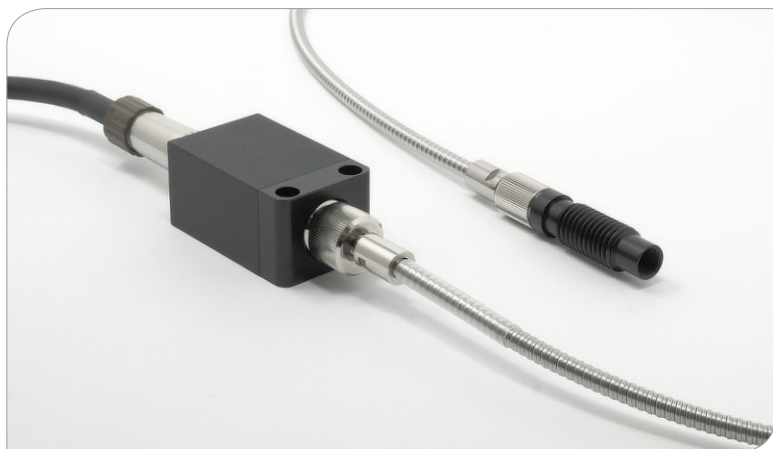# FibreCube

High Performance Fibre Optic Pyrometer

SENSOR PARTNERS

- 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

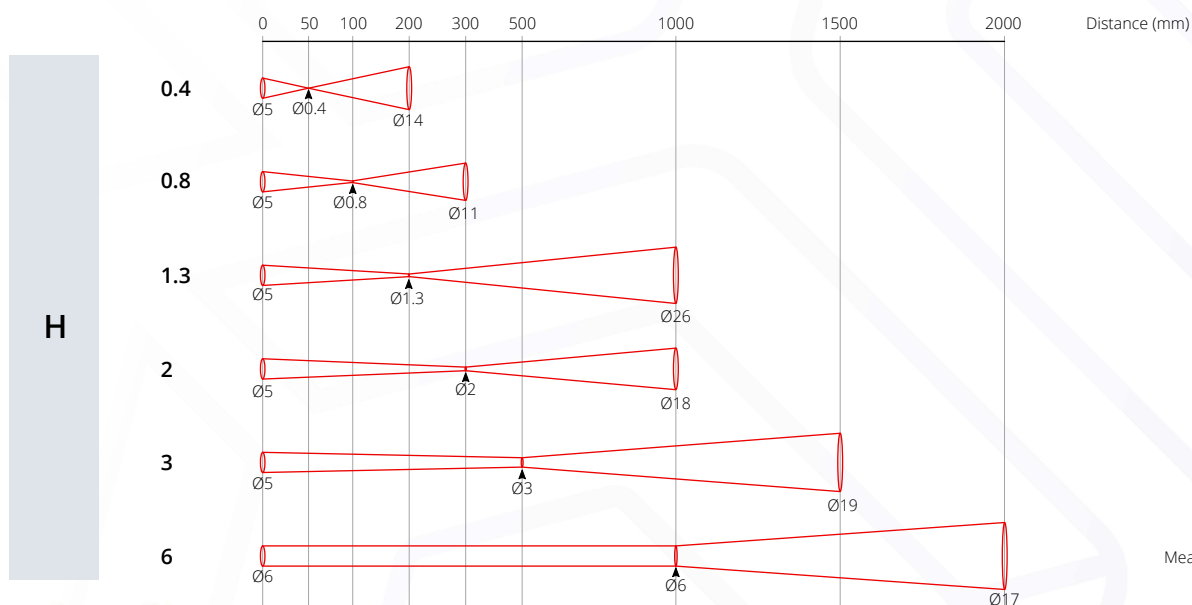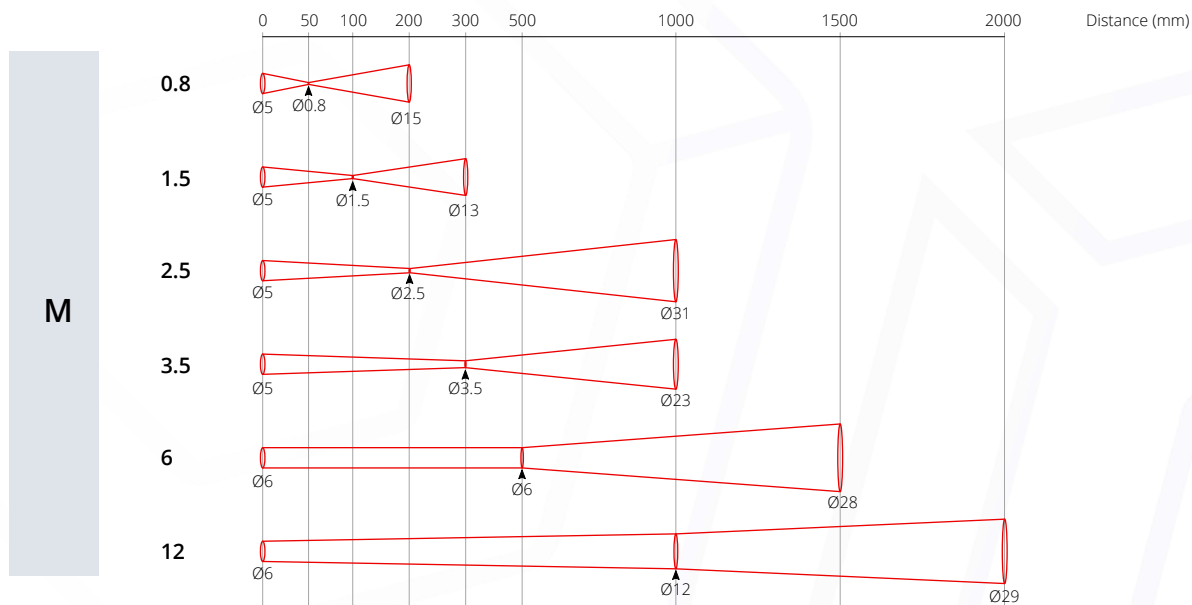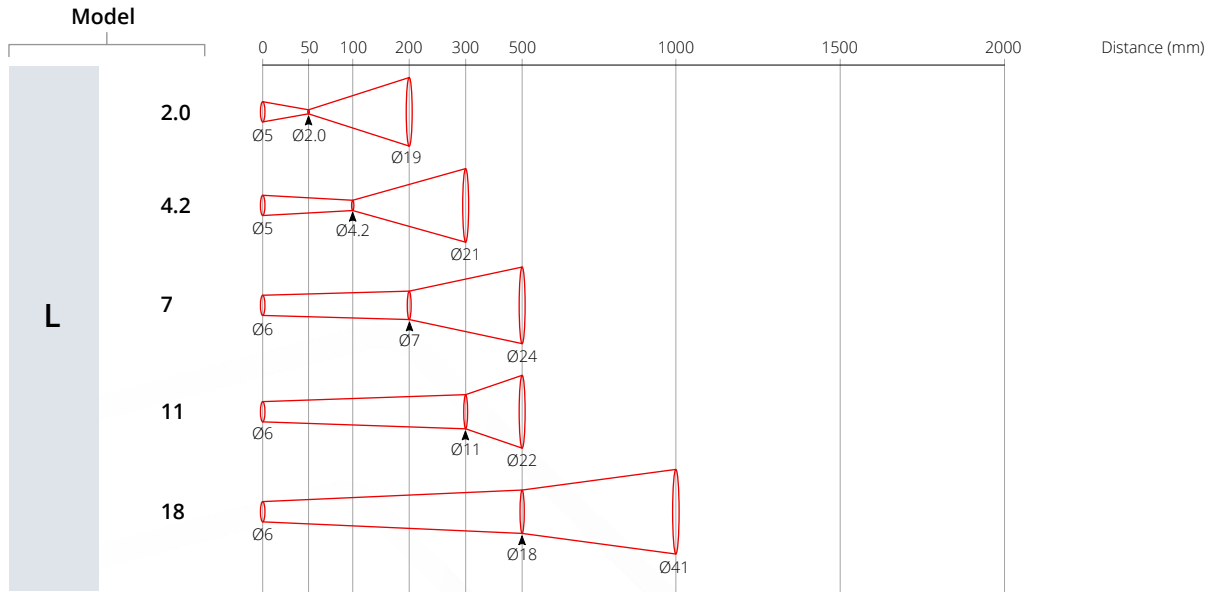| Application	Model	Measurement Temperature Range	Model	Measurement Temperature Range	Model	Measurement Temperature Range
Low temperature	FC-TL	100°C to 1500°C	FC-PL	220 to 1650°C	FC-AL	500 to 2000°C
High temperature	FC-TM	180°C to 2000°C	FC-PM	300 to 2000°C	FC-AM	600 to 2000°C
High temperature with smallest measured spot	FC-TH	240°C to 2000°C	FC-PH	400 to 2000°C	FC-AH	700 to 2000°C
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 Sensor Partners
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 (M and H 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) Depending on ambient temperature (sensing head)	Ambient temperature: Up to 50°C Minimum measurable temperature: 100°C Ambient temperature: Up to 70°C Minimum measurable temperature: 160°C Ambient temperature: Up to 120°C Minimum measurable temperature: 240°C
Storage temperature range	-15°C to 70°C
Ambient humidity	30% to 85% RH non-condensing

SENSOR PARTNERS

Model

L

| Distance (mm) | 0 | 50 | 100 | 200 | 300 | 500 | 1000 | 1500 | 2000 |

2.0 — Ø5, Ø2.0, Ø19

4.2 — Ø5, Ø4.2, Ø21

7 — Ø6, Ø7, Ø24

11 — Ø6, Ø11, Ø22

18 — Ø6, Ø18, Ø41

M

| Distance (mm) | 0 | 50 | 100 | 200 | 300 | 500 | 1000 | 1500 | 2000 |

0.8 — Ø5, Ø0.8, Ø15

1.5 — Ø5, Ø1.5, Ø13

2.5 — Ø5, Ø2.5, Ø31

3.5 — Ø5, Ø3.5, Ø23

6 — Ø6, Ø6, Ø28

12 — Ø6, Ø12, Ø29

H

| Distance (mm) | 0 | 50 | 100 | 200 | 300 | 500 | 1000 | 1500 | 2000 |

0.4 — Ø5, Ø0.4, Ø14

0.8 — Ø5, Ø0.8, Ø11

1.3 — Ø5, Ø1.3, Ø26

2 — Ø5, Ø2, Ø18

3 — Ø5, Ø3, Ø19

6 — Ø6, Ø6, Ø17

Measred 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

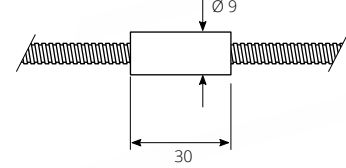| Configurable Parameters |
|---|
| Languages English, Chinese (simplified), Japanese |
| Temperature units °C/°F |
| Displayed temperature |
| LED sighting on/off |
| Password |
| Date & time (for data logging time stamps) |
| Peak hold period, decay level |
| Averaging period |
| Correction (gain/offset) |
| 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)
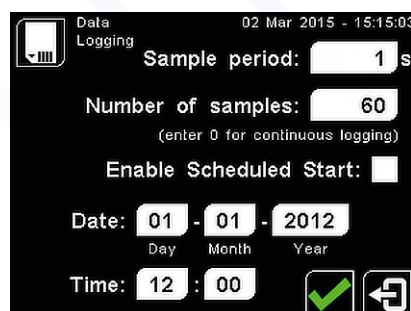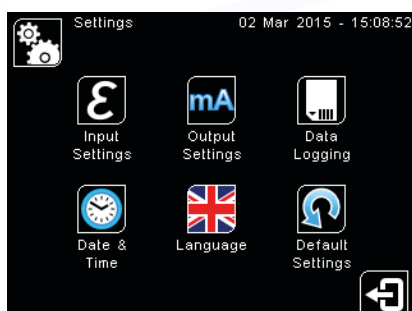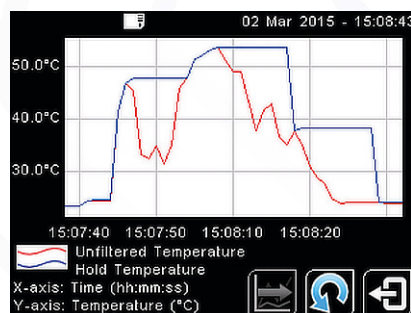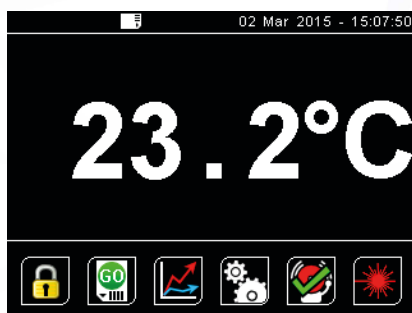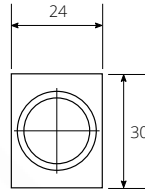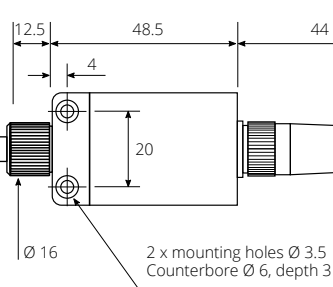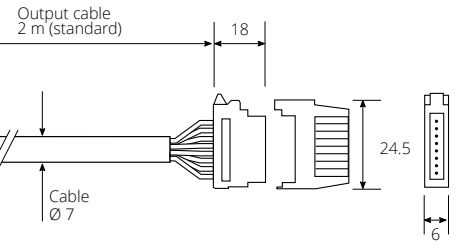
DIMENSIONS - FIBRECUBE SENSOR

Sensing Head

Thread
M12 x 1.75 mm

Ø 9.5
Ø 12

Fibre Optic Cable
Ø 5.2

8
22
70
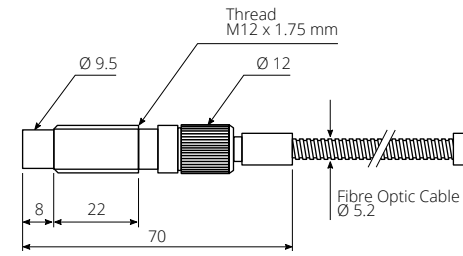
Fibre optic cable joint
Not fitted to fibre optic cables < 10 m
One joint every 10 m on fibre optic
cables > 10 m

Ø 9

30

Electronics Module

12.5
48.5
44

4

20

Ø 16

2 x mounting holes Ø 3.5
Counterbore Ø 6, depth 3

24

30

Connector
Ø 15

Cable
Ø 7

Output Connector Set

Output cable
2 m (standard)

18

24.5
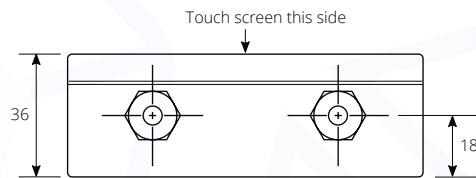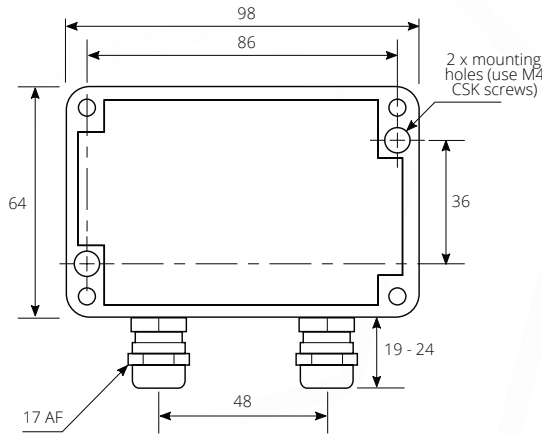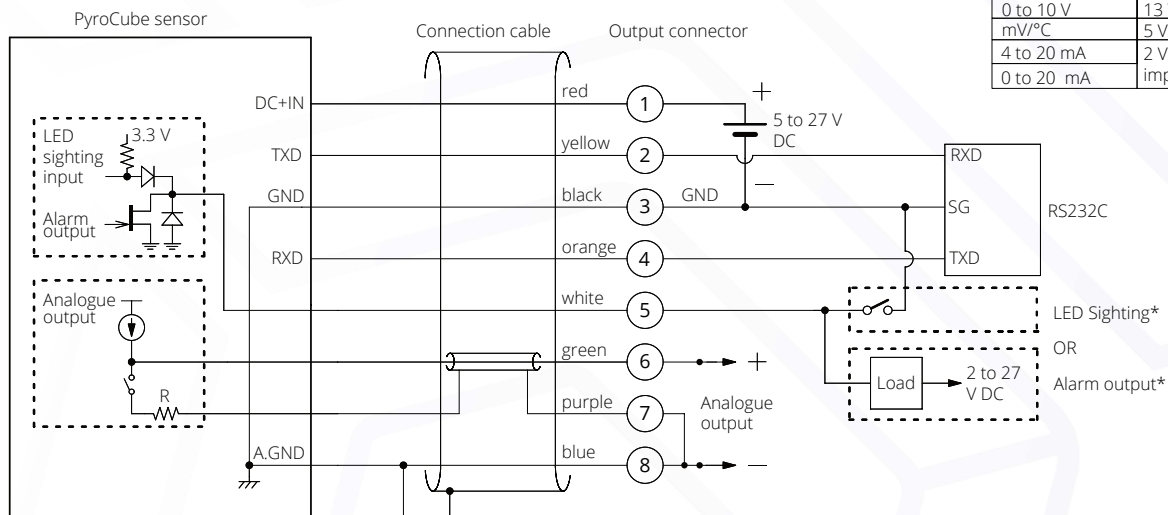
6

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

98
86

2 x mounting
holes (use M4
CSK screws)

64

36

19 - 24

17 AF

48

Touch screen this side

36

18

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
0 to 20 mA	impedance [Ω])

PyroCube sensor

Connection cable

Output connector

LED
sighting
input   3.3 V

Alarm
output

Analogue
output

R

DC+IN   red   1   +
                            5 to 27 V
TXD   yellow   2   DC
                            RXD
GND   black   3   GND SG   RS232C
RXD   orange   4   TXD
           white   5   LED Sighting*
                                 OR
           green   6   +
                            Load   2 to 27
purple   7   Analogue   V DC   Alarm output*
               output
A.GND   blue   8   −

* See LED SIGHTING AND ALARMS (with Specifications)

CONNECTIONS - PM030

Jumper

INT GND · · EXT GND

Red
Yellow
Black
Orange

White
Green
Purple
Blue

OP-
OP+
PWR+
PWR-

NO1
COM1
NC1

NO2
COM2
NC2

Alarm Relays:
24 V DC, 1 A

Power Supply: 5
to 27 V DC

Temperature Output:
0-20 mA
4-20 mA
mV/C
0-1 V DC
0-5 V DC
0-10 V DC

A   V

FibreCube electronics module

To sensing head →

ACCESSORIES

Mounting bracket
for sensing head

Mounting bracket
for electronics module

Protective lens cover

Air purge collar

Airless dust protector

Right angled mirror

5 m extension cable
with connectors

Panel Mounting Kit
for PM030

MODEL NUMBERS

FC - AM - 2.5 - 10F - 2M

Output cable length in metres

Available lengths: 2M, 5M, 10M

Fibre optic cable length in metres

Specify length in whole metres
e.g. 10F = 10 metres

M and H models: Maximum cable length 28 m
L models: Maximum cable length 10 m

Measured spot diameter at focal distance

see Optics

Spectral response and temperature range

AL = 0.8 to 1.0 μm, 500 to 2000°C
AM = 0.8 to 1.0 μm, 600 to 2000°C
AH = 0.8 to 1.0 μm, 700 to 2000°C

PL = 0.8 to 1.6 μm, 220 to 1650°C
PM = 0.8 to 1.6 μm, 300 to 2000°C
PH = 0.8 to 1.6 μm, 400 to 2000°C

TL = 2.0 to 2.5 μm, 100°C to 1500°C
TN = 2.0 to 2.5 μm, 180°C to 2000°C
TH = 2.0 to 2.5 μm, 240°C to 2000°C

Series

FC = FibreCube fibre optic infrared temperature sensor

PM030 — Touch screen interface module for FibreCube and PyroCube sensors
(any model)