ioPAC 6500 Series (65M) I/O Modules

I/O & TB modules for modular programmable IIN controllers

Features and Benefits

- Error-proof design to prevent erroneous installations
- Tool-free hardware installation and hot-swap design for maximizing operation efficiency
- Fully modular design for maximum deployment flexibility

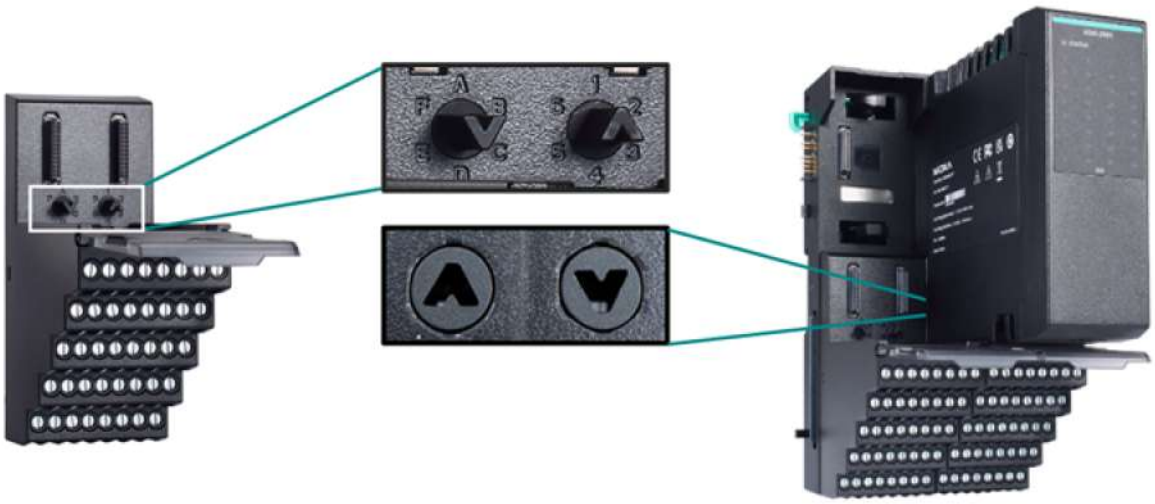
Certifications

Introduction

The ioPAC 6500 Series (also referred to as Intelligent Integrated Node or IIN) is an advanced Linux-based RTU featuring a built-in Layer-2 managed switch. Equipped with an Arm Cortex-A53 quad-core CPU, the ioPAC 6500 Series delivers robust performance.

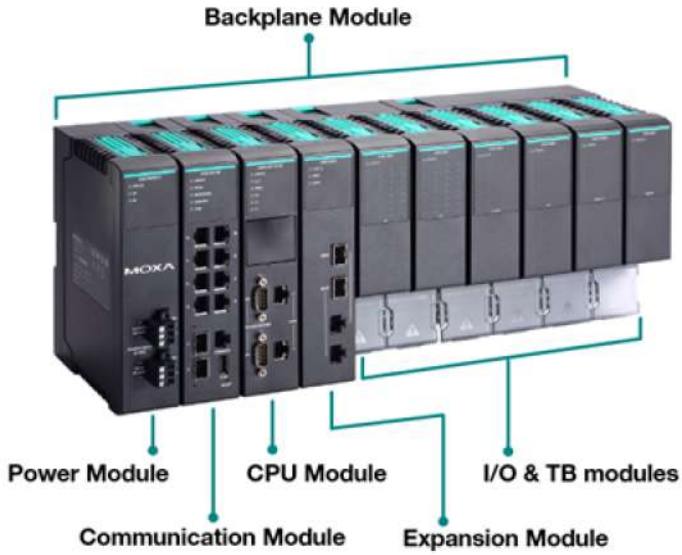
Error–proof Design With Arrow Pins

The arrow-pin design on the I/O and terminal block (TB) modules prevents erroneous installations. Each I/O module has its own TB module with a unique TB arrow ID.



Fully Modular Design

The ioPAC 6500 Series features a unique Lego-like mechanical design that allows for flexible deployment while minimizing installation efforts. The series can be divided into the components: Backplane modules, power modules, communication modules, expansion modules, CPU modules, I/O modules, and terminal-block modules.



Specifications

Input/Output Interface

Digital Input Channels	65M-1900-CT-T: 32
Digital Output Channels	65M-2901-CT-T: 32
Analog Input Channels	65M-3600-CT-T: 16 (current) 65M-3610-CT-T: 16 (voltage) 65M-3800H-CT-T: 8 (HART)
Analog Output Channels	65M-4820-CT-T: 8
Serial Channels	65M-5801-CT-T: 8
Isolation	65M-3600-CT-T/65M-3610-CT-T/65M-4820-CT-T/65M-5801-CT-T: - Between signal and system: 3k VDC - Between groups: 1k VDC per min All other models: - Between signal and system: 3k VDC

Digital Inputs

I/O Type	Sink (Internal/external field circuit supply for dry contact)
I/O Mode	DI or event counter (channels 1 to 8, group configurable by software)
Internal Field Circuit Supply Voltage	24 VDC 22.8 to 25.2 VDC
Internal Field Circuit Supply Current	125 mA (max.) (Only for dry contact)
Input Voltage	On: 11 to 30 VDC Off: 0 to 5 VDC
Input Current (voltage on)	2.35 mA ± 20% per channel
Counter Frequency	Square wave: 0 to 10 kHz
Digital Filtering Time Interval	Software configurable
Diagnostics	Input Wire-break Detection (current: 50 μA max., delay: 20 ms) Internal Field Circuit Supply Detection (17.5 VDC, 16 to 19 VDC)

Digital Outputs

I/O Type	Source
I/O Mode	DO or pulse output (channel 1 to 8, group configurable by software)
Common Power Input Voltage	24 VDC 19.2 to 28.8 VDC
Common Power Input Current	6.4 A (max.)
Load Current	200 mA/channel (typ.) 500 mA/channel (max.)
Pulse Duration	500 µs
Protection	Output Short-circuit Protection Common Power Input Over-voltage Protection Inductive Load Shutdown Voltage Protection
Diagnostics	Wire Break Detection (on state, output current < 3 mA) Wire Break Detection (off state, output load impedance > 58 kilo-ohms) Output Short-Circuit Detection (output current > 0.87 A, range: 0.64 to 1.2 A) External Power Detection (17.5 VDC, 16 to 19 VDC) Failsafe Configuration (hold last/failsafe state)

Analog Inputs

I/O Mode	65M-3600-CT-T: Current 65M-3610-CT-T: Voltage 65M-3800H-CT-T: HART
I/O Type	Differential
Input Range	65M-3600-CT-T: 0 to 20 mA 4 to 20 mA 65M-3610-CT-T: 0 to 10 V 1 to 5 V 65M-3800H-CT-T: 4 to 20 mA
Overload Permitted on Inputs	65M-3600-CT-T: ±30 mA 65M-3610-CT-T: ±12 V 65M-3800H-CT-T: 30 mA
Internal Loop Power Supply Current	65M-3600-CT-T: 200 mA / Group (max.) 65M-3800H-CT-T: 500 mA (max.) (only for 2-wire connection)
Internal Loop Power Supply Voltage	65M-3600-CT-T: 24 VDC 22.8 to 25.2 VDC
Converter Resolution	16 bits
Measurement Resolution	65M-3600-CT-T: 2 µA (0 to 20 mA) 1.6 µA (4 to 20 mA) 65M-3610-CT-T: 1 mV (0 to 10 V) 0.4 mV (1 to 5 V) 65M-3800H-CT-T: 1.6 µA (4 to 20 mA)
Accuracy	±0.1% FSR @ 25°C ±0.3% FSR @ -40 to 75°C

Conversion Time	100 ms
Rejection Ratio	Normal mode: > 60 dB @ 60 Hz (min.), conversion time: 100 ms Common mode: > 90 dB @ 60 Hz (min.), conversion time: 100 ms
Input Impedance	65M-3800H-CT-T: 250 ohms 65M-3600-CT-T: 250 ohms 65M-3610-CT-T: 1 mega-ohms
Diagnostics	65M-3800H-CT-T: Input Wire-break Input Short-circuit Input Underflow/Overflow Detection 65M-3600-CT-T: Internal Loop Power Detection (17.5 VDA, 16 to 19 VDC) Input Short-circuit Detection 65M-3600-CT-T (in 4 to 20 mA mode): Input Wire-break Detection (delay: 0.8 s) 65M-3610-CT-T: Input Wire-break Detection (delay:1.6 s max)

Analog Outputs

I/O Mode	Voltage/Current
Output Range	0 to 10 V 1 to 5 V 0 to 20 mA 4 to 20 mA
Converter Resolution	16-bit
Output Resolution	1 mV (0 to 10 V) 0.4 mV (1 to 5 V) 2 µA (0 to 20 mA) 1.6 µA (4 to 20 mA)
Accuracy	±0.1% FSR @ 25°C ±0.3% FSR @ -40 to 75°C
Output Refresh Time	16 ms
Output Impedance	Voltage mode: 1 kilo-ohms (min.) Current mode: 750 ohms (max.)
Diagnostics	Output Short-circuit Detection (voltage) Failsafe Configuration (hold last/failsafe state) Output Wire-break Detection (current)

Serial Interface

Serial Standards	RS-232, RS-422, RS-485-2w
Baudrate	300, 600, 1200, 1800, 2400, 4800, 9600, 19200, 38400, 57600, and 115200 bps
Data Bits	7, 8
Stop Bits	1, 2
Parity	None Even Odd
Flow Control	RTS/CTS, XON/XOFF
Serial Signals	RS-232: TxD, RxD, RTS, CTS, GND RS-422: Tx+, Tx-, Rx+, Rx-, GND RS-485-2w: Data+, Data-, GND

Terminal Blocks

ID	65M-TB-1900-CT-T: D1 65M-TB-2901-CT-T: D2 65M-TB-3600-CT-T: A1 65M-TB-3610-CT-T: A2 65M-TB-3800H-CT-T: A3 65M-TB-4820-CT-T: A5 65M-TB-5801-CT-T: F1 Note: Terminal blocks need to be purchased separately. See the Accessories section/ list for details.
Connector	Screw-fastened terminal block
Dimensions	42.3 x 102.38 x 80.8 mm (1.67 x 4.03 x 3.18 in)
Weight	164 g (0.36 lb)

Power Consumption

System Power	65M-1900-CT-T/65M-2901-CT-T: 0.068 A @ 12 VDC 65M-3610-CT-T/65M-4820-CT-T: 0.069 A @ 12 VDC 65M-3600-CT-T: 0.073 A @ 12 VDC 65M-3800H-CT-T: 0.072 A @ 12 VDC 65M-5801-CT-T: 0.143 @ 12 VDC
Field Power	65M-1900-CT-T: 0.019 A @ 24 VDC (without internal field circuit supply) 0.115 A @ 24 VDC (32-channel dry contact with internal field circuit supply) 65M-2901-CT-T: 0.005 A @ 24 VDC 65M-3600-CT-T: 0.053 A @ 24 VDC (without internal loop power) 0.466 A @ 24 VDC (16-channel 20 mA input with internal loop power) 65M-3610-CT-T: 0.038 A @ 24 VDC 65M-3800H-CT-T: 0.05 A (max.) @ 24 VDC (without internal loop power) 0.25 A (max.) @ 24 VDC (8-channel 4 to 20 mA input with internal loop power all in 20 mA) 0.66 A (max.) @ 24 VDC (500 mA input with internal loop power) 65M-4820-CT-T: 0.022 A @ 24 VDC (without external load) 0.266 A @ 24 VDC (4-channel 20 mA output) 65M-5801-CT-T: 0.11 A @ 24 VDC

Physical Characteristics

Housing	Plastic
Dimensions	42 x 116 x 130 mm (1.65 x 4,57 x 5.12 in)
Weight	65M-3610-CT-T: 250 g (0.55 lb) 65M-1900-CT-T: 253 g (0.56 lb) 65M-2901-CT-T: 254 g (0.56 lb) 65M-4820-CT-T: 257 g (0.57 lb) 65M-5801-CT-T: 259 g (0.57 lb) 65M-3800H-CT-T: 262 g (0.58 lb) 65M-3600-CT-T: 267 g (0.59 lb)

Environmental Limits

Operating Temperature	-40 to 75°C (-40 to 167°F) Note: Proper airflow is required in an environment with temperature > 65°C.
Storage Temperature (package included)	-40 to 85°C (-40 to 185°F)

Ambient Relative Humidity	5 to 95% (non-condensing)
Altitude	Up to 2000 meters[1]

Standards and Certifications

EMC	EN 55032/35 EN 61000-6-2/-6-4
EMI	CISPR 32, FCC Part 15B Class A
EMS	IEC 61000-4-2 ESD: Contact: 4 kV; Air: 8 kV IEC 61000-4-3 RS: 80 MHz to 1 GHz: 10 V/m IEC 61000-4-4 EFT: Power: (DC) 1 kV; Signal: 1 kV IEC 61000-4-5 Surge: Power: (DC) 0.5 kV L-N, 1 kV L/N-PE; Signal: 1 kV; IO: 0.5 kV IEC 61000-4-6 CS: Power: (DC) 10 V; Signal: 10 Vrms IEC 61000-4-8 PFMF: 30 A/m
Safety	UL 61010-1 UL 61010-2-201
Shock	IEC 60068-2-27 Half sine wave; acceleration: 15 g; time: 11 ms
Vibration	IEC 60068-2-6 DIN-rail mounted: 7 mm peak-peak (p-p) (2 to 8.42 Hz), 1 g (8.42 to 150 Hz) Rack mounted (with optional kit): 7 mm peak-peak (p-p) (2 to 8.42 Hz), 0.5 g (8.42 to 150 Hz)

MTBF

Time	65M-5801-CT-T: 2,310,512 hrs 65M-3610-CT-T: 1,885,953 hrs 65M-4820-CT-T: 1,874,152 hrs 65M-1900-CT-T: 2,057,118 hrs 65M-2901-CT-T: 2,007,795 hrs 65M-3600-CT-T: 1,686,798 hrs 65M-3800H-CT-T: 1,016,573 hrs
Standards	Telcordia Standard SR-332

Warranty

Warranty Period	5 years
Details	See www.moxa.com/warranty

Package Contents

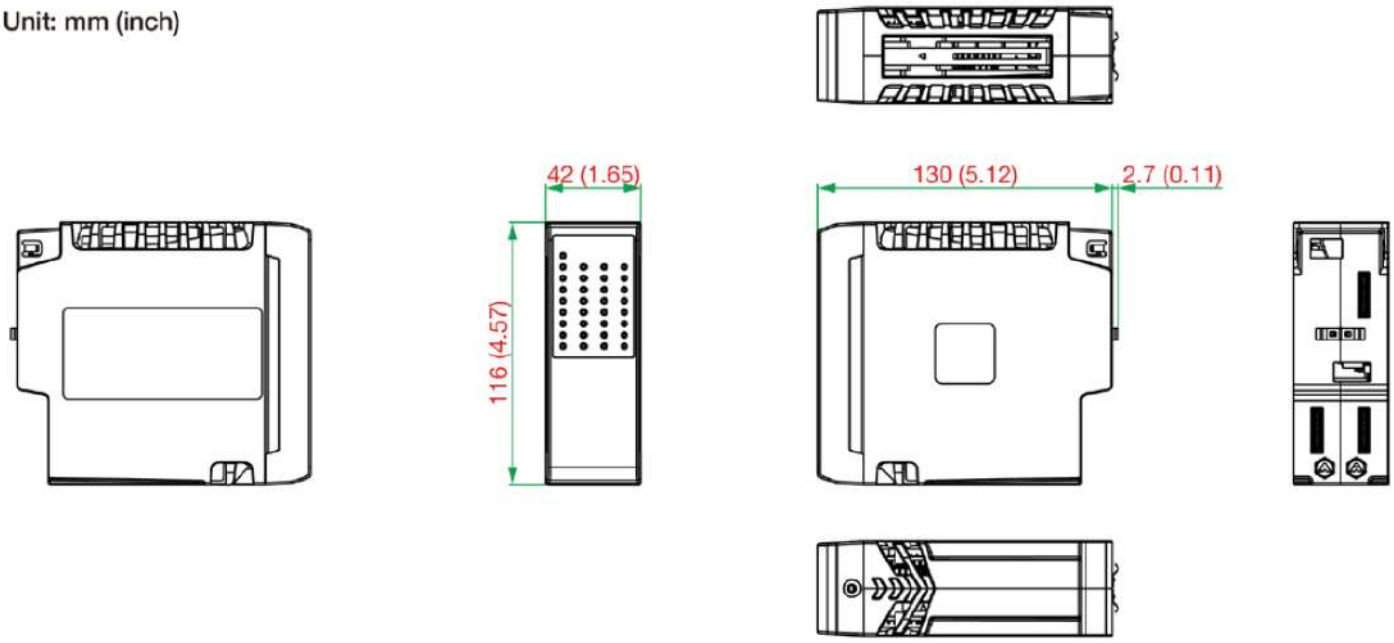
Device	1 x ioPAC 6500 Series (65M) I/O Module
Documentation	1 x quick installation guide 1 x warranty card

1. Please contact Moxa if you require products guaranteed to function properly at higher altitudes.

Dimensions

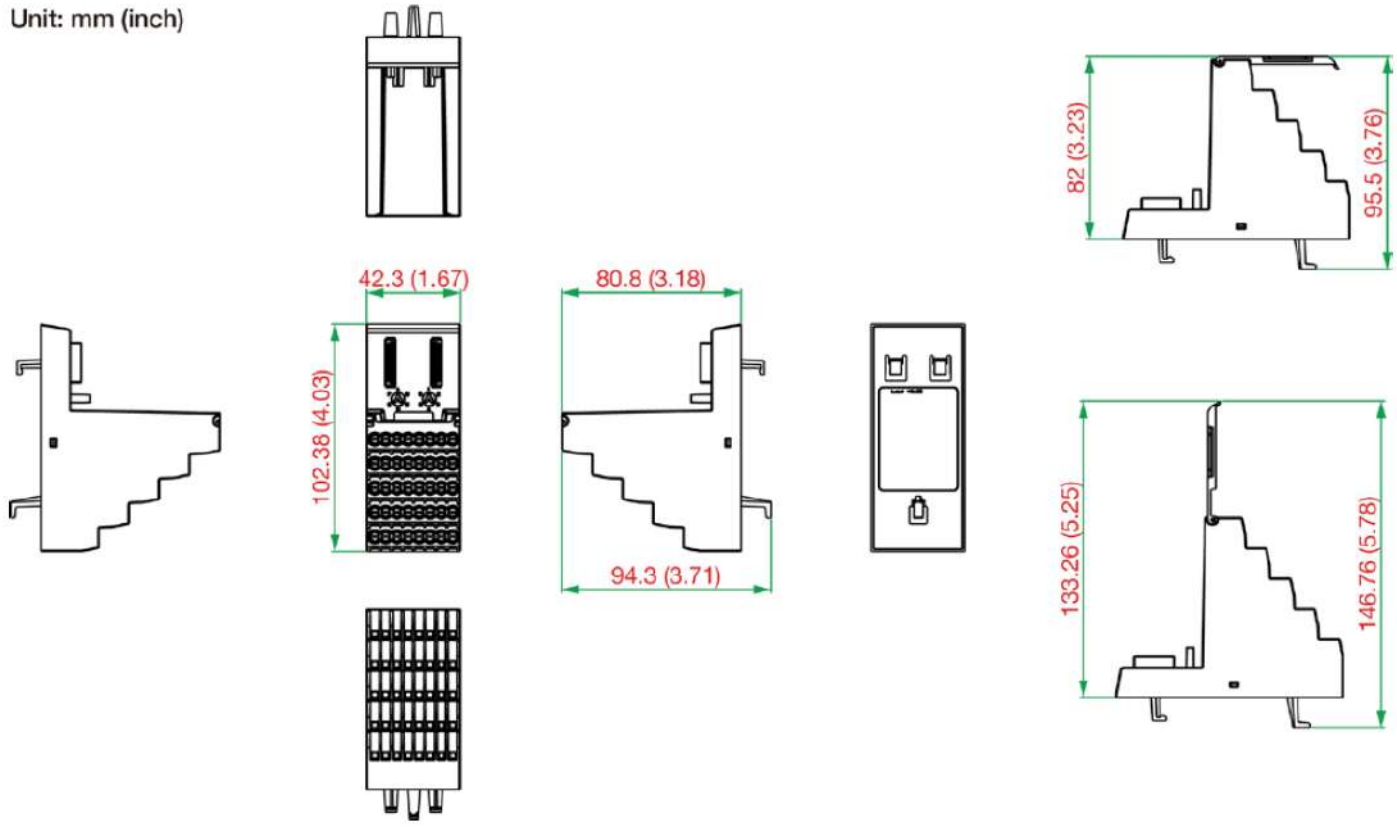
65M–1XXX/2XXX/3XXX/4XXX/5801 Models

Unit: mm (inch)



65M-TB Models

Unit: mm (inch)



Ordering Information

Model Name	No. of I/O Interfaces	Digital Inputs/ Outputs	Analog Inputs/ Outputs	HART	Operating Temperature
65M-1900-CT-T	DIs x 32	24 VDC	–	–	-40 to 75°C
65M-2901-CT-T	DOs x 32	24 VDC	–	–	-40 to 75°C

Model Name	No. of I/O Interfaces	Digital Inputs/ Outputs	Analog Inputs/ Outputs	HART	Operating Temperature
65M-3600-CT-T	AIs x 16	–	0 to 20 mA 4 to 20 mA	–	-40 to 75°C
65M-3610-CT-T	AIs x 16	–	0 to 10 V 1 to 5 V	–	-40 to 75°C
65M-4820-CT-T	AOs x 8	–	0 to 10 V 1 to 5 V 0 to 20 mA 4 to 20 mA	–	-40 to 75°C
65M-3800H-CT-T	AIs x 8 (HART)	–	4 to 20 mA	enable disable (default)	-40 to 75°C
65M-5801-CT-T	Serial Ports x 8	–	–	–	-40 to 75°C

Accessories (sold separately)

Terminal Blocks

65M-TB-1900-CT-T	ioPAC 6500 terminal-block module for 65M-1900, -40 to 75°C operating temperature, conformal coating Applicable Models: 65M-1900-CT-T
65M-TB-2901-CT-T	ioPAC 6500 terminal-block module for 65M-2901, -40 to 75°C operating temperature, conformal coating Applicable Models: 65M-2901-CT-T
65M-TB-3600-CT-T	ioPAC 6500 terminal-block module for 65M-3600, -40 to 75°C operating temperature, conformal coating Applicable Models: 65M-3600-CT-T
65M-TB-3610-CT-T	ioPAC 6500 terminal-block module for 65M-3610, -40 to 75°C operating temperature, conformal coating Applicable Models: 65M-3610-CT-T
65M-TB-3800H-CT-T	ioPAC 6500 terminal-block module for 65M-3800H, -40 to 75°C operating temperature, conformal coating Applicable Models: 65M-3800H-CT-T
65M-TB-4820-CT-T	ioPAC 6500 terminal-block module for 65M-4820, -40 to 75°C operating temperature, conformal coating Applicable Models: 65M-4820-CT-T
65M-TB-5801-CT-T	ioPAC 6500 terminal-block module for 65M-5801, -40 to 75°C operating temperature, conformal coating Applicable Models: 65M-5801-CT-T