Torque technology

Products

Made in Germany

SmartCheck Torque Tester | **40**

reddot award 2018 winner

TORSIOTRONIC® | **28**

perfectControl | **48**

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TORQUE AND CALIBRATION TECHNOLOGY

MANOSKOP® 714 | **22**

Indicating electronic torque wrenches from STAHLWILLE offer better accuracy, more information and additional functionality.

LESS TALK.
MORE TORQUE.

STAHLWILLE – PACE-SETTING TORQUE TECHNOLOGY.
ALL FROM A SINGLE SOURCE.

Controlled tightening is not just a trend: it is indispensable and essential in an increasing number of industries, in manufacturing and multinational enterprises, the transport sector and energy. The reason is that, it makes quality and safety reproducible.

Bolt tightening using torque or torque angle ensures that high levels of joint quality are achieved – and the same conditions apply to every fastener. This is how permanently safe bolted connections that will withstand the expected operating conditions are created.

However, state-of-the-art materials, such as carbon, aluminium, magnesium alloys and plastics, may reduce weight but they are far more susceptible and brittle than their conventional cousins like sheet steel and require fastening at much lower torques.

Added to this, there is an increasing need across all industries for joints to be documented. Torquing technology with a reliable logging function is a competitive advantage in this context.

STAHLWILLE has ideal solutions for all these requirements in its toolbox. As a pioneer in the field of torque technology, STAHLWILLE recognises new requirements earlier than many other companies – and provides customers with premium-standard torque solutions backed up with outstanding advisory services and first-rate service.
Be sure, be safe – today and always.

TECHNICAL ADVICE
STAHLWILLE supports its customers: regardless of the amount involved in the project or order, experienced application engineers are available to advise on the best possible solution for the particular case in point.

TORQUE TOOLS
Whether the torque tool is mechanical or electronic, STAHLWILLE's products promise uncompromising accuracy and incorporate numerous features designed to simplify the end user's working life.

CALIBRATION
Semi-automatic calibration systems made by STAHLWILLE, used in conjunction with the manufacturer's free-of-charge calibrating and tool management software, deliver maximum user convenience and extremely accurate results.

SERVICE MEANS SERVICE
From the telephone hotline and advice, calibration, repair and training: STAHLWILLE is always available to deal with customers' after-sales issues.

ACCURACY. THE PIVOTAL POINT. TO THE BENEFIT OF THE CUSTOMER.

Innovations are only really important if they address a need in the market, provide answers to contemporary questions and deliver a defined benefit for customers. STAHLWILLE has always done just that. Precisely.

Having an eye and an ear open for trends and customer requirements is the key to success in business. This is why STAHLWILLE is constantly on the look-out during discussions with customers for useful suggestions. Some of these eventually lead to pioneering new, accurate products and technologies that are only to be found at STAHLWILLE.

One exclusive STAHLWILLE feature, to name just one example, covers the trigger mechanism that much increases the service lifetime of the mechanical torque wrench and saves users a lot of time. The reason is that, instead of a compression spring that has to be reset to »0« after every fastener and must be protected against wear, STAHLWILLE torque wrenches have a durable flexible rod. This mechanism is virtually wear-free and absolutely accurate.

Indeed, all STAHLWILLE torque tools are designed and built for durability and robustness – every individual component is optimised with this in mind. On top of this, there is the ergonomic aspect that has one aim only: to simplify life for the worker, whether it is error-free scale read-off or the ergonomic handles that not only promote strain-free working but, at the same time, ensure the worker finds the ideal gripping position – to prevent inaccurate measurements effectively.

Accuracy by technology. Accuracy by design.
This is STAHLWILLE.

QUICKER.
Wear resistant trigger system with a flexible rod. In contrast to conventional torque wrenches, it is not necessary to reset the wrench to zero after each job to unload the spring.

CLEARER VIEW.
A clear view and an accurate reading: intuitive operation and easy-to-read displays are features of torque wrenches by STAHLWILLE.

BETTER ERGONOMICS.
Optimised convex handle for strain-free working. Resistant to oils, grease, fuels, brake fluids and Skydrol.

MORE CONVENIENT.
Right from the start of product development, convenient handling plays a decisive role. One example of this is simple, fast access to controls and buttons.

MORE SOPHISTICATED.
QuickRelease ensures that every shell tool or bit combination is effectively locked together as far as the fastener. It is not possible for them to become separated by accident.

EASIER.
Adjust it yourself – this is now a simple matter thanks to the easily accessible adjusting screws and STAHLWILLE's proprietary, non-complex mechanism.

Made in Germany

CONTENTS
TORQUE WRENCHES

Made in Germany

SOLUTIONS. DISCOVERED BY STAHLWILLE.
SPECIFIC REQUIREMENTS. SPECIAL PRODUCTS.

End users in a wide variety of industries, fields of activity and specialist areas often make highly specific demands on their preferred torquing tools. This is why STAHLWILLE offers such a large number of different solutions, each of which sets new standards in its particular field of application.

How can the ideal tool be made available for a particular application or specific work process? Where the tool has to combine peak accuracy with safety, efficiency and speed. This is the question the developers at STAHLWILLE ask themselves repeatedly.

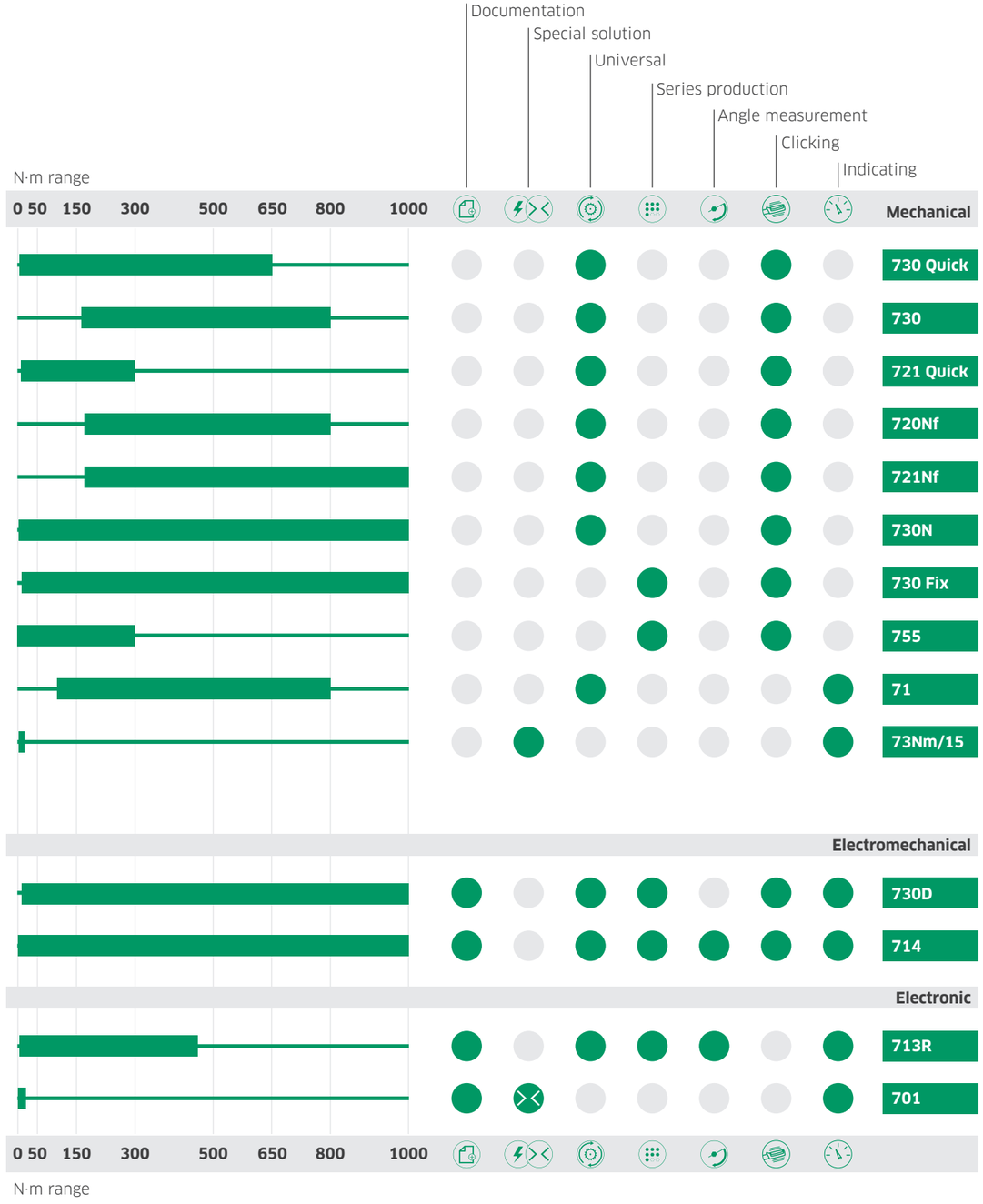
Their efforts are regularly rewarded. STAHLWILLE's range of tools is one for champions. They include general-purpose tools that can be applied effectively in many situations, and many highly specialised tools that deliver that additional functionality for individual applications in terms of efficiency, safety and speed – crucial differences between us and the competition.

Universal application

Angle controlled bolted joints

Series production

Low torques, awkward spaces



VERSATILE AND QUICK.
MANOSKOP® 730 QUICK.

CONVENIENT.
Improved accessibility and operation of the locking lever concealed inside the handle.

NO RESET.
Wear resistant trigger system with a flexible rod. In contrast to conventional torque wrenches, it is not necessary to reset the wrench to zero after each job to unload the spring.

CLEARER VIEW.
The new design, with opposing V-shaped "sights" facilitates fast, accurate setting even at an awkward reading angle.

Anyone in need of a mechanical torque wrench that can be quickly set for the next operation will find the MANOSKOP® 730 Quick the ideal helper.

Thanks to its broad range of 6–650 N·m and the interchangeable insert tools (9x12 mm, 14x18 mm and 22x28 mm), the MANOSKOP® 730 Quick is remarkably versatile – and quicker then ever: as a result of the much improved ergonomics and accessibility to the essential controls, the target torque is set in seconds.

PRODUCT FEATURES

- Noticeably quicker, easier, safer setting of trigger torque. No need for manual reset to zero.
- Ergonomic 360° convex handle for comfortable, strain-free working.
- Easily accessible adjusting screws and a display deviation of only ± 4%.

6–650 N·m

Experience the outstanding features of the MANOSKOP® 730 Quick in a video here:
www.stahlwille.de/videos/730quick

QUICKER. AND NOW EVEN MORE COMPACT.
MANOSKOP® 730 QUICK SIZES 2 AND 4.

CLEAR VIEW.
The design of the scale mount prevents parallax errors, which speeds up accurate setting – even at awkward angles.

RESILIENT.
The optimised convex handle promotes strain-free working and is resistant to oils, grease, fuels, brake fluids and Skydrol and always fits snugly in the hand.

COMPACT.
The particularly space-saving design helps when working in confined spaces and is also noticeably light.

Great! But small: compact and space-saving, the MANOSKOP® 730 Quick torque wrenches are available in sizes 2 and 4.

They feature the same measuring and trigger technology as their »big brother« and are just as precise and reliable. This makes them the ideal companions for all those professionals who frequently work with low tightening torques, attach great importance to maximum efficiency and like a tool bag that is not too heavy.

PRODUCT FEATURES

- Compact, light construction for smaller torques – and still with a broad torque range.
- Quick adjustment from outside, no disassembly of the torque wrench required.
- Anticlockwise tightening by reversing the insert tools.
- Click-type, display deviation value ± 4%.

4–40 N·m

Made in Germany

IT'S THE SETTINGS THAT MAKE THE DIFFERENCE.
MANOSKOP® 721QR QUICK.

1

FAST.
Conveniently accessible locking lever in the handle enables simple, quick unlocking of the sliding scale.

2

EXACTLY.
Simple, precise adjustment of the trigger torque thanks to easy-grip thumb recess.

3

EXTENSIVE.
Also available as a robust wheel-fitting set with wheel nut sockets sizes 17, 19 and 21 mm and an extension.

MANOSKOP® 721QR Quick saves time and helps users work more efficiently, quickly and safely. This is made possible by numerous ergonomic details.

The MANOSKOP® 721QR Quick makes it easier than ever to set the trigger torque in no time at all and yet with reliable accuracy. This is because it has an optimised unlocking mechanism and accurate setting system that reduces parallax and reading errors. In addition, the permanently installed ratchet enables cost saving compared to buying separate ratchets and torque wrenches.

PRODUCT FEATURES

- Clicking torque wrench with permanently installed ratchet and QuickRelease safety lock for a measuring range of 40–200 N·m
- Ergonomically optimised release by means of the locking lever and sliding scale
- No need for manual reset to zero thanks to wear-free flexible rod system
- Easy adjustment from outside, no disassembly required
- Display deviation value +/- 4%

30–200 N·m

STRONG AND HIGHLY TALENTED.
MANOSKOP® 730N.

1

CLEAR VIEW.
Easily readable twin scale with different colour coding for N·m and ft·lb simplifies fine adjustment.

2

UNCOMPLICATED.
Quick adjustment from outside, no disassembly of the torque wrench required

3

USER FRIENDLY.
Accurate QuickSelect one-handed setting – quick & easy control using the knob at the end of the handle. Pull. Set. Done.

Where an even wider torque range is required, combined with maximum rigidity and durability, the MANOSKOP® 730N comes into its own.

The mechanical MANOSKOP® 730N torque wrench features an extremely wide range and is suitable for absolutely accurate applications up to 1000 N·m. It is designed for use with interchangeable insert tools (9x12 mm, 14x18 mm and 22x28 mm) and is particularly easy to set up. When the target torque is reached, it provides a noticeable tactile dual stop signal.

PRODUCT FEATURES

- Easily readable twin scale (N·m and ft·lb) enables the target torque to be set quickly.
- Accurate one-handed setting using easily accessible, secure knob in the end of the handle.
- Wear resistant trigger system with a flexible rod. Saves time because it is not necessary to reset the tool to zero.

2–1000 N·m

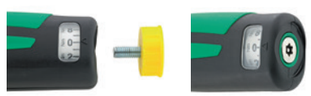
Made in Germany

WHERE CONSISTENCY COUNTS.
MANOSKOP® 730 FIX.

1

USER FRIENDLY.
Accurate QuickSelect one-handed setting – using the knob at the end of the handle. This system allows torque values to be set for series production tasks without an additional tester.

2



TAMPER-PROOF.
The setting knob can be removed after the target torque has been set – making inadvertent changes to the settings impossible. The locking screw supplied with the tool also protects against unwanted manipulation.

3

SAFE.
The QuickRelease technology ensures tools cannot be inadvertently lost – while enabling rapid, safe tool changes.

If the same fastener has to be tightened repeatedly, the risk of human error increases. MANOSKOP® 730 Fix puts customers in industrial environments back in the safe zone.

The MANOSKOP® 730 Fix guarantees that, once the target torque has been set, it cannot be inadvertently changed, which is an indispensable contribution to safe, uniform work processes.

Experience the outstanding features of the MANOSKOP® 730 Fix in a video here:
www.stahlwille.de/videos/730fix

PRODUCT FEATURES

- Ideally equipped for industrial applications up to 1000 N·m, thanks to the interchangeable insert tools (9x12 mm, 14x18 mm and 22x28 mm).
- For clockwise and anticlockwise operation – simply turn the wrench and the insert tool over.
- Very clear twin scales for N·m/ft·lb and ft·lb/in·lb and with display read-out extremely accurate to ± 3%.

10–1000 N·m

SPOT ON.
MANOSKOP® 755.

PROTECTED.
If the worker continues to apply force after the wrench has clicked, or applies force against the intended direction, this will not damage the trigger mechanism.

SWITCHABLE.
With the aid of swap-over insert tools, the MANOSKOP® 755 can also be used for anticlockwise tightening.

INDIVIDUAL.
If required, STAHLWILLE can preset the necessary target torque before the tool is delivered – the tool is then ready for use as soon as it is unpacked.

In series production, dependable, ergonomic, efficient tools are a necessity. Just such a tool is the MANOSKOP® 755 torque wrench, developed by STAHLWILLE specifically for highly repetitive operations.

The clicking MANOSKOP® 755 can exactly tighten the one fastener for which it has been set using the torque tester. Adjustments in the workplace are not necessary – and, indeed, not possible. This also promotes strain-free working.

PRODUCT FEATURES

- Click type torque wrench with a display deviation value of only ± 4%.
- Dual stop signal tells the worker that the target torque has been reached.
- Available for torque ranges 4–40 N·m, 20–100 N·m, 40–200 N·m and 60–300 N·m.

1.5–300 N·m

A STROKE OF GENIUS – WITH LOGGING.
MANOSKOP® 730D.

SAFE.
The QuickRelease technology ensures tools cannot be inadvertently lost – while enabling rapid, safe tool changes.

ELECTROMECHANICAL.
Patented electromechanical triggering. When the preset torque is reached, the MANOSKOP® 730D triggers – and indicates this fact to the user via a definite tactile signal and an audible click.

WELL CONNECTED.
Data output by means of a USB port. The tightening torques are stored. The data can be transferred to a PC for evaluation and documentation.

Tool owners wishing to combine the benefits of digital technology with the tried-and-tested mechanical torque wrench need look no further than the MANOSKOP® 730D.

Documenting fasteners in the wrench is possible with the electromechanical MANOSKOP® 730D torque wrench without having to dispense with the tactile mechanical trigger.

PRODUCT FEATURES

- Indicating and clicking – indicating function also works for anticlockwise torque.
- Indicates torque actually applied after clicking.
- Adjustable tolerance limits depending on the fastener and overload protection using visual and acoustic warnings.

10–1000 N·m

Made in Germany

SMALL FITS ALL.
SENSOTORK® 701.

80 | 4.5°

SAFE.
Thanks to the permanently integrated fine-tooth ratchet (80 teeth, tight return ratchet angle of only 4.5°) and QuickRelease safety lock.

INTUITIVE.
The required measuring unit and mode of operation (track, peak hold, user mode including joint evaluation) can be quickly and easily set using the single-button setting system.

COMPACT.
With its compact length of only 21 cm, it is ideally suited to safe, accurate work in confined spaces.

Working in confined spaces – and with very low torques? SENSOTORK® 701 is designed specifically for such cases. Compact design and permanently installed fine-tooth ratchet.

With a ratchet angle of only 4.5° and a ratchet mechanism like a high quality watch: with SENSOTORK® 701, accurate bolt tightening becomes child's play, even in awkward spaces. The electronic torque wrench shows torques from 1 to 20 N·m with a display deviation of only ± 4%. The QuickRelease system prevents loss of bits.

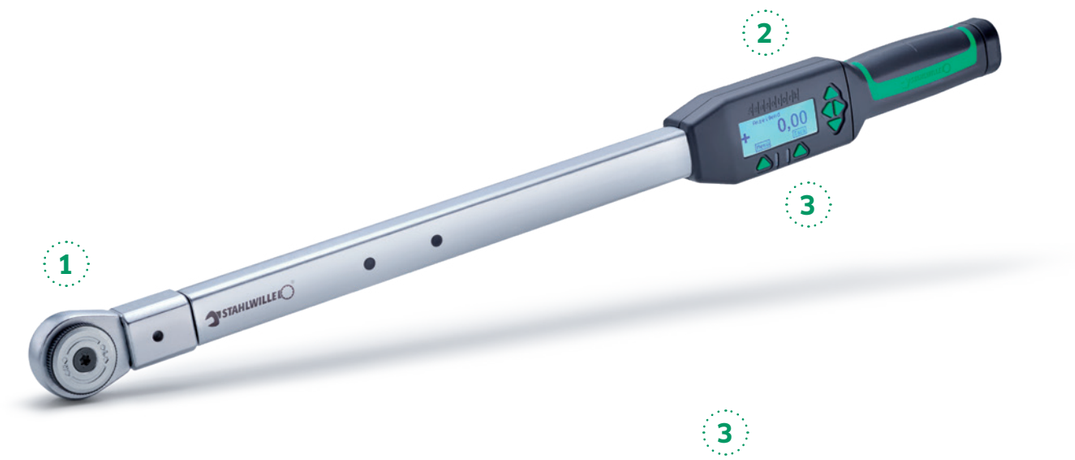
PRODUCT FEATURES

- Developed specifically for work involving low torques or working in very confined spaces.
- Ideal for torquing aluminium fasteners, for example, or joints with plastic, carbon or magnesium components.
- Programmable and with a logging function using the free-of-charge STAHLWILLE SENSOMASTER software.

1–20 N·m

Experience the outstanding features of the SENSOTORK® 701 in a video here:
www.stahlwille.de/videos/701

THE TORQUE ANGLE SPECIALIST.
SENSOTORK® 713R.



EXACT.
With a display deviation value of only ± 1% this is the champion in the STAHLWILLE range.

UNCOMPLICATED.
Operator guidance and the menu structure are intuitive – arrow keys simplify operation.

MULTISENSORY.
The torque achieved is indicated by visual, audible and tactile signals – with a multicoloured backlit LED display, acoustic signal and vibration.

When it comes to prescribed tightening using the torque angle, SENSOTORK® 713R is without doubt the most reliable and accurate tool on the market.

The SENSOTORK® 713R tightening angle torque wrench for clockwise and anticlockwise operation boasts a particularly broad measuring range and measures the angle and torque applied irrespective of the point of application of force. In this way it prevents human error. Display deviation for the angle and torque is only ± 1%.

PRODUCT FEATURES

- Set individual fasteners or program complex sequences – whether on the PC or on the tool itself using the display and function keys.
- Comprehensive documentation options. Tightening jobs are also stored with a timestamp
- Target values for the joints defined in advance can, if needed, be password-protected.

3–400 N·m

Experience the outstanding features of the SENSOTORK® 713R in a video here:
www.stahlwille.de/videos/713R

Made in Germany

SIMPLY DIFFERENT.
MANOSKOP® 714.

1

ACCURATE.
Display deviation value ± 2% for torque and ± 1% for angle. Electromechanical triggering for tactile and audible feedback.

HIGH RESOLUTION.
High-definition colour display with additional side-mounted indicator lamps.

READY WHEN YOU ARE.
Optional rechargeable lithium-ion batteries with 2600 mAh and a corresponding charger cradle ensure the tool is always ready for use.

You want a combination of angle tightening, electronic display and logging – but still want a tool that responds like a mechanical tightening angle torque wrench? This is exactly what MANOSKOP® 714 offers.

One of the great strengths of the clockwise clicking MANOSKOP® 714 is its tactile »click« feedback, that is normally only a feature of mechanical torque wrenches. In the indicating mode, this slim-line tightening angle torque wrench will work in both the clockwise and anticlockwise directions and, in sizes 1, 2 and 4, even has a lever-arm compensation mechanism that enables torque measurements irrespective of the point of application of force.

PRODUCT FEATURES

- Four measuring modes (torque, angle, torque backed up by angle, angle backed up by torque).
- Three function modes: clicking, peak (indicating mode) and track (indicating mode).
- Electromechanical triggering and numerous programming functions (fasteners and complex work sequences).

1–1000 N·m

WIRELESSLY LINKED.
MANOSKOP® 766 DAPTIQ®.

DAPTIQ®

1

OPEN.
The open programming architecture enables customers to incorporate the tools in their own production processes, set the parameters and read out relevant data. All the APIs required are supplied.

2

RADIO.
The high-performance, compact 868 MHz radio module (915 MHz) receives and transmits data within extremely short intervals from and to the central terminal. The system allows several torque wrenches to be logged into the customer's system at the same time.

3

INTEGRATED.
Depending on the programming, the torque wrench can communicate with other devices in the network – from the production control system to testers and calibrating units.

The tightening angle torque wrench for the fourth industrial revolution: productive and accurate – and with a radio module and an open interface for integration in production networks.

The electronic torque wrench can communicate with other machines in a production network, receive commands and configurations, transmit documentation of fasteners and display instructions and messages – wirelessly.

PRODUCT FEATURES

- Comprehensive programming, integration and control options.
- Low display deviation value (± 2% for torque; ± 1% for angle) and electromechanical triggering.
- High-definition colour display with additional side-mounted indicator lamps.

1–1000 N·m

Do you have questions?
daptiq@stahlwille.de has the answers.

Made in Germany

STAHLWILLE

CONTENTS
TORQUE SCREWDRIVERS

Made in Germany

SCREWDRIVERS WITH TORQUE.
TORSIOMAX 775.

1

EXACTLY.
The mounting shaft has been manufactured to the closest tolerances – for close-fitting, wobble-free attachment, which ensures excellent force transmission and accurate measurement.

2

HIGH-GRADE.
Handle and housing are made of aluminium – for longer lifetimes even when subjected to heavy use in day-to-day work.

3

ERGONOMICALLY DESIGNED.
Three versions available for different torque ranges. The version for the higher torque ranges has bolt-on auxiliary handles.

When series production fastening demands a classic screwdriver with torque, the Torsiomax 775 screwdriver is the preferred choice.

Torsiomax 775 for clockwise and anticlockwise operation will accept all standard 1/4" E 6.3 bits and will prevent overtorquing thanks to the disengaging clutch coupling. The torque level is set steplessly using a rotary micrometer scale. The display deviation value for the torque screwdriver is ± 6%.

PRODUCT FEATURES

- For torque controlled tightening in cN·m and in·lb scales.
- Equally applicable for single fasteners and production runs.
- The ergonomic handle ensures safe and accurate transfer of torque.

2–1000 cN·m

KEEP TORQUING.
TORSIOMETER 760.

1

SAFE.
Mounting shaft firmly holds inserts and extensions with an E 6.3 external hex and ensures precise control.

2

INDICATING.
The trailing pointer shows the torque applied in N·m. The additional dual scale shows the value in in·lb.

3

HANDY.
The ergonomic design and materials used for the plastic handle guarantee maximum grip and, as a result, safe transmission of forces.

Where fasteners have to be tightened by hand but to a defined torque, the indicating TORSIOMETER 760 torque screwdriver is the ideal tool.

Equipped with a torsional precision leafspring as the measuring element, the TORSIOMETER 760 displays to the user what torque is currently being applied to the fastener. This prevents material damage and reduces rework. The variably controllable torque is quickly and safely set.

PRODUCT FEATURES

- Compact, ergonomically designed torque screwdriver for a torque range of 15–600 cN·m.
- Designed for clockwise and anticlockwise tightening (with trailing pointer), with additional dual scale in in·lb and sliding pointer.
- With 1/4" internal hex drive to take E 6.3 bits.

15–600 cN·m

Made in Germany

ELECTRONICS AND MECHANICS: THE PERFECT SYMBIOSIS.
TORSIOTRONIC®.

reddot award 2018
winner

1

80 4.5°

SENSITIVE.
Integrated ratcheting bit-holder with 80 teeth provides a ratchet angle of only 4.5° and thus enables particularly sensitive working.

2

SAFE.
After the tool trips, the slip mechanism prevents the preset tightening torque from being inadvertently exceeded, which protects against overtightening.

3

BRILLIANT.
Clear display of all the relevant information in a bright, battery-friendly colour OLED display – readable at almost any angle.

4

READY WHEN YOU ARE.
Long-lasting battery charge with battery-saving stand-by mode. The rechargeable batteries can be quickly and easily changed.

5

LOGGING FUNCTIONALITY.
Stores up to 2500 fasteners and sequences for reading out and documenting on the PC later by means of the integrated micro-USB interface.

6

INTUITIVELY SIMPLE.
Easy learning curve thanks to almost self-explanatory controls and an easily understood menu structure.

The TORSIOTRONIC® from STAHLWILLE is the world's only torque screwdriver that blends the advantages of digital technology with those of a real mechanical trigger, appreciated by professional users.

The tool, which won the Red Dot Design Award, offers extensive programming options and allows comprehensive logging of every fastener. With a precision and efficiency that only digital tools can ensure – without having to dispense with the tactile mechanical trigger.

PRODUCT FEATURES

- Available in four versions for different torque ranges: 12–120 cN·m, 30–300 cN·m, 60–600 cN·m and 100–1000 cN·m.
- Whether the tool is set to indicating only or clicking – both modes can be applied clockwise or anticlockwise.
- Three operating modes and visual, acoustic and tactile stop signals. Visual assessment of the torquing action by means of the traffic light colours in the display and laterally placed LEDs.

12–1000 cN·m

CONTENTS
INSERT TOOLS

Made in Germany

A SOLUTION FOR EVERY FASTENER.
INSERT & SHELL TOOLS.

QR

Ratchet insert tools
- QuickRelease ratchet insert tools, fine-toothed ratchet insert tools and bit ratchet insert tools.
- Available for insert tool mounts in a range of formats (9x12 mm, 14x18 mm and 22x28 mm).
- Available for all popular take-off drive sizes.

Square-drive insert tools
- Practical square drive tools for different drive sizes.
- Ideal for all jobs that do not require a ratchet.
- STAHLWILLE – typically robust and durable.

Open-ended insert tools
- Twenty-eight sizes from 7 to 60 mm available, for all standard applications in the trades, production environments and industry.
- Resilient, durable premium steel, forged in Germany.
- Also available in imperial jaw sizes.

AS DRIVE

Ring insert tools
- Available in three take-off drives to cover ring sizes from 7 to 60 mm.
- With AS Drive profile – for optimum force transmission and to guard against slipping off and damaging the screwhead.
- Also available in imperial ring sizes

Weld-on insert tools
- To enable customers to weld on their own tools.
- To prevent heat damage to sensitive parts when welding, the locking pin, spring and disc are packed separately.
- Final assembly by customers using comprehensive assembly instructions.

Bit holder insert tools
- These offer maximum flexibility and efficiency when using screwdriver bits.
- Internal hex drive 1/4" or 5/16", made in conformity with DIN 3126/ISO 1173 D 6.3.
- Bits are easy to insert, lock securely in position and can be removed just as easily.

Open-ended shell tools
- For torque wrenches with a 24.5x28 mm external square drive.
- Available in eleven jaw sizes – covers nearly all fasteners in the trades, production environments and industry.
- Longer lifetimes and outstanding workmanship.

AS DRIVE

Ring shell tools
- Optimum edge-protection and excellent force transmission thanks to high-precision AS Drive profiles.
- Eleven shell tools to cover ring sizes from 24 mm to 60 mm.
- Also available in imperial ring sizes.

Adapters
- Increased flexibility when using existing insert and shell tools.
- Insert adapters with external square drive 9x12 mm, 14x18 mm and 22x28 mm, internal square drive 14x18 mm, 9x12 mm and external square drive 24.5x28 mm.
- Shell adapter with internal square drive 24.5x28 mm for attaching 14x18 mm insert tools.

VERSATILE.
Many insert tools with external square drives **9x12 mm, 14x18 mm** and **22 x 28 mm** and shell tools with an internal square drive **24.5x28 mm** are available.

CONTENTS
TORQUE MULTIPLIERS

Made in Germany

MAXIMUM POWER. MINIMUM EFFORT.
TORQUE MULTIPLIERS MP300.

1

HIGHTECH.
Thanks to the integrated high performance planetary gearbox, STAHLWILLE torque multipliers replace long lever arms. Ideal where space is at a premium.

2

SAFE.
In our torque multipliers for torques above 2000 N·m, an anti-backlash device prevents kick-back – improving occupational safety.

3

DURABLE.
»Made in Germany« quality – with integrated overload cut-out. For long service lifetimes.

Torque multipliers by STAHLWILLE reduce the amount of effort required for larger bolted connections, but without the need for long, unwieldy lever arms.

Above a certain size, tightening and releasing bolted connections requires high levels of torque. In order to keep the effort within a realistic range and reduce the physical input required by the worker, long lever arms are necessary. Or torque multipliers by STAHLWILLE.

PRODUCT FEATURES

- Torque multipliers MP300 are available for torque ranges up to 800, 2000 and 5000 N·m. On request, we can also supply them up to 12,000 N·m.
- Engineered for use in conjunction with STAHLWILLE torque wrenches.
- Even the highest torques can be safely and accurately applied with consistent force transmission, which protects nuts and bolts.

STAHLWILLE

LARGE TORQUES. SMALL CASE.
TORQUE MULTIPLIERS MP100–1500.

1

FOR HIGH TORQUES.
Indispensable where different, large torques have to be applied but mobility is essential.

2

PORTABLE.
All-round package in a portable, robust, but light plastic case – the ideal mobile solution with ratchet functions.

3

VERSATILE.
The torque multiplier enables pre-setting of torques in a wide torque range and also features an additional angle scale.

With the portable, versatile MP100–1500 torque multiplier by STAHLWILLE, end users are well equipped for all higher torques up to 1500 N·m.

This complete set for high torques is ideal for mobile jobs – for changing wheels on lorries, for example. The set in its sturdy case consists of not just the torque multiplier but also the most popular tool inserts and a torque absorption arm 400 mm long. It is remarkably compact and light-weight.

PRODUCT FEATURES

- Torque multiplier set for mobile use, for torques from 100 to 1500 N·m.
- Patented ratchet mechanism.
- Set consisting of the torque multiplier, hexagon inserts sizes 30, 32 and 36 mm, a 1" external square drive and a 400 mm torque absorption arm.
- Display deviation value of the torque multiplier is ± 5%.

CONTENTS
TESTING TECHNOLOGY

Made in Germany

PRIZE-WINNING RESULTS.
SMARTCHECK TESTER.

1

FLEXIBLE.
SmartCheck can be positioned almost anywhere. Whether horizontally or vertically – the well-thought-out fixing points, the compact construction and rotatable display make it easy to use.

2

REVOLUTIONARY.
SmartCheck can easily be adjusted to suit the user's angle of sight.
Not only the display but also the display mount and base body can be rotated through 180°.

3

NOW WITH A USB PORT.
The SmartCheck USB has a USB interface that allows test values stored on the device to be read out. This means the data can be transferred to an external system.

4

RESILIENT.
The display and keypad are splash-proof, and the housing is made of impact-resistant plastic. Safe transport and storage is ensured by the sturdy transport box.

5

INTUITIVE OPERATION.
The unit is easy to use and has operator guidance to aid fast working, reliable results coupled with high levels of safety.

6

iF DESIGN AWARD 2017

PRIZE-WINNING TECHNOLOGY.
The SmartCheck was awarded the coveted iF Design Award in 2017 in the industrial products category for outstanding ergonomic design and its attractive, functional product design.

The SmartCheck torque tester now enables users to check their torque wrenches and torque screwdrivers themselves to enable peak performance at all times.

The space-saving design of the torque wrench tester means it is easily located in any workshop, where it can be mounted horizontally or vertically. Operation is virtually self-explanatory and does not require complicated training. Since no additional transducers are required, it is possible to use the tester as soon as it has been set up. Besides classic operation with a mains adapter, it can also be battery powered.

PRODUCT FEATURES

- Extremely accurate, durable metrology from STAHLWILLE with a display deviation of only ± 1%.
- Available for five torque ranges: 1–10 N·m (also available as a special-purpose version for torque screwdrivers), 10 –100 N·m, 40–400 N·m, 80–800 N·m and 150 - 1500 Nm.
- Operating modes: track, first peak and peak hold. The target torque and tolerances can be individually set.

Experience the outstanding features of the SmartCheck in a video here:
www.stahlwille.de/videos/smartcheck

DAPTIQ®

The SmartCheck appliance for the fourth industrial revolution:
with a bidirectional open-source interface for excellent integration into the superordinate controller system.

Made in Germany

A GOOD COMBINATION FOR EXCELLENT RESULTS.
7707 W TORQUE TESTER.

1

COMPACT.
Thanks to its compact dimensions and the inherent mounting flexibility, the SENSOTORK® tester will fit in almost any workplace.

2

PRACTICAL SOLUTIONS.
The spiral cable and the 1.5 m tripod cable allow test results to be closely observed on the hand unit, alternatively mounted on the tripod – even when testing long torque wrenches.

3

VERSATILE.
The unit allows clockwise and anticlockwise measurements across a very broad measuring range from 2 to 100 per cent of the rated value. The interchangeable square drive adapters are conveniently stored in the mounting block.

The SENSOTORK® 7707 W electronic tester is not only compact – thanks to its quickly interchangeable transducers it is also extremely flexible.

The low-profile transducer in the SENSOTORK® 7707 W is, at the same time, responsible for digitising the readings. As a result, measurements are particularly accurate. The readings are shown on the display that is connected to the tester by a spiral cable.

PRODUCT FEATURES

- Transducers are exchanged using the QuickRelease lock for rapid change-over to other measuring ranges.
- With click type torque wrenches, the torque actually applied can be displayed.
- Horizontal and vertical mounting possible – mounting attachments included.

4

PC CAPABLE.
When used in conjunction with STAHLWILLE software, the readings can be transferred to a PC and documented there.

5

INDEPENDENT.
The unit can be used in a temperature range from - 20 °C to + 60 °C.

6

ACCURATE.
Patent, low-profile transducers guarantee minimum lateral forces and this translates into optimum readings – in these units of measure: N·m, ft·lb, in·lb.

CONTENTS
CALIBRATING TECHNOLOGY

MECHANICAL CALIBRATION. DIGITAL MEASUREMENT.
MANUTORK® 7791 AND 7792.


7791


7792

1

HOLD STEADY.
The torque wrench to be calibrated remains in the same position throughout the calibration process. A linear ball bearing helps to ensure that the tool remains accurately aligned.

2

ACCURATE.
The handwheel acts on a spindle to apply a linear motion that is converted into a rotary movement that acts on the transducer. It is impossible for the point of application of the force to be mislocated, so measuring errors are effectively prevented.

3

INDIVIDUAL.
The tool is suitable for use with many different transducers and for testing torque wrenches up to 400 N·m (model 7791) and 1000 N·m (model 7792).

The mechanical calibrators 7791 and 7792 are designed as modular units. Together with additional components, they can be quickly adapted to individual needs.

In compliance with DIN EN ISO 6789, when calibrating torque wrenches with the aid of the mechanical loader, the torque can be applied slowly and continually – especially important once 80% of the target value has been reached.

PRODUCT FEATURES

- Available for torques up to 400 N·m (model 7791) and 1000 N·m (model 7792).
- The rest can be height adjusted for measurements – to ensure excellent readings.
- Modular plug-in system with precise fit to enable simple, safe assembly and cater for individual preferences.

Extensions 7791-1 and 7792-1

- Tailored extensions for mechanical calibrating units 7791 and 7792
- Extensions enable torque wrenches with longer functional lengths and higher torques (7791 up to 1000 N·m and 7792 up to 3000 N·m) to be calibrated
- The precise plug-in system enables fast, simple attachment using an easily accessible screw retaining system.


7791-1

KEEP TORQUE SCREWDRIVERS AT THEIR BEST.
MECHANICAL LOADERS 7790 AND 7791-2.


7790


7791-2

1

UNIVERSAL.
Special-purpose fixing device guarantees torque screwdrivers are aligned centrally. For optimum mounting and safe force transmission.

2

FULL CONTROL.
The handwheel guarantees that the end user can apply exactly the right force required for the torque screwdriver calibration process.

3

PORTABLE.
Compact dimensions and low weights of only 7.9 kg (model 7790) and 3.9 kg (model 7791-2) facilitate installation, deinstallation and transport.

Mechanical loader 7790 for torque screwdrivers can be used as a stand-alone unit or can be attached to mechanical loader 7792, while model 7791-2 can be bolted onto mechanical loader 7791.

Mechanical loader 7790 allows torque screwdrivers to be calibrated in minutes. Used in conjunction with transducer 7728-1S, it is ideal for calibrating torque screwdrivers from 1–10 N·m. With transducer 7721, it will even calibrate from 0.2–10 N·m.

PRODUCT FEATURES

- Steady hold for every torque screwdriver and optimum control over the torque applied.
- This tool is also available as 7791-2, which is a bolt-on version for use with mechanical loader 7791.
- Torque is applied through a square-drive mount in the optional transducer.

Made in Germany

THE DEFINITIVE SELECTION.
PERFECTCONTROL CALIBRATING UNITS.

1 2 3

7794-2

5

7794-1

6

7794-3

1

EFFICIENT.
QuickRelease enables the transducer to be changed quickly and easily. The bridge support is locked in place using a one-handed eccentric lever.

2

ACCURATE.
All measurements are possible without moving the point of application of force. The transducers detect exactly, digitise the readings and transmit them to the PC.

3

CONVENIENT.
perfectControl 7794-2 with an electronic motor and keys for controlling measurements clockwise and anticlockwise, where the speed is automatically adjusted.

4

MODULAR.
The basic versions of perfectControl will calibrate torque wrenches up to 400 N·m. If the 7791-1 Extension Unit is added, calibrations up to 1000 N·m are possible.

5

MANUAL VERSION.
With the manual perfectControl 7794-1, force is applied to the torque wrench through the ergonomically designed handwheel.

6

ADDITIONAL FUNCTIONS.
perfectControl 7794-3 is also suitable for calibrating angle-controlled wrenches. Thanks to the integrated motor, the working height can be adjusted to suit the user.

The electronic perfectControl calibrating units reduce the amount of effort and time required for calibrations and adjustments and prevent incorrect measurement.

perfectControl calibrating units guarantee controlled application of force and, in conjunction with STAHLWILLE transducers, ensure the correct alignment of the tool for accurate readings. Together with the TORKMASTER software, this system enables calibration certificates to be issued in the shortest possible time.

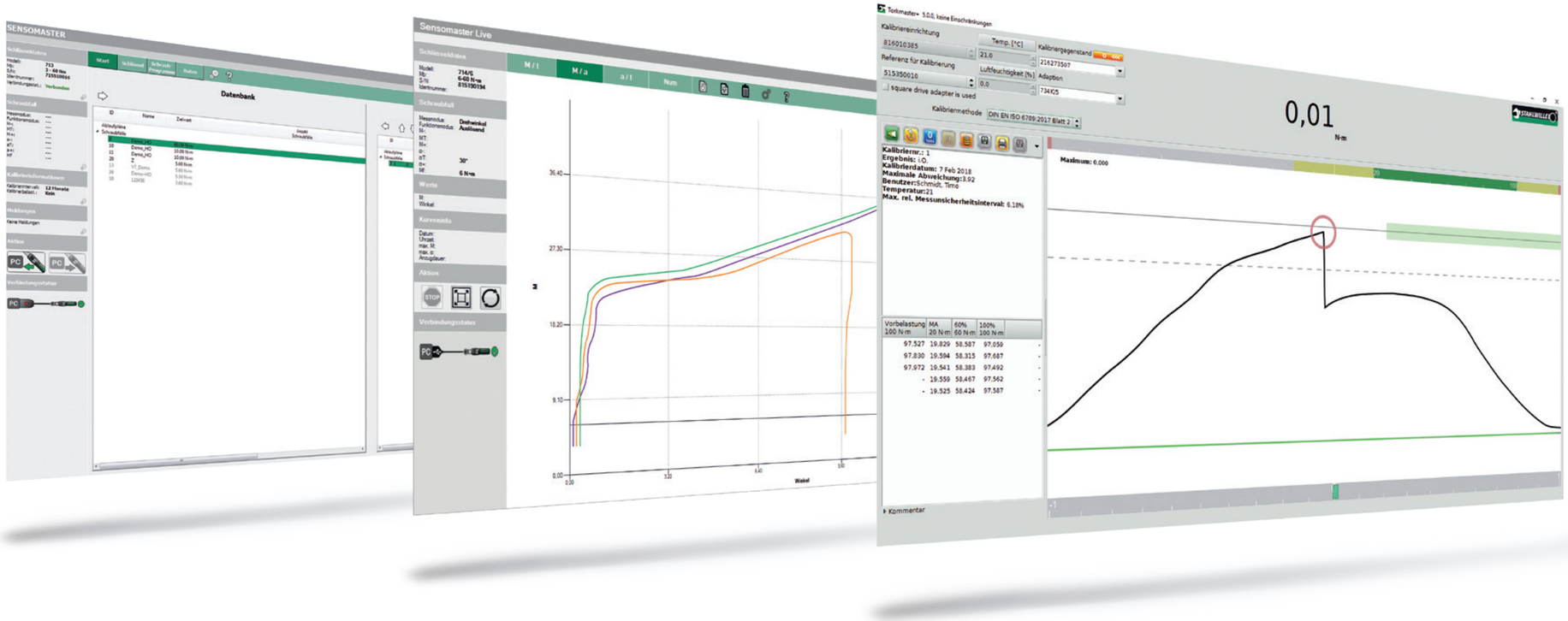
PRODUCT FEATURES

- The accurately mounted spindle and the finely controlled motor prevent incorrect measurements.
- Checks and calibrates electronic torque wrenches made by STAHLWILLE fully automatically.
- Integrated USB port for exchanging data with the PC.

4

7791-1

CONTENTS
SOFTWARE



Made in Germany

ONE FOR ALL.
SENSOMASTER.

1

INTUITIVE.
The intuitive user interface employs a well-organised tab layout and shows only those functions supported by the torque wrench currently connected.

2

PARAMETER SETTING.
Even complex fasteners and complete work sequences can be configured on-screen and transmitted to the connected tool in seconds.

3

READY TO READ.
Amongst other details, SENSOMASTER reads out the tool's identifier, tool serial number, target torque, target angle, trigger torque, tightening torque and angle achieved.

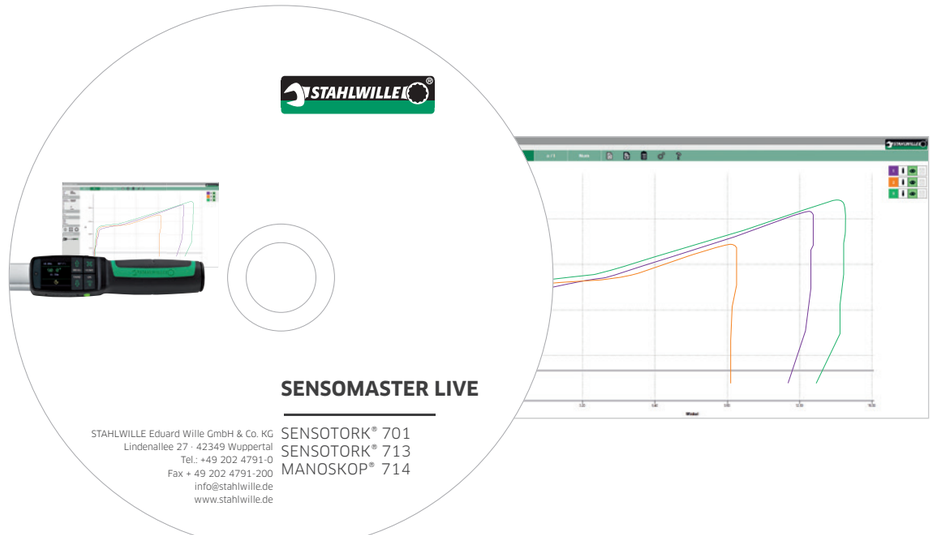
STAHLWILLE's SENSOMASTER software facilitates programming electronic torque wrenches and enables stored data to be read out.

With the aid of the free-of-charge software, any number of electronic torque wrenches from STAHLWILLE can be configured on the PC. In addition, the software allows comprehensive documentation to be compiled, statistical data to be viewed graphically and data to be exported.

PRODUCT FEATURES

- Only one software package for all electronic torque wrenches from STAHLWILLE.
- Transmits specifications for fasteners and work sequences to the torque wrench.
- Enables comprehensive evaluations, for example in connection with quality assurance.

THE TOOL FOR DEVELOPERS.
SENSOMASTER LIVE.



1

SIMPLE.
Intuitive operation thanks to the easily followed, tidy user interface. It is not possible to enter any parameters manually.

2

VISUAL.
Record torquing operations with the MANOSKOP® 714, SENSOTORK® 713R (from firmware 4.x) and SENSOTORK® 701. Representation of torque over time, angle over time, torque over angle.

3

FAST.
Realtime recording and simultaneous graphical processing of torquing operations. As many as 15 curves can be displayed at the same time marked in different colours.

The SENSOMASTER LIVE software is the ideal aid for anyone involved in the groundwork. It can be used to evaluate a fastener or a new joint in realtime – for instance in the design field.

SENSOMASTER LIVE allows every fastener to be analysed quickly and easily. As soon as the torque wrench is connected, it displays the progression of the torquing process as a curve and enables critical areas to be zoomed in for closer examination. More detailed analyses can be performed by exporting the data as a CSV format file.

PRODUCT FEATURES

- Displays as many as 15 curves, each of which can be displayed or suppressed, and with a zoom function.
- Automatically connects to the MANOSKOP® 714, SENSOTORK® 713R (from firmware 4.x) and SENSOTORK® 701 and reads all parameters.
- Various curve views are possible: torque over time, torque over angle, angle over time.

Made in Germany

SIMPLE, PROFESSIONAL CALIBRATION.
TORKMASTER.

1

USER FRIENDLY.
TORKMASTER runs in 17 languages and has integrated user management with password security – for optimum user convenience and a high standard of process dependability.

2

GRAPHICAL.
»As found« and »as left« calibrations can be documented. Torque paths are shown as graphics.

3

EFFICIENT.
STAHLWILLE makes comprehensive parameter databases available to customers for TORKMASTER, which much simplifies the task of calibrating torque tools.

The TORKMASTER software processes the data digitised in the transducer and transmitted to the PC and guides the user surely through the calibration process.

Calibration in compliance with the standards, generating calibration certificates to DIN EN ISO 6789:2003 and, in future, to DIN EN ISO 6789:2017 – this is exactly what the STAHLWILLE TORKMASTER software is for. At the highest standard of safety and with minimum effort for the user.

PRODUCT FEATURES

- Simple calibration of torque wrenches and torque screwdrivers.
- Print calibration certificates or generate PDF calibration certificates.
- Tool-specific calibration history for each torque tool.

4

VERSATILE.
Select the calibration method in a drop-down menu. Installed standard methods: test & adjust, quick test, DIN EN ISO 6789-1:2017 and DIN EN ISO 6789-2:2017.

5

UNMISTAKEABLE.
The main window displays the torque path and the measured trigger value, including the 80% and 100% marks.

6

SAFE.
Integrated management of IMTE (inspection, measuring, and test equipment) provides additional safety in standards-compliant calibration processes.

DAPTIQ®

By means of the TORKMASTER software supplied and the additional CAQ interface, the system can be easily integrated into a computer-aided quality system (CAQ). This speeds up workflows in the calibration laboratory and increases efficiency.

Torque technology

Technology and Service

Made in Germany

FORCE APPLIED EXACTLY.

The right force is a crucial factor in many fastener tightening jobs. STAHLWILLE explains why. And many other key points.

CONTROLLED TIGHTENING.
WHAT YOU NEED TO KNOW ABOUT TORQUE TECHNOLOGY.

STAHLWILLE is the expert when it comes to torque technology and torque metrology. This handtool specialist was one of the first to recognise the importance of controlled tightening operations and, in the last decades, has developed torquing solutions »Made in Germany« for such core industries as the automotive sector, aviation, power generation and industry generally, that are the defining forces in terms of accuracy and durability. Indeed, in 1997, STAHLWILLE was the first manufacturer of torque wrenches in Germany to be accredited by the German Calibration Service DKD. Today, the enterprise is accredited by DAkkS and has already issued several thousand official calibration certificates that are recognised internationally by ILAC.

Torque technology is epitomised by the brand name STAHLWILLE.

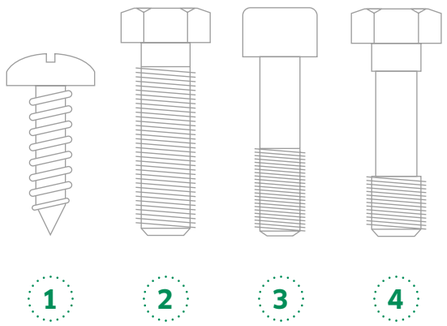
FASTENERS.
TRIED-AND-TESTED A BILLION TIMES OVER.

There are many ways of joining two components together. Wherever the joint will have to be separated again later and then rejoined, there is really no alternative to bolted connections. These are versatile, fulfil all the technical preconditions and are cost-efficient.

In contrast to other classic joining techniques, they have one decisive advantage: they can be dismantled. This is how they make it possible to repair or modify components. In addition, as opposed to adhesives, rivets and welded joints, they do not prevent the components from being reused. Last but not least, the fastener geometries and the metal alloys used can be ideally matched to the components to be joined and the expected loads in normal operation.

For these reasons, the joining technique most frequently used is that involving threaded fasteners. Whether it is in a laptop computer, an aeroplane or the girder construction of a bridge.

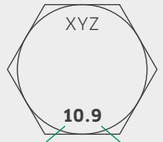
Examples of different types of fasteners



1. **Self-tapping screw**
2. **Machine screw, hexagonal**
3. **Machine screw, Allen-head**
4. **Tension bolt**

Bolted joints: background knowledge.
A key feature of a bolted joint is that it is based on the principle of force locking. This means that the fastener joins the two parts and prevents them moving relative to each other. At the same time, it applies so much cohesion friction to the two parts that they cannot move relative to each other (power or force locking). To achieve this, it must guarantee a sufficiently high clamping force under operating load to prevent shearing forces perpendicular to the axis of the fastener – this would otherwise cause the joint to work loose.

When calculating the preloading force required for the clamping power, frictional losses in the thread and under the screwhead must be taken into consideration. It is also essential to select a fastener that is capable of generating the required clamping force. The reason is that, fasteners differ not only in their size and profile but also in terms of their mechanical strength classification. This classification provides information about the load capacity and tensile strength of a fastener and must be marked on every fastener with a nominal diameter of more than 5 mm.



Tensile strength R_m
1st number x 100 N/mm²
10 x 100 N/mm²
1000 N/mm²

Yield point R_e
1st number x 2nd number x 10 N/mm²
10 x 9 x 10 N/mm²
900 N/mm²

The code for the strength category comprises two values separated by a dot. The first number corresponds to one hundredth of the nominal ultimate tensile strength. The second is a factor of ten of the ratio between the lower yield point and the nominal ultimate tensile strength. So a fastener marked with a strength category of 8.8 has a tensile strength of 800 megapascal (MPa) and a tensile strength ratio of 0.8.

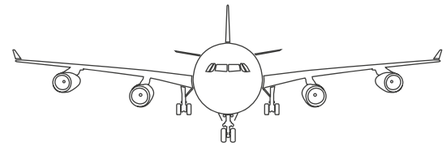
EXACT CONNECTIONS.
A GUARANTEE FOR …

THE FUTURE.

An increasing number of bolted connections have to be tightened to a specified torque and the results documented because of strict safety regulations and quality requirements. It is only a defined bolted connection that can ensure a joint will withstand the anticipated loads in subsequent operation. In addition, sensitive materials such as carbon, magnesium alloys and plastics are being used more frequently: if the clamping force is not absolutely right, the joint may be damaged or fail.

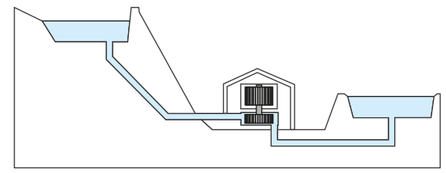
SAFETY.

Take aerospace, for example: there are many safety relevant bolted connections in a turbine and around the landing gear. These must be tightened to very strict specifications. This is why accurate torque tools are indispensable in production and maintenance.



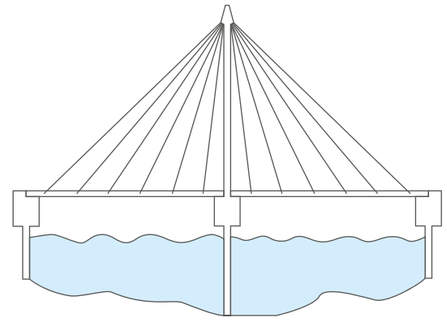
EFFICIENCY.

In power station construction and power generation generally it is essential to prevent defects that take a power station offline – every minute translates into losses for the operator. An incorrectly tightened fastener can become a very expensive matter.



DURABILITY.

Steel girders and fastening elements used in construction projects must be absolutely reliable and last for many years – often under extreme conditions, as is the case with bridges, for example. Torque technology has been indispensable in this field for many years because this is the only way sufficiently high, durable clamping forces can be generated.



TORQUE.
MULTIPLYING FORCE.

Torque or moment (symbol in physics »M«) describes the turning effect of a force (F) on a member – a fastener, for example. It is calculated by multiplying the force applied – in »newtons« or »N« – by the length of the lever used to apply it to the fulcrum – in »metres« or »m«. The unit used for the resulting moment or torque is N·m.

In terms of the physical principles involved, a bolted joint is a far more complex matter than applying a screwdriver, ratchet or torque wrench would have us think.

As soon as a fastener is tightened, axial forces occur within it, and these result in the fastener being elongated. As the fastener is elongated, the parts to be joined are compressed. As soon as the ideal clamping force has been attained, we have friction contact: the components act as if they were a single part.

So what has that got to do with torque? Quite simply, for many bolted joints, a predefined tightening torque is specified, and the required clamping force is only attained if the correct torque is properly applied. To achieve this, a torque wrench is indispensable, because it enables controlled tightening in reproducible quality.

However, tightening torque is calculated by multiplying the force applied by the length of the lever. As a result, it is impossible to estimate the torque without using appropriate measuring equipment. The longer the lever, the less the worker will notice what a tremendous force he or she is applying to the head of the fastener. This becomes even more complicated if insert and shell tools with an extension that deviates from the standard are used together with the torque wrench. In this case, it is necessary to recalculate the setting or display value for the torque wrench in use before applying force.

N·m

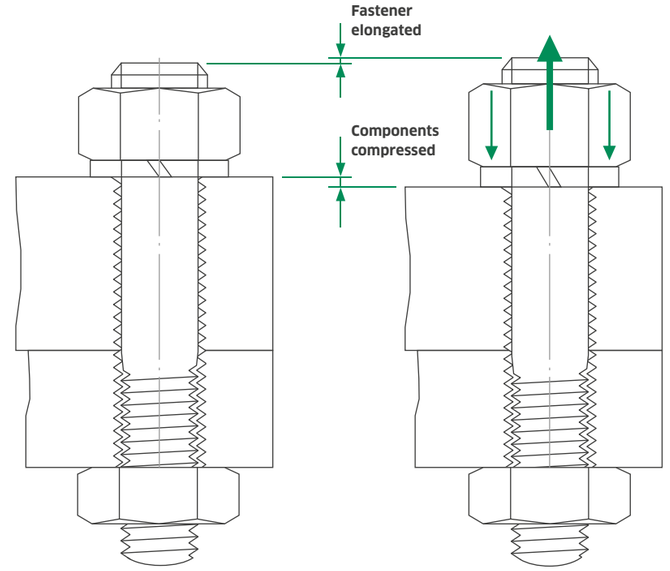
Newton metres
The most common unit of measure used to describe torque is the newton metre. This unit is part of the international system of units (SI) for physical quantities. One newton metre corresponds to one joule of energy and is the mechanical work performed when one newton is applied over a distance of one metre.

ft·lb

Foot pound
The foot pound is the Anglo-American unit of measure used for torque, or moment. Originally, it was called the pound foot (lbf·ft), but was renamed to avoid confusion with the unit of energy of the same name. One ft·lb corresponds to approx. 1.356 joules – which is the energy required to raise one pound avoirdupois one foot.

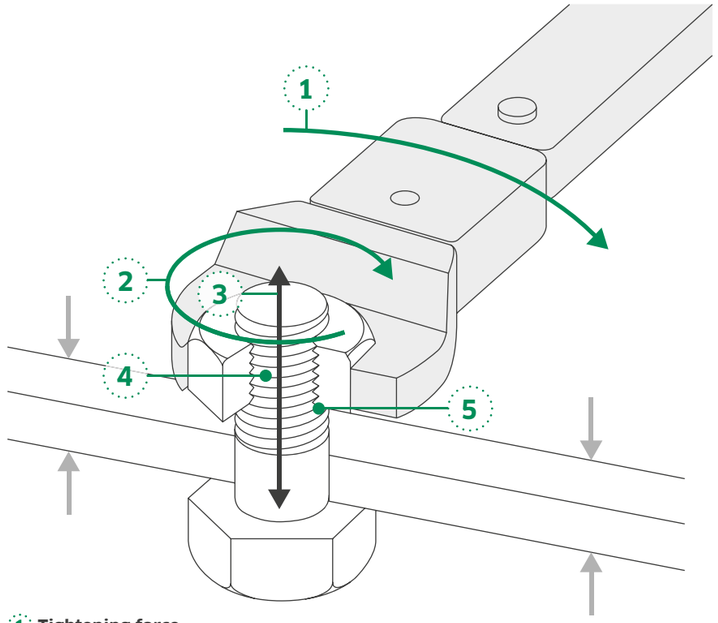
in·lb

Inch pound
The inch pound (lbf·in) is also an Anglo-American unit of measure. One in·lb corresponds to 0.11298483 joules, which is the energy required to raise one pound one inch (2.54 cm).



Joint **not tightened** Joint **tightened**

Metal moves
It is hard to believe, but a fastener is, in some ways, like a spring. It can be elongated and returns to its original length, so it can create pretension. We have to take into account that this process is subject to many parameters – like the amount of underhead friction, changes in the amount of force applied and the quality of the thread. A torque wrench can help to achieve very exact results despite all these variable factors.



1 **Tightening force**
2 **Sum (Σ) of all torques**
3 **Clamping force**
4 **Thread friction**
5 **Underhead friction**

Force to be reckoned with: torque
Tightening torque acts on the bolting point – in the centre of the fastener axis. Since it is the product of the length of the lever arm and the force applied, it is not possible to tighten a fastener to a given torque by hand. In addition, fasteners behave differently depending on the specific joint in question. If the materials are soft (soft joint), torque increases steadily and without peaks. If the components are made of hard material and are joined with a thread or self-tapping fasteners (hard joint), torque will suddenly increase in jumps towards the end of the tightening action.

ANGLE CONTROLLED TIGHTENING.
ONE STEP HIGHER.

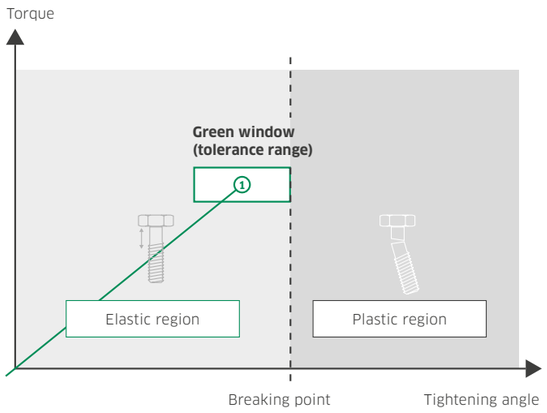
While tightening to a given torque is perfectly sufficient for many bolted joints, some applications require tightening to a certain tightening angle. This means that the fastener is tightened through a prescribed angle after the snug point has been reached by torquing.

Due to its enhanced complexity, angle controlled bolt tightening is reserved for situations involving particularly critical safety requirements, for instance with Class A bolted joints. Since the tightening angle is proportional to the preloading force, it is possible using this technique to create exactly reproducible clamping forces.

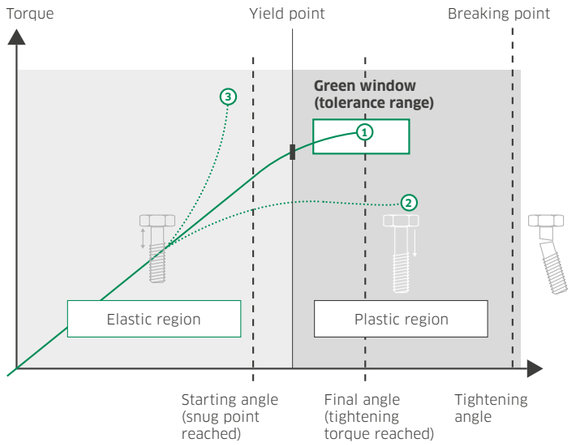
Application of the tightening angle method will normally elongate the fastener almost to its yield point – i.e. almost to a point at which the elongation becomes irreversible. In some applications, fasteners are indeed tightened until they transition from the elastic to the plastic state – this is found where special tension bolts are used in engine construction.

A further advantage of the tightening angle method is that, in production environments, it provides a second monitoring opportunity.

Tightening angle method with a **standard fastener**



Tightening angle method with a **tension bolt**



1 **Joint OK** Torque angle and equivalent final torque within specified tolerances.

2 **Joint not OK** Torque angle within specified tolerances, equivalent final torque not attained.

3 **Joint not OK** Torque angle not attained by the time maximum equivalent final torque reached.

BETTER SAFE THAN SORRY.
DON'T GIVE DEFECTS A CHANCE.

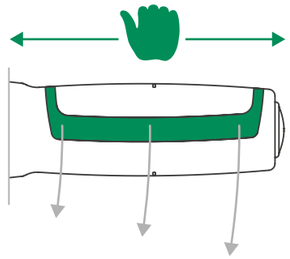
High-grade, resilient, durable bolted connections are not just a coincidence: they are created by an orchestrated blend of the worker, the tool and the material. There is enough room for human error and preventing them is what distinguishes amateurs from professionals. And professional tools from consumer qualities.

There are many sources of mistakes – even in the context of controlled tightening. Defective nuts and bolts are just some. There is also the human factor – it is, after all, a person that selects the fasteners of a particular strength category, makes settings on the tools, checks their functions and then uses that tool to make the joint.

Because we are well aware of these variables, we at STAHLWILLE develop our torque tools specifically with the aim of preventing human error – whether it is in inspecting the tools, setting them or using them. For example, we ensure that the target torque can be set exactly – whether it is a digital system, a slider or knob with clearly readable scales. The carefully designed ergonomics of the handles also automatically guides the worker to grasp the tool at the ideal point of application of force, which guarantees reliable readings.

Using electronic torque and angle-controlled wrenches makes the results even safer. They can record complex tightening sequences and guide the worker from one fastener to the next. They evaluate each fastener and provide the user with meaningful feedback. Finally, torque testers like the SmartCheck allow users to check their torque wrenches themselves. It only takes a few seconds for the user to know with certainty that the tool is within the tolerance limits.

Optimum measurement.
The ergonomic handle makes operating the tool particularly safe and prevents incorrect operation – because the user will intuitively grasp it in the right place.



Perfectly balanced.
Some of STAHLWILLE's torque wrenches are even able to compensate for the user's holding the tool in the wrong position and can measure torque irrespective of the point of application of force.

Trust, but verify.
The compact SmartCheck torque tester can be mounted horizontally or vertically, so it is easily located in any workshop. It is used to check the torque wrench within seconds before it is used.

THAT DECISIVE STEP AHEAD.
THE STAHLWILLE PRINCIPLE.

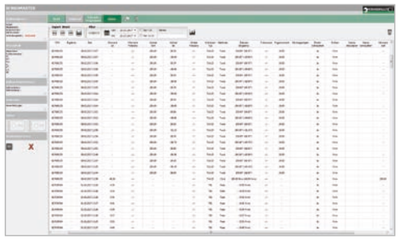
STAHLWILLE never ceases to develop ideas for torque – and always from the viewpoint of the user. What issues are at the top of their wish-lists? What requirements are they likely to be faced with tomorrow? How can one make it easier for workers to do their work, do it more reliably and improve safety? These are topics that drive our development team based in Wuppertal – and result in innovations to the benefit of customers. The following pages present a selection.

MANOSKOP® 730 Fix. More security. In series production.
When it comes to series operations, MANOSKOP® 730 Fix provides many advantages: firstly, because the trigger action does not use a compression spring, this wrench has a flexible rod with a triggering cam. So there is no need to reset to »0«. Then there is the QuickSelect control knob, which not only allows accurate setting without a tester. With the MANOSKOP® 730 Fix, the knob can even be removed with little effort to prevent inadvertent changes to the settings. Peak security is provided by the locking screw and the adhesive seals provided. Manipulation impossible – security issue fixed.

Made in Germany

Made in Germany
For over 150 years, the name STAHLWILLE has been a byword for innovative handtools that are Made in Germany. Smart torque technology and tool systems, high-grade tightening tools and individual solutions for handtool storage coupled with modern designs. STAHLWILLE unites all the outstanding features of traditional German forging, state-of-the-art production techniques and digital technologies.

You can feel it. Every time you pick one up. In every application. Handtools – made for generations.



One software package for all.
The SENSOMASTER software package is available for the electronic torque wrenches made by STAHLWILLE. This is a central PC tool that will allow all electronic torque wrenches from STAHLWILLE to be read out and configured. The software detects the tool automatically, uploads fasteners and work sequences to the tool and extracts the logged data from the wrench for the joints already completed. Individually adaptable filter functions support the user when locating specific data records, and there are numerous export options available – to aid quality assurance, for example. But the best thing about it is the basic software tool will not cost STAHLWILLE customers anything.

A fine pair: the electronic perfectControl calibrating unit and the **TORKMASTER** calibrating software.

Calibration – easier than ever
With STAHLWILLE's perfectControl 7794-3 calibrating and adjusting unit, you have a machine that is capable of calibrating torque and torque angle wrenches automatically from 1 to 1000 N·m. The 7794-3 is the only calibrating unit of its type worldwide that is capable of calibrating both torque and the tightening angle in a single unit for click type torque wrenches. The torque applied using the torque wrench is digitised within one of the transducers, interchangeable for different measuring ranges, and transmitted to the PC running appropriate evaluation software. All the user has to do is clamp the torque wrench in place.

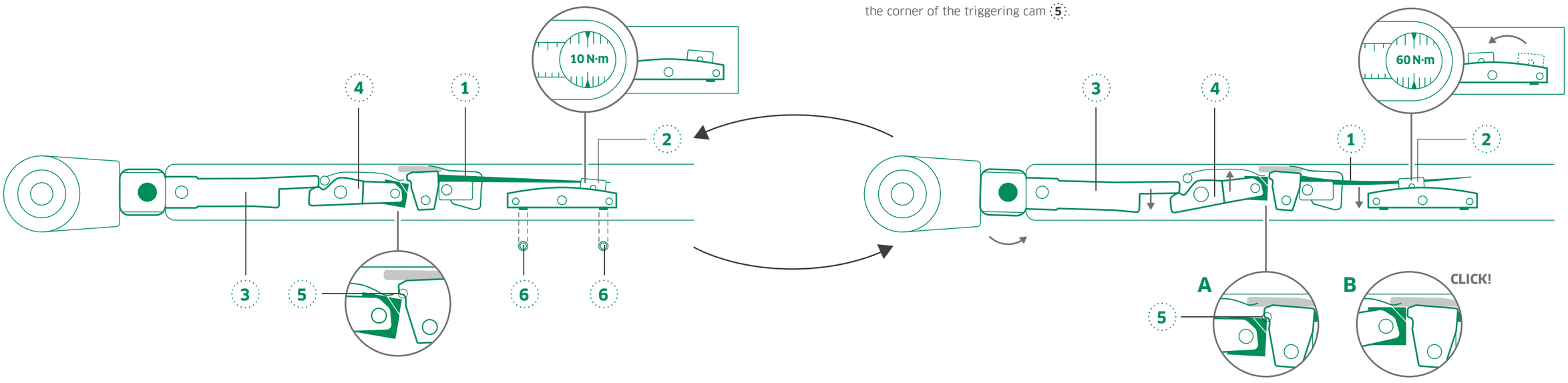
GREATER CONVENIENCE. MORE SAFETY.
THE FLEXIBLE ROD SYSTEM.

In contrast to conventional mechanical torque wrenches, STAHLWILLE torque wrenches are equipped with a trigger system that employs a triggering cam. The advantages are manifold: if a torque wrench has a spring mechanism, the user has to reset the spring to »0« at intervals. If it is not reset, there is a real danger that the spring will be deformed and this will result in incorrect measurement results. STAHLWILLE's trigger system with the triggering cam is only under load during the tightening operation. For this reason, it is not necessary to reset it to »0«. The user dispenses with one processing step and the trigger mechanism is virtually wear-free.

No reset, no wear

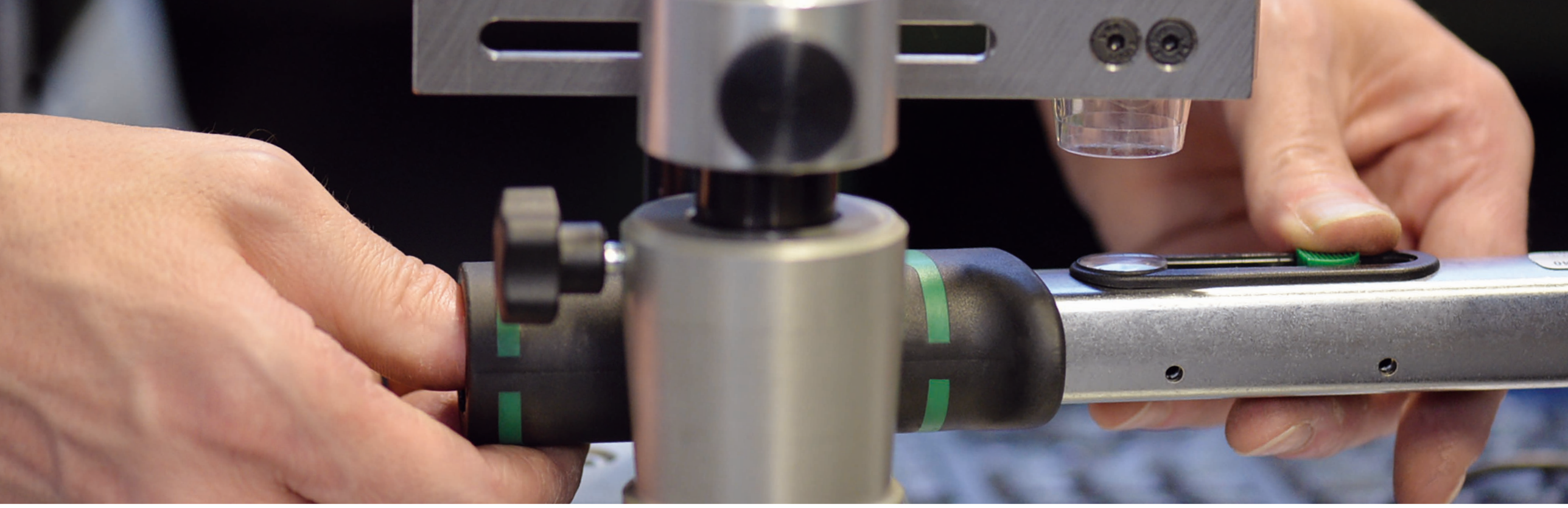
Where the working load is zero, the flexible rod (1) is not preloaded. The user moves the setting slide (2) to modify the position of the counter-bearing – and in doing so changes the effective length of the lever arm and its preloading or resistance. If force is now applied to the torque wrench, the switching element (3) tilts downwards and applies force to the switching element (4), forcing it up. The corner of the element moving upwards contacts the corner of the triggering cam (5).

To overcome the resistance created by the flexible rod (1), a specific force will be necessary, which depends on the torque that has been set. As soon as this has been reached, switching element (4) will be able to continue its travel upwards and will produce both an audible and a tactile signal. As soon as the user ceases to apply force, all the components automatically return to their unloaded positions – manual reset to »0« is not required.



Cutaway model of the MANOSKOP® 730N

1 Flexible rod
2 Setting slide
3 Left-hand switching element
4 Right-hand switching element
5 Triggering cam
6 Adjusting screws



PEAK ACCURACY: A PERMANENT TASK.
STAHLWILLE IS LICENSED TO CALIBRATE.

How can one ensure that a customer is informed about the accuracy of their torque tools? How is it possible to guarantee that tools of this type are carefully checked and, where necessary, compared with the national standard? STAHLWILLE has known the answers for more than 20 years: standards and directives are the key.

Very early on, STAHLWILLE recognised the importance of standardisation and calibration technology. In 1997, the enterprise was the first manufacturer of torque wrenches in Germany to be accredited by the German Calibration Service (DKD). This gave the company the licence to check torque with reference to the national standard and issue calibration certificates. Today, STAHLWILLE's calibration laboratory is accredited by DAkkS in accordance with DIN EN ISO/IEC 17025:2005. STAHLWILLE fulfils all the requirements of Technical Specification 16949 – an indispensable condition to enable torque tools for automotive suppliers to be calibrated. At the same time, STAHLWILLE's laboratory complies with DIN EN ISO 9001:2008 – which makes the company the ideal partner for all those enterprises that are certified to quality management system 9001.

To achieve this status, it is absolutely essential to have in-depth knowledge of calibrating and measuring techniques. The same know-how is an essential asset that is exploited in the development and production of torque tools. It is hardly surprising that STAHLWILLE products are recognised as being among the most accurate on the market.

But this fact does not mean STAHLWILLE rests on its laurels. On the contrary, the company plays an active role in national and international committees to continue to develop directives and standards. STAHLWILLE was involved in the drafting of the new standard for calibrating torque wrenches – DIN 6789:2017 – and is one of the first companies to implement it in its production and laboratory. When calibrations of torque wrenches are carried out in compliance with Part 2 of the new standard, customers will soon be provided with more details on the uncertainty of measurement of the tool.

STAHLWILLE:
The highest quality in corporate processes depends on accreditation and certification to key quality standards.

NEW STANDARD: MORE INFORMATION.
DIN EN ISO 6789:2017

DIN EN ISO 6789 is a regulatory instrument that governs the development and calibration of torque wrenches. The previous version required only details of the permitted deviation (Fig. 1, old standard). The new version in 2017 consists of two parts.

Inspection in compliance with Part 1 is sufficient for the issue of a Declaration of Conformance. This document confirms to the owner of the torque wrench that the tool is functioning within the standard, but does not constitute calibration. That confirmation is only provided in connection with inspection to Part 2, which results in the issue of a calibration certificate, which contains not only the display deviation value but also new details of the uncertainty of measurement.

Uncertainty of measurement is determined by the calibration laboratory in a complex process. This is because uncertainty of measurement is calculated from individual evaluation of several uncertainty parameters (Fig. 2). For each of these, the results from many different measuring points are used to calculate a statistical mean.

STAHLWILLE customers can continue to rely on peak quality. As a supplier of high-grade measuring equipment, STAHLWILLE will ensure that all new products are calibrated in good time to Part 2 of the standard and delivered with the corresponding calibration certificate.

Fig. 1: **Old standard** DIN EN ISO 6789:**2003**

MAKING UNCERTAINTY COUNTABLE, FOR SURE.

$$w = \sqrt{\left(\frac{W_{md}}{2}\right)^2 + W_r^2 + W_{rep}^2 + W_{od}^2 + W_{int}^2 + W_l^2 + W_{re}^2}$$

This example relates to a clicking torque wrench

The uncertainty of measurement, which is a new requirement, is calculated using seven factors. Every one of the uncertainty readings listed here is used for the calculation.

w_{rep} = Uncertainty resulting from reproducibility*
w_l = Uncertainty resulting from the length of the lever arm*
w_{re} = Uncertainty resulting from repeatability*
w_r = Uncertainty resulting from the display resolution (is defined once for each torque wrench model, i.e. 730/2, 730/4, 730N/5 etc.)

w_{od} = Uncertainty resulting from the insert tool*
w_{int} = Uncertainty resulting from the square drive adapter (only necessary if the torque wrench is calibrated with the square drive adapter attached)
w_{md} = Uncertainty resulting from the reference (transducer, is quoted in the DAkkS certificate)

* These amounts are calculated from complex statistical surveys which have to be continuously updated.

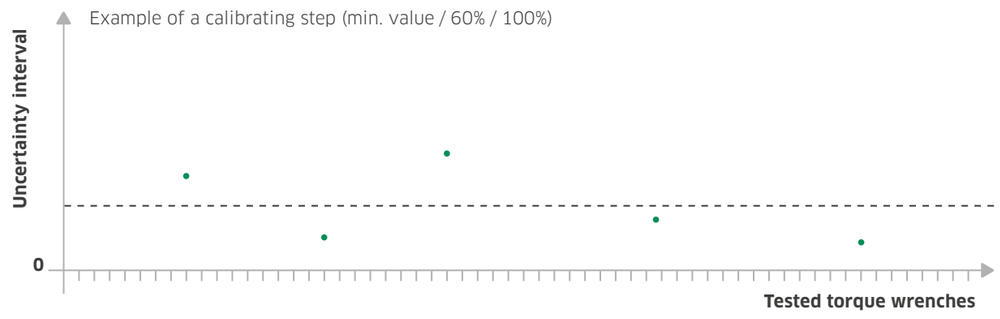
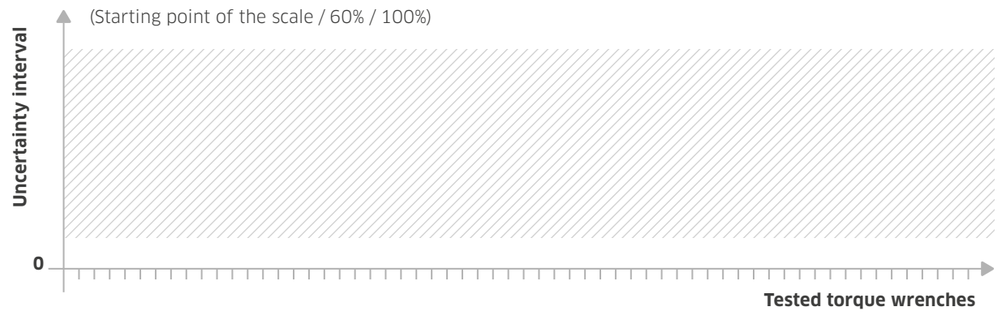


Fig. 2: **New standard** DIN EN ISO 6789:**2017, Part 2**
(Starting point of the scale / 60% / 100%)



Detail of deviation to old standard

Uncertainty interval determined in accordance with DIN EN ISO 6789:2017, Part 2

SERVICE SOLUTIONS.
AS INDIVIDUAL AS THE TOOL.

Anyone investing in STAHLWILLE products is not merely investing in tools that accelerate processes and enhance safety and quality. They are also participating in numerous services provided by the manufacturer. STAHLWILLE repairs, adjusts, calibrates the products and is the first port-of-call for any questions relating to the products and their application. Competent, trustworthy and always on the look-out for a solution.

Optimum service begins with the right advice and the willingness to answer questions whenever they occur. This is why the Sales Department, Service Centre, in-house sales staff and application engineers at STAHLWILLE always have a ready ear for customers from all over the world.

Repairs, adjustments and calibrations for customers from Europe and around the world are carried out by STAHLWILLE at the German location. In many countries, the company also works closely with authorised service workshops and distributors who are ready to help and advise. If a stand-in tool is required for the duration of a repair – whether it is a torque wrench or calibration system – STAHLWILLE has them available.

service.stahlwille.de

Customers using the STAHLWILLE service portal can now place and track their calibration, maintenance and repair orders more easily than ever before and ask questions relating to our products. The well-organized, intuitive portal makes it easy for the user and promotes transparency.

Direct service
Only three to five days plus delivery time: customers do not have to do without their tools longer than this. STAHLWILLE services have never been quicker or cheaper. Customers merely choose the required services. Within seconds, the portal calculates a firm price for the work enquired about. Costs can be approved online and the process initiated.

Estimates
If a customer prefers the classic alternative and requires an estimate, this can also be requested through the portal. The customer simply enters the services required and will receive an individual quotation, subject to a fee, that can be approved the conventional way.

Warranty enquiries
Simply upload your description of the problem through the service portal. We will then check the warranty and whether or not the matter is covered on a warranty or good-will basis. If the matter is not covered by the warranty, you will be sent a quotation automatically for the cost of a handling fee.

More transparency
STAHLWILLE's service portal also acts as a digital archive of all orders processed through the portal. And not only that, you can track consignments online, view the details of your transactions and even print out delivery notes and service reports.

TECHNICAL SERVICE.
PRODUCTS WITH ADDED VALUE.

STAHLWILLE's promise is always to find the best possible solution to a customer's individual requirements. To deliver on such a promise does not just require excellent products – it presupposes outstanding knowledge of the market, the ability to listen and provide support to the customer long after making the sale. This is exactly what our application engineers do.

STAHLWILLE application engineers support customers in selecting the appropriate products and sets of tools and optimising processes in terms of tools used, safety and efficiency. As specialists in their specific market segment – be it aerospace, automotive, energy or industry generally – they know all the demands of day-to-day use in production, service and MRO. So they will always find a solution that will help the customer on their way. That is, after all, what matters.

Designing individual tool inlays
is no problem for Technical Sales, even on site at the customer's facility: using design software developed by us in-house.

STAHLWILLE.
IN PARTNERSHIP WITH CUSTOMERS.

Analysis and advisory services
Analysing and optimising the current stock of tools – or developing a new tooling solution based on the results, where necessary, including transport and storage solutions, even worldwide, these are everyday tasks for the application engineers at STAHLWILLE.

First use and training
After delivering equipment such as calibration systems, our application engineers provide support to customers during first use and instruct employees on-site in the tool's operation.

Standard and individual solutions
If a customer has a requirement for which there is no standard solution, the application engineers at STAHLWILLE will work together with the development engineers to find the ideal solution.

Trends and innovations
Application engineers at STAHLWILLE are in continuous contact with their customers and understand the trends in those fields. This makes them key contributors when it comes to developing innovative technologies and complex, integrated production systems.

Processes and efficiency
Redesigning processes to be more efficient by using tool solutions is a central skill of our application engineers. Another is supporting customers when implementing reliable torquing solutions that guarantee logging functionality.

Preparation and implementation
Application engineers around the world facilitate the preparation and implementation of complex customer projects, which includes helping with invitations to tender. This helps to complete projects within the given schedule.

TRAINING WORKSHOPS: AS INDIVIDUAL AS THE USER.
THEORY AND PRACTICE IN HISTORICAL SURROUNDINGS.

The KONTOR is the official name of the Customer and Training Centre that STAHLWILLE has integrated in its converted and restored historical administration building at the Wuppertal headquarters. It is a place for meeting, exchanging ideas and communicating knowledge in the context of comprehensive training programmes.

Whether it is end users who work with STAHLWILLE torque tools daily; auditors working in the calibration laboratories of large enterprises; sales staff and customers in retail: they all have their own approach to torque technology and require specific know-how moulded around their own individual knowledge.

The place where they find the answers to their questions is steeped in tradition: STAHLWILLE's historical Kontor used to house the commercial departments of the tool specialist, STAHLWILLE. Today it is a state-of-the-art training and customer centre. Every year, several hundred people are given the opportunity to gain insights into topics relevant to them relating to the world of tools and torque. The building houses two storeys of well-appointed training rooms in which contemporary presentation techniques are employed to make theoretical knowledge tangible – from fastener technology and repair workshops to demanding fundamentals of physics in torque technology and complex matters such as unusual tightening methods, standardisation and calibration technology.

In all these situations, theory is matched by corresponding practice. Tools can be handled and tried out, technical terms such as »lever arm«, »point of application of force« and »trigger torque« become tangible, literally, when experienced on a real-life engine block. Last but not least, participants are given the opportunity to experience the typical unique selling points of STAHLWILLE.

One incalculable benefit of the STAHLWILLE training programmes is that they are modular and based on the users' actual needs. When registering for the first training workshop, users have the chance to select those aspects that are of most interest – whether it is the tool the participant wants to repair herself or himself, or the standards that have always intrigued him or her most. STAHLWILLE will compile the best possible individual training sessions based on this input.

This is unique in this market. Just as unique as the STAHLWILLE Kontor itself.

KONTOR

Concentrated knowledge gathered under a single roof
At the Kontor training centre, STAHLWILLE hands on valuable knowledge and skills to end users and customers.

THE STAHLWILLE GLOSSARY.
THE KEY INGREDIENTS OF TORQUE TECHNOLOGY.

Using technical terms can often help to explain things – as long as you know what they mean. The STAHLWILLE glossary on the following pages includes a large selection of technical terms you need to know if you regularly have to discuss torque, testing and calibrating technology. Accurately and concisely explained. To match our tools.

TECHNICAL TERMS IN BRIEF.
THE STAHLWILLE GLOSSARY.

A

Accreditation is the formal recognition by an authoritative body of the competence to work to specified standards.

Adjustment involves changing the instrument to minimise or eliminate the systematic deviation in its measuring results.

Anti-backlash device prevents unexpected reactions when using torque multipliers.

B

Breakaway torque is the torque that is required to overcome cohesion friction and transition to sliding friction.

Break point is the point where a break-back torque wrench will »break«.

C

Calibration is performed regularly to establish whether a measuring instrument is still accurate. Torque calibration is described in DIN EN ISO 6789 and DIN 51309 and in the DKD guidelines DKD-R 3–7 and 3–8. It involves determining without changing anything the amount by which inspection, measuring and test equipment deviates systematically from an equivalent instrument of greater accuracy (refer to Recalibration).

Calibration certificates are issued by STAHLWILLE as an authorised DAkkS calibration laboratory for torque. They can be issued in compliance with the prescribed procedures in the corresponding DKD guidelines for a torque wrench, a torque wrench tester or a torque transducer. The DAkkS calibration certificate lists all the readings taken, the values calculated, a graph and details of the uncertainty factor. Calibration is effected using transfer measuring instruments which are directly traceable back to the PTB in Braunschweig.

Calibration service is a service provided by us to issue calibration certificates. STAHLWILLE has been accredited as a calibration laboratory for torque since 1997.

CE certification (EU) confirms that the minimum requirements have been adhered to in terms of specified EU Directives during the development and production processes (EU Declaration of Conformity).

Certified reference material are »controls« or standards used to validate analytical measurement methods. The information can be used for the calibration of instruments.

Clamping force is the tension occurring within the fastener that is generated as the fastener is torqued, which elongates the fastener. If the clamping force is too high, this causes overloading and can result in damage to the fastener and workpiece. However, if the clamping force is insufficient, the joint can work loose. The clamping force is measured in newtons (N).

Click point is the point at which a torque wrench provides an audible and tactile signal. When this torque is reached, the worker will hear and feel it.

Compliance with the national standard. According to the requirements of DIN EN ISO 9001, every testing instrument must be calibrated in a traceable manner. This means that the testing equipment used for the calibration must be linked to recognised international or national standards.

D

DAkkS calibration refer to calibration.

DAkkS calibration certificate refer to calibration certificate.

DIN is the German Institute for Standardisation, a key forum in the development of standards.

DIN EN ISO 6789 is the international standard for the requirements and test methods for design conformance testing, quality conformance testing and recalibration procedures for hand operated torque tools (ISO 6789:2017).

DIN EN ISO 9001:2015 is the most important individual standard that contains all the obligatory requirements for a quality management system.

DIN EN ISO/IEC 17025 is the standard that lays down general requirements for the competency of testing and calibration laboratories (ISO/IEC17025:2005).

DIN standards are voluntary standards issued by the German Institute for Standardisation and are compiled under the supervision of a task committee.

Display deviation (permitted deviation) of a torque tool means the discrepancy between the preset (target value set) and the actual value inside certain specified tolerance limits, as defined in DIN EN ISO 6789.

DKD is the German Calibration Service. Since 2011, DKD has been an internal section of the German equivalent of the National Physics Laboratory, the »Physikalisch-Technische Bundesanstalt« (PTB), and took on the responsibilities of the DKD committees from the time up to 2010. The new DKD secures cooperation of accredited calibration laboratories with the PTB.

Dual scale includes additional markings in ft·lb (foot pounds) and in·lb (inch pounds) alongside those in N·m (newton metres).

Ductile yield is the permanent extension in length remaining after a breakage. The amount of the extension depends on the initial length.

E

Extension describes the distance between the tool mount of a torque wrench and the pivot point of the insert tool. The standard values for insert tools are 17.5 mm (9x12 mm tool mount) and 25 mm (14x18 mm tool mount). Insert tools with an extension value that is non-standard will affect the leverage of the torque wrench. When they are used, the display value of the torque wrench will have to be adjusted.

F

Fastener classes show the tensile strength of a fastener. The higher the class, the greater the quality, i.e. the fastener has a higher tensile strength. There are several strength classes.

Flexible rod a metal bar that is designed to bend under load. (A torsion rod, on the other hand, transits force through a turning force.)

Friction (coefficient of friction) is the resistance of one body to being moved over another body. Friction occurs in the thread and at the points where the head of the fastener and the washer are in contact. About 90% of the tightening torque applied is actually needed to overcome friction. Friction is measured as a coefficient consisting of the ratio of frictional force to normal force (symbol μ).

I

Inspection, measuring, and test equipment management is the listing and archiving of all testing instruments with their corresponding data regarding calibration results, tolerances, scheduled calibration dates.

ISO standards are standards created by the International Standards Organisation (ISO). ISO is an international association of standardisation bodies.

ISO units designate the metric »international system of units« (SI).

J

Joints can be either hard or soft. Hard joints are those in which the final torque is subject to rapid increase and is achieved after a tightening angle of only approx. 30° after being tightened to the snug point. With soft joints, from the snug point at least one further revolution (360°) is required until the fastener is finally properly tightened.

L

LCD is the abbreviation for »liquid crystal display« as used in displays and screens.

Locking (a ball or pin lock) prevents inadvertent release or loss of sockets. This is a mechanism incorporated in the square drive to secure shell tools

Locking pin (spring loaded) is a way of securing the sockets on the tool holder.

M

Measurement uncertainty is the range between the upper and lower limits of the readings within which the true value of the reading may vary. Uncertainty is expressed with regard to the measured value as a percentage »window« towards the plus and minus directions. The smaller the amount of uncertainty, the more accurate and reliable the calibration result.

TECHNICAL TERMS IN BRIEF.
THE STAHLWILLE GLOSSARY.

Measuring range is the working range within which the tool can be used for measurements or testing.

Metrology is the science of measurement – experimental and theoretical determinations at any level of uncertainty in any field of science and technology. Various state institutions worldwide regulate the way dimensions and weights are defined and checked. In Germany, this is the task of the PTB.

Minimum clamping force is the minimum force which has to be applied to press together the components to be bolted together. This force prevents the separation of the joint and guarantees, for example, that seals will work properly.

N

National standard. This is the most accurate sample of a unit in the international system of units (SI) available within a country. In Germany, the PTB is responsible for storing and distributing these units.

Newton is the unit of measure »newton (N)« for force, named after Sir Isaac Newton. Sir Isaac Newton was an English scientist, mathematician, naturalist, physicist, astronomer and philosopher.

Newton metre (N·m) is the most popular unit of measure used to express torque. It is calculated from force x lever arm = newton x metres.

O

ÖKD is the Austrian equivalent of the DKD (German calibration service). In Belgium, it is the BKO, in Denmark it is the DANAK and in the UK it is CESG. These are all recognised by the CC (Common Criteria Recognition Arrangement) and EAL certified.

P

Planetary gearbox is named after its construction which is similar to the movements of the planets around the sun. It usually consists of a central sun wheel (drive), an internal gear and several planetary gears mounted between the sun wheel and the internal gear. This load distribution enables high torques to be transmitted despite the compact construction.

PTB is the German institution in Braunschweig responsible for metrology (the equivalent of the UK's National Physical Laboratory). In Germany, the PTB is responsible for storing and distributing these units.

R

Recalibration is the process of repeated calibration of a measuring tool to check its accuracy. Refer to calibration.

S

Screw tightening torque. This comprises the thread tightening moment and the contact moment of friction between the head of the fastener or contact surface of the nut and the material. The contact moment of friction does not increase the clamping force.

Serial number is a crucial identifier and must be permanently marked on any torque tool that is provided with a certificate. This is a unique identification method for that tool and is shown on the certificate.

Setting of a bolted joint is plastic deformation of the threaded elements after assembly. This results from the contact areas adapting to fit together. The amount by which the bolted joint sets depends on the number of parting lines and the ambient and assembly temperatures. As temperature increases, the amount of setting also increases.

SI unit designates the international system of units (SI), which uses seven base units: length (metre), time (second), mass (kilogram), electric current strength (ampere), temperature (kelvin), amount of substance (mol) and luminous intensity (candela). Units such as energy (joule), force (newton), power (watt), voltage (volt), resistance (ohm) and torque (N·m) are derived from the SI units.

Snug tight condition has been reached when a joint has been tightened to a point where it is play-free. In other words, when the desired contact has been achieved between the fastener and the mating surface and is ideally fixed. After that, it can be tightened further on the basis of the tightening angle.

Step-up or step-down gearbox is a gearbox that increases or decreases the relative speeds by a given ratio. They allow a high speed at a low torque to be converted into a high torque at a low speed – and vice versa.

Strain gauge is a measuring element for detecting and recording force, compression, tension, weight, bending and torsion. A strain gauge converts tensile or compressive changes into measurable electrical resistances.

Strength categories. These are the internationally defined classifications of standard parts such as fasteners. This means that their mechanical properties as regards tensile strength, yield point, ductile yield and hardness are standardised. The higher the property class, the greater are the tensile strength, yield point and hardness. Ductile yield diminishes as property class increases. Examples of the classifications used for fasteners are 8.8, 10.9 and 12.9.

T

Tensile strength is an indication of the extension characteristics of a material under tensile load. The greater the tensile strength of the material, the more durable the bolted joint; because the screw will withstand the loads as long as it is ductile enough to compensate for the loads at every point where they occur. Tensile strength provides an indication of the extension characteristics of a fastener before the deformation becomes permanent or a breakage occurs. The tensile strength is the highest load resulting from the initial cross sectional size of the fastener. Tensile strength is given as »Rm«.

Testing instrument is the device used to do the testing. This might be a torque wrench or a torque wrench tester.

Tightening value describes the value actually applied when tightening a fastener.

Torque, or moment, is a rotational force applied to an object, such as a fastener. The international unit of measure is force x lever arm = newton x metres (N·m). The torque creates a corresponding pretensioning force in a joint.

Torque angle is the angle through which a fastener is tightened after the snug torque is reached.

Torque multipliers enable high torques to be applied with a very short lever arm and correspondingly little effort.

Torque wrenches are tools that are used to apply controlled, specified moment to a fastener and, in some cases to measure that moment.

Torsion is the twisting of a member about its longitudinal axis by application of a twisting moment. This is the moment acting on the member or bar when rotary leverage is applied perpendicular to the longitudinal axis. Torsional force is the load applied by rotation.

Torsion rod (torsion bar spring) is a rod-shaped spring in which torsional loading is created by turning the bar. It is used to limit the amount of torque to the current torque value (torsional moment).

Trailing pointer is an additional pointer synchronised with the measuring display that follows it. The readings are frozen as the trailing pointer stops when the peak torque is reached, while the actual measuring needle continues to move.

Transducers are used to record data. Some transducers have a static shaft while others have a dynamically rotating one.

U

Uncertainty interval is an interval around the measurement in which repeated measurements will fall. The relative uncertainty of measurement contains all the random scatter that can occur during measurement.

V

VDE stands for »Verband der Elektrotechnik Elektronik Informationstechnik e. V.«, The Association for Electrical, Electronic & Information Technologies.

VDI stands for »Verein Deutscher Ingenieure«, The Association of German Engineers.

W

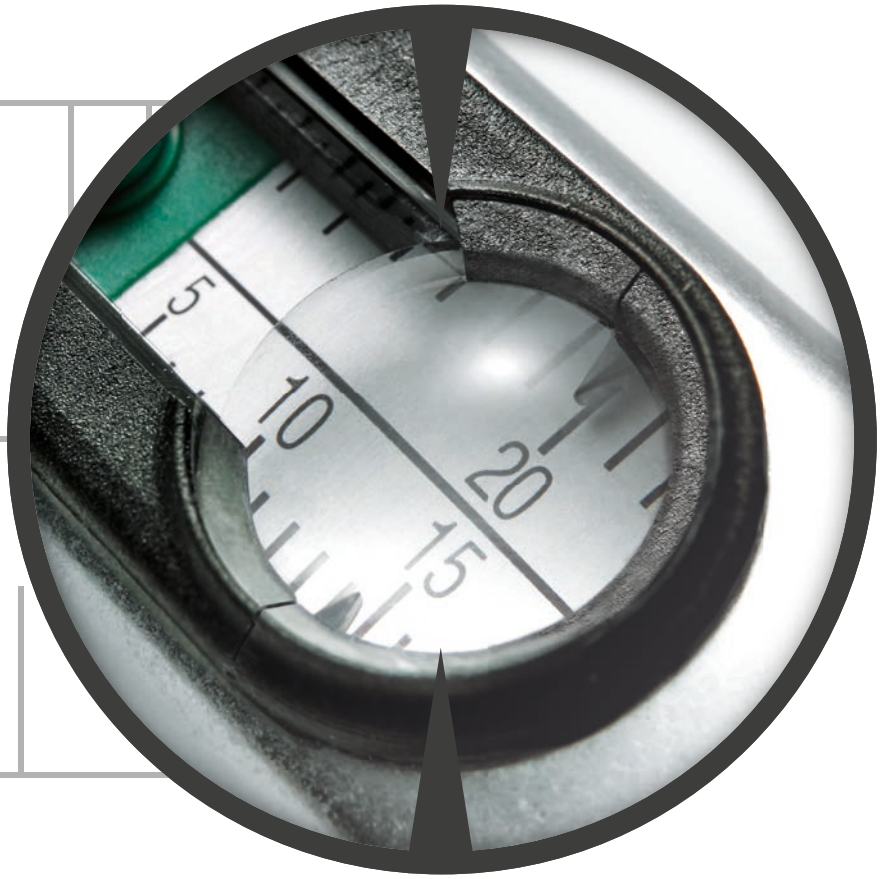
Works calibration certificate is a certificate issued by STAHLWILLE in compliance with various standards for calibrated torque tools and torque testers with details of the readings.

TECHNICAL TERMS IN BRIEF.
THE STAHLWILLE GLOSSARY.

Works certificate is a certificate in compliance with DIN EN 10204 issued by STAHLWILLE for calibrated torque wrenches without listing the individual readings.

Y

Yield point the load limit at which the elastic deformation of a material become a permanent plastic deformation due to a force applied. Prior to the yield point the material will deform elastically and will return to its original shape when the applied load is removed but once the yield point is passed, the deformation will be permanent and non-reversible.



Torque technology
Competence

ACCURACY
IN EVERY DETAIL.

Every single product bearing the STAHLWILLE name is proof of our achievements. At first sight. And, at the latest, on first handling the tool.

STAHLWILLE.
THE SOURCE OF TORQUE TECHNOLOGY COMPETENCE.

Other companies manufacture torque wrenches. STAHLWILLE drives the technology to the next level. This brand name blends award-winning know-how in the development and production of torquing tools with pace-setting metrology and calibrating technology, backed up by service that has redefined standards.

We provide what others cannot. In a nutshell, this is what drives STAHLWILLE to ever new heights. It is, however, not only the uncompromising commitment to quality in production that makes the difference. It is also a question of the details that communicate to our users: STAHLWILLE did that for me. Torque wrenches, for example, that no longer require a coil spring so they do not have to be reset to »0« and, thus, save time. Electronic torque wrenches that provide the same »tactile« feedback when they click as mechanical ones. And some that can be set more quickly than all the others.

Every sales person is an excellent advisor when it comes to torque. The STAHLWILLE application engineers are responsible for complex projects and questions about more intricate details. Together, they will ensure the customer is provided with the solution he or she needs. Whether it is a single tool or a full, bespoke set of premium tools for aerospace, automotive, energy or industry in general.

When it comes to after-sales service, STAHLWILLE is equally capable: thanks to our state-of-the-art service portal, customers know, as soon as they place an order for a repair or calibration, what it will cost. Processing is guaranteed within days. If customers wish to learn how to repair or calibrate torque wrenches themselves, we offer a wide range of training workshops in the Kontor, our Customer and Training Centre.

Which is why the by-word for capability in torque technology is simply STAHLWILLE.

TECHNICAL ADVICE
In the STAHLWILLE Sales Department, skilled in-house sales staff and their colleagues in the field work together with experienced application engineers to deliver the ideal solution for every requirement.

THE PRODUCTS
STAHLWILLE's torquing tools offer the decisive »more« factor. More accuracy. More customer benefit. More user friendliness and ergonomics. But, above all: longer service lifetimes.

SERVICE MEANS SERVICE
Every service order is managed quickly and transparently at STAHLWILLE. Thanks to the online service portal, customers can check the state of their order at any time.

TRAINING WORKSHOPS
At the STAHLWILLE Kontor, our Customer and Training Centre, the training specialists explain the basics of torquing technology to hundreds of visitors every year and teach them practical applications of the technical theory.

Made in Germany

SIMPLY INDISPENSABLE. INDISPENSABLY SIMPLE.
CONTROLLED TIGHTENING À LA STAHLWILLE.

Many bolted joints are subject to individual tightening torques. Often, workers are required to tighten the connections in a given sequence and document every step. In addition, restricted installation spaces make more compact tools essential, while lightweight designs and materials such as carbon, magnesium and plastics need far lower torques. At the same time, defects have to be reliably precluded. Absolutely accurate, simple but safe tools are needed.

Whether in aviation, the automotive sector, industry generally or in power generation, there is a tangible tendency towards greater complexity. New developments lead to greater demands on bolted joints, better control of fastener tightening and accurate documentation of torque, tightening angle, the timestamp and many other details.

The more complex a task is made, the greater the uncertainty. As a consequence, such targets as process capability, optimum and reproducible tightening quality and verifiable results can only be achieved if all these requirements are within the capabilities of the worker.

This is why STAHLWILLE torque tools are not only designed to be absolutely accurate in measuring and tightening – even under difficult conditions – they are also built on our »make it simple« principle.

This results in ergonomically shaped handles that the user will automatically grasp at the ideal point of application of force and, as a result, achieve optimum readings. A further example is mechanical torque wrenches that can be set up more quickly than any competitive product. Or compact electronic torque wrenches with intuitive one-handed operation.

+ GREATER SAFETY
It is only with torquing and angle-controlled tools that bolted connections can be fastened in such a way that the required clamping force is achieved and the joint will stand up to the stresses of everyday use. Accurate metrology and outstanding ergonomics are indispensable here.

– LOW POTENTIAL FOR ERROR
However accurate a torquing tool is and however well it documents the processes, incorrect use can quickly falsify the result. This is why the documentation function, user-friendliness and error-proofing are crucial.

= DEPENDABLE JOINT QUALITY
Making bolted joints dependably reproducible at high standards of quality requires particularly tight measuring and display deviations – coupled with the least possible uncertainty.

With torque tools, this objective is far easier and quicker to achieve, and more efficiently.

KNOW-HOW MAKES THE DIFFERENCE.

STAHLWILLE does not leave accuracy to chance. For this reason, the company has been accredited by DAkkS and is authorised to issue internationally recognised DAkkS calibration certificates.

ACCURACY. INCLUDED FROM THE FIRST MOMENT.
FOR ENHANCED SAFETY AND QUALITY.

STAHLWILLE was the first manufacturer of torque wrenches to receive accreditation for torque from the German Calibration Service (DKD). As the only German manufacturer, STAHLWILLE offers torque wrenches and pioneering calibration technology from a single source and combines both with a software solution that even allows fully automated calibrations. These examples show that absolute accuracy in the product and in the process are inherent in STAHLWILLE's DNA.

As a long-term partner of the aviation and automotive industries, STAHLWILLE knows that controlled tightening is an essential ingredient in the safety and durability of bolted joints, which is why nothing should be left to chance. It is possible at any time to verify the high quality of the joint and reliably trace the torque wrenches to the corresponding certified national standard.

STAHLWILLE was one of the first companies to be certified in 1990 to DIN EN ISO 9002, and in 1992 this was extended to include DIN EN ISO 9001. All our development and production processes are designed to maintain our quality and tolerances at the best achievable levels.
A key factor in this process is our own know-how in the field of calibration. For 20 years, STAHLWILLE has been calibrating tools to DKD/DAkkS standards in our own calibration laboratory and issuing corresponding calibration certificates. The laboratory is accredited by DAkkS to DIN EN ISO/IEC 17025:2005 and complies with all the technical specifications in ISO/TS 16949.

And as if that were not enough: STAHLWILLE provides a valuable contribution to the key committees in DKD, ISO and VDI/VDE in formulating standards and guidelines. In this way, the company is in a position to respond in good time to new standards, such as DIN EN ISO 6789:2017, to the benefit of our end users.

DIN EN ISO 6789 governs the calibration of hand-held torque tools. The latest version, issued in 2017, prescribes a declaration of conformity or a calibration certificate. And, for the first time, this version makes reference not only to display deviation but to many different parameters that affect measuring uncertainty. STAHLWILLE is one of the first manufacturers to apply the new standard.

STAHLWILLE:
Accreditation and certification to the most influential quality standards are a guarantee of peak quality in our in-house corporate processes.

Made in Germany

AS INDIVIDUAL AS EVERY CONNECTION.
TORQUE TECHNOLOGY FROM STAHLWILLE.

Irrespective of whether the torque range is for larger or smaller torques, whether the tools are mechanical or electronic, which means they have a full logging function, STAHLWILLE has the solution for every requirement.

STAHLWILLE torque wrenches can, by design or programming, be made for a specified range of applications. Or they may be made for a multitude of applications. But one thing they all have in common is that they pay for themselves, thanks to their long service lifetimes. Or their simple but safe operation that speeds up work processes and minimises human error. Once a worker has used STAHLWILLE torque wrenches, he or she will not want to change. Professionals know why.

1

SENSOTORK® 701
The electronic torque wrench with the fine-tooth ratchet is ideal for applying low torques in confined spaces.

2

MANOSKOP® 714
MANOSKOP® 714 offers all the advantages of an electronic tightening angle torque wrench and, at the same time, the popular electromechanical click effect.

3

SENSOTORK® 713R
Many industrial jobs require the joint always to be tightened to a given torque and tightening angle. The perfect job for the 713R.

4

MANOSKOP® 730 Quick / 721 Quick
The mechanical torque wrench that saves time: even inexperienced users can now set the target torque extremely easily in a very short time. MANOSKOP® 721 Quick incorporates a permanently installed ratchet.

5 6

MANOSKOP® 730 N / 730 FIX
This versatile mechanical torque wrench features impressively fast, accurate QuickSelect setting. The Fix model has an additional function to prevent inadvertent adjustment but allow intentional changes.

7

MANOSKOP® 730D
The MANOSKOP® 730D, with its digital display, is the ideal all-rounder for all bolted connections requiring documentation. Triggering is electromechanical: absolutely accurate, but with tactile feedback, like with conventional torque wrenches.

LOOKING AHEAD.

Every time STAHLWILLE develops a new torquing tool, it is creating additional customer benefit and releasing efficient new working methods that, yesterday, nobody even knew existed.

RECOGNISING TRENDS. REDEFINING STANDARDS.
A PERMANENT TASK.

STAHLWILLE is a pioneer in torque technology and is repeatedly breaking new ground where others see only water. Recognizing the needs of the market, talking face-to-face with customers and end users and using these exchanges to develop answers to today's questions has always been a keystone of the company's success. And that is not going to change.

Development never ends – whether it is in enhancing existing products or creating new ones to meet new demands in the market. With its compact electronic torque wrench for low torques, SENSOTORK® 701, STAHLWILLE proved its innovative capability and contributed to increased efficiency and safety in industries aiming for more miniaturisation. The same applies to the SmartCheck – the versatile, freely positionable tester for torque wrenches.

Other solutions are just waiting to be discovered: torque tools equipped with defined interfaces and radio systems that communicate with each other and the customer's central IT department. In future, setting, sequencing, control and documentation will take place automatically from a central control station.

The free-of-charge STAHLWILLE SENSOMASTER software already allows all electronic torque wrenches made by STAHLWILLE to be managed and read out with ease. In addition, manual and electronic testing & calibrating units by STAHLWILLE, in conjunction with the TORKMASTER software, enable torque tools to be quickly and safely calibrated. These are all examples of what is already possible with the right know-how, and a glimpse at what will one day be possible.

Prize-winning technology

Measuring and calibrating technology from STAHLWILLE wins prizes: back in 2011, the electronic perfectControl calibrating unit won the coveted iF Design Award in the industrial design category. The same success was achieved in 2017 when it was the turn of the STAHLWILLE SmartCheck torque tester, that was developed in conjunction with STAHLWILLE's US subsidiary, Jetco.

INDUSTRY 4.0
INTERCONNECTED TOOLS ARE ON THE WAY.

The digitalisation of work processes will change industry as much as the introduction of electricity did. The same is applicable to torque technology: torque tools, test and calibration units will all become an increasing part of a integrated work environment encompassing interlinked and communicating devices.

Industry 4.0 is the future. Anything that can be digitised will be networked. Production workflows depict work operations which integrate smart tools using standardised interfaces. Every single process step can be optimised to be more efficient and safer. STAHLWILLE is already developing products that can be easily integrated into complex IT system environments and are able to communicate with each other and with a central control station. The first of these products are already in the pipeline.

Networking
There is a consensus that products used in industrial production will, in future, be networked – from the torque wrench to the torque tester and calibration system. The question will be as to which technology we are to use. Cable-linked systems using USB or jack plugs will give way to wireless transmission systems such as RF 868, NFC, Bluetooth and WiFi – depending on which of these options provides most benefit in the specific operational scenario. The next generation of STAHLWILLE electronic torque wrenches will incorporate radio modules for radio frequencies of 868 MHz or 915 MHz (in the USA).

Open source
STAHLWILLE offers its customers maximum flexibility in integrating tools into their processes by providing a standardised, open interface for controlling and setting parameters on the tool. This includes such items as defining which fastener is to be addressed in what sequence, and the torque or angle to be used for tightening. Or what information is displayed on the tool when – work instructions, for example. The result is optimised processes coupled with a simultaneous reduction in the sources of errors.

If customers are lacking in the necessary experience, STAHLWILLE is pleased to assist.

Intelligent worker guidance
Efficiency improvements and quality assurance are decisive advantages of networked production. An upper level control system monitors parameter settings, imminent recalibrations, possible tool changes and every single bolt tightening operation. Human error is reduced to an absolute minimum, time saved and entire production processes become more efficient and safer. A central controller can identify a fastener simply by the location of the torque wrench and automatically set the tool accordingly. Even augmented reality will be able to support these efforts and will shape the intelligent worker guidance process. Using »smart glasses«, the worker addressing a real-life fastener will see additional instructions and information in the line of sight – relating to the locations of the fasteners or the sequence of tightening, for example. The torque wrench is set just in time by the control system and the tightening action monitored.

Documentation
One of the greatest strengths of tools that communicate wirelessly and their networking with other devices is the ability to ensure seamless monitoring and logging. Detailed logging of data takes place throughout the entire torquing procedure with no physical link to the computer system.

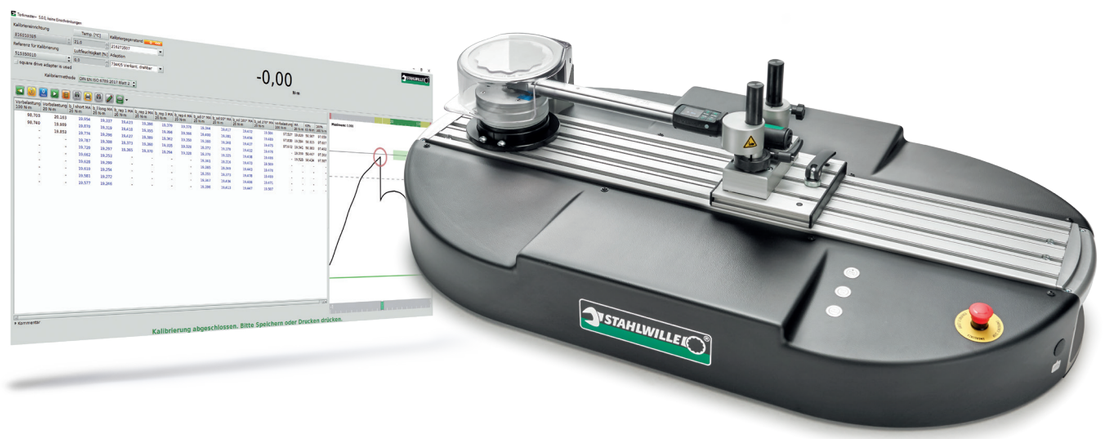
In future, all tools and other devices will be able to exchange information with the intelligent upper level control system in the background.

CALIBRATION TO DIN EN ISO 6789:2017.
SIMPLY AND PROFESSIONALLY. WITH TORKMASTER.

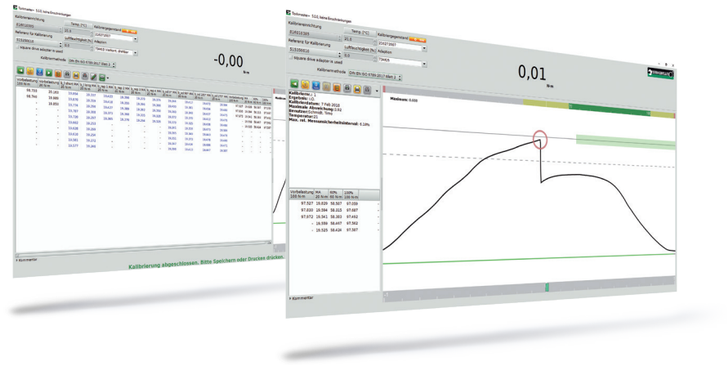
Since the new DIN EN ISO 6789:2017 standard that governs design conformance testing and recalibration procedures for torque tools came into force, the calibration process has become much more complex. Despite this the TORKMASTER software enables fast, efficient calibration of torque tools including the generation of calibration certificates that conform fully to the new requirements.

TORKMASTER

- TORKMASTER enables simple calibration of torque wrenches and torque screwdrivers in line with the new DIN EN ISO 6789:2017 standard Parts 1 and 2 – with remarkably little effort on the part of the user. The previously applicable standard DIN EN ISO 6789:2003 is still supported.
- In conjunction with the perfectControl unit, it is even possible to run time-saving, fully automatic calibrations.
- perfectControl and TORKMASTER can also be integrated in well-known CAQ systems. This allows the calibrating unit to receive all the data required for the calibration process and transmits the evaluated readings back to the customer's system after completing the calibration.
- In the TORKMASTER application, the main window displays the graphic torque path and the measured trigger value.
- Calibration certificates can be printed or output as PDF files.
- The various user permission levels simplify administrative activities in day-to-day use.
- A calibrating history can be stored for each tool.
- »As found« and »as left« calibrations can be documented.
- Choice of twenty-one installation languages.



CALIBRATION TO DIN EN ISO 6789:2017.
SIMPLY AND PROFESSIONALLY. WITH TORKMASTER.



DIN EN ISO 6789:2017

Until now, DIN EN ISO 6789 required only details of the permitted deviation in the calibration certificate. The new version from 2017 on consists of two parts: inspection in compliance with Part 1 is sufficient for the issue of a Declaration of Conformance with the standard. Calibration only takes place in connection with testing under Part 2: and this must include the uncertainty factor of the tool together with the display deviation. Since the number of required measurements is now considerably greater, the work involved in calibration has also increased. Despite this the TORKMASTER software enables efficient calibration and reduces the amount of additional work to a minimum.

TMGATEWAY – THE INTERFACE BETWEEN A CAQ SYSTEM AND TORKMASTER 5.2.

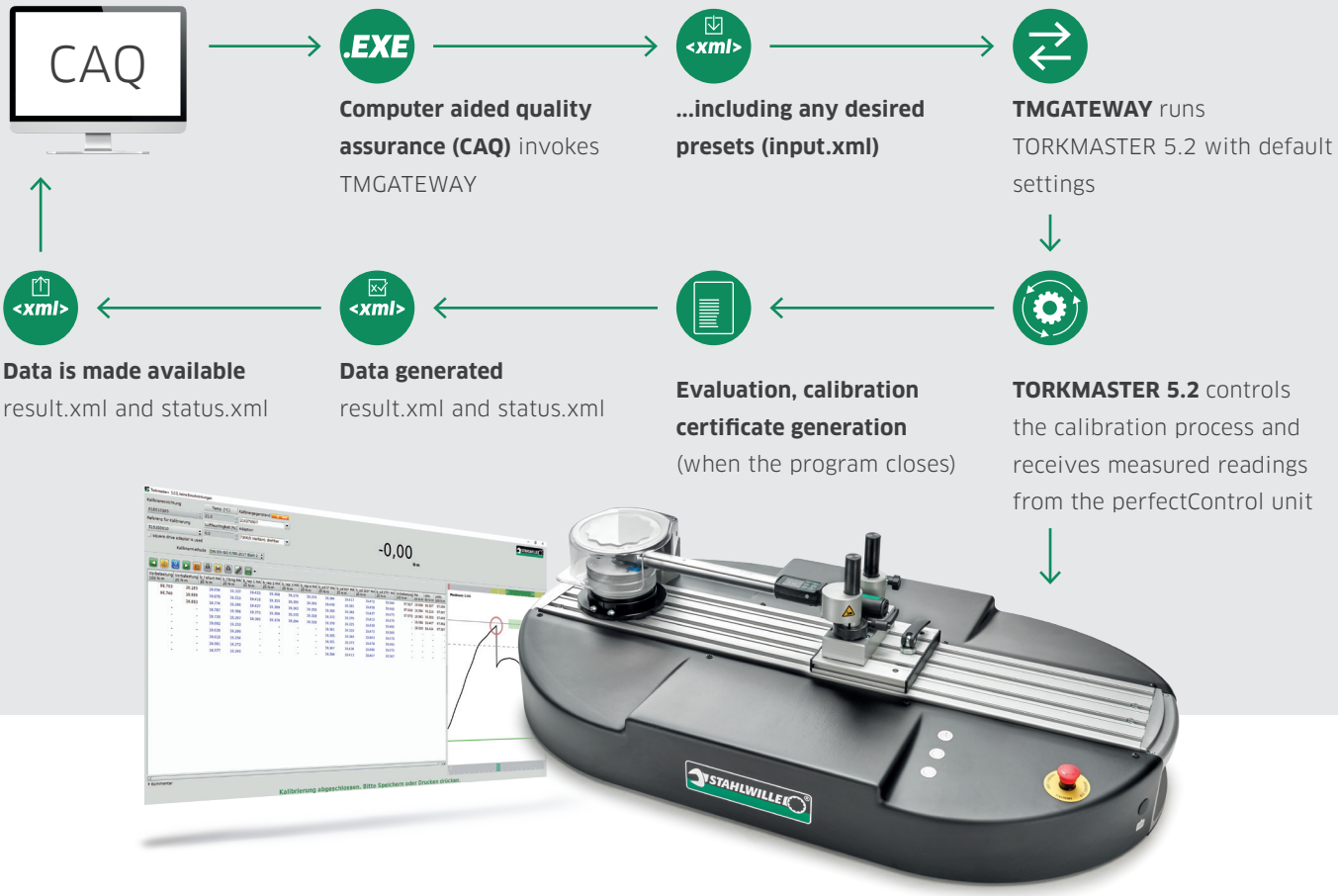
TMGATEWAY provides an interface to the superordinate CAQ system for the TORKMASTER 5.2 calibrating software, which gives the CAQ system access to all the inspection data at all times.

In doing so, TMGATEWAY reads the data from the external CAQ system, checks and analyses it and automatically initiates a process using TORKMASTER 5.2 according to the instructions from the CAQ system.

In this way, central data sovereignty is maintained in the higher-level CAQ system and redundant data is avoided.

Contact our DAPTIQ team at:
daptiq@stahlwille.de

An overview of the functions:



* QMSOFT® (QM-TORQUE), AHP (iQ-Basis), CSP (QS-Torque).
Details of other CAQ systems on request.

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