

WTT - Compact Wheel Torque Transducer

Data Sheet Version 1.4



WTT-Dx

The WTT Wheel Torque Transducer is a compact wheel torque transducer to measure torque in axial direction at the wheels of road vehicles. The Wheel Torque Transducer is not only waterproof (IP 67), but due to its integrated radio telemetry also highly compact. Up to four WTT measurement wheels can be operated synchronously from one receiver unit, creating one synchronous data stream. All of this without wiring or elaborate constructions—and highly fail-safe due to digital data transmission.

Fully differential amplifiers (incl. bridge supply) provide a maximum of noise suppression.

Due to mechanically induced nonlinearities, accurate calibration for each wheel on a special designed test rig is essential. The in-house CAEMAX calibration test rig has been redesigned to offer optimal calibration.

Highlights

- Measurement of driving and braking torques
- Waterproof
- Transmitter electronics integrated in sensor
- Power supply: rechargeable battery (approx. 50 h operating time)
- Working temperature: -10 °C to +60 °C (standard batteries), -30 °C to +65 °C (special batteries)
- Programmable amplifiers with autozero function
- Telemetry transmitter with analog and CAN output
- Simultaneous recording of up to 4 WTTs

Overview of the available variants

| Order Code | | article number |
|---|--|----------------|
| • H-SEN-CMX-WTT-DX-3kNm-868 | Wheel Torque transducer ± 3 kNm; 868 MHz | 1370018 |
| • H-SEN-CMX-WTT-DX-6kNm-868 | Wheel Torque transducer ± 6 kNm; 868 MHz | 1370019 |
| Wheel Torque transducer WTT including one Dx signal conditioning and transmitter unit (SCT) measurement range ± 3 kNm or ± 6 kNm ; 868 MHz band Requires additional Dx Receiver, Control and Interface unit (RCI); 868 MHz band | | |
| • H-SEN-CMX-WTT-DX-3kNm-2400 | Wheel Torque transducer ± 3 kNm; 2.4 GHz | 1370011 |
| • H-SEN-CMX-WTT-DX-6kNm-2400 | Wheel Torque transducer ± 6 kNm; 2.4 GHz | 1370021 |
| Wheel Torque transducer WTT including one Dx signal conditioning and transmitter unit (SCT) measurement range ± 3 kNm or ± 6 kNm; 2.4 GHz band Requires additional Dx Receiver, Control and Interface unit (RCI); 2.4 GHz band | | |

Included accessories

- AC charging device
 - LEMO connector
- with LEMO connector

Necessary expansions

- H-TEL-CMX-DX-RCI Receiver, Control and Interface unit (RCI) 1360010
868 MHz band (863 - 870 MHz)
for H-SEN-CMX-WTT-DX-xxx (1360001, 1360003)

Optional

- H-SEN-CMX-WTT-Dx-HUB Hub Adapter for WTT (specification of the wheel hub is needed) 1370022
- H-SEN-CMX-WTT-CASE Transportation case for WTT 1370023
- H-SEN-CMX-WTT-SCR Mounting bolts (set of 32) for mounting WTT to hub adapter and rim adapter 1370024
- H-SEN-CMX-WTT-Dx-RIM Rim Adapter for WTT (specification of the wheel rim is needed) 1370025
- H-SEN-CMX-WTT-DX-Taccu Battery modification for advanced temperature range -30 °C ... +60 °C; special battery 12.8 V, 1100 mAh 1370026
- H-SEN-CMX-WTT-DX-T Optional temperature channel type K on the WTT 1371027

Optionaler Service

- D-SEN-CMX-WTT-DX-KAL Calibration of one Wheel Torque Transducer WTT recommended every 2 years 1370020

Technical Specs - WTT

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| Parameter | Value | Remarks |
|------------------------|--|---|
| Measured Variable | axial torque M_y | |
| Signal transmission | digital-telemetry | |
| Measurement range | $M_y = \pm 3000 \text{ Nm}$ | optional $\pm 6000 \text{ Nm}$ |
| Bandwidth | max. 1 kHz | |
| Nonlinearity | <0.5 % | of applied load |
| Hysteresis | <0.5 % FS | |
| Crosstalk | <0.5 % | of applied load |
| Sensor diameter | 300 mm | |
| Sensor weight | approx. 4.75 kg | with telemetry unit |
| Material of sensor | aluminum | |
| Min. rim-Ø | 13" | |
| Max. hub-Ø | 6" with adapter | |
| Operating temperature | -10 °C to +60 °C -30 °C to +65 °C | standard batteries special batteries |
| Max. velocity | 250 km/h | |
| Max. acceleration | 50 g | |
| Protection class | IP67 (waterproof) | |
| Mounting and balancing | free access to wheel bolts | |
| Power supply | rechargeable battery, approx. 50 hrs operating time | |
| Autozero | remote control | |
| Signal output | CAN, analog | |

| Inputs for Voltage-signals: 1 differential input and 1 single ended input | | |
|---|---|--|
| Parameter | Value | Remarks |
| Measurement range | $\pm 0.2 \text{ V}$ to $\pm 22 \text{ V}$ | |
| Accuracy | 0.01 % FS | |
| Resolution | 16 Bit | |
| Sampling rate | max. 4.8 kHz | per channel |
| Antialiasing filter | 6-pol Butterworth filter | cut-off frequency 1/5 of sampling rate |

| Input for temperature signal | | |
|------------------------------|------------------|---------|
| Parameter | Value | Remarks |
| Measurement range | -40 °C to +85 °C | type K |