

Force Measurement for Demanding Bolted Connections S.Bolt XP

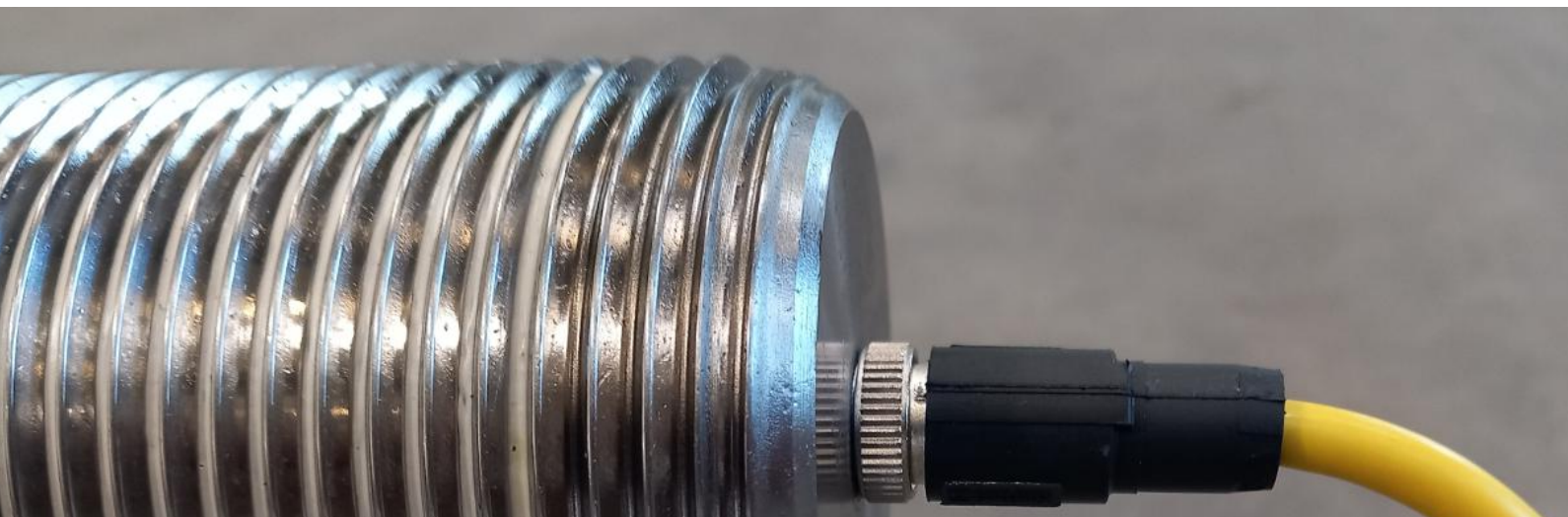
Integrated force measurement for
large bolts from M24 upwards –
for permanent monitoring of preload
and dynamic loads without
compromising the mechanical integrity
of the fastener

Compliant and Robust by Design

The S.Bolt XP was specifically developed for applications in which the mechanical integrity of bolted connections has the highest priority.

A central feature is the sensor system fully integrated into the thread root. This design enables the measurement of axial forces (version XA), bending (version XB) and torsion (version XT) without impairing the structural strength of the bolt. In contrast to conventional solutions in which drill holes or external cable ducts may alter mechanical properties, the S.Bolt XP fully retains its function as a fastening element.

By combining a standards-compliant design with innovative sensor integration, the S.Bolt XP is ideally suited for safety-critical applications in industry, energy and infrastructure.



Easy to integrate and durable

The S.Bolt XP can be seamlessly integrated into existing monitoring systems and supports both local and cloud-based analysis.

Via standardized interfaces, the sensor can be directly connected to industrial controllers, data loggers or gateways. For centralized data analysis, Sensorise Insights provides a scalable cloud solution that visualizes measurement values in real time and prepares them for condition assessment.

The system has a modular design. Sensor element, connection cable and evaluation electronics are clearly separated and can be configured according to the application. This allows the S.Bolt XP to be flexibly adapted to different requirements, from single-point monitoring to comprehensive condition monitoring of complex systems. Mechanical compatibility with common bolted connections enables easy retrofitting without structural modifications to the component.

Installation is carried out using standard tools and established methods such as torque-controlled or tensioning procedures. No special adapters or additional calibration aids are required

More safety for your projects

With the S.Bolt XP, you receive a measurement system that makes safety-critical bolted connections transparent and traceable.

Continuous monitoring of preload forces and dynamic loads enables early identification of risks such as loosening or overload.

Complete documentation supports assessment by external bodies and facilitates compliance with technical standards..



Preload force and dynamic loads under control

The S.Bolt XP demonstrates its strengths especially in continuous operation. Permanent reading of sensor data reliably detects gradual loss of bolt preload and records every dynamic load. Load cycles and load amplitudes can be precisely documented and directly incorporated into fatigue calculations. This creates a reliable basis for service life analysis and increases the operational safety of complex structures.

Data acquisition can take place in two ways. Locally via the fieldbus level or via a cloud-based solution. Fieldbus integration provides significantly higher temporal resolution and is ideal for applications with rapid load changes or safety-critical components. The cloud solution enables location-independent access to all monitoring data and is particularly suitable for higher-level analyses and fleet management. In practice, a combination of both approaches is recommended. Fieldbus for high-resolution real-time monitoring and cloud for centralized data storage and evaluation.

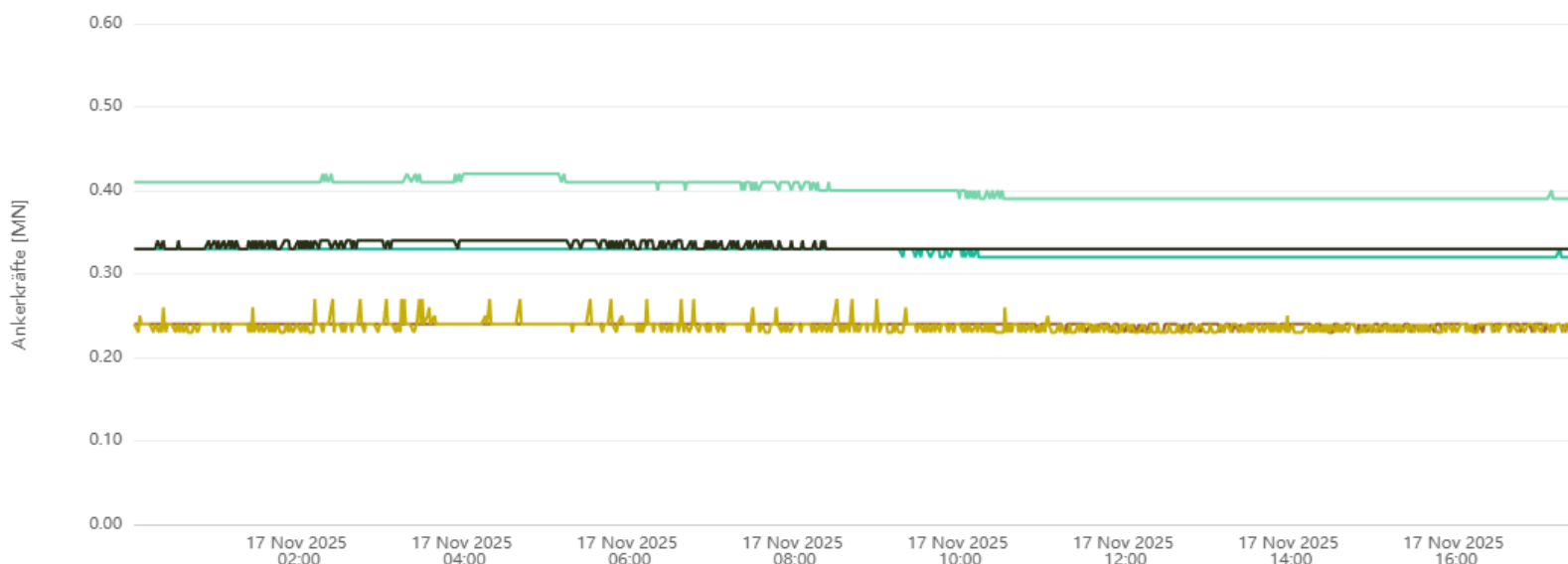
React early, avoid risks

Through continuous monitoring of bolt preload and occurring loads, the S.Bolt XP delivers decisive information in real time. Critical changes such as gradual preload loss or unexpected dynamic loads are detected immediately.

Maintenance measures can therefore be initiated in time before damage or failure occurs. Early response not only reduces the risk of structural failure but also extends the service life of the entire system.

Whether via fast fieldbus integration or the centralized cloud solution, you maintain full visibility at all times and ensure the reliable operation of your structure..

Kraftverlauf



All facts at a glance

Application: Measurement of forces in bolts with metric thread according to DIN ISO 965 or DIN 13-1

Minimum thread size: M24

Design variants: All common bolt types as well as custom-designed products

Measurement technology: Full Wheatstone bridge strain gauge configuration, temperature compensated. Optional temperature measurement available..

Measured quantities and versions:

S.Bolt XA: Axial strain bolt preload

S.Bolt XB: Bending load

S.Bolt XT: Torsional load

S.Bolt AB: Axial strain and bending

S.Bolt AT: Axial strain and torsion

Optional temperature measurement available for S.Bolt XA, XB and XT..

For extremely demanding environmental conditions, a specially encapsulated version S.Bolt XAR is available.

Calibration: Calibration according to DIN 376 up to 7500 kN available upon request.

Connection: M12-A industrial connector

Protection class: IP65



Steel with sensors. Supporting tomorrow.

Sensorise GmbH, based in Bremen, develops and integrates sensor technology into fastening elements.

Our solutions capture and analyze forces in real time and provide the data for various applications.

They are used in different sectors including geotechnics, steel construction, mechanical and plant engineering, energy generation and civil engineering.

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Further Solutions from Sensorise

S. Ring M

The S.Ring M is a ring-shaped load cell for large bolts up to 100 meganewtons. It is designed for demanding environments with protection classes IP67, IP68 and IP69. Installation is tool-free.

S.Ring HFS

The S.Ring HFS is used for the continuous monitoring of geotechnical anchors and complies with the requirements of ÖNORM B 4456:2021 and DIN EN 1537 as well as DIN 51308.

Sensorise Insights

With Sensorise Insights, you receive data and create meaningful dashboards.

Services

We offer asset monitoring for the permanent monitoring of safety-critical machines, systems and structures. In addition, we support design validation based on real measurement data and develop customized solutions for sensor integration.