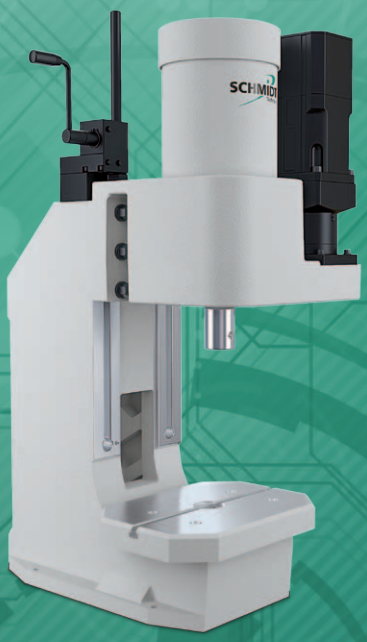
SCHMIDT® Technology

Electric Presses

SCHMIDT® ElectricPress, ServoPress and TorquePress



SCHMIDT Technology GmbH
Feldbergstr. 1 · 78112 St. Georgen · Germany
Tel. +49 (7724) 899 0 · Fax +49 (7724) 899 101
info@schmidttechnology.de · www.schmidttechnology.de

SCHMIDT Technology Ltd.
United Kingdom (UK)
Tel. +44 (0) 118 930 5464 · Fax +44 (0) 118930 5440
sales@schmidttechnology.co.uk · www.schmidttechnology.co.uk

SCHMIDT® ElectricPress
A new approach to assembly technology

The use of electric drives instead of pneumatic or hydropneumatic driven cylinders is a modern advancement in assembly technology. **SCHMIDT Technology** combined its proven rack & pinion and ServoPress experience to create a new electric drive technology, providing high efficiency, full programmability and precision in a flexible pressing system.

The success of your products depends to the highest degree on process-reliable and, above all, economical assembly:

- process-safe due to reliable quality statements
- economical due to a significant reduction in operating costs thanks to electric motor drive technology.

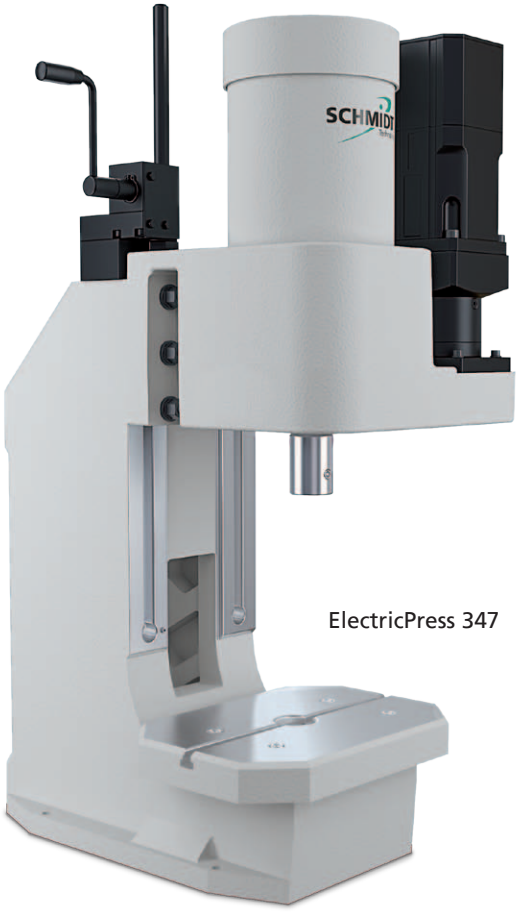
The synergy of both criteria is fulfilled by the press system **SCHMIDT® ElectricPress** with up to **20 kN** maximum force and the controls **SCHMIDT® PressControl 75** for **SCHMIDT® ElectricPress 43** and **45** or **SCHMIDT® PressControl 700x** for the force-displacement monitored systems. These well-known and proven components for robust use in automation technology guarantee exactly this success.

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

- Simple parameterisation minimises commissioning time
- Quick changeover procedures due to retrievable operating profiles
- Increased flexibility
- Cost reduction of tools and their wear due to free, precise positioning.
- The low noise level provides a stress-free working environment.
- The design-related non-existent stick-slip effect optimises the assembly process compared to pneumatic drives, especially at low speeds.

The expected high quality demands are met not least on the test bench. To determine the typical service life of 2 x 10^7 press cycles, the test was based on minimum requirements. The mechanical, electrical and motor components as well as the thermal behaviour of the entire system passed this stress test with flying colours.

- Real-time process monitoring
- High energy efficiency
- Simple integration
- Reproducible travel profiles
- Purely electric drive
- Height adjustable



ElectricPress 347

ElectricPress 345

SCHMIDT® ElectricPress 43/45
with **PressControl 75**

SCHMIDT® **ElectricPress** manual workstation with **SafetyModule** on PU 20

SCHMIDT® **PressControl 75** for quick set-up or rapid change-over and easy programming of press parameters; stores up to 24 datasets for us in manual workcells with **SCHMIDT Technology**'s proven and certified safety technology.
This combination can be used both in manual workstations as well as in automation solution.

SCHMIDT® ElectricPress 43 automation

Characteristics:

- Reproducible values for position, velocity, acceleration and deceleration
- 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 343/345
with PressControl 700/7000

Paired with a **SCHMIDT®** PressControl 700 or PressControl 7000 the ElectricPress becomes a force/stroke monitored system. Its closed-loop force and position control ensures highest accuracy and facilitates the programming of complex ram motion profiles for a wide variety of pressing applications.

In addition to the position controller, **SCHMIDT®** ElectricPress also works with a real force controller (force as a controlled variable).

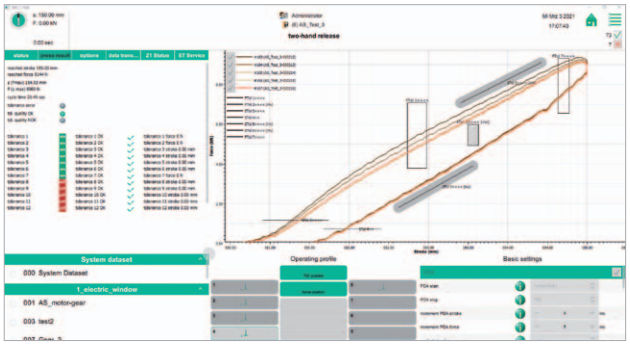
- Rapid approach of target force or position
- No over-shoot of programmed force or position
- Positioning accuracy in a range of 1/100 mm under constant loads
- Perfectly adapts to each application
- Pre-programmed with optimal acceleration/deceleration values
- Graphic display of force/time and stroke/time facilitates cycle time optimization

Single workstations

In conjunction with type-examined safety techniques **two-hand release**, **light curtain** and **SCHMIDT®** SmartGate

Automation

SCHMIDT® ElectricPress 343, 345 and 347 with **SCHMIDT®** PressControl 7000 control for automation solution



Process visualization

SCHMIDT® ElectricPress 347 automation

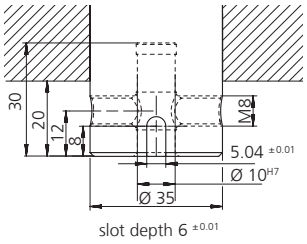
SCHMIDT® ElectricPress
Technical Data 43/343/45/345

Press Type			43	343	45	345
Force F max. [1]		kN	4	4	10	10
Force F at 100 % duty cycle [2]		kN	2,5	2,5	6	6
Ram stroke	A	mm	100	100	150	150
Ram speed max.		mm/s	200	200	200	200
Drive resolution		µm	< 1	< 1	< 1	< 1
Resolution PDA - Stroke - Force		 µm/inc N/inc		 1,69 1,25		 2,4 3,0
Throat depth	C	mm	129	129	129	129
Decibel level		dB A	60	60	60	60
Power supply - motor power - logic unit			 208 – 240 V AC ±10 % 24 V DC / 2 A	 208 – 240 V AC ±10 % 24 V DC / 2 A	 208 – 240 V AC ±10 % 24 V DC / 2 A	 208 – 240 V AC ±10 % 24 V DC / 2 A
Working height frame 7-420 [3] Working height frame 7-600 [3]	F	mm	62 – 420 100 – 610	62 – 420 100 – 610	50 – 360	50 – 360
S-H x S-B x S-T		mm	402 x 207 x 385	402 x 240 x 385	530 x 245 x 410	530 x 275 x 410
Weight		kg	35	35	59	59
PRC Gateway, number of I/O's				16 inputs / 16 outputs		16 inputs / 16 outputs

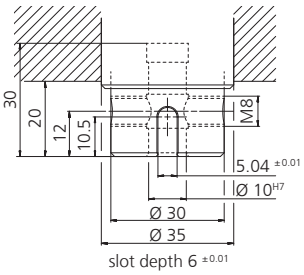
Frame Overview	Press Type	Frame Height M (mm)	Table Size B x T (mm)	Table Bore D Ø (mm)	Table Height K (mm)	Mounting surface (mm)
No. 7-420	43, 343, 45, 345	740	180 x 150	20^{H7}	90	220 x 362
No. 7-600	43, 343	960	180 x 280	20^{H7}	110	220 x 465

[1] Temporary peak load
[2] Nominal power in continuous operation
[3] Typical values; can vary ±3 mm due to casting and production tolerances

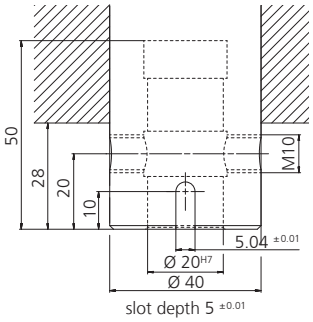
Ram press type 43



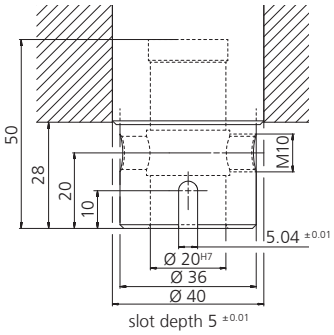
Ram press type 343

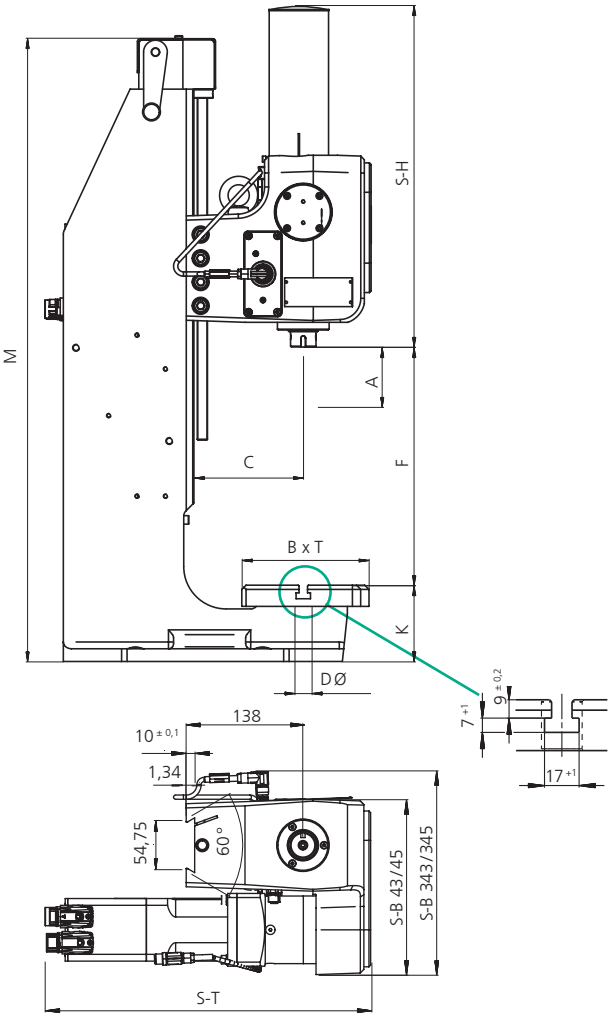


Ram press type 45



Ram press type 345





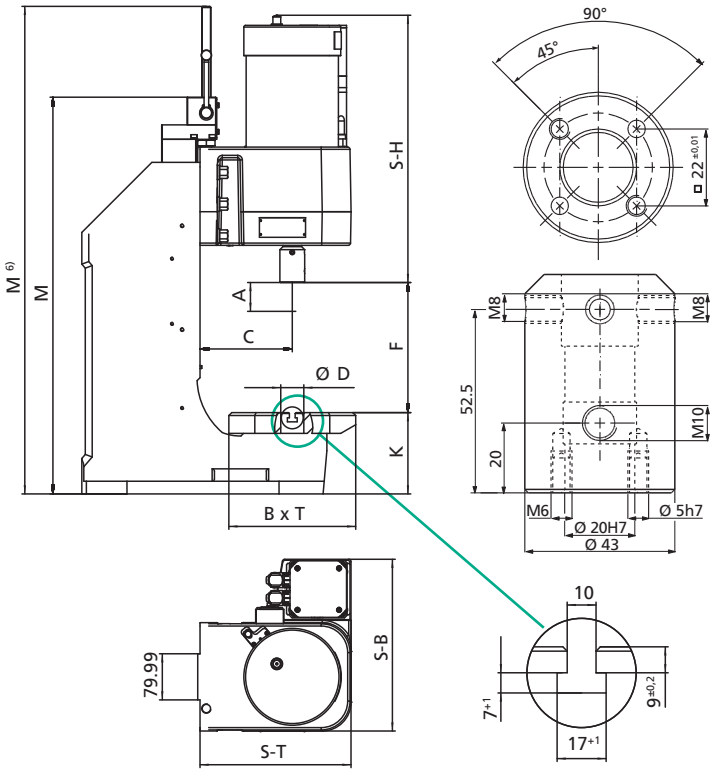
SCHMIDT® ElectricPress
Technical Data 347

Press type			347
Force F max. [1]		kN	20
Force F at 100 % duty cycle [2]		kN	13
Ram stroke	A	mm	150
Ram stroke max.		mm/s	100
Drive resolution	E	µm	< 1
Resolution PDA – stroke – force		 µm/inc N/inc"	 2,30 6,25
Throat depth	C	mm	160
Decibel level		dB A	66
Power supply – motor power – logic unit			208 – 240 V AC ±10 % 1.3 kW 24 V DC / 2 A
Working height frame 35 [3] frame 35-500 [3] frame 35-600 [3]	F	mm	 18 – 225 80 – 495 196 – 612
S-H x S-B x S-T		mm	464 x 298 x 261
Weight		kg	66
PRC Gateway, number of I/O's			16 inputs / 16 outputs

Frame overview	Press type	Frame Height M (mm)	Table Size W x D (mm)	Table Bore D (Ø mm)	Table Height K (mm)	Mounting Surface W x L (mm)	Frame Weight (kg)
No. 35	347	688 / (846) [6]	300 x 220	40H7	141	300 x 475	99
No. 35-500	347	983 / (1371) [6]	300 x 220	40H7	166	300 x 560	213
No. 35-600	347	1100 / (1488) [6]	300 x 220	40H7	166	300 x 590	242

[1] Temporary peak load
[2] Nominal power in continuous operation
[3] Typical values; can vary ± 3 mm due to casting and production tolerances
[6] incl. threaded rod Höhenverstellung

Ram press type 347



SCHMIDT® ServoPress
Forces ranging from 0.03 kN to 250 kN

605 | 616 | 617 | 620 | 650/655/660/680

Cost-effective assembly is crucial for product success. The aim is to produce accurate, complex assemblies using inexpensive, widely accepted individual components. For **SCHMIDT® ServoPress** systems, this has not been a challenge for decades but an everyday reality, even in tough industrial environments.

The modules serve as parts in assembly systems and, along with our safety technology, are used in single workstations.

SCHMIDT® ServoPress 602
For assembly tasks in the field of fine and micromechanics, the bar for precision has been elevated even further. The high-precision **SCHMIDT® ServoPress 602** enhances the product line with unmatched accuracy and repeatability in force and position.

Full load resistance

Integrated energy management

Absolute, direct position measuring system

Machine protection

Service-friendly design

Ergonomic features

SCHMIDT® ServoPress Modules
For a broad range of applications

The unrivaled solid construction of the **SCHMIDT® ServoPress** is the foundation for precision assembly results, even in the most rugged industrial environments. Before released for serial production, each newly designed press module undergoes test bench validation under the harshest of conditions. It is this testing that provides valuable insights for improvement of the design. A test run consist of 20 million cycles with maximum stroke, at full speed and pressing to full force while subjecting the ram to side loads.

Direct ram stroke measuring system

Precision sensor and scale integrated into the press module for direct ram stroke measurement. Tied directly to the PLC/CNC of the system for positioning based on ram location.

- Micron level positioning repeatability thanks to high resolution
- Compression compensation under full load
- Correction of ball bearing pitch inaccuracies
- Temperature related material expansions/contractions do not impact measuring results
- High resolution position feedback for process monitoring

Integrated load cell

Load cell tied into the control of the system to provide:

- True closed loop force control of the ram movement.
- No overshoot of the programmed force
- A constant force regardless of part / environment / system changes.
- True force feedback for process monitoring

Nominal force of module available

- 100 % of the time
- At any ram position
- For any duration
- Maximum force available in S3 Mode

System Protection

- Automatic spindle lubrication system
- Overload protection clutch (except ServoPress 605)
- Active cooling and thermal monitoring of electronic and mechanical components
- Current limiter

Maintenance friendly

- Automatic spindle lubrication system
- Integrated used grease depot
- No filters
- Plug-and-play module recognition

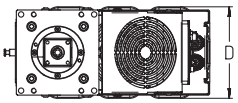
Integrated and EC type-approved operator safety with light-curtain, SmartGate and SmartGuard work cells.
ServoPress 650, 655, 660 and 680 are equipped with brake energy recuperation technology.

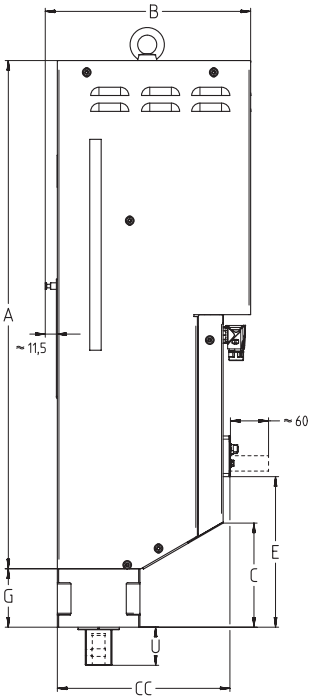
What does this mean for you?

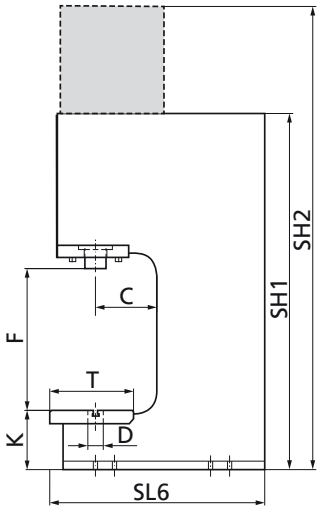
- Highest degree of efficiency
- Maximum operational availability
- Highest reliability

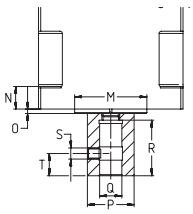
Modules
With force from 0.5 kN to 250 kN

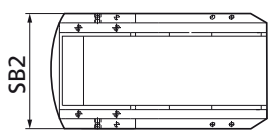
Press type		605	616	617	620	650	655	660	680
Force F max. S3 25 %, 20 s	kN	1	5	14	35	75	110	160	250
Force F 100 % continuous run	kN	0.5	3	7.5	20	50	80	110	200
Ram stroke	mm	150	200	300	400	500	500	350	350
Ram speed	mm/s	0 – 300	0 – 200	0 – 200	0 – 200	0 -200	0 -100	0 – 100	0 – 50
Resolution position control	µm	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Resolution PDA stroke	µm/inc	2.2	3.2	4.6	6.1	7.6	7.6	5.4	5.4
Resolution PDA force	N/inc	0.3	1.5	3.75	10	24	32	48	75
Power supply (V AC / 50 – 60 Hz)	V AC ±10 %	208 – 240	208 – 240	400 – 480 /3~	400 – 480 /3~	400 – 480 /3~	400 – 480 /3~	400 – 480 /3~	400 – 480 /3~
Module dimensions									
A	mm	574	535	800	957	1130	1130	1249	1249
G	mm	62	63.5	92	120	120	120	-	-
B	mm	155	252	318	384	555	555	552	552
D	mm	89	124	144	190	244	244	249	249
U	mm	40	50	60	60	60	60	67	114
Weight module	kg	11.6	25	64	113	225	225	283	283
Dimensions with C/H-frame SH2 / SB2 / SL6	mm	1015 / 160 / 365	1062 / 220 / 405	1467 / 250 / 460	1810 / 300 / 563	2112 / 370 / 636	2132 / 370 / 725	2136 / 390 / 761	2042 / 625 / 614
Throat depth C	mm	130	130	150	160	160	160	160	160
Working height with C/H-frame F	mm	246	300	387	518	612	602	600	500
Table bore D	Ø	20^{H7}	20^{H7}	40^{H7}	40^{H7}	40^{H7}	40^{H7}	40^{H7}	40^{H7}
Weight with frame	kg	45	101	166	334	553	757	805	729
Ram dimensions									
Ram P	mm	ø 25	ø 40	42 x 42	55 x 55	65 x 65	65 x 65	ø 90	ø 90
Ram bore Q	mm	6^{H7}	10^{H7}	20^{H7}	20^{H7}	20^{H7}	20^{H7}	20^{H7}	20^{H7}
Ram bore depth R	mm	18	30	50	50	50	50	50	50
Tool weight max.	kg	≤5	≤15	≤25	≤50	≤100	≤100	≤100	≤100











SCHMIDT® ServoPress 602
Precision in perfection

The ServoPress systems are renowned for their exceptional repeatability in the lower micrometer range. This is further enhanced by their precise force control, which delivers an accuracy of ±1 N and a repeatability of 0.4 N.
The high-precision press incorporates either a two-hand safety concept, a light curtain, or the **SCHMIDT® SmartGuard** solution. These design features collectively enhance the press's unprecedented level of precision.

Precision Mechanics

The press ram is guided throughout the entire stroke using profile rails:
- Maximum stiffness, even at full stroke (no bending)

Force sensor integrated into the base:
- Mechanical overload protection
- Mechanical decoupling from the drive train

The press column, made of ground tool steel, is an integral part of the pressing system:
- High stiffness and dimensional accuracy

XY fine adjustment on the press table:
- Easy and precise alignment

Accuracy of Measurement Technology

Patented Absolute Position Measurement for the ram and press head:
- No need for a reference stroke to the datum position

The load cell is impervious to the effects of:
- Lateral forces
- The weight of the upper tool
- Thermal influences from the motor and mechanical friction

Standard Features

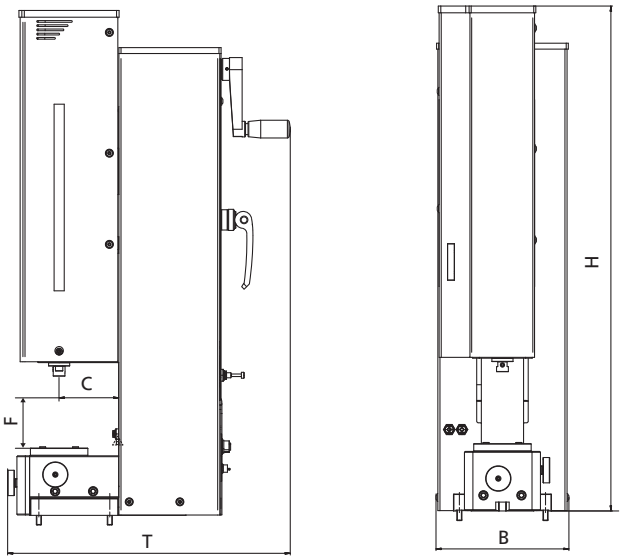
- Two air connections in the front cover plate, prepared for compressed air and/or vacuum in the work area
- Dimmable process area lighting integrated into the ram
- Status indicator (e.g. good/bad pressing result, machine status)
- Tool-free height adjustment of the press head, working height range from 86.5 – 136.5 mm
- Adapter for lubricating the ball screw, enabling lubrication in any position without removing the cover plates

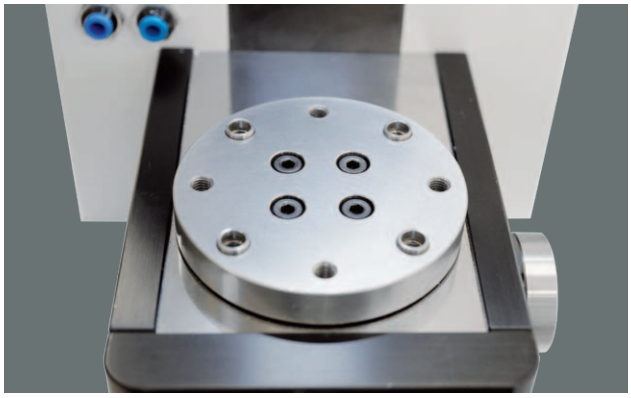
The latest model in the **SCHMIDT® ServoPress** family is meticulously crafted to excel in precision pressing tasks across various industries, including precision mechanics, spring testing, medical device technology, the watch and jewelry industry, and small motor and electronics manufacturing.

SCHMIDT® ServoPress 602

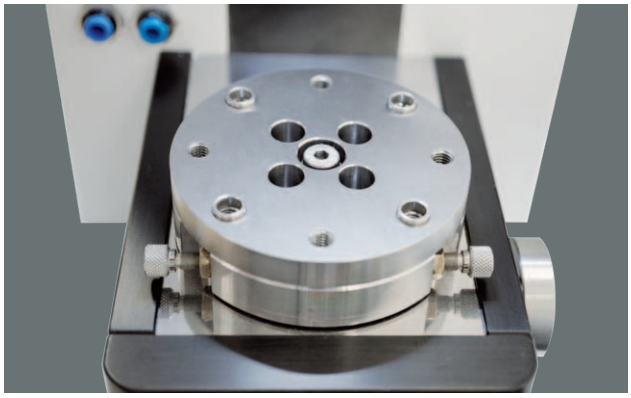
Technical Data		ServoPress 602
Force F_{max}	N	300
Nominal force F 100 % ED	N	200
Ram stroke	mm	75
Working height F	mm	85.2 – 135.2
Speed	mm/s	0 – 150
Throat depth C	mm	70
Dimensions W x H x D	mm	158 x 648 x 337
Weight	kg	38 kg
Force accuracy	N	±1
Repeatability of position	µm	±1
Repeatability of force	N	0.4
Resolution of position	µm	0.1
Resolution of process data acquisition	µm	2.2
Resolution of force	N	0.1
Power supply (V AC / 50 – 60 Hz)	V AC ±10 %	120 – 240

Technical Data		SmartGuard 602
Opening stroke, programmable	mm	up to 160
Speed closing opening	mm/s mm/s	up to 500 up to 1000
Dimensions W x H x D	mm	357 x 735 x 380
Weight	kg	36





Technical Data	XY slide table in the press table
Adjustment Range ±0.5 mm	Fine adjustment for alignment optimization 1/100 mm



Technical Data	Turntable (Option)
Diameter	68 mm
Mounting thread	8 x TK55 M5
Centering sleeves	4 x 7^{H7} mm
Adjustment range	±10°, fine adjustment for alignment optimization 0,01°

SCHMIDT® ServoPress/TorquePress
Superior Control Functionality

Attaching a ball screw to a servo or torque motor isn't enough to produce perfect assemblies. Key to consistent pressing results is having a control that communicates in a fast and accurate manner with the motor's drive.

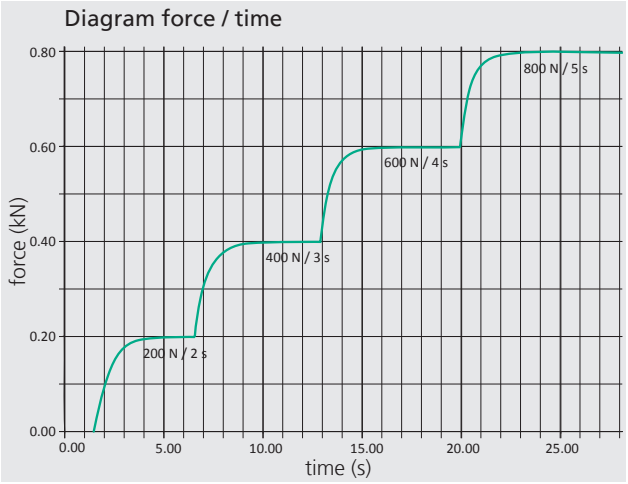
To achieve this, the drive, measuring unit and controller must be fully integrated. This is exactly what the **SCHMIDT® ServoPress** and TorquePress systems provide.

SCHMIDT® ServoPress and **TorquePress** modules with **PressControl 700** or **7000** provide:

- True closed-loop force and position control
- Rapid approach of target force or position with no over-shoot, even during dwell times.
- Positioning repeatability of 1 micron under constant conditions
- Adjustable control parameters
- Standard operation profiles for pressing to position, force, delta stroke, slope or external signal with no special programming required
- Pre-set and optimized acceleration/deceleration values
- Graphic display of Force/Time and Stroke/Time facilitates cycle time optimization

Key characteristics:

- Integrated measurement technology (200Hz measuring frequency)
- Backlash-free stroke measurement
- Zero side load force measurement
- Digitalization of process signals right at the module, making the system impervious to EMI.
- Complete closed loop control system via the **SCHMIDT® PressControl 700 / 7000**
- Optimized PLC for press control
- Software based PLC with integrated CNC for rapid signal processing



SCHMIDT® TorquePress
Compact, with high efficiency and hollow shaft motor

In addition to the ServoPress series, the **SCHMIDT®** TorquePress has a number of special features. Among other things, a hollow-shaft torque motor is used, which enables very high press forces with a very high motor torque without additional mechanical transmissions.

Compared to other electric presses, the noise level remains remarkably low under all load conditions. The spindle nut, which is driven directly without the use of additional gears, enables very high levels of efficiency. Thanks to the hollow shaft motor, the **TorquePress** is particularly compact and enables short overall lengths.

SCHMIDT® TorquePress are EC type-tested in connection with the safety technology options **SmartGate**, **SmartGuard** and **light curtain** and optionally with the particularly economical one **2-hand operation** .

TorquePress 520

TorquePress 560

Nominal force of module available
- 100 % of the time
- At any ram position
- For any duration
- Maximum force available in S3 Mode

Direct ram stroke measuring system
Precision sensor and scale integrated into the press module for direct ram stroke measurement. Tied directly to the PLC/CNC of the system for positioning based on ram location.
- Micron level positioning repeatability thanks to high resolution
- Compression compensation under full load
- Correction of ball bearing pitch inaccuracies
- Temperature related material expansions/contractions do not impact measuring results
- High resolution position feedback for process monitoring

Integrated load cell
Load cell tied into the control of the system to provide:
- True closed loop force control of the ram movement.
- No overshoot of the programmed force
- A constant force regardless of part / environment / system changes.
- True force feedback for process monitoring

System Protection
- Automatic spindle lubrication system
- Overload protection clutch
- Active cooling and thermal monitoring of electronic and mechanical components
- Current limiter

Maintenance friendly
- Automatic spindle lubrication system
- Integrated used grease depot
- No filters
- Plug-and-play module recognition

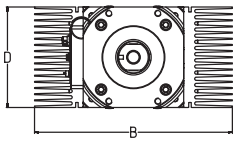
Efficiency
TorquePress 560 is equipped with brake energy recuperation technology.

What does this mean for you?
- Highest degree of efficiency
- Maximum operational availability
- Highest reliability

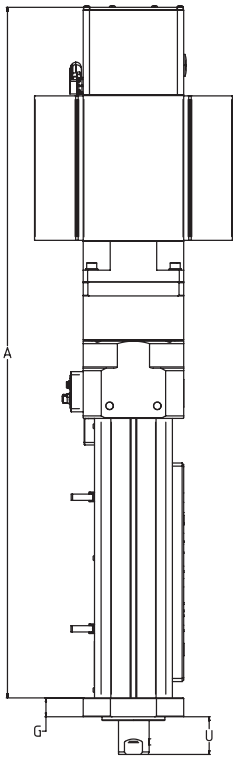
SCHMIDT® TorquePress

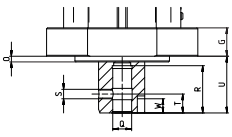
With force outputs from of 20 kN to 100 kN

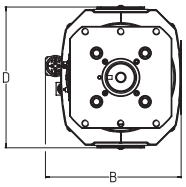
Press type		TorquePress 520	TorquePress 560
Force F max. S3 25 %, 20 s	kN	20	100
Force F 100 % continuous run	kN	10	50
Ram stroke	mm	250	300
Ram speed	mm/s	0 – 260	0 – 200
Resolution position control	µm	<1	<1
Resolution PDA stroke	µm	4	4.6
Resolution PDA force	N/inc	6.25	30
Power supply (V AC / 50 – 60 Hz)	V AC ±10 %	3 x 400 – 480	3 x 400 – 480
Frame dimensions			
A	mm	1102	1399
G	mm	30	39
B	mm	315	288
D	mm	160	304
U	mm	60	60
Weight approx.	kg	95	230
Dimensions of press module with frame SH2/SB2/SL6	mm	1664 / 300 / 568	2325 / 390 / 758
Throat depth with frame C	mm	160	160
Working height with frame F	mm	340	787
Table bore D	Ø	40^{H7}	40^{H7}
Weight with frame approx.	kg	127	552
Ram dimensions			
Ram P	mm	ø 50	ø 60
Ram bore Q	mm	20^{H7}	20^{H7}
Ram bore depth R	mm	50	50
Tool weight max.	kg	≤25	≤100



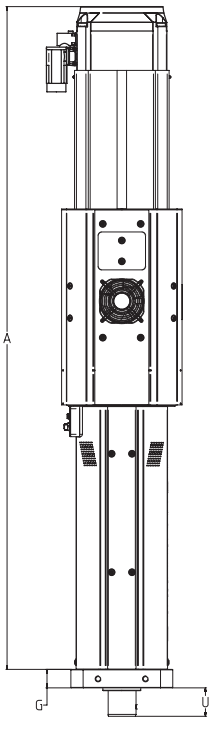
TorquePress 520

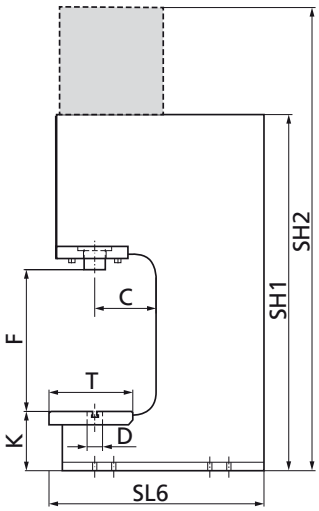


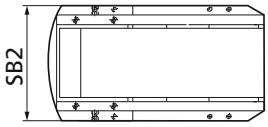




TorquePress 560





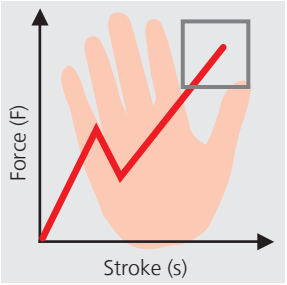


Detailed dimensional drawings can be downloaded:
www.schmidttechnology.com

Dynamic Bend Up Compensation

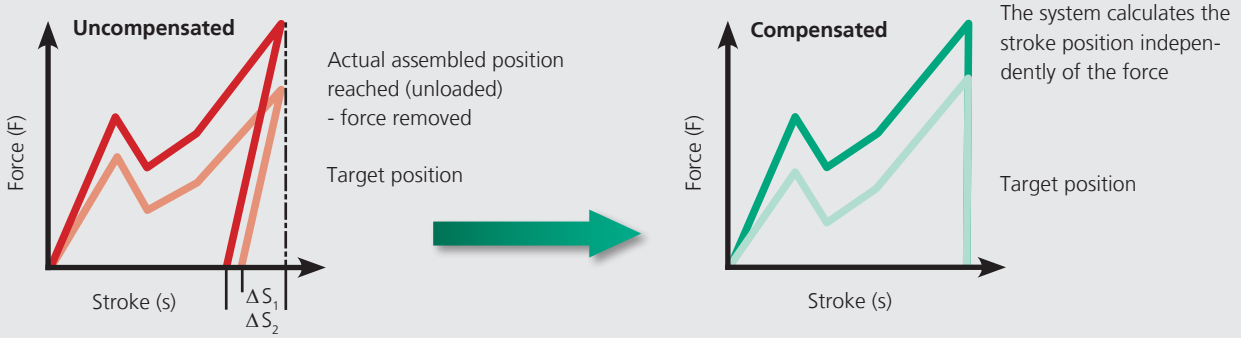
In order to achieve assembly requirements in the 1/100 mm range, compensation of the system yield is required. Work piece, tooling and machine are elastically deformed by the varying forces induced during the pressing process. Once the operation is complete and the press force is removed, this deformation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

Patented Dynamic Bend up compensation by **SCHMIDT Technology**

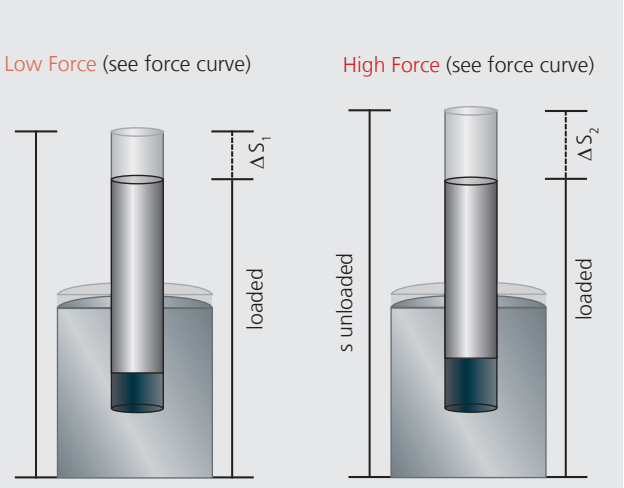


In typical applications, the force required to complete an assembly varies up to 40 % from part to part. When freely positioning, such as without a positive stop, the press ram extends to the same target position, regardless of load. But a closer inspection of the completed assembly and the force/distance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

- 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.



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