DESCRIPTION

PRODUCT COVERED:

USR, CNR - Switching - Power Supplies DC/DC Converters, Model Series PAF500F48, PAF500F24, PAF400F48 and PAF400F24, with or without suffixes.

See "ELECTRICAL RATINGS" for models covered.

GENERAL:

The products covered by this Report are switch-mode power supplies (DC to DC converters). They are provided with input and output terminals (pins) for mounting to a PWB in the end use equipment. All components are mounted on two printed wiring boards, which are placed into a plastic case and partially potted/encapsulated.

ELECTRICAL RATINGS:

	Input, dc		Output, dc	
Model	V	A	V	A
PAF400F48-12	36-76	14.5	12	33.5
PAF400F48-28	36-76	14.5	28	14.3
PAF500F48-3.3	36-76	18	3.3	80
PAF500F48-5	36-76	18	5	80
PAF500F48-12	36-76	18	12	42
PAF500F48-12/TMI	36-76	18	12	42
PAF500F48-28	36-76	18	28	18
PAF500F48-28/TFR	36-76	18	28	18
PAF500F48-12/NTL	36-76	12.5	12	29.2
PAF500F24-12	19-36	36	12	42
PAF500F24-28	18-36	36	28	18
PAF400F24-12	19-36	29	12	33.5
PAF400F24-28	18-36	29	28	14.3

Maximum Output Power: 504 W

Models may be followed by optional suffix denoting minor variations which are not related to safety aspects : "/" and any alphanumeric characters.

MODEL DIFFERENCES:

PAF500F and PAF400F series include the same critical components, differences between the two models are in the OCP circuitry.

Suffix /T - Indicates that the four corner studs are not threaded; standard models, without suffix /T, include four, threaded corner studs.

Suffix /TFR - Model PAF500F48-28 only - Identical to basic model; suffix /TFR provided for customer identification only.

Suffix /TMI - Used with Model PAF500F48-12 only. This suffix is identical to the basic model with the exception of some minor, non-critical component changes.

Suffix /TC – Indicates additional adhesive between daughter board PWB and plastic case.

Suffix /V – Indicates auto restart.

Suffix /NTL – Used with Model PAF500F48-12 only. This suffix is identical to the basic model with the exception of a new coil L101 and lower operating parameters.

Suffix /C – Indicates fixing T1 with adhesive, or any combination of suffix above.

ENGINEERING CONSIDERATIONS (NOT FOR FIELD REPRESENTATIVE'S USE):

Use - For use only in (or with) complete equipment where the acceptability of the combination is determined by Underwriters Laboratories Inc.

Special Considerations - The following items are considerations that were used when evaluating these products.

USR/CNR indicates investigation to the U.S. and Canadian (Bi-National) Standard for Information Technology Equipment - Safety - Part 1: General Requirements, UL 60950-1/ CSA C22.2 No. 60950-1-07, 2nd Edition, **Revision Date 2014/10/14.**

USR, CNR indicates investigation to UL 62368-1, 2nd Edition, dated 2014-12-01 (Audio/Video, Information and Communication Technology Equipment - Part 1: Safety Requirements) and CSA C22.2 No. 62368-1-14, 2nd Edition, dated 2014-12-01 (Audio/Video, Information and Communication Technology Equipment - Part 1: Safety Requirements).

The components were submitted and tested for a maximum manufacturer's recommended base plate temperature of 100°C, with the exception of Model PAF500F48-12/NTL, which is 85°C.

The equipment is: for building in, Class I (earthed).

Conditions of Acceptability - When installed in the end-product, consideration shall be given to the following:

1. These components have been judged on the basis of the required spacings (creepage and clearance distances) in the Standard for Information Technology Equipment - Safety - Part 1: General Requirements, UL 60950-1/ CSA C22.2 No. 60950-1-07, 2nd **Edition - Revision Date 2014/10/14, UL 62368-1, 2nd Edition, dated 2014-12-01 (Audio/Video, Information and Communication Technology Equipment - Part 1: Safety Requirements), and CSA C22.2 No. 62368-1-14, 2nd Edition, dated 2014-12-01 (Audio/Video, Information and Communication Technology Equipment - Part 1: Safety Requirements)**, which would cover the component itself, if submitted for Listing.

2. The components shall be installed in a suitable Electrical and Fire Enclosure, in compliance with the enclosure, mounting, creepage, casualty, marking and segregation requirements of the end-use application.

3. Tests on Model PAF400F48 and PAF500F48 were conducted with, and the instructions recommend use of, an external fuse, Cooper/Bussmann, Type ABC-30, rated 30 A, 125 V (investigated for interrupting ratings of 400 A at 125 V dc and 1000 A at 75 V dc). The breaking capacity and voltage rating are subject to the end-use requirements. However, tests were conducted with a supply capable of a fault current of 1500 A.

   Tests on Model PAF400F24 and PAF500F24 were conducted with, and the instructions recommend use of, an external fuse, rated 50 A, 125 Vdc. The breaking capacity and voltage rating are subject to the end-use requirements. However, tests were conducted with a supply capable of a fault current of 300 A.

4. The equipment has been evaluated for use in a pollution Degree 2 environment.

5. The components were submitted, and tested, for a maximum base plate temperature of 100°C, in the exception of Model PAF500F48-12/NTL, which is 85°C. This temperature limit shall determine the maximum working ambient temperature. The DC to DC converters were tested with the heat sink mounted below the base plate of the converters (worst case). For location of hot spot, see Instruction Manual.

6. The output circuits are SELV and at a hazardous energy level. For 12V Models and above, when the outputs are earthed in the end use equipment they are SELV. If the outputs are not earthed they must be considered hazardous voltage as a single fault in the secondary may make the output exceed SELV limits.

7. Each power supply shall be properly bonded to the main protective earthing termination in the end-product, as the power supplies were investigated for Class I construction.

8. Transformers **T101,** T102 **and T1** are provided with Basic Insulation. Fault conditions across all basic barriers have been conducted, under all possible earthing conditions, to prove **SELV/ES1** at the output.

9. Transformers T101 and T102 employ a Class H (180) insulation system; T1 employs a class F (155) insulation system.

10. The input to the units must be isolated from mains by reinforced insulation, in accordance with UL 60950-1, 2nd Edition, 2007-03-27/ CSA C22.2 No. 60950-1-07, 2nd Edition, **Revision Date 2014/10/14, UL 62368-1, 2nd Edition, dated 2014-12-01 / CSA C22.2 No. 62368-1-14, 2nd Edition, dated 2014-12-01** in order for the outputs from the dc/dc converters to be considered **SELV/ES1.** Due to the potential non-SELV **voltages/non ES1 voltages** at the source to the Model Series PAF400F48 and PAF500F48 (only) dc/dc converters, the input these models must be considered a hazardous secondary **voltage/ES2.**

11. The input and output connectors (pins) are only intended for soldering to a printed wiring board.

12. The following output circuits are at ES1 energy levels : Output of all models

13. The following output circuits are at PS3 energy levels : Output of all models

14. The following end-product enclosures are required : Electrical (and Fire, If the Top Cover is not secured in a sufficiently reliable)

15. The power supply terminals and/or connectors are: Suitable for factory wiring only.

16. Classification of PIS has not been conducted. However, Top Cover, Case and baseplate have been evaluated as fire barriers to any PIS parts and/or components inside the unit except for reliability of fixing mean of Top Cover. Consideration shall be given in end product application for securing Top Cover.

17. This component has been evaluated in ‘control of fire spread’ method, and the Case, baseplate (and Top Cover) have been evaluated as fire barriers.

18. Baseplate is floating. The separation between baseplate and internal parts at ES2/ES3 (maximum working voltage of 213Vpk) has not been evaluated as any type of insulation.

19. Unit intended for building-in and supplied ES1 or ES2 power from secondary circuit which is isolated from primary circuit by double or reinforced insulation.

20. Only functional insulation provided between input/output circuits, which complies with electric strength test at 2500Vdc

21. The Clearances and Creepage Distances have additionally been assessed for suitability up to 3000 m elevation.