

# SMART<sup>4</sup> Multi-Criteria Fire Sensor

## Data Sheet



Fires take many forms, from a slow smouldering fire that produces large amounts of smoke and Carbon Monoxide but little heat through to alcohol fires that produce high temperatures very quickly without any evidence of smoke. The SMART<sup>4</sup> has a sophisticated 'brain' capable of intelligently combining the data from the four sensing elements to provide a fast response to real fires while remaining extremely resilient to false alarm incidents.

Using a combination of Carbon Monoxide, Heat, Optical smoke sensing and Infrared flame sensing elements enables SMART<sup>4</sup> to detect the broadest range of fire conditions providing the earliest warning.

### Features

- Unique, true four sensor Multi-criteria detector
- Fully integrated Infra Red sensor to support the fire alarm decision
- CO gas sensing for fastest response to slow developing and smouldering fires
- Highest possible immunity to unwanted alarms
- Automatic drift compensation of smoke sensor and CO cell
- Twin LED indicators providing 360° visibility
- Wide temperature range
- Built in test switch
- Stable communication with high noise immunity

### How the SMART<sup>4</sup> works

The SMART<sup>4</sup> is configured so that it normally operates at a high immunity level, changing to become very sensitive to fires when fire characteristics are sensed. In this way transient nuisances are monitored and ignored, reducing the false alarm rate.

SMART<sup>4</sup> dynamically adjusts the detection profile of the device in response to the input from the sensors, enabling it to be re-characterised on the fly as the ambient conditions change. Based upon the sensor signals, sensor thresholds, sensor gain, time delays, combination, sampling rates, averaging rates are dynamically adjusted. And, if any sensor fails the sensitivity of the remaining sensors are adjusted to compensate and a fault condition is indicated.

The IR light sensor helps the detector recognise specific situations such as welding and makes adjustments rapidly in order to further reduce the potential for false alarms. The thermal detection function fuses thermistor technology with a software corrected linear temperature response. In areas where the normal daytime activities are likely to create unwanted alarms, the detector can be programmed to operate on a "Heat only" mode, automatically reverting to multi sensor operation during the unoccupied period. The SMART<sup>4</sup> is thus able to offer exceptional false alarm immunity and excellent fire detection.

This document is not intended to be used for installation purposes. Every care has been taken in the preparation of this document but no liability can be accepted for the use of the information therein. Design features may be changed or amended without prior notice.

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## SMART<sup>4</sup> Multi-Criteria Fire Sensor - IRX-751CTEM

The SMART<sup>4</sup> combines 4 separate sensing elements to act as a single unit. CO sensing (using EC technology) for monitoring CO products from a smouldering fire, IR sensing for measuring ambient light levels and flame signatures, optical smoke detection and heat detection.

SMART<sup>4</sup> dynamically adjusts the detection profile of the device in response to the input from the sensors. It normally operates at a high immunity level, changing to become very sensitive to fires when fire characteristics are sensed. In this way transient nuisances are monitored and ignored, delivering exceptional false alarm immunity and excellent fire detection.

Where specific threats of false alarm have been identified, one of 6 sensitivity levels can be chosen directly from the fire alarm control panel in order to further tailor the detectors performance to its environment.

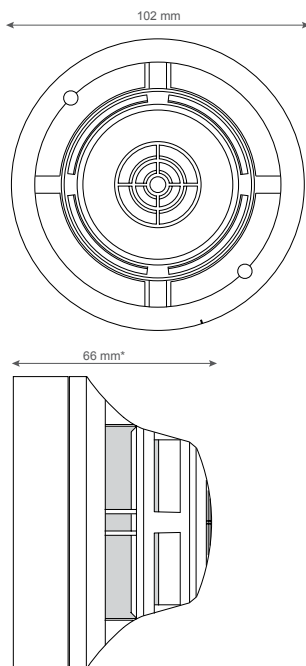


## Specifications

### IRX-751CTEM

#### Mechanical Specification

- Height: 66mm installed in B501 base
- Diameter: 102mm installed in B501 base
- Weight: 176g (inc base)
- Max Wire Gauge for Terminals: 2.5mm<sup>2</sup>
- Colour: White
- Material: Bayblend FR110



\* Note: the delay counter starts when the smoke level exceeds approximately 0.75%/ft.  
 † Do not install detectors in locations where normal ambient temperature exceeds 50°C

The IRX-751CTEM SMART 4 contains an electro-chemical CO sensor which has an expected lifetime from date of manufacture of 6 years and the remainder of the components are made to last over 10 years. Test your fire detection system at least biannually. Clean and take care of your smoke sensors regularly. Taking care of the fire detection system you have installed will significantly reduce your product liability risks.

#### Electrical Specification

- Operating Voltage Range: 15 to 32Vdc
- Max. Standby Current: 220µA @ 24Vdc (no communications)
- Max. Alarm Current: 7mA @ 24 Vdc
- Remote Output Voltage: 22.5Vdc @ 24Vdc
- Remote Output Current: 10.8mA @ 24Vdc
- Additional loop resistance using the B501AP: typ 20mohm (max 30 mohm)

#### Environmental Specifications

- Temperature Range: -20°C to +55°C†
- Humidity: 15 to 90% relative humidity (non-condensing)

#### Range

- IR Limits 0-450 uW/cm2
- CO Limits 0-500 PPM

#### Sensitivity and Nuisance Immunity Settings










The product provides 6 levels of sensitivity, detailed below:

Level 1	Low false alarm resistance, high photoelectric only sensitivity 1%/ft of smoke or greater than 45 ppm of CO. No delays from processed photo output.
Level 2	Medium false alarm resistance, medium photoelectric only sensitivity 2%/ft of smoke. No delays from processed photo output.
Level 3	Standard false alarm resistance, low photoelectric only sensitivity 3%/ft of smoke. No delays from processed photo output.
Level 4	High false alarm resistance, low photoelectric only sensitivity 3%/ft of smoke. Maximum of 10 minutes delay from processed photo output.*
Level 5	Very high false alarm resistance, low photoelectric only sensitivity 4%/ft of smoke. Maximum of 10 minutes delay from processed photo output.*
Level 6	Heat only alarm. Class A1R If the heat level on either thermistor exceeds 60°C or rate of rise limits.

The panel threshold should be chosen according to the specific environment:

- Ultra-clean applications use Level 1 for pre alarm or alarm
- Clean applications use Level 1 for pre alarm and levels 2 & 3 for alarm
- Moderate environments use Level 1, 2 or 3 for pre alarm and Level 4 for alarm
- Harsh environments use Level 2 or 3 for pre alarm and Levels 5-6 for alarm

## Product Range at a Glance

		Isolator	Colour	Part Number
	OPAL Optical smoke detector	✘	Ivory	NFX-OPT-IV
		✓	White	NFXI-OPT
	OPAL Heat detector, fixed 58°C	✘	Ivory	NFX-TFIX58-IV
		✓	White	NFXI-TFIX58
	OPAL Heat detector (A1R), rate of rise + fixed 58°C	✘	Ivory	NFX-TDIFF-IV
		✓	White	NFXI-TDIFF
	OPAL Heat detector, fixed 78°C	✘	Ivory	NFX-TFIX78-IV
		✓	White	NFXI-TFIX78
	OPAL SMART <sup>2</sup> Optical smoke & heat detector	✘	Ivory	NFX-SMT2-IV
		✓	White	NFXI-SMT2
	OPAL SMART <sup>3</sup> Optical smoke & heat detector with infra-red flame sensing	✘	Ivory	NFX-SMT3-IV
		✓	White	NFXI-SMT3
	SMART <sup>4</sup> Infrared, Carbon Monoxide, Optical, Thermal Multi sensor	✘	Ivory	IRX-751CTEM-IV
		✘	White	IRX-751CTEM-W
	Analogue sensor base with SEMS screw connections for isolated and non-isolated detectors and address identification label	n/a	White	B501AP
		n/a	Ivory	B501AP-IV
	Wet Base shroud for use with standard bases to allow condensation run off and rear seal. Conduit entry only.	n/a	White	WB-1AP
		n/a	Ivory	WB-1AP-IV

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