

DSM Messtechnik GmbH

# Flexible automation solutions for first-class assembly processes

ENGLISH



[www.dsm-messtechnik.de](http://www.dsm-messtechnik.de)

## Process know-how



We are continually further developing our technologies and aligning them with the individual requirements of our customers. Indeed, DSM customers currently have a choose: In addition to a wide range of standard products with many variants, we offer high-performance, custom-fit special designs and unique items. Regardless of which DSM product is chosen, it will be designed and produced in our headquarters in Aalen.

Software and hardware development, production, mechanical processing, quality testing ... All at one site, all defined by our Swabian inventive spirit, our precision, expertise and our commercial way of thinking.

In addition to an extraordinary wide range of products, this manufacturing depth allows us a high degree of flexibility and quality: Within no time at all, DSM is able to convert specific customer demands into market-ready, high-quality, and reliable products.

### Process know-how

#### **Tightening**

- Radial clearance measurement
- Flexing torque testing
- Screw breakage detection
- Redundant measuring circuit
- Sheet metal screw joints
- Self-tapping screws
- Stop and coupling nuts, micro-encapsulated screws
- Stick-Slip screw connection
- Detection of head contact
- Envelope curve monitoring
- Gradient monitoring
- External sensors ...

### Process know-how

#### **Press-in**

- Hold force / position
- Force linearisation
- Stroke linearisation
- Friction coefficient determination
- External length (stroke)
- Envelope curve monitoring
- Redundant measured value acquisition
- Clip point detection
- Review stroke ...

### Process know-how

#### **Automation**

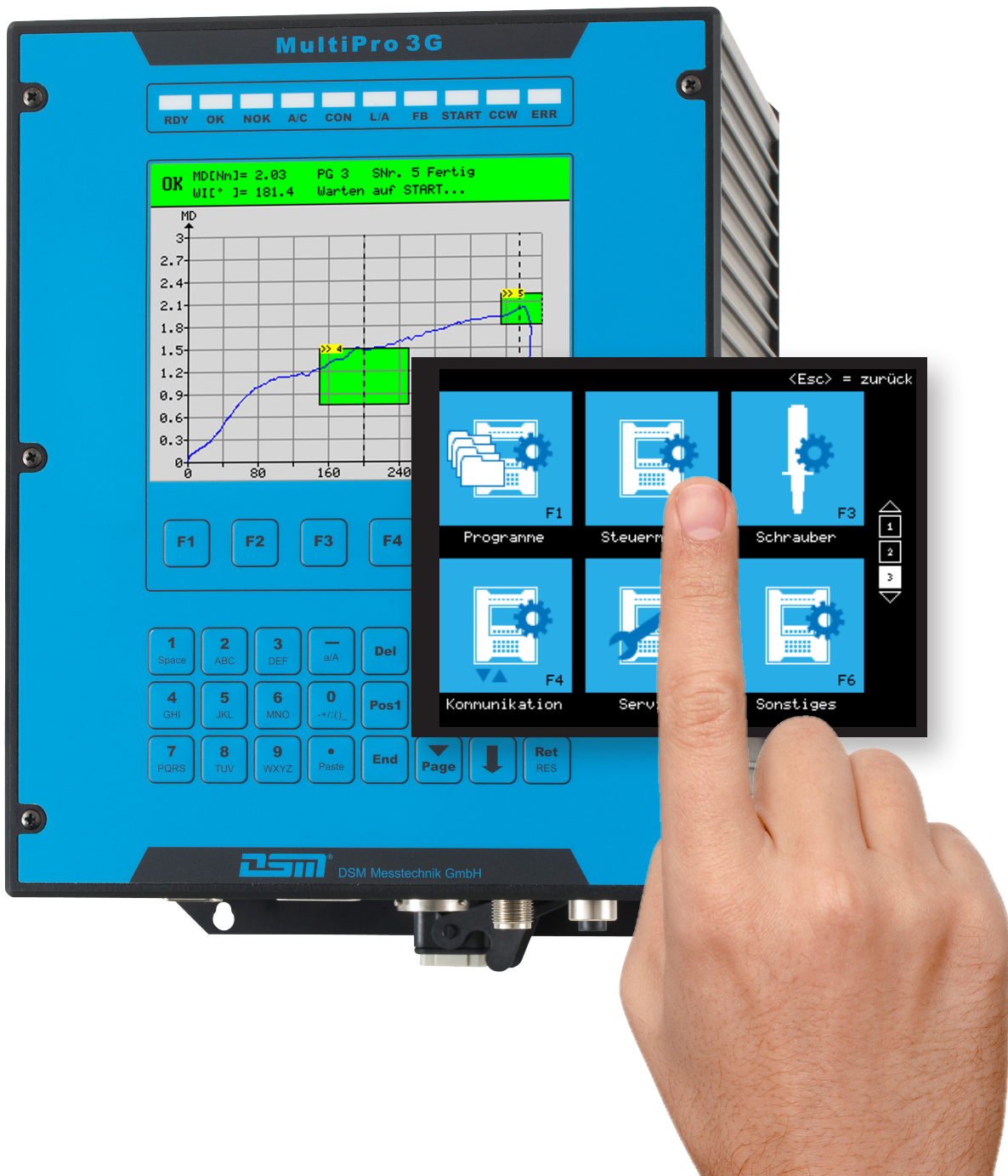
DSM is a competent partner for manual workplaces, for fully automatic assembly stations, for test / diagnostic stations as well as for robot applications. With our experience we are on hand to provide you with support and advice. Whether it is as component supplier or system supplier – DSM is your reliable partner.

## MultiPro 3G

The combination of intuitive user-friendliness and a modular hardware and software concept created a basis that meets the current and future requirements in assembly 4.0.

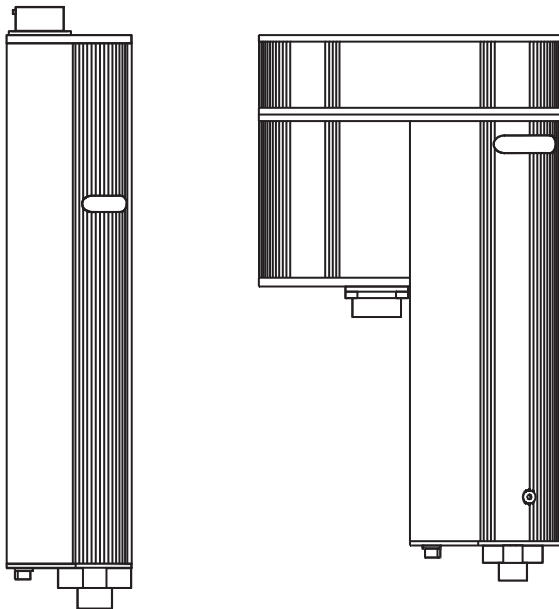
Flexible in application, because the installed firmware defines the use of the MultiPro 3G as a tightening or press-in system.

Furthermore, the MultiPro 3G technology with the scalable functional area enables the individual configuration of the scope of services. DSM implements special modifications in a customer oriented and professional manner – a new generated function can be easily integrated into the control system as an add-on.



## Modular design – tailor-made technology

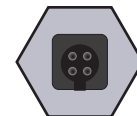
### Motor modules



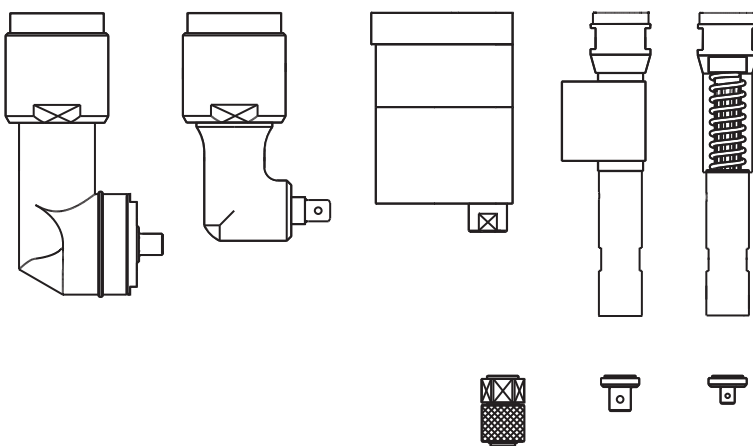
The illuminated field on the nutrunner indicates the status of the tightening process.



Connection possibility for start function (self start, starting handle or external initiator)



### Output modules



DSM nutrunners are characterised by their wide range of variants, highest reliability and precision. They are not only available in a wide range of torque variants, but also with various drive and output modules.

With DS series nutrunners the data transmission is digital. The advantage: The nutrunner has an independent decentralised intelligence for an error-free setup.

## Reliable hand-held tightening technique with the highest quality

DSM offers a variety of high-performance tightening tools for virtually every field of application.

Regardless of whether it's digital hand-held tightening technique or analogue nutrunners, DSM offers reliable function and excellent quality, first-class ergonomics as well as an enormous range of versions.

High-precision torque transducers and angle of rotation encoders – in combination with the MultiPro 3G – ensure assembly accuracy and complete documentation of the production data.

Thanks to the variability of our tightening procedures, the DSH nutrunners provide you with a high-performance system for error-free tightening in safety and quality-critical assembly.



## Hand-held nutrunners



**DSH 16**

0,25 / 0,5 Nm



**DSH 26**

0,5 / 1 / 2 / 4 Nm



**DSH 34**

5 / 10 Nm



**DSH 34-WA**

5 / 10 / 20 Nm



**DS 34-P**

2,5 / 5 / 10 / 15 Nm



**DSH 38**

5 / 10 / 15 Nm



**DSH 44**

20 / 30 Nm



**DSH 44-WA**

40 / 60 Nm



**DS 44-P**

2,5 / 5 / 10 / 20 / 35 Nm

## Impressive installation solutions from DSM

Great products are the result of flawless processes. In the case of industrial manufacturing, perfect production is paramount. Screw connections in particular should not cause product deficiencies. Regardless of whether it is digital or analogue tightening technique – DSM is a solid choice for high quality.

All DSM products are characterised by their perfect integration into new or existing production lines. High-precision torque transducers and absolute angle encoders – in combination with the MultiPro 3G – ensure assembly accuracy and complete documentation of the production data.

Thanks to the variability of our tightening procedures, the DS nutrunners provide you with a high-performance system for error-free tightening in safety and quality-critical assembly.

**0,05 Nm  
up to  
2400 Nm**  
Torque



## Built-in nutrunners



**DS 26**  
0,5 / 1 / 2 / 4 Nm



**DS 34**  
2,5 / 5 / 10 / 15 Nm



**DS 44**  
2,5 / 5 / 10 / 20 / 35 Nm



**DS 57**  
50 / 70 / 90 / 140 Nm



**DS 80**  
220 / 300 / 420 / 500 / 600 Nm



**DS 80-130**  
900 / 1000 / 1500 / 2000 / 2400 Nm

# Your benefit – a robot tightening system for several assembly tasks with different screw geometries

DSM tightening technology in connection with the applications **tightening unit SEL** and **bit changing machine BWA** for robot-controlled process automation.

The tightening unit SEL has a modular design – it consists of the basic module with nutrunner which is adapted to the robot and the coupling module with vacuum mouthpiece. The coupling modules, designed for different screw geometries, can be exchanged without tools and are coupled to the base module and locked pneumatically.

Additionally integrate the BWA bit changer into your line layout and increase the flexibility of the assembly and the possible variants in your station.

The BWA is equipped with a vertical and a horizontal lifting unit and enables the automatic change of the screwdriver bit.

The bit holder modules can be adapted to different bit geometries and are permanently assigned to a tool position.

**2** The robot moves the tightening unit to the bit changing machine and places it in the stand-by position.

Robot moves up and disconnects the bit which is then picked up by the bit holder.

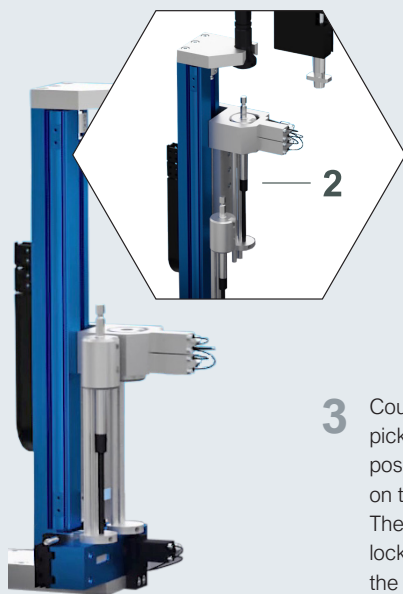
The lifting unit moves down and places the bit holder at the assigned tool position.

The horizontal lifting unit moves to the bit suitable for the screw connection; the vertical lifting unit moves downwards and picks up the bit holder moves upwards and the robot couples the bit into the quick-change unit.

**4** The vacuum mouthpiece picks up the screw with negative pressure and is placed at the screwdriving point by the robot – the tightening process starts.

The screw is screwed in a few turns, the mouthpiece is lifted from the screw head and the screw is screwed in until the final tightening – this prevents torque distortion due to frictional torque.

**1** The robot arm moves to the tool change position and disconnects the coupling module.



**3** Coupling modules are in pickup position. The robot positions the basic module on the suitable mouthpiece. The coupling module is locked and connected to the basic module.



## Detects when a tool is removed

When a tool is removed, ToolControl automatically calls up the correct sequence program on the linked control system. After appropriate activation, ToolControl shows the operator the tool that is required for the current assembly process.

The DSM control system automatically identifies the connected ToolControl systems; in the case of external presetting, ToolControl communicates with the external control system / PLC via field bus.



- Processor monitored tool removal
- Status reports via LCD plain text display
- Status indication for each tool
- Cast aluminium housing with mounting brackets
- Customised tool inserts
- Cascatable up to 32 tools

TC2 | TC2-E

**2** **72 mm**

Tools max. Ø

TC4 | TC4-E

**4** **40 mm**

Tools max. Ø

TC8

**8** **25 mm**

Tools max. Ø

## ToolControl



**TC2 TC4 TC8**  
Basic system



**TC2-E TC4-E**  
Expansion system



# Precise and exactly to the point: Reference measuring system QS Box

In addition to the control systems for tightening and press-in technique, DSM also offers a digital measuring system for the quality assurance of process operations.

The QS Box reference measuring device can be used for monitoring and checking as well as for adjusting or calibrating tightening and press-in systems.

This flexibility allows the use of plug-in modules

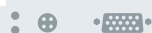
for the most common measuring sensors.

The advantage of the modern digital measuring system is an interference-free signal transmission, direct status display in the immediate vicinity of the measuring point and an intelligent memory module. The stored sensor data are set automatically when connected to the QS Box. With recurring calibrations, only the sensor is calibrated and not the entire measuring chain.



- Measuring equipment for monitoring and calibration
- Exchangeable plug-in modules for analogue and digital measuring signals
- Measurements possible in online and offline mode
- Measurement value recording and graphic monitoring
- Data storage directly on CF card or PC
- Test equipment monitoring with integrated measuring system

## Plug-in modules



### Digital

#### DSM Digital

The QS Box unfolds its complete potential with DSM-Digital:

Insensible signal transfer

Direct status report at the measuring sensor

Automatic recording of the sensor data's

Automatic adjustment of the measuring parameters

Further modules:

**± 1 mV/V**

**± 5 V**

**± 2 mV/V**

**± 10 V**

**4-20 mA**

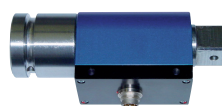
**± 15 V**

## SCI module

We convert your analogue sensors. Equipped with a SCI module, every existing transducer can be connected to the digital-interface of the QS Box. This allows you to use all advantages of the digital system cost-effectively.

## Measuring sensors

According to requirements, DSM delivers analogue and digital measuring sensors of any type: force load cell, length sensors, torque transducers and temperature sensors



## Linear module LM26, LM34, LM44

DSM linear modules for tool-free assembly of measuring equipment<sup>1</sup> on a DS26, DS 34 / DS 44 nutrunner without long process interruptions. In basic position the nutrunner is fixed by a locking device at the output. The nutrunner can be manually moved with the linear slide by pulling

the locking bolt and can be fixed on two further snap-in points for the integration / assembly of the measuring sensor. Precondition for this is a firm connection between linear module and output (e.g. spring output) as well as the direct mounting of the nutrunner at the linear slide.

<sup>1</sup> rotating torque transducer

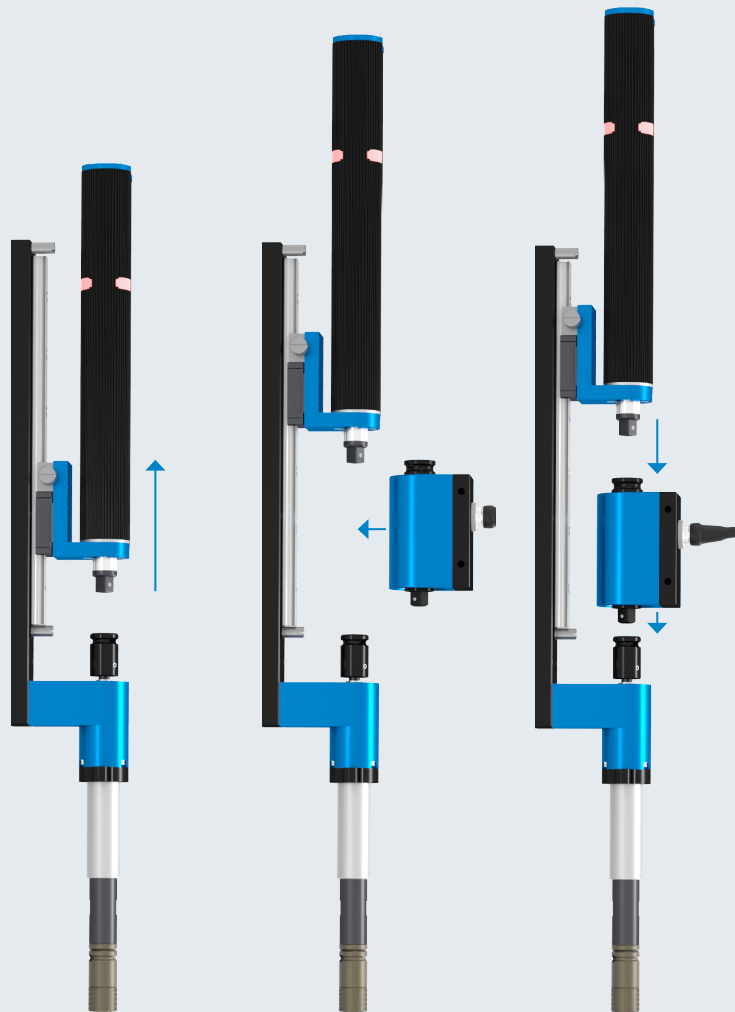
### Normal operation

Standard use of the nutrunner in the assembly process.



### Tool-free assembly of the torque transducer

Move the nutrunner manually with the linear slide and fix it at a snap-in point for the integration of the measuring sensor. Assemble the torque transducer without tools.



### Measuring mode

Measure during production and record the data with the QS Box.



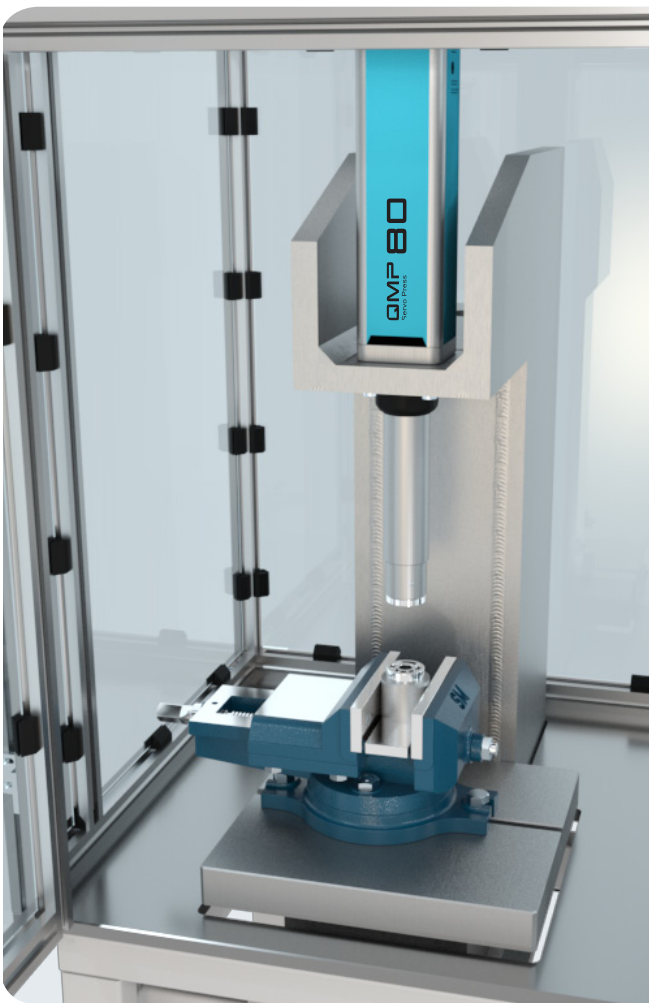
## Individual solutions tailor-made, typically DSM – Tightening and press-in stations

In addition to individual components for tightening and press-in technique, DSM also offers complete individual workstations and conversions to existing stations.

With our long-term experience in these fields, you can rely on a cost-effective, excellent overall solution, in which all components are ideally tailored to each other.

All dimensions can be individually tailored. We equip your workstation with the desired DSM products and, if desired, also with components from other manufacturers.

Personal safety according to current standards is ensured, for example, by a light curtain, lockable automatic lifting doors or two-hand control elements.



### Special solutions

Individual technical solutions, as well as hardware and software, are our strengths. Beyond our varied standard range, we produce special designs and completely new products for you. In close cooperation with you, we develop tailored solutions for the tightening technique, press-in technique and quality assurance fields of application.



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