



Type Approval Certificate

This is to certify that the undernoted product(s) has/have been tested with satisfactory results in accordance with the relevant requirements of the Lloyd's Register Type Approval System.

This certificate supersedes certificate number 15/20115 (E3) issued on 03.04.2018 which is hereby cancelled.

This certificate is issued to:

PRODUCER	DEIF A/S Frisenborgvej 33 7800 Skive Denmark
DESCRIPTION	Protection and power management unit, generator protection unit, paralleling and protection unit
TYPE	PPM 300 Comprising following components: PSM 3.1 Power supply module ACM 3.1 AC measurement module IOM 3.1/3.4 Input/output module EIM 3.1 Engine input module GAM 3.1/3.2 Governor/AVR module PCM 3.1 Processor and communication module DU 300* Display unit <i>Software Versions:</i> 1.0.x.x (BU application) 3.0.x.x (BU operating system) 4.1.x.x (ACM 3.1) 2.0.x.x (EIM 3.1) 1.0.x.x (DU 300) 2.0.x.x (GAM 3.1) 2.0.x.x (GAM 3.2)

Certificate No.	15/20115(E4)
Issue Date	26 November 2018
Expiry Date	08 October 2020
Sheet	1 of 3



Martin Lange
Hamburg Technical Support Office
Lloyd's Register EMEA

Lloyd's Register EMEA
71 Fenchurch Street, London EC3M 4BS

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TYPES continued

GPU 300

Comprising following components:

- PSM 3.1 Power supply module
- ACM 3.1 AC measurement module
- IOM 3.1/3.4 Input/output module
- PCM 3.1 Processor and communication module
- DU 300* Display unit

Software Versions: 1.0.x.x (BU application)
 3.0.x.x (BU operating system)
 4.1.x.x (ACM 3.1)
 1.0.x.x (DU 300)

PPU 300

Comprising following components:

- PSM 3.1 Power supply module
- ACM 3.1 AC measurement module
- IOM 3.1/3.4 Input/output module
- EIM 3.1 Engine input module
- GAM 3.1/3.2 Governor/AVR module
- PCM 3.1 Processor and communication module
- DU 300* Display unit

Software Versions: 1.0.x.x (BU application)
 3.0.x.x (BU operating system)
 4.1.x.x (ACM 3.1)
 2.0.x.x (EIM 3.1)
 1.0.x.x (DU 300)
 2.0.x.x (GAM 3.1)
 2.0.x.x (GAM 3.2)

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APPLICATION	Marine applications for use in environmental categories ENV1, ENV2 and ENV3 as defined in Lloyd's Register's Type Approval System, Test Specification Number 1 – July 2015.
ADDITIONAL TESTS	Low temperature test (- 40°C/16 hours) Components marked with * Low temperature test (- 25°C/16 hours)
STANDARD	Manufacturer's specification LR Ship Rules (2016) Part 6, Chapter 1 and 2
OTHER CONDITIONS	The EIM card may provide diesel safety functions as back up only to provide design diversity. Software for Generator Protection, Paralleling and Power Management are covered by LR Software Conformity Certificate No. SWC 17/20004(E1).

The Type Approval does not eliminate the need for normal inspection and survey procedures required by the Rules and Regulations.

If the specified standards are amended during the validity of this certificate, the product is to be re-approved prior to it being supplied to vessels to which the amended standards apply.

The Design Appraisal Document No. HTS/ETS 36744-18, issue 1 and its supplementary Type Approval Terms and Conditions form part of this Certificate.

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Lloyd's Register EMEA

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Design Appraisal Document

Lloyd's Register EMEA
Hamburg Technical Support Office
Am Sandtorkai 41
20457 Hamburg
Telephone +49 (0)40 328107-0 Fax +49 (0)40 328107-480
E-mail: hamburg-technical-support@lr.org

Date
26 November 2018

Please quote this reference number on all future communications
HPC1662083/37567-18/ML/AC

**THE LLOYD'S REGISTER'S TYPE APPROVAL SYSTEM, 2017
ISSUED TO: DEIF A/S, SKIVE, DENMARK
FOR: PROTECTION AND POWER MANAGEMENT UNIT, GENERATOR PROTECTION UNIT,
PARALLELING AND PROTECTION UNIT
TYPE APPROVAL CERTIFICATE NO. 15/20115 (E4)**

This Design Appraisal Document supersedes and cancels the Design Appraisal Document No. HTS/ETS 36744-18, Issue 0, dated 03 April 2018

The undernoted documents have been reviewed for compliance with the requirements of the Lloyd's Register's Type Approval System Procedure TA14 and this Design Appraisal Document forms part of the Certificate.

APPROVAL DOCUMENTATION

Application Checklist	Appendix to Form 2502TA	20.07.2018
GMS03-11-14	Request for Marine Services – Type Approval	16.08.2018
4921240558 A	Data Sheet – GAM3.2	2018
4921240557 A	Data Sheet – IOM3.4	2018
421704_Rev.A	Software Quality Plan for GAM 3.1 (ML300)	29.11.2017
421770_Rev.B	Software Quality Plan for GAM 3.2 (ML300)	06.12.2017
HPC1662083-3	PQA report	27.09.2018
4921240530 B	Data Sheet – GPU 300	2018
4921240465 H	Data Sheet – PPM 300	2018
4921240563 E	Data Sheet – PPU 300	2018
IPA0331 HWFMEA	Failure Mode and Effects Analysis (Hardware)	10.09.2018
IPA0331 SFME	Failure Mode and Effects Analysis	17.09.2018
FMECA	Failure Mode, Effects and Criticality Analysis – IOM 3.4	18.09.2018
410040	Software Quality Plan for PPU 300 version 1.0.3.0	12.04.2018
Unnumbered	Application Checklist	14.09.2017
HTS/ETS 34365-16	Design Appraisal Document for Certificate No. 15/20115 (E1)	04.11.2016
4921240563A	Data sheet Paralleling and Protection Unit PPU 300	2016

FINAL ACCEPTANCE OF ACTUAL ITEM(S) DEPEND(S) ON SATISFACTORY SURVEY AND TESTING

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Lloyd's Register EMEA
 Hamburg Technical Support Office
 Am Sandtorkai 41
 20457 Hamburg
 Telephone +49 (0)40 328107-0 Fax +49 (0)40 328107-480
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APPROVAL DOCUMENTATION (continued)

4189341097A	Designer's handbook Paralleling and Protection Unit PPU 300	2016
4189341098A	Installation instructions Paralleling and Protection Unit PPU 300	2016
4189341099A	Operator's manual Paralleling and Protection Unit PPU 300	2016

TEST REPORTS

19/17105_Rev.A	DANAK test report – EMC immunity test for IOM3.4 and GAM3.2	16.11.2016
4910212100F	Performance Test – 02A for IOM3.4 and GAM3.2	21.10.2016
4910213100G	Colt Test – 3A for IOM3.4 and GAM3.2 – witnessed by LR	27.09.2018
49102231000E	Performance Test results – Cold Test	undated
4910213105F	Dry Heat Test – 4A for IOM3.4 and GAM3.2	27.10.2016
4910216506B	Damp Heat Test – 6A for IOM3.4 and GAM3.2	09.11.2016
4910213116A	Damp Heat Test II – 6A for IOM3.4 and GAM3.2	14.11.2016
4910213120F	Damp Heat Steady State – 7A for IOM3.4 and GAM3.2	11.11.2016
4910214100H	Vibration Test – 9A for IOM3.4 and GAM3.2	16.12.2016
4910214101A	Vibration Test II – 9A for IOM3.4 and GAM3.2	22.12.2016
4910216510E	Repetitive Shocks Test – 10A for IOM3.4 and GAM3.2	29.12.2016
4910214110J	Shock Test – 11A for IOM3.4 and GAM3.2	23.12.2016
4910215100H	Insulation Resistance – 14A for IOM3.4 and GAM3.2	18.01.2017
4910215105I	High Voltage Test – 15A for IOM3.4 and GAM3.2	18.01.2017
4910216501J	Radiated Emission – 16A for IOM3.4 and GAM3.2	31.01.2017
4910216502I	Conducted Emission AC, DC and tele ports – 17A for IOM3.4 and GAM3.2	28.11.2016
4910217501N	Electrical Fast Transients (EFT) – Burst 1B for IOM3.4 and GAM3.2	31.10.2016
4910217501Q	Burst test – witnessed by LR	02.10.2018
4910217505F	Electrostatic Discharge (ESD) – 5B for IOM3.4 and GAM3.2	23.11.2016
4910217505J	ESD test – witnessed by LR	28.09.2018
4910217506K	Surge Test – 6B for IOM3.4 and GAM3.2	06.04.2017
4910217507J	RF Common Mode – Test 07B for IOM3.4 and GAM3.2	22.11.2016
4910217513I	Variations DC Power Ports – 13B for IOM3.4 and GAM3.2 – Witnessed by LR	04.10.2018
4910217515G	Interruptions – DC Power Port 15B for IOM3.4 and GAM3.2	22.12.2016
4910217515H	Interruptions – witnessed by LR	02.10.2018
4910217516F	Low frequency interference – witnessed by LR	02.10.2018
EPC 658	Multiline 300 HW update test data (215 pages)	22.12.2016
EPC 0658	PPU 300 witness test LR	19.01.2016
Unnumbered	PPU 300 Factory Acceptance Test Version 2	13.01.2017

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Lloyd's Register EMEA
Hamburg Technical Support Office
Am Sandtorkai 41
20457 Hamburg
Telephone +49 (0)40 328107-0 Fax +49 (0)40 328107-480
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DRAWINGS

4157200538_Rev.E	Schematic – GAM3.2	23.10.2017
1044600100_Rev.D	Layout – GAM3.2	18.09.2017
4157200546_Rev.D	Schematic – IOM3.4	20.10.2017
1044600140_Rev.C	Layout – IOM3.4	24.01.2017
4157200505_Rev.E	ACM3.1 ML 300	08.01.2016
4106200415_Rev.B	PCB assembly – top ACM3.1 ML 300	23.08.2016
4157200507_Rev.H	EIM 3.1 F100 ML300	11.07.2016
4106200417_Rev.D	PCB assembly – top EIM3.1 MI 300	10.06.2016
4157200508_Rev.E	GAM 3.1 ML300	16.11.2015
4106200422_Rev.D	GAM3.1 ML 300	17.03.2016
4157200509_Rev.E	ML300 IOM 3.1	09.11.2012
4106200413_Rev.C	IOM3.1 ML 300	23.02.2015
4157200504_Rev.I	PCM 5TX ML300	24.05.2016
4106200411_Rev.F	PCM3.x ML 300	15.07.2016
4157200503_Rev.I	BU ML300	16.09.2014



Martin Lange
Senior Specialist
Electrotechnical Systems
Hamburg Technical Support Office
Lloyd's Register EMEA
T +49 (0)172 5964017
E martin.lange@lr.org

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Supplementary Type Approval Terms and Conditions

Type Approval certifies that a representative sample of the product(s) referred to herein has/have been found to meet the applicable design criteria for the use specified herein. It does not mean or imply approval for any other use, nor approval of any product(s) designed or manufactured otherwise than in strict conformity with the said representative sample.

Type Approval is based on the understanding that the manufacturer's recommendations and instructions and any relevant requirements of the Rules and Regulations are complied with.

Type Approval does not eliminate the need for normal inspection and survey procedures required by the Rules and Regulations.

Lloyd's Register EMEA reserves the right to cancel or withdraw this Type Approval Certificate in accordance with the LR Type Approval System Procedure.

FINAL ACCEPTANCE OF ACTUAL ITEM(S) DEPEND(S) ON SATISFACTORY SURVEY AND TESTING

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Part 2

Power Distribution Systems / Protective Devices

Producer/Licence No.	Type	Standard	Rating	Category/ Additional Tests	Remarks	Cert. No.
<p>Deif A/S Friesenborgvej 33, DK-7800 Skive, Denmark</p>	<p>Protection and power management unit, generator protection unit, paralleling and protection unit Types</p> <p>PPM 300 Comprising following components: PSM 3.1 Power supply module ACM 3.1 AC measurement module IOM 3.1/3.4 Input/output module EIM 3.1 Engine input module GAM 3.1/3.2 Governor/ AVR module PCM 3.1 Processor and communication module DU 300* Display unit</p> <p>Software versions: 1.0.x.x (BU application) 3.0.x.x (BU operating system) 4.1.x.x (ACM 3.1) 2.0.x.x (EIM 3.1) 1.0.x.x (DU 300) 2.0.x.x (GAM 3.1) 2.0.x.x (GAM 3.2)</p> <p>GPU 300 Comprising following components: PSM 3.1 Power supply module ACM 3.1 AC measurement module IOM 3.1/3.4 Input/output module PCM 3.1 Processor and communication module DU 300* Display unit</p> <p>Software versions: 1.0.x.x (BU application) 3.0.x.x (BU operating system) 4.1.x.x (ACM 3.1) 1.0.x.x (DU 300)</p>	<p>Manufacturer's specification</p>	<p>Power supply (Vdc): 12 and 24 Input voltage (V ac): 100-690 (2-897#) Input current (A ac): 1 or 5 (0.02-17.5#) Input frequency (Hz): 40-70 (15-78#)</p> <p>(# = measurement range)</p>	<p>ENV1, ENV2, ENV3 (2015)</p> <p>Low temperature test (- 40°C/16 hours)</p> <p>Components marked with * Low temperature test (- 25°C/16hrs)</p>	<p>Expires: 08 October 2020</p> <p>The EIM card may provide diesel safety functions as back up only to provide design diversity.</p> <p>Software for Generator Protection, Paralleling and Power Management are covered by LR Software Conformity Certificate No. SWC 17/20004(E1).</p>	<p>15/20115 (E4)</p>



Part 2

Power Distribution Systems / Protective Devices

Producer/Licence No.	Type	Standard	Rating	Category/ Additional Tests	Remarks	Cert. No.
	PPU 300 Comprising following components: PSM 3.1 Power supply module ACM 3.1 AC measurement module IOM 3.1/3.4 Input/output module EIM 3.1 Engine input module GAM 3.1/3.2 Governor/ AVR module PCM 3.1 Processor and communication module DU 300* Display unit Software versions: 1.0.x.x (BU application) 3.0.x.x (BU operating system) 4.1.x.x (ACM 3.1) 2.0.x.x (EIM 3.1) 1.0.x.x (DU 300) 2.0.x.x (GAM 3.1) 2.0.x.x (GAM 3.2)					