Ref. Certif. No.

**NO136363**

IEC SYSTEM FOR MUTUAL RECOGNITION OF TEST CERTIFICATES FOR ELECTRICAL EQUIPMENT (IECEE) CB SCHEME

# CB TEST CERTIFICATE

| | |
|---|---|
| Product | DC-DC Converter |
| Name and address of the applicant | Bel Fuse Inc.<br>300 Executive Drive, Suite 300<br>West Orange NJ 07052<br>United States of America |
| Name and address of the manufacturer | Bel Fuse Inc.<br>300 Executive Drive, Suite 300<br>West Orange NJ 07052<br>United States of America |
| Name and address of the factory | Bel Power Solutions, s.r.o.<br>Areal ZTS 924<br>Dubnica nad Vahom 01841<br>Slovakia |
| *Note: When more than one factory, please report on page 2* | ☐ Additional Factories on Page 2 |
| Ratings and Principal characteristics | Input Voltage: 14.7A (max) 16 to 150Vdc (Model Dependent)<br>Output Voltage: 3.3Vdc to 24Vdc (Model Dependent)<br>Maximum Output Power: 50W – 194W (Model Depended) |
| Trademark /Brand (if any) | bel POWER SOLUTIONS & PROTECTION a bel group or bel |
| Customer's Testing Facility (CTF) Stage used | |
| Model/Type Ref. | xPxxx-xxx |
| Additional information (if necessary may also be reported on Page 2) | First 'x' can be B, C, D, E or G denoting input voltage, Vdc<br>Second 'x' can be 1, 2, 3 or 4 denoting No. of outputs<br>Third 'x' can be 1 to 9 denoting nominal voltage [output1/output4]<br>Fourth 'x' can be 01-5.1V, 10-3.3V, 20-12V, 40-15V, 60-24V or Other customer specifications 01 to 99 denoting nominal voltage [output2/output3]<br>Fifth 'x' can be 0, 1, 2, 3, 4, 5, 6, 7 or 9 denoting operational ambient temperature range Ta<br>Sixth 'x' can be letters or numbers denoting no –safety-critical options such as, but not limited to, potentiometer, output voltage control input, etc.<br>All models names maybe followed by 'G' indicating ROHS version.<br>☐ Additional Information on Page 2 |
| A sample of the product was tested and found to be in conformity with | IEC 62368-1:2023 |
| As shown in the Test Report Ref. No. which forms part of this Certificate | REP117772 |

This CB Test Certificate is issued by the National Certification Body

Nemko

Philip Pedersen vei 11,
NO-1366 Lysaker, Norway

Signature: Okhyun Jeon
Certification Department

Date: 2025-10-15

Disclaimer: This document is controlled and has been released electronically.

Only the version on the IECEE Website is the current document version

Test Report issued under the responsibility of:

Nemko
www.nemko.com

# TEST REPORT
# IEC 62368-1
# Audio/video, information and communication technology equipment
# Part 1: Safety requirements

| | |
|---|---|
| **Report Number. ..... :** | **REP117772** |
| **Date of issue ..... :** | **2025 October 9** |
| **Total number of pages ..... :** | **79** |
| **Name of CB Testing Laboratory preparing the Report ..... :** | Nemko USA Inc.<br>2210 Faraday Ave. Suite 150, Carlsbad, CA 92008, USA |
| **Applicant's name ..... :** | Bel Fuse Inc. |
| **Address ..... :** | 300 Executive Drive, Suite 300, West Orange, NJ 07052, USA |
| **Test specification:** | |
| **Standard ..... :** | IEC 62368-1:2023 |
| **Test procedure ..... :** | CB Scheme |
| **Non-standard test method ..... :** | N/A |
| **TRF template used ..... :** | IECEE OD-2020-F1:2024, Ed.1.7 |
| **Test Report Form No. ..... :** | IEC62368_1F |
| **Test Report Form(s) Originator .... :** | UL Solutions (US) |
| **Master TRF ..... :** | Dated 2025-06-13 |

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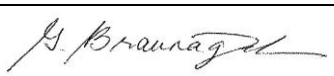
If this Test Report Form is used by non-IECEE members, the IECEE/IEC logo and the reference to the CB Scheme procedure shall be removed.

**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 ..... :** | DC-DC Converter |
| **Trademark(s) ..... :** | bel POWER SOLUTIONS & PROTECTION a bel group or bel |
| **Manufacturer ..... :** | Same as Applicant |
| **Model/Type reference ..... :** | xPxxx-xxx<br>See general Product information for variable designations |
| **Ratings ..... :** | Input Voltage: 14.7A (max), 16 to 150Vdc (Model Dependent)<br>Output Voltage: 3.3Vdc to 24 Vdc (Model Dependent)<br>Maximum Output Power: 50W – 194W (Model Depended)<br>See General Product information for additional details |

| | | | |
|---|---|---|---|
| **Responsible Testing Laboratory (as applicable), testing procedure and testing location(s):** | | | |
| ☒ | Nemko USA Inc. | Nemko USA Inc. | |
| **Testing location/ address.....:** | | 2210 Faraday Ave. Suite 150, Carlsbad, CA 92008, USA | |
| **Tested by (name, function, signature).....:** | | Gladys Braunagel (Project Handler) |  |
| **Approved by (name, function, signature)...:** | | George Daverin (Verificator) |  |
| | | | |
| ☐ | **Testing procedure: CTF Stage 1:** | | |
| **Testing location/ address.....:** | | | |
| **Tested by (name, function, signature).....:** | | | |
| **Approved by (name, function, signature)...:** | | | |
| | | | |
| ☐ | **Testing procedure: CTF Stage 2:** | | |
| **Testing location/ address.....:** | | | |
| **Tested by (name + signature) .....:** | | | |
| **Witnessed by (name, function, signature) .:** | | | |
| **Approved by (name, function, signature)...:** | | | |
| | | | |
| ☐ | **Testing procedure: CTF Stage 3:** | | |
| ☐ | **Testing procedure: CTF Stage 4:** | | |
| **Testing location/ address.....:** | | | |
| **Tested by (name, function, signature).....:** | | | |
| **Witnessed by (name, function, signature) .:** | | | |
| **Approved by (name, function, signature)...:** | | | |
| **Supervised by (name, function, signature) :** | | | |

**List of Attachments (including a total number of pages in each attachment):**

Attachment 1: European Group Differences and National Differences (27 pages)

Attachment 2: National Differences: Canada and US (12 pages)

Attachment 3: National Differences: Switzerland (2 pages)

Attachment 4: National Differences: Japan (6 pages)

Attachment 5: Photos (7 pages)

Attachment 6: Miscellaneous Documentation, e.g. Installation Instructions, PWB layout, Schematic etc. (8 pages) (Not for publication – Engineering use only)

Attachment 7: PWB Thermal cycling tests (51 pages) (Not for publication – Engineering use only)

**Summary of testing:**

This Test Report covers an upgrade from IEC 62368-1:2018 (Third Edition) to IEC 62368-1: 2023 (Fourth Edition). Replaced Nemko test report Ref. No. 393154, with appended CB Certificate Ref. No. NO113861.

Also, change applicant / manufacturer address, add alternate Bel trademark and add alternate source of components. See table 4.1.2 for details. No additional testing deemed necessary.

The equipment is a component, switch mode power supply without PFC with DC input (ES3/PS3) and DC voltage output (ES1/PS2, PS3) for building-in.

Intended location: The equipment is to be installed in the end product where the suitability of installation is to be evaluated in the end product.

Safety Instructions: Instructions shall be supplied in a language suitable for the country into which the product is to be sold.

Maximum operating temperatures: Equipment for building-in. Heating test was conducted monitoring the internal components temperature. Accessibility to high component temperature must be considered on end system equipment.

PCBs used for this equipment have been separately evaluated and determined to comply with requirements for Printed Boards per G.13.4.

Equipment markings: Identification marking (trade-mark and model name) are marked on the equipment. However, the durability test was not considered because the equipment is a component level product for building-in. Therefore, the marked surface is not to be located in an external area where it is likely to be cleaned with cleaning solution, rubbed, etc.

The unit tested is a prototype with all possible options and worst case of the models when necessary. The following tests have been performed with acceptable results.

| **Tests performed (name of test, test clause and date test performed – August 2020):** | **Testing location: (CBTL, SPTL, CTF, Subcontractor)** |
|---|---|
| Original Tests per IEC 60950-1:<br>1) Input Test ..... 1.6.2<br>2) Durability Test ..... 1.17.11<br>3) Energy hazards-d.c. mains supplies ..... 2.1.1.5<br>4) SELV Reliability Test ..... 2.2<br>5) Earthing test, earth trace test(UL PAG) ..... 2.6<br>6) Humidity Test ..... 2.9.2<br>7) Working Voltage Measurement ..... 2.10.2<br>8) Hazardous Voltage Measurement ..... 2.10.2<br>9) Hot swap Test ..... 4.3.5<br>10) Heating Test ..... 4.5.1<br>11)Ball pressure test ..... 4.5.5<br>12) Electric Strength Test ..... 5.2.2<br>13) Component Failure Test ..... 5.3<br>14) Abnormal Operation Test ..... 5.3<br>15) PS Output Overload and Short Test ……. 5.3<br><br>Updated tables in this Report:<br>5.2 Classification of electrical energy sources<br>5.4.1.8 Determination of working Voltage measurement<br>5.4.2, 5.4.3 Minimum clearances/creepage distances<br>5.4.8 Humidity<br>5.4.9 Electric Strength tests<br>5.5.2.2 Stored discharge on capacitors<br>5.6.6 Resistance of protective conductors and terminations<br>5.7.4 Unearthed Accessible parts<br>5.7.5 Earthed accessible conductive part (Prospective touch voltage, touch current and protective conductor current)<br>6.2.2 Power source circuit classifications<br>8.2 Mechanical energy source classifications<br>5.4.1.4, 9.3, B.1.5, B.2.6 – Temperature measurements<br>B.2.5 Input<br>B.3, B.4 Abnormal operating and fault condition tests<br>T- Mechanical and Stress Relief test | See page 2 |

**Summary of compliance with National Differences**

The list of countries recognizing the CB Scheme is actively updated on the iecee.org website.

- IECEE Member countries that are also CENELEC members
  Compliance with Group Differences evaluated ☒ **yes** ☐ **No** ☐ N/A

- IECEE Member countries with published National Differences which were evaluated:
  Canada (CA); United States of America (US); Japan (JP), Switzerland

- IECEE Member countries that did not publish any National Differences:
  All CENELEC members

To support compliance with published National Differences, attach a compilation of relevant ND and/or GD TRFs to the CB Test Report

**Use of uncertainty of measurement for decisions on conformity (decision rule) :**

☒ No decision rule is specified by the IEC standard, when comparing the measurement result with the applicable limit according to the specification in that standard. The decisions on conformity are made without applying the measurement uncertainty ("simple acceptance" decision rule, previously known as "accuracy method").

**Information on uncertainty of measurement:**

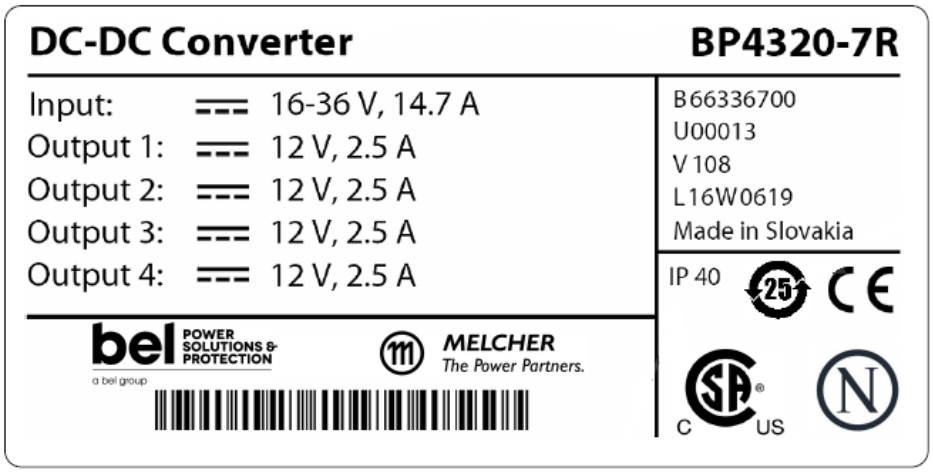
The uncertainties of measurement are calculated by the laboratory based on application of criteria given by OD-5014 for test equipment and application of test methods, decision sheets and operational procedures of IECEE.

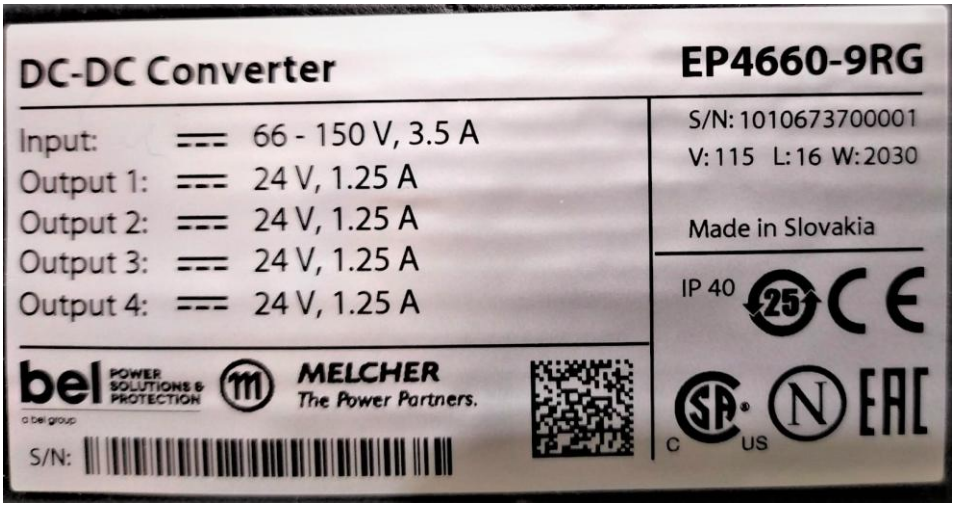
IEC Guide 115 provides guidance on the application of measurement uncertainty principles and applying the decision rule when reporting test results within IECEE scheme, noting that the reporting of the measurement uncertainty for measurements is not necessary unless required by the test standard or customer.

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

**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.**




Trademark bel will be located in the same location as the attached draft label.

| **Test item particulars:** | |
|---|---|
| **Product group .....:** | built-in component |
| **Classification of use by .....:** | Ordinary person / / Instructed person / Skilled person |
| **Supply connection.....:** | not mains connected: ES3 |
| **Supply tolerance .....:** | None |
| **Supply connection – type .....:** | mating connector provided, equipment for building-in, further evaluated at end use equipment |
| **Considered current rating of protective device... :** | 20 A<br>Location: equipment |
| **Equipment mobility..... :** | for building-in |
| **Overvoltage category (OVC) ..... :** | DC powered |
| **Class of equipment ..... :** | Class I |
| **Special installation location ..... :** | N/A |
| **Pollution degree (PD) ..... :** | PD 2 |
| **Manufacturer's specified $T_{ma}$..... :** | 71 maximum °C |
| **IP protection class ..... :** | IP20 |
| **Power systems ..... :** | not AC mains |
| **Altitude during operation (m) ..... :** | 2000 m or less |
| **Altitude of test laboratory (m) ..... :** | 300 m |
| **Mass of equipment (kg) ..... :** | Approximately 0.47 kg |

| | |
|---|---|
| **Possible test case verdicts:** | |
| **- test case does not apply to the test object.....:** | N/A |
| **- test object does meet the requirement.....:** | P (Pass) |
| **- test object does not meet the requirement.....:** | F (Fail) |
| **Testing.....:** | |
| **Date of receipt of test item .....:** | Sept 2015 (from Nemko report 292249) |
| **Date (s) of performance of tests.....:** | Sept 2015 (from Nemko Report 292249) |

**General remarks:**

"(See Enclosure #)" refers to additional information appended to the report.
"(See appended table)" refers to a table appended to the report.

**Throughout this report a ☐ comma / ☒ 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**<br>☒ **Not applicable** |

**When differences exist; they shall be identified in the General product information section.**

**Name and address of factory (ies).....:** Bel Power Solutions s.r.o
Areal ZTS 924
01841 Dubnica nad Vahom
SLOVAKIA

**General product information and other remarks:**

DC/DC converter model XPxxx-xxx is provided with an aluminium enclosure. The unit is hot swappable and can be used on(a) redundant system(s).
The unit can operate up to 95ºC case temperature, Tc. Refer to manufacturer's datasheet for exact Tc location.

Typical Model Designation: B P 1 1 01 - 7 X
I II III IV V VI VII

I – Input Voltage, Vdc:
B -- 16 to 36
C -- 33.6 to 75
D – 40 to 100.8
E – 66 to 150
G – 21.6 to 50.4

II – Model Series: P

III - No. of Outputs:
1 – Single Output
2 – Double Output
3 – Triple Output
4 – Quadruple Output

IV – Nominal Voltage [Output1/Output4] 1 to 9

V – Nominal Voltage [ Output2/Output3]
01-5.1V
10-3.3V
20-12V
40-15V
60-24V
Other customer specifications 01 to 99

VI Operational ambient temperature range Ta : 0 to 6 – Other
7 -25ºC to 71ºC
9 -40ºC to 71ºC

VII – Options Suffix X = Letters or numbers denoting no –safety-critical options such as, but not limited to, potentiometer, output voltage control input, etc.

Notes: IV and V specifies the output configurations and other features.
All models names maybe followed by "G" indicating ROHS version.

**ADDITIONAL ELECTRICAL RATINGS:**

| Output 1 | | | Output 2 | | | Output 3 | | | Output 4 | | | Type Input voltage 21.6-50.4Vdc |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Vo nom [Vdc] | Po nom [W] | Po max [W] | Vo nom [Vdc] | Po nom [W] | Po max [W] | Vo nom [Vdc] | Po nom [W] | Po max [W] | Vo nom [Vdc] | Po nom [W] | Po max [W] | |
| 3.3 | 100 | 132 | - | - | - | - | - | - | - | - | - | GP1101-7R |
| 5.1 | 122 | 183 | - | - | - | - | - | - | - | - | - | GP1001-7R |
| 12 | 120 | 192 | - | - | - | - | - | - | - | - | - | GP1301-7R |
| 15 | 120 | 194 | - | - | - | - | - | - | - | - | - | GP1501-7R |
| 24 | 120 | 192 | - | - | - | - | - | - | - | - | - | GP1601-7R |
| 3.3 | 50 | 66 | 5.1 | 61 | 91 | - | - | - | - | - | - | GP2101-7R |
| 5.1 | 61 | 91 | 5.1 | 61 | 91 | - | - | - | - | - | - | GP2001-7R |
| 5.1 | 61 | 91 | 12 | 60 | 91 | - | - | - | - | - | - | GP2020-7R |
| 12 | 60 | 96 | 12 | 60 | 96 | - | - | - | - | - | - | GP2320-7R |
| 15 | 60 | 97 | 15 | 60 | 97 | - | - | - | - | - | - | GP2540-7R |
| 24 | 60 | 96 | 24 | 60 | 96 | - | - | - | - | - | - | GP2660-7R |
| 5.1 | 61 | 91 | 12 | 38 | 48 | 12 | 38 | 48 | - | - | - | GP3020-7R |
| 5.1 | 61 | 91 | 15 | 38 | 48 | 15 | 30 | 48 | - | - | - | GP3040-7R |
| 5.1 | 61 | 91 | 24 | 30 | 48 | 24 | 30 | 48 | - | - | - | GP3060-7R |
| 5.1 | 20 | 30 | 12 | 30 | 48 | 12 | 30 | 48 | 3.3 | 10 | 20 | GP4720-7R |
| 12 | 30 | 48 | 12 | 30 | 48 | 12 | 30 | 48 | 12 | 30 | 48 | GP4320-7R |
| 15 | 30 | 48 | 15 | 30 | 48 | 15 | 30 | 48 | 15 | 30 | 48 | GP4540-7R |
| 24 | 30 | 48 | 24 | 30 | 48 | 24 | 30 | 48 | 24 | 30 | 48 | GP4660-7R |

| Output 1 | | | Output 2 | | | Output 3 | | | Output 4 | | | Type input voltage 16-36 Vdc | Type input voltage 33.6-75Vdc |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Vo nom Vdc | Po nom W | Po max W | Vo nom Vdc | Po nom W | Po max W | Vo nom Vdc | Po nom W | Po max W | Vo nom Vdc | Po nom W | Po max W | | |
| 3.3 | 100 | 132 | - | - | - | - | - | - | - | - | - | BP1101-7R | CP1101-7R |
| 5.1 | 122 | 183 | - | - | - | - | - | - | - | - | - | BP1001-7R | CP1101-7R |
| 12 | 120 | 192 | - | - | - | - | - | - | - | - | - | BP1301-7R | CP1301-7R |
| 15 | 120 | 194 | - | - | - | - | - | - | - | - | - | BP1501-7R | CP1501-7R |
| 24 | 120 | 192 | - | - | - | - | - | - | - | - | - | BP1601-7R | CP1601-7R |
| 3.3 | 50 | 66 | 5.5 | 61 | 91 | - | - | - | - | - | - | BP2101-7R | CP2101-7R |
| 5.1 | 61 | 91 | 5.1 | 61 | 91 | - | - | - | - | - | - | BP2001-7R | CP2001-7R |
| 5.1 | 61 | 91 | 12 | 60 | 96 | - | - | - | - | - | - | BP2020-7R | CP2020-7R |
| 12 | 60 | 96 | 12 | 60 | 96 | - | - | - | - | - | - | BP2320-7R | CP2320-7R |
| 15 | 60 | 97 | 15 | 60 | 97 | - | - | - | - | - | - | BP2540-7R | CP2540-7R |
| 24 | 60 | 96 | 24 | 60 | 60 | - | - | - | - | - | - | BP2660-7R | CP2660-7R |
| Output 1 | | | Output 2 | | | Output 3 | | | Output 4 | | | Type input voltage 16-36 Vdc | Type input voltage 33.6-75Vdc |
| Vo nom Vdc | Po nom W | Po max W | Vo nom Vdc | Po nom W | Po max W | Vo nom Vdc | Po nom W | Po max W | Vo nom Vdc | Po nom W | Po max W | | |
| 5.1 | 61 | 91 | 12 | 30 | 48 | 12 | 30 | 48 | - | - | - | BP3020-7R | CP3020-7R |
| 5.1 | 61 | 91 | 15 | 30 | 48 | 15 | 30 | 48 | - | - | - | BP3040-7R | CP3040-7R |
| 5.1 | 61 | 91 | 24 | 30 | 48 | 24 | 30 | 48 | - | - | - | BP3060-7R | CP3060-7R |
| 5.1 | 20 | 30 | 12 | 30 | 48 | 12 | 30 | 48 | 3.3 | 10 | 20 | BP4720-7R | CP4720-7R |
| 12 | 30 | 48 | 12 | 30 | 48 | 12 | 30 | 48 | 12 | 30 | 48 | BP4320-7R | CP4320-7R |
| 15 | 30 | 48 | 15 | 30 | 48 | 15 | 30 | 48 | 15 | 30 | 48 | BP4540-7R | CP4540-7R |
| 24 | 30 | 48 | 24 | 30 | 48 | 24 | 30 | 48 | 24 | 30 | 48 | BP4660-7R | CP4660-7R |

| Output 1 | | | Output 2 | | | Output 3 | | | Output 4 | | | Type input voltage 40-100.8Vdc | Type input voltage 66-150Vdc |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Vo nom Vdc | Po nom W | Po max W | Vo nom Vdc | Po nom W | Po max W | Vo nom Vdc | Po nom W | Po max W | Vo nom Vdc | Po nom W | Po max W | | |
| 3.3 | 100 | 132 | - | - | - | - | - | - | - | - | - | DP1101-7R | EP1101-7R |
| 5.1 | 122 | 183 | - | - | - | - | - | - | - | - | - | DP1001-7R | EP1001-7R |
| 12 | 120 | 192 | - | - | - | - | | - | - | - | - | DP1301-7R | EP1301-7R |
| 15 | 120 | 194 | - | - | - | - | - | - | - | - | - | DP1501-7R | EP1501-7R |
| 24 | 120 | 192 | - | - | - | - | - | - | - | - | - | DP1601-7R | EP1601-7R |
| 3.3 | 50 | 66 | 5.1 | 61 | 91 | - | - | - | - | - | - | DP2101-7R | EP2101-7R |
| 5.1 | 61 | 91 | 5.1 | 61 | 91 | - | - | - | - | - | - | DP2001-7R | EP2001-7R |
| 5.1 | 61 | 91 | 12 | 60 | 96 | - | - | - | - | - | - | DP2020-7R | EP2020-7R |
| 12 | 60 | 96 | 12 | 60 | 96 | - | - | - | - | - | - | DP2320-7R | EP2320-7R |
| 15 | 60 | 97 | 15 | 60 | 97 | - | - | - | - | - | - | DP2540-7R | EP2540-7R |
| 24 | 60 | 96 | 24 | 60 | 96 | - | - | - | - | - | - | DP2660-7R | EP2660-7R |
| 5.1 | 61 | 91 | 12 | 30 | 48 | 12 | 30 | 48 | - | - | - | DP3020-7R | EP3020-7R |
| 5.1 | 61 | 91 | 15 | 30 | 48 | 15 | 30 | 48 | - | - | - | DP3040-7R | EP3040-7R |
| 5.1 | 61 | 91 | 24 | 30 | 48 | 24 | 30 | 48 | - | - | - | DP3060-7R | EP3060-7R |
| 5.1 | 20 | 30 | 12 | 30 | 48 | 12 | 30 | 48 | 3.3 | 10 | 20 | DP4720-7R | EP4720-7R |
| 12 | 30 | 48 | 12 | 30 | 48 | 12 | 30 | 48 | 12 | 30 | 48 | DP4320-7R | EP4320-7R |
| 15 | 30 | 48 | 15 | 30 | 48 | 15 | 30 | 48 | 15 | 30 | 48 | DP4540-7R | EP4520-7R |
| 24 | 30 | 48 | 24 | 30 | 48 | 24 | 30 | 48 | 24 | 30 | 48 | DP4660-7R | EP4660-7R |

**CONDITIONS OF ACCEPTABILITY:**

When installed in the end use equipment, the following are among the considerations to be made:

All models require:

1) A reliable protective earth ground connection.
2) Accessible energy hazards at output.
3) Connections to other ES1, circuits.
4) Disconnect devices.
5) Temperature tests should be considered for specific installation conditions in the end system.
6) Enclosure should be suitable for fire, electrical and mechanical hazard prevention in the end system.
7) Sustainability of fusing to be evaluated in end use equipment.