i³CX Intelligent Control Station

- 640 x 480 colour touch display
- High resolution resistive touch screen
- Addressable function keys
- Real time clock
- Built-in Ethernet
- 3 x communications ports (RS 232 / RS 485)
- 1 x USB A, 1 x USB mini B
- 10 - 30 VDC power supply
- 1MB RAM (program), 27MB (Graphical)
- Free configuration software
- IP65 (NEMA4)
- Remote I/O communication
- Optional: MicroSD (up to 32GB)
  Modem (SMS, GSM, GPRS)
  USB drive up to 2TB

Options & Ordering Codes

Standard Options	DI	DO	AI	AO
i3CX12Z/10D03-SEHF	12	6 Relay	4	-
i3CX12Z/13C14-SEHF	12	12	2*	2
i3CX12C/20B05-SEHF	24	16	4	-
i3CX12Z/10B04-SEHF	12	12	2	-
i3CX12Z/10E24-SEHF	12	12	6*	4
i3CX12Z/00000-SEHF	-	-	-	-

* Universal Analog Inputs

i3 CX 12 Z / 10 D 0 3 - S E H F

Colour Display

640 x 480	CX

Comms Ports

RS232, RS 232/485/422	12

Programmable Keys

5 Programmable Keys	Z

Digital Inputs

No Digital Input	00
12 Digital Inputs	10
24 Digital Inputs	20
12 Digital Inputs + Temperature PT100/TC	13

Analog Inputs

0	No Analog Input
B	2 (12 Bit)
C	2 (14 Bit)
D	4 (12 Bit)
E	6 (14/17 Bit)

Analog Outputs

0	No Analog Output
1	2 (12 Bit)
2	4 (12 Bit)

Digital Outputs

0	No Digital Output
3	6 (Relay)
4	12 (DC)
5	16 (DC)

S	Serial
E	In built Ethernet and CAN port
H	iCAN
F	µSD Flash Card

i³CX Intelligent Control Station

Technical Specifications

General Specifications	
Required Power (Steady State)	420mA @ 12VDC / 230mA @ 24VDC
Required Power (Inrush)	25A for <1ms @ 24VDC DC Switched
Primary Power Range	10-30VDC
Relative Humidity	5 to 95% Non-Condensing
Clock Accuracy	+/-20ppm Maximum at 25°C (+/-1 Minute per month)
Operating Air Temperature	-10°C to +60°C
Storage Temperature	-40°C to +60°C
Weight	1.98kg / 4.375 lbs (without I/O)
Approvals	UL, CE

Control & Logic Specifications	
Control Language Support	Advanced Ladder Logic Full IEC 61131-3
Logic Program Size & Logic Scan Rate	1MB Maximum 0.013ms/k
Online Programming Changes	Supported in Advanced Ladder
I/O Support	Digital Inputs - 2048
	Digital Outputs - 2048
	Analog Inputs - 512
	Analog Outputs - 512
General Purpose Registers	50,000 (words) Retentive 16,384 (bits) Retentive 16,384 (bits) Non-retentive

Display Specifications	
Display Type	5.7" VGA TFT (450 nit typical)
Resolution	640 x 480
Colour	16-bit (65,536)
Screen Memory	27MB
User-Programmable Screens	1023
Backlight	LED - 30,000 hour life
Screen Update Rate	User configurable within the scan time. (perceived as instantaneous in many cases)

Connectivity	
Serial Ports	1 RS-232 & 1 RS-485 on first modular jack (MJ1/2) 1 RS-232 or 1 RS-485 on second Modular Jack (MJ3)
USB mini-B	USB 2.0 (480MHz) Programming & Data Access
USB A	USB 2.0 (480MHz) for USB FLASH Drives (up to 2TB)
CAN	Remote I/O, Peer-to-Peer Comms, i3 Configurator
Ethernet	10/100MB (Auto-MDX), Modbus TCP, HTTP, FTP, SMTP, i3 Configurator, Ethernet IP
Remote I/O	IOS, Smart IO, iSmart
Removable Memory	MicroSD (support for 32GB max) Application updates, Datalogging, more

Input / Output Specifications

Model	DC In	DC Out	Relays	HS In	HS Out	mA/V In	mA/V RTD/TC	mA/V Out
10D03	12		6	4		4		
10B04	12	12		4	2	2		
20B05	24	16		4	2	2		
13C14	12	12		4	2		2	2
10E24	12	12		4	2		6*	4*

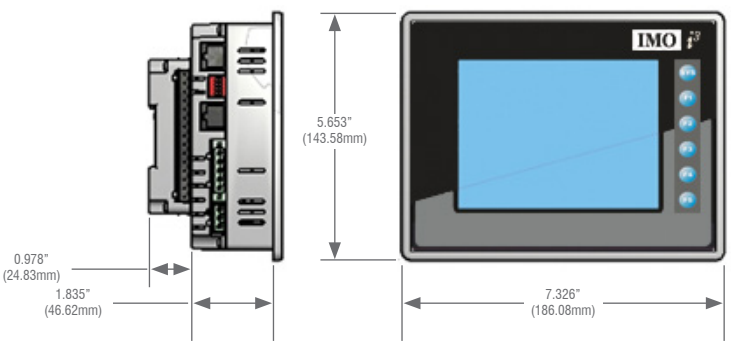
There are 4 high-speed inputs of the total DC inputs. There are 2 high-speed outputs of the total DC outputs. Model 10D03, 10B04, 20B05 feature 12-bit analog I/O. Model 13C14 features 14/16-bit analog I/O. High-speed outputs can be used for PWM and Pulse Train Outputs, currently limited to <65kHz. Model 10E14 features a 14/17 bit analog I/O

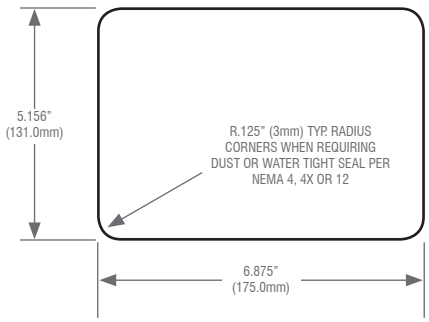
*Up to six mA/V In, RTD/TC, and mA/V Out

High Speed Counters	
Number of Counters	2
Maximum Frequency	500kHz each
Accumulator Size	32-bits each
Modes Supported	
Totalizer	Quadrature
Pulse Measurement	Frequency Measurement

2 Position Controlled Outputs
1 ON/OFF Setpoint per Output

Dimensions & Panel Cutout

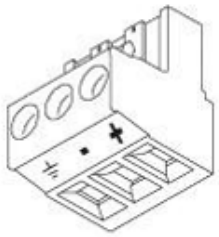




CUTOUT TOLERANCE TO MEET NEMA STANDARDS IS ±0.005" (0.1mm) Max. Panel Thickness is 5mm

i3 CX Intelligent Control Station

Ports & Connectors



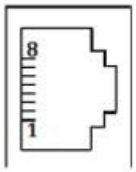
DC Input / Frame

Torque rating: 4.5-7 Lb-in (0.50-0.78Nm)

DC- is internally connected to I/O V-, but is isolated from CAN V-

A Class 2 power supply must be used

Primary Power Port Pins		
Pin	Signal	Signal Description
1	Ground	Frame Ground
2	DC-	Input Power Supply Ground
3	DC+	Input Power Supply Voltage



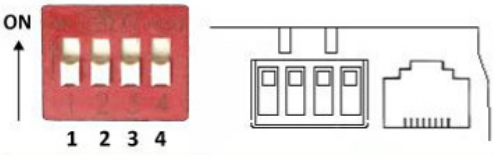
MJ1/2 Independent Serial Ports

MJ1: RS-232 w/Full Handshaking

MJ2: RS-485 Half-Duplex

PIN	MJ1 PINS		MJ2 PINS	
	Signal	Direction	Signal	Direction
8	TXD	OUT	-	-
7	RXD	IN	-	-
6	0 V	Ground	0 V	Ground
5	+5V@60mA	OUT	+5V@60mA	OUT
4	RTS	OUT	-	-
3	CTS	IN	-	-
2	-	-	RX- / TX-	IN / OUT
1	-	-	RX+ / TX+	IN / OUT

DIP Switches



Switch	Name	Function	Default
1	MJ3 RS485 Termination	ON = Terminated	OFF
2	MJ3 Duplex	ON = Half	OFF
3		OFF = Full	
4	MJ3 RS485 Termination	ON = Terminated	OFF

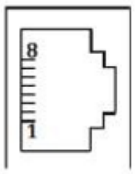
CAN

Locking Spring-Clamp 2-Terminators Per Conductor

Mounting screw torque rating: 4.5 Lb-in (0.50Nm)

SHLD and V+ pins are not internally connected to i3CX

Primary Power Port Pins			
Pin	Signal	Description	Direction
1	V-	CAN Ground - Black	-
2	CN L	CAN Data Low - Blue	IN / OUT
3	SHLD	Shield Ground - None	-
4	CN H	CAN Data High - White	IN / OUT
5	V+ (NC)	No Connect - Red	-



MJ3 Serial Port

2 multiplexed Serial Ports on One Modular Jack (8posn)

PIN	MJ3 PINS	
	Signal	Direction
8	TXD RS232	OUT
7	RXD RS232	IN
6	0 V	Ground
5	+5V@60mA	OUT
4	TX- RS485	OUT
3	TX+ RS485	OUT
2	RX- RS485	IN
1	RX+ RS485	IN

Built-in I/O

I/O is mapped into i3 Register space, in three separate areas – Digital/Analog I/O, High-Speed Counter I/O, and High-Speed Output I/O. Digital/Analog I/O location is fixed starting at 1, but the High-Speed Counter and High-Speed Output references may be mapped to any open register location. For more details on using the High-Speed Counter and High-Speed Outputs, see the i3CX User's Manual.

Fixed Address	Digital/Analog I/O Function	i3CX Model				
		10D03	10B04	20B05	13C14	10E14
%I1	Digital Inputs	1-12	1-12	1-24	1-12	1-12
	Reserved	13-32	13-31	25-31	13-31	13-31
	ESCP Alarm	n/a	32	32	32	32
%Q1	Digital Outputs	1-6	1-12	1-16	1-12	1-12
	Reserved	7-24	13-24	17-24	13-24	13-24
%AI1	Analog Inputs	1-4	1-2	1-2	1-2	1-4:33-38
	Reserved	5-12	3-12	3-12	3-12	n/a
%AQ1	Reserved	n/a	1-8	1-8	1-8	1-12
	Analog Outputs	n/a	n/a	n/a	9-10	n/a

Reserved areas maintain backward compatability with other i3 Controller models

Default Address*	High Speed Counter Function	i3CX Models
%I1601	Status Bits	1-8
&Q1601	Command Bits	1-32
%AI0401	Accumulator 1&2	1-8
%AQ0401	Preload & Match Values	1-12

*Starting Address locations for %I, %Q, %AI & %AQ may be re-mapped by user

Default Address*	High Speed Output Function	i3CX Models
%I1617	Status Bits	1-8
&Q**	Command Bits	1-32
n/a	n/a	n/a
%AQ0421	PWM or Pulse Train Parameters	1-20

*Starting Address locations for %I & %AQ may be re-mapped by user

**Q1-Q2 are part of the Fixed I/O Map. In High Speed Output mode they can be used to initiate a Stepper/PTO Move

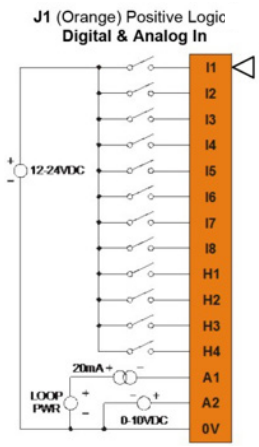
i^3CX Intelligent Control Station

10B04 & 20B05 I/O Board Specifications

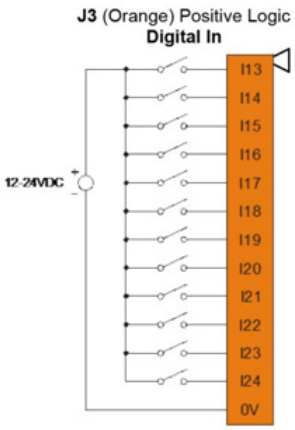
Digital DC Inputs	10B04	20B05
Inputs per Module	12 including 4 configurable HSC inputs	24 including 4 configurable HSC inputs
Commons per Module	1	
Input Voltage Range	10-30 VDC	
Absolute Max Voltage	35 VDC Max	
Input Impedance	10 kΩ	
Input Current	Positive Logic	Negative Logic
Upper Threshold	0.8mA	-1.6mA
Lower Threshold	0.3mA	-2.1mA
Max Upper Threshold	8 VDC	
Max Lower Threshold	3 VDC	
OFF to ON Response	1 ms	
ON to OFF Response	1 ms	
HSC Max Switching Rate	500 KHz each	
ON to OFF Response	1 ms	

Digital DC Outputs	10B04	20B05
Outputs per Module	12 including 2 configurable PWM outputs	16 including 2 configurable PWM outputs
Commons per Module	1	
Output Type	Sourcing / 10 K Pull-Down	
Absolute Max Voltage	28 VDC Max	
Output Protection	Short Circuit	
Max Output Current per Point	0.5 A	
Max Total Current	4 A Continuous	
Max Output Supply Voltage	30 VDC	
Min Output Supply Voltage	10 VDC	
Max Voltage Drop at Rated Current	0.25V	
Max Inrush Current	650 mA per channel	
Min Load	None	
OFF to ON Response	1 ms	
Output Characteristics	Current Sourcing (Pos Logic)	

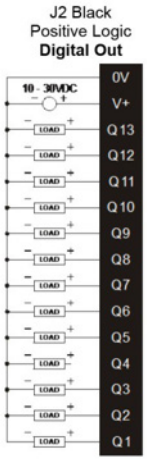
J1 (Orange)	Signal Name
I1	IN1
I2	IN2
I3	IN3
I4	IN4
I5	IN5
I6	IN6
I7	IN7
I8	IN8
H1	HSC1 / IN9
H2	HSC2 / IN10
H3	HSC3 / IN11
H4	HSC4 / IN12
A1	Analog IN1
A2	Analog IN2
0V	Common

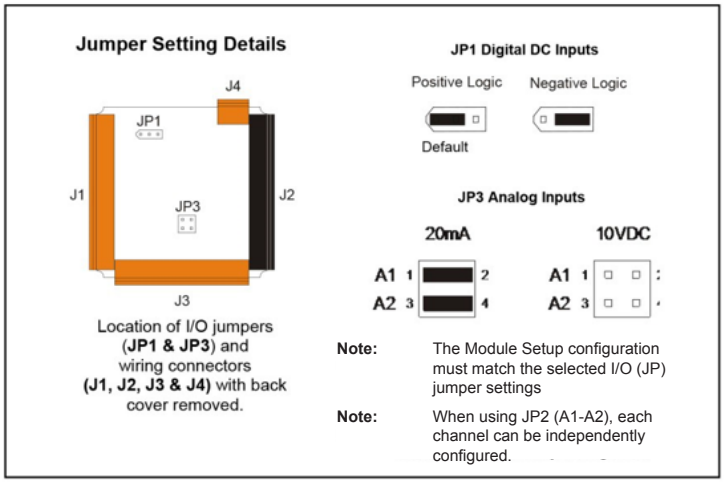


J3 (Orange)	20B05 Signal Name
I13	IN13
I14	IN14
I15	IN15
I16	IN16
I17	IN17
I18	IN18
I19	IN19
I20	IN20
I21	IN21
I22	IN22
I23	IN23
I24	IN24
0V	Common

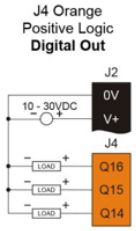


J2 (Black)	10B04	20B05
0V	Common	
V+	V+	
NC	No Connect	OUT13
Q12	OUT12	
Q11	OUT11	
Q10	OUT10	
Q9	OUT9	
Q8	OUT8	
Q7	OUT7	
Q6	OUT6	
Q5	OUT5	
Q4	OUT4	
Q3	OUT3	
Q2	OUT2 / PWM2	
Q1	OUT1 / PWM1	





J4 (Orange)	20B05
Q16	OUT16
Q15	OUT15
Q14	OUT14



Note:
10B04 uses J1 and J2 only
20B05 uses J1, J2, J3 and J4

* Please refer to medium analog resolution specification overleaf.

i3 CX Intelligent Control Station

Analog Inputs, Medium Resolution			
Number of Channels	4	Input Ranges	0-10 VDC, 0-20 mA, 4-20 mA
Safe Input Voltage Range	-0.5V to 12V	Input Impedance (clamped @ -0.5VDC to 12VDC)	Current Mode: 100 Ω / Voltage Mode: 500 k Ω
Nominal Resolution	10 Bits	%AI Full Scale	32,000
Max Over Current	35 mA	Conversion Speed	Once per Ladder Scan
Max Error at 25°C (excluding zero) Adjusting filtering may tighten	4-20 mA 1.00% of FS 0-20 mA 1.00% of FS 0-10 VDC 1.50% of FS	Filtering	160 Hz hash (noise) filter 1-128 scan digital running average filter

Safety

WARNING: Battery may explode if mistreated. Do not recharge, disassemble or dispose of in fire.

WARNING: EXPLOSION HAZARD - BATTERIES MUST ONLY BE CHANGED IN AN AREA KNOWN TO BE NON-HAZARDOUS

This equipment is suitable for use in Class 1, Division 2, Groups A, B, C and D or Non-hazardous locations only.

FOR U.S. & CANADA ONLY
Power input and output (I/O) wiring must be in accordance with Class 1, Division 2 wiring methods of the National Electric Code, NFPA70 for installations in the U.S. or as specified in Section 18-1J2 of the Canadian Electric Code for installations within Canada and in accordance with the authority having jurisdiction.

WARNING: EXPLOSION HAZARD - Do not disconect equipment unless power has been switched off or the area is known to be non-hazardous.

WARNING: EXPLOSION HAZARD - Substitution of components may impair suitability for Class 1, Division 2.

Digital outputs shall be supplied from the same source as the i3 Controller.

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.

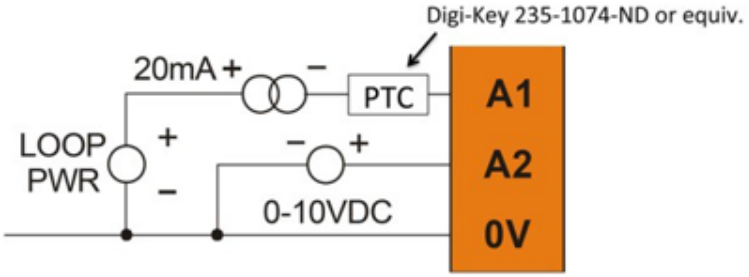
WARNING: To avoid the risk of electric shock or burns, always connects the earth ground before making any other connections.

WARNING: To reduce the risk of fire, electrical shock, or physical injury it is strongly recommended to fuse all Power Sources connected to the i3 controller. 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.

Jumpers on connector JP1 and others shall not be removed or replaced while the circuit is live unless the area is known to be free of ignitable concentrations of flammable gases or vapours.

Common Cause of Analog Input Tranzorb Failure

If a 4-20mA circuit is initially wired with loop power, but without a load, the Analog Input could see 24VDC. This is higher than the rating of the tranzorb. This can be solved by NOT connecting loop power prior to load connection, or by installing a low-cost PTC in series between the load and Analog Input.