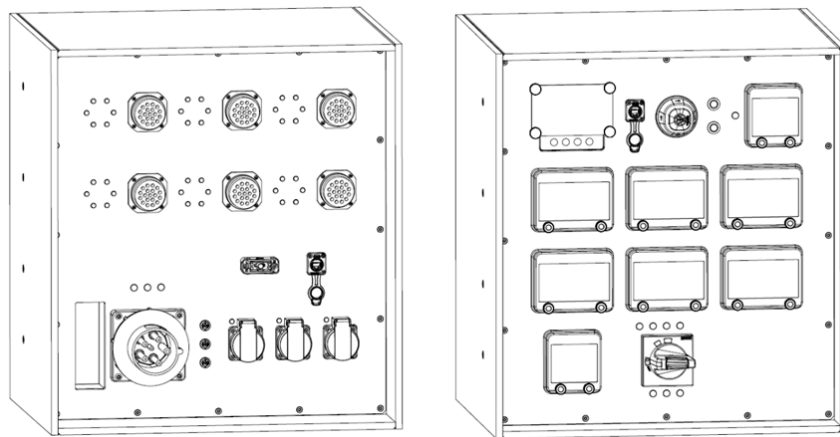




TESLA TECH
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USER MANUAL

FOR TTPF63-001 SERIES POWER DISTRIBUTION UNIT



Dear Customer,

Thank you for choosing a Tesla Entertainment Kft. product and for your trust in the Tesla Tech brand. We appreciate your commitment to quality and professional power solutions. At Tesla Tech, our mission is to provide you with dependable, high-performance power distribution systems, supported by exceptional service both before and after purchase, and throughout the entire product lifecycle.

This user manual contains essential information on the safe installation, operation, and maintenance of your device. Please read it carefully before use to ensure reliable performance and to prevent injury or damage.

⚠ Important Notice: By operating this device, the user confirms that they have read and understood this manual and are familiar with all safety instructions. The unit must only be used in accordance with the procedures and safety measures described herein.

⚠ Warning: Do not attempt to operate, open, or service the unit before reading this manual in full. Keep this guide for future reference, it contains information necessary for safe operation and maintenance.

Yours faithfully,
Daniel Korponai
Managing Director

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1. General Safety Instructions

This section contains essential safety instructions that must be followed during the installation, operation, and maintenance of this device. Failure to observe these instructions may result in electric shock, fire, personal injury, or equipment damage.

The device must only be operated by persons who have received appropriate electrical safety and accident prevention training and who are physically and mentally fit for the task. The operator is responsible for ensuring safe and compliant operation of the device in accordance with this manual and applicable regulations.

Tesla Entertainment Kft. assumes no liability for damage or malfunction resulting from improper use, modification, or non-compliance with these instructions.

**Risk of Personal Injury or Industrial Accident:**

Failure to follow the safety instructions in this manual may result in serious injury, electric shock, or property damage. Always adhere to prescribed procedures when handling, installing, or maintaining this device.

**Risk of Electric Shock:**

Hazardous voltages are present inside the unit. Failure to comply with this manual may result in severe or fatal electric shock. Work on live components must only be performed by qualified electricians authorized to work on low-voltage systems.

1.1 Intended Use

- This Power Distribution Unit (PDU) is designed exclusively for **professional use** in temporary or mobile power systems such as **events, film production, touring, or industrial applications**.
- The device must only be operated within its specified technical ratings (voltage, current, and IP protection).
- Any use outside these limits, including operation in explosive atmospheres, constitutes **improper use** and releases Tesla Entertainment Kft. from any liability for resulting damage or injury.

1.2 Workplace Safety

- Keep the work area clean, organized, and free from obstacles. Loose tools or cables may cause tripping hazards.
- Position the device so that it does not obstruct walkways, exits, or vehicle routes.
- Ensure adequate lighting, accessibility, and a stable, level surface at the installation site.

1.3 Electrical Safety

- Before connecting the device, verify that **protective earthing (PE)** is properly installed and that the mains socket or power source is in good condition.
- Confirm that the **supply voltage and frequency** match the rated values specified on the device's identification label.
- The **total connected load** of all connected equipment must not exceed the rated current and power specified on the device's identification label.
- **Do not open or disassemble** the device. There are **no user-serviceable parts inside**. Internal components may remain energized even after disconnection.
- Any form of **unauthorized modification** or repair is strictly prohibited.
- Protect the device from **heat sources, direct sunlight, and moisture**.
- Do not cover the device or ventilation openings or place objects on the device.
- In environments with strong sunlight or temperature fluctuations, **condensation** may form inside the unit; ensure the device is operated according to this user manual.
- Avoid running cables over sharp edges, tight bends, or high-traffic areas.
- Regularly inspect all power cables and connectors. Do not use the device if any part is damaged.
- Never lift, suspend, or pull the device by its cables.
- For outdoor applications, connect only equipment that is **rated and certified for outdoor use**.
- Do not allow the device to stand in water or other conductive liquids.
- Avoid strong impacts, vibration, or dropping the unit, as this may cause internal damage.
- Repairs must only be performed by qualified personnel **using original Tesla Tech spare parts**.
- Always disconnect the device from the mains before performing any maintenance, repair, or part replacement.
- Electrical safety inspections shall be carried out at regular intervals in accordance with applicable national regulations (e.g., HD 60364 or local equivalents). Refer also to the **6. Maintenance** section of this manual.

1.4 Personal Safety

- Keep unauthorized persons, especially **children**, away from the operating area.
- When not in use, store the device in a **dry, dust-free environment**, out of the reach of children.
- Allow only **trained and authorized** personnel to operate the PDU.
- To prevent unintentional startup, always switch connected equipment off before connecting or disconnecting it from the PDU.
- Do not operate the device in **explosive or flammable** environments.
- Never operate the device under the influence of **alcohol, drugs, or medication** that may impair judgment or reaction time.

1.5 Environmental Safety

- Operate the device only within its specified **IP protection class**.
- For outdoor or semi-outdoor use, ensure that all **unused sockets and inlets** are securely closed with their protective lids.
- When connectors are in use, ensure that only **properly mated, IP-rated plugs or cable assemblies** are used, maintaining the device's overall ingress protection level.
- The declared IP rating applies **when all covers are closed** or **when compatible IP-rated connectors** are properly engaged.
- Avoid operation in environments with excessive **dust, humidity, corrosive vapors, or strong vibrations**.
- Protect connectors from **direct exposure to rain** when not mated.

2. General Information

Abbreviation	Term
AUX	Auxiliary output connector
BKS	Bypass Key Switch
CEE	Industrial plug and socket system. The term CEE is based on the IEC 60309 specification (formerly IEC 309 and CEE17, also published by CENELEC as EN 60309), an international IEC standard for "plugs, sockets and couplers for industrial purposes"
E-Stop	Emergency Stop Pushbutton
HDPE	High-Density Polyethylene
MCCB	Molded Case Circuit-Breaker
PDU	Power Distribution Unit
PMD	Power Monitoring Device
RCBO	Residual Current Circuit-Breaker with Overcurrent Protection
Syntax® SSX	Professional 19-pin connector system compatible with Socapex® SL419 series, the Syntax SSX series.
STR	Shunt trip release
VMR	Voltage Monitoring Relay

2.1 General Overview

The TTPF63-001 Series is a professional portable power distribution unit (PDU) designed for high-reliability operation in **event, film, broadcast, and industrial** environments.

The enclosure is made from **UV-resistant, water-repellent black HDPE** with a structured surface, and securely mounted inside a custom flightcase. This dual-layer construction combines rugged protection and portability, offering **IP54** protection suitable for safe operation in both **indoor and semi-outdoor** conditions.

Rear Panel Components

- 1 x 63A three-phase five-pole CEE type input plug,
- 3 x phase presence indicator white LED, that indicates the presence of phase voltage (L1, L2, L3),

- 3 x 16A single-phase three-pole (AUX 1 ... 3) AUX connectors (refer to 2.4 AUX Connectors),
- 3 x RCBO "I / ON" state phase indicator green LED for AUX connectors,
- 6 x 16A three-phase nineteen-pole (Soca 1 ... 6 | Channel 1 ... 6) Syntax® SSX 19 Pin type connectors with IP67 protective caps,
- 36 x RCBO "I / ON" state phase indicator green LED for Syntax® SSX connectors,
- 3 x fuse holders for independent auxiliary circuits (e.g. phase indicator white LEDs and working light power supply unit),
- 1 x Han® GND grounding connector
- 1 x etherCON® TOP RJ45 CAT5e connector.

Front Panel Components

- 1 x PAC3220 Power Monitoring Device (PMD)
- 1 x etherCON® TOP RJ45 CAT5e connector
- 1 x illuminated Emergency Stop Pushbutton (E-Stop) with shunt trip release (STR) control for MCCB
- 1 x fault indicator red LED linked to the voltage monitoring relay (VMR) output, with Bypass Key Switch (BKS)
- 1 x extended rotary handle for the 3VA11 type 63A four-pole MCCB
- 3 x phase indicator white LED (L1, L2, L3)
- 3 x MCCB "I / ON" state phase indicator green LED
- 1 x MCCB "TRIP" state indicator red LED
- 2 x illuminated switches for front and rear working lights.

Under the Hinged Windows

- 3 x C16A 30mA two-pole (1P+N) A-type RCBO for AUX connectors¹,
- 36 x C16A 30mA two-pole (1P+N) A-type RCBO for Syntax® SSX 19 Pin type connectors
- 1 x voltage monitoring relay (VMR) with bypass key switch (BKS).

All monitoring, emergency, and lighting functions (PMD, VMR, E-Stop, front and rear working lights, indicator LEDs) are powered via an independent fused auxiliary circuit, ensuring visibility and diagnostic capability even if the main MCCB is tripped.

The PDU is designed for safe and efficient power distribution in demanding applications such as film production, live events, or temporary construction site environments.

¹ For J1 type AUX connector, RCBO is C10A 30mA 2P (1P+N) A-type. For G1 type AUX connector, RCBO is C13A 30mA 2P (1P+N) A-type. For B1 type AUX connector, RCBO is C13A 30mA 2P (1P+N) A-type.

2.2 Technical Data

The following section lists the key **technical specifications** for the TTPF63-001 Series. All parameters are verified according to the relevant IEC/EN standards for low-voltage switchgear and controlgear assemblies.

Parameter	Specification
Rated voltage (U_n)	400VAC, 3P+N+PE
Rated current (I_{nA})	63A
Rated frequency (f_n)	50/60Hz
Maximum continuous load	43kVA ² (43kW at $\cos\varphi = 1$)
Rated diversity factor (RDF)	0,30
Rated conditional short-circuit current (I_{cc})	25kA (in accordance with EN 60898)
Protection class	Class I (protective earth)
Ingress protection	IP54 (enclosure closed)
Impact resistance	IK10 (Enclosure)
Input	1x CEE 63A 5P
Input protection	1x Main MCCB 63A 4P with extended rotary handle 1x Emergency stop pushbutton (E-STOP) ³ 1x Voltage monitoring relay (VMR) ⁴
Output	3x AUX connector 16A 3P (refer to 2.4 AUX Connectors) 6x Syntax [®] SSX 16A 19P connector with IP67 protective cap 1x Han [®] GND connector
Output protection	3x RCBO C16A 30mA 2P (1P+N) A-type ⁵ for AUX connectors 36x RCBO C16A 30mA 2P (1P+N) A-type for Syntax [®] SSX connectors
Phase indicator	6x Phase presence indicator white LED

² At 30 °C ambient air temperature.

³ Operation with shunt trip release (STR).

⁴ Operation with shunt trip release (STR) and with bypass key switch (BKS).

⁵ For J1 type AUX connector, RCBO is C10A 30mA 2P (1P+N) A-type. For G1 type AUX connector, RCBO is C13A 30mA 2P (1P+N) A-type. For B1 type AUX connector, RCBO is C13A 30mA 2P (1P+N) A-type.

Parameter	Specification
	3x RCBO „I / ON“ state phase indicator green LED for AUX connectors 36x RCBO „I / ON“ state phase indicator green LED for Syntax® SSX connectors
Fault indicator	1x MCCB „TRIP“ state indicator red LED 1x VMR fault indicator red LED
Measuring device	1x PAC3220 power monitoring device (PMD) with 3x100/5A current transformer
Measuring device communication	2x etherCON® TOP RJ45 CAT5e connector
Illumination	1x Front working light with switch 1x Rear working light with switch
Material	UV-resistant, water-repellent black high-density polyethylene (HDPE) with a textured surface and securely mounted inside a custom flightcase
Operating temperature⁶	-25 °C to +40 °C
Storage temperature	-25 °C to +40 °C
Weight	57kg (including flightcase)
Dimensions	765 x 565 x 650 in mm (Height x Width x Depth) including flightcase
Certification	CE EN 61439 (Part 1 & 4)

⁶ The average ambient temperature over a 24-hour period not exceeding 35 °C (in accordance with IEC/EN 61439 recommendations). Relative humidity: Maximum 100% at ambient temperatures from -25 °C to 27 °C, decreasing to 60% at 35 °C and 46% at 40 °C, non-condensing (in accordance with IEC/EN 61439 recommendations). Maximum installation altitude: ≤2000 m above sea level.

2.3 Cross-Section of Wires

All internal wiring uses **H07V-K or equivalent** flexible conductors, to ensure maximum flexibility, insulation integrity, and compliance with IEC 60228 standards for fine-stranded copper conductors. The conductor cross-sections are dimensioned according to the rated load current for each circuit as shown below.

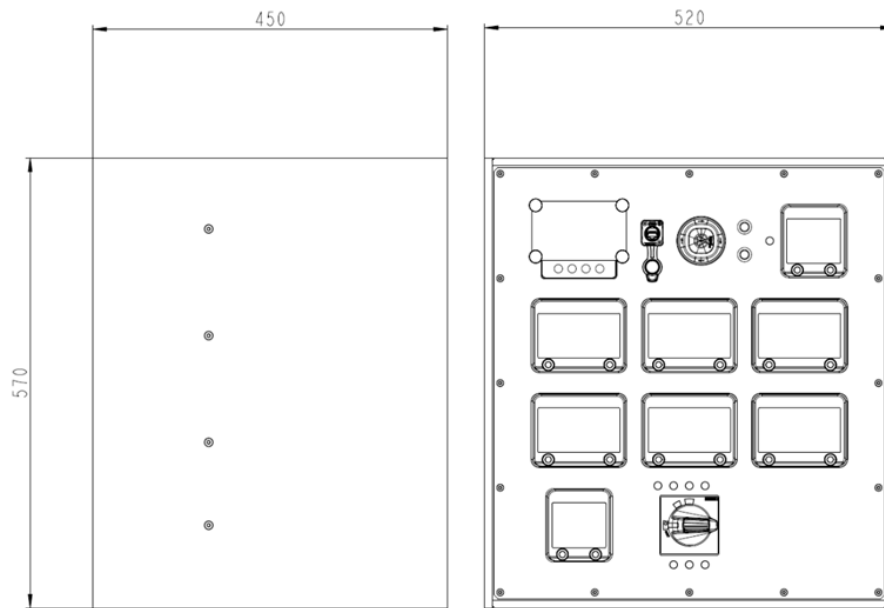
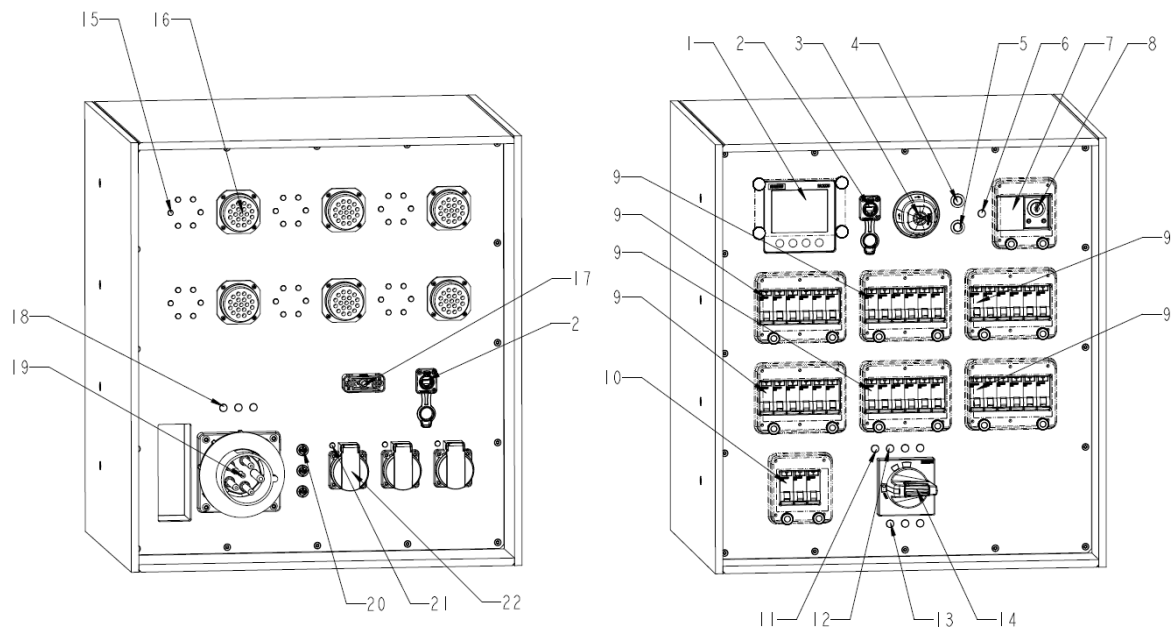
Connector type	Cross-section
CEE 63A	16mm ²
AUX	2,5mm ²
Syntax® SSX 16A	2,5mm ²
Han® GND	16mm ²

2.4 AUX Connectors

The following **AUX connector configurations** are available for this model. Each variant is defined by its national or regional standard, rated current, and ingress protection class.

Code	Type	Rated Current	IP Code ⁷
F1	German / Austrian (Type F)	16A	IP54
F2	German / Austrian with gasket (Type F)	16A	IP54
E1	French / Belgian (Type E)	16A	IP44
G1	British (Type G)	13A	IP44
P1	powerCON® TRUE1 with sealing self-closing cap	16A	IP65
J1	Swiss T13 (Type J)	10A	IP54
J2	Swiss T23 (Type J)	16A	IP54
B1	USA / Canada (Type B)	15A	IP44
K1	Danish (Type K)	16A	IP44
CE	CEE 6h	16A	IP54

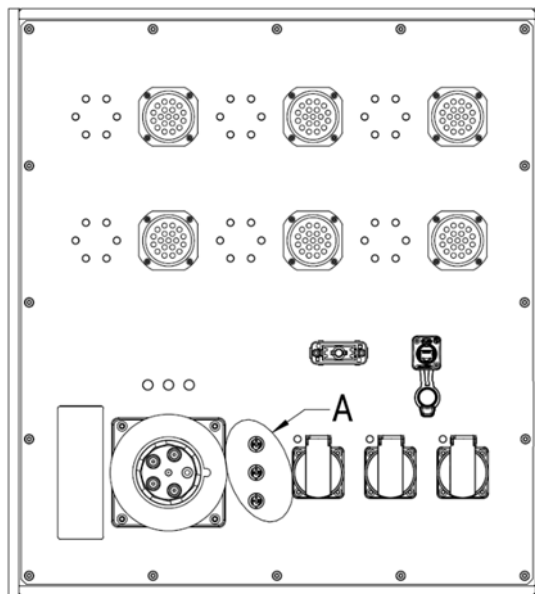
⁷ The stated IP rating applies when all enclosure lids and covers are fully closed. When connectors are mated, the overall ingress protection level may vary depending on the IP rating of the connected plugs. Users should ensure that all connected components maintain appropriate protection levels for the intended environment.

DIMENSIONAL DRAWING (PDU without flightcase)**COMPONENT DESIGNATIONS (Electrical)**

- | | |
|---------------------------------------|--|
| 1. Power monitoring device (PMD) | 6. VMR fault red LED |
| 2. EtherCON® TOP RJ45 CAT5e connector | 7. Voltage monitoring relay (VMR) |
| 3. Emergency stop pushbutton (E-Stop) | 8. Bypass key switch for VMR (BKS) |
| 4. Front working light switch | 9. Syntax® SSX connector - Soca 1 ... 6 Channel 1 ... 6 – RCBs |
| 5. Rear working light switch | 10. AUX connector - AUX 1 ... 3 - RCBs |

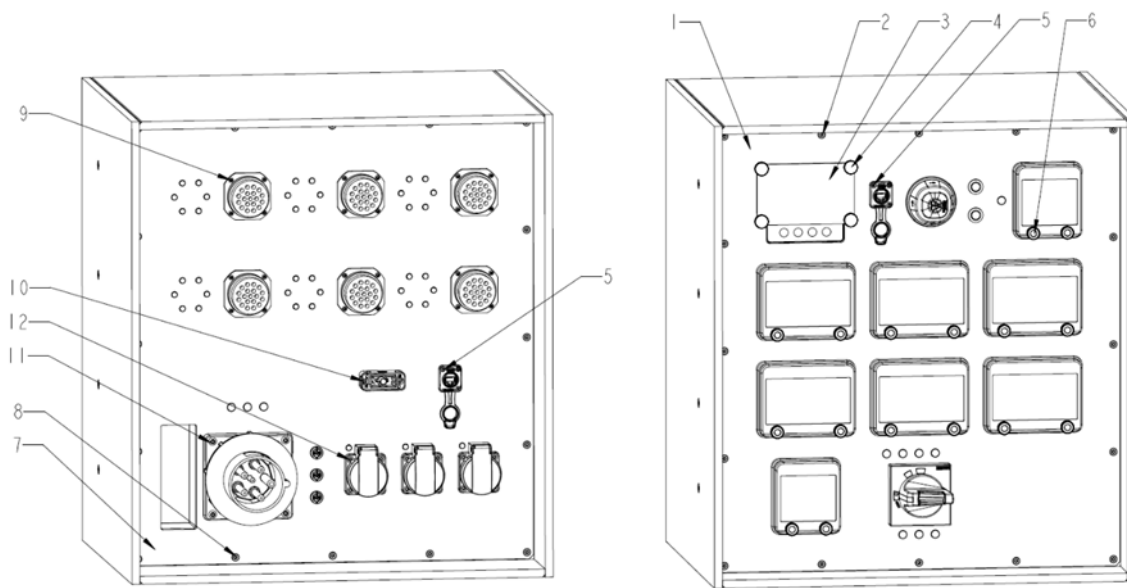
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|---|--|
| 11. MCCB „TRIP“ state red LED | 17. Han® GND connector |
| 12. MCCB „I / ON“ state phase indicator green LED | 18. Phase indicator white LED |
| 13. Phase indicator white LED (front) | 19. Power input plug CEE 63A 5P |
| 14. MCCB's extended rotary handle | 20. Independent fuse (A) |
| 15. Phase indicator green LED for Syntax® SSX - Soca 1 ... 6 - connector channels | 21. Phase indicator green LED for AUX - AUX 1 ... 3 - connectors |
| 16. Syntax® SSX 16A 19P connector | 22. AUX connector |

COMPONENT DESIGNATIONS (Fuse Holder)



- A. Fuse holder with 5x20mm miniature time lag ceramic fuse. T4A fuse on L1 phase and T1A fuse on L2, L3 phases.

COMPONENT DESIGNATIONS (Mechanical)



- | | |
|---|--|
| 1. Front cover plate (removable part) | 7. Rear cover plate (removable part) |
| 2. Front cover plate fixing screw | 8. Rear cover plate fixing screw |
| 3. Protection cover for power monitoring device (PMD) | 9. Syntax® SSX - Soca 1 ... 6 - fixing screw |
| 4. Knurled screw of the protective cover | 10. HAN® GND fixing screw |
| 5. EtherCON® TOP fixing screw | 11. CEE - 63A Power Input - fixing screw |
| 6. Hinged window with knurled screw | 12. AUX 1 ... 3 - fixing screw |

3. Operation

3.1 Basic Operation

⚠ Important Notice: This device must only be commissioned and operated by qualified or electrically skilled personnel in accordance with applicable electrical safety regulations (e.g., IEC/EN 60364). Always verify the mechanical integrity of the enclosure, connectors, and cables before energizing the unit.

Follow the steps below to safely commission and operate the **TTPF63-001 Series** PDU:

1. Power Connection

- Connect the **CEE 63A 5P supply plug** to the corresponding socket.
- Ensure that the connector is **fully engaged and locked** to prevent accidental disconnection.
- Once energized, the **three white phase presence indicator LEDs (L1, L2, L3)** on the rear panel will illuminate continuously, confirming voltage on each phase.
- The internal **auxiliary power supply unit** (for PMD, indicators, VMR, and lighting) is simultaneously energized.

2. Energizing the Unit

- Switch the **Main MCCB (C63A, 4P) rotary handle** from position **"0 / OFF"** to **"I / ON."**
- The green **MCCB "I / ON"** LEDs illuminate, indicating that output circuits are now supplied.
- On the front panel, release the knurled screws of the hinged windows by turning them counterclockwise and carefully open the covers.
- Then switch each **RCBO (C16A, 30mA, A-type)** from **"0 / OFF"** to **"I / ON."**

3. RCBO Test Procedure

- Verify the operation of each RCBO by pressing its **test ("T") button**. Perform tests one RCBO at a time to avoid misdiagnosis.
- The RCBO should **trip immediately** and **return to the "0 / OFF"** position when the test button is pressed.
- Reset each RCBO to the **"I / ON"** position after testing.
- The RCBO test must be performed **before each commissioning and at least once per month** during continuous operation.

4. Load Connection

- After completing the above steps, switch all RCBOs back to **"0 / OFF."**
- Connect the electrical consumers to the output connectors:
 - Remove the IP67 protection caps from the Syntax® SSX 19-pin connectors.
 - Verify that all plugs are **correctly aligned, fully inserted, and securely latched**.
- Once connected, switch the RCBOs to **"I / ON"** to energize the outputs.
- The green **"I / ON"** indicator LEDs will illuminate, confirming that the respective outputs are live.

5. Ensuring IP Protection

- Close **all hinged protective windows and tighten the knurled screws clockwise** to restore full enclosure protection.
- The unit provides **IP54 ingress protection** only when all covers are closed and all unused connectors are properly capped. When connectors are mated, ingress protection depends on the mated connector pair's rating
- When the covers are open, protection is reduced to **IP30**, and the unit may **only be used indoors** in dry, non-condensing environments.

6. Commissioning Completion

- Commissioning is now complete.
- **Operation may begin by switching on the connected consumers.**
- Ensure that all indicators show normal operation before proceeding.

7. Shutdown Procedure

- To safely de-energize the device:
 - Switch the **Main MCCB to "0 / OFF."**
 - Then switch off the **supply MCB/MCCB** or upstream circuit.
 - Disconnect all connected consumers and remove their plugs.
 - Unplug the **main CEE 63A supply plug.**
 - Replace the IP67 protective caps on all unused Syntax® SSX connectors.

8. Storage

- Store the unit in **a dry, dust-free environment**, away from direct sunlight, moisture, and children.
- For reuse, repeat the procedure from **Step 1** onward.

9. Operating Conditions

- The device is designed for continuous operation within the following environmental limits:
 - **Ambient operating temperature:** -25 °C to +40 °C
 - **Average over 24 h:** ≤ +35 °C
- Operation outside these limits may impair performance or reduce the service life of components.

3.2 Other Operational Functions

This device incorporates multiple advanced operational and monitoring systems designed to enhance safety, performance, and user awareness during operation. Each subsystem plays a specific role in monitoring electrical parameters, preventing hazardous conditions, and improving operator control.

3.2.1 Power Monitoring Device (PMD)

The integrated **Siemens PAC3220 Power Monitoring Device (PMD)** provides continuous measurement and visualization of key electrical parameters, enabling real-time supervision, diagnostics, and optimization of connected loads.

PMD measures and displays the following key parameters:

- Voltage (U): Phase-to-neutral and phase-to-phase [V]
- Current (I): Per phase and neutral [A]
- Apparent power (S): [VA]
- Active power (P): [W]
- Reactive power (Q): [VAr]
- Power factor ($\cos \varphi$)
- Frequency (f): [Hz]
- Energy: Apparent, active and reactive energy consumption [kVAh / kWh / kVArh]
- Harmonic distortion: Total Harmonic Distortion (THD %)
- Minimum, maximum, and average values
- Counters: Energy, Operating hour, Universal (limit violations etc.)

The high-contrast digital display provides clear visualization of live system data and configured alarm limits. These functions enable accurate load analysis, detection of phase imbalance, and prevention of overload conditions.

Factory Configuration and Calibration

The PAC3220 in this device is factory-configured and calibrated to ensure optimal accuracy and compatibility with the PDU's electrical system. The measurement inputs can be parameterized in the **"BASIC PARAMETERS"** menu; however, the parameters have been preset by Tesla Tech during factory configuration to match the device's electrical design. The measurement configuration is as follows:

Parameter	Setting	Description
Connection type	"VOLTAGE INPUTS" 3P4W	3 phases, 4 conductors, unbalanced load
Voltage parameter	"VOLTAGE INPUTS" USE PTs → OFF	Direct measurement on low- voltage system
CT Primary	"VOLTAGE INPUTS" 100A	Ensuring measurement precision and correct scaling.
CT Secondary	"VOLTAGE INPUTS" 5A	Standard output

⚠ Important Notice: The PAC3220 is factory-configured specifically for Tesla Tech PDUs. Do not modify the default parameter settings to ensure proper operation and measurement accuracy.

Parameters of the Installed Current Transformer

Type	Primary Current	Secondary Current	Burden	Accuracy Class
MBS AG ASRD 205.37	100A	5A	1VA	1%

Integrated I/O and LED Functions

- **Digital Input:** Not used
- **Digital Output:** Not used
- **Multicolor LED:** Configured as an output indicator for limit violations

When the PAC3220 is powered on, its LED lights **green** by default, indicating normal operation. If a limit threshold is exceeded, the LED blinks **red** until the condition returns to within safe parameters.

Limit	Source	Mode	Value	Pickup Delay	Reset Hysteresis	Logic
0	L1 current	Greater than	63A	10s	2%	OR
1	L2 current	Greater than	63A	10s	2%	OR
2	L3 current	Greater than	63A	10s	2%	OR

If the current drawn on any phase exceeds **63A for more than 10 seconds**, the LED flashes red continuously until the current drops below approximately **61.75 A (2 % hysteresis)**. This early warning feature alerts the operator to potential overload conditions, allowing corrective action, such as load redistribution or reduction, before the MCCB trips. This pre-alarm does not trip the PDU; see **Chapter 3.2.3 Emergency Stop Pushbutton (E-Stop)** and **Chapter 3.2.4 Voltage Monitoring Relay (VMR)**.

Universal Counter and User Settings

- **Universal Counter:** Configured to count the number of limit violations.
- **Language Selection:** The PAC3220 supports ten languages (English, Chinese, German, French, Italian, Portuguese, Polish, Russian, Spanish, Turkish). The preferred language can be selected in the **"SETTINGS → LANGUAGE"** menu.
- **Date and Time Configuration:** Settable manually in **"SETTINGS → DATE/TIME"** or automatically via SNTP synchronization using a network time server.
- **Security Features:** To prevent unauthorized modification, it is recommended to activate built-in protection mechanisms such as IP filtering or PIN code access.

For more information on the power monitoring device and detailed operating instructions, refer to the official Siemens documentation or search using the article number below:

- Article number: 7KM3220-0BA01-1DA0
- Equipment manual: <https://TeslaTech.GmbH/PAC3220>



3.2.2 Remote Monitoring - Web Server

The **Siemens PAC3220 Power Monitoring Device (PMD)** integrated into this PDU enables real-time remote monitoring and configuration via its built-in **web server and dual Ethernet interfaces**. This functionality allows operators to view live data, access device information, and integrate multiple PDUs into a centralized monitoring network.

Network Interfaces and Supported Communication Protocols

The PAC3220 features two integrated Ethernet (RJ45 etherCON® TOP) ports with an internal switch, allowing daisy-chain connections between multiple PDUs without the need for an external network switch, forming a simple linear topology for system-wide monitoring. It supports the following communication protocols:

- **Modbus TCP/IP:** Device configuration and data acquisition
- **Web Server (HTTP):** Access measured values via any web browser, no additional software required
- **SNTP (Simple Network Time Protocol):** Automatic time synchronization with a network time server
- **DHCP:** Automatic network configuration for plug-and-play commissioning

Each PDU can be monitored remotely from a PC, tablet, or smartphone connected to the same network. All parameters are accessible through a browser-based interface for live data monitoring and diagnostics.

Web Server Access

To access the integrated web server:

1. Connect the device to a PC or local network using one of the **Ethernet (RJ45 etherCON® TOP) ports**.
2. Ensure that the PAC3220 and the computer are in the **same IP subnet**.
3. Open a standard web browser and enter the **device's IP address** (default HTTP port: 80).
 - Example: <http://192.168.0.100>

4. The device's IP address can be found in the **SETTINGS** → **COMMUNICATION** menu of the PAC3220 display when either **LAN1** or **LAN2** is connected to the network.

When connecting several PDUs, use the dual Ethernet ports to interlink devices. This setup allows all connected PDUs to be monitored within the same local network, ideal for complex installations or distributed power systems.

Best Practices

- Ensure proper network grounding and shielding to prevent data interference in high-EMC environments.
- Assign static IP addresses for fixed installations to simplify device management.
- Restrict configuration access to authorized personnel using password or IP-based access control.
- Disable unused services and set device PIN/IP filters to prevent unauthorized changes.

3.2.3 Emergency Stop Pushbutton (E-Stop)

The **illuminated Emergency Stop pushbutton (E-Stop)** located on the front panel provides a direct and immediate means of disconnecting all output circuits of the PDU in the event of an emergency. When pressed, it activates the **shunt trip release (STR)** built into the **main MCCB**, causing the breaker to open and isolate the entire device from the supply.

Operation

- **Normal state**

In its default position, the E-Stop pushbutton is illuminated **white**, indicating that the emergency circuit is armed and the PDU is ready for normal operation. The MCCB rotary handle is in the **"I (ON)"** position, and the green **"I / ON" phase indicator LEDs** illuminate continuously, confirming voltage on all phases.

- **Activation**

In an emergency, press the red E-Stop pushbutton firmly.

- The mechanical latch will lock the pushbutton in the depressed position.
- The shunt trip release (STR) integrated into the MCCB is energized, and the MCCB's rotary handle moves automatically from **"I (ON)"** to **"TRIP"** position.
- The E-Stop pushbutton illumination changes from **white to red**, and the **"TRIP" status LED** on the front panel lights red, indicating that the emergency stop has been triggered and the PDU is fully de-energized.

- **Reset**

The MCCB cannot be reset while the E-Stop pushbutton remains pressed.

1. To reset, **turn the yellow frame** of the emergency stop button **clockwise** until the button releases and pops back to its normal position.

2. The pushbutton illumination returns to **white**, indicating that the emergency circuit is restored.
3. Next, reset the MCCB by turning its rotary handle **counterclockwise** from **"TRIP"** to **"RESET"** position.
4. The red **"TRIP"** indicator LED turns off.
5. Finally, turn the rotary handle **clockwise** to **"I (ON)"** position to reclose the circuit. The **green "I /ON"** phase indicator LEDs will light continuously, confirming that the PDU is energized and ready for operation.

⚠ Important Notice: After any E-Stop activation, identify and correct the cause before recommissioning the device. The functionality of the E-Stop should be tested periodically as part of scheduled maintenance (see Chapter 6. **Maintenance**). Only qualified personnel may reset and recommission the unit after an emergency stop. If you do not "RESET" the MCCB properly, you will not be able to switch it back to the "I (ON)" position.

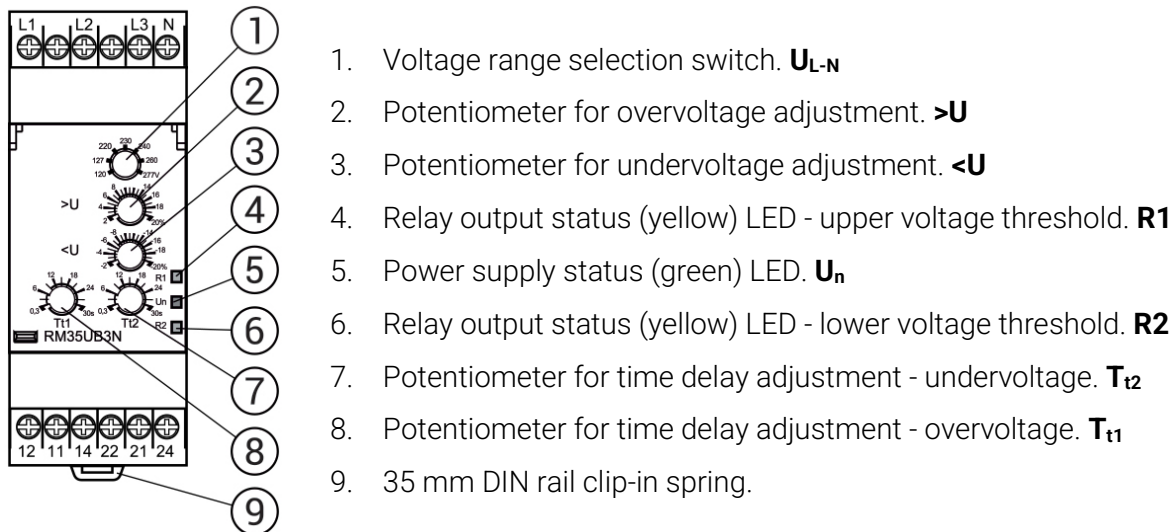
3.2.4 Voltage Monitoring Relay (VMR)

The **Voltage Monitoring Relay (VMR)** continuously supervises the supply voltage between each phase and neutral, ensuring that the PDU operates only within safe electrical limits. It protects the unit and connected equipment against **phase loss, absence of neutral, overvoltage, and undervoltage conditions**.

The TTPF63-001 Series is equipped with a Schneider Electric RM35UB3N30 relay, factory-configured and tested for reliable protection in three-phase systems. **The VMR automatically trips the main MCCB via the shunt trip release (STR)** if an abnormal voltage condition is detected.

Front View and Component Identification

The illustration below (included in the printed manual) shows the main control and indication elements of the VMR:



Operation

• Normal state

When all three phases (L1, L2, L3) are within their permissible limits the **VMR remains inactive**, allowing normal power operation. The **green “Un” LED** on the VMR is illuminated, and the red Fault Indicator LED on the PDU front panel is off. The MCCB remains in the **“I (ON)”** position, supplying power to all outputs.

• Activation (Fault Condition)

If the VMR detects one or more of the following abnormal conditions:

- Phase loss or phase failure
- Absence of neutral
- Undervoltage or overvoltage beyond the set thresholds

The relay output activates, sending a trip signal to the MCCB’s **shunt trip release (STR)**. The MCCB then moves to the **“TRIP” position**, and the **red Fault Indicator LED** on the front panel lights up continuously, indicating that a voltage anomaly was detected and the unit has been disconnected for protection. At the same time, **one or both of the yellow LEDs (R1 or R2) on the VMR** will illuminate to indicate which voltage threshold was exceeded.

• Reset

1. Identify and correct the fault condition (e.g., restore missing phase/neutral or stabilize supply voltage).
2. Once the supply parameters are back within limits, the VMR automatically resets to its normal state (green “Un” LED illuminated, yellow R1/R2 LEDs off).
3. Reset the MCCB by turning its rotary handle **counterclockwise from “TRIP” to “RESET”, then clockwise to “I (ON)”**.

4. If the VMR re-trips immediately, do not reclose the MCCB, investigate supply quality.
5. Verify that the red Fault Indicator LED on the front panel is off and that the white phase indicator LEDs are illuminated, confirming that all phases are healthy and power distribution has been restored.

Factory-Configured Parameters

The VMR is pre-configured by Tesla Entertainment Kft. according to IEC/EN 50160⁸ requirements for standard low-voltage systems:

Parameter	Symbol	Setting	Description
Voltage range	U_{L-N}	230 V	Nominal phase-to-neutral voltage
Overvoltage threshold	$>U$	+10%	253 V upper limit
Undervoltage threshold	$<U$	-10%	207 V lower limit
Overvoltage delay	T_{t1}	0.3 s	Trip delay for overvoltage
Undervoltage delay	T_{t2}	0.3 s	Trip delay for undervoltage

⚠ Important Notice: According to EN 50160, supply voltage variation should not exceed $\pm 10\%$ of nominal (230 V). Do not modify the factory settings unless absolutely necessary. Incorrect adjustment may result in improper protection or nuisance tripping.

For more information on the VMR and detailed operating instructions, refer to the official Schneider Electric documentation or search using the article number below:

- Article number: RM35UB3N30
- <https://TeslaTech.GmbH/RM35UB3N30>



Bypass Key Switch (BKS)

A **Bypass Key Switch (BKS)** is installed on the front panel to temporarily deactivate the VMR's automatic trip output. When engaged, it prevents the relay from tripping the MCCB but still allows fault indication via the **red Fault LED**. This function is useful during commissioning, testing, or controlled operation under non-standard conditions (e.g., generator synchronization or partial-phase testing).

⁸ According to EN 50160, the standard nominal voltage U_n is 230V between phase and neutral. The supply voltage variation should not exceed $\pm 10\%$ of the nominal voltage U_n . Therefore, the supply voltage is allowed to fluctuate within the range of 207V to 253V.

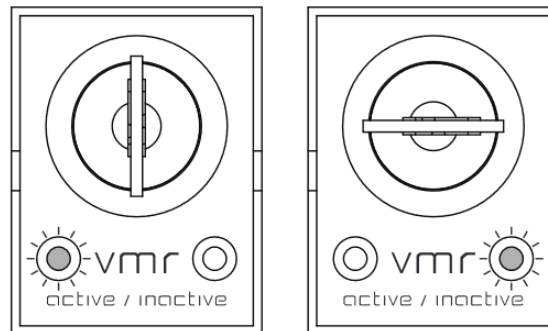
Operation of Bypass Key Switch:

- **Normal (Protection Active):**

The key is in the **vertical position**, and the **green LED** beside the switch is illuminated. The VMR protection is active.

- **Bypass (Protection Inactive):**

Turn the key **clockwise 90° to the horizontal position**. The protection output is disabled, and the **yellow LED lights** to indicate that the bypass mode is active. The VMR will continue to detect faults and indicate them via its yellow R1/R2 LEDs, but the MCCB will not trip automatically.



⚠ Warning: Use the bypass function only under supervision by qualified personnel. The manufacturer cannot be held liable for any damage resulting from operation with disabled protection.

3.2.5 Front and Rear Working Lights

The front and rear working lights provide safe illumination for setup, operation, and maintenance in low-light environments such as backstage areas, outdoor locations, and film sets. They ensure clear visibility of all connectors, switches, and indicators on both sides of the PDU, minimizing the risk of connection errors or accidental damage during handling.

- The front panel features **two blue-illuminated pushbuttons** for controlling the **front and rear LED working lights**.
- The pushbuttons remain softly illuminated for easy visibility in low-light environments.
- Illumination is provided by **natural white LED strips** mounted in recessed aluminium profiles, ensuring uniform light distribution for setup, operation, or maintenance in dark or confined spaces.
- Each LED strip provides approx. 75 lm of natural white light (4000K).
- The working lights are powered via an **independent fused auxiliary circuit**, allowing continued operation even if the main MCCB trips, ensuring visibility and safety during troubleshooting.

3.2.6 Four-Pole MCCB and Harmonic Protection

This PDU is equipped with a **four-pole Molded-Case Circuit Breaker (MCCB)**, providing full-phase and neutral conductor protection. This design feature ensures increased operational safety and reliability, especially in modern event and film production environments where the majority of connected equipment uses **switch-mode power supplies (SMPS)** such as LED panels, dimmers, audio amplifiers, and control electronics.

Harmonic Distortion and Neutral Overload

Electronic loads with non-linear current characteristics generate **harmonic currents**, particularly **odd harmonics (3rd, 5th, 7th, etc.)**. These harmonics do not cancel each other in the neutral conductor of a three-phase system; instead, they sum up, potentially causing the neutral current to exceed the phase current.

If a system is supplied through a 3-pole breaker (without neutral protection), this unmonitored current may lead to:

- **Neutral conductor overheating,**
- **Insulation degradation,**
- **Cable damage or fire, and**
- **Increased risk of short-circuit and equipment failure.**

To mitigate these hazards, Tesla Tech implements a **4-pole MCCB** design in this PDU, which disconnects and protects **all live conductors, including the neutral**, under fault or overload conditions.

Advantages of the 4-Pole MCCB Design

- Provides **simultaneous disconnection** of all phases and the neutral conductor.
- Protects the neutral against **thermal stress** caused by cumulative harmonic currents.
- Prevents **neutral imbalance faults** during switching or fault clearing.
- Ensures compliance with IEC/EN 60364-4-43 (Protection against Overcurrent) and EN 61439-4 requirements for portable distribution assemblies.
- Reduces the risk of **neutral conductor failure** in high-density electronic load applications.

⚠ Important Notice: Tesla Tech advises always using a 4-pole MCCB or MCB at the upstream supply point, ensuring that both phase and neutral conductors are simultaneously protected. This setup guarantees full electrical safety, equipment longevity, and compliance with modern power quality standards.

4. Faults and Their Rectification

This section provides guidance for identifying and rectifying common operational faults. Only a qualified electrician or authorized service technician may perform troubleshooting or corrective maintenance. If the following measures do not resolve the issue, contact Tesla Entertainment Kft. or an authorized service partner for assistance.

⚠ Warning: Only qualified personnel may perform fault diagnosis or repair work on electrical equipment. Before performing any inspection or corrective work, disconnect the device completely from the mains supply and verify that it is de-energized. Never attempt to open or service the device while energized.

⚠ Warning: The supplementary protection and control circuits (VMR, E-Stop, shunt trip) are powered from phase L1. If the L1 phase is lost, the VMR and E-Stop cannot trigger the MCCB shunt trip. The manufacturer does not recommend operation under this condition.

⚠ Important Notice: During commissioning, the Main MCCB must be in "0 / OFF." The Voltage Monitoring Relay (VMR) checks the supply voltage before allowing operation. If a supply fault such as phase loss, absence of neutral, overvoltage, or undervoltage is detected, the MCCB cannot be switched ON until the fault is corrected. Follow the commissioning steps described in Chapter 3.1 Basic Operation exactly.

4.1 No Voltage at Sockets - Device Volt-Free

Symptoms:

- No output voltage present.
- Phase indicator LEDs (L1, L2, L3) do not illuminate.
- PMD display is off.

Possible Causes:

- The upstream supply circuit or CEE plug is not energized.
- The input plug is not fully inserted or the locking mechanism is not engaged.
- A fault has occurred at the supply source (e.g., tripped upstream protection).

Corrective Actions:

1. Verify that the mains supply is active and correctly connected.
2. Ensure the input plug is fully inserted and locked into place.
3. Check the upstream MCCB or protection device and reset if tripped.
4. If the issue persists, isolate the device and have the supply point inspected by a qualified electrician.

4.2 Moulded-Case Circuit Breaker (MCCB) Tripped

Symptoms:

- The MCCB handle is in “TRIP” or “0 / OFF” position.
- Red TRIP status LED illuminated.
- Connected sockets have no voltage.

Possible Causes:

- Short-circuit or overload on one or more outputs.
- Excessive load current exceeding the MCCB rating.
- Thermal protection of the MCCB has tripped due to prolonged overload.
- VMR detected a supply fault and activated the shunt trip release.

Corrective Actions:

1. Disconnect all connected equipment (consumers).
2. Inspect all extension cables and connected devices for visible damage, overheating, or insulation faults.
3. If damaged:
 - Remove the faulty cable or equipment from service.
 - Have repairs performed by qualified personnel.
4. If no visible damage is found, allow several minutes for the MCCB's thermal protection to cool.
5. Reset the MCCB by turning the rotary handle counter-clockwise from “TRIP” to “RESET”, then clockwise to “I / ON”.
6. Reconnect loads one by one and monitor current draw on the PMD.
7. If the MCCB trips again, a short-circuit or overload persists, disconnect the device and request professional service.

⚠ Important Notice: The total connected load must not exceed the rated current shown on the device label. If the current draw exceeds the nominal rating, the MCCB will trip to prevent overheating and cable damage.

4.3 VMR Blocks MCCB – Cannot Switch ON

Symptoms:

- MCCB cannot be switched from “0 / OFF” to “I / ON.”
- Red Fault LED illuminated.

- VMR yellow LED R1 and/or R2 illuminated.

Possible Causes:

- Phase loss or absence of neutral.
- Overvoltage or undervoltage at the supply.
- Loose or incorrect supply connection.

Corrective Actions:

1. Verify that all three phases and the neutral conductor are present at the input.
2. Check the supply voltage, must be within $\pm 10\%$ of 230 V (L-N).
3. If necessary, have the supply corrected by a qualified electrician.
4. After the supply is stabilized, reset the VMR by switching the MCCB OFF (RESET) and ON again.

4.4 VMR Trips During Operation

Symptoms:

- MCCB moves to "TRIP."
- Red Fault LED and one or both yellow VMR LEDs (R1 / R2) illuminate.
- Outputs de-energized.

Possible Causes:

- Temporary or intermittent phase loss.
- Overvoltage or undervoltage outside configured limits.
- Loose or intermittent neutral connection.

Corrective Actions:

1. Check the supply point for correct phase sequence and voltage stability.
2. Inspect input connections and cables for looseness or damage.
3. After correcting the cause, reset the MCCB from "TRIP" → "RESET" → "I / ON."
4. If the VMR re-trips immediately, do **not** reclose, isolate the device and investigate supply quality.
5. If stable, verify all indicator LEDs show normal operation before resuming use.

4.5 RCBO Tripped

Symptoms:

- One or more RCBOs have switched to the "0 / OFF" position.
- The respective socket(s) are de-energized.

Possible Causes:

- Earth leakage or insulation fault in a connected device.
- Short-circuit or overload on the output circuit.
- Moisture or contamination causing unintended leakage currents.

Corrective Actions:

1. Disconnect all connected loads from the affected circuit.
2. Visually inspect cables, connectors, and connected devices for damage or moisture.
3. If damaged:
 - Remove the defective cable or device from service.
 - Arrange repair or replacement by a qualified technician.
4. If no visible damage is found, reset the RCBO to "I / ON."
5. If it trips again, an earth leakage or internal fault is present.
6. Do not continue using the device until the fault is located and rectified by an authorized electrician.

⚠ Important Notice: The RCBO provides dual protection (overcurrent + residual current). Frequent tripping indicates a genuine fault and must not be ignored.

4.6 Emergency Stop (E-Stop) Activated

Symptoms:

- MCCB in "TRIP."
- Red TRIP LED and red E-Stop illumination on.
- Outputs de-energized.

Possible Causes:

- E-Stop pushbutton pressed intentionally or accidentally.
- Mechanical latch not released.

Corrective Actions:

1. Turn the yellow E-Stop collar clockwise to release – the button pops up and illumination returns to white.
2. Reset the MCCB (TRIP → RESET → I / ON).
3. If the button cannot be released or the MCCB trips again immediately, have the device inspected by qualified service personnel.

4.7 Phase Indicator LED(s) Dim or Not Illuminated**Symptoms:**

- One or more white phase indicator LEDs are dim or off.
- Other LEDs and sockets may still function.

Possible Causes:

- Supply voltage fluctuation or loss of one phase.
- Fault in the phase indicating circuit.
- Loose connection or neutral failure on the supply side.

Corrective Actions:

1. Verify that all three phases (L1, L2, L3) and the neutral conductor are present at the CEE input.
2. Inspect the supply plug and cable for damage or loose contacts.
3. Check upstream power distribution for phase failure or imbalance.
4. If a single phase is missing, **do not operate three-phase loads** until the fault is corrected, as unbalanced operation may cause component stress.
5. If all phases are present but the LED still does not illuminate, have the device inspected by an authorized service technician.

4.8 PMD Shows Red Flashing LED**Symptoms:**

- PMD LED flashes red; outputs remain energized.
- No protective devices tripped.

Possible Causes:

- Current on one or more phases exceeds 63 A for more than 10 s.
- Load imbalance between phases.

Corrective Actions:

1. Read phase current values on the PMD.
2. Reduce or redistribute load to bring phase currents below rated limits.
3. After current stabilizes, the PMD LED returns to green automatically.
4. If overloads recur frequently, review load configuration or contact a qualified technician.

4.9 Indicator LEDs or Working Lights Not Functioning**Symptoms:**

- Phase indicator LEDs, Fault LED, PMD display, or working lights do not illuminate, but sockets are live.

Possible Causes:

- Blown internal fuse protecting the auxiliary circuits.
- LED or wiring failure.

Corrective Actions:

1. Confirm that there is no phase loss or neutral absence.
2. Inspect fuseholders (see Chapter 5. **Repair**) and replace fuses only with identical ratings.
3. If the issue persists, contact a qualified technician for further diagnosis.

4.10 General Troubleshooting Notes

- Always document recurring faults, tripping events, or component replacements in a maintenance log in accordance with HD 60364-6.
- Repeated operation of protection devices (MCCBs or RCBs) may indicate improper load balancing or defective connected equipment.
- After each fault, perform a visual inspection of cables and connectors before re-energizing the device.
- If the source of the fault cannot be safely identified, isolate the device and seek assistance from a qualified professional.

5. Repair

Warning - Risk of Electric Shock and Injury:

The user must not carry out repairs on this device. Opening or removing the enclosure covers exposes live components and presents a serious electrical hazard. Unauthorized access or modification is strictly prohibited.

5.1 Authorized Repairs

- During the warranty period, the device may only be repaired by Tesla Entertainment Kft. or by an authorized service partner.
- Any repair, replacement, or modification performed without authorization will void the warranty and release the manufacturer from all responsibility.
- Only qualified electricians may perform repairs after the warranty period, and all work must comply with applicable electrical safety standards (e.g., HD 60364, EN 61439-1).
- After any repair, a **complete electrical safety test** (insulation resistance, continuity of PE, functional verification) must be performed before recommissioning.

5.2 Connector Replacement (QCR System)

This device utilizes **Quick Connector Replacement (QCR)** technology for simplified maintenance of panel-mounted connectors. QCR allows a qualified technician to replace a damaged connector without disassembling the entire power distribution unit.

- All connectors are fixed using stainless-steel or black-coated (Cr VI-free) galvanized steel screws.
- Internal conductors are pre-wired with sufficient slack to permit connector removal and replacement without strain.
- Only **original Tesla Tech or manufacturer-approved connectors** must be used for replacement.

Types and tightening torques of fixing screws

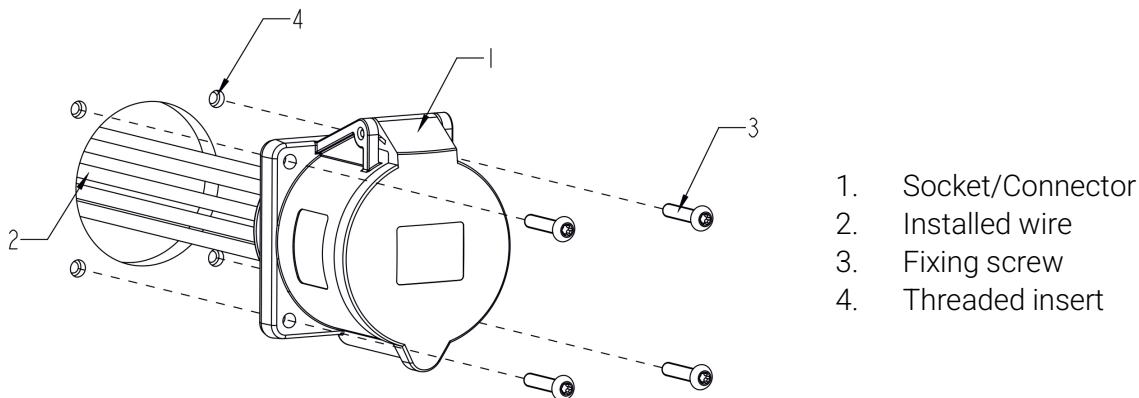
Fixing screw location	Fixing screw type	Maximum tightening torque
Front cover plate	M4 Torx (T20)	0,8Nm
Rear cover plate	M4 Torx (T20)	0,8Nm
CEE 63A input plug	M5 Torx (T25)	1,0Nm
Soca - 1 ... 6 - sockets	M3 Torx (T15)	0,6Nm
AUX - 1 ... 3 - sockets	M4 Torx (T20)	0,8Nm
HAN® GND ⁹	M4 HEX (3mm)	1,0Nm

⁹ Fixed mounting, not QCR.

Fixing screw location	Fixing screw type	Maximum tightening torque
EtherCON® TOP RJ45 ¹⁰	M3 Torx (T15)	0,8Nm

Replacing a Defective Connector (Qualified Personnel Only)

1. Isolate the device from the mains supply and verify de-energization.
2. Using the appropriate screwdriver, **unscrew the fixing screws (3)** of the defective connector (1) counter-clockwise from the threaded inserts (4).
3. Carefully **pull** the connector out to gain access to the **internal terminal screws (2)**.
4. **Loosen the terminal screws** and disconnect the conductors.
5. **Install the new connector**, ensuring each wire is reconnected in the correct sequence and tightened to the specified torque according to the installation manual of the spare part(s).
6. **Reinsert** the connector and tighten the fixing screws according to the torque values listed above.
7. After replacement, a **complete electrical safety test** (insulation resistance, continuity of PE, functional verification) must be performed before recommissioning.



⚠ Important: Do not exceed the maximum tightening torque. Over-tightening may cause the threaded insert to rotate or detach, rendering it unusable.

¹⁰ Fixed mounting, not QCR.

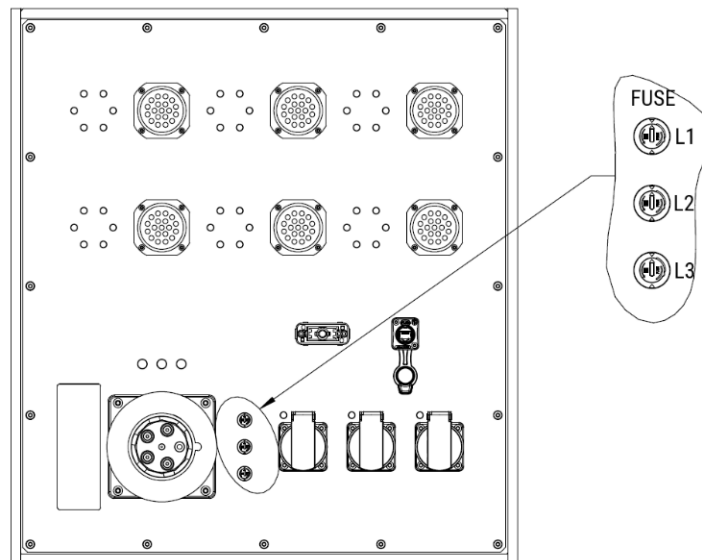
5.3 Replacing Blown Fuses

⚠ Caution - De-energize Before Proceeding

All fuse replacement operations must be performed only when the device is completely disconnected from the mains power supply.

⚠ **Important Notice:** Using incorrect fuse ratings or failing to properly close the fuseholder may lead to malfunction or loss of protection.

1. Identify the fuseholder location according to Chapter 2. **General Information**
2. Unscrew the fuseholder cap and **inspect the fuse** using a continuity tester.
3. Replace any blown fuse with one of **identical type and rating** from the table below.
4. Close the fuseholder securely by twisting the cap clockwise.



Replacement fuse types

Circuit fuse	Type	Part number
L1	T4A, Ceramic, 5x20mm	Schurter 0001.2510
L2, L3	T1A, Ceramic, 5x20mm	Schurter 0001.2504

6. Maintenance

Regular inspection and maintenance are essential to ensure the continued safe and reliable operation of this power distribution unit (PDU). All maintenance work must be performed in accordance with HD 60364-6 and applicable **national electrical safety regulations**.

6.1 General Requirements

- Maintenance and inspection must be carried out **only by qualified electricians or authorized service personnel**.
- The operator is responsible for establishing suitable maintenance intervals, considering **frequency of use, environmental conditions, and operating load**.
- For mobile units, include a visual inspection of transport components such as handles, frame, and swivel castors for integrity and secure attachment.
- Tesla Entertainment Kft. recommends a **minimum inspection interval of 12 months**, or more frequently under harsh or outdoor conditions (e.g., high humidity, dust, or frequent handling).

⚠ Warning: Before performing any maintenance or inspection, disconnect the PDU from all power sources and verify that it is de-energized. Never perform maintenance on live circuits.

⚠ Important Notice: All maintenance procedures and inspections must be documented and retained for verification as part of the product's conformity assessment and ongoing operational safety program.

6.2 Routine User-Level Checks

The following checks may be performed by trained users as part of regular operation:

- Test each **RCBO or RCCB** monthly by pressing the "T" (Test) button. The device should trip immediately. Reset after successful verification.
- Check all **socket covers** to ensure they close and latch securely.
- Visually inspect **connector contacts** to confirm they are clean, free from oxidation, and undamaged.
- Verify that **hinged inspection windows** are intact and can be securely closed.
- Inspect **handles, frame edges, and grips** for cracks, wear, or deformation.
Check that all **swivel castors** are intact, rotate freely, and lock securely.
- Check all **external fixing screws** for tightness and corrosion.
- Ensure the **identification label** (nameplate) is legible and securely attached.

- Clean the unit using a **soft, dry cloth**. If necessary, use a mild, non-conductive cleaning agent. Never use solvents, alcohol, or pressurized water.

6.3 Professional Inspection

In addition to routine checks, a **qualified electrician** must perform a detailed inspection and functional test at the defined maintenance interval. This includes:

- Verification of the **mechanical integrity** of the enclosure, connectors, and mounting hardware.
- Testing of the **continuity of protective earthing (PE)** conductors.
- Measurement of **insulation resistance** between live conductors and protective earth (minimum 1 MΩ at 500VDC).
- **Functional testing of MCCB and all RCBOs**, including verification of tripping characteristics and correct reset operation.
- Functionally test the **E-Stop and VMR** for proper tripping and reset behavior.
- During periodic inspection, verify the correct operation of the VMR by simulating over- and undervoltage using a variable supply or test module. Ensure the relay trips within ± 2 V of the factory-set limits (207 V and 253 V).
- Verification that all **phase presence indicators**, working lights, and auxiliary circuits operate correctly.
- Inspecting the **condition of internal wiring** for signs of overheating, discoloration, mechanical stress, or loose terminals.
- Verify the torque and tightness of all internal terminal connections per manufacturer specification.
- Confirmation that **IP and IK protection levels** are maintained (including seals, covers, and hinged elements).
- Documentation of all test results in accordance with HD 60364-6 and application-specific maintenance records.
- Testing shall be performed using calibrated instruments traceable to national measurement standards.
- If equipped, verify Ethernet interfaces and remote monitoring communication (PAC3220 web server) operate correctly.

⚠ Warning: Before performing insulation resistance measurements, all auxiliary and electronic circuits (e.g., working light PSU, VMR, Power Monitoring Device, LEDs, or control wiring) must be disconnected or isolated from the test circuit. Remove all fuses (5.3 Replacing Blown Fuses) or disconnect terminal points as necessary to prevent damage. Do not apply insulation test voltage (typically 500 VDC) to sensitive control components, as permanent failure may occur.

6.4 Damaged Equipment

If any mechanical or electrical damage is identified during inspection or operation:

- Immediately **remove the device from service**.
- Do not attempt to repair the device unless explicitly authorized by Tesla Entertainment Kft., especially during the warranty period.
- Repairs must only be performed using **original Tesla Tech spare parts**.
- After repair, the unit must undergo a **complete electrical safety and functional test** before being returned to service.

7. Cleaning

Regular cleaning helps maintain safe operation and extend the service life of the power distribution unit (PDU). Always clean the unit according to the following safety and operational guidelines.

7.1 General Requirements

- Before cleaning, **disconnect the device from all power sources** and ensure it is completely **de-energized**.
- Ensure all **connectors, socket covers, and hinged windows** are fully closed and securely **latched**.
- If any covers or windows must remain open, **only dry cleaning** is permitted.
- Do **not** use cleaning agents that are **flammable, conductive, or corrosive**.

⚠ Warning: Never use high-pressure water jets, steam cleaners, or immersion cleaning methods. Liquids under pressure can penetrate the enclosure, resulting in electrical hazards or irreversible equipment damage.

7.2 Recommended Cleaning Methods

Depending on the level of contamination, the following methods may be applied:

Dry Cleaning (for light dust or indoor use):

- Use a clean, dry, lint-free cloth or soft brush.
- Compressed air (max. 2 bar) may be used to remove loose dust from ventilation slots and external connectors.

Cleaning (for moderate dirt or outdoor use):

- Use a slightly damp cloth with **mild, non-abrasive detergent or neutral pH cleaning solution**.
- Wipe surfaces gently to remove dirt without damaging labels or markings.
- Avoid excessive moisture and prevent liquid from entering connectors, hinges, or cable entries.
- Dry thoroughly before reconnecting to power.

7.3 Post-Cleaning Inspection

After cleaning, perform the following checks:

- Verify all hinged windows and socket covers remain functional and properly sealed.
- Ensure no moisture or condensation remains inside or around connectors.
- Confirm that the IP protection rating is maintained before returning the device to service.

⚠ Important Notice: For devices operated outdoors, clean and inspect more frequently to prevent buildup of dust, salt, or other conductive contaminants. Only use cleaning materials compatible with the material of the PDU.

8. Warranty

8.1 Scope of Warranty

All Tesla Tech products are designed and manufactured by Tesla Entertainment Kft. to meet the highest standards of safety, performance, and reliability. Each unit undergoes rigorous quality control and electrical safety testing before leaving our facility.

This warranty covers defects in materials and workmanship that occur under normal, professional use, provided the product is installed, operated, and maintained in accordance with this user manual and all applicable electrical regulations.

8.2 Warranty Period

The warranty period is **one (1) year** from the date of purchase by the end user.

During this period, any verified defect resulting from faulty material or workmanship will be repaired or replaced free of charge.

8.3 Conditions

The warranty applies only when:

- The device has been professionally installed and operated within its rated specifications.
- The enclosure, wiring, and safety features remain unmodified.
- All maintenance and inspection work is performed by qualified electrical personnel.
- The device has not been opened, tampered with, or repaired without prior written authorization from Tesla Entertainment Kft.

Opening the enclosure (e.g., removing the cover plate fixing screws) or unauthorized repair immediately voids the warranty.

8.4 Exclusions

The warranty does **not** cover:

- Damage resulting from improper installation, overload, short circuit, or misuse.
- Normal wear and tear, corrosion, or damage from environmental exposure (e.g., condensation, dust, or chemicals).
- Damage caused by accident, negligence, or external impact (transport, shock, or fall).
- Consequential or indirect losses such as downtime, production loss, or lost revenue.
- Components subject to normal wear (e.g., seals, covers or labels).

If the unit has been modified, used beyond its intended purpose, or fitted with non-original components, the warranty becomes void.

8.5 Claim Procedure

If a defect is suspected:

- Disconnect the device from the power supply immediately and remove it from service.
- Contact Tesla Entertainment Kft. or your authorized distributor and provide:
 - The serial number and product identification,
 - A detailed description of the fault, and
 - A copy of the invoice or proof of purchase.
- If requested, return the unit to the manufacturer or an authorized service partner for inspection. Warranty service will be provided following verification of the defect.

Tesla Entertainment Kft. reserves the right to repair or replace the defective component or entire unit at its discretion. Repaired or replaced products remain covered for the remainder of the original warranty period.

8.6 Governing Conditions

All warranty terms are subject to the **General Terms and Conditions of Sale (GTCS)** of Tesla Entertainment Kft., available at: <https://teslatech.gmbh/GTCS>

9. Storing the Device

Proper storage ensures long-term reliability and trouble-free operation of the device. Observe the following recommendations when storing the PDU:

- **Clean before storage:** Always clean the device according to the instructions in Chapter 7. **Cleaning** before placing it into storage.
- **Packaging:** Use the original packaging or other suitable protective material to prevent mechanical damage and dust ingress.
- **Environment:** Store the unit in a dry, dust-free, and temperature-controlled environment within the range -25 °C to +40 °C.
- **Humidity:** The relative humidity should not exceed 80% (non-condensing).
- **Handling:** Avoid impacts, vibration, and stacking heavy objects on top of the device during storage.
- **Recommissioning:** Before reusing the unit after extended storage, perform a visual inspection and functional test according to Chapter 6. **Maintenance**.

10. Disposal

This product has been designed and manufactured using high-quality materials and components that can be reused or recycled. The symbol shown below indicates that this product must not be disposed of with regular household waste.

To prevent potential environmental and health hazards, please take the product to an authorized collection point or recycling facility for electrical and electronic equipment (EEE) waste, in accordance with the EU Directive 2012/19/EU (WEEE) and applicable local regulations.

Improper disposal may be subject to legal penalties under national waste management laws. For more information, contact your local waste disposal authority or the manufacturer.



11. Intellectual Property Notice

This document, including its structure, layout, and contents, is the intellectual property of Tesla Entertainment Kft.

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12. Certifications & Standards

- **CE Compliance:** All components and final assemblies are CE certified, conforming to the requirements of applicable European directives, including the Low Voltage Directive (2014/35/EU) and the EMC Directive (2014/30/EU).
- **Standards Compliance:** Designed in accordance with the following international standards:
 - EN 61439-1: Low-voltage switchgear and controlgear assemblies – General rules.
 - EN 61439-4: Assemblies for construction sites (ACS).
- **Manufacturer Information - Designed and Manufactured by:**
 - Tesla Entertainment Kft.
 - Address: H-1151 Budapest, Károlyi Sándor út 158.; Hungary
 - EU VAT ID: HU26587255
- **Country of Origin:** Hungary; all units are assembled and tested at our facility in Budapest.



TESLA TECH
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