RVO©

Pig speed regulator for process transfer lines and all types of fluids

Seals:

Presentation

The pig speed control unit (RVO) continuously and autonomously adjusts the most appropriate pig propellant pressure. It allows the speed of the pig to be continuously regulated during pigging. This system can be used whatever the characteristics of the line subject to the pigging process or the product to be recovered. The control unit is a stand-alone system, with instant access to data.

Key features

"Knowing how to anticipate flowrates and pressures, which are essential for pigging process control"

Compared to a standard system with a manual control unit (fixed pressure), the pig speed control unit (RVO):

- Protects lines from water hammer
- Prevents pig jamming
- Eliminates the "karcher®" effect of the product at the end of the process
- Ensures the safety of users and facilities
- Adapts to products of different natures or viscosities that can be transferred on the same line
- Increases pig service life

It also has the distinctive feature of:

- Detecting the end of a pig service life
- Detecting a leak in the line

Applications

- Pigging on transfer lines for all types of liquids
- This equipment is particularly suitable for lines conveying viscous, laden and/or solidifying liquids (creams, chocolate, caramel, paints, lubricants, etc.)

Technical features

Since propellant air is a compressible gas, it inevitably generates a "buffer effect":

In some cases, the pig consumes more air than the system allows, creating a pressure difference. The propellant pressure then drops to below the minimum launching pressure of the pig's discs, stopping the pigs in the line until the air returns to its initial pressure. Then the pig suddenly starts moving again at high speed, creating an instantaneous consumption of air, and therefore an immediate drop in pressure, which in turn causes the pig to stop, and so on...
This "buffer" phenomenon multiplies the number of untimely stops of the pig in a line, which results in premature wear, as the pig's discs "wear out" with each violent restart.

Operating principle of the pig speed control unit RVO:

For the duration of a pigging operation, the pig speed control unit RVO takes 100 measurements per second of the instantaneous flow of air consumed by the pig, in order to obtain a value representative of its speed. The control unit then calculates the difference between this speed and the set speed, and corrects the propellant pressure 10 times a second until the set speed is reached. Thus, when the pig exceeds its set speed, the control unit detects this and reduces the propellant pressure until the pig returns to its set speed; when the pig stops in the line, the control unit detects a drop in its air consumption, and then increases the pressure until the pig pushes through and its speed returns to the set value.

The pig speed control unit RVO is particularly recommended for:

- Pump outlet pressure greater than 2 bar
- Long line and/or DN greater than 2"½ (DN 65)
- Large liquid risers to be pushed
- Significant density and/or viscosity of the product to be recovered
- Several different types of liquid to be recovered on the same line
- Insufficient efficiency of manual control, leading to a risk for users and surrounding equipment
- Seeking an increase in the service life of the pig and surrounding equipment
- Packaging lines with open hoppers at the end of the line: the pig speed control unit RVO considerably reduces the risk of splashes (stable liquid flow)

Standard function integrated into the pig speed control unit:

- Possibility of setting other gas propellants on the HMI interface (CO2, N, etc.)

Installation & use:

The pig speed control unit RVO is installed as close as possible to the station, upstream of the gas or air propellant supply valve(s). The regulator can be used to feed several lines, as long as one pigging operation is completed before starting another, as it is designed to control the speed of one pig at a time. If the isometric allows it, it can push the same pig for the LAUNCH & RECEIVING operation.

Components

The pig speed control unit consists of the following components in the following order:

- 3/2 manual shut-off valve with lockout function
- 3/2 NC 24 Vdc solenoid valve for pneumatic assistance
- manual pressure regulator with built-in pressure gauge
- stand-alone 24 Vdc mass control core unit
- 3/2 NC emergency pressure relief valve (from 0 bar) with built-in pressure gauge

Shut-off valve:

Manually-operated 3/2 valve, padlockable in both positions (padlock not supplied as standard). Manually isolates upstream and decompresses downstream, enabling the equipment to be locked out for maintenance.

3/2 NC solenoid valve for pneumatic assistance:

With its 24 Vdc power supply, it provides pneumatic assistance to the 3/2 emergency decompression valve, enabling it to switch between 0 & 4 bar.

Pressure reducer:

Relieves the upstream air pressure; this allows the user to set a limit to the maximum pressure available to the control core unit to push the pig.

Control core unit:

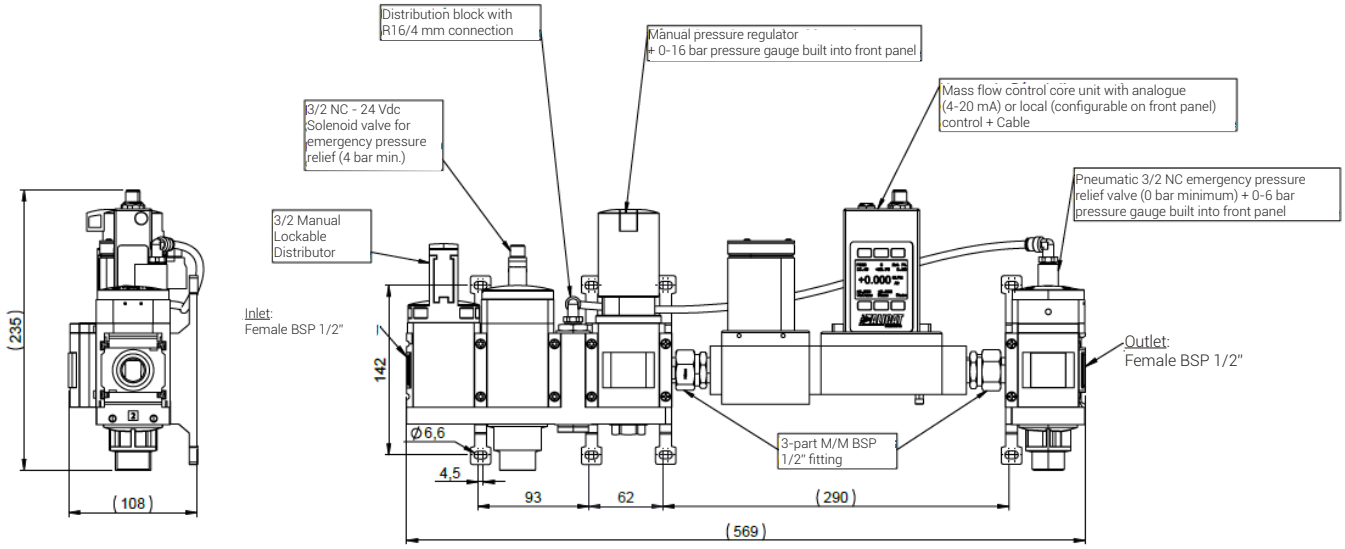
Machined stainless steel block incorporating a propellant flow control loop consisting of:

- mass flow meter (measures the instantaneous air flow consumed by the pig every 10 ms, in Nl/min),
- proportional valve which varies the flow area according to the instructions received from the interface until the required flowrate is obtained.
- 24 Vdc HMI interface for backlit electronic display of instantaneous air flowrate "Q" consumed in real time by the pig (in Nl/min).

Keypad on the front panel of the device allows to quickly select the local flowrate setting from 0 to 1,300 Nl/min. Other instantaneous measurements can be displayed and many other types of gas propellant can be selected. It is possible to receive from the PLC an analogue 4-20 mA remote setting signal and transmit monitoring information back to it. The response time of the control loop is < 100 ms, which means that the speed of the pig is automatically corrected more than 10 times per second.

3/2 NC pigging emergency stop valve:

Emergency stop of pigging process in progress. Pressure gauge mounted on the front panel displaying the instantaneous pressure regulated by the core unit. The pneumatic assistance of this valve enables it to work downstream of the core unit at very low regulated pressures (usually ~1 bar). If there is no 24 Vdc control voltage on the 3/2 solenoid valve, the distributor instantly loses its status and rapidly decompresses the downstream gas propellants, with an identical flow area in both directions (intake and blow-off), enabling the pig to be immobilised quickly. This safety feature, which does not exist with conventional manual controls, can pose a risk to users and surrounding equipment.



Options

- IP69K protection
- Adaptations for reduced space constraints
- Air reserve upstream of the regulator to compensate for insufficient or fluctuating air flow in the main network
- Special design on request

Warranty

12 months as from the date of dispatch (except for special conditions)