

## 4080W 3-Phase Input Industrial Power Supplies

<https://product.tdk.com/en/power/tps>  
[www.emea.lambda.tdk.com/tps](http://www.emea.lambda.tdk.com/tps)



The TPS series industrial AC-DC power supplies offer output power up to 4,080W in a 2U high package with 3 phase supply input. Features include voltage and current programming, remote on/off, remote sense, a standby supply, PMBus communication, built in ORing FET and wide operating temperature range of -40°C to +70°C. The TPS4000 is also designed to meet MIL-STD-461F/G RE102 EMI and MIL-STD-810F vibration and shock.

| Features   | Benefits                                   |
|--|--|
| • 400/440/480 VAC (Nominal) 3 Phase Delta or Wye | • Global Use                               |
| • Fully Regulated, Wide Range Voltage Adjustment | • Versatile Application                    |
| • Voltage and Current Programming                | • Flexible Control and Adjustment          |
| • -40°C (start up) to +70°C operation            | • Suitable for Rugged Environments         |
| • 92% Typical Efficiency                         | • Less Energy Used                         |
| • PMBus Communication                            | • Remote Output Programming and Monitoring |
| • Built in ORing FET for parallel operation      | • Suitable for N + 1 Redundancy            |

| Model Selector |                            |                      |                 |               |                                    |                                  |
|----------------|----------------------------|----------------------|-----------------|---------------|------------------------------------|----------------------------------|
| Model          | Nominal Output Voltage (V) | Adjustment Range (V) | Max Current (A) | Max Power (W) | Max Current at Nominal Voltage (A) | Max Power at Nominal Voltage (V) |
| TPS4000-24     | 24                         | 19.2 - 28.5          | 166             | 4000          | 170                                | 4080                             |
| TPS4000-48     | 48                         | 38.4 - 58            | 83.3            | 4000          | 85                                 | 4080                             |

| Specification                             |         |  |
|---|---------|--|
| Model                                     | TPS4000 |  |
| <b>Input</b>                              |         |  |
| Input Voltage range                       | V       | 350 - 528VAC, Delta or Wye 3 phase   |
| Input Frequency                           | Hz      | 47 - 63Hz  |
| Input Current (At nominal Vin)            | A       | 8A per phase (steady state)  |
| Inrush Current at 400-480VAC (Cold Start) | A       | <25A per phase (excluding initial filter capacitor charging <2ms)                    |
| Dropped Phase Power                       | W       | 1600W. Not recommended for long term operation                                       |
| Leakage Current                           | uA      | <3mA   |
| Power Factor (400-480VAC)                 | -       | 0.92 typical at rated load, nominal Vin  |
| Harmonics                                 | -       | Not applicable   |
| Hold Up Time (typ) at 115VAC Input        | ms      | >10ms at 80% of rated current, nominal input/output voltage                          |
| Efficiency (Typical)                      | -       | 92%  |
| Conducted & Radiated EMI                  | -       | EN55032-A Conducted and radiated (In end system)                                     |
| Immunity                                  | -       | EN61000, see immunity table. MIL-STD-461F/G CS101, CS114 (Army Ground), CS115, CS116 |
| Line Dip                                  | -       | SEMI F47-0706 at 480VAC nominal (Criteria B)   |
| Safety Agency Certifications              | -       | IEC/UL/CSA/EN62368-1, 60950-1, CE Mark   |

| Immunity                             |              |   |          |                 |
|--------------------------------------|--------------|---|----------|-----------------|
| Test                                 | Standard     | Test Level  | Criteria | Notes           |
| ESD                                  | EN61000-4-2  | ±8 kV air discharge,<br>±4 kV contact discharge                                       | B        | See test report |
| Radiated Susceptibility              | EN61000-4-3  | 3 V/m from 80-1000 MHz<br>(80% AM at 1kHz)  | A        | See test report |
| Electrical Fast Transient Burst      | EN61000-4-4  | Power line pulses of ± 1 kV;<br>I/O line pulses of ± 0.5 kV                           | B        | See test report |
| Surge                                | EN61000-4-5  | 3±2kV common mode,<br>±1kV differential mode  | B        | See test report |
| Conducted Susceptibility             | EN61000-4-6  | 3 Vrms, 150 kHz - 80 MHz<br>1 kHz 80% AM  | A        | See test report |
| Magnetic fields                      | EN61000-4-8  | Inductive loop at 50 Hz,<br>to 30.0 amps (rms) per meter & 300.0 amps (rms) per meter | A        | See test report |
| Voltage Dips and Input Interruptions | EN61000-4-11 | Voltage Dips of 30% and >95%; Interruptions of >95%.                                  | B / C    | See test report |

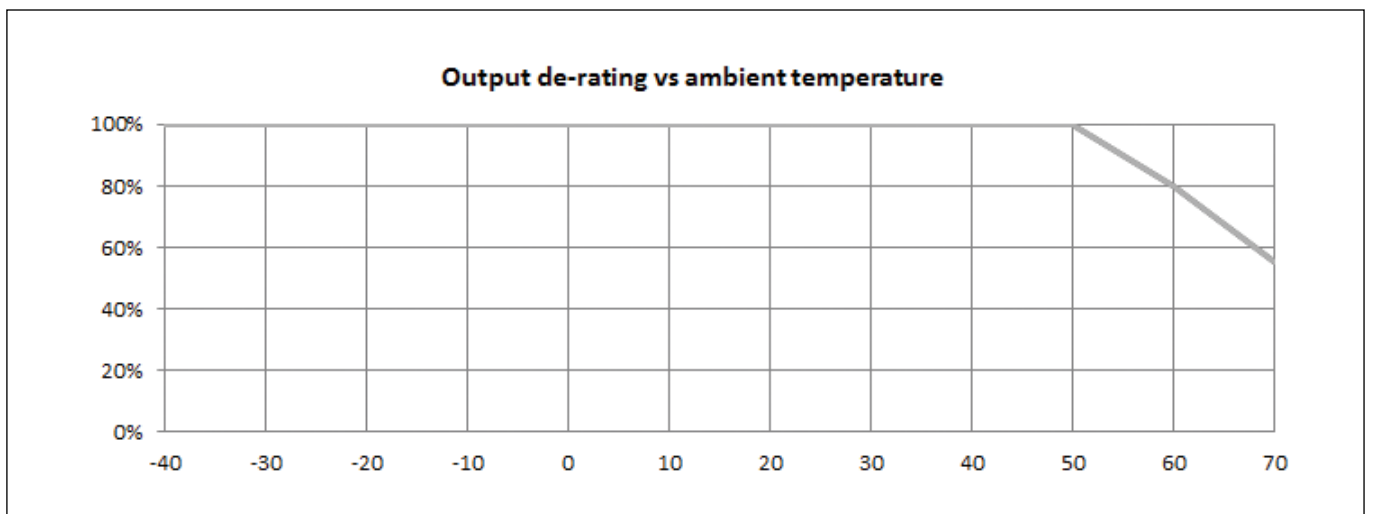
| Specification                  |         |   |
|--------------------------------|---------|---|
| Model                          | TPS4000 |   |
| <b>Output</b>                  |         |   |
| Line Regulation                | %       | <0.25%  |
| Load Regulation                | %       | <0.5%   |
| Total Regulation               | %       | <1.75%  |
| Warm Up Drift                  | %       | <0.2%   |
| Temperature Stability          | -       | 0.05% of rated Vout for 8hrs after 30min warmup   |
| Temperature Coefficient        | ppm/°C  | 200ppm/°C   |
| Ripple & Noise (pk-pk) Maximum | mV      | 24V model: 240mV, 48V model: 480mV  |
| Minimum Load                   | A       | None  |
| Overcurrent Protection         | %       | Adjustable (70-105% of maximum rated current). Constant current style.                                    |
| Overvoltage Protection         | %       | 115% of output voltage set point (tracking). Cycle AC or use the remote on/off to reset                   |
| Overtemperature Protection     | -       | Internal thermostat. Automatic reset  |
| Fan Fail                       | -       | Blocked or fan failure detection. Cycle AC input or use PMBus to reset                                    |
| Remote Sense                   | -       | Compensates for a total of 1V cable drop  |
| Remote On/Off                  | -       | Enable or inhibit (selectable)  |
| Voltage Programming            | -       | 0 - 5V external voltage adjusts the output from Vout max to Vout min                                      |
| Overcurrent Programming        | -       | 0 - 5V external voltage adjusts the current limit from Iout max to Iout min                               |
| DC Good                        | -       | Open Collector, ON when output is above 90% of output set point (tracking)                                |
| AC Fail                        | -       | Open Collector, ON when AC input is above 340VAC, the load is >30% and unit is enabled                    |
| Dropped Phase Warning          | -       | Open collector, OFF during normal operation, active low during dropped phase state. Load >30%             |
| Standby Voltage                | -       | 11.2 - 12.5V, 0.3A  |
| Indicators                     | -       | Green LEDs indicates DC is OK and AC is ON. Blinking red/green during dropped phase (Load >30%)           |
| Parallel Operation             | -       | Single wire current share, up to 8 units. (Internal ORing MOSFETs are fitted). Derate to 90% output power |
| Series Operation               | -       | Possible, see installation manual   |

| Specification                          |        |  |
|--|--------|--|
| Model                                  |        | TPS4000  |
| <b>Environmental</b>                   |        |  |
| Operating Temperature (-40°C start-up) | °C     | -10° to +70°, derate linearly from 100% to 80% load from 50° to 60°, and from 80% to 55% at 70°<br>(At -40°C a 10 min warm up at 80% load is required to meet specification) |
| Storage Temperature                    | °C     | -40° to +85°   |
| Humidity (non condensing)              | %RH    | 10 - 95%RH   |
| Cooling                                | -      | Internal variable speed fan  |
| Altitude                               | m      | 4,000m   |
| Withstand Voltage (For 1 minute)       | VAC    | Input to Ground 2,000VAC, Input to Output 3,000VAC, Output to Ground 500VDC  |
| Isolation Resistance                   | MΩ     | >100MΩ at 25°C, 70%RH & 500VDC   |
| Vibration (Operating)                  | -      | Designed to meet MIL-STD-810F, Method 514.5, Proc I, Category 1, 10  |
| Shock                                  | -      | Designed to meet MIL-STD-810F, Method 516.5, Procedure I, IV & VI  |
| <b>Other</b>                           |        |  |
| Weight (Typ)                           | g      | 4,000  |
| Size (WxHxD)                           | mm     | 107 x 84.4 x 335 (excluding output busbars)  |
| Size (WxHxD)                           | Inches | 4.21 x 3.33 x 13.2 (excluding output busbars)  |
| Mating Connectors                      | -      | Signal: Housing, JST PHDR-20VS, Crimp terminals, SPHD-001T-P0.5<br>PMBus shunt jumper: Samtec 2SN-BK-G   |
| MTBF - Telcordia SR-332 issue 3        | hrs    | 250,000 hours Method 1, Ground Benign, 25C, nominal input  |
| Warranty                               | yrs    | 3 years  |
| <b>PMBus Functions</b>                 |        |  |
| Output Voltage Monitoring              |        |  |
| Output Current Monitoring              |        |  |
| Internal Temperature Monitoring        |        |  |
| Remote On/Off Programming              |        |  |
| Remote Voltage Programming             |        |  |
| Remote Overcurrent Programming         |        |  |
| Fault Clearing                         |        |  |
| Reading Manufacturing Related Data     |        |  |

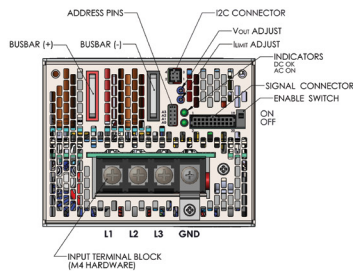
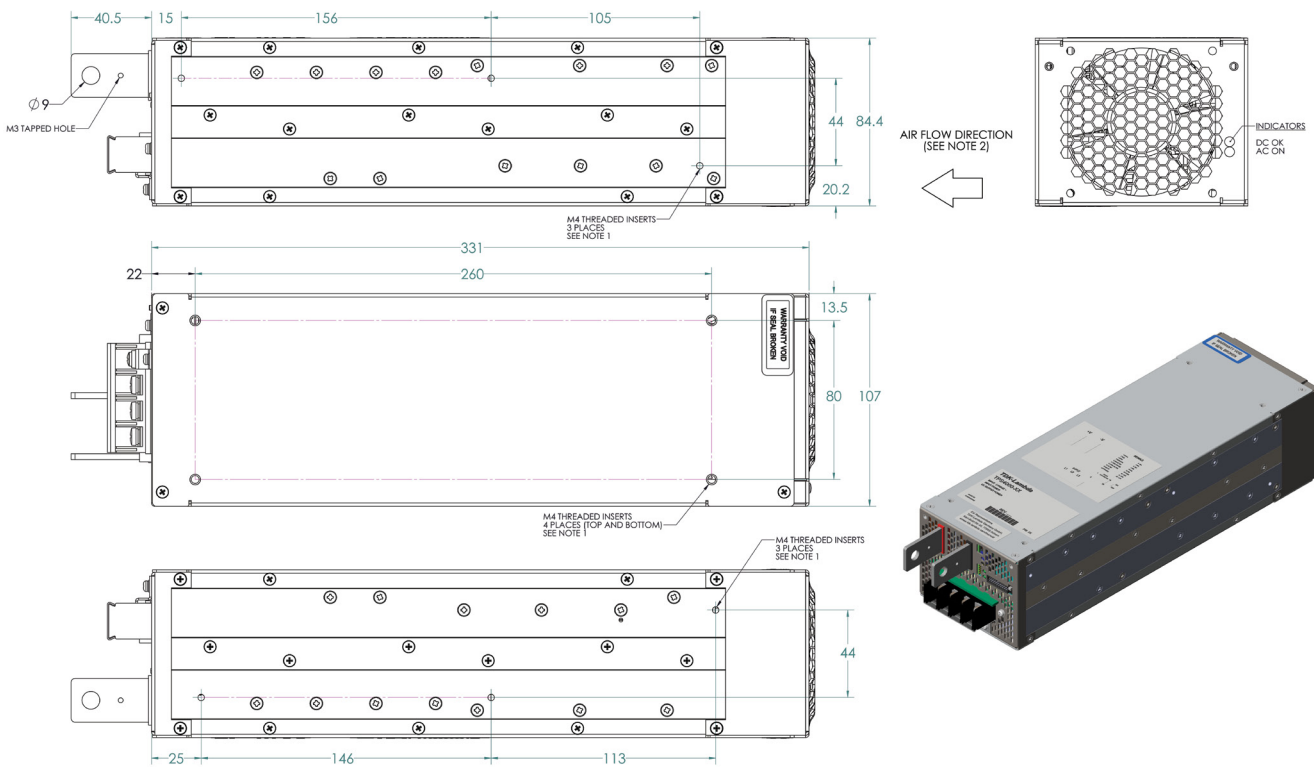
#### Notes

See website for detailed specifications, test methods and installation manual

## Derating Curve



## Outline Drawing



| I2C CONNECTOR | PIN No.   | FUNCTION |
|---------------|-----------|----------|
| 1             | SDA       |          |
| 2             | SCL       |          |
| 3             | SMB GND   |          |
| 4             | SMB ALERT |          |

| ADDRESS PINS            | FUNCTION |
|-------------------------|----------|
| V <sub>ADJUST</sub> (+) | ADJUST   |
| R1N                     | A1       |
| R1N                     | A2       |
| R1N                     | A3       |
| R1N                     | A4       |
| V <sub>ADJUST</sub> (-) | ADJUST   |
| CORE                    | 13V      |

| SIGNAL CONNECTOR | PIN No.          | FUNCTION |
|------------------|------------------|----------|
| 1                | ENABLE           |          |
| 2                | IGN              |          |
| 3                | V <sub>OUT</sub> |          |
| 4                | ENABLE           |          |
| 5                | OT               |          |
| 6                | +SNS             |          |
| 7                | GND (SIGNAL)     |          |
| 8                | -SNS             |          |
| 9                | PHASE OK         |          |
| 10               | IGN              |          |
| 11               | RTN (PHASE OK)   |          |
| 12               | PSON             |          |
| 13               | RTN (AC OK)      |          |
| 14               | PSON             |          |
| 15               | AC OK            |          |
| 16               | +SNS             |          |
| 17               | DC OK            |          |
| 18               | -SNS             |          |
| 19               | RTN (DC OK)      |          |
| 20               | +12V             |          |

### TDK-Lambda OUTLINE DRAWING TPS4000-XX

- NOTES:
1. MOUNTING SCREWS MUST NOT PROTRUDE INTO THE POWER SUPPLY MORE THAN 6mm
  2. ALLOW A MINIMUM OF 50mm UNRESTRICTED AIR SPACE AT THE REAR OF THE UNIT. DO NOT OBSTRUCT AIR FLOW TO THE FRONT PANEL
  3. SIGNAL CONNECTOR RECEPTACLE: JST P/N: PHDR-20VS RECEPTACLE CONTACTS: JST P/N: SPHD-001F-P0.5
  4. I2C CONNECTOR RECEPTACLE: MOLEX P/N: 51110-0460 RECEPTACLE CONTACTS: MOLEX P/N: 50394-8051
  5. ADDRESS PIN SELECTOR SHUNT JUMPER: SAMTEC P/N: 25N-BK-G

11/2019: Added second side view with mounting hole dimensions



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