

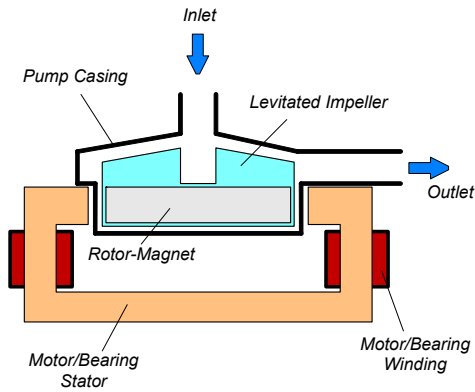
# PuraLev® Life Science Pump Series



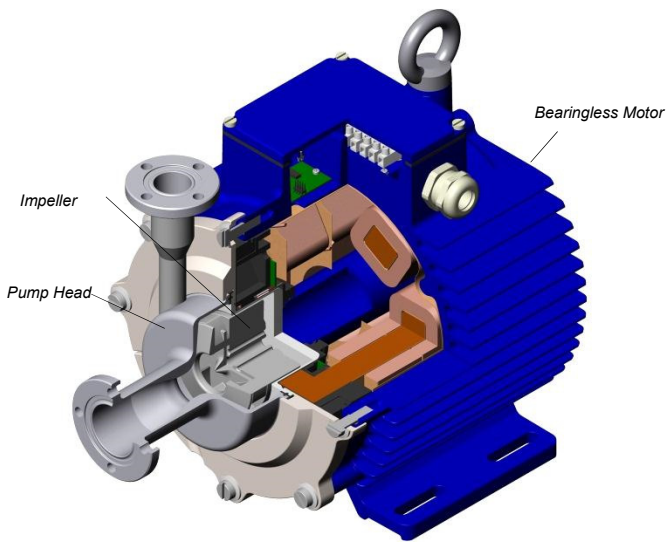
## PuraLev® 4000MU (Multi-Use)

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

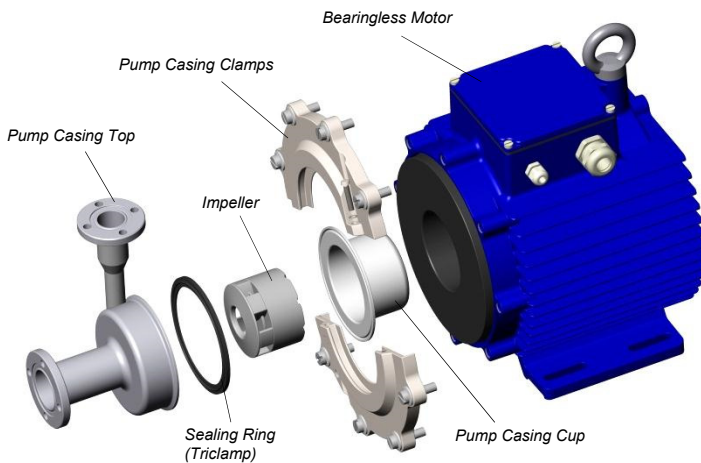
No Bearings. No Seals. No Contamination!



**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

## STAND-ALONE SYSTEM CONFIGURATION



The stand-alone 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 / IECEX motor (*Pos. 2b* in *Table 2*) comes with special connectors and relevant extension cables (*Pos. 4a* and *4b* 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* and shown in *Figure 12*.

- ATEX / IECEX certified for Category 3G and 3D (Zone 2 for Gas and Zone 22 for Dust) (Testing at certified third party).
- Thermal classification T5 (< 100 °C = 212 °F) for maximum liquid temperature of 90 °C / 194 °F.
- ATEX IECEX marking of motor with pump head:
  - CE  II 3G Ex An IIC T5 Gc
  - CE  II 3D Ex tc IIIC T100°C Dc
- 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.

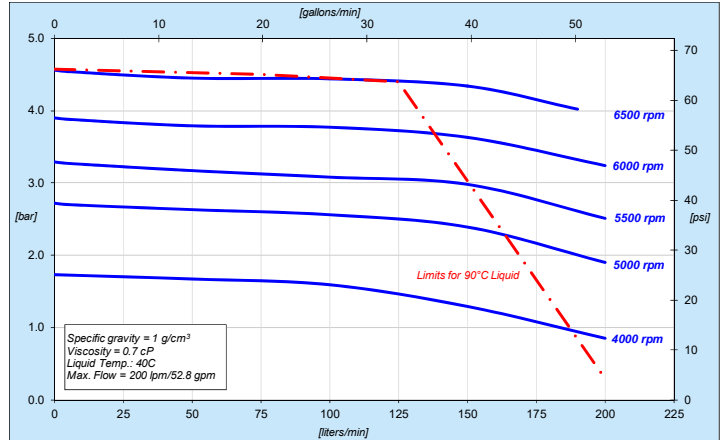


Figure 4: Pressure/flow curves

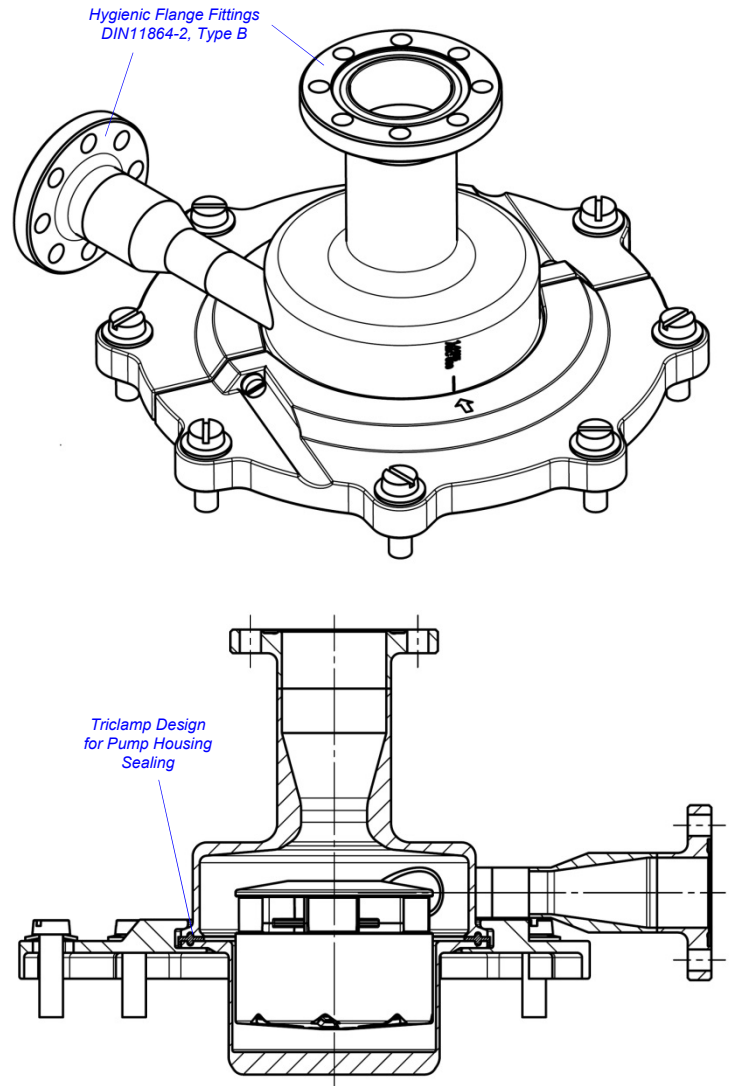


Figure 5: Aseptic pump head

# SYSTEM CONFIGURATIONS

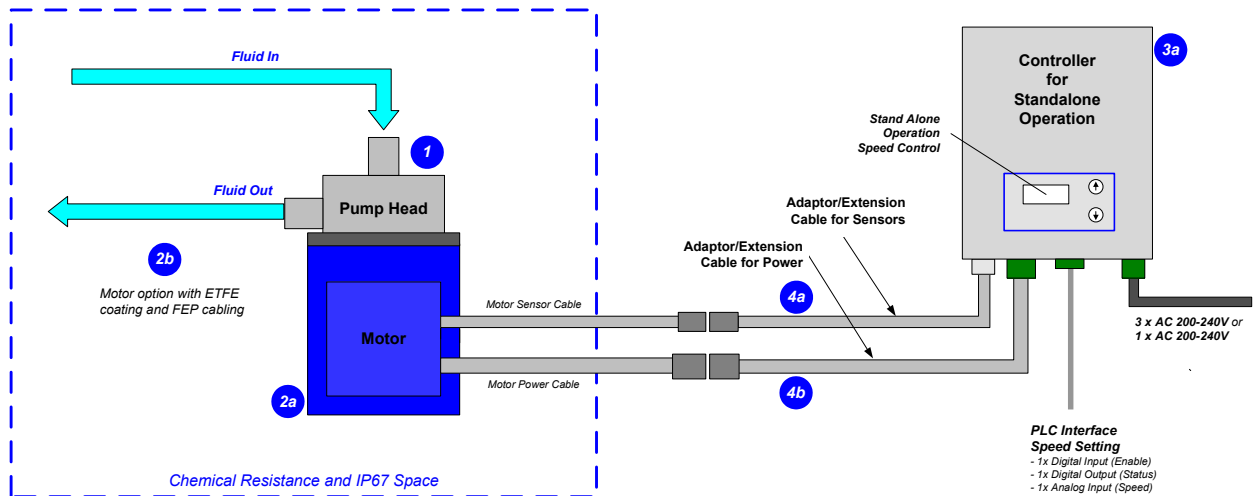


Figure 6: System configuration for standalone operation (speed setting with integrated user panel)

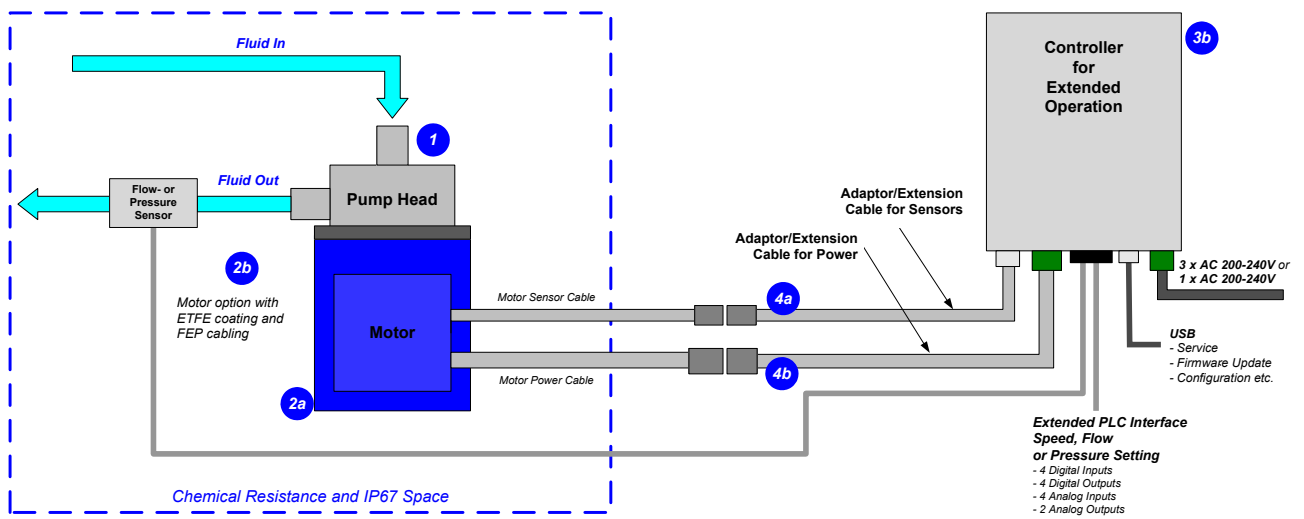


Figure 7: Extended operation (flow or pressure control) with extended controller

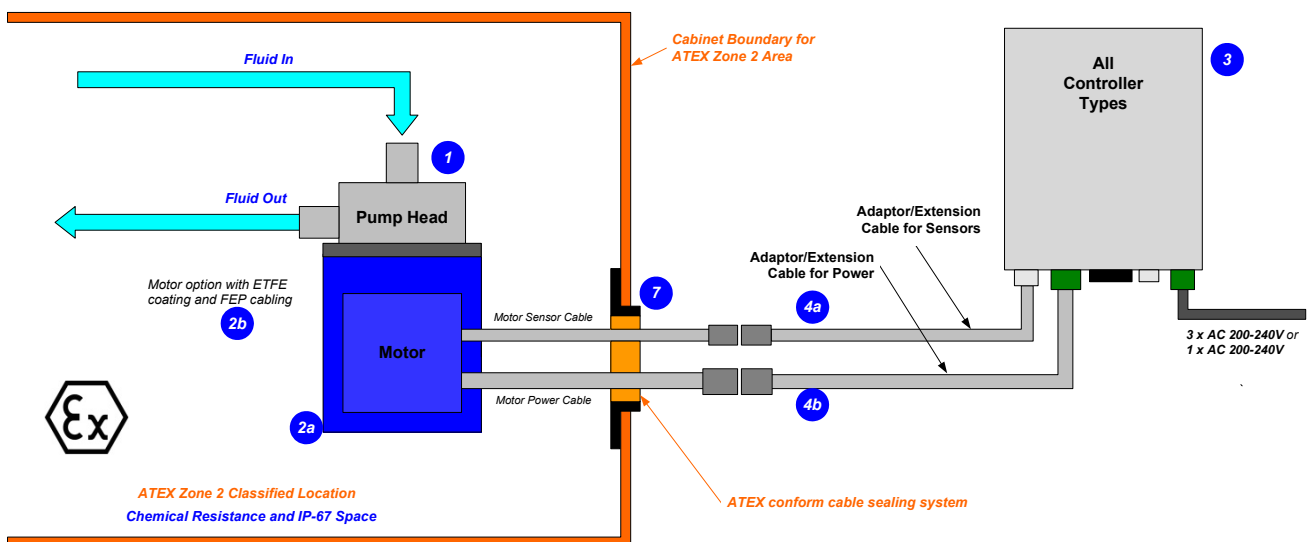


Figure 8: System Configuration for ATEX applications

# DIMENSIONS OF MAIN COMPONENTS

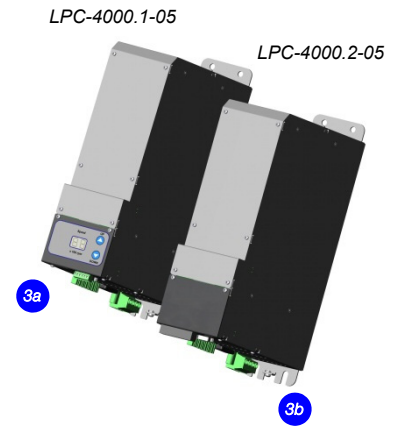
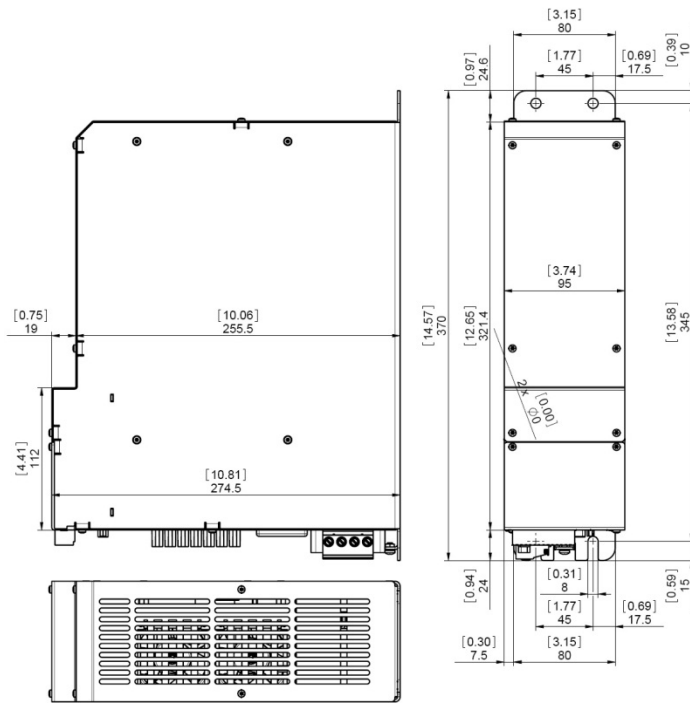


Figure 9: Dimensions of controllers

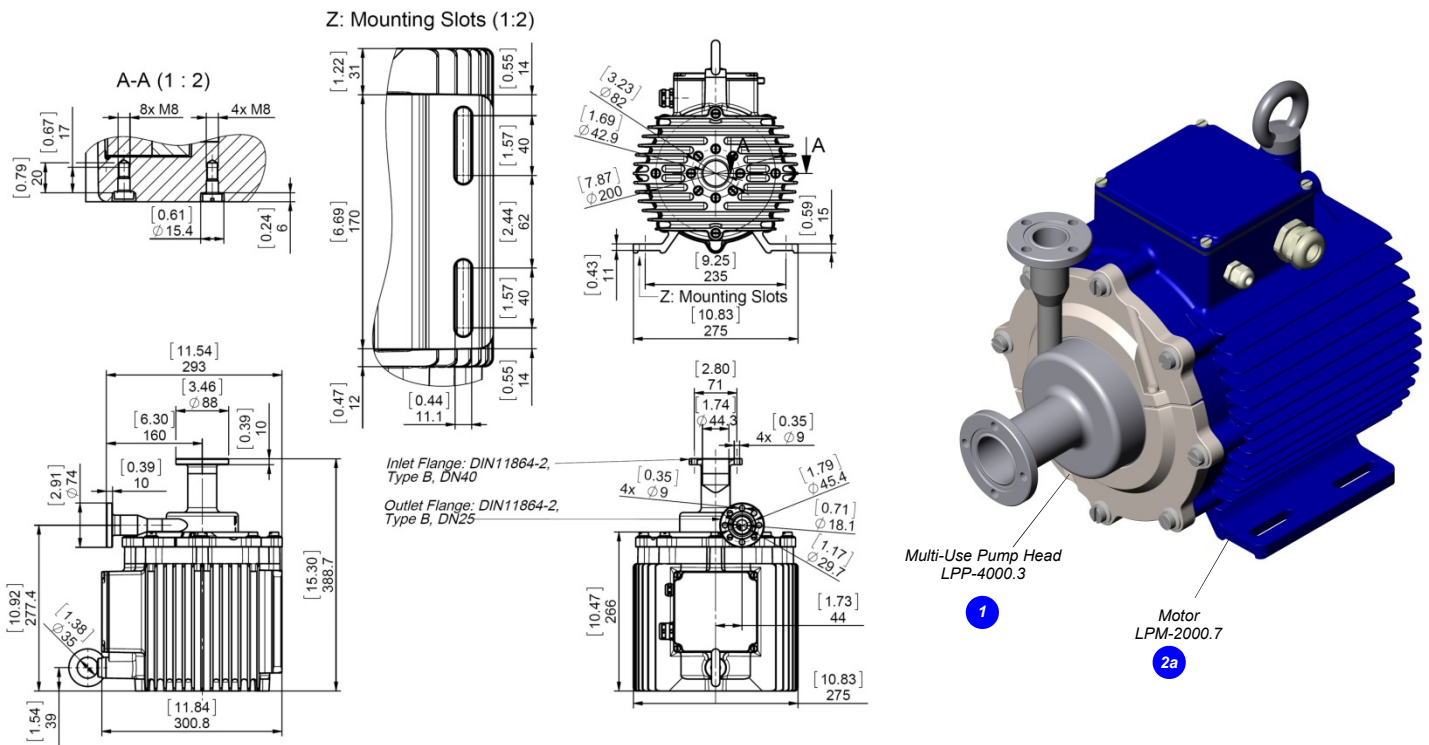


Figure 10: Dimensions of motor with single-use pump head

# 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 - 10m) 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. <sup>1</sup>
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	

**Table 1:** Standard system configurations with motor, controller and pump head (Note 1: Certified components are available on request.).

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

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

Pos.	Component	Article Name	Article #	Characteristics	Value / Feature
4a	Extension Adaptor Cable for Sensors	MCAS-600.2-05 (0.5m) MCAS-600.2-30 (3m) MCAS-600.2-50 (5m) MCAS-600.2-70 (7m) MCAS-600.2-100 (10m)	190-10226 190-10238 190-10127 190-10105 190-10239	Jacket Material Connectors	PVC Circular Wall mountable, Metallic (IP-67) to D-SUB
4b	Extension Adaptor Cable for Power	MCAP-4000.5-05 (0.5m) MCAP-4000.5-30 (3m) MCAP-4000.5-50 (5m) MCAP-4000.5-70 (7m) MCAP-4000.5-100 (10m)	190-10291 190-10292 190-10293 190-10294 190-10295	Jacket Material Connectors	PVC Circular Wall mountable, Metallic (IP-67) to COMBICON

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

Pos.	Component	Article Name	Article #	Characteristics	Value / Feature
5a	Air Cooling Module	ACM-4000.1	190-10177	Material / Connection Port Air Pressure	PP (+ 40% Talkum) / NPT 1/2" ~1 - 3 bar (14 - 43 psi)
5b	Air Cooling Module	ACM-4000.3 (ATEX)	190-10190	Material	PP-EL-S with conductive additive for operation with ATEX motor
6	Fan Cooling Module	FCM-4000.1	190-10178	Housing Material Cable Supply Spec. / IP-Rating	PP (+ 40% Talkum) PVC, 6m, open-end wires 20.4 - 27.6 VDC, 31.2 W, 1.3 A / IP55
7 (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

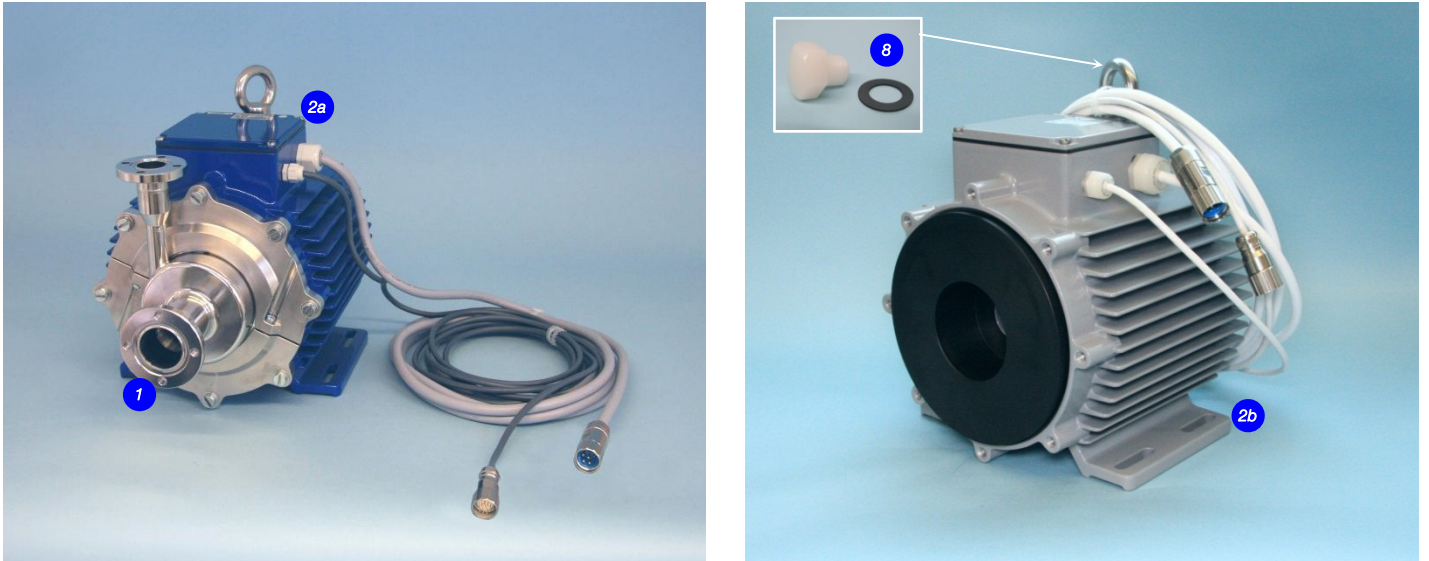


Figure 11: Pump system with standard components

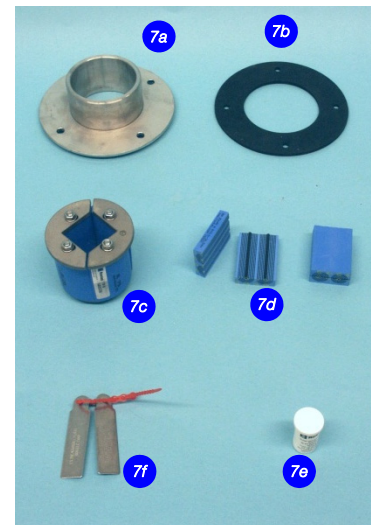
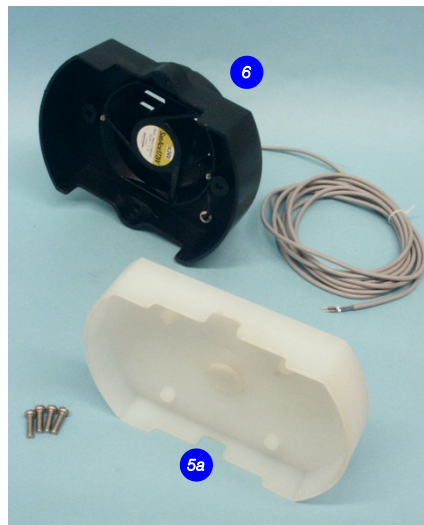
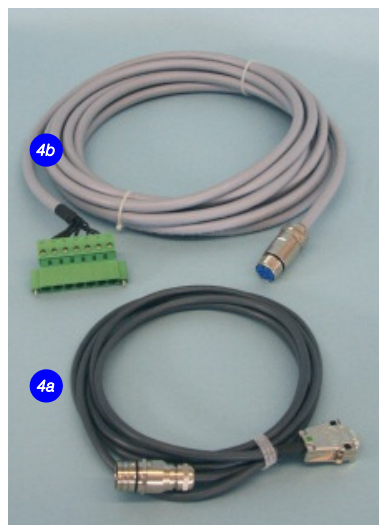


Figure 12: Accessories

*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.



● LEVITRONIX®  
● Representatives

#### 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: [sales@levitronix.com](mailto:sales@levitronix.com)

#### US Contact

Levitronix Technologies LLC  
20 Speen Street, Suite 102  
Framingham, Massachusetts 01701  
USA

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