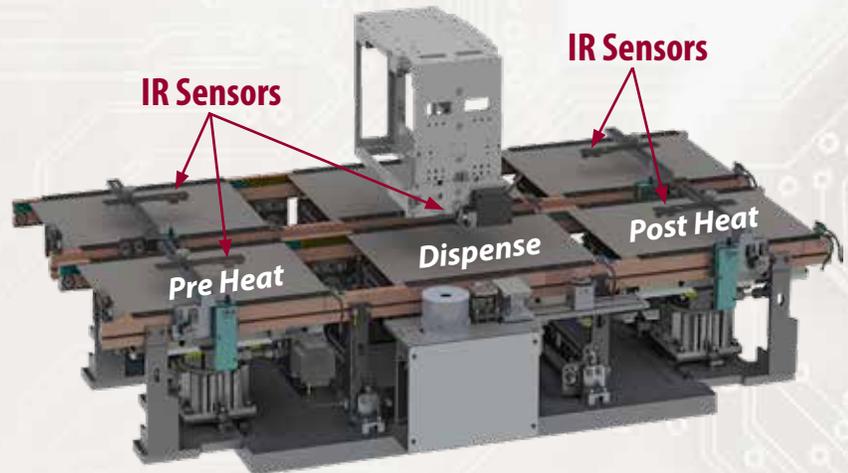# IR Temperature Sensors

Patent pending, closed-loop monitoring of the PCB/substrate temperature ensures dispenser process stability and yield improvements for underfill applications.

IR Sensors

IR Sensors

Pre Heat

Dispense

Post Heat

In applications where board heat is required, a constant product temperature through the dispense process is critical to ensure process stability and repeatability. The most common process that requires heat is underfilling of high I/O count devices such as BGA's, Flip Chips etc. During this process heat is applied to the underside on the product by a convection or contact heat system. Underfill materials vary in viscosity and filler types, therefore the heat requirement for the board also varies. The required "top side" board temperature for a given material is specified in the material datasheet and can vary from 60°C – 100°C.

The IR (Infrared) sensing option provides a closed loop, fail safe means to monitor and control the "top side" board temperature through each of the process zones: pre-heat, dispense heat and post-heat zones which are typically used during the Underfill process. The passive IR sensors can be configured in any or all of the 3 conveyor zones in single or dual lane systems, as shown above.

Programming is simple, the user defines the minimum and maximum "top side" temperature for each zone (see table) and then sets up control parameters. The machine does the rest. Product will only be passed between zones and dispensed if the measured temperature is within the desired range. The IR sensors can be positioned in a fixed position over a region of interest within the pre and post-heat zones. The IR sensor for the dispense zone is mounted to the head.

Pre Heat IR Sensing

☑ Enable

Min Temperature:	80	celcius
Max Temperature:	90	celcius
Soak Time:	5	secs
Timeout:	120	secs
Polling Rate:	500	msecs

Features

- Closed loop control of the product temperature through the entire process
- Compact, miniature design has no impact to gantry XY travel
- GUI displays in "real time" the product temperature in each zone
- All settings are stored in the process program and tied directly to the product
- OpenApps feature allows the data to be transferred into factory MES systems

IR Temperature Sensors

FAQs

Q: Why is the top side board temperature important?
A: If the board temperature is too low the capillary flow rate reduces, and the device may not be fully underfilled. If the temperature is too high, then the viscosity may increase again impacting the capillary flow underneath the device. Either scenario offers the possibility of quality issues and subsequent yield loss.

Q: What is the benefit of the IR Temperature Sensors?
A: To maintain a stable board temperature for the underfill process through the machine.

Q: How do the IR Temperature Sensors function?
A: By use of closed-loop monitoring and verification of the heated process parameters through Benchmark software.

Q: What parameters can be programmed?
A: Process parameter for minimum/maximum temperature range, soak time, timeout and polling rate.

Q: What is soak time?
A: Minimum time after board reaches temperature range before releasing to the next station.

Q: What is maintain temperature?
A: Board temperature is maintained by cycling convection heating air-flow on and off until the product is able to move downstream.

Q: What is timeout? What is polling rate?
A: Timeout is the amount of time from the first temperature reading of a board to alarm if not within desired temperature range. Polling rate is the time interval between readings.

Q: Where are the temperature settings stored?
A: All settings are stored in the process program.

Q: Are the sensors themselves affected by the heat inside the machine?
A: No, the sensors are rated up to 160℃.

Q: What version of software do I need on the Camalot Prodigy platform?
A: Benchmark version 9.1 release and above.

Q: What Camalot platforms is the IR Temperature Sensor option available on?
A: Camalot Prodigy single and dual lane platforms. Contact Camalot Technical Support for upgrade options.

Q: How is the sensor for the dispense zone used/programmed?
A: Dispense zone uses a sensor mounted to the head system which is flexible as to the location programmed in the process program. The process program can have multiple Infrared Temperature sense commands to enable various positions on the board to be verified/checked prior or during the dispensing operation.

Q: Where and how are the sensors positioned in the pre and post zones?
A: Pre and post zones use a sensor mount to an adjustable bracket that is positioned and locked in place over the region of interest on the clamped board. See illustration:

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