



*Ship Intelligence,
Decarbonization,
Parts & Services*

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Marine Shaft Power Meter

V5.4

Marine Shaft Power Meter

Datum Electronics' Marine Shaft Power Meter has been developed to meet the requirements of the commercial marine market. It provides customers with ongoing power monitoring data on ships, including; Propulsion Shafts, Thrusters and Generator Shafts.

The principal use of the Datum Electronics SPM system is to provide accurate and reliable data monitoring for fuel economy, efficiency optimisation, regulatory compliance and predictive maintenance.

What Can our Shaft Power Meter provide?

Datum Electronics Shaft Power Meter accurately measures the power transmitted through a shaft by using our proprietary designed strain gauges to measure torque. Alongside the speed being measured by our easy to install SPM system, enables the measurement of actual power an engine is delivering to the propeller or generator.

The Shaft Power Meter System is an essential tool, helping to reduce the running costs by maximising:

1. Fuel Savings
2. Improved Maintenance Scheduling
3. Equipment Protection

The cost of an accurate permanently installed SPM is very small, in comparison with potential savings in operational costs.



Features



Cost-Effective



Fully Modular



**Lloyd's
Register Type
Approved**



**ABS Type
Approved
System**



**Highly
Reliable**



**100%
Contactless**



**CCS Type
Approved
System**



**BV Type
Approved
System**



0.1% Accuracy



**Can Be Installed
in 1-2 Days**



**Predictive
Maintenance
Upgrade**
Datum Hawk - exp. 2024



**One-Time
Calibration**
(no Re-zero or
Re-Calibration required)



**Multiple Open
Source
Outputs**



EEXI
Upgradeable to
include SHaPoLi
Monitoring & Reporting



**Maintenance
Free**

Benefits

Shaft Power Measurement

Shaft Power is an essential input to Ship Performance Monitoring Systems. The data from monitoring actual power levels provides an accurate reference point, to assist with the assessment of:



- As part of an EEXI-SHaPoLi compliant system
- Engine Performance Monitoring
- Hull Condition
- Propeller Condition
- Specific Fuel Consumption
- Operational Efficiency Planning
- Ship Condition Changes

The same system will also provide data to assess the value of new equipment and operating procedures:

- Changes to Operation
- Changes to Fuel Types
- Changes to Hull Coatings

Fitted at an early stage, the torsion meter system can be used in Ship Acceptance Trials and, from that point on, be a measure of the condition of the ship, throughout its life cycle.



Marine Control Unit

The SPM System comes with a Marine Control Unit. This comprises a local Touchscreen display of Torque, Speed & Power and has a multitude of both Analogue & Digital Outputs, for simple integration into any performance monitoring software or data logger.

- LCD Display (Torque, Speed, Power & Status)
- Analogue Outputs for:
 - Torque
 - Power
 - 4-20mA, 4-12-20mA
 - 0-5Vdc, +/-5Vdc
 - 0-10Vdc, +/-10Vdc
 - Speed (unipolar only)
- Digital Outputs:
 - RS485 / RS232 / NMEA
 - Modbus RTU
- Local USB Logging (.csv files)

Technical Notes

The Torque and Power output from the torsion meter system is dependent on calculations, utilising constants from the shaft. These are: **Shaft Material** – either as shear modulus, or Young's modulus & Poisson's ratio.

Shaft Diameter – by direct measurement of the inside and outside diameter of a hollow shaft.

Datum Electronics Limited can conduct tests on a sample of the shaft material to determine the shear modulus. Two samples of shaft material, 20mm diameter and 150mm long, are required for this testing.



Upgrade to EEXI SHaPoLi

Our Type Approved EEXI-SHaPoLi solution streamlines compliance with IMO's EEXI regulations for vessels with single and multiple shafts. It combines our Type Approved SPM system with a versatile bridge interface module, applicable to multiple shafts.

The EEXI interface continuously monitors and records the vessel's power against EEXI limits, issuing clear breach warnings and automating compliance reporting. The system is Type Approved by LR, BV and ABS.



Introducing ECR2: Empowering Vessels with data

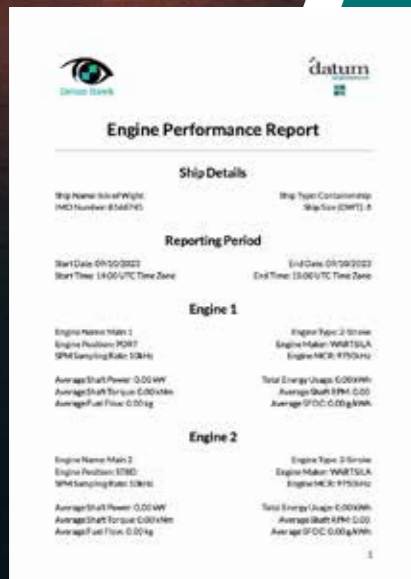
Unlock the Full Potential of Your Hardware

ECR2 seamlessly integrates with your Datums Electronics SPM system, providing the engine control room with unparalleled access to crucial power information. But that's not all – we go beyond data access.



From power to SFOC

ECR2 offers more than just data access; it equips you with user-friendly reporting tools that put the power of insights at your fingertips. And for those looking to take their vessel to the next level, ECR2 offers the option to upgrade and include SFOC (Specific Fuel Oil Consumption) data.



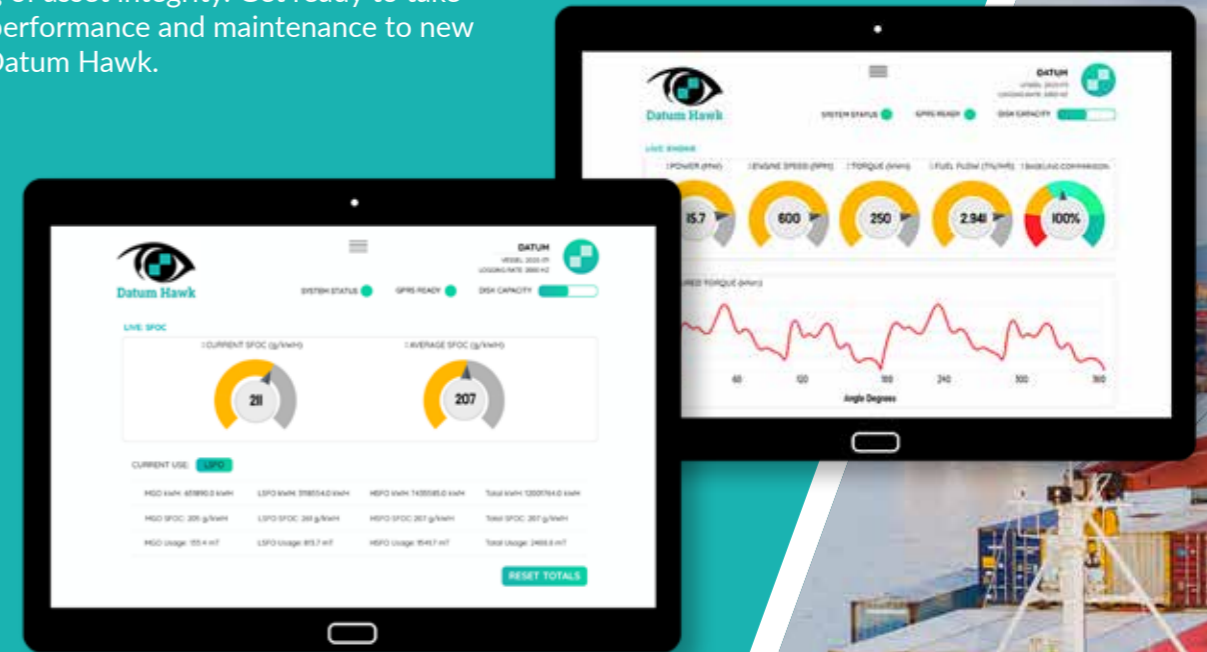
The Datum Hawk Project

A New Era in Predictive Maintenance

ECR2 marks the first step in our journey toward Datum Hawk, a cutting-edge predictive maintenance system. Datum Hawk taps into the vast reservoir of data collected by our SPM hardware, transforming it into actionable insights for vessel engineers and owners.

Unprecedented Asset Integrity Insights

Datum Hawk employs Torsional Vibrational Analysis, providing engineers and owners with an unparalleled understanding of asset integrity. Get ready to take your vessel's performance and maintenance to new heights with Datum Hawk.



Engine Profiling



Fuel Saving



Predictive Maintenance



Fuel Consumption (SFOC)



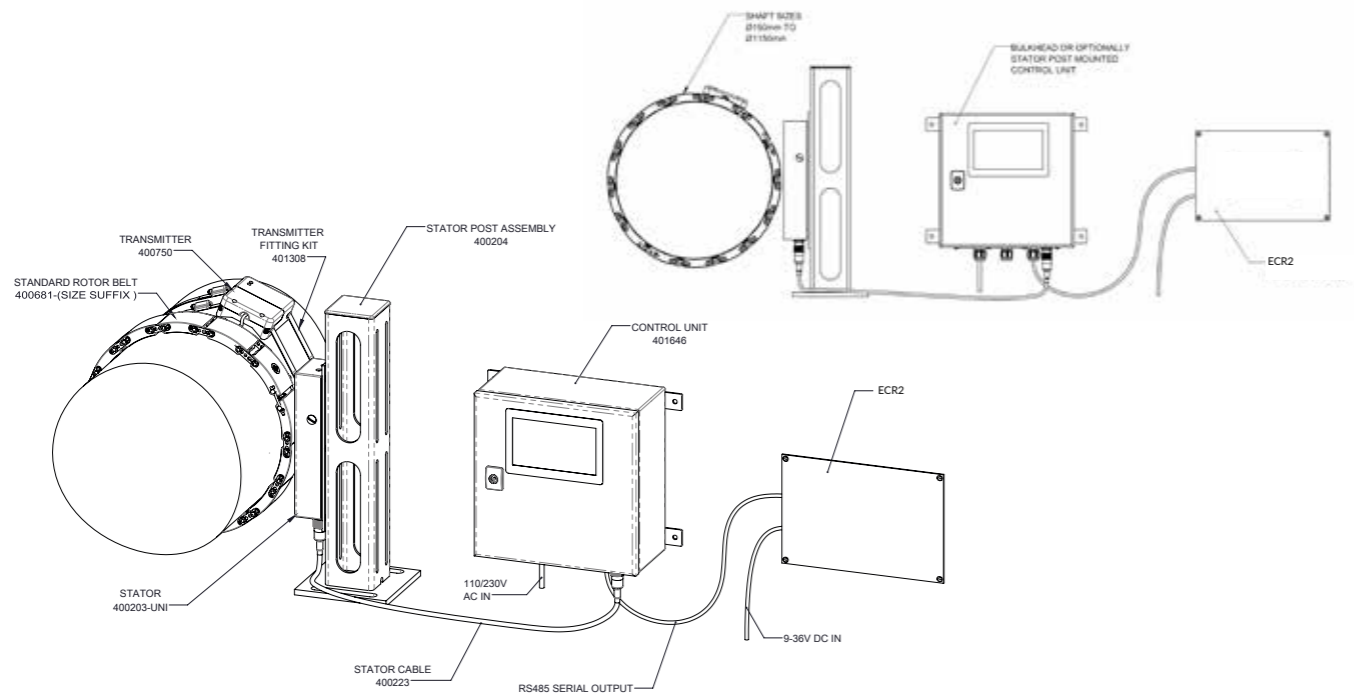
24/7 Condition Based Monitoring



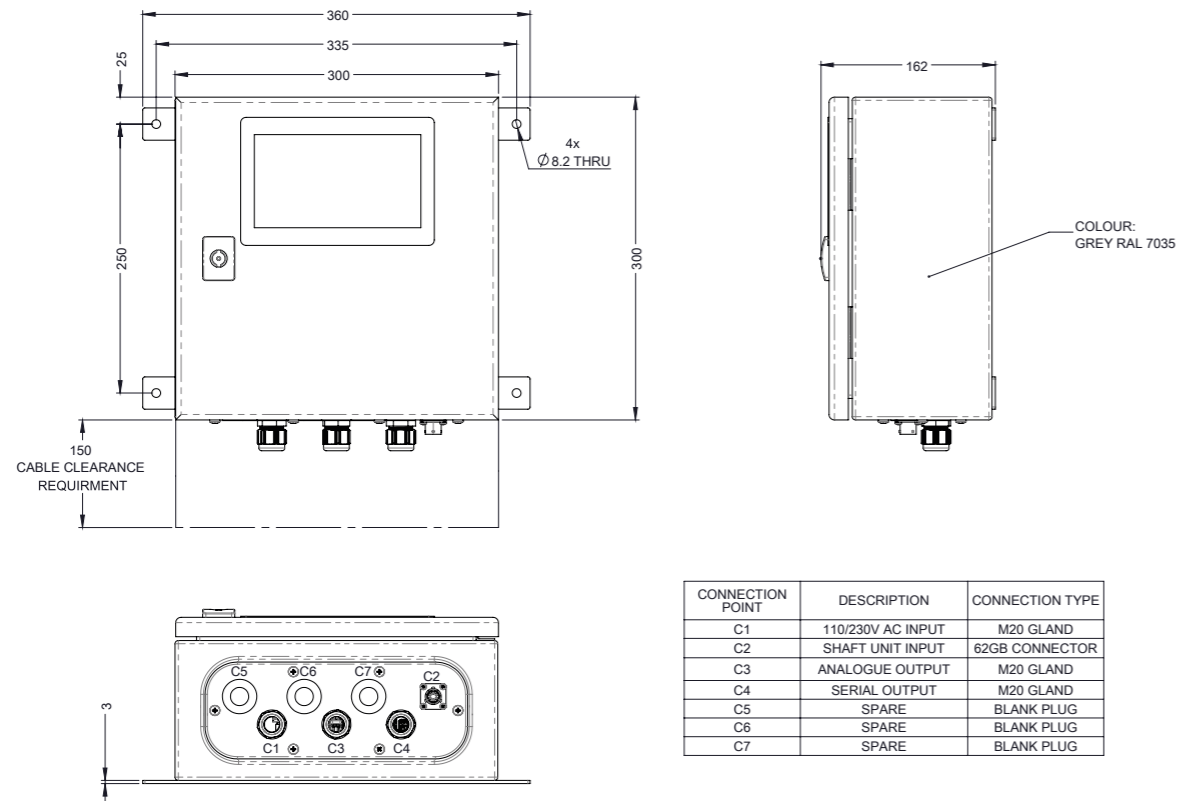
AI & Machine Learning Techniques

Dimensions

General Overview



Control Unit



Technical Specification

Instrumentation Accuracy	Shaft Torque	0.1%
	Shaft RPM	1 RPM
	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 this average is set the application and can vary from 0.1sec 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 MH/MW
	Power Measurement Data Output	Average Values of Shaft Power, Torque and Speed are logged at 10 times per second
Environmental	Operating Temperature	0°C to +55°C
	Storage Temperature	-25°C to +70°C
	Temperature Effect on Readings	0.01% FS per degree centigrade
Environment Sealing	Shaft Mounted Equipment	IP65
	Universal Stator Unit	IP65
	Control Unit	IP54
	Panel Mounted Display Unit	IP54 front and rear
Power	Supply Voltage	110-230 2Amps Vac, 24Vdc
Calibrated Outputs	Selectable Digital outputs	RS485 [BMT-ECR] Required for use with EEXI RS485 NMEA (Not compatible with EEXI) RS485 MODBUS (Not compatible with EEXI)
Analogue Outputs	Selectable Analogue outputs x 3 channels for Torque, Speed and Power	4-20mA 12+/-8mA 0-10V 0-5V +/-10V +/-5V

Additional Environmental Testing

TEST	IEC60945:2002 inc Corr 2008 and IACS E10: 2018	TEST	IEC60945:2002 inc Corr 2008 and IACS E10: 2018
Conducted LF Immunity	IACS E10:2018	Low Temperature (start-up)	EN 60068-2-1: 2007
Conducted RF Immunity	EN 61000-4-6: 2014	Humidity Test 1 - Cyclic	EN 60068-2-30: 2005
Radiated RF Immunity	EN 61000-4-3:2006 + A1: 2008 + A2: 2010	High Voltage	EN 60092-504: 2001
Fast Burst Transients	EN 61000-4-4: 2012	Vibration	EN 60068-2-6: 2008
Surge Immunity	EN 61000-4-5: 2014 + A1: 2017	Power Supply Variation	EN 60092-504: 2016
Electrostatic Discharge	EN 61000-4-2: 2009	Power Supply Failure	EN 60092-504: 2016
Radiated Emissions	EN 55016-2-3: 2017 + A1: 2019	Insulation Resistance	IACS E10: 2018
Conducted Emissions	EN 55016-2-1: 2014 + A1: 2017	Acoustic Noise	Section 8 Table 2.3 IEC 60945: 2002
Performance Test	IACS E10: 2018	Compass Safe Distance	Section 8 Table 2.3 IEC 60945: 2002
Dry Heat	EN 60068-2-2: 2007	Static Inclination	EN 60092-504: 2016
Low Temperature	EN 60068-2-1: 2007	Dynamic Inclination	EN 60092-504: 2016