

SIM-G

Serial Interface Module (1x Gasguard controller comms bridge)

Summary

The iMAC SIM-G Serial Interface Module provides an intrinsically safe communications bridge between the iMAC system and a single Ampcontrol Gasguard controller. The SIM-G operates as Modbus RS485 RTU Master device and uses Modbus commands to retrieve data from a Gasguard controller. This data is then packaged into 16 iMAC registers which are forwarded onto the iMAC controller via the iMAC fieldbus.

The SIM-G RS485 interface requires a local intrinsically safe power supply, however, the main CPU of SIM-G is powered directly from the iMAC fieldbus allowing the device to communicate information about its status regardless of whether the local power supply is available or not.

The RS485 interface is fully electrically isolated from the iMAC fieldbus, eliminating the possibility of ground loops between the Gasguard system and the iMAC system. The RS485 interface is intrinsically safe with an assigned set of entity parameters which must be matched accordingly when connecting to other intrinsically safe devices.



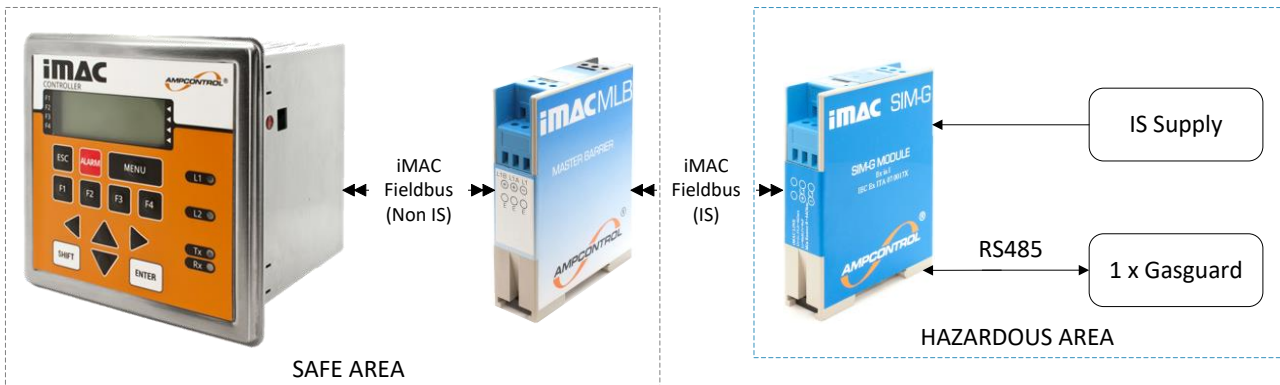
Data Register(s)

16 (Alarm Flags, Analogue Values, RS485 Error Counter, Serial Number)

Features

- Intrinsically Safe IECEx Ex ia Group I Ma
- Provides communication bridge between iMAC system and a single Gasguard controller
- Partially down-line powered from the iMAC L1 Fieldbus
- Multifunction iMAC fieldbus diagnostic status LED
- RS485 activity LED
- RS485 port electrically isolated
- Remotely monitored and configured via the iMAC Controller
- Standard DIN rail mounting

Minimum System

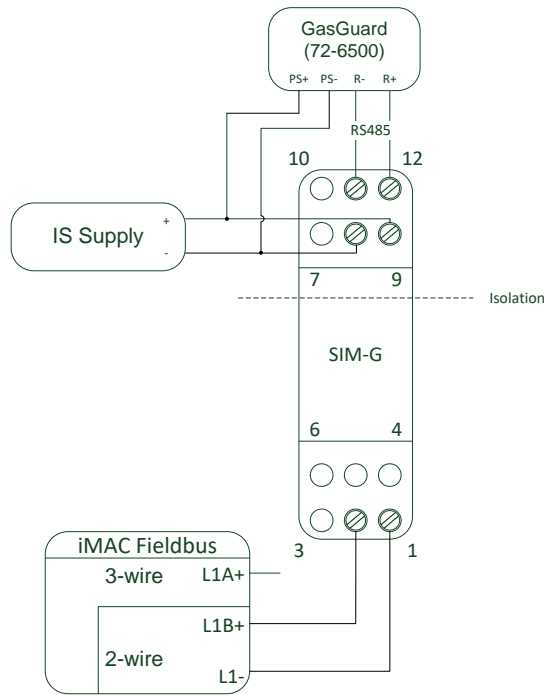


CAUTION!



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).

Electrical Connections



Note: refer to iMACB094 – iMAC Installation Requirements

Terminal	Label	Type	Description
1	L1-	L1 comms	iMAC Fieldbus (2 wire)
2	L1+		
3 - 7	-	-	-
8	PS-	Power supply input	DC
9	PS+		
10	-	-	-
11	RS485 TR-	RS485 comms	Interface for a single Gasguard controller
12	RS485 TR+		

Data Register(s)

Register 1 – Flags (iMAC SIM-G Address+0)

Bit	Description	Bit Value	R / W	Modbus Register
15	Not used	X	r	10016
14	Not used	X	r	10015
13	Not used	X	r	10014
12	Channel 2 – High Fault	1 = Alarm	r	10013
11	Channel 2 – Alarm 3	1 = Alarm	r	10012
10	Channel 2 – Alarm 2	1 = Alarm	r	10011
9	Channel 2 – Alarm 1	1 = Alarm	r	10010
8	Channel 2 – Low Fault	1 = Alarm	r	10009
7	Not used	X	r	10008
6	Not used	X	r	10007
5	Not used	X	r	10006
4	Channel 1 – High Fault	1 = Alarm	r	10005
3	Channel 1 – Alarm 3	1 = Alarm	r	10004
2	Channel 1 – Alarm 2	1 = Alarm	r	10003
1	Channel 1 – Alarm 1	1 = Alarm	r	10002
0	Channel 1 – Low Fault	1 = Alarm	r	10001

Register 2 – Flags (iMAC SIM-G Address+1)

Bit	Description	Bit Value	R / W	Modbus Register
15	-	X	r	10032
14	-	X	r	10031
13	-	X	r	10030
12	Channel 4 – High Fault	1 = Alarm	r	10029
11	Channel 4 – Alarm 3	1 = Alarm	r	10028
10	Channel 4 – Alarm 2	1 = Alarm	r	10027
9	Channel 4 – Alarm 1	1 = Alarm	r	10026
8	Channel 4 – Low Fault	1 = Alarm	r	10025
7	-	X	r	10024
6	-	X	r	10023
5	-	X	r	10022
4	Channel 3 – High Fault	1 = Alarm	r	10021
3	Channel 3 – Alarm 3	1 = Alarm	r	10020
2	Channel 3 – Alarm 2	1 = Alarm	r	10019
1	Channel 3 – Alarm 1	1 = Alarm	r	10018
0	Channel 3 – Low Fault	1 = Alarm	r	10017

Register 3 – Unused (iMAC SIM-G Address+2)

Zero

Register 4 – Flags (iMAC SIM-G Address+3)

Bit	Description	Bit Value	R / W	Modbus Register
15	RS485 Error	1 = Error	r	-
14	Not used	X	r	-
13	Not used	X	r	-
12	Not used	X	r	-
11	Not used	X	r	-
10	Not used	X	r	-
9	Zone 6	1 = Energised	r	10038
8	Zone 5	1 = Energised	r	10037
7	Zone 4	1 = Energised	r	10036
6	Zone 3	1 = Energised	r	10035
5	Zone 2	1 = Energised	r	10034
4	Zone 1	1 = Energised	r	10033
3	Relay 4	1 = Energised	r	00004
2	Relay 3	1 = Energised	r	00003
1	Relay 2	1 = Energised	r	00002
0	Relay 1	1 = Energised	r	00001

Registers 5 to 16 – Analogue Data (iMAC SIM-G Address+4 to +15)

Register	Description	R / W	Modbus Register
5	Channel 1 Analogue Input (0 – 9999)	r	30005
6	Channel 2 Analogue Input (0 – 9999)	r	30006
7	Channel 3 Analogue Input (0 – 9999)	r	30007
8	Channel 4 Analogue Input (0 – 9999)	r	30008
9	Channel 1 Display Format Value (1,10,100,1000)	r	30009
10	Channel 2 Display Format Value (1,10,100,1000)	r	30010
11	Channel 3 Display Format Value (1,10,100,1000)	r	30011
12	Channel 4 Display Format Value (1,10,100,1000)	r	30012
13	-	r	-
14	-	r	-
15	RS485 Error Count	r	-
16	SIM-G serial number	r	-

Configuration Parameters

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

SIM-G Parameters (roll-call name: SIM-G Module)					
No	Description	Range	Default	Units	R/W
1	First Data register address of this SIM-G module	1 - 255	150	-	r / w
2	Gasguard controller Modbus slave address	01h – 1Fh (1 – 31)	01h	-	r / w
3	Not used (Factory use)	-	-	-	r
4	Not used (Factory use)	-	-	-	r

Gasguard Parameters (factory use – block 1)					
No	Description	Range	Default	Units	R/W
1	Channel 1 Alarm 1 Set point	Refer to Gasguard controller manual GSB017: Modbus Registers 40021, 40022, 40023, 40024 (Value as displayed on Gasguard controller display with decimal point removed)			r
2	Channel 1 Alarm 2 Set point				r
3	Channel 1 Alarm 3 Set point				r
4	Channel 2 Alarm 1 Set point				r

Gasguard Parameters (factory use – block 2)					
No	Description	Range	Default	Units	R/W
1	Channel 2 Alarm 2 Set point	Refer to Gasguard controller manual GSB017: Modbus Registers 40025, 40026, 40027, 40028 (Value as displayed on Gasguard controller display with decimal point removed)			r
2	Channel 2 Alarm 3 Set point				r
3	Channel 3 Alarm 1 Set point				r
4	Channel 3 Alarm 2 Set point				r

Gasguard Parameters (factory use – block 3)					
No	Description	Range	Default	Units	R/W
1	Channel 3 Alarm 3 Set point	Refer to Gasguard controller manual GSB017: Modbus Registers 40029, 40030, 40031, 40032 (Value as displayed on Gasguard controller display with decimal point removed)			r
2	Channel 4 Alarm 1 Set point				r
3	Channel 4 Alarm 2 Set point				r
4	Channel 4 Alarm 3 Set point				r

Gasguard Parameters (factory use – block 4)					
No	Description	Range	Default	Units	R/W
1	Channel 1 Display Format Value	Refer to Gasguard controller manual GSB017 Modbus Registers 40033, 40034, 40035, 40036 (Decimal point division value: 1, 10, 100, 1000)			r
2	Channel 2 Display Format Value				r
3	Channel 3 Display Format Value				r
4	Channel 4 Display Format Value				r

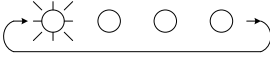



Functional Logic

The SIM-G issues four Master Modbus transactions to read required data from the slave Gasguard Controller. The Master Modbus transactions occur at the rate of one every iMAC refresh cycle (the time it takes to read all 255 iMAC fieldbus addresses). The read Modbus data is repackaged into the SIM-G iMAC data registers and published onto the iMAC fieldbus. The approximate time taken to read and transfer all the specified data from the Gasguard Controller to iMAC Controller is dictated by the iMAC Linespeed setting as follows:

iMAC Controller Linespeed (baud)	1000	500	300
SIM-G data transfer time (seconds)	36s	72s	120s

If a RS485 Modbus error occurs, the RS485 flag is set and the RS485 Error Counter register is incremented. The RS485 error flag is cleared on the next successful RS485 Modbus transaction. Both the flag and error counter are cleared on a SIM-G Fieldbus power-up cycle.

LED Indicators

Status LED (L1 OK)			
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		Error (general)	RS485 is not functioning correctly
RS485 LED			
Off	Module is not currently receiving data from the Gasguard controller		
Flash	Module is transmitting or receiving data on the RS485 link (RS485 activity)		

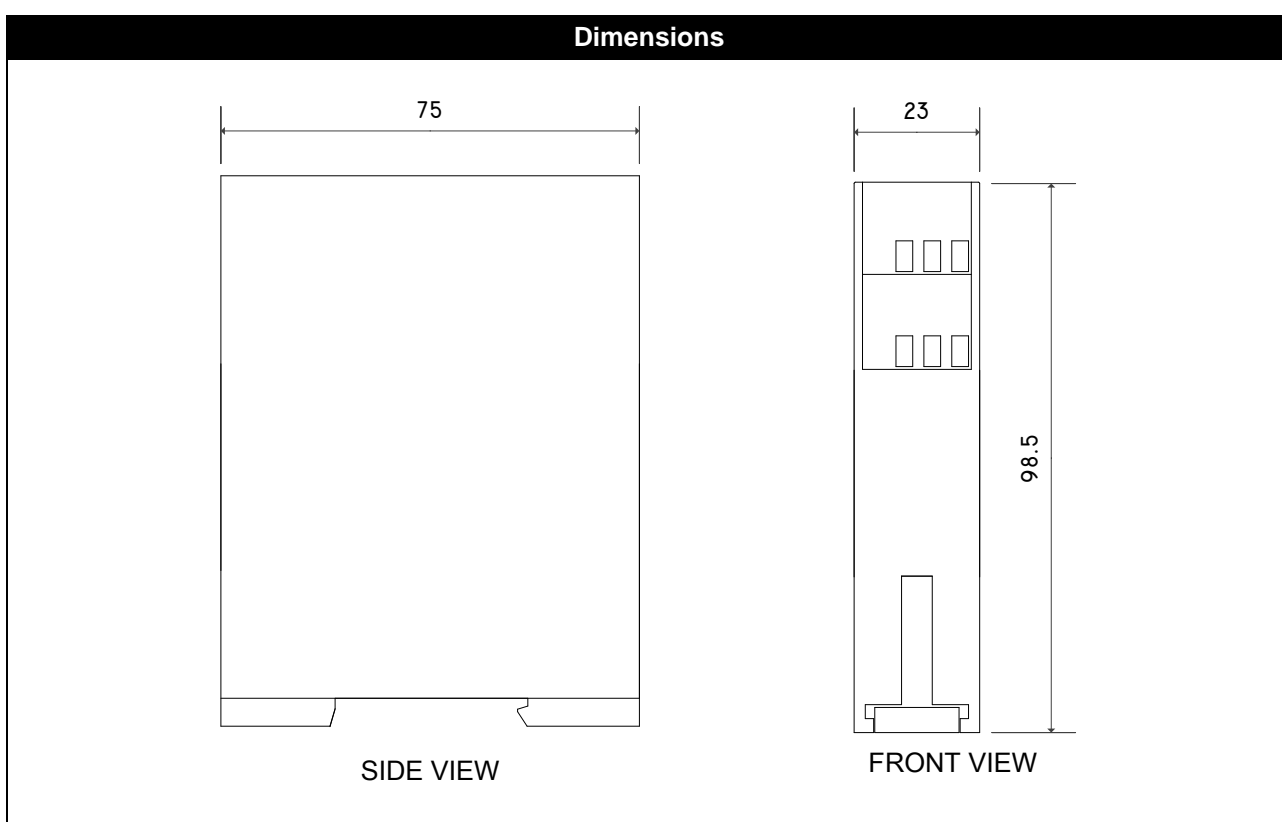
Certification / Approvals

Type	Ex ia I Ma (for use in zone 0, 1 or 2)		
Certificate number	IECEX ITA 07.0017X		
Module type	SIM		
IP rating	Must be installed in an enclosure not less than IP54		
Other	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+, L1- (Terminals 1 & 2)	$U_i = 21.5V$ (44.65R source resistor) $C_i = \text{Negligible}$ $L_i = \text{Negligible}$	
	PS+, PS- (Terminals 8 & 9)	$U_i = 16.5V$ $i_i = 3.5A$ $C_i = \text{negligible}$ $L_i = \text{negligible}$	
	TR+, TR- (Terminals 11 & 12)	$U_i = 7.14V$ $i_i = 2A$ $C_i = \text{negligible}$ $L_i = \text{negligible}$	
		$U_o = 5.88V$ $I_o = 19.8mA$ $P_o = 29.1mW$ $C_o = 1000\mu F$ $L_o = 1H$ $L/R = 1600\mu H/\Omega$	
Ambient temperature (T_a)	-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.			

Specifications

Mechanical	
Dimensions	23mm x 75mm x 98.5mm (See diagram below)
Weight	190g
IP Rating	IP20
Mounting	Standard 35mm DIN rail (Top hat rail – EN 50022)
Electrical Connections	ERNI Screw terminals (maximum wire size of 2.5mm ² , maximum tightening torque 0.4Nm)
Environmental	
Operating Temperature	-10°C to +60°C
Power Supply (RS485)	
Voltage	9 - 16.5 VDC (I.S.) / 9 - 16.5 VDC (Non - I.S.)
Current (@ VDC)	9mA (9) / 18mA (12) / 29mA (16)

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	3.5kVAC (to RS485 Interface)
L1 Line Loading (baud)	1.92mA (300) / TBC (500) / 4.16mA (1000)
Communications (Modbus)	
Modbus Master	Modbus RTU protocol (only compatible with Gasguard controllers)
Hardware interface	RS485
Baud Rate	2400 (fixed)
Bit protocol	8 data bits, parity none, 2 stop bits (fixed)
Isolation	3.5kVAC (to iMAC Fieldbus interface)
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	



Equipment List	
Part Number	Description
121915	MODULE IMAC SIM-G IECEx

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