

FORMING THE FUTURE



MINTING

System solutions for the minting industry

SCHULER 

Member of the ANDRITZ GROUP



SYSTEM SOLUTIONS FOR THE MINTING INDUSTRY

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A LONG HISTORY. SUCCESS STORIES IN MINTING TECHNOLOGY FOR MORE THAN A CENTURY.



Historic press – about 1900.

Coin manufacture over the course of time. The manufacture of coins has been a manual process for hundreds of years. The manual spindle press, used since the Middle Ages, could produce no more than two or three coins per minute.

The Industrial Age for minting technology began only about 1870. Motor-driven knuckle-joint presses replaced the strenuous manual labor of the previous age. Schuler was already delivering presses to mints in these early days. This is evidenced by several historical documents, including a letter from the Royal Württemberg Mint dated 1874.



National Mint, Jakarta (Indonesia) 1956.

At the turn of the century, Schuler knuckle-joint presses were producing coins at rates up to 60 per minute – a remarkable achievement for the time.

Schuler presses were also being widely exported at that time. A 1905 report by the Mint and Foundry Masters of Saxony, Buschick and Choulant, mentions a visit to Schuler and 30 presses destined for China. With various improvements and new features, Schuler delivered more than 1,000 such minting presses to about 50 countries up to the middle of the 1930s. A number of presses from this era are still in use today.



National Mint, San Luis Potosi (Mexico) 1983.



Bayerisches Hauptmünzamt (Germany), about 1990.

Ground-breaking development. With the development of the MRH/MRV series of minting presses, a new epoch of minting technology dawned in the 1980s. Gradually, the performance of these Schuler machines was expanded and increased – to as much as 850 coins per minute.

In parallel to this, and using the same concept with almost the same power, a series of machines was created in a vertical design for manufacturing round and multi-sided coins, as well as bi-metal and tri-metal coins.

INNOVATIVE SYSTEMS. CHALLENGES IN MINTING TECHNOLOGY.



Horizontal minting presses MRH.

Exacting requirements. The manufacture of coins has always been especially demanding. In addition to quality and output rate, one of the most important criteria for cost-effective industrial production is the multi-functional use of the equipment.

Specimens and collectors' items. Over and above their function as a means of payment, coins and medallions are also »calling cards« for the individual country – often desirable collectors' items, awards and artifacts of a particular time period. For more than a century, Schuler has been setting the standards for innovative developments in minting technology.

Ongoing technical development. Schuler provides innovative solutions for new challenges such as tri-metal coins, new material combinations or security features.



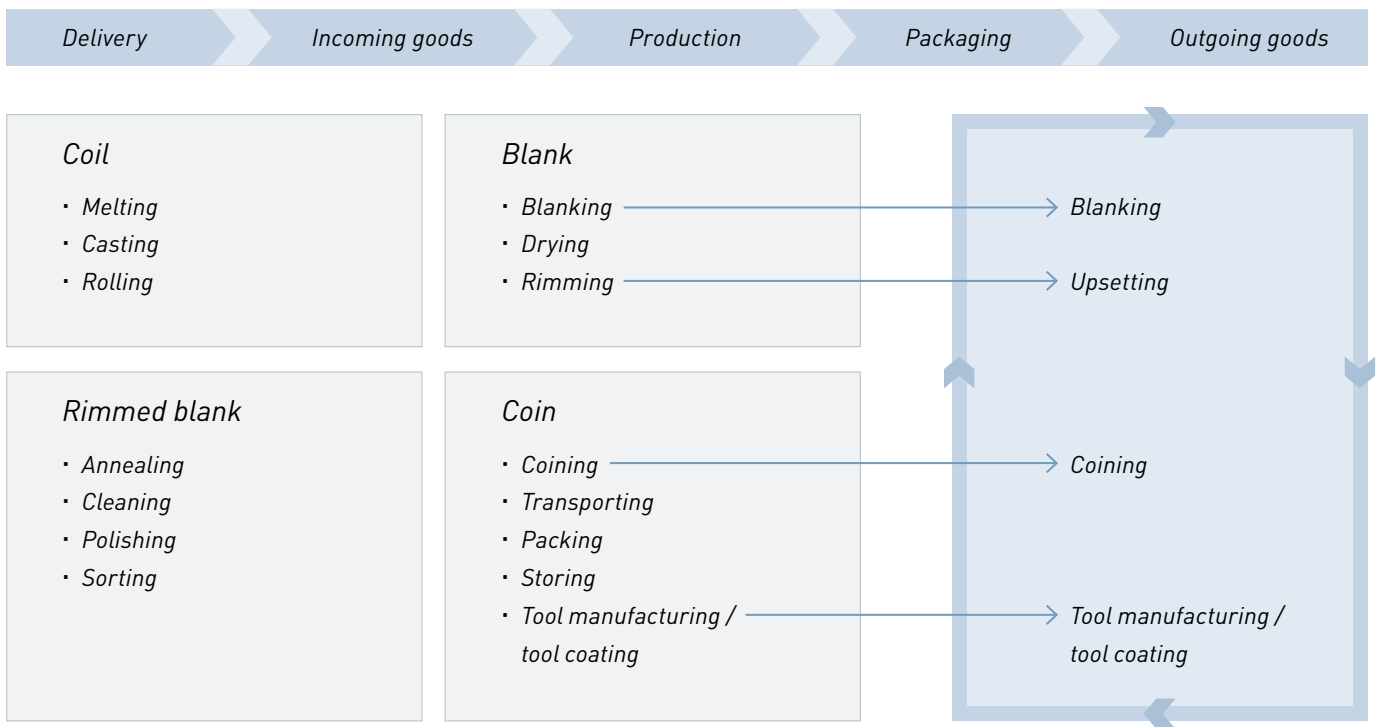
Exacting requirements on the manufacture of coins.

FROM COIL TO COIN. MANUFACTURING PROCESS FOR COINS.



Coins in all shapes and colors.

OVERVIEW OF THE VARIOUS STAGES OF THE COIN MANUFACTURING PROCESS



Schuler can provide its customers with the entire product spectrum – from coil to finished coin – using expert partners for certain production stages.

MANUFACTURE OF COIN BLANKS. TAILOR-MADE SYSTEMS WITH THE SCHULER BLANKMASTER.



Schuler Blankmaster SAK, complete system.

Precision and high production rate. For high-volume manufacture of coin blanks, Schuler offers fully automated blanking lines specially designed for this task. A complete modular system with peripherals is available to permit assembly of a »tailor-made« blanking line.

The Blankmaster SAK processes a variety of materials – from soft to very hard – for coin blank production. The rule of thumb is: the wider the coil, the greater the output per stroke and the greater the material recovery – between 75% and 85%. The market trend toward ever harder materials, increased coil widths, higher output, and the manufacture of bi-metal rings requires ever higher press force levels – currently 1,600 kN on average.

The dynamic counterbalance enables the press to be installed directly onto the floor with vibration-damping elements. The fast-acting clutch-brake system stops the slide within one revolution, even at the maximum stroke rate.



Schuler Blankmaster SAK, Mexico.

FEATURES OF THE SCHULER BLANKMASTER SAK

- Extremely rigid monoblock press body, welded and stress-relief annealed
- Schuler's unique »combination bearing system«
- Eccentric shaft mounted in roller bearings for high rigidity and low play
- Friction bearings in the connecting rod to cushion the blanking shock and eliminate vibrations
- Twin conrod and especially large pressure point for low deflection and slide tilting
- Compact die space ensures minimal deflection



Schuler Blankmaster SAK, Canada.

Three options for the processing of blanking scrap:

- A separate shear, downstream from the press, cuts the scrap web into strips which are then bound together in bundles.
- An auxiliary scrap cutter on the press bed separates the scrap web after each stroke. This creates small pieces of scrap that are deposited into containers by means of a conveyor.
- A take-up coiler at the end of the blanking line rolls up the scrap web.

Feed unit. The line is equipped with a high-performance servo feed for coil widths of 40 to 420 mm. High-performance roll feeds with a maximum width of 630 mm are available.

ADVANTAGES OF THE SCHULER BLANKMASTER

- High levels of uptime, thanks to quick tool change using hydraulic die clamping for the upper and lower tools
 - Roller rails in front of the clamping plate and hydraulic raise-lower rollers in the bolster plate
-



Coin blanks.

Coil thickness monitor. The coil thickness measurement device checks deviations from the correct coil thickness in on-line operation. If there are tolerance deviations, the material is advanced to a point in front of the die space, the press is stopped in TDC and the electric roll feed moves the out-of-tolerance coil through the open die to the take-up coiler.

Optimum line control. The Blankmaster uses the ABI-Plus press control system. For more information, refer to page 13.

Expansion to a tailor-made system is possible with the following options:

- Coil feed line
- Conveyor belts
- Coil lubrication unit
- Continuous-pass drying oven

SCHULER ABI-PLUS.

MODULAR AND FLEXIBLE CONTROL CONCEPT.

SIMPLE OPERATION BY TOUCHSCREEN INTERFACE.

Easy to operate. ABI-Plus, the Schuler line operation and information system, offers a user-friendly and versatile software for industrial PCs.

It ensures a high level of uptime for the line by fast clearance of faults, maintenance support and shorter changeover times.

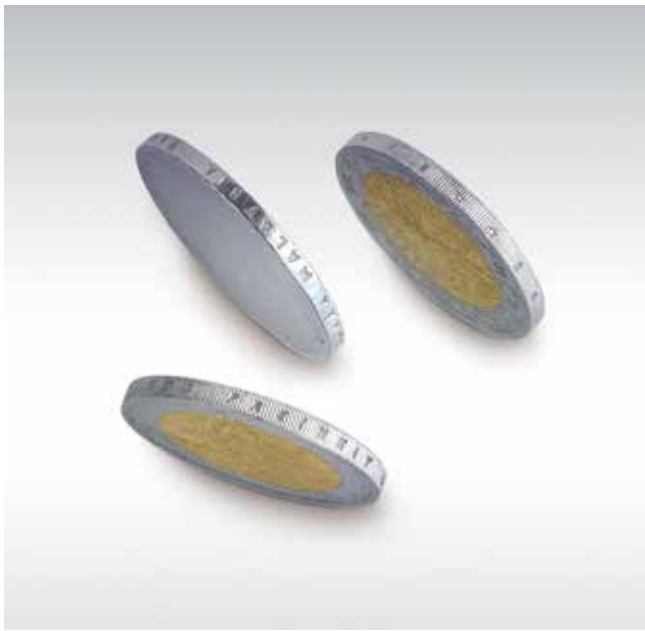
Data can be evaluated in the national language. ABI-Plus allows operation, maintenance and fault diagnostics for the minting press in the language of the user country. At the same time, data is collected, evaluated and stored. The data can also be transferred online to an external PC. ABI-Plus is an open software system. It permits integration and/or connection of customer-specific software modules.

Intuitive menu system. The operator is informed about the status of the coining process and the line by means of superimposed screens, graphics, measured values, and variable parameters. Step-by-step guidance for operator intervention is provided for the various operating modes (setup, inching, automatic continuous run). A help system can be called up at any time, if help is needed with the menus.



Control panel with touchscreen.

SORTING, RIMMING AND EDGE LETTERING. RS 50 AND ST 50 S MODELS.



Top quality rimming and edge lettering.



RS 50 model, die space.

RIMMING AND EDGE LETTERING.

Schuler offers high-performance systems for modern minting facilities. These systems include not only minting presses and blanking lines, but also edge-lettering (RS 50) and rimming machines (ST 50 S).

To achieve high-quality coins, the edge surfaces of the blanks after production on the blanking line have to be smoothed and rimmed. This is achieved by means of edge processing in rimming or edge-lettering machines. Schuler equipment is characterized by high precision

and output. The highest level of uptime for all such equipment is ensured by means of simple design of the tooling, and quick die changes as well as ease and simplicity of operation.

RS 50 model. The RS 50 model is a machine for the rimming of coin blanks and embossing of letters or ornamental patterns into the edge of the blank. Loading is fully automated by means of a special elevator conveyor above the feed drum. Options include manual loading by means of a feed chute. This method guarantees a



High output up to 600,000 coins per hour by rimming with the ST 50 S.



ST 50 S model, die space.

very gentle treatment, especially for precious-metal blanks. For blanks of 14 mm diameter, the rimming machine can process up to 130,000 pieces per hour.

ST 50 S model. The ST 50 S model can process blanks in the diameter range of 14 mm to 50 mm. Especially high output is achieved by the use of two feed drums. The production yield for 14 mm blanks is up to 600,000 pieces per hour, and for 50 mm blanks up to 225,000 per hour. The effective yield is influenced by weight, material and quality of the blanks.

MRH MODEL SERIES. MINTING PRESS LINES IN HORIZONTAL DESIGN.



MRH minting presses with acoustic protection system.



Section through a horizontal minting press in the MRH model series.



MRH horizontal minting press, Canada.

For round coins and high-volume coin production.

Minting presses of the MRH series are employed exclusively for the processing of round blanks. With cycle rates of up to 850 strokes per minute, this series is especially suited for large-volume production.

Short changeover times result from the small number of change parts and ensure a high degree of flexibility.

MRV MODEL SERIES. MINTING SYSTEMS IN VERTICAL DESIGN.



MRV 150 minting presses with Ringmaster equipment.



Section through a vertical minting press in the MRV model series.

MRV with universal applications. Vertical coining presses of the MRV series are extremely versatile in application. These presses were designed to be the basis for »universal coining centers« for the production of all kinds of coins. Vertical coining presses can be used to manufacture round and multi-sided coins, as well as bi-metal and tri-metal coins. Nominal press capacities of 1500, 2000 and 3000 kN are employed.

THE ADVANTAGES OF SCHULER MINTING SYSTEMS

- High levels of uptime, thanks to quick tool change using hydraulic die clamping for the upper and lower tools
- Roller rails in front of the clamping plate and hydraulic raise-lower rollers in the bolster plate
- Tailor-made system



MRV 300 vertical minting press with two feeds.

Other additional options:

- Coil feed line
- Conveyor belts
- Coil lubrication unit
- Continuous-pass drying oven

ROUND BLANK FEED.
PRECISION AND RELIABILITY FROM THE FEED TO
THE MINTING PROCESS.



Round blank feed.



Rimmed coin blanks.

Round blank feed that reduces material wear and tear.

Coin blanks for both horizontal and vertical presses are fed by means of rotating drums.

Feed drums of this design are particularly gentle because the abrasion is minimum compared to vibrating feed drums. Noise generation is also reduced. Only the round blank outfeed chute and the round blank thickness need to be altered for changing over to a different coin size.

Feeding of blanks and take-away of finished coins are performed with great reliability, by means of a dial feed



Feed drum for an MRH horizontal minting press.

plate with overload protection. The drive is equipped with a backlash-free mechanical indexing gear, which has an extremely high indexing accuracy, and with optimum acceleration and deceleration characteristics.

Different feed in vertical and horizontal minting presses.

In the case of horizontal presses, the blanks reach the dial feed plate by gravity via the feed channel. In vertical presses, feeding takes place by means of a channel, a feed tube and a pusher.

SCHULER MULTIPLE STRIKE. HIGHEST QUALITY WITH AUTOMATED OR MANUAL FEED.



Highest surface quality with Schuler multiple strike.

Option for maximum quality. A vertical minting press equipped with the »multiple strike« feature ensures the highest minting quality and flexibility. Loading may be manual or by automated blank feeding.

The feeding mechanisms and the ejector are inoperative during multiple-strike operation. The use of a controlled servomotor as the drive for the feeding mechanisms ensures maximum flexibility in the number of coining strokes – preselected as required from one to nine.

The following applications are possible:

- Manufacture of coins
- Collectors' coins
- Mass production
- Manual individual production

SCHULER RINGMASTER. PIERCING, JOINING, COINING, AND SEPARATING.



Manufacturing a multi-sided bi-metal coin with the Ringmaster.



Interior view of an MRV 150 vertical minting press, equipped with Ringmaster.

Option for piercing and separating. The Schuler Ringmaster is additional equipment for an MRV minting press. In addition to the abovementioned possible applications of a vertical

coining press, presses equipped with the Schuler Ringmaster can also be used as piercing and separating presses.

ADVANTAGES OF THE SCHULER RINGMASTER

- All forms of rim contour and/or edge lettering are possible
- Coins with edge lettering can be processed into bi-metal coins (after corresponding piercing)
- The Schuler piercing tool avoids distortion and guarantees the flatness of the rings
- Fast changeover from coining to piercing operation
- Wide variety of applications ensures high degree of utilization
- Ring manufacture at relatively low investment costs

BI-METAL AND TRI-METAL MINTING PRESSES. JOINING AND COINING IN ONE OPERATING SEQUENCE.



Two feeds for manufacturing bi-metal coins.



Bi-metal coins.

Manufacture of bi-metal and tri-metal coins. Minting lines in the MRV model series are optimally suited to the manufacture of bi-metal and tri-metal coins. Joining and coining are completed in one operating sequence. The rings and centers are fed separately and coined at maximum cycle rates.

SECURITY FEATURES ON COINS. MULTI-SIDED COINS AND MULTI-SIDED BI-METAL COINS.



Multi-sided coins.



Multi-sided bi-metal coins.

Security features. Multi-sided coins offer mints new possibilities when it comes to security features.

They can be manufactured in both mono- and bi-metal versions in mass production on vertical minting presses. The basis for this is an MRV 150 vertical minting press with bi-metal equipment that is expanded with additional technology developed by Schuler.

NEW DIMENSION IN COIN MANUFACTURE. TRI-METAL COINS.



Tri-metal coin manufactured on an MRV 300.

Manufacturing tri-metal coins in industrial mass production poses a considerable technical challenge. Tri-metal coins are produced using an MRV 300 vertical coining press, fitted with special technology.



MRV 300 – three feeds for manufacturing a tri-metal coin.

The ring and two centers, made from three different materials, are fed to the minting tool via three different feeds. Depending on the materials and technical specification, coins with diameters of up to 50 mm can be manufactured. Speeds of up to 500 strokes per minute can be reached.

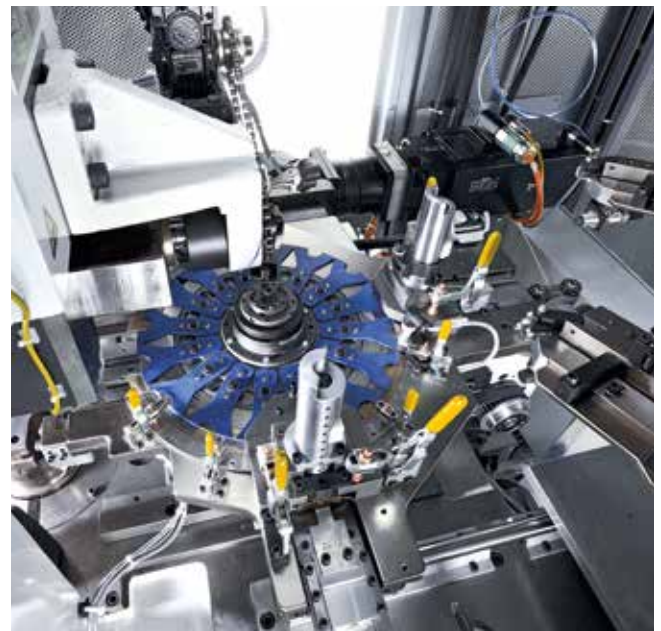
ACOUSTIC PROTECTION AND DIE CHANGE. LOW-NOISE AND EFFICIENT.



MRV 150 die space.

Low-noise. Acoustic protection is becoming more and more important in mass production. Schuler offers efficient solutions for the MRH and MRV model series. In both press versions, the acoustic protection enclosures and safety coverings can be opened easily; this allows quick and unhindered access to the die space if required.

In horizontal machines, the feed drum and infeed chute can also be swiveled away to the side once the locking mechanism has been released. The gear unit and dial feed plate are lowered pneumatically for changeovers.



MRV 150 feed.

Fast die change. The die change procedure can be performed in three minutes. In vertical machines, the gear unit and dial feed plate are moved as a complete unit for the changeover; the feed drum is moved separately.

The coining pressure can be adjusted manually or automatically using the ABI-Plus control when the machine is running. The machines are equipped with an inching drive so that the punch setting can be checked following a change of denomination.

CONSULTING AND PLANNING WORLDWIDE.
SCHULER AS SYSTEM PARTNER AND TURNKEY
SUPPLIER.



Schuler minting lines are installed in many countries worldwide.



Schuler is the turnkey supplier for minting plants.

Schuler offers more than just minting equipment for the production of blanks, circulating and special coins.

From coin design to the packaging – from the integration of new technologies into the manufacturing process, to the planning and realization of complete projects – Schuler is at your disposal as a system partner and turnkey supplier worldwide.

SCHULER AS TURNKEY SUPPLIER.

As a general planning partner and contractor, we offer the development and production launch of complete minting plants. Our services include planning the process engineering, project coordination, determining the interfaces and integration of components.

THE SCHULER RANGE:

- **Blanks, circulating coins, tooling:** Equipment for the production of blanks, circulating coins and tooling
- **Handling and logistics:** Equipment for inspection, counting and packaging of coins; systems for weight data measurement with printers; coin containers; safety devices, and floor-mounted conveyors
- **Special edition coins and medallions:** Equipment for cleaning and polishing of blanks, and systems for decorative packaging
- **Minting tools:** Support for design of coins, delivery of master tooling, coining punches, and rings
- **Manufacture of minting tools:** Equipment for engraving and manufacture of models, hobbing presses, annealing lines, including testing devices, and PVD coating systems for longer service life of the coining punches (TiN, CrN, AlTiN, and TiCN)
- **Research, development and training:** At the testing and demonstration center in Göppingen, Schuler provides its complete product range for demonstration purposes as well as for conducting test runs. Experts offer training on all aspects of minting technology according to customer needs.

SCHULER SERVICE. STATE-OF-THE-ART SERVICE FOR MORE PERFORMANCE.

Schuler Service offers a tailored portfolio of services covering the entire life cycle of your equipment.



Schuler Service – Customer-oriented & efficient, worldwide.

Over 900 service employees worldwide provide expert support 24/7 in close cooperation with you – our partners. Our main priority is always to ensure the maximum productivity and safety of your production equipment in order to secure your company's continued success.

With over 175 years of experience and expertise, we can guarantee the best possible support for the operation of your machines – and not only those supplied by Schuler, but by all other manufacturers. Whatever the situation, Schuler Service has the right solution for your specific needs.

OUR SERVICES FOR YOU.

Technical Customer Support:

- Machine inspections
- Safety inspections
- Preventive maintenance
- Repair
- Repair welding
- Production support

Components and Accessories:

- Spare parts and spare part packages
- Maintenance kits
- Repair parts
- Replacement parts

Project Business:

- Modernization
- Retrofits
- Refurbishment
- Machine relocations

Special Services:

- Service contracts
- Hotline and remote service
- Training
- Tailored customer training
- Optimizing plant & processes
- Consulting

Used Machinery:

- Purchase and sale
- Evaluation



[www.schulergroup.com/
service_en](http://www.schulergroup.com/service_en)

ABOUT THE SCHULER GROUP – WWW.SCHULERGROUP.COM

Schuler is the world market leader in metal forming technology. The company supplies presses, automation solutions, dies, process know-how, and services for the entire metalworking industry and lightweight automotive design. Customers include automobile manufacturers and suppliers as well as companies from the forging, household appliances, packaging, energy, and electronics industries. Schuler is the leading supplier of minting presses and supplies system solutions for aerospace, rail transport, and large pipe manufacturing. Following the acquisition of toolmaker AWEBA and a majority stake in Chinese press manufacturing company Yadon, Schuler employs around 6,600 members of staff in 40 countries. The Austrian ANDRITZ Group holds a majority share in Schuler.

Schuler Pressen GmbH

Schuler-Platz 1
73033 Göppingen
Germany
Phone Sales +49 7161 66-0
Phone Service +49 7161 66-582
Fax +49 7161 66-233

info@schulergroup.com
www.schulergroup.com



www.schulergroup.com/
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