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REVISION HISTORY

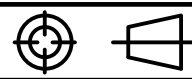

REV	DESCRIPTION	ORIGINATOR	CHECKED BY	APPROVED	DATE
R1-R6	PLEASE REFER TO HYP-226-BOM-Z-005 FOR REV CHANGE DETAILS	MC	JL	SF	07/05/2019
R7	DRAWING FORMAT CHANGED AS PER HYP-000-CN-Z-012, FIRMWARE UPDATE AS PER HYP-000-CN-Z-010	DK	AW	AD	07/05/2021

# HYPERDRIVE GEN4 12 CELL 44V MODULAR PACK

## PACK PART NUMBER: HYP-00-2889

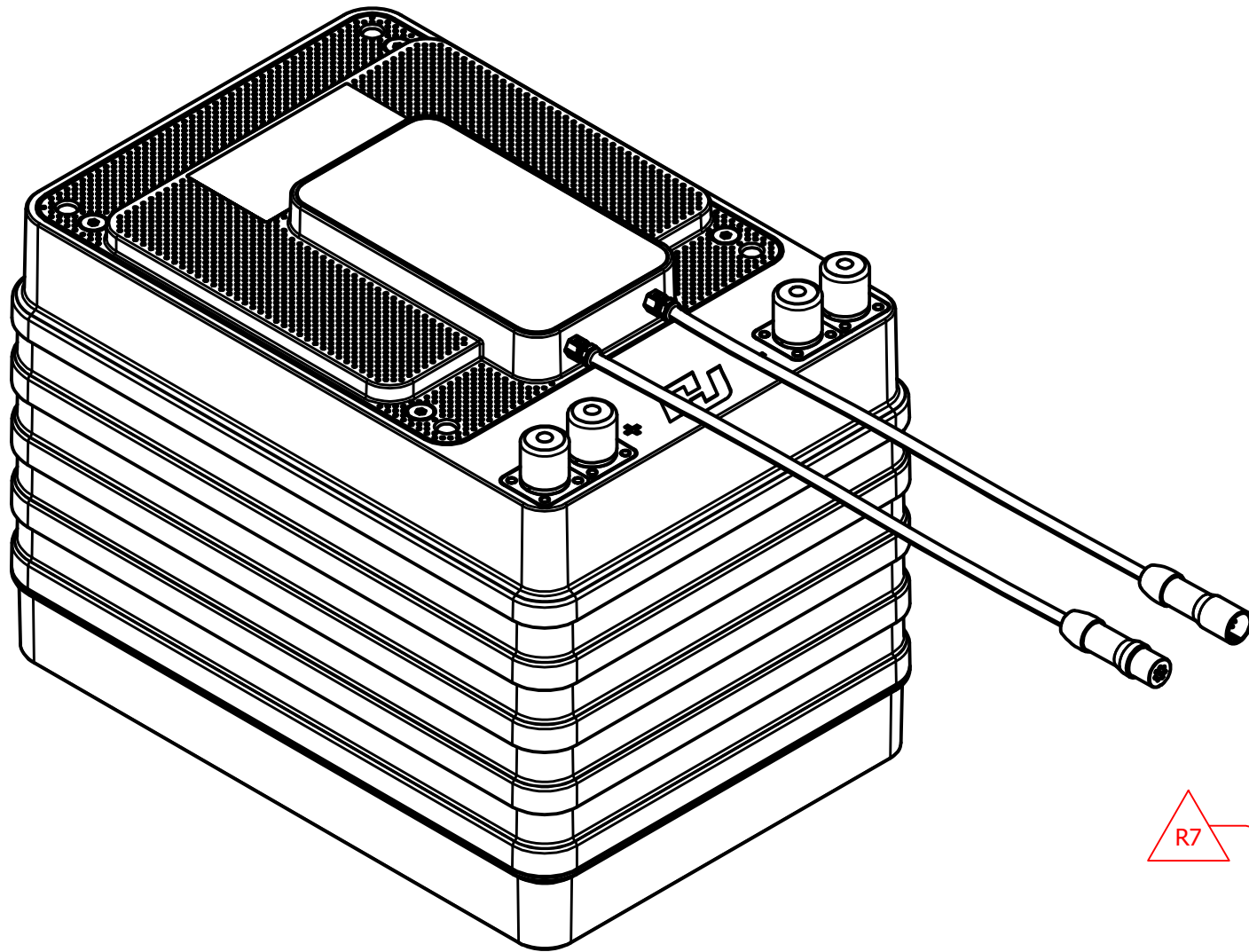
PRODUCT INFORMATION DRAWING

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HYPERDRIVE ON +44 (0) 191 640 4586

Drawing Number: <i>HYP-INF-2889</i>		Revision: <i>R7</i>		Part Number: <i>HYP-00-2889</i>		Dimension: <i>Millimetre (mm)</i>	
Title: <i>HYP-00-2889 Product Information</i>				Material: <i>MIXED</i>		Sheet: <i>1</i> of <i>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	 <b>HYPERDRIVE</b>		
	CLASS: m	CLASS: m	CLASS: m				
GEOMETRIC TOLERANCE (mm) ref. ISO 2768-2	STRAIGHTNESS & FLATNESS (mm)	PERPENDICULARITY (mm)	SYMMETRY (mm)				
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GENERAL	
FEATURE	DETAILS
Part Number	HYP-00-2889
Product Name	HY-Energy - Standard
Voltage Nominal	44.4V
Voltage Range Min/Max	37.2V/49.8V
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	4.94kWh/111.4Ah
Maximum Energy Density	152Wh/kg
Useable Capacity	Limited to 90% by BMS to improve cell life
Dimensions	W: 243 x L: 352 x H: 265mm
Weight	32kg
Mounting Fixtures	4x M8 mounting points for easy secure mounting

CELLS	
FEATURE	DETAILS
Cell Specification	12S2P Envision AESC Gen 4
Chemistry	Manganese Laminated Li-ion (LMNC)

ENVIRONMENTAL	
FEATURE	DETAILS
Enclosure	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 user selectable baud rate (proprietary message format) 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	Zivan, Victron, Delta-Q, TC-Charger, SPE. FOR Compatible models see user manual (Default: Zivan RE)
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	3.1.0.4
Bootloader	1.4.0.4

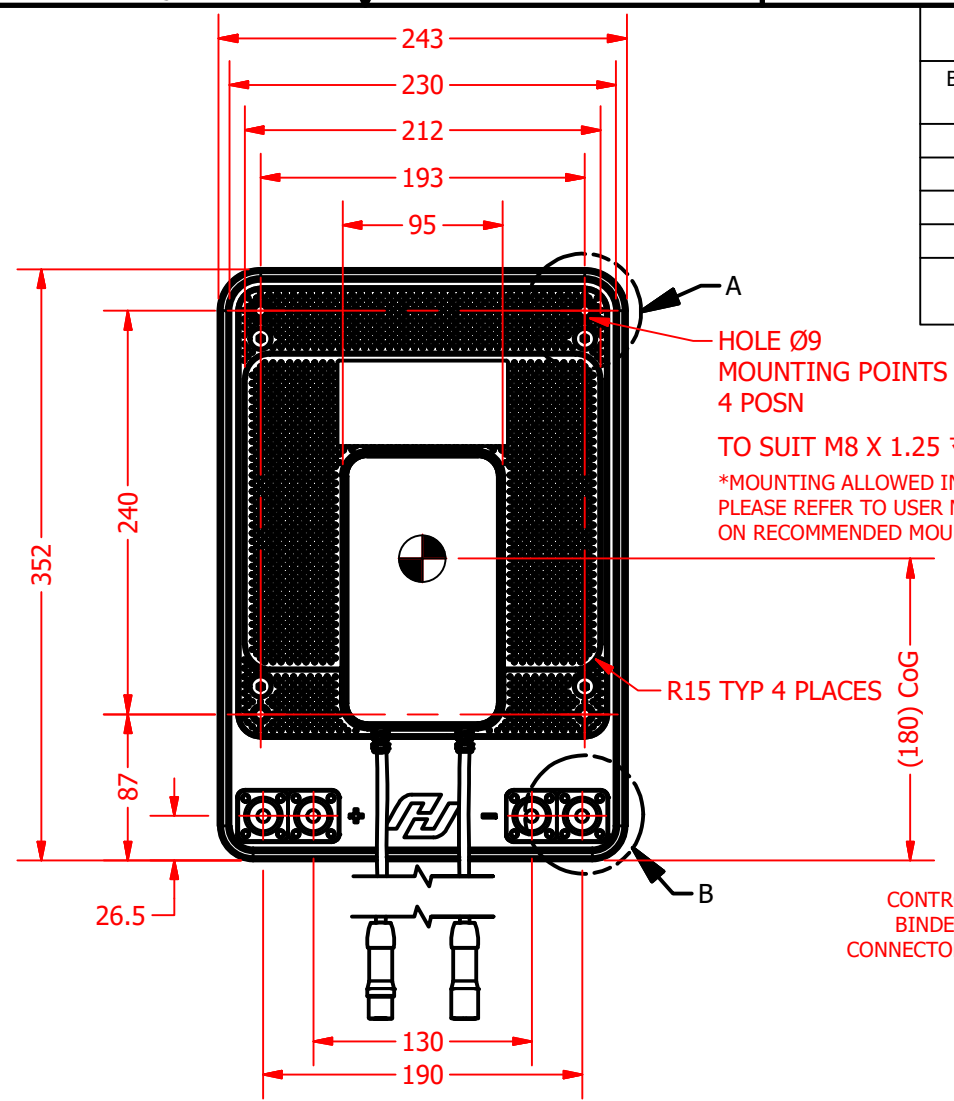
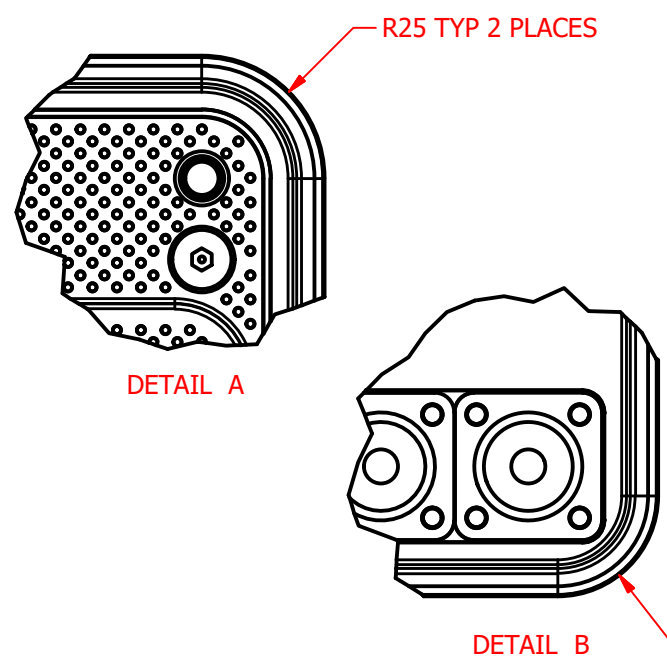
SYSTEM CONFIGURATION	
FEATURE	DETAILS
Max no. of Packs in Series	12
Max no. of Parallel Packs	127
External System Requirements	<ul style="list-style-type: none"> <li>External Protection Device (eg. Contactor) controlled by BMS Interlock</li> <li>One External Fuse per series string - (Max 150A rating)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

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Title: <b>HYP-00-2889 Product Information</b>		Material: <b>MIXED</b>	Sheet: <b>2 of 4</b>
Originator: <b>MC</b>	<b>07/05/2019</b>	Weight: <b>32 kg</b>	Size A3: 297 mm x 420 mm
Checked By: <b>JL</b>	<b>07/05/2019</b>	Scale: <b>DNS</b>	
Approved By: <b>SF</b>	<b>07/05/2019</b>	<b>THIRD ANGLE PROJECTION</b>	
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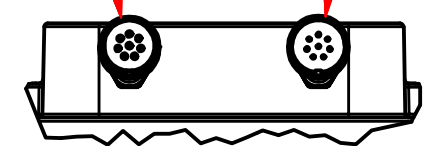


CONTROL CONNECTOR FEMALE - PINOUT	
BINDER 8 WAY (FEMALE)	DESCRIPTION
7	CAN H
2	CAN L
3	GND
1	ENABLE
6	CONTACTOR INTERLOCK (IN)

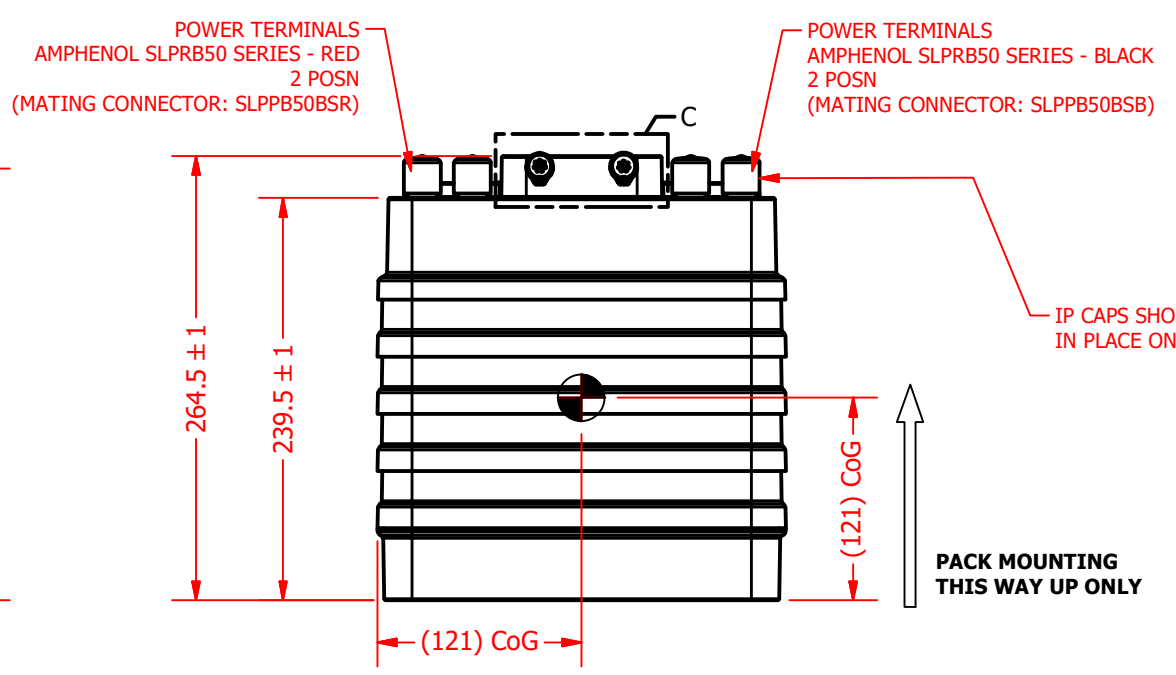
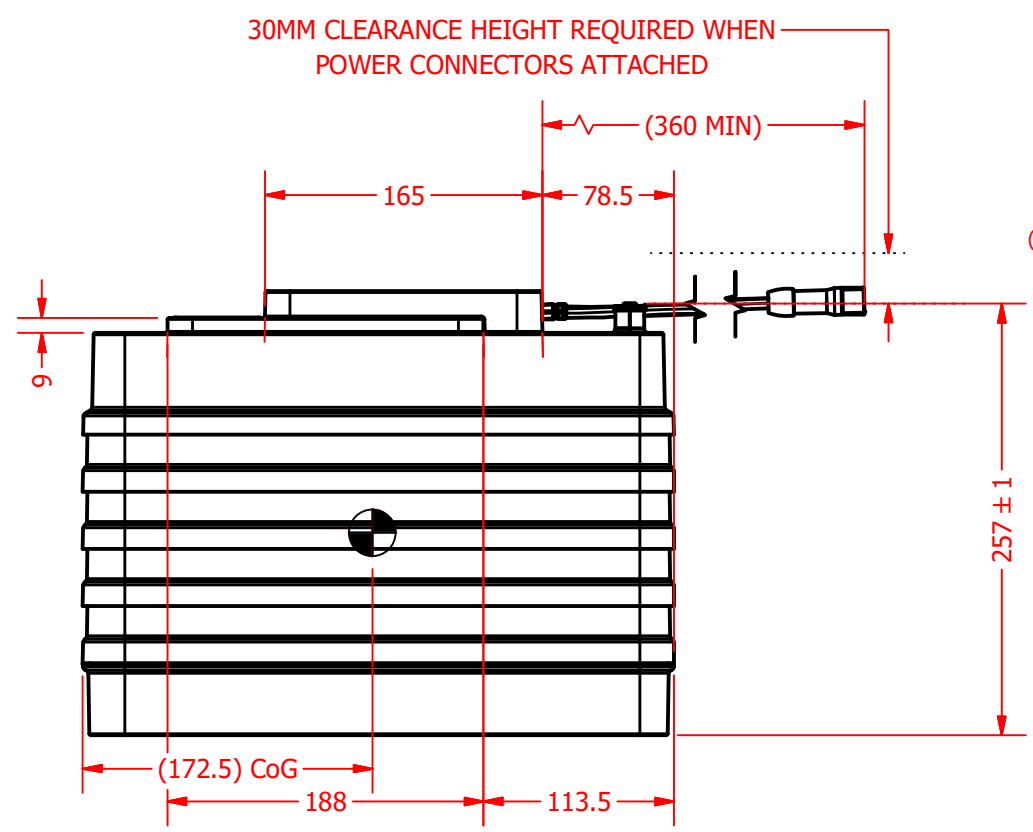
CONTROL CONNECTOR MALE - PINOUT	
BINDER 8 WAY (MALE)	DESCRIPTION
7	CAN H
2	CAN L
3	GND
1	ENABLE
6	CONTACTOR INTERLOCK (OUT)

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

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



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

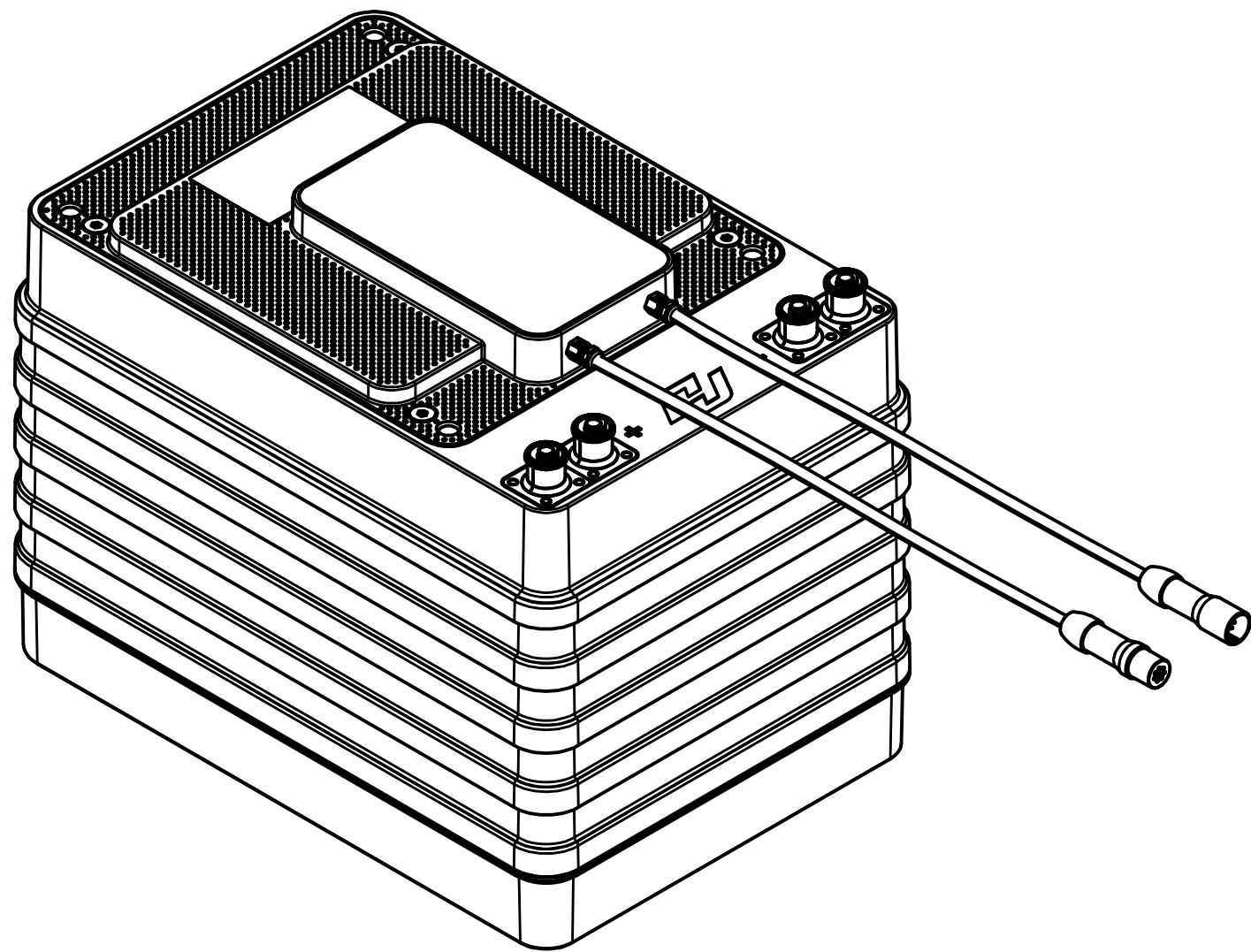


**\*\*\* DANGER! \*\*\***  
**BATTERY MUST NOT BE USED OUTSIDE OF APPROVED SYSTEM  
INCORPORATING PROTECTIVE DEVICES.**  
**REFER TO SUPPORTING DOCUMENTATION AS DETAILED ON SHEET 4 OF THIS DRAWING**

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**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-2889	R7	3D 'Packaging' Model

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