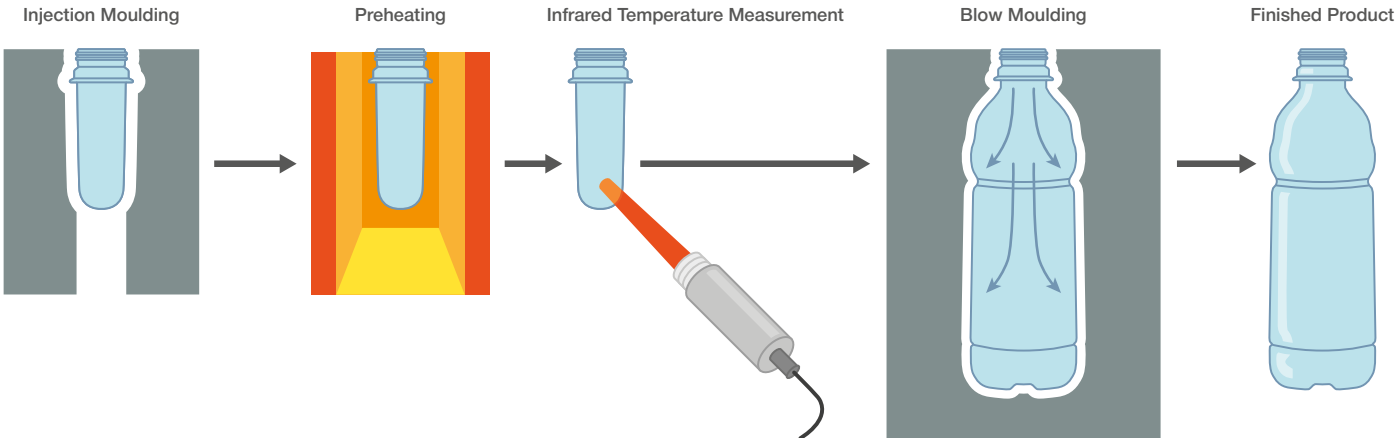
CALEX
ELECTRONICS LIMITED

Blow moulding

Preform temperature measurement using non-contact pyrometers

Infrared temperature sensors are helping to provide consistent product quality in the high-speed process of injection blow moulding.



PROCESS OVERVIEW

Blow-moulded objects, such as plastic bottles and similar containers, start as an injection moulded preform (or parison), usually made of poly(ethylene terephthalate) (PET).

In the one-stage stretch blow moulding (SBM) process, the preforms are blow-moulded quickly after forming while they are above their glass transition temperature (typically about 75°C to 85°C).

In the two-stage SBM process the preforms are cooled and stored, before being reheated by an infrared oven just before being blow-moulded.

In both the one-stage and two-stage processes, the preform temperature is measured with a non-contact infrared sensor before it is inflated to its final shape inside the mould cavity.

The temperature measurement is used to help control the infrared oven, optimise the speed of the process, and ensure repeatable product quality.

ACCURATE MEASUREMENTS

Infrared temperature sensors measure the average temperature within a spot whose size depends on the measurement distance and the sensor's field of view. Preforms have a slender shape that requires a sensor with narrow, focused optics to ensure that only the temperature of the plastic is captured, and not the background. The sensor is positioned at its focal distance to achieve the smallest possible measured spot size.

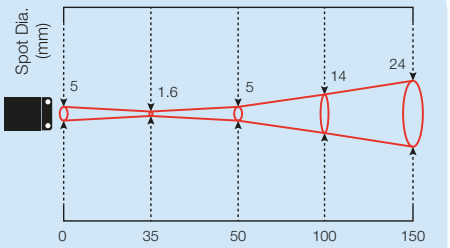
SUGGESTED MODELS

A choice of general-purpose infrared temperature sensors is available, offering increasingly fast response times:

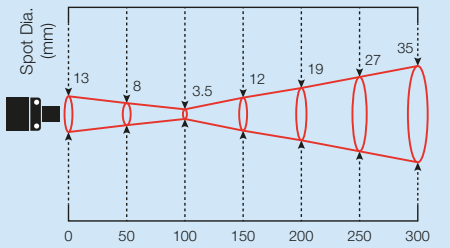
Fast

PyroMiniBus model PMBXCF measures a small spot, 3.5 mm in diameter, at a distance of 50 mm from the lens of the sensor. This sensor withstands ambient temperatures of up to 120°C and has a response time of 125 ms.

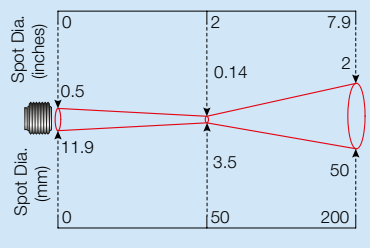
PyroMiniBus sensors communicate digitally via RS485 Modbus RTU. They can be used with an optional Calex touch screen interface, and/or with any third-party Modbus Master. Multiple sensors are connected to the same network to simplify installations and reduce the cost of cabling.



PCU-S1.6



PCU-F3.5



PMBXCF

Faster

For fast-moving production lines where a 125 ms response is not fast enough, the PyroCube is the solution.

PyroCube S model PCU-S1.6 has a response time of 10 ms. It measures an even smaller spot, 1.6 mm in diameter, at a distance of 35 mm. If close access is difficult and the sensor must be positioned further away, a range of alternative models are available to measure larger areas at longer distances. The PyroCube may be used in ambient temperatures of up to 50°C, or higher if used with an optional cooling jacket.

An optional touchscreen display and configuration interface is available, or the sensor can be connected directly to a PLC or PID controller via its analogue output.

The PyroCube offers the added advantage of a built-in focused LED light showing the exact position and size of the measurement area for certain and convenient aiming. All PyroCube models have this as standard.

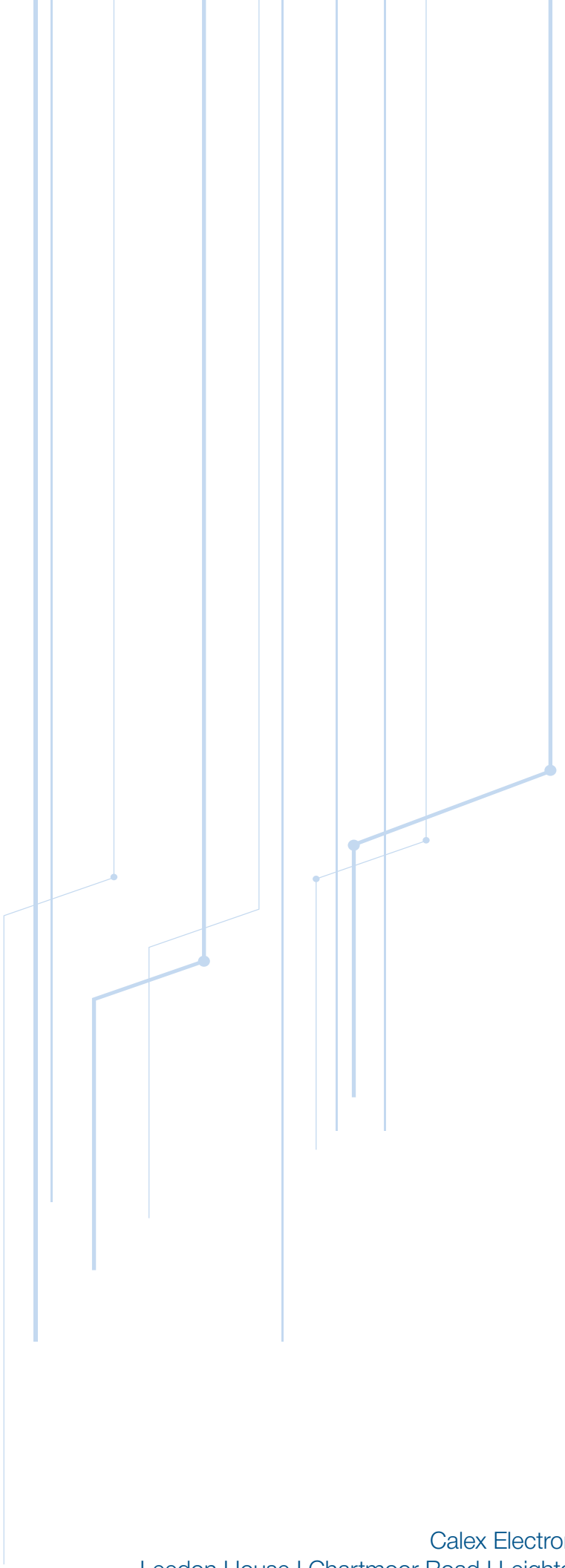
Fastest

The fastest response times can be achieved with the PyroCube F series. This sensor has a lightning-fast response time of 1 millisecond, making it possible to accurately measure the temperature of every individual preform as it moves past the sensor, such as on one-stage rotary blow-moulding machines.

If the preform moves longitudinally in front of the sensor, it is possible to measure a linear temperature profile, ensuring the correct heat distribution in the preheat stage for optimum inflation and even thickness distribution.

The PyroCube F has all the advantages of the PyroCube, including the aiming light and optional touch screen interface, and a similar choice of optics.

Our engineers and distributors are available for more information and technical assistance.



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