DI4

Digital Input Module (4 digital inputs)

Summary

The iMAC DI4 Module is an Intrinsically Safe Digital Input Module for the iMAC system. The DI4 provides four (4) voltage free digital inputs. The module is powered directly from the iMAC L1 Fieldbus communication line.

All four inputs may be individually configured as either normally open or normally closed contacts.

The module is fully encapsulated in a compact enclosure suitable for installing inside lanyard/pullkey enclosures or small electrical junction boxes for the purpose of monitoring the state of dry switch contacts.

The state of all four inputs is communicated to the iMAC Controller via the iMAC fieldbus. The controller can initiate control logic based on the state of the DI4 inputs. Alternatively, a DI4 module can be programmed to the same address as one or more iMAC RO4 module/s to provide distributed simultaneous control in multiple locations in which case the state of the DI4 inputs directly control the corresponding states of the RO4 relay outputs.

Data Register(s)

1 (Digital Input)

Features

- Intrinsically Safe IECEx Ex ia Group I Ma
- 4 voltage free contact inputs (configurable N/O or N/C)
- Compact, encapsulated design
- Down-line powered from the iMAC L1 Fieldbus
- Multifunction diagnostic status LED
- Remotely monitored and configured via the iMAC Controller
- Optional DIN rail mounting kits are available
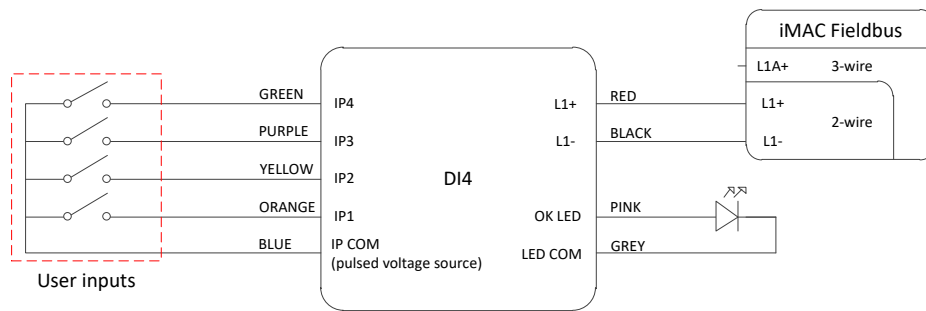
Minimum System

iMAC Fieldbus (Non IS)

iMAC Fieldbus (IS)

4 Switch Inputs

Status LED

SAFE AREA

HAZARDOUS AREA
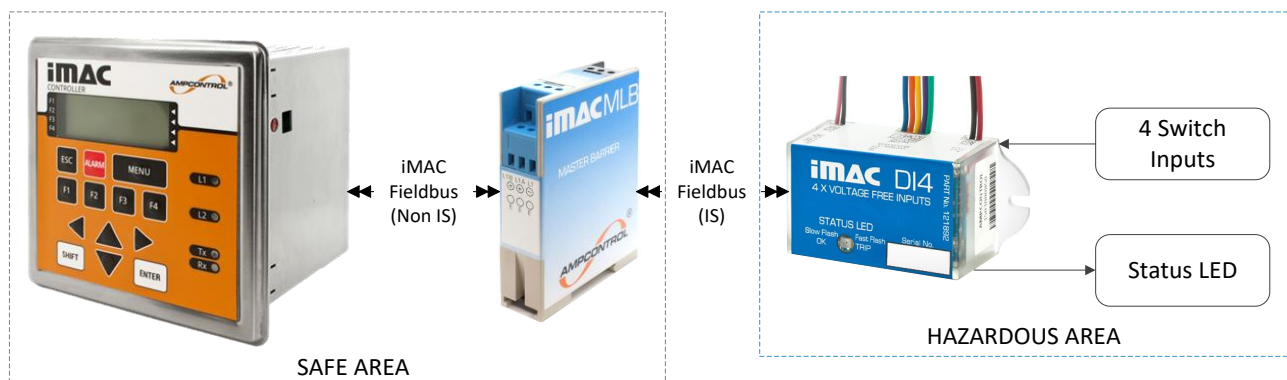
CAUTION!

Modules used in non-I.S. systems shall not be re-used in I.S. systems

(as the integrity of internal components upon which intrinsic safety depends may have been compromised).

iMAC DI4 Technical Datasheet
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Page 1 of 4

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Electrical Connections

The maximum allowable length for the digital inputs is 30m provided a shielded, twisted pair cable is used.

Note: refer to iMACB094 – iMAC Installation Requirements

Label	Wire colour	Type	Description
L1+	Red	L1 Comms	iMAC Fieldbus (2 wire)
L1-	Black		
IP1	Orange	Switch Inputs	User (4)
IP2	Yellow		
IP3	Purple		
IP4	Green		
IP COM	Blue		Common (pulsed voltage source)
OK LED	Pink	LED Output	External Status/OK LED
LED COM	Grey		Common (cathode)

Data Register(s)

Digital Input Register (Address: 1 - 255)				
Bit	**Description**	**Bit Value**	**R / W**	**Invert Bit**
15	-	X	r	-
14	-	X	r	-
13	-	X	r	-
12	-	X	r	-
11	-	X	r	-
10	-	X	r	-
9	-	X	r	-
8	-	X	r	-
7	-	X	r	-
6	-	X	r	-
5	-	X	r	-
4	-	X	r	-
3	SW4	0 / 1	r	3 (0008h)
2	SW3	0 / 1	r	2 (0004h)
1	SW2	0 / 1	r	1 (0002h)
0	SW1	0 / 1	r	0 (0001h)

Configuration Parameters

(Refer to document IMACB005 - iMAC module parameters programming procedure)

Input Register Parameters (roll-call name: DI4 Module)					
No	**Description**	**Range**	**Default**	**Units**	**R/W**
1	Input register address	1 - 255	0	-	r / w
2	Input register SWx bits invert	0000h – 000Fh	0000h	-	r / w
3	Not used (Factory use)	-	-	-	r
4	Not used (Factory use)	-	-	-	r

Parameter Details…

Parameter 2: Invert bits - specify whether received digital input state sets the output data bit to 0 or 1. If invert bit is 0, then corresponding digital input register is set when the input switch is open. Alternatively, if invert bit is 1, then corresponding digital input register is set when the input switch is closed.

Input Bits SWx (x = 1 to 4) Truth Table		
Input switch	**Input register parameter - invert bit value**	**Input register - SWx bit value**
Open	0 (N/C)	1
Closed	0 (N/C)	0
Open	1 (N/O)	0
Closed	1 (N/O)	1

Functional Logic

The DI4 emits a pulsed voltage signal from the input common terminal. When this terminal is shorted to one of the input terminals, the DI4 will sense this pulsing signal and set this input to closed.

The DI4 has the option of setting the input contacts to normally open or normally closed, via the 'invert bit' for each input (refer to Configuration Parameters).

LED Indicators

Status LED (RED)

Flash Sequence		Module - iMAC Comms Status	Module - Function Status
Off		Unknown (check connections)	Unknown (check connections)
Slow Flash		Healthy	All input register SWx bits = 0
2 Flashes		Healthy (has been roll-called)	-
3 Flashes		Error (address clash)	-
Fast Flash		Warn (general)	Any input register SWx bit = 1

Certification / Approvals

Intrinsic Safety

Type	Ex ia I Ma (for use in zone 0, 1 or 2)	
Certificate number	IECEx ITA 07.0017X	
Module type	GM1	
IP rating	Must be installed in an enclosure not less than IP20 (IP54 recommended)	
Other	Must be mounted in such a manner that the encapsulation is not exposed Must be connected in accordance with iMAC system drawing IMACZ032. L1+ L1- terminals must only connect to a single MLB (Master Line Barrier).	
I/O parameters	L1+ (red), L1- (black)	Ui = 21.5V (44.65R source resistor) Ci = Negligible Li = Negligible
	IP1 (orange), IP2 (yellow), IP3 (purple), IP4 (green), IP COM (blue), OK LED (pink), LED COM (grey)	Uo = 21.5V Io = 0.202A Po = 1.09W Co = 0.27uF Lo = 11.4mH Ci = 5.83uF Li = negligible
Ambient temperature (Ta)	-20°C to +40°C (refer to operating environment specifications)	
This table is provided for quick reference purposes only: refer to latest issue of the Certificate of Conformity for all system designs.		

QPS	
File Number	LR1527
Model	121892 MODULE IMAC DI4 IS IECEx
Environment	Indoor use (or must be installed in a suitable outdoor enclosure with minimum IP54 rating) Altitude up to 2000m Pollution Degree 2
The specified values approved by these standards may differ from the general specifications detailed elsewhere in this datasheet.	

Specifications	
Mechanical	
Dimensions (H x W x D)	33mm x 70mm x 25mm (See diagram below)
Weight	60g
IP Rating	Module is fully encapsulated
Mounting	Enclosure includes 2 mounting tabs, each with a 3mm slot (screws not supplied)
Electrical Connections	Individual 450mm flying leads (0.4mm^2 PVC insulated multi-strand flexible wire with an overall outside diameter of 1.5mm)
Environmental	
Operating Temperature	-10°C to +60°C
Relative Humidity	<95% RH
Inputs	
Digital	4 (self-wetting)
Limits	3VDC (pulsed) @ <1mA
Outputs	
Status LED	Internally current limited 3VDC source - via 330R resistor
Limits	< 2mA (external resistor may be required)
Communications (iMAC L1)	
Hardware interface	2 wire (+/-18VDC I.S. via MLB barrier or +/-21VDC non-I.S. iMAC Fieldbus)
Line Speed	300 - 1000 baud
Bit protocol	iMAC proprietary
L1 Isolation	None
L1 Line Loading (baud)	0.60mA (300) / 0.70mA (500) / 1.58mA (1000)
Find Out More	
For more information on this product, contact Ampcontrol Customer Service on +61 1300 267 373 or *customerservice@ampcontrolgroup.com* or visit the Ampcontrol website: www.ampcontrolgroup.com	

Dimensions
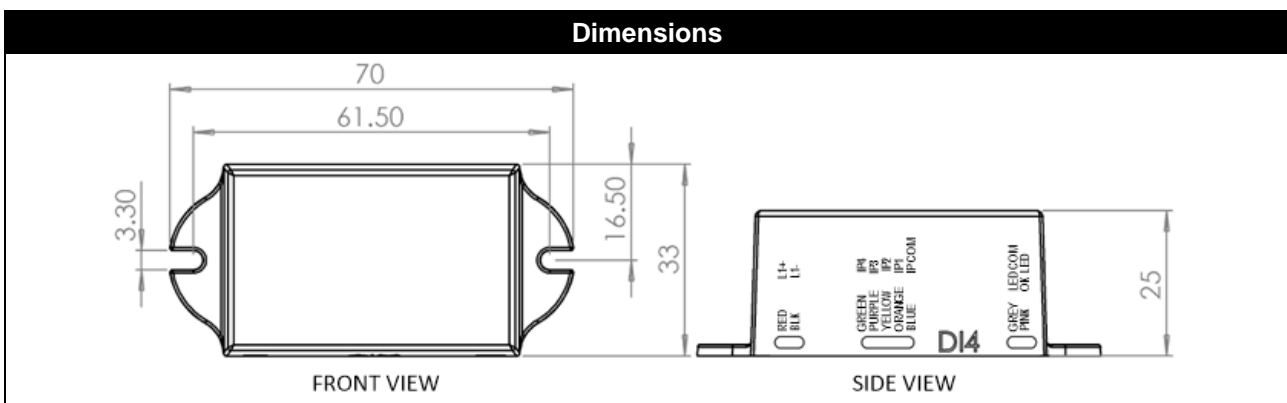
Equipment List	
Part Number	**Description**
121892	MODULE IMAC DI4 IS IECEx
120783	KIT IMAC DIN RAIL MOUNT

DISCLAIMER

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