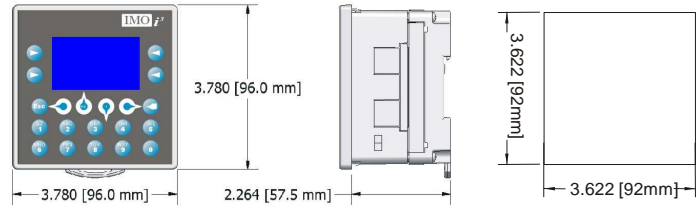


i³ User Start-up Guide



Getting Started:

1. Connect the 24VDC power as shown on the connector below.
2. Install i³ Configurator onto your PC.
3. Connect serial programming cable into port MJ1 port.
4. If using a USB to serial convertor (PC501), please check in Window Device Manager which com port has been assigned. Then enter menu Tools->Editor Options-> Communications port->Configure, and set accordingly.
5. Press the up and down arrows simultaneously on the front of the unit and check Network ID. Then press the target sign in the Configurator and make the Target ID match that of the i³

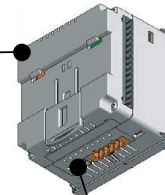


i	3	A	I	2	X	/					128x64 Display, 14 programmable keys
							1	3			12 Digital Inputs (4 HSC+ Universal Analogue in)
									C		2 Analogue Inputs (14-bit)
										I	2 Analogue Outputs (12 bit)
										4	12 Digital Outputs (2 PWM)
											2 Serial Ports, 0 CAN port, iCAN Protocol
										S O H	MicroSD Card

WARNING: Please ensure power is ON and i³ is in Idle mode before inserting SanDisk™ MicroSD.

Back cover screws. Remove the 4 screws and back plate to access the Internal jumpers.

WARNING: Do not Over-tighten screws.



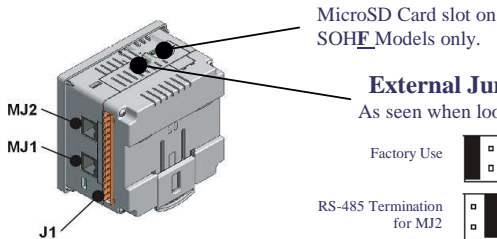
Power Connector

Power Up:

Connect to Earth Ground. Apply 10 - 30 VDC. Screen lights up.



- 1 - Positive
- 2 - Negative
- 3 - Ground



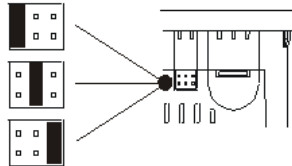
External Jumper Configuration.

As seen when looking at the top of the i³ unit

Factory Use

RS-485 Termination for MJ2

RS-485 Termination for MJ1



Serial Ports MJ1 / MJ2

MJ1 Serial Port Pin Assignments			
Pin	Signal	Signal Description	Direction
8	TD ¹	RS-232 Transmit Data	Out
7	RD ¹	RS-232 Receive Data	In
6	0V	Ground	-
5	+5	+5 VDC 60mA max	Out
4	RTS ¹	RS-232 Request to Send	In
3	CTS ¹	RS-232 Clear to Send	Out
2	RX/TX-	Receive/Transmit Negative	In/Out
1	RX/TX+	RS-485 Receive/Transmit Positive	In/Out

MJ2 Serial Port Pin Assignments			
Pin	Signal	Signal Description	Direction
8	TD ¹	RS-232 Transmit Data	Out
7	RD ¹	RS-232 Receive Data	In
6	0V	Ground	-
5	+5	+5 VDC 60mA max	Out
4	TX-	RS-485 Transmit Negative	In
3	TX+	RS-485 Transmit Positive	Out
2	RX-	RS-485 Receive Negative	In
1	RX+	RS-485 Receive Positive	In

¹Signals are labeled for connection to a DTE device
* +5 on i³ H/W Rev E and later

MJ2 RS485 Connection Examples:

MJ2 - Full Duplex Mode			
Pin	MJ2 Pins		Direction
	Signal	Direction	
8	-	-	
7	-	-	
6	0V	Ground	
5	-	-	
4	TX-	OUT	
3	TX+	OUT	
2	RX-	IN	
1	RX+	IN	

MJ2 - Half Duplex Mode			
Pin	MJ2 Pins		Direction
	Signal	Direction	
8	-	-	
7	-	-	
6	0V	Ground	
5	-	-	
4	-	-	
3	-	-	
2	TX-/RX-	IN/OUT	
1	TX+/RX+	IN/OUT	

This equipment is suitable for use in Class I, Division 2, Groups A, B, C and D or Non-hazardous locations only

WARNING: EXPLOSION HAZARD – Do not disconnect equipment unless power has been switched off or the area is known to be non-hazardous.
AVERTISSEMENT - RISQUE D'EXPLOSION - AVANT DE DECONNECTER L'EQUIPMENT, COUPER LE COURANT OU S'ASSURER QUE L'EMPLACEMENT EST DESIGNÉ NON DANGEREUX.

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: EXPLOSION HAZARD – Substitution of components may impair suitability for Class I, Division 2
AVERTISSEMENT - RISQUE D'EXPLOSION - LA SUBSTITUTION DE COMPOSANTS PEUT RENDRE CE MATERIAL INACCEPTABLE POUR LES EMBLEMES DE CLASSE 1, DIVISION 2

WARNING: EXPLOSION HAZARD - BATTERIES MUST ONLY BE CHANGED IN AN AREA KNOWN TO BE NON-HAZARDOUS
AVERTISSEMENT - RISQUE D'EXPLOSION - AVANT D'EVITER TOUT RISQUE D'EXPLOSION, S'ASSURER QUE L'EMPLACEMENT EST DESIGNÉ NON DANGEREUX AVANT DE CHANGER LA BATTERIE

WARNING: Battery May Explode If Mistreated. Do Not Recharge, Disassemble or Dispose Of In Fire

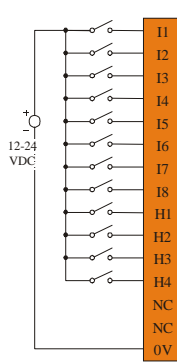
WARNING: Only qualified electrical personnel familiar with the construction and operation of this equipment and the hazards involved should install, adjust, operate, or service this equipment. Read and understand this manual and other applicable manuals in their entirety before proceeding. Failure to observe this precaution could result in severe bodily injury or loss of life.

I/O Register Map

Registers	Description
%I1 to %I24	Digital Inputs
%I32	Output Fault
%I25 to %I31	Reserved
%Q1 to %Q16	Digital outputs
%Q17	Clear HSC1 accumulator to 0
%Q18	Totalizer: Clear HSC2 Quadrature 1-2: Accumulator 1 Reset to max - 1
%Q19	Clear HSC3 Accumulator to 0
%Q20	Totalizer: Clear HSC4 Quadrature 3-4: Accumulator 3 Reset to max - 1
%Q21 to %Q32	Reserved
%AI1 to %AI4	Analogue inputs
%AI5, %AI6	HSC1 Accumulator
%AI7, %AI8	HSC2 Accumulator
%AI9, %AI10	HSC3 Accumulator
%AI11, %AI12	HSC4 Accumulator
%AQ1, %AQ2	PWM1 Duty Cycle
%AQ3, %AQ4	PWM2 Duty Cycle
%AQ5, %AQ6	PWM Prescale
%AQ7, %AQ8	PWM Period
%AQ9 to %AQ14	Analogue outputs

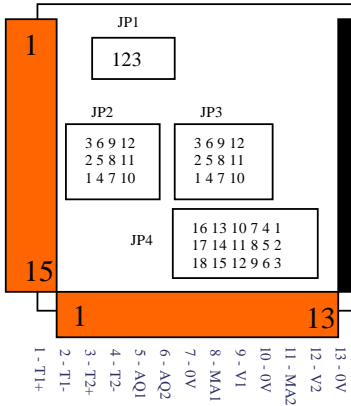
Note: Not all i^3 units contain the I/O listed in this table.

Positive Logic Digital In

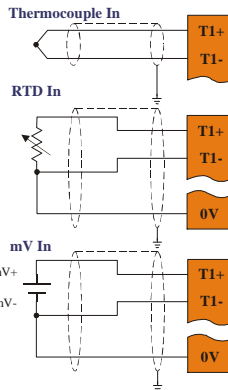
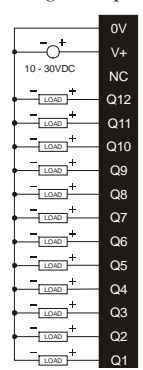


- 1 - IN1
- 2 - IN2
- 3 - IN3
- 4 - IN4
- 5 - IN5
- 6 - IN6
- 7 - IN7
- 8 - IN8
- 9 - HSC1 /A9
- 10 - HSC2 /I10
- 11 - HSC3 /I11
- 12 - HSC4 /I12
- 13 - N/C
- 14 - N/C
- 15 - 0V

Analogue I/O and Digital I/O

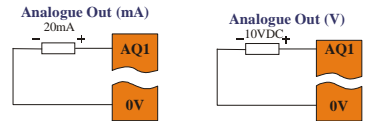
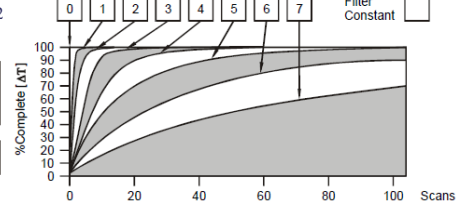
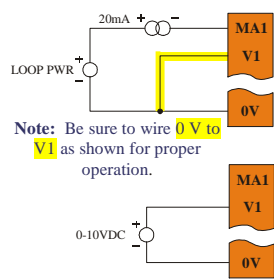


Positive Logic Digital Outputs



Analogue Input Filtering

A total of 2 analogue inputs and 2 analogue outputs can be utilised.



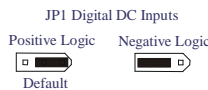
WARNING: Do not short loop power source directly to analogue inputs, more than 35mA load can damage input circuit.

Wiring Specifications

- For I/O wiring (discrete), use the following wire type or equivalent: Belden 9918, 18 AWG (0.8 mm²) or larger.
- For shielded Analogue I/O wiring, use the following wire type or equivalent: Belden 8441, 18 AWG (0.8 mm²) or larger.

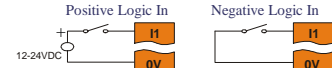
I/O Configuration

I/O Jumper settings are located internally. Remove the 4 screws on the back and lift casing off to access. **Only access when power is removed from the i^3 .** Care must be taken to avoid over tightening of the case screws.

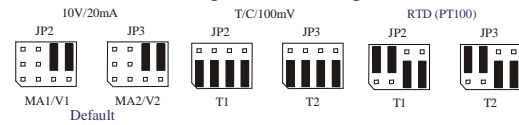


Positive Logic vs. Negative Logic Wiring

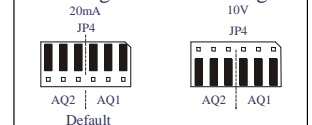
The i^3 can be wired for Positive Logic inputs or Negative Logic inputs depending on the position of JP1.



Analogue In JP Settings



Analogue Out JP Settings



Expansion I/O Modules

All i^3 controllers can have extra analogue and digital I/O added by connecting expansion modules to either MJ1 or MJ2 ports.



iCAN based expansion I/O is also available on special request. Please inquire at IMO technical support. automation@imopc.com

Basic Options

Input - 4 Channel RTD (0-2000ohm, 0-500ohm, PT100, Ni100, PT1000, Ni1000)	iOS / M 4 I P X - D1
Input - 8 Channel DC Current (-20mA to +20mA)	iOS / M 8 I C X - D1
Input - 8 Channel DC Voltage (-10V to +10V)	iOS / M 8 I V X - D1
Input - 8 Channel Thermocouple (J, K, R, S, B, E, T, N, +/- 50mV, +/-100mV)	iOS / M 8 I T X - D1
Output - 4 Channel DC Voltage / Current (0-20mA, 0-10V)	iOS / M 4 O X A - D1
16 Digital Input, 16 Transistor output (0.1A / Channel, 2A / Common)	GSL - D T 4 A
16 Relay Output (2A / Channel, 5A / Common)	GSL - R Y 2 A
32 Digital Input	GSL - D 2 4 A

Note: Other I/O configurations and Fieldbus options are available. Please inquire at IMO. automation@imopc.com

For further information on Remote I/O please consult the Remote I/O datasheet, and the i^3 Remote I/O tutorial in the downloads section of the IMO website. www.imopc.com/manuals

Technical Specifications					
Digital DC Inputs		Digital DC Outputs			
Inputs per Module	12 including 4 configurable HSC inputs		Outputs per Module	12 including 2 configurable PWM outputs	
Commons per Module	1		Commons per Module	1	
Input Voltage Range	12 VDC / 24 VDC		Output Type	Sourcing / 10 K Pull-Down	
Absolute Max. Voltage	35 VDC Max.		Absolute Max. Voltage	28 VDC Max.	
Input Impedance	10 kW		Output Protection	Short Circuit	
Input Current	<u>Positive Logic</u>	<u>Negative Logic</u>	Max. Output Current per point	0.5 A	
Upper Threshold	0.8 mA	-1.6 mA	Max. Total Current	4 A Continuous	
Lower Threshold	0.3 mA	-2.1 mA	Max. Output Supply Voltage	30 VDC	
Max Upper Threshold	8 VDC		Minimum Output Supply Voltage	10 VDC	
Min Lower Threshold	3 VDC		Max. Voltage Drop at Rated Current	0.25 VDC	
OFF to ON Response	1 ms		Max. Inrush Current	650 mA per channel	
ON to OFF Response	1 ms		Min. Load	None	
HSC Max. Switching Rate	10 kHz Totalizer/Pulse, Edges 5 kHz Frequency/Pulse, Width 2.5 kHz Quadrature		OFF to ON Response	1 ms	
			ON to OFF Response	1 ms	
			Output Characteristics	Current Sourcing (Positive Logic)	
Analogue Inputs High Resolution					
Number of Channels	2		Thermocouple	Temperature Range	
Input Ranges (Selectable)	0 - 10 VDC 0 - 20 mA 4 - 20 mA 100mV PT100 RTD, and J, K, N, T, E, R, S, B Thermocouples		B / R / S	2912°F to 32.0°F (1600°C to 0°C)	
			E	1652°F to -328°F (900°C to -200°C)	
			T	752.0°F to -400.0°F (400°C to -240°C)	
			J	1382.0°F to -346.0°F (750°C to -210°C)	
Safe input voltage range	10 VDC: -0.5 V to +15 V 20 mA: -0.5 V to +6 V RTD / T/C: ±24 VDC		K / N	2498.0°F to -400°F (1370°C to -240°C)	
			Thermocouple Common Mode Range		±10V
Nominal Resolution	10V, 20mA, 100mV: 14 Bits RTD, Thermocouple: 16 Bits		Converter Type		Delta Sigma
Input Impedance (Clamped @ -0.5 VDC to 12 VDC)	<u>Current Mode:</u> 100 W, 35mA Max. Continuous <u>Voltage Mode:</u> 500 kW, 35mA Max. Continuous		Max. Error at 25°C		*4-20 mA ±0.10%*
			(*excluding zero)		*0-20 mA ±0.10%*
			Max Thermocouple Error (After 1Hr Warm Up)		*0-10 VDC ±0.10%*
%AI full scale	10 V, 20 mA, 100 mV: 32,000 counts full scale. RTD / T/C: 20 counts / °C		Conversion Speed, Both Channels Converted		RTD (PT100) ±1.0 °C
Max. Over-Current	35 mA		Conversion Time per Channel		0-100 mV ±0.05%
Open Thermocouple Detect Current	50 nA		RTD Excitation Current		±0.2% (±0.3% below -100°C)
Analogue Outputs		General Specifications			
Number of Channels	2	Required Power (Steady State)	130 mA @ 24 VDC		
Output Ranges	0-10 VDC, 0-20 mA	Required Power (Inrush)	30 A for 1 ms @ 24 VDC – DC Switched		
Nominal Resolution	12 Bits	Primary Power Range	10 - 30 VDC		
Update rate	Once per PLC scan	Operating Temperature	-10° to 60° Celsius		
Minimum 10 V load	1 kW	Storage Temperature	14 to 140°F (-10 to 60°C)		
Maximum 20 mA load	500 W	Relative Humidity	5 to 95% Non-condensing		
Analogue Outputs; Output Points Required	2	Filtering	15Hz hash (noise) filter 1-128 scan digital running average filter		
Maximum Error at 25°C (excluding zero)	0.10%	Terminal Type	Screw Type, 5 mm Removable		
		Weight	12.5 oz. (354.36g)		
Additional error for temperatures other than 25°C	0.01% / °C	Shock / Vibration	IEC68-2-6 and IEC68-2-27		
		CE	Approved		
		UL			
		Clock Accuracy	+/- 35 ppm maximum at 25° C (+/- 1.53 Minutes per Month)		

Small Extras:

RS232 Serial Programming Cable
For programming any *i*³ Model.



PART No: i3PC45

IP65 RJ45 Panel-Mounted Socket
Bring either MJ1 or MJ2 ports to the outside world by installing this into a 22.5mm cut-out.



PART No: i3PAD

USB to RS232 Converter
For PCs without a serial Com Port.
Add one with this device.



PART No: PC501

**i³ Display...
Control...
Connect...**

**i³ Intergrated
Controller
& Associated Products**

Communication:

Ethernet Expansion card

Link an *i*³ to an Ethernet network. Program monitor and debug remotely, or run *i*³ as a Modbus TCP server.



PART No: i³-E

GSM Modem Expansion Card

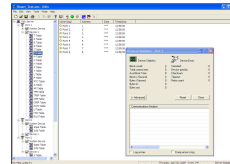
Send and Receive SMS messages via the *i*³, dial-up connection over GSM data link for remote programming, debugging etc. Or, use a GPRS always-on data connection ideal for programming, debugging, monitoring and connection to a SCADA package for constant data logging and remote control.



PART No: i³-M

ODIN OPC SERVER (With LOKI data-logger)

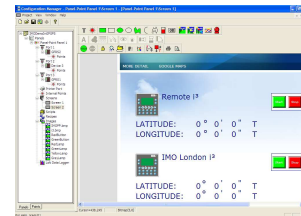
With no tag limit and 30+ Protocols to choose from (including IMO products, Mitsubishi, Allen Bradley, Siemens), ODIN can be used with LOKI to log data either to an Excel spreadsheet or an Access database.



PART No: IMO-OPC-SERVER

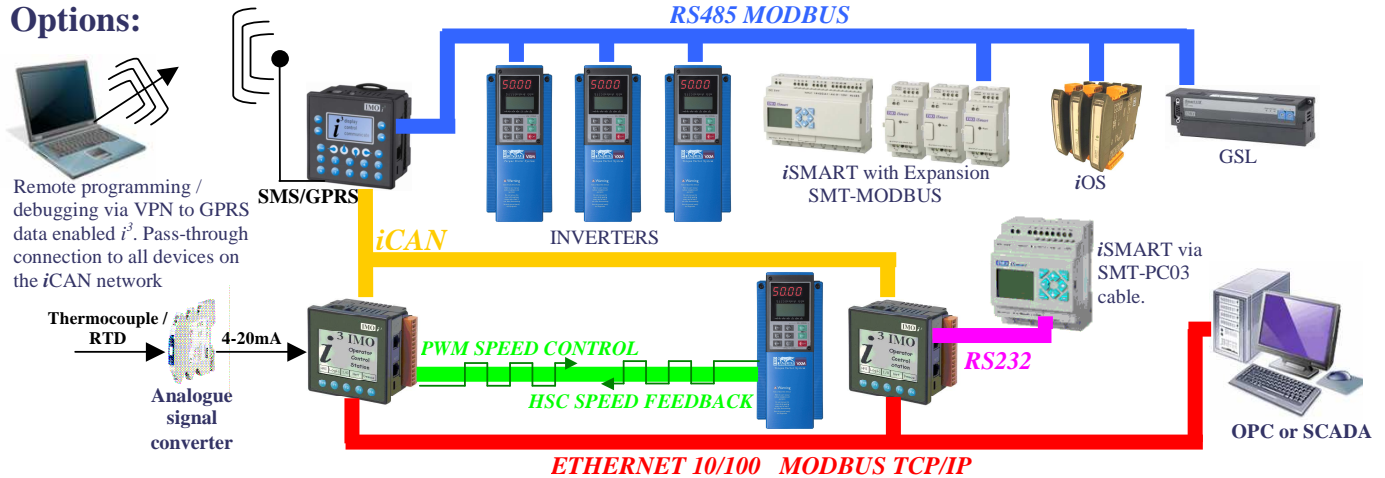
Panel Point SCADA^{lite}

With no tag limit and 30+ Protocols to choose from (including IMO products, Mitsubishi, Allen Bradley, Siemens), a powerful graphical editor, and a VB-based scripting language, Panel-Point allows a PC to become the central data hub of an application.



PART No: PANELPOINT (Developer)
PART No: PANELPOINTRT (Runtime)

Options:

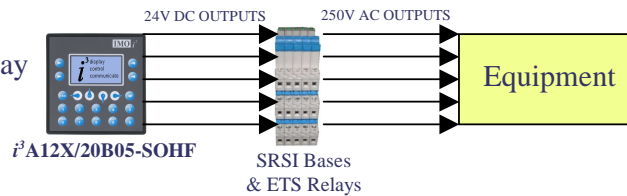


Miscellaneous:

DIN rail mounted SRSI Base and ETS Relay

Use the Transistor outputs of the *i*³ to operate the relay coils to switch up to 6A @ 250VAC.

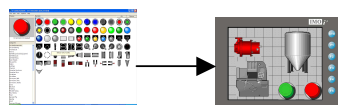
Part Numbers: SRSI-24AC/DC, ETS-1AN-SL-24VDC



*i*³ Configurator with Symbol Library

Obtain a copy of the *i*³ Software with a library of colour buttons, pipes, vessels, motors, pumps, fans etc. To enhance the look and feel of applications on the *i*³C.

Part Numbers: IMO-CDSUITE



GPS Receiver

Locate your *i*³ Controller anywhere in the world by connecting this device to MJ2 of a unit equipped with a GPRS enabled modem.



Part Number: i³-GPS

Custom screen overlays

Ask at IMO for custom overlays. Overlays are tooled to a customer's design.