



## Mains Switching Input/Output Unit Installation Guide

### General

The Mains Switching Input/Output Unit, part no 55000-875, which is a loop-powered device, provides a single-pole voltage-free changeover relay output and a monitored input. It is supplied with a backbox for surface mounting.

This product is designed to installation category 2 of IEC 61010.



**Caution:** The Mains Switching Input/Output Unit is not designed for outdoor use unless it is mounted in a suitable weatherproof enclosure. It is designed to switch mains voltages of up to 250V and should be installed with all due care by a qualified person. Isolate mains supply before starting work.

### Surface Mounting

1. Mount the backbox as required and install all cables for termination.
2. Remove the cover plate (if secured) from the Input/Output Unit assembly by inserting the blade of a terminal screwdriver into each of the four securing clips in turn, gently prising the outer edge of the cover plate over the clips underneath. **DO NOT USE EXCESSIVE FORCE.**
3. Terminate loop cables.
4. Check the status of the relay and, if necessary, reset. Power up the unit for at least 30 seconds to reset the relay.
5. Terminate the remaining cables.
6. Gently push the completed assembly towards the back box until the mounting holes are aligned and secure with the two mounting screws provided. **DO NOT OVERTIGHTEN.**
7. Set the address of the unit as shown on page 4.

- Finally, when commissioning is complete, fit the cover plate by placing it in position, observing the correct orientation (LEDs on the PCB must be aligned with viewing holes). Apply pressure to the cover plate until all four clips are holding it in position.

### Flush Mounting

- Secure a suitable backbox (35mm minimum depth) in position and install all cables ready for termination. If the backbox is metal, ensure that earth continuity from it to the external protective earth is maintained in accordance with the relevant standard.
- Follow steps 2 to 8 overleaf.

### Wiring Details

All wiring terminals will accept solid or stranded cables up to 2.5mm<sup>2</sup>



When screened loop cable is used, it is vital to connect the screen, also known as the 'functional earth', in accordance with the instructions of the control panel manufacturer. Always ensure that all segments of the loop cable have continuity of the functional earth and take care that it is insulated from any other earth point such as metalwork, cable trays or junction boxes.

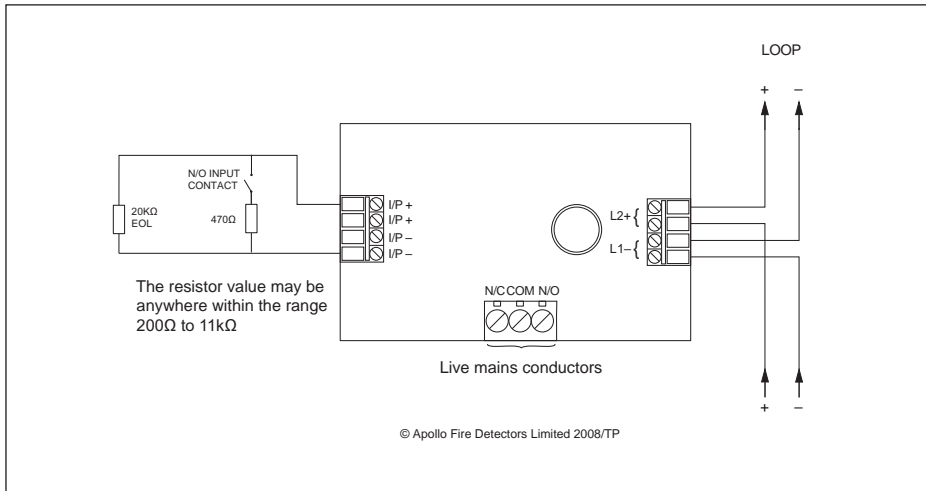


Fig 1 Connecting diagram for Input/Output Unit

### Connecting the Input/Output Unit to External Equipment



The equipment connected to this Input/Output Unit must be protected by an external circuit breaker and a fuse (see 'Rated Load' on page 6). The circuit breaker should be in close proximity to the connected equipment.

External equipment should be connected only by a qualified person. The instructions of the manufacturer of that equipment should be carefully observed. If this is not done, the protection afforded by the equipment may be impaired.

### Input conditions and status

Resistance across input	Status	Analogue Value	Input Bits 2 1 0
<100Ω	Short-circuit fault	4	0 0 0
100-200Ω	Indeterminate	4 or 16	0 0 0 or 1
200-11kΩ <i>470Ω</i>	Switch closed	16	0 0 1
11-15kΩ	Indeterminate	16	0 0 0 or 1
15-25kΩ <i>20kΩ</i>	Normal (switch open)	16	0 0 0
25-30kΩ	Indeterminate	4 or 16	0 0 0
>30kΩ	Open-circuit fault	4	0 0 0

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

### Troubleshooting

Before investigating individual units for faults, it is very important to check that the system wiring is fault-free. Earth faults on a data loop or any ancillary zone wiring may cause communication errors.

Many fault conditions are the result of simple wiring errors. Check all connections to the unit and make sure that the correct value resistors are fitted where necessary.

### Fault finding

Problem	Possible Cause
No response or missing	Incorrect address setting Incorrect loop wiring
Fault condition reported	Incorrect input wiring Incorrect end-of-line resistor fitted
Relay fails to operate	Incorrect wiring Control panel has incorrect cause and effect programming
Analogue value unstable	Dual address Loop data fault, data corruption

For further information on the Input/Output Unit, please refer to the Mains Switching Input/Output Unit PIN Sheet, PP2107-T

## Technical data

Loop voltage	17–28V DC
Maximum current consumption at 28V (no protocol)	
LED Enabled	
switch-on surge 200ms	4mA
quiescent, 20kΩ EOL fitted	1.5mA
switch input closed, LED on	5mA
any other condition, max 2 LEDs on	5mA
LED Disabled	
switch-on surge 200ms	4mA
quiescent, 20kΩ EOL fitted	1.5mA
switch input closed	2mA
any other condition	2mA
Rated Load	5A at 250V AC (resistive) 2A at 48V DC (resistive)
Max switching capacity	1.25kVA, 96W
Switch input monitoring voltage (open-circuit condition)	9–11V DC
Maximum cable resistance	50Ω

## Environmental Data

Operating temperature	–20°C to +70°C
Humidity (no condensation)	0–95%
Surface temperature under maximum load	} BS EN61010-1:1993
Vibration	
Rigidity	
Dielectric strength	
IP rating	54

Complies with EMC directive 2004/108/EC  
Complies with low voltage directive 73/23/EEC  
Complies with EN54-18:2005



## Important notes:

1. Cable glands must be used to provide cable restraint. The size of gland must be selected according to the cable size, to ensure proper restraint.
2. Knockouts should not be removed unless they are to be used for cable entry.
3. Insulating sleeves must be fitted over all single insulated conductors.
4. This product should be powered by a control panel which complies with IEC 950 or a similar safety standard.
5. Ensure that segregation of the safety extra low voltage and mains voltage cables is maintained within the backbox with the leatheroid mains barrier supplied, following the instructions below:



Fold the leatheroid mains barrier in half lengthways along the pre-formed crease to form an L-shape. (See Figure 2)

Align the cut out holes of the mains barrier with the screw knockouts in the backbox and slide into place either side of the backbox pillars. (See Figure 3)

The mains barrier can only be fitted one way.

Due to the need for cable segregation, cable entry from the rear of the backbox is not recommended.

If the mains barrier is not used, then safety extra low voltage cable must **not** lie across the mains terminal block or the mains conductors.

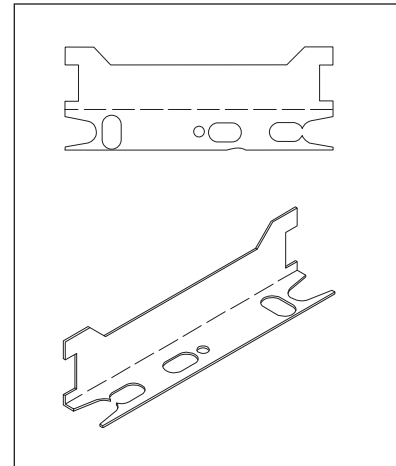


Fig 2 Preparing the mains barrier

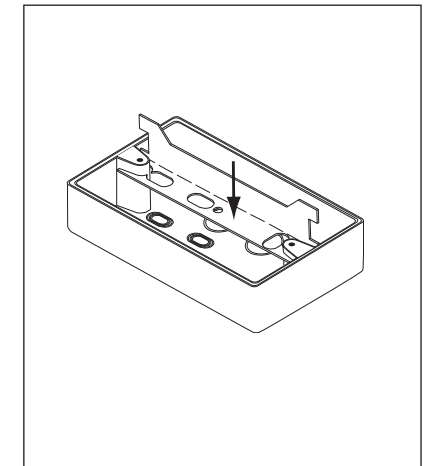


Fig 3 Correct placing of mains barrier

### Address Setting

The address of the Input/Output Unit is set using the lower seven segments of the DIL switch. Each segment of the switch must be set to "0" or "1", using a small screwdriver or similar tool.

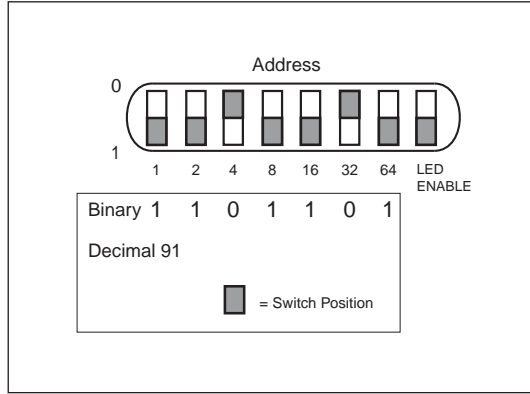


Fig 4 Example of DIL switch setting using address 91

A complete list of address settings is shown below.

addr	DIL switch setting 1234567	addr	DIL switch setting 1234567	addr	DIL switch setting 1234567	addr	DIL switch setting 1234567	addr	DIL switch setting 1234567
1	1000000	11	1101000	21	1010100	31	1111100	41	1001010
2	0100000	12	0011000	22	0110100	32	0000010	42	0101010
3	1100000	13	1011000	23	1110100	33	1000010	43	1101010
4	0010000	14	0111000	24	0001100	34	0100010	44	0011010
5	1010000	15	1111000	25	1001100	35	1100010	45	1011010
6	0110000	16	0000100	26	0101100	36	0010010	46	0111010
7	1110000	17	1000100	27	1101100	37	1010010	47	1111010
8	0001000	18	0100100	28	0011100	38	0110010	48	0000110
9	1001000	19	1100100	29	1011100	39	1110010	49	1000110
10	0101000	20	0010100	30	0111100	40	0001010	50	0100110
51	1100110	61	1011110	71	1110001	81	1000101	91	1101101
52	0010110	62	0111110	72	0001001	82	0100101	92	0011101
53	1010110	63	1111110	73	1001001	83	1100101	93	1011101
54	0110110	64	0000001	74	0101001	84	0010101	94	0111101
55	1110110	65	1000001	75	1101001	85	1010101	95	1111101
56	0001110	66	0100001	76	0011001	86	0110101	96	0000011
57	1001110	67	1100001	77	1011001	87	1011001	97	1000011
58	0101110	68	0010001	78	0111001	88	0001101	98	0100011
59	1101110	69	1010001	79	1111001	89	1001101	99	1100011
60	0011110	70	0110001	80	0000101	90	0101101	100	0010011
101	1010011	111	1111011	121	1001111				
102	0110011	112	0000111	122	0101111				
103	1110011	113	1000111	123	1101111				
104	0001011	114	0100111	124	0011111				
105	1001011	115	1100111	125	1011111				
106	0101011	116	0010111	126	0111111				
107	1101011	117	1010111						
108	0011011	118	0110111						
109	1011011	119	1110111						
110	0111011	120	0001111						

### Commissioning

It is important that the Input/Output Unit be fully tested after installation. An XP95 Test Set, part no 55000-870, may be used to carry out functional testing of individual units. It can also be used to perform data integrity tests of an entire loop.

### LED Indicators

- ⊙ Relay On            Illuminated red when relay is energised\*
- ⊙ Switch Closed      Illuminated red when monitored field contact is activated
- ⊙ Fault                Illuminated yellow when input is open or short circuit

\* The relay state is not monitored. The switch input is intended to be used to monitor a set of dry contacts that confirm operation of the equipment being controlled.

To conserve loop current the LEDs can be disabled by setting the 'LED ENABLE' segment of the DIL switch to '0'.

### Functional Test Data

output bit	function	input bit	function
2	not used	2	not used
1	not used	1	not used
0	operates relay 1 = on 0 = off	0	monitored input 0 = quiescent 1 = input received

For further information on protocol bit usage refer to the Mains Switching Input/Output Unit PIN sheet, PP2107.