



Test Report issued under the responsibility of:



TEST REPORT
IEC 61010-1
Safety requirements for electrical equipment for measurement,
control, and laboratory use
Part 1: General requirements

Report Number: E331788-D1005-2/A0/C0-CB
Date of issue: 2021-11-10
Total number of pages.....: 169

Name of Testing Laboratory
preparing the Report.....: UL International Demko A/S
 Borupvang 5A, DK-2750 Ballerup, Denmark

Applicant's name.....: TDK-LAMBDA UK LTD
Address: KINGSLEY AVE, ILFRACOMBE
 DEVON, EX34 8ES UNITED KINGDOM

Test specification:

Standard: IEC 61010-1:2010, IEC 61010-1:2010/AMD1:2016
Test procedure: CB Scheme
Non-standard test method.....: N/A

TRF template used: IECEE OD-2020-F1:2020, Ed.1.3
Test Report Form No......: IEC61010_1P
Test Report Form Originator: VDE Prüf- und Zertifizierungsinstitut GmbH
Master TRF.....: 2021-04-12

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If this Test Report Form is used by non-IECEE members, the IECEE/IEC logo and the reference to the CB Scheme procedure shall be removed.

This report is not valid as a CB Test Report unless signed by an approved IECEE Testing Laboratory and appended to a CB Test Certificate issued by an NCB in accordance with IECEE 02.

General disclaimer:

The test results presented in this report relate only to the object tested.
 This report shall not be reproduced, except in full, without the written approval of the Issuing NCB. The authenticity of this Test Report and its contents can be verified by contacting the NCB, responsible for this Test Report.

Test item description:	Switch Mode Power Supply	
Trade Mark:	Trademark image(s): 	
Manufacturer	Same as Applicant	
Model/Type reference:	EFE300Mxy-a-b-cdef-ghijk or Y5J008# or Y5J006#, see model differences for details of models and nomenclature	
Ratings:	100-240Vac, 4.9A rms max, 45-440Hz (See model differences for details of ratings)	
Responsible Testing Laboratory (as applicable), testing procedure and testing location(s):		
<input checked="" type="checkbox"/> CB Testing Laboratory:		
Testing location/ address	UL International Demko A/S Borupvang 5A, DK-2750 Ballerup, Denmark	
Tested by (name, function, signature)	Marcin Zurek, Handler	
Approved by (name, function, signature)	Krzysztof Wasilewski, reviewer	
<input type="checkbox"/> Testing procedure: CTF Stage 1:		
Testing location/ address		
Tested by (name, function, signature)		
Approved by (name, function, signature)		
<input type="checkbox"/> Testing procedure: CTF Stage 2:		
Testing location/ address		
Tested by (name, function, signature)		
Witnessed by (name, function, signature)		
Approved by (name, function, signature)		
<input checked="" type="checkbox"/> Testing procedure: CTF Stage 3:		
<input type="checkbox"/> Testing procedure: CTF Stage 4:		
Testing location/ address	TDK-Lambda UK Limited Kingsley Avenue, Ilfracombe Devon, EX34 8ES United Kingdom	
Tested by (name, function, signature)	Matt Carter, Tester	See Original Test report for signatures.

Witnessed by(name, function, signature)	N/A	
Approved by (name, function, signature)	Michael Jespersen, Approver	See Original Test report for signatures.
Supervised by (name, function, signature) ...	Hedieh Naderi, Handler	See Original Test report for signatures.

List of Attachments (including a total number of pages in each attachment)		
Document No.	Documents included / attached to this report (description)	Page No.
Refer to Appendix A of this report. All attachments are included within this report.		

Documents referenced by this report (available on request):		
Document Name or No.	Documents description	Page No.
Refer to Appendix A of this report. All attachments are included within this report.		

Summary of testing:

Refer to the Test List in Appendix B of this report if testing was performed as part of this evaluation.

Clause	Comment
<i>Refer to the Test List in Appendix B of this report if testing was performed as part of this evaluation.</i>	<i>Refer to the Test List in Appendix B of this report if testing was performed as part of this evaluation.</i>

<p>Test Report History: This report may consist of more than one report and is only valid with additional or previous issued reports:</p>	
Report Ref. No.	Item
<p><i>Refer to Report Modifications under General product information for any modifications made to this report.</i></p>	
<p>Tests performed (name of test and test clause): <i>Refer to the Test List in Appendix B of this report if testing was performed as part of this evaluation.</i></p>	<p>Testing location: <i>Refer to the Test List in Appendix B of this report if testing was performed as part of this evaluation.</i></p>
<p>Summary of compliance with National Differences (List of countries addressed): USA, Canada, EU Group</p> <p>[X] The product fulfils the requirements of <u>IEC 61010-1:2010, IEC 61010-1:2010/AMD1:2016.</u></p>	

Statement concerning the uncertainty of the measurement systems used for the tests

(may be required by the product standard or client)

Internal procedure used for type testing through which traceability of the measuring uncertainty has been established:

Procedure number, issue date and title:

Calculations leading to the reported values are on file with the NCB and testing laboratory that conducted the testing.

Statement not required by the standard used for type testing

(Note: When IEC or ISO standard requires a statement concerning the uncertainty of the measurement systems used for tests, this should be reported above. The informative text in parenthesis should be delete in both cases after selecting the applicable option)

Copy of marking plate

The artwork below may be only a draft. The use of certification marks on a product must be authorized by the respective NCBs that own these marks.

Refer to the enclosure(s) titled Marking Label in the Enclosures section in Appendix A of this report for a copy.

Test item particulars :	
Type of item:	Laboratory
Description of equipment function:	Switch Mode Power Supply for building in
Connection to mains supply:	None
Overvoltage category:	II
Pollution degree:	2
Means of protection:	Class I (PE connected)
Environmental conditions:	Extended (Specify): 0 to 70 C
For use in wet locations:	No
Equipment mobility:	Built-in
Operating conditions:	continuous
Overall size of equipment (W x D x H)	164mm x 85mm x 41mm maximum
Mass of equipment (kg):	1kg maximum
Marked degree of protection to IEC 60529:	None
Possible test case verdicts:	
- Test case does not apply to the test object	N/A (Not Applicable)
- Test object does meet the requirement	P (Pass)
- Test object does not meet the requirement	F (Fail)
Testing:	
Date of receipt of test item	2019-05-23
Date(s) of performance of tests	2019-06-11 to 2019-07-01
General remarks:	
The test results presented in this report relate only to the object tested. This report shall not be reproduced, except in full, without the written approval of the Issuing NCB. The authenticity of this Test Report and its contents can be verified by contacting the NCB, responsible for this Test Report.	
Throughout this report a point is used as the decimal separator.	
Manufacturer's Declaration per sub-clause 4.2.5 of IECEE 02:	
The application for obtaining a CB Test Certificate includes more than one factory location and a declaration from the Manufacturer stating that the sample(s) submitted for evaluation is (are) representative of the products from each factory has been provided	
: Yes	
When differences exist; they shall be identified in the General product information section.	
Name and address of factory (ies)..... :	TDK-LAMBDA UK LTD KINGSLEY AVE, LFRACOMBE DEVON, EX34 8ES UNITED KINGDOM
	PANYU TRIO MICROTRONIC CO LTD SHIJI INDUSTRIAL ESTATE, DONGYONG, NANSHA GUANGZHOU GUANGDONG CHINA
	Trio-Tronics (Thailand) Ltd 7/295 Mu. 6 Map Yang Phon Sub-District Pluak Daeng

DistrictRayong Province Thailand

General product information and other remarks:**Report Summary**

All applicable tests according to the referenced standard(s) have been carried out.
Refer to the Report Modifications for any modifications made to this report.

Product Description

EFE300M series. Switch mode power supplies for building into end equipment.

Additional Information

No tests conducted under this investigation due to reissue of CB Test Report Ref. No.E331788-D1005-1/A1/C0-CB. All required tests were carried out under the original investigation
This report is a reissue of CBTR Ref. No. E331788-D1005-1/A1/C0-CB and CB Test Certificate Ref. No. DK-88682-A1-UL. Based on the previously conducted testing and the review of product technical documentation including photos, schematics, wiring diagrams and similar, has been determined that the product continues to comply with the standard.

The report was modified to include the following changes:

- standard edition has been upgraded to the latest revision date.
- Standards has been updated on critical component list
- Alternate capacitor C12, 13, 14, 15, 19 has been added with the sam ratings and certification
- Updates to the enclosures.

No testing was deemed necessary.

Technical Considerations

- The product was investigated to the following standards:

Main Standard(s):

IEC 61010-1:2010/AMD1:2016/COR1:2019

From Country Differences:

- USA: UL 61010-1, 3rd Edition, May 11, 2012, Revised July 19, 2019
- Canada: CAN/CSA-C22.2 No. 61010-1(2012-05), 3rd Edition, with revisions through 2018-11
- EU Group: EN 61010-1:2010/A1:2019 (Edition 3.1)

Additional Standards:

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- The following additional investigations were conducted: N/A
- The product was not investigated to the following standards or clauses: N/A
- The following accessories were investigated for use with the product: N/A
- Equipment class: Class I

Equipment type: For building in

The product was submitted and tested for use at the maximum recommended ambient temperature (Tmra) of 50°C maximum load, 70°C reduced load.

For any non-certification testing - Unless specified otherwise in this report, the compliance "Decision Rule" is based on Simple Acceptance (Measurement Uncertainty is not taken into account when making a statement of conformity)

Engineering Conditions of Acceptability

When installed in an end-product, consideration must be given to the following:

- This component has been judged on the basis of the creepage and clearances required in the indicated Standards, which would cover the component itself if submitted for Listing: UL 61010-1, 3rd Edition, May 11, 2012, Revised July 19, 2019, CAN/CSA-C22.2 No. 61010-1(2012-05), 3rd Edition, with revisions through 2018-11, IEC 61010-1:2010/AMD1:2016, EN 61010-1:2010/A1:2019 (Edition 3.1).
 - The end-product shall consider that: The enclosure does not serve as a fire/electrical/mechanical enclosure
 - The need for the following shall be considered in the end-product: Bonding to protective earthing terminal (Class I construction)
 - The output connectors are: Not investigated for field wiring
 - Creepage and clearance distances were based on a maximum working voltage of: Primary to earth dead metal: 668Vpeak, 348Vrms., Primary to secondary: 880Vpeak, 408Vrms.
 - Insulation between primary circuits and accessible dead metal complies with the requirements for : Basic insulation
 - Insulation between primary and secondary circuits complies with the requirements for: Reinforced insulation
 - The following tests shall be performed in the end-product evaluation: Dielectric Strength test in accordance with the handbook., Temperature test for customer air models.,
 - The unit is considered acceptable for use at on a max branch circuit of: 20A
 - The unit is considered acceptable for use in a max ambient of: 50°C maximum load, 70°C reduced load.
 - End-product temperature tests for power supplies shall consider that the following transformers employ the indicated insulation system: Transformer Tx1, Class F (155°C)., Transformer Tx2, Class F (155°C).
 - End-product dielectric strength tests shall be based on the maximum working voltage of: Primary to earth dead metal: 668Vpeak, 348Vrms., Primary to secondary: 880Vpeak, 408Vrms.
 - The leakage current tests have been provided for information only. This test must be considered in the end product application and must be repeated for frequencies above 63Hz. --
 - This product has been assessed for a maximum altitude of 5000m
 - The risk associated with clause 5.4.5 shall be assessed in the end product.
 - Multilayer PWB's accepted under CBTR Ref. No.: E349607-A23 dated 2014-07-31 and letter report, Enclosure X-XX of this report.
- Description of special features.
(HV circuits, high pressure systems etc.)

Report Modifications

Date Modified (Year-Month-Day)	Modifications Made (include Report Reference Number)	Modified By
2019-09-20	<p>This report is reissued based on CBTR Ref. No: E331788-A16-CB-2 dated 2015-10-20 and CB certificate DK- 49192-UL dated 2015-10-20. Based on the previously conducted testing, limited testing for this report and the review of product technical documentation including photos, schematics, wiring diagrams and similar, it has been determined that the product complies with the standard.</p> <p>The original report has been modified for the following:</p> <ol style="list-style-type: none"> 1. Modification of base PWBs to accommodate 2x additional discharge resistors with relevant testing to show continued compliance. 2. Updates to the CCL. 3. Updates to the enclosures. 	Hedieh Naderi
2020-11-18	Administrative Amendment to add new Manufacturer Location	Gustav Hoppe

2021-11-10	<p>Trio-Tronics (Thailand) Ltd. (E331788-D1005-1/A1/C0)</p> <p>No tests conducted under this investigation due to reissue of CB Test Report Ref. No.E331788-D1005-1/A1/C0-CB. All required tests were carried out under the original investigation This report is a reissue of CBTR Ref. No. E331788-D1005-1/A1/C0-CB and CB Test Certificate Ref. No. DK-88682-A1-UL. Based on the previously conducted testing and the review of product technical documentation including photos, schematics, wiring diagrams and similar, has been determined that the product continues to comply with the standard.</p> <p>The report was modified to include the following changes:</p> <ul style="list-style-type: none"> - standard edition has been upgraded to the latest revision date. - Standards has been updated on critical component list - Alternate capacitor C12, 13, 14, 15, 19 has been added with the sam ratings and certification - Updates to the enclosures. <p>No testing was deemed necessary.</p>	Marcin Zurek
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Description of model differences:

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Nominal Input Voltage Range 100 – 240V AC
 Maximum Input Voltage Range 90** - 264V AC
 Input Frequency 45 – 440* Hz maximum
 Maximum Input Current 4.9A rms

**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.

EFE300M or –EFE300M models as described below:
 (may be prefixed by NS - # / Where # may be any characters indicating non-safety related model differences) products may additionally be marked with U5x or Y5x where x can be any characters indicating non-safety related model differences.

May be prefixed by SP followed by / or – (SP represents a sales code)

Unit Configuration Code: EFE300Mxy-a-b-cdefghijk

Where:

x = Nothing or J for Japanese models (may have non-safety differenes)
 y = Blank for Y2 capacitors from output to earth, P for Y1 capacitors from output to earth.
 a = Channel 1 output voltage: see CH1 in the outputs table below, adjustment range column.
 b = Standby voltage: see standby voltage table below or 0 for omitted.
 c = HN for open frame, no fan, with 12V / 1A fan supply.
 HU for U chassis, no fan, with 12V / 1A fan supply.
 HC for cover + chassis, no fan, with 12V / 1A fan supply.
 EC for cover + chassis, end fan (temp controlled).
 NN for open frame, no fan, no fan supply.
 NU for U chassis, no fan, no fan supply.
 NC for cover + chassis, no fan, no fan supply.
 CN for open frame, no fan, with 12V / 0.25A fan supply.
 d = M for molex input connector or equivalent, J for JST connector or equivalent.
 e = D for dual fused input or L for single fuse in the live line
 f = S for standard leakage, L for low leakage, R for reduced leakage, T for tiny leakage.*
 g = Y for Oring FET included or N for nothing.

h = E for enable, T for inhibit, N for no inhibit, no enable.
 i = Nothing for horizontal output connector, -V for vertical output connector, -S for screw terminal
 j = 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).
 k = Nothing or -x where x is 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.	Range (V)	O/P Current (A)	Max O/P Power (W)
CH1	12	11.4 - 13.2*	25	300 (400**)
	24	22.8 - 26.4*	12.5	300 (400**)
	28	27 - 32*	10.72	300 (400**)
	40	36 - 42*	7.5	300 (350***)
	48	47 - 50*	6.25	300 (350***)
Standby	50	50.1 - 54*	6.0	300 (350***)
	5	Fixed	2	10
Fan output	12	12-13.5*	1	13.5
	12	Fixed	0.25	3
	12	Fixed	1	12

* Can be adjusted from nominal at the factory only.

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

*** Peak power of 350W for 10 seconds maximum, in any 1 minute cycle, maximum rms power of 300W:

where T1 = peak power time on
 and T2 = reduced power time on

Maximum continuous power output 300W (excluding fan output)

Output Limitations

All standard outputs are SELV up to and including 48V nominal. Voltages above 48V nominal are non SELV and must not be accessible to an end operator..

All outputs have basic spacings to earth, and due consideration must be given to this in the end product design, except for Y50029# (60950-1 approved model) which has functional spacings to earth.

Non Standard models.

Model: Y5J008# (where # can be any letter) or EFE300MJ-12.1-5-008 or EFE300MJ-12.1-5-008-SGP

Maximum outputs: 12.1V, 21.49A, plus 5V, 2A standby.

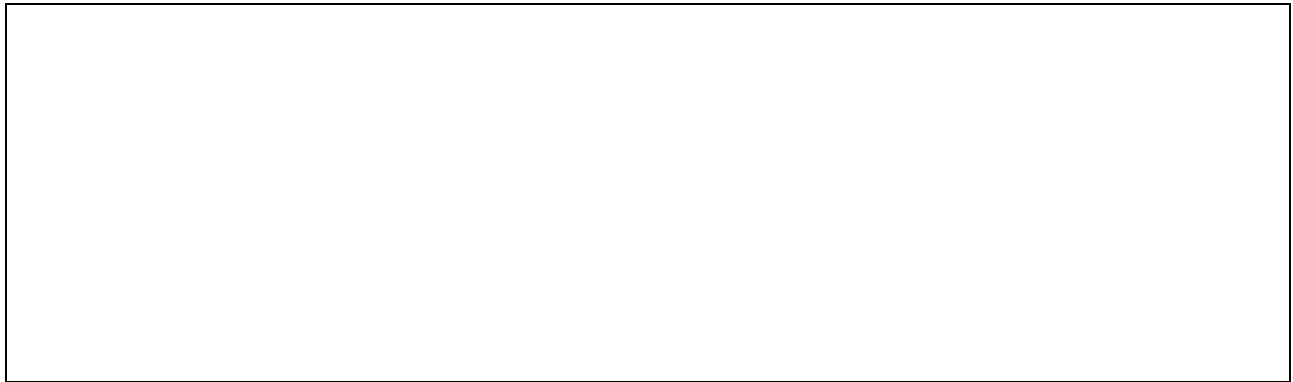
Maximum ambient: As standard model. Orientations: As standard model.

Comments: Fan speed is controlled at 6600rpm up to and between 45 to 50 degrees C ambient after which the fan resumes its normal nominal voltage rating. Can be fitted with or without fan guard. Model may also include a without fan and open frame type.

Model: Y5J006# (where # can be any letter) or EFE300MJ-12-5-006. Maximum outputs: 11.4V to 13.2V*, 25A, (300W max) plus 5V, 2A standby. Maximum ambient: As standard model.

Orientations: As standard model.

Comments: Longer version than standard model to accommodate additional reservoir capacitor for a greater hold up time.



Description of special features:
(HV circuits, high pressure systems etc.)

See additional information above.