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TRACO POWER

AC/DC Industrial Power Supply

TIB 080-EX Series, 80 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**
- **Back power 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**
- **5-year product warranty**

UL 508 UL 60950-1 IEC 60950-1

The TIB 080-EX family of next generation of 80 Watt din rail power supplies feature high efficiency operation of up to 90% 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 080-112EX	80 W	12 VDC (11.8 - 15.0 VDC)	6'700 mA	10'050 mA	88 %
TIB 080-124EX		24 VDC (23.5 - 28.0 VDC)	3'400 mA	5'100 mA	90 %
TIB 080-148EX		48 VDC (47.0 - 56.0 VDC)	1'700 mA	2'550 mA	90 %

Input Specifications

Input Voltage		85 - 264 VAC (Full Range)
Input Frequency		45 - 65 Hz
Power Consumption	- at no Load	1'450 mW typ.
Input Inrush Current	- at 230 VAC	30 A max.
	- at 115 VAC	15 A max.
Power Factor	- at 230 VAC	0.48 min. (Active Power Factor Correction)
	- at 115 VAC	0.48 min. (Active Power Factor Correction)

Output Specifications

Output Voltage Adjustment		12 VDC model:	11.8 - 15.0 VDC
		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!
Regulation	- Input Variation (Vmin - Vmax)		0.1% max.
	- Load Variation (10 - 90%)		0.5% max.
Output Current peak			Peak Power: 105 - 150% of Iout max. Peak Operation Time: 4 s max. (switch off) Off Time: 6 s typ. In peak power mode, the unit continuously switches off the output voltage after 4 s and restarts after approx. 6 s.
Ripple and Noise (20 MHz Bandwidth)		12 VDC model:	100 mVp-p max.
		24 VDC model:	100 mVp-p max.
		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		160 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 - 158% of Vout nom. (depending on model) 16 - 19 VDC (12 VDC 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 turnes off and tries to restart after 6 s.)
Transient Response	- Peak Variation		600 mV max. (10% to 90% Load Step)
	- Response Time		2500 µs typ. (10% to 90% Load Step)

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

Safety Specifications

Safety Standards	- IT / Multimedia Equipment	IEC 60950-1 EN 60950-1 UL 60950-1 CSA-C22.2, No 60950-1
	- Industrial Control Equipment	UL 508
	- ATEX	EN 60079-0 EN 60079-7 EN 60079-15 EX II3G Ex nA nC IIC T4 GC
	- HazLoc	UL 121201 Class I; Div 2; Groups A,B,C,D; T4
	- Certification Documents	www.tracopower.com/overview/tib080-ex
Protection Class		Class I Prepared: Connection to PE
Pollution Degree		PD 2
Over Voltage Category		OVC II

EMC Specifications

EMC 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
EMC Immunity			EN 50121-3-2 (EMC for Rolling Stock) EN 50121-4 (Railway Application Signalling) EN 61000-6-2 (Generic Industrial) EN 61204-3 (Low Voltage Power Supplies)
	- 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)		EN 61000-4-4, ±2 kV, perf. criteria B
	- Surge	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		EN 61000-4-8, 30 A/m, perf. criteria A
	- Voltage Dips & Interruptions	230 VAC / 50 Hz:	EN 61000-4-11 30%, 25 periods, perf. criteria C 60%, 10 periods, perf. criteria C >95%, 1 period, perf. criteria B >95%, 5 periods, perf. criteria C 20%, 250 periods, perf. criteria C
		115 VAC / 60 Hz:	EN 61000-4-11 30%, 25 periods, perf. criteria C 60%, 10 periods, perf. criteria C >95%, 1 period, perf. criteria B >95%, 5 periods, perf. criteria C 20%, 250 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

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

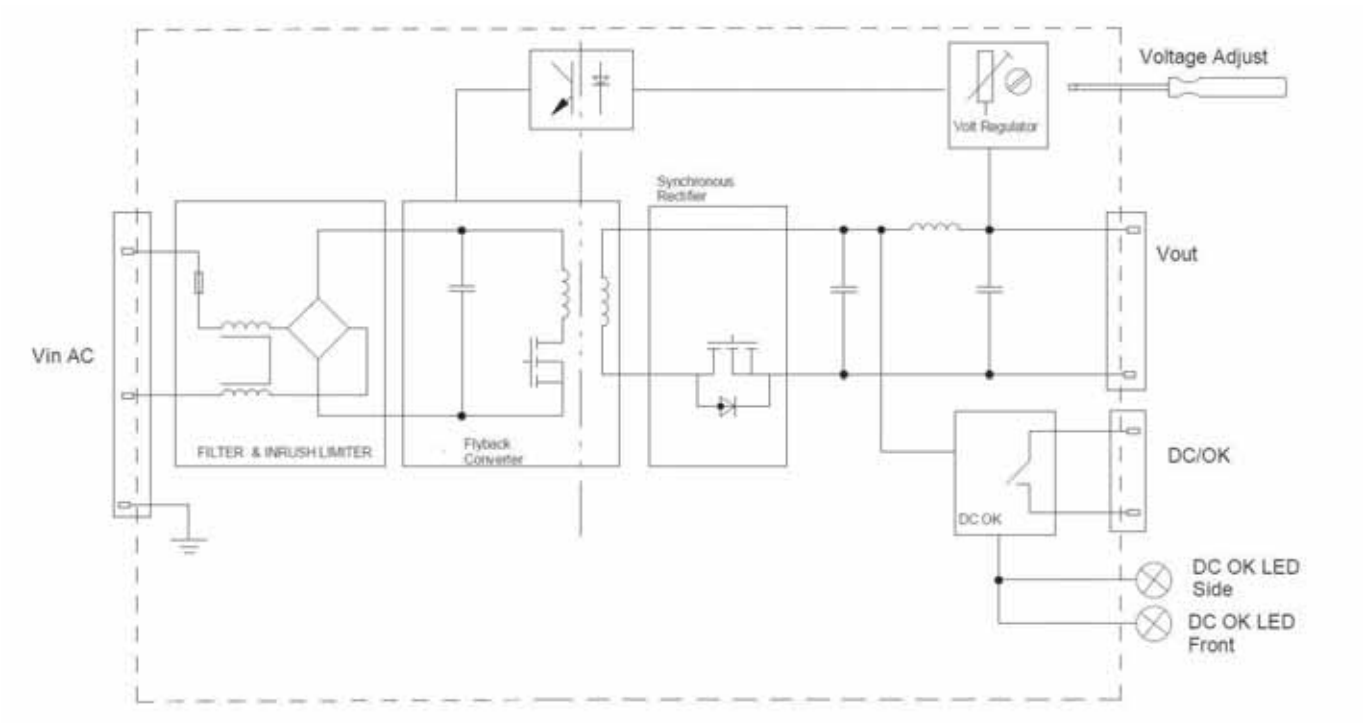
Power Derating	- High Temperature		2 %/K above 60°C (at standard operation) 3 %/K above 60°C (at peak power mode)
	- Low Input Voltage		3 %/V below 90 VAC (at standard operation) 1.5 %/V below 100 VAC (at peak power mode)
Over Temperature Protection Switch off			(Automatical switch off at over temperature)
Cooling System			Natural convection (20 LFM)
Altitude During Operation			2'000 m max.
Switching Frequency			60 - 75 kHz (PWM)
Insulation System			Reinforced Insulation
Isolation Test Voltage	- Input to Output, 60 s		4'250 VDC
	- Input to Case or PE, 60 s		1'500 VDC
	- 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.
Leakage Current	- Earth Leakage Current		3500 µA max.
	- Touch Current		310 µA max.
Reliability	- Calculated MTBF		1'950'000 h (IEC 61709)
Environment	- Vibration		EN 61373 IEC 60068-2-6 3 axis, sine sweep, 10 - 55 Hz, 2 g, 11 oct/min
	- Mechanical Shock		EN 61373 IEC 60068-2-27 3 axis, 25 g half sine, 11 ms shock
Housing Material			Aluminium (Chassis) Stainless Steel (Cover)
Connection Type			Screw Terminal
Mounting	- DIN Rail		For DIN-rails as per EN 50022-35×15/7.5
Weight			367 g
Thermal Impedance			1.81 K/W
Power Back Immunity		12 VDC model:	19 V max.
		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	12 VDC model:	OK: 10.9 VDC, Off: 10.7 VDC
		24 VDC model:	OK: 22.5 VDC, Off: 21.5 VDC
		48 VDC model:	OK: 45 VDC, Off: 43 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		www.tracopower.com/info/reach-declaration.pdf
	- RoHS		www.tracopower.com/info/rohs-declaration.pdf

Supporting Documents

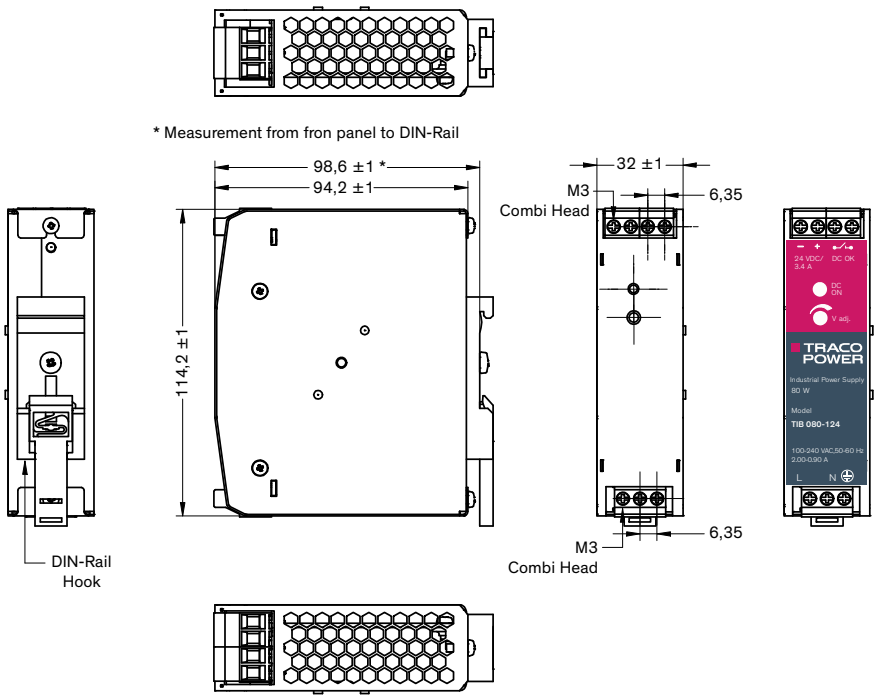
Overview Link (for additional Documents)	www.tracopower.com/overview/tib080-ex

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

Blockdiagram

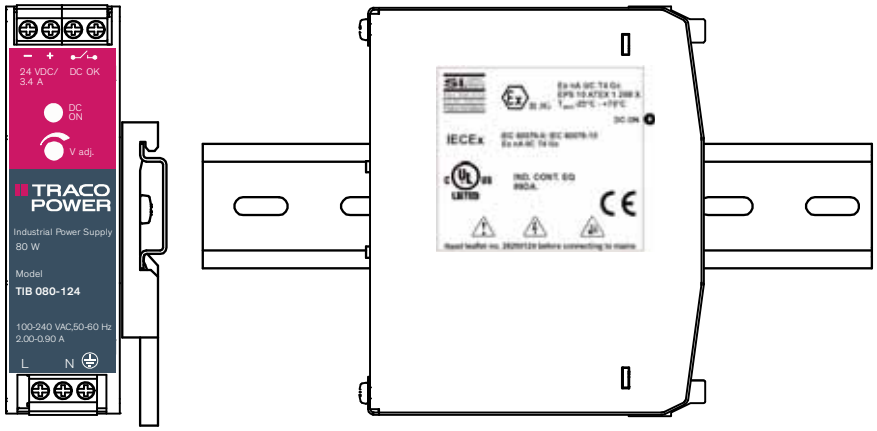


Outline Dimensions



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

Alternative side mounting



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TRACO POWER

AC/DC Industrial Power Supply

TIB 120-EX Series, 120 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**
- **Back power 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**
- **5-year product warranty**

UL 508 UL 60950-1 IEC 60950-1

The TIB 120-EX family of next generation of 120 Watt din rail power supplies feature high efficiency operation of up to 94% 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 120-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 120-112EX	120 W	12 VDC (11.8 - 15.0 VDC)	10'000 mA	15'000 mA	94 %
TIB 120-124EX		24 VDC (23.5 - 28.0 VDC)	5'000 mA	7'500 mA	94 %
TIB 120-148EX		48 VDC (47.0 - 56.0 VDC)	2'500 mA	3'750 mA	94 %

Input Specifications

Input Voltage		85 - 264 VAC (Full Range)
Input Frequency		45 - 65 Hz
Power Consumption	- at no Load	2'200 mW typ.
Input Inrush Current	- at 230 VAC	30 A max.
	- at 115 VAC	15 A max.
Power Factor	- at 230 VAC	0.8 min. (Active Power Factor Correction)
	- at 115 VAC	0.97 min. (Active Power Factor Correction)

Output Specifications

Output Voltage Adjustment		12 VDC model:	11.8 - 15.0 VDC
		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!
Regulation	- Input Variation (Vmin - Vmax)		0.1% max.
	- Load Variation (10 - 90%)		0.5% max.
Output Current peak			Peak Power: 105 - 150% of Iout max. Peak Operation Time: 4 s max. (switch off) Off Time: 10 s typ. In peak power mode, the unit continuously switches off the output voltage after 4 s and restarts after approx. 10 s.
Ripple and Noise (20 MHz Bandwidth)		12 VDC model:	100 mVp-p max.
		24 VDC model:	100 mVp-p max.
		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 - 158% of Vout nom. (depending on model) 16 - 19 VDC (12 VDC 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 turnes off and tries to restart after 10 s.)
Transient Response	- Peak Variation		800 mV max. (10% to 90% Load Step)
	- Response Time		2000 µs typ. (10% to 90% Load Step)

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

Safety Specifications

Safety Standards	- IT / Multimedia Equipment		IEC 60950-1 EN 60950-1 UL 60950-1 CSA-C22.2, No 60950-1
	- Industrial Control Equipment		UL 508
	- ATEX		EN 60079-0 EN 60079-7 EN 60079-15 EX II3G Ex nA nC IIC T4 GC
	- HazLoc		UL 121201 Class I; Div 2; Groups A,B,C,D; T4
	- Certification Documents		www.tracopower.com/overview/tib120-ex
Protection Class			Class I Prepared: Connection to PE
Pollution Degree			PD 2
Over Voltage Category			OVC II

EMC Specifications

EMC 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
EMC Immunity			EN 50121-3-2 (EMC for Rolling Stock) EN 50121-4 (Railway Application Signalling) EN 61000-6-2 (Generic Industrial) EN 61204-3 (Low Voltage Power Supplies)
	- 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)		EN 61000-4-4, ±2 kV, perf. criteria B
	- Surge	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		EN 61000-4-8, 30 A/m, perf. criteria A
	- Voltage Dips & Interruptions	230 VAC / 50 Hz:	EN 61000-4-11 30%, 25 periods, perf. criteria C 60%, 10 periods, perf. criteria C >95%, 1 period, perf. criteria B >95%, 5 periods, perf. criteria C 20%, 250 periods, perf. criteria C
		115 VAC / 60 Hz:	EN 61000-4-11 30%, 25 periods, perf. criteria C 60%, 10 periods, perf. criteria C >95%, 1 period, perf. criteria B >95%, 5 periods, perf. criteria C 20%, 250 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

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

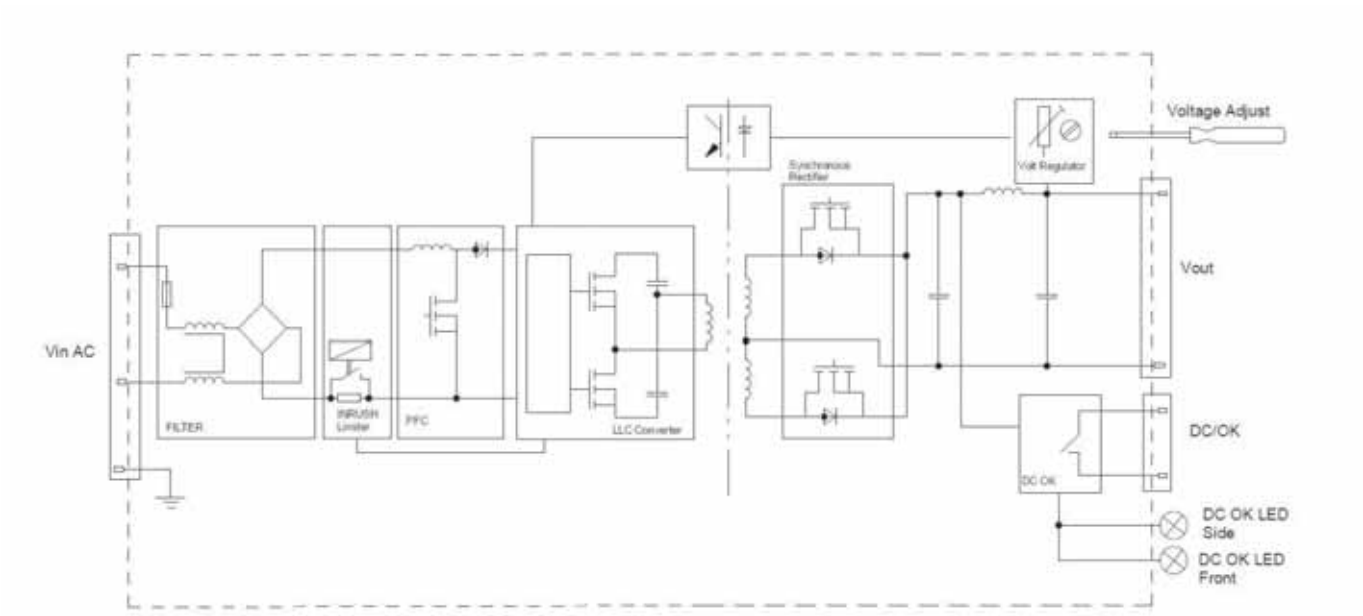
Power Derating	- High Temperature		2 %/K above 60°C (at standard operation) 3 %/K above 60°C (at peak power mode)
	- Low Input Voltage		3 %/V below 90 VAC (at standard operation) 1.5 %/V below 100 VAC (at peak power mode)
Over Temperature Protection Switch off			(Automatical switch off at over temperature)
Cooling System			Natural convection (20 LFM)
Altitude During Operation			2'000 m max.
Switching Frequency			70 - 100 kHz (PWM)
Insulation System			Reinforced Insulation
Isolation Test Voltage	- Input to Output, 60 s		4'250 VDC
	- Input to Case or PE, 60 s		1'500 VDC
	- 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.
Leakage Current	- Earth Leakage Current		3500 µA max.
	- Touch Current		310 µA max.
Reliability	- Calculated MTBF		1'450'000 h (IEC 61709)
Environment	- Vibration		EN 61373 IEC 60068-2-6 3 axis, sine sweep, 10 - 55 Hz, 2 g, 11 oct/min
	- Mechanical Shock		EN 61373 IEC 60068-2-27 3 axis, 25 g half sine, 11 ms shock
Housing Material			Aluminium (Chassis) Stainless Steel (Cover)
Connection Type			Screw Terminal
Mounting	- DIN Rail		For DIN-rails as per EN 50022-35×15/7.5
Weight			461 g
Thermal Impedance			0.8 K/W
Power Back Immunity		12 VDC model:	19 V max.
		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	12 VDC model:	OK: 10.9 VDC, Off: 10.7 VDC
		24 VDC model:	OK: 22.5 VDC, Off: 21.5 VDC
		48 VDC model:	OK: 45 VDC, Off: 43 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		www.tracopower.com/info/reach-declaration.pdf
	- RoHS		www.tracopower.com/info/rohs-declaration.pdf

Supporting Documents

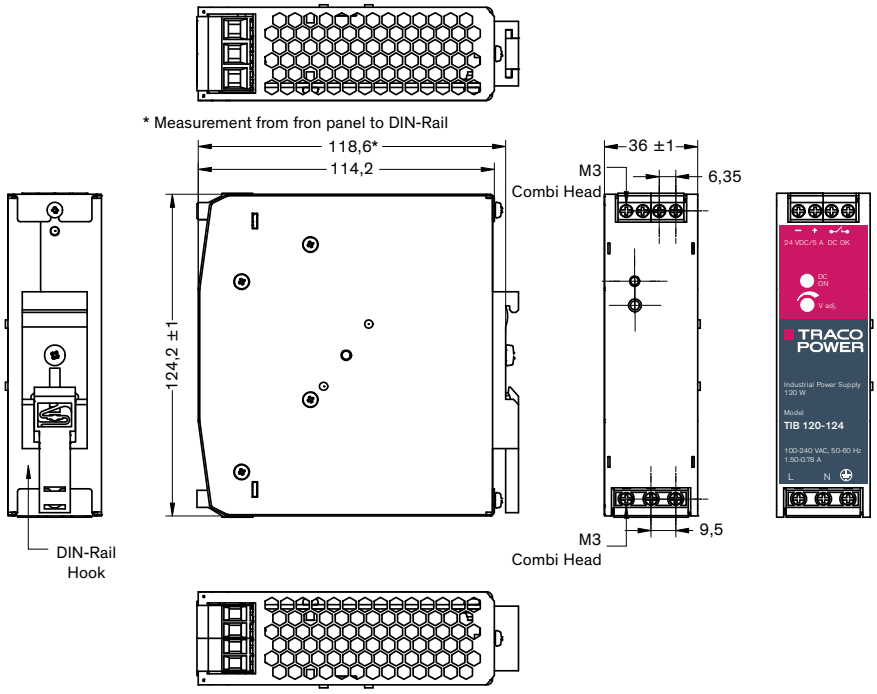
Overview Link (for additional Documents)	www.tracopower.com/overview/tib120-ex

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

Blockdiagram

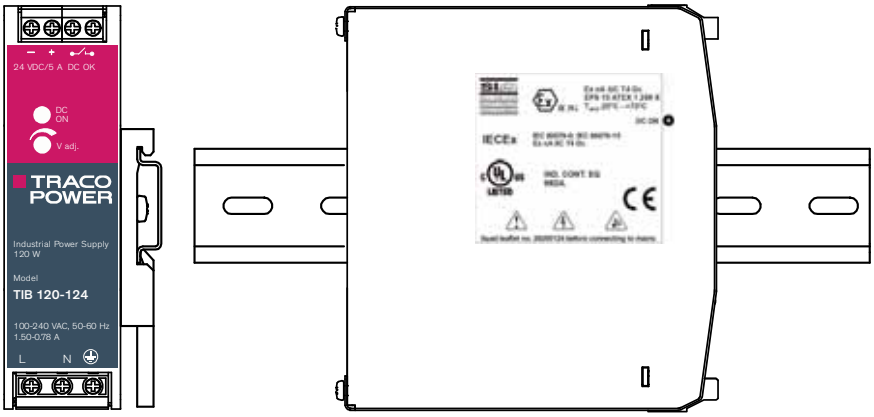


Outline Dimensions



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

Alternative side mounting



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TRACO POWER

AC/DC Industrial Power Supply

TIB 240-EX Series, 240 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**
- **Back power 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**
- **5-year product warranty**

UL 508 UL 60950-1 IEC 60950-1

The TIB 240-EX family of next generation of 240 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 240-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 240-124EX	240 W	24 VDC (23.5 - 28.0 VDC)	10'000 mA	15'000 mA	95 %
TIB 240-148EX		48 VDC (47.0 - 56.0 VDC)	5'000 mA	7'500 mA	95 %

Input Specifications

Input Voltage		85 - 264 VAC (Full Range)
Input Frequency		45 - 65 Hz
Power Consumption	- at no Load	2'300 mW typ.
Input Inrush Current	- at 230 VAC	30 A max.
	- at 115 VAC	15 A max.
Power Factor	- at 230 VAC	0.92 min. (Active Power Factor Correction)
	- at 115 VAC	0.98 min. (Active Power Factor Correction)

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!
Regulation	- Input Variation (Vmin - Vmax)	0.1% max.
	- Load Variation (10 - 90%)	0.5% max.
Output Current peak		Peak Power: 105 - 150% of Iout max. Peak Operation Time: 4 s max. (switch off) Off Time: 10 s typ. In peak power mode, the unit continuously switches off the output voltage after 4 s and restarts after approx. 10 s.
Ripple and Noise (20 MHz Bandwidth)	24 VDC model:	100 mVp-p max.
	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 turnes off and tries to restart after 10 s.)
Transient Response	- Peak Variation	600 mV max. (10% to 90% Load Step)
	- Response Time	2000 µs typ. (10% to 90% Load Step)

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

Safety Specifications

Safety Standards	- IT / Multimedia Equipment		IEC 60950-1 EN 60950-1 UL 60950-1 CSA-C22.2, No 60950-1
	- Industrial Control Equipment		UL 508
	- ATEX		EN 60079-0 EN 60079-7 EN 60079-15 EX II3G Ex nA nC IIC T4 GC
	- HazLoc		UL 121201 Class I; Div 2; Groups A,B,C,D; T4
	- Certification Documents		www.tracopower.com/overview/tib240-ex
Protection Class			Class I Prepared: Connection to PE
Pollution Degree			PD 2
Over Voltage Category			OVC II

EMC Specifications

EMC 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
EMC Immunity			EN 50121-3-2 (EMC for Rolling Stock) EN 50121-4 (Railway Application Signalling) EN 61000-6-2 (Generic Industrial) EN 61204-3 (Low Voltage Power Supplies)
	- 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)		EN 61000-4-4, ±2 kV, perf. criteria B
	- Surge	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		EN 61000-4-8, 30 A/m, perf. criteria A
	- Voltage Dips & Interruptions	230 VAC / 50 Hz:	EN 61000-4-11 30%, 25 periods, perf. criteria C 60%, 10 periods, perf. criteria C >95%, 1 period, perf. criteria B >95%, 5 periods, perf. criteria C 20%, 250 periods, perf. criteria C
		115 VAC / 60 Hz:	EN 61000-4-11 30%, 25 periods, perf. criteria C 60%, 10 periods, perf. criteria C >95%, 1 period, perf. criteria B >95%, 5 periods, perf. criteria C 20%, 250 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

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

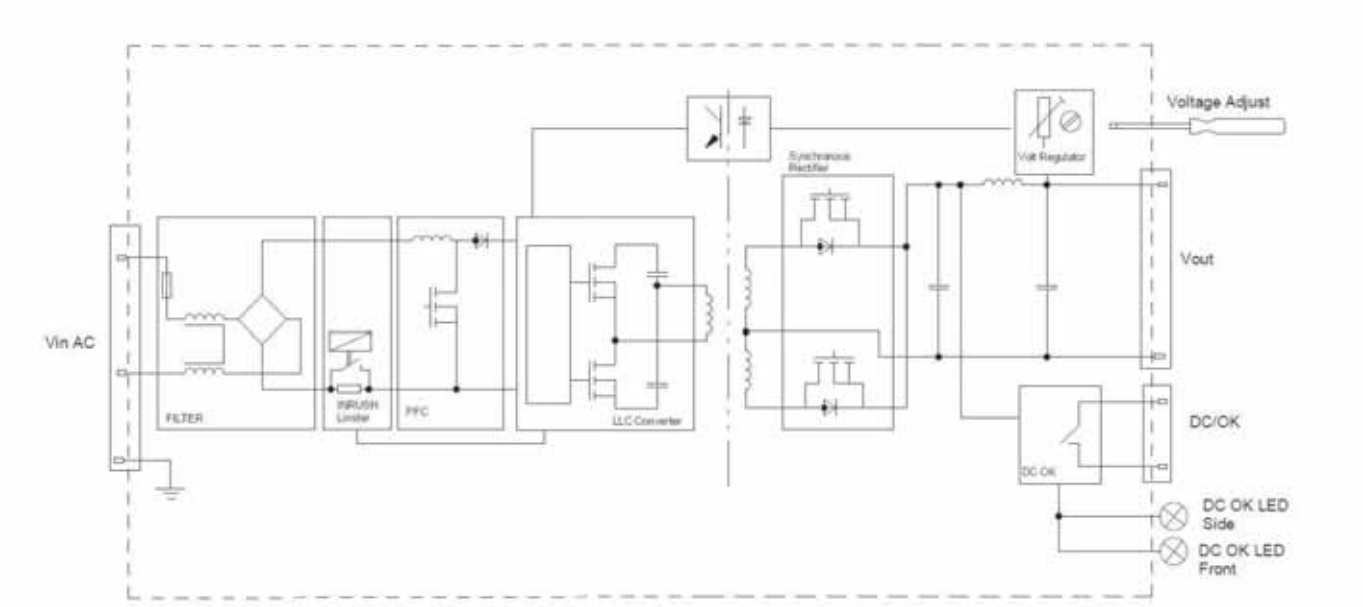
Power Derating	- High Temperature		2 %/K above 60°C (at standard operation) 3 %/K above 60°C (at peak power mode)
	- Low Input Voltage		3 %/V below 90 VAC (at standard operation) 1.5 %/V below 100 VAC (at peak power mode)
Over Temperature Protection Switch off			(Automatical switch off at over temperature)
Cooling System			Natural convection (20 LFM)
Altitude During Operation			2'000 m max.
Switching Frequency			75 - 100 kHz (PWM)
Insulation System			Reinforced Insulation
Isolation Test Voltage	- Input to Output, 60 s		4'250 VDC
	- Input to Case or PE, 60 s		1'500 VDC
	- 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.
Leakage Current	- Earth Leakage Current		3500 µA max.
	- Touch Current		310 µA max.
Reliability	- Calculated MTBF		1'300'000 h (IEC 61709)
Environment	- Vibration		EN 61373 IEC 60068-2-6 3 axis, sine sweep, 10 - 55 Hz, 2 g, 11 oct/min
	- Mechanical Shock		EN 61373 IEC 60068-2-27 3 axis, 25 g half sine, 11 ms shock
Housing Material			Aluminium (Chassis) Stainless Steel (Cover)
Connection Type			Screw Terminal
Mounting	- DIN Rail		For DIN-rails as per EN 50022-35×15/7.5
Weight			643 g
Thermal Impedance			0.95 K/W
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:	OK: 22.5 VDC, Off: 21.5 VDC
		48 VDC model:	OK: 45 VDC, Off: 43 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		www.tracopower.com/info/reach-declaration.pdf
	- RoHS		www.tracopower.com/info/rohs-declaration.pdf

Supporting Documents

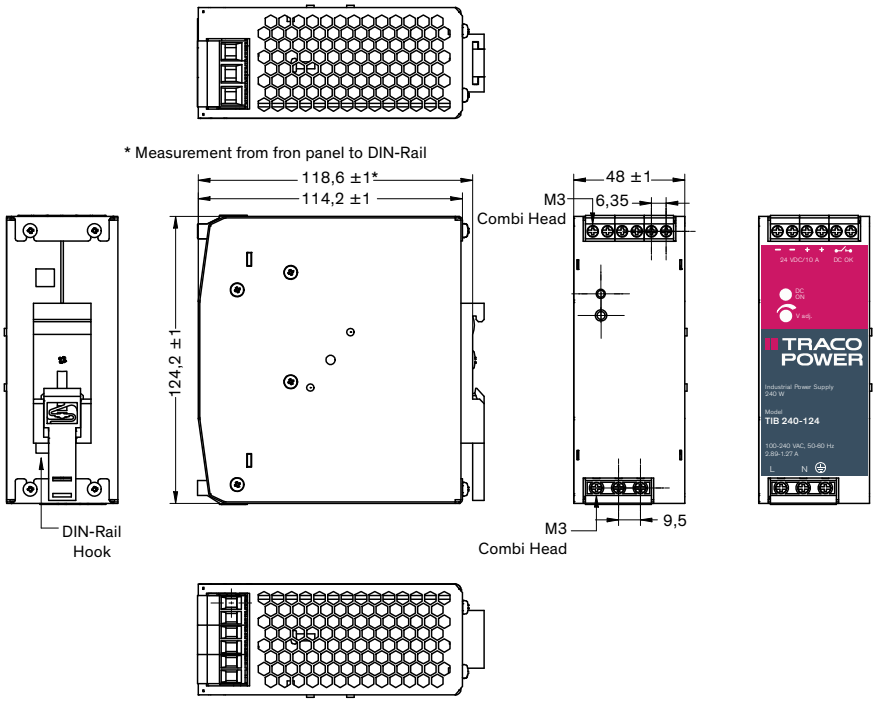
Overview Link (for additional Documents)	www.tracopower.com/overview/tib240-ex

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

Blockdiagram

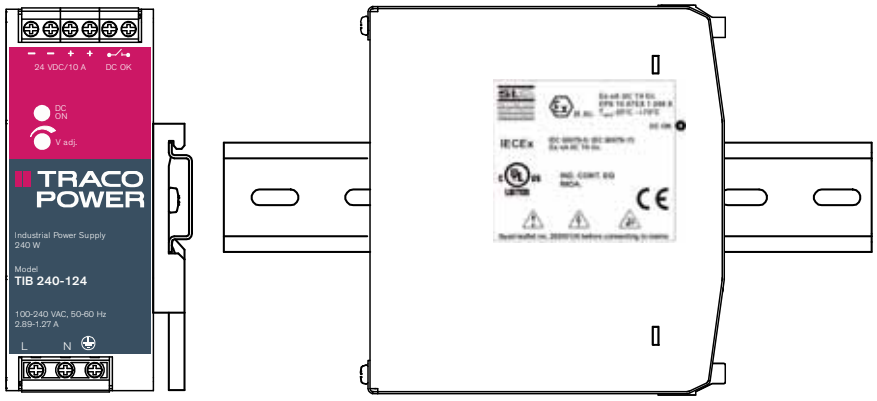


Outline Dimensions



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

Alternative side mounting



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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**
- **Back power 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**
- **5-year product warranty**

UL 508 UL 60950-1 IEC 60950-1

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	- Ruggedized DIN-Rail Clip to comply to EN 61373: www.tracopower.com/products/tib-rmk01.pdf

Input Specifications

Input Voltage		85 - 264 VAC (Full Range)
Input Frequency		45 - 65 Hz
Power Consumption	- at no Load	3'800 mW typ.
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)

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!
Regulation	- Input Variation (Vmin - Vmax)	0.1% max.
	- Load Variation (10 - 90%)	0.5% max.
Output Current peak		Peak Power: 105 - 150% of Iout max. Peak Operation Time: 4 s max. (switch off) Off Time: 10 s typ. In peak power mode, the unit continuously switches off the output voltage after 4 s and restarts after approx. 10 s.
Ripple and Noise (20 MHz Bandwidth)	24 VDC model:	100 mVp-p max.
	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 turnes off and tries to restart after 10 s.)
Transient Response	- Peak Variation	600 mV max. (10% to 90% Load Step)
	- Response Time	5000 µs typ. (10% to 90% Load Step)

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

Safety Specifications

Safety Standards	- IT / Multimedia Equipment	IEC 60950-1 EN 60950-1 UL 60950-1 CSA-C22.2, No 60950-1
	- Industrial Control Equipment	UL 508
	- ATEX	EN 60079-0 EN 60079-7 EN 60079-15 EX II3G Ex nA nC IIC T4 GC
	- HazLoc	UL 121201 Class I; Div 2; Groups A,B,C,D; T4
	- 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

EMC 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
EMC Immunity			EN 50121-3-2 (EMC for Rolling Stock) EN 50121-4 (Railway Application Signalling) EN 61000-6-2 (Generic Industrial) EN 61204-3 (Low Voltage Power Supplies)
	- 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)		EN 61000-4-4, ±2 kV, perf. criteria B
	- Surge	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		EN 61000-4-8, 30 A/m, perf. criteria A
	- Voltage Dips & Interruptions	230 VAC / 50 Hz:	EN 61000-4-11 30%, 25 periods, perf. criteria C 60%, 10 periods, perf. criteria C >95%, 1 period, perf. criteria B >95%, 5 periods, perf. criteria C 20%, 250 periods, perf. criteria C
		115 VAC / 60 Hz:	EN 61000-4-11 30%, 25 periods, perf. criteria C 60%, 10 periods, perf. criteria C >95%, 1 period, perf. criteria B >95%, 5 periods, perf. criteria C 20%, 250 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

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

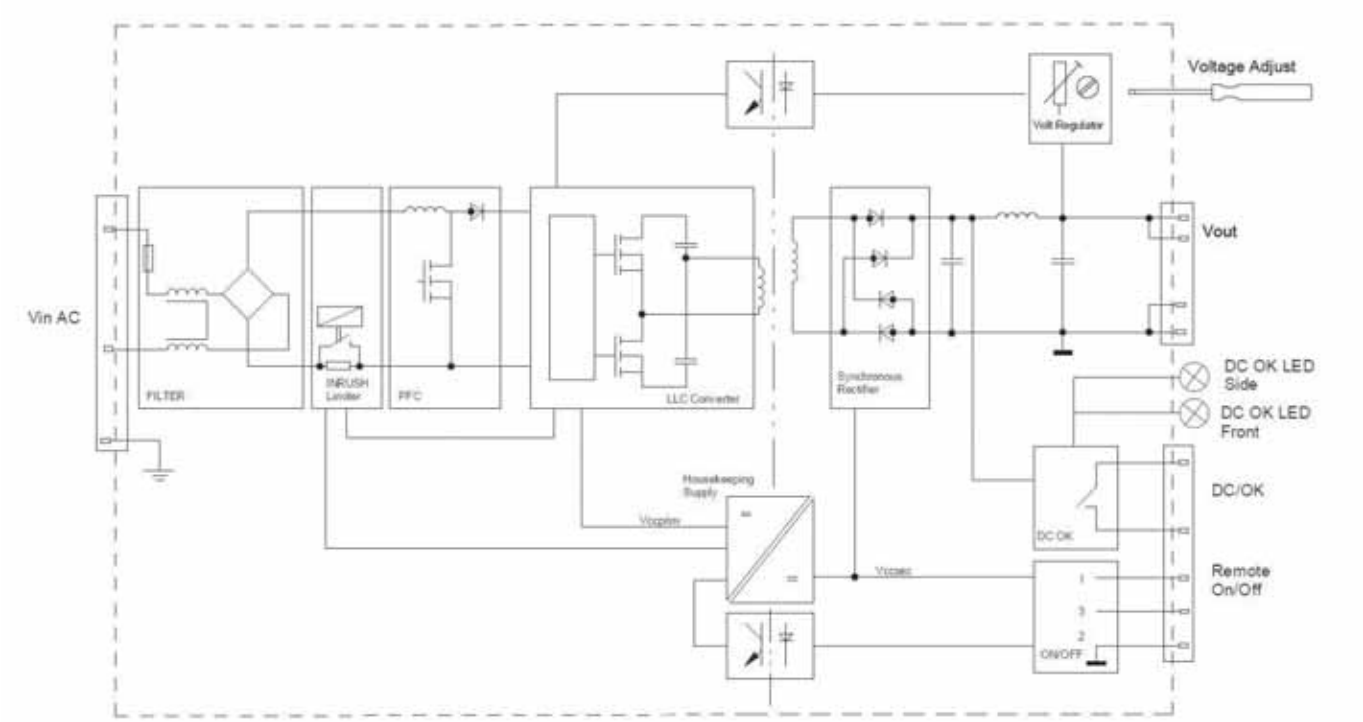
Power Derating	- High Temperature		2 %/K above 60°C (at standard operation) 3 %/K above 60°C (at peak power mode)
	- Low Input Voltage		3 %/V below 90 VAC (at standard operation) 1.5 %/V below 100 VAC (at peak power mode)
Over Temperature Protection Switch off			(Automatical switch off at over temperature)
Cooling System			Natural convection (20 LFM)
Altitude During Operation			2'000 m max.
Switching Frequency			70 - 90 kHz (PWM)
Insulation System			Reinforced Insulation
Isolation Test Voltage	- Input to Output, 60 s		4'250 VDC
	- Input to Case or PE, 60 s		1'500 VDC
	- 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.
Leakage Current	- Earth Leakage Current		3500 µA max.
	- Touch Current		880 µA max.
Reliability	- Calculated MTBF		1'000'000 h (IEC 61709)
Environment	- Vibration		EN 61373 IEC 60068-2-6 3 axis, sine sweep, 10 - 55 Hz, 2 g, 11 oct/min (Compliance to EN 61373 only with optional DIN-Rail Clip TIB-RMK01)
	- Mechanical Shock		EN 61373 IEC 60068-2-27 3 axis, 25 g half sine, 11 ms shock
Housing Material			Aluminium (Chassis) Stainless Steel (Cover)
Connection Type			Screw Terminal
Mounting	- DIN Rail		For DIN-rails as per EN 50022-35×15/7.5
Weight			1018 g
Thermal Impedance			0.6 K/W
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:	OK: 22.5 VDC, Off: 21.5 VDC
		48 VDC model:	OK: 45 VDC, Off: 43 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
Remote Control	- Refer to Application Note		www.tracopower.com/overview/tib480-ex (The unit can be controlled by external relay contact or open collector signal.)
Environmental Compliance	- Reach		www.tracopower.com/info/reach-declaration.pdf
	- RoHS		www.tracopower.com/info/rohs-declaration.pdf

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

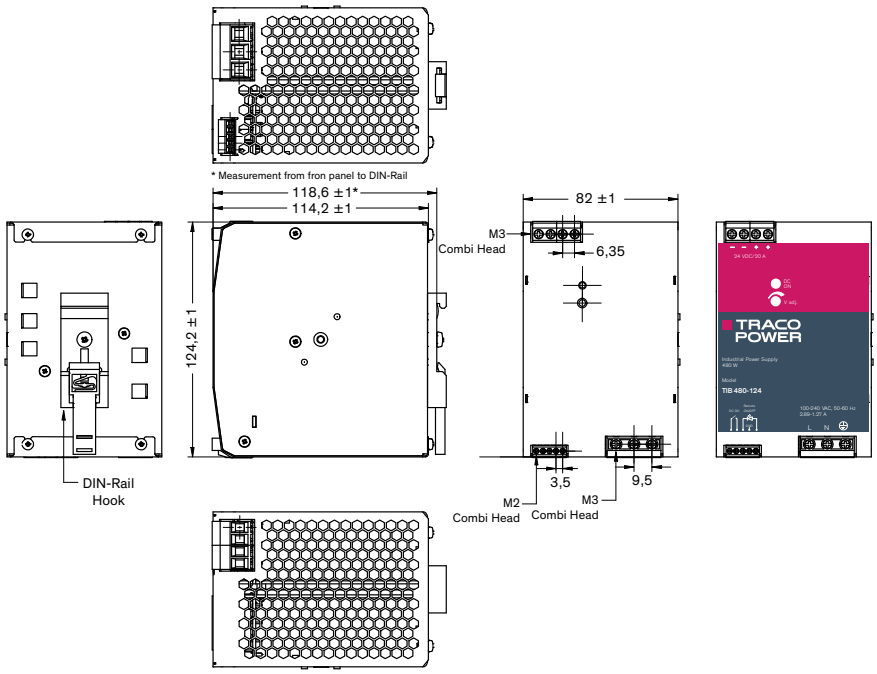
Supporting Documents

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

Blockdiagram

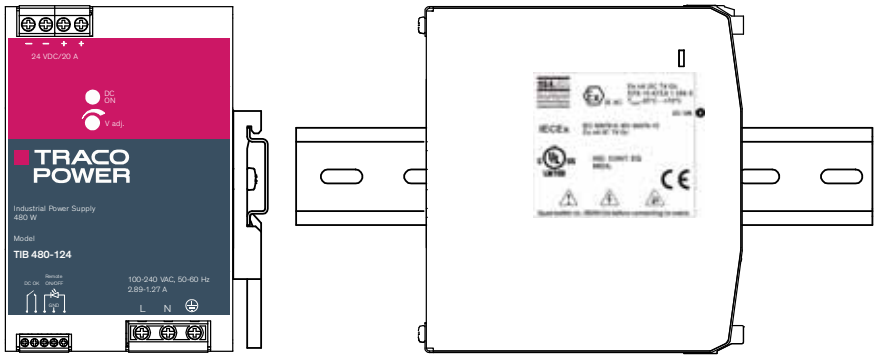


Outline Dimensions



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

Alternative side mounting



 Specifications can be changed without notice.