

HFE1600 SERIES SPECIFICATIONS:

			HFE1600-12	HFE1600-24	HFE1600-48	Rev	
1	Rated output voltage	V	12	24	48		
2	Output voltage set point	V	12+/-1%	24+/-1%	48+/-1%		
3	Output voltage range	V	9.6~13.2	19.2~29.0	38.4~58		
4	Rated Output Current at Vin ≥ 170Vac	(*1) A	133	67	33		
5	Rated Output Current at 100 ≤ Vin ≤ 132Vac	(*1) A	100	50	25		
6	Rated Output Current at 85V ≤ Vin < 100Vac	(*1) A	Linear derating 1% per 1Vac from output current at 100Vac:				
7	Rated output power Vin ≥ 170Vac	W	1596	1608	1584		
8	Rated output power 100 ≤ Vin ≤ 132Vac	W	1200	1200	1200		
9	Rated output power 85Vac ≤ Vin < 100Vac	W	Linear derating 1% per V				
10	Input voltage / frequency range	(*2) ---	85~265Vac continuous, 47~63Hz, Single phase				
11	Maximum input current (at 115/230Vac)	A	12.4/8.1			A	
12	Power Factor (Typ) (at 115/230Vac)	---	>0.99/0.98 at 115/230V and maximum output power			A	
13	Efficiency at 75% rated load (Typ)	(*3) %	87/90%	88/90%	89/92%		
14	Efficiency at 100% rated load (Typ)	(*3) %	87/90%	87/90%	88/91%		
15	Inrush current	(*4) A	Less than 35A				
16	Hold-up time	mS	≥ 10mS typical at 115/230Vac input, rated output voltage and less than 80% of rated load.			A	
17	Maximum line regulation	(*5) %	0.25%				
18	Max load regulation	(*6) %	0.50%				
19	Output Ripple and noise P-P	(*7) 0~+70°C	mV	240	240	480	
		-10~0°C	mV	360	360	780	
20	Temperature stability	%	0.05% of rated Vout for 8hrs after 30min warm-up. Constant line, load and temperature.				
21	Temperature coefficient	ppm/°C	+/-200				
22	Remote sensing	(*8) ---	Possible. Refer to instruction manual.				
23	Parallel operation	(*9) ---	Possible. Single wire current share, 5% accuracy of rated Iout, up to 10 units.			A	
24	Series operation	---	Possible (with external diodes), 2 units. Refer to instruction manual.				
25	Over current protection	%	105~115% of rated output current.				
26	Over voltage protection	(*10) V	Tracking OVP, range: 1.1xVout, accuracy: +/-3%			A	
27	Over temperature protection	---	Inverter shut down method, automatic reset.				
28	Remote On/Off control	---	Two complementary inputs. By electrical signal or dry contact. Refer to instruction manual.				
29	"DC OK" signal	---	Tracking, On when Vout>90+/-5% of set output voltage. Open collector signal. Max.sink current: 10mA				
30	Over-Temperature warning	---	Refer to instruction manual. Open collector signal, Max. sink current: 10mA.				
31	"AC FAIL" signal	---	On when 270Vac>Vin>85Vac. Open collector signal, Max. sink current: 10mA.				
32	Auxiliary power supply output	---	11.2~12.5V, 0.5A. 240mVp-p ripple and noise (*11)				
33	Vout programming by external voltage	---	By 0~5V, equal to Vout min ~ Vout max . Refer to Instruction Manual.				
34	Vout programming by external resistor	---	By 1Kohm potentiometer . Refer to Instruction Manual.				
35	Front panel indicators	---	AC OK, DC OK/FAIL				
36	I²C Interface	---	Optional, PMBus compatible. Refer to Instruction Manual.				
37	Operating temperature	---	-10~70°C. -10~50°C: 100% load. Derate 2%/°C, 50°C to 60°C, Derate 2.5%/°C, 60°C to 70°C.				
38	Storage temperature	---	-30~85°C				
39	Operating humidity	---	10~90% RH, no condensation.				
40	Storage humidity	---	10~95% RH, no condensation.				
41	Cooling	---	By internal Fans. Variable speed control by ambient temperature and power level.				
42	Vibration	---	Built to meet IEC60068-2-64 (Basic Transportation)				
43	Shock	---	Built to meet IEC60068-2-27 (Basic Transportation)				
44	Conducted emission	---	Built to meet EN55022 Class B, FCC part 15 Class-B, VCCI Class-B				
45	Radiated emission	---	Built to meet EN55022 Class A, FCC part 15 Class-A, VCCI Class-A				
46	Immunity	---	Built to meet IEC61000-4-2 (Level 2,3), -3 (Level 2), -4 (Level 2), -5 (Level 3,4), -6 (Level 2), -8 (Level 4), -11				
47	Applicable safety standards	---	UL60950-1, EN60950-1				
48	Withstand voltage	---	Input-Output: 3000Vac, 1min. Input-Ground: 2000Vac, 1min.				
		---	Output - Ground: 500Vac 1min.		Output - Ground: 2250Vdc 1min	A	
49	Insulation resistance	---	More than 100Mohm at 25°C and 70% RH. Output-Ground: 500Vdc				
50	Leakage current	(*12) mA	Less Than 0.75/1.5mA at 115/230Vac range			A	
51	Weight (Typ)	Kg	Max. 1.55				
52	Size (W*H*D)	---	85x41x300mm. Refer to Outline Drawing.				

Notes:

- *1 Refer to Fig. 1
- *2 For cases where conformance to various safety standards (UL, EN etc.) is required, to be described as 100-240Vac (50/60Hz).
- *3 At 115/230Vac, 25°C ambient temperature.
- *4 Not applicable for the noise filter inrush current less than 0.2mS.
- *5 From 85~132Vac or 170~265Vac, constant load.
- *6 From No-load to Rated load, constant input voltage. Measured at the sensing point in Remote sense.
- *7 Measured with JEITA-RC9131A 1:1 probe with 2x270uF electrolytic capacitors and 1uF film capacitor on the output, 20MHz B.W. When Power Supplies are installed in HFE1600-S1U shelf, measured with 1uF film capacitor on the output terminals of the HFE1600-S1U.
- *8 Voltage drop on load wires: HFE1600-12: 0.25V/wire, HFE1600-24: 0.5V/wire, HFE1600-48: 1V/wire.
- *9 Accuracy applicable for load current > 50% of rated output current. Derate maximum output power by 5%.
- *10 Inverter shut down method. Reset by AC voltage recycle or by On/Off control.
- *11 Measured with JEITA-RC9131A 1:1 probe with 470uF electrolytic capacitor and 0.1uF film capacitor on the output, 20MHz B.W. Capacitors are not required when the Power Supply is installed in HFE1600-S1U shelf.
- *12 Measured according to UL,EN method at 60Hz Ta=25°C

Vin(AC)	Model V/I	HFE1600	HFE1600	HFE1600
		-12	-24	-48
85V	V1 (V)	12	24	48
	V2 (V)	13.2	29	58
100~132V	I1 (A)	76	34	17
	I2 (A)	85	42.5	21
170~265V	I1 (A)	91	42	21
	I2 (A)	100	50	25
	I1 (A)	121	56	28
	I2 (A)	133	67	33

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DRAW	<i>[Signature]</i> 3-3-11
ENGR	<i>[Signature]</i> 3-3-11
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APPR	<i>[Signature]</i> 3-3-11

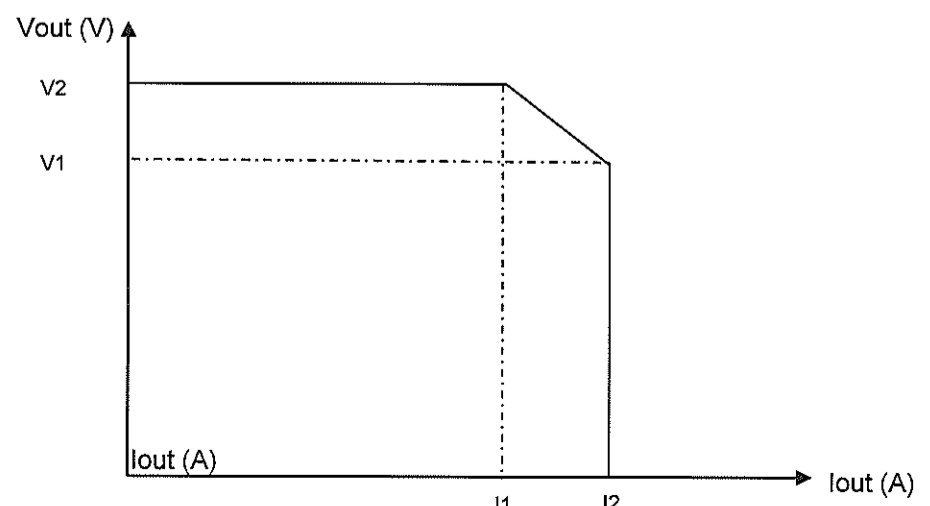


Fig. 1: Rated output current

A
A
B
A

HFE1600 SERIES I2C SPECIFICATIONS:

1. FEATURES

	REV
1.1 Output voltage measurement.	
1.2 Output voltage programming.	
1.3 Output current measurement.	
1.4 Internal ambient temperature measurement.	
1.5 Product information	
1.6 Status information	
1.7 SMBus alert	
1.8 Clock frequency: 100KHz	
1.9 Address lines: 4	

1. OUTPUT VOLTAGE MEASUREMENT

		HFE1600-12	HFE1600-24	HFE1600-48	REV
1.1 Measurement accuracy	-	+/-2% of full scale. Refer to instruction manual			
1.2 Measurement resolution	-	10 bits			
1.3 Measurement range (Full Scale)	V	0~15	0~30	0~60	A

2. OUTPUT VOLTAGE PROGRAMMING

		HFE1600-12	HFE1600-24	HFE1600-48	REV
2.1 Programming accuracy	-	+/-2% of full scale			
2.2 Programming resolution	-	10 bits			
2.3 Programming range	V	9.6~13.2	19.2~29.0	38.4~58	

3. OUTPUT CURRENT MEASUREMENT

		HFE1600-12	HFE1600-24	HFE1600-48	REV
3.1 Measurement accuracy	-	+/-10% of full scale			
3.2 Measurement resolution	-	10bit			
3.3 Measurement range (Full Scale)	A	0~160	0~80	0~40	A

4. INTERNAL AMBIENT TEMPERATURE MEASUREMENT (refer to Instruction Manual)

			REV
4.1 Measuring device accuracy	-	±3°C.	A
4.2 Measurement resolution	-	10bit	
4.3 Measurement range	°C	0~100	

5. PRODUCT INFORMATION

			REV
5.1 Factory programmed	-	Product ID	A
5.2 Factory programmed	-	Model Name	A
5.3 Factory programmed	-	Revision	A
5.4 Factory programmed	-	Serial Number	A
5.5 Factory programmed	-	Manufacturing location	A
5.6 Factory programmed	-	Coefficients	A

6. STATUS INFORMATION

			REV
6.1 "FAN FAIL" Signal	-	"1" -FAIL, "0"-OK	
6.2 "DC FAIL" Signal	-	"1" -FAIL, "0"-OK	
6.3 Output "OVP" Signal	-	"1"- OVP, "0"-OK	
6.4 "TEMPERATURE ALARM" signal	-	"1"- ALARM, "0"-OK	
6.5 "OTP" Signal	-	"1" -OTP, "0"-OK	
6.6 "AC FAIL" Signal	-	"1" -FAIL, "0"-OK	
6.7 I2C ON/OFF control	-	"1" -ON, "0"-OFF	
6.8 "SMB ALERT" signal	-	"1" -OK, "0"-ALERT	

DRAWING NO:		IA688-01-02A
DRAW	<i>[Signature]</i>	17-Feb-2011
ENGR	<i>[Signature]</i>	17-Feb-2011
CHECK	<i>[Signature]</i>	22.2.2
APPR	<i>[Signature]</i>	22.2.2