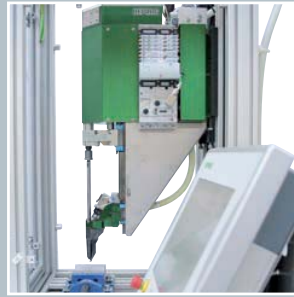# DEPRAG

SHEET METAL
DIRECT
SCREW ASSEMBLY
DEPRAG

The DEPRAG FlowFormScrewdriving system for direct screw assembly of chassis components

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The DEPRAG FlowFormScrewdriving system for direct screw assembly of chassis components

The material mix used in the modern automotive body construction, as well as the one-sided accessibility of the assembly positions, are a perfect reason for the use of a DEPRAG FlowFormScrewdriving Unit (D-FFS).

Advantages of DEPRAG FlowForm-Screwdriving system

Integrated revolver separator

■ The screws are shot in head first and directed through the revolver separator so that their position is secured even on overhead assemblies. Cycle time optimisation: the next screw is reloaded already as the first screw is being seated.

Magazine system, when feedhoses need to be eliminated

■ Screw presentation without feedhose: while the robot is supplied with screws from one magazine, the feeder simultaneously fills a second magazine at another station.

Intuitive setting of the screwdriving process and its parameters

■ System adjustment is automatic. The operator must only enter the following details into the clear HMI panel: screw geometry (shaft diameter, length), information relevant to the part (quantity, material and strength of the metal, with/without drill hole) and the tightening parameters.

Mouthpiece exchange device

■ Simple adjustment to another screw type or fault clearance at the touch of a button.

Active nosepiece jaws

■ Cylinder guided nosepiece jaws release the screws as soon as the screw begins to form its passage.

Comparison of Joining Technologies

|	Non-pre-punched joining	Multi-material mix	One-sided accessibility	Joining force	Loosening capability	Connection properties
FlowFormScrewdriving	☑	☑	☑	☑	☑	☑
Resistance spot welding	☑	☒	☒	☑	☒	☑
Friction element welding	☑	☑	☒	☒	☒	☑
Blind rivets	☒	☑	☑	☑	☒	☑
Fully and semi-hollow self-piercing rivets	☑	☑	☒	☒	☒	☒

The FFS-Software

The specially developed FFS software for highest reliability and user convenience enables the

- ◼ evaluation of individual screw assemblies and the display of assembly results, tightening parameters, torque, angle, screw depth and cycle time at a glance.

- ◼ simple system parameter set up and adjustment by entering screw geometry (shaft diameter and length), relevant information about the part (material thickness, strength of metal, with/without through-hole, layers), as well as tightening parameters.

DROP THAT FEEDHOSE! Get the magazine solution for the DEPRAG Flow-FormScrewdriving Unit

The material mix used in the modern automotive body construction, as well as the one-sided accessibility of the assembly positions, are a perfect reason for the use of a DEPRAG FlowFormScrewdriving Unit (D-FFS).

Complex geometries of a vehicle body require extreme mobility from the robot and the FFS-Unit. Combined turn and swivel movements of the robot are necessary for difficult-to-reach screw positions. The screws' feed-hose dressed alongside a robot arm may be kinked or deformed resulting in unreliable delivery of the screw to the FFS-Unit. This will cause interruption of the production run, reduce process reliability for the overall system, and result in considerable downtime.

MAGAZINE-RXS

Reload and Exchange Station

SCREWFEEDER

SCREW-MAGAZIN

for 31 screws
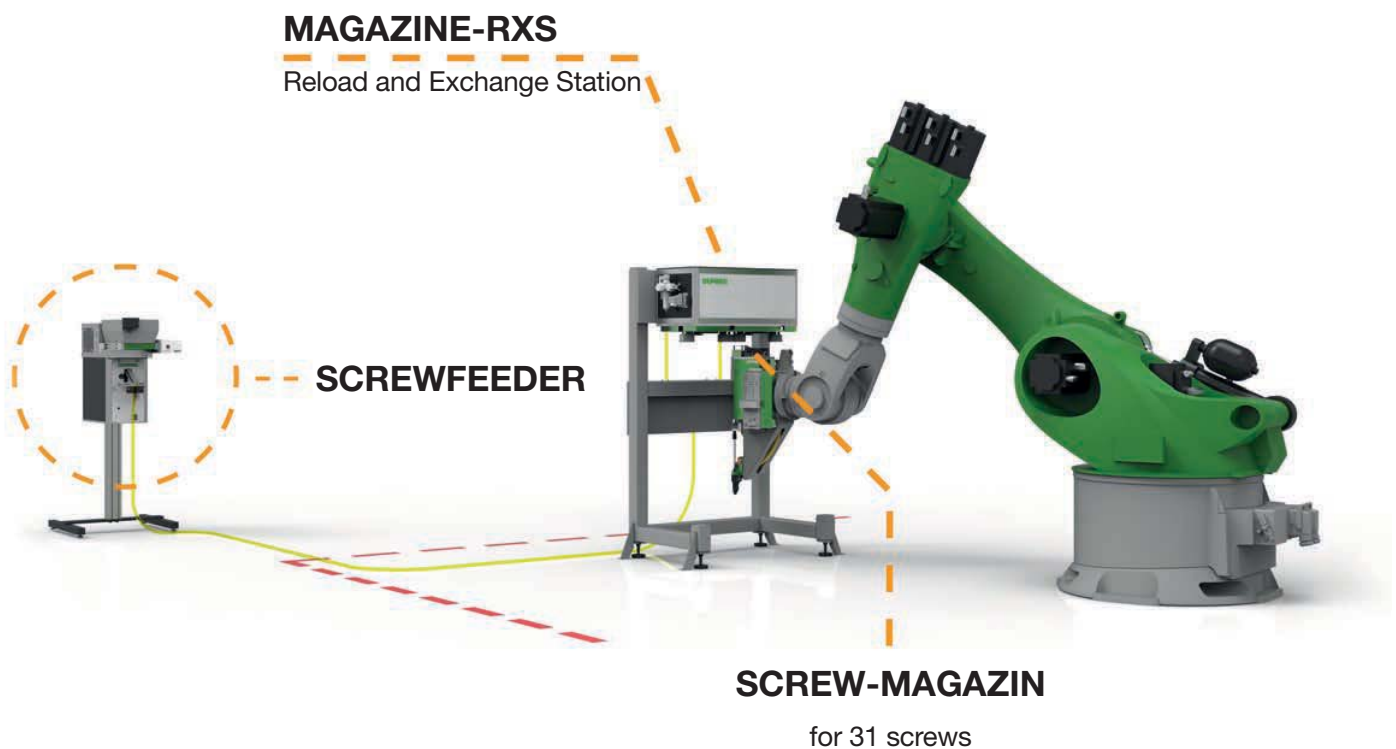
The DEPRAG-Magazine-System offers a solution that can be installed to any DEPRAG-FFS-Unit, even at a later time. The magazine system consits of three basic elements:

- Screw-magazines

- Magazine-RXS (Reload and Exchange Station)

- Screwfeeder

While one magazine is docked on the FFS-Unit and in operation to systematically feed up-to 31 fasteners, a second magazine is being filled in the Magazine-RXS by the screwfeeder. The feeder is located out-side of the robot work area to allow screw refills without the need of entering the robot's danger zone. It feeds screws to the Magazine-RXS located inside the robot cell. If the magazine is empty, the robot unloads it at the Magazine-RXS and picks-up a full magazine to continue with the assembly. This solution assures the best possible cycle time while guaranteeing the topmost process reliability.

How does FFS work?

Step 1:
By simultaneously applying high pressure and high speed to FFS screw the material heats up.

Step 2:
The material begins to yield and the screw tip penetrates the metal.

Step 3:
The forming tip of the FFS screw pushes the material in the screwdriving direction and forms an extrusion through the material.
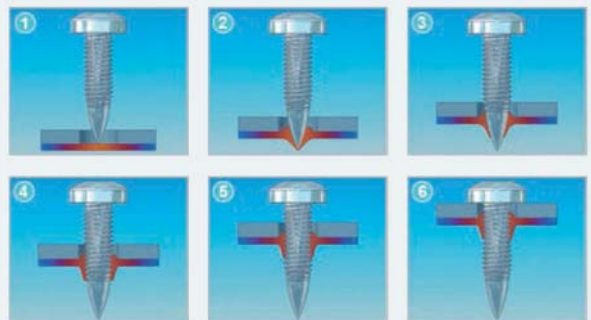
Step 4:
The thread forming process begins after a reduction in pressure and speed, the extrusion process provides sufficient contact surface to form several thread pitches.

Step 5:
The screw threads are formed.

Step 6:
The screw is assembled using the usual tightening procedures (torque, angle, friction value etc...).
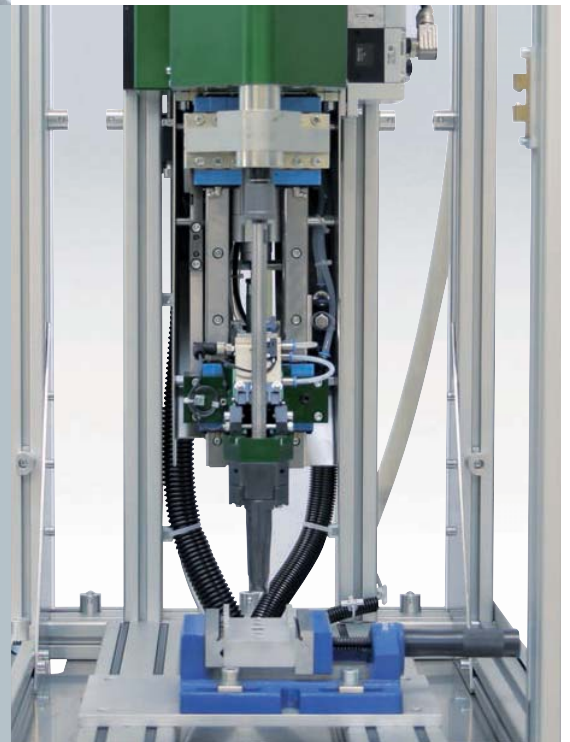

Step 1: Heat generation   Step 4: Thread forming
Step 2: Penetration   Step 5: Screwdriving
Step 3: Extrusion   Step 6: Tightening

DEPRAG

**Your worldwide partner
for screwdriving technology
and automation**