

FibreCube

High Performance Fibre Optic Pyrometer



- Temperature ranges from 100°C to 2,000°C
- Miniature fibre optic sensing head for ambient temperatures up to 150°C
- Bright green through-lens LED aiming light
- Choice of precision optics for large or small targets
- Extremely fast 1 ms response time
- Short measurement wavelength for improved performance on reflective metal surfaces, compared with general-purpose models
- 4-20 mA, voltage, alarm outputs
- RS-232 communications
- Optional display and configuration unit
- Conforms to industrial EMC standards

TEMPERATURE RANGES

Application	Model	Measurement Temperature Range	Model	Measurement Temperature Range	Model	Measurement Temperature Range
Low temperature	FC-TL	100°C* to 1500°C	FC-PL	220 to 1650°C	FC-AL	500 to 2000°C
High temperature	FC-TM	180°C* to 2000°C	FC-PM	300 to 2000°C	FC-AM	600 to 2000°C
High temperature with smallest measured spot	FC-TH	240°C* to 2000°C	FC-PH	400 to 2000°C	FC-AH	700 to 2000°C
* Depending on ambient temperature and fibre optic cable length - see Minimum Measurable Temperature						
Spectral response		2.0 to 2.5 µm		0.8 to 1.6 µm		0.8 to 1.0 µm

GENERAL SPECIFICATIONS

Aiming light	Green LED, through-lens (shows size and location of measurement area)
Accuracy*	Measurements below 800°C: ±4°C 800°C to 1200°C: ±0.5% of reading 1000°C to 2000°C: ±1.0% of reading
Repeatability*	±2°C ±0.2% of reading
Measurement resolution*	Measurements within 50°C of minimum of measurement temperature range: 3°C Measurements within 50°C of minimum of measurement temperature range: 1°C Otherwise: 0.5°C
Response time (95%)	Analogue output: 0.001 to 5 s Adjustable via averaging function
Warm up time	1 minute
Analogue output type	4 to 20 mA (set by default) Can be changed via PM030 or RS-232 to: 0 to 20 mA, mV/°C, or 0 to 1 V DC Other voltage output ranges available: contact Calex
RS-232C communications	Output swing width: ±4 V approx. Baud rate: 4800, 9600, 19200, 38400, 57600, 115200 bps (selectable)
Alarm output	Open drain, 27 V DC, 0.2 A
Alarm hysteresis	Adjustable, 0°C to 99.9°C
Peak hold	0.01 to 10 s, time or discharge mode, configurable
Emissivity setting	Adjustable, 0.3 to 1.0 (default setting 0.95) in 0.001 increments Emissivity may be set as low as 0.05 with reduced accuracy
Supply voltage	4.7 to 27 V DC, 0.1 A max

MECHANICAL SPECIFICATIONS

Output cable length	2 m, 5 m, or 10 m according to model number
Fibre optic cable length	According to model number: 1 m to 10 m (L models) 1 m to 28 m (AM, AH, PM, PH models) 1 m to 20 m (TM and TH models)
Construction	Sensing head and electronics module: Anodised aluminium Fibre optic cable jacket: Stainless steel
Minimum bend radius (fibre optic cable)	L models: 150 mm M and H models: 70 mm

ENVIRONMENTAL SPECIFICATIONS

Ambient (operating) temperature range	Fibre optic cable and sensing head: 0°C to 150°C Electronics module: 0°C to 50°C
Minimum measurable temperature (FC-T models only)	Ambient temperature: Up to 50°C Minimum measurement: 100°C Ambient temperature: Up to 70°C Minimum measurement: 160°C Ambient temperature: Up to 120°C Minimum measurement: 240°C See also Minimum Measurable Temperature (Fibre Optic Cable) on page 2
Storage temperature range	-15°C to 70°C
Ambient humidity	30% to 85% RH non-condensing

MINIMUM MEASURABLE TEMPERATURE (FIBRE OPTIC CABLE) FC-T models only

On FibreCube T models, the lowest measurable temperature depends on the fibre optic cable length..

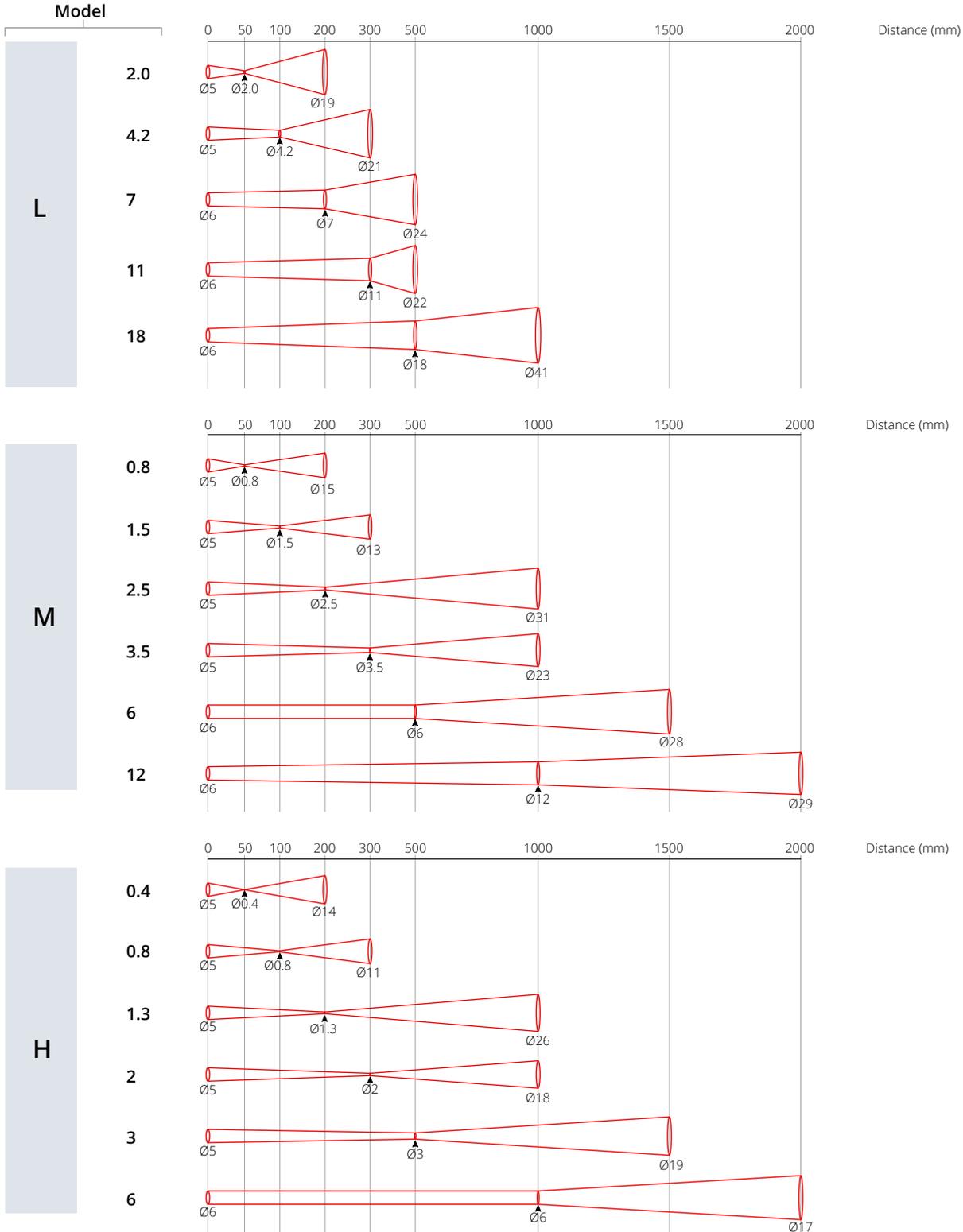
Model	Fibre optic cable length			
	1 m	2 m to 5 m	6 m to 10 m	11 m to 20 m
FC-TL	100°C	140°C	150°C	Not available
FC-TM	180°C	220°C	240°C	270°C
FC-TH	240°C	290°C	310°C	340°C

On all other models, the fibre optic cable length does not affect the minimum temperature.

OPTICS Diameter of target spot measured versus distance from sensing head - 90% energy

A choice of optics is available for each FibreCube temperature range (M, L, H), e.g. for FC-AM sensors, choose from the "M" optics below.

Note: Smaller measured spot sizes are available. If the below options are not suitable, contact Caalex to discuss special optics.



Measured spot diameters in mm

PM030 - TOUCH SCREEN INTERFACE FOR FIBRECUBE (ALL MODELS)



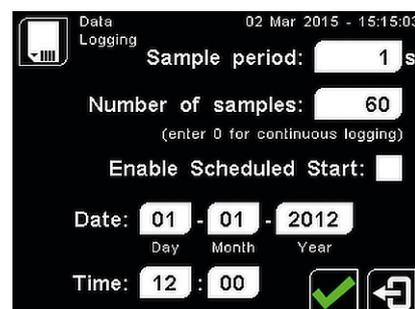
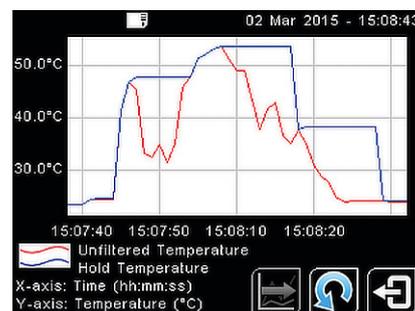
Optional wall-mounted display, data logging, configuration and alarm unit for FibreCube sensor

- **Read the temperature**
The large, bright backlit temperature display is visible from a distance and turns red in an alarm condition.
- **Record the temperature history**
See a graph of the measured temperature, and log more than a year of data to a single MicroSD Card. The data is stored in a simple text format that can be imported easily into Excel.
- **Configure the sensor**
All the sensor's configuration settings can be adjusted via the intuitive touch screen interface.
- **Trigger temperature alarms**
Two alarms are individually configurable as high, low, band or error. The screen turns bright red to signal an alarm condition, and the built-in 24 V, 1 A relay outputs can be connected directly to alarm sounders and beacons.
- **Accurate measurements, even with reflections of hot objects**
Place the sensor outside an oven or furnace and accurately measure the temperature of objects inside by using the Reflected Energy Compensation feature.

PM030 Specifications	
Inputs	1 x FibreCube or PyroCube sensor (any model)
Outputs	Retransmitted analogue output from sensor, and 2 relays, rated 24 V DC, 1 A
Display Format	2.83" (72 mm) resistive touch TFT, 320 x 240 pixels, backlit
Touch Screen Display Format	2.83" (72 mm) resistive touch TFT, 320 x 240 pixels, backlit
Storage	MicroSD Card (optional), max. 32 GB, equal to 16 years of data at the fastest sample rate of 1 per second
Data Logging Interval	1 second to 1 day (configurable)
Internal Clock Battery	1 x BR 1225 3V (not included)
Variables Logged	Instantaneous target temperature, hold temperature, alarm events
File format	.csv
Configurable Parameters (Data Logging)	Sample period Number of samples Scheduled start
Configurable Parameters (Alarm Logging)	Log times when triggered, acknowledged, reset Log data while triggered

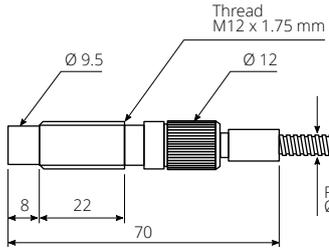
Configurable Parameters
Languages English, Chinese (simplified), Japanese
Temperature units °C/°F
Displayed temperature
LED sighting on/off
Password
Date & time (for data logging time stamps)
Peak hold period, decay level
Averaging period
Correction (gain/offset)
Emissivity setting (with teach function)
Reflected energy compensation (with teach function)
Output type
Output temperature range
Polarity on error
Alarm mode, levels, hysteresis

SCREENSHOTS (PM030 interface)

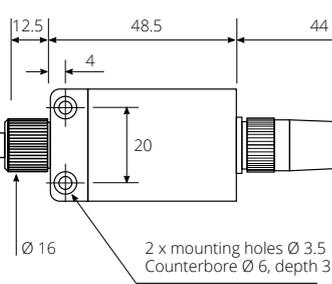


DIMENSIONS - FIBRECUBE SENSOR

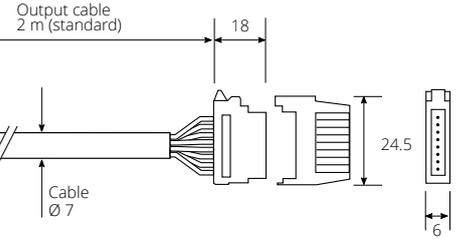
Sensing Head



Electronics Module

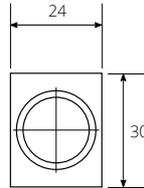
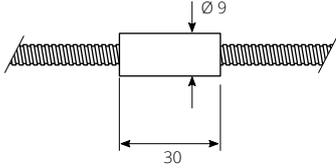


Output Connector Set



Fibre optic cable joint

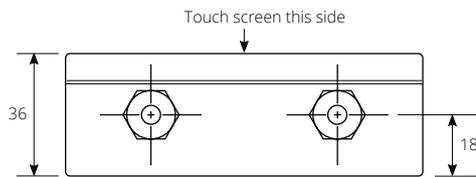
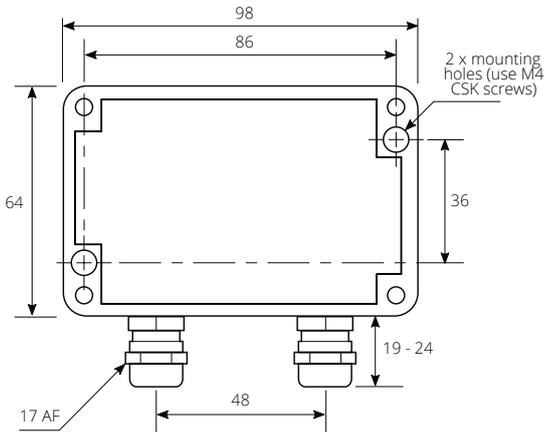
Not fitted to fibre optic cables < 10 m
One joint every 10 m on fibre optic cables > 10 m



Output connector set

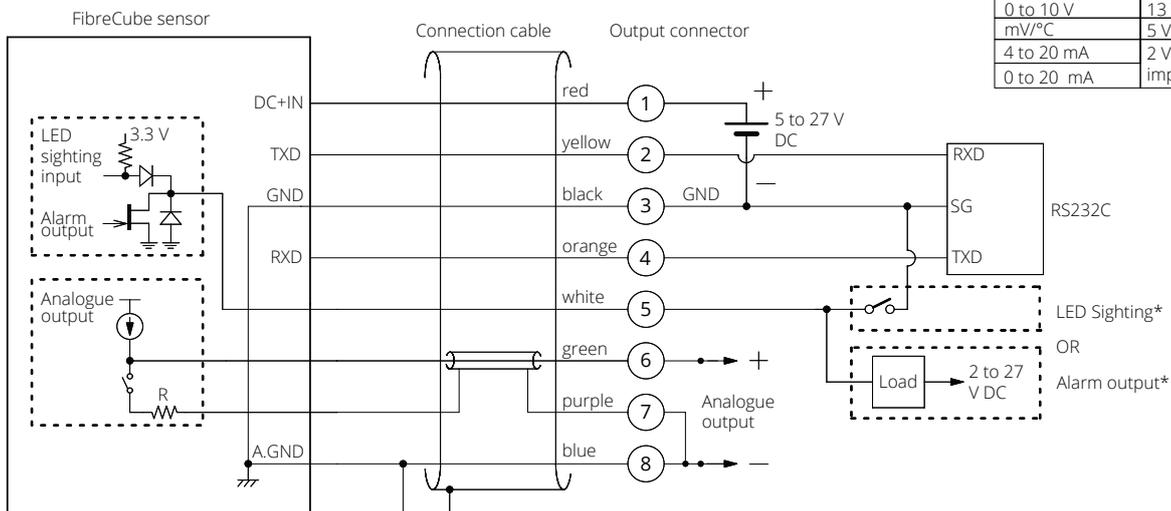
Both parts included with sensor
Easy-wire connectors for wire sizes 28 to 20 AWG (0.08 to 0.5 mm²)
Max sheath Ø 1.5 mm

DIMENSIONS - PM030 TOUCH SCREEN INTERFACE



All dimensions in mm

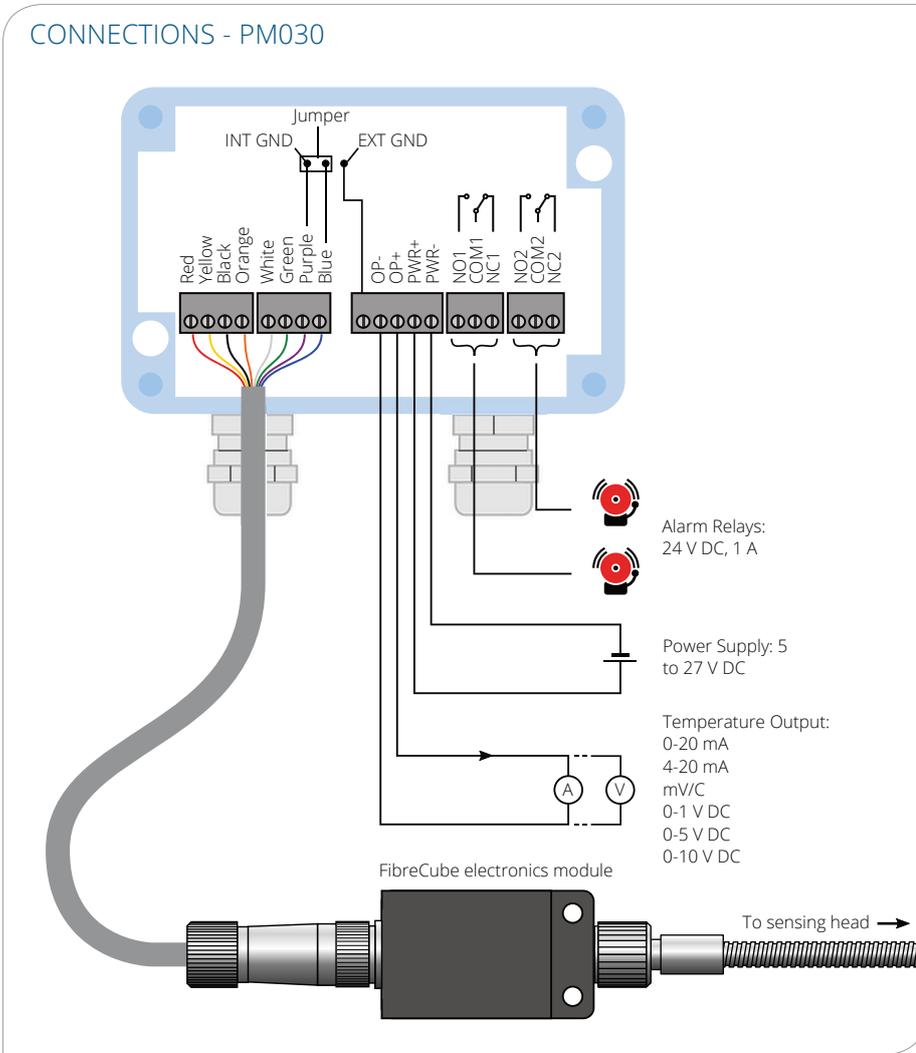
CONNECTIONS - FIBRECUBE SENSOR



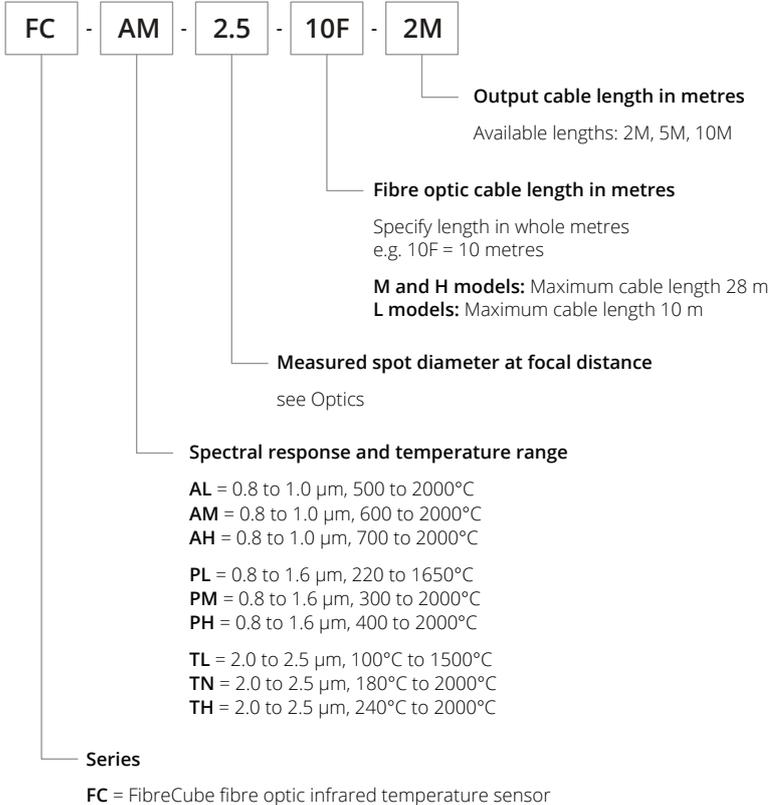
Analogue output	Minimum supply voltage
0 to 1 V	5 V
0 to 5 V	8 V
0 to 10 V	13 V
mV/°C	5 V
4 to 20 mA	2 V + (0.02 A x loop impedance [Ω])
0 to 20 mA	

* See LED SIGHTING AND ALARMS (with Specifications)

CONNECTIONS - PM030



MODEL NUMBERS



PM030

Touch screen interface module for FibreCube and PyroCube sensors (any model)

ACCESSORIES

