Joining Technologies

Screwdriving  |  Flow Drilling
Nut Driving   |  Pressing
Inserting    |  Feeding

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Industry leading quality and reliability.

At WEBER, our mission is simple:

To lead the way in providing the highest quality automated assembly solutions globally.

Since 1956, WEBER Screwdriving Systems Inc. has stood by this principle by continually raising the bar in the design and manufacture of our high-end automation product line. Our product capabilities encompass feeding and installing a wide array of mechanical fastener styles ranging from micro medical pins and screws, to large bolts and heavy fasteners. WEBER’s niche is in engineering solutions to facilitate hard-to-reach fastener locations, as well as designing standalone feeding systems intended for difficult-to-handle fastener styles. And, our latest evolution of IP capable, networkable control systems enables us to offer the most advanced DC solutions on the market today, proving once again that WEBER is the global leader providing "Technology That Connects".

WEBER strives to deliver the quality and support our clients have come to expect in today’s highly demanding production environments. Our continued focus on customer experience is evident by offering higher levels of technical expertise, faster deliveries, greater ROI, superior accuracy, and exemplary after-sales support. We have recently doubled our service staff and invested in additional training to enable a world class and timely response to your needs.

WEBER is dedicated to understanding our clients’ challenges and delivering the most suitable technology, product and solutions to see them through today and the next decade.

Karl Ernst Bujnowski
Managing Director
WEBER Schraubautomaten GmbH
Since its beginning in 1956, WEBER has provided reliable and accurate automatic screwdriving systems for assembly applications in all industrial sectors.

**Automotive and body construction**
New joining technologies for lightweight construction require flexible assembly systems and continuous innovations – with maximum system reliability.

**Wood industry**
High-performance handheld and stationary screwdrivers that are tailored to less complex assembly processes.

**Electrical industry**
Electrical components require assembly systems that provide high technical cleanliness despite short cycle times.

**Consumer Goods**
WEBER technology enables high cycle rates and installation locations that are often extremely difficult to access.

**Telecommunications**
WEBER technology allows even the smallest components to be fastened with consistently high quality.

**Medical and Life Sciences**
Technical cleanliness is a key requirement for the assembly of high-precision medical devices.
Sample setup of a WEBER screwdriving system with automatic feeding.

In this scenario, the power drive or the screw process is controlled by the C30S Process Controller. All the important functions of the screwdriving process including sensors, valves, spindle motion and feeding functions are handled by the CU30 Touch Screen Function Controller, which includes a PLC sequence control.

(A ZEL Step Feeder may also be used in place of the bowl feeder shown here.)
Feed while you drive.

The basis for this industry leading technology is the unique feed head design of our screwdriving systems. WEBER was the first and, to date, remains one of the few manufacturers in the industry to incorporate a swivel screw feed arm directly into the feed head. The swivel arm holds the next fastener in place, ready to be driven. This method eliminates the time spent waiting for the next fastener to travel all the way from the feed system, naturally reducing the cycle time by an average of 2 to 3 seconds. WEBER’s “Feed while you drive” technology has proven to significantly increase production capability and thereby improving the customer’s bottom line.

Step 1:
The first screw is blown through the swivel arm into the aligning jaws of the screwdriving head. The feeding tube and the aligning guide are made to suit the screw dimensions so that the shaft of the screw is perfectly concentric in the aligning guide to ensure a smooth transition of the screw through the jaws during installation.

Step 2:
The rotating screwdriver bit moves forward towards the fastener, pushing the swivel arm out of the way and thereby closing off the end of the swivel arm tube with the steel stop plate. The bit continues forward to engage the screw.

Step 3:
While the screwdriver installs the fastener, the next screw is already being delivered and positioned in the swivel arm, ready for the next cycle as soon as the bit retracts.

Step 4:
The screwdriver bit retracts back through the jaw set and past the swivel arm, allowing the arm to move back to its original position. The fastener then drops down into the jaw set and is immediately ready for another cycle.
WEBER handheld systems offer industry leading speeds and versatility to increase production and decrease operator fatigue. With a hand driver to suit almost any application, WEBER has you covered.

Models

HSP
Pneumatic Screwdriver
- Single grip switch start
- Automatic feed system
- Integrated bit stroke
- Feed while you drive
- Horizontal pistol grip version available
- Vacuum version for hard to reach screw locations available

HSE
DC Electric Screwdriver
- Complete WEBER DC motor/transducer packages
- Optional with customer supplied drive unit
- Automatic feed system
- Integrated bit stroke
- "Magnodrive" - Magnetic bit technology
- ESD safe option
- Horizontal “pistol grip” version available
HSE

Handheld DC Electric Screwdriver

The HSE handheld system features the flexibility that WEBER is famous for. This device allows the use of any DC electric or DC torque & angle system to be fitted to the back of this handheld device. The self advancing automatic bit stroke device allows the fastest screw installation in the business. When the start button on the handpiece is depressed, the self advancing bit starts to move forward out of the jaws to expose the bit and fastener while simultaneously starting the DC tools rotation. As the bit and fastener become exposed, the operator has much greater visibility and this helps with the accuracy of the installation.

After completion of the cycle, the next screw has already been loaded into the handpiece and the system goes into a bitlock position which prevents the fastener from falling back inside the system and holding the tip positively exposed for good operator targeting.

Scan to learn more
www.weberusa.com/handheld-screwdrivers
Precision Engineering & Manufacturing

The WEBER Fixtured Systems are the most reliable and accurate screwdriving units on the market. Fixtured spindles remain the preferred choice of system integrators, manufacturing experts, and maintenance engineers for automated assembly processes.

Fixtured systems are used when processes become more complex, cycle times become shorter and quality requirements, in terms of process reliability, are higher. These spindle systems easily adapt to a wide variety of applications using various nose pieces, stroke lengths, and motor drive configurations.

Models

**SER / SEB**
- Fixtured Screwdrivers
  - Standard design with screwdriver and integrated head stroke
  - Automatic feed system
  - Pneumatic or electric drive
  - Feed while you drive technology
  - Depth verification analog or digital
  - Optional active depth

**SEV**
- Vacuum Fixtured Screwdrivers
  - Screwdriving spindle with vacuum technology to ensure reliable fastener insertion in hard-to-reach locations with extremely limited access
  - Automatic feed system
  - Pneumatic or electric drive
  - Feed while you drive technology
  - Depth verification analog or digital
  - Optional active depth

**SEM / SEK**
- Fixtured Nutdrivers/Torquing
  - For installing short screws or nuts
  - Screwdriving spindle with active screw positioning at tooling for head heavy screws, as well as flanged and special hex nuts
  - Automatic feed system with profiled feed tube to deliver the fasteners to the spindle
  - Pneumatic or electric drive
Drive and transducer connections

The connections between the spindle modules are designed with a solid castellated connector, which ensures both quick installation and safe backlash-free torque transmission.

Robust housing

The housing is a monoblock design and is made of high-strength aluminum alloy. A special coating produces a very low coefficient of friction and high strength surface.

Sensors in clamping grooves

Magnetic-inductive sensors are used, delivering high switching accuracy in minimal space. The digital and analog sensors provide monitoring of the installation process and the final depth to speed up cycle times.

Quick release head

The entire screwdriving head has a quick-release system. Change of bits, re-tooling to a different screw, or fault rectification can be carried out in a few seconds without tools -- minimizing production downtime.

Standard & custom nosepieces

A wide variety of nosepiece designs allow WEBER to access even the most difficult and hard to reach installation locations.

Scan to learn more
www.weberusa.com/fixed-screwdriving-systems
WEBER offers both fixtured and handheld insertion systems. All versions can be equipped with automatic feed systems and intelligent controllers and are able to handle high process forces during setting or inserting. The setting tools are either pneumatically powered or can use DC servo systems for pressing.

**Models**

**HPP**

Handheld Inserting System

- Hand-manipulated system to install blowfed components at low insertion force
- Automatic feed system
- Pneumatic motion
- Feed while you drive technology

**SI**

Fixtured Inserting System

- Stationary system for insertion tasks up to 10 kN
- Automatic feed system
- Pneumatic drive
- Optional higher force and DC servo systems available
HPP

Handheld Inserting System

The HPP is designed for pneumatic setting at low insertion forces. The handheld unit is used to push fasteners or place them onto a component in a single motion, then retract.

SI

Fixtured Inserting System

The feed force on this fixtured inserting system is generated either pneumatically or using a DC servo and is highly suitable for a single station or complex assembly lines. Different thrust capabilities are available and are sized based upon the fastener and insertion force required. The quality of the insertion process can be assessed by checking the depth and the insertion force.

Scan to learn more

www.weberusa.com/inserting-system-technology
Feeding Systems

Intelligent sorting and feeding

The feeding system for fasteners is one of the key components when it comes to reliability, efficiency and capability in any automated assembly process. The success of the overall process will depend heavily on a robust jam-free feeding solution. WEBER offers a variety of feeding systems to fit any application.

ZEB
Bowl Feeders
- Abrasion-resistant polycast bowl material
- Special coating protects the screws and ensure long running times and reduced noise
- Hardened tool steel is used on all critical areas (escapement, tracks, sorting areas)

ZEL
Step Feeders
- Gentle method of conveying
- Very low noise emissions
- Fast feeding
- Low abrasion of fasteners
- Stainless steel pans
- Optional cover
- Ideal for clean screw technologies
- Hardened tool steel is used on all critical areas (escapement, tracks, sorting areas)

ZEP
Piezo Feeders
- ZEP090 Micro Piezo inline feeders
- ZEP120 Mini Piezo step feeder
- For small and micro sized fasteners, pins and parts
- High feed rates
- Low abrasion
- ESD safe options
- Hardened tool steel is used on all critical areas (escapement, tracks, sorting areas)

Scan to learn more
www.weberusa.com/feeding-systems

Models
Feed tubes
Parts with complex shapes can be delivered across distances using blowfeed methods. This saves time and space by placing the feed systems further away from the production environment. WEBER’s wide selection of profiled and round tubing provides the optimal method of transporting fasteners. WEBER was the first company to deliver hex nuts using the profiled tube concept.

Accessories

+ Sound enclosure and dust covers
  Sound enclosure covers reduce the sound emission of our feeding units. Removable top covers allow fasteners to be refilled effortlessly. Available in stainless steel or painted finish.

+ Base frames and distributors
  Our base frames ensure our WEBER feed systems are on a secure footing. They can be used to attach control units, screw distributors, pneumatic components and hopper systems easily. The screw distributors are designed to divert the fasteners to multiple WEBER installation devices.

+ Bulk storage hoppers
  These hoppers extend the intervals between refills of the feeder. They are placed on a frame directly above the feeding unit and come in various size capacities.
Process Controllers

Screwdriving process controllers
Process controls regulate and monitor the actual screwdriving process – RPM, torque & angle, screwdriving depth, screw presence, position, etc.

Features:
+ Define, control and adjust screwdriving spindle rotation (servo-drive)
+ Evaluate process and trigger response to OK or NOK
+ Display, document and transfer screwdriving data

Sequence controllers
These controls are responsible for running the system (actuators and sensors).

Features:
+ Control and monitor screwdriving spindle motion
+ Control and monitor feed system for fastener provision to spindle or handpiece
+ Communicate with peripherals through a variety of bus protocols

Models

C30S
Process Controller
- Complex applications
- Color 7-in touch screen
- Digital interface
- Fieldbus interface
- USB interface
- DC servo drive
- Data Collection
- Results Display
- Graphing

C50S
Process and Soft PLC Controller
- Very complex applications
- Digital interface
- Fieldbus interface
- External operator display
- Ethernet interface
- DC servo drive
- Data Collection
- Results Display
- Graphing

C10/C15
Function Controller
- Simple applications
- Sequence control
- Digital Interface

CU30
Touch Screen Function Controller
- Complex applications
- Sequence control
- Color touch screen
- Digital interface
- Fieldbus interface
- External display possible
- Controls motion of feeding system and spindles
Electronically controlled screwdriving system using current control technique

The screwdriving spindle is fitted with a highly dynamic electric servo-drive. The motor current consumption and rotor position of the DC drive are continuously measured during the screwdriving process. These signals are used by the controller to start/stop the DC motor. The lower cost control method is used instead of a full torque & angle encoder.

Electronically controlled screwdriving system with torque and rotation angle measurement

The screwdriving unit is also fitted with a dynamic electric servo-drive. The important torque & angle screwdriving parameters are continuously measured during the screwdriving process by a highly sensitive dynamic transducer and transferred to the screwdriver controller. The controller uses these collected measurements to control and regulate the entire screwdriving process in real time for outstanding accuracy. This system provides the best choice for tight process control and quality assurance. The system can store and export important process data for later inspection and archiving.

Redundant measurement according to VDI / VDE 2862

The VDI / VDE 2862 guideline defines joint types and minimum requirements for assembly tools. In category A – danger to life and physical well-being – the control and monitoring variable must be directly measured on an automatic screwdriving system. This means the transducer on the production system must have a second redundant transducer to constantly check the primary transducer for accuracy. WEBER screwdriving systems cover all categories A, B and C.

Scan to learn more
www.weberusa.com/control-systems
RSF – Flow Drilling Joining System

For flow drilling screws with automatic feed system

As modern vehicle design shifts focus to lightweight mixed material construction, assembly processes and technologies are changing along with it.

Greater use of aluminum and high tensile steel hybrid construction requires thinking and different joining methods. This is where flow drilling technology comes into play. Flow drilling technology allows joining of these dissimilar metals with or without a clearance hole in the top layer and makes for shorter overall cycle times, single-sided application and a lower cost per joint.

Flow drilling technology is used when vehicle construction geometries and assemblies become more complicated, only one side of the joint requires access in order to correctly install the fastener. There is no need for a large C shaped anvil on the back of the joint like other joining technologies. This is ideal for closeout or difficult to access locations where riveting is not an option. Unlike other conventional joining technologies like riveting, piercing or welding, flow screw joints are removable and repairable allowing for a greater degree of flexibility during production and during any later body repairs, should they be required throughout the vehicle life.

**System Solutions**

**Step 1**
The flow drilling screw contacts the part surface at low pressure and low RPM. Automatic screw measurement and stack-up height validation occurs in this stage.

**Step 2**
RPM and Force is then increased to begin the flow drilling process. Due to the friction at this tip of the screw the localized temperature increases and the material begins to plasticize and "flow".

**Step 3**
The material continues to flow to the back side of the part forming a boss which is two to three times the thickness of the original material allowing for stronger thread engagement.

**Step 4**
As the flow phase ends, the thread rolling process begins by reducing RPM and thrust.

**Step 5**
Once threads are formed, the screw then enters the Torque & Angle fastening phase while measuring active depth in real time like a normal machine screw.

**Step 6**
The fastener is then sealed to torque & depth with angle verification. The installation is complete and the material cools and constricts around the fastener forming an air & water tight joint.

Typically 3 seconds cycle
SBM20 – Captive Insert Setting System
(Spin-Pull Process)

With automatic feed system

For setting captive inserts, WEBER supplies an automatic setting unit suitable for round and hexagon head, steel or aluminum inserts in sizes between M5 and M12.

The controller and the feed system are integrated and form a single unit. Unlike older technologies, two separate DC servo drives handle the threading and setting process – the entire process is controlled by a programmable PLC and the setting process can be visualized on a control panel. This offers ultimate control over the process and quality monitoring of the installation.

This technology leaves a high quality, high strength threaded hole in sheet metals and extrusions to allow mounting of hardware or other assemblies.

Phase 1
Threading the captive insert onto threaded mandrel and aligning the hexagon for hexagon style nuts

Phase 2
Aligned insert is set into the sheet metal part up to the end stop.

Phase 3
The mandrel is pulled to collapse (or ‘set’) the insert.

Phase 4
Threaded mandrel is then counter-rotated leaving the insert securely connected to the sheet.
Field Service Visits

We pride ourselves in delivering quality and reliable screwdriving and feeding systems. However, as a valued customer, you can rest easy knowing one of WEBER’s highly skilled technicians can travel to your location and provide expert assistance in repairing and adjusting your WEBER equipment.

You may also choose to send your WEBER equipment to our facility in Mooresville, NC, where we will diagnose the system, inspect all components, and compile a parts quote so there are no surprises or hidden fees. Once the quote is approved, we will then repair your equipment and send it back to your location fully functional.

Maintenance Contracts

WEBER’s service team advises the customer from the initial design phase of an assembly line and defines maintenance schedules together with the customer. WEBER will make available our Maintenance Contract which allows preventative maintenance programs to be set up and offers the maximum protection and productivity of your WEBER equipment. With a maintenance contract in place, we will send a technician to perform preventative maintenance to your equipment on a pre-scheduled regular basis. This type of service can ultimately save thousands of dollars in poorly maintained equipment costs and tens of thousands of dollars in lost production.

Product Training

We at WEBER are strongly committed to developing the skills of our customers. This means that end-users are trained early and systematically to operate screwdriving equipment and systems to minimize downtime during assembly production.

Preventative maintenance and service training is also available as needed. This training provides our customers’ employees the technical skills necessary to troubleshoot, identify, and possibly rectify minor issues that may occur.
Research & Development within the WEBER Group

Quality Assurance

WEBER leaves nothing to chance when it comes to designing and manufacturing screwdriving systems. Visual and external assessment and testing of our products is an important and necessary part of quality assurance. In addition, WEBER engineers go above and beyond to inspect all components for safety and reliability.

Even the smallest defects can be detected through microscopic inspections. Micrographs are used to analyze the quality of surface finishes and structures to exclude any risk of premature material fatigue and breakage.

Testing

Series of tests in our in-house laboratory are followed by a practical trial phase. The process reliability and endurance of individual parts, machines, and systems are tested in simulated real-world production and environmental conditions. Any malfunctions are immediately reported back to our design engineers.

All tests are conducted according to standardized procedures. WEBER develops a catalog of parameters the machines must be able to deliver for use at the customer’s site based on the results of the extensive laboratory and field testing.

Robotic Test Cell

Once production of screwdriving systems are complete, each unit must clear final test runs before they are released for shipment to the customer. When it is not possible to simulate the entire assembly process in our labs, our screwdrivers are tested thoroughly in a robotic test cell.

The robots are also used for new product research and development. Product is later marketed and made available for customized applications. Our engineers design robotic joining methods that accurately mimic real-life conditions from development of materials or new joining techniques. Testing and development are therefore seamlessly integrated.
The WEBER Group

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