

# PyroCouple Series Operators Guide

---



PyroCouple, non-contact infrared sensors measure temperatures from -20°C to 500°C and provide either a linear 4 to 20mA output, a voltage output or a thermocouple output. This range of output signals is compatible with almost any indicator, controller, recorder, data logger etc., without the need for special interfacing or signal conditioning. They are suitable for most materials such as food, paper, textiles, plastics, leather, tobacco, pharmaceuticals, chemicals, rubber, coal and asphalt; but not materials with a low emissivity, for example polished metals.

PyroCouple sensors are available as either two-wire or four-wire units.

Two-wire PyroCouple sensors transmit the target temperature as a 4-20 mA output and offer a simple solution for most non-contact temperature measurement applications.

Four-wire PyroCouple sensors transmit the target temperature as a 0-50 mV or thermocouple output (type J, K or T) plus the internal sensor temperature as a 4-20 mA output. This second output can be used to ensure that the sensor is being operated within the correct ambient temperature limits and prevent damage caused by overheating or overcooling. It can also be used to give an approximate indication of the air temperature surrounding the sensor.

## SPECIFICATION

### Temperature Range vs Field-of-View table

Field of View	-20°C to 100°C	0°C to 250°C	0°C to 500°C
2:1	PC21LT-X	PC21MT-X	-
15:1	PC151LT-X	PC151MT-X	PC151HT-X
30:1	PC301LT-X	PC301MT-X	PC301HT-X
ø5mm @ 100mm	PCCFLT-X	PCCFMT-X	PCCFHT-X

### Output table

Model-X	Target Temperature Output	Sensor Temperature Output
-0	4-20 mA	Not available
-1	0-50 mV	4-20 mA
-2	Type T thermocouple	4-20 mA
-3	Type J thermocouple	4-20 mA
-4	Type K thermocouple	4-20 mA

## GENERAL

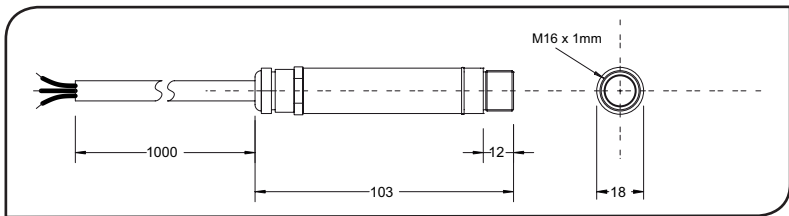
Accuracy	±1% of reading or ±1°C whichever is greater
Repeatability	±0.5% of reading or ±0.5°C whichever is greater
Emissivity	0.95 (fixed)
Response Time	240ms (90% response)
Spectral Response	8 to 14µm
Supply Voltage	24Vdc (28Vdc max.)
Sensor Voltage	6Vdc min.
Maximum Loop Impedance	900 Ohms (4-20mA output)
Output Impedance	56 Ohms (voltage/thermocouple output)

## MECHANICAL

Construction	Stainless Steel
Dimensions	18mm diameter x 103mm
Cable Length	1m
Weight with Cable	95g

## ENVIRONMENTAL

Environmental Rating	IP65
Ambient Temperature Range	0°C to 70°C
Relative Humidity	95% maximum non-condensing



**ACCESSORIES**

A range of accessories to suit different applications and industrial environments is available. These may be ordered at any time and added on-site. The accessories consist of the following parts .

- Fixed mounting bracket
- Adjustable mounting bracket
- Air purge collar
- Laser sighting tool

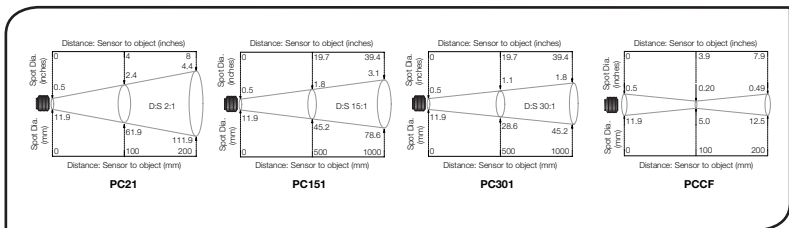
**OPTIONS**

The following options are available. Options are factory installed and must be ordered with the PyroCouple.

- Air/water cooled housing
- Certificate of calibration
- Longer cable (30m max.)

**OPTICAL CHART**

The optical chart below indicates the nominal target spot diameter at any given distance from the sensing head and assumes 90% energy.



**INSTALLATION**

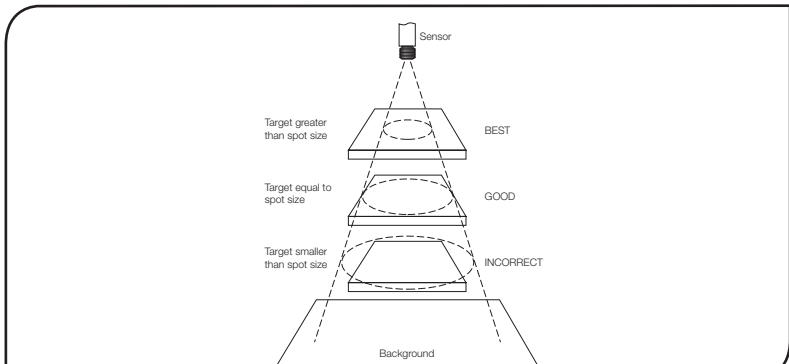
The installation process consists of the following stages:

- Preparation
- Mechanical installation
- Electrical installation

Please read the following sections thoroughly before proceeding with the installation.

**PREPARATION**

Ensure that the sensor is positioned so that it is focused on the target only.



## DISTANCE AND SPOT SIZE

The size of the area (spot size) to be measured determines the distance between the sensor and the target. The spot size must not be larger than the target. The sensor should be mounted so that the measured spot size is smaller than the target.

## AMBIENT TEMPERATURE

The sensor is designed to operate in ambient temperatures from 0°C to 70°C. For ambient temperatures above 70°C, an air/water-cooled housing will be required.

Avoid thermal shock. Allow 20 minutes for the unit to adjust to large changes in ambient temperature.

## ATMOSPHERIC QUALITY

Smoke, fumes or dust can contaminate the lens and cause errors in temperature measurement. In these types of environment the air purge collar should be used to help keep the lens clean.

## ELECTRICAL INTERFERENCE

To minimise electromagnetic interference or 'noise', the sensor should be mounted away from motors, generators and such like.

## WIRING

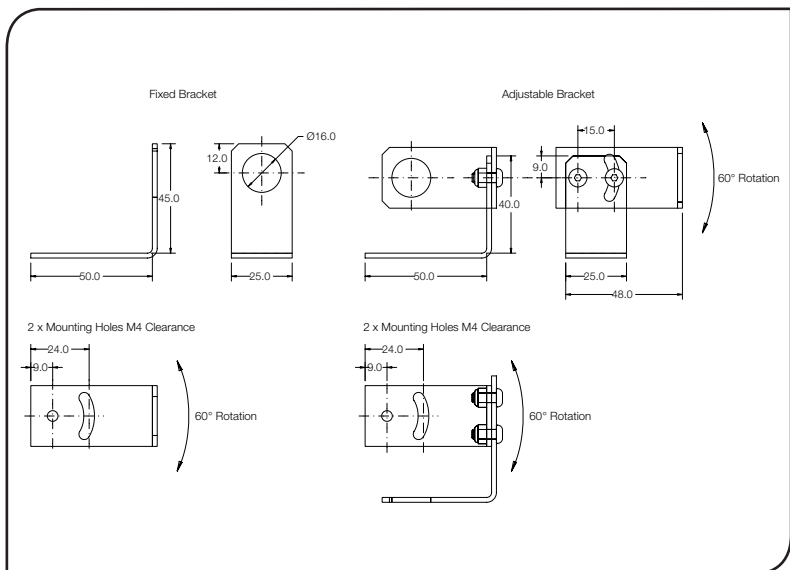
Check the distance between the sensor and the indicating/controlling device. If necessary, the PyroCouple sensor can be ordered with a longer cable attached.

## POWER SUPPLY

Be sure to use a 24Vdc, (25mA) power supply.

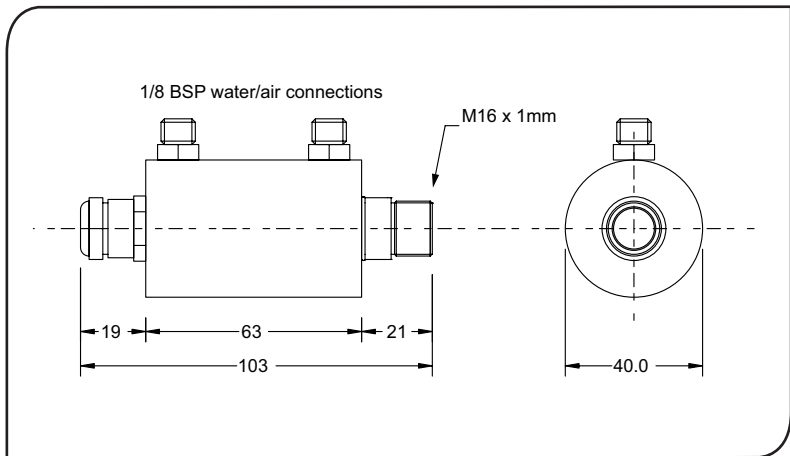
## MECHANICAL INSTALLATION

All sensors come with a 1m cable and a mounting nut. The sensor can be mounted on brackets or cut outs of your own design, or you can use the fixed and adjustable mounting bracket accessories which are shown below. Note: The sensor housing must be connected to earth at one point, either the cable shield termination or the sensor housing.



### AIR/WATER COOLED HOUSING

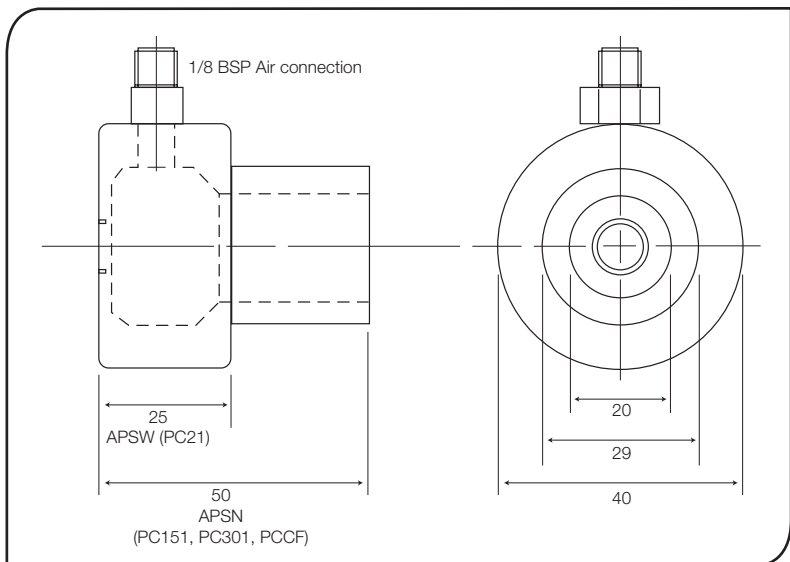
The air/water cooled housing shown below allows the sensor to withstand high ambient temperatures. It is equipped with two 1/8" BSP fittings. Water temperature should be 10°C to 27°C for efficient cooling. Chilled water below 10°C is not recommended. To avoid condensation, the air purge collar should be used with the water-cooled housing. Water flow rate should not be more than 0.5 to 1.5 litres/min.



### AIR PURGE COLLAR

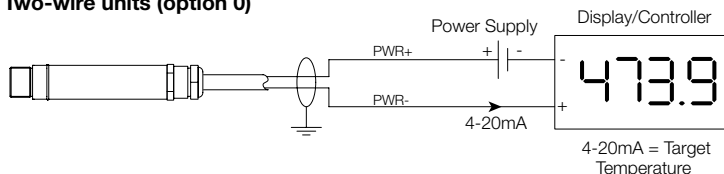
The air purge collar below is used to keep dust, fumes, moisture, and other contaminants away from the lens. It must be screwed in fully. Air flows into the 1/8" BSP fitting and out of the front aperture. Air flow should be no more than 5 to 15 litres/min.

Clean or 'instrument' air is recommended.

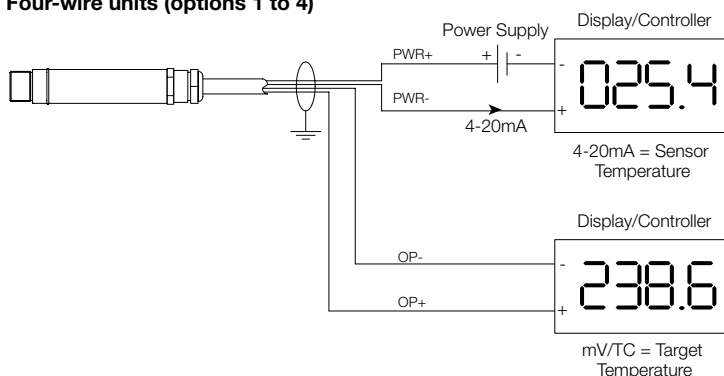


## ELECTRICAL INSTALLATION

### Two-wire units (option 0)



### Four-wire units (options 1 to 4)



## OPERATION

Once the sensor is in position and the appropriate power, air, water, and cable connections are secure, the system is ready for continuous operation by completing the following simple steps:

1. Turn on the power supply
2. Turn on the meter, chart recorder or controller
3. Read / monitor the temperature

## IMPORTANT

Be aware of the following when using the sensor:

- If the sensor is exposed to significant changes in ambient temperature (hot to cold, or cold to hot), allow 20 minutes for the temperature to stabilise before taking or recording measurements.
- Do not operate the sensor near large electromagnetic fields (e.g. around arc welders or induction heaters).  
Electromagnetic interference can cause measurement errors.
- Wire must be connected only to the appropriate terminals.

## MAINTENANCE

Our customer service representatives are available for application assistance, calibration, repair, and solutions to specific problems. Contact our Service Department before returning any equipment. In many cases, problems can be solved over the telephone. If the sensor is not performing as it should, try to match the symptom below to the problem. If the table does not help, call Calnex for further advice.

<b>Troubleshooting</b>		
<b>Symptom</b>	<b>Probable Cause</b>	<b>Solution</b>
No output	No power to sensor	Check power supply
Erroneous temperature	Incorrect wire connection	Check wire colour codes
Erroneous temperature	Faulty sensor cable	Verify cable continuity
Erroneous temperature	Field of view obstruction	Remove obstruction

## LENS CLEANING

Keep the lens clean at all times. Any foreign matter on the lens would affect measurement accuracy. Blow off loose particles (if not using the air purge accessory) with an air 'puffer'.

## GUARANTEE

Calnex guarantees each instrument it manufactures to be free from defect in material and workmanship under normal use and service for the period of two years from the date of purchase. This guarantee extends only to the original buyer according to Calnex terms and conditions of Sale.