

Key Features

- **Fully Integrated Power System**—controller, rectifiers, ring generators, distribution, low voltage disconnect all in a compact single cabinet
- **Single Point Adjustment (on MCA)**— system and PCU parameters are set once for simplified installation and system adjustments, reconfiguration is not required as the system grows
- **MCA Module**—full system monitoring and control
- **Plug'n'Play**—system shutdown is not required to add or replace a PCU/Ringer
- **Power Factor Corrected**—0.99 at 50% load at 120 VAC input
- **Wide AC Input Range (92-264 volts)**—no straps or taps to change
- **Low Voltage Disconnect (LVD)**—field replaceable, choice of battery or load disconnect
- **Optional Ringing**—redundant 50 VA ring generators with automatic/manual transfer occupying one PCU position
- **Rugged Construction**—meets seismic Zone 4 specifications
- **Thermal Current Limit**—protects system in high temperature environments, while extending battery discharge time
- **Distribution/Alarming**—connectorized for ease of wiring
- **Bottom to Top Ventilation**—allows for forced air cooling through the system
- **Battery Management**—DC voltage automatically adjusts to changes in battery chamber temperature, DC voltage steps down in “hot” battery conditions

8-40 amp, -48 VDC Vortex[®] Power System with 8 amp PCUs

Description

The VMS40 power system is the most recent addition to the VortexMini Series (VMS) product line. Built on the heritage of the Lorain[®] brand name, the VMS40 is ideal for local loop, private network and -48 VDC wireless applications.

The fully integrated system provides 40 amps of dependable -48VDC power from a single phase source with a nominal input voltage range of 120-240 VAC.

The system fits 23" (58.42cm) applications and is compact, occupying only three rack units of space and 12" (30.4cm) of depth.

The VMS40 is a rugged, temperature-hardened design consisting of a meter-control-alarm (MCA) module, up to five positions for power conversion units (PCUs), a set of redundant 50 VA ringing generators, selectable battery temperature compensation slope, integrated distribution and designed for use with or without batteries.

Application

The VMS40 power system is designed primarily for local loop applications including remote terminals, cabinets, CEVs, huts and most applications where a small -48 VDC power plant is necessary.

The system is environmentally hardened to withstand hostile environments and is rated for operation in ambient temperatures from -40° C to +65° C (-40° F to +149° F) with forced air cooling.

The System

Power Shelf

The front access power shelf is compact, 23" W x 5.25" H x 12" D and mountable in standard 23" (58.42) rails. Its temperature-hardened, rugged construction is seismic Zone 4 compliant.

The VMS40 power system is available in a 40 amp configuration that accepts up to five 8 amp PCUs, includes on-board distribution and optional space for redundant ringing generators.

MCA2 Module

The VMS40 is controlled with the MCA2, a compact meter-control-alarm module. It contains a digital meter that monitors and controls system parameters including; output voltage, high voltage shutdown set-point, system output current and individual PCU output current.



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All system adjustments are made from a single-point on the MCA2 module. Once specifications are set-up, they are automatically communicated to each PCU module. If the communication link between the MCA2 and the PCU modules fails, the PCU modules will default to factory defined settings.

The MCA2 module also provides local indicators and the ability to transmit alarms.

Power Conversion Units

The VMS40 system utilizes the V8F50/P compact, modular 8 amp power factor corrected PCU.

With the system's plug'n'play feature, the installer only needs to set up the system once. System settings are automatically communicated to each PCU module. If PCU modules are switched between systems with different settings, the PCU will assume the setting of the system into which it is installed. As a result, system capacity can be increased quickly and efficiently. Also, expansion or module replacement can be made without system shutdown or individual module adjustment.

The PCU operates with a thermal current limit circuit. This feature will reduce output current when temperatures reach beyond normal rated limits. Instead of complete shutdown, the system will proportionally decrease its output up to a maximum temperature of +75° C (167°F). As ambient temperatures cool, the system will recover automatically without requiring a site visit.

Low Voltage Disconnect (LVD)

The power shelf can be equipped with an optional low voltage disconnect (LVD) module. The shelf can be configured for either low voltage load disconnect or low voltage battery disconnect. The LVD module is controlled by fused dual control circuits to avoid inadvertent disconnection due to a faulty single control circuit.

Ringling Generator Module

The power shelf accommodates two optional plug-in DC powered ringling generator modules which fit in one PCU

slot. They provide a redundant single frequency ringling system with automatic/manual transfer capability.

The plug-in units have a selectable frequency between 15 and 50 Hz and an adjustable nominal output voltage range of 67.5 to 105 VAC RMS. The ringling output is superimposed on -48 VDC. The ringling modules supply up to 50 VA of redundant, continuous ringling power.

Either ringling generator can be selected as the main generator, with the other becoming the standby generator. In the event of a failure in either generator, local and remote alarms will be activated. If the failure occurs in the main generator, the ringling load will automatically transfer to the standby generator. A failed ringling generator card can be replaced without interrupting ringling or DC power to the load.

Battery Management

The VMS40 power system is available with an optional temperature compensation probe. The probe is designed for mounting near the battery. When installed in the battery compartment and connected to the power shelf, it automatically adjusts system output voltage as the ambient temperature in the battery compartment increases or decreases.

Temperature compensation extends the life of the batteries and helps prevent thermal runaway, a potentially catastrophic battery failure mode.

The MCA2 has a customer adjustable temperature compensation slope switch that allows the user to easily select the proper slope setting for the battery being used.

The system also offers an input port designed to receive a signal from thermal switches that causes the output voltage to step down in "hot" battery conditions. This feature also helps to prevent battery thermal runaway.

Distribution

The VMS40 offers distribution options integrated into the shelf such as, 10 GMT fuses, four ringling GMT fuses and two plug-in breakers, up to 30 amps; or bulk DC output for connection to an external distribution panel, etc.

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Power Conversion Unit Specifications

Design Technology: High frequency switch-mode

Input

Voltage: 92-264 VAC

Frequency: 50/60 Hz (47-65)

Protection: If the AC input voltage decreases below a non-adjustable predetermined value, the PCU power conversion circuitry inhibits, disabling the PCU output. The PCU will recover automatically when the AC input voltage is re-established within specifications limits (100-264 VAC).

Output

Voltage: Adjustable from 43.0 VDC to 57.6 VDC

Current: 8 to 40 amps at +65° C (+149° F) with forced air cooling, reduced capacity with convection cooling.

Regulation: Steady state output voltage remains within $\pm 0.5\%$ of any voltage within the range of 43.0 VDC to 57.6 VDC for any load current from no load to full load and for any input voltage and frequency within design parameters.

Filtering: On or off the battery

Voice Band Noise — Less than 32dBnC

Wide Band Noise — Does not exceed 250 mv peak-to-peak, 30 mv rms

Protection

Current Limiting — Output current of each PCU is automatically limited to approximately 105% of full load current.

Selective High Voltage Shutdown — The MCA module continuously monitors the power shelf DC output voltage. If the DC output voltage exceeds a preset user adjustable HVSD set point, set through the MCA, a signal is sent to all monitored PCUs. This signal causes any PCU that is delivering greater than 10% of full load to shut down. The MCA will attempt to re-start the PCU twice. Failing to re-start, the MCA will lock out this PCU.

Status/Alarm Indicators and Metering

Full complement alarming and status indicators such as system OK, major alarm and minor alarm are displayed on the MCA and remotely via form C contacts.

Environmental

Operating Temperature: -40° C to +65° C with forced air.

Storage Temperature: -40° C to +85° C (-40° F to +185° F)

Humidity: 0% to 95% relative humidity, non-condensing

Altitude: The maximum operating ambient temperature should be derated by 10° C (18° F) at an elevation of 10,000' (3,048m) above sea level. For elevations between 3,000' (914m) and 10,000' (3,048m), derate the maximum operating ambient temperature linearly.

EMI/RFI Suppression: Conforms to FCC rules Part 15, Subpart B, Class A.

Physical Characteristics

Mounting: Plug-in installation

PCU Dimensions:

Width: 23" (58.42cm)

Height: 5.18" (13.17cm)

Depth: 12" (30.48cm)

Weight:

PCU — 4lbs. (1.8 kgs)

Power Shelf with MCA Module — 17 lbs. (7.9 kgs)

Color: Off-white

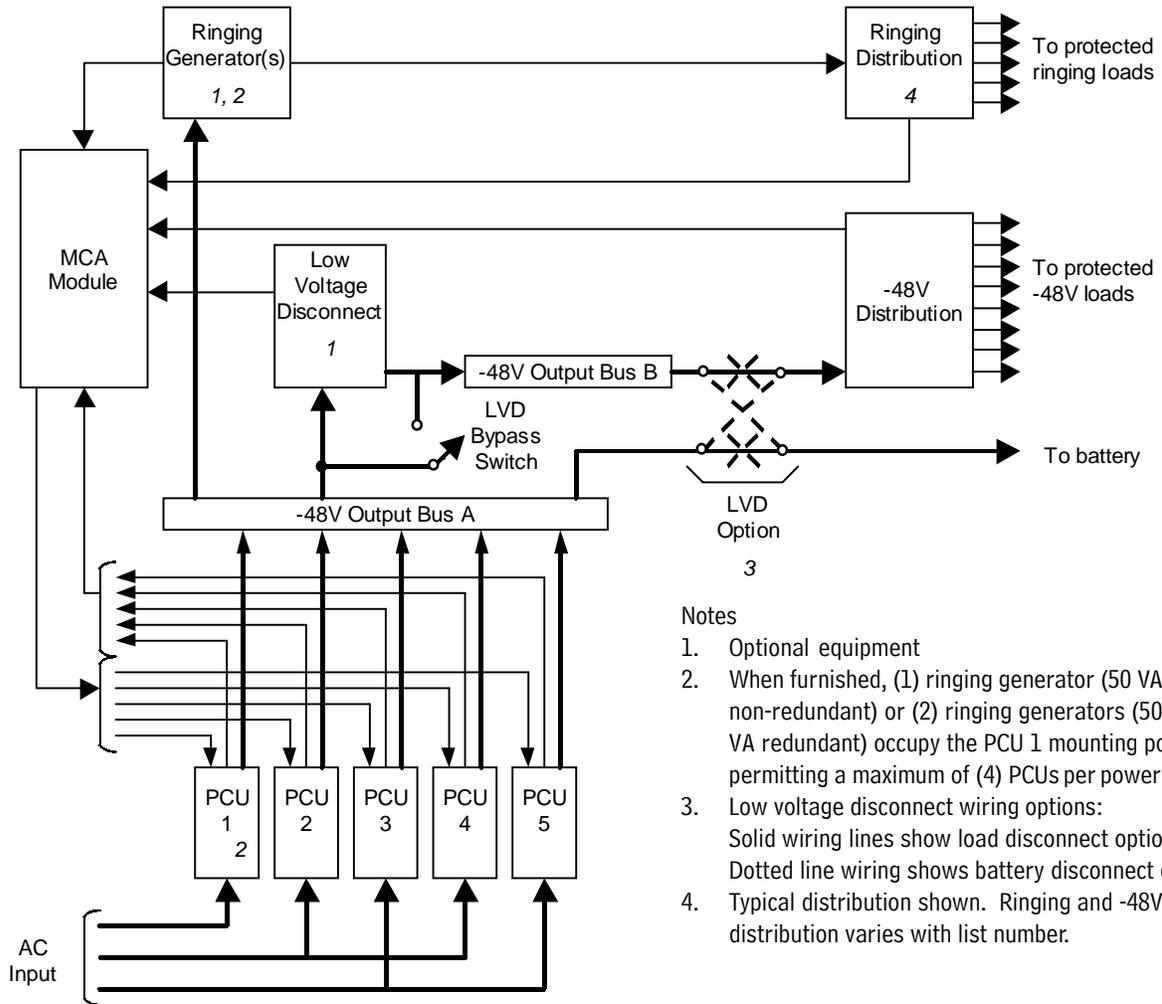
Safety Compliance

UL: UL Recognized (UL 1950)

CSA: CSA 22.2, No. 234-M90

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VMS40 System Block Diagram



Notes

1. Optional equipment
2. When furnished, (1) ringing generator (50 VA non-redundant) or (2) ringing generators (50 VA redundant) occupy the PCU 1 mounting position, permitting a maximum of (4) PCUs per power shelf.
3. Low voltage disconnect wiring options: Solid wiring lines show load disconnect option. Dotted line wiring shows battery disconnect option.
4. Typical distribution shown. Ringing and -48V distribution varies with list number.

Additional Information

For additional specification, engineering and installation information, contact a customer service representative.



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