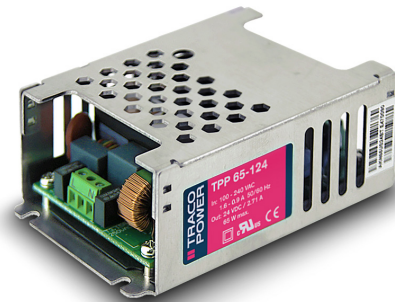


- Enclosed power supply with screw terminal connection
- Certification according to IEC/EN/ES 60601-1 3rd edition for 2×MOPP
- Low leakage current <75 µA rated for BF applications
- Risk management process according to ISO 14971 including risk management file
- Acceptance criteria for electronic assemblies according to IPC-A-610 Level 3
- EMC emission to IEC 60601-1-2-ed.4
- Protection class I and II
- Operating up to 5000 m altitude
- Ready to meet ErP directive, < 0.15 W no load power consumption
- 5 year product warranty



Open frame version with pin connection see TPP 65A Series



The TPP 65 Series of 65 Watt AC/DC power supplies feature a reinforced double I/O isolation system according to latest medical safety standards (60601-1 3rd edition, 2 × MOPP). The earth leakage current is below 75 µA what makes the units suitable for BF (body floating) applications.

The excellent efficiency of up to 92% allows a high power density for the standard 2.44" x 3.0" packaging format. The full load operating temperature range is -40°C to +60°C while it goes up to 85°C with 50% load derating (for single output models). The EMC characteristic is dedicated for applications in industrial and domestic fields.

High reliability is provided by use of industrial quality grade components and an excellent thermal management. It makes the products an ideal solution for medical devices and for demanding safety and space critical applications.

www.tracopower.com/overview/tpp65a

| Models | | | | | | | |
|--------------|----------------|--------|---------|------------------------|--------|--------|-----------------|
| Order code | Output voltage | | | Output current max. *2 | | | Efficiency max. |
| | Vout 1 *1 | Vout 2 | Vout 3 | Iout 1 | Iout 2 | Iout 3 | |
| TPP 65-105 | 5 VDC | | | 10.0 A | | | 90 % |
| TPP 65-112 | 12 VDC | | | 5.42 A | | | 92.5 % |
| TPP 65-115 | 15 VDC | | | 4.34 A | | | 93.5 % |
| TPP 65-124 | 24 VDC | | | 2.71 A | | | 93.5 % |
| TPP 65-221 | +12 VDC | +5 VDC | | 5.42 A | 8 A | | 90 % |
| TPP 65-231 | +15 VDC | +5 VDC | | 4.34 A | 8 A | | 90.5 % |
| TPP 65-251 | +24 VDC | +5 VDC | | 2.71 A | 8 A | | 89 % |
| TPP 65-321M2 | +12 VDC | +5 VDC | -12 VDC | 5.42 A | 8 A | 0.6 A | 89 % |
| TPP 65-331M3 | +15 VDC | +5 VDC | -15 VDC | 4.34 A | 8 A | 0.6 A | 89.5 % |
| TPP 65-3512 | +24 VDC | +5 VDC | +12 VDC | 2.71 A | 8 A | 0.6 A | 88.5 % |

Note: *1 Vout 1 is adjustable by ±10% with internal potentiometer
 *2 Total power should not exceed 65 Watt for continuous operation
 - Multi output models have a common ground (not isolated)
 - Other output voltages are available on request

Input Specifications

| | | |
|-----------------------------|--|--|
| Input voltage range | – AC range (universal input) – DC range | 85 – 264 VAC 120 – 370 VDC |
| Input frequency | | 47 – 63 Hz |
| Input current at full load | – at 115 VAC / 230 VAC | 1.65 A max. / 0.95 A max. |
| Input protection | | T3.15 A/250 VAC (internal fuse in both line & neutral) |
| Input inrush current | – at 230 VAC | 60 A max. |
| Zero load power consumption | | 0.15 W max. (acc. ErP directive) |

Output Specifications

| | | |
|--|---|--|
| Voltage set accuracy | | single output: ±1% multi output: ±1% Vout1 ±2% Vout2, Vout3 |
| Regulation - single output | – Input variation – Load variation (0 - 100%) | 0.2% max. 5 VDC model: 0.7% max. other models: 0.5% max. |
| Regulation - multi output | – Input variation – Load variation (0 - 100%) – Cross regulation (25% / 100%) | 0.2% max. Vout1: 0.5% max. Vout2: 1.5% max. (0.1W to full load: 0.7% max.) Vout3: 0.7% max. 1.5% max. |
| Minimum load | | not required (Vout3 requires 0.5 W on Vout1/Vout2 to be stabilized) |
| Temperature coefficient | | 0.02 %/K max. |
| Hold-up time | – Vin = 115 VAC | 16 ms typ. |
| Start-up time | | <1 s |
| Rise time | | 20 ms typ. |
| Ripple and noise (20 MHz bandwidth) | – Single output models – Multi output models | 5-15 VDC models: 75 mVp-p typ. w. cap. 10µF/25V 1206 X7R MLCC 24 VDC model: 75 mVp-p typ. w. cap. 1µF/50V 1206 X7R MLCC Vout 1: 12 VDC: 120 mVp-p typ. w. cap. 1µF/50V 1206 X7R MLCC Vout 1: 15 VDC: 150 mVp-p typ. w. cap. 1µF/50V 1206 X7R MLCC Vout 1: 24 VDC: 240 mVp-p typ. w. cap. 1µF/50V 1206 X7R MLCC Vout 2: 5 VDC: 100 mVp-p typ. w. cap. 10µF/25V 1206 X7R MLCC Vout 3: (+/-)12 VDC: 120 mVp-p typ. w. cap. 10µF/25V 1206 X7R MLCC Vout 3: -15 VDC: 150 mVp-p typ. w. cap. 10µF/25V 1206 X7R MLCC |
| Overvoltage protection | | 125 – 140% of nominal Vout |
| Overload protection by current limit | | single output models: at 145% Iout typ. multi output models: at 145% Pout1 + Pout2 |
| Short circuit protection | | hiccup mode (automatic recovery) |
| Transiente response | – Peak deviation – Recovery time | Vout1: 3% max. (25% load step change) 600 µs typ. |
| Capacitive load | – Single output – Dual output – Tripple output | 5 VDC model: 20'000 µF max. 12 VDC model: 4520 µF max. 15 VDC model: 2895 µF max. 24 VDC model: 1130 µF max. +12 / +5 VDC model: 2500 µF / 3000 µF max. +15 / +5 VDC model: 1600 µF / 3000 µF max. +24 / +5 VDC model: 625 µF / 3000 µF max. +12 / +5 / -12 VDC model: 2500 µF / 3000 µF / 500 µF max. +15 / +5 / -15 VDC model: 1600 µF / 3000 µF / 400 µF max. +24 / +5 / +12 VDC model: 625 µF / 3000 µF / 500 µF max. |

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

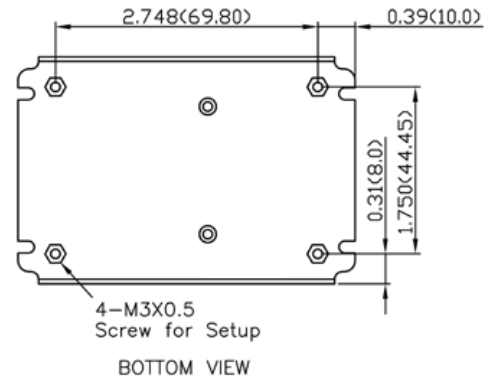
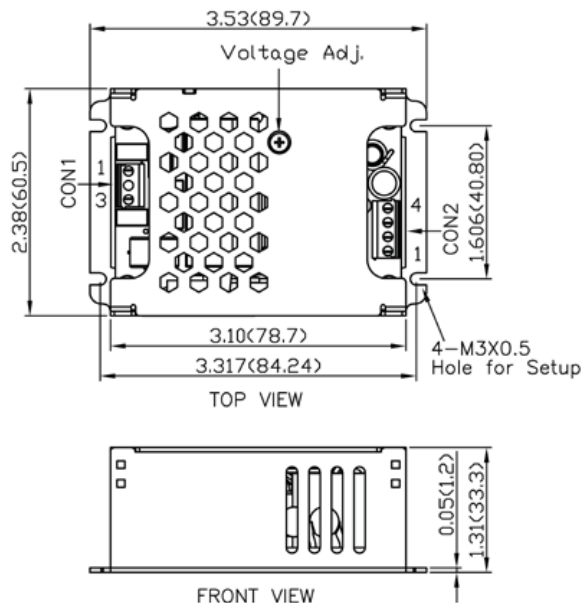
General Specifications

| | | |
|--|--|---|
| Operating temperature | | -40°C to +85°C with derating |
| Output power derating | <ul style="list-style-type: none"> - Temperature - Low input voltage | single output: 2 %/K above +60°C at 230 VAC 2 %/K above +55°C at 115 VAC multi output: 1.67 %/K above +55°C at 230 VAC 1.71 %/K above +50°C at 115 VAC 1.33 %/V below 100 VAC |
| Storage temperature | | -40°C to +85°C |
| Humidity (non condensing) | | 5 – 95 % rel. H max. |
| Altitude during operation | | 5000 m max. |
| Switching frequency - single output (at 230 VAC) | | 5 VDC model: 60 kHz typ. (pulse frequency modulation) other models: 120 kHz typ. (pulse frequency modulation) |
| Switching frequency - multi output (at 230 VAC) | <ul style="list-style-type: none"> - Vout 1 - Vout 2 - Vout 3 | 115 kHz typ. (pulse frequency modulation) 750 kHz typ. (pulse frequency modulation) 510 kHz typ. (pulse frequency modulation) |
| Isolation voltage | <ul style="list-style-type: none"> - Input / Output (60 s) - Input / Case (60 s) | 4000 VAC 2500 VAC |
| Leakage current (at 264 VAC/60Hz) | | 75 µA max. |
| Isolation resistance (at 500 VDC) | | 100 MOhm min. |
| Reliability | - calculated MTBF at +25°C acc. to IEC 61709 | 1'500'000 h for single output models 1'000'000 h for multi output models |
| Protection class | | class II prepared |
| Electromagnetic compatibility (EMC), emissions | <ul style="list-style-type: none"> - Conducted & Radiated input suppression - Harmonic current emissions - Voltage flicker | EN 55011 limits to IEC 60601-1-2 4th edition EN 55032 class B (internal filter) IEC / EN 61000-3-2, class B IEC / EN 61000-3-3, class B |
| Electromagnets compatibility (EMC), immunity | <ul style="list-style-type: none"> - Electrostatic discharge ESD - RF field immunity - Electrical fast transients/burst immunity - Surge - Conducted RF - Magnetic field (only for single output models) | IEC / EN 60601-1-2 IEC / EN 61000-4-2, 8kV/15kV perf. criteria A IEC / EN 61000-4-3, 20V/m perf. criteria A IEC / EN 61000-4-4, ± 2kV perf. criteria A IEC / EN 61000-4-5, ± 1kV/± 2kV perf. criteria A IEC / EN 61000-4-6, 20 Vrms perf. criteria A IEC / EN 61000-4-8, 10A/m perf. criteria A |
| Voltage dip and interruptions according to EN 60601-1-2 reference: 100 VAC / 50Hz | | 30%, 500ms perf. criteria A 60%, 100ms perf. criteria B > 95%, 10ms perf. criteria A > 95%, 5000ms perf. criteria B |
| Safety standards and certification | <ul style="list-style-type: none"> - Certification documents | IEC/EN 60601-1 3rd edition, ANSI/AAMI ES60601-1:2005(R)2012 www.ul.com file e188913 www.tracopower.com/overview/tpp65 |
| Environment | <ul style="list-style-type: none"> - Vibration acc. IEC 60068-2-6 - Shock acc. IEC 60068-2-27 | 3 axis, sine sweep, 10–55Hz, 1g, 1oct/min 3 axis, 10g half sine, 11msShock 20 G (3 directions each 3 times) |
| Environmental compliance | <ul style="list-style-type: none"> - Reach - RoHS | www.tracopower.com/products/reach-declaration.pdf RoHS directive 2011/65/EU |
| Connection | | screw terminal / pin connector |

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

Outline Dimensions

Single output:



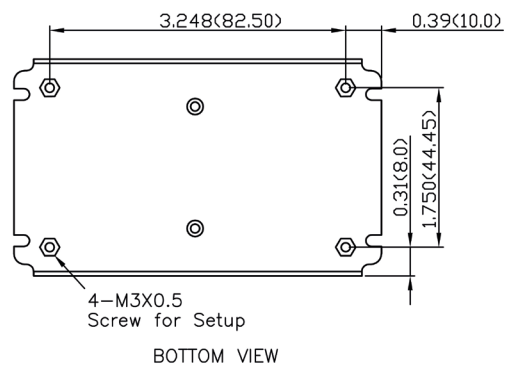
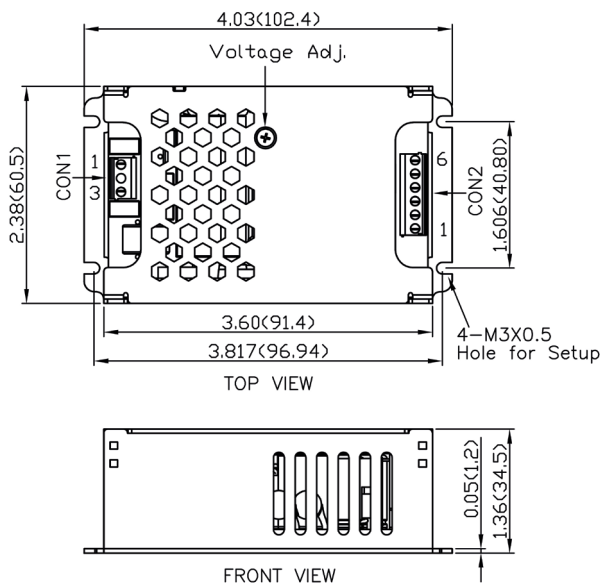
Screw Terminal

| Input | | Output | |
|-------|---------|--------|-------|
| Pin | Single | Pin* | Dual |
| 1 | Line | 1,2 | -Vout |
| 3 | Neutral | 3,4 | +Vout |

Weight: 172g (6.07 oz)

*Terminal rated for 10 A max.
(at higher current connection has to be split)

Multi output:



Screw Terminal

| Input | | Output | | |
|-------|---------|--------|--------|--------|
| Pin | Single | Pin* | Dual | Triple |
| 1 | Line | 1 | nc | Vout 3 |
| 3 | Neutral | 2,3 | Com | Com |
| | | 4,5 | Vout 2 | Vout 2 |
| | | 6 | Vout 1 | Vout 1 |

Weight: 221g (7.90 oz)

*Terminal rated for 10 A max.
(at higher current connection has to be split)

Dimensions in inch, () = mm
 Tolerances: $x.xx \pm 0.02$ ($x.x \pm 0.5$) $x.xxx \pm 0.01$ ($x.xx \pm 0.25$)
 Wire dimensions range 26 - 16 AWG
 M3x0.5 screw locked torque MAX 5Kgf.cm/0.49N.m
 Terminal screw locked torque MAX 2Kgf.cm/0.2N.m