

MANIPULATOR FOR THE AUTOMATIC EXTRACTION OF RUBBER BELLOWS (SLEEVES)

The MANIPULATOR IS for automatically loading and unloading moulding presses. THE HANDLERS are stand alone electric pneumatic and/or hydraulic units which are coupled to vertical and horizontal injection compression presses to remove moulded pieces and to load inserts. Because they require very limited installation space, the standard tools which are used to automate the insert loading operations, to remove moulded items, to remove and separate flashes from extracted items and to positions such articles in a precise order, can be mounted easily on the compact base of the handlers.

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.

DESCRIZIONE MACCHINA E SPECIFICHE TECNICHE	I
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1 General description of the machine

The manipulator is composed of a group for the horizontal movement and a group for the vertical movement of the gripping hands. The group for the vertical movement runs on a vertical slide fixed to the basement.

The framework is divided into three areas:

- A rear area where the horizontal axis guide slides
- A central area where the horizontal axis and the vertical axis slide;
- A front area for unloading the pieces extracted by the gripping hand.

The whole perimeter of the manipulator is closed by a series of panels fixed in the tubular profile. On the front side the manipulator is provided with two mobile protections to make the unloading operations, the container replacement and the pneumatic valves adjustment easier, while the left side is open and must rigidly lean onto the press, from which the pressed pieces are to be drawn. The manipulator is predisposed so as to allow a conveyor belt fitting, which consents to evacuate the pressed pieces and the burr, as an alternative to drawing through the container.

The machine is composed of:

- An electrical linear unit for the horizontal movement of the gripping hands
- A linear unit for vertical movement for the manual, mechanical adjustment of the horizontal axis work height.
- A four gripping hands unit for extracting pieces
- A three gripping hands device to strip burr (optional not include)
- Four expellers for extracted pieces
- A four-photocells device for controlling that the extraction and ejection of the extracted pieces has been operated
- A head rotation device for the fall of pressed pieces and burr
- An electrical, PLC-controlled panel, selectors and buttons
- A pneumatic system
- Two side front gates
- A rear area, which shall be closed by the press protection

2 Description and operating principle of the basic manipulator

The manipulator approaches with its front side open to one of the free sides of the press, normally the front or side part.

After the vulcanization time has elapsed (reticulation) the press opens vertically.

At the end of the opening run – after controlling that the pieces previously extracted have been ejected, the manipulator enters between the press tables and approaches the mould at the gripping point.

Before the end of run in an intermediate position the protection shells are oriented (optional) so as to allow them to follow the template of the pieces to be extracted.

At the end of the manipulator's horizontal forward movement the burr pliers close.

After the gripping operation carried out by the pliers the manipulator makes a horizontal exit movement to perform a programmed, adjustable run. During the arm exit the injection channels and the burr are stripped from the pressed pieces. During the manipulator exit a check for the burr effective presence on the pliers is performed.

At the end of the exit run and the burr extraction the head operates a vertical rotation movement of the pliers until it reaches the intermediate out-of-side-play position of the burr pliers and the alignment of the piece pliers with the mould males.

After this, the manipulator goes back for the second time into the press until it reaches the piece-gripping position. At the end of the horizontal run air is blown between the male and the pressed piece in order to make it easier for the anchor peak to penetrate between the mould core and the pressed piece.

After the air blowing time has elapsed the piece gripping pliers are closed.

After the pieces have been gripped by the pliers air is blown between the mould core and the piece, so causing the breakaway of the latter.

After the programmable, adjustable breakaway time has elapsed the manipulator comes out and extracts the pressed pieces with a horizontal movement.

During the exit movement air is constantly blown in to make the pieces extraction easier. At the end of the arm exit-run the head makes a vertical rotation, after which the piece-pliers open and the expellers come out.

After the ejection time has elapsed the expellers go back inside and the extracted pieces fall into a special container located in the piece-unloading area or onto the conveyor belt.

When all the pieces and burr have fallen the head rotates upwards and predisposes the burr pliers in the horizontal enter position for a new cycle.

The burr pliers open and let the burr and scrap fall into a special container.

If the evacuation through a conveyor belt has not been foreseen at the end of the head rotation after a number of previously programmed and adjustable cycles acoustic and light indicators tell the operator that the evacuation of the extracted pieces and burr can be carried out. This operation can be performed only if the press is open, the manipulator is at a standstill and when the message on the display indicates the container change and the light-blue lamp placed in the reset button is on.