



Medical



Industrial



Test



Broadcast



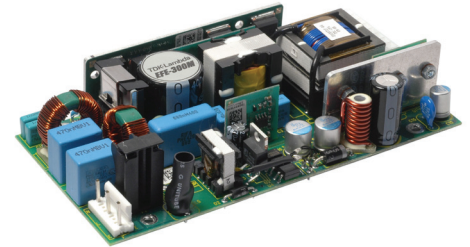
Comms



Renewable

**300W and 400W, High Density AC-DC, digital power solution**

| Features                            | Benefits                     |
|-------------------------------------|------------------------------|
| • Reinforced isolation              | Simplifies equipment design  |
| • Full Digital Control              | Improves Product Performance |
| • High Efficiency                   | Minimises heat in system     |
| • Temperature controlled fan option | Reduces noise in system      |
| • 5 Year Warranty                   | Low cost of ownership        |



| Input                 |                                                                                                                                                                      |                 |                                                                               |
|-----------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|-------------------------------------------------------------------------------|
| Input Voltage         | 90-264Vac                                                                                                                                                            | Input Frequency | 45 - 63Hz<br>(440Hz with reduced PFC - consult sales office)                  |
| Input Harmonics       | EN61000-3-2 compliant                                                                                                                                                | Inrush Current  | <40A at 25°C and 230Vac (cold start)<br>(meets EN61000-3-3). <50A for EFE400M |
| Input Fuse            | Dual fuses (Live + Neutral)<br>Fast acting (not user accessible)                                                                                                     |                 |                                                                               |
| Earth Leakage Current | 123µA at 120Vac (60Hz), 257µA max at 240Vac (60Hz)<br>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              |              |
| 48     | 47-50V                | 47-50V       |
| 50     | 50-54V                |              |

Required output voltage must be specified at time of ordering

| 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  
-N = Without ORing FET

blank = right angled  
-V = vertical

|                            |      |   |         |                    |                    |                   |                  |              |                  |                     |
|----------------------------|------|---|---------|--------------------|--------------------|-------------------|------------------|--------------|------------------|---------------------|
| EFE300M-<br>or<br>EFE400M- | Vout | - | Standby | Case/Fan<br>Option | Input<br>Connector | D - Dual<br>Fused | Earth<br>Leakage | ORing<br>FET | Remote<br>On/Off | Output<br>Connector |
|----------------------------|------|---|---------|--------------------|--------------------|-------------------|------------------|--------------|------------------|---------------------|

Standby Voltage

0 = None (Only with EFE300M and 'N' Remote On/Off)

5 = 5V / 2A

12 = 12V / 1A

M = Molex  
(see connection drawings for details)

L = 300µA

E = Enable  
T = Inhibit  
N = None

Confirm availability of created product with the sales office

## Isolation

|                 |            |                                                                                                                             |                 |         |
|-----------------|------------|-----------------------------------------------------------------------------------------------------------------------------|-----------------|---------|
| Input to Output | Reinforced | 2 x MOPPs (3rd edition 60601)<br>4kVac, 5.7kVdc type tested to 4kVac (equivalent to 5.7kVdc), production tested to 4.3kVdc. |                 |         |
| Input to Earth  | Basic      | 1.5kVac, 2.3kVdc                                                                                                            | Output to Earth | 1.5kVac |

## Output Specification

|                             | EFE300M        | EFE400M |                                                                                                                                                                                                         |
|-----------------------------|----------------|---------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Output Power                | 300W           | 400W    | Continuous (including fan supply) or RMS (including Peak power)<br>EFE400M derates below 100Vac input and units fitted with fan, vertical output connector, ORing FET derate. See handbook for details. |
| Peak Power                  | 400W           | 530W    | EFE300M - for 10 seconds. Outputs above 36V, 350W.<br>EFE400M - for 10 seconds. Outputs 47V and above, 470W.                                                                                            |
| 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. EFE400M 2s max.                                                                                                                                                    |
| Efficiency                  | up to 90%      |         |                                                                                                                                                                                                         |
| Hold up                     | >16ms          |         | at 90 Vac, 75% load                                                                                                                                                                                     |
| Min Load                    | None           |         |                                                                                                                                                                                                         |
| Transient Response          | <5%            |         | of set voltage for 50% load change<br>(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 previous page for details                                                                                                                                  |

## Global Signals

|                |                                                                                                                                                                                    |
|----------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Remote on/off  | Enable - TTL logic level low (relative to Standby 0V) enables channel 1 and fan supply<br>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).<br>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<br>30g shock = 11ms (+/-0.5msec), half sine<br>Conforms to EN60068-2-27, EN60068-2-47, IEC68-2-27, IEC68-2-47, JIS C0041-1987.<br>Conforms to MIL-STD-810E/F, Method 516.5, Pro IV, VI                             |
| Vibration        | Single axis 10 - 500 Hz at 2g (sweep and endurance at resonance) in all 3 planes<br>Conforms to EN60068-2-6, IEC68-2-6<br>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)<br>Non medical approval = -200 to 5000 <sub>a</sub> metres operational (-200 to 5000m storage/transportation)<br>a - non open frame EFE400M units = -200 to 4000 metres |
| Pollution        | Degree 2, Material group IIIb                                                                                                                                                                                                                                     |

## Emissions EN61000-6-3:2007, EN60601-1-2:2007

|                         |                  |                                                                                           |
|-------------------------|------------------|-------------------------------------------------------------------------------------------|
| Radiated Electric Field | EN55011, EN55032 | (as per CISPR.11/22) Class B, FCC47 part 15 subpart B<br>see application note for details |
| Conducted Emissions     | EN55011, EN55032 | (as per CISPR.11/22) Class B, FCC47 part 15 subpart B                                     |
| Conducted Harmonics     | EN61000-3-2      | Class A<br>Class C - EFE300M at 100W and above                                            |
| Flicker                 | EN61000-3-3      | Compliant - d <sub>max</sub> only                                                         |

| Immunity EN61000-6-2:2005               |              |         |                                                                                                         |  | Criteria |
|-----------------------------------------|--------------|---------|---------------------------------------------------------------------------------------------------------|--|----------|
| Electrostatic Discharge                 | EN61000-4-2  | Level 4 | Air discharge 15kV, Contact discharge 8kV<br>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<br>dc output tested to 2.2kV                                                   |  | A        |
| Surge Immunity                          | EN61000-4-5  | Level 3 | Common mode - 2.2kV<br>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 40% dip for 5 cycles (below 154Vac nominal), 1 cycle interruption and 5 sec interruption |  | A        |
| Ring Wave                               | EN61000-4-12 | Level 3 | Common mode - 2.2kV<br>Differential - 1.1kV                                                             |  | A        |
| Voltage Fluctuations                    | EN61000-4-14 | Class 3 |                                                                                                         |  | A        |

| Approvals / Accreditations                                                                       |                                                                  |
|--------------------------------------------------------------------------------------------------|------------------------------------------------------------------|
| IEC/EN 60950-1, UL60950-1 / CSA 22.2 No 60950-1                                                  | File E135494                                                     |
| IEC/EN 60601-1, UL/CSA 60601-1, ANSI/AAMI ES60601-1<br>CAN/CSA-C22.2 No 60601-1-08               | File E349607                                                     |
| IEC/EN 61010-1                                                                                   | EFE300M approved (File E331788), EFE400M designed to meet        |
| CE Mark (EN60950-1)                                                                              | LV Directive 2006/95/EC                                          |
| CB certificate and Report available on request                                                   | <i>Please check with technical sales for status of approvals</i> |
| Designed and manufactured under the control of ISO9001 and ISO13485 (including risk management). |                                                                  |

## Outline & Connection Drawings

### EFE300M (not -V version)

NOTE: \*1 (A) MODEL PIN N/C

MATING PARTS (MOLEX OR EQUIVALENT)

| CONNECTOR | HOUSING    | CRIMP PIN  |
|-----------|------------|------------|
| J1        | 09-50-8051 | 08-52-0113 |
| J2        | 39-01-2185 | 45750-3112 |

Notes: A 4 OFF HOLES Ø3.5mm CLEARANCE FOR M3 FIXINGS. B 8 OFF FIXING HOLES FOR M3, MAXIMUM PENETRATION 4.5mm, MAXIMUM TORQUE 0.9Nm. ALL TOLERANCES +/-0.5mm.

Note, connection details and outline drawings for -v (vertical) connector are different See handbook for details

### EFE400M (not -V version)

MATING PARTS (MOLEX OR EQUIVALENT)

| CONNECTOR | HOUSING    | CRIMP PIN  |
|-----------|------------|------------|
| J1        | 09-50-8051 | 08-52-0113 |
| J2        | 39-01-2185 | 45750-3112 |

Notes: A 5 OFF HOLES Ø3.5mm CLEARANCE FOR M3 FIXINGS. B 9 OFF M3 CUSTOMER FIXINGS, MAXIMUM PENETRATION 4.5MM

- 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)



## TDK-Lambda France SAS

3 Avenue du Canada  
Parc Technopolis  
Bâtiment Sigma  
91940 les Ulis  
France  
Tel: +33 1 60 12 71 65  
Fax: +33 1 60 12 71 66  
france@fr.tdk-lambda.com  
www.fr.tdk-lambda.com



## Italy Sales Office

Via Giacomo Matteotti 62  
20092 Cinisello Balsamo (MI)  
Italy  
Tel: +39 02 61 29 38 63  
Fax: +39 02 61 29 09 00  
info.italia@it.tdk-lambda.com  
www.it.tdk-lambda.com



## Netherlands

info@nl.tdk-lambda.com  
www.nl.tdk-lambda.com



## TDK-Lambda Germany GmbH

Karl-Bold-Strasse 40  
77855 Achern  
Germany  
Tel: +49 7841 666 0  
Fax: +49 7841 5000  
info.germany@de.tdk-lambda.com  
www.de.tdk-lambda.com



## Austria Sales Office

Aredstrasse 22  
2544 Leobersdorf  
Austria  
Tel: +43 2256 655 84  
Fax: +43 2256 645 12  
info@at.tdk-lambda.com  
www.de.tdk-lambda.com



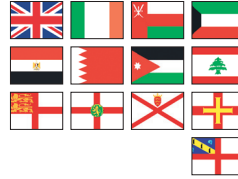
## Switzerland Sales Office

Eichtalstrasse 55  
8634 Hombrechtikon  
Switzerland  
Tel: +41 44 850 53 53  
Fax: +41 44 850 53 50  
info@ch.tdk-lambda.com  
www.de.tdk-lambda.com



## Nordic Sales Office

Haderslevvej 36B  
DK-6000 Kolding  
Denmark  
Tel: +45 8853 8086  
info@dk.tdk-lambda.com



## TDK-Lambda UK Ltd.

Kingsley Avenue  
Ilfracombe  
Devon EX34 8ES  
United Kingdom  
Tel: +44 (0) 12 71 85 66 66  
Fax: +44 (0) 12 71 86 48 94  
powersolutions@uk.tdk-lambda.com  
www.uk.tdk-lambda.com



## TDK-Lambda Ltd.

1 Alexander Yanai  
Segula  
Petah-Tikva  
Israel  
Tel: +9 723 902 4333  
Fax: +9 723 902 4777  
info@tdk-lambda.co.il  
www.tdk-lambda.co.il



## C.I.S.

### Commercial Support:

Tel: +7 (495) 665 2627

### Technical Support:

Tel: +7 (812) 658 0463  
info@tdk-lambda.ru  
www.tdk-lambda.ru

## Local Distribution