



Ship Intelligence,
Decarbonization,
Parts & Services



Naval Shaft Power Meter Systems

V1.1

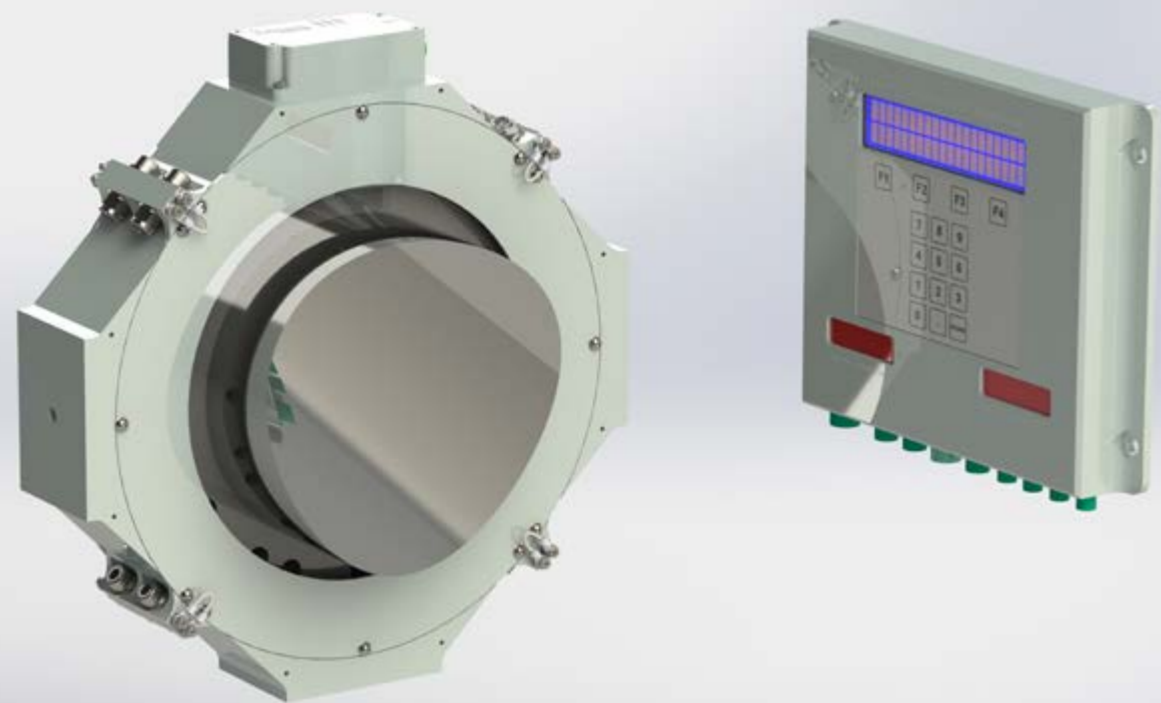
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Series 420 Torsionmeter System

Our state of the art Series 420 Torsionmeter System provides a durable tool to accurately access and monitor the performance and efficiency of the ships transmission system.

This cutting edge transducer securely measures the on-shaft torque (kNm), the speed of the shaft rotation (rpm) and the power (kW) that is going through the shaft. The data is transmitted from the shaft in a digital format that can be processed and scaled off-shaft. The data transmitted contains the torque level, the shaft speed and diagnostics data such as the on shaft voltage and power.



Our system provides actual data on the power delivered that can be compared with the expected design performance, together with ongoing data, that will indicate any changes to this expected performance level. Condition monitoring of a system of this type is important to any modern day vessel. Being able to accurately measure and record the ship's power and speed data can help towards determining equipment condition and efficiency. It's a pro-active measure with the specific purpose of improving performance and efficiency through a ship transmission system.

Tried and Tested

Our naval ship monitoring system assesses and monitors propeller shafts on ships, by measuring shaft speed, power and torque. Originally designed for use by the Royal Navy, later variations have been provided for the Indian Navy, Australian Navy and Korean Navy.

The ship propeller shaft power meters have been through rigorous UK MOD and USA MIL testing programmes for the harshest of environments, and are therefore verified in a number of marine conditions, including:

- MIL Spec std. 901-D shock
- 167-1A 2005 Vibration
- Safety Case to JSP430
- Shock to Def Stan 08-120
- EMC to Def Stan 59-41
- Selection of Marine Torsion meters Def Stan 02-606
- Magnetic Ranging to 08-123 DS31

Other environmental tests will include Def Stan 08-123 DS28 (shock), D25 (vibration), DS24 (contamination), DS9 (temperature and humidity) and DS21 (salt atmosphere).

Condition Based Monitoring

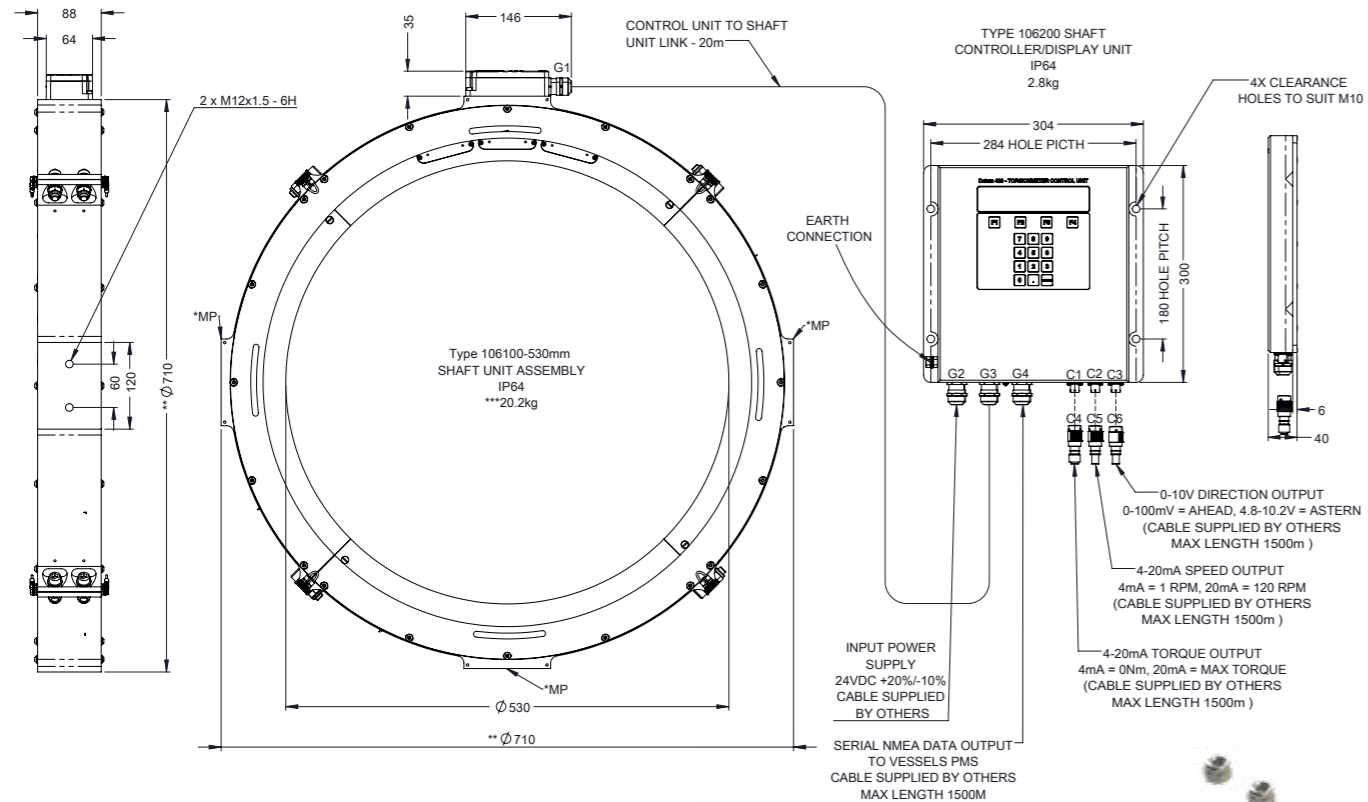
An additional advanced self-learning condition monitoring system, capable of analysing each individual cylinder of the engine from the dynamic torque signature can also be supplied. Coupled with the Datum Shaft Power Meter, it represents the ultimate sensor system for real-time condition-based ship monitoring, allowing for sharply-focused preventative maintenance.



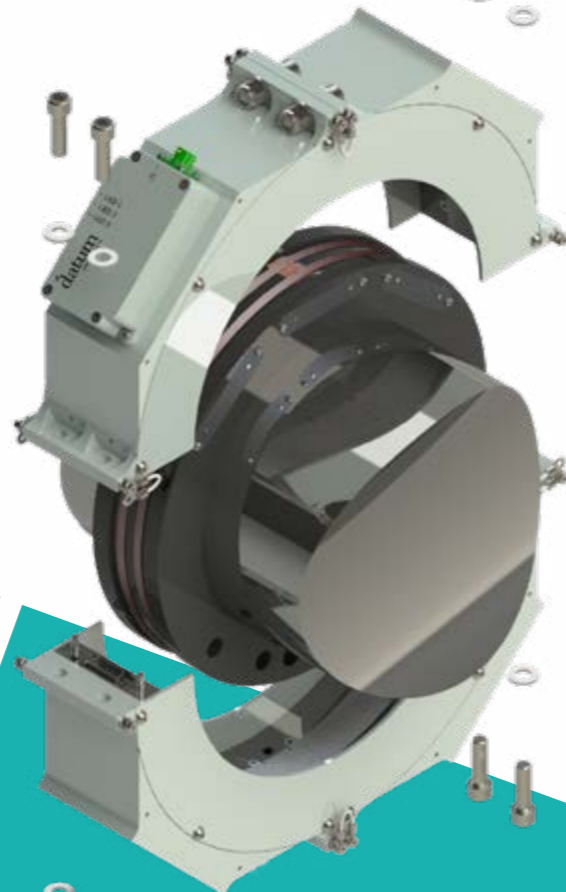
'Typical' Dimensions

We can design to specific requirements and can design and manufacture a solution to suit any shaft size.

Block Diagram & Wiring Schematic



* MP = MOUNTING POINT
 ** DRAWING SHOWS GENERAL DIMENSIONS FOR Ø530 SHAFT UNIT - FOR OTHER ARRANGEMENTS MARKED DIMENSIONS WILL BE EQUAL TO SHAFT Ø + 180mm
 *** WEIGHT REPRESENTATIVE OF Ø530 SHAFT UNIT



Technical Specifications

Instrumentation Accuracy	Shaft Torque	0.1%	
	Shaft RPM	1 RPM (measured at 10 pulses per rev)	
	Shaft Power	0.1%	
System Accuracy	Shaft Torque	0.1% + Ke	
	Shaft RPM	1 RPM	
	Shaft Power	0.1% + Ke	
	Ke	Total error in shaft modulus constant and shaft diameter measurement	
	System Repeatability	Shaft Torque	0.05%
	Shaft RPM	1 RPM	
	Shaft Power	0.05%	
Data Output and Display	Power, Torque and Speed Display	The display presents average values of torque, speed and power. The time period of the average values can be configured in the software provided and can vary from 0.1 second to 24hrs.	
	Total Energy	The total energy is displayed in kWh from the Reset date, to today. Previous totals between resets can be accessed through the menu.	
	Average Power	Average Power for a period between resets is displayed in MW.	
	Power Measurement Data Output	Average values of Shaft Power, Torque and Speed are transmitted 5 times per second.	
	Environmental	Operating Temperature	-15°C to +55°C
	Storage Temperature	-25°C to +70°C	
	Temperature Effect on Readings	0.01% per degree centigrade	
	Instrument Stability / Time Drift	Less than 0.1% per annum	
	Environment Sealing	Shaft Unit 106XXX	IP65
	Stator Electronics Unit	IP65	
	Bulkhead Control Unit	IP54	
	Panel Mounted Display Unit	IP54	
	Rotor Stator Air Gap	Radial 5 - 10mm, lateral +/-8mm	
	Supply Voltage	110-230Vac, AC, or DC12-24V	

Additional Environmental Testing

TEST	IEC60945:2002 inc Corr 2008 and IACS E10: 2018
Conducted LF Immunity	IACS E10:2018
Conducted RF Immunity	EN 61000-4-6: 2014
Radiated RF Immunity	EN 61000-4-3:2006 + A1: 2008 + A2: 2010
Fast Burst Transients	EN 61000-4-4: 2012
Surge Immunity	EN 61000-4-5: 2014 + A1: 2017
Electrostatic Discharge	EN 61000-4-2: 2009
Radiated Emissions	EN 55016-2-3: 2017 + A1: 2019
Conducted Emissions	EN 55016-2-1: 2014 + A1: 2017
Performance Test	IACS E10: 2018
Dry Heat	EN 60068-2-2: 2007
Low Temperature	EN 60068-2-1: 2007

TEST	IEC60945:2002 inc Corr 2008 and IACS E10: 2018
Low Temperature (start-up)	EN 60068-2-1: 2007
Humidity Test 1 - Cyclic	EN 60068-2-30: 2005
High Voltage	EN 60092-504: 2001
Vibration	EN 60068-2-6: 2008
Power Supply Variation	EN 60092-504: 2016
Power Supply Failure	EN 60092-504: 2016
Insulation Resistance	IACS E10: 2018
Acoustic Noise	Section 8 Table 2.3 IEC 60945: 2002
Compass Safe Distance	Section 8 Table 2.3 IEC 60945: 2002
Static Inclination	EN 60092-504: 2016
Dynamic Inclination	EN 60092-504: 2016

