

## EEXI Shaft Power Limit

### Fulfilling IMO's EEXI requirements

#### Concept

In order to comply with IMO's Energy Efficiency Existing Ship Index (EEXI) rules, Qtagg has developed the EcoLimit addition to DEGO IV that limits the propulsion power to a pre-defined max value.

The unit communicates with the existing equipment onboard, such as fuel meters, torque meters, NMEA network, alarm and monitoring systems etc.

As an option, the unit can easily be upgraded to Qtagg's EcoPilot for full optimization of the voyage utilizing weather forecasts, power profile calculations and machine learning.

Communication to- and from external systems takes place via standard communication protocols. The same interface is used together with Qtagg's Ship2Shore solution for onshore reports and data analysis via cyber-safe internet communication.

The Qtagg DEGO IV platform is approved by the major Marine Classification Societies.

#### How does it work?

The system limits the propulsion power generated by the main engine to comply with the EEXI rules.

The EEXI limitation can be cancelled from the bridge in case there is a justified need for additional power.

If the shaft power is less than the EEXI limit, the telegraph signal is used as the setpoint for the propulsion control system.

If the shaft power is higher than the EEXI limit, the system limits the shaft power to the EEXI limit. In this mode, the system automatically and continuously adjusts the telegraph position to keep the propulsion power at the EEXI limit.

If the operator cancels the EEXI limitation, the telegraph signal from bridge is routed to the propulsion control system without EEXI limitation.

The EEXI limit (in kW) can be changed using the DegoAid configuration software.

#### User Interface

If sensor information is available, the user interface gives the crew full access to real-time information about the engine and the propulsion system in a graphical format.



This allows for safe commissioning, optimal tuning and quick trouble shooting of the system.

#### Control Panel

The system is operated either via a display in the ECR or with a push button (ON/OFF) on the bridge.

The display shows current shaft power and EEXI value together with other information about the ship.

#### Mechanical Layout

The Qtagg DEGO IV unit is available in two packages. One for field mounting (IP54) and one for DIN Rail mounting inside an existing cabinet as seen below.



## Propulsion control systems

The system interface handles all known propulsion control systems on the market. The signals can be analog (mA, volt or potentiometer), CAN-bus or Modbus TCP. Examples of supported bridge control systems are:

- Kongsberg Marine: AutoChief C20.
- Lyngsoe/Wartsila: DMS 900, DMS 2100, DMS 2100i, EMS 2200 (EMS 2200-ME)
- Nabtesco: M800-S, M800-II, M800-III.
- SAM Electronics: M40
- ABB FAMP and FAHM

## Shaft Torque and Power meters

The system interface handles all torque and shaft power meter systems in the market. The outputs can be analog (mA or volt) or Modbus TCP.

## Engine and propeller shaft RPM

The system interface can be RPM measurement devices via pick-up inputs (24V pulses), analog signals (mA or Volt) and Modbus TCP.

The system has outputs to many types of propulsion- and engine control systems. The control outputs can be done via mA, volt, CAN-bus or Modbus TCP.

## Alarm and Monitoring System

Potential-free contacts are available for the ship's alarm and monitoring system.

## Logging system

The system provides output of data in JSON format that can be used to update external logging systems.

## Installation, commissioning, and upgrade

The Qtagg EcoLimit system is designed for efficient installation and easy commissioning. All tuning and configuration is be done with DegoAid. Either locally or remotely via Qtagg's Ship2Shore remote connection system.

## Options

The system can be upgraded with data transfer to shore. This gives full access to key data, performance reports and ad-hoc analysis tools.

For full optimization and control of the total consumption and the performance index of the voyage, the system can be upgraded with Qtagg's EcoPilot functionality.

## Bus Communication

CANOpen x2  
 TCP/IP  
 Serial RS-485 x 2  
 USB-port  
 Modbus TCP  
 JSON  
 Web-interface

## I/O Interfaces

Analog Input x 10  
 Analog Outputs x 5  
 Digital Inputs x 24  
 Digital Outputs x 10  
 Tacho / Pulse Inputs x 6  
 Alarm Outputs x3

## Control Interfaces

Analog Control and Feedback 0-20mA, +/-10V  
 PWM Control 0-200mA  
 CANOpen  
 Integrated drive for ABB Legacy Actuators