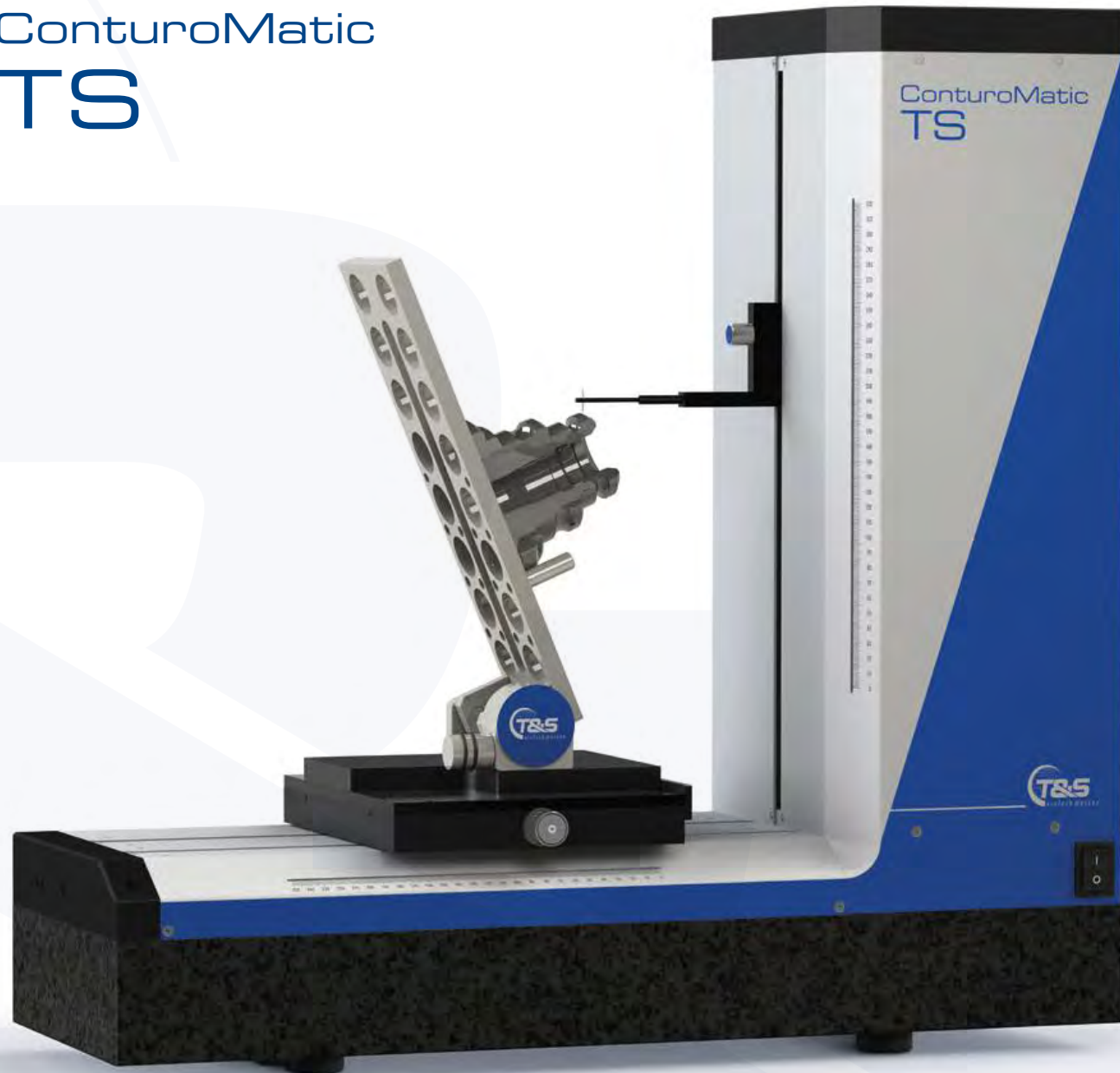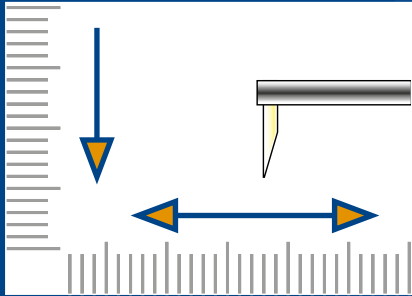# ConturoMatic
# TS

# Your needs are growing?
## ConturoMatic TS grows with you.

**The modular concept** allows cost-effective entry to the TS class with the option to retrofit additional functions at any time. With no mechanical intervention in the existing system; simply by software activation. The extension packages, which are available on an optional basis, contain all the necessary components, such as tracing arms for up/down scanning or roughness sensor with diamond tip.

**The technical innovations** that make our new TS system the best device in its class include the integrated, maintenance-free electro-mechanical system for tracing force adjustment. Using this function, the tracing force can be adjusted for the contour and roughness operation. These settings are individually configured for each tracing arm, managed by the software and automatically adjusted according to the required measurement function. To calibrate the tracing arm and the offset between the upper and lower probe tip, only the ball standard, which is included in the scope of supply, is required.
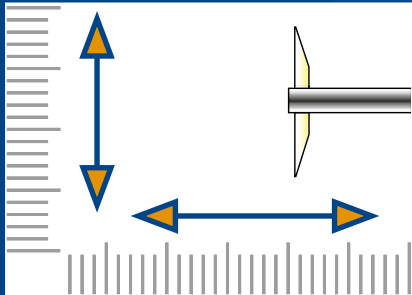
Due to the geometrically precise horizontal position of the tracing arm, it is possible to check contours and bores with a diameter of less than 2 mm to more than 300 mm.
Breakage of the probe tip is minimized by the integrated safety shutdown of the Z-axis movement. The roughness analysis option, which is realized through the integrated measuring force setting, can be used in combination with the contour analysis. In many cases this makes further measuring superfluous. Contour and roughness results can effectively be determined in a single step.

Other tasks that can be performed by our ConturoMatic-TS include the analysis of bores, distances from inner to outer contours, threads, taper angle and parallelism, profile defects and the measurement of discontinuous surfaces, with no loss of reference measurement.

# Extensions

**Option UD (Up/Down):**

This function allows switching of the scanning direction with no loss of reference, e.g. to define bores or reference measurements from outer to inner contours. This function is also available in combination with roughness analysis and can be integrated into automated measurement sequences.

**Additional evaluation options:**

- Determination of raceway diameters
- Diameter determination
- Wall-thickness variation
- Parallelity measurement
- Taper-angular measurement
- Slope determination
- Thread measurement (evaluation software optional)

**Option R (roughness):**

Software option for calculating the surface roughness. For a full list of assessable parameters see page 17.

- Measurement of surface roughness by means of reference surface measurement
- Contour + roughness measurements can be combined under "multi-contour"
  This function is also available in combination with the option UD described above
- Roughness evaluation can also be integrated into automated measurement sequences

**Option motorized Y-table:**

While manual adjustment is still possible the motorized Y-adjustable table's automatic cresting function can find the highest or lowest point with the press of a button in the software. Y-adjustment range ist 17 mm.

Table load capacity: TS, TS-R, TS-UD, TS-UDR = 35kg, TS-X = 25kg, TS-XHD = 50kg
The Y-search range can be adapted to avoid probe damage in small bores or narrow measuring points.

**Benefits:**

- User-independent calculation of reversal points with high precision
- Minimizes measurement errors due to upper and lower probe tip axle offset
- Automatic identification of convex and concave reversal points
- The automatic cresting function can be used when measuring from above and below

**Thread analysis:**

Software option for evaluating the characteristic values of threads and thread gauges. Usable with ConturoMatic TS-X/TS-UD/TS-UDR/T3/T1/T1-R.

**Overview of the included standards:**

- Metric ISO threads in accordance with DIN ISO 1502:1996 (DIN ISO 965:1998)
- Gauges for metric ISO-threads in accordance with ANSI B1.16M-1984
- Metric ISO trapezodial threads in accordance with DIN103:1997
- „Unified" thread or thread gauges in accordance with ANSI/AMSE B1.1-1983/B1.2-1983
- Thread gauges for „Unified" (ANSI/ASME B1.1) in accordance with BS 919:Part:1960
- Gauges for pipe threads in accordance with DIN ISO 228:2000
- Gauges for pipe threads in accordance with DIN 259:1979(alt)
- Armoured conduit thread in accordance with DIN 40430, DIN 40431:1972
- Gauges for round threads in accordance with DIN 405:1997
- Whitworth thread or thread gauge in accordance with BS 84:1956/BS 919: Part2:1971
- NPSM thread in accordance with ANSI/ASME 1.20.1-1983
- Betress thread in accordance with DIN 513:1985/company standard
- MJ thread in accordance with ISO 5855:1989
- Gauges for thread inserts (HeliCoil) in accordance with DIN 8140:1999(EG thread)
- Metric and „Unified" thread in accordance with Böllhoff company standard
- Valve thread in accordance with DIN 7756:1979 and ETRTO V.7
- ACME thread in accordance with ASME/ANSI B1.5-1988
- Stub ACME thread in accordance with ASME/ANSI B1.8-1988
- Thread for bicycles in accordance with DIN 79012
- Adjustment gauges for thread measuring devices in accordance with DIN 2241
- Further threads on request

**Data export (optional):**

Optional software to convert data created using ConturoMatic systems to qs-STAT (Q-DAS ASCII transfer format)[1]. ConturoMatic measurement data can be converted and exported in a readable format e.g. Q-DAS.

**Benefits:**

- No additional program needed for the conversion. The function is integrated in the main program.
- Largely freely defineable fields (K-fields)
- Transfer of values (actual and setpoint value, tolerances) from the ConturoMatic software
- Header data (e.g. order number, drawing number, etc.) are taken from the ConturoMatic software
- Path for saving the DFQ-file freely defineable
- Retrofittable for all ConturoMatic systems

[1] Certification of the converter by Q-DAS is not provided.

# ConturoMatic Roughness
## Contour and roughness measurement in one step
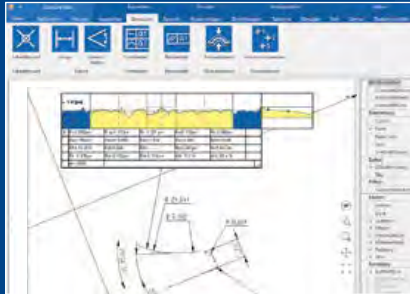
**State-of-the-art contour measuring systems increasingly permit data acquisition and calculation of roughness parameters too.** Roughness measuring of inclined contours brings more and more of the previous scanning procedures and assessment methods to their limits.

To solve this problem, our calculation algorithms have, from the start, been based on orthogonal regression. This method, in connection with dynamic speed control, which ensures even data point distance, leads to perfectly precise results – even on tilted surfaces. In contrast, conventional solutions for achieving constant measuring point distances require generating theoretical points, that haven't actually been measured, via interpolation.
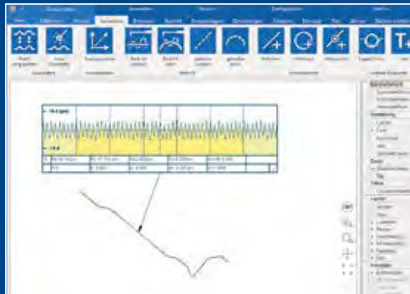
**With our optional surface roughness software update for the ConturoMatic TS, your contour measuring system turns into a particularly high-performance system for surface & contour measurement.**

All common parameters can automatically be measured and evaluated. The software is seamlessly integrated into the standard software and can be operated intuitively. It is also possible to update every T1, T2 and TS system delivered to date. The update comprises software for surface roughness, a roughness tracing arm with 2 µm tip radius and 60° angle, as well as comprehensiveoperating instructions. The roughness option is standard for the ConturoMatic TS-X.

# › Assessable parameters

- Pt, Pz, Pa, Pc, Pq, Pp, Pv, Psk, Pku, PSm, Pdq, Pmr(c)

- Rt, Rz, Ra, Rc, Rq, Rp, Rv, Rsk, Rku, RSm, Rdq, Rmr(c), Rk, Rpk, Rvk, Mr1, Mr2, RPc, Rmax (VDA 2006), R3z (DB works standard)

- Wt, Wz, Wa, Wc, Wq, Wp, Wv, Wsk, Wku, WSm, Wdq, Wmr(c)

- Optional: Dominant Waviness in accordance with VDA 2007

- Optional: Robust Gaussian Regression Filter in accordance with DIN EN ISO 16610-31 (03/2017)
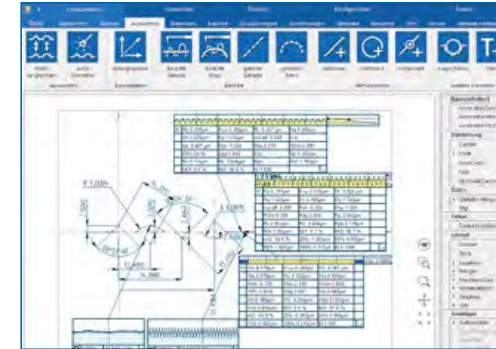


# › Applied standards for testing surface parameters

- DIN EN ISO 4287:2010-07

- DIN EN ISO 4288:1998-04

- DIN EN ISO 16610-21:2013-06

- DIN EN ISO 13565-1:1998-06

- DIN EN ISO 13565-2:1998-06

- DIN EN 10049:2014-03

- DIN EN ISO 16610-31:2017-03 *(Option)*

- VDA 2006:2003-07

- VDA 2007:2007-02 *(Option)*

- DB N 31007 (1983)

*User-defined settings can also be used to deviate from the standard.*

# Measurement
## technology for highest demands



**Our proven concept: "Contour and roughness measurements at the highest level"** is what keeps us developing new systems. This philosophy has driven us to reanalyze every element of our ConturoMatic TS to reach a new level of system accuracy. Detailed fine-tuning of the guides, aerostatic air bearings, high-speed data transfer, fast reaction axis tracing, optimized tracing arm bearing, newly developed drive units and incremental scales of the highest quality are the results of a comprehensive, ever evolving, development process.

**The result is the newest product from T&S: ConturoMatic TS-X – our high-performance measuring station.**



## Overview of the performance features of TS-X:

- Special frictionless aerostatic air bearings for the X- and Z-axes
- Enlarged measuring range (280 x 350 mm)
- Hybrid-ceramic tracing arm bearing
- Static sensing and measurement data collection in the X direction
- Module roughness analysis in the standard scope of delivery
- Table load of up to 25 kg (optionally 50 kg)
- Y-adjustable table can be set manually or automatically using the integrated motor.
- Non-contact incremental linear scales on steel base
- Measuring system resolution 1 nm
- Outstanding price-performance ratio
- Accuracy: ± (0.85 + L/100) µm [L = measuring length in mm] (no measuring direction change)
- Combined contour and roughness measurements possible over the entire measuring range
- ConturoMatic software compatible with: Win10/64Bit alternatively Win7/64Bit

## ConturoMatic TS-X surface roughness

- Measurement of surface roughness (by reference surface measurement)
- Measuring range of roughness: 280 x 350 mm
- Effective resolution: 1 nm
- Measuring speed: 0.1 - 0.5 mm/s
- Measuring force: 7.5 mN (variably adjustable)
- Measuring point distance: approx. 0.5 µm
- Suitable for roughnesses: Rz > 0.5 µm, Ra > 0.05 µm
- Accuracy: 5%

*See pages 16 and 17 for description and scope of functions.*