

LAND



UNO

STAND ALONE RADIATION
THERMOMETERS

An **AMETEK**® Company

LAND UNO

HIGH PRECISION NON FOR TOTAL INDUSTRI

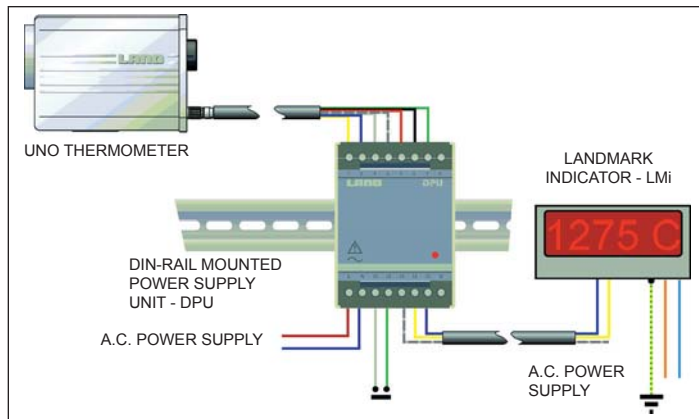
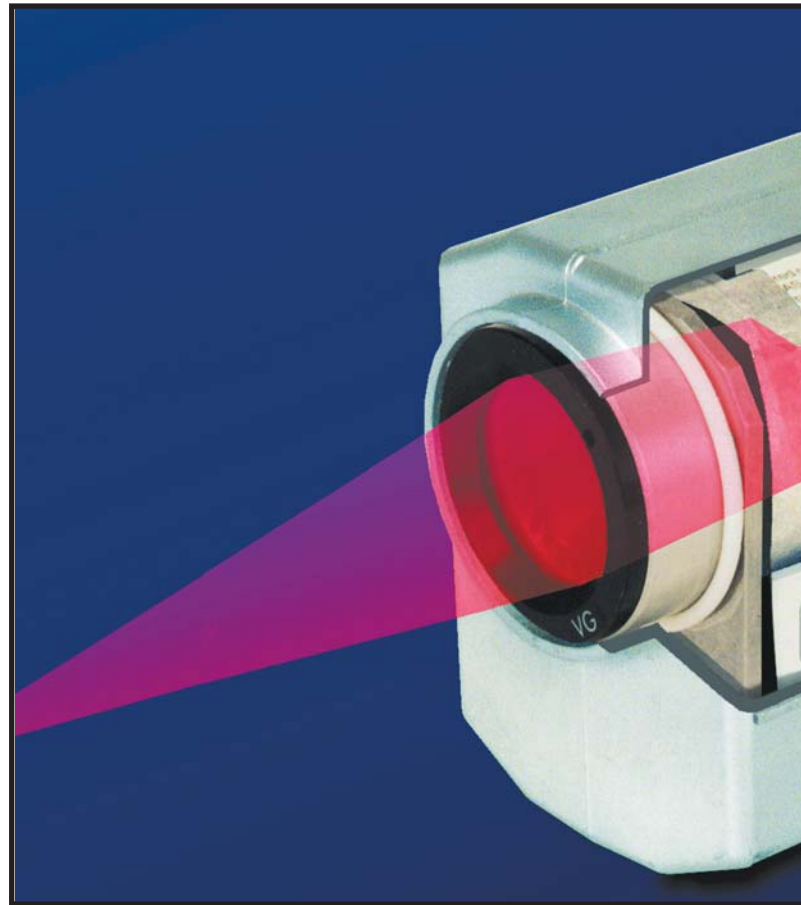
A range of stand alone thermometers answering the needs of OEM's, plant designers and process operators for a rugged, low cost temperature sensor which will integrate directly into a 4 to 20mA measuring, monitoring or control loop.

UNO is a new range of industrial radiation thermometers from the market leaders Land Infrared. UNO has been developed utilizing experience gained from fifty years of providing temperature measurement solutions to a wide range of industries throughout the world.

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

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.

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.



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

No other method of temperature measurement offers the benefits of infrared radiation thermometry.

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.

SYSTEM FEATURES

UNO is a new 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 fibroptic 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)

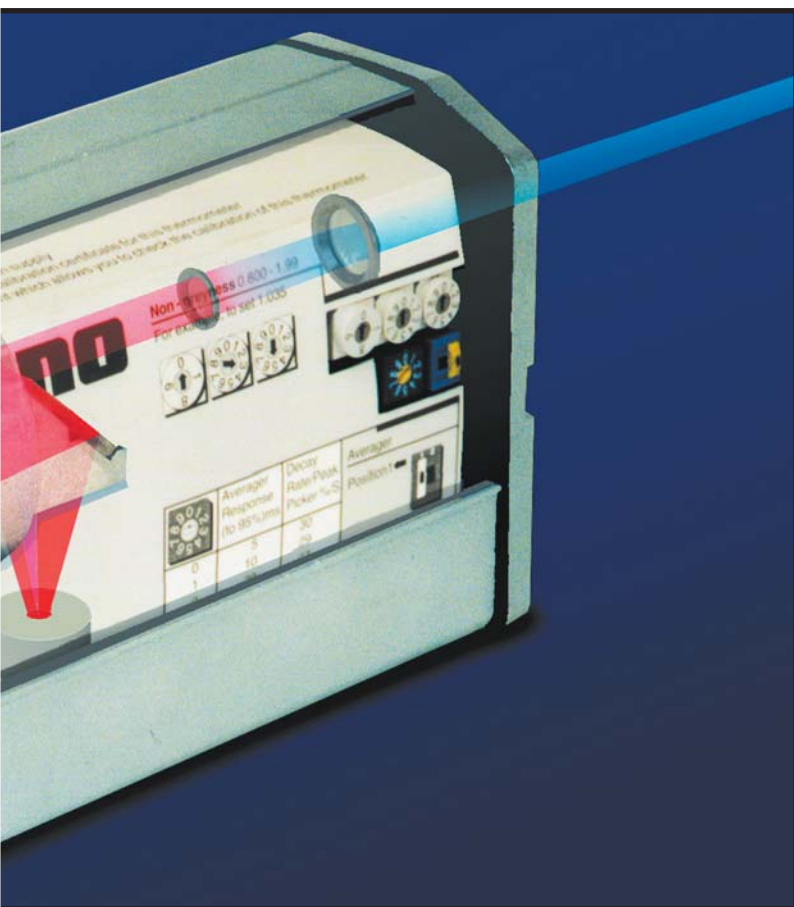


Standard bodied UNO thermometer with through-the-lens sighting



Fibroptic UNO thermometer with optional laser targeting

CONTACT TEMPERATURE MEASUREMENT AL PROCESS MONITORING AND CONTROL

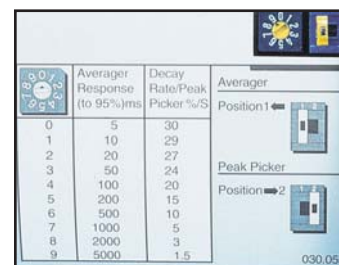


THERMOMETERS

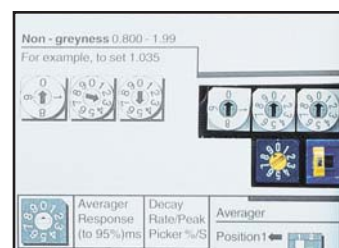
- Industry standard 4 to 20 mA linear output
- Choice of standard or fibroptic thermometers
- Accurate, reliable, drift-free measurement
- Traceable calibration, built within ISO 9001 QMS approval

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

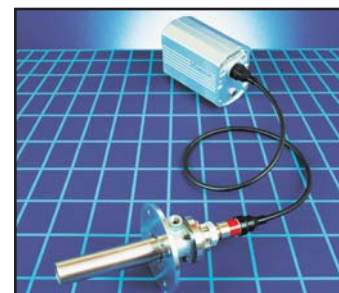
MOUNTINGS AND ACCESSORIES

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.

For further details request further brochures S4MA and S4FA.



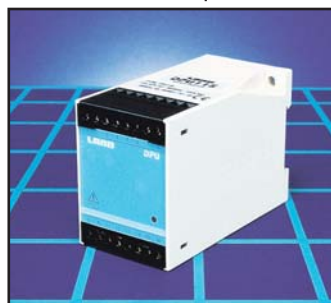
Thermometer Accessories (S4MA)



Fibroptic Accessories (S4FA)

DIN-RAIL MOUNTED POWER SUPPLY UNIT

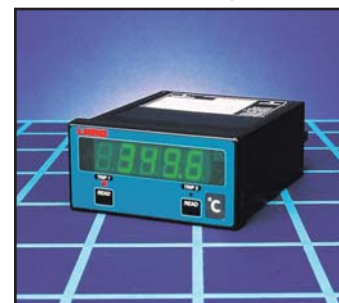
The optional DIN-rail mounted power supply unit DPU provides the d.c. voltage which UNO thermometers require.



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 dual hi/lo alarm outputs.



LANDMARK Indicator - LMi

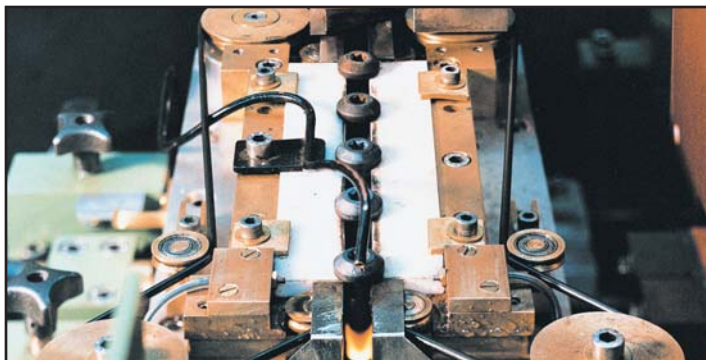
APPLICATIONS

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 & processing | ○ Mineral processing |
| ○ Electrical and electronics | ○ Petrochemicals |

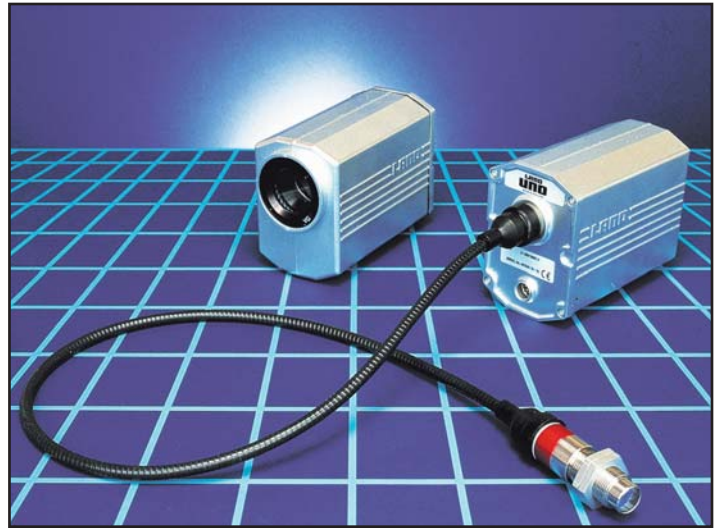
The photograph below shows heat treatment of automotive components on an induction heating machine.



UNO

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 $200^\circ\text{C}/400^\circ\text{F}$ without cooling of the optic head. There is a choice of three optic heads and three light guide lengths.

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 from 5ms (U1 and U2 thermometers) to 5 seconds 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 $1.0\mu\text{m}$ 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 $1.6\mu\text{m}$. They extend the measurement range of short wavelength thermometers down to $300^\circ\text{C}/600^\circ\text{F}$ 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 a lead sulphide detector and operate at a wavelength of $2.4\mu\text{m}$. 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.

V1 Ratio Thermometers

V1 ratio thermometers use dual silicon cell detectors operating at 0.85 to $1.1\mu\text{m}$. 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.

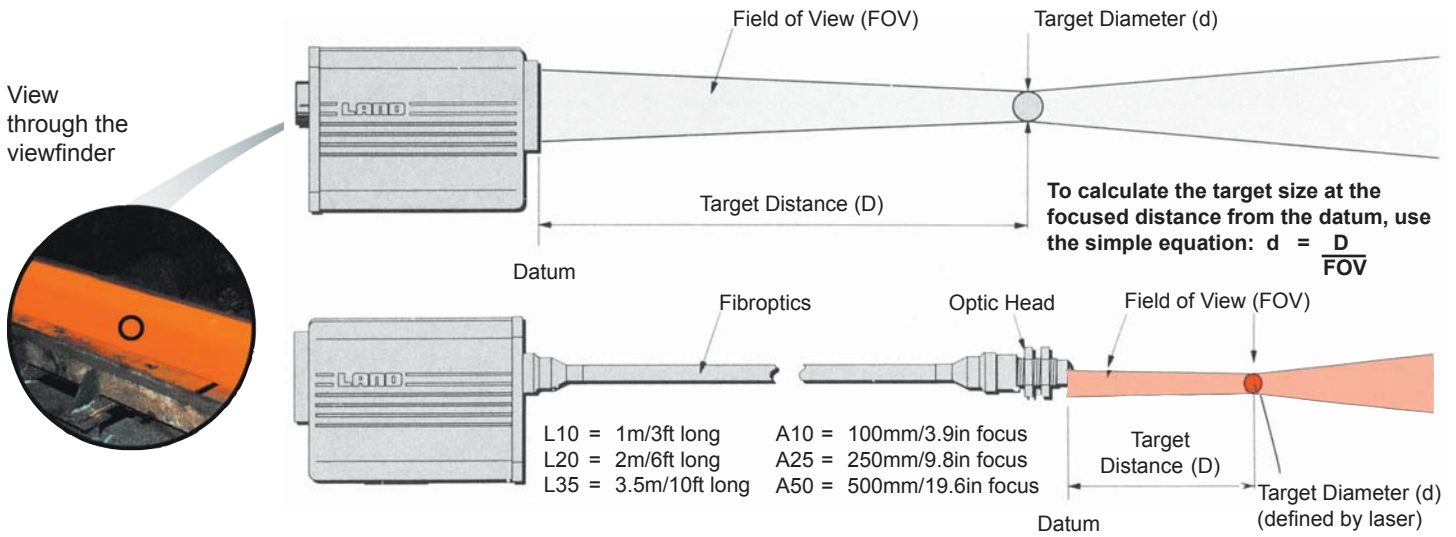
They can be used in high temperature applications such as metals, glass, coke ovens and induction heating.

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 β
U1 600/1600C	600 to 1600∞C	1.0 μm	100:1	V	5mm/0.19in	500mm/19.6in to infinity
U1 1100/2900F	1100 to 2900∞F			S	3.5mm/0.13in	350mm/13.7in to 1m/39.3in
U1 800/2600C	800 to 2600∞C	1.0 μm	200:1	V	2.5mm/0.1in	500mm/19.6in to infinity
U1 1500/4700F	1500 to 4700∞F			S	1.8mm/0.07in	350mm/13.7in to 1m/39.3in
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U2 300/1100C	300 to 1100∞C	1.6 μm	100:1	V	5mm/0.19in	500mm/19.6in to infinity
U2 600/2000F	600 to 2000∞F			S	3.5mm/0.13in	350mm/13.7in to 1m/39.3in
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U4 50/250C	50 to 250∞C	2.4 μm	30:1	V	16.6mm/0.65in	500mm/19.6in to infinity
U4 150/500F	150 to 500∞F			S	11.7mm/0.46in	350mm/13.7in to 1m/39.3in
U4 150/550C	150 to 550∞C	2.4 μm	100:1	V	5mm/0.19in	500mm/19.6in to infinity
U4 300/1000F	300 to 1000∞F			S	3.5mm/0.13in	350mm/13.7in to 1m/39.3in
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U5 400/1300C	400 to 1300∞C	4.8 to 5.2 μm	100:1	V	5mm/0.19in	500mm/19.6in to infinity
U5 750/2400F	750 to 2400∞F			S	3.5mm/0.13in	350mm/13.7in to 1m/39.3in
U5 1000/2500C	1000 to 2500∞C	4.8 to 5.2 μm	100:1	V	5mm/0.19in	500mm/19.6in to infinity
U5 1800/4500F	1800 to 4500∞F			S	3.5mm/0.13in	350mm/13.7in to 1m/39.3in
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V1 600/1600C	600 to 1600∞C	0.85 to 1.1 μm	50:1	V	10.0mm/0.39in	500mm/19.6in to infinity
V1 1100/2900F	1100 to 2900∞F			S	7.0mm/0.27in	350mm/13.7in to 1m/39.3in
V1 1000/2600C	1000 to 2600∞C	0.85 to 1.1 μm	200:1	V	2.5mm/0.1in	500mm/19.6in to infinity
V1 1800/4700F	1800 to 4700∞F			S	1.8mm/0.07in	350mm/13.7in to 1m/39.3in
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Model No.**	Range	Wavelength	FOV	Optic Head	Min Target Dia.	Focusing Distance
U1 600/1600CYL	600 to 1600∞C	1.0 μm	25:1	A10	4mm/0.15in	100mm/3.9in
U1 1100/2900FYL	1100 to 2900∞F			A25	10mm/0.39in	250mm/9.8in
				A50	23mm/0.90in	500mm/19.6in
U1 800/2600CYL	800 to 2600∞C	1.0 μm	75:1	A10	1.3mm/0.05in	100mm/3.9in
U1 1500/4700FYL	1500 to 4700∞F			A25	3.3mm/0.12in	250mm/9.8in
				A50	6.7mm/0.26in	500mm/19.6in
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U2 300/1100CYL	300 to 1100∞C	1.6 μm	25:1	A10	4mm/0.15in	100mm/3.9in
U2 600/2000FYL	600 to 2000∞F			A25	10mm/0.39in	250mm/9.8in
				A50	23mm/0.90in	500mm/19.6in
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V1 600/1600CYL	600 to 1600∞C	0.85 to 1.1μm	25:1	A10	4mm/0.15in	100mm/3.9in
V1 1100/2900FYL	1100 to 2900∞F			A25	10mm/0.39in	250mm/9.8in
				A50	23mm/0.90in	500mm/19.6in
V1 1000/2600CYL	1000 to 2600∞C	0.85 to 1.1μm	75:1	A10	1.3mm/0.05in	100mm/3.9in
V1 1800/4700FYL	1800 to 4700∞F			A25	3.3mm/0.12in	250mm/9.8in
				A50	6.7mm/0.26in	500mm/19.6in

* Nominal

β 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	U5 400/1300C U5 750/2400F	U5 1000/2500C U5 1800/4500F	V1 600/1600C V1 1100/2900F	V1 1000/2600C V1 1800/4700F	
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	400 to 1300°C 750 to 2400°F	1000 to 2500°C 1800 to 4500°F	600 to 1600°C 1100 to 2900°F	1000 to 2600°C 1800 to 4700°F	
Wavelength:	1µm		1.6µm	2.4µm		4.8 to 5.2µm		0.85 to 1.1µm		
Averager	Response time: Adjustable 5ms 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	200:1	100:1	30:1	100:1	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	1.8mm/0.07in	3.5mm/0.13in	11.7mm/0.46in	3.5mm/0.13in	3.5mm/0.13in		7mm/0.27in	1.8mm/0.07in	
Accuracy	±1°C/2°F 0.75%K		±2°C/4°F 0.75%K		±1°C/2°F ±1%K		±2°C/4°F 0.6%K		±1°C/2°F 0.6%K	
Repeatability:	±1°C/2°F 0.75%K		±2°C/4°F 0.75%K		±1°C/2°F ±1%K		±2°C/4°F 0.6%K		±1°C/2°F 0.6%K	
Absolute:	±1°C/2°F 0.75%K		±2°C/4°F 0.75%K		±1°C/2°F ±1%K		±2°C/4°F 0.6%K		±1°C/2°F 0.6%K	
Stability Temp:	0.2%/∞ amb	0.3%/∞ amb	0.2%/∞ amb	0.1%/∞ amb		<0.025%T(K)/∞C		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 IP54 requirements									
Ambient temp.	0 to 70°C/32 to 158°F		0 to 50°C/32 to 122°F -10 to 60°C/14 to 140°F		5 to 45°C/40 to 115°F 0 to 50°C/32 to 122°F		0 to 70°C/32 to 158°F -10 to 80°C/14 to 176°F		0 to 50°C/32 to 122°F -10 to 60°C/14 to 140°F	
Specified:	0 to 70°C/32 to 158°F		0 to 50°C/32 to 122°F -10 to 60°C/14 to 140°F		5 to 45°C/40 to 115°F 0 to 50°C/32 to 122°F		0 to 70°C/32 to 158°F -10 to 80°C/14 to 176°F		0 to 50°C/32 to 122°F -10 to 60°C/14 to 140°F	
Operating:	-10 to 80°C/14 to 176°F		0 to 50°C/32 to 122°F -10 to 60°C/14 to 140°F		5 to 45°C/40 to 115°F 0 to 50°C/32 to 122°F		0 to 70°C/32 to 158°F -10 to 80°C/14 to 176°F		0 to 50°C/32 to 122°F -10 to 60°C/14 to 140°F	
CE:	EN 50-082-2 (immunity), EN 50-081-1 (emission), IEC 1010 (safety)									

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 1100/2900FYL	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 5ms to 5s (0 to 95%)			Adjustable 15ms to 5s (0 to 95%)		
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.	4mm/0.15in at 100mm/3.9in		1.3mm/0.05in at 100mm/3.9in		4mm/0.15in at 100mm/3.9in	
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	
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	
A50 optic head	23mm/0.90in at 500mm/19.6in		6.7mm/0.26in at 500mm/19.6in		23mm/0.90in at 500mm/19.6in	
Accuracy	±1°C/2°F ±0.75%K		±2°C/4°F ±0.75%K		±1°C/2°F ±0.75%K	
Repeatability:	±1°C/2°F ±0.75%K		±2°C/4°F ±0.75%K		±1°C/2°F ±0.75%K	
Absolute:	±1°C/2°F ±0.75%K		±2°C/4°F ±0.75%K		±1°C/2°F ±0.75%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 IP54 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	0 to 70°C/32 to 158°F			0 to 50°C/32 to 122°F		
Specified:	0 to 70°C/32 to 158°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

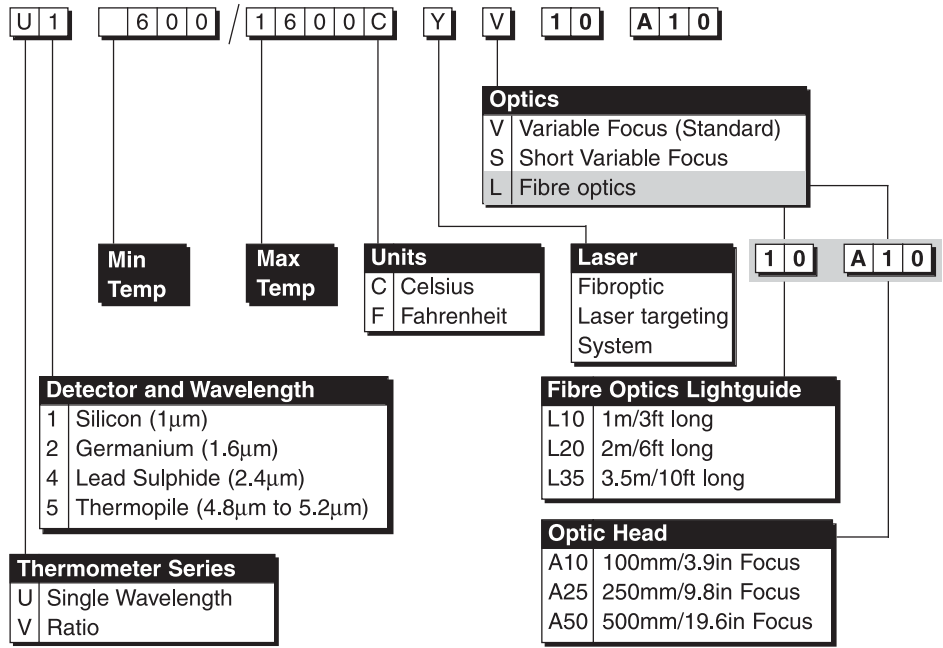
ORDERING INFORMATION

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.

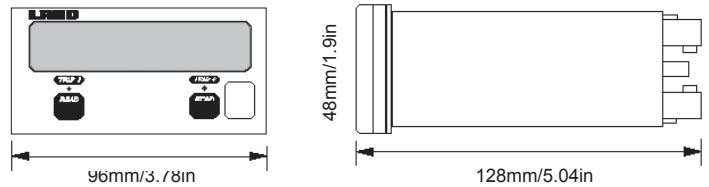
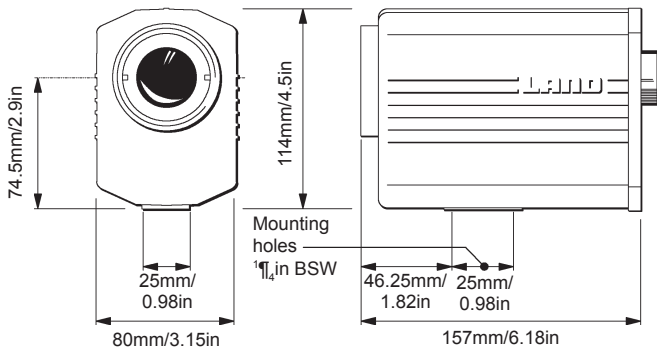
This model number can be used for selection and ordering purposes.

Forexample: U1 600/1600CV describes a single wavelength thermometer, operating at 1.0µm, with a measurement span of 600 to 1600∞, celsius version, with standard variable focus optics.



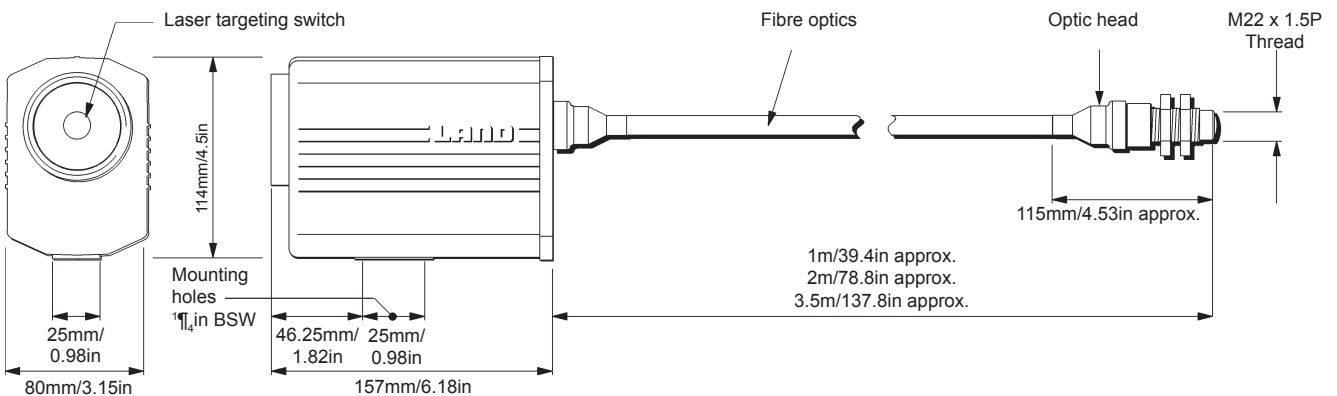
STANDARD BODIED UNO RADIATION THERMOMETER

LANDMARK INDICATOR - LMi (OPTIONAL)

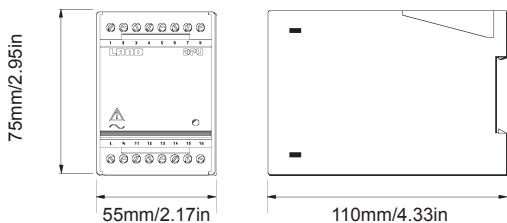


Type No.	Power Requirement	Part No.
LMi	110 to 240V a.c., 50 to 60Hz, 5VA	091.988

FIBROPTIC UNO RADIATION THERMOMETER



DPU - POWER SUPPLY UNIT (OPTIONAL)



Type No.	Power Requirement	Part No.
DPU 105	100 to 115V a.c., 50 to 60Hz, 10VA	092.426
DPU 115	113 to 127V a.c., 50 to 60Hz, 10VA	092.427
DPU 210	200 to 230V a.c., 50 to 60Hz, 10VA	092.428
DPU 230	225 to 254V a.c., 50 to 60Hz, 10VA	092.429

For fifty years LAND have supplied temperature measuring systems and instruments to many different industries all over the world. Now the world leader in non contact thermometry, our expert advice and support is never far away.



WORLDWIDE SUPPORT

In addition to the companies established in the U.S.A., Europe and Japan, LAND is represented by distributors in most of the major industrial countries throughout the world.

Our customers benefit, on a global basis, from practical and expert advice from fully trained technicians who are aware of specific requirements for their country and industry.

CALIBRATION

LAND operate an extensive calibration service. All calibrations made are traceable to National Standards. In the UK, LAND can issue a UKAS calibration certificate.

In the U.S.A. a traceable calibration certificate can be issued complying with the National Institute of Standards and Technology (NIST).

LAND also supply a full range of temperature reference sources which are used to verify or re-establish the accuracy of calibration in the field or in the laboratory.

A consultancy service is also available for those companies who wish to establish their own in-house calibration facility.

APPLICATIONS

LAND have solved many different temperature measurement problems in a wide variety of industries from food to atomic energy, some of which are listed below:

- Iron & Steel
- Heat Treatment
- Non-ferrous Metals
- Minerals
- Glass
- Petrochemical
- Power & Utilities
- Aerospace
- Electronics
- Pharmaceuticals
- Plastics
- Paper
- Rubber
- Textiles
- Maintenance

For further information or free advice on specific temperature measurement problems within these or any other industry, contact your nearest Land office.

PRODUCT ASSURANCE

When you specify LAND products you are assured of receiving a completely pretested, calibrated working product. Each instrument is carefully checked to ensure complete compliance with specification and is fully guaranteed. LAND was the first manufacturer of infrared instruments to successfully obtain ISO 9001 Quality Management System Approval for both design and manufacture of non contact infrared temperature measuring equipment.

CE UNO complies with current European directives relating to electromagnetic compatibility and safety (EMC directive 89/336/EEC; Low voltage directive 73/23/EEC).



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Non-Contact Temperature Measurement Solutions

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