TDK-Lambda

SPECIFICATIONS

ITEMS \ MODEL				HWS1500 -3/HD	HWS1500 -5/HD	HWS1500 -6/HD	HWS1500 -7/HD	HWS1500 -12/HD	HWS1500 -15/HD	HWS1500 -24/HD	HWS1500 -36/HD	HWS1500 -48/HD	HWS1500 -60/HD
1	Nominal Output Voltage		V	3.3	5	6	7.5	12	15	24	36	48	60
2	Maximum Output Current	at 100VAC	A	300	300	250	200	125	100	65	42	32	25.6
		at 200VAC	A	300	300	250	200	125	100	70	46.5	32	28
3	Peak output Current (*13)	at 200VAC	A	-		300	240	-		105	70	-	42
4	Maximum Output Power	at 100VAC	W	990	1500	1500	1500	1500	1500	1560	1512	1536	1536
		at 200VAC	W	990	1500	1500	1500	1500	1500	1680	1674	1536	1680
5	Peak Output Power (*13)	at 200VAC	W	-		1800	1800	-		2520	2520	-	2520
6	Efficiency (Typ) (*1)	at 100VAC	%	72	77	79	81	82	83	84	84	86	86
		at 200VAC	%	75	81	82	83	85	87	88	88	90	90
7	Input Voltage Range (*2)		-	85 - 265VAC (47 - 63Hz) or 120 - 330VDC									
8	Input Current (100/200VAC)(Typ) (*1)		A	15.0/8.0	19.5/10.0		19.0/10.0						
9	Inrush Current (Typ) (*3)		-	20A at 100VAC, 40A at 200VAC									
10	PFHC		-	Designed to meet IEC61000-3-2									
11	Power Factor (100/230VAC)(Typ) (*1)		-	0.98/0.94									
12	Output Voltage Range		V	2.64 - 3.96	4.0 - 6.0	4.8 - 7.2	6.0 - 9.0	9.6 - 14.4	12.0 - 18.0	19.2 - 28.8	28.8 - 43.2	38.4 - 52.8	48.0 - 66.0
13	Maximum Ripple & Noise (*4)	+25 - +71°C	mV	150	150	150	150	150	150	200	200	200	400
		0°C	mV	200	200	200	200	150	150	200	200	200	400
		-10°C	mV	220	220	220	220	200	200	200	240	400	600
14	Maximum Line Regulation (*5)		mV	36	36	36	40	48	60	96	144	192	240
15	Maximum Load Regulation (*6)		mV	60	60	60	60	72	90	144	150	288	360
16	Temperature Coefficient		-	Less than 0.02%/°C									
17	Over Current Protection (*7)		A	315.0 -	315.0 -	262.5 -	210.0 -	131.2 -	105.0 -	68.2 -	44.1 -	33.6 -	26.8 -
18	Over Voltage Protection (*8)		V	4.12 - 4.62	6.25 - 7.0	7.5 - 8.4	9.37 - 10.5	15.0 - 17.4	18.7 - 21.8	30.0 - 34.8	45.0 - 49.7	55.2 - 64.8	69.0 - 75.0
19	Hold-up Time (Typ) (*9)		-	20ms			16ms	20ms					
20	Leakage Current (*10)		-	1.5mA MAX at 100VAC / 240VAC									
21	Remote Sensing		-	Possible									
22	Remote ON/OFF control		-	Possible									
23	Monitoring Signal		-	PF (Open Collector Output)									
24	Output Voltage External Control		-	Possible									
25	Parallel Operation		-	Possible									
26	Series Operation		-	Possible									
27	Operating Temperature (*11)		-	-10 - +71°C, Guarantee Start up -40 - -10°C									
	at Input Voltage 100VAC/200VAC	-10 - +40°C	W	990	1500					1560/1680	1512/1674	1536	1536/1680
		+50°C	W	825	1250	1500				1560/1680	1512/1674	1536	1536/1680
		+60°C	W	660	1000	1125				1170/1260	1134/1255	1152	1152/1260
		+71°C	W	495	750					780/840	756/837	768	768/840
28	Operating Humidity		-	10 - 90%RH (No Condensing)									
29	Storage Temperature		-	-40 - +85°C									
30	Storage Humidity		-	10 - 95%RH (No Condensing)									
31	Cooling		-	Forced Air By Blower Fan									
32	Withstand Voltage		-	Input - FG : 2kVAC (20mA), Input - Output : 3kVAC (20mA),Output - CNT : 100VAC (100mA) Output - FG : 500VAC (300mA), (60V model 651VAC(390mA)) for 1min.									
33	Isolation Resistance		-	More than 100Mohm Output - FG ... 500VDC More than 10Mohm Output - CNT ... 100VDC at 25°C and 70%RH									
34	Vibration (*14) (*15)		-	At no operating, 10 - 55Hz (Sweep for 1min.) 19.6m/s^2 Constant, X,Y,Z 1h each. Designed to meet MIL-STD-810F 514.5 Category 4 figure 514.5C-1 and Category 10									
35	Shock (In package) (*15)		-	Less than 196.1m/s^2 Designed to meet MIL-STD-810F 516.5 Procedure I									
36	Safety (*12)		-	Approved by UL62368-1, CSA62368-1, EN62368-1, UL60950-1, CSA60950-1, EN60950-1 (Expire date of 60950-1 : 20/12/2020), EN50178. Designed to meet DENAN.									
37	Line DIP		-	Designed to meet SEMI-F47 (200VAC Line only)									
38	Conducted Emission		-	Designed to meet EN55011/EN55032-A, FCC-ClassA, VCCI-ClassA.									
39	Radiated Emission		-	Designed to meet EN55011/EN55032-A, FCC-ClassA, VCCI-ClassA.									
40	Immunity		-	Designed to meet IEC61000-4-2(Level 2,3), -3(Level 3), -4(Level 3), -5(Level 3,4), -6(Level 3), -8(Level 4), -11									
41	Weight (Typ)		g	4000					3800				
42	Size (W x H x D)		mm	126.5 x 82 x 280 (Refer to Outline Drawing)									
43	Other		-	PCB Coating on solder side and component side.									

*Read instruction manual carefully, before using the power supply unit.

=NOTES=

*1. At Ta=25°C and maximum output power.

*2. For cases where conformance to various safety specs (UL, CSA, EN) are required, input voltage range will be 100 - 240VAC (50/60Hz).

*3. First in-rush current. Not applicable to the first 0.2ms in-rush current flowing into the power supply noise filter.

*4. Measure with JEITA RC-9131A probe, Bandwidth of scope :100MHz. (at 100uF electric capacitor and 0.47uF film capacitor on the test fixture board.) Ripple noise spec for ambient temperature between -10 to 25 is a linearity value with respect to the -10 degrees C and 25 degrees C specs.

*5. 85 - 265VAC , constant load.

*6. No load-Full load, constant input voltage.

*7. Constant current limit with automatic recovery. Over current condition for more than 5 seconds will cause the output to shutdown. Output current exceeding maximum rated output current for more then 10 seconds continuously will result to output shutdown.

*8. OVP circuit will shut down output, manual reset (Power cycle) or ON/OFF CNT signal reset.

*9. At 100/200VAC, nominal output voltage and maximum output current.

*10. Measured by the each measuring method of UL, CSA, EN and DENAN (at 60Hz), Ta=25°C.

*11. Ratings - Derating at standard mounting.
- Load (%) is percent of maximum output power or maximum output current, whichever is greater.
- As for other mountings, refer to derating curve (DA006-01-02/HD-_).
- For conditions of start up at -40°C - -10°C, refer to derating curve (DA006-01-04/HD-_).

*12. As for DENAN, designed to meet at 100VAC.

*13. Peak output current is less than 10 seconds, and duty 35% max.

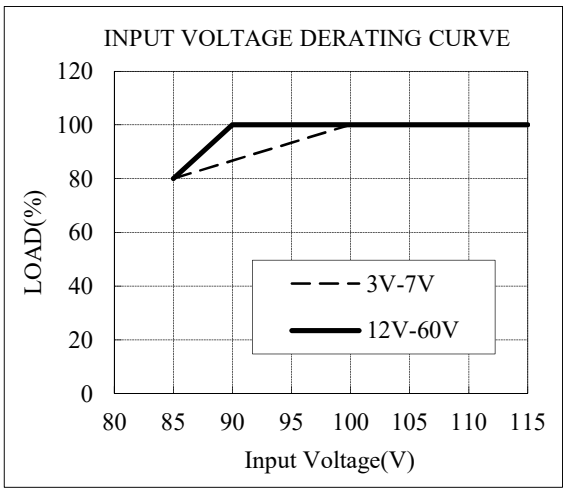
*14. Category 4 exposure levels : Track transportation over U.S. highways.

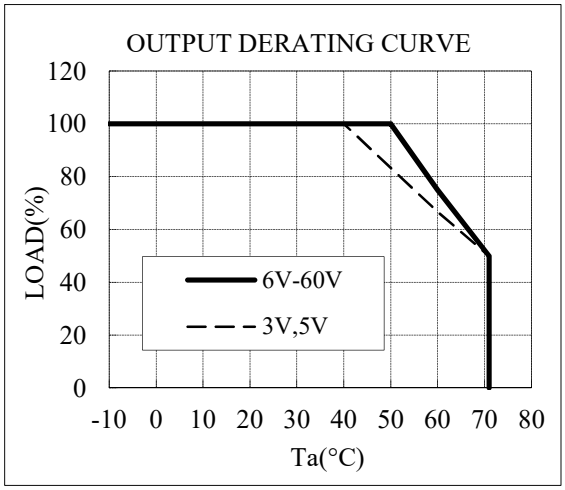
*15. It is compulsory to fix BRACKET onto product for MIL-STD-810F 516.5 Procedure I and MIL-STD-810F 514.5 category 10 compliance from REVISION A1 onwards. Refer to DA006-01-06/HD-_.

OUTPUT DERATING

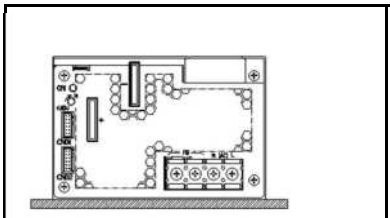
DA006-01-02/HD-A

Ta (°C)	LOAD(%)				
Mounting	A,B,C,D				
Input	85V		100V-		90V-
Output	3V,5V	6V-60V	3V,5V	6V,7V	12V-60V
-10 ~ +40	80	80	100	100	100
50	66.6	80	83.3	100	100
60	53.3	60	66.7	75	75
71	40	40	50	50	50

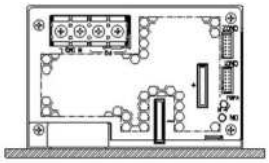




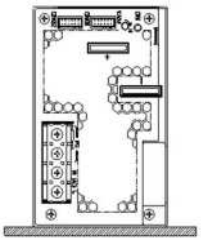
MOUNTING A
(STANDARD MOUNTING)



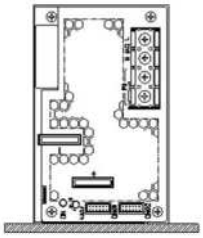
MOUNTING B



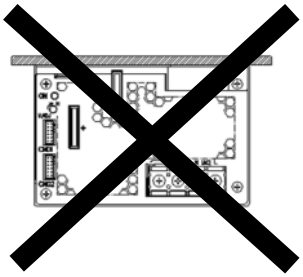
MOUNTING C

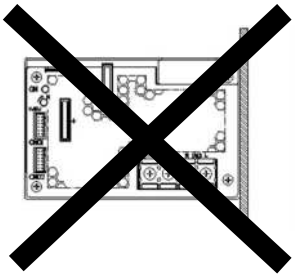


MOUNTING D



Inhibit

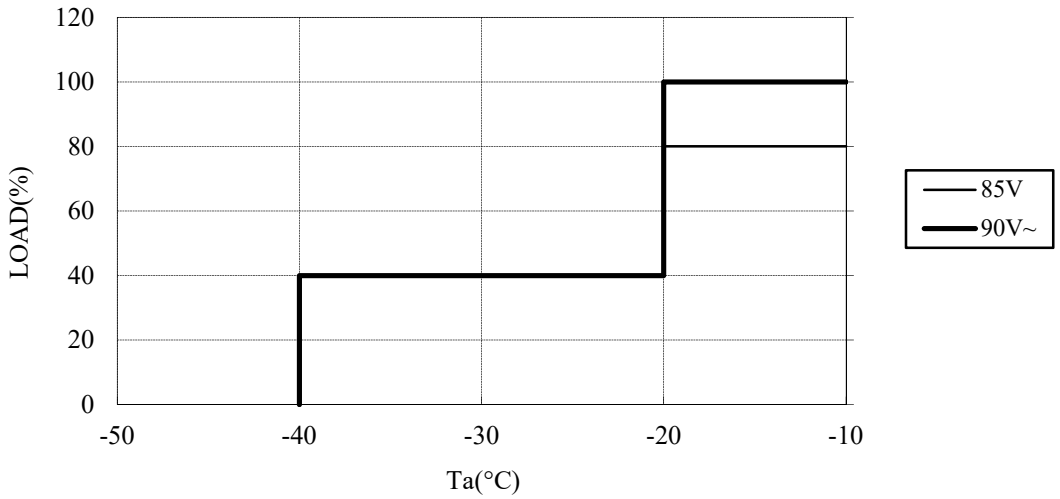




OUTPUT DERATING FOR START UP GUARANTEE

Ta(°C)	LOAD(%) MOUNTING A,B,C,D	
	85V	90V~
-40 ~-20	40	40
-20	80	100
-10	80	100

OUTPUT DERATING CURVE



=NOTES=

1) Input voltage : Not gradual start up.
2) No condensing.
3) Output voltage becomes more stable by performing the following.
   a) Electrolytic capacitor is added to an output.
      +3.3V, +5V, +6V : LXZ 10V 5600uF (NIPPON CHEMI-CON) x 3 parallel
      +7.5V : LXZ 16V 3900uF (NIPPON CHEMI-CON) x 3 parallel
      +12V : LXZ 25V 2700uF (NIPPON CHEMI-CON) x 3 parallel
      +15V : LXZ 25V 2700uF (NIPPON CHEMI-CON) x 3 parallel
      +24V : LXZ 35V 1800uF (NIPPON CHEMI-CON) x 3 parallel
      +36V : LXZ 50V 1000uF (NIPPON CHEMI-CON) x 3 parallel
      +48V : LXZ 63V 820uF (NIPPON CHEMI-CON) x 3 parallel
      +60V : LXV 100V 270uF (NIPPON CHEMI-CON) x 3 parallel
   b) Remote sensing function is used.
      Connect “+S” terminal to “+” terminal of the electrolytic capacitor
      and “-S” terminal to “-” terminal of the electrolytic capacitor with sensing wires.
4) Pay attention to above items before using the unit. Incorrect usage could lead to unstable output voltage.

POWER SUPPLY MOUNTING FOR MIL-STD

When MIL vibration(MIL-STD-810F 514.5 Category 10) &
MIL shock(MIL-STD-810F 516.5 Procedure I) specification is necessary,
mount the power supply using the BRACKET or equivalent.

Fix one set of BRACKET to the power supply with sixteen M4 screws
when mounting the power supply.

Two pieces of BRACKET is considered as one set.

The M4 screw is 8mm in length, washer and spring washer are also required.

Screw must not penetrate into power supply by more than 6mm.

