HMS80

SPECIFICATIONS

A276-01-01A

ITEMS	MODEL			HMS80	HMS80	HMS80	HMS80	HMS80
2		ITEMS		-5	-12	-15	-24	-48
2 Maximum Output Current A 16 6.7 5.4 3.4 1.7 3 Maximum Output Power W 80.0 80.4 81.0 81.6 81.6 81.6 4 Efficiency (Typ.) (*1) 100VAC % 83 85 85 85 86 87 5 Input Voltage Range (*2) - 85 - 265VAC (47 - 63Hz) or 80 - 370VDC 6 Input Current (Typ.) (*1) 4 1.0440.52 7 Inrush Current (Typ.) (*1) - 14A at 100VAC, 28A at 200VAC, 7a-25°C, Cold Start 8 PFHC - Designed to meet IEC61000-3-2 9 Power Factor (Typ.) (*1) - 10 Output Voltage Range V 4.0 - 6.4 9.0 - 14.4 12.0 - 18.0 19.2 - 28.8 38.4 - 52.8 10 Maximum Ripple & Noise 0 0 0 0 0 0 11 Maximum Ripple & Noise 0 0 0 0 0 0 0 12 Maximum Load Regulation (*5) mV 20 48 60 96 192 13 Maximum Load Regulation (*6) mV 40 96 120 150 240 14 Temperature Coefficient - Less than 0.02% / C 15 Over Current Protection (*8) V 6.67 - 7.73 15.0 - 17.4 18.8 - 21.8 30.0 - 34.8 55.2 - 64.8 16 Over Voltage Protection (*8) V 6.67 - 7.73 15.0 - 17.4 18.8 - 21.8 30.0 - 34.8 55.2 - 64.8 17 Hold-up Time (Typ.) (*1) - 20ms 18 Leakage Current (*9) - Less than 0.5mA	1	Nominal Output Voltage	V	5	12	15	24	48
Efficiency (Typ.)	2		A	16	6.7	5.4	3.4	1.7
Designed to meet ENSTON Series	3			80.0	80.4	81.0	81.6	81.6
Solution Solution	4	Efficiency (Typ.) (*1) 100VAC	2 %	83	85	85	86	87
Input Voitage Range		200VAC	%	85				89
S-80 VAC: Operation time within 20 seconds.	_	J V-14 D (*2		85 - 265VAC (47 - 63Hz) or 80 - 370VDC				
6 Input Current (Typ.) (*1) (*1)(*3) - 14A at 100VAC, 28A at 200VAC, Ta=25°C, Cold Start PFHC - Designed to meet IEC61000-3-2 9 Power Factor (Typ.) (*1) - 0.98/0.91 10 Output Voltage Range V 4.0 - 6.4 9.0 - 14.4 12.0 - 18.0 19.2 - 28.8 38.4 - 52.8 11 Maximum Ripple & Noise 0.5Ta ≤70°C mV 120 150 150 150 200 (*4) .10≤Ta ≤70°C mV 160 180 180 180 240 12 Maximum Line Regulation (*5) mV 20 48 60 96 192 13 Maximum Load Regulation (*6) mV 40 96 120 150 240 14 Temperature Coefficient - Less than 0.02% / °C 15 Over Current Protection (*7) A 16.8 ≤ 7.04 ≤ 5.67 ≤ 3.57 ≤ 1.79 ≤ 0.00 ×)	input voltage Range (*2	' ⁻					
PFHC	6	Input Current (Typ.) (*1) A					
9 Power Factor (Typ.)	7	Inrush Current (Typ.) (*1)(*3) -	14A				Start
10	8	PFHC	-		Designed	to meet IEC61	000-3-2	
Maximum Ripple & Noise	9	Power Factor (Typ.) (*1) -					
Maximum Line Regulation 4'5 mV 160 180 180 180 240	10	Output Voltage Range	V	4.0 - 6.4	9.0 - 14.4	12.0 - 18.0	19.2 - 28.8	38.4 - 52.8
12 Maximum Line Regulation (*5) mV 20 48 60 96 192	11	Maximum Ripple & Noise 0 \(\text{Ta} \le 70\)	mV					200
13 Maximum Load Regulation (*6) mV 40 96 120 150 240 14 Temperature Coefficient - Less than 0.02%/°C 15 Over Current Protection (*8) A 16.8 ≤ 7.04 ≤ 5.67 ≤ 3.57 ≤ 1.79 ≤ 16 Over Voltage Protection (*8) V 6.67 - 7.73 15.0 - 17.4 18.8 - 21.8 30.0 - 34.8 55.2 - 64.8 17 Hold-up Time (Typ.) (*1) - 20ms 18 Leakage Current (*9) - Less than 0.5mA. 0.2mA (Typ) at 100VAC / 0.4mA (Typ) at 230VAC 19 Remote ON/OFF Control - - - 20 Remote ON/OFF Control - - - 21 Parallel Operation - - - 22 Series Operation - - 10 to +50°C:100%, +60°C:80%, +70°C:60%) 24 Operating Humidity - - 30 to +85°C 25 Storage Temperature - - - -		(*4) -10≤Ta<0°	mV	160	180	180	180	240
Temperature Coefficient -	12	Maximum Line Regulation (*5) mV	20				
15 Over Current Protection (*7) A 16.8 ≤ 7.04 ≤ 5.67 ≤ 3.57 ≤ 1.79 ≤ 16 Over Voltage Protection (*8) V 6.67 - 7.73 15.0 - 17.4 18.8 - 21.8 30.0 - 34.8 55.2 - 64.8 17 Hold-up Time (Typ.) (*1) - 20ms 18 Leakage Current (*9) - Less than 0.5mA. 0.2mA (Typ) at 100VAC / 0.4mA (Typ) at 230VAC 18 Remote Sensing - Possible 20 Remote ON/OFF Control - - 21 Parallel Operation - - 22 Series Operation - Possible 23 Operating Temperature (*10) - -10 to +70°C (-10 to +50°C:100%, +60°C:80%, +70°C:60%) 24 Operating Humidity - 30 to 90%RH (No Condensing) 25 Storage Temperature - -30 to +85°C 26 Storage Humidity - 10 to 95%RH (No Condensing) 27 Cooling - Convection Cooling 28	13	Maximum Load Regulation (*6) mV	40	96	120	150	240
16 Over Voltage Protection (*8) V 6.67 - 7.73 15.0 - 17.4 18.8 - 21.8 30.0 - 34.8 55.2 - 64.8 17 Hold-up Time (Typ.) (*1) - 20ms 18 Leakage Current (*9) - Less than 0.5mA. 0.2mA (Typ) at 100VAC / 0.4mA (Typ) at 230VAC 19 Remote Sensing - Possible 20 Remote ON/OFF Control - - 21 Parallel Operation - Possible 23 Operating Temperature (*10) - -10 to +70°C (-10 to +50°C:100%, +60°C:80%, +70°C:60%) 24 Operating Humidity - 30 to 90%RH (No Condensing) 25 Storage Temperature - -30 to +85°C 26 Storage Humidity - 10 to 95%RH (No Condensing) 27 Cooling - Convection Cooling 28 Withstand Voltage - Input - FG : 2kVAC (20mA), Input - Output : 3kVAC (20mA) Output - FG : 500VAC (20mA) for lmin 29 Isolation Resistance - More than 100M\(\Omega\$ at 25°C cand 70%RH Output - FG : 500VDC 30 Vibration - At no operating, 10 - 55Hz (Sweep for Imin) 19.6m/s² Constant, X,Y,Z Ihour each. 31 Shock - Designed to meet SEMI-F47 (200VAC Line only) 32 Conducted Emission (*11) - Designed to meet EN55011/EN55022-B, FCC-B, VCCI-B 34 Radiated Emission (*11) - Designed to meet EN55011/EN55022-B, FCC-B, VCCI-B 35 Weight (Typ) - 470g	14	Temperature Coefficient	-		Les		°C	•
17 Hold-up Time (Typ.)	15	Over Current Protection (*7) A	16.8 ≤	7.04 <u>≤</u>	5.67 <u>≤</u>	3.57 ≤	1.79 <u><</u>
18 Leakage Current (*9) - Less than 0.5mA. 0.2mA (Typ) at 100VAC / 0.4mA (Typ) at 230VAC 19 Remote Sensing - Possible 20 Remote ON/OFF Control - - 21 Parallel Operation - - 22 Series Operation - Possible 23 Operating Temperature (*10) - -10 to +70°C (-10 to +50°C:100%, +60°C:80%, +70°C:60%) 24 Operating Temperature - - -10 to +70°C (-10 to +50°C:100%, +60°C:80%, +70°C:60%) 24 Operating Temperature - - -10 to +70°C (-10 to +50°C:100%, +60°C:80%, +70°C:60%) 24 Operating Temperature - - -10 to +70°C (-10 to +50°C:100%, +60°C:80%, +70°C:60%) 25 Storage Temperature - - -10 to +70°C (-10 to +50°C:100%, +60°C:80%, +70°C:60%) 26 Storage Temperature -	16	Over Voltage Protection (*8) V	6.67 - 7.73	15.0 - 17.4	18.8 - 21.8	30.0 - 34.8	55.2 - 64.8
Percent Possible Possible Possible Parallel Operation Possible Parallel Operation Possible Possible Parallel Operation Possible P	17	Hold-up Time (Typ.) (*1) -			20ms		
Remote ON/OFF Control	18	Leakage Current (*9) -	Less than 0.5mA. 0.2mA (Typ) at 100VAC / 0.4mA (Typ) at 230VAC				
Parallel Operation	19		-	Possible				
Series Operation - Possible	20	Remote ON/OFF Control	-	-				
23 Operating Temperature (*10) - -10 to +70°C (-10 to +50°C:100%, +60°C:80%, +70°C:60%) 24 Operating Humidity - 30 to 90%RH (No Condensing) 25 Storage Temperature - - -30 to +85°C 26 Storage Humidity - 10 to 95%RH (No Condensing) 27 Cooling - Convection Cooling 28 Withstand Voltage - Input - FG : 2kVAC (20mA), Input - Output : 3kVAC (20mA) 29 Isolation Resistance - More than 100MΩ at 25°C and 70%RH Output - FG : 500VDC 30 Vibration - At no operating, 10 - 55Hz (Sweep for 1min) 19.6m/s² Constant, X,Y,Z 1hour each. Less than 196.1m/s² 32 Line DIP - Designed to meet SEMI-F47 (200VAC Line only) 33 Conducted Emission (*11) - Designed to meet EN55011/EN55022-B, FCC-B, VCCI-B 34 Radiated Emission (*11) - Designed to meet EN55011/EN55022-B, FCC-B, VCCI-B 35 Immunity (*11) - Designed to meet IEC61000-6-2 IEC61000-4-2, -3, -4, -5, -6, -8, -11	21	Parallel Operation	-	-				
24 Operating Humidity - 30 to 90%RH (No Condensing) 25 Storage Temperature - -30 to +85°C 26 Storage Humidity - 10 to 95%RH (No Condensing) 27 Cooling - Convection Cooling 28 Withstand Voltage - Input - FG : 2kVAC (20mA), Input - Output : 3kVAC (20mA) 29 Isolation Resistance - More than 100MΩ at 25°C and 70%RH Output - FG : 500VDC 30 Vibration - At no operating, 10 - 55Hz (Sweep for 1min) 19.6m/s² Constant, X,Y,Z 1hour each. Less than 196.1m/s² 32 Line DIP - Designed to meet SEMI-F47 (200VAC Line only) 33 Conducted Emission (*11) - Designed to meet EN55011/EN55022-B, FCC-B, VCCI-B 34 Radiated Emission (*11) - Designed to meet EN55011/EN55022-B, FCC-B, VCCI-B 35 Immunity (*11) - Designed to meet IEC61000-6-2 IEC61000-4-2, -3, -4, -5, -6, -8, -11 36 Weight (Typ) - 470g	22	Series Operation	-	Possible				
25 Storage Temperature - -30 to +85°C 26 Storage Humidity - 10 to 95%RH (No Condensing) 27 Cooling - Convection Cooling 28 Withstand Voltage - Input - FG : 2kVAC (20mA), Input - Output : 3kVAC (20mA) 0	23	Operating Temperature (*10) -					
26 Storage Humidity - 10 to 95%RH (No Condensing) 27 Cooling - Convection Cooling 28 Withstand Voltage - Input - FG : 2kVAC (20mA), Input - Output : 3kVAC (20mA) 29 Isolation Resistance - More than 100MΩ at 25°C and 70%RH Output - FG : 500VDC 30 Vibration - At no operating, 10 - 55Hz (Sweep for 1min) 19.6m/s² Constant, X,Y,Z 1hour each. Less than 196.1m/s² 32 Line DIP - Designed to meet SEMI-F47 (200VAC Line only) 33 Conducted Emission (*11) - Designed to meet EN55011/EN55022-B, FCC-B, VCCI-B 34 Radiated Emission (*11) - Designed to meet EN55011/EN55022-B, FCC-B, VCCI-B 35 Immunity (*11) - Designed to meet IEC61000-6-2 IEC61000-4-2, -3, -4, -5, -6, -8, -11 36 Weight (Typ) - 470g	24	Operating Humidity	-					
Cooling Convection Cooling	25	Storage Temperature	-					
28 Withstand Voltage - Input - FG : 2kVAC (20mA), Input - Output : 3kVAC (20mA)			-	10 to 95%RH (No Condensing)				
Output - FG : 500VAC (20mA) for 1min 29 Isolation Resistance - More than 100MΩ at 25°C and 70%RH Output - FG : 500VDC 30 Vibration - At no operating, 10 - 55Hz (Sweep for 1min) 19.6m/s² Constant, X,Y,Z 1hour each. 19.6m/s² Constant, X,Y,Z 1hour each. 31 Shock - Less than 196.1m/s² 32 Line DIP - Designed to meet SEMI-F47 (200VAC Line only) 33 Conducted Emission (*11) - Designed to meet EN55011/EN55022-B, FCC-B, VCCI-B 34 Radiated Emission (*11) - Designed to meet EN55011/EN55022-B, FCC-B, VCCI-B 35 Immunity (*11) - Designed to meet IEC61000-6-2 IEC61000-4-2, -3, -4, -5, -6, -8, -11 36 Weight (Typ) - 470g			-	Convection Cooling				
29 Isolation Resistance -	28	Withstand Voltage	-					
30 Vibration - At no operating, 10 - 55Hz (Sweep for 1min) 31 Shock - Less than 196.1m/s² 32 Line DIP - Designed to meet SEMI-F47 (200VAC Line only) 33 Conducted Emission (*11) - Designed to meet EN55011/EN55022-B, FCC-B, VCCI-B 34 Radiated Emission (*11) - Designed to meet EN55011/EN55022-B, FCC-B, VCCI-B 35 Immunity (*11) - Designed to meet IEC61000-6-2 IEC61000-4-2, -3, -4, -5, -6, -8, -11 36 Weight (Typ) - 470g				Output - FG: 500VAC (20mA) for 1min				
19.6m/s² Constant, X,Y,Z 1hour each. 31 Shock - Less than 196.1m/s² 32 Line DIP - Designed to meet SEMI-F47 (200VAC Line only) 33 Conducted Emission (*11) - Designed to meet EN55011/EN55022-B, FCC-B, VCCI-B 34 Radiated Emission (*11) - Designed to meet EN55011/EN55022-B, FCC-B, VCCI-B 35 Immunity (*11) - Designed to meet IEC61000-6-2 IEC61000-4-2, -3, -4, -5, -6, -8, -11 36 Weight (Typ) - 470g	29		-	More than $100M\Omega$ at 25°C and $70\%RH$ Output - FG : $500VDC$			500VDC	
31 Shock - Less than 196.1m/s² 32 Line DIP - Designed to meet SEMI-F47 (200VAC Line only) 33 Conducted Emission (*11) - Designed to meet EN55011/EN55022-B, FCC-B, VCCI-B 34 Radiated Emission (*11) - Designed to meet EN55011/EN55022-B, FCC-B, VCCI-B 35 Immunity (*11) - Designed to meet IEC61000-6-2 IEC61000-4-2, -3, -4, -5, -6, -8, -11 36 Weight (Typ) - 470g	30	Vibration	-					
32 Line DIP - Designed to meet SEMI-F47 (200VAC Line only) 33 Conducted Emission (*11) - Designed to meet EN55011/EN55022-B, FCC-B, VCCI-B 34 Radiated Emission (*11) - Designed to meet EN55011/EN55022-B, FCC-B, VCCI-B 35 Immunity (*11) - Designed to meet IEC61000-6-2 IEC61000-4-2, -3, -4, -5, -6, -8, -11 36 Weight (Typ) - 470g	<u></u>			19.6m/s ² Constant, X,Y,Z 1hour each.				
33 Conducted Emission (*11) - Designed to meet EN55011/EN55022-B, FCC-B, VCCI-B 34 Radiated Emission (*11) - Designed to meet EN55011/EN55022-B, FCC-B, VCCI-B 35 Immunity (*11) - Designed to meet IEC61000-6-2 IEC61000-4-2, -3, -4, -5, -6, -8, -11 36 Weight (Typ) - 470g			-					
34 Radiated Emission (*11) - Designed to meet EN55011/EN55022-B, FCC-B, VCCI-B 35 Immunity (*11) - Designed to meet IEC61000-6-2 IEC61000-4-2, -3, -4, -5, -6, -8, -11 36 Weight (Typ) - 470g	32			Designed to meet SEMI-F47 (200VAC Line only)				
35 Immunity (*11) - Designed to meet IEC61000-6-2 IEC61000-4-2, -3, -4, -5, -6, -8, -11 36 Weight (Typ) - 470g			,	Designed to meet EN55011/EN55022-B, FCC-B, VCCI-B				
36 Weight (Typ) - 470g) -					
) -					
27 C: (W-, H-, D) 22 5 y 92 y 160 5 (Pafer to Outling Drawing)			-					
37 Size (W x H x D) mm 33.5 x 83 x 160.5 (Refer to Outline Drawing)	37							

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

=NOTES=

- *1. At 100VAC/200VAC, Ta=25°C, nominal output voltage and maximum output power.
- *2. Output derating needed when input voltage less than 110VDC and 85VAC. Refer to OUTPUT DERATING CURVE.(A276-01-02, A276-01-03)
- *3. Not applicable for the inrush current to Noise Filter for less than 0.2ms.
- *4. Measure with JEITA RC-9131B probe, Bandwidth of scope :100MHz.
- *5. 85 265VAC, constant load.
- *6. No load-Full load, constant input voltage.
- *7. 5V: Constant current limit and Hiccup with automatic recovery.
 - 12V 48V: Constant current limit with automatic recovery
 - Avoid to operate at over load or short circuit condition.
- *8. OVP circuit will shut down output, manual reset (Re power on).
- *9. Measured by the each measuring method of IEC60950-1 (at 60Hz), Ta=25°C.
- *10. Output Derating
 - Derating at standard mounting. Refer to OUTPUT DERATING CURVE.(A276-01-02_, A276-01-03_)
 - Load (%) is percent of maximum output power or maximum output current, do not exceed its derating of maximum load.
- *11. The power supply is considered a component which will be installed into a final equipment.

The final equipment should be re-evaluated that it meets EMC directives.

OUTPUT DERATING (AC INPUT)

A276-01-02

•Derating to input voltage: $85VAC \le Vin \le 265VAC$

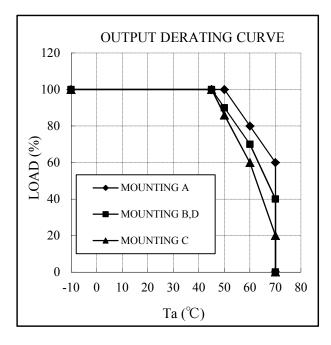
	LOAD(%)			
	MOUNTING	MOUNTING	MOUNTING	
Ta(°C)	A	B,D	C	
-10 to +45	100	100	100	
50	100	90	86	
60	80	70	60	
70	60	40	20	

•Derating to input voltage: $75VAC \le Vin < 85VAC *1$

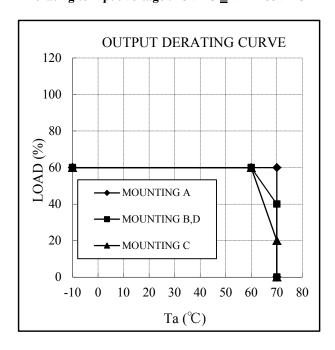
	LOAD(%)			
	MOUNTING	MOUNTING	MOUNTING	
Ta(°C)	Α	B,D	C	
-10 to +60	60	60	60	
70	60	40	20	

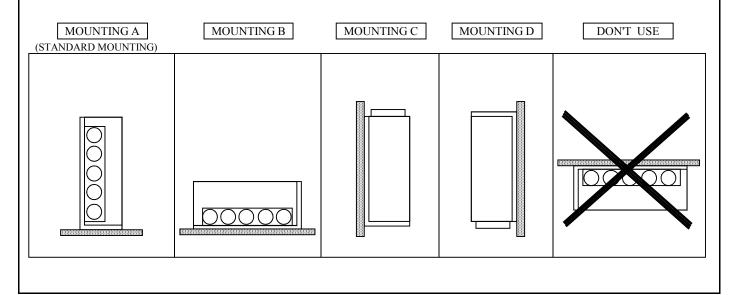
*1. Operation time within 20 seconds.

•Derating to input voltage : $85VAC \le Vin \le 265VAC$



•Derating to input voltage: 75VAC ≤ Vin < 85VAC





OUTPUT DERATING (DC INPUT)

A276-01-03

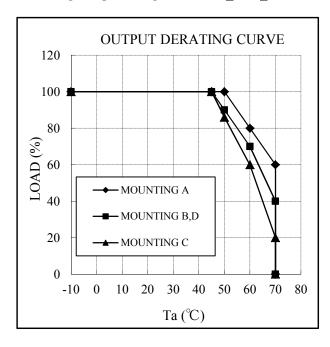
• Derating to input voltage : 110 VDC \leq Vin	√in ≤	≤ <i>3</i> 70VDC
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	LOAD(%)			
	MOUNTING	MOUNTING	MOUNTING	
Ta(°C)	A	B,D	C	
-10 to +45	100	100	100	
50	100	90	86	
60	80	70	60	
70	60	40	20	

• Derating to input voltage : 80VDC ≤ Vin < 110VDC

	LOAD(%)			
	MOUNTING	MOUNTING	MOUNTING	
Ta(°C)	Α	B,D	C	
-10 to +45	80	80	80	
50	80	72	69	
60	64	56	48	
70	48	32	16	

• Derating to input voltage : $110VDC \le Vin \le 370VDC$



• Derating to input voltage: 80VDC ≤ Vin < 110VDC

