LDD960-UU

960 W DIN Rail Combo DC-UPS
DC-DC Converter

LDD960-UU is a microprocessor-controlled unit that can perform two functions:

- DC-UPS rated 960 W / 20 A usable in any system 12 – 48 VDC
- DC/DC converter (non-isolated) rated 960 W / 20 A usable in any combination of IN/OUT voltages 12 – 48 VDC

For the UPS function it may use one 12 V battery, independently of the operating load voltage. For any supply voltages (12 – 48 VDC) it may use also multiple battery configuration (10 – 60 VDC).

LDD960-UU monitors the voltage coming from a DC power supply and in case of power failure a backup storage source supplies the energy to the load. In normal condition the battery is kept charged by an integrated battery charger supporting various battery chemistries.

As a DC/DC converter (no battery present), the input voltage is converted to any output voltage as per the set-up (programmable by front keys or communication interfaces).

FEATURES

- Digital power regulation, LCD interface
- Integrated battery charger for 12 – 48 V multi-chemistries batteries with a charging current up to 20 A
- Can operate with super capacitors modules
- Battery voltage independent of input and output voltage
- 20 A or 960 W rated load
- Multiple protections
- Remote ON/OFF or other remote control functions possible through INHIBIT input
- Measures voltages and currents on input, output and battery
- Battery protection against reverse polarity connection and over current
- Battery health monitoring system: measuring battery internal resistance, battery temperature, charge/discharge cycles and Coulomb counter
- User settable maximum backup time
- Auxiliary output with same voltage as battery (5 A max.), protected against over current/short circuit

EMBEDDED USER INTERFACE

- 4 keys and 1 color graphic TFT LCD display
- Allows online device configuration
- Displays the LDD960-UU status and alarms
- Modbus over RS-485 and USB interfaces for control & monitoring
- Dry contacts for programmable status signals

1. MODEL SELECTION

MODEL	INPUT VOLTAGE RANGE	INPUT CURRENT	OUTPUT VOLTAGE	MAX OUTPUT CURRENT	EFFICIENCY [1]	MAX OUTPUT POWER
LDD960-UU	10 - 60 VDC	20 A	12 - 48 VDC	20 A	96 - 98 %	960 W

[1] At full load, depending on operating mode

2. INPUT SPECIFICATIONS.

PARAMETER	DESCRIPTION / CONDITIONS	SPECIFICATION
DC Input Voltage	Nominal Range (UL certified)	12 - 48 VDC 10 - 60 VDC
DC Input Current		20 A
Standby Power		< 4 W

3. MAIN OUTPUT SPECIFICATIONS

PARAMETER	DESCRIPTION / CONDITIONS	SPECIFICATION
Output Voltage	Nominal = Vin for use as UPS; according to set-up for use as DC-DC converter	12 - 48 VDC
Maximum Output Current [2]	960 W	20 A
Short circuit Current	Constant current limited only in DC-UPS mode	21 A
Load Regulation		± 1 %

[2] Do not use continuously above 18 A for periods longer than 2 hours.

4. AUXILIARY OUTPUT SPECIFICATIONS

PARAMETER	DESCRIPTION / CONDITIONS	SPECIFICATION
Voltage	Nominal (= U battery - non regulated)	12 - 48 A
Continuous Current	Constant current limited only in DC-UPS mode	5 A
Overload Limit		6 A

5. BATTERY SPECIFICATIONS

PARAMETER	DESCRIPTION / CONDITIONS	SPECIFICATION
Battery Voltage (or to be used as input for DC-DC conversion)	Nominal Range	12 - 48 VDC 10 - 60 VDC
Battery Chemistries	Lead Acid Nickel Lithium Supercap capacitors	
Maximum Battery Charge Current		20 A
Maximum Battery Discharge Current		20 A
Allowed Battery Capacity		up to 1000 Ah
Battery Protections	Over current Deep discharge Reverse polarity	

BATTERY HEALTH MONITORING		
Battery Internal Resistance Range		1 - 300 mΩ
Additional Monitoring Functions	Coulomb counter Battery temperature through 10kΩ NTC sensor (optional WNTC-2MT) Battery operating time since installation Number of cycles	

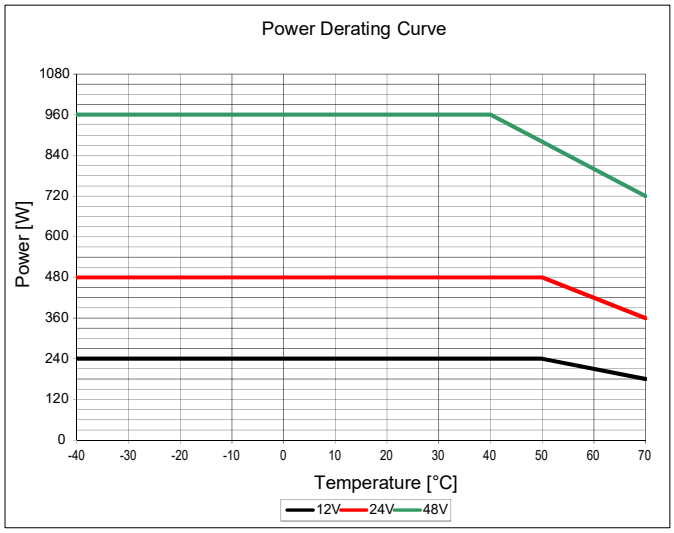
6. USER INTERFACE

PARAMETER	DESCRIPTION / CONDITIONS
1.5 inch color graphic LCD	Used to display the unit's status and to access the configuration menus
4 keys	Used to program the unit and to access various menus
Red LED	Constantly ON: generic failure on the system, details on the LCD Blinking: battery backup function active
2 dry contact relays (NO, 24 VDC / 1A)	RL1 / RL2 - Configurable RL COM - Common Pin
Other interfaces	INH - (INHIBIT) Isolated remote ON/OFF input, active for 5…30Vdc T SENSE - optional, remote temperature sensor for battery charging (WNTC-2MT) Modbus over USB and RS-485 interfaces

7. ENVIRONMENTAL, EMC & SAFETY SPECIFICATIONS

PARAMETER	DESCRIPTION / CONDITIONS	SPECIFICATION
Operating Temperature [3]	UL certified up to 50°C at 12 - 24 VDC or up to 40°C at 48 VDC Start-up type tested: - 40°C, possible at Vnom with load deration.	-40 to +70 °C
Storage Temperature		-40 to +80 °C
Derating	For derating, see *Figure 1*	
Efficiency	UPS mode with Vin present UPS mode during backup DC-DC mode Battery charge mode	> 98 % > 97 % > 97 % > 96 %
Power Loss	UPS mode with Vin present UPS mode during backup DC-DC mode Battery charge mode	< 7 W < 15 W < 15 W < 20 W
Maximum backup time	User programmable, up to battery deep discharge threshold	
Humidity	Non-condescending	5 - 95 % RH
Life Time Expectancy	Ta = 25°C, full load	281 904 (32.2) hrs (years)
MTBF	MIL-HDBK-217F at Ta = 25°C, full load	> 600 000 hrs
Overvoltage Category	EN 50178	I
Pollution Degree	IEC 60664-1	2
Isolation against Enclosure		0.75 kVDC
Safety Standards & Approvals	UL 508 (certified) IEC/EN 61010-1 IEC/EN 61010-2-201 IEC/EN 60950	
EMC Emissions	EN 61000-6-3	
EMC Immunity	EN 61000-6-2	
Protection Degree	EN 60529	IP20
Vibration Sinusoidal	IEC 60068-2-6	5 - 17.8 Hz: ±1.6 mm; 17.8 - 500 Hz: 2 g, 2 hours / axis (X, Y, Z)
Shock	IEC 60068-2-27	30 g 6 ms, 20 g 11 ms; 3 bumps / direction, 18 bumps total

[3] *For temperature ≤ - 20°C the LCD is not operating, for temperature ≥ +60°C the display reduce its life time, but the unit will operate correctly.*



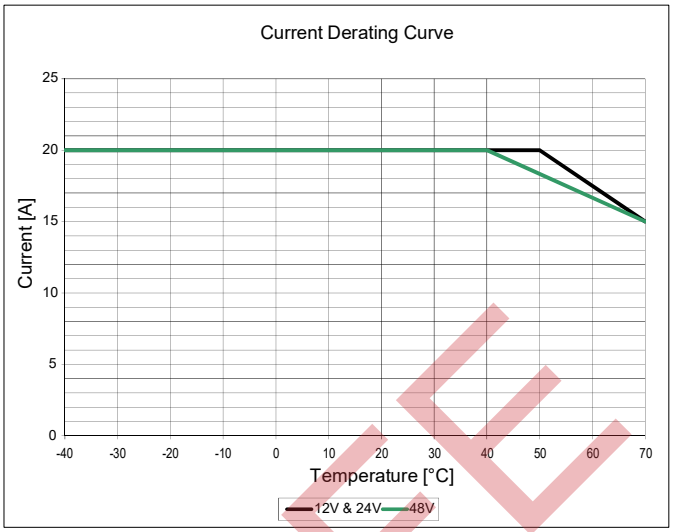
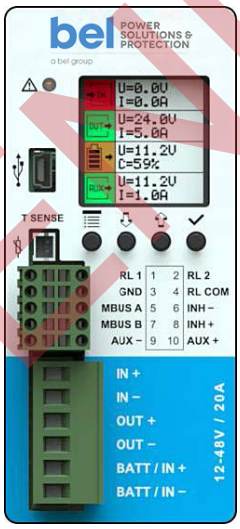


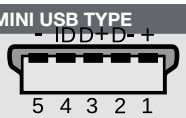
Figure 1. Derating curves

8. MECHANICAL SPECIFICATIONS

PARAMETER	DESCRIPTION / CONDITIONS	SPECIFICATION
Dimensions		54 x 115 x 110 mm 2.13 x 4.53 x 4.33 in
Weight		500 g
Mounting Rail	IEC 60715/H15/TH35-7.5(-15)	
In/Out/Batt Connection Terminals	Screw type pluggable (24 - 12 AWG)	2.5 mm²
Auxiliary Connection Terminals	Spring type pluggable (18 AWG)	up to 0.75 mm²
Temperature Sensor Connector	Friction lock connector	
Communication Interface Connector	Mini USB-B Type (virtual Com Port), RS-485 through auxiliary connector	
Case Material	Aluminum	

9. PIN LAYOUT & DESCRIPTION



MAIN CONNECTIONS	AUXILIARY CONNECTIONS	MINI USB TYPE
IN connect to: power supply in UPS mode • + = Positive DC • - = Negative DC **BATT/IN** connect to: battery in UPS mode or power supply in DC-DC mode • + = Positive DC • - = Negative DC **OUT** connect to load • + = Positive DC • - = Negative DC	**RL1 / RL2** (programmable dry contact) • RL1 = NO • RL2 = NO • RL COM = COM **MODBUS** (over RS-485, 2 wire interface) • MBUS A = RX/TX • MBUS B = RX/TX • GND = Common **INHIBIT** (5 – 30 VDC) • INH+ = Positive DC • INH- = Negative DC **AUX** (12 – 48 VDC not regulated 5 A max.) • AUX + = Positive DC • AUX - = Negative DC **T SENSE** (remote temp. sensor for battery charging) • Optional WNTC-2MT	 1 = VBUS (+5V) 2 = Data (D-) 3 = Data (D+) 4 = Not connected (ID) 5 = GND

MECHANICAL DRAWING

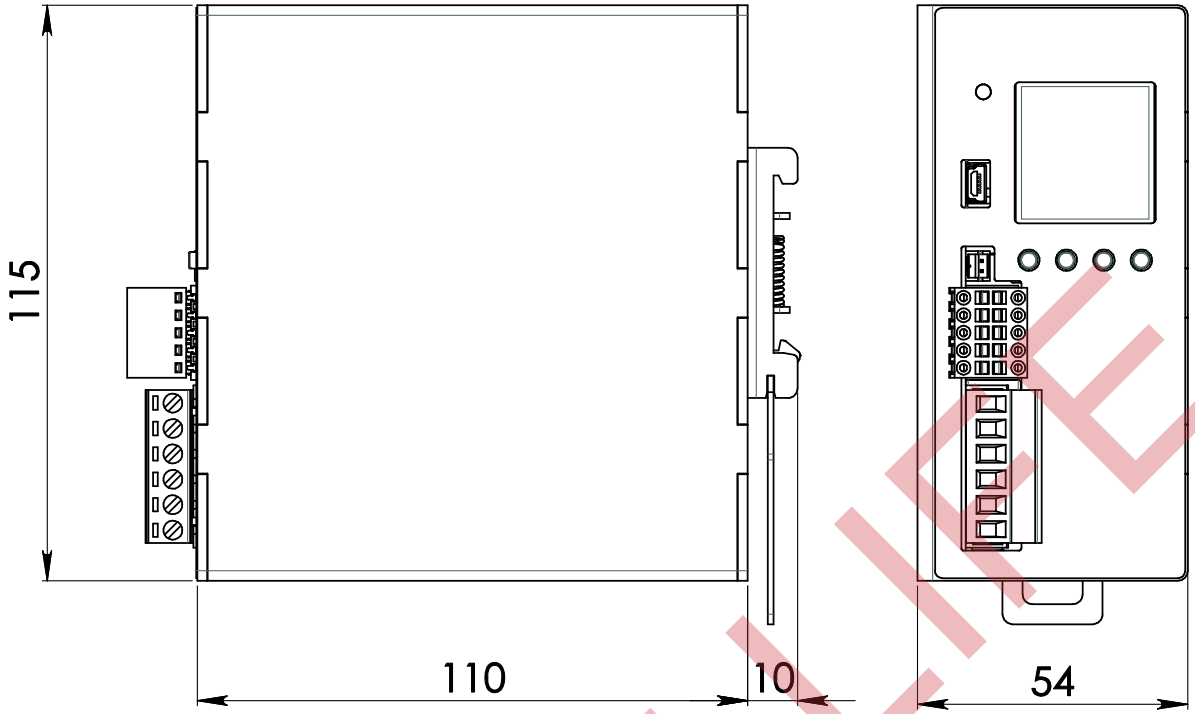


Figure 2. Mechanical Drawing

Notes:

Technical parameters are typical, measured in laboratory environment at 25°C, 24 VDC input and 24 V lead acid battery, at nominal values, after minimum 5 minutes of operation.
Power rating, losses, efficiency, ripple, thermal behaviour and start-up may change outside of the nominal rated input range. Contact factory for details.
For more details, performance and descriptions regarding all parameters not indicated in the above table, please refer to the User manual.