



Switchmode Li-Ion charger

# MEDICAL

with interchangeable adapter system.

All products conform to IEC 60335-2-29 and to IEC 60601-1.



## FOX30-C MEDICAL LI-ION CHARGER



### Characteristics

- High efficiency
- $\mu$ C controlled battery charger
- 4-step charge control
- Universal input voltage (90-264 VAC)
- Low leakage current  $\leq 100\mu$ A
- IEC 60601-1-2, 4th edition ready
- Wide operating temperature range 0 - 40°C
- Isolation 2x MOPP
- Double housing safety: snapped & welded
- IEC 60601-1-11 ready with IPX2 adapter
- Safety options like OTP, OVP, OCP, SCP, and reverse polarity protection
- Charge indicator by duo LED

## FOX30-C MEDICAL LI-ION CHARGER

FRIWO's medical products are designed for the most sensitive applications and for use under the harshest conditions. They must continue to work perfectly despite falls in the emergency room while protecting patients by offering the lowest possible levels of leakage current. FRIWO develops and manufactures power supply units you can trust.

The  $\mu$ C-controlled charger series with a CCCCCV charging characteristic includes highly efficient chargers for lithium-ion systems. These devices meet the latest US Department of Energy (DoE) efficiency standards for chargers, which have become mandatory since 13 June 2018. In order to ensure maximum patient safety, these medical technology devices are equipped with a 2 x MOPP (Means of Patient Protection) safety system and feature a minimal leakage current as well as double-sealed housings. The FOX-C product line is sustained short-circuit proof and has an overload protection as well as overvoltage and reverse polarity protection. Furthermore the device offers the possibility of battery temperature monitoring.

Another particular highlight of the FOX product family is its interchangeable adapter system with IP42 protection (against drops of water), which is available as an optional accessory. In practice, this means that the devices can be cleaned using wet cloths – an invaluable advantage in sterile environments. FRIWO's additional features make its products easier to use, day in, day out.

### Model Selection: Output Specifications

Cells	Voltage	Current	End-of-charge-voltage	Article no.	FW-Type
3	10.8 V	2000 mA	12.6 V	1960274	FW8103/03/4.2
4	14.4 V	1500 mA	16.8 V	1899125	FW8103/04/4.2

### Input Specifications

Input voltage	100-240 V ±10%
Frequency	50-60 Hz
Input current	460-240 mA

### General Specifications

Operating temperature	0..+40°C
Operating humidity	5..90 %
Operating altitude	3000 m
Storage temperature	-25°C..+70°C
Storage humidity	10..90 %
Non-operating altitude	5000 m (after release)
Atmospheric pressure	70-106kPa

MTBF calculation	200.000 h acc. Mil217F (based on calculations at 120Vac/60Hz & 230Vac/50Hz, ambient 25°C and 100% load)
Housing material	PC-ABS
Dimensions	34x90x55 mm
Weight	230 g
AC input	FRIWO interchangeable mains plug system: see Primary Adapters
DC output	JST connector

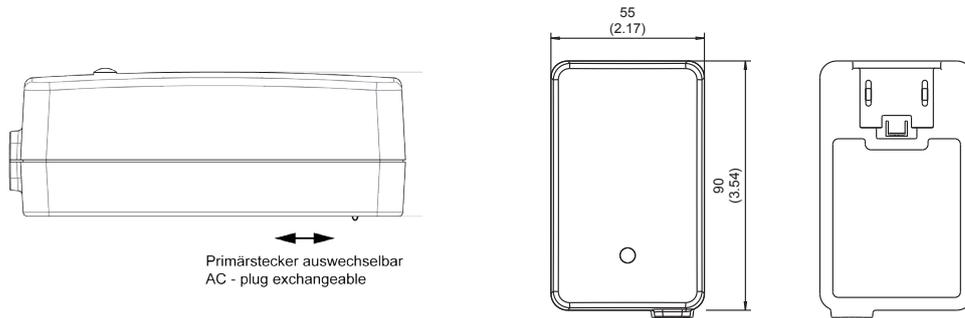
### Safety

Safety standards	IEC/EN/UL60601-1 3.1 Edition
Approbations	Europe, USA
Protection class	II
Isolation	Input - Output 2xMOPP, Input - Ground 1xMOPP
Leakage Current	≤ 100 µA
Flame class	UL 94 V0
IP code	IP40
Overload protection	Yes
Overvoltage protection	Yes
Short circuit protection	Yes

### EMC Compliance

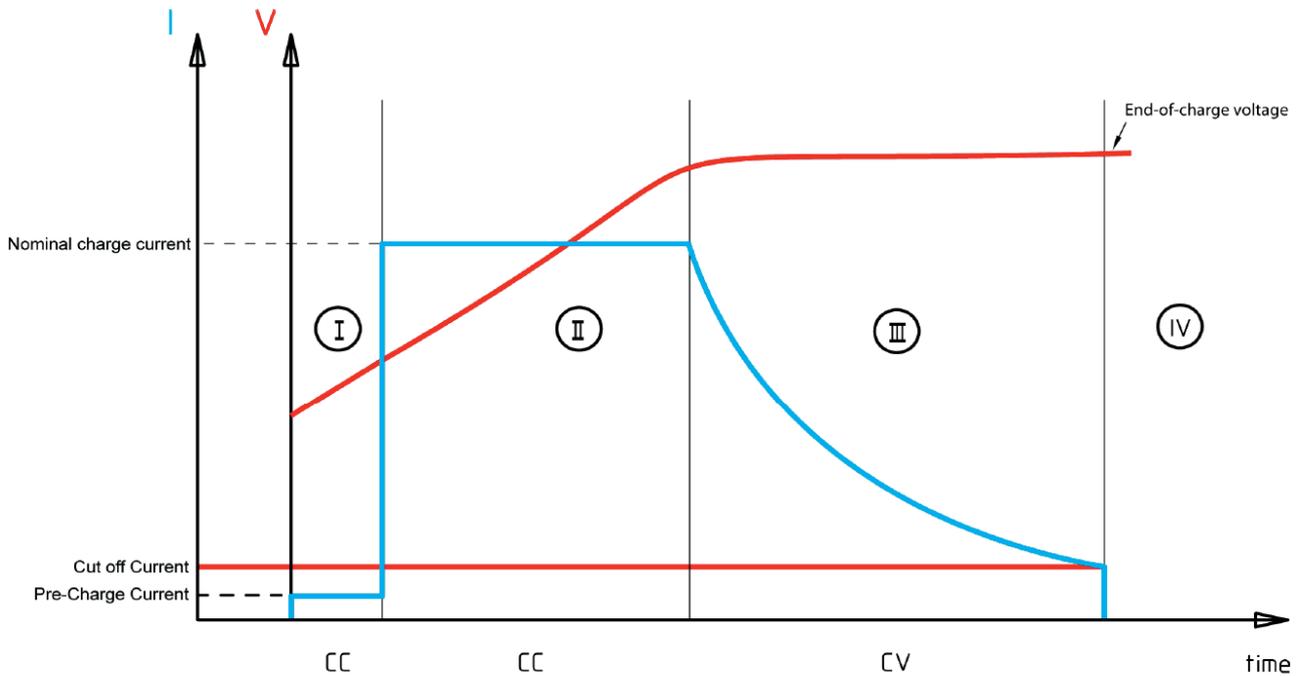
Conducted and radiated Emmissions	EN55032, EN55011, FCC15, Class B, EN60601-1-2, IEC60601-1-2 4th Edition, EN55014-1			
Immunity	EN55014-2, EN60601-1-2, IEC60601-1-2 4th Edition			
Harmonics	EN61000-3-2	Class A		
Flicker noise	EN61000-3-3	Yes		
ESD (contact / air)	EN61000-4-2	8kV / 15kV	Criteria B 100V	Criteria B 240V
Immunity against radiated field	EN61000-4-3	10V/m	Criteria A 100V	Criteria A 240V
ETF / Burst	EN61000-4-4	2kV	Criteria B 100V	Criteria B 240V
Surge	EN61000-4-5	1kV / 2kV	Criteria B 100V	Criteria B 240V
Immunity against conducted disturbances	EN61000-4-6	10V	Criteria A 100V	Criteria A 240V
Voltage dips	EN61000-4-11	0% 0,5 Cycle	Criteria B 100V	Criteria A 240V
		40% 5 Cycle	Criteria B 100V	Criteria B 240V
		70% 25 Cycle	Criteria B 100V	Criteria B 240V
		0% 5s	Criteria B 100V	Criteria B 240V
Immunity against magnetic field	EN61000-4-8	30A/m	Criteria A 100V	Criteria A 240V

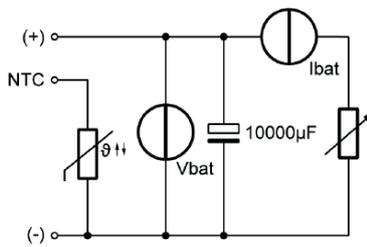
### Mechanical Drawings



Alle Abmessungen in Millimeter (Inch), Abweichung  $\pm 0,5$  (0.02)  
All Dimensions in Millimeter (Inch), Deviation  $\pm 0,5$  (0.02)

### Output Characteristics



Mode	Output voltage:	Output current:	<b>Batterie Ersatzschaltung / Battery equivalent circuit:</b> 
I	Pre charge CC		
	$6V \leq V_{bat} \leq 10V \pm 1\%$	Pre-charge current: 50-150mA	
II	Main charge CC		
	$10V < V_{bat} \leq \text{typ. } 12.4V^*$	Nominal charge current: 2000mA $\pm 10\%$	
III	Main charge CV		
	$\text{typ. } 12.4V < V_{bat} \leq 12.6V \pm 1\%$	Nom. charge current $\geq I_{bat} >$ Cut off current	
IV	Battery full (No Charging)		
	1.) Charging 2.) Connecting $\geq 12.3V$	1.) Cut off current: typ. 210mA 2.) No charging	

\*Voltage level dependent to output lead

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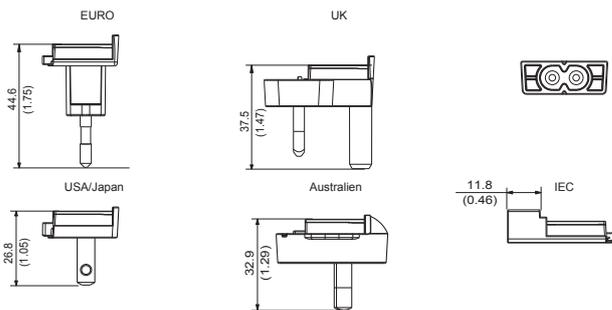
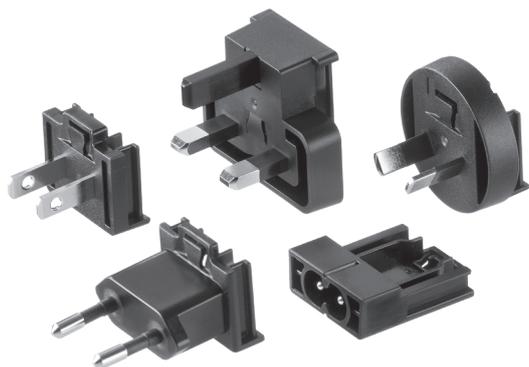


**FRIWO**®

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**Primary Adapters**

**Mechanical Drawings**



Alle Abmessungen in Millimeter (Inch), Abweichung ± 0,5 (0.02)  
 All Dimensions in Millimeter (Inch), Deviation ± 0.5 (0.02)

FOX	IPx0	IPx2	FOX	IPx0	IPx2	FOX	IPx0	IPx2
Country	Article no.	Article no.	Country	Article no.	Article no.	Country	Article no.	Article no.
<b>EURO</b>	<b>1847556</b>	<b>1847618</b>	<b>IEC</b>	<b>1847552</b>	–	<b>IND 2-polig</b>	<b>1847547</b>	–
<b>UK</b>	<b>1847544</b>	<b>1847606</b>	<b>ARG</b>	<b>1847548</b>	–	<b>IND 3-polig</b>	<b>1847546</b>	–
<b>USA / JPN</b>	<b>1847554</b>	<b>1847604</b>	<b>BRA</b>	<b>1847551</b>	<b>1847622</b>	<b>KOR</b>	<b>1847545</b>	–
<b>AUS</b>	<b>1847553</b>	<b>1847624</b>	<b>CHN</b>	<b>1847550</b>	<b>1847620</b>	<b>ZAF</b>	<b>1847549</b>	–