

INSTALLATION INSTRUCTION

LDP200-200

Programmable Switching Power Supply



LDP200-200 INPUT: 200 – 500 VAC, 1.4 – 0.5 A (single or two phase) or 250 – 725 VDC
 OUTPUT: 36 – 205 VDC, 2.3 A Max (187 W Max)

MAIN FEATURES

- High efficiency and compact size
- Active PFC
- 2 user programmable voltage steps with settable duration
- Digital control
- Remote ON/OFF input
- Multiple protections
- 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'incosservanza 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	AVVERTISSEMENT
<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 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).</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**

DIN rail mountable primary switched-mode power supply with 170 – 528 VAC input, suitable for single or two phase mains line.

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).

Be sure to check that the mounting DIN rail is properly connected to earth (PE) before mounting the device

WARNING: Do not insert/ remove any wire if the device is not fixed to the DIN rail.

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)

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 and ensure that all strands of a stranded wire enter the terminal connection (see Fig.5)

4) INPUT PROTECTION

The device input is provided with varistors against overvoltage. The input is not provided with internal fuses, thus an external short circuit/overcurrent protection must be provided by the end user (see Fig.6).

For operation on a single phase or two phase system, a protection fuse on each phase must be provided.

Surge protection: it is strongly recommended to provide external surge arresters (SPD) according to local regulations.

5) AC INPUT CONNECTION

The device can be connected to single phase AC line with V_{in} 230 VAC and two phase line with V_{in} 200 – 500 VAC (see Fig.7). Please connect the PE first.

6) DC INPUT CONNECTION

Connect L1 terminal to (+) positive pole, N terminal to (-) negative pole and \oplus terminal to GND. Rated voltage 250 – 725 VDC.

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

7) ENABLE INPUT CONNECTION

The device can be connected to AC lines or DC lines to provide an enable signal. With DC lines please be sure to respect the polarity.

Rated voltage 12 – 230 VAC / VDC.

The ENABLE line should be provided with a fuse type T, rated 250 V / 100 mA.

The ENABLE signal allows the output voltage to be switched ON or OFF. The ENABLE signal operating modes can be configured in the configuration menu. When the ENABLE function is not active the output is continuously ON. The ENABLE signal can also be used to change (normally a reduction) the output voltage after a defined time (used for an “over excitation” of a brake solenoid). In the configuration menu a delay time and a second voltage must be configured to use this function.

8) OUTPUT CONNECTION

The device is suitable for SELV and PELV circuitry (having V_{out} higher than 60 VDC is not a SELV source).

V_{out} can be adjusted through a dedicated menu through the push buttons "SET" "↑", "↓" (see Fig.8).

The voltage present at the unit output is shown on the display.

Check V_{out} before connecting the power supply to the load! With output voltage > 80 VDC, the continuous current must not exceed the nominal power (187 W).

9) OUTPUT PROTECTION

The device is protected against overload (OL) / short circuit / Input Undervoltage (---) / overtemperature (OT).

Protection codes are shown on the display when the protection condition is triggered.

- **(OL) Overload protection:** if the output power ($V_{out} \cdot I_{out}$) is greater that the nominal output power (187 W) for more than 3sec the output is witched off and “OL” is shown on the display.
- **(OT) Overtemperature protection:** turns off the device if the internal temperature exceeds a safe limit (see Fig.8).
- **(---) Undervoltage protection:** turns off the device if the input voltage is < 160 VAC. It automatically reset when the input voltage comes back to nominal values. This code (“---”) on the display can also indicate an internal failure.
- **(OL & OT) protections: No auto-recovery, recovery by primary shutdown or retrigger of enable input.**

Behaviour in overload conditions: The output current is limited to 2.4 A and the output power is limited to 187 W (constant current / power limitation). If the OL persists for > 3 s, the unit is turned OFF and the OL alarm is displayed.

Enable: Remote ON/OFF input.

Enable = 0: Every time an error is displayed the device turns OFF the output. To reset the error you should turn OFF the device and after 10 s turn it ON.

Enable = 1: Every time an error is displayed the device turns OFF the output. To reset the error you should apply a voltage (12 - 230 VAC / VDC) between the Enable connector. If after both procedures the same error is displayed check the unit and/or the external conditions.



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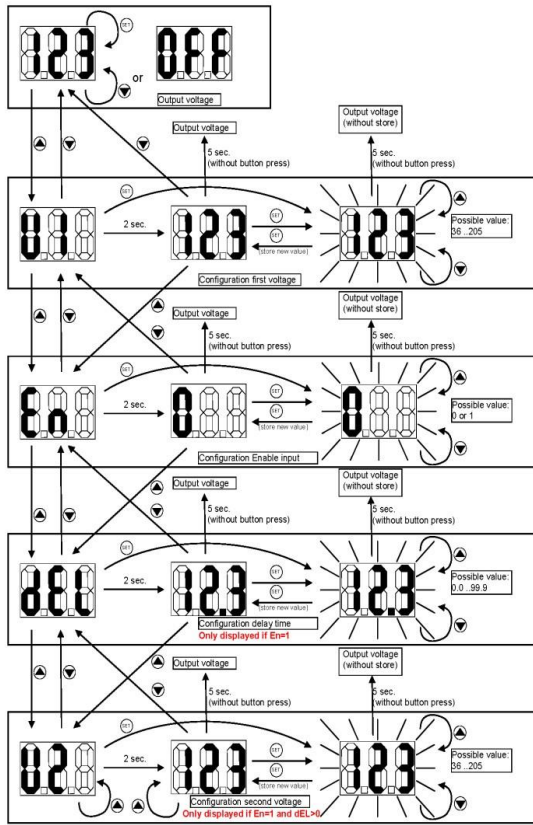
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CONFIGURATION MENU AND DISPLAY MODE



Set-up push button

To move inside the Set-up menus use the: UP, Down and SET button.



- UP:** Scroll up menus and values
- DOWN:** Scroll down menus and values
- SET:** Confirms selection Stored new value

Settable Parameters

U1: Configuration first output voltage Settable 36 – 205 VDC

En: Configuration Enable input

En = 0: Input Enable is disable, the output voltage it is the one set in Step U1
 En = 1: Input Enable is enabled, in order to active the unit must provide an AC/DC voltage on the Enable connector see Point 6 on Instructions. In this case you can set the Delay (DEL) and Second output voltage (U2).
 As default setting are DEL=0.0sec and U2=U1

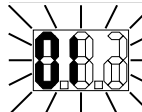
dEL: Configuration Delay Time Settable 0.0 - 99.9 s

U2: Configuration second output voltage Settable 36 - 205 VDC

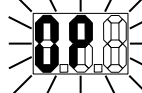
Errors Displayed



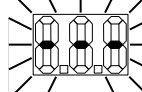
“OFF”:
 Output inactive
“En” Enable is active (En=1) and the enable input is not active



“OL”:
 Output switched off because the Output voltage below 30 VDC ≥ 3 s
No auto-recovery, recovery by primary shutdown or retrigger of enable input.

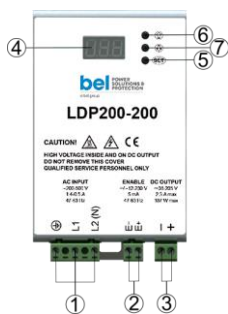


“OP”:
 Output switched off because of over temperature
No auto-recovery, recovery by primary shutdown or retrigger of enable input.



“---”:
 Output (power supply) switched off because of a general failure or input voltage is < 160 VAC.

FIG.1 - CONNECTIONS



- (1) AC input
- (2) Enable input
- (3) DC output (load)
- (4) Display
- (5) SET button menu
- (6) UP button menu
- (7) DOWN button menu

Input AC Line:

Single Phase

- L1 = Line
- N = Neutral
- ⊕ = earth ground

2 Phases

- L1 = Phase 1
- L2 = Phase 2
- ⊕ = earth ground

Input DC Line:

- L1 = + Positive DC
- N = - Negative DC
- ⊕ = earth ground

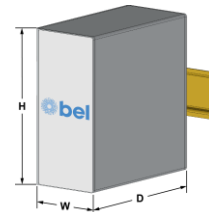
Enable:

- E+ = Line / Positive DC
- E- = Neutral / Negative DC

Output:

+ = Positive DC / - = Negative DC

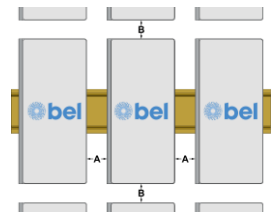
FIG.2 - DIMENSIONS



Dimension
 W
 D
 H

mm
 80
 120
 112

FIG.3 - DISTANCES



Distance
 A
 B

mm
 20
 50



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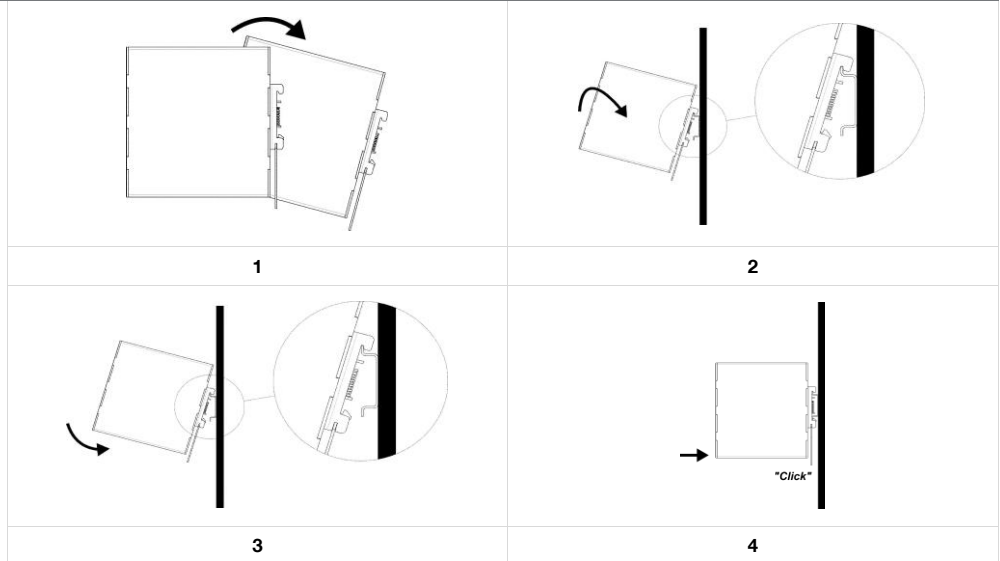
FIG.4 - MOUNTING / DISMOUNTING INSTRUCTIONS

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.



DISMOUNTING:

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

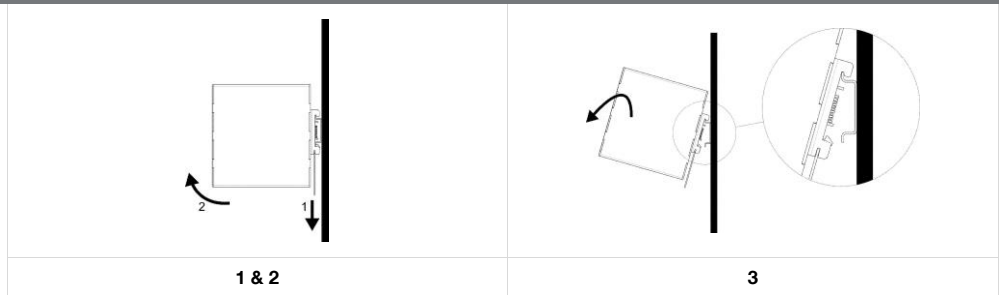


FIG.5 - RECOMMENDED CONNECTING CABLE

	<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>
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FIG.6 - 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.



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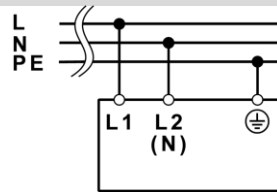
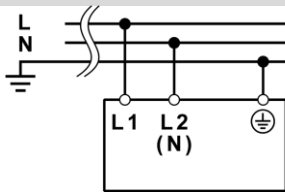
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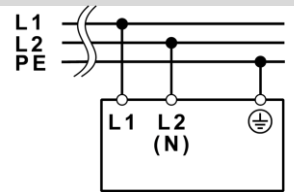
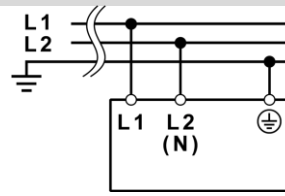
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FIG.7 - INPUT CONNECTIONS

AC LINE - SINGLE PHASE



AC LINE - TWO PHASES



DC LINE

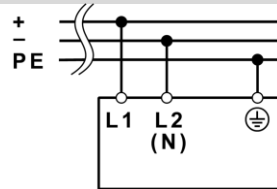
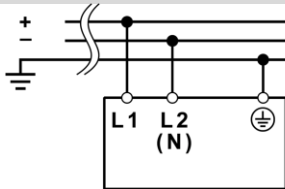


FIG.8 - ENVIRONMENT

OPERATING TEMPERATURE

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

DERATING

- 4.2 W / °C over 50°C
Do not exceed $V_{out} \times I_{out} = 100 \text{ W Max}$ at 70°C

NOTES:

- Data may change without prior notice in order to improve the product.
- Please refer to the latest version of [LDP200-200 Datasheet](#) or [LDP200-200 Installation Instruction](#) on our website: belfuse.com/power-solutions

ACCESSORIES

- LDX-D20 20 A Active ORing controller
- LDX-D50 50 A Active ORing controller
- LDX-B20 150J Buffer Module