Frequently Asked Questions │ Xtralis VIS-IR™ Thermography Detector

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1. Xtralis VIS-IR Thermography Detector

The Failsafe Thermography Detector (FTD) is a bi-spectral (IR & Visual) smart edge device that has been specifically designed for early warning heat-detection. It detects the amount of infrared energy emitted, transmitted, and reflected by any object. All objects with a temperature above absolute zero, also known as 0 Kelvin (-273 °C or -459 °F), emit infrared radiation.

The amount of radiation emitted by an object increases with temperature; therefore, thermography allows detection in variations in temperature. When viewed through a thermal imaging camera, warm objects stand out well against cooler backgrounds.

A thermal imaging camera can report the object temperature and a user can see the temperature distribution visually using a software.

An alarm can be generated when the measured temperature exceeds or drops below a set temperature limit.

The thermography detectors provide fire detection solutions where traditional smoke/fire detectors cannot cope with high smoke and dust conditions as part of normal operating conditions.

The detector offers immediate visual verification and a wealth of diagnostic and analytic information.

2. FAQ

Q: Why should I use VIS-IR?

A: There is no reliable traditional solution for smoke, fire, heat detection in dusty, dirty and environmentally challenging areas, as well as indoors and outdoors.

Earlier solutions often come at high cost and are not truly satisfactory.

Thermography brings an affordable cost-effective solution that is generally accepted and welcomed by insurance companies.

Q: Where can I use VIS-IR?

A: VIS-IR will typically be deployed in:

- Waste management and recycling sites
- Food and drink processing plants
- Industrial sites
- Transportation and other tunnels

Q: Is VIS-IR replacing any of Xtralis existing technologies?

A: No, VIS-IR is complementary to our existing range of detectors. It offers a solution where traditional smoke, heat and flames detectors fail, are too slow or have difficulties.

Thermography is perfect for detection in environmentally challenging sites, where there is a lot of dust, non-combustion smoke, steam, etc.

Q: What does failsafe mean?

A: Failsafe refers to the fact that whatever happens with the detector that will prevent its correct operation will trigger the fault relay. The nature of that fault can be found in the rich information provided by the configuration and management software (ViSM (VIS-IR Software Management)).

Failsafe also indicates that the fault relay itself operates failsafe. Meaning, the fault relay is permanently energized and drops in case of a fault. The fault relay also signals a fault in case the supply voltage is no longer present. This operation is typical for the fire industry but rarely, or almost never present in competitive products because these operate as a thermal camera rather than as a fire detector.

Q: Does VIS-IR have any approvals, EN54, UL, FM, …?

A: Unfortunately, there do not exist any global test and certification specifications.
Currently CNPP (France) and VdS (Germany) offer a local test specification. Certification with both these agencies is underway.

> ℹ️ **Important Note!**
>
> Having no certification does not imply you cannot sell and install these units!
>
> Generally, when traditional fire detection does not offer a reliable and fast enough detector, Authority Having Jurisdiction (AHJ) will give derogation to install these detectors for a specific site or application. As an example, insurers favor thermography in waste recycling operations.

Q: How is VIS-IR an early warning system?

A: Fires typically start with heat development, resulting in smoke and finally ending up with flames.
So, heat detection is the starting point and hence the earliest you can detect an incipient fire.
This fits thermography well because, contrary to traditional point or spot heat detectors, thermographic detectors detect IR radiation at the source. Hence thermographic detectors do not have to wait for flames to push the heat towards the ceiling for traditional spot/point heat sensors to operate. Same applies for linear heat detectors.

Q: What area does a detector cover and how do I know how many to install if there are no installation rules?

A: The area coverage is determined by the lens, the distance detector-target and the minimum desired detectable surface at that distance. All this based on a 3x3 or 5x5 pixel (for CNPP approved installations) area. A user-friendly spreadsheet provides you the outcome of the calculations in form of horizontal and vertical Field of View, based on the above set parameters.
This result will give you the covered area and hence how may detectors are required for the total area.

Q: What is the life time of a thermographic detector?

A: VIS-IR thermographic detectors use solid state components and have typically the same lifetime of traditional detectors, like beam detectors for example. Exception to be made for the electro-mechanical shutter that may need to be replaced earlier.

Q: What is the difference with competitive products/cameras?

A: The main competitors on price-performance are the Chinese companies Hikvision and Dahua.

Other established competitors are Mobotix, FLIR, AXIS, OPGAL, Silent Sentinel, etc.
The competitive thermography cameras are on the hardware level (imager resolution, temperature accuracy, etc.) comparable to VIS-IR although not every brand offers bi-spectral solutions.

Our knowledge of the fire market and hence the tuning of the detector to fit the fire market is our biggest advantage.

The VIS-IR detectors have been designed for the fire detection market and offer all the specific connectivity and operation that a system Integrator expects from a fire detector.

The fit with the fire market translates in the following specific features:

- On-board pre-alarm, alarm and fail-safe fault relay outputs
- 2 inputs; 1 x Remote Reset and 1 x External Fault for air blade failure (for future use)
- Automatic or manual reset
- Tri-colour LED on front for status signalling
- Remote alarm output
- Operation on 24 VDC
- Rate of Rise alarm (°/minute – freely programmable)
- User-friendly configuration, analytics and statistics/diagnostics)

Q: How expensive is VIS-IR?

A: The early thermographic detectors used to be quite expensive and only used if 'all else failed ', and detection was an absolute must. Advances in imager technology and increased volumes have considerably dropped the pricing. Thermography detector pricing is now in the same range of the better aspiration detectors.

Q: Why does Xtralis use a bi-spectral unit?

A: There are several reasons why a bi-spectral unit is preferred over IR only. The main reason for is to offer a visual image along with thermal image.
At lower resolution and when the background is thermally equal, there is not much detail on the thermal view. Visual image will provide situational awareness and enables a better decision making based on what's really happening. A second reason is our plan, in a later phase, to add extra detection analytics to the visual part.

Q: Is the imager a VOx (Vanadium Oxide) type?

A: No, the imager is not a Vanadium Oxide but an a-Si (Amorphous Silicon) one.

As detecting material, a-Si outperforms VOx in terms of lifework time, typically 15 years without desensitization. VOx material is facing desensitization after 10 years of usage. a-Si detectors are more stable and better perform in high temperature conditions.

VOx detectors on the other hand are more sensitive and have better NETD (Noise Equivalent Temperature Difference).

Therefore, they can "see" the smaller of temperature differences apparent, which is an advantage in high resolution applications. BUT, in the fire detection applications, with an accuracy +/- 2°C (3.6°F), the NETD value is not a differentiator.

Q: Is VIS-IR difficult to install and set up?

A: The installation itself is simple, just like a traditional fire detector.

A user-friendly spreadsheet assists with the choice of lenses, minimum detected surface and distances. The detector's camera provides immediate visual feedback on the detected area.
The configuration, like regions of interest, alarm levels, etc. is straightforward and logic.

Q: How many zones/Regions of Interest can I set for individual detection?

A: You can set up to 4 zones/Regions of Interest.

Q: What is 'emissivity' and how do I set it?

A: "Emissivity" expresses how efficient an object is in emitting thermal energy (IR radiation). This efficiency is measured relative to a perfect emitter known as a 'blackbody'. This measurement directly scales the intensity of the thermal emission with all real values being less than 1.

The emissivity of objects is based on the materials that it is composed of and its surface texture. Organic materials are generally highly emissive (0.8 - 0.95), i.e. human skin, cloth, tarmac, wood and bricks. These and are not or little dependent on the temperature. On the other hand, 'shiny materials' like glass, aluminium, stainless steel, brass, copper, etc. have far lower emissivity values (0.01 - 0.3) and fluctuate heavily with the temperature.

The value for the emissivity can be set, independently for each 'Region of Interest', in the configuration software. Emissivity tables are available to guide you for choosing the best emissivity. You can also use adhesive light absorbing dark foils to determine the emissivity of an object/target.

Q: Do I require special tools to maintain such system?

A: Maintenance is mainly cleaning the lenses and ensuring that the position and orientation of the camera is still fitting with the area to monitor.

To confirm the detector's continued temperature performance, use an air thermometer to spot check areas in the FOV and compare to the camera reading.

Alternatively, and preferably use a portable blackbody to confirm the correct operation and alarm reporting.

Q: Does the detector needs recalibration?

A: This new generation of imagers does not require re-calibration.

Q: Is there collateral available?

A: Yes, please visit Xtralis website, www.xtralis.com/VIS-IR to find the documents below:

- 36217: VIS-IR Thermography Detector Data Sheet
- 36684: VIS-IR Black Body FTD-BB Data Sheet
- 36218: VIS-IR Product Guide
- 36220: VIS-IR Engineering Specs
- 36224: VIS-IR Theoretical Spot Size Ratio Calculator
- 36572: VIS-IR Thermography Detector Black Body Application Note
- 36575: VIS-IR Theoretical Spot Size Calculator User Guide
- 37056: VIS-IR Thermography Detector Product Brochure

3. Value Proposition

- Where 'spot' and /or region temperature detection with localization is required
- Where early heat detection is required
- Dusty and dirty environments
- Environments with smoke and steam
- Environments with fog, smog, haze, rain and snow
- Where there is no lighting (complete darkness)
- Dangerous environments where close target detection is impossible (non-intrusive – non-invasive)
- Where immediate visual verification is a must

4. Opportunity

- VIS-IR is complementary to existing detection technologies, it represents an opportunity for Xtralis in a new segment
- The thermography market for fire and flare detection is worth $133 Mio and pretty much untapped by the fire industry

5. Supplementary Information

5.1. Key Hardware Features

- Bi-spectral, IR & visual, on the edge
- On-board pre-alarm, alarm and fail-safe fault relay outputs
- Sensor resolution 384 x 288 pixels
- Accuracy: +/-2°C up to 100°C, +/-2% (100°C to 450°C)
- Minimum area size detected 3x3 pixels
- Detection temperature range: -5°C to 450°C (23°F to +842°F)
- Fixed temperature and Rate of Rise Pre-Alarms and Alarms
- 3 different lenses; 42x31º /8,9mm - 88ºx65º /4,3mm - 22ºx16º/17mm
- Simple and user-friendly connection
- 2 inputs; 1 x Remote Reset and 1 x External Fault for air blade failure (for future use)
- Automatic or manual reset
- Tri-colour LED on front for status signalling
- Remote alarm output
- IP66
- Operation on 24 VDC
- Pluggable connection and terminals to connect directly to industry standard FACP
- User-friendly configuration, analytics and statistics/diagnostics

5.2. Heat Detection Features

- Rate of Rise alarm (°/minute – freely programmable)
- Four Regions of Interest (ROI)
- Alarm and pre-alarm per ROI
- Alarm delays
- Selection of minimum/maximum/average temperature alarm per ROI
- Minimum/maximum/average temperature displayed per ROI
- Hot & cold spot detection (upper or lower temperature limits)
- Unlimited number of detection area settings
- Various types of detection area settings; point, line, rectangle, circle, polygon
- Various colour palettes and isothermal images
- Standard Micro SD memory slot (snapshot & video)

5.3. Configuration & Analytics

The VIS-IR detectors are easy and user-friendly to configure and feature great analytics.

- User-friendly definition of ROI (point (single pixel), circle, rectangle, and polygon), colour palettes, (pre-) alarm levels, notification, communication, etc.
- On-screen information of alarm, name type, etc.
- Alarms notification window
- Alarm log – historic retrieval
- Temperature profiles
- Display maximum, minimum or a mean/average value
- Representation of the temperature of each of the pixels through which the straight-line passes
- Temperature time diagram window
- Allowing for recording videos and snapshots
- Capturing and analysing thermographic data