

# 15-75 amp, -48 VDC Vortex<sup>®</sup> Power System with 15 amp PCUs

## Key Features

- **Single Point Adjustment (on MCA)**— parameters set once for simplified installation and system adjustments.
- **MCA Module**—full system monitoring and control.
- **Plug'n'Play**—no system shutdown
- **Optional Temperature Compensation**— maximizes battery life
- **Front to Back Ventilation**— reduces critical rack space needed for revenue producing equipment
- **Power Factor Corrected**— 0.99 at 50% load at 120 VAC input
- **Wide AC Input Range (96-264 volts)**—no straps or taps to change
- **Optional Ringing & Distribution Modules**—fully-integrated power system in one 8.75" (22.23cm) high shelf

## Description

Built on the heritage of the Lorain<sup>®</sup> brand name, the Vortex Mini Series (VMS) power system is available in two versions and is ideal for local loop and -48 VDC wireless applications.

The VMS60, 19" (48.26cm) wide, has a meter-control-alarm (MCA) module and up to four module positions available for 15 amp plug-in power conversion units (PCUs) as well as optional equipment.

The VMS75 fits 23" (58.42cm) applications and consists of an MCA module and up to five positions for PCUs/optional equipment. Optional equipment consists of a ringing generator module and a distribution module that can be equipped with or without LVD. Optional temperature compensation is also available. These systems provide smooth, regulated -48 VDC power from a nominal input voltage range of 120-240 VAC, single phase source. They can be used without batteries or provided with shelf/rack-mounted batteries.

## Application

The VMS60 and the VMS75 power systems are 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 Vortex Mini Series power systems are environmentally hardened to withstand hostile environments and are rated for operation in temperature ranges from -40° C to +65° C (-40° F to +149° F).

## Additional Information

For additional specification, engineering and installation information, request instruction manual number 582130000 for the 19" (48.26 cm) power shelf and number 582130001 for the 23" (58.42 cm) power shelf.



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## The System

### Power Shelf

The rack-mounted power systems are available in 60 and 75 amp configurations. The 19" (48.26cm) VMS60 system accepts up to (4) 15 amp PCUs and the VMS75 power system accepts up to (5) 15 amp PCUs in a standard 23" (58.42cm) shelf. The power shelf also accommodates optional redundant ringing generators and an optional distribution module. Each require one module position in the system shelf.

### MCA Module

The meter-control-alarm (MCA) module contains a digital meter that monitors system output voltage, high voltage shutdown set-point, system output current and individual PCU output current. The MCA module provides local indicators and the ability to transmit alarms. All unit adjustments are made from one location on the MCA module. Set-up specifications are then communicated to all of the PCU modules. If the communication link between the MCA and the PCU modules fails, the PCU modules will default to a programmed output voltage.

### Power Conversion Units

The VMS system utilizes the V15F50 compact, modular 15 amp PCU. With the system's plug'n'play feature, the installer only needs to set up the system once. System settings will be automatically communicated to each PCU module. If PCU modules are switched between systems with different voltage parameters, 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. In addition, expansion or module replacement can be made without system shutdown. The V15F50 PCU is cooled by drawing air into the front and forcing it out the back. This method of cooling allows the PCU to mount in a compact space (8.75" [22.22cm]) and does not require open space above or below the unit.

The PCU features a thermal current limit circuit. This system will reduce output when temperatures reach beyond rated limits of +65° C (+149° F). Instead of complete shutdown, the system will proportionally reduce its output to 0 amps until its temperature reaches approximately +85° C (185° F). As ambient temperatures cool, the system will recover automatically without requiring a site visit.

### DC Distribution Module

The power shelf accommodates an optional front-access DC distribution module that provides up to four 0-30 amp circuit breakers and up to six 0-5 amp GMT fuses for distribution of DC power to equipment and batteries. The DC distribution module may be equipped with an optional redundant low voltage disconnect circuit. When furnished, this system protects the battery from complete discharge if the PCUs become unable to supply load power, as can occur during an extended AC power failure.

### Redundant Ringing Generator Module

The power shelf accommodates one optional plug-in ringing generator module which provides a redundant single frequency ringing system with transfer capability. The ringing module is equipped with two single output ringing generators. These plug-in units have a selectable frequency of 20, 25 or 30 Hz and an adjustable nominal output voltage range of 67.5-105 VAC RMS. The ringing output is superimposed on -48 VDC. The ringing module supplies up to 100 VA of redundant, continuous ringing power. Either ringing generator in the module can be selected to supply the load (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 ringing load will automatically transfer to the standby generator. A failed ringing generator card can be replaced without interrupting ringing power to the load.

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## The System(continued)

### Temperature Compensation Module

The -48 VDC VMS is available with an optional temperature compensation module which when installed in the battery compartment automatically adjusts system output voltage as ambient temperatures in the battery compartment increase or decrease. While all battery manufacturers recommend that the battery compartment remain at 25° C (77° F), they also suggest decreasing voltage in higher temperatures, likewise, increasing voltage in lower temperature. The temperature compensation module extends the life of the batteries and minimizes thermal runaway risk.

### Power Conversion Unit Specifications

Design Technology: High frequency switch-mode

#### Input

Voltage: 96-264 VAC

Frequency: 50/60 Hz (47-63)

Protection: If the AC input voltage decreases or increases beyond a non-adjustable predetermined value, the PCU power conversion circuitry inhibits, disabling PCU output. The PCU will recover automatically when the AC input voltage is re-established within specifications limits (96-264 VAC).

#### Output

Voltage: Adjustable from 46.0 VDC to 56.0 VDC

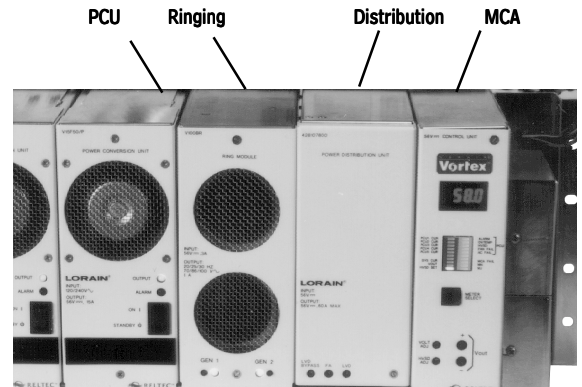
Current: 15 to 75 amps at +60° C (+140° F) and 13 to 65 amps at +65° C (+149° F)

Regulation: Steady state output voltage remains within  $\pm 0.5\%$  of any voltage within the range of 46.0 VDC to 56.0 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 500 mv peak-to-peak, 50 mv rms



### Protection

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

High Voltage Shutdown —

Selective High Voltage Shutdown: The MCA module continuously monitors the power shelf DC output voltage. If the DC output voltage exceeds a preset adjustable HVSD set point, 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 AC On/Standby, Fan Fail, PCU Failure and Open Sense are displayed on the MCA and locally on each unit.

### Environmental

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## Power Conversion Unit Specifications (continued)

Operating Temperature: -40° C to +65° C (-40° F to +149° F)

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 (+50° 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.

Heat Dissipation: Fan cooled front to rear — 642 BTU/hr for each 15 amp module.

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

Audible Noise: 5' (1.52m) from any vertical surface does not exceed 55dBA.

## Physical Characteristics

Mounting: Plug-in installation

Dimensions:

Width: 19" (48.26 cm) / 23" (58.42cm)

Height: 8.68" (22.06cm)

Depth: 11.5" (29.21cm)

Weight:

PCU — 11 lbs. (5.1 kgs)

Power Shelf with MCA Module —

19" (48.26 cm) – 21 lbs. (9.5 kgs)

23" (58.42 cm) – 25 lbs. (11.5 kgs)

Color: Off-white

## Safety Compliance

UL: UL Listed (UL 1950)

CSA: CSA 22.2, No. 234-M90



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