

*Machines for
solid metal forming*

Screw presses

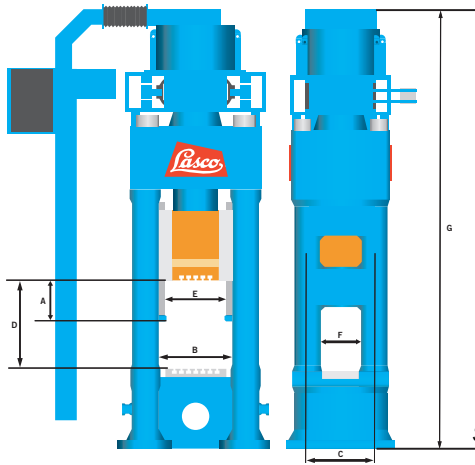


**LASCO UMFORMTECHNIK
WERKZEUGMASCHINENFABRIK**





SPR series



Schematic of SPR screw press

A = Ram stroke
 B = Ram width
 C = Ram depth
 D = Max. distance table/ram
 E = Daylight between guides
 F = Through-width of uprights
 G = Overall height

SPR series		400	500	630	800	1000	1250	1600
Nominal press force	[MN]	4	5	6,3	8	10	12,5	16
Permanently admissible press force	[MN]	6,3	8	10	12,5	16	20	25
Die to die blow force	[MN]	8	10	12,5	16	20	25	31.5
Gross energy	[kJ]	28	40	56	80	120	160	240
Ram stroke	[mm]	355	420	450	500	500	500	550
Screw diameter	[mm]	210	240	265	300	335	375	425
Max. distance table/ram	[mm]	670/710	750/800	750/800	850/900	880/1000	900/1000	900/1000
Ram width/ram depth	[mm]	950	1070	1240	1350	1530	1600	1640
Daylight between guides	[mm]	680	720	760	860	892	915	915
Through-width of uprights	[mm]	280	450	520	520	540	560	560
Overall height	[m]	4,8	5,3	5,6	6,5	5,7	6,9	7

SPR series		2000	2500	3150	4000	5000
Nominal press force	[MN]	20	25	31,5	40	50
Permanently admissible press force	[MN]	31,5	40	50	63	80
Die to die blow force	[MN]	40	50	63	80	100
Gross energy	[kJ]	320	500	700	1000	1400
Ram stroke	[mm]	600	650	750	850	950
Screw diameter	[mm]	475	530	600	670	750
Max. distance table/ram	[mm]	1000/1120	1120/1250	1200/1350	1350/1500	1500/1600
Ram width/ram depth	[mm]	1700	1830	2000	2200	2500
Daylight between guides	[mm]	1040	1140	1240	1370	1520
Through-width of uprights	[mm]	750	850	750	800	900
Overall height	[m]	7,5	8,5	9,5	10,5	12

- additional press series and sizes on request
- hydraulic ejectors in the table and/or in the ram on customer's demand
- ejector-force, -stroke, -speed according to customer's specifications

Efficient production

Lasco in its role as machine tool manufacturer, has concentrated its efforts, since formation, on the supply of machines and systems providing solutions for metal working tasks to users in industry and related trades. The experience of over 140 years of manufacture has provided us with the capability to offer production engineering that is tailored to the rough working conditions encountered in the metal working industry. Today, we have over 1000 customers in all areas of industry in over 53 countries throughout the world.

In the electrically driven screw presses from LASCO, the sum total of the most progressive components available at the time of manufacture combine in the drive, press frame and control system to form a functional unit that lasts for decades, providing solutions for a diverse range of applications.

The needs of our customers are the yardstick for the action we take, which is why every machine is individually optimized. The basic features and concepts of our directly driven screw presses are explained in this brochure. We would be delighted to personally discuss which features "your" screw press should have.



LASCO screw presses with frequency converter drive are in use worldwide. In the illustration, racks for automotive steering racks are being produced on an automated SPR 1000.

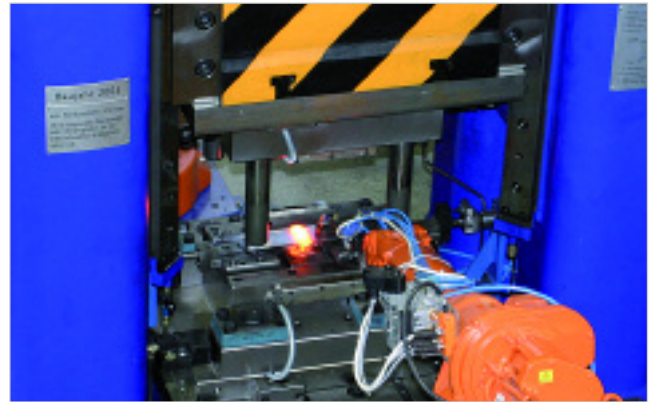


The 300 experts at LASCO have one common goal: the building of machines tailored to the needs and success of the user.

Precision screw presses for solid metal forming



Production of connecting elements on an SPR 315.



Fabrication of knife blanks on an SPP 400.

Screw presses are a classic among the machines built for metal forming. Leonardo da Vinci is supposed to have built the first one, and Gutenberg operated screw presses for his printed products. Moreover, several designs originating from the beginnings of industrial revolution are known, some ergonomically very dubious. Nowadays, modern, energy-saving precision screw presses are associated with LASCO worldwide.

As with hydraulically powered presses and drop forging hammers, electrically driven screw presses also belong to the family of non-lift metal forming machines.

Screw presses supply a high amount of force and energy at reasonable cost. They have no design-related kinetically fixed lower centre point and do not block under load.

As power driven machines, screw presses will always be used where the forming of blanks with a comparatively short stroke is possible

and/or with a stable energy supply, high repetitive accuracy of the forming process is desired.

Screw presses are used for reforming, straightening, hot and cold calibrating and coining steel, aluminium and other special alloys.

During powder metal forging, sintered blanks are re-compacted and, because of their characteristics, are perfectly suited to precision forging, in both open and closed die.

LASCO offers exclusively directly driven screw presses, which use electric energy to accelerate the flywheel, which is connected to the screw. Their high efficiency results from regenerative braking combined with economical power consumption and short stroke times. This drive concept opens up the possibility of precise, computer-controlled energy regulation. The frequency converter drive makes possible the use of low-loss drive motors because the low power supply loading is caused by

the frequency converter itself and not by electrically “soft” and therefore high-loss drives. Therefore, the forming process is far easier controllable. Even several blows of differing energy in the same die are possible under program control.

LASCO offers an optimal press concept for every application with the basic **SPR** series (slipping clutch for overload protection) and **SPP** (can absorb die-to-die blows, therefore no slipping clutch) and numerous options. Comprehensive accessories and the possibility of automation are available.

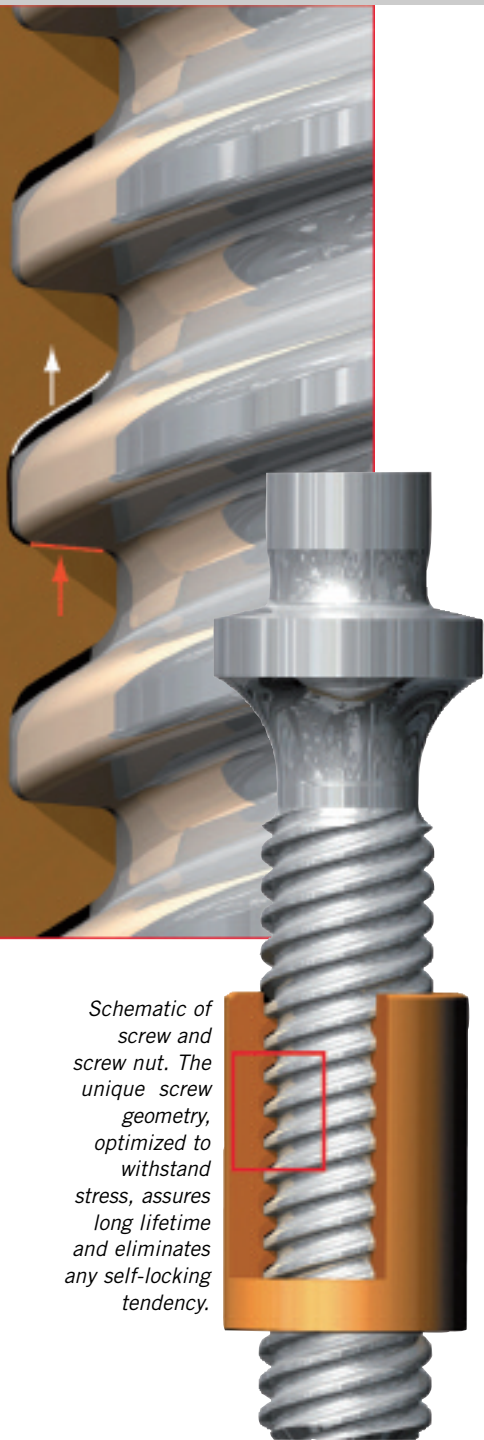
LASCO's services are not limited to construction, production and installation of standardized components, but cover the job of satisfying the customer as a whole. Our in-house depth of production has not only resulted in certified quality but also in flexibility allowing a fast, uncomplicated response to the customer's needs and requirements.

Convincingly efficient



Fully automated production of vehicle components on a LASCO SPR 1000.

Essential quality features



Schematic of screw and screw nut. The unique screw geometry, optimized to withstand stress, assures long lifetime and eliminates any self-locking tendency.

LASCO has continually increased the efficiency of its screw presses with a number of constructive improvements. The development of a frequency converter drive for this type of machine in the 1980s was regarded as a pioneering achievement in the history of metal forming machines and has secured LASCO's competitive lead in the international market. This leading position is based on a whole series of typical constructive features, such as:

Screw geometry

A unique feature of LASCO screw presses is the screw geometry of the forged special alloy CrNiMo steel screw, a joint development between the Technical University Munich and LASCO. It ensures long lifetime and eliminates any self-locking tendency. The fixed bearing arrangement and short screw length significantly increase the rigidity of the machine.

Screw nut

The screw nut built into the press ram is made of high-grade bronze and has extremely good gliding and emergency running properties.

The screw's thrust bearing is also made of wear-resistant bronze. It prevents the screw bending by symmetrically absorbing the pressing forces.

Telescopic guard

Premature wear of the screw and screw nut is prevented by a telescopic guard. It reliably protects the screw from scale and dirt.

Press ram

The ram is made of high-grade cast steel, fully stress relieved.

Guiding system

The guiding system is set at an angle of 45 degrees so that it is able to maintain constant clear-

ance in spite of heat expansion. Bronze and steel are used as guide pairs. The slide rails are nitrated. Adjustable guide rails ensure minimum clearance between the guides. In conjunction with long press ram guides and high ram rigidity, high product quality and excellent die life are ensured.

Flywheel

The cast-steel flywheel functions as an energy store. On SPR series screw presses, it is fitted with automatic overload protection (slipping clutch).

Brake

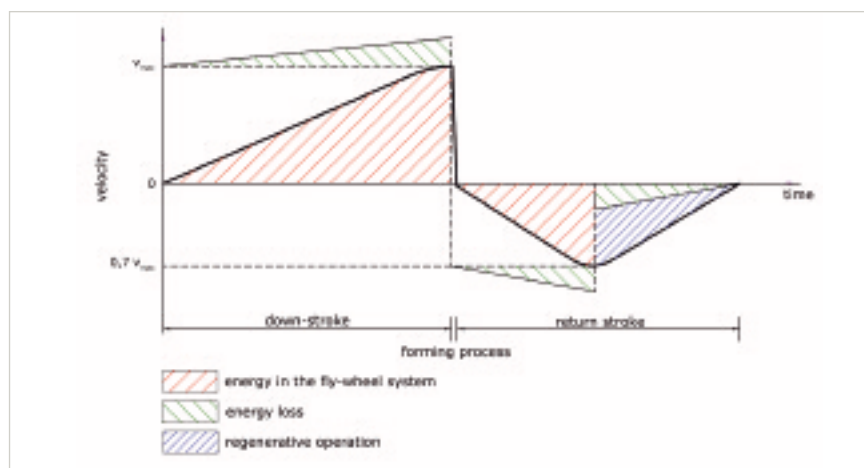
The integrated brake provides maximum possible safety. It acts directly on the flywheel and can stop the press ram and hold it in any position. It is closed by spring force and opened pneumatically or hydraulically. On larger presses, multiple disc brakes are used on the motors.

Drive

LASCO's precision screw presses are driven by reversing three-phase asynchronous squirrel cage motors. In the forging industry such drives are regarded as being exceptionally reliable with low maintenance requirements, and therefore highly efficient. The motors are connected directly to the flywheel and cooled by a temperature-controlled fan.

Landmark solutions

Frequency converter drive: short cycle times, even with small power requirements



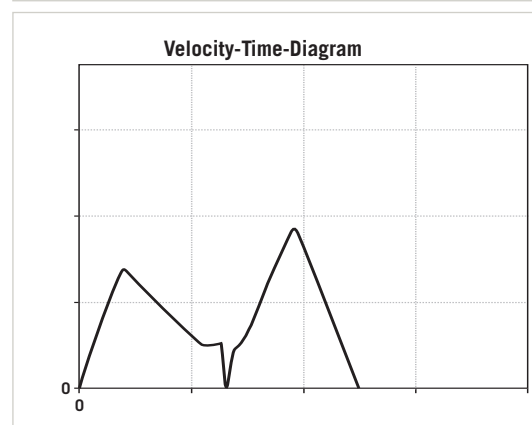
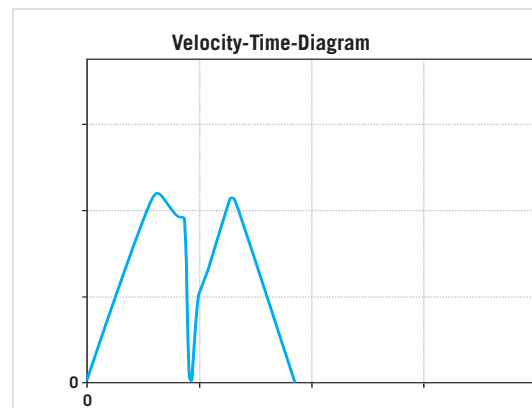
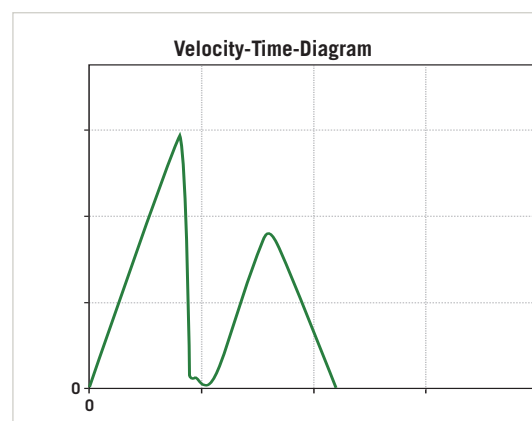
Power requirement of a screw press with frequency converter drive.

Equipping a screw press with frequency converter drive makes possible regenerative drive operation and increases the electrical efficiency of the machine considerably. The parameters for the working phase of a frequency converter drive screw press (see diagram) are stored in the control. The operator only has to enter the required power and the stroke for the process. The control then computes all the relevant data for the frequency converter such that the important quality criteria listed below are reliably fulfilled:

- Exact repetitive accuracy of the power available
- Exact approach to the upper dead center
- Time optimized motion, even with small power requirements
- Minimum power consumption
- Power factor $\cos\phi \approx 1$

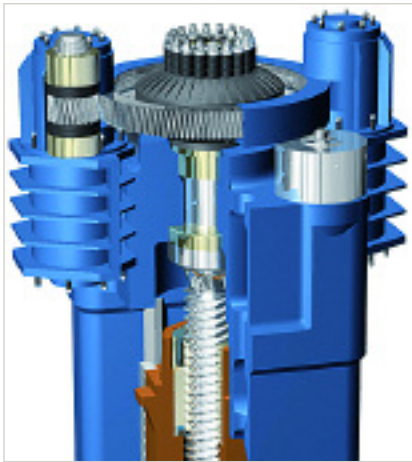
Thus, LASCO's frequency converter drive provides the user with the following advantages:

- Lower loading of the power supply by current peaks
- Smaller core cross-sections
- Energy recovery from regenerative braking
- Short cycle times, even at low forming energies
- Almost no reactive current
- Efficiency improvement by an approximate factor of three
- Negligible motor slip
- Lower power costs
- Reduction of wear and maintenance on the mechanical brake
- Exact energy control from 1% - 100% ensuring high process reliability and repeatability

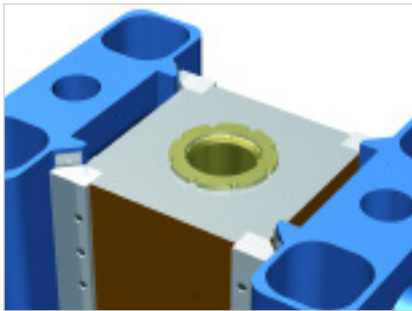


The three velocity-time-diagrams above show the course of the ram at 100, 50 and 10% energy set. The ram is accelerated at maximum possible speed and generatively decelerated at a velocity equivalent to the preset energy. After the forming process and the backlash, the ram is electronically intercepted, accelerated and again generatively decelerated, so that the ram exactly positions in the upper dead center. So every working stroke may be effected in the shortest possible time.

Solid design



Symmetrically configured three-phase asynchronous motors on the flywheel of a screw press (SPR 2500).



Sectional view of the guiding system for the press ram (SPR 2500).



The automated LASCO SPR 1250 screw press working in the facility of an automotive supplier in the USA.

Supply carrier

Components such as the compressed air filtering unit, the brake control, the central lubrication unit and the motor ventilation fan are mounted on a vibration-damped supply carrier.

Lubricating oil circulation

The screw and the thrust bearing are continuously lubricated by an electronically monitored oil circulation system. The glide properties of the guides are kept constant with few lubrication.

Bolster plate on the table

LASCO presses are equipped with a protective bolster plate on the press table to minimize wear. They are supplied as standard with T-slots for holding the tools, with option of custom designed hydraulic clamping systems.

Multiple cavity dies

Optionally, LASCO's screw presses are fitted with multiple cavity dies. Depending on the complexity of the forming process, these dies can be used with a movable slide on the press ram or a turntable for

the lower die. Above all, this makes sense when material properties and the geometry of the blank to be processed require several forming stages.

Measurement of press force

The press force exerted in the forming process is measured and recorded by strain gauges. When the maximum permissible force is exceeded, the system displays a warning message and shuts down the machine at repeated overload to prevent possible damage to the press.

Maximum operational reliability

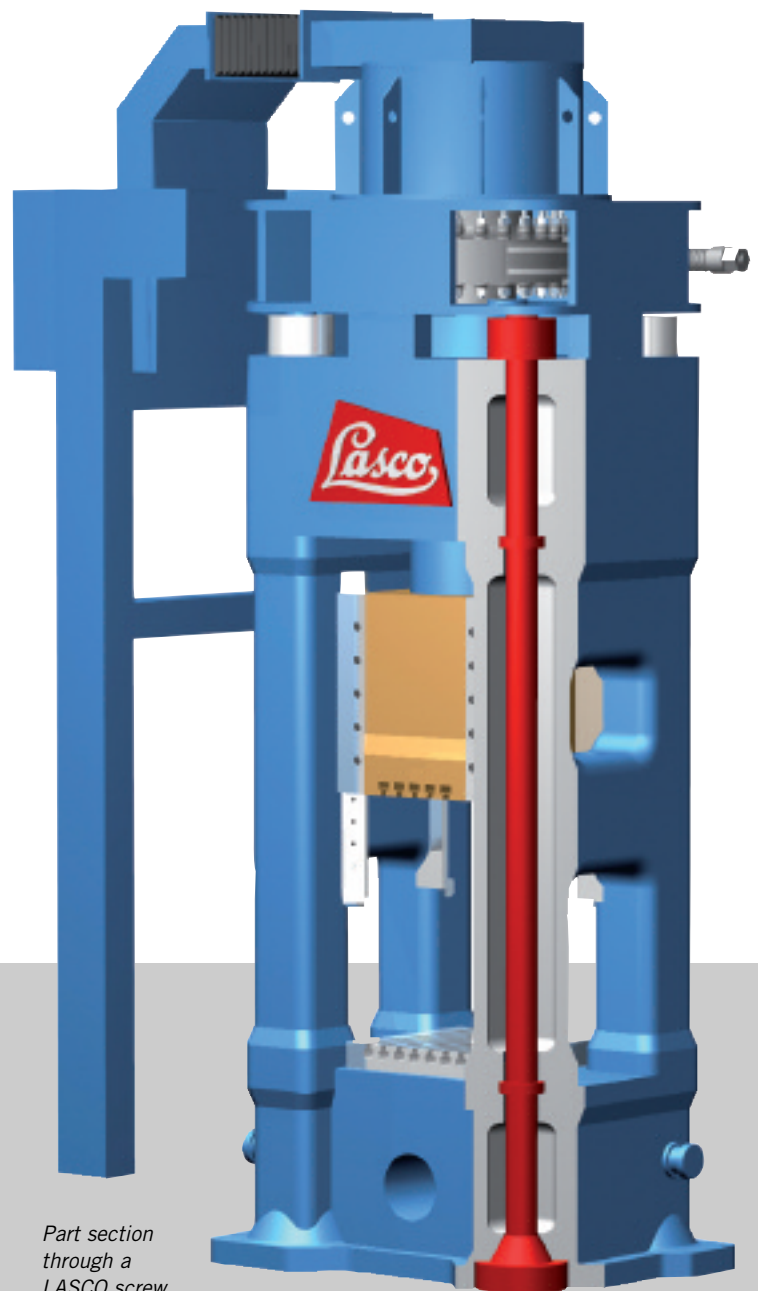
Multi-piece press frame

The design of the multi-piece frame offers certain advantages. Potential notch stress concentrations at the connection between the table and the uprights and between the cross-head and the uprights are eliminated. Transport and erection of larger presses may be easier.

Above all, the press frame consisting of several parts is considerably more rigid as a result of the pre-stressing. For the same tensile stress, the elongation is only 20% of the value induced in a single-piece frame. As well as ensuring longevity of the frame, and forming of more accurate parts, overall size and weight of the press may be reduced.

Laying the foundations

Optional spring damping elements under the bedplate ensure low vibration press operation. The transfer of vibration into the surroundings is thus reduced to a minimum.



Part section through a LASCO screw press. The compound frame, pre-stressed with tie rods, is optimized for complex forming requirements.

Uncompromising process reliability

Decentralised process control

The “brain” of every modern machine tool is its decentralised process control. As LASCO is totally customer focused, all configuration and programming is performed in-house.

LASCO's core competence in software programming and in the design and installation of electronic and electric components allows the consideration of all customer requests that are technically feasible, including the provision of interfaces for integration of existing processes and interlinked operations.

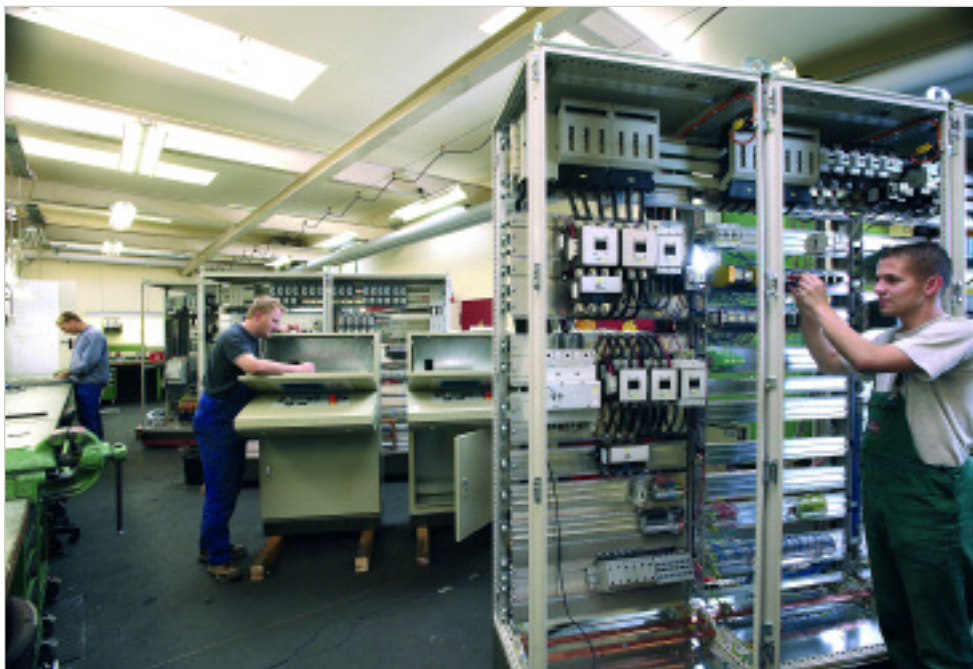
LASCO process and machine controls offer all the performance characteristics of a modern production organization, such as:

- centralized, product-related setting and evaluation of all machine parameters
- product data administration, optionally with data base link
- operating data registration
- product follow-up
- integration in MRP
- integrated maintenance programme
- integrated data logger

The requests of the customer are also considered, when designing man-to-machine interfaces, as well as specific screen menus and charts (available in several languages).

The operator is guided by a graphic colour display, which is in the same language as the messages displayed at the terminal. The registration, evaluation and listing of data can be input simultaneously during operation and the data can be transferred to the network via interfaces.

Software modules specific to the customer can be linked. Options of integrated phone- or internet-aided online maintenance systems are offered.



The design, programming and installation of electronic and electric components are just a few of LASCO's core competencies.

Operator guidance on customer's demand



LASCO designs operator menus and screen forms individually according to the customer's demand, in this case located in China.

Efficient interfaces ensure real-time communication with automation systems, including industrial robots. A data logger is always integrated and offers the possibility of archiving internal and external analogous and binary signals.

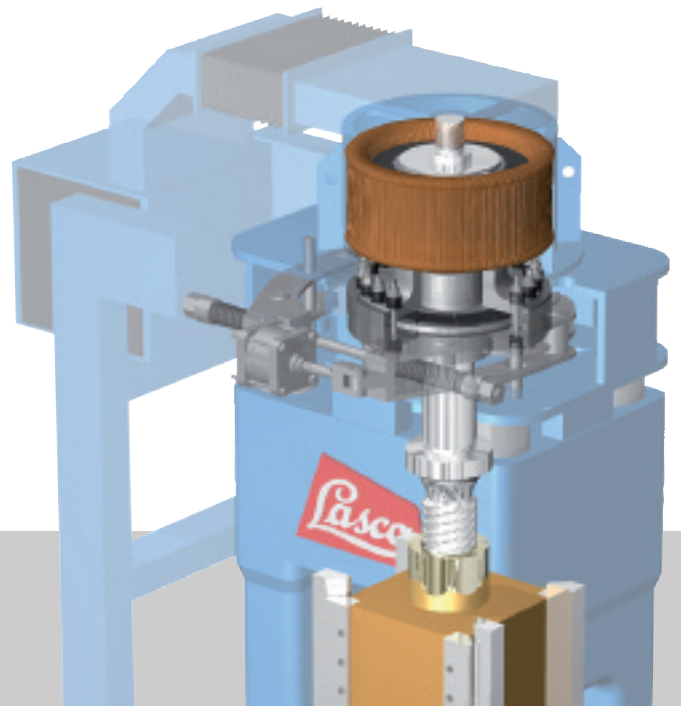
LASCO control concepts are decentralised systems on the basis of bus systems. Only hardware of international industrial standards is selected. This permits custo-

mers not only the possibility of making adjustments and performing maintenance on their own, but also reprogramming and enhancing at a reasonable price. Not least this means a high security of investment.

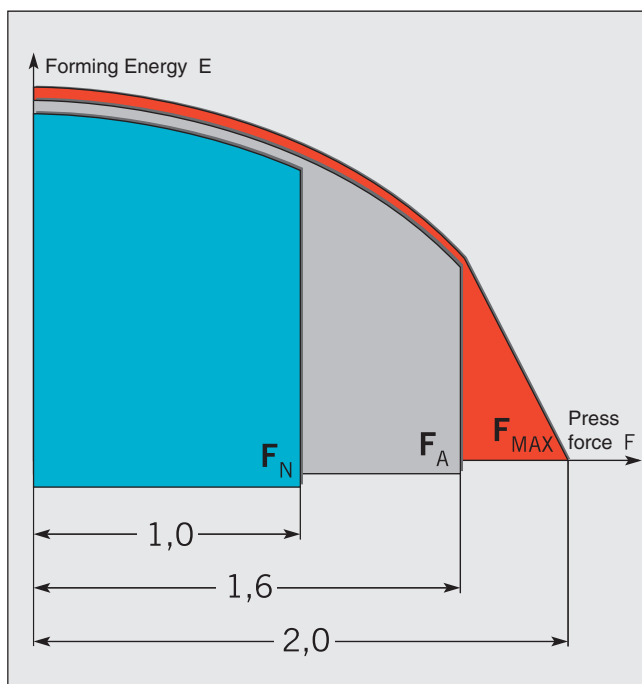
Overload protection with a slipping clutch



LASCO SPR 315.



Schematic of the basic design of an SPR series drive system.

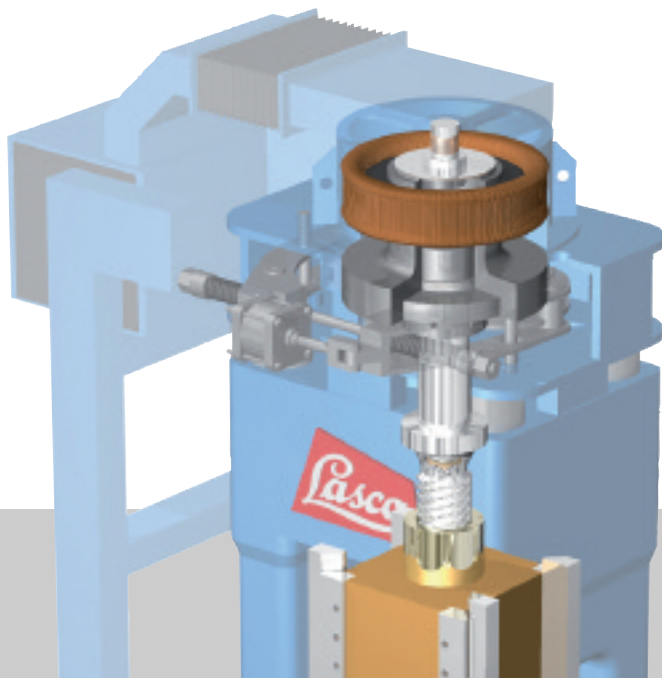


The force of pressure (red) generated by an **SPR** screw press can be a maximum of twice the nominal force. Machine overload is prevented by a slipping clutch on the flywheel.

LASCO's SPR and SPP series of screw presses are supplied with frequency converter drive and designed for typical metal forming tasks.

With their large working capacity, the **SPR** series can be used universally and is particularly suited to a wide range of forging work, including long forming strokes. The blow energy can be adjusted from 1 to 100 percent. The SPR series is fitted with overload protection in the form of a slipping clutch between the screw and the flywheel. The slipping clutch activates if an unintended die-to-die blow is triggered, preventing damage to the machine.

Calibrating and coining specialist



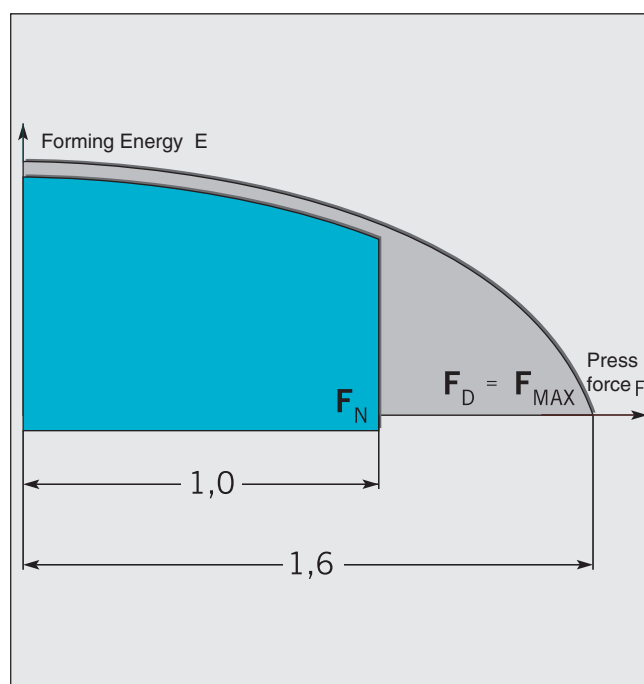
Schematic of the basic design of an SPP series drive.



Two LASCO SPP 400 in the assembly hall.

The **SPP** is designed for forming tasks requiring short forming strokes. The maximum energy stored in the flywheel is less than for an SPR. So the machine is protected against a die-to-die blow even without a slipping clutch.

SPP screw presses are particularly suited to tasks such as accurate calibrating, coining and the forming of flat metal parts. They are used, for example, in the manufacture of medical instruments or high quality cutlery.



With their high forming force at low power requirement, **SPP** screw presses are particularly suited to coining and calibrating work.

Screw presses for aluminium forming



LASCO frequency converter driven screw presses have, for many years, proven themselves in forming of aluminium and aluminium alloy blanks for many years now. Because of the special properties of these materials, however, several characteristics have to be observed in the design of the machine.

Whereas the ram in screw presses designed for traditional forging or calibrating tasks travels at velocities of up to 0.7 m/s, the flow qualities of materials with a high proportion of aluminium demand a slower forming velocity. In practi-

ce, a limitation to a maximum 0.5 m/s has proved to be acceptable. The nominal energy is retained in these variants by making corresponding corrections to the design of the flywheel.

This allows an optimal material flow in the die, even with complex geometries (for example, thin fins or braces). Fast stroke cycles are guaranteed because of the generative drive operation, independent of the soft materials.

A LASCO SPR 2000 screw press with 20,000 kN nominal press force at a German manufacturer of aluminium sectional parts.

Reliable top performers

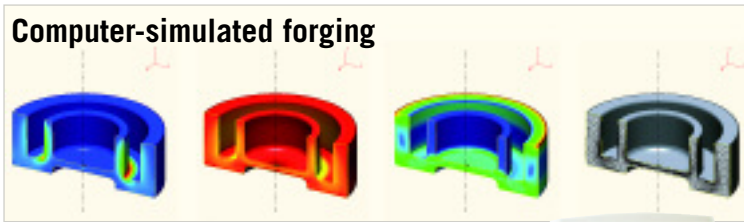


An SPR 400 screw press used for production of electric armatures for railroad vehicles. The preheated blanks in the furnace (left) are fed to the machine through a chute.



Precision parts of aluminium and aluminium alloy formed in a closed or open die on LASCO screw presses.

Adaptable to special demands



Examples for computer-simulated forming of a ring on a screw press (from the left): degree of forming, temperature, yield stress, grain flow.



Specialists in process technology develop optimum forming processes to satisfy the demands of the individual customer.

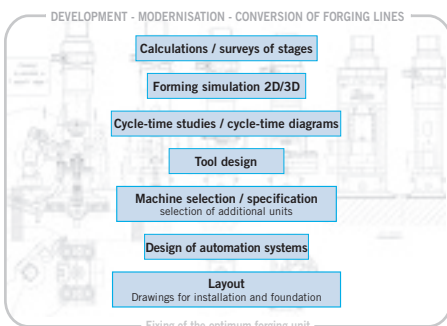
LASCO high precision frequency converter drive screw presses embody leading technology in all their elements and reflect "state of the art" process technology. Their inherent characteristics are rigid design and power in reserve. Highest levels of efficiency are achieved by individual adaptation

to the specific demands of the customer.

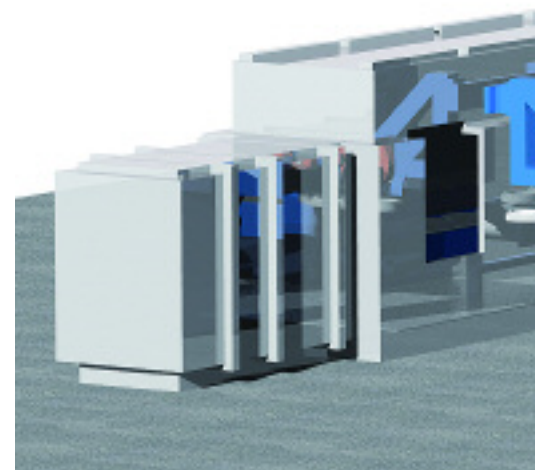
LASCO defines its role as a highly flexible press manufacturer in providing tailor made solutions to complicated and changing demands. Our process specialists develop efficient line concepts

starting with the range of the parts to be formed, and the particular demands of the client.

Our goal is to harmonize all major parameters of the forming unit and the tooling, resulting in the most economic forming process. The result is usually a truly unique solution for each project.



The computer-aided simulation of forming processes plays a major role in the development of all LASCO machines and forming solutions (top).



Automation, integration, control

Of course LASCO offers also a wide range of peripheral equipment to augment and simplify the production process of the main unit.

This option permits consideration of almost any automation for our presses, but also their successful integration into inter-linked processes.

Optional components

- Automatic loading and unloading devices.
- Tools and tool holders (optionally with temperature control).
- Quick-changing systems for tools, tool holders or cassettes.
- Tool conditioning units.
- Pressurized water descaling systems.
- Hydraulic table and ram ejectors (optionally multiple operations).
- Manipulators (in the press and outside).
- Robots.
- Protective devices.
- Electronic online maintenance.



Schematic of two interlinked LASCO units SPR 630 and MPP 400 with automation devices.

The LASCO benefit



Experts in the sales, design, manufacturing, installation, and service departments enable LASCO to take care of its customers' requests in a flexible and comprehensive way.

Your single source for engineered solutions

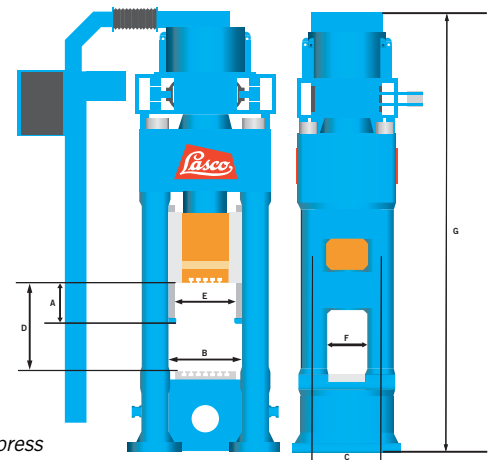
All components of a forming system that are essential for it to perform consistently are sourced from leading international suppliers or made in-house by LASCO's highly experienced and motivated experts. This fact, combined with the flexibility and the concise management of a medium-

sized company, enable LASCO to react in a comprehensive manner to requests, and to offer perfect solutions from one source. Complemented by personal service all around the globe, LASCO guarantees its customers a level of performance that has set the industry standard for decades.



LASCO employees co-operate in interdisciplinary project teams to find the optimum solution for your forming requirements.

SPP series



Schematic of SPP screw press

- A = Ram stroke
- B = Ram width
- C = Ram depth
- D = Max. distance table/ram
- E = Daylight between guides
- F = Through-width of uprights
- G = Overall height

SPP series		100	160	200	250	315	400	500
Nominal press force	[MN]	1	1,6	2	20,5	3,15	4	5
Permanently admissible press force	[MN]	1,6	2,5	3,2	4	5	6,3	8
Gross energy	[kJ]	2	3,5	5	7	10	14	20
Ram stroke	[mm]	200	280	300	300	355	355	420
Screw diameter	[mm]	110	135	150	170	190	210	240
Ram width/ram depth	[mm]	360/400	425/475	490/550	550/600	600/630	670/710	750/800
Max. distance table/ram	[mm]	480	600	700	750	850	950	1070
Daylight between guides	[mm]	367	432	500	560	610	680	720
Through-width of uprights	[mm]	225	260	250	250	260	280	450
Overall height	[m]	3	3,6	4	4,1	4,3	4,8	5,3

SPP series		630	800	1000	1250	1600	2000
Nominal press force	[MN]	6,3	8	10	12,5	16	20
Permanently admissible press force	[MN]	10	12,5	16	20	25	32
Gross energy	[kJ]	28	40	56	80	112	160
Ram stroke	[mm]	450	500	500	500	550	600
Screw diameter	[mm]	265	300	335	375	425	475
Ram width/ram depth	[mm]	750/800	850/900	880/1000	900/1000	900/1000	1000/1120
Max. distance table/ram	[mm]	1240	1350	1530	1600	1640	1700
Daylight between guides	[mm]	760	860	892	915	915	1040
Through-width of uprights	[mm]	520	520	540	560	560	750
Overall height	[m]	5,6	6,5	6,7	6,9	7	7,5

- additional press series and sizes on request
- hydraulic ejectors in the table and/or in the ram on customer's demand
- ejector-force, -stroke, -speed according to customer's specifications



www.lasco.com

Headquarters:

LASCO Umformtechnik GmbH
Hahnweg 139
96450 COBURG
DEUTSCHLAND
Phone +49 9561 642-0
Fax +49 9561 642-333
E-Mail lasco@lasco.de
Internet www.lasco.com

LASCO USA

LASCO Engineering Services L.L.C.
1111 Bellevue Avenue
DETROIT, MI 48207
USA
Phone +1 313 579 1100
Fax +1 313 579 2674
E-Mail lasco@lascoUSA.com
Internet www.lascoUSA.com

LASCO CHINA

Beijing Office
5 Xisanhuan Beilu
100089 BEIJING
P.R. CHINA
Phone +86 10 6873 1775
Fax +86 10 6873 1052
E-Mail china@lasco.de