

T4A, T4WA-S3

Torque/Screw Torque Transducer



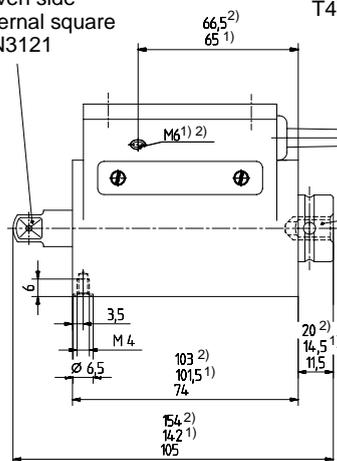
Special features

- Torque measurement in any direction
- T4WA-S3: Also provides angle of rotation and rotation speed measurement complete with detection of direction of rotation
- Nominal torques: 5 N·m, 10 N·m, 20 N·m, 50 N·m, 100 N·m, 200 N·m, 500 N·m and 1 kN·m
- Simple mounting with the aid of square connections
- Compact and easy to handle

Dimensions (in mm; 1 mm= 0.03937 inches)

| Type | Driven side | Drive |
|-----------------------------|---|---|
| T4A and T4WA-S3 5-50 N·m | 3/8" External square DIN 3121-F10 | 3/8" Internal square DIN 3121-G10 |
| T4A and T4WA-S3 100 N·m | 1/2" External square DIN 3121-F12,5 | 1/2" Internal square DIN 3121-G12,5 |
| T4A and T4WA-S3 200 N·m | 3/4" External square DIN 3121-F20 | 3/4" Internal square DIN 3121-H20 |
| T4A and T4WA-S3 1 kN·m | 1" External square DIN 3121-F25 | 1" Internal square DIN 3121-H25 |

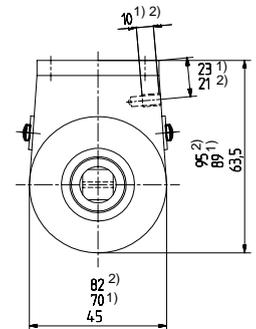
Driven side
external square
DIN3121



Torque:

T4A: 4-wire shielded cable, 3 m long, unterminated
T4WA-S3: 6-wire shielded cable, 3 m long, unterminated

Drive
internal square
DIN3121



Angle of rotation / rotation speed

(T4WA-S3 only) 4-wire shielded cable, 3 m long, unterminated

- 1) for T4../500 N·m
2) for T4../1 kN·m

Specifications

| Type | T4A/T4WA-S3 | | | | | | | | | | |
|---|-------------------|--|------|------|------|------|------|---------------------|------|-----|--|
| Accuracy class | 0.2 | | 0.1 | | | | | | | | |
| Torque measuring system | | | | | | | | | | | |
| Nominal torque | N·m | 5 | 10 | 20 | 50 | 100 | 200 | 500 | 1000 | | |
| Nominal sensitivity (nom. output signal at nominal torque) | mV/V | 2 | | | | | | | | | |
| Characteristic tolerance | % | < ± 0.2 | | | | | | | | | |
| Effect of temperature per 10 K in nominal temp. range | | | | | | | | | | | |
| on the output signal (by reference to actual value) | % | < ± 0.1 | | | | | | | | | |
| on the zero signal (by reference to nominal sensitivity) | % | < ± 0.1 | | | | | | | | | |
| Linearity deviation including hysteresis (by reference to nominal sensitivity) | % | 0.2 | 0.1 | | | | | | | | |
| Relative standard deviation of reproducibility to DIN 1319 (by reference to variation of the output signal) | % | < ± 0.05 | | | | | | | | | |
| Input resistance at reference temperature (T4A) | Ohm | 350 ± 1.8 | | | | | | | | | |
| Torque measuring system of T4WA-S3 | Ohm | 420 ± 40 | | | | | | | | | |
| Output resistance at reference temperature | Ohm | 350 ± 1.5 | | | | | | | | | |
| Maximum permissible excitation voltage | V | 20 | | | | | | | | | |
| Nominal range of the excitation voltage | V | 0.5 ... 12 | | | | | | | | | |
| Reference temperature | °C | +23 | | | | | | | | | |
| Nominal temperature range | °C | +10...+60 | | | | | | | | | |
| Operating temperature range | °C | -10...+60 | | | | | | | | | |
| Storage temperature range | °C | -50...+70 | | | | | | | | | |
| Torsional stiffness approx. | kNm/rad | 0.29 | 0.61 | 1.08 | 2.42 | 5.57 | 7.53 | 27.3 | 65 | | |
| Torsion angle at nominal torque, approx. | Deg. | 1 | 0.9 | 1.1 | 1.1 | 1.0 | 1.5 | 1.0 | 0.9 | | |
| Mass moment of inertia | gm ² | 0.04 | 0.04 | 0.04 | 0.04 | 0.04 | 0.04 | 0.28 | 0.44 | | |
| Maximum permissible rotation speed | min ⁻¹ | 4000 | | | | | | | | | |
| Service life of brushes, approx. | Rev. | 3 × 10 ⁸ | | | | | | 6 × 10 ⁸ | | | |
| Mechanical values (by reference to nominal torque) | | | | | | | | | | | |
| Static limit load | % | 150 | | | | | 125 | | 150 | | |
| Static ultimate load | % | 300 | | | | | 200 | | 300 | | |
| Lateral limit force on shaft ¹⁾ | N | 5 | 10 | 20 | 50 | 80 | 125 | 235 | 370 | | |
| Axial limit force on shaft ¹⁾ | kN | 0.35 | 0.7 | 2.0 | 3.5 | 5.5 | 8.8 | 16.4 | 25.9 | | |
| Bending limit moment on shaft ¹⁾ | Nm | 0.75 | 1.5 | 3 | 6 | 11 | 23 | 57 | 114 | | |
| Oscillation bandwidth to DIN 50100 (by ref. to nom. torque) | % | 70 (peak-to-peak) | | | | | | | | | |
| Upper and lower limits | | +M _N or -M _N | | | | | | | | | |
| Impact resistance, test severity level to DIN IEC68, Part 2-27; IEC 68-2-27-1987 | | | | | | | | | | | |
| number of | | 1000 | | | | | | | | | |
| Duration | ms | 3 | | | | | | | | | |
| Acceleration (half-sine) | m/s ² | 500 | | | | | | | | | |
| Vibration resistance, test severity level to DIN IEC 68, Part 2-6; IEC 68-2-27-1987 | | | | | | | | | | | |
| Frequency range | Hz | 5...65 | | | | | | | | | |
| Duration | h | 1.5 | | | | | | | | | |
| Acceleration (amplitude) | m/s ² | 50 | | | | | | | | | |
| Weight, approx. | kg | 0.4 | | | | | | 1.8 | | 2.4 | |
| Degree of protection to DIN IEC 60529 | | IP50 | | | | | | | | | |
| Rotation speed/angle of rotation measurement system | | | | | | | | | | | |
| Angle of rotation transducer with two output signals | | 90 pulses per revolution each offset by 1/4 period | | | | | | | | | |
| Tolerance of the slot width | mm | ± 0.05 | | | | | | | | | |
| Average optical diameter | | | | | | | | | | | |
| T4WA-S3/5 N m ... 200 N m | mm | approx. 31 | | | | | | | | | |
| T4WA-S3/500 N m and 1 kN m | mm | approx. 53 | | | | | | | | | |
| Output voltage (square wave) | V | 5, TTL level | | | | | | | | | |
| Supply voltage | V _{DC} | 4.8...5.2 | | | | | | | | | |
| Maximum current consumption | mA | 50 | | | | | | | | | |

¹⁾ Any irregular stress is only permissible up to the specified limits provided none of the other stresses occurring at the time can also reach that value. If this condition is not met, the limit values must be reduced. If 30 % of the bending limit moment and lateral limit force occur at the same time, only 40 % of the axial limit force is permissible and nominal torque must not be exceeded. The permissible bending moments, axial forces and lateral forces can affect the measurement result by approx. 1 % of nominal torque.

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