



Marine & Offshore

Certificate number: 11530/D0 BV

File number: AP 3411

Product code: 2658H

This certificate is not valid when presented without the full attached schedule composed of 7 sections

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TYPE APPROVAL CERTIFICATE

This certificate is issued to

DEIF A/S

Skive - DENMARK

for the type of product

GENERATOR CONTROL AND PROTECTION UNITS

Multi line 2

Generator Plant Control and Protection Units: PPU - GPU vers 2.0 - PPM.

Requirements:

BUREAU VERITAS Rules for the Classification of Steel Ships.

This certificate is issued to attest that Bureau Veritas Marine & Offshore did undertake the relevant approval procedures for the product identified above which was found to comply with the relevant requirements mentioned above.

This certificate will expire on: 16 Feb 2023

For Bureau Veritas Marine & Offshore,

At BV FREDERICIA, on 16 Feb 2018,

Jesper Jensen



This certificate remains valid until the date stated above, unless cancelled or revoked, provided the conditions indicated in the subsequent page(s) are complied with and the product remains satisfactory in service. This certificate will not be valid if the applicant makes any changes or modifications to the approved product, which have not been notified to, and agreed in writing with Bureau Veritas Marine & Offshore. Should the specified regulations or standards be amended during the validity of this certificate, the product(s) is/are to be re-approved prior to it/they being placed on board vessels to which the amended regulations or standards apply. This certificate is issued within the scope of the General Conditions of Bureau Veritas Marine & Offshore available on the internet site www.veristar.com. Any Person not a party to the contract pursuant to which this document is delivered may not assert a claim against Bureau Veritas Marine & Offshore for any liability arising out of errors or omissions which may be contained in said document, or for errors of judgement, fault or negligence committed by personnel of the Society or of its Agents in establishment or issuance of this document, and in connection with any activities for which it may provide.

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BV Mod. Ad.E 530 June 2017

This certificate consists of 4 page(s)

THE SCHEDULE OF APPROVAL

1. PRODUCT DESCRIPTION :

1.1 - Generator Protection Unit: GPU

Application: Generator Protection

Firmware Version: 2.4x.x

All protection functions have definite time characteristic:

- over current (2 levels)
- reverse power (1 level)

5 relay outputs can individually be configured to represent one or more of the above protections.

Measured and calculated values:

Generator: - voltage (3-phase U + N)
 - current (3-phase I)
 - active power (kW)
 - reactive power (Kvar)
 - power factor (cos j)
 - frequency (f)
 - energy production (kWh)

Busbar: - voltage (3-phase U)
 - frequency (f)

1.2 - Generator Paralleling and Protection Unit: PPU

Applications: Stand-alone

Parallel with other gen-sets

Parallel with the mains

Firmware Version: 2.4x.x

1) Synchronization:

- Frequency control with programmable slip freq
- voltage matching possible
- Breaker ON pulse at exact syn. point with programmable generator breaker delay time
- "black busbar" operation of generator breaker possible.

2) Power or frequency control:

- fixed frequency (standalone running)
- fixed power (parallel with mains)
- droop (controlled frequency drop with increasing load)
- load sharing (generator in parallel, island operation).

3) Measured and calculated values:

Generator: - voltage (3-phase U + N)
 - current (3-phase I)
 - active power (kW)
 - reactive power (Kvar)
 - power factor (cos j)
 - frequency (f)
 - energy production (kWh).

Busbar - Voltage (3-phase U)
 - frequency (f)

1.3 - PPU Power Management: PPM

The PPU Power Management (PPM) is a standard power management system. This system has been designed to carry out Generator Control, Supervision and Protection of up to 8 generators running in parallel.

Applications: Three configurations are available:

System	System Overview	Comments
System 01	DG1+DG2+DGn	Min. 2 Diesel Generators, Max. 8 Diesel Generators
System 02	DG1+DG2+DGn+SG	Min. 2 DG, 1 Shaft Generator, Max. 8 DG and 1 Shaft Generator
System 03	DG1+DG2+DGn+SG+TB	Min. 2 DG, 1 SG and 1 bus Tie Bar, Max. 8 DG, 1 SG and 1 bus Tie Bar

1.3.1 - Hardware Characteristics:

Slot 1	12/24 Vdc Power Supply and Output Relays
Slot 2	Not to be used
Slot 3	Binary I/O (Load Sharing)
Slot 4	Governor/AVR Outputs (Relay Outputs or Option)
Slot 5	AC Measuring (V, I)
Slot 6	I/O Slot (Option)
Slot 7	Engine I/F
Slot 8	Internal Communication (CAN Bus)

1.3.2 - Display Facilities:

DU	Operation and Display Unit with LCD and Pushbuttons
AOP	Additional Operation Panel with LEDs and Pushbuttons

1.3.3 - FirmWare / SoftWare:

PPM FW	Version 2.4x.x
PMS SW	Version 1.01.0

2. DOCUMENTS AND DRAWINGS :

Overview on GPU/PPU options:

Multi-line 2, Gen-set Control (4921240209G)

Application leaflets:

Type GPU, Generator Protection Unit, multi-line 2 (4921240191G)

Type PPU, Generator Paralleling and protection Unit, multi-line 2 (4921240193G).

Specification of options:

Type PPU Generator Paralleling and protection Unit, GPU Generator Protection Unit, multi-line 2 (4921240270A)

Designers reference handbook:

Document multi-line 2 - version 2, referenced 4189340265B

Software Quality Plan dated 2011-07-11, Software Version Numbering (unreferenced doc.), QI 7.3.4 Design & Development.

Multi-line 2 Drawings for GPU and PPU:

Measuring and up-Board (4157200343 rev.D)

Power supply and relay board (4157200344 rev.D)

Loadshare board (4157200345 rev.D)

LED and interfaceboard (4157200353 rev.D)

Analog output (4157200347 rev.B)

Relay output board (4157200346 rev.A)

Backplane (4157200352 rev.A)

Extension board (4157200355 rev.A)

Display Unit (4157200341 rev.C)

PWM governor board (1044500260B)

RS232 / RS485 (1044500250B)

Analog output ML2 (1044500190C)

LED and I/F board with overcurrent ML2 (1044500130G)

Governor PWM 2 board (1044500290A)

Engine interface w VDO ml-2 (1044500280B)

Engine interface (1044500180E).

PPU Power Management (PPM) Documents:

Data Sheet No. 4921240291

Designer's Reference Handbook No. 4189340408

Installation Instructions No. 4189340409

Description of Options.

3. TEST REPORTS :

Demko: Letter dated 12/12/2000 and referenced 129220.

DEIF:

Test reports dated January 2001 and referenced 3A, 4A, 6A, 9A, 11A, 13A, 14A, 15A, 1B, 2B, 3B, 5B, 6B, 7B, 8B, 13B, 14B, 15B, 16B.

Test reports Nos: IPG0146 dated 13/02/2003, IPG0147 dated 17/09/2002 and IPG0148 dated 24/04/2003.

Request form for Internal Product Approval - IPA No. 0215 dated 2006.02.13.

Environmental and EMC Certificates - BV witnessed Type Testing at DEIF A/S dated 12-15/02/2007.

4. APPLICATION / LIMITATION :

4.1 - BUREAU VERITAS Rules for the Classification of Steel Ships.

4.2 - Approval valid for ships intended to be granted with the following additional class notations: **AUT-UMS, AUT-CCS, AUT-PORT and AUT-IMS.**

4.3 - BUREAU VERITAS Environmental Category, **EC Code: 31**

4.4 - The equipment fulfils the EMC requirements for installation in General power Distribution Zones.

4.5 - In case of AUT notations issuance, machinery protection required by the Rules and based on data processing techniques are to be duplicated by another and different system.

4.6 - Each application and configuration is to be submitted to the Society's examination prior to fitting on board.

4.7 - The equipment, once installed on board ship, is to be tested in accordance with the above referred Regulations under the supervision of a Society's Surveyor.

4.8 - Only Hardware and Software and/or Firmware successfully tested together in compliance with the regulations as referred to in page one, according to the declaration of the manufacturer are covered by this certificate.

4.9 - Depending on the Application, Factory Acceptance and / or On-board Tests are to be performed in accordance with requirements for Category II or III Equipment.

5. PRODUCTION SURVEY REQUIREMENTS :

5.1 - The above products are to be supplied by **DEIF A/S** in compliance with the type described in this certificate.

5.2 - This type of product is within the category HBV of Bureau Veritas Rule Note NR320 and as such does not require a BV product certificate.

5.3 - **DEIF A/S** has to make the necessary arrangements to have its works recognised by Bureau Veritas in compliance with the requirements of NR320 for HBV products.

5.4 - For information, **DEIF A/S** has declared to Bureau Veritas the following production site(s):

DEIF A/S
Frisenborgvej 33, DK-7800 Skive
DENMARK

6. MARKING OF PRODUCT :

6.1 - Maker's name or trade mark, Serial number of the units, Equipment type number or model identification under which it was type-tested.

6.2 - Alternatively, the marking may be presented on a display at equipment start-up.

6.3 - The title and version of each software element included in the installed software system shall be either marked or displayed on command on the equipment.

6.4 - When the marking and the title and version of the software are displayed only on the display, such information shall also be included in the equipment manual.

7. OTHERS :

7.1 - It is **DEIF A/S's** responsibility to inform shipbuilders or their sub-contractors of the proper methods of fitting, use and general maintenance of the approved equipment and the conditions of this approval.

7.2 - This certificate supersedes the Type Approval Certificate No. 11530/C0 BV issued on 27 Sep. 2012 by the Society.

***** END OF CERTIFICATE *****