

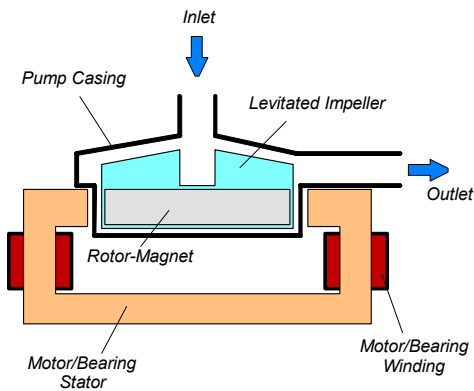
# PuraLev® Life Science Pump Series



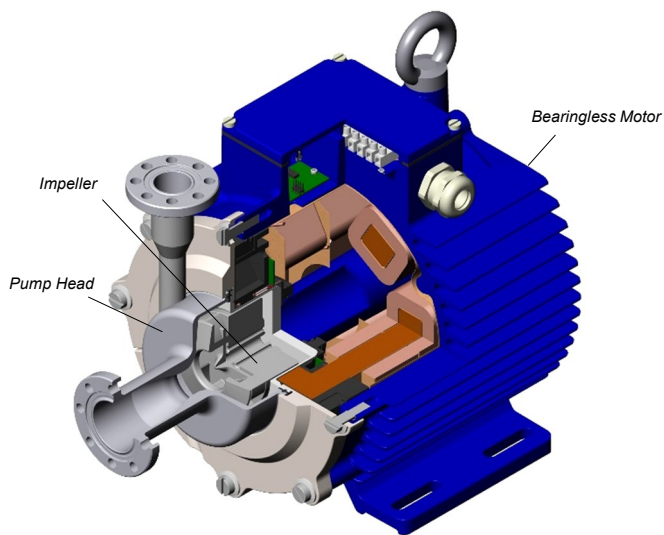
## PuraLev® 4000MU (Multi-Use)

4.6 bar	(67 psi)
200 liters/min	(53 gallons/min)

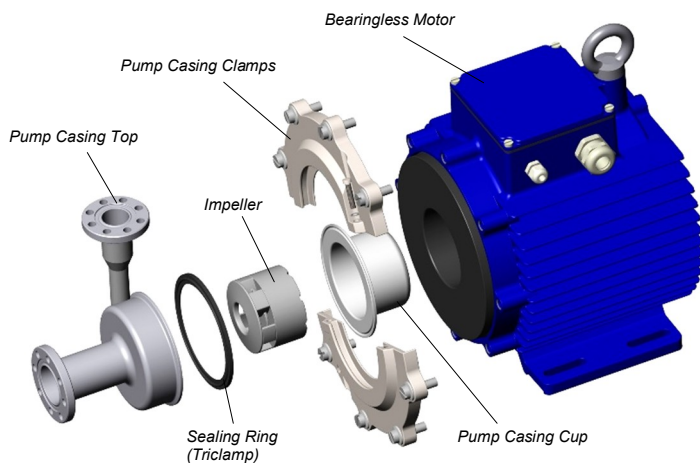
**No Bearings. No Seals. No Contamination!**



**Figure 1:** Schematic of the main elements of the maglev centrifugal pump



**Figure 2:** Cross-section of the bearingless pump motor and pump head.



**Figure 3:** Multi-use pump head concept

## INTRODUCTION

Levitronix® has developed a revolutionary pump that has no bearings to wear out or seals to break. 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 cup are both fabricated from biocompatible (FDA, USP-VI, BSE/TSE free) fluorocarbon resins. The pump casing top with the fittings is made of stainless steel. Flow rate or pressure is precisely controlled by electronically regulating the rotor speed, which eliminates any pulsation. With the lack of mechanical bearings plus the self-contained pump head design, the risk of contamination is drastically reduced. The absence of narrow gaps between the impeller and pump casing, plus the low-shear pump design allows the gentle pumping of sensitive liquids. The pump casing is fabricated with hygienic fittings and has an aseptic seal design (see Figure 5).

## SYSTEM BENEFITS

- Reduced risk of contamination due to the self-contained design with magnetic bearings
- Low shear-forces
- No particle generation
- No narrow gaps between the impeller and pump casing where bacteria could be entrapped
- Pump head is multiple times steam sterilizable (multi-use)
- Biocompatibility of wet plastic materials: FDA, USP-VI, BSE/TSE free
- Easy disassembling of pump casing for cleaning
- Aseptic pump housing design with Triclamp fittings and sealing technology
- Small size
- Dry running capability
- Proven technology in the medical (disposable blood pumps) and semiconductor (high-purity pumps) industries
- High flow capability with compact design
- Pulsation free

## APPLICATIONS

- Pumping of shear-sensitive liquids and cells
- Bioprocessing
- Recirculation and transfer applications in bioreactors
- Perfusion of hollow-fiber reactors
- Sterile and aseptic flow circuits in the pharmaceutical and food industry

## STANDALONE SYSTEM CONFIGURATION

The standalone configuration of the *PuraLev*<sup>®</sup> 4000MU pump system consists of a controller with an integrated user panel allowing the operator to set the speed manually (see *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 analogue signal (see specification for *Position 3a* in *Table 2*).

## EXTENDED SYSTEM CONFIGURATION

The extended version of the *PuraLev*<sup>®</sup> 4000MU pump 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*<sup>®</sup> *Service Software*. Hence parameterization, firmware updates and failure analysis are possible.

## 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 motor (see *Table 2*) comes with special connectors and relevant extension cables (*Pos. 5a* and *5b* in *Table 3*). An ATEX conform solution is needed for the motor cables to leave the ATEX area. One option is an ATEX certified cable sealing system as listed in *Table 4*.

## HAZLOC SYSTEM CONFIGURATION

An Hazardous Location NRTL certified motor together with the pump head allows installation of motor and pump head within an Class I Division 2 area (see *Figure 8*). The HazLoc motor (*Pos. 2c* in *Table 2*) comes with special connectors and NPT threads on the motor housing to attach a conduit for the cables to leave the hazardous location area.

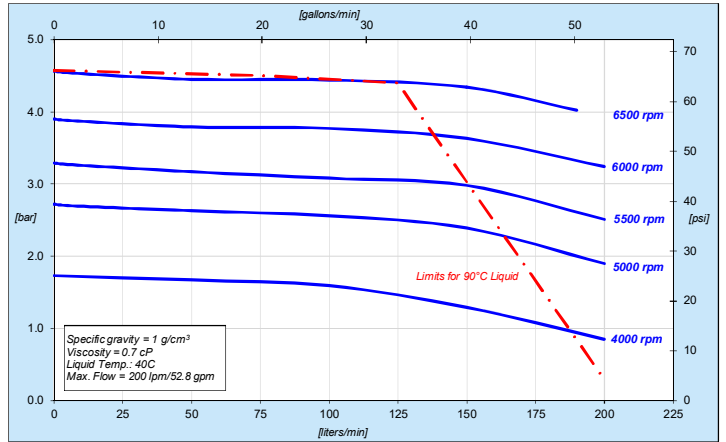


Figure 4: Pressure/flow curves

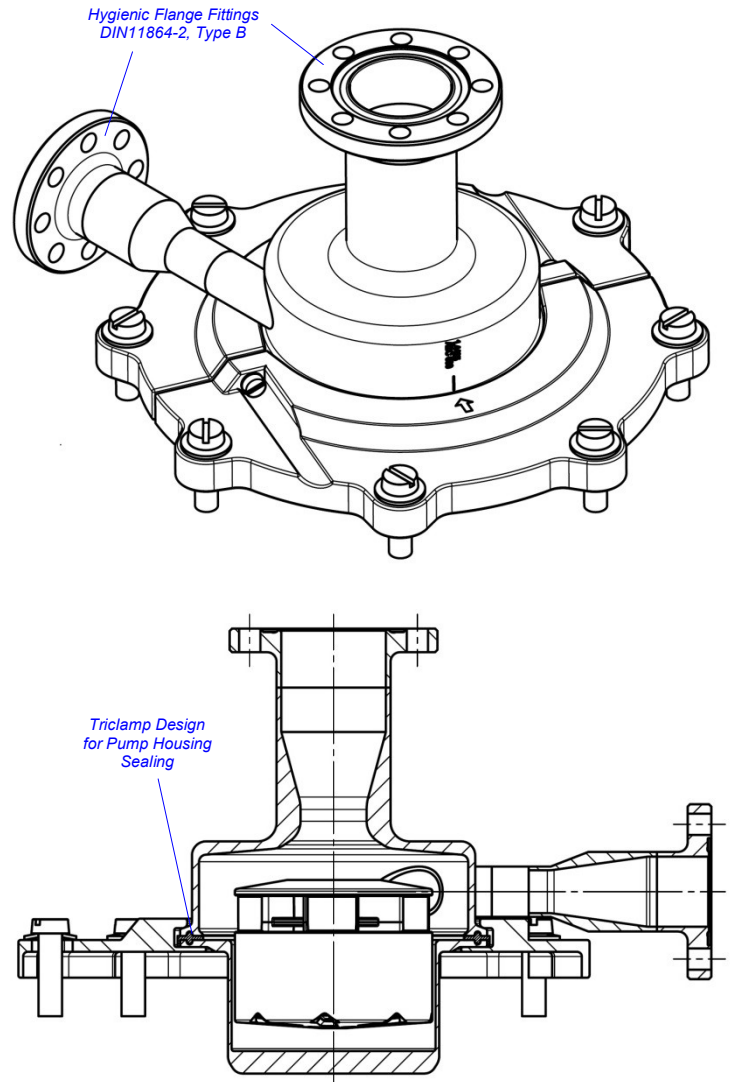


Figure 5: Aseptic pump head

# SYSTEM CONFIGURATIONS

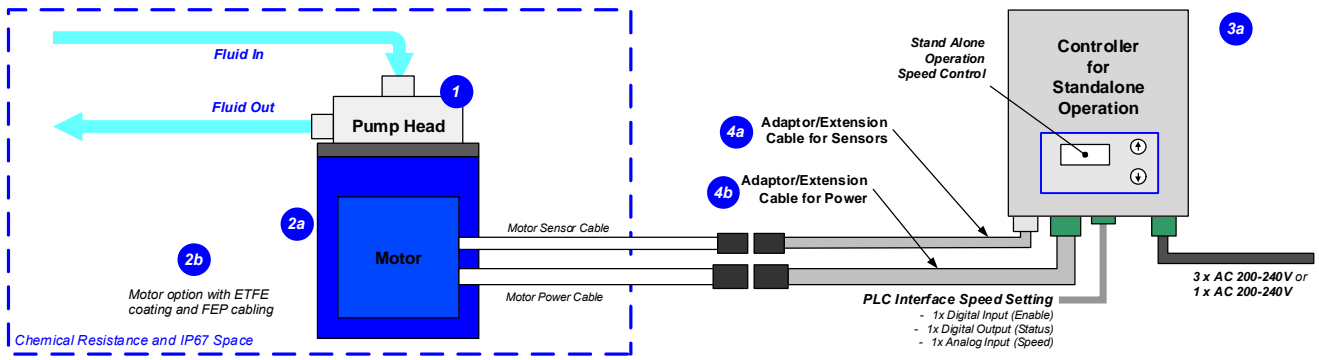


Figure 6: System configuration for standalone operation (speed setting with integrated user panel)

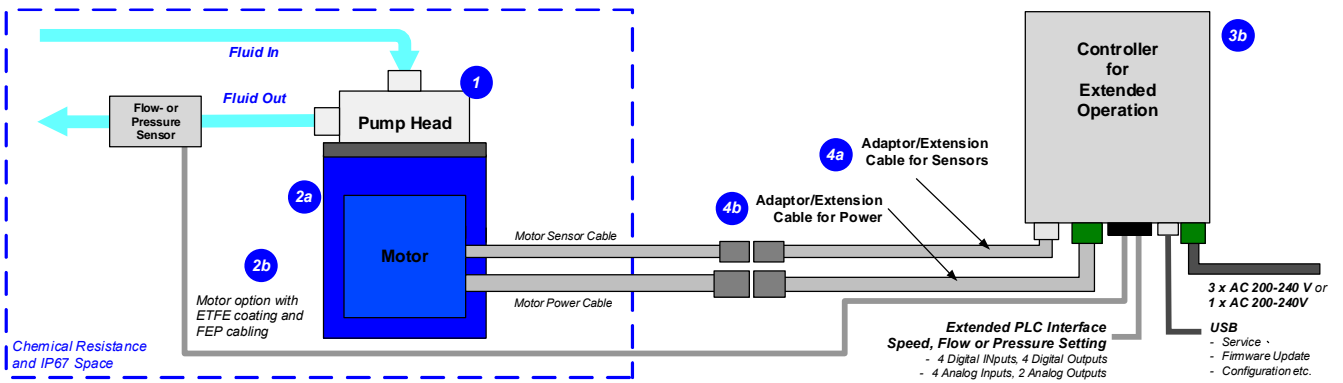


Figure 7: Extended operation (flow or pressure control) with extended controller

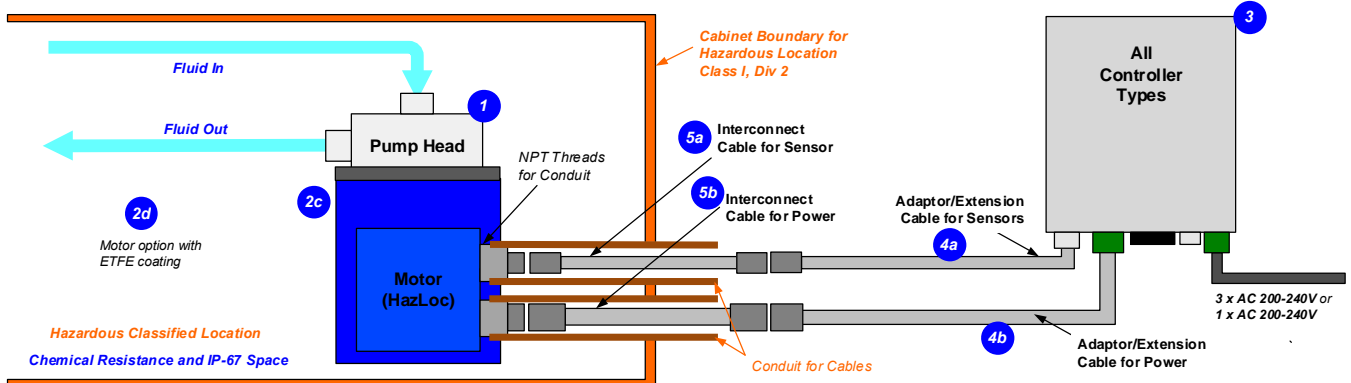
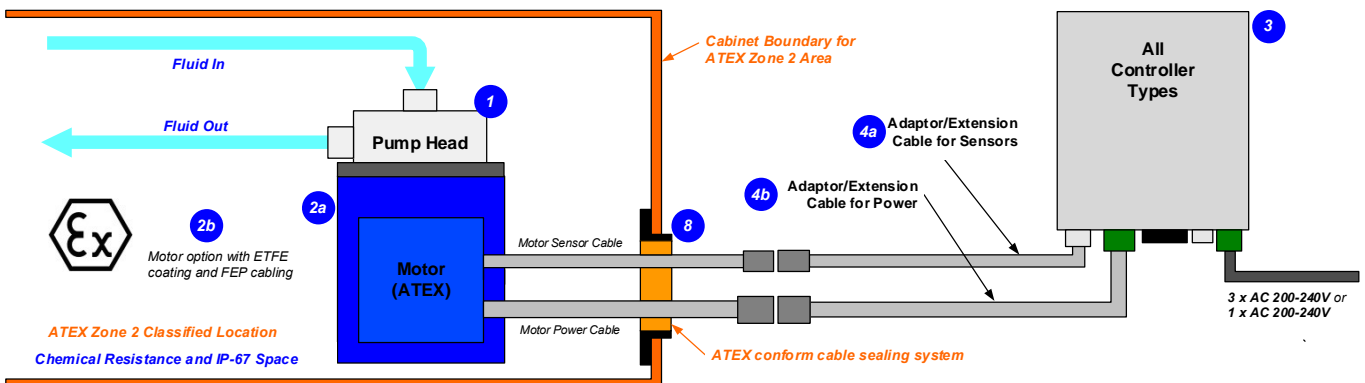


Figure 8: System Configuration for ATEX and Hazardous Location applications



# DIMENSIONS OF MAIN COMPONENTS

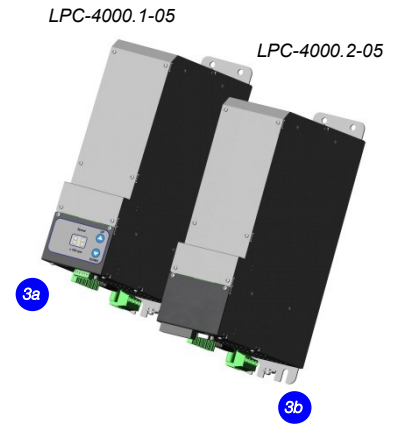
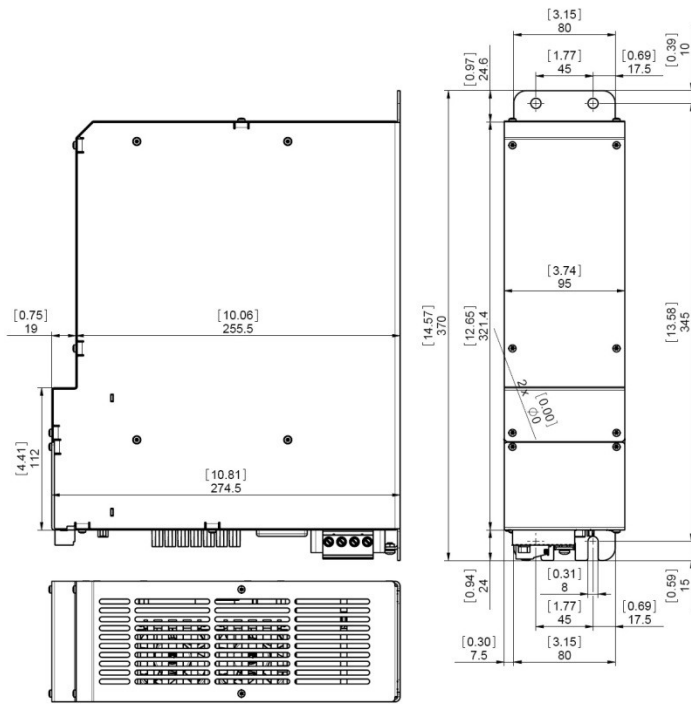


Figure 9: Dimensions of controllers

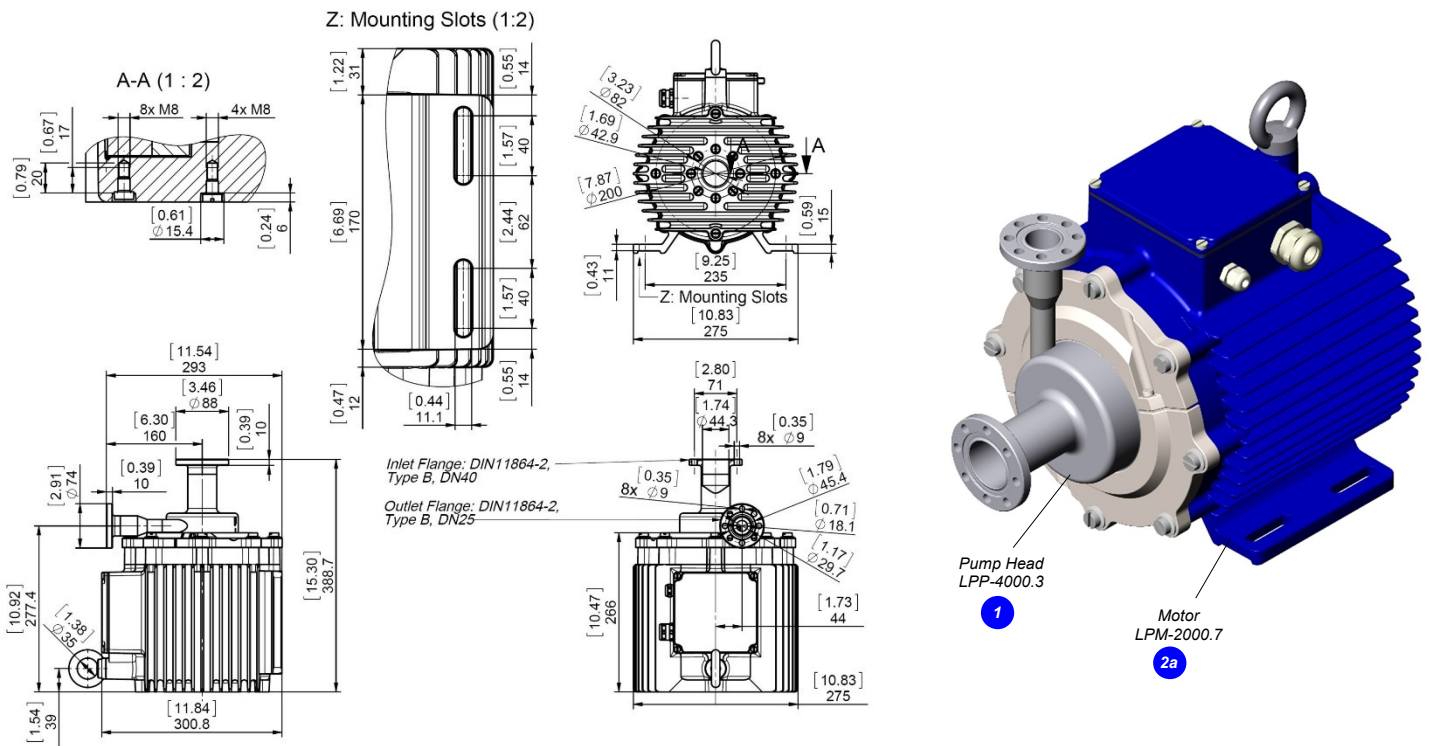


Figure 10: Dimensions of motor with single-use pump head

# ORDER INFORMATION

System Name	Article #	Pump Head	Motor	Controller	Note
PuraLev® 4000MU.1	100-90822	LPP-4000.3	LPM-4000.7	LPC-4000.1-05	Adaptor/Extension (0.5 – 10 m) cables according to Table 3 have to be ordered as separate article with specified length. ATEX Cable Sealing System can be ordered according to Table 4. Certifications: CE, IECEx CB scheme, ETL (NRTL), ATEX and IECEx.
PuraLev® 4000MU.2	100-90823		LPM-4000.7	LPC-4000.2-05	
PuraLev® 4000MU.4	100-90825		LPM-4000.8	LPC-4000.1-05	
PuraLev® 4000MU.5	100-90826		LPM-4000.8	LPC-4000.2-05	
PuraLev® 4000MU.7	100-91191		LPP-4000.3	LPM-4000.11	
PuraLev® 4000MU.8	100-91192	LPM-4000.11		LPC-4000.2-05	
PuraLev® 4000MU.10	100-91194	LPM-4000.10		LPC-4000.1-05	
PuraLev® 4000MU.11	100-91195	LPM-4000.10		LPC-4000.2-05	

**Table 1:** Standard system configurations with motor, controller and pump head

Pos.	Component	Article Name	Article #	Characteristics	Value / Feature
1	Multi-Use Pump Head	LPP-4000.3	100-90821	Impeller / Pump Housing	PFA / PEEK / Stainless Steel (FDA, USP Class VI, BSE/TSE free)
				Sealing Ring	EPDM (FDA, USP Class VI, BSE/TSE/animal free)
				Fittings	DIN 11864-2, Type B, DN40 for inlet and DN25 for outlet
				Max. Flow	200 liters/min / 53 gallons/min
				Max. Diff.-Pressure	4.6 bar / 67 psi
				Max. Viscosity	Aqueous liquids (others on request)
				Wet Pump Volume/Surface	560 ml / 1103 cm <sup>2</sup>
				Max. Liquid Temp.	Full performance: 70 °C / 158 °F Limited performance: 70 – 90 °C / 158 – 194 °F (see Figure 4)
				Sterilization Methods	CIP and SIP
2a	Motor (ATEX)	LPM-4000.7 (Epoxy)	100-10047	Housing	Epoxy (a) or ETFE (b) coated Alu., waterproofed (IP67).
2b		LPM-4000.8 (ETFE)	100-10048	Cable / Connectors	2x 3m cables with PVC (a) or FEP (b) jacket / 2x circular (M23, IP-67)
				ATEX Marking	CE II 3G Ex nA IIC T5 Gc / CE II 3D Ex tc IIC T100°C Dc
2c	Motor (HazLoc)	LPM-4000.11 (Epoxy)	100-10116	Housing / Connectors	Epoxy (a) or ETFE (b) coated alu., waterproofed (IP67 /circular connectors
2d		LPM-4000.10 (ETFE)	100-10115	Hazardous Location Marking	Class I, Div2, Groups A-D T5 Class II, Div2, Groups F-G T5
3a	Standalone Controller (User Panel)	LPC-4000.1-05	100-90820	Voltage / Power	1 x 200 – 240 V or 3x 200 – 240 V ± 10% 4 kW 50/60 Hz
				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 (relay)
				Standard Firmware	F2.25
3b	Extended Controller (PLC and USB)	LPC-4000.2-05	100-90811	Interfaces for Extended Controller	PLC with - up to 4 digital inputs 0 - 24 V (optocoupler) - up to 4 digital outputs 0 - 24 V (relay) - up to 2 analog inputs 4 - 20 mA - 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	F2.48

**Table 2:** Specification of standard components  
1: Levitronix® to be contacted for more information.

Pos.	Component	Article Name		Article #		Characteristics	Value / Feature
		Sensor Cable (a)	Power Cable (b)	Sensor	Power		
4a	Extension Adaptor Cable for Sensor (a) and Power (b) Wires	MCAS-600.2-05 (0.5 m)	MCAP-4000.5-05 (0.5 m)	190-10226	190-10291	Jacket Material Connector Types Connector Material	PVC Circular wallmountable M23 (IP67) to D-SUB Metallic – Nickel coated
		MCAS-600.2-30 (3 m)	MCAP-4000.5-30 (3 m)	190-10238	190-10292		
		MCAS-600.2-50 (5 m)	MCAP-4000.5-50 (5 m)	190-10127	190-10293		
		MCAS-600.2-70 (7 m)	MCAP-4000.5-70 (7 m)	190-10105	190-10294		
		MCAS-600.2-100 (10 m)	MCAP-4000.5-100 (10 m)	190-10239	190-10295		
5a	Interconnect Cable for Sensor (a) and Power (b) Wires	MCIS-2000.1-05 (0.5 m)	MCIP-4000.1-05 (0.5 m)	190-10391	190-10402	Jacket Material Connector Types Connector Material	PVC Circular M23 (IP67) to Circular M23 Metallic – Nickel coated
		MCIS-2000.1-30 (3 m)	MCIP-4000.1-30 (3 m)	190-10392	190-10403		
		MCIS-2000.1-50 (5 m)	MCIP-4000.1-50 (5 m)	190-10393	190-10404		
		MCIS-2000.1-70 (7 m)	MCIP-4000.1-70 (7 m)	190-10394	190-10405		
		MCIS-2000.1-100 (10 m)	MCIP-4000.1-100 (10 m)	190-10395	190-10406		

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

Pos.	Component	Article Name	Article #	Characteristics	Value / Feature
6a	Air Cooling Module	ACM-4000.1	190-10177	Material / Connection Port Air Pressure	PP (+ 40% Talcum) / NPT 1/2" ~1 - 3 bar (14 - 43 psi)
6b	Air Cooling Module	ACM-4000.3 (ATEX)	190-10190	Material	PP-EL-S with conductive additive for operation with ATEX motor
7	Fan Cooling Module	FCM-4000.1	190-10178	Housing Material Cable Supply Spec. / IP-Rating	PP (+ 40% Talcum) PVC, 6 m, open-end wires 20.4 – 27.6 VDC, 31.2 W, 1.3 A / IP55
8 (A-F)	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.
8	Screw-Seal Set	M16 x 20 PTFE / FKM	100-90913	Screw / Gasket Materials Purpose	M16 x 16 (SW24), PVDF / FKM Chemical protection of lifting eyebolt mounting thread of motor.

**Table 4:** Specification of accessories

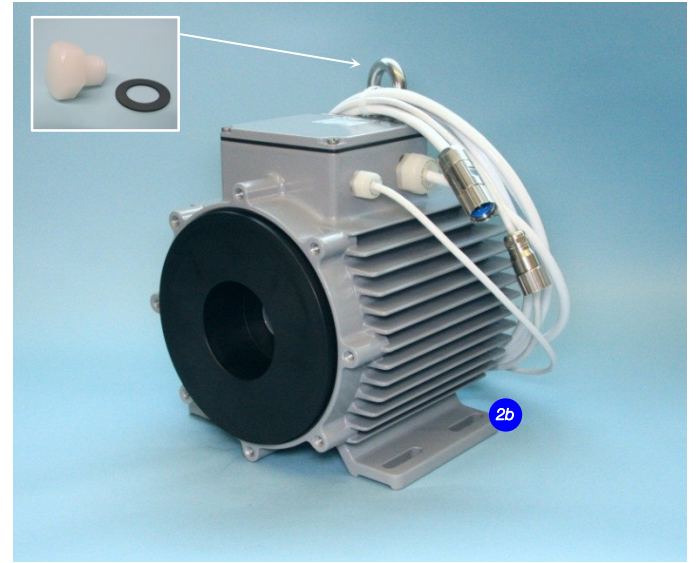
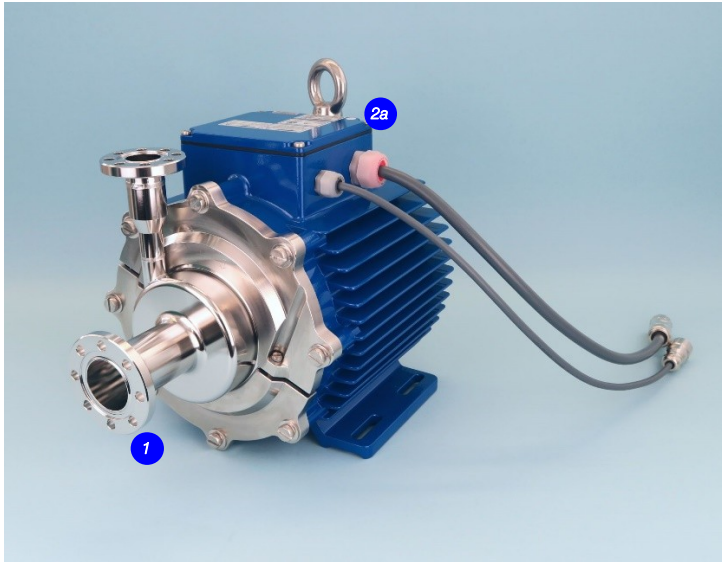


Figure 11: Pump system with standard components

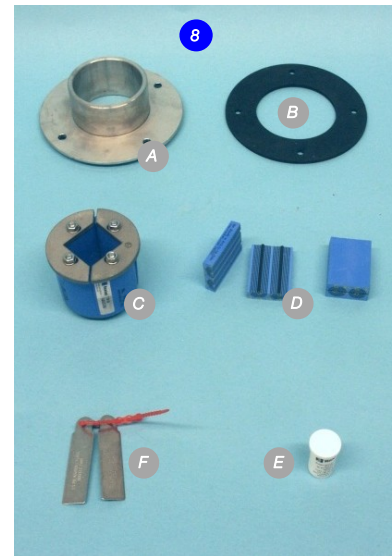
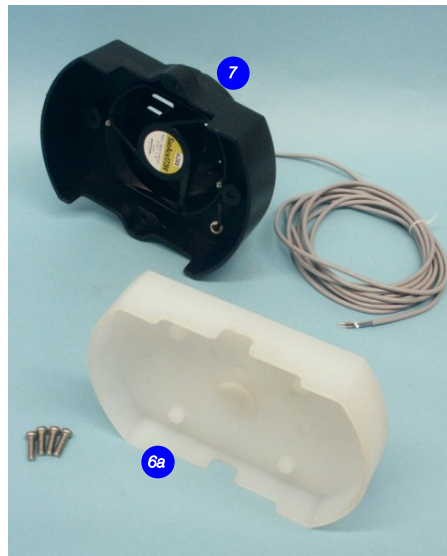


Figure 12: Accessories

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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