

SPC4™ *Load Indicating Fastener*

Safety!
for Assembled
Joints



The **SPC4™** load indicating fasteners allow users to install a bolted assembly with accuracy and confidence. The user can constantly monitor the clamp load on the bolted joint, whether static or dynamic, by attaching a probe to the datum disc located on the head of the fastener and reading the value on a hand held battery powered digital monitor. Optional data gathering and storage are available.

The integrity of a bolted joint is jeopardized when fasteners lose their tension. This loss of clamping force begins during assembly due to elastic interactions and joint relaxation. Self-loosening continues when the joint is put in service due to vibrations, temperature changes, shock and other variables. The **SPC4™** allows the end-user to tighten **only** the bolts or studs that have lost their clamp load, minimizing expensive downtime and saving money. For a minimal investment, the **SPC4™** offers maximum joint integrity with optimum performance.

The **SPC4™** can be manufactured to many of the ASTM, ISO, SAE or any specified customer standards with various types of head configurations.

Applications:



- ◆ Critical Joints
- ◆ Friction Joints
- ◆ Flanges
- ◆ Tension Loaded Joints
- ◆ Foundation Bolts
- ◆ Slip Critical Joints
- ◆ Bearing Joints Requiring Full Pre-Tension
- ◆ Where Accurate Tension Must be Maintained
- ◆ Where Ease of Installation is a Must
- ◆ Gasketed Joints



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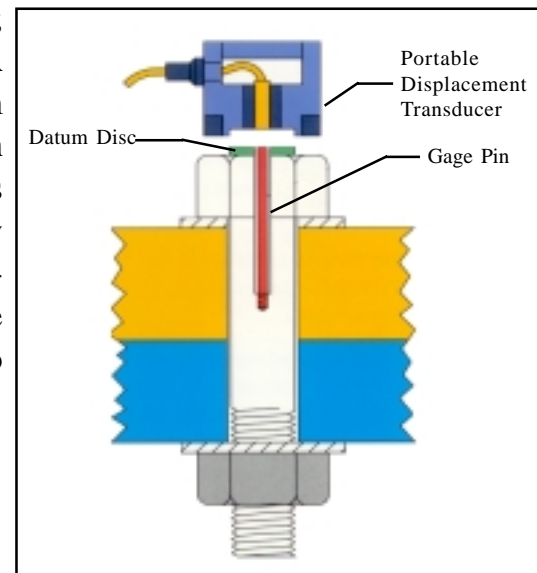
Advantages

- ◆ Accurate Joint Assembly
- ◆ Quick Installation
- ◆ Electronic Control of Installation Clamp Load
- ◆ Tightens to +/- 5% of True Clamp Load
- ◆ Any Tightening Tool can be Used
- ◆ Eliminate the Mystery of Torque Tightening
- ◆ Inexperienced Operators can Complete & Monitor Complex Assemblies
- ◆ Shut-off Capability of Installation Tool at Pre-determined Clamp Load
- ◆ Easily Displays the Amount of Clamp Load via an Electronic Hand Held Unit
- ◆ Capability for Continuous Monitoring
- ◆ Applies Uniform Distributed Load on Gasket Joints
- ◆ Reduces Inspection Time
- ◆ Prevents Expensive Downtime
- ◆ Safer Bolted Joint Assemblies
- ◆ Reduce Maintenance Cost
- ◆ Saves Dollars Optimize Bolted Joint Integrity

How Does an SPC4™ Function?

A fastener is modified by machining a small hole into the head; this minor engineered modification assures bolt design integrity. A gage pin is inserted into the hole and secured at the bottom. A datum disc is fitted on the top of the bolt head and forms a flat surface with the top of the gage pin when the bolt is unloaded. When the bolt is tightened, it elongates and the gage pin is drawn into the bolt away from the datum disc surface. A portable electronic displacement transducer measures the distance between the datum disc surface and the top of the gage pin. The elongation of the bolt is then correlated to joint clamp load via an electronic hand held monitor.

SPC4™ load indicators operate within the elastic limit of the bolt material in accordance with Hook's Law.



Load Progressions



Part with
Zero Load



Part with 50% at
Proof Load



Part with 90% at
Proof Load

and Accurate Bolted Assemblies

SPC4™ Load Indicator Monitor Models:

- ◆ **SPC-400 Series:** A portable hand-held monitor that displays bolt load (joint clamp load) as a percentage of its proof load.



SPC-400 Series



SPC-420, 440, 460 Series

- ◆ **SPC-420 Series:** The portable SPC-420 Series monitor provides an additional feature; it can be coupled to a power tightening tool that shuts it down at the predetermined joint clamp load.
- ◆ **SPC-440 Series:** The portable SPC-440 Series monitor incorporates the features of the SPC-400 and SPC-420 Series monitors with the capability of downloading data from a single bolt to a computer.
- ◆ **SPC-460 Series:** The portable SPC-460 Series incorporates the features of the SPC-440 Series with a multi-channel unit, that can simultaneously monitor the performance of any number of bolted joints. Results can be displayed and stored for permanent record keeping.

Foundation Bolt “RetroKit”

The **Foundation Bolt RetroKit** is an engineered system that provides real time measurement of the bolt load via our SPC4™ bolt technology. The bolt load is displayed in a digital format via a portable hand held unit. This system is designed for retrofitting existing foundation bolts, as well as, in new installations where accurate clamp load must be maintained. The foundation bolt RetroKit system is ideal when a routine tightening schedule is a requirement. It allows the technician to only tighten the bolts that have lost their clamp load and avoid over tensing of a given stud that may lead to expensive replacement cost. This system allows the engineer and the contractor the peace of mind that a proper clamp load has been achieved and maintained.



1. **Inner Coupling** – Attaches to existing foundation stud; this part is under tension.
2. **Outer Cylinder** – Provides a load surface for the hardened washer and SPC4™ bolt; this part is under compression.
3. **SPC4™** – Allows the user to monitor clamp load in a digital format via an electronic hand held unit (purchased separately).
4. **Probe** – To be placed on the datum disc on the fastener head.

Advantages:

- ◆ Inspection Time Reduced
- ◆ Reduce Maintenance Cost
- ◆ Avoids Breaking or Stripping of Studs During Scheduled Maintenance
- ◆ Avoids Expensive Damage to Equipment
- ◆ Provides Safe and Accurate Installation