# MD4814 Process & Temperature Meters
Data Sheet


- 1/8 DIN Digital Panel Meter with NEMA 4X, IP65 Front
- 4-20 mA, ± 10 V, TC & RTD Field Selectable Inputs
- Easy Field Scaling in Engineering Units without Applying an Input
- Full 4-Digit Display, 0.56” (14.2 mm) or 1.20” (30.5 mm)
- Shallow Depth Case Extends Only 3.6” (91 mm) Behind Panel
- Isolated 24 VDC @ 200 mA Transmitter Power Supply Option
- 2 Relays + Isolated 4-20 mA Output Options
- Free PC-Based MeterView Programming & Monitoring Software
- No Assembly Required
- Sunlight Readable Display
- Operating Temperature Range: -40 to 65°C (-40 to 149°F)
- UL & C-UL Listed. UL 508 Industrial Control Equipment
- Input Power Options: 85-265 VAC / 90-265 VDC or 12-36 VDC / 12-24 VAC
- Duplex Pump Controller with Alternation Capability
- External Contacts for Remote Button Operation (MD4814-X2 Only)
- USB, RS-232, & RS-485 Serial Communication Adapters Options
- Modbus RTU Communication Protocol Standard
- Copy Meter Settings to Other MD4814 Meters
- Password Protection
- Max/Min Display
- High & Low Alarms with Multiple Reset Actions
- Stainless Steel Sun Hood Accessory Available
- 3-Year Warranty

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# MD4814 Process & Temperature Meters

## *MD4814 & MD4814 X2 Displays*

Front Panel
NEMA 4X Rated

(Actual Size Digits)


0.56" (14.2 mm) Display

1.2" (30.5 mm) Display

## FEATURE RICH & SIMPLE TO USE

The MD4814 digital panel meter is one of the most versatile digital panel meters on the market and will satisfy a wide variety of process applications. The MD4814 can be field programmed to accept process voltage (0-5V, 1-5V, etc) and current (4-20 mA) inputs, 100 Ohm RTDs, and the four most common thermocouples. It is housed in a shallow-depth, 1/8 DIN enclosure that features a NEMA 4X front panel and convenient mounting hardware. There are two power options for the MD4814: 85 to 265 VAC or 12-36 VDC and it can provide 24 VDC to power the transmitter if needed. Programming and setup can be performed with the four front panel pushbuttons, free MeterView software, or using the Copy function.

## TWO DISPLAY SIZES

The display height on the standard MD4814 meter is 0.56" (14.2 mm) and on the MD4814 X2 the display height is an astounding 1.2" (30.5 mm). The MD4814 X2 can be read easily from distances of up to 30 feet!

The intensity of the display on both versions of the MD4814 can be adjusted to compensate for various lighting conditions, including direct sunlight.

## VERSATILE OPERATION

Look to the MD4814 meter for the key features and options you want and don't worry about getting bogged down in a confusing array of things you don't need. The MD4814's Max/Min function, 2 relays or 4-20 mA output, serial communication, and Modbus RTU options provide all the utility you need to handle all the common applications.

### Maximum/Minimum

To display the maximum and minimum readings since the last reset/power-up, use the Up arrow/Max button

### Powerful Relay Functionality

All relay functions are set up from the front panel or from a PC running MeterView software.

- Automatic reset only
- Automatic or manual reset
- Latching or non-latching relays
- Pump alternation control
- On and off time delays from 0 to 199 seconds
- Fail-safe operation is user selectable

### Isolated 4-20 mA Transmitter Output

The MD4814's optional Isolated 4-20 mA output option converts the MD4814 into a transmitter with a digital display; perfect for temperature applications!

### Serial Communication Adapters & Converters

A wide variety of serial communication adapters and converters are available for the MD4814 meter. A serial adapter and Madison's free MeterView software allows the MD4814 to be programmed from a computer and to connect to a PC for data acquisition. Adapters are available for USB, RS-232, and RS-485 communications. Converters are available for isolated and non-isolated RS-232 to RS-422/485 and USB to RS-422/485.


**PDA8006**


**PDA7232**

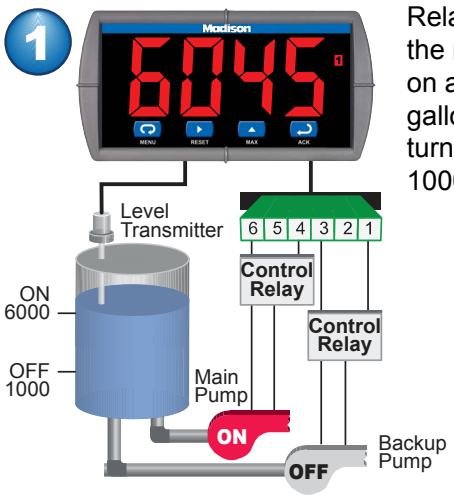

**PDA7422**

## Modbus RTU

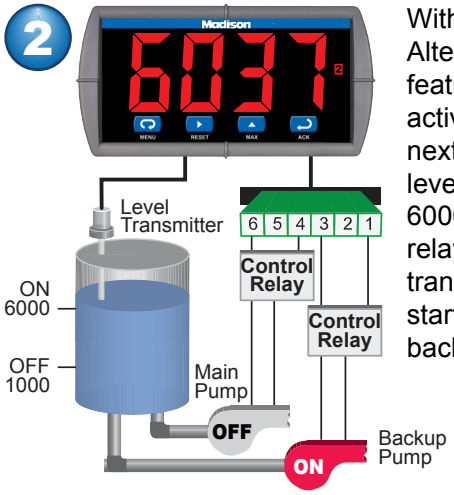
Use the MD4814's Modbus RTU communications to connect the MD4814 to a PLC, SCADA system or other digital device. It is a standard feature on all MD4814 models.

## Pump Alternation

The MD4814, in pump alternation mode, will automatically alternate two pumps:




Relay #1 turns the main pump on at 6000 gallons and turns it off at 1000 gallons.




With the Pump Alternation feature activated, the next time the level reaches 6000 gallons, relay #2 transfers and starts the backup pump.

## EASY SETUP AND PROGRAMMING

The MD4814 is easily setup and programmed using the simple four-button programming method. The meter can also be programmed using a PC and MeterView software or "cloned" with the Copy function. There is only one switch on the entire meter, no jumpers, and no need to ever open the case.

## Programming with Four Front Panel Buttons

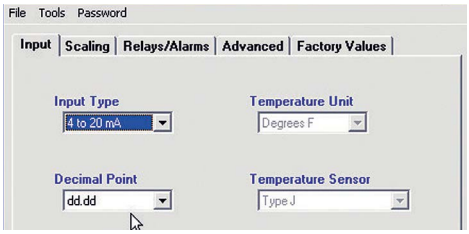
The MD4814's four front panel buttons keep the user in control of the programming process.

## Meter Copy

The Copy function is used to copy (or clone) all the settings from one MD4814 meter to other MD4814 meters in less than 10 seconds. The Copy function is a standard feature on all meters. The Copy feature does not require a serial communication adapter, it only requires the optional cable assembly (PDA7420), see the ordering information for

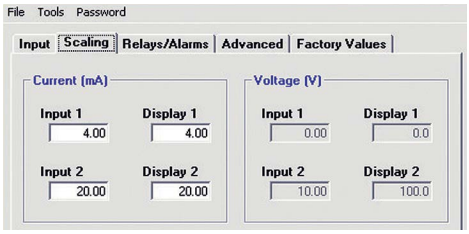

## Programming From a PC with MeterView

Madison's free MeterView software allows all MD4814 setup parameters to be programmed from a PC and to save the configuration settings to a file for reporting or programming other meters. And since the serial adapter is an external device, one serial adapter can program an infinite number of meters!



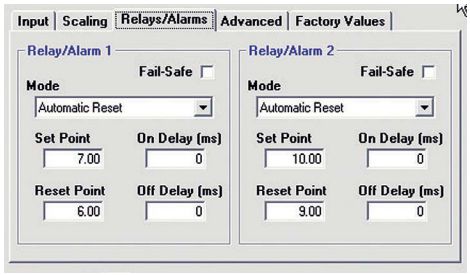

**Configure Input**

- Input type
- Decimal point
- Temp units
- Sensor type



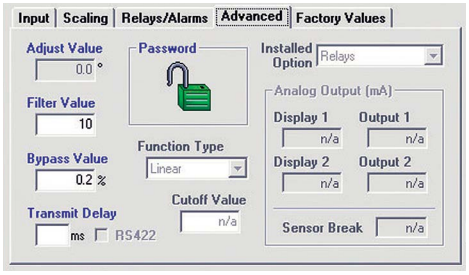

**Meter Scaling**

- Scale input
- No cryptic codes
- Simple to use




**Set Relays/Alarms**

- Select mode
- Set/reset points
- Fail-safe operation
- On & off delays



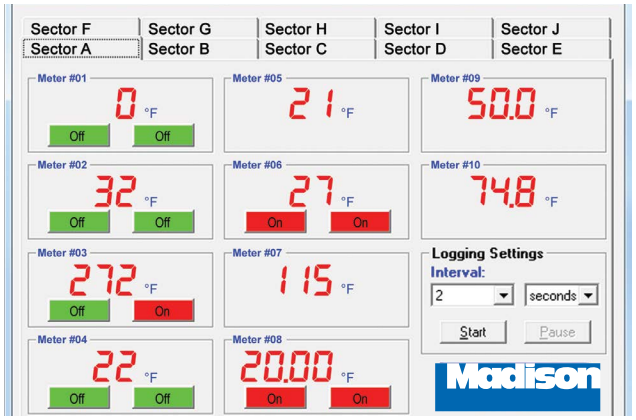

**Advanced Settings**

- Password
- Filter & bypass
- Transmit delay
- Function type
- Cutoff value

## DATA ACQUISITION

Digital panel meters make a great front end to a PC-based data acquisition system. They are easy to set up, can be used for a wide range of inputs, will power the transmitter, and best of all provide a local display of the process. Madison has the perfect package with its MD4814 Digital Panel Meters, a wide selection of serial adapters and converters and free MeterView software. Data is displayed on the PC and written to a file that could then be imported into a spreadsheet or other application.

### Data Logging up to 100 MD4814 Meters




### Sample File Generated by MeterView

**MD4814 Log File**

**Name:** C:\MV3logfile.htm **Created:** 1/7/2011 5:34:12 PM

| Serial Port: | Connection speed: | Logging rate: |
|---|---|---|
| COM 1 | 2400 Baud | 1 update every 10 seconds |

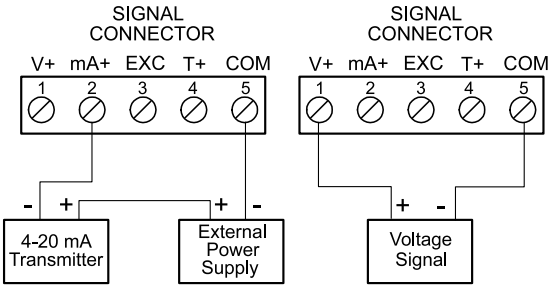
| Date & Time | Tag Number | Address | Display | Units | Relay 1 | Relay 2 |
|---|---|---|---|---|---|---|
| 1/7/2011 5:34:12 PM | Tank 1 Level | 06 | 17.70 | Feet | P1 On | P2 Off |
| 1/7/2011 5:34:12 PM | Tank 2 Level | 07 | 18.18 | Feet | P3 Off | P4 Off |
| 1/7/2011 5:34:12 PM | Tank 3 Level | 08 | 20.54 | Feet | P5 On | P6 Off |
| 1/7/2011 5:34:12 PM | Tank 1 Temp | 09 | 74 | °F | Off | Off |
| 1/7/2011 5:34:12 PM | Tank 2 Temp | 10 | 72 | °F | Off | Off |
| 1/7/2011 5:34:12 PM | Tank 3 Temp | 11 | 72 | °F | Off | Off |
| 1/7/2011 5:34:22 PM | Tank 1 Level | 06 | 17.58 | Feet | P1 On | P2 Off |
| 1/7/2011 5:34:22 PM | Tank 2 Level | 07 | 18.04 | Feet | P3 Off | P4 Off |
| 1/7/2011 5:34:22 PM | Tank 3 Level | 08 | 19.79 | Feet | P5 Off | P6 Off |
| 1/7/2011 5:34:22 PM | Tank 1 Temp | 09 | 74 | °F | Off | Off |
| 1/7/2011 5:34:22 PM | Tank 2 Temp | 10 | 72 | °F | Off | Off |

## PROCESS & TEMPERATURE INPUTS

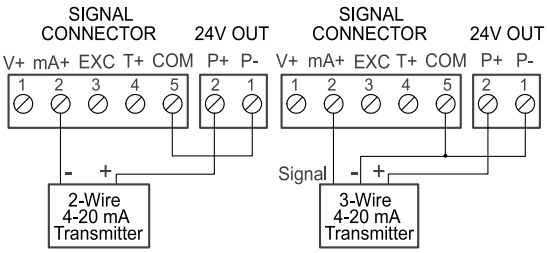
The MD4814 is factory calibrated to accept 4-20 mA, ±10 VDC, type J, K, T, or E thermocouples and 100 Ω platinum RTDs. Process inputs can be scaled with or without applying an input for virtually any engineering units. Temperature inputs can be programmed to display in degrees Fahrenheit or Celsius and the type K thermocouple can display up to 2300 °F.

### Current & Voltage Inputs

Setting up the meter to accept a current or voltage input could not be easier. All setup is performed with the front panel buttons and there are no switches or jumpers to deal with.




**Transmitter Powered by External Supply**




**Transmitter Powered by Internal Supply (optional)**

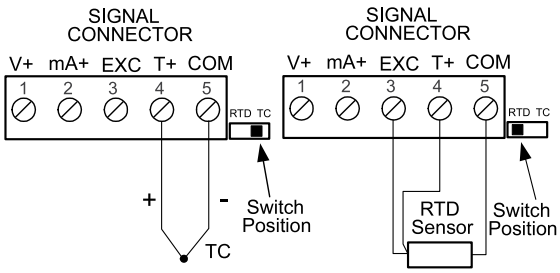
### Current Overload Protection

To protect the instrument from unexpected current overload, the current input circuit contains a resettable fuse. The fuse limits the current to a safe level when it detects a fault condition, and automatically resets itself when the fault condition is removed.

### Thermocouple & RTD inputs

Setting up the MD4814 to accept a thermocouple or RTD input is simply a matter of setting a switch at the rear of the case and selecting the input type from the menu.

The meter accepts J, K, T, or E type thermocouples as well as two, three, or four-wire 100 Ω platinum RTDs.



## NEMA X FIELD ENCLOSURE

Thermoplastic NEMA 4X enclosures for your MD4815 meters are available.

**PDA2811**
Plastic Low-Cost
NEMA 4X Enclosure

## STAINLESS STEEL SUN HOOD

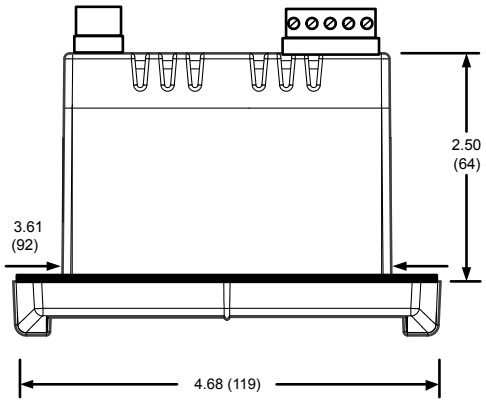
The PDA18DINSH Stainless steel sun hood reduces glare on your 1/8 DIN panel meter and increases readability.

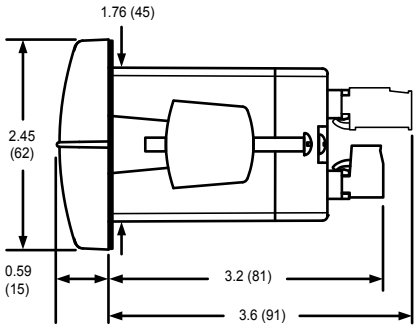
**PDA18DINSH**
Stainless Steel
Sun Hood

## QUICK INSTALLATION

The MD4814 is housed in a shallow-depth case that is designed for easy installation and servicing. The extra large front bezel is rated Type 4X, IP65. The mounting brackets are locked in place to make it easy to mount the meter in the panel. Removable screw terminal connectors make for easy and convenient wiring.

### Mounting Dimensions

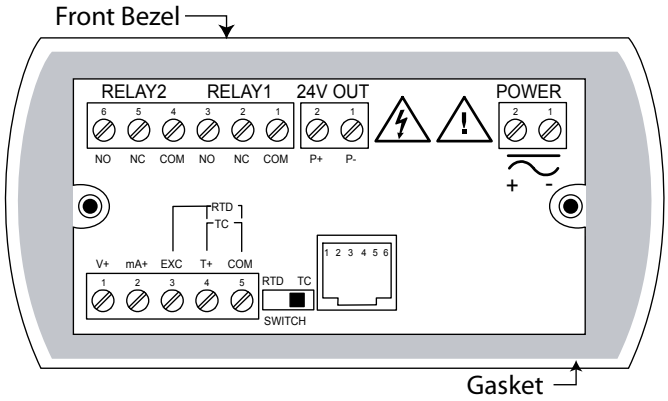



Notes:

1. Panel cutout required: 1.772 x 3.622 (45 x 92)
2. Panel thickness: 0.040 – 0.250 (1.0 – 6.4)
3. Mounting brackets lock in place for easy mounting

## CONNECTIONS




## SPECIFICATIONS

Except where noted all specifications apply to operation at +25°C.

### General

**Display:** MD4814: 0.56" (14.2 mm); MD4814 X2: 1.20" (30.5 mm) red LED, 4 digits (-1999 to 9999)
**Display Intensity:** Eight user selectable levels
**Front Panel:** NEMA 4X, IP65; panel gasket provided
**Programming Methods:** Four front panel buttons, cloning with Copy feature, PC with MeterView or LabVIEW software, and Modbus registers. Certified LabVIEW driver available.
**Noise Filter:** Programmable 2 to 199 (0 will disable filter)
**Display Update Rate:** Process/RTD: 3.7-5/sec; TC: 1.8-2.5/sec
**Overrange:** Display flashes 9999
**Underrange:** Display flashes -1999
**Recalibration:** All inputs are calibrated at the factory; recalibration is recommended at least every 12 months.
**Max/Min Display:** Stored until reset by user or meter is turned off.
**Password:** Restricts modification of programmed settings.
**Non-Volatile Memory:** Settings stored for a minimum of 10 years.
**Power Options:** 85-265 VAC, 50/60 Hz; 90-265 VDC, 20 W max or 12-36 VDC; 12-24 VAC, 6 W max.
**Required Fuse:** UL Recognized, 5 A max, slow-blow; up to 6 meters may share one fuse.
**Normal Mode Rejection:** 64 dB at 50/60 Hz
**Isolation:** 4 kV input/output-to-power line; 500 V input-to-output or output-to-24 VDC supplies.
**Operating Temperature:** 0 to 65°C
**Storage Temperature:** -40 to 85°C
**Relative Humidity:** 0 to 90% non-condensing
**Connections:** Power & Signal: removable screw terminal blocks accept 12 to 22 AWG. Serial: RJ11 header, standard on all meters.
**Enclosure:** 1/8 DIN, high impact plastic, 94V-0, color; gray
**Weight:** 9.5 oz (269 g) (including options)
**UL & C-UL Listed:** 508 Industrial Control Equipment
**Warranty:** 3 years parts & labor

### Process Inputs

**Inputs:** 0-20 mA, 4-20 mA, 1-5 V, ±10 V
**Accuracy:** ±0.05% FS ±1 count; square root: ±0.1% FS ±2 counts
**Function:** Linear or square root
**Low-Flow Cutoff:** 0 to 9999 (0 disables cutoff function)
**Decimal Point:** Up to 3 decimals.
**Calibration:** Scale without signal or calibrate with signal source
**Calibration Range:** User programmable over entire range of meter
**Input Impedance:** Voltage range: greater than 1 MΩ, Current range: 50-100 Ω, varies with resettable fuse impedance
**Input Overload:** Protected by automatically resettable fuse

| Temperature Drift: | 0 to 65º C ambient | -40 to 0º C ambient |
|---|---|---|
| Current | ±0.20% FS (50 PPM/ºC) | ±0.80% FS |
| Voltage | ±0.02% FS (1.7 PPM/ºC) | ±0.06% FS |

**Transmitter Supply:** Isolated, one or two transmitter supplies
P1: 24 VDC ±10% @ 200 mA max (-10 option)
P1 & P2: 24 VDC ±10% @ 200 mA & 40 mA max (-20 option)

# MD4814 Process & Temperature Meters

## Temperature Inputs

**Inputs:** Factory calibrated, field selectable: type J, K, T, or E thermocouples and 100 Ω platinum RTD (0.00385 or 0.00392 curve)
**Resolution:** 1°; type T: 1° or 0.1°
**Cold Junction Reference:** Automatic
**Temperature Drift:** ±2°C maximum
**Offset Adjustment:** Programmable to ±19.9°. This parameter allows the user to apply an offset value to the temperature being displayed.
**Input Impedance:** Greater than 100 kΩ
**Sensor Break:** All relays and alarm status LEDs go to alarm state.

| Type | Range | Acc. (0-65ºC) | Acc. (-40-0ºC) |
|---|---|---|---|
| J | -58º to 1382ºF<br>-50º to 750ºC | ±2ºF<br>±1ºC | ±5°F<br>±3°C |
| K | -58º to 2300ºF<br>-50º to 1260ºC | ±2ºF<br>±1ºC | ±4°F<br>±2°C |
| T | -292º to 700ºF<br>-180º to 371ºC | ±2ºF<br>±1ºC | ±13°F<br>±7°C |
| E | -58º to 1700ºF<br>-50º to 927ºC | ±2ºF<br>±1ºC | ±11°F<br>±6°C |
| RTD | -328º to 1382ºF<br>-200º to 750ºC | ±1ºF<br>±1ºC | ±5°F<br>±3°C |

## Relays

**Rating:** 2 Form C (SPDT); rated 3 A @ 30 VDC or 3 A @ 250 VAC resistive load; 1/14 HP; (≈ 50 watts) @ 125/250 VAC for inductive loads such as contactors, solenoids, etc.
**Deadband:** 0-100% FS, user selectable
**High or Low Alarm:** User may program any alarm for high or low
**Relay Operation:**
1. Automatic (non-latching) 2. Latching 3. Pump alternation control
**Relay Reset:** User selectable via front panel buttons or PC
1. Automatic reset only (non-latching)
2. Automatic plus manual reset at any time (non-latching)
3. Manual reset only, at any time (latching)
4. Manual reset only after alarm condition has cleared (latching)
**Automatic Reset:** Relays reset when input passes the reset point
**Manual Reset:** Front panel button, MeterView, Modbus registers
**Time Delay:** 0 to 199 seconds, on and off delays; programmable
**Fail-Safe Operation:** Programmable, independent for each relay. Relay coils are energized in non-alarm condition. In case of power failure, relays will go to alarm state.
**Auto Initialization:** When power is applied to the meter, relays will reflect the state of the input to the meter.

## Isolated 4-20 mA Transmitter Output

**Scaling Range:** 1.00 to 23.00 mA; reverse scaling allowed.
**Calibration:** Factory calibrated 4.00 to 20.00 mA
**Accuracy:** ±0.1% FS ±0.004 mA
**Temperature Drift:** 50 PPM/°C
*Note: Analog output drift is separate from input drift*
**Isolation:** 500 V input-to-output or output-to-24 VDC supplies; 4 kV output-to-power line
**External Power:** 35 VDC maximum
**Output Loop Resistance:** Loop Resistance

| Power Supply | Minimum | Maximum |
|---|---|---|
| 24 VDC | 10 Ω | 700 Ω |
| 35 VDC (external) | 100 Ω | 1200 Ω |

## Serial Communications

**Compatibility:** EIA-232, and EIA-485 with PDA7232 and PDA7422 MD4814 adapters.
**Protocol:** PDC and Modbus RTU
**Meter Address:** PDC protocol: 0 to 99, Modbus protocol: 1 to 247
**Baud Rate:** 300 to 19,200 bps
**Transmit Time Delay:** Programmable 0 to 199 ms
**Data:** 8 bit (1 start bit, 1 stop bit)
**Parity:** None (2 stop bits), even, or odd
(Modbus only; PDC protocol does not use parity)
Byte-to-Byte Timeout: 0.01 to 2.54 seconds (Modbus only)
**Turn Around Delay:** Less than 2 ms (fixed)
Refer to PDC and Modbus Serial Communications Protocol manuals for details.

## ORDERING INFORMATION

| MD4814 • Standard Display Models | | |
|---|---|---|
| **85-265 VAC Model** | **12-36 VDC Model** | **Options Installed** |
| MD4814-110-00 | | 24 VDC Supply |
| MD4814-110-02 | | 2 Relays + 24 VDC Supply |
| | MD4814-012-00-4 | 4-20 mA Output |

| MD4814 X2 • Large Display Models | | |
|---|---|---|
| **85-265 VAC Model** | **12-36 VDC Model** | **Options Installed** |
| MD4814-110-X2 | | 2 Relays |

| Accessories | |
|---|---|
| **Model** | **Description** |
| PDA18DINSH | Stainless Steel Sun Hood |
| PDA2811 | NEMA 4X Plastic Enclosure |
| PDA7420 | MD4814 Meter Copy Cable, 7' (2.1 m) |
| PDA7422 | MD4814 RS-485 Serial Adapter |
| PDA7232 | MD4814 RS-232 Serial Adapter |
| PDA7485-I | RS-232 to RS-422/485 Isolated Converter |
| PDA8006 | USB Serial Adapter |
| PDA8485-I | USB to RS-422/485 Isolated Converter |
| PDX6901 | Suppressor (snubber): 0.01 µF/470 Ω, 250 VAC |

## Disclaimer



LDS765MC_B 07/24

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