ioThinx 4500 Series (45MR) Modules

I/O and power modules for the ioThinx 4500 Series



Features and Benefits

- I/O modules include DI/Os, AI/Os, relays, and other I/O types
- Power modules for system power inputs and field power inputs
- Easy tool-free installation and removal
- Built-in LED indicators for IO channels
- Wide operating temperature range: -40 to 75°C (-40 to 167°F)
- Class I Division 2 and ATEX Zone 2 certifications

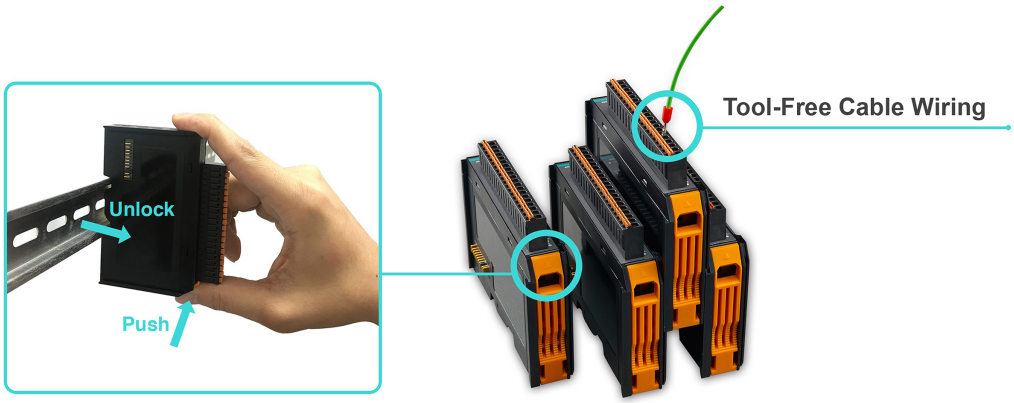
Certifications

Introduction

Moxa's ioThinx 4500 Series (45MR) Modules are available with DI/Os, AIs, relays, RTDs, and other I/O types, giving users a wide variety of options to choose from and allowing them to select the I/O combination that best fits their target application. With its unique mechanical design, hardware installation and removal can be done easily without tools, greatly reducing the amount of time required to set up and replace the modules.

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

Specifications

Input/Output Interface

Digital Input Channels	45MR-1600: 16 45MR-1601: 16 45MR-2606: 8
Digital Output Channels	45MR-2600: 16 45MR-2601: 16 45MR-2606: 8
Analog Input Channels	45MR-3800: 8

	45MR-3810: 8
Relay Channels	45MR-2404: 4
Analog Output Channels	45MR-4420: 4
RTD Channels	45MR-6600: 6
Thermocouple Channels	45MR-6810: 8
System Power Input Channels	45MR-7210: 1
Field Power Input Channels	45MR-7210: 1
Field Potential Output Channels	45MR-7820: 8
Isolation	3k VDC or 2k Vrms

Digital Inputs

Connector	Spring-type Euroblock terminal
Sensor Type	Dry contact Wet contact (NPN or PNP)
I/O Mode	45MR-1600/1601: DI or event counter (only supports the first 4 channels) 45MR-2606: DI or event counter (only supports the first 2 channels)
Dry Contact	On: short to FP+/FP- Off: open
Wet Contact (DI to FP-)	On: 10 to 30 VDC Off: 0 to 3 VDC
Wet Contact (DI to FP+)	On: 10 to 30 VDC Off: 0 to 3 VDC
Counter Frequency	1 kHz
Digital Filtering Time Interval	Software configurable

Digital Outputs

Connector	Spring-type Euroblock terminal
I/O Type	45MR-2600: Sink 45MR-2601/2606: Source
I/O Mode	45MR-2600/2601: DO or pulse output (only supports the first 4 channels) 45MR-2606: DO or pulse output (only supports the first 2 channels)
External Power	12/24 VDC
Pulse Output Frequency	1 kHz
Over-Voltage Protection	45 VDC
Over-Temperature Shutdown	175°C (typical), 150°C (min.)
Current Rating	500 mA per channel

Relays

Connector	Spring-type Euroblock terminal
Type	Form A (N.O.) power relay
I/O Mode	DO

Contact Current Rating	Resistive load: 2 A @ 30 VDC Resistive load: 2 A @ 250 VAC
Relay On/Off Time	10 ms (max.)
Initial Insulation Resistance	1000 mega-ohms (min.) @ 500 VDC
Mechanical Endurance	5,000,000 operations
Electrical Endurance	45MR-2404 Models: 50,000 operations @ 2 A resistive load
Contact Resistance	100 milli-ohms (max.)

Analog Inputs

Connector	Spring-type Euroblock terminal
I/O Mode	Voltage/Current
I/O Type	Differential
Resolution	16 bits
Input Range	45MR-3800: 0 to 20 mA, 4 to 20 mA, 4 to 20 mA (burnout detection) 45MR-3810: 0 to 10 VDC or -10 to 10 VDC
Over-Voltage Protection	-25 to +30 VDC (power on) -35 to +35 VDC (power off)
Accuracy	±0.1% FSR @ 25°C ±0.3% FSR @ -40 and 75°C
Sampling Rate	All channels: 100 samples/sec Per channel: 12.5 samples/sec Single channel: 100 samples/sec
Input Impedance	45MR-3800: 120 ohms 45MR-3810: 10 mega-ohms (min.)

Analog Outputs

Connector	Spring-type Euroblock terminal
I/O Mode	Voltage/Current
Output Range	0 to 10 VDC 0 to 20 mA 4 to 20 mA
Resolution	12-bit
Accuracy	±0.1% FSR @ 25°C ±0.3% FSR @ -40 to 75°C
Load (Current Mode)	Internal power: 500 ohms (max.)
Load (Voltage Mode)	1000 ohms (min.)

RTDs

Connector	Spring-type Euroblock terminal
Sensor Type	PT50, PT100, PT200, PT500 (-200 to 850°C) PT1000 (-200 to 350°C) JPT100, JPT200, JPT500 (-200 to 640°C) JPT1000 (-200 to 350°C) NI100, NI200, NI500 (-60 to 250°C) NI1000 (-60 to 150°C) NI120 (-80 to 260°C)

Resistance Type	310, 620, 1250, and 2200 ohms
Input Connection	2- or 3-wire
Sampling Rate	All channels: 12 samples/sec Per channel: 2 samples/sec
Resolution	0.1°C or 0.1 ohms
Accuracy	±0.1% FSR @ 25°C ±0.3% FSR @ -40 and 75°C
Input Impedance	625 kilo-ohms (min.)

Thermocouples

Connector	Spring-type Euroblock terminal
Sensor Type	J, K, T, E, R, S, B, N
Millivolt Type	±19.532 mV ±39.062 mV ±78.126 mV
Resolution	16 bits
Millivolt Accuracy	±0.1% FSR @ 25°C ±0.3% FSR @ -40 and 75°C
Sampling Rate	All channels: 12 samples/sec Per channel: 1.5 samples/sec
Input Impedance	1 mega-ohms (min.)

System Power Parameters

Power Connector	Spring-type Euroblock terminal
No. of Power Inputs	1
Input Voltage	12 to 48 VDC
Output Current	1 A (max.)
Power Consumption	800 mA @ 12 VDC
Over-Voltage Protection	55 VDC
Over-Current Protection	1 A @ 25°C

Field Power Parameters

Power Connector	Spring-type Euroblock terminal
No. of Power Inputs	1
Input Voltage	12/24 VDC
Output Current	2 A (max.)
Over-Current Protection	2.5 A @ 25°C
Over-Voltage Protection	33 VDC
Potential Output Mode	45MR-7820: 0 VDC, 12/24 VDC

Power Consumption

System Power	45MR-1600: 59.4 mA @ 3.3 VDC 45MR-1601: 59.4 mA @ 3.3 VDC 45MR-2404: 44 mA @ 3.3 VDC 45MR-2600: 57.2 mA @ 3.3 VDC 45MR-2601: 63.8 mA @ 3.3 VDC 45MR-2606: 62.7 mA @ 3.3 VDC 45MR-3800: 197.3 mA @ 3.3 VDC 45MR-3810: 187 mA @ 3.3 VDC 45MR-4420: 44 mA @ 3.3 VDC 45MR-6600: 131.7 mA @ 3.3 VDC 45MR-6810: 148.1 mA @ 3.3 VDC 45MR-7210: 45m A @ 24 VDC
Field Power	45MR-1600: 19.3 mA @ 12 VDC, 25.3 mA @ 24 VDC 45MR-1601: 19.3 mA @ 12 VDC, 25.3 mA @ 24 VDC 45MR-2404: 31.2 mA @ 12 VDC, 24.7 mA @ 24 VDC 45MR-2606: 15.4 mA @ 12 VDC, 18.7 mA @ 24 VDC 45MR-4420: 220.2 mA @ 12 VDC, 122.3 mA @ 24 VDC

Physical Characteristics

Housing	Plastic
Dimensions	19.5 x 99 x 60.5 mm (0.77 x 3.90 x 2.38 in)
Weight	45MR-1600: 77 g (0.17 lb) 45MR-1601: 77.6 g (0.171 lb) 45MR-2404: 88.4 g (0.195 lb) 45MR-2600: 77.4 g (0.171 lb) 45MR-2601: 77 g (0.17 lb) 45MR-2606: 77.4 g (0.171 lb) 45MR-3800: 79.8 g (0.176 lb) 45MR-3810: 79 g (0.175 lb) 45MR-4420: 79 g (0.175 lb) 45MR-6600: 78.7 g (0.174 lb) 45MR-6810: 78.4 g (0.173 lb) 45MR-7210: 77 g (0.17 lb) 45MR-7820: 73.6 g (0.163 lb)
Installation	DIN-rail mounting
Strip Length	I/O cable, 9 to 10 mm
Wiring	45MR-2404: 18 AWG 45MR-7210: 12 to 18 AWG 45MR-2600/45MR-2601/45MR-2606: 18 to 22 AWG All Other 45MR Models: 18 to 24 AWG

Environmental Limits

Operating Temperature	Standard Models: -20 to 60°C (-4 to 140°F) Wide Temp. Models: -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)[1]
Altitude	Up to 4000 meters[2]

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 1 GHz: 3 V/m IEC 61000-4-4 EFT: Power: 1 kV; Signal: 0.5 kV

1. The relays of the 45MR-2404 may malfunction when operating in high condensation environments below 0°C.
2. Please contact Moxa if you require products guaranteed to function properly at higher altitudes.

	IEC 61000-4-5 Surge: Power: 2 kV; Signal: 1 kV IEC 61000-4-6 CS: 3 V IEC 61000-4-8 PFMF
Shock	IEC 60068-2-27
Vibration	IEC 60068-2-6
Safety	UL 61010-2-201
Hazardous Locations	ATEX, Class I Division 2

Declaration

Green Product	RoHS, CRoHS, WEEE

MTBF

Time	45MR-1600: 661,247 hrs 45MR-1601: 661,247 hrs 45MR-2404: 1,955,805 hrs 45MR-2600: 647,334 hrs 45MR-2601: 660,179 hrs 45MR-2606: 638,652 hrs 45MR-3800: 2,085,426 hrs 45MR-3810: 2,478,459 hrs 45MR-4420: 1,450,453 hrs 45MR-6600: 2,291,755 hrs 45MR-6810: 1,649,892 hrs 45MR-7210: 2,550,077 hrs 45MR-7820: 256,886,914 hrs
Standards	Telcordia SR332

Warranty

Warranty Period	All models except 45MR-2404: 5 years 45MR-2404: 2 years[3]
Details	See www.moxa.com/warranty

Package Contents

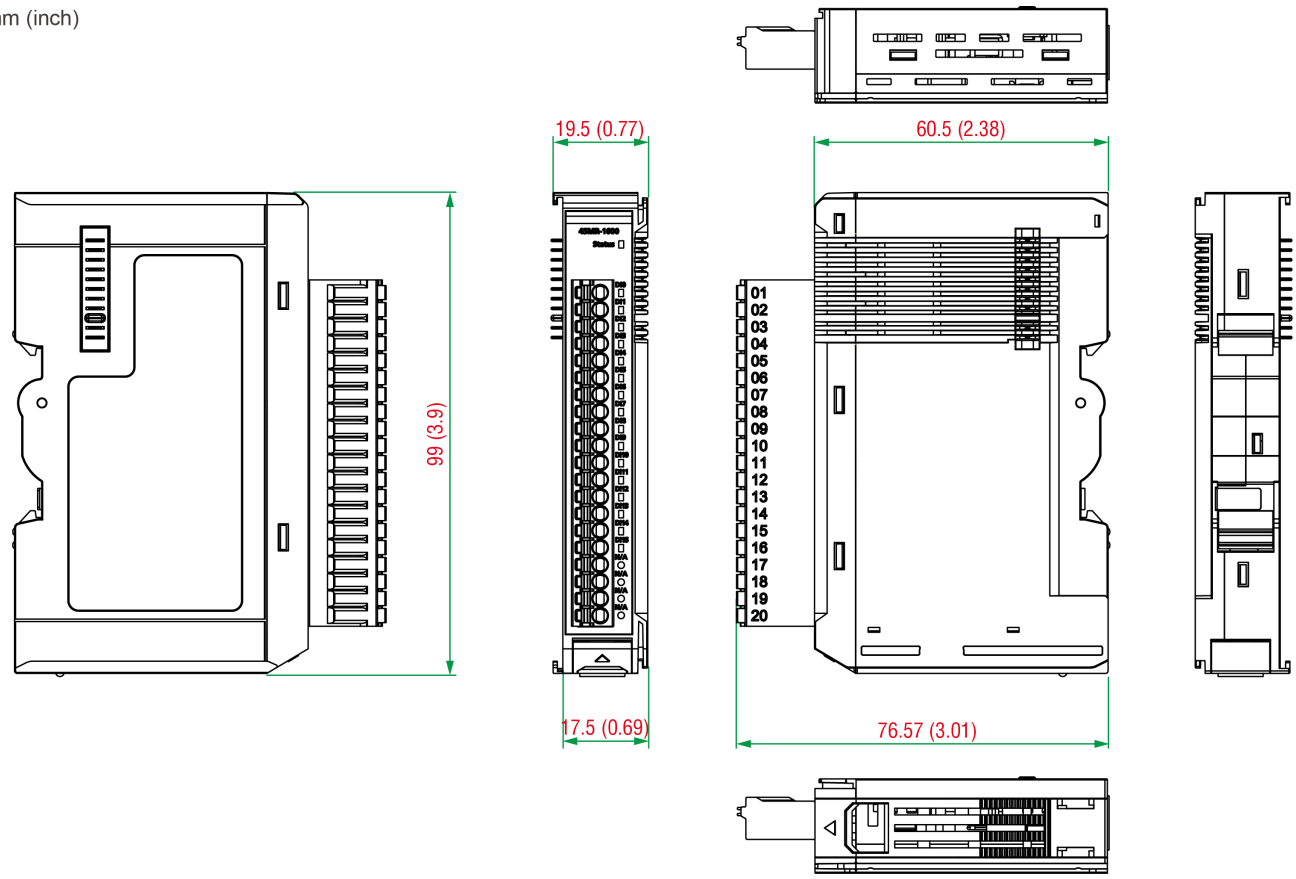
Device	1 x 45MR Series product
Installation Kit	1 x terminal block, 20-pin, 3.5 mm
Documentation	1 x quick installation guide 1 x warranty card

3. Because of the limited lifetime of power relays, products that use this component are covered by a 2-year warranty.

Dimensions

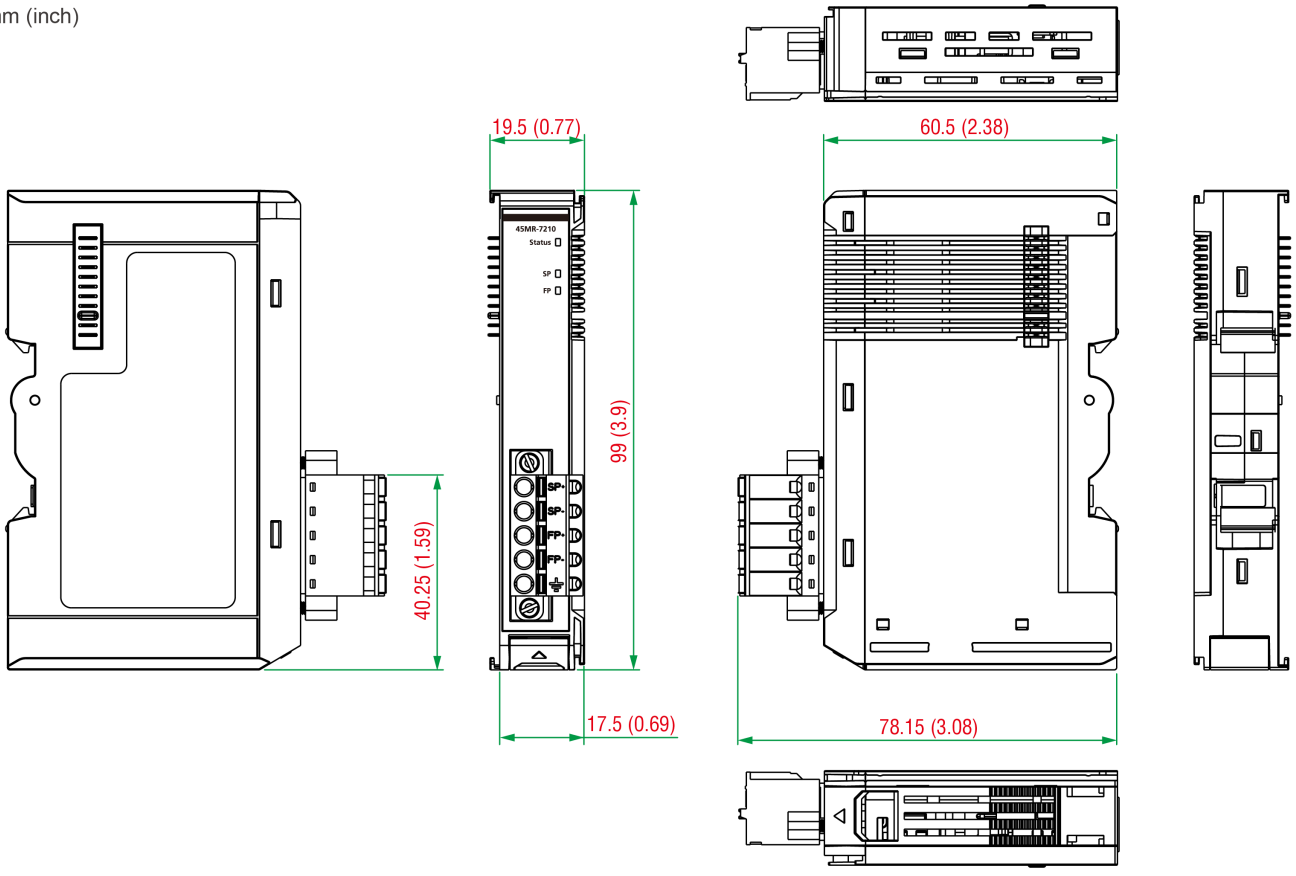
ioThinx 4500 Modules (not including the 45MR-7200)

Unit: mm (inch)



ioThinx 4500 45MR-7200 Module

Unit: mm (inch)



Ordering Information

Model Name	Input/Output Interface	Digital Input	Digital Output	Relay	Analog Input Type	Analog Output Type	Power	Operating Temp.
45MR-1600	16 x DI	PNP 12/24VDC	–	–	–	–	–	-20 to 60°C
45MR-1600-T	16 x DI	PNP 12/24VDC	–	–	–	–	–	-40 to 75°C
45MR-1601	16 x DI	NPN 12/24 VDC	–	–	–	–	–	-20 to 60°C
45MR-1601-T	16 x DI	NPN 12/24 VDC	–	–	–	–	–	-40 to 75°C
45MR-2404	4 x Relay	–	–	Form A 30 VDC/250 VAC, 2 A	–	–	–	-20 to 60°C
45MR-2404-T	4 x Relay	–	–	Form A 30 VDC/250 VAC, 2 A	–	–	–	-40 to 75°C
45MR-2600	16 x DO	–	Sink 12/24 VDC	–	–	–	–	-20 to 60°C
45MR-2600-T	16 x DO	–	Sink 12/24 VDC	–	–	–	–	-40 to 75°C
45MR-2601	16 x DO	–	Source 12/24 VDC	–	–	–	–	-20 to 60°C
45MR-2601-T	16 x DO	–	Source 12/24 VDC	–	–	–	–	-40 to 75°C
45MR-2606	8 x DI, 8 x DO	PNP 12/24VDC	Source 12/24 VDC	–	–	–	–	-20 to 60°C
45MR-2606-T	8 x DI, 8 x DO	PNP 12/24VDC	Source 12/24 VDC	–	–	–	–	-40 to 75°C
45MR-3800	8 x AI	–	–	–	0 to 20 mA 4 to 20 mA	–	–	-20 to 60°C
45MR-3800-T	8 x AI	–	–	–	0 to 20 mA 4 to 20 mA	–	–	-40 to 75°C
45MR-3810	8 x AI	–	–	–	-10 to 10 VDC 0 to 10 VDC	–	–	-20 to 60°C
45MR-3810-T	8 x AI	–	–	–	-10 to 10 VDC 0 to 10 VDC	–	–	-40 to 75°C
45MR-4420	4 x AO	–	–	–	–	0 to 10 V 0 to 20 mA 4 to 20 mA	–	-20 to 60°C
45MR-4420-T	4 x AO	–	–	–	–	0 to 10 V 0 to 20 mA 4 to 20 mA	–	-40 to 75°C
45MR-6600	6 x RTD	–	–	–	RTD	–	–	-20 to 60°C
45MR-6600-T	6 x RTD	–	–	–	RTD	–	–	-40 to 75°C
45MR-6810	8 x TC	–	–	–	TC	–	–	-20 to 60°C
45MR-6810-T	8 x TC	–	–	–	TC	–	–	-40 to 75°C
45MR-7210	1 x system power input 1 x field power input	–	–	–	–	–	1 x SP+ 1 x SP- 1 x FP+ 1 x FP- 1 x FP GND	-20 to 60°C
45MR-7210-T	1 x system power input 1 x field power input	–	–	–	–	–	1 x SP+ 1 x SP- 1 x FP+ 1 x FP- 1 x FP GND	-40 to 75°C

Model Name	Input/Output Interface	Digital Input	Digital Output	Relay	Analog Input Type	Analog Output Type	Power	Operating Temp.
45MR-7820	8 x field power output	–	–	–	–	–	8 x FP+ 8 x FP-	-20 to 60°C
45MR-7820-T	8 x field power output	–	–	–	–	–	8 x FP+ 8 x FP-	-40 to 75°C

© Moxa Inc. All rights reserved. Updated Oct 06, 2022.

This document and any portion thereof may not be reproduced or used in any manner whatsoever without the express written permission of Moxa Inc. Product specifications subject to change without notice. Visit our website for the most up-to-date product information.