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

The PRA-MPS3 combines multiple functions into a single compact device, serving several PRAESENSA audio 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 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
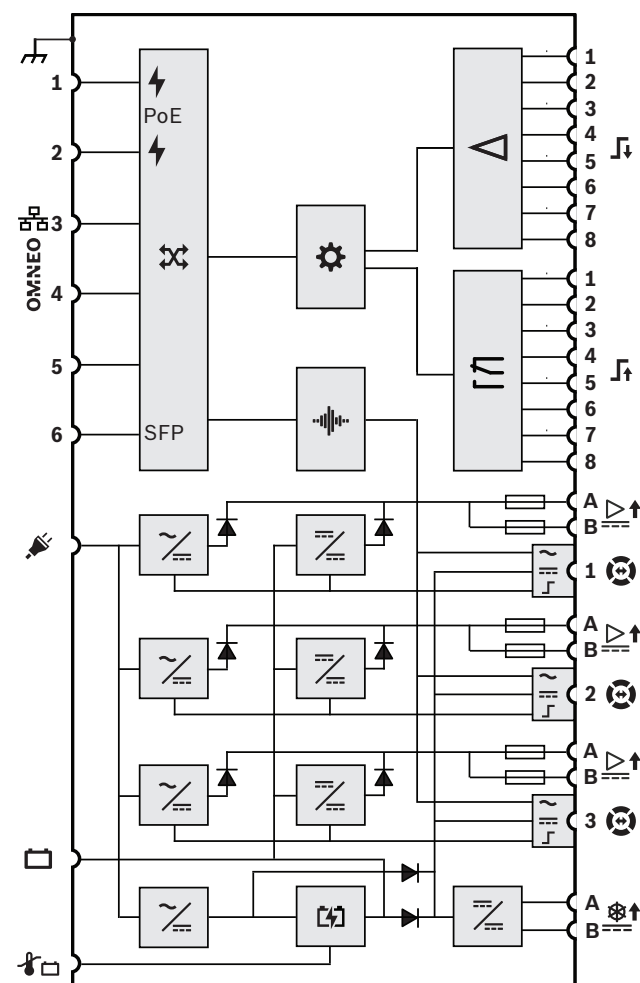
⚡	Power over Ethernet power source	◁	Control input processor
✕	OMNEO network switch	⊏	Control output relay
SFP	Socket for SFP module	∼	Lifeline audio output
⚙	Controller	⎓	Power-save DC output
⑈	Audio processing (DSP)	⌐	Power-save control interface
⩘	Mains to DC converter	⇥	Diode
⩘	DC to DC converter	⇔	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 blinking 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

Rear panel connections

🔌	Mains input with fuse	
▭	Battery 12 Vdc	

⚡▭	Battery temperature sensor	
▷↑	48 Vdc output A-B (1-3, to amplifier 1-3)	
✪	Audio lifeline / Power-save (1-3, to amplifier 1-3)	
⊐↓	Control input 1-8	
⊐↑	Control output 1-8	
❈↑	24 Vdc output A-B (to system controller)	
🖧 OMNEO	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 & Engineers specification - PRA-MPS3

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
International	ISO 7240-16

Environmental directive compliancy

Safety	EN/IEC/CSA/UL 62368-1
Immunity	EN 55103-2 (E1, E2, E3) EN 50130-4
Emissions	EN 55032 EN 61000-6-3 ICES-003 ANSI C63.4 FCC-47 part 15B class A
Maritime	IEC 60945 (excluding salt mist test) DNV Type approval
Railway	EN 50121-4

Conformity declarations

Europe	CE/CPR
USA/Canada	FCC/c-UL/CSA
China	CCC
Korea	KE
Australia	RCM
Taiwan	BSMI
Russian Federation	EAC
Environment	RoHS

Parts included

Quantity	Component
1	Multifunction power supply
1	Set of 19" rack mounting brackets (pre-mounted)
1	Set of screw connectors

Quantity	Component
1	Battery connection set (wiring, fuse, temperature sensor)
1	Mains power cord
1	Safety instructions booklet
1	Quick Installation Guide

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 / β = 3984 K
Charging temperature range	-15 to 50 °C
48 Vdc outputs (1-3)	
Nominal DC output voltage	48 V
Maximum continuous current	4.7 A
Maximum peak current	6.9 A
24 Vdc output	
Nominal DC output voltage	24 V
Maximum continuous current	0.7 A
Maximum peak current	1.0 A
Power save 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	IEE802.3af (mode B)
Maximum PD load	12.95 W

Power transfer

Power consumption	
Load condition	3 x PRA-AD60x
	1 x PRA-SCL
	1 x PRA-CSLx
	2 x PRA-CSE
Mains powered	
Active mode, idle	230 W
Active mode, rated power	840 W
Battery powered	
Snooze mode	46 W
Active mode, rated power	840 W

Heat loss	
Load condition	3 x PRA-AD60x
	1 x PRA-SCL
	1 x PRA-CSLx
	2 x PRA-CSE
Mains powered	
Idle condition	432 kJ/h (410 Btu/h)
Rated power condition	480 kJ/h (454 Btu/h)
Battery powered	
Snooze mode	29 kJ/h (27 Btu/h)
Active mode, rated power	480 kJ/h (454 Btu/h)

Lifeline / power save interface	
Audio level (100 V / 70 V mode)	0 dBV / -3 dBV
Bandwidth (-3 dB)	200 Hz to 15 kHz
Signal to Noise Ratio (SNR)	90 dBA

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	0 to 2.5 kohm / >30 kohm
Minimum hold time	100 ms
Maximum voltage to ground	24 V

Control output contacts (1-8)	
Principle	Contact switch over (Relay SPDT)

Control interface

Galvanic isolation	Yes
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	Input voltages
	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	1 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℃ (23 to 122℉)
Storage and transport	-30 to +70℃ (-22 to 158℉)
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
	< 50 dBSPLA

Reliability

MTBF	> 1,000,000 h

Mechanical

Enclosure

Dimensions (WxHxD)
   With mounting brackets
 	
   Rack unit
	
	483 x 88 x 400 mm
	(19 x 3.5 x 15.7 in)
	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**