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Document: Technical Manual

**Product: EVC-IR (F04-60044)
 EVC-IR Zero (F04-60045)**

Reference: NISM-EVC-IR.

**Description: Conventional Infrared Flame Detector (EVC-IR) is a flame detector
 which monitors infrared energy emitted during a fire.**

1.0 General.

The Conventional Infrared Flame Detector (EVC-IR) is a flame detector monitoring infrared energy emitted during a fire. The Flame detectors are designed to monitor flame in large and high-ceiling areas such as an atrium, or a gymnasium where Heat or Smoke detectors are unable to detect fires quickly.

In addition, if this detector is installed near machinery which could be an ignition source, this detector can detect small fires at an early stage.

Main Characteristics:

- Provides reliability and cost-effectiveness by employing dual infrared wavelengths.
- Provides a supervision angle of 100° ($\pm 50^{\circ}$) .
- Omniview 360° LED Fire Alarm Indicator permits visibility from any angle.
- Embedded Self-test function detects a sensor fault and contamination of Element Window Glass.

2.0 Part Identification.

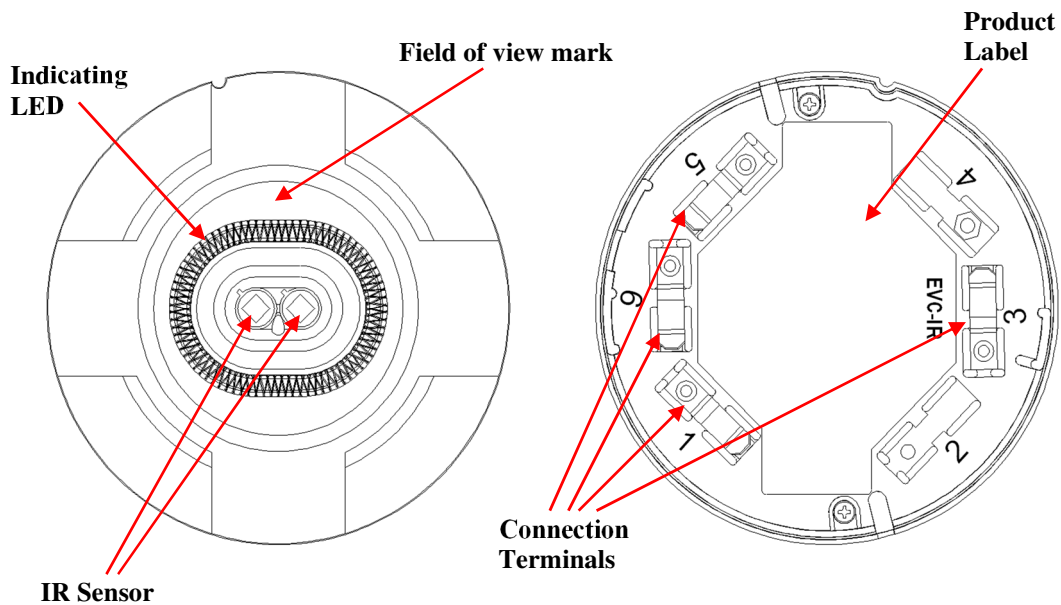


Figure 1: Detector appearance

3.0 Specification.

Product Model	EVC-IR (375 Ohm Alarm)			EVC-IR Zero (0 Ohm Alarm)		
CPR Certificate	2831-CPR-F2439			2831-CPR-F2440		
UKCA Certificate	0832-UKCA-CPR-F0042			0832-UKCA-CPR-F0043		
Product Type	Conventional Infrared Flame Detector					
Approvals	Standard: EN54-10:2002/A1:2005					
Detection Method	CO2 Resonance Emission, Flame Flicker, Dual Wavelengths					
Operating Voltage	DC24V (Operating Voltage 10 ~ 32V)					
Stabilisation Time	< 30 seconds					
Reset	Remove power (or reduce Voltage across terminals 3 and 1.6 to blow holding voltage), for > 1 sec.					
Power on Reset Time Note 1:	4 seconds					
Quiescent Current Consumption	<130μA (at DC24V)					
Alarm Current	50mA@24V, (Internal 375Ω resistor in series with 6Vdrop)			65mA@24V, (Shall be Limited by external resistor)		
Remote Indicator LED	20mA			Up to 50mA		
Supervision Distance	30m (17m~30m)	17m	19m	20m	25m	30m
Viewing Angle	100° Max (± 50°)	100°	90°	80°	60°	20°
LED Indicator	Alarm : LED (RED) ON Fault : RIL Pulses					
Ambient Condition	-10 ~ 55°C					
Materials	Head : PC/ABS Blend					
Weight	Head : 132g					

Note 1: Period from when the detector starts operation, during which the detector will not reset

3.1 Detection Method.

The detector monitors fire parameters in the following three ways.

CO₂ Resonance Emission

By analysing the light spectrum emitted from a fire, it is determined that the light reaches a peak at 4.3 μ m in the Infrared area as shown in Figure 2. This is called CO₂ Resonance Emission emitted from high temperature CO₂, which is a combustion product. The detector detects fire by monitoring this light emission.

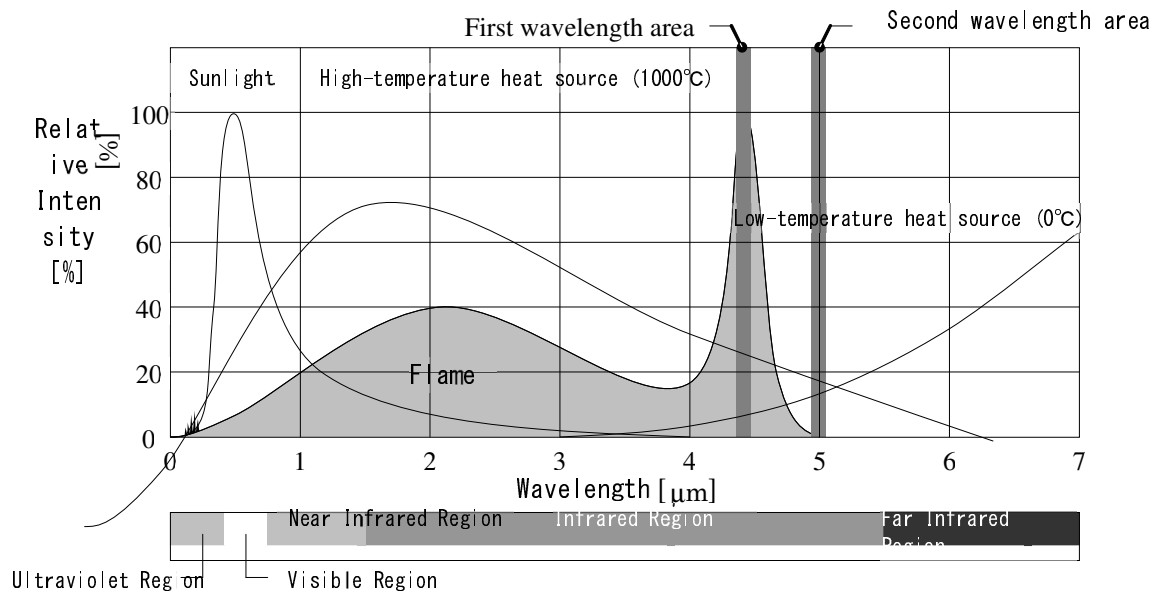


Figure 2: Diagram for Spectrum of Flame and Temperature Objects

Flame Flicker Frequency

A fire exhibits expansion and contraction influenced by the balance of burning materials, oxygen and heat energy. This causes flame flicker. Pyroelectric infrared detection which is used for this detector considers this flicker as a change of the amount of infrared. It does not have sensitivity to a heat and light source since the amount of light for these sources does not change.

The frequency of fire flicker is considered to be 1~10Hz, and the frequency filter circuit removes excess noise.

Dual Wavelength System

All objects which have temperature emit infrared. However, the black body infrared does not have a characteristic peak. To utilise this difference, a second wavelength sensor has been added and the size is compared. i.e. it detects fire when the output of the first wavelength is greater than the one of the second wavelength. i.e. If the first wavelength level $>$ the second wavelength level, detects fire. Conversely, if the first wavelength level $<$ the second wavelength level, does not signal a fire condition.

By doing this, it is possible to discriminate the heat source which would be a cause of false alarm more effectively.

3.2 Indicator (Omniview)

Employing a 360° Omniview indicator, the detector can be installed in any orientation. Sensors can be installed vertically or horizontally. Indicator can be viewed from any angle.

3.3 Self-test Function

This detector has a self-test function which checks for contamination of the Element Window Glass and the status of the sensor. This allows the detector to maintain required sensitivity.

If an internal fault is detected, the external RIL terminal pulses.

Contaminated Window : 1 pulse every 4s

Sensor fault : 2 pulses every 4s

3.4 Connection Configuration

NEU Connections:

Terminal 1: -ve Power In from Panel

Terminal 3: +ve Power (10-32V)

Terminal 5: RIL

Terminal 6: -ve Power to Next device

4.0 Installation Recommendations

1) Places where special protection is required or desired for preservation purposes	National and Historical Buildings, Libraries, Museums, Temples, Churches, and Private Housings
2) Hazardous material Collection and storage areas	Car Parks, Garages, Package Distribution Centre, Electric Power Generating Rooms, Truck Yards, Engine Test Rooms
3) Flammable Materials Fabrication Areas	Paper Mills, Wood Working Factories, Paint Shops, Rubber Product Manufacturers, Machine Shops, Garage Recycling Centres
4) Warehouses	Paper, Wood, Resins, Rubber, Paper Boards, Clothing
4) Rubbish Collection Areas	Garages, Used Tires, Scrap Yards, Paper recycling Centres
5) Others	Prevention of fire spread, Forest Fires, Machinery Engine Rooms

Installation Notes:

- Supervision distance changes with viewing angle
- To change the supervision direction of the detector, a separate sensitivity adjustment is needed.
- Please do not install the detector where sufficient maintenance cannot be provided.
- Please do not place any obstacles between the detector and the monitored object. Even transparent windows, such as glass or plastics, can be obstacles, to Infra-red radiation.
- Sensitivity reduction and detection fault may occur where vibration and electromagnetic interference occur constantly.
- Sensitivity reduction and detection fault may occur where there is a constant high heat source flicker.

Unsuitable Installation Areas

- Where Corrosive gases would be produced
- Where flame is a normal condition i.e.: kitchens
- Where high temperature is the norm
- Direct sunlight
- Where a large amount of smoke may occur as the norm
- Where a large amount of water vapour is normal
- Where condensation is common

5.0 Maintenance/Inspection.

A Maintenance plan corresponding to the installation environment shall be considered. Please ensure routine maintenance/inspection, including cleaning is conducted.