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

cULus CB CE FC

PFC integrated | POWER SAVE

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

T	A	H	450	U	S	12	□	-	F2
Application	**Package Code**	**Dimension Code**	**Output Power (W)**	**Input Voltage (VAC)**	**Output Quantity**	**Output Voltage (VDC)**	**Protection Type**		**Option**
Industry Application	**A:**Open type **E:**Enclosed type			**U:** Universal 85 ~ 264VAC	**S:**Single	**12:**12V **15:**15V **24:**24V **28:**28V **36:**36V **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 T**E**H450 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℃ unless otherwise noted

Model Number	Input Range	Output Voltage	Output Current @ 230VAC				Input Power @ No Load	Efficiency
			Natural convection	Conduction cooling	Forced air cooling			
					21 CFM External Fan	Internal Fan		
	VAC	VDC	A	A	A	A	W	%
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	---	0.5	92
TEH450US15(-Y)	85 ~ 264	15	16.6	18.6	30.0	---	0.5	92
TEH450US15-F1(Y1)	85 ~ 264	15	---	---	---	30.0	0.8	92
TEH450US15-F2(Y2)	85 ~ 264	15	---	---	---	30.0	0.8	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
TAH450US36(-Y)	85 ~ 264	36	8.9	9.72	12.5	---	0.5	93
TEH450US36(-Y)	85 ~ 264	36	8.9	9.72	12.5	---	0.5	93
TEH450US36-F1(Y1)	85 ~ 264	36	---	---	---	12.5	0.8	93
TEH450US36-F2(Y2)	85 ~ 264	36	---	---	---	12.5	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 DC input			85 120		264 370	VAC VDC
Input frequency	AC input			47		63	Hz
Input current	100VAC and Full Load 240VAC and Full Load					5.8 2.4	A
No load input power	230VAC	TAH(-Y), THE(-Y)	12Vout others		0.3 0.5		Watts
		TEH –F□(Y□)	12Vout others		0.4 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 Conduction cooling @ 230VAC Natural convection @ 230VAC *Please refer to the derating curve for detailed rating.	All 12Vout,15Vout others 12Vout,15Vout others			450 280 350 250 320	Watts
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 10% Load to 90% Load		-0.5 -0.4		+0.5 +0.4	%
Voltage adjustability			-8		+8	%
Minimum load				0		%
Ripple and noise	Measured by 20MHz bandwidth With a 1μF/25V 1206 X7R MLCC With a 1μF/50V 1206 X7R MLCC With a 0.1μF/100V 1206 X7R MLCC	 12Vout 15Vout 24Vout 28Vout 48Vout 53Vout		 250 300 240 280 480 530		mVp-p
Temperature coefficient			-0.02		+0.02	%/℃
Transient response	Load step from 50 ~ 75% change at 2.5A/μs	Peak deviation Recovery time		3 600		% Vout 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, automatics 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 Input (Output) to F.G.	3000 2000			VAC
Isolation resistance	500VDC		0.1			GΩ
Switching frequency	230VAC, Full load	15Vout Other		75 65		kHz
Safety approvals	IEC/ EN/ UL 60950-1, 62368-1				UL:E193009 CB:UL(Demko)	
Weight		TAH(-Y) TEH(-Y) TEH –F1(Y1) TEH –F2(Y2)			462g(16.29oz) 504g(17.77oz) 524g(18.48oz) 552g(19.47oz)	
MTBF	MIL-HDBK-217F Ta=25℃, Full load				4.093×10^5 hrs	

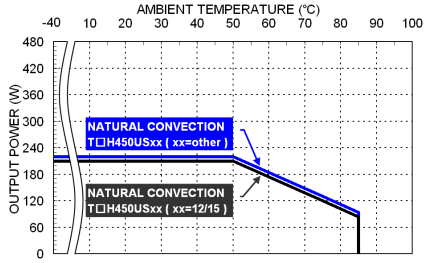
ENVIRONMENTAL SPECIFICATIONS

Parameter	Conditions		Min.	Typ.	Max.	Unit
Operating ambient temperature	With derating	TAH(-Y), TEH(-Y) TEH –F□(Y□)	-40 -40		+85 +80	℃
Storage temperature range		TAH(-Y), TEH(-Y) TEH –F□(Y□)	-40 -40		+85 +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	

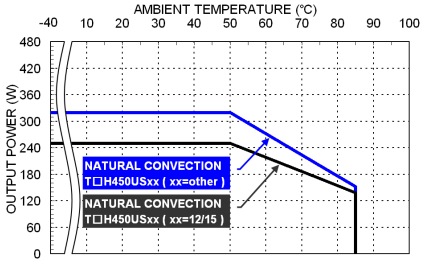
EMC SPECIFICATIONS

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 ± 15kV and Contact ± 8kV	Perf. Criteria A
Radiated immunity	EN61000-4-3	3 V/m	Perf. Criteria A
Fast transient	EN61000-4-4	± 2kV	Perf. Criteria A
Surge	EN61000-4-5	DM ± 1kV and CM ± 2kV	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		

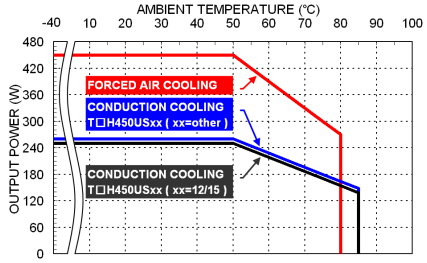
CHARACTERISTIC CURVE



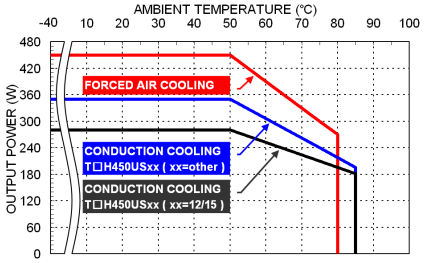
Derating Curve vs. Ambient Temperature
Vin=115VAC and Natural convection



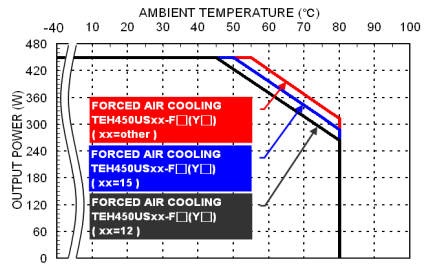
Derating Curve vs. Ambient Temperature
Vin=230VAC and Natural convection



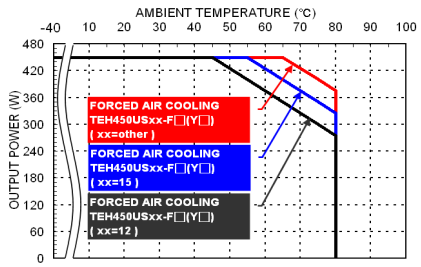
Derating Curve vs. Ambient Temperature
Vin=115VAC and Conduction cooling
Forced air cooling with 21CFM (External Fan)



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

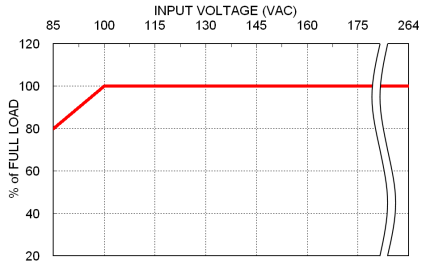


Derating Curve vs. Ambient Temperature
Vin=115VAC and Forced air cooling (Internal Fan)

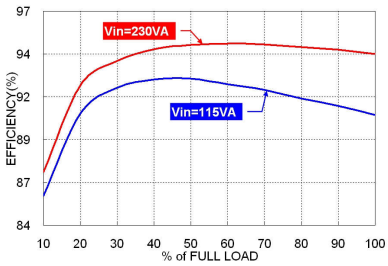


Derating Curve vs. Ambient Temperature
Vin=230VAC and Forced air cooling (Internal Fan)

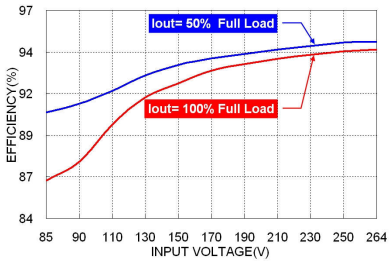
CHARACTERISTIC CURVE (CONTINUED)



Derating Curve vs. Input Voltage
T□H450



Efficiency vs. Output Load
T□H450US24 with Forced air cooling



Efficiency vs. Input Voltage
T□H450US24 with Forced air cooling

OUTPUT SENSING

Output sensing function can be applied via connecting wires on CON3. Initially, Pin 7 and Pin 8 are shorted by a jumpper set as default, shown as Fig. 1.

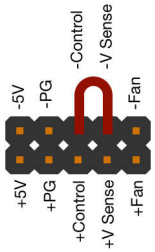
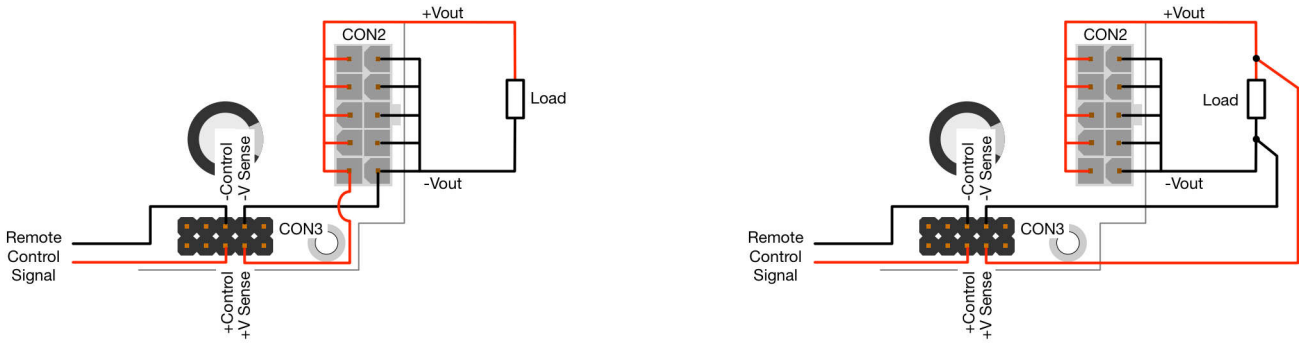


Fig. 1 Default connection

But if remote control function is to be used, the jumpper on Pin 7 and Pin 8 should be removed. Since sense pins sould not be left open for module stability, please follow the connections as below (Fig. 2).

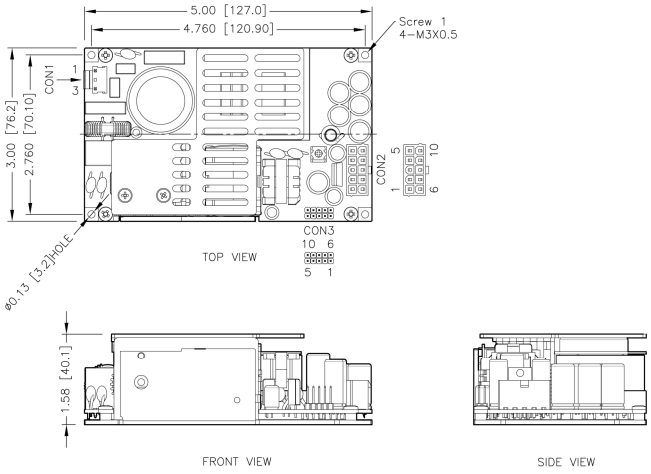


(a) Sense pins connect to corresponding polarity of Vout pin (b) Sense pins connect to corresponding polarity terminal of load.

Fig. 2 Recommended output sensing connections

MECHANICAL DRAWING

T**A**H450USXX **(-Y)**



*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

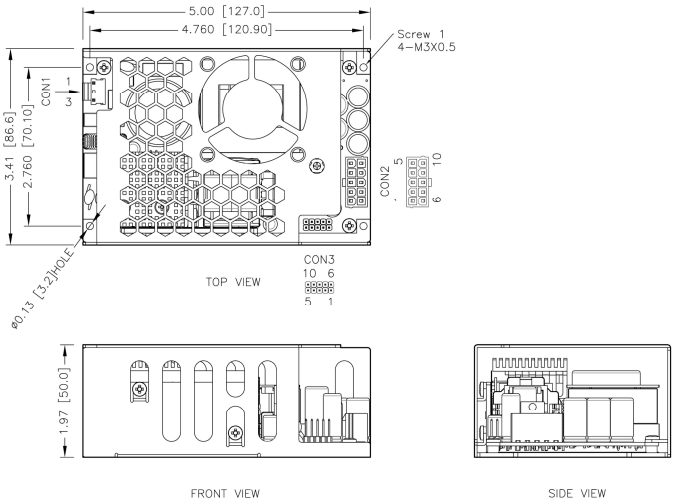
Mates with
Molex housing : **39-01-2105**
Molex crimp terminals : **5556,45750**

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**

T**E**H450USXX **(-Y)**



*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**

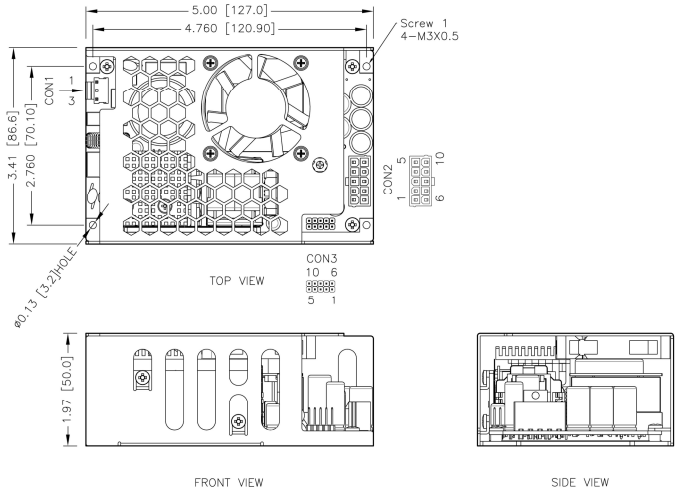
CON3 – Aux Connector

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–F1 (Y1) 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**

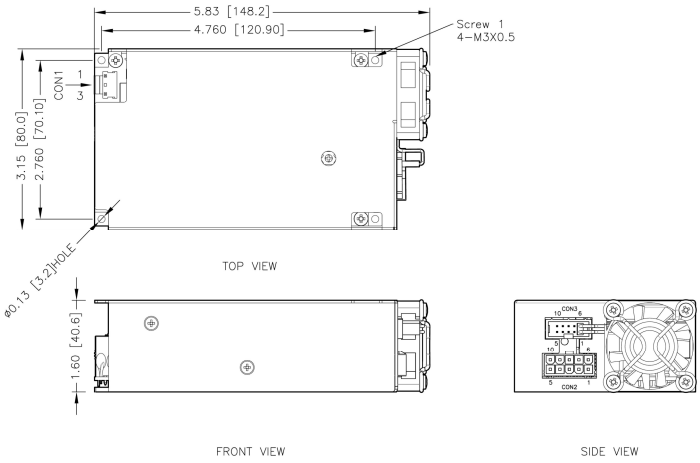
CON3 – Aux Connector

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** **(Y2)** 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±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**

P-DUKE Technology Co., Ltd.

Tel +886-4-2359-0668
Fax +886-4-2359-1337
Email sale@pduke.com
Web www.pduke.com
Add No. 36, 22nd Rd., Taichung Industrial Park, Taichung, Taiwan, R.O.C.