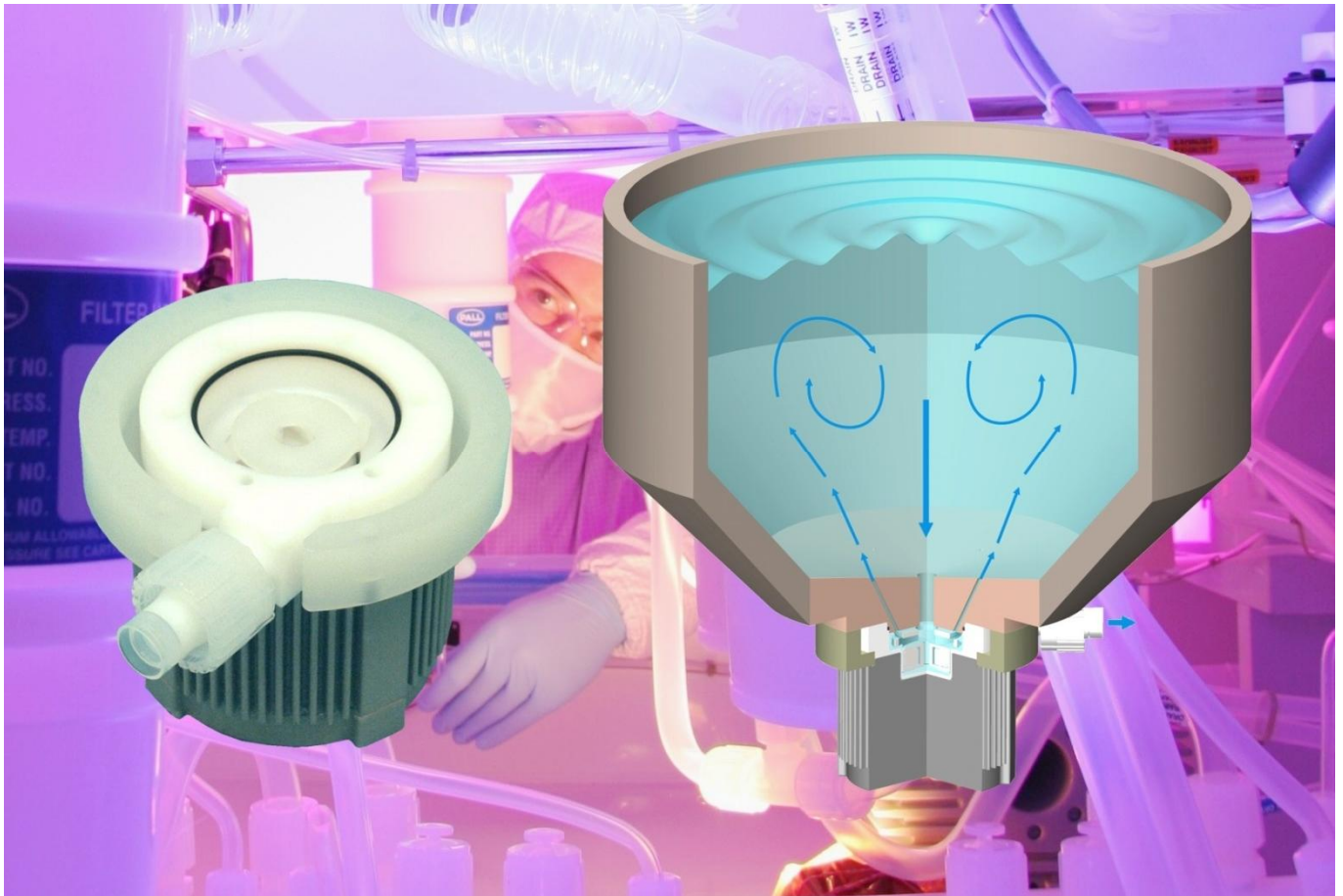


**High Purity Pumping and Mixing  
 with One Single Device!**



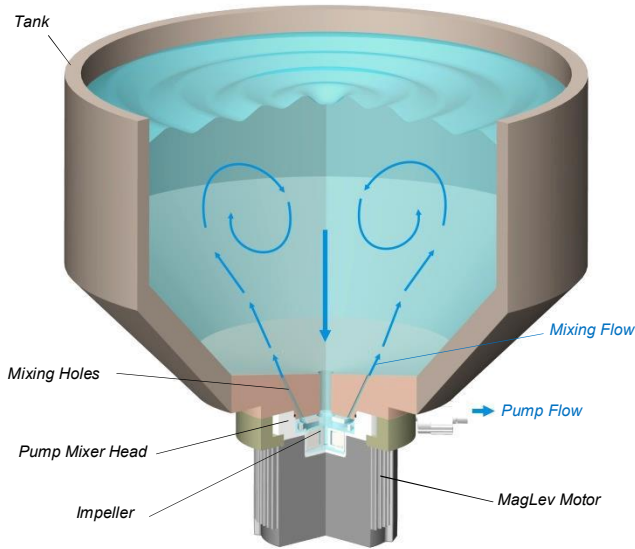
**No Seals, No Bearings,  
 No Particle Contamination!**

**PTM-200**

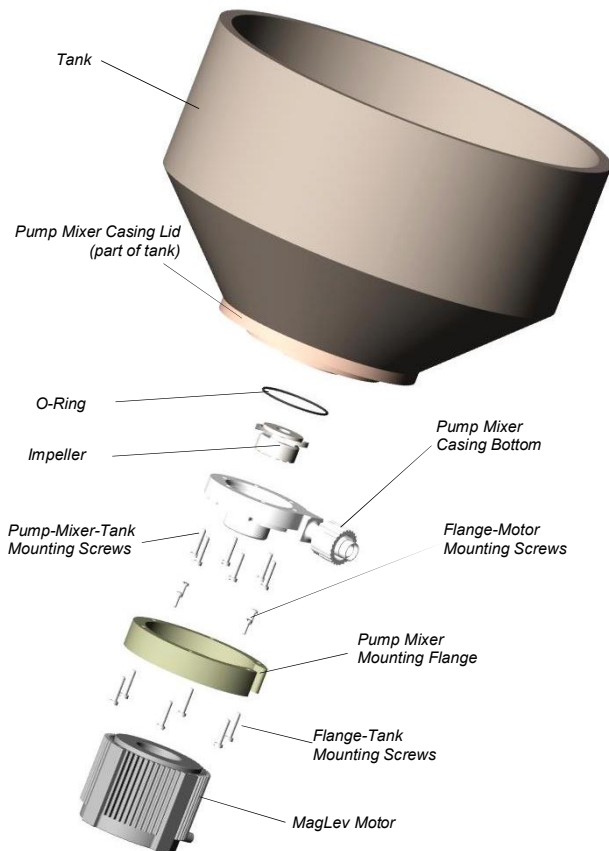
1.6 bar (23.2 psi)  
 Typical Tank Size

20 lpm ( 5.3 gpm)  
 100 liters (26.5 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-200 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-200 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-200 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-200 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 (see Table 2) comes with special connectors and relevant extension cables (see 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:
  - CE Ex II 3G Ex c nAc IIC 110°C (T4)
  - CE Ex II 3D Ex c tc 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.

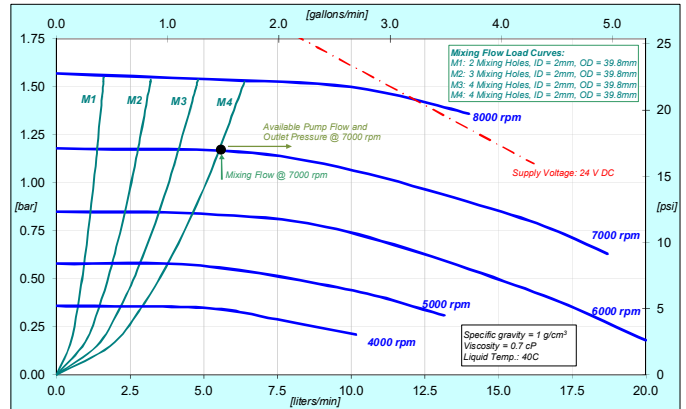


Figure 3: Pressure/flow curves of CPM-200.2 pump mixer head

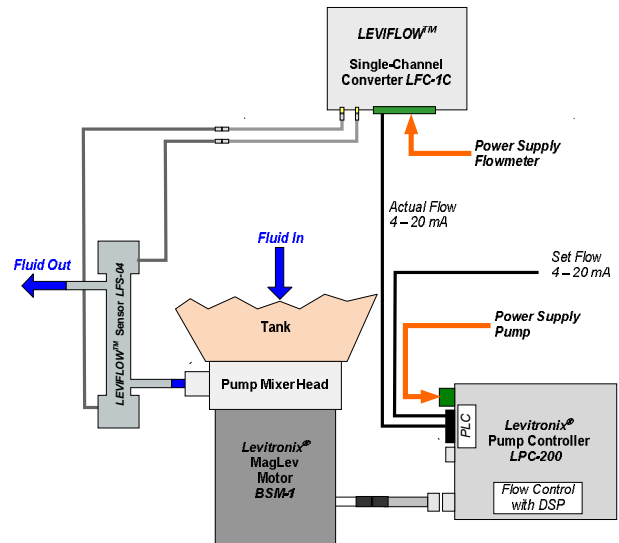


Figure 4: Flow control setup with PTM-200 system and LEVIFLOW® flowmeters

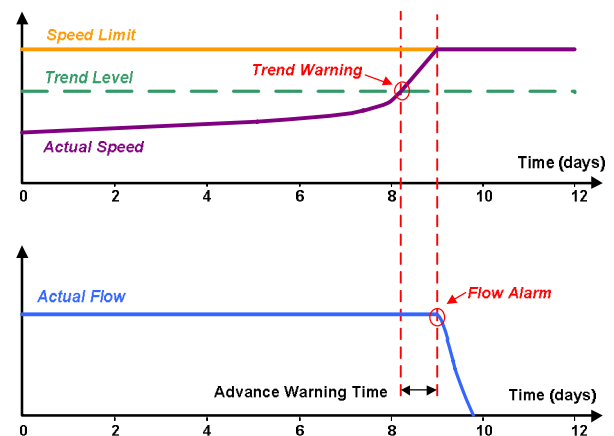


Figure 5: Dynamic Condition Trending (DCT)

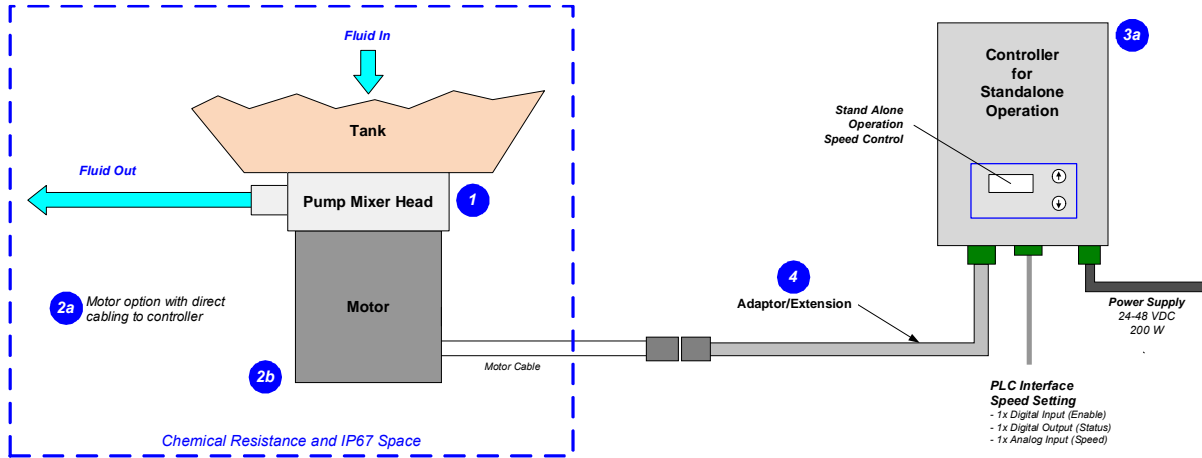


Figure 6: System configuration for standalone operation (Speed setting with integrated user panel)

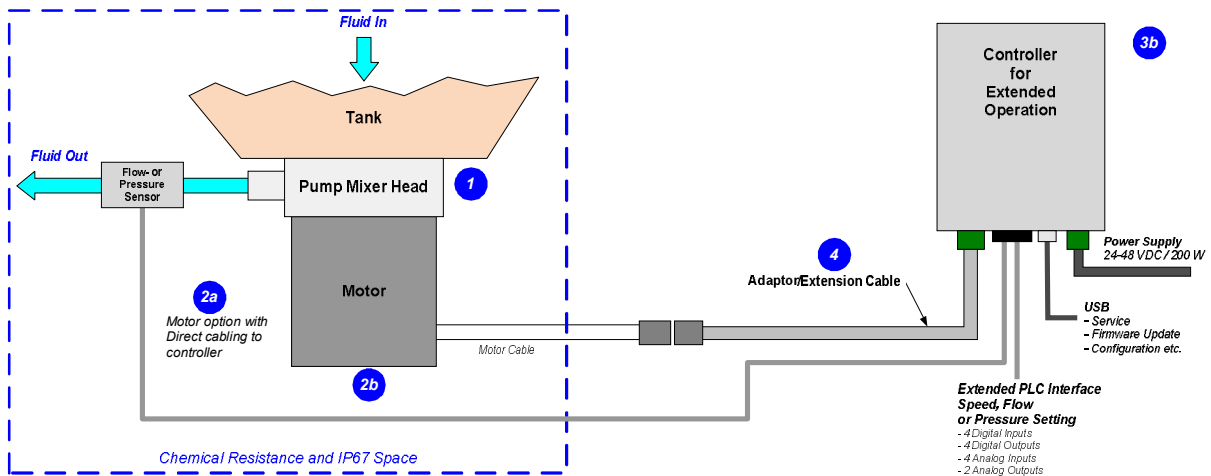


Figure 7: Extended operation (flow or pressure control) with extended controller

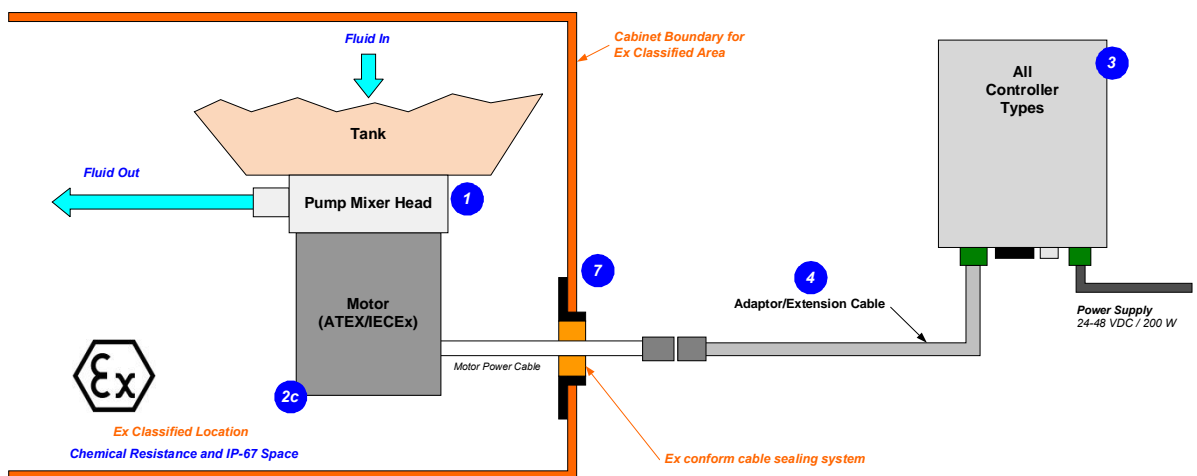


Figure 8: System Configuration for ATEX / IECEx applications

**DIMENSIONS OF MAIN COMPONENTS**

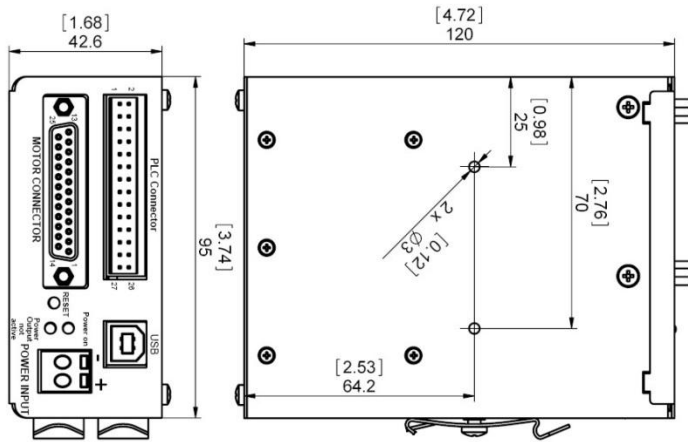


Figure 9: Dimensions of controllers LPC-200.1 and LPC-200.2

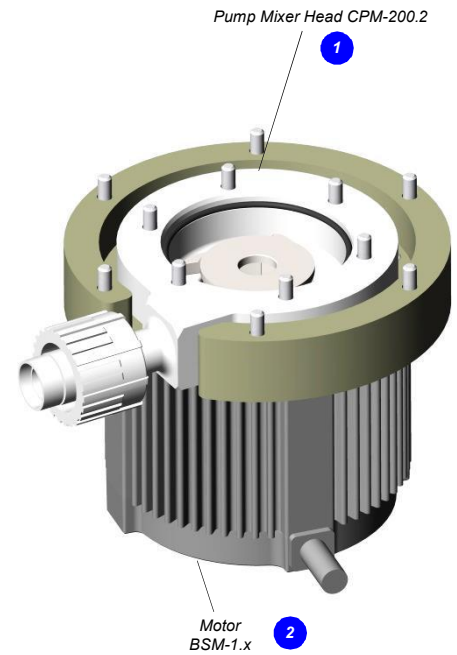
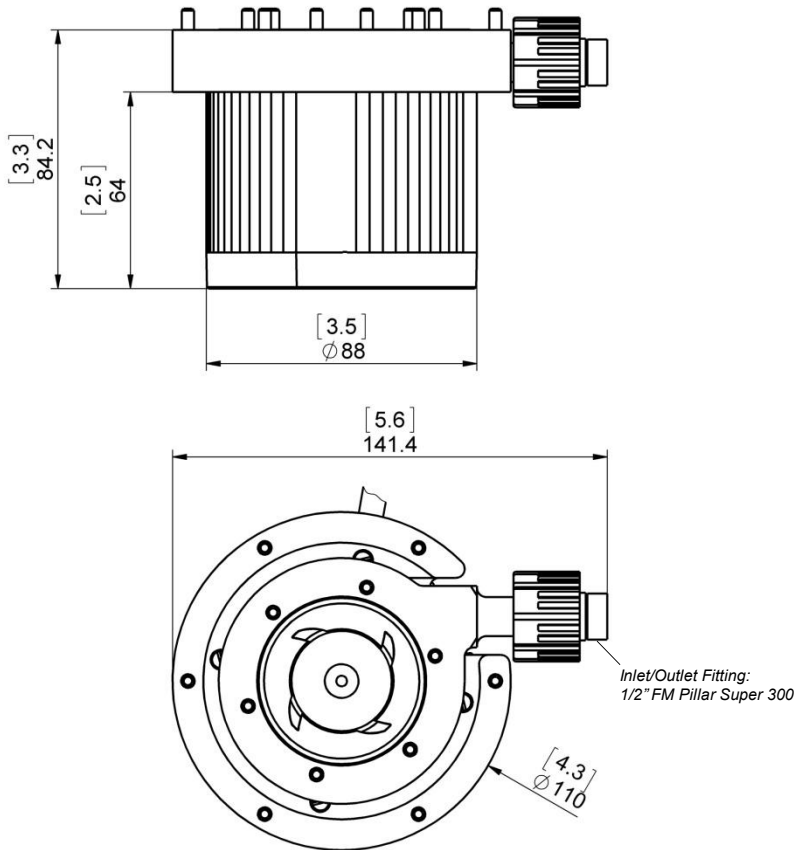


Figure 10: Basic dimensions of motor BSM-1 with pump mixer head CPM-200.2

System Name	Article #	Pump Mixer Head	Motor	Controller	Note
PTM-200.1 PTM-200.2	100-90929 100-90931	CPM-200.2	BSM-1.3	LPC-200.1-03 LPC-200.2-03	Adaptor/Extension (0.5 - 10m) cables according to Table 3 have to be ordered as separate article. Certifications: CE, IECEx CB scheme, ETL (NRTL). <sup>1</sup>
PTM-200.4 (ATEX) PTM-200.5 (ATEX)	100-90933 100-90934		BSM-1.6	LPC-200.1-03 LPC-200.2-03	Adaptor/Extension (0.5 - 10m) cables according to Table 3 have to be ordered as separate article. ATEX Cable Sealing System can be ordered according to Table 4. Certifications: CE, IECEx CB scheme, ETL (NRTL), ATEX and IECEx. <sup>1</sup>

**Table 1: Standard system configurations**  
1: Certifications have been done in the context with the BPS-200 pump system.

Pos.	Component	Article Name	Article #	Characteristics	Value / Feature
1	Pump Mixer Head	CPM-200.2	100-90476	Impeller / Pump Housing	PFA / PTFE
				Sealing Ring	Kalrez® perfluoroelastomer <sup>1</sup>
				Fittings	Pillar Super 300 FM 1/2"
				Mounting Flange	PVDF
				Max. Flow	20 liters/min / 5.3 gallons/min
				Max. Diff.-Pressure	1.6 bar / 23.2 psi
				Max. Liquid Temp.	90°C / 194°F
				Interface to Tank	Detailed design guideline can be requested at Levitronix®.
2a	Motor	BSM-1.3	100-10004	Housing	ETFE (chemical resistant) coated Aluminum, waterproofed (IP67)
				Cable / Connectors	1x 2m cable with FEP jacket / 1x circular (M23, IP-67) (needs extension adaptor cable for connection to controller)
2c	Motor (ATEX / IECEx)	BSM-1.6	100-10063	Cable / Connectors	1x 2m cable with FEP jacket / 1x circular (M23, IP-67) (needs extension adaptor cable for connection to controller)
				ATEX / IECEx Marking	CE II 3G Ex c nAc IIC T5 CE II 3D Ex c tc IIIC T100°C IP6x
3a	Standalone Controller (User Panel)	LPC-200.1-03	100-30072 (Enable/PLC connector included)	Electrical Power / Voltage	200 W / 24 - 48V DC
				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	C5.25
3b	Extended Controller (PLC and USB)	LPC-200.2-03	100-30073 (PLC connector included)	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 inputs 0 - 10 V - up to 2 analog outputs 0 - 5 V
				Standard Firmware	C5.48
				USB interface (for service and system monitoring)	

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

Pos.	Component	Article Name	Article #	Characteristics	Value / Feature
4	Extension Adaptor Cable for Power	MCA-1.4-05 (0.5m)	190-10228	Jacket Material Connectors	PVC-jacket Circular Hummel to D-SUB connector
		MCA-1.4-30 (3m)	190-10170		
		MCA-1.4-50 (5m)	190-10187		
		MCA-1.4-70 (7m)	190-10229		
		MCA-1.4-100 (10m)	190-10230		

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

Pos.	Component	Article Name	Article #	Characteristics	Value / Feature
5	Air Cooling Module	ACM-1.1	190-10003	Material / Connection Port Air Pressure / Consumption	PVDF / NPT 1/4" ~ 0.5bar (7.2 psi)
6 (a,b,c, d,e)	Impeller Exchange Kit	IEK-200.6 (for CPM-200)	100-90930	Impeller LPI-200.2 (a) Sealing O-Ring (b) Pump-Mixer-Tank Screws (c) Flange-Tank Screws (d) Flange-Motor Screws (e) Exchange Tool IET-1.1 (f)	PFA O-Ring, Kalrez, 50.52 x 1.78 6 pieces, stainless steel PTFE coated, M4 x 20 mm 6 pieces, stainless steel PTFE coated, M4 x 20 mm 4 pieces, stainless steel PTFE coated, M3 x 10 mm POM-C
7	ATEX Cable Sealing System	ACS-A.1	100-90292	Sleeve (a) / Gasket (b) Frame (c) Cable Module (d)	Stainless Steel and EPDM Roxylon (EPDM rubber) Roxylon (EPDM rubber) <i>Note:</i> Lubricant (e) and measurement plates (f) are included.
8a	AC/DC Power Supply	TPS 360-124 (Standard Traco Supply)	100-40016	Voltage / Power Output Voltage Input Dimensions	24 VDC / 360 W 85 - 132 / 187 - 264 VAC, autoselect 125 x 125 x 80 mm
8b	AC/DC Power Supply	TPS 360-124 (Standard Traco Supply)	100-40017	Certification	UL, CSA, CB, Semi F47
				Voltage / Power Output	48 VDC / 360 W (other specifications same as 9a)

**Table 4: Specification of accessories**

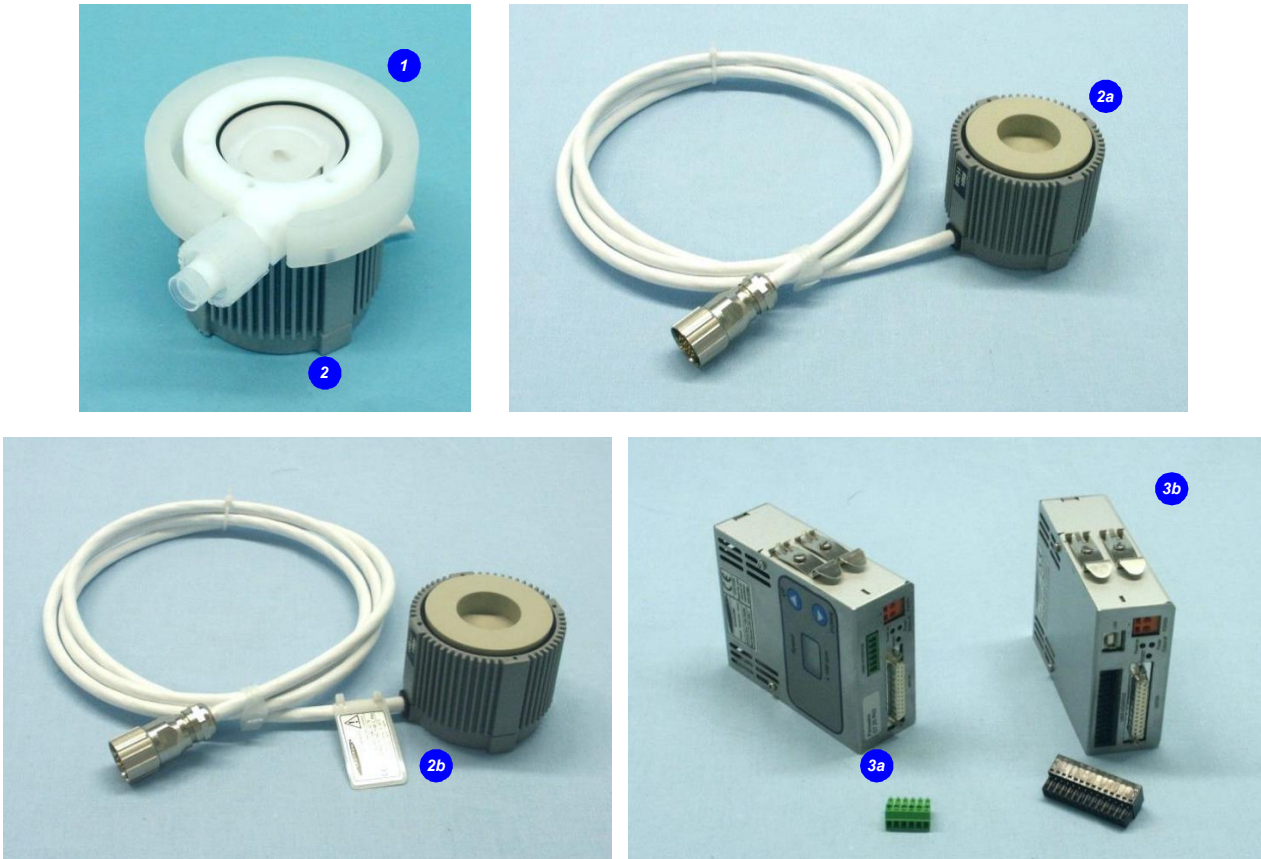


Figure 11: Pump system PTM-200 with standard components

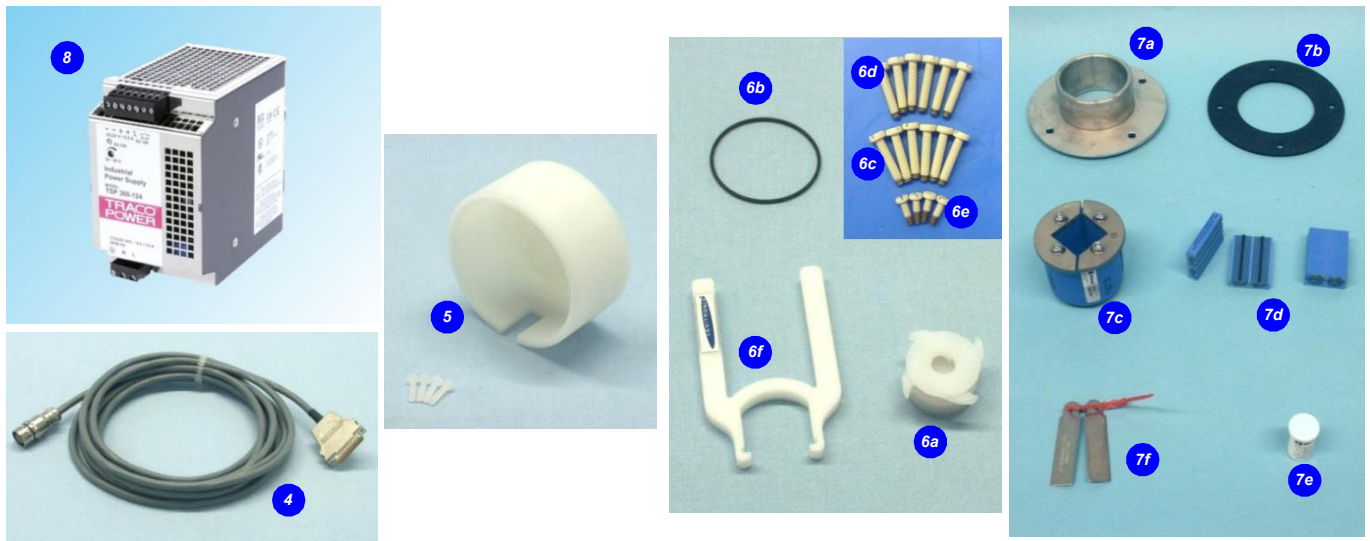


Figure 12: Accessories

**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.



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