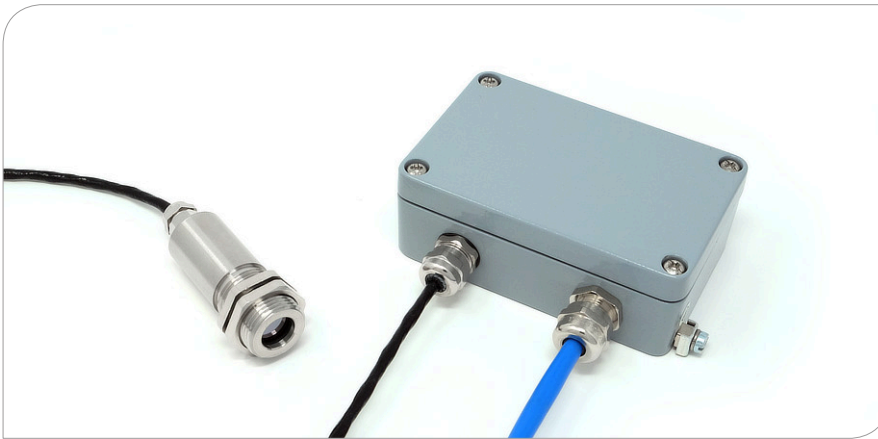# ExTempMini

Miniature Intrinsically Safe Infrared Temperature Sensor for High Ambient Temperatures

ATEX
IECEx
JapanEx
UKCA

Ex

- Suitable for gas hazardous areas, Zone 0, 1 and 2 (sensing head) with a suitable Intrinsically Safe isolator
- Miniature sensing head for use in high ambient temperatures up to 180°C
- Temperature range: -20°C to 1000°C
- Two wire, 4-20 mA output
- Rescalable output and adjustable emissivity setting via optional USB and RS-485 adapters
- Fast response time and high stability
- Stainless steel 316 housing on sensing head - ideal for offshore applications
- IP65 sealed
- Supplied with up to 25 m sensing head cable

SPECIFICATIONS

GENERAL

Measurement Temperature Range	-20°C to 1000°C (see table of Model Numbers)
Output	Two-wire 4 to 20 mA (loop powered)
Minimum Temperature Span	100°C
Maximum Temperature Span	1000°C
Field of View	See table of Model Numbers
Accuracy	± 1°C or 1% of reading, whichever is greater
Repeatability	± 0.5°C or 0.5%, whichever is greater
Emissivity Setting Range	0.20 to 1.00 (pre-set to 0.95)
Emissivity Setting Method	User configurable via optional USB / RS-485 adapters
Response Time, t_{90}	240 ms (90% response)
Spectral Range	8 to 14 µm
Supply Voltage	12 to 24 V DC ± 5%
Minimum Sensor Voltage	11.4 V DC
Maximum Current Draw	25 mA

ENVIRONMENTAL

	Main Enclosure	Sensing Head
Environmental Rating	IP65 (NEMA 4)	IP65 (NEMA 4)
Ambient (Operating) Temperature Range	0°C to 70°C	0°C to 180°C
Ambient Pressure Range	80 kPa (0.8 bar) to 110 kPa (1.1 bar)	80 kPa (0.8 bar) to 110 kPa (1.1 bar)
Relative Humidity	Max. 95% non-condensing	Max. 95% non-condensing
CE Marked	Yes	Yes
RoHS Compliant	Yes	Yes

MECHANICAL

|	Main Enclosure	Sensing Head
Construction	Painted aluminium	Stainless Steel 316
Major Dimensions	99 x 65 x 35 mm	Ø 20 x length 69 mm including cable gland (see Dimensions)
Mounting	2 x mounting holes, use M4 socket head screws	M20 x 1.5 mm thread, length 20 mm, supplied with two mounting nuts
Cable Length (Sensing Head)	-	Choice of 5 m, 10 m or 25 m factory-fitted. Contact Calex for information about extending cable.
Weight with 5 m Cable	TBD	TBD
Cable Connections	Removable screw terminal blocks (see Connections). Conductor size 22 AWG to 14 AWG (0.326 mm² to 2.08 mm²)	-
Output Cable Gland	Suitable for cable diameters 3.5 to 7.0 mm	-

HAZARDOUS AREA CLASSIFICATION

	Main Enclosure	Sensing Head	
Ambient Temperature Rating	-20°C ≤ Ta ≤ 70°C	-20°C ≤ Ta ≤ 115°C	-20°C ≤ Ta ≤ 180°C
ATEX Classification	Ex II 2 G	Ex II 1 G	Ex II 1 G
IECEx Classification (Gas)	Ex ia [ia Ga] IIC T4 Gb	Ex ia IIC T4 Ga	Ex ia IIC T3 Ga

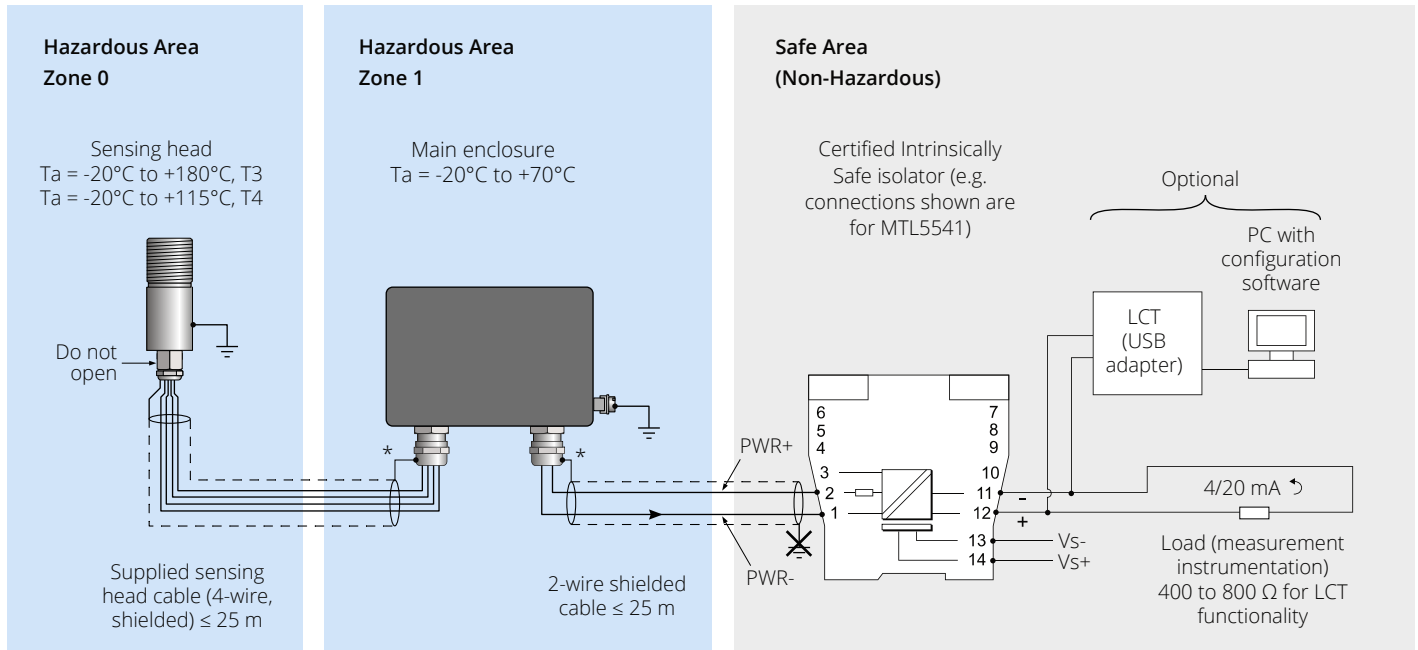|	
Maximum DC Input Voltage	Ui = 28 V
Maximum Input Current	Ii = 93 mA
Maximum Input Power	Pi = 0.651 W
Maximum Internal Capacitance	Ci = 5.17 nF
Maximum Internal Inductance	Li = 1.99 µH
ATEX Certificate Number	CML 22ATEX2007X
IECEx Certificate Number	IECEx CML 22.0001X
JapanEx Certificate Number	CML 22JPN2009X
UKCA Certificate Number	CML 22UKEX2008X

CALEX ELECTRONICS LIMITED

OPTICS

Diameter of target spot measured versus distance from sensing head (90% energy)

-21

-201
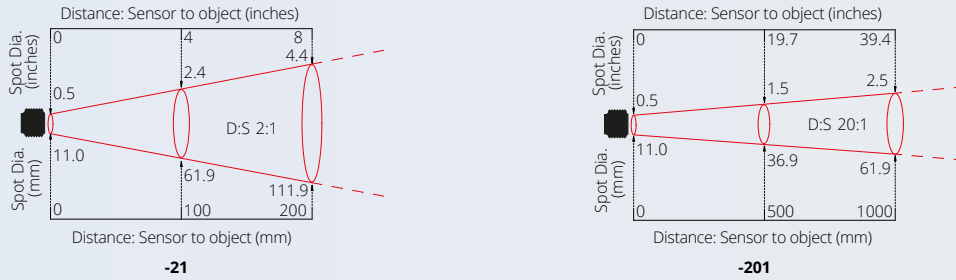
Note: The sensor will measure at longer distances than shown, with a larger measured spot diameter. Contact Calex for more information.

CONNECTIONS: EXTEMPMINI SENSOR

Hazardous Area Zone 0

Sensing head
Ta = -20°C to +180°C, T3
Ta = -20°C to +115°C, T4

Do not open

Supplied sensing head cable (4-wire, shielded) ≤ 25 m

Hazardous Area Zone 1

Main enclosure
Ta = -20°C to +70°C

2-wire shielded cable ≤ 25 m

Safe Area (Non-Hazardous)

Certified Intrinsically Safe isolator (e.g. connections shown are for MTL5541)

Optional

PC with configuration software

LCT (USB adapter)

PWR+

PWR-

4/20 mA

Load (measurement instrumentation) 400 to 800 Ω for LCT functionality

Vs-
Vs+

* Cable shield is terminated in main enclosure gland - see OUTPUT CABLE INSTALLATION in Operator's Guide
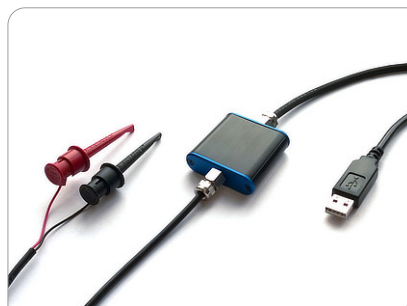
CONFIGURATION

A choice of optional adapters is available to allow configuration of the ExTempMini sensor.

Both adapters must be connected on the safe side of an Intrinsically Safe isolator.

The isolator must be capable of digital communications over 4-20 mA, and correct loop polarity must be observed.

Configurable settings include the emissivity setting, 4-20 mA temperature range, averaging, peak and valley hold processing and reflected energy compensation.

LCT

USB adapter

For sensor configuration

LCT-485

RS-485 network interface

allows configuration and continuous measurement from multiple sensors via a network)

LCT

The Loop Configuration Tool (LCT) allows the ExTemp or ExTempMini sensor to be connected to a PC via USB.

CalexConfig software makes it easy to configure the sensor.

For more information on the software, please see www.calex.co.uk/software and the Software data sheet.

LCT-485 NETWORK INTERFACE

This DIN rail-mounted unit provides RS-485 Modbus RTU Slave communications for one ExTemp or ExTempMini sensor. It allows up to 224 sensors to be connected together in a network.

FEATURES

- Fault-tolerant RS-485 interface with up to 60 V over-voltage protection
- Isolated RS-485 interface for easy connection to separately powered buses
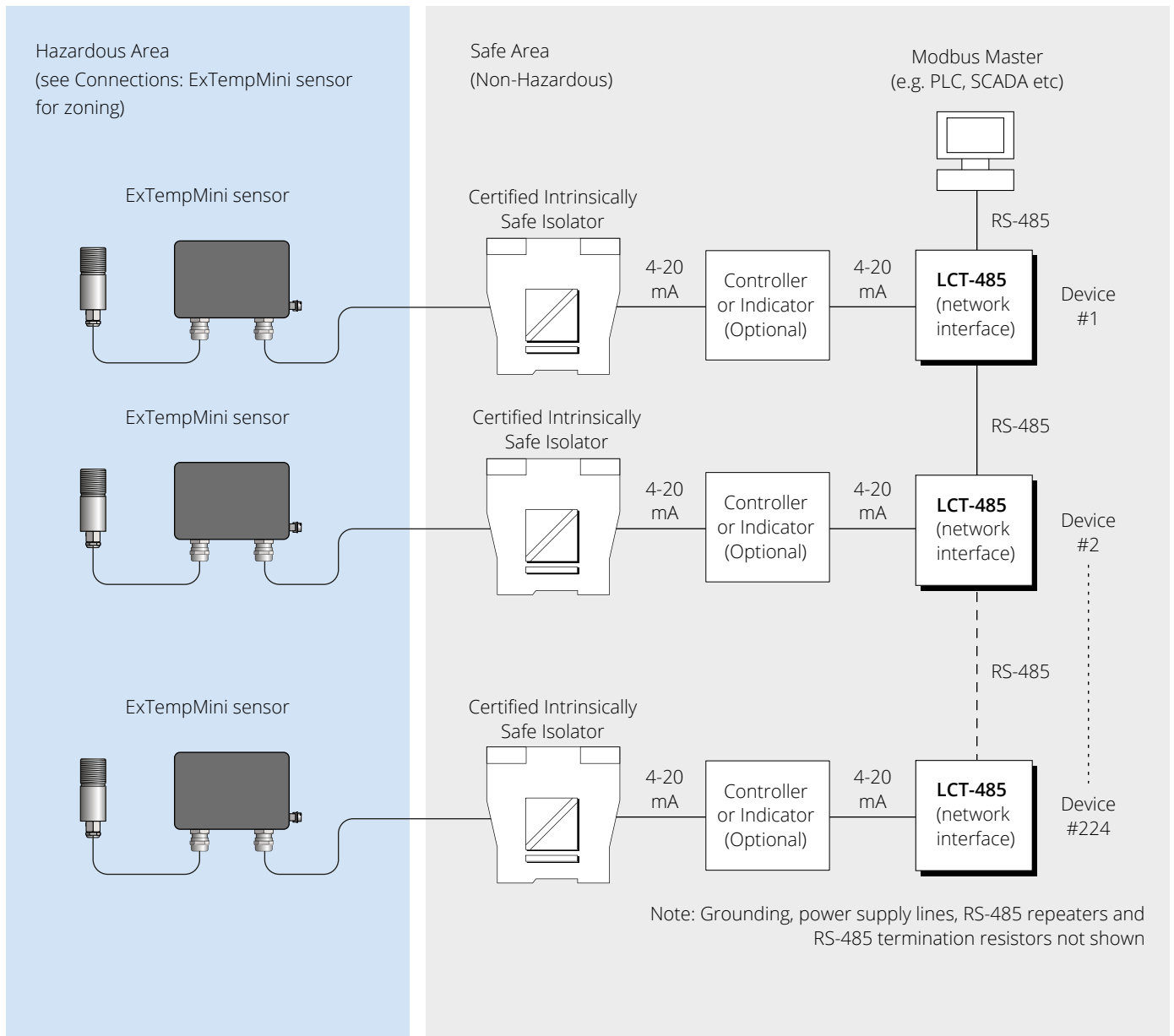- Built-in 270 ohm loop resistor for simplified wiring

SPECIFICATIONS

Mounting	DIN rail (35 mm)
Dimensions	114(d) x 18(w) x 107(h) mm approx
Connections	Screw terminals for RS-485, power, and sensor loop
Supply voltage	6 to 28 V DC
Max current draw	50 mA
Protocol	Modbus RTU Slave
Baud rate	1200-57600 bps, detected automatically
Ambient temperature	-20°C to 70°C
EMC Conformity	BS EN 61326-1:2013 & EN 61326-2-3:2013*
Max. No. of Devices	Up to 224 x LCT-485 Slave devices per Modbus Master

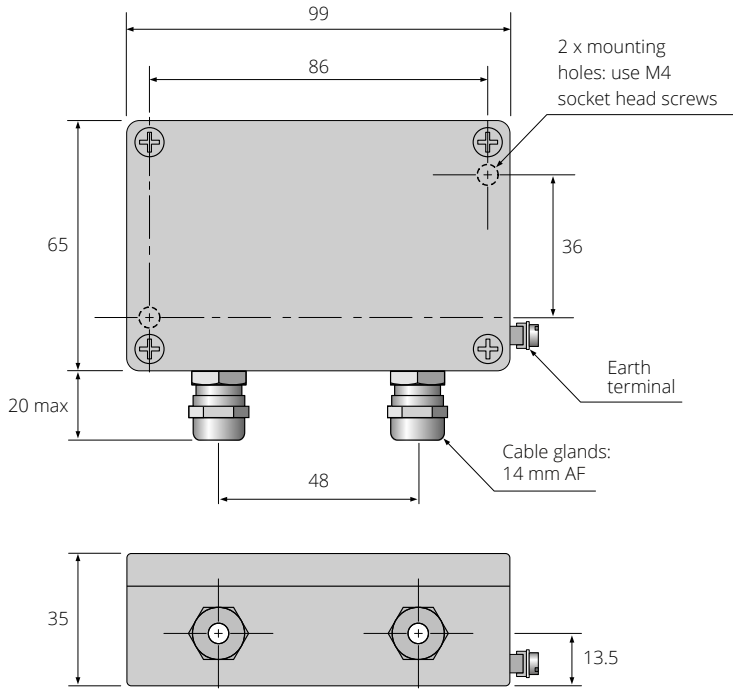* for lines ≤ 30 m within buildings, for RS-485 & loop terminals

NETWORK LAYOUT: LCT-485 INTERFACE

Hazardous Area
(see Connections: ExTempMini sensor for zoning)

Safe Area
(Non-Hazardous)

Modbus Master
(e.g. PLC, SCADA etc)

ExTempMini sensor

Certified Intrinsically Safe Isolator

4-20 mA

Controller or Indicator (Optional)

4-20 mA

LCT-485 (network interface)

RS-485

Device #1

ExTempMini sensor

Certified Intrinsically Safe Isolator

4-20 mA

Controller or Indicator (Optional)

4-20 mA

LCT-485 (network interface)

RS-485

Device #2

RS-485

ExTempMini sensor

Certified Intrinsically Safe Isolator

4-20 mA

Controller or Indicator (Optional)

4-20 mA

LCT-485 (network interface)

Device #224

Note: Grounding, power supply lines, RS-485 repeaters and RS-485 termination resistors not shown

DIMENSIONS (mm)

Main enclosure

99

86

2 x mounting holes: use M4 socket head screws

65

36

20 max

48

Earth terminal

Cable glands: 14 mm AF

35

13.5

Sensing head

69

53

20

Ø4

Ø20

Thread M20 x 1.5
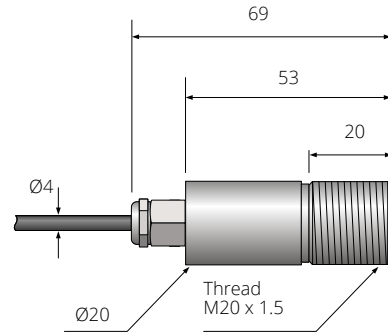
MODEL NUMBERS

ExTempMini infrared temperature sensor with miniature sensing head and separate electronics module.
Supplied with 2 x mounting nuts and operator's guide

| EXM8 | - | 201 | - | LT | - | 25 |

Sensing Head Cable Length (m)

e.g.

5 = 5 m
10 = 10 m
25 = 25 m (maximum length)

The sensing head and electronics module are calibrated together as a pair. The sensing head cable length may not be modified by the user. Contact Calex for more information.

Measurement Temperature Range

LT = -20°C to 100°C
MT = 0°C to 250°C
HT = 0°C to 500°C
XT = 0°C to 1000°C
ST = Special temperature range

Temperature range may be rescaled between limits -20°C and 1000°C via optional adapters and software

Field of view (see OPTICS)

21 2:1 divergent optics
201 20:1 divergent optics

Series
EXM8 = ExTempMini infrared temperature sensor with miniature sensing head and separate electronics module. Supplied with 2 x mounting nuts and operator's guide. General-purpose, 8-14 µm spectral response, for non-reflective non-metal surfaces and painted metals.

Ambient temperature range (sensing head) 0°C to 180°C

ACCESSORIES

FBL	Fixed mounting bracket (1-axis rotation)
ABL	Adjustable mounting bracket (2-axis rotation)
APM	Air purge collar (for 20:1 optics)
APMW	Air purge collar (for 2:1 optics)
CALCERTA	Calibration certificate, 3 temperature points, UKAS traceable
LCT	USB configuration adapter (CalexConfig software available as a free download)
LCT-485	RS-485 Modbus network interface

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Specifications subject to change without notice