OMICRON

MPD 800

Technical data

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MPD 800 system

MPD 800

Input

Voltage	PD input:	80 V_{peak}	
Current	PD input (max. RMS continuous)[1]:		150 mA
	PD input (min. RMS continuous for sync.)[1]:		2 µA
	AC input (max. RMS continuous):		150 mA
	AC input (min. RMS for sync.):		20 nA
	DC measurements		
	AC input (min. DC current)[2]:		100 nA
	AC input (max. DC current):		200 mA
	VLF measurements		
	PD input (min. RMS):		500 nA
	PD input (max. RMS continuous):		200 mA
Impedance	PD input:	50 Ω ± 20 %	
	AC input (f < 4 kHz):	5 Ω ± 20 %	
Dynamic range	PD input:	140 dB (overall), 70 dB (per range)	
	AC input:	170 dB (overall), 107 dB (per range)	
Input range	PD input:	14	
	AC input:	5	

Frequency range

PD input	Internal CPL enabled:	6 kHz … 35 MHz
	Internal CPL disabled:	0 Hz … 35 MHz
AC input	DC, 0.01 Hz … 10 kHz	

Accuracy

PD input	± 2 %
AC input	0.02 %
Frequency	± 1 ppm
DC current	0.05 %

PC requirements

Interface	USB 3.0
Hardware	Minimum[3]: Quad-Core 64-bit Intel or AMD CPU with at least 1.6 GHz, 4 GB RAM (e.g. Intel i5, AMD Ryzen 3) Recommended[4]: Quad-Core 64-bit Intel or AMD CPU with at least 2.5 GHz, 8 … 16 GB RAM, dedicated GPU (e.g. Intel i7, AMD Ryzen 5) High-End[5]: Octa-Core 64-bit Intel or AMD CPU with at least 3.2 GHz, 32 GB RAM, dedicated GPU (e.g. Intel i7/i9, AMD Ryzen 7)
Software	Windows 8™, Windows 8.1™, Windows 10™, Windows 11™ (all 64-bit)

[1] Internal CPL
[2] 0.05 % accuracy
[3] For example, for 1 × MPD 800 for "pass/fail" testing
[4] For example, for 1 to 4 × MPD 800 including 3PARD, PD fault localization and channel gating

Output

Optical trigger port	1 × ST (820 nm), OM2, FO cable length ≤ 50 m
OUT port	1 × BNC, 50 Ω ± 10 %, 5 V ± 0.5 % at 1MΩ
AUX port	For MBB1 support

Fiber-optic ports

Wavelength	1308 nm
Connector type	2 × LC (interchangeable)

PD data processing

Time domain integration range	56 ns … 8 µs	
PD sampling rate	125 MS/s	
Resolution	PD:	14 bits
	AC:	24 bits
	FFT:	7.6 kHz
PD pulse rate	Max.:	2 Mio./s
PD filters/bandwidths	RIV:	4.5 kHz and 9 kHz
	Charge:	30 kHz, 100 kHz, 200 kHz, 300 kHz, 400 kHz, 600 kHz, 900 kHz[6], 1 MHz, 2 MHz, 5 MHz, 10 MHz, 20 MHz
PD input low-pass filters	1.1 MHz, 2.3 MHz, 4.7 MHz	
PRPD pre-recording time	0 s … 30 s	
PD scope	Recording depth:	131 µs
	Refresh rate:	41 ms
PD event time resolution	< 2 ns	
System noise	Typical[7]: < 0.01pC	
Spectrum analyzer noise (100 kHz … 5 MHz)	< -125 dBm	
Max. double pulse resolution (BW = 20 MHz)	< 80 ns	
Negativ superposition error	< 3 %	

Mechanical data and ambient conditions

Humidity	5 % … 95 %, non-condensing
Operation temperature	-20 °C … 55 °C (-4 °F … 89 °F)
Dimensions (W × H × D)	119 × 190 × 55 mm (4.7 × 7.5 × 2.2 in)
Weight	870 g (1.9 lbs)

[5] For example, for multi-units up to 20 measurement channels
[6] Fixed filter (100 kHz-1 MHz)
[7] Time domain integration

Protection specifications

Input surge current withstand capability PD input (8/20 µs, 10 operation)	< 4.5 kA[1]
Input surge current withstand capability PD input (1 s, 50 Hz, 10 operations)	20 A
Input surge current withstand capability AC input (100 s, 50 Hz, 1000 operations)	5 A

Equipment reliability

Shock	IEC/EN 60068-2-27
Vibration	IEC/EN 60068-2-6
Damp heat	IEC/EN 60068-2-78
Ingress protection (IEC/EN 60529)	IP4x
Temperature changes	IEC/EN 60068-2-14
Dry heat	IEC/EN 60068-2-2
Cold	IEC/EN 60068-2-1
EMV	IEC/EN 61326-1 (industrial electromagnetic environment) FCC subpart B of part 15, class A
Safety	IEC/EN/UL 61010-1 IEC/EN/UL 61010-2-030
Laser class	EN 60825-1:2007 EN 60825-2:2007

Certificates

IEC 60270 type test

[1] < 30 A2s, < 1ms

MCU2 – Multi-device control unit

The controller MCU2 converts optical signals transmitted by a fiber-optic cable to standard electrical communication signals.

Interface	USB 3.0
Fiber-optic (FO) network	For MPD 800: LC For MPD 600: ST
Connector type	2 × LC (FO1, FO2) 1 × ST pair (FO3)
Max. FO cable length	2.5 km / 1.55 mi

Mechanical data

Dimensions (W × H × D)	119 × 175 × 55 mm (4.7 × 6.9 × 2.2 in)
Weight	750 g (1.7 lbs)

RBP1 – Lithium-ion battery pack

The RBP1 is a rechargeable battery pack for operating the MPD 800, including a battery status display. Up to five RBP1 can be connected to power long-time PD measurement setups.

Operating time for MPD 800 with RBP1	At -20 °C / -4 °F: At 23 °C / 73 °F: At 55 °C / 131 °F:	9 hours 14 hours 14 hours
Typical charging duration	< 4 hours	
Battery lifecycle	1 000 cycles or 5 years[1]	
Nominal voltage	11.1 V	
Nominal energy	96.6 Wh	

Power supply

Battery charge voltage	8 V DC … 12.4 V DC
Power supply voltage	100 V … 240 V (50 Hz … 60 Hz)

Mechanical data

Dimensions (W × H × D)	115 × 38 × 175 mm (4.5 × 1.5 × 6.9 in)
Weight	910 g (2 lbs)

[1] Whichever occurs first, remaining 50 % state of health (SoH) equals 40 Wh remaining energy.

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MPD 800 accessories

CAL 542 – Charge calibrator/injector

The CAL 542 charge calibrator is used to inject a defined charge into and verify the measurement circuit.

Technical data	
Pulse repetition frequency	300 Hz
Pulse rise time	< 4 ns[1]
Dimensions (W × H × D)	110 × 30 × 185 mm (4.3 × 1.2 × 7.3 in)
Weight	520 g (1.2 lbs) (incl.battery)
Output connector	1 × BNC (with BNC adapter, cables and connection clamps)
Power supply	Lithium Battery 9 V, Lifetime > 10 years

[1] Typical value for type A and B

RIV1 – RIV Test calibrator

The RIV1 calibrator enables the reliable calibration of the MPD system for PD measurement based on Radio Influence Voltage (RIV) according to NEMA and CISPR standards.

Technical data	RIV1-NEMA	RIV1-CISPR
Frequency range	100 kHz … 2 MHz (50 kHz steps)	100 kHz … 2 MHz (50 kHz steps)
Magnitude	10 µV … 10 mV	10 µV … 10 mV @ 300 Ω
Magnitude accuracy	< 2 %	< 2 %
Output impedance	< 2 Ω	20 kΩ
Standards met	NEMA 107 - 1987, IEEE C57.12.90-2008	IEC 60437, CISPR 18-2 (2)
Accessory (Quadripole)	CPL 542 NEMA 0.5 A, CPL 542 NEMA 1.2 A	CPL 542 CISPR 0.5 A, CPL 542 CISPR 1.2 A

Connectors	1 × BNC
Dimensions (W × H × D)	120 × 40 × 183 mm (4.7 × 1.6 × 7.2 in)
Weight	680 g /1.5 lbs
Temperature	Operating: 0 °C … 50 °C (-4 °F … 122 °F) Storage: -20 °C … 70 °C (14 °F … 158 °F)
Humidity	10 % … 95 %, non-condensing

CPL1/CPL2 – Measuring impedance

The CPL1/2 quadripoles are external measuring impedances (coupling device) for PD measurements. All CPL1/2 versions include surge current withstand capability of up to 8 kA.

Technical data	IEC	NEMA/IEC/CISPR	CISPR/IEC
Max. input current		7 A	
Min. input current for sync.		5 µA	
Input impedance	50 Ω ± 20 %	150 Ω ± 20 %	300 Ω ± 13 %
PD frequency range (-6 dB resp. 1 MHz)	5 kHz … 35 MHz	20 kHz … 40 MHz	35 kHz … 2 MHz
Dimensions (W × H × D)	119 × 175 × 55 mm (4.7 × 6.9 × 2.2 in)		
Weight	1.3 kg (2.8 lbs)		

MBB1 – Measurement balanced bridge

The MBB1 is used to obtain reliable PD measurements in test environments with heavy interference. It enables you to perform differential PD measurements as recommended by IEC 60270.

Technical data	
Frequency range	100 kHz … 1 MHz
Maximum voltage input	60 V_{rms}
Maximum PD voltage inputs	10 V_{rms}
Input connections	3 × BNC (PD-1, PD-2, V)
Output connections	2 × BNC (PD, V)
Control and power supply	via AUX-connection to MPD 600 or MPD 800
Dimensions (W × H × D)	110 × 190 × 44 mm (4.3 × 7.5 × 1.7 in)
Weight	650 g (1.4 lbs)

MCC – Coupling capacitor

The coupling capacitor connects the MPD system to the high-voltage test object. Different MCC coupling capacitors are available for various voltage levels.

Technical Data	MCC 117C	MCC 124C	MCC 210L
$U_{phase\text{-}to\text{-}phase\ (RMS)}$	17.5 kV	24 kV	100 kV
$U_{pr8\ phase\text{-}to\text{-}ground}$ [1]	17.5 kV	24 kV	-
$C_{nominal}$	2.2nF (+/-15%) (for Option D)	1.1nF (+/-15%) (for Option D)	1.0 nF (± 10 %)
Withstand voltage (1 min)	38 kV	50 kV	120 kV
Q_{PD}	< 2 pC @ 20.7 kV	< 2 pC @ 26.4 kV	< 1 pC @ 100 kV
Weight	2.3 kg (5.1 lbs)	3.2 kg (7.1 lbs)	9 kg (19.8 lbs)
Dimensions (W × H × D)	104 × 150 × 165 mm (4.1 × 5.9 × 6.5 in)	150 × 219 × 150 mm (5.9 × 8.6 × 5.9 in)	450 × 766 × 450 mm (17.5 × 30.15 × 17.5 in)
Scope of delivery	Adapter (TNC to BNC), BNC connection cable	Adapter (TNC to BNC), BNC connection cable	BNC connection cable, corona ring
Connection type	Directly connected to MPD 800 (internal CPL)	Directly connected to MPD 800 (internal CPL)	Directly connected to MPD 800 or connected to CPL1

[1] Primary rated voltage for 8 hours or laboratory use.

BTA kits – Bushing tap adapters

The following BTA kits consist of a BTA adapter that connects to the specific measurement tab and includes a gas discharge tube. The kits also include a BTA to BNC adapter and a coaxial cable that connects either via CPL or directly to the MPD system.

Technical Data	
BTA3 kit	G ¾" inside thread, 4 mm female connector (e.g. for ABB / Micafil standard, RTKF, RTKG)
BTA6 kit	2¼" – 12 UN outside thread, 8 mm female connector for IEEE standard (C57.19.01 - 2000 bushing measurement tab, e.g. HSP, ABB type O plus C)
BTA7 kit	M30 × 1.5 outside thread, 4 mm female connector (e.g. for HSP type SETF)
BTA9 kit	¾" – 14 NPSM outside thread, spring contact interface (e.g. for ABB type T)
BTA14 kit	M24 inside thread, 4 mm male connector (e.g. for F&G or HSP type EKTF)

MCT 120 – High frequency CT

The MCT 120 is a high-frequency current transformer (HFCT), which picks up PD signals in moderate heights and at a safe distance from high-voltage.

Technical Data	
Frequency range (-6 dB)	80 kHz … 40 MHz at 0 mm gap
Inner hole dimensions	ø ~ 53.5 mm / 2.1 in
Outer dimensions	114 × 154 × 62 mm (4.5 × 6.1 × 2.5 in)
Ferrite core	Split
Connector	BNC, 50 Ω, female
Weight	1.2 kg (2.7 lbs)
Operating temperature	-20 °C … 55 °C (-4 °F … 130 °F)

Technical data

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TEV 1

The TEV 1 is a passive and broadband transient earth voltage sensor, which picks up capacitive coupled signals from the surface of earthed metal cases. TEV 1 is designed for installations on medium voltage switchgear or other metal cladding high-voltage equipment.

Technical Data	
Frequency range	Up to 50 MHz
Connector type	1x BNC, female
Nominal capacity to enclosure	capacitive / ~150pF
Overvoltage protection	None
Impedance	50 Ohm
Mounting	magnetic
Housing Material	Aluminium
Weight	200 g (0.44 lbs)
Dimension (W × H × D)	65 x 25 x 80 mm (2.56 x 0.98 x 3.15 in)
Operating temperature	-20 °C … 55 °C (-4 °F … 130 °F)

UHF 800

The UHF 800 is an ideal PD measurement solution for measuring power transformers and gas-insulated substations (GIS). It measures in the very high frequency (VHF) and ultra-high frequency (UHF) ranges. The UHF 800 is connected to the MCU2 or MPD 800 units and can be used together with UVS 610, UCS1 and UHT1 sensors, as well as most of the pre-installed UHF PD sensors for GIS.

Technical Data	
UHF input range fc	100 MHz – 2 GHz
Measuring bandwidth Δf	Broadband and narrowband modes
Impedance UHF input	50 Ω (N-type input jack)
RF pre-amplifier	Switchable +20 dB and attenuator
Synchronization via UHF sensor	10 mHz … 10 kHz

Mechanical Data	
Connector type (FO1, FO2)	2x LC (compatible OM3)
Wavelength	1 308 nm
Connectivity	FO series connection with MPD 800 units
Power supply	Powered by RBP1 battery
Dimension (W × H × D)	119 × 190 × 55 mm (4.7 × 7.5 × 2.2 in)
Ambient temperature	-20 °C … 55 °C (-4 °F … 89 °F)
Relative humidity	5 % … 95 %, non-condensing

UVS 610 – UHF valve sensor

The UHF valve sensor allows PD measurements in high-frequency ranges in power transformers with liquid insulation. It is inserted through the oil drain valve (DN 50 and DN 80).

Technical Data	
Usable frequency range	150 MHz … 1 GHz
Tightness	Up to 5 bar pressure -15 °C … 120 °C (5 °F … 248 °F)
Insertion depth	0 … 417 mm (0 in … 16.4 in)
Weight	3.1 kg (6.8 lbs)
Dimensions (Ø × H)	200 mm x 623 mm (7.8 x 24.5 in)

UPG 620 – Pulse generator

The UPG 620 generates very fast slope pulses and is mainly used to verify the measurement circuit in the UHF range.

Technical Data	
Rise time	< 200 ps
Decay time	> 100 ns
Frequency repetition rate	100 Hz
Power supply	2 × 9 V lithium battery for > 120 h continuous operation
Weight	700 g (1.5 lbs)
Dimensions (W × H × D)	110 × 28 × 185 mm (4.3 × 1.1 × 7.3 in)
Operating temperature	0 °C … 55 °C (35 °F … 130 °F)

MPD 800 cases

MPC1

The MPC1 is the universal MPD 800 protection case for outdoor usage and rough industrial environments. It offers several configuration options for flexible usage.

Technical Data

Configuration options	2 × MPD 800 1 × MPD 800 and 1 × CPL1 1 × MPD 800 and 1 × UHF 800
Weight (empty)	3.9 kg (8.59 lbs)
Ingress protection	IP44
Dimensions (W × H × D)	477 × 174 × 330 mm (18.8 × 6.9 × 13 in)
Operating temperature	-20 °C … 45 °C (-4 °F … 113 °F) (50 °C / 122 °F with one MPD 800)

MTC1

The MTC1 is a universal MPD transport case and can contain up to a 5 MPD 800 units, one UHF 800, one RIV and one IEC calibrator, a controller and batteries. Alternatively, the MTC1 can include a 3-unit MPD 800 system 3 CPLs, one UHF 800, a controller, two calibrators (IEC, RIV) and batteries.

Technical Data

Ingress protection	IP67
Weight (empty)	8.5 kg (18.73 lbs)
Dimensions (W × H × D)	560 × 455 × 265 mm (22.04 × 17.91 × 10.43 in)

MTC2

The MTC2 is the MPD flight case. It can contain up to 3 MPD 800 units, an UHF 800, one calibrator, MCU2 controller and batteries.

Technical Data

Ingress protection	IP5x
Weight (empty)	4.0 kg (8.81 lbs)
Dimensions (W × H × D)	543 × 368 × 207 mm (21.37 × 14.48 × 8.14 in)

OMICRON is an international company that works passionately on ideas for making electric power systems safe and reliable. Our pioneering solutions are designed to meet our industry's current and future challenges. We always go the extra mile to empower our customers: we react to their needs, provide extraordinary local support, and share our expertise.

Within the OMICRON group, we research and develop innovative technologies for all fields in electric power systems. When it comes to electrical testing for medium- and high-voltage equipment, protection testing, digital substation testing solutions, and cybersecurity solutions, customers all over the world trust in the accuracy, speed, and quality of our user-friendly solutions.

Founded in 1984, OMICRON draws on their decades of profound expertise in the field of electric power engineering. A dedicated team of more than 900 employees provides solutions with 24/7 support at 25 locations worldwide and serves customers in more than 160 countries.

The following publications provide more information about MPD 800:

- MPD 800 Universal Partial Discharge and Analysis System
- MPD 800 Ordering Information
- MPD 800 Upgrade Information for MPD 600 Users

For more information and detailed contact information of our worldwide offices please visit our website.

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