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Industrial Solutions and Services

ELFA Hybrid marine propulsion system



Market & Suitable Applications

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- Propulsion systems up to 1.5 MW
Above 1.5 MW an industrial solution may qualify, unless space restraints make it impossible
- Displacement Hull application up to 130 feet
Recreational, Commercial and Government
- Planing Hull applications
Small hulls up to 35-40 feet diesel electric, above 40 feet hybrid propulsion
- Fast speed patrol applications
Vessel with extreme load profile either loiter or fast speed with multiple hotel load requirements
- Auxiliary marine systems
Wing shafts, thruster, fire pumps etc

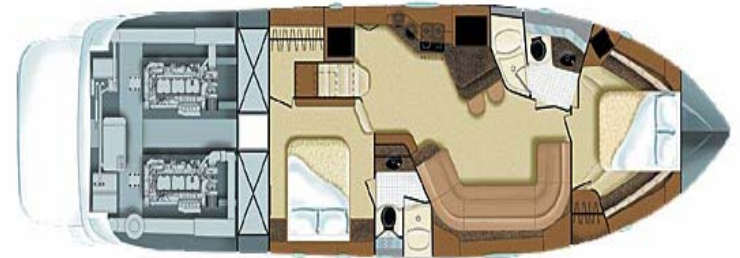
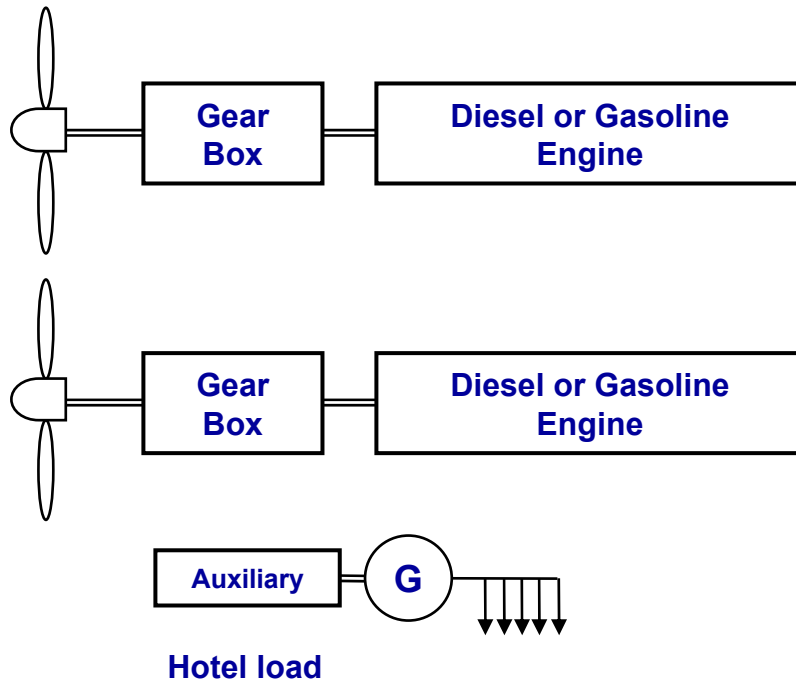
ELFA technology is suitable for virtually all boat application whether commercial, recreational or government.



Classic Vessel Design

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Two propellers, two engines
Fixed pitch propeller





Traditional Propulsion Problems

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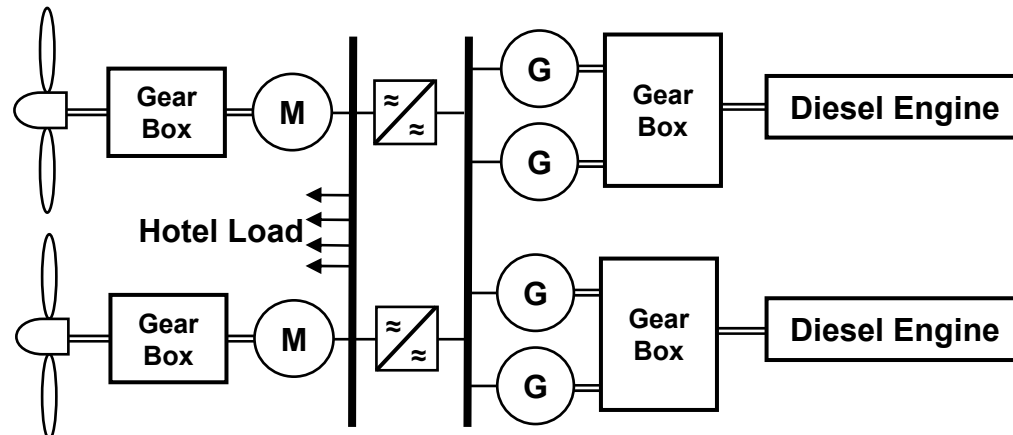
- Slow Acceleration
Quick acceleration results in clouds of black smoke, the maritime equivalent of burning rubber in a high-powered car
- Precision Maneuvering is Difficult
Relatively high idle speed of the engine complicates low-speed maneuvering
- Inefficiency
Standard fixed-pitch propellers match the power capability of the engine only at one point
- Cramped Engine Room
Congestion in the engine room can make inspection and maintenance difficult
- Inflexible Boat Design
Space required for propulsions takes away from living space
- Limited Engine Torque At Lower RPMs



Diesel-Electric Alternative

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- Design flexibility
- More efficient operation of engines reduces fuel consumption and/or extends range
- Precise control while docking and maneuvering
- Less noise, vibration, heat, and emissions
- Plenty of electric power throughout your boat
- Alternative layouts with batteries, fuel cells, solar panels

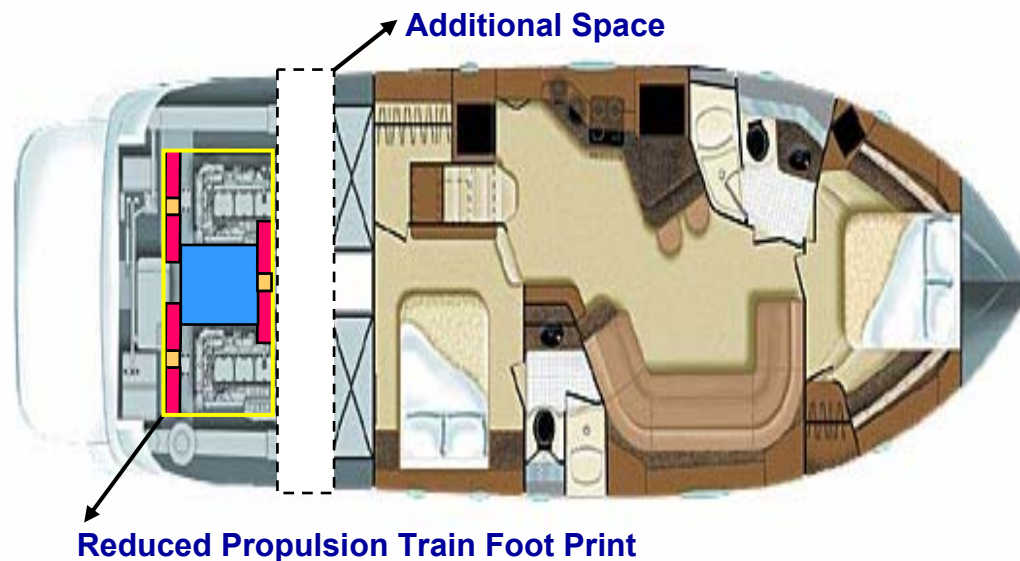




Diesel-Electric Solution

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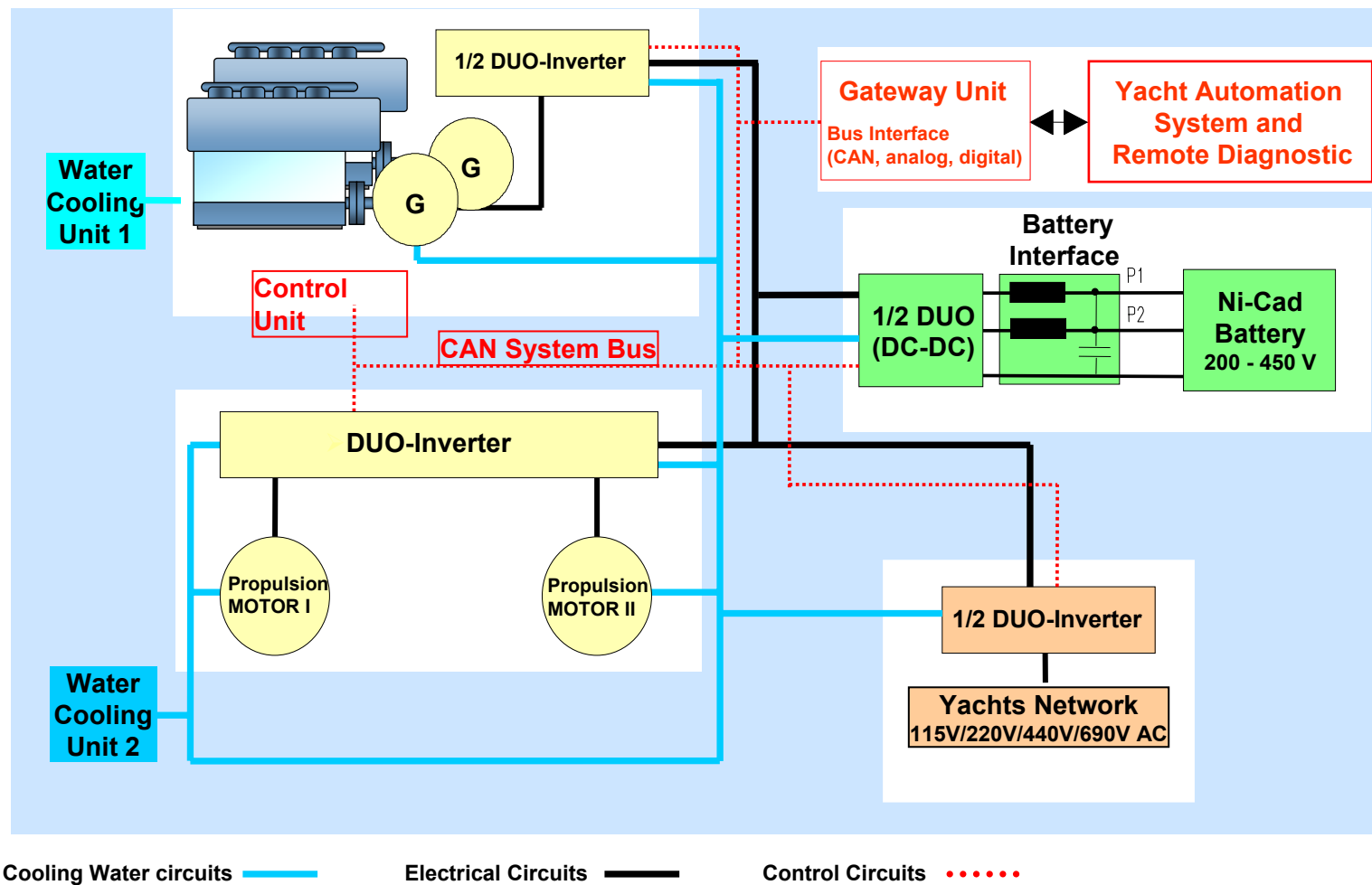
- Design and arrangement flexibility for naval architects
- Installation flexibility for boatyards
- Save space and increases payload
- Boats designed for this type of propulsion will benefit the most from the layout





Siemens Yacht Solutions

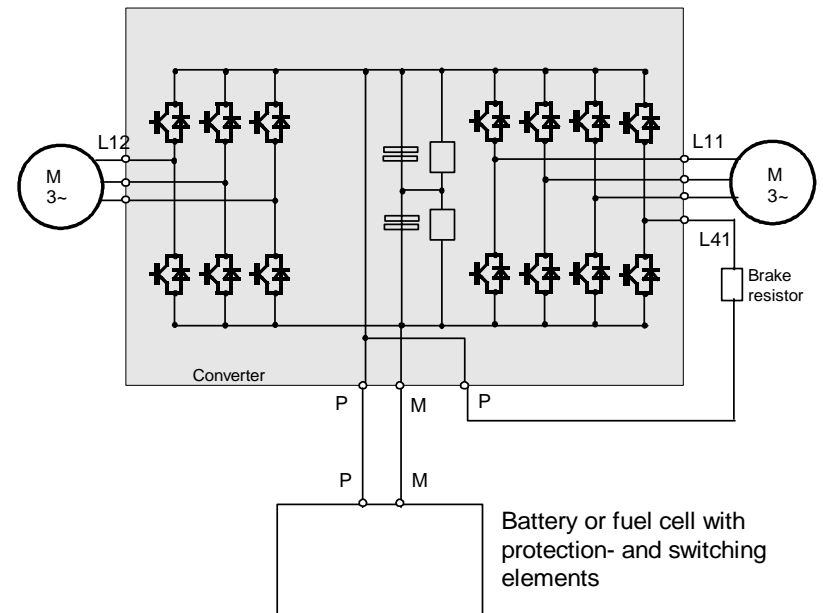
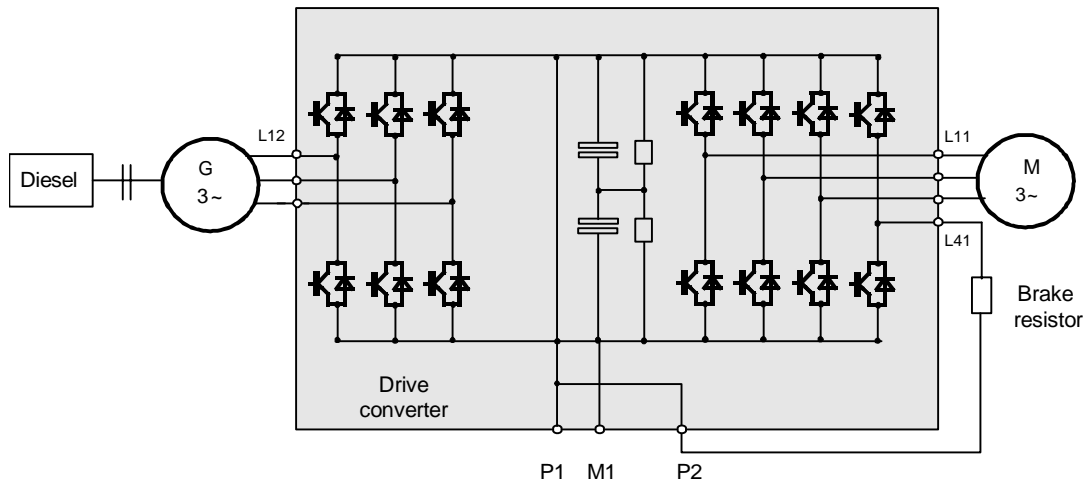
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Converter set up

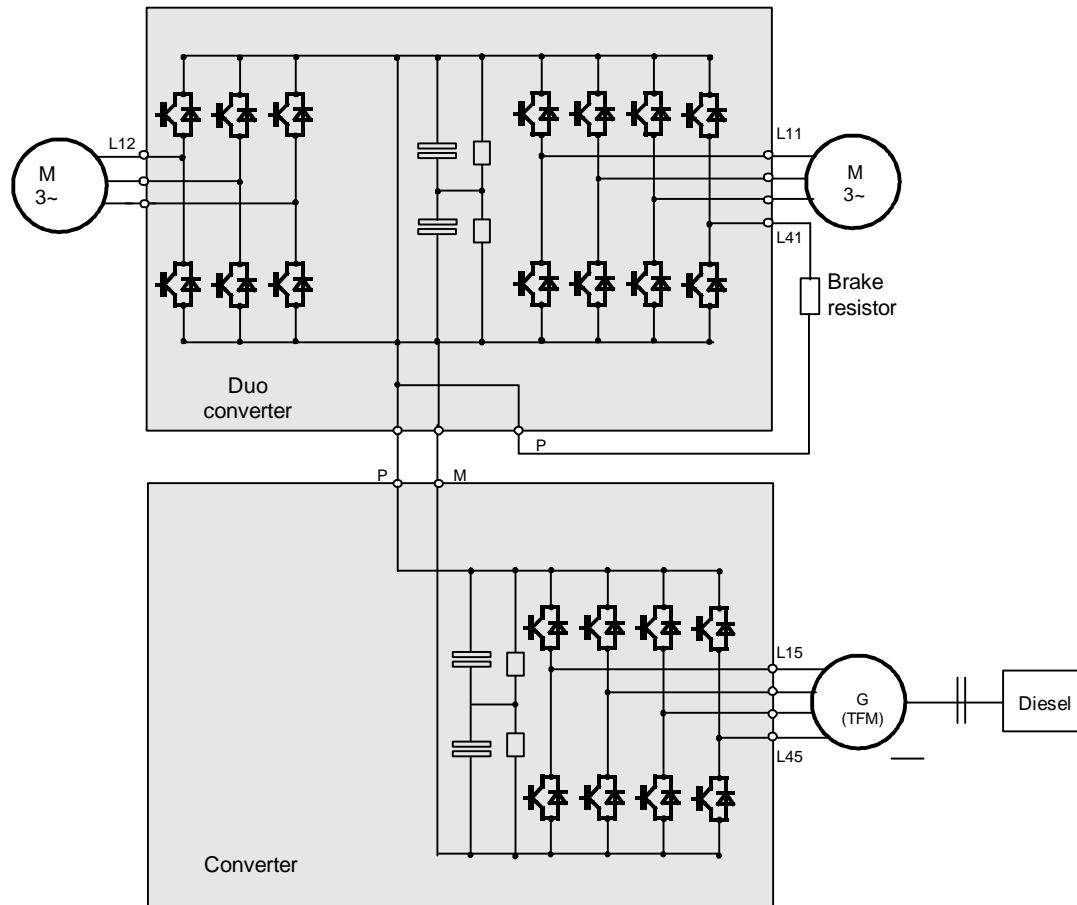
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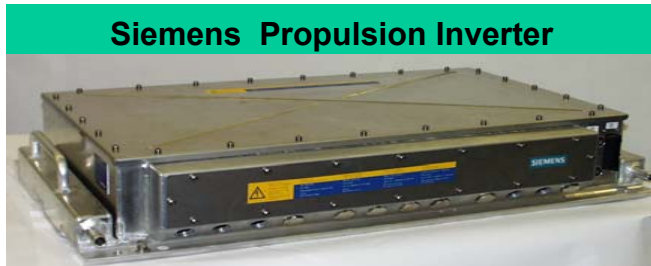
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Siemens Components

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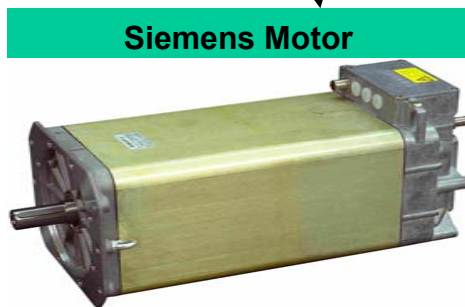
Siemens Propulsion Inverter



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Siemens Inverter for Hotel Load/Motor



Siemens Motor

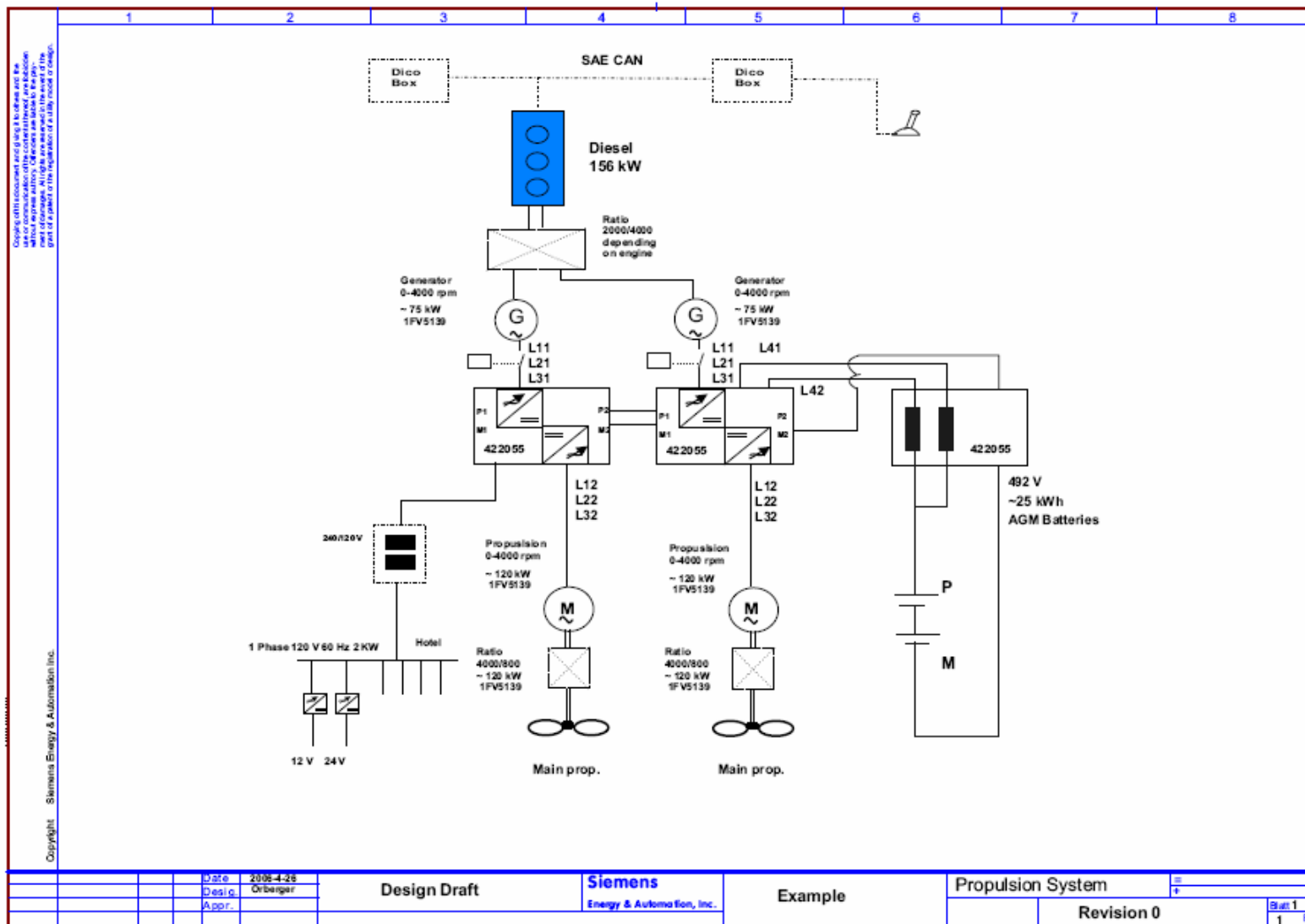
**Nearly 8,000,000 operating
hours...maintenance free**

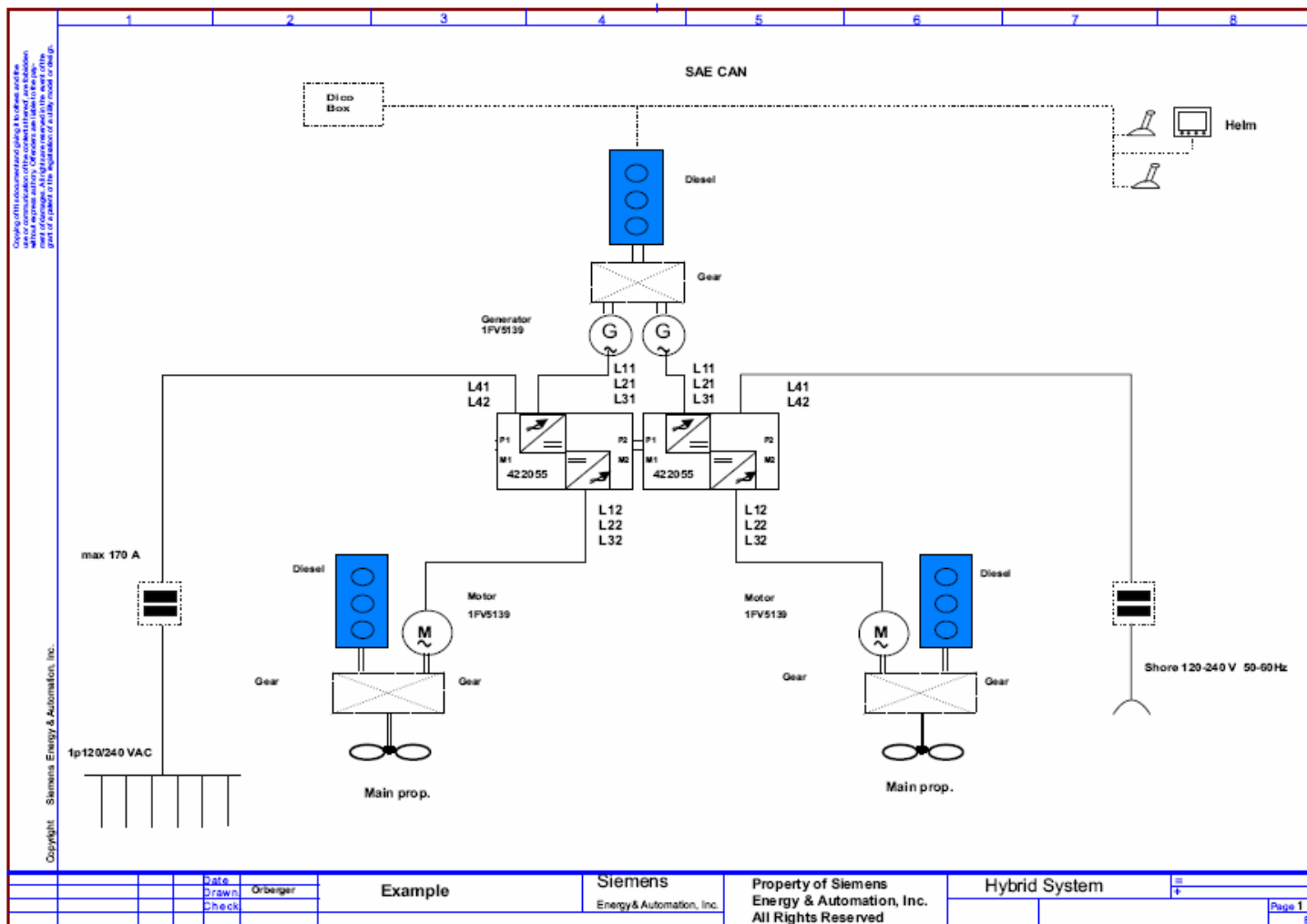
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Propulsion Example

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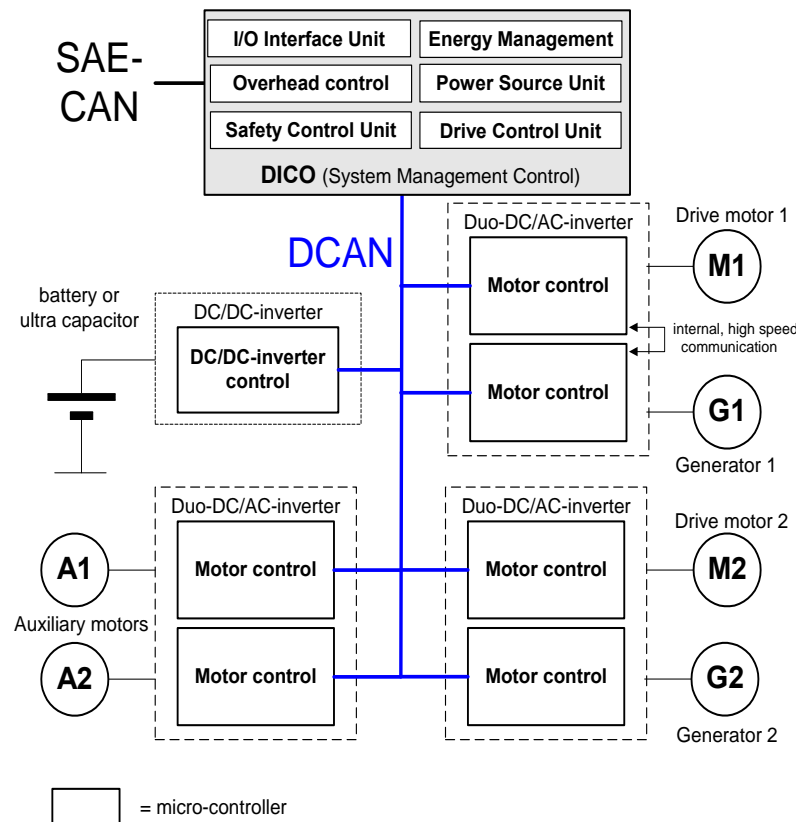


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CAN*-Bus Structure

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Modular concept, whereby configuration of the application is programmed in the DICO

Available software supports all kind of hybrid applications (diesel-genset, fuel cell, pure battery, trolley, dieselectric)

Motors / generators could be either torque or speed controlled

Inverter software is standard solution, supporting all different applications and used in more than 20 different projects

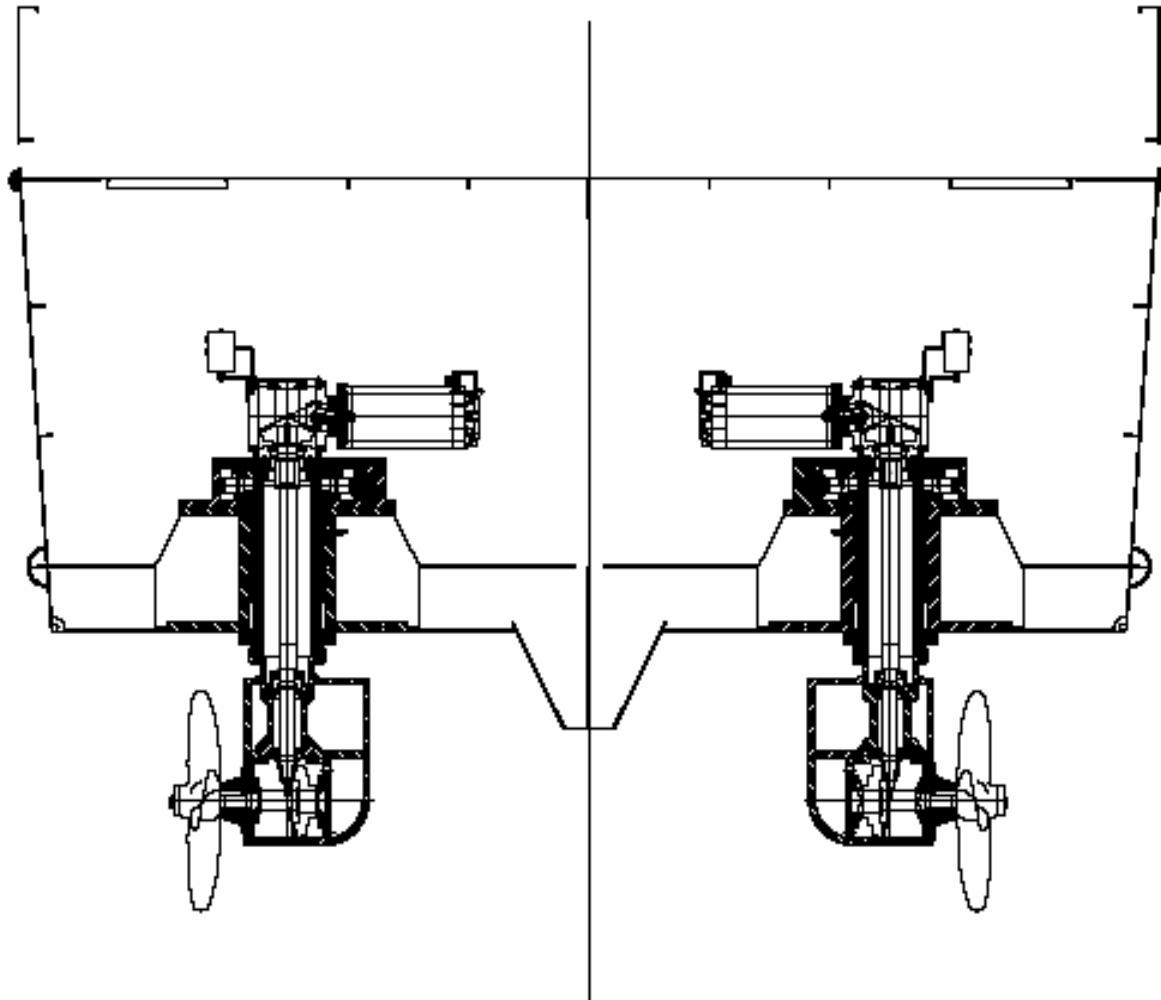
* **Controller Area Network**

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Siemens Yacht Solutions - ELFA

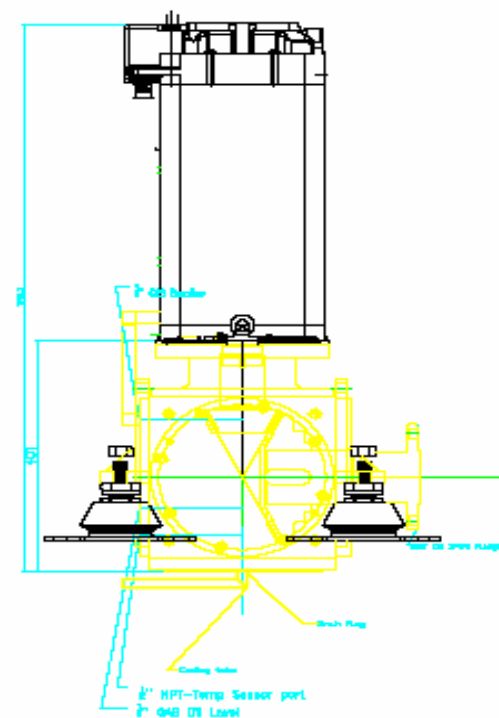
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Please provide info on:
1. Drive Flange - Counter Flange dimensions
2. Mounting Width (Std. Options - 25" and 31.5",
Special dimensions available on request).

PS 140.1-2V-S005-TZS2-Fx-MXx-T-00

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Installation Details

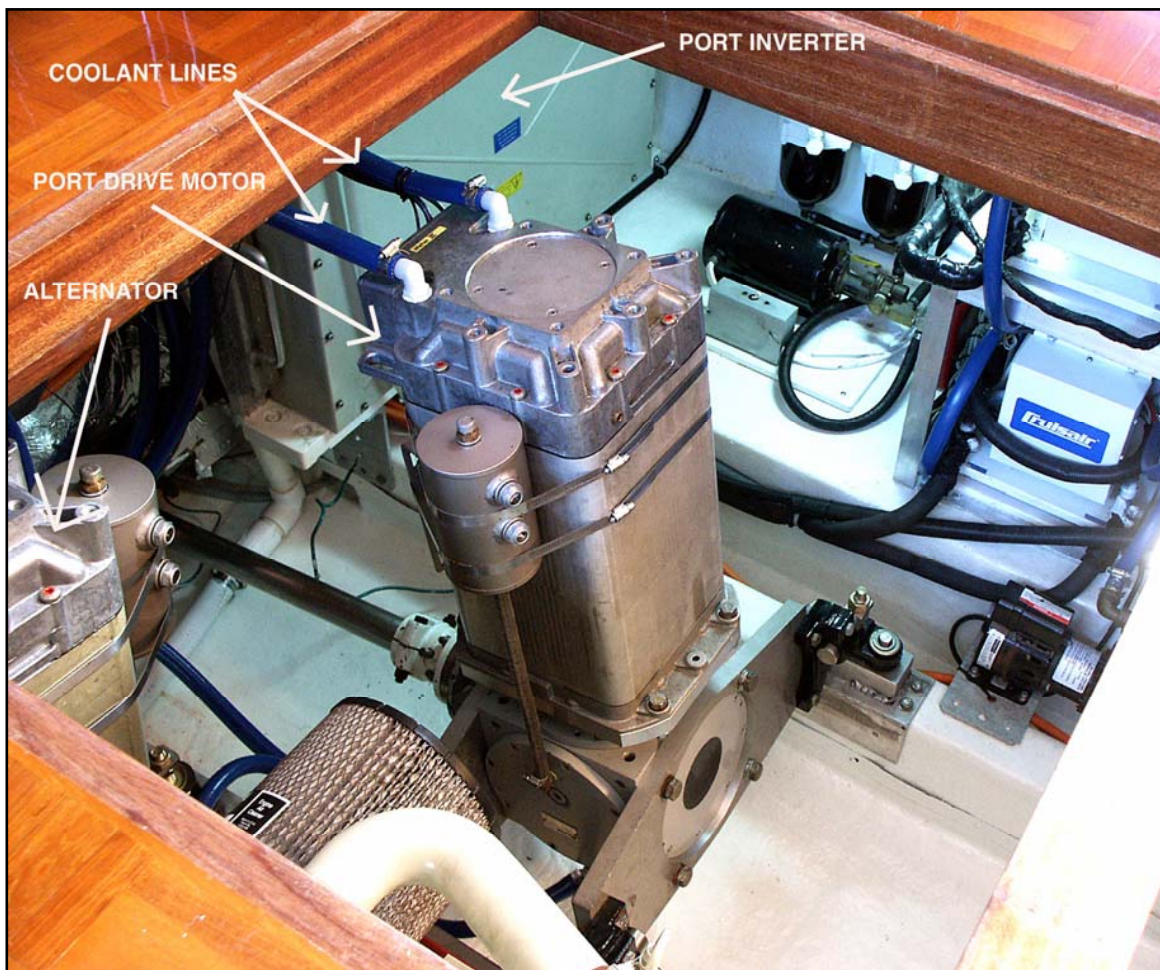
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Installation Details

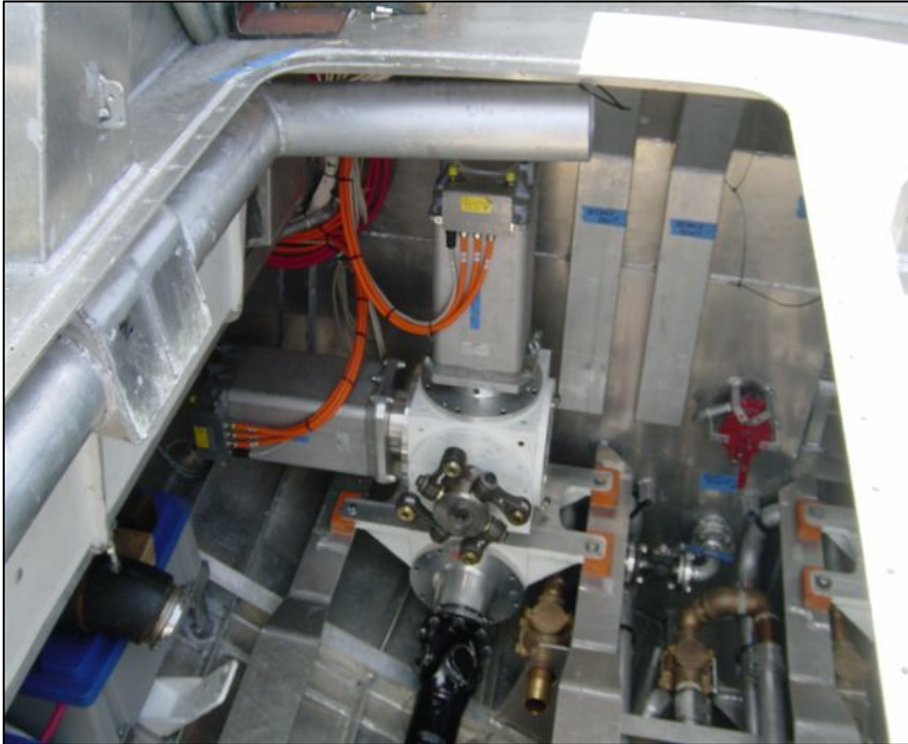
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Installations

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Installations

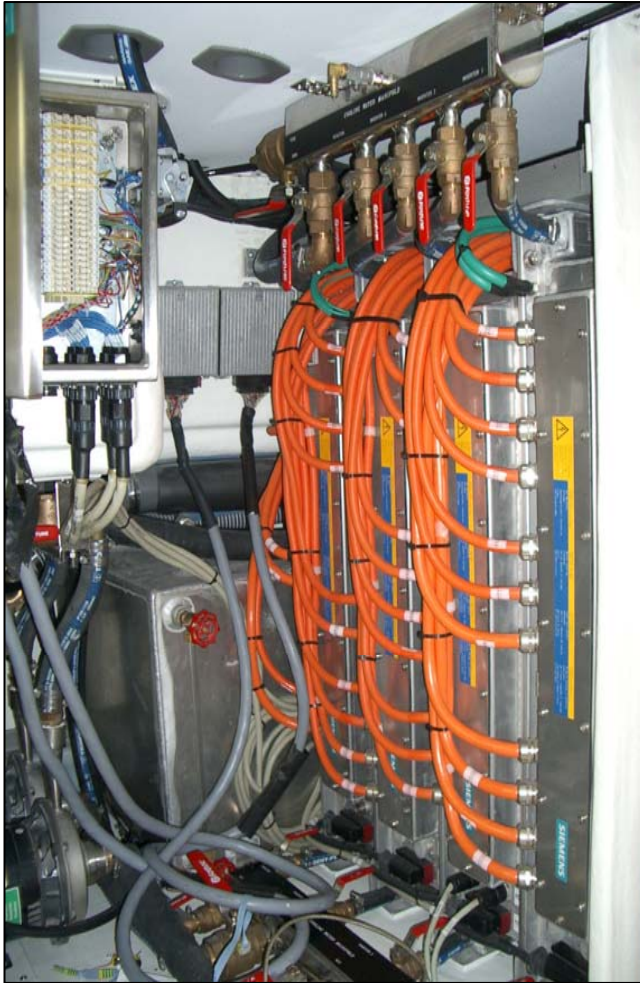
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Installations

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Thank you very much for your attention.