G010995

Programmable Smoke & Heat Detector

CS-PYH

Part no. 5210020-00A

System: CFD5000 T

General description

The CS-PYH is an addressable combined optical smoke and heat detector suitable for use in SIL 1 and SIL 2 environments. It is designed to comply with the standards for the industrial, maritime, offshore and rolling stock markets up to Safety Integrity Level 2 (SIL 2).

The detector has an output for remote indication in form of a remote LED or a local sounder.

The CS-PYH detects smoke and heat in accordance with EN 54 and UL standards, and can be configured to detect the following:

Table 1.

Temperature class EN 54-5	**A1R**	**A2S**	**CS**	**CR**
Operating temperature	-40 °C to +70 °C	-40 °C to +70 °C	-40 °C to +70 °C	-40 °C to +70 °C
Application temperature	-40 °C to +50 °C	-40 °C to +50 °C	-40 °C to +80 °C	-40 °C to +80 °C
Response temperature	+54 °C to 65 °C	+54 °C to 70 °C	+84 °C to 100 °C	+84 °C to 100 °C
Response to increasing temperature (10 °C/min), from typical application temperature	25 °C: 60 to 260 sec	No alarm response	No alarm response	55 °C: 120 to 330 sec
Temperature rating UL	**Ordinary**		**Intermediate**	
Operating temperature	15 °F to 122 °F (-9 °C to +50 °C)		15 °F to 167 °F (-9 °C to +75 °C)	
Ambient installation temperature	32 °F to 100 °F (0 °C to +38 °C)		32 °F to 150 °F (0 °C to +65 °C)	

The CS-PYH can also detect multi-criteria heat assisted smoke according to Test fires TF2-TF5 & TF8 for temperature class A1R, CS and CR, as well as multi-criteria heat assisted smoke for temperature class A2S.

The CS-PYH can furthermore be configured to detect smoke at 5 different sensitivity levels, the default sensitivity level is 3. Normal.

Local intelligence via an integrated CPU

The integrated CPU makes it possible to make decisions locally, like evaluation of the alarm condition.

IDAxt protocol

The IDAxt protocol is an extension of Consilium's communication protocol (IDA) and meets the demands on data integrity, reliability and robustness required for use in SIL 1 and SIL 2 safety functions and safety systems.

Periodic BIST

The Periodic Built-In Self-Test is a central mechanism which the system uses to ensure long proof test intervals.

Countermeasures (defences) have been implemented in order to address the fault modes (threats) in the fire detection system. These countermeasures are done in order to increase the confidence in the system.

The system has two types of Built-In Self-Tests (BIST). The first BIST is made continuously; for instance when reading A/D values from hardware. This typically involves evaluation of the read value to determine if the hardware is broken; i.e. gives measurements outside an acceptable interval.

The second BIST is the Periodic Built-In Self-Test (Periodic BIST) which is made once every five minutes in order to verify the safety function by testing communication paths. All internal communication paths and all testable parts of the loop-units are included in the Periodic BIST mechanism, to verify the whole path from detection to reporting (fire) status.

The system creates a log with the results of the Periodic BIST. This log can be extracted from the system with a USB memory stick.

Short Circuit Isolator (SCI)

The built-in SCI isolates short circuits on the loop-line and also has a probe function for evaluating a short circuit. The SCI ensures that the fire detection system does not lose contact with the loop units when there is one short circuit on the loop-line. The probe function makes it possible to reset the short circuit condition without restart of the loop-line.

Data

Sensor method	Light Scatter and Thermistor
Operating voltage	22–38 VDC
Operating current:	
- Normal condition	0.1 mA ± 5%
- Alarm condition with LED activated	3 mA ± 5%
Sub-Loop (Remote indication, supervised dry-contact reading)	Current limited: 5 mA
Loop communication protocol	IDAxt
UL listed temperature	See Table 1
Operating temperature	-40 °C to +70 °C
Storage temperature	-40 °C to +70 °C
Relative humidity	0 to 95% RH non-condensing
Addressing method	DIP switch
Ingress protection	Depends on base: IP22 (if used together with UB-6-PA66, 5100449-00A) IP44 (if used together with IP-BASE, 5100774-00A)
Material	Polyamide 6.6
Weight (w/o base)	110 g ± 5%
Colour	White RAL 9003
Loop cable requirement	See the Installation & Commissioning manual
UL	Listed to standards 268 and 521
Approvals	EN 50155, EN 45545-2

CE

When Safety Matters SIL 2 IEC 61508/EN 50126/28/29

RAMS EN50126/EN50128/EN50129

Functional Safety Data

Type	B
HFT	0
SFF	95 %
PFD_{avg}	2.89×10^{-4}

PFD_{avg} is calculated for MTTR 8 h and proof test interval 1 year.
Suitable for use in SIL 1 and SIL 2 environments.

Accessories

5100449-00A	UB-6-PA66	Detector Base (material polyamide 6.6)
5100774-00A	IP-BASE	Detector Base
5100775-00A	IP-ADAPT	Base Adapter
5100626	CD-S	Alarm Sounder

NOTE!
Do not remove the protective cover from the detector until all paint work and polluting (dusty) activities are finished and the area has been cleaned.
After installation: Be sure to remove all covers before the fire detection system is put into operation.

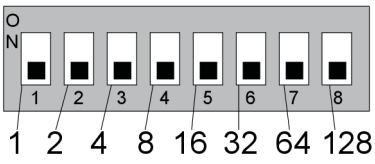
Data for built-in Short Circuit Isolator (SCI)

Ic max (Maximum Continuous current)	500 mA
Is max (Maximum Switching current)	800 mA

Current when short circuited (IL max)	< 1 mA
Open to Close voltage	22 ± 2 VDC
Open to Close, maximum load expressed in ohms on the non-energized side	≈1.2 kΩ
Close to Open voltage	14 ± 2 VDC

Address switch

The loop units are identified by a physical address. The address number is set on an 8 pole DIP switch located on the loop unit. (For settings use a pointed tool of suitable size.)



1 to 150 are valid addresses. The DIP switch value follows the binary system.

Configuration of Safe I/O

The CS-PYH has one configurable input/output, called Safe I/O.

Table 2. The allowed configurations of Safe I/O

Safe I/O		Active High/Low	Monitored 1)	CS-PYH
Input	Fault	H/L	X	X
	General	H/L	X	X
Output	Remote Indication (RIL)	NA		X

1) Monitored for cable break and short circuit

Cleaning

WARNING!
Potential electrostatic charging hazard
If the unit requires cleaning, only clean exterior with a damp cloth to avoid electrostatic charge build up.

Testing & Maintenance

Environmental compensation

The detector compensates for environmental contamination of its smoke chamber to maintain its sensitivity setting and to avoid false alarms. The detector will generate a warning if it becomes slightly contaminated (but still remains in working condition). When it gets too contaminated to fulfill its safety function it will generate a fault alarm.

Mechanical dust protection

The detector has a finely pitched net, that blocks dust from entering the smoke chamber, in order to reduce the rate of environmental contamination.

Test equipment

5200112-00A	Testifier	Multi-stimulus Detector Tester
N1743	Solo 461	Heat Detector Tester
N1738	Solo 330	Smoke Detector Tester

CAUTION!
Testifier and Solo 461 are not approved for use in hazardous environments.

If the detector is configured for heat detection

To test heat detection use either Testifier or Solo 461:

- Apply heat to the sensing element until alarm is indicated by the red indication on the detector.

If the detector is configured for smoke detection

To test smoke detection use either Testifier or Solo 330:

- Spray test gas on to the detector during 1 second. Wait 10 seconds until new gas is sprayed during 1 second.
- Repeat this procedure until the detector indicates alarm with a red indication.
  If the detector fails to alarm after three attempts the detector has to be replaced.

For further detailed instructions, please see the datasheet for the test equipment and the Service & Maintenance manual for the fire detection system.

Connection

Hint!
For connection, please refer to the data sheet for IP-ADAPT (5100775-00A) or UB-6-PA66 (5100449-00A).

Dimensions (mm)