

HANDLERS FOR AUTOMATIC LOADING AND UNLOADING OF PRESSES AND RHEOMETERS

1 General description of the machine

The manipulator is used for loading raw pieces and automatically extracting rubber pieces that have been pressed by means of vertical compression presses. This PLC-controlled manipulator with pneumatic movement is composed of a group for the gripping-hand horizontal movement and a group for the vertical movement. The vertical axis is rigidly constrained to the basement, on which also the electrical control panel and the pneumatic valves block are located.

The basement structure is divided into three areas:

- A rear area for the horizontal axis
- A central area with the horizontal axis, the vertical axis, a raw rubber loader insert and the raw rubber accumulation belt
- A front area for unloading the pieces that have been extracted by the manipulator.

2 Description of the operation principle of the basic manipulator for the rheometer loading and unloading

The manipulator approaches with its front side open to one of the press free sides, normally the front or side part. When the press opens the rotor pliers inside the press are released. The rotor ascends and is blocked again at the end of its ascent.

After the rotor has been blocked the manipulator goes into the press tables, approaches the die at the gripping point and takes the pieces by applying a light pressure.

After taking the piece with the pliers the manipulator detaches the gripping hand from the die through a partial exit horizontal movement, cutting and dragging the pressed piece away with its movement.

At the end of its horizontal, partial exit movement the gripping hand closes with a higher pressure and takes the piece that is to be extracted.

After taking the pieces with the pliers the manipulator detaches the gripping hand from the die through a vertical movement upwards and drags the pressed piece away.

At the end of the vertical movement the manipulator translates the gripping hand and the pressed piece outside the die on the opposite side to the entry side. At the end of run of the complete entry of the manipulator the gripping hand opens to allow the extracted pieces to fall into a special container.

The manipulator controls the rotor release and at the end it comes down until it reaches the low manipulator mechanical and electrical end-of-run.

At the end of the internal descent the manipulator activates the rotor descent and the raw rubber pushing device descent. At the end of run of the pushing device descent the raw rubber previously loaded is deposited onto the rotor, the pushing device is made to ascend until it reaches its mechanical and electrical end of run; the manipulator operates the internal ascent of the pliers and at the end of the ascension the manipulator translates the gripping hand outside the press.

At the end of the exit run the press can close again to start a new pressing cycle, while the accumulation belt rotates anticlockwise to take the raw rubber to the loading position. At the end of the belt rotation, after the raw rubber has been set to the loading position, the arm descends until it reaches the bottom position and the raw rubber pushing device pushes the raw rubber into the special notch in the rear part of the pliers. Then the pushing device goes back to the starting position and remains waiting for a new work cycle.

When the pre-defined, adjustable number of cycles has been reached the pressed items are to be removed by the operator.

DESCRIPTION OF THE MACHINE AND TECHNICAL SPECIFICATIONS	I
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HANDLER USE ADVANTAGES:

- **REDUCED THE TIME OF ITEMS REMOVE**, because it's made at the same time for all the items and not one by one as in a manual removing cycle.
- **REDUCED MANUAL LABOUR**: cycles are completely automated and therefore one operator can control several machines.
- **REDUCED OPEN MOULD TIME**, then smaller moulds cooling and smaller vulcanization time.
- **ELIMINATION OF UNDUE CYCLE STOPS** and their pertinent problems due to moulds cooling down, such as scraps due to insufficient heating, moulds cleaning and eventual removing of them, purges for cleaning the nozzle from prevulcanized material.
- **REDUCED MACHINE DOWN TIME**: it is no longer necessary to wait for the operator to remove moulded items.
- **IMPROVED QUALITY AND CONSISTENCY OF MOULDED ITEMS**: continuous extractor cycles eliminate hazardous open machine down time due to operator absence and/or extraction speed, thus preventing the mould from cooling off and/or the compound from curing in the injection pot and extruder, which may change the physicalchemical properties of the moulded item.
- **THEY PROVIDE A RAPID RETURN ON INVESTMENT.**
- **IMPROVED PLANT OPERATING TIME**: simplifying the machine work load programming, it's really easier to programm, because of costant cycle times.
- **MORE FLEXIBILITY**: the handlers can be simply coupled to similar machines, compatible to their pertinent electric and pneumatic connections taps: they can be used on several similar moulds with small differences in tap positions.
- **REDUCED MANUAL LABOUR DEDICATED TO ITEMS TRIMMING**: the handlers use allows to remove and part automatically the moulded items burr straight through during the removing cycle.