High Purity Pumping and Mixing with One Single Device!

No Seals, No Bearings, No Particle Contamination!

**PTM-600**

3.1 bar (45 psi)  
Typical Tank Size  
75 lpm (20 gpm)  
200 liters (53 gallons)
MagLev Pump Tank Mixer System PTM-600
Pumping and Mixing with One Single Device

REVOLUTIONARY MAGNETICALLY LEVITATED CENTRIFUGAL PUMP

The PTM-600 pump mixer is a revolutionary device which combines mixing and pumping in one single device (see Figure 1). The system has no bearings to wear out, or seals to fail. Based on the principles of magnetic levitation, an impeller is suspended, contact-free, inside a sealed casing and is driven by the magnetic field of the motor. The impeller and casing are both fabricated from chemical-resistant high purity fluorocarbon resins.

Fluid flow rate and pressure are precisely controlled by electronically regulating the impeller speed. The mixing flow depends on the impeller speed, and on the number and size of the mixing holes (see Figure 3).

Figure 1 and Figure 2 illustrate the concept of the system. The pump mixer head comes delivered with an impeller, casing bottom and a flange to mount the head to the tank. Design specifications for the casing lid, which is part of the tank, can be requested at Levitronix®.

SYSTEM BENEFITS

- Compact mixing and pumping with one single device.
- 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.
- CMP slurry handling.
- 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 PTM-600 system consists of a controller with an integrated user panel allowing the operator to set the speed manually (Figure 6). 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 PTM-600 system (Figure 7) 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 PTM-600 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 4. 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 5).

**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 8). 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 (see Pos. 8) and shown in Figure 12.

- **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:**
  - Ex II 3G Ex e x nac IIC 110 °C (T4)
  - Ex II 3D Ex x e x IIIC T110 °C IP67
- **Explosion groups:**
  - Group IIA: Propane (IPA), Methane, Acetone, Acetaldehyde
  - Group IIB: Ethylene, Ethylenglycol
  - Group IIC: Acetylene, Hydrogen (not carbon disulphide)
- **ATEX / IECEx listing corresponds to UL hazardous location Class 1 Division 2.**

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**Levitronix® MagLev Pumping and Mixing Technology**

**Better Pumps and Mixers for Better Yield!**
MagLev Pump Tank Mixer System PTM-600
Pumping and Mixing with One Single Device

Figure 6: System configuration for standalone operation (Speed setting with integrated user panel)

Figure 7: Extended operation (flow or pressure control) with extended controller

Figure 8: System Configuration for ATEX / IECEx applications

Levitronix® MagLev Pumping and Mixing Technology
Better Pumps and Mixers for Better Yield!
DIMENSIONS OF MAIN COMPONENTS

Figure 9: Dimensions of controllers LPC-600.1 and LPC-600.2

Figure 10: Basic dimensions of motor LPM-600 with pump mixer head CPM-600.1
## MagLev Pump Tank Mixer System PTM-600

Pumping and Mixing with One Single Device

### 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>1</td>
<td>Pump Mixer Head</td>
<td>CPM-600.1</td>
<td>100-90424</td>
<td>Impeller / Pump Housing</td>
<td>75 liters/min / 20 gallons/min</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Sealing Ring</td>
<td>3.1 bar / 45 psi</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Fittings / Mounting Flange</td>
<td>90°C / 194°F</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Interface to Tank</td>
<td>Detailed design line can be requested at Levitronix®</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>5a</td>
<td>Extension Adaptor Cable for Sensor (a) and Power (b) Wires</td>
<td>MCAS-600.3-65 (5.0m)</td>
<td>190-10159</td>
<td>Jacket Material</td>
<td>PVC</td>
</tr>
<tr>
<td>5b</td>
<td>Extension Adaptor Cable for Sensor (a) and Power (b) Wires</td>
<td>MCAS-600.3-30 (3.0m)</td>
<td>190-10159</td>
<td>Connector Types</td>
<td>Circular AMP to D-SUB</td>
</tr>
<tr>
<td></td>
<td>Extension Adaptor Cable for Sensor (a) and Power (b) Wires</td>
<td>MCAS-600.3-50 (5.0m)</td>
<td>190-10159</td>
<td>Connector Material</td>
<td>Plastics (PA)</td>
</tr>
<tr>
<td></td>
<td>Extension Adaptor Cable for Sensor (a) and Power (b) Wires</td>
<td>MCAS-600.3-70 (7.0m)</td>
<td>190-10159</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Extension Adaptor Cable for Sensor (a) and Power (b) Wires</td>
<td>MCAS-600.3-100 (10m)</td>
<td>190-10159</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Table 3: Specification of adaptor/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>6</td>
<td>Air Cooling Module</td>
<td>ACM-600.2</td>
<td>190-10140</td>
<td>Material / Connection Port</td>
<td>PP (+ 40% Talkum) / NPT 1/2&quot;</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Air Pressure / Consumption</td>
<td>~1 - 3 bar (14 – 43 psig) / 100 L/min @ 1 bar (14.5 psig)</td>
</tr>
<tr>
<td>7a</td>
<td>Fan Cooling Module</td>
<td>FCM-600.1</td>
<td>190-10401</td>
<td>Housing / Cable Spec / Supply Spec. / B Rating</td>
<td>PP (+ 40% Talkum) white / PP jacket, 3m, circular-sealed M12 connector (PP). 24 VDC, 3.4 W</td>
</tr>
<tr>
<td>7b</td>
<td>Fan Cool. Module Cable</td>
<td>FCC-1.1-50 (5 m)</td>
<td>190-10407</td>
<td>Specification</td>
<td>PP cable jacket with circular M12 connector (PP) to open wires</td>
</tr>
<tr>
<td></td>
<td></td>
<td>FCC-1.1-100 (10 m)</td>
<td>190-10408</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Impeller Exchange Kits</td>
<td>IEX-600.5</td>
<td>190-90796</td>
<td>Impeller LPM-600.2 (A)</td>
<td>O-Ring (B)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Pump Housing Screws (C)</td>
<td>Stainless steel PTFE coated. 14 pcs M8 x 35</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Motor Mounting Screws (C)</td>
<td>Stainless steel PTFE coated. 4 pcs M8 x 20</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Exchange Tool IET-3-1 (E)</td>
<td>POM-C</td>
</tr>
<tr>
<td>9</td>
<td>ATEX Cable Sealing System</td>
<td>ACS-A.1 (Roxtec)</td>
<td>100-90292</td>
<td>Sleeve (A) and Gasket (B)</td>
<td>Stainless Steel and EPDM (EPDM connector)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Frame (C)</td>
<td>Stainless Steel and EPDM (EPDM connector)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2x Cable Module (D)</td>
<td>Note: Lubricant (E) and measurement plates (F) are included</td>
</tr>
</tbody>
</table>

### Table 4: Specification of accessories

Levitronix® MagLev Pumping and Mixing Technology
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MagLev Pump Tank Mixer System PTM-600
Pumping and Mixing with One Single Device

Figure 11: Pump system PTM-600 with standard components

Figure 12: Accessories

Levitronix® MagLev Pumping and Mixing Technology
Better Pumps and Mixers 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.

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