

SIM-T

Serial Interface Module (1x Trolex controller comms bridge)

Summary

The iMAC SIM-T Serial Interface Module provides an intrinsically safe communications bridge between the iMAC system and a single Trolex 9042 Controller. The SIM-T operates as Modbus RS485 RTU Master device and uses Modbus commands to retrieve data from a Trolex 9042 controller. This data is then packaged into 16 iMAC registers which are forwarded onto the iMAC controller via the iMAC fieldbus.

The SIM-T RS485 interface requires a local intrinsically safe power supply, however, the main CPU of SIM-T 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 Trolex 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.



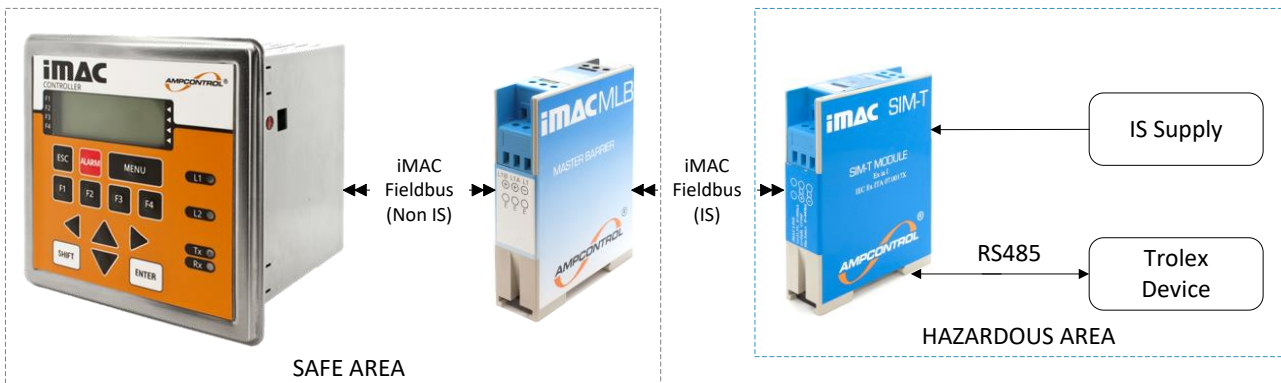
Data Register(s)

16 (4x Flags, 8x Analogue Input, Software Version, Error Count, Serial number)

Features

- Intrinsically Safe IECEx Ex ia Group I Ma
- Provides communication bridge between the iMAC system and a Trolex 9042 RS485 Modbus device
- 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

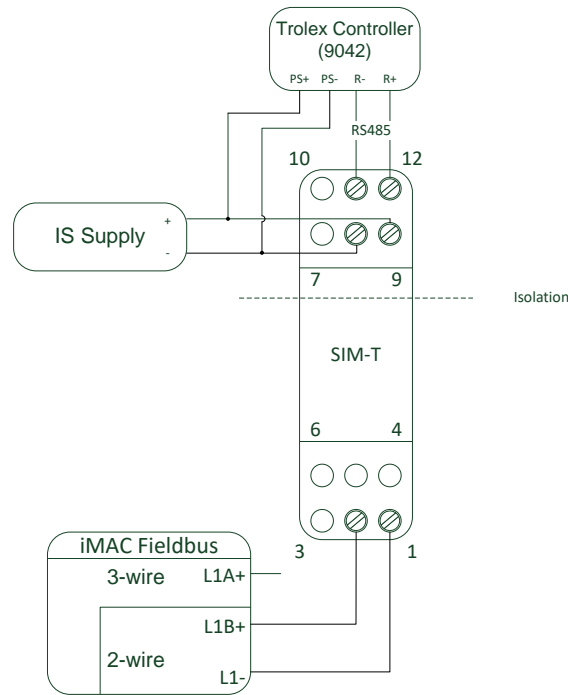


CAUTION!



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 Trolex 9042 controller
12	RS485 TR+		

Data Register(s)

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

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

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

Bit	Description	Bit Value	R / W	Modbus Register
15	Channel 8 – Not used	X	r	10032
14	Channel 8 – Fault Status	1 = Alarm	r	10031
13	Channel 8 – Set point 2	1 = Alarm	r	10030
12	Channel 8 – Set point 1	1 = Alarm	r	10029
11	Channel 7 – Not used	X	r	10028
10	Channel 7 – Fault Status	1 = Alarm	r	10027
9	Channel 7 – Set point 2	1 = Alarm	r	10026
8	Channel 7 – Set point 1	1 = Alarm	r	10025
7	Channel 6 – Not used	X	r	10024
6	Channel 6 – Fault Status	1 = Alarm	r	10023
5	Channel 6 – Set point 2	1 = Alarm	r	10022
4	Channel 6 – Set point 1	1 = Alarm	r	10021
3	Channel 5 – Not used	X	r	10020
2	Channel 5 – Fault Status	1 = Alarm	r	10019
1	Channel 5 – Set point 2	1 = Alarm	r	10018
0	Channel 5 – Set point 1	1 = Alarm	r	10017

Register 3 – Flags (iMAC SIM-T Address+2)

Bit	Description	Bit Value	R / W	Modbus Register	Notes
15	Channel 8 – Input 2	1 = Alarm	r	10048	If DIM used
14	Channel 8 – Input 1	1 = Alarm	r	10047	If DIM used
13	Channel 7 – Input 2	1 = Alarm	r	10046	If DIM used
12	Channel 7 – Input 1	1 = Alarm	r	10045	If DIM used
11	Channel 6 – Input 2	1 = Alarm	r	10044	If DIM used
10	Channel 6 – Input 1	1 = Alarm	r	10043	If DIM used
9	Channel 5 – Input 2	1 = Alarm	r	10042	If DIM used
8	Channel 5 – Input 1	1 = Alarm	r	10041	If DIM used
7	Channel 4 – Input 2	1 = Alarm	r	10040	If DIM used
6	Channel 4 – Input 1	1 = Alarm	r	10039	If DIM used
5	Channel 3 – Input 2	1 = Alarm	r	10038	If DIM used
4	Channel 3 – Input 1	1 = Alarm	r	10037	If DIM used
3	Channel 2 – Input 2	1 = Alarm	r	10036	If DIM used
2	Channel 2 – Input 1	1 = Alarm	r	10035	If DIM used
1	Channel 1 – Input 2	1 = Alarm	r	10034	If DIM used
0	Channel 1 – Input 1	1 = Alarm	r	10033	If DIM used

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

Bit	Description	Bit Value	R / W	Modbus Register	Notes
15	RS485 Error	1 = Error	r	-	-
14	Not used	X	r	-	-
13	RLY_RST (A36) Input	1 = Alarm	r	10050	-
12	POR_DLY (A35) Input	1 = Power ON Delay Disabled	r	10049	-
11	Channel 8 – Relay Status	1 = Alarm	r	00012	If Relay Module
10	Channel 7 – Relay Status	1 = Alarm	r	00011	If Relay Module
9	Channel 6 – Relay Status	1 = Alarm	r	00010	If Relay Module
8	Channel 5 – Relay Status	1 = Alarm	r	00009	If Relay Module
7	Channel 4 – Relay Status	1 = Alarm	r	00008	If Relay Module
6	Channel 3 – Relay Status	1 = Alarm	r	00007	If Relay Module
5	Channel 2 – Relay Status	1 = Alarm	r	00006	If Relay Module
4	Channel 1 – Relay Status	1 = Alarm	r	00005	If Relay Module
3	Relay 4 Status	1 = Alarm	r	00004	-
2	Relay 3 Status	1 = Alarm	r	00003	-
1	Relay 2 Status	1 = Alarm	r	00002	-
0	Relay 1 Status	1 = Alarm	r	00001	-

Registers 5 to 16 – Analogue Data (iMAC SIM-T Address+4 to +15)			
Register	Description	R / W	Modbus Register
5	Channel 1 Analogue Input (as displayed on Trolex display with decimal point removed -9999 to 9999)	r	30001
6	Channel 2 Analogue Input (as above)	r	30002
7	Channel 3 Analogue Input (as above)	r	30003
8	Channel 4 Analogue Input (as above)	r	30004
9	Channel 5 Analogue Input (as above)	r	30005
10	Channel 6 Analogue Input (as above)	r	30006
11	Channel 7 Analogue Input (as above)	r	30007
12	Channel 8 Analogue Input (as above)	r	30008
13	Software version (must be divided by 10 ie 27 = version 2.7)	r	30009
14	Not used	r	N/A
15	Error Count for RS485 Communication	r	N/A
16	SIM-T serial number	r	N/A

Configuration Parameters

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

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

Trolex Parameters (factory use – block 1)					
No	Description	Range	Default	Units	R/W
1	Channel 1 Set point 1	Refer to Trolex 9042 manual			r
2	Channel 1 Set point 2				r
3	Channel 2 Set point 1				r
4	Channel 2 Set point 2				r

Trolex Parameters (factory use – block 2)					
No	Description	Range	Default	Units	R/W
1	Channel 3 Set point 1	Refer to Trolex 9042 manual			r
2	Channel 3 Set point 2				r
3	Channel 4 Set point 1				r
4	Channel 4 Set point 2				r

Trolex Parameters (factory use – block 3)					
No	Description	Range	Default	Units	R/W
1	Channel 5 Set point 1	Refer to Trolex 9042 manual			r
2	Channel 5 Set point 2				r
3	Channel 6 Set point 1				r
4	Channel 6 Set point 2				r

Trolex Parameters (factory use – block 4)					
No	Description	Range	Default	Units	R/W
1	Channel 7 Set point 1	Refer to Trolex 9042 manual			r
2	Channel 7 Set point 2				r
3	Channel 8 Set point 1				r
4	Channel 8 Set point 2				r


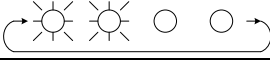
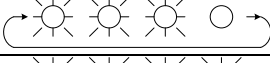

Trolex Parameters (factory use – block 5)					
No	Description	Range	Default	Units	R/W
1	Relay 1 – Delay time (x100ms)	Refer to Trolex 9042 manual			r
2	Relay 2 – Delay time (x100ms)				r
3	Relay 3 – Delay time (x100ms)				r
4	Relay 4 – Delay time (x100ms)				r

Functional Logic

The SIM-T issues three Master Modbus transactions to read required data from the slave Trolex 9042 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-T iMAC data registers and published onto the iMAC fieldbus. The approximate time taken to read and transfer all the 16 specified data registers from the Trolex 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)	27s	54s	90s

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.

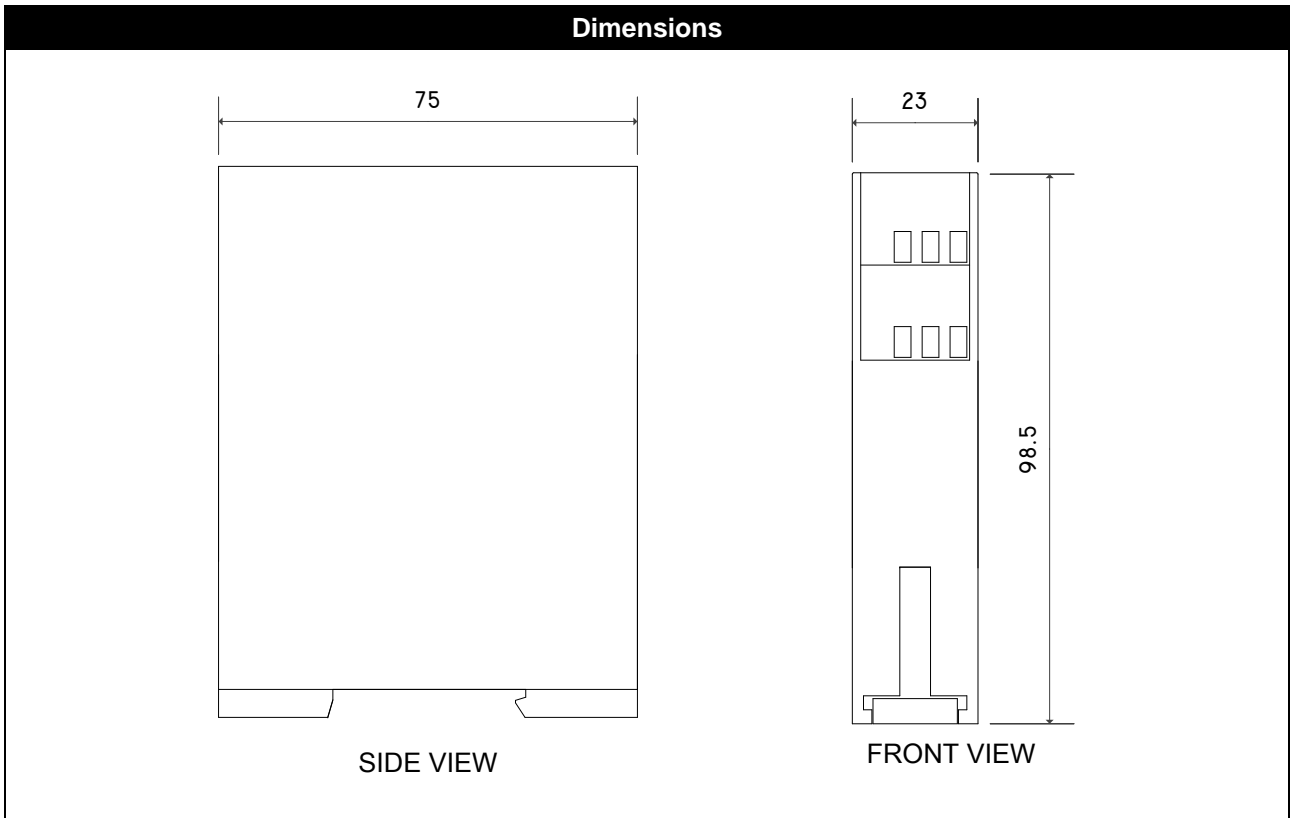
LED Indicators			
Status LED (L1 OK)			
Flash Sequence	Module - iMAC Comms Status	Module - Function Status	
Off	-	Unknown (check connections)	Unknown (check connections)
Slow Flash		Healthy	-
2 Flashes		Healthy (has been roll-called)	-
3 Flashes		Error (address clash)	-
Fast Flash		Error (general)	RS485 is not functioning correctly
RS485 LED			
Off	Module is not currently receiving data from the Trolex 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 = Negligible L _i = Negligible
	PS+, PS- (Terminals 8 & 9)	U _i = 16.5V I _i = 3.5A C _i = negligible L _i = negligible
	TR+, TR- (Terminals 11 & 12)	U _i = 7.14V I _i = 2A C _i = negligible L _i = negligible
		U _o = 5.88V I _o = 19.8mA P _o = 29.1mW C _o = 1000uF L _o = 1H L/R = 1600uH/Ω
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.		

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 of 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 Trolex 9042 controller)
Hardware interface	RS485
Baud Rate	2400
Bit protocol	8 data bits, Even parity, 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
121917	MODULE IMAC SIM-T IECEX

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