ioThinx 4530 Series

Advanced modular controllers with built-in serial port

Features and Benefits

- -40 to 75°C wide operating temperature model available
- Easy tool-free installation and removal
- Supports up to 64 45MR I/O and up to 5 45ML communication modules
- microSD socket for storage expansion
- Class I Division 2 and ATEX Zone 2 certifications

Certifications

Introduction

The ioThinx 4530 Series is a versatile Linux-based controller with support for I/O and serial expansion modules. Equipped with a Cortex-A7 dual-core CPU, 2 GB of memory, and 3-in-1 serial interfaces, the ioThinx 4530 Series offers robust performance. These controllers can support up to 64 units with the dedicated 45MR Series modules, including digital and analog I/O, relay, and temperature modules. In addition, the ioThinx 4530 Series supports up to five 45ML Series serial modules.

Moxa Industrial Linux 3 (MIL3)

The ioThinx 4530 Series runs on Moxa Industrial Linux 3 (MIL3), an industrial-grade Linux distribution based on Debian. Developed and maintained by Moxa, MIL3 is specifically designed to meet the security, reliability, and long-term support requirements of industrial automation systems.

### Small Footprint With High-density I/O Points

A single ioThinx 4530 Series controller fully equipped with expansion modules can support up to 1,024 digital I/O points while maintaining a remarkably small footprint, measuring less than 10 cm (3.9 in) wide and 6.1 cm (2.4 in) tall. The 45MR Series module come in even smaller at 1.8 cm (0.7 in) width. This compact design allows for installation in limited spaces, enhancing the simplicity and maintainability of your control cabinet.

Flexible Modular Design to Expand I/O and Serial Interfaces

Featuring a flexible modular design for expanding I/O and serial interfaces, the ioThinx 4530 Series enables users to effortlessly modify the combination of expansion modules to suit various application scenarios. This modular capability helps developers seamlessly migrate programs from one project to another.

Easy Tool-free Installation and Removal

The ioThinx 4500 Series has a unique mechanical design that reduces the amount of time required for installation and removal. In fact, screwdrivers and other tools are not required for any part of the hardware installation, including mounting the device on a DIN-rail, as well as connecting the wiring for both communication and I/O signal acquisition. Furthermore, no tools are required to remove the ioThinx from a DIN-rail. Removing all of the modules from a DIN-rail is also easy using the latch and release tab.

Unmount single modules easily
with a push and unlock design

Tool-Free Cable Wiring
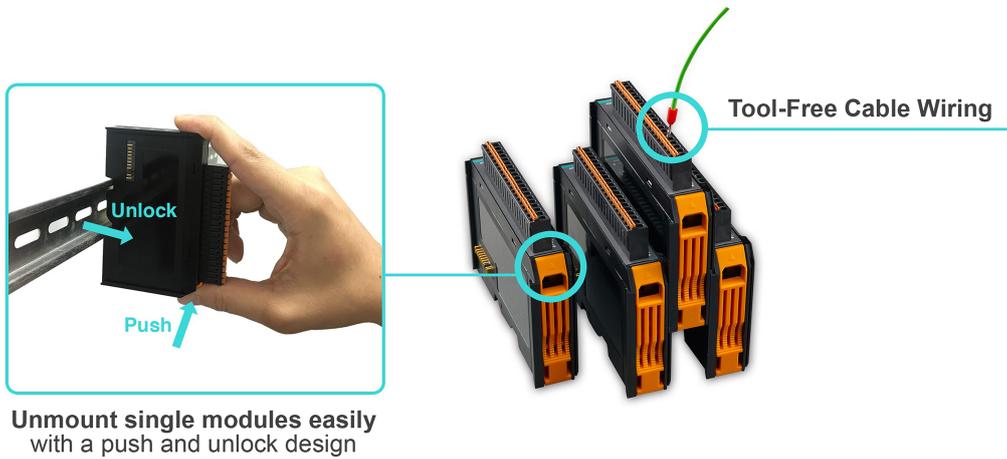
Programmer-friendly

Moxa provides comprehensive documentation and tools for the ioThinx Series, featuring C/C++ and Python libraries, a cross-compiler toolchain, and sample codes. These resources help programmers accelerate project delivery time lines.
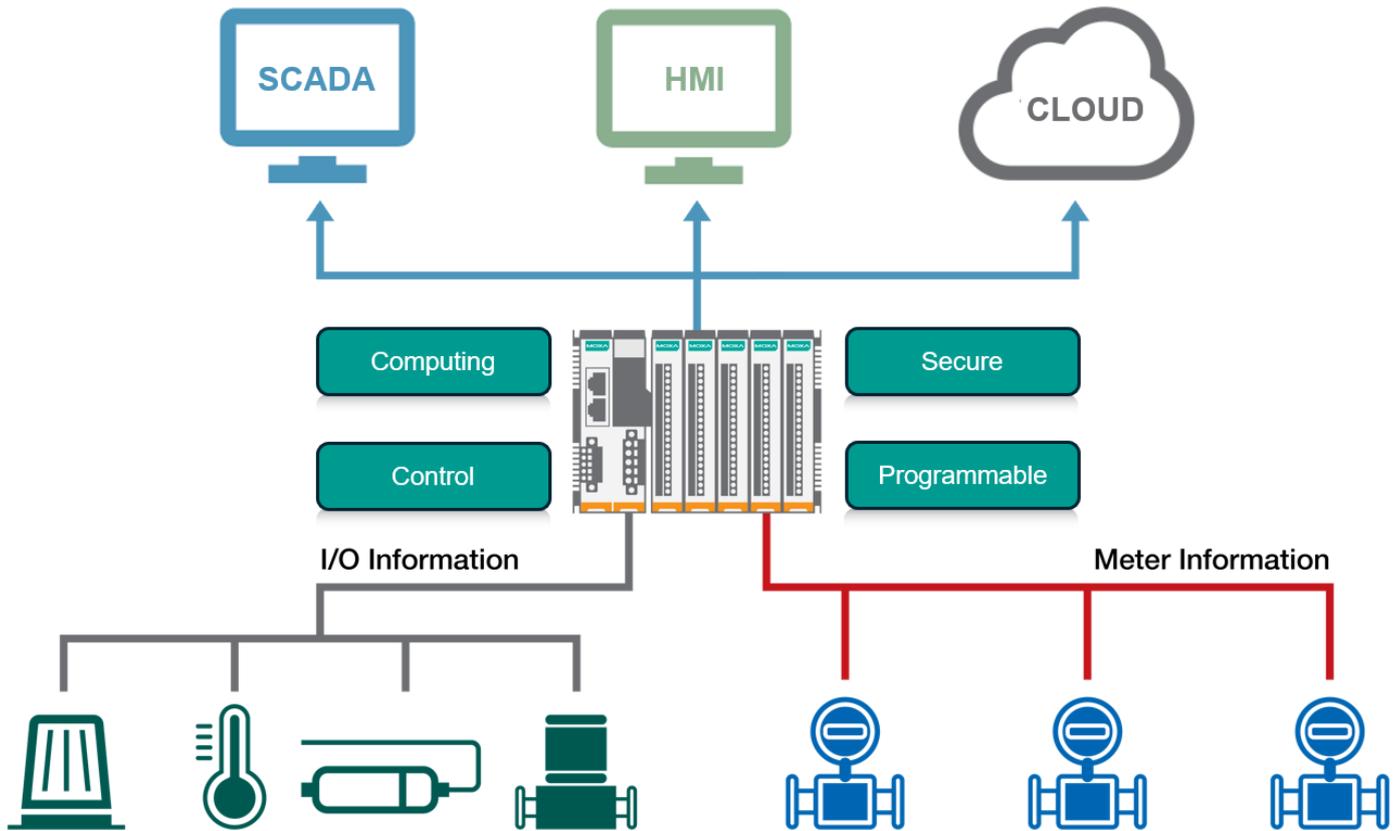
Specifications

Computer

CPU	Armv7 Cortex-A7 dual-core 1 GHz
OS	Moxa Industrial Linux 3 (Debian 11, kernel 5.10) See www.moxa.com/MIL
Clock	Real-time clock with capacitor backup
DRAM	2 GB DDR3L
MRAM	128 kB
Storage Pre-installed	8 GB eMMC (6 GB reserved for the user)

Storage Slot	microSD Slots x 1 (up to 32 GB)
Expansion Slots	Up to 64 (with 45MR I/O modules) Up to 5 (with 45ML communication modules)

Control Logic

Language	C/C++ Python

Computer Interface

Buttons	Reset button

Input/Output Interface

Rotary Switch	0 to 9

Ethernet Interface

10/100BaseT(X) Ports (RJ45 connector)	Auto negotiation speed
Magnetic Isolation Protection	1.5 kV (built-in)

Security Functions

Authentication	Local database
Encryption	AES-256 SHA-256
Security Protocols	SSHv2
Hardware-based Security	TPM 2.0

Serial Interface

Console Port	RS-232 (TxD, RxD, GND), 3-pin (115200, n, 8, 1)
No. of Ports	1 x RS-232/422 or 2 x RS-485-2w
Connector	Spring-type Euroblock terminal
Serial Standards	RS-232/422/485 (software selectable)
Baudrate	300, 600, 1200, 1800, 2400, 4800, 9600, 19200, 38400, 57600, 115200 bps
Flow Control	RTS/CTS
Parity	None, Even, Odd
Stop Bits	1, 2
Data Bits	7, 8

Serial Signals

RS-232	TxD, RxD, RTS, CTS, GND
RS-422	Tx+, Tx-, Rx+, Rx-, GND
RS-485-2w	Data+, Data-, GND

System Power Parameters

Power Connector	Spring-type Euroblock terminal
No. of Power Inputs	1
Input Voltage	12 to 48 VDC

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Power Consumption	1940 mA @ 12 VDC
Over-Current Protection	3 A @ 25°C
Over-Voltage Protection	55 VDC
Output Current	1 A (max.)

Field Power Parameters

Power Connector	Spring-type Euroblock terminal
No. of Power Inputs	1
Input Voltage	12/24 VDC
Over-Current Protection	5 A @ 25°C
Over-Voltage Protection	33 VDC
Output Current	2 A (max.)

Physical Characteristics

Wiring	Serial cable, 16 to 28 AWG Power cable, 12 to 26 AWG
Strip Length	Serial cable, 9 to 10 mm Power cable, 12 to 13 mm
Housing	Plastic
Dimensions	60.3 x 99 x 75 mm (2.37 x 3.9 x 2.96 in)
Weight	207.7 g (0.457 lb)
Installation	DIN-rail mounting

Standards and Certifications

EMC	EN 55032/35
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 1000 MHz: 3 V/m IEC 61000-4-4 EFT: Power: 2 kV; Signal: 1 kV IEC 61000-4-5 Surge: Power: 2 kV; Signal: 1 kV IEC 61000-4-6 CS: 10 V IEC 61000-4-8 PFMF
Safety	UL 61010-2-201
Shock	IEC 60068-2-27
Vibration	IEC 60068-2-6
Hazardous Locations	Class I Division 2 ATEX

MTBF

Time	954,606 hrs
Standards	Telcordia SR332

Environmental Limits

Operating Temperature	ioThinx 4533-LX: -20 to 60°C (-4 to 140°F) ioThinx 4533-LX-T: -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	Up to 4000 m

Declaration

Green Product	RoHS, CRoHS, WEEE

Warranty

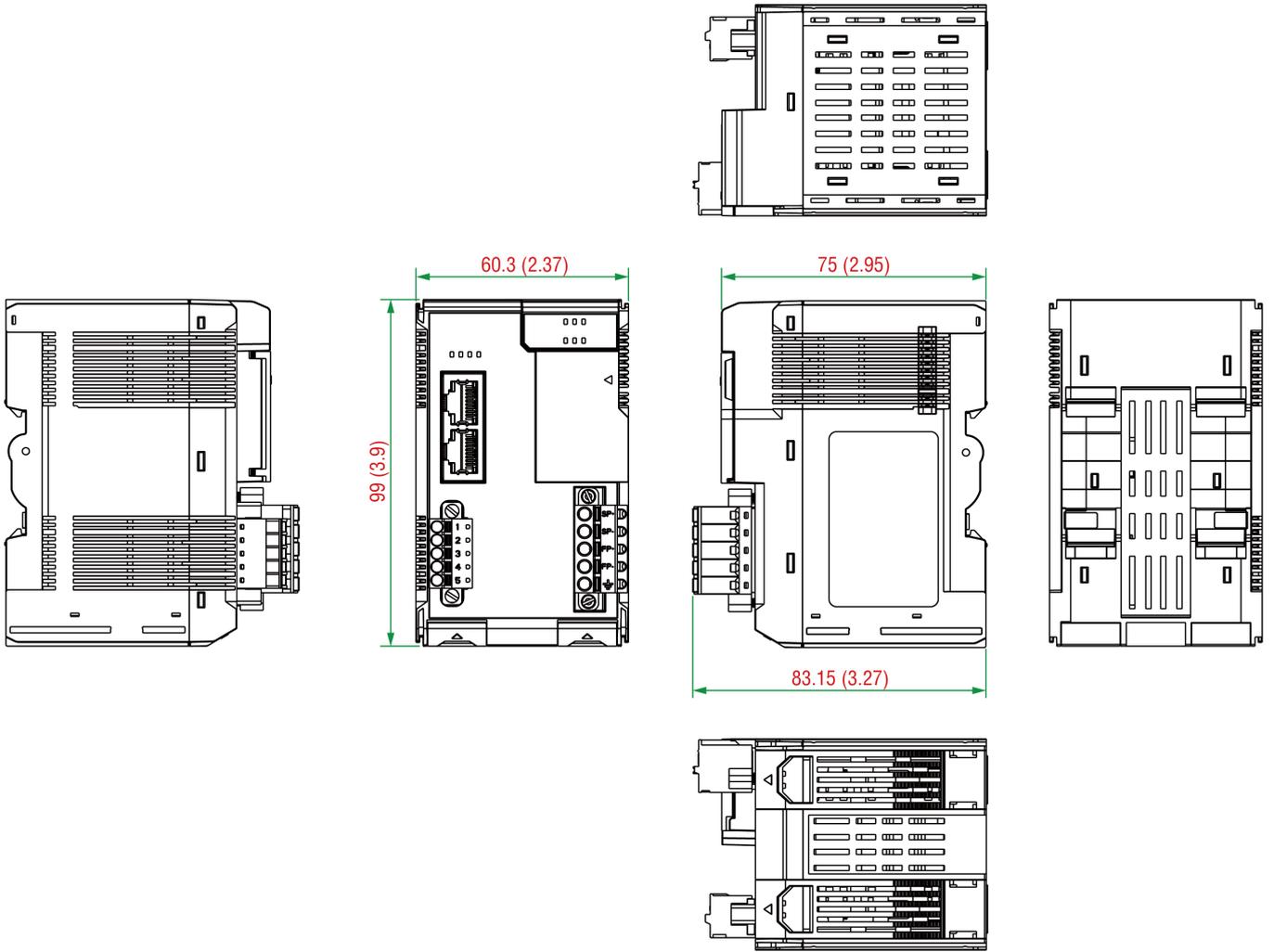|	
Warranty Period	5 years
Details	See www.moxa.com/warranty

Package Contents

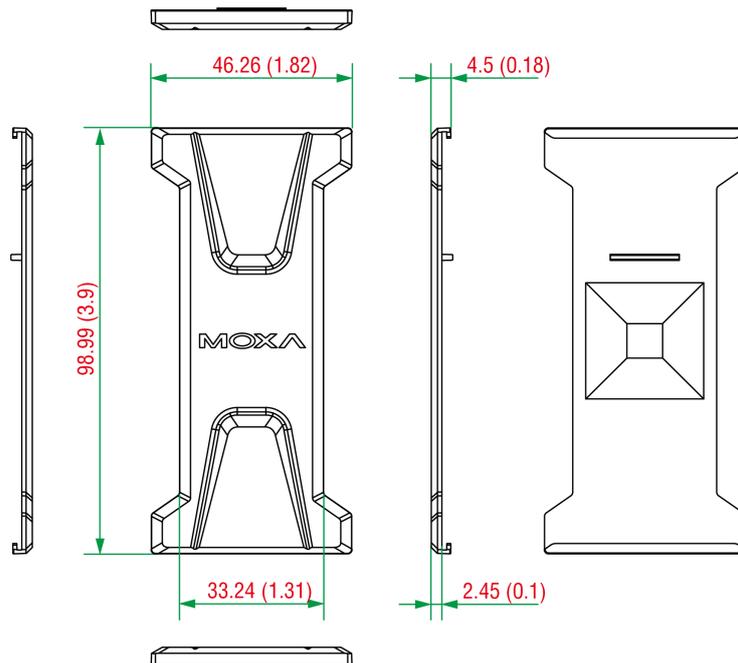|	
Device	1 x ioThinx 4530 Series Controller
Cable	1 x 4-pin header to DB9 console port
Installation Kit	1 x terminal block, 5-pin, 5.00 mm 1 x terminal block, 5-pin, 3.81 mm
Documentation	1 x warranty card 1 x quick installation guide

Dimensions

Top/Side/Bottom Panels

Unit: mm (inch)

60.3 (2.37)

75 (2.95)

99 (3.9)

83.15 (3.27)

Side Cover

Unit: mm (inch)

46.26 (1.82)

4.5 (0.18)

98.99 (3.9)

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33.24 (1.31)

2.45 (0.1)

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Ordering Information

Model Name	Language	Ethernet Interface	Serial Interface	No. of Support I/O Modules	Operating Temp.
ioThinx 4533-LX	C/C++, Python	2 x RJ45	RS-232/RS-422/RS-485	64	-20 to 60°C
ioThinx 4533-LX-T	C/C++, Python	2 x RJ45	RS-232/RS-422/RS-485	64	-40 to 75°C

Accessories (sold separately)

I/O Modules

45MR-1600	Module for the ioThinx 4500 Series, 16 DIs, 24 VDC, PNP, -20 to 60°C operating temperature
45MR-1600-T	Module for the ioThinx 4500 Series, 16 DIs, 24 VDC, PNP, -40 to 75°C operating temperature
45MR-1601	Module for the ioThinx 4500 Series, 16 DIs, 24 VDC, NPN, -20 to 60°C operating temperature
45MR-1601-T	Module for the ioThinx 4500 Series, 16 DIs, 24 VDC, NPN, -40 to 75°C operating temperature
45MR-2404	Module for the ioThinx 4500 Series, 4 relays, form A, -20 to 60°C operating temperature
45MR-2404-T	Module for the ioThinx 4500 Series, 4 relays, form A, -40 to 75°C operating temperature
45MR-2600	Module for the ioThinx 4500 Series, 16 DOs, 24 VDC, sink, -20 to 60°C operating temperature
45MR-2600-T	Module for the ioThinx 4500 Series, 16 DOs, 24 VDC, sink, -40 to 75°C operating temperature
45MR-2601	Module for the ioThinx 4500 Series, 16 DOs, 24 VDC, source, -20 to 60°C operating temperature
45MR-2601-T	Module for the ioThinx 4500 Series, 16 DOs, 24 VDC, source, -40 to 75°C operating temperature
45MR-2606	Module for the ioThinx 4500 Series, 8 DIs, 24 VDC, PNP, 8 DOs, 24 VDC, source, -20 to 60°C operating temperature
45MR-2606-T	Module for the ioThinx 4500 Series, 8 DIs, 24 VDC, PNP, 8 DOs, 24 VDC, source, -40 to 75°C operating temperature
45MR-3800	Module for the ioThinx 4500 Series, 8 AIs, 0 to 20 mA or 4 to 20 mA, -20 to 60°C operating temperature
45MR-3800-T	Module for the ioThinx 4500 Series, 8 AIs, 0 to 20 mA or 4 to 20 mA, -40 to 75°C operating temperature
45MR-3810	Module for the ioThinx 4500 Series, 8 AIs, -10 to 10 V or 0 to 10 V, -20 to 60°C operating temperature
45MR-3810-T	Module for the ioThinx 4500 Series, 8 AIs, -10 to 10 V or 0 to 10 V, -40 to 75°C operating temperature
45MR-4420	Module for the ioThinx 4500 Series, 4 AOs, 0 to 10 V or 0 to 20 mA or 4 to 20 mA, -20 to 60°C operating temperature
45MR-4420-T	Module for the ioThinx 4500 Series, 4 AOs, 0 to 10 V or 0 to 20 mA or 4 to 20 mA, -40 to 75°C operating temperature
45MR-6600	Module for the ioThinx 4500 Series, 6 RTDs, -20 to 60°C operating temperature
45MR-6600-T	Module for the ioThinx 4500 Series, 6 RTDs, -40 to 75°C operating temperature
45MR-6810	Module for the ioThinx 4500 Series, 8 TCs, -20 to 60°C operating temperature
45MR-6810-T	Module for the ioThinx 4500 Series, 8 TCs, -40 to 75°C operating temperature

Power Modules

45MR-7210	Module for the ioThinx 4500 Series, system and field power inputs, -20 to 60°C operating temperature
45MR-7210-T	Module for the ioThinx 4500 Series, system and field power inputs, -40 to 75°C operating temperature
45MR-7820	Module for the ioThinx 4500 Series, potential distributor module, -20 to 60°C operating temperature
45MR-7820-T	Module for the ioThinx 4500 Series, potential distributor module, -40 to 75°C operating temperature

Communication Modules

45ML-5401	Module for the ioThinx 4530 Series, 4 serial ports (RS-232/422/485 3-in-1), -20 to 60°C operating temperature
45ML-5401-T	Module for the ioThinx 4530 Series, 4 serial ports (RS-232/422/485 3-in-1), -40 to 75°C operating temperature

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