Soteria®

Tri-Sensor Detector (Dual Optical / Heat / CO)

Product overview

Product	**Soteria Tri-Sensor Detector (Dual Optical / Heat / CO)**
Part No.	**SA5100-810APO**
Digital Communication	**Discovery and CoreProtocol® compatible**

Product information

The Soteria Tri-Sensor Detector (Dual Optical / Heat / CO) combines dual angle smoke, Heat and CO sensors into a single algorithm that achieves reduced susceptibility to false alarms. The detector can operate in 5 modes of sensitivity.

- Available with integrated switchable isolator
- Drift compensation
- Tricoloured LED status indicator
- FasTest® for quicker testing of detectors
- Locking mechanism (grub screw)
- DIL Switch Addressing

**Note: Not all features are available when Soteria devices are connected to a Discovery fire control panel.*

Manufacturer's Specification

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

Digital communication	*Discovery and CoreProtocol compatible*	
Sensor configuration	*Smoke*	*Chamber with IR emitter-receiver pair (LED and photo-diode) and a second photo-diode receiver to get multiple angle light scattering information.*
	Heat	*Single, centrally positioned, NTC thermistor.*
	CO	*Electrochemical cell.*
Terminal functions (note: L1 & L2 are polarity sensitive)	*+L2*	*Loop in and out positive*
	–L1 in	*Loop (isolated) negative*
	–L1 out	*Loop (isolated) negative*
	+R	*Remote indicator positive connection*
	–R	*Remote indicator negative connection (4.7mA maximum)*
Supply voltage (Vmin–Vmax)	*17 V – 35 V dc*	
Modulation voltage	*5V –13 V peak to peak*	
Quiescent current	*600 µA*	
Power-up Surge Current	*2 mA*	
Alarm current, LED illuminated	*4 mA*	
Clean-air analogue value	*23 +2/–0*	
Alarm level analogue value	*85 - 97 (specific values based on the cause of the alarm)*	
Operating Modes	*1*	*High Sensitivity - EN54-31 NT, EN54-7 and EN54-5*
	2	*Clean Environments - EN54-31 NT, EN54-7 and EN54-5*
	3	*General Purpose - EN54-31 MT*
	4	*Harsh Environments - EN54-31 MT*
	5	*Low Sensitivity - EN54-31 MT*
Status indicator	*Alarm*	*Red*
	Fault	*Flashing Yellow*
	Isolate	*Yellow*
	Poll	*Green*
Operating temperature	*–10°C to 55°C*	
Humidity	*0% to 90% RH (no condensation or icing)*	

Continued overleaf

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Technical data (cont'd)	
IP Rating	*IP40*
Dimensions	*103mm Diameter x 55mm Height*
Weight	*105g*
Materials	*All parts are made in >ABS< except the swirl/screen which is in >POM< and the light guides are in >PC<.*

Electrical description

The Soteria detector is designed to be connected to a two-wire loop circuit carrying both data and power. A shortcircuit isolator is integrated into the detector.

Operation

The Soteria Tri-Sensor (Dual Optical/Heat/CO) detector mounts two LED indicators which illuminate red when in alarm, yellow to indicate a fault and green to indicate protocol activity.

The dual optical smoke sensing channel works on a light scattering-Tyndall effect basis: an IR emitter–receiver pair (LED and photo-diode) is placed in a smoke chamber, designed to have a high immunity to environment light and dust settling.

The optical detection also exploits a second photo-diode receiver to take advantage of the angle scattering information to improve the capability to reject nuisance related signals.

Proper amplification and data processing is applied to the signals to discriminate transient signals, noises, etc from real fire and dangerous situations. The dual optical smoke sensing channels compensates for environment light and uses an enhanced dust compensation algorithm that sensibly reduces maintenance periods.

The heat sensing channel exploits a single, centrally positioned, NTC thermistor which supervises the environment temperature.

The CO sensing channel samples the output of the CO conditioning circuit, which exploits an electrochemical cell in order to supervise the environment level of carbon monoxide (CO).

The mixed information of optical, heat and CO detection improve both the immunity to false alarms and the early fire detection. The optical-heat-CO algorithm is based on five modes, and allows to adapt the detector performances to different application environments.

There are two categories of multi-criteria CO detector according to EN 54-31 normative:

- Category NT: This detector settings may give a fire alarm in presence of a single fire phenomenon
- Category MT: This detector settings are intended to withstand high levels of a single fire phenomenon without giving a fire alarm.

Device Addressing

The addressing method will not be using the XPERT Address card, instead, it will be through soft addressing or a DIL switch on bottom of the detector.

When Soteria devices are used with CoreProtocol, device auto-addressing can be enabled by fire control panels that have been designed to incorporate this feature.

Table 1: Soteria Multi-Sensor Detector (Dual Optical / Heat) response modes

Mode	Mode Description	Optical Sensor		Heat Sensor	CO Sensor
		%/m	dB/m*		
1 NT**	High Sensitivity	2.9	0.14	A1R	Fixed
2 NT**	Clean Environments	2.9	0.13	A1R	Fixed
3 MT**	General Purpose	***	***	***	Fixed
4 MT**	Harsh Environments	***	***	***	Fixed
5 MT**	Low Sensitivity	***	***	***	Fixed

** Tested in oil mist to EN54-7 standard*

** *In all the modes the CO sensor contributes to heat and smoke response but does not cause an alarm on it's own*

**** MT mode no response to smoke or heat only*

Table 2: Alarm response combination

Mode	MT/NT	AND/OR	Sensor 1	Sensor 2
1, 2	NT	OR	Smoke	Heat
3, 4, 5	MT	AND	Smoke	Heat
		AND	Smoke	CO
		AND	Heat	CO

Communication

Soteria uses the new digital CoreProtocol to allow more advanced control and configuration, whilst maintaining backwards compatibility with previous generations of Apollo products – Discovery. Discovery and CoreProtocol make use of the Normal, Read and Write modes with additional non-volatile data fields made available to the fire control panel.

Backward Compatibility

Soteria detectors have been designed to operate on Discovery loops. This allows for Soteria detectors and bases to operate on existing systems and for Soteria detectors to operate on Discovery bases (XPERT 7 Intelligent Mounting Base).

It should be noted that not all features of Soteria will be available when used with Discovery fire control panels.

Maintenance and Service

Soteria 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 Soteria can be enabled within a fire control panel that incorporates this feature. This facilitates quicker testing of detectors with appropriate test equipment. FasTest disables the transient rejection algorithms to allow a faster detector response, whilst ensuring the detectors absolute sensitivity remains identical to Mode 3. A visual pass/fail indication is provided by the detector and overall, FasTest reduces commissioning and maintenance time.

FasTest can also be enabled using magnets. Using the line marker on the side of the detector, a magnet can activate FasTest. It is active when the LED's flash RED three times (smoke, heat, CO). The LED flash pattern will change depending on which cell has been tested and passed, for example: GREEN, RED, RED = smoke cell has been tested and passed. Using this feature provides a localised and panel indication that testing has been performed and is automatically logged.

Maintenance has to be performed in accordance with all applicable standards. Clean the detector externally using a soft damp cloth.

EMC Directive 2014/30/EU

The Soteria Tri-Sensor Detector (Dual Optical / Heat / CO) 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 Tri-Sensor Detector (Dual Optical / Heat / CO) with the EMC Directive does not confer compliance with the directive on any apparatus or systems connected to it.

Construction Products Regulation (EU) 305/2011

The Soteria Tri-Sensor Detector (Dual Optical / Heat / CO) complies with the essential requirements of the Construction Products Regulation (EU) 305/2011 in respect of EN 54-5:2017 and EN 54-7:2018.

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

Figure 1 - Soteria Tri-Sensor Detector (Dual Optical/Heat/CO) dimensional drawing