



# P-DUKE POWER

## TAH450 Series

3 X 5 Inch AC-DC POWER SUPPLIES  
Up to 450 Watts

**3**  
YEARS  
WARRANTY

ROHS  
COMPLIANT

REACH  
COMPLIANT

+85°C  
-40°C  
AMBIENT TEMP.



Automation



Datacom



IPC



Industry



Measurement



Telecom



Automobile



Boat



Charger



Medical



PV



Railway



**3000 VAC**  
Reinforced  
Insulation

**ADJ.**  
Output  
Voltage

Internal  
EN55032  
Class **B**  
Filter

**LOW**  
Leakage  
Current

**LOW**  
Standby  
Power

Operating  
Altitude  
**5000**  
meter

**POWER  
GOOD**

Protection  
Class I  
Class II

**REMOTE  
ON  
OFF**

**OCP**

**OTP**

**OVP**

**SCP**

### PART NUMBER STRUCTURE

<b>T</b>	<b>A</b>	<b>H</b>	<b>450</b>	<b>U</b>	<b>S</b>	<b>12</b>		-	<b>F2</b>
Application	Package Code	Dimension Code	Output Power (W)	Input Voltage (VAC)	Output Quantity	Output Voltage (VDC)	Protection Type		Option
<b>Industry Application</b>	A: Open type E: Enclosed type			U: Universal 85 ~ 264VAC	S: Single	12: 12V 15: 15V 24: 24V 28: 28V 48: 48V 53: 53V	Blank: CLASS I B: CLASS II		Blank: Fan connector with fixed fan speed control. Y: Fan connector with variable fan speed control.  For TEH450 only: Fixed fan speed F1: Fan 1, fan on the top F2: Fan 2, fan on the side  Variable fan speed Y1: Fan 1, fan on the top Y2: Fan 2, fan on the side

**TECHNICAL SPECIFICATION** All specifications are typical at 230VAC input, full load and 25°C unless otherwise noted

Model Number	Input Range VAC	Output Voltage VDC	Output Current @ 230VAC and Ta 50°C <sup>(1)</sup>			Input Power @ No Load W	Efficiency %
			Natural convection A	Conduction cooling A	Forced air cooling With 21CFM A		
TAH450US12(-Y)	85 ~ 264	12	20.8	23.3	37.5	0.3	91
TEH450US12(-Y)	85 ~ 264	12	20.8	23.3	37.5	0.3	91
TEH450US12-F1(Y1)	85 ~ 264	12	---	---	37.5	0.4	91
TEH450US12-F2(Y2)	85 ~ 264	12	---	---	37.5	0.4	91
TAH450US15(-Y)	85 ~ 264	15	16.6	18.6	30.0	0.3	92
TEH450US15(-Y)	85 ~ 264	15	16.6	18.6	30.0	0.3	92
TEH450US15-F1(Y1)	85 ~ 264	15	---	---	30.0	0.4	92
TEH450US15-F2(Y2)	85 ~ 264	15	---	---	30.0	0.4	92
TAH450US24(-Y)	85 ~ 264	24	13.3	14.55	18.75	0.5	93
TEH450US24(-Y)	85 ~ 264	24	13.3	14.55	18.75	0.5	93
TEH450US24-F1(Y1)	85 ~ 264	24	---	---	18.75	0.8	93
TEH450US24-F2(Y2)	85 ~ 264	24	---	---	18.75	0.8	93
TAH450US28(-Y)	85 ~ 264	28	11.4	12.5	16.1	0.5	93
TEH450US28(-Y)	85 ~ 264	28	11.4	12.5	16.1	0.5	93
TEH450US28-F1(Y1)	85 ~ 264	28	---	---	16.1	0.8	93
TEH450US28-F2(Y2)	85 ~ 264	28	---	---	16.1	0.8	93
TAH450US48(-Y)	85 ~ 264	48	6.65	7.3	9.4	0.5	94
TEH450US48(-Y)	85 ~ 264	48	6.65	7.3	9.4	0.5	94
TEH450US48-F1(Y1)	85 ~ 264	48	---	---	9.4	0.8	94
TEH450US48-F2(Y2)	85 ~ 264	48	---	---	9.4	0.8	94
TAH450US53(-Y)	85 ~ 264	53	6.05	6.6	8.55	0.5	94
TEH450US53(-Y)	85 ~ 264	53	6.05	6.6	8.55	0.5	94
TEH450US53-F1(Y1)	85 ~ 264	53	---	---	8.55	0.8	94
TEH450US53-F2(Y2)	85 ~ 264	53	---	---	8.55	0.8	94

INPUT SPECIFICATIONS						
Parameter	Conditions			Min.	Typ.	Max. Unit
Operating input voltage range	AC input			85		264 VAC
	DC input			120		370 VDC
Input frequency	AC input			47		63 Hz
Input current	100VAC and Full Load					5.8 A
	240VAC and Full Load					2.4 A
No load input power	230VAC	TAH(-Y), THE(-Y)	12Vout, 15Vout		0.3	Watts
			others		0.5	
		TEH -F□(Y□)	12Vout, 15Vout		0.4	
			others		0.8	
Leakage current	264VAC				300	μA
Power Factor				0.95		
Start up time					2000	ms
Rise time					30	ms
Hold up time	115VAC and Full Load				14	ms
Input inrush current	230VAC				100	A
Input protection	Internal fuse in line and neutral					T6.3A/250VAC

## OUTPUT SPECIFICATIONS

Parameter	Conditions		Min.	Typ.	Max.	Unit
Output power	Forced air cooling	All			450	Watts
		12Vout, 15Vout others			280	
	Conduction cooling @ 230VAC	12Vout, 15Vout others			350	
		Natural convection @ 230VAC	12Vout, 15Vout others			
					320	
	*Please refer to the derating curve for detailed rating.					
Initial set voltage accuracy	230VAC and Full Load		-1.0		+1.0	%
Line regulation	Low Line to High Line at Full Load		-0.2		+0.2	%
Load regulation	No Load to Full Load		-0.5		+0.5	%
	10% Load to 90% Load		-0.4		+0.4	
Voltage adjustability			-8		+8	%
Minimum load				0		%
Ripple and noise	Measured by 20MHz bandwidth With a 1μF/25V 1206 X7R MLCC	12Vout		250		mVp-p
		15Vout		300		
	With a 1μF/50V 1206 X7R MLCC	24Vout		240		
		28Vout		280		
With a 0.1μF/100V 1206 X7R MLCC	48Vout		480			
	53Vout		530			
Temperature coefficient			-0.02		+0.02	%/°C
Transient response	Load step from 50 ~ 75% change at 2.5A/μs	Peak deviation		3		%
		Recovery time		600		μs
Over voltage protection	% of Vout(nom); Latch mode		110		135	%
Over load protection	% of Iout rated; Hiccup mode		115		155	%
Short circuit protection	Protection level 1 (nominal) Protection level 2 (instantaneous high current)		Continuous, automatic recovery Latch			
Standby power supply			5V at 2000mA			
Fan power supply			12V at 500mA			

## GENERAL SPECIFICATIONS

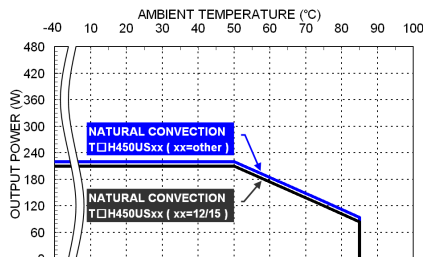
Parameter	Conditions		Min.	Typ.	Max.	Unit
Isolation voltage	1 minute (Reinforced insulation)	Input to Output	3000			VAC
		Input (Output) to F.G.	2000			
Isolation resistance	500VDC		0.1			GΩ
Switching frequency	230VAC, Full load	15Vout		75		kHz
		Other		65		
Design meet safety standard			IEC/ EN/ UL 60950-1			
Weight	TAH(-Y)					462g(16.29oz)
	TEH(-Y)					504g(17.77oz)
	TEH -F1(-Y1)					524g(18.48oz)
	TEH -F2(-Y1)					552g(19.47oz)
MTBF	MIL-HDBK-217F Ta=25°C, Full load					4.093 x 10 <sup>5</sup> hrs

## ENVIRONMENTAL SPECIFICATIONS

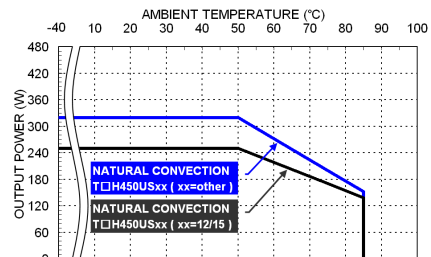
Parameter	Conditions		Min.	Typ.	Max.	Unit
Operating ambient temperature	With derating	TAH(-Y), TEH(-Y)	-40		+85	°C
		TEH -F□(Y□)	-40		+80	
Storage temperature range		TAH(-Y), TEH(-Y)	-40		+85	°C
		TEH -F□(Y□)	-40		+75	
Operating altitude			5000			m
Thermal shock			MIL-STD-810F			
Shock			IEC60068-2-27			
Vibration			IEC60068-2-6			
Relative humidity	Non-condensing		5% to 95% RH			

**EMC SPECIFICATIONS**

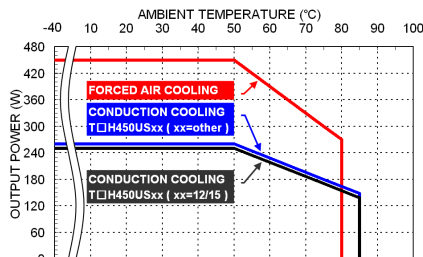
Parameter	Conditions	Level
EMI	EN55011, EN55032 and FCC Part 15  For optimum EMI performance, the power supply should be mounted to a metal plate grounded to all 4 mounting holes of the power supply. To comply with safety standards, this plate must be properly grounded to protective earth.	Conducted Class B Radiated Class A
Harmonic currents	EN61000-3-2 Full Load	Class A and D
Voltage flicker	EN61000-3-3	
ESD	EN61000-4-2 Air $\pm 15$ kV and Contact $\pm 8$ kV	Perf. Criteria A
Radiated immunity	EN61000-4-3 3 V/m	Perf. Criteria A
Fast transient	EN61000-4-4 $\pm 2$ kV	Perf. Criteria A
Surge	EN61000-4-5 DM $\pm 1$ kV and CM $\pm 2$ kV	Perf. Criteria A
Conducted immunity	EN61000-4-6 20 Vr.m.s	Perf. Criteria A
Power frequency magnetic field	EN61000-4-8 30 A/m	Perf. Criteria A
Dip and interruptions	EN61000-4-11 and EN55024	

**CHARACTERISTIC CURVE**


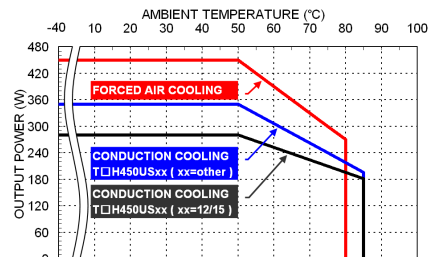
Derating Curve vs. Ambient Temperature  
Vin=115VAC and Natural convection



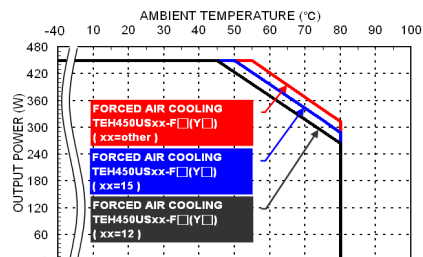
Derating Curve vs. Ambient Temperature  
Vin=230VAC and Natural convection



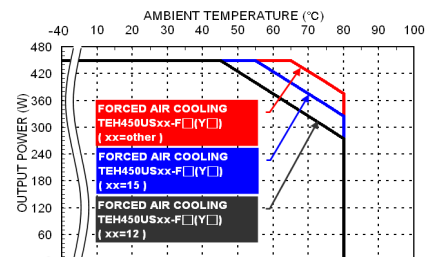
Derating Curve vs. Ambient Temperature  
Vin=115VAC and Conduction cooling  
Forced air cooling with 21CFM



Derating Curve vs. Ambient Temperature  
Vin=230VAC and Conduction cooling  
Forced air cooling with 21CFM

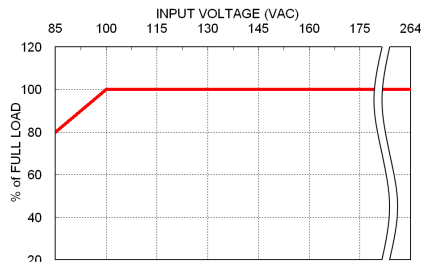


Derating Curve vs. Ambient Temperature  
Vin=115VAC and Forced air cooling

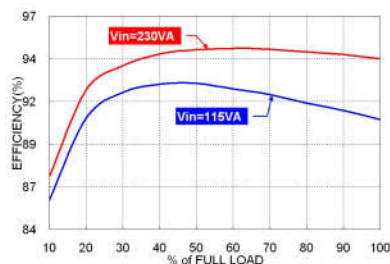


Derating Curve vs. Ambient Temperature  
Vin=230VAC and Forced air cooling

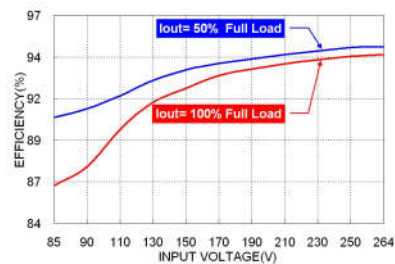
## CHARACTERISTIC CURVE (CONTINUED)



Derating Curve vs. Input Voltage  
TAH450



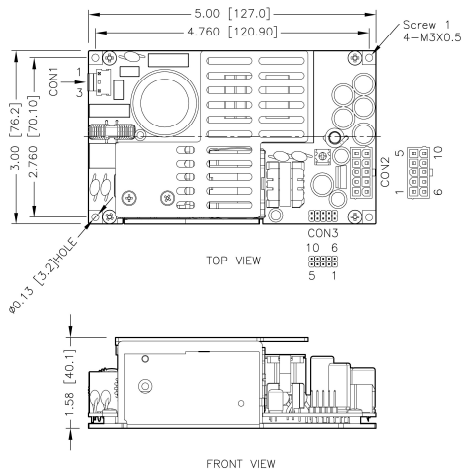
Efficiency vs. Output Load  
TAH450US24 with Forced air cooling



Efficiency vs. Input Voltage  
TAH450US24 with Forced air cooling

## MECHANICAL DRAWING

TAH450USXX



\*Either one of four screw holes can be considered as PE connection for CLASS I application.

- All dimensions in inch [mm]
- Tolerance :  $x.xx \pm 0.02$  [ $x.x \pm 0.5$ ]  
 $x.xxx \pm 0.01$  [ $x.xx \pm 0.25$ ]
- Screw 1 locked torque : MAX 5.2Kg $\cdot$ cm/0.51N $\cdot$ m

### CONNECTORS CONNECTIONS

#### CON1 – Input Connector

Pin 1	Line
Pin 3	Neutral

Mates with  
 Molex housing : **09-50-8031**  
 Molex crimp terminals : **2478,6838,45570**

#### CON2 – Output Connector

Pin 1,2,3,4,5	+Vout
Pin 6,7,8,9,10	-Vout

Mates with  
 Molex housing : **39-01-2105**  
 Molex crimp terminals : **5556,45750**

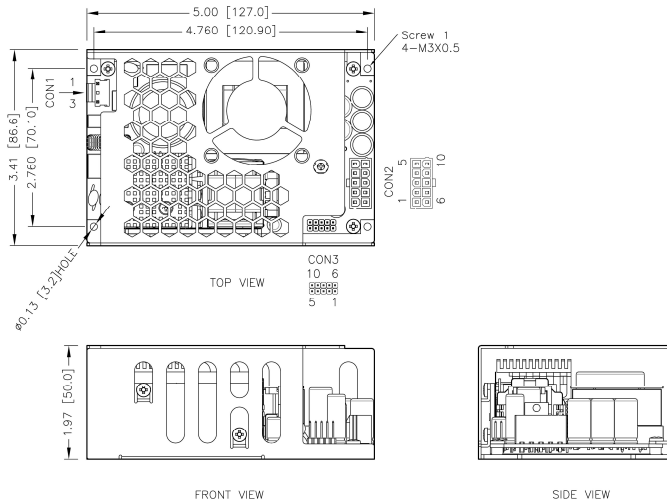
#### CON3 – Aux Connector

Pin 1	+Fan	Pin 6	-Fan
Pin 2	+V Sense	Pin 7	-V Sense
Pin 3	+Control	Pin 8	-Control
Pin 4	+PG	Pin 9	-PG
Pin 5	+5V	Pin10	-5V

Mates with  
 Molex housing : **90143-0008**  
 Molex crimp terminals : **90119**

## MECHANICAL DRAWING (CONTINUED)

TEH450USXX



\*Either one of four screw holes can be considered as PE connection for CLASS I application.

1. All dimensions in inch [mm]
2. Tolerance : x.xx±0.02 [x.x±0.5]  
x.xxx±0.01 [x.xx±0.25]
3. Screw 1 locked torque : MAX 5.2Kgf-cm/0.51N.m

### CONNECTORS CONNECTIONS

#### CON1 – Input Connector

Pin 1	Line
Pin 3	Neutral

Mates with

Molex housing : **09-50-8031**

Molex crimp terminals : **2478,6838,45570**

#### CON2 – Output Connector

Pin 1,2,3,4,5	+Vout
Pin 6,7,8,9,10	-Vout

Mates with

Molex housing : **39-01-2105**

Molex crimp terminals : **5556,45750**

#### CON3 – Aux Connector

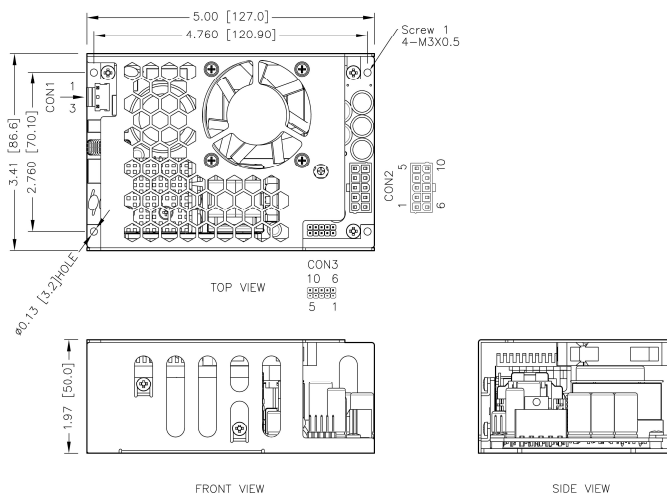
Pin 1	+Fan	Pin 6	-Fan
Pin 2	+V Sense	Pin 7	-V Sense
Pin 3	+Control	Pin 8	-Control
Pin 4	+PG	Pin 9	-PG
Pin 5	+5V	Pin10	-5V

Mates with

Molex housing : **90143-0008**

Molex crimp terminals : **90119**

TEH450USXX-F1 FAN dimension: 50x50x10mm Air flow: 11.4 CFM  
 The fan's life is shorter than power supply and has only 2 years warranty.



\*Either one of four screw holes can be considered as PE connection for CLASS I application.

1. All dimensions in inch [mm]
2. Tolerance : x.xx±0.02 [x.x±0.5]  
x.xxx±0.01 [x.xx±0.25]
3. Screw 1 locked torque : MAX 5.2Kgf-cm/0.51N.m

### CONNECTORS CONNECTIONS

#### CON1 – Input Connector

Pin 1	Line
Pin 3	Neutral

Mates with

Molex housing : **09-50-8031**

Molex crimp terminals : **2478,6838,45570**

#### CON2 – Output Connector

Pin 1,2,3,4,5	+Vout
Pin 6,7,8,9,10	-Vout

Mates with

Molex housing : **39-01-2105**

Molex crimp terminals : **5556,45750**

#### CON3 – Aux Connector

Pin 1	+Fan	Pin 6	-Fan
Pin 2	+V Sense	Pin 7	-V Sense
Pin 3	+Control	Pin 8	-Control
Pin 4	+PG	Pin 9	-PG
Pin 5	+5V	Pin10	-5V

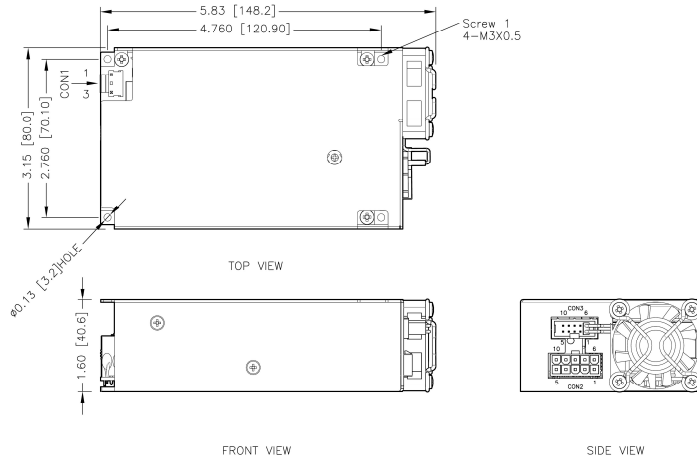
Mates with

Molex housing : **90143-0008**

Molex crimp terminals : **90119**

**MECHANICAL DRAWING (CONTINUED)**

**TEH450USXX-F2** FAN dimension: 40x40x10mm Air flow: 9.5 CFM  
 The fan's life is shorter than power supply and has only 2 years warranty.



\*Either one of four screw holes can be considered as PE connection for CLASS I application.

1. All dimensions in inch [mm]
2. Tolerance :  $x.xx \pm 0.02$  [ $x.x \pm 0.5$ ]  
 $x.xxx \pm 0.01$  [ $x.xx \pm 0.25$ ]
3. Screw 1 locked torque : MAX 5.2Kgf-cm/0.51N.m

**CONNECTORS CONNECTIONS**
**CON1 – Input Connector**

Pin 1	Line
Pin 3	Neutral

Mates with  
 Molex housing : **09-50-8031**  
 Molex crimp terminals : **2478,6838,45570**

**CON2 – Output Connector**

Pin 1,2,3,4,5	-Vout
Pin 6,7,8,9,10	+Vout

Mates with  
 Molex housing : **39-01-2105**  
 Molex crimp terminals : **5556,45750**

**CON3 – Aux Connector**

Pin 1	+Fan	Pin 6	-Fan
Pin 2	+V Sense	Pin 7	-V Sense
Pin 3	+Control	Pin 8	-Control
Pin 4	+PG	Pin 9	-PG
Pin 5	+5V	Pin10	-5V

Mates with  
 Molex housing : **90143-0008**  
 Molex crimp terminals : **90119**