STÖGER AUTOMATION

Screwdriving and Fastening Technology with Automatic Feeding

Product Overview

Relying on proven systems

With a STÖGER AUTOMATION screwdriving system you buy a high-quality product. The use of excellent materials, first-class workmanship and proven designs adapted to your individual applications ensure high availability and longevity of our screwdriving systems.

STÖGER AUTOMATION screwdriving systems are designed as complete systems: Each system comprises a screwdriving unit with drive, a feed unit and a control unit for the screwdriving and feed unit. Each system can be supplemented with additional components. Alternatively, however, we also supply individual components from our product portfolio.

An extensive range of accessories is available, which can be integrated into the whole system, depending on the individual application.

... or exploring new territory

You can break new ground with us when it comes to the automation of production processes. With more than 30 years of experience in the field of assembly automation we are a reliable and efficient partner by your side. Based on your specifications and requests and combined with our know-how we will work out individual solutions together with you, which are exactly tailored to your production environment and requirements. This may range from engineering of new components and processes to customisation of screwdriving technologies as well as achieving production maturity of newly developed screwdriving systems. Even supporting the development of our customers' products can be part of this cooperation. Design and engineering, a part of the production, and the complete assembly of our systems are carried out in our modern factory in Bavaria. This is where we also test all systems thoroughly for final acceptance before supporting you during installation and commissioning in your own manufacturing plant.

Content

Screwdriving and connecting technology with automatic feeding

Hand-held screwdrivers

Introducing hand-held screwdrivers for automated processing of fastening elements has huge advantages:

for the company
Automatic feeding of fastening elements and shorter cycle times increase output and productivity. It is very easy to integrate hand-held screwdrivers in production units at a later stage..

for the operator
Work safety is improved, work processes become more ergonomic and simplified.

for the product
Screwdriving data are documented, the quality of the fastening process enhanced

Firmly-protruding screw

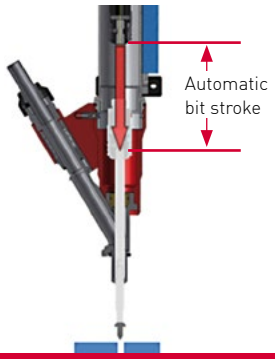
The firmly-protruding screw is a particular feature of our hand-held screwdrivers. The screw shaft protrudes from the nose piece and can't be pushed or pressed back. This facilitates the positioning of the screw on the screw hole, making the handling process for the operator more ergonomic and time-saving.

Screw is fed to the nose piece

Bit holds screw firmly in protruding position

During the screwdriving process, the nose piece retracts upwardly away from the work piece without touching it.

Resting position with screw blown into the screwdriving head



A pneumatic cylinder causes the screwdriving tool to travel to the screw. Screw is positioned in screwdriving location

Automatic bit stroke (Tool stroke)

The bit stroke is the path which the tool travels during the screwdriving process from the resting position until it has reached the screwdriving head. When the bit stroke is automated, a pneumatic cylinder performs the first stroke which positions the tool on the screw. The automatic bit stroke in hand-held screwdrivers facilitates the handling for the operator and may reduce the cycle time.

Vacuum screwdriver vs. magnetic bit

Work pieces with protruding obstacles often require the use of a long and thin screwdriving tool which has to travel a long way beyond the nose piece in order to take the fastening element to the screwdriving location. For these applications we have designed two different versions:

→ Vacuum version

In this version a vacuum holds the fastening element in the vacuum tube so that it can be properly positioned in the screwdriving location and fastened by the screwdriving tool. This vacuum version is applicable for fastening elements made of magnetic and non-magnetic materials.

→ Magnetic bit

In this version a magnetic bit attracts the fastening element so that it can be positioned at the screwdriving location and fastened. This solution is only suitable for magnetisable fastening elements. The feasibility has to be checked for each screwdriving application individually.

Hand-held screwdrivers for screws

HSF: with automatic bit stroke, pneumatic or electric drive

	HSF
Firmly protruding screw	yes
Automatic bit strok	yes
Free choice of drive	yes
Vacuum version possible	yes
Version with magnetic bit possible	yes
Screw size	M3-M8*
Weight	approx. 1.2 kg (without drive)
Noise level measurement	electric: approx. 50 dBA pneumatic: approx. 60-80 dBA

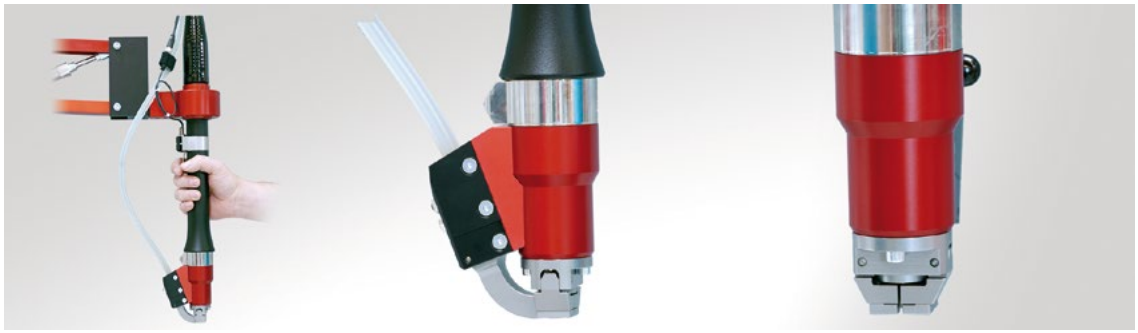
* Standard, other sizes possible

Hand-held nutrunners

HSM: pneumatic or electric drive

	HSM
Firmly protruding nut	depending on model
Automatic tool stroke	yes
Free choice of drive	yes
Vacuum version possible	yes
Nut size	M3-M8*
Weight	approx. 1.2kg (without drive)
Noise level measurement	electric: approx. 50 dBA pneumatic: approx. 60-80 dBA

* Standard, other values possible



Screwdriving units

Using automatic screwdrivers for automated processing of fastening elements has huge advantages:

for the company

Automatic feeding of the fastening elements and shorter cycle times increase output and productivity. (Partial) automation of a work station helps to cut costs of each fastening process additionally. Due to the slim designs and the possibility to use automatic screwdrivers in any screwdriving position, on axle systems and robots, production plants can be planned in a more efficient way.

for the product

Screwdriving results are documented, thus ensuring reliability. The quality of the product is improved, as the fastening process is reproducible and verifiable.

Automatic screwdrivers for screws

SES: System based on minimal movement of masses due to integrated stroke movements; suitable for fast-running high performance systems with high cycle times. Drive and sensors are not moved during the fastening process, which increases their life span

SEL: short and compact design, for high torques, with head stroke

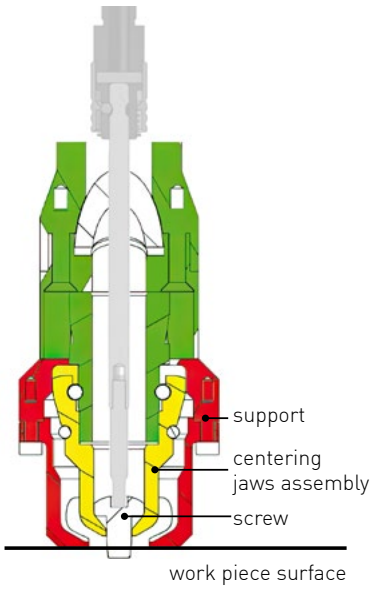
SRL: short and compact design, for high torques, without head stroke, e.g. for robot application

	SES	SEL	SRL
Head stroke	yes	yes	no
Vacuum version	yes	yes	yes
Drive	free choice	free choice	free choice
Screw size	M2-M10*	M2-M12*	M2-M12*
Rotational speed	50 – 2,500 rpm* (depending on drive)	50 – 2,500 rpm* (depending on drive)	50 – 2,500 rpm* (depending on drive)
Torque	up to 45 Nm*	up to 100 Nm*	up to 100 Nm*
Cycle time	from 0.8 sec.*	from 1.5 sec.*	from 1.5 sec.*
Bit change	laterally, < 10 sec.	downward, < 20 sec.	downward, < 20 sec.

* Standard, other values possible

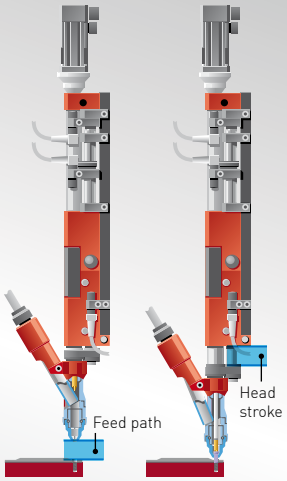
Level-based fastening

In the level-based fastening process possible tolerances in the work piece height are taken into account. Irrespective of the height of the work piece the fastener is always screwed in to the required depth, as the feed head of the screwdriving unit is supported on the surface or reference surface of the work piece. From this level the fastening will always be made to the same depth.



Interferences

Interferences are protruding obstacles around the screwdriving location. The accessibility of the screwdriving location is the essential factor in finding a technical solution. Often changing the sequence of the assembly steps or altering the work piece location during the assembly helps to simplify the technical solution.



Head stroke

The head stroke is needed when the work piece or the automatic screwdriver can't be automatically positioned for the screwdriving process (e.g. by a robotic arm or a sliding carrier system). The head stroke describes the path travelled by the feed head to the work piece in order to screw in the fastening element: The fastening element is blown by air into the feed head, which then travels with the fastening element to the work piece. Subsequently, the bit moves into position and screws the fastening element into the work piece. The feed head then returns to its start position and the bit is retracted. This process ensures that fastening elements which can't be screwed in correctly (e.g. due to a faulty bore hole or defective thread) will be ejected automatically. The automatic screwdriving process continues without interruption; as a rule, the faulty work piece will be ejected automatically.

Tool change

The bit or screwdriving tool change at our standard automatic screwdrivers is possible without tool. The clever design allows the tool to be changed from the side in many models, which reduces the vertical space required.

Automatic screwdrivers for threaded pins without engagement

The challenge of fastening threaded pins without engagement is met by rotating a quick-release chuck which grips the threaded pin securely.

SBS: based on the proven SES series, slim design, high cycle rates

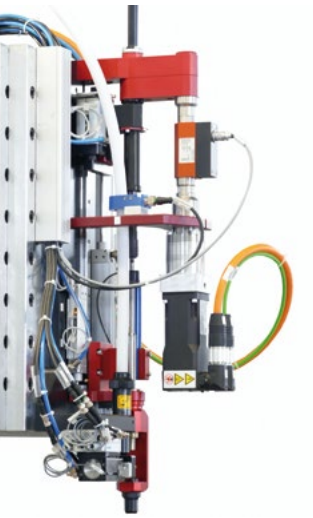
Drive	Servo drive
Cycle time (depending on material)	> 6.0 sec.
Fastening elements	Double-threaded screws or studs, symmetric or asymmetric

STÖGER Flow Drill System (FSF)

Flow drilling is an innovative technology for joining metal sheets. The work piece has no pre-drilled or pre-cut thread. The screw cuts the thread itself after having formed a flow drilling funnel. The entire screwdriving process is controlled and documented.

FSF: Fully monitored system with parameter output, automatic feeding system or feeding the fastener from a magazine, stationary or for robot application

Dimension L x W x H	750 x 320 x 280
Contact pressure tool	3300 N
Contact pressure downholder	1200 N
Speed	6000 min-1
Torque	15 Nm
Weight	34 kg
Size joining element	M4 - M6
Measurable sizes	Screw-in depth, torque, angle of rotation



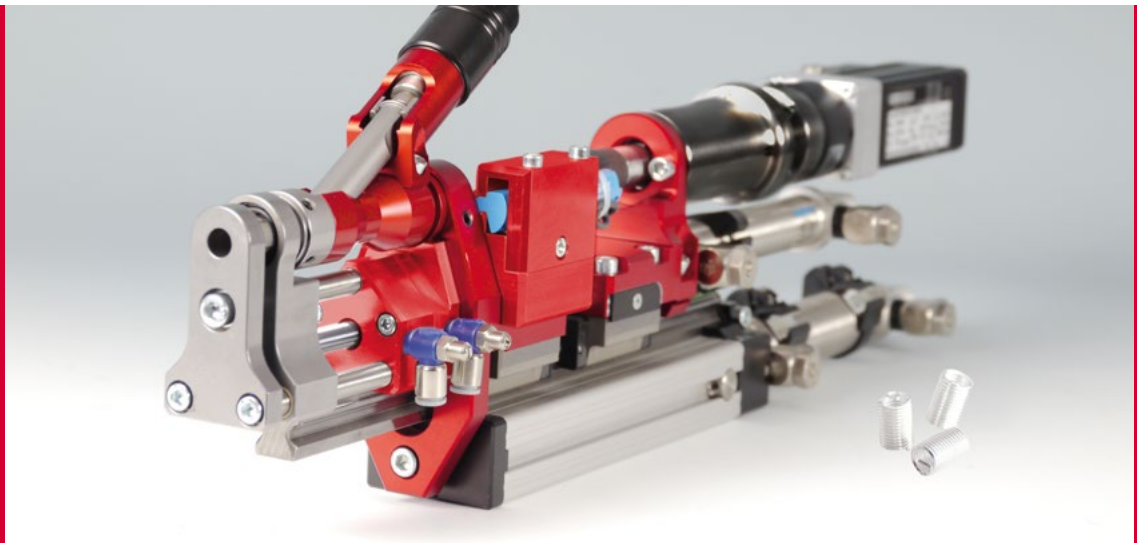
Automatic screwdriver for coil thread inserts

Usually thread inserts (also known under the brand name Helicoil) are processed manually or fed from a magazine. In our system thread inserts are fed automatically, which increases the cycle rate considerably. The quality of the fastening process is improved as torque, torque angle and screwdriving depth are monitored, thus increasing the process efficiency.

DGS: slim design due to elimination of the magazine, processing independent of position, thus suitable for robots and positioning systems, feeding of the thread inserts through a tube allows a separate installation of automatic screwdriver and feed unit

Feed stroke	yes
Drive	electric; integrated
Coil thread insert with pin	M4-M14*
Coil thread insert with conical tip	M4-M14*
Coil thread insert without pin and with double-sided conical tip	M4-M14*
Cycle time (depending on coil thread dimensions)	3 - 5 sec.
Bit change	laterally

* Standard, other sizes possible



Automatic nutrunners

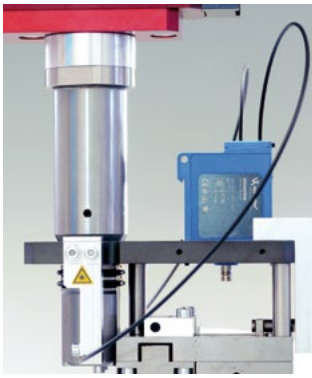
SEM: system based on minimal movement of masses due to integrated stroke movements; suitable especially for fast running high-performance systems. Drive and sensors are not moved during the fastening process, which increases their life span

SMZ: like SEM, with electronically controlled centering needle, can compensate positioning tolerances in the work piece; important e.g. when fastening nuts on tilted threaded bolts (e.g. airbag); works without suction air

SRM: special design, for high torques

	SEM	SMZ	SRM
Feed stroke	optional	no	yes
Centering needle	spring-loaded	controlled	spring-loaded
Vacuum version possible	yes	no	yes
Drive	free choice	free choice	free choice
Nut size	M3-M8*	M3-M8*	M3-M8*
Torque	up to 32 Nm*	up to 32 Nm*	up to 100 Nm*
Cycle time	from 2,5 sec.*	from 2,0 sec.*	from 3,0 sec.*
Bit change	< 1 min.	< 1 min.	< 2 min.

* Standard, other sizes possible



Vacuum version vs. centering needle

There are two possible solutions for positioning the nut at the fastening location:

→ Vacuum version

A vacuum causes adhesion of the fastener to the suction tube. The nut can thus be positioned at the fastening location and fastened by the screw-driving tool.

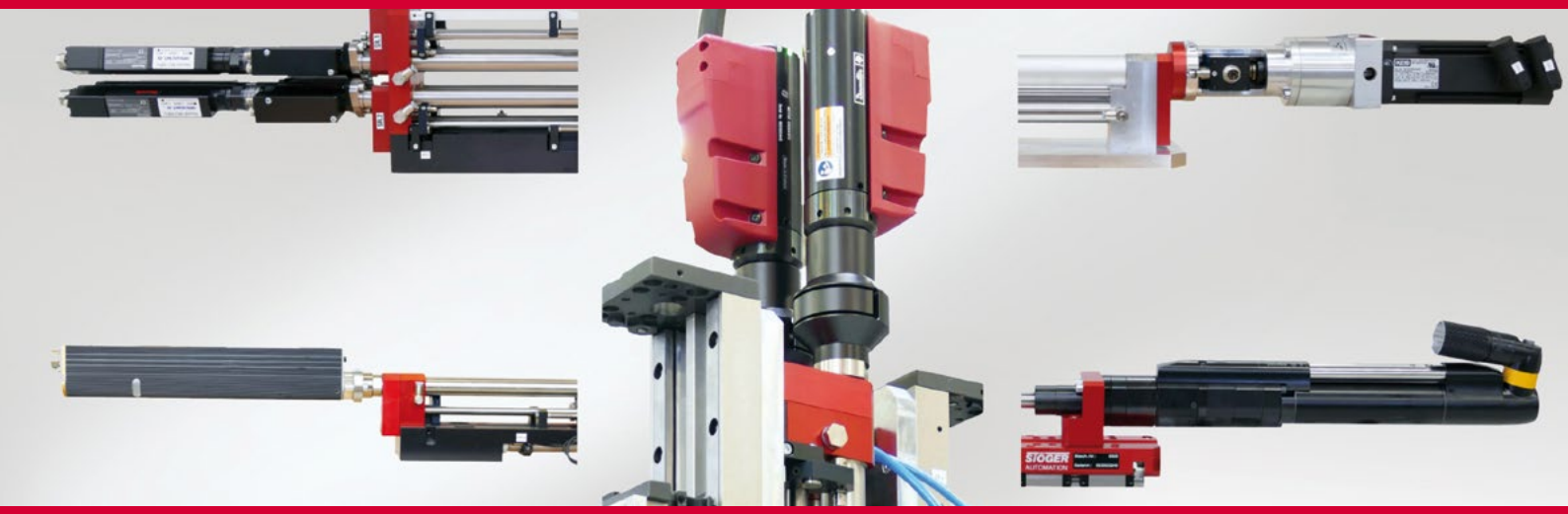
→ Centering needle

An electronically controlled centering needle positions the nut at the fastening location. This system is also suitable for nuts with larger tolerances.

Automatic screwdrivers for the aviation industry: automatic fastening of Lok-Bolt, Hi-LokTM, OSI-Bolt...

The development of automatic screwdrivers and setting units for the aviation industry requires special know-how, as special demands for design and weight of the systems have to be met. Due to their geometry and complexity the automated fastening process is a particular challenge. For these applications we have developed a flexible system for robot use. We have implemented several large projects with leading companies in the sector ever since. Our systems are used worldwide for the screwing and riveting of Lok-Bolts, Hi-LoksTM, OSI-Bolts and other special fasteners.

Drive technology



There are two types of drives: electric or pneumatic. The choice of the drive can depend on several parameters, e.g.

- torque and torque precision
- angle and angle precision
- rotational speed
- cycle time
- screwdriver geometry
- precision
- type of screwdriving process
- performance
- environmental factors such as noise or technical cleanliness
- customer specification

Our own drives are used for our automatic screwdrivers as well as any other brand requested by our customers. In the case of other brands we use the respective control units and adapted software. Both versions with and without torque sensor are possible.

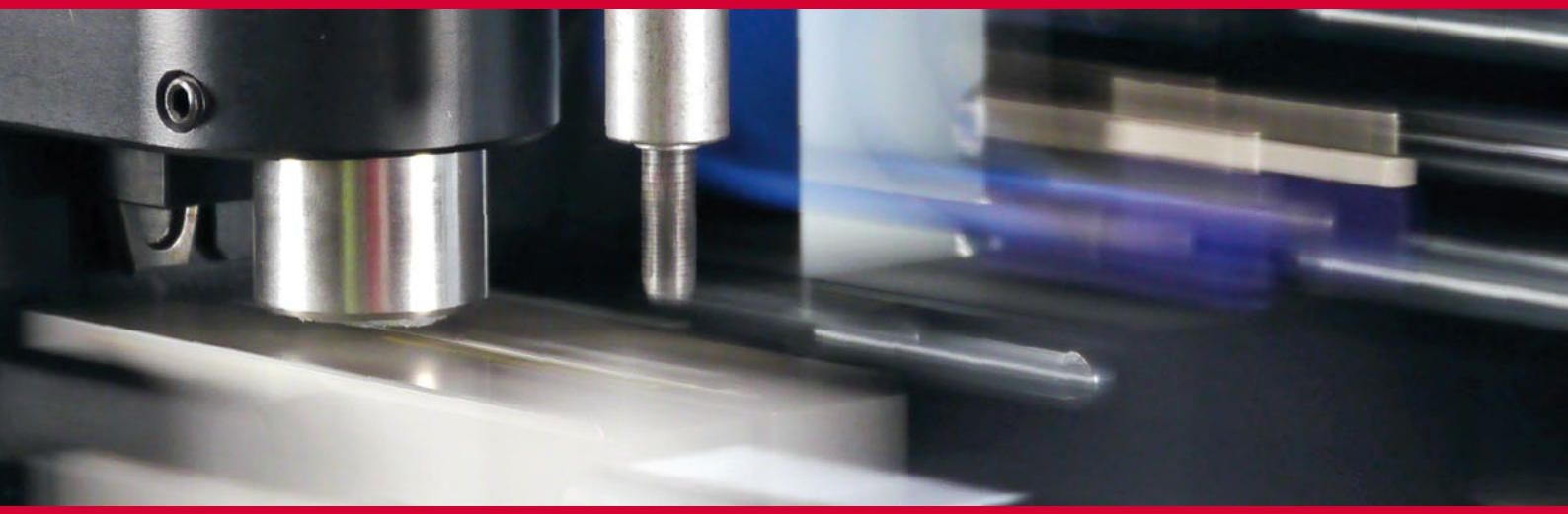
Fields of application:

torque accuracy < +- 1 %

rotational speeds up to 3,000 min-1

range of torque from 0.02 Nm

Setting units



Setting units position, join or rivet fasteners with or without exerting large forces. Our setting unit for blind rivet nuts takes a special position. The automated process of setting a blind rivet nut is entirely monitored. They are thus suitable for transfer lines, turn table and positioning systems as well as robots. Our setting units for blind rivet nuts feature technical details such as integrated feed stroke with displacementmeasuring system, torque controlled servo drive, a load cell for monitoring the drawing force, an automatic check of the thread before and after the setting process etc. A possible tool breakage is detected by the control unit.

The system works electrically / pneumatically without the need of a hydraulic system. The significant advantage of our system is that the tight fit of the rivet is additionally verified with torque control. This prevents the blind rivet nut from rotating when the screw is screwed in. Additionally, the system monitors that the blind rivet nut does not rotate while the screw is fastened. This patented method is a decisive advantage for our customers.

Setting units for blind rivet nuts

BMS: suitable for all sorts of blind rivet nuts, adjustable draw speed, stationary, suitable for positioning systems and robots, integrated head stroke with controlled pressing force. The system works electrically/pneumatically without the need of a hydraulic system.

Head stroke	yes, 120 mm
Drive	Servo drive
Torque	up to 1,500 rpm
Draw force	max. 30 kN
Cycle time (depending on material)	from start to start approx. 7 sec.

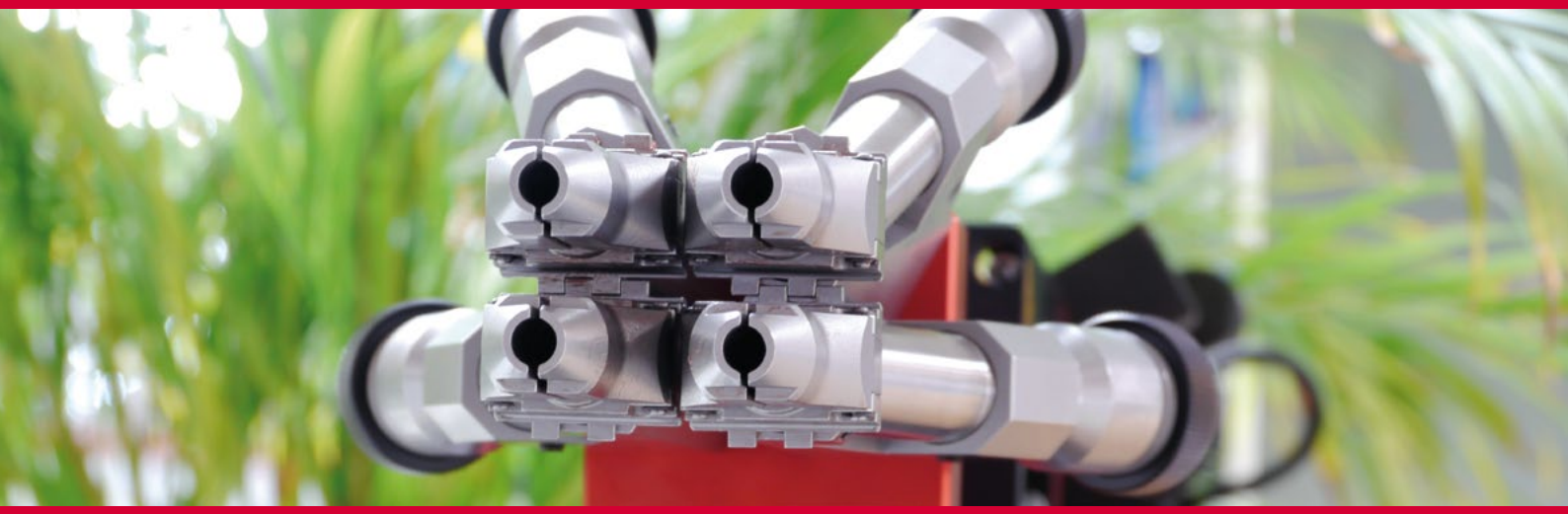
Setting units for rivets, balls, pins...

Due to the varying geometries of the fasteners (e.g. pins, sleeves, balls, tubular rivets) setting units have to be adapted individually to specific requirements. The fasteners are sorted into a defined position and automatically fed to the system. A force-displacement measurement ensures a correct fastening process; a load cell monitors and controls the exerted force.
Our setting systems are also suitable for positioning axles and robots.

EDE: pressing unit, integrated head stroke, force-displacement measurement

Head stroke	yes
Drive	Servo drive or pneumatic cylinder
Setting force / Joining force	up to several 100 kN
Cycle time (depending on force)	from start to start approx. 2-3 sec.
Automatic feeding of fasteners	yes

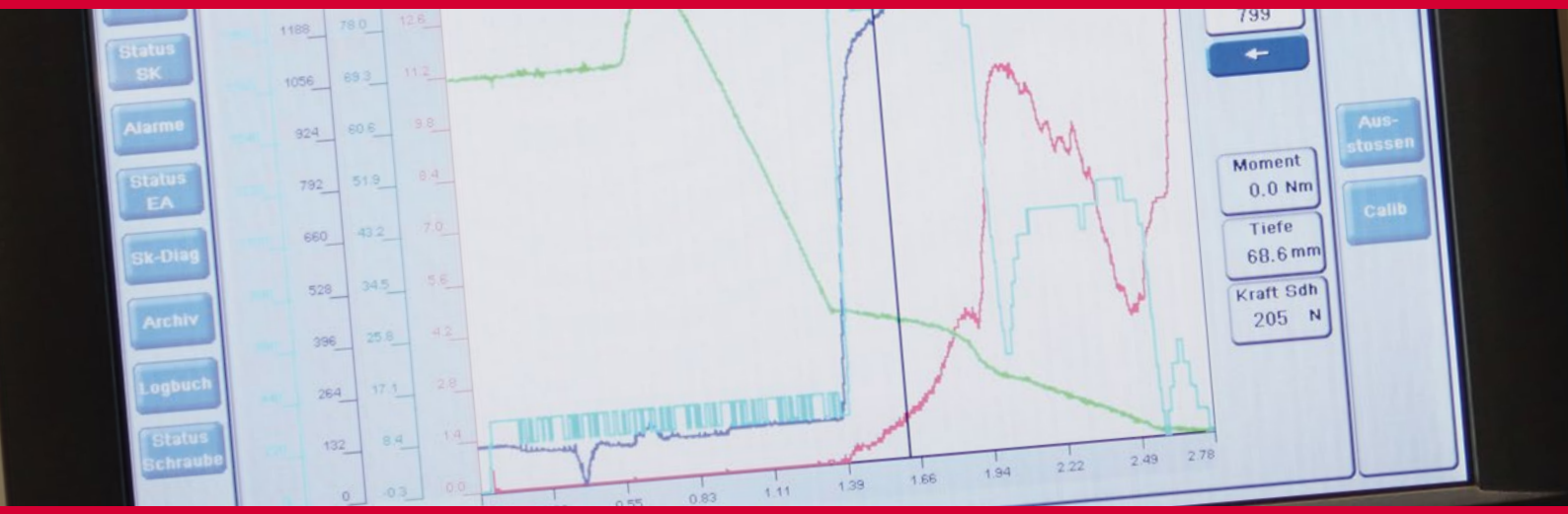
Multi-spindle machines



A multi-spindle machine is used when several fasteners (of the same or different type) have to be processed in one work piece within a short cycle time. Multi-spindle systems may be based on our standard models or newly developed according to the customer specification.

Diverters or storage magazines are installed for simultaneous feeding and fastening of the fastening elements to the screwdriving units. Alternatively, several feed units are used simultaneously, especially when using different fastening elements. Our multi-spindle units are also suitable for installation in robots, positioning axles or assembly cells.

Process monitoring

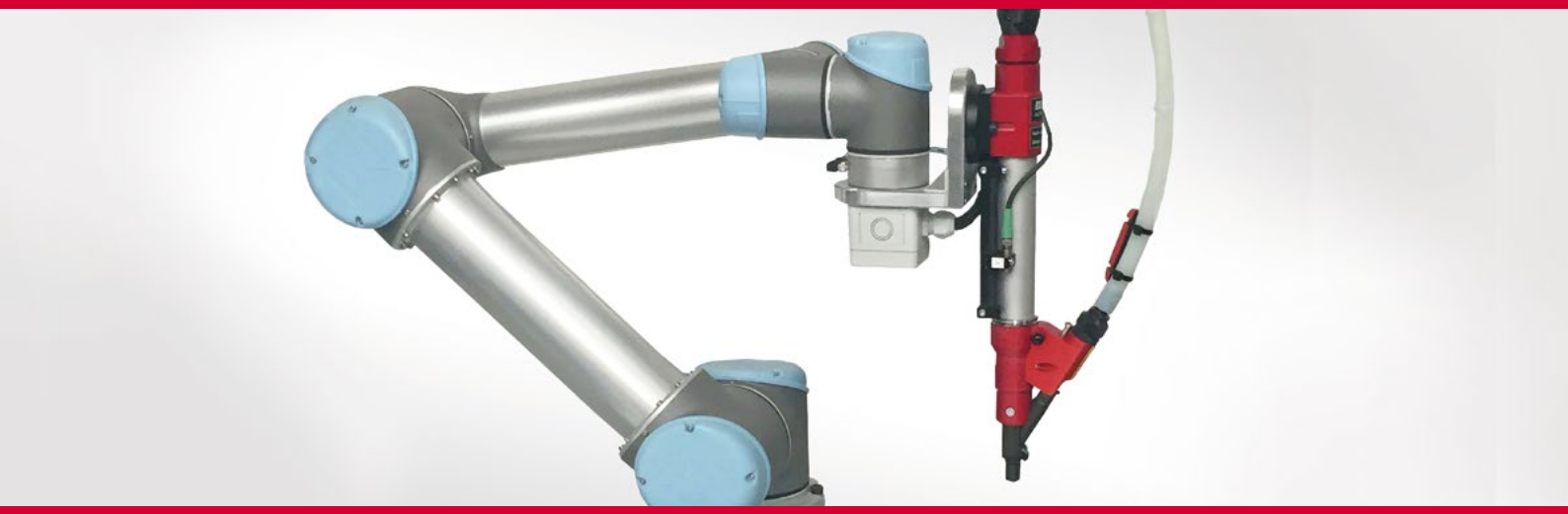


Several values are monitored in order to guarantee the quality of a connection and to identify faulty connections: torque (through power consumption or torque transducer), rotational speed, torque angle and screw-driving depth. The control unit compares the values measured with set values. If the value exceeds the tolerance range, the connection is assessed as NOK.

Differential torque method or Tapping torque addition: During the fastening process the tapping torque is determined, based on which the final tightening torque is calculated.

GAP Control: GAP Control is a system that measures whether the screw head really has contact with the work piece surface. This technique checks not only the depth of insertion and the torque but also the screw head height. Thus the individual depth of insertion in relation to the work piece height is determined. By combining both test methods the probability of errors is practically eliminated.

Use in robotic systems



In general, all our screwdriving systems can be used in robots, positioning axle systems and handling systems. Where smaller and lighter screwdriving systems are necessary, e.g. due to the lack of space, problems with heavy weights or for financial reasons, a screwdriving system particularly developed for the use in robots will be the right choice.

Screwdriving units for collaborating robots
Due to the rising demand for collaborating robot systems the screwdriving units have to fulfil high safety requirements. We develop, design and build screwdriving systems adapted to human-robot collaboration.

Screwdriving robot with automatic tool change
With the SPATZ (STÖGER Pick&Place screwdriving robot with automatic tool change and feed unit for fasteners), a screwdriving robot has been developed whose modularity means that not only different screws can be screwed with the same unit, but that even different activities such as gripping, plugging or assembling can be carried out.

Automatic screwdrivers for robots

CSX: Automatic screwdriver for Human-Robot-Interaction, automatic switch-off when protection sleeve is touched, short design, low weight, suitable for lightweight robots with load-bearing capacity > 5kg

RSX: Automatic screwdriver for leightweight robots with load-bearing capacity > 5kg, short and compact design, short cycle times

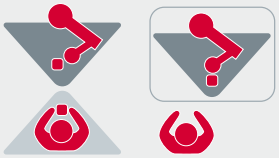
SRL: short design, for very high torques, suitable for rough environments

SRS: less moving masses, short cycle times, high availability

	CSX	RSX	SRL	SRS
Suitable for collaborating robots	yes	no	no	no
Drive	free choice	free choice	free choice	free choice
Screw size	M2-M8*	M2-M8*	M2-M12*	M2-M10*
Rotational speed (depending on drive)	50-2,500 rpm*	50-2,500 rpm*	50-2,500 rpm*	50-2,500 rpm*
Torque	up to 16 Nm*	up to 16 Nm*	up to 100 Nm*	up to 45 Nm*
Cycle time	from 0.8 sec.	from 0.8 sec.	from 1.5 sec.	from 1.5 sec.
Bit change	downward, <10 sec.	downward, <10 sec.	downward, <20 sec.	downward, <20 sec.

* Standard, other values possible

Interaction scenarios for robot applications



Co-existence:
Humans and robots are in adjacent areas at the same time. An example is an insertion station with a rotary table on a robotic cell.

Cooperation:
Human and robot share a workspace, but work in it at different times. The work area is secured.

Collaboration:
Both share the same workspace at the same time. According to DIN EN 10218-1 and ISO TS 15066, a distinction is made between 4 types of collaboration:

Safety-rated monitored stop	Manual guidance	Power and force limitation	Speed and distance monitoring

Pick&Place screwdriving robot with automatic tool change

Due to the modular design, all conceivable screwing sequences with different screw geometries and screw positions can be mapped and combined with each other. Many other activities are possible besides screwdriving. For example, grippers can also be integrated. Thus, one and the same robot can pick up a component, screw in different screws, place balls or pins, assemble components and much more. This opens up completely new possibilities for the system layout.

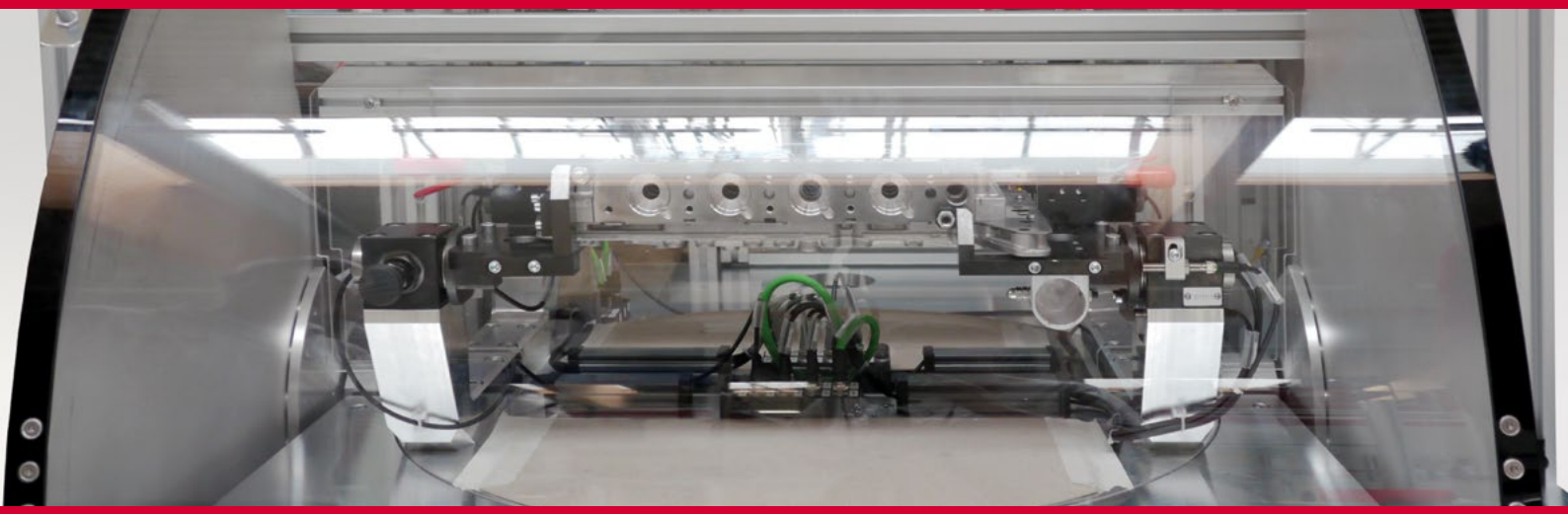
SPATZ: modular Pick&Place screwdriving robot with automatic tool change and automatic feeding of the fasteners. Suitable for lightweight robots with a load-bearing capacity > 3kg, UR+ certified product

General	
Concept	modular Pick&Place Screwdriving system; automatic tool change; design optimized for HRI; certified UR+ product
Versions	Free choice of drive; up to 15 screwdriving programs possible; provisioning of screws realised by a feed unit with internal or external supply unit; further tools, e.g. gripper adaptable

Technical data		
Type	Spatz 04	Spatz 30
Dimension L x W x D	380 x 64 x 64	500 x 80 x 80
Torque	0.05 - 4 Nm	0.2 - 30 Nm
Measurable sizes	Screw-in depth, torque, angle of rotation, time	Screw-in depth, torque, angle of rotation, time
Weight	from 1 kg	from 2 kg
Number of different screwing tools	Any	Any
Other tools	e.g. finger gripper, vacuum gripper, punch	e.g. finger gripper, vacuum gripper, punch

UNIVERSAL ROBOTS+
Certified

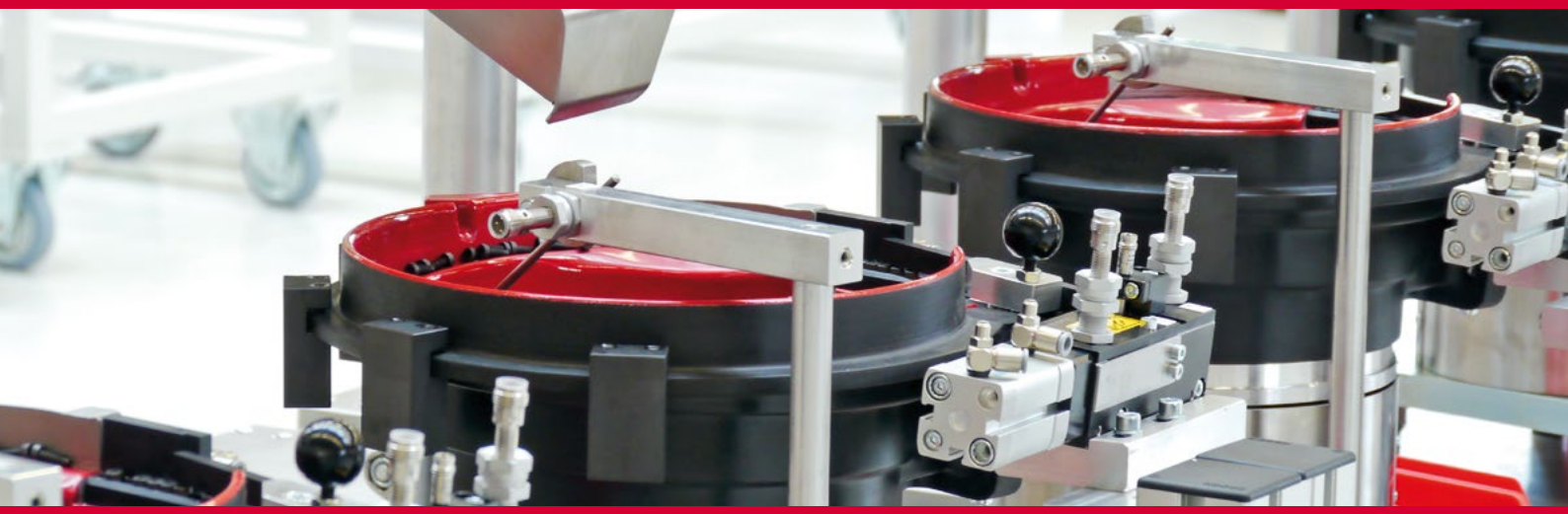
Assembly cells



Assembly cells are fully or semi-automated assembly units which are designed for manual work stations or automated assembly lines.

Due to a variety of individual applications assembly cells are available in different versions: with roller shutter, automatic sliding door or light curtain, with turntable or safety drawer to position the work piece, as well as with any possible add-on. Further operational steps can be integrated, such as lubricating, adhesive bonding, machining the work piece, scanning of bar codes or printing of labels, etc. Our modular assembly cell was developed in order to meet any possible requirement.

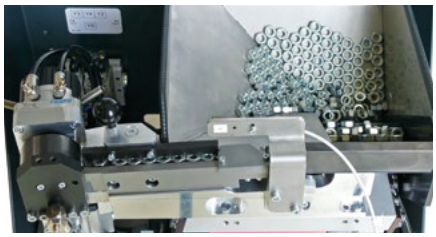
Feed systems



Due to the large variety of fastening elements and applications feed systems have to meet different requirements: screws with differing geometries as well as coated, micro-encapsulated and lubricated screws have to be sorted and fed correctly, short cycle times have to be achieved, they should be quiet in operation, avoid abrasion, etc. Thus, several types of feed systems based on different operating principles have been developed. All feed systems can be dejammed without tools, e.g. if foreign objects have entered the feed system. Additional functions can be provided by accessories such as hoppers, diverters for simultaneous equipping of several screwdriving units, fill level controls, output rails, screw selecting mechanisms, storage devices, sound enclosures and acoustic covers.

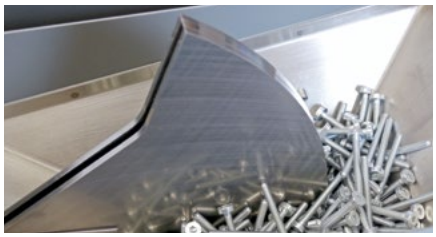
Bowl feeder (ZSE):

high output volume, suitable for all types of non-coated,
non-lubricated or non-micro-encapsulated fastening elements



Step feeder (STF):

suitable for all types of fastening elements, low in vibration



Segment feeder (SGF):

particularly suitable for fasteners with sensitive surface,
works without vibration

	Bowl feeder	Step feeder	Segment feeder
Capacity	0,4 - 3.0 liter*	1 - 10 liter	0.5 - 2 liter
Screws	M2-M14*	M3-M10*	M2-M10*
Nuts	M2-M12*	M3-M14*	no
Other fasteners	yes	yes	yes
Micro-encapsulated screws	conditionally possible	yes	conditionally possible
Lubricated and coated screws	conditionally possible	yes	conditionally possible
Noise level measurement	< 68 dbA	< 60 dbA	approx. 65 dbA
Output volume	up to 100 screws/min	up to 100 screws/min	up to 100 screws/min
Hopper	yes, option	STF 8010: optional STF 9020: standard	yes, option

* Standard, other sizes possible

Control units

The control unit monitors and controls the screwdriving system. The choice of the control unit may depend on

- the type of screwdriving system (handheld or automatic screwdriving unit)
- the number of screwdriving systems to be controlled
- the parameters to be monitored

The complexity of tasks such as singling and feeding of fasteners or the sequence control of multi-spindle screwdriving systems is essential for the selection of the proper control unit. Apart from our standard units any control unit requested by our customer (operational guidelines, technical specification) is available and will be built and programmed. Control units may be built according to the German DIN ISO standard or the American UL standard.

FAS 3512: basic controller for hand-held screwdriving systems, fixed setting of operational sequence

eControl 3051: standard sequence control for one screwdriving system with external drive

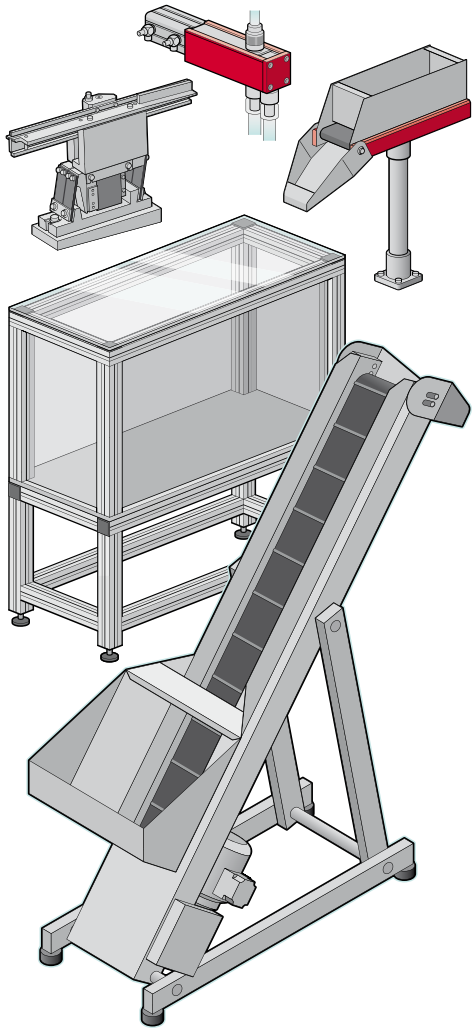
MPC 5000: compact control unit incl. drive control; complete sequence control for up to 4 screwdriving systems

	FAS 3512	eControl 3051	MPC 5000
Number of screwdriving systems to be controlled	1	1	4
Suitable for hand-held screwdrivers	yes	yes	no
Suitable for automatic screwdrivers	no	yes	yes
Fieldbus systems	n.a.	all standard types (ANYBUS)	all standard types (ANYBUS)
Sequence control	yes	yes	yes
Drive control integrated	no	no	yes
Touchscreen	no	yes	yes

STÖGER Monitoring System (SMS):

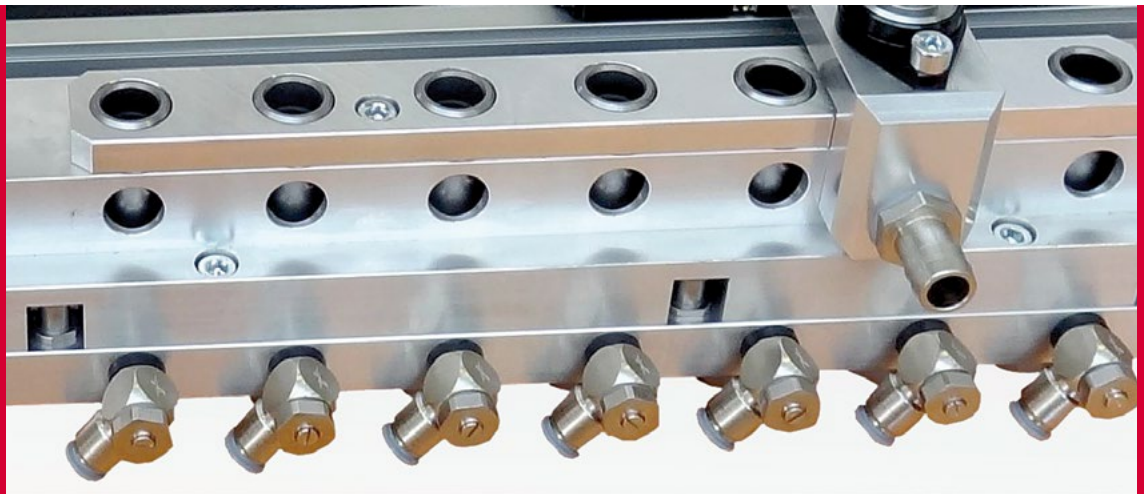
compact control unit incl. drive control; complete sequence control for up to 4 screwdriving systems

Software	
Results archive	100,000 results/day, 14 days
Process curves (e.g. screwing curves)	10,000 curves
Parameter change and alarm and result archive	14 days
Data backup	USB, SMB network drive
Recording and analysis of signals for process optimisation	16 signals for one minute
Switchable between three languages	EN, DE, national language



Accessories

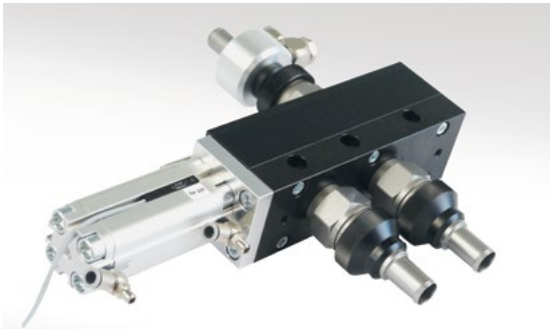
- pneumatic / electric diverters
- support arms (parallel arm, spring-loaded arm, handling device etc.)
- hopper
- template, working piece carrier
- fill level control
- feed control
- base frame
- enclosure
- acoustic cover
- pistol grip
- adapter with torque sensor



Base frame and hopper

Parallel arm

Handling device



Diverter

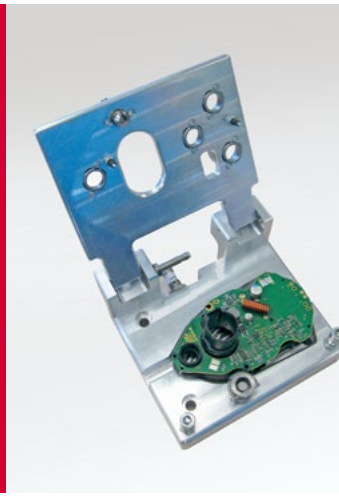
Acoustic cover

Adapter with
torque sensor

Diverter

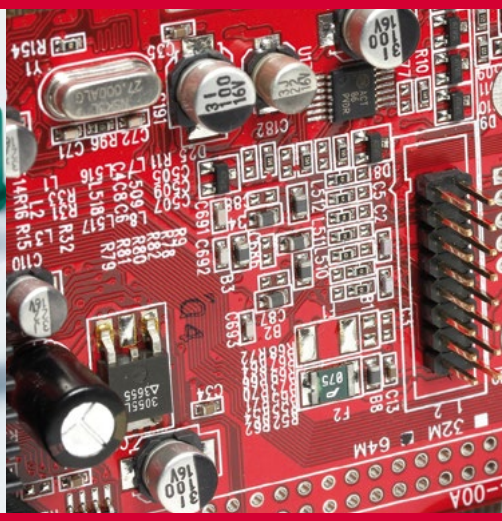
Fill level control

Pistol grip



Template, working
piece carrier

Technical cleanliness



Technical cleanliness in assembly processes is becoming increasingly more important in certain branches of industry such as medical technology, the pharmaceutical industry, and especially in the automotive, aviation and electronics industry. There are numerous reasons: Apart from optical reasons, dirt particles impair the hygiene and functionality. Thus, various standards have been established: Standards for clean rooms and relevant clean room areas are stipulated in DIN EN ISO 14644 and VDA 19 Part 2 deals with aspects of technical cleanliness in automotive assembly processes.

Requirements for technical cleanliness in automated screwdriving and feeding processes move thus into focus. The four main factors that may influence technical cleanliness in screwdriving processes are the fastening element, the work piece, the screwdriving system and the screwdriving environment. Depending on these factors, as well as customer requirements, we design the screwdriving system individually for our customers.

Components to improve technical cleanliness

Vacuum screwdriver:

Due to the vacuum in the screwdriving system the particles are extracted off the fastening element and channeled into a filter.

Step feeder:

Only the rail of the singling mechnism vibrates in order to bring the fastening elements into the correct sorting position. By using a hopper and a fill level control the number of fasteners in the bowl can be kept low.

Segment feeder:

The system works without any vibration. By using a hopper and a fill level control the number of fasteners in the bowl can be kept down.

Particle sluice:

A particle sluice is installed before the nose piece in the feed hose. Adhering particles are extracted and channeled into a filter. The screw is transported further on. The whole process lasts only a split second.

Pick and place systems:

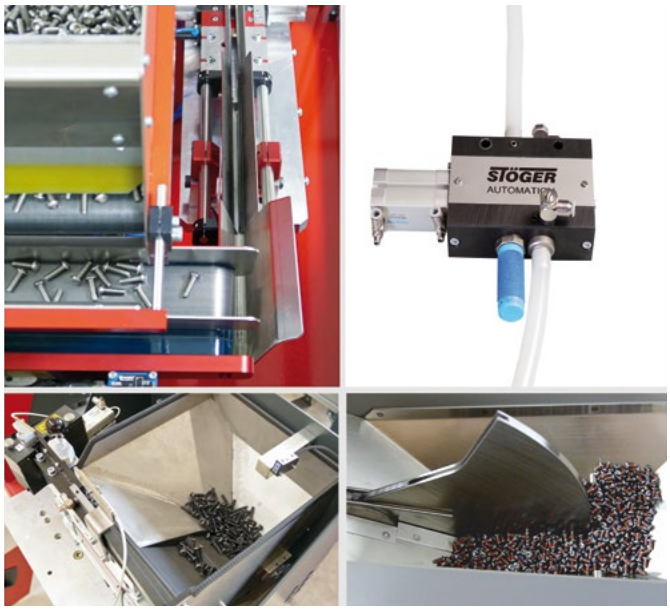
Pick and place systems work without any vibration or sorting air current. They have to be placed in close proximity of the screwdriving system.

Feeding from a magazine:

Magazines are used in robotic systems or in systems with positioning axles. Fasteners are fed from the feed unit into the magazine. The systems work without transport air current.

Extraction:

In the case of contamination caused by the manufacturing process or the material, dirt particles can be extracted from the work piece or the screwdriving environment and channeled into a filter.



STÖGER AUTOMATION

- 30 years of expertise in the development, design and construction of individual customer solutions
- Test laboratory for test fittings
- On-site service for commissioning and maintenance
- Detailed operating manuals

STÖGER AUTOMATION GmbH
Gewerbering am Brand 1
82549 Königsdorf
Germany
Phone +49 8179 997 67-0
info@stoeger.com

www.stoeger.com

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