

GUARDS AND SAFETY DEVICES

Guards and safety devices are produced according to EC regulations for EC countries; on request according to the regulations in force in the place of destination.

TECHNICAL DATA

MOULD-HOLDER								
MOULD-HOLDERS	N°	18	24	30				
LAST CLAMPING FORCE (10 bar)	kN	7,8						
RINGS CLAMPING FORCE	kN	74						
SOLE CLAMPING FORCE	kN	16,6 PRAGMA PU - 150 PRAGMA COMBI						
LAST OPENING STROKE	mm	300 - 200						
RINGS OPENING STROKE	mm	80+80						
RINGS DIMENSIONS	mm	435x200						
LAST HEIGHT	mm	333-433						
POWER INSTALLED								
LAST HEATING	kW	0,25 x 18	0,25 x 24	0,25 x 30				
DUMMY LAST HEATING	kW	0,25 x 18	0,25 x 24	0,25 x 30				
SOLE-RINGS HEATING	kW	0,74 x 18	0,74 x 24	0,74 x 30				
UPPER ELECTRIC HEATERS (optional)	kW	0,8 x 18	0,8 x 24	0,8 x 30				
TABLE ROTATION MOTOR	kW	7,5	7,5	7,5 x 2				
ELECTRIC PANEL	kW	8 each panel						
TRANSFORMER	kW	7,5	7,5	11				
INJECTOR (TPU)								
NUMBER OF INJECTOR UNITS	N°	1 + (1 optional)						
SCREW DIAMETER	mm	65						
SCREW L/D RATIO	-	18						
PLASTICIZING CAPACITY	Kg/h	100						
INJECTION VOLUME	cm³	1.000						
INJECTION PRESSURE	Bar	550						
INJECTION SPEED	cm³/sec.	200						
SCREW SPEED	r.p.m.	0 - 160						
SCREW TORQUE	daNm	160						
HEATING ZONES	N°	3 + 1						
POWER INSTALLED								
INJECTIONS UNITS HEATING	kW	6,4						
INJECTION MOTORS	kW	22						
HYDRAULIC UNIT MOTOR	kW	18,5						
INJECTOR FANS (optional)	kW	0,3						
DRYER (optional)	kW	6						
INJECTOR (PU)								
NUMBER OF INJECTION UNITS	N°	1+(1 optional)						
SCREW DIAMETER	mm	25						
SCREW L/D RATIO	g/s	30 / 70						
MIXING SCREW SPEED	r.p.m.	19.000						
TYPE OF HEAD	-	self cleaning						
NUMBER OF COMPONENTS DOSING PUMP	N°	2 - 8 each injector						
TYPE OF PUMP	-	with gears						
NUMBER OF TANKS	N°	2 - 8 each injector						
TANK CAPACITY	dm³	250 (100 optional)						
POWER INSTALLED								
TANKS HEATING	kW	2,1 each tank						
ISOCYANATE-POLYOL PIPE HEATING	kW	1,5 each tank						
ISOCYANATE-POLYOL PUMPS HEATING (optional)	kW	0,2 each tank						
MIXING SCREW MOTOR (electro-spindle)	kW	7,5 each injector						
ISOCYANATE-POLYOL MOTORS AGITATOR	kW	1,1 each tank						
ISOCYANATE-POLYOL PUMP SPEED CHANGE GEAR UNIT	kW	0,75 each tank						
ISOCYANATE POLYOL LOADING	kW	1,1 each tank						
DIATHERMIC OIL RECIRCULATION PUMP MOTORS	kW	0,33 each tank						
MIXING SCREW FORWARDING MOTOR (optional)	kW	0,4 each injector						
AUTOMATIC DEVICE FOR NOZZLE CLEANING (optional)	kW	0,73 each injector						
MASTER (optional)								
TANK CAPACITY	dm³	24 / 30						
TANKS HEATING	kW	0,35 each tank						
TANK MOTOR AGITATOR	kW	0,17 each tank						
MASTER PUMP SPEED CHANGE GEAR UNIT	kW	0,37 each tank						
TOTAL INSTALLED POWER								
		PRAGMA PU			PRAGMA COMBI			
		18	24	30	18	24	30	
TOTAL INSTALLED POWER	kW	Base	83,5	97	119	126	138	161
			Max	160,5	174	196	237	251
		PRAGMA PU			PRAGMA COMBI			
		18	24	30	18	24	30	
ELECTRICAL ENERGY	kW/h	Base	30	34	41	44	49	57
			Max	50	55	63	83	88
AIR	Nl/min	1.000			500			
FRIGORIES	frig/h	6.000			21.000			
WEIGHT								
		PRAGMA PU			PRAGMA COMBI			
		18	24	30	18	24	30	
NET WEIGHT (max)	Kg	Base	29.500	36.700	44.000	31.800	39.000	46.200
			Max	36.600	43.800	51.000	42.000	49.300
		PRAGMA PU			PRAGMA COMBI			
		18	24	30	18	24	30	
TOTAL LENGTH	mm	11.800	12.000	13.000	11.850	12.000	14.000	
TOTAL WIDTH	mm	8.000	10.850	12.000	8.100	10.230	12.400	
ROTARY TABLE DIAMETER	mm	5.000	6.700	8.050	5.000	6.700	8.050	
HEIGHT	mm	3.000	3.000	3.000	3.000	3.000	3.000	

The technical data stated are not binding and the manufacturer reserves the right to change them without prior notice.

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MAINGROUP

SERIES
PRAGMA PU
SINGLE AND DUAL-DENSITY
POLYURETHANE

PRAGMA
COMBI
MIDSOLE SINGLE AND
DUAL-DENSITY POLYURETHANE
BOTTOM TPU



AUTOMATIC ROTARY MACHINES
FOR DIRECT INJECTION ONTO UPPERS OF SOLES IN COMBINED
MATERIALS: SINGLE-DENSITY PU FOR THE MIDSOLE AND BOTTOM –
SINGLE-DUAL DENSITY PU FOR THE MIDSOLE AND TPU FOR THE BOTTOM

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SERIES PRAGMA

This series of **PRAGMA** machines is the top of range for the production of **safety and work footwear, walking shoes and comfort shoes**. High-performance machines that are extremely reliable and flexible but also extremely simple to use.

The modular design of the mechanical, electronic, pneumatic and hydraulic systems means that Pragma machines achieve the best results in directly injecting onto upper products in **single and dual-density PU** and **combined TPU+PU**.

The layout of each machine and the rational organisation of components make machine access and operations very simple.

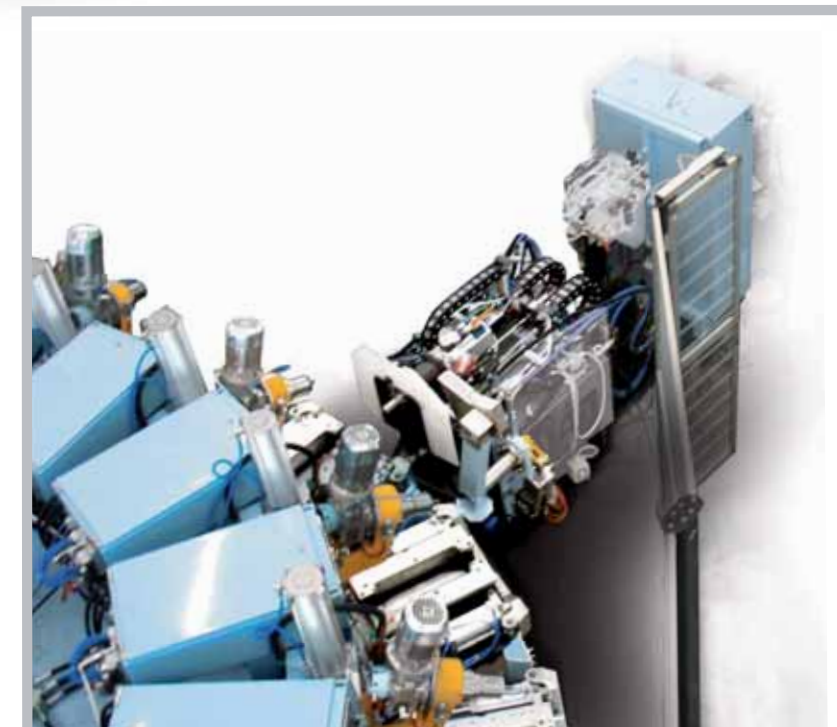
The machine is available in two versions:
PRAGMA PU, single and dual-density polyurethane with totally electric-pneumatic functions.

PRAGMA COMBI, TPU+PU, with hydraulic system that provides a clamping force of 15 tons on the bottom and excellent controls of the TPU injection unit.

SERIES
PRAGMA PU



SERIES
PRAGMA COMBI



ADVANTAGES

The modern electronic hardware and software system, together with precise and sturdy mechanics, guarantee **reliability** and **more simple maintenance**.

Production flexibility, thanks to a more capacious mould-holder, both in terms of ring opening stroke, sole plate and last-holder movement, able to house larger moulds other than standard (up to size 52).

High quality, thanks to the high clamping force of the mould-holders and the possibility to better distribute the release agent in the mould.

High productivity, thanks to the speed of the mechanical movements and rapid cycle changes that the user-friendly practical supervision system provides.

AUTOMATION

All the **PRAGMA PU** and **PRAGMA COMBI** versions can be equipped with accessories and devices to automate production, reducing the need for machine operators to a minimum.

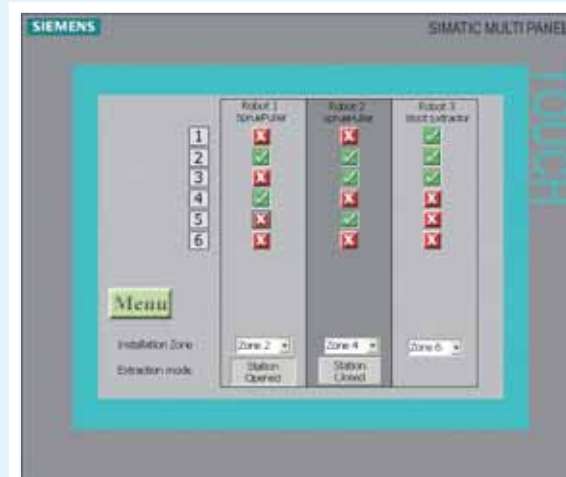
The main automations are:

- robot handlers
- silicone spreaders
- sprue transport/grainer mills
- sprue ejection robot
- robot to apply the steel sole inside the mould during the automatic cycle
- others besides, according to Customer's specific request

All these components and automatic equipment applied to the injection machine are managed by just one system, the **Management System** which assures the efficiency of the entire installation.

Management system is the management software of MAIN GROUP machines that optimises the functions of the entire installation, providing at the same time simple diagnosis of all problems that could occur during the complete production cycle.

For example, causes for machine-stops or failed production during normal work cycles (the end work reports can establish how many real minutes the machine has produced, how many rejects there have been and divide them by type) enabling fast and easy remedial actions to be taken.



EXAMPLE OF A PRODUCTION LINE

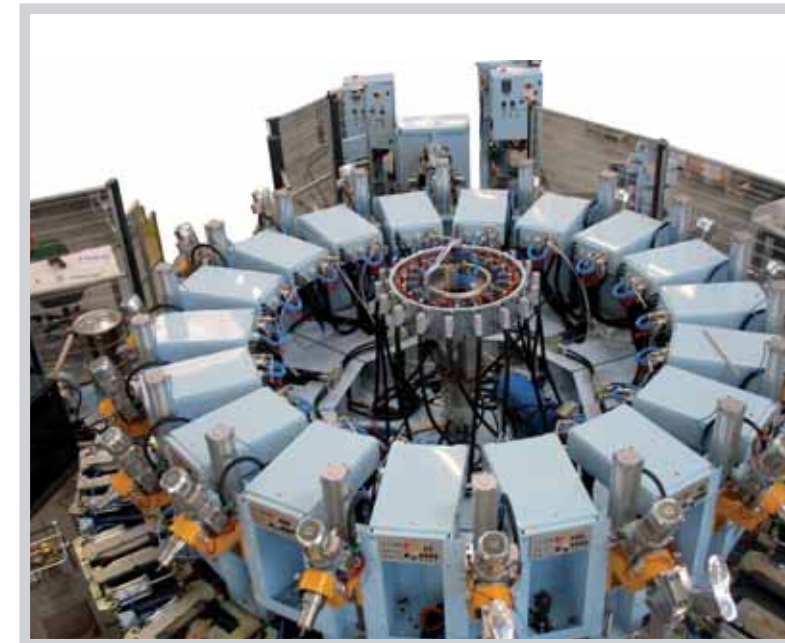


A 30-station PRAGMA in production.

ROTARY TABLE UNIT

Sturdy base in normalised steel, with high capacity bearing DI 700 and circular platform also in normalized steel.

- Electric rotation of the rotary table centre
- Geneva wheel rotary movement, which guarantees perfect alignment
- The rotary table is complete with adjustable support and brakes for even rotation
- Lower work level, just 935 mm from the ground, meaning the operator can work without the aid of a footboard.



MOULD-HOLDER UNIT

Each mould-holder is a complete structure with all its working parts. The base is composed of a sturdy spheroidal graphite cast iron casting.

Its main features are:

- Pneumatic horizontal ring movement, with opening to 140mm or 160 mm
- Fast mould coupling system (optional)
- Moulds of up to 434 x 200 mm can be fitted, capable of producing shoes up to size n. 52
- Other types of moulds may be fitted (optional), without altering the original coupling systems
- Last and dummy last couplings with carriage, using a manual pawl (optional)
- Pre-assembled last couplings, both manual and pneumatic (optional)
- Mould heating system, with energy limiting device or thermostat system (optional)
- Hydraulic last movement, with an adjustable stroke of 300 mm and clamping force up to 70 kN
- Hydraulic sole plate cylinder movement, with double closing speed, stroke of 60 mm and clamping force of 70 kN (optionally up to 150 kN)
- Automatic adjustment of sole plate stroke (optional)
- Micrometric adjustment of the stroke end position of the sole plate movement cylinder
- Automatic last rotation (optional), with rotation that can be stopped at 45 °
- Last/ring closing cycle inversion
- Larger uppers box (290x650x300 mm), to hold more uppers
- Electric ovens for heating uppers, to facilitate fitting on the aluminium lasts (optional)
- Each station is equipped with push button panel fitted between the mould-holders in an inclined position for setting times and self-diagnostics, controlled by the central computer
- Two-handed accident prevention controls
- Pneumatic toecap device (optional)
- Template holder for manual distribution of cement or for roughing (optional).



TPU INJECTION UNIT

Screw-piston INJECTOR diam. 65 mm (1000 c.c.) **INCOM PROCESS®** system, which allows to pour the material into an open mould, then closes the mould and gets final compression.

With this simple and easy to manage system, very thin thicknesses and complex profiles can be achieved even with reduced clamping forces. There are virtually no rejects; injection is done with no sprue which means reduced material waste. It is also very easy to position the inserts.

INJECTOR complete with electric motor with high power gearmotor, complete with:

- 4+1 barrel heating zones with thermostatic control
- Fan system for cooling the screw
- Proportional delivery valves, for regulating movement
- Carriage forward movement with programmable stops, controlled from the main PC
- "Energy saving" variable delivery pump.

2nd SCREW-PISTON INJECTOR (optional) diam. 65 mm, fitted beside the first and translating with alternating movement to the first (optional).

By using the second injector and alternating the loading phase of one injector with the injection phase of the other, greater flexibility is obtained in the choice of material/colour and high productivity in the case of large volumes to be obtained with the same material.



INCOM PROCESS® Injection-pouring system

POLYURETHANE INJECTION UNIT

Low pressure **PU SMART®** injector, with self-cleaning mixing screw, with recirculation of PU-components in the head, electronic dosing of the components via variable delivery pump controlled by inverter.

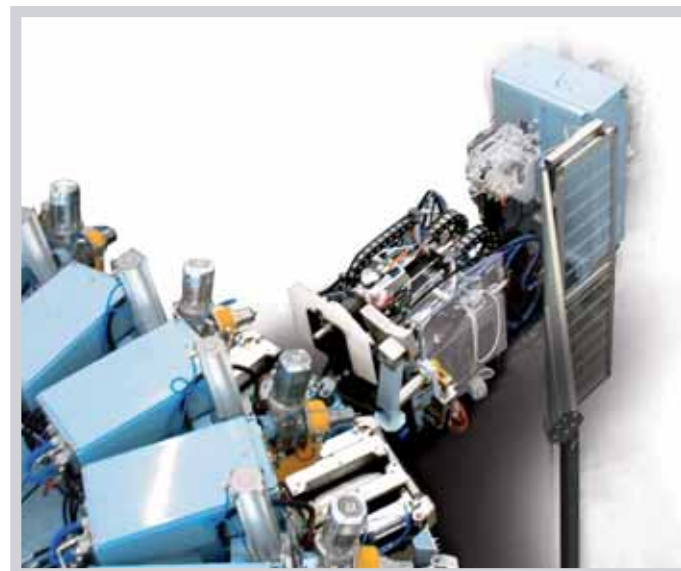
Features:

- Brushless motor control device for the dosing pump (optional)
- Injection needle valve on the injection head, with micrometric regulation of the opening stroke, electro-pneumatically controlled
- Predisposition of the mixing head up to 8 inlet ports: max 4 colours + 4 materials (optional)
- High-speed screw spindle to improve component mixing, complete with drive belt
- Variable mixing screw rotation speed, given by the electro-spindle controlled by inverter
- Fast screw change device
- Soundproofed structure
- Pneumatic cylinder for moving the injector carriage, with hydraulic impact absorption during forward movements
- Cylinder with micrometric adjustment of stroke to optimize the operating position of the screw and to clean the injection chamber
- Complete push button panel placed on the injector
- Base unit with slide guides, complete with automatic lubrication system
- Automatic device to clean the injection nozzle (optional)

2nd low-pressure injector (optional), with the same features as the first, complete with feed system and 2 tanks each containing 250 lts.



PU SMART® injector



CONTROL SYSTEM

HARDWARE

Last generation Siemens PLC series S7 – 200/300.

Siemens industrial PC with 12" or 15" touchscreen, made to the most advanced ergonomics requirements. External keyboard and mouse supplied on request (optional).

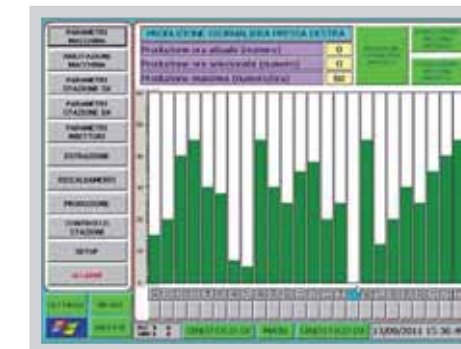
Ethernet TCP/IP board, for connection technology to the PLC and vertical communication with Office Automation.

Outside data exchange with WebService technology.

(UPS) Uninterruptible Power Supply: no longer needed owing to the use of the last generation Siemens PC and PLC.

Interfacing with external robots (optional)

Air-conditioner for the Control Unit, essential in damp climates with high temperatures (optional).



SOFTWARE

Supervisor system in Windows environment

Electronic programming, individual for each station, of work cycles, via the single PLC on the main control board

Electronic microprocessor control unit, human-machine interface (HMI), to control the injection parameters on each mould (volume, pressure, TPU injection phase), the material dosing pump motor speed, pressure and temperatures, production count, self-diagnosis and error controls.

Separate control panel in the operator area.

COLOURING UNIT

The automatic device for colouring in the head has two optional systems to choose from:

TYPE A - with transportable and independent carriages.

TYPE B - with independent small tanks, mounted on a portable frame, with 30 lts. tanks, colour pigment recirculation in the mixing head, mixer, outlet pressure transducer.



TYPE A



TYPE B

PNEUMATIC SYSTEM and HYDRAULIC SYSTEM

The **PRAGMA PU version** is completely **electro-pneumatic** to guarantee maximum cleanliness in both the machine and the mould-holder.

The pneumatic system is rationalised with wired pneumatic islands and standard components, which offers great advantages in terms of both machine maintenance and diagnostics.

The **PRAGMA COMBI version** has the **hydraulic system** installed, which gives a clamping force of 15 tons on the mould-holder, meaning very thin thicknesses can be achieved, even for the midsole, and ensuring the use of TPU.

The use of hydraulic energy is reduced to a minimum however, and only used when the functions expressly require.

FEEDING UNIT



Polyol and Isocyanate feed system, composed of 2 tanks each containing 250 lts, with double inner barrel for diathermic oil circulation to ensure perfect thermoregulation of the recirculating material, each complete with loading pump with rigid pipe for drawing up from drums, and mixer.