

## 4080W 3-Phase Input Industrial Power Supplies

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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

\*Wider range adjustment as stated on the UL safety files are possible, although some parameters might not meet some of the listed specifications.

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, ±4 kV contact discharge	B	See test report
Radiated Susceptibility	EN61000-4-3	3 V/m from 80-1000 MHz (80% AM at 1kHz)	A	See test report
Electrical Fast Transient Burst	EN61000-4-4	Power line pulses of ± 1 kV; I/O line pulses of ± 0.5 kV	B	See test report
Surge	EN61000-4-5	3±2kV common mode, ±1kV differential mode	B	See test report
Conducted Susceptibility	EN61000-4-6	3 Vrms, 150 kHz - 80 MHz 1 kHz 80% AM	A	See test report
Magnetic fields	EN61000-4-8	Inductive loop at 50 Hz, 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

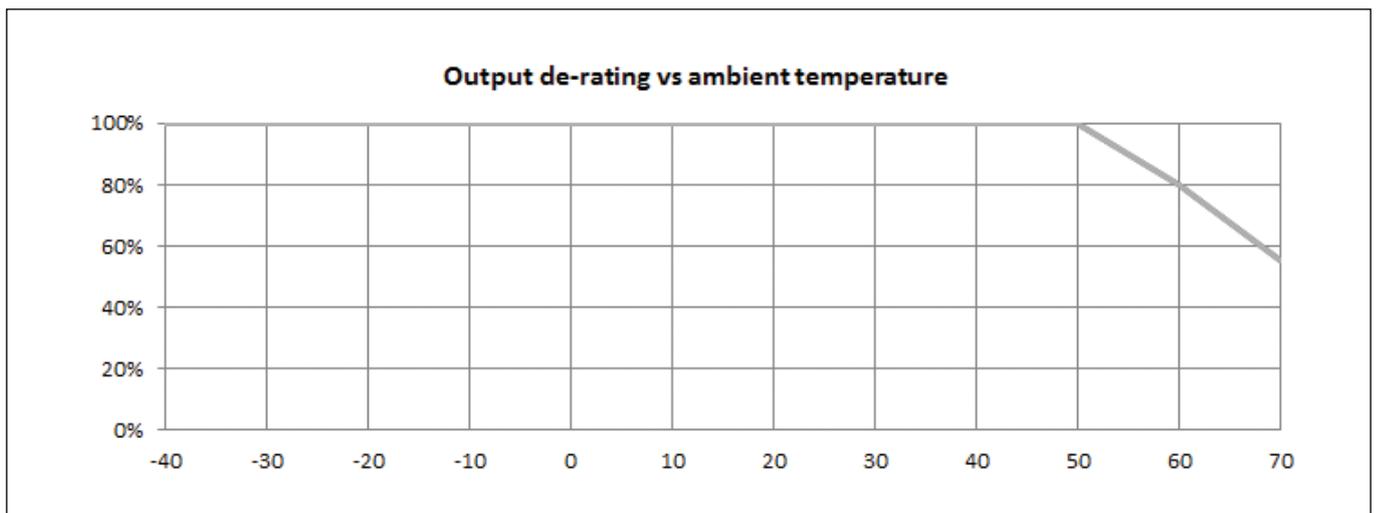
Specification		
Model	TPS4000	
<b>Output</b>		
Line Regulation	%	<0.25%
Load Regulation	%	<0.5%
Total Regulation	%	<1.75%
Warm Up Drift	%	<0.2%
Temperature Stability	-	0.05% of rated Vout for 8hrs after 30min warmup
Temperature Coefficient	ppm/°C	200ppm/°C
Ripple & Noise (pk-pk) Maximum	mV	24V model: 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° (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 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		

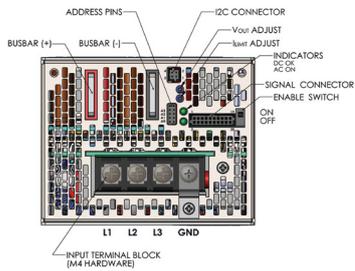
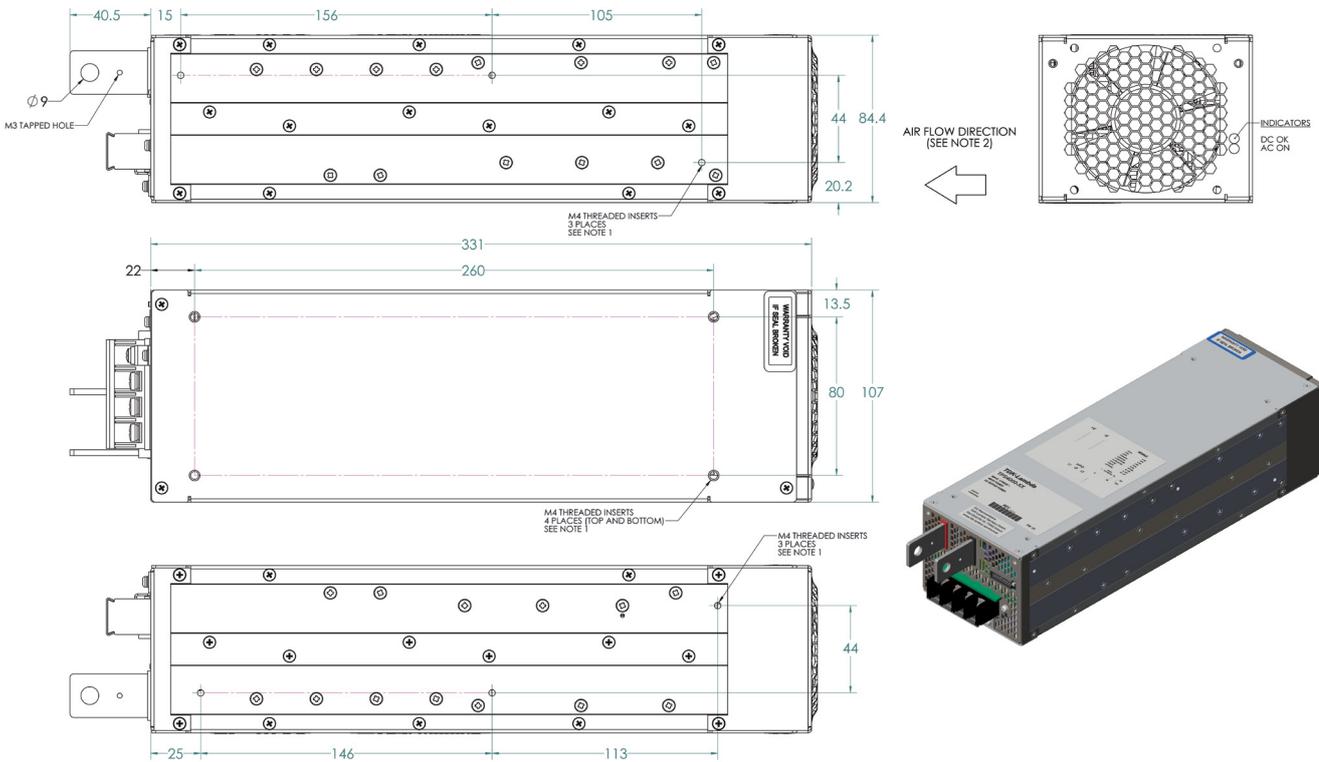
**Notes**

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	
PIN	FUNCTION
1	AD0
2	AD1
3	AD2
4	AD3
5	AD4
6	AD5
7	AD6
8	AD7
9	AD8
10	AD9
11	AD10
12	AD11
13	AD12
14	AD13
15	AD14
16	AD15
17	AD16
18	AD17
19	AD18
20	AD19

SIGNAL CONNECTOR	
PIN No.	FUNCTION
1	ENABLE
2	FAULT
3	Vout
4	ENABLE
5	OT
6	+SNS
7	GND (SIGNAL)
8	-SNS
9	PHASE OK
10	Inp
11	RTN (PHASE OK)
12	PSON
13	RTN (AC OK)
14	PSDN
15	ACOK
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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