OPERATION & INSTALLATION MANUAL

LBC Series: LBC8000-1110SxxxG, LBC12000-1110SxxxG
Battery Charger / PSU

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 Power Solutions 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 Power Solutions 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 Power Solutions 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 Power Solutions 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 2 minutes).	**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 2 Minuten).	**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. 2 minuti).	**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 2 minutes).
INTENDED USE	**BESTIMMUNGSGEMÄSSER BETRIEB**	**USO PREVISTO**	**UTILISATION**
These are component type devices for internal installation within system equipment. The devices should be used for railway applications only. Do not use these devices in applications where malfunction may cause injury or death. Please see full spec of unit for further details.	Dies sind Komponenten für die interne Installation in Systemgeräten. Die Geräte solten nur für Eisenbahn Anwendungen verwendet werden. Verwenden Sie diese Geräte nicht in Anwendungen, bei denen eine Fehlfunktion zu Verletzungen oder zum Tod führen kann. Weitere Informationen finden Sie in der vollständigen Spezifikation des Geräts.	I dispositivi sono di tipo componente per l'installazione all'interno dell'apparecchiatura. I dispositivi son per l'utilizzo per ferrovia applicazioni. Non utilizzare in applicazioni in cui un eventuale guasto può comportare rischio di lesioni o di morte. vedere le specifiche complete del dispositivo per ulteriori dettagli	Ce sont des types de composant pour une installation interne d'équipement de système. Les appareils peuvent être utilisés pour des chemin de fer applications. Ne pas utiliser ces dispositifs dans une application où un dysfonctionnement pourrait entraîner le risque des blessures ou de mort. Pour de plus amples informations, se référer à la fiche technique du produit
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.



MODELS:

LBC8000-1110SxxxG
LBC12000-1110SxxxG

AC INPUT: ~ 3 PHASE
VOLTAGE: 230-277 / 400-480 Vac 3W + PE
CURRENT: 14-9 A (LBC8000)
CURRENT: 21-14 A (LBC12000)
FREQUENCY: 50 / 60 Hz

DC OUTPUT: ⎓
VOLTAGE: adjustable 80 – 137.5 Vdc
CURRENT: max. 73 A (8000 W @ 110 V)
CURRENT: max. 110 A (12000 W @ 110 V)

SAFETY APPROVALS

- CE Mark
- China RoHS

CAUTION

These component level power supplies are intended exclusively for installation within other equipment by an industrial assembly operation or by professional installers. These are Class 1 power supplies; the unit must be properly connected to earth ground in end use. A component power supply should be installed in end-use equipment according to the requirements of the safety standard used for that equipment. This power supply is not designed to be operated outside of an enclosure which provides a means of mechanical, electrical, and fire protection.

PROTECTIVE EARTHING

The Power Supply must be properly grounded to mains protective earth termination at end use.

ENVIRONMENTAL CONDITIONS

TRANSPORTATION & STORAGE:
Ambient Temperature Range -40 °C to +85 °C
Relative Humidity Range: 5% to 95% RH Non-Condensing
Altitude: to 12192 m (40 000 feet) ASL

OPERATION:
Ambient Temp. Range -25°C to +55°C (at 100% load), to +70°C (at 75% load)
Relative Humidity Range: 10% to 90% RH Non-Condensing
Altitude (ASL): to 2500 m full power, to 3048 m (10 000 feet) derating 90% of full power

DISCLAIMER

It is the customer's responsibility to check the suitability and qualify the product in their application. If any queries, please contact Bel (at tech.support@psbel.com or website belfuse.com/home/contact-bel) to ensure product remains within specification at all time.
Supplier shall in no way be liable for use or installation of the product outside of the parameters of the specification.

INSTALLATION REQUIREMENTS

Recommended power wires dimensions you can find in charts below. The mate parts of connectors are also described below. For the air inlet and outlet, it is required to maintain a minimum open space of 10 cm. For the chassis fastening, 6x screws M8 are needed. The preferred mounting position is vertical, with connectors on top.
The input shall be fused by: Breaker ABB, S203MT, C16, or similar. The output Battery must be protected by the following fusing: Breaker ABB, S802S-UCB125 (125A, char. B), or similar.

SOFTWARE

In case the standard units are delivered to the customer with the Configuration file (.csv) in default (factory) settings, it is necessary for the customer to upgrade the Configuration file (by the help of GUI) to the version, which corresponds with their specific project. The same needs to be done, if the units are returned from the repair (RMA), since the units are shipped back to the customer with default Configuration setting.

WARNINGS

1. The equipment is for business use (Class A) and has acquired electromagnetic conformity registration. This product may cause interference if used in residential areas. Such use must be avoided unless the user takes special measures to reduce electromagnetic emissions to prevent interference to the reception of radio and television broadcasts.
2. The Touch current measured according to IEC 62368-1 exceeds ES2 limits at maximal input voltage and frequency (3 x 528 VAC / 63 Hz). It is necessary to take appropriate measures (additional fixed grounding of the chassis).
3. Measured value of the protective conductor current is 10.7 mA /7.2 mA for LBC12000/LBC8000.
4. Do not touch the Output connector X2 during the operation. There is a hazard voltage present, up to 138 Vdc.
5. Caution, this is a heavy weight unit, 24/30 kg.

SAFETY INSTRUCTIONS

Switch off the input power and disconnect battery (X2) together with connector X3, X1 and wait min. 2 minutes before doing any maintenance on the unit!

SERVICING

In case of failure, the unit must be returned to the Bel Power Solutions Authorized Service Center. There are no user serviceable parts inside, except of the fan replacement. In case of failure of the fan this can be replaced without whole chassis opening. The procedure is described below.

CORROSION PROTECTION

The unit outside is protected by painting with Soprano 1 – Art. 095 000298-000. Inside all PC boards are protected by lacquering with Humiseal 1B73.

LIMITED WARRANTY

Bel Power Solutions warrants each power supply of its manufacture for a period of two years from the date of original shipment. This warranty applies to defects in materials and workmanship that result in non-performance to published specifications. The product(s) must be returned to a Bel Power Solutions Authorized Service Center for repair with a Bel Power Solutions pre-assigned RMA number.
Bel Power Solutions assumes no liabilities for consequential damages of any kind through the use or misuse of its products by any user. No other obligations are expressed or implied. Please note that the specifications, terms, and conditions stated are subject to change without notice.

NUCLEAR AND MEDICAL APPLICATIONS

Bel Power Solutions products are not designed, intended for use in, or authorized for use as critical components in life support systems, equipment used in hazardous environments, or nuclear control systems without the express written consent of the respective divisional president of Bel Power Solutions.

TECHNICAL REVISIONS

The appearance of products, including safety agency certifications pictured on labels, may change depending on the date manufactured. Specifications are subject to change without notice.

FAN REPLACEMENT PROCEDURE

In case of fan failure any of four (three at LBC8000) fans placed on the front panel, can be replaced.

1) Turn-off the whole device and by screwdriver PH2 simply remove four outer screws (signed by red circle - not those holding the ventilation grill) on the front panel, which contains the failed fan and pull the panel out from the chassis (see Fig. 1).
2) Disconnect the fan connector from the PC board by pressing the connector latch.
3) Now by the same screwdriver remove four screws holding the grill together with fan on the panel.
4) Replace the part for an original replacement part YVD.00969 (the left end panel) or YVD.00946.0 (the rest panels). Contact our Service Center.
5) Keep the airflow direction from outside to inside. Proceed with the mounting in reverse order.

Life expectance: 70 000 / 50 000 hours (YVD.00969 / YVD.00946.0) @ 40 °C, continuous operation



Figure 1. Fan replacement procedure

OPERATION

After battery charger installation first turn-on the battery breaker and only then turn-on the input AC voltage breaker. The charger will start to supply the load connected at the Consumer output (Safe mode – constant voltage, e.g. 105 Vdc, the voltage depends on the LBC model). Inside, in series with this output, is connected an OR-ing diode, so two or more LBC systems (preferably each one with his own separate battery) can be at the Consumer outputs connected in parallel, to supply the load in redundancy.
30 seconds after the start-up the charger will perform the battery test by decreasing the output voltage. During battery test the output voltage can drop down to 80 V, if the battery is not connected. In this case after the test the charger will be set to the Safe mode. In the other case (battery OK), or if the battery will be connected afterwards, the charger will start to work in a current mode and the voltage will be set to keep the maximal charging current, value corresponds to the measured battery temperature. The actual state can be seen by LED-s on the upper front panel (control unit) or by communication SW / GUI.
When no temperature sensor will be connected to the X3 connector, or any other fail will be detected, the charger will remain to work in the Safe mode (in this case the battery will be not fully charged). In this mode the output voltage is set below the value allowed at Tmax (charging curve dependent, e.g. 105Vdc). The Safe mode is indicated by the LED, see Datasheet BCD.00821 for details. When no battery voltage sense will be connected to the X3 connector, the charger will still work normally, only the battery voltage symmetry will be not evaluated and reported by communication.

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The charger does not have the possibility to disconnect the battery by undervoltage, when supplied from battery only. UVLO must be controlled by consumers (typical turn-off should be less than 80 V, value depends on battery type). In case a firmware update is needed please refer to Programming Instruction document BCA.00213, Section 1.
This equipment complies with IEC 61000-3-12 provided that the short-circuit power Ssc is greater than or equal to $2{,}9x10^6$ at the interface point between the user's supply and the public system. It is the responsibility of the installer or user of the equipment to ensure, by consultation with the distribution network operator if necessary, that the equipment is connected only to a supply with a short-circuit power Ssc greater than or equal to $2{,}9x10^6$.

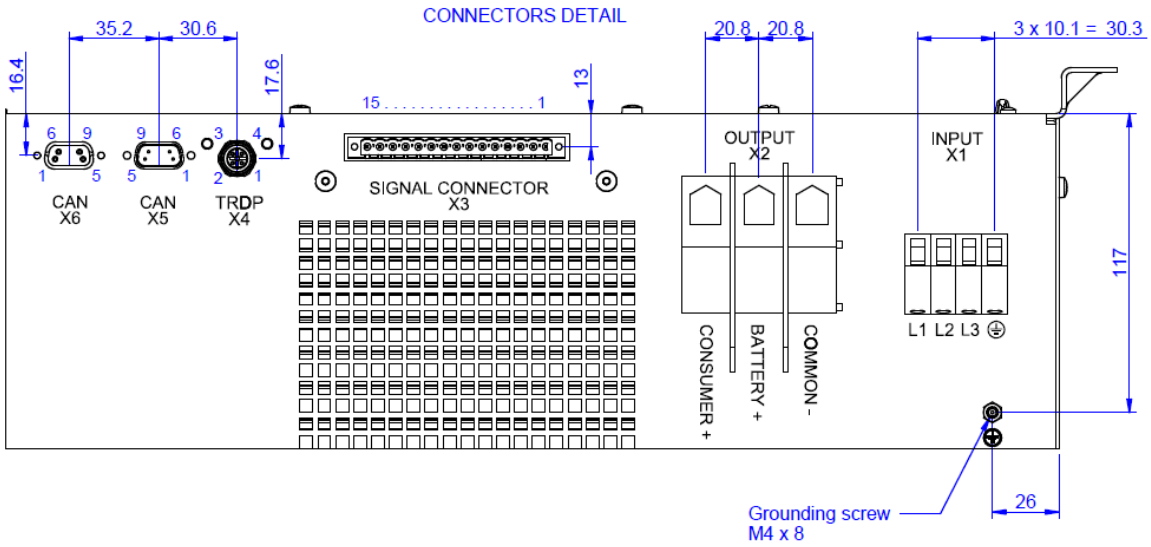

Figure 2. Connectors placement

AC INPUT CONNECTOR X1 – PINOUT

SIGNAL NAME	PIN #	TYPE	RECOMMENDED WIRES	V MAX I MAX
Earth	⏚	Earth / Chassis	Min. 4 mm² Max. 10 mm²	528 Vrms (line to line) 14/21 Arms (per line)
AC Line 1	L1	Input Power AC Fused	Min. 4 mm² Max. 10 mm²	
AC Line 2	L2	Input Power AC Fused	Min. 4 mm² Max. 10 mm²	
AC Line 3	L3	Input Power AC Fused	Min. 4 mm² Max. 10 mm²	

Connector type: *4-pin terminal block HDFK 10-HV/Z (Phoenix Contact)*
Mating part: *Wires, max. 10 mm2, torque max. 2 Nm*

OUTPUT and BATTERY CONNECTOR X2 - PINOUT

SIGNAL NAME	PIN #	TYPE	RECOMMENDED WIRES	V MAX I MAX
CONSUMER+		Output Power DC	Min. 16/25 mm² Max. 50 mm²	137.5 VDC, 73/110 A
BATTERY+		Output Power DC	Min. 16/25 mm² Max. 50 mm²	
COMMON-		Output Power DC_return	Min. 16/25 mm² Max. 50 mm²	

Connector type: *3-pin terminal block HDFK 50/Z / UW50/S * (Phoenix Contact)*
Mating part: *Wires, max. 50 mm2, torque 3-5 Nm / 6-8 Nm **
* For models with Suffix S505G or higher

NOTE: Do not apply excessive forces on the connector, do not band the wires close to the connector, keep the required torque!

SIGNAL CONNECTOR X3 – PINOUT Carefully check all connections after installation, especially pins 7,8,9,10!

SIGNAL NAME	PIN #	TYPE	SIGNAL REFERENCE	LOW LEVEL HIGH LEVEL	V MAX I MAX
VBsense1	1	Battery Voltage Sense 1	X2, Pin 3		138 V
VBsense2	2	Battery Voltage Sense 2	X2, Pin 3		138 V
VBsense3	3	Battery Voltage Sense 3	X2, Pin 3		138 V
VBsense4	4	Battery Voltage Sense 4	X2, Pin 3		138 V
VBsense5	5	Battery Voltage Sense 5	X2, Pin 3		138 V
N.C. / VBsense6 *	6	Battery Voltage Sense 6 *	X2, Pin 3		138 V
TB1H	7	Temperature sensor 1 High	TB1L	Cannot withstand battery voltage!	3.3 V
TB1L	8	Temperature sensor 1 Low		Cannot withstand battery voltage!	3.3 V
TB2H	9	Temperature sensor 2 High	TB2L	Cannot withstand battery voltage!	3.3 V
TB2L	10	Temperature sensor 2 Low		Cannot withstand battery voltage!	3.3 V
GRS	11	Signal Ground **			
INH / ADR0 ***	12	Inhibit, pull high to inhibit / Address 0 ***	X2, Pin 3	Floating – 110 V	138 V
P_LIM / ADR1 ***	13	Power Limitation, pull high to limit / Address 1 ***	X2, Pin 3	Floating – 110 V	138 V
FA	14	Floating relay contact (normally open) Open when in fault condition, which can be defined in the Configuration file			0.4A@138Vdc
FB	15				

Connector type: Combicon MSTB2.5/15-GF-1776825, male (Phoenix Contact)
Mating part: Combicon MSTB2.5/15-STF-1786967 or FKCN2.5/15-STF-1733084, female (Phoenix Contact)

* For models with Suffix S505G or higher
** Do not connect
*** Second option (address setting) on request – contact manufacturer

ETHERNET CONNECTOR X4 – PINOUT

SIGNAL NAME	PIN #	TYPE	SIGNAL REFERENCE	NOTE	V MAX I MAX
TxData+	1	Communication Data		10/100 Mbit	
RxData+	2	Communication Data		10/100 Mbit	
TxData-	3	Communication Data		10/100 Mbit	
RxData-	4	Communication Data		10/100 Mbit	

Connector type: *4-pin M12 D-coded female 1534630 (Phoenix Contact)*
Mating part: *4-pin M12 D-coded male 1521258 (Phoenix Contact)*

CAN-BUS CONNECTOR X5, X6 – PINOUT

SIGNAL NAME	PIN #	TYPE	SIGNAL REFERENCE	NOTE	V MAX I MAX
CAN +	7	Communication Data	CAN-	250 kbit	
CAN -	2	Communication Data	CAN+	250 kbit	
GND	3				
+5V	9	Power Supply – normally do not use	GND	Only for servicing	5.5V / 100 mA

Connector type: *X5: 9-pin D-SUB male (Harting) X6: 9-pin D-SUB female (Harting)*
Mating part: *9-pin D-SUB female / male*

NOTE: CAN and Ethernet (TRDP) communication commands are described in a separate document Communication Interface, BCE.02158.

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MECHANICAL DIMENSIONS

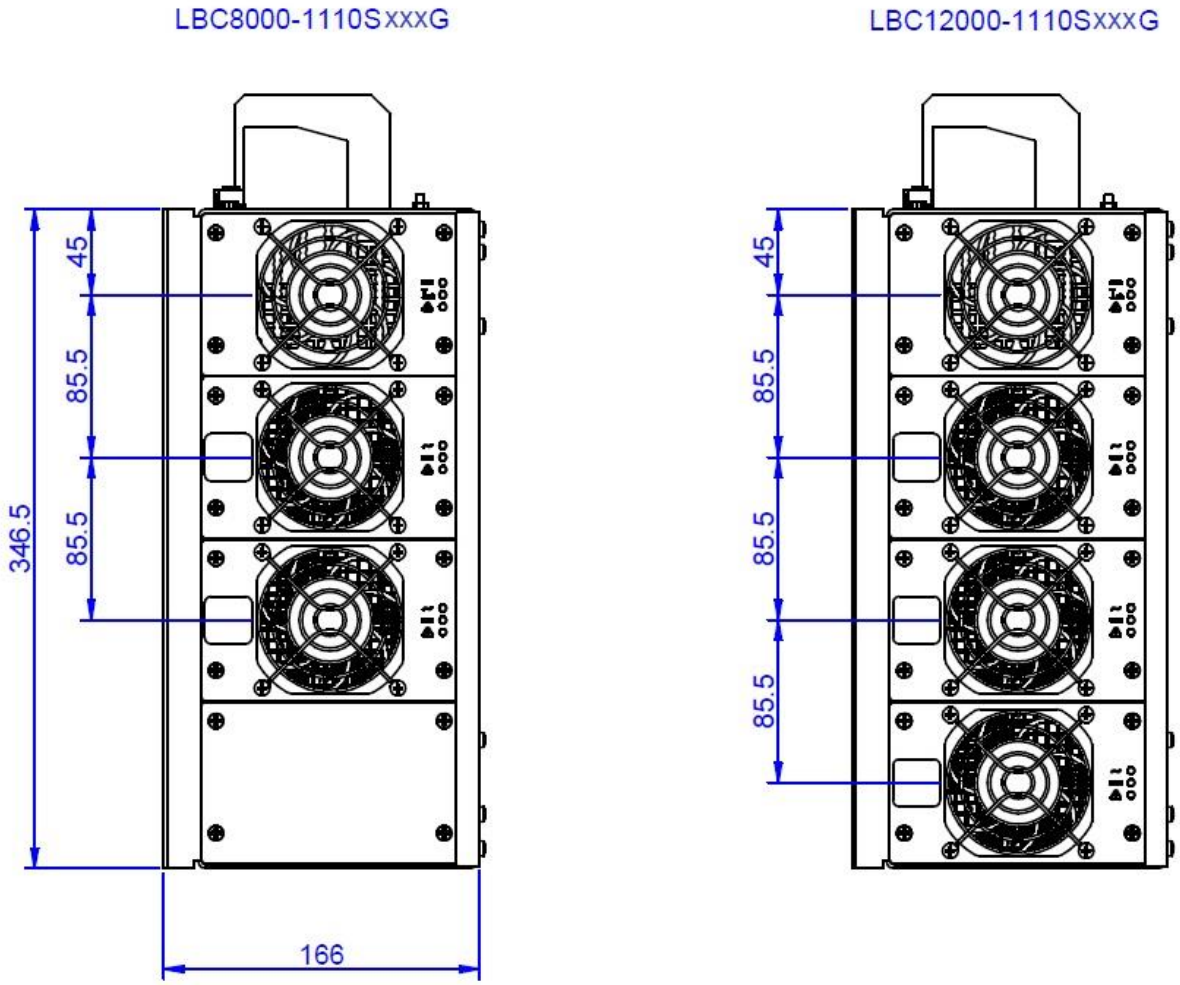

Figure 3. Front view

Weight: 23.5 kg (LBC8000) / 30.0 kg (LBC12000)

MOUNTING REQUIREMENTS

Charger shall be mounted securely on the supporting frame by all 6pcs of self-locking screws.
Mounting holes are designed to support charger only and cannot be used to support other assemblies.
The charger can be installed vertically or horizontally, by keeping minimal 10 cm of free space around all ventilation openings.
Recommended screw size is M8 (or equivalent).
Recommended tightening torque 20Nm.

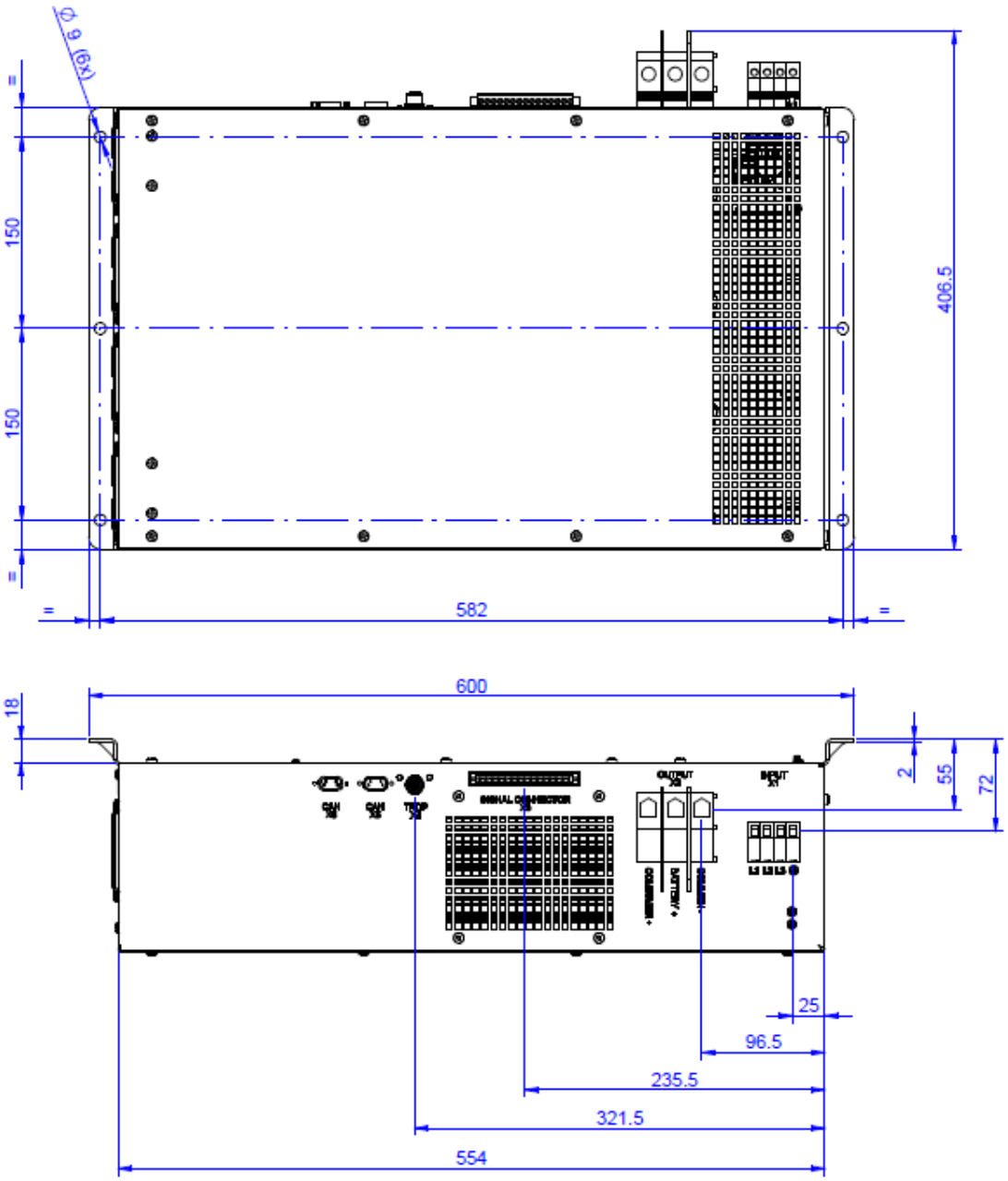

Figure 4. Side and top view

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