

PuraLev® Life Science Pump Series



PuraLev® 200MU (Multi-Use)

2.4 bar	(35 psi)
21 liters/min	(5.5 gallons/min)

No Bearings. No Seals. No Contamination!

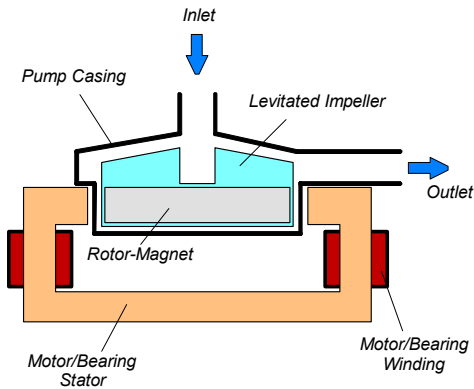


Figure 1: Schematic of the main elements of the maglev centrifugal pump

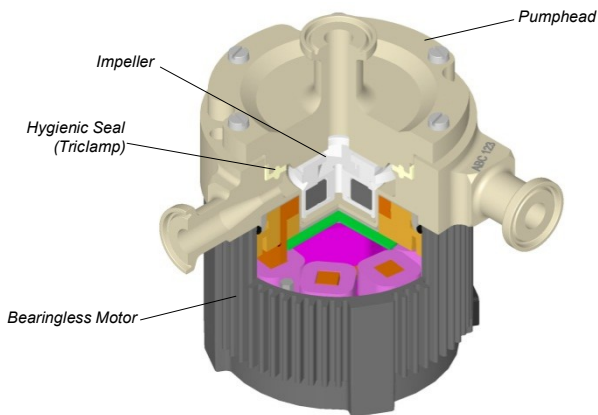


Figure 2: Cross-section of the bearingless pump motor and pumphead.

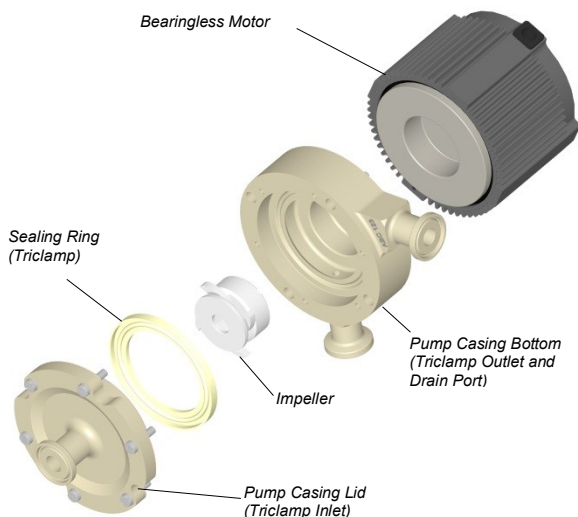


Figure 3: Multi-use pumphead concept

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 are both fabricated from biocompatible (FDA, USP-VI, BSE/TSE and Animal free) fluorocarbon resins and together they make up the multi-use pumphead. 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 Triclamp fittings and has an aseptic seal design for the pump housing (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
- Pumphead is multiple times steam sterilizable (multi-use)
- Biocompatibility of wet materials: FDA, USP-VI, Animal/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*[®] 200MU 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*[®] 200MU 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*[®] *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. 4* in *Table 3*). An *Ex* conform solution is needed for the motor cables to leave the *ATEX* area. One option is an *Ex* certified cable sealing system as listed in *Table 4* and shown in *Figure 12*.

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

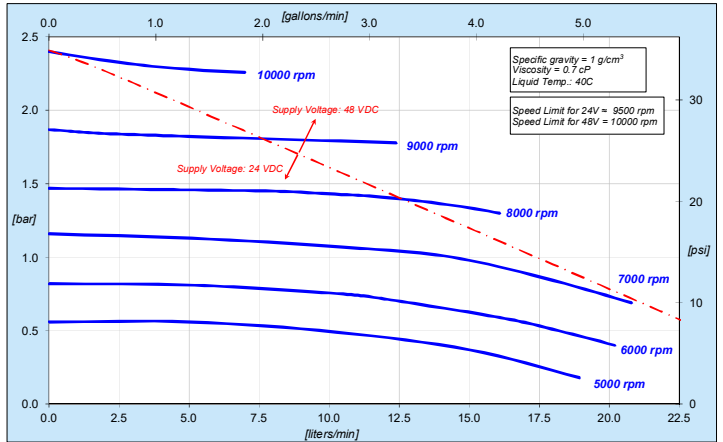


Figure 4: Pressure/flow curves

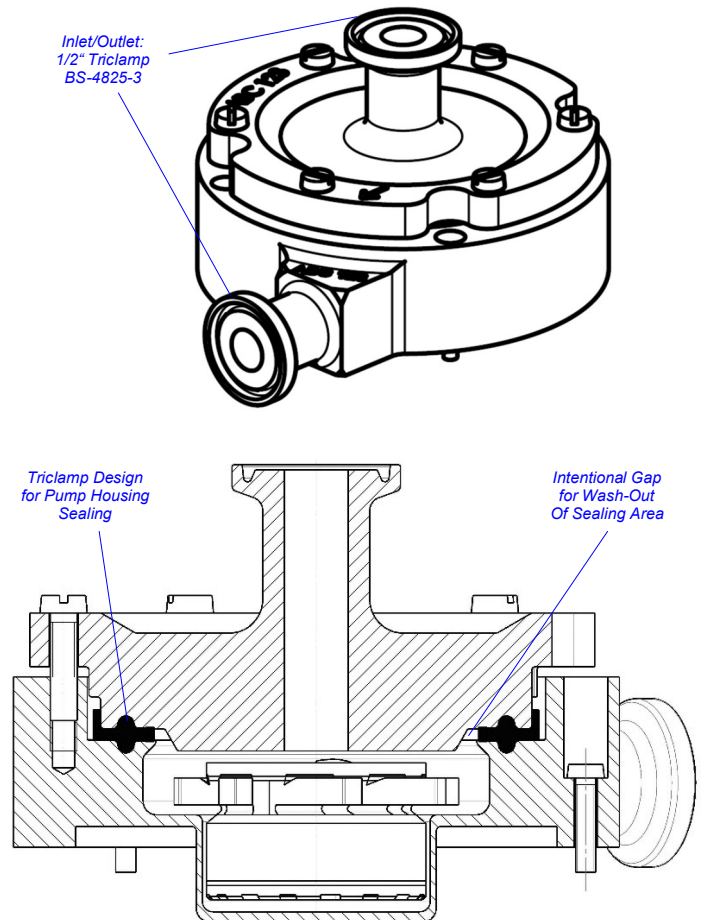


Figure 5: Aseptic design of pumphead

SYSTEM CONFIGURATIONS

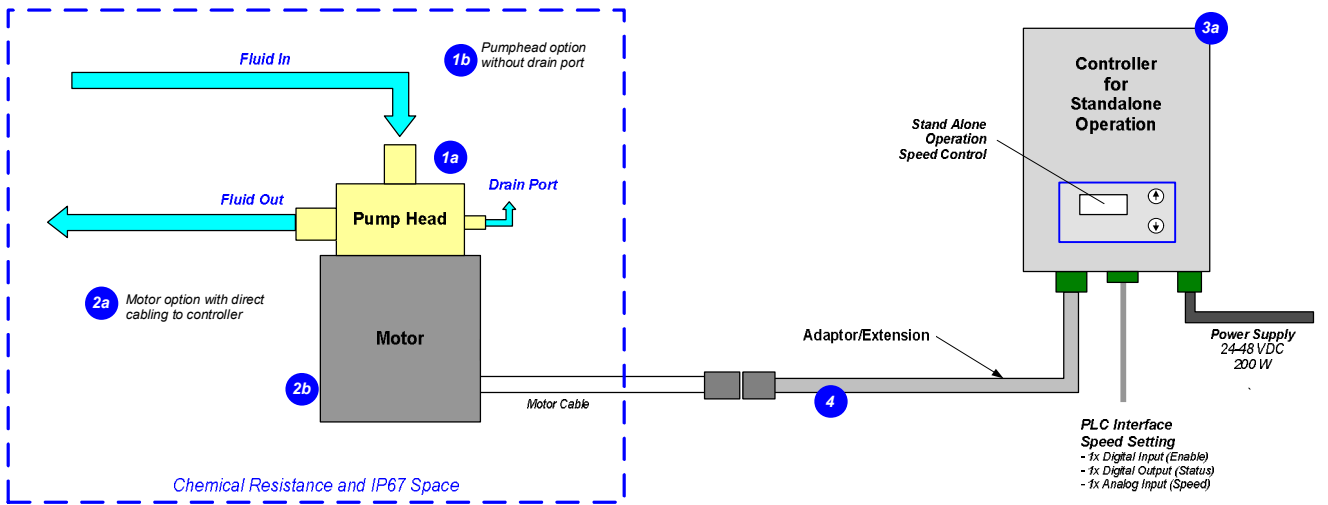


Figure 6: System configuration for standalone operation (Speed setting with integrated user panel)

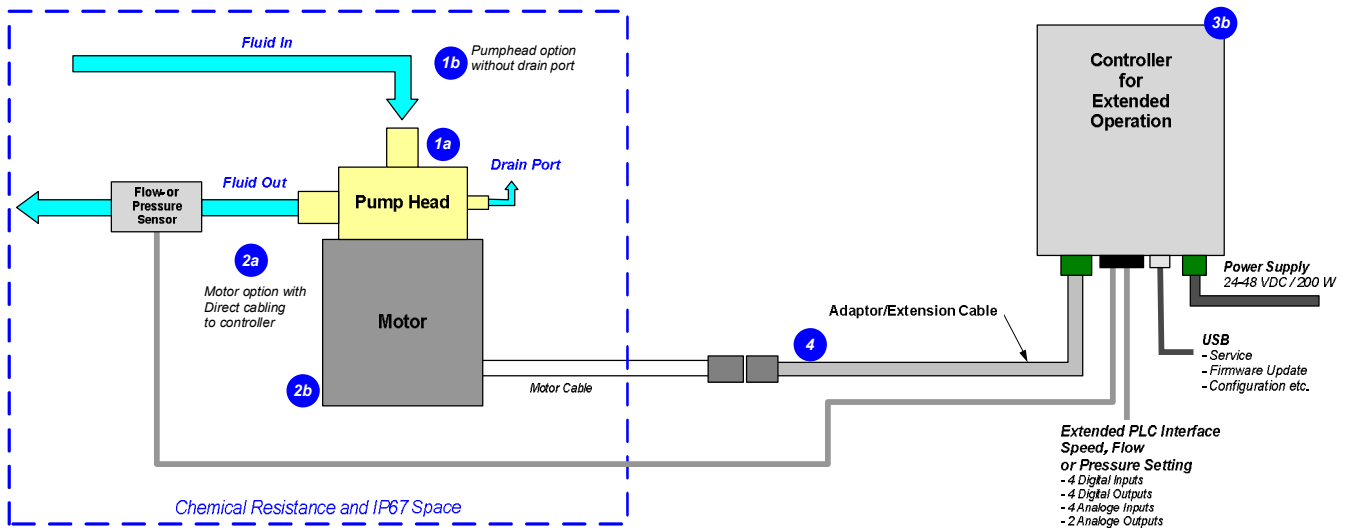


Figure 7: Extended operation (flow or pressure control) with extended controller

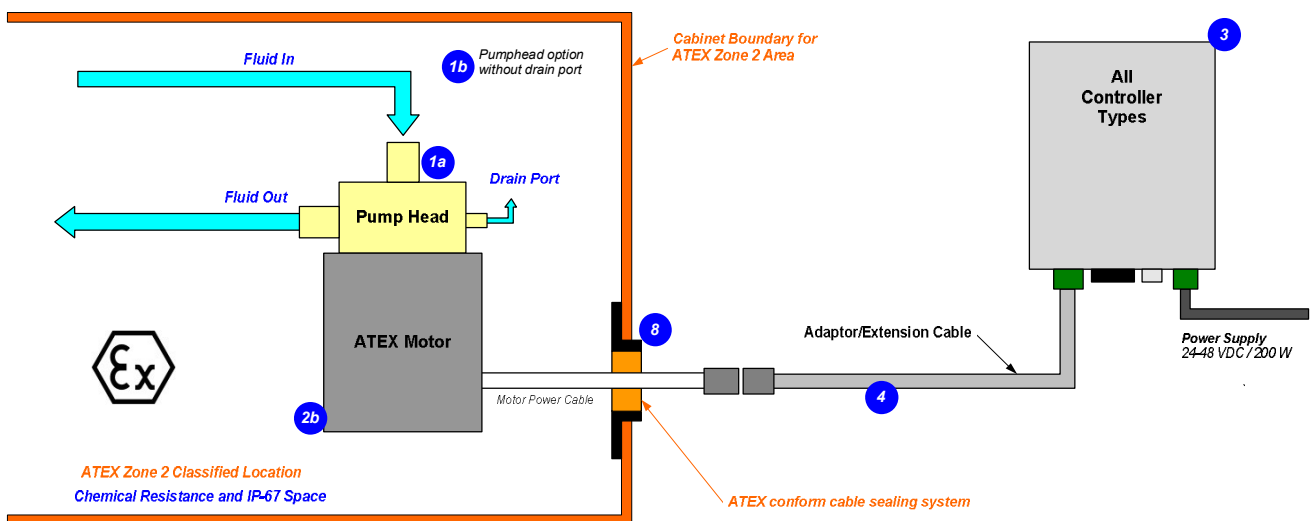


Figure 8: System Configuration for ATEX / IECEx applications

DIMENSIONS OF MAIN COMPONENTS

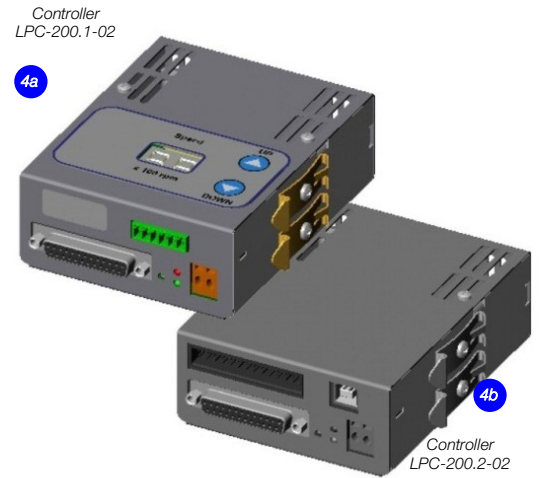
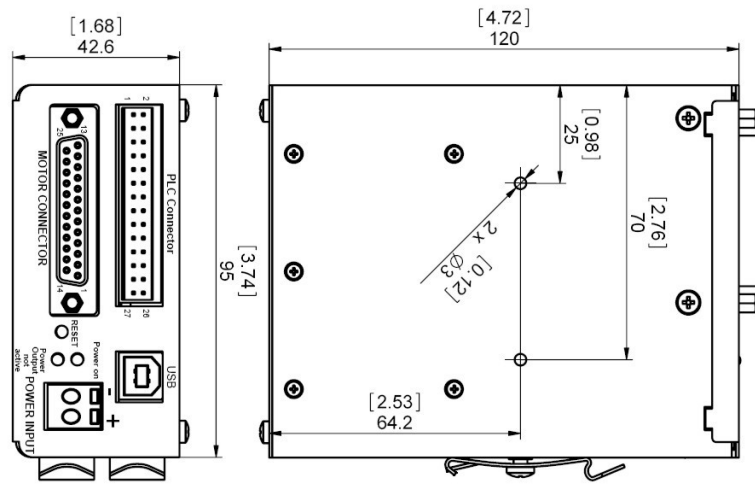


Figure 9: Dimensions of controllers in mm and [inch]

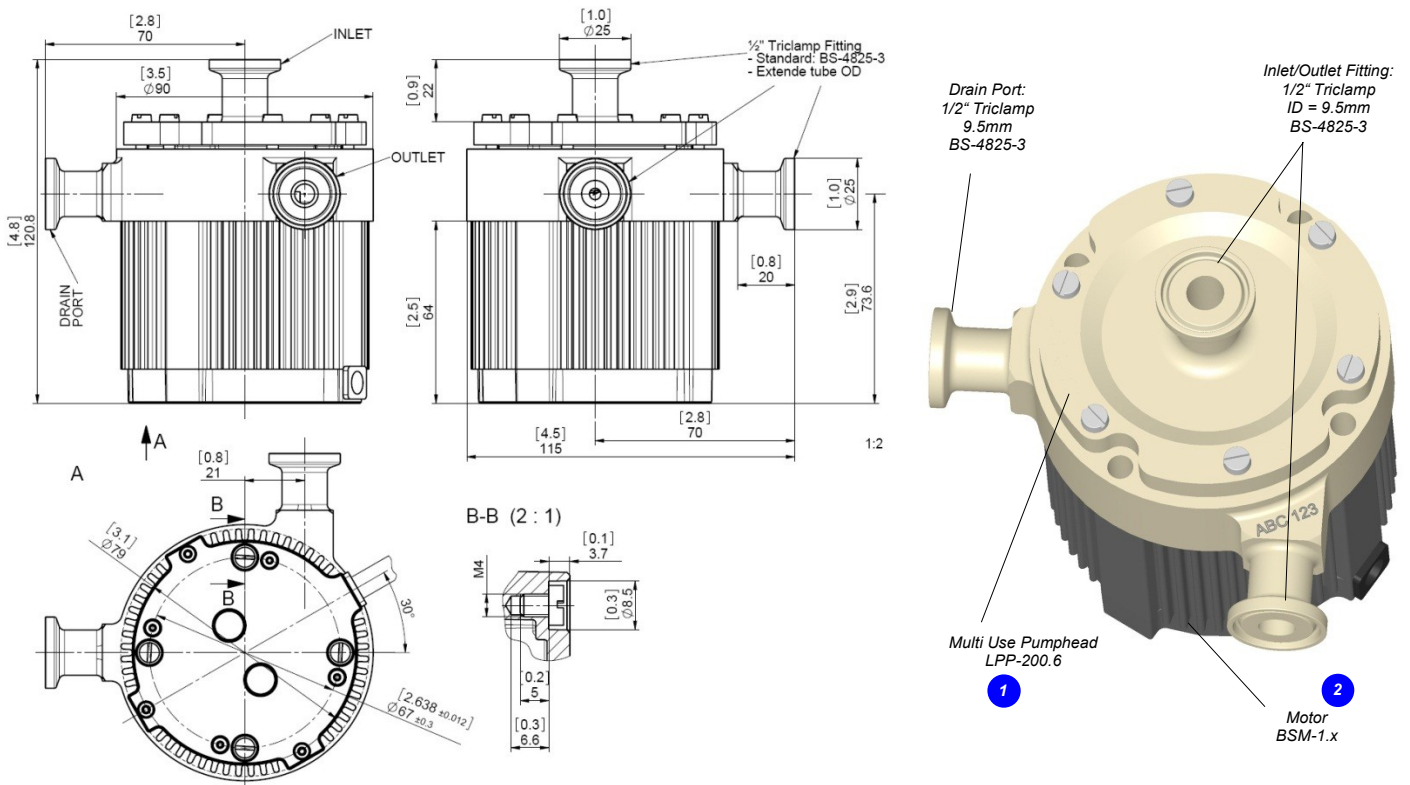


Figure 10: Dimensions of motor with multi-use pumphead in mm and [inch]

ORDER INFORMATION

System Name	Article #	Pumphead Socket	Motor	Controller	Note
PuraLev® 200MU.26	100-90865	LPP-200.17	BSM-1.4	LPC-200.1-02	Direct cabling between motor and controller.
PuraLev® 200MU.27	100-90866	(with drain port)		LPC-200.2-02	
PuraLev® 200MU.29	100-90868	LPP-200.16		LPC-200.1-02	
PuraLev® 200MU.30	100-90869	(without drain port)		LPC-200.2-02	Certifications: CE, IECCEB scheme, ETL (NRTL).
PuraLev® 200MU.32	100-90871	LPP-200.17	BSM-1.6 (ATEX, IECEx)	LPC-200.1-02	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.
PuraLev® 200MU.33	100-90872	(with drain port)		LPC-200.2-02	
PuraLev® 200MU.35	100-90874	LPP-200.16		LPC-200.1-02	
PuraLev® 200MU.36	100-90875	(without drain port)		LPC-200.2-02	Certifications: CE, IECCEB scheme, ETL (NRTL), ATEX and IECEx.

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

Pos.	Component	Article Name	Article #	Characteristics	Value / Feature
1a	Multi-Use Pumpheads	LPP-200.17 (with drain port)	100-90864	Impeller / Pump Housing Housing Sealing O-Ring In-/Outlet Fittings	PFA/PVDF (FDA, USP Class VI, BSE/TSE/Animal free) Triclamp EPDM (FDA, USP VI, Animal/BSE/TSE free) Triclamp 1/2" for in/outlet, Triclamp 1/2" for drain port (Standard: BS-4825-3)
		LPP-200.16 (without drain port)	100-90863	Max. Flow Max. Diff.-Pressure Max. Viscosity	21 liters/min / 5.5 gallons/min 2.4 bar / 35 psi < 20 cP
1b		LPP-200.17 (with drain port)	100-90864	Wet Pump Volume/Surface	26 ml / 158 cm ² (without drain port)
		LPP-200.16 (without drain port)	100-90863	Max. Liquid Temp. Sterilization Methods	90 °C / 194 °F CIP (clean in place), SIP (steam in place), Autoclaving ¹
2a	Motor	BSM-1.4	100-10005	Housing Cable / Connectors	ETFE (chemical resistant) coated Aluminum, waterproofed (IP67) 1x 5m cables with FEP jacket / 1x D-SUB (direct cable to controller)
2b	Motor (ATEX)	BSM-1.6	100-10063	Cable / Connections	1x 2m cable with FEP jacket / 1x circular (M23, IP-67) (needs extension adaptor cable for connection to controller)
				ATEX Marking	CE II 3G Ex nA T5 Gc CE II 3D Ex tc IIIC T100°C Dc
3a	Standalone Controller (User Panel)	LPC-200.1-02	100-30030 (Enable connector included)	Voltage / Power	24-48 V DC / 200 W
				Interfaces	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)
3b	Extended Controller (PLC and USB)	LPC-200.2-02	100-30031 (PLC connector included)	Standard Firmware	C9.25
				Interfaces	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	C9.48

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

Pos.	Component	Article Name	Article #	Characteristics	Value / Feature
4	Extension Adaptor Cable for Motor	MCA-1.5-05 (0.5m)	190-10225	Jacket Material Connectors	PVC Circular Wallmountable Metallic (IP-67) to D-SUB
		MCA-1.5-30 (3m)	190-10231		
		MCA-1.5-50 (5m)	190-10199		
		MCA-1.5-70 (7m)	190-10232		
		MCA-1.5-100 (10m)	190-10233		

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	PVDF / NPT 1/4" ~0.5 bar (7.2 psi)
6	Mounting Base Plate	MBP-1.1	190-10004	Material	PVDF
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.
8a	AC/DC Power Supply	TSP 360-124 (Standard Traco Supply)	100-40016	Voltage / Power Output Voltage Input Dimensions Certification or Standards	24 VDC / 360 W 85 - 132 / 187 - 264 VAC, autoselect 125 x 125 x 80 mm UL, CSA, CB, Semi F47
8b	AC/DC Power Supply	TSP 360-148	100-40017	Voltage / Power Output	48 VDC / 300 W
9	Autoclaving Reinforcing Tool	ART-200.1	190-10280	Purpose	Stabilization of pump housing during autoclaving
				Material	Anodized Aluminum
				Mounting Screws	4 pcs M3 x 14 mm (Stainless steel)

Table 4: Specification of accessories

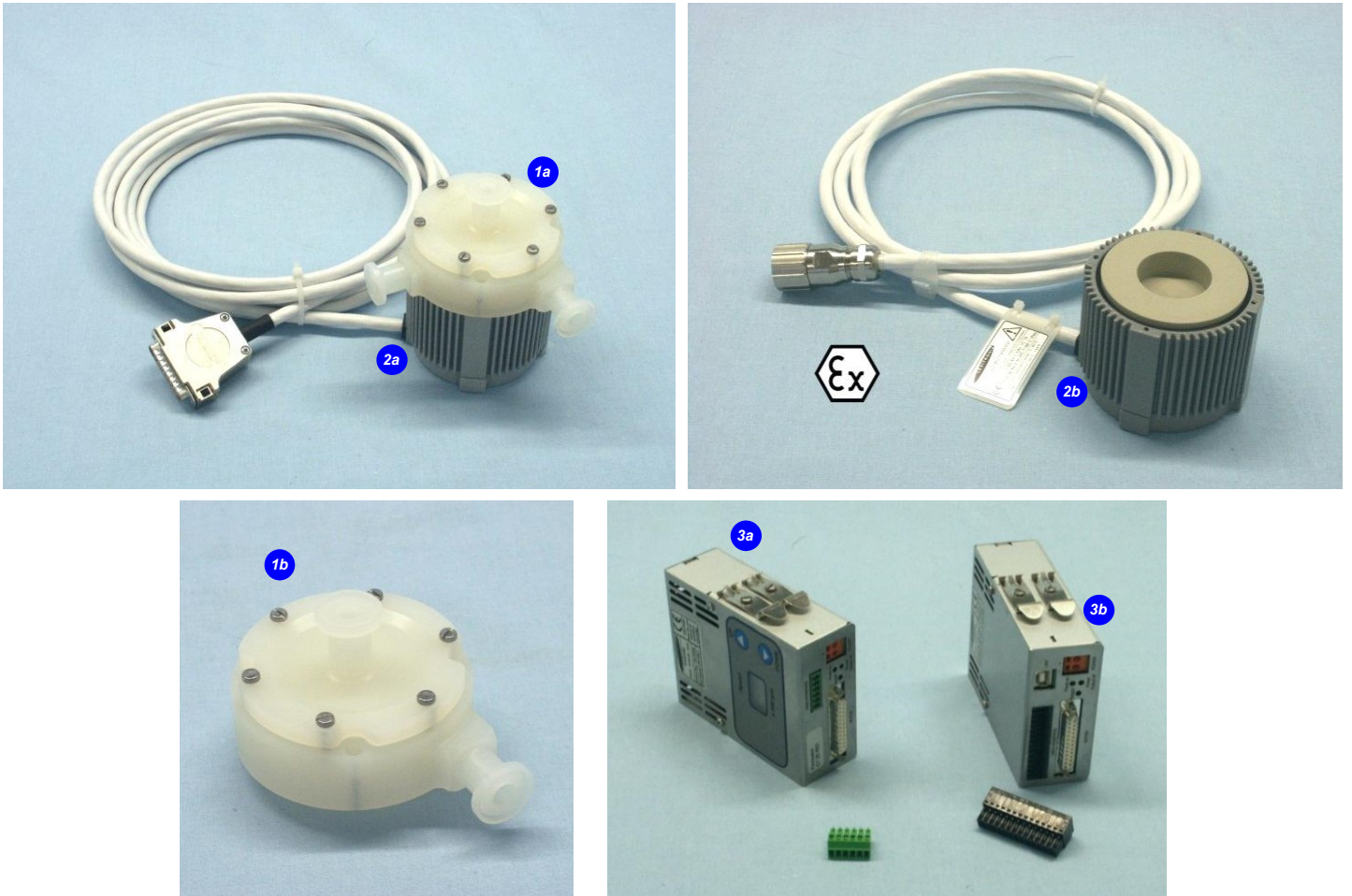


Figure 11: Pump system with standard components

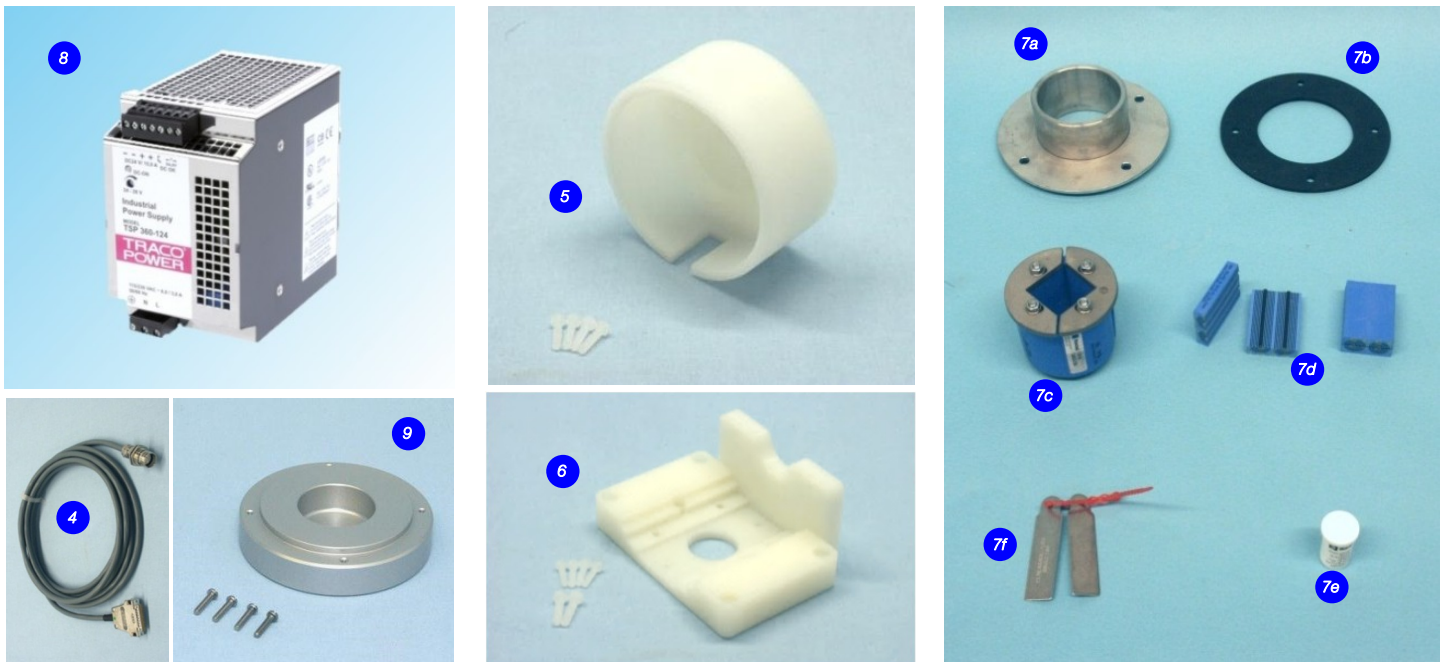


Figure 12: Accessories

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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