

thermoIMAGER TIM 160S

Inline thermography for plastic injection molding

TIM 160S mounted on the cross member of the handling system and black component

Operators of injection molding machines for plastics processing are facing increasing quality requirements imposed by end customers, especially in the automotive sector. Due to this market trend, the importance of inline temperature monitoring directly after extrusion as a global quality feature is continuously increasing.

Inline thermography offers a new solution for the detection of quality variations caused by the temperature or the tool. Since the defect might be located anywhere on the plastic part and is revealed by chance, such an inspection is only possible with an IR camera. It detects and inspects the entire part.

This is where the advantages of the TIM systems come into full effect. They are small, fast and very flexible industrial infrared cameras with PC software connection.

These thermal imaging cameras are particularly suitable for the analysis of injection molded parts. Due to the high thermal sensitivity and the required precision, the thermoIMAGER TIM 160S is used.

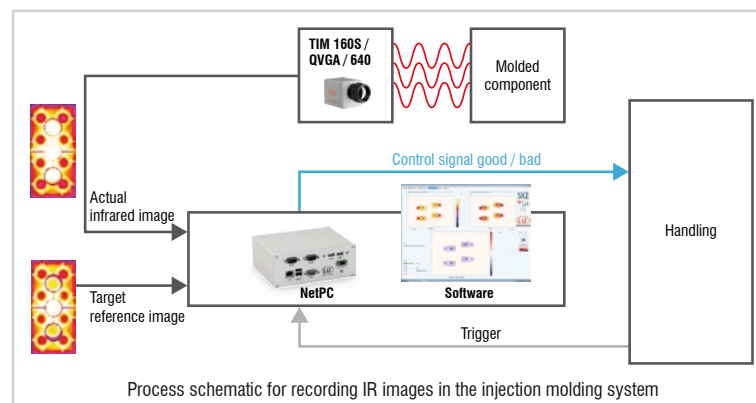
If a higher resolution is required, the thermoIMAGER TIM QVGA infrared cameras and the TIM 640 are the preferred choice for those applications. With modern injection molding machines, it's no longer a human operator who removes the injection molded part manually, but a handling system.

This system removes the plastic component from the mold and puts it, e.g., onto a deposit belt or in a container. In the case of automated removal, the task is to make a good/bad part selection especially for critical parts, in order to avoid problems during further processing.

In the picture above, a thermoIMAGER TIM 160S is installed on the cross member of a handling system in an injection molding machine. The black component is being inspected.

During the dead time between two shots, the handling system presents the freshly molded component from one or more sides to the thermoIMAGER TIM IR camera which captures one IR image respectively. The image acquisition is synchronized with the handling system so that a signal is emitted after the measuring position is reached.

The following schematic depicts the data acquisition process in the overall context of the injection molding machine. The application-specific software, which was specially developed by the SKZ (Süddeutsches Kunststoff Zentrum, Southern German Plastics Center), communicates with the plant control system and the TIM system.



More Precision.

Furthermore, this software compares the IR images of the component with the stored references. Based on identified temperature differences (reference to the current component) a good / bad selection is made. The alarm limits are freely definable. This information is reported back to the handling system, which then performs the sorting task.

A screenshot of this user software can be seen in the following image:



Screenshot of the SKZ software

The software displays the reference image (top left), the currently acquired image (top right) and the difference image of these two images (in the middle).

The limit values for different components and tools can be stored in a component database. Based on these settings, defective components are removed. Optionally, the IR image of the defective part can be stored onto the hard drive.

Benefits of thermography systems:

- Start up tools more precisely/quickly
(reduces the changeover time)
- Recognize and select rejects during a 100% reliable process control
- Inspect 2K bodies with soft components
(not possible with visual systems!)
- Cost-effective and fast integration into existing extraction systems
(handling)
- Favorable price compared with conventional image acquisition solutions
- No contrast problem with black and dark gray measuring objects
compared to visual image acquisition

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