

LAND



SYSTEM 4

STANDARD AND FIBROPTIC THERMOMETERS



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SYSTEM 4

INFRARED APPLICATIONS

Non contact temperature measuring systems are designed for continuous quality and process monitoring and control in a wide range of industries including:- Iron & Steel, Glass, Plastics, Rubber, Minerals, Paper... and many more.

With measurement capabilities from 0 to 2600°C, infrared thermometers measure both the product being processed and the plant and machinery used in the production. Here are just a few of the processes where **SYSTEM 4** can solve your measurement problems:-

Metal Production

Smelting, refining, pouring, continuous casting, slabbing, reheating, rolling, drawing, coiling, extruding, coating, annealing, stamping, pressing, forging, sintering, galvanising, heat treatment...

Glass Production

Melting, refining, firing, gob formation, furnaces, floating, moulding, toughening, laminating, fibre drawing, vapour deposition, preforming...

Mineral Processing

Firing, mixing, drying, storing, conveying, laying...

Paper

Rolling, drying, calendering, coating, printing, photographic, curing..

Plastics & Rubber

Thick & thin film plastics, blown film, thermoforming, calendering, orientation, extruding, mixing, shrinking, laminating, moulding...

Chemical

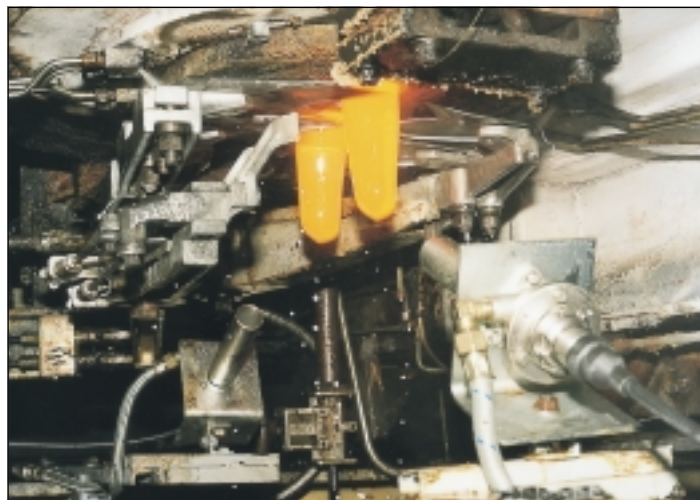
Catalyst beds, powder drying, mixing, furnaces, thermal reactors...

Food & Pharmaceuticals

Freezing, moulding, extruding, sterilising, tablet drying, labelling, sealing...

Electronics

Wave soldering, glass coating, circuit board testing, doping...



There is a choice of thermometer type to match your temperature requirements and process.

Single wavelength thermometers are intended for general purpose use as well as solving problems in specific applications.

Ratio thermometers are used in difficult environments containing steam, smoke, or dust, or where the target does not completely fill the field of view.

Fiberoptic thermometers are used to measure the temperature of materials where the target is difficult to access.

The use of fibre optics is most effective in high temperature, high magnetic fields etc. which would prevent location of other sensors.

SYSTEM 4 THERMOMETERS



Typical System

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.

- 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
- Accurate, reliable, drift-free measurement
- Rugged design with a range of mounting options
- Flexible fibre 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 give a thermometer which delivers accurate, dependable temperature measurement. A rugged die-cast aluminium body, with a high quality electrical connector, ensures reliable performance.

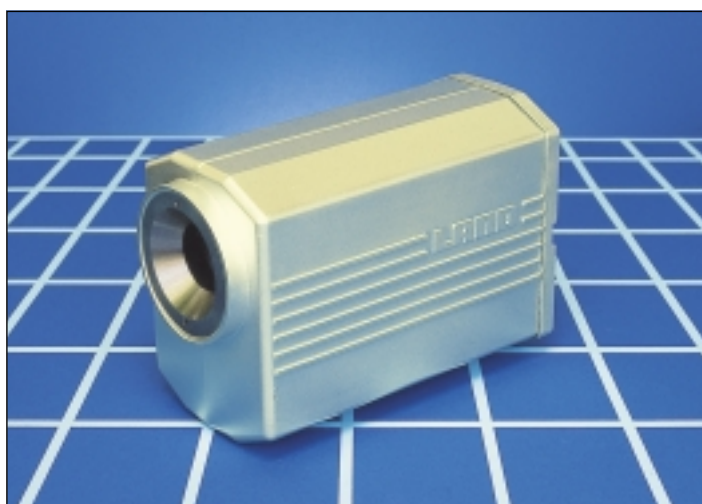
Standard bodied thermometers all feature through-the-lens sighting with a 6° field of view. Adjustable focus with a circular graticule gives precise alignment on to the smallest of targets. Two optical variants are available: Standard focus - adjustable between 500mm and infinity, and Short-focus - viewing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

FIBROPTIC THERMOMETERS

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



Standard Bodied Thermometer

Fibroptic Thermometer



SYSTEM 4

<i>Thermometer Description</i>	Model N°	Wavelength (µm)	Range	Minimum Target Dia* (mm)
M1 Thermometers M1 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.	M1 450/1000C M1 600/1600C M1 800/2600C	1.0 1.0 1.0	450 to 1000°C 600 to 1600°C 800 to 2600°C	3.0 0.9 0.45
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 and have a fast response time of 5ms.	M2 300/1100C	1.6	300 to 1100°C	0.9
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	2.4 2.4	50 to 250°C 150 to 550°C	3.2 1.0
M5 Thermometers M5 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.	M5 400/1300C M5 1000/2500C	4.8 to 5.2 4.8 to 5.2	400 to 1300°C 1000 to 2500°C	1.0 1.0
M6 Thermometers M6 thermometers are designed specifically for lower temperature applications. Unique short wavelength operation minimizes errors due to low or variable emissivity.	M6 0/300C M6 100/700C	3.0 to 5.0 3.0 to 5.0	0 to 300°C 100 to 700°C	3.2 1.0
M7 Thermometers M7 thermometers operate at waveband selected especially for measurement on plastic films as thin as a few microns.	M7 25/375C	3.43	25 to 375°C	3.2
M8 Thermometers M8 thermometers measure from 0 to 1000°C and are ideal for applications such as food, textiles, paper and plastics. They operate at a waveband which avoids the effects of atmospheric absorption.	M8 0/1000C	8 to 14	0 to 1000°C	5.0
R1 Ratio Thermometers R1 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.	R1 600/1600C R1 1000/2600C	0.85 to 1.1 0.85 to 1.1	600 to 1600°C 1000 to 2600°C	1.8 0.45
* When fitted with Close-up lens				
Fiberoptic M1 Thermometers Fiberoptic M1 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.	M1 600/1600CYL M1 800/2600CYL	1.0 1.0	600 to 1600°C 800 to 2600°C	4.0 1.3
Fiberoptic M2 Thermometers Fiberoptic M2 thermometers can be used in applications such as glass mould temperatures where access to the target is restricted, or limited to a few milliseconds.	M2 300/1100CYL	1.6	300 to 1100°C	4.0
Fiberoptic M3 Thermometers Fiberoptic M3 thermometers are designed for low temperature applications, with low or uncertain emissivity, such as secondary metals.	M3 50/250CQ	2.1	50 to 250°C	5.0
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 applications include kilns and vacuum furnaces.	R1 600/1600CYL R1 1000/2600CYL	0.85 to 1.1 0.85 to 1.1	600 to 1600°C 1000 to 2600°C	4.0 1.3
Y denotes Laser Targeting Version				

THERMOMETER SPECIFICATIONS

	Model	Range	Wavelength	Field of View	Ambient Temperature	Response Time ⁽¹⁾	Interchangeability	Repeatability	Accuracy ⁽²⁾	Stability
STANDARD THERMOMETERS	M1 450/1000C	450 to 1000°C	1µm	30:1	0 to 70°C	5ms	<1K	1K	0.4%K	<0.2K/K
	M1 600/1600C	600 to 1600°C	1µm	100:1	0 to 70°C	5ms	<1K	<1K	0.4%K	<0.2K/K
	M1 800/2600C	800 to 2600°C	1µm	200:1	0 to 70°C	5ms	<1K	2K	0.7%K	<0.3K/K
	M2 300/1100C	300 to 1100°C	1.6µm	100:1	0 to 50°C	5ms	<1K	<1K	0.25% + 1K	<0.2K/K
	M4 50/250C ⁽³⁾	50 to 250°C	2.4µm	30:1	5 to 45°C	100ms	<1K	1K	3K	<0.1K/K
	M4 150/550C	150 to 550°C	2.4µm	100:1	5 to 45°C	100ms	<1K	1K	4K	<0.1K/K
	M5 400/1300C	400 to 1300°C	4.8 to 5.2µm	100:1	0 to 70°C	100ms	<2K	<1K	0.6%K ⁽⁴⁾	<0.02%K/K
	M5 1000/2500C	1000 to 2500°C	4.8 to 5.2µm	100:1	0 to 70°C	100ms	<2.5K	1K	0.5%K	<0.02%K/K
	M6 0/300C	0 to 300°C	3 to 5µm	30:1	5 to 45°C	100ms	<1K	<1K	0.3% + 2.5K	<0.15K/K
	M6 100/700C	100 to 700°C	3 to 5µm	100:1	5 to 45°C	100ms	<1K	1K	0.3% + 2K	<0.2K/K
	M7 25/375C ⁽³⁾	25 to 375°C	3.43µm	30:1	5 to 45°C	100ms	<1K	1.5K	3K	<0.1K/K
	M8 0/1000C	0 to 1000°C	8 to 14µm	100:1	0 to 70°C	100ms	2K	<1K	1%K + 1K	<0.3K/K
	R1 600/1600C	600 to 1600°C	0.85 to 1.1µm	50:1	0 to 50°C	15ms	0.25%K	1K	0.65% K	<0.05%K/K
	R1 1000/2600C	1000 to 2600°C	0.85 to 1.1µm	200:1	0 to 50°C	15ms	0.45%K	2K	1.1% K	<0.1%K/K
FIBROPTIC THERMOMETERS	M1 600/1600CYL	600 to 1600°C	1µm	25:1	0 to 70°C	5ms	<1K	<1K	0.4%K	<0.2K/K
	M1 800/2600CYL	800 to 2600°C	1µm	75:1	0 to 70°C	5ms	<1K	2K	0.7%K	<0.3K/K
	M2 300/1100CYL	300 to 1100°C	1.6µm	25:1	0 to 50°C	5ms	<1K	<1K	0.25% + 1K	<0.2K/K
	M3 50/250CQ ⁽³⁾	50 to 250°C	2.1µm	20:1	0 to 50°C	<100ms	1K	1K	3K	<0.1K/K
	R1 600/1600CYL	600 to 1600°C	0.85 to 1.1µm	25:1	0 to 50°C	15ms	0.25%K	1K	0.65% K	<0.05%K/K
	R1 1000/2600CYL	1000 to 2600°C	0.85 to 1.1µm	75:1	0 to 50°C	15ms	0.45%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 ⁽⁴⁾ Optimised for glass toughening = 3K at 630°C Y Denotes laser targeting system available

STANDARD OPTICAL SPECIFICATIONS

Focus range	0.5m to infinity (V version) 0.35 to 1.0m (S version)
Sighting	6° graticule-defined field of view 1.8x magnification 30mm eye relief (with or without spectacles/ safety glasses) 98% of energy detected is <i>guaranteed</i> to be within area defined by graticule

FIBROPTIC OPTICAL SPECIFICATIONS

Focus range	Determined by Spacer fitted
None (A50 or D50)	500mm
Blue (A25), Purple (D25)	250mm
Red (A10), Green (D10)	100mm
Lightguide length	1.0m, 2.0m and 3.5m

ENVIRONMENTAL SPECIFICATIONS

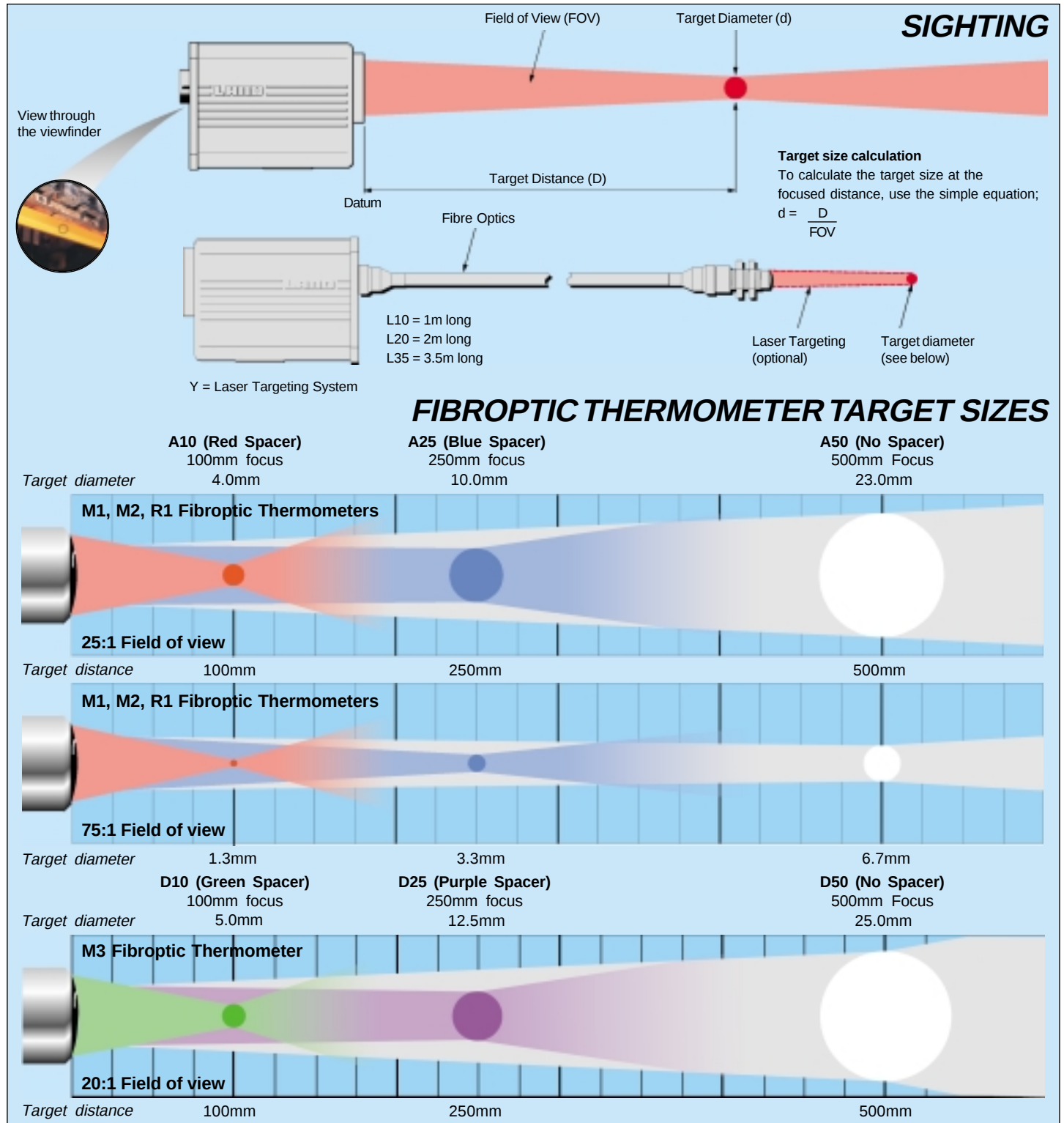
Vibration	3g - 60 to 300Hz, 0.5mm - 10 to 60Hz
Humidity	0 to 99% non condensing
CE	EN 50-082-2 (immunity) EN 50-081-1 (emission)
Sealing	To IP54 requirements
Fiberoptic: Optic Head	200°C Maximum ambient temperature
Lightguide	200°C Maximum ambient temperature

OPTIONAL EXTRAS

Standard Body	Close-up lenses
Fiberoptic	Laser targeting

Note: 'D' focal variants relate to M3 only

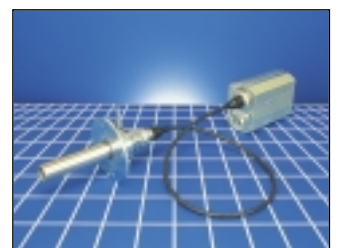
SYSTEM 4



THERMOMETER MOUNTINGS AND ACCESSORIES

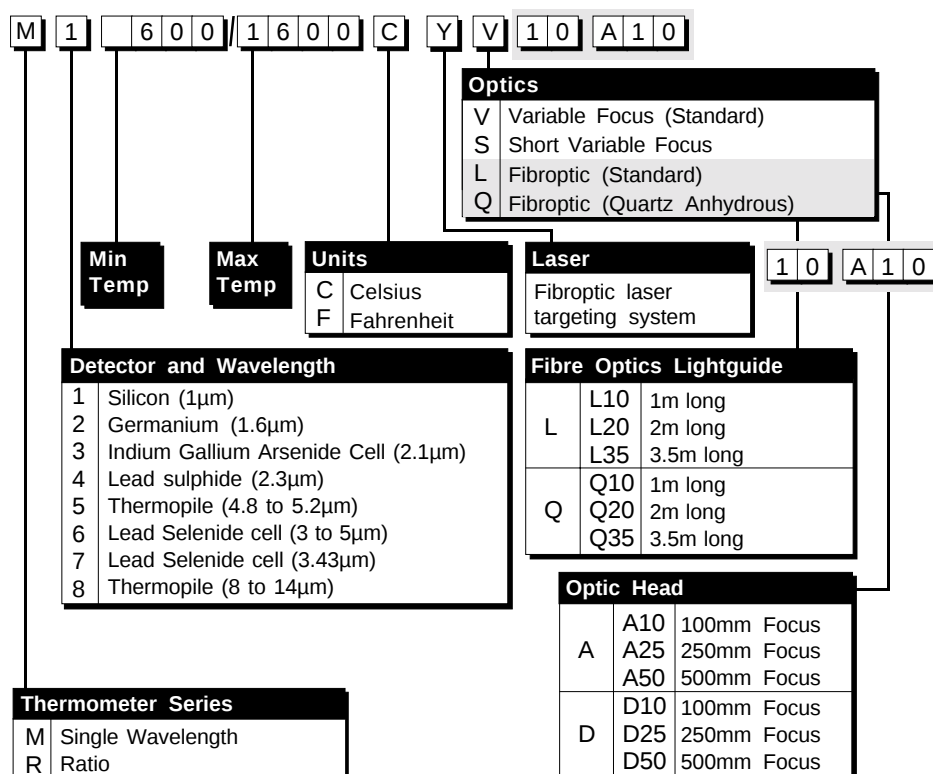
A complete range of thermometer protection and mounting accessories is available, which provides full mechanical and thermal protection for the thermometer and electrical connections, and ensures uninterrupted service with minimal maintenance, in even the most severe operating conditions.

For more information, refer to the Mountings and Accessories Brochure - ref S4M100



All dimensions in millimetres

For example: M1 600/1600 C - V
describes a single wavelength
thermometer, operating at 1.0 μ m, with a
measurement span of 600 to 1600°,
celsius version, with standard variable
focus optics.



For more than fifty years LAND have supplied temperature measuring and process imaging systems 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.



WORLD LEADERS

LAND is the world leader in the manufacture of non contact temperature measurement systems, thermal imagers and linescanners.

WORLDWIDE SUPPORT

In addition to the companies established in Europe, USA, Mexico 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.

APPLICATIONS

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

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

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.



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

The Quality Management System of Land Instruments International Ltd. Is approved to BS EN ISO9001:2000 for the design and manufacture, stockholding, in-house repair and site servicing of non contact temperature measuring instrumentation. Associated software designed and developed in accordance with TickIT. Calibration certificates are available from our UKAS accredited Calibration Laboratory No. 0034. The Land calibration laboratory complies with the requirements of the international standard BS EN ISO/IEC 17025.



LAND

instruments international

Infrared Temperature Measurement

Land Instruments International • Dronfield S18 1DJ • England • Tel: (01246) 417691 • Fax: (01246) 410585
Email: infrared.sales@landinst.com • Internet: www.landinst.com

Land Instruments International • 10 Friends Lane • Newtown, PA 18940-1804 • U.S.A. • Tel: (215) 504-8000
Fax: (215) 504-0879 • Email: irsales@landinstruments.net • Internet: www.landinstruments.net

France
Land Instruments Sarl
Tel: (1) 34 62 05 45 • Fax: (1) 30 56 51 12
Email: commercial@landinst.fr

Japan
Land KK
Tel: 06 6330 5153 • Fax: 06 6330 5338
Email: ikeland@silver.ocn.ne.jp

Germany
Land Instruments GmbH
Tel: 02171/7673-0 • Fax: 02171/7673-9
Email: infrarot@landinst.de

Spain
Land Instruments International
Tel: 91 630 0791 • Fax: 91 630 2918
Email: land-infrared@landinst.es

Italy
Land Instruments Srl
Tel: 02/99040423 • Fax: 02/99040418
Email: infrared@landinst.it

Mexico
Land Instruments International
Tel: 52 55 9171 1466 • Fax: 52 55 9171 1477
Email: ventas@landinstruments.net

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Continuous product development may make it necessary to change these details without notice.

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Solinas

Postbus 563, 1420 CB Uithoorn
C. Verolmelaan 130, 1422 ZB Uithoorn
Nederland

ING bank 66.30.63.795
SWIFT INGBNL2A
BTW NL 8107 90 166 B01

Tel. +31 (0)297 522 552
Fax +31 (0)297 526 252
E-mail solinas@solinas.nl

www.solinas.nl
www.solinas.be
KvK 280 83 073



LAND



SYSTEM 4

PROCESSORS AND SYSTEM OVERVIEW



0034



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SYSTEM 4

LAND

For over 50 years, Land have been the world leaders in delivering solutions to temperature measurement problems.

The new family of products, combining unrivalled expertise and design know-how with the latest technology is...

SYSTEM 4

SYSTEM 4 gives you a choice of products which covers all applications, environments and budgets, ensuring premium performance at competitive prices. Compatibility and interchangeability of each product ensures maximum flexibility, both at time of purchase and subsequently for easy maintenance.

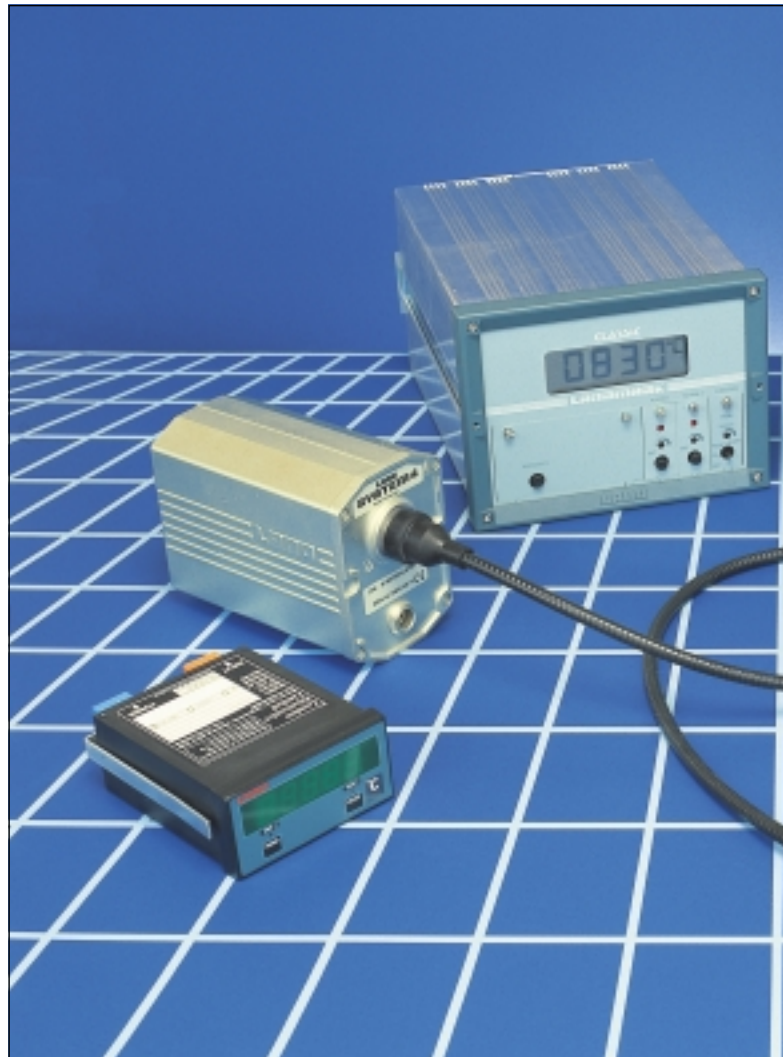
Non contact temperature measuring systems are designed for continuous quality and process monitoring and control in a wide range of industries. They can be used in a variety of applications such as metal production, processing, foundry and forging, glass, electronics, mineral processing and petrochemical where accurate measurement of temperature is vital.

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

- Infrared radiation thermometer systems measure continuously the temperature of hot, moving or normally inaccessible materials accurately and safely at a distance.
- Sensing heads do not require contact with the target object, and therefore cannot interfere with, damage or contaminate the product they are measuring.
- 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.

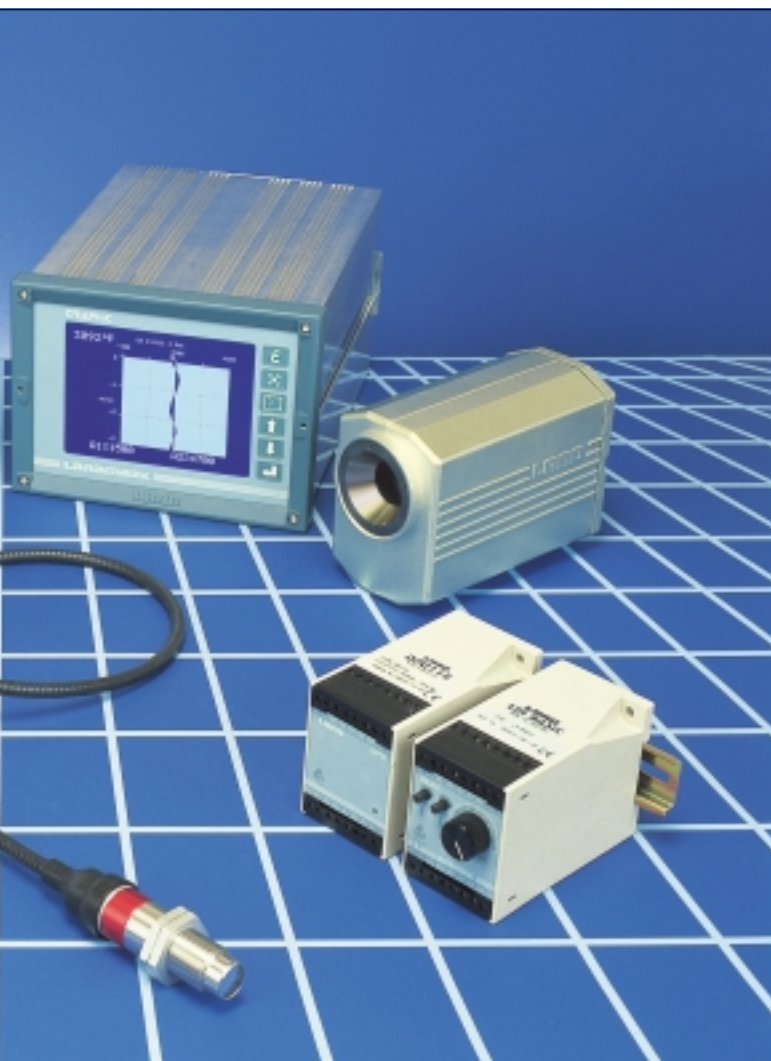
SYSTEM 4 gives you a wide choice of compatible items to ensure the system you buy is optimized to meet the needs of your application, budget and environment.

LANDMARK® processors are designed to produce the process control variables you need from ANY of the **SYSTEM 4** sensors. With this total compatibility, you are free to choose a processor to give the features and performance you need and select the sensor type best suited to the application. All **SYSTEM 4** processors and sensors are calibrated individually to guarantee interchangeability and hence easy maintenance for many years.



SYSTEM 4 offers an extensive, and expanding, range of Standard and Fibroptic thermometers, designed to cover all industrial non contact temperature measurement applications.





SYSTEM 4 includes an extensive range of mountings and accessories which provides protection and accurate alignment for both Standard and Fibroptic thermometers. All mountings permit quick and tool-free installation and removal of thermometers, keeping downtime to the absolute minimum.



PROCESSORS

The heart of any temperature measurement system is the signal processor. A **LANDMARK®** signal processor puts the controls of your system where you need them - panel mounted or DIN rail mounted, the choice is yours. **SYSTEM 4** uses high speed inputs, real time signal processing and flexible outputs to convert the output of each sensor into real process variables.

LANDMARK® GRAPHIC is the state-of-the-art, panel mounted signal processor, designed to control and process data from *any* **SYSTEM 4** Thermometer. The Multi-channel processor accepts, processes and displays inputs from *any combination* of up to four separate thermometers simultaneously - it is **not** multiplexed. Multiple outputs are provided which can be integrated directly into any process monitoring, recording or control system.

LANDMARK® GRAPHIC processors offer a variety of features and advanced time functions which present temperature data in a choice of displays and outputs to suit the particular application.

LANDMARK® GRAPHIC processors are rugged, and extremely versatile, utilizing the latest technology available, giving you more choice and more precision in the measurement of temperature.

For applications which do not require this high level of processor power, a simple alternative is available - **LANDMARK® CLASSIC**.

LANDMARK® CLASSIC can be used with any **SYSTEM 4** Thermometer. It displays the measured temperature and optional plug-in cards give you a choice of either a peak picker or averager time function, plus up to two alarm modules.

LANDMARK® TECHNIC is a high precision, DIN-rail mounted intelligent digital processor. Its features include adjustable emissivity/non-greyness, peak picker, averager, track and hold, alarm and 4 to 20mA outputs, and RS232C serial communications for set up via a PC.

LANDMARK® BASIC is a simple DIN-rail mounted signal processing unit, providing simple signal conditioning with economy and versatility.

THERMOMETERS

Infrared radiation thermometers do not require contact with the target object, so they cannot interfere with, damage, or contaminate the product they are measuring. They do not remove heat or disturb the process being monitored and offer the only solution when the product is moving, small, fragile, or in a vacuum or controlled atmosphere.

SYSTEM 4 Thermometers all feature temperature spans and operating wavebands selected to ensure optimum accuracy of measurement for each application.

Any **SYSTEM 4** thermometer, selected from the extensive range available, can be used with *any* **SYSTEM 4 LANDMARK®** processor, allowing you to build a temperature measurement system designed specifically to your application requirements.

Standard thermometers feature precision through-the-lens focusable optics which guarantee exact viewing and accurate measurement of the smallest of target areas.

Single wavelength thermometers are intended for both general purpose use as well as solving problems in specific applications.

Fibroptic thermometers are used to measure the temperature of materials where the target is difficult to access, and where high temperature or high magnetic fields prevent the use of other types of sensor.

Ratio thermometers are used in difficult environments containing steam, smoke, or dust, or where the target is small or does not completely fill the field of view.

For more details, refer to the 'System 4 Standard and Fibroptic Thermometers' Brochure

LANDMARK® GRAPHIC is the premier non contact temperature measurement system offering an extensive range of standard features and user benefits.

- Highest system accuracy
- High speed, high precision, real time signal processing
- Unique Multi-channel and Math Function options
- Modular, expandable system design
- Simple, user-friendly interface with large numeric and graphic displays
- Selectable time functions and alarm settings
- 0 to 20mA, 4 to 20mA and 1mV/° outputs to suit all industry control systems
- Optional Serial Communications

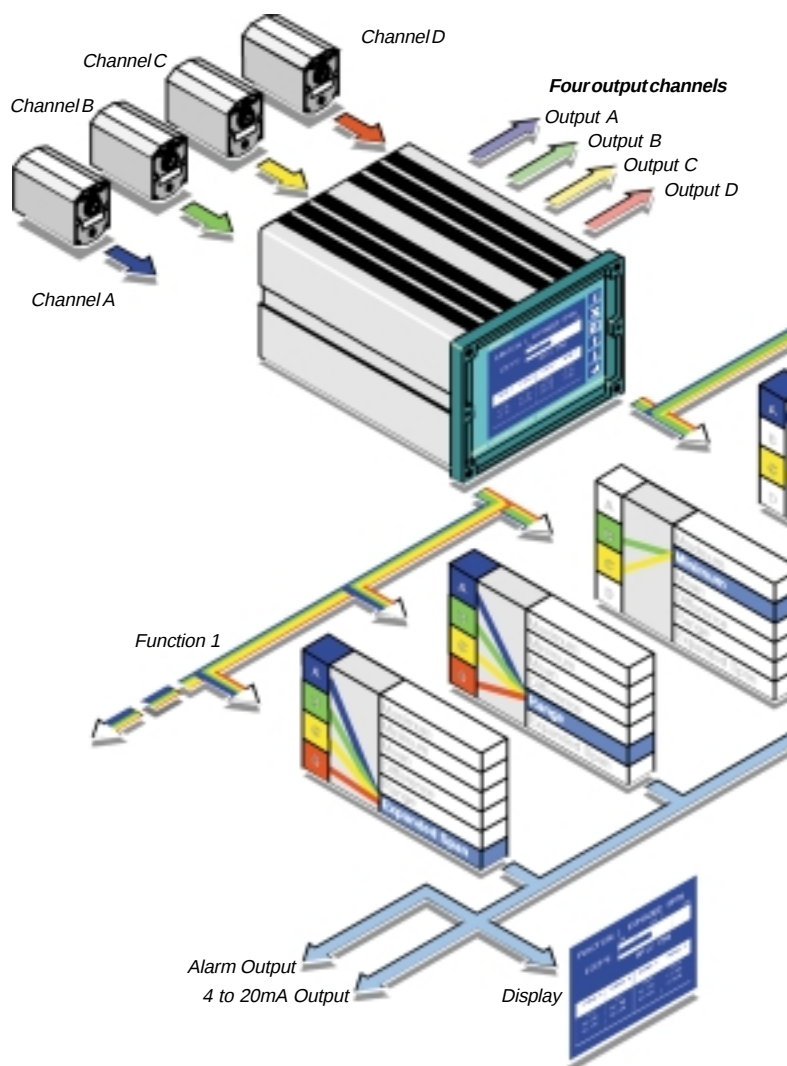
LANDMARK® GRAPHIC is a high precision, intelligent multiple microprocessor-based thermometer signal processor, designed to give the ultimate in process monitoring and control.

LANDMARK® GRAPHIC processors are multi-channel capable and can be configured to work with up to four different **SYSTEM 4** thermometers simultaneously.

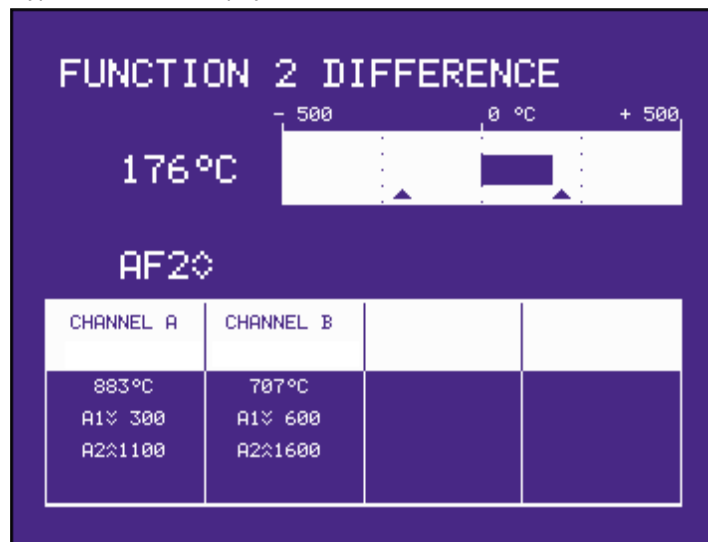
A Math Function option is available which applies user-configured math functions to the temperature measurement signals from the thermometers in the system.

The processor supplies power to each thermometer and the control signals required for either emissivity or non-greyness compensation. A large LCD display shows temperature and parameter variables, and system outputs.

A complete range of thermometer signal conditioning functions is provided including: peak picker, averager, track and hold, and alarm outputs.

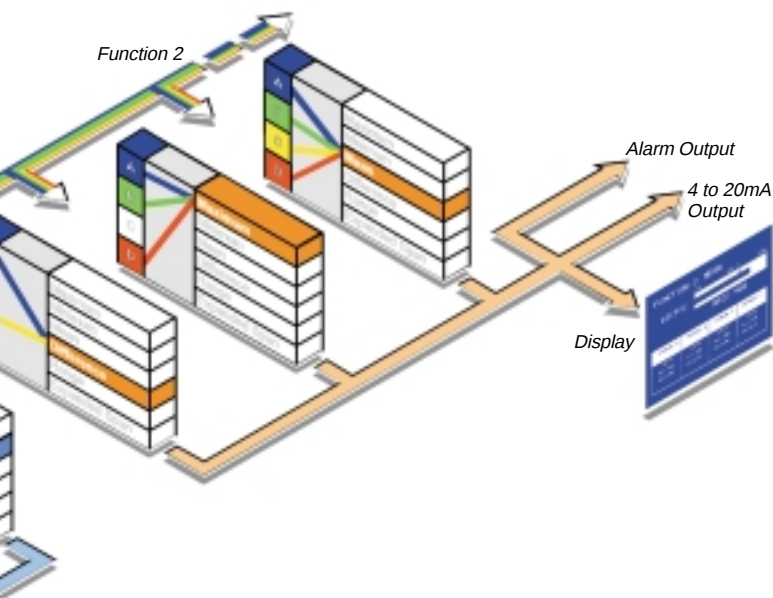


Typical Difference display



Landmark Graphic Processor fitted with Math function option





MULTI-CHANNEL CAPABILITY

The Multi-channel version of the **LANDMARK® GRAPHIC** processor provides up to four fully featured and independent temperature measurement systems in one package.

Any **SYSTEM 4** Thermometer can be connected to any input channel of the processor. Each channel is fully independent of the other, the inputs are *not* multiplexed. Additional channels may be added as required without affecting existing settings.

The processor can control all types of **SYSTEM 4** thermometer simultaneously (i.e. M1, R1, M6 etc.). The thermometers can have differing temperature ranges and even units (°C or °F).

Each channel has identical features to the single channel version; two analog outputs; a fully scaleable 0 to 20 or 4 to 20mA output, and a 1mV/° output. Two alarm outputs, both either High or Low activated, each with changeover relay, are provided on every channel card.

MATH FUNCTIONS

The unique multi-channel capability of the **LANDMARK® GRAPHIC** makes possible the, also unique, Math Function option. The processor accepts and compares up to four thermometer signals. The results are then output to the process control instruments in the form most suited to their requirements.

Two independent math functions are provided, each can calculate, display and output either the *Maximum*, *Minimum*, *Mean*, *Difference* or *Range* of temperatures measured by the selected thermometers in your system.

The *Expanded Span* function allows you to extend the span of your temperature measurement system from the minimum temperature of the thermometer with the lowest temperature range, to the maximum temperature of the thermometer with the highest temperature range.

Any **SYSTEM 4** Thermometer can be used in conjunction with the Math Functions. Up to *four* **SYSTEM 4** Thermometers can be connected to the processor and *two* Maths Functions can be configured. There are many different options for each Math Function, the same option can be selected for both functions if required.

Each Math Function is fully independent from the other, and both are independent from the four individual thermometer temperature output channels, standard to the Landmark Graphic Processor. Each function has both a current output, either 0 to 20mA or 4 to 20mA, and a single relay alarm output.

Math Functions have an almost unlimited range of uses in applications such as trending, cross-product uniformity, hot edge detection etc.

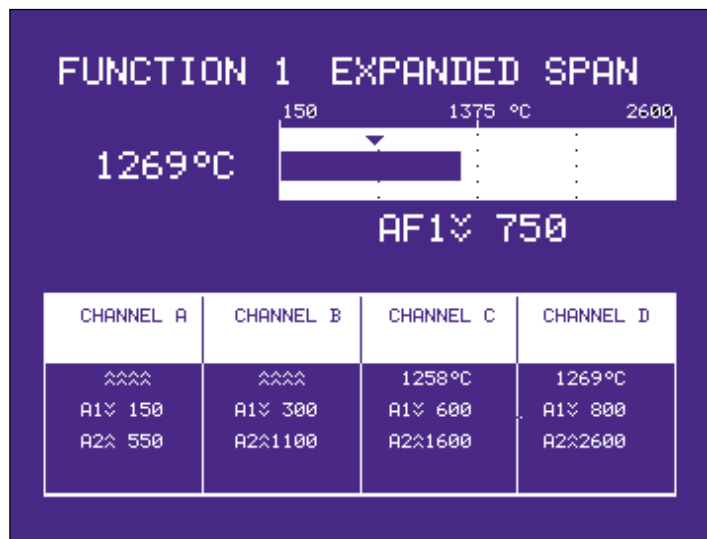
SERIAL COMMUNICATIONS

RS232C and RS485 serial communications are included with the Math Function option for the **LANDMARK® GRAPHIC** processor. A serial option is also available for users who do not require Math Functions.

Serial communications provide a remote interface between the processor and the process control computer. The serial communications circuitry connects directly to the internal microprocessor, via which it has access to all the data in the **LANDMARK® GRAPHIC**.

A single option card can input any parameter for any fitted channel card, and retrieve all existing settings along with the temperature data and system status information for any fitted channel card.

Typical Expanded Span display



EASY CONFIGURATION

LANDMARK® GRAPHIC is easy to configure using the text based, setup menu system which is switch selectable in different languages; English, French, German, Italian, Spanish and Japanese. Once the thermometer type has been entered, the processor automatically configures the appropriate input data. You can then select the required temperature span for the output current range, target emissivity/non greyiness values and a range of time functions and alarm settings to match your exact needs.

All parameter settings are entry code protected.

Customer connections are also made as easy as possible, using two-part demountable terminal strips located on the rear panel. The modular construction of **SYSTEM 4** ensures that any system expansion is catered for with ease.

GRAPHICAL DISPLAY AND KEYPAD

The LCD panel features a large 320 x 240 pixel display, providing a high quality visual interface with the system.

The tactile keypad enables easy configuration of the processor with thermometer and process variables.

Help and error messages simplify setup and operation.

The cold cathode back-lit LCD panel provides a display of measured temperature in numeric or graphic formats, presenting useful profile or trending data. The LCD panel provides a choice of numeric, line chart, deviation chart or mixed displays.

Inputs from up to four individual thermometers can be displayed simultaneously as 4 channel numeric, 4 channel bar graph or 4 channel deviation bar graph.

REAL TIME PROCESSING

A fully featured and real time **Peak Picker** 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.

Fast input sampling by the **Peak Picker**, combined with a built-in spike protection filter allows the processor to respond quickly to a rise in temperature signal from the thermometer.

The user settings also includes a threshold value which, together with On/Off delay timers and two distinct modes of operation, allow configuration to deal with the most demanding of applications.

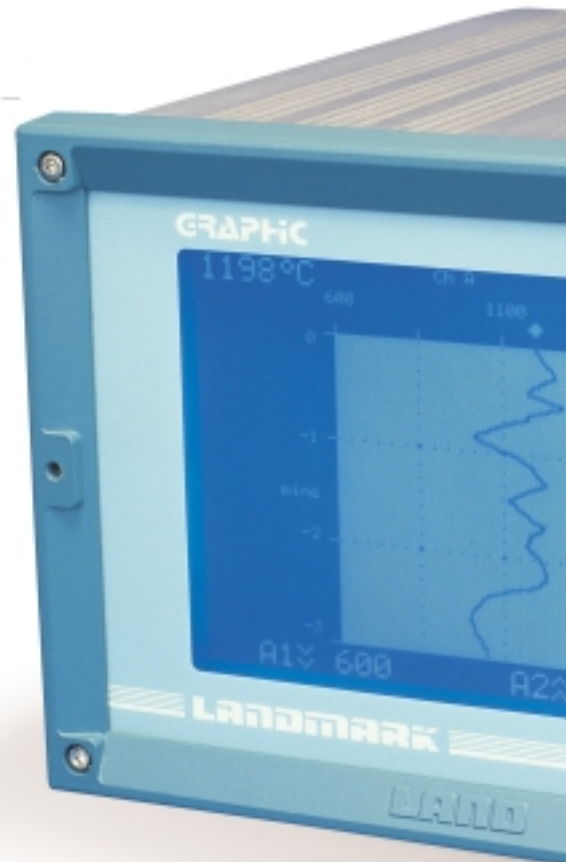
An **Averager** is used to smooth any rapid fluctuations in the process value or reading to deliver a stable, time-averaged value for process control.

The time constant is selected from 0 to 512 seconds, to give suitable, gradual changes in the temperature display and processor output.

If your process is intermittent or interrupted, a **Track and Hold** function is provided which allows you, via an external command signal, to **Hold** the required measurement value until you wish to once again **Track** the variations in the process.

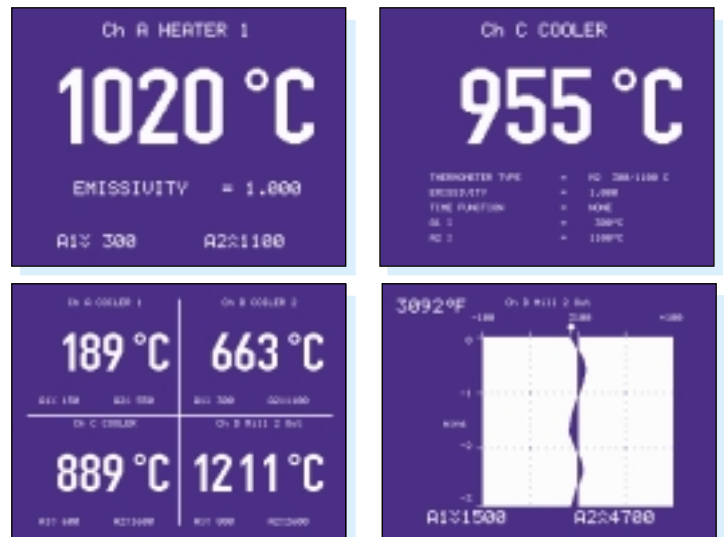
ALARMS

Two alarms are provided, selectable as either high or low, and are ideal for use as ON/OFF controllers. Alarm thresholds are selectable in 1° steps within the temperature of the thermometer.



Landmark® Graphic Processor display and keypad

Typical Landmark® Graphic Displays



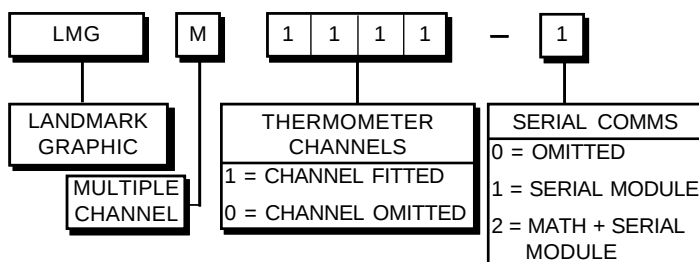


ORDERING INFORMATION

LANDMARK® GRAPHIC has a unique model number which describes the processor model.

The model number, consisting of the various options available, can be used for selection and ordering purposes (see below).

MULTI-CHANNEL PROCESSOR



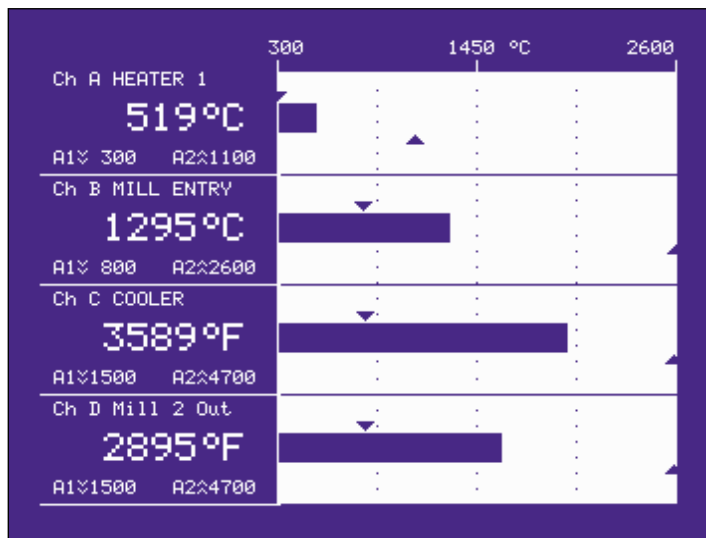
For example: LMG - M 1 1 1 1 - 1 is a **LANDMARK® GRAPHIC** configured with four thermometer input cards with serial communications.

ENVIRONMENTAL PROTECTION

The processor case is constructed from high quality extruded aluminium with a die cast bezel.

An optional, clear, moulded cover panel is available. The cover panel, designed to the requirements of IP65/NEMA 4 is removable and provides environmental protection in hostile locations.

Multi-Channel Bar Chart Display



Landmark Graphic Processor fitted with cover panel



Solinas

Postbus 563, 1420 CB Uithoorn
C. Verolmelaan 130, 1422 ZB Uithoorn
Nederland

ING bank 66.30.63.795
SWIFT INGBNL2A
BTW NL 8107 90 166 B01

Tel. +31 (0)297 522 552
Fax +31 (0)297 526 252
E-mail solinas@solinas.nl

www.solinas.nl
www.solinas.be
KvK 280 83 073



CLASSIC

The Landmark® Classic is a simple, reliable thermometer signal processing unit, with many optional features, intended for cost conscious temperature monitoring and control applications.

- Rugged flexible modular design
- Proven, reliable electronics
- Optional time function and alarm modules
- Industry standard 4 to 20mA output to suit all industries and control systems

LANDMARK® CLASSIC is a modular, flexible processor, fully compatible with the entire range of **SYSTEM 4** thermometers.

The processor provides the necessary power and control signals required by the thermometer for either emissivity or non greyness compensation. It has an LCD display of temperature and parameter variables.

The processor accepts the input signal from the **SYSTEM 4** thermometer, provides a display of temperature and retransmits the signal as an industry standard 4 to 20mA output either directly to your process control system, or via optional time function and alarm modules.

LANDMARK® CLASSIC can be configured with either a peak picker or averager time function, and up to two alarm modules which may be selected at the time of purchase or retrofitted in the field. There is no requirement for recalibration on subsequent change of options installed.

The modular design of **LANDMARK® CLASSIC** gives you maximum flexibility on the choice of processing requirements for your application.

This ensures that your temperature measurement system can be adapted to suit all applications, whatever the specific requirements.

EASY CONFIGURATION

Configuration is simple and quick. The measurement range is scaled to suit the particular type of thermometer in use via span and offset controls on the front panel.

Built-in reference sources enable processor calibration without any external test equipment.

Switches are provided for thermometer series, units (°C or °F) and emissivity or non greyness.



Landmark Classic Processor fitted with Alarms and Peak Picker function





Landmark Classic Processor fitted with cover panel



DISPLAY

The large, easy to read LCD panel provides a continuous display of measured temperature, together with over and under range indications.

Alarm and emissivity or non-greyness settings are displayed at the press of a button.

REAL TIME PROCESSING

A fully featured and real time **Peak Picker** 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.

Fast input sampling by the **Peak Picker**, combined with a built-in spike protection filter allows the processor to respond quickly to a rise in temperature signal from the thermometer.

The **Peak Picker** has a user adjustable decay rate and both manual and remote reset controls, giving flexibility to deal with the most demanding of applications.

An **Averager** is used to smooth any rapid fluctuations in the process value or reading to deliver a stable, time-averaged value for process control.

The time constant is selected from 0 to 512 seconds, to give suitable, gradual changes in the temperature display and processor output.

ALARMS

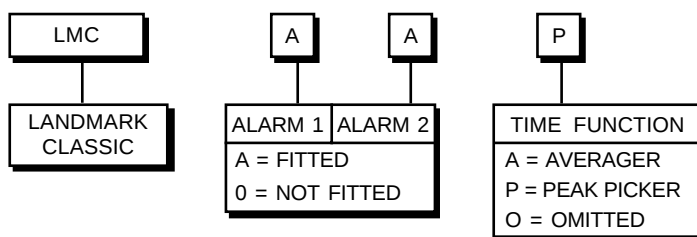
Two alarms are provided, selectable as either high or low, and are ideal for use as ON/OFF controllers. Alarm thresholds are adjustable in 1° steps within the temperature of the thermometer.

ENVIRONMENTAL PROTECTION

The processor case is constructed from high quality extruded aluminium with a die cast bezel. An optional, clear, moulded door panel is available. The door panel, designed to the requirements of IP65/NEMA 4, is removable and provides environmental protection in hostile locations, as well as a degree of tamper proofing.

ORDERING INFORMATION

LANDMARK® CLASSIC has a unique model number which describes the processor model. The model number, consisting of the various options available, can be used for selection and ordering purposes.



For example: LMC-A-A-P is a **LANDMARK® CLASSIC** processor with alarms 1 and 2, and peak picker modules fitted.

LANDMARK® TECHNIC is a high precision, digital, DIN-rail mounted signal processing unit, providing economic conditioning of any System 4 thermometer output signal - ideal for both end user and OEMs.

- Standard DIN-rail mounting - requires no panel space
- Time functions - average, peak picker and track and hold as standard
- Industry standard 4 to 20mA output
- Remote input for Track and Hold
- Emissivity/non-greyness adjustment
- Alarm output
- Set up performed using a PC and configuration software
- Indicator (LMi) and power supply are also available

LANDMARK® TECHNIC has standard electrical outputs and is DIN-rail mounted for easy integration into OEM's and end user process control systems.

RS232C serial communications are included providing a remote interface between the processor and a PC for configuring the system parameters.

REAL TIME PROCESSING

The **Averager** function is used to smooth unwanted variations or rapidly fluctuating changes in the measured signal. The Averager time constant can be adjusted from 50ms to 512s (63%) in 15 steps.

The **Peak Picker** function is used when measuring the temperature of intermittent targets or where the hot target surface is obscured by cool areas. The **Peak Picker** decay rate is adjustable from 0.25°/s to 512°/s in 12 steps.

The **Track and Hold** function is also provided with remote reset via voltage free relay or switch contacts.

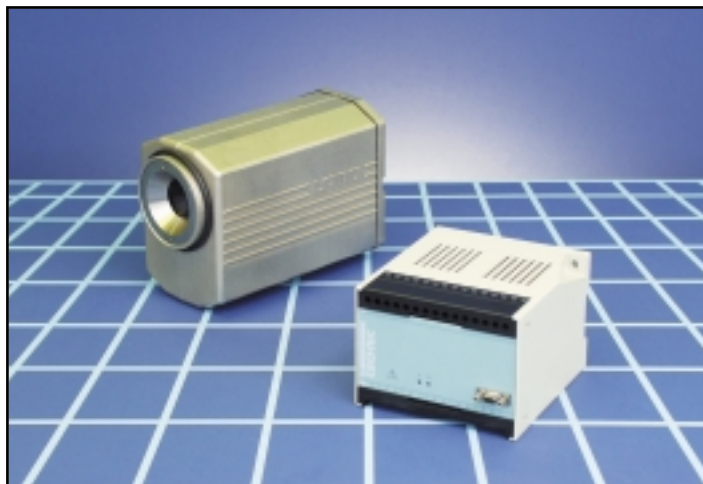
POWER SUPPLY

The **DPU** power supply unit provides the power supply (30V d.c. nominal) which the **LANDMARK® TECHNIC** processor requires. The **DPU** can be DIN-rail mounted alongside the **LANDMARK® TECHNIC**. Several models are available to cover all input voltages.

LANDMARK® INDICATOR

The **LMi** is an easy to read digital panel meter providing continuous indication of measured temperature. Up to two alarms (high or low) may be set, providing a voltage free relay output. A visual display on the front panel indicates when an alarm has been tripped. Alarm thresholds are set via the front panel.

It also provides scaleable 4 to 20mA output to match the input range of your process control system.



Landmark Technic Processor and System 4 thermometer



Landmark Technic Processor connections

CONFIGURATION

The temperature measurement system is readily configured using the LM Technic Configuration Software and a PC.

The PC is connected to the RS232C port on the LM Technic front panel to perform the configuration.

Once configured, the PC is disconnected from the LM Technic and the LM Technic can be left to operate. The system configuration is stored in non volatile memory.



LANDMARK® BASIC is a simple, low cost, DIN-rail mounted signal processing unit, providing economic conditioning of any System 4 thermometer output signal - ideal for both end user and OEMs.

- Standard DIN-rail mounting - requires no panel space
- Time functions - average and peak picker as standard
- Provides easy access to your thermometer's emissivity/non-greyness control
- Digital panel meter with alarm is available (LMi)
- Industry standard 4 to 20mA output to suit all industries and control systems

LANDMARK® BASIC has standard electrical outputs and DIN-rail hardware, designed to allow easy integration into OEM's and end user process control systems.

LANDMARK® BASIC enables adjustment of emissivity/non-greyness and time functions from your control room - not out on your sensor.

LANDMARK® BASIC signal processing features an adjustable averager and peak picker with remote reset.

REAL TIME PROCESSING

The **Averager** function is used to smooth unwanted variations or rapidly fluctuating changes in the measured signal.

The **Averager** time constant can be adjusted, via the control mounted on the front of the **BASIC** processor, from 175ms to 4s (10 to 90%).

The **Peak Picker** function is used when measuring the temperature of intermittent targets or where the hot target surface is obscured by cool areas. The **Peak Picker** decay rate is adjustable from 1 to 5000% of span per second. A remote reset function is provided from voltage free relay or switch contacts.

POWER SUPPLY

The **DPU** power supply unit provides the power supply (30V d.c. nominal) which the **LANDMARK® BASIC** processor requires. The **DPU** can be DIN-rail mounted alongside the **LANDMARK® BASIC**. Several models are available to cover all input voltages.

LANDMARK® INDICATOR

The **LMi** is an easy to read digital panel meter providing continuous indication of measured temperature.

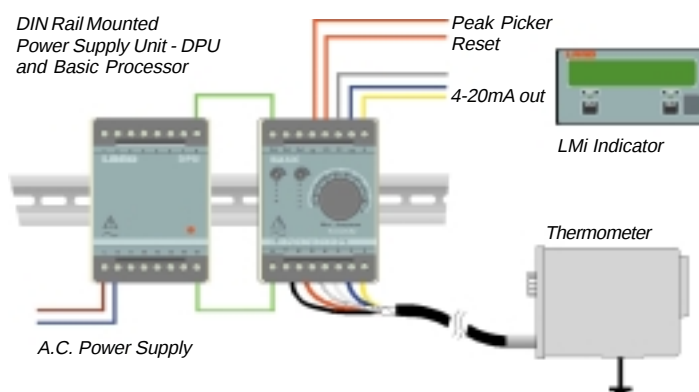
Up to two alarms (high or low) may be set, providing a voltage free relay output. A visual display on the front panel indicates when an alarm has been tripped. Alarm thresholds are set via the front panel.

It also provides scaleable 4 to 20mA output to match the input range of your process control system.



Landmark Basic Processor and DPU Power Unit

Landmark Basic Processor and DPU connections



Landmark Basic Processor controls



SPECIFICATIONS

		Landmark Graphic		Landmark Classic		Landmark Technic		Landmark Basic	
Display		Cold cathode, backlit, 320 x 240 pixels		LCD		Optional LMI Indicator		Optional LMI Indicator	
Outputs		4 to 20mA, 0 to 20mA, 1mV/°		4 to 20mA over temperature range		0 to 20mA or 4 to 20mA		4 to 20mA over temperature range	
Output update		10ms		5ms to 98% (without time function module)		10ms		3ms to 98% (time functions at minimum)	
Emissivity		0.050 to 1.000 in 0.001 steps**		0.20 to 1.00		0.200 to 1.000 in 0.001 steps		0.20 to 1.00	
Non Greyness		0.800 to 1.250 in 0.001 steps		0.800 to 1.250		0.800 to 1.250 in 0.001 steps		0.800 to 1.250	
Peak Picker		Yes		Optional		Yes		Yes	
Averager		Yes		Optional		Yes		Yes	
Track and Hold		Yes		No		Yes		No	
Alarms		Yes		Optional		Yes		No	
Serial Comms.		Optional		No		Yes		No	
Power requirement		90 to 132V a.c. or 180 to 264V a.c 48 to 63 Hz, 35VA (290VA max with 4 thermometers)		90 to 132V a.c. or 180 to 264V a.c 48 to 63 Hz, 35VA		30V d.c. nominal		24 to 30V a.c. 50 to 60Hz or 30 to 45V d.c at 200mA	
Ambient operating temperature				5 to 50°C (specified) 5 to 60°C (max. operating)					
Sealing		To requirements of IP65/NEMA4 (with optional cover fitted)				IP40, IP20 to terminals			
Humidity				0 to 99% non condensing					
Vibration				1g any axis, 10 to 300Hz					
Weight		5.5kg approx.		4.3kg approx.		0.5kg approx		0.2kg approx.	
CE		EN 50-082-2 (immunity), EN 50-081-1 (emission), IEC 1010 (safety)							
System Accuracy		Repeatability*	Accuracy*	Repeatability*	Accuracy*	Repeatability*	Accuracy*	Repeatability*	Accuracy*
Thermometers	M1 450/1000C	<1K	0.4%K	<1K	0.5%K	<1K	0.4%K	<1K	0.6%K
	M1 600/1600C	<1K	0.25%K	<1K	0.5%K	<1K	0.25%K	<1K	0.6%K
	M1 800/2600C	<2K	0.4%K	<2K	0.75%+1K	<2K	0.4%K	<2K	0.9%+1K
	M2 300/1100C	<1K	2K	<1K	0.25%+2K	<1K	2K	<1K	0.4%+2K
	M3 50/250C ⁽¹⁾	<1.5K	2K	<1.5K	3K	<1.5K	2K	<1.5K	4K
	M4 50/250C ⁽¹⁾	<1K	3K	<1K	3.5K	<1K	3K	<1K	4K
	M4 150/550C	<1K	3.5K	<1K	4.5K	<1K	3.5K	<1K	5.5K
	M5 400/1300C	<1K	0.35%K	<1K	0.7%K ⁽²⁾	<1K	0.35%K	<1K	0.75%K ⁽²⁾
	M5 1000/2500C	<1K	0.5%K	<1K	0.6%K	<1K	0.5%K	<1K	0.65%K
	M6 0/300C	<1K	2K	<1K	0.3%+2.5K	<1K	2K	<1K	0.4%+2.5K
	M6 100/700C	<1K	2K	<1K	0.3%+2.5K	<1K	2K	<1K	0.4%+2.5K
	M7 25/375C ⁽¹⁾	<1.5K	2K	<1.5K	3K	<1.5K	2K	<1.5K	4K
	M8 0/1000C	<1K	3.5K	<1K	4.5K	<1K	3.5K	<1K	5.5K
	R1 600/1600C	<1K	0.45%K	<1K	0.7%K	<1K	0.45%K	<1K	0.75%K
	R1 1000/2600C	<2K	0.75%K	<2K	1.1%K	<2K	0.75%K	<2K	1.2%K

⁽¹⁾ Above 75°C ⁽²⁾ Optimised for glass toughening = 3K at 630°C

* For a definition of 'Repeatability' and 'Accuracy', refer to Land document 'NDA 478'

** Systems are functional, but performance is unspecified at emissivity values <0.200.



Solinas

Postbus 563, 1420 CB Uithoorn
C. Verolmelaan 130, 1422 ZB Uithoorn
Nederland

ING bank 66.30.63.795
SWIFT INGBNL2A
BTW NL 8107 90 166 B01

Tel. +31 (0)297 522 552
Fax +31 (0)297 526 252
E-mail solinas@solinas.nl

www.solinas.nl
www.solinas.be
KvK 280 83 073



SYSTEM 4

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.

- Focusable optics - guaranteeing 98% of target energy within the lens graticule. Optics remain focusable during operation
- Additional close-up lenses for 'standard bodied' thermometers for targets as small as 0.45mm
- Flexible fibre optics light guide versions - with optional laser targeting system to define target size and position
- Traceable, individual calibration - giving flexible systems with unrestricted interchangeability
- Long term accurate, reliable and drift-free measurement
- Rugged design with a wide range of mounting accessories

STANDARD BODIED THERMOMETERS

Proven reliable electronics and a high quality optical system are housed in a rugged die-cast aluminium body with a robust electrical connector to provide reliable performance.

All thermometers feature through-the-lens sighting.

Adjustable focus with a circular graticule gives precise alignment on to the smallest of targets. Two optical variants are available: Standard and Short-focus.

System 4 Standard Bodied and Fibroptic Thermometers



M1 Thermometers

M1 thermometers are intended for general purpose use in high temperature applications from 450 to 2600°C. They utilize a silicon cell detector and operate at short wavelengths and have a fast response time of 5ms to 95%.

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 and have a fast response time of 5ms.

M4 Thermometers

M4 thermometers measure from 50 to 550°C and are used on low temperature, partially obscured, 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.

M5 Thermometers

The fast speed of response, coupled with small target size and accurate sighting facility make the M5 thermometers ideal for all flat glass, glass toughening and optical fibre preform applications. They measure from 400 to 2500°C.

M6 Thermometers

The unique M6 short wavelength thermometers measure from 0 to 700°C and are designed specifically for lower temperature applications such as metal processing, glass lehr, food, paper, rubber and textiles.

M7 Thermometers

M7 thermometers operate at a waveband selected especially for measurement on plastic films as thin as a few microns, such as Polyethylene and PVC, and measure from 25 to 375°C.

M8 Thermometers

M8 thermometers measure from 0 to 1000°C and are ideal for applications such as food, textiles, paper and plastics. They operate at a waveband which avoids the effects of atmospheric absorption.

R1 Ratio Thermometers

R1 Ratio Thermometers are intended for difficult, high temperature applications where the field of view is not fully filled or where the sight path is obscured. Their range is 600 to 2600°C and can accurately measure temperature of targets with up to 95% obscuration.

FIBROPTIC THERMOMETERS

Fibroptic models have a flexible fibre optics light guide which enables the detector and electronics enclosure to be located in a less hostile environment.

Fibroptic M1 Thermometers

Fibroptic M1 thermometers measure from 600 to 2600°C and 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 M2 Thermometers

Fibroptic M2 thermometers are designed for applications from 300 to 1100°C, such as glass mould temperatures where access to the target is restricted, or limited to a few milliseconds.

Fibroptic M3 Thermometers

The Fibroptic M3 thermometers is designed for low temperature applications, with low or uncertain emissivity, such as secondary metals, within the range 50 to 250°C.

Fibroptic R1 Ratio Thermometers

Fibroptic R1 ratio thermometers measure from 600 to 2600°C and 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.

THERMOMETER MOUNTINGS AND ACCESSORIES

To enable you to measure temperature accurately in even the most severe operating conditions, a complete range of thermometer protection and mounting accessories is available.

Full mechanical and thermal protection for the thermometer and electrical connections is ensured, giving uninterrupted service with minimal maintenance in almost any environment.

JACKET

The corrosion resistant thermometer jacket provides air or water cooling where excessive heat may exist.

The jacket allows quick, no-tools thermometer installation and removal and ensures reproducible alignment.

END CAP

The end cap provides protection for the rear of the thermometer. The ingenious design, featuring a pre-wired thermometer connector and a terminal strip inside the end cap simplifies customer connections on-site.



THERMOMETER CONNECTOR

The thermometer connector is normally supplied pre-wired and terminated in the end cap. A connector pre-wired to 4m of cable must be ordered if the user does not require an end cap for the application.

AIR PURGE

Extensive research has resulted in a highly efficient air purge which keeps condensation, dirt and other deposits off the thermometer lens. The air purge also helps to disperse fumes and smoke from the thermometer sight path.

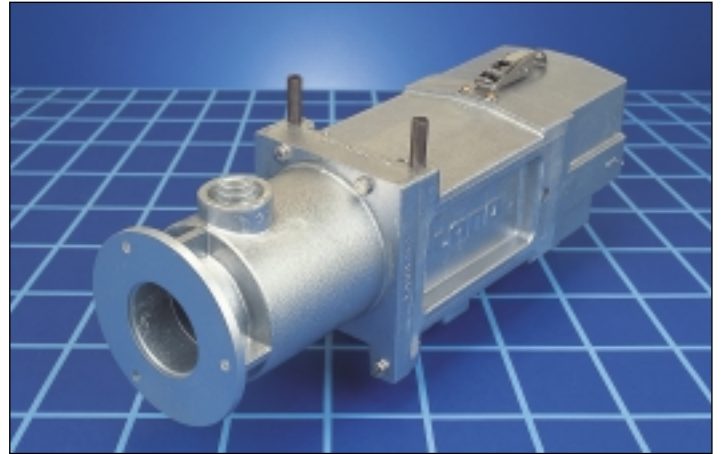
The purge accepts a range of air entry adapters and fittings, and has the added bonus of being suitable for use with both fan or compressed air supplies.

The front flange of the purge also mounts directly onto the Land System 3 range of mounting plates and sighting tubes.

SIGHTING TUBES

A range of Silicon Carbide, Sillimanite and Stainless Steel sighting tubes are available in various lengths up to 1200mm for use in temperatures up to 1550°C.

Open ended sighting tubes (Type STO) are used to ensure a clear view of a solid target through flame, smoke, fumes and dust. Closed-end sighting tubes (Type STC) are used to measure the temperature of a fluid material.



MOUNTING PLATES

Mounting plates enable the thermometer, together with a jacket, purge and sighting tube, to be securely mounted in a safe position to monitor the product or process.

O/N/M mounting plate is a simple, rugged mounting which can be used with all of the sighting tubes.

O/N/AF adjustable mounting plate is for use where accurate sighting is essential. The jacket/ purge fastens to an adjustable circular plate. The O/N/AF mounting is used with the FS6 and FS36 sighting tubes.



FIBROPTIC MOUNTINGS AND ACCESSORIES

QUICK-RELEASE AND AIR PURGE ASSEMBLY

The quick release and air purge/sighting tube assembly attaches to the optic head of the fibroptic thermometer to keep the lens clean.

The assembly can be used with a range of mounting accessories.

MOUNTING PLATE ASSEMBLY

A simple, robust 127mm diameter mounting plate and quick release/air purge assembly permits a range of mounting options.



ANGLE MOUNTING BRACKET ASSEMBLY

A simple mounting bracket serves as an inexpensive mounting for the thermometer optic head. The bracket is designed for bolting to almost any mounting surface.

ADJUSTABLE MOUNTING FLANGE ASSEMBLY

The adjustable mounting flange and quick release/air purge assembly provides accurate alignment of the optic head.

ADJUSTABLE MOUNTING PLATE

An adjustable mounting flange allows alignment of the optic head at any angle up to 45°.

For more details of Land Thermometer Mountings and Accessories, please refer to brochure ref. S4M100E

THERMOMETER MOUNTINGS AND ACCESSORIES

Both the Standard bodied and Fibroptic range of mounting accessories are subdivided into three groups which cover all environmental conditions i.e. **INDUSTRIAL**, **NON-HOSTILE** and **LABORATORY**.

INDUSTRIAL

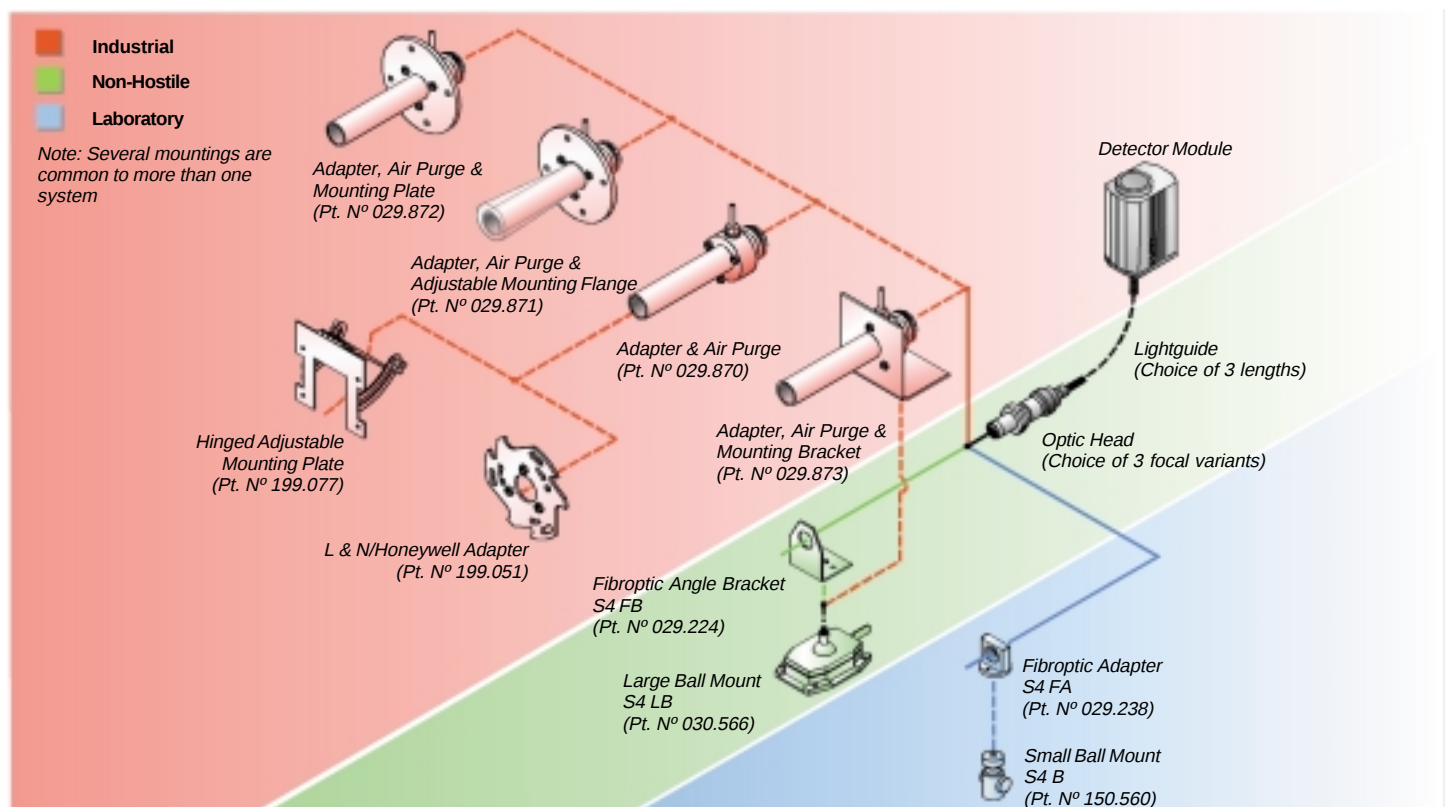
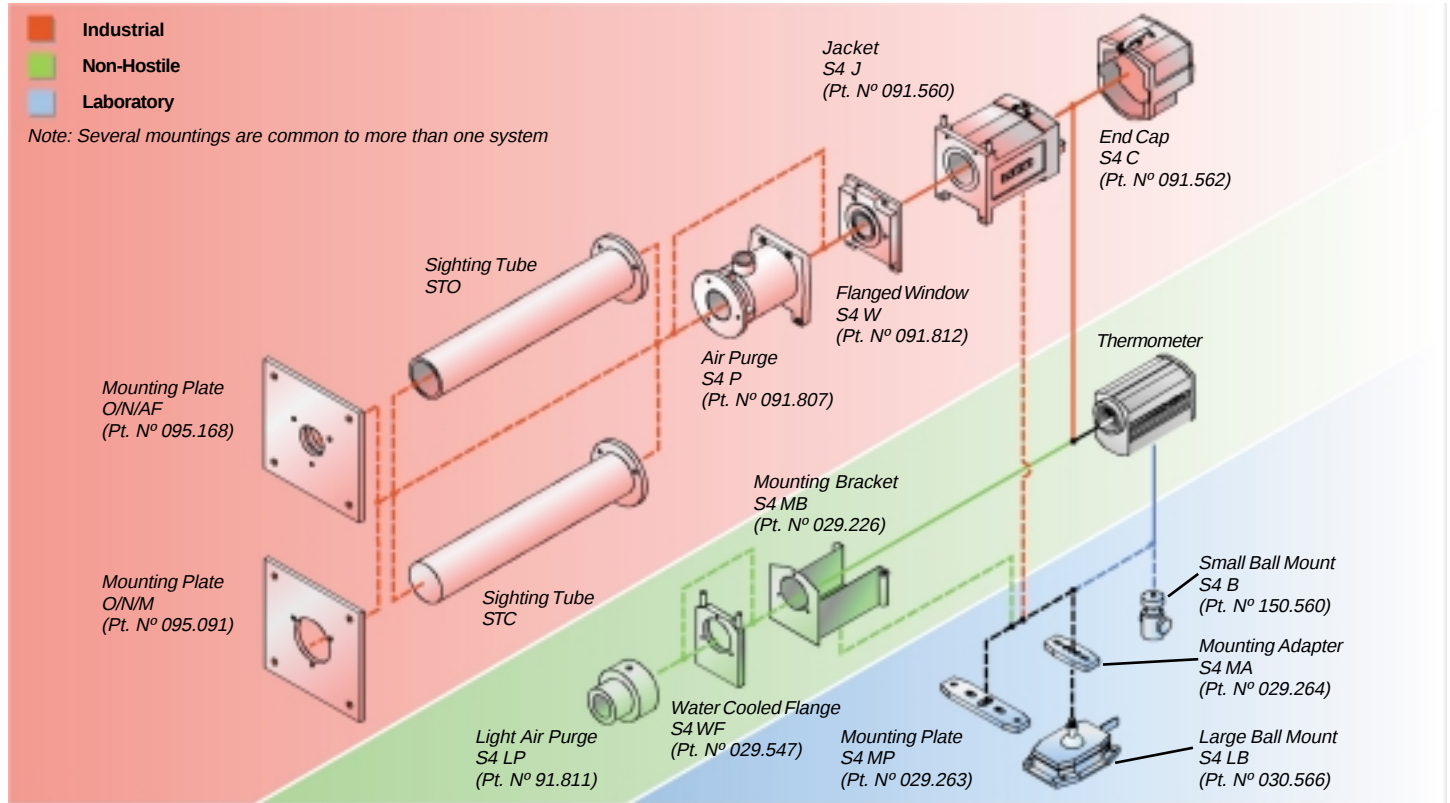
To be used where severe or extreme environmental conditions prevail.

NON-HOSTILE

Where the environmental conditions which apply to the measurement application are less severe.

LABORATORY

No adverse environmental conditions prevail, a requirement for thermometer mounting only.



For more than fifty years LAND have supplied temperature measuring and process imaging systems 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



Expert advice and support is never far away

WORLD LEADERS

LAND is the world leader in the manufacture of non contact temperature measurement systems, thermal imagers and linescanners.

WORLDWIDE SUPPORT

In addition to the companies established in Europe, USA, Mexico 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.

APPLICATIONS

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

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

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.



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

The Quality Management System of Land Instruments International Ltd. is approved to BS EN ISO9001:2000 for the design and manufacture, stockholding, in-house repair and site servicing of non contact temperature measuring instrumentation. Associated software designed and developed in accordance with TickIT. Calibration certificates are available from our UKAS accredited Calibration Laboratory No. 0034. The Land calibration laboratory complies with the requirements of the international standard BS EN ISO/IEC 17025.



0034



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LAND

instruments international

Infrared Temperature Measurement

Land Instruments International • Dronfield S18 1DJ • England • Tel: (01246) 417691 • Fax: (01246) 410585
Email: infrared.sales@landinst.com • Internet: www.landinst.com

Land Instruments International • 10 Friends Lane • Newtown, PA 18940-1804 • U.S.A. • Tel: (215) 504-8000
Fax: (215) 504-0879 • Email: irsales@landinstruments.net • Internet: www.landinstruments.net

France
Land Instruments Sarl
Tel: (1) 34 62 05 45 • Fax: (1) 30 56 51 12
Email: commercial@landinst.fr

Japan
Land KK
Tel: 06 6330 5153 • Fax: 06 6330 5338
Email: ikeland@silver.ocn.ne.jp

Germany
Land Instruments GmbH
Tel: 02171/7673-0 • Fax: 02171/7673-9
Email: infrarot@landinst.de

Spain
Land Instruments International
Tel: 91 630 0791 • Fax: 91 630 2918
Email: land-infrared@landinst.es

Italy
Land Instruments Srl
Tel: 02/99040423 • Fax: 02/99040418
Email: infrared@landinst.it

Mexico
Land Instruments International
Tel: 52 55 9171 1466 • Fax: 52 55 9171 1477
Email: ventas@landinstruments.net

Printed in England

Continuous product development may make it necessary to change these details without notice.

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Solinas
BENELUX BY

Postbus 563, 1420 CB Uithoorn
C. Verolmelaan 130, 1422 ZB Uithoorn
Nederland

ING bank 66.30.63.795
SWIFT INGBNL2A
BTW NL 8107 90 166 B01

Tel. +31 (0)297 522 552
Fax +31 (0)297 526 252
E-mail solinas@solinas.nl

www.solinas.nl
www.solinas.be
KvK 280 83 073



LAND



THERMOMETER

MOUNTINGS AND ACCESSORIES



0034



001



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Postbus 563, 1420 CB Uithoorn
C. Verolmetaan 130, 1422 ZB Uithoorn
Nederland

ING bank 66.30.63.795
SWIFT INGBNL2A
BTW NL 8107 90 166 B01

Tel. +31 (0)297 522 552
Fax +31 (0)297 526 252
E-mail solinas@solinas.nl

www.solinas.nl
www.solinas.be
KvK 280 83 073





The new Standard Bodied and Fibroptic range of temperature measurement systems from Land Infrared includes a comprehensive range of thermometer mounting and protection accessories to suit any measurement environment. All mountings and accessories feature quick and tool-free installation and removal. The range of accessories can be sub-divided into three groups **INDUSTRIAL**, **NON-HOSTILE** and **LABORATORY**. These groups provide a classification which equate to the given environmental conditions.

SELECTING MOUNTINGS AND ACCESSORIES

The following information will help determine which specific mountings and accessories are necessary to maintain measurement accuracy and reliability of performance of the thermometer.

Cooling Jacket - Standard Thermometers

The thermometer cooling and protection jacket provides benefits where there is a requirement for:

- Thermal protection of the thermometer i.e high ambient temperatures
- Mechanical protection of the thermometer i.e risk of damage
- Full environmental protection of the thermometer i.e water or smoke ingress

End Cap - Standard Thermometers

The End Cap provides benefits where there is a requirement for:

- Full environmental protection of the thermometer electrical connections i.e water ingress

Air Purge

The Air Purge clears dust, steam and smoke from the thermometer sight path to ensure accurate temperature measurement.

An Air Purge is required to:

- Clear the sight path
- Prevent build-up of debris on the thermometer lens
- Protect the lens from flame or gas impingement

Mounting Bracket/Plate/Adapter

The range of brackets, plates and adapters are used where there is a need for:

- Fixed, robust installation
- Thermal protection
- Mechanical protection
- Angular adjustment (accurate sighting)

Sighting Tubes

Sighting Tubes are used for:

- Viewing the target through flame, smoke, fumes etc.

INDUSTRIAL For full details of Standard Body INDUSTRIAL Mountings and Accessories refer to pages 4 - 7.

For Fibroptic INDUSTRIAL Mountings and Accessories, refer to pages 12 and 13.

To be used where severe or extreme environmental conditions prevail.

- High or low ambient temperatures
- Smoke, steam, fumes present in the atmosphere i.e. requirement for thermometer purge
- Exposure to exceptional environmental conditions i.e. inside a furnace
- Potential damage from personnel or other equipment

NON-HOSTILE For full details of Standard Body NON-HOSTILE Mountings and Accessories refer to pages 8 and 9.

For Fibroptic NON-HOSTILE Mountings and Accessories refer to page 14.

Where the environmental conditions which apply to the measurement application are less severe i.e. Non-Hostile.

- Room temperature operating conditions i.e. none or minimal requirement for thermometer cooling
- Absence of large amounts of smoke, steam, fumes etc i.e potential for air purging to maintain accuracy of reading only
- No unusual environmental conditions
- No possibility of damage from personnel or other equipment i.e no requirement for heavy-duty mountings

LABORATORY For full details of Standard Body LABORATORY Mountings and Accessories refer to page 10.

For Fibroptic LABORATORY Mountings and Accessories refer to pages 14 and 15.

No adverse environmental conditions prevail, a requirement for thermometer mounting only.

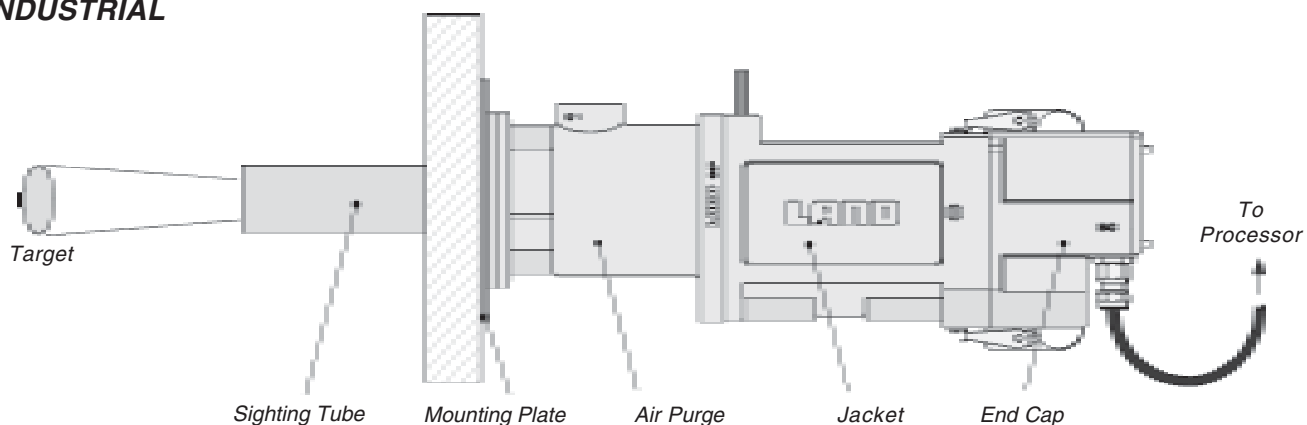
AIR SUPPLY SYSTEMS For full details of AIR SUPPLY SYSTEMS refer to page 15.

Notes: 1. For full details of Standard Body INDUSTRIAL Mountings and Accessories refer to pages 4 - 7.

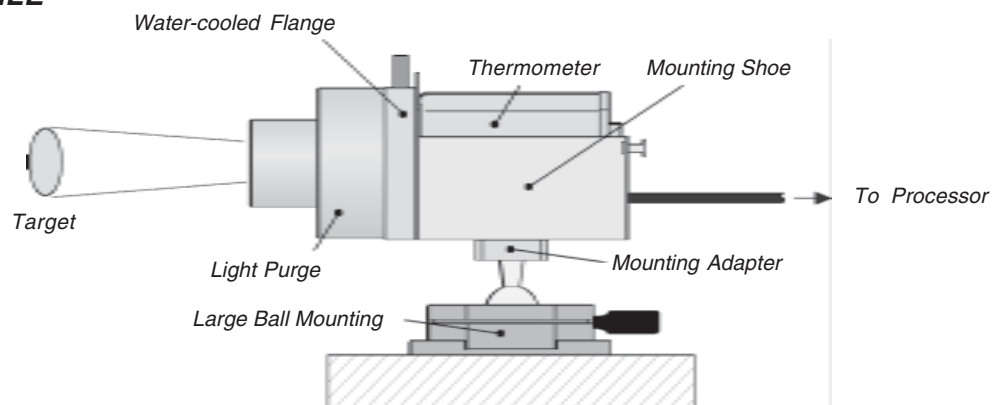


COMPLETE STANDARD BODIED THERMOMETER SYSTEMS

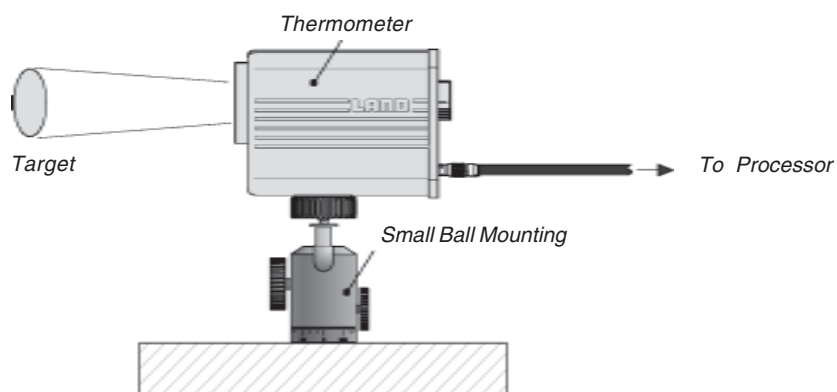
INDUSTRIAL



NON-HOSTILE



LABORATORY



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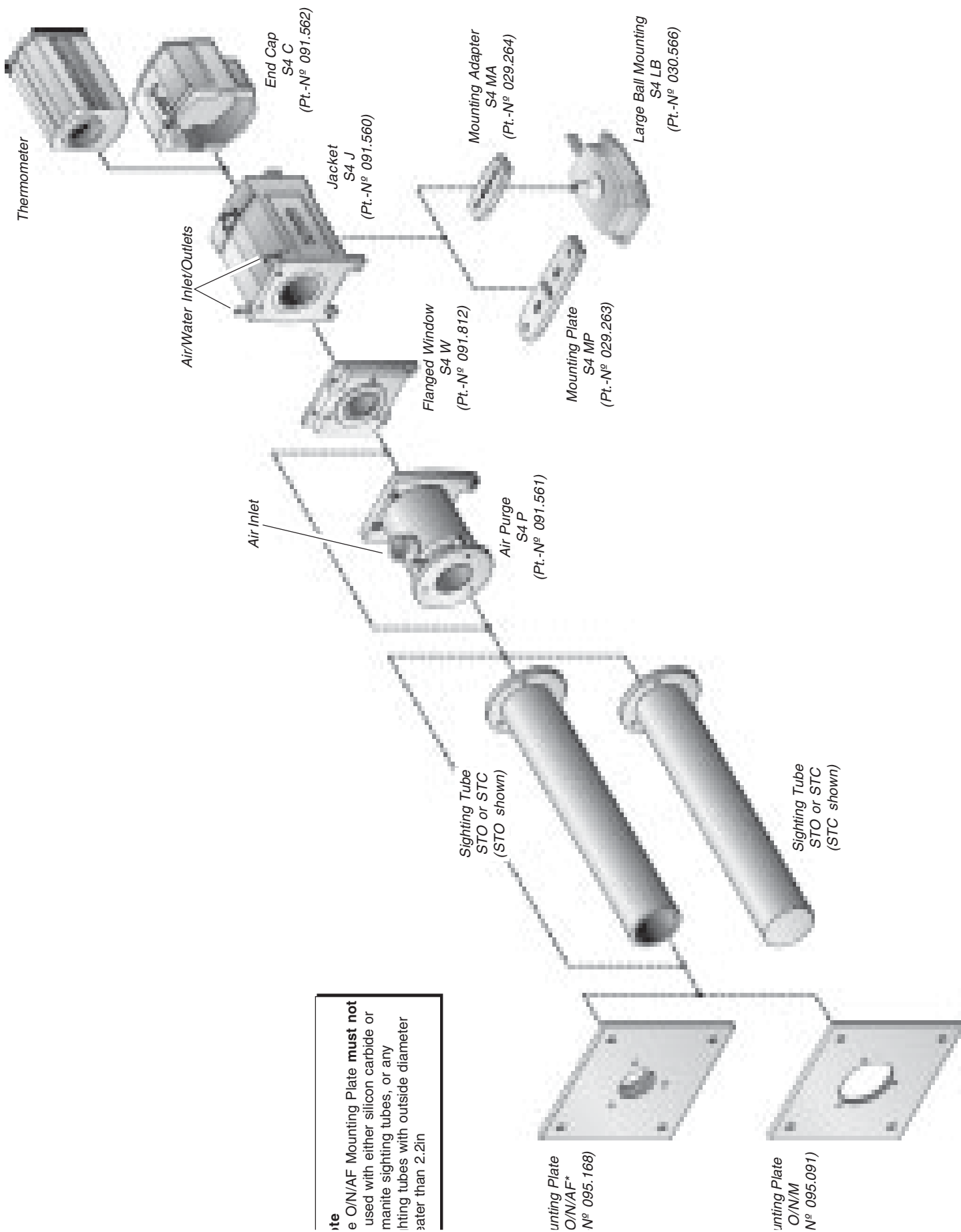
ING bank 66.30.63.795
SWIFT INGBNL2A
BTW NL 8107 90 166 B01

Tel. +31 (0)297 522 552
Fax +31 (0)297 526 252
E-mail solinas@solinas.nl

www.solinas.nl
www.solinas.be
KvK 280 83 073



INDUSTRIAL



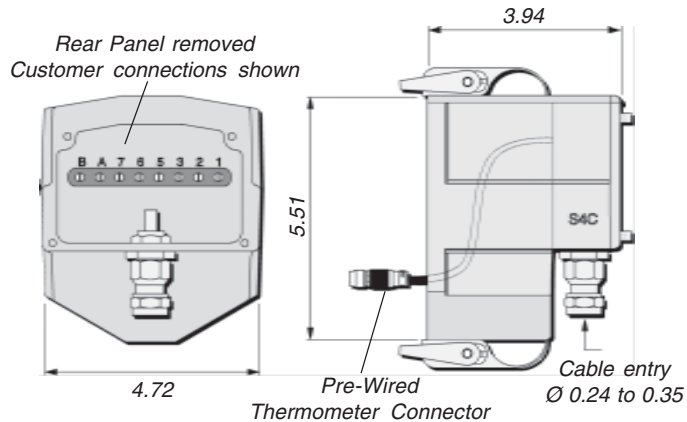
THERMOMETER COOLING JACKET, END CAP AND PURGE

End Cap S4 - C (Pt.No. 091.562)

The End Cap provides full environmental protection for the electrical connections to the thermometer. Customer connections are made to the terminal strip inside the cap. The pre-wired thermometer connector plug is integral to the cap.

Two Camlock fasteners secure the cap to the thermometer jacket for use in a hostile environment.

Weight: 3.42lb



Thermometer Connector (Pt.No. 029.673)

The thermometer connector is normally prewired and terminated in the end cap. A connector prewired to cable must be ordered if the user does not require an end cap.

Air Purge S4 - P (Pt.No. 091.561)

Air purge units use a stream of clean air to keep condensation, dirt and other deposits from the thermometer lens/window. The air stream also helps to disperse steam, fumes or smoke from immediately in front of the thermometer. The units are robust, trouble free and easily fitted between jacket and mounting plate or straight onto the jacket if a universal mounting is used. The only requirement is clean and dry air supply.

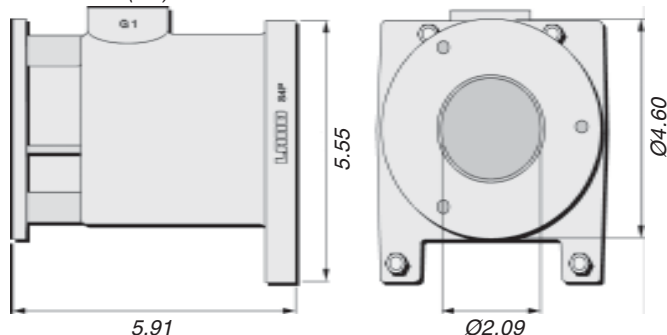
Inlet pressure: 350N/m² / 3.5mBar (0.05 psi)

Flow rate: 60l/min / 2cfm < 2cfm

Pipe thread: G1 (BS), for fan air supply

Weight: 3.2lb

Air Inlet G1(BS)/1in BSP



Cooling Jacket S4 - J (Pt.No. 091.560)

The cooling jacket contains an effective air or water cooling facility for use in environments where excessive heat may damage or affect the thermometer. The thermometer fits inside and is held in place by two retaining clips.

Water cooled: Flow $\leq$ 1 l/min / 0.2 Gal/min

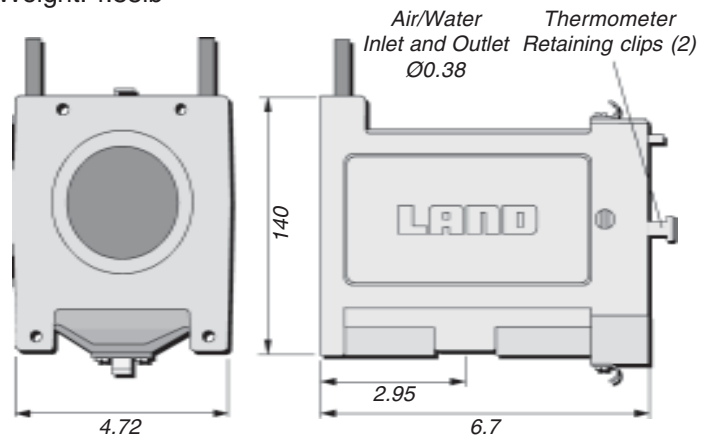
(exceeding the recommended flow may cause over-cooling leading to condensation problems)

Air cooled: Flow < 450 l/min / 16cfm

Maximum working pressure: 700kNm²/7Bar (100psi)

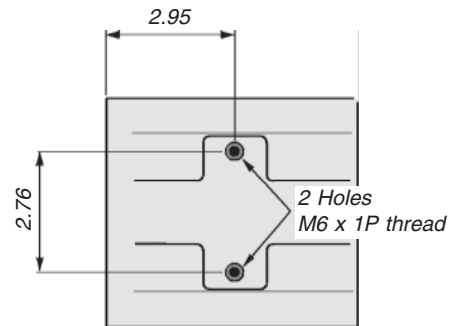
Plain pipe connections: Ø0.375

Weight: 4.85lb

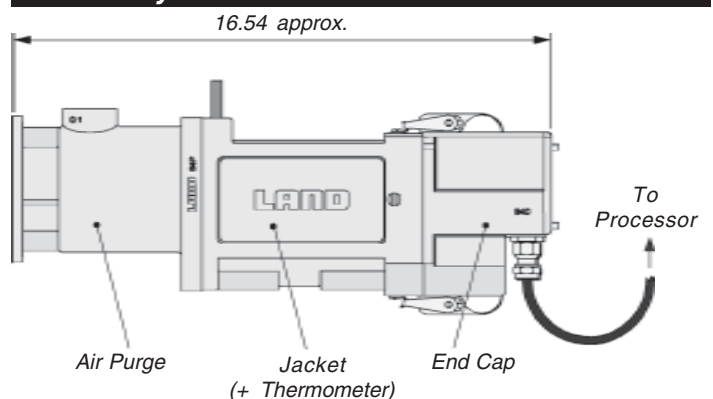


Mounting holes underside of S4 J Jacket

Two holes (M6 x 1P) in the base of the Cooling Jacket (S4 J) permit mounting directly to a flat surface or to an alternative mounting i.e. S4 MA or MP.



Assembly

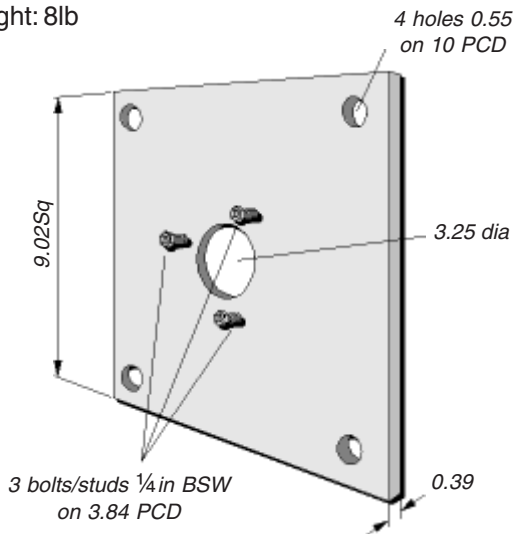


THERMOMETER MOUNTINGS AND BRACKETS

Mounting Plate O/N/M (Pt.No.095.091)

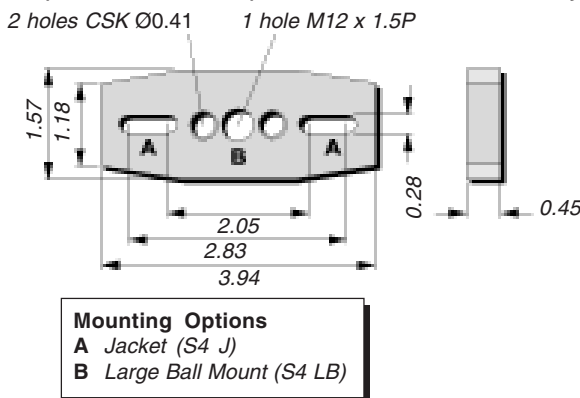
The mounting plate has four fixing holes, three studs for the jacket or purge, and a centre thermometer hole. It is ideal for mounting System 4 thermometer systems.

Weight: 8lb



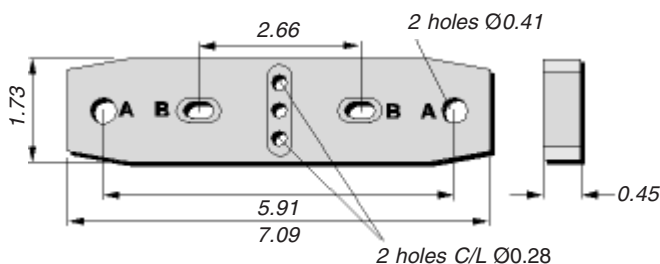
Mounting Adapter S4 MA (Pt.No. 029.264)

When the ball mounting is used with the cooling jacket this adapter provides a stable plate on which to attach the jacket.



Mounting Plate S4 MP (Pt.No. 029.263)

The mounting plate can be used to mount the jacket to a flat surface using holes A. It has holes at centers identical to those of the jacket (B). Two 1/4 inch BSW, 1/2 inch long screws (112.467) are supplied with the plate to secure it to the jacket.

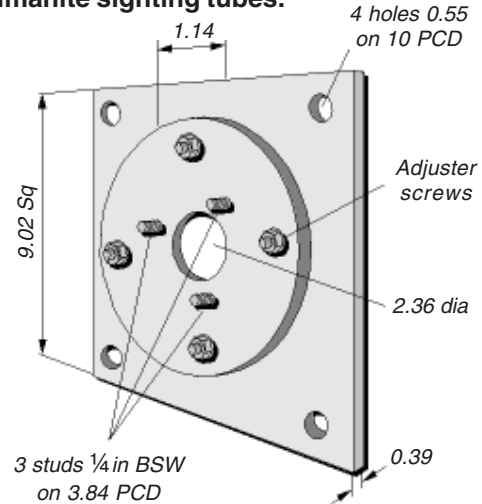


Mounting Options
A Mounting Holes

Adjustable Mounting Plate O/N/AF (Pt.No.095.168)

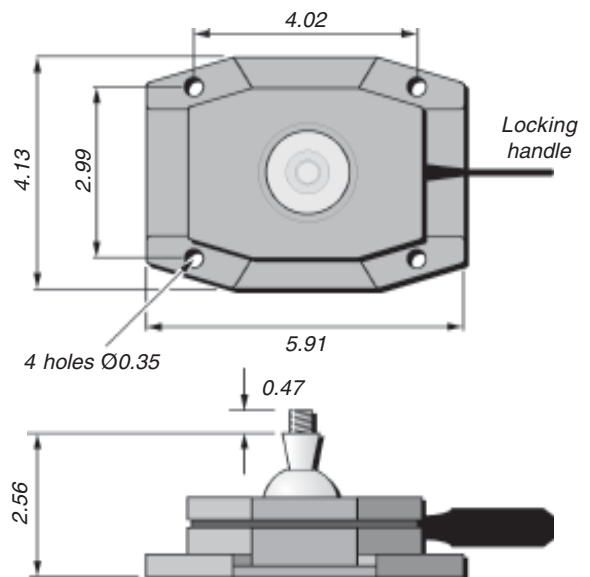
The jacket or purge fastens to a circular plate, which with the adjustment of four screws can move up to 7.5° with respect to the main plate. For use where accurate sighting is essential. Weight: 11lb

This plate is not suitable for use with either silicon carbide or sillimanite sighting tubes.



Large Ball Mounting S4 LB (Pt.No. 150.577)

The ball mounting is used with the Mounting adapter (S4 MA). Four holes permit fixing to flat surface. A locking handle secures the ball mount at the required orientation for accurate sighting.



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Postbus 563, 1420 CB Uithoorn
C. Verolmetaan 130, 1422 ZB Uithoorn
Nederland

ING bank 66.30.63.795
SWIFT INGBNL2A
BTW NL 8107 90 166 B01

Tel. +31 (0)297 522 552
Fax +31 (0)297 526 252
E-mail solinas@solinas.nl

www.solinas.nl
www.solinas.be
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Sighting Tubes

Sighting tubes are made from metal or refractory materials and are either open ended (Type STO) or closed (Type STC).

Type STO tubes are used when viewing a solid target through flame, smoke, fumes etc. The closed end of the type STC tube is used as the target. A thermometer used with an STC tube can replace a sheathed thermocouple.

To attach the sighting tubes to a mounting plate a steel adapter (Type STA) is cemented into refractory sighting tubes. The STA is drilled to fit the studs on the mounting plate (O/N/M).

Replacement Sighting Tubes can be purchased without the STA adapter fitted. Contact Land Infrared for details.

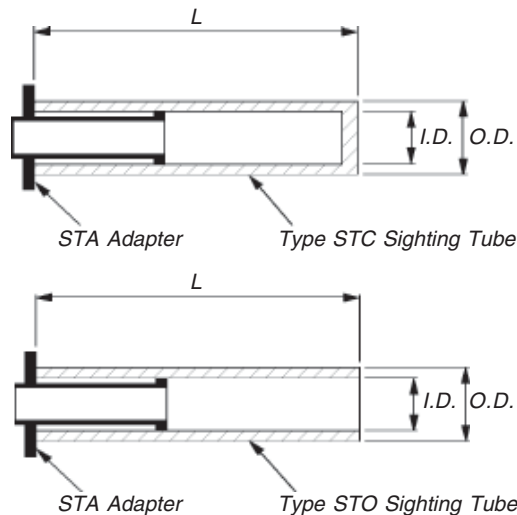
There are 3 types of tube material with varying lengths. For exact dimensions and ordering references please refer to the table adjacent.

Silicon Carbide Tubes (STO & STC)

These are either open ended or closed, and can be used in temperatures up to 2700°F/1500°C. They have high mechanical strength, good resistance to thermal shock and very high thermal conductivity.

Sillimanite Tubes (STO only)

These are suitable for use in temperatures up to 2800°F/1550°C and are fairly resistant to thermal shock. Sillimanite liner tubes are also available.



Stainless Steel Tubes

A low temperature tube for use up to a maximum of 1470°F/800°C. The exact temperature will depend upon length and operating conditions. Used mainly to protect the thermometer window from physical damage and to direct purge air along the sight path. Stainless Steel sighting tubes come complete with own type F adapter.



Sighting Tube Information

Type	Dimensions in			Adapter Type	Part No.
	L	OD	ID		
Silicon Carbide STC	17.7	3.0	2.5	STA	091.410
	23.6	3.0	2.5	STA	091.411
	29.5	3.0	2.5	STA	091.412
	35.4	3.0	2.5	STA	091.413
	41.3	3.0	2.5	STA	091.414
Silicon Carbide STO	17.7	3.0	2.5	STA	091.415
	23.6	3.0	2.5	STA	091.416
	29.5	3.0	2.5	STA	091.417
	35.4	3.0	2.5	STA	091.418
	41.3	3.0	2.5	STA	091.419
Sillimanite STO	23.6	2.75	2.4	STA	091.420
	29.5	2.75	2.4	STA	091.421
	35.4	2.75	2.4	STA	091.422
	41.3	2.75	2.4	STA	091.423
	47.2	2.75	2.4	STA	091.424
Sillimanite liner tubes	14.0	3.74	3.2	-	118.270
	20.0	3.74	3.2	-	118.271
Stainless Steel FS6	6.0	2.25	2.12	F	091.458
	36.0	2.25	2.12	F	N/S

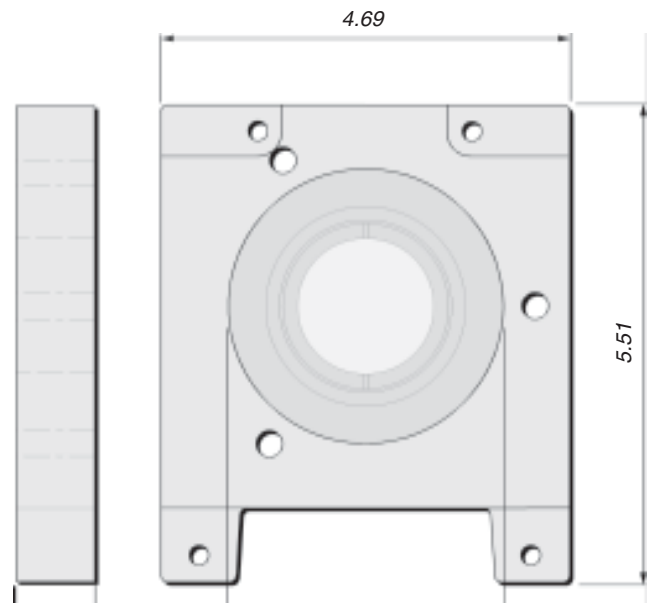
Window Assembly S4 W (Pt.No.091.812)

The Window Assembly is required for use on pressure vessels, vacuum furnaces and other applications where controlled atmospheres are encountered. Refer to Land Infrared for suitability in a particular application.

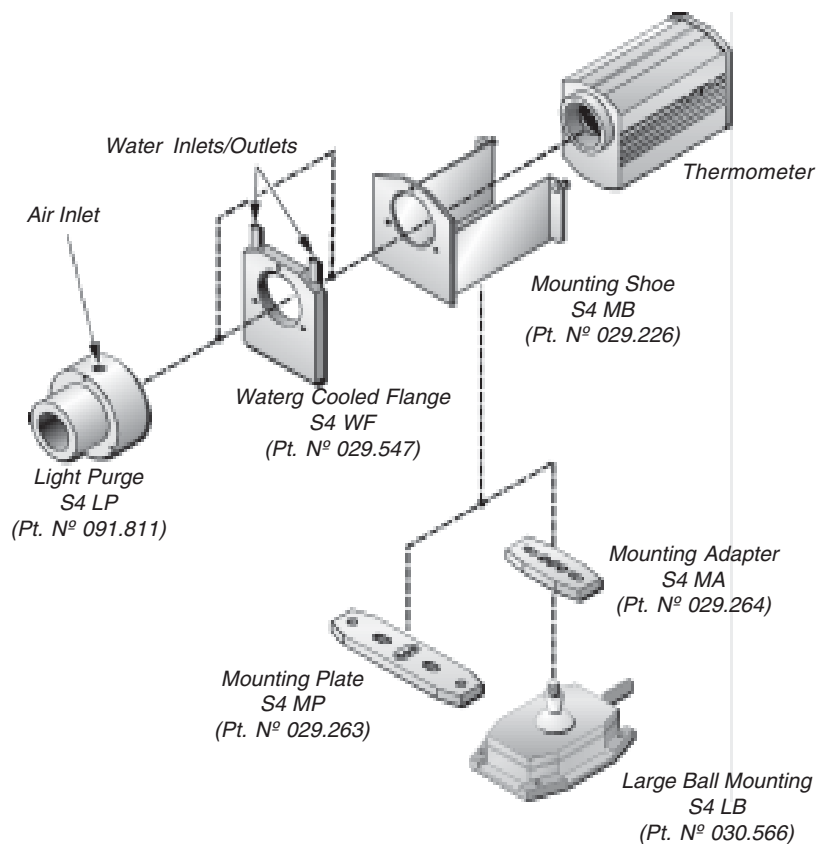
Two versions are available:-

- S4 W (Quartz) Pt. No. 091.812
For System 4 M1, M2, M4 thermometers
- S4 W (Fluorite) Pt. No. 092.519
For System 4 M5, M6, M7 thermometers and UNO U5 thermometers

Replacement seals: Pt. No. 001.431



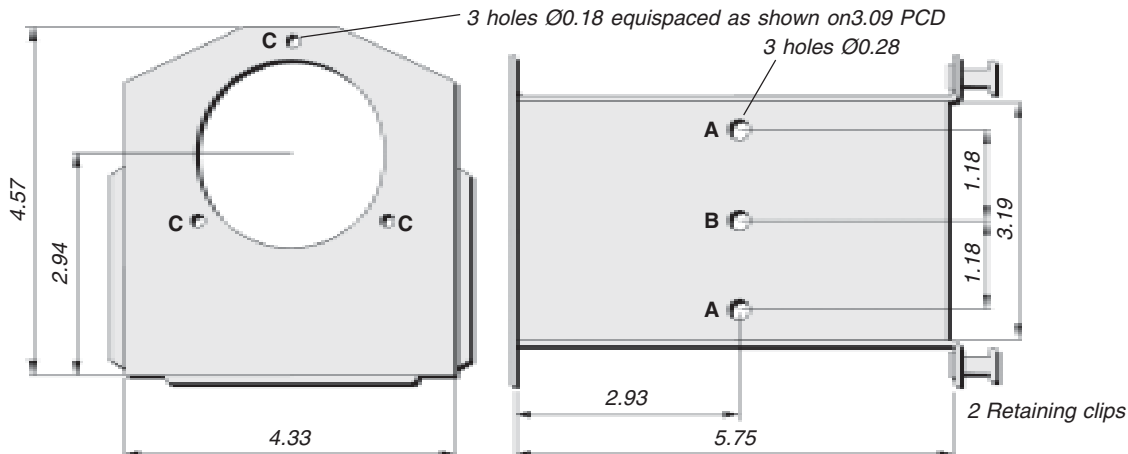
NON - HOSTILE



THERMOMETER MOUNTINGS AND ACCESSORIES

Mounting Shoe S4 MB (Pt. No. 029.226)

The thermometer is held inside the Mounting Shoe using retaining clips similar to those on the S4 J jacket. The holes on the front permit mounting of the S4 LP purge or S4 WF flange.



Mounting Options

A Mounting Plate (S4 MP)/Mounting Adapter (S4 MA)

B Thermometer Base (To secure only)



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Nederland

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SWIFT INGBNL2A
BTW NL 8107 90 166 B01

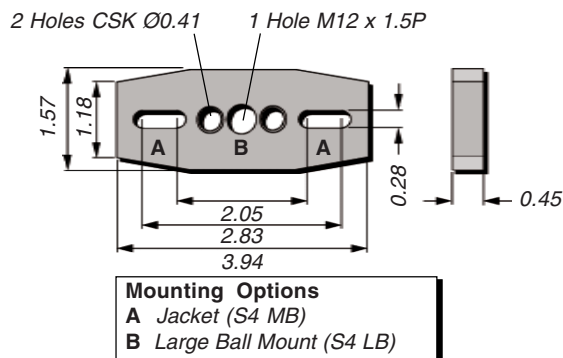
Tel. +31 (0)297 522 552
Fax +31 (0)297 526 252
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www.solinas.be
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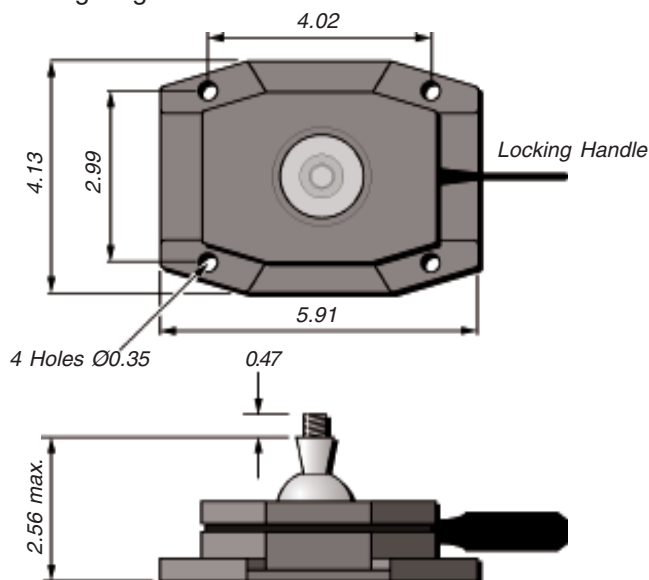
Mounting Adapter S4 MA (Pt.No. 029.264)

When the ball mounting is used with the mounting shoe (S4 MB), this adapter provides a stable plate on which to attach the shoe.



Large Ball Mounting S4 LB (Pt.No. 150.577)

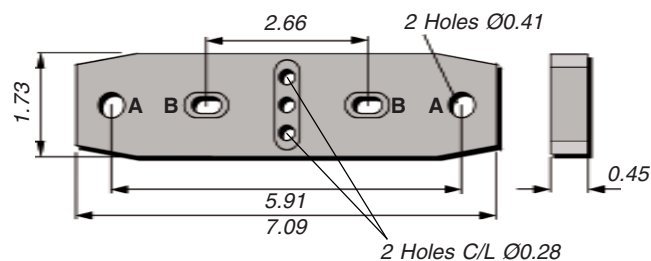
The large ball mounting attaches to the thermometer using the mounting adapter (S4 MA using Mounting Option B). Four holes (Ø0.35) permit fixing to a flat surface. A locking handle secures the ball mount at the required orientation for accurate sighting.



Mounting Plate S4 MP (Pt.No. 029.263)

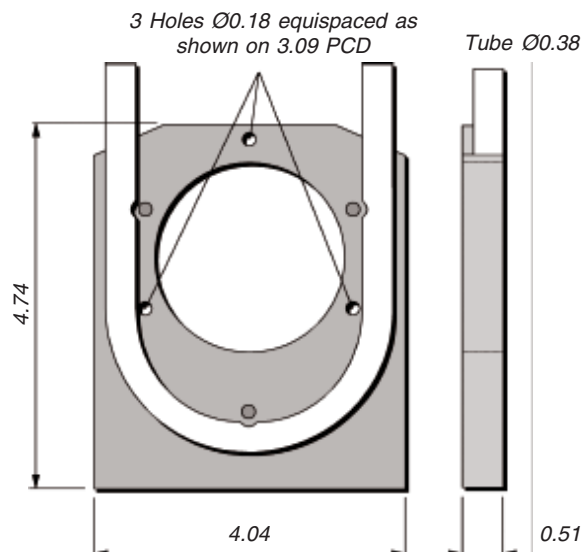
The mounting plate can be used to mount the shoe to a flat surface. It has three sets of mounting holes as specified below.

Two ¼in BSW, ½in long screws (112.467) are supplied with the plate to secure it to the shoe.



Water cooled flange S4 WF (Pt. No. 029.547)

Some applications do not require the strong physical protection and high efficiency cooling of the S4 J jacket, but some cooling may still be necessary to protect the thermometer. In these circumstances the water-cooled flange is recommended. It is mounted to the front face of the mounting shoe, and will ensure that the internal temperature of the thermometer does not exceed the recommended operating temperature upper limit. Water flow: <1 l/min / 13 Gal/hr
 Pipe connections: Ø0.375



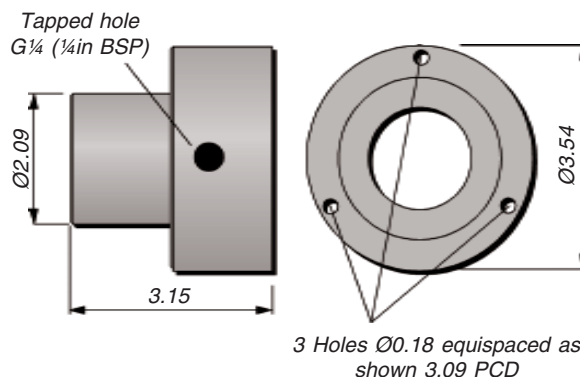
Light Purge S4 LP (Pt.No. 091.811)

This small, highly efficient purge attaches to the mounting shoe (S4 MB) and is used to keep the thermometer lens/window clean.

Inlet pressure: 3750N/m²

Flow rate: 140 l/min

Hole: G¼ (¼in BSP)



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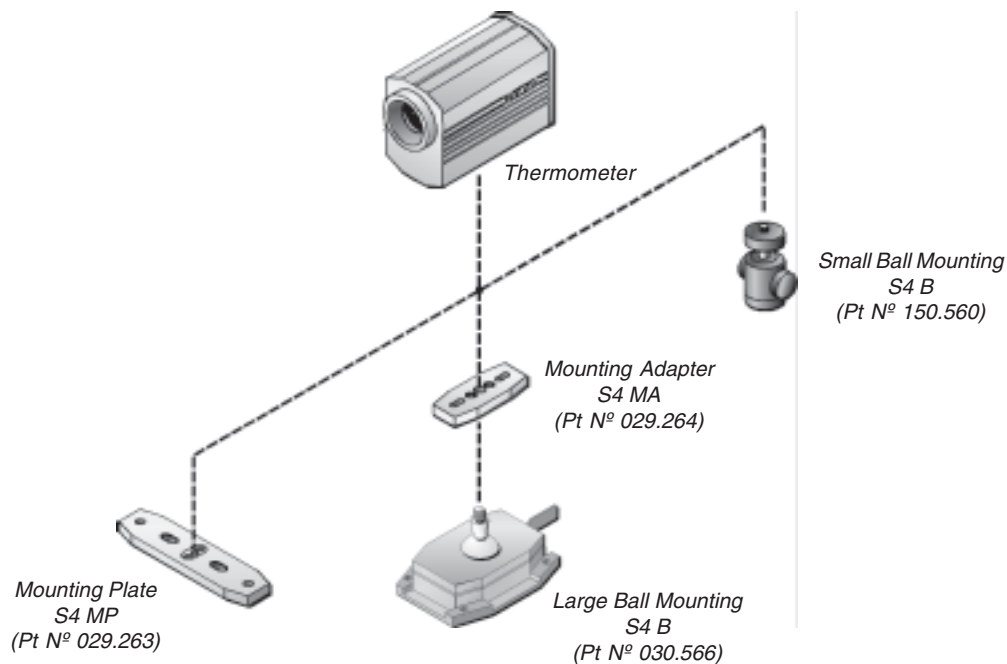
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 SWIFT INGBNL2A
 BTW NL 8107 90 166 B01

Tel. +31 (0)297 522 552
 Fax +31 (0)297 526 252
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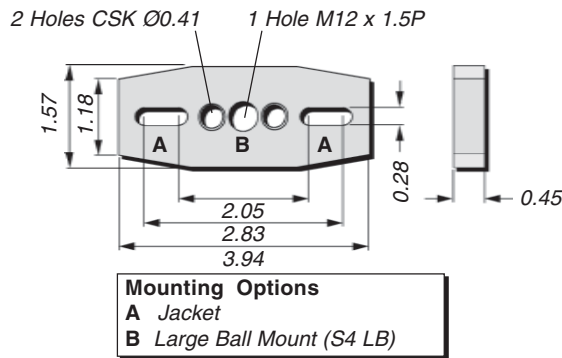
LABORATORY



THERMOMETER MOUNTINGS AND ACCESSORIES

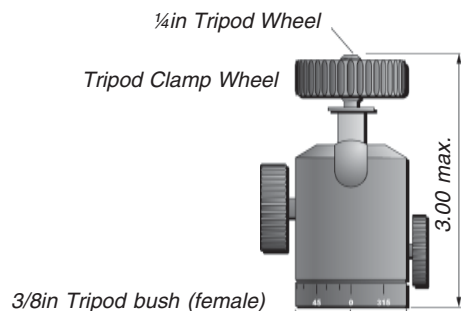
Mounting Adapter S4 MA (Pt.No. 029.264)

When the ball mounting is used with the thermometer this adapter fits to the thermometer base (A) using the screws provided, and couples using the centre hole (B) to the Large Ball Mounting (S4 LB). Two ¼in BSW, ½in long r/head screws (112.467) are supplied with the adapter to secure it to the thermometer.



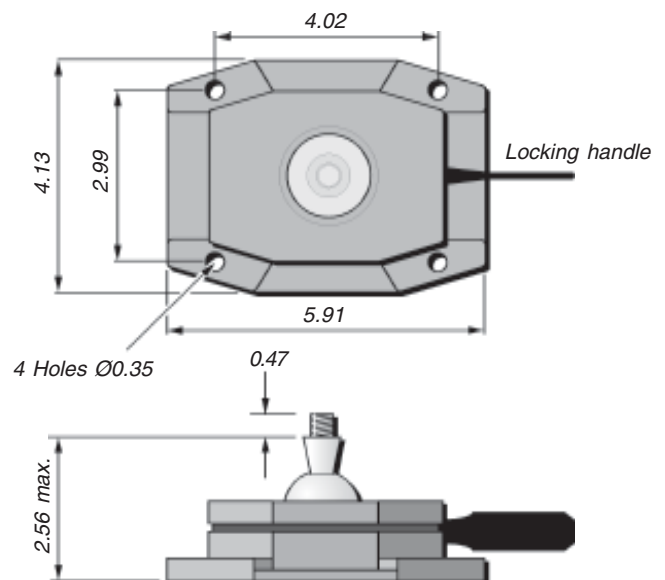
Small Ball Mounting S4 B (Pt.No.150.560)

The S4 B can be used with the thermometer only, for accurate sighting. It is identical to a standard tripod mounting.



Large Ball Mounting S4 LB (Pt.No.150.577)

The large ball mounting attaches to the thermometer using the mounting adapter (S4 MA using Mounting Option B). Four holes (Ø0.35) permit fixing to a flat surface. A locking handle secures the ball mount at the required orientation for accurate sighting.



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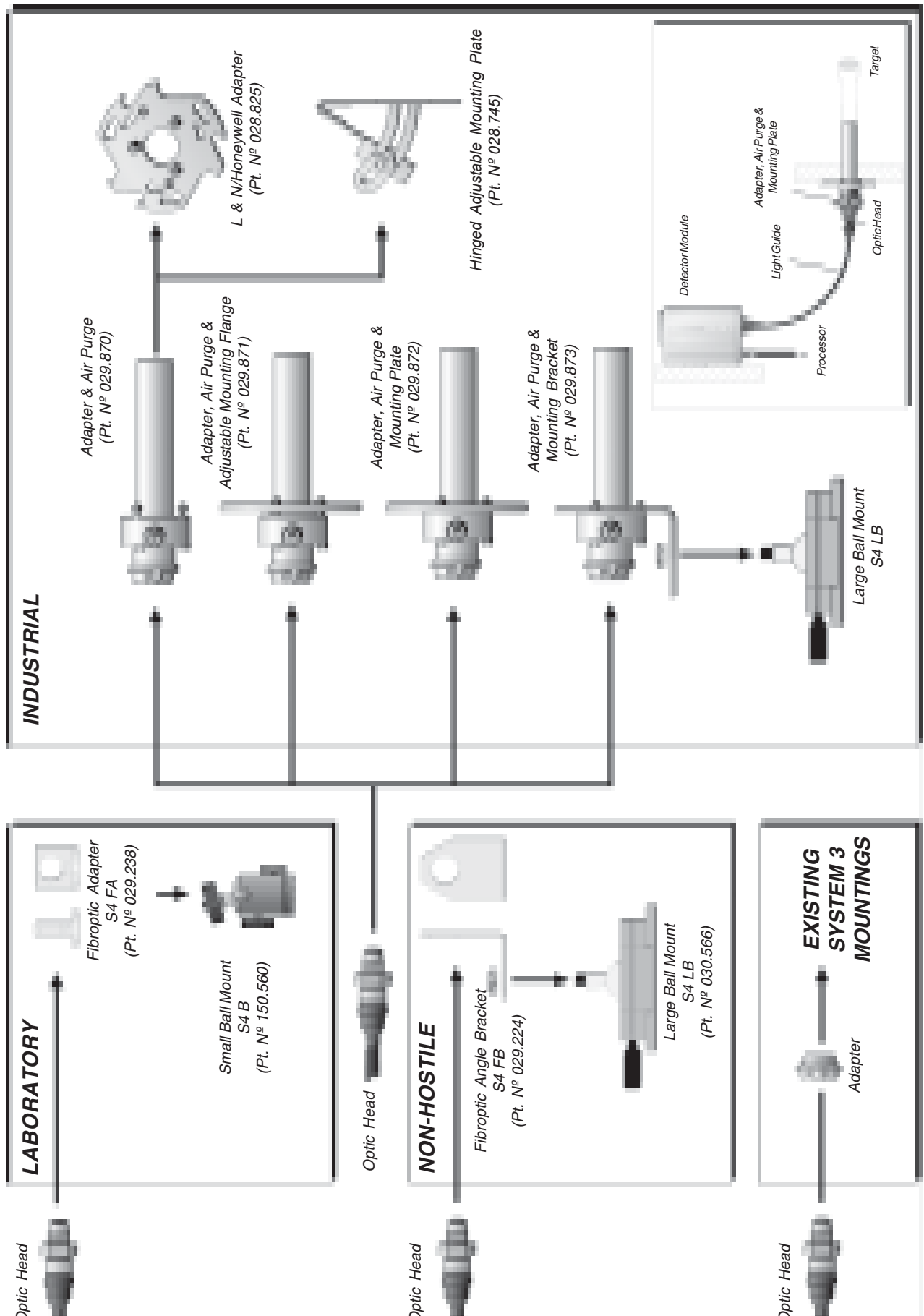
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SWIFT INGBNL2A
BTW NL 8107 90 166 B01

Tel. +31 (0)297 522 552
Fax +31 (0)297 526 252
E-mail solinas@solinas.nl

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SWIFT INGBNL2A
BTW NL 8107 90 166 B01

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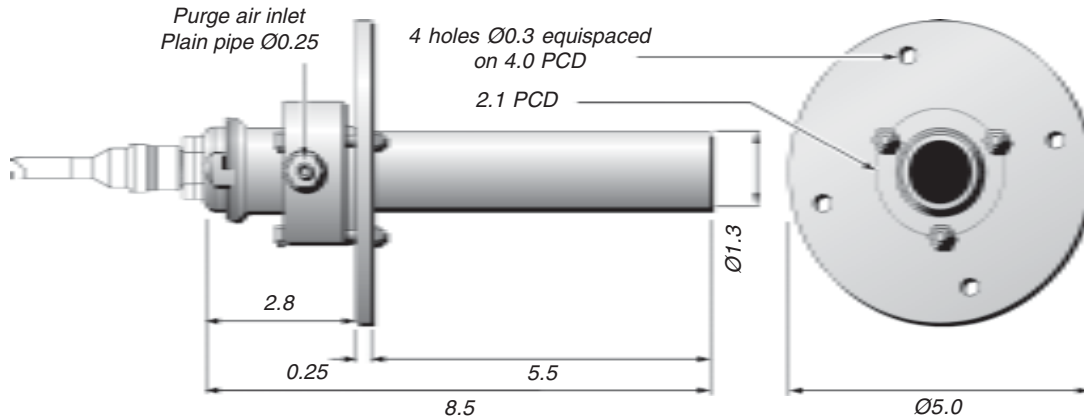


INDUSTRIAL

Quick Release Adapter, Air Purge & Adjustable Mounting Flange (Pt.No. 029.871)

The adapter, air purge and adjustable mounting flange assembly attaches to the optic head, and provides a mounting using the four holes through the circular plate. Three studs link the main plate to a smaller plate which provide adjustment to ensure accurate alignment on to the target surface; particularly useful when sighting onto a small target. The quick-release adapter which forms an integral part of this assembly allows rapid, no tools removal of the optic head for routine maintenance.

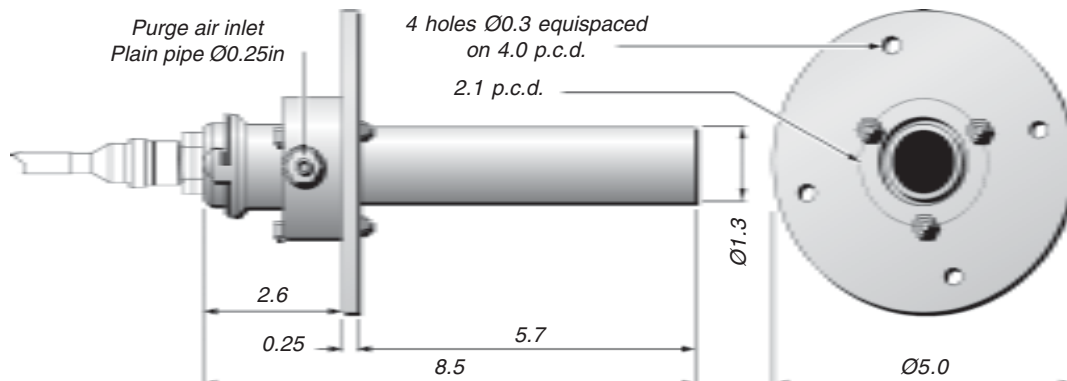
Air purge flow rate: 60 litre/min (2.12ft³/min), Air purge pressure: 0.1 Atmosphere (0.1bar)



Adapter, Air Purge & Mounting Plate (Pt.No. 029.872)

The adapter, air purge and mounting plate assembly attaches to the optic head, and provides a mounting using the four holes through the circular plate. The quick-release adapter which forms an integral part of this assembly allows rapid, no tools removal of the optic head for routine maintenance.

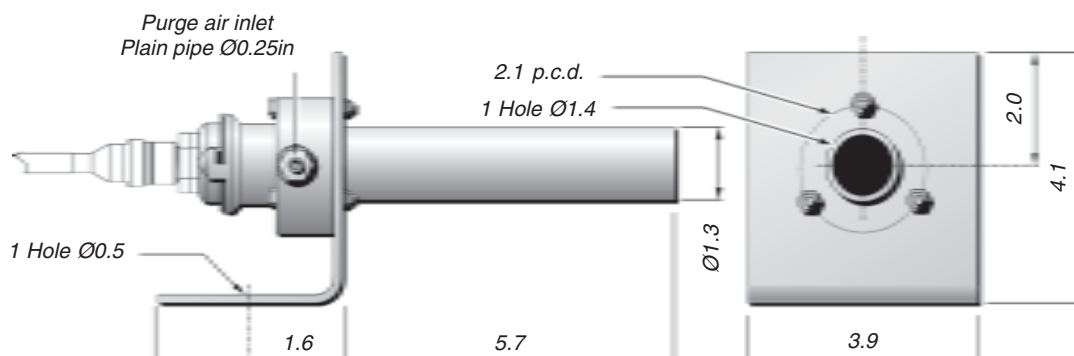
Air purge flow rate: 60 litre/min (2.12ft³/min), Air purge pressure: 0.1 Atmosphere (0.1bar)



Adapter, Air Purge & Mounting Bracket (Pt.No. 029.873)

The adapter, air purge and mounting bracket assembly attaches to the optic head, and provides mounting using the single hole in the base of the bracket. Alternatively, the bracket will attach to the large ball-mounting (S4 LB) to provide adjustment to ensure accurate alignment on to the target surface; particularly useful when sighting onto a small target. The quick-release adapter which forms an integral part of this assembly allows rapid, no tools removal of the optic head for routine maintenance.

Air purge flow rate: 2.12ft³/min, Air purge pressure: 0.1 Atmosphere (0.1bar)



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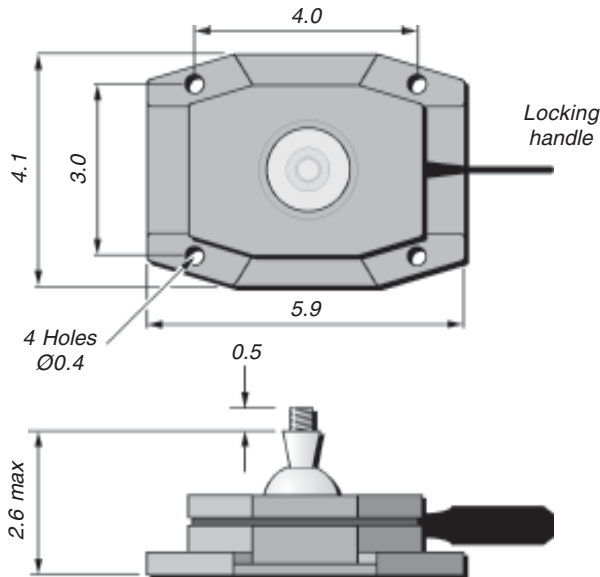
Tel. +31 (0)297 522 552
Fax +31 (0)297 526 252
E-mail solinas@solinas.nl

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Large Ball Mounting S4 LB (Pt.No.150.577)

The ball mounting can be used with either the mounting bracket assembly (029.873) or the fibroptic angle bracket (S4 FB) to provide adjustable mounting for accurate sighting. A locking handle secures the ball mount at the required orientation.

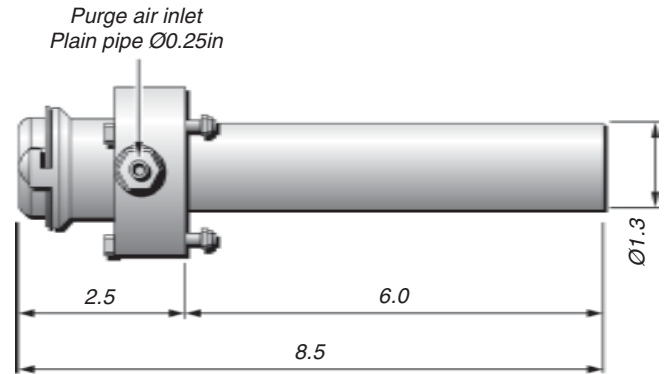


Quick Release Adapter & Air Purge (Pt.No. 028.870)

The air purge is used where a clear sight path has to be maintained, by using the purging air to maintain the lens free from dust, dirt etc. The purge connects to the optic head with a quick-release adapter (supplied) which allows rapid, no tools removal of the optic head for routine maintenance. The purge is secured on the installation using either a mounting adapter or plate (see below).

Air purge flow rate: 60 litre/min (2.12ft³/min)

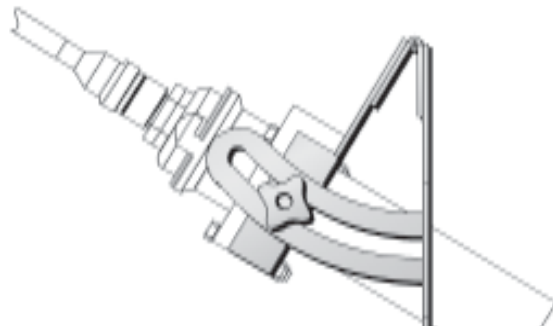
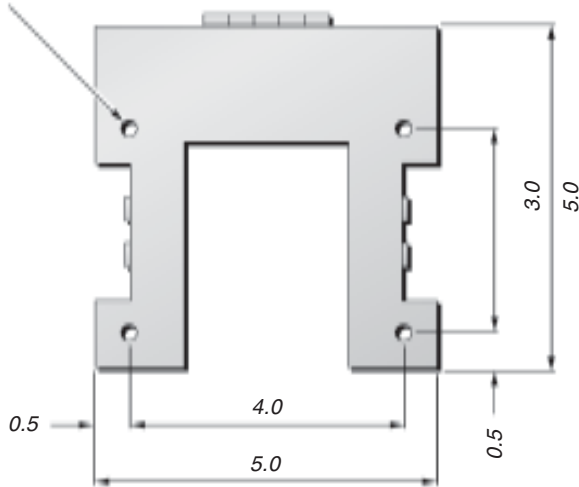
Air purge pressure: 0.1 Atmosphere (0.1bar)



Hinged Adjustable Mounting Plate (Pt.No. 028.745)

The hinged adjustable mounting plate enables the head/adapter/purge assembly to be mounted securely at a fixed location. It has 45° adjustment for accurate sighting onto the target and can be easily adjusted at any time.

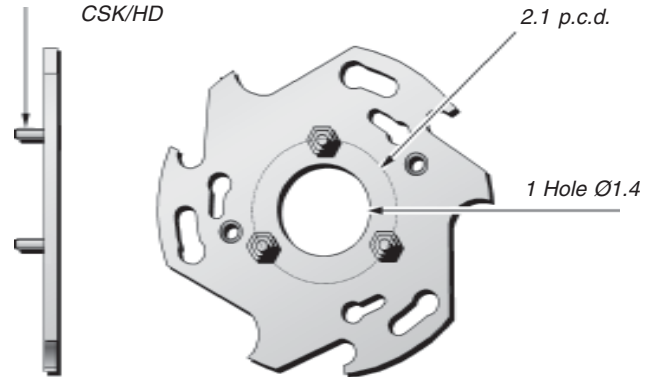
4 Holes Ø0.3



L&N/Honeywell Adapter (Pt.No. 028.825)

This adapter permits the optic head/adapter/purge assembly to be mounted (using the range of holes and slots provided) onto existing thermometer mountings (including competitors) or to a convenient structure for sighting the measurement target area.

3 Screws M4 x 0.39
CSK/HD



Quick Release Adapter (Pt.No. 029.591)

The quick release adapter allows no tools removal of the optic head from the air purge or mounting for routine maintenance. It permits a System 4 optic head to be mounted onto existing System 3 mountings.



Solinas
BENELUX BY

Postbus 563, 1420 CB Uithoorn
C. Verolmetaan 130, 1422 ZB Uithoorn
Nederland

ING bank 66.30.63.795
SWIFT INGBNL2A
BTW NL 8107 90 166 B01

Tel. +31 (0)297 522 552
Fax +31 (0)297 526 252
E-mail solinas@solinas.nl

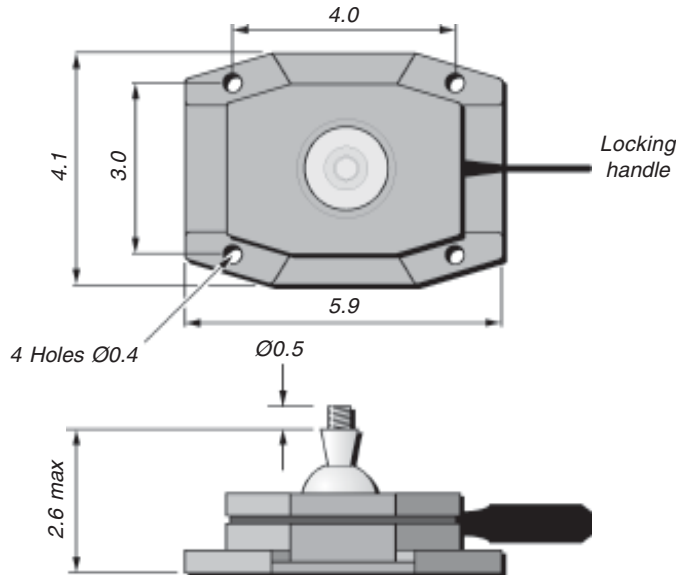
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www.solinas.be
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NON-HOSTILE

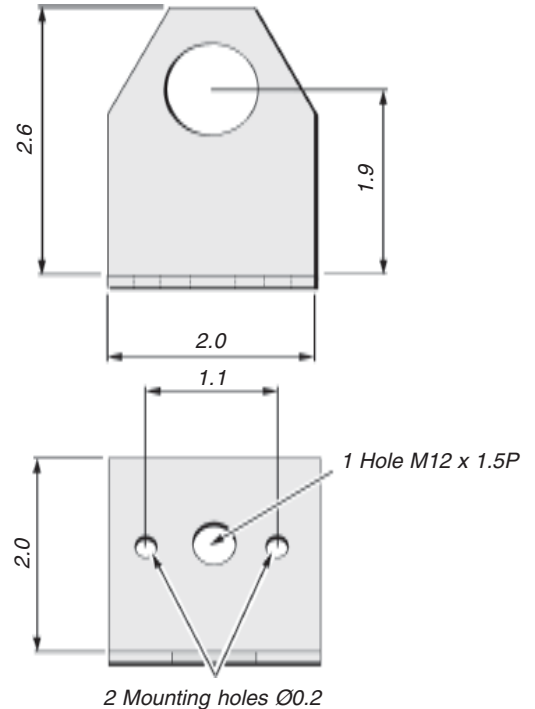
Large Ball Mounting S4 LB (Pt.No.150.577)

The ball mounting is used with the Fibroptic Angle Bracket (S4 FB) to provide adjustable mounting for accurate sighting. Four holes (Ø0.35) permit fixing to a flat surface. A locking handle secures the ball mount at the required orientation.



Fibroptic Angle Bracket S4 FB (Pt.No.029.224)

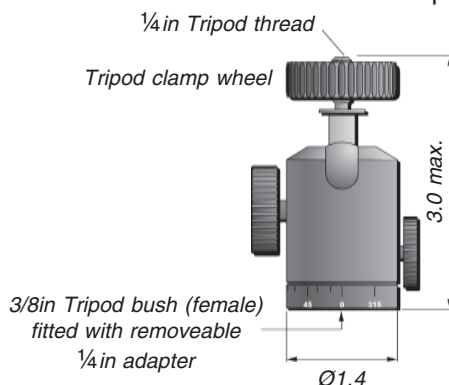
The Fibroptic Angle Bracket enables the optic head to be mounted either as a stand-alone in applications which require no purging, protection or special mounting considerations; or with the Large Ball Mounting (S4 LB) where accurate sighting is essential.



LABORATORY

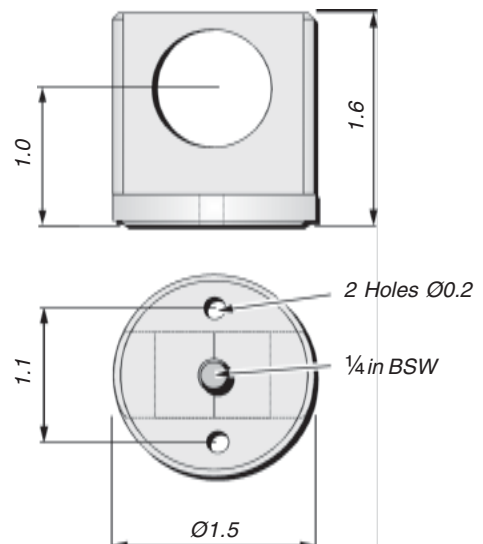
Small Ball Mounting S4 B (Pt.No. 150.560)

The S4 B is used with the Fibroptic Adapter (S4 FA) for mounting the optic head only, where accurate sighting is essential. It is identical to a standard tripod mounting.



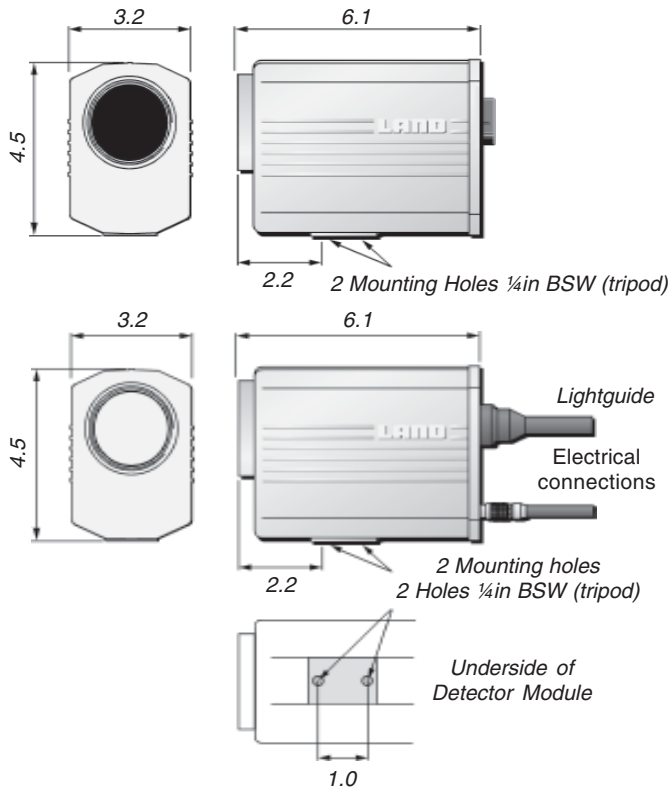
Fibroptic Adapter S4 FA (Pt.No.029.238)

The Fibroptic Adapter enables the optic head to be mounted as a stand-alone, in applications which require no purging, protection or special mounting considerations. A single 1/4 in thread bolt hole can attach to the Small Ball Mounting (S4 B) or a standard tripod mounting. Two further holes in the base permit mounting to a flat surface.



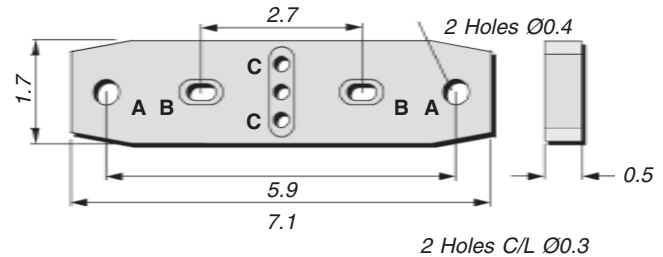
Thermometer and Detector Module

The thermometer and detector module has two holes on the underside. It will mount directly onto a tripod or the Small Ball Mounting (S4 B); or can be used with the Large Ball Mounting (S4 LB) with the Mounting Adapter (S4 MA); or fixed to a flat surface using the Mounting Plate (S4 MP).



Mounting Plate S4 MP (Pt.No. 029.263)

The mounting plate attaches to the thermometer or detector module using holes C, and mounts to a flat surface using holes A or B. It is supplied with two screws (1/4in BSW, 1/2in long screws, 112.467) to fit the thermometer base.



Mounting Options

- A Mounting holes
- B Mounting holes
- C Detector module base

AIR SUPPLY SYSTEMS

Air purges use a stream of air to disperse dust and fumes from the thermometer sight path and to prevent dirt settling on the lens or window.

Clean dry air must be supplied to the purges, and jackets with integral purge and a diffuser.

Any foreign material in the air supply will potentially block the diffuser, reduce the purge efficiency and deposit material on the lens or window.

To achieve the necessary cleanliness standards, the air system should be designed to recommended guidelines. A filter system should be fitted in every air line which feeds a purge.

LAND can supply an automatic drain air filter system with optional low flow alarm for use with correctly engineered compressed air systems.

A relatively clean, dry compressed air supply of 25 to 150 lb/in²/1.75 to 10.5 kg/cm² is required for use with the system A/A air filter system.

System A/A (LF and HF)

There are two types of restrictor available; low flow (LF) and high flow (HF). Low Flow (LF) is for use when only purging is required, the high flow (HF) when both purging and cooling are required.

The optional flow alarm detects a low flow rate. This can be

System A/A/LF (Pt. No. 004.449)

System A/A/LF with Low flow alarm (Pt. No. 003.939)

System A/A/HF (Pt. No. 004.450)

System A/A/HF with Low flow alarm (Pt. No. 003.940)

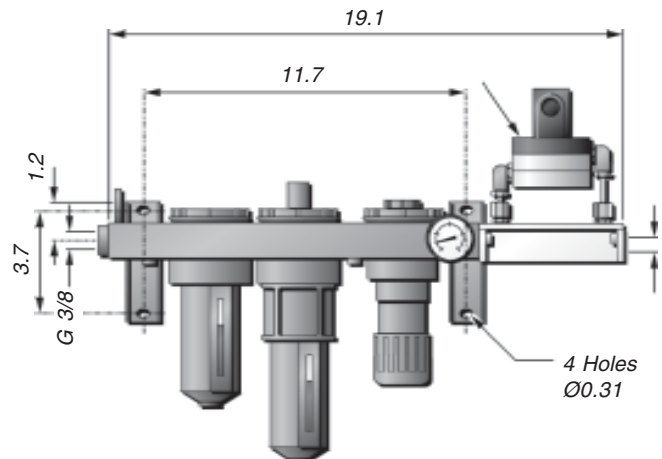
Fixing Details

The following are pipe dimensions recommended for use with the A/A system:

3/8in dia. bore up to 7m/23ft long

1/2in dia. bore 7m to 27m/23ft to 90ft long

3/4in dia. bore 27m to 210m/90ft to 700ft long



For more than 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

Expert advice and support is never far away

APPLICATIONS

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

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

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.



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

The Quality Management System of Land Instruments International Ltd. Is approved to BS EN ISO9001:2000 for the design and manufacture, stockholding, in-house repair and site servicing of non contact temperature measuring instrumentation. Associated software designed and developed in accordance with TickIT. Calibration certificates are available from our UKAS accredited Calibration Laboratory No. 0034. The Land calibration laboratory complies with the requirements of the international standard BS EN/IEC 17025.



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Infrared Temperature Measurement

Land Instruments International • Dronfield S18 1DJ • England • Tel: (01246) 417691 • Fax: (01246) 410585
Email: infrared.sales@landinst.com • Internet: www.landinst.com

Land Instruments International • 10 Friends Lane • Newtown, PA 18940-1804 • U.S.A. • Tel: (215) 504-8000
Fax: (215) 504-0879 • Email: irsales@landinstruments.net • Internet: www.landinstruments.net

France
Land Instruments Sarl
Tel: (1) 34 62 05 45 • Fax: (1) 30 56 51 12
Email: commercial@landinst.fr

Japan
Land KK

Germany
Land Instruments GmbH
Tel: 02171/7673-0 • Fax: 02171/7673-9
Email: infrarot@landinst.de

Spain
Land Instruments International

Italy
Land Instruments Srl
Tel: 02/99040423 • Fax: 02/99040418
Email: infrared@landinst.it

Mexico
Land Instruments International



Solinas

Postbus 563, 1420 CB Uithoorn
C. Verolmetaan 130, 1422 ZB Uithoorn
Nederland

ING bank 66.30.63.795
SWIFT INGBNL2A
BTW NL 8107 90 166 B01

Tel. +31 (0)297 522 552
Fax +31 (0)297 526 252
E-mail solinas@solinas.be

www.solinas.nl
www.solinas.be
KvK 280 83 073

