SPRINT 8

USER GUIDE

LANGUAGE: ENGLISH

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SPRINT Digital Thermometer

LAND
AMETEK®

QUALITY CUSTOMER SOLUTIONS

Contents

1 Introduction

Thank you for purchasing this high quality Sprint 8 Digital Infrared Thermometer from Ametek Land, Inc. This non-contact thermometer is a precision instrument and is designed to be easily configured and used. The sturdy stainless steel construction, durable digital electronics and precision optics combine to serve you with years of quality temperature measurements.

Please read this manual completely before installation and use.
If you have any questions please contact Ametek Land, Inc. at (412) 826-4444.

1.1 General advice and safety

1.1.1 Intended use

This instrument is designed for use as a non-contact temperature measurement sensor. Any other use is not recommended by Ametek Land, Inc. and may void the instrument warranty or compromise safety.

1.1.2 Precautions

Please follow this instruction manual for electrical and mechanical installation of the thermometer. The required 24V DC power supply will not pose a health risk to the user.

Do not try to use mains voltage on the Sprint 8, it is not required, may damage the instrument and will compromise safety.

1.1.3 Thermometer use and maintenance

Use of this infrared thermometer should be restricted to qualified personnel who have read and understood these instructions before initial operation and handling. Instructions should be given by a supervisor or optionally by Ametek Land, Inc. customer service

1.1.4 Safety

The operation of this thermometer is only allowed with a potential-free low voltage of 24V DC. The required 24V DC power supply will not pose a health risk to the user.

The thermometer is a passive sensor and as such stares at a target and measures the infrared energy being emitted from that target. The Sprint 8L models have a Green LED aiming light that will define the target spot location and approximate diameter.

1.1.5 Modifications

You are cautioned against modifying the Sprint 8 without permission from Ametek Land, Inc. Any tampering, disassembly or unauthorized modification will void the equipment warranty and possibly create a dangerous situation.

1.2 Care and Maintenance

The sensor does not require any maintenance other than occasionally checking to see if the lens is clean. A dirty lens can be cleaned by using a soft dry brush or if necessary a soft lens cloth.

Do not clean the lens with acidic or solvent-based fluids.

1.2.1 Packaging, shipping and storage

If the original packaging is not available, please wrap the sensor in bubble wrap before boxing and shipping. For extended term storage in high humidity areas the sensor package should be sealed to protect it. Please also protect the optics with a protection cover like the one originally supplied.

1.2.2 Warranty

12 months from shipment – details see the Ametek Land Inc. terms and conditions supplied with the Sprint 8 quotation

1.2.3 Copyright

2010 Ametek Land, Inc.

1.2.4 Specifications Statement

Due to continuous design improvements specifications are subject to change without notice.

2 Sensor and Features

2.1 What's in the box?

Sprint 8 (L) thermometer
Two, Stainless Steel 40mm x 1.5mm pitch mounting nuts
User Guide
EasySpot Software

Accessories like connection and setup cables, protection purges and jackets are available separately.

2.2 Use and features

The Sprint 8 is a rugged, digital non-contact temperature sensor ideally suited for industrial use. This sensor is designed for temperature measurements of objects between 0 and 1800°F (32-1800°F for the L model).

The rugged, stainless steel body allows use even in hostile environments. Various focus models are available that allow small targets at close distances to be measured. With it's rapid 50ms response time the Sprint 8 can be used on fast reacting processes. The response speed can be user adjusted between 100ms and 100s if averaging is desired.

A USB digital port is located under a protective cap on the rear of the Sprint 8. The Sprint 8's emissivity, temperature span and response speed can be easily configured via this USB connection. The sensor can also be used exclusively over this USB link displaying and data logging with the supplied EasySpot for Windows software. This can be useful in laboratory, test and research locations. In this mode the Sprint 8 is powered by the USB connection and no separate power supply is required.

For most industrial uses the thermometer is simply configured using the USB port. Once configured the USB cable is disconnected. The Sprint 8 can then be connected and used as a standard loop-powered, two-wire 4-20mA thermometer.

The Sprint 8 L models feature an integrated Green LED aiming light, which enables you to focus onto small close targets exactly. The size of the LED aiming spot closely relates to the measuring spot size.

The Sprint 8 family uses two-wire, loop powered technology. Both wires of a two-wire sensor will be used simultaneously for power supply and transmission of the temperature output signal. The measurement target's temperature is output as a linear 4-20mA output signal. This makes for a simple, cost effective and reliable installation using readily available shielded twisted pair cable.

3 Technical Data

3.1 Sensor

	Sprint 8	Sprint 8-L (with Green LED)
Measuring range	0-1800°F	32-1800°F
Spectral range	8 to 14 µm	8 to 14 µm
Optics (see table 3.2 below)	4, 12, 30 and 48 inch focus factory set versions (specify when ordering)	
Internal Signal Processing	Digital	
Emissivity	0.2 to 1.0, adjustable via USB interface	
Measurement Span	Adjustable anywhere within range, minimum span 90°F	
Response speed (95% energy)	50 ms (min.), adjustable 100 ms to 100 s via USB interface	
Uncertainty	1% of meas. value specified in Kelvin	
Repeatability	0.5 % of meas. value specified in Kelvin	
NETD	0.05 °F	
Output	two-wire 4 to 20 mA temperature linear, into 600 Ohm load at 24V	
Digital Interface	USB interface (galvanically isolated)	
Aiming	Manual	Green LED
Parameters	Adjustable via USB interface and supplied EasySpot for windows software: emissivity; response time; Units °F / °C, measurement span	
Power supply	24 V DC +/- 25%, ripple 500 mV max Sprint 8L only: 7 ... 30 V DC, <200 mW	
Power consumption	max. 0.6 W (without aiming LED)	
Operating temperature	0 to +160°F	
Storage temperature	-4 to +160°F	
Housing	Stainless Steel, IP 65 sealed	
Weight	Approx. 1lb	
Dimensions	Thermometer body length 5 inches, threaded 40mm x 1.5	

3.2 Optical Characteristics

Optics (focus point **bold**)											
		4" Focus									
Spot Size in mm	Distance in mm	0	50	**100**	150	200	250	300	400	500	800
Sprint 8 (L)-4	32-1800°F	15	8.5	**2**	10.5	19.0	27.5	36.0	53.0	70	121
		12" Focus									
Spot Size in mm	Distance in mm	0	100	200	**300**	400	500	600	800	1000	1200
Sprint 8 (L)-12	32-1800°F	15	12.0	9.0	**6.0**	13.0	20.0	27.0	41.0	55.0	90
		30" Focus									
Spot Size in mm	Distance in mm	0	200	400	600	**800**	1000	1200	1500	2000	4000
Sprint 8 (L)-30	32-1800°F	15	15.3	15.5	15.8	**16.0**	23.8	31.5	43.1	62.5	140
		48" Focus									
Spot Size in mm	Distance in mm	0	200	400	600	800	1000	**1200**	1500	2000	4000
Sprint 8 (L)-48	32-1800°F	15	15.8	17.3	18.8	19.5	21.8	**24.0**	33.8	50.0	115

3.3 Accessories Sprint 8 (L)

Single axis mounting bracket Model Sprint 8-SM

Dual axis mounting bracket Model Sprint 8-DM

Cooling jacket incl. air purge unit & bracket Model Sprint 8-JP

Air purge when cooling not required Model Sprint 8-P

Cable Types and Lengths	**Sprint Model**	**Type**
Connector cable assy. 15ft	Sprint 8L	Sprint 8L-15F
Connector cable assy. 48ft	Sprint 8L	Sprint 8L-48F
USB Programming cable 5ft	Sprint 8 and 8L	Sprint 8U-5F

4 Installation and setup

4.1 Preparation

The thermometer's positioning and adjustable parameters are determined by the application. Concerning the thermometer installation, please understand your ambient temperature, conditions and any large RF Electromagnetic fields – see 4.1.3 below. If you have any questions please contact your local Ametek land representative or Regional manager.

If an air purge unit is required, the following compressed air characteristics are recommended:
Compressed air, free of oil and water,- pressure between 3 to 15 psi.

If using the dedicated USB connection please understand the limits of USB connectivity. The International USB standard limits connection distances to no more than 16 feet six inches (5 Meters).

When using a two-wire 4-20mA loop connection the total loop impedance is limited to 600 Ω at 24V DC.By increasing the voltage to 30 V DC the loop impedance can rise to 900 Ω

4.1.1 Ambient temperature limits

The ambient temperatures must not exceed the allowed operation temperature for the thermometer: 32°F to +158°F. Otherwise readings may be erroneous or damage to the thermometer can occur. If the ambient temperature is too high the thermometer must be used in combination with appropriate protective cooled mountings (e.g. 8-JP cooling jacket).

4.1.2 Environmental conditions

Smoke, dust, steam or other air contamination as well as dirty lenses can become a problem for non-contact sensors. If the Thermometer cannot "see" all of the target object's emitted infrared energy, low readings can result. An air purge unit (see accessories list) can help keep the lens clean even in very dirty or dusty conditions.

4.1.3 Electromagnetic interference

The Sprint 8 (L) is designed, tested and rated to reject common industrial surrounding EMF fields and is correspondingly designed, tested and CE marked.

To protect the sensor from the effects of high levels of electromagnetic interference the following practices are recommended:

The sensor should be mounted as far as possible from potential sources of interferences, e.g. machine parts with electrical motors, which may produce interference peaks.

- ❑ Use shielded cables for all connections.
- ❑ Ensure that shields are correctly made in their connectors
- ❑ Make sure that the Thermometer is grounded properly.
- ❑ To avoid ground loops please connect only the cable shield or the ground of the thermometer.
- ❑ Try not to run the signal cable in wiring trays that carry power cables to high voltage or switching equipment

4.2 Installation of the Sprint 8

4.2.1 Installation

Sprint 8 accessories are recommended for mounting of the Sprint 8 thermometer.

4.2.2 Operating personnel requirements

Qualified instrumentation personnel should perform the installation after reading this manual.

Ametek Land, Inc. is not responsible for damage caused by failure to read, understand or implement suggested actions according to this manual.

4.2.3 Mechanical installation

The mounting bracket should be installed first. The thermometer can then be installed by using the threaded M40x1.5 Stainless Steel nuts supplied.

1. Loosen the nuts
2. Attach thermometer to the mounting bracket
3. Tighten the nuts, one each side of the bracket
4. If using the optional air purge or cooling jacket, use the Sprint 8 nuts to attach the front of the accessory to the bracket.

4.2.4 Cable routing

Besides the mentioned requirements to location and operating personnel the distance from thermometer to power supply unit should also be kept in mind. Do not use a cable length more than 300 feet long for the power supply. The maximum length of any USB cable is 16 feet six inches (5 Meters). The optional USB cable from Ametek Land, Inc. is 5 feet long. USB extension cables are available at most computer stores.

4.3 Thermometer Alignment

Correct alignment of the Sprint 8 thermometer is done by simply pointing the thermometer at the target.

If you cannot view the target normal to it’s surface take care to keep the tilt angle within 45 degrees of normal.

The Sprint 8 L models have an LED alignment light which makes aiming on small close-up objects quite easy.

This Green LED light spot defines the thermometer’s measuring spot location and approximate size. The LED targeting light can be used continuously; it does not influence the measurement. The thermometer should be located at the correct focusing distance to obtain the smallest measurement spot size.

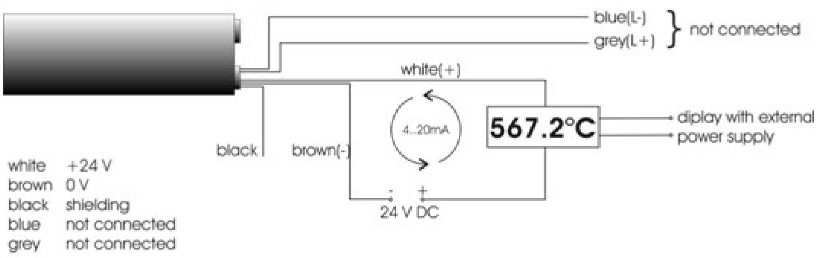
4.4 Initial thermometer setup

4.4.1 Connecting the power supply

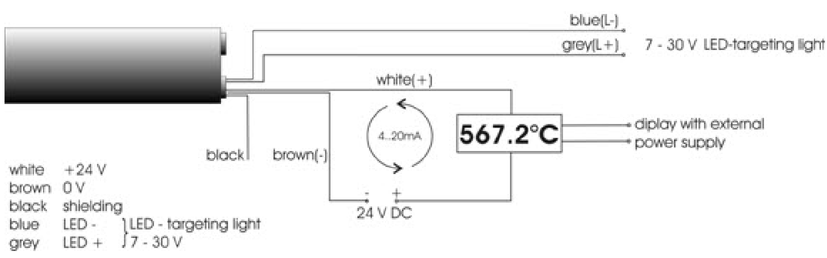
The Sprint 8 (L) requires a power supply of 24 V DC ±25%. Please fit the 5-pin connector at the rear of the thermometer and connect the other end of the cable to a 24 V DC power supply.

The thermometer is reverse-polarity protected.

Polarity is important when connecting the thermometer with power supply (see Figure).
35mA is the maximum current draw. You may use a common power supply for the thermometer and the optional targeting LED (Sprint 8 L only).



Connecting diagram for Sprint 8 model without integrated LED aiming light



Connecting diagram for Sprint 8 L with integrated Green LED aiming light

Once connected the Sprint 8 is operational.

NOTE

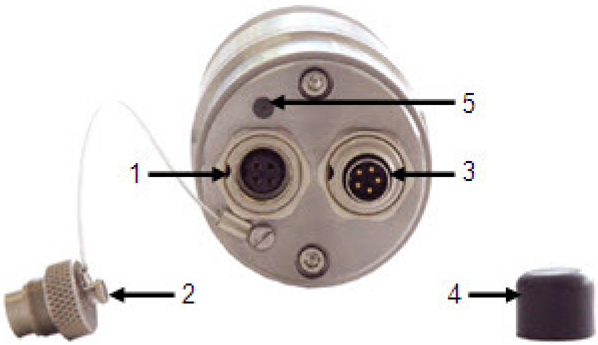
The thermometer is designed to be used with a power supply nominally 24 V DC ± 25%. *Additional items like digital displays, controllers, recorders, etc. can be daisy-chained into the same current loop for processing the 4 to 20mA output signal. The maximum loop impedance must not exceed 600 Ω at 24V DC, 300 Ω at 18 V DC or 900 Ω at 30 V DC.*

To meet the requirements of electromagnetic compatibility all connecting cables should be shielded. The shield of a five wire connecting cable is connected at thermometer end only to prevent ground loops. If using extension cables the shields have to be extended also.

The 4-20mA DC output corresponds linearly to a range of 0-1800°F (Sprint 8) or 32-1800°F (Sprint 8L).
EasySpot software can be used to set narrower spans anywhere within that range to a minimum value of 90°F.

4.5 Connections

All connections are located on the rear of the Sprint 8 as shown below



1) USB interface
   Used to configure thermometer setup parameters.
   This can optionally be used as a full time digital connection in Laboratory and research environments instead of the 4-20mA loop output.

2) Protective Screw fitting cover if USB port is not connected

3) Signal/Power socket - optional Aiming LED Connector (model 8L). This 5-pin connector is used for the power supply, the signal 4-20mA output & the LED aiming light.

4) Plastic cap
   Replace the plastic cap if storing or shipping the Sprint 8, or if only using USB connectivity.

5) Power LED
   This LED indicates that a USB-communication session is active.

Stand-alone operation: If the sensor is connected via USB to a PC no power supply is required for operation of the Sprint 8. All parameter settings can be done via the supplied EasySpot for Windows software. In addition EasySpot Software will display current measured temperature, minimums and Maximums and show an electronic pen trace record of readings. In USB mode the current output (4…20mA) doesn’t function without a separate power supply.

5 Software - EasySpot

The provided EasySpot for Windows software offers the ability to setup the sensor and can also display, record and evaluate measurement data.

5.1 Software Installation

IMPORTANT – Do not connect the USB cable Yet

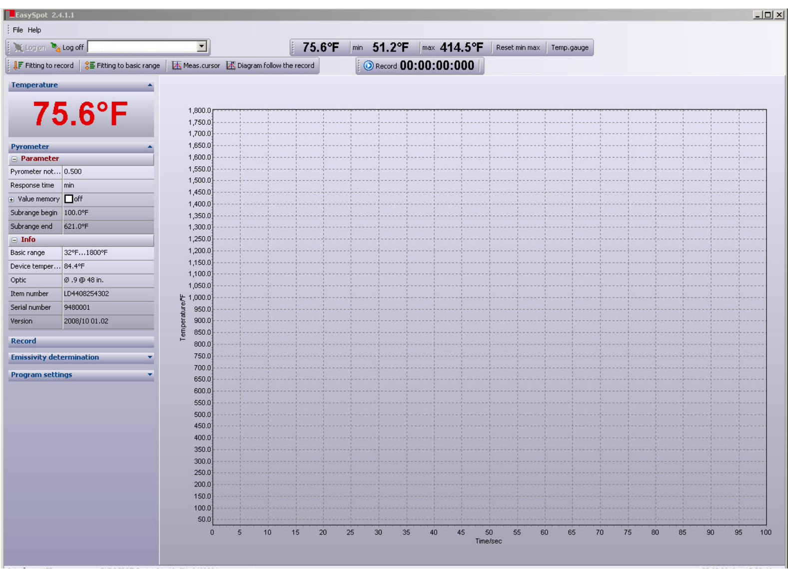
Install the software FIRST before trying to connect the Sprint 8

You will find the "setup.exe " on the CD ROM. Run this setup routine and the driver and software installation will proceed.

After the software installation has completed you can then connect the thermometer by USB cable to the PC

Start the software by clicking the 

desktop icon.



EasySpot initial screen

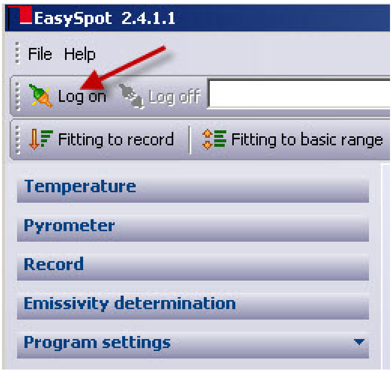
6 Using the Software

6.1 Logon to the Sprint 8

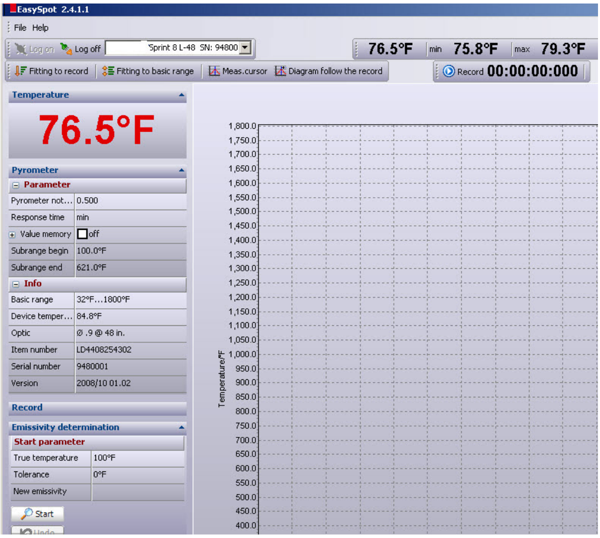
If software and drivers are installed correctly and a Sprint 8 is connected to the USB interface, the Windows Operating System will detect the device automatically.

NOTE

Be sure to connect to a USB port on the PC itself, USB ports on Monitors and keyboards may not have enough current to power the Sprint 8.

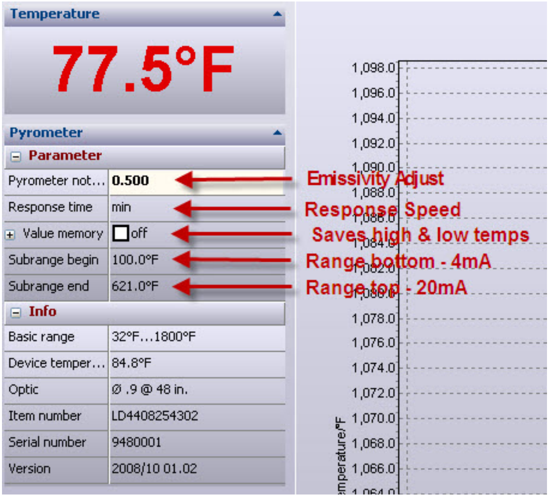


By Clicking the button “Log on” the connected Sprint 8 will be recognized by EasySpot.



6.2 Parameter settings

All device parameters can be set by using EasySpot parameters.



After connecting Sprint 8 to a USB interface & clicking "Log on" the start up screen will be displayed.

The Target Emissivity, Thermometer response speed, Session high and low temperature storage and Range min and max for the 4-20mA output can all be set in the parameter section.

6.3 Emissivity settings

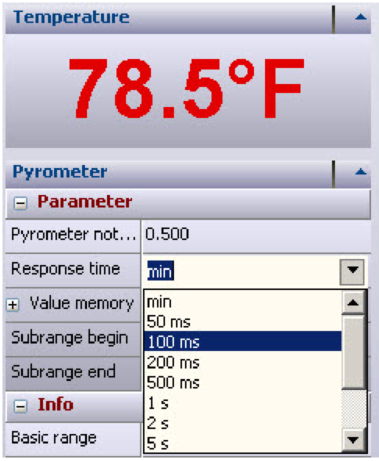
The emissivity can be set by clicking on Parameters. Type in the desired emissivity value. This new emissivity value will be saved to the Sprint 8 by hitting the "ENTER" key.

6.4 Emissivity Calculation

With the Sprint 8 it is possible to "back calculate" the emissivity of the measured object if you already know it's "true temperature". Enter "Emissivity determination" & type in "True temperature" the temperature of the object. In "Tolerance" enter the process tolerance. Click "Start" and the new emissivity will be displayed.

6.5 Response speed

The desired thermometer response speed can be chosen in the panel Parameter by clicking the appropriate pull down menu value. The new value will be saved to the Sprint 8 by hitting the "ENTER" key.



6.6 Setting a measurement span

In "Parameter" any measurement span can be set within the measuring range of the Sprint 8 shown in the status bar. The minimum span is 90 °F. The "begin" of the sub-range value corresponds to 4mA output and the "end" of the sub-range value corresponds to 20mA. Hit Enter and this new span will be saved.

Storage settings:

The storage value saves the highest and lowest measurement taken during a reading. You can program the amount of time that the stored value will be held and displayed, before it is deleted and replaced by a new value. This feature is particularly useful when: fluctuating object temperatures cause the display or the analogue outputs to change too rapidly, or the Sprint 8 is not constantly viewing an object to be measured. In addition, it may also be beneficial to periodically delete and reset the stored max. or min. values.

The Sprint 8 is equipped with a double storage. This mode utilizes two memories in which the highest measured value is held and is deleted alternately in the set time interval (clear time).

The other memory retains the maximum value throughout the next time interval. Any problems associated with rapid display fluctuations are solved by this approach.

The following settings are possible:

Storage “off“: the storage is switched off and only actual values are measured.

Storage “on”: the maximum value is held in double storage mode. After the entered time (in seconds) the storage will be deleted. You can choose the clear time in the list.

The “auto” mode is used for discontinuous measuring tasks. For example objects are transported on a conveyer belt and pass the sighting (FOV) of the Sprint 8 only for a few seconds. The maximum value for each object has to be indicated. In this mode the maximum value is stored until The “auto” mode is used for discontinuous measuring tasks. For example objects are transported on a conveyer belt and pass the sighting (FOV) of the Sprint 8 only for a few seconds. The maximum value for each object has to be indicated. In this mode the maximum value is stored until a new hot object appears in the FOV of the Sprint 8. The temperature which has to be recognized as “hot“ is defined by the low limit of the adjusted sub range. The stored maximum value will be deleted when the temperature of the new hot object exceeds the low limit of the sub range by 1% or at least 4°F. If a lower limit is not entered, the maximum value storage will be deleted whenever the low level of the full measuring instrument range has been exceeded.

NOTE

The Auto-Mode is only available for maximum.

6.7 Device information

Sprint 8 specific information will be displayed in this panel.

⊟ Info	
Basic range	32°F...1800°F
Device temper...	85.8°F
Optic	Ø .9 @ 48 in.
Item number	LD4408254302
Serial number	9480001
Version	2008/10 01.02

6.8 Diagram view

A measurement record (Electronic Strip Chart) can be started and stopped with the "Record" button.

In additional the session values, minimum and maximum will be displayed. By using the "Reset min max" button all this values will be deleted.

The drawing of the recorded values can be optimized (in diagram) for "record" or for the " basic range" of the device.
The drawing will be cleared by using the button "Record clear".

6.9 File Menu

Data files can be opened and saved, in addition you can Export data in text or ASCII csv formats.

You can save a recorded data file as a Microsoft Excel spreadsheet – careful it may be large!

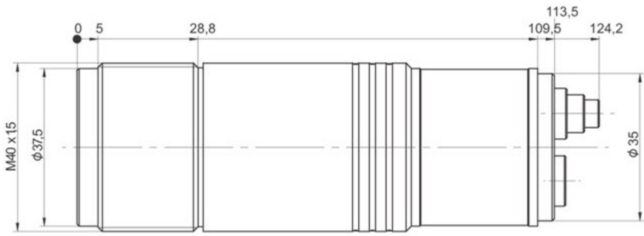
1	**Date**	3/24/2010
2	**Start**	1:35:54 PM
3	**Record time**	00:01:32:085
4	**File**	C:\Documents and Settings\JSimpson\Desktop\test2.lrf
5		
6	**Minimum**	74.6°F
7	**Maximum**	77.5°F
8	**Average**	76.1°F
9	**Meas.points**	5644
10		
11	**Emissivity**	1
12	**Pyrometer**	LAND Sprint 8 L-48
13	**Optic**	Ø .9 @ 48 in.
14	**Serial number**	9480001
15		
16	**Time/sec**	**Temperature/°F**
17	0	77.1
18	0.01	77.1
19	0.02	77.1
20	0.04	76.7
21	0.05	76.7
22	0.08	76.7
23	0.09	76.7
24	0.1	76.7
25	0.12	76.5
26	0.13	76.5
27	0.15	76.5
28	0.16	76.5
29	0.18	76.5
30	0.19	76.5
31	0.22	76.5
32	0.23	76.5
33	0.25	76.5
34	0.26	76.5
35	0.28	76.3
36	0.29	76.3
37	0.31	76.3

Open and transmit parameter preset – this allows you to load a previously saved set of parameters from a previous session.

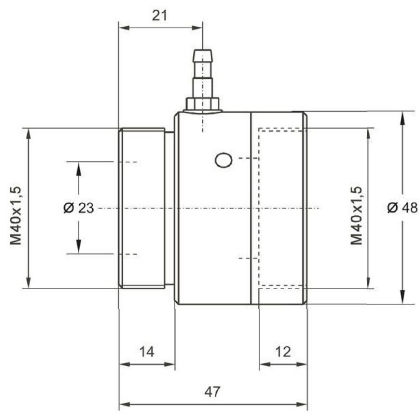
Save parameter preset – this allows you to save all the settings parameters that you have changed to a file for future recall.

7 Dimensions

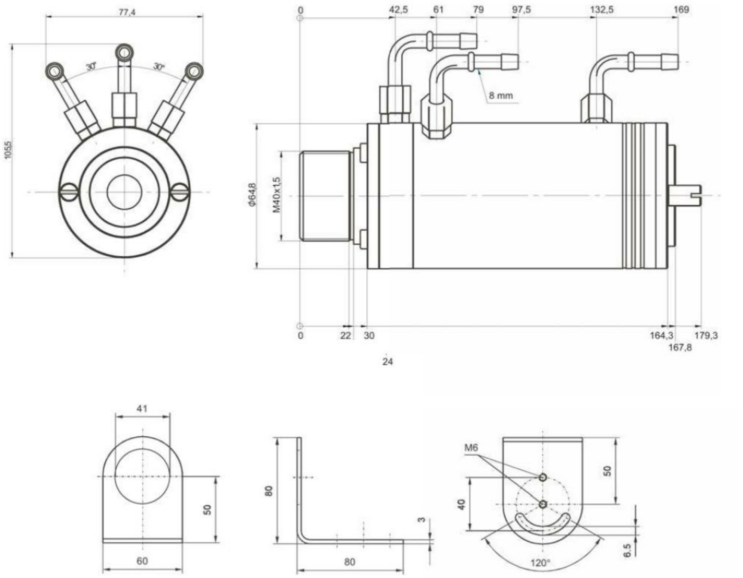
Sprint 8 and 8 L Body



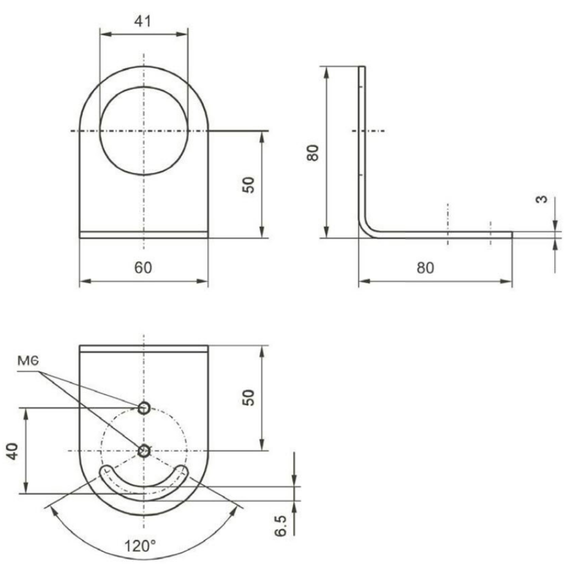
Sprint 8-P Lens air purge



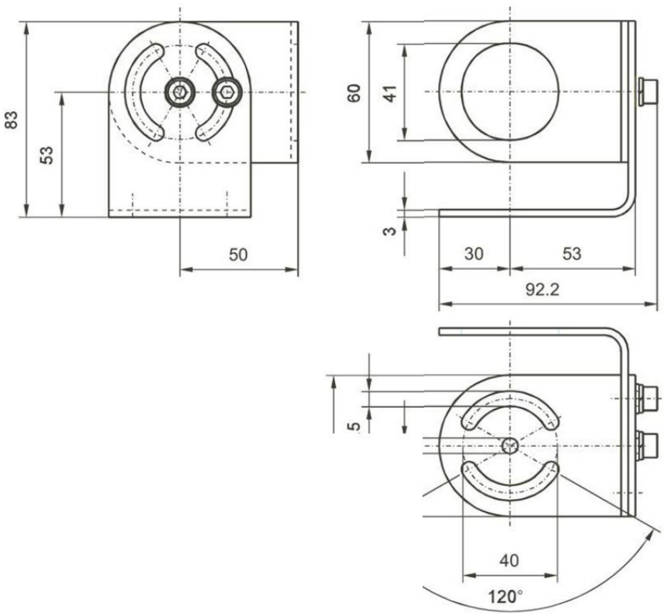
Sprint 8-JP Cooled Jacket including Purge and Single axis mount



Sprint 8-SM Single axis mount



Sprint 8 –DM Dual Axis mount



SPRINT 8
DIGITAL THERMOMETER

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

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