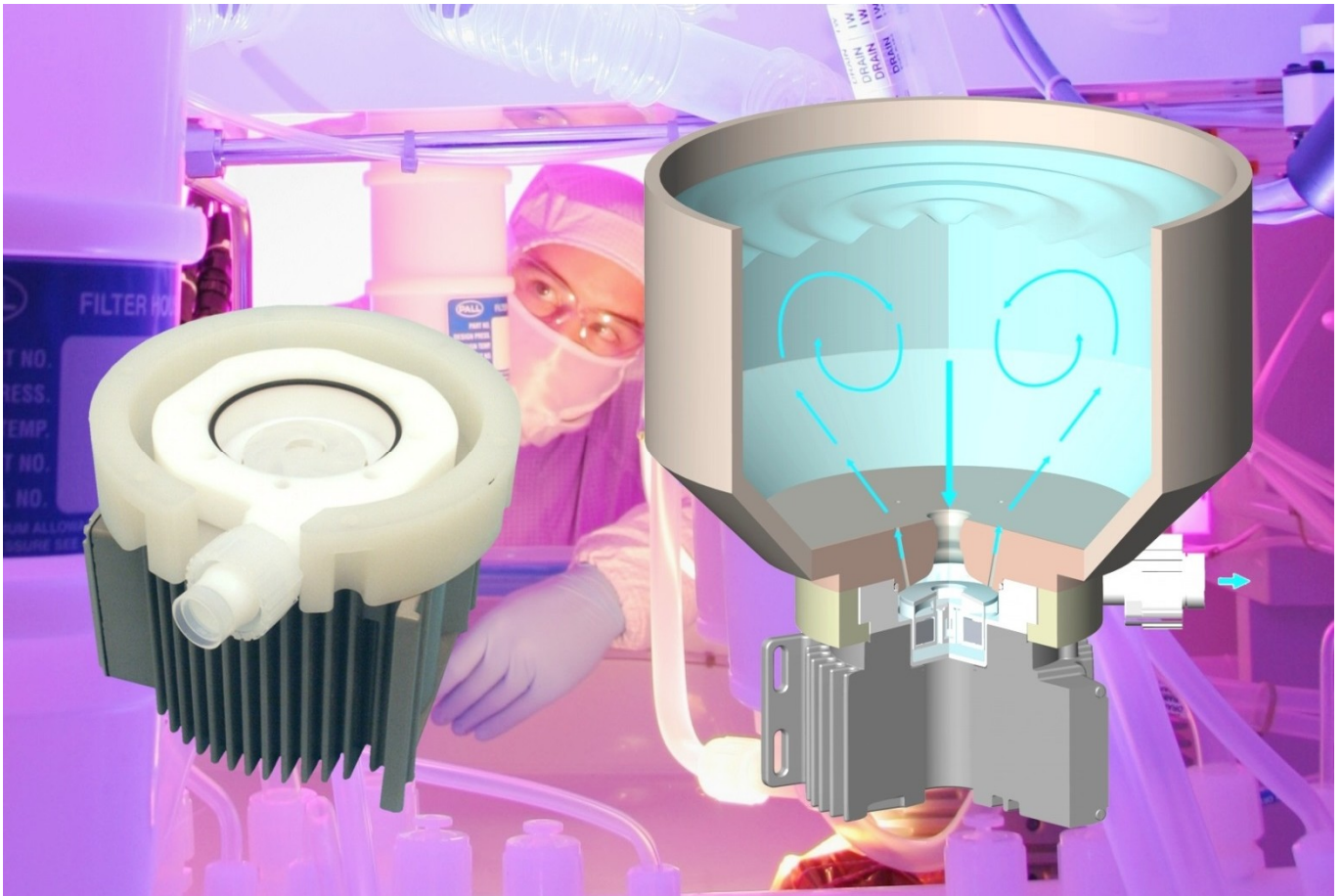


## **High Purity Pumping and Mixing with One Single Device!**



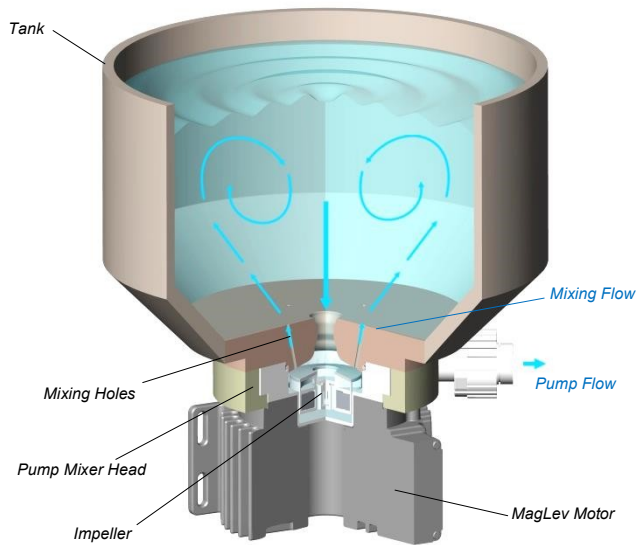
**No Seals, No Bearings,  
No Particle Contamination!**

### **PTM-600**

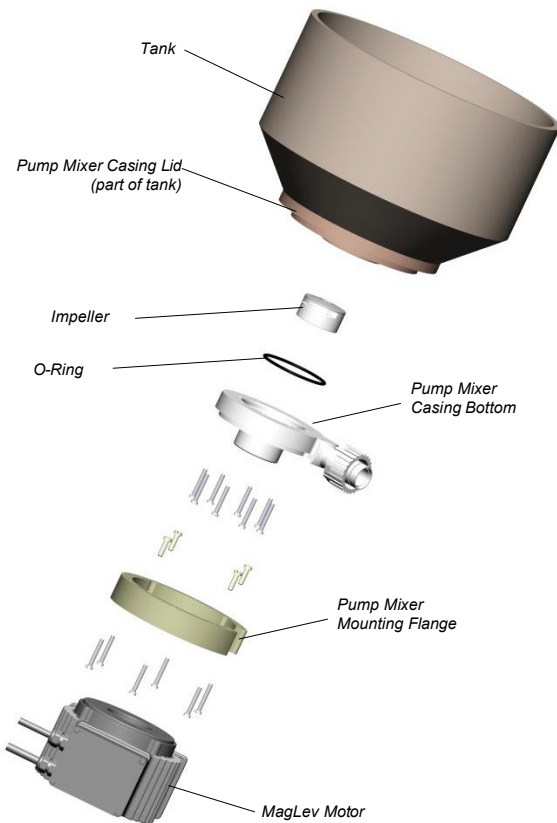
*3.1 bar (45 psi)*  
*Typical Tank Size*

*75 lpm ( 20 gpm)*  
*200 liters (53 gallons)*

**Levitronix® MagLev Pumping and Mixing Technology**  
**Better Pumps and Mixers for Better Yield!**



**Figure 1:** Concept of the MagLev pump tank mixer.



**Figure 2:** Main elements of the pump tank mixer

**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 T5 (< 100°C = 212°F) for maximum liquid temperature of 90 °C / 194 °F.
- Ex marking of motor with pump head:
  - CE Ex II 3G Ex nAc IIC 100°C T5 Gc
  - CE Ex II 3D Ex tc IIC T100°C Dc

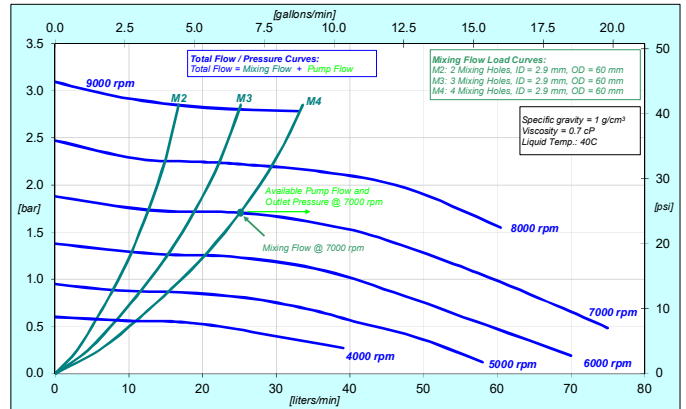


Figure 3: Pressure/flow curves of CPM-600.1 pump mixer head

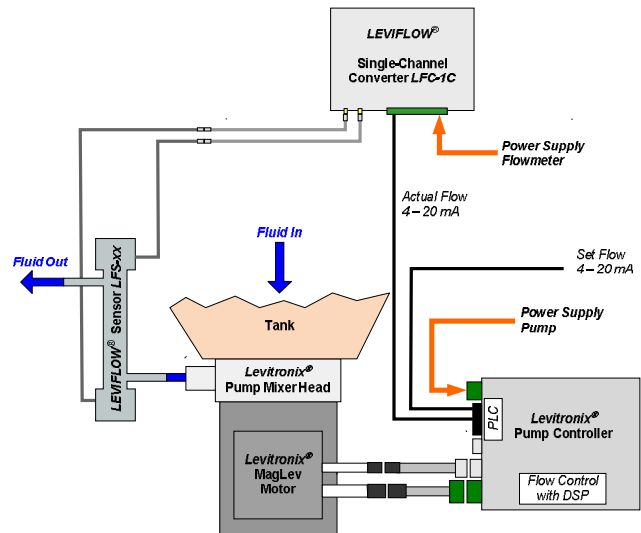


Figure 4: Flow control setup with PTM-600 system and LEVIFLOW® flowmeters

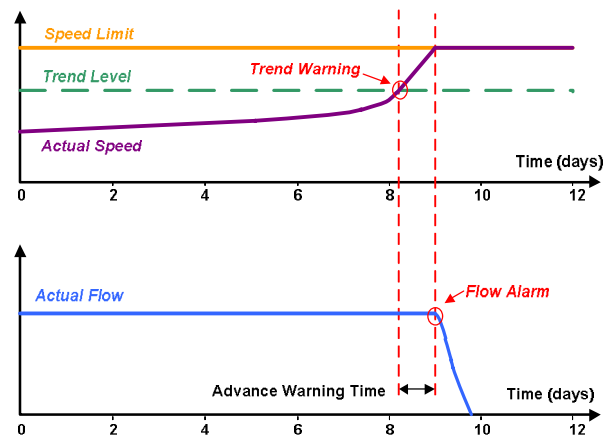
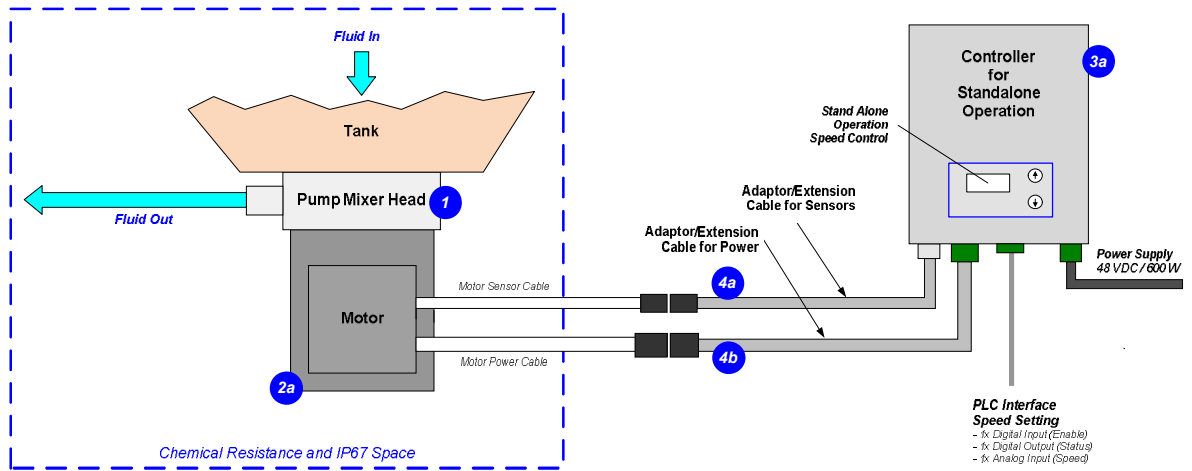
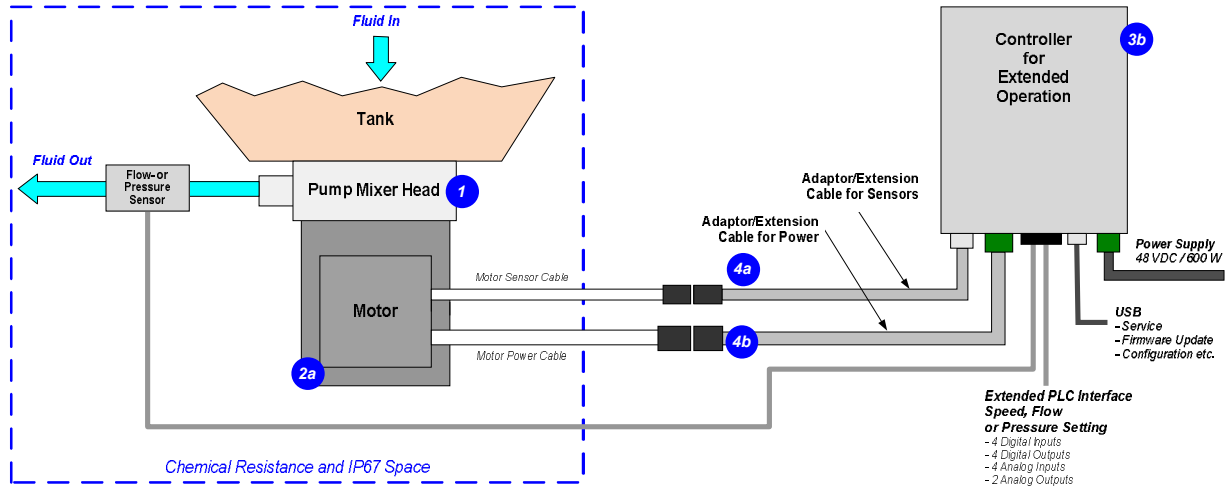


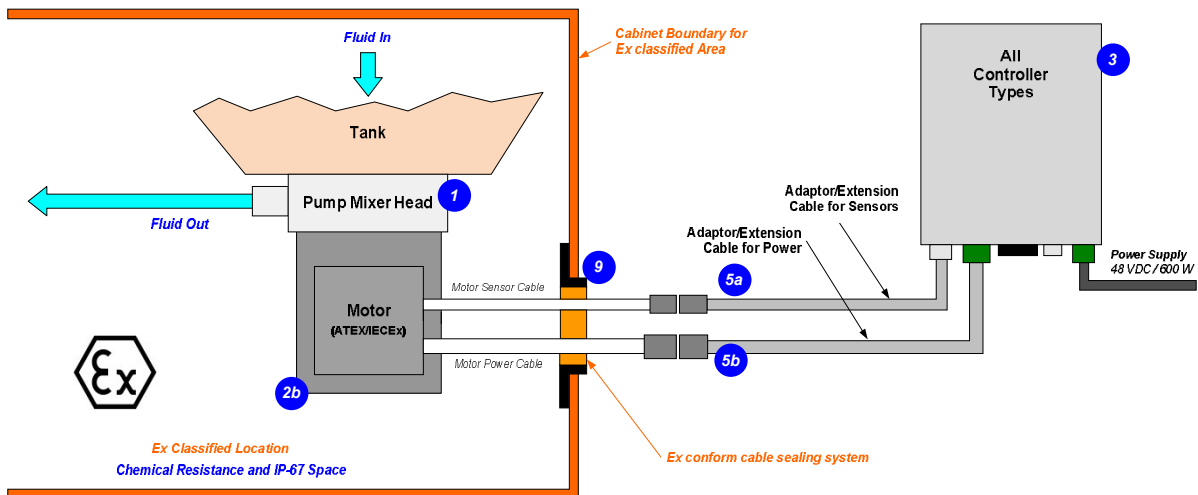
Figure 5: Dynamic Condition Trending (DCT)



**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

**DIMENSIONS OF MAIN COMPONENTS**

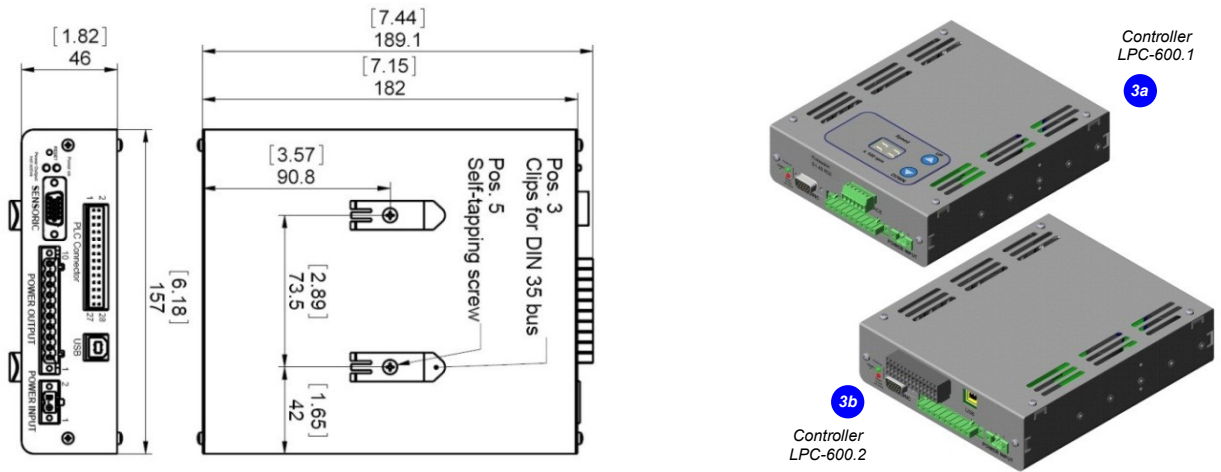


Figure 9: Dimensions of controllers LPC-600.1 and LPC-600.2

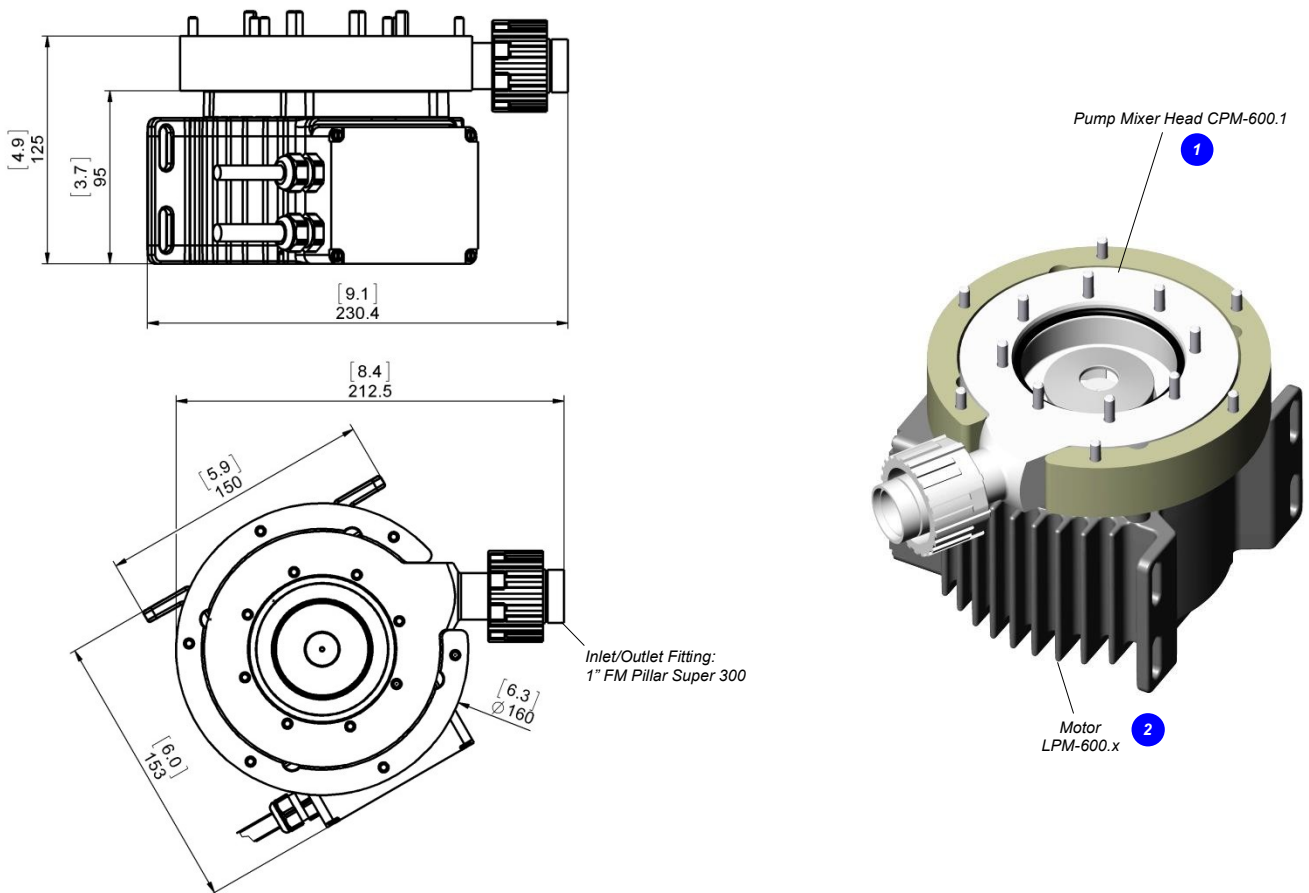


Figure 10: Basic dimensions of motor LPM-600 with pump mixer head CPM-600.1



System Name	Article #	Pump Mixer Head	Motor	Controller	Note
PTM-600.1	100-90425	CPM-600.1	LPM-600.2	LPC-600.1	Adaptor/Extension (0.5 - 10m) cables according to (position 4a and 4b) have to be ordered as separate article with specified length. Certifications: CE, IECEx CB scheme, ETL (NRTL). <sup>1</sup>
PTM-600.2	100-90793		LPM-600.2	LPC-600.2	
PTM-600.4 (ATEX)	100-90794		LPM-600.4 (ATEX)	LPC-600.1	Adaptor/Extension (0.5 - 10m) cables according to Table 3 (Position 5a and 5b) have to be ordered as separate article with specified length. ATEX Cable Sealing System can be ordered according to Table 4 (Position 8). Certifications: CE, IECEx CB scheme, ETL (NRTL), ATEX and IECEx. <sup>1</sup>
PTM-600.5 (ATEX)	100-90795		LPM-600.4 (ATEX)	LPC-600.2	

**Table 1: Standard system configurations** (Note 1: Certifications have been done in the context with the BPS-600 pump system.)

Pos.	Component	Article Name	Article #	Characteristics	Value / Feature
1	Pump Mixer Head	CPM-600.1	100-90424	Impeller / Pump Housing Sealing Ring	PFA / PTFE Kalrez® perfluoroelastomer <sup>1</sup>
				Fittings / Mounting Flange	Pillar Super 300 FM 1" / PVDF
				Max. Flow Max. Diff.-Pressure Max. Liquid Temp.	75 liters/min / 20 gallons/min 3.1 bar / 45 psi 90°C / 194°F
				Interface to Tank	Detailed design guideline can be requested at Levitronix®.
2a	Motor	LPM-600.2	100-10025	Housing	- ETFE (chemical resistant) coated Alu. (IP67 without connectors)
				Cable / Connectors	2x 3m cables with FEP jacket / 2x circular (AMP types)
2b	Motor (ATEX / IECEx)	LPM-600.4	100-10038	ATEX / IECEx Marking	CE II 3G Ex nAc IIC 100°C T5 Gc / CE II 3D Ex tc IIC T100°C Dc
				Cable / Connectors	2x 3m cables with FEP jacket / 2x circular (M23, IP67)
3a	Standalone Controller (User Panel)	LPC-600.1	100-30005 (Controller with power supply cable and Enable connector incl. in 100-90315)	Voltage / Power	48V DC / 600 W
				Interfaces for Standalone Controller	Panel to set speed (automatic storage on internal EEPROM) PLC with 1x analog input ("Speed") 4 - 20 mA 1x digital input ("Enable") 0 - 24 V (optocoupler) 1x digital output ("Status") 0 - 24 V (relais)
				Standard Firmware	D6.25
3b	Extended Controller (PLC and USB)	LPC-600.2	100-30004 (Controller with power supply cable and PLC connector incl. in 100-90314)	Interfaces for Extended Controller	PLC with - up to 4 digital inputs 0 - 24V (optocoupler) - up to 4 digital outputs 0 - 24 V (relais) - up to 2 analog inputs 4 - 20mA - up to 2 analog outputs 0 - 10 V - up to 2 analog outputs 0 - 5 V
					USB interface (for service and system monitoring)
				Standard Firmware	D6.48

**Table 2: Specification of standard components** (Note 1: Kalrez® is a registered trademark of DuPont Dow Elastomers.)

Pos.	Component	Article Name		Article #		Characteristics	Value / Feature
		Sensor Cable	Power Cable	Sensor	Power		
4a 4b	Extension Adaptor Cable for Sensor (a) and Power (b) Wires	MCAS-600.1-05 (0.5m)	MCAP-600.1-05	190-10122	190-10118	Jacket Material Connector Types Connector Material	PVC Circular AMP to D-SUB Plastics (PA)
		MCAS-600.1-30 (3m)	MCAP-600.1-30	190-10123	190-10119		
		MCAS-600.1-50 (5m)	MCAP-600.1-50	190-10124	190-10120		
		MCAS-600.1-70 (7m)	MCAP-600.1-70	190-10101	190-10102		
		MCAS-600.1-100 (10m)	MCAP-600.1-100	190-10125	190-10121		
5a 5b	Extension Adaptor Cable for Sensor (a) and Power (b) Wires	MCAS-600.3-05 (0.5m)	MCAP-600.3-05	190-10158	190-10154	Jacket Material Connector Types Connector Material	PVC Circular M23 (IP-67) to D-SUB Metallic - Nickel coated
		MCAS-600.3-30 (3m)	MCAP-600.3-30	190-10159	190-10155		
		MCAS-600.3-50 (5m)	MCAP-600.3-50	190-10130	190-10129		
		MCAS-600.3-70 (7m)	MCAP-600.3-70	190-10160	190-10156		
		MCAS-600.3-100 (10m)	MCAP-600.3-100	190-10161	190-10157		

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

Pos.	Component	Article Name	Article #	Characteristics	Value / Feature
6	Air Cooling Module	ACM-600.2	190-10140	Material / Connection Port	PP (+ 40% Talkum) / NPT 1/4"
				Air Pressure / Consumption	~1 - 3 bar (14 - 43 psi) / 100 Liter/min @ 1 bar (14.5 psi)
7a	Fan Cooling Module	FCM-600.1	190-10401	Housing / Cable Spec. Supply Spec. / IP Rating	PP (+ 20% Talkum) white / PP jacket, 3m, circular sealed M12 connector (PP). 24 VDC, 3.4 W / IP-65 (fan is IP68 rated).
7b	Fan Cool. Module Cable	FCC-1.1-50 (5 m)	190-10407	Specification	PP cable jacket with circular M12 connector (PP) to open wires
		FCC-1.1-100 (10 m)	190-10408		
8	Impeller Exchange Kits	IEK-600.5	100-90796	Impeller LPI-600.2 (A) O-Ring (B) Pump Housing Screws (C) Motor Mounting Screws (D) Exchange Tool IET-3.1 (E)	PFA O-Ring, Kalrez, 72.62 x 3.53 Stainless steel PTFE coated, 14 pcs M5 x 35 Stainless steel FEP coated, 4 pcs M6 x 20 POM-C
9	ATEX Cable Sealing System	ACS-A.1 (Roxtec)	100-90292	Sleeve (A) and Gasket (B) Frame (C) 2x Cable Module (D)	Stainless Steel and EPDM Roxylon (EPDM rubber) Roxylon (EPDM rubber) Note: Lubricant (E) and measurement plates (F) are included.
10	AC/DC Power Supply	TSP 600-148-M (M = Modified Levitronix design from Traco)	100-40013 (Traco ID Number: T1068-01A)	Voltage / Power Output Voltage Input	48 VDC / 600 W 85 - 265 VAC (automatic detection)
				Certification or Standards	CB, UL, CSA, Semi F47

**Table 4: Specification of accessories**

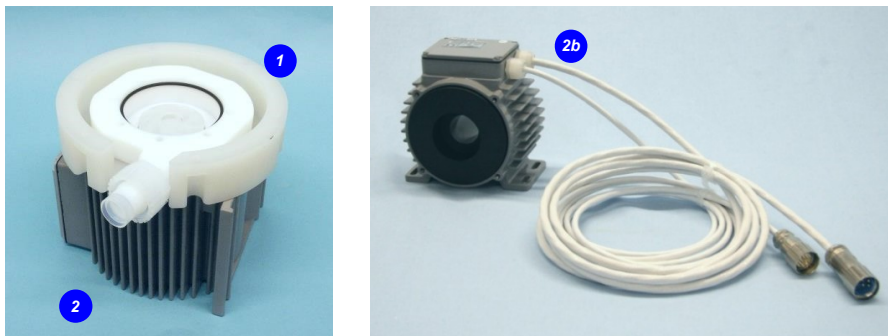


Figure 11: Pump system PTM-600 with standard components



Figure 12: Accessories

**Levitronix<sup>®</sup> 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 LEVIFLOW® flowmeter series to the market.



**Headquarter and European Contact**

Levitronix GmbH  
Technoparkstr. 1  
CH-8005 Zurich  
Switzerland

Phone: +41 44 445 19 13  
Fax: +41 44 445 19 14  
E-Mail: [salesEurope@levitronix.com](mailto:salesEurope@levitronix.com)

**US Contact**

Levitronix Technologies Inc.  
10 Speen Street, Suite 102  
Framingham, Massachusetts 01701  
USA

Phone: +1 508 861 3800  
Fax: +1 508 861 3837  
E-Mail: [salesUS@levitronix.com](mailto:salesUS@levitronix.com)

**Japan Contact**

Levitronix Japan K.K.  
Wing Eight 5floor, 4-16-4  
Asakusabashi, Taito-ku  
Tokyo, 111-0053 Japan

Phone: +81 3 5823 4193  
Fax: +81 3 5823 4195  
E-Mail: [salesJapan@levitronix.com](mailto:salesJapan@levitronix.com)

**Taiwan Contact**

Levitronix Taiwan  
5F, No. 251, Dong Sec. 1,  
Guangming 6th Rd., Chu Pei City,  
Hsin-Chu 302, Taiwan, R.O.C.

Phone: +886 3 657 6209  
Fax: +886 988 321472  
E-Mail: [salesAsia@levitronix.com](mailto:salesAsia@levitronix.com)