HWS150/HD

SPECIFICATIONS

A228-01-01/HD

	ITEMS / MODEL			HWS150 -3/HD	HWS150 -5/HD	HWS150 -12/HD	HWS150 -15/HD	HWS150 -24/HD	HWS150 -48/HD
1	Nominal Output Voltage		V	3.3	5	12	15	24	48
2	Minimum Output Current (*1)		A	0.3	0.3	0.1	0.1	0.07	0.03
3	Maximum Output Current		A	30	30	13	10	6.5	3.3
4	Maximum Output Power		W	99	150	156	150	156	158.4
5	Efficiency (Typ) (*2)	100VAC	%	78	83	83	83	85	85
		200VAC	%	81	86	86	86	88	88
6	Input Voltage Range (*3)		-	85 ~ 265VAC (47 ~ 63Hz) or 120 ~ 370VDC					
7	Input Current (100/200VAC)(Typ) (*2)		A	1.3/0.65	1.9/0.95				
8	Inrush Current(Typ) (*4)		-	14A at 100VAC, 28A at 200VAC, Ta=25°C, Cold Start					
9	PFHC		-	Designed to meet IEC61000-3-2					
10	Power Factor (100/200VAC)(Typ) (*2)		-	0.98/0.90	0.99/0.95				
11	Output Voltage Range		V	2.97~3.96	4.0~6.0	9.6~14.4	12.0~18.0	19.2~28.8	38.4~52.8
12	Maximum Ripple & Noise	0≤Ta≤71°C	mV	120	120	150	150	150	200
	(*5)	-10≤Ta<0°C	mV	160	160	180	180	180	240
13	Maximum Line Regulation (*6)		mV	20	20	48	60	96	192
14	Maximum Load Regulation (*7)		mV	40	40	96	120	192	384
15	Temperature Coefficient		-	Less than 0.02% / °C					
16	Over Current Protection (*8)		A	31.5 ~	31.5 ~	13.6 ~	10.5 ~	6.82 ~	3.46 ~
17	Over Voltage Protection (*9)		V	4.13~4.95	6.25~7.25	15.0~17.4	18.8~21.8	30.0~34.8	55.2~64.8
18	Hold-up Time (Typ) (*10)		-	20ms					
19	Leakage Current (*11)		-	Less than 0.5mA. 0.2mA(Typ) at 100VAC / 0.4mA(Typ) at 230VAC					
20	Remote Sensing		-	Possible					
21	Parallel Operation		-	-					
22	Series Operation		-	Possible					
23	Operating Temperature (*12)		-	-10 ~+71°C (-10 ~+50°C:100%,+60°C:60%,+71°C:20%) Guarantee Start up at -40~-10°C					
24	Operating Humidity		-	30 ~ 90%RH (No dewdrop)					
25	Storage Temperature		-	-40 ~ +85°C					
26	Storage Humidity		-	10 ~ 95%RH (No dewdrop)					
27	Cooling		-	Convection cooling					
28	Withstand Voltage		-	Input - FG : 2kVAC (20mA), Input - Output : 3kVAC (20mA) Output - FG : 500VAC (100mA) for 1min					
29	Isolation Resistance		-	More than 100MΩ at 25°C and 70%RH Output - FG : 500VDC					
30	Vibration (*13)		-	At no operating, 10 ~ 55Hz (Sweep for 1min) 19.6m/s^2 Constant, X,Y,Z 1hour each. Designed to meet MIL-STD-810F 514.5 Category 4, 10					
31	Shock (In package)		-	Less than 196.1m/s^2 Designed to meet MIL-STD-810F 516.5 Procedure I, VI					
32	Safety (*14)		-	Approved by UL60950-1, CSA60950-1, EN60950-1, EN50178 Designed to meet UL508, DENAN					
33	Line DIP		-	Designed to meet SEMI-F47 (200VAC Line only)					
34	Conducted Emission		-	Designed to meet EN55011/EN55022-B, FCC-B, VCCI-B					
35	Radiated Emission		-	Designed to meet EN55011/EN55022-B, FCC-B, VCCI-B					
36	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					
37	Weight(Typ.)		-	500g					
38	Size (W x H x D)		mm	37 x 82 x 160 (Refer to Outline Drawing)					

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

=NOTES=

*1. Output voltage might be unstable when start up at -40~-10°C and no load. In that case, apply minimum output current.
*2. At 100/200VAC, Ta=25°C and maximum output power.
*3. For cases where conformance to various safety specs (UL, CSA, EN) are required, to be described as 100 ~ 240VAC(50/60Hz).
*4. Not applicable for the in-rush current to Noise Filter for less than 0.2ms.
*5. Measure with JEITA RC-9131A probe, Bandwidth of scope :100MHz.
*6. 85 ~ 265VAC , constant load.
*7. No load-Full load, constant input voltage.
*8. Constant current limit and Hiccup with automatic recovery.
Not operate at over load or dead short condition for more than 30seconds.
*9. OVP circuit will shutdown output, manual reset (Re power on).
*10. At 100/200VAC , nominal output voltage and maximum output current.
*11. Measured by the each measuring method of UL,CSA,EN and DENAN(at 60Hz).
*12. 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 (A228-01-02/HD-_).
- For conditions of start up at -40°C~-10°C, refer to derating curve (A228-01-04/HD-_).
*13. Category 4 exposure levels : Track transportation over U.S. highways, Composite two-wheeled trailer.
*14. As for DENAN, dsigned to meet at 100VAC.

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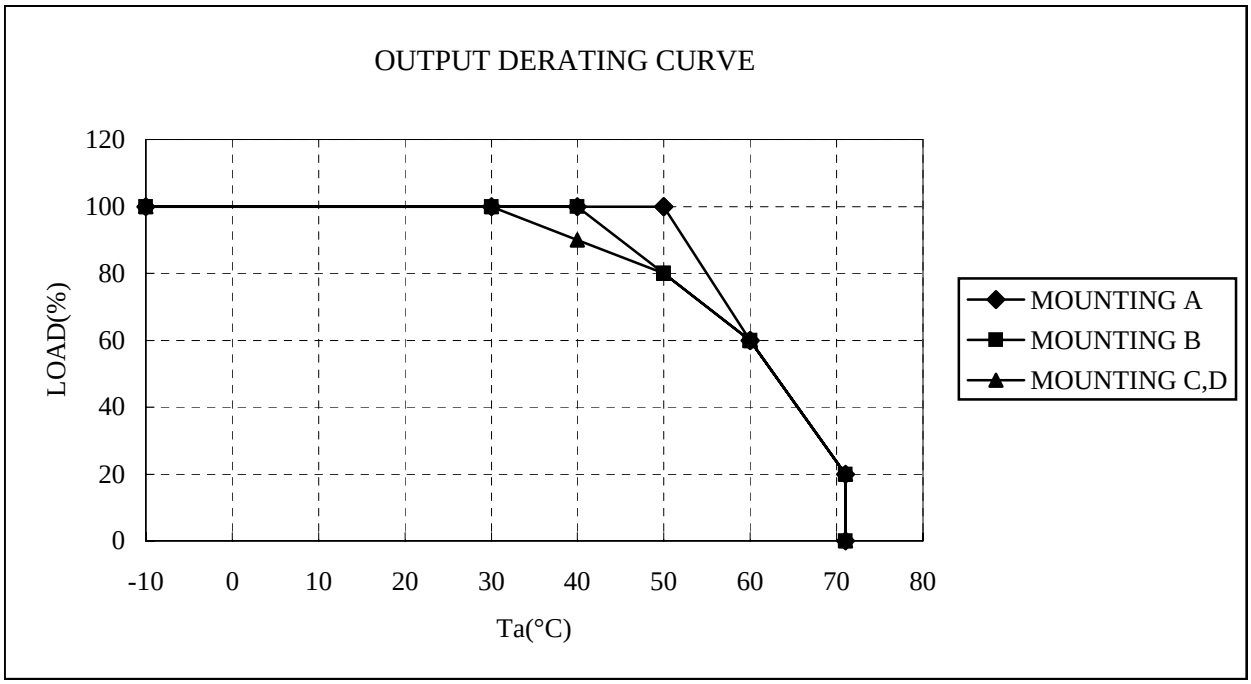
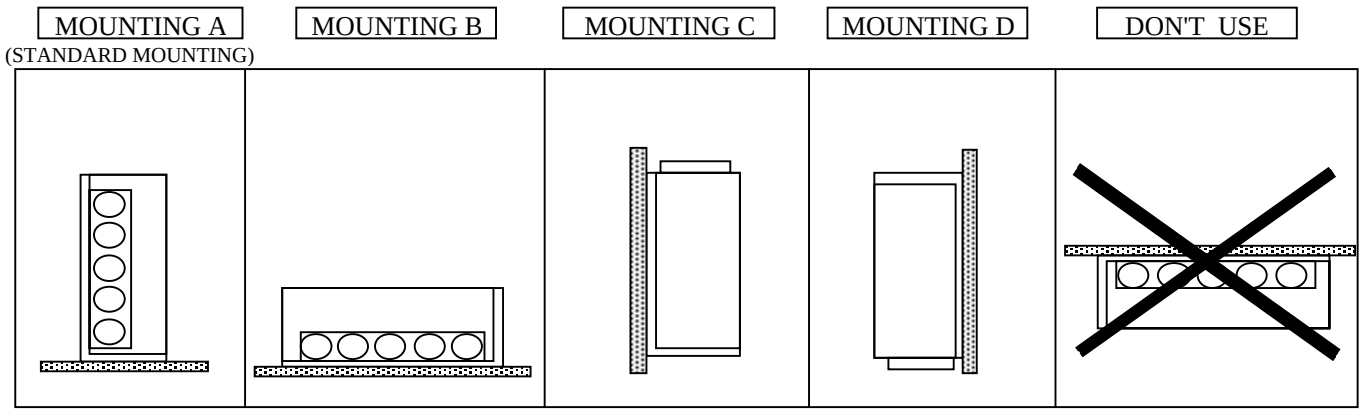
OUTPUT DERATING

A228-01-02/HD

*COOLING : CONVECTION COOLING

Ta(°C)	LOAD(%)		
	MOUNTING A	MOUNTING B	MOUNTING C,D
-10 ~+30	100	100	100
40	100	100	90
50	100	80	80
60	60	60	60
71	20	20	20





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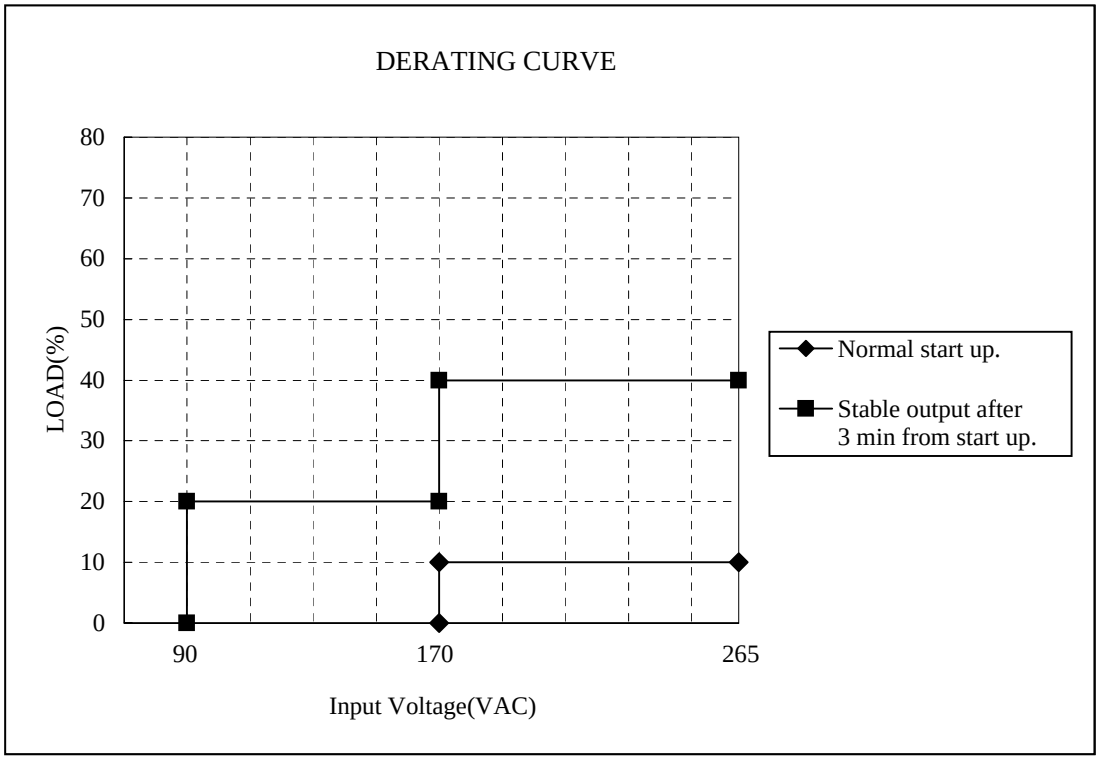
DERATING TO START UP AT Ta : -40~-10°C

A228-01-04/HD

Input Voltage (VAC)	LOAD(%)	
	Normal start up.	Stable output after 3 min from start up.
90	-	20
170	10	40

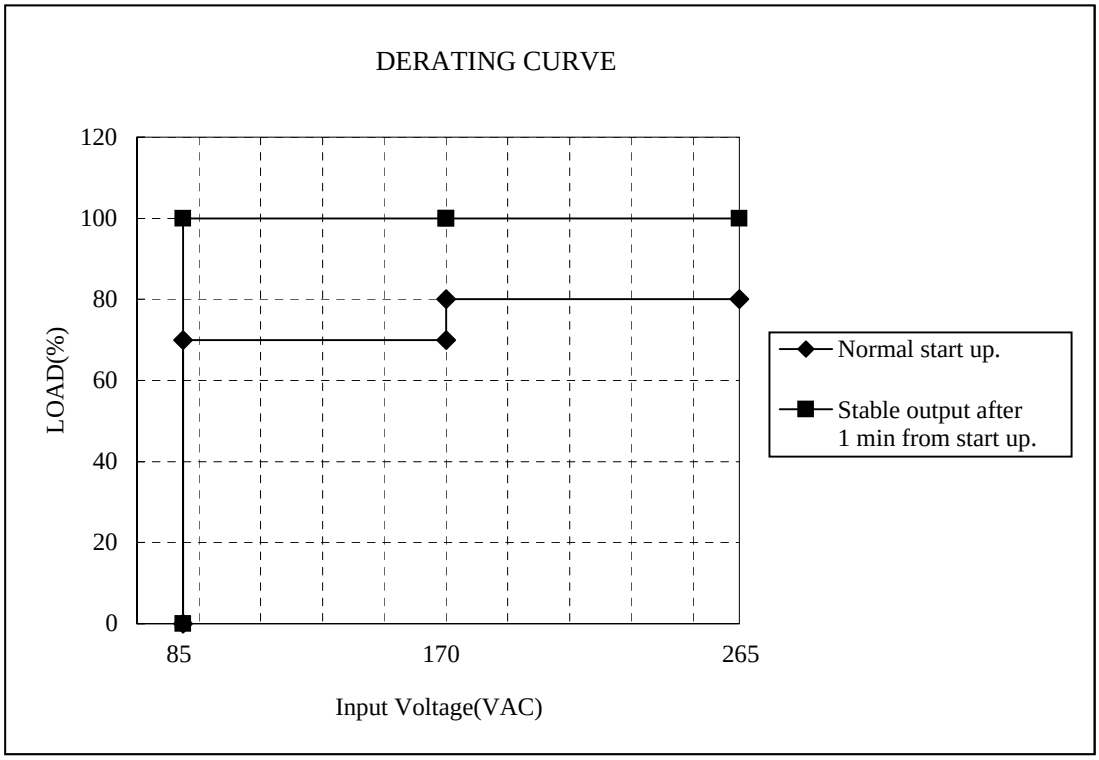


=NOTES=
*At Ta : -40~-10°C.
*Output voltage : Nominal output voltage.
*Input voltage : Not operate at 85 ~ 90VAC, and not gradual start up.
*Do not use the load that is constant current mode.
*Avoid forced air cooling. It is assumed that inside of power supply is heated by self-heating within 3 minutes.
*No dewdrop.
*Output voltage might be unstable at no load. In that case, apply minimum output current.
*Pay attention to above items before using the unit. Incorrect usage could lead to unstable output voltage

DERATING TO START UP AT Ta : -30~-10°C

A228-01-05/HD

Input Voltage (VAC)	LOAD(%)	
	Normal start up.	Stable output after 1 min from start up.
85	70	100
170	80	100



=NOTES=
*At Ta : -30~-10°C.
*Output voltage : Nominal output voltage.
*Input voltage : Not gradual start up.
*Do not use the load that is constant current mode.
*Avoid forced air cooling. It is assumed that inside of power supply is heated by self-heating within 1 minutes.
*No dewdrop.
*Output voltage might be unstable at no load. In that case, apply minimum output current.
*Pay attention to above items before using the unit. Incorrect usage could lead to unstable output voltage