

UFE / UFR Series

Up to 6000 Watts

Total Power: Up to 6000 W
Input Voltage: 85 - 264 Vac
of Outputs: Single + Aux
Output: 24 V & 48 V



Special Features

- Rack mounted chassis (1U, 19")
- 3 hot pluggable rectifiers per 1U chassis, up to 4 kW redundant or 6 kW available power (180-264 Vac input)
- Up to 2.6 kW redundant or 3.9 kW available per shelf at 90-132 Vac input
- Stackable to 6U high to provide up to 36 kW available power
- Class B conducted EMI EN55022 (See Note 1)
- Automatic fan speed control with fault reporting
- Auxiliary standby output, 11 V at approximately 2.8 W
- High density up to 22 W/in³
- High efficiency up to 91%
- Floating as well as isolated main output voltage allows positive or negative polarity operation
- EU directive 2002/95/EC compliant for RoHS
- 2 year warranty
- PMBus compliant

Safety

- VDE EN/IEC60950-1
- UL/cUL60950-1

Electrical Specifications

Output		
Output Power:	Main output Auxiliary output	See Table 1 11 V $\pm$ 15%, 2.875 W
Line regulation:	Low line to high line	$\pm$ 0.15% max.
Load regulation (active share mode):	Full load to min. load	$\pm$ 0.15% max.
Turn-on delay:	(See Note 4)	5.0 s max.
Ambient temp. coefficient:	At full load, min. Vin	$\pm$ 0.005%/°C
Voltage adjustability:	48 Vout 24 Vout	42-57 Vdc 21-28.5 Vdc
Adjustable PMBus command (See Note 6)		
Output setpoint accuracy:		$\pm$ 0.5%
Default output voltage: setting 25 °C	48 Vout (active default) 24 Vout (active default)	48 V $\pm$ 0.5% @ 41 A 27 V $\pm$ 0.5% @ 48 A
Voltage droop: (operation set PMBus command)	24 Vout 48 Vout	40.3 mV/A $\pm$ 3.0% from 10 A up to power limit 80.6 mV/A $\pm$ 3.0% from 10 A up to power limit
Total error band:	-40 °C to +70 °C, FL range	$\pm$ 1.0% max.
Overshoot/undershoot:	Main output @ turn-on/off	0%/0%
Ripple and noise (20 MHz):	Main output, -5 °C and above Auxiliary output	500 mV pk-pk, 150 mV rms 400 mV pk-pk, 150 mV rms
Dynamic regulation (except droop mode):	Peak dev., 25% load step Recovery time	2.5% max. 1 ms max.
Current sharing (See Note 3):	(I1-I2) / I LIMIT x 100	15% max.

All specifications are typical at nominal input, full load at 25 °C ambient unless otherwise stated.



Input		
Input voltage range: (See note 2)		88-264 Vac 176-264 Vac
Input frequency range:		47-63 Hz
Input current:		15 A max.
Ground leakage current:	AC to safety ground	2 mA max.
Input fuse (internal)	Both lines fused	30 A
Power factor:	50 to 100% load	0.98
Undervoltage lockout: (power up)	High line range Wide line range	176 Vac max. 88 Vac. max
Undervoltage lockout: (power down)	High line range Wide line range	162 Vac min. 76 Vac min. LED warning @ 176 V max. LED warning @ 88 V max.
General Specifications		
Electrical insulation:	Input/output Input/chassis	3000 Vac / 4242 Vdc 1500 Vac / 2121 Vdc
Switching frequency:	Fixed	450 kHz
Approvals and standards:		VDE EN/IEC60950-1 UL/CUL60950-1
Weight:		5.5 lbs
Hold-up time:	48 Vout at rated output power 24 Vout at rated output power	20 ms min. 20 ms min.
MTBF (@25 °C):	Telcordia SR-332 Issue 1	279,069 hours
Acoustical noise:	Over all conditions 25 °C ambient at rated output power	71 dB max. 58 dB typ.
EMC		
Conducted emissions:	EN55022, FCC part 15	Class B (when installed in system)
Immunity:		
Harmonic current:	EN61000-3-2	Compliant
ESD air/contact:	EN61000-4-2	Level 3
Surge:	EN61000-4-5	
Fast transients:	EN61000-4-4	Level 3
Flicker:	EN61000-3-3	Compliant
Magnetic field:	EN61000-4-8	Compliant
Radiated immunity:	EN61000-4-3	Level 3
Conducted immunity:	EN61000-4-6	Level 3

Notes

- 1 Final EMI performance is system/shelf dependent.
- 2 Auto ranging sets power limit based on input voltage at turn on.
- 3 The difference in output current among any two rectifiers operating in parallel does not exceed a value equal to 15% of the rated current limit. This specification applies for operation with any output current from no load to 110% of maximum.
- 4 Maximum 15 minute warm up time at light loads below -15 °C. See Application Note 212 for cold start timing data.
- 5 For operation above 1,524 m (5,000 ft), maximum operation temperature is derated by 2 °C per 305 m (1,000 ft).
- 6 Output voltage can be modified on the fly between 21-28.5 V (24 V model) or 42-57 V (48 V model) PMBus command.
- 7 PM BUs communication. Pin names in parenthesis refer to the PMBus version names. UFE2000-96S48PJ and UFE130096S24PJ use PMBus.

Ordering Information									
Rated Output Power	Output Voltage Vout		Output Current (Min)	Power Limit +15% / -0% Vout (min)	Line Range at Turn On (Auto Ranging)	Operating Line Range	Current Limit (Vout) < Vout (min)	Model Numbers ⁽⁷⁾	Order Number
	Min	Max							
24 Vout Models									
1300 W	21 v	28.5 V	0 A	1300 W	90-264 Vac	65 A	65 A	UFE1300-96S24PJ	UFE1300-5
48 Vout Models									
1300 W	42 V	57 V	0 A	1300 W	90-264 Vac	33 A	33 A	UFE2000-96S48PJ	UFE2000-9
2000 W	42 V	57 V	0 A	2000 W	180-264 Vac	52 A	52 A		
1300 W	42 V	57 V	0 A	1300 W	90-264 Vac	33 A	33 A	UFE2000-96S48PDJ	UFE2000-9-D
2000 W	42 V	57 V	0 A	2000 W	180-264 Vac	52 A	52 A		
1300 W	42 V	57 V	0 A	1300 W	90-264 Vac	33 A	33 A	UFE2000-96S48PHDJ	UFE2000-9-HD
2000 W	42 V	57 V	0 A	2000 W	180-264 Vac	52 A	52 A		
Rack Ordering Information									
Rack Model Number				Hot Plug Interface			Number of Power Modules per Pack		
UFR6000-00J				Yes			3		
UFR6000PJ				Blank Panel			3		

Environmental Specifications

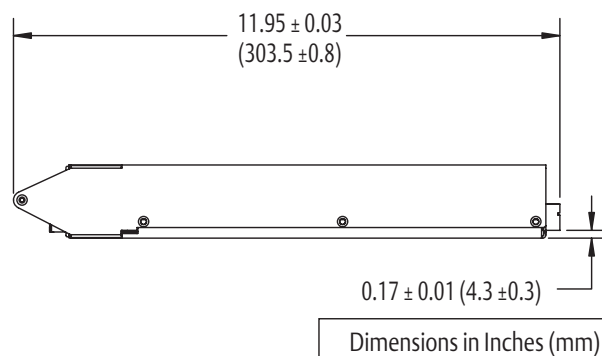
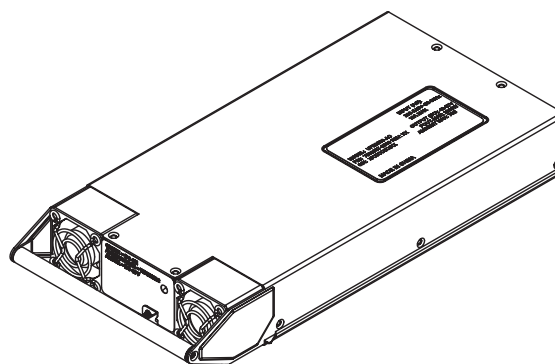
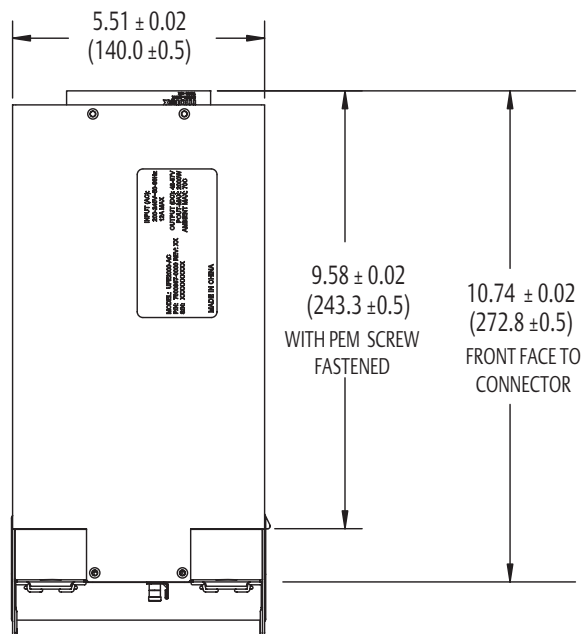
Thermal performance: (See Notes 4 and derating curves)	Operating Non-operating Cold Start	-33 °C to +70 °C -40 °C to +100 °C -40 °C
Relative humidity: non-condensing	Operating Non-operating	Up to 80% Up to 95%
Altitude: (See Note 5)	Operating Non-operating	10,000 feet max. 35,000 feet max.
Vibration:	Operating Non-operating	1.0 G peak 1.5 G peak
Shock:	Operating Non-operating	10 G peak / 11 ms 40 G peak / 11 ms
Protection		
Power limit: $V_o > V_{out\ min}$		$\pm$ Rated power +15%/-0%
Current limit:	Constant current limiting - brickwall $V_o \geq V_{out\ min}$	$\pm$ limit, $\pm$ 8%
Short-circuit:	Hiccup mode at $V_o < 40\ V_{dc}$ $V_o < 20\ V_{dc}$	200 ms on / 1/8 s off
Overvoltage:	Output shutdown Latching after 1 retry	60 V max. 32 V max.
Thermal:	Self protecting	Non-latching
OR-ing fault (See Note 7)	Tested via I ² C or PMBus	LED alarm (by read) in case of OR-ing fault
Communication Monitoring Readout Accuracy		
Current:	Valid from 15% to max. load	$\pm$ 15%
Voltage:	Measured before output OR-ing	$\pm$ 5%
Temperature:	Measured Internal output OR-ing	$\pm$ 5 °C
Hours counter:		$\pm$ 36 s/hours approx.

Part Number System with Options

Product Family	Rated Output Power	Input Range	Standard Compliance	Type of Output	Output Voltage	Communications Type	Option Code	Special Modification	RoHS Compliance ⁽⁹⁾
UFE	2000	9	6	S	48	P	D	XX	J
UFE = Universal Front-End	1300 = 1300 Watts 2000 = 2000 Watts	9 = Universal Input with PFC	6 = UL/CSA/VDE Class A/B	S = Single	48 = 48 V 24 = 24 V	P = PMBus serial communications	None = Active Ishare D = Droop Ishare HD = PS Enable HI/Droop		J = Pb free (RoHS 6/6 compliant)

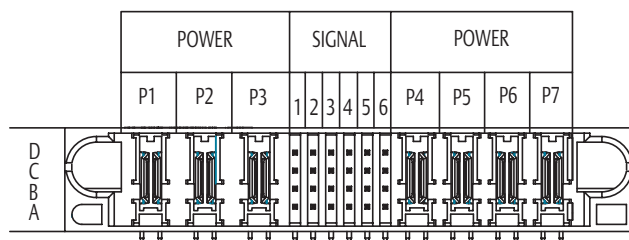
Mechanical Drawing

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Power Supply Connector	Mating Connector
Molex: 87663-4006	Molex: 87664-2004
Tyco: 2-1450330-8	Tyco: 1450370-5
FCI Berg: 51939-180	FCI Berg: 51915-070

Power Supply Connector

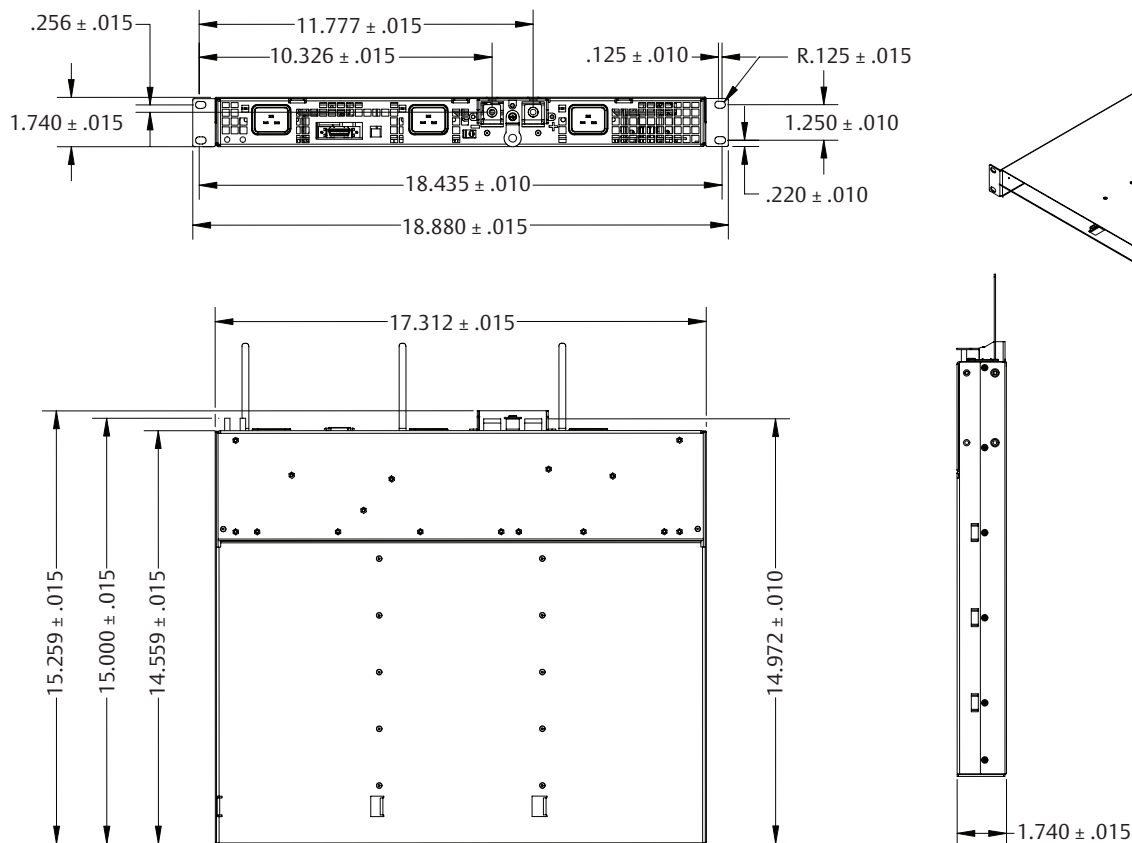


Power Connections Layout
(Looking into Connector Side of UFE Power Supply)

Power Supply Connector Pinout					
Pin	D	C	B	A	
P1	L1				
P2	L2				
P3	PEG				
1	Sense-	Sense+		GND	Shortpin
2	Present-L	GND		PS-ID0	GND
3	PS-ID3	PS-ID2		GND	12V-AUX
4	GND	SCL		PS-ID1	GND
5	SDA	GND		GND	I ² C-En-H (Comm-En-H)
6	SMBALERT#	Ishare		DC-OK-L	PS-EN (Control)
P4	DC_N				
P5	DC_N				
P6	DC_P				
P7	DC_P				

Rack Specifications

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Rack Signal Connector Pinout			
Pin No.	Function	Pin No.	Function
1	Sense+	14	Ishare
2	Ground	15	Unit 1 Present
3	Sense-	16	Ground
4	Ground	17	Unit 2 Present
5	PS-EN (Control)	18	Ground
6	DC1-OK0-L	19	Unit 3 Present
7	DC2-OK-L	20	Ground
8	DC3-OK-L	21	SCL
9	I ² C-En-H-1 (Comm-En-H)	22	Ground
10	I ² C-En-H-2 (Comm-En-H)	23	SDA
11	I ² C-En-H-3 (Comm-En-H)	24	Ground
12	Ground	25	SMBALERT#
13	12V-Aux	26	N/C

Signal Connector (1 per shelf)	
Shelf Connector	Mating Connector
Molex: 52986-2679	Molex: 52316-2619
Tyco: 2-178238-4	Tyco: 2-5175677-4

AC Input Connector (3 per shelf)	
Shelf Connector	Mating Connector
IEC320 C20 Socket	IEC320 C20 Plug (Straight Entry)

Shelf DIP Switch Table		
Shelf Number	DIP Switch	DIP Switch
1	Up	Up
2	Up	Down
3	Down	Up
4	Down	Down

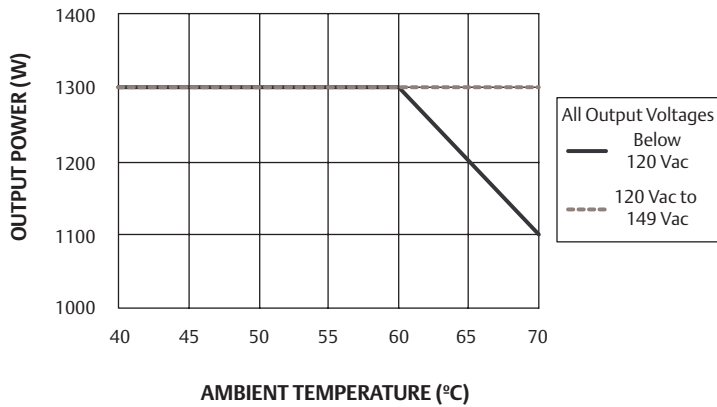


Figure 1 - Thermal Derating Curve for UFE2000-96S48J Model
Low Line Input Voltage

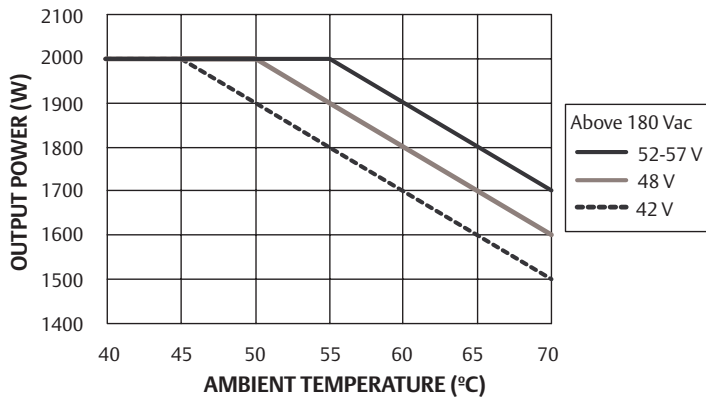


Figure 2 - Thermal Derating Curve for UFE2000-96S48J Model
High Line Input Voltage

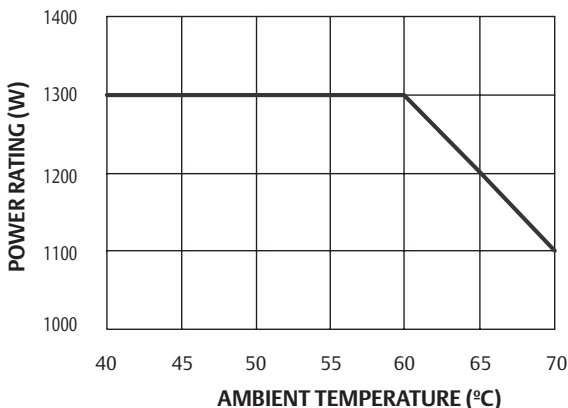


Figure 3 - Thermal Derating Curve for UFE1300-96S24J Model
All Conditions

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