Screwdriving Technology
Automation
Air Motors
Air Tools

DEPRAG

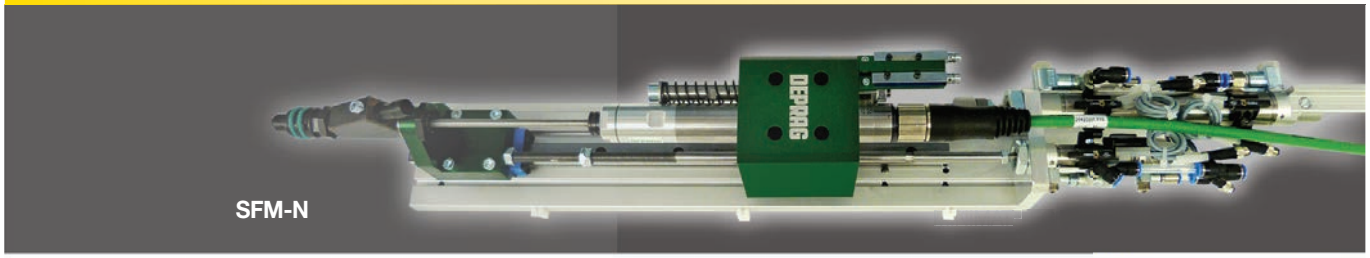
Screwdriver Function Module for the automatic Screw-Assembly

- **wide product variety for all applications**
- **maximum ease of integration**
- **service optimized**
- **suitable for a complete process documentation**
- **standard modules allow for short delivery times**

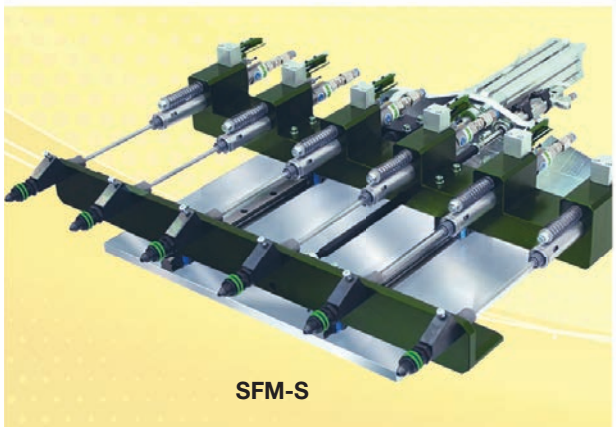
Screwdriver Function Modules are the basis of any automated, process-reliable screw-assembly. You benefit from our long-standing experience in the fields of screwdriving technology and assembly automation.

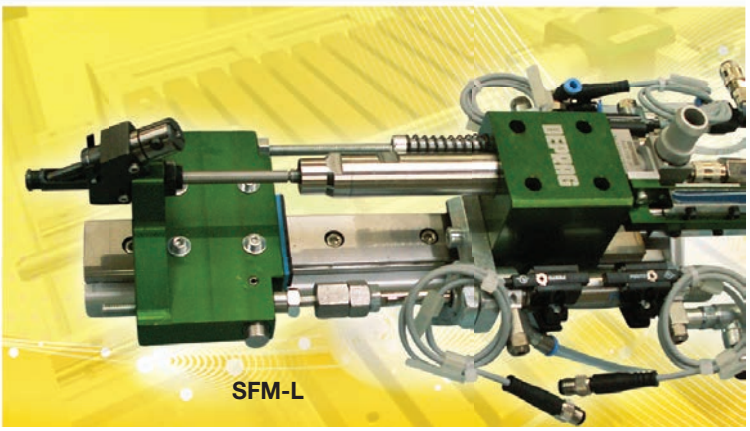
We offer both single-spindle and multi-spindle units.

Machine Building Components



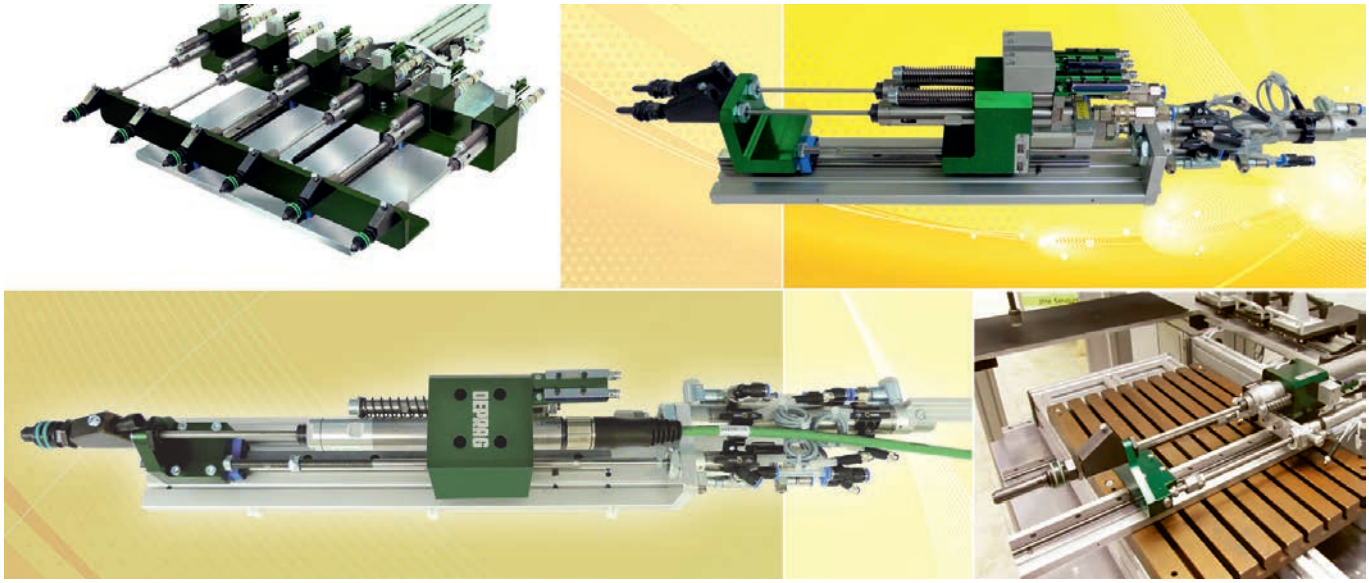
SFM-N


SFM-S



SFM-L

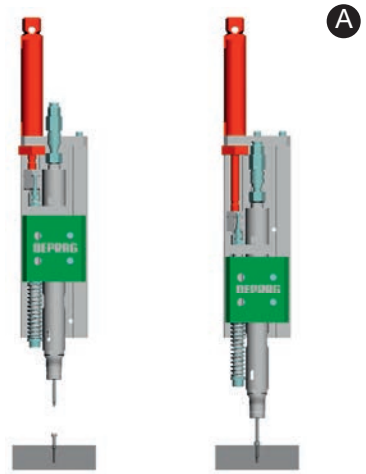
Overview



Stroke variants of DEPRAG Screwdriver Function Modules

Stroke variant A: Without Screwfeeding

If you have an application with pre-positioned screws (automatic screwfeeding is not necessary), then we equip your Screwdriver Function Module with only one actuating cylinder for the spindle stroke.

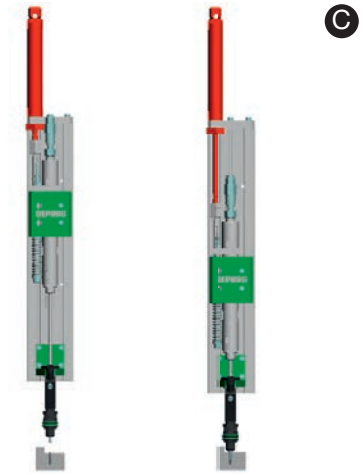


Stroke variant B: Automatic screw presenting through a defined pick-position

Does your application require the automatic presentation of a screw by a feed-system with a pick-position? Then we can offer a suitable Screwdriver Function Module that incorporates not only a spindle-stroke but also a pick-stroke for lifting the fastener from a pick-position.

Stroke variant C: Robotic application with automatic screwfeeding through a feedhose

Do you use a robotic module that carries out the feed-stroke and where the screw is presented by an automatic screwfeed system?
For such an application, the Screwdriver Function Module is equipped with a mouthpiece, a guide sleeve and only one actuating cylinder for the spindle-stroke.

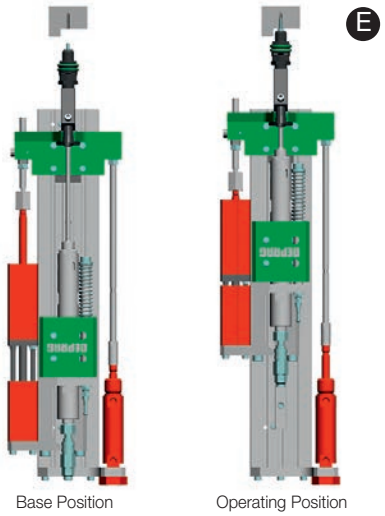


Stroke variant D: Stationary use with automatic screwfeeding through a feedhose

For this application, the Screwdriver Function Module is structurally integrated into your system. Mouthpiece and nosepiece have to be moved on top of the screw-location. Therefore, the Screwdriver Function Module is equipped with two actuating cylinder; one for the mouthpiece-stroke and one for the spindle-stroke.

Stroke variant E: Underfloor (inverted) use with automatic screwfeeding through a feedhose

For vertical, inverted assemblies, a possible danger is that the screw fed into the nosepiece (guide-sleeve) drops back into the tooling because of the gravity. For those types of applications, we equip the Screwdriver Function Module with an additional actuating cylinder:
Besides the strokes for mouthpiece and spindle, an additional locking-stroke is applied to the forward-positioned bit to avoid the dropping-back of the screw. When compared to other offered systems, where the screw is being held in position by a continued air-pressure, our locking-stroke technology is especially process-reliable and efficient.



Stroke variant F: Customer specific design

Naturally, for all applications that cannot be handled by our standard products, we offer cost-effective, customer-specific solutions that are based on our standard modules.

F

Customer specific design

Advantages of DEPRAG Screwdriver Function Modules

Wide product variety for all applications

DEPRAG screwdriver-function-modules excel through their wide design variety. There is a solution for every application. For example, the screwdriver function modules are available for a large torque range in both single- and multi-spindle execution.

The modular design of our screwdriving units is based on six different standard designs:

1 Standard execution
A slender design for horizontal- or vertical screwdriving.

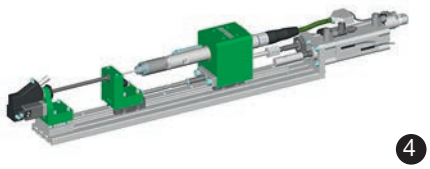
2 Short execution
For limited space access.

3 Underfloor execution
For a vertical, inverted assembly.

4 Vacuum execution
For difficult to access or recessed screw-locations in any assembly-direction.

5 Pick & Place execution
For fasteners presented to a defined pick-position.

6 Nut execution
For the automatic feeding and assembly of nuts.



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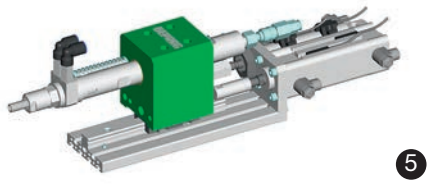

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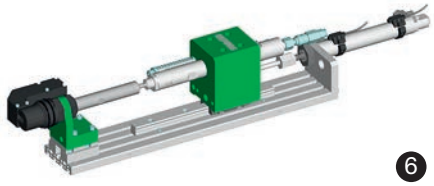

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Suitable for a complete process documentation of all screwdriving parameter

Our Screwdriver Function Modules can be equipped with any DEPRAG Screwdriver. When outfitted with an EC-screwdriving-system, the complete acquisition of the processing-data is possible.
Besides the display of torque- and angle values, it is also possible to display the status of screw-depth and screw-reloading, which allows the next cycle.

Standard modules allow for short delivery times

Due to the modular design and the use of many standard components, the screwdriver function module can easily and individually be adapted to fit your application.
A high level of availability and short delivery times are the result.

Maximum east of integration

The compact, robust design and the simple connection ports allow the easy integration of our modules into your assembly system. Our screwdriver function module can be integrated into any machine and reduces engineering and production efforts considerably.
Your module is supplied as an integration-ready, fully functional component, which has been specifically and extensively tested with your sample parts.

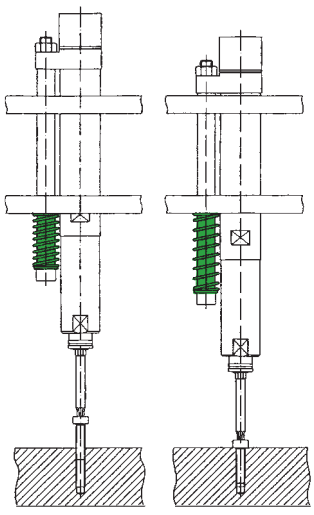
Axial spring load without the need for special “Inline” bit shaft adapters

Screwdriver spindles always require a stroke compensation. All of our screwdriver spindles are therefore equipped with a lateral guide bolt and spring to regulate the ”end load pressure” of each drive spindle.
We do not use custom made and/or spring loaded bits or sockets. Internationally available and ”standard” bits and sockets are compatible.

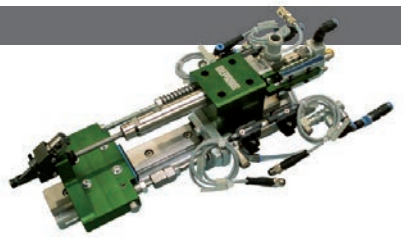
Service optimized

The goal of our design engineers is the optimization of your service- and maintenance efforts. Every DEPRAG screwdriver spindle is equipped with a quick-change-chuck that allows a fast bit-exchange that takes only seconds. Our screwdriver function modules are designed in such a way that standard bits and sockets can be used. This results into an extensive saving of follow-up costs and reduces down-times.

It only takes a minute to exchange a screwdriver spindle to perform a calibration or maintenance:
Simply loosen one nut!



Execution SFM-L



Light-weight and compact single-spindle design for low torque ranges.

Torque: 0.008 Nm - 0.8 Nm
Mouthpiece Stroke: 25 mm, 80 mm
Screw Head-Ø: up to 10 mm

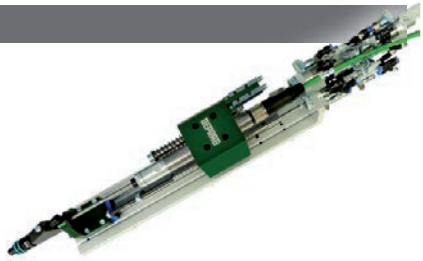
Technical Data

Screwdriver Function Module SFM-L - Single-Spindle Execution

		Without Feeding	With Feeding
Max. screw head-Ø	mm / in.	no limit	10 / 0.39
Max. number of screwdriver spindles		1	1
Torque	Nm / in.lbs	0.008 - 0.8 / 0.07 - 7.08	0.008 - 0.8 / 0.07 - 7.08
Mouthpiece stroke	mm / in.	–	25, 80 / 0.98, 3.1
Spindle stroke	mm / in.	50, 100 / 1.95, 3.9	depends on mouthpiece stroke
Stroke vacuum finder (only with vacuum execution)	mm / in.	–	50, 100 / 1.95, 3.9
Stroke socket (only with nut execution)	mm / in.	–	50, 100 / 1.95, 3.9
Split-jaw nosepiece / ball-type nosepiece length	mm / in.	–	40, 80 / 1.56, 3.1
Operating modes		pneumatic	pneumatic
		electric	electric
Possible stroke variants		A / B	C / D / E
Distance from mounting surface to screw axis (a)	mm / in.	61 / 2.38	61 / 2.38
Weight	kg / lbs.	2 / 4.4	5 / 11

Additional strokes and other types of nosepieces are available on request.

Execution SFM-N



Compact single-spindle design for a wide torque range.

Torque: 0.06 Nm - 20 Nm
Mouthpiece Stroke: 25 mm, 80 mm
Screw Head-Ø: up to 14 mm

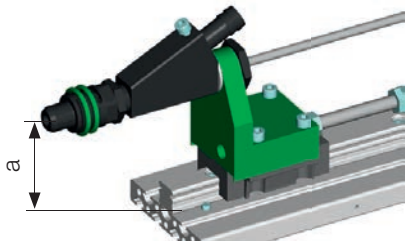
Technical Data

Screwdriver Function Module SFM-N - Single-Spindle Execution

		Without Feeding	With Feeding
Max. screw head-Ø	mm / in.	no limit	14 / 0.55
Max. number of screwdriver spindles		1	1
Torque	Nm / in.lbs	0.06 - 20 / 0.53 - 177	0.06 - 20 / 0.53 - 177
Mouthpiece stroke	mm / in.	–	25, 80 / 0.98, 3.1
Spindle stroke	mm / in.	50, 100 / 1.95, 3.9	depends on mouthpiece stroke
Stroke vacuum finder (only with vacuum execution)	mm / in.	–	50, 100 / 1.95, 3.9
Stroke socket (only with nut execution)	mm / in.	–	50, 100 / 1.95, 3.9
Split-jaw nosepiece / ball-type nosepiece length	mm / in.	–	40, 80 / 1.56, 3.1
Operating modes		pneumatic	pneumatic
		electric	electric
Possible stroke variants		A / B	C / D / E
Distance from mounting surface to screw axis (a)	mm / in.	94 / 3.67	94 / 3.67
Weight	kg / lbs.	5 / 11	8 / 17.6

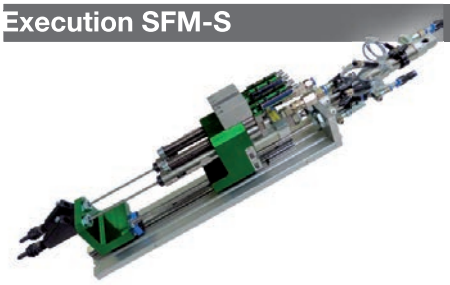
Additional strokes and other types of nosepieces are available on request.

To support your design efforts, we can supply you with CAD data.
Please contact us.



Screwdriver Function Modules - Execution and Technical Data

Execution SFM-S



Robust multi-spindle design for the use of multiple screwdrivers and high down-load forces.

Torque: adapted to your application
Mouthpiece Stroke: 25 mm, 80 mm
Screw Head-Ø: up to 10 mm

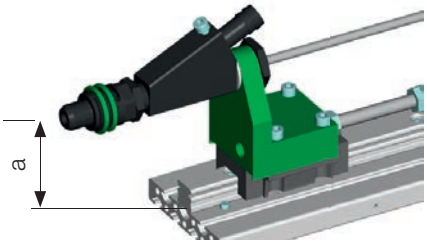
Technical Data

Screwdriver Function Module SFM-S - Multi-Spindle Execution

		Without Feeding	With Feeding
Max. screw head-Ø	mm / in.	no limit	14 / 0.55
Max. number of screwdriver spindles		10 *)	10 *)
Torque	Nm / in.lbs	adapted to application	adapted to application
Mouthpiece stroke	mm / in.	–	25, 80 / 0.98, 3.1
Spindle stroke	mm / in.	50, 100 / 1.95, 3.9	depends on mouthpiece stroke
Stroke vacuum finder (only with vacuum execution)	mm / in.	–	50, 100 / 1.95, 3.9
Stroke socket (only with nut execution)	mm / in.	–	50, 100 / 1.95, 3.9
Split-jaw nosepiece / ball-type nosepiece length	mm / in.	–	40, 80 / 1.56, 3.1
Operating modes		pneumatic	pneumatic
		electric	electric
Possible stroke variants		as customer's requirement	as customer's requirement
Distance from mounting surface to screw axis (a)	mm / in.	adapted to application	adapted to application
Weight	kg / lbs.	depends on application	depends on application

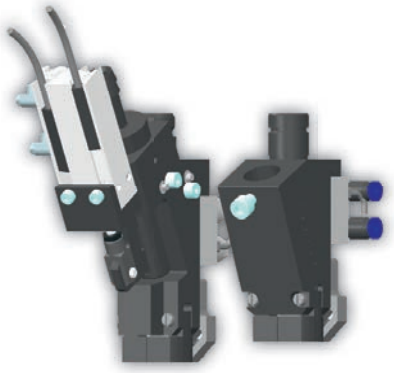
Additional strokes and other types of nosepieces are available on request.

*) It is possible to use more than 10 screwdriver spindles. Please contact us.



To support your design efforts, we can supply you with CAD data.
Please contact us.

MAS-SYSTEM - Increase Process Reliability, Reduce Down-time, Save costs!



Difficult accessibility to the screw position? Space is too restricted for any kind of nosepiece or jaw type tooling?

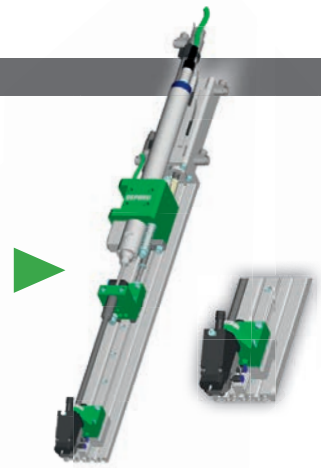
The MAS-System from DEPRAG in combination with a Vacuum-SFM offers the highest process reliability for restricted access screw positions. The screw is blown through a feed tube to the MAS-system where the screw is loaded onto a pick finder which is, in many cases, no larger in diameter than the head of the screw.

The screw is held securely in the vertical plane (no tilting) and the “active“ two piece jaws allow the screw finder to pass through with zero friction.

Your Advantages

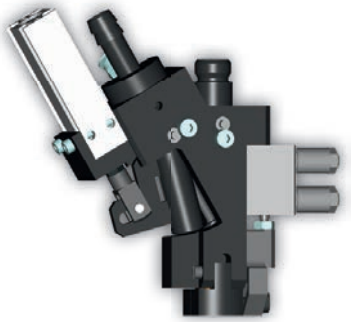
- Defined transfer of the screw to the vacuum finder (controlled via pressure differential sensor)

Screw feed system

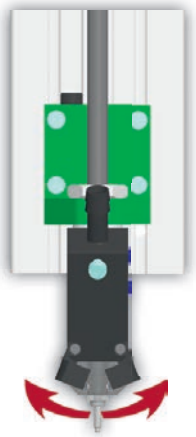


Screwdriver function module with MAS

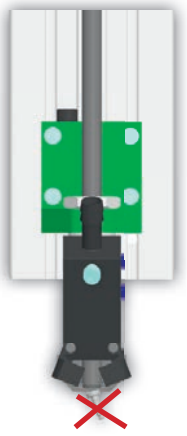
Pressure sensor



- Pre-feeding of the screw during a screw assembly cycle is possible
  = cycle time optimization
- Actively controlled pre-feeding tube tooling minimizes friction contact
  = reduced wear



- Actively controlled jaw tooling
- Longer service life of the slim line vacuum finder because there is no friction between the vacuum finder and the jaw tooling



- No tilting of the screw on the end tooling due to the active transfer of the screw to the finder via the MAS tooling

Function

The screw is blow fed through a feed-tube to the MAS-System where the screw is actively controlled onto the vacuum finder. The vacuum SFM positions the vacuum finder and the correct positioning of the screw on the finder is determined by inspection of the pressure differential. After the successful screw-to-finder transfer the active jaws are opened. Friction between the vacuum finder and the jaw tooling is completely avoided. Additionally the active jaws allow contact free passage of the screw on the vacuum finder and the screw is controlled on plane with the vacuum finder (even for horizontal or inverted applications).

After a successful screw assembly cycle the complete system returns to the home position, the active jaws are closed and the process starts again.

Optional Control- and Add-On Functions

- **Screwdriver Shut-Off Control**
  for pneumatic spindle by PE-Switch

- **Depth Control**

	Type	Control Function
digital	**single**	- Screw-head is seated and assembly is OK - Screw-head is not seated– screw is not completely assembled
	double	- Screw-head is seated and assembly is OK - Screw-head is not seated– screw is not completely assembled - Screw is over-tightened – part is damaged
analog	**absolute**	- Screw-head is seated and assembly is OK - Screw-head is not seated– screw is not completely assembled - Screw is over-tightened – part is damaged - Depth Control for different levels of screw-locations
	relative	- Screw-head is seated and assembly is OK - Screw-head is not seated– screw is not completely assembled - Screw is over-tightened – part is damaged - Depth Control relative to the screw-head surface of the part

Optional Accessories

- **Point-Of-Use Oiler** (see catalog D3340E)

Inquiry form Screwdriver Function Module

Please submit your application requirements; our application consultants are standing by:

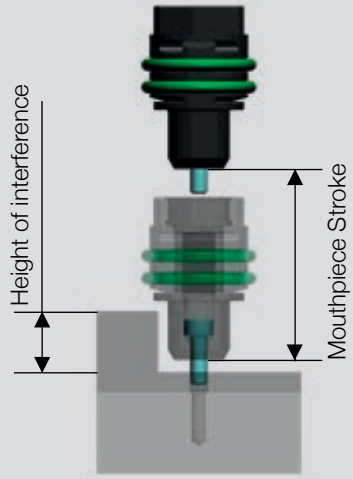
Automatic Screwfeeding ☐ yes ☐ no

Operating Mode of Screwdriver ☐ pneumatic ☐ electric

Fastener

☐ Screw	☐ Nut	☐ Threaded Insert
Type:	Type:	Type:
Size:	Size:	Size:

Screwdriver Data



Speed		**rpm**
Torque		**Nm**
Screw Depth		**mm**
Feed Stroke		**mm**
Height of interference		**mm**

Type of Assembly ☐ To Depth ☐ To Torque ☐ To Angle electronic Screwdriver

Screwdriving Direction ☐ vertical from above ☐ vertical from below ☐ horizontal

Number of screw-locations:

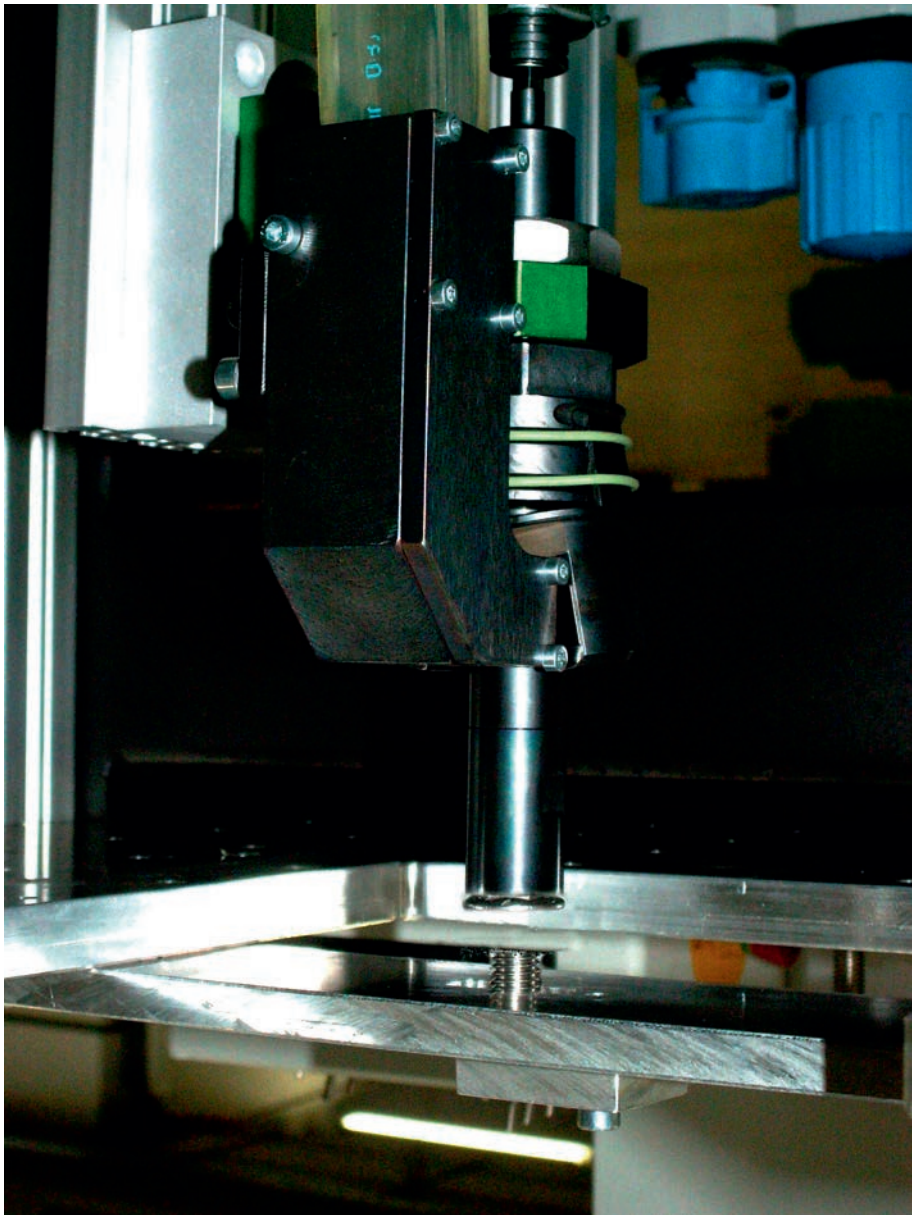
Desired Cycle time: s

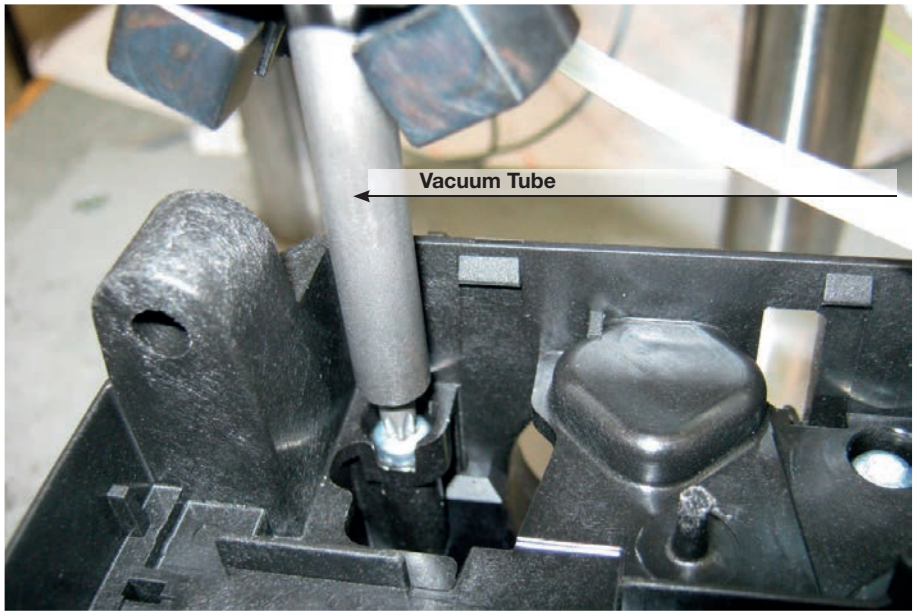
Description of your Application

Application Examples

Nut Assembly Unit

Nuts that are fed through a feedhose and presented in a pick-nest, are picked-up by a socket and positioned above the screw-location.



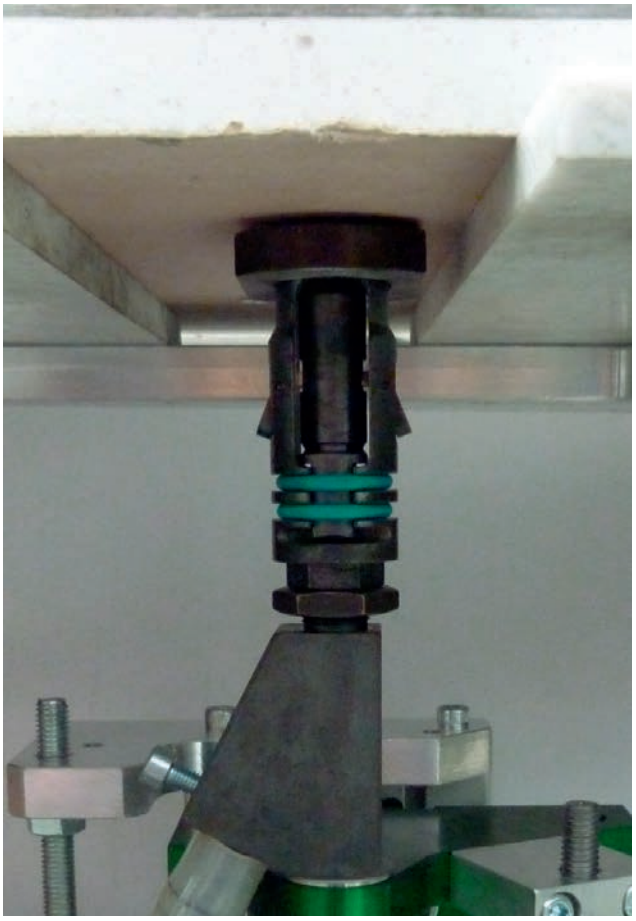


Vacuum Application

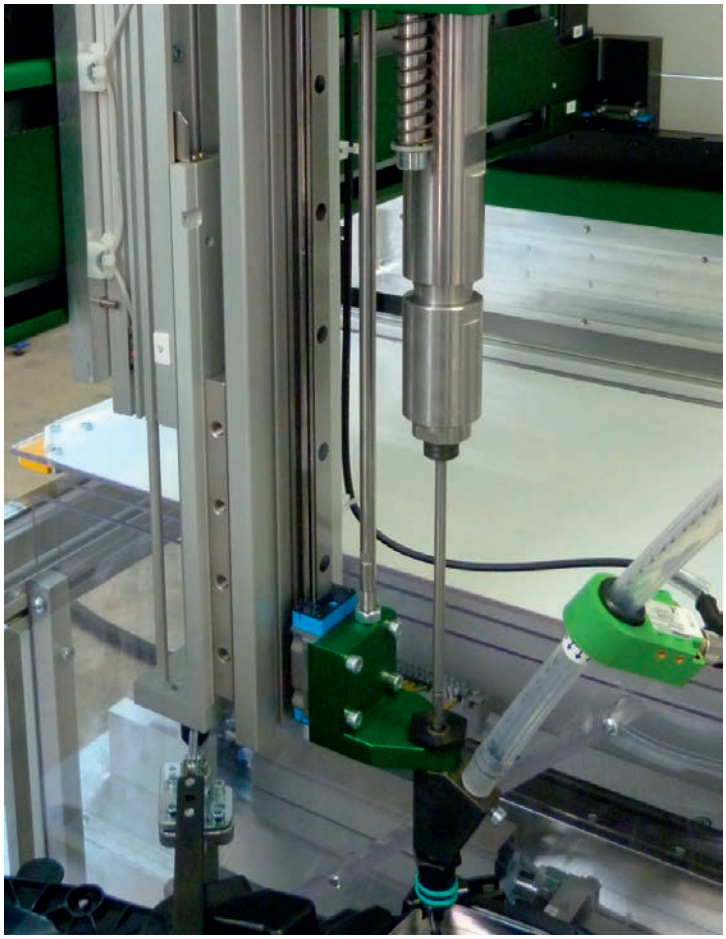
Because of limited space, the screw is being presented by a vacuum tube and tightened until seated.
It is possible to reliably assemble extreme recessed screws with this procedure.

Application Examples

Underfloor Unit for the assembly of plasterboard to sheet metal.
The screw is fed from below and subsequently tightened. The DEPRAG screwdriver shut-off occurs through a relative depth control.



Automatic assembly of speaker housings



DEPRAG

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