TRACO POWER

AC/DC Industrial Power Supply

TIB 480-EX Series, 480 Watt

- **UL Hazloc Class I, division 2 approval and ATEX certification**
- **SEMI F47 compliant for voltage sag immunity**
- **Rugged metal case with optional side-mounting**
- **Power Back immunity**
- **150% peak current for 4 s**
- **Operating Temp –40°C to +70°C (full load up to 60°C)**
- **Adjustable output voltage**
- **High Reliability: MTBF 1 mill hrs per IEC 61709**
- **Short circuit and overload protection**
- **3-year product warranty**

UL 508 UL 60950-1 IEC 62368-1

The TIB 480-EX family of next generation of 480 Watt din rail power supplies feature high efficiency operation of up to 95% enabling a slim design with alternative side-mounting for flat panels (DC OK Indicator on both front and side panel). These products certified to UL Hazloc Class 1 / Div 2, and ATEX (EN 60079-0, EN 60079-7. EN 600079-15) for operation in hazardous locations. These convection cooled power supplies have a -40°C to +60°C full load operating temperature range. 150% peak power for up to 4 seconds which is ideal for stepper motors, solenoids or actuators. The TIB 080-EX series has an important Back Power Immunity feature that helps protect against shut-down or malfunction with loads such as inductors and decelerating motors that can feed voltage back to the power supply. Outputs are radio-interference-suppressed to impede radiation at long output lines which reduces the common mode current to within limits of telecommunication ports. The series operate with a high power factor of up to 99% which also minimizes inrush current. Additional qualifications include IEC/EN/UL 60950-1, UL 508 and CB Report with EMC compliance to IEC/EN 61000-6-2 and IEC/EN 61000-6-3.

Models

Order Code	Output Power max.	Output Voltage nom. (adjustable)	Output Current max.	Output Current peak	Efficiency typ.
TIB 480-124EX	480 W	24 VDC (23.5 - 28.0 VDC)	20'000 mA	30'000 mA	95 %
TIB 480-148EX		48 VDC (47.0 - 56.0 VDC)	10'000 mA	15'000 mA	95 %

Options

TIB-RMK01	- Optional Ruggedized DIN-Rail Mounting Clip for EN 61373: www.tracopower.com/products/tib-rmk01.pdf
on demand (backorder with MOQ non stocking item)	- Optional models with certified DC input

Input Specifications

Input Voltage	- AC Range	Operational Range:	85 - 264 VAC (Full Range)
		Rated Range:	100 - 240 VAC (Full Range)
	- DC Range	Operational Range:	90 - 350 VDC
		Certified Range:	100 - 250 VDC
		Polarity:	+DC: L / –DC: N
			(Models with certified DC input are on-demand.)
Input Frequency		Operational Range:	45 - 65 Hz
		Certified:	50/60 Hz
Power Consumption	- No load & Vin = 230 VAC		3'500 mW max.
	- No load & Vin = 115 VAC		4'900 mW max.
Input Inrush Current	- At 230 VAC		30 A max.
	- At 115 VAC		15 A max.
Power Factor	- At 230 VAC		0.97 min. (Active Power Factor Correction)
	- At 115 VAC		0.99 min. (Active Power Factor Correction)
Recommended Input Fuse			(The need of an external fuse has to be assessed in the final application.)

Output Specifications

Output Voltage Adjustment		24 VDC model:	23.5 - 28.0 VDC
		48 VDC model:	47.0 - 56.0 VDC
			(By trim potentiometer)
			Output power must not exceed rated power!
Voltage Set Accuracy			±0.25% max.
Regulation	- Input Variation (Vmin - Vmax)		0.1% max.
	- Load Variation (10 - 90%)		0.5% max.
Boost Power			Output Current peak: See model table
			Peak power time: 4 s max. (auto switch off)
			Off Time: 10 s typ.
Ripple and Noise		24 VDC model:	100 mVp-p max.
(20 MHz Bandwidth)		48 VDC model:	200 mVp-p max.
Capacitive Load			Infinite
Minimum Load			Not required
Temperature Coefficient			±0.02 %/K max.
Hold-up Time	- At 230 VAC		20 ms min.
	- At 115 VAC		20 ms min.
Start-up Time	- At 230 VAC		2'000 ms max.
	- At 115 VAC		2'000 ms max.
Short Circuit Protection			Continuous, Automatic recovery
Overload Protection			Constant Current Mode
			Switch off after 4 s delay, automatic restart
Output Current Limitation			155% min. of Iout max.
Overvoltage Protection			117 - 146% of Vout nom.
			(depending on model)
			32 - 35 VDC (24 VDC model)
			56 - 60 VDC (48 VDC model)
			(In case of an internal error a second voltage regulation loop keeps the output voltage at a save level, the power supply turns off and tries to restart after 10 s.)
Transient Response	- Peak Variation		600 mV max. (10% to 90% Load Step)
	- Response Time		5'000 µs typ. (10% to 90% Load Step)

All specifications valid at nominal voltage, resistive full load and +25°C after warm-up time, unless otherwise stated.

Safety Specifications

Standards	- IT / Multimedia Equipment	CSA-C22.2, No. 60950-1 EN 60950-1 EN 62368-1 IEC 60950-1 IEC 62368-1 UL 60950-1
	- Industrial Control Equipment	UL 508
	- ATEX	EN 60079-0 EN 60079-15 EN 60079-7 EX II3G Ex nA nC IIC T4 GC
	- HazLoc	UL 121201 Class I; Div 2; Groups A,B,C,D; T4
	- Measurement, Control & Lab.	EN 61010-1 EN 61010-2-201 IEC 61010-1 IEC 61010-2-201 UL 61010-1 UL 61010-2-201
	- Certification Documents	www.tracopower.com/overview/tib480-ex
Protection Class		Class I (Prepared): Connection to PE
Pollution Degree		PD 2
Over Voltage Category		OVC II

EMC Specifications

EMI Emissions		EN 61000-6-3 (Generic Residential) EN 61204-3 (Low Voltage Power Supplies) EN 50121-3-2 (EMC for Rolling Stock) EN 50121-4 (Railway Application Signalling)
	- Conducted Emissions	EN 55011 class B (internal filter) EN 55032 class B (internal filter)
	- Radiated Emissions	EN 55011 class B (internal filter) EN 55032 class B (internal filter)
	- Harmonic Current Emissions	EN 61000-3-2, class A

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EMS Immunity			EN 61000-6-2 (Generic Industrial) EN 61204-3 (Low Voltage Power Supplies) EN 50121-3-2 (EMC for Rolling Stock) EN 50121-4 (Railway Application Signalling)
	- Electrostatic Discharge	Air:	EN 61000-4-2, ±8 kV, perf. criteria A
		Contact:	EN 61000-4-2, ±4 kV, perf. criteria A
	- RF Electromagnetic Field		EN 61000-4-3, 10 V/m, perf. criteria A
	- EFT (Burst) / Surge		EN 61000-4-4, ±2 kV, perf. criteria B
		L to L:	EN 61000-4-5, ±1 kV, perf. criteria B
		L to PE:	EN 61000-4-5, ±2 kV, perf. criteria B
	- Conducted RF Disturbances		EN 61000-4-6, 10 Vrms, perf. criteria A
	- PF Magnetic Field	Continuous:	EN 61000-4-8, 30 A/m, perf. criteria A
	- Voltage Dips & Interruptions	230 VAC / 50 Hz:	EN 61000-4-11 20%, 250 periods, perf. criteria C 30%, 25 periods, perf. criteria C 60%, 10 periods, perf. criteria C >95%, 1 period, perf. criteria B >95%, 5 periods, perf. criteria C
		115 VAC / 60 Hz:	EN 61000-4-11 20%, 250 periods, perf. criteria C 30%, 25 periods, perf. criteria C 60%, 10 periods, perf. criteria C >95%, 1 period, perf. criteria B >95%, 5 periods, perf. criteria C
	- Voltage Sag Immunity		SEMI F47, criteria A

General Specifications

Relative Humidity			95% max. (non condensing)
Temperature Ranges	- Operating Temperature		−40°C to +70°C
Power Derating	- High Temperature		2 %/K above 60°C (at standard operation) 3 %/K above 60°C (at peak power mode)
	- Low Input Voltage		3 %/V below 90 VAC (at standard operation) 1.5 %/V below 100 VAC (at peak power mode) 1 %/V below 110 VDC (48 Vout DC model) 1 %/V below 100 VDC (other DC models)
Over Temperature Protection Switch Off	- Protection Mode		Automatic recovery
Cooling System			Natural convection (20 LFM)
Remote Control	- Voltage Controlled Remote	See application note:	www.tracopower.com/overview/tib480-ex (The unit can be controlled by external relay contact or open collector signal.)
Altitude During Operation			2'000 m max.
Regulator Topology			LCC Converter
Switching Frequency			70 - 90 kHz (PWM)
Insulation System			Reinforced Insulation
Isolation Test Voltage	- Input to Output, 60 s		3'000 VAC
	- Input to Case or PE, 60 s		1'500 VAC
	- Output to Case or PE, 60 s		750 VDC
Creepage	- Input to Output		8 mm min.
	- Input to Case or PE		4 mm min.
	- Output to Case or PE		1.5 mm min.
Clearance	- Input to Output		8 mm min.
	- Input to Case or PE		4 mm min.
	- Output to Case or PE		1.5 mm min.
Isolation Resistance	- Input to Output, 500 VDC		4'000 MΩ min.
Leakage Current	- Earth Leakage Current		3500 µA max.
	- Touch Current		880 µA max.

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Reliability	- Calculated MTBF		1'000'000 h (IEC 61709)
Environment	- Vibration		EN 61373 IEC 60068-2-6 2 g, 3 axis, sine sweep, 10-55 Hz, 11 oct/min (Compliance to EN 61373 only with optional DIN-Rail Clip TIB-RMK01)
	- Mechanical Shock		EN 61373 IEC 60068-2-27 25 g, 3 axis, half sine, 11 ms
	- Mechanical Shock		(Compliance to EN 61373 only with optional DIN-Rail Clip TIB-RMK01)
Housing Material			Aluminum (Chassis) Stainless Steel (Cover)
Housing Type			Metal Case
Mounting Type			DIN-Rail Mount (EN 60715 - 35x7.5mm/35x15mm)
Connection Type			Screw Terminal
Weight			1'018 g
Thermal Impedance	- Case to Ambient		0.6 K/W typ.
Power Back Immunity		24 VDC model:	35 V max.
		48 VDC model:	60 V max. (When external voltage is supplied above set output voltage and below OVP threshold, the power supply will function normally without switch off or destruction, even if external voltage is applied continuously.)
Power OK Signal			Relay Output
	- Trigger Threshold	24 VDC model:	21 - 23 VDC
		48 VDC model:	42 - 46 VDC
	- Power OK		Relay contact closed
	- Power Off		Relay contact open
	- Pin Specifications		30 VDC / 1 A max.
Status Indicator			Also indicated by green LEDs: front and side
Environmental Compliance	- REACH Declaration		www.tracopower.com/info/reach-declaration.pdf REACH SVHC list compliant REACH Annex XVII compliant
	- RoHS Declaration		www.tracopower.com/info/rohs-declaration.pdf Exemptions: 7a, 7c-I (RoHS exemptions refer to the component concentration only, not to the overall concentration in the product (O5A rule).)
	- SCIP Reference Number		dcdfe03f-01a2-4900-ab4c-08ff29edae1f

Supporting Documents

Overview Link (for additional Documents)	www.tracopower.com/overview/tib480-ex

All specifications valid at nominal voltage, resistive full load and +25°C after warm-up time, unless otherwise stated.

Blockdiagram

Outline Dimensions

All specifications valid at nominal voltage, resistive full load and +25°C after warm-up time, unless otherwise stated.

Alternative side mounting

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