

Adaptative Threshold InfraRed (ATIR) Switch

by **New Infrared Technologies**



allows detecting hot objects of temperatures as low as 200 °C even using very narrow field of views and very short time constants. The optics included in the ATIR switch has a very narrow field of view of 0.35 deg (170:1) which provides a wide range of installing distances ranging from 0.5 m (spot size 3x3 mm) to 5 m (spot size 30x30 mm) depending on the environmental conditions and applications (other optics are available). Focal length is adjustable easily in order to collect the maximum amount of radiation for low temperature / low emissivity applications.

Left: The **ATIR** Switch in its current appearance.

New Infrared Technologies launches the outstanding IR Switch **ATIR** with adaptative threshold (Hot Objects Detector). The device has unpairable performances in terms of spatial resolution (170:1), range of detection temperatures (200 – 1600 C), velocity of response (2 KHz), cost and reliability.

The **ATIR** switch electronics, based on advanced micro-processor technology, provides both analog (0-24 VDC) and digital (USB) outputs, converting the device in an excellent tool for stand-off counting or triggering process involving high-speed moving hot objects.

This IR switch was designed for being compatible in standard automatic industrial lines but has also the possibility of being used as a point sensor able to carry out specific measurements and studies in process optimization. The device includes custom software which allows data acquisition, storage and analysis in a PC.

As a particular characteristic in the products of its kind, the real time adaptative threshold algorithm makes the device specially recommended for applications where heterogeneous temperature objects are present. This converts the **ATIR** switch in an excellent tool for applications where hot moving objects are coming from different lines or processes, or applications where hot objects have a wide range of temperatures.

The high sensitivity of its MWIR sensor (1-5 microns) al-

Case of study: ATIR switch as counter and sticky containers detector in the Glass Container Manufacturing Industry

The **ATIR** switch was installed close to the final of a conveyor belt which transported glass containers coming from two different lines of molds. Thanks to the high sensitivity of detector in the ATIR switch it was possible to install the device far enough from the molds, when the containers were cold enough for allowing to carried out the measurements without any type of cooling or thermal shell protecting the **ATIR** device.

Due to the different distance travelled by the containers in the conveyor, half of them crossed the **ATIR** FoV with a temperature T1 and the other half with a higher temperature T2. The objective of **ATIR** was to count and to detect sticky containers.

When T1 and T2 are different, a standard strategy based on setting a single threshold does not work. For sure some containers will be missed. It is necessary a dynamic variation of threshold in order of assuring a perfect job. **ATIR** specific electronics adjust continually the signal threshold guarantying an accurate count without missing any event.

Figure 1a shows experimental register measured during trials. There it is possible to see (red line) the IR signal variation observed as the containers crossed the narrow

field of view (5x5 mm) of **ATIR**. It is possible to see differences in temperatures of the containers depending on the mold and on the fabrication line. White curve represents the threshold adjusted in real time automatically by a specific algorithmic implemented in the device electronics. Figure 1b shows the output delivered by **ATIR**. and figure 1c the corresponding image in visible.

In addition to the automatic threshold adjustment, **ATIR** is immune to environmental variations thanks to a specific algorithmic which minimize the signal drift due to changes in the ambient temperature.

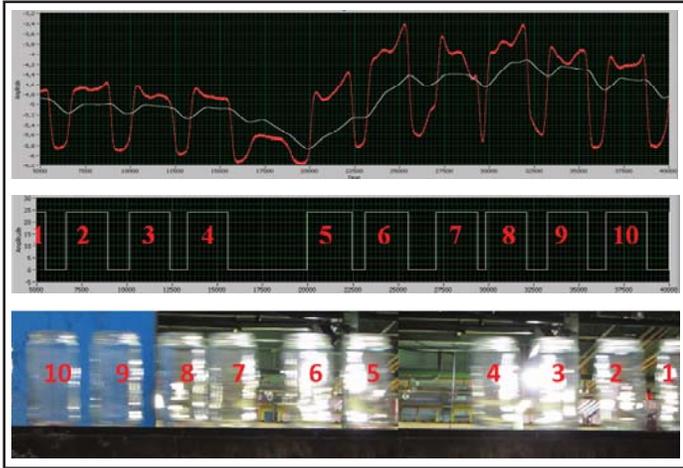
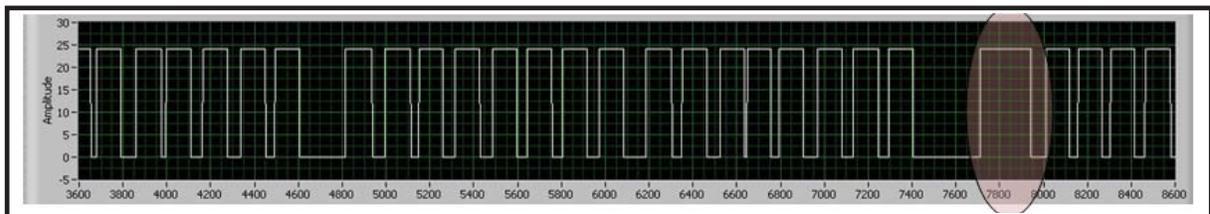


Figure 1a (above) shows IR signal (red line) measured with the detector. White curve is the threshold automatically adjusted in real time by the **ATIR** electronics. Figure 1b shows the output of **ATIR**. Figure 1c shows the corresponding visible image.

In the test, **ATIR** was used for detecting sticky containers. It is a frequent issue found in glass container industry. For this particular application thigh velocities of response (2 KHz) and narrow field of views (170:1) are mandatory for proper function. As in counter case **ATIR** demonstrated a excellent reliability detecting all the sticky containers occurred during the duration of trials. Figure 2 shows output signal delivered by **ATIR**. The circle indicates the signal registered corresponding to two stucked containers.

Figure 2.- **ATIR** signal output. Circle indicates the signal measured corresponding to two stucked glass containers. High velocity of response (2 KHz) and narrow field of view (170:1) are mandatory for detecting this type of defects.



Detector	LEPTON SERIES DETECTOR, 1x1 mm ² (VPD PbSe) (2x2 mm ² detector under request)
Spectral band	1-5 microns
Range of detection temperatures	200 – 1600 C
Optics included (ask for other options)	Si lens + AR: - D/S 170:1 - FoV 0.34 deg - Manual focusing
Analog Output	Voltage: Voltage: 0-24 volts Max. output current : 60 mA Optocoupled output Commute time < 2ms
Digital Input/Output	USB 2.0 Input: Automatic threshold adjust parameters Output: Analog and digital IR signal, time
Software	Data storage, analysis & representation
Control and indicators	Green led: Analog output Red led: Power supply Reset push button
Weight	700 grams
Dimensions	External Diameter: 50 mm Length: max 320 mm (shortest distance focus); min 180 mm (longest distance focus)

Applications of the ATIR switch

ATIR is an infrared switch especially designed for fault-free operation in industries such as Steel industry, Glass Industry, Coal Industry, Petrochemical industry, Plastic industry, Paper industry, Cement industry, Power generation industry, among others.



NIT
New Infrared Technologies

We make uncooled IR imaging fast and affordable!

info@niteurope.com - www.niteurope.com

