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EU DECLARATION OF CONFORMITY



CFE400M Series

We, TDK Lambda UK Limited, of Kingsley Avenue, Ilfracombe, Devon, EX34 8ES declare under our sole responsibility that the TDK-Lambda power supplies, as detailed on the attached products covered sheets, comply with the provisions of the following European Directives and are eligible to bear the CE mark:

Low Voltage	Directive 2014/35/EU
EMC	Directive 2014/30/EU
RoHS	Directive 2011/65/EU (as amended by 2015/863)

Assurance of conformance of the described product with the provisions of the stated EC Directive is given through compliance to the following standards:

Electrical Safety (LVD)	EN 62368-1:2014/AC:2015
Electromagnetic Compatibility (EMC)	EN 61000-6-3:2007 + A1:2011 EN 61000-6-2:2005 EN 61204-3:2000 EN 55024:2010 EN 55032:2015
Restriction of Hazardous Substances (RoHS)	EN 63000:2018

Our representative in the EU is TDK-Lambda Germany GmbH, located at Karl-Bold-Str. 40, 77855 Achern, Germany.

Note: The EMC performance of a component power supply will be affected by the final installation, compliance to the stated EMC standards and conformance to the EMC Directive must be confirmed after installation by the final equipment manufacturer. For guidance with respect to test conditions please visit our website at https://emea.lambda.tdk.com/EMC_Guidance or contact your local TDK-Lambda sales office.

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UK DECLARATION OF CONFORMITY



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Electrical Equipment (Safety) Regulations 2016

Electromagnetic Compatibility Regulations 2016

Restriction of the Use of Certain Hazardous Substances in Electrical & Electronic Equipment Regulations 2012

Assurance of conformance of the described product with the provisions of the stated UK Regulation is given through compliance to the following standards:

Electrical Safety	EN 62368-1:2014/AC:2015
Electromagnetic Compatibility (EMC)	EN 61000-6-3:2007 + A1:2011 EN 61000-6-2:2005 EN 61204-3:2000 EN 55024:2010 EN 55032:2015
Restriction of Hazardous Substances (RoHS)	EN 63000:2018

Note: The EMC performance of a component power supply will be affected by the final installation, compliance to the stated EMC standards and conformance to the EMC Regulation must be confirmed after installation by the final equipment manufacturer. For guidance with respect to test conditions please visit our website https://emea.lambda.tdk.com/EMC_Guidance or contact your local TDK-Lambda sales office.

CFE400M Series Products Covered

Unit Nomenclature:

CFE400M or CFE-400M series as described below:

Units may be marked with a Product Code: U7x or Y7x where x may be any number of letters and/or numbers 0 to 9.

Unit Configuration (Description :) Code may be prefixed by NS # followed by / or - (where # may be any number of characters indicating non- safety related model differences).

Unit Configuration Code:

CFE400Mx-a-bc-defg-hi-j-k-lmn-o

Where:

x = 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 table below, adjustment range column).

b = Standby voltage (see standby in the table below, adjustment range column).
N for no supply

c = N no for supply.
C for 0.1A.
H for 2A.

d = NN for no fan, no fan supply
N1 for 12V nom / 0.25A fan supply. (V varies with Ch1 output voltage)
TF for chassis with fan fitted to cover.

e = U for chassis only.
C for chassis with perforated or top fan cover.
S for chassis with cover.

f = M for Molex KK type 41791 input connector or equivalent.
S for screw terminal input connector.

g = S for standard Leakage,
L for low Leakage,
R for reduced Leakage,
T for tiny Leakage*

h = Y for Oring FET included.
N for no Oring FET.

i = N for no inhibit or enable.
T for inhibit.
E for enable.

j = Omit for standard channel 1 output voltage with no droop.
Dx where D is for units with programmed negative load regulation,
x is the voltage of the regulation in 100mVolts and is within the Output Adjustment range
(example, D5 = 0.5V of negative load regulation).

k = Omit for no secondary comms.

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

o = Blank for dual fuse input or -FL for single fuse input in the live line

*S >300uA leakage, L <300uA leakage, R <150uA leakage and T <75uA leakage

Input Parameters

Standard	60950-1
Nominal input voltage	100 - 240 Vac
Input voltage range	85 - 264 Vac
Input frequency range	47 - 440 Hz
Maximum input current	6.1A rms (6.4A rms 450W peak)

All ratings apply for ambient temperatures up to 50°C. (see variations and limitations below)

Output Parameters

There are three CFE400M standard models with various options and output parameters shown in the tables below.

Standard models:

Standard models at 50°C maximum ambient in forced air and top fan models:

Output Channel	Vout Nom.	Adjustment Range (V)	Maximum Output Current (A)	Maximum Power (W)
Channel 1	12	9 - 14.4	33.33 (35.7†)	400 (450†)
	15	14.4 - 15.5	24.67	370
	24	18 - 28.8	16.67 (18.75†)	400 (450†)
	48	36 - 54	8.34 (9.38†)	400 (450†)
Fan output (optional)	12	9 - 12	0.25	3
Standby output (optional)	5	5 - 5.5*	2	11
Standby output (optional)	5	5	0.1	0.5

Variations and limitations of use for Standard models at 50°C maximum ambient in forced air and fan models:

- * Can be adjusted at the factory only.
- Maximum continuous power output 400W.
- † Peak power of 450W for 10 seconds maximum, maximum rms power of 400W.
- See Cooling for customer air below for forced air and convection cooled models.
- Channel 1 output de-rated 10W/°C from 50°C - 70°C.

Standard model at 50°C maximum ambient convection cooled:

Output Channel	Vout Nom.	Adjustment Range (V)	Maximum Output Current (A)	Maximum Power (W)
Channel 1	12	9 - 14.4	20.83 (35.7†)	250 (450†)
	15	14.4 - 15.5	15.4	231
	24	18 - 28.8	10.41 (18.75†)	250 (450†)
	48	36 - 54	5.21 (9.38†)	250 (450†)
Fan output (optional)	12	9 - 12	0.25	3
Standby output (optional)	5	5 - 5.5*	2	11
Standby output (optional)	5	5	0.1	0.5

Variations and limitations of use for Standard models at 50°C maximum ambient convection cooled:

- * Can be adjusted at the factory only.
- Maximum continuous power output 250W.
- † Peak power of 450W for 10 seconds maximum, maximum rms power of 250W.
- See Cooling for customer air below for convection cooled models.
- Channel 1 output de-rated 10W/°C from 50°C - 60°C.

Standard model at 40°C maximum ambient convection cooled:

Output Channel	Vout Nom.	Adjustment Range (V)	Maximum Output Current (A)	Maximum Power (W)
Channel 1	12	9 - 14.4	25 (35.7†)	300 (450†)
	15	14.4 - 15.5	18.46	277
	24	18 - 28.8	12.5 (18.75†)	300 (450†)
	48	36 - 54	6.25 (9.38†)	300 (450†)
Fan output (optional)	12	9 - 12	0.25	3
Standby output (optional)	5	5 - 5.5*	2	11
Standby output (optional)	5	5	0.1	0.5

Variations and limitations of use for Standard models at 40°C maximum ambient convection cooled:

- * Can be adjusted at the factory only.
- Maximum continuous power output 300W.
- † Peak power of 450W for 10 seconds maximum, maximum rms power of 300W.
- See Cooling for customer air below for convection cooled models.
- Channel 1 output de-rated 5W/°C from 40°C - 50°C.

Standard model at 40°C maximum ambient convection cooled:

Output Channel	Vout Nom.	Adjustment Range (V)	Maximum Output Current (A)	Maximum Power (W)
Channel 1	48	38 - 42	6.25 (15†)	300 (630†)
Standby output (optional)	5	5	0.1	0.5

Variations and limitations of use for Standard models at 40°C maximum ambient convection cooled:

- Maximum continuous power output 300W.
- † Peak power of 630W with Ch1: 10ms sawtooth current waveform of 42V at 15A to 5A for 10s followed by 42V at 1A for 30s minimum. Standby at 5V, 0.1A continuous.
- See Cooling for customer air below for convection cooled models.

Output Limitations

Seriesing of outputs is not allowed without further evaluation in end-use equipment.

All outputs have basic spacings to earth rated for mains - 250Vac, and due consideration must be given to this in the end product design.

Environmental parameters

Description	Operation	Storage
Use	Indoor	-
Temperature	0°C - +70°C *	-40°C - +70°C
Humidity	5 - 95% RH, non-condensing	5 - 95% RH, non-condensing
Altitude	-200m - 5000m	-200m - 5000m
Pressure	54kPa - 106kPa	54kPa - 106kPa
Orientation	Sides, vertical with input lowest, horizontal (customer air versions: all)	All
Material Group	IIIb	
Pollution Degree	2	
Overvoltage Category	II	
Class	I	

* See variations and limitations of use for each model above.

Customer Air Cooling:

The following method must be used for determining the safe operation of PSUs when NN, U or S options (Customer Air) are fitted, i.e. fan not fitted to PSU. The minimum permitted airflow for customer air cooling is 0.5m/s.

For PSUs and assemblies cooled by customer supplied airflow the components listed in the following table must not exceed the temperatures given. Additionally ratings specified for units with an internal fan shall still be complied with, eg. mains input voltage range, maximum output power, module voltage / current ratings and maximum ambient temperature. To determine the component temperatures the heating tests shall be conducted in accordance with the requirements of IEC60950-1. Consideration should also be given to the requirements of other safety standards.

Test requirements include: PSU/assembly 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/assembly. To determine the most adverse conditions consideration shall be given to the end use equipment maximum operating ambient, the PSU/assembly loading and input voltage, ventilation, end use equipment orientation, the position of doors & covers, etc. Temperatures shall 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 shall be run until all temperatures have stabilised.

Circuit Ref.	Description	Max. Temperature (°C) †
J1	Input connector	105
C7, C8	X capacitor	100
L1, L2	Common mode choke winding	110
L9	Series mode choke winding	120 (130)
TX1††, TX3	Standby trx winding	110 (130)
U2, U7	Opto-coupler	100
ASY4-B	PFC FET	120
ASY4-C	Boost diode	120
L3, L5	Boost choke winding	110 (140)
C9	Boost capacitor	83 (105)
ASY5	Bridge	125 (130)
RLY1	Relay	100
L6 winding	Primary resonant choke winding	125 (145)
TX5-A	Primary winding	110 (130)
TX5-B	Channel 1 winding	110 (130)
TX5-C	Sec aux winding	110 (130)
XQ18	HS Ch1 synchronous rectifier	120 (130)
XL1	Channel 1 output choke	110 (130)
ASY7-C (††)	Standby switch	120
ASYF4-F (††)	Oring FET	120
C1, C3, C5, C16, C17, C21 (††)	Electrolytic capacitors	82.5 (105)
C6, C18 (††)	Electrolytic capacitors	91 (105)

† The higher temperatures limits in brackets may be used but product life may be reduced.

†† When fitted.

CFE400M Series Signature Page

Name of Authorized Signatory	Christopher Haas
Signature of Authorized Signatory	
Position of Authorized Signatory	Head of Quality & Compliance Europe
Date	23 September 2021
Date when this CE declaration first issued	15 February 2012
Date when this UKCA declaration first issued	6 April 2021
Place where signed	Achern, Germany

This declaration is signed for and on behalf of TDK-Lambda