480W AC to DC Power Supply DIN Rail Mount

RoHS Compliant

Features

- Universal 85 - 277V AC or 120 - 390V DC Input voltage
- Operating ambient temperature range: -40°C to +85°C, 60°C @ 100% load without derating
- Efficiency up to 95%
- Active PFC, PF>0.97
- DC OK function
- Double-sided conformal coating, salt-spray proof, explosion-proof
- Operating altitude up to 5000m
- Input under-voltage protection
- Output short circuit, over-current, over-voltage, over-temperature protection
- Safety according to ATEX, IECEx increased safety type explosion-proof certification
- 5 years warranty
- Safety according to ANSI/ISA 71.04-2013 G3
- OVC III (Safety according to EN61010)
- Safety according to IEC/UL62368, UL508

MPIMF480-23Bxx is explosion-proof Din-rail power supply featuring with high performance, high reliability, high efficiency. Up to 95% efficiency can greatly improve power supply reliability and service life. It can work at ambient temperature of -40°C to +85°C without adding a fan for heat dissipation. With good EMC performance and compliant with international standards of IEC/UL62368, UL508 for EMC and safety. They are widely used in wind power industry, DCS, industrial control equipment, machine control, LED, 5G communication and other fields.

Selection Guide

Part Number	Output Power (W)	Nominal Output Voltage and Current (Vo/Io)	Output Voltage Adjustable Range (V)	Efficiency at 400V AC (%) Typ.	Max. Capacitive Load (μF)
MPIMF480-23B24	480	24V/20A	24-28	95	100000
MPIMF480-23B48		48V/10A	48-56	95.5	25000
Note: * When the output voltage rises, the total power of the product should not exceed the rated power.					

Input Specifications

Item	Operating Conditions		Min.	Typ.	Max.	Unit
Input Voltage Range	Rated input (Certified voltage)		100		240	V AC
	AC input		85		277	
	DC input		120		390	V DC
Maximum Input Voltage	Lasts for 2h without damage		-		305	V AC
Input Voltage Frequency			47		63	Hz
Input Switching Voltage			60	--	70	V AC
Input Turn-off Voltage			75		85	
Input Current	115V AC		--		5	A
	230V AC				2.5	
Inrush Current	115V AC	Cold start			15	A^2s
	230V AC				35	

Item	Operating Conditions			Min.	Typ.	Max.	Unit
Inrush Current Integral (I^2t)	115V AC		Cold start	--	0.2	--	A^2s
	230V AC				0.8		
Power Factor	Rated load	115V AC		0.99	--	--	--
		230V AC		0.97		--	
THD	230V AC, rated load			--	2	--	%
Start-up Delay Time	115V AC/230V AC, rated load				400		ms
Rise Time					25		
Input Fuse	Built-in fuse				8		A
DC OK Signal	Resistive load			30V DC/1A Max.			
Hot Plug				Unavailable			

Output Specifications

Item	Operating Conditions		Min.	Typ.	Max.	Unit
Output Voltage Accuracy	Full load range		--	±1	-	%
Line Regulation	Rated load			±0.25		
Load Regulation	0%-100% load			±0.5		
Power Consumption*	230V AC, rated load	24V		24		W
		48V		21.6		
Ripple & Noise*	20MHz bandwidth (peak-to-peak value)	24V		--	100	mV
		48V			150	
Hold-up Time	115V AC/230V AC			22	--	ms
DC OK Relay	Operation voltage	24V		21.6		V
		48V		43.2		
	Release voltage	24V		19.2		
		48V		38.4		
Short Circuit Protection	Constant current		115	125	140	%
Over-current Protection	115V AC/230V AC		110% - 140% Io (typ. 125%Io, constant current, self-recover)			
Over-voltage Protection	24V		≤32V DC (Hiccup, self-recover)			
	48V		≤60V DC (Hiccup, self-recover)			
Over-temperature Protection*	230V AC, rated load	Over-temperature protection start	--	--	95	°C
		Over-temperature protection release	60	--	--	

Note:
1. * Power consumption curve, over-current protection mode and short circuit protection mode see product characteristic curve;
2. * The “Tip and barrel method” is used for ripple and noise test, output parallel 47uF electrolytic capacitor and 0.1uF ceramic capacitor, please refer to Enclosed Switching Power Supply Application Notes for specific information;
3. * Over-temperature protection: Put the product into a high temperature box. After the ambient temperature stabilizes, increase the temperature slightly (3°C to 54°C), and the load remains unchanged. After the product reaches thermal equilibrium, increase the temperature until the product triggers over-temperature protection.

General Specifications

Item		Operating Conditions		Min.	Typ.	Max.	Unit
Isolation Test*	Input - ⏚	Electric strength test for 1min., leakage current <5mA		2500			V AC
	Input - output	Electric strength test for 1min., leakage current <10mA		4000			
	Output - ⏚	Electric strength test for 1min., leakage current <5mA		1500		--	
Insulation Resistance	Input - ⏚	Environment temperature: 25±5°C Relative humidity: <95%, non-condensing Test voltage: 500V DC		500			MΩ
	Input - output						
	Output - ⏚						
Operating Temperature				-40		+85	°C
Storage Temperature				-40		+85	
Operating Humidity		Non-condensing		10		95	%RH
Storage Humidity				20	--	90	
Switching Frequency		PFC		58		77	kHz
		DC-DC		40		130	
Power Derating		Operating temperature derating @AC input	+40°C to +30°C	2			%/°C
			+30°C to +60°C	0			
			+60°C to +80°C	3.75			
		Operating temperature derating @DC input	+40°C to +30°C	2			
			+30°C to +60°C	0			
			+60°C to +80°C	2			
		Input voltage derating	85V AC - 100V AC	1			%/V AC
			100V AC - 277V AC	0			
			120V DC - 140V DC	1			
			140V DC - 390V DC	0			
Leakage Current		240V AC		<1.5mA			
Safety Standard				UL61010-1 safety approved & EN62368-1 (Report) Design refer to IEC/UL62368-1, UL508			
Safety Class				CLASS I, ANSI/ISA71.04-2013			
MTBF		MIL-HDBK-217F@25°C		>702,000h			
		MIL-HDBK-217F@40°C		>504,000h			
Warranty		Ambient temperature: <40°C		5 years			
High and Low Voltage Crossing		Test with Mornsun P/N: LUPS20-24F-N-UNT		NB/T 31111-2017			

Note: 1.* 1 Remove the screw at the mark when the product is subjected to withstand voltage test; 2 The gas discharge tube built into the device effectively protects the power supply against damage by asymmetric disturbance variables (eg EN 61000-4-5). Each power supply continuous withstand voltage test will cause extremely high load to the power supply. Therefore, unnecessary loading or damage to the power supply due to excessive test voltage should be avoided. If necessary, disconnect the gas discharge tube built into the device to use a higher test voltage. After successful completion of the test, reconnect the gas discharge tube. Please refer to the installation diagram below for specific operation methods;

2. * The power supply has two converters with two different switching frequencies.

Environmental Characteristics		
Item	Operating Conditions	Standard
High and Low Temperature Working	+85°C, -40°C	GB2423.1, IEC60068-2-1
Sinusoidal Vibration	10 - 500Hz, 2g, three directions of X, Y, Z axis	GB2423.10, IEC60068-2-6
Salt Mist	+35°C, 5%NACL, 48h	GB2423.17, IEC60068-2-11
Alternating Hot and Humid	+25°C, 95%RH - +60°C, 95%RH	GB2423.4, IEC60068-2-30
Low Temperature Storage	-40°C	GB2423.1, IEC60068-2-1
High Temperature Storage	+85°C	GB2423.2, IEC60068-2-2
High Temperature Aging	+60°C	GB2423.2, IEC60068-2-2
Normal Temperature Aging	+25°C	GB2423.1, IEC60068-2-1
Temperature Shock	-40°C to +85°C	GB2423.22, IEC60068-2-14
Temperature Cycle	-25°C to +60°C	GB2423.22, IEC60068-2-14
Hot and Humid	+85°C, 85%RH	GB2423.50, IEC60068-2-67
High Temperature Elevation	+60°C, 54KPa	GB2423.26, IEC60068-2-41
Low Temperature Elevation	-25°C, 54KPa	GB2423.25, IEC60068-2-40
Constant Humid and Hot	+40°C, 95%RH	GB2423.3, IEC60068-2-78
Random Vibration	5 - 10Hz, ASD 0.3 - 10g²/Hz, three directions of X, Y, Z axis	GB/T 4798.2-2008, IEC60721-3-2
Sinusoidal Vibration Response	10 - 150Hz, 1g, three directions of X, Y, Z axis	GB/T 11287-2000, IEC60255-21-1
Sinusoidal Vibration Endurance Test		
Sinusoidal Impulse Response	15g, pulse duration 11ms, three times in each direction of X, Y, Z axis	GB/T 114537-1993, IEC60255-21-2
Sinusoidal Impact Endurance Test		
Packaging Drop	1m, one corner, three edges and six sides	GB2423.8, IEC68-2-32

Mechanical Specifications	
Case Material	Metal (AL5052, SUS304)
Dimensions	124mm × 55mm × 127mm
Weight	985g (Typ.)
Cooling Method	Free air convection

Electromagnetic Compatibility (EMC)

EMC	Item	Standard	Range	Judge
Emissions	CE (Input port)	CISPR32 EN55032	150K - 30MHz	CLASS B
	CE (Output port)	CISPR32 EN55032	150K - 30MHz	CLASS A
	RE	CISPR32 EN55032	30MHz - 2GHz	CLASS B
	Harmonic current	IEC/EN61000-3-2		CLASS A and CLASS D
	Voltage flicker	EN61000-3-3		Fulfilled
Immunity	ESD	IEC/EN61000-4-2	Contact ±8KV/Air ±15KV	perf. Criteria A
	RS	IEC/EN61000-4-3	20V/m	
	EFT (Input port)	IEC/EN61000-4-4	±4KV	
	EFT (Output port)	IEC/EN61000-4-4	±2kv	
	Surge (Input port)	IEC/EN61000-4-5	L to N ±3KV/L or N to PE ±6KV	
	Surge (Output port)	IEC/EN61000-4-5	line to line ±1KV/line to ground ±2KV	
	CS	IEC/EN61000-4-6	0.15 - 80MHz 20Vr.m.s	
	AC power port harmonics	IEC61000-4-13	CLASS 3	
	Harmonic and network signal			
	Low frequency immunity			
	PFMF	IEC/EN61000-4-8	30A/m	
	Voltage dips, short interruptions and voltage variations immu	IEC/EN61000-4-11	0% of 100V AC, 0V AC, 20ms	perf. Criteria A
			40% of 100V AC, 40V AC, 200ms	perf. Criteria C
			70% of 100V AC, 70V AC, 500ms	perf. Criteria A
			0% of 200V AC, 0V AC, 20ms	perf. Criteria A
			40% of 200V AC, 80V AC, 200ms	perf. Criteria A
			70% of 200V AC, 140V AC, 500ms	perf. Criteria A
	Voltage interruption	IEC/EN61000-4-11	0% of 200V AC, 0V AC, 5000ms	perf. Criteria C

Note:* perf. Criteria:
A: The equipment shall continue to operate as intended without operator intervention;
B: After the test, the equipment shall continue to operate as intended without operator intervention;
C: Loss of function is allowed, provided the function is self-recoverable, or can be restored by the operation of the controls by the user in accordance with the manufacturer's instructions.

Product Characteristic Curve

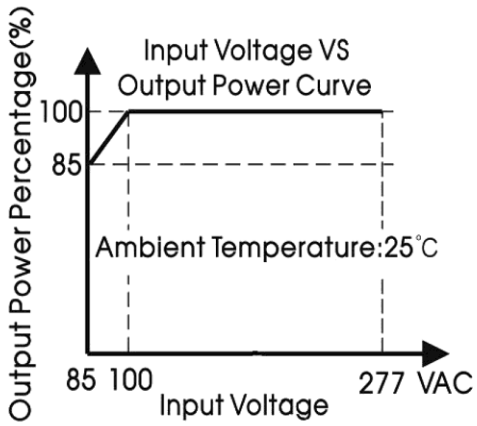


Figure 1

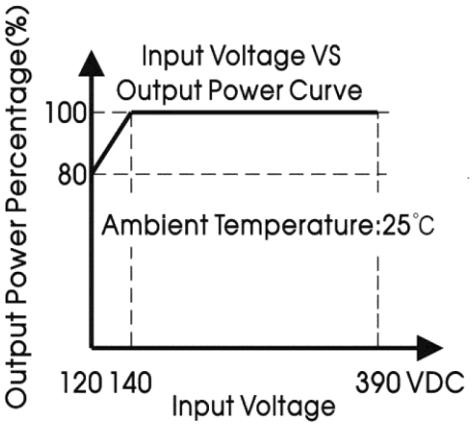


Figure 2

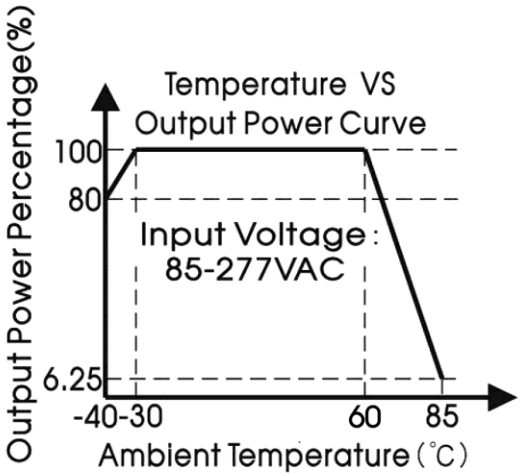


Figure 3

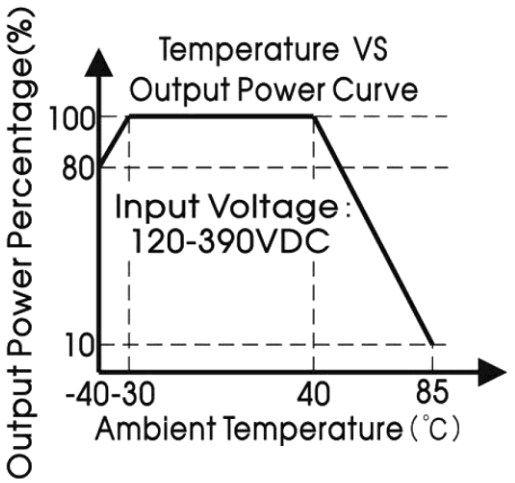


Figure 4

Over-current/ Short circuit protection curve (Typ.)

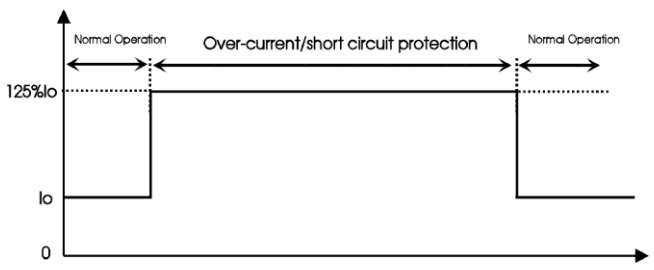


Figure 5

DC OK behavior curve (Typ.)

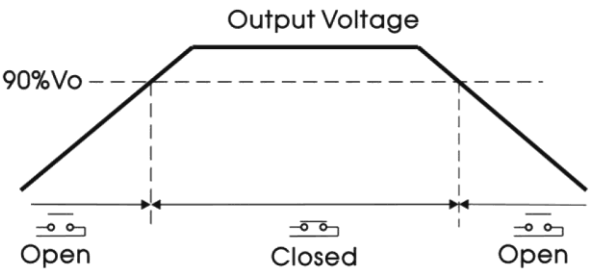


Figure 6

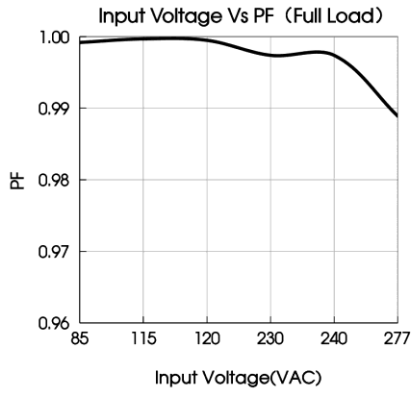


Figure 7

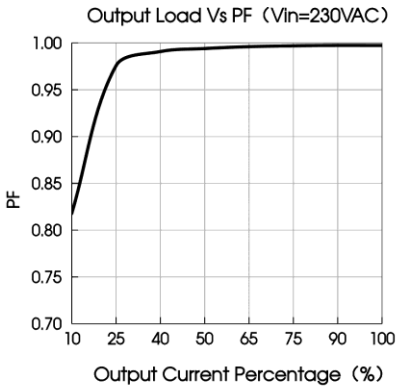


Figure 8

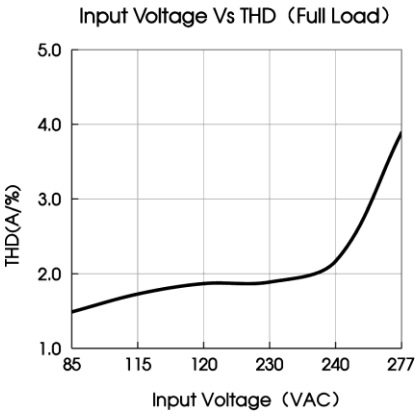


Figure 9

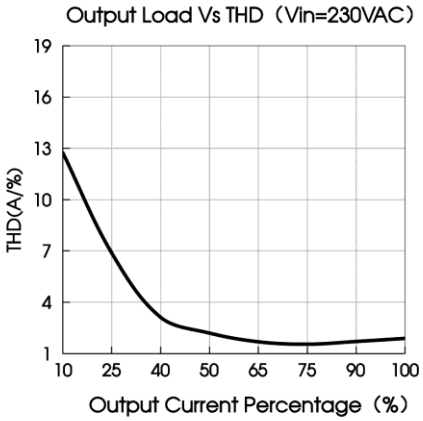


Figure 10

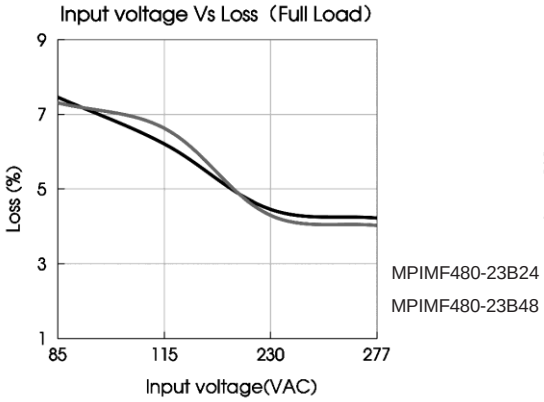


Figure 11

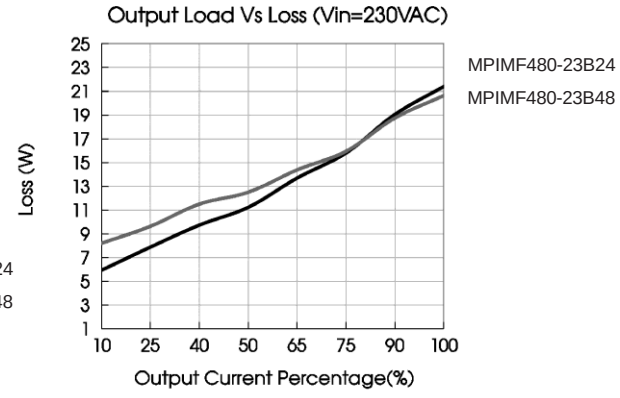


Figure 12

Note: 1. All curves are for 24V output, measured at input 230VAC, 50Hz, output Io, ambient temperature 25°C, unless otherwise stated;

2. With an AC input voltage between 85-100V AC and a DC input between120-140V DC the output power must be derated as per the temperature derating curves;

3. This product is suitable for applications using natural air cooling; for applications in closed environment.

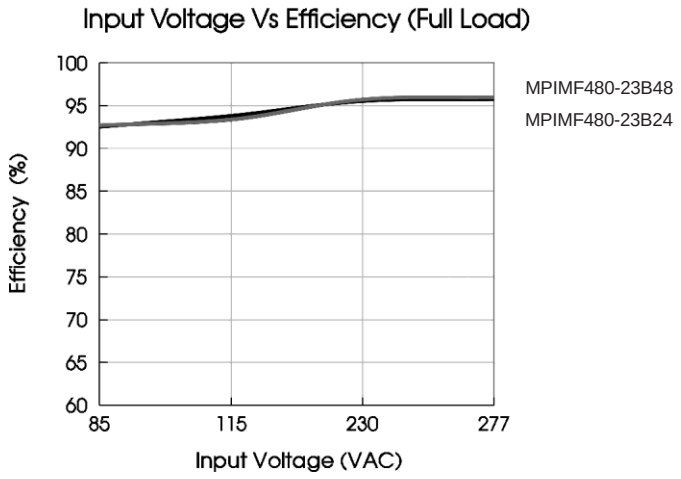


Figure 13

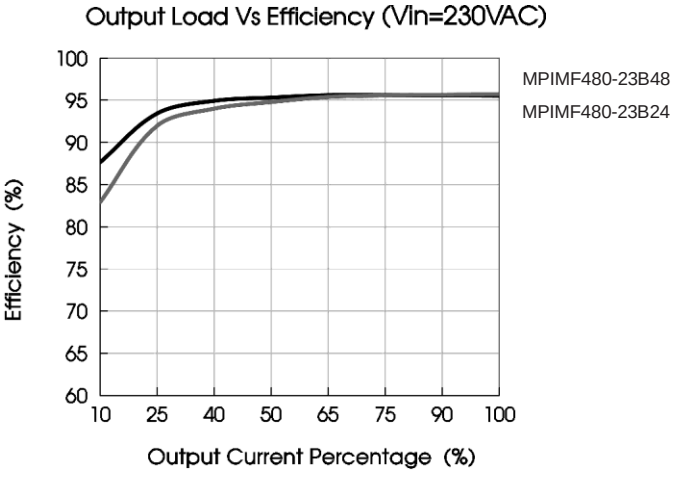
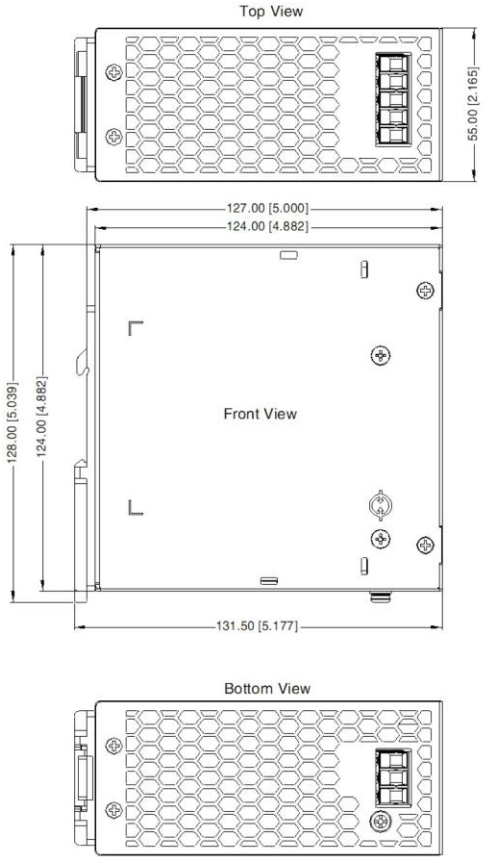
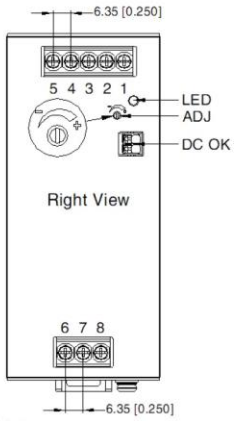


Figure 14

Dimensions and Recommended Layout





Pin–Out	
Pin	Mark
1	–Vo
2	–Vo
3	–Vo
4	+Vo
5	+Vo
6	AC(N)
7	AC(L)
8	⏚

Note:
Unit: mm[inch]
LED: Output status indicator LED
ADJ: Output adjustable resistor
Wire range: Input: 16–10AWG(12–10AWG for Pin8)
Output: 24V: 12–10AWG
48V: 16–10AWG
DC–OK: 24–16AWG
Tightening torque: Max 0.5 N.m
Mounting rail: TS35
General tolerances: ± 1.00[± 0.039]

WARNING Risk of electrical shock, fire, personal injury or death:
AVERTISSEMENT AVERTISSEMENT Risque de choc électrique, d'incendie, de blessures corporelles ou de décès :

1. Do not use the power supply without proper grounding (Protective Earth). Use the terminal on the input block for earth connection and not one of the screws on the housing; N'utilisez pas l'alimentation électrique sans mise à la terre appropriée (Terre protectrice). Utilisez le terminal sur le bloc d'entrée pour la connexion terrestre et non pas une des vis sur le boîtier;
2. Turn power off before working on the device, protect against inadvertent re-powering;
   Éteignez l'alimentation avant de travailler sur l'appareil, protégez-vous contre la réénergisation accidentelle;
3. Make sure that the wiring is correct by following all local and national codes;
   Assurez-vous que le câblage est correct en suivant tous les codes locaux et nationaux;
4. Do not modify or repair the unit;
   Ne modifiez pas ou ne réparez pas l'appareil;
5. Do not open the unit as high voltages are present inside;
   Ne modifiez pas ou ne réparez pas l'appareil;
6. Use caution to prevent any foreign objects from entering the housing;
   Faire preuve de prudence pour empêcher les objets étrangers d'entrer dans le logement;
7. Do not use in wet locations or in areas where moisture or condensation can be expected;
   Faire preuve de prudence pour empêcher les objets étrangers d'entrer dans le logement;
8. Do not touch during power-on, and immediately after power-off, hot surfaces may cause burns;
   Ne touchez pas pendant l'alimentation et, immédiatement après l'alimentation, les surfaces chaudes peuvent causer des brûlures.
9. For ambient temperature ≤60°C, use ≥90°C - copper wire only; for ambient temperature >60°C to 85°C, use ≥105°C - copper wire only; use only wires with a minimum dielectric strength of 300V (input) and 60V (output);
   Température ambiante ≤60°C, utiliser ≥90°C - seulement fils de cuivre; Température ambiante >60°C et 85°C, utiliser ≥105°C - seulement fils de cuivre; Uniquement pour l'ulilisation de fils de cuivre d'une résisitance d'isolation minimale de 300V (d'entrée) et 60V (de sortie).

Notes:

1. Unless otherwise specified, parameters in this datasheet were measured under the conditions of Ta=25°C, humidity<75%RH with nominal input voltage and rated output load;
2. The room temperature derating of 5°C/1000m is needed for operating altitude greater than 2000m;
3. The out case needs to be connected to PE (⏚) of system when the terminal equipment in operating;
4. The output voltage can be adjusted by the ADJ, clockwise to increase;
5. WARNING Risk of electrical shock, fire, personal injury or death

Part Number Table

Description	Part Number
AC-DC DIN Rail Mount Power Supply, 1 Phase, 24V, 10A	MPIMF480-23B24
AC-DC DIN Rail Mount Power Supply, 1 Phase, 48V, 5A	MPIMF480-23B48