



TORQUE MONITORING FOR ELECTRIC DRIVE SHIPS

MEASUREMENT FOR HIGH EMI ENVIRONMENTS

Application: Torque Monitoring for Electric Drive Ships (in a high EMI environment)

Wireless torque measurement for new designs of large ships

Industry: Marine

Product: [AT-4400](#)

Parameters measured: Torque

When a government laboratory needed to monitor torque in the presence of high EMI from variable speed drive circuitry, they found that their legacy FM telemetry systems were not able to reliably transfer data. In searching for an alternative, they found Accumetrics' website, and recognized that digital telemetry would be a likely solution. The AT-4400 was identified as a unit of choice. The needs for the system were:

- No dropouts (gaps in data) or distortion due to EMI interference
- Long term operation (no batteries)
- High resolution

A demonstrator AT-4400 was tested in an EMI susceptibility chamber and found to far surpass the older existing telemetry systems' EMI capability during swept frequency testing. An AT-4400 system was obtained for a large drive shaft and has been shown to be capable of withstanding modern ship operating requirements as seen in DD(X) and other high power/ highly noise prone AC drive designs.

The AT-4400 samples at 26,484 samples per second, and has outstanding accuracy, noise floor, and resolution (16 bit).





- The top picture shows a split clamp-collar glass laminate (G10) transmitter collar surrounded by a rigid phenolic pickup loop for induction power and data.
- The middle picture shows the front of the Receiver, with on-the-fly shunt calibration control (controlling a shunt resistor at the rotating transmitter).
- The bottom picture shows the AT-4400 Receiver rear view. The Receiver is the digital to analog 0 +/- 10V output device. The open panel shows the fine adjust gain, offset, and symmetry controls, the coarse gain and offset controls, and the output signal filter control.



6 British American Boulevard Suite 103-F, Latham, NY 12110 USA
Toll-Free in the USA: **888 684 0012**
Phone: **1 518 393 2200** | Email: **telemetry@pcb.com**

Accumetrics, Inc. provides digital telemetry systems used in a variety of applications such as aerospace, marine, defense, agriculture, transportation, milling operations, energy, and power generation. Systems transmit sensor data from rotating structures using wireless techniques, preserving the integrity of the data even in environments with high levels of electromagnetic interference. Measurement solutions range from single channel products, such as strain gage torque measurements, to advanced custom multichannel systems. Accumetrics, Inc. is a subsidiary of PCB Piezotronics, Inc., and PCB® is a wholly owned subsidiary of MTS Systems Corporations.

© 2019 Accumetrics, Inc. In the interest of constant product improvement, specifications are subject to change without notice. PCB®, ICP®, Swiveler®, Modally Tuned®, and IMI® with associated logo are registered trademarks of PCB Piezotronics, Inc. in the United States. ICP® is a registered trademark of PCB Piezotronics Europe GmbH in Germany and other countries. UHT-12™ is a trademark of PCB Piezotronics, Inc. SensorLine™ is a service mark of PCB Piezotronics, Inc. SWIFT® is a registered trademark of MTS Systems Corporation in the United States. All other trademarks are property of their respective owners.

MD-0422 revNR 0719



MTS Sensors, a division of MTS Systems Corporation (NASDAQ: MTSC), vastly expanded its range of products and solutions after MTS acquired PCB Piezotronics, Inc. in July, 2016. PCB Piezotronics, Inc. is a wholly owned subsidiary of MTS Systems Corp.; IMI Sensors and Larson Davis are divisions of PCB Piezotronics, Inc.; Accumetrics, Inc. and The Modal Shop, Inc. are subsidiaries of PCB Piezotronics, Inc.