The many opportunities of screwdriving technology

Work-facilitating screwdrivers | Screwdriving automation | Bespoke screwdriving solutions

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Screwdriving technology rationalises the manufacturing processes

The goal of screwdriving is either to attach a subject to the desired holding strength or to dismantle assembled screws. The work is often simple, but that is exactly why it causes a remarkable strain on the person performing it.

Screwdriving technology provides many solutions to reduce strain. It offers several different options for facilitating and speeding up the work as well as improving quality. Compared to traditional tools, pneumatic and electric screwdrivers make work significantly more efficient, while screwdriving automation goes even further, up to fully automated production line solutions.

An increasing number of sectors have started to take advantage of the benefits of automation. It is the path to efficiency and an important asset, both in industry and in many other sectors.

In this guide, we highlight the many opportunities that screwdriving technology and its automation offer to different industrial sectors. There would be high demand for handheld and automatic screwdrivers that make the screwdriving process easier, for example, in electronics, the woodworking industry as well as the door and window industry. However, a lack of information regarding the screwdriving technology is often a deterrent for the adoption of these new measures.

Read our guide and, if you need more information, please don't hesitate to ask! You can find our contact information on the last page of the guide.

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Pneumacon delivers contemporary screwdriving solutions to all of Finland and the Baltic countries

Established in 1994, **Pneumacon Oy** is an import company specialising in pneumatic and hydraulic products. Our customers know us for our quality products, solid expertise, fast delivery times and flexible service. We have built good relationships based on trust with our suppliers, one of the most important of which is Deprag Schulz GmbH, a German company specialising in screwdriving and pneumatic tools.

Although we primarily market our products via our retailer network, we deliver most of our bespoke screwdriving automation solutions directly to our customers.

Different screwdriver options

In industrial mass production, choosing the right screwdriver is key if you want to minimise product flaws and ensure quality production. At the same time, you can reduce the number of returned products and improve your brand reliability.

When it comes to screwdrivers, there is a wide range of different options, so you are certain to find the right tool for the job. Pneumatic or electric screwdrivers are suitable for both manual and automatic use.

Pneumatic screwdrivers

Pneumatic screwdrivers come in straight, angled and pistol grip models with either a trigger-start or push-to-start system. The running noise is very quiet. The repeatability accuracy of the clutch is excellent (<±3%). The tightening torque will remain at the set value regardless of the quality of use, variation in air pressure or the screw joint. Pneumatic screwdrivers are also available as ESD versions meeting the requirements of the EN 100015 standard.

Pneumatic screwdrivers offer a large scale of options to meet demanding work requirements. The Deprag Schulz GmbH NANOMAT screwdrivers we import are suitable for micro-sized tasks, such as medical technology or electronics, while the MICROMAT and MINIMAT screwdrivers are suitable for nearly all screwdriving tasks, and the SENSOMAT screwdrivers are suitable for the wood and metal industries, for example.

Electric screwdrivers

Electric screwdrivers are the most sensible option for applications where compressed air is not available. They cover the 0.04–8.8 Nm torque range. The available screwdriver models include either a trigger-start or push-to-start feature.

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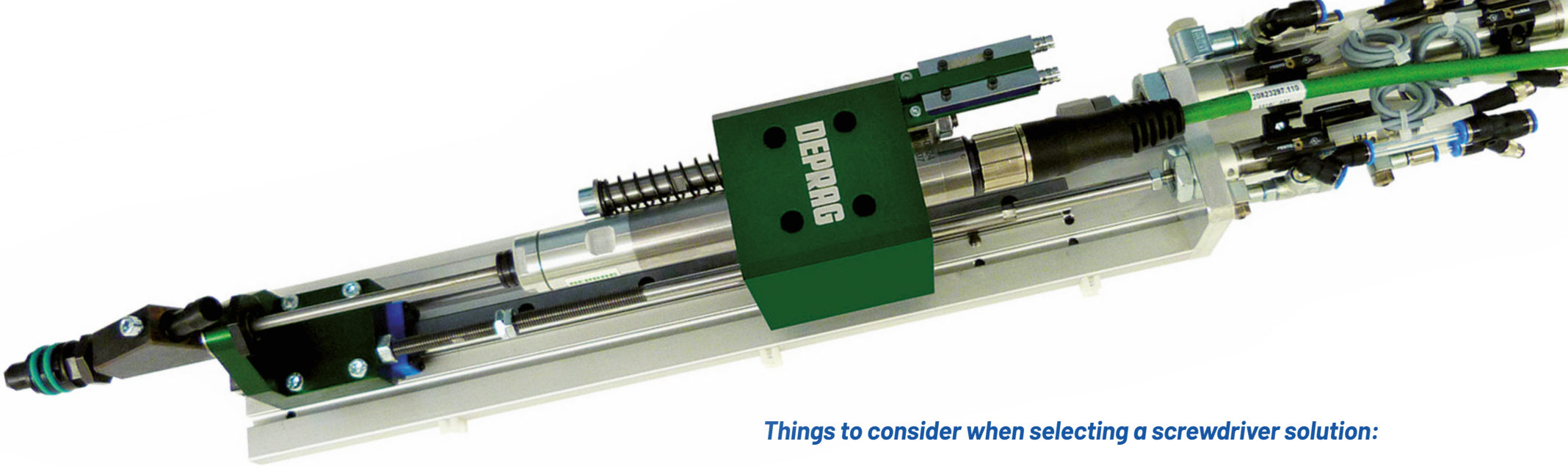

Programmable electric screwdrivers

Programmable screwdrivers make it possible to quickly change, e.g. the rotational speed, torque value or angle even in the run of assembling the product. The straight ergonomic screwdrivers include a trigger-start or push-to-start feature as standard. Thanks to the versatile torque-monitoring options, even demanding joints can be reliably tightened. The screwdrivers come in three different sizes. The tightening torque ranges from 0.1 Nm up to 25.0 Nm.

The programmable electric screwdrivers NANOMAT-EC, MICROMAT-EC and MINIMAT-EC included in Deprag's product range meet the highest quality standards. They enable the screwdriving process to be freely programmed in terms of the tightening torque, speed, angle and direction of rotation.

Things to consider when selecting a screwdriver solution:

- ✓ **Is the screwdriver used handheld or as part of automation?** If the volumes are relatively low, a handheld screwdriver is usually a sensible choice.
- ✓ **Do you want a pneumatic or electric device?** Pneumatic devices are robust and simple to maintain, but digital devices are easier to reprogramme if it becomes necessary to adjust the parameters. Programmable electric devices also include the option to collect and store data about the screwdriving process.
- ✓ **Which is the most suitable model: straight, pistol grip or angled?** A straight screwdriver is best for vertical screwdriving tasks, whereas pistol grip models are suitable for horizontal work. An angled model is the best option in tight spaces or where there is need for very high torque.
- ✓ **Which other properties does the work process require?** What are the requirements with regard to, e.g. precision and speed?

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Screwdriving automation: automatic screw feeders and screwdriving units

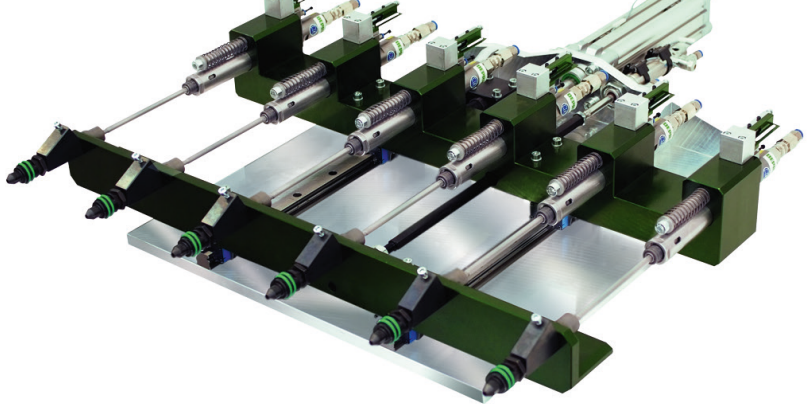
The utilisation of screwdriving automation makes it possible to maintain productivity and product availability at a consistently good level.

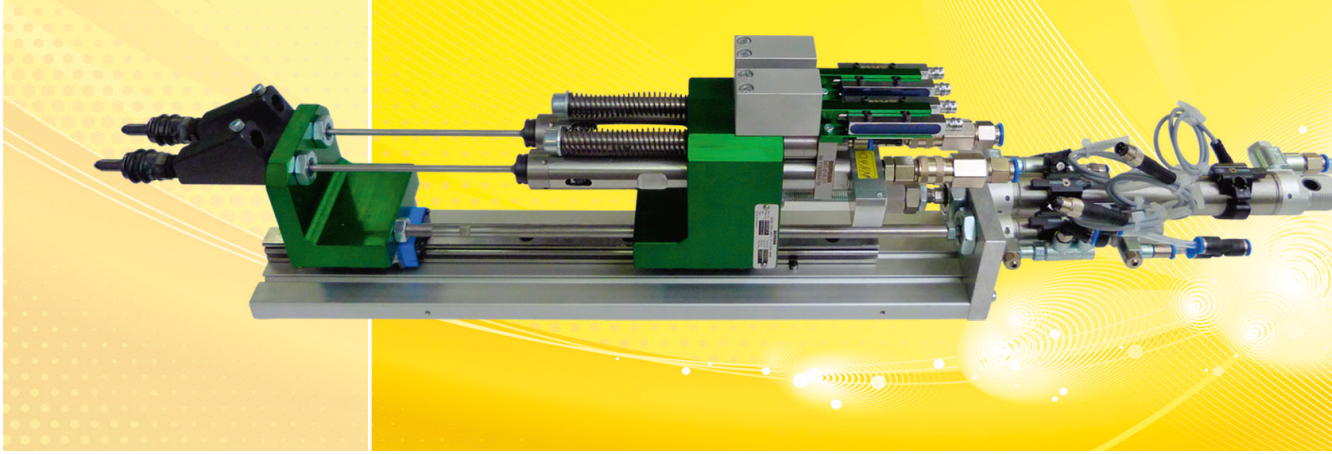
The product solutions required for automation are always chosen in accordance with the customer's needs. The equipment can perform one work stage or it can combine several functions, such as feeding screws, screwdriving and other required stages.

Handheld automatic screw feeders

If the number of screws installed at a workstation increases to over 100,000 annually, it makes sense to use an automatic screw feeder. The device makes screws easier to handle, improving the speed of working. One feeder can feed screws to one or two screwdrivers. The dimensions of the screw should take the minimum measuring requirements into account.

Deprag's automatic screw feeders combine a handheld screwdriver and a feeder equipped with an integrated controller. Other additional parts can also be added to the system as required.





Automatic screw feeders for automation cells or lines

Automatic screw feeders are made for screws, thread taps, pins and numerous other parts. They are available as vibratory bowl and so-called "sword" models in many different size categories. The parts are delivered either through a feedhose to the tip of the screwdriver or via a conveyor to pick-up position. Deprag's high-quality automatic screw feeders are reliable and freely programmable. The equipment comprises the feeding system, feedhose, air connection, power switch and electronic controller.

The automation components or the so-called screw driving function modules (SFM)

The screwdriving function modules (SFM) are the foundation of stationary screwdriving. The units comprise modules, which can be selected on the basis of the required features and which are equipped with the preferred screwdriver. The stationary screwdriving units include the parts required for screw feeding, the cylinders and guides needed to move the screwdriver as well as the required sensors.

The Deprag screwdriving units are designed to make the use and maintenance of the equipment as easy as possible. Thanks to the modular structure, the system can be easily assembled in accordance with the customer's needs

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Custom made screwdriving solutions

The product-and customer-specific screwdriving stations are made bespoke and equipped with different accessories, either as a line version or as independent cells, in compliance with the strictest safety regulations.

The automation solutions can increase productivity in many sectors, such as

- ✓ electronics, IT and telecommunications
- ✓ the automotive industry
- ✓ vehicular and aircraft technology
- ✓ home appliance manufacture
- ✓ medical technology
- ✓ the machine industry
- ✓ the food industry

Screwdriving automation design

When designing a screwdriving solution, good basic knowledge is a good starting point.
A proper survey enables the screwdriving solution to be fit for purpose, efficient and functional.

1. What purpose is the screwdriving solution required for?

It goes without saying that it is essential to know what you want to achieve with screwdriving automation. In most cases, you want to tighten or attach something, but what and where? What is the surface and the working conditions like? These factors have an effect on things like the design of the tip of the screwdriving unit. It is important to know how much space there is around the screw and whether the screw is installed in a deep recess, for example.

2. What are the dimensions of the screw?

When it comes to screw feeding, it is important to know the dimensions and tolerances of the screw. On the basis of this information, it can be defined whether the screw can be fed into the screwdriver via a feedhose. If the diameter of the screw head is too large compared to the length of the screw, there is a risk of the screw turning around inside the hose. In this case, you have to use a so-called pick-and-place solution (vacuum suction or a mechanical gripper), which is slower than a feedhose.

A good rule of thumb is that the length of the screw should be 2 mm longer than the diameter of the screw head. Of course, sometimes there is a bit of leeway in terms of the dimensions of the screw.

3. What is the required and preferred torque?

In addition to the torque, you must also know the allowed torque range or tolerance. Any potential restrictions with regard to the screwdriver's rotational speed must also be known. For instance, when driving screws into plastic, a maximum or optimal rotational speed is often quoted, and exceeding it is detrimental to the properties of the material. For example, drill point screws may also include a recommended minimum rotational speed.

4. How do you want to handle the work stage?

A screwdriving solution can be implemented as fully or partly automatic. The larger the volume and the longer the time the product requiring the task is being manufactured, the more profitable it is to choose full automation.

Full automation may also include options that affect the equipment. For example, do you want the screwdriver to be in a fixed position with the product being moved, or do you want to move the screwdriver? If so, should the movement take place along an XY linear axis or robotically?

Ask us about screwdriving solutions!

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