

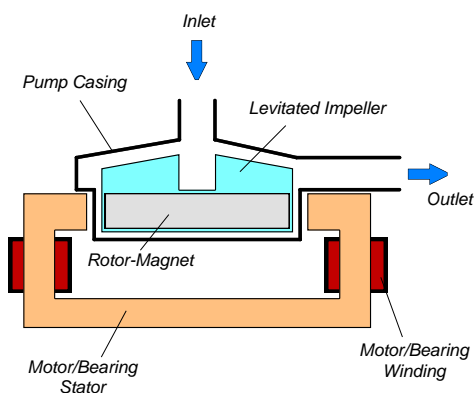
## PuraLev® Life Science Pump Series



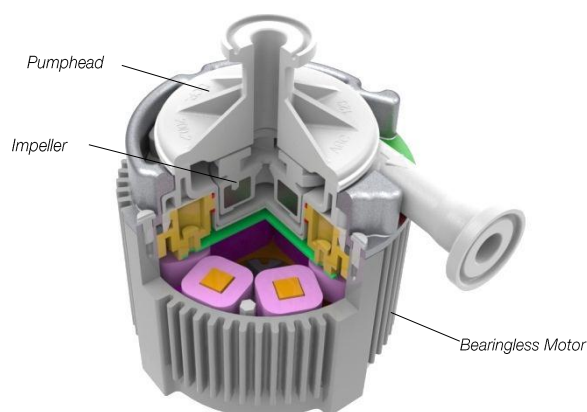
### PuraLev® 200SU (Single-Use)

2 bar	(29 psi)
21 liters/min	(5.5 gallons/min)

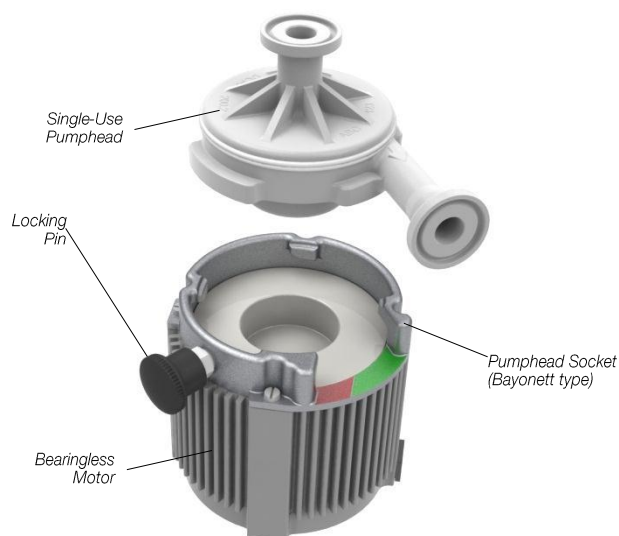
Low Shear Design - High Cell Viability



**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:** Single-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) gamma sterilizable polypropylene (PP) and together they make up the disposable pump head. A simple and intuitive exchange of the single use pumphead is achieved with a bayonet socket type mounting procedure (see Figure 5). Flow rate or pressure are 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 can be easily inserted and removed with an intuitive bayonet socket.

## SYSTEM BENEFITS

- Low shear-forces
- Reduced risk of contamination due to the self-contained design with magnetic bearings
- No particle generation
- No over-pressure situations (compared to roller pumps)
- No narrow gaps between the impeller and pump casing where bacteria could be entrapped
- Pumphead is gamma sterilizable
- Biocompatibility of wet materials: FDA, USP-VI, Animal/BSE/TSE free
- Bayonet socket design for easy and intuitive exchange of disposable pumphead (see Figure 5)
- 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 (for example perfusion)
- Recirculation and transfer applications in bioreactors
- Filtration

## STAND-ALONE SYSTEM CONFIGURATION

The stand-alone configuration of the *PuraLev® 200SU* 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® 200SU* 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 SYSTEM CONFIGURATION

An ATEX certified motor together with the pumphead allows installation of motor and pump head within an ATEX Zone 2 area (see *Figure 8*). The ATEX motor (*Pos. 2b* in *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* (see *Pos. 9*) and shown in *Figure 12*.

- ATEX certified for Category 3G and 3D (Zone 2 for Gas and Zone 22 for Dust) (Testing and certification by Electrosuisse, Switzerland, CH-8320 Fehraltorf)
- 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 c nAc IIC T5  
 CE Ex II 3D Ex c tc IIIC T100°C IP6x
- Explosion groups:
 

Group IIA: Propane (IPA), Methane, Acetone, Acetaldehyde  
 Group IIB: Ethylene, Ethylenglycol  
 Group IIC: Acetylene, Hydrogen (not carbon disulphide)
- ATEX listing corresponds to UL hazardous location Class 1 Division 2.

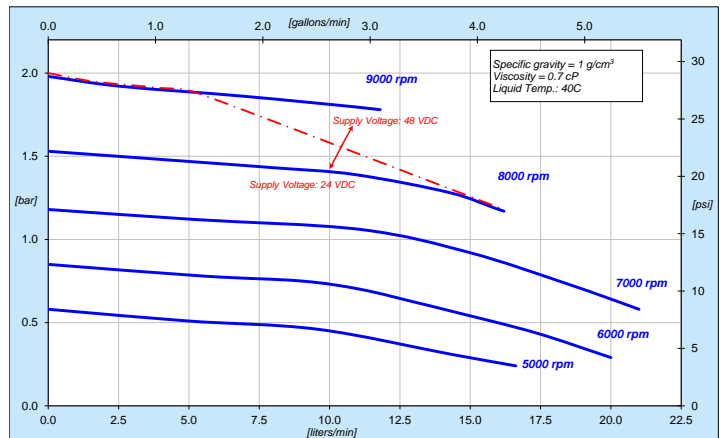


Figure 4: Pressure/flow curves (DCP-200.2 pumphead)

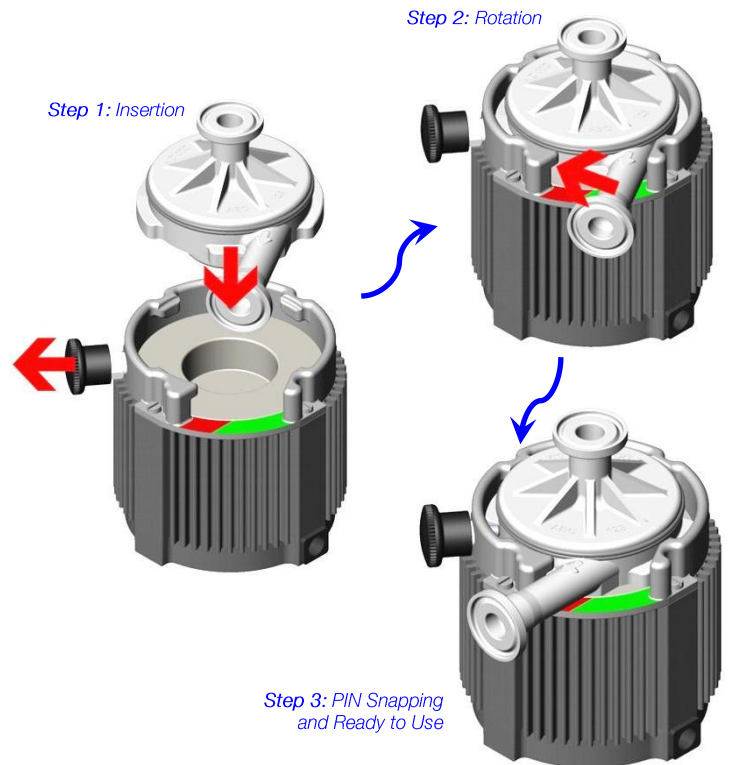


Figure 5: Intuitive 3-step pumphead mounting procedure with bayonet type socket (PHS-200.1)

SYSTEM CONFIGURATIONS

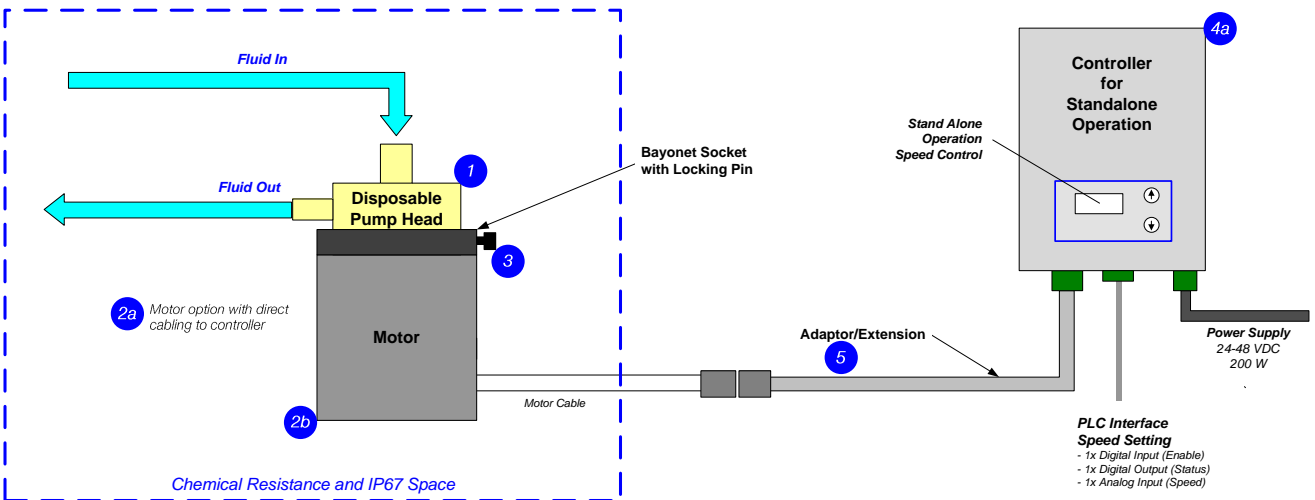


Figure 6: System configuration for standalone operation (Speed setting with integrated user panel)

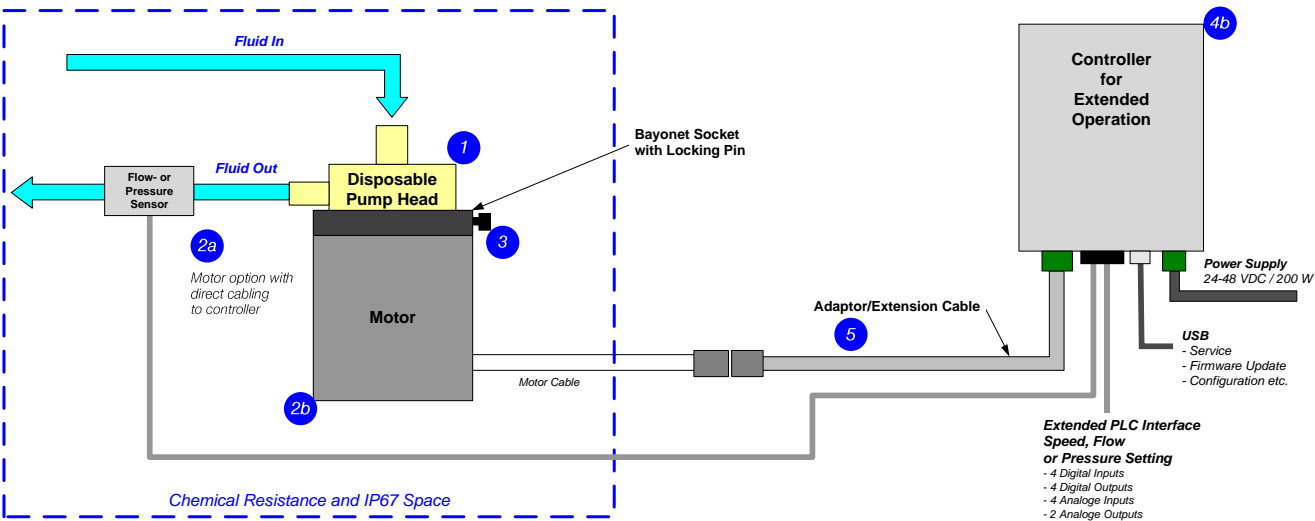


Figure 7: Extended operation (flow or pressure control) with extended controller

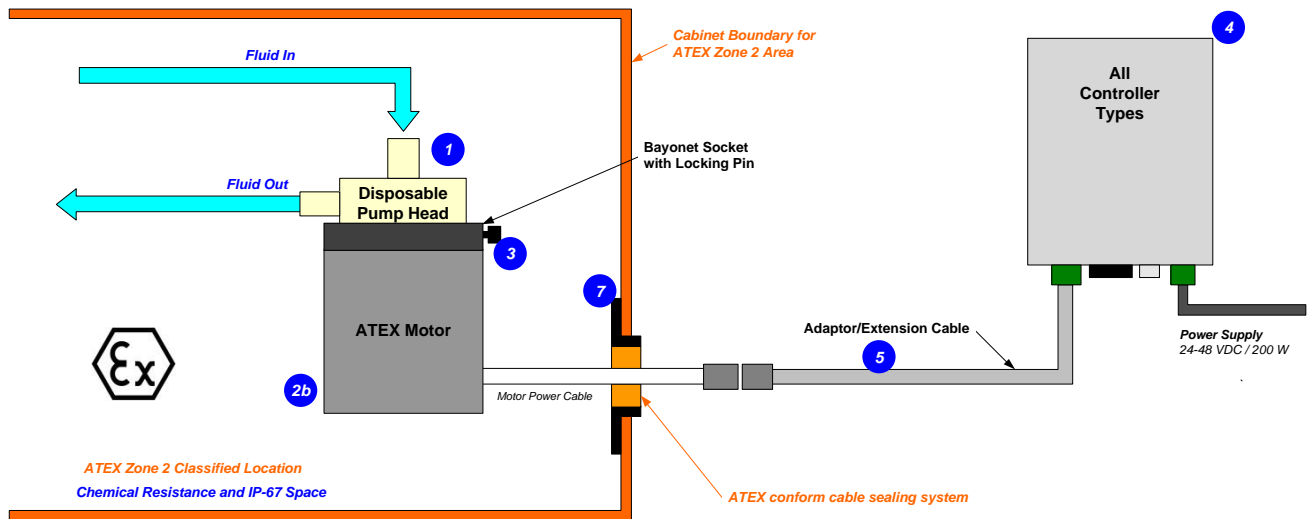


Figure 8: System Configuration for ATEX applications



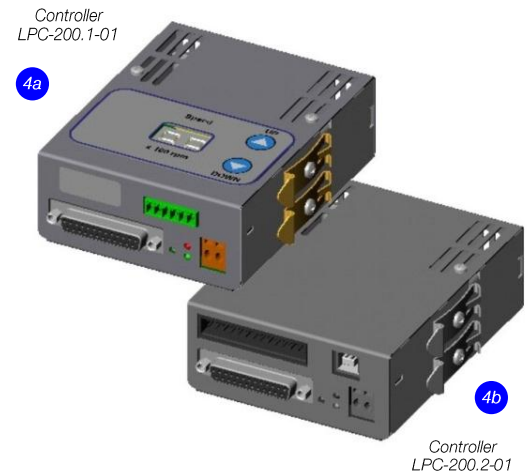
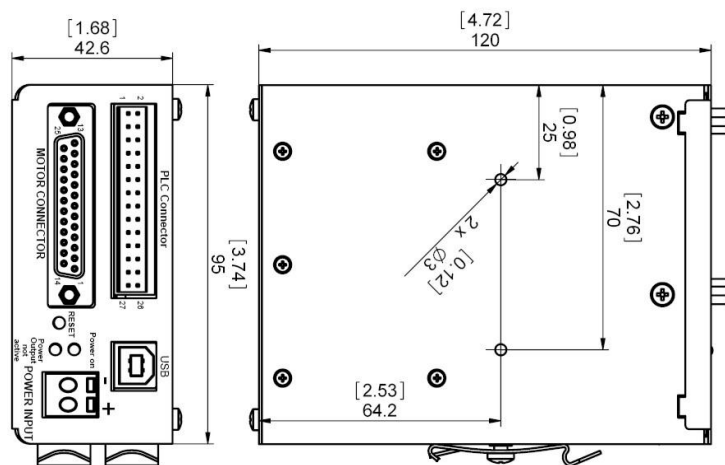


Figure 9: Dimensions of controllers

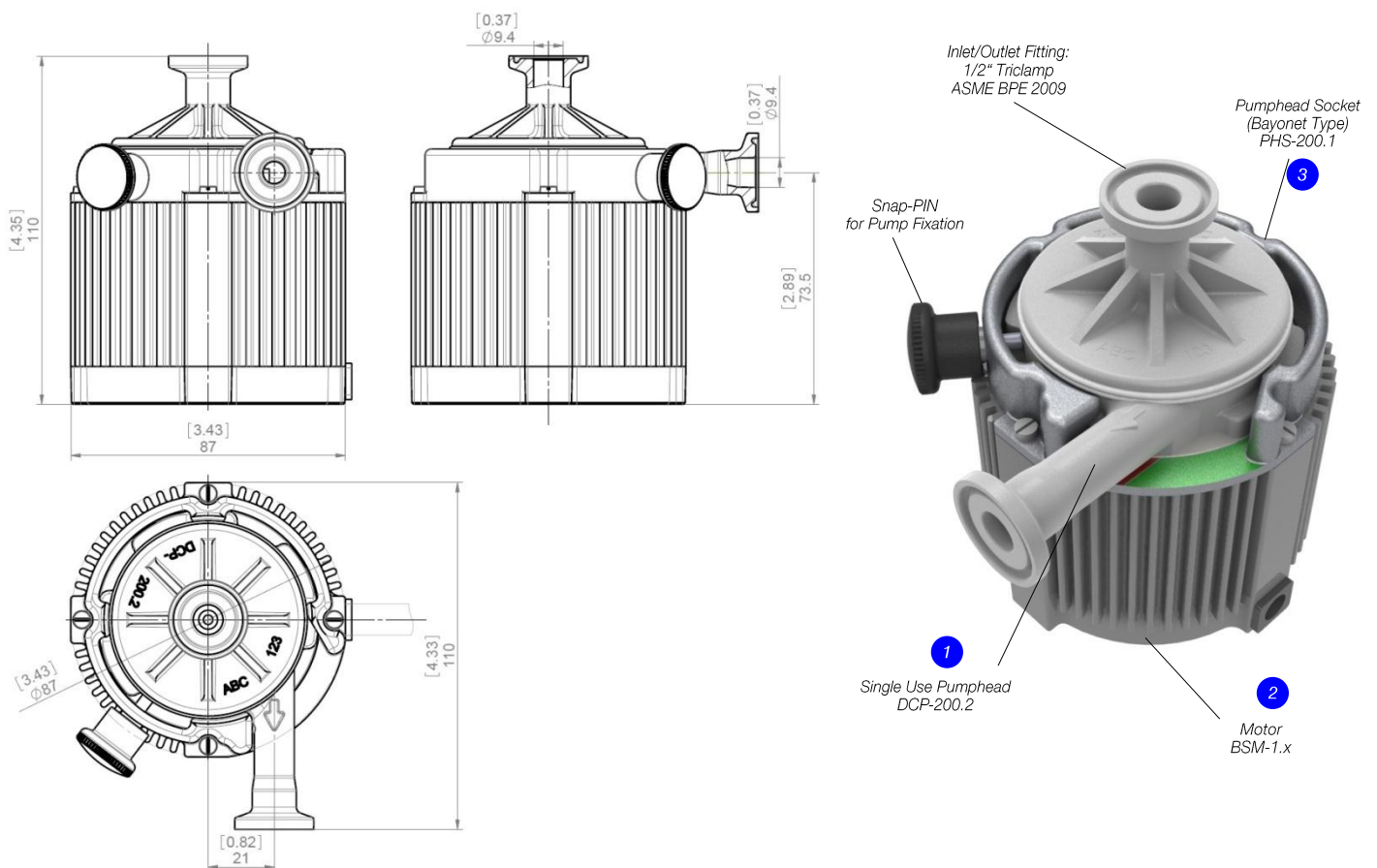


Figure 10: Dimensions of motor with single-use pumphead

## ORDER INFORMATION

System Name	Article #	Pumphead Socket	Motor	Controller	Note
PLD-200SU.1	100-90647	PHS-200.1	BSM-1.4	LPC-200.1-01	Direct cabling between motor and controller
PLD-200SU.2	100-90648	PHS-200.1	BSM-1.4	LPC-200.2-01	
PLD-200SU.4 (ATEX)	100-90650	PHS-200.1	BSM-1.6	LPC-200.1-01	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.
PLD-200SU.5 (ATEX)	100-90651	PHS-200.1	BSM-1.6	LPC-200.2-01	

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

Pos.	Component	Article Name	Article #	Characteristics	Value / Feature
1	Disposable Pumphead	DCP-200.2 (Molded)	100-90734	Impeller / Pump Housing	Polypropylene (FDA, USP Class VI, BSE/TSE/Animal free)
				Housing Sealing	Infrared welding
				In-/Outlet Fittings	Triclamp 1" (ASME BPE 2009)
				Max. Flow	21 liters/min / 5.5 gallons/min
				Max. Diff.-Pressure	2 bar / 29 psi
2a	Motor	BSM-1.4	100-10005	Max. Viscosity	< 20 cP
				Wet Pump Volume/Surface	24 ml / 150 cm²
				Max. Liquid Temp.	60°C / 140°F
				Sterilization Methods	Gamma radiation up to 40kGy
				Housing	ETFE (chemical resistant) coated Aluminum, waterproofed (IP67)
2b	Motor (ATEX)	BSM-1.6	100-10063	Cable / Connectors	1x 5m cables with FEP jacket / 1x D-SUB (direct cable to controller)
				Cable / Connections	1x 2m cable with FEP jacket / 1x circular (M23, IP-67) (needs extension adaptor cable for connection to controller)
3	Pumphead Socket	PHS-200.1	100-90695	ATEX Marking	CE II 3G Ex c nAc T5 CE II 3D Ex c tc IIIC T100°C IP6x
				Mounting Type	Bayonet type with locking pin
				Material	Anodized Aluminum
4a	Standalone Controller (User Panel)	LPC-200.1-01	100-30027 (Enable connector included)	Assembly Screws	4 pcs M3 x 8mm (Stainless Steel, INOX A4)
				Voltage / Power	24-48 V DC / 200 W
				Interfaces	Panel to set speed (automatic storage on internal EEPROM)
				Standard Firmware	C3.25
4b	Extended Controller (PLC and USB)	LPC-200.2-01	100-30028 (PLC connector included )	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)
				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
				Standard Firmware	C3.48
					USB interface (for service and system monitoring)

Table 2: Specification of standard components

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

Table 3: Specification of adaptor/extension cables

Pos.	Component	Article Name	Article #	Characteristics	Value / Feature
6	Air Cooling Module	ACM-1.1	190-10003	Material / Connection Port Air Pressure	PVDF / NPT 1/4" ~0.5 bar (7.2 psi)
7	Mounting Base Plate	MBP-1.1	190-10004	Material	PVDF
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)
9a	AC/DC Power Supply	SWS-300-24 (Lambda)	100-40007	Voltage / Power Output Voltage Input Certification or Standards	24 VDC / 300 W 85 - 265 VAC (automatic detection) TUV, UL, Semi F47
9b	AC/DC Power Supply	SWS-300-48 (Lambda)	100-40008	Voltage / Power Output	48 VDC / 300 W (other specifications are same as for 9a)

Table 4: Specification of accessories

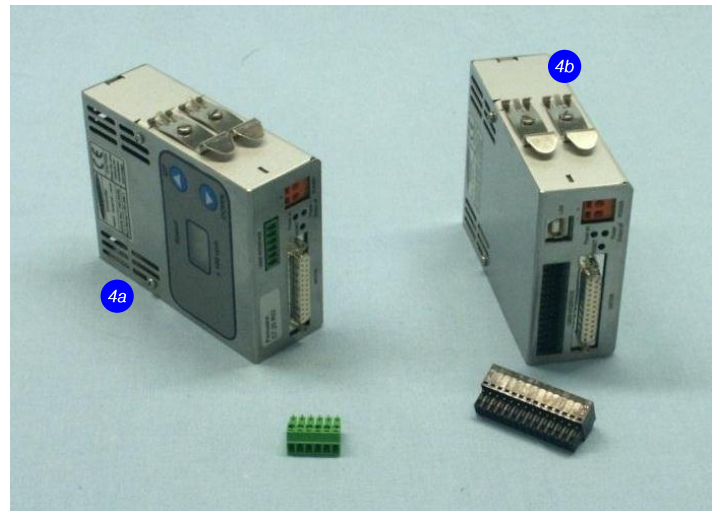
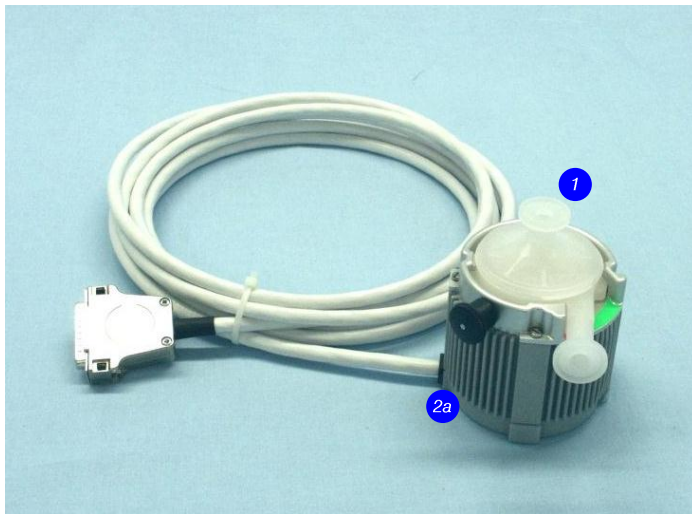


Figure 11: Pump system with standard components

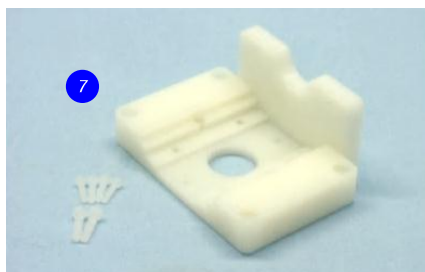
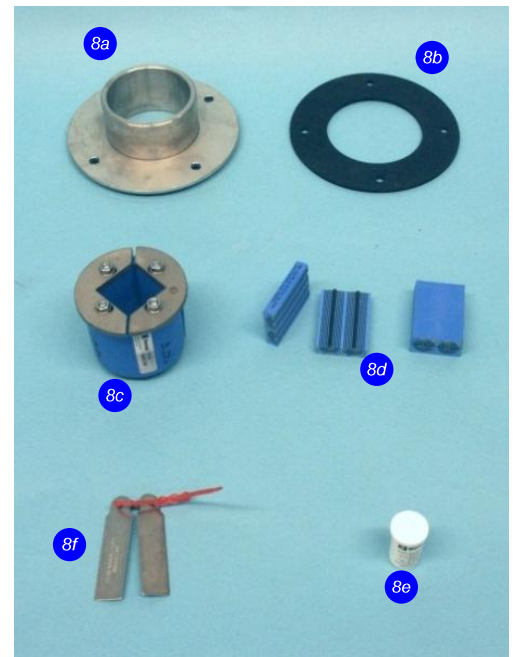
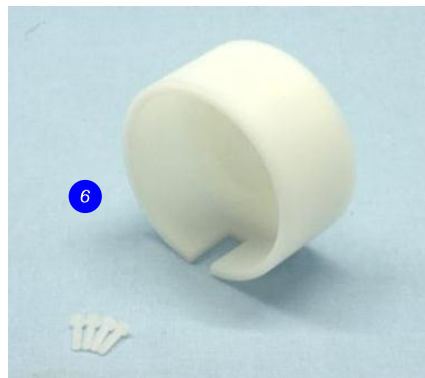
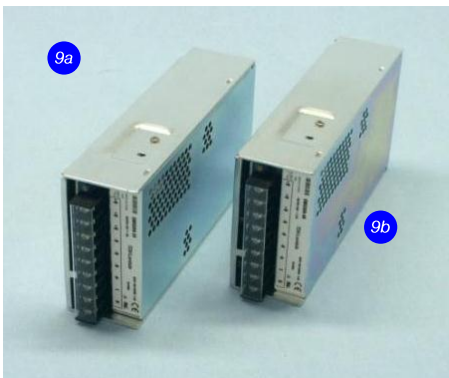


Figure 12: Accessories

*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 Lifescience 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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