FRIWO Gerätebau GmbH
Von-Liebig-Straße 11
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Firma / Company :	**FRIWO**
Gerätetyp / Type :	FB2S1P18650-26
Artikelnr. / Part-No. :	5500088
Zeichnungsnr. / Drawing-No. :	50.0001.100-01
Datum / Date :	30.04.2015
Sachbearbeiter Verkauf / Contact Sales :	Stuckenberg
Sachbearbeiter Mechanik / Contact Mech. Eng. :	KSTMS
Sachbearbeiter Elektronik / Contact Elec. Eng. :	KSTDE
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
ⓐ	2015/06/17	Schmidt	At pos.1 the dimension added. Pos.2 label updated. Weight per unit added. At point 6.2 added the test report for UN38.3. At point 6.3 the precautions updated. Point 7 added.

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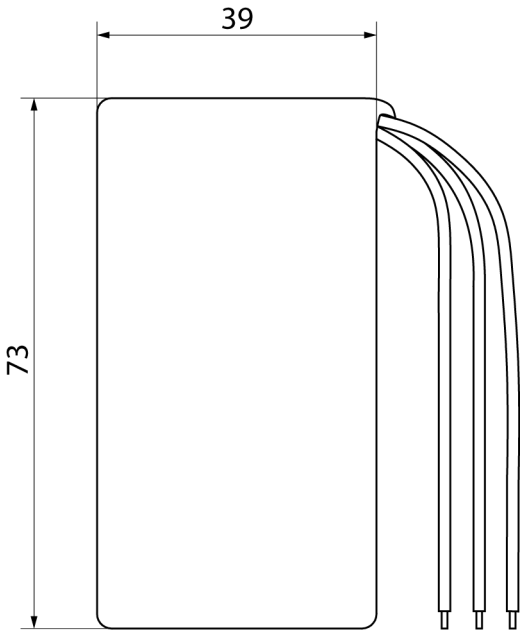
USt.-Ident.-Nr. DE811114890
Amtsgericht Münster
HRB 9325

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: Schrumpfschlauch/ Shrinking tube
Material: PVC
Farbe / colour: Blau / Blue



Breite / Width: 20mm

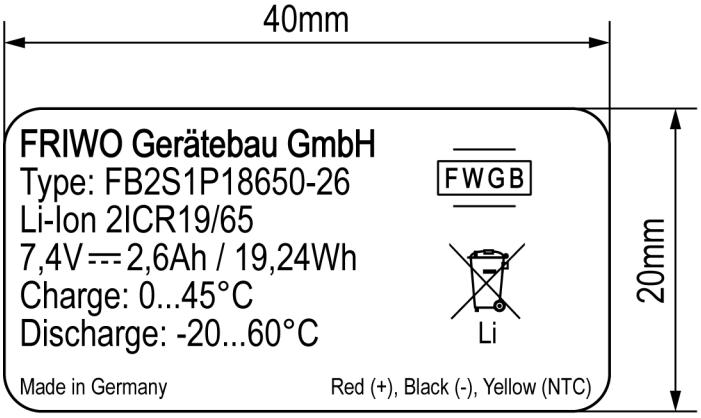
ⓐ

2 Gehäuseaufschriften / Housing labelling:

2.1 Batterie Beschriftung / Battery labelling

2.1.1

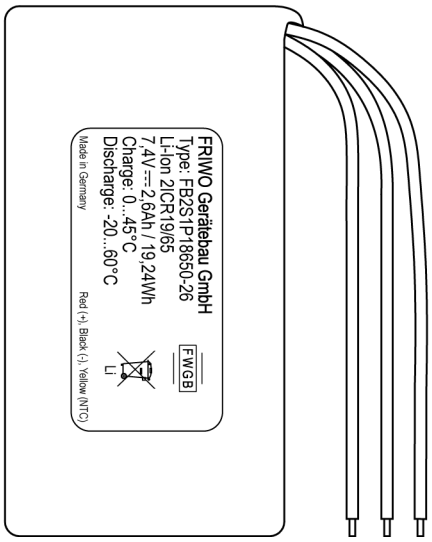
M2:1



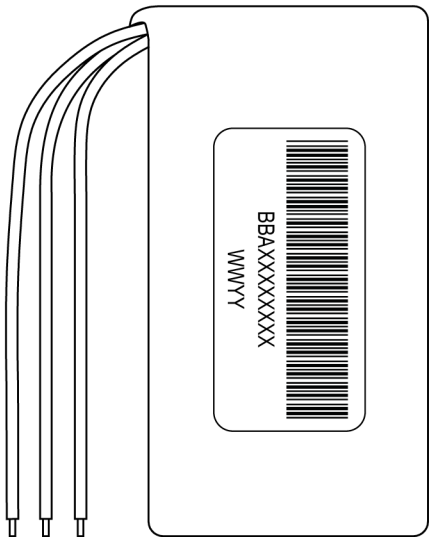
M2:1

ⓐ

M1:1



M1:1



Barcode: Code 39
BB = Battery Business
A = Fixed letter
XXXXXXXX = Ongoing number
For example: BBA00000100

Date code: WWYY
WW = Week
YY = Year

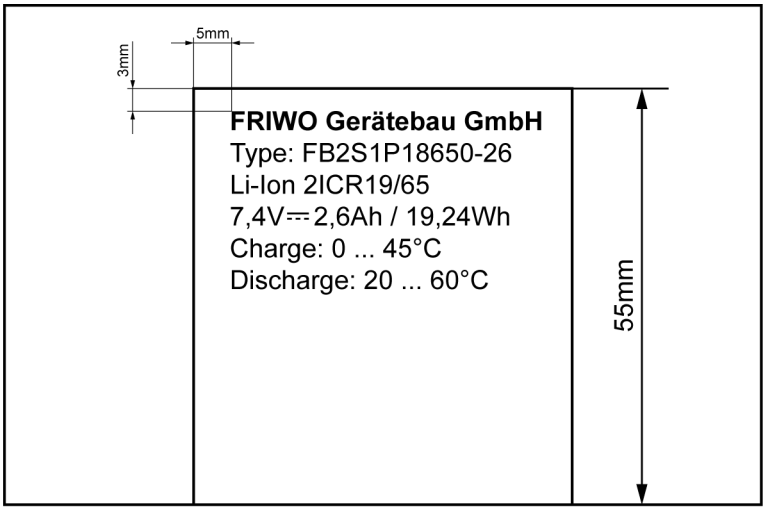
3 Verpackung / packaging:

3.1 Einzelverpackung / individual packaging:

Polybeutel / Polybag

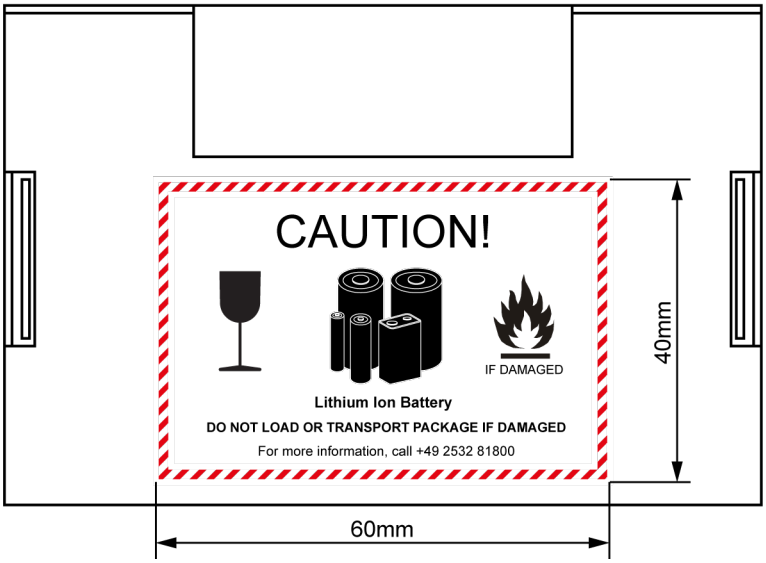
Faltschachtel / Folding box: 15.2710.556-01
Aufkleber / Label: 1814313 (50mm x 100mm)
Warnaufkleber / Caution label: 5000163 (40mm x 60mm)

Top view



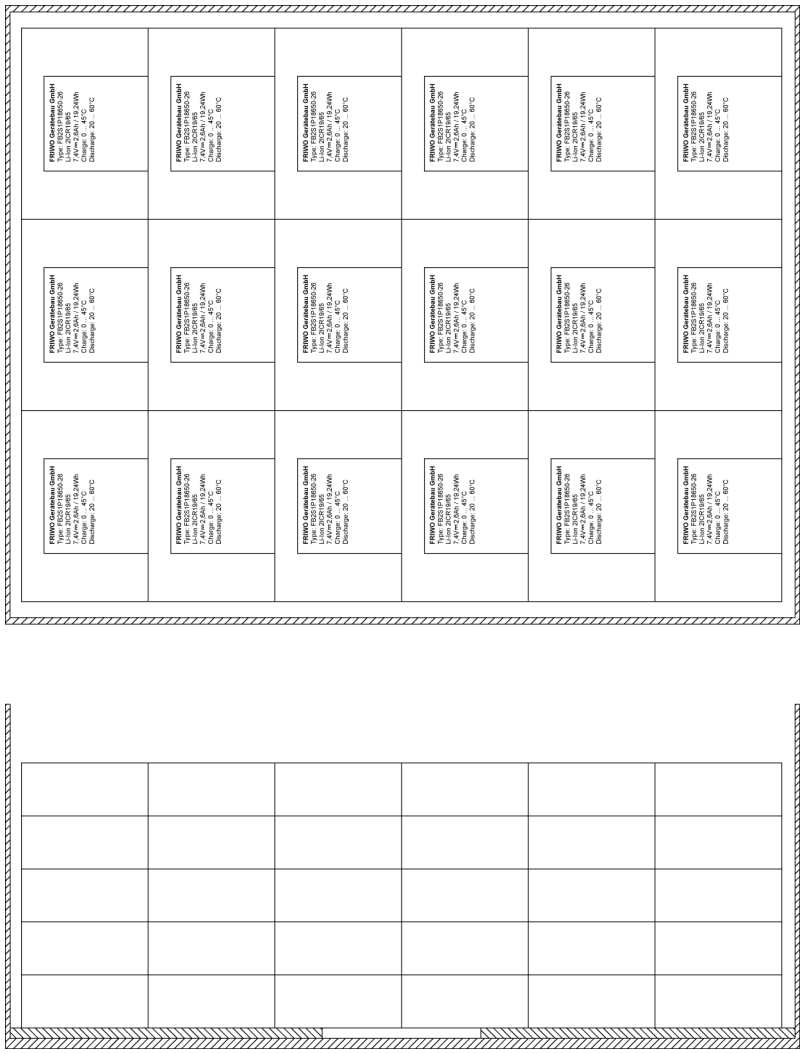
Front view

Bottom view



3.2 Sammelverpackung / bulk packaging: 5000193

3.2.1 Aussenabmessungen / Outer dimensions: 433mm x 317mm x 314mm



3.3 Anzahl der Geräte pro Umkarton / amount of units per master carton: 152

3.4 Gewicht pro Stück / weight per unit: 108 g ⓐ

3.5 Lagertemperatur / storage temperature:

1Jahr / 1 Year: -20°C - +25°C
3 Monate / 3 Month: -20°C - +45°C
1 Monat / 1 Month: -20°C - +60°C
If the cell is kept as ex-factory status (50% of charge), the capacity recovery rate is more than 80%

3.6 Transport Klassifizierung / Transport classification:

UN Class	Class 9
UN number	UN3480, Lithium Ion Battery
Energie des Batteriepacks / Energy of battery	<100Wh

The following caution label should be placed on bulk packaging and overpackage.

4 Allgemeine Prüfbedingungen / General test conditions:

Wenn keine anderen Umgebungsbedingungen angegeben sind, beziehen sich die elektrischen Daten auf eine Temperatur von 25±5°C und eine Luftfeuchtigkeit von 65±20%.

Unless otherwise specified, all electrical data are tested at temperature of 25±5°C and humidity of 65±20%.

5 Elektrische Prüfbedingungen / electrical tests:

5.1 Battery pack

Zellen / cells	Samsung ICR18650-26F
Konfiguration / configuration	2S1P
IEC62133 Bezeichnung /designation	2ICR19/65
Nennspannung / nominal voltage	7.4V
Nennkapazität / nominal capacity	2600mAh (0.2C, 2.75V discharge)
Nennenergie / nominal energy	19.24Wh
Ladespannung / charging voltage	8.4V
Lademodus / charging method	CC-CV (constant voltage with current limit)
Ladestrom / charging current	Standard charge: 1300mA Rapid charge: 2600mA
Maximaler Ladestrom / Max. charge current	2600mA
Maximaler Entladestrom / Max. discharge current	5200mA
Entladeschlussspannung / Discharge cut of voltage	5.5V
Anfänglicher Innenwiderstand / Initial internal impedance	≤200mOhm
Arbeitstemperatur / Operation temperature	Charge: 0 to 45°C Discharge: -20 to 60°C

5.2 Protection circuit

Überladeschutz Abschaltspannung / Overcharge protection voltage	4.25±0.025V (cell)
Überladeschutz Freigabespannung / Overcharge recovery voltage	4.05±0.05V (cell)
Überladeschutz Verzugszeit / over charge protection delay time	1200ms-300ms
Tiefentladeschutz Spannung / over discharge protection voltage	2.40+-0.025V (cell)
Tiefentladeschutz Freigabespannung / over discharge recovery voltage	3.0+-0.08V (cell)
Tiefentladeschutz Verzugszeit / over discharge protection delay time	128ms-39ms
Überstromerkennung / over current protection current	5.0-12.0A
Kurzschlusserkennungzeit / short protection delay time	500us-150us
Stromaufnahme statisch / static self-consumption current	<=10uA
PCB Widerstand / internal resistance	<=60mOhm

6 Sicherheitsanleitung / Safety details:

6.1 Aufbau nach folgenden Normen/ Construction according

Standard	Version	Description
ROHS directive	2002/95/EC	Remove of Hazardous Substances
WEEE directive	2002/96/EC	Waste Electrical and Electronic Equipment
Battery directive	2006/66/EC	Directive on batteries and accumulators and waste batteries and accumators and repealing Directive 91/157/EEC
EN62133 2nd edition	04/2003	Secondary cells and batteries containing alkaline or other non-acid electrolytes – Safety requirements for portable sealed secondary cells, and for batteries made from them, for use in portable applications
UL2054	2004	Household and commercial batteries

6.2 Zulassungen / Approvals

Standard	Test report	Description
UL1642	UL BBCV2.MH21015	UL
UN38.3	UL BA-4786908576-A-1	Transport of dangerous goods, Manual of Tests and Criteria

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6.3 Warnungen / Precautions (Source: IEC62133 Edidtion 2.0 2012-12) Recommendations to equipment manufacturer

a) Do not dismantle, open or shred cells. Batteries should be dismantled only by trained personnel. Multi-cell battery cases should be designed so that they can be opened only with the aid of a tool.

b) Do not short-circuit a cell or battery. Do not store cells or batteries haphazardly in a box or drawer where they may short-circuit each other or be short-circuited by conductive materials.

c) Do not remove a cell or battery from its original packaging until required for use.

d) Do not expose cells or batteries to heat or fire. Avoid storage in direct sunlight.

e) Do not subject cells or batteries to mechanical shock.

f) In the event of a cell leaking, do not allow the liquid to come into contact with the skin or eyes. If contact has been made, wash the affected area with copious amounts of water and seek medical advice.

g) Equipment should be designed to prohibit the incorrect insertion of cells or batteries and should have clear polarity marks. Always observe the polarity marks on the cell, battery and equipment and ensure correct use.

h) Do not mix cells of different manufacture, capacity, size or type within a battery.

i) Seek medical advice immediately if a cell or battery has been swallowed.

j) Consult the cell/battery manufacturer on the maximum number of cells, which may be assembled in a battery and on the safest way in which cells may be connected.

k) A dedicated charger should be provided for each equipment. Complete charging instructions should be provided for all secondary cells and batteries offered for sale.

l) Keep cells and batteries clean and dry.

m) Wipe the cell or battery terminals with a clean dry cloth if they become dirty.

n) Secondary cells and batteries need to be charged before use. Always refer to the cell or battery manufacturer’s instructions and use the correct charging procedure.

o) Do not maintain secondary cells and batteries on charge when not in use.

p) After extended periods of storage, it may be necessary to charge and discharge the cells or batteries several times to obtain maximum performance.

q) Retain the original cell and battery literature for future reference.

r) When disposing of secondary cells or batteries, keep cells or batteries of different electrochemical systems separate from each other.

s) Drop a device containing the battery once from a height of one meter onto a concrete floor. Test three sets of fully charged batteries. For dropping, select the direction in which the free fall is likely to have the greatest impact on the safety of the battery. Instead of dropping a host device, a shock equivalent to dropping may be given to the battery for simulation.

Recommendations to the end-users

a) Do not dismantle, open or shred secondary cells or batteries.

b) Do not expose cells or batteries to heat or fire. Avoid storage in direct sunlight.

c) Do not short-circuit a cell or a battery. Do not store cells or batteries haphazardly in a box or drawer where they may short-circuit each other or be short-circuited by other metal objects.

d) Do not remove a cell or battery from its original packaging until required for use.

e) Do not subject cells or batteries to mechanical shock.

f) In the event of a cell leaking, do not allow the liquid to come in contact with the skin or eyes. If contact has been made, wash the affected area with copious amounts of water and seek medical advice.

g) Do not use any charger other than that specifically provided for use with the equipment.

h) Observe the plus (+) and minus (–) marks on the cell, battery and equipment and ensure correct use.

i) Do not use any cell or battery which is not designed for use with the equipment.

j) Do not mix cells of different manufacture, capacity, size or type within a device.

k) Battery usage by children should be supervised.

l) Seek medical advice immediately if a cell or a battery has been swallowed.

m) Always purchase the battery recommended by the device manufacturer for the equipment.

n) Keep cells and batteries clean and dry.

o) Wipe the cell or battery terminals with a clean dry cloth if they become dirty.

p) Secondary cells and batteries need to be charged before use. Always use the correct charger and refer to the manufacturer’s instructions or equipment manual for proper charging instructions.

q) Do not leave a battery on prolonged charge when not in use.

r) After extended periods of storage, it may be necessary to charge and discharge the cells or batteries several times to obtain maximum performance.

s) Retain the original product literature for future reference.

t) Use only the cell or battery in the application for which it was intended.

u) When possible, remove the battery from the equipment when not in use.

v) Dispose of properly.

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7 Entsorgung

Wir weisen darauf hin, dass diese Batterien (Akku-Packs) im entladenen Zustand bei den Rücknahmestellen abgegeben werden sollen bzw. das Vorsorge gegen Kurzschlüsse getroffen werden muss (z.B. durch das Isolieren der Pole mit Klebestreifen)

Disposal

We advise you that the battery packs have to be discharged before returning to the collection points or it must be taken care against short circuits (eg by isolating the poles with tape).