

TTPF400-002 SERIES PDU

Technical Specifications

Input	Input Protections
5x PowerLock 400A with IP67 protection caps and SyntaxLock (Valentini)	1x Main MCCB 400A 4P I_{cn} :55kA (Siemens) with extended rotary handle 1x Voltage monitoring relay (VMR) (Schneider Electric)

Outputs	Outputs Protections
5x PowerLock 400A with IP67 protection caps and SyntaxLock (Valentini)	Looped/linked
12x HAN®16E 16A 230V 16P with IP65 protective cap (Harting)	72x RCBO C16A 30mA 1P A-type (Siemens)
3x Auxiliary connector 230V 3P (Optional)	3x RCBO C16A* 30mA 1P A-type (Siemens)
1x HAN® GND grounding connector (Harting)	

*For selected auxiliary connectors, the rated current of RCBO varies. J1 version is with RCBO C10A 30mA 1P A-type; and G1 and B1 versions are with RCBO C13A 30mA 1P A-type.

Additional Functionalities

- **Remote Power Monitoring:** Integrated Siemens PAC3220 Power Monitoring Device with three current transformers for comprehensive real-time metering of voltage, current, power, and energy consumption. Remote access is enabled via two panel-mounted CAT5E (RJ45) connectors, supporting Modbus TCP/IP communication (45–65 Hz). Each device receives a unique IP address, allowing direct access through any web browser; no additional software required. Users can monitor system parameters live from computers, smartphones, or tablets on the same network, making it an ideal tool for proactive diagnostics, energy management, and grid optimization.
- **Voltage Monitoring Relay (VMR):** The system includes a phase-to-neutral Voltage Monitoring Relay (VMR), which continuously monitors voltage integrity. It detects and responds to critical anomalies such as phase loss, missing neutral, overvoltage, and undervoltage. Upon identifying a fault, the VMR can trigger a power disconnection or alarm to protect connected equipment and maintain system stability. This protection is essential for setups using sensitive electronics or operating under unstable power conditions.
- **VMR Bypass Key Switch:** A secure key-operated switch allows temporary bypass of the VMR for specific diagnostic or maintenance operations. This function is intended for use by qualified personnel and provides flexibility without compromising system safety.

- **Emergency Stop (E-Stop):** A Schneider Electric emergency pushbutton is mounted on the front panel, enabling immediate shutdown of all outputs. Monitoring systems, diagnostic tools, and working lights remain operational via independently protected auxiliary circuits, facilitating post-trip fault identification and rapid intervention.
- **Integrated Work Lights:** Equipped with one front and one rear working light, controlled by front-panel pushbuttons. These lights improve safety and visibility during operation, setup, or maintenance in low-light environments such as backstage or industrial sites.
- **MCCB Operation with Shunt Trip Release:** The input-side MCCB is equipped with a shunt trip release mechanism, enabling remote disconnection of power under fault or emergency conditions. This feature allows the MCCB to be tripped via external signals (such as emergency stop systems, VMR alarms, or monitoring relays) enhancing safety and control across the power distribution chain.
- **Active Ventilation System:** Includes a high-efficiency 120 × 120 mm front-mounted fan with a replaceable HEPA filter, ensuring optimal cooling and particulate protection. A rear exhaust grid maintains internal airflow while preserving enclosure IP rating. This system supports thermal stability and extends component lifespan in high-demand environments.
- **Indicator LEDs**
 - 6x Phase presence indicator white LED (L1, L2, L3)
 - 3x MCCB "ON" state green LED
 - 1x MCCB "TRIP" state red LED
 - 72x RCBO "I-ON" state green LED for HAN®16E output channels
 - 3x RCBO "I-ON" state green LED for auxiliary connectors
 - 1x Fault Indicator red LED triggered by VMR
- **Independent fuses:** All monitoring, emergency, and lighting functions (such as the power monitoring device, VMR, and related indicator LEDs) are powered through independently fused circuits. In the event of an MCCB trip, these systems remain active to support fault identification and ensure continued diagnostic visibility.

Mechanical & Electrical Design

- **Ingress Protection:** IP54-rated enclosure, including transparent hinged covers for MCCB, RCBOs, and VMR components, providing dust protection and water splash resistance in semi-outdoor or protected outdoor environments.
- **Enclosure Material:** The internal PDU is constructed from high-density polyethylene (HDPE) with a structured finish, securely integrated into a custom-built flightcase. The HDPE material is UV-stabilized and water-resistant, offering excellent mechanical strength, long-term durability, and resistance to environmental stress; making it ideal for demanding field applications.
- **Flightcase Construction:** The outer flightcase is manufactured from 7 mm high-grade birch plywood, finished with a durable black textured phenolic resin laminate for enhanced surface

resistance and visual uniformity. The design ensures maximum protection during transport and on-site use. The unit includes:

- Four robust handles (two per side) for multi-angle handling,
- Four industrial-grade wheels, two of which are lockable for safety during setup,
- Four lid dishes for stable vertical stacking via wheel alignment,
- One integrated plate for labeling or documentation storage.
- This configuration provides superior protection, portability, and logistical efficiency for demanding professional environments
- **Overall Dimensions:** 1015 x 780 x 800 in mm (Height × Width × Depth).
- **Labeling:** All connectors and protective devices are identified with UV-printed markings. UV printing ensures resistance to environmental degradation, including UV exposure and solvent-based cleaning agents.
- **Connector Installation:** Equipped with Quick Connector Replacement (QCR) system. Connectors are mounted with four stainless steel screws and sufficient internal cable slack to enable replacement without disassembling the entire enclosure.
- **Internal Conductor Cross-Sections:**
 - 400A circuits: 4x32mm flexible tinned busbar ($I_{n75^{\circ}\text{C}} = 561\text{A}$) (Cu-ETP)
 - 16A circuits: 2.5 mm² (Cu)
- **Wiring and Components:**
 - Internal cabling: Helukabel flexible conductors, H07V-K or equivalent.
 - Terminal blocks: Phoenix Contact or Ouneva spring-cage or screw-type terminals, selected per application and load class.

Electrical Specifications

- Rated voltage (U_n): 400 V AC, 3P+N+PE
- Rated current (I_{nA}): 400 A
- Frequency (f_n): 50/60 Hz
- Maximum continuous load: 276 kVA** (276 kW at $\cos\phi = 1$)
- Rated diversity factor with using the loop output (RDF_1): 0.5
- Rated diversity factor without using the loop output (RDF_2): 1
- Rated conditional short-circuit current (I_{cc}): 55 kA (in accordance with EN 60898)
- Protection class: Class I (protective earth)

**At 30°C ambient air temperature

Environmental Ratings

- Operating temperature: -25 °C to +40 °C, with the average ambient temperature over a 24-hour period not exceeding 35 °C (in accordance with IEC/EN 61439 recommendations).
- Storage temperature: 0 °C to +40 °C

- 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

Auxiliary Connector Options

The following configurations are available for auxiliary connectors:

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

***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.

Ordering Information

The following table lists all standard configuration variants available for the TTPF400-002 Series. Each part number corresponds to a specific auxiliary connector layout and color scheme.

Ordering Code	Connector Color Description	
	Input	Auxiliary Connector
TTPF400-002-F1-B	Green, Blue, Brown, Black, Grey	Black
TTPF400-002-F2-B	Green, Blue, Brown, Black, Grey	Black
TTPF400-002-E1-B	Green, Blue, Brown, Black, Grey	Black
TTPF400-002-G1-B	Green, Blue, Brown, Black, Grey	Black
TTPF400-002-P1-B	Green, Blue, Brown, Black, Grey	Black
TTPF400-002-J1-B	Green, Blue, Brown, Black, Grey	Black with blue lid
TTPF400-002-J2-B	Green, Blue, Brown, Black, Grey	Black with blue lid

Ordering Code	Connector Color Description	
	Input	Auxiliary Connector
TTPF400-002-B1-B	Green, Blue, Brown, Black, Grey	Black
TTPF400-002-K1-B	Green, Blue, Brown, Black, Grey	Black
TTPF400-002-CE-B	Green, Blue, Brown, Black, Grey	Black

Connector Color Options:

- B = All connectors in black (where available).
- C = Color-coded connectors: red for input and grey/blue/black for outputs (where available), offering quick visual identification during setup.

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.

Safety Notice

- This device must be installed, operated, and maintained by qualified personnel only. Internal components may carry live voltage during operation. Maintenance tasks, including connector replacement, must only be carried out with the power supply fully disconnected/isolated.
- All safety guidelines, installation procedures, and maintenance instructions are provided in the product's user manual. Please read and follow them carefully to ensure safe and correct operation.
- For full warranty terms and legal information, please refer to our General Terms and Conditions available at: <https://TeslaTech.GmbH/GTCS>

Disclaimer

- All specifications are subject to change without notice.
- This document, including its structure, layout, and contents, is the intellectual property of Tesla Entertainment Kft. No part of this publication may be reproduced, distributed, or transmitted in any form or by any means without the prior written permission of the owner. Tesla Entertainment Kft. reserves all rights to the designs, technical data, and configurations presented herein.