

PRA-MPS3 Multifunction power supply, large

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Invented for life



- ▶ Fully supervised DC-power supply with integrated fail-safe redundancy
- ▶ Unique single 12 V battery backup solution
- ▶ Integrated 6-port Ethernet switch on RJ45 and SFP
- ▶ General purpose control inputs and outputs
- ▶ Backup lifeline for connected amplifiers

This compact device combines multiple support functions to power and serve other PRAESENSA system devices.

It can be used in a centralized system, but it is an enabler for decentralized system topologies with several smaller racks or cabinets located across the premises, to reduce loudspeaker cabling costs significantly.

It provides DC-power supply to connected amplifiers and peripherals from the mains, with a standards compliant charger for a single 12 V backup battery, saving on installation and battery maintenance costs. The integrated 6-port Ethernet switch, with glass fiber support, facilitates easy interconnection of decentralized clusters of devices.

Configurable, supervised control inputs and voltage-free control outputs are available as interface to external equipment. Its OMNEO interface for control and fault reporting also provides an analog audio backup lifeline for the connected amplifiers.

Functions

Independent mains power supplies

- Three fully independent 48 VDC power supplies for up to three amplifiers.

- One 24 VDC output for a system controller or auxiliary device.
- All power supply outputs have double connectors for A/B dual redundant wiring to the connected loads.
- A fault condition on one of the outputs does not affect any of the other outputs.
- Universal mains input with power factor correction to maximize the amount of power that can be taken from a single phase power distribution network.

Backup battery solution

- Integrated charger for a 12 V VRLA (Valve Regulated Lead-Acid) battery, with a capacity up to 230 Ah for standards compliant charging and energy storage.
- The battery life time for servicing is maximized by using a single 12 V battery that has all six battery cells at the same temperature and all cells using the same electrolyte. This prevents unequal charging and consequently overcharging of series connected batteries, which is the main cause of premature battery aging.
- Three fully independent battery to 48 VDC power converters for up to three amplifiers.
- Flexible, pre-terminated battery cabling of fixed length included, with fuse and battery temperature sensor, for fast battery connection and predictive cabling resistance.

- Accurate battery impedance measurement to monitor aging of the battery and supervision of battery connections.

Ethernet switch

- Six OMNEO network ports, supporting Rapid Spanning Tree Protocol (RSTP), for loop-through connections to adjacent devices:
 - Five ports are for copper connection on RJ45, two of them provide Power over Ethernet (PoE) to supply power to connected call stations or other devices.
 - One port provides an SFP-cage for Small Form-factor Pluggable transceivers for single or multi-mode glass fiber connections.

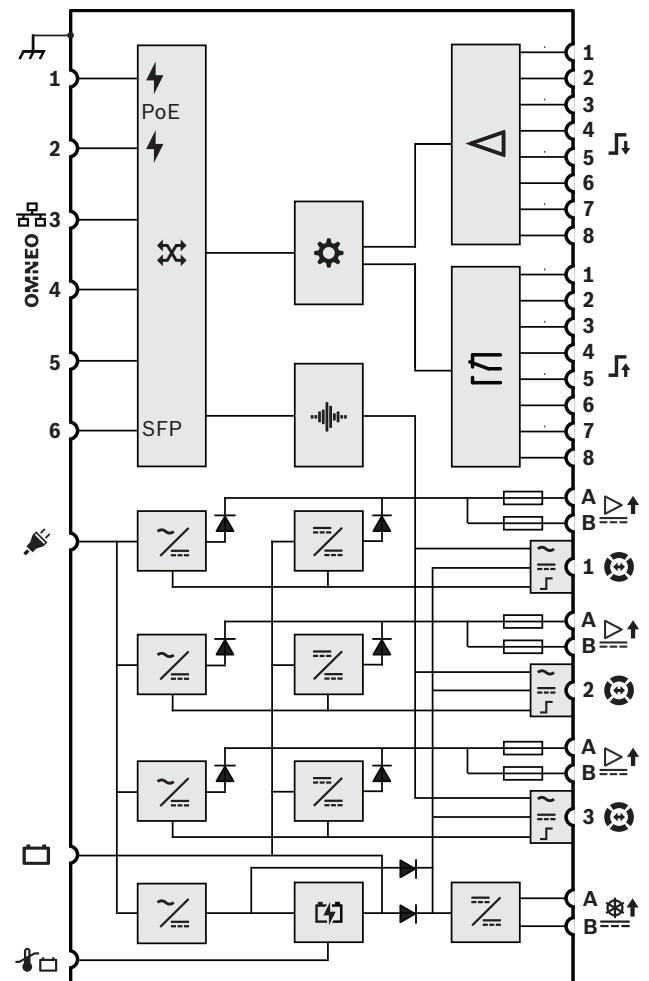
General purpose control inputs and outputs

- Eight control inputs to receive signals from external systems with configurable connection supervision.
- Eight voltage free single pole, double throw (SPDT) relay contacts to activate external devices.
- Control input and output functions are software configurable.

Fault tolerance and supervision

- Supervision of mains, battery and device operation and all connections; faults are reported to the system controller and logged.
- Automatic battery backup takeover from mains in case of mains failures.
- Multi-port network interface with RSTP-support for recovery from a failing network connection.
- Supervised audio lifeline to connected amplifiers, as backup for a failing amplifier network interface.

Connection and functional diagram



	Power over Ethernet power source		Control input processor
	OMNEO network switch		Control output relay
	Socket for SFP module		Lifeline audio output
	Controller		Lifeline supply output
	Audio processing (DSP)		Lifeline control interface
	Mains to DC converter		Diode
	DC to DC converter		Fuse
	Battery charger		

Front view**Front panel indicators**

	48 VDC amplifier power supply A-B (1-3) Power on Fault	Green Yellow
	24 VDC auxiliary power supply A-B Power on Fault	Green Yellow
	Device fault present	Yellow
	Network link to system controller present Network link lost	Green Yellow
	Battery status Full (float charging) Charging (bulk or absorption charging) Fault	Green Green Yellow
	Mains present Mains fault	Green Yellow

Rear view**Rear panel indicators**

	100 Mbps network 1 Gbps network	Yellow Green
	Power on Device in identification mode	Green Green blinking
	Device fault present	Yellow

Rear panel controls

	Device reset (to factory default)	Button
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Rear panel connections

	Mains input with fuse	
	Battery 12 VDC	

	Battery temperature sensor	
	48 VDC output A-B (1-3, to amplifier 1-3)	
	Lifeline interface (1-3, to amplifier 1-3)	
	Control input 1-8	
	Control output 1-8	
	24 VDC output A-B (to system controller)	
	Network port 1-5 (port 1 and 2 with PoE)	
	Network port 6 (SFP, e.g. for PRA-SFPLX or PRA-SFPSX)	
	Chassis ground	

Architects' and Engineers' Specifications

The IP-networked multifunction power supply shall be designed exclusively for use with Bosch PRAESENSA systems. The multifunction power supply shall contain four independent mains power supplies with power factor correction and dual output connection facilities to power up to three 600 W amplifiers and to power a system controller and two call stations. The multifunction power supply shall have an integrated battery charger for a connected battery, and independent converters to use the battery as a backup power source for all connected loads in case of mains failures. Failover to the backup battery shall be without interruption of output power. It shall use a single 12 V VRLA backup battery to eliminate the need for battery balancing, while maximizing battery lifetime and power density. The multifunction power supply shall have eight general purpose control inputs with connection supervision and eight voltage free control outputs. The multifunction power supply shall provide an interface for control data and to receive a backup audio channel over OMNEO using an integrated 6-port Ethernet switch for redundant network connections, supporting RSTP and loop-through cabling. Two ports

shall have PoE to provide redundant power to a call station. The backup audio channel shall be available as analog lifeline to connected amplifiers. The multifunction power supply shall provide front-panel LED indications for status of the power supply sections, mains and battery, network link and fault presence, and provide additional software monitoring and fault reporting features. The multifunction power supply shall be rack mountable (2U). The multifunction power supply shall be certified for EN 54-4 and ISO 7240-4, marked for CE and be compliant with the RoHS directive. Warranty shall be three years minimum. The multifunction power supply shall be a Bosch PRA-MPS3.

Certifications and approvals

Emergency standard certifications

Europe	EN 54-16 EN 54-4
International	ISO 7240-16 ISO 7240-4

Regulatory areas

Safety	EN/IEC/CSA/UL 62368-1
Immunity	EN 55024 EN 55103-2 (E1, E2, E3) EN 50130-4
Emissions	EN 55032 EN 61000-3-2 EN 61000-3-3 EN 61000-6-3 ICES-003 ANSI C63.4 FCC-47 part 15B class A

Conformity declarations

Europe	CE/CPR
Environment	RoHS

Parts included

Quantity	Component
1	Multifunction power supply
1	Set of 19"-rack mounting brackets (pre-mounted)
1	Set of screw connectors
1	Battery connection set (wiring, fuse, temperature sensor)
1	Mains power cord
1	Quick Installation Guide
1	Important Product Information

Technical specifications

Electrical

Power transfer

Mains power supply input	
Input voltage range	115 to 240 VRMS
Input voltage tolerance	102 to 264 VRMS
Frequency range	50 to 60 Hz
Inrush current	< 20 A
Power factor (PF)	0.9 to 1.0
Leakage current to safety ground	< 0.75 mA (120 V), < 1.5 mA (240 V)
Battery power supply input	
Nominal DC input voltage	12.6 V
DC input voltage tolerance	9 to 15 V
Maximum current	90 A
Under-voltage protection	< 9 V
Battery charger	
Nominal charging current	8.5 A
Nominal float voltage	13.5 V
Float voltage control	-21.9 mV/°C
Temperature sensor NTC	10 kohm / $\beta = 3984$ K
Charging temperature range	-15 to 50 °C
48 VDC outputs (1-3)	
Nominal DC output voltage	48 V
Maximum continuous current	5.5 A
Maximum peak current	7.0 A
24 VDC output	
Nominal DC output voltage	24 V
Maximum continuous current	0.7 A
Maximum peak current	0.9 A
Lifeline DC outputs (1-3)	
Nominal DC output voltage	18 V
Maximum continuous current	0.7 A
Maximum peak current	1.0 A
Power over Ethernet (PoE 1-2)	
Nominal DC output voltage	48 V
Standard	IEE 802.3af (mode B)
Maximum PD load	12.95 W
Power consumption	
Mains powered	
Active mode, all outputs loaded	<1000 W
Battery powered	
Unloaded	5.2 W
Active mode, all outputs loaded	<1000 W
Per active port	0.4 W
Per active SFP port	0.7 W
Lifeline / power save interface	
Audio level (100 V / 70 V mode)	0 dBV / -6 dBV
Frequency response (+0 / -3 dB)	200 Hz to 15 kHz
Signal to Noise Ratio (SNR)	90 dBA

EN 54-4 related information

Maximum battery capacity	230 Ah
Lowest discharge voltage	9 V
Continuous output current (I max. a / I max. b / I min.)	
48 VDC outputs (1-3)	5.5 A / 5.5 A / 0 A
24 VDC output	0.7 A / 0.7 A / 0 A
PoE output (1-2)	0.3 A / 0.3 A / 0 A
Lifeline DC outputs (1-3)	0.7 A / 0.7 A / 0 A
Output voltage range	
48 VDC outputs (1-3)	46 to 50 V
24 VDC output	23 to 25 V
PoE output (1-2)	44 to 57 V
Lifeline DC outputs (1-3)	9 to 18 V
Maximum impedance of battery circuit	
230 Ah battery	7.1 mohm
180 Ah battery	8.6 mohm
140 Ah battery	9.8 mohm
100 Ah battery	11.0 mohm

Control interface

Control input contacts (1-8)	
Principle	Contact closure
Galvanic isolation	No
Supervision	Resistance measurement
Contact closed	8 to 12 kohm
Contact open	18 to 22 kohm
Cable fault detection	<2.5 kohm / >50 kohm
Minimum hold time	100 ms
Maximum voltage to ground	24 V
Control output contacts (1-8)	
Principle	Contact switch over (Relay SPDT)
Galvanic isolation	Yes

Control interface

Maximum contact voltage	110 VDC, 125 VAC
Maximum contact current	1 A
Maximum voltage to ground	500 V

Supervision

Battery	Disconnect Short circuit Charging state Impedance
Power supplies	Converter voltages Output voltages
Lifeline connection	Impedance
Control input connections	Open / short
Temperature	Per section
Fan	Rotation speed
Controller continuity	Watchdog
Network interface	Link presence

Network interface

Ethernet	100BASE-TX, 1000BASE-T
Protocol	TCP/IP
Redundancy	RSTP
Audio/control protocol	OMNEO
Network audio latency	10 ms
Audio data encryption	AES128
Control data security	TLS
Ports	
RJ45	5 (2 with PoE)
SFP	1

Environmental**Climatic conditions**

Temperature Operating	-5 to +50 °C (23 to 122 °F)
Storage and transport	-30 to +70 °C (-22 to 158 °F)
Humidity (non condensing)	5 to 95 %
Air pressure (operating)	560 to 1070 hPa
Altitude (operating)	-500 to +5000 m (-1640 to 16404 ft)
Vibration (operating) Amplitude Acceleration	< 0.7 mm < 2 G
Bump (transport)	< 10 G

Airflow

Fan airflow	Front to sides/rear
Fan noise Idle condition, 1 m distance Rated power, 1 m distance	< 30 dBSPLA < 53 dBSPLA

Mechanical**Enclosure**

Dimensions (WxHxD) With mounting brackets	483 x 88 x 400 mm (19 x 3.5 x 15.7 in)
Rack unit	19 in, 2U
Ingress protection	IP30
Case Material Color	Steel RAL9017
Frame Material Color	Zamak RAL9022HR
Weight	11.8 kg (26 lb)

Ordering information**PRA-MPS3 Multifunction power supply, large**

Power supply with battery charger for up to three amplifiers and a controller, with integrated network switch and control inputs and outputs.

Order number **PRA-MPS3**

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