

# WAGENER KLIV<sup>®</sup> Vulcanizers

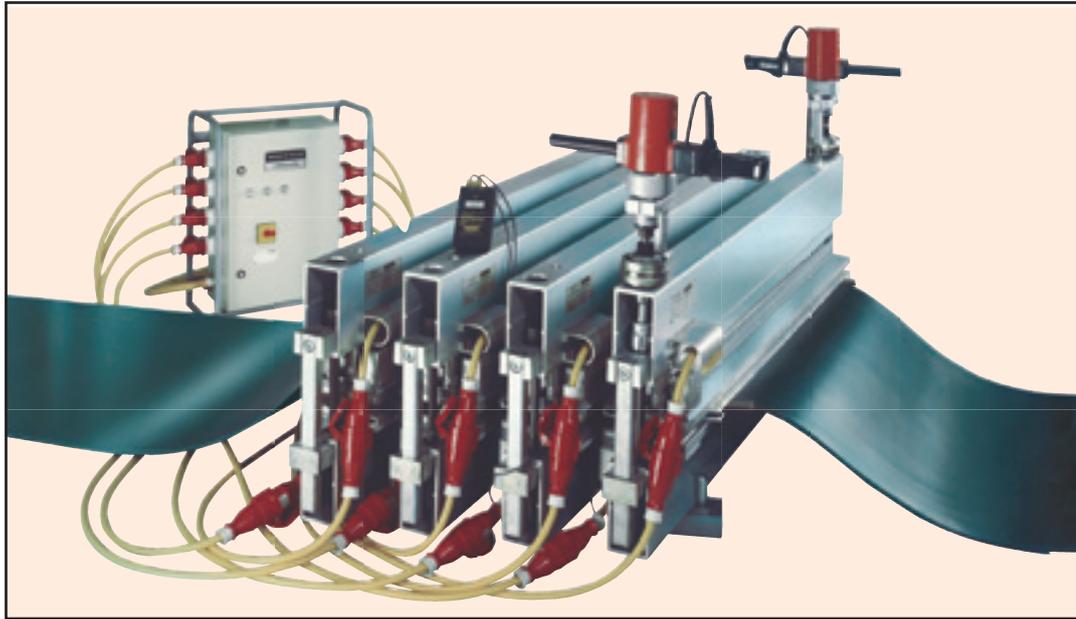


- Fully automatic ceramic heating system
- Hydro-mechanical system for uniform pressure
- For all types and widths of rubber, PVC/PVR conveyor belts

**WAGENER**  
*Schwelm*

... the safety of a good splice.

## KLIV® Module. Functional and economical



### **Available press sizes for conveyor belt widths from 400 – 1400 mm (16" – 54"):**

- Compact press modules with integrated pressure and heating/cooling elements
- The maximum weight of the heaviest component is only approx. 75 kg (165lbs.).
- The ideal equipment for the vulcanizing of small and medium widths up to 1400 mm (54").

### **A complete new outlook on vulcanizing techniques.**

#### **1. Automatic ceramic heating system.**

This system overcomes the major problem of non-uniform temperature distribution inherent in conventional vulcanizing heating systems. It does this in a unique and very simple manner eliminating the need for any temperature control equipment.

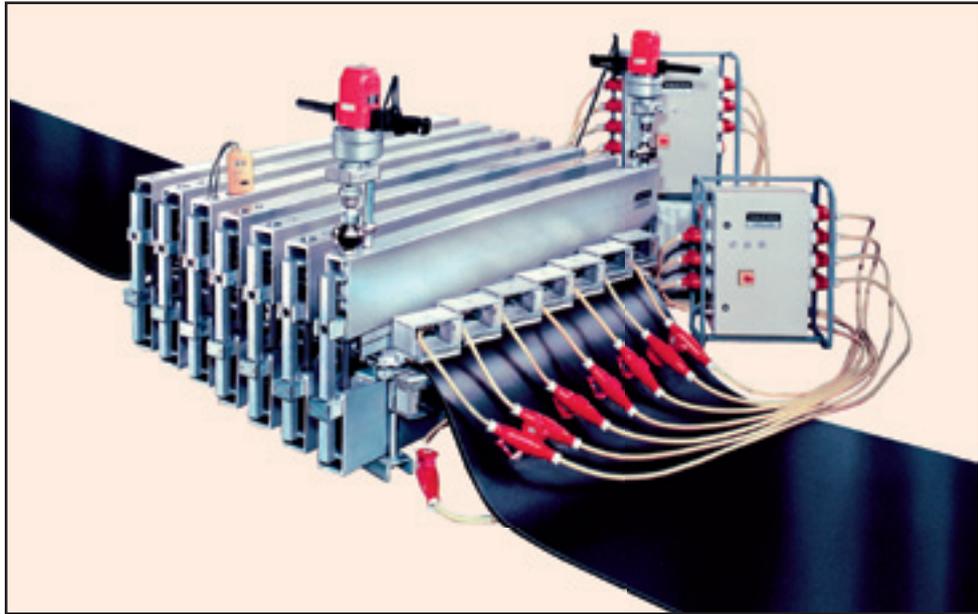
#### **2. Hydro-mechanical system for uniform pressure.**

The simplest possible method of mechanically tightening tension bolts is used to apply hydraulic pressure. Beam deflection is compensated for by special hydraulic elements thus giving the best possible method of obtaining uniform pressure distribution.

#### **3. The unit construction principle of KLIV®.**

All KLIV® Vulcanizing presses consist of individual module assemblies. The number of modules depends on the dimensions of the vulcanizing area. These modules are considerably lighter and more compact than those of conventional systems, making them portable and easy to assemble. Hence, KLIV® vulcanizing presses are available for service anywhere.

**KLIV® COMBI.**  
Combination all-purpose press



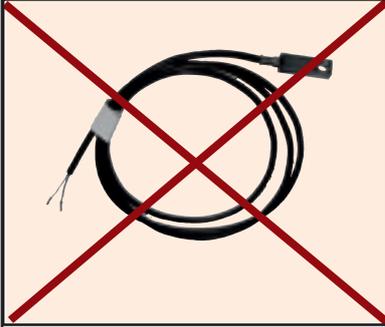
**Available press sizes for all conveyor belt widths, particularly 1400 mm (54")**

Pressure traverses, heating/cooling elements and pressure elements of this system are designed as individual units. Hence all press components are easy to handle even when a belt width of up to 3200 mm (126") is to be spliced. Any combination with regards to length and width of the vulcanizing area is feasible.

The optimum unit construction system.

**Thanks to a standardized and simple design that offers a wide range to choose from.**

## Most important vulcanizing parameters: Temperature and Pressure



**KLIV® ceramic heating elements for uniform temperature distribution. Automatically controlled.**

The electrical resistance in the ceramic heating elements increase with temperature rise up to the point when the set temperature has been reached and temperature is maintained. Based on the selection of the ceramic recipe the maximum end temperature is unadjustable.



**Guaranteed temperature stability: a must for accurate vulcanization:**

The KLIV® heating/cooling elements not only prevent too high or too low temperatures, but also uneven temperature distribution. The vulcanizing process is always completed exactly according to specification; precise repetition is guaranteed. The temperature cycle of the vulcanizing process can be observed by means of digital thermometers.



**No control devices, no control problems.**

The KLIV® heating/cooling elements are self-controlling. There is no need to check and maintain sensitive control devices, thus eliminating common sources of malfunction.

## You are not „under pressure“ with KLIV®



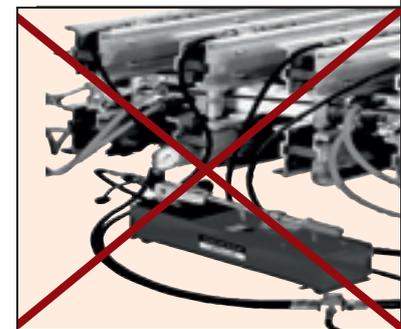
**The hydraulic pressure is generated mechanically by tightening the traction bolts.**

Though it sounds very simple this system is by far the most reliable. Traction bolts are installed at both ends of the top and bottom pressure traverses. These bolts are tightened simultaneously on each side with a torque multiplier which is driven either manually, or with an electric or pneumatic screw driver.



**Pressure distribution by hydraulic elements.**

The hydraulic pressure elements are installed on the underside of the top pressure traverses. The mechanically generated hydraulic pressure is distributed uniformly over the whole conveyor belt width. This system is simple and reliable.



**No need for pumps, clutches, cylinders, hoses and hydraulic lines when using the KLIV® pressure system.**

Further advantages of the KLIV® hydraulic elements: they are corrosion-proof, and resistant to temperature changes and fracture. Furthermore, because of the material they are made of, the elements act as a thermal insulation barrier between the heating and pressure system, thereby minimizing thermal energy loss.

## You can keep your "kool" with KLIV® when vulcanizing rubber and PVC conveyor belts



### Simple current feed

Each KLIV® heating/pressing element is equipped with plug and connecting cable. Connection to the power system is made by means of terminal boxes which are equipped with overload protection. Phase control is standard.



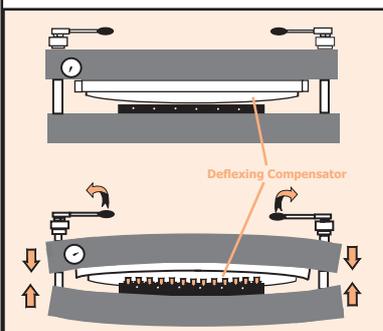
### Waterproof and maintenance-free

KLIV® heating elements are welded at the ends; thus being absolutely waterproof. They do not require any checks or servicing, yet provide maximum performance reliability. Should, however, one heating element fail to work, it can easily be replaced by a spare element. When using conventional presses even a minor electrical defect can result in a total breakdown of the complete press.



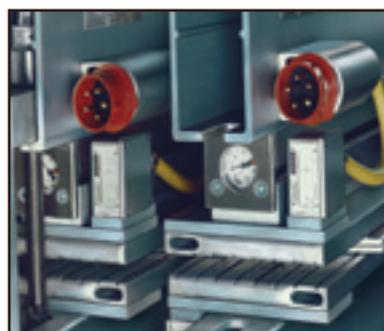
### Integrated cooling by evaporation. This ensures fewer production loss.

All KLIV® heating/cooling elements have cooling channels into which water is metered. The evaporation of water into steam results in a very effective cooling. In 10 to 15 minutes the press is cooled down to below 100° C using a surprisingly small amount of water. Alternatively, the cooling channels can be equipped with hose couplings to be connected to the water mains for quickest possible cooling.



### Uniform pressure by hydraulic elements incorporating deflection compensator.

The shape of this slightly curved compensator corresponds exactly to the deflection of the traverses at nominal pressure. A perfectly uniform pressure over the total belt width is guaranteed. The pressure is equally distributed from the center to the edges; thus, avoiding splice defects caused by pressure fluctuations. The same applies to pressure as applies to temperature uniformity over the total vulcanizing surface.



### Accurate pressure control by visual inspection

Each KLIV® pressure traverse is equipped with a gauge for precise control of the pressure development. The traction bolts at each end are to be tightened uniformly and simultaneously until the needle of the gauge has reached the "green" mark.

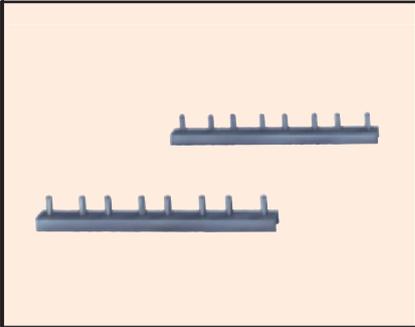


### Heating/pressing sheets for perfect pressure and heat transmission

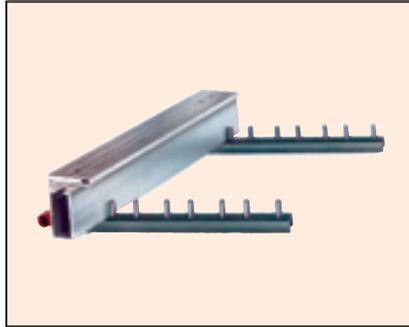
There is a variety of KLIV® heating/pressing plates available for all possible splices as regards width, length and area. Bore holes are provided for the use of digital thermometers to monitor temperature.

## Economical: KLIV® Module

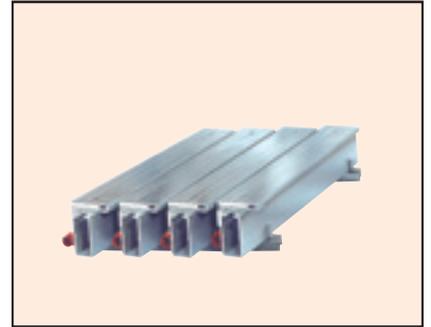
### Press Assembly:



1. The KLIV® spacing rails are placed on an ordinary work table or on any suitable support. They assist in fixing the correct spacing of the bottom modules and provide accurate horizontal and parallel alignment.



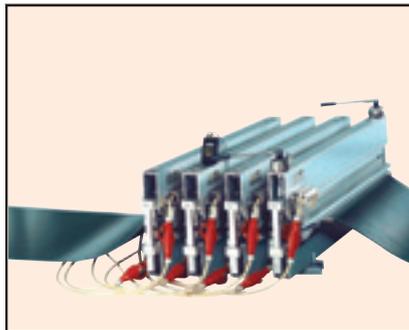
2. As a first step the bottom modules (without hydraulic pressure elements) are put on top of the spacing rails so that traverse sections are positioned between the guide pins of the rails.



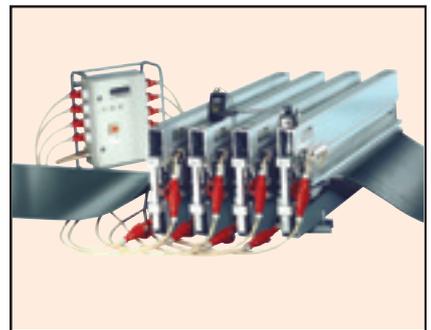
3. The number of modules needed depends on the length of the splice to be made. The module width is always 200 mm (8").



7. Then the top pressure traverses are placed on top. Ensure that gauges as well as top and bottom cable plugs are on the same side. Insert the traction bolts.



8. Carefully push traction bolts up to the stops. Then tighten simultaneously and uniformly on both sides until the needle of the gauge has reached the "green" mark. This procedure is repeated with each traverse. During the vulcanizing process the hydraulic pressure rises automatically up to the nominal operating pressure marked "red" at the gauge.



9. Connect all cable sets to the terminal box, which in turn is connected to the main power supply. The heating-up process can now begin. Insert the thermocouple needles into the appropriate bore hole of the heating/pressing sheets

### Possible range of applications:



#### 1. Rectangular

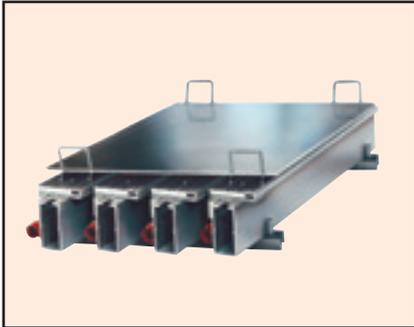
For rectangular splices the KLIV® modules have to be arranged at a right angle to belt running direction.



#### 2. Rhombic

For rhombic splices the KLIV® modules can be arranged according to the rhombic configuration, and at whatever angle is desired.

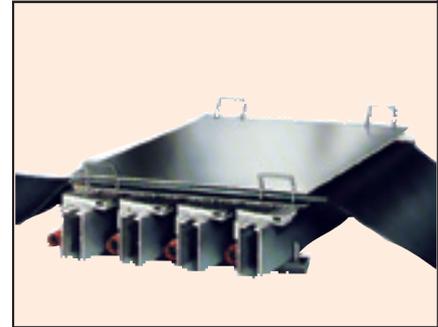
## Available press sizes for belt widths from 400 – 1400 mm (16" – 54")



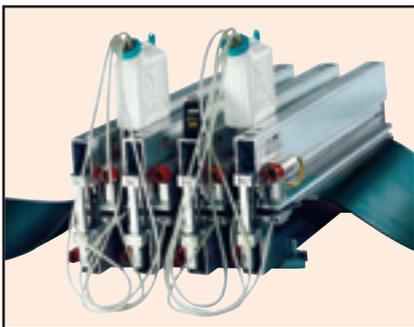
4. After precise alignment of the bottom modules a heating/pressing sheet of matching size is placed on top. Accurate positioning is guaranteed by the guide supports on the heating/cooling elements.



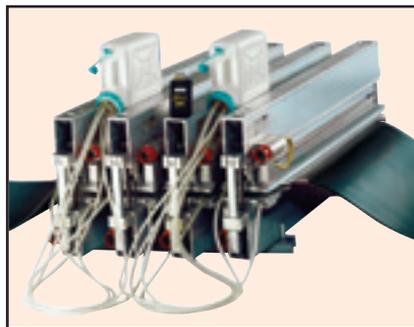
5. Preparation of the belt splice is done according to manufacturer's instructions.



6. After that the edge bars and the top heating/pressing sheet are correctly positioned and aligned. The optional edge bar clamping devices are fitted into the bottom traverses. These are suitable for pressing the edge bars and holding the heating/pressing sheets, quantity required depends on length of press.

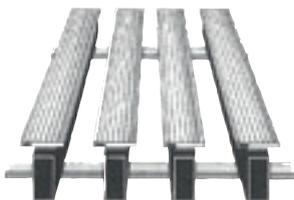


10. Switch off the electric current after completion of the vulcanizing period. Place cooling water containers on the press and connect the hoses to the cooling channels of the heating/cooling elements.



11. When the container is turned on its side, water will be metered into the cooling channels. The water evaporates and results in a very effective cooling. The cooling process is finished when steam no longer escapes – the temperature of the press having cooled down to below 100°C.

Disassembly is in reserve order.



### 3. Wide pressure range

The specific vulcanizing pressure can be varied by altering the number of KLIV® modules on a given press length.

### 4. Variable vulcanizing area

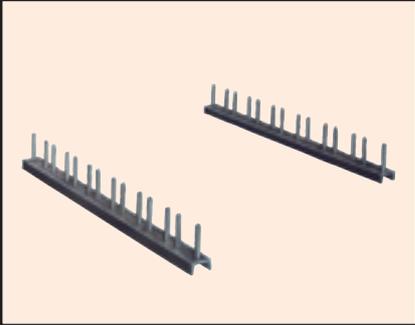
For larger vulcanizing areas any number of KLIV® modules can be arranged in line just by using adequately long spacing rails.

### 5. Specific pressure

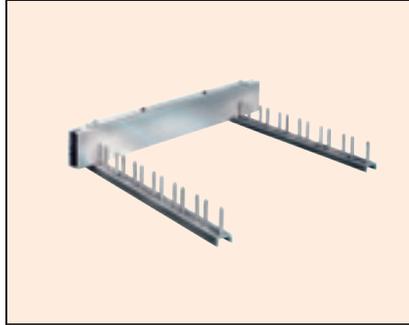
The pressure range can be made to vary between approx. 75 - 150 N/cm<sup>2</sup> (100 - 215 psi).

# KLIV® Combi: Combination all purpose-press.

## Press Assembly:



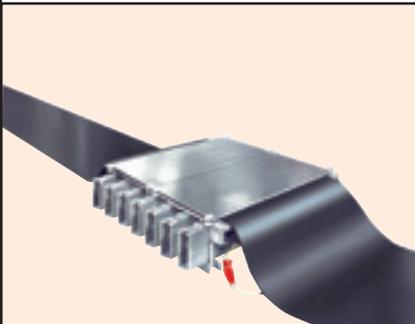
1. The KLIV® spacing rails are placed on an ordinary work table or on any suitable support. They assist in fixing the correct spacing of the bottom modules and provide accurate horizontal and parallel alignment.



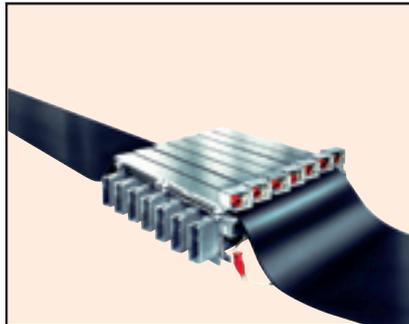
2. As a first step the bottom traverses (without hydraulic pressure elements) are put on top of the spacing rails so that traverse sections are positioned between the guide pins of the rails.



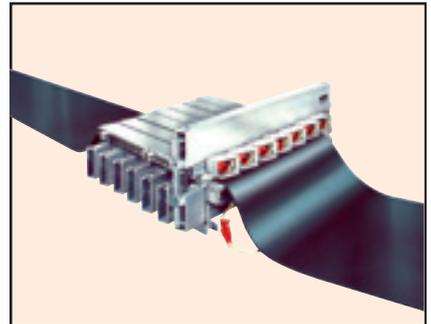
3. The number of traverses and the length of the heating/cooling elements depend on the length of the splice to be made. Based on the required specific vulcanizing pressure the traverses are arranged either at larger or smaller intervals, or in close rows for maximum pressure.



7. The optional edge bars and the top heating/pressing sheet are correctly positioned and aligned. The optional edge bar clamping devices are fitted into the bottom traverses. These are suitable for pressing the edge bars against the belt. The number of devices required depends on the press length.



8. The top heating elements are assembled and accurately aligned with the bottom elements. Accurate positioning of the heating/pressing sheets is guaranteed by guide supports.



9. Then the top traverses with their hydro-mechanical pressure element are assembled. Insert the traction bolts immediately on both sides into the traverse profiles to prevent from tilting over. Ensure that all gauges are on the same side.

## Sample application:



### 1. Rectangular

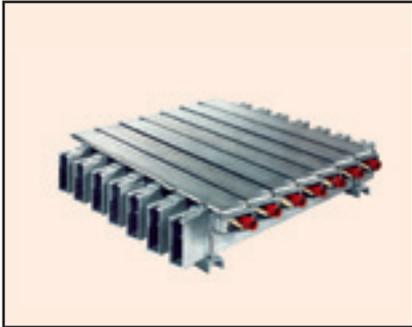
For rectangular splices the KLIV® traverses have to be arranged at right angles to belt running direction.



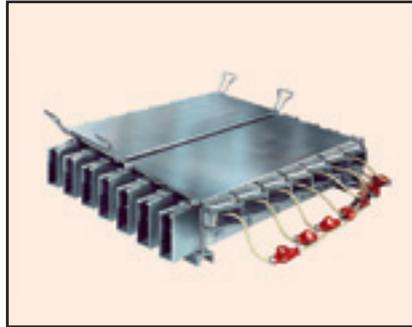
### 2. Rhombic

For rhombic splices the traverses and heating/cooling elements can be arranged according to the rhombic configuration, and at whatever angle is desired.

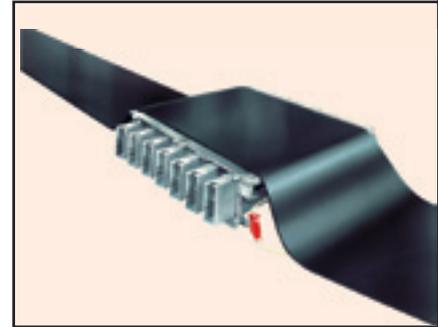
## Available press sizes for all conveyor belts, specially wider than 1400 mm (54")



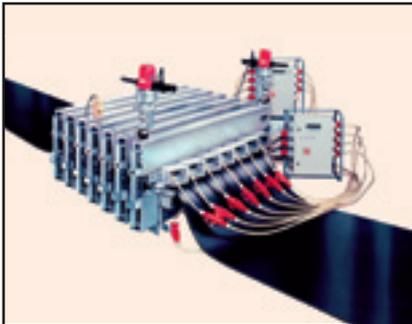
4. The separate heating/cooling elements are placed on the bottom pressure traverses in the running direction of the conveyor belt. Guide cams are used to provide firm support for the heating elements. The heating elements have a standard width of 200 mm (8").



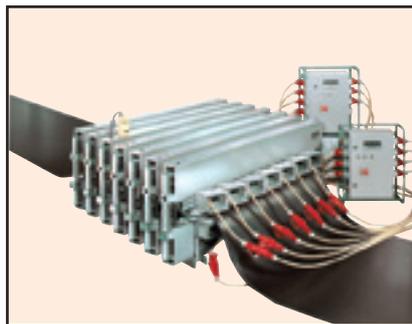
5. The bottom heating/pressing sheets are placed on the bottom heating elements. Accurate positioning is guaranteed by the guide supports on the bottom traverses. Connect the cable sets to the bottom heating elements and the water hoses to the cooling channels.



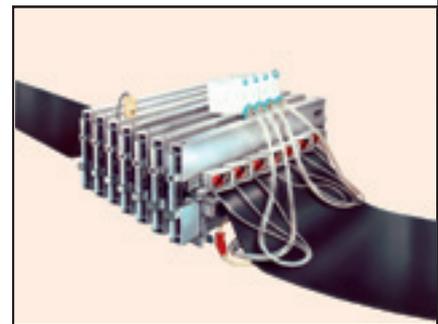
6. Preparation of the belt splice is done according to manufacturer's instructions.



10. Carefully push traction bolts up to the stops. Then tighten simultaneously and uniformly on both sides until the needle of the gauge has reached the "green" mark. This procedure is repeated with each traverse. During the vulcanizing process the hydraulic pressure rises automatically up to the nominal operating pressure marked "red" at the gauge.

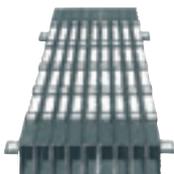


11. Connect all cable sets to the terminal box, which in turn is connected to the main power supply. Insert the thermocouple needles into the appropriate bore holes of the heating/pressing sheets. The heating-up process can now commence.



12. Switch off the electric current after completion of the vulcanizing period. Place cooling water containers on the press. When the container is turned on its side, water will be metered into the cooling channels. The water evaporates and results in a very effective cooling. The cooling process is finished when no longer steam escapes – the temperature of the press having cooled down to below 100 °C.

Disassembly is in reverse order.



### 3. High pressure

For maximum specific vulcanizing pressure the traverses are arranged without a gap. In general the range can vary between 75 and 150 N/cm<sup>2</sup> (100-250psi).



### 4. Longer traverses

Longer traverses are needed for the wider belts, but only a few heating/cooling elements have to be added. Consequently there is no need to have one complete press for each belt size.



### 5. Two units

For long splices and repairs two combi press units are backed up. It is recommended to use heating/pressing plates corresponding to the total press length.

# KLIV® Repair-Press for all conveyor belts, especially wider than 1400 mm (54")

## Portable KLIV® Repair Presses for the cure of

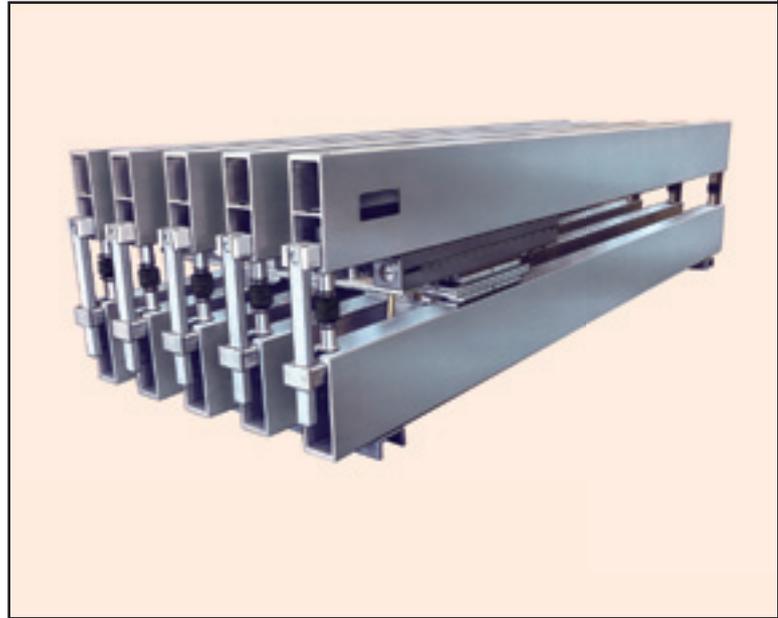
- belt damages lengthwise
- rips
- edge repairs

As the bottom heating plates are very difficult to reach underneath the belt in order to control/adjust the temperature, the KLIV® heating plates, with their system-designed temperature limitation, are especially suitable. 400 mm wide heating plates in lengths of 1000, 1500 or 2000 mm ensure a uniform temperature distribution.

The heating plates are provided with cooling channels to enable fast cooling and minimize stand-still times. After the cure, the cooling channels are either connected to the water tanks or direct to the water mains.

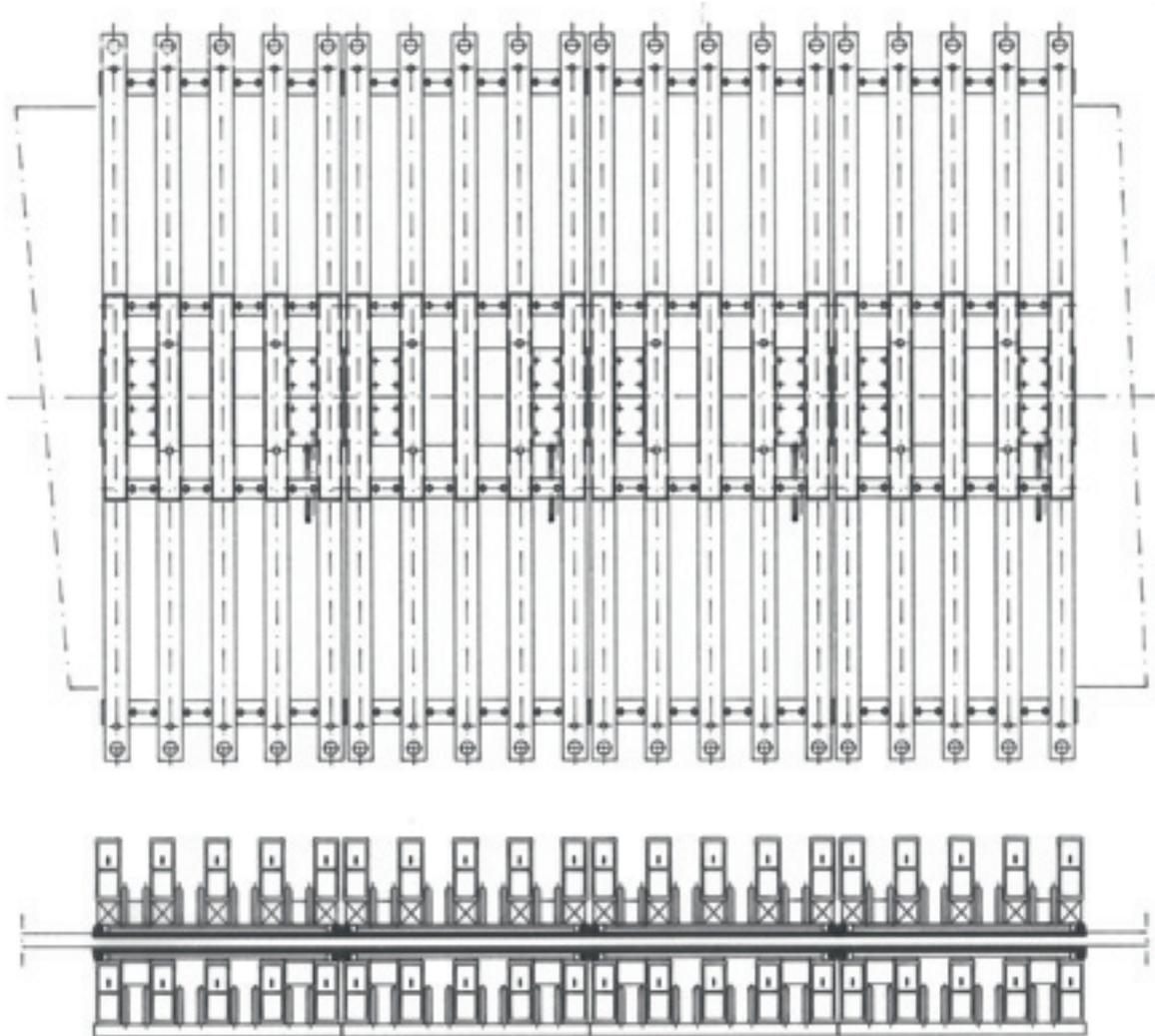
Short hydro-mechanical pressure elements, which are arranged on a frame in small units, are used together with light aluminium tubular profiles in order to achieve the necessary pressure. Neither pumps nor hose connections are required! The traction bolt units at both sides of each traverse are simply tightened by using torque multipliers.

Heating plates can be arranged as required over the entire belt width.

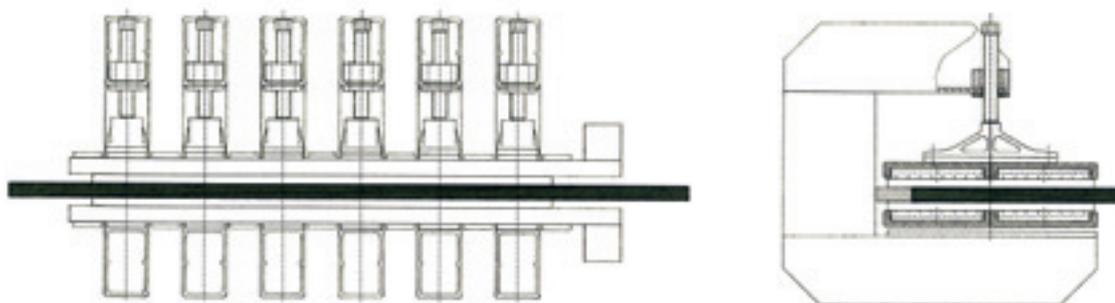


## All-purpose press:

Based on the modular construction, these presses can be extended to any required length.



**For Edge Repairs:**  
Rip repair – heating plates with "C"-clamps, -mechanical, -hydraulic pressure



# WAGENER Vulcanizing Press KLIV®-CYCON-Module



## Vulcanizing Press Type KLIV®-CYCON-MODULE

The WAGENER Schwelm vulcanizing press type KLIV®-CYCON-MODULE consists of:

- KLIV® heating elements with cooling channels
- distributor boxes to connect the heating elements to the electric mains
- pressing sheets for a uniform distribution of temperature and pressure
- hydraulic traverse beams for pressure application

The hydraulic traverse beams are bolted to the heating elements to form modules. Each pair of modules consists of one top and one bottom module part, connected by means of 2 traction bolt units.

### Heating System

The heating system consists of multiple heating elements made of aluminium. Each heating element has a built-in ceramic PTC resistor heating system with self-regulating electric control characteristics. Temperature regulation via thermostats, temperature sensors nor additional electric control circuits are required.

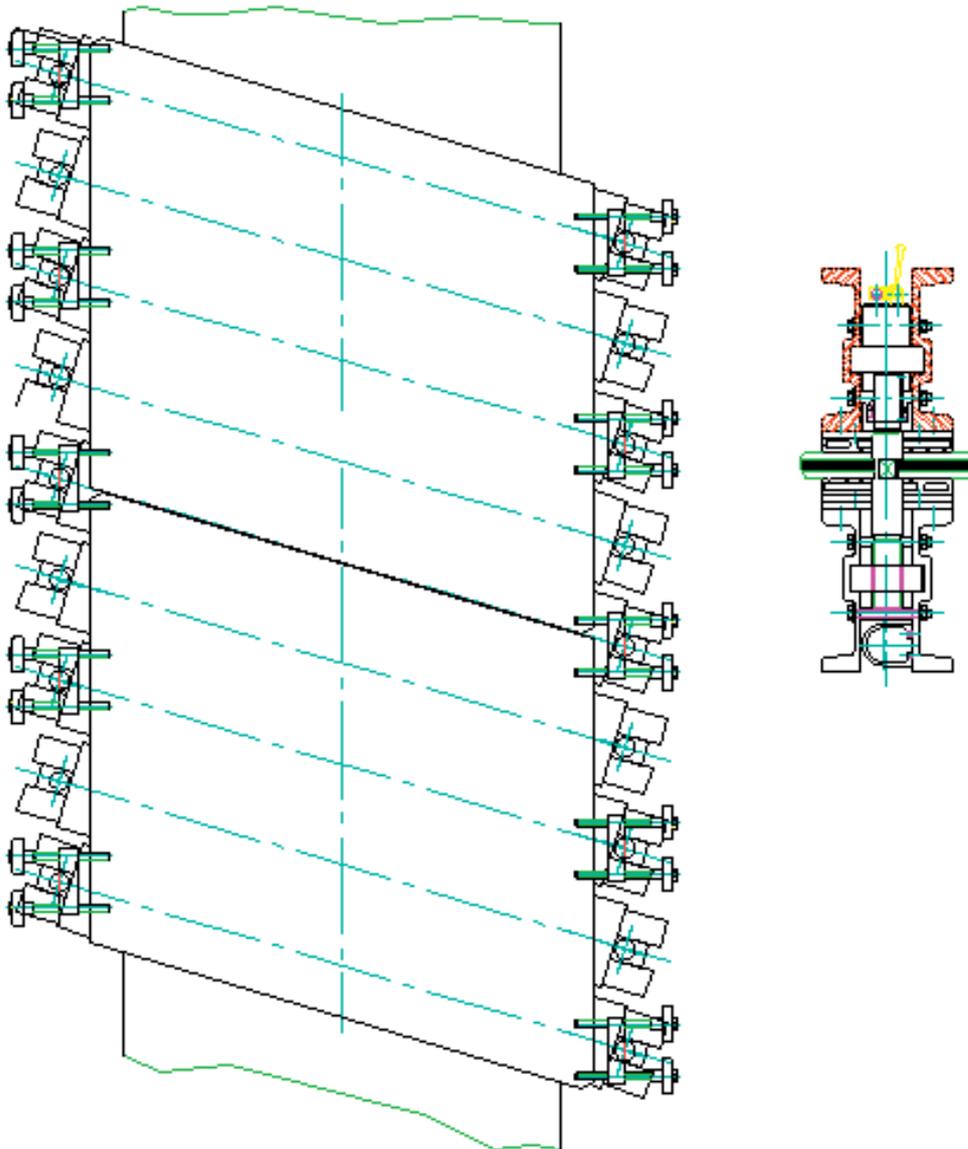
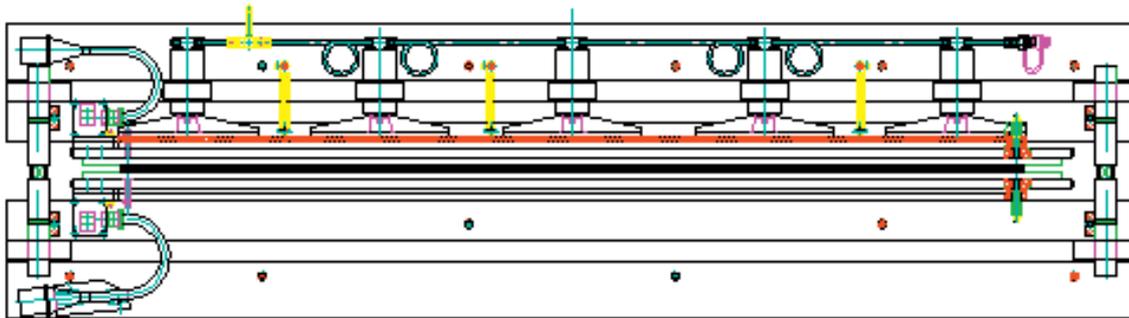
### Cooling System

Each heating element has built-in channels to conduct cooling media (water or air). The most effective form of cooling is provided by the evaporation of water from an open circuit. Only a small amount of water is required for this, in which case hoses are connected to a plastic tank. It is recommended that the cooling channels are cleaned out with compressed air, as dirt or remaining water from the previous cooling process can affect the cooling process or the heating-up time.

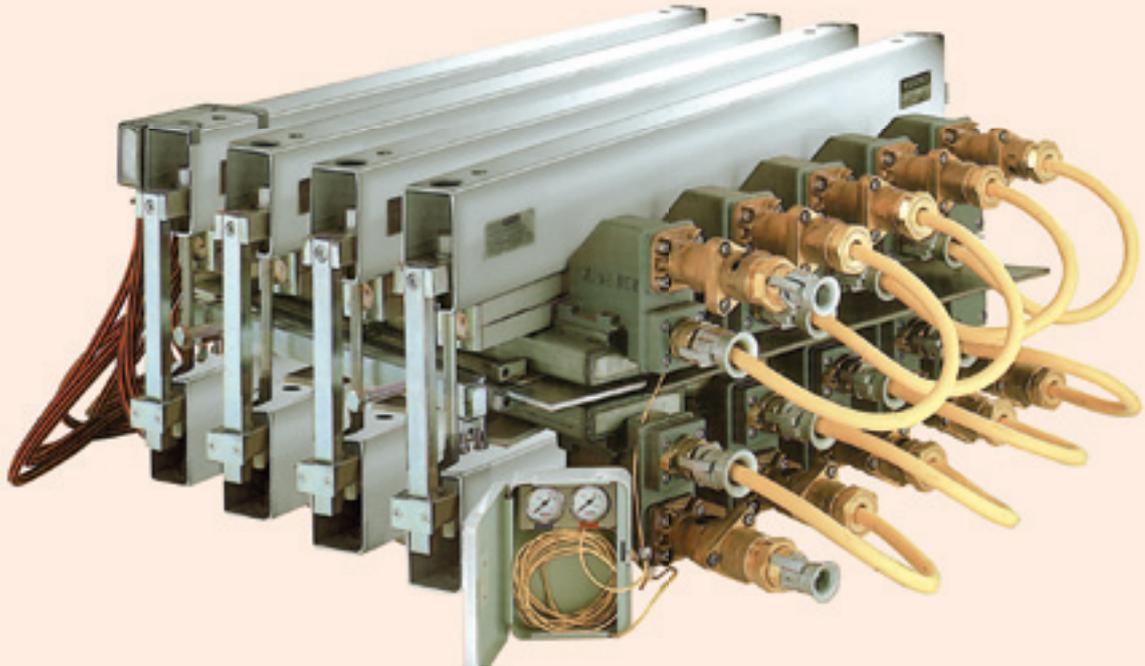
### Pressure System

The hydraulic pressure system of the vulcanizing press type KLIV®-CYON-Module consists of multiple pairs of modules. Each pair of modules consists of a top and bottom module and two traction bolt units, whereby the hydraulic cylinders are located in the top or bottom module according to the type of application. The individual pressure cylinders are connected to each other and are provided with a hydraulic connection at the side of the traverse beam. The modules are hydraulically connected to each other via a hose connector set. The required pressure is applied by means of a hand-operated or motor-driven pump. Pressing sheets are used to distribute the pressure equally.

# WAGENER Vulcanizing Press KLIV®-CYCON-Module



## Highlight for Underground Vulcanization: KLIV<sup>®</sup> - I M2 EEx dI - ATEX



A special design of the KLIV<sup>®</sup> Combi System for use underground:

Approved and authorized according to the European Standard 94/9EG dated March 23, 1994 (ATEX).  
In accordance to the material specifications of the European Standard EN 50014 and EN 50018.

 IM2 EEx dI according to Design Test Certificate BVS 03 ATEX E322.

 I M2EEx d I

### Flameproof heating element.

Each heating element has a stainless steel casing and is equipped with a FLP twin-plug.  
This system does not require any additional electric distribution device.



### For the safe splicing of all types of conveyor belts underground:

E.g.

- solid-woven conveyor belts of PVC and PVR
- two-ply conveyor belts of PVC and rubber
- steelcord rubber conveyor belts.

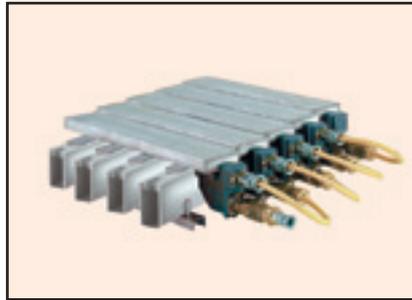
# Certified for 500 – 1100 volts.

Unadjustable end temperature ensured by the ceramic heating system

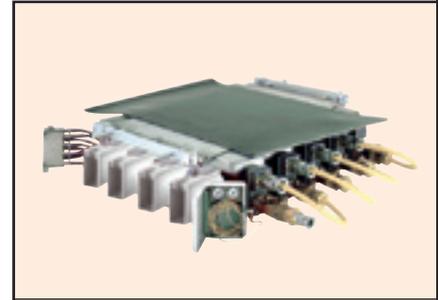
## Pressure traverses of high-strength material.



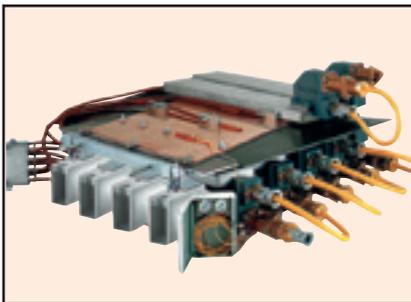
In compliance with underground requirements, steel traverses are used for underground operations. Thanks to the availability of high-strength materials it is now possible to keep the weight of the traverses low. Transportation and handling is feasible without any auxiliary means.



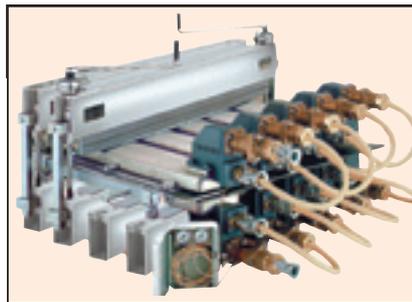
The separate heating elements are placed on the bottom pressure traverses in the running direction of the conveyor belt. Spacing rails are used to provide firm support for the heating elements. The heating elements have a standard width of 215 mm.



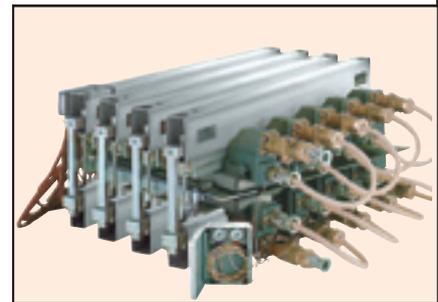
The bottom heating/pressing sheets are placed on the bottom heating elements. Accurate positioning is guaranteed by the guide supports on the heating/cooling elements. Preparation of the belt splice is done according to manufacturer's instructions.



The heating/pressing sheets for the KLIV® Ex - are made of stainless steel. They are equipped with guide supports for the location of the heating elements. These supports can also be used as carrying handles. A sensing unit is welded on each plate for the temperature sensor.



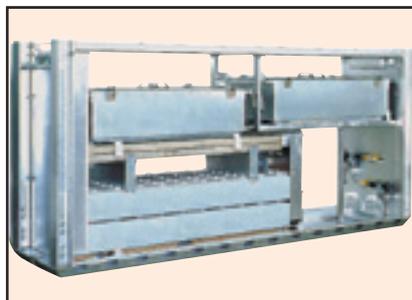
The top heating elements are accurately aligned with the bottom elements. Carefully push traction bolts up to the stops. Then tighten simultaneously and uniformly on both sides until the needle of the gauge has reached the "green" mark. This procedure is repeated with each traverse.



**Flameproof vulcanizing press.** Only one power supply cable each up to 100 Amps is required for connecting top and bottom press to the electric mains. All heating elements are interconnected in parallel.



**Special pneumatic turbo screwdriver with torque multiplier.** To apply the hydraulic pressure to the traverses. Alternatively, the hydraulic pressure can be applied by means of a ratchet in connection with the torque multiplier.



**Special container. For trouble-free underground transport all KLIV Ex - presses** can be supplied in special containers, the size of which fits all known underground transportation systems (e.g. mono-rail and track haulage means).



**Remote thermometers.** A remote thermometer facilitates monitoring the temperature development.

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