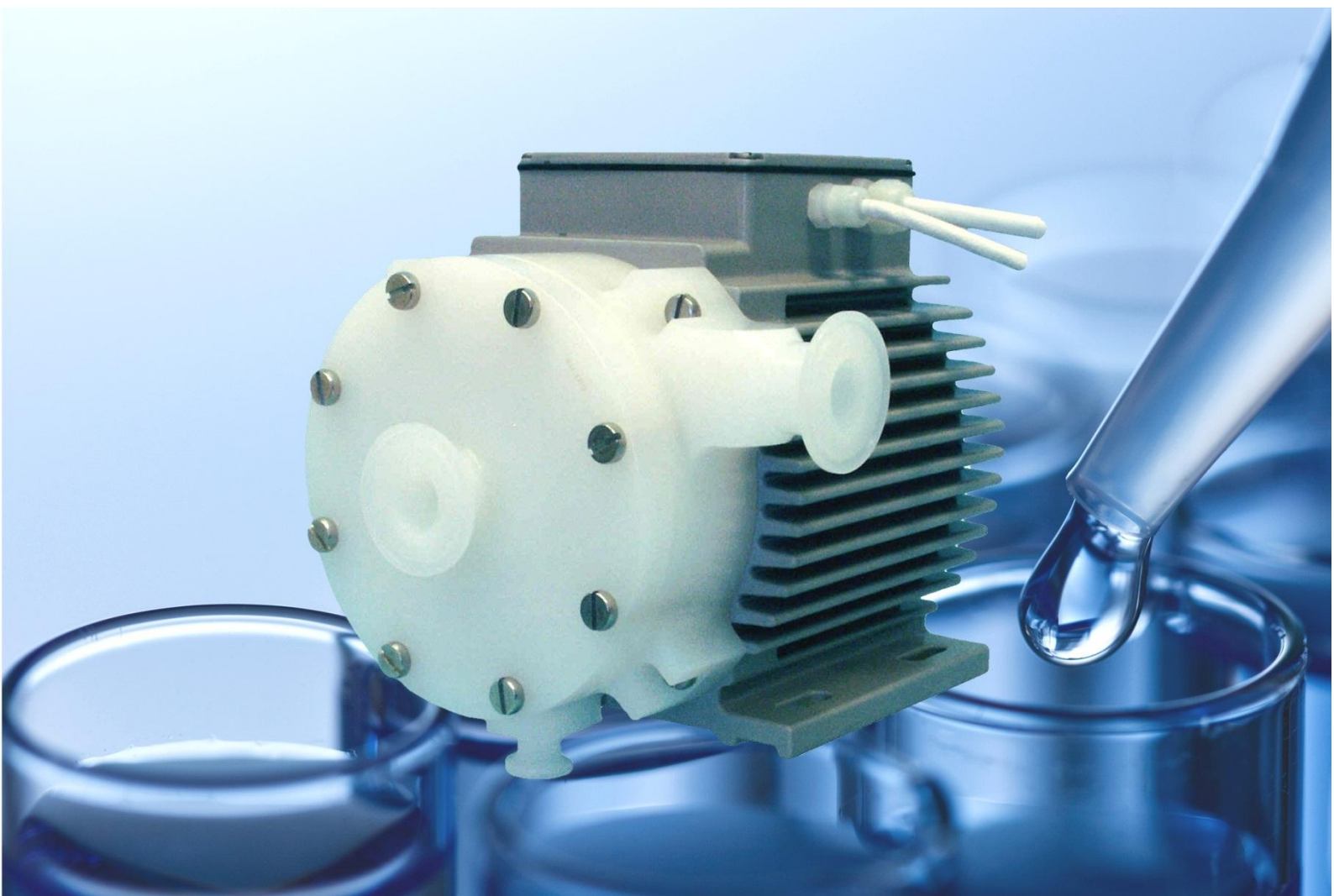


PuraLev® Life Science Pump Series



PuraLev® 4MU (Multi-Use)

4.1 bar	(59.5 psi)
140 liters/min	(37 gallons/min)

No Bearings. No Seals. No Contamination!

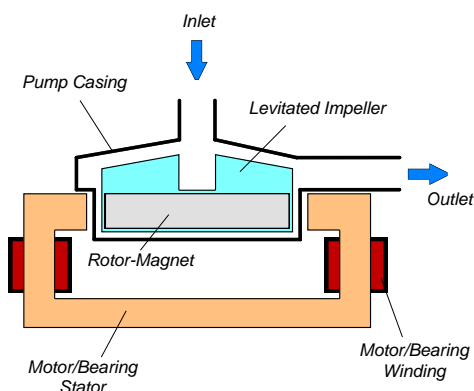


Figure 1: Schematic of the main elements of the maglev centrifugal pump

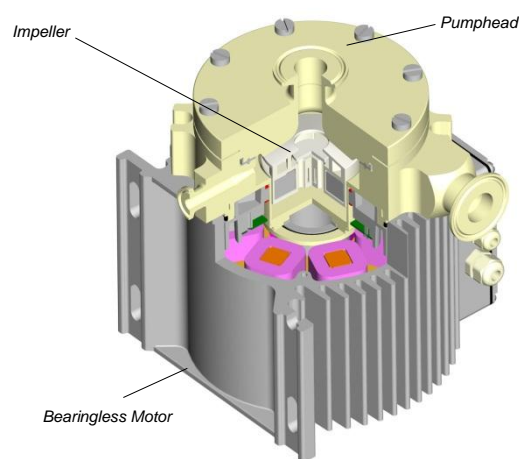


Figure 2: Cross-section of the bearingless pump motor and pumphead.

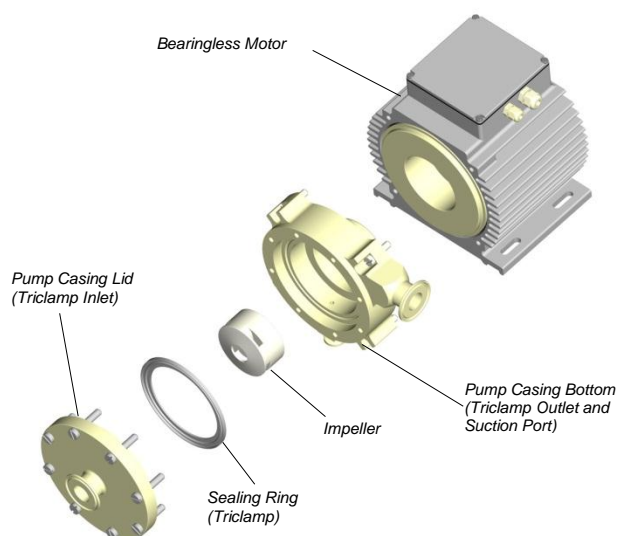


Figure 3: Multi-use pumphead concept

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 over-pressure situations (compared to roller pumps)
- 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

SYSTEM CONFIGURATION FOR STAND-ALONE OPERATION

If the *PuraLev*[®] 4MU needs to be operated as standalone system a handheld user panel (*LUI-A.1*) can be attached to the *RS232* port of the controller allowing the operator to set the speed manually (see *Figure 6*).

Furthermore the user panel displays also error messages for efficient problem solving.

SYSTEM CONFIGURATION FOR EXTENDED OPERATION

For external control with analog and digital signals a designated *PLC* module (*PLC-A.1*) can be attached to the controllers *PLC* interface allowing to set the speed with an analog signal and control operation with various digital signals (see *Figure 7*).

For more sophisticated operation and control the *RS232* port on the controller can be used. Contact *Levitronix*[®] for the relevant protocol.

A computer can be connected via the *RS232* interface to allow communication with *Levitronix*[®] Service Software. Hence parameterization, firmware updates and failure analysis are possible.

SYSTEM CONFIGURATION FOR PROCESS CONTROL

Precise flow or pressure control can be realized in a closed loop together with a flowmeter or pressure sensor as illustrated in *Figure 8*. *Levitronix*[®] provides either turnkey solutions for closed-loop flow control or helps to design your own flow control system. 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.

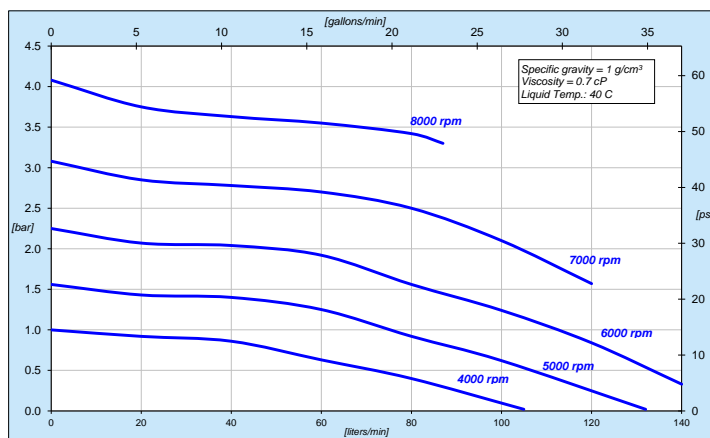


Figure 4: Pressure/flow curves

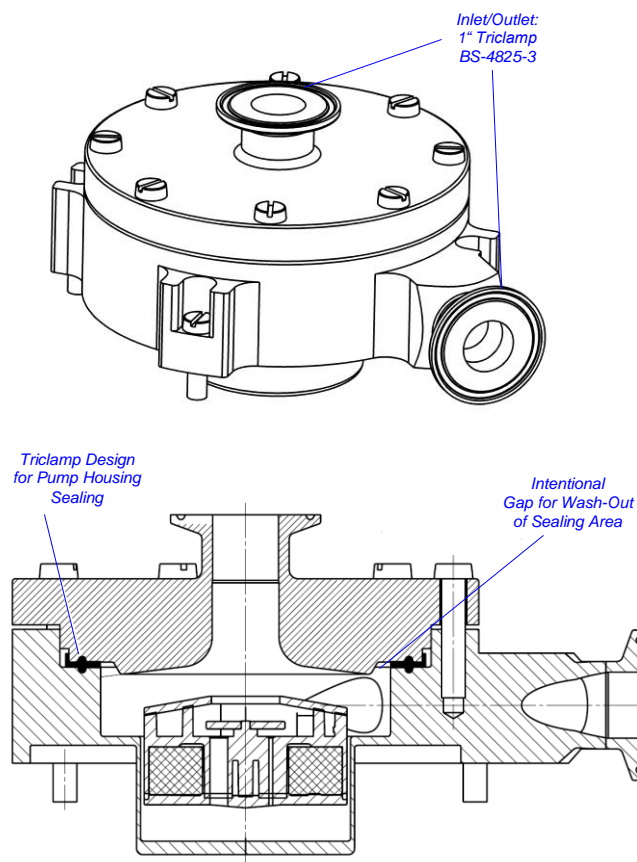


Figure 5: Aseptic pumphead (without drain port)

SYSTEM CONFIGURATIONS

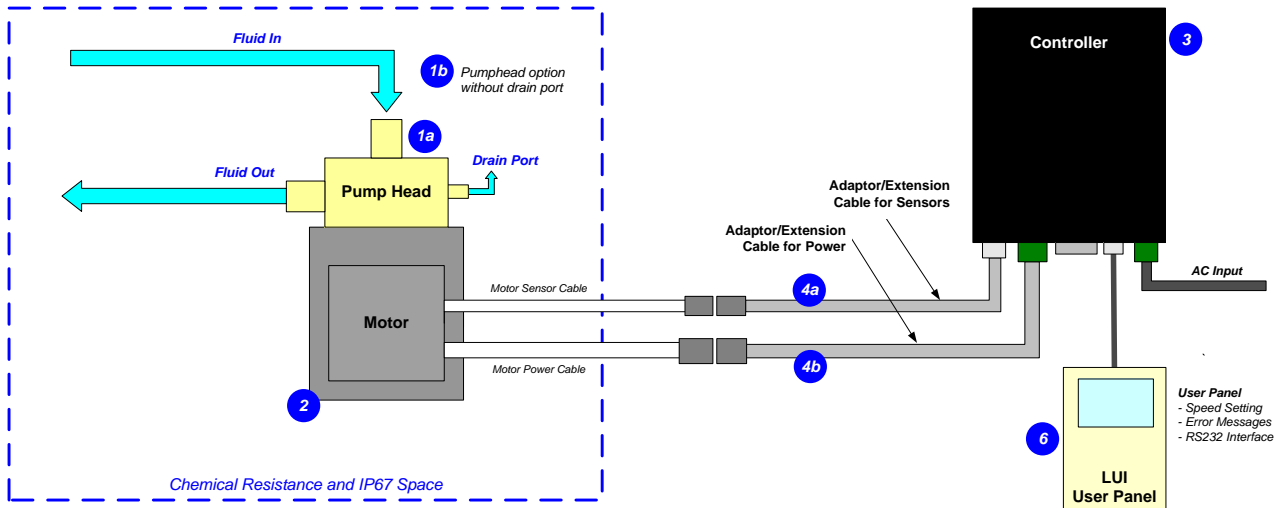


Figure 6: System configuration for standalone operation (speed setting with user panel)

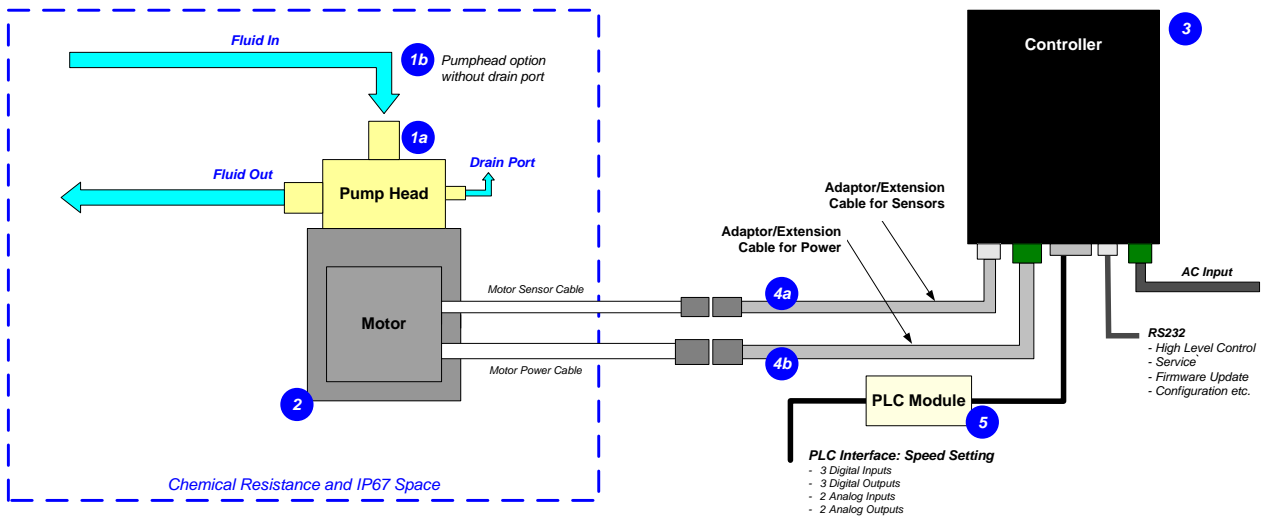


Figure 7: Extended operation with PLC module

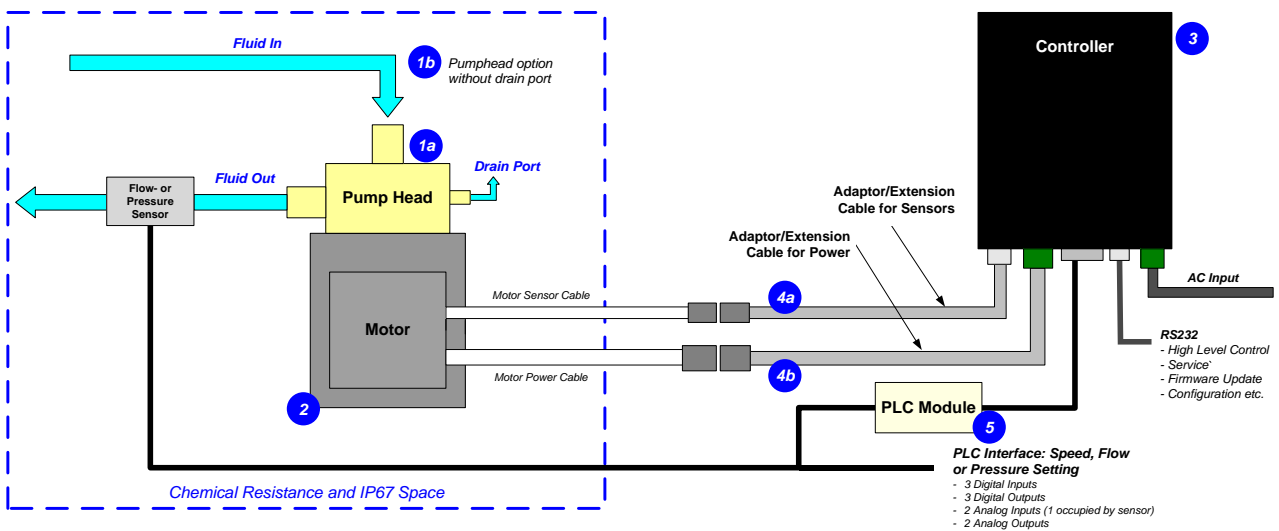


Figure 8: System configuration for process control (pressure or flow)

DIMENSIONS OF MAIN COMPONENTS

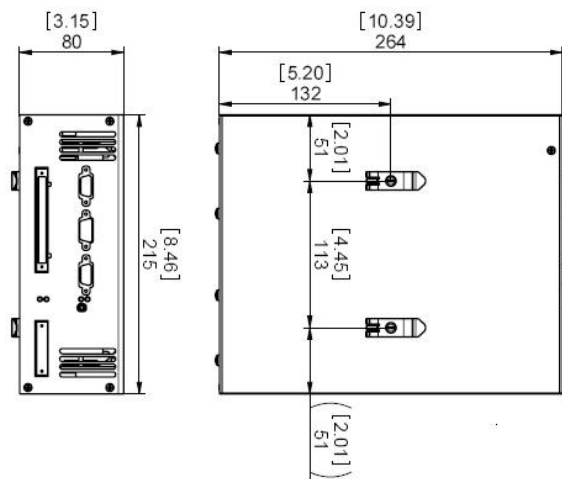


Figure 9: Dimensions of controller

Z: Mounting Slots

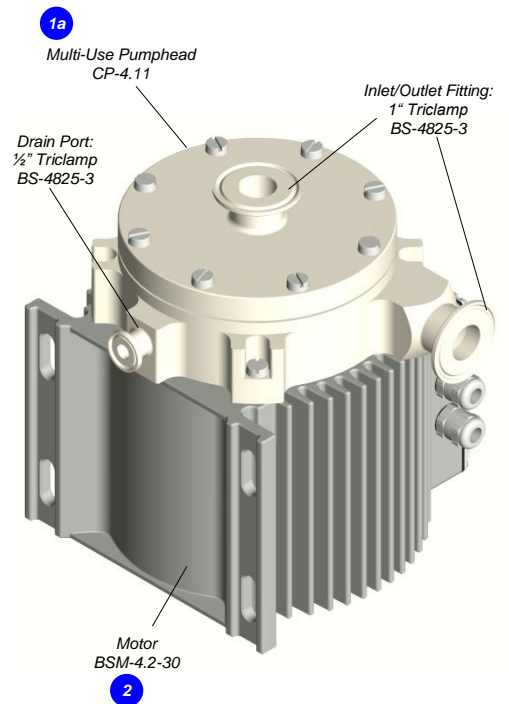
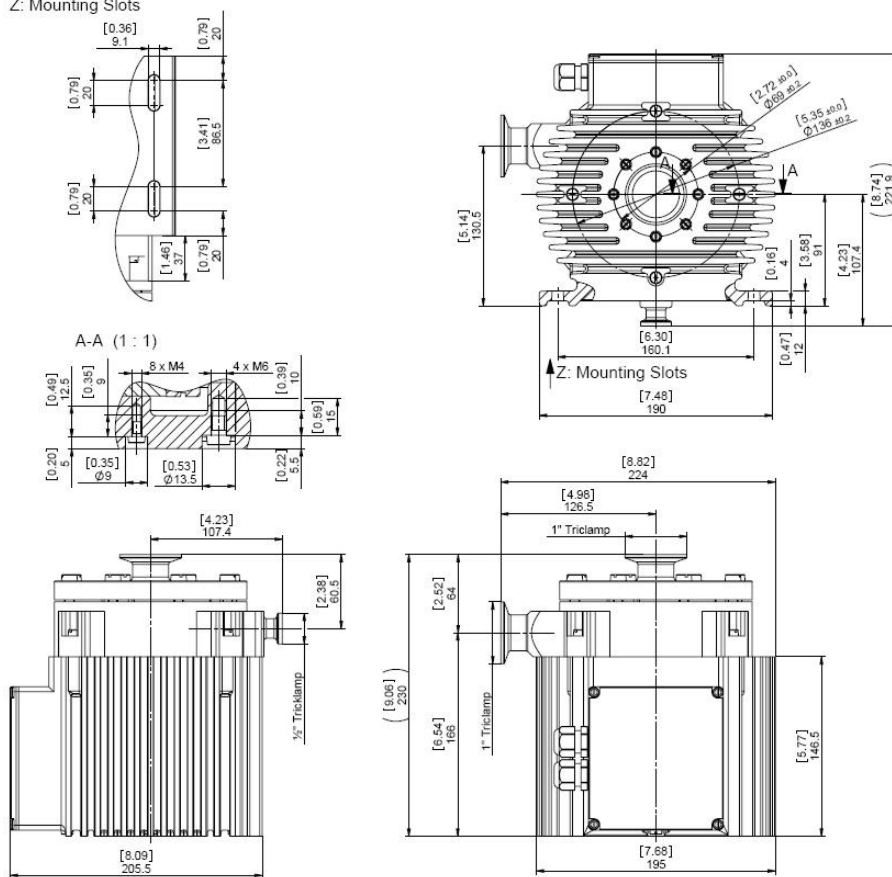


Figure 10: Dimensions of motor with multi-use pumphead

ORDER INFORMATION

System Name	Article #	Pumphead Socket	Motor	Controller	Note
PuraLev® 4MU.1	100-90786	CP-4.11 (with drain port)	BSM-4.2-30	LC325	Adaptor/Extension (0.5 - 10m) cables according to Table 3 have to be ordered as separate article with specified length.
PuraLev® 4MU.2	100-90787	CP-4.19 (without drain port)	BSM-4.2-30	LC325	

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

Pos.	Component	Article Name	Article #	Characteristics	Value / Feature
1	Multi-Use Pumpheads	CP-4.11 (with drain port)	100-90245	Impeller / Pump Housing Sealing Ring Fittings	PFA / PVDF (FDA, USP Class VI, BSE/TSE/Animal free) Silicon (FDA, USP Class VI, BSE/TSE/Animal free) Triclamp 1" for in/outlet and Triclamp ½" for drain port (Standard: BS-4825-3)
				Max. Flow Max. Diff.-Pressure Max. Viscosity	140 liters/min / 37 gallons/min 4.1 bar / 59.5 psi 50 cP
		CP-4.19 (without drain port)	100-90458	Wet Pump Volume/Surface	260 ml / 629 cm ²
				Max. Liquid Temp.	90°C / 194°F
				Sterilization Methods	CIP, SIP, Autoclaving ¹
2	Motor	BSM-4.2-30	100-10011	Housing	ETFE coated Aluminum, waterproofed (IP67)
				Cable / Connectors	2x 3m cables with PVC jacket / 2x circular (M23, IP-67)
3	Controller	LC325	100-30003 (Controller with power supply connector incl. in 100-90313)	Voltage Power	3x 200 or 208 V AC, 1x 230 V AC, ± 10%, 50/60 Hz 1500 W
				Interfaces	PLC in connection with PLC module PLC-A.1 RS232 interface (for service and system monitoring)
				Standard Firmware	S 1.48

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-4.2-05 (0.5m)	190-10285	Jacket Material Connectors	PUR (Polyurethan) Circular Wallmountable, Metallic (IP-67) to D-SUB
		MCAS-4.2-30 (3m)	190-10136		
		MCAS-4.2-50 (5m)	190-10134		
		MCAS-4.2-70 (7m)	190-10286		
		MCAS-4.2-100 (10m)	190-10287		
4b	Extension Adaptor Cable for Power	MCAP-4.2-05 (0.5m)	190-10288	Jacket Material Connectors	PUR (Polyurethan) Circular Wallmountable, Metallic (IP-67) to COMBICON
		MCAP-4.2-30 (3m)	190-10137		
		MCAP-4.2-50 (5m)	190-10135		
		MCAP-4.2-70 (7m)	190-10289		
		MCAP-4.2-100 (10m)	190-10290		

Table 3: Specification of adaptor/extension cables

Pos.	Component	Article Name	Article #	Characteristics	Value / Feature
5	PLC Module	PLC-A.1	100-30204	Digital Inputs Digital Outputs	3x 24V DC (typical), galvanic isolated 3x closing relay (30V, 1A)
				Analog Inputs Analog Outputs	2x 4-20mA, not galvanic isolated 2x 0-5V, not galvanic isolated
6	User Interface Module	LUI-A.1	100-30300	Purpose	Standalone manual operation
				Interface	RS232 (for connection to controller)
7	Air Cooling Module	ACM-4.2	190-10139	Material / Connection Port	PP (+ 40% Talkum) / NPT 1/4"
				Air Pressure	~1 - 3 bar (14 - 43 psi)
8	Autoclaving Reinforcing Tool	ART-2000.1	190-10282	Purpose	Stabilization of pump housing during autoclaving
				Material	Anodized Aluminum
				Mounting Screws	4 pcs M8 x 30mm (Stainless steel)

Table 4: Specification of accessories



Figure 11: Pump system with standard components

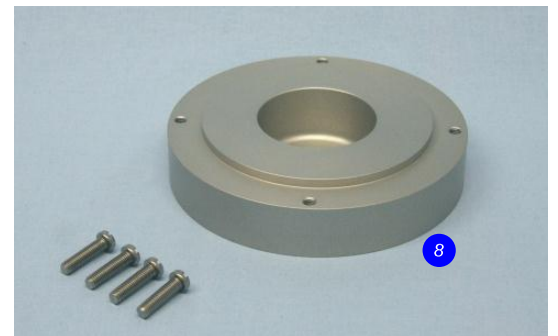


Figure 12: Accessories

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 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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