

A3

## REVISION HISTORY

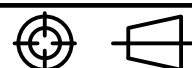

REV	DESCRIPTION	ORIGINATOR	CHECKED BY	APPROVED	DATE
R1-R6	PLEASE REFER TO HYP-227-BOM-Z-003 FOR REV CHANGE DETAILS	MC	JL	SF	07/05/2019
R7	DRAWING FORMAT CHANGED AS PER HYP-000-CN-Z-012, FIRMWARE UPDATE AS PER HYP-000-CN-Z-010	DK	AW	AD	10/05/2021

# HYPERDRIVE GEN4 14 CELL 52V MODULAR PACK

## PACK PART NUMBER: HYP-00-2890

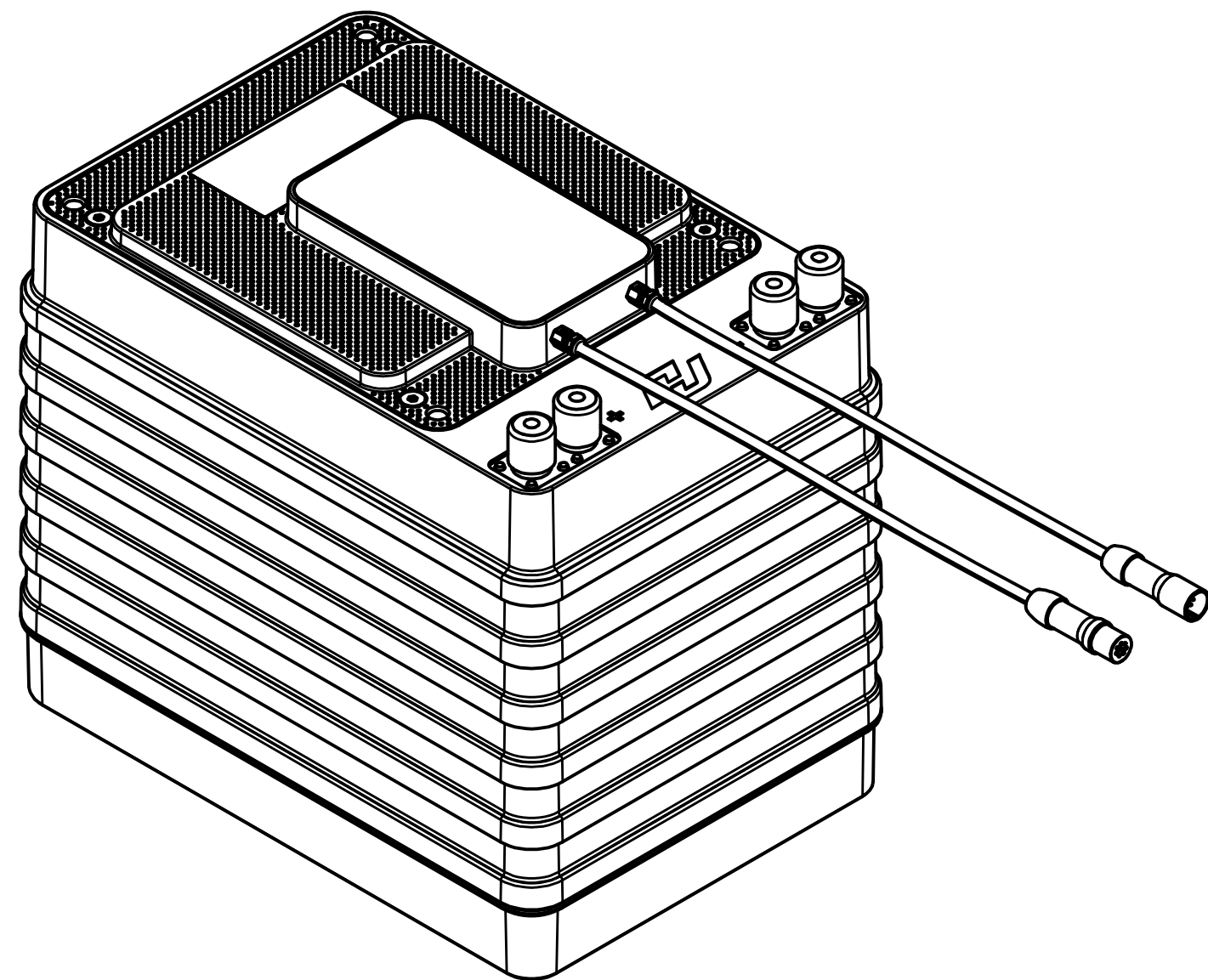
PRODUCT INFORMATION DRAWING

IF IN DOUBT, DO NOT HESITATE TO CALL  
HYPERDRIVE ON +44 (0) 191 640 4586

Drawing Number: <i>HYP-INF-2890</i>		Revision: <i>R7</i>		Part Number: <i>HYP-00-2890</i>		Dimension: <i>Millimetre (mm)</i>	
Title: <i>HYP-00-2890 Product Information</i>				Material: <i>MIXED</i>		Sheet: <i>1 of 4</i>	
Originator: <i>MC</i>		<i>07/05/2019</i>		Weight:		Size A3: 297 mm x 420 mm	
Checked By: <i>JL</i>		<i>07/05/2019</i>		Scale: <i>DNS</i>			
Approved By: <i>SF</i>		<i>07/05/2019</i>					
GENERAL TOLERANCES ACCORDING TO ISO 2768							
DIMENSION TOLERANCE (mm) ref. ISO 2768-1	LENGTH (mm)	CHAMFERS (mm)	ANGLE (DMS)	 THIRD ANGLE PROJECTION			
	CLASS: m	CLASS: m	CLASS: m				
GEOMETRIC TOLERANCE (mm) ref. ISO 2768-2	STRAIGHTNESS & FLATNESS (mm)	PERPENDICULARITY (mm)	SYMMETRY (mm)				
	CLASS: K	CLASS: K	CLASS: K				
The information contained in this drawing is the sole property of Hyperdrive Innovation Ltd. It must not be reproduced in part or whole without the express permission of Hyperdrive Innovation Ltd.				 <b>HYPERDRIVE</b> Hyperdrive Innovation Ltd. The Future Technology Centre, Barmston Court, Nissan Way, Sunderland, Tyne & Wear SR5 3NY Tel: +44 (0) 191 6404586 Web: hyperdriveinnovation.com			

A3

IF IN DOUBT, DO NOT HESITATE TO CALL  
HYPERDRIVE ON +44 (0) 191 640 4586



GENERAL	
FEATURE	DETAILS
Part Number	HYP-00-2890
Product Name	HY Energy Plus
Voltage Nominal	51.8V
Voltage Range Min/Max	43.4V/58.1V
Charge Current	132A maximum De-rated by BMS message over CAN depending on cell voltage/temperature. Charger integration must follow this dynamic current limit. See user manual
Discharge Current	130A maximum De-rated by BMS message over CAN depending on cell voltage/temperature. System/inverter should follow this dynamic current limit. See user manual
Maximum Capacity	5.76kWh/111.4Ah
Maximum Energy Density	164Wh/kg
Useable Capacity	Limited to 90% by BMS to improve cell life
Dimensions	W: 243 x L: 352 x H: 302mm
Weight	37kg
Mounting Fixtures	4x M8 mounting points for easy secure mounting

CELLS	
FEATURE	DETAILS
Cell Specification	14S2P Envision AESC Gen 4, 3 full modules and 1 half module (module contains 4S2P cells)
Chemistry	Manganese Laminated Li-ion (LMNC)

ENVIRONMENTAL	
FEATURE	DETAILS
Enclosure	Fully sealed plastic case (IP55)
Operating Temp Range (Charge)	-25°C to +60°C
Operating Temp Range (Discharge)	-25°C to +60°C
Storage Conditions	Temperature: -40°C to +70°C Humidity: Below 75%

BATTERY MANAGEMENT SYSTEM (BMS)	
FEATURE	DETAILS
Communication Protocol	CAN bus at 1000, 500, 250, 125, 50 kbit/s Default: 250 kbits/s J1939 compatible option available
Reported Information	Cell Temperatures and Voltages, Pack Current, State of Charge and Faults
Pack Protection Mechanism	Interlock to control external protection device e.g. contactor. Note: The Hyperdrive modular battery pack cannot directly protect itself without an external protection circuit. This circuit must be approved by Hyperdrive before use.
Balancing Method	Actively controlled dissipative balancing
Multi-Pack Behaviour	BMS implements a single master and multi-slave system
Compatible Chargers as Standard	Bassi (CAN-Enabled), Zivan, Victron, Delta-Q, TC-Charger
Charger Control	Direct current control based on cell voltage/temperature CAN bus data to allow other chargers to be implemented by user
Auxiliary Connectors	Binder 720-Series 8-way male and female
Power Connectors	4x Amphenol SurLok Plus 8mm
Firmware	3.1.500.4
Bootloader	1.4.0.4

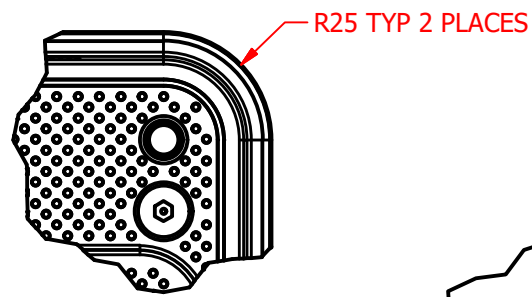
SYSTEM CONFIGURATION	
FEATURE	DETAILS
Max no. of Packs in Series	10
Max no. of Parallel Packs	127
External System Requirements	<ul style="list-style-type: none"> <li>External Protection Device (eg. Contactor) controlled by BMS Interlock</li> <li>One External Fuse per series string - (Max 150A rating)</li> <li>BMS Enable signal (12-24V)</li> </ul>

STANDARDS	
FEATURE	DETAILS
EMC	Designed to meet: EN61000-6-2:2005 and EN61000-6-3:2007 + A1:2011
Transport	UN38.3 rev 6 including impact and vibration testing
Other	RoHS directive and WEEE directive

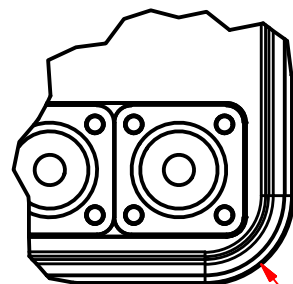
Drawing Number: <i>HYP-INF-2890</i>	Revision: <i>R7</i>	Part Number: <i>HYP-00-2890</i>	Dimension: <b>Millimetre (mm)</b>
Title: <i>HYP-00-2890 Product Information</i>		Material: <b>MIXED</b>	Sheet: <b>2 of 4</b>
Originator: <i>MC</i>	<i>07/05/2019</i>	Weight: <i>37.00 kg</i>	Size A3: 297 mm x 420 mm
Checked By: <i>JL</i>	<i>07/05/2019</i>	Scale: <b>DNS</b>	<p>THIRD ANGLE PROJECTION</p>
Approved By: <i>SF</i>	<i>07/05/2019</i>	<p><b>HYPERDRIVE</b></p> <p>Hyperdrive Innovation Ltd. The Future Technology Centre, Barnston Court, Nissan Way, Sunderland, Tyne &amp; Wear SR5 3NY Tel: +44 (0) 191 6404586 Web: hyperdriveinnovation.com</p>	
GENERAL TOLERANCES ACCORDING TO ISO 2768			
DIMENSION TOLERANCE (mm) ref. ISO 2768-1	LENGTH (mm)	CHAMFERS (mm)	ANGLE (DMS)
	CLASS: m	CLASS: m	CLASS: m
GEOMETRIC TOLERANCE (mm) ref. ISO 2768-2	STRAIGHTNESS & FLATNESS (mm)	PERPENDICULARITY (mm)	SYMMETRY (mm)
	CLASS: K	CLASS: K	CLASS: K
<p>The information contained in this drawing is the sole property of Hyperdrive Innovation Ltd. It must not be reproduced in part or whole without the express permission of Hyperdrive Innovation Ltd.</p>			

A3

IF IN DOUBT, DO NOT HESITATE TO CALL  
HYPERDRIVE ON +44 (0) 191 640 4586

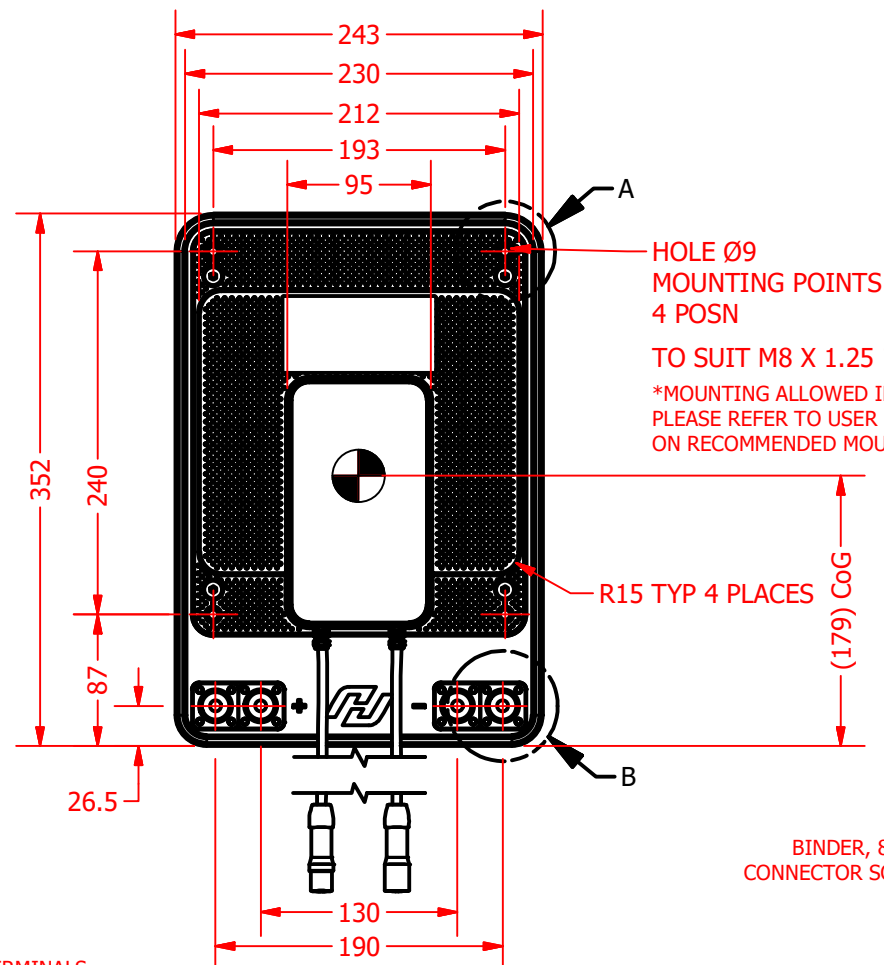


DETAIL A



DETAIL B

R20.5 TYP 2 PLACES

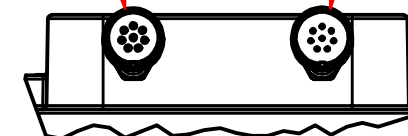


CONTROL CONNECTOR FEMALE - PINOUT	
BINDER 8 WAY (FEMALE)	DESCRIPTION
7	CAN H
2	CAN L
3	GND
1	ENABLE
6	CONTACTOR INTERLOCK (IN)

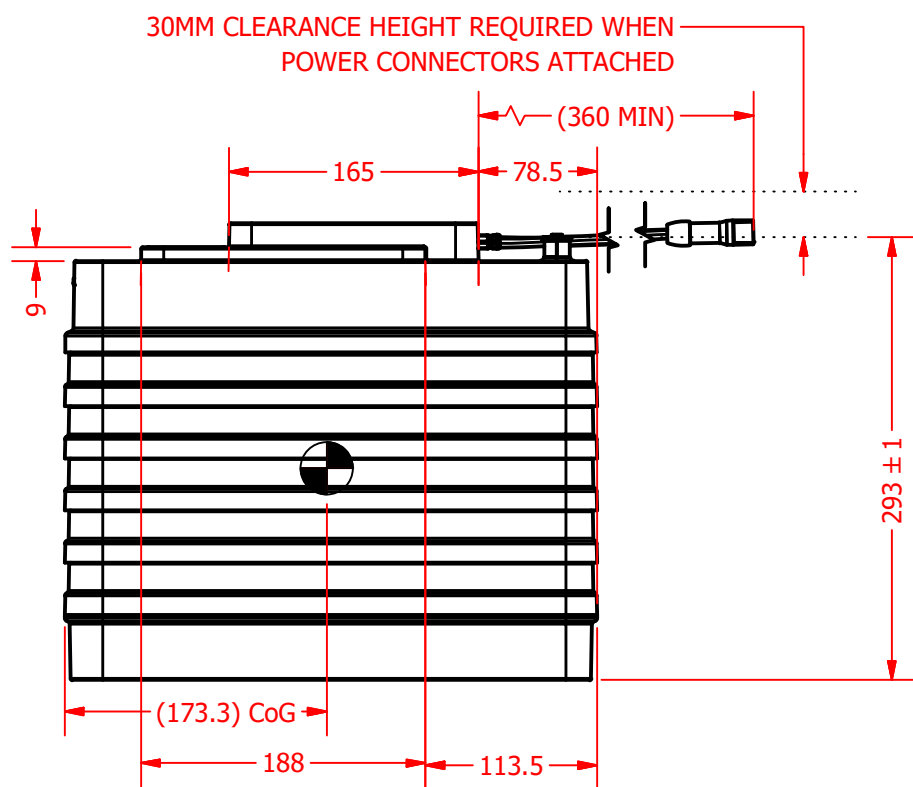
CONTROL CONNECTOR MALE - PINOUT	
BINDER 8 WAY (MALE)	DESCRIPTION
7	CAN H
2	CAN L
3	GND
1	ENABLE
6	CONTACTOR INTERLOCK (OUT)

CONTROL CONNECTOR IN  
BINDER, 8 POLE CABLE MOUNT MINI  
CONNECTOR SOCKET, FEMALE CONTACTS  
BINDER: 99-9126-00-08

CONTROL CONNECTOR OUT  
BINDER, 8 POLE CABLE MOUNT MINI  
CONNECTOR PLUG, MALE CONTACTS  
BINDER: 99-9125-00-08

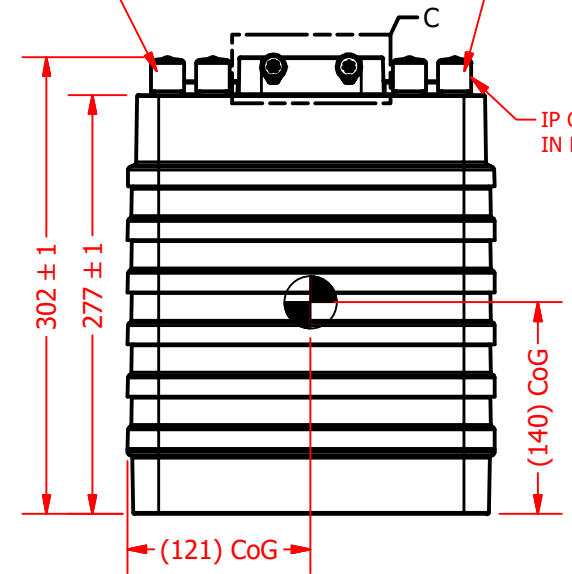


DETAIL C  
\*MINIMUM BEND RADIUS FOR CAN CABLE = 42mm\*



POWER TERMINALS  
AMPHENOL SLPRB50 SERIES - RED  
2 POSN  
(MATING CONNECTOR:  
SLPPB50BSR)

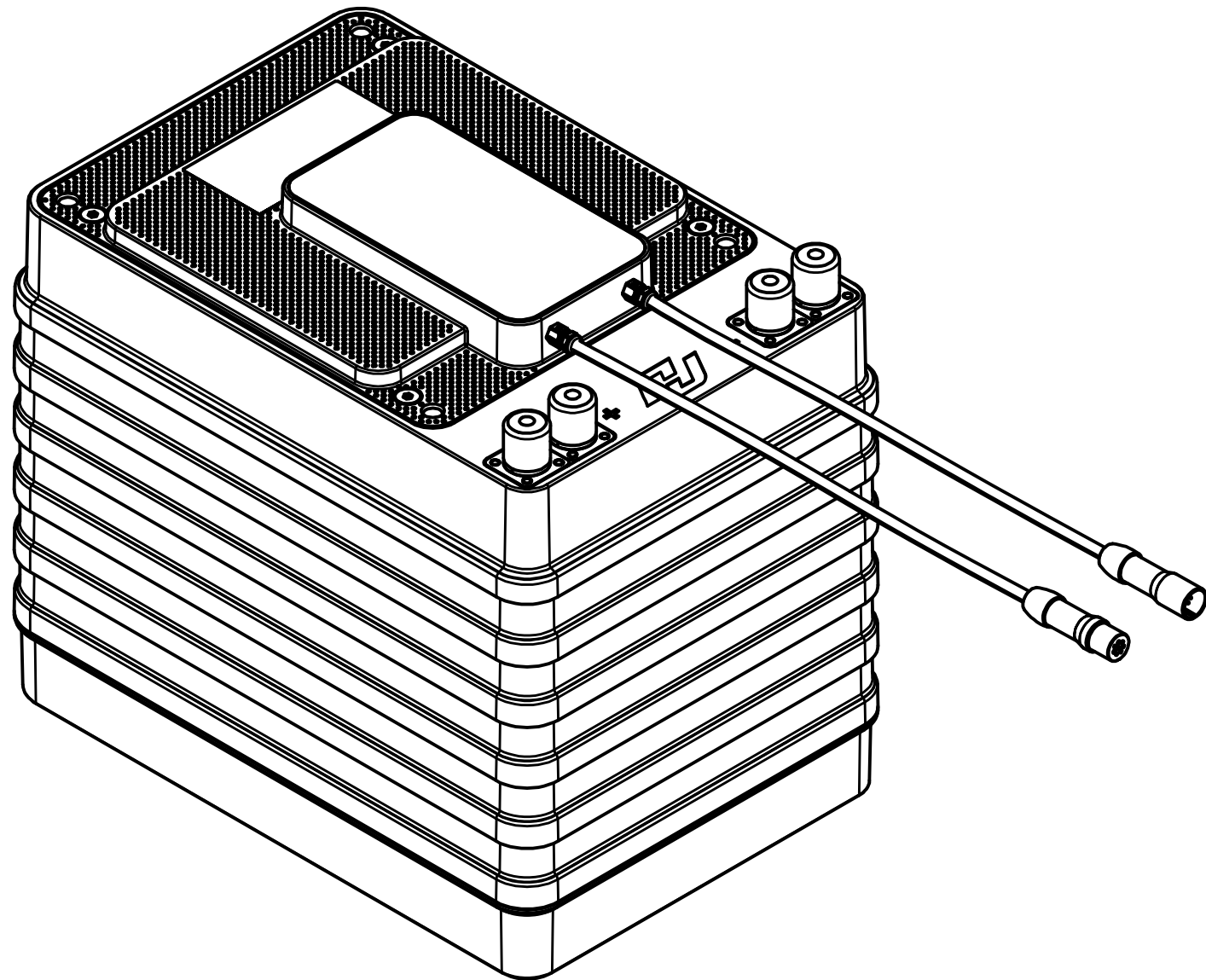
POWER TERMINALS  
AMPHENOL SLPRB50 SERIES - BLACK  
2 POSN  
(MATING CONNECTOR: SLPPB50BSB)



PACK MOUNTING  
THIS WAY UP ONLY

**\*\*\* DANGER! \*\*\***  
**BATTERY MUST NOT BE USED OUTSIDE OF APPROVED SYSTEM**  
**INCORPORATING PROTECTIVE DEVICES.**  
**REFER TO SUPPORTING DOCUMENTATION AS DETAILED ON SHEET 4 OF THIS DRAWING**

Drawing Number: <i>HYP-INF-2890</i>		Revision: <i>R7</i>		Part Number: <i>HYP-00-2890</i>		Dimension: <i>Millimetre (mm)</i>	
Title: <i>HYP-00-2890 Product Information</i>				Material: <i>MIXED</i>		Sheet: <i>3 of 4</i>	
Originator: <i>MC</i>		07/05/2019		Weight: <i>37.00 kg</i>		Size A3: 297 mm x 420 mm	
Checked By: <i>JL</i>		07/05/2019		Scale: <i>DNS</i>			
Approved By: <i>SF</i>		07/05/2019					
GENERAL TOLERANCES ACCORDING TO ISO 2768							
DIMENSION TOLERANCE (mm) ref. ISO 2768-1	LENGTH (mm)	CHAMFERS (mm)	ANGLE (DMS)	 THIRD ANGLE PROJECTION			
	CLASS: m	CLASS: m	CLASS: m				
GEOMETRIC TOLERANCE (mm) ref. ISO 2768-2	STRAIGHTNESS & FLATNESS (mm)	PERPENDICULARITY (mm)	SYMMETRY (mm)				
	CLASS: K	CLASS: K	CLASS: K				
The information contained in this drawing is the sole property of Hyperdrive Innovation Ltd. It must not be reproduced in part or whole without the express permission of Hyperdrive Innovation Ltd.				 <b>HYPERDRIVE</b> Hyperdrive Innovation Ltd. The Future Technology Centre, Barmston Court, Nissan Way, Sunderland, Tyne & Wear SR5 3NY Tel: +44 (0) 191 6404586 Web: hyperdriveinnovation.com			



**INTEGRATION REQUIREMENTS:**

Due to the modular nature of the battery product, there is a requirement for a level of integration work to form a complete and safe system.

The battery packs can be used in different sized systems and therefore the protective devices must be located outside of the battery packs and specified appropriately for the application.

Protective devices are used to protect the battery packs against overcurrent (via fuses) and to disconnect the battery packs in the event of a fault such as the cells getting too hot or charging the pack higher than its maximum designed voltage (via contactors).

Failure to correctly integrate the battery packs will result in an un-safe system. Care must be taken to ensure that the integration instructions are followed and that the batteries are never used outside of an approved system.

Hyperdrive can provide support or full design services to achieve this goal.

The following areas **MUST** be covered in a complete system design:

- External protection contactor(s) rated to the system current & voltage
- Fault checking of protection contactor(s) e.g Welded contact checks
- Pre-charge of any capacitive loads
- Ensuring that all current sources/loads are located after the protection contactor
- Integration of the BMS interlock to control contactor position
- Consideration to prevent storage at low SoC (deep discharge prevention) + checks of packs in storage.
- System electrical isolation monitoring / ground fault detection if required
- Any further requirements to meet standards of the intended application
- System testing and commissioning
- Correct system 'sizing' to ensure suitability of continuous / peak current ratings and stored energy
- Battery pack mechanical mounting and electrical isolation
- Battery pack software configuration (array size, CAN speed, charger type etc)
- Charger selection and BMS compatibility checks
- Appropriate system fusing
- Appropriate system cabling
- Low voltage system enabling signal supply

**Please refer to Product Manual 'HYP-131-MAN-Z-001' for further information.**

**UNDER NO CIRCUMSTANCES MUST A USER EVER CONNECT A CHARGER OR LOAD DIRECTLY TO THE BATTERY PACK TERMINALS WITHOUT THE ABOVE PROTECTIONS**

**SUPPORTING DOCUMENTATION**

DOCUMENT NUMBER	REV	TITLE
HYP-131-MAN-Z-001	R12	Modular Battery Pack Product Manual
HYP-226-MAN-Z-002	R4	Modular Pack CAN Interface Manual
HYP-226-REP-Z-008	R1	Modular Pack System FMEA Example
ENG-FO-018	R2	Customer Schematic Checklist
ENG-FO-020	R1	Customer Commissioning Checklist
HYP-00-DAT-Z-004	R1	Compliance of HDI Modular Batteries wrt EU EMC directive 2014
HYP-00-DAT-Z-003	R1	Compliance of HDI Modular Batteries wrt UN38.3 T7
HYP-000-DAT-Z-006	R1	Modular Batteries Waste Disposal Advice Note
HYP-226-MAN-Z-001	R5	Storage and Handling of Hyperdrive Gen 4
HYP-191-DAT-Z-002	R6	Modular Pack Gen 4 MSDS
HYP-PAK-2890	R7	3D 'Packaging' Model

Drawing Number: <i>HYP-INF-2890</i>		Revision: <i>R7</i>	Part Number: <i>HYP-00-2890</i>	Dimension: <i>Millimetre (mm)</i>
Title: <i>HYP-00-2890 Product Information</i>		Material: <i>MIXED</i>	Sheet: <i>4 of 4</i>	
Originator: <i>MC</i>	<i>07/05/2019</i>	Weight: <i>37.00 kg</i>	Size A3: 297 mm x 420 mm	
Checked By: <i>JL</i>	<i>07/05/2019</i>	Scale: <i>DNS</i>		
Approved By: <i>SF</i>	<i>07/05/2019</i>			
GENERAL TOLERANCES ACCORDING TO ISO 2768				
DIMENSION TOLERANCE (mm) ref. ISO 2768-1	LENGTH (mm)	CHAMFERS (mm)	ANGLE (DMS)	
	CLASS: m	CLASS: m	CLASS: m	
GEOMETRIC TOLERANCE (mm) ref. ISO 2768-2	STRAIGHTNESS & FLATNESS (mm)	PERPENDICULARITY (mm)	SYMMETRY (mm)	
	CLASS: K	CLASS: K	CLASS: K	
			 THIRD ANGLE PROJECTION	 <b>HYPERDRIVE</b> Hyperdrive Innovation Ltd. The Future Technology Centre, Barmston Court, Nissan Way, Sunderland, Tyne & Wear SR5 3NY Tel: +44 (0) 191 6404586 Web: hyperdriveinnovation.com
The information contained in this drawing is the sole property of Hyperdrive Innovation Ltd. It must not be reproduced in part or whole without the express permission of Hyperdrive Innovation Ltd.				