

INSTALLATION INSTRUCTION

LDD240-11024

240 W DIN Rail DC-DC Converter



LDD240-11024

INPUT: 90 – 148 VDC, 3.6 – 2.6 A

OUTPUT: 24 VDC, 10 A

MAIN FEATURES

- High efficiency and compact size
- Wide Input voltage range
- Isolated topology
- Overload 150%
- Up to 50°C operating temperature with no derating

| READ THIS CAREFULLY BEFORE INSTALLATION! | VOR DER INSTALLATION BITTE FOLGENDE SICHERHEITSHINWEISE BEACHTEN! | LEGGERE ATTENTAMENTE PRIMA DELL'INSTALLAZIONE! | A LIRE ATTENTIVEMENT AVANT L'INSTALLATION! |
|---|--|--|---|
| <p>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.</p> | <p>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.</p> | <p>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.</p> | <p>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.</p> |
| CAUTION | ACHTUNG | ATTENZIONE | AVERTISSEMENT |
| <p>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).</p> | <p>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 Überschlüge 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).</p> | <p>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).</p> | <p>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).</p> |
| INTENDED USE | BESTIMMUNGSGEMÄßER BETRIEB | USO PREVISTO | UTILISATION |
| <p>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.</p> | <p>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.</p> | <p>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.</p> | <p>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.</p> |
| ENVIRONMENTAL CHARACTERISTICS | UMGEBUNGSBEDINGUNGEN | CARATTERISTICHE AMBIENTALI | CARACTÉRISTIQUES ENVIRONNEMENTALES |
| <p>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.</p> | <p>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.</p> | <p>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.</p> | <p>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.</p> |

USER INSTRUCTIONS**1) DESCRIPTION**

Description: The DC/DC converter can be supplied with 110 VDC. In order to get the highest efficiency and the lowest power loss the converter has no input polarity protection.

To prevent damage in case of reverse polarity, the device is protected by an internal replaceable fuse. The internal fuse is not user replaceable.

The DC/DC converter can be used in SELV and PELV circuits.

2) INSTALLATION

Use DIN-rails according to EN60715. 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. In order 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 SMPS automatically restarts after cooling. To get normal operation reduce the temperature of the air surrounding the power supply, increase the ventilation or reduce the load (see Fig.8)

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)

Use appropriate copper cables of indicated cross section, designed for 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 and ensure that all strands of a stranded wire enter the terminal connection (see Fig.5)

4) INPUT PROTECTION

All the devices are equipped with internal fuse, ratings of DC line protection devices must be coordinated with input current indicated on the data sheet for each model (see Fig.6). If input voltage is provided by batteries, when the voltage is at minimum level, with constant load, the input current reaches max value.

5) DC INPUT CONNECTION

Connect + terminal to (+) positive pole, - terminal to (-) negative pole and \oplus terminal to GND. Rated voltage 90 – 148 VDC.

The device is also suitable for photovoltaic or wind turbine applications (see Fig.7).

6) OVERLOAD (OL) / SHORT CIRCUIT (SC) / OVERVOLTAGE (OVP) / OVERTEMPERATURE (OTP) PROTECTIONS

Hiccup auto-reset and over temperature protection.

OL exceeding the limits indicated on the data sheet for each model, if applied to the device makes the output operate an on/off duty-cycle variable depending on OL value, air temperature and device temperature.

Overload behaviour: Up to the overload limit (I_{lim}) there is no reduction of the output voltage. For currents >I_n but <I_{lim} the device operates continuously up to the intervention of the thermal protection.

Short circuit behaviour: if I_{out}>I_{lim} the device enters into hiccup mode protecting the output and the connected load.

Output overvoltage protection: the output is protected against external overvoltage applied to the DC line and exceeding $\geq V_{nom} \times 1.4$.

In case of an internal failure, a double protection circuit switch off the output and avoid output voltage higher than 30% potentially dangerous for the supplied devices.

7) STATUS SIGNALS

| | |
|---------------------------|--|
| a) "DC OK" green LED: | on = all function and IN/OUT parameter are OK, V _{out} \geq of the threshold voltage (see data sheet). off = direct short circuit on a low resistance line, Input voltage not present, OVT shut down or device internal failure. |
| b) "OVERLOAD" red LED: | on = on with I _{out} > I _n + 10%. In case of OL (I _{out} > 1.5I _n) the device enters on to hiccup mode. |
| c) "DC OK" alarm contact: | Contact closes when the SMPS is turned-on and remains closed with V _{out} \geq minimum voltage threshold (see table). The behaviour of the contact operation, follows the LED "DC OK" |

8) OUTPUT VOLTAGE ADJUSTMENT

Adjustable with trimmer on front panel.

If output voltage is set > V_{nom} the maximum output current should not exceed V_{out} x I_{out} = P_{nom}.

9) REDUNDANT AND PARALLEL CONNECTION

For redundant connection, an external isolating diode must be used. Use only devices of the same model.

V_{out} must be set uniformly (± 100 mV) on each power supply and the wiring must be symmetrical to ensure an equal current distribution.

LDD240-11024 model is equipped with ORing output decoupling diode for direct redundant connection.

For redundant connection, use an external isolating device must be used (see accessory device).

10) 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.

11) OPERATION WITH BATTERY

When a battery is connected in parallel to the Output for backup purposes (see accessory device).

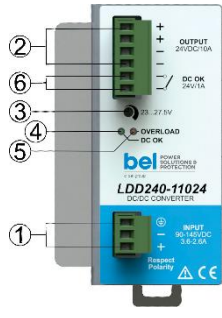
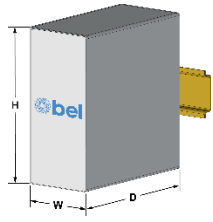
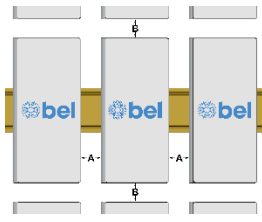
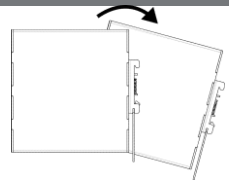
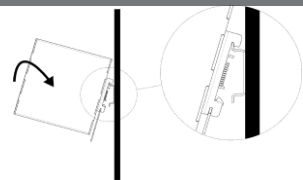
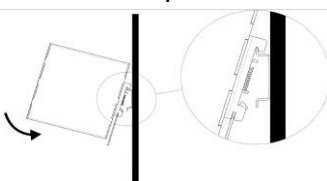
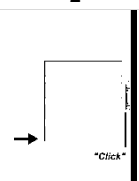
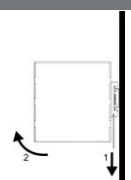
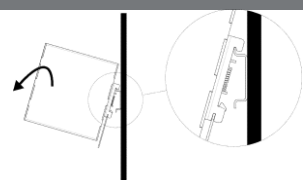
| FIG.1 - CONNECTIONS | FIG.2 - DIMENSIONS | FIG.3 - DISTANCES | | | | | | | | | | | | | | |
|---|--|-------------------|----|---|------|---|-------|---|-------|--|----------|----|---|----|---|----|
|  <p>(1) DC input (2) DC output (load) (3) Output voltage adjustment (4) Green LED: Output OK (5) Red LED: Overload (6) Diagnostic Output dry contact (7) NC output OK</p> <div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> <p>Input DC Line:</p> <ul style="list-style-type: none"> ■ += Positive DC ■ -= Negative DC ■ ⊕ = Earth ground </div> <div style="width: 45%;"> <p>Output:</p> <ul style="list-style-type: none"> ■ += Positive DC ■ -= Negative DC ■ Dry contact = NC </div> </div> |  <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="background-color: #eee;">Dimension</th> <th style="background-color: #eee;">mm</th> </tr> </thead> <tbody> <tr> <td>W</td> <td>69.0</td> </tr> <tr> <td>D</td> <td>115.0</td> </tr> <tr> <td>H</td> <td>110.0</td> </tr> </tbody> </table> | Dimension | mm | W | 69.0 | D | 115.0 | H | 110.0 |  <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="background-color: #eee;">Distance</th> <th style="background-color: #eee;">mm</th> </tr> </thead> <tbody> <tr> <td>A</td> <td>20</td> </tr> <tr> <td>B</td> <td>50</td> </tr> </tbody> </table> | Distance | mm | A | 20 | B | 50 |
| Dimension | mm | | | | | | | | | | | | | | | |
| W | 69.0 | | | | | | | | | | | | | | | |
| D | 115.0 | | | | | | | | | | | | | | | |
| H | 110.0 | | | | | | | | | | | | | | | |
| Distance | mm | | | | | | | | | | | | | | | |
| A | 20 | | | | | | | | | | | | | | | |
| B | 50 | | | | | | | | | | | | | | | |

FIG.4 - MOUNTING / DISMOUNTING INSTRUCTIONS

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

| MOUNTING: | |
|---|---|
| <p>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.</p> |  1 |
| |  2 |
| |  3 |
| |  4 |
| DISMOUNTING: | |
| <p>1. Pull down the slide clamp lever 2. Tilt the unit upward 3. Unhook the unit from the rail</p> |  1 & 2 |
| |  3 |

| FIG.5 - RECOMMENDED CONNECTING CABLE | | | |
|---|---|--|--|
|  | <p>Recommended Tightening torque 0.5 - 0.6 Nm 4.42 - 5.30 lbf in</p> |  | <p>Solid: 2.5 mm² / 12 AWG Stranded: 1.5 mm² / 12 AWG L: 6.0 - 7.5 mm / 0.24 - 0.30 in</p> |

| FIG.6 - INPUT PROTECTION | | |
|-------------------------------|---|--|
| <p>Model LDD240-11024</p> | <p>Internal Fuse (not user replaceable) 5AT/250 VAC 5 x 20 mm</p> | <p>External recommended Fuse ≥ 6 A C curve</p> |

FIG.7 - INPUT CONNECTIONS

DC LINE

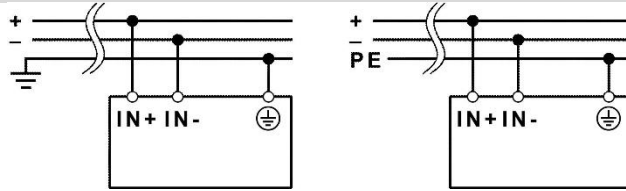


FIG.8 - ENVIRONMENT

OPERATING TEMPERATURE

- 40°C to 70°C
5 - 95% r.H. non condensing
Overtemperature protection

DERATING

- 3 W / °C over 50°C for LDD240-11024

NOTES:

- Data may change without prior notice in order to improve the product.
- Please refer to the latest version of the Installation Instruction for each product by visiting belfuse.com/power-solutions.

ACCESSORIES

- LDX-D20 20 A Active ORing controller
- LDX-D50 50 A Active ORing controller
- LDX-U20 20 A High performance DC UPS
- LDX-B20 150J Buffer Module
- LDX-C120 Battery charger and DC UPS Module
- LDX-L30 Sealed Lead acid Battery pack