



***FLT5B***  
***Thermometer***

***User Guide***

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### Health and Safety Information



Read all of the instructions in this booklet - including all the **WARNINGS** and **CAUTIONS** - *before* using this product. If there is any instruction which you do not understand, **DO NOT USE THE PRODUCT.**

### Safety Signs



#### WARNING

Indicates a potentially hazardous situation which, if not avoided, could result in death or personal injury.



#### CAUTION

Indicates a potentially hazardous situation which, if not avoided, could result in minor or moderate injury to the user or users, or result in damage to the product or to property.

#### NOTE

Indicates a potentially hazardous situation which, if not avoided, could result in damage or loss of data.

### Signs and Symbols used on equipment and Documentation



Caution, risk of electric shock.



Caution, attention to possibility of risk of damage to the product, process or surroundings. Refer to instruction manual.



Caution, hot surface.



Protective Conductor Terminal.



Observe precautions for handling electrostatic discharge sensitive devices.

### Equipment Operation

Use of this instrument in a manner not specified by AMETEK Land may be hazardous. Read **and understand** the user documentation supplied **before** installing and operating the equipment.

The safety of any system incorporating this equipment is the responsibility of the assembler.

### Protective Clothing, Face and Eye Protection

It is possible that this equipment is to be installed on, or near to, machinery or equipment operating at high temperatures and high pressures. Suitable protective clothing, along with face and eye protection must be worn. Refer to the health and safety guidelines for the machinery/equipment before installing this product. If in doubt, contact AMETEK Land.



Wear Protective Gloves



Wear Protective Clothing



Wear Eye Protection



Wear Ear Protection



Wear Safety Boots



Wear Face Protection

### Electrical Power Supply

Before working on the electrical connections, all of the electrical power lines to the equipment must be isolated. All the electrical cables and signal cables must be connected exactly as indicated in these operating instructions. If in doubt, contact AMETEK Land.

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For further details on all AMETEK Land offices, distributors and representatives, please visit our website.

## Storage

The instrument should be stored in its packaging, in a dry sheltered area.

The maximum storage temperature is 10°C (18°F) higher than the maximum operating temperature.

The minimum storage temperature is 10°C (18°F) lower than the minimum operating temperature.

Refer to the Technical Specification for details of the operating temperature limits.

## Unpacking

Check all packages for external signs of damage. Check the contents against the packing note.

## Lifting Instructions

Where items are too heavy to be lifted manually, use suitably rated lifting equipment. Refer to the Technical Specification for weights. All lifting should be carried out in accordance with local and national regulations.

## Return of Damaged Goods

**IMPORTANT** If any item has been damaged in transit, this should be reported to the carrier and to the supplier immediately. Damage caused in transit is the responsibility of the carrier not the supplier.

**DO NOT RETURN** a damaged instrument to the sender as the carrier will not then consider a claim. Save the packing with the damaged article for inspection by the carrier.

## Return of Goods for Repair

If you need to return goods for repair please contact our Customer Service Department for details of the correct returns procedure.

Any item returned to AMETEK Land should be adequately packaged to prevent damage during transit.

You must include a written report of the problem together with your own name and contact information, address, telephone number, email address etc.

## Design and Manufacturing Standards

The Quality Management System of Land Instruments International is approved to BS EN ISO 9001 for the design, manufacture and on-site servicing of combustion, environmental monitoring and non-contact temperature measuring instrumentation.

Registered ISO9001 Management System approvals apply in the USA.

UK Calibration Laboratory: UKAS 0034.

USA Calibration Laboratory: ANAB Accredited ISO/IEC 17025.

National Accreditation Board for Testing and Calibration Laboratories approvals apply in India.

Operation of radio transmitters, telephones or other electrical/electronic devices in close proximity to the equipment while the enclosure doors of the instrument or its peripherals are open, may cause interference and possible failure where the radiated emissions exceed the EMC directive.

The protection provided by this product may be invalidated if alterations or additions are made to the structural, electrical, mechanical, pneumatic, software or firmware components of this system. Such changes may also invalidate the standard terms of warranty.

## Copyright

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# 1 Introduction

## 1.1 About this guide

This guide gives the information necessary for you to operate a LAND **FLT5B** Thermometer. Basic information regarding installation is contained within the Installation Guide. More detailed information regarding servicing, repair and calibration of the thermometer is contained in the Service Manual.

## 1.2 About the **FLT5B** thermometer

The LAND **FLT5B** thermometer is a highly accurate, non contact thermometer designed for independent or STAND ALONE use.

The thermometer features include:

- Stand Alone operation.
- Adjustable response speed.
- 4 to 20mA loop powered, output linear over the temperature span of the thermometer.
- Built in Emissivity controls.



Fig. 1 Land **FLT5B** Thermometer

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The LAND **FLT5B** thermometer is designed to provide precise, non contact temperature measurement in float line applications.

A comprehensive range of mountings and accessories is available, see Section 4.0.

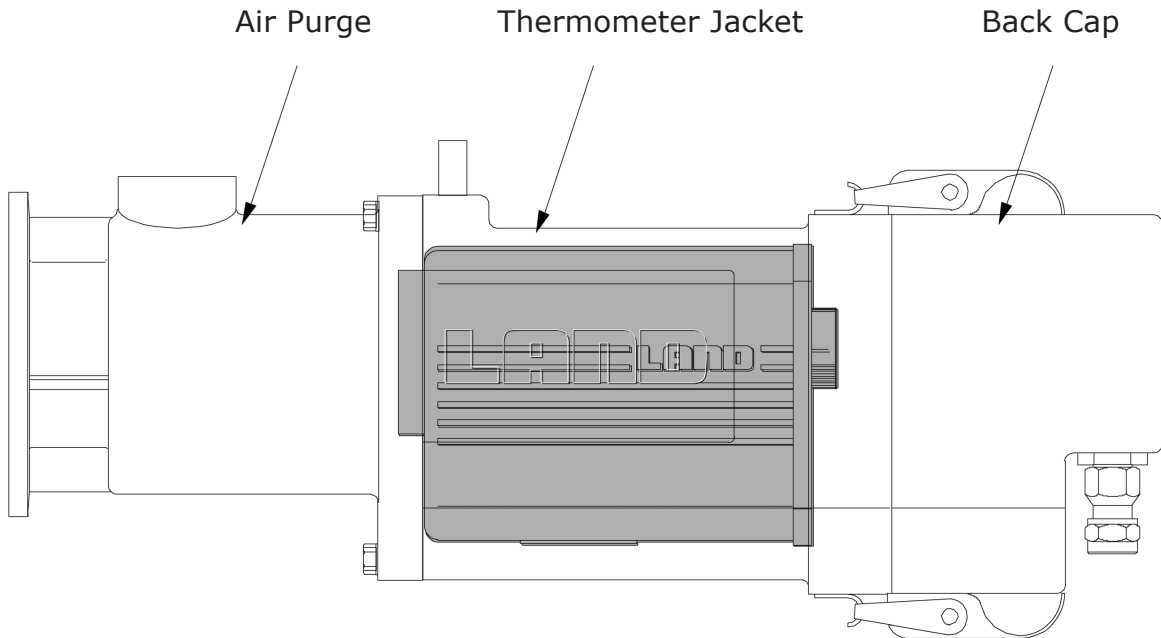


Fig. 2 Thermometer with Air Purge, Protection Jacket and Back Cap

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### 1.3 Unpacking the thermometer

Along with this User Guide, the thermometer packaging will also contain the following items:

- Envelope containing this User Guide.
- Binder, for your thermometer and power supply user documentation.
- **FLT5B** thermometer (fitted with protection cap on the lens).

It is recommended that the lens protection cap is kept attached until the thermometer is installed.

## 1.4 Specifications

	<b>FLT5B</b>	<b>FLT51B</b>
Temperature Range:	250 to 1100 °C 500 to 2000 °F	400 to 1300 °C
Spectral response:	4.8 to 5.2 μm	
Field of view:	50:1 at 1 m focus (fixed) 50:1 at 39.4 in focus (fixed)	
Output:	4 to 20 mA current loop	
Response time (0 to 95%):	1 to 10 seconds adjustable	
Emissivity adjustment:	0.1 to 1.09 in steps of 0.01	
Resolution:	0.2 °C (slow response setting) 0.4 °F (slow response setting)	
Stability:	0.023 % of span per 1 °C change in ambient temperature 0.023 % of span per 2 °F change in ambient temperature	
Accuracy:	0.25 %K or 5 °C 0.25 %K or 9 °F (Whichever is higher)	
Ambient limits:	0 to 60 °C specified; -10 to 80 °C operating 32 to 140 °F specified; 14 to 176 °F operating	
EMC:	EN 50 082-2 (immunity) EN 50 081-1 (emission) IEC 1010 (safety)	
Sealing:	to requirements of IP65	
Vibration:	3g (10 to 300Hz)	
Sealing:	IP65	
Power supply:	12 to 45 V d.c.	

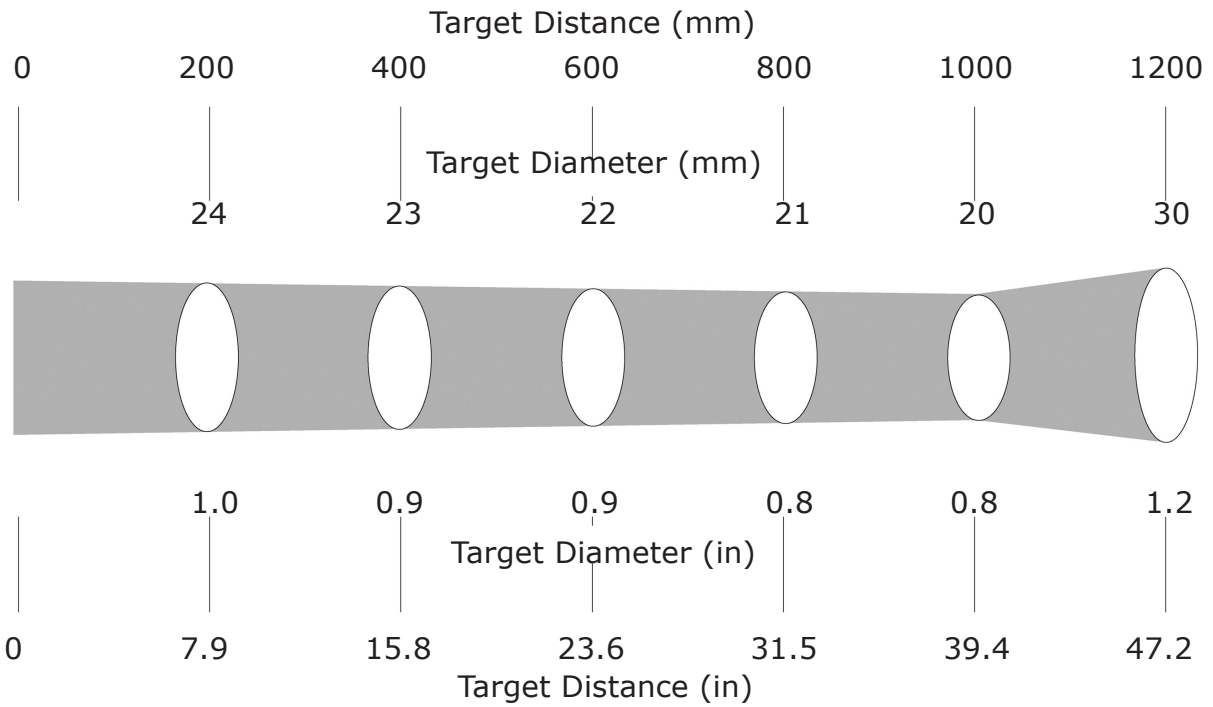


Fig. 3 Target Size Table for **FLT5B**

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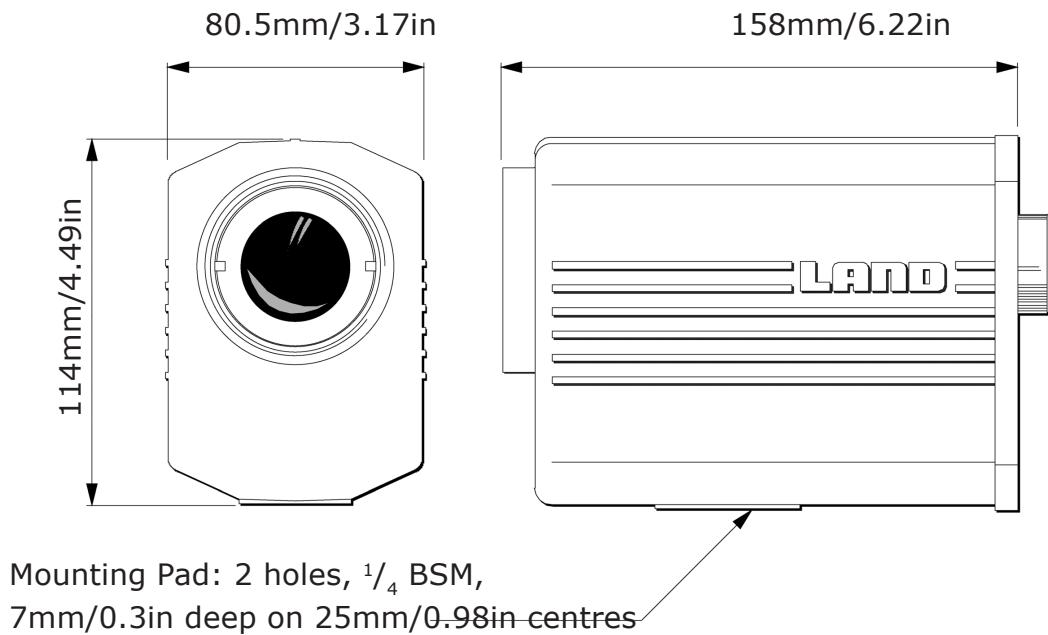


Fig. 4 Thermometer installation dimensions

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## 2 Installing the Thermometer

This section contains similar information to the thermometer Installation Guide.

If the thermometer is to be used in conjunction with a protection jacket and air purge, refer to the installation guides provided with those accessories.

If the thermometer is to be installed in a location where the ambient temperature is within the ranges specified for the thermometer, and no air purging is required to keep the lens clean, the thermometer can be mounted using the two tapped holes on the mounting pad. Either hole can be used for direct tripod mounting.

### 2.1 Choosing a location for the thermometer

The overall dimensions of the thermometer installation are given in Fig. 4.

- 1) Choose a location where the thermometer will not be exposed to excessive heat, fumes and spray.

Refer to the 'Specification' (Page 3) for ambient temperature limits etc.

- 2) Refer to the Target Size Table (Fig. 3). Ensure that the target completely fills the field of view at the chosen target distance.

Check that nothing obstructs the sighting path between the thermometer and the target.

- 3) Make sure that the sighting path is free from smoke, oil or water spray.
- 4) Ensure that the chosen location for the thermometer allows easy access for servicing.

### 2.2 Power supplies and temperature displays

The **FLT5B** Thermometer requires a power supply of 12 to 48V d.c.

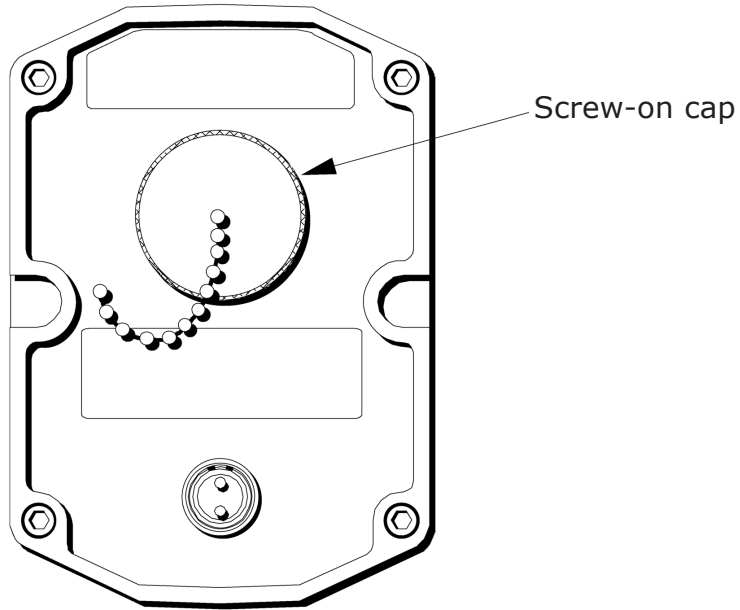


Fig. 5 Location of the screw-on cap

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**Emissivity**  
Example = 0.85

**Response Speed**  
Fully anticlockwise = 1sec  
Fully clockwise = 10sec

Emissivity	SW1	SW2
0.10	1	0
<b>0.80</b>	<b>8</b>	<b>0</b>
0.85	8	5
0.92	9	2
<b>1.00</b>	<b>0</b>	<b>0</b>
1.09	0	9

*Example settings*

Fig. 6 'Emissivity' and 'Response Speed' controls

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## 3 Using the Thermometer

It is recommended that the 'Emissivity' and 'Response Speed' controls are set to match the requirements of the particular measurement location before installation. This is particularly relevant if the thermometer is to be used in a location which is difficult to access and/or used in conjunction with a jacket and back cap.

### 3.1 Location of controls

The 'Emissivity' and 'Response Speed' control switches are located on the rear face of the thermometer. The controls are protected by a screw-on cap (See Fig. 5).

#### NOTE



To keep the thermometer electronics sealed against ingress of dust and moisture, always replace the screw-on cap after adjusting the settings.

### 3.2 Adjusting the 'Emissivity' value

For accurate temperature measurement, the 'Emissivity' setting must be set to correspond with the target being measured.

The emissivity can be set in the range 0.10 to 1.09 in steps of 0.01.

The **FLT5B** is supplied with the emissivity factory-set to 1.00.

The 'Emissivity' value is set using switches **SW1** and **SW2**. See Fig. 6.

When switch **SW1** is set from **1 to 9**, this denotes the **first figure after** the decimal point of the emissivity value.

e.g. for an emissivity value of '0.85', set SW1 to '8' and SW2 to '5'.

When switch **SW1** is set to **0**, this denotes a '**1** before', and a '**0** after', the decimal point of the emissivity value.

e.g. for an emissivity value of '1.00', set SW1 to '0' and SW2 to '0'.



### 3.3 Adjusting the averager 'Response Speed'

The Averager time function is adjusted by the potentiometer **P1**.  
(See Fig. 6, Page 6).

The Averager 'Response Speed' can be set to any value between 1 and 10 seconds (for 0 to 95% of final reading).

- 1) To increase the 'Response Speed' (i.e. make faster), turn the potentiometer **P1** anticlockwise. When **P1** is turned fully anticlockwise, the 'Response Speed' is 1 second.
- 2) To decrease the 'Response Speed' (i.e. make slower), turn the potentiometer **P1** clockwise. When **P1** is turned fully clockwise, the 'Response Speed' is 10 seconds.

### 3.4 Note your settings

Write down the settings for 'Emissivity' and 'Response Speed' in the spaces provided below.

Use this table as a quick reference guide.

Each time you adjust the settings, make a note in the table.

Serial Number	Date	Emissivity	Response Speed

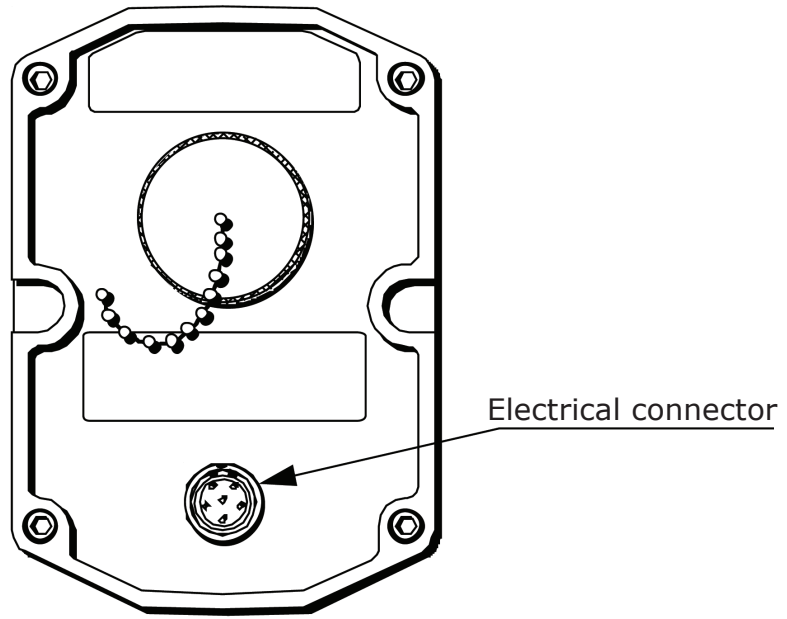


Fig. 7 Location of the electrical connector

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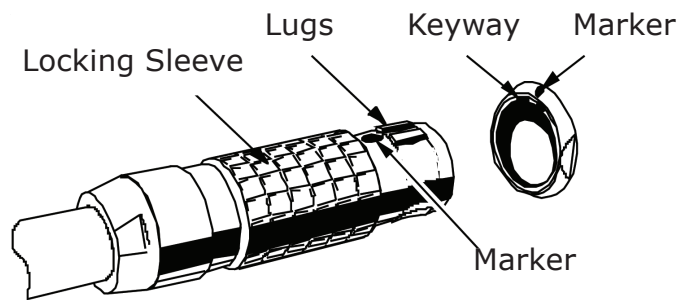


Fig. 8 Connecting the plug to the socket

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### 3.5 Electrical connections

The electrical connections for the thermometer power supply and temperature output are made via the 6-way socket on the rear of the thermometer. See Fig. 7.

The cable connections are as follows:

Thermometer			
Thermometer Pinj No.	Function	Cable Colour	End Cap Pin No.
1	-	-	-
2	-	-	-
3	V+, 4 to 20 mA	Red	5
4	-	-	-
5	-	-	-
6	V-, 4 to 20 mA	Black	6

Electrical connection to the thermometer must be made by either:

- 6-way plug (LAND Part N° 206.551)
- 6-way plug housed in Back Cap (LAND Part N° 091.562)
- Pre-wired cable, 4m long (LAND Part N° 029.673)

To connect the cable;

- 1) Refer to Fig. 8. Align the red marker near the lugs of the pre-wired plug with the red marker above the keyway in the socket on the thermometer.
- 2) Push the plug into the socket.

To disconnect the cable;

- 1) Grip the locking sleeve section of the plug.
- 2) Pull the plug outwards to release the locking mechanism and disconnect the cable.

## 4 Mountings and Accessories

The FLT5B thermometer is compatible with all Land System 4 Mountings and Accessories.

For the majority of float line applications, the following package of accessories is recommended:

Air Purge: Part N° 091.561

Jacket: Part N° 091.560

Back Cap: Part N° 091.562

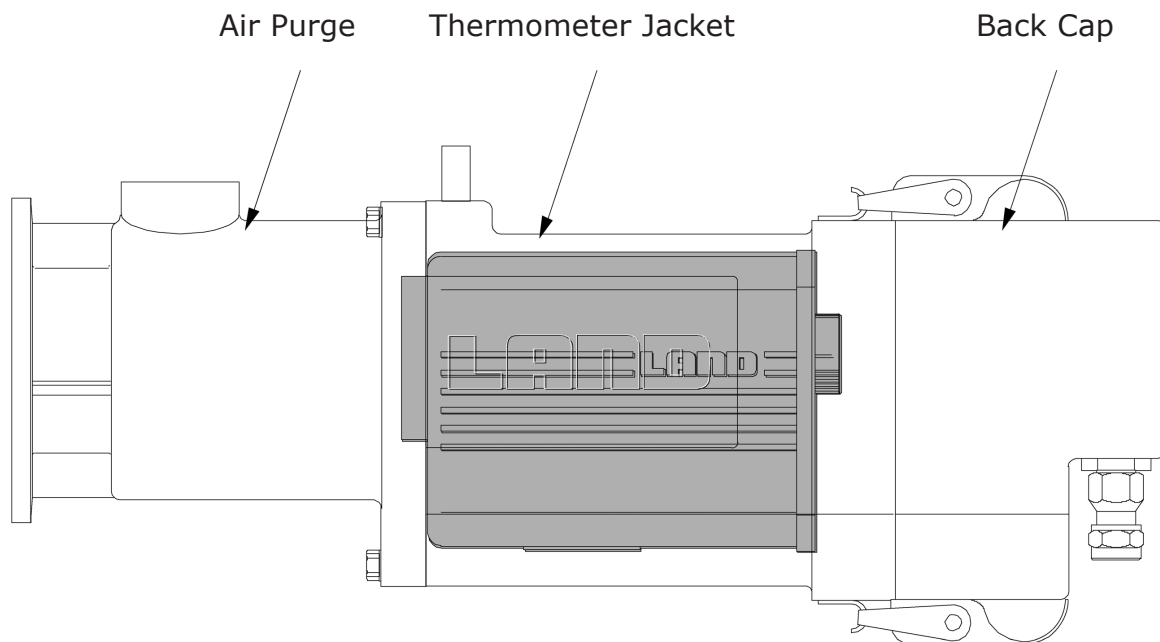


Fig. 9 Recommended mounting accessories for **FLT5B**

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**For more information on Mountings and Accessories, refer to the "Thermometer Mountings and Accessories Installation Guide".**

## 5 Maintenance

Thermometer maintenance consists mainly of ensuring that the lens is clean. If the lens becomes dirty, clean it with lens cleaning fluid and a soft cloth.

If it is the lens is difficult to keep clean, it may be necessary to use the thermometer in conjunction with a suitable air purge (LAND Part N° 091.561). Contact LAND Infrared for more information.

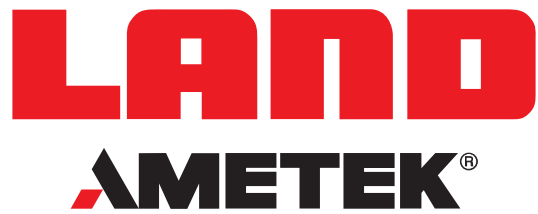
If the thermometer is used in conjunction with a cooling jacket, ensure that the flow rate for the cooling water is 1 litre per minute/0.035 cu. ft per minute.

**WARNING**

Never 'over-cool' the thermometer as this may result in condensation either on or inside the thermometer.

If the thermometer is used in conjunction with an air purge, check that the flow rate for the purge air is 1 litre per second/2 cu. ft per minute.





## PRODUCT WARRANTY

Thank you for purchasing your new product from Land Instruments International. This Land manufacturer's 'back-to-base' warranty covers product malfunctions arising from defects in design or manufacture. The warranty period commences on the instrument despatch date from the Land Instruments International Ltd. factory in Dronfield, UK.

### 36 MONTHS WARRANTY



Building upon the reputation for reliability and longevity that System 4 and UNO thermometers have earned, Land are delighted to be able to provide our customers with an industry-leading 36 month warranty for the following products:-

- SPOT thermometers, accessories\* and mountings\* and special instruments based on SPOT.  
*\*Note: SPOT Actuators are provided with an 12 months Warranty.*
- System 4 thermometers, processors, accessories and mountings and special instruments based on System 4.
- UNO thermometers, accessories and mountings and special instruments based on UNO.
- Application-dedicated processors based on LANDMARK® Graphic.
- ABTS/S and ABTS/U
- FTS
- VDT/S and VDT/U
- DTT
- FLT5/B
- 4500 MkIII (Transmissometer and AFU-APS-I/O only)
- LWIR Thermal Imaging Cameras
- NIR-B / MWIR-B Thermal Imaging Cameras

This 36 month warranty is provided as standard for all orders for the products listed above received from 1st May 2002.

We believe that our customers expect us to set the standard in terms of performance, quality, reliability and value for money. This 36 months warranty, as a part of an on-going program of continuous improvement, is just one way in which Land strive to maintain our position as the temperature measurement partner of choice.

### 24 MONTHS WARRANTY

The following Land Instruments International products are provided with a 24 months warranty:

- LSP-HD Linescanners
- NIR
- SDS-640

### 12 MONTHS WARRANTY

All other AMETEK Land products including NIR-B Camera Retraction and Mounting Systems, VIRALERT Human Body Temperature Screening Systems, Water Cooled Housings & Accessories, SPOT Actuator, and Air PurgeEquipment

# PRODUCT WARRANTY

## EXCLUSIONS FROM WARRANTY

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It should be noted that costs associated with calibration checks which may be requested during the warranty period are not covered within the warranty.

AMETEK Land reserve the right to charge for service/calibration checks undertaken during the warranty period if the cause is deemed to fall outside the terms of the warranty

This Land manufacturer's warranty does not cover product malfunction arising from:-

- improper installation
- misuse
- unauthorised alteration
- inappropriate routing, support, physical shock & strain protection, etc. of the fibre-optic lightguide (where fitted)
- environmental conditions exceeding the IP / NEMA rating of the product
- inappropriate recalibration which results in product calibration being taken outside specification
- improper resealing of thermometer following parameter adjustment (UNO, FLT5/A, etc.)
- damage caused by an unauthorised repair
- consumables including filters, electrochemical cells, batteries and sorbents

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