AC/DC Power Supply

- Enclosed power supplies with screw terminal block
- Universal input range 90 to 264 VAC
- Ready to meet ErP directive, < 0.3 W no load power consumption
- Adjustable output voltage
- 4242 VDC I/O-isolation
- High efficiency up to 88%
- Operating temperature range: –30°C to +70°C max.
- Short circuit and over voltage protection

The TXH 060 series is a family of power supplies in metal enclosure, designed for a wide range of cost critical applications. The high efficiency of up to 88% is achieved through an innovative design for free air convection cooling. This design also qualifies the power supply to meet the ErP directive ( < 0.3 W no load power consumption). The units are equipped with screw terminal blocks and are easy to install in any equipment. These power supplies have universal input and comply with European EMC standards and the Low Voltage Directive (LVD).

### Models

<table>
<thead>
<tr>
<th></th>
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<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>TXH 060-105</td>
<td>50 W</td>
<td>5 VDC (4.8 - 5.3 VDC)</td>
<td>10'000 mA</td>
<td>81 %</td>
</tr>
<tr>
<td>TXH 060-112</td>
<td>60 W</td>
<td>12 VDC (11.4 - 12.6 VDC)</td>
<td>5'000 mA</td>
<td>87 %</td>
</tr>
<tr>
<td>TXH 060-115</td>
<td></td>
<td>15 VDC (14.3 - 15.8 VDC)</td>
<td>4'000 mA</td>
<td>87 %</td>
</tr>
<tr>
<td>TXH 060-124</td>
<td></td>
<td>24 VDC (22.8 - 25.2 VDC)</td>
<td>2'500 mA</td>
<td>88 %</td>
</tr>
<tr>
<td>TXH 060-148</td>
<td></td>
<td>48 VDC (45.6 - 50.4 VDC)</td>
<td>1'250 mA</td>
<td>88 %</td>
</tr>
</tbody>
</table>
### Input Specifications

<table>
<thead>
<tr>
<th>Input Voltage</th>
<th>90 - 264 VAC (Full Range)</th>
<th>120 - 370 VDC (Designed for, no certification)</th>
</tr>
</thead>
<tbody>
<tr>
<td>AC Range</td>
<td></td>
<td></td>
</tr>
<tr>
<td>DC Range</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Input Frequency</td>
<td>47 - 63 Hz</td>
<td></td>
</tr>
<tr>
<td>Input Current</td>
<td>1 mA max.</td>
<td>2 mA max.</td>
</tr>
<tr>
<td>Power Consumption</td>
<td>300 mW max. (Ready to meet ErP directive)</td>
<td></td>
</tr>
<tr>
<td>Input Inrush Current</td>
<td>70 A max.</td>
<td>35 A max.</td>
</tr>
<tr>
<td></td>
<td>(An external Thermistor has to be integrated in the circuit at the converter input L. Thermistor recommendation: 10R / 15Ω)</td>
<td></td>
</tr>
</tbody>
</table>

**Recommended Input Fuse**

(The need of an external fuse has to be assessed in the final application.)

### Output Specifications

**Output Voltage Adjustment**

±5% (By trim potentiometer)

Output power must not exceed rated power!

**Voltage Set Accuracy**

±2% max.

**Regulation**

- Input Variation (Vmin - Vmax)
  - Load Variation (0 - 100%)
  - 1% max.
  - 1% max.

**Ripple and Noise**

(20 MHz Bandwidth)

<table>
<thead>
<tr>
<th>Voltage Model</th>
<th>Ripple and Noise</th>
</tr>
</thead>
<tbody>
<tr>
<td>5 VDC</td>
<td>75 mVp-p max. (w/ 0.1 µF // 47 µF)</td>
</tr>
<tr>
<td>12 VDC</td>
<td>100 mVp-p max. (w/ 0.1 µF // 47 µF)</td>
</tr>
<tr>
<td>15 VDC</td>
<td>125 mVp-p max. (w/ 0.1 µF // 47 µF)</td>
</tr>
<tr>
<td>24 VDC</td>
<td>150 mVp-p max. (w/ 0.1 µF // 47 µF)</td>
</tr>
<tr>
<td>48 VDC</td>
<td>200 mVp-p max. (w/ 0.1 µF // 47 µF)</td>
</tr>
</tbody>
</table>

**Capacitive Load**

- 5 VDC model: 10’000 µF max.
- 12 VDC model: 5’000 µF max.
- 15 VDC model: 4’000 µF max.
- 24 VDC model: 2’000 µF max.
- 48 VDC model: 1’000 µF max.

**Minimum Load**

Not required

**Temperature Coefficient**

±0.02 %/K max.

**Hold-up Time**

- At 230 VAC: 55 ms min.
- At 115 VAC: 10 ms min.

**Start-up Time**

- At 230 VAC: 400 ms max.
- At 115 VAC: 500 ms max.

**Short Circuit Protection**

Continuous, Automatic recovery

**Output Current Limitation**

115 - 160% of Iout max.

**Overvoltage Protection**

105 - 145% of Vout nom.

(By Zener diode)

**Transient Response**

- Response Deviation: 2% max. (75% to 100% Load Step)
- Response Time: 500 µs typ. (75% to 100% Load Step)

### Safety Specifications

**Safety Standards**

- IT / Multimedia Equipment: EN 60950-1
- Certification Documents: IEC 60950-1
- UL 60950-1
- www.tracopower.com/overview/txh060

**Protection Class**

Class I (Prepared): Connection to PE

**Pollution Degree**

PD 2

**Over Voltage Category**

OVC II

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

**EMI Emissions**
- Conducted Emissions: EN 55032 class B (internal filter)
- Radiated Emissions: EN 55032 class B (internal filter)
- Harmonic Current Emissions: EN 61000-3-2, class B
- Voltage Fluctuations & Flicker: EN 61000-3-3

**EMS Immunity**
- 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
  - EFT (Burst) / Surge
    - L to L: EN 61000-4-5, ±2 kV, perf. criteria A
    - L to PE: EN 61000-4-5, ±2 kV, perf. criteria A
- Conducted RF Disturbances
- PF Magnetic Field
- Voltage Dips & Interruptions
  - Continuous: EN 61000-4-8, 30 A/m, perf. criteria A
  - 230 VAC / 50 Hz: EN 61000-4-11
  - 30%, 25 periods, perf. criteria A
  - >95%, 0.5 periods, perf. criteria A
  - >95%, 250 periods, perf. criteria C

### General Specifications

**Relative Humidity**
95% max. (non condensing)

**Temperature Ranges**
- Operating Temperature: –30°C to +70°C
- Storage Temperature: –50°C to +85°C

**Power Derating**
- High Temperature
- Low Input Voltage
  - See application note: [www.tracopower.com/overview/tlh060](http://www.tracopower.com/overview/tlh060)
  - 2 %/V below 100 VAC

**Cooling System**
Natural convection (20 LFM)

**Altitude During Operation**
3’100 m max.

**Switching Frequency**
60 - 70 kHz

**Insulation System**
Reinforced Insulation

**Working Voltage (rated)**
305 VAC

**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: 500 VAC

**Creepage**
- Input to Output: 5 mm min.

**Clearance**
- Input to Output: 4 mm min.

**Leakage Current**
- Earth Leakage Current: 1000 µA max.
- Touch Current: 750 µA max.

**Reliability**
- Calculated MTBF: 130’000 h (MIL-HDBK-217F, ground benign)

**Environment**
- Vibration: 2 g, 3 axis, 60 min, 10-500 Hz, 10 min/cycle

**Connection Type**
- Screw Terminal

**Weight**
220 g

**Environmental Compliance**
- Reach
- RoHS
  - [www.tracopower.com/info/reach-declaration.pdf](http://www.tracopower.com/info/reach-declaration.pdf)

### Supporting Documents

**Overview Link (for additional Documents)**
[www.tracopower.com/overview/tlh060](http://www.tracopower.com/overview/tlh060)

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

Outline Dimensions

Pin Connections

<table>
<thead>
<tr>
<th>Pin</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>AC IN (N) / DC IN (-)</td>
</tr>
<tr>
<td>2</td>
<td>AC IN (L) / DC IN (+)</td>
</tr>
<tr>
<td>3</td>
<td>PE</td>
</tr>
<tr>
<td>4</td>
<td>+Vout</td>
</tr>
<tr>
<td>5</td>
<td>–Vout</td>
</tr>
</tbody>
</table>