

Liebert® MPX™ Rack Power Distribution Unit (PDU)

Guide Specifications

1.0 GENERAL

1.1 SUMMARY

This specification defines the electrical and mechanical characteristics and requirements for a continuous-duty, adaptive power distribution system. The system, hereafter referred to as the Liebert MPX PDU, will provide high-quality AC power for sensitive electronic equipment loads.

1.2 STANDARDS

The Liebert MPX PDU is designed in accordance with the applicable sections of the current revision of the following documents. Where a conflict arises between these documents and statements made herein, the statements in this specification will govern.

1.2.1 North America

120V and 208V (Single and three phase)

- UL 60950-1 Information Technology Equipment
- CAN/CSA-C22.2 No. 60950-1-03 Information Technology Equipment
- FCC, Title 47, Part 15 Subpart B for Class A operation as defined by ANSI Standard C63.4.
- ISTA Procedure 1A and 2A
- ROHS Compliant

1.2.2 Europe

230V and 400V (Three phase)

- CE Markings Directive 93/68EEC according to the Low-Voltage Directive (LVD)
- CE Markings Directive 73/23/EEC
- Electromagnetic Compatibility (EMC) Directive 89/336/EEC
- European Directive 2002/95/EC on the restriction of the use of certain hazardous substances in electrical and electronic equipment
- IEC 61709
- ISTA Procedure 1 A and 2A
- ROHS and WEEE Compliant

1.3 SYSTEM DESCRIPTION

The Liebert MPX PDU provides for scalable global power distribution by means of compatibility with a wide variety of North/Central American, European and International power supply cords, connectors and receptacles/sockets. The Liebert MPX adaptive rack PDU system delivers break-through flexibility, availability and total cost of ownership.

The Liebert MPX PDU enables users to respond to and manage changing rack power and management environments. The Liebert MPX PDU provides users the ability to size their rack PDU system to support initial requirements and then adapt as connectivity, capacity and/or functionality needs changing. The Liebert MPX PDU is based on a patent-pending design built on a power/communication bus and input/output power module strategy.

The Liebert MPX PDU is provided as separate ship-loose modules for user on-site configuration. The Liebert MPX PDU is designed for simple and quick configuration and reconfiguration. Pre-configured systems are available as an SFA when ordered as factory-installed in Knurr rack enclosure systems. The Liebert MPX PDU design is modular in that the input power service and distribution means are segmented into functionally discrete components that are operatively fastened onto a common MPX PDU Power Rail Chassis (PRC).

The Liebert MPX PDU monitors electrical attributes of an individual rack PDU, including real-time remote and (optional) local display of monitoring of aggregate and branch electrical parameters (status, thresholds, alarms) including voltage, amps, kW and kW-hr. Liebert MPX PDU features include rack PDU/ branch load monitoring and control for continuous uptime and minimum disruptions, an expandable monitoring interface providing simplified growth management, rugged construction and the availability to be factory-installed in the Knurr rack enclosure system. The Liebert MPX PDU provides power-related metering of inputs and outputs. This information can be conveyed to other public network devices via a rack PDU communications plug-in card (such as the RPC-1000 card) inserted into the MPX Power Entry Module (MPX PEM) to gain direct access to the private, inter-module communication bus to which all modules are operably connected. Additionally, the RPC communication card provides support for local environmental sensing and control, as well as the RPC card Basic Display Module (BDM), operatively coupled and intended for viewing to facilitate installation configuration and system troubleshooting.

The Liebert MPX PDU is intended for use with light industrial, telecommunication, and network infrastructure and is designed for safety in accordance with the harmonized IEC 60950-1 1st Edition Information Technology Equipment Safety standards. The Liebert MPX PDU is designed as Class I stationary equipment and will protect against electric shock by basic insulation with a bonded connection to the ground in the building installation wiring.

1.4 SYSTEM COMPONENTS

The Liebert MPX adaptive rack PDU is composed of several key building blocks and support modules. The Liebert MPX PDU is built on the MPX Power Rail Chassis (MPX PRC) that distributes power and communications to all support modules, acts as a backplane to mount support modules and offers provisions to physically mount the Liebert MPX PDU in a network rack. Input power is connected and delivered to the Liebert MPX PDU system via the MPX Power Entry Module (MPX PEM). The output power connectivity and communications management level is defined by the MPX Branch Receptacle Modules (MPX BRM). MPX BRM power connectivity includes NEMA, IEC and Schuko receptacles. MPX BRM capabilities include branch monitoring and receptacle management versions. Network communications, sensor and/or a local display interface is provided by the Liebert Rack PDU Card (Liebert RPC communication card) that mounts in the MPX PEM. The Liebert RPC card provides connection to an optional RPC card Basic Display Module (RPC BDM) for local status/alarm viewing. Two different module versions are available for North American and European applications. The following sections identify and describe the electrical performance requirements and their implementation strategies for each Liebert MPX PDU component.

1.4.1 MPX PDU POWER RAIL CHASSIS (PRC)

The MPX PRC distributes power and communications to the installed MPX modules. The MPX PRC supports single and three phase power input from 20 to 60amps (North America) or 16 to 63amps (European). It includes provisions to mount and secure input power (MPX PEM) and output receptacle (MPX BRM) modules. It is available in lengths to accommodate typical 23 or 42U network racks [1035mm (40.75in) or 1880mm (74.0in)]. The MPX PRC includes zero-U mounting provisions that accommodate most rack designs. The MPX PRC is provided with cover/spacers to assist users with positioning for future MPX modules.

1.4.2 MPX PDU POWER ENTRY MODULE (PEM)

The MPX PEM provides input power to the MPX system and includes provisions for the addition of the RPC communication card to support remote and local communications. The MPX PEM is available in two versions: Variable Capacity and Fixed Capacity. The MPX PEM Variable Capacity version allows the user to select and change power input via different MPX Input Power Cords (IPCs). The MPX IPC includes a cord, the MPX PEM connector and a NEMA or IEC input plug. The MPX PEM Fixed Capacity version supports rated input capacities from 40 up to 63amps with fixed cord and plug connections. All MPX PEMs include an audible overcurrent alarm with local reset. One MPX PEM is required per MPX rack PDU.

The MPX PEM can be installed onto either end of the MPX PRC to energize it via a safe, secure, and reliable mating connection.

The MPX PEM does not support hot-swap capability. It must be first disconnected from the AC main supply, and the device loads must also be disconnected from the MPX BRMs before it can be safely removed from the MPX PRC.

1.4.2.1 North America

- *Variable Capacity:* MPX PEMs are available in 220mm length for application on short and long MPX PRCs (1035mm and 1880mm). The Variable Capacity MPX PEM is available in the following configurations for North America:
 - o MPXPEM-NVAXXAXX: 120 or 208VAC single phase and/or 208-240VAC three phase input up to 30amps.
 - MPX Input Power Cord (IPC): The MPX PEM Variable Capacity version allows the user to select and change power input via different MPX IPCs. The MPX IPC includes a cord, MPX PEM connector, and a NEMA or IEC input plug. The MPX IPC is available in multiple versions supporting up to 30amps, including single phase North American 120VAC and 208VAC and three phase North American 120/208VAC connections.
 - This section lists the supported North/Central American style MPX IPC assemblies based upon phase designation:
 - Single Phase 120V: This section describes the supported North/Central American single phase 120V (line L1-to-neutral) 3-wire MPX IPC assemblies.
 - o NEMA L5-30P (L1-N-G): A detachable 3-wire IPC assembly is constructed with a locking NEMA L5-30P plug rated 125VAC and a 30amp rated cable terminated with a 32amp quick connect coupling.

- **Single Phase 208-240V:** This section describes the supported North/Central American single phase 208V (line L1-to-line L2) 3/4 wire MPX IPC assemblies.
 - **NEMA L6-30P (L1-L2-G):** A detachable 3-wire IPC assembly is constructed with a locking NEMA L6-30P plug rated 250VAC and a 30amp rated cable terminated with a 32amp quick connect coupling.
- **Three Phase 120/208/240V:** This section describes the supported North/Central American three phase 5-wire MPX IPC assemblies.
 - **NEMA L21-20P (L1-L2-L3-N-G):** A detachable 5-wire IPC assembly is constructed with a locking NEMA L21-20P plug rated 120/208VAC and a 20amp rated cable terminated with a 32amp quick connect coupling.
 - **NEMA L21-30P (L1-L2-L3-N-G):** A detachable 5-wire IPC assembly is constructed with a locking NEMA L21-30P plug rated 120/208VAC and a 30amp rated cable terminated with a 32amp quick connect coupling.
- **Fixed Capacity:** These systems are available in 266mm length for application on long (1880mm) MPX PRC systems. The Fixed Capacity MPX PEM is available in the following (two) configurations for North America:
 - **MPXPEM-NHBXVA30** Power Entry Module - 208-240VAC, three phase 4-wire, 50amp input, CS8365C plug, 3.0m-10ft cord
 - **MPXPEM-NHBXWA30** Power Entry Module - 208-240VAC, three phase 5-wire, 60amp input, IEC60309 Pin-Sleeve plug, 3.0m-10ft cord

1.4.2.2 Europe

The following sections describe the supported International high-power pin and sleeve style MPX IPC assemblies based upon pole designation. All plugs are specified in accordance with IEC 60309.

- **Variable Capacity:** MPX PEMs are available in 220mm length for application on short and long MPX PRC (1035mm and 1880mm). The Variable Capacity MPX PEM is available in the following configurations:
 - **MPXPEM-EVAXXAXX:** Power Entry Module- 230VAC single phase and/or 230/400VAC three phase input up to 32amps.
 - **MPX Input Power Cord (IPC):** The MPX PEM Variable Capacity version allows the user to select and change power input via different MPX IPCs. The MPX IPC includes cord, MPX PEM connector, and NEMA or IEC input plug. The MPX IPC is available in multiple versions supporting up to 32amps, including single phase European 230VAC and three phase European 230/400VAC connections.
 - This section lists the supported style MPX IPC assemblies based upon phase designation:
 - **MPXIPC-EXR30XXX:** 32amp-230/400VAC-Three Phase; IEC309 5W plug; 3.0m-10ft length cord

- *Fixed Capacity:* These systems are available in 266mm length for application on long (1880mm) MPX PRC systems. The Fixed Capacity MPX PEM is available in the following (two) configurations:
 - o MPXPEM-EHBXZA30: Power Entry Module - 230/400VAC, three phase 5-wire, 63amp input, IEC60309 Pin-Sleeve plug, 3.0m-10ft cord

1.4.3 MPX PDU BRANCH RECEPTACLE MODULE (BRM)

The MPX BRM provides output power distribution to and remote management/monitoring of user loads. MPX BRMs include output receptacles (NEMA, IEC or Schuko) and are overload protected. The MPX BRM is available in two versions: branch monitoring and receptacle management. The MPX BRM branch monitoring version supports monitoring of its aggregate branch electrical and energy parameters (status, thresholds and alarms) including voltage, amps, kW, and kW-hr. The MPX BRM receptacle management version supports monitoring of individual receptacle electrical and energy parameters (status, thresholds and alarms) including voltage, amps, kW and kW-hr, supports on-off power control of individual receptacles, along with the aggregate branch monitoring provided on BRM branch monitoring systems.

MPX BRMs are hot-swappable to allow user installation without powering down the MPX system. Each BRM includes a display that automatically assigns and displays an identification number to the BRM when added to an active MPX system (such as MPX PRC, MPX PEM and Rack PDU Card). Each BRM is overload protected by a Hydraulic-Magnetic 20amp rated branch circuit breaker that adheres to UL60950 requirements. The breakers are protected from inadvertent tripping (they require tool insertion to manually open) and from accidental impact damage (by a protection body/cover).

MPX BRMs are offered in line-to-line and line-to-neutral power configurations. These configurations support different power input requirements and support for load balancing for three phase input power systems.

Up to three MPX BRMs can be deployed on an MPX system utilizing the 1035mm MPX PRC for typical 23U racks and up to six BRMs for systems utilizing the 1880mm PRC for typical 42U racks. All MPX BRMs are 266mm in length.

1.4.4 SAFETY COMPLIANCE

The Liebert MPX PDU is listed for safe product design in accordance with the harmonized EN/UL/CSA 60950-1 safety standards. It is evaluated for safe operation under normal use, where faulty product configuration, use or exposure to disruptive environmental influences could result in unexpected fault conditions that have the potential to create hazardous conditions and need to invoke certain protective measures. Where applicable, regional or national differences are noted.

- The CE marked models are evaluated in accordance with the measurement and test procedure described in Sections 4.7.3.1-4 of IEC 60950-1.
- The Liebert MPX PDU is certified to meet EMI radio interference standards according to FCC Class A Part15, Sub-Part B and EN 55022:1998 Class A (includes Amendments A1:2000 and A2:2003).
- The PDU is certified to meet EMI radiated and conducted emissions standards according to EN 61000-6-2 (IEC 61000-6-2:2005).

1.4.5 LISTING/CERTIFICATIONS

The Liebert MPX PDU operates within the guidelines of the specified agency standards and regional variants, and does not adversely affect or compromise the safety compliance of other Vertiv managed devices connected to the system. The Liebert MPX PDU is designed for commercial and light industrial use only.

1.4.6 LIEBERT MPX PDU SERVICEABILITY

The following sections describe important serviceability conditions:

- Site Modifications:
 - o The Liebert MPX PDU provides hot-swappable field exchange or upgrade to the BRMs without disconnection of the AC mains supply and disconnection of the device loads.
 - o The Liebert MPX PDU requires that field exchanges or upgrades to the PEM and/or PRC have the operator disconnect the AC mains supply first via the power supply cord. Or, for hard-wired configurations, open the branch circuit breaker(s) at the distribution panel and confirm the de-energized condition.
- Maintenance/Repair Time: The Liebert MPX PDU has no user-serviceable parts.

2.0 ENVIRONMENTAL CONDITIONS

2.1 AMBIENT TEMPERATURE

- Operating: 41°F — 131°F (5°C — 55°C) for altitudes 10,000 ft (3000 meters) above sea level.
- Storage: -13°F — 185°F (-25°C — 85°C)

2.2 RELATIVE HUMIDITY

5- 95% non-condensing

3.0 USER ACCESSORIES AND PACKAGING

3.1 DOCUMENTATION

The specified system is supplied with a user manual. The manual includes installation drawings and instructions, a functional description of the equipment, safety precautions, illustrations, operating procedures and general maintenance guidelines.

4.0 WARRANTY AND QUALITY ASSURANCE

4.1 WARRANTY TERMS

The manufacturer warrants against defects in materials and workmanship for two (2) years.

4.2 MANUFACTURER QUALIFICATIONS

Vertiv provides more than thirty years' experience in the design, manufacture and testing of systems. The company is certified to ISO 9001 (2008).

4.3 FACTORY TESTING

Before shipment, the product is tested to assure compliance with the specification.