

Integritas™ Industrial DC Power Systems

IFC Type 1 Series



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Integritas™ Industrial DC Power Systems

Overview

The Integritas™ Industrial DC Power System family of products represent a complete solution for industrial DC power by combining AC/DC power conversion, battery charging, and power distribution into an integrated package. Central to this product offering are the modular, reliable, highly efficient switch mode rectifiers (SMR) which convert power from AC to DC. This product is designed as a floor mounted cabinet solution. It boasts true redundancy, a state-of-the-art controller with monitoring and alarms, as well as NERC compliance capabilities.

Integritas™ Type 1 industrial power systems can be configured for primary DC output of 24V, 48V, or 125V nominal with capacities ranging from 2.6 to 20 kW . The design is very configurable and scalable, offering a significantly higher power density when compared to traditional SCR based chargers. The Type 1 power system is designed as a complete DC UPS with distributed power output and battery backup all included in one unit.

Features

- AC/DC power rectification using modular SMR power units
- DC power distribution with circuit breaker protection
- Battery charging with battery circuit breaker included
- Battery backup using VRLA or NiCad style batteries

Industries

- Power Transmission and Distribution
- Industrial Process Control
- Oil and Gas
- Power Generation
- Data Centers

Applications

- DC UPS
- Protection Relay Power
- Pump Control/Supply
- Generator Control Power
- Emergency Lighting
- Switchgear Control Power

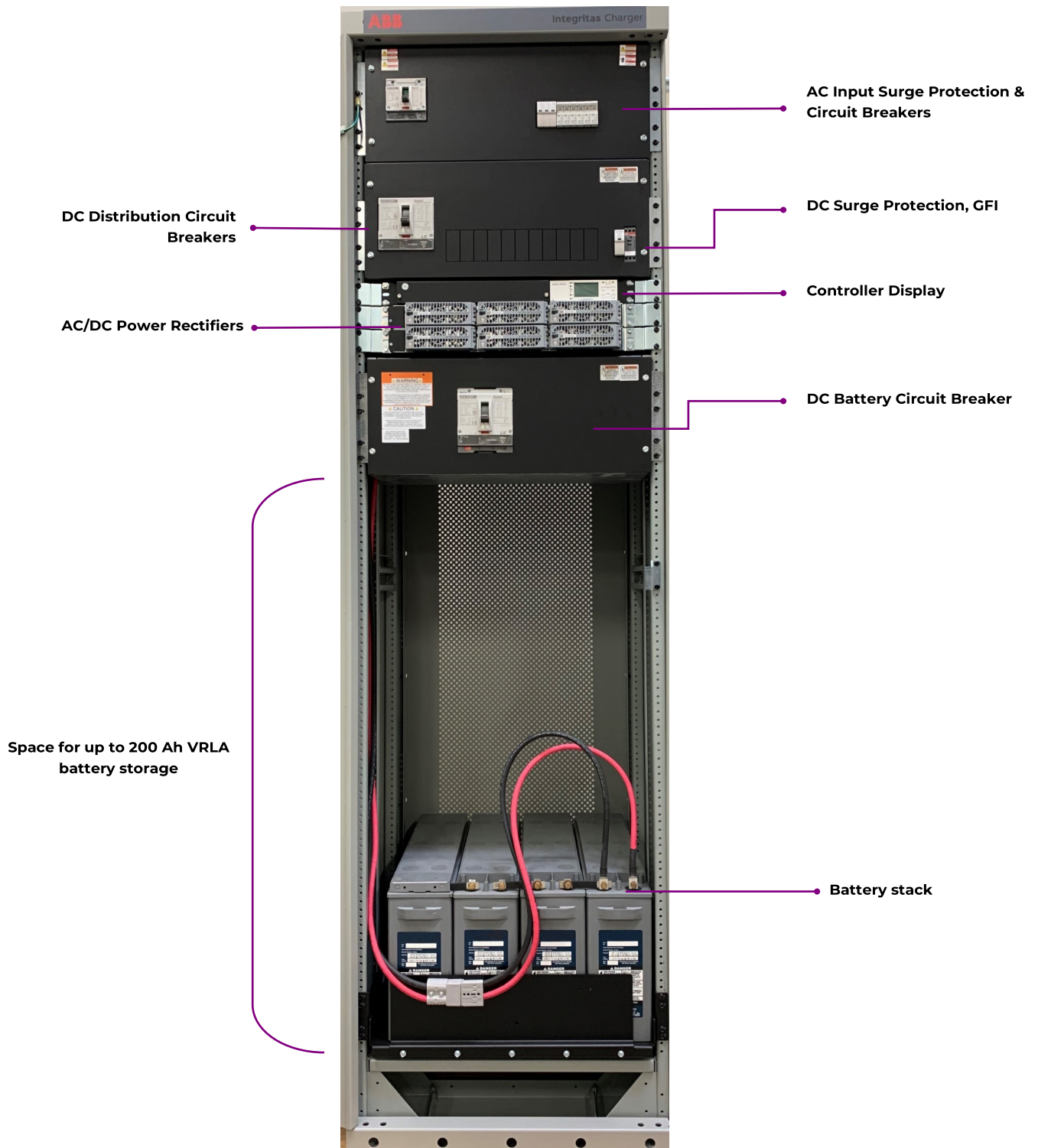
Advantages

- N+1 and N+N Redundancy
- Integrated load distribution panel
- Optional secondary output breakers
- Optional battery disconnect panel
- Wide input voltage range
- Hot pluggable rectifier modules
- Secured remote access and monitoring
- Controller independent system operation
- Front panel access to most control and monitoring parameters including alarms
- Integrated DC & AC surge protection



DC Power System - Type 1

Layout



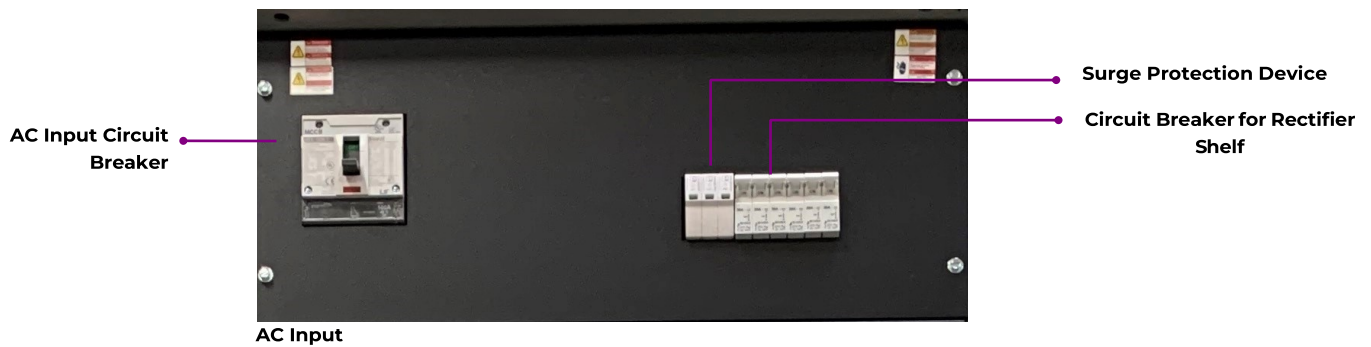
Typical configuration

General Configuration

The Integritas DC power system is a complete solution in a single cabinet. This allows users to install a single cabinet to support the function of both battery charging and DC power output. The bay is partitioned into multiple sections consisting of the following.

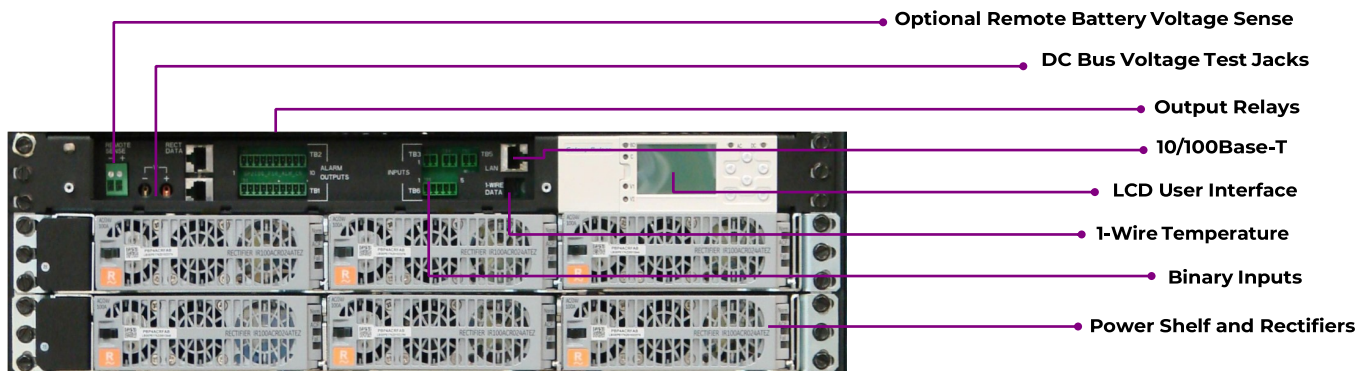
- **AC Input Panel**

Provides a means to connect various AC input configurations to the bay and distribute power to each rectifier shelf in the system. Additional Class II Surge Protection is integrated into the charger to provide protection from external surges.



- **Rectification and Control**

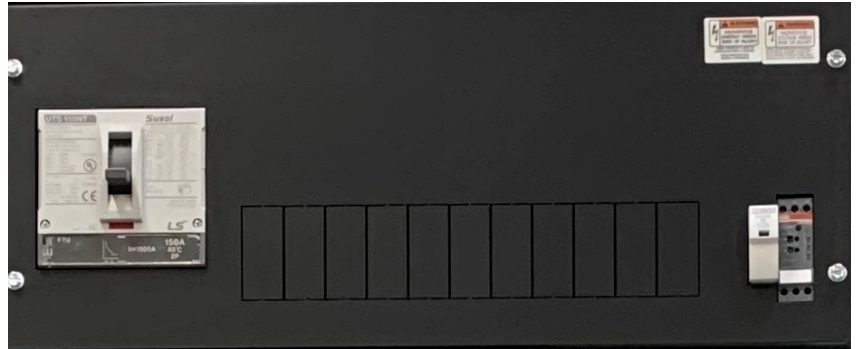
This section contains a controller and the AC/DC rectifier shelves. The number of shelves and rectifier positions are configurable for the capacity and output of the system with each shelf supporting between 1 to 3 rectifiers. The controller is pre- configured for the applicable output voltage.



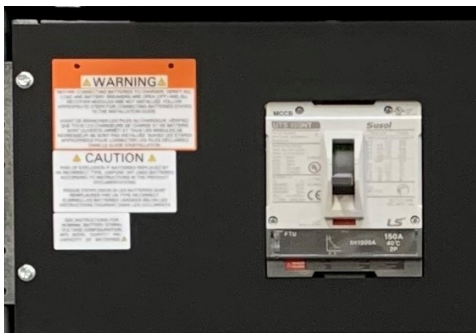
NE843G3 Galaxy Pulsar Plus

- **DC Distribution Panel**

Provides a common distribution solution for both Primary and Supplementary loads. Class III Surge protection and ground fault detection is included to protect the system from surges, and indicate ground faults in the DC plant.



DC Distribution



Battery Distribution

- **Battery Distribution Panel**

Separate battery disconnect panel for supporting internal battery connectivity. This section includes a battery shunt for monitoring the battery input/output current and for battery temperature compensation. A battery disconnect and cabled interface is also provided.

- **Battery Compartment**

The batteries are located in this section. Up to three shelves are available for housing the battery stack depending on the application, voltage level, and battery requirements. Various types of batteries are available using VRLA or NiCad type of battery technology.



Battery Compartment

Specifications

INPUT	VALUE	UNITS
Voltage Range		
1Φ Low-Line	85 - 140	VAC
1Φ High-Line	175 - 305	VAC
3Φ High-Line	320 - 530	VAC
Current (size dependent)	up to 90	AMPS
Frequency	45 - 66	HZ
Power Factor	98 - 99.8	%
Total Harmonic Distortion	5 max (THD< 5% at load over 50%)	%

OUTPUT	VALUE	UNITS
Voltage Class		
24	22-29	VDC
48	42-58	VDC
125	90-160	VDC
Power (size dependent)	up to 20	KWATTS
Regulation	±0.5	%
Efficiency	93.3 - 96	%
Output Voltage Ripple ¹	<100	mV _{rms}
Thermal Output (Max)	up to 756 depending on size/load	kcal/h

MECHANICAL/ENVIRONMENTAL

Cabinet (L x W x H)	691 x 605 x 2133 [27.2 x 23.8 x 84.0]	MM [IN]
Operating Temperature ²	-20 to 50; de-rates above 45 [-4 to 122]	°C [°F]
Storage Temperature ³	-40 to 85 [-40 to 185]	°C [°F]
Relative Humidity	95% max, non-condensing	%
Altitude	4000 (for altitudes above 2000, peak operating temperature de-rates 0.656° C /100M; 4000M peak temperature rating is 62° C	METERS
Color	ANSI 61 Gray	

SAFETY AND STANDARDS COMPLIANCE

Protection Class	NEMA 1, IP 21
Safety	UL 1012, ANSI/UL60950-1-2014 and CAN/CSA C22.2 No. 60950-1-07, Second Edition + A2:2014 (MOD)
RoHS	Compliant to RoHS EU Directive 2002/95/EC RoHS 6/6
EMC	European Directive 2014/30/EU; EN55032, Class A, EN55035; FCC, Class A
ESD	EN61000-4-2, Level 4
Surge	AC Class II, DC Class III, Rectifiers (EN61000-4-5, Level 4;ANSI C62.41-2002; EN61000-4-4)

¹Typical when system is used with a battery bank

² Rating is dependent on battery type selected. Values shown exclude battery limitations.

³ Temperature ratings are for system only. Batteries should be stored separately and maintained per manufacture requirements.

Power Rectifiers

Overview

The OmniOn “IR” series of power rectifiers efficiently transform energy from AC power to DC power to meet the needs of industrial applications. The power rectifier is central to the operation of the Integritas Type 1 DC power system, providing power to the DC load, and charging the battery bank. OmniOn “IR” family of products are available in a wide variety of sizes. Units are available for both single phase and three phase AC inputs. Typical nominal DC outputs include 24 VDC, 48 VDC, and 125 VDC. All rectifier units are modular in design and slide directly into a matching power shelf. Multiple rectifiers can be banked together to increase the power output needs depending on the application.

These switch mode rectifiers (SMR) are extremely efficient exceeding 95% efficiency over a wide range of operation. They represent market leading technology for diode protected, true hot pluggable, power plants.

The “IR” series of rectifiers offer a powerful combination of efficiency, network simplicity, and reliability, all in a compact, modular package.



Standard System Features

- Modular 125 , 48, or 24 VDC power packages
- Hot-Swappable, redundant, parallel operation
- 1U-high rack system increments
- N+1 to N+N redundancy capable, with full load sharing between units when coupled with a matching controller
- Very high rectifier efficiencies >95%
- EMI class B at shelf level
- Extremely long life
- Rugged, robust industrial design
- Industry hardened switch-mode reliability
- Quick view LED indicators on front
- Monitoring/control – the built in microprocessor controls and monitors all critical rectifier functions and communicates with the system controller using the built in Galaxy protocol serial interface.



Galaxy Pulsar Controller

Overview

The Galaxy Pulsar Plus controller is a cost-effective unit that provides basic system monitoring and control features for DC power system components. The controller monitors system components within the assembly including rectifiers, inputs, outputs and alarms utilizing a multi-drop RS-485 digital communications bus.

The Pulsar Plus has a 2-inch monochrome LCD front-panel screen that uses a simple menu driven approach to read system status, alarms, and parameters. The display also has a unique 3 color (green, amber, red) backlit feature that changes color when an alarm occurs based on alarm severity. Basic settings and alarm thresholds can be configured from the menu. Using a computer, the user can connect to the Pulsar Plus via local RS-232 or Ethernet port which provides complete access to all assignments, configurations, alarms, inputs, and outputs. Remote access through a network connection via Internet or Intranet is also available.



Standard System Features

- Standard and user defined alarms
- 10 alarm relays (7 user assigned)
- Rectifier management features
- Multiple Low Voltage Load and Low Voltage Battery Disconnect thresholds
- Configuration, statistics, and history All stored in non-volatile memory
- Remote/local backup and restore of configuration data
- Industry standard defaults
- Basic, busy hour, and trend statistics
- Detailed event history
- User defined events and derived channels

Standard Battery Management Features

- Float/boost mode control
- Battery discharge testing
- Slope thermal compensation

Remote Access and Features

- Integrated 10/100Base-T Ethernet Network
 - TCP/IP, SSH, SSL
 - SNMPV3, IPV6
 - SMTP for email
 - DHCP for plug-n-play
 - FTP for rapid backup and upgrades
 - HTTP & HTTPS for standard web pages and web browsers
- SCADA communication protocols
 - Modbus TCP
- 3 password protected security levels
 - Automatic rectifier sequence control
 - N + X redundancy check
- Multiple Low Voltage Load and Low Voltage Battery Disconnect thresholds
- Configuration, statistics, and history
 - All stored in non-volatile memory
 - Remote/local backup and restore of configuration data
- Industry standard defaults
 - Customer specific configurations
 - Available Remote/ local software upgrade
- Basic, busy hour, and trend statistics
- Detailed event history
- User defined events and derived channels

Battery Management Features

- Float/boost mode control
 - Manual boost
 - Manual timed boost locally, T1.317, and remotely initiated
 - Auto boost terminated by time or current

- Battery discharge testing
 - Manual (local/remote)
 - Periodic
 - Plant Battery Test (PBT) input driven
 - Configurable threshold or 20% algorithm
 - Graphical discharge data
 - Rectifiers on-line during test
- Slope thermal compensation
 - High temperature
 - Low temperature
 - Step temperature
 - STC Enable/Disable, low temperature Enable/Disable
 - Configurable mV/°C slopes
- State of charge indication
- High temperature disconnect settings
- Reserve-time prediction
- Recharge current limit

Integrated Monitoring Inputs/Outputs

- System plant voltage (accuracy $\pm 0.5\%$, resolution 0.1V)
- One system shunt (accuracy $\pm 0.5\%$ full scale, resolution 1A)
 - Battery or load
 - Mounted in the return side of DC bus
- Up to 7 binary inputs
 - 7 input close/open to return
 - User assignable
 - Up to 10 Form-C output alarms (125Vdc @ .5A) User assignable
 - 1-Wire* bus devices Up to 16 temperature probes (DTP873)

Specifications

GENERAL	
Operating Voltage	24, 48, 125 Vdc class
Input Power	Up to 25W
Operating Temperature Range	-40°C to +65°C; (-40°F to 167°F)
Operating Relative Humidity	0 - 95% (non-condensing)
Storage Temperature Range	-40°C to +85°C (-40°F to 185°F)
Physical Specifications	Sizes vary by packaging option
Display	8-line by 40-character with alarm context sensitive backlit LCD

SAFETY AND STANDARDS COMPLIANCE

Safety	ANSI/UL60950-1-2014 and CAN/CSA C22.2 No. 60950-1-07, Second Edition + A2:2014 (MOD), dated October 14, 2014
RoHS	Compliant to RoHS EU Directive 2002/95/EC RoHS 6/6
EMC	European Directive 2014/30/EU; EN55032, Class A, EN55035; FCC, Class A; GR1089-CORE, Issue 6 [Level 3]
ESD	EN 61000-4-2 level 4
Radiated Emissions	European Directive 2014/30/EU; EN55032, (CISPR22) Class A, EN55035 (CISPR24)

Battery Only Cabinet

Overview

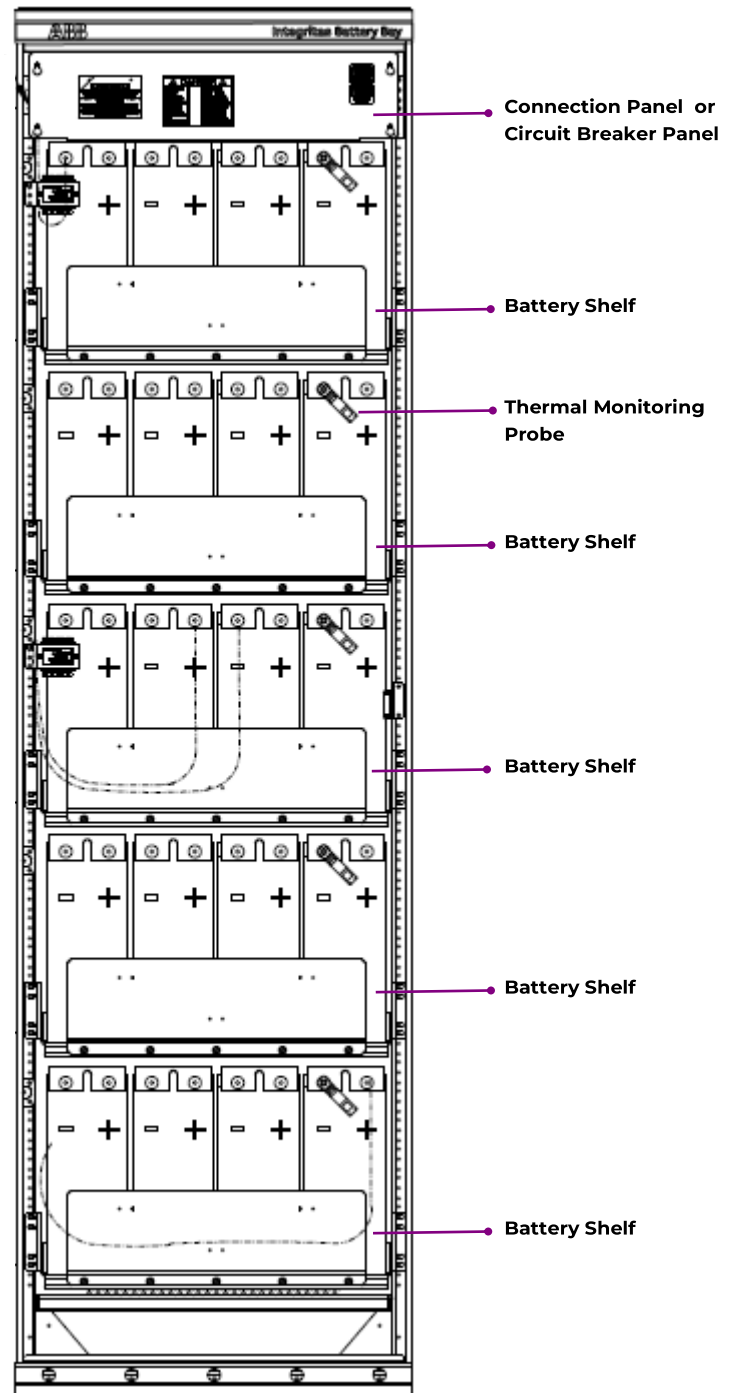
For applications where power demands are larger than what is available within the all-in-one Type 1 power system, using a combination of an Integritas Type 1 battery only cabinet coupled with a Type 2 DC power system is the solution.

Battery only cabinets are designed to fit industry standard valve regulated lead acid (VRLA) style battery packages. Battery selection is designed to match the voltage class of the application. Nickel cadmium (NiCad) battery options are also available as an alternative.

Additional options include top or bottom cabling access, thermal probes (DTP873) for measuring temperature at key battery terminal locations, and a circuit breaker panel for electrical protection and battery disconnect function.

Features

- Designed for use with VRLA or NiCad style batteries.
- 24, 48, or 125 volt sizes
- Thermal measurements
- Electrical protection/disconnect panel



Training

OmniOn offers on-site and classroom training options based on certification curriculum. Technical training can be tailored to individual customer needs. Training enables customers and partners to more effectively manage and support the power infrastructure. We have built our training program on practical learning objectives that are relevant to specific technologies or infrastructure design objectives.

Service & Support

OmniOn field service and support personnel are trusted advisors to our customers – always available to answer questions and help with any project, large or small. Our certified professional services team consists of experts in every aspect of power conversion with the resources and experience to handle large turnkey projects along with custom approaches to complex challenges. Proven systems engineering and installation best practices are designed to safely deliver results that exceed our customers' expectations.

Warranty

OmniOn is committed to providing quality products and solutions. We have developed a comprehensive warranty that protects you and provides a simple way to get your products repaired or replaced as soon as possible.

Reliability

- Delivers decades of service
- High availability architecture
- Designed to meet UL standards

Intelligence

- Industry leading smart monitor
- Network interface for secure remote access
- Visual, audible and remote alarms

Investment Protection

- Backward compatibility
- Flexible upgrade options
- Seamless integration with Integritas plants

On Time Delivery

- Standard building blocks
- 24/7 technical support

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