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www.hindlepowerinc.com

HindlePower 2024 Product Catalog

Printed December 2023

All specifications subject to change

HindlePower, Inc.

1075 Saint John Street
Easton, PA 18042

HindlePower

Utility Battery Chargers &
Custom DC System Products

2024
Product Catalog



hindlepowerinc.com



Welcome...

Dear valued customers,

On behalf of the Hindle family and our dedicated team, I want to express our sincere appreciation for your unwavering support. Your trust in us has played a vital role in enabling us to fulfill your power solution needs throughout the years, and we are truly grateful for your business.

At HindlePower, we take great pride in the products we create, viewing it as a privilege to contribute to our nation's electrical infrastructure. We recognize the work you do every day is an essential thread in the fabric of our society. Our commitment to quality, excellent customer service, and ensuring prompt delivery reflects our gratitude and the core values that define us as a company.

As you browse this catalog, I encourage you to contact our team of dedicated professionals for any assistance or inquiries you may have. Your satisfaction is our priority, and we are here to support you every step of the way.

Thank you for choosing HindlePower as your trusted partner. We look forward to serving you with integrity and excellence.

Warm regards,

Nicholas Hindle
President
HindlePower

Table of contents

ATevo Battery Charger

<i>Product Brochure</i>	9
<i>Standard Specification</i>	23

HindleHealth Plus

<i>Product Brochure</i>	39
-------------------------	-----------

EPIC Series Battery Cabinet

<i>Product Brochure</i>	43
<i>Standard Specification</i>	53

EPIC Series Battery House

<i>Product Information</i>	62
----------------------------	-----------

EPIC Series Mobile DC Trailer

<i>Product Information</i>	64
----------------------------	-----------

DC Control Panel

<i>Product Brochure</i>	67
<i>Standard Specification</i>	71

Best Battery Selector

<i>Product Brochure</i>	77
-------------------------	-----------

Trailer Connection Panel

<i>Product Brochure</i>	81
<i>Standard Specification</i>	85

Quality, Customer Service, & Lead Time

We strive to provide our customers with the industry's best quality, customer service, and lead time. That's our promise.

Quality: Our Focus, Our Passion

We believe that the quality of our products is a direct result of the quality of our people and our culture. Our culture fosters an environment of continuous improvement, where every employee is empowered to contribute, and we obsessively focus on delivering excellence.

We believe that quality is not a one-time achievement but an ongoing commitment and our ISO 9001:2015 Certification is a testament to our dedication. At HindlePower, Quality isn't a department; it's a shared responsibility. It isn't a step in our process; it's the mindset that guides us. Quality isn't just a goal; it's

John Hemond, Technical Support



Nic Hindle, President

who we are. We want every product that bears the HindlePower name to be synonymous with quality and reliability.

Customer Service: Your Success, Our Mission

Our customers are at the heart of everything we do. We understand that your success hinges on more than just our products; it's about the support and service you receive. That's why our culture places an unwavering emphasis on customer service. Our dedicated professionals are always ready to assist you. Whether you have a question about purchasing our products, or need help troubleshooting in the field, we are here to help. Our expert team works with you to craft custom solutions tailored to your unique needs. Your satisfaction is our driving force, and we are com-



97% On Time Delivery



mitted to going the extra mile to ensure your experience with HindlePower exceeds your expectations.

Our partnership begins from the moment of your initial inquiry, and you'll have our support for the lifetime of our products.

Lead Time: Delivering Excellence, On Time

When you choose HindlePower, you're not just choosing a product; you're choosing a partner who respects your timelines and helps you stay ahead. We understand that delayed deliveries can disrupt operations, which is why we prioritize prompt and accurate lead times.

Our culture embraces the importance of swift and reliable service. Our efficient supply chain

management enables us to provide industry leading lead times without compromising on quality. The last few years have been tumultuous for everyone in the manufacturing industry, but we pride ourselves on the fact that we can still boast an impressive 97% on time delivery. You can count on us for telling you an accurate and reliable ship date.

Our commitment to quality, customer service, and lead time isn't just a business strategy—it's our culture. We invite you to experience first-hand how these values are woven into every aspect of HindlePower.



ISO 9001:2015 Certified

AT Series Product

ATevo Battery Charger



INTRODUCTION



*“the **premier choice** for all stationary battery charger specifications”*



HindlePower products have been the utility industry standard for over 50 years. **ATEvo** continues the legacy of the AT10.1/ AT30 Series battery chargers.

ATEvo is designed and manufactured with the same high quality and reliability you’ve come to expect from HindlePower.

Complying with both NERC PRC-005 & TPL-001, ATevo is equipped with powerful diagnostics to better assess the health of your charging system, while meeting the demand for full system reliability.



TABLE OF CONTENTS

10	Introduction
12	Standard Features
14	Options & Accessories
17	Specification
18	Available Models & Standard Enclosures
20	ATEvo Ordering Code



SIMPLE INSTALLATION & SETUP

The ATevo Quick Setup Guide leads you through five basic steps from installation to configuration via the Edit/Enter button.

INTUITIVE USER INTERFACE

The graphic LCD screen provides all the information you need with no guess work.

EASY STATUS VERIFICATION

Easily know your system's condition with HindleHealth System status lights. Green, you are good to go. Solid Red, some maintenance is required. Blinking Red, immediate action is required.

HIGH QUALITY & RELIABILITY

ATevo comes with the same high quality and reliability that you have come to expect from HindlePower. Every battery charger is backed by our customer service, technical support, and dc expertise.

STANDARD FEATURES



UNIVERSAL CONTROL BOARD

The main control board can operate any ATevo battery charger regardless of input and output ratings.

GRAPHICAL LCD DISPLAY

ATevo's easy to use interface provides all the information you need with no guess work.

FILTERING

Output filtering is essential whenever there is a need for low AC ripple and low noise on the DC bus for critical loads.

Available Options:

- Filter Level 1 - Filtered (standard)
 - available for 24/48/130V models
- Filter Level 2 - High Filtered (optional)
 - available for 24/48/130/260V models
- Special 30mV Filtered on battery (optional)
 - only available for 130V models

Definitions consistent with standard IEEE 2405-2022

CIRCUIT BREAKER PROTECTION

ATevo comes factory equipped with thermal magnetic or hydraulic magnetic breakers for both the AC input and DC output. Higher Ampere Interrupting Capacity (AIC) ratings are available.

Refer to Input Current (Aac) / Circuit Breaker Tables:

- [JF5072-01](#) for a full list of 1PH AIC ratings
- [JF5072-03](#) for a full list of 3PH AIC ratings

LOCAL & REMOTE VOLTAGE SENSE

Allows the charger to read the battery terminal voltage.

STANDARD ALARMS

The ATevo allows users to configure the common alarm and also group alarms into high and low priority.

- High DC Voltage *
- Low DC Voltage *
- DC Output Failure *
- AC Input Failure *
- Ground Fault *
- Common Alarm *
- Open DC Breaker
- Open External and Internal Feedback
- Ambient Temperature Probe Failure
- DC Short Circuit
- DC Supply Failure
- Equalize Mode Disabled
- High Level Shutdown
- Low AC Shutdown
- Low AC Supply
- High Level Detect
- Low Level Detect
- Rectifier Over-temp
- Relay Failure
- End of Discharge
- Current Limit
- Open Battery Alarm
- Positive/Negative Ground Fault Warning
- Positive/Negative Ground Fault Critical
- Open DC Output
- Rectifier Temperature Sense Failure
- Alarm Relay Failure
- Ground Voltage Imbalance Warning
- Ground Voltage Imbalance Critical

** supplied with discrete LED indicator*

SECURITY

Three levels of password protected security prevents unauthorized users from changing any settings on the ATevo battery charger.

EVENT LOGGING

Don't miss a thing! ATevo can log up to 1,024 events such as alarms and/or parameter changes.

GROUND FAULT METERING

Standard, digital, zero-center voltmeter alerts users of any imbalance on the dc bus.

SD MEMORY CARD

Included with every ATevo, the SD card allows users to copy data from the event log, save and restore battery charger configuration, and load firmware updates.

CLEAR SAFETY COVER

Clear acrylic protective cover marked with layout and connection diagram covering all internal components (excludes certain larger battery charger enclosures).

DIGITAL ONLINE MANUAL

Full manual is available in both English and Spanish with easy [QR Code](#) access on charger.

OPTIONS & ACCESSORIES

AUXILIARY ALARM RELAY BOARD

The Auxiliary Alarm Relay Board gives users the ability to monitor and report ATevo status to or from third party equipment.

Each auxillary input/output board is equipped with:

- (6) programmable alarm relays
- (4) programmable generic binary inputs
- (4) programmable generic analog inputs

EJ5301-##

BARRIER TYPE ALARM TERMINAL BLOCK

Features a separate molded phenolic terminal block, wired directly to the Auxiliary Alarm Relay PC Board. It allows the user to connect remote alarm wiring with ring or fork type lugs.

EI5205-##

COMMUNICATIONS

ATevo communication options allow users to remotely monitor and control the battery charger using DNP 3 Level 2, Modbus, and IEC 61850 Protocols. Refer to Communications Manual [JA0102-54](#).

SERIAL COMMUNICATIONS ADAPTER

EN5034-00

ETHERNET COMMUNICATIONS ADAPTER

EN5035-00

IEC 61850 COMMUNICATIONS ADAPTER

* may include separate enclosure depending on charger size

EJ5309-5#

COPPER GROUND BUS

Offers a convenient means to tie the ATevo to the building's ground.

EI5098-0#

AC LIGHTNING ARRESTOR

Recommended for installations with risk of frequent AC surges, such as high elevations or severe weather. Is in accordance with IEEE 472 requirements.

EJ5308-0#

NEMA TYPE-2 DRIP SHIELD

Provides a drip shield on the enclosure to protect it from falling dirt and/or dripping water.

EI0191-5#

NEMA TYPE-4 ENCLOSURES

All-weather cabinets (will also meet NEMA TYPE-12 and TYPE-13).

CONSULT
FACTORY

HINDLEHEALTH+

An electronically enhanced shunt that provides continuous monitoring of open battery status and calculates the anticipated amp-hour remaining in your battery, offering the industry's highest level of resolution and accuracy. Refer to document [JF5081-00](#) for more information.



- Mounted in a separate enclosure
- Includes Battery Charge / Discharge Meter & Battery Discharge Alarm
- Includes Temperature Compensation & Battery Temperature/Alarm
- Utility compliance with NERC PRC-005 & TPL-001

EJ5178-##

TEMPERATURE COMPENSATION & BATTERY TEMPERATURE/ALARM

Adjusts the dc output in response to battery temperature fluctuations. Compatible with lead acid and NiCad type batteries.

Displays battery temperature/alarm on charger LCD screen.

EJ5304-0#

FORCED LOAD SHARING

Provides for equal load sharing of 2 identical chargers in parallel, allowing for system redundancy.

EJ5306-0#

INTERNAL COATINGS

Fungus proofing, anti-static, and PCB conformal.

Fungus Proofing

EJ1076-00

Anti-Static

EJ1076-01

PCB Conformal

EJ1076-03

FLOOR STANDS

Allows for floor mounting of Style-5054 and Style-5070 enclosures.

Style-5054

EI0192-50

Style-5070

EI0184-71

WALL MOUNTING BRACKETS

Allow for wall mounting of floor mounted Style-5070 enclosures.

EI5008-##

RELAY RACK MOUNTING

Available for Style-5054 and Style-5070 enclosures. These brackets allow mounting into standard EIA 19in/23in/24in relay racks.

EI0193-5#

LOCKING PROVISIONS

Provide extra security by physically locking the front door.

Padlock

EI0215-0#

Keylock

EI0215-1#

<p>TOUCH UP PAINT 2oz bottle of ANSI 61 gray touch up paint.</p>	<p>EI5047-00</p>				
<p>CUSTOM COLORS All ATevo enclosures feature an ANSI 61 gray epoxy powdercoat finish. Custom color options are available upon request. Please provide either ANSI, PMS, or RAL color desired.</p>	<p>CONSULT FACTORY</p>				
<p>CABINET HEATER Provides for anti-condensation heating of the battery charger cabinet.</p>	<p>EJ5156-0#</p>				
<p>INSECT/RODENT/SNAKE SCREENING Provides an added protective screen device that inhibits the entrance of insects, reptiles, and small animals in a NEMA-1 or NEMA-2 enclosure.</p>	<p>EJ1076-02</p>				
<p>HEAT SHRINK WIRE MARKERS Provides the additional durability of heat shrink wire markers on the ends of each wire which correspond to the wire numbers on the charger wiring diagram.</p>	<p>EJ1076-04</p>				
<p>FAN CONTROL CONTACTOR Mounted in a separate NEMA 1 enclosure, this accessory provides a relay contact to activate a battery installation vent or exhaust fan when the charger is in equalize.</p>	<p>10Adc EJ5017-2# 20Adc EJ5017-3#</p>				
<p>VOLTAGE AND CURRENT TRANSDUCERS Transmits 4-20 mA, 0-5Vdc, 0-10Vdc analog outputs for: DC Voltage, DC Current, AC Current(s), and/or AC Voltage(s) measurements</p>	<table border="0"> <tr> <td>Vdc EJ5318-##</td> <td>Vac EJ5316-##</td> </tr> <tr> <td>Adc EJ5319-##</td> <td>Aac EJ5317-##</td> </tr> </table>	Vdc EJ5318-##	Vac EJ5316-##	Adc EJ5319-##	Aac EJ5317-##
Vdc EJ5318-##	Vac EJ5316-##				
Adc EJ5319-##	Aac EJ5317-##				
<p>CIRCUIT BREAKER/DOOR INTERLOCKS An added measure of protection that allows the operator to open the battery charger door only when the ac and dc breakers are open.</p>	<p>EI5136-0#</p>				
<p>AC METERING Displays input voltage (Vac), input current (Aac), and frequency on the battery charger's digital LCD screen.</p>	<p>EJ5303-##</p>				
<p>AC CIRCUIT BREAKER AUXILIARY SWITCH Generates alarm when AC circuit breaker is open. (DC Circuit Breaker Auxiliary Switch is standard)</p>	<p>EJ5305-1#</p>				

SPECIFICATIONS



DC OUTPUT

Voltage Ratings:

24, 48, 130 and 260 Vdc nominal

Current Ratings:

1PH units available from 6-100A

3PH units available from 16A-1000A

(refer to next page for available charger output ratings)

Continuous Rating:

110% rated current at maximum equalize voltage at -10 to 50°C

Transient Rating:

Per IEEE std 2405

Current Limit Adjustment Range:

50% to 110 % rated output

Voltage Regulation:

+0.25% for line, load, and temp. variations

* regulation at extended equalize voltages may not meet +0.25%

Electrical Noise:

26dBnc

Ripple:

24/48Vdc

- Filter Level 1- Filtered- 2% Vrms*

- Filter Level 2- High Filtered- 30mVrms**

130Vdc

- Filter Level 1- Filtered- 2% Vrms*

- Filter Level 2- High Filtered- 100mVrms**

- Special 30 mVrms Filtered on 130V battery

260Vdc

- Filtered Level 2- 200mVrms**

* Filter Level 1 equivalent to NEMA PE5 filtered output

** Filter Level 2 equivalent to NEMA PE5 battery eliminator filter

Surge Withstand Capability:

Designed to meet IEEE-472, ANSI C37.90a

AC INPUT

Code

Input Voltage:

Code	Input Voltage:
120	120V 60 Hz*
208	208V 60 Hz
240	240V 60 Hz
480	480V 60 Hz
600	600V 60 Hz
220	220V 50/60 Hz
380	380V 50/60 Hz
416	416V 50/60 Hz
MT1	120/208/240 60 Hz*

*120 Vac and multi-tap inputs not available for certain single phase units, and all three-phase units

Input Voltage Tolerance:

+10%, -12%

Input Frequency Tolerance:

+/- 5%

Efficiency:

85-90% typical for 130Vdc at 50-100% load

ENVIRONMENTAL

- Operating ambient temperature -10 °C to 50 °C w/o derating
- Operating altitude 3,300ft (1,000m) above sea level w/o derating
- Relative humidity 0% to 95% (w/o condensation)
- Audible noise less than 65 dBA at any point 5ft (1.5m) from any vertical surface of enclosure

SAFETY & ACCEPTANCE

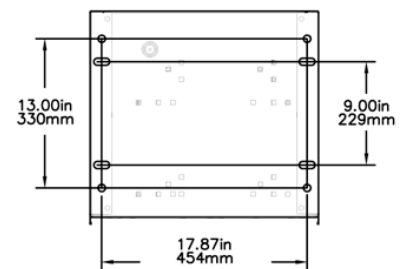
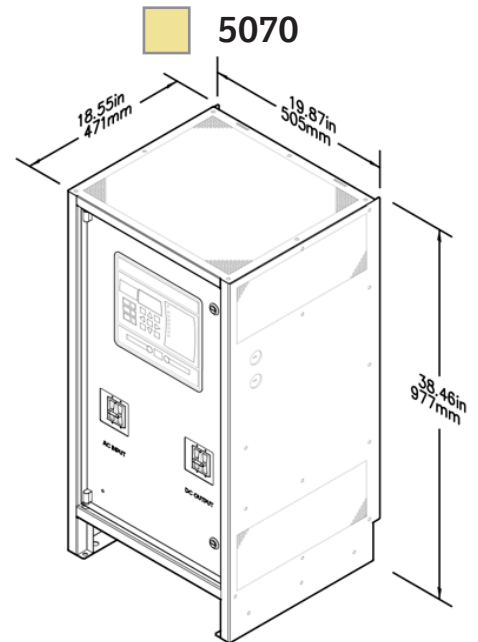
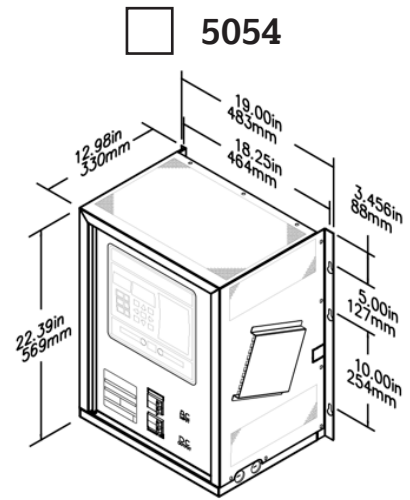
- Standard IEEE 2405 2022 (supercedes NEMA PE5)
- Standards UL 1564 & UL 1012
- Standard CSA 22.2
- Standard IEEE/ANSI C37.90
- Standard FCC Part 15 Subpart J Class A
- Seismic qualified IEEE 693, CBC & IBC
- HindlePower Standard 5-year Warranty (refer to document [JF5001-00](#))



Standard Drawings & Operating Instructions

AVAILABLE MODELS & STANDARD ENCLOSURES (Single Phase Inputs)

DC OUTPUT RATINGS		Enclosure Style	Approximate Weights (lbs.(kg))	Heat Loss Watts (BTU/hr)
VOLTS	AMPERES			
24Vdc	6	5054	121 (55)	33 (111)
	12	5054	121 (55)	60 (204)
	16	5054	132 (60)	78 (265)
	20	5054	138 (62)	96 (327)
	25	5054	138 (62)	118 (404)
	30	5054	147 (66)	141 (481)
	40	5054	149 (67)	186 (635)
	50	5054	177 (80)	231 (789)
	75	5070	282 (128)	344 (1174)
	100	5070	317 (143)	457 (1558)
48Vdc	6	5054	121 (55)	42 (144)
	12	5054	135 (61)	79 (268)
	16	5054	157 (71)	103 (352)
	20	5054	175 (79)	128 (436)
	25	5054	175 (79)	158 (548)
	30	5054	181 (82)	189 (644)
	40	5054	198 (90)	250 (852)
	50	5054	204 (92)	311 (1061)
	75	5070	321 (146)	463 (1582)
	100	5070	398 (178)	616 (2103)
130Vdc	6	5054	146 (67)	71 (243)
	12	5054	186 (84)	137 (467)
	16	5054	211 (96)	181 (617)
	20	5054	235 (107)	224 (766)
	25	5054	235 (107)	279 (953)
	30	5054	241 (109)	334 (1140)
	40	5070	341 (155)	443 (1513)
	50	5070	384 (174)	553 (1887)
	75	5070	422 (192)	826 (2821)
	260Vdc	6	5054	199 (90)
12		5054	227 (103)	235 (803)
16		5070	380 (172)	312 (1064)
25		5070	420 (190)	484 (1652)



HOW TO SIZE YOUR BATTERY CHARGER (Simplified Formula)

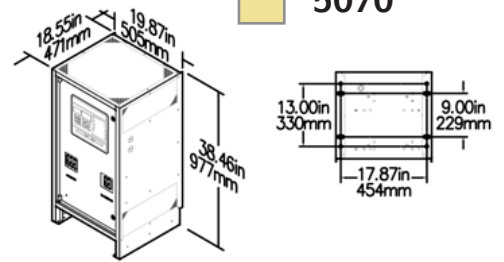
$$\left(\frac{\text{Ah} \times 1.R}{t} \right) + L = \text{Continuous Charger Output Rating}$$

- Ah = Ampere hours removed
- R = Recharge factor (1 = Pb) or (3 = NiCd)
- L = Additional standing load
- t = Recharge time in hours

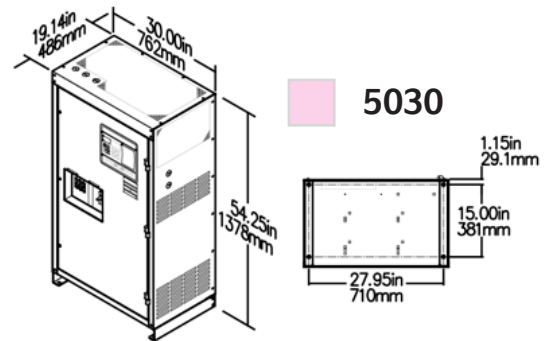
AVAILABLE MODELS & STANDARD ENCLOSURES (Three Phase Inputs)

DC OUTPUT RATINGS		Enclosure Style	Approximate Weights (lbs.(kg))	Heat Loss watts (BTU/hr)
VOLTS	AMPERES			
24Vdc	50	5070	232 (105)	231 (789)
	75	5070	251 (114)	344 (1174)
	100	5070	269 (122)	457 (1558)
	125	5030	392 (178)	569 (1943)
	150	5030	413 (187)	682 (2328)
	200	5030	479 (217)	908 (3098)
	250	5030	658 (298)	1133 (3868)
	300	5030	670 (304)	1359 (4638)
	400	163	1150 (522)	1810 (6178)
	500	163	1300 (590)	2261 (7717)
600	163	1530 (694)	2712 (9257)	
800	198	2020 (916)	3614 (12336)	
1000	198	2440 (1107)	4516 (15416)	
48Vdc	50	5070	257 (117)	311 (1061)
	75	5070	305 (138)	463 (1582)
	100	5070	327 (148)	616 (2103)
	125	5030	461 (209)	769 (2624)
	150	5030	471 (214)	921 (3145)
	200	5030	535 (243)	1227 (4187)
	250	5030	750 (340)	1532 (5229)
	300	5030	816 (370)	1837 (6272)
	400	163	1100 (499)	2448 (8356)
	500	163	1350 (612)	3058 (10440)
600	198	1600 (726)	3669 (12524)	
800	198	2020 (916)	4890 (16693)	
1000	198	2400 (1089)	6111 (20861)	
130Vdc	25	5070	261 (118)	279 (953)
	30	5070	261 (118)	334 (1140)
	40	5070	300 (136)	443 (1513)
	50	5070	333 (151)	553 (1887)
	75	5070	407 (184)	826 (2821)
	100	5030	629 (285)	1100 (3755)
	125	5030	661 (300)	1376 (4690)
	150	5030	663 (301)	1647 (5624)
	200	5030	746 (338)	2195 (7492)
	250	163	1130 (513)	2742 (9360)
300	163	1330 (603)	3289 (11229)	
400	163	1580 (717)	4384 (14965)	
500	198	2150 (975)	5478 (18702)	
600	198	2650 (1202)	6573 (22439)	
800	198	3250 (1474)	8762 (29912)	
260Vdc	16	5070	344 (156)	312 (1064)
	25	5070	372 (168)	484 (1652)
	50	5030	683 (309)	963 (3286)
	75	5030	725 (329)	1441 (4920)
	100	5030	819 (371)	1920 (6553)
	150	163	1319 (598)	2877 (9820)
200	163	1502 (681)	3834 (13088)	
300	198	2323 (1053)	5748 (19622)	
400	198	2428 (1101)	7662 (26156)	

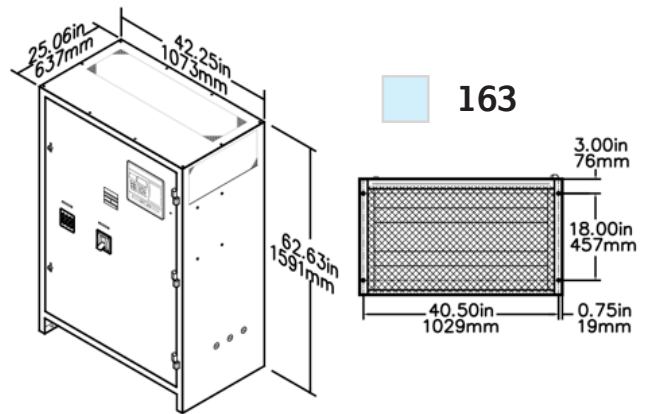
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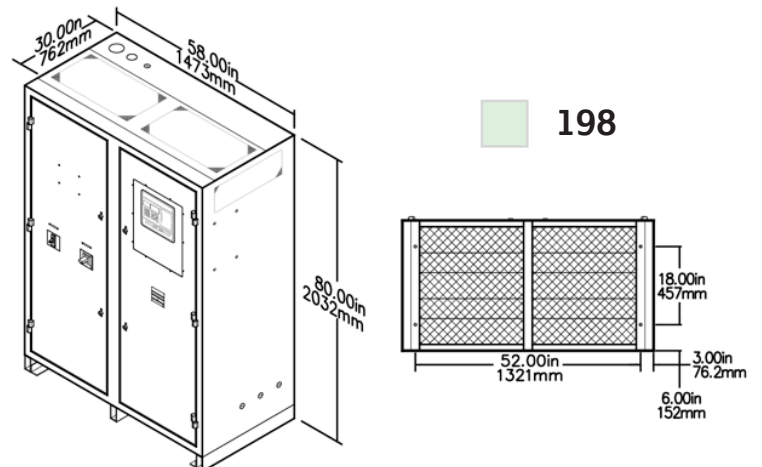
5030



163



198



ATEVO ORDERING CODE

SAMPLE CODE															
ATEV	1	130	025	E	240	S	S	X	X	X	X	X	X	G	1
	B	C	D	E	F	G	H	J	K	L	M	N	P	Q	R
DESCRIPTION		CODE	FEATURE												
A			ATEV												
B	Number of input phases	1	Single Phase												
		3	Three Phase												
C	Nominal DC Output Voltage	024	24 Vdc												
		048	48 Vdc												
		130	130 Vdc												
		260	260 Vdc												
D	Nominal DC Output Current (refer to page 3-4)	006	6 Adc	125	125 Adc										
		012	12 Adc	150	150 Adc										
		016	16 Adc	200	200 Adc										
		020	20 Adc	250	250 Adc										
		025	25 Adc	300	300 Adc										
		030	30 Adc	400	400 Adc										
		040	40 Adc	500	500 Adc										
		050	50 Adc	600	600 Adc										
		075	75 Adc	800	800 Adc										
		100	100 Adc	1k0	1000 Adc										
E	DC Output Filtering	F	Level 1												
		E	Level 2*												
		S	130V Special Filtering												
F	AC Input Supply Voltage**	120	120V 60 Hz												
		208	208V 60 Hz												
		240	240 60 Hz												
		480	480 60 Hz												
		600	600 60 Hz												
		220	220V 50/60 Hz												
		380	380V 50/60 Hz												
		416	416V 50/60 Hz												
		MT1	120/208/240 60 Hz***												

*260Vdc only available with Level 2 filter

**Refer to [JF5072-00](#) for available ac inputs voltages and specific kAIC ratings for each breaker option

***Multi-tap input only available on single-phase units 25A or less, in 5054 enclosure



DESCRIPTION		CODE	FEATURE
G	AC Input Protection ****	S	Standard AIC
		M	Medium AIC
		H	High AIC
		U	Ultimate AIC
H	DC Output Protection ****	S	Standard AIC
		M	Medium AIC
		H	High AIC
		U	Ultimate AIC
J	Auxiliary I/O PC Boards (refer	X	No Aux I/O Board Supplied
		1	One Aux I/O Board
		2	Two Aux I/O Board
		3	Three Aux I/O Board (Consult Factory)
		4	Four Aux I/O Board (Consult Factory)
		A	One Aux I/O Board w/ Barrier Terminal Blocks
		B	Two Aux I/O Board w/ Barrier Terminal Blocks
		C	Three Aux I/O Board w/ Barrier Terminal Blocks (Consult Factory)
		D	Four Aux I/O Board w/ Barrier Terminal Blocks (Consult Factory)
K	Remote Communications	X	No Remote Communications Supplied
		1	Serial Communications Module
		2	Ethernet Communications Module
		3	Both Serial & Ethernet Communications Module
		4	IEC 61850 Communications Module
		C	Custom Communications (Consult Factory)
L,M N,P	Factory Use Only		
Q	Site Wiring Protection	X	Standard Internal CU-AL Compression Box Lug Supplied
		G	Copper Ground Bus Bar Supplied
		L	AC Input Lightning Arrestor Supplied
		B	Both Ground Bus (G) and Lightning Arrestor (L) Supplied
R	Enclosure Type	1	NEMA Type 1 (Standard)
		2	NEMA Type 2 Drip Shield Mounted to Standard NEMA Type 1 Enclosure
		4	Special NEMA Type 4 (12) Water-Proof Cabinet (Vented & Fan Cooled)

**** AC and DC breakers must match for chargers in a 5054 enclosure

Specifications subject to change



STANDARD SPECIFICATION
ATevo Battery Charger



JF5061-00

Standard Specification

ATEvo Series Float Battery Charger

An industrial battery charger shall be furnished in accordance with the following specification.

TABLE OF CONTENTS

<u>Section</u>	<u>Description</u>	<u>Page</u>	<u>Section</u>	<u>Description</u>	<u>Page</u>
1	General	24	9	Data Recording & Event Log	31
2	Applicable Codes	24	10	Hindle Health System	31
3	Standard Features	25	11	Construction	32
4	Operation	27	12	Options	33
5	Equalize Modes & Functions	27	13	Filtering	35
6	Alarms & Communication	28	14	Documentation	35
7	Protective Devices	30	n/a	Job-Specific Worksheet	37
8	Soft Touch HMI	30			

1. General

- 1.1. The battery charger shall be sized, using industry accepted IEEE sizing methods, to continuously carry any constant load and recharge the battery.
- 1.2. The battery charger shall provide a continuous regulated dc output derived from an ac source. The battery charger shall provide for a 2-rate output to accommodate both float and equalizing charge, as applicable for the technology.
- 1.3. The battery charger shall be of a design that employs microprocessor technology to control and define all critical operational, calibration, regulation, and alarm functions.

2. Applicable Codes

The charger shall meet requirements of latest versions of the following industry and agency standards:

- 2.1. IEEE 2405.2022 / NEMA PE5 for stationary battery chargers
- 2.2. IEEE 946 DC System Design
- 2.3. UL 1564 standard for industrial battery chargers
- 2.4. UL 1012 standard for stationary power supplies
- 2.5. CSA 22.2 standard for battery chargers
- 2.6. IEEE/ANSI C37.90 surge withstand capability (SWC)
- 2.7. FCC Part 15 Subpart J Class A
- 2.8. Current seismic compliance: IEEE 693-2005 High



3. Standard Features

- 3.1. Standard Input Voltages include: 120, 208, 240, 480, and 600Vac @ 60Hz, and 220, 380, 416Vac @ 50-60Hz. Input frequency tolerance 47Hz to 63Hz, and ac input voltage tolerance is +10%/-12%. Other custom ac input voltages are available.
- 3.2. Standard Output Voltages include: 24, 48, 130, and 260Vdc with output current ratings from 6Adc to 1000Adc. See catalog model details for available combinations.
- 3.3. Output regulation of +/- 0.25% of dc voltage setting with input line variations of +10%/-12% voltage, and/or +/-5% frequency with load variations from no load to full load over the operating dc voltage range.
- 3.4. AC input and dc output circuit breakers are standard.
- 3.5. Output control is constant-voltage, current-limited.
- 3.6. The charger can deliver 110% continuous rated output current at the maximum equalize voltage and at the rated ac input voltage, from -10 °C to + 50 °C. Current limit shall be factory set at 110% of output and be adjustable from 50% to 110% of the nominal output.
- 3.7. Operating environment shall be:
 - 3.7.1. -18 °C to +50 °C (-1 °F to 122 °F) without de-rating
 - 3.7.2. 30 °C to +70 °C (-22 °F to 158 °F) storage
 - 3.7.3. RH 0% - 95% noncondensing
 - 3.7.4. elevation to 1,000 meters (3,300 feet) without derating
- 3.8. Minimum dc output filtering, consisting of two inductors and one or more electrolytic capacitors, limiting the output ripple as specified in IEEE 2405 / NEMA PE5.
- 3.9. Random parallel load share operation of two (2) chargers with the same dc voltage rating shall be a standard feature of the filtered charger.
- 3.10. DC voltage transients due to sudden changes in load current over the range of 10% to 90% or 90% to 10% of full load occurring within 2 milliseconds shall not result in an output variation of greater than +/-6% of the nominal voltage setting. Recovery to within +/-0.25% of the nominal will occur within 300 milliseconds.
- 3.11. Startup: Charger start-up will incorporate a safe start feature that stabilizes charger output within 15 seconds when a load of at least 5% of rating is applied to the charger which is connected to a fully charged battery.
- 3.12. Charger will operate into zero battery voltage without activating any protective devices other than electronic current limiting.
- 3.13. Charger will start and operate with a crowbar short circuit on the output without tripping the standard dc circuit breaker.
- 3.14. Cooling: Battery charger internal heat dissipation (generated by transformer, inductors,



rectifier, etc.) is dependent upon requirement & model / enclosure.

3.14.1. NEMA Type-1 top-vented enclosures (smaller ratings)

- natural convection (all 1PH/3PH 6Adc - 300Adc models)
- also applies with optional NEMA Type-2 drip shield

3.14.2. NEMA Type-1 top-vented enclosures (larger ratings)

- forced air cooling (all 3PH 400Adc - 1000Adc models)
- fans powered by battery charger's isolation transformer
- also applies with optional NEMA Type-2 drip shield

3.14.3. NEMA Type-4 weather-proof cabinets (smaller ratings)

- forced air cooling (Style-5054, Style-5070 & Style-5030 models)
- fans not powered by battery charger
- terminal block provided for external 120 Vac 1PH power connection to cabinet cooling fans

3.14.4. NEMA Type-4 weather-proof cabinets (larger ratings)

- forced air cooling (Style-163 & Style-198 models)
- fans powered by battery charger's isolation transformer

3.15. Style 5054 and 5070 chargers shall have the HindlePower patented clear safety cover over all internal components. The safety cover is marked with a component layout and connection diagram. (excludes certain larger battery charger enclosures)

3.16. Remote sense terminals are standard for all chargers. This sensing feature detects and compensates for a voltage difference, as measured between the charger and the battery, caused by any resistance in a dc cable over a given distance.

3.17. All non-magnetic wiring shall use Hypalon or XLPE (cross-linked polyethylene) insulation system, 600V, 105 °C. Printed circuit board interconnections may use ribbon cables, or other standard pcb components.

3.18. Solderless CU-AL compression input & output terminals, including user ground to chassis.

3.19. Test points are provided for easy field testing of dc output voltage.

3.20. Metering shall be back lit LCD, simultaneously displaying Vdc and Adc with additional screens for displaying ground fault metering and resistance.

3.20.1. The display shall provide all alarm and status indications in plain English.

3.21. Firmware shall be downloadable via SD card.

3.21.1. All firmware shall be encrypted.



4. Operation

- 4.1. Battery charger shall be configurable via the HMI soft touch pad and at a minimum display the following:
 - 4.1.1. dc output voltage (Vdc)
 - 4.1.2. dc output current (Adc)
 - 4.1.3. float / equalize mode
 - 4.1.4. manual / auto equalize timer mode
 - 4.1.5. equalize hours remaining
 - 4.1.6. error and message codes
 - 4.1.7. AC ON
 - 4.1.8. alarm indications
 - 4.1.9. ATevo menu functions (see Section 8.1.1)
 - 4.1.10. Hindle Health® System (HHS) to indicate overall health of the charger
- 4.2. The charger dc output voltage (Vdc) and dc output current (Adc) are displayed simultaneously, using a back-lit LCD device, with 0.5% accuracy.
- 4.3. Float and equalize charge modes are displayed in the upper line of the display.
- 4.4. Equalize methods (see Section 5.1) are displayed in upper line of LCD. In equalize mode the display will alternate between the display mode setting and the hours of equalize charge remaining.
- 4.5. Alarms are indicated by the associated labeled LEDs and on the bottom line of the display.
- 4.6. The battery charger shall automatically annunciate alarms and respond to any configured options, without operator intervention. Errors and messages, generated by self-diagnostics and operating conditions, shall be indicated on the front panel digital HMI display, using plain English words (no codes).
- 4.7. High DC Voltage Shutdown may be operator enabled or disabled and functions by deactivating the gate pulses to the SCRs.
- 4.8. When enabled, a High DC Voltage Shutdown condition requires user intervention to reset.
- 4.9. Charger operational security may be enabled and activated by user defined password.

5. Equalize Modes and Functions

- 5.1. Equalize modes:
 - 5.1.1. Equalize mode disabled
 - 5.1.2. Manual Timed Equalize
 - 5.1.2.1. Activate by pressing “Charge Mode” button



5.1.2.2. Charger returns to float mode after equalize timer expires.

5.1.3. Auto Timed Equalize

5.1.3.1. Charger will activate equalize mode when ac power is restored after an outage of greater than 12 seconds.

5.1.3.2. Charger returns to float mode after equalize timer expires.

5.2. Equalize Timer

5.2.1. Equalize Timer is adjustable from 0 to 255 hours in 1-hour increments.

5.3. Equalize time remaining appears on display when equalize charge mode is active.

6. Alarms & Communication

6.1. Standard Alarms:

6.1.1. AC input failure

6.1.2. High DCV (HVDC)

6.1.3. High level detect alarm (analog HVDC)

6.1.4. Low DCV (LVDC)

6.1.5. Low level detect alarm (analog LVDC)

6.1.6. DC output failure

6.1.7. Battery open alarm

6.1.8. Alarm relay failure

6.1.9. Open external feedback

6.1.10. Open internal feedback

6.1.11. DC power supply failure

6.1.12. Main microprocessor failure

6.1.13. Charger output ripple

6.1.14. Charger output at current limit

6.1.15. Charger over temperature alarm

6.1.16. Rectifier temperature sensor failure

6.1.17. End of discharge alarm (EOD)

6.1.18. Open dc Circuit Breaker (DCCB)

6.1.19. Cooling fan not operating (applies only to 400A+, forced air-cooled models)

6.1.20. Ground fault:

6.1.20.1. Positive (+) fault

6.1.20.2. Negative (-) fault



- 6.2. Form-C Contacts (relays)
 - 6.2.1. Standard, one (1) common Form-C contact for all alarm functions.
 - 6.2.1.1. Common alarm relay can be configured to activate when any alarm(s) occur.
 - 6.2.1.2. Contact rating: 130Vac/Vdc @ 0.50A, 24Vdc @ 1.0A
 - 6.2.2. Optional, additional Form-C contacts for alarms.
 - 6.2.2.1. Programmable Form-C contact for any one alarm (groups of 6 relays)
 - 6.2.2.2. Contact rating 130Vac/Vdc @ 0.50A/24VDC @ 1.0A
- 6.3. Alarm and Form-C Contact Configuration
 - 6.3.1. Common alarm assignment
 - 6.3.1.1. The three (3) versions of the common alarm Form-C contact can be programmed to activate when any one (1) of a group of alarms is present. Group Alarm assignments as follows:
 - 6.3.1.1.1 Common Alarm
 - 6.3.1.1.2 Major Alarm
 - 6.3.1.1.3 Minor Alarm
 - 6.3.2. Optional Form-C contact alarm assignment
 - 6.3.2.1. Each Form-C contact can be programmed to indicate the status of any one (1) alarm.
 - 6.3.3. Each Form-C contact has a time delay configuration.
 - 6.3.3.1. The Form-C contact relay time delay is adjustable from 0 to 999 seconds after alarm occurs.
 - 6.3.4. Each Form C contact may be configured to “latch” when active.
 - 6.3.4.1. “Self-clearing” relays automatically return to the non-alarm state when alarm clears.
 - 6.3.4.2. “Latched” relays will remain in the alarmed state until the user manually clears the alarm.
- 6.4. Optional Communications
 - 6.4.1. Serial Communications Adapter
 - 6.4.1.1. ATevo battery chargers can support up to three (3) Serial Communication Adapters
 - 6.4.1.2. Serial Modbus and DNP3.0 ports can be supported simultaneously.
 - 6.4.1.3. Each Serial Communication Adapter will support:



- 6.4.1.3.1. Isolated Port Connection (isolated from charger and all other ports)
- 6.4.1.3.2. RS-232 or RS-485 (2-wire or 4-wire) networks
- 6.4.1.3.3. Modbus, DNP3.0, or IEC-61850 protocols, supporting all HMI functions and alarms
- 6.4.1.3.4. Forced Load Sharing option
- 6.4.1.3.5. (future expandability)
- 6.4.2. Ethernet Communications Adapter
 - 6.4.2.1. Supports 10/100 Mbps copper media via standard RJ-45 connector
 - 6.4.2.2. Supports both Modbus, DNP3.0 & IEC-61850 simultaneously
- 6.4.3. Fiber Communications
 - 6.4.3.1. Serial fiber options are available
 - 6.4.3.2. Ethernet over fiber options are available

7. Protective Devices

- 7.1. The battery charger shall employ protection circuit breakers as standard, for ac input and dc output connections.
- 7.2. AC input transient over voltage protection shall be accomplished via MOVs (metal oxide varistor) on ac input terminals.
- 7.3. DC external transient over voltage protection shall be via MOVs (metal oxide varistor) on the dc bus. This shall be located on the battery charger Power Board.
- 7.4. The charger shall be protected against damage if the battery is connected in reverse.
- 7.5. Output electronic current limit shall be adjustable from 50% to 110% of rated dc output current.
- 7.6. The battery charger shall electronically protect itself from a short circuit in the output by limiting the output current. When the short is corrected, the battery charger will automatically return to normal charger operation. An alarm shall be provided to indicate a short circuit of the output. The error code shall be automatically removed when the output voltage rises above 2.0Vdc.

8. Soft Touch Human Machine Interface (HMI)

- 8.1. The HMI will be interactive, and provide the following information via a LCD screen display:
 - 8.1.1. Standard menu for configuring the charger:
 - 8.1.1.1. Charger operation and alarm settings
 - 8.1.1.2. System settings: date, time, backlight, contrast



- 8.1.1.3. Alarm view: view active alarms
- 8.1.1.4. Event log: view event log
- 8.1.1.5. Event log utilities: clear or download event log
- 8.1.1.6. Relay configuration: latching/non-latching, delay, relay assignment to alarms
- 8.1.1.7. Relay utilities: reset latched alarms
- 8.1.1.8. System information: software version
- 8.1.2. Network and communication settings
- 8.1.3. Lamp/display test will test display operation and lamps
- 8.1.4. Hindle Health® System (see Section 10)
- 8.1.5. Alarm conditions, status and adjustments (see Section 6)
- 8.1.6. Event logging of alarm conditions (see Section 9)
- 8.1.7. Security password

9. Data Recording and Event Log

- 9.1. System to record all data events for the life of the charger and provide status as follows:
 - 9.1.1. Each alarm function, date, start time and end time
 - 9.1.2. Each self-diagnostic event, date and time
 - 9.1.3. Hours of operation since last reset
- 9.2. All events are viewable on the digital display and may be downloaded using comma-separated value (.CSV) format.
- 9.3. Over 1,000 events may be stored on the battery charger's removable memory SD card.

10. Hindle Health® System

- 10.1. The Hindle Health® System (HHS) provides a 2-stage self-diagnostic and system verification tool designed to assist the operator in verifying proper operation and settings of system parameters. This feature offers a systematic verification procedure to confirm the health of the battery charger. It queries the operator to verify all charger parameters and alarm settings. HHS steps the operator through an electronic functional check of all parameters including relay operations.
 - 10.1.1. HHS Status Lights: Front panel green and red status lights confirm whether battery charger is functioning properly or requires attention. (Patented)
 - 10.1.2. HHS Parameters Verification:
 - 10.1.2.1. LED Lamp Test
 - 10.1.2.2. Verify dc output using hand-held dc voltmeter
 - 10.1.2.3. Float voltage



- 10.1.2.4. Equalize voltage
 - 10.1.2.5. Equalize timer hours
 - 10.1.2.6. Auto equalize on/off
 - 10.1.2.7. Current limit
 - 10.1.2.8. High dc alarm
 - 10.1.2.9. High dc voltage level detect
 - 10.1.2.10. High dc voltage shutdown
 - 10.1.2.11. Low dc alarm
 - 10.1.2.12. End of discharge alarm
 - 10.1.2.13. Low dc voltage level detect
 - 10.1.2.14. Ripple alarm
 - 10.1.2.15. Ground alarm warning
 - 10.1.2.16. Ground alarm critical
- 10.1.3. The self-diagnostic system automatically monitors any battery charger malfunction or alarm condition.
- 10.1.4. Alarm Simulations.
- 10.1.4.1. High dc voltage alarm
 - 10.1.4.2. Low dc voltage alarm
 - 10.1.4.3. Negative (-) ground detect
 - 10.1.4.4. Positive (+) ground detect
- 10.1.5. HindleHealth+ (see Section 12.29)

11. Construction

- 11.1. I/O power terminals appropriately sized for field wiring.
 - 11.1.1. CU-AL compression box lugs (Style-5070 & Style-5030)
 - 11.1.2. Circuit Breaker compression lugs (Style-5054, Style-163 & Style-198)
- 11.2. Alarm function contacts use standardized solderless compression screw terminal blocks for #22-14 GA wire.
 - 11.2.1. Optional barrier type terminal blocks for connections using spade or ring type connectors, with wire sizes to #10 GA
- 11.3. Enclosure steel thicknesses as follows, by enclosure: (tba)
- 11.4. Enclosure finish: ANSI-61 gray, baked powder epoxy inside and out
- 11.5. Serviceability: The battery charger shall be serviceable by a technician using standard hand tools. No special tools are required for any routine installation, maintenance, or repair. All



service is made through front of unit, no rear access required. Any and all options (including but not limited to: filtering, alarm capabilities, battery eliminator, remote temperature compensation, forced load sharing, medium or high AIC circuit breakers, and/or fuses) can be added in the field by the technician without any special training, using standard hand tools.

12. Options

- 12.1. Multi-input tap ac input transformers.
- 12.2. Battery eliminator filter per IEEE 2405 / NEMA PE5. (See Section 13.2)
- 12.3. Special filtering to 30mV rms on 130Vdc systems, with a battery connected (measured at 130V battery terminals)
- 12.4. Form-C contacts are configurable in groups of six (6) for available alarms. Maximum of two (2) groups of six (6) available for Style-5054 enclosure. Maximum of four (4) groups of six (6) available for all other enclosures. Contact rating: 120Vac/Vdc @ 0.50A
- 12.5. AC Input Metering Module for Vac and Aac
- 12.6. Battery Current Charge / Discharge Meter (+/- Adc) & Battery Discharge Alarm
- 12.7. Communications (for SCADA applications):
 - 12.7.1. MODBUS/DNP3.0 communications for all HMI functions and alarms
 - 12.7.2. Ethernet Communications of all HMI functions and alarms
 - 12.7.3. Fiber Link
 - 12.7.4. IEC-61850 (separate accessory)
 - 12.7.5. Expandable ports for future communications protocols
- 12.8. Generic Binary Inputs
 - 12.8.1. Independent optical isolated inputs are available in groups of four
 - 12.8.2. Input can be user configured for 12, 24, 48, or 130Vdc thresholds
 - 12.8.3. Examples include, remote shutdown, electrolyte level, vent fan failure
- 12.9. Generic Analog Inputs
 - 12.9.1. 0-10Vdc inputs referenced to charger DC(-) are available in groups of four (4)
 - 12.9.2. Input can be scaled to report and alarm in primary values
 - 12.9.3. Examples include, ac voltage, ac current, and temperature transducer inputs
- 12.10. Forced Load Sharing: Two chargers (2) with the same dc ratings, connected to the same dc bus, will equally share the system load. The chargers negotiate the load via a serial communications board, using a cable connected between to the two (2) chargers.
- 12.11. Custom Rated AC & DC AIC Circuit Breakers. For additional details, see online document (<https://www.hindlepowerinc.com/media/4v2dcekw/JF5072-00.pdf>).



- 12.12. Auxiliary Alarm Contacts for AC Input Circuit Breaker
 - 12.12.1. Auxiliary Alarm Contacts for DC Output Circuit Breaker (standard)
- 12.13. Temperature Compensation (TempCo):
 - 12.13.1. external temperature probe, mounted on or near battery
 - 12.13.2. for Lead-Acid or Nickel-Cadmium battery chemistries (same probe)
 - 12.13.3. cables (to remote battery) available in 25, 50, 100, and 200 foot lengths
- 12.14. Battery temperature alarm (requires temperature compensation probe)
- 12.15. Remote Equalize (with the addition of an auxiliary I/O board)
- 12.16. Circuit breaker lockable, and lock-out features
- 12.17. Special Enclosure Features:
 - 12.17.1. NEMA Type-2 drip shield
 - 12.17.2. NEMA Type-4 cabinet (weather-proof)
- 12.18. Copper Ground Bus Bar w/CU-AL Compression Box Lug
- 12.19. ANSI/IEEE-472 AC Input Lightning Arrestor Protection
- 12.20. Barrier Type Alarm Terminal Blocks
- 12.21. Custom Paint (internal/external)
- 12.22. Custom Engraved Equipment Tag Plates
- 12.23. Thermostat-Controlled Space-Heaters
- 12.24. Fungus Proofing
- 12.25. Anti-Static Protection
- 12.26. Conformal Coating of Printed Circuit Boards
- 12.27. Customized (As-Built) Record Drawing Packages
- 12.28. Certified Test Data
- 12.29. HindleHealth+ (separate accessory)
 - 12.29.1. continuous open battery monitoring (for alarm)
 - 12.29.2. calculated battery Ah capacity remaining
 - 12.29.3. remote battery charge/discharge metering (+/-A_{dc})
 - 12.29.4. remote battery discharge alarm
 - 12.29.5. remote battery temperature dc voltage compensation (TempCo)



12.29.6. remote battery temp monitoring ($^{\circ}\text{C}$) & battery over-temp alarm

13. Filtering

13.1. Standard dc output filter, consistent with industry specifications IEEE 2405.2022 & NEMA PE5. Circuit consists of two (2) inductors and one (1) or more electrolytic capacitors, capable of limiting the output ripple with a battery connected. The dc output filter reduces output ripple voltage to less than:

13.1.1. 30mVrms (or less) on batteries through 48V

13.1.2. 100mVrms (or less) on 130V batteries

13.1.3. 200mVrms (or less) on 260V batteries

Ripple measurements made at the battery terminals.

13.2. Battery eliminator filter, consistent with industry specifications IEEE 2405.2022 & NEMA PE5. Circuit consists of two (2) inductors and two (2) stages of capacitor sets, capable of limiting the output ripple without (or with) a battery connected. The eliminator filter reduces output ripple voltage to less than:

13.2.1. 30mVrms (or less) on 24V and 48V systems without battery

13.2.2. 100mVrms (or less) on 130V systems without battery

13.2.3. 200mVrms (or less) on 260V systems without battery

Ripple measurements made at the charger dc output terminals.

13.3. Special filtering to 30mVrms on 130Vdc models (with battery connected), measured at 130V battery terminals.

13.4. As defined by NEMA PE5, a test battery must be fully charged and have an Ampere-hour capacity equal to four (4) times the rated output of the charger, where the Ah rating is at least four (4) times the charger dc output current rating.

14. Documentation

14.1. Manual(s) describing the installation, operation, and maintenance of the battery charger, including all accessories and options shall be included. The charger shall have provision for storing the manual(s) in a convenient permanent pocket attached directly to the chassis.

14.1.1. The charger's manual(s) shall be available on the manufacturer's public website, and be downloadable at no cost and without registration. This electronic copy shall have active hyperlinks to key additional descriptive details, and have a digital-accessible table of contents, as standard.

14.2. Standard drawings consisting of enclosure outlines, internal component layouts, electrical schematics, and connection diagrams are provided in the manual. Hyperlinks to freely downloadable versions of these documents also provided.



- 14.3. A customized parts data package report, including manufacturer's replacement part number and recommended spares, shall be included with the battery charger.
- 14.4. Production Test Data per IEEE 2405-2022 / NEMA PE 5 shall be included with the battery charger.
- 14.5. Optional customized as-built record drawings are available for user-defined battery charger requirements.
- 14.6. Optional customized approval drawings are available for user-defined battery charger requirements.



Job-Specific Details

Job Name _____

(Please refer to the specification for “Fill-In” details)

Feature	Spec Section	Detail	Specifier Fill-In Details
AC Input	3.1	Voltage	
		No. of Phases	
		Frequency	
DC Output	3.2	DC Voltage (nominal)	
		DC Current	
DC Output Filtering	13.0	per IEEE 2405 / NEMA PE5	
AC Circuit Breaker	7.0	AIC Rating	
DC Circuit Breaker	7.0	AIC Rating	
Standard Alarms (relays are programmable)	6.0	Number of Alarm Relays (six per Aux I/O Board)	
		Barrier Terms for Alarm Relays	
Desired Optional Alarms	6.0	see Section 12 for details	
Communications	6.4	Serial (DNP/MODBUS)	
		Ethernet (DNP/MODBUS)	
		Serial & Ethernet	
		IEC-61850 over Ethernet	
Enclosure	12.17	NEMA Type-1 (top vented)	
		NEMA Type-2 (drip shield)	
		NEMA Type-4 (cabinet)	
Protection	12.x	Copper Ground Bus	
		Lightning Protection IEEE-472	
		Fungus Protection	
		Static Proofing	
HindleHealth+	12.29	Continuous Battery Monitoring	
Additional Features	n/a		



ISO 9001:2015 Certified

HINDLEPOWER COMPANION PRODUCT
HindleHealth+



HindleHealth+

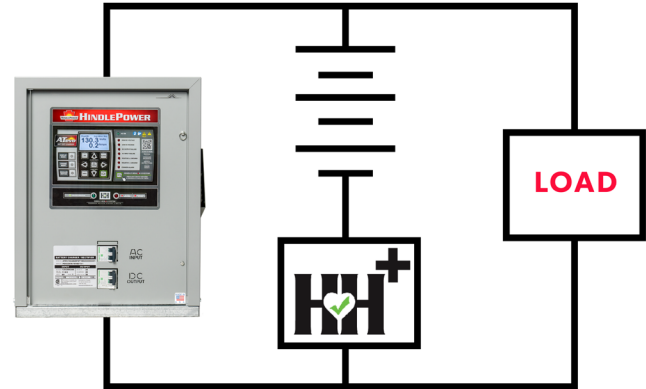
Exclusively available with ATevo



Reliably Provides:

- **Continuous Open Battery Monitoring**
- **Ah Capacity Remaining**
- **Battery Discharge Alarm**

HindlePower's pursuit of DC System Reliability has led to the development of the HindleHealth+. An electronically enhanced shunt, capable of continuously detecting open battery and calculating the anticipated Ampere hour remaining in your battery, offering the industry's highest level of resolution and accuracy.

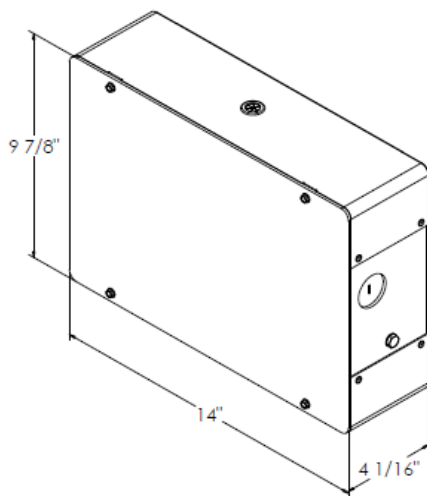


Battery Capacity
Initial capacity: 250.0 A/h
Remaining: 232.4 A/h
Percent remaining: 93%
Weeks commissioned: 62

(Sample Screen)

- **Utility compliance with NERC PRC-005 & TPL-001**
- **Useful with both Lead Acid and NiCad Batteries**
- **Clear protective shield for easy inspection of battery connections**
- **Easily mounts to battery rack or wall**
- **Temperature Compensation included**

SPECIFICATION



Ordering Information	
Part Number	EJ5178-00
Contact factory for ordering details	

BATTERY CURRENT

Shunt Rating (Continuous):	500A/50mV
Resolution:	
0-1Adc	0.1mA
> 1Adc, or (-) Adc	100mA
Accuracy:	
0-1Adc	+/- 1mA
> 1Adc, or (-) Adc	+/- 0.1% of FS

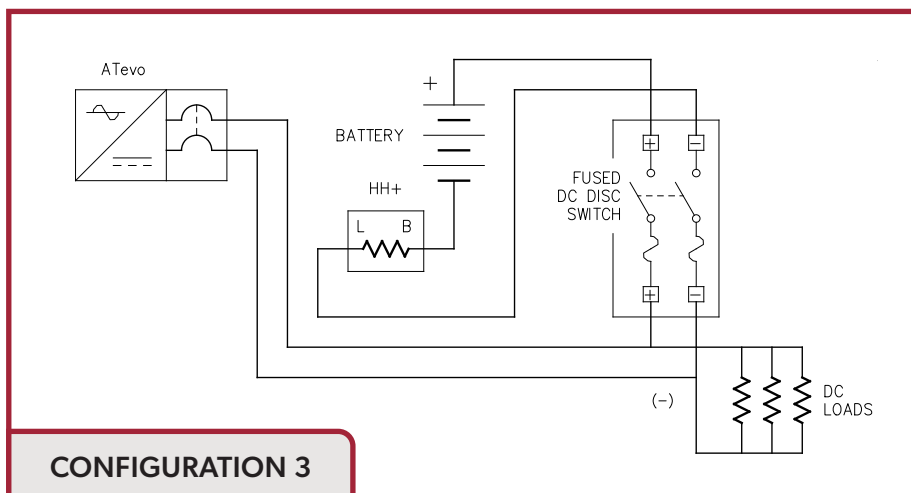
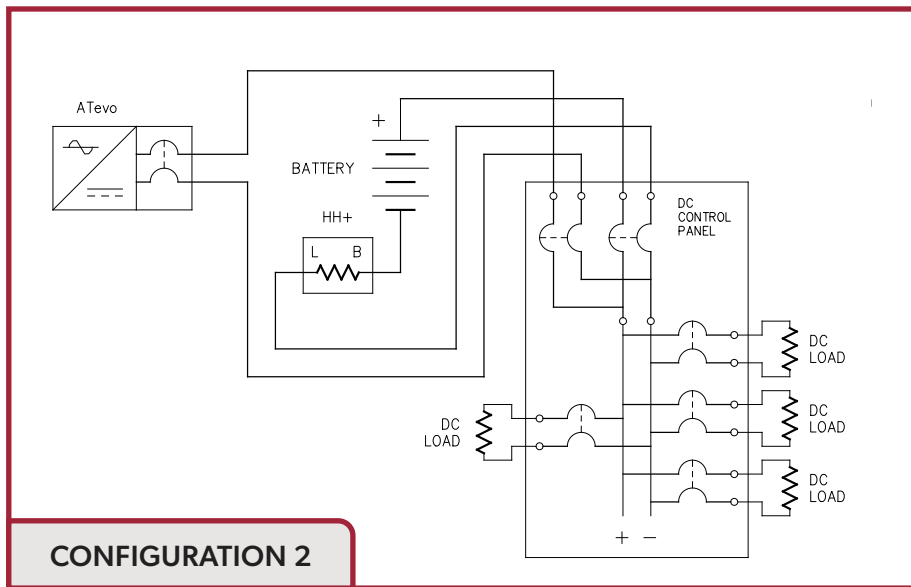
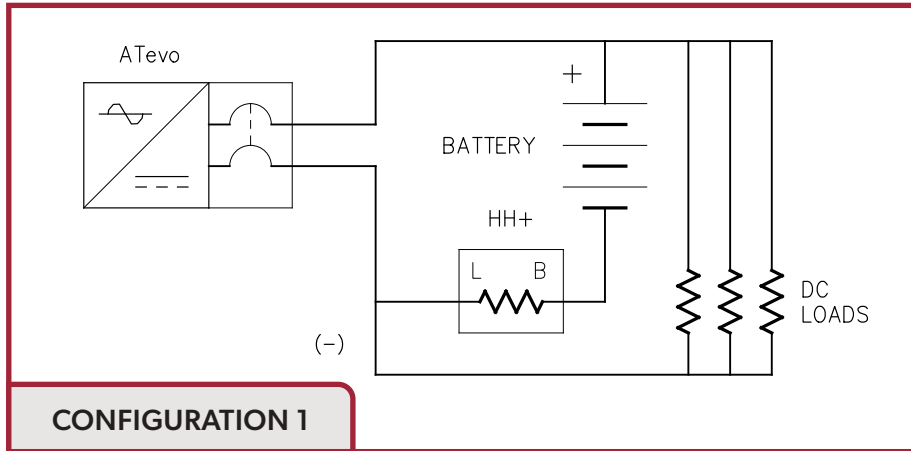
FLOAT CURRENT

Range:	0-1A
Resolution:	0.1mA
Accuracy:	+/- 1mA

BATTERY VOLTAGE

Input Resistance:	3.2MΩ
Range:	0-300V
Resolution:	100mV
Accuracy:	+/- 0.25% of FS

System Configuration Examples:





ISO 9001:2015 Certified

EPIC SERIES PRODUCT

Battery Cabinet



INTRODUCTION

EPIC SERIES

“A simple and flexible solution that safely houses your DC equipment...”

The EPIC Series Battery Cabinet creates an ideal environment to maximize battery life and save you time and money.

Built in the USA, this enclosure is a simple and flexible solution that safely houses your DC equipment including batteries, battery chargers and other ancillary equipment.

Available in either NEMA 1 or 3R, the EPIC Series Battery Cabinet is ideal for both indoor and outdoor applications.

We offer in-house engineering to provide a turnkey solution specific to your application needs.



TABLE OF CONTENTS

- 44 Introduction
- 46 Standard Features
- 48 Options & Accessories
- 49 Design Examples
- 50 System Integration
- 51 Specifications



Safely enclose batteries, chargers, distribution & ancillary equipment with a **modular design** that easily expands to accommodate any configuration.

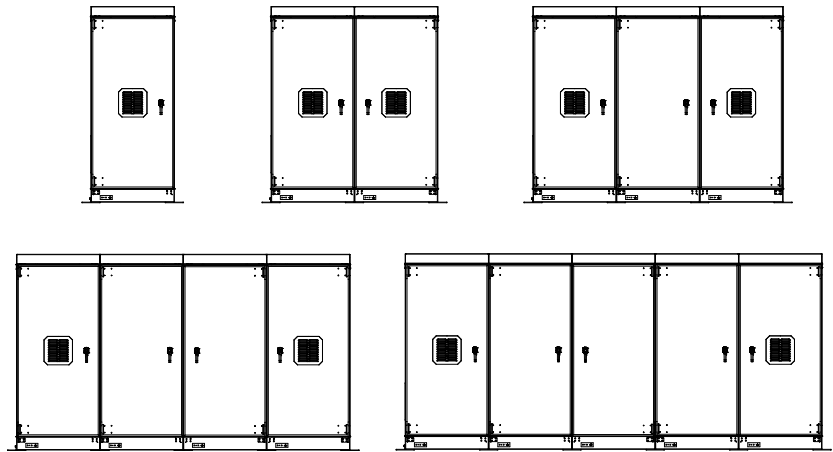


- ENVIRONMENTAL PROTECTION**
Keeps your dc equipment at the ideal temperature to extend performance and life.
- SEISMIC CERTIFIED**
Certified to IEEE 693 High and Moderate.
- CONSOLIDATE YOUR DC SYSTEM**
A great alternative for substations with limited interior space allowing for consolidation of your dc power system.
- SAFETY**
Safely enclose dc equipment to keep personnel away from exposed battery terminals. Equipped with hydrogen mitigation per IEEE 1635.

STANDARD FEATURES

MODULAR DESIGN

The construction of the console is comprised of modular 3ft. units. It is be configured based on your system requirements.



NEMA 1/ NEMA 3R

Available in either NEMA 1 or 3R. NEMA 1 provides general protection of the battery. NEMA 3R is constructed of extremely durable injected foam panels that achieve a level of thermal performance not previously seen in traditional battery cabinets.

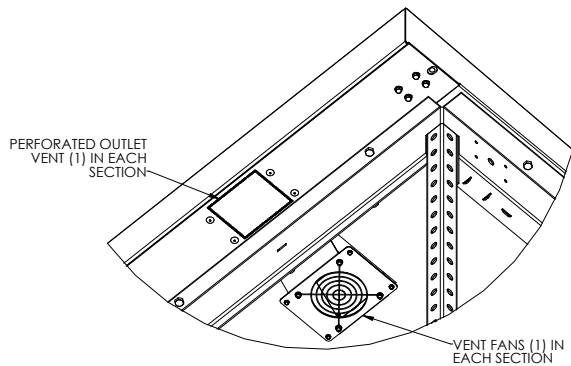


NEMA 3R Panel

SEISMIC CERTIFIED BATTERY RACK

Using a Unistrut design, the battery rack is sized to your exact battery model, allowing for a perfect fit. The rack is part of the main structure of the cabinet, creating a sturdier build and easy access for maintenance. Seismic bracing comes standard and is certified to IEEE 693 High and Moderate.





HYDROGEN MITIGATION

Equipped with a ventilation system that purges the air based on battery Ah capacity and technology set forth in IEEE 1635 guidelines.

HINDLE HEALTH STATUS LIGHTS

Exterior LED indicators that give quick and simple indication if an issue should arise. Green means good to go. Red means action is required.

PADLOCK HANDLES

All doors come standard with padlockable doors.

NEMA 2 GROUND PAD

A ground pad is provided on the base of each cabinet section.

WIRE LABELS

Internal wiring is labeled for easy identification.

WEATHER SEALED (NEMA 3R ONLY)

A recessed drip edge and inter-panel gasketing ensures protection from the elements.

OPTIONS & ACCESSORIES

HEATING AND AIR CONDITIONING

State-of-the-art temperature control system ensures your batteries and chargers operate within the optimal temperature range, regardless of external weather conditions.

Heating
EI5184-##

Air Conditioning
EI5185-##

SPILL CONTAINMENT

Available for both Lead and NiCad systems, spill trays and pillows offer protection from hazardous battery spills and leaks.

EI5186-##

SMOKE DETECTOR

Provides an alarm output in the event of smoke build-up.

EI5193-00

FIRE EXTINGUISHER

Easily accesible for use in the event of an emergency.

EI5193-10

HYDROGEN SENSOR

Provides 1% and 2% alarm outputs in the event of hydrogen build-up.

EI5192-00

DOOR OPTIONS

Rear door option that allows for easy access to both sides of the enclosure, and **bi-fold door** options that are ideal for confined spaces.

EI5179-##

LED LIGHTING

Internal 12Vdc lighting in all cabinet sections with a manual switch.

EI5190-##

ELECTRICAL OUTLET

120Vac, 15A duplex outlet for maintenance use.

EI5194-##

LIFTING STRAPS

An easy and safe strapping system to lift the cabinet via crane or forklift.

EI5196-##

DC TERMINAL BLOCK

Common point for the user to tie into the dc bus.

EJ5097-##

PORTABLE EYE WASH

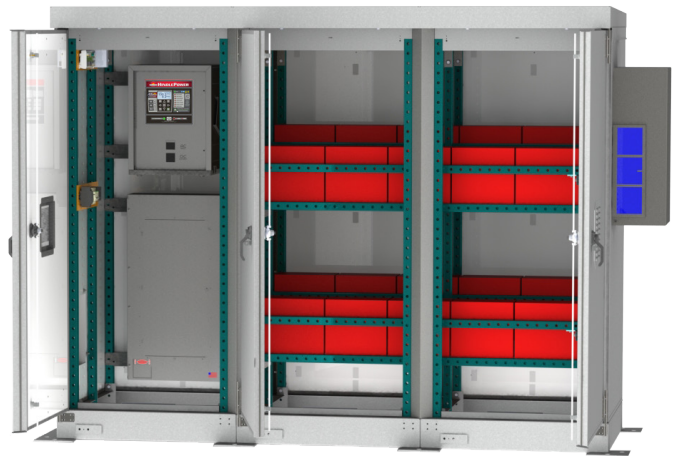
Two bottle portable eye wash station, mounted on the interior of the battery bay door for easy access.

PL0068-50

DESIGN EXAMPLES



NEMA 1: This style battery cabinet is ideal for indoor applications not requiring temperature control. This example is a two door cabinet equipped with standard seismic rated battery rack.



NEMA 3R: This battery and electric cabinet is a three door design, equipped with standard seismic rated battery rack, user selected ATevo Battery Charger and DC Control Panel, and an optional air conditioner for temperature control.



NEMA 3R: This battery and electric cabinet is a three door unit equipped with front and rear door access. It also includes the standard seismic rated battery rack, two user selected ATevo Battery Chargers, an optional 19 inch full relay rack and air conditioner for temperature control.



NEMA 3R: This one door combined battery and electric cabinet is ideal for applications with limited space. It is equipped with standard seismic rated battery rack, user selected ATevo Battery Charger, and an optional air conditioner for temperature control.

SYSTEM INTEGRATION

The EPIC Series Battery Cabinet is an enclosure you can truly make your own.

We recognize every site and every project comes with its own unique requirements. Our team can integrate a variety of equipment needed for your specific application.

- *Alarming Capabilities*
- *Monitoring Equipment*
- *Safety Equipment*
- *Communication*
- *Power Distribution & Control*
- *And More...*



Call HindlePower at **610-330-9000** to speak with our professional and knowledgeable team.

Our staff is available Monday-Friday from 8:00am-5:00 pm ET

SPECIFICATIONS



Nominal Dimensions:

Height- 86in
Depth- 43in
Length- 36in
(scalable in 36in increments)

Performance:

NEMA 1, IP 10
NEMA 3R, IP 14
IEEE 1635 Ventilation and Thermal
Management of Batteries
Snow load up to 40 psf
Wind load up to 151 mph

Certifications:

IEEE 693 'High'
(up to 1000lbs per section)

Insulation:

Walls- R12 (NEMA 3R only)
Floor- R12 (NEMA 3R only)
Ceiling- R6 (NEMA 3R only)

Thermal Performance:

65 deg F internal at -40 deg F exterior
ambient
77 deg F internal at 122 deg F exterior
ambient

Finish:

ANSI 61 gray polyester, powder coat

Input Voltage:

120/240 Vac split phase

Alarming:

Standard summary alarm contact

Warranty:

5 year on cabinet structure



**Standard Drawings
& Documentation**



STANDARD SPECIFICATION

EPIC Series Battery Cabinet



JF5063-00

Standard Specification **EPIC Series Battery Cabinet**

A battery cabinet shall be furnished in accordance with the following specification.

TABLE OF CONTENTS

<u>Section</u>	<u>Description</u>	<u>Page</u>	<u>Section</u>	<u>Description</u>	<u>Page</u>
1	General	54	7	Electrical Design	57
2	Applicable Codes	54	8	Standard Features	58
3	Performance Conditions	55	9	Optional Features	58
4	Mechanical & Base Cabinet Design	55	10	Advanced Capabilities	59
5	Battery Racking System	57	11	Drawings & Instruction Manual	60
6	Electrical Bay & Equipment	57	12	Nameplate information	60
			n/a	Job-Specific Worksheet	61

1. General

- 1.1. This specification applies to the construction, materials, and performance of the EPIC Series Battery Cabinet. The cabinet provides a means for batteries and electrical equipment to be stored in an enclosure with the option for environmental controls and allowing operator(s) to monitor the system remotely.

2. Applicable Codes

The cabinet shall meet requirements of latest versions of the following industry and agency standards:

- 2.1. NEMA Type 1, IP 10
- 2.2. NEMA Type 3R, IP14
- 2.3. ASCE 7-10 (2010): Minimum Design Loads for Buildings and Other Structures, as applicable for wind and snow loading
- 2.4. IEEE 693 (2018): IEEE Recommended Practice for Seismic Design of Substations; High, Seismic certified, essential equipment (up to 1000lbs/door or width of section)
- 2.5. IEEE693 (2018): IEEE Recommended Practice for Seismic Design of Substations; Moderate, Seismic certified, essential equipment (up to 2000lbs/door or width of section)
- 2.6. IEEE 1635 (2018): Guide for the Ventilation and Thermal Management of Batteries for Stationary Applications
- 2.7. CSA C22.2 No. 286-17 (2017), Industrial Control panels (Special Request)
- 2.8. UL 508A (2018), Standard for Safety Control Equipment (Special Request)



3. Performance Conditions

- 3.1. The EPIC Battery Cabinet will be an indoor or outdoor enclosure meeting either NEMA 1 or NEMA Type 3R rating requirements.
- 3.2. For NEMA 3R, and when environmental options are provided, the battery cabinet will maintain a steady internal temperature of 68° F to 75° F (+/- 3°) through an external ambient temperature of -30° to 120°F.
- 3.3. For NEMA 3R, battery cabinet will safely mitigate hydrogen to a level of 2% per IEEE 1635 (2018).
 - 3.3.1. Each battery section will include exhaust fans in the eave of each roof section.
 - 3.3.2. A make up air vent will be on far left front door of the battery section.
 - 3.3.3. Each electrical section will include exhaust fans in the eave of each roof section.
 - 3.3.4. A make up air vent will be on the far right front door of the electrical section.
- 3.4. The battery cabinet roof will withstand loads from falling snow up to 40 psf.
- 3.5. The battery cabinet will withstand loads from wind up to 151 mph.

4. Mechanical & Base Cabinet Design

- 4.1. General Cabinet Structure
 - 4.1.1. The battery cabinet will be scalable, allowing the addition of sections for greater length.
 - 4.1.2. All exterior battery cabinet hardware will be 18-8 stainless steel or better.
- 4.2. Base Design
 - 4.2.1. The battery cabinet base frame will be not less than 12-gauge.
 - 4.2.2. The battery cabinet base frame will be coated, before final powder coating, with a cationic epoxy primer.
 - 4.2.2.1. Tested per ASTM B117 for salt spray resistance at 500 hours and 1000 hours.
 - 4.2.2.2. Tested per GMW14872 for cyclic corrosion at 28 cycles.
 - 4.2.2.3. Tested per ASTM D1735 for humidity resistance at 500 hours, 5B rating.
 - 4.2.2.4. Tested per ASTM D870 for water resistance at 500 hours, 5B rating
- 4.3. Frame Design
 - 4.3.1. The battery cabinet interior frame will be constructed from painted 1-5/8" P1000H3 Unistrut® or equivalent.
- 4.4. Door/Panel Design
 - 4.4.1. NEMA 1, the battery cabinet wall and door panels will consist of steel skins.



- 4.4.2. For NEMA 3R, the battery cabinet wall and door panels will consist of injected foam insulated panels.
 - 4.4.2.1. Panels will incorporate skins fabricated from 20-gauge powder-coated aluminum sheet.
 - 4.4.2.2. Panels will incorporate a 2-inch core of injected polyurethane foam utilizing HFO 1233zd(E) and water blowing agent, designed for commercial and industrial insulation applications meeting the requirements of UL94HF-1.
 - 4.4.2.3. Panels will incorporate a perimeter of polymeric material with a UV inhibitor package and include an integrated provision for gasketing material.
 - 4.4.2.4. Panel gasketing will be EPDM rubber foam or equivalent for sealing to the console frame.
- 4.4.3. The battery wall and door panels provide a heat resistance capacity of not less than R-12.
- 4.4.4. The battery cabinet's external hinges, hinge pins, and hinge brackets will be 316 stainless steel or better.
- 4.4.5. The battery cabinet doors will have a pad-lockable, three-point latching system.
- 4.4.6. Doors will incorporate handles made from polyamide thermoplastic.
- 4.5. Roof/Ceiling Design
 - 4.5.1. For NEMA 1, the battery cabinet roof will incorporate a perforated steel sheet.
 - 4.5.2. For NEMA 3R, the battery cabinet roof will have a pitch of 1.7 degrees.
 - 4.5.3. For NEMA 3R, the ceiling will provide a heat resistance capacity of not less than R-6.
- 4.6. Cable Entry
 - 4.6.1. The battery cabinet will allow for conduit entry by the following means:
 - 4.6.1.1. Stub-ups through the floor
 - 4.6.1.2. Gland plate on cabinet side.
- 4.7. Finish
 - 4.7.1. The console exterior finish will be ANSI 61 gray epoxy coat per HindlePower standard CB5046-00 or equivalent when carbon steel is selected for:
 - 4.7.1.1. Exterior wall and door panel skins.
 - 4.7.1.2. Exterior base and upper frame assemblies.
 - 4.7.1.3. Roof assembly
 - 4.7.2. For NEMA 3R, the cabinet interior wall and door skins will be smooth matte white per RAL 9010 per HindlePower standard CB5046-01 49/10103 or equivalent.
 - 4.7.3. The cabinet exterior door/wall panel skins, base and upper frame assemblies will be unfinished when optional 316 stainless steel is selected.



- 4.7.4. The cabinet wall and door panel perimeter extrusions will be color-coordinated to ANSI 61 gray.
- 4.7.5. The cabinet will accommodate custom colors per customer specification (at increased cost and lead-time) for:
 - 4.7.5.1. Exterior wall and door panel skins.
 - 4.7.5.2. Exterior base and upper frame assemblies.
 - 4.7.5.3. Roof assembly

5. Battery Racking System

- 5.1. The console will incorporate a battery racking system comprising a standard P1000H3 Unistrut® (or equivalent) system to accommodate a variety of battery sizes and arrangements per application requirements.
- 5.2. The battery racking system has seismic certifications per applicable standards and capacities included in section 2.
- 5.3. Battery supports will be rated to handle the battery weight per standards included in Section 2.
- 5.4. Battery rack rails will incorporate an electrolyte-resistant nonconductive rail cover.
- 5.5. Battery rack rails will be supported by re-positionable brackets bolted into Unistrut® to allow for field modification if required.

6. Electrical Bay and Equipment

- 6.1. The cabinet can accommodate the following factory-installed electrical equipment in the electrical section:
 - 6.1.1. ATevo, AT10, and AT30 battery charger(s).
 - 6.1.2. Optional DC distribution panel.
 - 6.1.3. Optional DC disconnect.
 - 6.1.4. Optional AC distribution panel.
 - 6.1.5. Optional AC disconnect.
 - 6.1.6. Optional AC main breaker.
 - 6.1.7. Optional best battery selector.
 - 6.1.8. Optional equipment racking per EIA 19in or 23in standards. Rack to be removable for equipment installation and wiring.
 - 6.1.9. Customer specified equipment.

7. Electrical Design

- 7.1. The cabinet will accept 120/240 Vac split phase as its standard input.



- 7.1.1. Standard terminal block for customer input terminals
- 7.1.2. Cabinet operation will be powered from 120 Vac (line, neutral)
- 7.1.3. Battery chargers will operate from 240 Vac (line, line)
- 7.1.4. Nonstandard inputs are available via isolation transformer.
- 7.2. The cabinet internal power and control wiring will utilize XLPE wire per HindlePower standard CB0002-00.
 - 7.2.1. The cabinet internal wiring will include wire identification labels.
 - 7.2.2. The cabinet internal wiring will be in accordance with standards listed in section 2.

8. Standard Features

- 8.1. Integrated two-hole NEMA ground pads for each section.
- 8.2. For NEMA 3R, dc ventilation fans in each section.
- 8.3. Wire labels.
- 8.4. Seismic rated pad mounting clips.
- 8.5. Padlockable handles on each door.
- 8.6. HindleHealth status lights.
 - 8.6.1. Under the following conditions, the system will indicate steady green:
 - 8.6.1.1. Normal operation (no faults or alarms within the system or subsystem)
 - 8.6.2. Under the following conditions, the system will indicate steady red:
 - 8.6.2.1. Cabinet alarms
 - 8.6.2.1.1. Fan failure
 - 8.6.2.1.2. Battery bay over-temperature (if equipped)
 - 8.6.2.1.3. Battery bay low temperature (if equipped)
 - 8.6.2.1.4. Electronic bay over-temperature (if equipped)
 - 8.6.2.1.5. Electronic bay low temperature (if equipped)
 - 8.6.2.1.6. Smoke alarm (if equipped)
 - 8.6.2.1.7. Hydrogen 2% (if equipped)
 - 8.6.2.1.8. Hydrogen 1% (if equipped)
- 8.7. Common alarm relay, 1 form-C contact.
- 8.8. Fan failure alarm relay, 1form-C contact.

9. Optional Features

- 9.1. Battery section forced air heating (for NEMA 3R).



- 9.2. Battery section air conditioning (for NEMA 3R).
- 9.3. Battery spill containment (lead acid or NiCd).
 - 9.3.1. Stainless steel spill trays under each battery bay.
 - 9.3.2. Spill absorbant pillows.
- 9.4. Smoke detector
- 9.5. Fire extinguisher
- 9.6. Hydrogen detector
- 9.7. Portable two bottle eyewash, door mounted in battery bay.
- 9.8. Interior LED lighting with manual switch
- 9.9. Interior electrical outlet
- 9.10. Crane lifting straps
- 9.11. Elevated base kit
- 9.12. Individual alarm relays
 - 9.12.1. Battery bay high temperature
 - 9.12.2. Battery bay low temperature
 - 9.12.3. Electronic bay high temperature
 - 9.12.4. Electronic bay low temperature.
- 9.13. 3rd party equipment alarm integration.
- 9.14. Rear doors.
- 9.15. Custom colors.
- 9.16. Stainless steel.
- 9.17. Custom nameplate data (markings, model number, etc.)
- 9.18. Customized parts data package
 - 9.18.1. Manufacturer's replacement part number.
 - 9.18.2. Recommended spares.

10. Advanced Capability with ATevo Battery Charger

- 10.1. The EPIC Series Battery Cabinet can have certain advanced capabilities when equipped with an ATevo battery charger.



- 10.1.1. Binary inputs for customer-supplied equipment alarms. (Requires optional auxiliary alarm relay board)
- 10.1.2. Modbus over Ethernet I/O. (Requires optional communication board)
- 10.2. Each input acknowledged by the ATevo auxiliary relay board will have remote monitoring capabilities.
 - 10.2.1. Charger alarms.
 - 10.2.2. Any third-party device that can communicate a digital or analog signal for alarm or value will be integrated into the alarm schedule, event log, and able to illuminate the green or red LED.

11. Drawing and Instruction Manuals

- 11.1. Each EPIC Battery Cabinet will be furnished with the following standard documentation:
 - 11.1.1. Drawing list.
 - 11.1.2. Outline drawing.
 - 11.1.3. Internal component layout.
 - 11.1.4. Foundation drawing.
 - 11.1.5. Lifting diagram.
 - 11.1.6. Cabinet electrical schematic.
 - 11.1.7. Connection diagram.
 - 11.1.8. Circuit breaker coordination study.
 - 11.1.9. Hydrogen mitigation calculations.

12. Nameplate Information

- 12.1. Each nameplate will include:
 - 12.1.1. Model number.
 - 12.1.2. Serial number.
 - 12.1.3. AC input voltage and configuration.
 - 12.1.4. AC input frequency.
 - 12.1.5. Maximum AC input amperes.
 - 12.1.6. Cooling capacity BTU/h (if installed).
 - 12.1.7. Heating capacity BTU/h (if installed).
 - 12.1.8. Interrupting capacity.
 - 12.1.9. Short circuit rating.



Job-Specific Details

Job Name _____

(Please refer to the specification for “Fill-In” details)

Feature	Spec Section	Detail	Specifier Fill-In Details
Application	3.1	Indoor or Outdoor	
		Nema 1 or NEMA 3R	
DC System Voltage		DC System Voltage	
Battery Information	5.1	Battery Model	
		Number of Cells	
		Number of Jars	
		Jar Dimensions	
Battery Charger Detail		Battery Charger Model	
		Battery Charger Dims	
DC Distribution Panel		DC Panel Model	
		Main breaker amp rating	
		# of branch breakers	
		Branch breaker amp rating	
DC Disconnect		Disconnect Model	
		Disconnect Rating	
		Fused or Unfused	
Optional Features	9	Heater System	
		Air Conditioner	
		Spill Containment	
		Interior LED Lighting	
		Interior Electrical Outlet	
		Portable Eyewash	
		Hydrogen Detector	
		Fire Extinguisher	
		Smoke Detector	
		Rear Doors	
		DC Terminal Block	
		Lifting Straps	
Additional Comments			

BATTERY HOUSE



Custom Engineered



Fully Integrated & Tested



Modular & Scalable Design



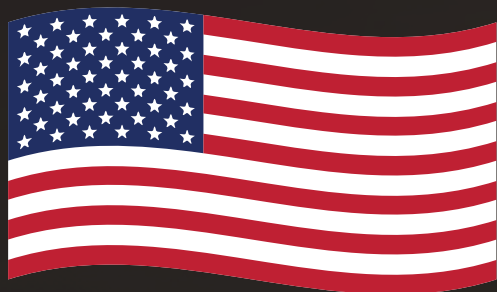
NEMA 3R Enclosure



Climate Controlled

The EPIC Series Battery House is a complete dc system... all in one house. These custom walk-in style enclosures are uniquely designed for applications requiring larger batteries, chargers, and additional ancillary equipment.

The Battery House is a climate controlled structure that provides additional space to support expanding dc system demand. It also offers a fully integrated and lower cost alternative to traditional control buildings.



**EPIC
SERIES**





PENNSYLVANIA
SUPR • HRO
www.PA.com

TRAILER GROUP




MOBILE DC POWER SYSTEM

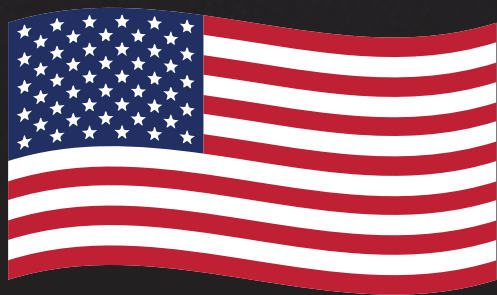
The EPIC Series Mobile DC Power System is a utility grade trailer that is custom designed to meet your substation maintenance and emergency power applications.

Integrated, tested, and ready to use, these systems are fully equipped with batteries, battery chargers and all associated power equipment.

Flexibility in design and versatility of use make our Mobile DC Power System a powerful tool for maintenance and system reliability.

Primary Applications Include:

-  **Routine power station system maintenance**
-  **Power redundancy for critical loads**
-  **Disaster recovery and emergency black start**



EPIC SERIES



ISO 9001:2015 Certified

HINDLEPOWER COMPANION PRODUCT DC Control Panel



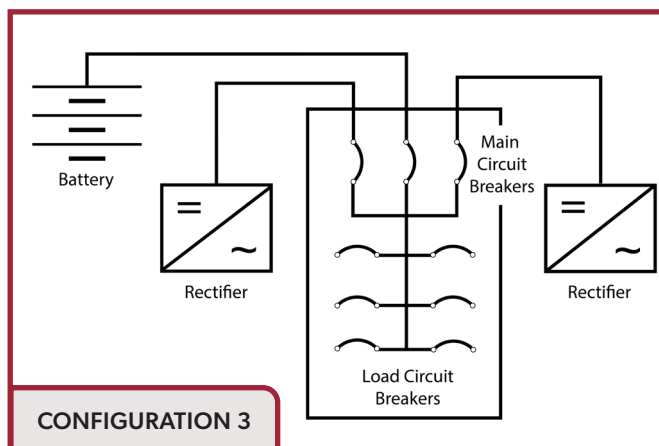
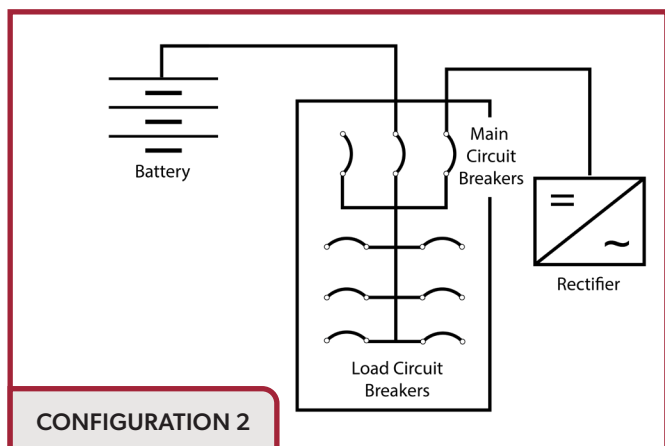
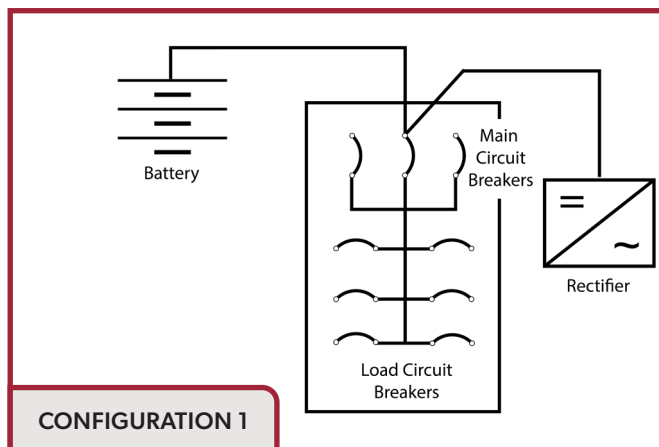
DC Control Panel

A smart way to coordinate DC loads with DC sources

The DC Control Panel provides up to three main circuit breakers, useful for connecting multiple dc sources, such as chargers and batteries.

Assembly is NRTL designed, manufactured, tested, and labeled via SICP to standards CSA C22.2 No. 286-17 & UL 508A.

Utilizes UL 489 listed Square-D molded case circuit breakers for branch protection.



Features and Configurations

Main Circuit Breakers

Supports up to three (3) main breakers rated at 250Vdc:

- “Hx” frame: 50, 75, 100, 125, and 150A_{dc}
- “Jx” frame: 150, 175, 200, 225 and 250A_{dc}

The sum of the dc sources not to exceed 400A_{dc}

Main breaker(s) interrupting rating is 20 kAIC standard

Optional auxilliary switches available

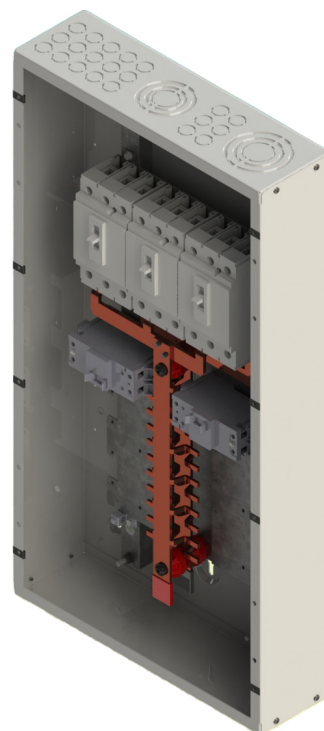
Branch Circuit Breakers

Distribution section supports multiple Square-D Power-Pact “Bx” type circuit breakers:

- 15, 20, 25, 30, 35, 40, 50, 60, 70, 80, 90, 100, 110, and 125A_{dc} trip ratings available

Branch breaker(s) interrupting rating is 10 kAIC standard with optional 20 kAIC available

Optional single pole circuit breakers and auxilliary switches available



Enclosure Features

Standard enclosure is designed to meet NEMA Type-1 specs. It can also be supplied with an optional enclosure to meet NEMA Type-3R specs.

Designed for standard rear surface wall mounting. Optional bracket accessory for EIA rack mounting is available.

Pre-punched conduit knockouts, on top side as standard:

- (1) 1.25in / 32mm through 3.50in / 89mm knockout
- (1) 0.75in / 19mm through 3.00in / 76mm knockout
- (24) 0.5in / 13mm through 0.75in / 19mm knockouts

Enclosure can be arranged with optional bottom conduit knockouts, if requested.

SPECIFICATION

Main Bus

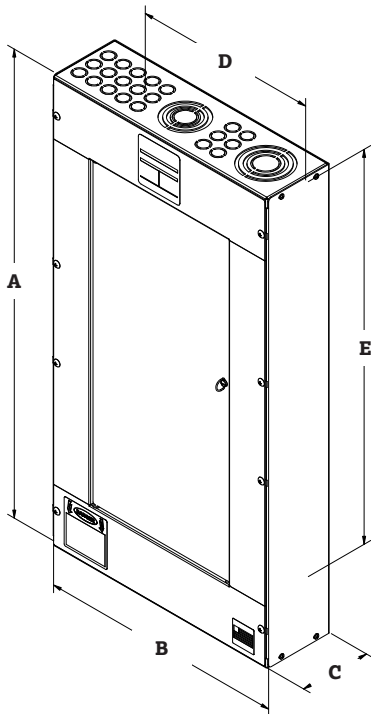
Material: ETP 110 copper
 Bus bar Rating: 250Vdc / 400A

Branch Bus

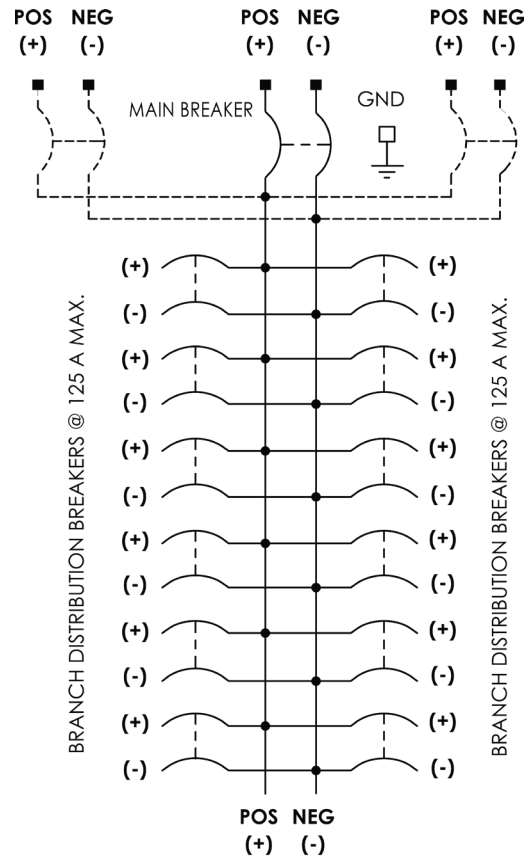
Material: ETP 110 copper
 Bus bar Rating: 250Vdc / 125A

ENVIRONMENTAL

Operating Temperature: 0-40 °C



DC Control Panel Schematic



Enclosure Dimensions

Enclosure	DCP38	DCP56
A	38.00in	56.00in
B	20.12in	20.12in
C	5.82in	5.82in
D	15.00in	15.00in
E	32.00in	50.00in

Operating Instructions



Standard Drawings





STANDARD SPECIFICATION
DC Control Panel



JF5033-20

Standard Specification DC Control Panel

A dc control panel shall be furnished in accordance with the following specification.

TABLE OF CONTENTS

<u>Section</u>	<u>Description</u>	<u>Page</u>	<u>Section</u>	<u>Description</u>	<u>Page</u>
1	General	72	4	Electrical (System)	73
2	Applicable Codes	72	5	Circuit Breakers	74
3	Construction	72	6	Documentation & Labeling	75

1. General

- 1.1. The DC Control Panel (DCP) is a HindlePower product design, useful for coordinating dc loads with dc sources. It has the unique ability to provide up to three (3) main circuit breakers, which can be useful in connecting multiple dc sources, such as chargers and batteries, or systems using Best Battery Selectors.
- 1.2. Site Installation Configurations:
 - 1.2.1. The main circuit breaker(s) can serve as a disconnect for all branched dc loads.
 - 1.2.2. The main circuit breaker can be used as disconnect for any primary dc source(s).
 - 1.2.3. The DCP can be supplied *without* a main breaker, replaced with direct feed CU-AL compression lugs. In this configuration, one (1) branch breaker can be utilized as a battery charger input.

2. Applicable Codes

- 2.1. The DCP assembly is listed to Canadian Standards Association (CSA), via CSA Group Special Industrial Control Panel (SICP) Shop Program, and labeled as such.
- 2.2. The DCP assembly is NRTL designed, manufactured, tested, and labeled, via SICP to standards:
 - 2.2.1. CSA C22.2 No. 286-17
 - 2.2.2. UL 508A
- 2.3. All molded case circuit breakers (main feeder & distribution) supplied with the DCP are listed to standard UL 489 for branch protection.

3. Construction

- 3.1. The standard DCP assembly enclosure is designed for indoor use, to meet National Electrical Manufacturers Association (NEMA) Type-1.
 - 3.1.1. The DCP can be supplied with an optional enclosure to meet NEMA Type-3R specs.



- 3.2. The DCP is temperature rated to operate between 0-40 °C.
- 3.3. The DCP is designed for standard rear surface (wall) mounting.
 - 3.3.1. A bracket accessory is available for optional 23in / 594mm EIA rack mounting
 - accessory can be factory-installed as ordered, or supplied as a field kit
 - rack-mounting accessory incompatible with optional NEMA Type-3R enclosure
- 3.4. The DCP Style-5013 (Square-D type MH38 / MH56) enclosure dimensions are:
 - 3.4.1. width: 20.00in / 508mm
 - 3.4.2. depth: 6.00in / 152mm
 - 3.4.3. height: 38.00in / 965mm (type MH38 for: 1-12 2-pole branch breakers)
or
 - 3.4.4. height: 56.00in / 1422mm (type MH56 for: 13-24 2-pole branch breakers)
 - 3.4.5. The standard DCP NEMA-1 enclosure is constructed using 16 GA sheet steel.
- 3.5. The DCP enclosure external front finish is ANSI 61 gray epoxy powder coat paint.
 - 3.5.1. Rear shroud finish is galvanized steel.
- 3.6. The DCP NEMA-1 enclosure features pre-punched knockouts, on *one* side (top as standard).
 - 3.6.1. one (1) 1.25in / 32mm through 3.50in / 89mm knockout
 - 3.6.2. one (1) 0.75in / 19mm through 3.00in / 76mm knockout
 - 3.6.3. (24) 0.5in / 13mm through 0.75in / 19mm knockouts
 - 3.6.4. Enclosure can be arranged with *optional* bottom conduit knockouts, if requested.
- 3.7. Branch breakers are mounted for ease of replacement, and/or future expansion.
 - 3.7.1. Two-pole branch breakers are bolt-on mounted to back panel.
 - 3.7.2. Single-pole branch breakers are DIN-rail mounted.
 - 3.7.3. Future branch breaker expansion utilizes break-away tabs on dead front panel.

4. Electrical (system)

- 4.1. The DCP main (feeder) supports up to three (3) individual dc sources.
 - 4.1.1. Maximum load on feeder (or sum of dc sources) not to *exceed* 400A.
 - takes into account 25% de-rating for inductive loads
- 4.2. Copper (CU) only conductors may be used in the DCP.
- 4.3. The DCP main bus (system)
 - 4.3.1. main bus material: ETP 110 copper



- 4.3.2. main bus bar rating: 250 Vdc / 400A
- 4.4. The DCP branch bus bars
 - 4.4.1. branch bus bar material: ETP 110 copper
 - 4.4.2. branch bus bar rating: 250 Vdc / 125A
 - 4.4.3. Maximum current for a motor load on any single branch circuit is 100A (on 125A bkr).
- 4.5. One (1) copper-aluminum (CU-AL) compression box lug is be supplied for user grounding.
 - 4.5.1. ground lug properly labeled per IEC 60417 No. 5019
 - 4.5.2. optional ground bus bar also available
- 4.6. If no main circuit breaker is supplied, direct feed connections to main bus are supplied per 1.2.3.
 - 4.6.1. two (2) removable CU-AL compression type box lugs
 - 4.6.2. will accept #6 AWG - 350MCM wire (per pos[+] or neg[-] pole)
- 4.7. If single-pole branch breakers are used, a common return bus bar is provided.
 - 4.7.1. common return bus bar rating: 250 Vdc / 400A

5. Circuit Breakers

- 5.1. The DCP utilizes Square-D “Standard” molded case circuit breakers (main & branch).
- 5.2. The DCP top section supports up to three (3) feeder circuit breakers of user-specified ratings.
 - 5.2.1. One (1) main feeder will be *center*-mounted as standard.
 - second (optional) feeder breaker will be mounted to *left*
 - third (optional) feeder breaker will be mounted to *right*
 - 5.2.2. Main feeder circuit breaker(s) are Square-D *PowerPact* type:
 - “Hx” frame: 50A, 75A, 100A, 125A & 150A trip ratings available
 - “Jx” frame: 150A, 175A, 200A, 225A, and 250A trip ratings available
 - 5.2.3. Main breaker(s) interrupting rating is 20 kAIC
 - 5.2.4. Main breaker(s) feature top-loaded compression lugs, accepting:
 - “Hx” frame: #12 - #2/0 AWG
 - “Jx” frame: #4 AWG - 350 MCM
- 5.3. The DCP distribution section supports multiple branch circuit breakers, of user-specified ratings.



- 5.3.1. Branch breakers installed in distribution section from top-to-bottom, and left-to-right.
 - 1-12 branch breakers: MH38 type enclosure (38.00in H)
 - 13-24 branch breakers: MH56 type enclosure (56.00in H)
- 5.3.2. Branch circuit breaker(s) are Square-D *PowerPact* “Bx” type:
 - 15, 20, 25, 30, 35, 40, 50, 60, 70, 80, 90, 100, 110, and 125 Adc trip ratings available
 - Maximum current for an inductive load on any branch circuit is 100A.
- 5.3.3. Branch breakers interrupting rating:
 - “BD” series: 10 kAIC
 - “BG” series: 20 kAIC
- 5.3.4. Branch breaker(s) feature side-loaded compression lugs, accepting:
 - #6-2/0 fine-stranded copper wire
 - #14-3/0 rigid or stranded copper wire
- 5.3.5. Optional single-pole branch breakers can be supplied (in lieu of std. 2-pole) as requested:
 - 1-24 single-pole branch breakers: type MH38
 - 25-48 single-pole branch breakers: type MH56
- 5.3.6. Electrical auxiliary switches can be added to both main and branch circuit breakers.
 - Square-D auxiliary switches are listed to UL 489 & CSA C22.2 No. 5
 - auxiliary switches have a current rating of 0.3A
 - auxiliary switches are supplied in a bagged kit

6. Documentation & Labeling

- 6.1. Each DCP will ship with the following industry-standard labeling:
 - 6.1.1. **!DANGER!** safety label on outside of enclosure
 - 6.1.2. silver data nameplate decal with unit ratings (thermal transfer printed)
 - 6.1.3. circuit breaker schedule mounted to inside surface of front panel door
- 6.2. Each DCP will ship with the following user documentation:
 - 6.2.1. operating instructions (p/n JA5117-01)
 - 6.2.2. outline / internal layout drawing (p/n JE5368-00)
 - 6.2.3. parts data package report (bill of spare / replacement parts)



ISO 9001:2015 Certified

HINDLEPOWER COMPANION PRODUCT

Best Battery Selector

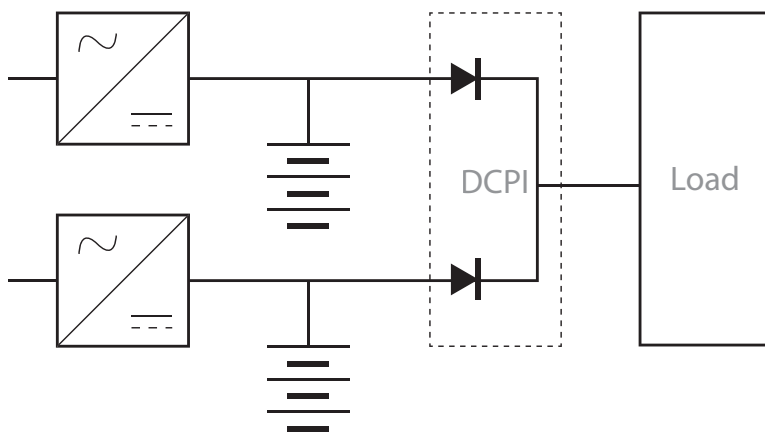


Best Battery Selector

True dc system protection and redundancy

Using a Best Battery Selector (BBS) is an effective and low cost method of providing true battery system protection and redundancy. When two or more batteries are paralleled, electrical isolation is required so that system redundancy is not compromised.

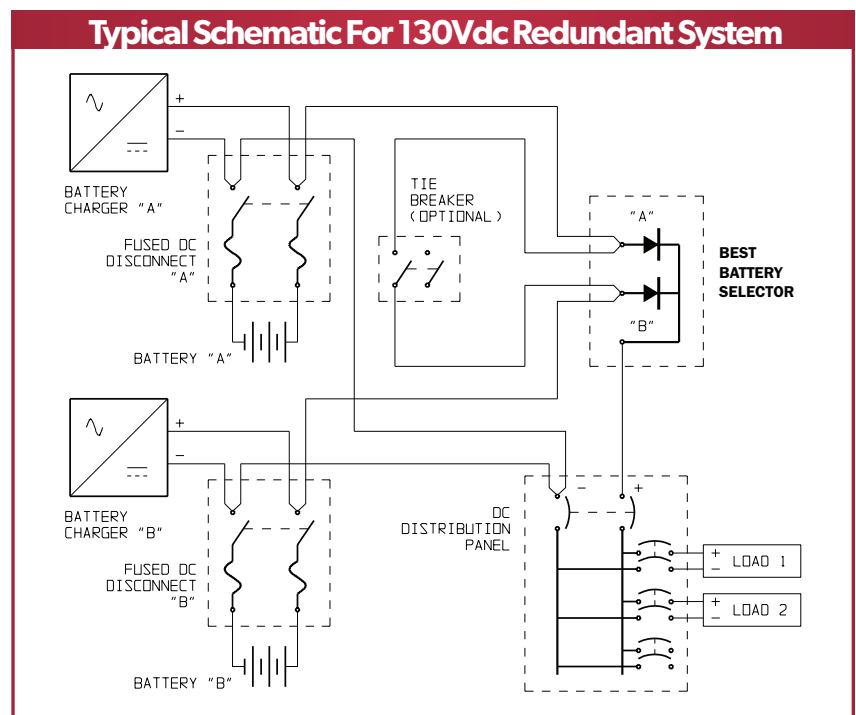
The BBS is a power diode arrangement that uses multiple parallel battery circuits while ensuring that no single battery will ever be a burden on the system.



- **Solid State Design**
- **Automatic Operation**
- **No Maintenance Required**
- **NEMA Type 1 Enclosure**
- **Convection Cooled**

The BBS is a passive device that requires no user intervention and helps to ensure battery viability regardless of any battery's health. It does not rely on mechanical or operator intervention.

- **Uniform shared discharge of both battery banks.**
- **Seamless transfer of supply from either bus.**
- **Isolation ensures system integrity in the event of failure on either bus.**

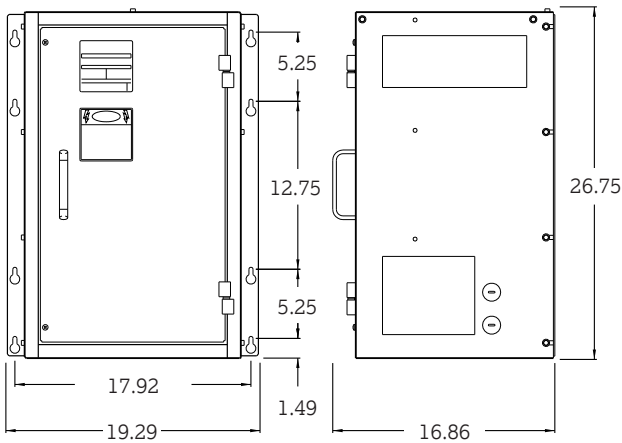


Specification Chart

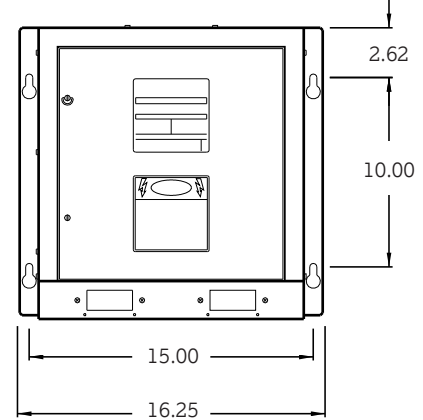
Standard Best Battery Selector Models

HindlePower p/n	Voltage (max)	Current (continuous @ 50°C)	Current (1 sec)	Current (30sec 50°C)	Battery / Charger Quantity	Enclosure Style	CU-AL Lug Connector
EJ5144-20	250	50	1000	450	2	586	#14- 1/0 AWG
EJ5144-01	250	100	1000	450	2	5017	#6 AWG- 350 MCM
EJ5144-02	250	200	1000	450	2	5017	#6 AWG- 350 MCM
EJ5144-03	250	500	3500	2000	2	5017	#2 AWG- 600 MCM
EJ5144-24	600	50	1000	450	2	586	#14- 1/0 AWG
EJ5144-05	600	100	1000	450	2	5017	#6 AWG- 350 MCM
EJ5144-06	600	200	1000	450	2	5017	#6 AWG- 350 MCM
EJ5144-07	600	500	3500	2000	2	5017	#2 AWG- 600 MCM
EJ5144-12	600	750	8700	6800	2	5018	(2) 300- 800 MCM
EJ5144-09	250	100	1000	450	3	5017	#6 AWG- 350 MCM
EJ5144-10	250	200	1000	450	3	5017	#6 AWG- 350 MCM
EJ5144-11	250	500	3500	2000	3	5018	#2 AWG- 600 MCM

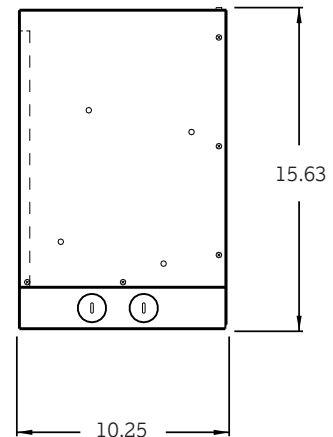
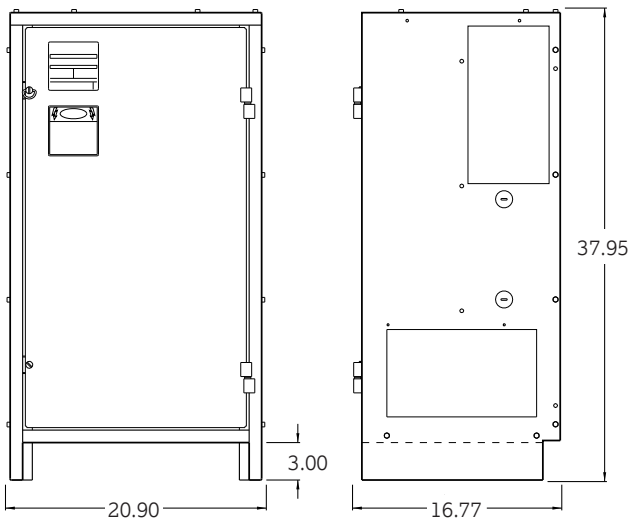
NEMA 1 enclosure - STYLE 5017



NEMA 1 enclosure - STYLE 586



NEMA 1 enclosure - STYLE 5018



Operating Manual

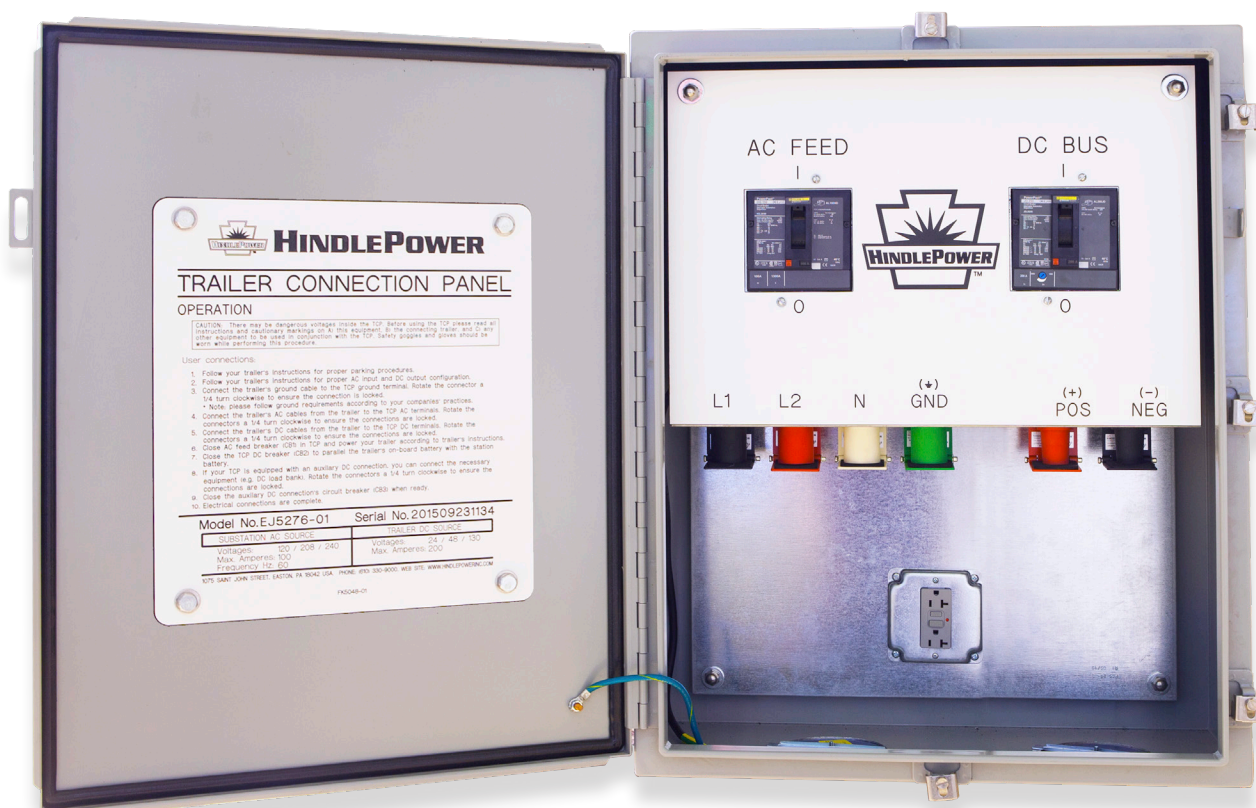


Standard Drawings



ISO 9001:2015 Certified

HINDLEPOWER COMPANION PRODUCT TRAILER CONNECTION PANEL



HINDLEPOWER

TRAILER CONNECTION PANEL

OPERATION

CAUTION: There may be dangerous voltages inside the TCP. Before using the TCP please read all instructions and cautions markings on all the equipment. Do the covering clean about any other equipment to be used in conjunction with the TCP safety goggles and gloves should be worn while performing this procedure.

User connections:

1. Follow your trailer's instructions for proper parking procedure.
2. Follow your trailer's instructions for proper AC input and DC output configuration.
3. Connect the trailer's ground cable to the TCP ground terminal. Rotate the connector a 1/4 turn clockwise to ensure the connection is locked.
4. Connect the trailer's AC cables from the trailer to the TCP AC terminals. Rotate the connectors a 1/4 turn clockwise to ensure the connections are locked.
5. Connect the trailer's DC cables from the trailer to the TCP DC terminals. Rotate the connectors a 1/4 turn clockwise to ensure the connections are locked.
6. Close AC feed breaker (CB) on TCP and power your trailer according to trailer's instructions.
7. Close the TCP DC breaker (CB) to parallel the trailer's on-board battery with the motor battery.
8. If your TCP is equipped with an auxiliary DC connection, you can connect the necessary equipment to a DC load bank. Rotate the connectors a 1/4 turn clockwise to ensure the connections are locked.
9. Close the auxiliary DC connections circuit breaker (CB) when ready.
10. Electrical connections are complete.

Model No. EJ5276-01	Serial No. 201509231134
<small>AC SOURCE</small>	
<small>Substation</small>	<small>Phase</small>
<small>Voltage</small>	<small>Voltage</small>
<small>Max. Amperes</small>	<small>Max. Amperes</small>
<small>Frequency</small>	

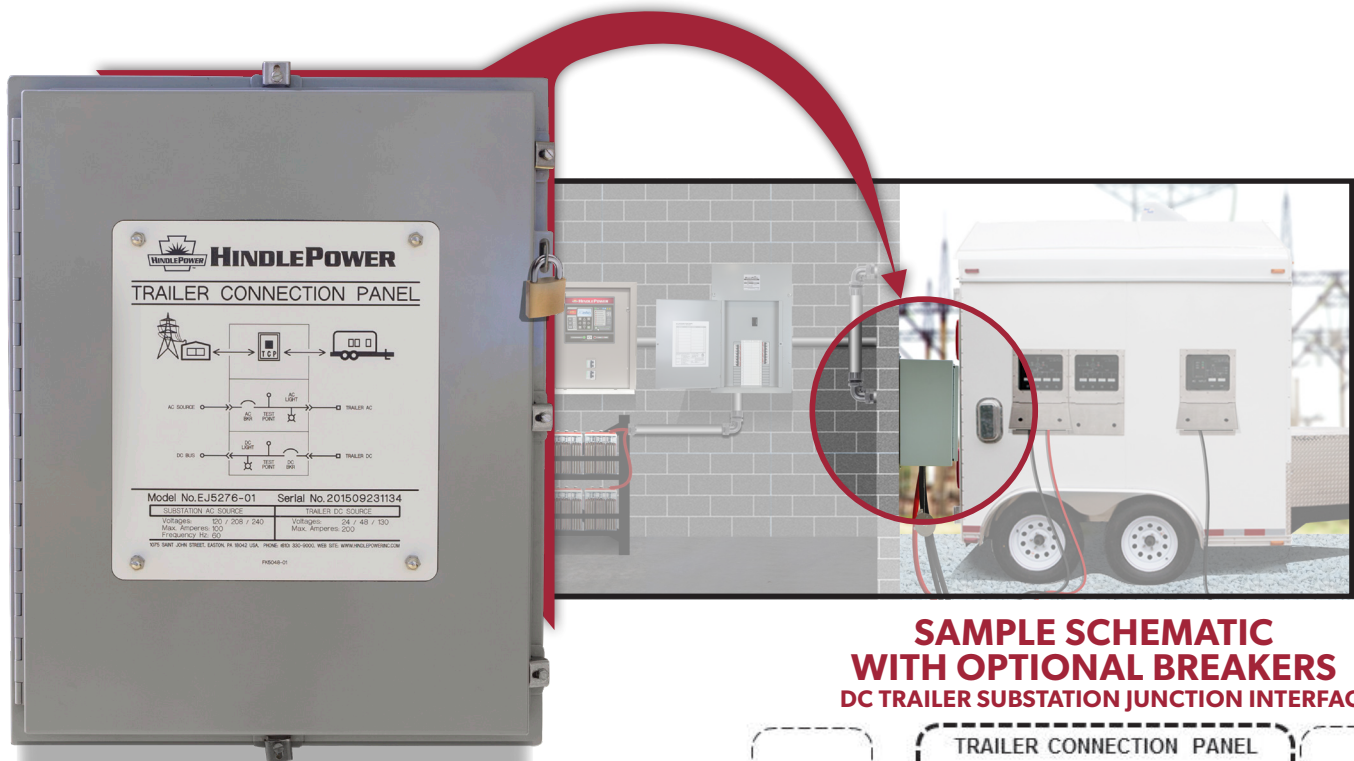
1075 SAINT JOHN STREET, EASTON, TN 37521 USA. PHONE: 423-531-9000. WEB SITE: WWW.HINDLEPOWER.COM

PN2048-01

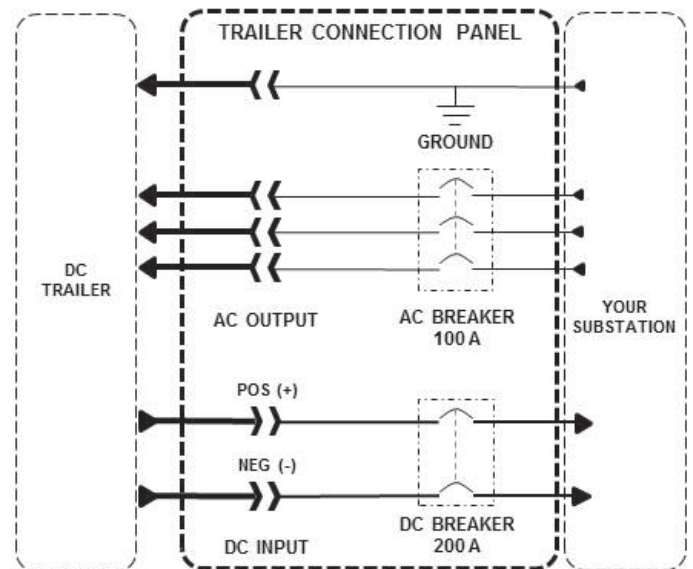


Trailer Connection Panel

The quick and easy way to connect to your dc battery trailer



SAMPLE SCHEMATIC WITH OPTIONAL BREAKERS
DC TRAILER SUBSTATION JUNCTION INTERFACE



The Trailer Connection Panel offers a quick, safe & secure connection between your dc trailer and your substation. This standard design creates uniformity throughout your grid.

Standard Features

- **Indoor / Outdoor Installation**
- **NEMA 3R Enclosure**
- **NEMA 3R, 4X & 12K rated connectors**
- **Can be secured with a padlock**

Optional Features

- **Circuit breaker protection**
- **Dual dc connections**
- **Manually-operated molded case switches**

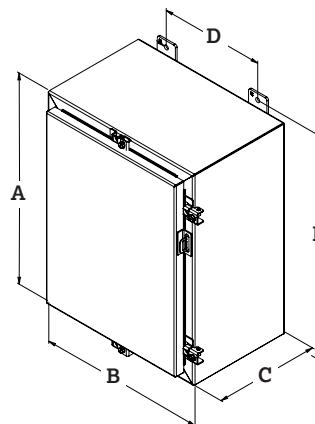


Operating Instructions

Ordering Information & Dimensions

Part Number	Single DC Connection	Dual DC Connection
EJ5276	-00 -10*	-01 -11*
A	30in	36in
B	24in	30in
C	10in	10in
D	18in	24in
E	31.25in	37.25in

**Includes circuit breaker protection*





STANDARD SPECIFICATION
Trailer Connection Panel



JF5060-00

Standard Specification Trailer Connection Panel (TCP)

The Trailer Connection Panel shall be furnished in accordance with the following specification.

1. General

- 1.1. The Trailer Connection Panel is an assembly designed to connect the HindlePower Mobile DC Power System to the user's substation dc bus for battery maintenance or emergency use. The connection panel shall provide terminations for the trailer's ac feed and dc output. Manual switches (or circuit breakers) may be provided for ac and dc connections if required.
- 1.2. Site Installation Configurations:
 - 1.2.1. The base unit will include ac and dc connections with test points, indicators for energized terminals, and a 120Vac GFI outlet.
 - 1.2.2. The panel can be supplied with a second set of dc connection terminals for connecting ancillary user equipment (e.g. dc load bank).
 - 1.2.3. The panel can be supplied with ac and/or dc manual switches for isolating user connections.
 - 1.2.4. The panel can be supplied with ac and/or dc circuit breakers for input/output protection, as well as a means of isolating panel connections.

2. Electrical

- 2.1. The connection panel shall be equipped with:
 - three (3) single phase ac connection terminals (line 1, line 2, and neutral)
 - one (1) ground connection terminal
 - two (2) dc connection terminals (positive and negative)
 - if ordered, (2) additional dc connection terminals (positive and negative)
- 2.2. All terminals rated for 400A
- 2.3. The connection panel shall be equipped with test points for measuring voltage, and indicators that allow the user to determine if the connections are energized.
- 2.4. The connection panel shall be equipped with a standard 120Vac / 20A GFI outlet that allows the user to power ancillary equipment.
- 2.5. If supplied, the ac breaker shall be rated for 100A, and the dc breaker rated for 200A.



2.6. User connection wire ranges:

100A ac breaker	#14 - #3/0 AWG
200A dc breaker	#3/0 AWG - 350 MCM
20Aac GFI outlet	#12 AWG

3. Enclosure Construction

- 3.1. The connection panel enclosure shall be NEMA Type-4 assembly, designed for outdoor use.
- 3.2. The connection panel enclosure shall be designed for wall mounting. Enclosure dimensions shall be as follows:

single dc connection	30in (762mm) H x 24.0in (609mm) W x 10in (254mm) D
dual dc connection	36in (914mm) H x 30.0in (762mm) W x 10in (254mm) D

- 3.3. The connection panel enclosure shall be constructed of 14 GA steel. External finish shall be ANSI-61 gray epoxy powder coat paint.
- 3.4. The connection panel enclosure shall feature pre-punched 4in (102mm) cable entry holes, with water-tight, clamping, hole-covers secured to the enclosure with lanyards.
- 3.5. The enclosure door is to have an engraved data nameplate permanently mounted to the outside, and an engraved one-line diagram with user instructions permanently mounted on the inside.
- 3.6. The connection panel enclosure shall have provisions for pad locking.
- 3.7. The connection panel shall feature a bonding stud on the door, and a grounding stud in the enclosure.
- 3.8. The connection panel enclosure shall have collar studs provided for mounting the inner panel.

4. Inner Panel Construction

- 4.1. The inner panel enclosure shall be constructed of 16 GA galvanized steel.
- 4.2. The inner panel shall feature mounting holes for all possible configurations, allowing for field upgrade.
- 4.3. The inner panel shall feature an engraved diagram that provides identification of all installed components.
- 4.4. The inner panel engraved diagram shall cover any unused component mounting holes.



hindlepowerinc.com

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Please note that emails received after 4pm ET may not be responded to the same business day

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