

Electric Presses

SCHMIDT[®] ElectricPress, ServoPress and TorquePress



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.

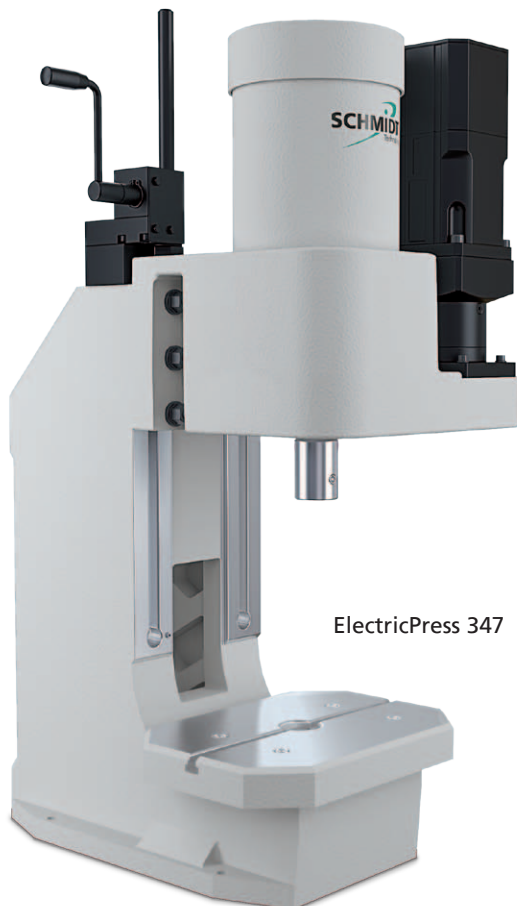
The synergy of both criteria is fulfilled by the press system **SCHMIDT® ElectricPress** with up to 20 kN maximum force and the controls **SCHMIDT® PressControl 75** for **SCHMIDT® ElectricPress 43** and **45** or **SCHMIDT® PressControl 700x** for the force-displacement monitored systems. These well-known 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 2×10^7 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



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 use 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

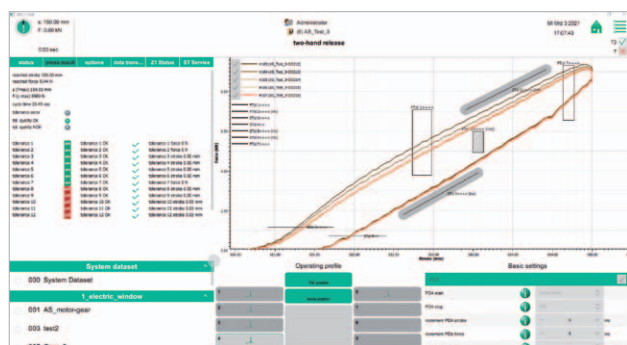


Single workstations

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

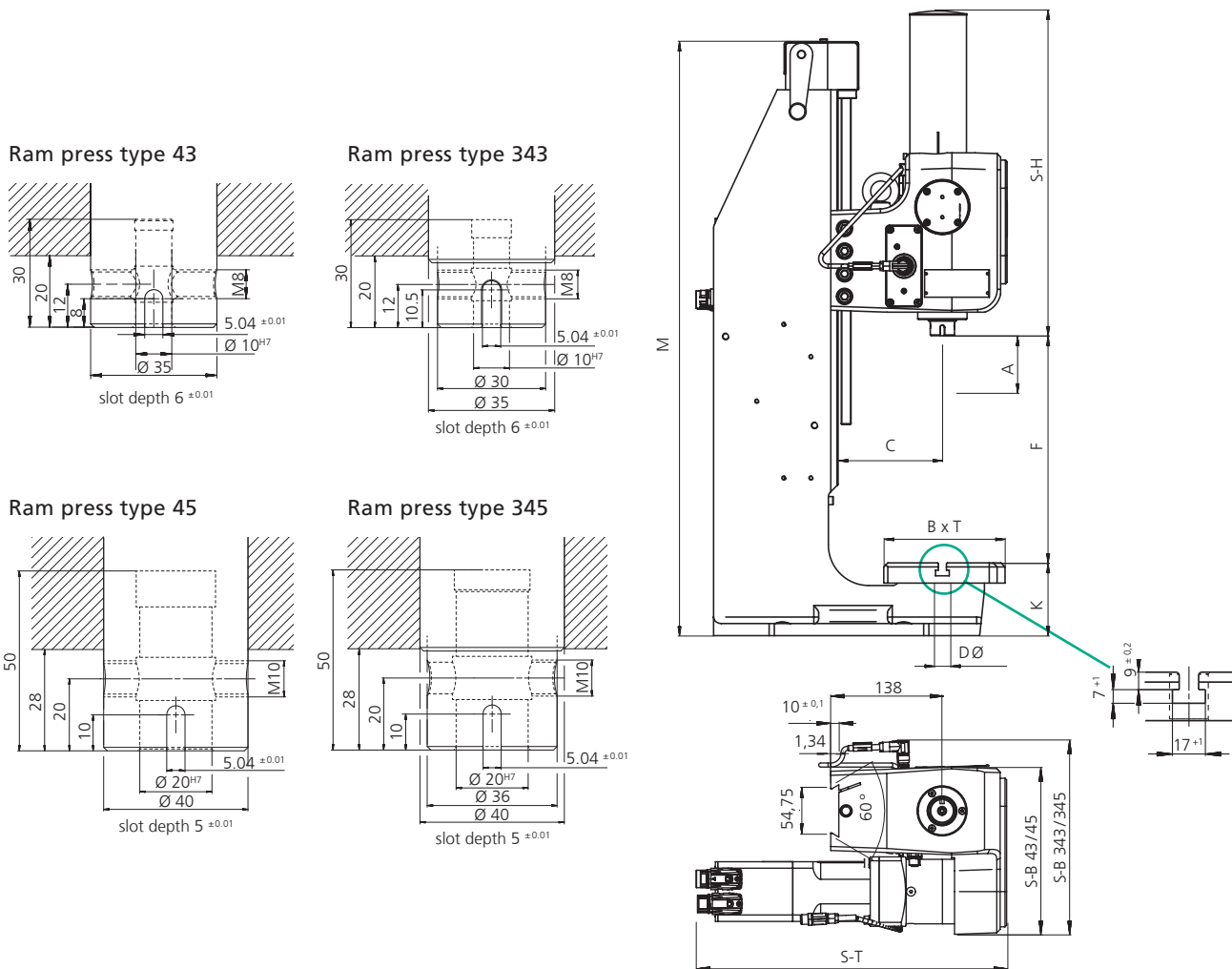
SCHMIDT® ElectricPress

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		µm/inc		1,69		2,4
- Force		N/inc		1,25		3,0
Throat depth	C	mm	129	129	129	129
Decibel level		dBA	60	60	60	60
Power supply						
- motor power			200 – 240 V AC / < 6 A	200 – 240 V AC / < 6 A	200 – 240 V AC / < 10 A	200 – 240 V AC / < 10 A
- logic unit			24 V DC / 0,5 A	24 V DC / 0,5 A	24 V DC / 0,5 A	24 V DC / 0,5 A
Working height frame 7-420 ³⁾			62 – 420	62 – 420	50 – 360	50 – 360
Working height frame 7-600 ³⁾	F	mm	100 – 610	100 – 610		
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



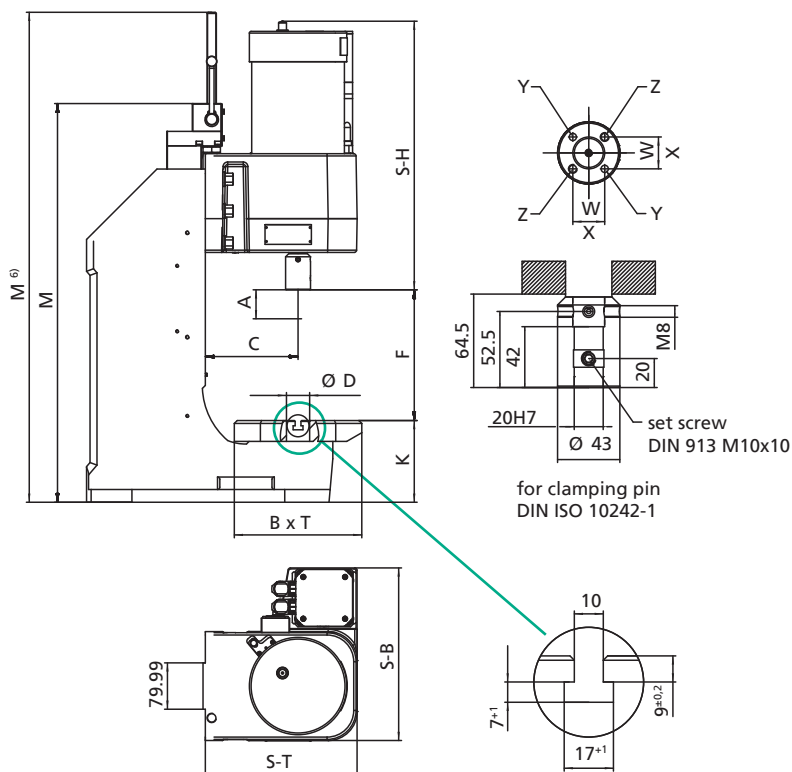
SCHMIDT® ElectricPress

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		µm/inc	2,30
– force		N/inc ³⁾	6,25
Throat depth	C	mm	160
Decibel level		dB A	66
Power supply			200 – 240 V AC < 10 A
– motor power			1.3 kW
– logic unit			24 V DC / 0.5 A
Working height			
frame 35 ³⁾	F	mm	18 – 225
frame 35-500 ³⁾			80 - 495
frame 35-600 ³⁾			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



SCHMIDT® ServoPress

Forces from 1 kN bis 250 kN



Press type 605

Press type 616

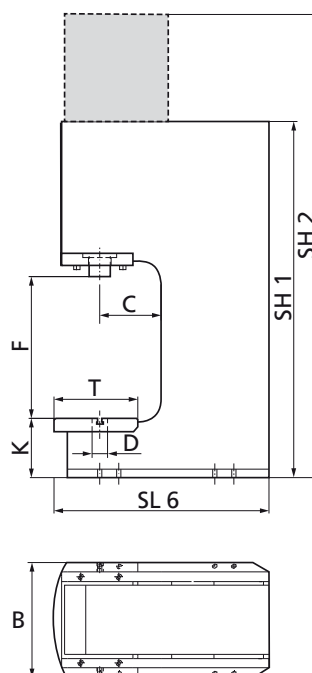
Press type 617

Press type 620

Press type 650/655/660/680

An efficient assembly process is crucial for the success of your company. Parts with individual tolerances must be joined to create an accurate assembly. Electrically driven screw type actuators (servo presses) are ideally suited for this task. The high precision **SCHMIDT® ServoPress** paired with a specifically designed **SCHMIDT® PressControl 700** or **7000** offers the perfect solution both as a single work cell or in an automated assembly line, combining full closed loop force and position control with full force and distance monitor.

All **SCHMIDT® ServoPress** modules are designed to press to their full load capacity, incorporate ram position measurement technology, integrated load cells, automatic spindle greasing and have a built-in overload protection clutch (except No. 605). When equipped with our light curtain/guarding, SmartGate or SmartGuard safety options, they meet the most current EC machinery directives for safety and can be provided with type approval documentation if required.



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.

Test bench validated

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 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 – 60 Hz)	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	∅ 25	∅ 40	□ 42	□ 55	□ 65	□ 65	∅ 90	∅ 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	∅ 20 ^{H7}	∅ 20 ^{H7}	∅ 40 ^{H7}	∅ 40 ^{H7}	∅ 40 ^{H7}	∅ 40 ^{H7}	∅ 40 ^{H7}	∅ 40 ^{H7}
Working height (ServoPress 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 (ServoPress 680 in H-frame-version)	SL 6	mm	365	405	460	563	636	725	761	614
Frame height (ServoPress 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
Housing										
	A	mm	574	535	800	957	1130	1130	1249	1249
	B	mm	155	252	318	384	555	555	552	552
	C	mm	62	119	165	210	260	260	200	200
	D	mm	89	124	144	190	244	244	249	249
Cable connection										
	E	mm	105	497	237	256	823	823	370	370
	F	mm	~60	~60	~60	~60	~60	~60	~60	~60
Flange										
	G	mm	62	63.5	92	120	120	120	-	-
	H	mm	75	75	130	140	150	150	230	230
	J	mm ¹⁾	60	88	120	160	210	210	130/210	130/210
	I	mm	75	109	134	180	235	235	230	230
	K	mm ¹⁾	60	63	115	120	130	130	130	130
	L	mm ¹⁾	40	59.4	75	-	-	-	-	-
	M	∅ mm	45h6	45h6	65h6	90h6	100h6	100h6	120h6	120h6
	N	mm	10.5	15	19	32	28	28	-	-
	O	mm	3.5	3.5	4	5	5	5	8	8
	AA	∅ mm	5.5	6.3	8.4	10.3	12.1	12.1	-	-
	BB	∅ mm	M5	M6	M8	M12	M14	M14	M14	M14
	CC	mm	130	239	272	344	542	542	482	482
Ram										
External ram dimensions	P	mm	∅ 25	∅ 40	42 x 42	55 x 55	65 x 65	65 x 65	∅ 90	∅ 90
Ram bore (with bushing)	Q	∅ mm	6H7	10H7	20H7	20H7	20H7	20H7	20H7	20H7
	R	mm	18	30	50	50	50	50	50	50
	S		M5	M8	M10	M10	M10	M10	M10	M10
	T	mm	8	10	20	20	20	20	20	20
Top working position	U	mm	40	50	60	60	60	60	67	114
Top ram position	V	mm	19.5	27.8	38.1	44.6	55	55	67	114
for pin bore	W	mm ²⁾	---	22	32	40	40	40	40	40
for thread	X	mm		22	32	40	40	40	40	40
	Y		---	M5	M6	M8	M8	M8	M8	M8
	Z	∅ mm	---	5H7	5H7	8H7	8H7	8H7	8H7	8H7

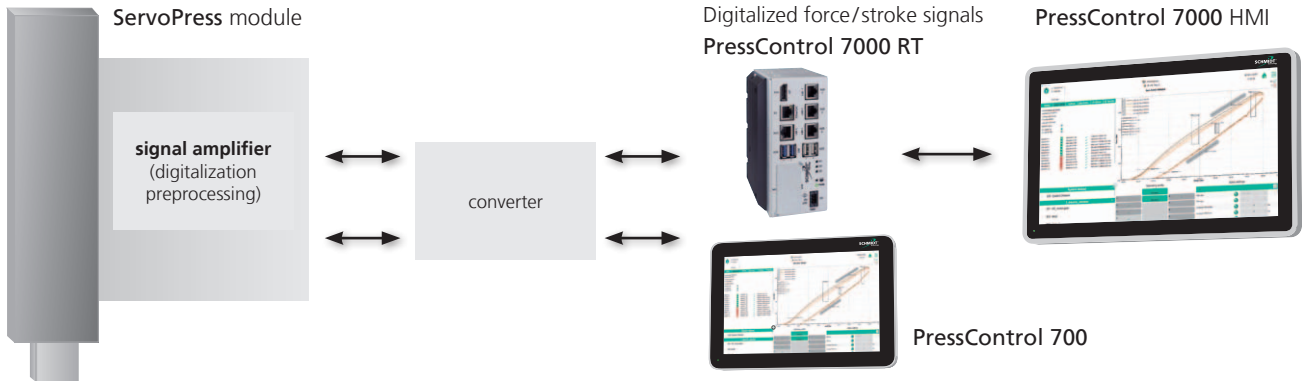
¹⁾ ±0.01 ²⁾ ±0.02

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.

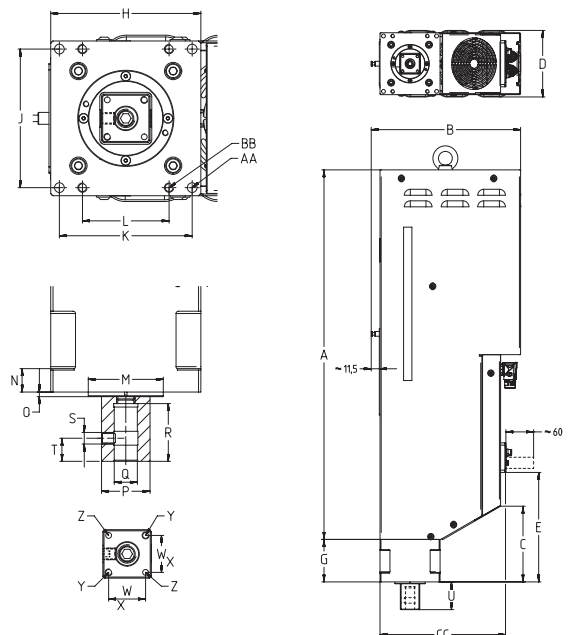
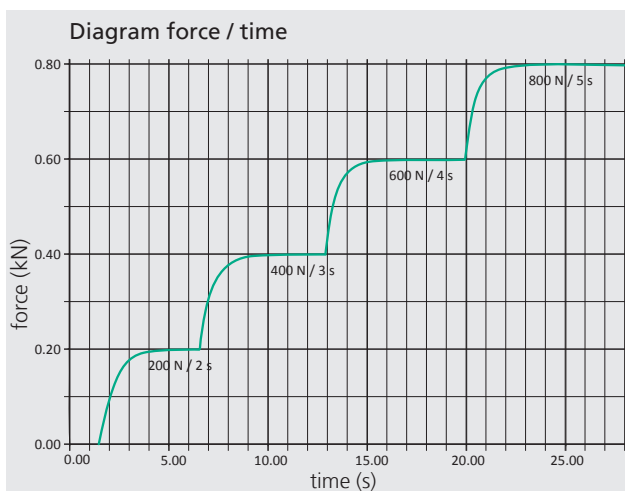


SCHMIDT® ServoPress and **TorquePress** modules with **PressControl 700** or **7000** provide:

- True closed-loop force & 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

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

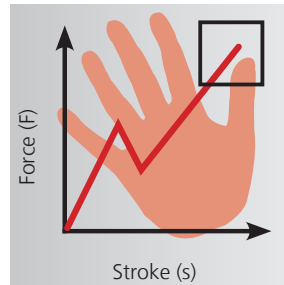
Detailed dimensional drawings can be downloaded:
www.schmidttechnology.de

Dynamic Bend Up Compensation

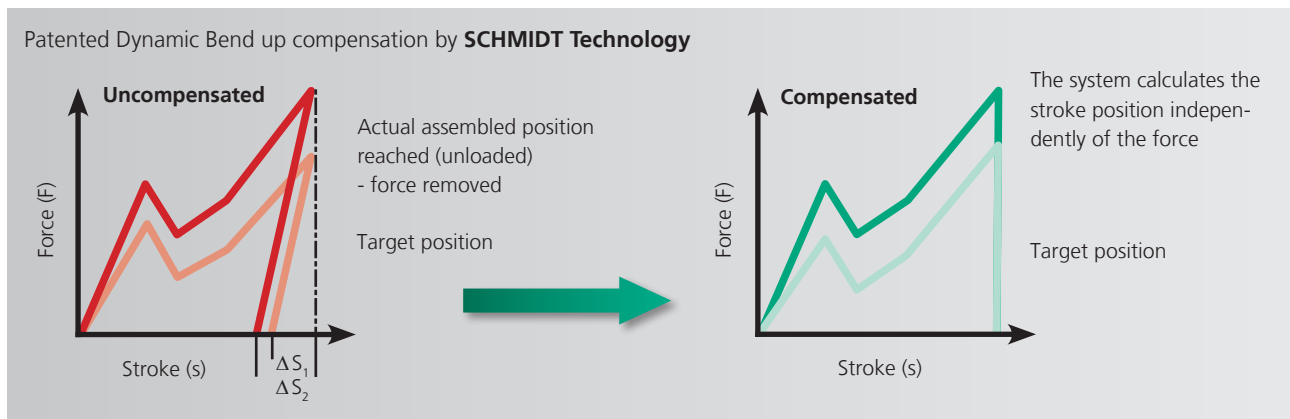
Patented Feature

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.

