Switchmode power supply

MEDICAL

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

FRIWO®

FOX6-XM 6 W MEDICAL POWER SUPPLY



Characteristics

- High efficiency: up to 81.6%
- Low no load power consumption <95mW
- Meets DoE efficiency level VI
- CoC version 5 Tier 2
- Ultra-low leakage current ≤10µA
- 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
- IEC 6060-1-11 ready with IPX2 adapter

FOX6-XM 6 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 ≤ 10 µA as well as double-sealed housings.

The power supply will operate at universal input range of 90V 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 50mW 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
1960496	FW8002.1M/5	5V	1400mA	7,00 W	180 mV pp	76,4%	<75mW
1960497	FW8002.1M/6	5,9V	1200mA	7,08 W	150 mV pp	76,4%	<75mW
1960498	FW8002.1M/8	7,5V	800mA	6,00 W	150 mV pp	76,4%	<75mW
1960499	FW8002.1M/9	9V	800mA	7,20 W	150 mV pp	80,2%	<75mW
1960500	FW8002.1M/12	12V	600mA	7,20 W	200 mV pp	80,2%	<75mW
1960501	FW8002.1M/15	15V	500mA	7,50 W	180 mV pp	80,4%	<75mW
1960502	FW8002.1M/18	18V	400mA	7,20 W	180 mV pp	80,2%	<75mW
1960503	FW8002.1M/24	24V	300mA	7,20 W	240 mV pp	80,2%	<75mW

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

FOX6-XM

6 W MEDICAL POWER SUPPLY

Input Specifications

Input voltage	100-240 V ±10%
Frequency	50-60 Hz
Input current	160-80 mA
Inrush current (@240V)	<35A

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 %
Atmospheric pressure	70-106kPa
Output voltage tolerance	±5 %
Line regulation	±1 %
Load regulation	±4 %
Turn-on delay	≤2 s
Hold-up time	>5ms (120V) >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	58,0x31,5x41,0mm
Weight	112 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 ciruit protection	Yes

EMC Compliance

Conducted and radiated Emmisions	EN55032, 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	1kV / 2kV		Criteria B 100V	Criteria B 240V
Immunity against conducted disturbances	EEN61000-4-6	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

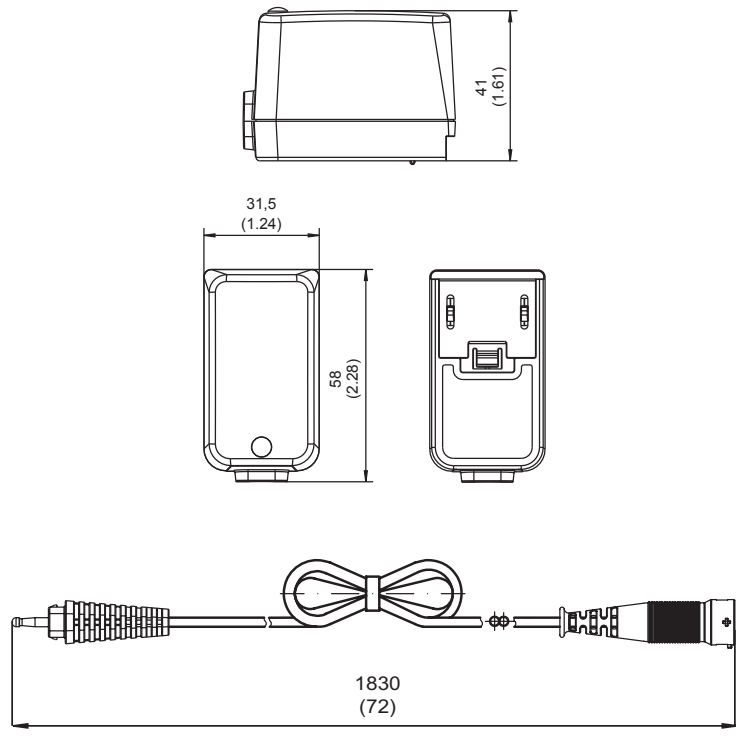
Drop Test

Standard	IEC 60068-2-32
Surface	Steel
Drop height	1 m
Numbers of Drops (total)	3

Vibration

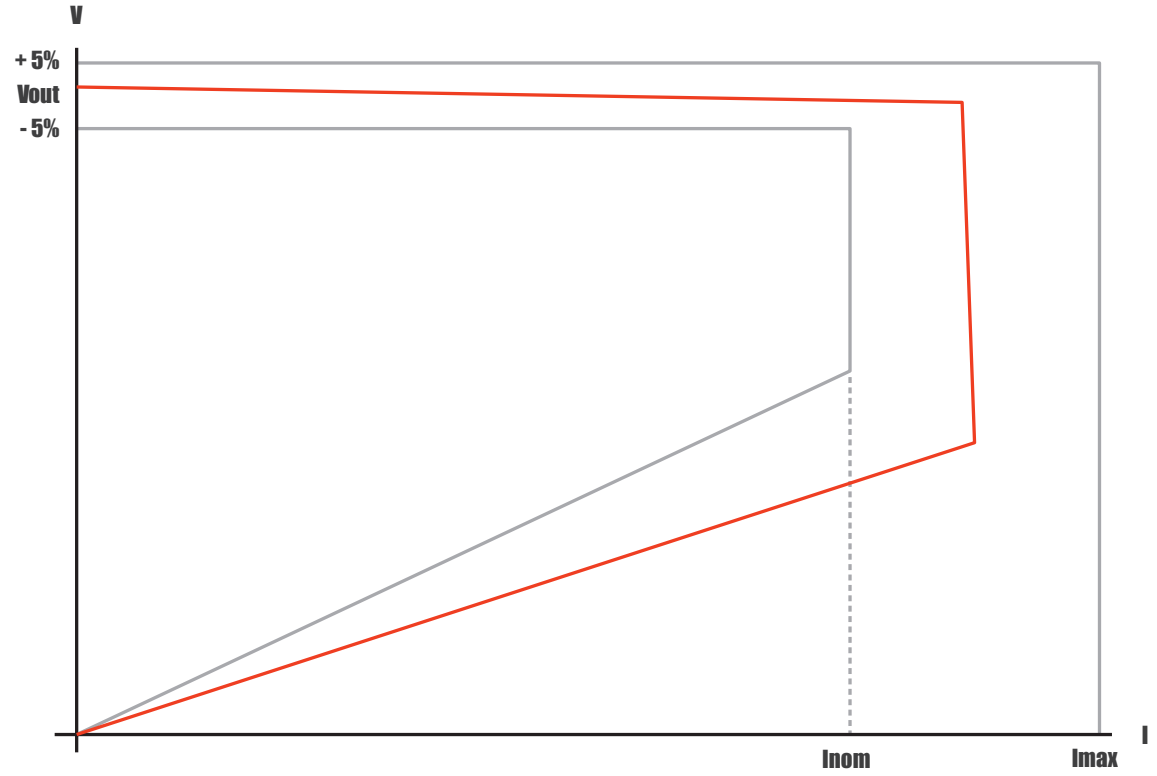
Standard	IEC 60068-2-6
Frequency range	10 – 500 Hz
Cross-over-frequency	58 – 62 Hz
Displacement amplitude	0.2 mm
Peak acceleration	3 g
Number of cycles	10 per axis

Mechanical Drawings



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

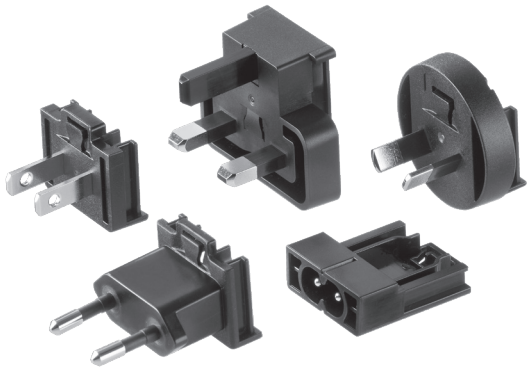
Output Characteristics



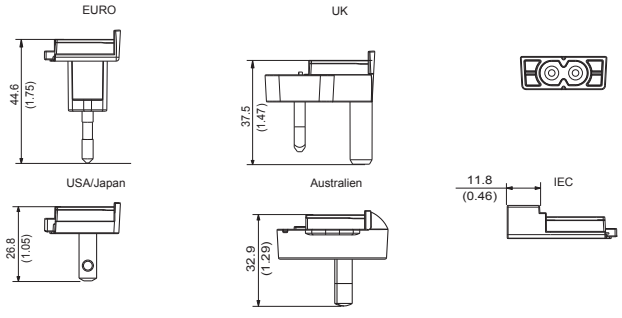
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Primary Adapters



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.
EURO	1847556	1847618	IEC	1847552	–	IND 2-polig	1847547	–
UK	1847544	1847606	ARG	1847548	–	IND 3-polig	1847546	–
USA / JPN	1847554	1847604	BRA	1847551	1847622	KOR	1847545	–
AUS	1847553	1847624	CHN	1847550	1874620	ZAF	1847549	–

Secondary Adapters

Straight coaxial connectors

Ø out.	Ø in.	Length mm	Article no.
3.5	1.3	9.5	1807699
4.0	1.7	9.5	1822557
4.0	1.7	11.0	1811994
4.8	1.7	9.5	1822559
5.5	2.1	9.5	1807700
5.5	2.1	11.5	1807701
5.5	2.1	14.0	1807697
5.5	2.5	9.5	1807698
5.5	2.5	11.5	1807702
5.5	3.3	9.5	1822561
DIN 45323			1807703

Angled coaxial connectors

Ø out.	Ø in.	Length mm	Article no.
3.5	1.3	9.5	1822478
4.0	1.7	9.5	1822558
4.0	1.7	11.0	1822482
4.8	1.7	9.5	1822560
5.5	2.1	9.5	1822479
5.5	2.1	11.5	1822480
5.5	2.1	14.0	1822476
5.5	2.5	9.5	1822477
5.5	2.5	11.5	1822481
5.5	3.3	9.5	1822562
DIN 45323			1822483

Straight jack connectors

Ø out.	Length mm	Article no.
2.5	13	1807704
3.5	14	1807705

Angled jack connectors

Ø out.	Length mm	Article no.
2.5	13	1822484
3.5	14	1822485

Connectors / Sockets

Model	Article no.
Texas connector	
Straight texas connector	1807706
Angled texas connector	1822486
Texas sockets 2-pin	
Snap-in type	1323938
PCB type	1321609
Texas sockets 3-pin	
Snap-in type	1327259
PCB type	1363506