



OMICRON

# MPD 800

## Technical Data



## MPD 800 Technical Data

© OMICRON electronics GmbH 2020. All rights reserved.

This technical data was extracted from the following manual: MPD-800-User-Manual-ENU 1223 05 01

All rights including translation reserved. Reproduction of any kind, for example, photocopying, microfilming, optical character recognition and/or storage in electronic data processing systems, requires the explicit consent of OMICRON.

The document content represents the technical status at the time of writing and is subject to change without prior notice.

We have done our best to ensure that the information given in this document is useful, accurate and entirely reliable. However, OMICRON does not assume responsibility for any inaccuracies which may be present.

OMICRON translates this document from the source language English into a number of other languages. Any translation of this document is done for local requirements, and in the event of a dispute between the English and a non-English version, the English version of this document shall govern.

# 1 Technical specifications

## 1.1 Care and cleaning

The *MPD 800* system does not require any special maintenance or care. Always use dry and clean fiber-optic cables which are approved by OMICRON electronics.

Clean the devices and accessories from time to time or as necessary. To clean the *MPD 800* system and fiber-optic cables, use a cloth dampened with isopropanol alcohol.

### DANGER



#### Death or severe injury caused by high voltage or current

- ▶ Always observe the five safety rules (see section 1.2.2 “Safety rules” in the *MPD 800* User Manual) before cleaning the *MPD 800* system.

## 1.2 *MPD 800* acquisition unit

### 1.2.1 Accuracy, resolution, display and measuring range

Table 1-1: Accuracy, resolution, display and measuring range

| Parameter   | Value   |
|---|---------|
| Dynamic range overall PD input                                      | 140 dB  |
| Dynamic range per range PD input                                    | 70 dB   |
| Dynamic range overall AC input                                      | 170 dB  |
| Dynamic range per range AC input                                    | 107 dB  |
| Measurement accuracy of current AC input<br>(0.1 Hz ... 100 Hz)     | 0.02 %  |
| Measurement accuracy of PD input                                    | ±2 %    |
| Measurement accuracy of frequency                                   | ±1 ppm  |
| System noise PD input (time domain integration)                     | < 9 fC  |
| Partial discharge event resolution PD input                         | 2 ns    |
| Partial discharge double pulse resolution PD input<br>(BW = 20 MHz) | < 80 ns |

## 1.2.2 Device data

Table 1-2: Device data

| Parameter   | Value   |
|---|---|
| Analog PD bandwidth (Nyquist frequency)   | 62 MHz  |
| Frequency range PD input (-6 dB) <sup>1</sup> , internal quadripole enabled                           | 6 kHz ... 35 MHz  |
| Frequency range PD input (-6 dB) <sup>1</sup> , internal quadripole disabled                          | 0 Hz ... 35 MHz   |
| Bandwidth   | 4.5 kHz, 9 kHz, 30 kHz, 100 kHz, 200 kHz, 300 kHz, 400 kHz, 600 kHz, 900 kHz, 1 MHz, 2 MHz, 5 MHz, 10 MHz, 20 MHz |
| Frequency range AC input ( $\pm 0.01$ dB)   | 0 Hz ... 10 kHz   |
| Input impedance PD input (2.5 MHz ... 40 MHz) (internal quadripole enabled)                           | 50 $\Omega$ $\pm 20$ %  |
| Input impedance PD input ( $\leq 40$ MHz) (internal quadripole disabled)                              | 50 $\Omega$ $\pm 20$ %  |
| Input impedance AC input ( $\leq 4$ kHz)  | 5 $\Omega$ $\pm 20$ %   |
| Input power PD input (max. continuous)  | 500 mW  |
| Input voltage PD input (max. RMS continuous)  | 5 V <sub>RMS</sub>  |
| Voltage range PD input (max. peak)  | 80 V, 40 V, 20 V, 10 V, 5 V, 2.5 V, 1.28 V, 640 mV, 320 mV, 160 mV, 80 mV, 40 mV, 20 mV, 10 mV                    |
| Input partial discharge impulse voltage PD input (max. 100 $\mu$ s)                                   | 80 V <sub>peak</sub>  |
| Input current AC input (max. RMS continuous)  | 250 mA <sub>RMS</sub>   |
| Input current AC input (max. peak)  | 400 mA <sub>peak</sub>  |
| Current range AC input (max. peak)  | 400 mA, 200 mA, 20 mA, 2 mA, 200 $\mu$ A  |
| Input current AC input (min. RMS) <sup>2</sup>  | 20 nA <sub>RMS</sub>  |
| Input surge current withstand capability PD input (internal quadripole enabled)                       | $\leq 4.5$ kA ( $\leq 30A^2s$ )   |
| Input current withstand capability PD input (1 s, 50 Hz, 10 operations) (internal quadripole enabled) | 20 A  |
| Input current withstand capability AC input (100 s, 50 Hz)  | 5 A   |

Table 1-2: Device data (continued)

| Parameter  | Value  |
|--|--|
| Sampling rate PD input                             | 125 MS/s   |
| Sampling rate AC input                             | 31.25 kS/s                                       |
| Resolution PD input                                | 14 Bits  |
| Resolution AC input                                | 24 Bits  |
| Impedance OUT connector                            | 50 $\Omega$ $\pm$ 10 %                           |
| Output voltage OUT connector                       | 5 V $\pm$ 0.5 %                                  |
| Wavelength FO1, FO2                                | 1308 nm  |
| Wavelength TRIGGER                                 | 820 nm   |
| Maximum fiber-optic cable length and type FO1, FO2 | $\leq$ 2.5 km, 50/125 $\mu$ m OM3, LC compatible |
| Maximum fiber-optic cable length and type TRIGGER  | $\leq$ 50 m, 50/125 $\mu$ m OM2, ST connector    |

1. Relative to 1 MHz

2. In order to be more than 60 dB above the internal noise, the measuring current without external quadripole should be at least 20 nA<sub>RMS</sub>.

### 1.2.3 Power data

Table 1-3: Power data

| Parameter   | Value           |
|---|-----------------|
| Supply voltage POWER input                            | 9 V ... 24 V DC |
| Power consumption POWER input standby mode            | $\leq$ 25 mW    |
| Power consumption POWER input active mode             | $\leq$ 6 W      |
| Supply voltage OMICRON 24 W DC supply                 | 100 V ... 240 V |
| Supply voltage frequency range OMICRON 24 W DC supply | 50 Hz ... 60 Hz |

### 1.2.4 Mechanical data

Table 1-4: Mechanical data

| Parameter                            | Value  |
|--------------------------------------|--|
| Dimensions (W $\times$ D $\times$ H) | 119 mm $\times$ 190 mm $\times$ 55 mm<br>(4.69 inch $\times$ 7.48 inch $\times$ 2.17 inch) |
| Weight                               | 870 g  |



## 1.2.5 Environmental conditions

Table 1-5: Environmental conditions

| Parameter  | Value                          |
|--|--------------------------------|
| Humidity   | 5 % ... 95 %, non-condensing   |
| Operating time at -20°C / 23°C / 55°C (using one <i>RBP1</i> ) | 13 hours / 16 hours / 16 hours |
| Ambient temperature (operating)                                | -20 °C ... +65 °C              |
| Ambient temperature (storage)                                  | -40 °C ... +85 °C              |
| Maximum operating altitude                                     | 4000 m                         |
| Maximum storage altitude                                       | 12000 m                        |
| Ambient temperature OMICRON 24 W DC supply                     | +10 °C ... +55 °C              |

## 1.2.6 Standards

Table 1-6: Standards

| Parameter                             | Standard   | Value  |
|---------------------------------------|--|--|
| EMC                                   | IEC/EN 61326-1 (industrial electromagnetic environment)<br>FCC subpart B of part 15, class A | <br> |
| Safety                                | IEC/EN/UL 61010-1<br>IEC/EN/UL 61010-2-030   |  |
| Laser class                           | EN 60825-1:2007<br>EN 60825-2:2007   | Eye-safe laser class 1   |
| Ingress protection (connectors mated) | IEC/EN 60529   | IP4x   |
| Partial discharge measurement         | IEC 60270  |  |

## 1.3 CPL1 and CPL2 external quadripole

### 1.3.1 Accuracy

Table 1-7: Accuracy

| Parameter  | Value |
|--|-------|
| Current divider ratio accuracy IN input to AC output | 1:250 |
| Phase deviation IN input to AC output                | < 1°  |

### 1.3.2 Device data

Table 1-8: Device data

| Parameter   | Value  |
|---|--|
| Frequency range PD output (-6 dB)<br>(Option <i>IEC</i> , $Z_i = 50 \Omega$ )                               | 5 kHz ... 35 MHz                             |
| Frequency range PD output (-6 dB) <sup>1</sup><br>(Option <i>NEMA ANSI IEC CISPR</i> , $Z_i = 150 \Omega$ ) | 20 kHz ... 40 MHz                            |
| Frequency range PD output (-6 dB) <sup>1</sup><br>(Option <i>CISPR IEC</i> , $Z_i = 300 \Omega$ )           | 20 kHz ... 40 MHz                            |
| Frequency range AC output (1 dB)  | 5 Hz ... 14 kHz                              |
| Input impedance IN input (20 kHz... 7 MHz)<br>(Option <i>IEC</i> )  | 50 $\Omega \pm 20 \%$                        |
| Input impedance IN input (20 kHz... 3 MHz)<br>(Option <i>NEMA ANSI IEC CISPR</i> )                          | 150 $\Omega \pm 20 \%$                       |
| Input impedance IN input (35 kHz... 2 MHz)<br>(Option <i>CISPR IEC</i> )                                    | 300 $\Omega \pm 13 \%$                       |
| Input impedance IN input (15 Hz... 400 Hz)  | 1.3 mH $\pm 10 \%$ + 90 m $\Omega \pm 10 \%$ |
| Required termination impedance PD output  | 50 $\Omega$                                  |
| Required termination impedance AC output  | $\leq 7.5 \Omega$                            |
| Input current (15 Hz... 400 Hz, max. RMS continuous)  | 7 A <sub>RMS</sub>                           |
| Input current (50 Hz, min. RMS) <sup>2</sup>  | 5 $\mu$ A <sub>RMS</sub>                     |
| Short term input current IN input (50 Hz, max. 60 seconds)  | 14 A <sub>RMS</sub>                          |
| Short term duty factor of input current IN input  | 10 %   |
| Current divider ratio IN input to AC output   | 250:1  |

## MPD 800 Technical Data

Table 1-8: Device data (continued)

| Parameter   | Value                          |
|---|--------------------------------|
| Output partial discharge impulse voltage PD output (max.)                                       | 80 V <sub>peak</sub>           |
| Input surge current withstand capability  | ≤ 8 kA (≤ 500A <sup>2</sup> s) |
| Maximum voltage between RTN/OUT connector and GND connector (applies to CPL2 only) <sup>3</sup> | 140 V <sub>RMS</sub>           |

1. Relative to 1 MHz

2. In order to be more than 60 dB above the internal noise, the measuring current should be at least 5 μA<sub>RMS</sub>.

3. The voltage drop across the input impedance of the equipment connected to OUT/RTN should not exceed 140 V<sub>RMS</sub> with the maximum input current applied.

### 1.3.3 Mechanical data

Table 1-9: Mechanical data

| Parameter              | Value  |
|------------------------|--|
| Dimensions (W × D × H) | 119 mm × 175 mm × 55 mm<br>(4.69 inch × 6.89 inch × 2.17 inch) |
| Weight                 | 1270 g   |

### 1.3.4 Environmental conditions



Table 1-10: Environmental conditions

| Parameter                       | Value                        |
|---------------------------------|------------------------------|
| Humidity                        | 5 % ... 95 %, non-condensing |
| Ambient temperature (operating) | -20 °C ... +65 °C            |
| Ambient temperature (storage)   | -40 °C ... +85 °C            |
| Maximum operating altitude      | 4000 m                       |
| Maximum storage altitude        | 12000 m                      |



### 1.3.5 Standards

Table 1-11: Standards

| Parameter                             | Standard   | Value   |
|---------------------------------------|--|---|
| EMC                                   | IEC/EN 61326-1 (industrial electromagnetic environment)<br>FCC subpart B of part 15, class A |  |
| Safety                                | IEC/EN/UL 61010-1<br>IEC/EN/UL 61010-2-030   |  |
| Ingress protection (connectors mated) | IEC/EN 60529   | IP4x  |
| Partial discharge measurement         | IEC/EN 60270   |   |

## 1.4 **MCU2 multi-device control unit**

### 1.4.1 **Device data**

Table 1-12: Device data

| Parameter  | Value   |
|--|---|
| Wavelength FO 1  | 1308 nm   |
| Wavelength FO 2 (if present)                               | 1308 nm   |
| Wavelength FO 3 (if present)                               | 820 nm ( <i>MPD 600</i> version)<br>1308 nm ( <i>MPD 800</i> version) |
| Wavelength TRIGGER   | 430 nm ... 1100 nm  |
| Maximum fiber-optic cable length and type FO 1, FO 2, FO 3 | 2.5 km, 50/150 µm OM3   |
| Connector types  | 2 x LC (duplex) and 1 x ST (duplex)                                   |

### 1.4.2 **Power data**

Table 1-13: Power data

| Parameter         | Value                                       |
|-------------------|---|
| Power supply      | 5 V ±5 % according to USB 3.0 specification |
| Power consumption | ≤ 4.5 W                                     |

### 1.4.3 **Mechanical data**

Table 1-14: Mechanical data

| Parameter              | Value  |
|------------------------|--|
| Dimensions (W × D × H) | 119 mm × 175 mm × 55 mm<br>(4.69 inch × 6.89 inch × 2.17 inch) |
| Weight                 | 750 g  |



## 1.4.4 Environmental conditions

Table 1-15: Environmental conditions

| Parameter                       | Value                        |
|---------------------------------|------------------------------|
| Humidity                        | 5 % ... 95 %, non-condensing |
| Ambient temperature (operating) | -20 °C ... +55 °C            |
| Ambient temperature (storage)   | -40 °C ... +85 °C            |
| Maximum operating altitude      | 4000 m                       |
| Maximum storage altitude        | 12000 m                      |

## 1.4.5 Standards

Table 1-16: Standards

| Parameter                             | Standard   | Value  |
|---------------------------------------|--|--|
| EMC                                   | IEC/EN 61326-1 (industrial electromagnetic environment)<br>FCC subpart B of part 15, class A |   |
| Safety                                | IEC/EN/UL 61010-1<br>IEC/EN/UL 61010-2-030   |  |
| Laser class                           | EN 60825-1:2007<br>EN 60825-2:2007   | Eye-safe laser class 1   |
| Ingress protection (connectors mated) | IEC/EN 60529   | IP4x   |

## 1.5 *RBP1* rechargeable battery pack

### 1.5.1 Device data

Table 1-17: Device data

| Parameter   | Value                  |
|---|------------------------|
| Output voltage OUTPUT   | 9 V...24 V DC          |
| Output current OUTPUT   | ≤ 4 A DC <sup>1</sup>  |
| Nominal battery voltage   | 11.1 V                 |
| Energy<br>(900 mA discharge current, 25 °C ambient temperature) | 80 Wh                  |
| Nominal energy<br>(theoretical value)                           | (96.6 Wh)              |
| Charge cut-off voltage <sup>2</sup>                             | 12.5 V                 |
| Discharge cut-off voltage <sup>3</sup>                          | 9 V                    |
| Cell chemistry  | Lithium-ion            |
| Battery life cycle <sup>4</sup>                                 | 1000 cycles or 5 years |

1. Short-circuit protected. The current cannot be increased by multiple *RBP1* devices.
2. Defined by internal charger circuitry. The charging process is stopped at the overcharge cut-off voltage.
3. Defined by internal charger circuitry. Discharging the *RBP1* is stopped at the overdischarge cut-off voltage.
4. Whichever occurs first. Remaining 50 % SoH equals 40 Wh remaining energy.

### 1.5.2 Power data

Table 1-18: Power data

| Parameter  | Value                |
|--|----------------------|
| Supply voltage INPUT input   | 9 V ... 24 V DC ±5 % |
| Power consumption INPUT input:<br>Supply voltage ≤20 V<br>Supply voltage >20 V | ≤ 24 W<br>≤ 75 W     |
| Supply voltage OMICRON 24 W DC supply  | 100 V ... 240 V      |
| Supply voltage frequency range OMICRON 24 W DC supply                          | 50 Hz ... 60 Hz      |

### 1.5.3 Mechanical data

Table 1-19: Mechanical data

| Parameter              | Value  |
|------------------------|--|
| Dimensions (W × D × H) | 115 mm × 175 mm × 38 mm<br>(4.53 inch × 6.89 inch × 1.50 inch) |
| Weight                 | 910 g (2 lb)   |



### 1.5.4 Environmental conditions

Table 1-20: Environmental conditions

| Parameter                                  | Value                        |
|--|------------------------------|
| Humidity                                   | 5 % ... 85 %, non-condensing |
| Ambient temperature (operating/discharge)  | -20 °C ... +55 °C            |
| Ambient temperature (charge)               | 0 °C ... +40 °C              |
| Ambient temperature (storage)              | -20 °C ... +30 °C            |
| Maximum operating altitude                 | 4000 m                       |
| Maximum storage altitude                   | 12000 m                      |
|  |                              |
| Ambient temperature OMICRON 24 W DC supply | +10 °C ... +55 °C            |

### 1.5.5 Standards

Table 1-21: Standards

| Parameter                             | Standard   | Value  |
|---------------------------------------|--|--|
| EMC                                   | IEC/EN 61326-1 (industrial electromagnetic environment)<br>FCC subpart B of part 15, class A |  |
| Safety                                | IEC/EN/UL 61010-1<br>IEC/EN/UL 61010-2-030   |  |
| Ingress protection (connectors mated) | IEC/EN 60529   | IP4x   |

## 1.6 V-to-AC-adapter 100kOhm

### 1.6.1 Device data

Table 1-22: Device data

| Parameter  | Value   |
|--|---|
| Nominal resistance   | 100 kΩ  |
| Initial resistance accuracy                                      | ±0.02 %   |
| Typical temperature coefficient                                  | 2 ppm/K   |
| Maximum power dissipation  | 200 mW  |
| Maximum working voltage  | 200 V <sub>peak</sub> / 140 V <sub>RMS</sub> continuous |
| Maximum withstand voltage (open circuit)                         | 300 V <sub>peak</sub> (overvoltage CAT I)               |
| Long term resistance deviation (1000 full load cycles / 2 years) | < ±0.15 %   |

### 1.6.2 Mechanical data

Table 1-23: Mechanical data

| Parameter          | Value                                    |
|--------------------|--|
| Dimensions (W × Ø) | 72 mm × 24 mm<br>(2.83 inch × 0.94 inch) |
| Weight             | 55 g                                     |

### 1.6.3 Environmental conditions

Table 1-24: Environmental conditions

| Parameter                       | Value                        |
|---------------------------------|------------------------------|
| Humidity                        | 5 % ... 95 %, non-condensing |
| Ambient temperature (operating) | -20 °C ... +55 °C            |
| Ambient temperature (storage)   | -40 °C ... +85 °C            |
| Maximum operating altitude      | 4000 m                       |
| Maximum storage altitude        | 12000 m                      |

## 1.7 MPC1 measurement protection case

### 1.7.1 Mechanical data

Table 1-25: Mechanical data

| Parameter              | Value   |
|------------------------|---|
| Dimensions (W × H × D) | 477 mm × 174 mm × 330 mm<br>(18.80 inch × 6.85 inch × 13.00 inch) |
| Weight (empty)         | 3900 g  |

### 1.7.2 Environmental conditions

Table 1-26: Environmental conditions

| Parameter   | Value                        |
|---|------------------------------|
| Humidity  | 5 % ... 95 %, non-condensing |
| Ambient temperature (operating <i>MPD 800</i> system)       |                              |
| Option A, B and C   | -20 °C ... +45 °C            |
| Option D and E  | -20 °C ... +50 °C            |
| Ambient temperature (storage for the <i>MPD 800</i> system) | -20 °C ... +30 °C            |
| Ambient temperature (charging <i>RBP1</i> )                 | 0 °C ... +40 °C              |
| Maximum operating altitude                                  | 4000 m                       |
| Maximum storage altitude                                    | 12000 m                      |

### 1.7.3 Standards

Table 1-27: Standards

| Parameter                             | Standard     | Value |
|---------------------------------------|--------------|-------|
| Ingress protection (connectors mated) | IEC/EN 60529 | IP65  |