

PuraLev® Life Science Pump Series



PuraLev® 600MU (Multi-Use)

3.2 bar	(46 psi)
75 liters/min	(20 gallons/min)

No Bearings. No Seals. No Contamination!

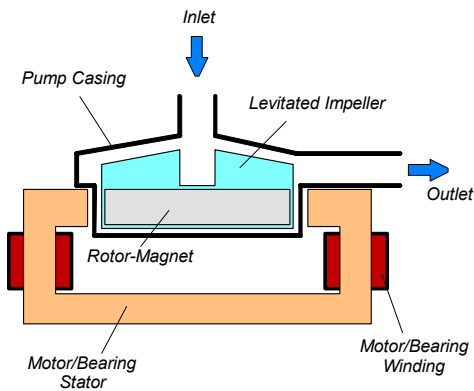


Figure 1: Schematic of the main elements of the maglev centrifugal pump

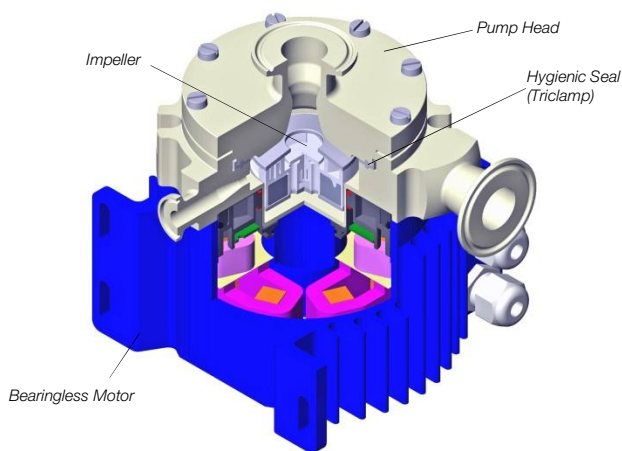


Figure 2: Cross-section of the bearingless pump motor and pump head

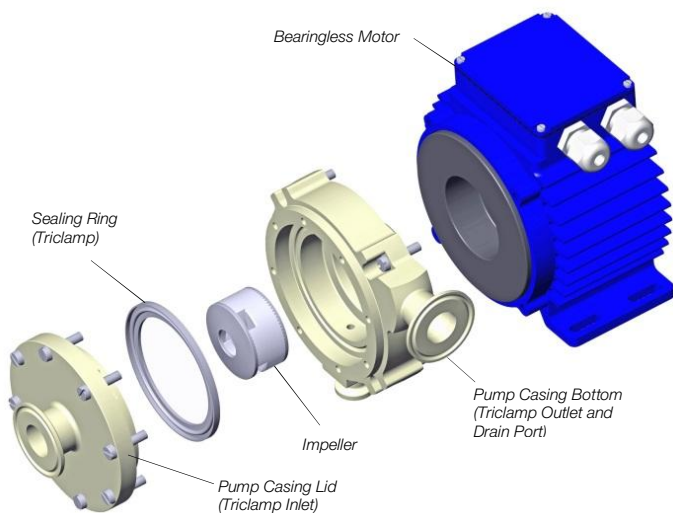


Figure 3: Disassembled multi-use pump head

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 pump head. 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
- Pump head 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*[®] 600MU 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*[®] 600MU 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. 4a* and *4b* in *Table 3*). An Ex conform solution is needed for the motor cables to leave the Ex 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)
- Thermal classification T4 (< 110 °C = 230 °F) for maximum liquid temperature of 90 °C / 194 °F.
- ATEX / IECEx marking of motor with pump head:
 - CE Ex II 3G Ex c nAc IIC 110°C (T4)
 - CE Ex II 3D Ex c tc IIIC T110°C IP67
- 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.

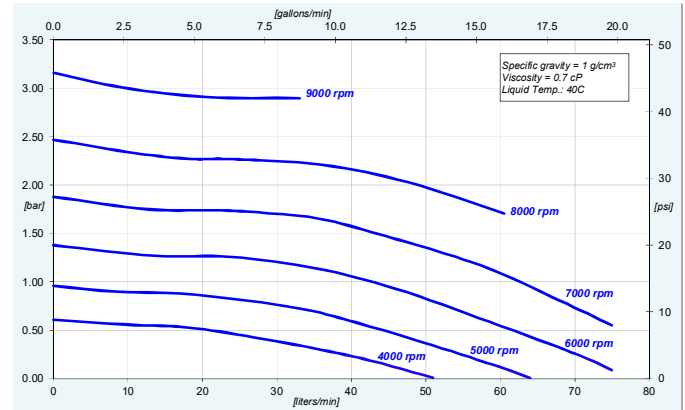


Figure 4: Pressure/flow curves (LPP-600.18 pump head)

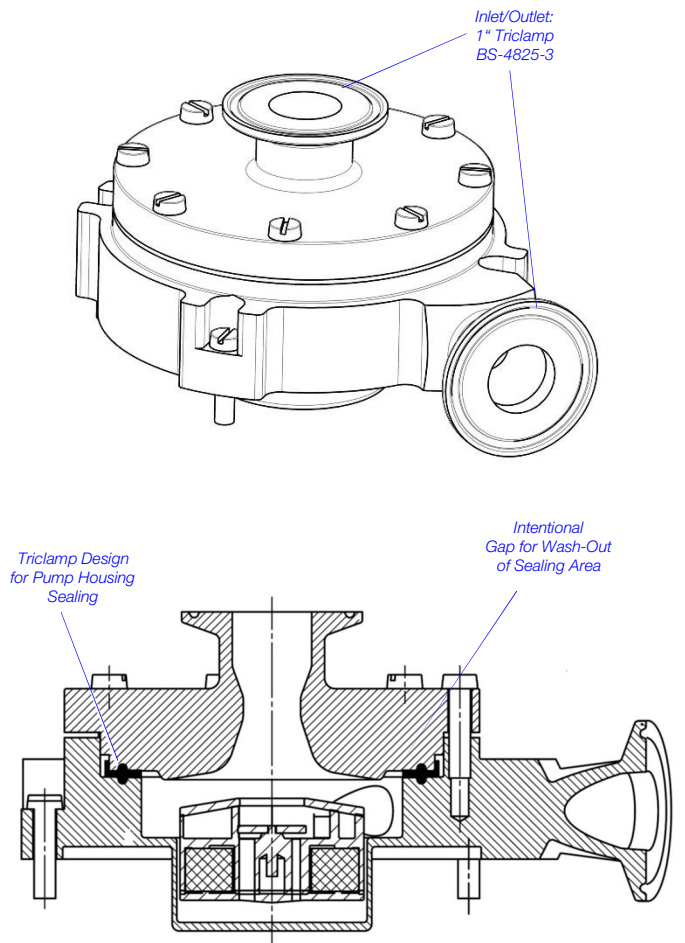


Figure 5: Aseptic design of pump head (without drain port)

SYSTEM CONFIGURATIONS

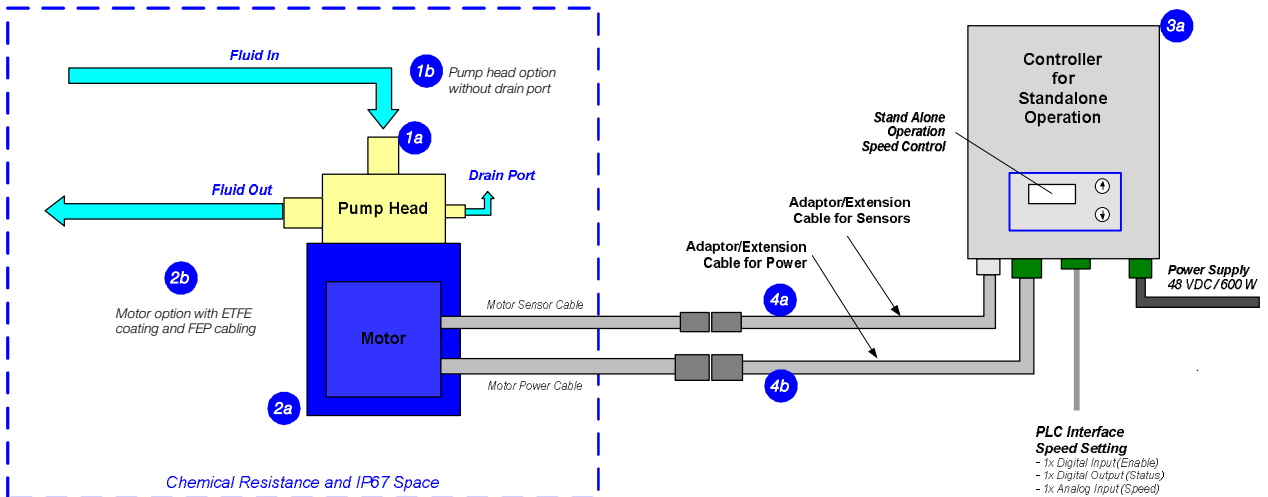


Figure 6: System configuration for standalone operation (Speed setting with integrated user panel)

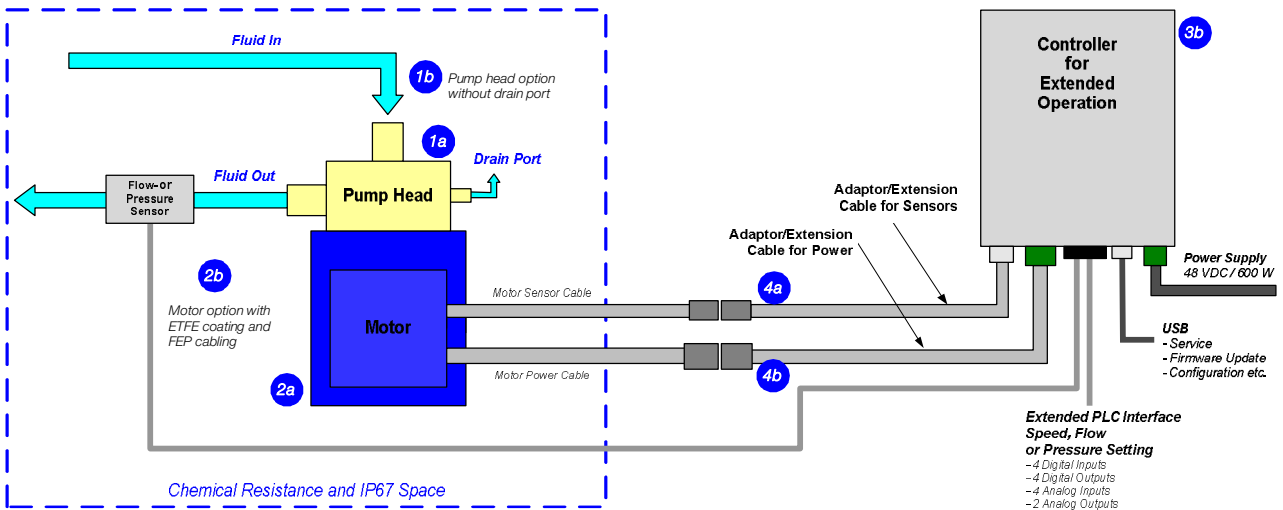


Figure 7: Extended operation (flow or pressure control) with extended controller

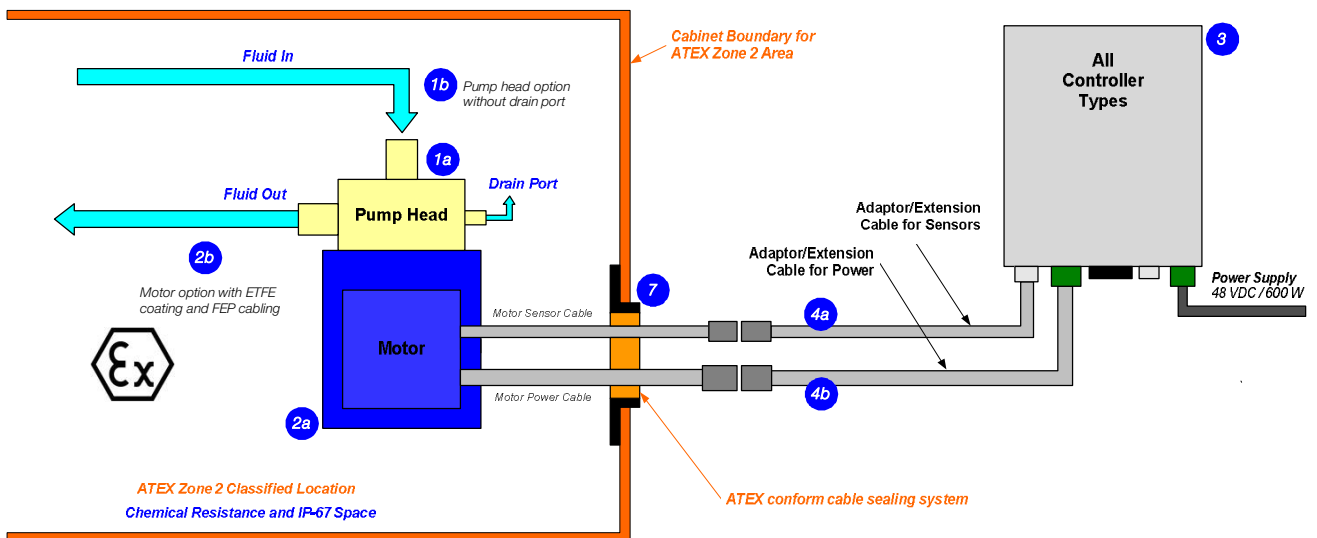
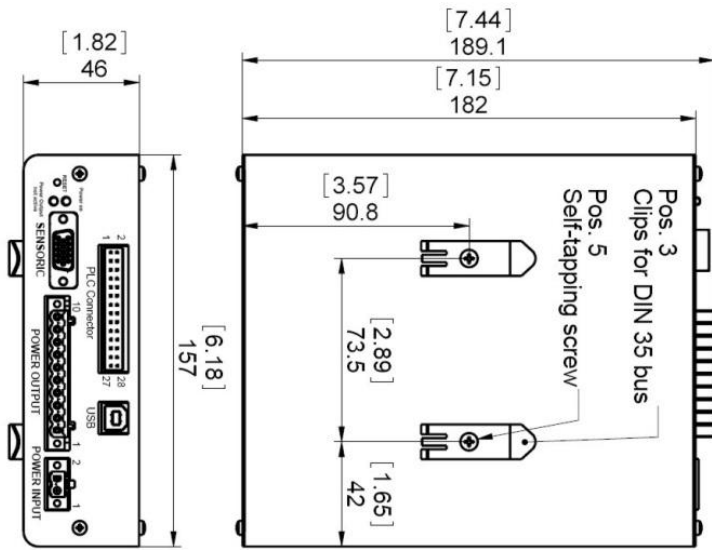


Figure 8: System Configuration for ATEX / IECEx applications

DIMENSIONS OF MAIN COMPONENTS



Controller LPC-600.1-02

3a



3b

Controller LPC-600.2-02

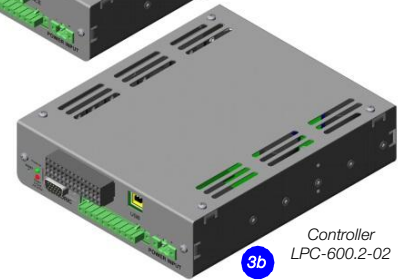
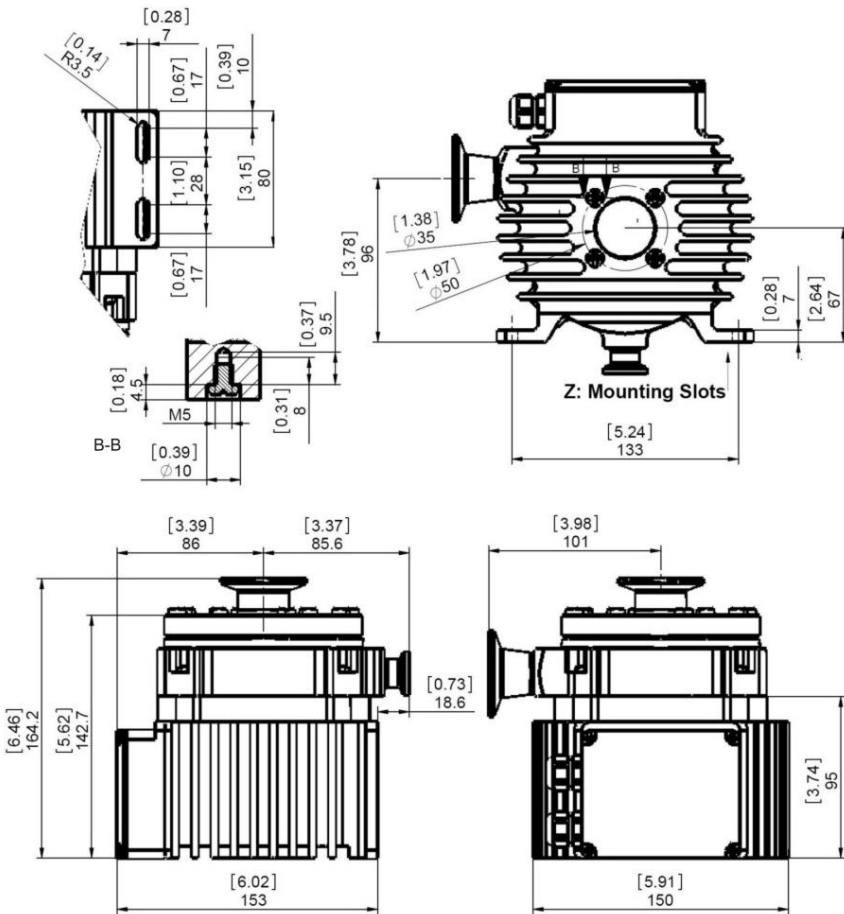


Figure 9: Dimensions of controllers

Z: Mounting Slots

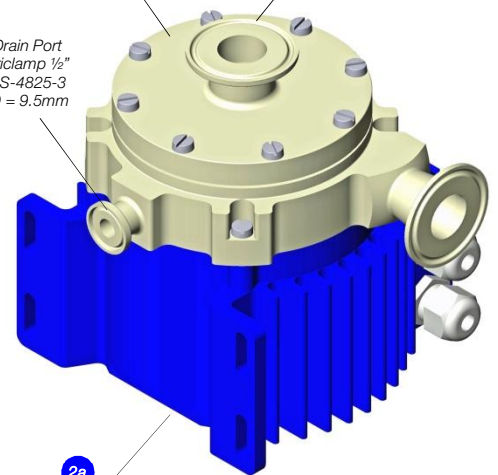


1a

Multi-Use Pump Head LPP-600.7

Inlet/Outlet Fitting: 1" Triclamp BS-4825-3 ID = 22.2mm

Drain Port Triclamp 1/2" BS-4825-3 ID = 9.5mm



2a

Motor LPM-600.5

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

ORDER INFORMATION

System Name	Article #	Pump head	Motor	Controller	Note
PuraLev® 600MU.1	100-90590		LPM-600.5	LPC-600.1-02	
PuraLev® 600MU.2	100-90591	LPP-600.7	LPM-600.5	LPC-600.2-02	Adaptor/Extension (0.5 - 10m) cables according to Table 3 have to be ordered as separate article with specified length.
PuraLev® 600MU.4	100-90593	(with drain port)	LPM-600.4	LPC-600.1-02	
PuraLev® 600MU.5	100-90594		LPM-600.4	LPC-600.2-02	
PuraLev® 600MU.7	100-90596		LPM-600.5	LPC-600.1-02	ATEX Cable Sealing System can be ordered according to Table 4.
PuraLev® 600MU.8	100-90597	LPP-600.18	LPM-600.5	LPC-600.2-02	Certifications: CE, IECEx CB scheme, ETL (NRTL), ATEX and IECEx.
PuraLev® 600MU.10	100-90599	(without drain port)	LPM-600.4	LPC-600.1-02	
PuraLev® 600MU.11	100-90632		LPM-600.4	LPC-600.2-02	

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

Pos.	Component	Article Name	Article #	Characteristics	Value / Feature
1a	Multi-Use Pump Heads	LPP-600.7 (with drain port)	100-90287	Impeller / Pump Housing Housing Sealing In-/Outlet Fittings	PFA / PVDF (FDA, USP Class VI, BSE/TSE/Animal free) Triclamp EPDM (FDA, USP Class VI, BSE/TSE/Animal free) Triclamp 1" for in/outlet, Triclamp ½" for drain port (Standard: BS-4825-3)
1b		LPP-600.18 (without drain port)		100-90548	Max. Flow Max. Diff.-Pressure Max. Viscosity
				Wet Pump Volume/Surface Max. Liquid Temp.	160 ml / 363 cm ² (without drain port) 90°C / 194°F
				Sterilization Methods	SIP (Steam in Place), CIP (Clean in Place), Autoclaving ¹
2a	Motor (ATEX / IECEx)	LPM-600.5	100-10039	Housing Cable / Connectors ATEX / IECEx Marking	Epoxy (anti-corrosive) coated Aluminum, waterproofed (IP67) 2x 3m cables with PVC jacket / 2x circular (M23, IP-67) CE II 3G Ex c nAc IIC 110°C (T4) CE II 3D Ex c tc IIC T110°C IP67
2b	Motor (ATEX / IECEx)	LPM-600.4		100-10038	Housing Cable / Connectors
3a	Standalone Controller (User Panel)	LPC-600.1-02	100-30033	Voltage / Power Interfaces Standard Firmware	48V DC / 600 W 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-600.2-02		100-30034	Interfaces Standard Firmware

Table 2: Specification of standard components (Note 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)	190-10226	Jacket Material Connectors	PVC Circular Wallmountable, Metallic (IP-67) to D-SUB
		MCAS-600.2-30 (3m)	190-10238		
		MCAS-600.2-50 (5m)	190-10127		
		MCAS-600.2-70 (7m)	190-10105		
		MCAS-600.2-100 (10m)	190-10239		
4b	Extension Adaptor Cable for Power	MCAP-600.2-05 (0.5m)	190-10227	Jacket Material Connectors	PVC Circular Wallmountable, Metallic (IP-67) to COMBICON
		MCAP-600.2-30 (3m)	190-10240		
		MCAP-600.2-50 (5m)	190-10126		
		MCAP-600.2-70 (7m)	190-10106		
		MCAP-600.2-100 (10m)	190-10241		

Table 3: Specification of adaptor/extension cables

Pos.	Component	Article Name	Article #	Characteristics	Value / Feature
5	Air Cooling Module	ACM-600.2	190-10140	Material / Connection Port Air Pressure	PP (+ 40% Talkum) / NPT 1/4" ~1 - 3 bar (14 - 43 psi)
6a	Fan Cooling Module	FCM-600.1	190-10401	Housing / Cable Spec. Supply Spec. / IP Rating	PP (+ 20% Talkum) white / PP jacket, 3m, circular sealed M12 connector (PP). 24 VDC, 3.4 W / IP-65 (fan is IP68 rated).
6b	Fan Cool. Module Cable	FCC-1.1-50 (5 m) FCC-1.1-100 (10 m)	190-10407 190-10408	Specification	PP cable jacket with circular M12 connector (PP) to open wires
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	AC/DC Power Supply	TSP 600-148-M (M = Modified Levitronix design from Traco)	100-40013 (Traco ID Number: T1068-01A)	Voltage / Power Output Voltage Input Certification or Standards	48 VDC / 600 W 85 - 265 VAC (automatic detection) CB, UL, CSA, Semi F47
9	Autoclaving Reinforcing Tool	ART-600.1	190-10281	Purpose Material Mounting Screws	For stabilization of pump housing during autoclaving Anodized Aluminum 4 pcs M6 x 25mm (Stainless steel)

Table 4: Specification of accessories

COMPONENTS



Figure 11: Pump system with standard components

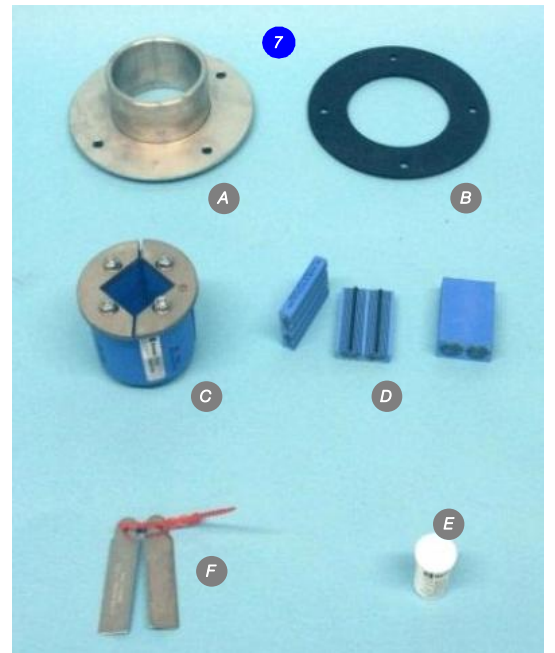


Figure 12: Accessories

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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