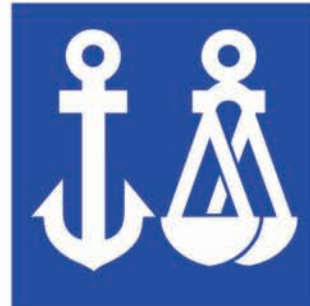


## White paper

### Maritime DNV



LES-2400-RPS



IES-2208F-DNV



IES-2216C-DNV



IES-0008T-DNV



IEC-0101FT-DNV

## Challenges of Maritime Application

Marine network applications are divided into two categories – One is On-shore, the other is Off-shore. On-shore applications include Lighthouse surveillance, Wind Power controlling and monitoring systems, Tide Power controlling and monitoring systems and surveillance. Off-shore applications include IP networking for Oil platforms, Battleships, Yachts, and Cruise Liners.

The challenges of marine network applications include coping with harsh environmental conditions. These conditions include extreme operating temperatures, heavy moisture, erosion, extensive shock and vibration. Also, extensive EMI can prevent some of the equipment used in the ship, especially the compass and navigation systems, from operating properly.



## Harsh Environment

Problems caused by erosion, heavy moisture and extreme working temperatures are common in marine applications. Lantech's "Marine" Series Industrial Switches are designed to cope with those problems. Given the diversity of locations that switches may be used, Industrial Switches are needed for the various types of approvals under DNV classification.

DNV (Det Norske Veritas) Maritime Certification specifies the test criteria for all equipment used in Ships, High Speed and Light Water Craft as well as Off-shore oil platforms. The DNV Organization originated in Norway. Initially, DNV was to provide consulting services for managing the risk and quality control systems onboard ships. Today, DNV Maritime is recognized by 80 national maritime authorities in managing their risk for the "Tough" maritime environmental conditions. DNV Tests Directives

DNV maritime test directives are defined through the relevant EU-Directives, which include:

- The Marine Equipment Directive (MED)
- The Electromagnetic Compatibility Directive (EMC)
- The Low Voltage Directive (LVD)

DNV uses test categories to verify products for satisfactory operation in typical on-board environments.

The test categories include:

Test Categories	Test Categories
Temperature Range	Performance Test
Humidity	Power Supply Test
Vibration with Frequency Range	Inclination Test
EMC	Insulation Resistance Test
Enclosure	High Voltage Test
Compass Safe Distance Test	Salt Mist Test
Acoustic noise and Alarm signal levels	Additional Tests



Type Approval Certificate for Ships, High Speed and Light Craft

Please refer to the detailed table of each Test Category as each test varies depending upon the different locations on board (Source: Standard for DNV Certification – No.2.4; APR, 2006). Lantech Industrial Ethernet Switches are used primarily for IP networks within the automotive and machinery instrument panels on board. As such, the colored columns are major applicable requirements.





Transportation



Maritime area



Power station



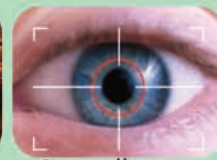
Oil platform



Airport



FTTX



Surveillance






## Wind Power and Tidal Power Generation with IP networks

Wind Power and Tidal Power generators are built on-shore by using Sea-wind and Sea-tide power to generate power. Sea wind power is more stable than other wind while Tide power is predicable. Wind power and tidal power are mostly used in European Countries such as Denmark, Spain, Portugal, and Iceland while tidal power is used in the U.K. Both wind power and tidal power account for only 1% of the world's energy, but they are growing in today's world due to concerns about ecological and environmental protection.

What IP networks can do for Wind Power and Tidal Power Generation is mostly for Turbines monitoring/Data collection and Alarm notification through the Internet or through a local network. In such applications, fiber optic networks for long distance connections and enclosures to withstand salt mist are the most critical features.

### Lantech's "Marine" Series of Industrial Ethernet Switch

Lantech's "Marine" Series of Industrial Ethernet Switch consists of control room switches and device-end switches, all which will be passed comprehensive DNV test criteria. The product family table is as follows:

Control Room Switch/Media Converter		
Product Name	Description	Features
LES-2400-RPS 	3 slot Modular 100M SNMP Switch + 2 Gigabit uplink switch with redundant power supply	Pro-Ring (fast recovery within 10ms) with Lantech Industrial Switch
Device-end / Edge Industrial Switches and Media Converters		
IES-2208F-DNV 	8 port 10/100TX + 2 100M FX SNMP Switch	Pro-Ring 10ms ; Advanced SNMP with Windows - View utility
IES-2216C-DNV 	16 10/100TX + 2 Giga/100M SNMP switch	Pro-Ring 10ms ; Advanced SNMP with Windows - View utility
IES-0008T-DNV 	8 port 10/100TX switch	Plug-and-Play
IEC-0101FT-DNV 	1 port 10/100TX to 1 port 100FX converter	LLF, LFP function

### What extra benefits can Lantech deliver to marine ship applications ?

Besides the hardware elements to meet with strict marine ship / DNV certifications, Lantech brings a complete line of Ethernet solutions from the control room to the edge of the network. All switches include our Pro-Ring protocol (self healing, recovery in less than 10ms). In a harsh network environment, the risk of network disconnection is much higher than in an office network. Lantech's marine solution is designed to reduce network downtime, and provides for fast, automatic recovery in the event of a loss of connectivity.

For more product information, please go to [www.lantechcom.tw](http://www.lantechcom.tw).



# Marine Ships- Tough Conditions

Marine ships, especially Battleships, are confronted with several challenges for on-board equipment.

## Challenge I Vibration

When a ship starts its engine, the vibration can cause equipment to fail. For battleships, the vibration caused by firing missiles is so intense, that it can cripple electronic equipment on-board ships. The vibration strain test that DNV carries out takes from 90 to 120 minutes and operates three perpendicular plans (different frequency / amplitude) to reveal the most possible ways to damage EUT tested devices. Through vibration tests, equipment can be assured to function normally during and after intense vibration.

## Challenge II High Voltage

Typically at the bottom of a ship, all ships have a high voltage room for distributing electricity to the ship. Under some circumstances, like when a missile is fired, the high voltage will be applied for a short period of time. DNV tests up to 1000V to the EUT for a period of one minute to ensure that the product is able to survive during a period of high voltage.

## Challenge III Conducted Radio Frequency Immunity and Emission

Generators on the ship supply power to all the equipment. However, a generator is constantly creating noise through the line, so it is important to discharge the electromagnetic disturbance to the earth. If not, the conducted emissions on the power supply port will exceed the limits. The DNV test carries out the frequency range as per CISPR 16-1,16-2 which is 200Hz – 9K Hz (Conducted Emission Test) and 9K Hz to 120K Hz (Radiated Emission Test).

