

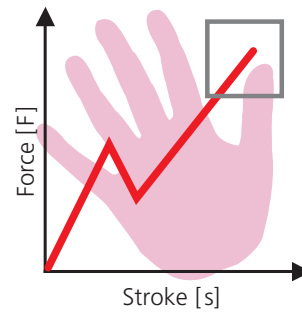
Dynamic Bending Compensation

Patented feature

In order to achieve assembly requirements in the 1/100 mm (0.0004") range, compensation of the system yield is required. Workpiece, tooling and machine are elastically deformed by the varying forces induced during the pressing process. Once the operation is complete and the press force is removed, this deformation disappears. The result is that the assemblies are not joined to their programmed dimensions. This yielding effect makes it impossible to produce high precision joints regardless of a systems positioning accuracy.

How It Works:

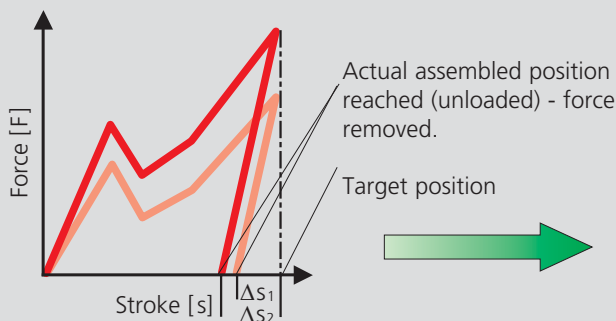
First, a complete process representation of the force characteristic in loaded and unloaded state is necessary so that the system can carry out the required compensation.



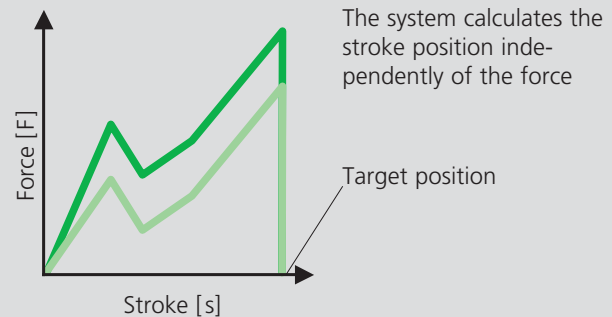
Conventional procedures end in the block position – but the process is not finished yet. The system is under force.

Patented Dynamic Bending Compensation by SCHMIDT Technology

uncompensated (figure 1)



compensated (figure 2)



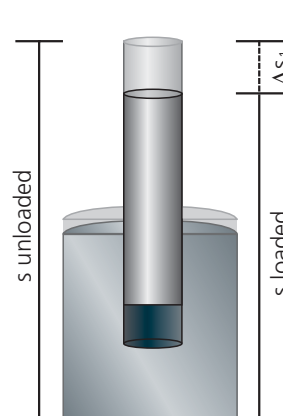
In typical applications, the force required to complete an assembly varies up to 40 % from part to part. When freely positioning, such as without a positive stop, the press ram extends to the same target position, regardless of load. But a closer inspection of the completed assembly and the force/distance curve generated, shows that the final pressed position

will vary due to the forces in the operation. (figure 1) In order to overcome this effect, **SCHMIDT® ServoPress** systems compensate dynamically to the changing forces. This compensation allows for the assembly to be pressed to the target position, regardless of force (figure 2)

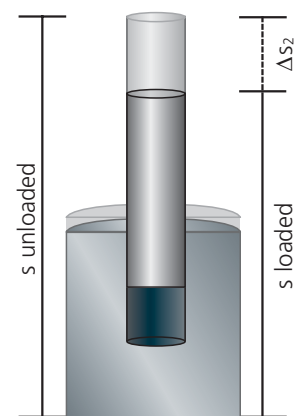
Pressing a pin in a bushing

The elasticity of an assembly depends on the equipment, process and the component geometries. This effect becomes significant for assemblies with which the assembly forces of the individual components differ strongly from one another. This can particularly be seen in the example shown.

low force (see force curve)



high force (see force curve)



" Δs " changes proportionally to the force output, that means, the components have different dimensions depending on the force requirement of each component.

- The **SCHMIDT® ServoPress / TorquePress** system determines easily and precisely the system elasticity and compensates it dynamically in real time.
- Only with dynamic bending compensation, can the end position be reached to an accuracy of the 1/100 mm range.
- Free positioning with compensation of the system elasticity is more accurate than pressing on effect tool stop.
- Dynamic bending compensation does not reduce the process speed.
- Dynamic bending compensation in connection with other intelligent functions, such as offset of tolerance data, has been patented.