

3500W 1U Front End Power Supplies

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The HFE3500 AC-DC industrial power supplies can be operated in a hot-swap redundant configuration, or used to provide up to 13,300W of bulk power in a single 1U rack. Up to four power supplies can be fitted in each 19" 1U high rack and three full racks can be paralleled for configuration as a single output. The HFE supplies have internal ORing MOSFETs and current share for automatic parallel operation. Communication is possible with the power supplies using the built in isolated PMBus™ (I2C) interface or LAN option* (integrated into rack backplane). AC fail, DC good, remote output adjust, remote on/off and a 5V or 12V auxiliary output are fitted as standard.

Features	Benefits
• Internal ORing MOSFET and Current Share	• Suitable For N+1 Redundancy
• Up to 13,300W in 1U Rack	• Uses Less System Space
• Full Array of Signals Available	• Easy Remote Monitoring
• PMBus (I2C) as standard, and LAN* rack options	• Industry Standard Communication Interfaces
• External Output Voltage Adjustment	• Simple External Resistance or Voltage Connection

Model Selector (Power Supplies)						
Model	Output Voltage (V)	Adjustment Range (V) ⁽¹⁾	Max Current (A) (Vin>180Vac)	Max Power (W) (Vin>180Vac)	Max Current (A) (100<Vin<170Vac) ⁽¹⁾	Max Power (W) ⁽¹⁾ (100<Vin<170Vac)
HFE3500-24	24	24.0 - 27.6	146	3504	84	2016
HFE3500-48	48	48.0 - 55.2	73	3504	42	2016

Model Selector (Power Supplies)

HFE3500-	24	/	F	S	E
	Output voltage 24, 48		Standby Output Voltage F 5V, 2A T 12V, 1A	Digital Interface PMBus (Fitted as standard)	Input Fuse Options D Dual AC Fuses E Single AC Fuse in the Live Line

Model Selector (Rack)

HFE3500-	S1U	/	TB	-LAN
			Fitted with input terminal blocks	LAN Digital Interface Blank Not fitted (note PMBus is provided as standard on rack) -LAN* LAN interface (integrated into rack backplane, connector on rack rear)

* contact factory for availability

Specifications				
Model	HFE3500-24		HFE3500-48	
Input				
AC Input Voltage Range (Operating) ⁽¹⁾	Vac	85 - 264, See model selector for power derating		
Nominal Input Voltage Range	Vac	100 - 240 (Note: Safety certified for 90 - 264Vac only)		
Input Frequency	Hz	47 - 63 (for frequency up to 440Hz contact technical sales)		
Input Current max at 100Vac input	Arms	25		
Input Current max at 230Vac input	Arms	22		
Inrush Current	A	<50 (t > 0.2ms)		
Leakage Current 230Vac, 60Hz	mA	1.5		
Power Factor Correction (230Vac)	-	0.97 at maximum output power		
Harmonic Compliance	-	EN61000-3-12		
No Load Power Consumption	W	≤10 when output is inhibited		
Hold-Up Time 115/230Vac, 60Hz	ms	>10 at nominal voltage		
Efficiency (115/230Vac)	%	92 / 94	92 / 94	
Conducted EMI	-	EN55011 Class B, EN55032 Class B, FCC Title 47, Chapter 1, Part 15.107 - Class B, VCCI Class B		
Radiated EMI	-	EN55011 Class A, EN55032 Class A, FCC Title 47, Chapter 1, Part 15.109 - Class A, VCCI Class A		
Immunity	-	See immunity section		
Safety Certifications and Markings	-	IEC/UL/CSA/EN62368-1, EN/UL61010-1, CE Mark and UKCA Mark		

Immunity				
Test	Standard	Test Level	Criteria	Notes
ESD	EN61000-4-2	2	A	Contact
Radiated Susceptibility	EN61000-4-3	2, 3	A	10V/m 80 - 1000 MHz 3V/m 1.4 - 6.0 GHz
Electrical Fast Transient Burst	EN61000-4-4	3	B	AC Port, 5kHz, 100kHz
Surge	EN61000-4-5	3	B	Common and normal mode
Conducted Susceptibility	EN61000-4-6	3	A	AC Port
Magnetic fields	EN61000-4-8	4	A	-
Voltage Dips	IEC61000-4-34	3	B	-
	IEC61000-6-2	-	Compliant	-
SEMI F47	SEMI F47	-	A	180Vac (min), 2000W (max)

Specifications			
Model		HFE3500-24	HFE3500-48
Output			
Line Regulation ⁽²⁾	%	0.25	
Load Regulation	%	0.5	
External Load Capacitance	uF	1000uF/A	
Ripple & Noise	mV	240	480
Temperature Coefficient	%/°C	<0.02	
Minimum Load	-	No minimum load required	
Overcurrent Protection	%	101-120% of rated output current at rated output voltage. Adjustable down to 40% (±8%) using Analogue or PMBus interface	
Overvoltage Protection	%	110% (tracking). Cycle AC to reset or utilize Remote On/Off	
Overtemperature Protection	-	Shutdown with automatic reset. Warning signal provided	
Remote Sense Compensation	V/wire	0.5	1
Remote On/Off	-	Unit ON: 0-0.6V or short, OFF: 2-15V or open circuit	
Remote Adjust	-	By either external 0-5V signal or 1k potentiometer	
AC Fail Signal	-	Open collector (max 10mA, 15V), 1ms warning time (min)	
DC Good Signal	-	Open collector (max 10mA, 15V), ON when Vout above 90%(±5%) of setpoint (tracking)	
Auxiliary Output	-	5V/2A or 12V/1A	
Communication	-	Isolated PMBus™ (I2C) interface fitted as standard	
Indicators	-	AC OK/Fail= Green/Red,	DC OK/Fail=Green/Red
Parallel Operation	-	Yes, single wire current share, up to 95% accuracy (load dependent), up to 12 units	
Series Operation	-	Possible (with external diodes), 2 units. Refer to instruction manual.	

Specifications		
Model		
		HFE3500-24
		HFE3500-48
Environmental		
Operating Temperature	°C	0 to +40 (-10 start-up): 100% load, 3300W at 50 ; +50 to +60 derate: 2%/°C of load; +60 to +70 derate: 2.5%/°C of load
Storage Temperature	°C	-40 to +85
Humidity (non condensing)	%RH	Operating: 10 - 90, Storage: 10 - 95
Cooling	-	Internal variable speed fans.
Altitude	m	5000 max.
Audible Noise	dBA	66 at full load
Withstand Voltage	-	Input to output 3kVac, input to ground 2kVac, output to ground 500Vdc
Isolation Resistance	MΩ	>100 at 25°C & 70%RH, Output to Ground 500Vdc
Vibration (Non-operating))	-	Meets IEC60068-2-64 (Basic Transportation)
Shock (Non-operating)	-	Meets IEC60068-2-27 (Basic Transportation)
Other		
Weight (Typ)	kg	Power Supply: 2.0, Rack: 4.9
Size (WxHxD)	mm	Power Supply: 107 x 40.1 x 330, Rack: 444.5 x 43.7 x 428
Size (WxHxD)	Inches	Power Supply: 4.21 x 1.61 x 12.99; Rack: 17.5 x 1.72 x 16.8
MTBF - Telcordia SR-332 Issue 4, Method 1	Hours	75,000 (30°C ambient)
Warranty	yrs	Five

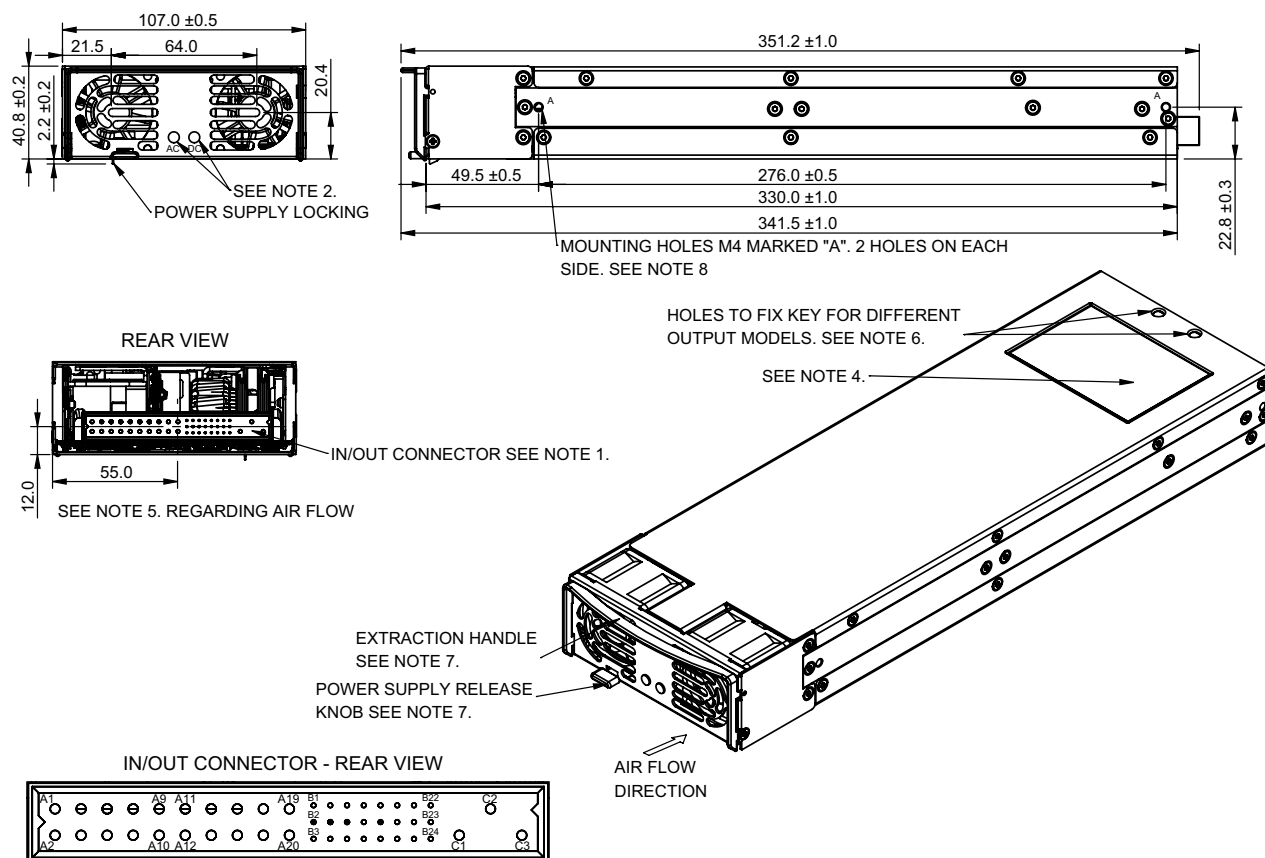
Notes

See installation manual for detailed specifications & test methods

(1) Derate linearly 1%/V from 180Vac to 170Vac and 1.3%/V from 100Vac input

(2) From 85 - 132Vac or 170 - 265Vac, constant load

Outline Drawing HFE3500 (Power Supply)



PIN No.	FUNCTION	PIN No.	FUNCTION
A1 - A10	-VO	B14	A1
A11 - A20	+VO	B15	DC_OK
B1	SIGNAL RTN	B16	A0
B2	PS_EXIST	B17	SDA
B3	+V_STBY (NOTE 3)	B18	TEMP_ALARM_SR
B4	-SENSE	B19	V_REF_EXT
B5	A2	B20	SMB_ALERT
B6	CS	B21	AC_FAIL_OUT
B7	ENABLE	B22	5V_TRIM
B8	V_PROG	B23	NC
B9	+SENSE_IN	B24	NC
B10	A3	C1	EARTH
B11	I_PROG	C2	NEUTRAL
B12	INHIBIT	C3	LINE
B13	SCL		

NOTES:

- CONNECTOR TYPE: PCIH47M400/A1, POSITRONIC. MATES WITH FEMALE CONNECTOR TYPE: PCIH47F400A1/AA.
- LED INDICATORS: REFER TO INSTRUCTION MANUAL.
- +V_STBY: /T = +5V, /F = +12V (REFER TO INSTRUCTION MANUAL)
- MODEL NAME, INPUT AND OUTPUT RATING AND SAFETY APPROVAL SYMBOLS ARE DESCRIBED ON TOP SURFACE LABEL.
- ALLOW MINIMUM 50mm OF FREE AIR OUTLET AT THE REAR OF THE UNIT. DO NOT OBSTRUCT AIR FLOW TO THE FRONT PANEL.
- REFER TO INSTRUCTION MANUAL FOR SETTING DETAILS
- TO EXTRACT POWER SUPPLY, ELEVATE THE RELEASE KNOB AND PULL THE EXTRACTION HANDLE.

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