ENERGY SYSTEMS

Datasheet
11/2022

*illustration similar

3S HY-Di® Smart Batteries
HY-Di-3S2P-z1

- 3S Li-Ion Battery pack
- 10.8V nominal voltage
- 72Wh capacity and up to 8.8A discharge
- Fuel gauge with 4 LEDS
- SM-Bus or CAN-Bus interface
- IEC + UN certified, UL in preparation

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Content

3S HY-Di® Smart Batteries – HY-Di-3S2P-z1

Specifications

Item	Descriptions	Specifications		Remark
1	Model Number	HY-Di-3S2P-z1		z = communication bus
2	Cell	Panasonic NCR18650BF		
3	Configuration	3S2P		HY-Di-3S2P-S1 for SM-Bus HY-Di-3S2P-C1 for CAN-Bus
4	Nominal Voltage	10.8V		3.6V*3S
5	Nominal Capacity	3S2P: 6.7Ah		3.35Ah*2P=6.7Ah
6	Watt-Hour (UN38.3)	3S2P: 72Wh		12.06Wh*6pcs
7	Internal Resistance	tbd		
8	Recommended operation Temperature	Standard Charge Standard Discharge	0°C … +45°C -20°C … +60° C	
9	Storage condition	< one month < three months < one year	-20°C … +50°C -20°C … +40°C -20°C … +20°C	Percentage of recoverable capacity 80%
10	Charging Voltage (Maximum)	12.4V		
11	Charge Current	3S2P: <3.2A		
12	Discharge Current avg.	3S2P: 7.0A		
13	Discharge Current peak	8.8A		For 10min.
14	BMS Chip	TI BQ40Z50-R1		
15	BMS Design	(1) Over voltage protection (2) Under voltage protection (3) Over current protection (4) Short circuit protection (5) Over temperature protection (6) Under temperature protection (7) Cell balance (8) SM-Bus / CAN-Bus communication (9) Fuel gauge with 4 LEDs and 1 button		

3S HY-Di® Smart Batteries – HY-Di-3S2P-z1

Specifications

Item	Descriptions	Specifications	Remark
16	Connection type and pin definition	AMP 787614-1 5-pin 1: P+ 2: SCL/CAN-L 3: SDA/CAN-H 4: NC/PRESET 5: P-	
17	Parameter file	upon request	
18	Enclosure	PC+ABS, Sabic C6600, black, UL94-V0	
19	Weight (g)	3S2P: ~350 ±50g	
20	Dimension(mm)	3S2P: L134.5 * W80 * H22.5 (mm)	
21	IP standard	IP20	
22	Certifications	UN 38.3 7th edition IEC 62133-2:2017/AMD1 :2021 BS EN 62133-2 :2017/A1 :2021 IEC 60601-1-2:2014 BS EN 60601-1-2:2015 CE, UKCA	Transport test Safety UK Safety EMC UK EMC Confirmation of Conformity
23	Specifications SM-Bus	SM-Bus: SBS1.1	
24	Specifications CAN-Bus	CAN-Bus: HY-LINE_CAN_Protocol_3.0_Rev.2 500kBit/s	upon request

3S HY-Di® Smart Batteries – HY-Di-3S2P-z1

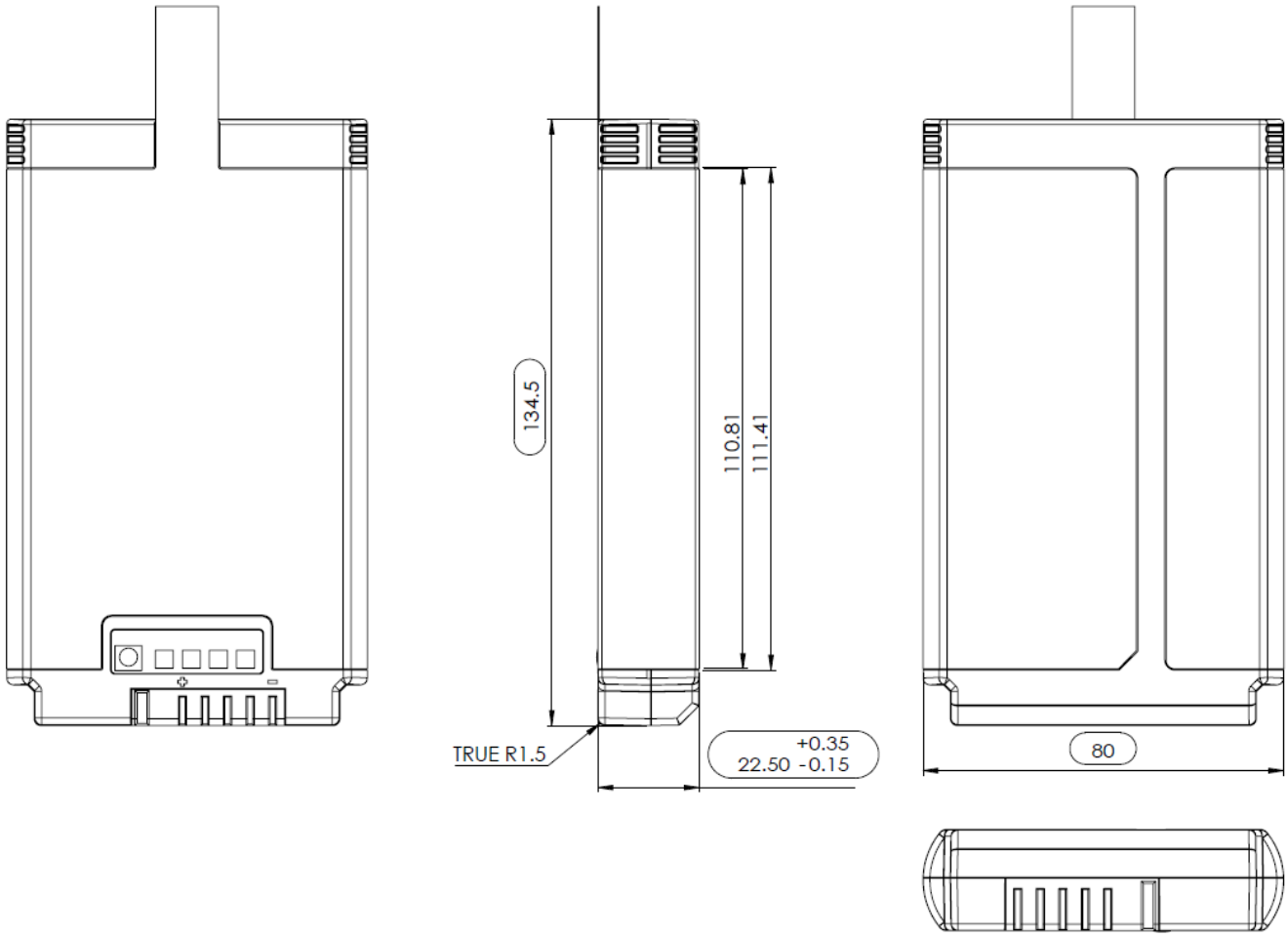
BMS specifications

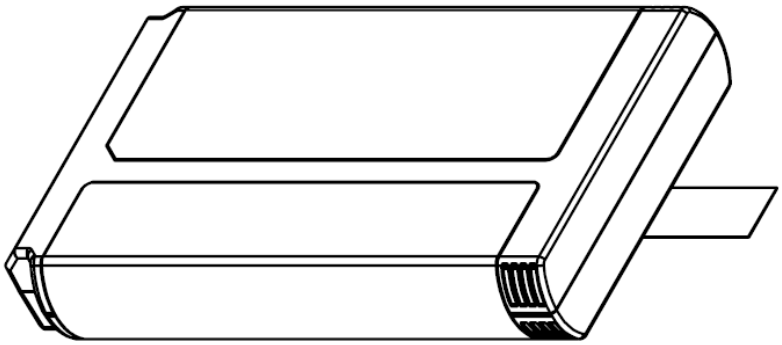
Item	Descriptions		Specification	Remark
1	PCM		4S-32A	
2	Dimension		71*18.8*1.2mm	
3	Material		FR4	
4	Over voltage protection	1st Over voltage threshold 1st Over voltage release 1st Over voltage delay time 2nd Over voltage threshold 2nd Over voltage release 2nd Over voltage delay time	4.25V 4.00V 2sec 4.35V no 10sec	Each cell Each cell Each cell PF
5	Under voltage protection	Under voltage threshold Under voltage release Under voltage delay time	2.70V 3.00V 2sec	Each cell Each cell
6	Over charge current protection	1st Over charge current threshold 1st Over charge current release 1st Over charge current delay time 2nd Over charge current threshold 2nd Over charge current release 2nd Over charge current delay time	3.50A (2P) -10mA / 10sec 2sec 4.50A (2P) -10mA / 10sec 2sec	OCC1 OCC OCC1 OCC2 OCC OCC2
7	Over discharge current protection	1st Over discharge current threshold 1st Over discharge current release 1st Over discharge current delay time 2nd Over discharge current threshold 2nd Over discharge current release 2nd Over discharge current delay time	-9.00A -200mA / 10sec 2sec -11.00A -200mA / 10sec 2sec	OCD1 OCD OCD1 OCD2 OCD OCD2
8	Short circuit protection	Short circuit in charge Short circuit in charge release Short circuit in discharge Short circuit in discharge release	18.5A External release -33.3A External release	ASCC ASCD1
9	Over temperature protection	Over charge temp. threshold Over charge temp. release Over discharge temp. threshold Over discharge temp. release	50°C 45°C 65°C 60°C	OTC OTC OTD OTD
10	Under temperature protection	Under charge temp. threshold Under charge temp. release Under discharge temp. threshold Under discharge temp. release	-2°C -2°C -20°C -15°C	UTC UTC UTD UTD

3S HY-Di® Smart Batteries – HY-Di-3S2P-z1

Mechanical

Drawing 3S2P Outlines in mm: 134.5 x 80 x 22.5



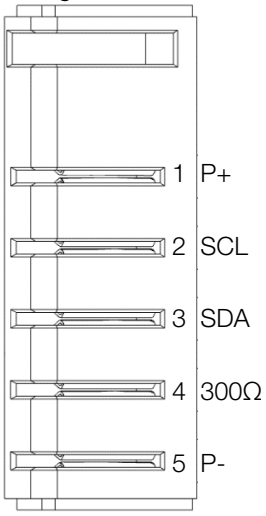


3S HY-Di® Smart Batteries – HY-Di-3S2P-z1

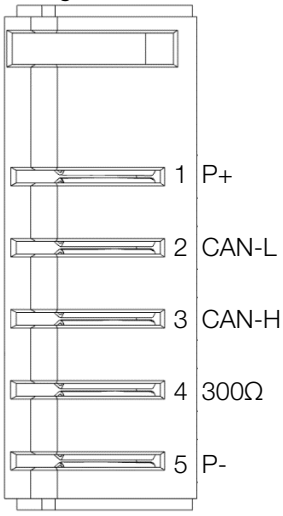
Connector

Type: AMP 787614-1 5-pin connector

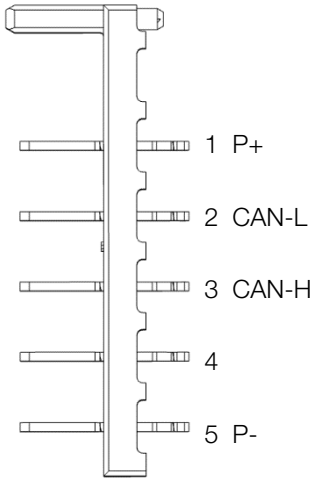
Configuration for SM-Bus



Configuration for CAN-Bus



Device Counterpart for CAN-Bus



Pin	SM-Bus	CAN-Bus
1	Battery +	Battery +
2	SM-Bus clock	CAN-low
3	SM-Bus data	CAN-high
4	300 Ω to P-	300 Ω to P-
5	Battery -	Battery -

Serial number code

Example: HY-Di-3S2P-S1-1-1521-00000

Part Number	Hardware Rev.	Production Date wwyy	Serial Number
HY-Di-3S2P-S1	-1	-1521	-00000

3S HY-Di® Smart Batteries – HY-Di-3S2P-z1

LED Definition

Charging status of LED (During charging)

No.	SOC	Description	LED Indicator
1	0 ~ 12% of SOC	1st LED is flashing fast	
2	13 ~ 24% of SOC	1st LED is flashing slow	
3	25 ~ 37% of SOC	1st LED is “On” / 2nd LED is flashing fast	
4	38 ~ 49% of SOC	1st LEDs is “On” / 2nd LED is flashing slow	
5	50 ~ 62% of SOC	1st ~ 2nd LEDs are “On” / 3rd LED is flashing fast	
6	63 ~ 74% of SOC	1st ~ 2nd LEDs are “On” / 3rd LED is flashing slow	
7	75 ~ 87% of SOC	1st ~ 3rd LEDs are “On” / 4th LED is flashing fast	
8	88 ~ 100% of SOC	1st ~ 3rd LEDs are “On” / 4th LED is flashing slow	
9	Fully Charged	1st/3rd LED are “On” / 2nd/4th LED are flashing fast	

Discharge status of LED (After pushing the button)

No.	SOC	Description	LED Indicator
1	0 ~ 12% of SOC	1st LED is flashing slow	
2	13 ~ 24% of SOC	1st LED is “On”	
3	25 ~ 37% of SOC	1st LED is “On” / 2nd LED is flashing slow	
4	38 ~ 49% of SOC	1st/2nd LED are “On”	
5	50 ~ 62% of SOC	1st/2nd LED are “On” / 3rd LED is flashing slow	
6	63 ~ 74% of SOC	1st ~ 3rd LEDs are “On”	
7	75 ~ 87% of SOC	1st ~ 3rd LEDs are “On” / 4th LED is flashing slow	
8	88 ~ 100% of SOC	1st ~ 4th LEDs are “On”	

3S HY-Di® Smart Batteries – HY-Di-3S2P-z1

Photos

Product Family (*illustration similar)

Accessoires

Item	Part number	Remark
Dual Bay Charger	HY-Di-CHG-A1	suitable for 2S, 3S and 4S HY-LINE batteries
Battery PC Interface	HY-Di-HBI-A1	for SM-Bus and CAN-Bus
Cable CAN-Bus	HK-HBI-CAN01	Connection cable for HY-LINE Smart Battery to Battery Interface with AMP Con for CAN-Bus
Cable SM-Bus	HK-HBI-SM01	Connection cable for Smart Battery to Battery Interface with AMP Con for SM-Bus
Cable HBI to terminal block 5pin	HK-HBI-Multi01	Connection cable HBI to terminal block (5pin), CAN- and SM-Bus
Cable HBI to charger	HK-HBI-CH01	Connection cable HBI to HY-LINE Smart Battery Charger (HY-Di-CHG-A1)
Cadex C7 adapter	07-111-7080-00	CADEX Adapter for HY-LINE Smart Batteries to CADEX C7x00 battery analyser
Counterpart connector for battery connector AMP 787614-1	5787419-1  5787446-1 	AMP DC Jack Connectors, Board-to-Board, 5 Positions, Pitch 5mm, with flange AMP DC Jack Connectors, Board-to-Board, 5 Positions, Pitch 5mm

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Safety Instructions

- Never disassemble or modify the battery pack.
- Do not pierce the battery pack with a nail, strike it with a hammer, step on it or otherwise subject it to strong impact.
- Do not immerse the battery in water or sea water or get it wet.
- Do not use or leave battery nearby fire, stove or heated place (more than 80°C)
- Do not store the battery in high humidity or in the place with which may expose the battery to rain or water.
- The product will shut down and no output if the product is interfered by EMC. After removing and installing, the product will be workable normally.
- Careful consideration of this information is essential when stacking or collocating equipment and when routing cables and accessories.
- Please do not use any other cables or accessories not approved by the manufacturer in this manual to avoid negative influence on electromagnetic compatibility.
- This equipment is not intended for use in residential environments and may not provide adequate protection to radio reception in such environments.
- The produce is a steady DC output power source, it does not produce noise to interference the ME equipment. The product involves components for Antistatic (ESD) to prevent ESD destruction. And apply multiple layers (4 layers) for PCB to enhance the strength to resist external radiation. The product has a strong surge absorption capacity to prevent EFT. The product also has been passed IEC62133 2nd certification and relevant tests.
- Electric devices may interact due to electro-magnetic radiation. We recommend a safety distance of at least 1-metre especially for sensitive equipment. RF mobile communications equipment can affect medical electrical equipment. Medical electrical equipment needs special precautions regarding EMC and needs to be installed according to the EMC information provided.

Charging:

- It is not allowed that the battery pack voltage is out of the specification.
- It is not allowed that the charge current is out of the specification.
- It is not allowed that the battery pack temperature is out of specification.
- It is not allowed that the battery pack cannot operate suddenly although the battery pack voltage, charge current and temperature is within the specification.

Discharging:

- It is not allowed that the battery pack voltage is out of the specification.
- It is not allowed that the charge current is out of the specification.
- It is not allowed that the battery pack temperature is out of specification.
- It is not allowed that the battery pack cannot operate suddenly although the battery pack voltage, charge current and temperature is within the specification.

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ENERGY SYSTEMS

HY-LINE AG

HY-LINE AG belongs to the HY-LINE group, a group of specialized distributors.
HY-LINE AG is a specialist in batteries and systems. In addition to standard batteries and charging and maintenance systems, the focus is on the development and design of custom-specific batteries and systems.

HY-LINE Power Components Vertriebs GmbH

HY-LINE Power Components is part of the HY-LINE Group, a group of specialized distributors.
HY-LINE Power Components supplies all core parts and components for power electronics and power supply technology. As a highly specialized distributor and manufacturer representative, HY-LINE Power Components has extensive application-specific know-how and provides support already during the design phase in the selection of components and the configuration of coordinated subsystems.