

SCHMIDT® ElectricPress

A new Approach to Assembly Technology

To use electric drives instead of pneumatic or hydropneumatic driven cylinders, is a modern advancement in assembly technology. **SCHMIDT Technology** combined its proven rugged mechanics with the latest electric drive technology to create assembly presses for industrial production applications. The high efficiency of electric drives may not be the only reason to choose them. The individual process, the infrastructure and the quality of the compressed air should also have a bearing on that decision.

The key advantages of the **SCHMIDT® ElectricPress**:

- Easy programming of parameters reduces set-up time
- Stored press ram motion profiles allow for quick changeover
- Enhanced flexibility
- Reduced tooling costs and wear due to precise positioning
- The stick-slip effect does not occur due to our design. As a result the assembly process will be optimized compared to pneumatic drives, especially at low speeds
- Low noise level reduces operator fatigue and stress

SCHMIDT® ElectricPress 43 with PressControl 75 and SafetyModule

Manual workstation with EC type approved safety technology



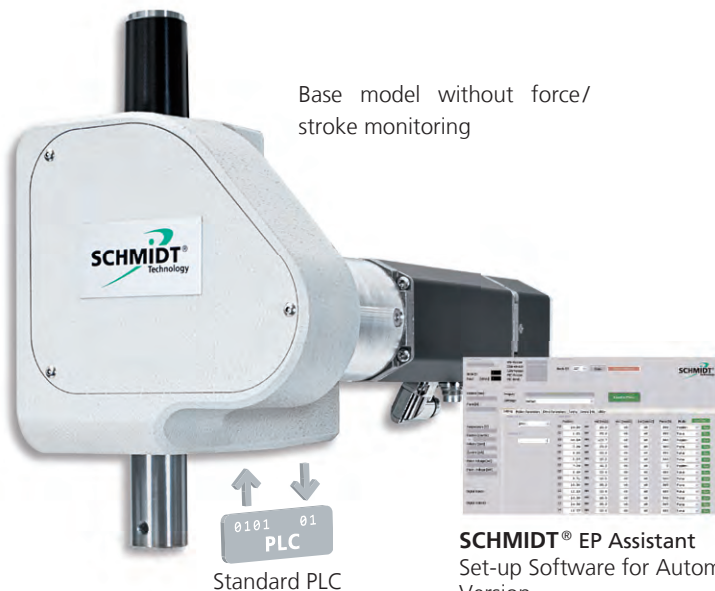
SCHMIDT® PressControl 75 for quick set-up or rapid change-over and easy programming of press parameters; stores up to 24 datasets.

Safety Concepts see page 72

SCHMIDT® ElectricPress manual workstation with **Safety-Modul** on PU 20

SCHMIDT® ElectricPress 43 Automation

Simple, efficient solution for complex assembly automation



Base model without force/
stroke monitoring

Features:

- Reproducible values for position, velocity, acceleration and deceleration
- Storage of complete NC-sets in the **EP Assistant** software
- Combination of up to 14 individual ram motion profiles into one complete profile by using a standard PLC
- Press to exact position (closed loop control stroke)
- Press to force (determined by motor current) to
 - press to final force
 - press to position but interrupt if force is exceeded
 - touch force to determine position of workpiece

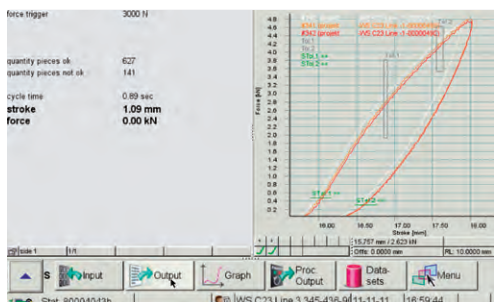
SCHMIDT® ElectricPress 343 with PressControl 600 and SafetyModule

Complete workstation with EC type approved safety technology

Rigorous life-cycle test of the **SCHMIDT® ElectricPress**

To meet the highest quality standards expected of a **SCHMIDT® Press**, the EP 343 press system underwent a rigorous press-stroke test cycle over a 4 months period at a maximum force of 4 kN/900 lbs. All mechanical, electrical and motor elements have passed that stress test with flying colors.

Safety Concepts see page 72



Process visualization



SCHMIDT® ElectricPress 343 Automation with PressControl 600

Latest Assembly Technology

An efficient and reliable assembly process is key to the success of your products in an increasingly competitive market.

The all-new **SCHMIDT® ElectricPress 343** with **SCHMIDT® PressControl 600** is your most economical solution, combining a cost effective fully programmable assembly press, using innovative electrical drive technology, with closed loop position and force control to provide flexibility and precision to even the most complex assembly tasks. The system also uses integrated sensor technology to provide precise process monitoring, ensuring quality control on every part.

SCHMIDT®'s state-of-the-art assembly technology monitors and controls the entire manufacturing process rather than individual assembly steps. The proprietary **SCHMIDT® DataBase** software maps the process data of all individual assembly steps into a data bank, including historic data. CAN-bus technology communication compatible with all established field CAN-bus systems is standard on all **SCHMIDT®** monitored presses. And with the **SCHMIDT® PRC OPC** software available on these models, data exchange will now become the automation standard.



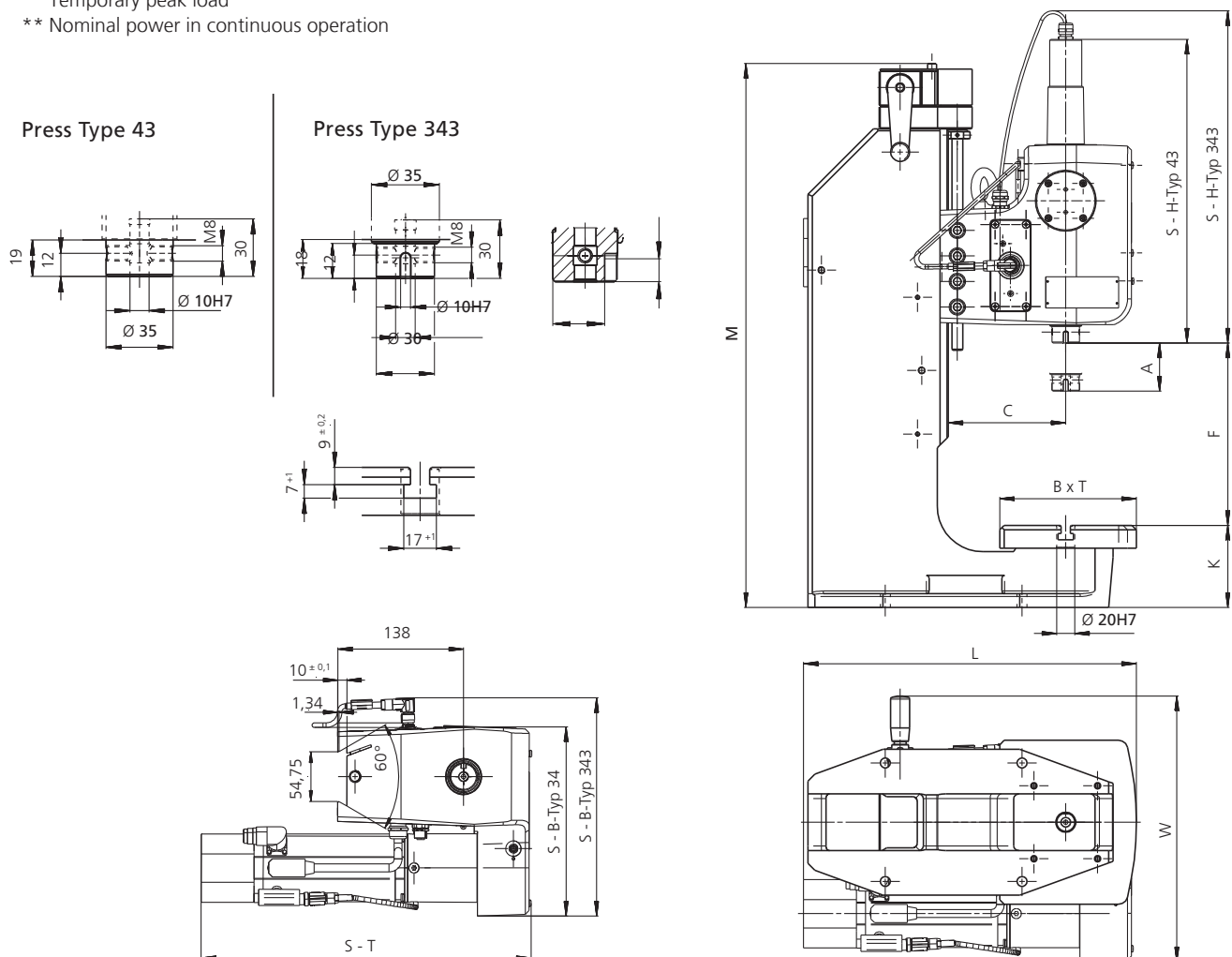
Press Type			43	343
Force F max. *		kN	4	4
Force F at 100 % duty cycle**		kN	2.5	2.5
Ram stroke	A	mm	100	100
Ram speed max.		mm/ s	150	150
Drive resolution		µm	< 1	< 1
Resolution PDA		µm/inc		2.42
- Stroke		N/inc		1.25
- Force				
Throat depth	C	mm	129	129
Decibel level		dBA	60	60
Power supply			42 V DC / 13 A (22 A max.)	42 V DC / 13 A (22 A max.)
- Motor power			24 V DC / 0.5 A	24 V DC / 0.5 A
- Logic unit				
Working hight frame 7 ¹⁾	F	mm	62 – 274	62 – 274
Working hight frame 7-600 ¹⁾		mm	100 – 610	100 – 610
S-H x S-B x S-T		mm	333 x 207 x 362	368 x 242 x 362
Weight		kg	35	35
PRC Gateway, number of I/O's				16 inputs / 16 outputs
Mounting surface with Frame	W x L	mm	292 x 366	292 x 366
- No. 7			292 x 468	292 x 468
- No. 7-600				

Frame Overview	Press Type	Frame Height M (mm)	Table Size B x T (mm)	Table Height K (mm)
No. 7	43, 343	600	180 x 150	90
No. 7-600	43, 343	960	180 x 280	110

¹⁾ Typical values; can vary ± 3 mm due to cast and production tolerances

* Temporary peak load

** Nominal power in continuous operation



SCHMIDT® ServoPress / TorquePress

The Reference for Precise Assembly

An economic and high quality assembly is the key to the success of your product. The aim is to join together precise assemblies from low-cost individual components with different tolerances. Electrically driven spindle presses, servo presses, are ideal for such tasks. **SCHMIDT® ServoPress** systems offer an integrated solution of **SCHMIDT® PressControl 600** or **5000** control unit and **SCHMIDT® ServoPress** modules. They meet the most complex requirements, as stand-alone machines or in automatic production lines.

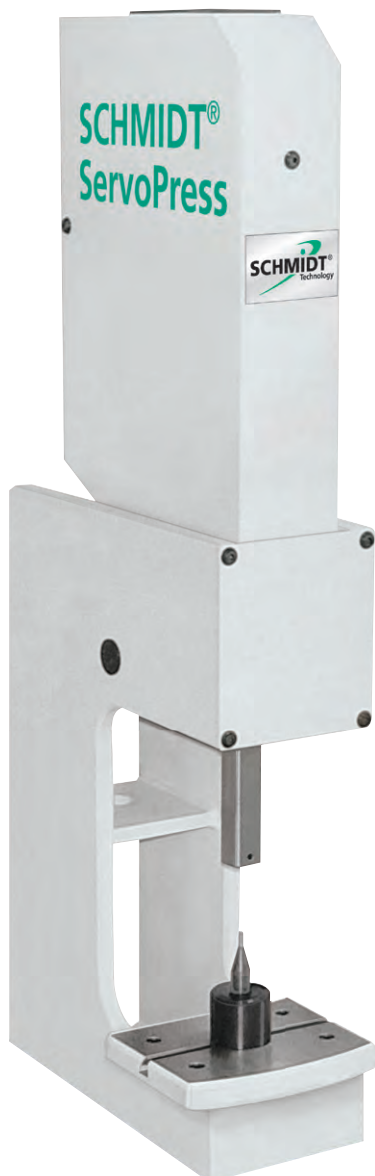
The very high torque of the **SCHMIDT® TorquePress 200** allows very high forces without additional mechanical transmissions. The considerably higher speed constancy compared to conventional drives entails a higher machine precision.

In comparison to high ratio electric motor driven spindle presses the **SCHMIDT® TorquePress 200** has an essential lower self moment of inertia and thereby a high dynamic. For this reason the run-up time from zero to working speed is very short. The noise remains remarkably low with all load conditions.

Technical Data	TorquePress 200
Force F max. *	230 kN
Force F at 100 % ED **	200 kN
Ram stroke	500 mm
Resolution (drive control)	< 0.1 µm
Process data acquisition	
- Force	8 µm/inc.
- Stroke	100 N/inc.
Ram speed (max.)	200 mm/s
Overload protection	mechanical
Service life of the cycles acc. to standard operating profile	1 x 10 ⁷
Drive	Planetary roller screw drive
Power supply	400 V 3~ / 32 A, 400 V power socket CEE
Weight / height resp. length	
- Modul (approx.)	770 kg / 2300 mm (upright resp. horizontal)
- H-frame (approx.)	980 kg / 850 mm (upright resp. horizontal)
- Press base	approx. 125 kg / height flexible
Control unit	SCHMIDT® PressControl 5000 / 600

* Temporary peak load

** Nominal power in continuous operation



SCHMIDT® ServoPress/TorquePress

Ergonomic Manual Workstations with Light Curtain

SCHMIDT® ServoPress/TorquePress manual workstations are delivered ready for operation with press base, transparent protective guarding and light curtain. These systems are single workstations, which can be delivered with all **SCHMIDT® ServoPress/TorquePress** modules.

Included in the scope of delivery are:

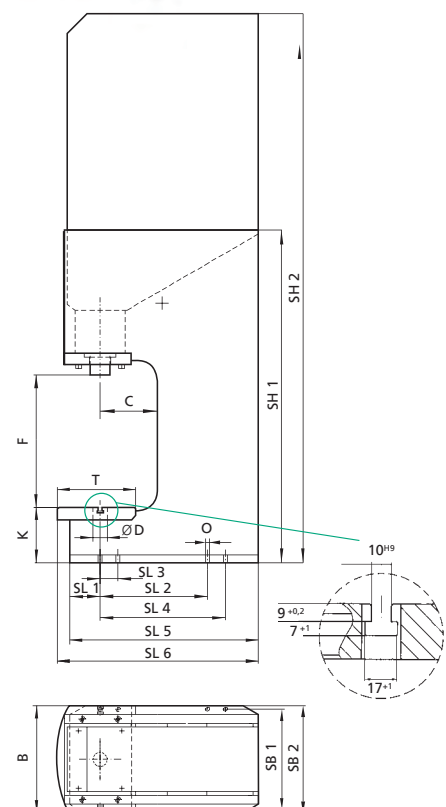
- Module **SCHMIDT® ServoPress/TorquePress** mounted on a frame
- **SCHMIDT® PressControl 600** or **PressControl 5000** with pendant arm system
- Press base PU 20/PU 40 (in fixed or height-adjustable design)
- Transparent protective guarding with light curtain and workplace illumination
- Distance light curtain adjustable in order to ensure a safe distance to the tool

All systems are EC type-approved!



From 15 N to 150 kN

ServoPress Type			405	415 / 416	417	420	450	460
Frame								
Throat depth	C	mm	130	130	150	160	160	160
Table bore	D	Ø mm	20H7	20H7	40H7	40H7	40H7	40H7
Working height	F	mm	246	300	387	518	612	602
Table height	K	mm	93	113	128	155	190	220
Table size	B x T	mm	160 x 140	220 x 175	250 x 200	300 x 220	370 x 230	370 x 230
Mounting surface	B x SL 6	mm	160 x 345	220 x 405	250 x 460	300 x 563	370 x 635	370 x 760
	O	Ø mm	9	11	11	13	13	13
	SL 1	mm	50	80	80	85	95	95
	SL 2	mm	220	250	250	300	350	350
	SL 3	mm				50	50	50
	SL 4	mm				350	400	400
	SL 5	mm	325	390	430	528	600	725
	SL 6	mm	345	405	460	563	635	760
	SH 1	mm	510	630	780	1080	1150	1192
	SH 2	mm	1016	1100	1430	1835	2150	2170
	SB 1	mm	140	200	220	280	350	370
	SB 2	mm	160	220	250	300	370	390



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

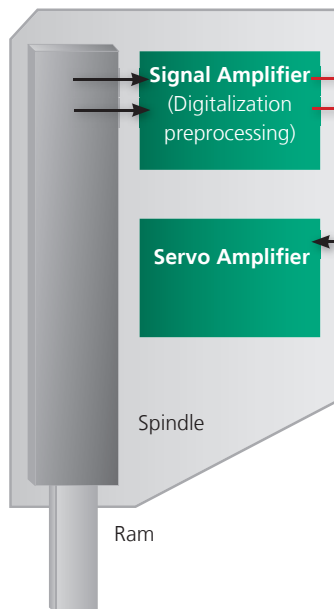
SCHMIDT® ServoPress/TorquePress

Superior controlled Behavior

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 behavior of the press. This requires an integrated system consisting of drive unit, processmeasure-

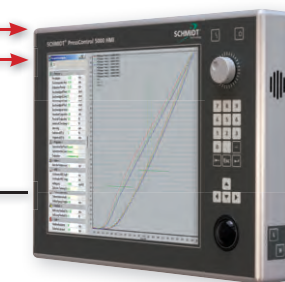
ment technology and control unit. These requirements have been taken into account in the system architecture of a **SCHMIDT® ServoPress/TorquePress**.

SCHMIDT® ServoPress Module



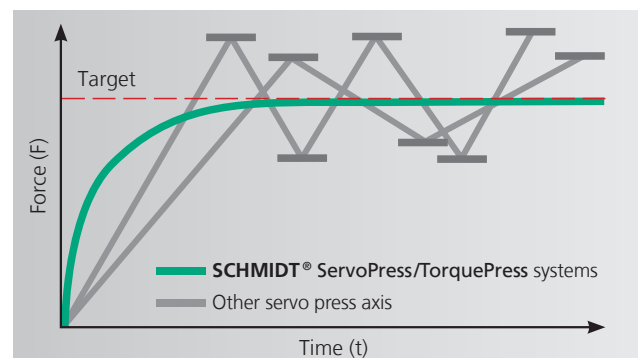
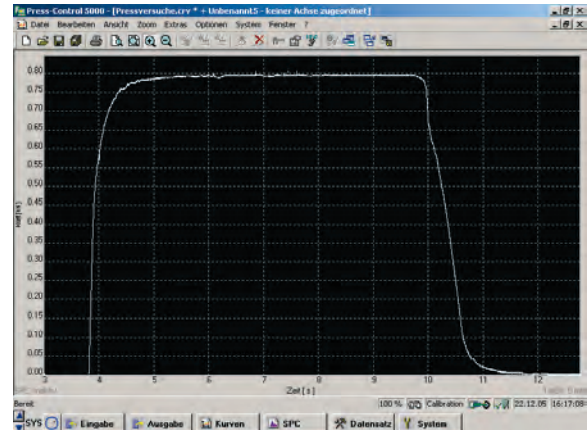
SCHMIDT® PressControl 5000

Digitalized force/stroke signals



Axis control
force/stroke

SCHMIDT® PressControl 600



SCHMIDT® ServoPress/TorquePress work with real force controllers, unlike the simple switching controllers used by other manufacturers*. That means:

- Quickly reaching the nominal values
- No overtravelling of the target values
- Precise positioning in the 1/100 mm range, even with dynamically changing force outputs
- High precision force control
- The control parameters can be adjusted.
 - Optimum adaptation to your application
 - No PLC programming necessary
 - The system works with predefined optimum acceleration values (no incorrect entries possible)
- Optimization of the processing times is possible due to an additional graphical display force/time [F/t], stroke/time [s/t] for an analysis of the behavior of the process. The classic force/stroke [F/s] display of conventional electronic axis cannot be compared to the reliable recording and visualization possibilities of the **SCHMIDT® ServoPress/TorquePress**

These characteristics are achieved exclusively by combining the following features:

- Integrated measurement technology [scanning rate 2000 Hz]
 - Free-of-play distance measurement, force measurement without lateral forces
- Amplification of the process signals on the **SCHMIDT® ServoPress/TorquePress** module
 - Insensitive against electromagnetic interferences (EMC)
- The system is completed by using **SCHMIDT® PressControl 600** or **5000** (PC-based system), i. e. servo amplifier and motor receive nominal values from the control unit
 - Optimized PLC control algorithm
 - Force [F], stroke [s] or other external control inputs are simultaneously processed
 - The control input can be freely selected
- Quick signal processing on software-based PLC with integrated CNC
- CNC with extended command set, in particular for controlling force-regulated positioning tasks

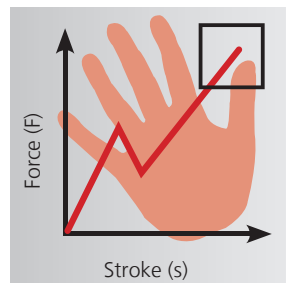
* Regulation exclusively by position controller

Dynamic Bending Compensation

Patented Feature

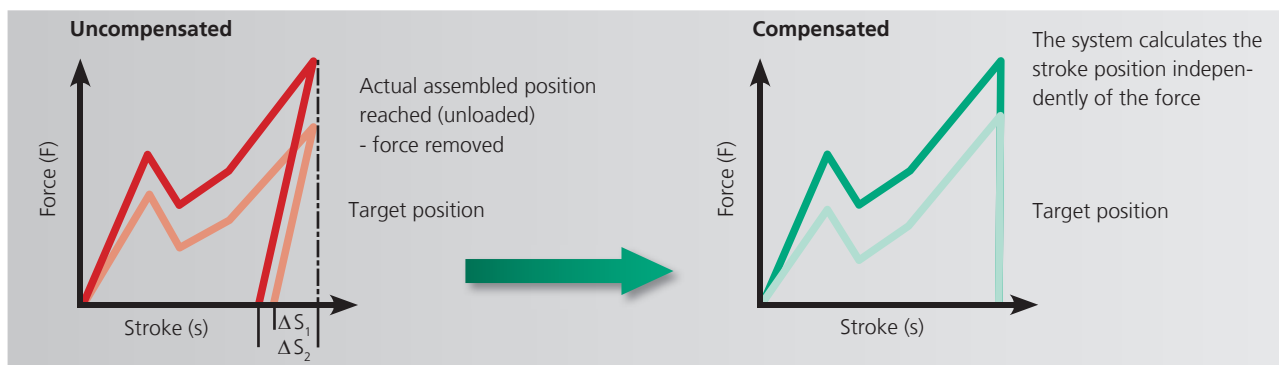
In order to achieve assembly requirements in the 1/100 mm range, compensation of the system yield is required. Workpiece, tooling and machine are elastically deformed by the varying forces induced during the pressing process. Once the operation is complete and the press force is removed, this deformation 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.

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



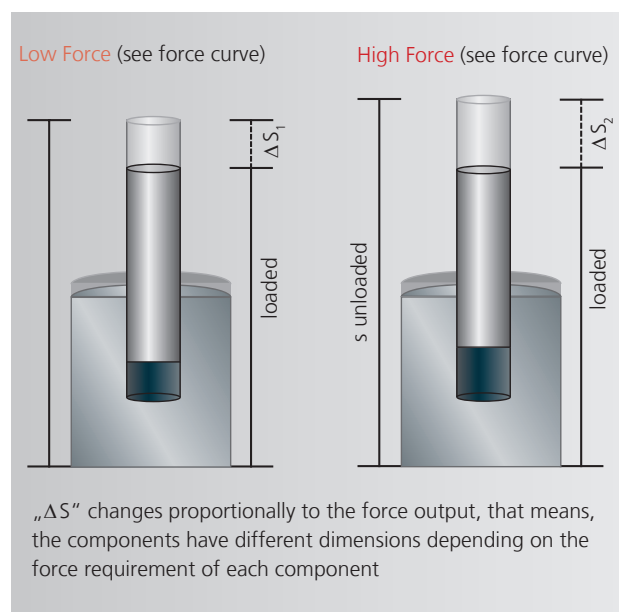
In typical applications, the force required to complete an assembly varies up to 40 % from part to part. When freely positioning, such as without a positive stop, the press ram extends to the same target position, regardless of load. But a closer inspection of the completed assembly and the force/distance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

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.

- 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



SCHMIDT® ServoPress/TorquePress

Operating Profiles and Applications

SCHMIDT® ServoPress/TorquePress allow a simple setup of the operating profiles. Different standard operating profiles are provided for a quick set-up. According to experience, these standard operating profiles and the combinations of them cover most applications.

TDC = top dead center of the process¹⁾

PS = Pressing start, start of the process data recording¹⁾

PP = Probing position (depending on the component geometry)

IP = Intermediate position¹⁾ (is required for monitoring purposes)

EP = End position¹⁾

Target is "Stroke"

Normal operating profile, is typically combined with bending compensation.

Target is "Force"

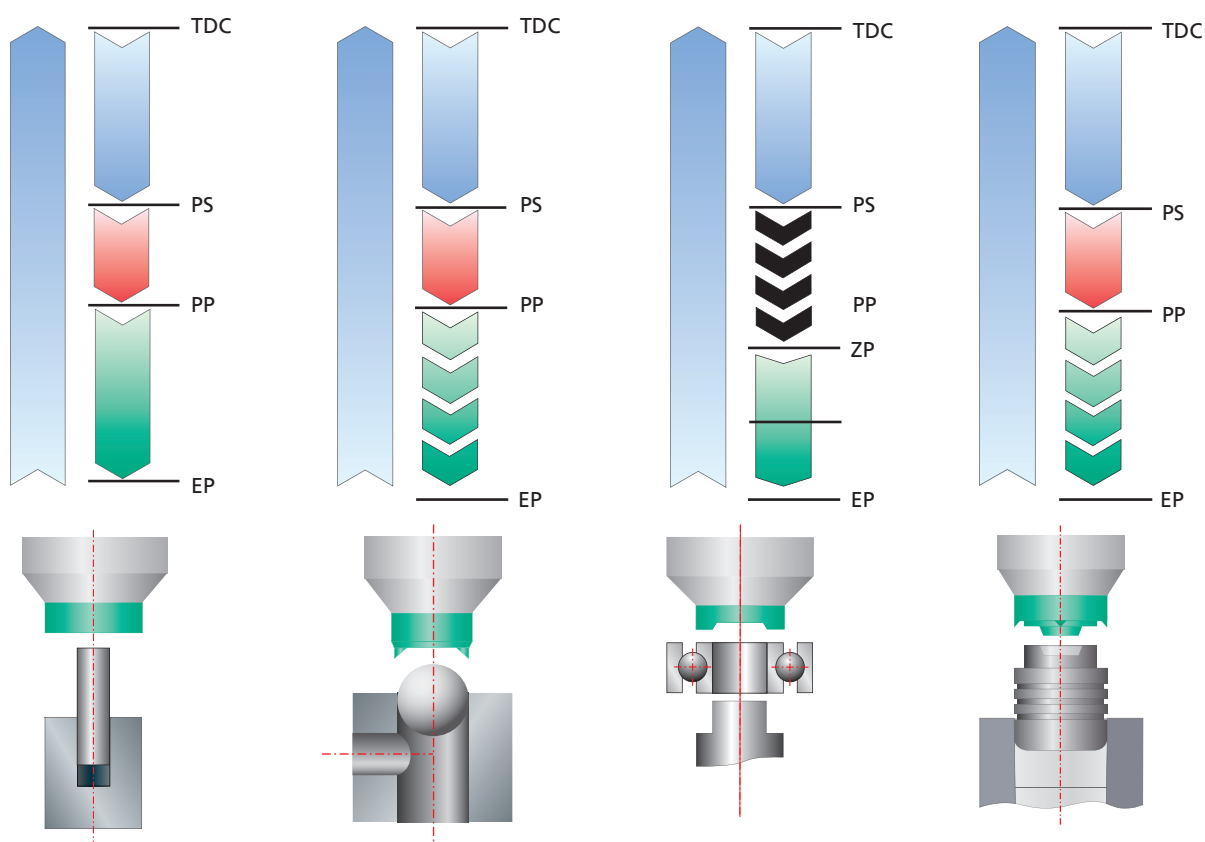
For processes in which the force reached is a measure for the process quality e. g. material compression.

Target is "Delta Stroke" with probing Force

For processes in which component tolerances must be detected. The press detects the surface and presses to a programmed distance from.

Target is "Force Increase"

The return stroke is triggered by detecting a customer defined force slope.

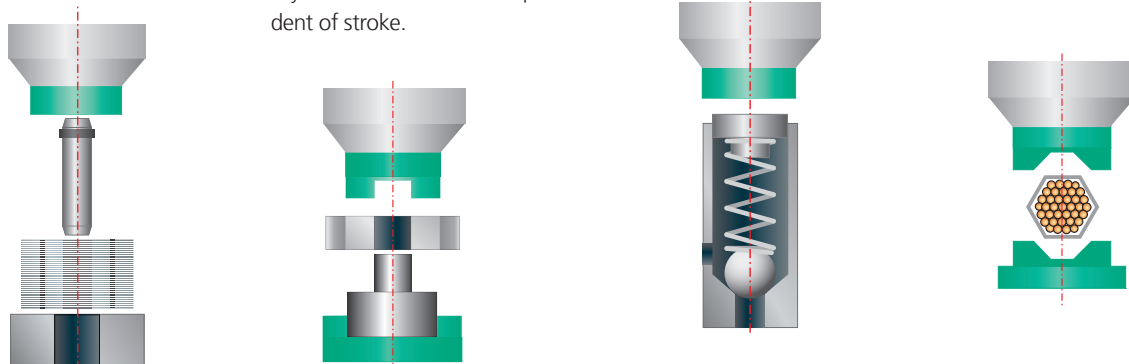


Pressing until reaching a specified position leads to precise results in connection with bending compensation.

Plugging blind bores – a sphere is pressed in and crimped. Force output correlates to material density and retain force independent of stroke.

Pressing to a predetermined force which identifies a target feature with which the final pressing distance is measured and pressed.

Pressing of "Beta" plugs or „König“ expanders. Sealing and retaining function depend on a force increase that is the return stroke criterion for the press.



SCHMIDT® ServoPress/TorquePress

Uncompromising Quality

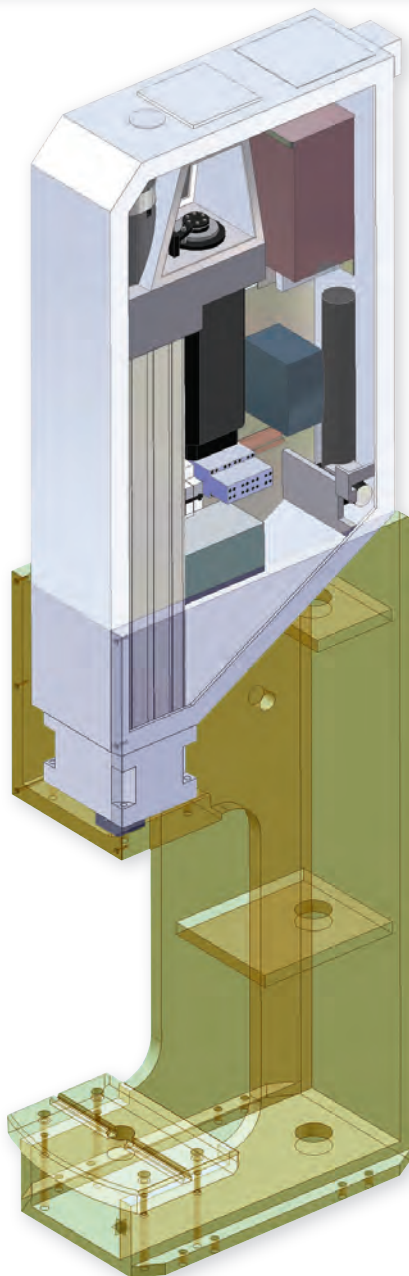
The solid, unique mechanics of the **SCHMIDT® ServoPress/TorquePress** is an essential for precise joining results, even in the toughest industry environments.

Test Bench

Before a new model is released, modules are endurance tested under the most severe operating conditions.

The rigorous testing helps identify limitations. Improvements are implemented, which ultimately benefit you.

- Test duration is 3 months
- 20 million loading cycles over the entire working stroke with nominal force and lateral forces components at full travel speed
- Cycle time approx. 2 seconds



Continuous full load capable Modules

- Over the entire ram stroke
- With rapid process times
- Via exact roller guiding of the ram with little play
- Square ram benefits
 - Insensitive to lateral forces
 - Locked against rotation (without additional friction such as with slot guidance)

Built-in Auto-Protection and Maintenance

- Fully automated spindle lubrication
- Mechanical clutch as overload protection for motor & load cell
- Cooling and thermal monitoring of mechanical and electronic system
- Current limitation if exceeding admissible load
- Machine safeguarded against operator error

Service-friendly

- Low maintenance
- Easy module change possible. The control unit recognizes the new module. No modifications of the data sets are necessary. This is achieved due to a high-precision ram position in the reference point with relation to the supporting surface

Built-in Safety in LV system EC type-approved

- Two-channel safety circuit, PLe

As a Result, this means the following for your Application:

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

SCHMIDT® ServoPress

Modules with large Application Range



Press Typ 405

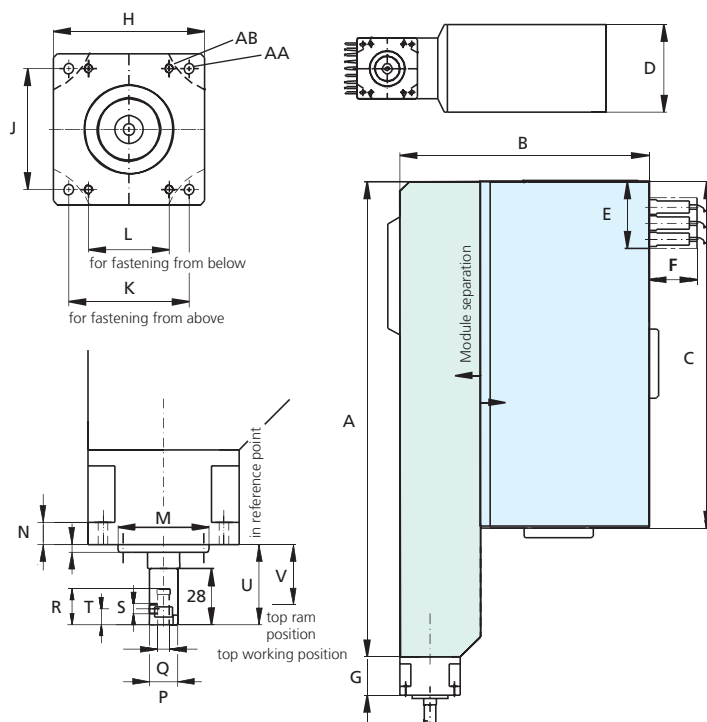
Press Typ 415/416

Press Typ 417

Press Typ 420

Press Typ 450/460

ServoPress 405



ServoPress 415 to 460

