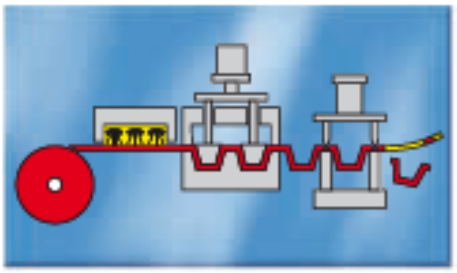
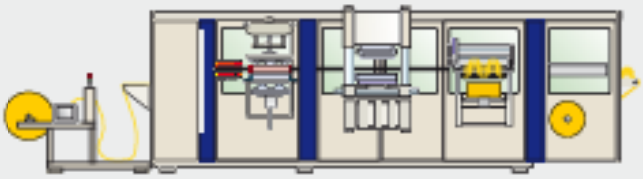


Automatic vacuum forming machines RV 53, RV 74

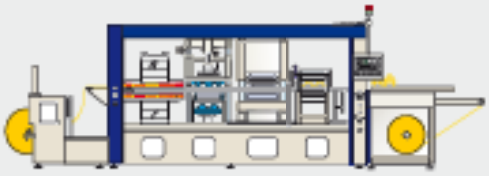
Automatic vacuum forming machines RV 53c, RV 74c

3rd Generation Thermoformer

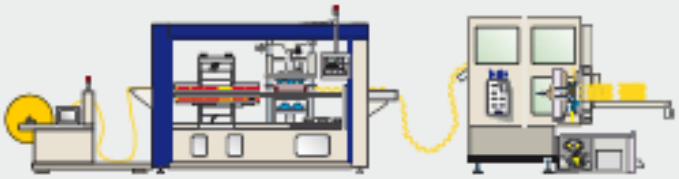
RV 53



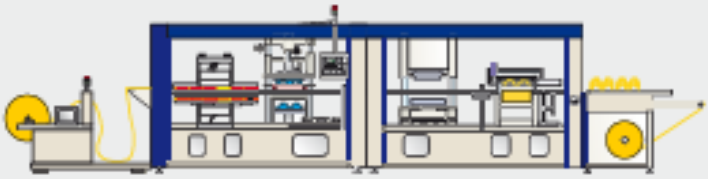
RV 74



RV 53c



RV 74c only forming, interlinked with STAL 80



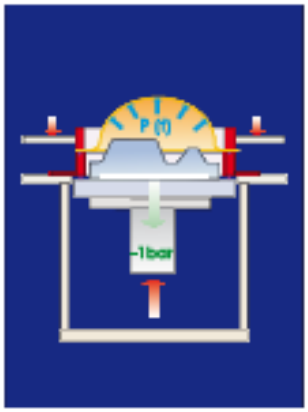
RV 74c

ILLIG RV machines – vacuum forming with different forming areas, expansion levels and automation levels

Formings can be produced economically and efficiently, even in small batch sizes, using the vacuum forming technology in combination with simple tools. A uniform wall thickness is achieved in high parts by employing the positive forming method with automatic pre-blowing and material pre-stretching.

The **RV 53** is suitable for forming, punching and stacking of thermoformed articles.

The **RV 74** can be completed by adding a hole punch press in order to punch holes in the bottom of formed parts.

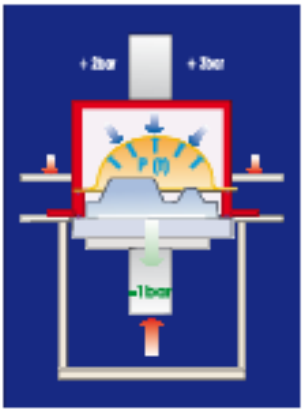


Using the RV technology, uniform wall thickness is achieved by pre-blowing, forming is carried out by vacuum

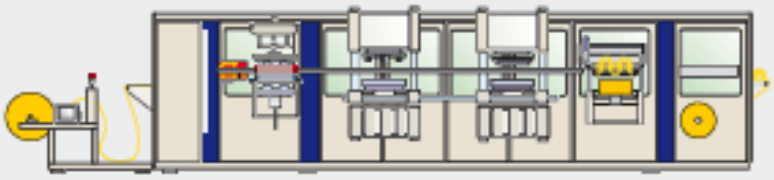
The innovative concept of the RV 53c und RV 74c machine generation permits vacuum forming applications supported by pressure air and ensures maximum productivity and a high quality level

The **RV-c** series features a higher automation level and facilitated operation as well as convenient, rapid tool changes. Wall thickness is improved in high parts due to the positive forming method with automatic pre-blowing and pre-stretching of the material.

Forming is effected by vacuum, supported by a 2 bar pressure air. The total forming pressure is available in a very short time since forming air distances covered were reduced. This equipment is suitable for the production of formings of superior quality and definition with higher output at the same time.



Parts are formed by vacuum in the RV 53c and RV 74c series, supported by 2/3 bars pressure air



RV 74 with hole punch press

RV 53c with hole punch press

RV 74c with hole punch press

Vacuum forming suitable for the production of small batch sizes. Six forming programs, high automation level and rapid change of format parts

Benefits of this series:

- Unique system of tools and standard parts for the construction of molds, punching tools and stacking devices, very beneficial for the production of small batch sizes and samples
- Production parameters can be optimized and stored for high repeat accuracy and reliable, smooth operation
- Four tool movement elements, working independently, for a multitude of tool design possibilities
- Vacuum device for upper and lower table
- High output, with low maintenance efforts required at the same time
- Very economical due to low energy consumption
- Fast, reliable commissioning and optimum availability of machine right from the beginning

RV 53 and RV 74 machines suitable for vacuum forming, economical thermoforming of different batch sizes

RV machines feature simple tool technology for forming, punching and stacking of thermoformed articles. With this technology vacuum forming can be also used for the production of small series.

The forming station is equipped with 4 independently working tool movement elements. The forming tables and clamping frames are moved pneumatically (in RV 74 machines they are moved by motor). Depending on tool design and forming program, strokes of table and upper frame can be set by entering respective time values.

The set time value is analogous to the stroke. Reduced stroke for flat parts means shorter cycle times and thus reduced consumption of air pressure air.

Parameters for pre-blowing, suction and demolding can be digitally set on the central operating panel. These setting data can be saved and filed to ensure further reproducibility.

15 – 20 cycles can be achieved using tools with direct or indirect cooling.

Width and index length of the material transport are set on the operating panel. Indexing tolerances are reduced to ± 0.2 mm due to the electronic positioning drive.

After forming the parts are punched in the punching station and transported to the stacking station suspended in the skeletal.

Digitalized function sequencing for practice-oriented operating philosophy

The new user interface with Touch-TFT Display is an innovation (RV 53) which allows selective operator guidance through the individual process phases. All data relevant for the production process are entered on the operating panel and displayed as set-actual comparison. Consequences of the measures taken are exactly displayed on the screen.

Vacuum forming machine RV 74 with integrated hole punch

RV 53 Automatic vacuum forming machine

RV 53 Vacuum forming station
RV 53 Steel rule punch press

Proven machine program and simple tool technology

Tool change

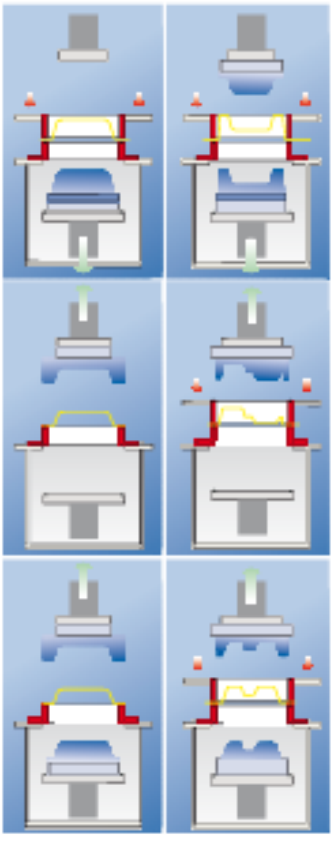
The quick change system includes the automatic setting of the material transport to the tool width as well as quickclamping for forming and punching tools. The position of the steel rule punch press is automatically set according to the index length. All tool parts and format parts can be changed from the operating side of the machine.

Stacking station RV 53, RV 74

Formed parts are stacked in upward direction into the format-dependent stacking cages. The parts, suspended in the skeletal, are clamped in the stacking station and punched out of the skeletal by the break-out plug. The formed parts are moved into the stacking cage by a further movement.

Product stacks are formed using a counting device, they are moved to a discharge sheet by a pushing-out device.

The setting parameters of the stacking movements are entered on the operating panel. The stacking station can be moved in operating direction in order to ensure precise stacking. The position can even be changed during operation.



Some tool design possibilities for vacuum forming on RV 53 and RV 74

The pneumatic chain tensioning device continuously tensions the chain and thus ensures precise material transport

RV 53c, RV 74c machines for vacuum forming, supported by pressure air – for better contour definition and higher output

Formed parts attributed to pressure forming so far can be manufactured on these machines in an inexpensive way.

Thermoforming with machines of the RV-c series ensures higher performance, availability, flexibility and low format part costs. The main target of the innovative technology is the reduction of product costs, also for smaller batch sizes.

Some of the major benefits of RV 53c and RV 74c are: economical production of packaging articles of all plastics suitable for thermoforming, simple operation, high output, fast tool change, computer-aided basic setting and simple operation.

The robust design of all highly-stressed elements ensures continuous operation with high availability at the same time and competent service worldwide.

Consistent optimization of the forming process resulted in the development of these vacuum forming machines.

New forming programs and an optimized arrangement of all elements involved in the forming process allow the production of sophisticated contours.

Based on newly developed standard parts customers benefit from inexpensive format sets for economical vacuum forming, also for small batch sizes.

Short cycle times and a high automation level for forming, punching and stacking combined with a tried and tested quick-change tool technology ensure high productivity and the demanded availability at the same time.

RV 53c Hole punch press

RV 53c Automatic vacuum forming machine

RV 53c Forming station
RV 53c Steel rule punch press

Economical thermoforming of different batch sizes, higher forming speed due to short forming air distances covered

Materials such as PS, PVC, PET and PP can be processed on RV machines. The material thickness to be processed on RV-c machines is 180 my to 1.5 mm. Materials up to 2 mm thickness can be processed on RV 74c machines as well as optionally on RV 53c.

The basic RV 53c machine is equipped with heating, forming and punching station. The machine can be upgraded by adding a stacking device as well as a hole punch press.

Basic elements of the RV 74c machine are the heating and forming station. Additionally, a steel rule punch press, a hole punch press and a stacking device are available.

The special features of the RV-c series with respect to heating and material transport make PP processing possible without problem.

Roll pre-heaters are available for pre-heating.

Shortest cycle times and optimum contour definition are achieved due to very short cavity filling times. Forming air and vacuum are available with selectable switching option for upper and lower table.

Uniform wall thickness is achieved in sophisticated parts by positive forming with pre-blowing device and pneumatic pre-stretching of material.

23 – 45 cycles can be achieved by using cooled tools for RV 53c.

Larger forming area, superior technology and high availability: RV 74c

Optimized machine equipment for higher performance. The RV 74c equipped with a larger forming area offers the same benefits like the RV 53c with respect to forming and punching.

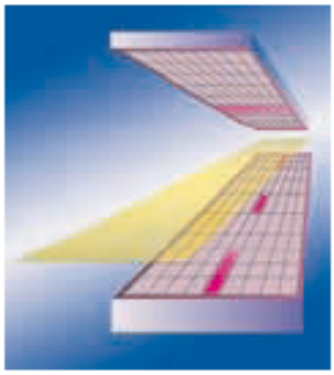
Machine equipment in detail

The requested performance can only be achieved with both, more comprehensive machine equipment and optimized thermoforming process. The optimized thermoforming process consists of a multitude of detail solutions which affect the sequencing as a whole as well as the tool technology.

Servo-driven material transport for precision positioning during high speeds

Width and index length setting of the material transport are automatically set by the basic setting program of the machine. The electronic positioning drive reduces index length tolerances to ± 0.2 mm.

In the forming station area the material transport is moved apart pneumatically by the spreading device. The material is stretched thus preventing webbing during the forming process. This is especially beneficial for PP processing. Material spreading is carried out pneumatically in the RV 53c. In the RV 74c spreading is carried out by servo motor. Spreading parameters are entered on the operating panel.



Example RV 74c:
■ *Pilot*
Upper heater equipped with longitudinal row control, lower heater equipped with cross row control

New heating technology, ideal for thermoforming

Upper and lower heater come as standard. Each individual row of heater elements can be pilot-controlled. Heater element rows which are not needed are automatically switched off, with respect to index length and material width. The upper heater is equipped with longitudinal row control, the lower heater is equipped with cross row control.

A heating profile is calculated by the control system with respect to the center row of heater elements. All thermoforming possibilities can be used with this type of heater equipment.

RV 74c Automatic vacuum forming machine with steel rule punch press and stacking device

RV 74c Forming station
RV 74c Steel rule punch press

Optimizing possibilities due to customized equipment

Longer service lives of steel rule dies due to higher flexural strength of the steel rule punch press.

The steel rule punch press is equipped with movable upper and lower table. Higher cycle speeds are achieved without wear and tear of brakes due to the servo drive.

Based on the new drive technology, the punching tables can be moved by indexing or in various stages of creep speed. This is especially beneficial for adjustment of the steel rule cutter.

The height adjustment of the upper bridge which is free from backlash reduces the cutting shock and improves the service lives of the steel rule dies.

The complete station can be moved in longitudinal direction to achieve a uniform punching rim. The position is calculated by the control and stored.

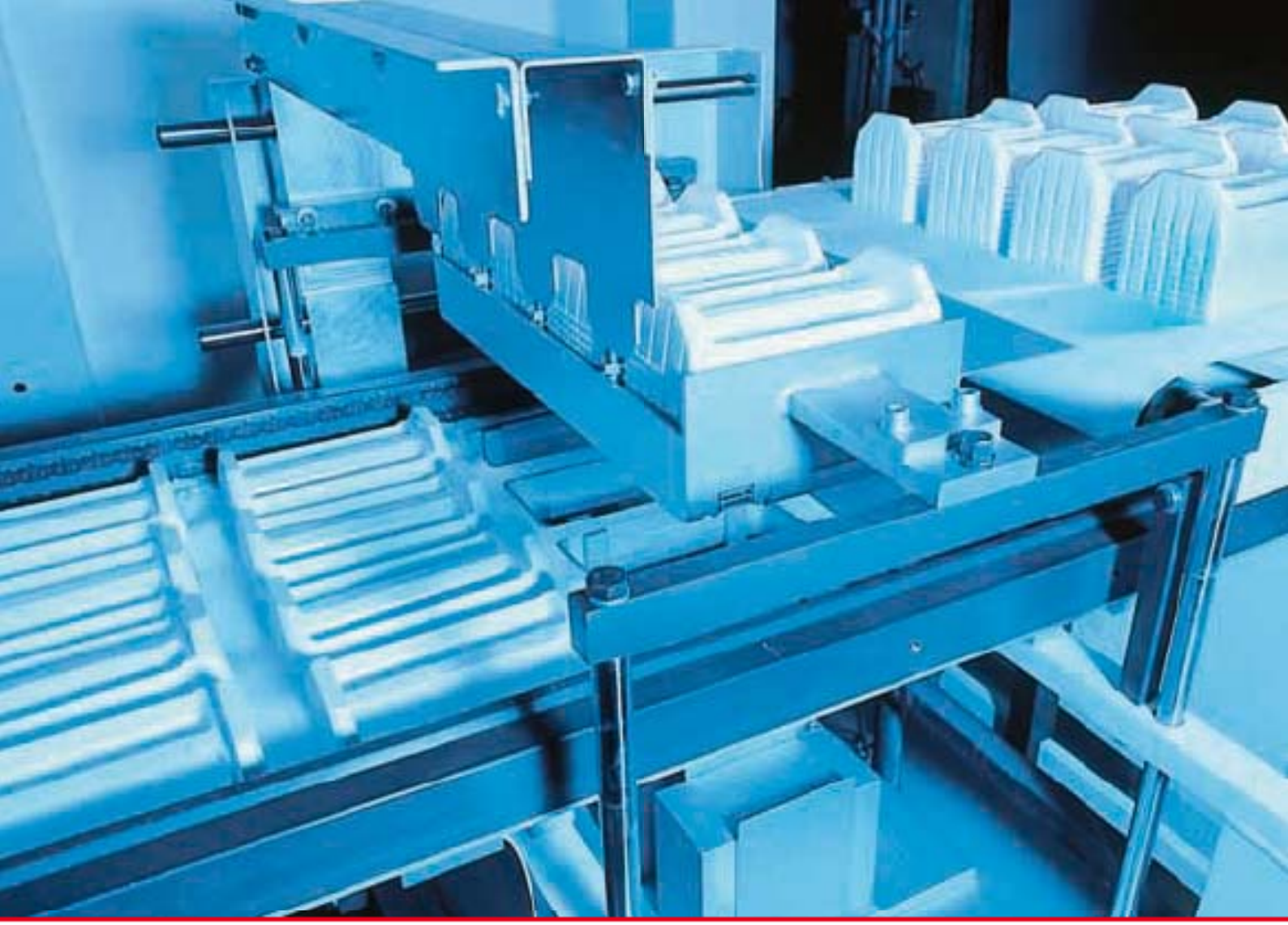
Cross movements of the steel rule cutter are carried out by a special adjustment device. The selected positions can be altered during machine operation and stored after being optimized.

A steel rule die heating reduced the cutting forces.

Hole punch press for hole punching in the bottom

A hole punch press is available for the production of formings with holes punched in the bottom. All parts within the forming range can be punched in the bottom due to the movable upper and lower table.

Automatic positioning of the movable hole punch press by computer-aided basic setting.



Stacking variants for all automation levels

Stacking stations RV 53c, RV 74c (option)

Economic efficiency is based on: quality of the product stacks, cost-effective format parts, reliability as well as ergonomic end packing.

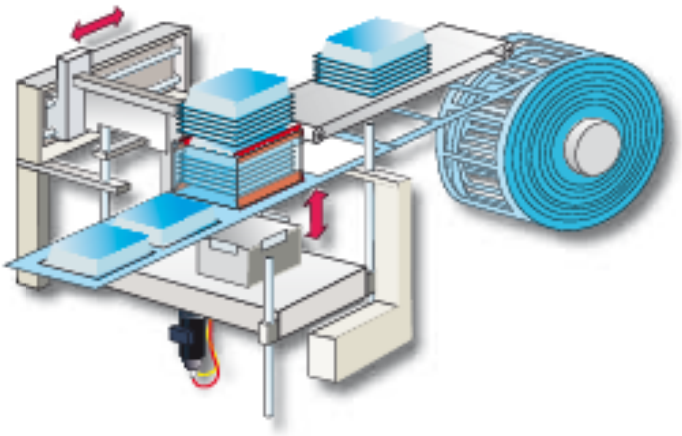
The concept of the stacking systems also meets the requirement for fast and simple change of format parts. Additionally, the position of the stacking station is calculated by the basic setting program with respect to the index length.

The position can be changed during operation and stored. Consequently, no setting work is required for repeat orders and a fast and reliable start-up is ensured.

Function of the stacking systems

Formed parts are stacked in upward direction into format-dependent stacking cages. The web is clamped and the formings are separated from the web by means of a break-out plug. A further movement takes the parts into the stacking cage. The respective product stacks are formed by means of a counting device.

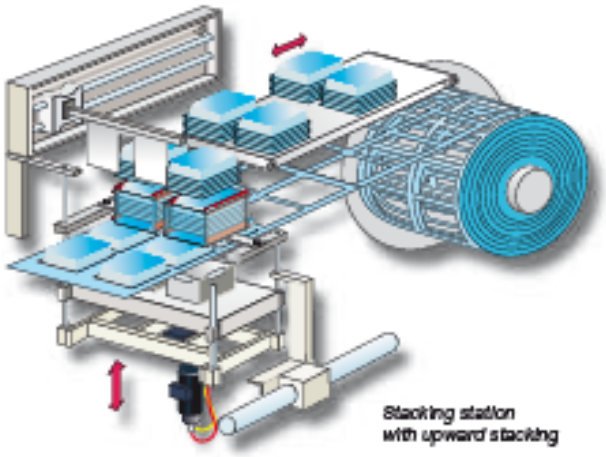
Subsequently they are moved onto a synchronized conveyor. To ensure that several e.g. RV 74c machines can be operated by one operator, the conveyor filled with product stacks can be emptied selectively to be subsequently available as buffer zone.



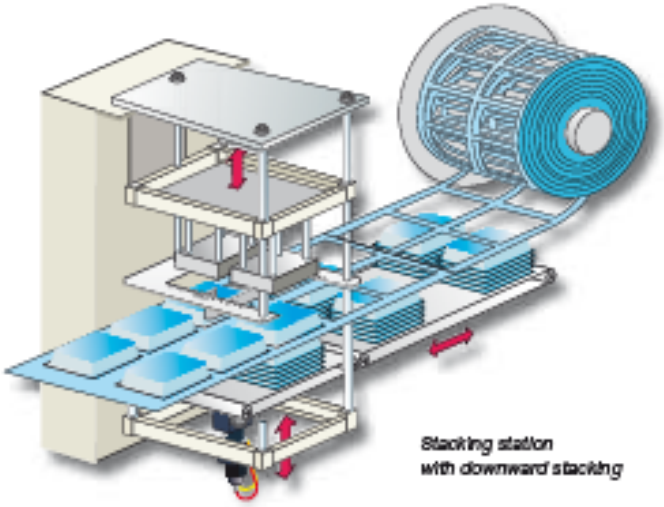
Sketch RV 53c stacking station

RV 53c Stacking station

*RV 74c Stacking station
with downward stacking*



*Stacking station
with upward stacking*



*Stacking station
with downward stacking*

Stacking system solutions adapted to customer-specific requirements

RV 74c stacking station (optional RV 53c)

Improved setting and operating convenience in RV 74c due to servo drives for stacking movements. The strokes of break-out plug and push-out device can be set very easily in the teach-in method. The strokes set by the operator are converted by the machine control into setting values. These values can be stored. They reduce set-up times and result in higher efficiency with improved customer benefit at the same time.

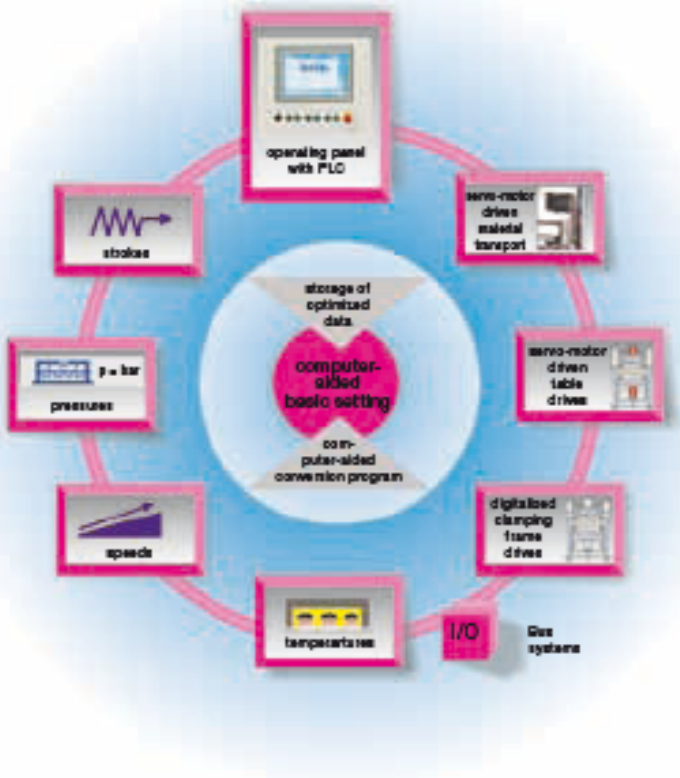
In the stacking variant for RV 74c where stacking is effected in downward direction, the break-out plugs push the formed part out of the web onto a stacking conveyor which is lowered in sequence. Lowering distances can be programmed in different ways, thus causing parts to nest firmly or only slightly.

When the set number is reached, the stacks of counted parts are transferred to the discharge conveyor and discharged from the machine. Ergonomic removal of formed parts thanks to existig discharge height.

The forming process is influenced by the different stacking variants. Consequently, hinged packs, for example, can be stacked in a better way.

RV53c
Process optimized machine

RV74c
Vacuum forming machine supported by pressure air



Digitalized functions allow computer-aided basic setting of machine data. Output is increased by process optimization.

Easy operation and computer-aided basic setting

Process engineering and application technology in conjunction with comprehensive material knowledge result in optimum machine programs incorporating the parameters for forming, punching and stacking.

In the c-series, the optimum setting of data and process times can be calculated for new tools with respect to material, part geometry and tool design. Calculations are carried out supported by the computer-aided basic setting and servo-motor drives.

The machines set the standard with respect to ease of operation. The total reproducibility of production data is a major element for maximum availability especially if automation levels and frequent product changes are concerned.

All data relevant to the production process are entered on the operating panel and displayed as set/actual comparison.

The optimized data can be saved and they are available right away for repeat orders.

All major process parameters are permanently available to check the ongoing production.

Easy operation, computer-aided basic setting of machine data and computer-aided conversion due to digitalized machine

Free potentials from movement sequences systematically converted into increased cycle speeds

Screen page "optimization parameters forming program" The operating philosophy includes a structured operator guidance on the screen through the individual menu pages.

Operability is kept on a manageable level for the operator in spite of numerous and complex processes. The process parameters are automatically integrated in process sequences and flexible movement profiles and as a result we achieve a process-optimized manufacturing sequence with faster production cycles and constantly high product quality at the same time.

3rd Generation Thermoformers provide an optimization strategy thanks to the innovative functional program structure which is employed to improve performance, product quality and production reliability at the customer in a well-targeted way.

Newly developed menus provide systematic operator guidance through the individual optimization phases. Parameters relevant for performance are provided automatically to the operator in a selective way, subject to the forming program of the machine, for optimizing purposes. Consequences of the measures taken are displayed on a newly developed menu. The main benefit of this visualization is the selective display of required information and auxiliary functions based on principles of professional industrial design. Operating mistakes are avoided thanks to a clear and simple menu structure.

Easy and comfortable navigation through individual menus can be selected on the operating panel. The dialogue system also features an electronic help function included in the operating system.

Screen page "status of forming pressure" Display of process sequencing in tool

- Siemens S7 control with screen operating panel
- Digital setting and storage of production parameters, thus reproducible thermoforming process
- Material transport with servo drive and width adjustment by motor
- Optimum material heating
- servo-motor table drives

Quick-change of forming tool

Change of steel rule cutter by r eleasing the pneumatic clamping device

Future-oriented system technology – shortest setting times and flexible production

Quick-change technology to change complete format sets, especially beneficial for the production of small batch sizes

The tool change is not limited to the change of forming tools. In the RV-c series, the change of all format parts is considered. The tool change system ensures shortest change-over times for forming and punching tools without using any hand tools. The changing process is supported by the conversion program. The material transport opens automatically and subsequently adjusts to the new material width. Additionally, the punching and stacking station are moved to the correct position with respect to the forming station.

All tool and format parts can be changed from the operating side due to the linear arrangement. Large sliding doors facilitate operation, maintenance and conversion of the machine.

Forming station

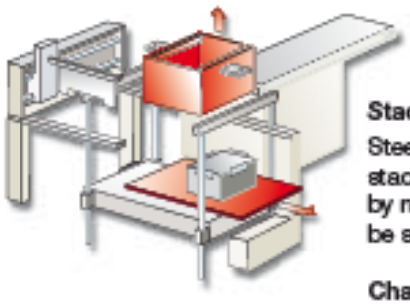
Rapid tool change times can be achieved for forming tools by using spring-mounted, pneumatically unlockable tool clamping devices in combination with the mechanical tool installation aid.

Punching station

The pneumatically unlockable clamping device reduces change-over times for steel rule cutters to only a few minutes.

Stacking device

Stacking parts can be easily changed from the operating side.



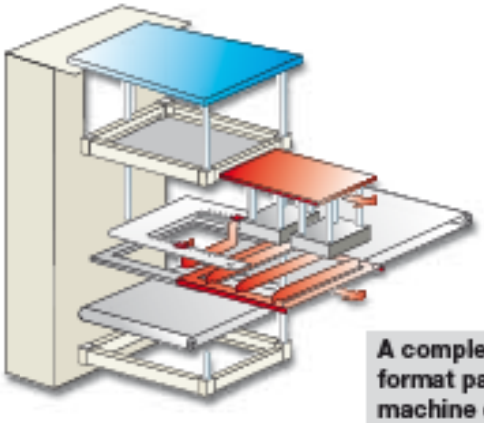
Change of stacking parts RV 53c

Stacking station

Steel rule punch press and stacking device are positioned by motor, the positions can be saved.

Change of skeletal

A pneumatic skeletal push-out device is available to facilitate skeletal changes.



Change of stacking parts RV 74c

A complete change of format parts in the basic machine can be performed in approx. 15 minutes for repeat orders.

Change of stacking format parts

Menu pages: tool installation and/or removal
The format change is supported by the basic setting program.

Application examples and some tool design possibilities for RV 53c and RV 74c

Flexibility due to various tool design options

The forming station features four independent tool movement elements. Forming tables are moved by servo motors, clamping frames are moved pneumatically. A multitude of tool design options results from the six forming programs installed as well as various movement sequences.

Unique tool design

Construction parts developed together with the machines are available as standard parts for forming tools, clamping frames as well as stacking format parts.

With this tool system of simple design the machine can be utilized to the full extent. This means cost-effective production, also for small batches.

Longer service lives of steel rule dies due to increased flexural strength of the steel rule punch press

Very simple steel rule cutters are employed which are either wood-mounted, unheated, and consequently very inexpensive or aluminium-mounted. A steel rule die heating reduces the cutting forces.

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