3500W 1U Front End Power Supplies

https://product.tdk.com/en/power/hfe
www.emea.lambda.tdk.com/uk/products/hfe



Industrial COTS Test COMM Broadcast

PMBus

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. 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	• 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

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

Model Selector (Rack)

HFE3500-	S1U	/	TB

- TB: Fitted with input terminal blocks

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 230Vac and nominal load, >20 at 115/230Vac with output derating to 2000W	
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 IEC61000-6-2	3 -	B Compliant	- -
SEMI F47	SEMI F47	-	A	180Vac (min), 2000W (max)

Specifications

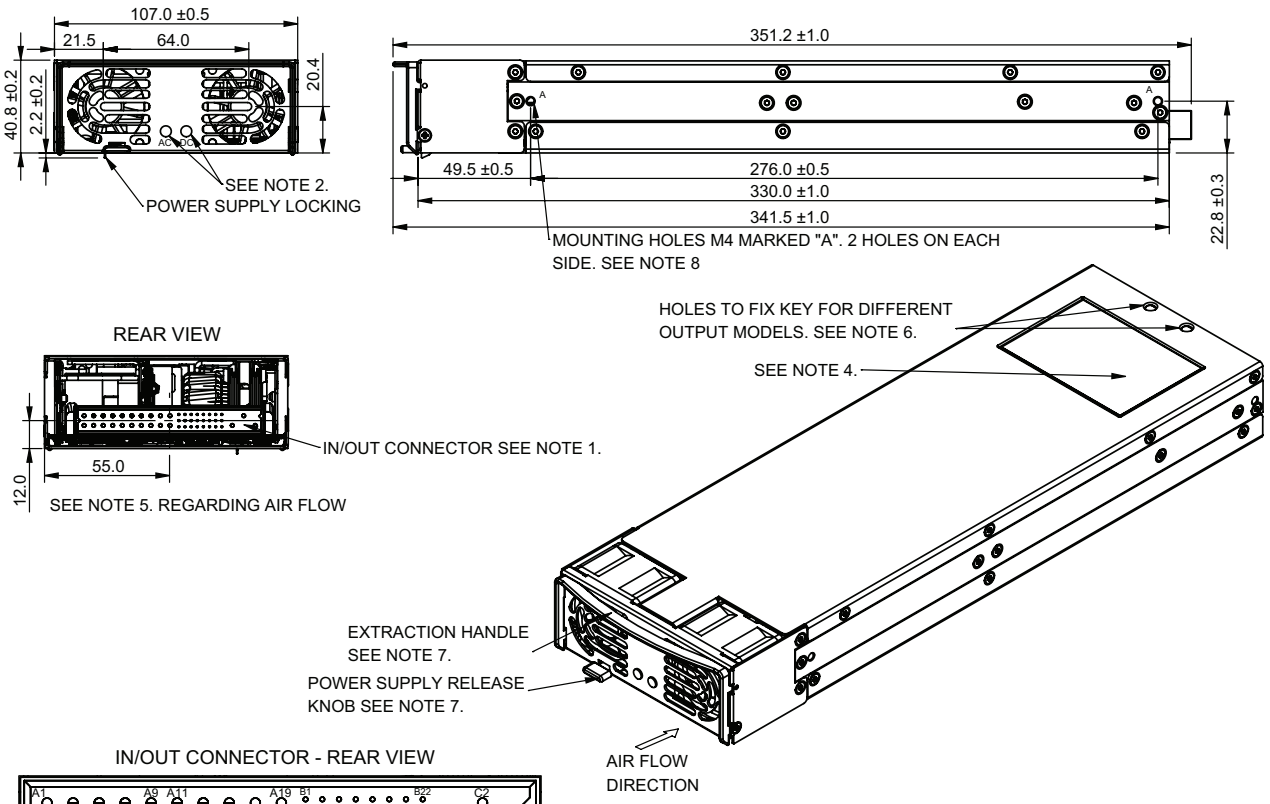
Model		HFE3500-24	HFE3500-48
Output			
Line Regulation(2)	%	0.25	
Load Regulation	%	0.5	
External Load Capacitance	uF	1000uF/A	
Ripple & Noise	mV	240	480
Temperature Coefficient	%/°C	<0.02	
Minimum Load	-	No minimum load required	
Overcurrent Protection	%	101-120% of rated output current at rated output voltage. Hiccup mode with automatic recovery. OCP threshold 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)

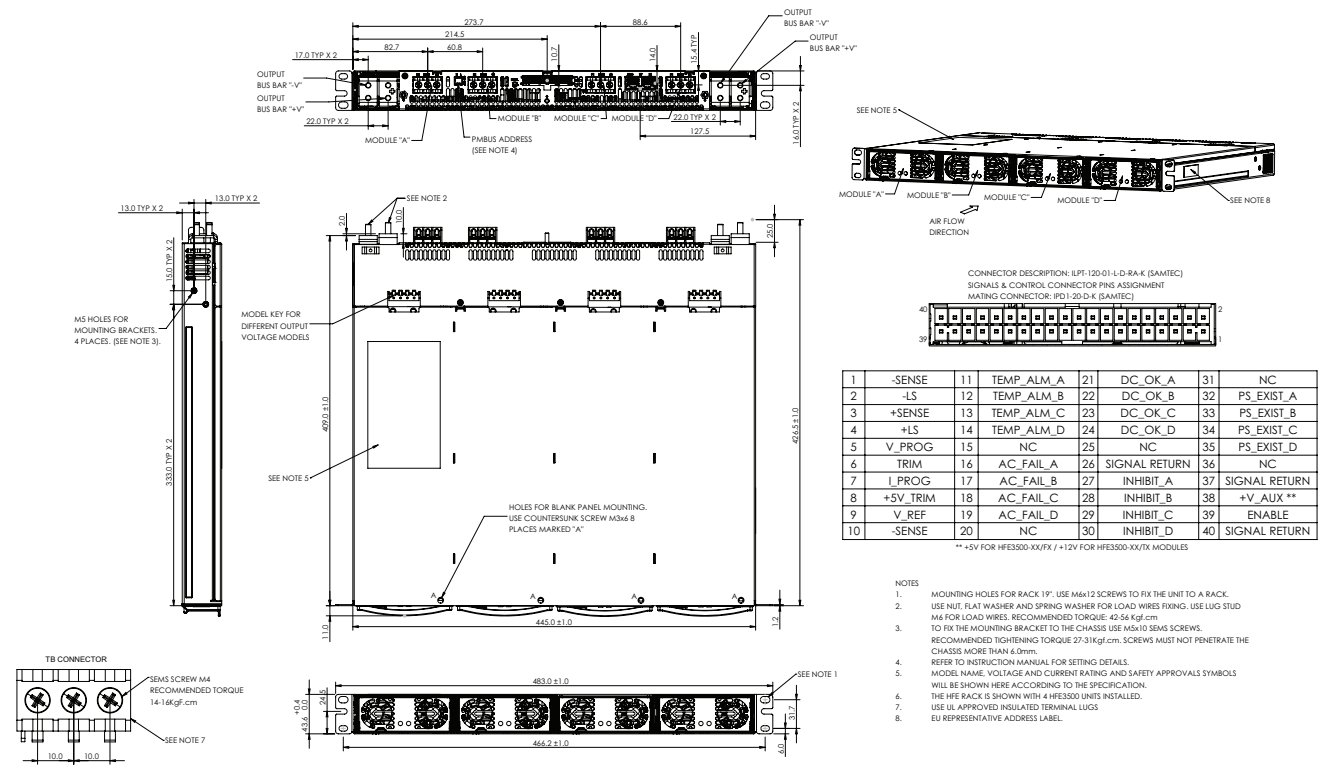


PIN No.	FUNCTION	PIN No.	FUNCTION
A1 - A10	-VO	B14	A1
A11 - A20	+VO	B15	DC_OK
B1	SIGNAL_RTN	B16	A0
B2	PS_EXIST	B17	SDA
B3	+V_STBY (NOTE 3)	B18	TEMP_ALARM_SR
B4	-SENSE	B19	V_REF_EXT
B5	A2	B20	SMB_ALERT
B6	CS	B21	AC_FAIL_OUT
B7	ENABLE	B22	5V_TRIM
B8	V_PROG	B23	NC
B9	+SENSE_IN	B24	NC
B10	A3	C1	EARTH
B11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

NOTES:

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

Outline Drawing HFE3500 (Rack)



CONNECTOR DESCRIPTION: ILPT-120-01-L-D-RA-K (SAMTEC)
SIGNALS & CONTROL CONNECTOR PINS ASSIGNMENT
MATING CONNECTOR: IPD1-20-D-K (SAMTEC)

1	-SENSE	11	TEMP_ALM_A	21	DC_OK_A	31	NC
2	-LS	12	TEMP_ALM_B	22	DC_OK_B	32	PS_EXIST_A
3	+SENSE	13	TEMP_ALM_C	23	DC_OK_C	33	PS_EXIST_B
4	+LS	14	TEMP_ALM_D	24	DC_OK_D	34	PS_EXIST_C
5	V_PROG	15	NC	25	NC	35	PS_EXIST_D
6	TRIM	16	AC_FAIL_A	26	SIGNAL RETURN	36	NC
7	I_PROG	17	AC_FAIL_B	27	INHIBIT_A	37	SIGNAL RETURN
8	+5V_TRIM	18	AC_FAIL_C	28	INHIBIT_B	38	+V_AUX **
9	V_REF	19	AC_FAIL_D	29	INHIBIT_C	39	ENABLE
10	-SENSE	20	NC	30	INHIBIT_D	40	SIGNAL RETURN

** +5V FOR HFE3500-XX/FX / +12V FOR HFE3500-XX/TX MODULES

NOTES
1. MOUNTING HOLES FOR RACK 19". USE M6x12 SCREWS TO FIX THE UNIT TO A RACK.
2. USE NUT, FLAT WASHER AND SPRING WASHER FOR LOAD WIRES FIXING. USE LUG STUD M6 FOR LOAD WIRES. RECOMMENDED TORQUE: 42-56 Kgf.cm
3. TO FIX THE MOUNTING BRACKET TO THE CHASSIS USE M5x10 SEMS SCREWS. RECOMMENDED TIGHTENING TORQUE 27-31Kgf.cm. SCREWS MUST NOT PENETRATE THE CHASSIS MORE THAN 6.0mm.
4. REFER TO INSTRUCTION MANUAL FOR SETTING DETAILS.
5. MODEL NAME, VOLTAGE AND CURRENT RATING AND SAFETY APPROVALS SYMBOLS WILL BE SHOWN HERE ACCORDING TO THE SPECIFICATION.
6. THE HFE RACK IS SHOWN WITH 4 HFE3500 UNITS INSTALLED.
7. USE UL APPROVED INSULATED TERMINAL LUGS
8. EU REPRESENTATIVE ADDRESS LABEL.

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