



Advanced Measurement Solutions

LTM2214 – Laser Torque Meter

www.AdvancedMeasurementSolutions.com



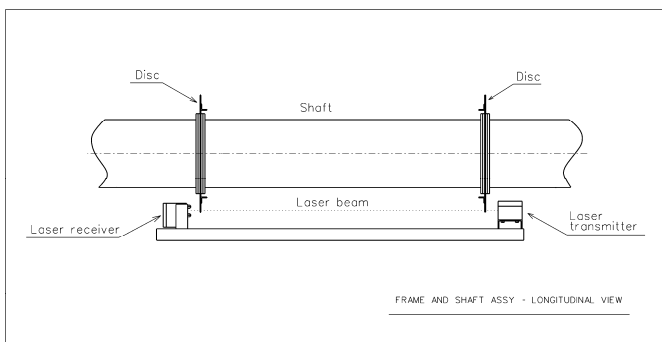
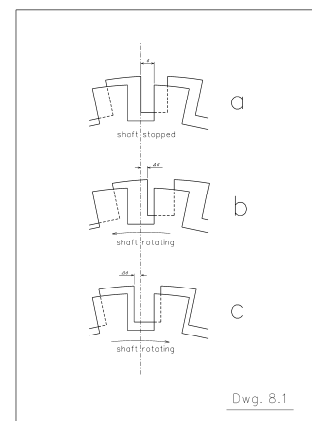
Advanced Measurement Solutions announces its most recent LTM2214 line of sight single beam laser torque metering system available in an IP55 protection degree rugged enclosure.

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.

The line of sight single beam laser (LOS-SBL) technology, developed and patented by Advanced Measurement Solutions, represents a quantum leap in the torque measurement. It completely eliminates the errors induced by the difficulty of the exact positioning of the magnetic pick ups in toothed discs systems, or of the optical sensors in the multiple beam laser systems, and in the fiber optic 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. The LTM2214 torque calculation is completely digital, thus eliminating the drifts and inaccuracies which are typical of analogue systems requiring periodical adjustment.



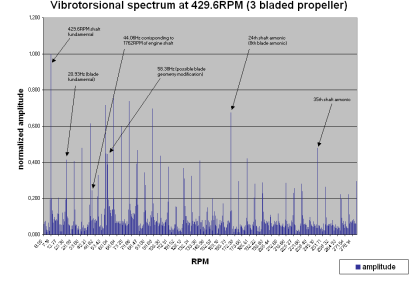
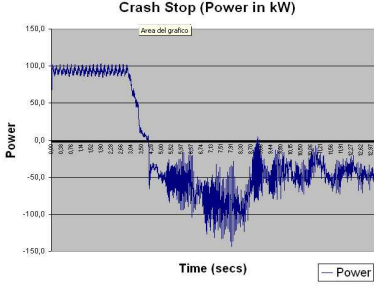
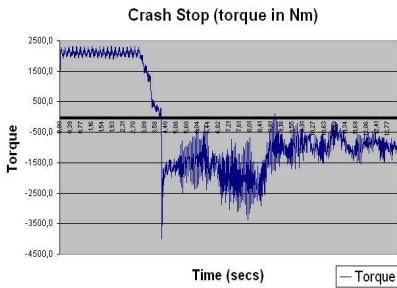
For these reasons, the LTM2214 surpasses the other torque metering technologies in terms of reliability, repeatability, accuracy and resolution. These characteristics allow it to be used as a reference instrumentation equipment (standard accuracy is in any case better than 0.7%).

The LTM2214 includes a fuel meter input (current, voltage or pulse input is selectable) for real time fuel consumption (FOC) and specific fuel consumption (SFOC) calculations. Warnings and alarms can be freely assigned by the user to all measured data (relay and serial outputs are available). All these features permit the LTM2214

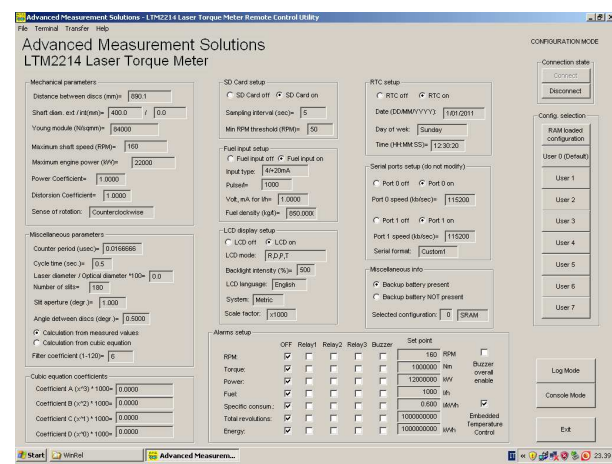
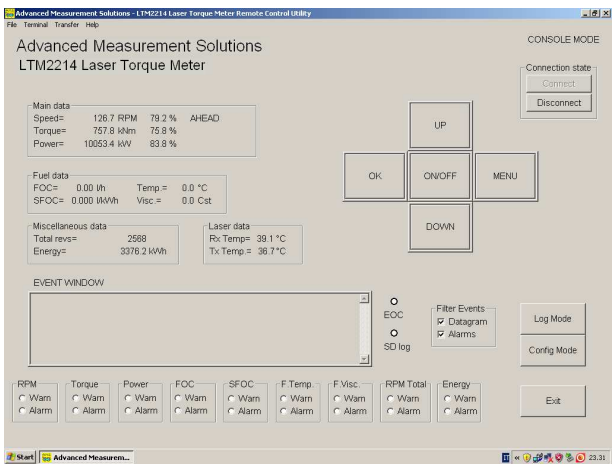
to optimize the maintenance costs (maintenance could be carried out when the preset alarm threshold is exceeded) or to be used as a system performance monitor (to reduce fuel consumption or to increase speed), to reduce CO₂, SO_x and NO_x emissions, and to reduce the shaftline stresses.

Seven parameters are calculated in real time by the 32 bits digital system (RPM, torque, power, instant fuel consumption (FOC), specific fuel consumption (SFOC), energy, total revolutions).

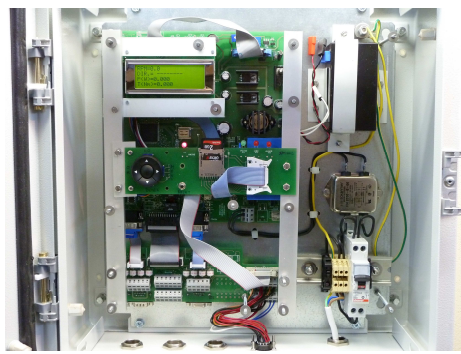
Using several LTM2214 systems it is possible to monitor several shaftlines at the same time.



The LTM2214 system provides vibrotorsional analysis in time and frequency domains, using the software tools available from Advanced Measurement Solutions (the time domain tool and the demo version of the frequency domain one are included in the standard supply and are freely downloadable from our web site). The frequency domain tool and the log trend analysis tool licenses require the payment of a fee and are sent via email.



The LTM2214 system includes a Windows (Win32) remote control utility for PC (freely downloadable from our web site). The LTM2214 has two communication ports: a RS232 for short distances and a RS422 for longer ones. The NMEA0183 (shipborne electronics standard) plus custom protocols are available. 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 (e.g. in shipborne installations). Data storage on a SD card is also included (for data logging, black box, or vibrotorsional analysis). The SD data logging can exceed months. The SD Card data can be downloaded remotely via a serial link.



Accessories and spare parts are also available. Line of sight single beam laser torque metering technology is patented by Advanced Measurement Solutions.

Please visit our web site for more detailed information on all our products at: www.AdvancedMeasurementSolutions.com or contact us at: info@AdvancedMeasurementSolutions.com

Note: For the technical characteristics please refer to LTM2214-RM data sheet documents.

The name "Advanced Measurement Solutions" and the relevant logo are registered trademarks of Advanced Measurement Solutions.

Agent:



Advanced Measurement Solutions

LTM2214 Laser Torque Meter - Technical data sheet

Model:	LTM2214-RM (rugged version)
Electronic Unit:	
Power supply	220Vac approx.20W (115Vac upon request)
Fuse	1A delayed (220Vac, 115Vac)
Display	LCD STN with led backlight, 20 characters x 4 rows (inside case)
Display backlight	adjustable via keypad
Display contrast	trimmer adjustable
Internal clock	crystal RTC, +/-10ppm/month
Digital input	optically insulated pulse fuel consumption: 0/+5V, -5/+5V, 0/12V, -12/+12V, 0/+20mA
Analog input	not insulated fuel consumption: 0/+3.3V, 0/+20mA, 4/+20mA (jumper and keypad selectable current input)
Digital output	n.3 assignable alarm thresholds with 1 pole changeover contacts relay 0.3A 24Vdc (DOUT2 and DOUT3 shared with ETC)
Serial output	a) RS232 9 pin male D type, with selectable speed from 4800 to 921600Baud b) RS422 9 pin female D type, with selectable speed from 4800 to 921600Baud
Commands	keypad (inside the case): MENU (▶), OK (◀), UP (▲), DOWN (▼), ON/OFF
Signalling	a) red led (EOC - end of cycle) internal b) green led (laser pulse reception) internal c) red led (Alarm) internal d) red led (ON) internal
Frame – electronic unit interconnection cable length	a) standard: 12m b) higher lengths upon request
Environmental (with door closed)	Temperature: -10/+50°C Humidity: 10-98% relative condensating Pressure: 700-1200mbar Acceleration: 4mm/s @ F<=800Hz; 2mm/sec @ F>800Hz Protection degree: IP55 (IP20 with door opened)
Dimensions (LxHxD)	400mm x 400mm x 200mm 15.75in x 15.75in x 7.87in
Weight (kg)	10kg (22.0lb) approx.
Optical Receiver:	
Power supply	(from the electronic unit) 18Vdc (polarity inversion protected) or 18Vac, approx. 0.3A
Signalling	a) red led (ON) on the board b) green led (laser pulse reception) on the board
Adjustment	low pass filter cut frequency
Environmental	Temperature: -10/+50°C (standard version); -20/+ 70°C (extended temperature version) Humidity: 10-90% relative non condensating Pressure: 700-1200mbar Acceleration: 5mm/s @ F<=800Hz; 2.5mm/sec @ F>800Hz Protection degree: IP55
Dimensions (LxHxD)	260mm x 80mm x 74mm 10.24in x 3.15in x 2.91in
Weight (kg)	1.5kg (3.3lb) approx. (standard version); 3kg (6.6lb) approx. (extended temperature version)
Laser Transmitter:	
Laser wavelength	670nm
Laser beam power	1.0mW (Class II)
Beam shape	focused circular/elliptical dot
Focused dot dimension	100um typical
Optics	single element with adjustable focus
Power supply	9Vdc polarity inversion protected, approx. 50mA

Environmental	Temperature: -10 ⁺ +50 ^{°C} (standard version); -20 ⁺ + 70 ^{°C} (extended temperature version) Humidity: 10-90% relative non condensating Pressure: 700-1200mbar Acceleration: 5mm/s @ F<=800Hz; 2.5mm/sec @ F>800Hz Protection degree: IP55
Dimensions (LxHxD)	160mm x 58mm x 77mm 6.30in x 2.28in x 3.03in
Weight (kg)	1.5kg (3.3lb) approx. (standard version); 2kg (4.4lb) approx. (extended temperature version)
Frame (exact values must be expressly requested):	
Surface treatment	None (AISI304 stainless steel)
Dimensions (LxHxD)	1320mm x 580mm x 180mm 52.0in x 22.83in x 7.08in
Weight (kg)	38kg (83.6lb) approx.
Frame covers:	
Surface treatment	None (AISI304 stainless steel)
Dimensions (LxHxD)	580mm x 250mm x 130mm 22.83in x 9.8in x 5.1in
Weight (kg)	8kg (17.6lb) approx.
Performance:	
Performance figures measured at:	Temperature: 20 ^{°C} +/-20% Humidity: 50% +/-20% relative non condensating Pressure: 1013mbar +/-20% Acceleration: 1mm/s @ F<=800Hz; 0.5mm/sec @ F>800Hz
Accuracy (Precision)	<+/-0.7% of read value
Resolution:	+/-1 digit
Repeatability	<+/- 0.7% of read value