Certificate No: LR25241159TA
Issue Date: 03/10/2025
Expiry Date: 02/10/2030

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.

Manufacturer	**Echandia Marine AB**
Address	Johannesfredvägen 15, Bromma, 168 69, Sweden
Place of Production	Echandia Marine AB Johannesfredvägen 15, Bromma, 168 69, Sweden
Type	Lithium-Ion Battery System
Description	LTO Battery System including BMS and string controller
Trade Name	ERS3
Application	Marine use in environmental category ENV2, as detailed in Lloyd's Register Test Specification No.1, July 2024
Specified Standard	Lloyd's Register Test Specification No.1, July 2024 Lloyd's Register Test Specification No.5, March 2019
Ratings	**Battery ModuleType3-20HP** • Rated capacity: **39Ah** • Energy capacity: **1076Wh** • Maximum ambient operating temperature: **45°C** • Automatic shutdown cell maximum temperature: **60°C** • Module operating voltage range: **from 18V to 32.4V** • Battery Pack operating voltage range: **from 18V to 1200V**

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- Module shutdown voltage limits: **from 18V to 32.4V**
- Cell shutdown voltage limits: from **1.5V to 2.7V**
- Cell configuration: **2P12S**
- Cell chemistry: **LTO**
- Continuous charge and discharge rate: **160A**
- Maximum instantaneous current: **500A - 10s**
- Peak bolted short circuit current: **15kA**
- Gas volume generated cell: **76L**
- Gas volume generated module: **1824L**
- Gas Temperature Classification: **T2**
- Gas Zone Group: **IIC**
- Thermal runaway limited to single cell level (**no propagation between cells**)

String Controller

- Max. Voltage: **1500V**
- Max. Current: **160A**
- Nr. of modules per string controller: **1 to 37**

Other Conditions

1. The battery system and integration are subject to design approval when it is intended to be used on board LR Classed vessels.
2. Type Approval does not eliminate the need for ship specific inspection and survey procedures required by the LR Rules and Regulations.
3. If the specified standards are amended during the validity of this certificate, the product is to be reapproved prior to it being supplied to vessels to which the amended standards apply.
3. Cyber Security requirement are excluded from this Type Approval Certificate.
4. Where recirculation of air on the battery space is chosen, a detailed risk assessment (FMEA) is to be submitted to LR for ship specific installation.
5. Where batteries are not used as emergency source of power, automatic shutdown of the battery system is to be implemented by the system integrator on board (LR Ship Rules Part 6,Ch 2, Sec 12.2.4)

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6. Battery modules and string controller are to be always installed within the battery rack enclosure having an Ingress Protection IP44 or higher.

This certificate is not valid for equipment, the design, ratings or operating parameters of which have been varied from the specimen tested. The manufacturer should notify Lloyd's Register EMEA of any modification or changes to the equipment in order to obtain a valid Certificate.

The Design Appraisal Document LR25241159DA and its supplementary Type Approval Terms and Conditions form part of this Certificate.

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