

i³

...Display, Control, Connect...



Hardware Guide

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1 INTRODUCTION

The *i*³ Series is a cost effective family of high performance *all-in-one* controllers. The *i*³ features an advanced control engine, operator interface, and a variety of communications options giving open access to SCADA, Remote I/O and 3rd party devices such as Modems, Bar code readers and printers. The *i*³ can be used to perform advanced machine, process and temperature control as well as plant monitoring and data logging. The *i*³ is has a 128x64 backlit LCD displays and features a range of I/O configurations with optional Modem and Ethernet connectivity.

2 SPECIFICATIONS

General Specifications	i3A12X/10A01-SOO	i3A12X/10D03-SCH	i3A12X/10B04-SCH	i3A12X/20B05-SOH	i3A12X/13C14-SOH
Required Power	130 mA @ 24 VDC				
Required Power (Inrush)	30 A for 1 ms @ 24 VDC				
Primary Power Range	10 – 30 VDC				
Relative Humidity	5 to 95% Non-condensing				
Storage Temperature	-10 to 70 ° C				
Operating Temperature	0° to 50° Celsius (32 - 122°F)				
Terminal Type	Screw Type, 5 mm Removable				
Input Voltage	10 to 32 VDC				
Screen Type	128x64 LCD Backlit, monochrome STN.				
LCD Backlighting	Blue or Off (selectable).				
Keypad / LEDs	20 keys (10 fn keys, 4 soft screen keys).				
Keypad Type	Tactile Dome (1 million operations minimum).				
Application Memory	256K Ladder Memory, plus 32KB Register, plus 1Mbyte Graphics				
Control Scan Rate	0.1mS / K Ladder Logic (typical)				
CAN Port	–	1 isolated	1 isolated	–	–
I/O Expansion Interfaces	Serial RS485 252 Smart I/O points, Maximum.				
Portable Memory	Micro SD				
Battery	Replaceable 3V Lithium battery – 4.5 years (off) lifetime				
Ethernet Ports	Optional internal 10/100 Mbit board.				
Serial Ports	2 ports (RJ45) RS-232 & RS-232/485 RJ45				
Environment	Designed for installation in a NEMA 12, NEMA 4/4X or IP65 environment.				
RTC	32k min battery backed 5 years minimum.				
Weight	12 oz. (340.19 g)				
Compliance Certification	CE, cUL, UL, E-Marked				
Wiring - Digital	Use following or equivalent: Belden 9918, 18 AWG or Larger				
Wiring – Analogue	Use following or equivalent: Belden 8441, 18 AWG or Larger				
Wiring - CAN	Use following or equivalent: Belden 3084, 18 AWG or Larger				



Digital Inputs	i3A12X/10A01-SOO	i3A12X/10D03-SCH	i3A12X/10B04-SCH	i3A12X/20B05-SOH	i3A12X/13C14-SOH
Inputs per Module	12 including 4 configurable HSC inputs	12 including 4 configurable HSC inputs	12 including 4 configurable HSC inputs	24 including 4 configurable HSC inputs	12 including 4 configurable HSC inputs
Commons per Module	1				
Input Voltage Range	12 VDC / 24 VDC				
Absolute Max. Voltage	35 VDC Max.				
Input Impedance	10 kW				
Input Current	Positive Logic		Negative Logic		
Upper Threshold	8V @ 0.8 mA		-1.6 mA		
Lower Threshold	3V @ 0.3 mA		-2.1 mA		
OFF to ON Response	1 ms				
ON to OFF Response	1 ms				
HSC Max. Switching Rate	20 kHz				

Digital Outputs	i3A12X/10A01-SOO	i3A12X/10D03-SCH	i3A12X/10B04-SCH	i3A12X/20B05-SOH	i3A12X/13C14-SOH
Outputs per Module	6	6	12 including 2 configurable PWM outputs	16 including 2 configurable PWM outputs	12 including 2 configurable PWM outputs
Commons per Module	6	6	1	1	1
Output Type	SP ST NO Relay	SP ST NO Relay	Sourcing / 10 K Pull-Down	Sourcing / 10 K Pull-Down	Sourcing / 10 K Pull-Down
Absolute Max. Voltage			28 VDC Max.	28 VDC Max.	28 VDC Max.
Max. Output Supply Voltage			30 VDC	30 VDC	30 VDC
Minimum Output Supply Voltage			10 VDC	10 VDC	10 VDC
Max. Inrush Current			650 mA per channel	650 mA per channel	650 mA per channel
Min Load			None	None	None
OFF to ON Response			1 ms	1 ms	1 ms
ON to OFF Response			1 ms	1 ms	1 ms
Max. Total Current	5 A continuous	5 A continuous	4 A Continuous	4 A Continuous	4 A Continuous
Output Protection			Short Circuit	Short Circuit	Short Circuit
Output Characteristics			Current Sourcing (Pos logic)	Current Sourcing (Pos logic)	Current Sourcing (Pos logic)
Max. Output Current	5 A at 250 VAC, resistive. 1A inductive	5 A at 250 VAC, resistive. 1A inductive	0.5A per point	0.5A per point	0.5A per point
Max. Output Voltage	275 VAC , 30 VDC	275 VAC , 30 VDC			
Max. Switched Power	150 W, 1250 VA	150 W, 1250 VA			
Contact Isolation to XLE ground	1000 VAC	1000 VAC			
Max. Voltage Drop at Rated Current	0.5 V	0.5 V	0.25 VDC	0.25 VDC	0.25 VDC
Expected Life	No load: 5,000,000 Rated load: 100,000	No load: 5,000,000 Rated load: 100,000			
Max. Switching Rate	300 CPM at no load 20 CPM at rated load	300 CPM at no load 20 CPM at rated load	50Hz - resistive, 0.5 Hz - inductive. Max 2Khz High Speed Output resistive		
Response Time	One update per scan + 10 ms				

Analog Inputs	i3A12X/10A01-SOO	i3A12X/10D03-SCH	i3A12X/10B04-SCH	i3A12X/20B05-SOH	i3A12X/13C14-SOH
Number of Channels	1	4	2	2	2
Input Ranges	0 - 10 VDC 0-20 mA 4-20 mA	0 - 10 VDC 0-20 mA 4-20 mA	0 - 10 VDC 0-20 mA 4-20 mA	0 - 10 VDC 0-20 mA 4-20 mA	0 - 10 VDC 0-20 mA 4-20 mA PT100, RTD
Safe input voltage range	-0.5 V to +12V	-0.5 V to +12V	-0.5 V to +12V	-0.5 V to +12V	10 VDC: -0.5 to +15 V 20 mA: -0.5 to +6 V RTD/ T/C:±24 VDC
Input Impedance (Clamped @ -0.5 VDC to 12 VDC)	Current Mode: 100 W Voltage Mode: 500 k W	Current Mode: 100 W Voltage Mode: 500 k W	Current Mode: 100 W Voltage Mode: 500 k W	Current Mode: 100 W Voltage Mode: 500 k W	Current Mode: 100 W, 35mA Max. Continuous Voltage Mode: 500 kW, 35mA Max. Continuous
Nominal Resolution	10 Bits	10 Bits	10 Bits	10 Bits	14 Bits
%AI full scale	32,000	32,000	32,000	32,000	32,000
Max. Over-Current	35 mA	35 mA	35 mA	35 mA	
Conversion Speed	1 per scan	1 per scan	1 per scan	1 per scan	1 per scan
Thermocouple Common Mode Range					±10V
Open Thermocouple Detect Current					50 nA
RTD Excitation Current					250 mA
Filtering	160 Hz noise filter, 1-128 scan digital running average filter				

Analog Outputs	i3A12X/10A01-SOO	i3A12X/10D03-SCH	i3A12X/10B04-SCH	i3A12X/20B05-SOH	i3A12X/13C14-SOH
Number of Channels					2
Output Ranges					0-10 VDC, 0-20 mA
Nominal Resolution					12 Bits
Update rate					Once per PLC scan
Minimum 10 V load					5 kW
Maximum 20 mA load					500 W
Analog Outputs;					2
Output Points Required					2
Maximum Error at 25°C					0.10%

3 INSTALLATION PROCEDURE

3.1 Overview of Required Steps

1. In line with the specifications illustrated in *Figure 1* and *Figure 2* – carefully prepare the panel cutout. Ensure that the corners of the cutout are square and free from burrs.
2. Place the unit in the panel cut-out, secure the unit using the four (4) supplied mounting clamps.
3. When the panel is in it’s final operating position carefully remove the protective plastic sheet from the front of the unit.

CAUTION: *Remove the plastic sheet slowly, from corner to corner, so as not to damage the i³ keypad/display overlay.*

3.2 Dimensions

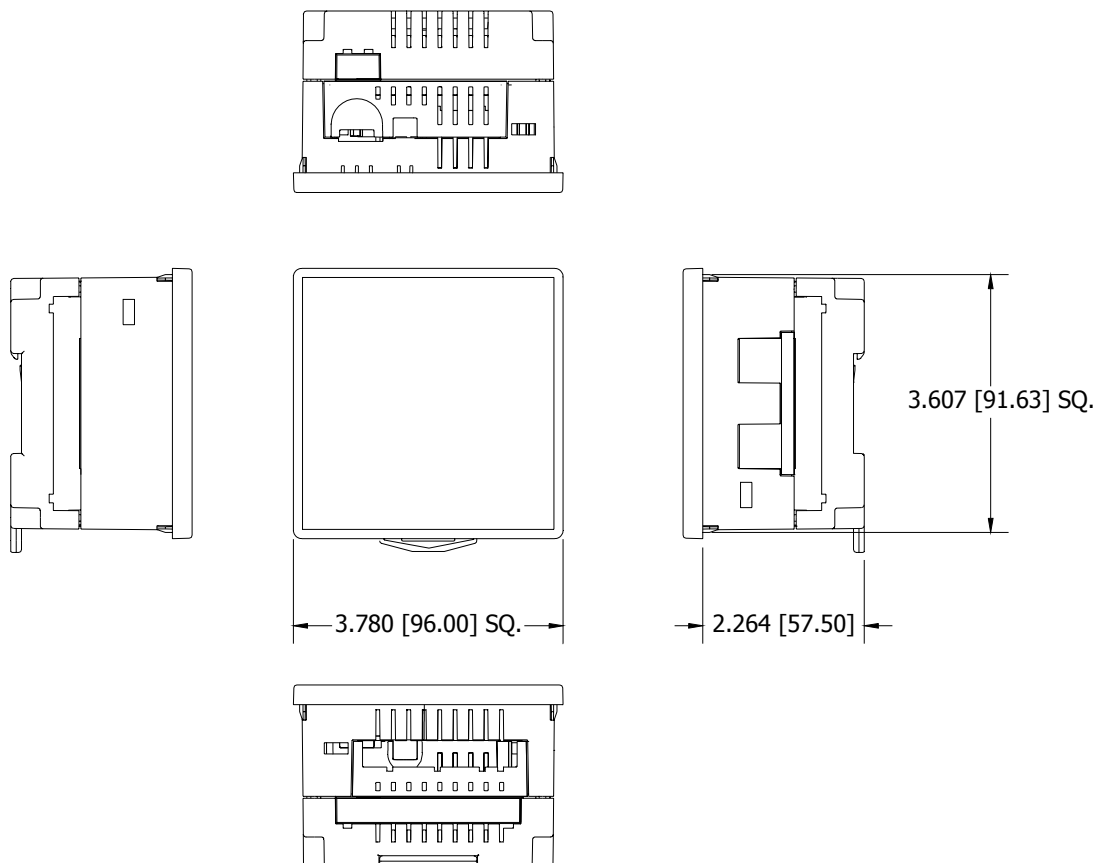


Figure 1 – i³ Dimensions

3.3 Panel Cut-Out

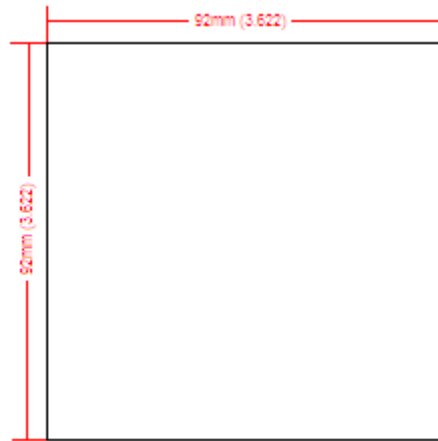


Figure 2 – *i*³ Panel Cut-Out

3.4 Ports, Connectors and Wiring

3.4.1 Power and Optional CAN ports

The *i*³ has various connections on the sides of the unit. **Figure 3 - 9** shows the locations and pinouts of the most common connectors used during installation.

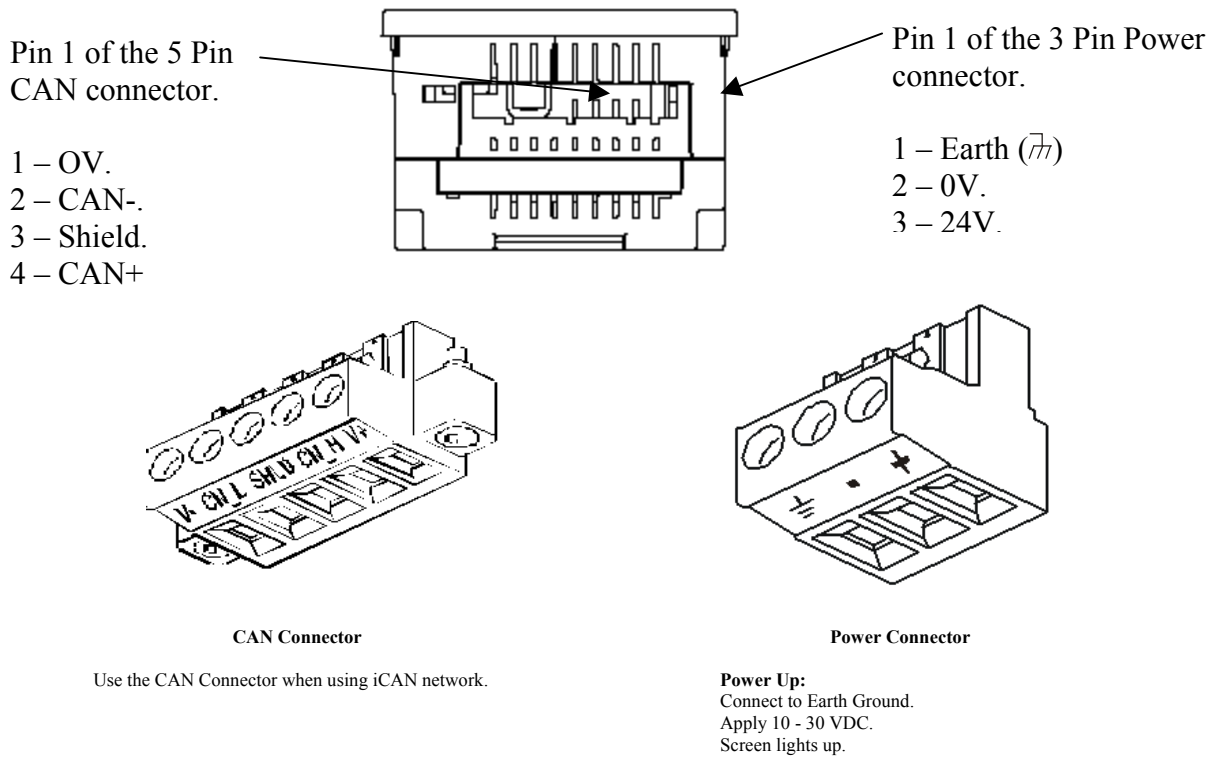


Figure 3 – Power and CAN connector placement and pin-out for the *i*³

3.4.2 RS-232/ RS-485 Programming Ports and Wiring

The *i*³ features two active serial ports, accessible through two RJ45 connectors MJ1 and MJ2. These two ports can may be used simultaneously.

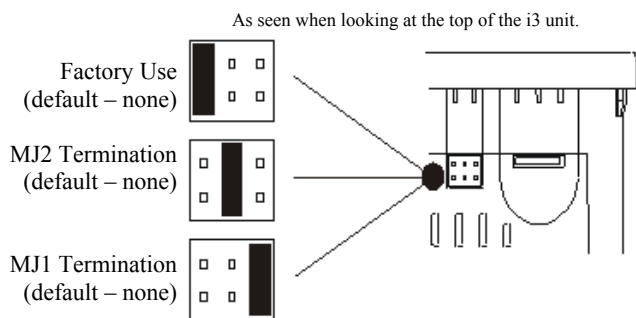
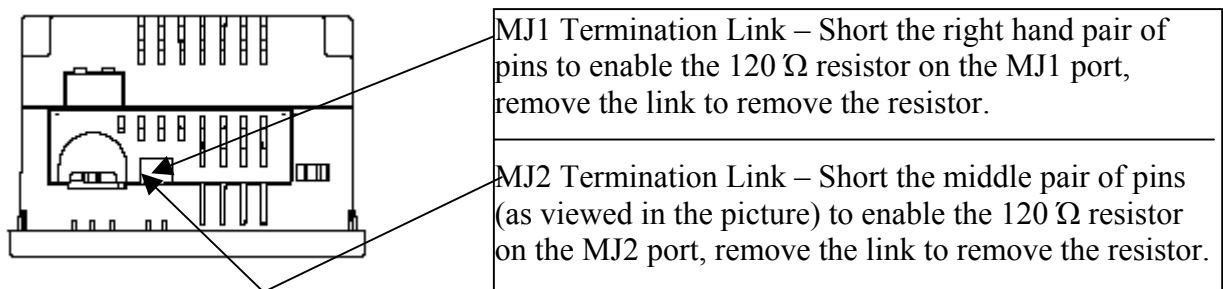
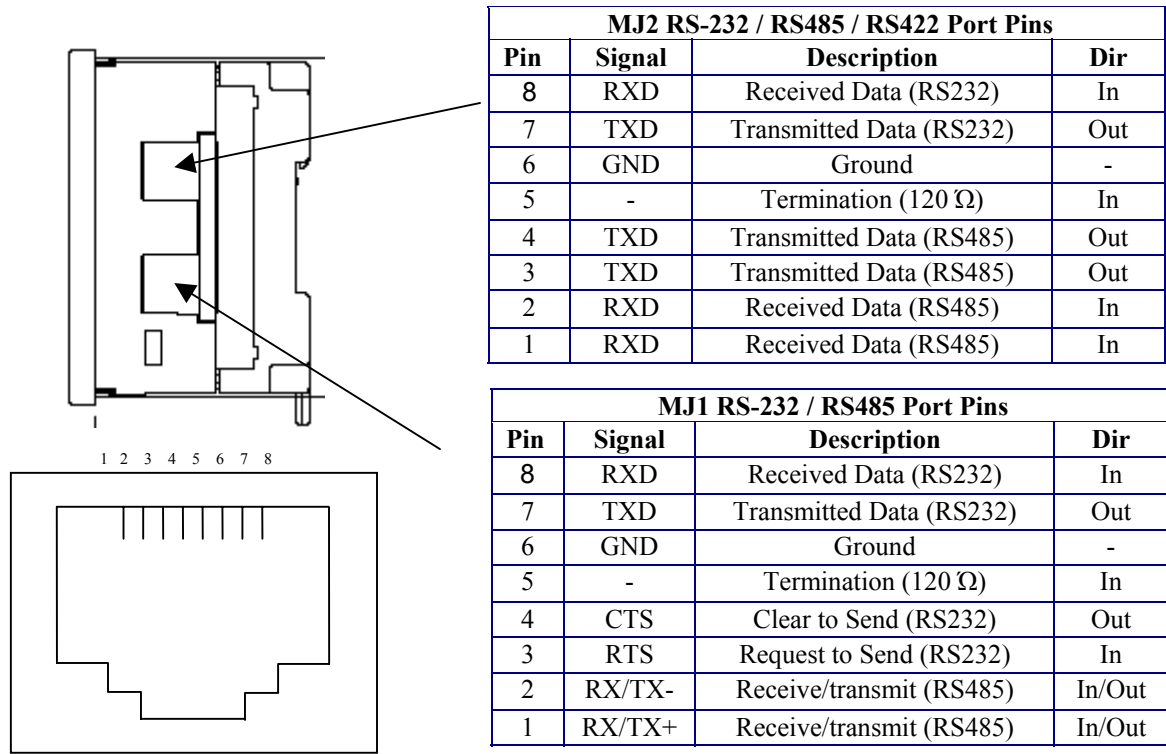


Figure 4 – Serial port connector placement and pin-out for the *i*³

3.4.3 I/O Connector details

Each of the I/O boards have jumper links for configuration. JP1 is common to all five *i*³ models for configuration of the digital inputs. For common high (pnp mode) or common low (nnp mode) move the link as in Table 3.

Description	JP1 Position
24V Pullup (pnp)	2-3
0V Common (nnp)	1-2



Table 3. JP1 link positions.

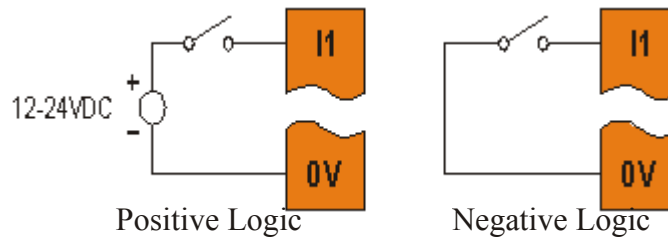


Figure 4: Positive and Negative Digital Input Logic wiring

The input circuitry on all five models is defined by JP2. Table 5 defines the link positions for models: i3A12X/10A01-SOO, i3A12X/10D03-SCH, i3A12X/10B04-SCH and i3A12X/20B05-SOH.

Function JP2	i3A12X/10A01-SOO 20mA	i3A12X/10D03-SCH 20mA	i3A12X/10B04-SCH 20mA	i3A12X/20B05-SOH 20mA	All 10V
Channel 1	1-2	1-2	1-2	1-2	Open
Channel 2		3-4	3-4	3-4	Open
Channel 3		5-6			Open
Channel 4		7-8			Open

Table 5. JP2 Link position and Function.

*i*³ Relay model pin-outs: i3A12X/10A01-SOO

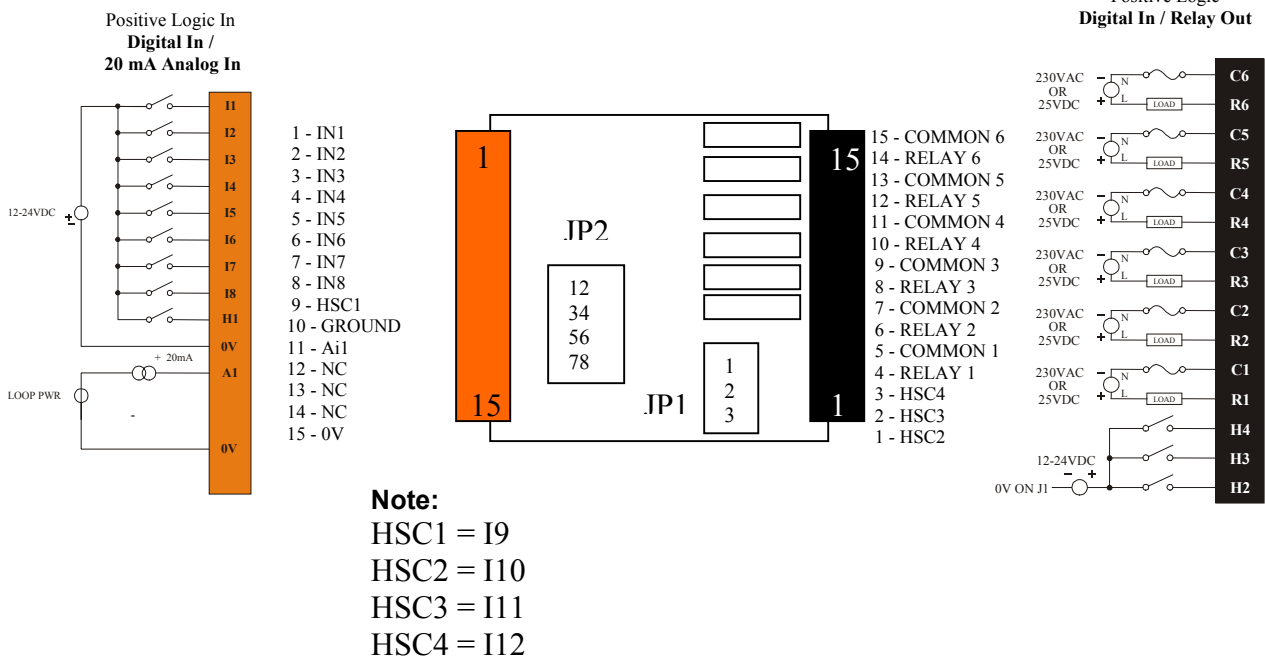
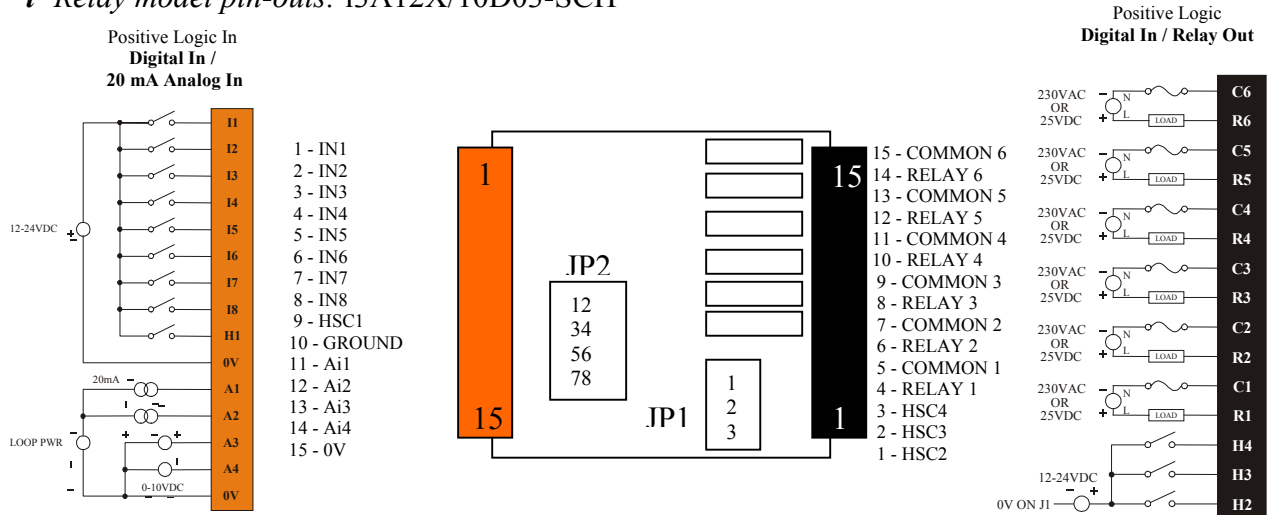


Figure 5. Connector pin outs for the Relay models (board viewed from rear) and wiring suggestions.

*i*³

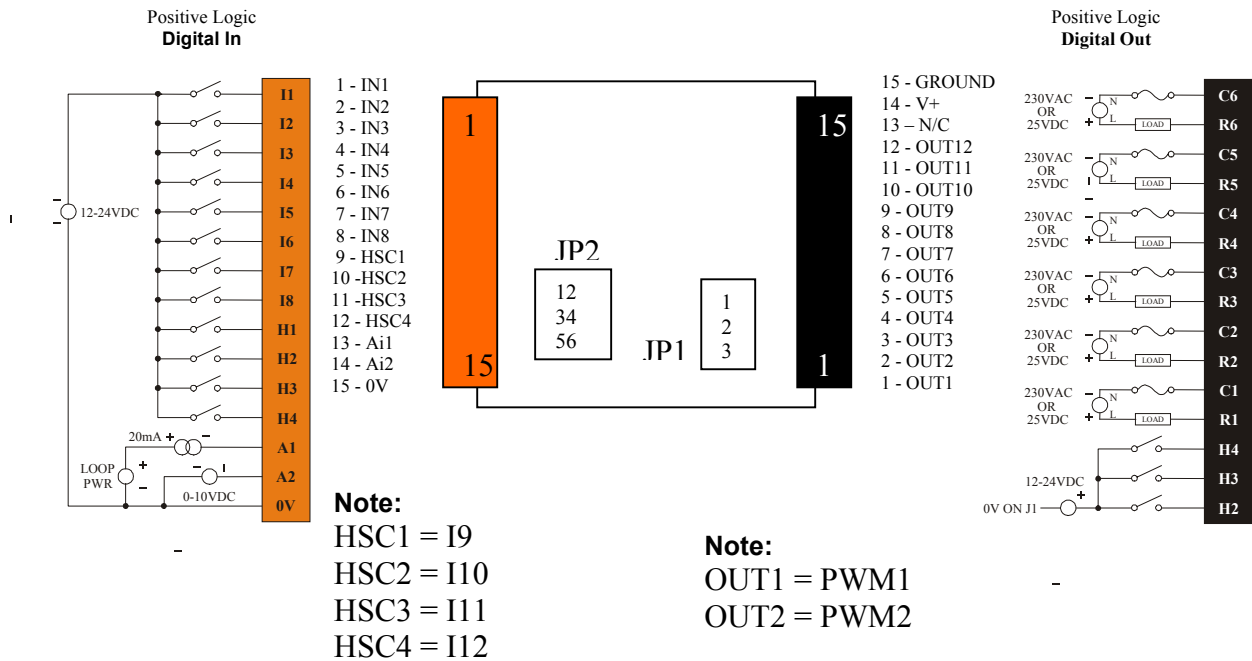
*i*³ Relay model pin-outs: i3A12X/10D03-SCH



Note:
HSC1 = I9
HSC2 = I10
HSC3 = I11
HSC4 = I12

Figure 6. Connector pin outs for the Relay models (board viewed from rear) and wiring suggestions.

*i*³ model - i3A12X/10B04-SCH



Note:
HSC1 = I9
HSC2 = I10
HSC3 = I11
HSC4 = I12

Note:
OUT1 = PWM1
OUT2 = PWM2

Figure 7. Connector pin outs (board viewed from rear) and wiring suggestions.

i³ model - i3A12X/20B05-SOH

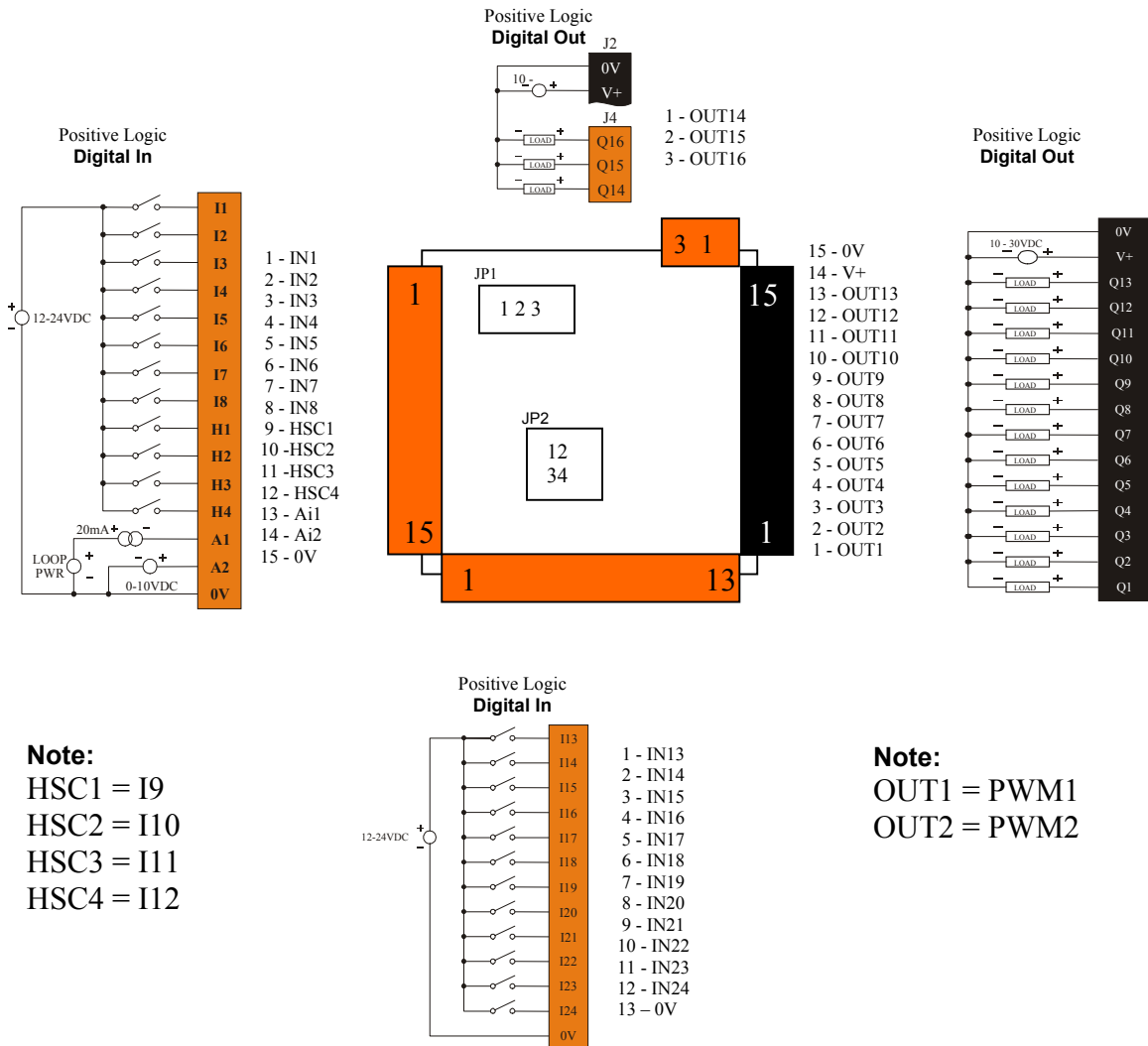


Figure 8. Connector pin outs (board viewed from rear) and wiring suggestions.

*i*³

*i*³ model - i3A12X/13C14-SOH

Table 7 shows link positions for the Analogue I/O options on i3A12X/13C14-SOH:

Link No.	Function	20mA	10V	PT100	Thermocouple
JP2	AI 1	8-9	8-9	2-3	1-2
		11-12	11-12	5-6	4-5
				7-8	7-8
				10-11	10-11
JP3	AI 2	8-9	8-9	2-3	1-2
		11-12	11-12	5-6	4-5
				7-8	7-8
				10-11	10-11
JP4	OUTPUT 1	1-2	2-3		
		4-5	5-6		
		7-8	8-9		
	OUTPUT 2	10-11	11-12		
		13-14	14-15		
		16-17	17-18		

Table 7. Analogue I/O Mode Jumper positions

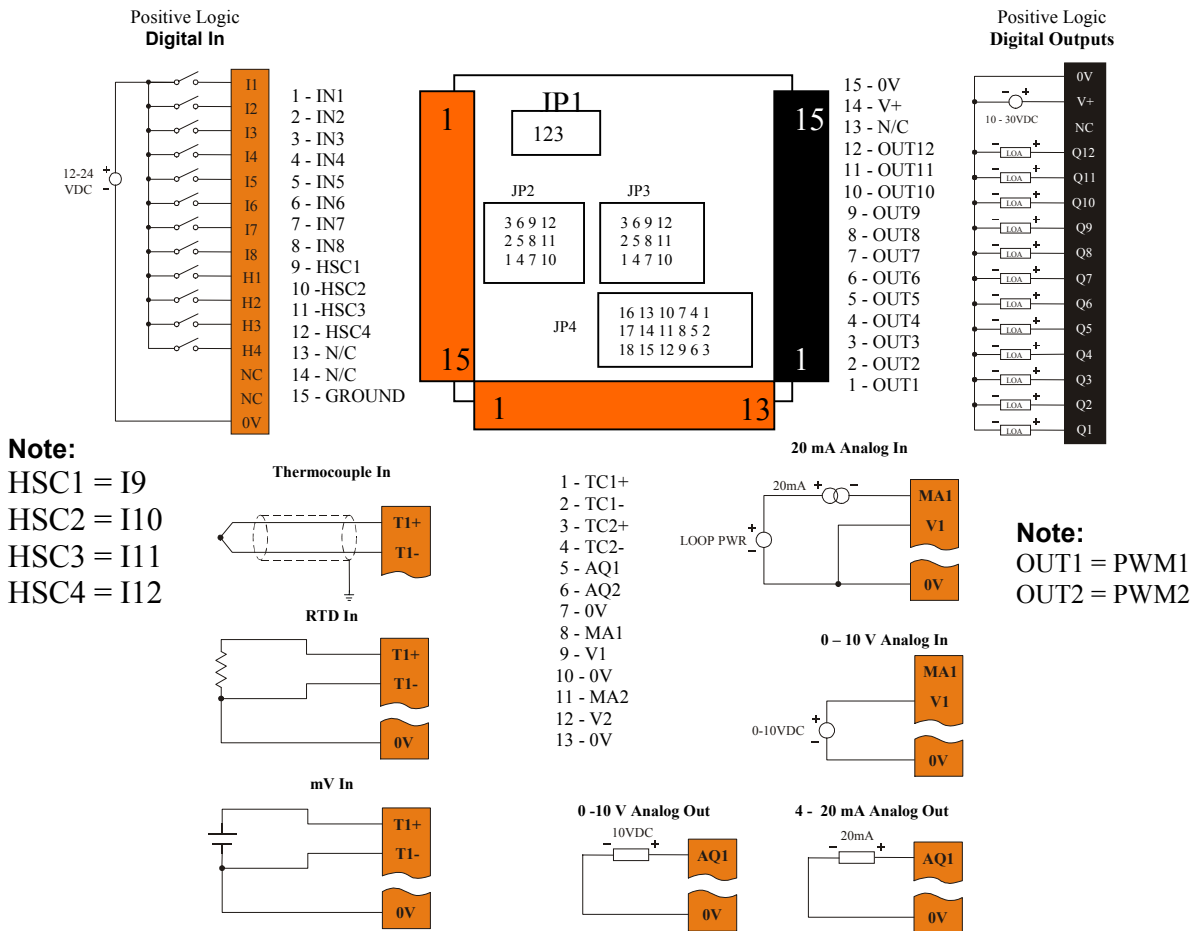


Figure 9. Connector pin outs (board viewed from rear) and wiring suggestions.

4.0 SAFETY

When found on the product, the following symbols specify:



Warning: Consult user documentation.



Warning: Electrical Shock Hazard.

WARNING: To avoid the risk of electric shock or burns, always connect the safety (or earth) ground before making any other connections.

WARNING: To reduce the risk of fire, electrical shock, or physical injury it is strongly recommended to fuse the voltage measurement inputs. Be sure to locate fuses as close to the source as possible.

WARNING: Replace fuse with the same type and rating to provide protection against risk of fire and shock hazards.

WARNING: In the event of repeated failure, do not replace the fuse again as a repeated failure indicates a defective condition that will not clear by replacing the fuse.

WARNING: Only qualified electrical personnel familiar with the construction and operation of this equipment and the hazards involved should install, adjust, operate, or service this equipment. Read and understand this manual and other applicable manuals

- All applicable codes and standards need to be followed in the installation of this product.
- Connect the green safety (earth) ground first before making any other connections.
- When connecting to electric circuits or pulse-initiating equipment, open their related breakers. Do not make connections to live power lines.
- Make connections to the module first; then connect to the circuit to be monitored.
- Route power wires in a safe manner in accordance with good practice and local codes.
- Wear proper personal protective equipment including safety glasses and insulated gloves when making connections to power circuits.
- Ensure hands, shoes, and floor are dry before making any connection to a power line.
- Make sure the unit is turned OFF before making connection to terminals. Make sure all circuits are de-energized before making connections.
- Before each use, inspect all cables for breaks or cracks in the insulation. Replace immediately if defective.



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- Drives
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- Limit Switches
- Photoelectric Switches
- PLCs
- Proximity Switches
- Temperature Controls



- Data Acquisition & Control
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- Intelligent Terminals/HMI
- Limit Switches
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- PLCs
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All IMO products are tried, tested and approved to relevant international quality standards



- Jaguar VXM 0.37-500KW
- Jaguar VXSM 0.37-7.5KW
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