



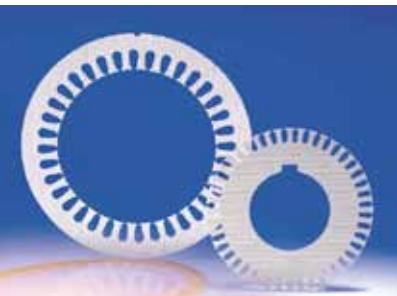
Notching equipment for manufacturing electric motor laminations



Forming the Future

NOTCHING EQUIPMENT

Notching: cost-effective manufacturing technology for electric motor laminations in small and medium lot sizes



MODULAR PRODUCT LINES FOR A VARIETY OF PROCESS REQUIREMENTS

Schuler's modular program consisting of single machines and lines can be configured to the most varied of manufacturing requirements. The foundation is provided by two specific high-precision, high-performance press models on which round blanks and/or segments can be produced. They can be operated as single presses with manual feeding, as well as in various degrees of automation – including subsequent retrofit – in accordance with the modular design principle.

The lines can be individually configured based on your specific needs thanks to the flexibility of the part handling systems. The extreme versatility in the number of possible combinations can ensure an optimal configuration even for unusual requirements. A large array of auxiliary equipment is also available for customer-specific requirements.



NOTCHING EQUIPMENT

Manually operated notchers

NOTCHERS



Application: **Blanks**
 Press capacity: **40/80/200 kN**
 Circular blank outside diameter up to max:
600/1,100/1,800 mm

The equipment is versatile in its range of application and can be delivered with numerous accessories to suit customer-specific requirements.

SEGMENT NOTCHERS



Available in 1-axis and 3-axis design
 Application: **Segments and circular blanks**
 Press capacity: **250/320 kN**
1-axis
 Circular blank outside diameter up to max:
1,800 mm
 Segment blank outside diameter up to max:
2,500 mm
3-axis
 Circular blank outside diameter up to max:
1,800 mm
 Segment blank outside diameter up to max:
unlimited

NOTCHING EQUIPMENT

Automated solutions

FULLY AUTOMATED NOTCHING LINES WITH CIRCULAR TRANSFER (SPIDER) AUTOMATION



Application: **Circular blanks**
 Model variants: **Single/Tandem**
 Press capacity: **40/80/200 kN**
 Circular blank outside diameter max:
400/450/630/800/1,000 mm
 Stacking/unloading: **via stacking mandrel**

FULLY AUTOMATED NOTCHING LINES WITH LINEAR AUTOMATION



Application: **Blanks**
 Model variations: **Single/Tandem**
 Press capacity: **80/200 kN**
 Segment blank outside diameter max: **1,000 mm**
 Circular blank outside diameter max: **1,300 mm**
 Stacking/unloading: **via pallet system**

Linear design for segments

Application: **Segments**
 Press capacity: **250/320 kN**
 Segment size max: **1,250 × 750 mm**
 Stacking/unloading: **via pallet system**

CONTROL

The notching equipment controls are specifically designed to meet the requirements of the production process. Special attention is paid to user-friendliness. The use of Siemens components ensures fast availability worldwide. The intuitive and self-explanatory visualization/graphic display with touchscreen makes for easy operation of the lines. Numerous functions ensure complete insight into the production process.

The right solution for every application – Notching equipment from Schuler

MANUALLY OPERATED NOTCHERS

Schuler offers manually operated notchers for the cost-effective manufacture of rotor and stator laminations for electric motors and generators. Blank loading and unloading are performed manually. The operation of the notcher takes place automatically.

- Special features:**
- Operator friendly
 - High levels of flexibility
 - High levels of precision

FULLY AUTOMATED NOTCHING LINES

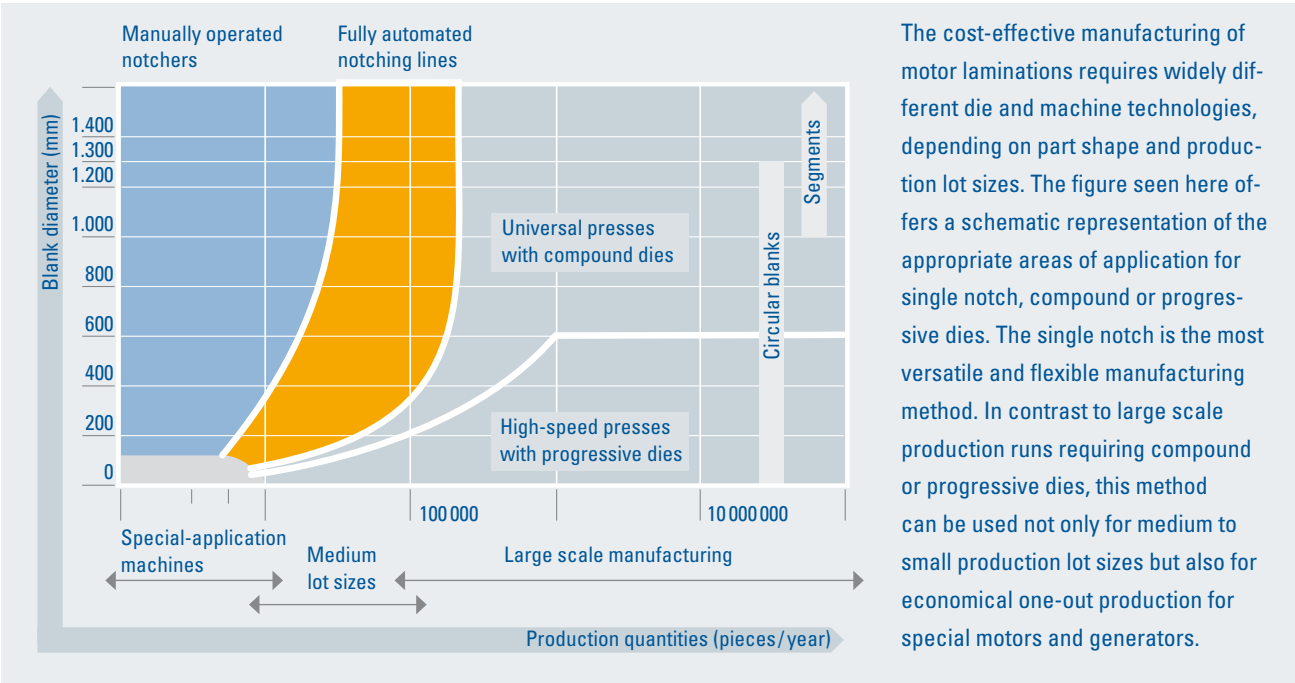
For large production lot sizes, Schuler offers fully automated notching lines for both high production rates and process reliability. The combination of one or two notchers with a linear or rotary automation system produces a line that is both cost-effective and flexible.

- Special features:**
- High production rates
 - High levels of uptime
 - Short changeover times

EXTENSIVE ACCESSORIES AND SPECIAL APPLICATION EQUIPMENT

To meet the many varied requirements of our customers, we offer a wide range of accessories for both manually operated notchers and fully automated notching lines.

AREAS OF APPLICATION FOR EQUIPMENT USED TO MANUFACTURE MOTOR LAMINATIONS



The cost-effective manufacturing of motor laminations requires widely different die and machine technologies, depending on part shape and production lot sizes. The figure seen here offers a schematic representation of the appropriate areas of application for single notch, compound or progressive dies. The single notch is the most versatile and flexible manufacturing method. In contrast to large scale production runs requiring compound or progressive dies, this method can be used not only for medium to small production lot sizes but also for economical one-out production for special motors and generators.

Manually operated notchers for circular blanks and segments

When operating a notcher as a stand-alone press, loading of blanks and unloading of notched laminations are performed manually. The manually operated notchers work with precision and efficiency at high stroke rates as well as the highest level of indexing accuracy to ensure part quality.

For notching circular blanks, Schuler offers a numeric notching press with an extensive range of accessories. For the notching of segments Schuler offers 1-axis or 3-axis notching presses.

YOUR ADVANTAGES

- Low investment costs
- High stroke rate
- Low costs for dies
- Production precision
- Simple operation
- High degree of flexibility



Manufacturing precision and simple operation with the manual notching press

NOTCHING PRESS

Schuler notchers are constructed with cast press frames. They are notable for their favorable resilience and vibration characteristics. In order to maintain the desired notch indexing, the CNC indexing drive is provided by a position-controlled servo motor. In this way, these presses ensure a high degree of flexibility, short changeover time as well as the ability to achieve the widest possible variety of notch patterns.

The design of the y-axis (pitch) diameter adjustment includes a CNC-axis. In this way, punching takes place at multiple pitch diameters and permits the use of controllable dies.

SEGMENT NOTCHING PRESS

The programmable segment notching presses open nearly unlimited possibilities for the design of large motors and generators. Depending on the blank dimensions and the desired programmable complexity, either 1-axis or 3-axis models may be employed. The 1-axis lines are best suited to manufacture pole laminations and smaller segment laminations. The 3-axis lines are provided with a blank bolster plate with 3-axis CNC motion capabilities. Circular blanks can also be notched.



Manually operated notching presses



3-axis segment notching presses

Fully automated notching lines

Schuler offers automated lines for notching electric motor laminations at high production rates and with a high level of process reliability. The combination of one or two notching presses with a linear or rotary automation system provides a solution that is both cost-effective and extremely flexible. They are not only flexible but can be expanded to include fully automated pallet/stacking mandrel changeovers as well as integrated shaft hole punching.

FULLY AUTOMATED NOTCHING LINES WITH CIRCULAR TRANSFER (SPIDER) AUTOMATION

For notching of blanks with smaller diameters, Schuler offers its compact and efficient system of circular transfer (spider) automation. The drive for the circular transfer (spider) is provided by a servo motor. The pneumatically operated raise/lower motion ensures the precise transfer of blanks to individual stations.

The rotors and stators are stacked onto mandrels. Two mandrels are mounted on a turntable system. This ensures fast stack changes, whether performed manually or automatically.

YOUR ADVANTAGES

- Short cycle times
- Short changeover times
- High levels of uptime
- Fast stack changes
- Cost-effectiveness
- Safe, reliable handling of laminations on stacking mandrel or pallet



Fully automated notching line with circular transfer (spider) automation

FULLY AUTOMATED NOTCHING LINES WITH LINEAR AUTOMATION, SINGLE/TANDEM

Automated feeding and unloading of larger lamination blanks and segments are performed by means of a linear overhead transfer system. This achieves maximum flexibility together with a very high degree of automation. The drive for the independent feeding and unloading grippers is provided by servo or linear motors. The gripper arms can be individually adjusted to suit the whole spectrum of possible requirements. Features such as double blank monitors or fanning magnets guarantee the highest level of process reliability. Pallets are used for unloading and depositing the blanks. Automatically cycled lift

platforms permit a high degree of stacking accuracy.

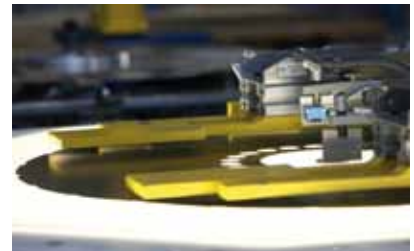
Different design variations are possible depending on requirements:

- Single notchers with five or more stations
- Tandem notchers with six or more stations
- Notchers for segments with four stations

All notching equipment can be expanded to suit customer requirements, for example, the integration of shaft hole punching.

Option: optical orienting station

The position of the blanks being fed is detected in the orienting (centering) station by means of a specialized camera system. Position correction takes place in the linear transport. The notcher corrects the offset angle.



Optical orienting station



Fully automated notching line with linear automation

More. Service from Schuler.

Technical service

- Maintenance and servicing
- Machine inspection
- Safety inspection
- Preventive maintenance
- Energy checks
- Teleservice
- Overhaul
- Machine relocation
- Machine installations

Performance enhancement

- Optimization
- Modernization
- Die and process technology

Training

- Schuler Academy
- Production start-up support

Used equipment



Service worldwide:

- Germany • France • Great Britain • Italy •
Switzerland • Slovakia • Spain • Czech Republic •
Russia • USA • Mexico • Brazil • China • India

SCHULER PRESSEN GMBH

Bahnhofstr. 41 | 73033 Göppingen | Germany
Phone +49 7161 66-0 | Fax +49 7161 66-233

SCHULER PRESSEN GMBH

Werk Weingarten | Schussenstr. 11 | 88250 Weingarten | Germany
Phone +49 751 401-01 | Fax +49 751 401-2458

info@schulergroup.com | www.schulergroup.com