

# ioThinx 4500 系列 (45MR) 模組

ioThinx 4500 系列的 I/O 和電源模組



## 特色與優點

- I/O 模組包括 DI/O、AI/O、繼電器和其他類型的 I/O。
- 系統電源輸入和現場電源輸入的電源模組
- 無需工具即可輕鬆安裝和拆卸
- 內建 I/O 通道 LED 指示燈
- 寬操作溫度範圍-40 至 75°C ( -40 至 167°F )
- Class I Division 2 和 ATEX Zone 2 認證

## 認證

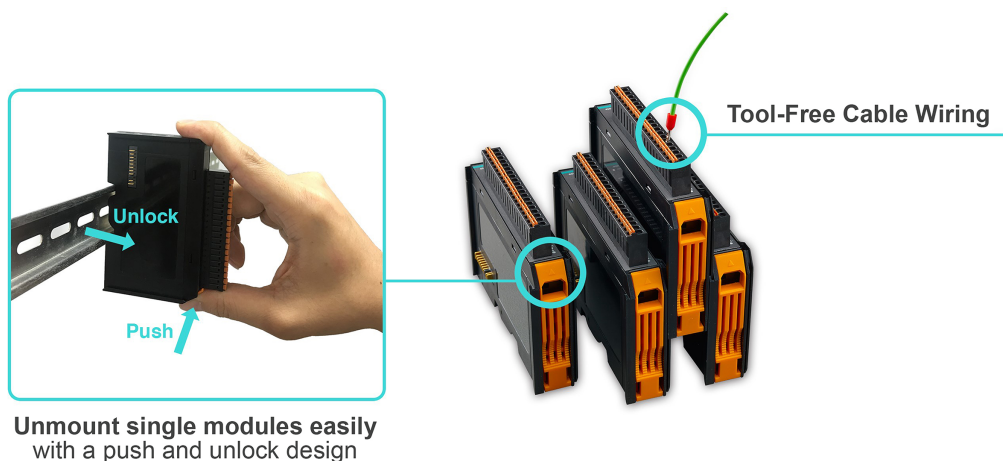


## 簡介

Moxa 的 ioThinx 4500 系列 (45MR) 模組提供多種 I/O 類型，包括 DI/O、AI、繼電器、RTD 和其他 I/O 類型，使用者有多種選項可供選擇，使用者可選擇最適合其目標應用的 I/O 組合。憑藉其獨特的機械設計，無需工具即可輕鬆安裝和拆卸硬體，大幅減少設置和更換模組所需的時間。

### 無需工具即可輕鬆安裝和拆卸

ioThinx 4500 系列採用獨特的機構設計，可減少安裝和拆卸所需的時間。硬體安裝的任何部分都不需要螺絲起子和其他工具，包括將設備安裝到 DIN 軌道上，以及連接通訊和 I/O 訊號擷取的線路。此外，無需任何工具即可從 DIN 軌道上拆卸 ioThinx。使用門鎖和釋放片，從 DIN 軌道上拆卸所有模組也很容易。



## 規格

### Input/Output Interface

|                         |                                                |
|-------------------------|------------------------------------------------|
| Digital Input Channels  | 45MR-1600: 16<br>45MR-1601: 16<br>45MR-2606: 8 |
| Digital Output Channels | 45MR-2600: 16<br>45MR-2601: 16<br>45MR-2606: 8 |
| Analog Input Channels   | 45MR-3800: 8<br>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<br>Wet contact (NPN or PNP)                                                                                                         |
| I/O Mode                        | 45MR-1600/1601: DI or event counter (only supports the first 4 channels)<br>45MR-2606: DI or event counter (only supports the first 2 channels) |
| Dry Contact                     | On: short to FP+/FP-<br>Off: open                                                                                                               |
| Wet Contact (DI to FP-)         | On: 10 to 30 VDC<br>Off: 0 to 3 VDC                                                                                                             |
| Wet Contact (DI to FP+)         | On: 10 to 30 VDC<br>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<br>45MR-2601/2606: Source                                                                                                     |
| I/O Mode                  | 45MR-2600/2601: DO or pulse output (only supports the first 4 channels)<br>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<br>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                                                                                                 |
| Converter Resolution    | 16 bits                                                                                                      |
| Input Range             | 45MR-3800: 0 to 20 mA, 4 to 20 mA, 4 to 20 mA (burnout detection)<br>45MR-3810: 0 to 10 VDC or -10 to 10 VDC |
| Over-Voltage Protection | -25 to +30 VDC (power on)<br>-35 to +35 VDC (power off)                                                      |
| Accuracy                | ±0.1% FSR @ 25°C<br>±0.3% FSR @ -40 and 75°C                                                                 |
| Sampling Rate           | All channels: 100 samples/sec<br>Per channel: 12.5 samples/sec<br>Single channel: 100 samples/sec            |
| Input Impedance         | 45MR-3800: 120 ohms<br>45MR-3810: 10 mega-ohms (min.)                                                        |

#### Analog Outputs

|                      |                                             |
|----------------------|---------------------------------------------|
| Connector            | Spring-type Euroblock terminal              |
| I/O Mode             | Voltage/Current                             |
| Output Range         | 0 to 10 VDC<br>0 to 20 mA<br>4 to 20 mA     |
| Converter Resolution | 12-bit                                      |
| Accuracy             | ±0.1% FSR @ 25°C<br>±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)<br>PT1000 (-200 to 350°C)<br>JPT100, JPT200, JPT500 (-200 to 640°C)<br>JPT1000 (-200 to 350°C)<br>NI100, NI200, NI500 (-60 to 250°C)<br>NI1000 (-60 to 150°C)<br>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<br>Per channel: 2 samples/sec |
| Converter Resolution | 0.1°C or 0.1 ohms                                          |
| Accuracy             | ±0.1% FSR @ 25°C<br>±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<br>±39.062 mV<br>±78.126 mV                       |
| Converter Resolution | 16 bits                                                      |
| Millivolt Accuracy   | ±0.1% FSR @ 25°C<br>±0.3% FSR @ -40 and 75°C                 |
| Sampling Rate        | All channels: 12 samples/sec<br>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<br>45MR-1601: 59.4 mA @ 3.3 VDC<br>45MR-2404: 44 mA @ 3.3 VDC<br>45MR-2600: 57.2 mA @ 3.3 VDC<br>45MR-2601: 63.8 mA @ 3.3 VDC<br>45MR-2606: 62.7 mA @ 3.3 VDC<br>45MR-3800: 197.3 mA @ 3.3 VDC<br>45MR-3810: 187 mA @ 3.3 VDC<br>45MR-4420: 44 mA @ 3.3 VDC<br>45MR-6600: 131.7 mA @ 3.3 VDC<br>45MR-6810: 148.1 mA @ 3.3 VDC<br>45MR-7210: 45mA @ 24 VDC |
| Field Power  | 45MR-1600: 19.3 mA @ 12 VDC, 25.3 mA @ 24 VDC<br>45MR-1601: 19.3 mA @ 12 VDC, 25.3 mA @ 24 VDC<br>45MR-2404: 31.2 mA @ 12 VDC, 24.7 mA @ 24 VDC<br>45MR-2600: 10.8 mA @ 12 VDC, 10.8 mA @ 24 VDC<br>45MR-2601: 10.8 mA @ 12 VDC, 10.8 mA @ 24 VDC<br>45MR-2606: 15.4 mA @ 12 VDC, 18.7 mA @ 24 VDC<br>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)<br>45MR-1601: 77.6 g (0.171 lb)<br>45MR-2404: 88.4 g (0.195 lb)<br>45MR-2600: 77.4 g (0.171 lb)<br>45MR-2601: 77 g (0.17 lb)<br>45MR-2606: 77.4 g (0.171 lb)<br>45MR-3800: 79.8 g (0.176 lb)<br>45MR-3810: 79 g (0.175 lb)<br>45MR-4420: 79 g (0.175 lb)<br>45MR-6600: 78.7 g (0.174 lb)<br>45MR-6810: 78.4 g (0.173 lb)<br>45MR-7210: 77 g (0.17 lb)<br>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<br>45MR-7210: 12 to 18 AWG<br>45MR-2600/45MR-2601/45MR-2606: 18 to 22 AWG<br>All Other 45MR Models: 18 to 24 AWG                                                                                                                                                                                                                                                                              |

## Environmental Limits

|                                        |                                                                                             |
|----------------------------------------|---------------------------------------------------------------------------------------------|
| Operating Temperature                  | Standard Models: -20 to 60°C (-4 to 140°F)<br>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) <sup>1</sup>                                                      |
| Altitude                               | Up to 4000 meters <sup>2</sup>                                                              |

## 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 |

1. 45MR-2404 的繼電器在 0°C 以下的高冷凝環境中運作時可能會發生故障。
2. 如果您需要產品能在高海拔地區正常運作，請與 Moxa 聯繫。

|                     |                                                                                                                                                                                             |
|---------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                     | IEC 61000-4-3 RS: 80 MHz to 1 GHz: 3 V/m<br>IEC 61000-4-4 EFT: Power: 1 kV; Signal: 0.5 kV<br>IEC 61000-4-5 Surge: Power: 2 kV; Signal: 1 kV<br>IEC 61000-4-6 CS: 3 V<br>IEC 61000-4-8 PFMF |
| Shock               | IEC 60068-2-27                                                                                                                                                                              |
| Vibration           | IEC 60068-2-6                                                                                                                                                                               |
| Safety              | UL 61010-2-201                                                                                                                                                                              |
| Hazardous Locations | ATEX<br>Class I Division 2                                                                                                                                                                  |

## Declaration

|               |                   |
|---------------|-------------------|
| Green Product | RoHS, CRoHS, WEEE |
|---------------|-------------------|

## MTBF

|           |                                                                                                                                                                                                                                                                                                                                                                  |
|-----------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Time      | 45MR-1600: 661,247 hrs<br>45MR-1601: 661,247 hrs<br>45MR-2404: 1,955,805 hrs<br>45MR-2600: 647,334 hrs<br>45MR-2601: 660,179 hrs<br>45MR-2606: 638,652 hrs<br>45MR-3800: 2,085,426 hrs<br>45MR-3810: 2,478,459 hrs<br>45MR-4420: 1,450,453 hrs<br>45MR-6600: 2,291,755 hrs<br>45MR-6810: 1,649,892 hrs<br>45MR-7210: 2,550,077 hrs<br>45MR-7820: 256,886,914 hrs |
| Standards | Telcordia Standard SR-332                                                                                                                                                                                                                                                                                                                                        |

## Warranty

|                 |                                                                            |
|-----------------|----------------------------------------------------------------------------|
| Warranty Period | All models except 45MR-2404: 5 years<br>45MR-2404: 2 years <sup>3</sup>    |
| Details         | See <a href="http://www.moxa.com/tw/warranty">www.moxa.com/tw/warranty</a> |

## Package Contents

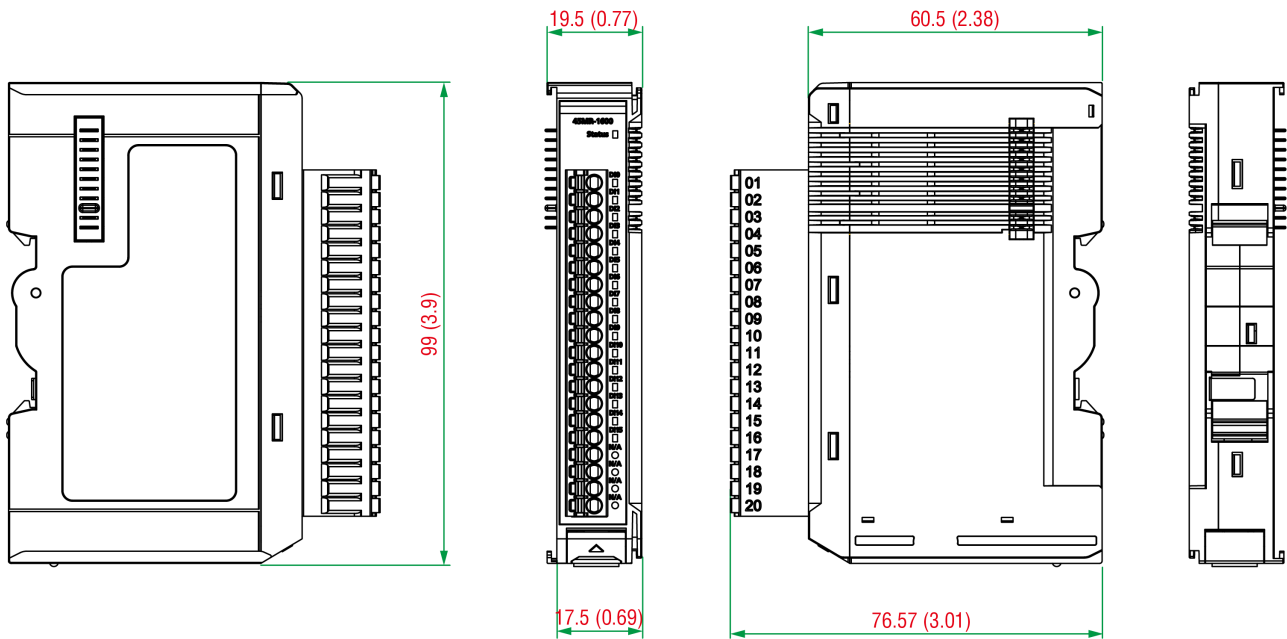
|                  |                                                   |
|------------------|---------------------------------------------------|
| Device           | 1 x 45MR Series product                           |
| Installation Kit | 1 x terminal block, 20-pin, 3.5 mm                |
| Documentation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

3. 由於功率繼電器的使用壽命有限，因此使用此元件的產品享有 2 年保固。

尺寸

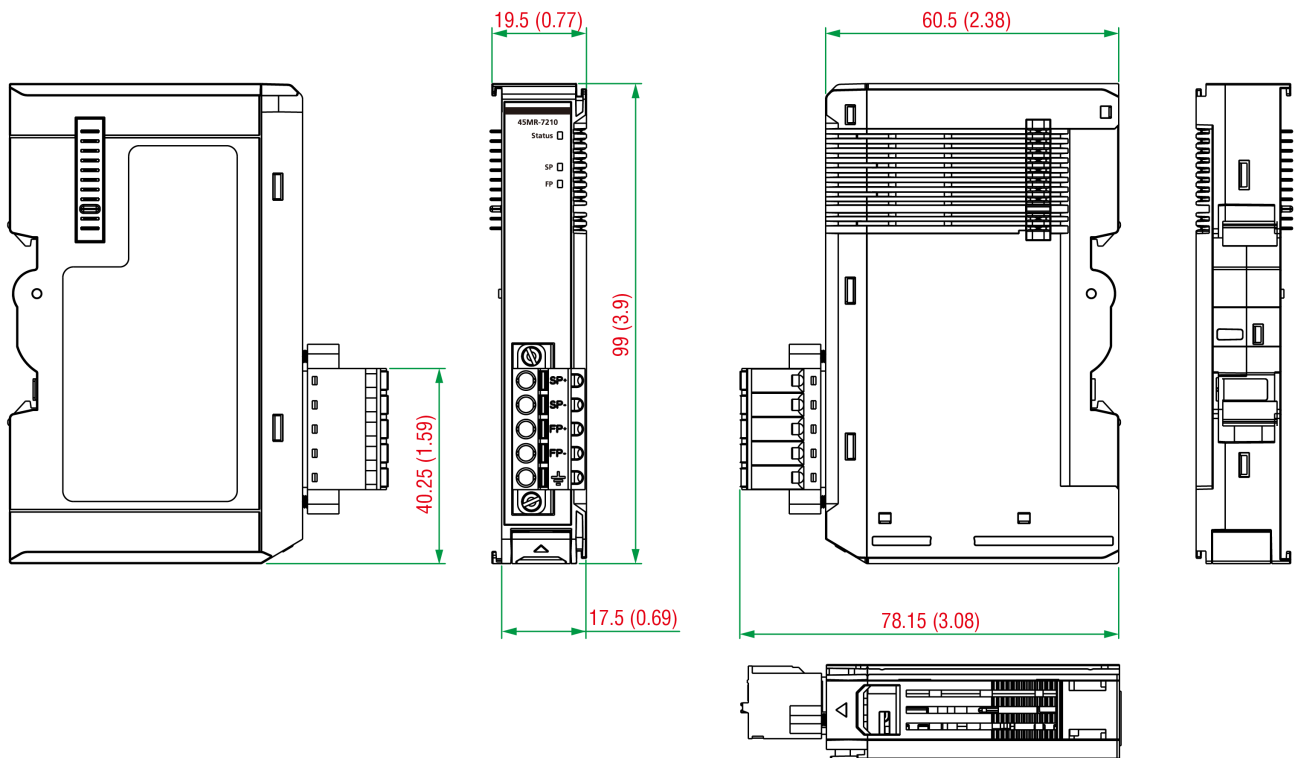
ioThinx 4500 模組 ( 不包括 45MR-7200 )

單位：公釐 (英吋)



ioThinx 4500 45MR-7200 模組

單位：公釐 (英吋)



| 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<br>12/24VDC  | –                   | –                             | –                            | –                                     | –                                                      | -20 to 60°C     |
| 45MR-1600-T | 16 x DI                                               | PNP<br>12/24VDC  | –                   | –                             | –                            | –                                     | –                                                      | -40 to 75°C     |
| 45MR-1601   | 16 x DI                                               | NPN<br>12/24 VDC | –                   | –                             | –                            | –                                     | –                                                      | -20 to 60°C     |
| 45MR-1601-T | 16 x DI                                               | NPN<br>12/24 VDC | –                   | –                             | –                            | –                                     | –                                                      | -40 to 75°C     |
| 45MR-2404   | 4 x Relay                                             | –                | –                   | Form A<br>30 VDC/250 VAC, 2 A | –                            | –                                     | –                                                      | -20 to 60°C     |
| 45MR-2404-T | 4 x Relay                                             | –                | –                   | Form A<br>30 VDC/250 VAC, 2 A | –                            | –                                     | –                                                      | -40 to 75°C     |
| 45MR-2600   | 16 x DO                                               | –                | Sink<br>12/24 VDC   | –                             | –                            | –                                     | –                                                      | -20 to 60°C     |
| 45MR-2600-T | 16 x DO                                               | –                | Sink<br>12/24 VDC   | –                             | –                            | –                                     | –                                                      | -40 to 75°C     |
| 45MR-2601   | 16 x DO                                               | –                | Source<br>12/24 VDC | –                             | –                            | –                                     | –                                                      | -20 to 60°C     |
| 45MR-2601-T | 16 x DO                                               | –                | Source<br>12/24 VDC | –                             | –                            | –                                     | –                                                      | -40 to 75°C     |
| 45MR-2606   | 8 x DI, 8 x DO                                        | PNP<br>12/24VDC  | Source<br>12/24 VDC | –                             | –                            | –                                     | –                                                      | -20 to 60°C     |
| 45MR-2606-T | 8 x DI, 8 x DO                                        | PNP<br>12/24VDC  | Source<br>12/24 VDC | –                             | –                            | –                                     | –                                                      | -40 to 75°C     |
| 45MR-3800   | 8 x AI                                                | –                | –                   | –                             | 0 to 20 mA<br>4 to 20 mA     | –                                     | –                                                      | -20 to 60°C     |
| 45MR-3800-T | 8 x AI                                                | –                | –                   | –                             | 0 to 20 mA<br>4 to 20 mA     | –                                     | –                                                      | -40 to 75°C     |
| 45MR-3810   | 8 x AI                                                | –                | –                   | –                             | -10 to 10 VDC<br>0 to 10 VDC | –                                     | –                                                      | -20 to 60°C     |
| 45MR-3810-T | 8 x AI                                                | –                | –                   | –                             | -10 to 10 VDC<br>0 to 10 VDC | –                                     | –                                                      | -40 to 75°C     |
| 45MR-4420   | 4 x AO                                                | –                | –                   | –                             | –                            | 0 to 10 V<br>0 to 20 mA<br>4 to 20 mA | –                                                      | -20 to 60°C     |
| 45MR-4420-T | 4 x AO                                                | –                | –                   | –                             | –                            | 0 to 10 V<br>0 to 20 mA<br>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<br>power input<br>1 x field power<br>input | –                | –                   | –                             | –                            | –                                     | 1 x SP+<br>1 x SP-<br>1 x FP+<br>1 x FP-<br>1 x FP GND | -20 to 60°C     |
| 45MR-7210-T | 1 x system<br>power input<br>1 x field power<br>input | –                | –                   | –                             | –                            | –                                     | 1 x SP+<br>1 x SP-<br>1 x FP+<br>1 x FP-<br>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+<br>8 x FP- | -20 to 60°C     |
| 45MR-7820-T | 8 x field power output | –             | –              | –     | –                 | –                  | 8 x FP+<br>8 x FP- | -40 to 75°C     |

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