

## UL TEST REPORT AND PROCEDURE

<b>Standard:</b>	UL 60950-1, 2nd Edition, 2014-10-14 (Information Technology Equipment - Safety - Part 1: General Requirements) CAN/CSA C22.2 No. 60950-1-07, 2nd Edition, 2014-10 (Information Technology Equipment - Safety - Part 1: General Requirements)
<b>Certification Type:</b>	Component Recognition
<b>CCN:</b>	QQGQ2, QQGQ8 (Power Supplies for Information Technology Equipment Including Electrical Business Equipment)
<b>Product:</b>	Power Supply
<b>Model:</b>	EFE300 series ( EFE300x-a-bcde- f-g-hij, see model differences for details of models and nomenclature).
<b>Rating:</b>	133-318Vdc nom 100-240Vac nom, 45-440Hz 4.7A rms max, 3.8Adc max.
<b>Applicant Name and Address:</b>	TDK-LAMBDA UK LTD KINGSLEY AVE ILFRACOMBE DEVON EX34 8ES UNITED KINGDOM

This is to certify that representative samples of the products covered by this Test Report have been investigated in accordance with the above referenced Standards. The products have been found to comply with the requirements covering the category and the products are judged to be eligible for Follow-Up Service under the indicated Test Procedure. The manufacturer is authorized to use the UL Mark on such products which comply with this Test Report and any other applicable requirements of UL LLC ('UL') in accordance with the Follow-Up Service Agreement. Only those products which properly bear the UL Mark are considered as being covered by UL's Follow-Up Service under the indicated Test Procedure.

The applicant is authorized to reproduce the referenced Test Report provided it is reproduced in its entirety.

UL authorizes the applicant to reproduce the latest pages of the referenced Test Report consisting of the first page of the Specific Technical Criteria through to the end of the Conditions of Acceptability.

Any information and documentation involving UL Mark services are provided on behalf of UL LLC (UL) or any authorized licensee of UL.

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2016-02-12

**Supporting Documentation**

The following documents located at the beginning of this Procedure supplement the requirements of this Test Report:

- A. Authorization - The Authorization page may include additional Factory Identification Code markings.
- B. Generic Inspection Instructions -
  - i. Part AC details important information which may be applicable to products covered by this Procedure. Products described in this Test Report must comply with any applicable items listed unless otherwise stated in the body of this Test Report.
  - ii. Part AE details any requirements which may be applicable to all products covered by this Procedure. Products described in this Test Report must comply with any applicable items listed unless otherwise stated in the body of each Test Report.
  - iii. Part AF details the requirements for the UL Certification Mark which is not controlled by the technical standard used to investigate these products. Products are permitted to bear only the Certification Mark(s) corresponding to the countries for which it is certified, as indicated in each Test Report.

**Product Description**

EFE300 range. Switch mode power supplies for building into end equipment.

**Model Differences**

Nominal Input Voltage Range	100 - 240V AC or 133 - 318VDC
Maximum Input Voltage Range	90* - 264V AC or 120 - 350VDC
Input Frequency	45-440 Hz maximum or DC
Maximum Input Current	4.7A rms or 3.8A DC

\* Channel 1 output is linearly derated from 90Vac to 85Vac, 4W per volt to 280W.

All ratings apply for ambient temperatures up to 50°C. From 50 to 70°C the output power is derated at 2.5% per deg C.

Unit Configuration Code:

EFE300 or EFE-300x-a-bcde- f-g-hij

(may be prefixed by NS - # / where # may be any number of characters indicating non safety related model differences). Products may additionally be marked with U2x or Y2x where x can be any number of characters indicating non-safety related model differences.

where:

x=Nothing or J for Japanese models (may have non-safety differences)

a=Channel 1 Output Voltage: any voltage within the Adjustment Range for the Vout (nom) from the Output Table below, e.g. 12.8 for 12.8V output (12Vout nom), 24.6 for 24.6V output (24Vout nom).

b=CN for Open Frame with fan output , CU for U chassis with fan output, CC for U chassis and cover with fan output, EC for U chassis and cover with fan.

c=M for Molex input connector or equivalent, J for JST connector or equivalent.

d=D for dual fused input or L for single fuse in the live line.

e=S for Standard Leakage, L for Low Leakage, R for Reduced Leakage, T for Tiny Leakage.\*

f=Nothing for horizontal output connector, V for vertical output connector.

g=Nothing for standard channel 1 output voltage, xD or xPD where D is for units with programmed negative load regulation, PD is for units with programmed positive load regulation, x is the voltage of the regulation in 100mVolts and is within the Output Adjustment range (example, 7D = 0.7V of negative load regulation, 24PD = 2.4V of positive load regulation).

2016-02-12

hij=Three numbers from 0 to 9 which denotes various output voltage/current settings within the specified ranges of each output for a particular unit or blank for standard output settings. (may define non-safety related parameters/feature, e.g. reduced primary current limit, reduced OVP)

\* At 440Hz, leakage current is > 3.5mA and therefore must be assessed in the end use application.

\* L < 300uA leakage, R < 150uA leakage and T < 75uA leakage.

Output parameters:

O/P Channel	Vout nom (V).	Range (V)	Max O/P (A)	Max O/P (W)
CH1	12	11.4 - 13.2*	25	300 (400**)
	24	22.8 - 26.4*	12.5	300 (400**)
Fan output	12	Fixed	0.25	3

\* Can be adjusted from nominal at the factory only.

\*\* Peak power of 400W for 10 seconds maximum, maximum rms power of 300W

Maximum continuous power output 300W (excluding fan output)

Output Limitations

All outputs are SELV

All outputs have functional spacing's to earth, and due consideration must be given to this in the end product.

Customer Air Cooling (CN, CU and CC options):

The following method must be used for determining the safe operation of PSUs. The components listed in the following table must not exceed the temperatures given. To determine the component temperatures the heating tests must be conducted in accordance with the requirements of the standard concerned.

Test requirements include: PSU to be fitted in its end-use equipment and operated under the most adverse conditions permitted in the end-use equipment handbook/specification and which will result in the highest temperatures in the PSU. To determine the most adverse conditions consideration should be given to the end use equipment maximum operating ambient, the PSU loading and input voltage, ventilation, end use equipment orientation, the position of doors & covers, etc. Temperatures should be monitored using type K fine wire thermocouples (secured with cyanoacrylate adhesive, or similar) placed on the hottest part of the component (out of any direct airflow) and the equipment should be run until all temperatures have stabilised.

Circuit Ref.	Description	Max. Temperature (°C)
J1	Input connector	75
L1, L2	Common mode choke winding	115 (130)
C7, C8	X capacitors	100
C9	Reservoir capacitor (electrolytic)	60 (105)
L3	Boost choke winding	115 (140)
TX2	Transformer winding	120 (130)
TX2	Transformer core	120 (130)
TX2	Transformer braid	120 (130)
U2	Optocoupler	75 (100)
C10, C11	Channel 1 output capacitors	80 (105)
L6	Primary choke (24V model only)	120 (130)
L4	Channel 1 Output choke	115 (130)
XU2/XU8	Fan regulator	115 (130)
XQ201	Boost FET (IMS board)	115 (130)
Q1	Channel 1 output FET (adjacent to R4)	115 (130)

2016-02-12

XU3	Primary driver IC	100 (130)
Various	All other electrolytic capacitors	80 (105)

### Technical Considerations

- Equipment mobility : for building-in
- Connection to the mains : To be determined in the end use application
- Operating condition : continuous
- Access location : for building in
- Over voltage category (OVC) : OVC II
- Mains supply tolerance (%) or absolute mains supply values : 90-264Vac or 120-350Vdc
- Tested for IT power systems : Yes (Norway only)
- IT testing, phase-phase voltage (V) : 230V
- Class of equipment : Class I (earthed)
- Considered current rating of protective device as part of the building installation (A) : 20A
- Pollution degree (PD) : PD 2
- IP protection class : IP X0
- Altitude of operation (m) : 3000m
- Altitude of test laboratory (m) : 64m
- Mass of equipment (kg) : 0.8kg
- Equipment was evaluated for a maximum supply tolerance of 90-264Vac and 120-350Vdc
- The product was submitted and evaluated for use at the maximum ambient temperature (T<sub>ma</sub>) permitted by the manufacturer's specification of: 50°C (full load); 70°C (power and output current decreasing linearly by 2.5%/°C above 50°C)
- The product is intended for use on the following power systems: IT (Norway only) TN, DC mains supply
- The following were investigated as part of the protective earthing/bonding: Printed wiring board trace (refer to Enclosure - Schematics + PWB for layouts)
- The following are available from the Applicant upon request: Installation (Safety) Instructions / Manual
- The equipment disconnect device is considered to be: Provided by the end equipment
- The product was investigated to the following additional standards: EN 60950-1:2006 + A11:2009+ +A1:2010 + A12:2011 + A2:2013 (which includes all European national differences, including those specified in this test report).
- Multi-layer PWB's accepted under CBTR Ref. No. E349607-A23 dated 2014-07-31 and letter report, Enclosure 8-06 of this report.

### Engineering Conditions of Acceptability

For use only in or with complete equipment where the acceptability of the combination is determined by UL LLC. When installed in an end-product, consideration must be given to the following:

- The end unit must be considered against clause 5.1.7 leakage current for input frequencies above 63Hz.
- The following Production-Line tests are conducted for this product: Earthing Continuity Electric Strength
- The following secondary output circuits are SELV: All

2016-02-12

- The end-product Electric Strength Test is to be based upon a maximum working voltage of: Primary-SELV: 392 Vrms, 762 Vpk Primary-Earthed Dead Metal: 392 Vrms, 668 Vpk
- The power supply terminals and/or connectors are: Suitable for factory wiring only
- The investigated Pollution Degree is: 2
- Proper bonding to the end-product main protective earthing termination is: Required
- The following end-product enclosures are required: Mechanical, Fire, Electrical
- The following output terminals were referenced to earth during performance testing: All outputs and their return lines individually referenced to obtain maximum working voltage.
- The maximum investigated branch circuit rating is: 16A (For IEC); 20A (For North America)
- An investigation of the protective bonding terminals has: been conducted
- The following magnetic devices (e.g. transformers or inductor) are provided with an OBJY3 insulation system with the indicated rating greater than Class A (105°C): Transformer TX2 (Class F) - See table 1.5.1 for details of insulation systems used.
- The following secondary output circuits are at hazardous energy levels: Channel 1 output
- The following components require special consideration during end-product Thermal (Heating) tests due to the indicated maximum temperature measurements during component-level testing: Input connector J1 (75°C) Common mode choke winding L1, L2 (130°C) X capacitors C7, C8 (100°C) Reservoir capacitor C9 (105°C) Boost choke winding L3 (140°C) Transformer winding TX2 (130°C) Transformer core TX2 (130°C) Transformer braid (to pin 13) TX2 (130°C) Optocoupler U2 (100°C) Channel 1 output capacitors C10, C11 (105°C) Primary choke (24V model only) L6 (130°C) Channel 1 Output choke L4 (130°C) Fan regulator XU2 or XU8 (130°C) Boost FET (IMS board) XQ201 (130°C) Channel 1 output FET (adjacent to R4) Q1 (130°C) Primary driver IC XU3 (130°C) All other electrolytic capacitors (105°C)
- Fans: The fan provided in this sub-assembly is provided with a fan guard to reduce the risk of contact with the rotor. , The fan provided in this sub-assembly is not intended for operator access.

#### Additional Information

This report is a reissue of CBTR Ref. No. E135494-A33-CB-3, CB Test Certificate Ref. No. DK-29194-UL dated 2012-11-13 due to an upgrade of the standard to amendment 2. Based on the previously conducted testing and the review of product technical documentation including photos, schematics, wiring diagrams and similar, it has been determined that the product continues to comply with the standard.

No Testing was deemed necessary to cover the following changes/additions for reissue of the report:

1. Update of the report to Amendment 2.
2. XU2 added as an alternative circuit reference for XU8
3. Addition of single fuse nomenclature
4. Handbook updated
5. CCL updated

#### Additional Standards

The product fulfills the requirements of: EN 60950-1:2006 + A11:2009 + A1:2010 + A12:2011 + A2: 2013, CSA C22.2 NO. 60950-1-07 + AMD 1 AMD 2 - Edition 2 - Revision Date 2014/10/14

#### Markings and instructions

Clause Title	Marking or Instruction Details
1.7.1 Power rating - Ratings	Ratings (voltage, frequency/dc, current)
1.7.1 Power	Listee's or Recognized company's name, Trade Name, Trademark or File

2016-02-12

rating - Company identification	Number
1.7.1 Power rating - Model	Model Number
1.7.6 Fuses - Non-operator access/soldered-in fuses	Unambiguous reference to service documentation for instructions for replacement of fuses replaceable only by service personnel
2.7.6 Warning to service personnel	"CAUTION: Double pole/neutral fusing"
<b>Special Instructions to UL Representative</b> N/A	

2016-02-12

<b>Production-Line Testing Requirements</b>						
<b><u>Electric Strength Test Special Constructions - Refer to Generic Inspection Instructions, Part AC for further information.</u></b>						
Model	Component	Removable Parts	Test probe location	V rms	V dc	Test Time, s
N/A	-	-	-	-	-	-
<b><u>Earthing Continuity Test Exemptions - This test is not required for the following models:</u></b>						
-						
<b><u>Electric Strength Test Exemptions - This test is not required for the following models:</u></b>						
-						
<b><u>Electric Strength Test Component Exemptions - The following solid-state components may be disconnected from the remainder of the circuitry during the performance of this test:</u></b>						
-						
<b><u>Sample and Test Specifics for Follow-Up Tests at UL</u></b>						
Model	Component	Material	Test	Sample(s)	Test Specifics	
EFE400 Series	PWB Coating	James Briggs Ltd (Distributors: Electrolube & RS)  HLX16 (p/n 069258) RS p/n 569-313	Annex A.2 test	3 off	20mm needle flame test	
EFE400 Series	PWB Coating	H.K.Wentworth Ltd (Distributors: Electrolube & RS)  Electrolube p/n TRV500ML or APL-BULK (Same as TRV500 ML but in bulk) RS p/n 199-1496	Annex A.2 test	3 off	20mm needle flame test	
EFE400 Series	PWB Coating	Electrolube (Flurocoat)	Annex A.2 test	3 off	20mm needle flame test	

2016-02-12

1.5.1	TABLE: list of critical components					Pass
Object/part or Description	Manufacturer/ trademark	type/model	technical data	Product Category CCN(s)	Required Marks of Conformity	Supplement ID
IMS PWBs	Interchangeable	Interchangeable	94V-1 (Minimum)120°C	ZPMV2	UL	
PWB's (alternate) (multi-layer)	Eurotech	2	94V-1 (Minimum) 130°C, (Min. internal spacing, Reinforced:0.60mm)	ZPMV2	UL (E76441)	
PWB's (alternate) (multi-layer)	Tak Shing Technology (Hong Kong) Ltd	TS-M	94V-1 (Minimum) 130°C, (Min. internal spacing, Reinforced:0.58mm)	ZPMV2	UL (E305886)	
PWB's (alternate) (multi-layer)	Okii Printed Circuits Co.Ltd.	OM-11	94V-1 (Minimum) 130°C, (Min. internal spacing, Reinforced:0.403mm)	ZPMV2	UL (E48977)	
PWB's (alternate) (multi-layer)	MFS Technology (PCb) Co., Ltd	MDL10	94V-1 (Minimum) 130°C, (Min. internal spacing, Reinforced:0.36mm)	ZPMV2	UL (E94919)	
PWB's (alternate) (multi-layer)	Yan Tat Technology Ltd	Y-16	94V-1 (Minimum) 130°C, (Min. internal spacing, Reinforced:0.57mm)	ZPMV2	UL (E152990)	
PWB's (alternate) (multi-layer)	Garner Osbourne Circuits	3	94V-1 (Minimum) 130°C, (Min. internal spacing, Reinforced:0.60mm)	ZPMV2	UL (E176375)	
J1 input connector	Molex	41791 series	250V, 7A	ECBT2	UL (E29179)	
J1 input connector (Alternative 1)	Tyco	MTA series	250V, 7A	ECBT2	UL (E28476)	
J1 input connector (Alternative 2)	Japan Solderless Terminal MFG Co.	VH series	250V, 10A	ECBT2	UL (E60389)	
XR55 and XR54 Discharge resistors	Interchangeable	Interchangeable	180kohm, 1W	-	-	
Fuse F1 (two fuses)	Littelfuse	216 series	F8A, 250V 5x20mm	JDYX2	UL (E10480)	
Fuse FS1 (alternative)	Schurter AG	SP series	F8A, 250V 5x20mm	JDYX2	UL (E41599)	
Fuse F1 (alternative)	Littelfuse	477 Series	T8A 500Vac, 400Vdc 5x20mm	JDYX2	UL (E10480)	
Fuse F1 (alternative)	Conquer	UDE series	T8A, 500Vac/dc 5x20mm	JDYX2	UL (E82636)	
F1 Fuse holder	Interchangeable	TDKL Part No: 67110	Plastic is EI Dupont Rynite FR530 or FR530L, 0.8mm thick	QMFZ2	UL (E41938)	



2016-02-12

			rated 94V-0, RTI 155°C			
F1 Fuse holder	Interchangeable	TDKL Part No: 72296	Plastic is EI Dupont Rynite FR530 or FR530L, 0.8mm thick rated 94V-0, RTI 155°C	QMFZ2	UL (E41938)	
C7 and C8 X Capacitors (Optional)	Kemet	PHE840MB Series	470nF maximum, 250V, X2 105°C	FOWX2	UL (E73869)	
C7 and C8 X Capacitors (Optional) (Alternative1)	Kemet	R.46 Series	470nF maximum, 250V, X2 110°C	FOWX2	UL (E97797)	
C7 and C8 X Capacitors (Optional) (Alternative2)	Vishay BC Components BV	MKP 338 2 Series	470nF maximum, 250V, X2 105°C IEC 60384-14	FOWX2	UL (E354331)	
C7 and C8 X Capacitors (Optional) (Alternative3)	Carli Electronics Co Ltd	MPX Series	470nF maximum, 250V, X2 100°C	FOWX2	UL (E120045)	
C7 and C8 X Capacitors (Optional) (Alternative4)	Xiamen Faratronic Co Ltd	MKP62 Series	470nF maximum, 250V, X2 110°C	FOWX2	UL (E186600)	
C7 and C8 X Capacitors (Optional) (Alternative5)	Okaya electric industries Co Ltd	LE-MX Series	470nF maximum, 250V, X2 110°C	FOWX2	UL (E47474)	
C12, C13 Y Capacitors (Optional)	Kemet	PHE850 Series	4.7nF maximum, 250V, Y2, 110°C	FOWX2	UL (E73869)	
C12, C13 Y Capacitors (Optional) (Alternative2)	Kemet	PME271Y	4.7nF maximum, 300V, Y2, 100°C	FOKY2	UL (E78369)	
C12, C13 Y Capacitors (Optional) (Alternative3)	Wima Spezialvertrieb Elektronischer	MP3-Y2 Series	4.7nF maximum, 250V, Y2, 110°C	FOKY2	UL (E100438)	
C12, C13 Y Capacitors (Optional) (Alternative4)	Faratronic (Xiamen)	MKP-63 Series	4.7nF maximum, 250V, Y2, 105°C	FOWX2	UL (E186600)	
C12, C13 Y Capacitors (Optional) (Alternative5)	Vishay	338-6	4.7nF maximum, 300V, Y2, 105°C	FOWX2	UL (E354331)	
C12,C13 Y Capacitors (Optional) (Alternative6)	Murata	KY	4.7nF maximum, 250V, Y2, 125°C	FOWX2	UL (E37921)	
C12,C13 Y Capacitors (Optional) (Alternative7)	Murata MFG Co. Ltd.	KX series	4.7nF maximum, 250V, Y1, 125°C	FOWX2	UL (E37921)	
C14 Y Capacitor (Optional)	Kemet	ERP 610 Series	4.7nF maximum, 250V, Y1, 125°C IEC 60384-14	FOWX2	UL (E356389)	
C14 Y Capacitor (Optional) (alternate 1)	Murata MFG Co. Ltd.	KX series	4.7nF maximum, 250V, Y1, 125°C	FOWX2	UL (E37921)	
C14 Y Capacitor (Optional) (alternate 2)	Murata	KY	4.7nF maximum, 250V, Y2, 125°	FOWX2	UL (E37921)	
L1 and L2 common	Interchangeable	Interchangeable	Cores: OD 22mm, ID 14mm,	Base: QMTS2	-	

2016-02-12

mode choke		model numbers	Depth 8mm Wire: Class H 0.6mm min. ECW Base:- Interchangeable manufacturers, Nema FR4, 1.6mm 94V-0, RTI 140°C			
L5 Earth Choke (optional)	Interchangeable	Interchangeable model numbers	Cores: OD 11mm, ID 6mm, Depth 5mm Wire: Class H 1.4mm diameter minimum ECW	-	-	
L5 Earth Choke – wire link (optional) (alternate)	Interchangeable	Interchangeable	Optional wire link – in place of L5. 1.4mm diameter minimum; copper or tinned copper.	-	-	
XTH201 Thermistor (IMS)	Murata	PRF18BB471+++ ++ (+ can be any number or letter)	4.7Kohm at 115°C	XGPU2	UL (E131788)	
L3 Boost Choke	Interchangeable	Interchangeable model numbers	PQ Cores : 26mm x 25mm x 19mm Wire: Class F 24x0.127mm and 0.3mm ECW Bobbin: Manufactured by Sumitomo Bakelite PM9820, 0.7mm 94V-0, RTI 150°C	Bobbin: QMFZ2	-	
L6 primary resonant choke (24V model only)	Interchangeable	Interchangeable model numbers	Cores: OD 8mm, ID 4mm, Depth 3mm Wire: Class H 0.4mm min. ECW Base: Manufactured by EI Dupont Rynite FR530 or FR530L, 0.8mm thick rated 94V-0, RTI 155°C	Base: QMFZ2	-	
L6 primary resonant choke, covered with 1 layer of heatshrink (24V model only)  (alternate)	Interchangeable	Interchangeable model numbers	Cores: OD 8mm, ID 4mm, Depth 3mm Wire: Class H 0.4mm min. ECW Base:- Interchangeable manufacturers, Nema FR4, 1.6mm 94V-0, RTI 140°C	Base: QMTS2	-	
C9 reservoir capacitor	Interchangeable	Interchangeable	120uF maximum, 400V minimum, 105°C	-	-	
TX2 transformer	TDK-Lambda UK Ltd	TDKL Part No:	Class F Reinforced insulation,	OBJY3	UL	

2016-02-12

	or Trio Engineering Co Ltd	33567 33568 May be followed by 'T'	system CEL-CF4 or TEC-CF4. CEL-CF2 or TEC-CF2		(E148927)	
TX2 transformer bobbin	Interchangeable	TDKL Part No: 60313	Plastic is EI Dupont Rynite FR530 or FR530L, 0.8mm thick rated 94V-0, RTI 155°C	QMFZ2	-	
TX2 transformer cradle	Interchangeable	TDKL Part No: 60721	Plastic is EI Dupont Rynite FR530 or FR530L, 0.8mm thick rated 94V-0, RTI 155°C	QMFZ2	-	
TX2 transformer cores	Interchangeable	Interchangeable	Cores: two sets, 30mm x 30mm x 9mm	-	-	
TX2 transformer triple insulated wire (pri aux winding)	New England Wire Technologies Corporation	W26T1.5ExxTC1x (Where x may be replaced with a letter or number)	Triple insulated wire 26AWG (0.4mm diameter) minimum. Provides reinforced insulation. Class F	OBJT2	UL (E205791)	
TX2 transformer triple insulated wire (pri winding)	New England Wire Technologies Corporation	W26T2.0ExxMW80S19x (where x may be replaced with a letter or number)	Triple insulated wire 26AWG (19x0.1mm diameter) Provides reinforced insulation. Class F	OBJT2	UL (E205791)	
TX2 transformer (Ch1 24V winding)	Interchangeable	Winding wire	Winding wire: Litz wire, NELB96/38HNUL-x (where x = nothing or any number)	OBMW2	UL	
TX2 transformer (Ch1 12V winding)	Interchangeable	Winding wire	Winding wire: Litz wire, NELC240/38HNUL-x (where x = nothing or any number)	OBMW2	UL	
TX2 transformer (sec aux winding)	Interchangeable	Winding wire	Winding wire: 0.56mm ECW	OBMW2	UL	
J2 output terminal block (10Way)	Interchangeable	Interchangeable	60V (Minimum), 6A	ECBT2	UL	
L4 output choke	Interchangeable	Interchangeable model numbers	Core: 20mm x 6mm Base: Interchangeable manufacturers, Nema FR4, 1.6mm 94V-0, RTI 140°C	Base: QMFZ2	-	
U2 opto-coupler	Vishay	SFH615A may be followed by additional letters and numbers.	4420Vac min. Provides reinforced insulation	FPQU2	UL (E52744)	

2016-02-12

U2 opto-coupler Alternative 1	Renesas Electronics Corporation	PS2581L1	5000Vac May be marked NEC and/or Renesas. provides reinforced insulation. 0.4mm internal insulation, external creepage 8mm	FPQU2	UL (E72422)	
U2 opto-coupler Alternative 2	Renesas Electronics Corporation	PS2561L1-1	5000Vac May be marked NEC and/or Renesas. provides reinforced insulation. 0.4mm internal insulation, external creepage 8mm	FPQU2	UL (E72422)	
U2 opto-coupler Alternative 3	Renesas Electronics Corporation	PS2561DL1-1	5000Vac May be marked NEC and/or Renesas. provides reinforced insulation. 0.4mm internal insulation, external creepage 8mm	FPQU2	UL (E72422)	
XTH123 Thermistor (ch1)	Murata	PRF18BB471+++ ++ (+ can be any number or letter)	4.7Kohm at 115°C	XGPU2	UL E137188	
XTH124 Thermistor (nr XD34 and XD35)	Murata	PRF18AR471+++ ++ (+ can be any number or letter)	4.7Kohm at 135°C	XGPU2	UL E137188	
XTH124 Thermistor (nr XD34 and XD35) (alternate 1)	Murata	PRF18BA471+++ ++ (+ can be any number or letter)	4.7Kohm at 125°C	XGPU2	UL E137188	
XTH124 Thermistor (ch1) (alternate 2)	Murata	PRF18BB471+++ ++ (+ can be any number or letter)	4.7Kohm at 115°C	XGPU2	UL E137188	
Miscellaneous items	-	-	-	-	-	
Chassis side insulation	Interchangeable	Interchangeable	Polyester or polyimide tape. Provides Basic insulation	OANZ2	UL	
Cover insulation	Interchangeable	Interchangeable	Polyester or polyimide tape. Provides Basic insulation	OANZ2	UL	
Fan	Sunonwealth	KDE1204PKBX	12V, 10.8cfm	GPWV2	UL (E77551)	
Fan (alternative)	Sunonwealth	KDE1204PKVX	12V, 10.8cfm	GPWV2	UL (E77551)	

2016-02-12

Fan (alternative)	Sunonwealth	MB40201VX	12V, 10.8cfm	GPWV2	UL (E77551)	
Sleeving on fan leads, TX2, L6 and L5	Interchangeable	Interchangeable	300V (Minimum)125°C (Minimum), VW-1 (minimum)	YDPU2	UL	
Non-conformal coating (optional)	Dow Corning Corp	1-2577 Low VOC	V-0, 130°C	QMJU2	UL (E81611)	
Non-conformal coating (optional)	Dow Corning Corp	1-2577	V-0, 130°C	QMJU2	UL (E81611)	
Optional coating	Dymax Corp	984-LVUF	V-1, 120°C	QMJU2	UL (E140512)	
Optional coating	Lackwerke Peters gmbh & Co kg.	DSL 1600 E-FLZ/75	V-0, 120°C	QMJU2	UL (E80315)	

2016-02-12

## Enclosures

<u>Type</u>	<u>Supplement Id</u>	<u>Description</u>
Photographs	3-01	EFE300 PSU with CN fan/case option
Photographs	3-02	EFE300 PSU with CU fan/case option
Photographs	3-03	EFE300 PSU with CC fan/case option
Photographs	3-04	EFE300 PSU with EC fan/case option
Diagrams	4-01	12V Transformer diagram
Diagrams	4-02	24V transformer diagram
Schematics + PWB	5-01	Trace layout (upper and lower)
Manuals	6-01	Manual
Miscellaneous	7-03	Heating tests (full list of tests applied)
Miscellaneous	7-06	Declaration Letter