

- Designed for Medical Equipment (BF rated)
- High Efficiency
- 300W = 6x3 in footprint, 400W = 6.5x3.5 in
- 1W standby (EFE400M only)
- High Power Density (up to 18W/in³)
- No minimum load
- Fits 1U applications
- 5 Year Warranty



Scan here for product page

EFE300M / EFE400M

300/400 Watts, medical (BF rated)
AC-DC, digital power solution

Key Market Segments & Applications

- | | |
|-----------------------------|-------------------------|
| Medical | Broadcast |
| Instrumentation | ATE |
| Automation | Industrial Computing |
| Security | Lifesciences/Laboratory |
| Network Servers and Routers | |

Features and Benefits

Features

- Reinforced isolation
- Full Digital Control
- High Efficiency
- Low Profile
- High Power Density
- Temperature controlled fan option

Benefits

- Simplifies equipment design
- Improves Product Performance
- Minimises heat in system
- Fits 1U applications
- Less Space
- Quieter operation

| INPUT | | | |
|-----------------------|--|-----------------|--|
| Input Voltage | 90 - 264Vac / 120 - 350Vdc | Input Frequency | 45 - 63Hz (440Hz with reduced PFC - consult factory) |
| Input Harmonics | EN61000-3-2 compliant | Power Factor | 0.97 typical |
| Input Fuse | Dual fuses (Live + Neutral) Fast acting (not user accessible) | Inrush Current | <40A at 25°C and 230Vac, (cold start) (meets EN61000-3-3), <50A for EFE400M |
| Earth Leakage Current | 123µA at 120Vac (60Hz), 257µA max at 240Vac (60Hz) Worst case leakage current is less than 300µA at 264Vac, 63Hz (normal condition, 0.5mA Single Fault Condition) | | |

QUICK SELECTOR (Standard models). Additional variants available - see below

| Output Voltage | Current | Units without fan | | | | Units with end fan | |
|----------------|---------|-----------------------|----------------|-----------------------|----------------|-----------------------|----------------|
| | | Open Frame | | Cover + Chassis | | Cover + Chassis | |
| | | Description | Order Code | Description | Order Code | Description | Order Code |
| 12V | 25A | EFE300M-12-5-HNMDL-YT | U5Y0020 | EFE300M-12-5-HCMDL-YT | U5Y001Z | EFE300M-12-5-ECMDL-YT | U5Y0031 |
| | 33.3A | EFE400M-12-5-HNMDL-YT | U6Y001H | EFE400M-12-5-HCMDL-YT | U6Y004L | EFE400M-12-5-ECMDL-YT | U6Y007P |
| 24V | 12.5A | EFE300M-24-5-HNMDL-YT | U5Y0053 | EFE300M-24-5-HCMDL-YT | U5Y0042 | EFE300M-24-5-ECMDL-YT | U5Y0064 |
| | 16.7A | EFE400M-24-5-HNMDL-YT | U6Y002J | EFE400M-24-5-HCMDL-YT | U6Y005M | EFE400M-24-5-ECMDL-YT | U6Y008Q |
| 48V | 6.25A | EFE300M-48-5-HNMDL-YT | U5Y0201 | EFE300M-48-5-HCMDL-YT | U5Y0223 | EFE300M-48-5-ECMDL-YT | U5Y0166 |
| | 8.3A | EFE400M-48-5-HNMDL-YT | U6Y003K | EFE400M-48-5-HCMDL-YT | U6Y006N | EFE400M-48-5-ECMDL-YT | U6Y009R |

HOW TO CREATE A PRODUCT DESCRIPTION

| Output | Factory Setting Range | |
|--------|-----------------------|--------------|
| | EFE300M | EFE400M |
| 12 | 11.4 - 13.2V | 11.4 - 13.2V |
| 24 | 22.8 - 26.4V | 22.8 - 26.4V |
| 28 | 27 - 32V | |
| 36 | 36 - 42V | |
| 48 | 47 - 50V | 47 - 50V |
| 50 | 50 - 54V | |

Required output voltage must be specified at time of ordering

Standby Voltage
5 = 5V / 2A
12 = 12V / 1A

Case/Fan Option

- HN Open frame, no fan, with 12V / 1A fan supply
- HU U chassis, no fan, with 12V / 1A fan supply
- HC Cover+chassis, no fan, with 12V / 1A fan supply
- EC Cover+chassis, end fan (temp controlled)
- NN Open frame, no fan, no fan supply
- NU U chassis, no fan, no fan supply
- NC Cover+chassis, no fan, no fan supply

-Y = ORing FET included

blank = right angled
-V = Vertical

E = Enable
T = Inhibit

M Molex kk (see pg 3 for details)

L = 300µA

Confirm availability of created product with the factory

Product Description Format: **EFE300M- or EFE400M-** Vout - Standby Case/Fan Option Input Connector **D** - Dual-Fused Earth Leakage ORing FET Remote On/Off Output Connector

| ISOLATION | | | | |
|-----------------|------------|--|-----------------|---------|
| Input to Output | Reinforced | 4kVac, 5.7kVdc type tested to 4kVac (equivalent to 5.7kVdc), production tested to 4.3kVdc. | | |
| Input to Earth | Basic | 1.5kVac, 2.3 kVdc | Output to Earth | 1.5kVac |

| OUTPUT SPECIFICATION | | | |
|-----------------------------|----------------|---------|--|
| | EFE300M | EFE400M | |
| Output Power | 300W | 400W | Continuous (including fan supply) or RMS (including Peak power) EFE400M derates below 100V input. See handbook for details. |
| Peak Power | 400W | 530W | EFE300M - for 10 seconds. Outputs above 36V, 350W. EFE400M - for 10 seconds. No peak power for outputs 47V and above. |
| Total Regulation | better than 4% | | Including Line (for 90-264Vac input change), Load (for 0-100% load change) and temperature (0-50°C) |
| Ripple & Noise | 1.5% | | pk-pk, using EIAJ test method & 20MHz bandwidth |
| Voltage Setting Accuracy | ±1% | | at 50% load |
| Turn on Time | 1.5s max | | at 90 Vac & 100% rated output power |
| Efficiency | 90% | | typical. 87% typical if Standby Supply is fully loaded |
| Hold up | 16ms | | typical at 90 Vac, 75% load |
| Min Load | None | | |
| Transient Response | <5% | | of set voltage for 50% load change (in 50µs within the range 25 - 100% load) |
| Recovery | <1ms | | for recovery to 2% of set voltage |
| Short circuit protection | Yes | | Auto recovery after removal of short circuit |
| Over Temperature protection | Yes | | Primary - auto recovers, secondary - cycle power to restart |
| Over Voltage Protection | Yes | | Latching, need to cycle ac to restart unit. |
| Fan supply | 12V / 1A | | Depending on 'Case/Fan Option' selected. See p1 for details |

| GLOBAL SIGNALS | |
|----------------|--|
| Remote on/off | Enable - TTL logic level low (relative to Standby 0V) enables channel 1 and fan supply Inhibit - TTL logic level low (relative to Standby 0V) inhibits channel 1 and fan supply |
| Standby Supply | 5V / 2A or 12V / 1A, isolated supply, not affected by remote on/off. |
| Power Good | Logic high indicates ac supply is good and Ch1 is within regulation |
| ORing FET | Allows redundant connection of power supplies with no additional diodes required. |

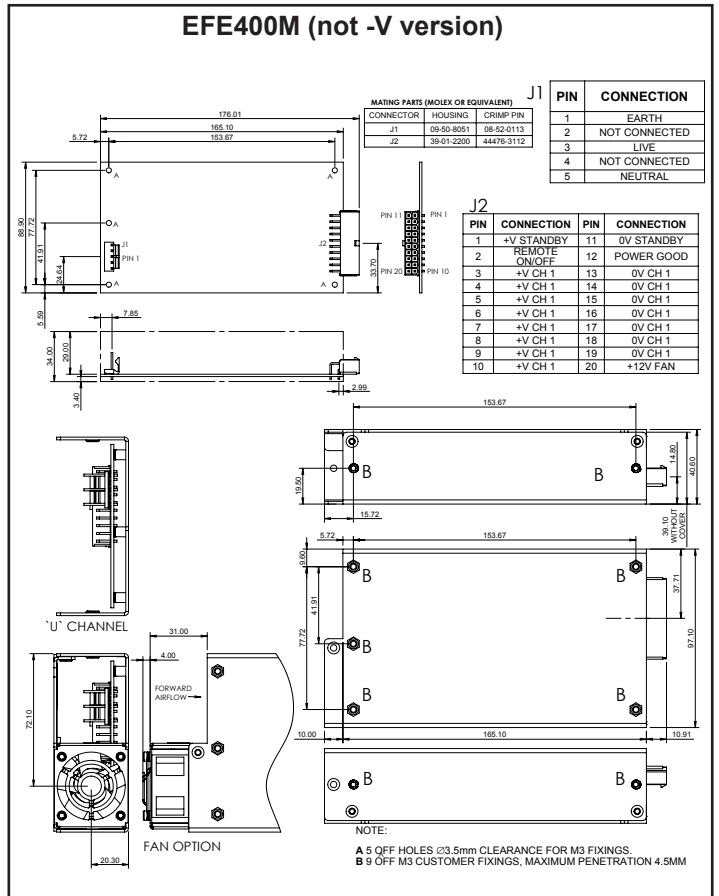
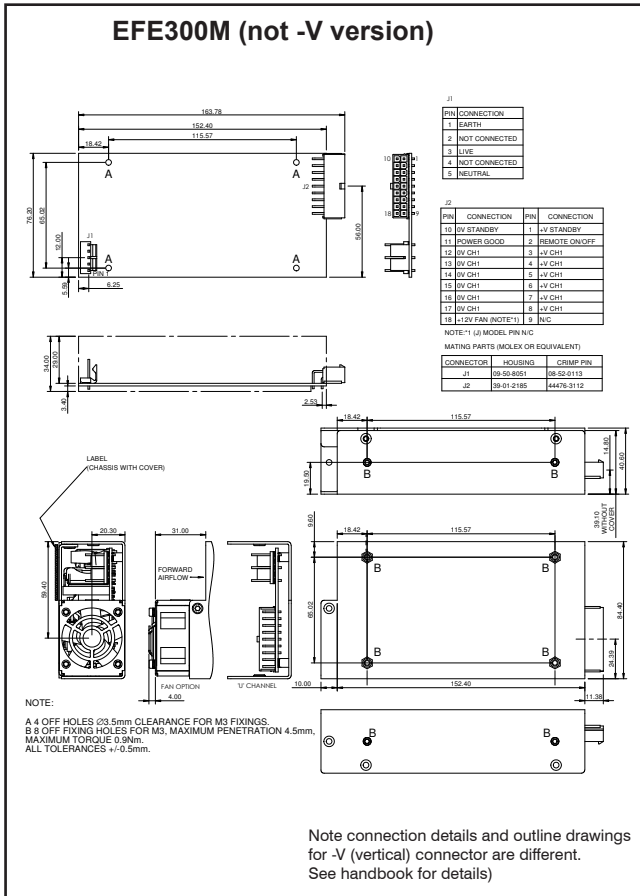
| ENVIRONMENT | |
|------------------|---|
| Temperature | 0°C to 50°C operational, -40°C to 70°C storage (max 12 months). Full load, with 2m/s air blown from input to output (approximately 10CFM) |
| Derating | 50°C to 70°C derate each output by 2.5% per °C |
| Low Temp Startup | -20°C |
| Humidity | 5 - 95% RH non condensing |
| Shock | ±3 x 30g shocks in each plane, total 18 shocks 30g shock = 11ms (+/-0.5msec), half sine Conforms to EN60068-2-27, EN60068-2-47, IEC68-2-27, IEC68-2-47, JIS C0041-1987. Conforms to MIL-STD-810E/F, Method 516.5, Pro I, IV, VI |
| Vibration | Single axis 10 - 500 Hz at 2g (sweep and endurance at resonance) in all 3 planes Conforms to EN60068-2-6, IEC68-2-6 Conforms to MIL-STD-810E, Method 514.4, Pro I, Cat 1,9 |
| Altitude | Medical approval = -200 to 3000 metres operational (-200 to 5000m storage/transportation) Non medical approval = -200 to 5000 _a metres operational (-200 to 5000m storage/transportation) a - non open frame EFE400M units = -200 to 4000 metres |
| Pollution | Degree 2, Material group IIIb |

| EMISSIONS EN61000-6-3:2007, EN60601-1-2:2001 | | |
|--|------------------|---|
| Radiated Electric Field | EN55011, EN55022 | (as per CISPR.11/22) Class B, FCC47 part 15 subpart B see application note for details |
| Conducted Emissions | EN55011, EN55022 | (as per CISPR.11/22) Class B, FCC47 part 15 subpart B |
| Conducted Harmonics | EN61000-3-2 | Class A Class C - EFE300M at 100W and above |
| Flicker | EN61000-3-3 | Compliant - d _{max} only |

| IMMUNITY EN61000-6-2:2005 | | | | Criteria |
|---|--------------|---------|---|----------|
| Electrostatic Discharge | EN61000-4-2 | Level 4 | Air discharge 15kV, Contact discharge 8kV Level 3 for Fan supply (-HN, -HU & -HC units only) Not applicable to open frame units | A |
| Electromagnetic Field | EN61000-4-3 | Level 3 | 12V/m | A |
| Fast / Burst Transient | EN61000-4-4 | Level 4 | ac input tested to 4.4kV dc output tested to 2.2kV | A |
| Surge Immunity | EN61000-4-5 | Level 3 | Common mode - 2.2kV Differential - 1.1kV | A |
| Conducted RF Immunity | EN61000-4-6 | Level 3 | 12V | A |
| Power Frequency Magnetic Field | EN61000-4-8 | Level 4 | 30A/m | A |
| Voltage Dips, Variations, Interruptions | EN61000-4-11 | Class 3 | Criteria B for 5 sec interruption Criteria B for 1 cycle interruption | A |
| Ring Wave | EN61000-4-12 | Level 3 | Common mode - 2.2kV Differential - 1.1kV | A |
| Voltage Fluctuations | EN61000-4-14 | Class 3 | | A |

| SAFETY APPROVALS | | | | | |
|--|-------------------------------------|--|--|------------------|--|
| | Edition / Date | Amendments/notes | Edition / Date | Amendments/notes | |
| EN 60950-1 | Edition 2 - 2006 | | IEC 60950-1* | Edition 2 - 2005 | |
| UL 60950-1 | Edition 2 - 2007 | File E135494-A34/A67 | CSA 22.2 No 60950-1 | Edition 2 - 2007 | |
| EN 61010-1 | Edition 2 - 2001 | EFE300M approved EFE400M designed to meet | IEC 61010-1* | Edition 2 - 2001 | EFE300M approved EFE400M designed to meet |
| EN60601-1 | Edition 2 - 1990 | A1, A2, A13 | IEC60601-1* | Edition 2 - 1988 | A1, A2 |
| CE Mark | LV Directive 2006/95/EC (EN60950-1) | | UL/CSA 60601-1 | Edition 2 - 2003 | With Revisions 2006 File E135494-A35/A68 |
| * CB certificate and Report available on request | | | Check with factory for status of approvals | | |

OUTLINE & CONNECTION DRAWINGS



- Notes
1. All customer fixings M3
 2. Maximum Penetration 4.5mm
 3. Maximum torque 0.9Nm
 4. All tolerances +/-0.5mm

- Connectors are not included with the product. They are available from TDK-Lambda
- 1 off input connector and 3 crimps are available as part number is 94910.
 - 1 off output connector and 18 crimps are available as part number 94752. (EFE300M)
 - 1 off output connector and 20 crimps are available as part number 94912 (EFE400M)

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