



ELECTRIC UPSETTING MACHINES

Convincingly economical



THE ELECTRIC UPSETTING PROCESS

Cost reduction through optimal preforming

LASCO manufactures electric upsetting systems in vertical and horizontal arrangement as well as special designs - adapted to individual market and customer requirements.

Electric upsetting combines the two processes of **heating** and **upsetting** in one machine. High electric current flows through a bar section - limited by contact electrodes with different potential - at low voltage. Because of the high current density and the ohmic resistance of the material, the bar section heats up. Feed via a hydraulic cylinder produces the desired volume accumulation. With the material volume increasing, the distance between the electrodes is extended. At the same time, the anvil electrode recedes to create space for volume accumulation.

All commercially available steels and non-ferrous metals as well as high-temperature nickel alloys can be formed by the electric upsetting process.

METHODS:

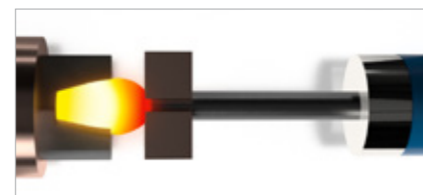
In addition to free and form upsetting at the bar end, volume can be accumulated at any position:



Free upsetting



Semi-open die upsetting



A combination of free and form upsetting is the semi-open die upsetting

Centric upsetting



Patented LASCO process (DE 10 2015 100 801 B4) for free upsetting in inner or centric areas of workpieces

Further shape variations are possible with specially shaped anvil electrodes. This process is not limited to specific cross-sectional shapes.

Challenge us!

YOUR BENEFITS

Efficiency and process reliability

When using the electric upsetting method, some known technological limitations of mechanical upsetting machines can be avoided and the economic efficiency improved.

BENEFITS:

- ▶ **Heating and forming in one machine**
- ▶ **Constant heating temperature** due to steplessly adjustable heating current
- ▶ **Energy-saving** – only the volume to be formed is heated (extremely favorable specific energy consumption of approx. 0.35 - 0.40 kWh/kg)
- ▶ **Upsetting and anvil speed, as well as heating current can be changed independently of each other** by using the latest servo drive and control technology
- ▶ **Further processing at forging temperature**
Workpieces produced by the free upsetting method can be further forged without intermediate heating. The reduction of forming stages avoids cooling, saves space and eliminates costly transfer routes
- ▶ **Energy saving in the finish-forging process** through optimized preform by electric upsetting
- ▶ **Optimally adapted grain flow and flawless surface**
Electric upsetting avoids overlapping and wrinkling; the cold shaft remains undamaged
- ▶ **Virtually unlimited forming length in one operation**
Forming lengths up to approx. 40 x bar diameter have already been realized
- ▶ **Volume accumulation in only one forming stage**
- ▶ **Substantially reduced scale formation**
Dies achieve long service life
- ▶ **Material savings**
Precise volume accumulation in the upsetting process enables flashless forging in downstream processes

As an alternative to hydraulic cylinders, electro-mechanical upsetting and anvil axes are possible

- + **Reduction in size of the hydraulic power unit**
- + **More rigid upsetting and anvil axes**
- + **Environmentally friendly and clean**

PROCESS RELIABILITY AND HIGHER PRODUCTIVITY THROUGH:

- ▶ **Monitoring of the upsetting and anvil speed**
- ▶ **Monitoring of the anvil plate and upset temperatures**
- ▶ **Monitoring of buckling**
- ▶ **Parallel gripping clamps**

TYPES EV/EH

Designed for your specific application

There is no fundamentally preferred design and no fixed type series.
We develop the system perfectly tailored to your needs, working together with you.

EV - Electric upsetting in compact form:

The LASCO system EV in vertical construction is designed for the processing of

- ▶ bar diameters from 5 - 140 mm and
- ▶ bar lengths from 100 - 1000 mm

Accordingly, small and short parts are often produced with an EV.
The vertical design enables compact and space-saving systems.



Scan now –
See the upsetting process in
vertical arrangement



LASCO supplies combined upsetting and forging systems.

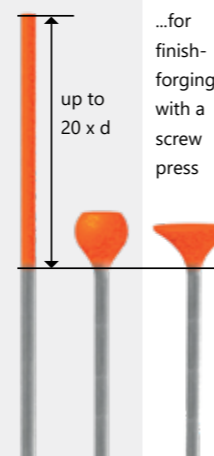
In the example, six to eight vertical **electric upsetting machines** and a **screw press** produce approx. 1000 valves per hour in a fully automatic operating cycle:



EV 12

Sequence of operations valve production

Pre-forged valve billet at forging heat...



EH 315

EH - for a wide range of applications:

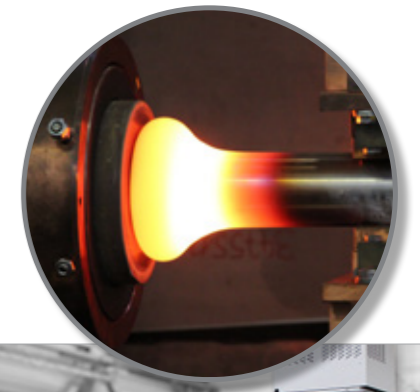
The LASCO system EH allows for the horizontal processing of bar billets in theoretically unlimited lengths

- ▶ bar diameters from 5 - 160 mm and
- ▶ bar lengths of > 1000 mm

The upsetting process is optimally adapted to your technical requirements.



Scan now –
See the upsetting process in
horizontal arrangement



EH 50 with electromechanical upsetting and anvil axes

LASCO KNOW-HOW 4.0 - Ready for the future

LASCO is a specialist for modern machine tools in the field of **solid metal** and **sheet metal forming** as well as **automation solutions** and **robotic systems** for efficient, intelligent production lines.

LASCO's virtual commissioning simulates and optimizes all machine processes and operating states of the complete manufacturing system already in the engineering phase on the basis of the digital system twin. Our experts also accompany you virtually during production operation - the **LASCO Remote Assistance System** enables bidirectional image and sound transmission via video stream and SmartGlasses.

Your needs. Our solutions.

Detailed information can be found in our brochure **Automation & Robotics.**



IN PRACTICE

Wide range of industrial applications

The decisive influencing factor for cycle time or output is the heating speed.

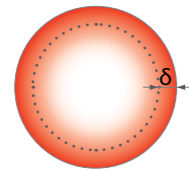
Criteria are alloy components, bar diameter, billet surface, head shape and nominal capacity of the heating transformer - in the example **EH 63** = horizontal electric upsetting machine with a nominal capacity of the transformer of **63 kVA**.

In theory, all electric upsetting systems can be designed with direct or alternating current.

However, when heated with a conventional transformer connected to the AC mains, the current only flows in the outer 10 mm of the surface due to the **skin effect**. In the case of a billet with a diameter of 30 mm, the inner 10 mm therefore only heat up by thermal conduction. For billets with diameters > 50 mm, heating by thermal conduction takes very long.

Transformer capacities:

AC: 10 – 400 kVA
DC: 250 – 800 kVA



Equivalent conductive layer thickness δ and actual current distribution in the conductor cross-section shown as the course of the red coloration

SOLUTION:

To avoid the skin effect with thick bars (> \varnothing 70/80 mm), the use of direct current is usually advisable, but mandatory from \varnothing 100 mm.

This results in uniform and rapid heating of the bar cross-section.

Examples of finish-forged workpieces:

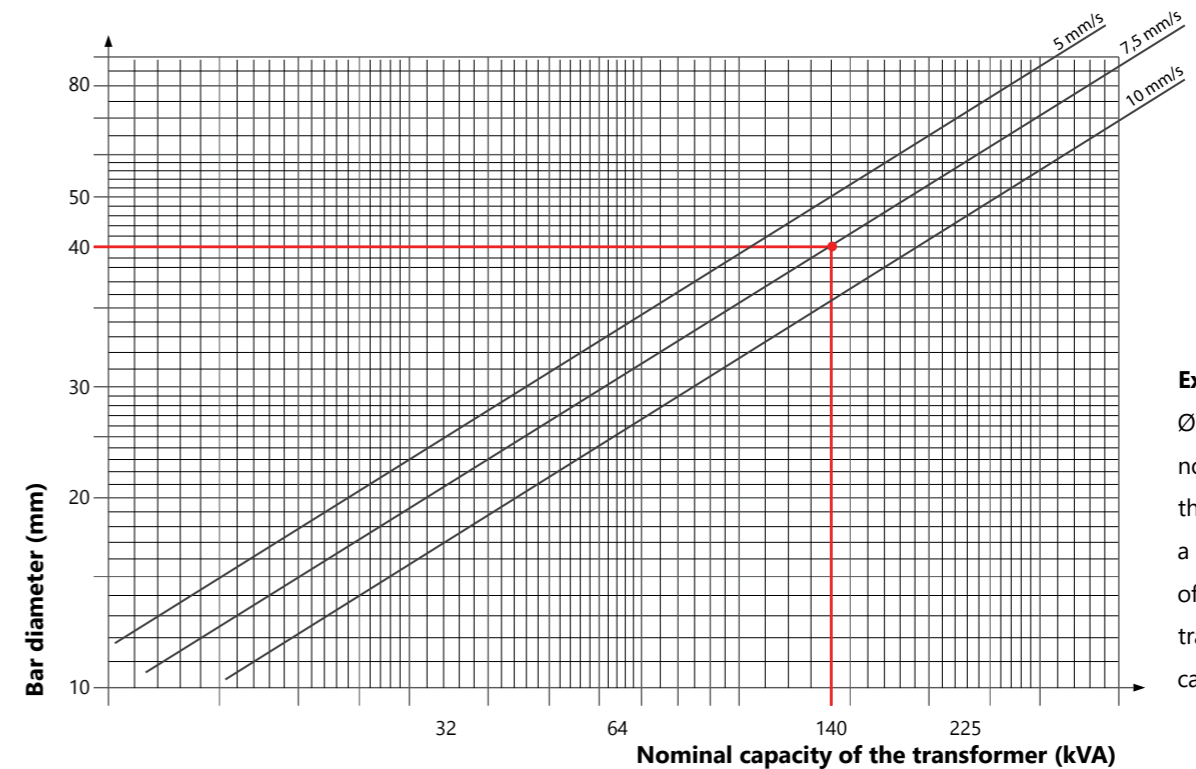


Torsion bar



Stabilizer

On the following logarithmic scale, the required **nominal capacity of the heating transformer** can be read on the basis of bar diameter and average heating speed:



Example:
 \varnothing bar: 40 mm
nominal capacity of the transformer at a heating speed of 7,5 mm/s = transformer capacity 140 kVA

We look forward to meeting your challenge!



Tie rod end

Flanged shaft

Eyebolt

Valves (with collar)

Turbine blades

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