



Firma / Company : FRIWO

Gerätetyp / Type : FW8100/08/4,2

Artikelnr. / Part-No. : 1897114

Zeichnungsnr. / Drawing-No. : 15.4461.500-00

Datum / Date : 22.04.2015

Sachbearbeiter Verkauf / Contact Sales : Stuckenberg

Sachbearbeiter Mechanik / Contact Mech. Eng. : KSTMS

Sachbearbeiter Elektronik / Contact Elec. Eng. : KSTST

Freigabe App. / Approved App. : PRFFR

Freigabe / Approved : KSTWEG

Wir bitten Sie, ein Exemplar mit Freigabevermerk an uns zurückzusenden. Sollten Sie dieser Spezifikation nicht unverzüglich widersprechen, gilt die Zustimmung und Fertigungsfreigabe auf Grundlage dieser Spezifikation als erteilt.

We may ask you to return one signed copy of this specification for our records as having your approval. Unless you do not enter your objection to the latest specification issue without delay, your acceptance and release for production on the basis of this specification is deemed to be given.

Kundenfreigabe / Customer Release:

Datum / Date:

Unterschrift / Signature:

| Index / Rev. | Datum / Date | Name | Einzelheit / Detail |
|--------------|--------------|---------|-----------------------------------------------------------------------------------------------------------------------------|
| ① | 2015/07/24 | Schmidt | Bottom labelling changed to 15.4461.501-04. Input data updated to 850mA. Added the colour for the wires. Packaging updated. |
| | | | |
| | | | |
| | | | |

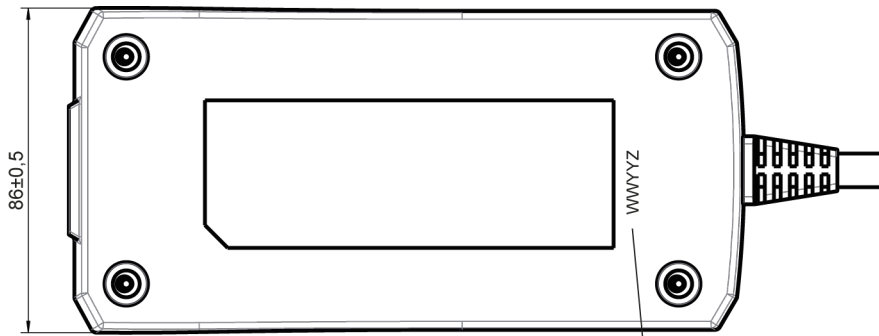
Geschäftssitz / Headquarter
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 Fax +49 2532/ 81-112
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 St.-Nr. 346/5840/0923
 Finanzamt Warendorf
 USt.-Ident.-Nr. DE811114890
 Amtsgericht Münster
 HRB 9325

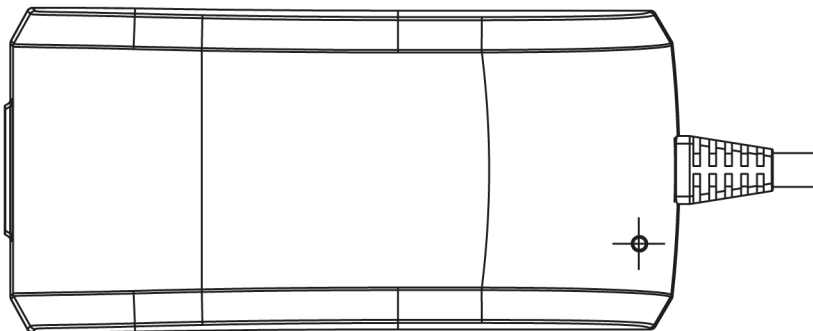
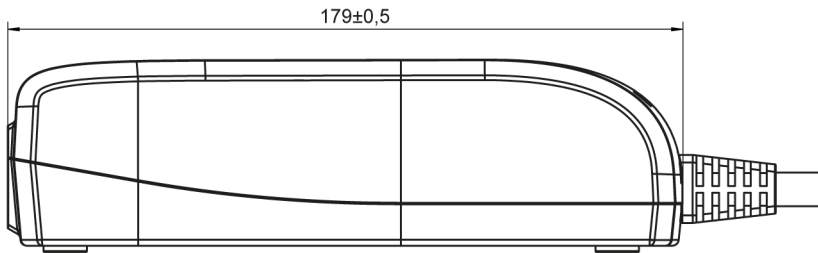
Bankverbindung / Bank Details
Sparkasse Münsterland-Ost
 BLZ 400 501 50 (EUR) Kto. 5 000 526
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 BLZ 400 501 50 (USD) Kto. 86 0000 23
 SWIFT WELADED1MST
Commerzbank AG, Frankfurt a. M.
 BLZ 500 400 00 Kto. 5 811 419
 IBAN DE05 5004 0000 0581 1419 00

1 Gehäuse / Housing:

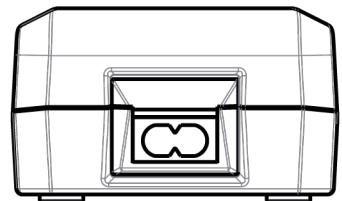
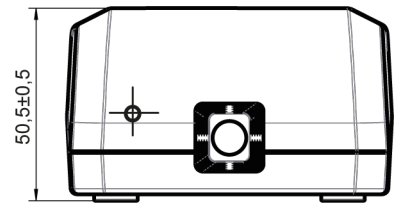
Gehäusotyp / housing-typ:
 Material: PC / ABS V0 125°C
 Farbe Boden/ bottom colour: schwarz / black
 Farbe Deckel/ cover colour: schwarz / black



Datumscode/ date-code "WWYYZ"
 W=Woche/ week Y=Jahr/ year Z=Fertigungsstätte/ Factory code
 Note: with out/ ohne mark = FRIWO Gerätebau GmbH G



M1:2

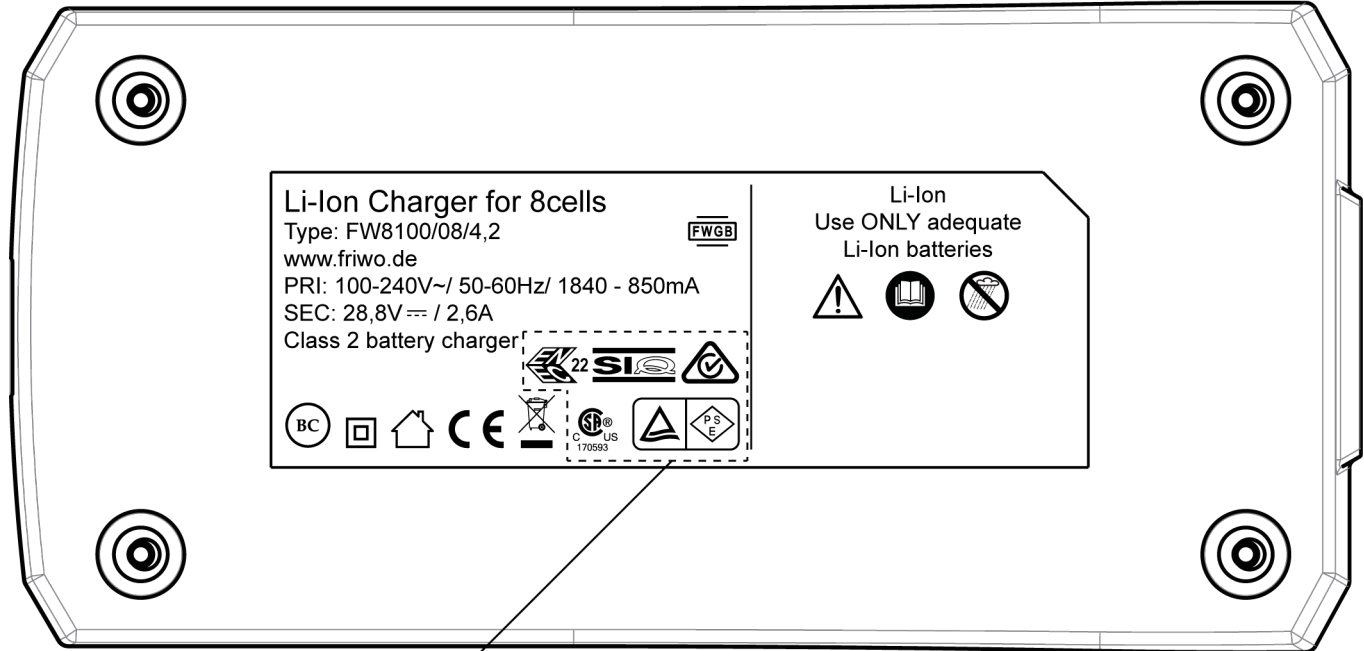


2 Gehäuseaufschriften / Housing labelling:

2.1 Bodenbeschriftung / Bottom labelling

2.1.1

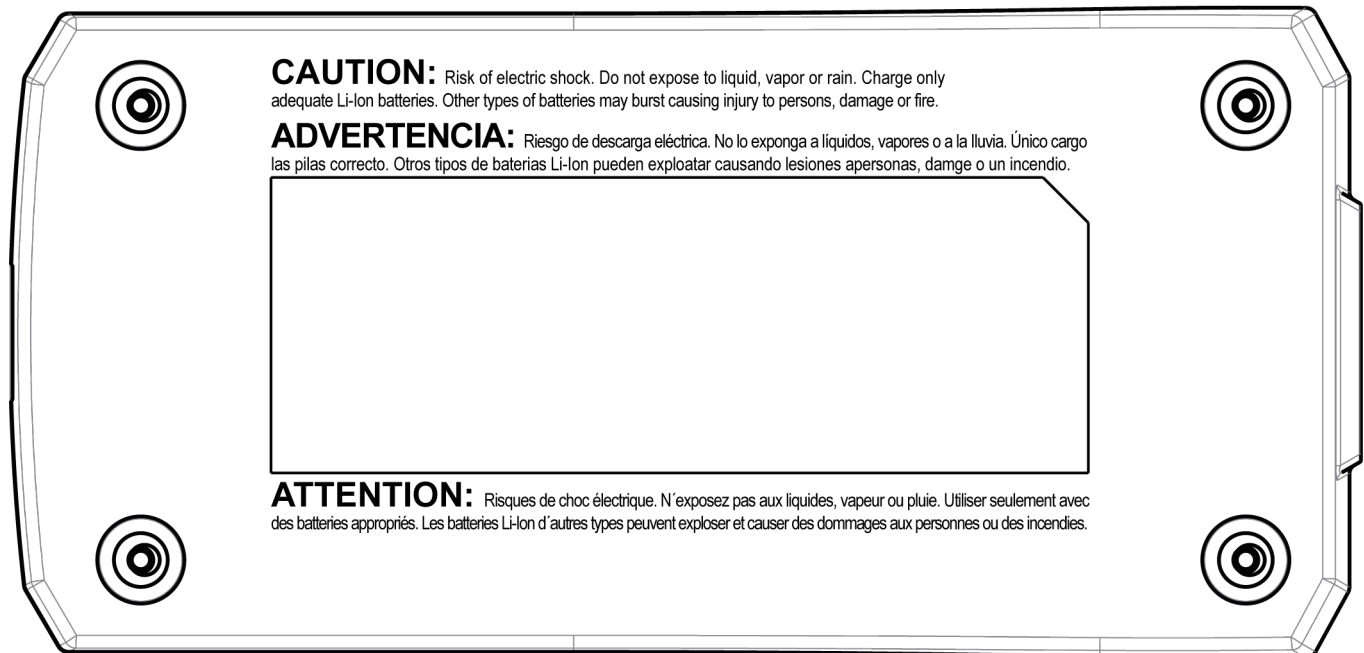
15.4461.501-04



Approval marks after release

2.1.2

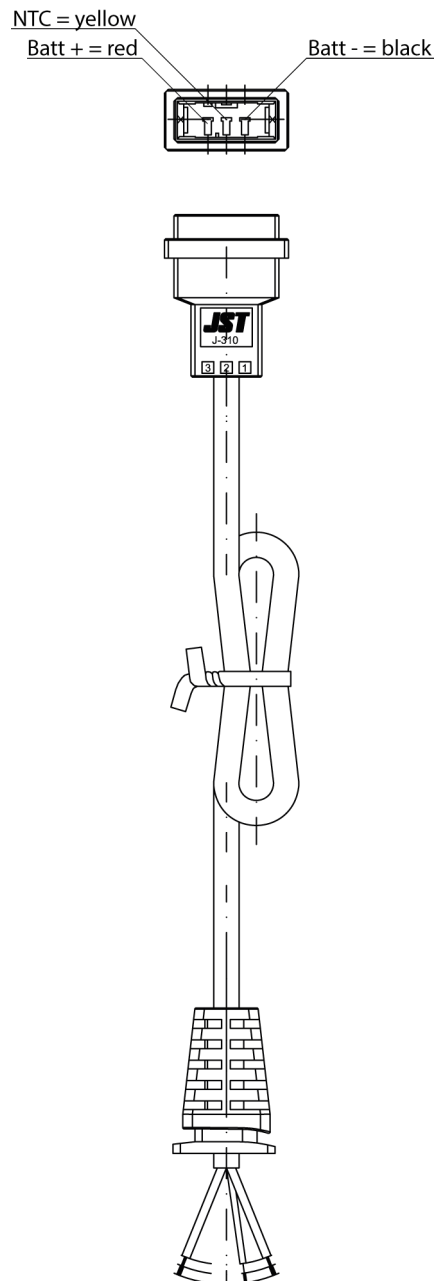
15.4461.501-03



3 Leitungen / Leads:

- 3.1 Ausgangsleitung / output lead: 15.4395.503-00
Länge / length: 1830 mm
Querschnitt / cross section: 2XAWG17/1XAWG22
Farbe / colour: schwarz / black

Polarität / polarity: siehe Zeichnung/ see drawing



4 Verpackung / packaging:

4.1 Einzelverpackung / individual packaging: 15.4264.556-00

mit Beschriftung * / with printing *

* SPEC.-NO.: 15.4461
PART.-NO.: 1897114
OUTPUT: 28,8V DC / 2,6A
INPUT: 100-240V AC

4.1.1 Aussenabmessungen / Outer dimensions: 225mm x 158mm x 75mm

4.2 Sammelverpackung / bulk packaging: 56 er UMKARTON / Carton 56

mit Beschriftung ** / with printing **

**

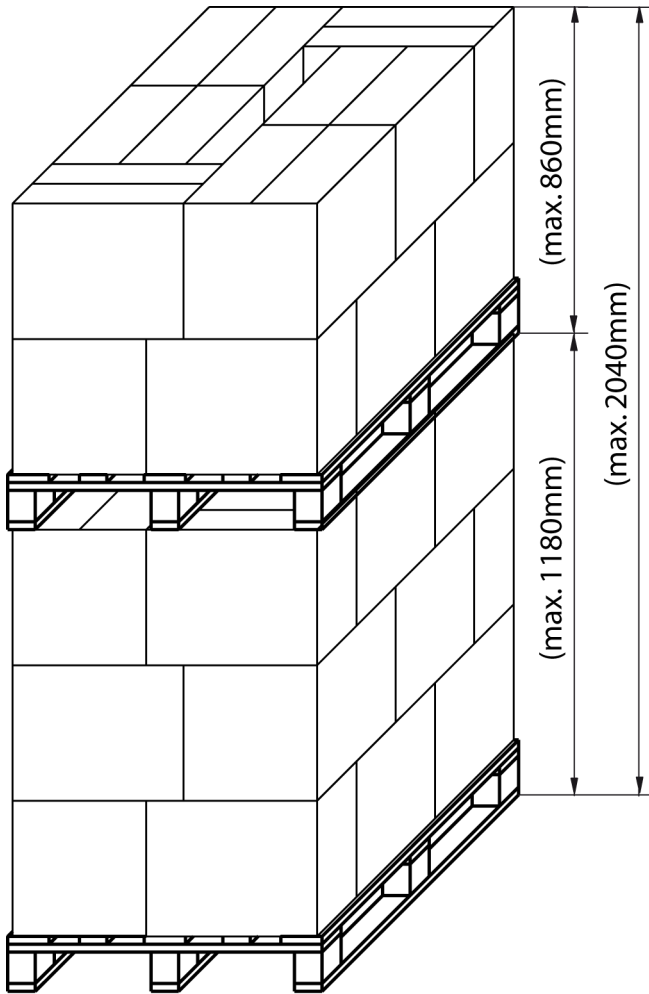
4.2.1 Aussenabmessungen / Outer dimensions: 433mm x 338mm x 356mm

4.3 Anzahl der Geräte pro Umkarton / amount of units per master carton: 13

4.4 Gewicht pro Stück / weight per unit: 509 g

4.5 Lagertemperatur / storage temperature: -20°C - +70°C / 10 to 85 rel. hum.

4.6 Verpackungsvorschriften / packaging specification:



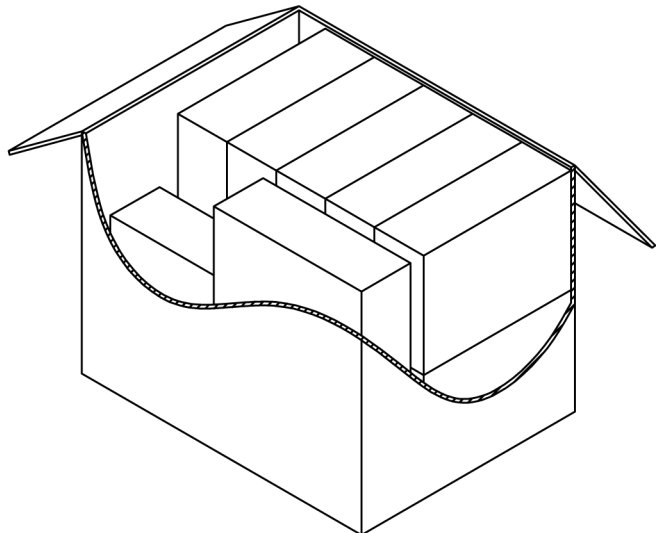
Master Packing

Notes:

- 1) 13 pcs per carton
- 2) 6 cartons per layer
- 3) 3 layers on 1st pallet + 2 layers on 2nd pallet
- 4) 2 pallets stacked one over another
- 5) total 390 pcs per stack

22 pallets (11 stacks)
 = 4290 pcs
 = 1 20 foot container

48 pallets (24 stacks)
 = 9360 pcs
 = 1 40 foot container



Ⓐ

5 Allgemeine Prüfbedingungen / General test conditions:

- 5.1 Operating temperature: 0°C ... +40°C
- 5.2 Input data: $V_E = 90-264V\sim$, 47-63Hz, 1840mA-850mA
- 5.3 Minimum start- up voltage $V_E = 90Vac$
- 5.4 Charger is short circuit proof
- 5.5 LED indication

| Mode | Indication | Remark |
|-------------------|---------------------------------|-------------------------------------------|
| Self-test | Yellow light 1s, Green light 1s | After power on |
| Standby | No indication | No battery detected |
| Pre-charge Mode | Green light blinking | $1/_{10}$ nominal charge current |
| Main charge Mode | Green light blinking | nominal charge current |
| Charging complete | Green light constant ON | |
| Warning | Yellow light constant ON | Information for user charging interrupted |
| Error | Red light constant ON | Charging stop |

- 5.6 Reverse current: Charger not connected to mains:
 $I_Q < 50\mu A @ V_{Batt} = 28,8V$

6 Charge Characteristic

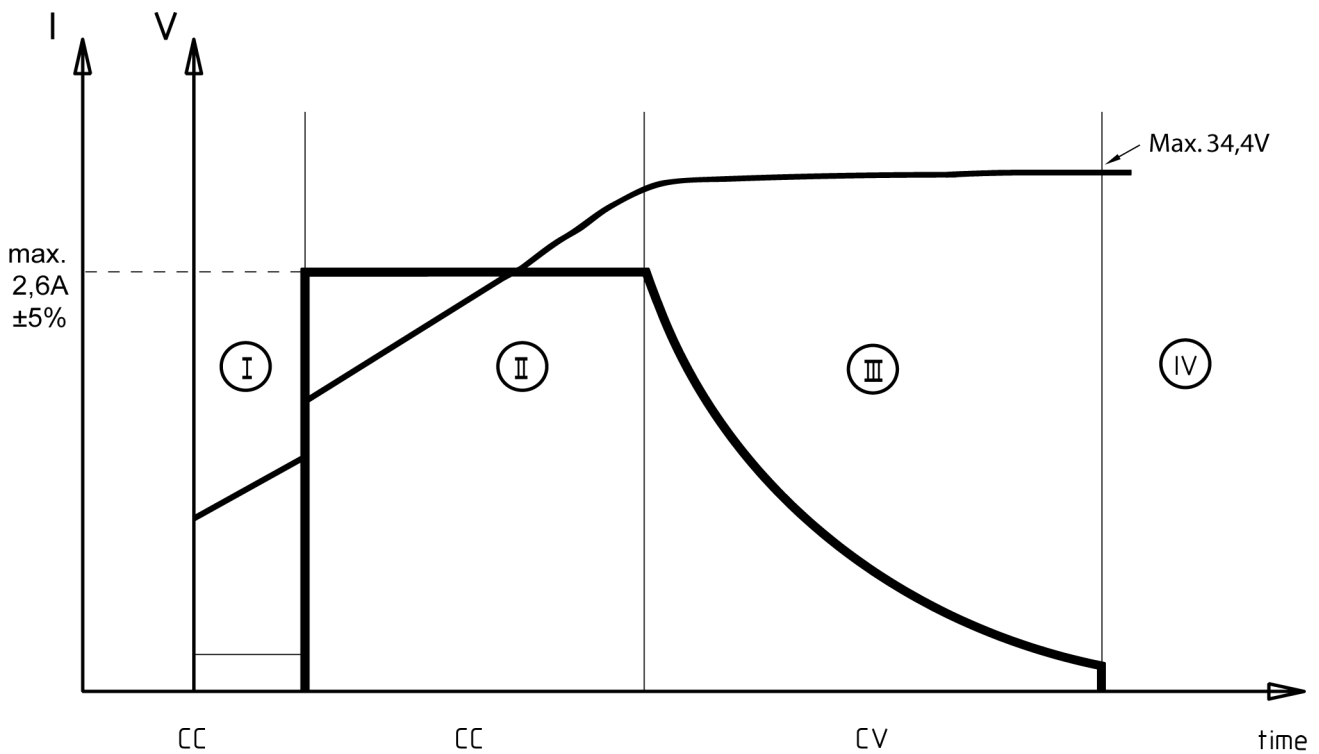
Simulation circuit for 8 Lithium cells.

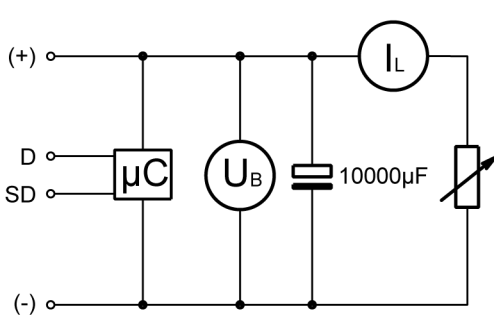
6.1 Batterie Informationen / Cell Information

| Chemistry | Type | Capacity range | Cell range |
|----------------------|------------------------|------------------------------------------------------------|------------|
| Lion Lion-Polymer | Household / Medical | Min. allowed Charge Current >2.6A typ. 2,6 - 24Ah | 8 |

6.2 Output characteristic: CCCCCV

6.3 Ambient temperature: 25°C After 2min of operation:



| | Output: $V_{Batt}(V)$ | Output: $I_{Charge}(mA)$ | Ersatzschaltung / Equivalent circuit:  |
|---|-------------------------------------|-----------------------------|-------------------------------------------------------------------------------------------------------------------------------|
| Ⓘ | Max. pre-charge current | | |
| | <21,6V ±10% | 260mA ±20% | |
| Ⓜ | Main-charge current | | |
| | >21,6V - 33,6V (±1%), max. 2,6A ±5% | | |
| Ⓝ | Max. main-charge voltage | | |
| | 33,6V (±1%) | 2600mA ±5% | |
| Ⓓ | Battery full condition | | |
| | 33,6V - 31,2V | 0mA | |

I

6.3.1 Pre-Charge
Light indication Green light blinking.
Characteristic: CC
Description: Battery is charged with constant current I_{ch} .

II

6.3.2 Main charge
Light indication: Green light blinking.
Characteristic: CC
Description: Battery is charged with constant current I_{ch} .

III

6.3.3 Main charge
Light indication: Green light constant ON.
Characteristic: CV
Description: Battery is charged with constant voltage

IV

6.3.4 Battery full
Light indication: Green light constant ON
Characteristic: CV
Description: Battery status "battery full", current is switched off.

6.3.5 Charge current is limited to $2,6A \pm 5\%$
Charge voltage is limited to $33,6V \pm 1\%$

6.4 Error detection

6.4.1

| Type | Description | Remark |
|---------|-----------------------------------------------|------------------------------------------------------------------------------|
| Warning | Battery de-balance | BMS* active near charging complete |
| Warning | BMS* in deep sleep mode | After 1min error |
| Warning | Short circuit at the output | After 1min error |
| Error | Short circuit at the output | Connection between battery and charger defect |
| Error | Battery defect detected | |
| Warning | Battery temperature, out of temperature range | only if NTC is connected Battery too hot > 45°C Battery too cold < 0°C |
| Error | No output voltage detected | Defect charger |
| Error | Over current detected | Defect charger |
| Error | Over voltage detected | Wrong battery, defect charger |
| Error | NTC contact error detected | Connection between battery and charger defect |
| Error | Pre-charge timer over run | deep discharged battery |
| Error | Charge timer over run | Wrong battery, defect battery, too high battery capacity |
| Error | BMS* active | Wrong battery, defect battery |

*BMS = Battery Management System

7 Safety

7..1 Overvoltage protection.

Independent voltage regulation at 34,4V±2%.

7.1 Over temperature protection.

Charger is equipped with independent over temperature protection on primary side.
Output current is derated if temperature is above limit.

7.2 Thermal Battery protection via NTC.

The charger is able to detect an external NTC-sensor in the Batterie,
via NTC pin.

Batterie thermal range is 0- 45°C

NTC-sensor: R=10kR +/- 5% / B=3988K

7.3 Overcharge protection.

Charger is equipped with a timer function, charging stops after 12h.

8 Sicherheitsanleitung / Safety Details:

| | |
|------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------|
| Sicherheitsaufbau nach / Safety-standard acc. to | : IEC60601-1, UL60601-1, EN60335-1, EN60601-1 |
| Schutzklasse / Protection class | : II |
| Trennung (prim.-sek.) | : Galvanisch durch Wandler |
| Separation (prim.-sec.) | : Galvanic by transformer |
| Kriech- und Luftstrecken / Creepage distance and clearance | : \geq Kr : 8mm, Lu : 5mm ; Cr : 8mm, Cl : 5mm |
| Ableitstrom | : I Ableit \leq 100 μ A Gemessen nach EN60335-1 siehe www.friwo.de |
| Leakage current | : I leak \leq 100 μ A According to EN60335-1 see www.friwo.de |
| Hochspannungstest / High-voltage test | : \geq 4kVac |
| Anwendungsbereich | : Haushaltsgeräte |
| Range of application | : household application |
| Umgebungstemperatur / Ambient temperature range | : 0°C bis / to +40°C |

9 CE-Konformitätserklärung / Declaration of Conformity

Wir, der Hersteller, erklären hiermit, dass das Produkt: /
 We, the manufacturer, hereby confirm, that the product:

Gerätetyp / Type: FW8100/08/4,2

Artikel-Nr. / Part-No.: 1897114

Zeichnungs-Nr. / Drawing-No.: 15.4461.500-00

weitere Merkmale /
 additional information:

mit der beiliegenden Beschreibung die Anforderungen der Niederspannungsrichtlinie 2006/95/EG, der EMV-Richtlinie 2004/108/EG und Öko-Design Richtlinie 2009/125/EG erfüllt.

Hiermit bestätigen und garantieren wir, dass unsere Produkte, unabhängig von der Produktionsstätte, RoHS-konform produziert werden und die Anforderungen der EU Richtlinie 2011/65/EU (Neufassung der Richtlinie 2002/95/EU) erfüllen.

with the enclosed description fulfils the requirements of the Low Voltage Directive 2006/95/EC, the regulations of the EMC Directive 2004/108/EC and the eco design Directive 2009/125/EC.

Hereby, we certify and guarantee that our products, regardless of the production location, RoHS compliant and fulfill the directive 2011/65/EC (revised version: directive 2002/95/EC).

Das Gerät entspricht der / *The unit corresponds to:*

a) Niederspannungsrichtlinie /
 Low Voltage Directive

- EN 60335-2-29 11/2010
- EN60601-1 Ed.3 07/2007
- EN 60335-1 11/2010

b) EMV-Richtlinie /
 EMC Directive

- EN 61000-3-2 06/2011
- EN 61000-3-3 06/2009
- EN 55014-1 02/2010
- EN 60601-1-2 12/2007
- EN 55014-2 06/2009
- EN 55011 11/2007

c) Öko Design /
 ECO Design

- Not applicable



Jendrik Moellers
 Vice President Product Management & Marketing

Ausstelldatum / *Date of issue:* 21.08.2014



Firmenstempel / Company stamp



Armin Wegener
 Vice President Research & Development

Allgemeines / In general:

Für Batterieladegeräte ist der Vertreiber gemäß den Anforderungen in den Normvorschriften verpflichtet, den Produkten grundsätzlich eine Bedienungsanleitung beizufügen. Diese muß in der jeweiligen Landessprache des Landes, in dem das Produkt verkauft wird, folgendes erhalten:

- vor Inbetriebnahme ist die Gebrauchsanweisung zu lesen
- nur zur Verwendung in Räumen (vor Feuchtigkeit schützen)
- eine Warnung vor dem Laden von nicht aufladbaren Batterien
- Angaben über den Typ der Batterie, die Anzahl der Zellen, die Ladezeit sowie die Nennkapazität
- einen Hinweis, daß Zellen die Quecksilber, Cadmium oder Blei als elektrochemisch aktive Substanzen enthalten, entsorgungspflichtig sind.

Bei Batterieladegeräten zum Laden von Kraftfahrzeugbatterien:

- Die Batterieklemme, die nicht an das Fahrgestell angeschlossen ist, wird zuerst angeschlossen. Der andere Anschluß wird zum Fahrgestell hergestellt, entfernt von der Batterie und der Benzinleitung. Dann wird das Batterieladegerät an das Versorgungsnetz angeschlossen.
- Nach dem Laden wird das Batterieladegerät vom Versorgungsnetz getrennt. Dann wird der Anschluß an das Fahrgestell und der zur Batterie in dieser Reihenfolge entfernt.
- vom Netz trennen, bevor Verbindungen zur Batterie geschlossen oder geöffnet werden.
- ACHTUNG! Explosive Gase - Flammen und Funken vermeiden - Während des Ladens für ausreichende Belüftung sorgen.

For battery chargers the distributor is obliged, by the standard regulations, to add to the product an instruction leaflet. This must be written in the language of the country in which the product is to be sold and must contain the following:

- please read the user instructions before using the charger
- for indoor use only (protect against moisture)
- a warning against the charging of non-rechargeable batteries
- information about the type of battery, the number of cells, the charging time and the nominal rating of the battery
- a direction that all cells containing mercury, cadmium or lead as electrochemical substances are subject to special waste disposal.

For battery chargers to charge vehicle batteries:

- The battery terminal which is not connected to the chassis should be connected first. Then the other terminal is connected to the chassis, ensuring sufficient clearance from the battery and the fuel line phase. Subsequently, the battery charger can be connected to the mains supply.
- On completion of charge, the battery charger should be disconnected from the mains supply. Then the connection to the chassis should be removed and in turn the connection to the battery.
- disconnect from mains prior to connecting or disconnecting to battery
- ATTENTION! Explosive gases - avoid fire and sparks - ensure sufficient ventilation during charging.

10 **Warnung / Warning!**

Alle Zellen oder Batteriepacks, die geladen werden sollen, müssen einen unabhängigen Sicherheitsstromkreis besitzen. Der Sicherheitsstromkreis muss die Zellen vor Tiefentladung, Übertemperatur und Überladung schützen.

Die Missachtung dieser Warnung kann zu ernsthaften Verletzungen, Feuer oder zur Explosion der Li-Ion-Batterie führen./

All Li-Ion cells or Li-Ion battery cell packs, which are to be charged, have to possess an independent safety circuit. The safety circuit has to protect the cell against deep-discharge, temperature rise and overcharge. Ignoring this warning may cause serious injuries, fires or an explosion of the Li-Ion battery.