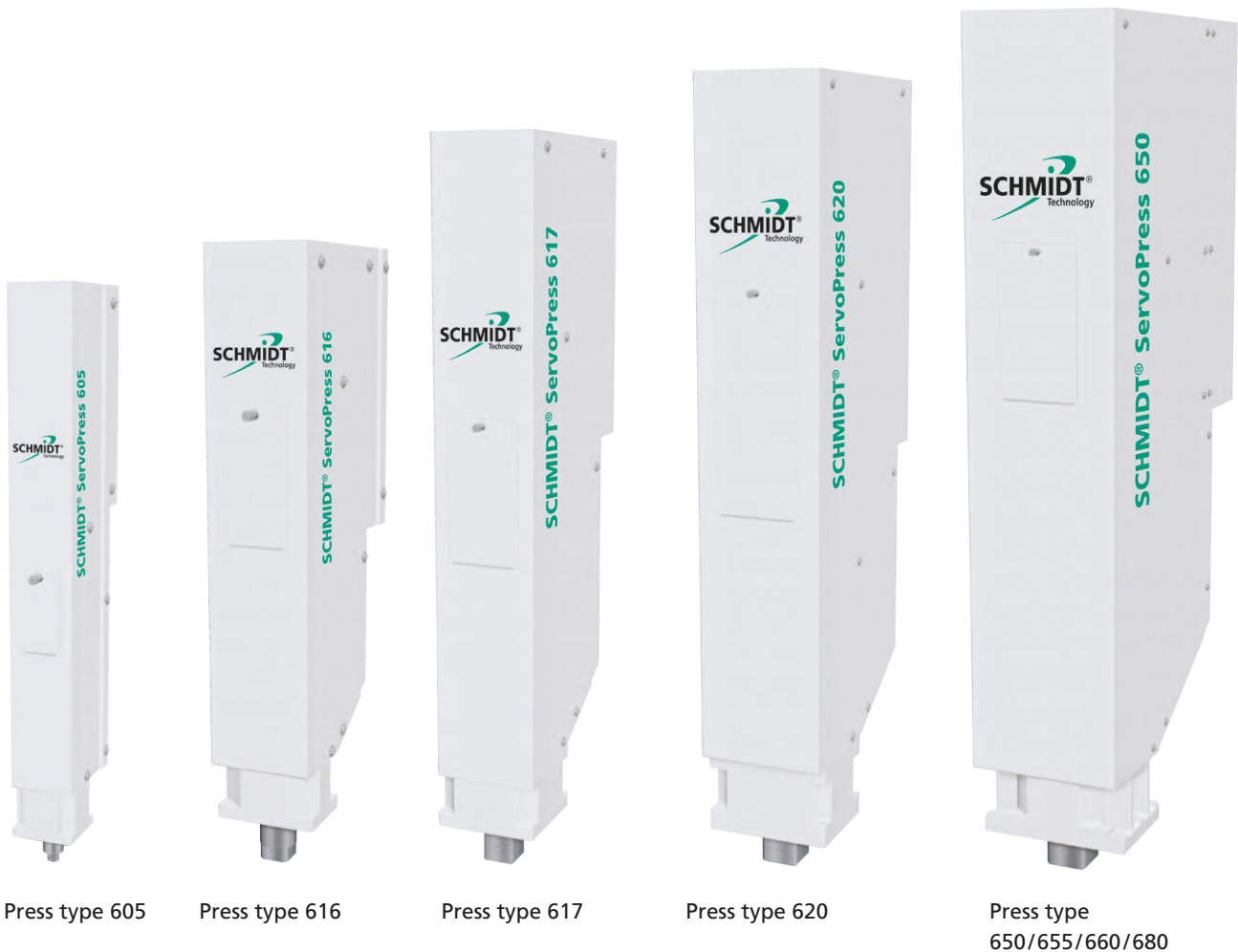


SCHMIDT® ServoPress

Forces from 1 kN bis 250 kN



Economical assembly is a decisive factor for the success of your product. The goal is to join precise assemblies from inexpensive individual components with high tolerances. Electrically driven presses – servo presses – are ideally suited for such tasks in terms of precision. The high-precision **SCHMIDT® ServoPress** systems offer them the perfect solution in the interaction of **SCHMIDT® ServoPress** modules and the **SCHMIDT® PressControl 700** or **PressControl 7000** control system developed for this purpose. These meet the most complex requirements, as "stand alone" machines or in automated production lines.

The full load resistant modules of the **SCHMIDT® ServoPress** series are **EC type tested** in combination with the safety technology options **SmartGate**, **SmartGuard** and **light curtain**. Furthermore, the servo presses have an integrated automatic spindle lubrication system and are protected by overload clutch from type 616 onwards.

SCHMIDT® ServoPress

Quality without compromise

The solid, unparalleled mechanics of the **SCHMIDT® ServoPress** are a basic prerequisite for precise joining results, even in the toughest industrial environments.

Bench test

Before series production, new modules are subjected to a stress test under the toughest conditions. Not least, these tests result in many properties that benefit the applications.

Test over 20 million load cycles over the full working stroke with nominal force and lateral force components at full travel speed with a cycle time of approx. 2 seconds.

Absolute, direct stroke measurement system

- Precise repeatability due to high system resolution
- Compensation of mechanical compressions under full load
- Compensation of pitch errors of the spindle
- Material length changes are eliminated as far as possible

Full load resistant modules

- With nominal force at 100% duty cycle
- Over the complete ram stroke
- With short process times
- Via precise, low-backlash guidance of the ram
- Peak force in S3 mode

Machine self-protection

- Fully automatic spindle lubrication
- Mechanical clutch as overload protection of the ServoPress in case of "crash"
- Active cooling with thermal monitoring of mechanics and electronics
- Current limitation when exceeding permissible load capacities
- Destruction by faulty operation is impossible

Service friendly

- Low maintenance
- Easy module change due to a high precision ram 0-position.
- Module is automatically detected
- No changes to existing data sets

Built-in safety in the light curtain system, workplace protection with SmartGate or equipped with protective enclosure SmartGuard and of course EC type approved. From ServoPress 650/655/660/680 integrated energy management, intermediate storage of braking energy.

As a result, this means the following for your application:

- ✓ Excellent efficiency
- ✓ Maximum capacity
- ✓ High production safety

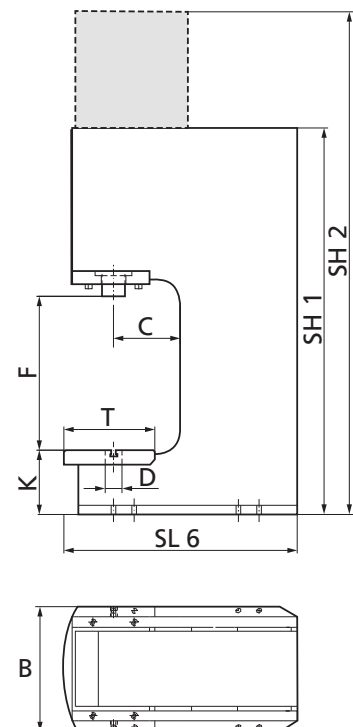


Modules

With force outputs of 1 kN to 250 kN

Press type		605	616	617	620	650	655	660	680
Force F max. S3 25 %, 20 s	kN	1	5	14	35	75	110	160	250
Force F 100 % continuous run	kN	0.5	3	7.5	20	50	80	110	200
Ram stroke	mm	150	200	300	400	500	500	350	350
Resolution position control	µm	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Ram speed	mm/s	0 – 300	0 – 200	0 – 200	0 – 200	0 – 200	0 – 100	0 – 100	0 – 50
Resolution PDA force	N/inc	0.3	1.5	3.75	10	24	32	48	75
Resolution PDA stroke	µm/inc	2.2	3.2	4.6	6.1	7.6	7.6	5.4	5.4
Overload protection		none	mechanical	mechanical	mechanical	mechanical	mechanical	mechanical	mechanical
Drive		ball screw			planetary roller screw				
Weight appr.	kg	11.6	25	64	113	225	225	283	283
Tool weight max.	kg	5	15	25	50	100	100	100	100
Power supply (50-60Hz)	VAC	200 – 240	200 – 240	400 – 480, 3~	400 – 480, 3~	400 – 480, 3~	400 – 480, 3~	400 – 480, 3~	400 – 480, 3~
Dimension H / W / D	mm	636 / 89 / 155	599 / 124 / 258	892 / 144 / 318	1077 / 190 / 384	1250 / 243 / 561	1250 / 243 / 561	1249 / 249 / 552	1249 / 249 / 552
Ram bore	mm	6 ^{H7}	10 ^{H7}	20 ^{H7}	20 ^{H7}	20 ^{H7}	20 ^{H7}	20 ^{H7}	20 ^{H7}
Ram dimension	mm	Ø 25	Ø 40	□ 42	□ 55	□ 65	□ 65	Ø 90	Ø 90

Overall dimensions with frame			605	616	617	620	650	655	660	680
Throat depth	C	mm	130	130	150	160	160	160	160	160
Table bore	D	mm	Ø 20 ^{H7}	Ø 20 ^{H7}	Ø 40 ^{H7}	Ø 40 ^{H7}	Ø 40 ^{H7}	Ø 40 ^{H7}	Ø 40 ^{H7}	Ø 40 ^{H7}
Working height (SP 680 in H-frame-version)	F	mm	246	300	387	518	612	507	500	500
Table height	K	mm	93	113	128	155	190	220	220	178
Table size	B x T	mm	160 x 140	220 x 175	250 x 200	300 x 200	370 x 230	370 x 230	370 x 230	370 x 230
Frame depth (SP 680 in H-frame-version)	SL 6	mm	365	405	460	563	636	725	761	614
Frame height (SP 680 in H-frame-version)	SH 1	mm	510	630	780	1080	1050	1050	1097	942
Total height	SH 2	mm	1015	1062	1467	1810	2012	2032	2036	2062
Weight appr.		kg	45	101	166	334	553	757	805	867

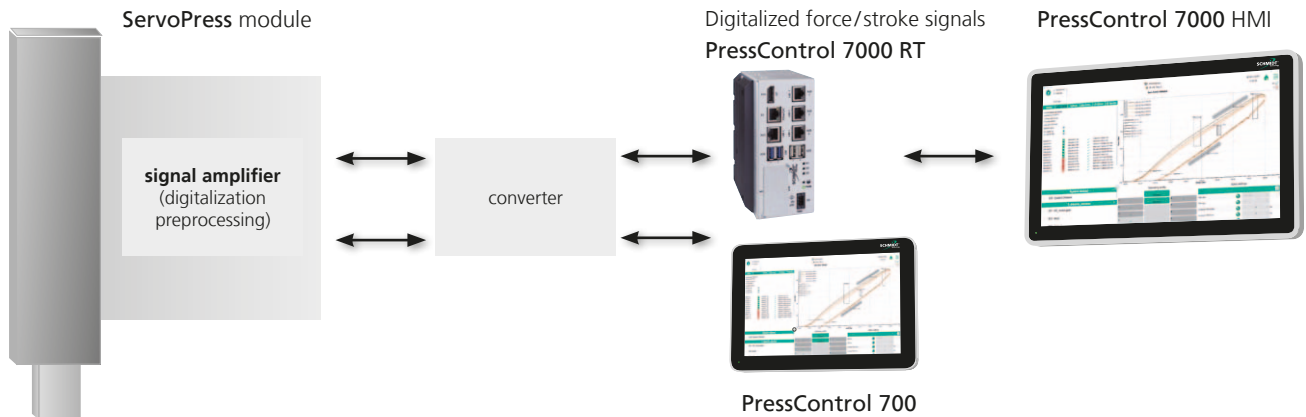


SCHMIDT® ServoPress/TorquePress

Superior controlled behaviour

The combination of a spindle with a servo drive is not sufficient to achieve optimum joining results. The key for intelligent assembly is quick and exact controlled behaviour of the press. This requires an integrated system consisting of drive unit, process measure-

ment technology and control unit. These requirements have been taken into account in the system architecture of a **SCHMIDT® ServoPress /TorquePress**.



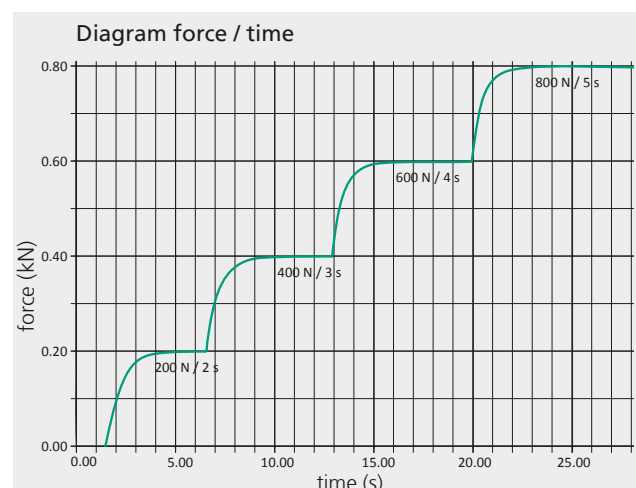
SCHMIDT® ServoPress/TorquePress modules operate with a true force control loop (force as a command variable).

That means:

- fast approach of the target values
- no overshooting of the target values
- precise positioning in the 1/100 mm range even with strongly fluctuating press-in forces
- highly accurate, continuous force control
- the control parameters can be adjusted
 - optimal adaptation to your application
 - no programming necessary
 - the system works with pre-set optimal acceleration values (no incorrect inputs possible)
- optimization of process times possible by additional graphical display. Force / time [F/t], and stroke / time [s/t] for analysis of the control behavior. The classic force / stroke [F/s] display of conventional electric axes is not comparable with the convenient recording and visualization options of the ServoPress / TorquePress
- stable closed loop force control over a long period of time
- no over or under oscillation (no vibrations) during the control process

These properties are achieved by combining the following features:

- integrated measurement technology (Sample rate 2000 Hz)
 - backlash-free displacement recording, force measurement without transverse forces
- amplification of the process signals at the **SCHMIDT® ServoPress** module
 - insensitive to electromagnetic interference (EMI)
 - closed-loop control takes place in **SCHMIDT® PressControl 700** or **PressControl 7000RT**, i.e. servo amplifier and motor receive the targets from the control system
 - optimized PLC control algorithm for external references
 - force [F], stroke [s] or other external reference parameters are processed simultaneously during the process.
 - the reference variables can be freely defined
- fast signal processing on software-based PLC with integrated CNC



SCHMIDT® TorquePress

Precise dynamic

A number of special features characterizes the **SCHMIDT® TorquePress** in addition to the ServoPress series. Among other things, a hollow-shaft torque motor is used, which enables very high pressing forces due to the high motor torque without additional mechanical ratios.

Noise levels also remain remarkably low at all load conditions compared to other electric presses. The spindle nut, which is driven directly without the use of additional gears, enables very high efficiencies. Thanks to the hollow-shaft motor, the TorquePress is particularly compact and allows short overall lengths.

SCHMIDT® TorquePress are EC type approved in combination with the safety technology options SmartGate, SmartGuard and light curtain as well as optionally with the particularly economical 2-hand operation.

The solid, unparalleled mechanics of the **SCHMIDT® TorquePress** are a basic prerequisite for precise joining results, even in the toughest industrial environments.

Bench test

Before series production, new modules are subjected to a stress test under the toughest conditions. Not least, these tests result in many properties that benefit the applications.

Test over 20 million load cycles over the full working stroke with nominal force and lateral force components at full travel speed with a cycle time of approx. 2 seconds.

Absolute, direct stroke measurement system

- Precise repeatability due to high system resolution
- Compensation of mechanical compressions under full load
- Compensation of pitch errors of the spindle
- Material length changes are eliminated as far as possible

Full load resistant modules

- With nominal force at 100 % duty cycle
- Over the complete ram stroke
- With short process times
- Via precise, low-backlash guidance of the ram
- Peak force in S3 mode

Machine self-protection

- Fully automatic spindle lubrication
- Mechanical clutch as overload protection of the ServoPress in case of "crash"
- Active cooling with thermal monitoring of mechanics and electronics
- Current limitation when exceeding permissible load capacities
- Destruction by faulty operation is impossible

Service friendly

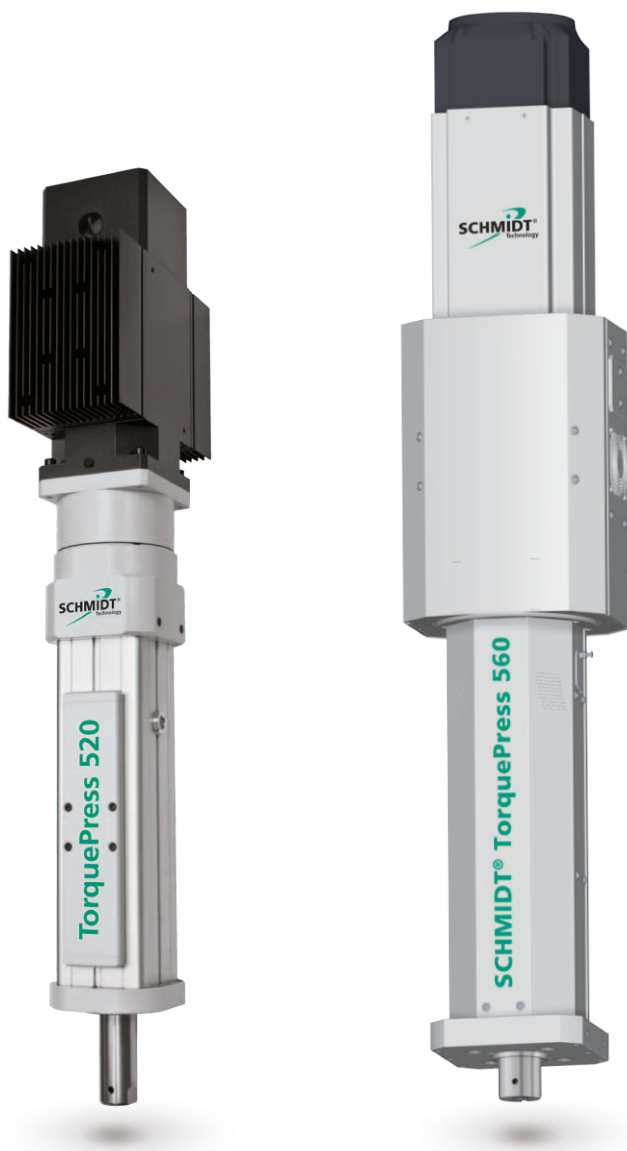
- Low maintenance
- Easy module change due to a high precision ram 0-position.
- Module is automatically detected
- No changes to existing data sets

Built-in safety in the light curtain system, workplace protection with SmartGate or equipped with protective enclosure SmartGuard and of course EC type approved.

TorquePress 560 with **integrated energy management**, intermediate storage of braking energy

As a result, this means the following for your application:

- ✓ highest efficiencies
- ✓ maximum machine availability
- ✓ very high production reliability



TorquePress 520

TorquePress 560

Modules

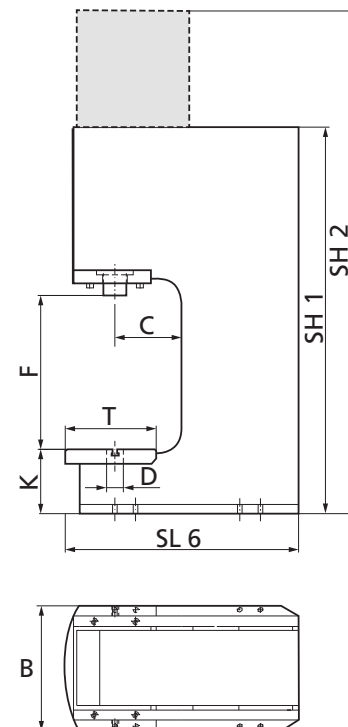
With force outputs of 20 kN to 100 kN

Pressentyp		TorquePress 520	TorquePress 560
Force F max. S3 25%, 20 s	kN	20	100
Force F 100 % continuous run	kN	10	50
Ram stroke	mm	250	300
Resolution position control	µm	< 1	< 1
Ram speed	mm/s	0 – 260	0 – 200
Resolution PDA force	N/inc	6,25	30
Resolution PDA stroke	µm	4	4,6
Overload protection		electrical	mechanical
Drive		ball screw	planetary roller screw
Weight appr.	kg	95	230
Tool weight max.	kg	25	100
Power supply (50 – 60Hz)	VAC	400 – 480, 3~ / 16 A	400 – 480 V 3~ / 32 A
Dimension H / W / D	mm	1132 / 163 / 315	1438 / 304 / 255
Ram bore	mm	ø 20 ^{H7}	ø 20 ^{H7}
Ram dimension	mm	ø 50 ^{H6}	ø 60 ^{H6}



TorquePress 560 with SmartGuard and PressControl 7000 RT/HMI on PU40

Overall dimensions with frame			TorquePress 520	TorquePress 560
Throat depth	C	mm	160	160
Table bore	D	mm	ø 40 ^{H7}	ø 40 ^{H7}
Working height	F	mm	340	420
Table height	K	mm	132	180
Table size	B x T	mm	300 x 230	370 x 230
Frame depth	SL 6	mm	530	620
Frame height	SH 1	mm	670	880
Total height	SH 2	mm	1662	2098
Weight approx.		kg	222	584



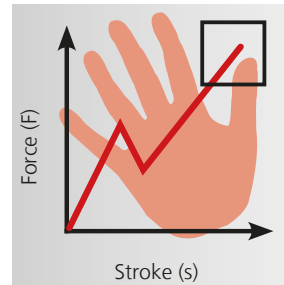
Detailed dimensional drawings can be downloaded:
www.schmidttechnology.de

Dynamic bend up compensation

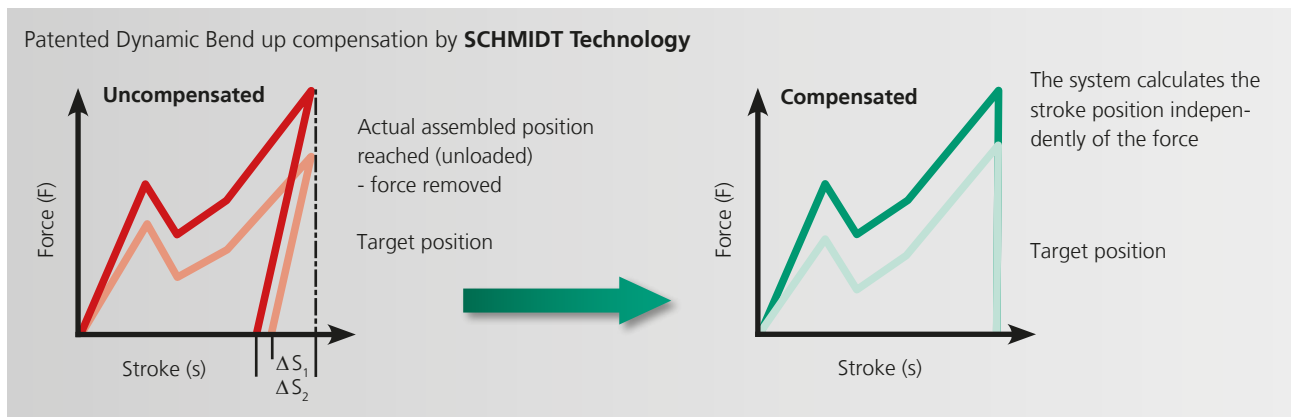
Patented feature

In order to achieve assembly requirements in the 1/100 mm range, compensation of the system yield is required. Work piece, 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.

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.



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/TorquePress** 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)

- The **SCHMIDT® ServoPress/TorquePress** system determines easily and precisely the system elasticity and compensates it dynamically in real time
- Only with dynamic bend up compensation, the end position can 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 bend up compensation does not reduce the process speed
- Dynamic bend up compensation in connection with other intelligent functions, such as offset of tolerance data, has been patented

Example: Press in 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.

