

4080W 3-Phase Input Industrial Power Supplies

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www.emea.lambda.tdk.com/tps



COTS



Industrial



Test



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Broadcast

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	
Input		
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

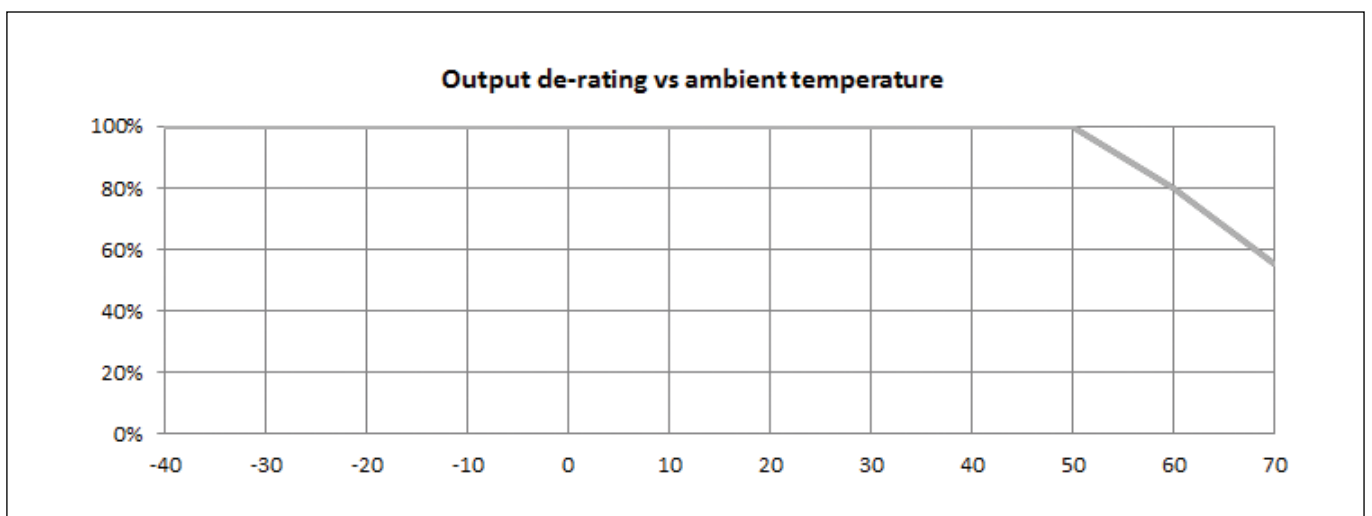
Specification		
Model	TPS4000	
Output		
Line Regulation	%	<0.25%
Load Regulation	%	<0.5%
Total Regulation	%	<1.75%
Warm Up Drift	%	<0.2%
Temperature Stability	-	0.05% of rated Vout for 8hrs after 30min warmup
Temperature Coefficient	ppm/°C	200ppm/°C
Ripple & Noise (pk-pk) Maximum	mV	24V model: 240mV, 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
Environmental		
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
Other		
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
PMBus Functions		
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		

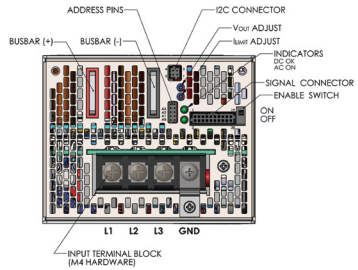
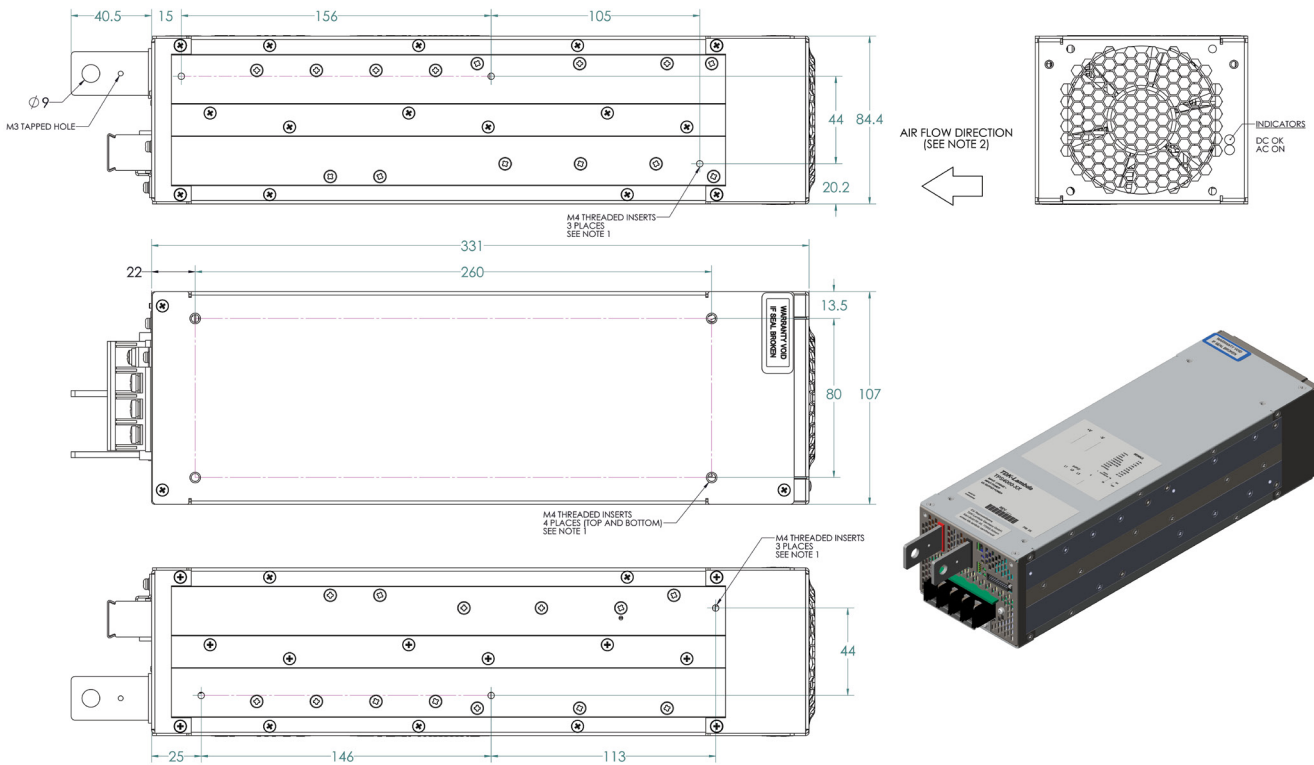
Notes

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 _{ADJUST} (+)	ADJUST
R1N	A1
R1N	A2
R1N	A3
R1N	A4
V _{ADJUST} (-)	ADJUST
CORE	13V

SIGNAL CONNECTOR	PIN No.	FUNCTION
1	ENABLE	
2	FAULT	
3	V _{OUT}	
4	ENABLE	
5	OT	
6	+SNS	
7	GND (SIGNAL)	
8	-SNS	
9	PHASE OK	
10	IN _{OK}	
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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