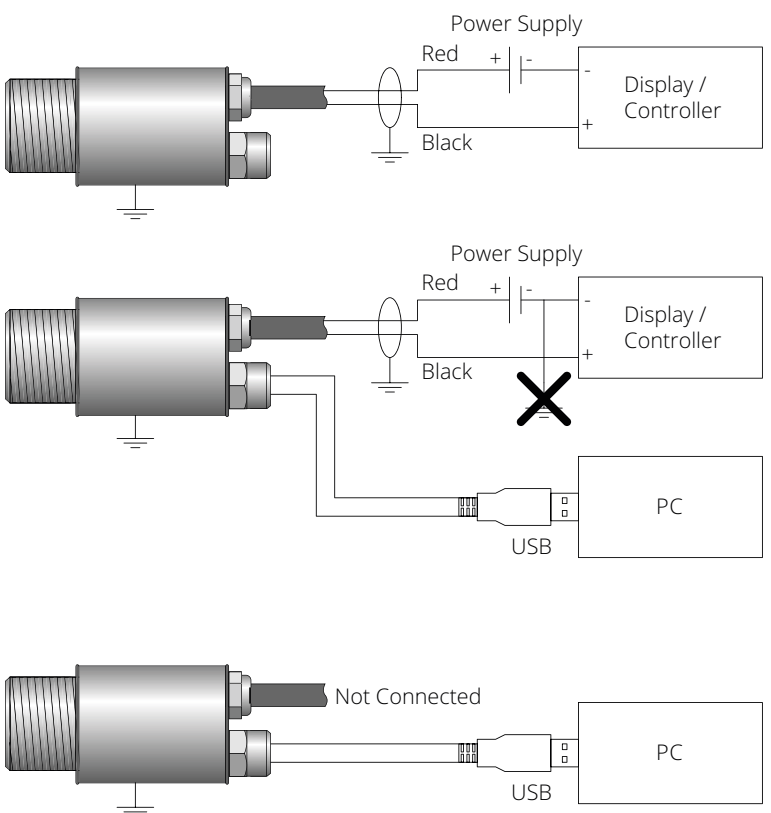
PyroUSB

USB Configurable Infrared Temperature Sensors with 4-20 mA Output

- Temperature ranges from -40°C to 2000°C
- 2-wire 4-20 mA output
- Fully configurable via USB using Modbus protocol
- Cable and software included
- Specialised models for measuring metals, high-temperature objects or glass surfaces
- General-purpose models for most other applications
- Peak and valley hold mode allows easy measurement of objects on conveyors
- Stainless steel housing, sealed to IP65
- Quick and easy installation

CONNECTIONS

The sensor will operate with either the 4 to 20 mA cable connected, the USB cable connected, or both.



Note: The sensor must be grounded at only one point, either the cable shield or the sensor housing.

PyroUSB Series infrared pyrometers measure temperatures from -40°C to 2000°C accurately and consistently, with an outstanding response time of 200 ms. The 4 to 20 mA output is compatible with almost any indicator, controller, recorder or data logger. without the need for special interfacing or signal conditioning.

A choice of measurement wavelengths is available to suit a range of applications.

General-purpose PUA8 (8-14 µm) models can measure from -40°C to 1000°C. They are suitable for measuring high-emissivity materials such as paper, thick plastics, food, pharmaceuticals, rubber, asphalt and painted surfaces. These models are capable of measuring very low temperatures, so they are ideal for sub-zero measurements in the food, logistics and storage industries.

Short-wavelength PUA2 (2.2 µm) models have a choice of temperature ranges from 45°C to 2000°C. They provide a more accurate reading when measuring low-emissivity materials such as many reflective metals. They are also capable of measuring through glass viewports.

Glass PUA5 (5 µm) models have a choice of temperature ranges from 50°C to 1650°C. They are filtered at a wavelength where glass is least reflective, making them an ideal pyrometer for glass surface temperature measurement.

All models have USB communications. A USB cable is included and free software is available to download from the Calex website.

Data is transmitted via Modbus, so it is also easy to configure and read temperatures from the sensor using third-party software.

The USB cable has an IP65 connector at the sensor end, and an IP65 cap protects the sensor when the USB cable is not connected.

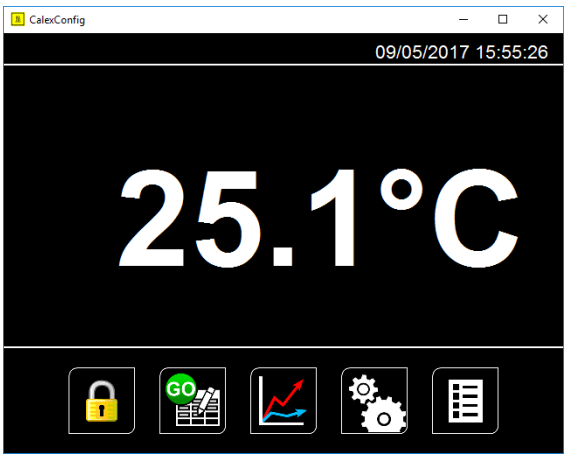
CALEX ELECTRONICS LIMITED

SOFTWARE

The sensor can be configured using the included USB cable and a choice of Windows software. It is also possible to take temperature readings, see temperature charts and log data via USB in real time.

CalexConfig and CalexSoft 2 are available to download free of charge at www.calex.co.uk/software.

CALEXCONFIG



Simple, touch-friendly software for one sensor.

CALEXSOFT 2

Multi-channel software for Calex sensors with digital communications.

FEATURES (CALEXCONFIG AND CALEXSOFT 2)

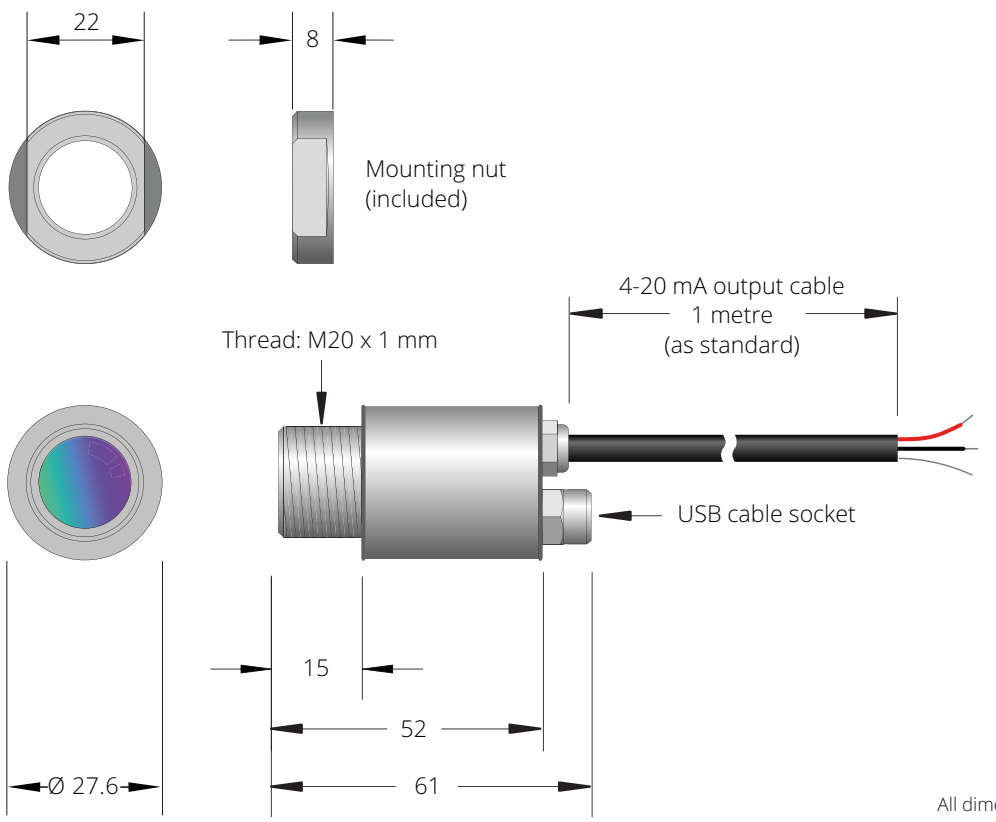
- Temperature display (°C or °F)
- Scrolling temperature chart
- Data logging to comma-separated text file, Excel-compatible
- PyroUSB sensor configuration:
  - Emissivity setting
  - Averaging
  - Peak/valley hold processing
  - Reflected energy compensation
  - 4-20 mA output temperature scale

THIRD-PARTY SOFTWARE

The PyroUSB can also be used with third-party Modbus software.

Modbus protocol information is provided in the Operator's Guide, available to download at www.calex.co.uk and supplied with each sensor.

DIMENSIONS

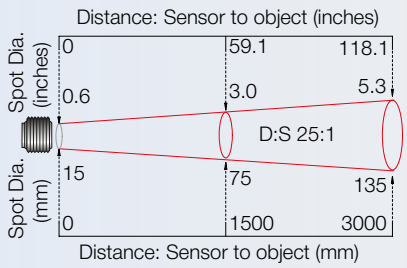


All dimensions in mm

OPTICS

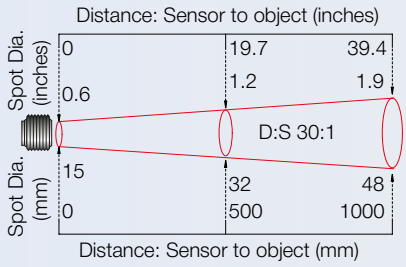
Diameter of target spot measured versus distance from sensing head (90% energy)
Note: The sensor will measure longer distances than shown, with a larger measured spot size.

Optics (PUA5)

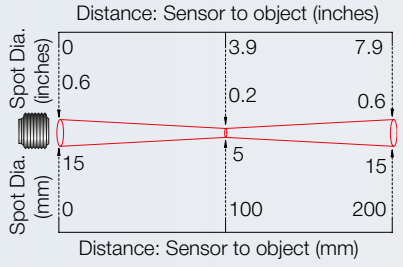


251

Optics (PUA8)

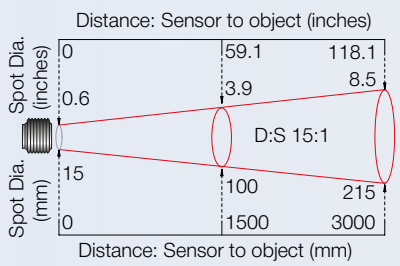


301

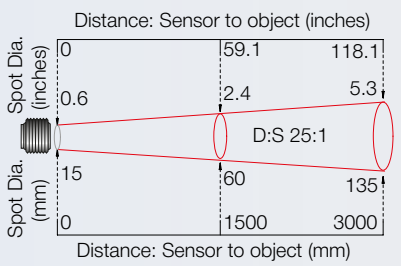


CF

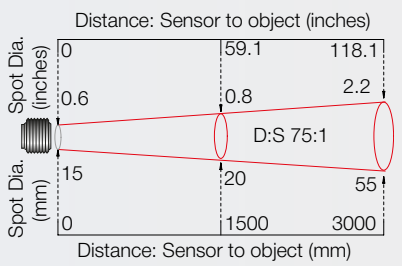
Optics (PUA2)



151



251



751

General Specifications			
Model	**PUA2**	**PUA5**	**PUA8**
Spectral Response	2.2 µm	5 µm	8 to 14 µm
Application	Ferrous metals and high-temperature targets	Glass	General purpose
Temperature range	Choice of ranges from 45°C to 2000°C	Choice of ranges from 50°C to 1650°C	-40°C to 1000°C
Response time	200 ms		
Output	2-wire, 4-20 mA, linear with measured temperature		
Communications	USB 2.0 (removable USB cable and software included) using the Modbus protocol		
Optics	Choice of optics for small or large targets at short or long distances (see Optics)		
Accuracy	± 2°C or 1% of reading, whichever is greater	± 1°C or 1% of reading, whichever is greater	
Repeatability	± 0.5°C or 0.5% of reading, whichever is greater		
Emissivity Setting	0.1 to 1.0		
Maximum Span (4-20 mA output)	Full temperature range		
Minimum Span (4-20 mA output)	100°C		

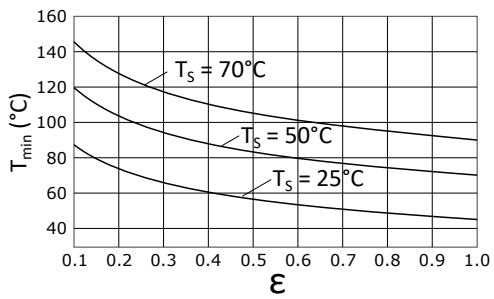
Electrical	
Supply Voltage	24 V DC (28 V DC max)
Sensor Voltage (minimum)	6 V DC
Maximum Loop Impedance	900 Ω @ 24 V DC

Mechanical	
Construction	Stainless Steel
Dimensions	Ø 27.6 x length 61 mm including cable glands
Thread mounting	M20 x 1 mm pitch, length 15 mm
4-20 mA Output Cable Length	1 m (standard), up to 30 m (optional)
Weight with 1 m Output Cable	155 g
USB Cable Length	1.8 m
Relative Humidity	95% max. non-condensing

Environmental	
Environmental Rating	IP65
Ambient (Operating) Temperature	0°C to 70°C (cooled models are available for higher temperatures)

MINIMUM MEASURABLE TEMPERATURE

(PUA2-151-LT only)



Graph showing the minimum measurable object temperature (Tmin), determined by surface emissivity (ε) and sensor temperature (TS).

MODEL NUMBERS

Short Wavelength	PUA2	-	251	-	MT	-	WJ
Glass	PUA5	-	251	-	GHT	-	WJ
General Purpose	PUA8	-	301	-		-	WJ

Cooling

(blank)	Sensor without cooling
WJ	Air/water cooled jacket with air purge collar

Temperature range

PUA2

LT	45°C to 300°C (151 models only)
PT	100°C to 400°C (151 models only)
MT	250°C to 1000°C
HT	450°C to 2000°C

PUA5

GLT	50°C to 1000°C
GHT	200°C to 1650°C

PUA8

(blank)	All models: -40°C to 1000°C

Field of view

PUA2

151	15:1 divergent optics (LT & PT models only)
251	25:1 divergent optics
751	75:1 divergent optics

PUA5

251	25:1 divergent optics

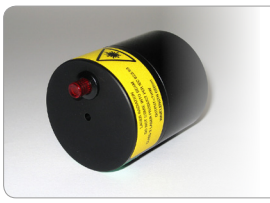
PUA8

301	30:1 divergent optics
CF	Close-focus optics (focal spot size 5 mm at 100mm distance)

Spectral response

PUA2	2.2 µm, for measuring reflective metals and high-temperature objects
PUA5	5 µm, for measuring glass surface temperature
PUA8	8 to 14 µm, general-purpose, for non-reflective non-metals, painted metal surfaces and most other applications

ACCESSORIES



Laser sighting tool
LSTL

Adjustable mounting bracket
ABL

Air/water cooled housing
WJ

Air purge collar
APL

Dual laser sighting bracket
DLSBFL, DLSBAL

Protective plastic window (for PUA8)
PWL

ACCESSORIES ALSO AVAILABLE

Fixed mounting bracket **FBL**

Extended 4-20 mA output cable:
- for PyroUSB models without cooling **PUACE**
- for PyroUSB WJ models **PUACEHT**

(Maximum factory-fitted cable length: 30 m)

Calibration certificate, UKAS traceable, 3 standard temperature points **CALCERTA**