ioPAC 6500 Series (65M) I/O Modules

I/O & TB modules for modular programmable IIN controllers



Features and Benefits

- Supports a comprehensive I/O portfolio: DI, DO, AI, HART AI, AO, Ch-Ch isolated AO, serial, and relay
- 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

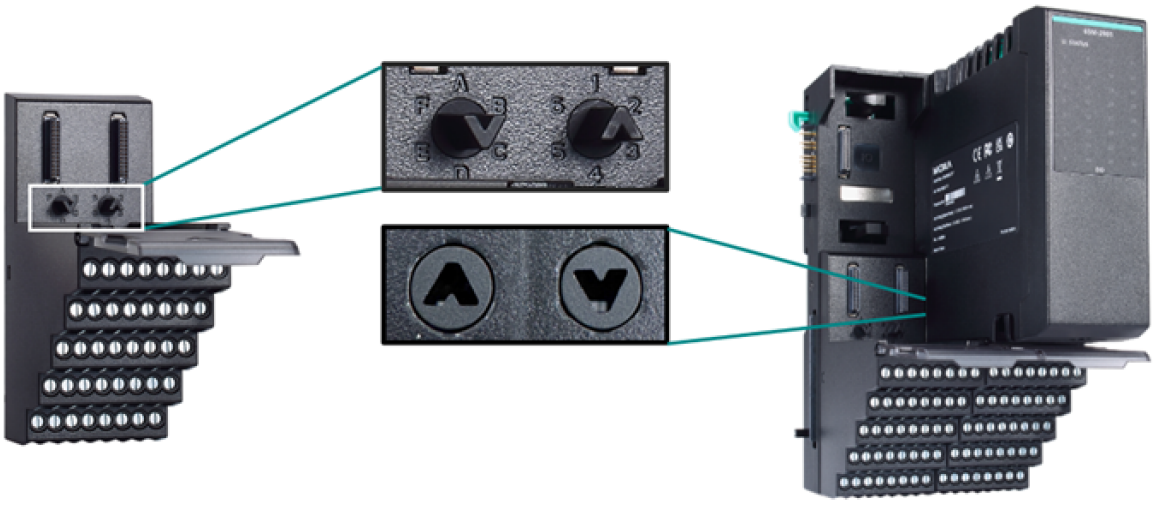
Introduction

The I/O modules collect data from sensors and meters via input channels and trigger actions on motors, valves, and actuators via output channels.

Terminal blocks are used to do the physical wiring and connect the field devices. Each I/O module requires its corresponding terminal-block module. For example, a DI module requires a DI terminal-block module. The same principle applies to all other I/O modules.

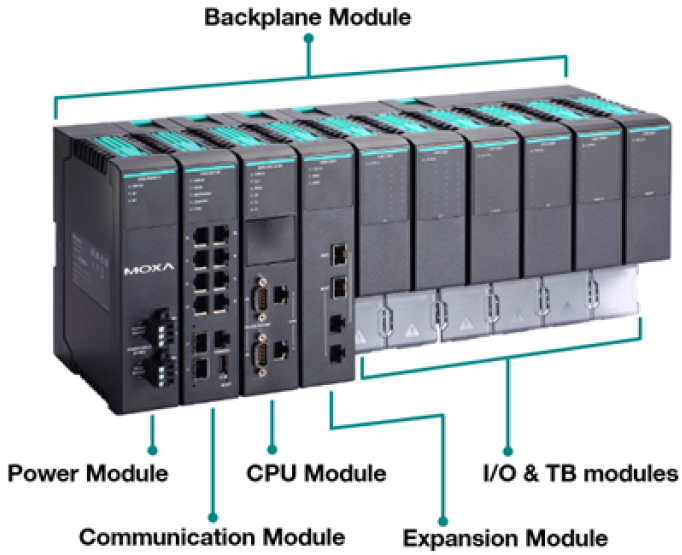
Error–proof Design With Arrow Pins

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 design that is mistake-proof and supports tool-free assembly 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 65M-4450-CT-T: 4 (channel-to-channel isolation)
Relay Channels	65M-2804-CT-T: 8
Serial Ports	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 65M-4450-CT-T: Between signal and system: 3k VDC Between channels: 1k VDC 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	65M-4820-CT-T: Voltage/Current 65M-4450-CT-T: Voltage/Current (channel-to-channel isolation)
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)

Relay Outputs

Type	Form A (N.O.) power relay
Rated Applied Voltage	24 VDC
Maximum Load (current)	24 VDC, 2 A
Switching Frequency	2 Hz

Mechanical Endurance	5,000,000 cycles
Electrical Endurance	20,000 cycles @ 24 VDC, 2 A

Serial Interface

Serial Standards	RS-232, RS-422, RS-485-2w
Bitrate	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-2804-CT-T: D3 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-4450-CT-T: A6 65M-TB-4820-CT-T: A5 65M-TB-5801-CT-T: F1 Note: Terminal blocks need to be purchased separately. See the Accessories section 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-2804-CT-T: 0.11 A @ 12 VDC 65M-4450-CT-T: 0.35 A @ 12 VDC 65M-5801-CT-T: 0.143 A @ 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-2804-CT-T: 258 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) 65M-4450-CT-T: 272 g (0.60 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

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

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
Hazardous Locations	ATEX Zone 2, Class I Division 2, IECEx[2]
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-2804-CT-T: 2,281,026 hrs 65M-1900-CT-T: 2,057,118 hrs 65M-2901-CT-T: 2,007,795 hrs 65M-3610-CT-T: 1,885,953 hrs 65M-4820-CT-T: 1,874,152 hrs 65M-4450-CT-T: 1,812,149 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

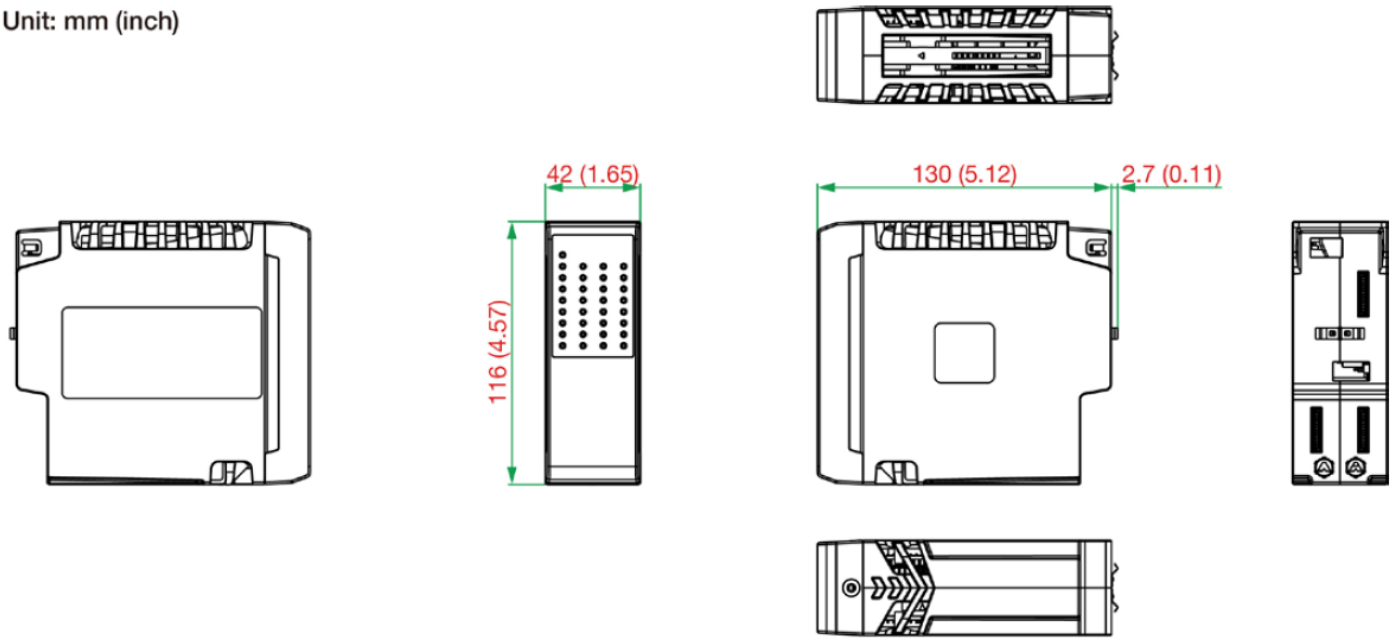
Device	1 x ioPAC 6500 Series (65M) I/O Module
Documentation	1 x quick installation guide 1 x warranty card

2. All models except 65M-2804-CT-T and 65M-4450-CT-T are ATEX Zone 2, CID2, and IECEx certified.

Dimensions

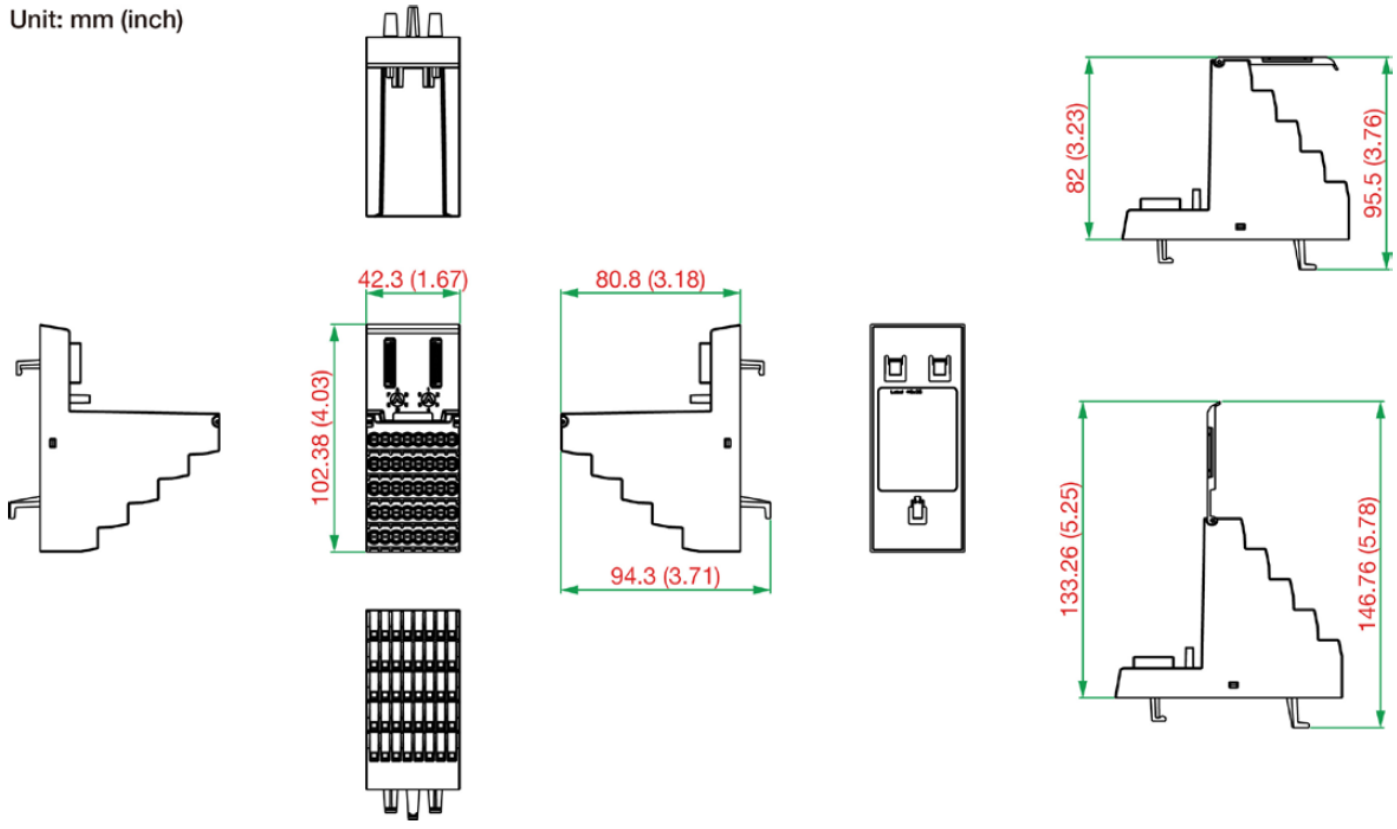
65M–1XXX/2XXX/3XXX/4XXX/5801 Models

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-2804-CT-T	Relay x 8	N/A	N/A	N/A	-40 to 75°C

Model Name	No. of I/O Interfaces	Digital Inputs/ Outputs	Analog Inputs/ Outputs	HART	Operating Temperature
65M-2901-CT-T	DOs x 32	24 VDC	–	–	-40 to 75°C
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-4450-CT-T	AOs x 4	N/A	0 to 10 V 1 to 5 V 0 to 20 mA 4 to 20 mA	N/A	-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-2804-CT-T	ioPAC 6500 terminal-block module for 65M-2804, -40 to 75°C operating temperature, conformal coating Applicable Models: 65M-2804-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-4450-CT-T	ioPAC 6500 terminal-block module for 65M-4450, -40 to 75°C operating temperature, conformal coating Applicable Models: 65M-4450-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

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