DS Series Bolt Preload Acquisition Devices

THETA

The DS series bolt preload acquisition devices are industrial-grade devices designed to monitor the health of critical bolts in industrial equipment. The devices feature resistance to interference, high accuracy, and durability, making them suitable for long-term operation in harsh industrial environments.

DS140 supports up to 4 probes, while DS180 supports up to 8 probes. The probes feature ultra-thin design and easy installation. The DS series preload acquisition devices are suitable for various applications, including wind turbine foundation anchor bolts, tower bolts, blade bolts, hydroelectric turbine fastening bolts, and steel bridge fastening bolts.

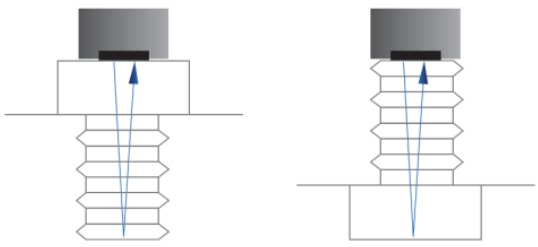
The device uses ultrasonic technology to accurately measure the time of the reflective ultrasonic waves. Additionally, each probe is equipped with a temperature probe to measure the surface temperature of the bolt. By applying a temperature compensation algorithm, the device can measure accurately and reliably the bolt's preload (axial tensile force) at different temperatures.

The sensor data is transmitted to remote monitoring system, allowing users to remotely monitor the bolt preload and receive timely alerts in case of loosening, fatigue, or fracture of the bolt. This allows continuous tracking of the entire process of bolt loosening, ensuring safe equipment operation, preventing unplanned downtime, and reducing maintenance time and costs.

Features and Advantages

Non-intrusive	⇨	No impact on the structure or strength of the bolt.
Accurate	⇨	Interference resistant and highly accurate, with automatic temperature compensation.
Easy-to-install	⇨	Compact and light-weighted probe; mounted with epoxy, welding, or clamp fixture.
Ruggedized	⇨	Waterproof, dustproof, shockproof, corrosion-resistant; suitable for harsh industrial environment.
Accessible	⇨	Remotely accessible anytime, anywhere; automatic alarm; maintenance free.
Convenient	⇨	Bluetooth compatible and connected via mobile APP.

The probe is installed non-intrusively on one end of the bolt. The DS series bolt preload acquisition device emits ultrasonic waves into the bolt's interior, and when the ultrasonic waves reach the other end or a fracture surface of the bolt, they are reflected back and received by the device for processing. Utilizing advanced signal processing technology and temperature compensation algorithms, the device can accurately calculate the preload and further determine the bolt's condition, such as loosening, fatigue, or fracture.

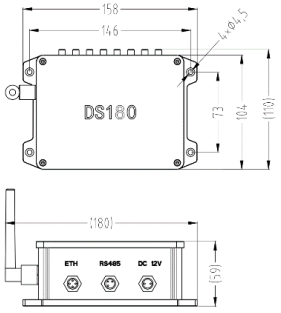


DS Series Bolt Preload Acquisition Devices

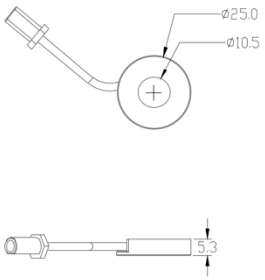
THETA SENSORS CORPORATION

Specifications

Product Model	DS140	DS180
Number of Channels	4	8
Preload Accuracy	1.5%	
Bolt Range	Installation on threaded end: M30 and above Installation on hexagonal head: M20 and above Total length of bolts: 200-6000 mm	
Temperature Range	-40~85°C	
Temperature Accuracy	±1°C	
Data Acquisition Rate	Up to 1Hz, configurable	
Communication	100M Ethernet; RS485 (optional)	
Protocols	TCP/IP, DHCP, NTP, MQTT, HTTP, Modbus RTU, Modbus TCP	
Power Supply	12-24VDC; 5W	
Interfaces	Ethernet: 4pin-M12; serial: RS-485 (optional)	
Switch	Power On/Off Switch	
Indicator	Steady On, Flashing, Steady Off	
Probe Size	See the diagram below	
Probe Lead Length	Up to 8 meters.	
Dimensions	158mm x 104mm x 59mm (L x W x H), see the diagram below	
Weight	800g	
Operating Temperature	-40~85°C	
Operating Humidity	10%~90% RH	
Enclosure	Aluminum alloy metal (main unit, integrated probe); stainless steel (split probe)	
Ingress Protection	IP67	
Mounting	Probe: adhesive (optional auxiliary fastening structure) Main unit: bolted	

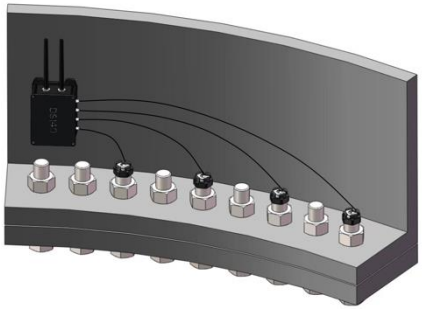


Main Unit



Probe

Mounting



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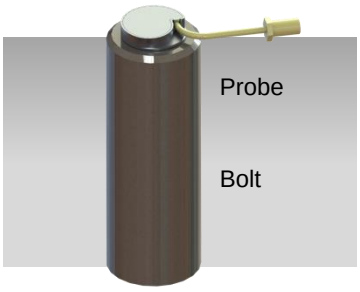

Probe

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