

## EJOT FDS® direct assembly without pre-hole

Modern space frame structures have high demands on the joining technology in the body shell work because of the composite construction and the oftentimes one-sided accessibility. While the clamped components for joining the EJOT FDS® screw to the Audi TT were still pre-punched, this pre-punching was omitted for the Audi R8. For this the fastening parameters were adjusted and the geometry of the FDS® screw below the screw head was optimised, since a small amount of the material flows towards the fastening direction. While in the past this through hole was used for taking up the displaced material it is now being absorbed by the increased space below the screw head.

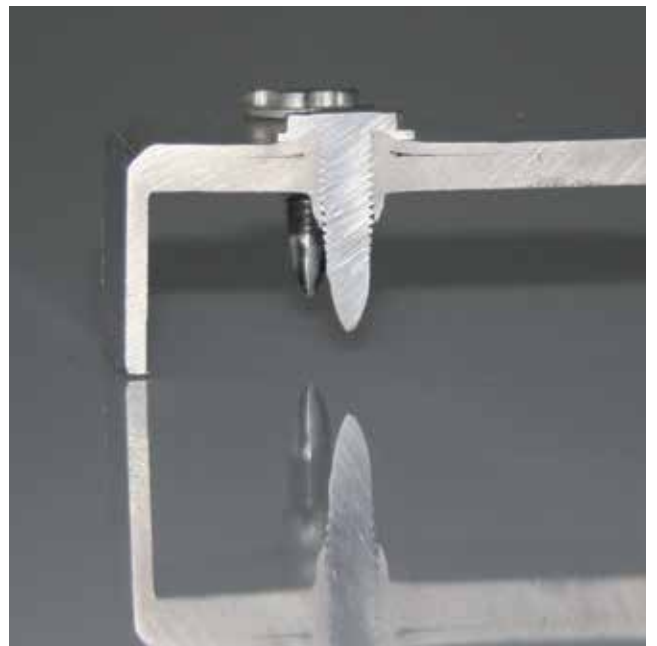


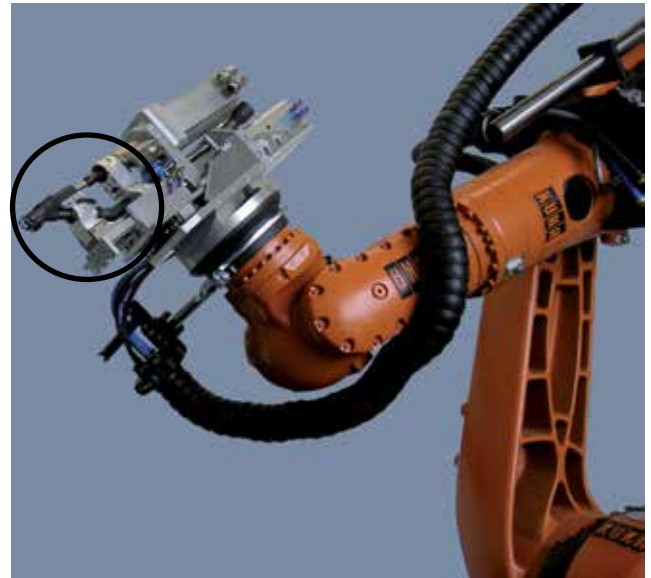
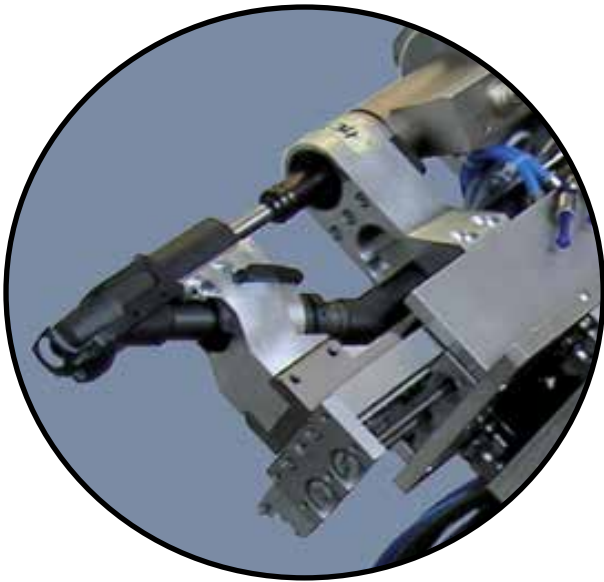
To fasten the FDS® screw it is fed automatically into the nozzle of the robot guided fastening equipment. Prior to the actual fastening the retainer, which is positioned in front of the mouthpiece, pushes on the joining location in order to minimise cracking between the two components during the fastening process. The spindle speed is increased simultaneously to the application of the axial load. The screw point pierces both components and forms a metric female thread without chips. When the screw head connects to the surface the displaced material is taken up by the screw head. Until reaching the tightening torque the screw clamps the two components and ensures a much stronger joint due to the larger thread engagement.

The material arrangement when fastening without pilot hole should be "thin in thick" or "soft in hard" respectively, since higher tightening torques can be reached and gaps between the two components can be minimised.

The screw can be loosened again without damage, which is an advantage especially in the case of repairs or for recycling.

In this way 310 EJOT FDS® screws are fastened in the Audi R8 series without pilot hole fully automated in the body shell assembly.





### Robot guided fastening system

The FDS® screws are used in the body construction with a robot-guided fastening system with automatic feeding. The complete equipment is supplied by the company Weber Schraubautomaten.

The necessary frictional heat for the flow drilling is facilitated, according to the material and thickness, over a high rotational speed of the electro motor of up to 5000 1/min and a clamping force of up to 1,8 kN.

*Robot supported fastening system of the company Weber Schraubautomaten.*

### Process steps of the FDS® assembly

1. Heating
2. Penetrating
3. Through draught forming
4. Thread forming
5. Engagement of full threads
6. Tightening

