ioThinx 4500 Series (45MR) Modules

Modules for ioThinx 4500 Series



Features and Benefits

- 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)

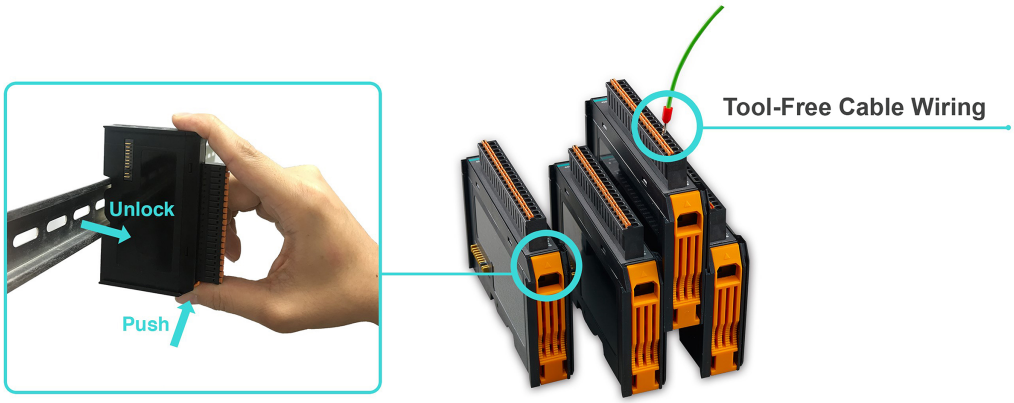
Certifications

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

	45MR-3810 Series: 8
Relay Channels	45MR-2404 Series: 4
Analog Output Channels	45MR-4420 Series: 4
RTD Channels	45MR-6600 Series: 6
Thermocouple Channels	45MR-6810 Series: 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 Series: DI or event counter (only supports the first 4 channels) 45MR-2606 Series: 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 Series: Sink 45MR-2601/2606 Series: Source
I/O Mode	45MR-2600/2601 Series: DO or pulse output (only supports the first 4 channels) 45MR-2606 Series: 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	400,000 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 Series: 0 to 20 mA, 4 to 20 mA, 4 to 20 mA (burnout detection) 45MR-3810 Series: 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 Series: 120 ohms 45MR-3810 Series: 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.)

Power Parameters

Mode	45MR-7820 Series: 0, 12/24 VDC
Channels	45MR-7820 Series: 8

System Power Parameters

Power Connector	45MR-7210: Spring-type Euroblock terminal 45MR-7210-T: Spring-type Euroblock terminal
Over-Current Protection	45MR-7210: 1 A @ 25°C 45MR-7210-T: 1 A @ 25°C
No. of Power Inputs	45MR-7210: 1 45MR-7210-T: 1
Input Voltage	45MR-7210: 12 to 48 VDC, 45MR-7210-T: 12 to 48 VDC
Power Consumption	45MR-7210: 800 mA @ 12 VDC 45MR-7210-T: 800 mA @ 12 VDC
Output Current	45MR-7210: 1 A (max.) 45MR-7210-T: 1 A (max.)
Over-Voltage Protection	45MR-7210-T: 55 VDC 45MR-7210: 55 VDC

Field Power Parameters

Power Connector	45MR-7210: Spring-type Euroblock terminal 45MR-7210-T: Spring-type Euroblock terminal
No. of Power Inputs	45MR-7210: 1 45MR-7210-T: 1
Output Current	45MR-7210: 2 A (max.) 45MR-7210-T: 2 A (max.)
Input Voltage	45MR-7210: 12/24 VDC, 45MR-7210-T: 12/24 VDC

Over-Current Protection	45MR-7210: 2.5 A @ 25°C 45MR-7210-T: 2.5 A @ 25°C
Over-Voltage Protection	45MR-7210-T: 33 VDC 45MR-7210: 33 VDC

Power Consumption

System Power	45MR-1600 Series: 59.4 mA @ 3.3 VDC 45MR-1601 Series: 59.4 mA @ 3.3 VDC 45MR-2404 Series: 44 mA @ 3.3 VDC 45MR-2600 Series: 57.2 mA @ 3.3 VDC 45MR-2601 Series: 63.8 mA @ 3.3 VDC 45MR-2606 Series: 62.7 mA @ 3.3 VDC 45MR-3800 Series: 197.3 mA @ 3.3 VDC 45MR-3810 Series: 187 mA @ 3.3 VDC 45MR-4420 Series: 44 mA @ 3.3 VDC 45MR-6600 Series: 131.7 mA @ 3.3 VDC 45MR-6810 Series: 148.1 mA @ 3.3 VDC 45MR-7210 Series: 45m A @ 24 VDC
Field Power	45MR-1600 Series: 19.3 mA @ 12 VDC 45MR-1601 Series: 19.3 mA @ 12 VDC 45MR-2404 Series: 31.2 mA @ 12 VDC 45MR-2606 Series: 15.4 mA @ 12 VDC 45MR-4420 Series: 220.2 mA @ 12 VDC 45MR-1600 Series: 25.3 mA @ 24 VDC 45MR-1601 Series: 25.3 mA @ 24 VDC 45MR-2404 Series: 24.7 mA @ 24 VDC 45MR-2606 Series: 18.7 mA @ 24 VDC 45MR-4420 Series: 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 Series: 77 g (0.17 lb) 45MR-1601 Series: 77.6 g (0.171 lb) 45MR-2404 Series: 88.4 g (0.195 lb) 45MR-2600 Series: 77.4 g (0.171 lb) 45MR-2601 Series: 77 g (0.17 lb) 45MR-2606 Series: 77.4 g (0.171 lb) 45MR-3800 Series: 79.8 g (0.176 lb) 45MR-3810 Series: 79 g (0.175 lb) 45MR-4420 Series: 79 g (0.175 lb) 45MR-6600 Series: 78.7 g (0.174 lb) 45MR-6810 Series: 78.4 g (0.173 lb) 45MR-7210 Series: 77 g (0.17 lb) 45MR-7820 Series: 73.6 g (0.163 lb)
Installation	DIN-rail mounting
Wiring	I/O cable, 18 to 24 AWG
Strip Length	I/O cable, 9 to 10 mm

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]

1. The relays of the 45MR-2404 Series 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.

Standards and Certifications

EMC	EN 55032/24
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 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 (except 45MR-4420 Series & 45MR-7210 Series)

Declaration

Green Product	RoHS, CRoHS, WEEE

MTBF

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

Warranty

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

Package Contents

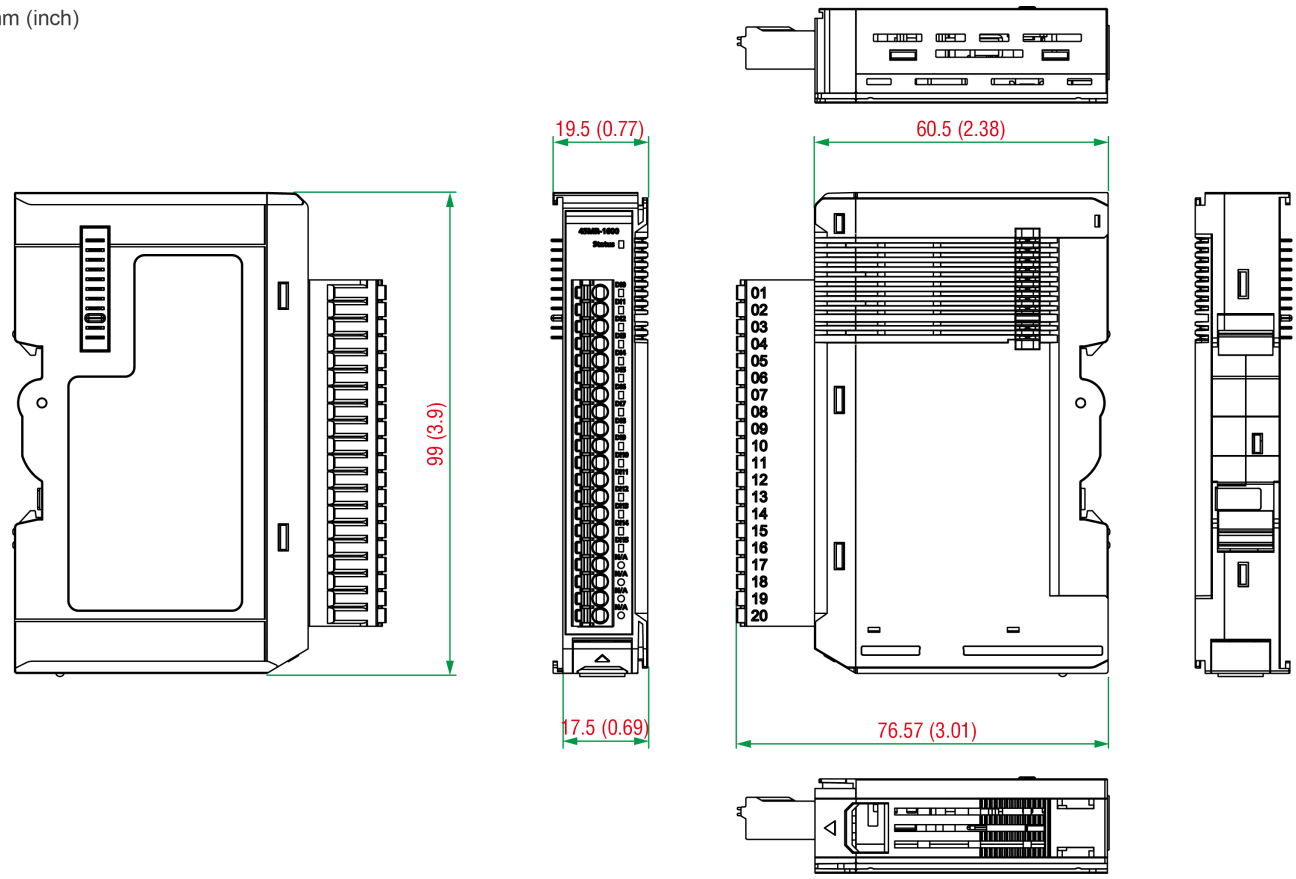
Device	1 x 45MR Series product
Installation Kit	1 x terminal block, 20-pin, 3.5 mm
Documentation	1 x quick installation guide 1 x warranty card

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

Dimensions

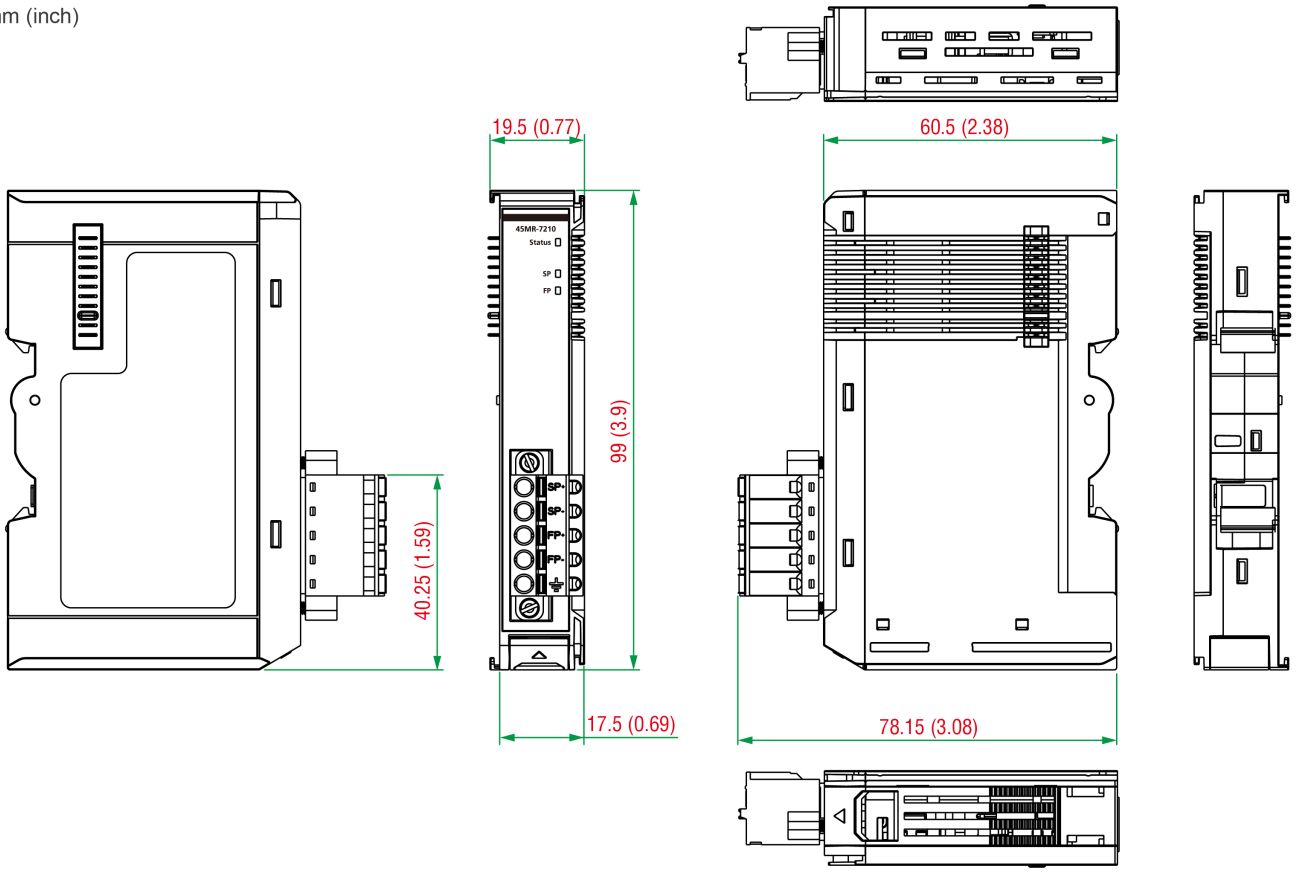
ioThinx 4500 Modules (not including the 45MR-7200)

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 Nov 21, 2019.

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.