90in at 500mm/19.6in	6.7mm/0.26in at 500mm/19.6in	23mm/0.90in at 500mm/19.6in	23mm/0.90in at 500mm/19.6in	6.7mm/0.26in at 500mm/19.6in
Accuracy					
Repeatability:	±1°C/2°F	±2°C/4°F	±1°C/2°F	±1°C/2°F	±2°C/4°F
Absolute:	0.75%K	0.75%K	±1%K	±0.9%K	±1%K
Stability Temp:	0.2%/° amb	0.3%/° amb	0.2%/° amb	0.05%/° amb	0.1%/° amb
Stability Time:	±2°C/4°F/year				
Power supply:	23 to 48V d.c., ±200mA				
Vibration:	3g, any axis, 10 to 300Hz				
Humidity:	0 to 99% non-condensing				
Sealing:	To IP65 requirements				
Ambient temp.	200°C/392°F		200°C/392°F	200°C/392°F	
Optic Head:	200°C/392°F		200°C/392°F	200°C/392°F	
Lightguide:	200°C/392°F		200°C/392°F	200°C/392°F	
Detector Specified:	0 to 70°C/32 to 158°F		0 to 50°C/32 to 122°F	0 to 50°C/32 to 122°F	
Operating:	-10 to 80°C/14 to 176°F		-10 to 60°C/14 to 140°F		
CE:	EN 50-082-2 (immunity), EN 50-081-1 (emission), IEC 1010 (safety)				

* Nominal

** Y denotes optional laser targeting system fitted

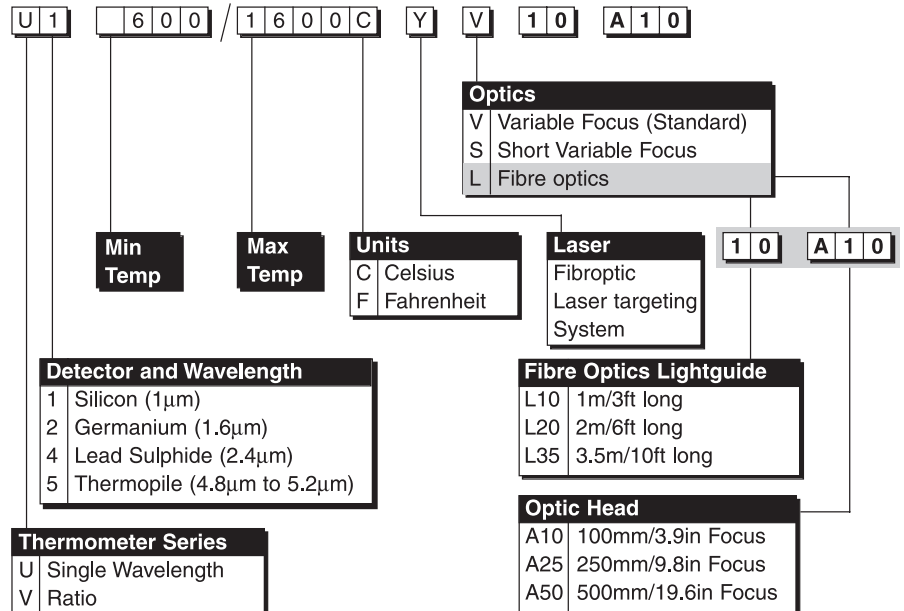
ORDERING INFORMATION

UNO thermometers have a unique part number to suit the particular combination of features which make up the model.

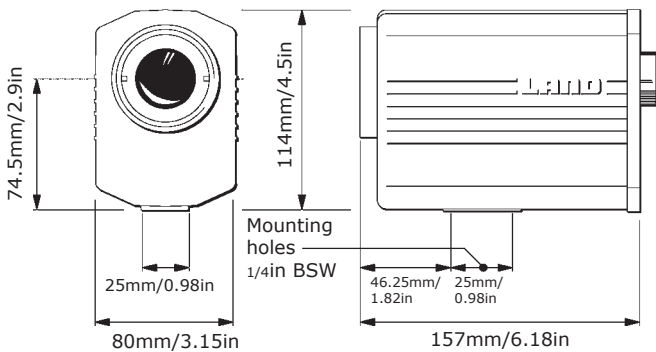
The model number, consisting of the various options available, describes the exact UNO thermometer type required.

This model number can be used for selection and ordering purposes.

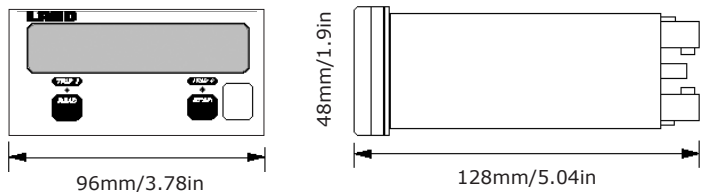
For example: U1 600/1600C V describes a single wavelength thermometer, operating at 1.0µm, with a measurement span of 600 to 1600°, celsius version, with standard variable focus optics.



STANDARD BODIED UNO RADIATION THERMOMETER



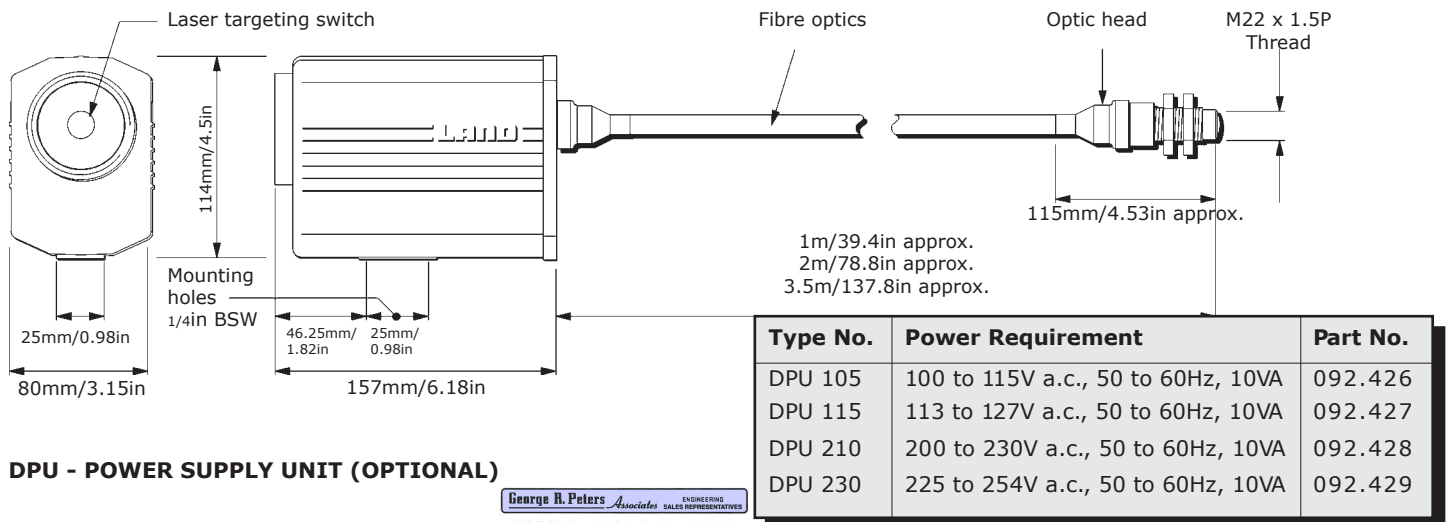
LANDMARK INDICATOR - LMi (OPTIONAL)



Type No.	Power Requirement	Part No.
LMi	110 to 240V a.c., 50 to 60Hz, 5VA	*Various

*Various models include options such as alarms and signal re-transmission

FIBROPTIC UNO RADIATION THERMOMETER



DPU - POWER SUPPLY UNIT (OPTIONAL)

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Non-Contact Temperature Measurement Solutions



LABORATORY ACCREDITATION BUREAU ACCREDITED ISO/IEC 17025:2005



Applies in the UK

Applies in the USA