DC UNINTERRUPTABLE POWER SUPPLY

DUPS-28-MDC-300-A02

The "DUPS-28-MDC-300-A02" is a DC uninterruptible power supply with multiple output capabilities, capable of charging an internal BB2590 battery and delivering 28 VDC, 16VDC, and 12 VDC to loads when connected to an 18-36V input. In the event of power interruptions or low input voltage, it maintains regulated output from the internal battery. Key features include DC UPS functionality, continuous built-in testing, various charging modes, voltage protection, fanless cooling, and adjustable output between 24-32 VDC. It meets MIL-STD-810 standards and supports multiple operational modes, making it versatile and reliable for various applications.

- DC UPS Function
- Constant current charge mode
- Constant voltage charge mode
- Battery over-voltage protection
- Battery under-voltage protection
- Conduction cooling without fan
- Droop-method current sharing
- Continuous built-in test
- During power failure automatically supplies regulated 28 VDC, 16VDC, and 12 VDC to loads

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The "DUPS-28-MDC-300-A02" model is a DC uninterruptible power supply with multiple output capabilities. When connected to the 18-36V input bus voltage, it can charge the internal BB2590 battery using smart battery charging protocols and deliver 28 VDC, 16VDC, and 12 VDC to loads through output connectors. In the event of a power interruption or input voltage falling below a specified value, the unit can supply regulated 28 VDC and 12 VDC to loads from the internal battery. Thus, the DUPS-US-28M-300-A02 functions as a DC uninterruptible power supply.

This device features DC UPS functionality, continuous built-in testing, constant current and constant voltage charge modes, battery over-voltage and under-voltage protection, fanless conduction cooling, and adjustable regulated output between 24-32 VDC. Capable of providing regulated 28 VDC, 16 VDC, and 12 VDC automatically during power failure, the device is designed to meet various electrical, mechanical, and environmental specifications. It conforms to MIL-STD-810 standards for vibration, low pressure, shock, sand, dust, and corrosion testing. The operational modes include power supply mode, portable power supply mode, uninterruptible power supply mode and charging mode.

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1. PRODUCT OVERVIEW

"DUPS-28-MDC-300-A02" is a DC uninterruptable power supply with multiple output capability. When connected to the 18-36V input bus voltage, unit can charge internal BB2590 battery with smart battery charging protocols and also delivers 28 VDC, 16VDC, and 12 VDC to loads through output connectors. If there is a case such as a power interrupt or input voltage lower than a prespecified voltage value, unit can supply regulated 28 VDC and 12 VDC to loads from internal battery. So that DUPS-28-MDC-300-A02 simply functions as a DC uninterruptable power supply.

1.1. FEATURES

- DC UPS Function
- Continuous built-in test
- Constant current charge mode
- Constant voltage charge mode
- Battery over-voltage protection
- Battery under-voltage protection
- Conduction cooling without fan
- Adjustable regulated output between 24-32 VDC
- During power failure automatically supplies regulated 28 VDC, 16VDC and 12 VDC to loads

Technical Specifications

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2. TECHNICAL SPECIFICATIONS

Table 1: Electrical Specification

PARAMETER	VALUE	UNIT
Input Voltage	18 - 36	Vdc
Output Voltages	28VDC, 16VDC, 12VDC	Vdc
Battery Charge Voltage	10 - 16.8	Vdc
Maximum Battery Charge Current	2 x 3	A
Maximum Battery Discharge Current	2 x 10	A
Operating Temperature	-32 / +52	°C
Storage Temperature	-40 / +63	°C

Table 2: Mechanical Specification

PARAMETER	VALUE	UNIT
Dimensions	111×180×180	mm
Weight	<4	kg
Case Color	Green 383 Camouflage	-

Table 3: Environmental Specification

DESCRIPTION	PROCEDURE
Temperature	MIL STD 810 H METOD 501.7 Procedure II (+52°) MIL STD 810 H METOD 502.7 Procedure II (-32°) MIL STD 810 H METOD 501.7 Procedure I (+63°) MIL STD 810 H METOD 502.7 Procedure I (-40°)
Humidity	MIL STD 810 H METOD 507.6 Procedure II
Dust & Sand	MIL STD 810 H METOD 510.7 Procedure I-II
Vibration	MIL STD 810 H METOD 514.8 Procedure I (Category 20-a Table 514.8C-I Figure 514.8C)
Shock	MIL STD 810 H METOD 516.8 Procedure I (20g/11ms and 40g/11ms sawtooth)
Rain	MIL STD 810 H METOD 506.6 Procedure I (1.7mm/min)
Immersion	MIL STD 810 H METOD 512.6 Procedure I (1 meter / 30 min)
Contamination	MIL STD 810 H METOD 504.3 Procedure I (Table 504.3-I, liquits 4-5)
Solar Radiation	MIL STD 810 H METOD 505.7 Procedure I (Figure 505.7C-5)

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Figure 1: DUPS-28-MDC-300-A02 front panel view

Panel components are shown in Figure 2.

Figure 2: Panel assembly drawing

3.1.1. DC OUTPUT CONNECTOR

The part number for the power output connector used in the unit is ‘D38999/20WB98SN’

The part number for the mating connector is 'D38999/26WB98PN'

Table 4: KN1 Pinout

PIN NO	SIGNAL NAME
A	28V
B	12V
C	12V_RTN
D	16V_RTN
E	16V
F	28V_RTN

3.1.2. DC INPUT CONNECTOR

The part number for the power input connector used in the unit is 'D38999/20WB4PN'

The part number of the mating connector is 'D38999/26WB4SN'.

Table 5: KN2 Pinout

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

3.1.3. POWER INDICATOR LED

The power LED lights up green when there is power at the output connector and does not light up when there is no power.

3.1.4. BATTERY INDICATOR LED

The battery LED lights up in three different colors based on the battery's charge level.

• Green (SOC 100% - 67%)

• Orange (SOC 66% - 34%)

• Red (SOC 33% - 0%)

The battery LED lights up differently depending on the system's status.

• If an error occurs while the system is running, it flashes red four times per second for 30 seconds.

• If the system is operating on battery power, the LED blinks once per second in the color corresponding to the battery's charge level.

• If the system is powered by an external source of 28V or higher, the LED remains steadily lit in the color corresponding to the battery's charge level.

3.1.5. POWER SWITCH

The power switch is turns the output on and off.

When the power switch is on:

• The output connector supplies the voltages of Channel 1 (26-32V), Channel 2 (12V), and Channel 3 (16V).

3.1.6. BATTERY SWITCH

The battery switch is used to connect or disconnect the battery within the unit. The switch should be set to 'OFF' when the unit is not in use and being stored.

When the battery switch is on:

• If the voltage at the system's input connector is above 27V and the battery is not fully charged, the unit will charge the battery.

• If the voltage at the system's input connector is below 26V and the battery is not empty, it provides regulated voltages of 25.8V at Channel 1 and 12V at Channel 2.

Operating Procedure

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4. USAGE INSTRUCTIONS

4.1. Operating Modes

The unit can be configured to operate in four different modes based on the connections and switch settings to meet various needs.

4.1.1. Power Supply Mode

When there is voltage at the KN2 (input) connector and the power switch is turned on, a voltage equal to the input voltage will be present between pins A-F, a voltage of 12V will be present between pins B-C and a voltage of 16V will be present between pins E-D on the KN1 (output) connector. In this configuration, the system can be used as a power source without activating the battery.

Figure 3: Front Panel View In Power Supply Mode

4.1.2. Portable Power Supply Mode

When no other power source is available, if both the battery switch and the power switch are turned on, a voltage of 25.8V will be present between pins A-F, a voltage of 12V will be present between pins B-C and a voltage of 16V will be present between pins E-D on the KN1 (output) connector. In this configuration, the system can be used as a portable power supply.

Figure 4: Front Panel View In Portable Power Supply Mode

4.1.3. Uninterruptable Power Supply Mode

When there is voltage at the KN2 (input) connector and the power switch is turned on, a voltage equal to the input voltage will be present betwee n pins A-F and a voltage of 12V will be present between pins B-C on the KN1 (output) connector. If the input voltage is 27V or higher, the unit will charge the battery.

In the event of a power outage (when the input voltage drops below 26V), the unit activates the battery, and a voltage of 25.8V will be present between pins A-F and a voltage of 12V will be present between pins B-C on the KN1 (output) connector. In this way, the system can be used as an uninterruptible power supply.

Figure 5: Front Panel View In Uninterruptable Power Supply Mode

4.1.4. Charging Mode

When there is voltage of 27V or higher at the KN2 (input) connector and the battery switch is turned on, the unit will charge the battery. In this configuration, the system can be used as a battery charger

Figure 6: Front Panel View In Charging Mode

Operator Maintenance Instructions

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5. OPERATOR MAINTENANCE INSTRUCTIONS

4.1. FAULT CONDITIONS

When the unit is not used properly or operated above the rated values, faults may occur or enter an error state.

Wait until the battery is fully charged while charging. If the unit needs to be turned off while charging, first turn off the power switch, then disconnect the input power. Finally, disable the battery switch. If the battery switch is turned off while the battery is charging without following these steps, the system enters an error state, and the red light flashes for 30 seconds. After this period, the system resumes normal operation.

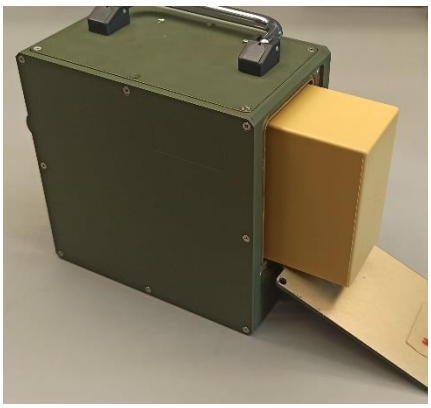
If the unit is running on battery power without power from the input, it enters an error state when the battery is depleted, and the red light flashes for 30 seconds. In this case, the battery switch should be turned off, or power should be supplied to the system. If it's desired for the system to continue operating, the depleted battery can be replaced with a fully charged one.

If an unknown error occurs in the unit and the battery LED continues to flash red four times per second after 30 seconds, power from the input should be disconnected, switches should be turned off, and the unit should be restarted. If the error persists after several attempts, contact the manufacturer.

When power is supplied to the unit from the input or the battery switch is turned on, if the power LED does not light up when the power switch is turned on and there is no voltage at the output, contact the manufacturer.

4.2. BATTERY REPLACEMENT

1. Set the battery switch to the 'OFF' position.
2. Remove the screws located on the back of the unit by turning them counterclockwise by hand.
3. Tilt the unit to allow the battery to slide out with its own weight.
4. Insert the new BB 2590 battery into the unit with the connector facing downward.
5. Close the cover and tighten the screws by turning them clockwise.



4.3. STORAGE AND MAINTENANCE

- The unit's power and battery switches should be kept in the off position when not in use.
- The unit should be stored in a closed environment away from direct sunlight.
- If the battery is to be stored inside the unit, it should be charged before storage.
- The unit should be powered on and the battery charged every six months.