

Soteria Dimension®

Optical Detector



Product overview

Product	Soteria Dimension Optical Detector
Part No.	FL5100-600APO (Detector) FL5000-200APO (Mounting box)
Digital Communication	XP95®, Discovery® Protocol compatible and CoreProtocol®

Product information

The innovative design of the Soteria Dimension Optical Detector differs from standard fire detectors, having no chamber and being flush mounted. A new optical sensing technology is used to detect smoke particles outside the detector housing. A combination of Infra-Red (IR) LEDs and photo-diodes identify smoke particles, detected just below the detector housing and initiates an alarm.

- Low profile design
- Utilises digital CoreProtocol communications
- Compatible with Discovery and XP95 systems*
- Integrated switchable isolator as standard
- 8-way DIL switch addressing
- Drift compensation
- FasTest® for quicker testing
- Tricoloured LED status indicator
- Polycarbonate moulding for colour stability and strength
- Comprehensively tested to exceed EN 54-7 and EN 54-17 standards
- Locking mechanism (grub screw)

*Note: Not all features may be available when Soteria devices are connected to an XP95 or Discovery fire control panel

Technical data

All data is supplied subject to change without notice. Specifications are typical at 24V, +25°C and 50% RH unless otherwise stated.

Detection principle	Photo-electric light scattering										
Sensor configuration	Chamberless detector with two photo-diodes. Micro-controller provides sensor timings, digital signal processing and alarm decision.										
Sampling frequency	Once per second										
Terminal functions (Note: L1 and L2 are polarity sensitive)	<table border="0"> <tr> <td>-L1 in</td> <td>Loop in negative</td> </tr> <tr> <td>-L1 out</td> <td>Loop out negative</td> </tr> <tr> <td>+L2</td> <td>Loop in and out positive</td> </tr> <tr> <td>+R</td> <td>Remote indicator positive connection (internal connection to positive)</td> </tr> <tr> <td>-R</td> <td>Remote indicator negative connection (4.7 mA maximum)</td> </tr> </table>	-L1 in	Loop in negative	-L1 out	Loop out negative	+L2	Loop in and out positive	+R	Remote indicator positive connection (internal connection to positive)	-R	Remote indicator negative connection (4.7 mA maximum)
-L1 in	Loop in negative										
-L1 out	Loop out negative										
+L2	Loop in and out positive										
+R	Remote indicator positive connection (internal connection to positive)										
-R	Remote indicator negative connection (4.7 mA maximum)										
Supply voltage (Vmin-Vmax)	17 - 35 V dc										
Digital communication protocol	XP95, Discovery Protocol compatible and CoreProtocol ready 5 - 13 V peak to peak										
Quiescent current	1 mA										
Power-up surge current	1 mA										
Maximum power-up time	15 s										
Alarm current, LED illuminated	4.5 mA										
Maximum loop current through isolator	2 A										
Clean-air analogue value	23 +4/-0										
Alarm level analogue value	55										
Status indicator	<table border="0"> <tr> <td>Alarm</td> <td>Red</td> </tr> <tr> <td>Fault</td> <td>Flashing Yellow</td> </tr> <tr> <td>Isolated</td> <td>Yellow</td> </tr> <tr> <td>Poll</td> <td>Flashing Green</td> </tr> </table>	Alarm	Red	Fault	Flashing Yellow	Isolated	Yellow	Poll	Flashing Green		
Alarm	Red										
Fault	Flashing Yellow										
Isolated	Yellow										
Poll	Flashing Green										
Operating temperature	-40 °C to +55 °C										
Humidity	0% to 95% RH (no condensation or icing)										
Effect of atmospheric pressure	None										
Effect of wind speed	None										
Vibration, impact and shock	EN 54-7										
IP Rating	IP55 - rating not EN 54 approved										
Standards & approvals	EN 54-7, EN 54-17, CPR, LPCB, FG and SBSC										
Dimensions:											
Detector with backbox	140 mm diameter x 38.2 mm depth 140 mm diameter x 71 mm depth										
Weight:											
Detector with backbox	148 g 273 g										
Materials:											
Housing	White flame-retardant polycarbonate										
Terminals	Nickel plated stainless steel										

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Electrical Considerations

The Soteria Dimension Optical Detector is designed to be connected to a two-wire loop circuit carrying both data and a 17 V - 35 V dc supply. A short-circuit isolator is also integrated into the detector head.

Operating Principles

The Soteria Dimension Optical Detector contains two daylight filtered photo-diodes and three IR emitters in different positions and angles. Different combinations of these are used to act as smoke sensors and proximity sensors to measure the smoke level at the detector and to detect any physical obstruction or interference of the detector.

As this detector is chamberless, an IR LED emits light outside the detector. The light is scattered by smoke back towards the detector and registered by a photo-diode.

A pair of microprocessors control these sensors, setting the sensor timings and using a digital phase-sensitive detection algorithm to reduce noise and the effect of background light. They then provide digital filtering for transient rejection, compensation for drift and temperature and ultimately make an alarm decision.

The mode of operation may be selected at the fire control panel (see Table 1).

Table 1: Soteria Dimension Optical Detector operating modes

Mode	Response Value		Minimum Time to Alarm	Minimum Time to Proximity Fault
	%/m*	dB/m**	Seconds	Seconds
1	4.8	0.27	15	10
2	4.8	0.27	30	10
3	4.8	0.27	15	20
4	4.8	0.27	30	20
5	4.8	0.27	30	30

* Tested in grey smoke

** Tested in oil mist to EN 54-7 standard

Anti-abrasion coated windows make the detector more resistant to physical damage.

With the detection region external to the detector case, the Soteria Dimension Optical Detector is designed to be flush mounted, with a very low profile.

The device has a polycarbonate front plate, which can be locked into place with a grub screw locking mechanism.

Three LEDs provide status indication as detailed in the Technical Data table (see page 1).

The Soteria Dimension Optical Detector has been designed and manufactured in the UK to exacting standards using advanced simulation and development processes.

Application

Fire detectors should always be installed in accordance with all local and national laws and codes of practice.

Optical smoke detectors are recommended for general use, particularly where there is a risk of slow burning fires.

Communication

The Soteria Dimension Optical Detector uses the Apollo digital CoreProtocol to allow more advanced control and configuration, whilst maintaining backwards compatibility with previous generations of Apollo products – Discovery and XP95. For future feature availability, please check with your panel partner.

It should be noted that not all features of the Soteria Dimension Optical Detector will be available when used with Discovery or XP95 fire control panels. If the Soteria Dimension Optical Detectors are used with XP95 fire control panels incorporating drift compensation algorithms, these must be disabled when communicating with the Soteria Dimension Optical Detectors.

Device Addressing

The device address may be set using an 8-bit DIL switch on the detector head.

Backward Compatibility

The Soteria Dimension Optical Detectors have been designed to operate on XP95 and Discovery loops.

EMC Directive 2014/30/EU

The Soteria Dimension Optical Detector complies with the essential requirements of the EMC Directive 2014/30/EU, provided that it is used as described in this data sheet.

A copy of the Declaration of Conformity is available from Apollo on request.

Conformity of the Soteria Dimension Optical Detector with the EMC Directive, does not confer compliance with the directive on any apparatus or systems connected to it.

Construction Products Regulation 305/2011/EU

The Soteria Dimension Optical Detector complies with the essential requirements of the Construction Products Regulation 305/2011/EU.

A copy of the Declaration of Performance is available from Apollo on request.

Maintenance and Service

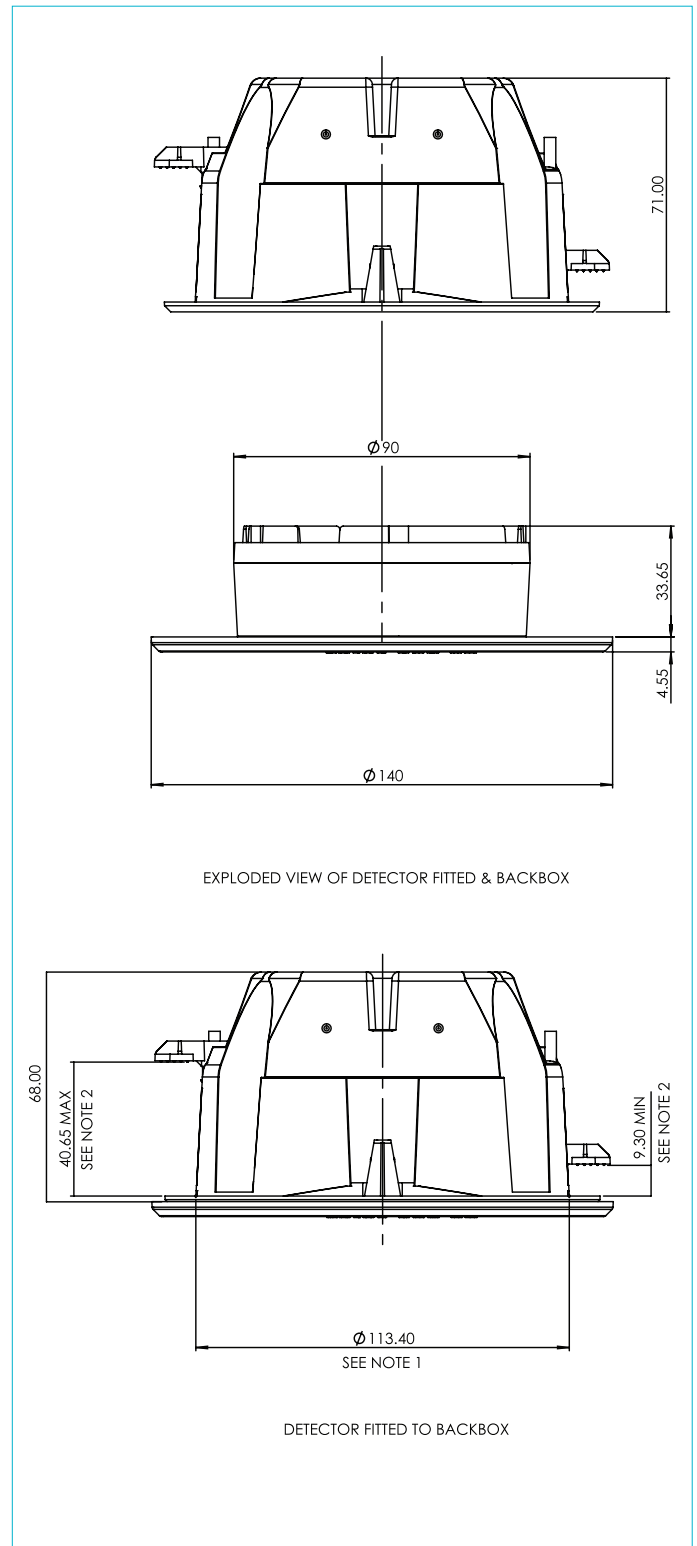
The Soteria Dimension Optical Detectors have been designed with a comprehensive set of features to support maintenance and service, from self test capabilities to drift compensation warnings on dirty detectors.

The new FasTest mode facility on the Soteria Dimension Optical Detector, which can only be enabled on compatible fire control panels, facilitates quicker testing of detectors with appropriate test equipment. The FasTest disables a portion of the signal processing algorithm and also the built-in proximity sensor to allow for a faster detector response, whilst ensuring that the detectors absolute sensitivity remains identical to that of Mode 3 (refer to Table 1). This helps to reduce commissioning time.

The detector may also be tested using a smoke pen, with the method described in the installation guide for this product - 39215-173.

Maintenance has to be performed in accordance with all applicable standards. Clean the detector externally using a soft damp cloth. If the cleaning process takes more than 10 seconds, the detector may register a fault. For full cleaning and recalibration detectors should be returned to Apollo Fire Detectors.

Figure 1: Soteria Dimension Optical Detector dimensional drawing



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