



Restoration and Recalibration Maintains Measurement Integrity and Performance of SWIFT® Transducers



SWIFT cells



A SWIFT system returned for recertification

Few transducers take as much punishment in their service life as an MTS SWIFT wheel force transducer. The SWIFT sensor is designed to handle this rugged use. An exclusive automated process with custom engineered software and hardware has calibrated each SWIFT unit that leaves the factory. The performance of these units should be verified and maintained over time. That is why MTS offers a complete, comprehensive, and sophisticated recalibration service that validates system performance. Calibration factors are then adjusted to help ensure the highest measurement accuracy. Mechanical and electrical components are also examined with corrective actions identified to restore the unit to its optimal condition. The SWIFT sensor restoration and recalibration process assures the precision and reliability you need and expect. This service is recommended annually to help ensure optimal design performance.

TRACEABLE REFERENCE STANDARDS

MTS has engineered a calibration stand and software to quickly, comprehensively, and completely deliver a thorough calibration in metrological compliance with ISO17025. After a careful visual inspection, each SWIFT system is mounted on the calibration stand where a matrix control of ten actuators applies true vector loads to each axis through NIST-traceable reference standards. As the loads are applied, raw bridge output signals from the SWIFT system and reference standards are acquired and recorded. The calibration software collects the data and computes the required calibration gains and crosstalk compensation coefficients, loading them into the system's transducer interface electronics. After computing the calibration file, all loads are reapplied and final outputs from the transducer interface are recorded to report final system accuracies. The applied forces in each loaded axis are read through the NIST-traceable calibration reference cells. Displacement controls in combination with slack adapters are used to verify no-contact loading in the unloaded axis. All output signals are recorded by a metrology-certified digital multimeter.

CONTRIBUTING FACTORS THAT DRIVE VARIABILITY IN RATES OF SWIFT SYSTEM DETERIORATION

Accumulated usage, severity of application, and environmental operating conditions combine to vary the rate of normal wear and potential loss in SWIFT transducer measurement integrity and performance. This rate of deterioration accelerates when equipment is pushed beyond its design limitations or when operational errors occur. The tangible outcomes of unchecked degradation are 1) reduced equipment capability, 2) lower data fidelity, and 3) higher downtime percentage. All of these negatively impact a user's operating cost.

Lead times are pre-established for following standard services based on the business day product is received in the MTS factory via the official RAN process.

FUNCTIONAL SWIFT SYSTEM RETURNED

FOR RECERTIFICATION

Leadtime is 10 business days for functional SWIFT systems when scheduled 4 weeks in advance of receiving unit

- A1. Check and recertify to original gain
- A2. Optimized with new gain settings
- A3. Spinning tests on a rotating stand to verify rim and hub adapter effects.
- A4. Spider, TI Box, and Encoder Validation testing
- A5. ECN upgrades as relevant to TI Spider box
- A6. Non-bridge related non-volatile repairs
 - » Remove and reseal elastic compound
 - » Clean, check, and/or adjust slip ring / encoder

NON-FUNCTIONAL SWIFT SYSTEM RETURNED FOR REPAIR AND CALIBRATION

Lead times are additive when combining elements from both the non-functional and functional columns

- B1. Simple repair of electrical connections & components and re-load firmware/software (1 week)
- B2. Replace failed Slip Ring and/or Encoder (3 days)
- B3. Repair Slip Ring & Encoder (4 weeks)
- B4. Complex Spider and/or TI box repair/Replacement (2 weeks)
- B5. Strip, regage and test only (4 weeks)
- B6. Replace with a new cell, tested only (1 week)

A periodic process of recertifying a SWIFT system is the only effective means of assessing its current state of integrity and identifying any corrective action needed for restoration. The optimal recertification cycle for a given SWIFT system is determined by considering all contributing factors driving its rate of deterioration. Based on nominal usage, SWIFT transducers have the unique attribute of reflecting a lower total cost of long-term ownership when they are annually recertified by MTS. The reason is rather simple. Early detection of minor degradations to the non-bridge related areas of a SWIFT system can be easily and more economically corrected during a planned maintenance cycle. Left unchecked, the potential rises for a more severe degradation, triggering more costly damage to the bridge related areas.

SWIFT cells are designed with the compliance needed to provide the sensor sensitivity to measure slight changes in forces and moments. Elastic sealing compounds are used to provide this compliance. The seal integrity is critical to keeping moisture and other corrosive elements away from the bridge area. MTS uses a unique pressurize-and-hold testing methodology to validate the seal integrity. MTS replaces the elastic sealing compound if any seal degradation is discovered. A full MTS recertification also examines cabling and other electrical wiring connectivity issues, including slip ring and encoder transmission when applicable in the non-bridge related areas. This eliminates most intermittent connector issues. The process also identifies any rise in slip ring signal-to-noise ratios that require corrective action in advance of unacceptable degradation in measurement fidelity.

CATEGORIES OF RESTORATION:

THE PLANNED APPROACH TO SWIFT LIFECYCLE EXTENSION

As the OEM of SWIFT systems, MTS has harnessed years of repair experience in defining categories of restoration. The categories enable modular methodologies for SWIFT system asset management. A successful SWIFT sensor recertification process uses this modular structure to achieve the desired technical results with greater budget certainty and lower long-term cost of ownership. Enrolling in periodic recertification creates a natural lifecycle extension for your SWIFT systems, thus enhancing the returns on your initial investment.

Our MTS metrology system uses a Met-Track system for customers that enroll in a planned approach for asset management. This allows reservations to be placed at specific times throughout the year to ensure faster cycle times for the recertification of your SWIFT cells. We have options available to couple our Met-Track recall system with a service contract tailored to your needs.

BE CERTAIN OF SWIFT SYSTEM INTEGRITY WITH MTS

Only MTS can truly calibrate, adjust, and restore SWIFT wheel force transducers to design specifications and stated accuracies. The MTS calibration system provides the most accurate calibration of wheel force transducers available in the industry. MTS has the product experience, automated system, and metrological processes to assess and make any adjustments required to ensure the patented SWIFT system is certified for optimal accuracy. MTS SWIFT transducer calibrations provide both an as-found verification and a newly optimized calibration data. In this way, you are assured that the best possible product is returned to you following its calibration. Compare this to verification only, where errors are reported but performance is not optimized. MTS SWIFT transducer calibrations provide full-scale loading so that the true errors are reported. Other wheel force transducer calibrations may load through the tire assembly. Since tires are not uniform, and do not present a controlled geometry, load application points change as the tire patch changes and deforms under loading. Another problem in load application through a tire occurs with tire slippage, often resulting in the need to do partial range calibrations, which do not accurately report errors at full-scale loads. The MTS automated SWIFT transducer calibration system is unmatched in its capabilities to perform calibrations on SWIFT systems.

FAST TURNAROUND

Most calibrations and recertification of functional SWIFT systems can be performed with a two-week turnaround. We use our proven Return Authorization Number process to track and complete the factory services required of a SWIFT system. This includes collecting critical customer input on both the scope of the requested work and capturing any problem reporting with the equipment being returned.

In the MTS factory process, the unit is calibrated in an “as found” condition, with loads applied using the previous year’s calibration settings. “As Found” accuracy is verified and reported into the calibration report. MTS calibration technicians proceed to then adjust gains to optimize the accuracy of the SWIFT system. The final accuracy of the “As-Left” condition is verified and a comprehensive calibration report produced. The report includes the following information:

- » System Serial Number and Model
- » Customer ID
- » Full-Scale Range
- » Current Calibration Date
- » Previous Calibration Date
- » Current Calibration Gain Settings
- » Previous Calibration Gain Settings
- » Summary of Max Errors for Each Axis in Previous, As Found, and Current Calibration Status

RENTAL UNITS CREATE MINIMUM DISRUPTION

For minimal interference with your testing program, MTS can provide a rental unit for the duration of the factory-calibration period. This allows a seamless flow of your testing program while your SWIFT units are recalibrated.

FOR MORE INFORMATION

For more information on MTS SWIFT transducer calibration, contact your local MTS field service technician, or contact MTS at 800-328-2255, or 1-952-937-4000, or (e-mail) info@mts.com.



SWIFT transducer calibration stand



MTS Systems Corporation

14000 Technology Drive
Eden Prairie, MN 55344-2290 USA

Toll Free: 1.800.328.2255

Fax: 1.952.937.4515

E-mail: info@mts.com

www.mts.com

ISO 9001 Certified QMS

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