

# ioThinx 4500シリーズ（45MR） モジュール

## ioThinx 4500シリーズ用I/Oおよび電源モジュール

### 機能とメリット

- DI/O、AI/O、リレー、その他のI/Oタイプを含むI/Oモジュール
- システム電源およびフィールド電源用の電源モジュール
- ツール不要の簡単な設置と取り外し
- I/Oチャンネル用の内蔵LEDインジケータ
- 広い動作温度範囲：-40～75℃（-40～167°F）
- Class I Division 2およびATEX Zone 2認証



### 認証

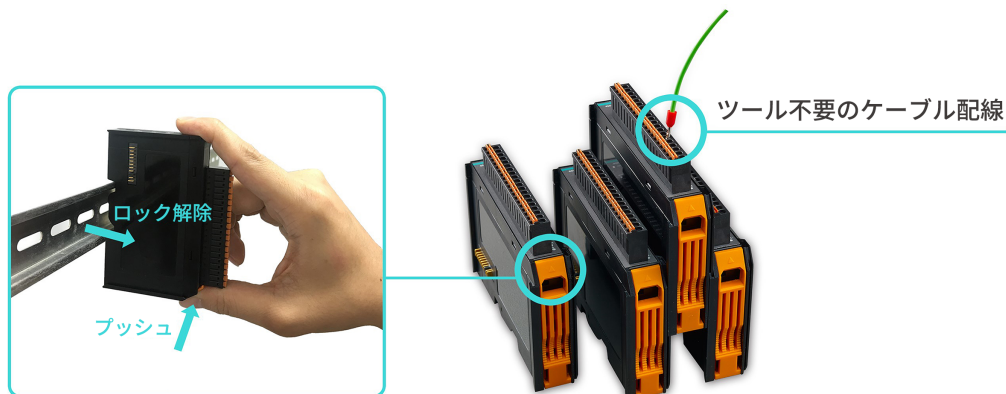


### 製品紹介

MoxaのioThinx 4500シリーズ（45MR）モジュールには、DI/O、AI、リレー、RTD、およびその他のI/Oタイプが用意されており、ユーザーは幅広い選択肢から、対象アプリケーションに最適なI/Oの組み合わせを選択できます。独自の機械設計により、ハードウェアの設置と取り外しがツール不要で簡単に行え、モジュールのセットアップおよび交換に必要な時間を大幅に短縮できます。

#### ツール不要の簡単な設置と取り外し

ioThinx 4500シリーズは、設置と取り外しに必要な時間を短縮する独自の機械設計を採用しています。実際、DINレールへのデバイス取り付け、通信およびI/O信号取得の配線接続を含め、ハードウェア設置のどの部分にもドライバーなどのツールは不要です。さらに、DINレールからioThinxを取り外す際にもツールは不要です。DINレールからすべてのモジュールを取り外すのも、ラッチ/リリースタブを使用して簡単に行うことができます。



プッシュとロック解除の設計により、単一モジュールを簡単に取り外し可能

### 仕様

#### 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のリレーは、0°C未満の高結露環境で動作すると誤動作する可能性があります。
2. Please contact Moxa if you require products guaranteed to function properly at higher altitudes.

|                     |                                                                                                                                                                                             |
|---------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                     | 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/jp/warranty">www.moxa.com/jp/warranty</a> |

## Package Contents

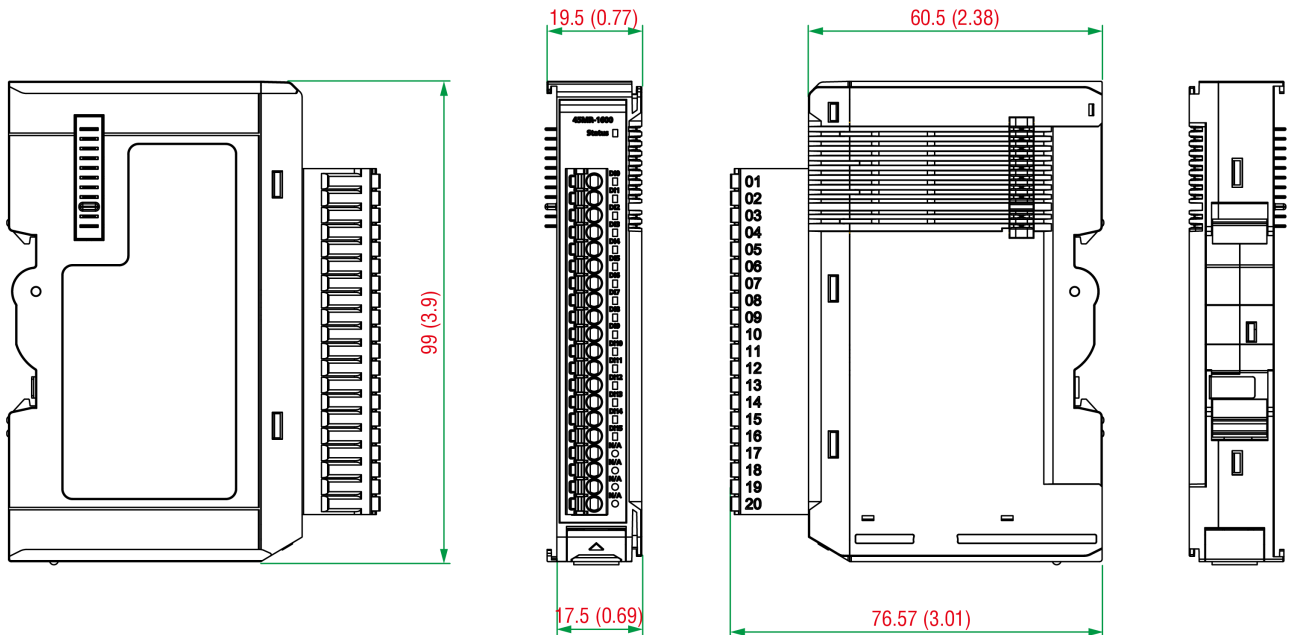
|                  |                                                   |
|------------------|---------------------------------------------------|
| Device           | 1 x 45MR Series product                           |
| Installation Kit | 1 x terminal block, 20-pin, 3.5 mm                |
| Documentation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

3. パワーリレーの寿命には制限があるため、このコンポーネントを使用する製品は2年間の保証の対象となります。

## 寸法

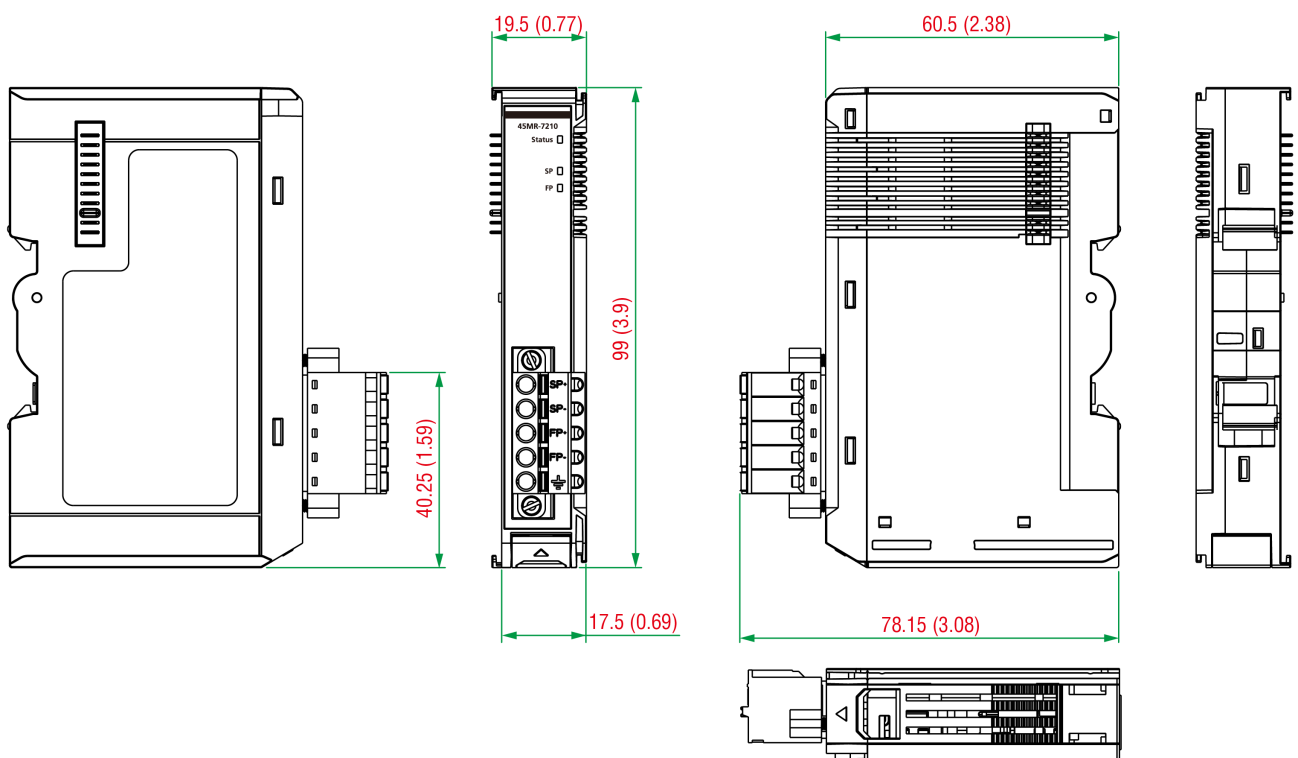
### ioThinx 4500モジュール（45MR-7200を除く）

単位：mm（インチ）



### ioThinx 4500 45MR-7200モジュール

単位：mm（インチ）



## 注文情報

| 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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