Energy and Process Control
Compact Ejectors X-Pump
Energy and Process Control
Minimum Energy Consumption
Maximum System Availability and Performance

Energy-Efficient Solutions from Schmalz
Rising energy prices and corporate responsibility promote the awareness of energy use. In automation technology, Schmalz supports you with efficient and sustainable vacuum solutions. In developing our products, we take into account both the energy consumption of the products themselves and their effect on the overall energy consumption of the entire process.

From Product Efficiency to Process Efficiency
With the new energy and process control, Schmalz is building a bridge between efficient products and efficient processes. With this technology, all parameters relevant to energy consumption and performance of vacuum systems can be measured, monitored and optimized. Automated processes can therefore be improved to ensure maximum productivity. The energy and process control makes its debut in the compact ejectors X-Pump SXPi-PC and SXMPi-PC models, which are used as vacuum generators in many industries from automotive to packaging.

Optimum Interplay between Product and Process
The energy and process control is a new function in Schmalz’ compact ejectors X-Pump. For the first time, vacuum generators provide the machine operator with all information relevant to energy consumption and performance. The operator can import this data into his system controller and optimize the process. The technology is based on three function modules integrated into the X-Pump SXPi-PC and SXMPi-PC models:

**Energy Monitoring EM**
For the optimization of energy consumption in vacuum systems

**Condition Monitoring CM**
For increasing system availability

**Predictive Maintenance PM**
For increasing performance and quality of gripping systems

**Energy Monitoring EM**

**Energy Monitoring for the Optimization of Energy Consumption in Vacuum Systems**
The EM function determines a real value for the energy consumption of compact ejectors in vacuum systems. This allows the energy efficiency of a vacuum system to be optimized even before the start of operations. The energy consumption of the system in this state is saved in the system controller as the optimum value.

During operation, the EM function measures the actual energy consumption, recognizes any changes and reports these to the system controller. By making a visual representation of these values the machine operator can monitor, compare and optimize all parameters relevant to energy consumption.

<table>
<thead>
<tr>
<th>Output parameters</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Absolute energy consumption per cycle</td>
<td>Nl, W</td>
</tr>
<tr>
<td>Length of switch-on/suction times</td>
<td>s, %</td>
</tr>
</tbody>
</table>

**Your Benefits**
- Measurement of the current energy consumption of both individual system parts and the entire system
- Trend analysis per component, per production cycle and per shift
- Identification of disproportionate energy consumption
- Optimization of the energy consumption for the entire vacuum system
Condition Monitoring CM

**Condition Monitoring for Increasing System Availability**

The CM function measures the leak-tightness of the vacuum system during operation as well as the operating pressure. It continuously monitors the condition of the system during the process. If a leak arises in the system, this is displayed on the ejector and reported to the system controller. If the operating pressure falls below a critical value, this is reported immediately.

The CM function simultaneously monitors the valve switching frequency and, if necessary, switches off the vacuum generator's regulation or prevents the control frequency from rising too high in order to safeguard the process. Errors are identified early and the system availability is improved.

<table>
<thead>
<tr>
<th>Output parameters</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vacuum level</td>
<td>mbar</td>
</tr>
<tr>
<td>Operating pressure</td>
<td>bar</td>
</tr>
<tr>
<td>Leakage rate</td>
<td>mbar/s</td>
</tr>
<tr>
<td>Evacuation time</td>
<td>ms</td>
</tr>
</tbody>
</table>

**Your Benefits**
- Monitoring of all process data relevant to system functioning on the ejector
- Maximum system availability due to detailed analysis of the condition of the vacuum system
- Fast and efficient rectification of critical errors in individual system parts or in the overall system
- Cost savings due to minimization of downtimes

Predictive Maintenance PM

**Predictive Maintenance for Increasing Performance and Quality of Gripping Systems**

The PM function determines the condition of the vacuum gripping system and allows the performance and quality of different gripping systems to be compared (e.g. in processes with changing components). The system measures the flow resistance and the leak-tightness of a particular gripper. This allows the operator to configure the gripper to ensure that the vacuum is established with optimum speed and reliability.
With the PM function, the system can be set up for maximum performance even before the start of operations. During operation, the system recognizes any decline in the process e.g. by contamination and allows this to be visualized. The operator can react before errors occur and recover the system performance (predictive maintenance).

<table>
<thead>
<tr>
<th>Output parameters</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pressure during free suction, caused by the flow resistance of the gripping system (performance)</td>
<td>bar, %</td>
</tr>
<tr>
<td>Leak-tightness of the gripping system (quality)</td>
<td>mbar/s, %</td>
</tr>
</tbody>
</table>

Your Benefits
- Quick and easy system optimization by evaluating the performance of gripping systems
- Identification and prevention of faulty configurations
- Monitoring of performance-relevant process data and early recognition of changes in system condition (e.g. leakage or contamination)

Conclusion
Through the optimum interaction of these three function modules, compact ejectors X-Pump with energy and process control reduce energy consumption, enable early detection and rectification of errors and allow the system to be configured to maximum performance.

Compact Ejectors X-Pump
First Vacuum Generators with Energy and Process Control

The compact ejectors X-Pump SXPi-PC and SXMPI-PC with energy and process control provide the machine operator with all important process information and thus create maximum transparency. The operator can easily import the data into his system controller for individual evaluation.

Highlights
- Integrated pressure sensor as the basis for the energy and process control functions
- Communication via IO-Link technology
- High suction rate for minimum cycle times
- Air-saving function to minimize energy consumption
- Voltage regulator to compensate for voltage fluctuations
- Power blow-off and pulsed version (optional)

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