



### Features & Benefits

- Input status indication
- Calibrated output
- DIN Rail mounting
- Expands controller input capacity
- Fault finding LED indication
- Input status LED indication

### Technical Overview

The IO-DIM-4 module is intended for use with the BMS controllers to expand their input capacity, by multiplexing 4 digital signals or 24Vac/dc inputs into a single analogue controller input.

Each combination of input states corresponds to an analogue value from the IO-DIM-4, which can be decoded into 4 digital status bits.

### Product Codes

**IO-DIM-4**      4 x VFC or 24V inputs to 0-10Vdc /4-20mA output

### Specification

|                         |  |
|-------------------------|--|
| Inputs                  | VFC or 24Vac or 24Vdc<br>(>17.5V = ON, <7.5V = OFF)                      |
| Outputs (selectable)    | 0-10Vdc into 2k $\Omega$ impedance<br>4-20mA into 500 $\Omega$ max.      |
| Power supply:           |  |
| 0-10Vdc                 | 24Vac $\pm$ 15% @ 50Hz or<br>24Vdc +15% -6%                              |
| 4-20mA                  | 24Vdc +15% -6%   |
| Current:                |  |
| Voltage output          | 35mA max.  |
| Current output          | 55mA max.  |
| LED indication:         | Supply OK<br>Supply voltage low<br>Supply voltage high<br>Current output |
| (4-20mA output only)    |  |
| Manual override         | On/Auto for each input   |
| Electrical Terminals    | Rising cage connectors for 0.5-2.5mm <sup>2</sup> cable                  |
| Ambient range:          |  |
| Temperature             | -10 to +50 $^{\circ}$ C  |
| RH                      | 0 to 80% non-condensing  |
| Dimensions (H x W x D): | 75 x 55 x 42mm   |
| Country of origin       | UK   |

#### WEEE Directive:



At the end of the products useful life please dispose as per the local regulations.  
Do not dispose of with normal household waste.  
Do not burn.



The products referred to in this data sheet meet the requirements of EU Directive 2014/30/EU

### Installation



Antistatic precautions must be observed when handling these sensors. The PCB contains circuitry that can be damaged by static discharge.

1. The IO-DIM-4 should only be installed by a competent, suitably trained technician, experienced in installation with hazardous voltages. (>50Vac & <1000Vac or >75Vdc & 1500Vdc)
2. Ensure that all power is disconnected before carrying out any work on the IO-DIM-4.
3. Maximum cable is 2.5mm<sup>2</sup>, care must be taken not to over tighten terminals.
4. When mounting the IO-DIM-4 care should be taken not to stress the PCB when fitting to the DIN rail. If it is necessary remove the module from the DIN rail, be sure to use a flat bladed screwdriver to release the DIN clips.
5. The IO-DIM-4 is designed to operate from a 24Vac/dc supply (so that power can be drawn from a 24Vac transformer used for other purposes if a 24Vdc supply is not available). In either case one side of the supply is common to the signal ground from the BEMS controller.
6. The outputs of the modules are pre-calibrated and no adjustment is required. The output is also self-calibrating, to ensure that the output is always correct.

### LED Status

#### Power Supply

##### Normal:

The green LED indicates the supply power condition. If the power supply is normal (between 22V and 40V) the green LED is ON continuously, showing that the IO-DIM-4 is powered correctly.

##### Low Supply Voltage:

If power supply falls below about 22V the green LED double flashes twice a second;

\*\_\*\_\*\_\*\_\*\_\*\_\*\_\*\_\*\_\*\_\*\_\*\_\*\_\*\_\*\_\*

The PCB tries to maintain the correct output but may be unable to achieve the specified voltage or current level.

##### High Supply Voltage:

If the power supply is above 40V the green LED flashes 6 times a second;

\*\_\*\_\*\_\*\_\*\_\*\_\*\_\*\_\*

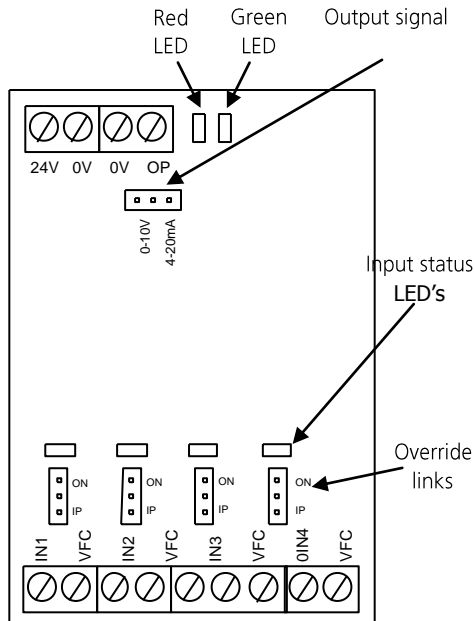
The PCB tries to maintain the correct output.

#### Output


The Red LED is lit when the PCB is in 4-20mA mode and working correctly. For this to be the case, these conditions must be met:


1. The output select jumper must be connected in the 4-20mA position
2. The output terminals must be connected through an impedance of 500Ω or less.
3. The PCB is capable of sourcing the correct output current. (The red LED may flash if the PSU is below 22V or the impedance is more than 500Ω.)

### Connections & Jumper Settings




Output signal link:

0-10Vdc output signal 

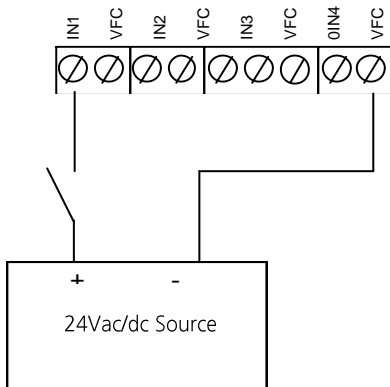
4-20mA output signal 

Override links:

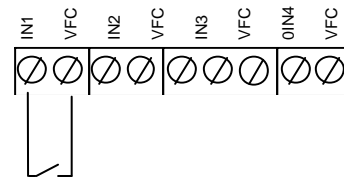
On 

Off 

Examples:  
24V switching:



VFC switching



### Switching Sequences

| Input Status |           |           |           | Nominal Output |
|--------------|-----------|-----------|-----------|----------------|
| IN1          | IN2       | IN3       | IN4       |                |
| OFF          | OFF       | OFF       | OFF       | 0.30Vdc        |
| <b>ON</b>    | OFF       | OFF       | OFF       | 0.90Vdc        |
| OFF          | <b>ON</b> | OFF       | OFF       | 1.60Vdc        |
| <b>ON</b>    | <b>ON</b> | OFF       | OFF       | 2.20Vdc        |
| OFF          | OFF       | <b>ON</b> | OFF       | 2.80Vdc        |
| <b>ON</b>    | OFF       | <b>ON</b> | OFF       | 3.40Vdc        |
| OFF          | <b>ON</b> | <b>ON</b> | OFF       | 4.10Vdc        |
| <b>ON</b>    | <b>ON</b> | <b>ON</b> | OFF       | 4.70Vdc        |
| OFF          | OFF       | OFF       | <b>ON</b> | 5.30Vdc        |
| <b>ON</b>    | OFF       | OFF       | <b>ON</b> | 5.90Vdc        |
| OFF          | <b>ON</b> | OFF       | <b>ON</b> | 6.60Vdc        |
| <b>ON</b>    | <b>ON</b> | OFF       | <b>ON</b> | 7.20Vdc        |
| OFF          | OFF       | <b>ON</b> | <b>ON</b> | 7.80Vdc        |
| <b>ON</b>    | OFF       | <b>ON</b> | <b>ON</b> | 8.40Vdc        |
| OFF          | <b>ON</b> | <b>ON</b> | <b>ON</b> | 9.10Vdc        |
| <b>ON</b>    | <b>ON</b> | <b>ON</b> | <b>ON</b> | 9.70Vdc        |

| Input Status |           |           |           | Nominal Output |
|--------------|-----------|-----------|-----------|----------------|
| IN1          | IN2       | IN3       | IN4       |                |
| OFF          | OFF       | OFF       | OFF       | 4.50mA         |
| <b>ON</b>    | OFF       | OFF       | OFF       | 5.50mA         |
| OFF          | <b>ON</b> | OFF       | OFF       | 6.50mA         |
| <b>ON</b>    | <b>ON</b> | OFF       | OFF       | 7.50mA         |
| OFF          | OFF       | <b>ON</b> | OFF       | 8.50mA         |
| <b>ON</b>    | OFF       | <b>ON</b> | OFF       | 9.50mA         |
| OFF          | <b>ON</b> | <b>ON</b> | OFF       | 10.50mA        |
| <b>ON</b>    | <b>ON</b> | <b>ON</b> | OFF       | 11.50mA        |
| OFF          | OFF       | OFF       | <b>ON</b> | 12.50mA        |
| <b>ON</b>    | OFF       | OFF       | <b>ON</b> | 13.50mA        |
| OFF          | <b>ON</b> | OFF       | <b>ON</b> | 14.50mA        |
| <b>ON</b>    | <b>ON</b> | OFF       | <b>ON</b> | 15.50mA        |
| OFF          | OFF       | <b>ON</b> | <b>ON</b> | 16.50mA        |
| <b>ON</b>    | OFF       | <b>ON</b> | <b>ON</b> | 17.50mA        |
| OFF          | <b>ON</b> | <b>ON</b> | <b>ON</b> | 18.50mA        |
| <b>ON</b>    | <b>ON</b> | <b>ON</b> | <b>ON</b> | 19.50mA        |

**Scaling & Type 18 Function Module (Trend Controls only)**

**0-10Vdc Output:**

|          |      |
|----------|------|
| Trange   | 262  |
| Brange   | -265 |
| Upper    | 263  |
| Lower    | -263 |
| Exponent | 3    |

**4-20mA Output:**

|          |      |
|----------|------|
| Trange   | 257  |
| Brange   | -385 |
| Upper    | 258  |
| Lower    | -386 |
| Exponent | 4    |

**0-10Vdc output:**

|              |             |
|--------------|-------------|
| Scaling type | 5           |
| Input type   | 0 (voltage) |
| sUpper       | 256         |
| sLower       | 0.3         |
| Points used  | 2           |

**4-20mA output:**

|              |             |
|--------------|-------------|
| Scaling type | 5           |
| Input type   | 2 (current) |
| sUpper       | 256         |
| sLower       | 0           |
| Points used  | 2           |

Input 1 = 0.30  
Input 2 = 9.70

Output 1 = 12  
Output 2 = 244

Input 1= 4.50  
Input 2= 19.50

Output 1= 12  
Output 2= 244

The alarm byte associated with a Trend type 18 function module consists of 8 bits. For example, F1 (function 1) has a default destination of A101 (analogue node 101), which in turn is associated with alarm digital byte 141. The table below shows which bit of the alarm byte is affected by which input of the IO-DIM4, and assumes function 1 is used as the A/D (i.e. alarm byte 141).

| IO-DIM-4 Input | Alarm Bit |
|----------------|-----------|
| <b>IN1</b>     | 141.4     |
| <b>IN2</b>     | 141.5     |
| <b>IN3</b>     | 141.6     |
| <b>IN4</b>     | 141.7     |