SPECIFICATIONS CONTINUED	
Accuracy	: see previous table
Linearity	: 0.04% of span (maximum)
Drift	: 100ppm/°C typ.
Number of inputs	: 8 (maximum)
Resolution	: 1 mV / 1uA
Display	: V, mA or % (software configurable)
RESPONSE TIME	
Step Input	: 10% to 90%. Settles to within 3% in 200 ms.
ISOLATION	
Input to system logic	: 1500 VAC*rms*
Input to input	: 500 VAC*rms*
INSULATION	
Input to system logic	: >20MΩ at 500 V dc
INTERFERENCE REJECTION	
CMRR @50Hz	: no effect up to 400 VAC*rms*
NMRR @50Hz	: 50 dB
INPUT IMPEDANCE	
Voltage/Current Inputs	: ±1MΩ (excluding sense resistor for current input)
POWER SUPPLY	
Voltage	: +5 V dc ± 5%
Current	: 300 mA (maximum)
ENVIRONMENTAL	
Operating temperature	: 0 °C to 60 °C
Storage Temperature	: -40 °C to +85 °C
Operating humidity	: 5% to 95% (non-condensing)
IDENTIFICATION CODES	
Scan code	: 41
Module ID	: 48
MASS	
Including packaging	: 505g
Excluding packaging	: 419g
ORDERING INFORMATION	
Order code	: M1431B

INSTALLATION GUIDE

Maxiflex 1000 Series

8 Isolated Voltage or Current Inputs Module (8 VC ISO)

Model Number: M1431B

General Description

The M1431B 8 VC ISO module consists of eight isolated analog inputs where each input can be configured as either a voltage or current input with the aid of an external sense resistor. The input types and standard ranges handled by the module are as follows:-

Input Type	Range	Ideal Sense Resistor
Voltage	0V - 1 V	N/A
Voltage	0V- 5 V	N/A
Voltage	1 V- 5 V	N/A
Voltage	0 V - 10 V	N/A
Voltage	2 V - 10 V	N/A
Current	0 mA -50 mA	200 Ω
Current	10 mA - 50 mA	200 Ω
Current	0 mA - 20 mA	500 Ω
Current	4 mA - 20 mA	500 Ω

Each input can be converted into a current input by inserting a current sensing resistor between the input terminals.

The input value is presented as either a scaled percentage value (0.00% to 100.00%) or the actual value in signed integer format to 3 decimal places (*eg* 0 V to 10.000 V). Over-range and under range inputs are presented as +32767 (7FFFH) and -32768 (8000H) values respectively for the particular input selected.

The input type, input current sensing resistor (for current inputs) and data presentation format configuration for each input are downloaded to the module by the Maxiflex CPU user application Ezi-forth program. The input resistor must be in the range 50 - 500 Ω. It must be specified to 2 decimal places. The factory default input type for all eight inputs is none selected. Should a power failure occur or the module is replaced then the module will have to be re-initialised by the Maxiflex CPU module.

Isolation of 1500 VAC*rms* is provided between the inputs and bus logic. Isolation of 500 VAC*rms* is provided between inputs.

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The module plugs into any I/O slot and has a Scan Code and Module ID which are used by the CPU module to detect the module and run the appropriate driver for the module. A CPU OK green LED is viewable through the front cover which shows the status of the module as follows:

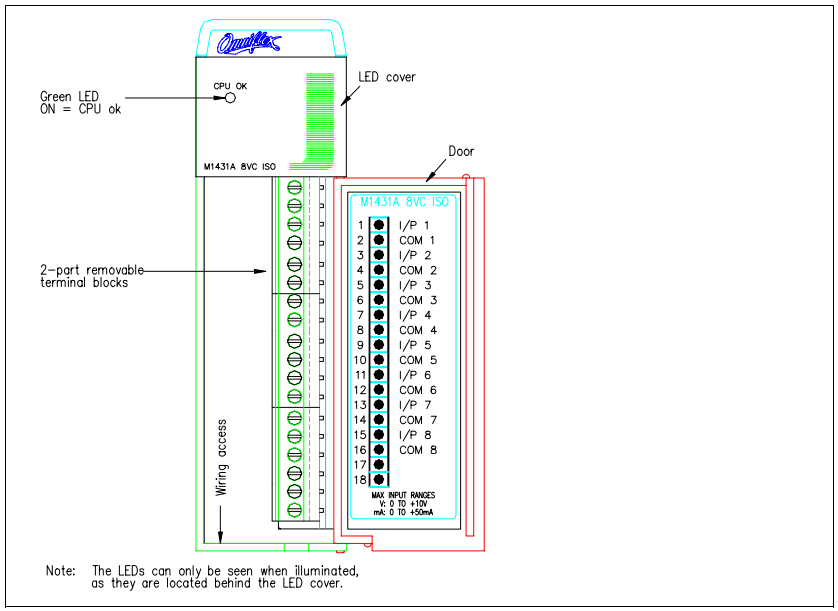
Table 1: LED indicator

CPU OK	MODULE
On	Operating correctly
Flashing	Failure
Off	No power or failure

With the aid of an accurate DC Voltage source and the M1431B Ezi-forth calibration program*, the module can be field calibrated by the user. The module is factory calibrated at an ambient temperature of ±25 °C.

- - available on request

Figure 1 : Layout of M1431B Module




```
33 CONSTANT INPUT_1_LL
34 CONSTANT INPUT_1_DB
: TO ( value reg slot --- ) 33 BIOS
: FROM ( reg slot --- value ) 32 BIOS

: CONFIG_MOD
 255 UP_DOWN_SCALE SLOT3 TO ( set all inputs to down scale burnout )
 9 1 DO
     V_10.I.16. + SLOT3 TO ( set all inputs to V, range 0 to 10V )
     6000 I 1 - 5 * INPUT_1_HH + SLOT3 TO   ( HH trip = 6.000V )
     5000 I 1 - 5 * INPUT_1_H  + SLOT3 TO   ( H trip = 5.000V )
     2000 I 1 - 5 * INPUT_1_L  + SLOT3 TO   ( L trip = 2.000V )
     1000 I 1 - 5 * INPUT_1_LL + SLOT3 TO   ( LL trip = 1.000V )
     200  I 1 - 5 * INPUT_1_DB + SLOT3 TO   ( DB  = 0.200V  )
   LOOP
;

: RD_INPUTS
 CR
 9 1 DO
    ." VOLTS = " I SLOT3 FROM .                    ( read input value  )
    ." STATUS = " I 8 + SLOT3 FROM . CR            ( read input status )
   LOOP
 CR
;
```

SPECIFICATIONS

INPUTS

Quantity : 8
Voltage : 0 V to 1 V, 0 V to 5 V, 1V to 5 V, 0V to 10 V, 2 V to 10 V,
Current : 0 mA to 50 mA,10 mA to 50 mA, 0 mA to 20 mA, 4 mA to 20 mA

PERFORMANCE

Input Type	Lower Limit	Upper Limit	Accuracy % of span	Sense Resistor Ω ±0.1%
Voltage	0 V	10 V	0.017	N/A
Voltage	2 V	10 V	0.021	N/A
Voltage	0 V	5 V	0.033	N/A
Voltage	1 V	5 V	0.042	N/A
Voltage	0 V	1 V	0.17	N/A
Current	0 mA	50 mA	0.117	200 Ω
Current	10 mA	50 mA	0.121	200 Ω
Current	0 mA	20 mA	0.117	500 Ω
Current	4 mA	20 mA	0.121	500 Ω

Display Format

The V or mA input value is displayed as a percentage value to two decimal places or as a V or mA value to three decimal places. Refer to Table 2 for the addresses.

Table 5 : Format of the display format register

D15	D14	D13	D12	D11	D10	D9	D8
0	0	0	0	0	0	0	0

D7	D6	D5	D4	D3	D2	D1	D0
Input 8	Input 7	Input 6	Input 5	Input 4	Input 3	Input 2	Input 1

Each input has a bit allocated to it and if the bit is set the value is displayed as a percentage value and if not as an V or mA value. The default setting of the register is zero *ie* all values displayed as a V or mA values.

Trip Limits

This table contains two high trip limits, two low trip limits and a deadband for each input. The limits are used to determine if the input signal has transgressed a particular limit. Refer to Table 2 for the addresses. Default value is zero. The format is the same as the display format above.

Input Resistor Value

The input current sensing resistor (for current inputs) downloaded to the module by the Maxiflex CPU user application Ezi-forth program. The input resistor must be in the range 50 to 500 Ω and must be specified to 2 decimal places. Default value is zero.

Firmware Version Number

This register contains the installed firmware version number in hex format.

Calibration Done Flag

A value of one indicates the module has been calibrated. Any other value indicates calibration not done or corrupt.

Sample Forth program

The following program provides a "TO" and a "FROM" command which allows the modules registers to be directly accessed. The program assumes that the module is in slot 3 and configures it as follows:-

All inputs set to Volts range 0 to 10Volts and all inputs set to down scale burnout. The display format is Volts. The trip limits are set as follows : High High = 6.000 V, High = 5.000 V, Low = 2.000 V, Low Low = 1.000 V and deadband = 0.200 V.

```
FORGET ALL
: ALL ;

3  CONSTANT SLOT3
40 CONSTANT V_10
27 CONSTANT UP_DOWN_SCALE
30 CONSTANT INPUT_1_HH
31 CONSTANT INPUT_1_H
32 CONSTANT INPUT_1_L
```


Removing /Replacing Led Cover

1. Remove top screw and lift off vent cover.
2. Open the door and gently force down the door until the door is free of the LED cover. Remove door.
3. Holding the LED cover gently force the housing apart until the LED cover is freed.

Replace in reverse order.

Installation

The M1431B can be installed in any I/O slot of a Maxiflex base located on the right hand side of the bases.

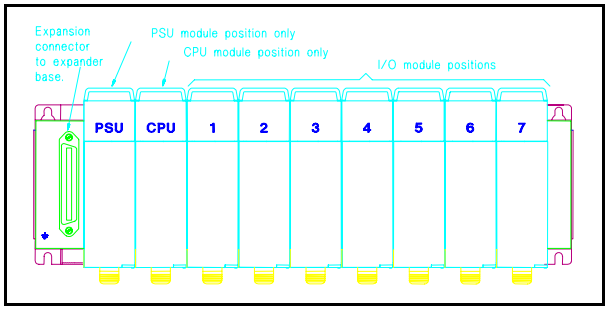
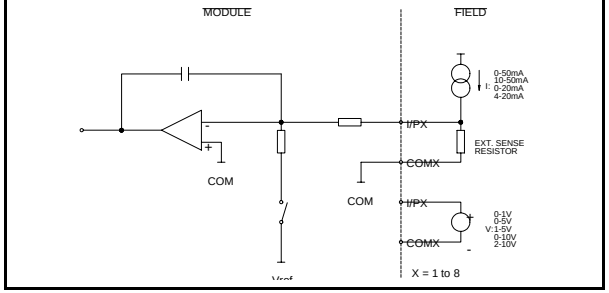


Figure 3 : Electrical Connections



Module Memory Map

The input type, data display format and setpoints configuration for each input are downloaded to the module by the Maxiflex CPU user application Ezi-forth program. The layout and description of the modules registers are provided in the Table below as well as a sample forth program that configures and reads a modules inputs. If after configuration, the module loses power for any reason, then the module will revert back to default values and the module will therefore have to be reconfigured.

Table 2 : M1431A Memory Map

Register	Description	Register	Description
0	Scancode (41) MSB	42	Input 3 Low Limit
	Module ID (48) LSB	43	Input 3 Low Low Limit
1	Input 1 Value	44	Input 3 Deadband
2	Input 2 Value	45	Input 4 High High Limit
3	Input 3 Value	46	Input 4 High Limit
4	Input 4 Value	47	Input 4 Low Limit
5	Input 5 Value	48	Input 4 Low Low Limit
6	Input 6 Value	49	Input 4 Deadband
7	Input 7 Value	50	Input 5 High High Limit
8	Input 8 Value	51	Input 5 High Limit
9	Input 1 Status	52	Input 5 Low Limit
10	Input 2 Status	53	Input 5 Low Low Limit
11	Input 3 Status	54	Input 5 Deadband
12	Input 4 Status	55	Input 6 High High Limit
13	Input 5 Status	56	Input 6 High Limit
14	Input 6 Status	57	Input 6 Low Limit
15	Input 7 Status	58	Input 6 Low Low Limit
16	Input 8 Status	59	Input 6 Deadband
17	Input 1 Type	60	Input 7 High High Limit
18	Input 2 Type	61	Input 7 High Limit
19	Input 3 Type	62	Input 7 Low Limit
20	Input 4 Type	63	Input 7 Low Low Limit
21	Input 5 Type	64	Input 7 Deadband
22	Input 6 Type	65	Input 8 High High Limit
23	Input 7 Type	66	Input 8 High Limit
24	Input 8 Type	67	Input 8 Low Limit
25	Display Format	68	Input 8 Low Low Limit
26-29	Spare	69	Input 8 Deadband
30	Input 1 High High Limit	70	Input 1 Resistor Value
31	Input 1 High Limit	71	Input 2 Resistor Value
32	Input 1 Low Limit	72	Input 3 Resistor Value
33	Input 1 Low Low Limit	73	Input 4 Resistor Value
34	Input 1 Deadband	74	Input 5 Resistor Value
35	Input 2 High High Limit	75	Input 6 Resistor Value
36	Input 2 High Limit	76	Input 7 Resistor Value
37	Input 2 Low Limit	77	Input 8 Resistor Value
38	Input 2 Low Low Limit	78-80	Spare
39	Input 2 Deadband	81	Firmware Version Number
40	Input 3 High High Limit	82	Calibration Done Flag
41	Input 3 High Limit		

Scancode and Module ID

The scancode and module ID's are used by the Maxiflex CPU module to detect and identify the M1431B module. The scancode is 41 and the module ID is 48. Refer to Table 2 for the addresses.

Input Values

This table consists of eight integer values corresponding to inputs 1 to 8. If the mA or V input display is selected then the value is a signed integer value to three decimal places or if percentage display is selected then the value is a signed integer value to two decimal places. Refer to Table 2 for the addresses.

Input Status

This Table contains one register per input. If a particular trip limit is transgressed then its corresponding bit is set. If D4 is set then EEprom has been corrupted and module needs re-calibration. If D5 is set then user configuration data has been corrupted and the user must re-configure the module. If D6 is set, then the incorrect input type has been downloaded to the module. Table 3 lists the allocation of the bits. Refer to Table 2 for the address of the individual inputs status registers.

Table 3 : Format of Input Status Rregister

Input >= High Limit	D0 = 1
Input >= High High Limit	D1 = 1
Input <= Low Limit	D2 = 1
Input <= Low Low Limit	D3 = 1
Calibration EEprom corrupted	D4 = 1
Configuration RAM corrupted	D5 = 1
Input Type Selection Incorrect	D6 = 1

D7 not used. Default set to zero.

Input Types

This table consists of eight integer values corresponding to input types 1 to 8. Table 4 below lists the various input types and their corresponding input type numbers. Refer to Table 2 for the addresses.

Table 4 : Input types

Input Type No	Description
0	none selected *
40	V: 0 to 10 Volts
41	V: 2 to 10 Volts
42	V: 0 to 5 Volts
43	V: 1 to 5 Volts
44	V: 0 to 1 Volts
60	mA: 0 to 20 mA
61	mA: 4 to 20 mA
62	mA: 0 to 50 mA
63	mA: 10 to 50 mA

```
* - default value
```