

LITHIONICS BATTERY®

LITHIUM-ION IRON PHOSPHATE BATTERY SYSTEMS



PART NUMBER:
51-155 – Round SoC Display

EXTERNAL
ACCESSORIES

The Advanced Series BMS supports an optional SoC (state-of-charge) gauge, designed to display battery capacity as well as other valuable parameters. Battery state-of-charge is calculated by a coulomb counter based on an internal, high sensitivity hall-effect sensor in the Advanced Series BMS. SoC data can be observed on the LCD display which can show 2 data fields independently. Pressing the left button scrolls through the available data fields on the upper line, while pressing the right button scrolls through the available data points on the lower line.

The SoC gauge data will only be correct if the configuration parameters are set correctly which are pre-set initially by Lithionics Battery® but are user adjustable with supporting hardware. The meter will be most accurate if the battery is fully charged on a regular (weekly) basis. Partial charging and/or cycling may cause the SoC meter reading to drift over time and become less accurate.

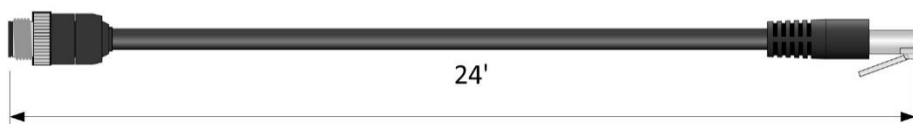
The SoC display is not waterproof and is designed to be installed in an area that does not receive direct sunlight, moisture, or debris.



FEATURE HIGHLIGHTS

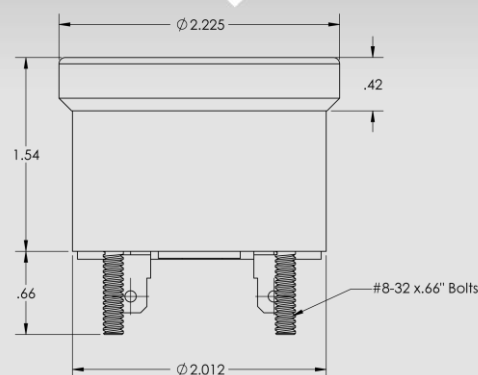
Feature	Display	Description
Graphical Fuel Gauge	E ■■■■■ F	Digital Empty-to-Full Representation of Battery State-of-Charge
State-of-Charge Percentage	95% BAT	Percentage Available Until Reserve Cutoff is Reached
Amperage	117.4A	Net Current Draw in Amps. + Sign Indicates Charging Current
Wattage	1550W	Net Current Draw in Watts. + Sign Indicates Charging Current
Voltage	13.2V	Battery Voltage Reading
Temperature	82F t1	Temperature Data from Battery Module Sensors
Amp Hour Capacity	342Ah	Remaining Amp Hour Capacity
Watt Hour Capacity	4514Wh	Remaining Watt Hour Capacity
Remaining Time	D 2.9h	Remaining Time at Current Load Until Battery is Depleted (D) or Charged (C) in Days (d) or Hours (h)
Status Code (State-of-Health)	R000000	Current System Status or Fault Code
Amp Hour Meter (State-of-Health)	T0001234	Total Number of Amp Hours Used from Battery since Manufactured (used to assist in tracking remaining battery life.)

Includes 24' M12 A-Code 8-pin Male to RJ45 Cable to BMS



DIMENSIONS

2.25 X 2.25 X 2.20
Measured in inches



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PART NUMBER:
51-160 – Ion Gage

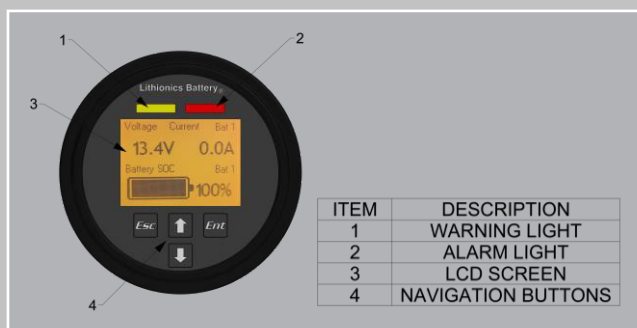
EXTERNAL
ACCESSORIES



The Advanced and Compact 200 Series BMS supports an optional SoC (state-of-charge) gauge, designed to display battery capacity as well as other valuable parameters. Battery state-of-charge is calculated by an internal, high sensitivity hall-effect sensor. SoC data can be observed on the LCD display which can show 2 data fields independently.

The meter will be most accurate if the battery is fully charged on a regular (weekly) basis. Partial charging and/or cycling may cause the SoC meter reading to drift over time and become less accurate.

The SoC display is not waterproof and is designed to be installed in an area that does not receive direct sunlight, moisture, or debris.

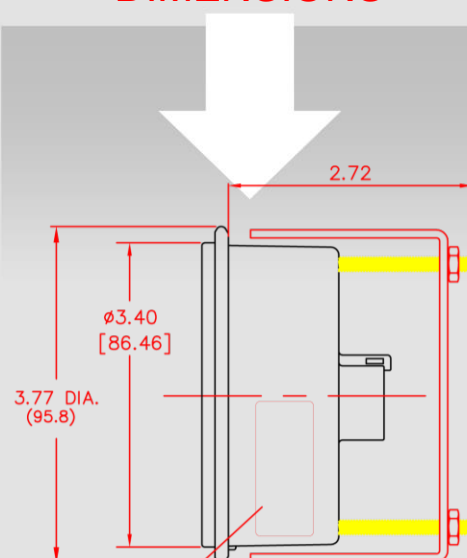


FEATURE HIGHLIGHTS

Feature	Display	Description
Graphical Fuel Gauge	E ■■■■■ F	Digital Empty-to-Full Representation of Battery State-of-Charge
State-of-Charge Percentage	95% BAT	Percentage Available Until Reserve Cutoff is Reached
Amperage	117.4A	Net Current Draw in Amps. + Sign Indicates Charging Current
Wattage	1550W	Net Current Draw in Watts. + Sign Indicates Charging Current
Voltage	13.2V	Battery Voltage Reading
Temperature	82F t1	Temperature Data from Battery Module Sensors
Amp Hour Capacity	342Ah	Remaining Amp Hour Capacity
Watt Hour Capacity	4514Wh	Remaining Watt Hour Capacity
Remaining Time	D 2.9h	Remaining Time at Current Load Until Battery is Depleted (D) or Charged (C) in Days (d) or Hours (h)
Status Code (State-of-Health)	R000000	Current System Status or Fault Code
Amp Hour Meter (State-of-Health)	T0001234	Total Number of Amp Hours Used from Battery since Manufactured (used to assist in tracking remaining battery life.)

Part Number	Description
75-521-288	Universal Harness, 24ft Length, For External BMS Version 8 or Legacy GTX12V315A-E2107-CS200 Models
75-523-288	Dual M12 Harness, 24ft Length, For GTX GTX12V320A-E2107-CS200-UL or GTX12V315A-E2107-CS200 (M12) Models

DIMENSIONS



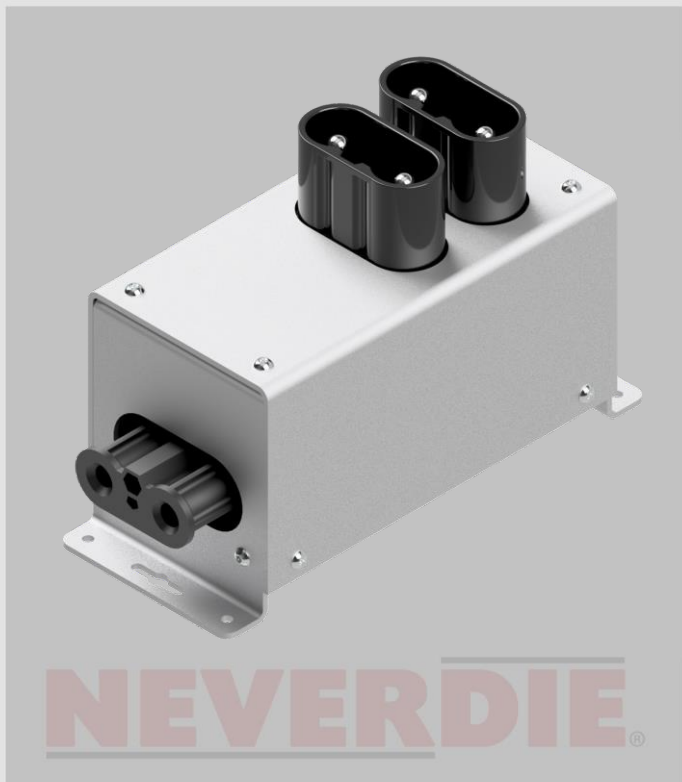
LITHIONICS BATTERY®

LITHIUM ION IRON PHOSPHATE BATTERY SYSTEMS



PART NUMBER:
76-DIN2P-02 – 2 Port Combiner Box

EXTERNAL
ACCESSORIES

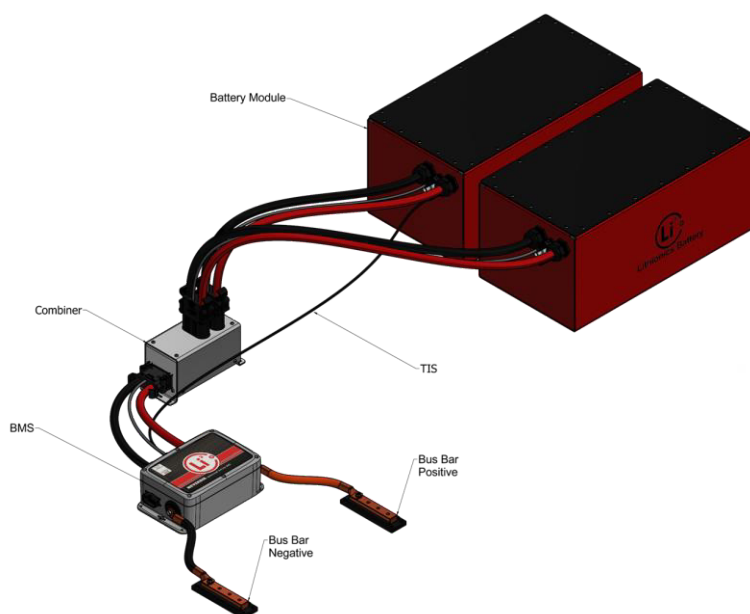


SPECIFICATIONS

The combiner box current rating is 400 amps continuous. However, the maximum current rating may be limited by the battery modules used and/or the Battery Management System rating. Please confirm the system-level maximum charge and discharge current capabilities with Lithionics Battery®.

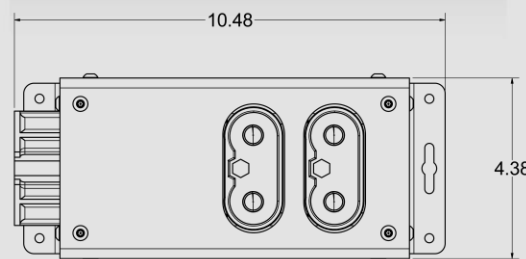
Lithionics Battery® recommends securing the battery connectors in place to the combiner box with cable ties after installation to prevent connectors from backing out.

Note: Jumper DIN connector required for unused ports.



DIMENSIONS

10.48 X 4.38 X 4.92
Measured in inches



2-Port Combiner Box: 8lbs

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LITHIUM ION IRON PHOSPHATE BATTERY SYSTEMS



PART NUMBER:
76-DIN4P-02 – 4 Port Combiner Box

EXTERNAL
ACCESSORIES

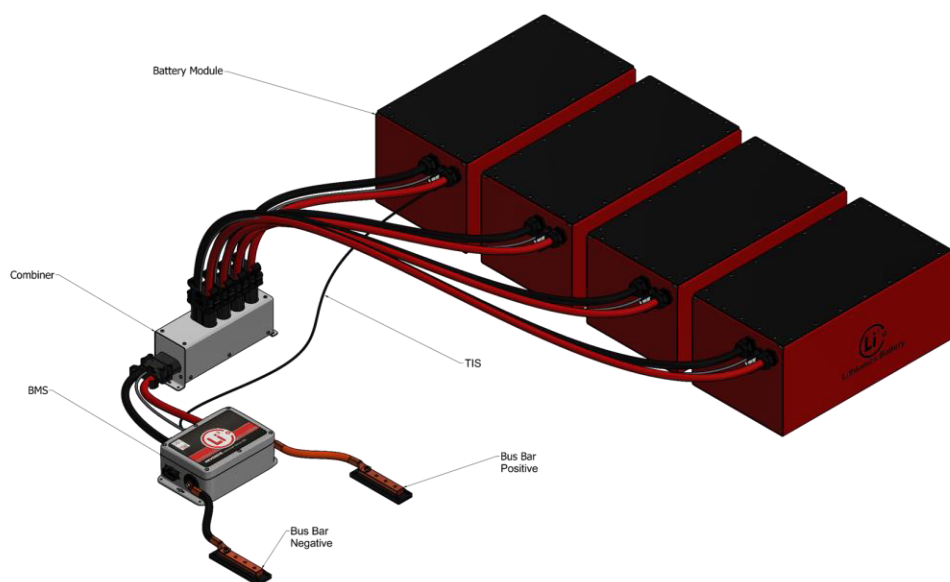


SPECIFICATIONS

The combiner box current rating is 400 amps continuous. However, the maximum current rating may be limited by the battery modules used and/or the Battery Management System rating. Please confirm the system-level maximum charge and discharge current capabilities with Lithionics Battery®.

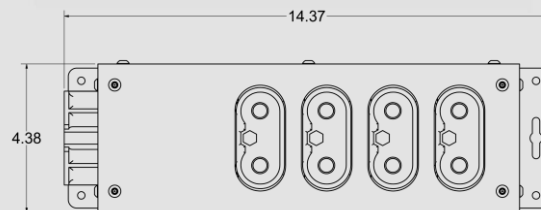
Lithionics Battery® recommends securing the battery connectors in place to the combiner box with cable ties after installation to prevent connectors from backing out.

Note: Jumper DIN connector required for unused ports.



DIMENSIONS

14.37 X 4.38 X 4.92
Measured in inches



4-Port Combiner Box: 13lbs

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LITHIUM ION IRON PHOSPHATE BATTERY SYSTEMS



PART NUMBER:
76-DIN6P-02 – 6 Port Combiner Box

EXTERNAL
ACCESSORIES



SPECIFICATIONS

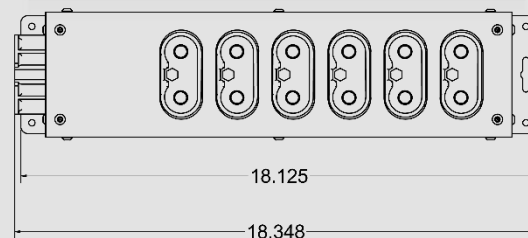
The combiner box current rating is 400 amps continuous. However, the maximum current rating may be limited by the battery modules used and/or the Battery Management System rating. Please confirm the system-level maximum charge and discharge current capabilities with Lithionics Battery®.

Lithionics Battery® recommends securing the battery connectors in place to the combiner box with cable ties after installation to prevent connectors from backing out.

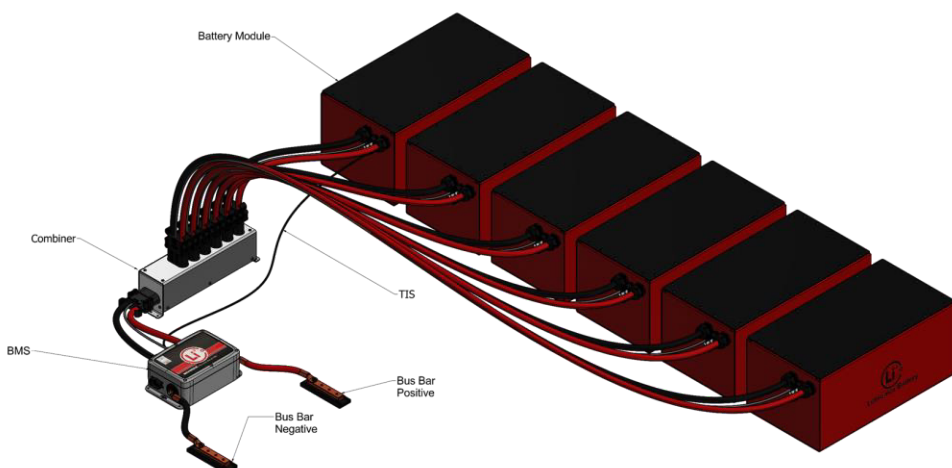
Note: Jumper DIN connector required for unused ports.

DIMENSIONS

18.35 X 4.38 X 4.92
Measured in inches



6-Port Combiner Box: 17lbs



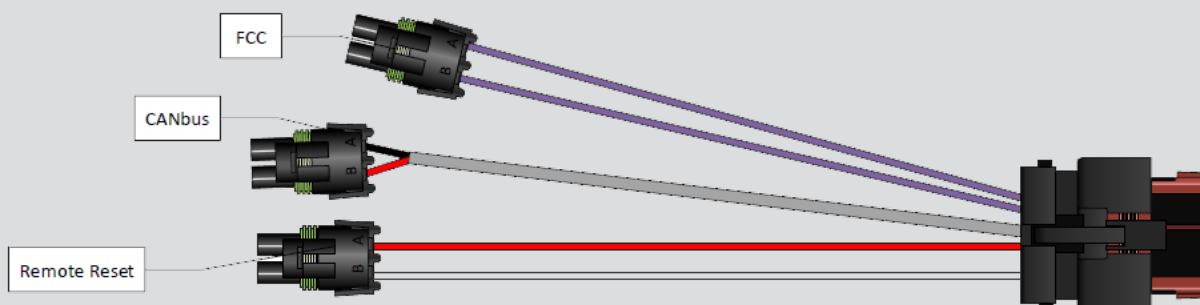
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LITHIUM ION IRON PHOSPHATE BATTERY SYSTEMS



PART NUMBER:
75-H1FCR Ampseal 8 Harness Kit

EXTERNAL
ACCESSORIES



Feature	Description
FCC	Alternator Field Control Circuit
Remote Reset Switch	Remote Momentary Power Switch
CANBus	Limited CANBus RV-C Telemetry

ABOUT AMPSEAL 8

The mating Ampseal 8 connector kit is designed for use with the Standard series NeverDie® Battery Management System (BMS). The 8 pin Ampseal connector is located on the side of external BMS models (for internal BMS models, this is located on the lid on most batteries), and is used to access the BMS's ported features. This allows implementation of the combination of BMS functions listed above. Mating cable extensions are optional and available separately per the part numbers listed below.



Optional Mating Extensions:

Part Number	Model	Description
75-149-180	FCC Extension	Dual Weatherpack Connector to Bare Wires, 15ft Length
75-122-180	Remote Reset Extension	Dual Weatherpack Connector to Remote Momentary Reset Switch, 15ft Length

Note: Contact factory regarding mating connections for CANBus feature.

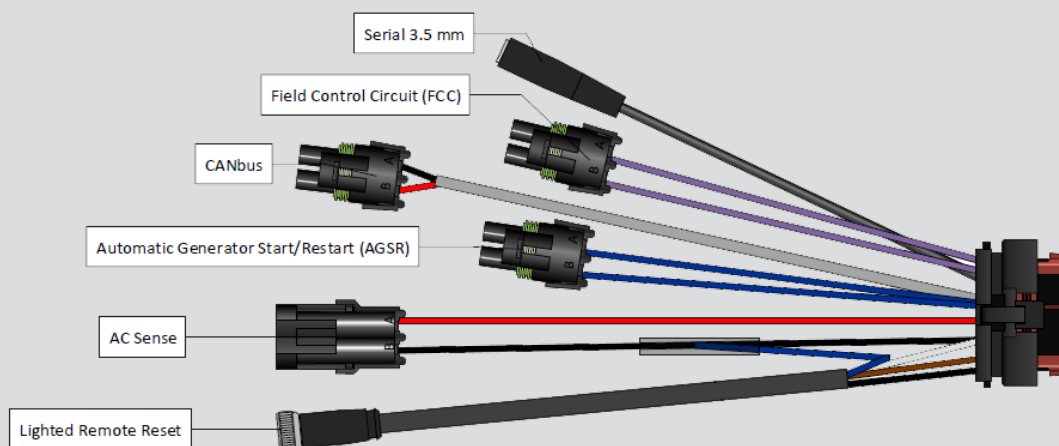
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LITHIUM ION IRON PHOSPHATE BATTERY SYSTEMS



PART NUMBER:
75-H2FAECSBR Ampseal 23 5V-UART Version

EXTERNAL
ACCESSORIES



Feature	Description
FCC	Alternator Field Control Circuit
AGSR	Automatic Generator Start/Restart Circuit
Remote LED Switch	Remote Momentary Illuminated Power Switch
CANBus	CANBus RV-C Telemetry
Serial UART	Serial UART Telemetry
AC Sense	External +12V Power Input for BMS Electronics

ABOUT AMPSEAL 23

The mating Ampseal 23 connector kit is designed for use with the Advanced series NeverDie® Battery Management System (BMS). The 23 pin Ampseal connector is located on the side of external BMS models (for internal BMS models, this is located on the lid on most batteries), and is used to access the BMS's ported features. This allows implementation of the combination of BMS functions listed above. Mating cable extensions are optional and available separately per the part numbers listed below.



Optional Mating Extensions:		
Part Number	Model	Description
75-149-180	FCC Extension	Dual Weatherpack Connector to Bare Wires, 15ft Length
75-159-180	AGS Extension	Dual Weatherpack Connector to Bare Wires, 15ft Length
75-200B-180	Remote LED Reset Extension	M8 4-Pin Connector to Remote Momentary Illuminated Reset Switch, 15ft Length
75-185-K	USB Serial UART Cable	3.5mm to USB Serial UART Adapter Cable Kit

Note: Contact factory regarding mating connections for CANBus & AC Sense features.

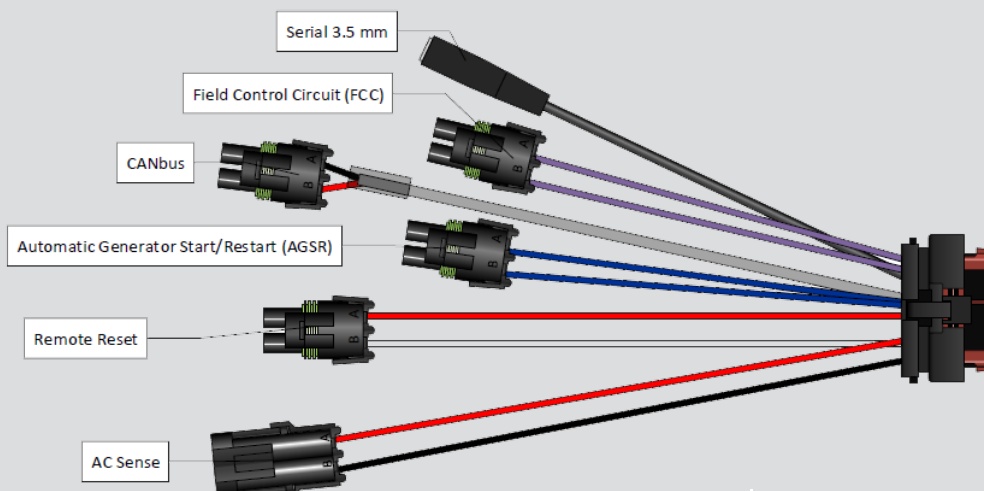
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LITHIUM ION IRON PHOSPHATE BATTERY SYSTEMS



PART NUMBER:
75-H2FAECSR Ampseal 23 Consumer Version

EXTERNAL
ACCESSORIES



Feature	Description
FCC	Alternator Field Control Circuit
AGSR	Automatic Generator Start/Restart Circuit
Remote Reset Switch	Remote Momentary Power Switch
CANBus	CANBus RV-C Telemetry
Serial UART	Serial UART Telemetry
AC Sense	External +12V Power Input for BMS Electronics

ABOUT AMPSEAL 23

The mating Ampseal 23 connector kit is designed for use with the Advanced series NeverDie® Battery Management System (BMS). The 23 pin Ampseal connector is located on the side of external BMS models (for internal BMS models, this is located on the lid on most batteries), and is used to access the BMS's ported features. This allows implementation of the combination of BMS functions listed above. Mating cable extensions are optional and available separately per the part numbers listed below.



Optional Mating Extensions:		
Part Number	Model	Description
75-149-180	FCC Extension	Dual Weatherpack Connector to Bare Wires, 15ft Length
75-159-180	AGS Extension	Dual Weatherpack Connector to Bare Wires, 15ft Length
75-122-180	Remote Reset Extension	Dual Weatherpack Connector to Remote Momentary Reset Switch, 15ft Length
75-185-K	USB Serial UART Cable	3.5mm to USB Serial UART Adapter Cable Kit

Note: Contact factory regarding mating connections for CANBus & AC Sense features.

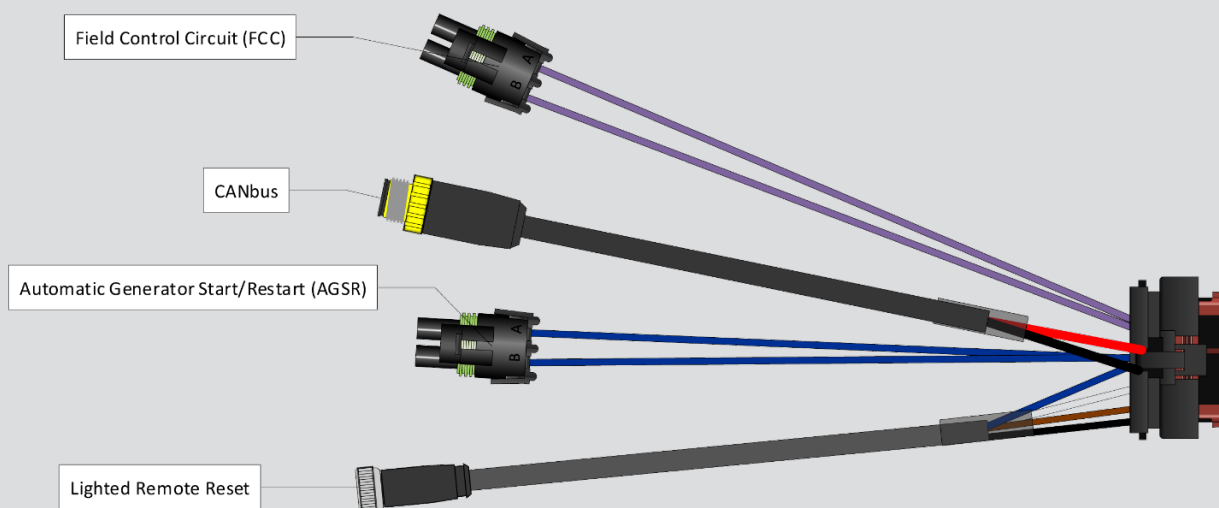
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LITHIUM ION IRON PHOSPHATE BATTERY SYSTEMS



PART NUMBER:
75-H2FAC1BR Ampseal 23 Marine Version

EXTERNAL
ACCESSORIES



Feature	Description
FCC	Alternator Field Control Circuit
AGSR	Automatic Generator Start/Restart Circuit
Remote LED Switch	Remote Momentary Illuminated Power Switch
CANBus	CANBus RV-C Telemetry, Marine Ancor Connector

ABOUT AMPSEAL 23

The mating Ampseal 23 connector kit is designed for use with the Advanced series NeverDie® Battery Management System (BMS). The 23 pin Ampseal connector is located on the side of external BMS models (for internal BMS models, this is located on the lid on most batteries), and is used to access the BMS's ported features. This allows implementation of the combination of BMS functions listed above. Mating cable extensions are optional and available separately per the part numbers listed below.



Optional Mating Extensions:

Part Number	Model	Description
75-149-180	FCC Extension	Dual Weatherpack Connector to Bare Wires, 15ft Length
75-159-180	AGS Extension	Dual Weatherpack Connector to Bare Wires, 15ft Length
75-200B-180	Remote LED Reset Extension	M8 4-Pin Connector to Remote Momentary Illuminated Reset Switch, 15ft Length

Note: Contact factory regarding mating connections for CANBus feature.

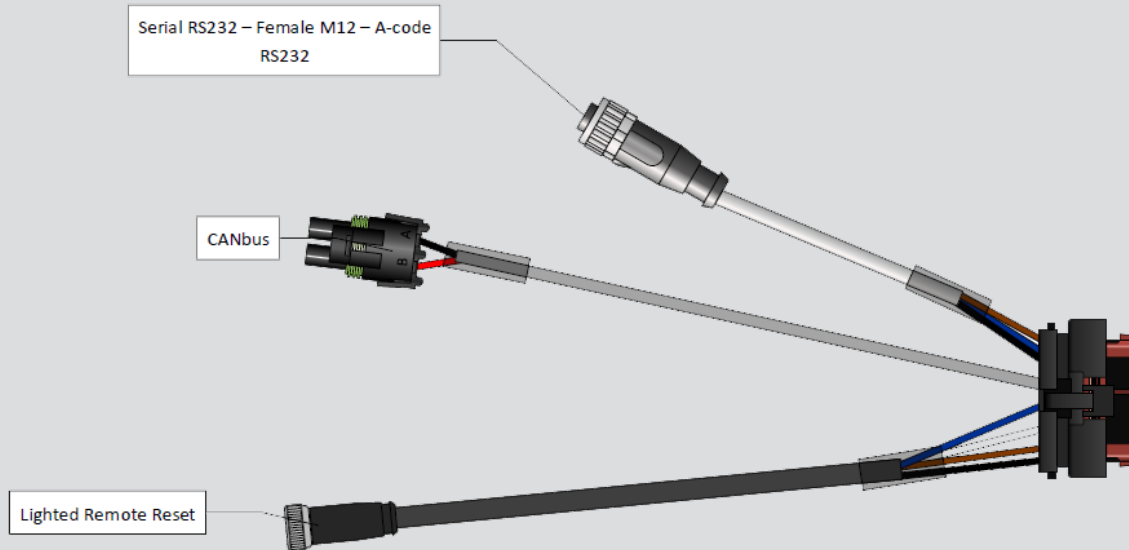
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LITHIUM ION IRON PHOSPHATE BATTERY SYSTEMS



PART NUMBER:
75-H2CMBR Ampseal 23 RS232-DB9 Version

EXTERNAL
ACCESSORIES



Feature	Description
Remote LED Switch	Remote Momentary Illuminated Power Switch
CANBus	CANBus RV-C Telemetry
Serial RS232	Serial RS232 Telemetry

ABOUT AMPSEAL 23

The mating Ampseal 23 connector kit is designed for use with the Advanced series NeverDie® Battery Management System (BMS). The 23 pin Ampseal connector is located on the side of external BMS models (for internal BMS models, this is located on the lid on most batteries), and is used to access the BMS's ported features. This allows implementation of the combination of BMS functions listed above. Mating cable extensions are optional and available separately per the part numbers listed below.



Optional Mating Extensions:

Part Number	Model	Description
75-200B-180	Remote LED Reset Extension	M8 4-Pin Connector to Remote Momentary Illuminated Reset Switch, 15ft Length
75-151-K	USB Serial RS232 Cable	M12 A-code 3pin to USB Serial Adapter Cable Kit

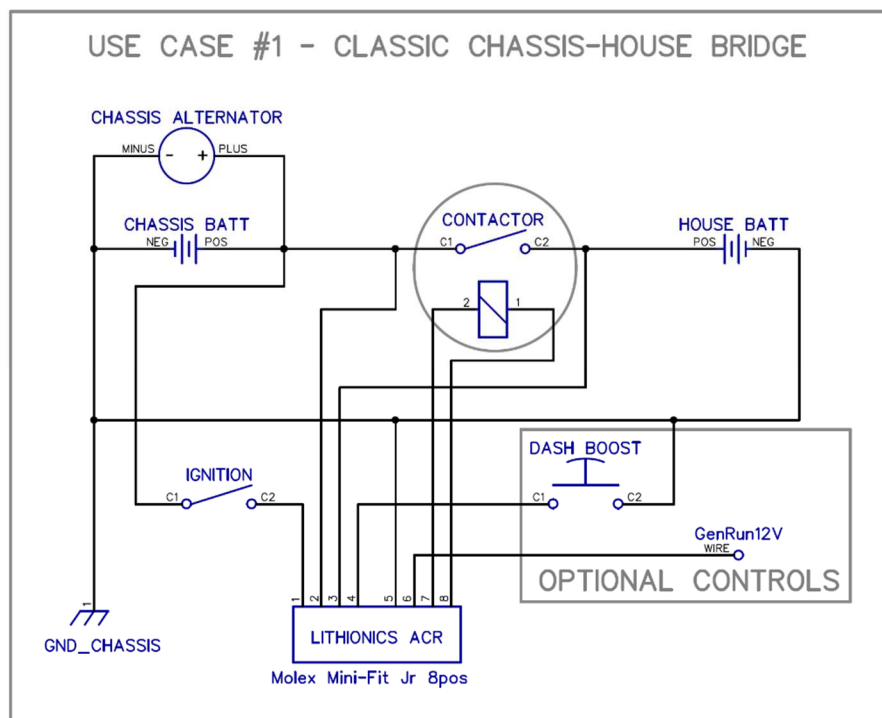
Note: Contact factory regarding mating connections for CANBus feature.

ACR Logic Table

ACR logic table below lists all possible functional states and entry/exit conditions for each state.

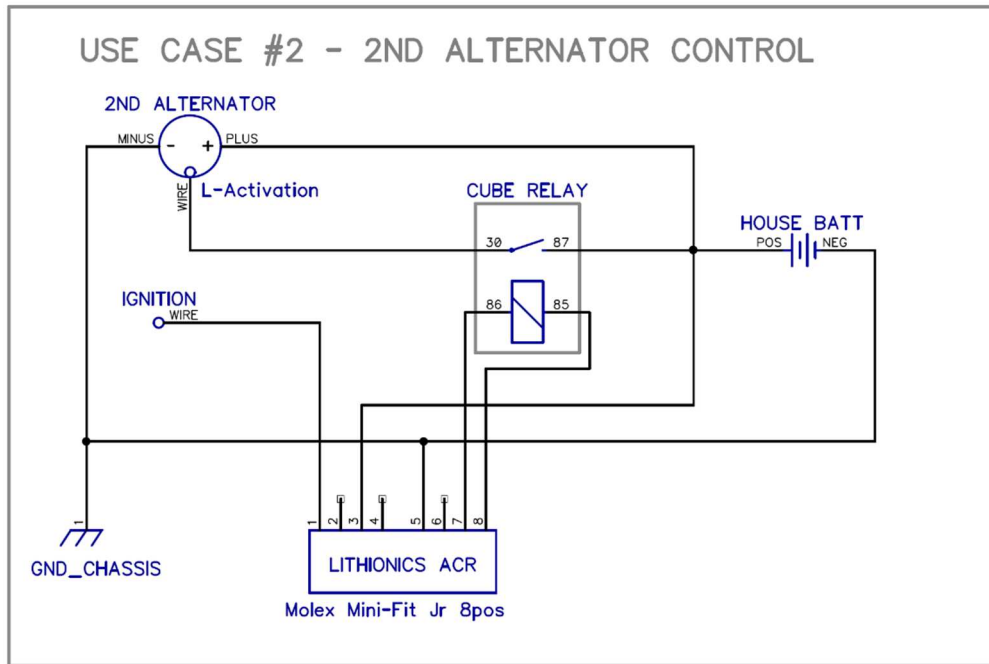
ACR STATE	State code	LED State	Enter conditions	ACR Contactor State	Exit conditions	Notes
STAND_BY	0	Short Blink	none, default state	OPEN	evaluate all inputs	all states exit into STAND_BY state
WARMING_UP	1	Slow Blink	Ignition change OFF -> ON	OPEN	(Warm_Up Timer > 30s) OR Ignition = OFF	
HOUSE_CHARGING	2	Solid On	(Ignition = ON) AND	CLOSED	(Ignition = OFF) OR	
			(Chassis > 13.2) AND		(Chassis < 12.0)@30s OR	Chassis conditions are disabled when \$CHASSIS=0 is set
			(House < 13.4V)		(House > 14.5V) OR	immediate disconnect if voltage reaches maximum allowed
					(House > 14.2V)@30min OR	allowing for 30 min absorption stage if voltage stays good
					(Genrun = ON) OR	generator inhibits alternator to prevent fighting of charge sources
					Charging Timer > 60min	
CHASSIS_CHARGING	3	Solid On	(Ignition = OFF) AND	CLOSED	(Ignition = ON) OR	Chassis function can be disabled in systems with 2nd alternator charging House and ACR controls the alternator via small relay
			(Chassis < 12.4V) AND		(Chassis < 12.0)@30s OR	Chassis conditions are disabled when \$CHASSIS=0 is set
			(House > 13.4V)		Charging Timer > 60min	
RESTING	4	Slow Blink	Charging Timer > 60m	OPEN	(Charging Timer > 75min) OR	15 min resting period to cool off the alternator and settle down battery voltages, then repeat charge cycle as needed
					Ignition change	
BOOSTING	5	Solid On	Dash_Button change OFF -> ON	CLOSED	(Dash_Button Timer > 2min) OR	If button is pressed shortly, then merge for 2 minutes. If button is held down, then allow up to 15 min of merge time
					(Dash_Button = ON) AND (Timer > 15min)	
GEN_RUNNING	6	Slow Blink	Genrun = ON	OPEN	(Genrun = OFF) OR BOOSTING state triggered	BOOSTING state disables GEN_RUNNING state
FAULT	7	Rapid Blink	(ACR_State = CLOSED) AND	OPEN	Ignition change	Possible contactor failure or loose lug when voltage across closed contactor is >0.5V
			ABS(Chassis - House) > 0.5V@5s			

ACR Wiring Diagram – Case #1 Classic Chassis-House Bridge



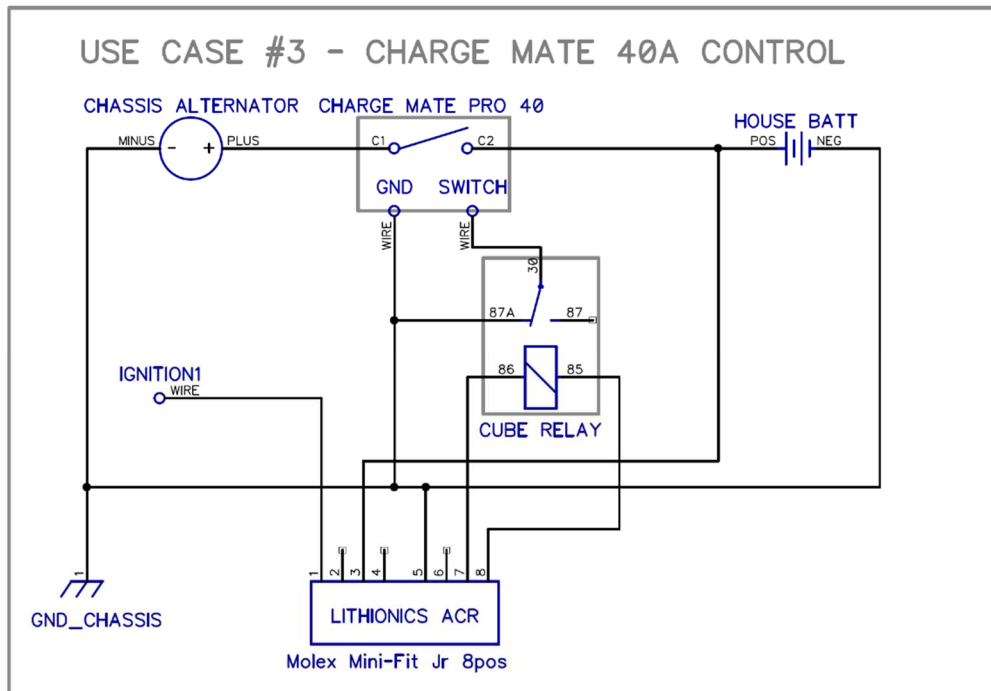
ACR Wiring Diagram – Case #2 Secondary Alternator Control

NOTE: Alternator is enabled by connecting its “L” a.k.a. Activation terminal to battery voltage and disabled by disconnecting from battery voltage.

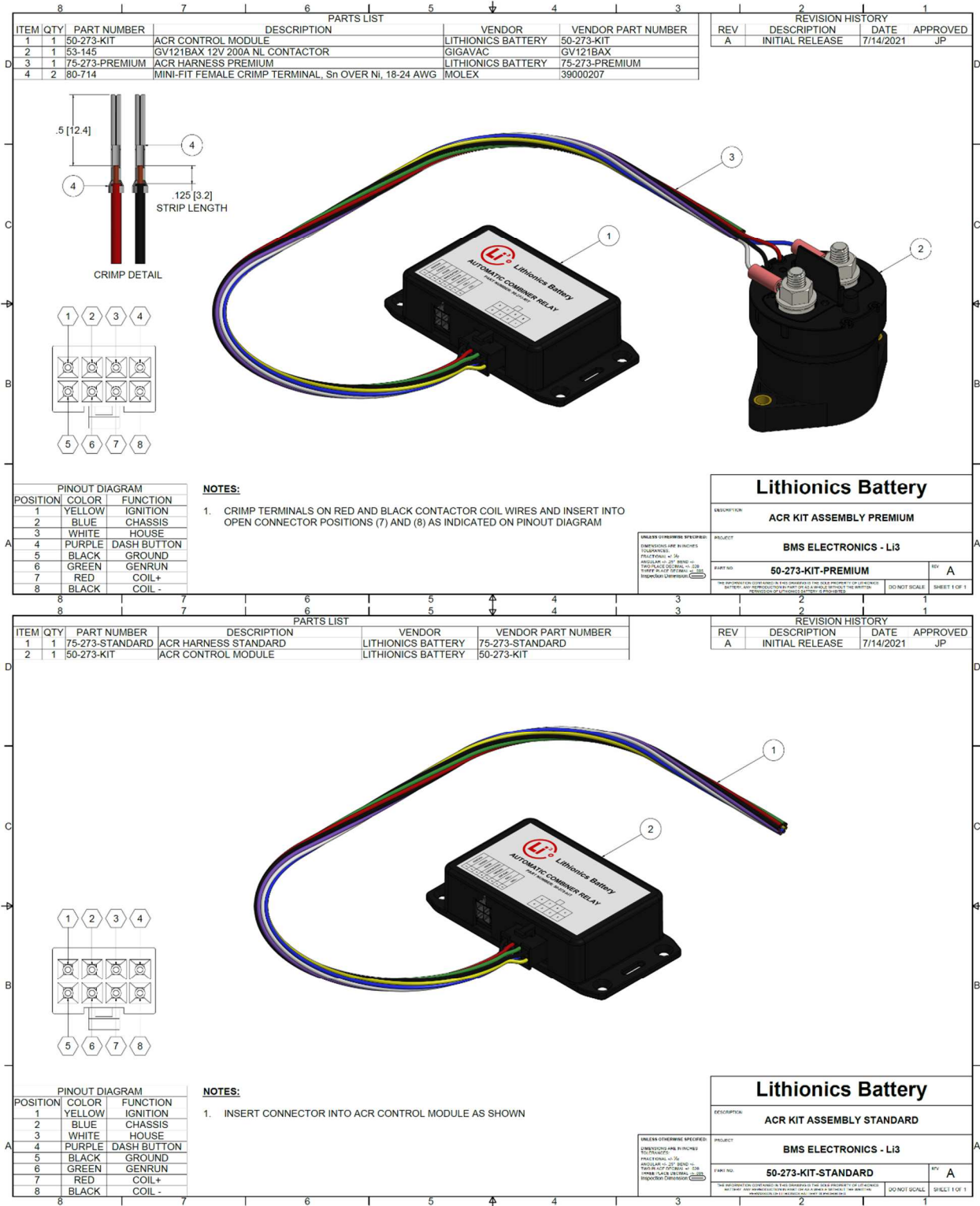


ACR Wiring Diagram – Case #3 Charge Mate Pro 40 Control

NOTE: Charge Mate is disabled by grounding its Switch terminal and enabled by floating the same terminal.



ACR Kits and wiring harnesses options with and without contactor





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Internal Cold-Weather Heating Kit

Heater Setup:

- Proprietary heating kit is installed internally to the Lithium Battery module.
- A solid-state thermostat device controls the heaters on at 35F and off at 40F.
- The heating kit requires 12V DC (24V option available) to power the heating element.

Separate cable leads are provided on the battery module for the heating kit to allow you to connect battery power or a supplemental 12V DC power source (e.g. 12V chassis/alternator power, AC-DC converter from shore power, DC-DC converter from higher battery voltage). Please contact Lithionics Battery® for recommendations on wiring and powering the heater kit.

Heater Performance:

- Max heater consumption is 80W.
- Typical duty cycle to maintain the lithium core between 35-40F is approximately 55W at subfreezing temperatures- which is much more efficient than an external heating element. Additional note: This assumes the battery is sitting unused and idle. Any additional charge or discharge loads will cause the battery to self-heat and the required duty cycle of the internal heaters would become less.

Available on the Following Models:

GTR Models	GT 12V Models	GT 24V Models	GT 48V & 51V Models
GTR12V150A-30H-Module	GT12V150A-G31EXT-Module	GT24V75A-G31EXT-Module	GT48/51V75A-GC2E-Module
GTR12V300A-5D-Module	GT12V300A-GC2E-Module	GT24V150A-GC2E-Module	GT48/51V150A-8DR-Module
GTR12V450A-F39-Module	GT12V450A-8DR-Module	GT24V300A-8DR-Module	GT48/51V150A-F24-Module
GTR12V600A-F39-Module	GT12V525A-8DR-Module	GT24V300A-F24-Module	
	GT12V600A-8DR-Module		
	GT12V600A-F24-Module		

(Not available on internal BMS models- only battery modules requiring an external BMS)

Note: Contact Lithionics Battery® for availability on other models or custom solutions.