Almatec Futur-Series Air-operated double diaphragm pumps

DESCRIPTION

The Almatec® Futur Series Air-Operated Double-Diaphragm (AODD) pumps are specifically designed for supplying and circulating chemicals in the semiconductor industry. Utilizing straight-through flow pattern technology, these pumps meet the stringent purity, reliability, and performance requirements of semiconductor manufacturing processes.

Futur Series pumps are self-priming and capable of dry running, and feature a compact, simple design with a minimal number of components. The pump housings are precision-machined from solid blocks to ensure long service life, and each pump is cleaned, assembled, and tested in a cleanroom environment. For every pump size and material configuration, a matching pulsation damper is available to support stable and efficient operation.

KEY FEATURES

- Five material versions (T, H, E, S/ SH and F) for different applications
- All plastic models contain no metal (T, H, E, F)
- Temperature range up to 200°C/392°F (H)
- Contactless cascade sealing between the product chambers
- No O-ring sealing in wetted areas
- Straight-through flow pattern, only one wetted housing part
- PERSWING P® air control system requires no lubrication or maintenance
- Internal air flow
- One-piece full PTFE diaphragms with optimized geometry
- Cylinder valves with surface sealing
- Compact, simple design with few parts, very low space required
- Housing and diaphragms machined from solid blocks
- Easy to dismantle and assemble
- No elements to fix, such as tie rods or clamps
- Separate pulsation damper available for all materials and sizes, can be retrofitted without dismantling of pump and piping
- Optional diaphragm and/or stroke sensors
- Self-priming
- Low noise level
- Assembled in a clean-room line

DESIGN HIGHLIGHTS

Futur Series pumps are self-priming air-operated diaphragm pumps and can be easily controlled via the air volume. The liquid flows straight through the product chambers of the center housing, while the air control system and the air chambers are located in the side housing. This design ensures that only one part of the housing comes in contact with the liquid, reduces the number of flow bends to only two, minimizes the surface area, eliminates sliding parts in the product chambers, and makes it possible to dispense with gaskets. In the wetted area of the Futur pumps is no O-ring sealing.

There are no fastening elements, such as tie rods or clamps. The contactless cascade sealing between the product chambers is a major structural element. All the design features mentioned serve to minimize the generation of particles.

Futur pumps have a compact, simple design with few parts. The housing parts are machined from solid blocks, resulting in long-life operation. Onepiece diaphragms are as well machined from massive PTFE slices. Suction and discharge ports are located at the front, thus simplifying installation in confined spaces.

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COMPONENTS OF THE ALMATEC FUTUR SEREIS PUMP

SIDE HOUSING LEFT HAND

- Solid construction
- Non-wetted housing part
- Materials:
  - PTFE conductive (H)
  - Polyethylene (T, E)
  - Polyethylene conductive (S)
  - SS316 (SH)
  - PE-conductive (F)

CENTER HOUSING

- Solid construction
- Wetted housing part
- Materials:
  - PTFE-TFM (T, H)
  - Polyethylene (E)
  - SS316L (S/SH)
  - PE-conductive (F)

UNINION NUTS

- Fixing element for the pump housings
- Same part on both side of the pump

SIDE HOUSING RIGHT HAND

- Solid construction
- Non-wetted housing part
- Materials:
  - PTFE conductive (H)
  - Polyethylene (T, E)
  - Polyethylene conductive (S)
  - SS316 (SH)
  - PE-conductive (F)

DIAPHRAGMS

- Especially designed for the Futur pumps
- Machined one-piece design
- Small wetted surface
- Long service life
- Material: PTFE

CASADE SLEEVE

- Contactless cascade sealing between the product chambers
- No sliding surface in the liquid
- Material: PTFE-TFM

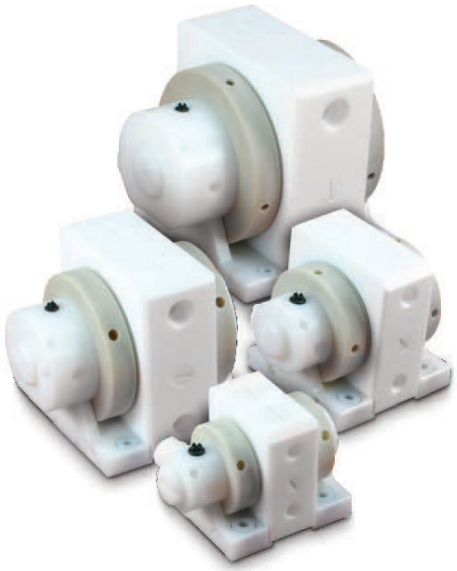
PERSWING P® AIR CONTROL SYSTEM

- Accurate reversal of the main piston without dead spot
- Pilot piston decoupled from the diaphragm stroke
- Low noise level
- No maintenance required
- Replacement as a complete cartridge, accessible from the outside

MODEL OVERVIEW

MODEL FUTUR T

When delivering acids and caustics, corrosion resistance is of the highest importance, so the center housing is constructed of special PTFE-TFM. Compared to normal PTFE, it has a higher tensile strength and surface density. Parts made of this material are smooth and free of pores, which results in reduced particle generation. The pumps are absolutely metal-free and can be used in temperature ranging up to 130°C (266°F).



APPLICATIONS

- Acids, caustics, high purity chemicals
- Wet Benches, loops
- Supply, disposal, filtration, circulation

MATERIALS

- Center housing: PTFE-TFM
- Side housings: Polyethylene

PUMP SIZES AND PERFORMANCE

- 10T (10 l/min / 2.6 gpm)
- 20T (20 l/min / 5.3 gpm)
- 50T (50 l/min / 13 gpm)
- 100T (100 l/min / 26 gpm)

MODEL FUTUR E

The Futur E model has been designed to be abrasion-resistant, which is a requirement for pumping semiconductor polishing-slurries. To meet these operational demands, they are constructed of PE (polyethylene). It has a very high abrasion resistance (higher than steel), good impact value and withstands the introduction of slurry particles. Its good chemical properties allow handling both basic and acidic slurries. The Futur E is metal-free, with a maximum permitted liquid temperature of 70°C (158°F).

APPLICATIONS

- Basic water acidic slurries
- Wafer polish (CMP)

MATERIALS

- Center housing: Polyethylene
- Side housings: Polyethylene

PUMP SIZES AND PERFORMANCE

- 20E (20 l/min / 5.3 gpm)
- 50E (50 l/min / 13 gpm)

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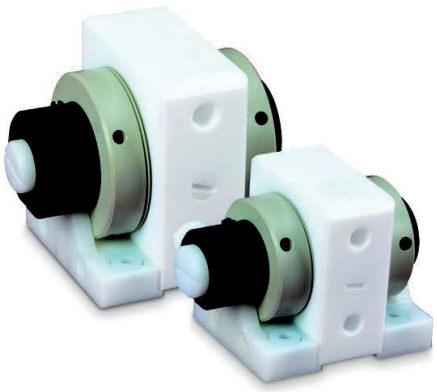
MODEL FUTUR H

Metal-free Futur H pumps have been designed to operate ideally in hot applications involving acids and caustics. The temperature limit is 200°C (390°F) at max. 2 bar (29 psig).



APPLICATIONS

- Acids, caustics, high purity chemicals
- Wet Benches, loops
- Supply, disposal, filtration, circulation

MATERIALS

- Center housing: PTFE-TFM
- Side housings: PTFE conductive

PUMP SIZES AND PERFORMANCE

- 10H (10 l/min / 2.6 gpm)
- 20H (20 l/min / 5.3 gpm)

MODEL FUTUR S/SH

Futur S/SH pumps are constructed of stainless steel (316L) with extremely low carbon content. The housing parts are machined from a solid block of stainless steel and polished afterwards, the only way in which a pore-free surface can be secured.

The Futur S and Futur SH series differ in the material of the non-wetted side housings (PE conductive or SS316) and in the resulting maximum temperature of 80°C/176°F (S) or 130°C/266°F (SH).

APPLICATIONS

- Solvents
- Solvents mixtures
- Strippers

MATERIALS

- Center housing: SS316L
- Side housings: PE conductive (Futur S) SS316 (Futur SH)

PUMP SIZES AND PERFORMANCE

- 20 S/SH (20 l/min / 5.3 gpm)
- 50 S/SH (50 l/min / 13 gpm)

MODEL FUTUR F

Designed specifically for high-purity and ATEX applications involving solvents.

The FUTUR 100F is made from electrically conductive ultrahigh molecular weight polyethylene (UHMW-PE), offering outstanding chemical resistance, abrasion resistance and conductivity.

APPLICATIONS

- Semiconductor processing
- High purity, explosion-hazardous environments
- Solvent transfer
- Strippers

MATERIALS

- Conductive UHMW-PE

PUMP SIZES AND PERFORMANCE

- 100F (100l/min / 26.42 gpm)

Technical Data

Series	Material	Available pump sizes	Nominal Port Size (NPT)	Air Connection (NPT)	Suction Head Dry (mWC/ft)	Suction Head Wet (mWC/ft)	Max Drive Pressure	Max Permitted Operating Pressure				
								At max 2 bar (29 psig)	At max 3 bar (44 psig)	At max 4 bar (58 psig)	At max 5 bar (73 psig)	At max 6 bar (87 psig)
Futur T	PTFE-TFM Center, PE Side	10, 20, 50, 100	3/8", 1/2", 1", 1 1/4"	1/4"	1 (3.3), 2.5 (8.2), 3.5 (11.5), 4 (13.1)	8 (26.2), 9 (29.5), 9 (29.5), 9 (29.5)	6 bar	130°C 266°F	130°C 266°F	120°C 248°F	110°C 230°F	100°C 212°F
Futur H	PTFE-TFM Center, Conductive PTFE Side	10, 20	3/8", 1/2"	1/4"	1 (3.3), 2.5 (8.2)	8 (26.2), 9 (29.5)	6 bar	200°C 392°F	200°C 392°F	180°C 356°F	130°C 266°F	100°C 212°F
Futur E	PE Center, PE Side	20, 50	1/2", 1"	1/4"	2.5 (8.2), 3.5 (11.5)	9 (29.5), 9 (29.5)	6 bar	70°C 158°F	70°C 158°F	70°C 158°F	70°C 158°F	70°C 158°F
Futur F	Conductive UHMW-PE	100	1 1/4"	1/4"	4 (13.1)	9 (29.5)	6 bar	60°C 140°F	60°C 140°F	60°C 140°F	60°C 140°F	60°C 140°F
Futur S	SS316L Center, Conductive PE Side	20, 50	1/2", 1"	1/4"	2.5 (8.2), 3.5 (11.5)	9 (29.5), 9 (29.5)	6 bar	80°C 176°F	80°C 176°F	80°C 176°F	80°C 176°F	80°C 176°F
Futur SH	SS316L Center and Side	20, 50	1/2", 1"	1/4"	2.5 (8.2), 3.5 (11.5)	9 (29.5), 9 (29.5)	6 bar	130°C 266°F	130°C 266°F	130°C 266°F	130°C 266°F	130°C 266°F

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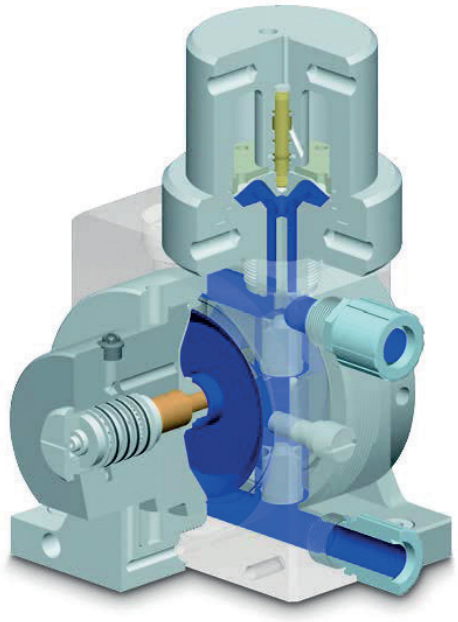
ADVANTAGES

PULSATION DAMPERS AND SPECIAL EQUIPMENT

Due to their design, oscillating displacement pumps deliver a pulsating flow. This pulsation is considerably reduced by utilizing the appropriately designed air distribution channels and chambers of the Futur series, as well as by the cascade seal. Pulsation dampers (type D) of the same design without tie rods are available for all pump materials and sizes, if the remaining pulsation on the discharge side is unacceptable for a specific application. The installation of a pulsation damper is quick and easy, as it is simply screwed on top of the pump. Therefore, a separate pulsation damper can be retrofitted at any time, even on installed pumps, without changing the product connections.

Futur pumps can be fitted with a sensor installed in the muffler to monitor the diaphragms. A pneumatical stroke counter with a pressure transmitter registers the changes in pressure within the air chamber behind the diaphragm on the left-hand side.

Suction and discharge ports on the plastic Futur pumps can optionally be equipped with Flaretek® connectors for the piping system. For Futur S/SH models VCR connectors of stainless steel are available.



- Diaphragm monitoring (Code D)
- Stroke counting (Code C)
- Flaretek® connectors (Code G)
- VCR connectors (Code V)

DIAPHRAGMS AND CYLINDER VALVES

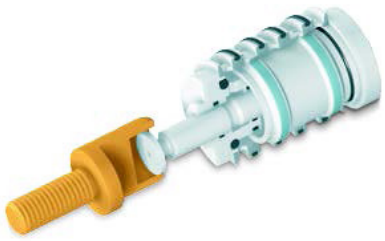
Neither piston plates nor gaskets are required for the one-piece diaphragm machined from solid PTFE slices. The well-balanced geometry leads to an extremely long lifetime. The wetted surface is small, and does not contain any pockets in which particles may accumulate. In this respect, the Futur diaphragms differ considerably from sensitive bellows with their large surface and bends.

The pumps are equipped with the tried-and-tested cylinder valves. These valves seal a large area and ensure very good dry priming. They close gently and evenly and permit accurate delivery.

ADVANTAGES

THE PERSWING P® AIR CONTROL SYSTEM

The main piston is accurately switched by the built-in air control system PERSWING P®. The pilot piston is decoupled from the diaphragm stroke and is operated only then at the end of the stroke like an indirect air control. There are no external controllers, limit switches and wiring. The patented PERSWING P® air control system does not require maintenance, operates without lubrication, and is characterized by a low noise level during operation.



SPARE PART KITS

Spare parts kits ensure that the correct replacement parts are always available in the required quantities. This helps to avoid production stoppages and ensures that the Almatec air-operated double diaphragm pumps are always ready for action. We strongly recommend not to install non-genuine spare parts into your Almatec pumps and pulsation dampers. Any certificates on material conformity and all CEand ATEX-certificates for our products are invalid when using spare parts of nongenuine origin.

PERFORMANCE CHARTS

The specified performance data are warranted by Almatec in accordance with DIN EN ISO 9906 as far as applicable. The data refers to water. The blue lines state the air consumption (in Nm³/h, independent from the pressure).