Digital Power
Flexible Power Solutions
(877).634-0982
www.digipwr.com

HD500 SERIES

AC-DC ITE SWITCHING PSU - 500 WATT

E199779

KEY FEATURES

Digital Power's HD500 Series are switching power supplies that produce superior output wattages with natural convection. The series include enclosed, open fame and U bracket format with output voltage options of 12V, 24V and 48V. Featured with compact, low profile footprint, and best-in-class performance, HD500 Series are optimal for broad Industrial and Telecommunication Applications.

Designed with energy saving in mind, Digital Power's HD500 Series boasts not only high operating efficiency up to 93%. but also high-power density with full input range of 90-264Vac and built-in active PFC.

HD500 operates over wide temperature range from -30°C to +80°C with complete protections and certified to UL / IEC / EN 62368-1.

PRODUCT SPECIFICATION

Enclosed, U Bracket Switching Power Supply

- Universal Input 90-264Vac
- High Efficiency up to 93%
- Safety Approval to UL / IEC / EN 62368-1
- -30°C to +80°C Wide Operation Temperature Range
- Operating Altitude 5000M
- Active PFC Function
- I/O Isolation 4000VAC
- Built-in 12V/0.3A Auxiliary Output (HD500U)
- Standby 5V@1A with Fan
- Standby 0.4A without Fan (HD500U)
- Ultra Compact Size:

  HD500E:5.11 x 3.25 x 2.42 Inches

  HD500U:5.11 x 3.25 x 1.6 Inches

ELECTRICAL SPECIFICATION - HD500U SERIES

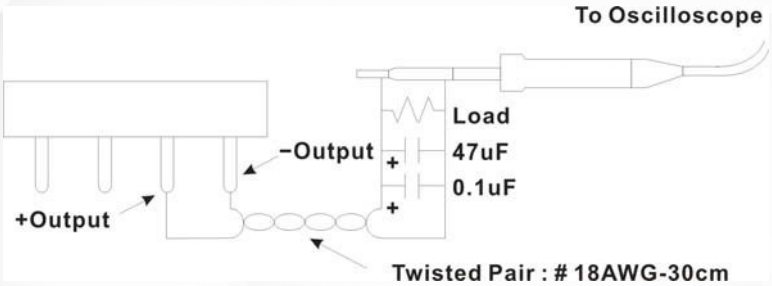
Model No.			HD500U-112	HD500U-124	HD500U-148
Max Output Wattage (with 30CFM FAN) (W)			500 W		
Max Output Wattage (Conduction Cooling) (W) (Note 6)			400 W (100 VAC) / 450 W (230 VAC)		
Max Output Wattage (Natural Convection) (W)			250 W (100 VAC) / 330 W (230 VAC)		
Input	Voltage(Note 3)		90-264 VAC or 127-370 VDC		
	Frequency (Hz)		47-63 Hz		
	Current (Full load)		<6.3 A max. (115 VAC) / <3.15 A max. (230 VAC)		
	Inrush Current (<2ms) (Clod Start)		< 40 A max. (115 VAC) / < 80 A max. (230 VAC)		
	Power Factor (at 230 VAC)		PF>0.94 at Full Load		
Output	Voltage (V.DC.)		12V	24V	48V
	Voltage Adj Range (V.DC.)		±5% Output Voltage		
	Voltage Accuracy		±2%		
	Current (with 30CFM FAN) (A) (max.)		41.5	20.8	10.41
	Current (Conduction Cooling) (A) (max.)	at 100 VAC	33.3	16.6	8.33
		at 230 VAC	37.5	18.75	9.375
	Current (Natural Convection) (A) (max.)	at 100 VAC	20.83	10.42	5.21
		at 230 VAC	27.5	13.75	6.87
	Line Regulation (100-264 VAC)		±1%		
	Load Regulation (10-100%) (typ.)		±1%		
	Minimum Load		1%		
	Maximum Capacitive Load		5,000µF	2,500µF	1,250µF
	Ripple & Noise (typ.)(Note 1)		160mV	240mV	480mV
	Efficiency (at 230VAC)		90.5%	91%	92%
	Hold-up Time (at 115 VAC)(Note 2)		8 ms min.		
Protection	Over Power Protection		Auto recovery		
	Over Voltage Protection		Auto recovery		
	Overt Temperature Protection		Auto recovery		
	Short Circuit Protection		Protection level 1 (nominal) : Continuous, Auto recovery		
			Protection level 2 (instantaneous high current) : Latch		
Isolation	Input-Output(Note 5)		4000VAC or 5656VDC		
	Input-PE(Note 5)		2000VAC or 2828VDC		
	Output-PE(Note 5)		1500VAC or 2121VDC		
Environment	Operating Temperature		-30°C...+80°C (with derating)		
	Storage Temperature		-30°C...+85°C		
	Temperature Coefficient		±0.03%/°C (0~50°C)		
			±0.06%/°C (-30~0°C)		
	Altitude During Operation		5000m		
	Humidity		95% RH		
	MTBF		>160,000 h @ 25°C (MIL-HDBK-217F)		
	Vibration		IEC60068-2-6 (10~500Hz, 2G 10min./1cycle, 60min. each along X, Y, Z axes)		
	Shock		IEC60068-2-27		
Physical	Dimensions (L x W x H)		5.11 x 3.25 x 1.6 Inches (129.7 x 82.55 x 40.6) Tolerance 0.5 mm		
	Weight		700g		
	Cooling Method		Natural Convection / Conduction Cooling / 30CFM FAN		
Safety	Approval		UL 60950 UL / IEC / EN 62368		
EMC	Conducted EMI		EN55032 Class B		
	Radiated EMI		EN55032 Class A		
	EMS		EN55035		

All specifications valid at normal input voltage, full load and +25°C after warm-up time unless otherwise stated.

ELECTRICAL SPECIFICATION - HD500U SERIES

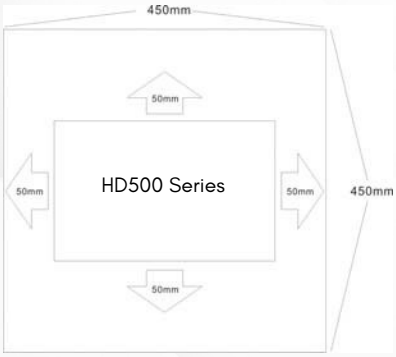
NOTE

1. Ripple & Noise are measured at 20MHz of bandwidth with ceramic 0.1uF & chemi-con KY 47uF parallel capacitor.



A 30cm twisted pair of no.18 AWG copper wire is connected to a 47uF and 0.1uF capacitor of proper polarity and voltage rating. The oscilloscope probe ground led should connect right to the ground ring of the probe and be as short as possible. The oscilloscope bandwidth should be at 20MHz and connected to AC ground.

2. Hold-up Time measured at 90% Vout.
3. Please check the derating curve for more details.
4. Main Vout >3% Load, 12V (Aux) / 0.3A., 12V (Aux) need 0.1A Minimum Load, Auxiliary voltage output ground 10.2~13.3V
5. Strongly recommend to conduct this test with DC Voltage. If customer wishes to test with AC Voltage, please disconnect all Y-Capacitors from Digital Power power supply.
6. The size of the suggested aluminum plate is shown as below. And for optimizing thermal performance, the aluminum plate must have an even and smooth surface (or coated with thermal grease), and HD500 series must be firmly mounted at the center of the aluminum plate.

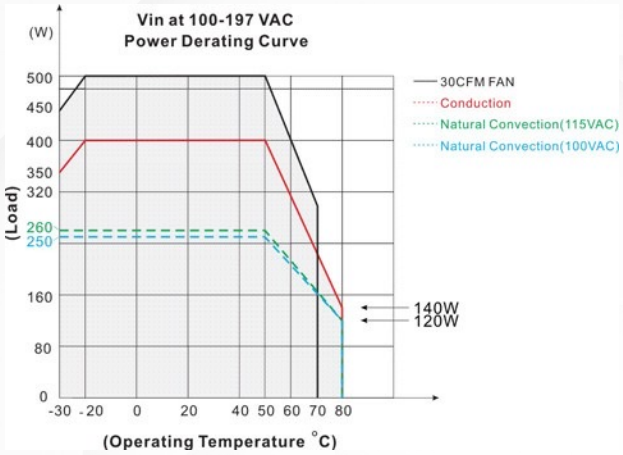


450 x 450 x 3.0 mm

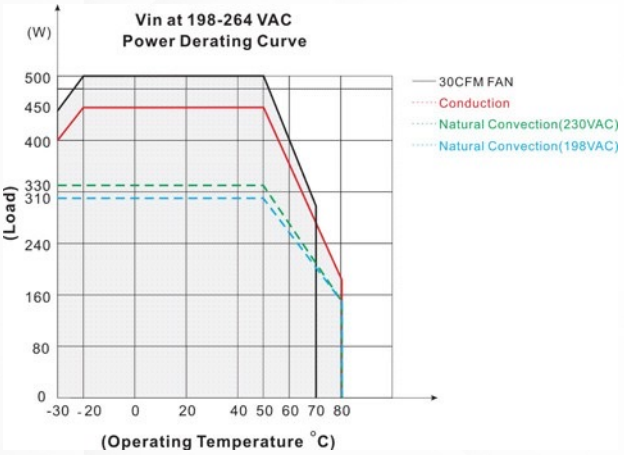
7. CAUTION: Double pole, neutral fusing. Disconnect mains before servicing.

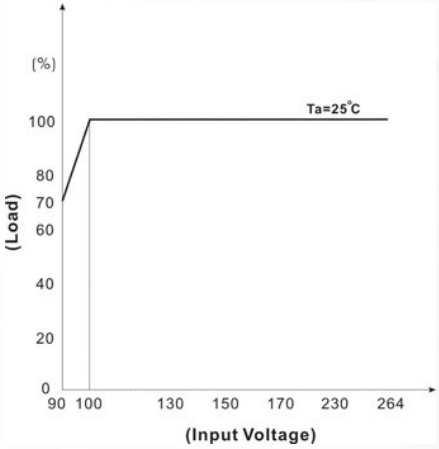
ELECTRICAL SPECIFICATION - HD500U SERIES

DERATING

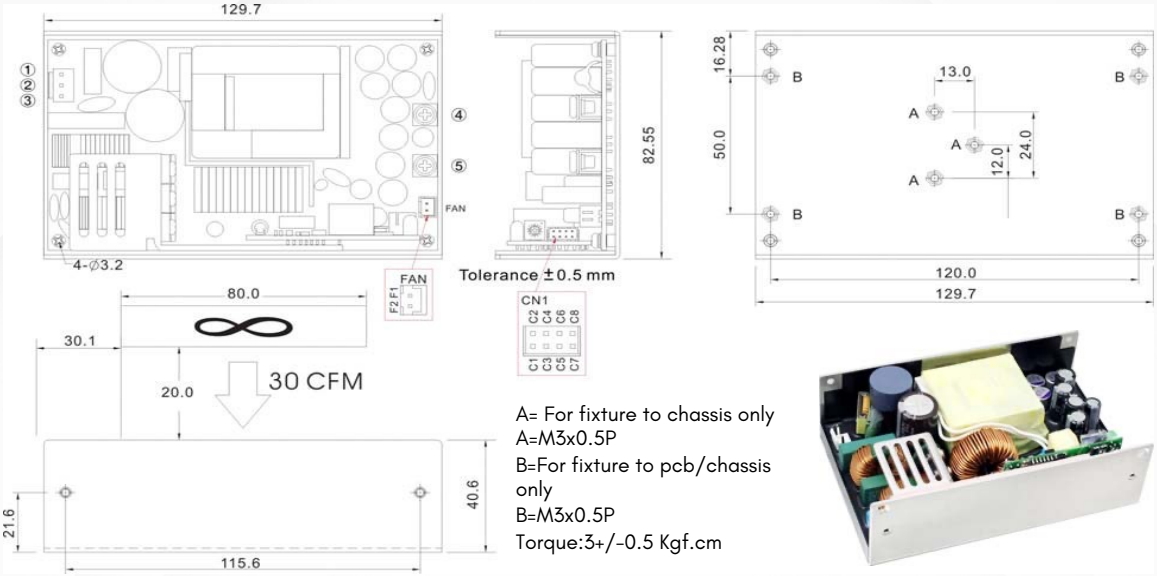


If input voltage is lower than 100VAC, please refer to the output derating V.S. input voltage curve for details





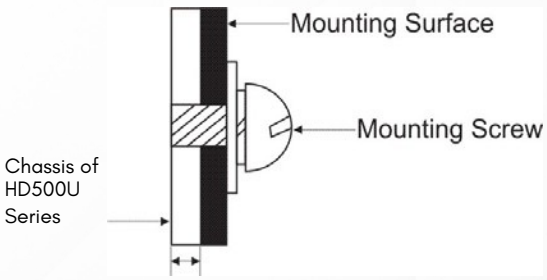
MECHANICAL DIMENSIONS- HD500U SERIES



A= For fixture to chassis only
A=M3x0.5P
B=For fixture to pcb/chassis only
B=M3x0.5P
Torque:3+/-0.5 Kgf.cm

Brands		Alex		JST	
PIN#	Single	Mating Housing	Terminal	Mating Housing	Terminal
1	AC IN (N)	9396-3	96T series	VHR-3N	SVH-41T-P1.1
2	NO PIN				
3	AC IN (L)				
4	+DC OUT	Terminal : M5 Pan HD screw in 2 positions. Torque to 8 lbs-in(90cNm) max			
5	-DC OUT				
6	PE	—	—	—	—

ASSEMBLY INSTRUCTIONS
U Case T=1.5mm
Customer is advised to screw into the threads no more than 1.5mm



Connector Pin (CN1)					
Brands		Cherng Weei		JST	
PIN#	Single	Mating Housing	Terminal	Mating Housing	Terminal
C1	-5V SB	PHD-H20-2X4P	PHD-T20	PHDR-08VS	SPHD-001T- P0.5
C2	+5V SB				
C3	GND				
C4	DC-OK				
C5	-RC				
C6	+RC				
C7	-S				
C8	+S				

Connector Pin (FAN)					
Brands		Alex		JST	
PIN#	Single	Mating Housing	Terminal	Mating Housing	Terminal
F1	+12V	8821-2	8820T	XHP-2	SXH-002T-P0.6
F2	GND				

MECHANICAL DIMENSIONS- HD500U SERIES

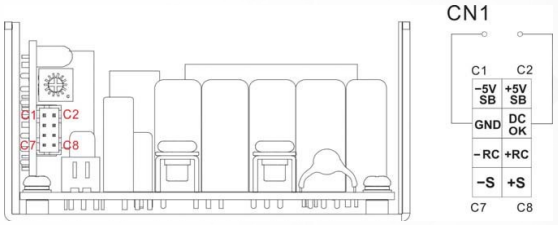
FUNCTION DESCRIPITON of CN1

Pin No.	Function	Description
C1	-5VSB	This pin connects to the negative terminal(-V). Return for DC-OK and -RC signal output.
C2	+5VSB	Stand by voltage output ground 4.2~5.5V, referenced to pin C1(-5VSB). The maximum load current is 1A with Fan, 0.4A without Fan..
C3	GND	This pin connects to the negative terminal(-V). Return for DC-OK and -RC signal output.
C4	DC OK	DC-OK Signal is a DC output, referenced to pin C3(DC-OK GND).
C5	-RC	This pin connects to the negative terminal(-V). Return for DC-OK and -RC signal output.
C6	+RC	Turns the output on and off by electrical or dry contact between pin C5 (-RC), Short: Power OFF, Open: Power ON. The input voltage must be less than 1V in order to disable VOUT and greater than 3.3V (up to 5V) to enable it.
C7	-S	Negative sensing. The -S signal should be connected to the negative terminal of the load. The -S and +S leads should be twisted in pair to minimize noise pick-up effect.
C8	+S	Positive sensing. The +S signal should be connected to the positive terminal of the load. The +S and -S leads should be twisted in pair to minimize noise pick-up effect.

FUNCTION MANUAL & APPLICATION NOTE

1. DC-OK Signal

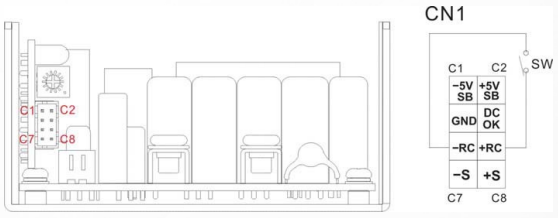
Between DC-OK and GND	Output Status
3.7~6V	ON
0~1V	OFF



2. Remote Control

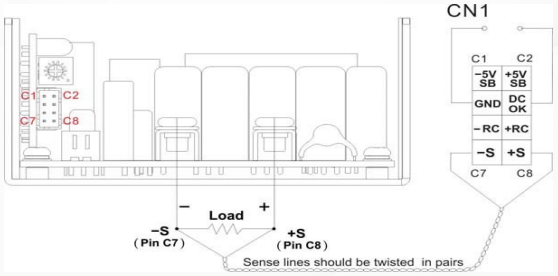
It can be turned ON/OFF by using the "Remote Control" function.

Between +RC and -RC	Output Status
SW ON (Short)	OFF
SW OFF (Open)	ON



3. +S and -S Sense

Shorter wiring to each unit is recommended, as well as twisting +S and -S in pairs, as shown below



ELECTRICAL SPECIFICATION - HD500E SERIES

Model No.		HD500E-112	HD500E-124	HD500E-148
Max Output Wattage (W)		500 W		
Input	Voltage (Note 3)	90-264 VAC or 127-370 VDC		
	Frequency (Hz)	47-63 Hz		
	Current (Full load)	<6.3 A max. (115 VAC) / <3.15 A max. (230 VAC)		
	Inrush Current (<2ms) (Clod Start)	< 40 A max. (115 VAC) / < 80 A max. (230 VAC)		
	Power Factor (at 230 VAC)	PF>0.94 at Full Load		
Output	Voltage (V.DC.)	12V	24V	48V
	Voltage Adj Range (V.DC.)	±5% Output Voltage		
	Voltage Accuracy	±2%		
	Current (with 30CFM FAN) (A) (max.)	41.5	20.8	10.41
	Line Regulation (100-264 VAC)	±1%		
	Load Regulation (10-100%) (typ.)	±1%		
	Minimum Load	1%		
	Maximum Capacitive Load	5,000μF	2,500μF	1,250μF
	Ripple & Noise (typ.) (Note 1)	160mV	240mV	480mV
	Efficiency (at 230VAC)	90%	90.5%	91.5%
	Hold-up Time (at 115 VAC) (Note 2)	8 ms min.		
Protection	Over Power Protection	Auto recovery		
	Over Voltage Protection	Auto recovery		
	Overt Temperature Protection	Auto recovery		
	Short Circuit Protection	Protection level 1 (nominal) : Continuous, Auto recovery		
		Protection level 2 (instantaneous high current) : Latch		
Isolation	Input-Output (Note 5)	4000VAC or 5656VDC		
	Input-PE (Note 5)	2000VAC or 2828VDC		
	Output-PE (Note 5)	1500VAC or 2121VDC		
Environment	Operating Temperature	-30°C...+70°C (with derating)		
	Storage Temperature	-30°C...+85°C		
	Temperature Coefficient	±0.03%/°C (0~50°C)		
		±0.06%/°C (-30~0°C)		
	Altitude During Operation	5000m		
	Humidity	95% RH		
	MTBF	>160,000 h @ 25°C (MIL-HDBK-217F)		
	Vibration	IEC60068-2-6 (10~500Hz, 2G 10min./1cycle, 60min. each along X, Y, Z axes)		
	Shock	IEC60068-2-27		

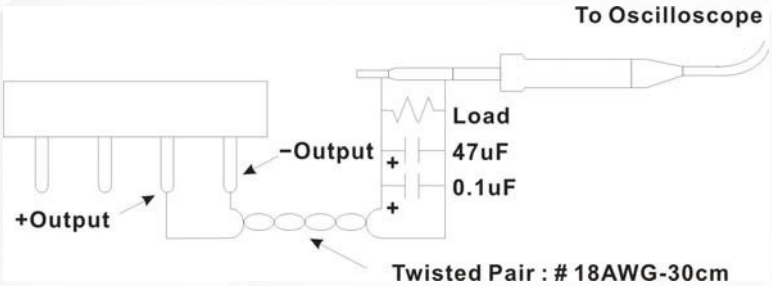
Physical	Dimensions (L x W x H)	5.11 x 3.25 x 2.42 Inches (129.7 x 82.55 x 61.4) Tolerance 0.5 mm
	Weight	700g
Safety	Approval	UL 60950 UL / IEC / EN 62368
EMC	Conducted EMI	EN55032 Class B
	Radiated EMI	EN55032 Class A
	EMS	EN55035

All specifications valid at normal input voltage, full load and +25°C after warm-up time unless otherwise stated.

ELECTRICAL SPECIFICATION - HD500E SERIES

NOTE

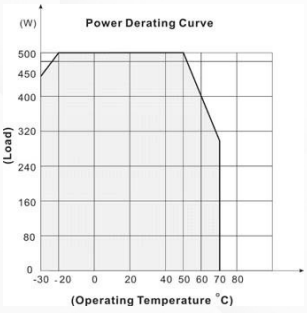
1. Ripple & Noise are measured at 20MHz of bandwidth with ceramic 0.1uF & chemi-con KY 47uF parallel capacitor.

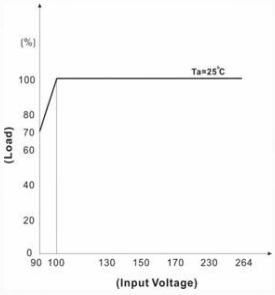


A 30cm twisted pair of no.18 AWG copper wire is connected to a 47uF and 0.1uF capacitor of proper polarity and voltage rating. The oscilloscope probe ground led should connect right to the ground ring of the probe and be as short as possible. The oscilloscope bandwidth should be at 20MHz and connected to AC ground.

2. Hold-up Time measured at 90% Vout.
3. Please check the derating curve for more details.
4. Main Vout >3% Load, 12V (Aux) / 0.3A., 12V (Aux) need 0.1A Minimum Load, Auxiliary voltage output ground 10.2~13.3V
5. Strongly recommend to conduct this test with DC Voltage. If customer wishes to test with AC Voltage, please disconnect all Y-Capacitors from Digital Power power supply.
6. CAUTION: Double pole, neutral fusing. Disconnect mains before servicing.

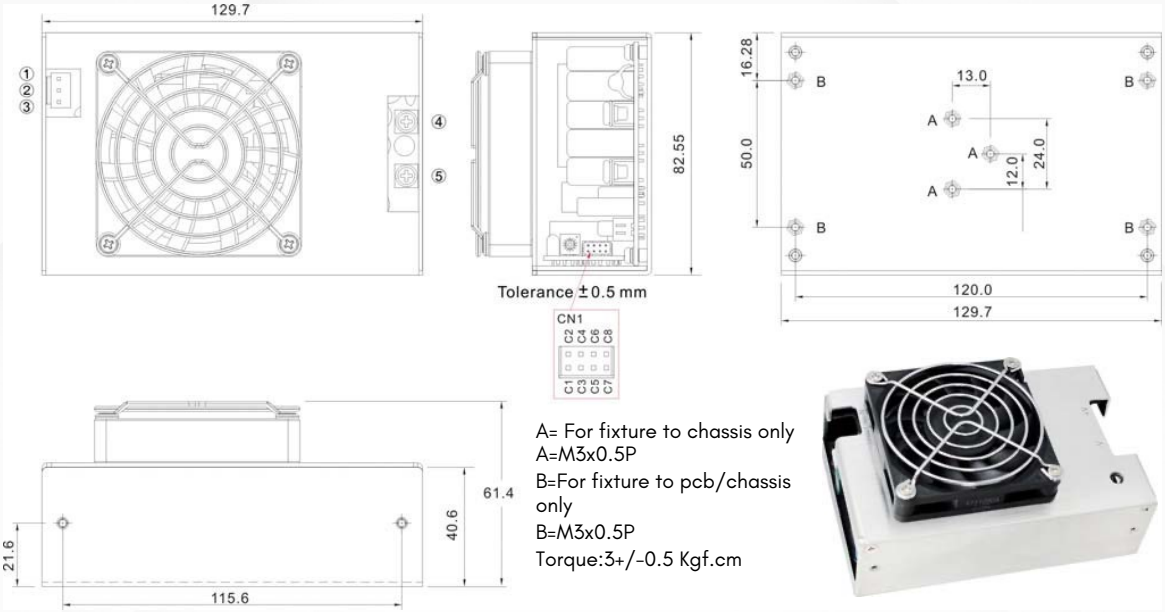
DERATING





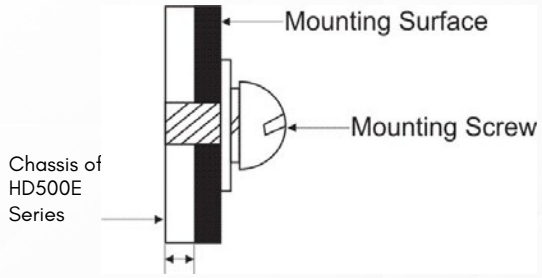
If input voltage is lower than 100VAC, please refer to the output derating V.S. input voltage curve for details

MECHANICAL DIMENSIONS – HD500E SERIES



Brands		Alex		JST	
PIN#	Single	Mating Housing	Terminal	Mating Housing	Terminal
1	AC IN (N)	9396-3	96T series	VHR-3N	SVH-41T-P1.1
2	NO PIN				
3	AC IN (L)				
4	+DC OUT	Terminal : M5 Pan HD screw in 2 positions. Torque to 8 lbs-in(90cNm) max			
5	-DC OUT				

ASSEMBLY INSTRUCTIONS
U Case T=1.5mm
Customer is advised to screw into the threads no more than 1.5mm



Connector Pin (CN1)					
Brands		Cherng Weei		JST	
PIN#	Single	Mating Housing	Terminal	Mating Housing	Terminal
C1	-5V SB	PHD-H20-2X4P	PHD-T20	PHDR-08VS	SPHD-001T-P0.5
C2	+5V SB				
C3	GND				
C4	DC-OK				
C5	-RC				
C6	+RC				
C7	-S				
C8	+S				

Connector Pin (FAN)					
Brands		Alex		JST	
PIN#	Single	Mating Housing	Terminal	Mating Housing	Terminal
F1	+12V	8821-2	8820T	XHP-2	SXH-002T-P0.6
F2	GND				

MECHANICAL DIMENSIONS – HD500E SERIES

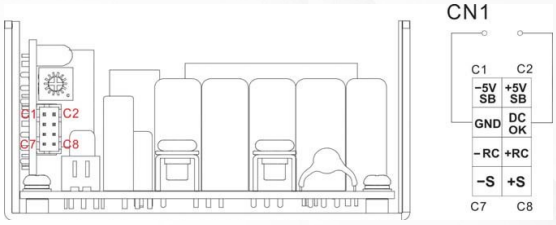
FUNCTION DESCRIPITON of CN1

Pin No.	Function	Description
C1	-5VSB	This pin connects to the negative terminal(-V). Return for DC-OK and -RC signal output.
C2	+5VSB	Stand by voltage output ground 4.2~5.5V, referenced to pin C1(-5VSB). The maximum load current is 1A with Fan, 0.4A without Fan..
C3	GND	This pin connects to the negative terminal(-V). Return for DC-OK and -RC signal output.
C4	DC OK	DC-OK Signal is a DC output, referenced to pin C3(DC-OK GND).
C5	-RC	This pin connects to the negative terminal(-V). Return for DC-OK and -RC signal output.
C6	+RC	Turns the output on and off by electrical or dry contact between pin C5 (-RC), Short: Power OFF, Open: Power ON. The input voltage must be less than 1V in order to disable VOUT and greater than 3.3V (up to 5V) to enable it.
C7	-S	Negative sensing. The -S signal should be connected to the negative terminal of the load. The -S and +S leads should be twisted in pair to minimize noise pick-up effect.
C8	+S	Positive sensing. The +S signal should be connected to the positive terminal of the load. The +S and -S leads should be twisted in pair to minimize noise pick-up effect.

FUNCTION MANUAL & APPLICATION NOTE

1. DC-OK Signal

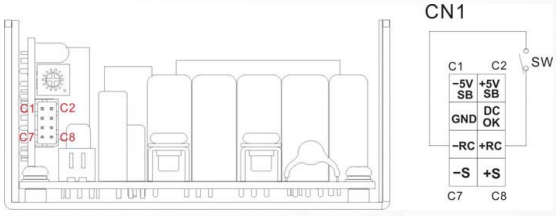
Between DC-OK and GND	Output Status
3.7~6V	ON
0~1V	OFF



2. Remote Control

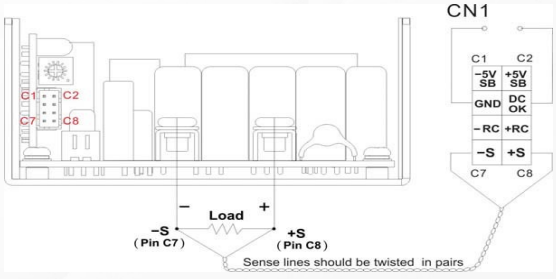
It can be turned ON/OFF by using the "Remote Control" function.

Between +RC and -RC	Output Status
SW ON (Short)	OFF
SW OFF (Open)	ON



3. +S and -S Sense

Shorter wiring to each unit is recommended, as well as twisting +S and -S in pairs, as shown below



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Digital Power Corporation designs and manufactures full custom, value added and standard comprehensive power solutions for the most demanding applications in the defense, healthcare, telecom, and industrial markets.