

SPEDEX AC

TECHNICAL SPECIFICATIONS

Rotary Machine to produce shaped adhesive plasters, packed singularly, with continuous or centred gauze.

Technical Data

-MECHANICAL SPEED	60mt/min.
-PRODUCTION SPEED WITH COLD-SEAMED WRAPPER	50mt/min.
-PRODUCTION SPEED WITH HOT-SEAMED WRAPPER	20/30mt/min.
-FORMAT CHANGE: max. time 30-45 minutes according to the format	

PLASTER SIZE :

all the formats of your standard production:

-width of the passage of the plaster material	max. 110 mm
- width of the passage of the wrapper paper	max. 150 mm
- max. cutting length of the plaster 350/1000 mm	max.
- double fold on wrapper	
- inward fold of the wrapper towards the plate	
- tolerance for positioning the gauze on the plaster :	± 1 mm
- installed power	about 14 kw
- voltage	380V - 50 Hz- three phase
- dimensions of assembled machine SPPDEX-AC	about 4440X2180X2225h mm
- height from the ground :	200 mm with adjustable feed with 50 mm for levelling
- height of higher roll-holder	about 1700 mm. (from the centre of the roll)
- height of lower roll-holder	about 600 mm (from the centre of the roll)
- noise level:	within 75 Dba

We assemble the following motors:

- Digital Brushless with absolute encoder and SIEMENS epicyclic reduction gear

Materials used for the electrical and pneumatic system :

- OMRON
- SIEMENS
- FESTO

-BOSCH

Machine Description

Rotary cutting line consisting of modular groups for the various processes used to produce and pack plasters of various shapes and sizes .

The current performances of the SPEEDEX AC are the result of the development that our company has undertaken in the past years in the sector of manufacturing mechanical machines for the production of plasters.

The SPEEDEX AC is part of a line of highly technological machines capable of producing medical and non-medical plasters taking advantage of fully automated production processes, managed by an integrated electronic system that controls each phase of production.

To be more specific, a digital servomotor with absolute multi-revolutions encoder and SIEMENS epicyclic reduction gear is fitted to each one of the working groups listed below, the reduction gear permits to have the full control on each group and each single plaster manufactured. The flexibility thus obtained permits each quick modification of the format of the final product, with small, but necessary, mechanical parts to be substituted, in conformity with the characteristics of each single product.

The customized software that manages the system of the above described manufacturing units has been implemented, designed and tested with the purpose to have all the machine components under control and an operator's interface that can be customized in accordance with the specific requirements of each client.

All mechanical connecting parts concerning the majority of gears, transmissions, belts, pulley, etc. have been eliminated thus greatly reducing maintenance costs.

Each gear is the absolute electronic gearing type. The format change is carried out by simply changing the cutting blades and setting the new process on the touch-screen; the software automatically re-times the entire line.

The empty/full reel substitution and material axial centring times have been greatly reduced: machine down-times almost none. In fact the SPEEDEX AC has a fully automated system to quickly change the reels (gauze cutting, protective silicon paper, upper wrapper paper and lower wrapper paper) with no machine down-times with the addition of an electronic system to centre the axis of the reels that allows the operator not to be in attendance during the operation. Obviously each single automatic passage of the reel seams is rejected.

The product manufactured is deposited on a mat and collected by the operator or by an automatic system arranged by the customer, while scrap materials are sent to a container arranged for the purpose.

The SPEEDEX AC is fitted with digital sensors to read the print mark for the production of plasters with centred print or customized wrappers.

- the front plate, all the groups and all the mechanical components making up the machine are treated with anti-corrosive substances, while the aluminium parts are anodised ,
- the machine is completely enclosed by stainless steel panels, the access openings on the back of the machine are protected by a stainless steel frame on which polycarbonate protections, which open like a book, slide, while on the front part are folding door with a polycarbonate protection ,

The machine is equipped with all the safety devices needed to protect the operator.

The machine is constructed in compliance with EC standards and comes complete with a use and maintenance manual which shall also include the electric diagrams and production criteria.

DESCRIPTION OF THE MACHINE ELECTRONIC CONTROL

GENERAL INFORMATION

The RCA Bignami Speedex equipment can be easily defined "fully electronic". Each group has its own independent brushless digital servomotor, which permits the independent adjustment of every single part of the machine. The only mechanical operations required are the substitution or the regulation of machine parts strictly connected with the product, such as dies and cutting groups.

RCA Bignami entrusted SIEMENS, worldwide leader in the sector of industrial automation, servicing its customers in every corner of the planet, for the automation and control of its machines.

Given the very high performances required by the equipment (20 axis, more than 4000 pieces/min), we made a "non compromises" choice: the Siemens SIMOTION D445 CPU, which represents the top of the line in the last generation of Simotion controllers.

To this powerful "brain" we fitted "muscles" that are just as performing and innovative, the SINAMICS controls, compact and sturdy, capable of operating in difficult conditions and to regenerate energy toward the electric mains, without the need of braking resistances (and therefore overheating).

TOTALLY INTEGRATED AUTOMATION

"*Totally integrated automation*" is a philosophy introduced by Siemens with the purpose to bring into harmony the various parts of a complex automation system: PLC, Human-Machine Interface (HMI), Motion Control, Servo-controls. Until a while ago these parts worked independently, each one had to be individually programmed through a dedicated development environment. Today the entire machine is "open", the programming tools are shared and the integration of the single parts does not represent a problem any more, since it is designed and tested by the manufacturer from the beginning.

Thanks to the Simotion calculating power and to its integration it is possible to simultaneously manage tens of brushless axis or other dynamics, digital I/O, capture sensors and communicate with the operator's panel in "clear".

For the final customer the advantages of the global Siemens approach are obvious:

- A single supplier, from the motor to the control electronics
- A single machine software, on practical compact-flash cards easily substituted in the event of malfunction
- An operator's panel that naturally adapts to the controller sharing its databases
- Profibus to allow for the possible integration of hardware from third parties
- Ethernet toward the plant

AXIS CONTROL

Each group (calenders, dies, seaming units) is independently motorized by a brushless servo-motor ("axis")

Each motor is driven in full torque, speed and position control.

Since all the mechanical gears have been eliminated, the entire machine is based on the electronic gearing concept. A virtual master motor, rebuilt by the motion controller, "drags" the slave motors in accordance with a specific pursuit ratio, like a pair of gearings. A software compensation eliminates every time position drift avoiding phase rotation phenomena unfortunately to be found in lower class systems.

With the purpose to reduce the format change operation to the minimum, some groups have been rendered "universal" (identical even when the format changes) thanks to the use of the electronic cam.

The cam calculation is automatically done by the motion controller when the format is changed or during the machine adjustment.

The format change is simply implemented choosing a new "recipe" on the graphic touch-screen; the system automatically re-aligns all the groups in accordance with the memorized parameters, instantaneously recreating all the operating conditions previously saved without the need of further adjustments.

All the software algorithms have been newly developed for this machine and have been severely tested obtaining exceptional performances (more than 4000 product/minute individually checked, with errors below the tenth of mm).

STRETCH CONTROL ON THE MATERIALS

The control on the material stretching on the reels is also fully innovative and the result of a deep theoretical study.

Each reel is individually motorized by a brushless servo-motor with speed and torque control.

The stretch control is extremely "soft" and continuous: the torque and speed controls are, in fact, carried out with high frequency (approx. 2 ms).

A proprietary algorithm permits to calculate the instantaneous diameters of the reels without any analogue sensor (sensorless), greatly increasing the reliability and the firmness of the pulls on the material.

There is also the possibility to implement an inertial compensation of the pull in the event of very large and/or heavy reels, introducing adequate torques during the acceleration and decelerations phases of the machine.

All possible controls are carried on each reel out to look for anomalies: rupture control, seam control on the material (with possible ejection of the piece non in conformity) control on the minimum diameter for the slow-down or stoppage of the machine.

HUMAN-MACHINE INTERFACE

The user-friendly fully graphic human-machine interface guides the operator during the adjustment and trouble shooting operations of the single groups with consecutive zooms starting from the main screen.

It is sufficient to touch the concerned area (reels, motorized group, etc.) to access the adjustment and trouble shooting pages of that part of the machine.

The trouble shooting information that require a quick evaluation are available both on digital and analogue (needle-like) displays. Each anomaly is notified on the display with flashing areas and detailed alarm messages. There is also an historic display for the alarms where it is possible to retrieve previous messages displayed and accepted by the operator.