Integritas™ Industrial Battery Chargers

IWC Series

—
Table of contents

Integritas Industrial Battery Charger

Modular, Modern Switched Mode Battery Charging

Overview

The Integritas™ industrial battery charger is ABB's most reliable, rugged battery charger designed for cabinet, wall mount, or rack mount applications. It boasts true redundancy, a state-of-the-art controller with extensive monitoring capabilities and supports NERC compliance. The Integritas battery chargers can be configured for 24, 48, or 125Vdc output capacities ranging from 20A to 150A. The chargers incorporate a modular design which provides scalability, higher power output in a more compact design, and better reliability compared to traditional SCR based chargers in the same size. This modular design provides for minimal downtime and low mean time to repair. The charger is available in two nominal sizes, 19" (485mm) or 23" (564mm) wide, designed for mounting to a wall, or in a standard battery frame. Integrated into the battery charger is an advanced controller that is simple to operate and utilizes field proven technology. The controller provides the user key maintenance information and system monitoring capability making the Integritas battery charger a market leader for reliability and availability.

Industries

- Power Utilities
- Process Control
- Transportation
- Oil and Gas
- Manufacturing

Features

- N+1 and N+N redundancy
- Front panel access to most control and monitoring parameters including alarms
- Wide input voltage range
- Hot pluggable charger & control modules
- Rack mount or wall mount
- Secured remote access and monitoring
- Controller independent system operation
- Optional dual AC input
- Optional secondary output breaker for battery test or external loads

Applications

- Battery Charging / Standby Power
- Pump Control / Supply
- Emergency Lighting
- Switchgear Control Power

—

Specifications

INPUT	RECTIFIER MODEL	MIN	TYPICAL	MAX	UNITS
Voltage Range 1Φ Low-Line (LL)	IP100ACR024ATEZ IP050ACR048ATEZ IP020ACR125ATEZ	85	110	140	VAC
1Φ High-Line (HL)	IP100ACR024ATEZ IP050ACR048ATEZ IP020ACR125ATEZ	175	220	305	VAC
3Φ High-Line	IP040H3R125ATEZ	320	380-480	530	VAC
Frequency		25^2	50/60	66	HZ
Power Factor		98	99.5	99.8	%
Total Harmonic Distortion		5 max (THD< 5% at load over 50%)			%

OUTPUT	IP100ACR024ATEZ	IP050ACR048ATEZ	IP020ACR125ATEZ	IP040H3R125ATEZ	UNITS
Nominal Voltage	24	48	125	125	VDC
I_o (high-line) (low-line)	100 44	50 22	20 10	40^1 N/A	AMPS
Vo Setpoint	27.25	54.5	125	125	VDC
Vo Range	21—29	42-58	90-160	90-160	VDC
Regulation	±0.5	±0.5	±0.5	±0.5	%
Efficiency	> 95 (Peak 95.6)	> 96 (Peak 96.4)	> 94.5 (Peak 95.1)	> 96 (Peak 96.5)	%
Output Voltage Ripple	<30	<30	<30	<30	mV
Thermal Output (Max)	620	510	544	853	BTU/HR

MECHANICAL		UNITS
System L x W x H	Type 1 (19 in): 361 (14.2) x 441 (17.4) x 719 (28.3) Type II (23 in): 361 (14.2) x 579 (22.8) x 719 (28.3)	MM (IN)
Module Weight	1Φ versions: 5.5 (12.1) 3Φ versions: 7.3 (16.1)	KG (LB)
System Weight	Type 1 (19 in): 27.2-60 (60-133) Type II (23 in): 29-65.4 (64-145)	KG (LB)
Finish	ANSI 61 Gray Powder Coated Paint	

ENVIRONMENTAL		UNITS
Operating Temperature	-40 to +75 (-40 to 167) [de-rates above 50°C, see rectifier datasheets for details]	°C (°F)
Storage Temperature	-40 to +85 (-40 to 185)	°C (°F)
Relative Humidity	95 max, non-condensing	%
Altitude	4000 (altitudes above 2000, peak operating temp. de-rates 0.656º C /100M 4000M peak temp. rating is 62º C)	M

Notes:

1 - Rectifier Io: 50 amps out @ 90-125 VDC; 40 amps out @ 142 VDC; 32 amps out @ 160 VDC. All outputs based on operating temp up to 55 deg. C.

2 - IP020ACR125ATEZ is rated to operate at 25 Hz, in addition to 45-66 range. All others are rated for 45-66 Hz.

SAFETY AND STANDARDS COMPLIANCE

NEMA	NEMA PE5 NEMA 1 Enclosure
Safety	UL 1012 ANSI/UL60950-1-2014 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 B EN55035 Class B FCC Part 15
ESD	EN61000-4-2, Level 4
Seismic	IEEE 693-2018

PROTECTION	DESCRIPTION
Voltage	Input under voltage, Input over voltage, Output overvoltage, Output under-voltage
Current	Fuse in both the input lines, output over current protection, Output short circuit protection
Thermal	Over temperature protection and auto restart upon removal of over temperature condition
Surge	Input surge protection, Output surge protection
Reverse Polarity	Battery reverse polarity
Ground Fault	Ground fault detection and alarm (only reporting)
Breakers	Industrial grade UL/IEC recognized bulk input and bulk output breaker

Ordering Steps

The following pages show how to configure a battery charger model based on the intended application. The Integritas™ industrial battery charger is a modular design and requires two pieces of information to create a complete order.

1. Define the model number of the desired battery charger configuration.

2. Select the rectifier ordering code and quantity needed based on application needs.

Example:

For an application requiring 240 VAC single phase with single AC input, bottom access wiring, 125 VDC output with 40 amps output needed, independent breakers for both battery and load, and DNP3 communication interface to a master station, the following would be ordered.

Qty. 1, 3BR125-SACY-B10Y-N0D0 battery charger

Qty. 2, 150050531 IP020ACR125ATEZ rectifiers

—

Ordering Guide Information

Group	1	2	3	4	5	6	7	8	9	10	11	12	13
Item	Cabinet	Connection	Nominal DC Out	AC In Type	AC Input	AC Surge	DC Out Type	Breaker Rating	DC Surge	Control	Comm Type	Protocol	Ground Fault
Model	3	TR	125	S	AC	Y	S	10	Y	N	0	D	0

Model numbers are defined by selecting the appropriate code from each of the thirteen group types as noted, based on specific application needs of the battery charger.

Example: 3TR125-SACY-S10Y-N0D0

Group 1: Cabinet	Code	Description	Note
	3	Type I	Nominal 19 in. wide
	6	Type II	Nominal 23 in. wide

Group 2: Connection Type	Code	Description	Note
	BR	Bottom	Location for input and output connections
	TR	Top	Location for input and output connections

Group 3: Nominal DC Output	Code	Description	Note
	024	24 V	
	048	48 V	
	125	125 V	

Group 4: AC In Type	Code	Description	Note
	S	Single	
	D	Dual	Code 6, Type II, 23 in. models only

Group 5: AC Input	Code	Description	Note
	AC	110/120, 230/240 VAC	Single phase
	L3	208 Delta (208 - 240 VAC)	Three phase
	HW	480Y/277 VAC	Three phase, 4-wire (L - N) + PE
	H3	480 Delta (380 - 520 VAC)	Three phase, 3-wire (L - L) + PE

Group 6: AC Surge	Code	Description	Note
	Y	AC Surge Protection Included	MOV (metal-oxide varistor) type protector

Group 7: DC Out Type	Code	Description	Note
	S	Single Load	One (1) load breaker
	D	Dual Load	Two (2) independent load breakers
	B	One Load, One Battery	One (1) load breaker, One (1) battery breaker

Group 8: Breaker Rating	Code	Description	Note
	10	10 kAIC minimum	

Group 9: DC Surge	Code	Description	Note
	Y	DC Surge Protection Included	MOV (metal-oxide varistor) type protector

Group 10: Control	Code	Description	Note
	P	Pulsar XL	See Controllers section for more details
	N	Nebula	See Controllers section for more details

Group 11:	Code	Description	Note
Comm Type	0	Standard TCP	

Group 12:	Code	Description	Note
Protocol	0	Default/SNMP/Modbus TCP	
	D	DNP3 Outstation	TCP/IP only

Group 13:	Code	Description	Note
Ground Fault Indication	0	DC ground fault indicator Included	Standard configuration
	E	Excluded	Another means for detecting DC ground fault must be provided when choosing this option

LIST OF MATCHING RECTIFIERS BASED ON MODEL AND DC OUTPUT CURRENT REQUIREMENTS [2]

Type I cabinet can hold up to 3 rectifiers

Type II cabinet can hold up to 6 rectifiers

Ordering Code	Rectifier Model Number	AC Input Code (Group 5)	DC Output Code (Group 3)	Current output per rectifier (A)	Max current output (amps) per cabinet configuration and (x) number of rectifiers installed (Group 1)					
					Type I /II (x=1)	Type I/II (x=2)	Type I/II (x=3)	Type II (x=4)	Type II (x=5)	Type II (x=6)
150052773	IP100ACR024ATEZ	AC, L3, HW	024	100	100	150	150	150	150	150
150050530	IP050ACR048ATEZ	AC, L3, HW	048	50	50	100	150	150	150	150
150050531	IP020ACR125ATEZ	AC, L3, HW	125	20	20	40	60	80	100	120
150052737	IP040H3R125ATEZ	H3	125	40[1]	40	80	120	150	150	150

Notes:

1 - Rectifier Io: 50 amps out @ 90-125 VDC; 40 amps out @ 142 VDC; 32 amps out @ 160 VDC. All outputs based on operating temp up to 55 deg. C.

2 - Max DC current outputs shown are based on each respective rectifier I_o high-line output ratings, as listed in the specifications table.

LIST OF COMMON MODELS AND ASSOCIATED ORDERING CODE (Additional models available)

Model Number	Ordering Code	Matching Rectifier	Rectifier Ordering Code
3BR024-SACY-S10Y-P000	1600093520A	IP100ACR024ATEZ RECTIFIER	150052773
3BR048-SACY-B10Y-P000	1600096134A	IP050ACR048ATEZ RECTIFIER	150050530
3BR125-SACY-B10Y-N000	1600279058A	IP020ACR125ATEZ RECTIFIER	150050531
3TR125-SACY-B10Y-N000	1600279059A	IP020ACR125ATEZ RECTIFIER	150050531
3BR125-SACY-B10Y-N0D0	1600406017A	IP020ACR125ATEZ RECTIFIER	150050531
3BR125-SACY-S10Y-P000	150050531	IP020ACR125ATEZ RECTIFIER	150050531
3TR125-SACY-S10Y-P000	1600063517A	IP020ACR125ATEZ RECTIFIER	150050531
3BR125-SH3Y-B10Y-P000	1600226757A	IP040H3R125ATEZ RECTIFIER	150052737
3TR125-SH3Y-B10Y-N000	1600459434A	IP040H3R125ATEZ RECTIFIER	150052737
3BR125-SHWY-B10Y-P000	1600301334A	IP020ACR125ATEZ RECTIFIER	150050531
3BR125-SL3Y-B10Y-N000	1600458269A	IP020ACR125ATEZ RECTIFIER	150050531
6TR125-SACY-B10Y-N000	1600279061A	IP020ACR125ATEZ RECTIFIER	150050531
6BR125-DH3Y-B10Y-P000	1600376035A	IP040H3R125ATEZ RECTIFIER	150052737
6BR125-SH3Y-B10Y-N000	1600459436A	IP040H3R125ATEZ RECTIFIER	150052737
6TR125-SH3Y-B10Y-N000	1600459437A	IP040H3R125ATEZ RECTIFIER	150052737

—
Controllers

Pulsar XL Controller

The Pulsar XL controller is a cost-effective unit that provides basic system monitoring and control features for Integritas™ battery chargers. 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 XL 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. Basic settings and alarm thresholds can be configured from the menu. Using a computer, the user can connect to the Pulsar XL 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.

Pulsar XL Key Features

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
    - SNMP V2c, 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

GENERAL	DESCRIPTION
System Plant Voltage	Accuracy ±0.5%, resolution 0.1V
One System Shunt	Accuracy ±0.5% full scale, resolution 1A
Inputs	6 inputs close/open to battery, 9 inputs close/open to return, user assignable
Outputs	10 NC/NO alarms (125 Vdc @ 0.5 A), 7 user assignable
1-Wire Bus Devices	Up to 16 temperature probes (via optional QS873 device), up to 16 mid-string monitors (via optional ES771 device)
Display	8-line by 40-character with color alarm indicating backlit LCD (Red = major, Amber = minor, Green = none)
Radiated Emissions	European Directive 2014/30/EU; EN55032, (CISPR22) Class B, EN55035 (CISPR24)

—
Controllers

Nebula Controller

The Nebula is the latest embedded controller in the Integritas™ family of products with advanced system monitoring and control features. Built on a modern ARM-based platform, the controller monitors system components within the charger including rectifiers, inputs, outputs, and alarms utilizing a high speed digital communications bus. The Nebula has a 7-inch LCD full color touch screen with object-oriented graphics that present concise data about the system. On the left side of the display are quick view status indicators that change color to indicate a problem. A host of information is available at the touch of the screen including system status, alarms, and key parameters; all in a quick, easy to view graphic user interface. From the front panel display the user can quickly gather information on how the charger is operating. Connecting to the Nebula via an Ethernet port, and using standard secure login protocol, provides for complete access to all assignments, configurations, alarms, inputs, and outputs . Remote connectivity through a high-speed dual port network connection is available that allows the battery charger to be connected to plant-wide DCS systems. The Nebula controller is built to deliver connectivity between the battery charger and your data networks.

Nebula Key Features

Standard System Features

- Standard and user defined alarms
- Four "quick view" color changing status indicators (AC, DC, System, Ground Fault) plus alarm cutoff (ACO)
- 10 auxiliary inputs
- 10 alarm relay outputs
- Rectifier management features
- Multiple Low Voltage Load and Low Voltage Battery Disconnect thresholds
- Configuration, statistics, and history all stored in non-volatile memory
- Detailed event history

Standard Battery Management Features

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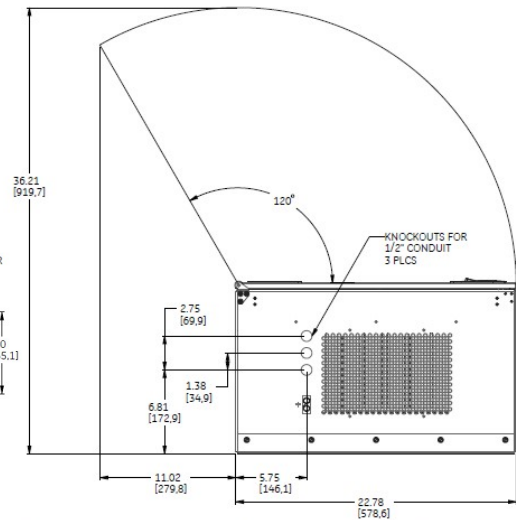- Battery discharge testing
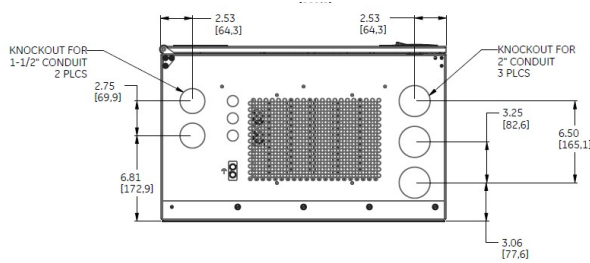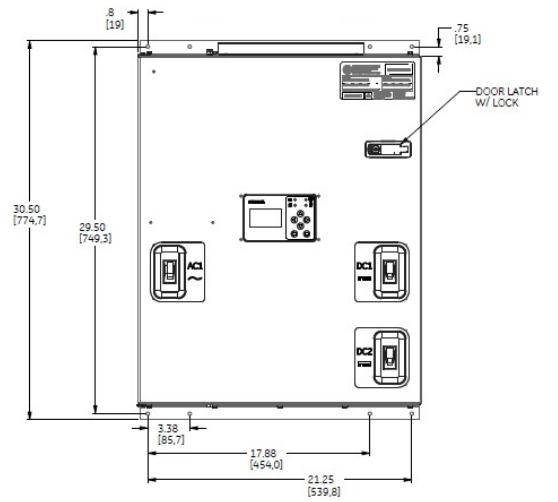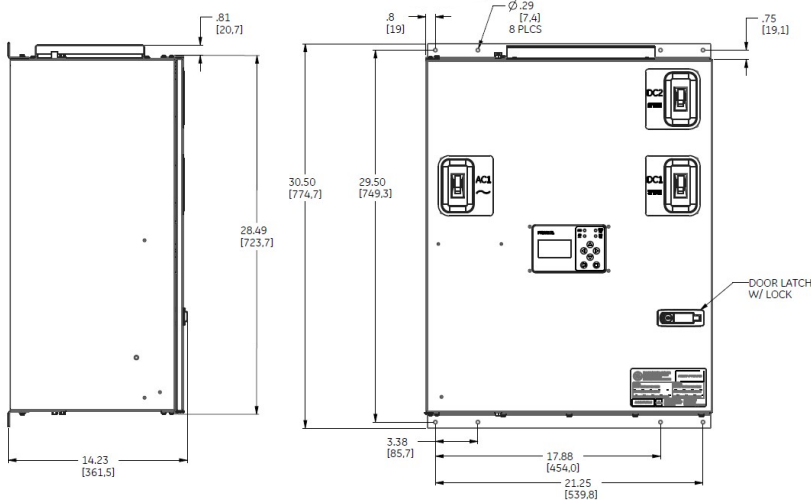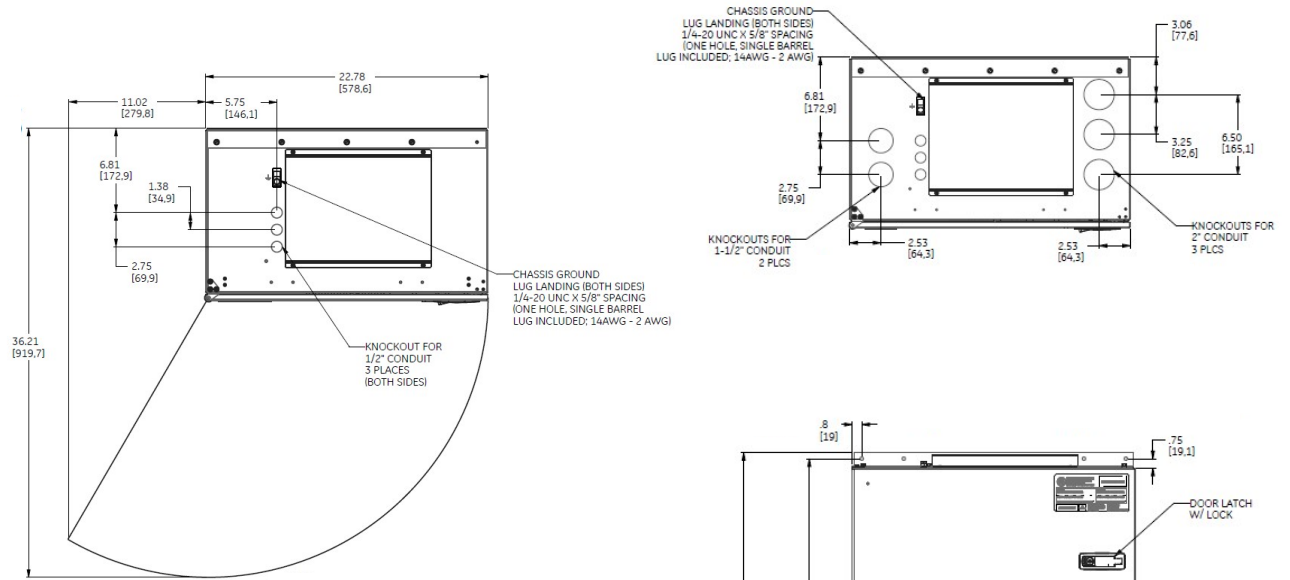- Slope thermal compensation

Communication Features

- 10/100/1000 Base-T dual-port Ethernet
    - TCP/IP, TLS
    - SMTP allowing for email notification of alarms
- Built-in web browser interface
- SCADA communication protocols
    - DNP3 Outstation
    - Modbus
- 3 password protected security levels

GENERAL	DESCRIPTION
System Plant Voltage	Accuracy ±0.5%, resolution 0.1V
One System Shunt	Accuracy ±0.5% full scale, resolution 1A
Inputs	10 binary total (6 "dry" no voltage, 4 opto-isolated 24V sourced) user assignable
Outputs	10 form-C alarm (125 Vdc @ 0.5 A), 7 user assignable
1-Wire Bus Devices	Up to 16 temperature probes (via optional QS873 device)
Display	7 in. full color 640 x 480 touch screen and traditional tactile navigation buttons
Radiated Emissions	European Directive 2014/30/EU; EN55032, (CISPR22) Class B, EN55035 (CISPR24)

Product Dimensions   in. [mm]

CHASSIS GROUND LUG LANDING (BOTH SIDES) 1/4-20 UNC X 5/8" SPACING (ONE HOLE, SINGLE BARREL LUG INCLUDED; 14AWG - 2 AWG)

17.35 [440,7]
8.30 [210,8]
5.75 [146,1]
6.31 [160,2]
1.63 [41,3]
3.25 [82,6]
30.777 [781,74]

CHASSIS GROUND LUG LANDING (BOT 1/4-20 UNC X 5/8" (ONE HOLE, SINGLE LUG INCLUDED; 14

KNOCKOUT FOR 1/2" CONDUIT 3 PLACES (BOTH SIDES)

3.06 [77,6]
6.50 [165,1]
3.25 [82,6]
6.81 [172,9]
2.75 [69,9]

KNOCKOUTS FOR 1-1/2" CONDUIT 2 PLCS
2.53 [64,3]
2.53 [64,3]
KNOCKOUTS FOR 2" CONDUIT 3 PLCS

.81 [20,6]
.8 [20]
Ø .290 [7,37] 8 PLCS
.75 [19,1]

28.50 [723,8]
30.50 [774,7]
29.50 [749,3]
14.23 [361,5]

DC2
AC1
DC1

DOOR LATCH W/ LOCK

3.38 [85,7]
12.38 [314,3]
15.75 [400,1]

.8 [20]
.75 [19,1]
30.50 [774,7]
29.50 [749,3]

DOOR LATCH W/ LOCK

AC1
DC1
DC2

3.38 [85,7]
12.38 [314,3]
15.75 [400,1]

KNOCKOUT FOR 1-1/2" CONDUIT 2 PLCS
2.53 [64,3]
2.53 [64,3]
KNOCKOUT FOR 2" CONDUIT 3 PLCS
2.75 [69,9]
3.25 [82,6]
6.50 [165,1]
6.81 [172,9]
3.06 [77,6]

120°
KNOCKOUTS FOR 1/2" CONDUIT 3 PLCS
30.78 [781,7]
3.25 [82,6]
1.63 [41,3]
6.31 [160,2]
8.30 [210,8]
5.75 [146,1]
17.35 [440,7]

Type I
Bottom Connections

Type I
Top Connections

Product Dimensions in. [mm]

Type II
Bottom Connections

Type II
Top Connections

Product Dimensions   in. [mm]

19 in. Flush Mount

19 in. Mid Mount

Accessories and Spare Parts

Battery Thermal Probes

Ordering Code	Description	Application
1600127057A	Thermal probe bridge 1 IN/OUT 4	Battery thermal probe interconnect module
1600093513A	DTP873 battery sensor	Battery thermal probe sensor

Additional Accessories (Mounting Hardware, Filters, etc.)

Ordering Code	Description	Application
1600097831A	19IN IWC 19IN frame mount kit	Mounting hardware to attach 19" battery charger to 19" frame
1600097832A	19IN IWC 23IN frame mount kit	Mounting hardware to attach 19" battery charger to 23" frame
850052732	Filter, IWC battery charger, 19	Air filter for 19" battery charger cabinet
850053032	Filter, IWC battery charger, 23"	Air filter for 23" battery charger cabinet

Additional Accessories (Surge Protection Replacement Modules)

Ordering Code	Description	Application
4600367368P	VAL-SEC-T2-350-P	AC L-N surge arrestor replacement module
4600186517P	VAL-SEC-T2-N/PE-350-P	AC N-PE surge arrestor replacement module
4600367370P	PLT-SEC-T3-24-P-UT/PT	24V DC surge arrestor replacement module
4600367371P	PLT-SEC-T3-60-P-UT/PT	48V DC surge arrestor replacement module
4600367372P	PLT-SEC-T3-230-P-UT/PT	125V DC surge arrestor replacement module

Controller Modules

Ordering Code	Description	Application
1600093508A	IP843G_24V_S controller module	Integritas battery charger, Pulsar XL hot-swappable 24Vdc controller module with secure protocols
1600093510A	IP843G_48V_S controller module	Integritas battery charger, Pulsar XL hot-swappable 48Vdc controller module with secure protocols
1600093509A	IP843G_125V_S controller module	Integritas battery charger, Pulsar XL hot-swappable 125Vdc controller module with secure protocols
1600093511A	IP843G_IO module	Integritas battery charger, Pulsar XL input / output module (compatible with all charger voltages)
1600272809A	IWC943LG_DSP	Integritas battery charger, Nebula hot-swappable front panel user Interface
1600272801A	IWC943_24/48V controller application module	Integritas battery charger, Nebula hot-swappable 24Vdc/48Vdc controller module with secure protocols
1600272802A	IWC943G_125V controller application module	Integritas battery charger, Nebula hot-swappable 125Vdc controller module with secure protocols
1600272800A	IWC943G_IO module	Integritas battery charger, Nebula input / output module (compatible with all charger voltages)

Miscellaneous

Ordering Code	Description	Application
8600092348P	Blank IP charger module faceplate	Blank filler for empty charger slots
1600134098A	Thermal probe wire set, 25 ft.	Wiring between thermal probe bridge and controller
1600134099A	Thermal probe wire set, 50 ft.	Wiring between thermal probe bridge and controller
1600134100A	Thermal probe wire set, 100 ft.	Wiring between thermal probe bridge and controller
1600134101A	Thermal probe wire set, 250 ft.	Wiring between thermal probe bridge and controller
1600134102A	Thermal probe wire set, 500 ft.	Wiring between thermal probe bridge and controller