



Member of the SCHULER GROUP



## FORGING PRESSES FOR HOT FORGING

# ■ ABOUT FARINA PRESSE



Factory building in Suello (Lecco), Italy

## ■ PRODUCTION OF HOT-FORGING LINES

Farina Presse designs and produces complete lines for hot forging. We can cover the complete production process within the company, from the design phase through installation and service.

## ■ CUSTOMIZED DESIGN

The core business of our technology department is the quick and customized design of projects with the goal of meeting the requirements of our customers. The reliability of the products by Farina Presse is the result of a consistent search for new technologies and comprehensive mechanical and electronic design.

## ■ DIRECT AND QUICK CUSTOMER SERVICE

Our customers can rely on direct and quick customer service.

## ■ OVERHAUL OF SYSTEMS

The product and service range of Farina Presse also provides the overhaul of existing press and systems of any make and model.

## ■ GLOBAL PRESENCE

Farina is a part of the Schuler Group since 2018. The press manufacturer, founded in 1839 at its headquarters in Göppingen, Germany, has about 6,600 employees at production sites in Europe, China and America, as well as service companies in more than 40 countries. Via Schuler, Farina gains access to a global distribution network and to new international markets.



Samples of hot-forged workpieces

# ■ THE HISTORY OF THE COMPANY

## ■ FORGING SYSTEMS FOR MORE THAN 85 YEARS

In 1932, Domenico Farina started his company "Costruzioni Meccaniche Farina," a workshop for the production of dies for cutting sheet metal. For testing the dies, a press was necessary. Thus, the first Farina press came into being. Initially, the press were only for cutting sheet metal. Then, in the 1970s, the focus was on press for hot-forging. Since that moment, Farina Presse has

been dedicated to the production of press for hot-forging steel. The company complements its product range with machinery necessary for completion – and automation – of the hot forging process. Farina Presse designs and produces entire lines for hot forging. In addition, the company does retrofits – that is, it rebuilds and reconditions existing press.

1930-1950



Lathes



Manual spindle press



Shakers



Double connecting rod press



Eccentric press that can be inclined



Belt press



press with movable workbench

1951-1970



Free fall hammers



Press that can be inclined



Spindle press



GDB press series



GAS-500 press



GAS-630 T press



GAS-650 press

1971-1990



1000 T press at the BIMU trade show in Milan



GAS-400 press



GAS-1000 press



GAS-400 with automation



GAS-1000 with robot



GAS 1600 press line



GAS 1000 + GAS 1600

1991-2008



Mechanical hands for loads up to 500 kg



GAS-1000 transfer press



TCF hot cutting line



GAS-3150 press



GAS-4000 press



GAS-5000 line



GAS-2500 line with 5 robots

2009-TODAY



GLF 750



GLF 1000



GLF 1300



GLF 1600



GLF 1800



GLF 2000



GLF 2500



GLK 2500



GLF 3150



GLK 3150



GLF 4000



GLF 5000



GLF 6000



GLF 8000



GLF 10000



GLF 16000

# ■ CERTIFICATES AND PATENTS



The four pillars of quality management, environment, energy and workplace health & safety. All employees of Farina Presse actively participate in this process.

## ■ QUALITY

Quality system

Standard: UNI EN ISO 9001:2015

Certificate: No. 50 100 1267

## ■ ENVIRONMENT

Environmental management system

Standard: UNI EN ISO 14001:2015

Certificate: No. 50 100 2488

## ■ ENERGY

Energy management system

Standard: UNI CEI EN ISO 50001:2011

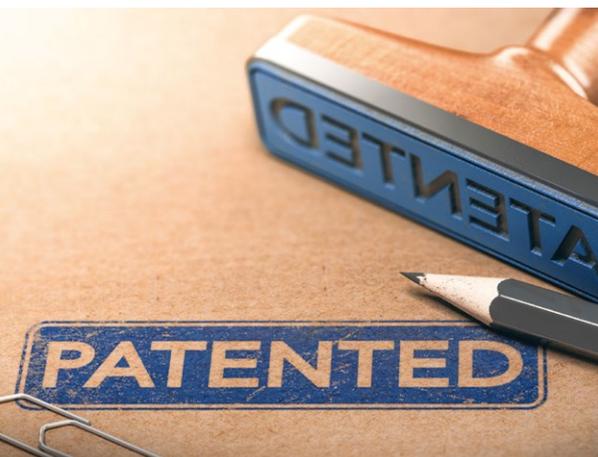
Certificate: No. 50 100 14822

## ■ SAFETY

Work safety and health protection of the employees

Standard: UNI ISO 45001:2018

Certificate: No. 50 100 12182



## ■ DEVICE FOR SLIDE ADJUSTMENT

Patent No.: EP 2 243 571 A1

This device makes it possible to adjust the slide during operation of the press without interrupting the production cycle.

## ■ BENEFITS

- Shortened times for completing a cycle for adjusting the slide while the press is in operation.
- Automatic locking and unlocking of the eccentric ring with annulment of the plays.
- Automatic unlocking of the eccentric ring during the adjustment to ease the ring's rotation.
- Continuous temperature monitoring of the bronze bearing located in the eccentric ring, using a temperature sensor.
- Optimizing the system for lubrication of the bronze bearing.

## ■ DESIGN

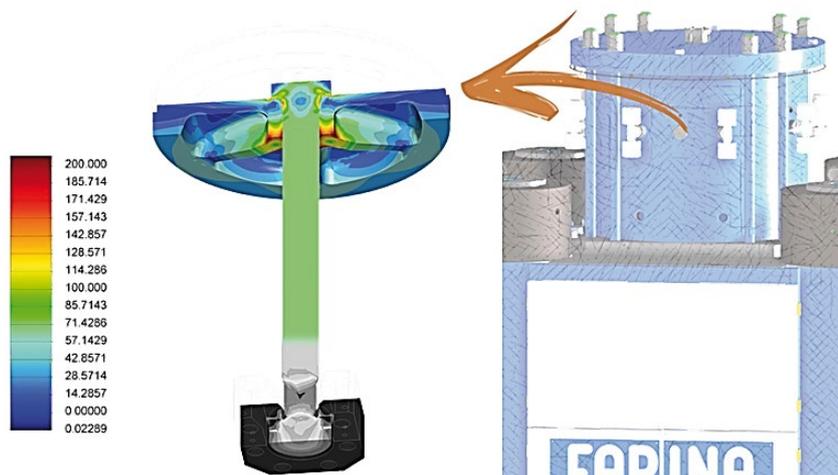


The entire production of Farina Presse is designed in the company's own technology department. Not only the mechanical but also the electronic components and the software of the products are developed here. The objective of design is continuously optimizing product features. In doing so, it also keeps a constant focus on

the European regulations that are in force for product quality, user safety and environmental protection. The technology department creates all of the technical documentation and the manuals that are part of every shipment, in accordance with the Machinery Directive and the regulations valid at the place of installation.

### ■ FINITE ELEMENT METHOD

Since 2005, we have been using the FEM (Finite Element Method) to evaluate and optimize our machines as early as the planning phase. This method makes it possible to determine the state of stress, deformation and extension of elements that are exposed to loads. As part of this process, all the components in the flow of forces are analyzed so that any changes and optimizations can be carried out as early as possible.



FEM analysis on the counterbalancing piston of the slide

# ■ PRECISE, COMPACT, POWERFUL – THE PRESS OF THE GLF SERIES



- ADVANTAGES OVER THE PREVIOUS ECCENTRIC PRESS TYPE GAS SERIES
- Higher structural rigidity with reduction of deformation by 45%.
- More options for work with non-centered dies.
- Reduction of the floor height of the press by 25%.
- Lower burr thickness on the pressed parts.

Since 2005, the mechanical guided ram press of the GLF series have been one of our portfolio's strong points. Their technology is undergoing continuous development, and they guarantee high productivity and precision in hot forging. The GLF series includes press with a press force from 7,500 kN to 160,000 kN. The technical properties of these press can be customized.

▪ GLF PRESSES TECHNICAL DATA (STANDARD)

	GLF 750V	GLF 1000V	GLF 1300V	GLF 1600V	GLF 1600VL	GLF 1800V	GLF 1800VL	GLF 2000V
Press capacity (nominal force) [kN]	7,500	10,000	13,000	16,000	16,000	18,000	18,000	20,000
Stroke rate (cont.) [RPM]	110	95	90	85	85	85	85	85
Stroke rate (thermal) Standard   <b>KERS</b> [RPM]	30	22	22	15   30	15   30	15   30	15   30	15   30
Slide stroke [mm]	200	230	230	280	280	280	280	300
Slide adjustment [mm]	10	16	16	16	16	16	16	16
Distance Bed/Slide (max.) [mm]	600	850	900	1,100	1,200	1,100	1,200	1,200
Frontal light between uprights [mm]	750	1,000	1,000	1,100	1,300	1,100	1,300	1,300
Side light between uprights [mm]	550	720	750	850	890	850	890	960
Ram Table size (L-R x F-B) [mm]	710 x 850	890 x 1,070	890 x 1,070	970 x 1,200	1,120 x 1,200	970 x 1,200	1,120 x 1,200	1,200 x 1,300
Bed area (L-R x F-B) [mm]	750 x 900	1,000 x 1,100	1,000 x 1,100	1,100 x 1,250	1,300 x 1,250	1,100 x 1,250	1,300 x 1,250	1,300 x 1,300
Main motor power [kW]	45	75	90	110	132	132	160	200
Machine weight [kg]	38,000	70,000	75,000	115,000	128,000	120,000	128,000	140,000

	GLF 2500R	GLF 3150R	GLF 4000R	GLF 5000R	GLF 6300R	GLF 8000R	GLF 10000	GLF 16000
Press capacity (nominal force) [kN]	25,000	31,500	40,000	50,000	63,000	80,000	100,000	160,000
Stroke rate (cont.) [RPM]	70	60	55	50	47	40	36	30
Stroke rate (thermal) Standard   <b>KERS</b> [RPM]	15   30	13   24	12   24	12   24	10   20	8   16	7   14	6   12
Slide stroke [mm]	340	400	400	400	460	480	500	600
Slide adjustment [mm]	20	20	20	20	20	20	20	20
Distance Bed/Slide (max.) [mm]	1,250	1,600	1,600	1,500	1,600	1,650	1,800	2,100
Frontal light between uprights [mm]	1,400	1,630	1,600	1,600	1,750	1,800	2,000	2,550
Side light between uprights [mm]	960	1,250	1,160	1,150	1,200	1,300	1,400	2,200
Ram Table size (L-R x F-B) [mm]	1,300 x 1,460	1,520 x 1,700	1,510 x 1,900	1,510 x 1,900	1,600 x 2,000	1,700 x 2,200	1,900 x 2,400	2,400 x 3,200
Bed area (L-R x F-B) [mm]	1,360 x 1,450	1,630 x 1,700	1,600 x 2,200	1,600 x 1,800	1,750 x 2,000	1,800 x 2,200	2,000 x 2,400	2,500 x 3,200
Main motor power [kW]	200	250	315	315	355	355	450	800
Machine weight [kg]	180,000	250,000	330,000	360,000	490,000	640,000	850,000	1,750,000

# ■ KERS SYSTEM



## ■ KERS (KINETIC ENERGY RECOVERY SYSTEM)

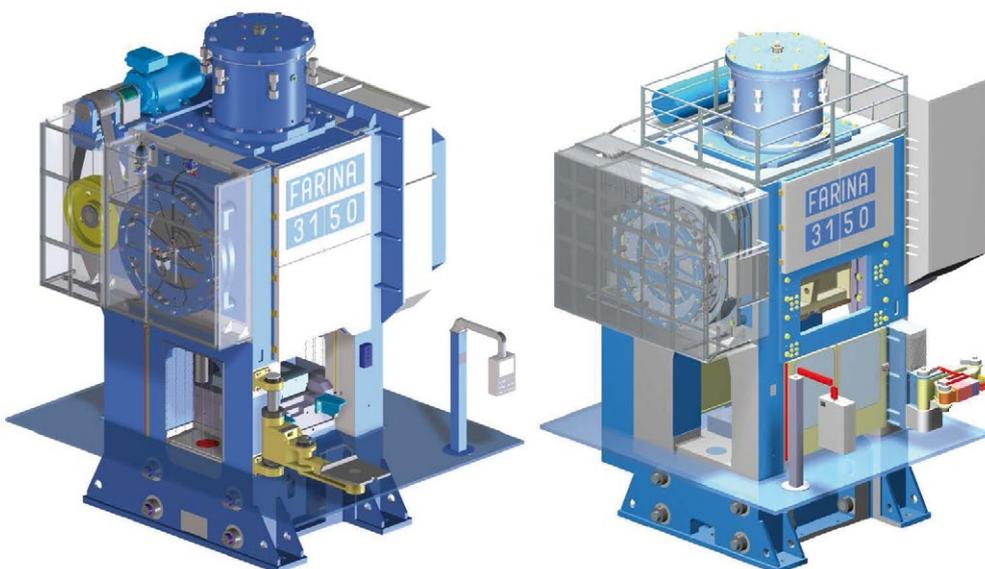
Traditional press systems for hot forging are not as energy efficient as they could be, because up to 40% of the energy fed into them is converted into heat and dissipates into the environment. The flywheel loses up to 20% thermal energy during the clutch process; during the braking process at the end of the cycle another 20% is lost.

The KERS system prevents this. A switch on the auxiliary drive starts the cycle and takes the strain off the clutch, which can now work smoothly. The total energy from the flywheel can be used for the forging process. The KERS system also enables the energy released during the braking process to be used to supply energy to the flywheel. Thanks to KERS, 100% energy efficiency can be achieved.

## ■ ADVANTAGES OF THE KERS SYSTEM

- Big benefit for cycled forging process
- Larger number of strokes per minute
- Energy saving (up to 40%)
- Less wear of machine parts (clutch/ break)
- Less downtimes due to maintenance
- Higher efficiency of the press

## ■ RETROFITTING THE PRESS MODEL GLF TO MODEL GLK



Before

After

## ■ TRANSFER PRESS

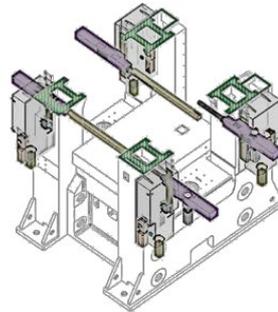
Transfer presses can be operated fully automated and with high flexibility. The forging transfer moves the parts inside the press. This cycled process facilitates optimum energy utilization and increases productivity.

Automatic operation allows for a significant increase in productivity compared to conventional manual presses when producing medium to large batch sizes. With optimum use, the production capacity can be increased by more than 100% compared to conventional presses.



### ■ ELECTRONIC MULTI-AXIS TRANSFER

The electronic double-bar multi-axis transfers are installed on the press upright. With their robust and dirt-resistant design, the transfers are optimized for the forging environment.



# ■ COMPLETE FORGING LINES



## ■ FORGING LINES FOR HOT FORGING

Farina Presse produces complete lines for hot forging, all according to the specific requirements of the customers. Our customers receive everything from a single source – from the initial draft through the final design, from installation through acceptance and service.

## ■ FUNCTION OF THE LINES

- **Automatic:** The transfers, mechanical hands and robots maneuver the workpieces in all production phases completely automatically. The line is surrounded by a protective fence with locked doors preventing access. During automatic operation of the line, the sole task of the operators is to monitor the line.
- **Semi-automatic:** The mechanical hands and robots automatically load and unload the workpieces from the work area, whereas the operator exclusively intervenes in the forging phase of the workpieces in the work area.
- **Manual:** All actions of maneuvering the workpieces for loading and unloading from the work area and for forging are executed by the operator.

## ■ ADVANTAGES

- Maximum flexibility in the layout of the line, individually designed layouts
- Consultation on selection and manufacturing of the necessary equipment for the production line
- Manufacturing control systems for optimizing the performance of the line.

The lines can be manufactured with manual, semi-automatic and automatic operation, with mechanical hands, robots and transfer systems.

Various criteria are taken into account during the design of the forging lines, such as productivity, flexibility, complexity of parts, and the batch sizes to be produced.

In order to minimize the installation phase at the customer plant, the forging line can be accepted “cold” at the Farina factory.

# ■ HOT CUTTING LINES

The hot cutting line rounds off the production of Farina Presse. Its main characteristics are its robustness and high productivity, with which the material handling in the entire process can be optimized, because workpieces do not need to travel as far.

Hot cutting begins with loading the material bars onto the loading device and ends with the transfer of the workpiece to the press at the intended dimensions and at the correct temperature. At this point, the workpieces are ready for forging. Through an automated feed, the material bars are transported through the entire line.

The size of the line depends on the dimensions of the cut that can be performed by the cutter:

Round  (diameter up to 300 mm).

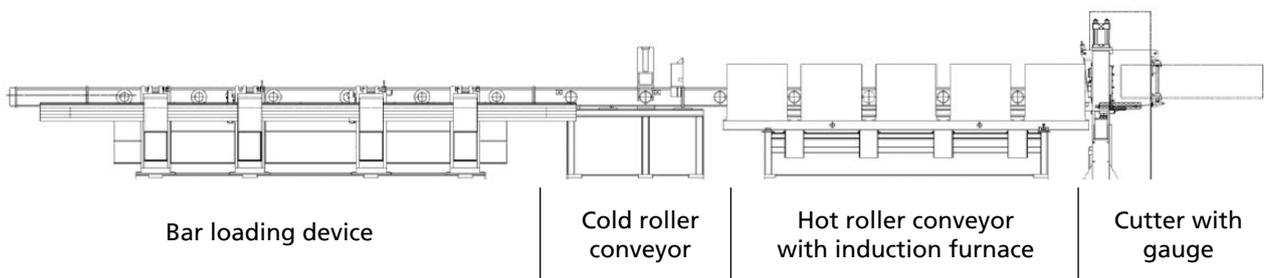
Billets  (up to 250 x 250 mm).

The hot cutting line by Farina Presse is also capable of processing “special” materials that usually cannot be cut when cold.



## ■ COMPOSITION OF THE LINE

- Bar loading device on which the bars are laid in bundles that are subsequently loaded automatically onto the first roller conveyor, which is called the “cold” conveyor.
- Cold roller conveyor with pusher and measuring device – here, the passage of the bars is checked.
- Hot roller conveyor with induction furnace, where the bars are heated to the temperature required for cutting and forging.
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# ■ TRIMMING PRESSES FOR FORGED PIECES



## ■ TRIMMING PRESSES FOR FORGED PIECES

Extremely strong and precise trimming presses for maximum process quality.

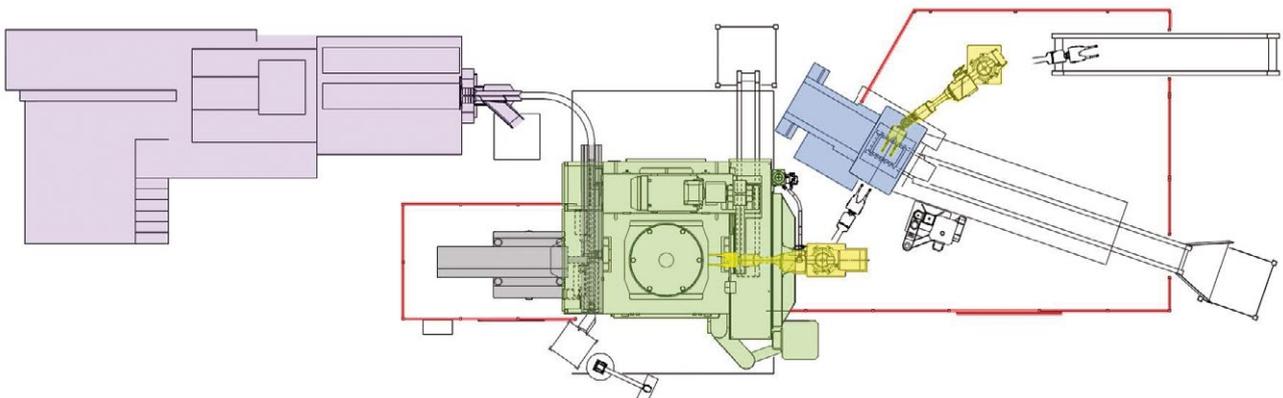
- C-frame model for nominal force up to 2,500 kN
- H-frame model for nominal force up to 16,000 kN

Customization on the bed area, the ram table and the output of the produced pieces is possible.

Electrical management with PLC for an easy interface with the hot forging press and robots, for automatic production cycles.

## ■ ADVANTAGES

- High quality press
- Simple maintenance
- Automatic cycle management
- Integration with the Industry 4.0 process



Layout

## ■ AUTOMATIC DIE CHANGE

The automatic die change enables rapid replacement of the die. This in turn reduces downtimes for the press, which can increase the overall equipment effectiveness.

There are two hydraulic cylinders installed in the press for locking the die, as well as one hydraulic cylinder for inserting and removing the die.



### ■ FUNCTION OF THE SYSTEM

- Hydraulic cylinders that are manufactured by Farina Presse are in charge of locking and unlocking the boxes in the cutting die holder. They are installed in the upper and lower frame.
- Hydraulic devices automatically insert and remove the boxes from the cutting die holder.

- A lifting arm mounted on the front side of the press puts the boxes down and removes them from the cutting die holder. The arm is lifted hydraulically using a control unit attached to the device or by means of a direct connection to the hydraulic control system of the press. The movement of the arm can be enabled in two ways:
  - Automatically using hydraulic motors.
  - Manually with or without the use of locking brakes.

## ■ DIE LUBRICATION

The lubrication of the die is of fundamental importance for the production process of hot forging. During production, its purpose is to clean the die, to lubricate it and to cool it so that the material flows more smoothly and wear on the surfaces is reduced.

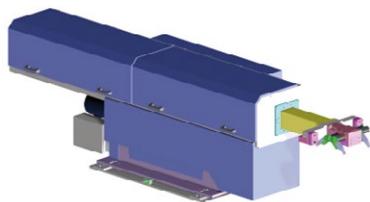
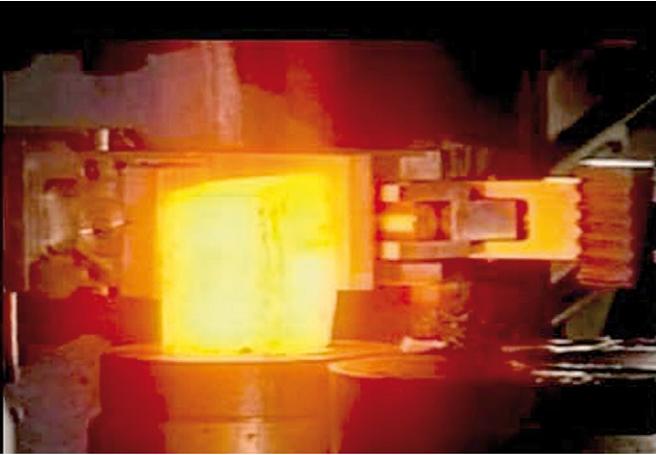
Usually, a mixture of water and graphite is used as lubricant. The water gets in contact with the glowing workpiece and evaporates, creating a cloud of steam that cools the cutting die. The graphite forms a film on the die thanks to its lubricating and dissolving properties. The film lubricates the walls of the die and eases the separation of the workpiece during lift-off.

The method described above ensures that workpieces can be processed better. It also protects the die and extends its service life.

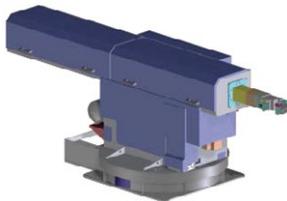
### ■ APPLICATION OPTIONS FOR THE LUBRICATION OF CUTTING DIES

- Independent arm for spray lubrication.
- Spray lubrication system integrated into the transfer bars.
- Spray lubrication system moved by mechanical hands and robots.
- Spray lubrication system installed directly on the press.

# ■ MECHANICAL HANDS AND ROBOTS



Fixed mechanical hand



Rotating mechanical hand



Anthropomorphic robot

## ■ MECHANICAL HANDS AND ROBOTS

Mechanical hands and robots are used in hot-forging lines ever more frequently. They are specialized in loading the workpieces into the press and removing them from the press or in moving them between the tooling stages during production.

Farina Presse designs and engineers the mechanical hands completely on its own. We also produce the tooling and grippers of the individual robots that serve to hold the workpieces. These machines guarantee high productivity and are capable of executing automatic cycles for long time periods without breaks at maximum precision. The administration of the movements and the control of the commands are usually integrated into the main press.

## ■ SELECTION OF TYPES OF MECHANICAL HANDS

The mechanical hands from Farina Presse can be fixed or rotating, with up to five axes and a carrying capacity from 8 to 500 kg. They are driven by brushless motors and rotating actuators. If they are integrated into large press, they increase production by up to 35%. In manual production, they load the workpieces into the press and remove them from it, and they assist the operator in moving the workpieces.

## ■ RETROFIT

### ■ FARINA PRESSE OVERHAULS PRESS OF ANY MAKE AND MODEL

The retrofit, or overhaul, is a procedure in which press that are outdated, no longer in use or defective are completely rebuilt and refurbished. The press are completely dismantled and scrutinized in a thorough technical analysis.

All sensitive components of the press are analyzed using suitable control systems in order to establish their condition. The press components are checked and faulty parts are replaced. All existing systems are replaced and equipped with safety devices that correspond to the applicable regulations.

After the function of the press has been tested completely and the in-house acceptance has been finalized, a new CE declaration of conformity is issued, and the label is attached to the press. The completely overhauled press have Farina Presse warranty. The adapted and overhauled press allow for savings in the range of 35 to 40%.



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