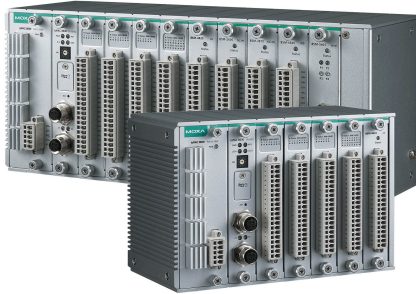# ioPAC 8600 Series

Rugged modular programmable controllers

Features and Benefits

- Modular CPU/power/backplane design that supports 85M/86M modules
- Tag-centric design with ready-to-run services
- Supports C/C++ and IEC 61131-3 programming languages
- Compact, lightweight design
- Supports a redundant power module with dual power inputs
- 24 to 110 V DI/O module and universal power input range module
- Complies with EN 50121-4
- Complies with all EN 50155 mandatory test items[1]

Certifications

EN 50155   EN 50121-4   CE   FC

Introduction

The ioPAC 8600 Series modular programmable controllers are 100% modular, giving you the freedom to choose the power, backplane, communication, and I/O modules you need for your application. In addition, the ioPAC 8600 enhances the hardware system architecture and key features of the ioPAC 8020 and ioPAC 8500 combined, and has an Ethernet bus on the backplane to support Ethernet switch modules.

The ioPAC 8600 supports the C/C++ and IEC 61131-3 programming languages and ready-to-run services, including Modbus TCP/RTU, SNMP, data logging, and email alarms to fulfill different customer requirements. With active tag and MX-AOPC UA Suite data integration software, the ioPAC 8600 Series provides a comprehensive solution for data acquisition and control applications in harsh environments.

All New High-Performance CPU30 Module

Moxa's ioPAC 8600-CPU30 module is equipped with a new 1 GHz high-performance Cortex™ A8 CPU, which shortens the cycle time significantly, and allows users to run more programs simultaneously. With the CPU30 module's 4 GB eMMC, the ioPAC 8600 can support more communication protocols for a wider range of scenarios, including a RESTful API for railway IIoT applications and DNP3 outstations[2] for oil and gas applications. The CPU30 also reserves up to 1.7 GB of internal storage that gives users the freedom to develop more complex programs for specific ioPAC applications. As an added bonus, users can develop programs directly on the ioPAC.[2]

Tag-Centric Design and Ready-to-Run Service

Moxa's ioPAC 8600 programmable controllers use a tag-centric design with ready-to-run services. The tag-centric design helps streamline the connection between the ioPAC 8600 controller and remote I/Os, and allows you to easily manage I/O status by implementing get/set routines to read-from/write-to tag values, even if you are not particularly familiar with PLC FBDs and APIs. The ready-to-run service allows programmers to rapidly configure services (SNMP, Modbus RTU/TCP, email alarms, etc.) without writing a single line of code, reducing the development of complicated communication applications to a few mouse clicks. The ioPAC 8600's tag-centric design and ready-to-run service greatly increase an engineer's productivity.

2-Wire Ethernet Technology

Moxa's 2-wire Ethernet technology offers system integrators an attractive option for upgrading a train's IP network to a 10/100 Mbps[3] Ethernet backbone with existing 2-wire cable. This innovative technology greatly reduces cable usage by providing 100 Mbps Ethernet transmission over only two wires, thereby reducing the train's weight and improving energy efficiency. The 2-wire Ethernet switch module supports Ethernet bypass functionality, ensuring that the Ethernet backbone will continue to operate even if one ioPAC unit is without power. As an added bonus, by installing two 2-wire Ethernet modules in one ioPAC unit, the network can transmit at 200 Mbps and provide a redundant architecture.

Limited number of coupler poles

2-Wire Ethernet

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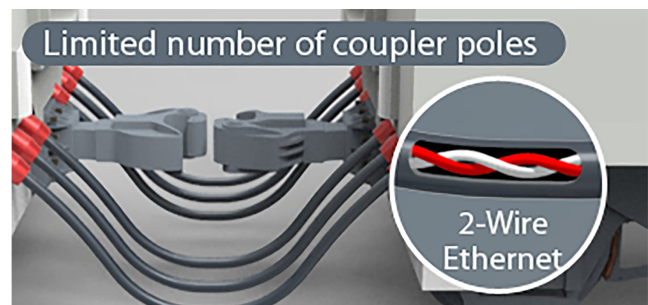
1. This product is suitable for rolling stock railway applications, as defined by the EN 50155 standard. For a more detailed statement, click here: www.moxa.com/doc/specs/EN_50155_Compliance.pdf
2. Additional customization is required.
3. When using 2-wire technology, network performance is dependent on cable quality.

Compact, Lightweight Integrated Solution

The compact ioPAC 8600 programmable controller is well-suited for smaller sized installation spaces, and its lightweight design reduces energy consumption and allows the product to withstand the wear and tear of railway applications. However, the ioPAC's small size does not limit its capabilities. The ioPAC 8600 is equipped with universal dual power inputs that support all railway power voltages. With support for both 85M and 86M modules, the ioPAC 8600 programmable controller can implement the wide variety of IO scenarios required by train applications. The ioPAC 8600 also supports a variety of communication interfaces, including Ethernet, serial, CAN, and HART.[4] System integrators can control or monitor subsystems with the ioPAC 8600, which saves space and provides powerful functions that both fit within the system integrator's budget and overcome installation difficulties.

Specifications

Computer

CPU	32-bit Cortex-A8 1 GHz CPU
OS	Real-time Linux (PREEMPT_RT)
Clock	Real-time clock with capacitor backup

Memory

eMMC	4 GB (1.7 GB reserved for the user)
SDRAM	512 MB DDR3(L)
SPI-NVRAM	128 KB
microSD Slot	Up to 32 GB (SD 2.0 compatible)[5]

Control Logic

Language	C/C++, IEC 61131-3

Ethernet Interface

10/100BaseT(X) Ports (M12 D-coded 4-pin female connector)	M12 version: 2, 1 MAC address (Ethernet bypass) or 2 MAC addresses, jumper selectable
10/100BaseT(X) Ports (RJ45 connector)	RJ45 version: 2, 1 MAC address (Ethernet bypass) or 2 MAC addresses, jumper selectable
Magnetic Isolation Protection	1.5 kV (built-in)

Ethernet Software Features

Configuration Options	Windows Utility (RTUxpress)
Industrial Protocols	Modbus TCP Client (Master), Modbus TCP Server (Slave), Moxa AOPC (Active Tag), SNMPv1/v2c Trap, SNMPv1/v2c/v3
Management	BOOTP, IPv4, SMTP, UDP, TCP/IP
Security	SSH
Time Management	SNTP

Serial Interface

Console Port	RS-232 (TxD, RxD, GND), 3-pin (115200, n, 8, 1)

Modbus RTU/ASCII

Functions Supported	1, 2, 3, 4, 5, 6, 15, 16
Mode	Master, Slave

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4.   HART only available on a project basis.
5.   For units operating in extreme temperatures, industrial-grade, wide-temperature microSD cards are required.

www.moxa.com

Modbus TCP

Functions Supported	1, 2, 3, 4, 5, 6, 15, 16
Mode	Master, Slave

Power Parameters

Power Connector	Spring-type Euroblock terminal
No. of Power Inputs	2
Input Voltage	24 to 110 VDC
Power Consumption	223 mA @ 24 VDC
Galvanic Isolation	3k VDC

Physical Characteristics

Slots	ioPAC 8600-BM005: 5 ioPAC 8600-BM009: 9 ioPAC 8600-BM012: 12
Housing	Metal
Dimensions	ioPAC 8600-BM005: 205.65 x 133.35 x 100 mm (8.1 x 5.25 x 3.94 in) ioPAC 8600-BM009: 324.8 x 133.35 x 100 mm (12.79 x 5.25 x 3.94 in) ioPAC 8600-BM012: 436.8 x 132.2 x 100 mm (17.19 x 5.2 x 3.94 in)
Weight	ioPAC 8600-BM005: 2,560 g (5.64 lb) ioPAC 8600-BM009: 3,690 g (8.14 lb) ioPAC 8600-BM012: 4,550 g (10.03 lb)
Installation	Wall mounting (with optional kit)
Wiring	Power cable, 14 to 28 AWG

Environmental Limits

Operating Temperature	-40 to 75°C (-40 to 167°F)
Storage Temperature (package included)	-40 to 85°C (-40 to 185°F)
Ambient Relative Humidity	5 to 95% (non-condensing)
Altitude	2000 m[6]

Standards and Certifications

EMC	EN 55032/24, EN 61000-6-2/-6-4
EMI	CISPR 32, FCC Part 15B Class A
EMS	IEC 61000-4-2 ESD: Contact: 6 kV; Air: 8 kV IEC 61000-4-3 RS: 5100 MHz to 6000 MHz: 3 V/m IEC 61000-4-4 EFT: Power: 1 kV; Signal: 0.5 kV IEC 61000-4-5 Surge: Power: 2 kV; Signal: 1 kV IEC 61000-4-6 CS: 10 V IEC 61000-4-8 PFMF
Railway	EN 50121-4, EN 50155
Safety	UL 508
Shock	IEC 60068-2-27
Vibration	IEC 60068-2-6

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

MTBF

Time	ioPAC 8600-CPU30 Series: 1,358,656 hrs ioPAC 8600-PW10-15W-T: 1,752,960 hrs ioPAC 8600-PW10-30W-T: 1,341,777 hrs
Standards	Telcordia SR332

Warranty

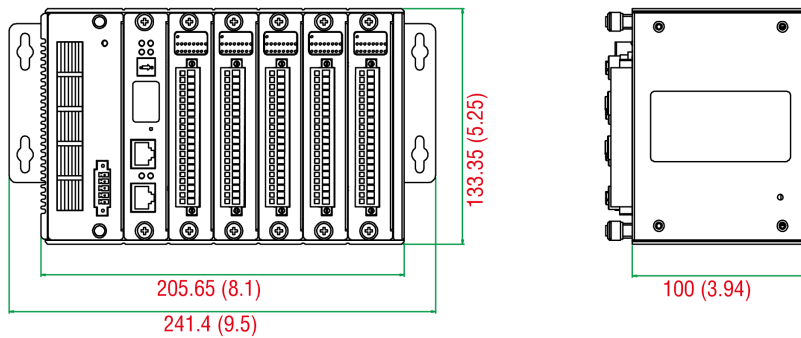|	
Warranty Period	5 years
Details	See www.moxa.com/warranty

Package Contents

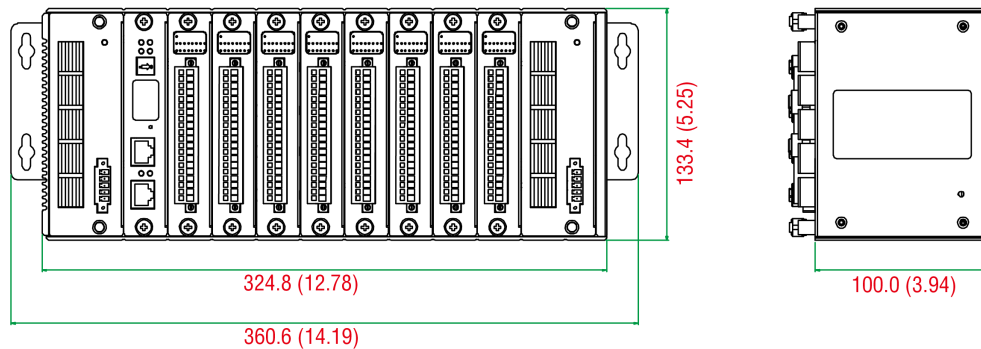|	
Device	1 x ioPAC 8600 Series modular controller
Cable	C++ version: 1 x 4-pin header to DB9 console port
Documentation	1 x warranty card 1 x software DVD
Note	This product requires additional modules (sold separately) to function.

Dimensions
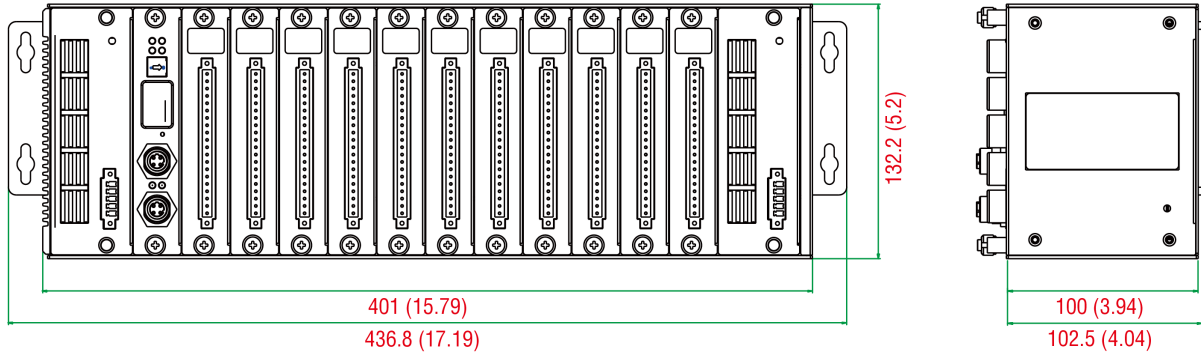
5-Slot ioPAC 8600

Unit: mm (inch)

133.35 (5.25)
205.65 (8.1)
241.4 (9.5)
100 (3.94)

9-Slot ioPAC 8600

Unit: mm (inch)

133.4 (5.25)
324.8 (12.78)
360.6 (14.19)
100.0 (3.94)

12-Slot ioPAC 8600

Unit: mm (inch)

401 (15.79)
436.8 (17.19)
132.2 (5.2)
100 (3.94)
102.5 (4.04)

Ordering Information

Model Name	CPU	OS	LAN	Control Logic Languages	Dual-Power Input	Slots
ioPAC 8600-CPU30-M12-C-T	32-bit Cortex-A8 1 GHz	Real-time Linux (PREEMPT_RT)	2 x M12	C/C++	–	–
ioPAC 8600-CPU30-RJ45-C-T	32-bit Cortex-A8 1 GHz	Real-time Linux (PREEMPT_RT)	2 x RJ45	C/C++	–	–
ioPAC 8600-CPU30-M12-IEC-T	32-bit Cortex-A8 1 GHz	Real-time Linux (PREEMPT_RT)	2 x M12	IEC 61131-3	–	–
ioPAC 8600-CPU30-RJ45-IEC-T	32-bit Cortex-A8 1 GHz	Real-time Linux (PREEMPT_RT)	2 x RJ45	IEC 61131-3	–	–
ioPAC 8600-PW10-15W-T	–	–	–	–	24-110 VDC, 15 W	–
ioPAC 8600-PW10-30W-T	–	–	–	–	24-110 VDC, 30 W	–
ioPAC 8600-BM005-T	–	–	–	–	–	5
ioPAC 8600-BM009-T	–	–	–	–	–	9
ioPAC 8600-BM012-T	–	–	–	–	–	12

Accessories (sold separately)

IO Modules

85M-1602-T	For the ioPAC 8600/8500 Series, 16 DIs, 24 VDC, sink/source type
85M-2600-T	For the ioPAC 8600/8500 Series, 16 DOs, 24 VDC, sink type
85M-3800-T	For the ioPAC 8600/8500 Series, 8 AIs, 4 to 20 mA
85M-3801-T	For the ioPAC 8600/8500 Series, 8 AIs, 0 to 10 V
85M-3810-T	For the ioPAC 8600/8500 Series, 8 AIs, 4 to 20 mA, 40 kHz
85M-3811-T	For the ioPAC 8600/8500 Series, 8 AIs, 0 to 10 V, 40 kHz
85M-6600-T	For the ioPAC 8600/8500 Series, 6 RTDs
85M-6810-T	For the ioPAC 8600/8500 Series, 8 TCs
86M-1620D-T	For the ioPAC 8600 Series, 16 DIs, sink, 24 to 110 VDC, channel LED
86M-1832D-T	For the ioPAC 8600 Series, 8 DIs, sink/source, 24 VDC, channel-to-channel isolation, channel LED
86M-2604D-T	For the ioPAC 8600 Series, 6 relays, form A (N.O.), channel LED
86M-2830D-T	For the ioPAC 8600 Series, 8 DOs, sink, 24 VDC, channel-to-channel isolation, channel LED
86M-4420-T	For the ioPAC 8600 Series, 4 AOs, 0 to 10 V, -10 to 10 V, 0 to 20 mA, or 4 to 20 mA
85M-5401-T	For the ioPAC 8600/8500 Series, 4-port serial, DB44 connectors

| 86M-5212U-T | For the ioPAC 8600 Series, 2-port 2-wire Ethernet switch |
| 86M-5250-T | For the ioPAC 8600 Series, 2 CAN ports |

Software

| MX-AOPC UA Server | OPC UA Server software for converting fieldbus to the OPC UA standard |

Brackets

| 85M-BKTES | Empty slot cover (3 pieces per package) |

Cables

| CBL-M12D(MM4P)/RJ45-100 IP67 | M12-to-RJ45 cable, IP67-rated, 1 m

Applicable Models:
ioPAC 8600-CPU30-M12-C-T
ioPAC 8600-CPU30-M12-IEC-T |
| CBL-RJ458P-100 | 8-pin RJ45 CAT5 Ethernet cable, 1 m

Applicable Models:
ioPAC 8600-CPU30-RJ45-C-T
ioPAC 8600-CPU30-RJ45-IEC-T |

Wall-Mounting Kits

| WK-75 | Wall-mounting kit, 2 plates, 8 screws, 75 x 90 x 2.5 mm |

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