DS Series Bolt Preload Acquisition Devices

THETA

The DS series bolt preload acquisition devices are industrial-grade devices designed specifically for monitoring the health status 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, including wind power foundation anchor bolts, tower bolts, blade bolts, water turbine fastening bolts, steel structure bridge fastening bolts, and more.

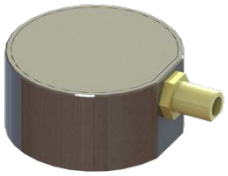
DS140 can connect up to 4 probes, while DS180 can connect up to 8 probes. There are two types of probes: integrated and split type. The integrated probes are ultra-thin and easy to install, making them suitable for environments where disassembly is not required or installation space is limited. The split type probes can be easily removed without affecting the maintenance of the 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 stress) at different temperatures.

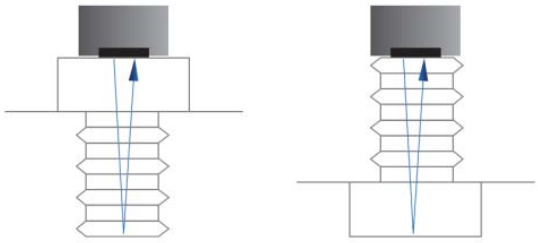
The sensor data is transmitted to a remote monitoring platform. Users can remotely monitor the bolt preload and receive timely alerts in case of loosening, fatigue, or fracture of the bolt. This allows continuous tracking of the entire process of bolt loosening, ensuring safe equipment operation, preventing 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.



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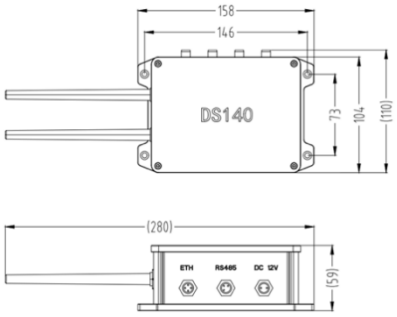
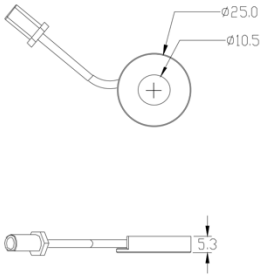
THETA SENSORS CORPORATION

Specifications

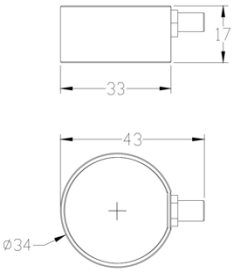
Product Model	DS140	DS180
Number of Channels	4	8
Preload Accuracy	1.5%	
Temperature Range	-40~85°C	
Temperature Accuracy	±1°C	
Data Acquisition Rate	Up to 1Hz, configurable	
Communication	100M Ethernet; RS485 (optional)	
Protocols	TCP/IP, DHCP, NTP, MQTT, HTTP, Modbus RTU, Modbus TCP	
Power Supply	12-24VDC; 5W	
Interfaces	Ethernet: 4pin-M12; serial: RS-485 (optional)	
Switch	Power On/Off Switch	
Indicator	Steady On, Flashing, 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	Integrated probe: adhesive (optional auxiliary fastening structure) Split type probe: magnetic and adhesive Main unit: bolted	



Main Unit

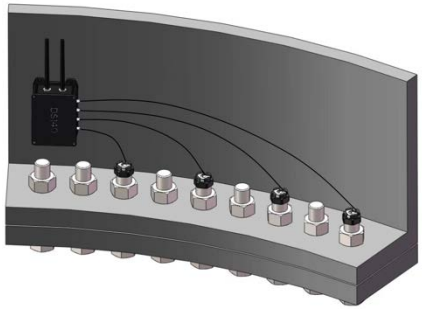


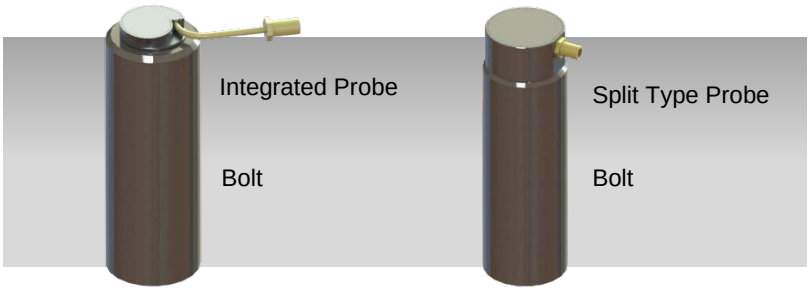
Integrated Probe



Split Type Probe

Mounting





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