

PyroSense SP-1

Control device

Features

- 1 monitored Pyrogen MAG Output (2 or 4 MAG units)
- 2 monitored detector alarm loop inputs
- 1 monitored external discharge alarm input
- Ignition "panel switch on"
- Power 8–28 V DC
- Internal alarm/fault buzzer
- Engine & ventilation shut down output
- General fault, alarm & discharged output
- Press button "Silence" for silencing of audible
- Press button "Reset" for resetting of the panel
- Press buttons simultaneously for discharge of Pyrogen
- Dual LED indicators for power ok, general fault, alarm and discharged.



Description

This panel is for the monitoring and controlling of Pyrogen fire extinguishing systems in pleasure crafts, small fishing vessels and vehicles. The system is build to fit in to standard dashboards & instrument panels.

The SP-1 PyroSense system is designed to monitor various sensors and activate outputs to control a-Pyrogen fire extinguisher/s in the event of a fire being detected.

The SP-1 PyroSense system continually monitors its inputs and reacts to changes in the inputs by applying a series of rules. Once a rule is activated, it will make changes to the outputs, which will active until the "Reset" button is pressed, or until the rule is superseded by a higher priority rule.

In the event of multiple rules being triggered, the more critical rules will supersede the less critical rules.

The system monitors the inputs both to detect actual alarm or fire situations, and to check for faults in the system itself. It is able to detect faults such as short-circuits or breaks in the sensor cables, and faults in the LEDs on the panel. There is also a comprehensive test mode that can be used both during production, installation and servicing of the system.

The panel components are based around a low-power microcontroller, which controls the system. Much of the functionality (such as the analogue-to-digital converter) is built into the microcontroller, so it spends most of the time in low-power "sleep" mode. This results in very low power consumption for the panel, which is important when the system is running from batteries.

The software is contained within the microcontroller's flash memory, and can be updated using a programming adaptor. This means that the controller's software can be changed, if need be, with very little effort.

Technical data PyroSense SP-1

Power supply	Operating voltage.....	8 - 28 VDC
	Standby current (8 – 28 VDC).....	2 mA (ignition off)
	Normal current.....	50 mA
	Internal automatic fuse.....	2 A
	Fuse on supply lead (max).....	5 A
Ignition	From ignition- or main switch	+ 8 to 28 VDC (2 mA)
Alarm loop 1 (Thermal sensing cable)	Alarm Temperature	180°C
	Maximum normal ambient temp.....	105°C
	Voltage.....	3 VDC
	Normal current/Alarm current	0.03 / 0.06 mA
	Sensor cable EOL resistor.	47 k ¹
Alarm loop 2	Alarm situation, resistor value on loop	23,5k ² ?
	Norm. situation, resistor value on loop.	47k ² ?
	EOL resistors on NC alarm contact ...	2x47 k ² ? ¹
	Voltage.....	3 VDC
	Normal current/Alarm current.....	0.03/ 0.12 mA
Remote Manual Discharge loop	Alarm situation, resistor value on loop	23,5k ² ?
	Norm. situation, resistor value on loop.	47k ² ?
	EOL resistors on NC alarm contact ...	2x47 k ² ? ¹
	Voltage	3 VDC
	Normal current/Alarm current.....	0,03/ 0,12 mA
Discharge signal	Duration (Pulse time).....	10 sec.
	Voltage	8 - 28 VDC
	Discharge current (Max).....	1,2 A (current limitation)
	Normal current 12V/24V	0.25 / 0.5 mA
	Max number of MAG generators.....	2 (12 V dc) or 4 (24 V dc)
Discharge monitoring	Voltage	3.3 V dc
	Current.....	0.1 mA
Sounder/Beacon connection (Output 1)	Voltage	8 - 28 V dc
	Current (max)	1.8 A ²
Engine & Ventilation shut down (Output 2)	Voltage	8 - 28 V dc
	Current (max)	1.8 A ²
Dimensions	Front L x W x D.....	70 x 70 x 30 mm
	Cut out.....	Ø 60 mm
	Depth in cut out	40 mm
	Weight.....	200 g
IP Rating	Flush & surface mounted	IP65 (IP67 on request)
Limited life components	MAG generator.....	Max. 10 year ³

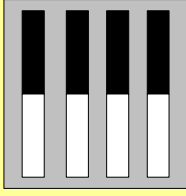
The manufacturer reserves the right to amend specifications and details within this document, without prior notice.

¹ R1=47k in serial with NC alarm contact, and R2=47k in parallel with the NC alarm contact and R1.

² Max. same time load for the out 1 & out 2 are 2 Amp.

³ Depending upon environmental exposure, the MAG cannister life time is guaranteed from 1 to 10 years.

“Cause effect” matrix

1=ON 0=OFF X=Dont care  4 3 2 1 Factory default = all switches off	DIP SWITCH				Buzzer continual	Buzzer pulsing	Out. 1 continual	Out. 1 pulsing	Out. 2	Delayed discharge	Mom. discharge	Alarm LED	Exting. conf. LED	Fault LED	NOTE
	4	3	2	1											
	Alarm input 1 = ALARM	X	X	1	0		
Alarm input 2 = ALARM	1	0	X	X		.	.	.	.	.		.	.		2
Alarm inp. 1 & 2 = ALARM	1	1	1	1		.	.	.	.	.		(.)	.		3
Alarm input 1 = ALARM	X	X	0	0	.		.					.			4
Alarm input 2 = ALARM	0	0	X	X	.		.					.			5
Alarm input 1 = ALARM	X	X	0	1	.		.					.	.		6
Alarm input 2 = ALARM	0	1	X	X	.		.					.	.		7
Manual Discharge by front buttons	X	X	X	X		.	.	.	.		.	.	.		8
External man. Discharge=ALARM	X	X	X	X		.	.	.	.		.	.	.		9
Alarm input 1 = FAULT	X	X	X	X	.		.							.	10
Alarm input 2 = FAULT	X	X	X	X	.		.							.	11
Ext. Man. Discharge = FAULT	X	X	X	X	.		.							.	12
MAG loop = FAULT	X	X	X	X	.		.							.	13

Priorities

More serious events always take priority over less serious events. Thus, if a rule calling for immediate discharge is activated, then it has first priority, followed by delayed initiation, followed by the various warning and alarm indicators.

Power LED

The power LED will be lit constantly if the ignition in input shows the ignition is on.

Discharge LED

The discharge LED will blink slowly during the first 17 seconds of the 20-second delay. In the last 3 seconds, it will blink more rapidly, then it will blink most rapidly when the Pyrogen MAG output has actually been activated. For immediate manual release, it will go straight to rapid blinking.

NOTES

- Alarm loop 1 is used to initiate a delayed (20 sc.) activation of the Pyrogen MAG unit. Detectors could either be a linear heat line detector or a spot detector (heat, UV/IR or smoke types). EOL resistor 43 kΩ. Alarm condition is a shorted loop.
- Alarm loop 2 is used to initiate a delayed (20 sc.) activation of the Pyrogen MAG unit. Detectors could either be a linear heat line detector or a spot detector (heat, UV/IR or smoke types) of voltages free contact type (NC). EOL resistor is a 47 kΩ in series and a 47 kΩ in parallel to the NC contact of detector. Alarm condition is a 47 kΩ input.
- A combination of Alarm loop 1 and Alarm loop 2 is used to initiate a delayed (20 sc.) activation of the Pyrogen MAG unit.
- Alarm loop 1 is used to initiate an Alarm situation (fire alarm, pressure switch monitoring etc.).
- Alarm loop 2 is used to initiate an Alarm situation (fire alarm, pressure switch monitoring etc.).
- Alarm loop 1 is used to monitor the Pyrogen MAG unit for pyrotechnical activation (confirmed activation).
- Alarm loop 2 is used to monitor the Pyrogen MAG unit for pyrotechnical activation (confirmed activation).
- Manual activation of Pyrogen MAG units is initiated immediately by holding both the “reset” and “silence” buttons down, simultaneously, for at least 5 seconds.
- Manual activation of Pyrogen MAG units is initiated immediately by activating an external “Break glass button”
- Fault condition Alarm loop 1. Fault condition is initiated by a break in the loop.
- Fault condition Alarm loop 2. Fault condition is either a break in the loop or a short.
- Fault condition External discharge button. Fault condition is initiated by either a break in the loop or a short.
- Fault condition MAG input loop. Fault condition is initiated by a break in the loop.

Test functions

General

The system has a comprehensive test mode that can be entered by holding down the silence button during power on. This test mode is designed to allow all the inputs and outputs to be fully tested as part of the production and testing of the panels, and optionally during installation and service. The testing is divided into three stages, with the reset button used to step between the stages (giving a short audible buzz as acknowledgement). After stage 3 is complete, pressing reset will re-start the system in normal mode. The DIPswitches and the LEDs are used extensively during test mode.

The LEDs and buzzer are tested while the silence button is being held down during start up, as is the silence button itself. The reset button is tested when stepping between the stages.

Stage 1 – Testing the LEDs

At this stage, the four DIPswitches are connected to four of the LEDs. When the corresponding switch is activated, the appropriate LED will blink between the main and reserve elements.

DIP switch

4321

xxx1

LED

Power LED

xx1x

Fault LED

x1xx

Activation LED

1xxx

Alarm LED

Stage 2 – Testing the analogue inputs

When testing the analogue inputs, one input is chosen at a time using the DIPswitches, as shown. The input will be analysed, and the state (short, closed, open, free or error) will be determined and shown on the LEDs. The test mode distinguishes between a “tight” match and a “normal” match. A tight match uses tighter boundaries, and is useful during testing, while the normal match is used during normal operation. Tight matches cause the corresponding main LED element to light, while normal matches light the reserve element.

DIP switch

4321

0001

0010

0100

1000

SHORT

CLOSED

OPEN

FREE

ERROR

LED

Alarm loop 2

Alarm loop 1

Man. Activation

MAG loop

Power LED

Fault LED

Alarm LED

Activation LED

No LED

Stage 3 – Testing the outputs and remaining inputs

In the final test stage, the DIPswitches and buttons are used to activate the outputs and to check the inputs, as shown.

DIP /input

Ignition
activated

4321

xxx1

1x1x

x1xx

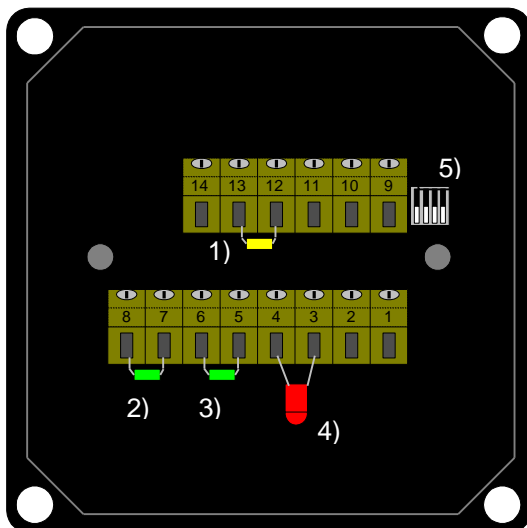
LED/Output

Power LED

Fault
LED/shutdown

Activation.
LED/MAG
Activation.

Alarm
LED/Alarm out



- 1,2 &3) Factory installed Loop EOL resistors.
4) Factory installed test lamp.
5) DIP-Switch

Terminals

- | | |
|----|--|
| 1 | Battery (+) 12 or 24 V (Through a 3A fuse) |
| 2 | Battery (-) GND . |
| 3 | Pyrogen MAG generator (+) |
| 4 | Pyrogen MAG generator (-) |
| 5 | Loop 2 (+) |
| 6 | Loop 2 (GND). |
| 7 | External Manual activation button (+). |
| 8 | External Manual activation button (GND). |
| 9 | Out 1 (+) |
| 10 | Out 1 & 2 (GND) |
| 11 | Out 2 (+) |
| 12 | Loop 1 (+) |
| 13 | Loop 1 (GND). |
| 14 | Ignition (+) |