Certificate no.:
TAA00003H9

TYPE APPROVAL CERTIFICATE

This is to certify:

that the Power Management System

with type designation(s)
DEIF iE 250, iE 350 and iE 650

issued to
DEIF A/S
Skive, Midtjylland, **Denmark**

is found to comply with
DNV rules for classification – Ships, offshore units, and high speed and light craft

Application:

Product(s) approved by this certificate is/are accepted for installation on all vessels classed by DNV.

Issued at **Hamburg** on **2024-10-29**
This Certificate is valid until **2026-10-28**.
DNV local unit: **Denmark CMC**

Approval Engineer: **Torsten Dzillak**

for **DNV**

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This Certificate is subject to terms and conditions overleaf. Any significant change in design or construction may render this Certificate invalid.
The validity date relates to the Type Approval Certificate and not to the approval of equipment/systems installed.

LEGAL DISCLAIMER: Unless otherwise stated in the applicable contract with the holder of this document, or following from mandatory law, the liability of DNV AS, its parent companies and their subsidiaries as well as their officers, directors and employees ("DNV") arising from or in connection with the services rendered for the purpose of the issuance of this document or reliance thereon, whether in contract or in tort (including negligence), shall be limited to direct losses and under any circumstance be limited to USD 300 000.

Product description

The DEIF iE 250, iE 350 and iE 650 is a series of products.

iE 250 and iE 350 may be configured as "Marine" controllers with Core sw package or Power Management sw package or as PLCs.

iE650 is a PLC with EtherCAT based I/O.

The products offer a range of external I/O units or expansion racks with additional modules.

The products support CODESYS runtime for integrated development environment for programming controller applications according to the international industrial standard IEC 61131-3.

The following Software versions are approved with this certificate:

		PCM2.1	**PCM3.3**	**PCM6.2**
		iE 250 Marine	**iE 350 Marine**	
Marine	Operating System	BSP 5.0.1.x	BSP 5.0.1.x	
	Controller Application	2.0.2.x	2.0.2.x	
	REST Version	1.0.5.x	1.0.5.x	
	CODESYS version	1.3.0.16	1.3.0.16	
	HMI Web Config Version	1.0.2.x	1.0.2.x	
	HMI Display WebUI	1.0.2.x	1.0.2.x	
	MIO Version	1.0.0.x	N/A	
		iE 250 Marine PM	**iE 350 Marine PM**	
Marine PM	Operating System	BSP 5.0.1.x	BSP 5.0.1.x	
	Controller Application	2.0.2.x	2.0.2.x	
	REST Version	1.0.5.x	1.0.5.x	
	CODESYS version	1.3.0.16	1.3.0.16	
	HMI Web Config Version	1.0.2.x	1.0.2.x	
	HMI Display WebUI	1.0.2.x	1.0.2.x	
	MIO Version	1.0.0.x	N/A	
		iE 250 PLC	**iE 350 PLC**	**iE 650 PLC**
PLC	Operating System	BSP 5.0.1.x	BSP 5.0.1.x	BSP 5.0.1.x
	PLC Application	2.0.2.x	2.0.2.x	2.0.2.x
	REST Version	1.0.5.x	1.0.5.x	1.0.5.x
	CODESYS version	1.3.0.16	1.3.0.16	1.3.0.16
	HMI Web Config Version	1.0.2.x	1.0.2.x	1.0.2.x
	HMI Display WebUI	1.0.2.x	N/A	N/A
	MIO Version	1.0.0.x	N/A	N/A

Software cyber security will be covered by separate certificate with the following number TAA00003G3.

Application/Limitation

This type approval covers the following functions:
- Breaker trip and alarms
- Breaker open and close (external command)
- Breaker position detection
- Synchronization check
- Synchronization (dynamic and static) and deloading
- Diesel generator start and stop commands
- Load sharing (isochronous, over DEIF Ethernet ring network)
- Load-dependent start and stop of generators
- Generators priority selection

• Automatic blackout recovery
• Heavy consumer function
• Stop of non-connected generator
• Load-dependent start and stop of generators
• Generators priority selection
• Automatic blackout recovery
• Heavy consumer function
• Stop of non-connected generator

• Power supply module PSM3.1 and PSM3.2
• Alternating current modules ACM3.1 and ACM3.2
• Input output modules IOM3.1, IOM3.2, IOM3.3 and IOM3.4
• Engine interface module EIM3.1 (iE 350 Marine, PPU 300 and PPM 300 only)
• Governor and AVR module GAM3.1 and GAM3.2 (iE 350 Marine, PPU 300 and PPM 300 only)
• Processor and communication module PCM3.1 (Multi-line 300, GPU/PPU/PPM 300)
• Processor and communication module PCM3.3 (iE 350 Marine)
• Display unit DU 300 (Multi-line 300, GPU/PPU/PPM 300)
• Display unit iE7 (iE 350 Marine+ iE250 Marine with base unit)

Any network connections to other ship functions shall be dedicated to this purpose. This includes Modbus TCP networks.

If the CODESYS integrated development environment is installed, the development environment and the runtime systems shall be installed in a separate security zone. CODESYS protocols shall not be available from outside of the security zone. CODESYS runtime versions prior to v3.5.19.0 shall not be used.

If the type approved product is used in applications subject requirements by DNV rules for classification, correct configuration shall be verified by DNV.

Major changes affecting the type approved shall be informed to DNV. Such modifications may require witnessing of type testing and update of this type approval certificate to reflect new products or versions listed in Product description.

- The Type Approval is valid for systems made by production facilities listed under Place of Manufacture
- The Type Approval covers hardware and software listed under Product description
- The Type Approval does not cover functions implemented in Custom Logic. Any functions implemented therein shall be documented on case-by-case basis
- For high speed vessels category B (ref. Pt.4 Ch.8 Sec.2 [6]) and for ships with additional class notations DYNPOS(AUTR) or DYNPOS(AUTRO) (ref. Ship Rules Pt.6 Ch.3 Sec.2 [8.4]) the PPM 300 system must be configured so as to ensure that the power management functions are active for each busbar section when the bus-tie breaker is open. Also, the communication network between DGUs for one busbar section must not be affected by a defective communication network for the other busbar section
- Hybrid-controller application shall be approved on a case-by-case bases.

Product certificate

Each system to be certified according to Pt.4 Ch.9 Sec.1. The certification test is to be performed before the system is installed onboard at the company defined as responsible for the system, typically at the switchboard manufacturer. The product certificate must identify this Type Approval Certificate and the parameter settings for the specific project. After the certification the clause for application software control will be in force.

The following documentation of the actual application is to be submitted for approval in each case:

- Reference to this Type Approval Certificate
- System block diagram
- Power supply arrangement (may be part of the System block diagram)
- List of hardware and software modules as identified in this Type Approval Certificate
- Functional description
- A document describing the specific functions for hybrid mode operation stating operating modes, hard- and software configuration and integration/ interfacing with other system.
- List of implemented alarm and protection functions (ref. the ANSI list above) with proposed limits and time delays Software versions used in specific delivery
- Test program for the certification test

Software update notification

When the type approved software is revised (affecting all future deliveries) DNV is to be informed by forwarding updated software version documentation. If the changes are judged to affect functionality for which rule requirements apply a new functional type test may be required and the certificate may have to be renewed to identify the new software version.

Tests carried out

Tested in accordance with requirements for DNV Rules Pt.4 Ch.9 by use of CG-0339 Edition August 2021.

Marking of product

The product shall be marked with:

- manufacturer name
- model name
- serial number
- power supply ratings

Periodical assessment

The scope of the periodical assessment is to verify that the conditions stipulated for the type are complied with, and that no alterations are made to the product design or choice of systems, software versions, components and/or materials.

The main elements of the assessment are:

- Ensure that type approved documentation is available
- Inspection of factory samples, selected at random from the production line (where practicable)
- Review of production and inspection routines, including test records from product sample tests and control routines
- Ensuring that systems, software versions, components and/or materials used comply with type approved documents and/or referenced system, software, component and material specifications
- Review of possible changes in design of systems, software versions, components, materials and/or performance, and make sure that such changes do not affect the type approval given
- Ensuring traceability between manufacturer's product type marking and the type approval certificate

A renewal assessment will be performed at renewal of the certificate.

END OF CERTIFICATE