Ref. Certif. No.

NO113023

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

SYSTEME CEI DACCEPTATION MUTUELLE DE CERTIFICATS DESSAIS DES EQUIPEMENTS ELECTRIQUES (IECEE) METHODE OC

CB TEST CERTIFICATE CERTIFICAT D'ESSAI OC

Product Produit	DC-DC Converter
Name and address of the applicant Nom et adresse du demandeur	Bel Fuse Inc. 206 Van Vorst St. Jersey City, NJ 07302 USA
Name and address of the manufacturer Nom et adresse du fabricant	Bel Fuse Inc. 206 Van Vorst St. Jersey City, NJ 07302 USA
Name and address of the factory Nom et adresse de l'usine Note: When more than one factory, please report on page 2 Note: Lorsque il y plus d'une usine, veuillez utiliser la deuxième page	☑ Additional information on page 2
Ratings and principal characteristics Valeurs nominales et caractéristiques principales	Input: 48 = 36 – 75 Vdc; 48 Vdc nominal 24 = 18 – 36 Vdc; 24 Vdc nomina
Trademark (if any) Marque de fabrique (si elle existe)	bel
Type of Manufacturer's Testing Laboratories used Type de programme du laboratoire d'essais constructeur	CTF Stage 3
Model / Type Ref. Ref. De type	SQ, ASQ, JSQ Series
Additional information (if necessary may also be reported on page 2) Les informations complémentaires (si nécessaire, peuvent être indiqués sur la deuxième page	Output ratings see the test report. The model number may be followed G indicating ROHS version or by two-numeric character, one alpha character, and five numeric characters, may or may not be followed by a dash and additional alpha/numeric character ☐ Additional information on page 2
A sample of the product was tested and found to be in conformity with Un échantillon de ce produit a été essayé et a été considéré conforme à la	IEC 62368-1:2018
As shown in the Test Report Ref. No. which forms part of this Certificate Comme indiqué dans le Rapport dessais numéro de référence qui constitue partie de ce Certificat	401862

This CB Test Certificate is issued by the National Certification Body
Ce Certificat dessai OC est établi par l'Organisme **National de Certification**

Nemko

Philip Pedersen vei 11,
NO-1366 Lysaker, Norway

Date: 09-07-2020

Signature: Juan Z. Saussey
Certification Department

BPS Asia Pacific Electronics (Shenzhen) Co., Ltd.
Building# 6, Nanming Road, Gongming Town Huahong
Xintong Industrial Park, Guangming District
Shenzhen 518108
China

Zhongshan Wing Ming Electronic Limited
86 Du Xing Dong Road,, Du Tou, South District
Zhongshan City Guangdong Province 528455
China

Nemko
Philip Pedersen vei 11,
NO-1366 Lysaker, Norway

Date: 09-07-2020

Signature: Juan Z. Saussey
Certification Department

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

Report Number..... :	401862
Date of issue ..... :	7 July, 2020
Total number of pages ..... :	65
Name of Testing Laboratory preparing the Report ..... :	Nemko USA Inc.
Applicant's name..... :	Bel Fuse Inc.
Address ..... :	206 Van Vorst St., Jersey City, NJ 07302, USA
Test specification:	
Standard ..... :	IEC 62368-1: 2018
Test procedure..... :	CB Scheme
Non-standard test method..... :	N/A
Test Report Form No. ..... :	IEC62368_1C
Test Report Form(s) Originator.... :	UL(US)
Master TRF ..... :	Dated 2019-01-17

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 CB 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 CB Testing Laboratory. 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
Trade Mark .....:	bel
Manufacturer.....:	Same as Applicant
Model/Type reference .....:	SQ, ASQ, JSQ Series. Model number may be followed G indicating ROHS version or by two-numeric character, one alpha character, and five numeric characters, may or may not be followed by a dash and additional alpha/numeric character. See Test Report Nomenclature for Model Differences.
Ratings .....:	Input: 48 = 36 – 75 Vdc; 48 Vdc nominal 24 = 18 – 36 Vdc; 24 Vdc nominal Output: See General Product Information

Responsible Testing Laboratory (as applicable), testing procedure and testing location(s):			
☒	**CB Testing Laboratory:**	Nemko USA Inc.	
Testing location/ address ..... :		2210 Faraday Ave. Suite 150, Carlsbad, CA 92008, USA	
Tested by (name, function, signature) ..... :			
Approved by (name, function, signature) .. :			
☐	**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:**	BPS Asia Pacific Electronics (Shenzhen) Co., Ltd.	
☐	**Testing procedure: CTF Stage 4:**		
Testing location/ address ..... :		Building#6, Nanming Road, Gongming Town Huahong Xintong Industrial Park Guangming District 518108 Shenzhen PEOPLE'S REPUBLIC OF CHINA	
Client Representative (name, function, signature) ..... :		Editha Vergara (Customer Representative)	
Project Engineer (name, function, signature) ..... :		Jeff Busch (Project Handler)	
Approved by (name, function, signature) .. :		George Daverin (Verificator)	

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

Attachment 1: Europe Group National Differences and National Differences according to EN 62368-1:2020+A11:2020 (21 pages)

Attachement 2: National Differences: USA and Canada (8 pages)

Attachement 3: Miscellaneous documentation, e.g. Photos , etc. (4 pages)

Summary of testing:

The test data referenced in this report was originally generated and published as part of a previous evaluation to IEC 62368-1:2014. (CB Report Ref. No. 348158, CB Certificate Ref. No. NO101888).

The equipment is a component, switch mode power supply with universal DC input (ES2/PS2) and DC voltage outputs (ES1/PS2) for building-in. This report covers multiple models and all comments / tests apply to all models unless otherwise indicated. Limited additional testing was performed for this upgrade report..

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 mode name) are marked on the equipment. However, the test was not considered because the equipment is a component level product for building-in. Therefore the marked surface is not to be located an external area where it is likely to be cleaned with cleaning solution, rubbed, etc.

Tests performed (name of test and test clause):	**Testing location:**
5.2 Classification of electrical energy sources 5.4.1.8 Determination of working Voltage measurement 5.4.2, 5.4.3 Minimum clearances/creepage distances 5.4.8 Humidity 5.4.9 Electric Strength tests 6.2.2 Power source circuit classifications 5.4.1.4, 9.3, B.1.5, B.2.6 – Temperature measurements B.2.5 Input B.3, B.4 Abnormal operating and fault condition tests	BPS Asia Pacific Electronics (Shenzhen) Co., Ltd. Building#6, Nanming Road, Gongming Town Huahong Xintong Industrial Park Guangming District 518108 Shenzhen PEOPLE'S REPUBLIC OF CHINA

Summary of compliance with National Differences (List of countries addressed):

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

All CENELEC members according to EN 62368-1:2020 +A11:2020.

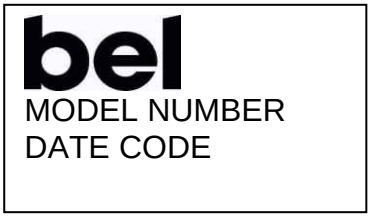
All National Differences listed in the IECEE Online Bulletin are covered by the Common Modifications, Special National Conditions, National Differences, and the National Requirements noted above except for the following countries which are documented in National Differences Appendixes attached to this report.

Canada/USA

☒ **The product fulfils the requirements of IEC 62368-1:2018/EN 62368-1: 2020+A11:2020**

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.



Calibration	All instruments used in the tests given in this test report are calibrated and traceable to national or international standards. Further information about traceability will be given on request.
Measurement uncertainty	Measurement uncertainties are calculated for all instruments and instrument set-ups given in this report. Calculations are based on the principles given in the standard EA-4/02 (Dec. 1999), IEC Guide 115:2007, and other relevant internal Nemko-procedures. Further information about measurement uncertainties will be given on request.
Evaluation of results	If not explicitly stated otherwise in the standard, the test is passed if the measured value is equal to or below (above) the limit line, regardless of the measurement uncertainty. If the measured value is above (below) the limit line, the test is not passed - ref IEC Guide 115:2007. The instrumentation accuracy is within limits agreed by IECEE-CTL.

Test item particulars:	
Product group ..... :	☐ end product ☒ built-in component
Classification of use by ..... :	☐ Ordinary person ☐ Children likely present ☒ Instructed person ☒ Skilled person
Supply connection ..... :	☐ AC mains ☐ DC mains (Secondary) (Regulated source) ☒ not mains connected: ☐ES1 ☒ ES2 ☐ ES3
Supply tolerance ..... :	☐ +10%/-10% ☐ +20%/-15% ☐ + %/ - % ☒ None
Supply connection – type ..... :	☐ pluggable equipment type A - ☐ non-detachable supply cord ☐ appliance coupler ☐ direct plug-in ☐ pluggable equipment type B - ☐ non-detachable supply cord ☐ appliance coupler ☐ permanent connection ☐ mating connector☒ other: component for building-in
Considered current rating of protective device ..... :	☒ Not applicable, component for building-in Location: ☐ building ☒ equipment ☐ N/A
Equipment mobility ..... :	☐ movable ☐ hand-held ☐ transportable ☐ direct plug-in ☐ stationary ☒ for building-in ☐ wall/ceiling-mounted ☐ SRME/rack-mounted ☒ other: component for building-in
Overvoltage category (OVC) ..... :	☐ OVC I ☐ OVC II ☐ OVC III ☐ OVC IV ☒ other:
Class of equipment ..... :	☐ Class I ☐ Class II ☐ Class III ☐ Not classified ☒ open frame unit intended for building-in
Special installation location ..... :	☒ N/A ☐ restricted access area ☐ outdoor location☐
Pollution degree (PD) ..... :	☐ PD 1 ☒ PD 2 ☐ PD 3
Manufacturer's specified T_{ma} ..... :	Maximum Case temperature (Tc) of 120°C. See Conditions of Acceptability for details ☐ Outdoor: minimum °C
IP protection class ..... :	☒ IPX0 ☐ IP20
Power systems ..... :	☐ TN ☐ TT ☐ IT - V_{L-L} ☒ not AC mains
Altitude during operation (m) ..... :	☒2000 m or less ☐ _____ m
Altitude of test laboratory (m) ..... :	☐ 2000 m or less ☒ 94 m
Mass of equipment (kg) ..... :	7.1 g

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 .....:	August 2015
Date (s) of performance of tests.....:	August 2015 – September 2015 (Refer to Summary of testing)
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** ☐ **Not applicable**
When differences exist; they shall be identified in the General product information section.	
Name and address of factory (ies) ..... :	BPS Pacific Electronics (Shenzhen) Co.,Ltd. Building# 6, Nanming Road, Gongming Town Huahong Xintong Industrial Park Guangming District 518108 Shenzhen PEOPLE'S REPUBLIC OF CHINA Zhongshan WING MING Electronic Limited 86 Du Xing Dong Road, Du Tou, South District Zhongshan City, Guangdong Province, China

General product information and other remarks:

The subject equipment is intended for building-in type, series of ES2 DC/DC Converters intended to be connected to ES2 circuitry only, and intended for installation into end-use equipment that will be separately evaluated.

The DC/DC Converters are not intended for connection to external circuits.

The DC/DC Converters have no mains supply connections.

The devices are intended for factory installation by OEMs and systems integrators. Replacements are only supported by trained service personnel.

All power is provided via standard PCIe bus

The devices are powered by an ES2 source and contain ES2 and ES1 circuits.

Maximum recommended Case Temperature (Tc) of 120°C on PWB (Transformer winding and FET junction)

Connection to the supply: ES2, no mains supply connection.

'Planar' Transformers referenced in table 5.4.1.4 are planar type, with windings composed of traces on the PCB. The PCB material is rated at 130˚C. Therefore, 130˚C was used as a limit for Table 5.4.1.4.

Abnormal Operation and Single-Fault were conducted with external fuse, rated F, 15 A, 65 Vdc. If higher rating fuses are used, additional testing may be required.

Model Differences –

All models are similar in construction to each other and differ only on transformer secondary windings, minor system configuration options, and/or minor ES2 circuit options, not affecting safety.

TYPICAL MODEL DESIGNATION:

SQ	48	T	15	033	–	X
I	II	III	IV	V		VI

I. Product Series, Eighth Brick Format:		SQ, ASQ, JSQ
II	– Input Voltage:	48 = 36 - 75 Vdc; 48 / 60 Vdc nominal 24 = 18 - 36 Vdc; 24 Vdc nominal
III	– Mounting Scheme:	S = Surface Mount T = Through Hole
IV	– Rated Output Current:	03 = 3.3 A 04 = 4 A 05 = 5 A 08 = 8 A 10 = 10 A 15 = 15 A
V	– Output Voltage Rating:	010 = 1.0 Vdc 012 = 1.2 Vdc 015 = 1.5 Vdc 018 = 1.8 Vdc 020 = 2.0 Vdc 025 = 2.5 Vdc 033 = 3.3 Vdc 050 = 5.0 Vdc (10 A maximum)

	060 = 6.0 Vdc (8 A maximum) 080 = 8.0 Vdc (5 A maximum) 120 = 12 Vdc (4 A maximum) 150 = 5.0 Vdc (3.3 A maximum)
VI – Options Suffix:	X = May or may not, be followed by a dash followed by letters and/or numbers denoting non-safety-critical options such as, but not limited to, positive or negative enable logic, clearance off user board, non-standard pin configuration, etc.

Any combination of input voltage and output voltage within the nomenclature shown above creates a valid model number.

CONDITIONS OF ACCEPTABILITY (Considerations used to test a component or sub-assembly):

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

1) Unit is intended to be supplied from an isolated secondary circuit and has been evaluated for basic insulation between the input and output circuits.
2) The input and output connectors (pins) are suitable for factory wiring only.
3) The unit has been evaluated for use in a Pollution Degree 2 environment.
4) The component was submitted and tested for a manufacturer's recommended PWB maximum temperature of 120°C. The below airflow is required to maintain the PWB at or below the maximum temperature of 120°C.

   SQ48T15033 – 160 LFM

   SQ48T04120, SQ48T10050- 200 LFM

   SQ24T15033- 30 LFM

   SQ24T10050 -130 LFM for 36Vdc input, 110 LFM for 18 Vdc

   SQ24T04120 -50 LFM for 36Vdc input, 40 LFM for 18 Vdc
5) Abnormal Operation and Single-Fault were conducted with external fuse, rated 15 A, 65 Vdc. If higher rating fuses are used, additional testing may be required.
6) If the input meets all of the requirements for ES1 the outputs may be considered ES1. Output voltages remain within ES1 limits, even with internally- generated non-ES1 voltages, if any.
7) Basic safeguard is provided between the input and output
8) A suitable Electrical and Fire enclosure shall be provided.
9) The units were tested for zero tolerance input voltage