Panametrics

Application note

Ensuring Mission Critical Reliability:

How a major navy achieved accurate and reliable flow verification with Panametrics' PT900 clamp-on flow meter technology

Summary

Operating a military submarine is a highly complex task, requiring numerous interconnected systems to function in precise coordination. Even minor failures can have serious consequences, including risks to personnel and significant damage to critical and costly equipment.

To mitigate these risks, system reliability is critical, and redundancy must be embedded by design. In this case, Panametrics' customer, a major navy, required a dependable way to verify flow rates across multiple piping systems within submarines.

Piping systems carry either cooling water to keep engines and other equipment operating at optimal temperatures or lubricating oil to reduce friction related overheating in mechanical components. However, strict space limitations on board submarines made it impractical to install dedicated measurement equipment on each line.

As a result, the customer sought a portable, versatile solution capable of delivering reliable flow measurements across different systems. This challenge is common not only to submarines but to marine vessels in general, where space constraints and operational flexibility are key considerations,

Benefits:

- Ease of installation
- Ability to run a quick and effective survey
- No process shutdown required for continuous operation
- Strong local support
- Rock-solid performance

Fig. 1: PT900 transmitter front view

Application

Medium:	Cooling water & lubricating oil
Pipe size and thickness:	Various
Pipe material:	Various
Pressure:	Various
Flow rate:	Various
Temperature:	5-180°C
Requested accuracy:	2%

Challenges

Flow measurement devices used on military submarines must meet exceptionally high reliability standards and typically require annual recalibration or validation from the manufacturer to ensure accuracy and reliability. However, completing this process with permanently installed inline meters would create a significant operational and logistical challenge.

As a result, the customer recognized that it needed a solution that was highly robust and easy to deploy, minimizing maintenance effort while delivering advanced levels of accuracy and reliability. In addition to measurement performance, additional factors such as ease of operation, responsive technical support, and long-term availability of spare parts were also critical.

Few manufacturers are capable of meeting all these requirements. However, the customer's prior positive experience with Panametrics products gave them confidence that the Panametrics team would address the demanding needs of the application.

Solution

The selected solution consisted of five PT900 clamp on portable flow meters paired with C RR and CF LP transducers. This configuration delivered the flexibility needed to obtain accurate measurements across a wide range of pipe diameters and operating temperatures found throughout the submarines. In addition, the ability to mount the transducers on various parts of the pipe—such as the top or sides—provided even greater adaptability, allowing the system to perform effectively despite the limited space available.

Fig. 2: PT900 clamping fixture for C-RR transducers

The integrated data logging capability allows the customer to collect flow data over time, supporting both system verification and long term performance trending. Stored log files are retained for subsequent analysis, enabling proactive identification of deviations or emerging issues.

Reliable connectivity was another key requirement. The PT900's strong Bluetooth signal ensures stable communication even in the confined, compartmentalized environment of a submarine, where signal propagation is inherently challenging.

Finally, onsite training and dedicated after sales support were essential elements of the overall solution. Due to regular personnel rotation, recurring training is required to ensure consistent and correct system use, making long term support and knowledge transfer critical to sustained operational success.

The PT900 ultimately delivered exactly what the customer required: a precise, reliable, and user friendly flow measurement solution designed for the most demanding marine environments. With consistent results, dependable performance, and long term support, the customer now has complete confidence in its piping system measurement process.

PANA134AN (02/2026)

Panametrics

panametrics.com