GIROMAT® GE rotary packer
Rotary packer family

FLSmidth Ventomatic Spa is located nearby the historical town of Bergamo (North-East of Milan, Italy), where are concentrated all of its activities, from R&D to production and assembly. Here our company started the production of packing equipment in 1957. Since then FLSmidth Ventomatic Spa has been recognised for its innovative design and for the originality of the solutions it has proposed to the industry.

FLSmidth Ventomatic Spa was the first manufacturer to develop a microprocessor-based controller for filling and weighing units on packers and the first to introduce the electronic rotary packer in an industry that up until then had only known packers with mechanical weighing system.

The GIROMAT® GE rotary packer generation distinguishes itself in the market for the modular design with very high flexibility and expandability thanks to the modular integration between mechanical parts and electronic control.

FLSmith Ventomatic supply and control complete packing lines including:

- Cement feeding such as bucket elevator, vibrating screen and vane feeder;
- Filled bag transport system comprising bag cleaning, electronic check weigher, bag trap, belt conveyor, curves, bag diverters;
- Bag loading comprising automatic and manual truck loaders, palletisers;
- Dust recovery system comprising screw conveyors, bag filters, hoppers.
FLSmidth Ventomatic® rotary packers GIROMAT® GE are specially designed and developed for handling many types of building materials, with a wide range of configurations such as:

- Vertical or horizontal shaft impeller depending on the particle size distribution of the product;
- Various impeller designs;
- Bag clamping device for glued and stitched bags and suitable for various bag construction material;
- Quick discharge system;
- Bag sealing system on board (ultrasonic technology).

**Example of packing plant:**

- GIROMAT® GE V14 fourteen spouts rotary packer with vertical axis impeller;
- INFILROT® Z shooting bag applicator;
- POLINAT® C 4S palletizer.

**Output rate:**

- 5000 bags/hour (25 kg bags).

**Configuration**

**OPTICAL CONNECTION**

Infrared data transmission device for connecting the bag filling units (mounted on the rotating part) with the operator panel and the control system.

**ENCODER**

To track the angular position of each bag filling unit and to control the bag filling cycle.

**VENTODIGIT™ ELECTRONIC WEIGHING UNIT**

Multi-microprocessor electronic weighing unit designed for bag filling application. OIML and PTB certified.

**FILLING UNIT**

Impeller, fluidisation system, guillotine valve, nozzle and supporting frame, all designed for high weight accuracy, high output and low dust emission.

**BAG SUPPORT SADDLE**

Available for wide-range of bag types and sizes and for manual or automatic levelling (two or multi-positions).

**OUTPUT RATE:**

- 5000 bags/hour (25 kg bags).
Encoder and optical connection

The sequence of the bag filling operations is defined by the peripheral location of the bag on the packer during the filling cycle: empty bag application location, tare location, bag discharge location, etc. During the rotation and according to its location, the filling unit receives the relevant commands. These points, on bag location, are normally determined by a complicated system of microswitches, solenoid valves, pneumatic cylinders, etc., all mounted on the external perimeter of the packer.

FLSmidth Ventomatic® packers, however, fulfill the same operations with an encoder mounted on the top of the rotating shaft of the packer. It continuously tracks the angular position of the packer and, via a field-bus connection, the information is sent to the filling units that react accordingly. These points, on bag location, are normally determinated by a complicated system of microswitches, solenoid valves, pneumatic cylinders etc., all mounted on the external perimeter of the packer.

The encoder tracking system significantly simplifies the packer and offers shorter and easier erection and tuning and eliminates sources of possible malfunctioning. The positions for each of the filling operations is quickly and accurately set on the operator panel, eliminating the need to physically position mechanical devices externally mounted on the packer. Specific sequences of the filling cycle (and their positions) can be set in relation to type of product, empty bag size, etc.

Vertical shaft impeller

FLSmith Ventomatic SpA introduced a new philosophy in packing technology with the vertical shaft impeller. The product feed flow is in the same direction as the impeller shaft, and due to the blade design, the internal turbulence is minimised and the product is completely centrifuged.

The performance of the vertical shaft impeller is optimal with cement and similar products compared to the more traditional horizontal shaft solution, which is however still available for special applications;

The result is an optimal deaeration of the product itself and a minimum kinetic energy dispersion with high filling performance.

Legend
1) Bag application
2) Tare
3) Not filled bag removing position
4) Bag Evacuation
5) Saddle Return

Process

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Horizontal shaft impeller

Process
The filling device configuration with a horizontal shaft impeller represents the traditional solution for packing powder products. It is still a valid solution for special types of cement and products with a particle size distribution up to 2 mm. Special execution is available for particle size up to 5 mm with special lined impeller and guillotine.

This configuration implies a different product flow compared to the vertical shaft impeller previously explained and is more adequate for handling special products.

Modularity and flexibility

A FLSmidth Ventomatic® packer is composed of a number of pre-assembled modules, which are prepared and tested before delivering. These modules are quickly and easily mounted on the central tank of the packer during the erection. The numbered pneumatic connector plugs and electric rapid connectors avoid the possibility of mistakes. If required and in order to minimise the initial investment, it is possible to put the packer in service with a reduced number of bag filling units. In case of future growth in production demand, additional filling units can be easily added on.

Example
4-spout packer (supplied with the tank for 8 spouts) which can be expanded with up to four additional filling units without modifying main pneumatic, electric plants and control system.

Standard capacity table (bags per hour)

<table>
<thead>
<tr>
<th>min.</th>
<th>max.*</th>
<th>min.</th>
<th>max.*</th>
<th>min.</th>
<th>max.*</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>50 kg</td>
<td>40 kg</td>
<td>35 kg</td>
<td>25 kg</td>
</tr>
<tr>
<td>6</td>
<td>900</td>
<td>960</td>
<td>1035</td>
<td>990</td>
<td>1125</td>
</tr>
<tr>
<td>3</td>
<td>1200</td>
<td>1280</td>
<td>1380</td>
<td>1400</td>
<td>1500</td>
</tr>
<tr>
<td>4</td>
<td>1440</td>
<td>1500</td>
<td>1728</td>
<td>1800</td>
<td>1920</td>
</tr>
</tbody>
</table>

* Depending on the characteristic of the cement.
VENTODIGIT™
Electronic Weighing Unit

FLSmidth Ventomatic Spa has been a pioneer in manufacturing electronic packers since 1980 and with the VENTODIGIT™ we achieved the objective of introducing a new all-in-one electronic unit.

The weighing unit is based on the vast experience gained from our packer installations worldwide. Every filling spout is controlled by the electronic weighing unit.

<table>
<thead>
<tr>
<th>Dimensions</th>
<th>Height 243 mm, length 128 mm, width 80 mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Display</td>
<td>graphic LCD, 128x64, LED backlight</td>
</tr>
<tr>
<td>Load cell</td>
<td>6000 div.</td>
</tr>
<tr>
<td>Keyboard</td>
<td>IP65 touch-pad with LED</td>
</tr>
<tr>
<td>Memory</td>
<td>32 (expandable)</td>
</tr>
<tr>
<td>Digital I/O</td>
<td>16+16 24v optoisolated (expandable)</td>
</tr>
<tr>
<td>Analog I/O</td>
<td>1+1 10mA/20mA (expandable)</td>
</tr>
<tr>
<td>Interface</td>
<td>Full CANBUS, RS232/422/485</td>
</tr>
</tbody>
</table>

**HW Platform**

The completely redesigned HW platform includes the following main new features:

- Powerful microprocessor permits high-speed response and very accurate control of the dynamic weighing process;
- Separate weighing module, equipped with sigma-delta technology A/D converter with a double post digital filter action;
- Possibility of installing optional modules, i.e. analog I/O, additional digital I/O, etc for covering special applications.

**Weighing Functions**

- Automatic taring;
- Zero setting;
- Coarse and fine flow;
- Filling parameters self adjusting;
- Filling time control;
- Dynamic filling cycle optimisation;
- Set-point correction feed back from the check weigher (in option).

**Packing Functions**

- Check correct empty bag application;
- Bag breakage detection;
- Filling unit aeration (start/stop);
- Automatic bag support saddle levelling system;
- Rapid product emptying control;
- Continuous bag discharge adjustment according to rotation speed, bag sizes and product conditions.

**Network**

All filling units on the rotary packer are connected to a data network CANBUS. Through the unique FLSmidth Ventomatic® optical connection system, all the weighing units are also connected to the absolute encoder (for tracking their angular position) and to the operator panel. The operator panel, and the remote control system VENTOLINK™, receive in real time the complete status of each bag filling unit and also its weighing performance. Furthermore, all filling units can be completely programmed from the operator panel.

An infra-red optical communication system specially developed for high-speed data communication in heavy industrial environments. It is 100% dust proof and not sensitive to any kind of vibrations or EMC noise. Furthermore, there is no mechanical wear.

**Operator Panel**

High performance industrial bus

**Check Weigher**

The belt weigher VENTOCHECK™ can also be connected to the same network exchanging data with the other systems such as packer, operator panel, VENTOLINK.

**VentolinK**

The supervision and reporting system VENTOLINK (optional) collects and presents production data from packers and belt weighers in tables and graphic form.
The belt weigher can be directly connected, without using external master or other additional device, to the packer operator panel and then to all the filling units on board.

A real-time monitor and basic production statistic page of the belt check weigher is always available on the operator panel display.

**Execution with VENTOCHECK™ belt check weigher**

- Sorting of broken bags, underweight and overweight bags;
- Providing overall production data;
- Monitoring each bag single filling unit performance on the packer;
- Adjusting automatically the set-point of each filling unit on the packer (correction “spout-by-spout”) see “Important Note”;  
- Disabling automatically a filling unit in case of malfunction or mechanical problems.

**Important note**
The packer is able to achieve the target weight performance without necessarily using the feedback from the belt weigher.

**Operator panel**

The achievement of greater flexibility and higher level of automation requires an operator panel quite different to the conventional pushbutton desk. The HMI (Human Machine Interface) is an IP65 industrial graphic terminal designed for industrial use and dusty environments which thanks to a dynamic mimic of the packing line, provides a clear and detailed overview and monitoring of all the main equipment.

The overall feeding and packing processes are monitored with the possibility to adjust/optimise the performance through specific pages of the HMI (protected by different password levels) such as adjusting timers, variables and abilitations of the PLC program. Furthermore, all alarms and warnings are recorded, facilitating troubleshooting and supporting preventive maintenance planning.

All the main operations such as start/stop of the line, change of product and bag size, emptying and cleaning of the line, are completely automatic and programmable.
VENTOLINK™
Statistical and supervisory system

It is a new supervisory and data acquisition system for FLSmidth Ventomatic® plants, able to collect and elaborate production data from several different packing lines. Based on Windows, all stored data are exportable to Access or Excel or other formats according to ODBC standard. It can manage data from rotary packers and from VENTOCHECK™ weighers;

Supervisory module
The basic configuration of this module provides a real-time monitor of the status of the packer and the belt weigher including actual production recipes, current bag weights, alarms and warning signal tracking and recording. Furthermore, the “recipes management function” allows the remote setting and tuning of all the working parameters of the packer and the belt weigher.

The system can collect data from several packing lines.

The system is composed of three main parts: supervision line module, shift setting module, statistical and reporting module.

The production data recorded in the database contains all the information about packing line number, time, dates, number of the filling units, shift number, etc., in response to all most the relevant queries from the production department.