

# SERIES 420 Shaft Power Meter

Needles Building, Trinity Wharf, East Cowes, Isle of Wight, PO32 6RF

T: +44 (0) 1983 28 28 34 F: +44 (0) 1983 28 28 35 E: web@datum-electronics.co.uk W: datum-electronics.co.uk

## Shaft Power Meter

### DESCRIPTION

Datum Electronics Series 420 Shaft Power Meter provides an accurate tool to assess and monitor propeller shafts on ships by measuring shaft speed, torque and power. This Power Meter System can be installed on a ships propeller shaft or shafts and uses strain gauge technology providing a highly accurate non-contact method of measuring shaft torque.

The aim of this system is to offer the basic tools required to provide the means to operate a ship at its maximum efficiency level. To achieve this accurate shaft speed, power output and torque information on a ships propeller shaft is fundamental to provide a perfect balance and greater fuel economy.

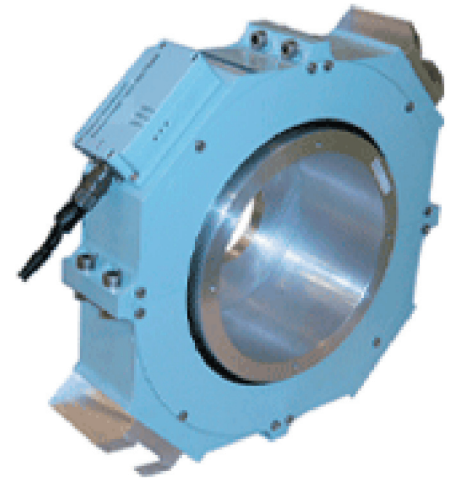
### SYSTEM OUTLINE

The Datum Electronics Series 420 Marine Shaft Power Meter accurately measures the on-shaft torque (kNm), 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.

The 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 ships 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.

**“ If you are looking at ship efficiency systems and analysis tools to determine power efficiency then the Datum Series 420 Marine Torsionmeter is a valuable tool. ”**



### 420 SHAFT POWER METER

SINGLE OR DUAL SHAFT SYSTEM

SHAFT SIZES RANGE FROM  
160MM — 1100mm DIAMETER

STRONG ROBUST DESIGN  
TESTED TO DEFSTAN 59-41,  
61-5, 08-123 (NES 1004)

SHIPS DATA INFORMATION RELAYED TO PC

- RUNNING HOURS
- ACCUMULATED POWER
- POWER LOG
- TORQUELOG

FLEXIBLE SYSTEM FOR SEA TRIALS OR  
PERMANENT INSTALLATIONS

DISPLAY(S) FOR REMOTE MONITORING OF  
TORQUE, SPEED AND POWER

### SINGLE OR DUAL SHAFT MEASUREMENT

The Datum Electronics Series 420 Shaft Power Meter System can either be a dual or a single shaft system to provide highly accurate non-contact torque measurement of shaft torque, speed and power.

The Datum Electronics  
Series 420 Shaft Power Meter System  
has been developed  
to accurately access and monitor  
the performance and efficiency  
of the ships transmission system

## PRODUCT DEFINITION

The Datum Electronics Series 420 Shaft Power Meter System can either be a dual or a single shaft system to provide highly accurate non-contact torque measurement of shaft torque, speed and power.

The system comprises:-

A shaft Unit which is fitted to each propeller shaft to measure torsional strain and rotational speed.

A Control Unit to provide power to, and take data from, the shaft units, to calculate calibrated torque and shaft power (as a function of measured torque & speed). The Control Unit also records & displays accumulated running hours for each shaft.

An optional Display Unit that displays, Torque, Rotational Speed (and direction 'AHEAD' or 'ASTERN') and Calculated Power from the shafts. This feature is an additional extra and where required.

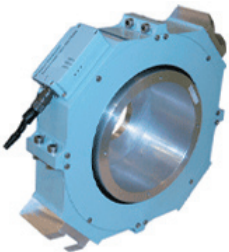
## SYSTEM DATA

A Series 420 Marine Shaft Power Meter System effectively allows you to monitor the ships propeller shaft in terms of its efficiency and performance levels, which can lead to reduced fuel costs and improved performance.

- Reduce fuel costs
- Optimisation of fuel and cylinder oil consumption
- Protection against engine overload
- Increase profitability
- Analysis of increased power compensation caused by natural growth on ships hull.
- Allow for better planning and scheduling of maintenance works
- Increasing a ships speed performance whilst reducing fuel consumption.
- Synchronise load distribution on two-shaft ships
- Verification of engine efficiencies as specified by engine suppliers
- Quick analysis of failures or inefficient drive systems
- Condition based monitoring of a ships transmission system during operation
- Continuous power monitoring

## EQUIPMENT SPECIFICATION

### ON-SHAFT EQUIPMENT



The Series 420 Shaft Power Meter System provides a display of the shaft torque, rotary speed and power. The torque signal is derived from strain gauges installed on to the shafts. The shaft speed signal is derived from an on-shaft speed pick off within the stator unit. These signals are transmitted from the shaft rotor to the shaft stator unit. These signals are then transmitted to the Control Unit and calibrated to provide a display of torque, speed and power for either a single or dual shaft.

DESIGNED TO FIT SHAFT DIAMETER 160MM - 1100MM

### CONTROL UNIT



The control unit is the main hub of the system and applies preset calibration values to the data received from the shafts and displays torque in kNm. It also calculates power from torque & speed data and uses the presence of speed signal to accumulate 'shaft running hours' for each shaft and this is displayed on the control unit. Once all the information has been processed the unit transmits Torque, Speed and Power data via RS485 to the remote display(s).

DIMENSIONS: L: 240MM W: 304MM D: 40MM

### DISPLAY UNIT



(OPTIONAL)

The remote display(s) receive RS485 Data and display Torque, Speed and Power. Each remote display(s) shows Torque, Speed and Power and as required. The display(s) also show direction of shaft rotation which is annotated by an illuminated legend, showing 'AHEAD' or 'ASTERN'.

DIMENSIONS: L: 200MM W: 210MM D: 40MM

## SHAFT SPECIFICATIONS

The Series 420 Shaft Power Meter (SPM) fits ship shaft diameters between (160mm - 1100mm). The shaft installation comprises a standard stator unit that provides power to the on-shaft electronics and conditions the output signals.

The Series 420 Shaft Power Meter (SPM) fits ship shaft diameters between (160mm - 800mm). The system (SRS) has a complete stator assembly that encloses the shaft. The stator housings are manufactured to cater for a range of shaft sizes.

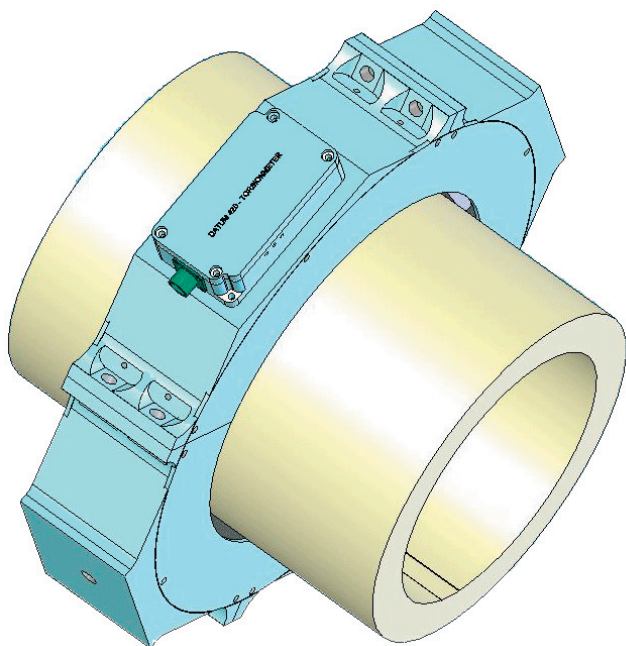
SIZE 1 - SHAFTS 160mm — 250mm

SIZE 2 - SHAFTS 250mm — 350mm

SIZE 3 - SHAFTS 350mm — 500mm

SIZE 4 - SHAFTS 500mm — 650mm

SIZE 5 - SHAFTS 640mm — 800mm



## SYSTEM INSTALLATION

One of the advantages of this type of system is how easy the installation process is made. The shaft system is easy to install around the shaft and the control unit and display unit have been designed for easy installation within a marine environment.

The Torsionmeter System has a shaft installation supplied as a rotor sub-assembly and a stator sub-assembly.

The installation on to each shaft comprises a dual bridge strain gauge installation. The installation of the rotor is followed by the installation of the stator. The rotor sub-assembly is split into two halves and bolted over the strain gauge installation. The rotor houses the rotor electronics module, acts as a carrier for the rotor coil and physical protection for the strain gauges. To maximise the vibration tolerance between the shaft and the stator the stator should be centred about the shaft to a tolerance of  $\pm 1$ mm, this will allow an additional vibration tolerance of  $\pm 6$ mm. On larger shafts this vibration tolerance is between  $\pm 2.5$  to  $3.5$  shaft diameter.

The Control Unit is supplied as a complete assembly; it requires four physical mounting points for easy installation and 9 off connection points. The optional Remote Display Units are supplied as a complete assembly, with four physical mounting points and 2 off connection points.

Contact Datum Electronics Ltd for full details of the Series 420 Shaft Power Meter. The system is flexible to your requirements and environment, so if you require single or dual shaft installation on shaft diameters between 100mm - 650mm, one, two or three remote display units, the Series 420 Shaft Power Meter System can meet your requirements.

Datum Electronics Limited  
Needles Building  
Trinity Wharf  
East Cowes  
Isle of Wight  
PO32 6RF  
United Kingdom

T: +44 (0) 1983 28 28 34 (International)  
T: 01983 28 28 34 (UK)  
F: +44 (0) 1983 28 28 35  
E: sales@datum-electronics.co.uk  
W: www.datum-electronics.co.uk

 datum  
electronics