

BATTERY-POWERED TORQUE WRENCH MAD-S: INDUSTRY 4.0 AND 1 % ACCURACY

M-PT Matjeschk-PowerTools has developed a sensor-controlled battery torque wrench. Integrated into the worker guidance systems **ProTight™** and **BoltPilot®** the tool guarantees maximum process security.

Being the newest development in bolting systems on the market, the battery-powered MAD-S delivers maximum ergonomics, occupational safety and accuracy on all bolted connections in the wind industry. The torque sensor on the MAD-S is located at the gearbox output. Thanks to this unique design the torque accuracy remains unaffected by progressive wear on the gearbox. This is different compared to conventional sensor-controlled bolting tools, where the torque sensor is placed between the motor and the gearbox input. These tools will become less accurate the more they are used: worn gear parts or motor failure have an adverse influence on the bolting accuracy of these tools.

The MAD-S has an accuracy of $\pm 1,0\%$ in a torque range from 70–1.400Nm. More types of up to 7.000Nm are currently under development.



Certified Fastener Engineer (DSV)® Felix Hebestreit and hard-/software developer Peter Mirtschink at a bolt tightening analysis on field.

The benefits of the MAD-S

- Sensor-controlled torque shut-off via strain gauges positioned on gearbox output
- Sensor-controlled angle tightening
- Suitable for bolting according to VDI/VDE 2862-2 category A
- Digital setup menu
- Brushless electric motor
- Adjustable automatic load release
- Including Documentation System and Bolt Check Function

With the help of the Torque Check program, made by M-PT, the MAD-S battery-powered torque wrench is able to check bolted connections without turning the bolt. This prevents overtightening of bolts.



Sensor-controlled battery torque wrench series MAD-S.



Bolting in the worker guidance system ProTight™ with battery torque wrench MAD 20.

ProTight™ worker guidance system

The software on the MAD-S was programmed in cooperation with the development department of ProTight™, adhering to all criteria and requirements of this worker guidance system. ProTight™ software is mostly used by wind turbine manufacturers at their assembly workstations. Depending on the equipment, the bolting result will be visualized on signal lights as PASS or FAIL, or printed as a barcode and placed on the component. Furthermore, the bolting connections can be displayed on the monitor screen as a picture or a video. The ProTight™ software communicates with the bolting tool via Bluetooth and transmits all torque and angle values bolt by bolt.

BoltPilot® for use on site

For construction and maintenance of wind turbines, the sensor-controlled battery torque wrench MAD-S is also equipped with BoltPilot® software. All bolting processes will be documented and saved in the cloud with BoltPilot®. The assembly supervisor can check the recorded bolting values from any location. This facilitates the communication between the assembly supervisor and the technicians on site.

Conclusion

Thanks to the strain gauges being positioned on the gearbox output of the torque wrench an accuracy of $\pm 1,0\%$ is ensured. Progressive gear wear has no influence on the accuracy of the tool, as opposed to competitors' tools. Bolted connections are fastened securely and reproducibly. Wind turbine manufacturers and wind turbine service companies can demonstrate the torque results to their clients and to quality assurance, and if specified, proof that all bolts were fastened within the specified torque range.



Bolting of vertical flange in the tower with sensor-controlled battery torque wrench MAD 7-S.

Torque wrenches with ProTight™ at a glance

- Battery torque wrench MAD (30–7.000 Nm)
- Sensor-controlled battery torque wrench MAD-S (70–1.400 Nm)
- Electric torque wrench MED (65–11.000 Nm)
- Sensor-controlled electric torque wrench MED-S (65–11.000 Nm)
- Electric torque wrench E-RAD BLU (135–16.500 Nm)
- Sensor-controlled electric torque wrench E-RAD BLU-S (135–16.500 Nm)

Project overview

Initiator	M-PT Matjeschk-PowerTools GmbH & Co. KG
Implemented by	M-PT Matjeschk-PowerTools GmbH & Co. KG, De Jaeger Automation BVBA and Texas Controls S.L.
Facts and figures	Development and sale as well as rental of torque wrenches (battery, electric, pneumatic) and hydraulic bolting systems (hydraulic torque wrenches, tensioners and pumps). Repair and calibration of all torquing and clamping systems (also from other manufacturers).
Project status	On the market since April 2020.



Are you interested in the project and want to know how your community or your business can benefit from it? Contact us. Our contact can be found on page 250 ►