PRODUCT SPECIFICATION

Product Name: High Voltage Box

Product Model: TB-PDU1020

Version: V1.1

Compiler: Jason	Reviewer: Ethan	Ratify: Gary
2026-5-1	2026-5-2	2026-5-3

The copyright of this document belongs to Shenzhen Tringo Control Co., Ltd., and it shall not be copied without written approval!

Revision Record

Date	Revised Version	Revision Note	Reviser
2026-5-1	V1.0	Newly formulate	Jason
2026-7-1	V1.1	Update 4.1 Structural Dimensions	Jason

Catalog

1. Overview 4
1.1. Introduction 4
1.2. Model Description 4
1.3. Application environment 4
2. Function & Configuration 5
3. Key components List 6
4. Product Structure 7
4.1. Structural Dimensions 7
4.2. Port definition 7
5. Schematic diagram 9
6. Precautions 9

1. Overview

1.1. Introduction

TB-PDU10xx series high-voltage box is designed as a battery cluster-level power circuit management and protection unit for DC energy storage systems. It integrates voltage and current collection, circuit control, fault protection, and status monitoring, providing a safe and reliable high-voltage connection and intelligent management between the battery cluster and the Power Conversion System (PCS).

The rated DC voltage of this series is up to 1000 VDC, with a rated current of 200A.

1.2. Model Description

TB-PDU1020：

Battery cluster total voltage ≤ 1000 VDC, rated current ≤ 200 A

1.3. Application environment

Index item	Parameter
Use ambient temperature range	-20℃ ~ 70℃
Storage environment temperature range	-40℃ ~ 85℃
Use ambient humidity range	5 ~ 95（45℃±2℃）%RH
Storage environment humidity range	≤95（45℃±2℃）%RH
Atmospheric pressure	76 ~ 106 Kpa
Altitude	≤2000 m
Heat dissipation mode	Natural heat dissipation
IP rating	IP20

2. Function & Configuration

Function	Cell Type	☑LFP □LMO ☑LTO ☑ NMC（Mark：support）
	Cell Capacity	☐50AH ☐100AH ☐150AH ☐200AH ☑280AH ☐314AH
	Display	☐Touchscreen (7inch) ☑Touchscreen (4.3inch) Optional
	Relay	☑Equipped with 4 relays by default (main contacts: Normally Open)Includes: charge, discharge, pre-charge, and negative relays ☐Other： Charge Relay： ☑NC(Default) ☑NO ☐No auxiliary contact Discharge Relay： ☑NC(default) ☑NO ☐No auxiliary contact Pre-charge Relay： ☐NC ☐NO ☑No auxiliary contact（default) Negative Relay： ☑NC (default) ☐NO ☐No auxiliary contact
	Shunt Trip Unit	☐None ☑Default logic ☐Custom logic Definition：The shunt trip remains closed under normal conditions. It will open when any of the following conditions is met: 1）Emergency Stop (E-Stop), Level-3 fault 2）Fire alarm, Level-3 fault 3）When a Level-3 charge or discharge fault occurs and the corresponding current direction (charge/discharge) absolute value ≥ 10 A, the shunt trip will open after a 3-second delay. If the current drops below the threshold or the fault is cleared during the delay, the trip action will be cancelled.
	Insulation monitoring	☑Enabled ☐UPS Disabled(default for UPS)
	BMU cell Strings per Pack	12S，16S，20S，32S，48S，52S，64S（optional）
	Power supply	☐AC/DC power module ☑DC/DC power module：24V（DC/DC connected to

	mode	BAT+） ☐Others：____
Communication	Communication Interface	☑Independent RS485 ☑Independent CAN
	Firmware Upgrade Method	☑RS485-1 ☐CAN-2

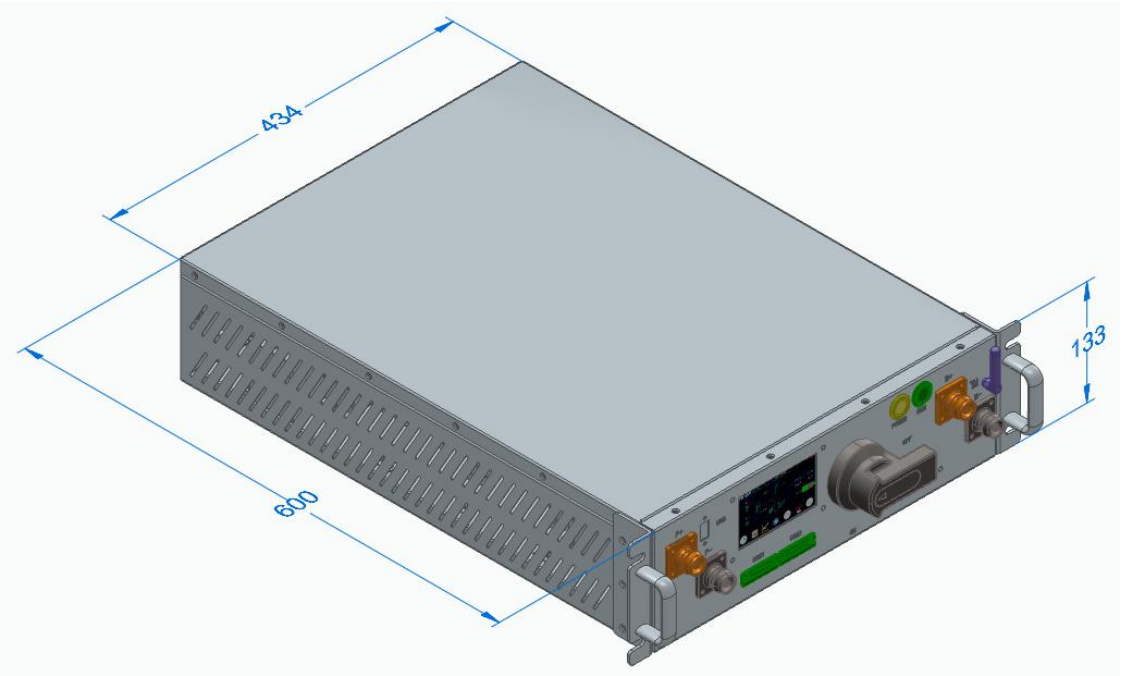
3. Key components List

No.	Component	Qty.	Unit	Sign	Function
1	Control Board	1	PC	BCU	Brand: TG-EP Battery Cluster Master Control Board
2	Display	1	PC	Display	Brand: TG-EP
3	Circuit Breaker	1	PC	QF1	Manual switching and automatic tripping for battery cluster circuits
4	Pre - charge Contactor	1	PC	K1	Automatic switching for pre-charge circuits
5	Main circuit Contactor	3	PC	K2/K3/K4	Automatic switching for battery cluster positive/negative circuits
6	DC Fuse	1	PC	FU1	Overcurrent protection for main circuits
7	Pre - charge Resistor	1	PC	R1	Current limiting for pre-charge and circulation circuits
8	DC Fuse	1	PC	FU2	Control power supply switching
9	DC Shunt	1	PC	R2	Current measurement
10	DC/DC power supply	1	PC	DC/DC	Power supply for BCU
11	Diode	2	PC	D1/D2	controls the direction of charging and discharging current, ensuring circuit protection and safety.

4. Product Structure

4.1.Structural Dimensions



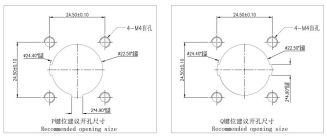


4.2.Port definition

Port Definition	Description	Remarks
B+	Battery cluster positive input	input Connect to battery cluster positive terminal
B-	Battery cluster negative input	Connect to battery cluster negative terminal

P+	High-voltage box positive output	Output from HV box to PCS positive terminal
P-	High-voltage box negative output	Output from HV box to PCS negative terminal
RUN Button	Software start button	Controls relay close/open
POWER Button	Power switch	BMS power switch button, controls BMS power on/off

Note: The power connectors adopt Huzheng connectors. Detailed specifications are as follows:

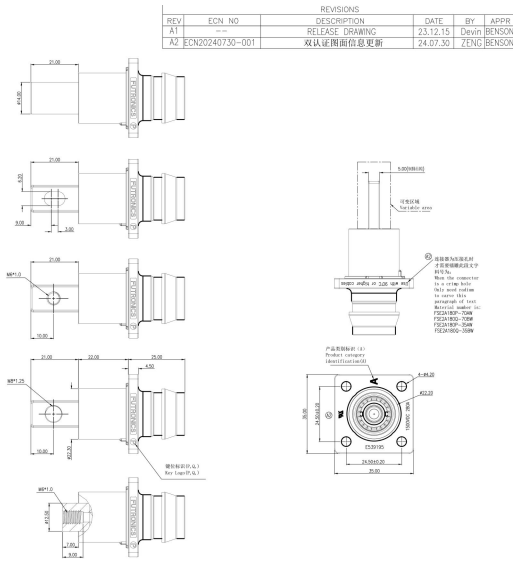


NOTE:
1. 外观表面无划痕、划伤、污渍，异物等缺陷
No scratches, scratches, stains, foreign matter and other defects on the appearance surface
2. 产品功能说明参考TABLE 1
Product Function Description Reference TABLE 1
3. 产品使用PE袋+纸箱包装
Products are packaged in PE bags + cartons
4. 产品符合ROHS
Products conform to ROHS
5. M4组合螺丝锁紧面板扭矩为0.90~1.1N.M
Torque of M4 combination screw locking panel is 0.9~1.1N.M
6. 要求使用带"瞬间制动"（达到设定扭力后即停止，并发出嗒嗒声）电批锁螺丝,不可使用无"瞬间制动"电批，若无符合上述要求之电批，可使用扭力扳手
We should use the electric screwdriver with "instant brake" (stop immediately after reaching setting torque and make a click) to lock screw , and the screwdriver without "instant brake" cannot be used.if there is no screwdriver with "instant brake",can use Torque spanner



TABLE 1:

项目 items	规格 SPEC
额定电流 rated current	UL:180A/230A/280A TUV:200A/250A/300A
接线规格 Wiring specifications	35mm²、2AWG;50mm²、1/0AWG;70mm²、2/0AWG 均需使用镀锡线缆Use tin-plated cables
工作电压 Operating voltage	DC1500V
工作温度 Operating temperature	-40°C~+125°C
温升 Temperature rise	UL:MAX 45K TUV:MAX 55K
耐电压 breakdown voltage	6800V AC
绝缘电阻 Insulation resistance	5000MΩ MIN(干燥 drying) 200MΩ MIN(RH 95%)
接触电阻 Contact resistance	0.3 mΩ max
寿命 Durability life	500次 500cycling
盐雾 salt fog	144H（配合状态下 Matching state）
防护等级 Protection Level	IP67B
端子材质 Terminal material	铜合金 Copper alloy
防火等级 Fire rating	UL94-V0
M8扭矩 M8 torque	安装扭矩(locking torque)5.0~5.5N.M
M6扭矩 M6 torque	安装扭矩(locking torque)4.0~4.5N.M



REVISIONS					
REV	ECN NO	DESCRIPTION	DATE	BY	APPR
A1	--	RELEASE DRAWING	23.12.15	Devin	BENSON
A2	ECN20240730-001	双认证图面信息更新	24.07.30	ZENG	BENSON

ITEM	PART NUMBER	Qty	DESCRIPTION	REMARK

MATERIALS LIST

UNLESS OTHERWISE SPECIFIED
1) All dimensions are in metric(mm).
2) Tolerances are as follows:
1 PL DEC ±1.00
2 PL DEC ±0.50 Fractions ±1/64
3 PL DEC ±0.25 Angles ±2°

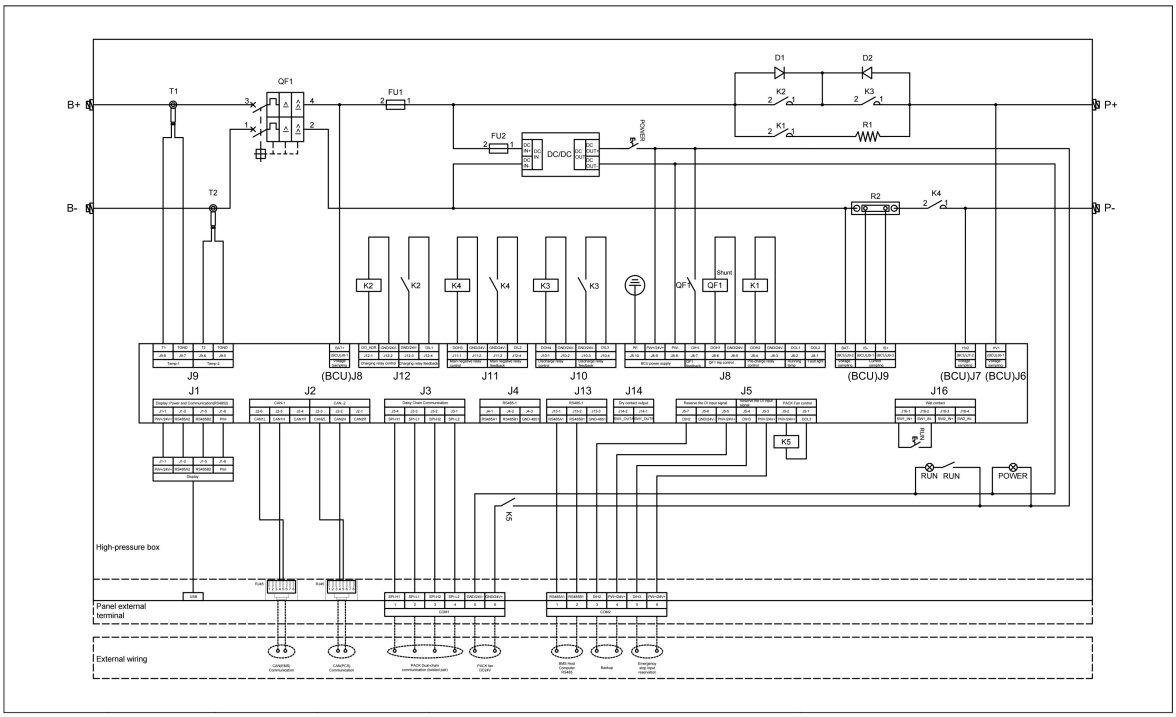
MATERIAL SPECIFICATIONS: SEE TABLE
DRAWING TYPE: COSTOMER DRAWING

签名 SIGNATURE		日期 DATE
制 图 DRAWN	ZDG	24.07.30
审 核 CHECKED		
工 艺 ENGINEER		
批 准 APPROVAL		
客 户 CUSTOMER		

THIS DRAWING IS SUPPLIED FOR INFORMATION ONLY. DESIGN FEATURES, SPECIFICATIONS AND PERFORMANCE DATA SHOWN HEREON ARE THE PROPERTY OF THE FUTRONICS CORPORATION. NO RIGHTS OF REPRODUCTION ARE IMPLIED. ALL DIMENSIONS ARE SUBJECT TO NORMAL MANUFACTURING VARIATIONS.

琥正电子科技有限公司
FUTRONICS
8.0单芯连接器插座（IP67防）大法兰（带防呆）
PART NO: FSE2A180()-()()()W
第三角投影 THIRD ANGLE PROJECTION
文件编号 FSCM NO. 幅 面 SIZE 质 量 MASS 版次 REV. 比 例 SCALE
A4 9 A2 1:1
SHEET 1 OF 2
DWG NO. F-FSE2A180()-()()()W

5. Schematic diagram



6. Precautions

- Prevent electrostatic discharge, moisture, and water ingress during use.
- Ensure correct polarity when connecting battery modules; reverse polarity is prohibited.Verify full insertion of terminals during harness-to-module connections.
- Avoid excessive power harness lengths and crossing with communication cables.
- Wear insulating gloves when handling HV terminals (Total Positive/Negative).
- Confirm input voltage is within specifications before powering on the HV box.
- Never touch HV terminals while the unit is energized.
- Strictly follow sequential power-on/shutdown procedures.
- Use twisted-pair shielded cables for CAN/RS485 communication.
- The Company reserves the final right to interpret this document.

Shenzhen Tringo Control Co., Ltd.

Company add（RD center): 4F, Bldg.4, Nantai Yunchuang Valley, Fenghuang Str., Guangming Dist., Shenzhen, CN

Web：www.tg-ep.com

Our company reserves the right to modify the equipment parameters without prior notice.