

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 ±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%/°C |
| Voltage adjustability: Adjustable 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 °C | 48 Vout (active default) 24 Vout (active default) | 48 V ± 0.5% @ 41 A 27 V ± 0.5% @ 48 A |
| Voltage droop: (operation set 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 °C to +70 °C, FL range | ±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 | 176 Vac max. |
| | Wide line range | 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. |

Notes

- Final EMI performance is system/shelf dependent.
- Auto ranging sets power limit based on input voltage at turn on.
- 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.
- Maximum 15 minute warm up time at light loads below -15 °C. See Application Note 212 for cold start timing data.
- For operation above 1,524 m (5,000 ft), maximum operation temperature is derated by 2 °C per 305 m (1,000 ft).
- 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.
- PM BUs communication. Pin names in parenthesis refer to the PMBus version names. UFE2000-96S48PJ and UFE130096S24PJ use PMBus.

| General Specifications | | |
|--------------------------|-------------------------------------|------------------------------------|
| Electrical insulation: | Input/output | 3000 Vac / 4242 Vdc |
| | Input/chassis | 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 | 20 ms min. |
| | 24 Vout at rated output power | 20 ms min. |
| MTBF (@25 °C): | 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 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 |

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 | UFE1300-96S24C1J | 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 |
| UFR6000-01J | Yes | 2 + 1 (Split Rack) |
| UFR6000P | Blank Panel | 3 |

Environmental Specifications

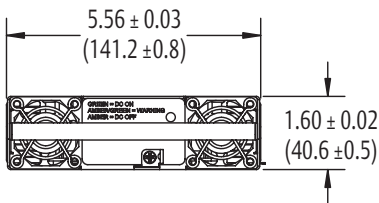
| | | |
|---|---|---|
| Thermal performance: (See Notes 4 and derating curves) | Operating Non-operating Cold Start | -33 °C to +70 °C -40 °C to +100 °C -40 °C |
| Relative humidity: non-condensing | Operating Non-operating | Up to 80% Up to 95% |
| Altitude: (See Note 5) | Operating Non-operating | 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: 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 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 | ± 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 | 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 | C1 = I ² C serial communication P = PMBus serial communication | None = Active Ishare D = Droop Ishare HD = PS Enable HI/Droop | | J = Pb free (RoHS 6/6 compliant) |

Mechanical Drawing

Rev.06.14.11_47
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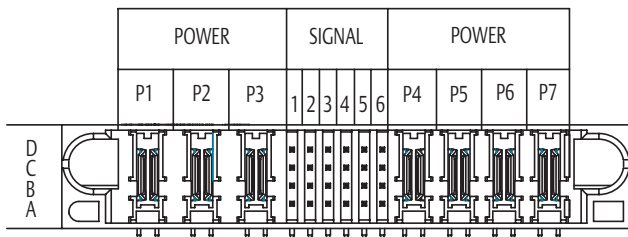


Dimensions in Inches (mm)

| 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 |

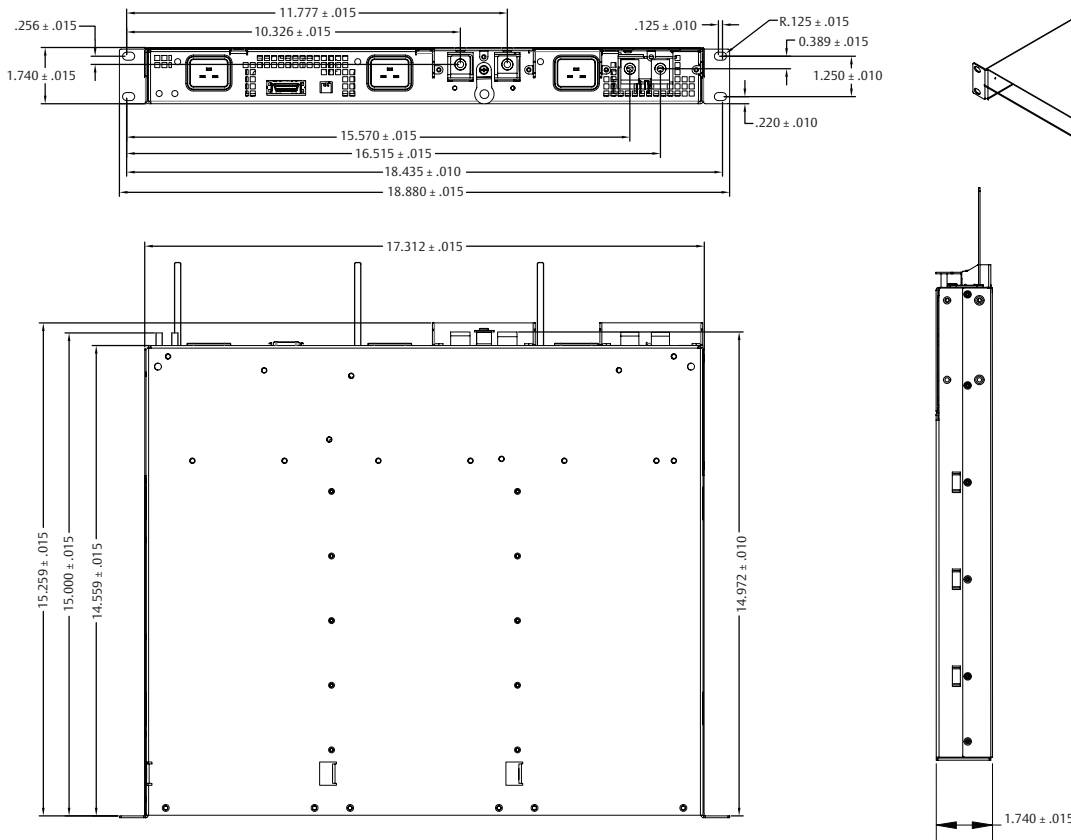
| Power Supply Connector Pinout | | | | | |
|-------------------------------|-----------|--------|---|---------|--------------------------------------|
| Pin | D | C | B | A | |
| P1 | | | | L1 | |
| P2 | | | | L2 | |
| P3 | | | | PEG | |
| 1 | Sense- | Sense+ | | GND | Shortpin |
| 2 | Present-L | GND | | 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 | |

Power Supply Connector



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

Rack Specifications



| Rack Signal Connector Pinout | | | |
|------------------------------|-------------------------------------|---------|----------------|
| Pin No. | Function | Pin No. | Function |
| 1 | 48V Sense+ | 14 | 48V Ishare |
| 2 | Ground | 15 | Unit 1 Present |
| 3 | 48V Sense- | 16 | Ground |
| 4 | Ground | 17 | Unit 2 Present |
| 5 | PS-EN (Control) | 18 | Ground |
| 6 | DC1-OK-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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