



Firma / Company : FRIWO

Gerätetyp / Type : FW8102/10/4,2

Artikelnr. / Part-No. : 1897215

Zeichnungsnr. / Drawing-No. : 15.4614.500-00

Datum / Date : 27.04.2015

Sachbearbeiter Verkauf / Contact Sales : Stuckenberg

Sachbearbeiter Mechanik / Contact Mech. Eng. : KSTMS

Sachbearbeiter Elektronik / Contact Elec. Eng. : KSTRE

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
Ⓐ	2015/09/30	Schmidt	The drawing no. changed to 15.4614.500-00. The bottom labelling c...
Ⓑ	2015/12/02	Schmidt	On page 1 the type updated to FW8102/10/4,2. Bottom labelling changed to 15.4614.501-04. The polarity of the lead added. The weight per unit added.

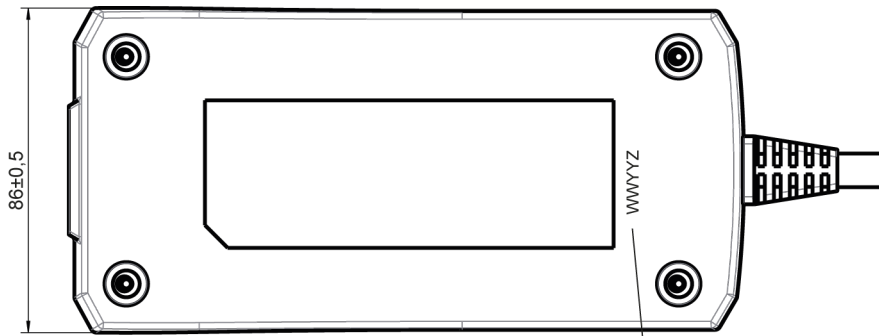
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 Finanzamt Warendorf
 USt.-Ident.-Nr. DE811114890
 Amtsgericht Münster
 HRB 9325

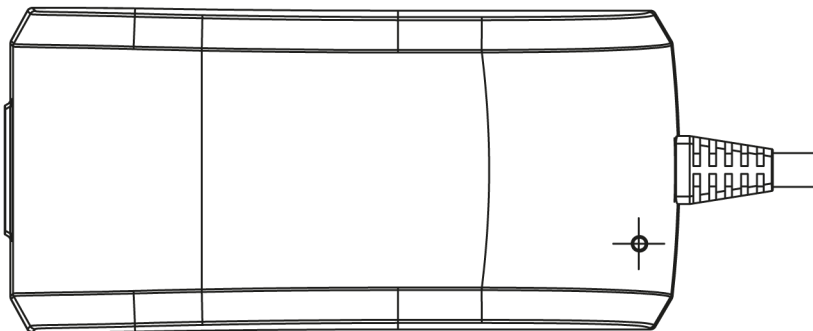
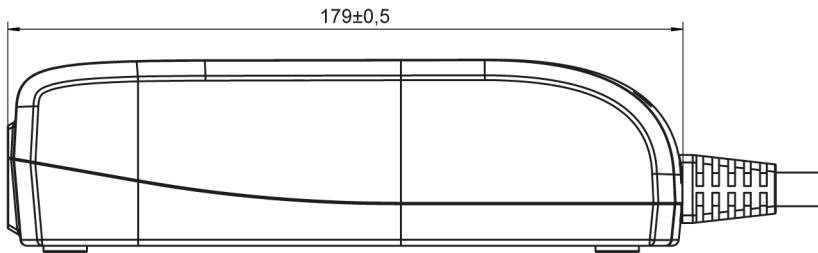
Bankverbindung / Bank Details
Sparkasse Münsterland-Ost
 BLZ 400 501 50 (EUR) Kto. 5 000 526
 IBAN DE42 4005 0150 0005 0005 26
 BLZ 400 501 50 (USD) Kto. 86 0000 23
 SWIFT WELADED1MST
Commerzbank AG, Frankfurt a. M.
 BLZ 500 400 00 Kto. 5 811 419
 IBAN DE05 5004 0000 0581 1419 00

1 Gehäuse / Housing:

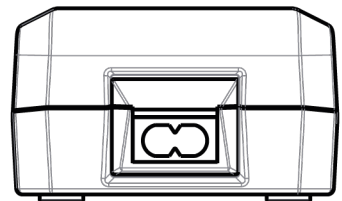
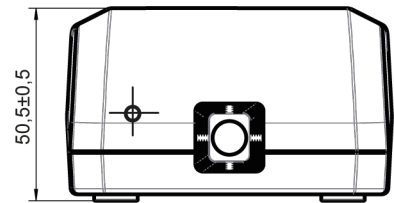
Gehäusetyp / housing-typ: E-Bike
 Material: PC / ABS V0 125°C
 Farbe Boden/ bottom colour: schwarz / black
 Farbe Deckel/ cover colour: schwarz / black



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

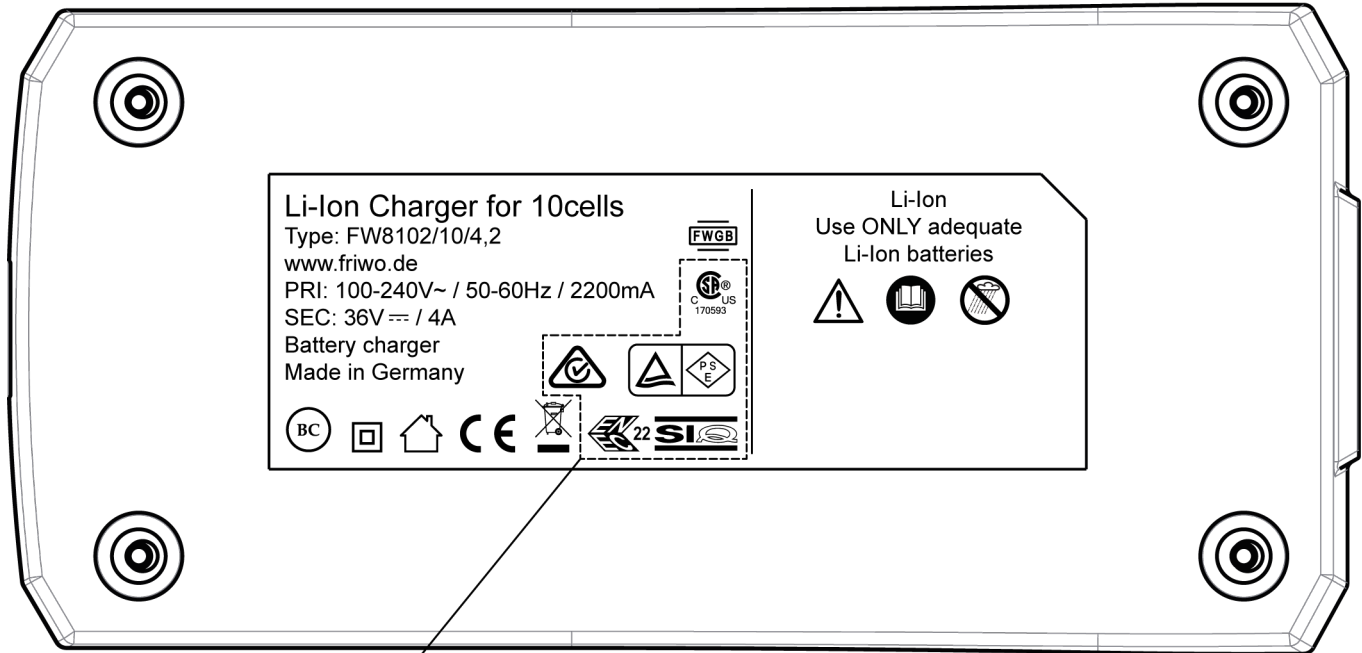


2 Gehäuseaufschriften / Housing labelling:

2.1 Bodenbeschriftung / Bottom labelling

2.1.1

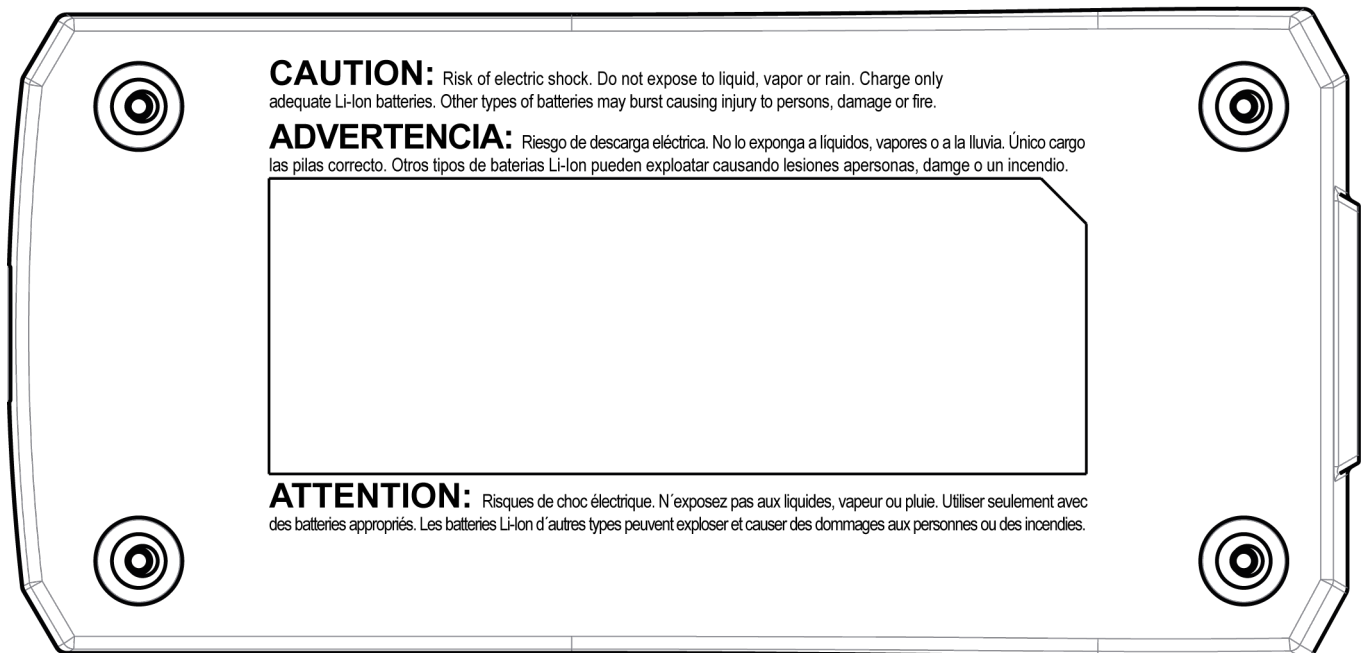
15.4614.501-04



Approval marks after release

2.1.2

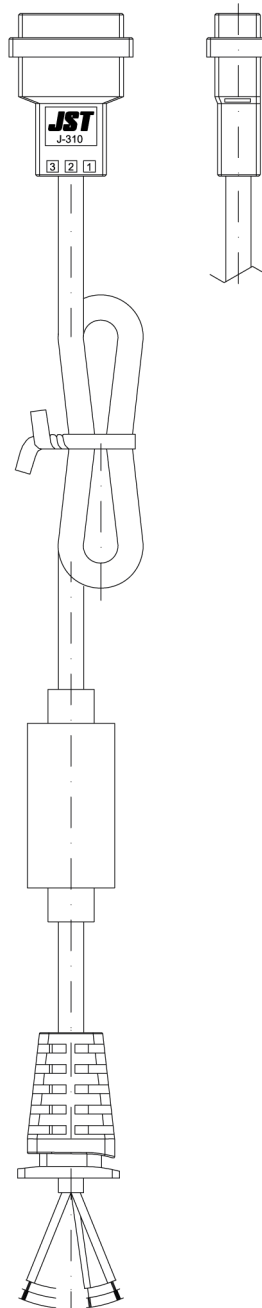
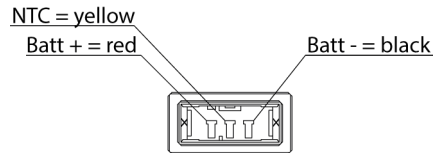
15.4461.501-03



3 Leitungen / Leads:

3.1 Ausgangsleitung / output lead: 15.4614.503-00
 Länge / length: 1000 mm
 Querschnitt / cross section: 2XAWG17/1XAWG22
 Farbe / colour: schwarz / black

Polarität / polarity:



ⓑ

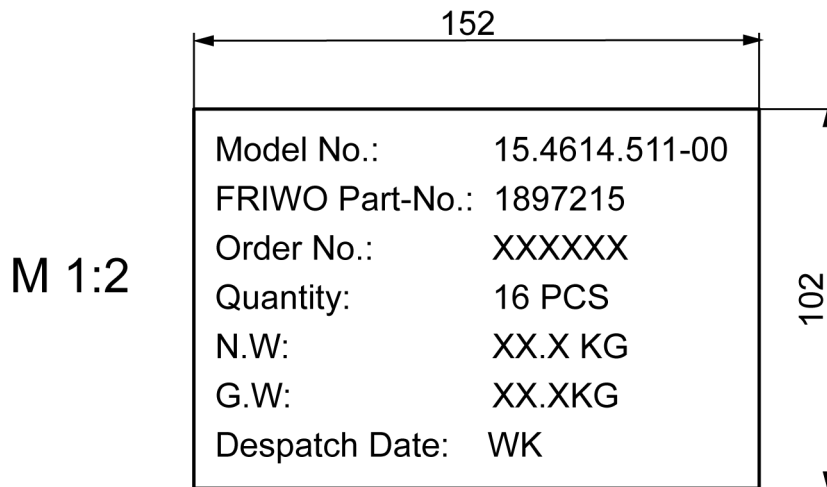
4 Verpackung / packaging:

4.1 Einzelverpackung / individual packaging:
 15.4264.556-00

mit Beschriftung * / with printing *

*

Adhesive label for carton part-no. 1821105
 Colour: white Printing colour: black



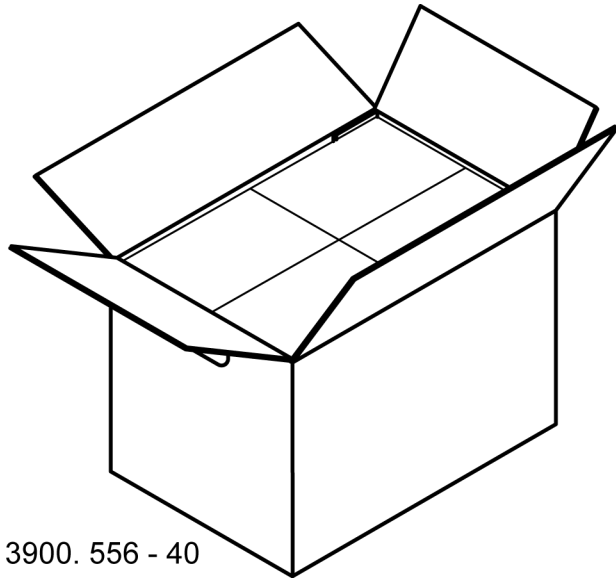
N.W = Net weight
 G.W = Gross weight
 WK = Week (Printing the produce date after WK.) For example:01,02,03 ...

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

4.2 Sammelverpackung / bulk packaging:
 Karton 15.3900.556-40

4.2.1 Aussenabmessungen / Outer dimensions: 440mm x 357mm x 370mm

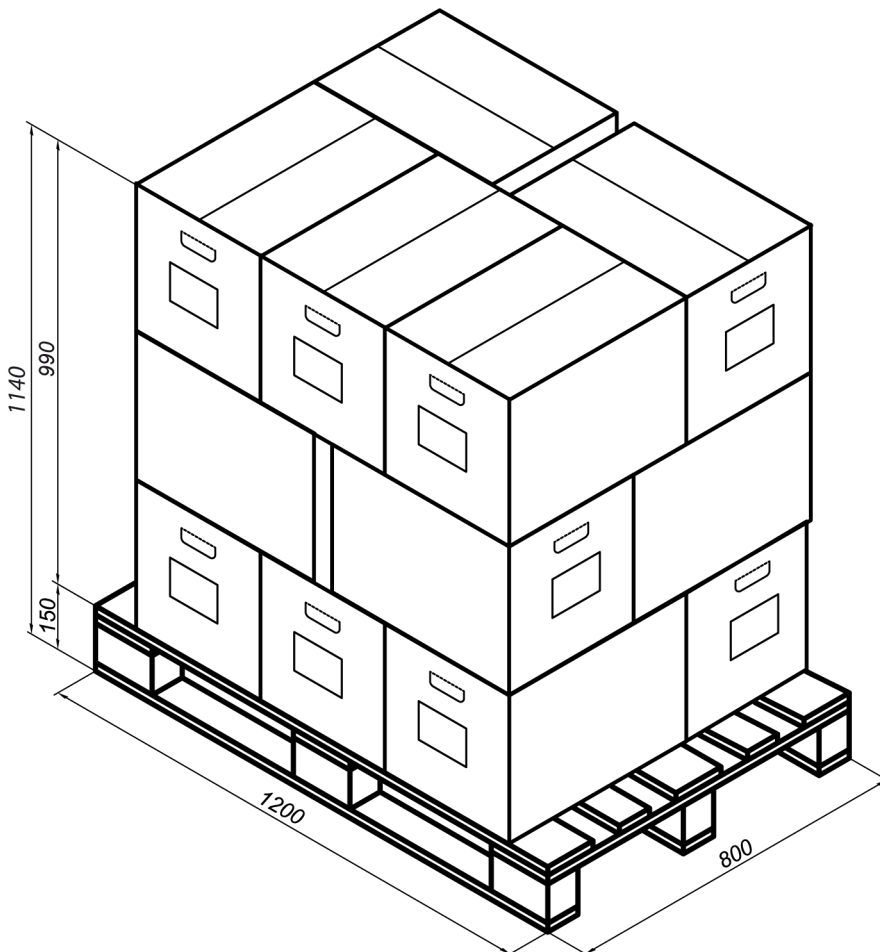
4.3 Anzahl der Geräte pro Umkarton / amount of units per master carton: 16



1 unit per folding box 15. 4264. 556 - 00
 4 folding box (units) per layer
 16 folding box (units) per cardboard box 15. 3900. 556 - 40

4.4 Gewicht pro Stück / weight per unit: 507 g

4.5 Verpackungsvorschriften / packaging specification:



Master Packing

Notes:

- 1) 16 pcs per carton
- 2) 5 cartons per layer
- 3) 3 layers on pallet
- 4) total 240 pcs per pallet

5 Allgemeine Prüfbedingungen / General test conditions:

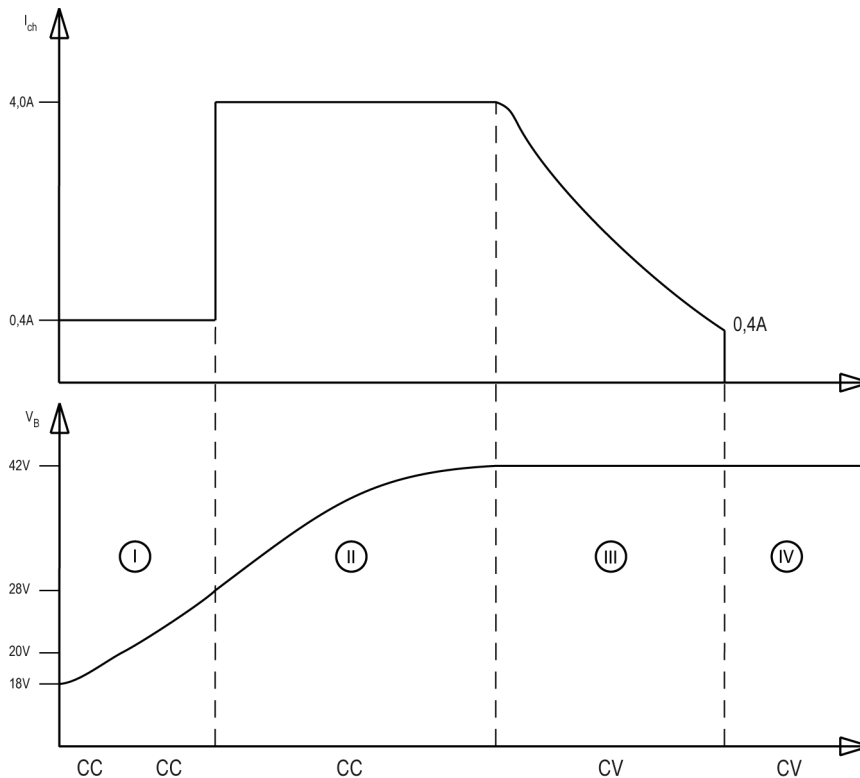
Operating temperature: 0°C ... +40°C
 Storage temperature: -20°C ... +70°C
 Input data: $V_E = 90-264V\sim, 47-63Hz, 2200mA, 198W$
 High voltage test: Input / Output: 3kV / 50Hz / 2s
 Charger is short circuit proof
 Reverse current: $I_Q \leq 1mA$

5.1 Charge characteristic

Simulation circuit for n = 10 Lithium cells

5.2 Output characteristic: CCCCCV

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



	Output: $V_{Batt}[V]$	Output: $I_{Charge} [mA]$	Ersatzschaltung/ equivalent circuit
Ⓚ	Pre-charge		
	$10V \leq V_A \leq 27V$	$0,4A \pm 20\%$	
Ⓛ	Main-charge		
	$27V \leq V_A \leq 42V$	$\geq 4,0A \pm 5\%$	
Ⓜ	Main-charge		
	$V_B = 42V \pm 1\%$	$0,4A \pm 20\%$	
Ⓝ	Main-charge		
	$V_B = 42V \pm 1\%$	$I_{ch} = 0mA$	

5.3.1 Detection of battery insertion
Battery is detected if voltage $\geq 10V$

5.3.2 The charging sequence is divided into 4 steps dependent on the battery status
A complete main charge sequence (step II to step IV) is limited to max. 6h

5.3.2.1 Pre charge

Ⓘ

Characteristic: CC

Description: Battery is charged with constant for max. 30 minutes
current I_{ch}^* , pre = 0,4A until voltage of 27V is reached

5.3.2.2 Main charge

Ⓢ

Characteristic: CC

Description: Battery is charged with constant
current $I_{ch}^* = 4,0A$ until battery voltage reaches $V_B = 42V$

5.3.2.3 Main charge

ⓈⓈ

Characteristic: CV

Description: Battery is charged with constant voltage of 42,0V
until charge current drops 400mA

5.3.2.4 Stop mode

ⓈⓈⓈ

Characteristic: CV

Description: After end of charge, charge
current is switched off

I_{ch}^* , 0mA

Independent of phase II to III charging of battery is terminated in case of

Timer $t_{max} > 6h$

or

$V_B \geq 42,4V$

5.4 Error detection

5.4.1

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

5.5 Safety

Over voltage protection: independent voltage regulation at $47 \pm 3V$

Over current protection: charge current limited to < 10A

Temperature protection:

Linear derating of charge current above 20°C ambient temperature is implemented to keep the surface temperature of plastic case below 75°C

(measured on hot spot of top case)

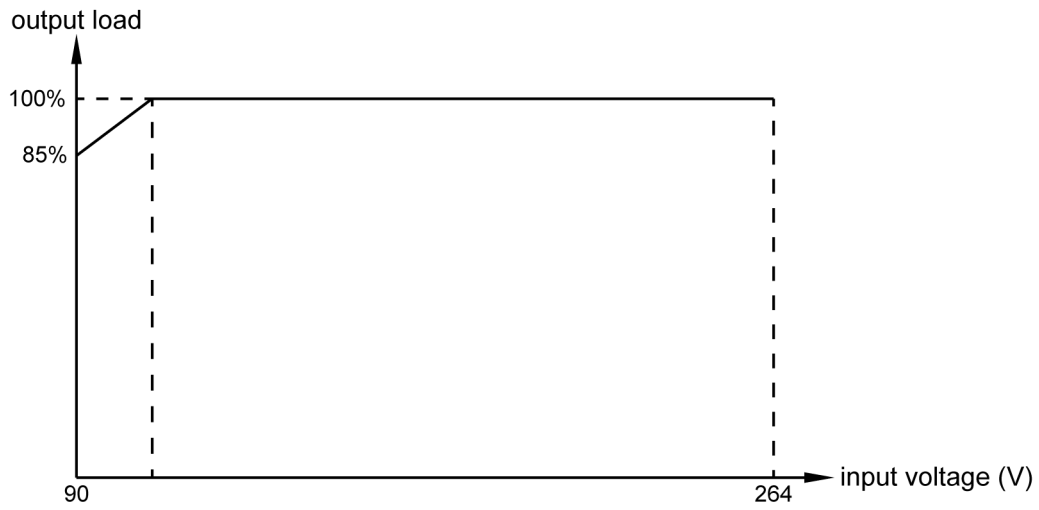
Thermal battery protection via NTC

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

Battery thermal range is 0-45°C

NTC-sensor: R= 10kR $\pm 5\%$ / B=3988K

5.6 Output derating



5.7 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	$\frac{1}{10}$ 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

6 Other valid documents
 Firmware description 1895278.doc

6.1 In general:

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 where the product is sold and must contain the following:

- please read the directions for use before using the implementing
- for indoor use only
- a warning against the use 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 for all cells containing mercury, cadmium or lead as electro-chemical substances, that these batteries are subject to special waste disposal.

6.2 In general

For all mains adapters and chargers with mains lead and strain-relief the following notes for the connected unit's end user, written in the end users national language, must be included as important information in the directions for use:

- A damaged mains lead has to be replaced by a special lead of the manufacturer or his agent, or
- damaged leads which can only be changed with a special tool cannot be replaced by the user, the unit must be therefore be returned to the manufacturer or his agent.

6.3 In general

This appliance is not intended for use by persons (including children) with reduced physical, sensory or mental capabilities, or lack of experience and knowledge, unless they have been given supervision or instruction concerning use of the appliance by a person responsible for their safety.

Children should be supervised to ensure that they do not play with the appliance.

6.4 In general

This appliance can be used by children aged from 8 years and above and persons with reduced physical, sensory or mental capabilities or lack of experience and knowledge if they have been given supervision or instruction concerning use of the appliance in a safe way and understand the hazards involved.

Children shall not play with the appliance. Cleaning and user maintenance shall not be made by children without supervision.

7 EMC Specification

EMC according to EN 55014-1, EN 55014-2 and 47CFR15, Subpart B

7.1 Harmonic current emissions acc. to EN 61000-3-2 and EN 61000-3-3, class A

7.2 Immunity to electrostatic discharge (ESD) acc. to EN 61000-4-2

Discharge characteristic	Test level	Assessment criteria U_{in} 230Vac
Air discharge	±8kV	B
Contact discharge	±4kV	B
Indirect discharge	±4kV	B

7.3 Immunity to radiated electromagnetic field acc. to EN 61000-4-3

Testparameter / test characteristic: 80 - 1000 MHz; 80% AM (1kHz)

Test level	Assessment criteria
3V/m	A

7.4 Immunity to fast electric transients (burst) to EN 61000-4-4

Coupling	Test level	Assessment criteria U_{in} 230Vac
AC - input	2kV	B

7.5 Surge capability acc. to EN 61000-4-5

Surge voltage	Assessment criteria U_{in} 230Vac
2kV	B

7.6 Immunity to conducted disturbances, induced by radio frequency fields acc. to EN 61000-4-6

Test characteristic: 0,15 - 230 MHz; 80% AM (1kHz)

Test level	Assessment criteria
3V	current drift max. 5%

7.7 Immunity to voltage dips, short interruptions and voltage variations.

Test acc. to EN 61000-4-11

Test performed at $U_{in} = 230V_{ac}$

Voltage dips

Test level % U_N	Voltage dips and short interruptions % U_N	duration time of voltage dips (in halfsine)	Test result 36,0V battery
0	100	0,5	A
40	60	1	A
		5	B
		10	B
		25	B
		50	B

Voltage variations

Test level	Duration to decrease the voltage	Duration of the decrease d voltage	Duration to increase the voltage	Test result 36V battery
40% U_N	2s \pm 20%	1s \pm 20%	2s \pm 20%	B
0% U_N	2s \pm 20%	1s \pm 20%	2s \pm 20%	B

7.8 Assessment criteria

- A Agreed operational behaviour within the specified limits.
- B Time limited functional diminishment or malfunction during the tests is permitted. The function is self-reactivated by the unit following completion of the tests.
- C Malfunction is permitted. The function can be reactivated either by reconnection to the mains or by operator intervention.

8 Sicherheitsanleitung / Safety details:

Sicherheitsaufbau nach / Safety-standard: EN60335-1, EN60335-2-29, UL1012
 acc. to

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 : 6.4mm, Lu : 4mm ; Cr : 6.4mm, Cl : 4mm

Ableitstrom : I Ableit \leq 250 μ A
 Gemessen nach EN60335-1 siehe www.friwo.de

Leakage current : I leak \leq 250 μ A
 According to EN60335-1 see www.friwo.de

Hochspannungstest / High-voltage test : \geq 3kVac

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: FW8102/10/4,2

Artikel-Nr. / Part-No.: 1897215

Zeichnungs-Nr. / Drawing-No.: 15.4614.500-00

weitere Merkmale /
additional information:

mit der beiliegenden Beschreibung die Anforderungen der Niederspannungsrichtlinie 2006/95/EG (gültig bis 19. April 2016) der Niederspannungsrichtlinie 2014/35/EU (gültig ab 20. April 2016), der EMV-Richtlinie 2014/30/EG und Öko-Design Richtlinie 2009/125/EG erfüllt.

Hiermit bestätigen 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 (valid to 19. April 2016) the Low Voltage Directive 2014/35/EU (valid from 20. April 2016), the regulations of the EMC Directive 2014/30/EC and the eco design Directive 2009/125/EC.

Hereby, we certify 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 60335-1
- EN60335-2-29 06/2005

b) EMV-Richtlinie /
EMC Directive

- EN 61000-3-2 06/2011
- EN 61000-3-3 06/2009
- EN 55014-1 02/2010
- EN 55014-2 06/2009

c) Öko Design /
ECO Design

- Not applicable



Jendrik Moellers
 Vice President Product Management & Marketing

Ausstelldatum / *Date of issue:* 10.04.2013



Firmenstempel / Company stamp



Armin Wegener
 Vice President Research & Development