



Type Approval Certificate

[Power Management and Protection System]

Initial Approval 18 February 2008

Manufacturer DEIF A/S

Frisenborgvej 33, DK-7800 Skive, Denmark

Product Description Type : Power Management and Protection System (PPM-3)
Paralleling and Protection Unit (PPU-3)
Generator Protection Unit (GPU-3)

" See Appendix 1 "

- Approval Condition**
1. This approval is granted on the basis of the approved documentation and the test reports (IACS UR E10 Rev.7).
 2. In case where this system is installed on board, the system drawings for individual vessel are to be approved by this Society.
 3. Individual Product Certification is not required in case when the device based on this type approval certificate is assembled into a switchboard or another product to be delivered to a shipyard.

THIS IS TO CERTIFY that the above-mentioned product has been approved in accordance with the relevant requirement of this Society's Rules and / or of the recognized standards as follows.

Pt. 6, Ch. 2, Art. 301 of the Rules for Classification, Steel Ships.

This Certificate is valid until 17 February 2028

Issued at Busan, Korea on 24 May 2023



This certificate is signed electronically in accordance with IMO FAL.5/Circ.39/Rev.2. Validation and authentication of the certificate can be confirmed from "<http://e-cert.krs.co.kr>" by using the tracking No(ME23021996103) and certificate No.(CPH06107-AC004).



KOREAN REGISTER

*General Manager of
Marine & Ocean Equipment Team*

Note : 1. This certificate will be valid subject to complying with the approval conditions described on the certificate and/or on the Rules of this Society.
2. This certificate will be invalid from the expiry date aforementioned unless the extension or renewal has been granted to the applicant or the manufacturer.
3. Any significant modifications or changes in design or construction to the above product without approval from this Society will render this certificate invalid.
4. Should the specified rules, regulations or standards be amended during the validity of this certificate, the product is to be re-approved by this Society in accordance with the requirements as amended.

Product Description and/or Approval Condition

Date of Issue : 24 May 2023

Product Description :

1. Protection Power Management (PPM-3)

1) Basic function:

- All breakers can be synchronised by choice
- Load-dependent start/stop operation
- Priority selection of gen-sets
- Redundant communication between the controllers
- Plant divided into sections for individual functionality
- Load transfer
- Heavy consumer management
- Multi-master system

2) The plant operational modes supported by the power management options are:

- Diesel generator operation
- Shaft generator operation
- Shore connection operation
- Split busbar(s) operation
- Emergency/harbour generator operation

* The PPM is a power management system able to handle applications with up to 8 bus tie breakers (BTB), 16 diesel generators (DG), 1 emergency generator (EDG), 2 shaft generators (SHAFT), 2 shore connections (SHORE)

3) Signal Interface :

- Slot #1 : Power supply
- Slot #2 : External Comm.
- Slot #3 : Load sharing, in-/outputs
- Slot #4 : Governor, AVR, in-/outputs
- Slot #5 : AC measuring
- Slot #6 : In-/outputs
- Slot #7 : Engine I/F
- Slot #8 : Engine comm., in-/outputs
- Ethernet : TCP/IP Modbus comm.
- LED I/F : Display connection

* Additional operator panel : AOP-1, AOP-2

4) Software version 3.0x.x

5) Documents and drawings:

- DEIF type certificate PPM-3 : 4124030053C
- Document No. : 4921240337A, 4189340447B, 4189340557A, 4189340559A, 4189340460A
- Type Test Report : IPA 0272-1
- IACS_Immunity_80MHz-6GHz_Display against antenna_2023-05-01_JHS dated 2023-05-01
- IACS_Immunity_80MHz-6GHz_Bottom against antenna_2023-05-02_JHS dated 2023-05-02
- IACS_Immunity_80MHz-6GHz_Side against antenna_2023-05-02_JHS dated 2023-05-02
- Marine equipment in power zone 150KHz-30MHz_Loop-0_2023-05-01_JHS dated 2023-05-01
- Marine equipment in power zone 150KHz-30MHz_Loop-90_2023-05-01_JHS dated 2023-05-01
- Marine equipment in power zone 30MHz-1GHz_2023-05-01_JHS dated 2023-05-01
- Marine equipment in power zone 1GHz-6GHz_2023-05-01_JHS dated 2023-05-01

2. Paralleling and Protection Unit (PPU-3)

1) Basic function & descriptions :

- Generator Protection, Synchronization and Governor Regulation
- Engine Control and Protection (Option)
- Same Multi-line 2 hardware as PPM-3

2) Technical specifications

- Measuring Voltage : 100/110 V AC ~ 690 V AC (± 20 %)
- Auxiliary Supply Voltage : 12/24 V DC (8 ~ 36 V DC)

3) Regulation modes

- Fixed Frequency
- Fixed Power

Product Description and/or Approval Condition

Date of Issue : 24 May 2023

- Frequency Droop
- Load Sharing

4) Software version 3.1x.x

5) Optional function :

- Load sharing on CAN-bus (Slot #8, Option G9)

6) Documents and drawings:

- Documents : FMEA file no. FMEA PPU-3 jst20111201
Witness Test Report no. EPC0458-02/03/04
Data sheet no. 4921240354E
Spec no. PPU/GPU-3 V3.06.0
- Test Reports : IACS_80MHz-6GHz_top to ant_20210420_JHS
IACS_80MHz-6GHz_side to ant_20210420_JHS
Marine equipment power zone_150KHz-30MHz_loop0_20210415_JHS
Marine equipment power zone_150KHz-30MHz_loop90_20210415_JHS
Marine equipment power zone_30MHz-1GHz_20210415_JHS
Marine equipment power zone_1GHz-6GHz_20210415_JHS

3. Generator Protection Unit (GPU-3)

1) Basic function & Descriptions :

- Generator Protection
- Engine Control and Protection (Option)
- Same Multi-line 2 hardware as PPM-3

2) Technical specifications

- Measuring Voltage : 100/110 V AC ~ 690 V AC (± 20 %)
- Auxiliary Supply Voltage : 12/24 V DC (8 ~ 36 V DC)

3) Software version 3.1x.x

4) Documents and Drawings (GPU-3 & PPU-3) :

- Document No. : 4921240354, 4124030042, 4189340583, 4189340621 for PPU-3,
4921240352, 4124030048, 4189340584, 4189340620 for GPU-3
- Shared document No. : 4189340149, 4189340556, 4189340451, 4189340582, 1000000341uk,
4189340579, 4189340582, 4910290040, 20100108
- Test report No. : IPA0272-1, IPA0272-3, IPA0275, 4A-200909024, 13B-200909024,
15B-200909024, 16B-200909024, 2A-20091013, 12A-20091013,
14A-20091013, 16A-20091013, 1B-20091013, 2B-20091013,
20091013, 20091013, 5B0-PPU-3, 6A0-PPU-3, 6B0-PPU-3, 7B0-PPU-3,
9A0-PPU-3, 14A0-PPU-3, 15A0-PPU-3

< End of Certificate >