INSTALLATION INSTRUCTION

LDD240-WU

240 W Programmable DC-DC Converter



LDD240-WU

INPUT: 12 – 48 VDC, 12 A

OUTPUT: 5 – 55 VDC, 10 A Max (240 W Max)

MAIN FEATURES

- Up to 240 W output power (voltage dependent)
- Converts any voltage between 11 V and 55 V to any voltage between 5 V and 55 V
- High efficiency and compact size
- Constant current or hiccup mode limitation, user settable
- Digital Power regulation
- Isolated topology (4.2 kVDC)
- Modbus over USB interface for control and monitoring
- Multiple protections integrated
- Parallelable for power or redundancy (integrated ORing circuitry)
- UL508 Certified

READ THIS CAREFULLY BEFORE INSTALLATION!	VOR DER INSTALLATION BITTE FOLGENDE SICHERHEITSHINWEISE BEACHTEN!	LEGGERE ATTENTAMENTE PRIMA DELL'INSTALLAZIONE!	A LIRE ATTENTIVEMENT AVANT L'INSTALLATION!
Before operating, read this document thoroughly and retain it for future reference. Non-respect of these instructions may reduce performances and safety of the devices and cause danger for people and property. The products must be installed, operated, serviced and maintained by qualified personnel in compliance with applicable standards and regulations. Do not open the device, it does not contain replaceable components, the tripping of the internal fuse (if included) is caused by an internal failure. Do not repair or modify the device, if malfunction or failure should occur during operation, send unit to the factory for inspection. No responsibility is assumed by Bel for any consequences deriving from the use of this material.	Lesen Sie dieses Dokument vor der Inbetriebnahme sorgfältig durch und bewahren Sie es zum späteren Nachschlagen auf. Die Nichtbeachtung dieser Anweisungen kann die Funktion und Sicherheit der Geräte beeinträchtigen und birgt Gefahren für Personen und Eigentum. Die Geräte müssen von qualifiziertem Personal unter Einhaltung der geltenden Normen und Vorschriften installiert, betrieben, gewartet und instand gehalten werden. Öffnen Sie das Gerät nicht, es enthält keine austauschbaren Komponenten, das Auslösen der internen Sicherung (falls vorhanden) ist stets auf tiefergehende Fehler im Schaltkreis zurück zu führen. Reparieren oder modifizieren Sie das Gerät nicht. Sollte während des Betriebs eine Fehlfunktion oder ein Defekt auftreten, schicken Sie das Gerät zur Überprüfung ins Werk. Bel übernimmt keine Haftung für die Folgen, die sich aus dem Einsatz dieses Gerätes ergeben.	Prima dell'installazione, leggere attentamente questo documento istruzioni e conservarle per future consultazioni. L'inosservanza delle presenti istruzioni può compromettere le caratteristiche e la sicurezza dell'apparecchio e causare pericolo per le persone e le cose. Il prodotto deve essere installato, utilizzato e riparato da personale qualificato e nel rispetto delle normative vigenti. Non aprire il prodotto, esso non contiene componenti sostituibili, il guasto del fusibile interno (se previsto) è causato da un guasto interno. Non tentare di riparare o modificare il prodotto, se durante il funzionamento si verificano guasti o anomalie, inviarlo al produttore per il controllo. Bel non si assume nessuna responsabilità per qualunque conseguenza derivante dall'uso di questo materiale.	Lire ces instructions avant l'installation, conserver ce manuel pour référence future. Défaut de se conformer à ces instructions peut affecter les caractéristiques et la sécurité du dispositif, et causer du danger aux personnes ou aux biens. Les produits doivent être installés, exploités et entretenus par du personnel qualifié et en conformité avec les règlements. N'ouvrez pas le produit, il ne contient aucune pièce réparable, le déclenchement du fusible interne (le cas échéant) est causé par un défaut interne. Ne pas essayer de réparer ou modifier le produit ; si des défaillances se produisent pendant le fonctionnement, retourner le produit au fabricant pour inspection. Bel n'assume aucune responsabilité des conséquences éventuelles découlant de l'utilisation des produits.
CAUTION	**ACHTUNG**	**ATTENZIONE**	**AVVERTISSEMENT**
RISK OF BURNS, EXPLOSION, FIRE, ELECTRICAL SHOCK, PERSONAL INJURY. Never carry out work on live parts! Danger of fatal injury! The product's enclosure may be hot, allow time for cooling product before touching it. Do not allow liquids or foreign objects to enter into the products. To avoid sparks, do not connect or disconnect the device before having previously turned-off input power and wait for internal capacitors discharge (minimum 1 minute).	**GEFAHR VON VERBRENNUNGEN, EXPLOSIONEN, FEUER, STROMSCHLAG, PERSONENSCHÄDEN.** Führen Sie niemals Arbeiten an spannungsführenden Teilen durch! Gefahr von tödlichen Verletzungen! Das Gehäuse des Gerätes kann heiß sein, lassen Sie Zeit zum Abkühlen des Gerätes, bevor Sie es berühren. Lassen Sie keine Flüssigkeiten oder Fremdkörper in die Geräte eindringen. Um Überschläge zu vermeiden, schließen Sie das Gerät nicht an oder trennen Sie es nicht ohne vorher die Eingangsspannung abgeschaltet zu haben, und warten Sie die Entladung der internen Kondensatoren ab (mindestens 1 Minute).	**RISCHIO USTIONI, ESPLOSIONE, INCENDIO, SCOSSA, LESIONI GRAVI.** Non effettuare mai operazioni sulle parti sotto tensione! Pericolo di lesioni letali! Il contenitore può scottare, lasciar quindi raffreddare il dispositivo prima di toccarlo. Non far entrare liquidi o oggetti estranei nel dispositivo. Per evitare scintille, non collegare o scollegare l'apparecchiatura prima di avere tolto tensione di ingresso e prima che sia avvenuta la scarica dei condensatori interni (min. 1 minuto).	**RISQUE DE BRULURES, EXPLOSION, INCENDIE, ELECTROCUTION, DOMMAGE AUX PERSONNES.** Ne jamais effectuer des opérations sur les parties sous tension! Danger de mort! Le boîtier peut produire des brûlures, le laisser refroidir avant de toucher l'appareil. Ne faire pas pénétrer des liquides ou des corps étrangers dans l'appareil. Pour éviter des étincelles, ne pas connecter ou déconnecter l'équipement jusqu'à ce que la tension d'entrée a été supprimée et avant qu'il n'ait eut lieu la décharge des condensateurs internes (minimum 1 minute).
INTENDED USE	**BESTIMMUNGSGEMÄßER BETRIEB**	**USO PREVISTO**	**UTILISATION**
These are isolated devices suitable for **SELV** and **PELV** circuitry and are designed to be mounted on DIN rail and installed inside a protective enclosure. They are intended for general use such as in industrial control, communication, and instrumentation equipment. Do not use these devices in applications where malfunction may cause injury or death.	Es handelt sich um galvanisch getrennte Geräte, die für SELV- und PELV-Anwendungen geeignet sind und für die Montage auf DIN-Schienen und die Installation in einem Schutzgehäuse konzipiert sind. Sie sind für den allgemeinen Gebrauch wie z.B. in industriellen Steuer-, Kommunikations- und Automatisierung-Anwendungen vorgesehen. Verwenden Sie diese Geräte nicht in Anwendungen, bei denen eine Fehlfunktion zu Verletzungen oder zum Tod führen kann.	I dispositivi sono isolati, adatti per applicazioni **SELV** e **PELV**, sono dotati di aggancio per il montaggio su guida DIN all'interno di quadri elettrici o contenitori di protezione, per l'utilizzo con controllori industriali, unità di comunicazione o apparecchi di misura. Non utilizzare in applicazioni in cui un eventuale guasto può comportare rischio di lesioni o di morte.	Les produits sont isolés, appropriés pour les circuits **TBTS** et **TBTP** et sont équipés d'un crochet pour montage sur rail DIN dans des armoires ou conteneurs de protection, pour utilisation avec les contrôleurs industriels, des modules de communication ou des unités de mesure. Ne pas utiliser ces dispositifs dans une application où un dysfonctionnement pourrait entraîner le risque des blessures ou de mort.
ENVIRONMENTAL CHARACTERISTICS	**UMGEBUNGSBEDINGUNGEN**	**CARATTERISTICHE AMBIENTALI**	**CARACTÉRISTIQUES ENVIRONMENTALES**
Installation in a Pollution Degree 2 environment. Do not use in wet area or subject to moisture. Carefully recycle the product and related batteries according to local regulations.	Installation in einer Umgebung mit Verschmutzungsgrad 2. Nicht in nassen Bereichen oder unter Feuchtigkeit verwenden. Das Gerät und die zugehörigen Batterien sind entsprechend den lokalen Vorschriften zu recyceln bzw. zu entsorgen.	Usare in ambienti con Grado di Inquinamento 2. Non far funzionare l'apparecchio in un ambiente umido o soggetto a formazione di condensa. Riciclare il prodotto e le batterie collegate, nel rispetto delle normative locali vigenti.	Utiliser les produits dans des environnements avec degré de pollution 2. Ne pas employer l'appareil dans un environnement humide ou soumis à la condensation. Recycler les produits et les batteries, conformément à la réglementation locale.

USER INSTRUCTIONS

1) DESCRIPTION

Description: LDD240-WU can be supplied with any voltage between 11 VDC and 55 VDC, **please respect the polarity**. The output voltage can be programmed to any voltage between 5 VDC and 55 VDC.
To prevent damage in case of reverse polarity, the device is protected by an internal not replaceable fuse. LDD240-WU can be used in SELV and PELV circuits.

2) INSTALLATION

use DIN-rails according to EN 60715. Installation should be made vertically (see Fig.4). For better device stability fix the rail to the wall close to the point where the device is to be mounted. To guarantee sufficient convection, we recommend observing a minimum distance to other modules (see Fig.3).
The device is provided with a thermal protection, a limited air flow can cause the thermal protection tripping.
The device automatically restarts after cooling.
To get normal operation reduce the temperature of the air surrounding the unit, increase the ventilation or reduce the load.

3) CONNECTIONS

The device is equipped with pluggable screw terminals. To avoid sparks, do not connect or disconnect the connectors before having previously turned-off input power and waited for internal capacitors discharge (minimum 1 minute)
In order to comply with UL certification, use appropriate copper cables of indicated cross section, designed for an operating temperatures of:
60°C for ambient up to 45°C
75°C for ambient up to 60°C
90°C for ambient up to 70°C
Strip the connecting ends of the wires according to the indication on Fig.5 and ensure that all strands of a stranded wire enter the terminal connection.

4) DC INPUT PROTECTION

LDD240-WU is equipped with internal fuse, ratings of DC line protection devices must be coordinated with input current indicated on the data sheet.

5) OVERLOAD (OL) / SHORT CIRCUIT (SC) / OVERVOLATGE (OVP) / OVERTEMPERATURE (OTP) PROTECTIONS

Hiccup auto-reset and constant current limitation, user selectable.
Overload behaviour in hiccup mode: the output current is limited at 1.5xImax. When the programmed Imax value is exceeded a timer is started. If the load current demand is not reduced below Imax for maximum 5 seconds the output is switched off and kept off for 10 seconds.
Overload (OL) error message is shown on the display, this cycle is then repeated until the load current demand is not decreased below Imax.
Overload behaviour in constant current mode: the output current is limited at Imax. If the load asks for more current than Imax the output voltage is progressively decreased to keep the output current regulated at Imax.
Short circuit behaviour: the output is switched off in about 0.2 seconds and kept off for 10 seconds. Short Circuit (SC) error message is shown on the display details. This cycle is then repeated until the short circuit is removed.
Input/output overvoltage protection: the unit is protected against external overvoltage applied to the input; for input voltages greater than 62V the device will shut down. In case of an internal failure, a double protection circuit switch off the output and avoid output voltage higher than 62V potentially dangerous for the supplied devices.
Overtemperature protection: The “Over Temperature (Ot)” error message appears when the internal temperature exceeds the safe limits. In this case the output is switched off. The output is switched back on when the temperature decreased to safe limits.

6) STATUS SIGNALS

“DC OK” relay contact(24V/1A): Contact closes when the output voltage is present and within the product specified output voltage regulation range.

7) REDUNDANT AND PARALLEL CONNECTION

LDD240-WU is equipped with an internal ORing circuit allowing direct parallel connection for redundancy without the need of an external isolating diode. Parallel connection for power increase can be achieved connecting the output of the devices in parallel. Please keep the length of the input and output cables of the 2 paralleled units the same length and cross section to achieve the best possible current balancing. Avoid exceeding 80% of the total available output current. To use parallel connection the operating mode shall be set to “Parallel (PA)” in the configuration menu.

8) FEEDING DC MOTORS

it is possible to feed DC motors considering that when a motor starts-up under effort its consumption is much higher than the nominal current and it can trigger overcurrent protection.
NOTE: motors can generate high conducted noise on the DC line. Therefore, it is not recommended to feed on the same line motors and equipment sensitive to noise.

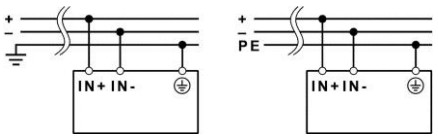
9) WARRANTY

Power supplies are guaranteed free from factory defects for the time specified in the “Sales Conditions”.
Failures caused by misuse, external and/or abnormal events (i.e. overvoltage, over temperatures) or non-respect of above parameters and standards, are not covered by warranty.
Opening the housing of the product makes warranty to be no longer valid.

INPUT PROTECTION

Fuse MCB 6 A C curve or 4 A D curve.
For USA and Canada, use the fuse type closest to the European equivalent type. **Surge protection:** it is strongly recommended to provide external surge arresters (SPD) according to local regulations.

INPUT CONNECTIONS - DC LINE



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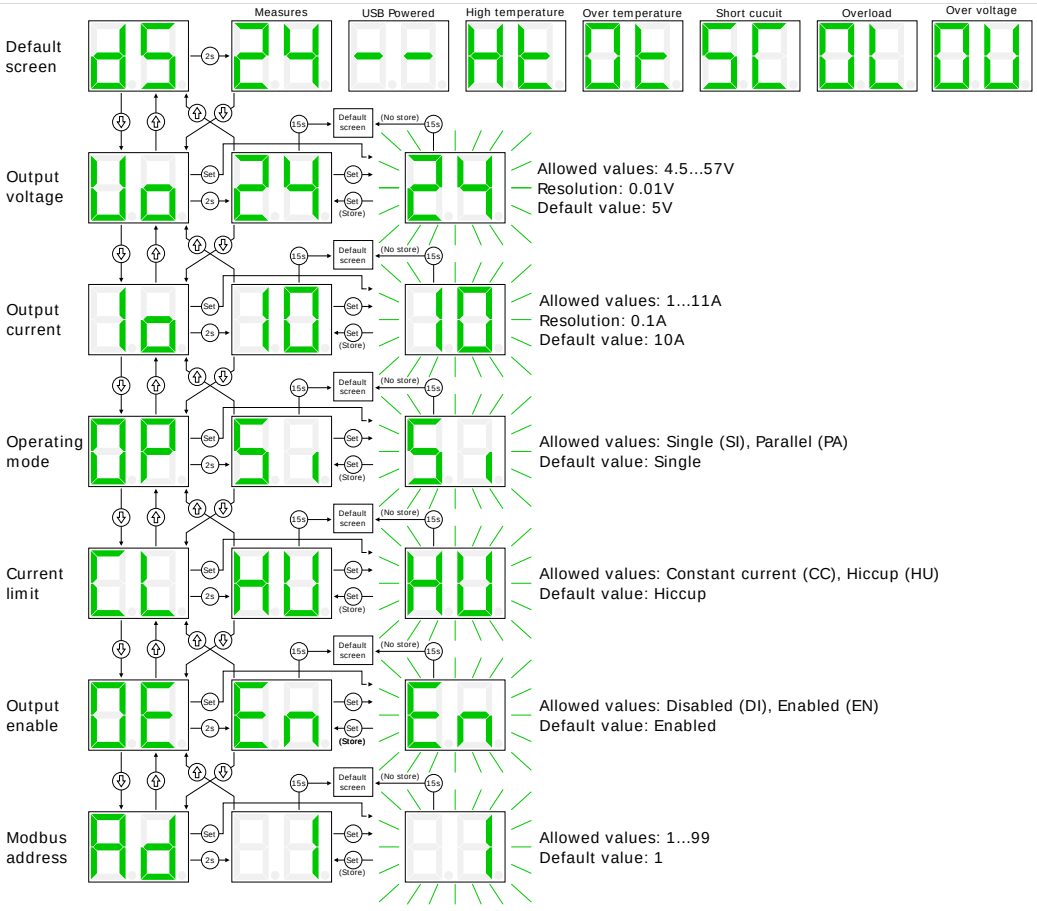
MENU NAVIGATION

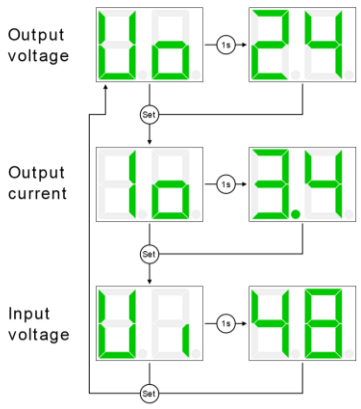
The menu organisation is presented in the following diagram. The various options are selected with 3 control keys.



Alarm codes

Display code	Description	Behaviour
	**Output short circuit error**	The "Short Circuit (**SC**)" error message appears when a short circuit is detected at the output. In this case the output is switched off and then restarted after 10 seconds. This cycle is repeated until the short circuit is removed.
	**Output overload error**	The "Overload (**OL**)" error message appears when the output current exceeds Imax; it is only applicable when "hiccup mode" current limitation is selected. In this case the output is switched off after 5 seconds of sustained overload and then restarted after 10 seconds. This cycle is repeated until the output current is reduced below Imax.
	**Over-temperature warning**	The "Over Temperature warning (**Ht**)" appears when the internal temperature is reaching unusually high levels. If no modification of the ambient operating temperature and / or load conditions is performed by the user, it is highly possible that a "Over Temperature (**Ot**)" error occurs, leading to the output switch off.
	**Over-temperature error**	The "Over Temperature (**Ot**)" error message appears when the internal temperature exceeds the safe limits. In this case the output is switched off. The output is switched back on when the temperature decreased to safe limits. In case of repeated Over Temperature errors check the device ventilation and/or reduce ambient temperature
	**Output over voltage error**	In case of an internal DC/DC converter defect, if the measured voltage exceeds the set voltage of 15% the output is shut down and the alarm signaled.

Measures



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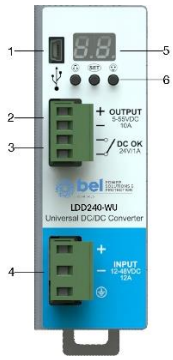
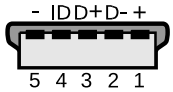
CONNECTIONS AND USER INTERFACE



(1) Modbus over USB: used to connect a device running POWERMASTER or custom user application. Firmware update is also possible.
(2) DC Output: connected to the load. The output voltage is adjustable between 5 to 55 VDC.
(3) DC-OK dry contact: normally open relay contact is available; the relay closes when the output voltage is >90% of the programmed output voltage value.
(4) DC Input: input voltage supply, range is from 12 to 48 VDC.
(5) Display: 2-digits LED display used to program the device and read its status.
(6) Control keys: 3 push buttons are provided to navigate through menus and to select various functions.

Input Connection:
- + = Positive DC
- - = Negative DC
- ⏚ = Earth ground

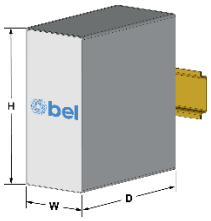
Output Connection:
- + = Positive DC
- - = Negative DC



Mini USB-B Type:
- 1 = VBUS (+5V)
- 2 = Data (D-)
- 3 = Data (D+)
- 4 = Not connected (ID)
- 5 = GND

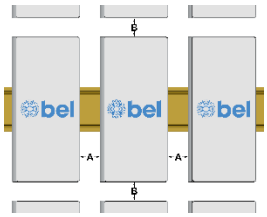
Auxiliary Connection:
DC OK: Dry contact
- NO
- COM

DIMENSIONS



Dimension	mm
W	40.0
D	110.0
H	115.0

DISTANCES



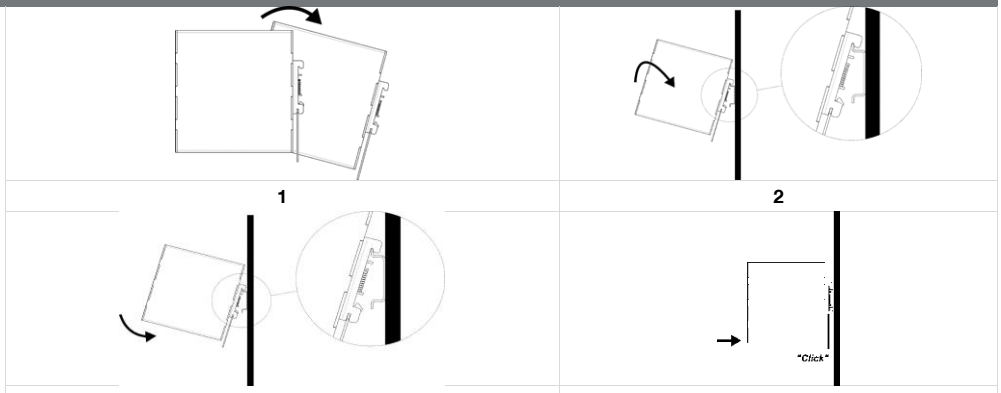
Distance	mm
A	20
B	50

MOUNTING / DISMOUNTING INSTRUCTIONS

For DIN rail fastening according to IEC 60715 TH35-7.5(-15)
Mounting as shown in figure, with input terminals on lower side, with suitable cooling and maintaining a proper distance between adjacent devices as specified in the Installation Instruction of each family.

MOUNTING:

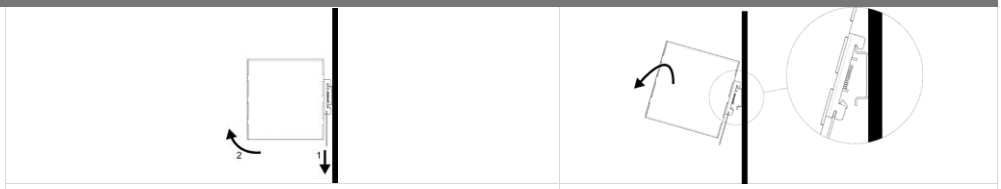
1. Tilt the unit slightly backwards.
2. Fit the unit over the top edge of the rail.
3. Slide it downward until it hits the stop.
4. Press against the bottom for locking.



1 2 3 4

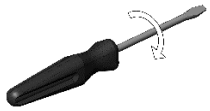
DISMOUNTING:

1. Pull down the slide clamp lever
2. Tilt the unit upward
3. Unhook the unit from the rail

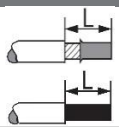


1 & 2 3

RECOMMENDED CONNECTING CABLE



Recommended Tightening torque
0.5 - 0.6 Nm
4.42 - 5.30 lbf in



Input / Output connections
Solid: 2.5 mm² / 12 AWG
Stranded:1.5 mm² / 12 AWG
L: 6.0 - 7.5 mm / 0.24 - 0.30 in

NOTES:

- **Data may change without prior notice in order to improve the product.**
- **Please refer to the latest version of LDD240-WU Datasheet or LDD240-WU User Manual on our wbsite belfuse.com/power-solutions**

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