TECHNICAL DATASHEET

CRM

Control Relay Module

Summary

The iMAC CRM Module is an Intrinsically Safe Control Relay output module for the iMAC System. The iMAC CRM provides remote mirroring of the iMAC Controller's Control Relay (CR). There are three CRM variants to suit 24 VDC, 110 VAC, or 240 VAC power supplies.

The CRM can be used with 2-wire or 3-wire iMAC fieldbus systems and requires EOL module data to operate.

Provides a fully independent verification of EOL module data.

The CRM module CR relay output can be wired in series with the iMAC Controller CR relay to provide a 1oo2 SIL3 rated safety system output.

Provides redundancy for CR relay output logic.

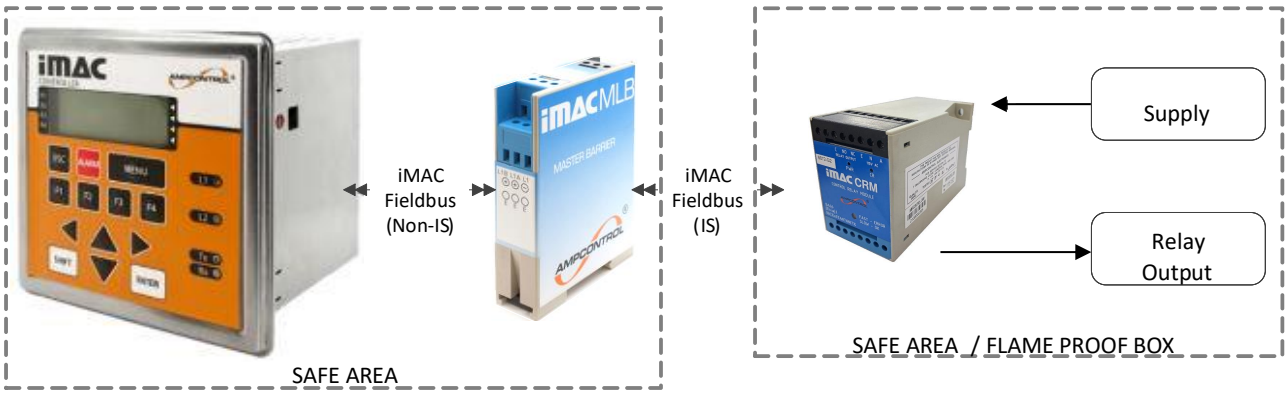
Data Register(s)

1 (Output)

Features

- Intrinsically Safe IECEx [Ex ia] Group I Ma
- Mirrors the iMAC Controller's Control Relay
- iMAC Fieldbus electrically isolated
- Variety of power supply options
- Power healthy LED indicator
- CR energised LED indicator
- Multifunction diagnostic status LED
- Remotely controlled via the iMAC Controller
- Standard DIN rail or foot mounting

Minimum System



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).

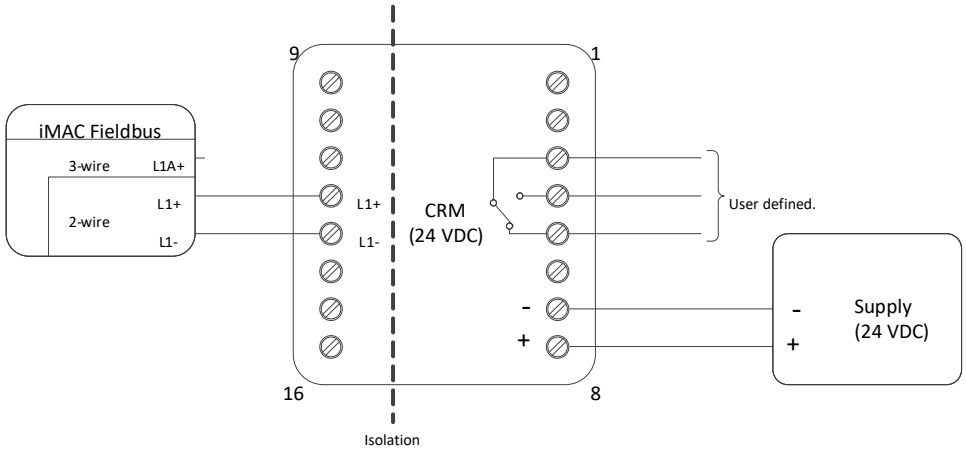
Inductive loads must include transient suppression (snubber) to prevent output relay contact damage (refer to output relay ratings).

Custom iMAC Controller application software (SLP code) is required to operate this module.

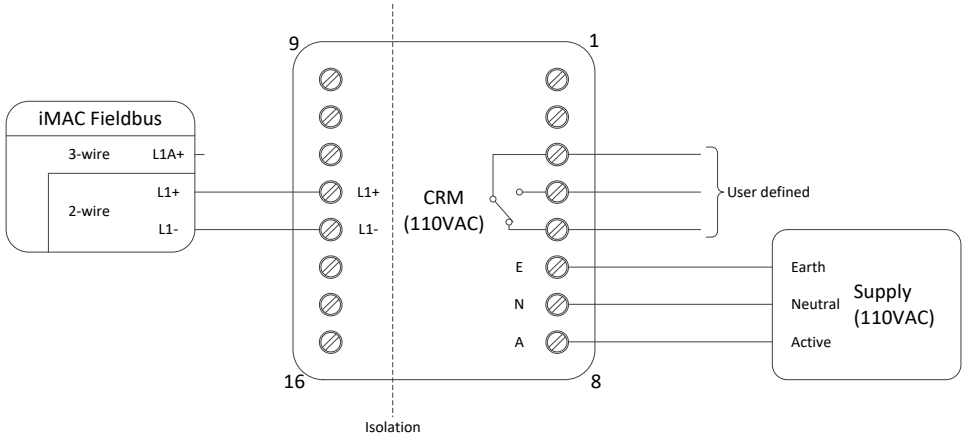
When connected to an iMAC intrinsically safe communication line, the iMAC CRM Relay must be installed in a safe area or a flameproof enclosure.

Electrical Connections

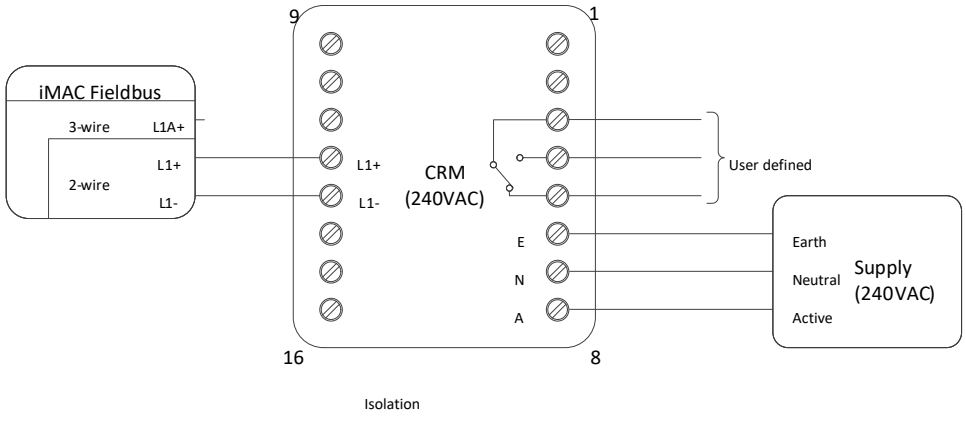
24 VDC Model



110 VAC Model



240 VAC Model



Note: refer to iMACB094 – iMAC Installation Requirements

Terminal	Label	Type	Description
1, 2	-	-	-
3	C	Relay output	Duplicates the iMAC controller Control relay (signal line healthy)
4	NO		
5	NC		
6	E	Power supply input	AC / DC – model dependent (E connection required only for AC models)
7	N / (-)		
8	A / (+)		
9, 10, 11	-	-	-
12	L1+	L1 Comms	iMAC Fieldbus (2 wire)
13	L1-		
14, 15, 16	-	-	-

Data Register(s)			
Output Register (Address: Fixed at 0)			
Bit	**Description**	**Bit Value**	**R / W**
15	-	X	W
14	-	X	W
13	-	X	W
12	-	X	W
11	-	X	W
10	-	X	W
9	-	X	W
8	-	X	W
7	-	X	W
6	-	X	W
5	-	X	W
4	-	X	W
3	-	X	W
2	-	X	W
1	-	X	W
0	Control Relay	1 = energised	W

Configuration Parameters

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

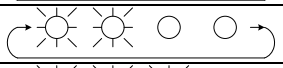
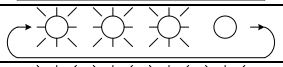
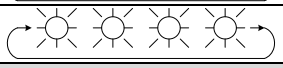
Output Register Parameters (roll-call name: CRM Module)					
No	**Description**	**Range**	**Default**	**Units**	**R/W**
1	Output register address	0	0	-	R
2	L1 comms - Invalid symbol counter	0 - 65535	0	-	R
3	L1 comms - Checksum error counter	0 - 65535	0	-	R
4	Not used (Factory use)	-	-	-	R

Functional Logic

The iMAC CRM Module address is fixed at 0. Custom iMAC Controller application software (SLP) code is required to assert address 0 bit 0 when the iMAC controllers CR relay is energised.

The CRM relay output energises (closes) if EOL (End of Line) data is present and iMAC signal line address 0, bit 0 is asserted from the iMAC Controller. The iMAC CRM Module will tolerate 1 bit of data corruption in 8 scans of the EOL data and 1 bit of data corruption in 2 scans of the address 0, bit 0 data. The CRM relay output de-energises (opens) immediately if these conditions are not maintained.

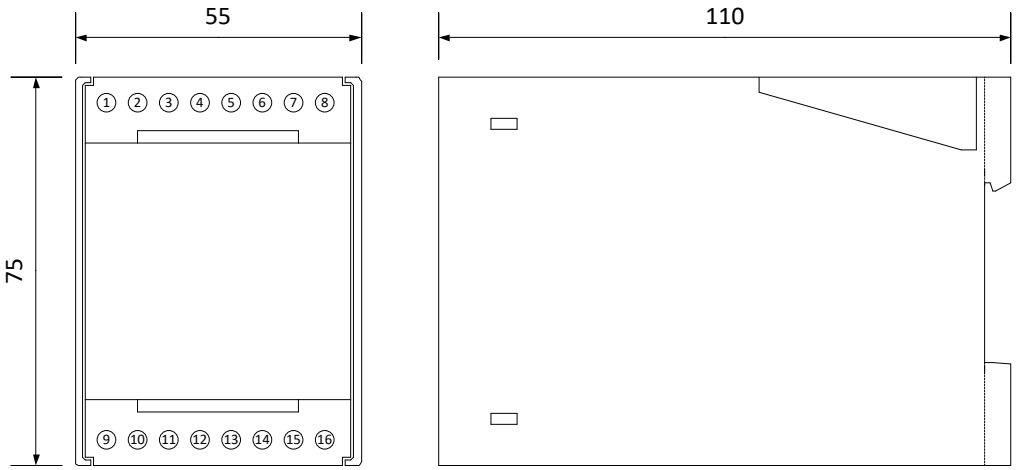
CRM Output Relay			
EOL Module	**iMAC Controller CR**	**Output Register – Auxiliary Relay Bit**	**CRM Output Relay**
Healthy	Energised	1	Energised
Failed	Energised	1	De-Energised
Healthy	De-Energised	0	De-Energised
Failed	De-Energised	0	De-Energised

LED Indicators			
Status LED (RED)			
Flash Sequence		**Module - iMAC Comms Status**	**Module - Function Status**
Off		Unknown (check connections)	Unknown (check connections)
Slow Flash		Healthy	-
2 Flashes		Healthy (has been roll-called)	-
3 Flashes		Error (address clash)	-
Fast Flash		Warn (general)	-
Power LED (PWR)			
Off	The module is not powered		
On	The module is powered		
Control Relay LED (CR)			
Off	Relay is de-energised		
On	Relay is energised		

Certification / Approvals		
Intrinsic Safety		
Type	[Ex ia] I Ma	
Certificate number	IECEx ITA 07.0017X	
Module type	SA16	
IP rating	Must be installed in an enclosure not less than IP20 (IP54 recommended)	
Other	Must be installed in safe area or flame proof box. 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	Terminals 1 - 8	Um = 250 V
	Terminals 12 wrt 13 (L1+ wrt L1-)	Ui = 21.5 V (44.65 R source resistor) Ci = Negligible Li = Negligible Uo = 0 V Io = 0 A
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	115151 MODULE IMAC CRM 24VDC	
Environment	Indoor use (or must be installed in a suitable outdoor enclosure with minimum IP54 rating) Altitude up to 2000 m Mains supply fluctuations up to 15 % of the nominal voltage Transient overvoltage's up to the levels of Overvoltage Category II Pollution Degree 2	
Relay Output (1 C/O)	150 VAC @ 8 A or 30 VDC @ 5 A	
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)	75 x 55 x 110 mm		
Weight	230 g		
IP Rating	IP20		
Mounting	Standard 35 mm DIN rail (Top Hat Rail – EN50022)		
Electrical Connections	ERNI screw terminals (maximum wire size of 4 mm^2, maximum torque or 0.4 Nm)		
Environmental			
Operating Temperature	0 °C to +50 °C		
Relative Humidity	<95 % RH (non-condensing)		
Power Supply (external)			
Voltage	24 VDC (±15 %)	110 VAC (±15 %)	240 VAC (±15 %)
Current (qty relays on)	7 mA (0) / 26 mA (1)	36.4 mA (4 W max)	16.7 mA (4 W max)
Relay Outputs (1 C/O)			
Limits	240 VAC @ 8 A (100 VA max) or 30 VDC @ 5 A (resistive) (100 VA max)		
Communications (iMAC L1)			
Hardware interface	2 wire (+/-18 VDC I.S. via MLB barrier or +/-21 VDC Non I.S. iMAC Fieldbus)		
Line Speed	300 - 1000 baud		
Bit protocol	iMAC proprietary		
L1 Isolation	3.5kV AC		
L1 Line Loading (baud)	Relay energised: 0.80 mA (300) / 1.32 mA (500) / 3.56 mA (1000)		
	Relay de-energised: 0.52 mA (300) / 0.82 mA (500) / 2.16 mA (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**
115151	MODULE IMAC CRM 24VDC IECEx
115152	MODULE IMAC CRM 110V IECEx
144326	MODULE IMAC CRM 240V IECEx