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

RoHS 2002/95/EC

PMBus

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 ±15%, 2.875 W
Line regulation:	Low line to high line	±0.15% max.
Load regulation (active share mode):	Full load to min. load	±0.15% max.
Turn-on delay:	(See Note 4)	5.0 s max.
Ambient temp. coefficient:	At full load, min. Vin	±0.005%/ºC
Voltage adjustability: Adjustable via I2C or PMBus command (See Note 6)	48 Vout 24 Vout	42-57 Vdc 21-28.5 Vdc
Output setpoint accuracy		±0.5%
Default output voltage, setting 25 ºC	48 Vout (active default) 24 Vout (active default)	48 V ±0.5% @ 41 A 27 V ±0.5% @ 48 A
Voltage droop (operation set via I2C or PMBus command)	24 Vout 48 Vout	40.3 mV/A ±3.0% from 10 A up to power limit 80.6 mV/A ±3.0% from 10 A up to power limit
Total error band	-40 ºC to +70 ºC, FL range	±1.0% max.
Overshoot/undershoot	Main output @ turn-on/off	0%/0%
Ripple and noise (20 MHz)	Main output, -5 ºC 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) / ILIMIT x 100	15% max.

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

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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	162 Vac min. LED warning @ 176 V max.
	Wide line range	76 Vac min. LED warning @ 88 V max.

GENERAL

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	Telcordia SR-332 Issue 1	279,069 hours
Acoustical noise	Over all conditions	71 dB max.
	25 °C ambient at rated output power	58 dB typ.

EMC

Conducted emissions:	EN55022, FCC part 15	Class B (when installed in system)
Immunity:		
Harmonic content	EN61000-3-2	Compliant
ESD air/contact	EN61000-4-2	Level 3
Surge	EN61000-4-5	Level 3 (See Note 8)
Fast transients	EN61000-4-4	Level 3
Flicker	EN61000-3-3	Compliant
Magnetic field	EN61000-4-8	Compliant
Radiated	EN61000-4-3	Level 3
Conducted	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) via I²C or PMBus command.
7 Two different models of communication are available (I²C and PMBus communication). Pin names in parenthesis refer to the PMBus version names. UFE2000-96S48CJ and UFE1300-96S24CJ use I²C
UFE2000-96S48PJ and UFE1300-96S24PJ use PMBus (available Q1 2006).
8 Level 4 is achievable with a few external components. Please see Application Note 212 for more details.

Ordering Information

Rated Output Power	Output Voltage Vout (min)	Output Vlotage Vout (max)	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 Number [7]	Order Number
24 Vout Models									
1300 W	21 V	28.5 V	0 A	1300 W	90-264 Vac	90-264 Vac	65 A	UFE1300-96S2PJ	UFE1300-5
48 Vout Models									
1300 W	42 V	57 V	0 A	1300 W	90-140 Vac	90-264 Vac	33 A	UFE2000-96S4PJ	UFE2000-9
2000 W	42 V	57 V	0 A	2000 W	150-264 Vac	180-264 Vac	52 A		

Rack Ordering Information

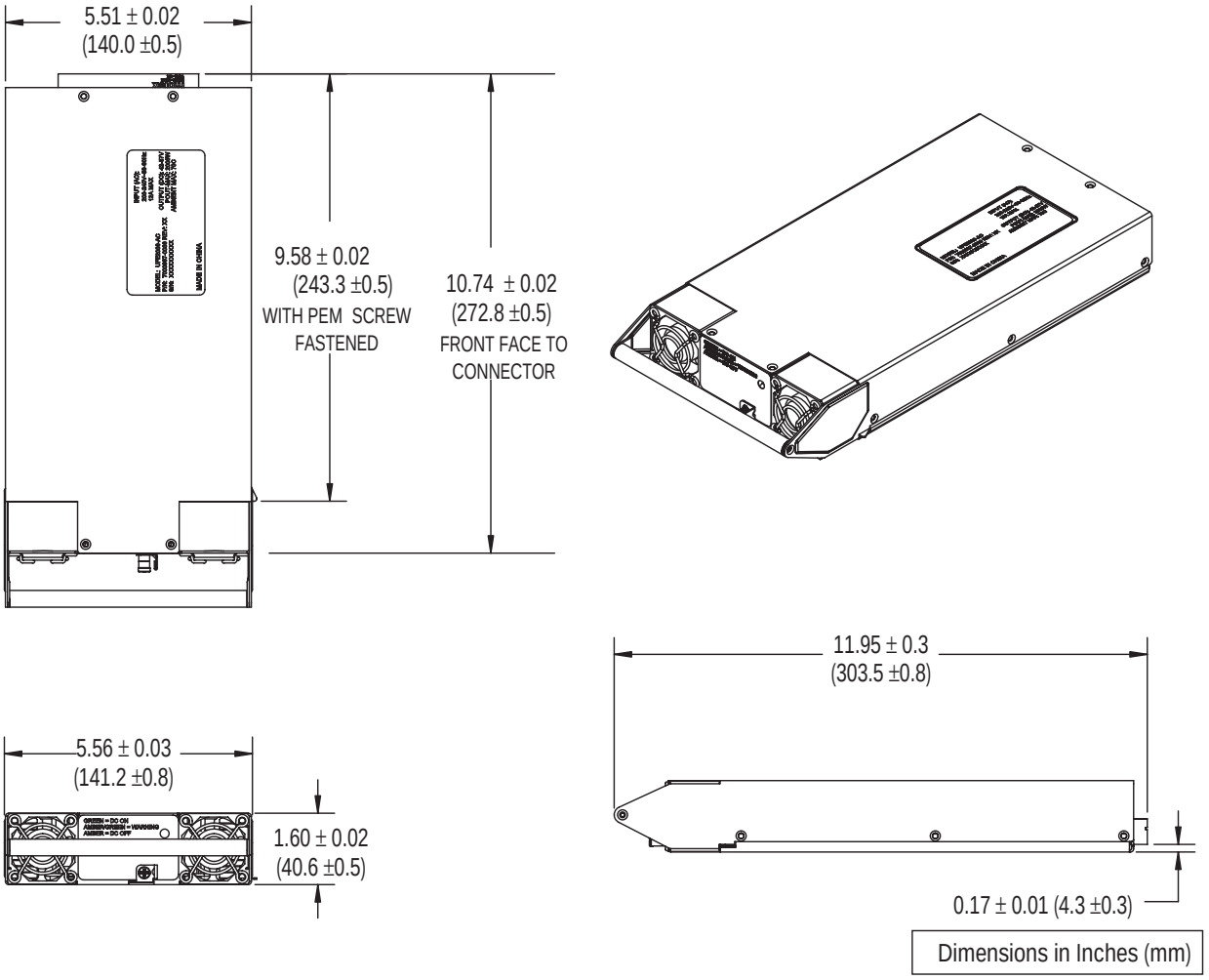
Rack Model Number	Hot Plug Interface	No. of Power Modules per Pack
UFR6000	YES	3

Thermal performance (See Note 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 Vo > Vout min		Rated power +15%/-0%
Current limit	Constant current limiting - brickwall Vo ² Vout min.	±limit, ±8%
Short-circuit	Hiccup mode at Vo < 40 Vdc Vo < 20 Vdc	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 I²C or PMBus	LED alarm (by read) in case of OR-ing fault
COMMUNICATION MONITORING READOUT ACCURACY		
Current	Valid from 15% to max. load	±15%
Voltage	Measured before output Or-ing	±5%
Temperature	Measured Internal output Or-ing	±5 °C
Hours counter		±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	RoHS Compliance (9)
UFE	**2000**	**9**	**6**	**S**	**48**	**C**	**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	C = I²C serial communications P = PMBus serial communications	J = Pb free (RoHS 6/6 compliant)

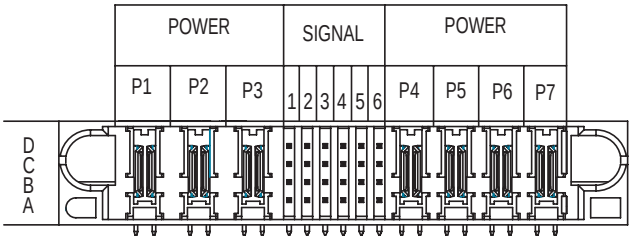
Mechanical Drawing



Dimensions in Inches (mm)

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



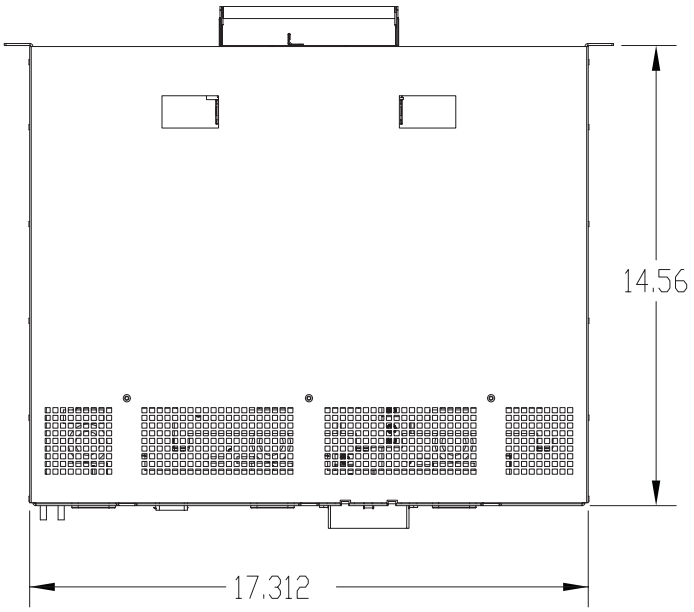
Power Connections Layout
(Looking into Connector Side of UFE Power Supply)

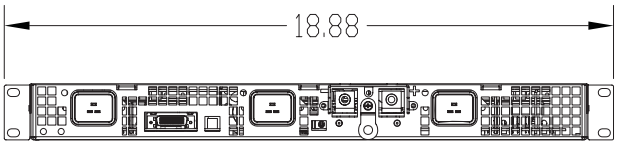
POWER SUPPLY CONNECTOR PINOUT					
PIN	D	C		B	A
P1	L1				
P2	L2				
P3	PEG				
1	Sense-	Sense+		GND	Shortpin
2	Present-L	GND		PS-ID0	GND
3	PS-ID3	PS-ID2		GND	12V-AUX
4	GND	SCL		PS-ID1	GND
5	SDA	GND		GND	I²C-En-H [8] (Comm-En-H)
6	SMBALERT#	Ishare		DC-OK-L	PS-EN [8] (Control)
P4	DC_N				
P5	DC_N				
P6	DC_P				
P7	DC_P				

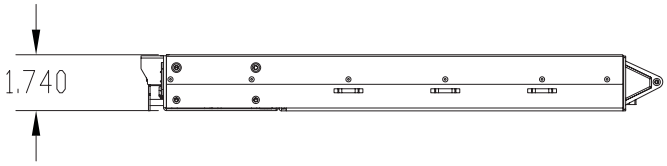
Power Connections

Rack Specifications

Mechanical Drawing







RACK 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) (8)	18	Ground
6	DC1-OK-L	19	Unit 3 Present
7	DC2-OK-L	20	Ground
8	DC3-OK-L	21	SCL
9	I²C-En-H-1 (Comm-En-H) (8)	22	Ground
10	I²C-En-H-2 (Comm-En-H) (8)	23	SDA
11	I²C-En-H-3 (Comm-En-H) (8)	24	Ground
12	Ground	25	SMBALERT#
13	12V-Aux	26	N/C

SHELF CONNECTOR	MATING CONNECTOR
Molex: 52986-2679	Molex: 52316-2619
Tyco: 2-178238-4	Tyco: 2-175677-4

Signal Connector (1 per shelf)

SHELF CONNECTOR	MATING CONNECTOR
Molex: 42820-3212	Molex: 42816-0312 with 42815-0012 terminal crimp

AC Input Connector (3 per shelf)

SHELF NUMBER	DIP SWITCH	DIP SWITCH
1	Up	Up
2	Up	Down
3	Down	Up
4	Down	Down

Shelf DIP Switch Table

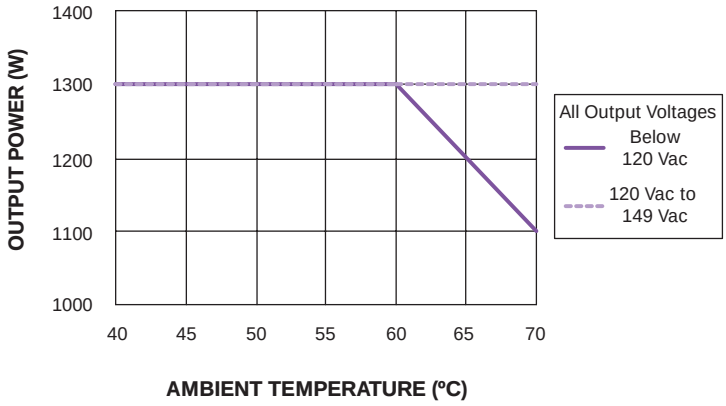


Figure 1 - Thermal Derating Curve for UFE2000-96S48J Model
Low Line Input Voltage

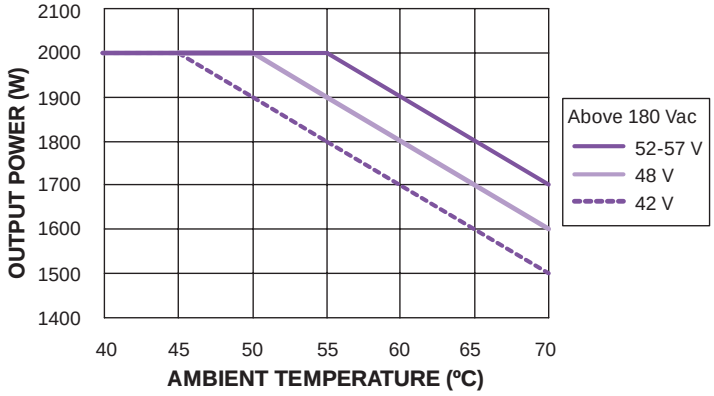


Figure 2 - Thermal Derating Curve for UFE2000-96S48J Model
High Line Input Voltage

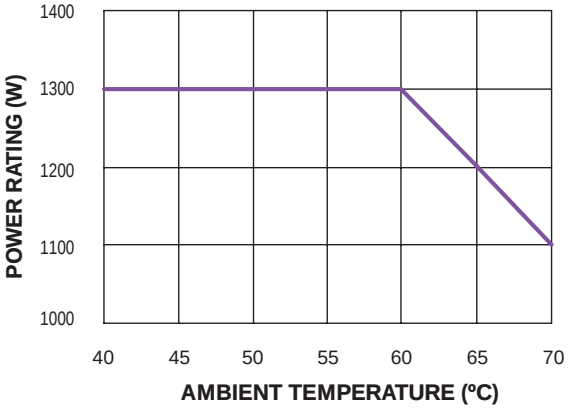


Figure 3 - Thermal Derating Curve for UFE1300-96S24J Model
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