

## 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
- 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



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 60079-15) 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 62368-1, IEC/EN/UL 61010-1 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<br>max. | Output Voltage<br>nom. (adjustable) | Output Current<br>max. | Output Current<br>peak | Efficiency<br>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 %               |

### Options

|                                                        |                                                                                                                                                             |
|--------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------|
| TIB-RMK01                                              | - Optional Ruggedized DIN-Rail Mounting Clip for EN 61373: <a href="http://www.tracopower.com/overview/tib-rmk01">www.tracopower.com/overview/tib-rmk01</a> |
| on demand<br>(backorder with MOQ<br>non stocking item) | - Optional models with certified DC input<br>- Optional models with additional IECEx certification                                                          |

## Input Specifications

|                        |                           |                                                                                                                                                                        |
|------------------------|---------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Input Voltage          | - AC Range                | Operational Range: <b>85 - 264 VAC</b> (Full Range)<br>Rated Range: <b>100 - 240 VAC</b> (Full Range)                                                                  |
|                        | - DC Range                | Operational Range: <b>90 - 350 VDC</b><br>Certified Range: <b>100 - 250 VDC</b><br>Polarity: <b>+DC: L / -DC: N</b><br>(Models with certified DC input are on-demand.) |
| Input Frequency        |                           | Operational Range: <b>45 - 65 Hz</b><br>Certified: <b>50/60 Hz</b>                                                                                                     |
| Power Consumption      | - No load & Vin = 230 VAC | <b>3'000 mW max.</b>                                                                                                                                                   |
|                        | - No load & Vin = 115 VAC | <b>3'500 mW max.</b>                                                                                                                                                   |
| Input Inrush Current   | - At 230 VAC              | <b>30 A max.</b>                                                                                                                                                       |
|                        | - At 115 VAC              | <b>15 A max.</b>                                                                                                                                                       |
| Power Factor           | - At 230 VAC              | <b>0.92 min.</b> (Active Power Factor Correction)                                                                                                                      |
|                        | - At 115 VAC              | <b>0.98 min.</b> (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: <b>23.5 - 28.0 VDC</b><br>48 VDC model: <b>47.0 - 56.0 VDC</b><br>(By trim potentiometer)<br>Output power must not exceed rated power!                                                                                                                                                   |
| Voltage Set Accuracy                   |                                 | <b>±0.25% max.</b>                                                                                                                                                                                                                                                                                     |
| Regulation                             | - Input Variation (Vmin - Vmax) | <b>0.1% max.</b>                                                                                                                                                                                                                                                                                       |
|                                        | - Load Variation (10 - 90%)     | <b>0.5% max.</b>                                                                                                                                                                                                                                                                                       |
| Boost Power                            |                                 | Output Current peak: See model table<br>Peak power time: <b>4 s max.</b> (auto switch off)<br>Off Time: <b>10 s typ.</b>                                                                                                                                                                               |
| Ripple and Noise<br>(20 MHz Bandwidth) | 24 VDC model:                   | <b>100 mVp-p max.</b>                                                                                                                                                                                                                                                                                  |
|                                        | 48 VDC model:                   | <b>200 mVp-p max.</b>                                                                                                                                                                                                                                                                                  |
| Capacitive Load                        |                                 | Infinite                                                                                                                                                                                                                                                                                               |
| Minimum Load                           |                                 | Not required                                                                                                                                                                                                                                                                                           |
| Temperature Coefficient                |                                 | <b>±0.02 %/K max.</b>                                                                                                                                                                                                                                                                                  |
| Hold-up Time                           | - At 230 VAC                    | <b>20 ms min.</b>                                                                                                                                                                                                                                                                                      |
|                                        | - At 115 VAC                    | <b>20 ms min.</b>                                                                                                                                                                                                                                                                                      |
| Start-up Time                          | - At 230 VAC                    | <b>2'000 ms max.</b>                                                                                                                                                                                                                                                                                   |
|                                        | - At 115 VAC                    | <b>2'000 ms max.</b>                                                                                                                                                                                                                                                                                   |
| Short Circuit Protection               |                                 | Continuous, Automatic recovery                                                                                                                                                                                                                                                                         |
| Overload Protection                    |                                 | Constant Current Mode<br>Switch off after <b>4 s delay</b> , automatic restart                                                                                                                                                                                                                         |
| Output Current Limitation              |                                 | <b>155% min. of Iout max.</b>                                                                                                                                                                                                                                                                          |
| Overvoltage Protection                 |                                 | <b>117 - 146% of Vout nom.</b> (depending on model)<br><b>32 - 35 VDC</b> (24 VDC model)<br><b>56 - 60 VDC</b> (48 VDC model)<br>(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                | <b>600 mV max.</b> (10% to 90% Load Step)                                                                                                                                                                                                                                                              |
|                                        | - Response Time                 | <b>2'000 µs typ.</b> (10% to 90% Load Step)                                                                                                                                                                                                                                                            |

All specifications valid at 230 VAC, resistive full load and +25°C after warm-up time, unless otherwise stated.

## Safety Specifications

|                       |                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|-----------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Standards             | <ul style="list-style-type: none"> <li>- IT / Multimedia Equipment</li> <li>- Industrial Control Equipment</li> <li>- ATEX</li> <li>- HazLoc</li> <li>- Measurement, Control &amp; Lab.</li> <li>- Certification Documents</li> </ul> | EN 62368-1<br>IEC 62368-1<br>UL 62368-1<br>UL 508<br>EN 60079-0<br>EN 60079-15<br>EN 60079-7<br>EX II3G Ex nA nC IIC T4 GC<br>UL 121201<br>Class I; Div 2; Groups A,B,C,D; T4<br>EN 61010-1<br>EN 61010-2-201<br>IEC 61010-1<br>IEC 61010-2-201<br>UL 61010-1<br>UL 61010-2-201<br><a href="http://www.tracopower.com/overview/tib240-ex">www.tracopower.com/overview/tib240-ex</a><br>((When operating in ex environments such as ATEX, Hazloc, etc.: Check certification documents for special conditions for safe use.)) |
| Protection Class      | See application note:                                                                                                                                                                                                                 | Class I (Prepared): Connection to PE<br><a href="http://www.tracopower.com/info/protection-class.pdf">www.tracopower.com/info/protection-class.pdf</a>                                                                                                                                                                                                                                                                                                                                                                      |
| Pollution Degree      |                                                                                                                                                                                                                                       | PD 2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Over Voltage Category |                                                                                                                                                                                                                                       | OVC II                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |

## EMC Specifications

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

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|                            |                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|----------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>EMS (Immunity)</b>      |                                                                                                                                                                                                    | EN 61000-6-2 (Generic Industrial)<br>EN 61204-3 (Low Voltage Power Supplies)<br>EN 50121-3-2 (EMC for Rolling Stock)<br>EN 50121-4 (Railway Application Signalling)<br>Air: EN 61000-4-2, $\pm 8$ kV, perf. criteria A<br>Contact: EN 61000-4-2, $\pm 4$ kV, perf. criteria A<br>EN 61000-4-3, 10 V/m, perf. criteria A<br>EN 61000-4-4, $\pm 2$ kV, perf. criteria B<br>L to L: EN 61000-4-5, $\pm 1$ kV, perf. criteria B<br>L to PE: EN 61000-4-5, $\pm 2$ kV, perf. criteria B<br>EN 61000-4-6, 10 Vrms, perf. criteria A<br>Continuous: EN 61000-4-8, 30 A/m, perf. criteria A<br>230 VAC / 50 Hz: EN 61000-4-11<br>20%, 250 periods, perf. criteria C<br>30%, 25 periods, perf. criteria C<br>60%, 10 periods, perf. criteria C<br>>95%, 1 period, perf. criteria B<br>>95%, 5 periods, perf. criteria C<br>115 VAC / 60 Hz: EN 61000-4-11<br>20%, 250 periods, perf. criteria C<br>30%, 25 periods, perf. criteria C<br>60%, 10 periods, perf. criteria C<br>>95%, 1 period, perf. criteria B<br>>95%, 5 periods, perf. criteria C<br>SEMI F47, criteria A |
|                            | - Electrostatic Discharge<br>- RF Electromagnetic Field<br>- EFT (Burst) / Surge<br>- Conducted RF Disturbances<br>- PF Magnetic Field<br>- Voltage Dips & Interruptions<br>- Voltage Sag Immunity |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>EMC / Environmental</b> | - Certification Documents                                                                                                                                                                          | <a href="http://www.tracopower.com/overview/tib240-ex">www.tracopower.com/overview/tib240-ex</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |

## General Specifications

|                                               |                              |                                                                                                                                 |
|-----------------------------------------------|------------------------------|---------------------------------------------------------------------------------------------------------------------------------|
| <b>Relative Humidity</b>                      |                              | 95% max. (non condensing)                                                                                                       |
| <b>Temperature Ranges</b>                     | - Operating Temperature      | -40°C to +70°C                                                                                                                  |
| <b>Power Derating</b>                         | - High Temperature           | 2 %/K above 60°C (at standard operation)<br>3 %/K above 60°C (at peak power mode)                                               |
|                                               | - Low Input Voltage          | 3 %/V below 90 VAC (at standard operation)<br>1.5 %/V below 100 VAC (at peak power mode)<br>1 %/V below 100 VDC (for DC models) |
| <b>Over Temperature Protection Switch Off</b> | - Protection Mode            | Automatic recovery                                                                                                              |
| <b>Cooling System</b>                         |                              | Natural convection (20 LFM)                                                                                                     |
| <b>Altitude During Operation</b>              |                              | 2'000 m max.                                                                                                                    |
| <b>Regulator Topology</b>                     |                              | LCC Converter                                                                                                                   |
| <b>Switching Frequency</b>                    |                              | 75 - 100 kHz (PWM)                                                                                                              |
| <b>Insulation System</b>                      |                              | Reinforced Insulation                                                                                                           |
| <b>Isolation Test Voltage</b>                 | - 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                                                                                                                         |
| <b>Creepage</b>                               | - Input to Output            | 8 mm min.                                                                                                                       |
|                                               | - Input to Case or PE        | 4 mm min.                                                                                                                       |
|                                               | - Output to Case or PE       | 1.5 mm min.                                                                                                                     |
| <b>Clearance</b>                              | - Input to Output            | 8 mm min.                                                                                                                       |
|                                               | - Input to Case or PE        | 4 mm min.                                                                                                                       |
|                                               | - Output to Case or PE       | 1.5 mm min.                                                                                                                     |
| <b>Isolation Resistance</b>                   | - Input to Output, 500 VDC   | 4'000 MΩ min.                                                                                                                   |
| <b>Leakage Current</b>                        | - Earth Leakage Current      | 3500 μA max.                                                                                                                    |
|                                               | - Touch Current              | 310 μA max.                                                                                                                     |
| <b>Reliability</b>                            | - Calculated MTBF            | 1'300'000 h (IEC 61709)                                                                                                         |

All specifications valid at 230 VAC, resistive full load and +25°C after warm-up time, unless otherwise stated.

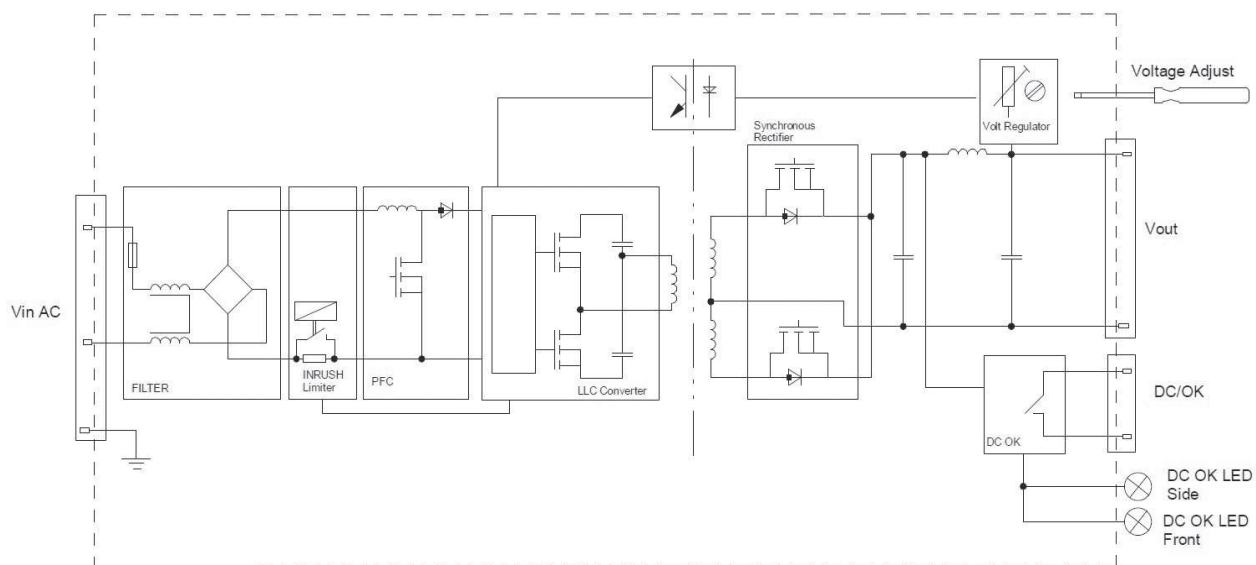
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|--------------------------|-------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Environment              | - Vibration             | EN 61373<br>IEC 60068-2-6<br>2 g, 3 axis, sine sweep, 10-55 Hz, 11 oct/min                                                                                                                                                                                             |
|                          | - Mechanical Shock      | EN 61373<br>IEC 60068-2-27<br>25 g, 3 axis, half sine, 11 ms                                                                                                                                                                                                           |
| Housing Material         |                         | Aluminum (Chassis)<br>Stainless Steel (Cover)                                                                                                                                                                                                                          |
| Housing Type             |                         | Metal Case                                                                                                                                                                                                                                                             |
| Mounting Type            |                         | DIN-Rail Mount<br>(EN 60715 - 35x7.5mm/35x15mm)                                                                                                                                                                                                                        |
| Connection Type          |                         | Screw Terminal                                                                                                                                                                                                                                                         |
| Weight                   |                         | 643 g                                                                                                                                                                                                                                                                  |
| Thermal Impedance        | - Case to Ambient       | 0.95 K/W typ.                                                                                                                                                                                                                                                          |
| Power Back Immunity      | 24 VDC model:           | 35 V max.                                                                                                                                                                                                                                                              |
|                          | 48 VDC model:           | 60 V max.<br>(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<br>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     | <a href="http://www.tracopower.com/info/reach-declaration.pdf">www.tracopower.com/info/reach-declaration.pdf</a><br>REACH SVHC list compliant<br>REACH Annex XVII compliant                                                                                            |
|                          | - RoHS Declaration      | <a href="http://www.tracopower.com/info/rohs-declaration.pdf">www.tracopower.com/info/rohs-declaration.pdf</a><br>Exemptions: 7(a), 7(c)-I<br>(RoHS exemptions refer to the component concentration only, not to the overall concentration in the product (O5A rule).) |
|                          | - SCIP Reference Number | 96735fdc-59b3-4359-996b-20464f2257aa                                                                                                                                                                                                                                   |

## Additional Information

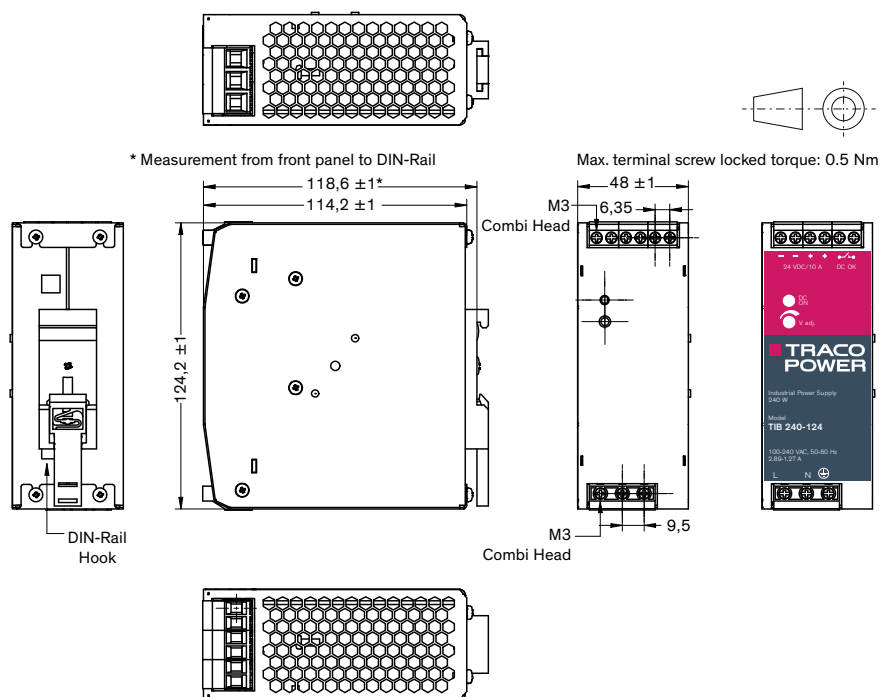
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|----------------------------|--------------------------------------------------------------------------------------------------|
| Supporting Documents       | <a href="http://www.tracopower.com/overview/tib240-ex">www.tracopower.com/overview/tib240-ex</a> |
| Frequently Asked Questions | <a href="http://www.tracopower.com/glossary-faq">www.tracopower.com/glossary-faq</a>             |
| Glossary                   | <a href="http://www.tracopower.com/info/glossary.pdf">www.tracopower.com/info/glossary.pdf</a>   |

All specifications valid at 230 VAC, resistive full load and +25°C after warm-up time, unless otherwise stated.

### Blockdiagram



### Outline Dimensions



All specifications valid at 230 VAC, resistive full load and +25°C after warm-up time, unless otherwise stated.

### Alternative side mounting

