



TYPE APPROVAL CERTIFICATE

Certificate no.:
TAA000038D
Revision No:
1

This is to certify:

that the **Power Management System**

with type designation(s)
IE 150 Marine

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.

Temperature	B
Humidity	B
Vibration	A
EMC	B
Enclosure	IP65 (front w/ sealing gasket) IP20 terminal side

Issued at **Hamburg** on **2025-04-10**

This Certificate is valid until **2027-04-09**.

DNV local unit: **Denmark CMC**

Approval Engineer: **Jens Dietrich**



for **DNV**

Digitally signed by: **Dariusz Lesniewski**
Location: **DNV SE, Germany**

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.



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Place of system modules manufacture

DEIF A/S Skive,
Denmark

Product description

The iE 150 Marine product line is a front mounted hardware platform ranging from simple stand-alone units to integrated power management systems. The unit is based on a compact all-in-one design which includes a LCD display. One additional display (remote display) can be installed within 100m distance of the main display unit. Additional operator panels (AOP) with 16 LEDs and 8 pushbuttons can be installed, 2 within 200m (AOP-2).

The units are designed for the following applications:

An iE 150 Marine system includes the following basic functions:

- All breakers can be synchronized by choice
- Load-dependent start/stop operation
- Priority selection of gen-sets
- Plant divided into sections for individual functionality
- Load transfer
- Heavy consumer management
- Multi-master system for the following applications:
 - Diesel generator operation
 - Battery operation
 - Shore connection operation
 - Split busbar(s) operation
 - Solar operation

Examples:

iE 150 Marine controller

Single controller to protect and control an engine, Auxiliary supply: 12 or 24 V DC

Engine functions
Start and stop functions
Engine start and stop sequence
Temperature-dependent cooling down
Time-based cooling down
Configurable crank and run coil
Built-in test sequence (simple test)
Regulation functions
PID regulation
Manual speed control
Speed sensing using CAN or MPU
Derate engine
Fixed speed or variable regulation speed
Ramp function for loading and de-loading
Ventilation fan control
Fuel use functions
Fuel usage monitoring
Fuel pump logics
Counters
Start attempts
Fuel pump logics
Running hours
Service intervals
Fan
General functions
Modbus functions
Modbus RS-485
Modbus TCP/IP
Configurable Modbus area
PID functions
PIDs for controlling user-defined set points
Reference value for PIDs with analogue inputs
2 x general purpose PID regulators (built-in analogue outputs)
Logic and output functions

PLC logic (M-Logic)	
4 analogue outputs (using 2 x IOM 230)	
Protections	ANSI
Overspeed	12
Crank failure	48
Running feedback error	34
MPU wire break	-
Start failure	48
Stop failure	48
Stop coil, wire break alarm	5
Emergency stop	1
Engine heater	26
Max. ventilation/radiator fan	-
Not in remote mode	34
Fuel fill check	-
Low auxiliary supply	27DC
High auxiliary supply	59DC
Maintenance alarms	-

IE 150 Marine (Stand-Alone) Genset controller

Controller for protection and control for one genset in non-synchronising applications.

Power supply: 100 - 690 V / 1A or 5A AC, 50/60Hz

Auxiliary supply: 12 or 24 V DC

AC Protections	No. of Alarm stages	ANSI	Operate Time
Voltage-dependent over-current	1	51V	
Over-voltage	2	59	<200ms
Under-voltage	3	27P	<200ms
Over-frequency	3	81O	<300ms
Under-frequency	3	81U	<300ms
Unbalanced voltage	1	47	<200ms
Unbalanced current	1	46	<200ms
Under-excitation or reactive power import	1	32RV	<200ms
Over-excitation or reactive power export	1	32FV	<200ms
Overload	5	32F	<200ms
Earth current	1	51G	<100ms
Neutral current	1	51N	<100ms
Busbar over-voltage	3	59P	<50ms
Busbar under-voltage	4	27P	<50ms
Busbar over-frequency	3	81O	<50ms
Busbar under-frequency	3	81U	<50ms
Emergency stop	1	1	<200ms
Low auxiliary supply	1	27DC	
High auxiliary supply	1	59DC	
Generator breaker, Tie breaker external trip	1	5	
Breaker open, close, position failure		52BF	
Phase sequence error	1	47	
Hz/V failure	1	53	
Not in remote	1	34	
Engine protections			
Overspeed	2	12	<400ms
Crank failure		48	
Running feedback error		34	
MPU wire break		-	
Start/Stop failure		48	
Stop coil, wire break alarm		5	
Engine heater		26	
Max. ventilation/radiator fan		-	
Fuel fill check		-	

Engine feature
Start and stop sequences
Engine communication
Speed sensing using CAN, MPU or frequency
Tier 4 final support
Temperature-dependent cooling down
Time-based cooling down
Fuel usage monitoring
Fuel pump logics
Maintenance alarms
Configurable crank and run coil

Software version : USW-3 v.3.5x.x

Application/Limitation

The Type Approval is valid for systems made by production facilities listed under Place of Manufacture. The Type Approval covers hardware and software based on Pt.4 Ch.9 listed under Product description.

Documentation requirement:

For each delivery where the product is included (typically a switchboard), the following information related to the iE 150 is to be submitted for approval:

- 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
- Power supply system one-line diagram
- Functional description (PMS, if applicable)
- Project specific list of control and monitoring points (I/O list)
- List of implemented alarm, engine safety and protection functions (ref. the ANSI list above) with proposed limits/delays
- Test program for test at DEIF, the switchboard maker or onboard as applicable

The CAN communication to the prime mover engine controller shall be tested during product certification

Prime mover engine alarm and related safety functions are to be processed independently, which would imply coverage of either function by an external system.

Configurations:

- The generator protection and power management functions are to be configured as required by the applicable DNV rule set for Electrical Installations.
- Prime mover engine safety functions (if implemented) shall work according to the fail-to-maintain principle, unless sufficiently justified to deviate from this principle. Simple wire breaks of sensors or stop solenoids shall be alarmed as such and must not lead to an engine shut-down. Safety sensors and the stop-solenoid utilized for the safety shut-down are to be monitored and alarmed for wire break.
- System is to be configured allowing alarm routing of internal iE 150 failures to an external ship's alarm system
- The CAN communication to the prime mover engine controller shall be tested during product certification
- Manual emergency stop function must (also) work independently from iE 150.

Operating instruction of the manufacturer to be observed.

Product certificate:

Each delivery of the application system is to be certified according to Pt.4 Ch.9 Sec.1. The certification test is to be performed before the system is shipped to the yard, that is, at the manufacturer of the application system or at the switchboard manufacturer if agreed and adequate system competence and test facilities are available here.

If certified together with the switchboard a combined control system and switchboard certificate may be issued. The certificate must identify this Type Approval Certificate plus the firmware by versions and date.

After the certification the clause for application software control will be in force.

Software control

All changes in software are to be recorded as long as the system is in use on board. Documentation of major changes is to be forwarded to DNV for evaluation and approval before implemented on board. Certification of modified functionality



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may be required for the particular vessel.

Type Approval documentation

Tests carried out

Applicable tests according to DNV CG.0339, August 2021, IEC 60255.
Functional performance tests based on FAT reports for Genset and Engine Drive.

Marking of product

Product label showing: DEIF A/S, address, type designation ML 150 – iE150, order number, electric ratings, IP rating, SW package, S/N (serial number).

Periodical assessment

The scope of the periodical assessment is to verify that the conditions stipulated for the Type approval are complied with and that no alterations are made to the product design or choice of materials.

The main elements of the assessment are:

- Inspection on factory samples, selected at random from the production line (where practicable)
- Results from Routine Tests (RT) checked (if not available tests according to RT to be carried out)
- Review of type approval documentation
- Review of possible change in design, materials and performance
- Ensuring traceability between manufacturer's product type marking and Type Approval Certificate.

Periodical assessment is to be performed at renewal of the certificate.

END OF CERTIFICATE