PSC-SSS-PM Series

Miniature Infrared Temperature Sensors with Optional Touch Screen Display

PROCESS SENSORS®
CORPORATION

a **KPM** ANALYTICS brand

PSC-SSS-PM with touch screen display (-CRT version)

FEATURES

- Miniature sensing head and configurable electronics box
- Touch screen display (optional) for temperature indication and sensor system configuration
- Display screen turns bright red in alarm condition for maximum visibility
- Adjustable emissivity settings on all models
- Data logging to MicroSD Card (optional on touch screen display models)
- 4 to 20 mA or RS485 Modbus RTU outputs depending on the model
- Alarm relay outputs rated 24 V DC (optional) - no need for separate trip amplifier
- Maximum, minimum, average and real time readings, peak or valley hold, reflected energy compensation

PSC-SSS-PM GENERAL PURPOSE Version

- High-ambient sensing heads which can withstand up to 120°C (-CB) or 180°C (-CRT) without cooling
- Suitable for a wide range of target materials such as paper, plastics, food, painted surfaces, coated metal, ceramics, liquids, powders, etc
- Resistant to interference from movement of sensing head cable (-JA, -HA models) - ideal for mounting on robot arms
- Temperature ranges from -20°C to 1000°C

PSC-SSS-PM 2.2 HIGH TEMPERATURE Version

- Short-wavelength measurement for improved accuracy on reflective targets such as steel and many other metal surfaces
- Temperature ranges from 100°C to 2000°C
- Choice of optics, including narrow options for long-distance measurements of very hot objects

GENERAL SPECIFICATIONS

	PSC-SSS-PM General Purpose	PSC-SSS-PM 2.2 High Temperature
Temperature Range	Choice of ranges from -20°C to 2000°C (see Model Numbers on page 2)	
Output	4 to 20 mA or RS485 Modbus (up to 247 sensors may be installed on each Modbus network)	
Alarm Relays (-CRT and -BRT models)	2 x Single Pole Changeover alarm relays rated 24 V DC, 1 A, isolated 500 V DC	
Accuracy	± 1% of reading	±1% of reading
Repeatability	± 0.5%	
Field of View	Choice of optics (see FOV tables on page 3)	
Emissivity Setting Range	0.20 to 1.00	0.10 to 1.00
Emissivity Setting Method	-CRT and -BRT models: via touch screen -BB and -BRT models: via RS485 -CB models: via two rotary switches in electronics box	
Response Time, t90	≤ 240 ms (90% response)	
Spectral Range	8 to 14 µm	2.0 to 2.6 µm
Supply Voltage	24 V DC ± 5%	
Maximum Current Draw	100 mA	
Maximum Loop Impedance	-CB and -CRT models: 900 Ω (4 to 20 mA output)	
Max Temp Span (-CRT models)	Full temperature range	
Min Temp Span (-CRT models)	100°C	

MECHANICAL

	Sensing Head	Electronics Module
Construction	Stainless Steel 316	Cast aluminium
Dimensions	Ø 18 x 45 mm (see diagram)	98(w) x 64(h) x 36(d) mm
Mounting	M16 x 1 mm thread	Two M4 screw holes for wall mounting (see diagram)

Cable Length (sensing head to electronics module)
1 m (standard), up to 30 m (optional)
Weight with 1 m Cable
14 oz. (390 g)
Cable Connections
Removable screw terminal blocks (see Connections) Conductor size: 28 AWG to 18 AWG
Output Cable Gland
Suitable for cable diameters 3.0 to 6.5 mm

ENVIRONMENTAL

	Sensing Head	Electronics Box (w/o touch screen)	Electronics Box (with touch screen)
Environmental Rating	IP65 (NEMA 4)	IP65 (NEMA 4)	-
Ambient Temperature Range	See below *	0°C to 60°C	0°C to 60°C
Relative Humidity	Maximum 95% non- condensing	Maximum 95% non- condensing	Maximum 95% non- condensing
RoHS Compliant	Yes	Yes	Yes

*Ambient Temperature Rating (Sensing Head)
PSC-SSS-PM series: Ranges from 0°C to 120°C /180°C, depending on model (see Model Numbers on page 2)
PSC-SSS-PM 2.2: 0°C to 70°C

ELECTROMAGNETIC COMPATIBILITY STANDARDS
Conforms to EMC Directive EN61326-1:2006 (Electrical equipment for measurement, control and laboratory use – Industrial) as well as industrial standards for electromagnetic immunity and emissions.

MODEL NUMBER SELECTION

Series	Sensing Head Operating Temperature Range	Field of View	Temperature Range	Output and Interface
PSC-SSS-PM General Purpose (8-14 um)	**MA** (0-60°C)	**21** (2:1) **151** (15:1) **301** (30:1) **CF** (close focus)	**HT** (0 - 500°C) **XT** (0 - 1000°C)	CB
			CT (-20 - 1000°C)	CRT BB BRT
	HA (0-180°C) **JA** (0-120°C)	**201** (20:1)	**HT** (0 - 500°C) **XT** (0 - 1000°C)	CB
			CT (-20 - 1000°C)	CRT BB BRT

PSC-SSS-PM 2.2 High Temperature (2.2 um)	0-70°C	**151** (15:1) **251** (25:1) **751** (75:1) **CF** (close focus)	**PT** (100 - 400°C) **MT** (250 - 1000°C) **HT** (450 - 2000°C)	CB CRT BB BRT

MEASUREMENT TEMPERATURE RANGE (°C)

PSC-SSS-PM (General Purpose)

-HT

-XT

-CT

-20   0   100   250   500   1000°C

PSC-SSS-PM 2.2 (High Temperature)

-PT

-MT

-HT

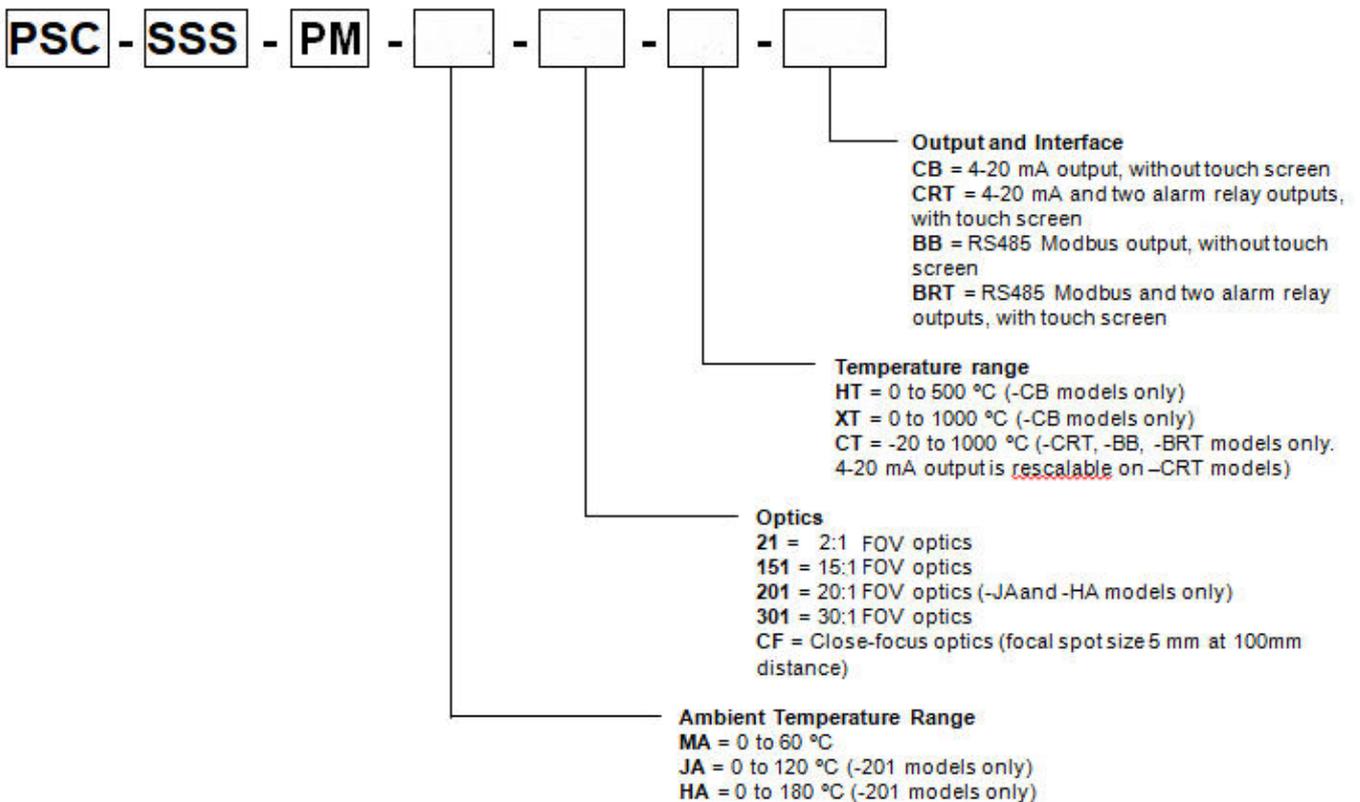100   250   400   450   1000   2000°C
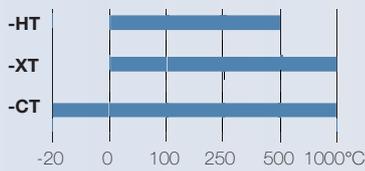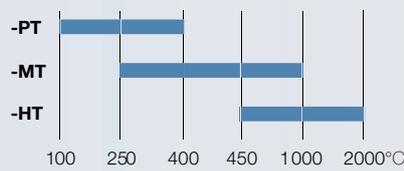
-CB models: Fixed 4 to 20 mA output scale (e.g. -XT: 0°C @ 4 mA, 1000°C @ 20 mA)

-CRT models: 4 to 20 mA output is configurable within this range
-BRT and -BB models: Digital output, full temperature range

OUTPUT AND INTERFACE

-CB No touch screen display, 4 - 20 mA output

-CRT Touch screen display with 4 - 20 mA output and two alarm relay outputs

-BB No touch screen display, RS485 Modbus output

-BRT Touch screen display with RS485 Modbus output and two alarm relay outputs

MODEL SELECTION GUIDE

Since the PSC-SSS-PM series has multiple IR temperature sensor variations, it can be somewhat difficult determining the correct model numbers. The model selection tables below can be used to quickly determine the correct model number of the IR temperature sensor which most perfectly suits your application.

PSC - SSS - PM - ☐ - ☐ - ☐ - ☐

Output and Interface
CB = 4-20 mA output, without touch screen
CRT = 4-20 mA and two alarm relay outputs, with touch screen
BB = RS485 Modbus output, without touch screen
BRT = RS485 Modbus and two alarm relay outputs, with touch screen

Temperature range
HT = 0 to 500 °C (-CB models only)
XT = 0 to 1000 °C (-CB models only)
CT = -20 to 1000 °C (-CRT, -BB, -BRT models only. 4-20 mA output is rescalable on –CRT models)

Optics
21 = 2:1 FOV optics
151 = 15:1 FOV optics
201 = 20:1 FOV optics (-JAand -HA models only)
301 = 30:1 FOV optics
CF = Close-focus optics (focal spot size 5 mm at 100mm distance)

Ambient Temperature Range
MA = 0 to 60 °C
JA = 0 to 120 °C (-201 models only)
HA = 0 to 180 °C (-201 models only)

2

PSC - **SSS** - **PM2.2** - ☐ - ☐ - ☐

Output and Interface
CB = 4-20 mA output, without touch screen
CRT = 4-20 mA and two alarm relay outputs, with touch screen
BB = RS485 Modbus output, without touch screen
BRT = RS485 Modbus and two alarm relay outputs, with touch screen

Temperature range*
PT = 100 to 400 °C
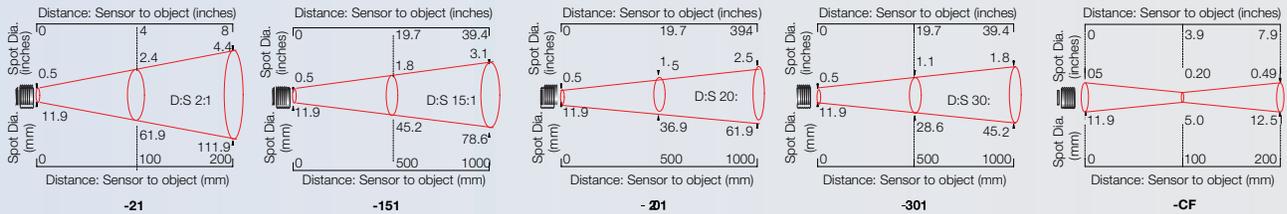MT = 250 to 1000 °C
HT = 450 to 2000 °C

Optics
151 = 15:1 FOV optics (PT models only)
251 = 25:1 FOV optics
751 = 75:1 FOV optics
CF = Close-focus optics (focal spot size 7.5 mm at 500mm distance) -Not available with 100 - 400°C temperature range (PT)

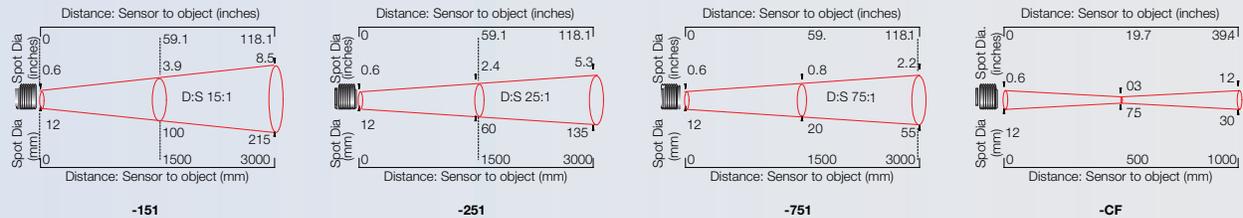## MODEL NUMBER EXAMPLE: PSC-SSS-PM2.2-251-MT-CRT

PSC-SSS-PM2.2 is the Process Sensors model series with a 2.2 um wavelength. 251 provides a FOV of 25:1, and MT indicates a temperature range of 250 to 1000°C. CRT indicates a Touch Screen Display with a 4-20mA output and two alarm relays.

FIELD OF VIEW (PSC-SSS-**PM** - General Purpose)
Diameter of target spot measured versus distance from sensing head 90% energy

-21 — D:S 2:1
Distance: Sensor to object (inches): 0, 4, 8; Spot Dia. (inches): 0.5, 2.4, 4.4
Spot Dia. (mm): 11.9, 61.9, 111.9; Distance: Sensor to object (mm): 0, 100, 200

-151 — D:S 15:1
Distance: Sensor to object (inches): 0, 19.7, 39.4; Spot Dia. (inches): 0.5, 1.8, 3.1
Spot Dia. (mm): 11.9, 45.2, 78.6; Distance: Sensor to object (mm): 0, 500, 1000

-201 — D:S 20:1
Distance: Sensor to object (inches): 0, 19.7, 394; Spot Dia. (inches): 0.5, 1.5, 2.5
Spot Dia. (mm): 11.9, 36.9, 61.9; Distance: Sensor to object (mm): 0, 500, 1000

-301 — D:S 30:1
Distance: Sensor to object (inches): 0, 19.7, 39.4; Spot Dia. (inches): 0.5, 1.1, 1.8
Spot Dia. (mm): 11.9, 28.6, 45.2; Distance: Sensor to object (mm): 0, 500, 1000

-CF
Distance: Sensor to object (inches): 0, 3.9, 7.9; Spot Dia. (inches): 05, 0.20, 0.49
Spot Dia. (mm): 11.9, 5.0, 12.5; Distance: Sensor to object (mm): 0, 100, 200

FIELD OF VIEW (PSC-SSS-**PM2.2** - Short Wavelength)

-151 — D:S 15:1
Distance: Sensor to object (inches): 0, 59.1, 118.1; Spot Dia. (inches): 0.6, 3.9, 8.5
Spot Dia. (mm): 12, 100, 215; Distance: Sensor to object (mm): 0, 1500, 3000

-251 — D:S 25:1
Distance: Sensor to object (inches): 0, 59.1, 118.1; Spot Dia. (inches): 0.6, 2.4, 5.3
Spot Dia. (mm): 12, 60, 135; Distance: Sensor to object (mm): 0, 1500, 3000

-751 — D:S 75:1
Distance: Sensor to object (inches): 0, 59., 118.1; Spot Dia. (inches): 0.6, 0.8, 2.2
Spot Dia. (mm): 12, 20, 55; Distance: Sensor to object (mm): 0, 1500, 3000

-CF
Distance: Sensor to object (inches): 0, 19.7, 394; Spot Dia. (inches): 0.6, 03, 12
Spot Dia. (mm): 12, 75, 30; Distance: Sensor to object (mm): 0, 500, 1000

PSC-SSS-PM series without touch screen display (-CB, -BB versions)

300.0°C

PSC-SSS-PM with touch screen display (-CRT version)

3

## TOUCH SCREEN DISPLAY (-CRT AND -BRT MODELS)

The optional backlit touch screen display mounted in the lid of the electronics box provides a large, bright display of the measured temperature, as well as allowing full configuration of the IR sensor. The graph view shows the history of the measured temperature.

In alarm conditions, the display changes color to provide an immediate and obvious alarm indication. Alarm modes and levels can be configured via the touch screen display.
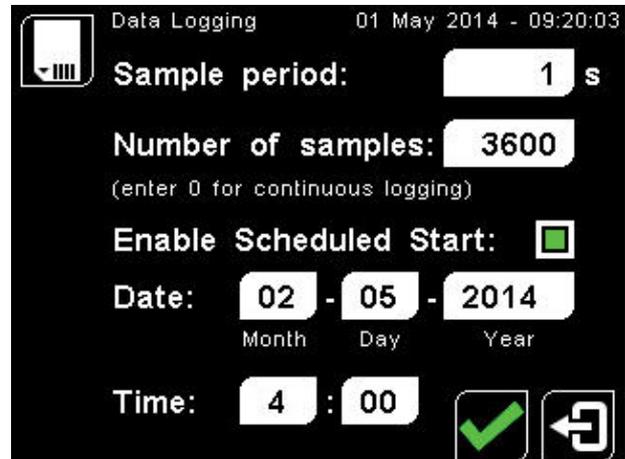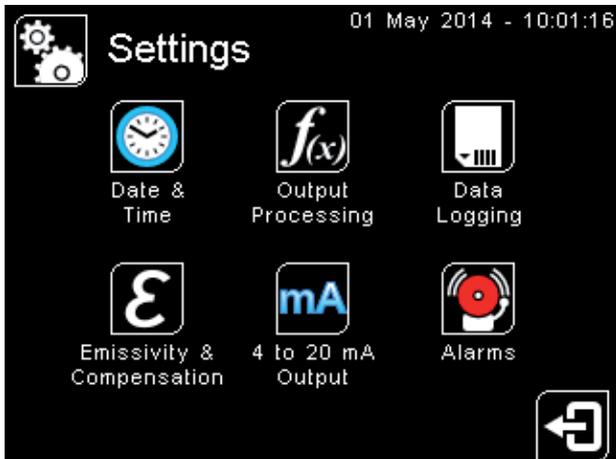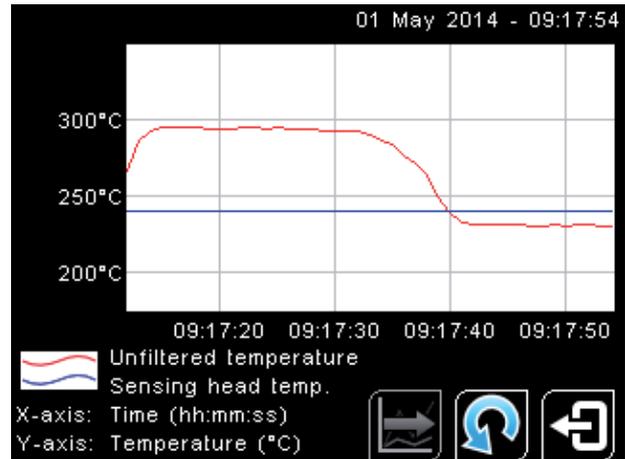
TOUCH SCREEN SPECIFICATIONS

Touch Screen Display Format	2.83" (72 mm) resistive touch TFT, 320 x 240 pixels, backlit
Configurable Parameters	Temperature range, temperature units, emissivity setting, reflected energy compensation, alarms, signal processing, Modbus address (-BRT models), date and time, data logging
Temperature Units	°C or °F configurable
Temperature Resolution	0.1°
Alarm Configuration	Two alarms with adjustable level, individually configurable as HI or LO. Alarm 2 can be set to target temperature or sensing head internal temperature
Signal Processing	Average, peak hold, valley hold, minimum, maximum

EXAMPLE SCREENSHOTS
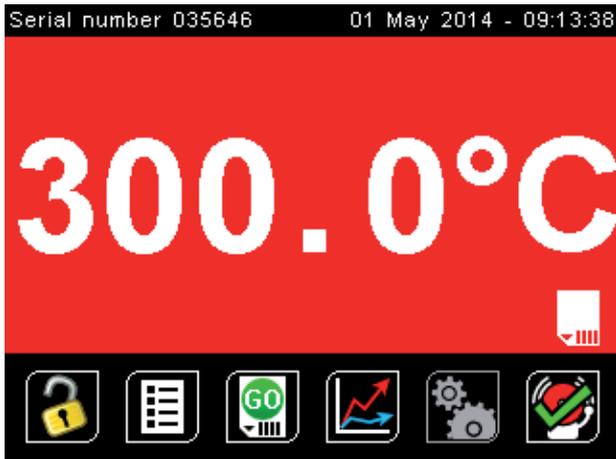
Screen shown with red background to indicate alarm condition

DATA LOGGING SPECIFICATIONS

Data Logging Interval	1 to 86,400 seconds (1 day)
MicroSD Card	Max. capacity: 32 GB (not included)
Internal Clock Battery	1 x BR 1225 3V (not included)
Variables Logged	Target temperature, sensing head temperature, electronics module temperature, max, min, average, emissivity setting, reflected energy compensation temperature, alarm events
File format	.csv
Configurable Parameters	Sample period, number of samples, scheduled start date and time

DATA LOGGING WITH TOUCH SCREEN DISPLAY

The PSC-SSS-PM series (-CRT & -BRT versions) can be used as a standalone data logger and includes a MicroSD card slot for data logging, which can be configured via the touch screen interface. The user can select the sample rate and the number of samples to be taken and schedule the data logging to start at a certain time.

With a 2 GB card, the user can store 28.4 million readings, which provides almost 1 year's worth of data at the fastest possible sample rate of 1 per second.
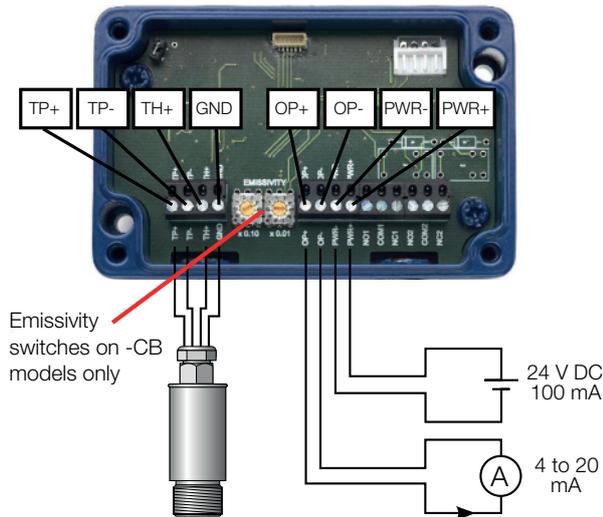
Data is stored on the MicroSD card in .csv format and can be viewed and edited easily using spreadsheet software. Alarm events can also be logged to the MicroSD Card.

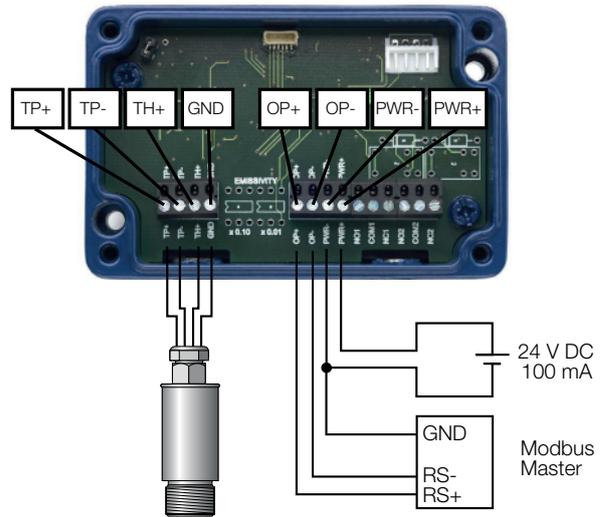A MicroSD card with SD card adapter is available as an optional accessory.

The MicroSD card slot and battery holder are located on the touch screen display circuit board in the lid of the PSC-SSS-PM. Temperature readings are time and date stamped using the sensor's internal clock. The clock is reset when the power is disconnected, or it will continue if the optional battery is installed.

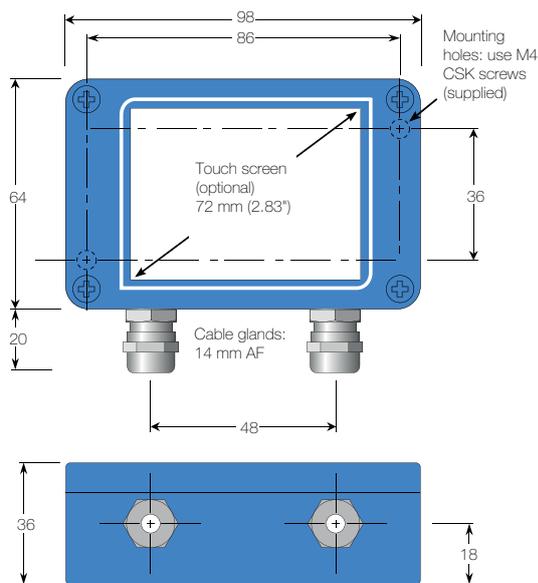## WIRING CONNECTIONS

Analog 4-20 mA version -CB models

| TP+ | TP- | TH+ | GND | OP+ | OP- | PWR- | PWR+ |

Emissivity switches on -CB models only

24 V DC 100 mA

(A) 4 to 20 mA

Digital RS485 Modbus version -BB / -BRT / -CRT models

| TP+ | TP- | TH+ | GND | OP+ | OP- | PWR- | PWR+ |

24 V DC 100 mA

GND
RS-
RS+

Modbus Master

DIMENSIONS AND ACCESSORIES

Electronics Module

98
86

Mounting holes: use M4 CSK screws (supplied)

Touch screen (optional) 72 mm (2.83")

64
36
20

Cable glands: 14 mm AF

48
36
18

Sensing Head

ø 18.6   ø 18   Thread M16 x 1 mm

Mounting Nut (included)
4

Standard length: 1000   13   45   12

18

Air Purge Collar

1/8" BSP air fitting

Removable spigot fitted to type APSN for use with all models except -21. Not fitted to type APSW for -21 models.

18
ø 40
ø 29
25
50
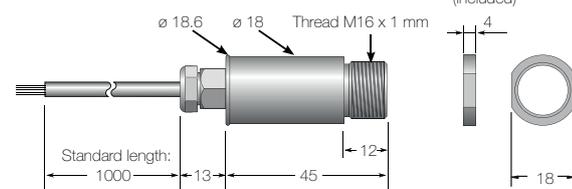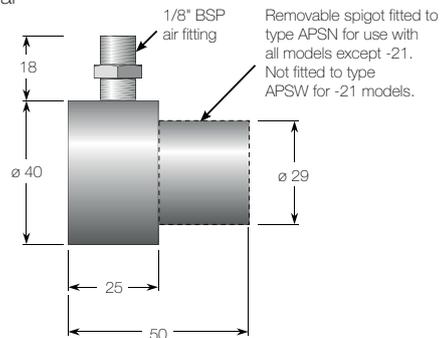
All dimensions in mm

ACCESSORIES

- MicroSD Card with SD Card adapter: stores logged data (-CRT and -BRT models) **MSD**
- Extended cable between sensing head & electronics box (PSC-SSS-PM -MA models) **PMCE**, (PSC-SSS-PM -HA and -JA models) **PMCEHT**, (PSC-SSS-PM 2.2 models) **PM2.2CE**
- Calibration certificate **CALCERTA**
- Laser sighting tool **LSTS**
- Mounting bracket, Adjustable **ABS**, Fixed **FBS**
- 6-channel Modbus temperature display with data logging **PM180**

Laser Sighting Tool

Adjustable Mounting Bracket

PM180 Electronics Box