

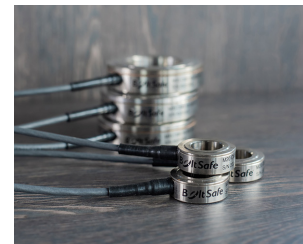
BOLTSAFE LOAD SENSOR

BoltSafe load sensors measure the actual tightening force of a bolt. Their washer-like design allows them to be installed in virtually any location across various industries. The sensors eliminate uncertainty regarding tightening force and are installed on the opposite side of the bolt, preferably under the nut.

CMS AND CMS-NC SENSORS

There are three models of force sensors: for continuous and periodic monitoring, as well as the fully wireless CMS Fusion. The model designed for periodic monitoring is suitable for locations where a permanent cable connection is not possible. CMS and CMS-NC work with all readers, while CMS Fusion features a built-in display and wireless connectivity.

| Item* | Bolt Size | Outside Ø mm | Thickness mm | Clamping, Load Class 10.9 (kN) | Steps (kN) | Weight g |
|----------------|-----------|--------------|--------------|--------------------------------|------------|----------|
| BKS-M20-CMS | M20 | 37,0 | 14 | 166 | 2 | 73 |
| BKS-M22-CMS | M22 | 40,0 | 14 | 208 | 2 | 85 |
| BKS-M24-CMS | M24 | 44,0 | 14 | 239 | 2 | 104 |
| BKS-M27-CMS | M27 | 50,0 | 14 | 315 | 3 | 137 |
| BKS-M30-CMS | M30 | 64,3 | 17 | 385 | 5 | 214 |
| BKS-M33-CMS | M33 | 68,4 | 17 | 480 | 5 | 218 |
| BKS-M36-CMS | M36 | 72,8 | 17 | 560 | 5 | 295 |
| BKS-M39-CMS | M39 | 78,0 | 17 | 670 | 5 | 300 |
| BKS-M42-CMS | M42 | 83,0 | 20 | 772 | 5 | 445 |
| BKS-M45-CMS | M45 | 87,6 | 20 | 905 | 10 | 506 |
| BKS-M48-CMS | M48 | 92,0 | 20 | 1 018 | 10 | 591 |
| BKS-M52-CMS | M52 | 97,2 | 20 | 1 221 | 10 | 669 |
| BKS-M56-CMS | M56 | 102,0 | 20 | 1 408 | 15 | 798 |
| BKS-M60-CMS | M60 | 108,0 | 23 | 1 647 | 20 | 1 083 |
| BKS-M64-CMS | M64 | 114,0 | 23 | 1 794 | 20 | 1 196 |
| BKS-M64-HV-CMS | M64HV | 120,0 | 23 | 2 100 | 20 | 1 310 |
| BKS-M72-CMS | M72 | 124,0 | 23 | 2 250 | 20 | 1 360 |
| BKS-M72-HV-CMS | M72(HV) | 124,0 | 23 | 2 500 | 20 | 1 370 |



CMS



CMS-NC

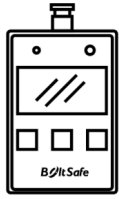
*) Available for periodic monitoring as CMS-NC models

READERS

| Action | Reader | | | | | | |
|-------------------------|---------|------------------------|---------------|-----------------|-----------|----------|------------|
| | SM-300 | Multi reader | Converter | CM-3000 | BLE node | IoT node | CMS Fusion |
| Standalone | ✓ | ✓ | | | | | ✓ |
| Plug & Play | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Integrated display | ✓ | ✓ | | | | | ✓ |
| Power supply | Battery | 110v-230v [or battery] | USB or 10-30v | 24v | Battery | Battery | Battery |
| Connectivity | USB | n/a | RS-232 / USB | RS-485 (Modbus) | Bluetooth | LoRaWan | LoRaWan |
| Analog output | | ✓ (valinnainen) | ✓ | | | | |
| Internal data logging | ✓ | ✓ | | | ✓ | | |
| Real time monitoring | ✓ | ✓ | ✓ | ✓ | ✓ | | ✓ |
| Periodic monitoring | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| # sensors per readout | 1 | 32 | 1 | 8 | 1 | 1 | Integrated |
| Maximum network size | ∞ | 256 | ∞ | 256 | ∞ | ∞ | ∞ |
| Third party integration | | | ✓ | ✓ | | ✓ | ✓ |

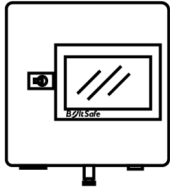
ATEX / C1D2

✓ (optional)



SM-300

The SM-300 is a handheld reader designed to quickly measure the load values of individual load sensors. The device connects directly to a CMS or CMS-NC sensor via a cable and displays real-time load data on an LCD screen. A compact and easy-to-use solution for field measurements and load checks during installation. Measurement data can be saved for later review.



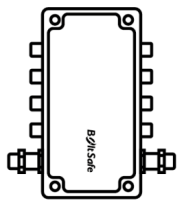
MULTI READER

The PDI-NT is a standalone monitoring system enabling simultaneous monitoring and data logging of up to 8 load sensors without a separate computer. It features a built-in display for real-time load monitoring. Multiple units can be interconnected to form a network of up to 256 sensors, making it suitable for continuous monitoring and historical data logging.



CONVERTER

The RS-232 and analog converter connects a single load sensor directly to a data acquisition system, computer, or PLC. The converter automatically scales the analog output (5 Vdc, 10 Vdc, or 20 mA) according to the sensor's maximum load. Built-in relay control enables alarm functions in the event of load deviations and can also control external devices, such as pumps or torque wrenches.



CM-3000

The CM-3000 connects up to 8 load sensors directly to a PLC, data acquisition system, or computer using the Modbus RTU protocol (RS-485). Multiple units can be daisy-chained to form larger systems. The IP66-rated aluminum enclosure withstands harsh environments, and with optional ATEX and CSA certifications, the device is suitable for use in potentially explosive atmospheres.



BLE NODE

The BLE node is a wireless data logger that stores up to 1,750 load sensor measurements in its internal memory. Bluetooth Low Energy enables a battery life of up to five years, making it ideal for rotating or moving objects. When connected to a Windows device, real-time data from up to four nodes can be monitored within a 100-meter range. Using BoltSafe Connect, the recording interval can be adjusted and data exported in CSV format.



IOT NODE

The IoT node connects the load sensor to the LoRaWAN network and transmits measurement data to the cloud several times an hour. The data can be viewed from any internet-connected device via a web portal, which displays load history and graphs and allows users to set up email notifications. The reader's battery life is approximately ten years, and no on-site visits are required after installation. The solution is particularly suitable for hard-to-reach locations where wired monitoring would be difficult.



CMS FUSION

CMS Fusion is a fully wireless load sensor with a built-in display for reading real-time load data. The sensor transmits data to the BoltSafe Connect app via the LoRaWAN network and automatically switches between three different operating modes: tightening mode, rapid monitoring (first 3 days), and normal monitoring. A magnetic switch allows for manual control of these modes. With a battery life of up to 10 years and a compact design, it is the ideal solution for wireless monitoring without the need for separate readers.