

# XP95 SWITCH MONITOR PLUS WITH ISOLATOR

## FUNCTION

The XP95 Switch Monitor Plus with Isolator is designed to monitor the state of one or more single pole, volt-free contacts connected on a single pair of cables and to report the status to Apollo compatible control equipment. It has an opto-coupled output for resetting a remote detector and a selectable delay, making it suitable for monitoring flow switches.

## FEATURES

The Switch Monitor Plus with isolator provides four input states to the control equipment: 'Normal', 'Fault', 'Pre-alarm' and 'Alarm'. These are derived from the switched resistive values shown in the table overleaf. The Switch Monitor Plus with isolator has a red LED to indicate an alarm and two yellow LEDs to indicate a switch input wiring fault or a loop short-circuit wiring fault. The 30 second delay is selected by setting the eighth bit of the DIL switch to '0'.

The Switch Monitor Plus with isolator is fitted with a bi-directional short-circuit isolator and will be unaffected by a single loop short-circuit on either loop input or output.

## ELECTRICAL CONSIDERATIONS

The XP95 Switch Monitor Plus with isolator is loop powered and operates at 17–28V DC with protocol voltage pulses of 5-9V. It is designed to accept a maximum loop line resistance of 50Ω. The end-of-line resistor required for the monitored switch circuit is 20kΩ. The opto-coupled output takes the



**Part no** 55000-841 (surface mount)

form of a current limited transistor output.

## PROTOCOL COMPATIBILITY

The Switch Monitor Plus with isolator operates only with control equipment using the Apollo Series 90, XP95 or Discovery protocol.

## PROTOCOL BIT USAGE

*The control equipment transmits a 10-bit message to the Switch Monitor Plus with isolator:*

The output (**or forward command**) bits from the control panel have the following function:

When **output bit 2** is set to logic 1 on two or more consecutive cycles, the red LED is illuminated.



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36 Brookside Road, Havant, Hampshire PO9 1JR, England.

Tel: +44 (0)23 9249 2412 Fax: +44 (0)23 9249 2754 Website: [www.apollo-fire.co.uk](http://www.apollo-fire.co.uk) Email: [sales@apollo-fire.co.uk](mailto:sales@apollo-fire.co.uk)

When **output bit 1** is set to logic 1 on two or more consecutive cycles, a self test is activated, resulting in an analogue value of 64 being transmitted to the control panel.

When **output bit 0** is set to logic 1 on two or more consecutive cycles, the opto output is switched on.

The **seven bits** which are then transmitted by the control equipment correspond to the **address (as set on the DIL switch)** of the device to be polled.

*A response message is then sent by the Switch Monitor Plus with isolator to the control equipment:*

The **interrupt bit** is always set to logic 0.

The **analogue value bits** are set to return a pre-set analogue value of 4 for open and short circuit faults, 16 during normal operation, 45-51 to indicate a pre-alarm and 64 to signal an alarm.

The **input bits** are used to confirm the operation of the corresponding output bits.

The **type bits** are used to identify the type of unit responding. The type code of the Switch Monitor Plus with isolator is set to 100 01 (bits 2,1,0,4,3 respectively). Bits 2, 1 and 0 are sent immediately after the input bits and bits 4 and 3 are sent in the XP95 protocol extension.

The Switch Monitor Plus with isolator sends **seven bits** of data to confirm its **address** and then **one bit** to indicate that the device can use the XP95 protocol (**XP95 flag**).

The **alarm flag** is set if another device is in alarm and has not been polled for one second. (The Switch Monitor Plus with isolator places an alarm flag if its analogue value is 64 and is repeated every 32 protocol frames. This flag is set on the data stream of another device.

The next **two bits** returned by the device are bits 4 and 3 of the type code.

The next **five bits** are the second block of analogue value data bits and are not used by the Switch Monitor Plus with isolator.

The **parity bit** is set to '1' or '0' such that the device will always respond with an even number of data bits.

The final **seven bits** are used to transmit the **alarm address**.

## MECHANICAL CONSTRUCTION

The Switch Monitor Plus with isolator is supplied with a back box for surface mounting and is intended for indoor use only.

Three LEDs, one red and two yellow, are visible through the front cover of the enclosure.

The red LED can be illuminated under CIE control in the event of an alarm being detected.

One yellow LED is illuminated in the event of a fault condition being detected in the monitoring circuit and cannot be controlled by the CIE.


The other LED is illuminated whenever the built-in isolator has sensed a short-circuit loop fault.

### Dimensions and weight of Switch Monitor Plus with Isolator (surface mount):

150 x 90 x 48mm

240g

## Technical Data

Minimum loop operating voltage in normal conditions	
Maximum loop operating voltage	17V DC 28V DC
Maximum current consumption at 24V	
switch-on surge, max 150ms	3.5mA
quiescent, 20kΩ EOL fitted	1.25mA
LED off, switch input closed	1.5mA
LED on, switch input closed	3.4mA
LED on, switch input s/c	4.2mA
Maximum continuous current	1A
Maximum switching current	3A
On resistance	0.2Ω
Opto voltage range	5-30V DC
Guaranteed opto current	1mA
Switch input monitoring voltage	9-11V DC
Maximum cable resistance	50Ω
Operating temperature	-20°C to +70°C
Humidity (no condensation)	0-95%RH
Shock	to GEI 1-052
Vibration	
Impact	
IP rating	54
Radiated and conducted RF emissions	to BS EN50081-1 & 2
Radiated and conducted RF immunity	to BS EN50130-4
	

Resistance across input	Status	Analogue Value
<100Ω	<i>Short-circuit fault</i>	4
100–200Ω	<i>Indeterminate</i>	4 or 64
200–2kΩ 1kΩ *	<i>Alarm</i>	64
2–3kΩ	<i>Indeterminate</i>	64 or 45–51
3–11kΩ 10kΩ *	<i>Pre-alarm</i>	45–51
11–15kΩ	<i>Indeterminate</i>	45–51 or 16
15–25kΩ 20kΩ *	<i>Normal</i>	16
25–30k	<i>Indeterminate</i>	16 or 4
>30kΩ	<i>Open-circuit fault</i>	4

\*The values shown in *italics* are recommended values

### EMC DIRECTIVE 89/336/EEC

The XP95 Switch Monitor Plus with isolator complies with the essential requirements of the EMC directive 89/336/EEC, provided that it is used as described in this PIN sheet.

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

Conformity of the XP95 Switch Monitor Plus with isolator with the EMC directive does not confer compliance with the directive on any apparatus or systems connected to it.

## Schematic Diagram & Wiring Connections

