

MILITARY CHARGER UNIT

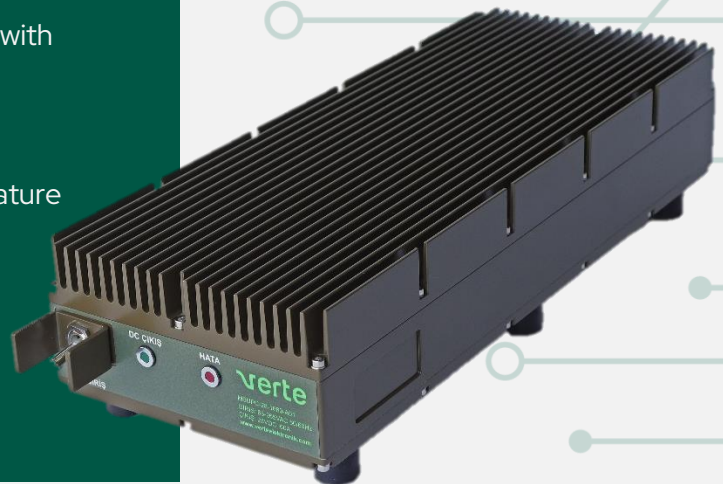
MSUPC-MPH-28-1680-B01

The "MSUPC-MPH-28-1680-B01" is a 1680 W military battery charger with input voltage of 90-264 VAC, 47-63 Hz and charging voltage of 12-36 VDC in accordance with the harshest environmental conditions and superior performance targets.

- AC Input: Single or three phase, 90-264 VAC, 47-63 Hz
- Charging Voltage: 12-45VDC, fixed value in accordance with user selection
- Power: 1680 W

Maximum Current: 60A

- Operating temperature: -40 °C to 55 °C with full power
- Multiple unit parallelization
- Over-Current, Short Circuit, Over-Temperature protections



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Built to meet stringent military standards, this battery charger guarantees reliable power delivery under extreme conditions. It operates efficiently across a wide input voltage range of 90-264V AC, accommodating various power grids with ease. Its high efficiency, approaching 90%, ensures minimal energy loss, translating into prolonged operational life. The converter's robust design includes comprehensive protection mechanisms against over-voltage, over-current, over-temperature, and short-circuits, safeguarding both the device and connected equipment.



Designed to withstand the rigors of military and industrial use, this battery charger performs flawlessly in diverse climatic conditions. It resists up to 90% non-condensing humidity, ensuring stable operation in humid environments. Designed also for both three-phase and single-phase operation, ensuring maximum flexibility across various power infrastructures. Additionally, the unit features a parallelization capability through the CANBUS interface, allowing seamless operation of up to 6 units in parallel. This scalable architecture enables increased power output and enhanced redundancy for mission-critical applications. With a single-unit power capacity of 1680W, the system can be expanded to deliver a total power of 10 kW when fully paralleled. For enhanced diagnostics and configuration, the converter integrates RS485 and CANBUS interfaces, providing real-time monitoring and precise control. This ensures optimal performance and adaptability across various operational demands.



TABLE OF CONTENTS

1. PRODUCT OVERVIEW	4
1.1. FEATURES	4
2. TECHNICAL SPECIFICATIONS	6
2.1. ELECTRICAL SPECIFICATIONS	6
2.2. ENVIRONMENTAL SPECIFICATIONS	7
2.3. MECHANICAL SPECIFICATIONS	8
3. INDICATORS & CONNECTORS	10
3.1. PANEL CONTROLS AND INDICATOR.....	10
3.1.1. ON/OFF SWITCH	10
3.1.2. INPUT STATUS LED	10
3.1.3. OUTPUT STATUS LED	10
3.1.4. FAULT STATUS LED	10
3.2. CONNECTORS	11
3.2.1. AC INPUT CONNECTOR.....	12
3.2.2. SIGNAL CONNECTORS.....	12
3.2.3. DC OUTPUT CONNECTOR.....	14
3.2.4. MATING CONNECTORS	15

Product Overview

1



1. PRODUCT OVERVIEW

The MSUPC-MPH-28-1680-B01 is designed for advanced military applications, this high-performance battery charger provides reliable and continuous power even in harsh outdoor environments. With its sealed design and intense cooling features, this device stands out by providing 1680W of power from single or three phase grids to charge a battery to 12-45VDC depending on the user configuration, making it an ideal solution for high power density military operations. Manufactured to the highest quality and durability standards, it is suitable for a wide range of military and industrial applications. Additionally, its parallelization capability via the CANBUS interface allows for scalability, supporting up to 6 units in parallel to meet higher power demands. The system consisting of MSUPC-MPH-28-1680-B01 can deliver 10 kW in full configuration.

1.1. FEATURES

- AC Input: 90-264 VAC, 47-63 Hz
- Single phase and three phase compliance (1-Ø / 3-Ø)
- Charging Voltage: 12-36VDC, fixed value in accordance with user selection (can be disabled for 28.8VDC default output)
- Unit Rated Power: 1680 W
- Operating temperature between -40 °C to 55 °C with full power
- Cooling with built-in fan
- Over-Current, Short Circuit, Over-Temperature protections
- CANBUS & RS485 interfaces for diagnostic and configuration
- Parallelization up to 6 units through CANBUS: 10kW power delivery when expanded

Technical Specifications

2



2. TECHNICAL SPECIFICATIONS

2.1. ELECTRICAL SPECIFICATIONS

Table 1: Input Electrical Specification

PARAMETER	VALUE	UNIT
Input Voltage	90-264	VAC
Input Frequency	47-63	Hz
Input Current (max)	20.0	A
Power Factor (full load)	>0.95	
Efficiency (full load)	90%	

Table 2: Output Electrical Specification

PARAMETER	VALUE	UNIT
Charging Voltage	12-36	VDC
Rated Charging Power	1680	W
Rated Current	60	A
Output Voltage Ripple*	200	mV _{p-p}
Line Regulation	±0.5%	
Load Regulation	±0.5%	

* at 20MHz bandwidth

Table 3: Protections

PROTECTIONS	
Over-Current	105 ~ 125% Constant current limiting, recovers automatically after fault condition is removed
Short Circuit	Constant current limiting, recovers automatically after fault condition is removed
Over-Temperature	Shut down output voltage, re-power on to recover
Output Overvoltage	Shut down output voltage, re-power on to recover
Input Undervoltage	Shut down PFC under 85VAC, re-power on to recover

2.2. ENVIRONMENTAL SPECIFICATIONS

Table 4: Environmental Specification

Description	Procedure
Operation Temperature	For -40°C/55°C MIL-STD-810F, Method 501.4 and 502.4
Storage Temperature	For -40°C/85°C MIL-STD-810F, Method 501.4 and 502.4
Humidity	MIL-STD-810F, Method 507.4
Vibration	MIL-STD-810F, Method 514.6, Procedure I, Category 20, Table 514.5 C-VII, Figure 514.5 C-3
Shock	MIL-STD-810F, Method 516.5, Procedure I, Shock, 20g 11 ms
Altitude	<3000 meters
EMI & EMC	CE102, CS101, CS114, CS115, CS116, RE102, RS103 (MIL-STD 461F)

2.3. MECHANICAL SPECIFICATIONS

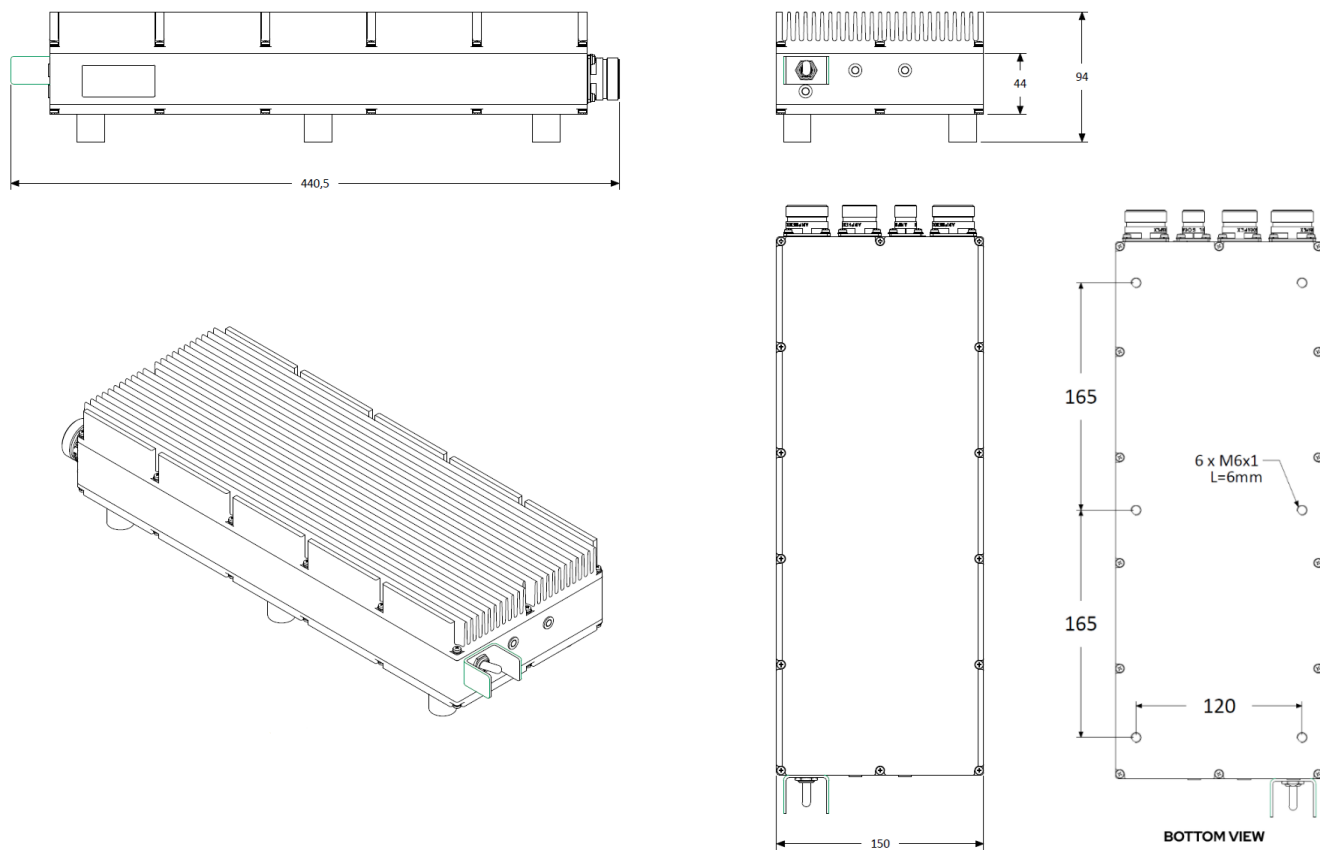


Figure 1: Mechanical Dimensions

Table 5: Mechanical Specification

PARAMETER	VALUE	UNIT
Colour	RAL 6014	
Connection Interface	6 X M6 x 1 ↓ 6.5 mm	
Width	150.0±0.5	mm
Height	94.0±0.5	mm
Length	440.5±0.5	mm
Weight (typical)	6.75	kg

Indicators & Connectors

3



3. INDICATORS & CONNECTORS

3.1. PANEL CONTROLS AND INDICATOR



Figure 2: Front Panel

There is a switch on the front panel to control the unit and 3 LEDs to monitor its status.

■ 3.1.1. ON/OFF SWITCH

When the switch is in the down position the unit is off, when it is moved to the up position it starts to supply regulated 28VDC to the output.

■ 3.1.2. INPUT STATUS LED

AC Input status LED turns on if the unit has a valid AC power source described in Table I at the KN1 (AC Input) connector, and turns off otherwise. The color of the LED is yellow.

■ 3.1.3. OUTPUT STATUS LED

Output status LED turns on green as long as there is power at the unit's KN2 (DC Output) connector, and turns off otherwise. The color of the LED is green.

■ 3.1.4. FAULT STATUS LED

Fault status LED turns on when a malfunction of the unit occurs, and turns off when fault situation goes off or there is no fault. The color of the LED is red.

3.2. CONNECTORS

The unit has four connectors. Two of them are for power input and output. Two of them are for the configuration and diagnostics of device(s). Part numbers and pin information are given below.

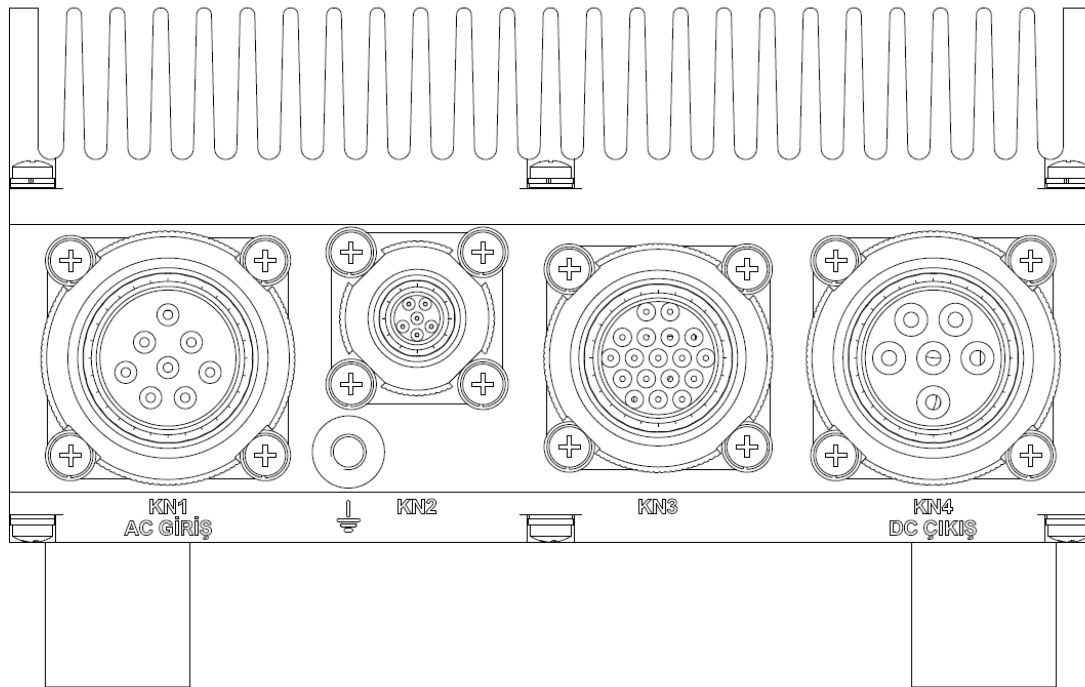


Figure 3: Back (Connector) Panel

Table 6 shows the AWG sizes of the pin/sockets in the connectors.

Table 6: AWG Size Table of the pins/sockets

PIN/SOCKET SYMBOL	AWG SIZE
○	22
⊖	20
⊕	16
◐	12

■ 3.2.1. AC INPUT CONNECTOR

The part number for the power input connector (KN1) in the unit is 'D38999/20WE8PN'. KN1 interface and pin descriptions of the corresponding connector is given in Figure 4 and Table 7, respectively.

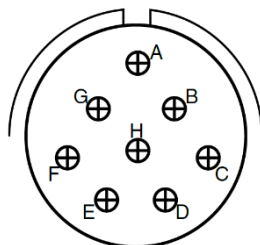


Figure 4: KN1 Connector Interface

Table 7: KN1 Pinout

PIN NO	SIGNAL NAME
A	Phase-A _{3-Ø} / Phase _{1-Ø}
B	Neutral
C	Phase-B _{3-Ø} / Phase _{1-Ø}
D	Neutral
E	Phase-C _{3-Ø} / Phase _{1-Ø}
F	Neutral
G	Not Connected
H	Earth

■ 3.2.2. SIGNAL CONNECTORS

There are two connectors for signal transmission. Connector part numbers are D38999/20WA35SN (KN2) and D38999/20WD18SN (KN3).

KN2 interface and corresponding socket descriptions are given in Figure 5 and Table 8, respectively.

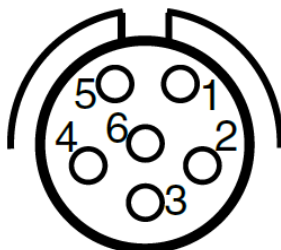


Figure 5: KN2 Connector Interface

Table 8: KN2 Pinout

SOCKET NO	SIGNAL NAME
1	CAN2_H
2	CAN2_L
3	GND_CAN2
4	Reserved
5	Reserved
6	Reserved

KN3 interface and corresponding socket descriptions are given in Figure 6 and Table 9, respectively.

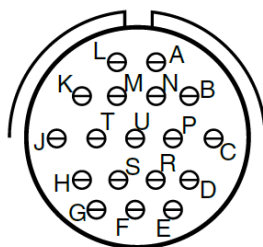


Figure 6: KN3 Connector Interface

Table 9: KN3 Pinout

SOCKET NO	SIGNAL NAME
A	Discrete Input I
B	Discrete Input II
C	Discrete Output I
D	Discrete Output II
E	GND_IO
F	RS485_A
G	RS485_B
H	RS485_Y
J	RS485_Z
K	GND_RS485
L	CAN1_H

M	CAN1_L
N	GND_CAN1
P	CAN2_H
R	CAN2_L
S	GND_CAN2
T	Reserved for Future Use
U	Reserved for Future Use

■ 3.2.3. DC OUTPUT CONNECTOR

The part number for the power output connector used in the unit is 'D38999/20WE6PN'. KN4 interface and pin descriptions are given in Figure 7 and Table 10, respectively.

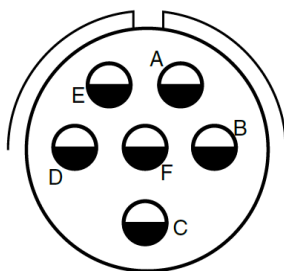


Figure 7: KN4 Connector Interface

Table 10: KN4 Pinout

PIN NO	SIGNAL NAME
A	28V
B	28V
C	28V
D	28V_RTN
E	28V_RTN
F	28V_RTN

■ 3.2.4. MATING CONNECTORS

Table 11 shows the mating connector specifications of the unit.

Table 11: Mating Connector Specifications of MSUPC-MPH-28-1680-B01

UNIT CONNECTOR DESIGNATOR	MATING CONNECTOR PART NUMBER
KN1	D38999/26WE8SN
KN2	D38999/26WA35PN
KN3	D38999/26WD18PN
KN4	D38999/26WE6SN