Better Pumps for Better Yield!

No Seals, No Bearings, No Particle Contamination!

**BPS-600 (PTFE)**

- 3.2 bar (46 psi)
- 75 liters/min (20 gallons/min)

*Levitronix® MagLev Pump Technology*

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REVOLUTIONARY MAGNETICALLY LEVITATED CENTRIFUGAL PUMP

The BPS-600 pump system is a revolutionary centrifugal pump that has no bearings to wear out or seals to break down and fail. Based on the principles of magnetic levitation, the pump’s impeller is suspended, contact-free, inside a sealed casing and is driven by the magnetic field of the motor (Figure 1).

The impeller and casing are both fabricated from chemical-resistant high purity fluorocarbon resins (PFA and PTFE). Together with the rotor magnet they make up the pump head.

Fluid flow rate and pressure are precisely controlled by electronically regulating the impeller speed without pulsation. Closed loop flow or pressure control is easy configurable with the usage of an additional pressure or flow sensor. Various system configurations are possible as explained in the following sections.

SYSTEM BENEFITS

- Extremely low particle generation due to the absence of mechanically contacting parts. Reduces particle contamination issues in wet processes by generating 10 to 50 times fewer particles compared to other pumps.
- Increases equipment uptime.
- Lower maintenance costs by eliminating valves, bearings, rotating seals and costly rebuilds.
- Reduced risk of contamination due to the self-contained design with magnetic bearings.
- Very gentle to sensitive fluids due to low-shear design.
- No narrow gaps and fissures where particles or micro-organisms could be entrapped.
- Smooth, continuous flow without pressure pulsation.
- Electronic speed control.
- Compact design compared to pneumatic and magdrive pumps. Saves valuable space in process tools by having a smaller footprint.
- Proven technology in medical and semiconductor industry (MTBF > 50 years).

APPLICATIONS

- Semiconductor wet processing.
- Flip chip and advanced packaging.
- Solar cell production.
- Flat panel display manufacturing.
- Hard-disk fabrication.
- Printer ink handling.
- Pharmaceutical production.
STAND-ALONE SYSTEM CONFIGURATION

The stand-alone configuration of the BPS-600 pump system consists of a controller with an integrated user panel allowing the operator to set the speed manually (Figure 7). The speed is automatically stored in the internal EEPROM of the controller. As an option, the speed can also be set with an analog signal (see specification for Position 3a in Table 2).

EXTENDED SYSTEM CONFIGURATION

The extended version of the BPS-600 pump system (Figure 8) consists of a controller with an extended PLC interface. The PLC interface allows the speed to be set via an external signal, facilitating precise closed-loop flow or pressure control when either a flow or pressure sensor is integrated into the system (see specification of Position 3b in Table 2). A computer can be connected via a USB interface to allow communication with Levitronix® Service Software. Hence parameterization, firmware updates and failure analysis are possible.

Precise ultrapure flow control systems can be realized with the BPS-600 pump system in combination with LEVIFLOW® flowmeters. Levitronix® provides either turnkey solutions for closed-loop flow control or helps to design your own flow control system. A block-diagram for a typical flow control system is shown in Figure 5. The versatility of Levitronix® flow control systems goes far beyond the capabilities of simple flow controllers. In addition to the flow control function, the control systems goes far beyond the capabilities of simple flow control system is shown in Figure 5. The versatility of Levitronix® flow control systems goes far beyond the capabilities of simple flow controllers. In addition to the flow control function, the Levitronix® control firmware comes with several condition monitoring features to monitor the integrity of the fluid circuit. Levitronix® flow control systems can generate alarms for preventive filter exchange, no-flow conditions or line clogging. Dynamic Condition Trending (DCT) enables failure prediction and scheduling of preventive maintenance (Figure 6).

ATEX / IECEx SYSTEM CONFIGURATION

An ATEX / IECEx certified motor together with the pump head allows installation of motor and pump head within an ATEX Zone 2 area (see Figure 9). The ATEX / IECEx motor (Pos. 2b in Table 2) comes with special connectors and relevant extension cables (Pos. 5a and 5b in Table 3). An Ex conform solution is needed for the motor cables to leave the Ex area. One option is an Ex certified cable sealing system as listed in Table 4.

- ATEX / IECEx certified for Category 3G and 3D (Zone 2 for Gas and Zone 22 Dust).
- Thermal classification T4 (< 110 °C = 230 °F) for maximum liquid temperature of 90 °C / 194 °F.
- Ex marking of motor with pump head:
  - II 3G Ex nA IIC T 5 Gc
  - II 3D Ex tc IIIC T100°C Dc
- Explosion groups:
  - Group IIA: Propane (IPA), Methane, Acetone, Acetaldehyde
  - Group IIB: Ethylene, Ethyleneglycol
  - Group IIC: Acetylene, Hydrogen (not carbon disulphide)
- ATEX / IECEx listing corresponds to UL hazardous location Class 1 Division 2.

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Bearingless Pump System BPS-600 (PTFE) MagLev Pumps for Ultrapure Fluid Handling

Figure 7: System configuration for standalone operation (Speed setting with integrated user panel)

Figure 8: Extended operation (flow or pressure control) with extended controller

Figure 9: System Configuration for ATEX / IECEx applications

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DIMENSIONS OF MAIN COMPONENTS

Figure 10: Dimensions of controllers LPC-600.1 and LPC-600.2

Figure 11: Dimensions of motor with pump head

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**Table 1: Standard system configurations**

<table>
<thead>
<tr>
<th>Pos.</th>
<th>Component</th>
<th>Article Name</th>
<th>Article #</th>
<th>Characteristics</th>
<th>Value / Feature</th>
</tr>
</thead>
<tbody>
<tr>
<td>1a</td>
<td>Pump Head</td>
<td>LPP-600.1</td>
<td>100-90242</td>
<td>Impeller / Pump Housing</td>
<td>7x digital input (&quot;Enable&quot;)</td>
</tr>
<tr>
<td>1b</td>
<td>Pump Head</td>
<td>LPP-600.23 (Antistatic)</td>
<td>100-90983</td>
<td>Max. Flow / Max. Pressure</td>
<td>75 liters/min (20 gallons/min) / 3.2 bar (46 psi)</td>
</tr>
<tr>
<td>2a</td>
<td>Motor</td>
<td>LPM-600.2</td>
<td>100-10025</td>
<td>Housing</td>
<td>ETFE (chem. resistant) coated Aluminum (IP67 without connectors)</td>
</tr>
<tr>
<td>2b</td>
<td>Motor ATEX / IECEx</td>
<td>LPM-600.4</td>
<td>100-10038</td>
<td>ATEX / IECEx Marking</td>
<td>2x 3m cables with FEP jacket / 2x circular (AMP types)</td>
</tr>
<tr>
<td>3a</td>
<td>Standalone Controller (User Panel)</td>
<td>LPC-600.1</td>
<td>100-30005</td>
<td>Interfaces for Standalone Controller</td>
<td>1x analog input (&quot;Speed&quot;)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0 - 24 V (analog)</td>
</tr>
<tr>
<td>3b</td>
<td>Extended Controller (PLC and USB)</td>
<td>LPC-600.2</td>
<td>100-30004</td>
<td>Interfaces for Extended Controller</td>
<td>1x digital output (&quot;Status&quot;)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0 - 24 V (digital)</td>
</tr>
</tbody>
</table>

**Table 2: Specification of standard components**

<table>
<thead>
<tr>
<th>Pos.</th>
<th>Component</th>
<th>Article Name</th>
<th>Article #</th>
<th>Characteristics</th>
<th>Value / Feature</th>
</tr>
</thead>
<tbody>
<tr>
<td>4a</td>
<td>Extension Adaptor Cable for Sensor (a) and Power (b) Wires</td>
<td>MCAS-600.1-100 (5m)</td>
<td>190-10122</td>
<td>Sensor Material</td>
<td>PVC</td>
</tr>
<tr>
<td>4b</td>
<td>Extension Adaptor Cable for Sensor (a) and Power (b) Wires</td>
<td>MCAS-600.2-100 (5m)</td>
<td>190-10159</td>
<td>Sensor Material</td>
<td>Metal coated with polyamide (PA)</td>
</tr>
<tr>
<td>5a</td>
<td>Extension Adaptor Cable for Sensor (a) and Power (b) Wires</td>
<td>MCAS-600.3-100 (10m)</td>
<td>190-10161</td>
<td>Sensor Material</td>
<td>Metal coated with polyamide (PA)</td>
</tr>
<tr>
<td>5b</td>
<td>Extension Adaptor Cable for Sensor (a) and Power (b) Wires</td>
<td>MCAS-600.4-100 (10m)</td>
<td>190-10165</td>
<td>Sensor Material</td>
<td>Metal coated with polyamide (PA)</td>
</tr>
</tbody>
</table>

**Table 3: Specification of adapter/extension cables**

<table>
<thead>
<tr>
<th>Pos.</th>
<th>Component</th>
<th>Article Name</th>
<th>Article #</th>
<th>Characteristics</th>
<th>Value / Feature</th>
</tr>
</thead>
<tbody>
<tr>
<td>6a</td>
<td>Air Cooling Module</td>
<td>ACM-600.2</td>
<td>190-10140</td>
<td>Material / Connection Port</td>
<td>Plastic coated with EPDM (2x cable for ATEX applications) / 0°C to 100°C</td>
</tr>
<tr>
<td>6b</td>
<td>Air Cooling Module</td>
<td>ACM-600.3 (ATEX)</td>
<td>190-10141</td>
<td>Material / Connection Port</td>
<td>Plastic coated with EPDM (2x cable for ATEX applications) / 0°C to 100°C</td>
</tr>
<tr>
<td>7a</td>
<td>Fan Cooling Module</td>
<td>FCM-600.1</td>
<td>190-10401</td>
<td>Housing / Cable Spec.</td>
<td>Plastic coated with EPDM (2x cable for ATEX applications) / 0°C to 100°C</td>
</tr>
<tr>
<td>7b</td>
<td>Fan Cooling Module</td>
<td>FCC-1.1-80 (5 m)</td>
<td>190-10407</td>
<td>Cable / Connectors</td>
<td>Plastic coated with EPDM (2x cable for ATEX applications) / 0°C to 100°C</td>
</tr>
<tr>
<td></td>
<td>Fan Cooling Module</td>
<td>FCC-1.1-100 (10 m)</td>
<td>190-10408</td>
<td>Cable / Connectors</td>
<td>Plastic coated with EPDM (2x cable for ATEX applications) / 0°C to 100°C</td>
</tr>
<tr>
<td>8</td>
<td>Impeller Exchange Kits</td>
<td>IEK-600.1</td>
<td>190-90515</td>
<td>PP (+ 20% Talkum) / NPT 1/2&quot;</td>
<td>3.4 W / IP-65 (fan is IP68 rated)</td>
</tr>
<tr>
<td>9</td>
<td>ATEX Cable Sealing System</td>
<td>ACS-A.1 (Roxtect)</td>
<td>100-90292</td>
<td>Stainless Steel and EPDM</td>
<td>1.3 m (1/2&quot; NPT)</td>
</tr>
<tr>
<td>10</td>
<td>AC/DC Power Supply</td>
<td>TSP-600-148-M (M = Modified Levitronix design from Traco)</td>
<td>100-40013</td>
<td>Voltage / Power Output</td>
<td>24 VDC / 600 W</td>
</tr>
<tr>
<td>11</td>
<td>Screw Set</td>
<td>Screw Set SS+PTFE</td>
<td>100-90412</td>
<td>Material / Dimensions</td>
<td>12 pcs, M8x25 Stainless Steel + PTFE coating</td>
</tr>
</tbody>
</table>

**Table 4: Specification of accessories**

**Levitronix® MagLEV Pump Technology**

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**Figure 12:** Pump system BPS-600 with standard components

**Figure 13:** Accessories

Levitronix® MagLev Pump Technology

*Better Pumps for Better Yield!*
LEVITRONIX® THE COMPANY

Levitronix® is the world-wide leader in magnetically levitated bearingless motor technology. Levitronix® was the first company to introduce bearingless motor technology to the Semiconductor, Medical and Life Science markets. The company is ISO 9001 certified. Production and quality control facilities are located in Switzerland. In addition, Levitronix® is committed to bring other highly innovative products like the LEVFLOW® flowmeter series to the market.