



Integrity-One System

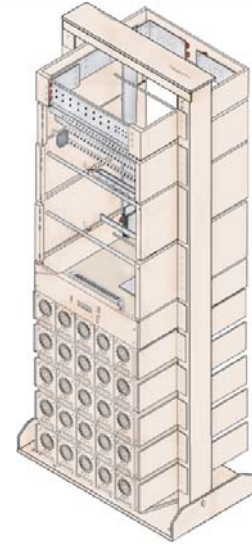
Description

The Integrity-One Power System is the next generation solution for today's power system needs. Using a modular cabinet design, the system is easily upgradeable for future growth. With capacity up to 1250 amps, and a small footprint, the Integrity-One system is ideal for either central office or cell site applications. In addition, Power-One offers multiple options for remote access with user-friendly software.

Basic design concepts allow the user to develop system configurations that meet initial network capacity requirements while allowing future capacity expansion through module additions or multi-bay configurations. A wide variety of hot swappable modules, rectifiers and distribution, enables post installation upgrades, while ensuring minimum initial installation cost.

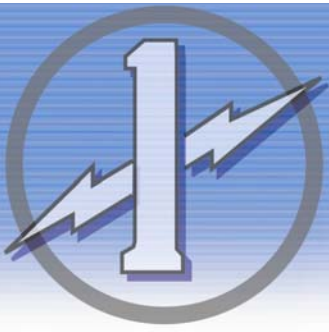
Standard features include the advanced microprocessor PCS controller. This controller offers an extensive list of monitoring and control features that can be accessed locally or remotely through the standard RS232 connection or remotely through the optional Power-One Network Interface box, which allows communication through Ethernet and SNMP protocols. External reporting can also be accomplished by using Form-C contacts.

In addition to the three systems listed here, other layouts, and individual components, are also available for integration into customer provided equipment racks, cabinets, outdoor enclosures, or other power requirements. Please contact Power-One so we may assist you with your unique requirements.



Features

-
 - Modular systems from 50 to 1250 amps.
 - Up to 92% efficient.
 - Intelligent, programmable controller.
 - Front Access Distribution Panels with optional load shedding.
 - Local and remote programming and monitoring.
 - Hot swappable rectifiers.
 - True front access distribution.
 - User-selectable alarm parameters.
 - 208/240 VAC input.
 - Optional Power-One Network interface.
 - Optional Low Voltage Disconnect with programmable disconnect setting.
 - Optional Battery Circuit Breakers.
 - Extensive battery testing and monitoring
 - Programmable Temperature Compensation
 - Battery Testing with data logging
 - Voltage and Symmetry monitoring.
 - Compatible with PowCom™ PC-Based software.



Integrity-One System

Distribution Panels

- Hot Swappable Distribution Panels
- Front, middle and rear distribution positions (Waterfall Effect) allow for system cable management.
- SDS: Secondary Distribution Shelf
 - Rated at 500A
 - Plug in CB's up to 100A rating
 - Accommodates up to 22 Circuit Breakers
- PDS: Primary Distribution Shelf
 - Up to Qty 8 single pole CB's (up to 250A Rating)
 - Up to Qty 3 double pole CB's (up to 400A Rating)
 - Up to Qty 2 triple pole CB's (up to 600A Rating)

PCS Controller

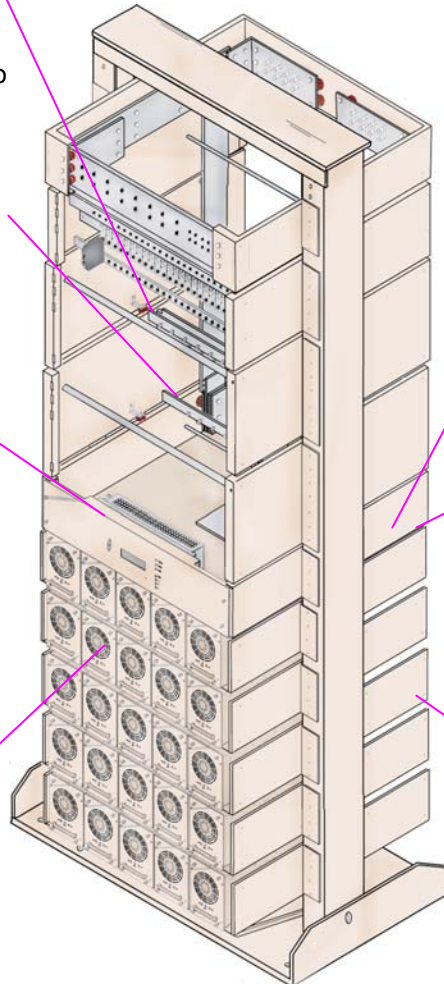
- RS485 Digital Signal Data Bus
- Fully Programmable
- 6 programmable alarms (Upgradeable to 24)
- Battery Test: manual or automatic
- Alarm Relay Test
- Adjustable Battery Current
- Software controlled start-up after mains outage and battery test
- Mounts easily on the front of the distribution shelves.

PMP25 Rectifier

- 5 rectifiers into 4U 23" shelf
- Available in 24 or 48VDC
- Thermal protection
- Power Factor Protection
- Fan cooled modules with speed control and alarms
- Hot swappable
- RS485 interface
- Low weight
- Up to 92% Efficiency

System Interface Shelf

- Easy connection of system alarm signals and wiring
- Optional battery symmetry and temperature probes
- Allows the easy mounting of the optional Power-One Network Interface box (Featuring Ethernet and SNMP protocol capability)
- Optional Low Voltage Disconnect
- Battery shunt



PowCom™ software provides easy user access to system controls, including system configuration and alarm management.

Rectifier Shelves

- RS485 communication bus
- 23" shelf allows up to 5 rectifiers
- Digital Current Sharing
- Individual or single rectifier AC feeds



Integrity-One System

System Configurations

The Integrity-One system is available in three different configurations, allowing the customer to choose the solution right for them. Each system uses the same basic components, these include:

- o The System Interface Shelf:
 - o User alarm signals
 - o Battery LVD
 - o Network Interface
- o PCS Controller
- o PMP25 Rectifier Modules
- o SDS/PDS Distribution Shelves
- o Single or individual rectifier AC inputs to each rectifier shelf.

Full Rack System

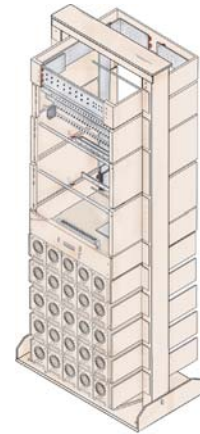
The Integrity-One full system allows for up to 1250 amps with distribution in a single bay (up to 19U) any combination of SDS (5-100 amp breakers) or PDS (100 to 600 amp breakers) may be ordered within this space. Each rack is capable of holding up to five rectifier shelves for 48V applications providing 1250Amps or two rectifier shelves for 24V applications providing 1000A. Multiple racks may also be paralleled to produce a total system capability of 5000Amps using a single controller in the primary rack.

Half-Height Rack System

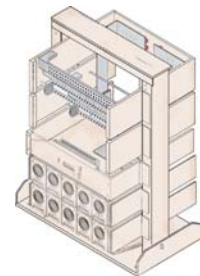
The Integrity-One Half-Height rack system is available at 1000 amps and can be installed above existing battery trays. The Half-Height system is ideal for systems requiring 1,000 Amp hour battery backup. Up to 44 load breakers can distribute up to 500 amps at -48V, or up to 1000 amps at +24V.

Integrity-One Rack with Battery Trays

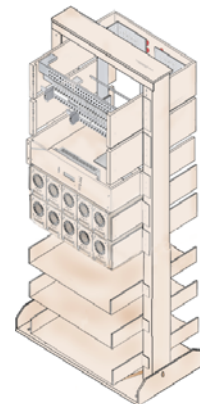
Systems can be delivered with an infinite combination of rectifier shelves and battery trays within the 29U of available mounting space. Battery breaker panels are also available upon request.



Integrity-One Full Rack System



Integrity-One Half-Height Rack System



Integrity-One System with Battery Trays



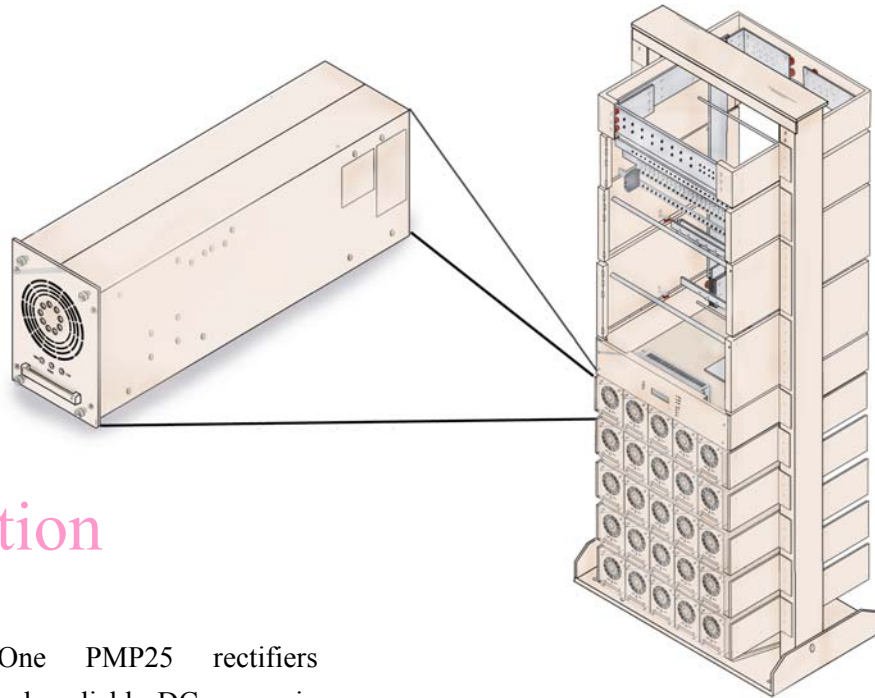
Integrity-One System

Technical Specifications

Electrical Specifications:	
Input Voltage:	208-240VAC +/- 10%
Input Current:	16 amp per rectifier at full load
Input Frequency:	44-66 hz.
Input Fuse:	25 amp
DC Output (48VDC):	45-56VDC (50-1200 amp)
DC Output (24VDC):	22.5-28VDC (100-1000 amp)
Rectifier:	See PMP25 Rectifier data sheet
Battery Monitor:	See PCS Controller data sheet
Power Factor:	>0.99
Efficiency:	>88% (24VDC); >91% (48VDC)
Ripple:	<100m Vp-p
Psophometric:	<2mV, CCITT norms
Insulation:	Reinforced Insulation tested at: -4.25KV DC primary - secondary -2.12KV DC primary - ground -0.8KV DC secondary-ground
Mechanical Specifications:	
Width:	23"
Height (Max):	84" (213.36 cm)
Depth:	23" (58.42 cm)
Weight:	550 lbs. (113.4kg) without rectifiers (max)
Floor Mounting:	Mounting holes provided
Paralleling:	Up to 4 1250 amp racks.
Compliance:	FCC Part 15, Class B; EN5022 Class B; EN 50081-1; EN50082-2
Environmental Specifications:	
Ambient Temperature:	Operating: -25°C to +65°C Storage: -40°C to +85°C
Relative Humidity:	10-90%
Audible Noise:	<60dBA



PMP25 Rectifier Modules



Different arrangements of rectifiers are available to meet specific needs.

Description

The Power-One PMP25 rectifiers provide extremely reliable DC power in the highest possible density. Digital interfaces are incorporated using a RS485 data bus to communicate with the system controller and adjacent rectifiers, guaranteeing tightly controlled load sharing among the rectifiers, and providing status and identification information to the controller. In only 4U height, these compact rectifiers allow for up to 5 units in a 23" rack, (or 4 in a 19" rack) providing up to 250 amps at 48V or up to 500 amps at 24V. With full power available up to 65°C, these rectifiers are ideal for indoor and outdoor applications.

Features

- Compact 4U height.
- 24 and 48 volt rectifiers.
- 50 amp at 48V.
- 100 amp at 24V.
- 176-275 VAC single-phase or three-phase inputs.
- Hot-swappable rectifiers are true plug and play.
- No adjustments required.
- High Efficiency, up to 92%.
- Active Current Sharing.
- International Standards Compliance.



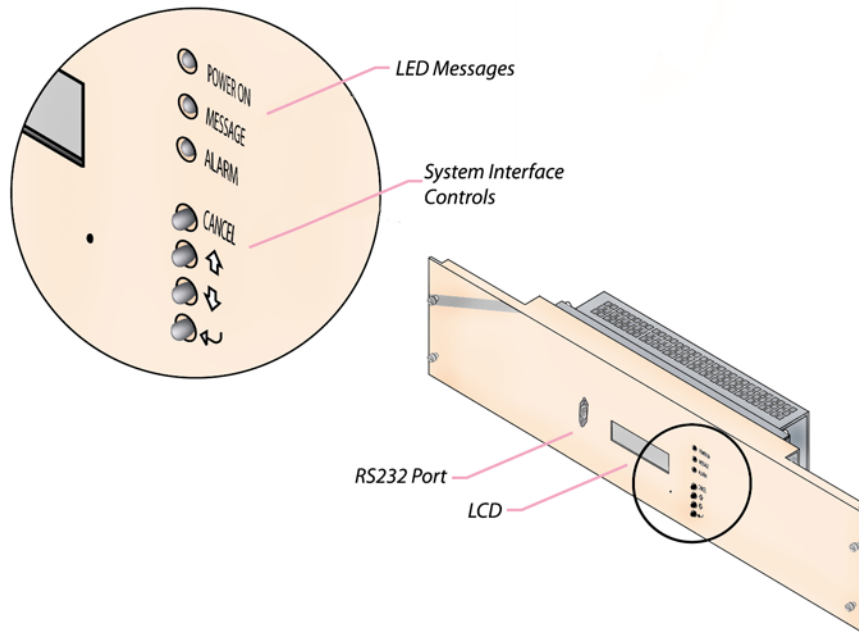
PMP25 Rectifier Modules

Technical Specifications

Electrical Specifications:	
AC Input Range:	176-275V 44-66Hz Single Phase
AC Maximum Current:	20 amp
Soft Start:	<25A peak maximum 5ms
Recommended AC Breaker:	25 amp
Power Factor:	>0.98 (50-100% load)
AC Transient Response:	+/- 6% at load variations 10-90%, recovery time 150ms
Load Sharing:	<5% of nominal current
Ripple:	<100mV p-p (B.W. 20MHz)
Psophometric Noise:	<2mV, CCITT norms
Efficiency:	24V (86%) 48V (92%)
EMC:	Emissions: EN50081-1; Immunity: EN50082-2
Protection	
Short Circuit:	Automatic current limiting, shut down on application of direct short, automatic restart on removal of short.
Over Voltage:	Latching shutdown of rectifier at unsafe voltage level.
Over Temperature:	Automatically reduces output power if environmental conditions exceed 60°C.
Status and Alarms Indications:	Green LED: Power on Red LED: Module Failure Yellow LED: Current Limit/ Thermal Protection Activated
Mechanical Specifications:	
Cooling:	Fan Cooled. Speed controlled and alarmed.
Weight:	Rectifier Module 13.6 lbs. (6.2kg)
Dimensions:	6.9" x 4.13" x 17.9" (176 x 105 x 455mm)
Environmental:	
Altitude Rating:	13,000 ft, derate 7°C/ 1000ft above 8000ft
Audible Noise:	<60dBA
Ambient Temperature:	Operating: 24 Volt- -25°C to +65°C (+65 to +70°C at reduced output) 48 Volt- -25°C to +60°C (+60 to +70°C at reduced output) Storage:-40°C to +85°C
Humidity:	0% to 95% (non-condensing)
Vibration Tolerance:	IEC 721-3-3
Shock Tolerance:	IEC 721-3-2



PCS Controller Unit



The PCS controller has a hinged panel that allows easy access for upgrades.

Description

The PCS Power-One power plant controller system provides comprehensive monitoring and control for a broad range of Power-One's DC power plants. This digital controller monitors total system conditions, including DC voltage, rectifier current, rectifier temperature, system capacity, battery parameters, and circuit breaker status.

Precise control of rectifier output current, disconnect contactors, and battery capacity testing are key features of the PCS unit. It also enables data storage of system configuration information, such as battery type and installation date, system commission date, and graphical data from battery testing. The controller is capable of monitoring up to 128 rectifiers, and 128 sub controllers within a power plant. Visual notification of any alarm or warning condition is provided by front panel LEDs, while descriptions of the alarm is provided via an LCD display, and direct RS232 communication which may be accessed remotely through a modem or the Network Interface (PNI) module.



PCS Controller Unit

Overview

PCS – Plant Control Unit is a microprocessor-based system specifically designed for the supervision of DC Power systems. The design is based on the philosophy of one main controller supervising the entire power supply system, and the use of distributed intelligence by local micro controllers. A complete supervisory system consists of the following sub-assemblies:

- o Main Controller- Master unit in the system communicating with all distributed micro controllers. The unit includes LCD display, menu driven operation, visual alarm indication, RS232 contact for remote operation, and RS 485 for internal communication with up to 256 addresses (128 rectifiers - PMP 25 and 128 other remote micro controllers). An RS232 Connection point for the optional Power-One Network Interface, or a PC, is also provided.

- o Internal Power- DC/DC converter providing galvanic isolated DC power to the control system

- o Alarm Interface- Provides input connections for rectifier data, plant voltage reading, battery and load breaker monitoring, battery temperature, and battery symmetry measurement. Provides output connections for operating two individual LVD contactors and six Form-C alarm contacts. Additionally up to four analog or digital inputs for supervision of miscellaneous signals (ventilation, door open, etc.) are available.

Features

- User controls and interfaces.

- Internal RS485 data bus for digital signal collection.

- User programmable system configuration.

- Reporting of each rectifier output, internal temperature, serial number, and status.

- Data logging of last 40 events with time and date stamp .

- Multiple language options.

- Local and remote programming and monitoring.

- RS232 Interface for modem or local PC interface, for use with PowCom™ PC-based software.

- Password Controlled.

- Network Interface (PNI) module available for Ethernet and SNMP communication.

- External Digital and Analog inputs.

- Alarm Relay testing.

- Intelligent battery management.

- Temperature compensation with programmable compensation factor.

- Automatic and manual load testing.

- Battery voltage and symmetry monitoring.



PCS Controller Unit

Available with Advanced PowCom Software

Both controllers can be interfaced with PowCom™ software to provide PC-based access to power plant operating information from multiple sites. This software was specifically developed to provide point-and-click data logging, analysis, and display capabilities for critical power plant performance and battery management data.

Extensive Interface and Data Logging Capabilities.

Data is received through the RS232 interface of the PCS controller. Data collection can be automated by defining a password-protected list of up to 100 systems for modem dial up. A dedicated log function provides the user with a selection of data logging parameters and intervals. This data logging information is saved in a separate downloadable file.

PowCom™ software is compatible with PC's utilizing Windows v3.1 or higher, Windows 95, or Windows NT. Hayes-compatible modems that communicate at 2400, 4800, or 9600 baud are required.

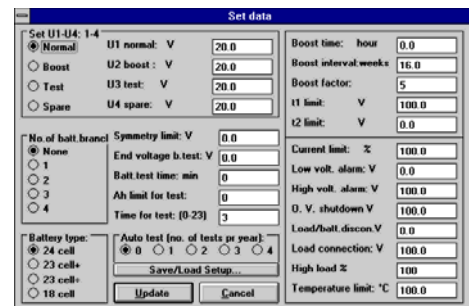
Powerful Analysis and Display

System data displayed by PowCom™ software includes system voltage, load current, battery current, rectifier output current, rectifier status, temperature reading, and the status of alarm relays. Alarm information displayed for the last 40 events includes alarm symbol and text, and time/date of occurrences. PowCom™ data can also be exported to other programs. Powerful statistical and historical analysis can be presented in spreadsheet and graphical formats.

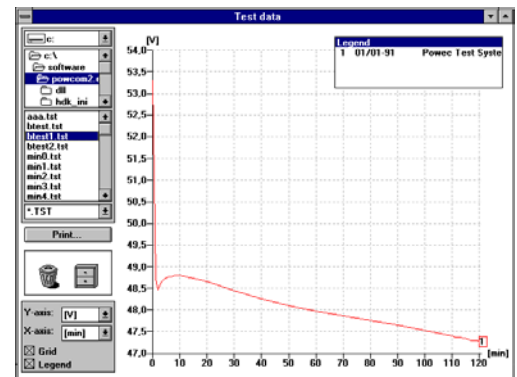
Intelligent Battery Management

Programmable battery test parameters include battery test interval, duration, Ah limit, and end voltage. The results of the last 10 tests may be downloaded to a PC for graphical analysis. Multiple discharge curves can be shown on the same graph for comparison.

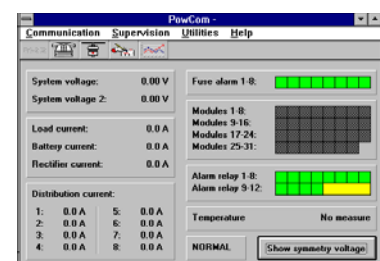
Programmable battery equalization parameters include interval, duration, and voltage. In addition, low-voltage disconnect and reconnect points, temperature compensation slope, and other system parameters maybe remotely set with PowCom™. Parameters from the system may be exported to a data file, edited offline, and remotely uploaded to the controller.



PowCom™ provides easy user access to set points for battery functions such as test, equalize, compensation, and alarm limits.



Graphical presentation of battery test data facilities comparison with future test results for battery integrity trend analysis.



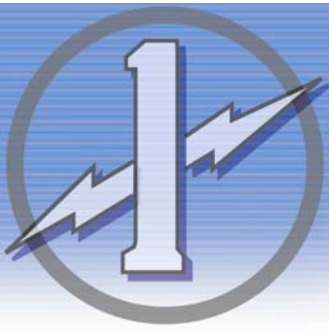
Critical system parameters, such as rectifier and alarm status, are concisely displayed. Clicking on the alarm button displays an alarm history screen depicting the last 40 alarm events.



PCS Controller Unit

Technical Specifications

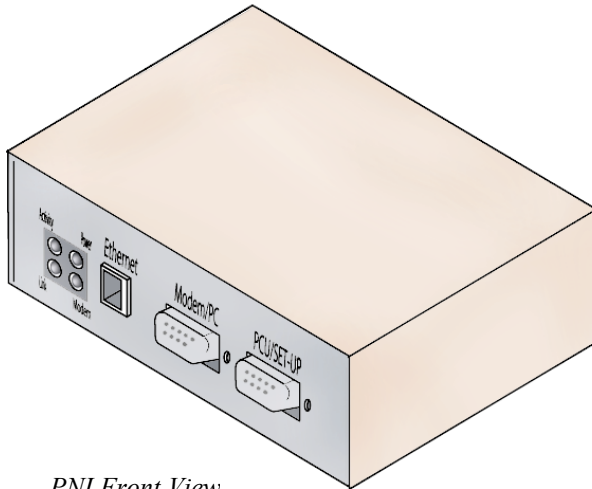
Communication:	External: RS232 serial interface for remote control from PC with PowCom software
	Internal: RS485 data bus for internal communication with a maximum of 128 power modules and 128 sub-controllers
Basic Functions:	Menu Driven operation
	6-pre-defined alarm groups
	16 (factory) programmable alarms
	Multiple language choices
	Temperature compensated charging
	Boost Charging, manual or automatic
	Alarm Relay testing
	Adjustable battery current
	Software controlled start up after AC outage and battery test
	Controller failure will not affect the basic operation of the power plant
Indications:	Green LED: OK
	Red LED: Alarm
	Yellow LED: Message
	2 x 20 character alphanumeric LCD with backlight for monitoring of output data, alarms, and messages.
Weight:	3.5 lbs. (1.6kg)
Dimensions:	3U (3.75") high, 23" panel mount
Ambient Temperature:	Operating: -25°C to +55°C
	Storage: -50°C to +85°C
Vibration Tolerance:	IEC 721-3-2
Shock Tolerance:	IEC 721-3-2



Power-One Network Interface

Description

The Power-One Network Interface (PNI) is an embedded network server that allows a PCS unit to be remotely accessed via Ethernet and SNMP. SNMP protocol allows enhanced managing capabilities and enables the system to be accessed from any location. The protocol uses simple commands to configure and control the system and relay the system status to the operator. Using this monitoring ability allows the alarm messages to be transmitted to any location. The PNI also can be used in conjunction with PowCom™ software either through a modem or Ethernet connection.



PNI Front View

Features

Allows each system to be accessed from a TCP/IP network

Multiple sites can be monitored from a central location

Uses SNMP protocol for reliable remote access.

Uses RS232, RS485 and 10Base-T Ethernet

Allows an external modem for backup

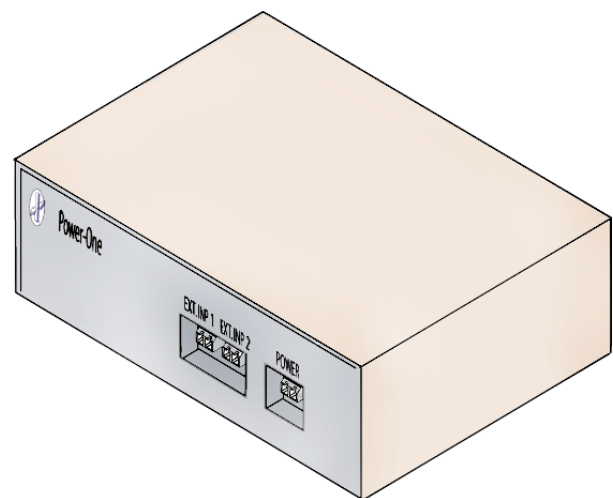
Instantaneous access to:

- o System parameters
- o Alarm history
- o Battery discharge curves

FTP for updating software

Telnet for system diagnostics

Compliant with PowCom™ software



PNI Rear View



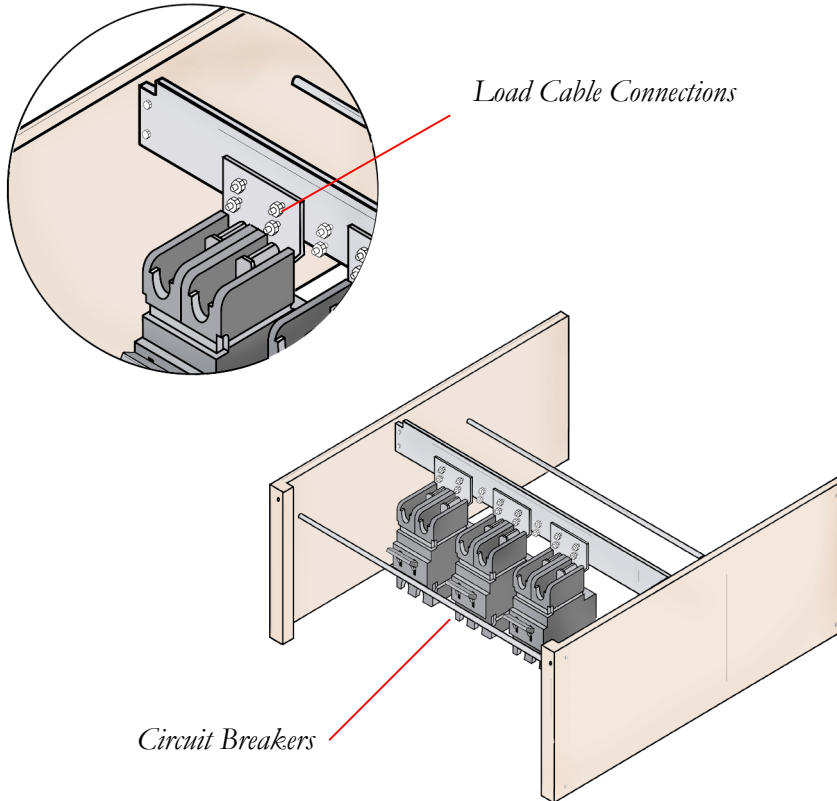
Power-One Network Interface

Specifications

Electrical Specifications:	
Power Consumption:	<2W
Supply Voltages:	+24VDC, -48VDC or 60VDC
Communications Specifications:	
Ethernet:	10Base-T Driver/Receiver with line transformer and EMI Filter Full Duplex Switched Ethernet
Serial Port:	2 RS232 ports (1 for PCU/Setup and 1 for Modem/PC)
Mechanical Specifications:	
Weight:	1 lbs.
Dimensions:	147x38x84mm
Environmental:	
Ambient Temperature:	Operating: -10 to 70°C Storage: -40 to 85°C
Humidity:	0% to 95% (non-condensing)
Compliance:	
Ethernet:	Supports IEEE 802.3 Ethernet Standard
Serial Port:	Industry standard 16550A-compatible UART.



PDS Distribution Unit



Features

.....
Distributes up to 1000 Amps.
.....

.....
Hot Swappable
.....

- o Up to 8 single pole circuit breakers (up to a 250A rating)
- o Up to 4 double pole circuit breakers (up to a 400A rating)
- o Up to 2 triple pole circuit breakers (up to a 600A rating)
- o Or a mixture of breaker sizes

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System design allows for staggered placement of the distribution units within the shelf, aiding in system wiring.
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Description

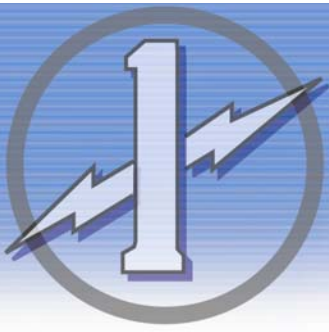
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The Primary Distribution Shelf (PDS) is a high-density distribution panel accommodating a variety of circuit breaker sizes up to a 600-amp triple-pole rating. The PDS offers quick, easy access from the front of the unit, including circuit breaker, load circuit wiring and distribution panel removal or installation.
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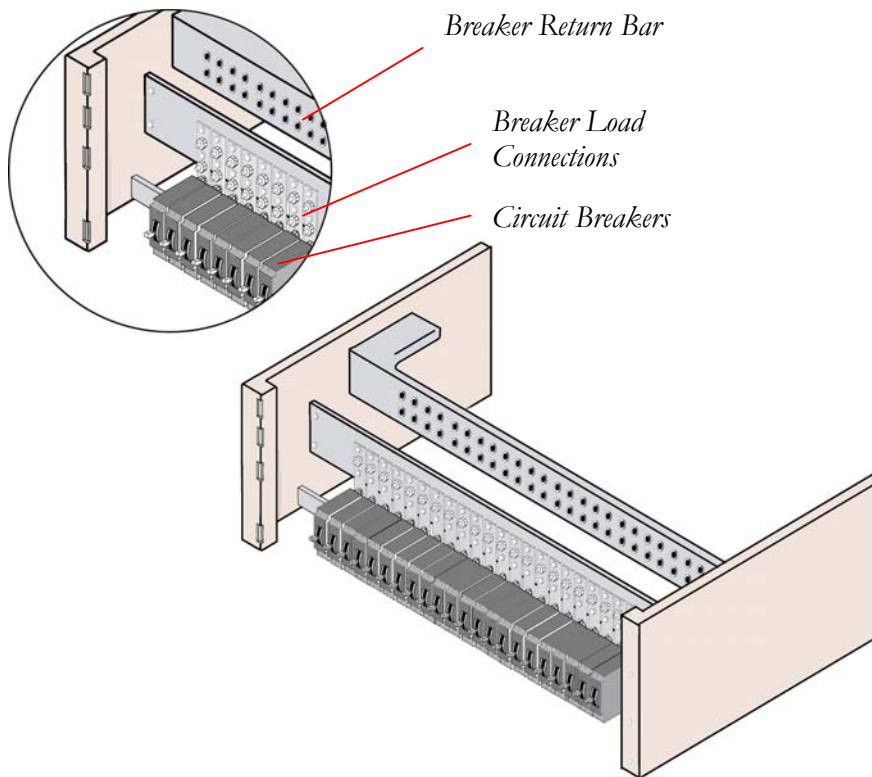
PDS Distribution Unit

Specifications

Electrical Specifications:	
Input Operating Voltage:	-48VDC or 24VDC
Maximum Current Per Shelf:	1000A
Interrupt Rating:	Breakers- 25kA
Mechanical Specifications:	
Dimensions:	23" Mounting 7U high (12.22 in.) (31.04 cm)
Load & Return Lugs:	1.0" center-to-center 3/8"
Environmental:	
Ambient Temperature:	-40 to 65°C
Humidity:	0% to 95% (non-condensing)



SDS Distribution Unit



Features

Hot Swappable breakers and shelves

- o Rated at 500A
- o Only 5U high
- o Plug in Circuit Breakers up to 100A
- o Accommodates up to 22 Mid-Trip Circuit Breakers
- o Accommodates TPS fuses

System design allows for staggered placement of the distribution units to aid in system wiring

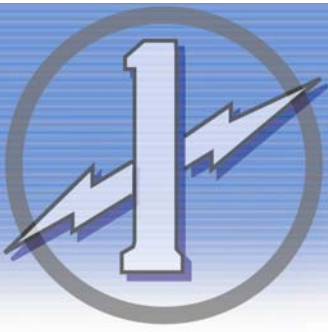
Optional LVD for load shedding

Available in multiple depths to fit different customer needs

Available with plug & play connectors to install in Integrity-One systems, or with standard hardware connections for customer integration.

Description

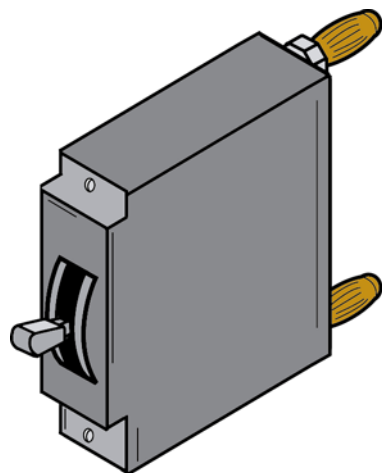
The Secondary Distribution Shelf (SDS) is an industry leading high-density distribution panel that accommodates up to 22 bullet type mid-trip circuit breakers or TPS fuses within a 5U compact housing. Plug-in breakers offer quick, easy installation from the front of the unit, and can be hot swapped during system expansion. The Secondary Distribution Shelf is also designed for plug & play installation and can be easily added or removed from a system to increase or decrease distribution capability.



SDS Distribution Unit

Specifications

Electrical Specifications:	
Input Operating Voltage:	-48VDC or 24VDC
Maximum Current Per Shelf:	500A
Interrupt Rating:	Breakers- 50kA
Mechanical Specifications:	
Dimensions:	23" Mounting 5U high (8.87 in.) (22.53 cm)
Load & Return Lugs:	1.0" center-to-center SDS- ¼"
Environmental:	
Ambient Temperature:	-40 to 65°C
Humidity:	0% to 95% (non-condensing)



Bullet Connectors

*The SDS panel uses circuit breakers with quick disconnect bullet connectors available from:
Airpax (LMLK Series)
Carling (CS1 Series)
Eaton (AM1R Series)*