Advanced Measurement Solutions

Advanced technologies for a more efficient world

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Scenario

The present increased globalized competition requires a careful cost management policy.
The high impact of fuel costs on fleet management overall costs imposes an additional challenge on ship owners. For this reason fuel consumption reduction is one of the most important goal to achieve.
Fuel consumption unfortunately depends on many, difficultly controllable, parameters such as: ship speed, trim and list, meteorological conditions, engine maintenance, fuel quality, cooling system adjustment, air temperature, humidity and pressure.

International regulations (e.g. MARPOL Annex VI) fixed new more restrictive limits for combustion emissions level and composition (mainly for CO_2, SO_x and NO_x).

Maintenance represents another strategic issue in fleet management costs.

For all the above mentioned reasons the reduced efficiency of the ship propulsion system must be immediately detected and rectified.

To face these demanding issues it is of the utmost importance to base fleet management on the continuous monitoring of the ship propulsion system performance parameters.

Advanced Measurement Solutions LTM2214 line of sight single beam laser torque meter can be effectively used to solve all these problems.

System description

The LTM2214 is the most recent line of sight single beam laser torque meter (LOS-SBL) developped by Advanced Measurement Solutions. The LTM2214 main unit is available in a rugged IP55 steel box for bulkhead mounting.

LOS-SBL technology overview

A line of sight single beam laser torque meter is essentially composed of three parts: two dynamically balanced slitted discs which are mounted on the shaft with a known reciprocal angular displacement, a laser beam emitter, and a laser beam receiver. The laser beam passes through the slits of the two discs and is detected by the receiver. As the shaft rotates the beam is periodically interrupted by the apertures of the slitted discs thus generating laser pulses which are detected by the receiver. The variation of pulse lengths compared to the length at zero torque (at the same angular speed) is proportional to the torque applied to the shaft.

Advantages of LOS-SBL technology

The line of sight single beam laser (LOS-SBL) technology, developed and patented by Advanced Measurement Solutions, represents a quantum leap in torque measurement. It completely eliminates errors induced by the difficulty of obtaining exact positioning of magnetic pick ups in toothed discs systems, or of optical sensors in multiple beam laser systems, and fiber optics guided implementations.

With the LOS-SBL technology, there is no contact between the components mounted on the shaft and the rest of the system (e.g. no slip ring is present), and no electronics is mounted on the shaft (as in strain gauges systems using radio waves to transmit data from the electronics mounted on the shaft to the rest of the system).
Consequently the LTM2214 is not influenced by temperature variations and centrifugal forces and can be used even at high speeds.

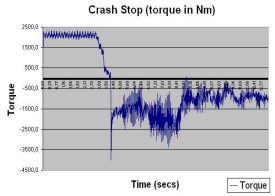
LTM2214 main features

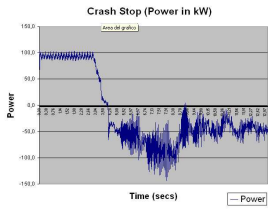
The LTM2214 torque calculation is completely digital, thus eliminating the drifts and inaccuracies which are typical of analog systems requiring periodical adjustment.

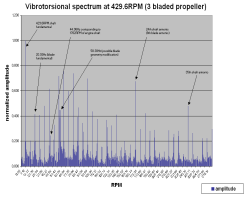
The LTM2214 surpasses other torque metering technologies in terms of reliability, repeatability, accuracy and resolution.
The LTM2214 standard accuracy is better than 0.7%.
The LTM2214 includes a fuel meter input for real time fuel oil consumption (FOC) and specific fuel oil consumption (SFOC) calculations.
Warnings and alarms can be freely assigned by the user to all measured data.
All these features allow the LTM2214 to optimize maintenance costs (maintenance could be carried out when the preset alarm threshold is exceed) or to be used as a system performance monitor (to reduce fuel consum-ption or increase speed), to reduce CO_2, SO_x and NO_x emissions, or to reduce shaftline stresses.
RPM, torque, power, instant fuel consumption (FOC), specific fuel con-sumption (SFOC), energy, total revolu-tions are calculated in real time by the LTM2214 32 bits digital system.
Using several LTM2214 systems it is possible to monitor several shaftlines at the same time.

Time/frequency domain analysis

The LTM2214 system provides the vibrotorsional analysis in time and frequency domains, using the software tools available from Advanced Measurement Solutions.

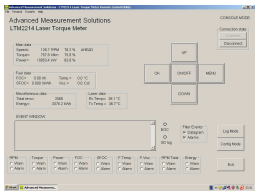






Remote control utility

The LTM2214 system includes a Windows remote control utility for PC.



The LTM2214 has two communication ports (RS232 and RS422). NMEA0183 (shipborne electronics standard) plus custom communication protocols are available.

Typical system implementation

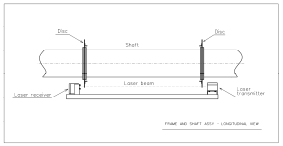
The LTM2214 can be used as a stand alone system, can be integrated in a machinery automation system, or used as a remote diagnostic system controlled via a satellite link.

SD Card data storage

Data storage on a SD card is also included (for data logging, black box, or vibrotorsional analysis). SD data logging can exceed months. SD Card data can be downloaded remotely via a serial link. Both SDSC and SDHC cards are supported.

Installation

An important advantage of the LTM2214 is that its installation does not require any shaftline interruption or modification.



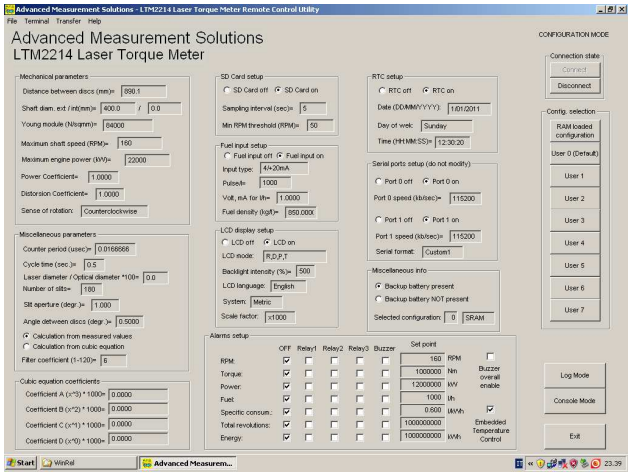
Consequently the LTM2214 installation costs and time are very low. The LTM2214 is thus ideal for retrofitting.

Accessories and Spares

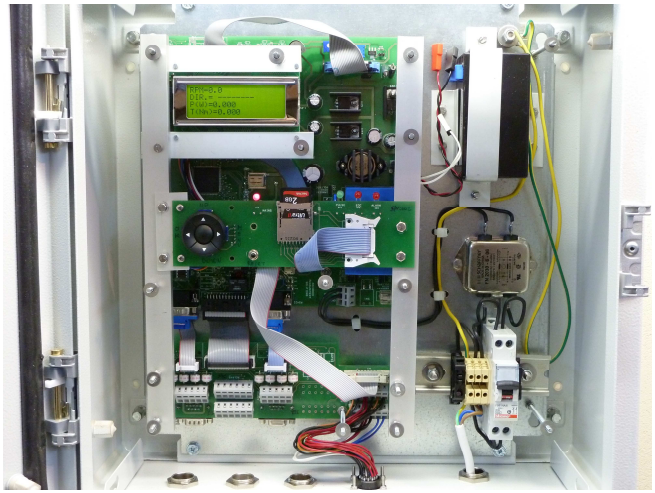
A complete range of accessories and spare parts are available and can be ordered via web or email.

Patents/Trademarks

Line of sight single beam laser torque metering technology is patented by Advanced Measurement Solutions.
The name “Advanced Measurement Solutions” and the relevant logo are registered trademarks of Advanced Measurement Solutions.



LTM2214-RCU (Remote Control Utility) configuration mode


LTM2214 main unit

Agent:

For more detailed information on all our products visit our web site at:
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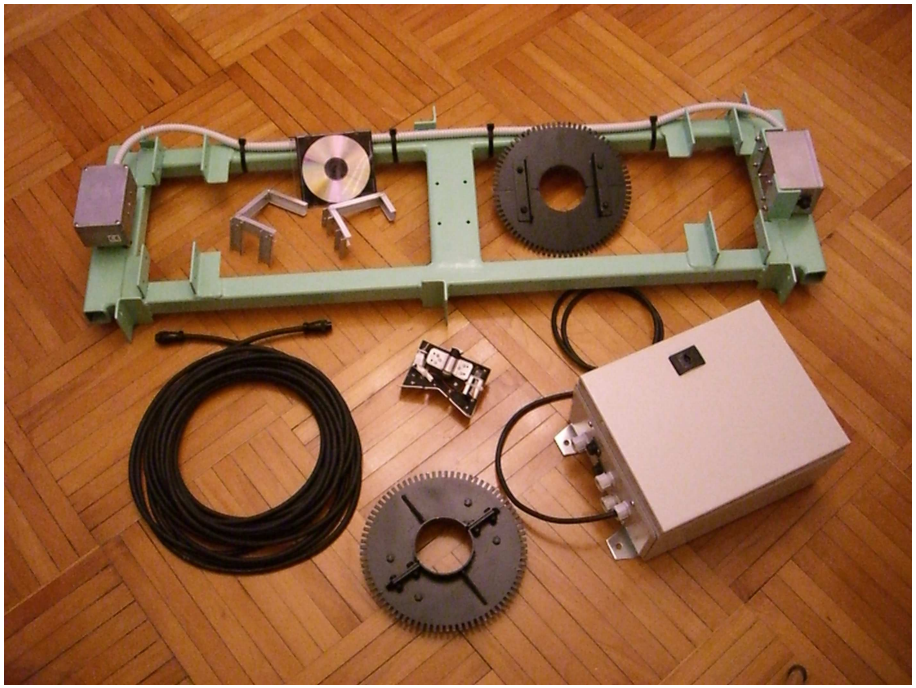
Advanced Measurement Solutions

LTM2214 – Laser Torque Meter

Line of sight single beam laser torque metering system



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