



Switchmode power supply

# MEDICAL

with interchangeable adapter system.  
All products conform to IEC 60601-1.

**FRIWO®**

## FOX30-XM

30 W MEDICAL POWER SUPPLY



### Characteristics

- High efficiency: up to 88%
- Low no load power consumption <100mW
- Meets DoE efficiency level VI
- CoC version 5 ready
- Ultra-low leakage current  $\leq 10\mu\text{A}$
- IEC 60601-1-2, 4th edition ready
- Wide operating temperature range 0 - 45°C
- Isolation 2x MOPP
- Double housing safety: snapped & welded
- IP42 approved interchangeable plug system as additional accessories
- Also available as version with fixed plugs: FOX30-FM

## FOX30-XM 30 W MEDICAL POWER SUPPLY

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. In order to ensure maximum patient safety, FRIWO medical technology devices are equipped with its 2 x MOPP (Means of Patient Protection) safety system and feature a minimal leakage current of  $\leq 10\mu\text{A}$  as well as double-sealed housings.

The power supply will operate at universal input voltage range of 90Vac to 264Vac in a wide temperature range of 0-45°C without derating. In addition to patient safety, efficiency plays a major role: with low standby losses of 80mW and high efficiency rates the medical FOX line complies with the demanding US efficiency standard DOE (Department of Energy) and its European counterpart ErP (Energy related Products)

Another particular highlight of the FOX product family is its interchangeable adapter system with IP42 protection (against drops of water and dampness), 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

Article no.	FW Type	Voltage	Current	Power	Ripple voltage*	Efficiency (typ)	No-Load Power
1898160	FW8030M/5	5 V	5000 mA	25 W	150 mV pp	84,5%	<80mW
1898161	FW8030M/6	5.9 V	4200 mA	24.78 W	150 mV pp	85,0%	<90mW
1898162	FW8030M/8	7.5 V	4000 mA	30 W	150 mV pp	87,0%	<70mW
1898163	FW8030M/9	9 V	3300 mA	29.7 W	120 mV pp	87,2%	<80mW
1898164	FW8030M/12	12 V	2500 mA	30 W	120 mV pp	87,0%	<90mW
1898165	FW8030M/15	15 V	2000 mA	30 W	150 mV pp	87,5%	<100mW
1898166	FW8030M/18	18 V	1670 mA	30.06 W	180 mV pp	88,1%	<100mW
1898167	FW8030M/24	24 V	1250 mA	30 W	180 mV pp	87,8%	<100mW
1898168	FW8030M/48	48 V	625 mA	30 W	300 mV pp	87,5%	<100mW

\* Ripple measured with 20MHz Bandwidth Oscilloscope and 0.1uF/50V ceramic capacitor and 10uF/50V aluminum electrolytic capacitor across the output terminal.

Input Specifications

Input voltage	100-240 V ±10%
Frequency	50-60 Hz
Input current	600-300 mA
Inrush current (@240V)	< 50 A

General Specifications

Operating temperature	0..+45°C
Operating humidity	10..95 %
Operating altitude	3000 m
Storage temperature	-40°C..+70°C
Storage humidity	10..95 %
Non-operating altitude	3000 m
Atmospheric pressure	70-106kPa
Output voltage tolerance	±5 %
Line regulation	±1 %
Load regulation	±4 %
Turn-on delay	≤2 s
Hold-up time	>10 ms (120 V) >50 ms (230 V)
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	90x55x34 mm
Weight	187 g
AC input	FRIWO interchangeable mains plug system: see Primary Adapters
DC output	FRIWO Universal output plug system: see Secondary Adapters

Safety

Safety standards	IEC/EN/UL60601-1 3.1 Edition
Approbations	Europe, USA, Australia, Japan
Protection class	II
Isolation	Input - Output 2xMOPP, Input - Ground 1xMOPP
Leakage Current	≤ 10 µA
Flame class	UL 94 V0
IP code	IP40 (IP42 adapters optionally available)
Overload protection	Yes
Overvoltage protection	Yes
Short circuit protection	Yes

EMC Compliance

Conducted and radiated Emmisions	EN55022, EN55011, FCC15, Class B, EN60601-1-2			
Immunity	EN55024, EN60601-1-2			
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	2kV / 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 A 240V
		70%   25 Cycle	Criteria B 100V	Criteria A 240V
		0%    5s	Criteria B 100V	Criteria B 240V
Immunity against magnetic field	EN61000-4-8	30A/m	Criteria A 100V	Criteria A 240V



### Drop Test

Standard

IEC 60068-2-32

Surface

Steel

Drop height

1 m

Numbers of Drops (total)

3

### Vibration

Standard

IEC 60068-2-6

Frequency range

10 – 500 Hz

Cross-over-frequency

58 – 62 Hz

Displacement amplitude

0.2 mm

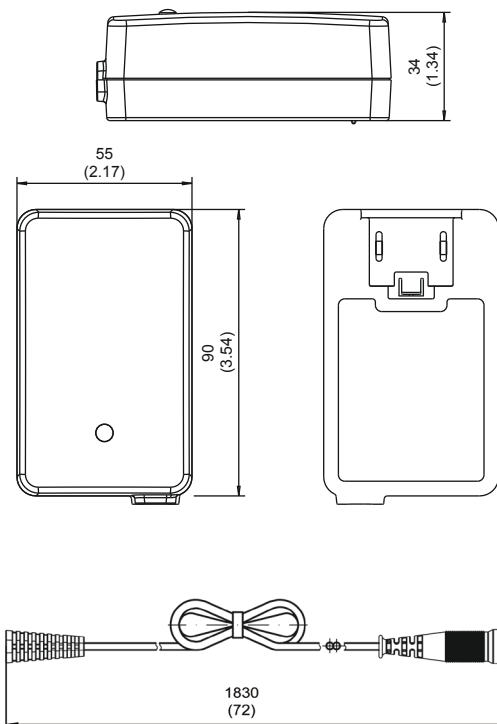
Peak acceleration

3 g

Number of cycles

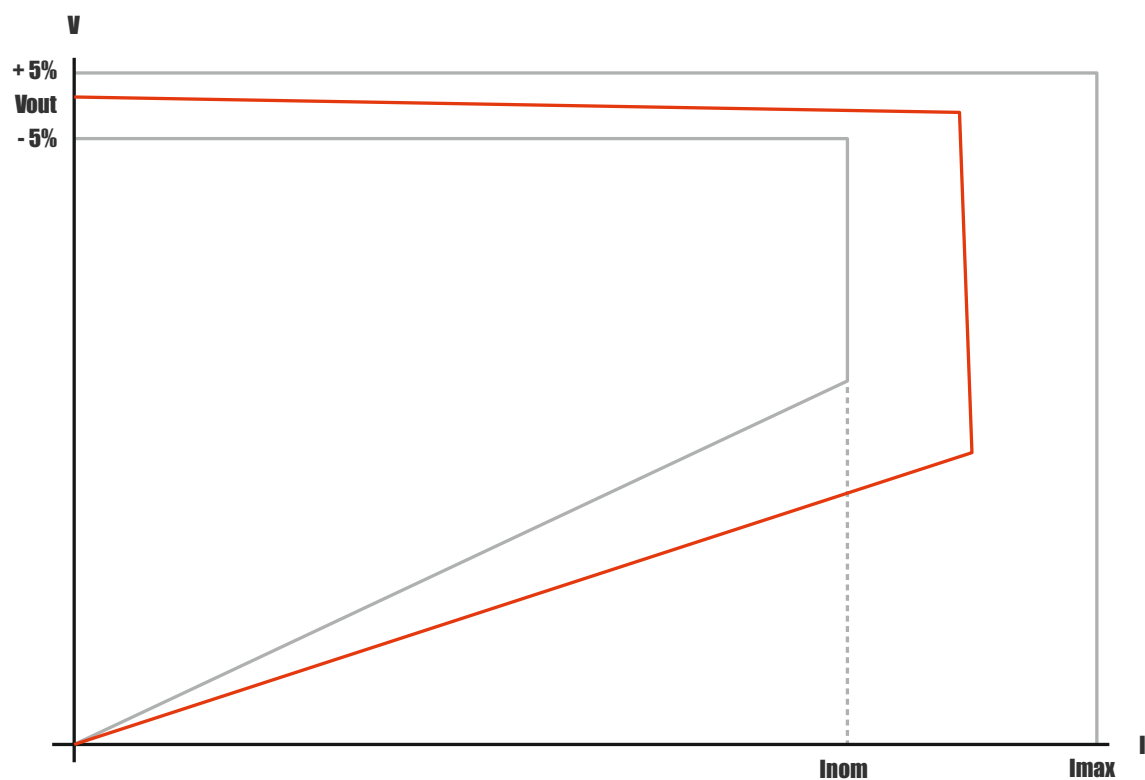
10 per axis

### Mechanical Drawings



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

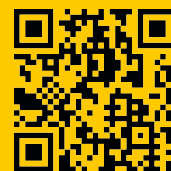
### Output Characteristics





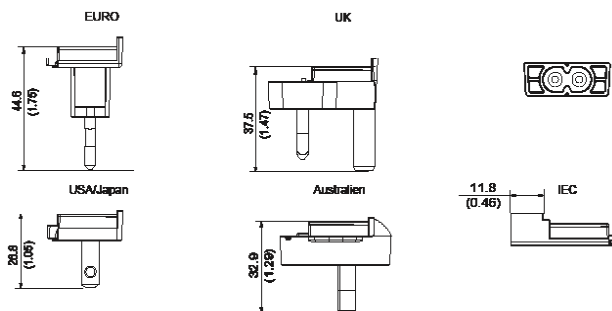
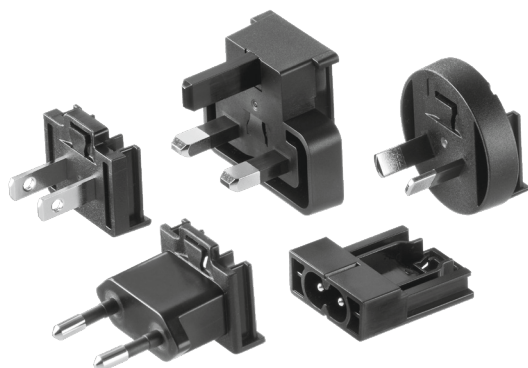
FRIWO Gerätebau GmbH  
Von-Liebig-Straße 11 · 48346 Ostbevern · Germany  
Tel. +49 2532 81-0 · [www.friwo.com](http://www.friwo.com)

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## Primary Adapters

## Mechanical Drawings



Alle Abmessungen in Millimeter (Inch), Abweichung  $\pm 0,5$  (0.02)  
All Dimensions in Millimeter (Inch), Deviation  $\pm 0,5$  (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.
EURO	1847556	1847618	IEC	1847552	–	IND 2-polig	1847547	–
UK	1847544	1847606	ARG	1847548	–	IND 3-polig	1847546	–
USA / JPN	1847554	1847604	BRA	1847551	–	KOR	1847545	–
AUS	1847553	1847624	CHN	1847550	–	ZAF	1847549	–

## Secondary Adapters

Straight coaxial connectors				Angled coaxial connectors				Straight jack connectors			Connectors / Sockets	
Ø out.	Ø in.	Length mm	Article no.	Ø out.	Ø in.	Length mm	Article no.	Ø out.	Length mm	Article no.	Model	Article no.
3.5	1.3	9.5	1807699	3.5	1.3	9.5	1822478	2.5	13	1807704	Texas connector	
4.0	1.7	9.5	1822557	4.0	1.7	9.5	1822558	3.5	14	1807705	Straight texas connector	1807706
4.0	1.7	11.0	1811994	4.0	1.7	11.0	1822482				Angled texas connector	1822486
4.8	1.7	9.5	1822559	4.8	1.7	9.5	1822560	Angled jack connectors			Texas sockets 2-pin	
5.5	2.1	9.5	1807700	5.5	2.1	9.5	1822479				Snap-in type	1323938
5.5	2.1	11.5	1807701	5.5	2.1	11.5	1822480	Ø out.	Length mm	Article no.	PCB type	1321609
5.5	2.1	14.0	1807697	5.5	2.1	14.0	1822476	2.5	13	1822484		
5.5	2.5	9.5	1807698	5.5	2.5	9.5	1822477	3.5	14	1822485	Texas sockets 3-pin	
5.5	2.5	11.5	1807702	5.5	2.5	11.5	1822481				Snap-in type	1327259
5.5	3.3	9.5	1822561	5.5	3.3	9.5	1822562				PCB type	1363506
DIN 45323			1807703	DIN 45323			1822483					