

**For high purity chemical handling applications  
in semiconductor processing applications**

## For high purity chemical handling applications in semiconductor processing applications

The F-Series includes pneumatic drive bellows pumps that are designed for use in the semiconductor manufacturing processes. Iwaki introduced the first designs over 20 years ago and has continually developed new products to keep up with rapidly changing market needs. With over 20 different models available the quality and performance of our products has made them the preferred solution by device manufacturers all over the world. Their quality and performance are recognized and highly rated by device manufacturers all over the world.

We offer not only pump solutions, but also accessories including controllers, dampeners, and liquid chemical supply systems that have been developed to compliment a comprehensive portfolio of quality equipment for wet process and surface preparation applications.



Small & lightweight



Low cost



High temperature transfer



Pulsation reduction



Large flow transfer

### Guideline for pump selection

Max. discharge capacity (L/min)	Max. supplied air pressure (MPa)	Max. air consumption (NL/min)	Temperature range (°C)
55	0.5	670	180 - 5
100	0.5	1210	180 - 10
100	0.7	1495	60 - 5
80	0.5	820	100 - 10
40	0.5	480	180 - 10
22	0.3	180	100 - 5
40	0.2	200	180 - 20
40	0.4	200	100 - 5

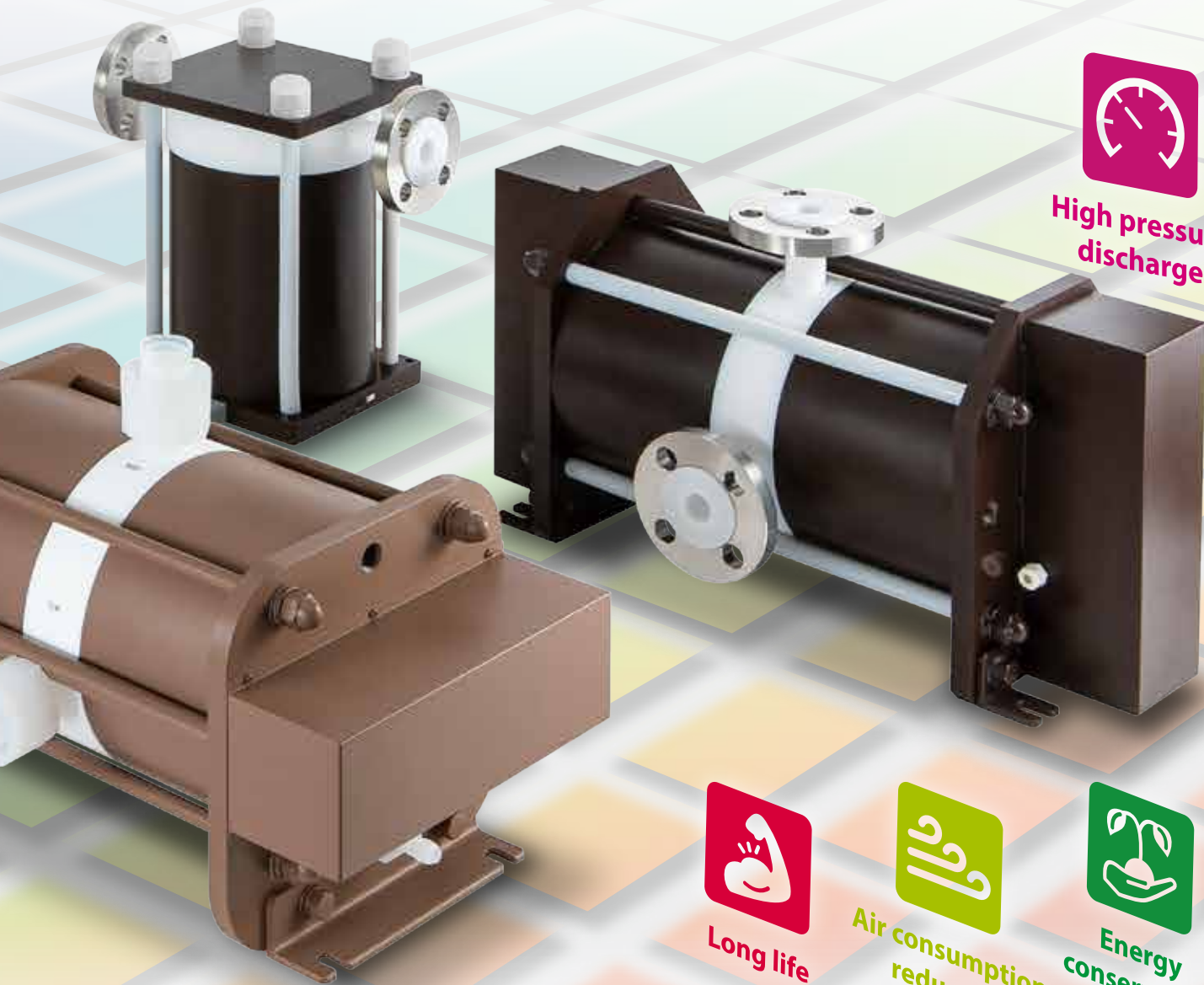
Note: Please check the specifications of each pump for liquid temperature and maximum supply air pressure.

■ Applications

●: Usable ○: Usable depend on condition

Model		FS-H	FS-N	FW	FW-H	FF	FF-H	FA	CFD
Wafer wet-bench	Cleaning (Batch process)	●	●	●	●	●	●	●	—
	Cleaning (Single wafer)	●	●	●	●	●	●	●	—
Chemical supply equipment		●	●	●	—	○	—	○	—
CMP process	Mixed-liquid circulation/Transfer	●	●	●	—	○	—	○	—
	Cleaning	●	●	●	—	●	—	●	—
Chemical replenishing equipment		—	—	—	—	—	—	—	●

Note: Liquid temperature conditions vary depending on pump specifications.



High pressure discharge



Long life



Air consumption reduction



Energy conservation

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FS-100H	High temperature transfer Large flow transfer	4
FS-N	Small & lightweight Low cost High pressure discharge Large flow transfer	5
FW	High pressure discharge Long life	6
FW-H	High temperature transfer High pressure discharge Long life	6
FF	Air consumption reduction Energy Conservation	7
FF-H	High temperature transfer Air consumption reduction Energy Conservation	7
FA	Long life	8

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Pump identification, Construction and materials, Specifications, Dimensions

# FS-15/30/60H



Small & lightweight



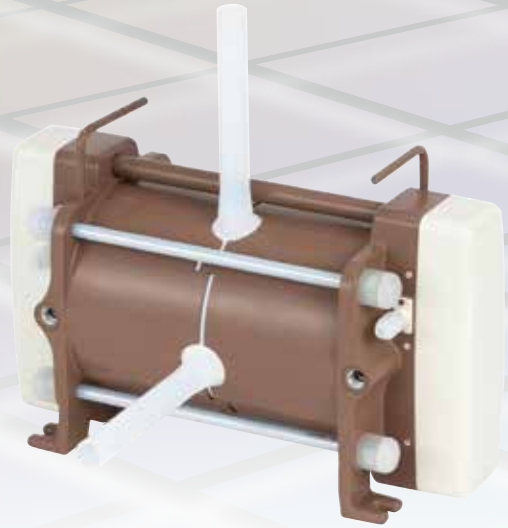
Low cost



High temperature transfer

## A small, lightweight and cost effective solution

- Using a higher stroke rate (240 spm maximum) has resulted in a reduction in size, weight and cost.  
Note: The maximum stroke rates are dependent on model and application; please refer to the specification table for details.
- All liquid contact components are constructed of high purity fluoro resin materials. The exterior of the units are also coated in fluoro resin so that no metallic components are exposed. FS-H pumps also utilize our own shaft seal design (patent pending) resulting in a marked reduction in particle generation.
- The pumps are rated for liquid temperatures ranging from 5 - 180 °C with discharge pressure to 0.45 MPa. Applications include wet process circulation and CMP processes, as well as chemical distribution feed systems.
- The pump uses a proximity sensor drive system which opens/closes an external air solenoid valve providing easy performance control capabilities that are compatible with a variety of controller options.



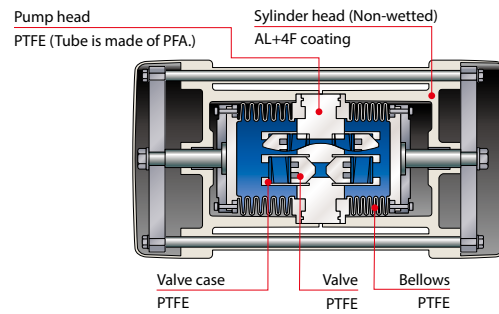
### ■ Pump identification

**FS - 15 H T 1 - 01**

1            2            3            4            5            6

- 1 Series code
- 2 Pump size  
15 : Max. discharge capacity 15L/min  
30 : Max. discharge capacity 30L/min  
60 : Max. discharge capacity 55L/min
- 3 Liquid temperature  
H : High liquid temperature (5 - 180°C)
- 4 Pump connection (suction/discharge)  
T : Tube connection
- 5 Sealing structure of pump head/bellows  
1 : Bellows separation type  
2 : Welded one-piece structure
- 6 Special specification  
Without code : Standard specification  
01 (Serial number) : Special specification

### ■ Construction and materials



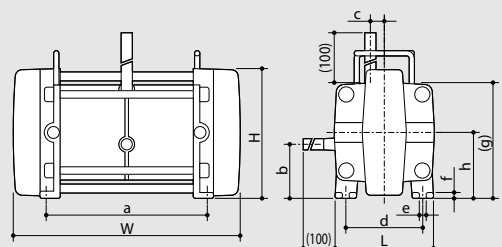
### ■ Specification

Model	FS-15HT1/T2			FS-30HT1/T2			FS-60HT/T2		
Max. discharge capacity	15			30			55		
Air supply pressure range	0.15 - 0.5	0.15 - 0.3	0.15 - 0.2	0.15 - 0.5	0.15 - 0.3	0.15 - 0.2	0.15 - 0.5	0.15 - 0.3	0.15 - 0.2
Liquid temperature range	5 - 50	51 - 100	101 - 180	5 - 50	51 - 100	101 - 180	5 - 50	51 - 100	101 - 180
Max. air consumption	200	160	110	370	280	170	670	440	300
Max. stroke speed <sup>Note</sup>	Max. 240			Max. 220			Max. 200		
Pump connection size	1/2" PFA tube			Ø19×Ø16mm PFA tube			Ø25×Ø22mm PFA tube		
Supply air connection size	Rc1/4			Rc1/4			Rc3/8		
Ambient temperature	0 - 40			0 - 40			0 - 40		
Drive system	By proximity switch			By proximity switch			By proximity switch		

Note: 180 spm maximum with feed air pressures between 0.3 and 0.5 MPa.  
• Max. discharge capacity shows when pumping clear water at 20°C.

### ■ Dimension in mm

Model	W	L	H	a	b	c	d	e	f	g	h
FS-15HT1/T2	315	120	166	213	77	15.5	96	10	8	144	84
FS-30HT1/T2	390	151	208	272	93	23	115	10	9	180	105
FS-60HT1/T2	441	194	251	317	107	27	152	12	11	224	127



# FS-100H



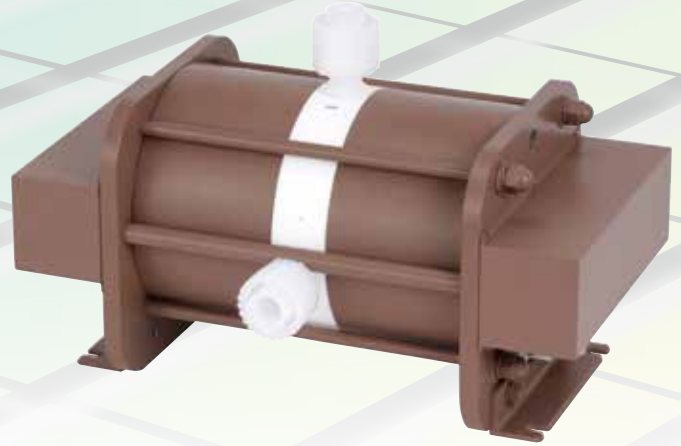
High temperature transfer



Large flow transfer

## Flow and temperature capabilities offer improved process efficiencies

- Maximum flow rate of up to 100 L/min with 180°C liquid. This allows delivery of CARO (SPM) or H3PO4 at a flow rate 1.8 times higher than our existing pumps (55 L/min).
- Higher flow rates improve cleaning efficiency and removal of containments during wafer processing. Cleaning times are also reduced in systems with multiple processing lines.
- In addition to the use of fluoroplastic wet ends (PTFE and PFA), a fluorine coating on the pump's outer surfaces offers the best resistance to vapors from acid, alkali and hydrogen peroxide chemistries used in semiconductor manufacturing.
- Optimization of design has resulted in reduced weight of about 15% of our existing 80-100L models making installation and replacement work easier.
- The pump uses a proximity sensor drive system which opens/closes an external air solenoid valve providing easy performance control capabilities that are compatible with a variety of controller options.



### ■ Pump identification

**FS - 100 H T 2 - 01**

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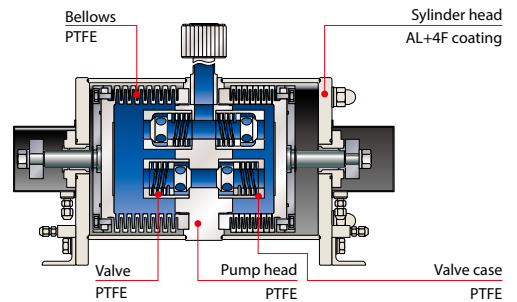
- |   |   |
|---|---|
| <p>1 Series code</p> <p>2 Pump size<br/>100 : Max. discharge capacity 100L/min</p> <p>3 Liquid temperature<br/>H : 10 - 180°C</p> | <p>4 Pump connection (suction/discharge)<br/>T : Tube connection</p> <p>5 Sealing structure of pump head/bellows<br/>2 : Welded one-piece structure</p> <p>6 Special specification<br/>Without code : Standard specification<br/>01 (Serial number) : Special specification</p> |
|---|---|

### ■ Specification

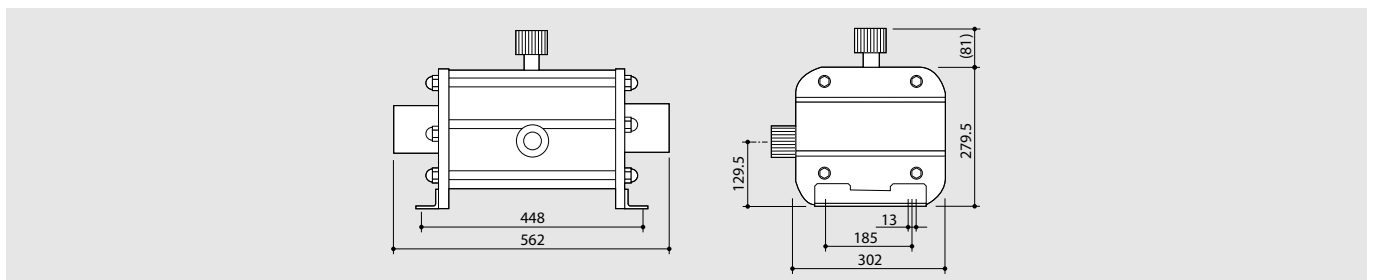
Model	FS-100HT2		
Max. discharge capacity	L/min	100	
Air supply pressure range	MPa	0.15 - 0.5	0.15 - 0.4      0.15 - 0.3
Liquid temperature range	°C	10 - 100	101 - 140      141 - 180
Max. air consumption	NL/min	1210	
Max. stroke speed <sup>Note</sup>	spm	Max. 120	
Pump connection size	1 1/4" fittings (SUPER 300-type PILLAR FITTING manufactured by Nippon Pillar Packaging Co., Ltd.)		
Supply air connection size	Rc1/2		
Ambient temperature	°C	0 - 60	
Drive system	By proximity switch		

• Max. discharge capacity shows when pumping clear water at 20°C.

### ■ Construction and materials



### ■ Dimension in mm



# FS-N



Small and lightweight



Low cost



High pressure discharge



Large flow transfer

## Max. 100L/min. High flow design for chemical distribution applications

- Perfectly suited to high flow & pressure chemical distribution requirements.
- The high stroke rate (Max 200 SPM:FS-80NT) provides for a compact, lightweight and lower cost option without sacrificing flow and pressure capability.
- All liquid contact materials are made of high purity fluororesin resulting in contamination-free construction. Our unique patented shaft seal (FS- 80NT...PAT.) also dramatically reduces particle generation.
- The pump utilizes a built in proximity sensor driven control system to switch an external air solenoid valve. Leak sensors are also included as standard equipment.
- Seal welded pump head and bellows eliminate leakage.



### ■ Pump identification

**FS - 80 N T - 01**

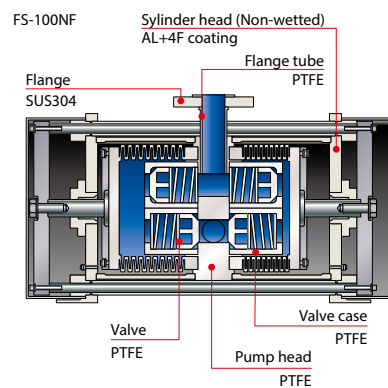
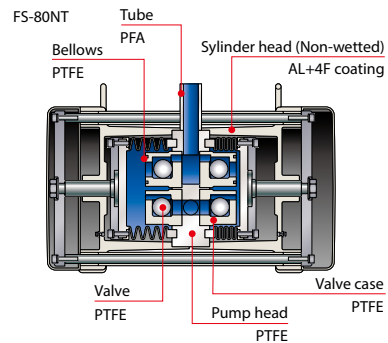
- |               |  |                      |  |   |
|---------------|--|----------------------|--|---|
| 1             | 2  | 3                    | 4  | 5   |
| 1 Series code | 2 Pump size  | 3 Liquid temperature | 4 Pump connection (suction/discharge)  | 5 Special specification   |
|               | 80 : Max. discharge capacity 80L/min<br>100 : Max. discharge capacity 100L/min | N : 5 - 60°C         | T : Tube connection<br>F : Flange connection<br>Sealing structure of pump head/bellows: Welded one-piece structure | Without code : Standard specification<br>01 (Serial number) : Special specification |

### ■ Specification

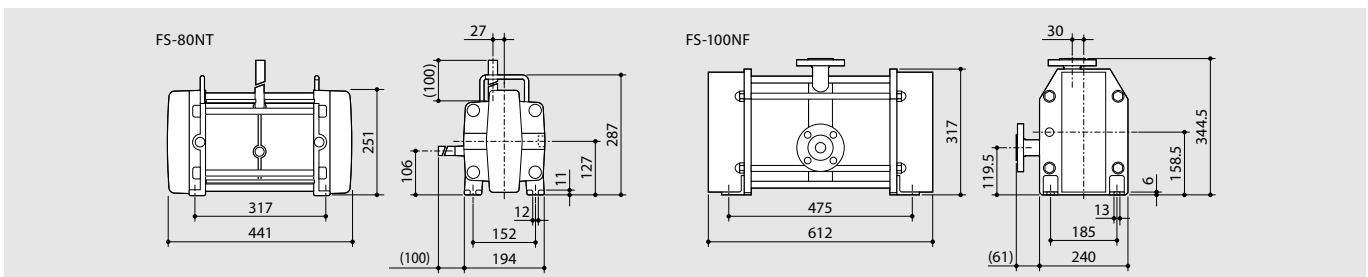
Model	FS-80NT			FS-100NF	
Max. discharge capacity	L/min	80			100
Air supply pressure range	MPa	0.2 - 0.5	0.5 - 0.6	0.6 - 0.7	0.2 - 0.7
Liquid temperature range	°C	5 - 60			5 - 60
Max. air consumption	NL/min	1029	938	787	1495
Max. stroke speed	spm	Max. 200	Max. 150	Max. 110	Max. 100
Pump connection size		Ø25×Ø22mm PFA tube			JIS 20K 25A Flange
Supply air connection size		Rc3/8			Rc1/2
Ambient temperature	°C	0 - 40			0 - 40
Drive system		By proximity switch			By proximity switch

• Max. discharge capacity shows when pumping clear water at 20°C.

### ■ Construction and materials



### ■ Dimensions in mm



# FW/FW-H



High temperature transfer



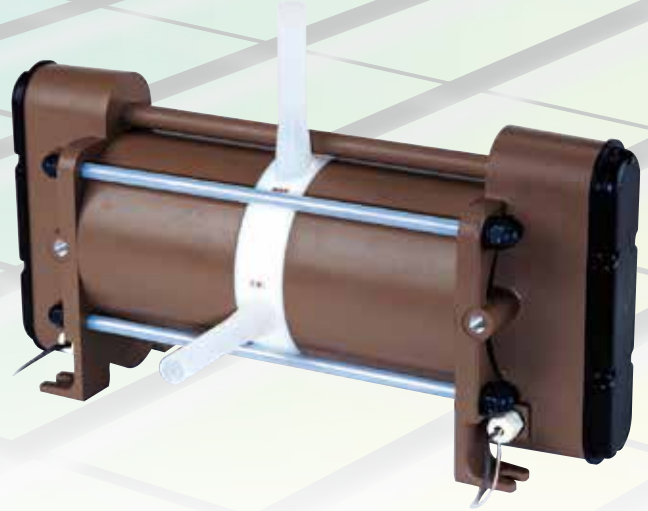
High pressure discharge



Long life

## Robust bellows design provides for high pressure capability and extended service life

- The use of a thick bellows increases the pumps discharge pressure rating to as high as 0.45 MPa maximum. In addition, the bellows have three to four times longer service life than a diaphragm. This results lower case a substantially reduced downtime.
- This design is commonly used for chemical feed, the FW series can be used in high pressure and medium temperature (10 - 100 °C) cleaning systems as well as for the circulation of CMP slurry liquids. The FW-H with its higher temperature capability (10 - 180 °C) is ideal for chemical circulation in wafer cleaning applications.
- Easily adaptable fitting capability, the internally formed PFA suction and discharge tubes prevent the accumulation of particles.
- When connected to a special controller, the discharge can be monitored and controlled easily.
- The pump utilizes a built in proximity sensor driven control system to switch an external air solenoid valve. Leak sensors are also included as standard equipment.



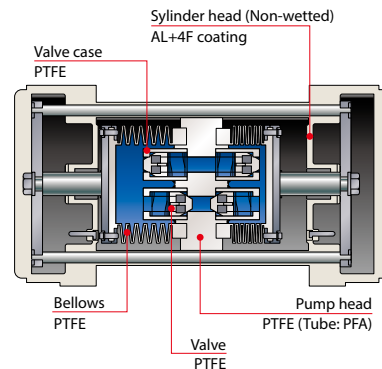
### ■ Pump identification

**FW - 20 H T 1 - 01**

1                      2                      3                      4                      5                      6

- 1 Series code
- 2 Pump size  
20 : Max. discharge capacity 20L/min  
40 : Max. discharge capacity 40L/min  
80 : Max. discharge capacity 80L/min
- 3 Liquid temperature  
Without code : Medium-liquid temperature (10 - 100°C)  
H : High liquid temperature (10 - 180°C)
- 4 Pump connection (suction/discharge)  
T : Tube connection
- 5 Sealing structure of pump head/bellows  
1 : Bellows separation type  
2 : Welded one-piece structure
- 6 Special specification  
Without code : Standard specification  
01 (Serial number) : Special specification

### ■ Construction and materials



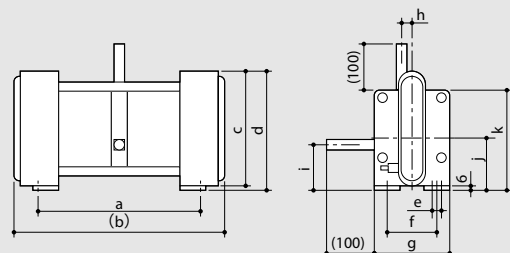
### ■ Specification

Model	FW-20	FW-40	FW-80	FW-20H			FW-40H			
Max. discharge capacity L/min	20	40	80							
Air supply pressure range MPa	0.2 - 0.5			0.2 - 0.5	0.15 - 0.3	0.15 - 0.2	0.2 - 0.5	0.15 - 0.3	0.15 - 0.2	
Liquid temperature range °C	10 - 100	10 - 100	10 - 80	10 - 100	101 - 150	151 - 180	10 - 100	101 - 150	151 - 180	
Max. air consumption NL/min	330	480	820	330	200	140	480	300	220	
Max. stroke speed <sup>Note</sup> spm	Max. 120	Max. 80	Max. 80	Max. 120			Max. 80			
Pump connection size mm	Ø19×Ø16 PFA tube		Ø25×Ø22 PFA tube		Ø19×Ø16 PFA tube			Ø25×Ø22 PFA tube		
Supply air connection size	Rc1/4	Rc3/8	Rc1/2	Rc1/4			Rc3/8			
Ambient temperature °C	0 - 40			0 - 40			0 - 40			
Drive system	By proximity switch			By proximity switch			By proximity switch			

• Max. discharge capacity shows when pumping clear water at 20°C.

### ■ Dimensions in mm

Model	a	(b)	c	d	e	f	g	h	i	j	k
FW-20/20H	347	458	218	221	10	105	140	22	90	112	182
FW-40/40H	435	542	240	250	12	143	183	25.5	102	130	220
FW-80	464	600	302	317	13	185	240	27	119.5	158.5	317



# FF/FF-H



High temperature transfer



Air consumption reduction



Energy conservation

## Energy efficient design consumes less air

- The FF series is designed for use with medium temperature liquids (Al cylinder type: 5 to 100°C, PVC cylinder type: 5 to 50°C) and the FF-H series is designed for temperatures ranging from 20 to 180°.
- All liquid contact components are constructed of high purity fluoro resin materials with no metal or elastomers. The bellows are welded to the center eliminating leaks associated with heat cycles. The efficient design minimizes dead air volume surrounding the bellows to minimize air consumption.
- Shaft packing is easily accessible externally, no need to disassemble the pump for replacement.
- Suction and discharge fluid connections are PFA tubes and for FF models PFA tubes with special fittings are available.
- The pump utilizes a built in proximity sensor driven control system to switch an external air solenoid valve. Leak sensors are also included as standard equipment.



### ■ Pump identification

**FF - 20 B T 1 - 01**

1 2 3 4 5 6

- |   |   |
|---|---|
| 1 Series code<br><b>FF</b> : Medium-liquid temperature (5 - 100°C)  | 4 Pump connection (suction/discharge)<br><b>T</b> : Tube connection   |
| 2 Pump size<br><b>10</b> : Max. discharge capacity 10L/min<br><b>20</b> : Max. discharge capacity 22L/min | 5 Sealing structure of pump head/bellows<br><b>1</b> : Bellows separation type  |
| 3 Cylinder material<br><b>B</b> : Al+4F coating<br><b>C</b> : PVC   | 6 Special specification<br>Without code : Standard specification<br><b>01</b> (Serial number) : Special specification |

**FF - 20 H T - 01**

1 2 1 3 4

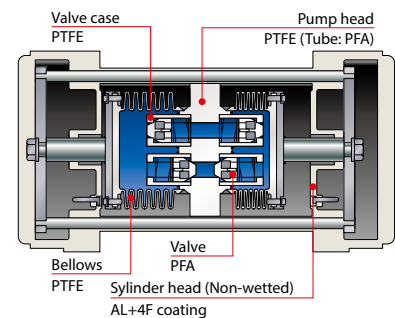
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|---|--|
| 1 Series code<br><b>FF-H</b> : High-liquid temperature (20 - 180°C)                                       | 3 Pump connection (suction/discharge)<br><b>T</b> : Tube connection<br>Sealing structure of pump head/bellows:<br>Welded one-piece structure |
| 2 Pump size<br><b>20</b> : Max. discharge capacity 20L/min<br><b>40</b> : Max. discharge capacity 40L/min | 4 Special specification<br>Without code : Standard specification<br><b>01</b> (Serial number) : Special specification                        |

### ■ Specification

Model	FF-10BT/CT1	FF-20BT/CT1	FF-20HT	FF-40HT1
Max. discharge capacity	L/min 10	22	20	40
Air supply pressure range	MPa 0.15 - 0.3	0.15 - 0.3	0.15 - 0.2	0.15 - 0.2
Liquid temperature range	°C B type: 5 - 100, C type: 5 - 50 <sup>Note</sup>		20 - 180	20 - 180
Max. air consumption	NL/min 90	180	150	200
Max. stroke speed	spm Max. 120	Max. 120	Max. 120	Max. 80
Pump connection size	1/2" PFA tube	3/4" PFA tube	3/4" PFA tube	Ø25×Ø22mm PFA tube
Supply air connection size	Rc1/4	Rc1/4	Rc1/4	Rc3/8
Ambient temperature	°C 0 - 40	0 - 40	0 - 40	0 - 40
Drive system	By proximity switch	By proximity switch	By proximity switch	By proximity switch

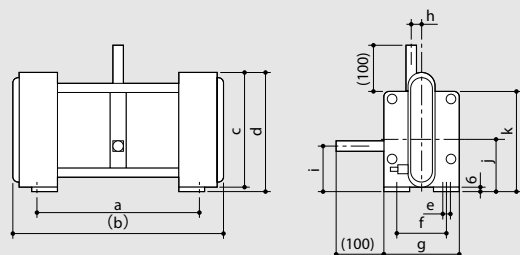
Note: The cylinder of the "B" type is made of aluminum and tetrafluoro resin and that of the "C" type is of PVC.  
• Max. discharge capacity shows when pumping clear water at 20°C.

### ■ Construction and materials



### ■ Dimension in mm

Model	a	(b)	c	d	e	f	g	h	i	j	k
FF-10	266	361	188	191	10	84	114	14.5	82	97	154
FF-20/20H	288	400	218	221	10	105	140	20	91/80	112	182
FF-40H	431	533	240	250	12	143	183	23.5	97	130	220





# FA



Long life

## Designs for circulating moderate temperature fluids

- There are two standard models available in the FA series; the FA-2E, a horizontal type for lower flow requirements and the FA-40VEW, a vertical type for a higher flow rates. A typical application for the FA-2E is in aspray system for single wafer processing while the FA-40VEW is suitable for batch cleaning of 200/300 mm wafers.
- The FA-40VEW is designed for a long service life and uses a robust bellows design suitable for continuous operation at higher discharge pressures.
- Discharge rates can be easily monitored and controlled when used with a dedicated controller
- The pump utilizes a built in proximity sensor driven control system to switch an external air solenoid valve. Leak sensors are also included as standard equipment.



FA-2



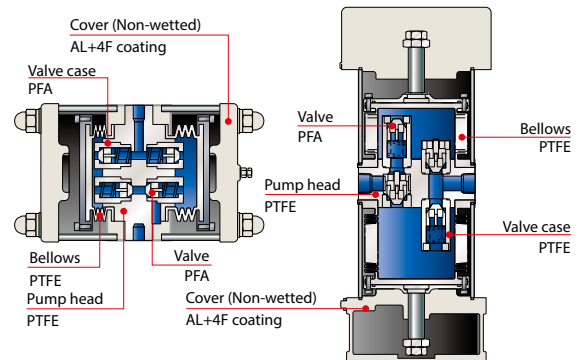
FA-40VEW

### ■ Pump identification

**FA - 2 E-1 - 01**

- |               |  |   |   |
|---------------|--|---|---|
| 1             | 2  | 3   | 4   |
| 1 Series code | 2 Pump size  | 3 Pump drive system   | 4 Special specification   |
|               | <ul style="list-style-type: none"> <li>2 : Max. discharge capacity 2L/min</li> <li>40 : Max. discharge capacity 40L/min</li> </ul> | <ul style="list-style-type: none"> <li>• FA-2</li> <li>-1 : Air pulse timer switching valve system+Electrodes</li> <li>E-1 : Controller system+Electrodes</li> <li>• FA-40</li> <li>VEW : Controller system+Electrodes Pump head and bellows welded into one piece</li> </ul> | <ul style="list-style-type: none"> <li>Without code : Standard specification</li> <li>01 (Serial number) : Special specification</li> </ul> |

### ■ Construction and materials

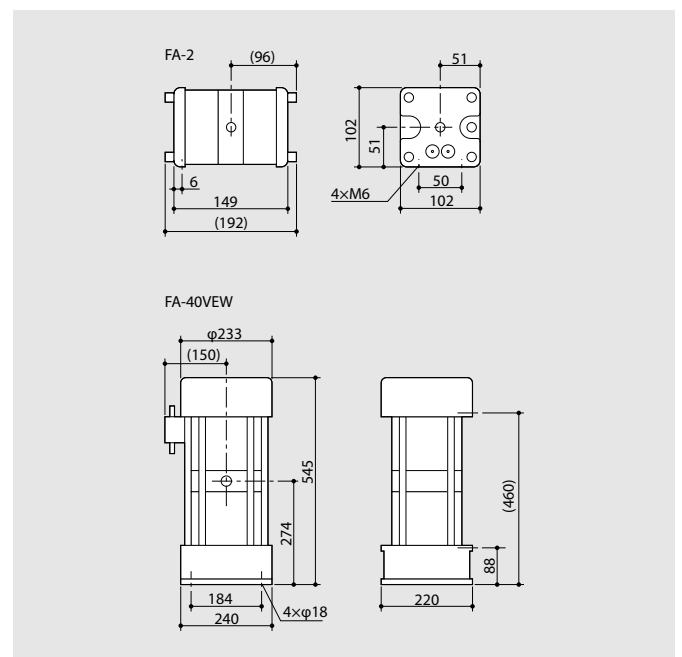


### ■ Specification

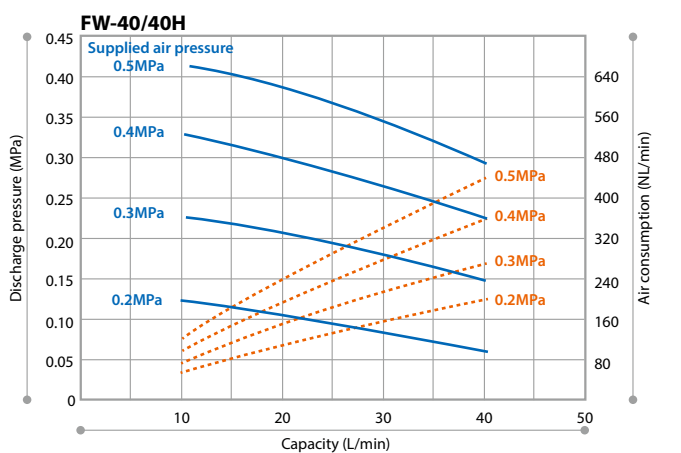
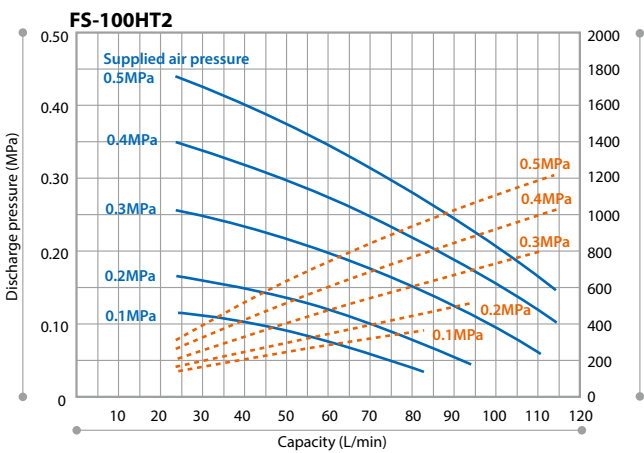
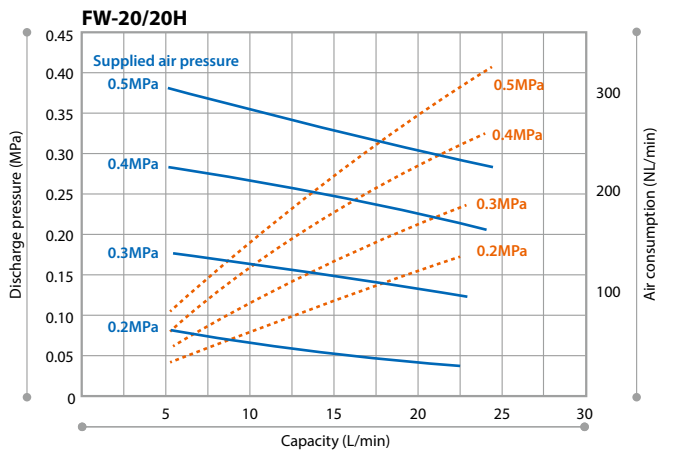
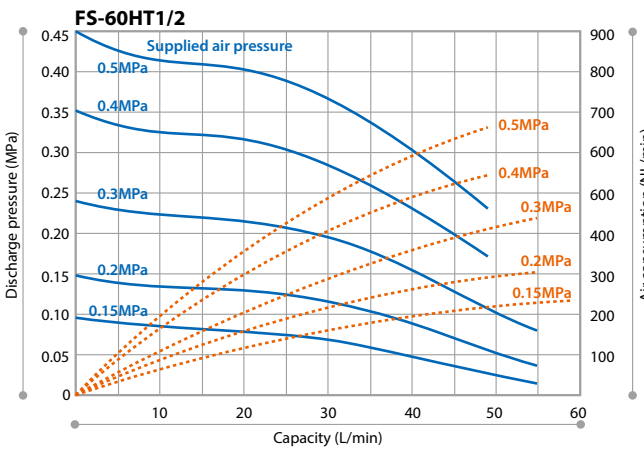
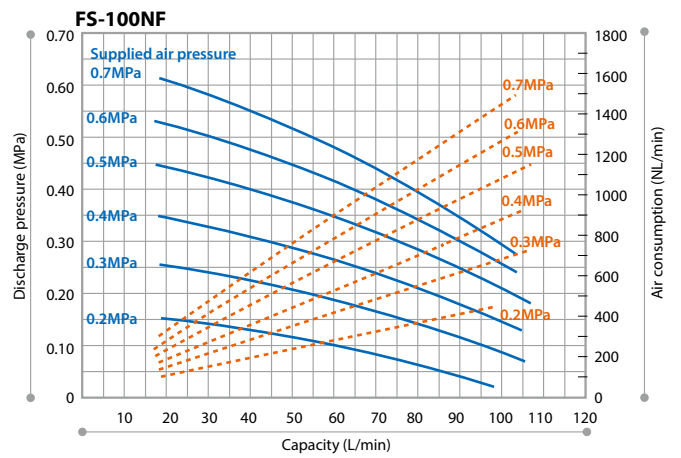
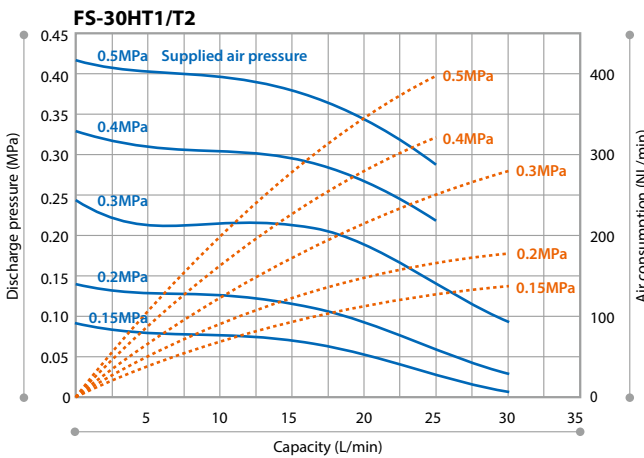
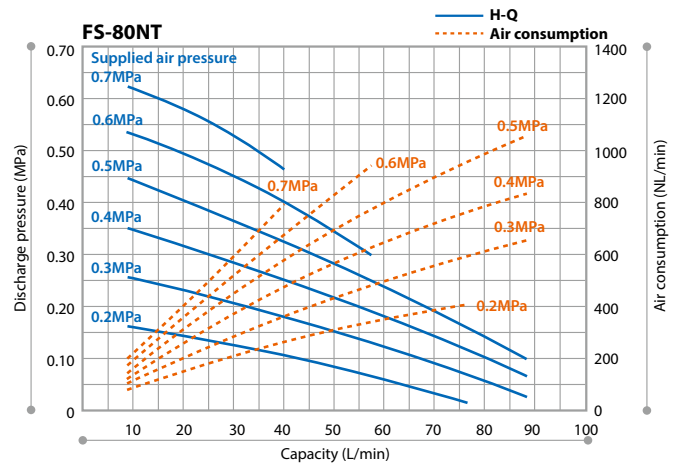
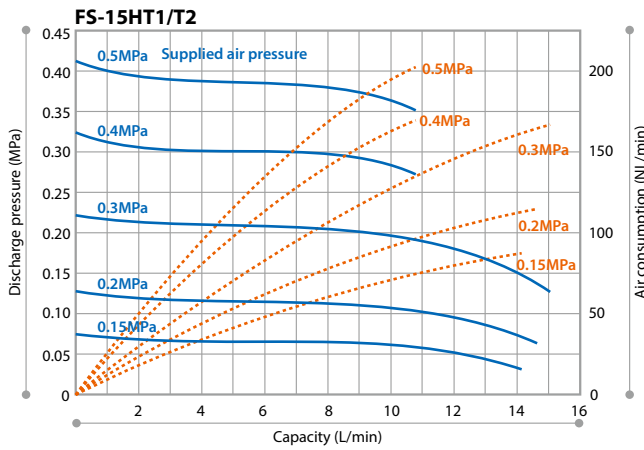
Model		FA-2E-1	FA-40VEW
Max. discharge capacity	L/min	2	40
Air supply pressure range	MPa	0.2 - 0.4	0.1 - 0.4
Liquid temperature range	°C	5 - 100	5 - 100
Max. air consumption	NL/min	50	200
Max. stroke speed	spm	Max. 150	Max. 80
Pump connection size		Rc1/8	Rc1
Supply air connection size		Rc1/4	Rc3/8
Ambient temperature	°C	0 - 40	0 - 40
Drive system		By proximity switch	By proximity switch

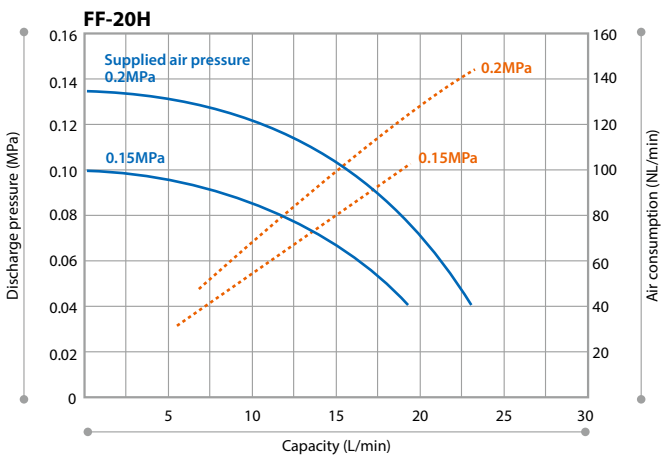
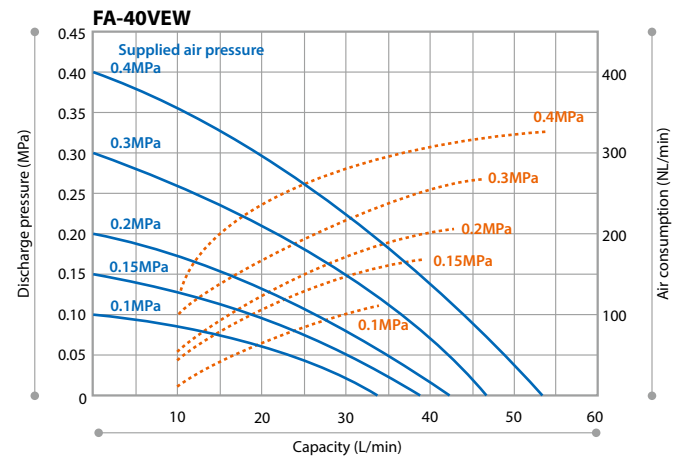
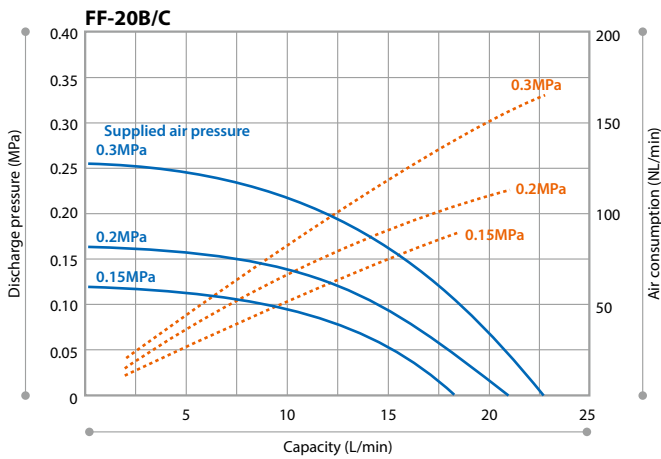
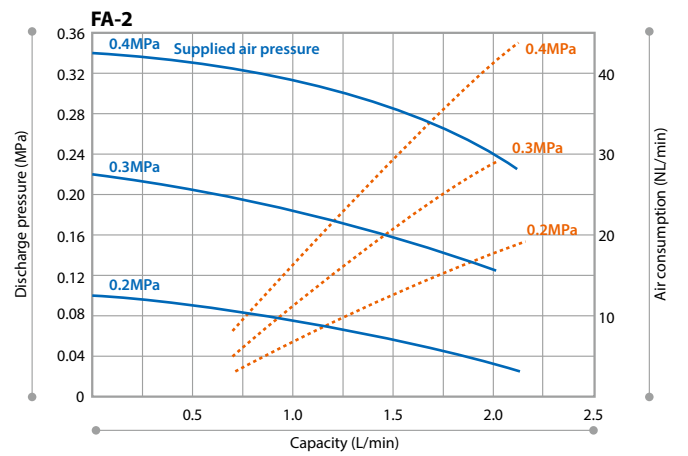
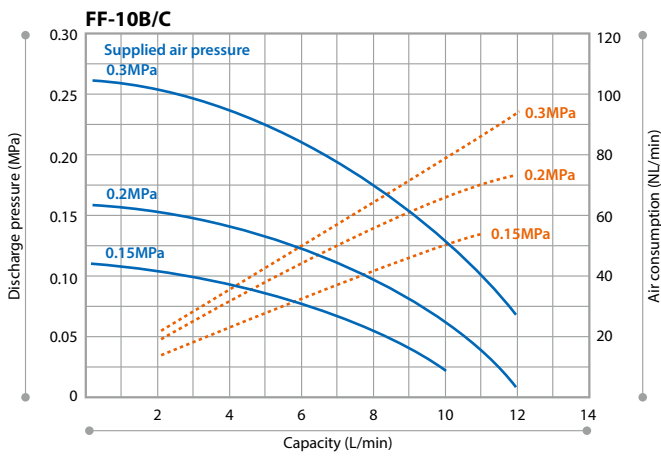
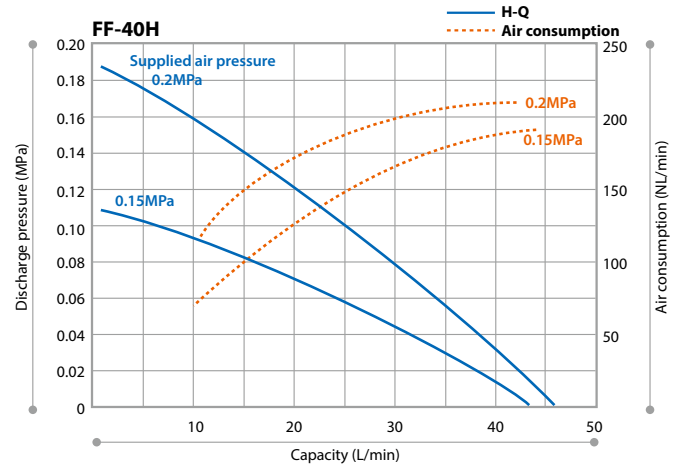
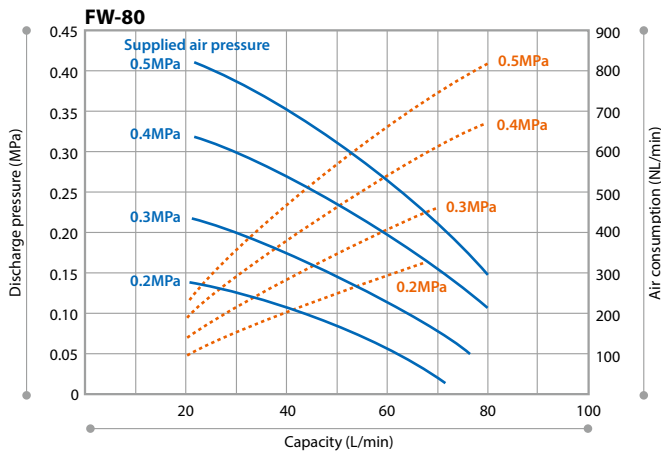
• Max. discharge capacity shows when pumping clear water at 20°C.

### ■ Dimension in mm



**Performance curves**





## Options



Pulsation  
reduction

### Dampener

The installation of a dampener on the discharge side of the pump will reduce pulsation and prevent particle release through filters as well as from pipe vibration.

### Pulse dampeners PD-H (for wet use)

for the FS-H only

- A low cost and compact dampener.
- Liquid inside the bellows can be easily drained.
- A leak sensor is included as a standard.



### Pulse dampeners PD-H1

FF FF-H FA

- No automatic pressure adjustment.
- The PD-H1 is a medium-pressure design for use with FF, FF-H and FA pumps.



\* Models with leak sensors are available through special order.

### Automatic dampeners PDA-H1/WB/W

FS-H FW FW-H FF FF-H FA

- Automatic pressure adjustment minimizes downtime, eliminates manual adjustments.
- Liquid inside the bellows can be easily drained. (PDA-WB/W model)
- The PDA-H1 is a medium pressure design for use with the FF, FF-H, and FA pumps. The PDA-WB/W is a high-pressure design suitable for use with the FW, FW-H, and FS-H pumps. Typical applications include drug delivery and dispensing.
- The PDA-WB/W includes a leak sensor as standard. (For the PDA-H1, a leak sensor is available through special order.)
- For the PDA-WB/W, only the specified liquid pipe joint can fit the model. Please contact us before use to check if your joint is applicable.



### Automatic dampeners PDA-100WBN

For the FS-100NF only

- Automatic pressure adjustment minimizes downtime, eliminates manual adjustments.
- Dampener pressure is automatically adjusted to the minimum pulse pressure even if the pump discharge load changes due to a clogged filter. The unit prevents particles being released from the filter and the pinging vibration.
- A leak sensor is included as a standard.



Model	PD-15H		PD-30H		PD-60H	
Applicable pumps	FS-15HT1/T2		FS-30HT1/T2		FS-60HT1/T2	
Liquid temperature range °C	5 - 100	101 - 180	5 - 100	101 - 180	5 - 100	101 - 180
Max. supplied air pressure MPa	0.3	0.2	0.3	0.2	0.3	0.2
Supply air pressure range MPa	0.15 - 0.3	0.15 - 0.2	0.15 - 0.3	0.15 - 0.2	0.15 - 0.3	0.15 - 0.2
Pulsation pressure range MPa	Less than 0.06 <sup>Note</sup>					
Connection size	1/2" PFA tube		3/4" PFA tube		Ø25×Ø22mm PFA tube	
Supply air connection size	Rc1/8					
Wet-end materials	PTFE, PFA					

Note: In case that liquid viscosity is less than 1 - 50 mPas.  
• Cannot be used above the working pressure of the pump.

Model	PDA/PD-10H1	PDA/PD-20H1	PDA/PD-40H1
Applicable pumps	FF-10B/CT1	FF-20B/CT1 FF-20HT	FA-40VEW FF-40HT1
Liquid temperature range °C	20 - 180		
Supply air pressure range MPa	0.3		0.4
Pulsation pressure range MPa	0.04 or less		
Connection size	1/2" PFA tube	3/4" PFA tube	Ø25×Ø22mm PFA tube
Supply air connection size	Rc1/4		
Wet-end materials	PTFE/PFA		

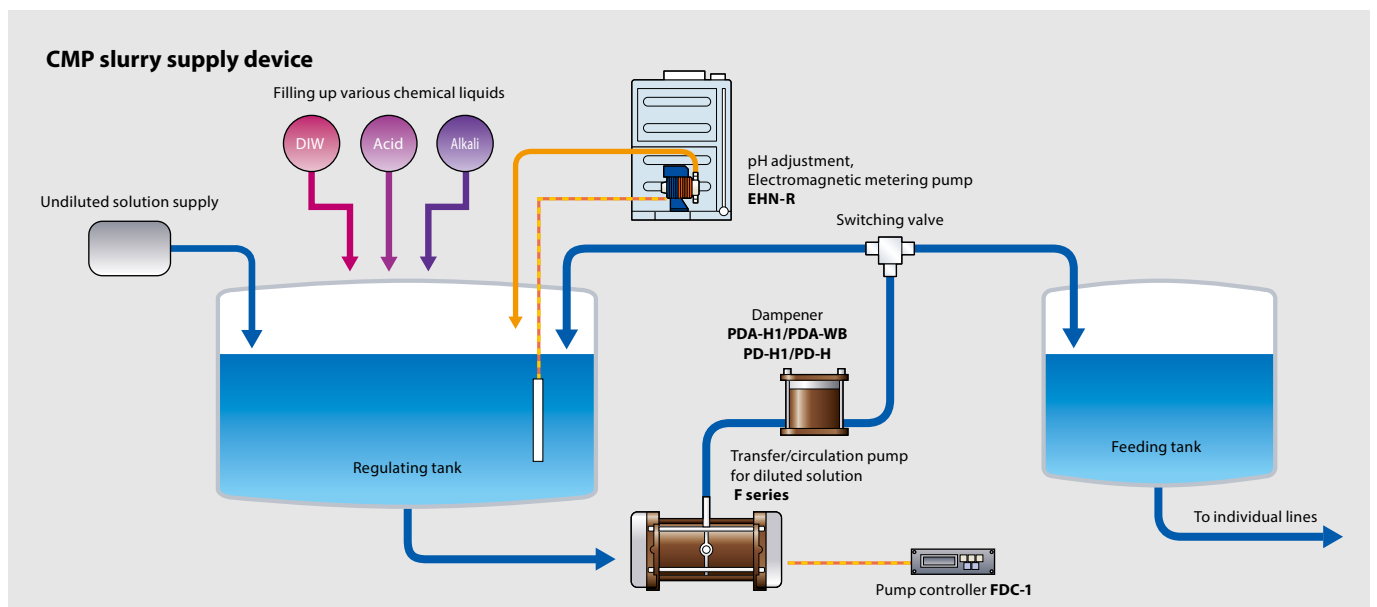
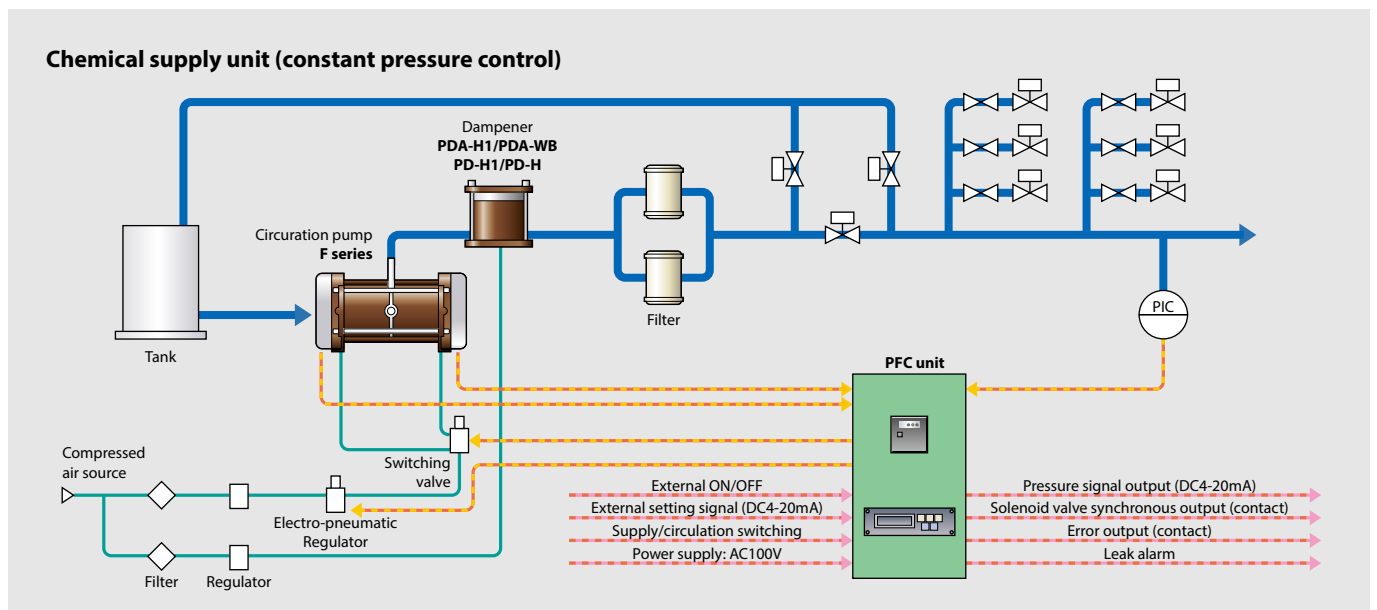
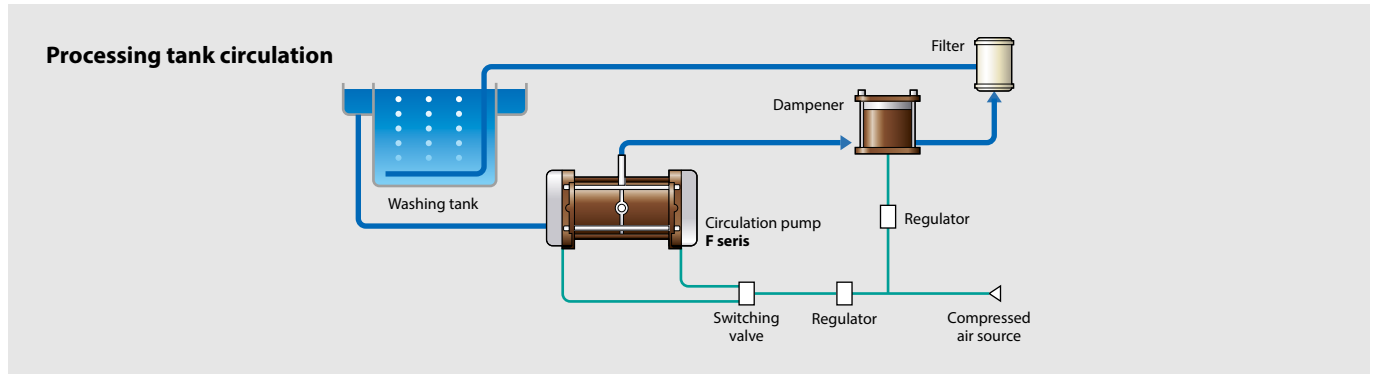
Model	PDA-20WB/W, PDA-40WB/W			PDA-80WB/W
Applicable pumps	FW-20/FW-20H, FS-15/FS-30 (PDA-20WB/W) FW-40/FW-40H/FS-60 (PDA-40WB/W)			FW-80
Liquid temperature range °C	10 - 100	101 - 150	151 - 180	10 - 80
Supply air pressure range MPa	0.5	0.3	0.2	0.5
Pulsation pressure range MPa	Less than 0.06 <sup>Note</sup>			
Connection size	1/2" PFA tube	Ø25×Ø22mm PFA tube		
Supply air connection size	Rc1/4			
Wet-end materials	PTFE/PFA			

Note: In case that liquid viscosity is less than 1 - 50 mPas.  
• Cannot be used above the working pressure of the pump.  
• The pulsating pressure range depends on the operating conditions. Please contact us for details.  
• There are some fittings that cannot be used. Please contact us for details.

Model	PDA-100WBN
Applicable pumps	FS-100NF
Liquid temperature range °C	5 - 60
Max. supplied air pressure MPa	0.7
Supply air pressure range MPa	0.2 - 0.7
Pulsation pressure range MPa	0.15 <sup>Note</sup>
Connection size	JIS 20K 25A Flange
Supply air connection size	Rc1/4
Wet-end materials	PTFE

Note: In case that liquid viscosity is less than 1 - 50 mPas.  
• The maximum working fluid pressure is the pressure generated when the discharge side is closed.  
• Please contact us for dampers for FS-80NT.

**Example of installation**



## Options

### Quick exhaust valve

When installed on the air exhaust lines at the pump the exhaust valve will help to reduce pulsation and prevent particle release from the filter as well as from pipe vibration.

### QEV

Quick exhaust valves should be installed between the pump and the external solenoid valve. This helps to prevent corrosion of the solenoid valve from return air. It also reduces exhaust resistance to allow the bellows to move smoothly through each cycle.



Model	Connection size	Applicable pumps
QEV-8V	Rc1/4	FW-20/20H, FF-10/20/20H, FA-2, FS-15/30
QEV-10V	Rc3/8	FW-40/40H, FF-40H, FA-40, FS-60/80N
QEV-15V	Rc1/2	FS-100HT, FS-80NT, FS-100NF

### Pump controller/driver

The external solenoid valve is switched in response to signals from the built-in proximity sensors on each side of the bellows to ensure reliable operation of the pump. Two controller options are available along with one driver option.

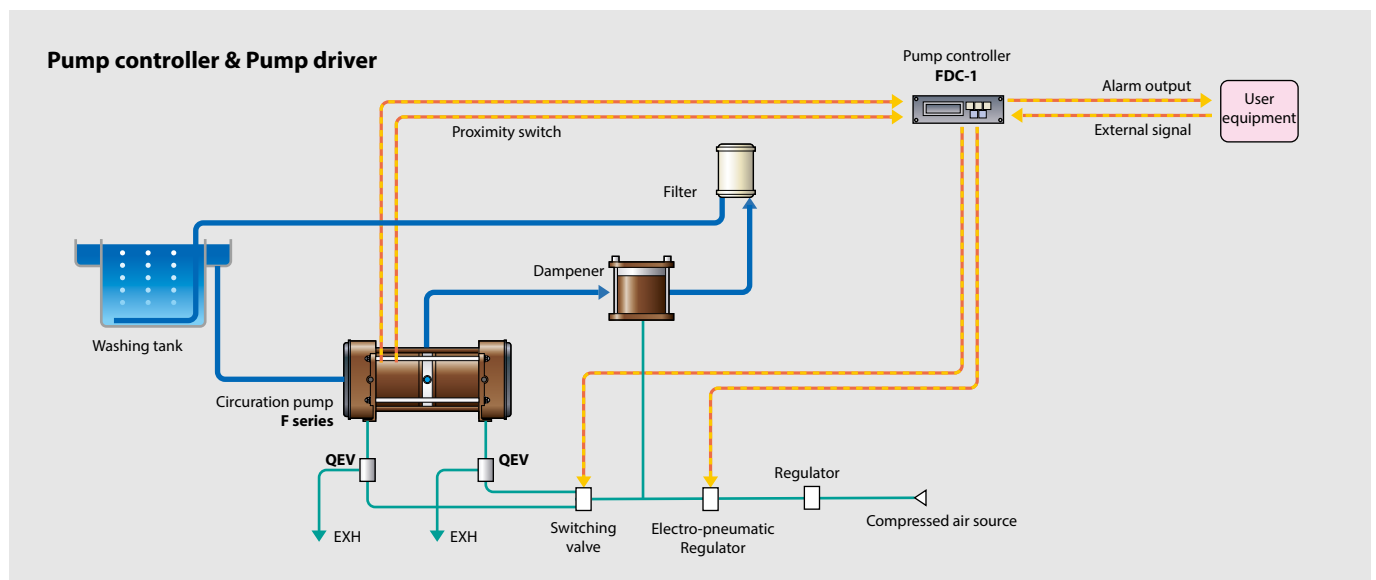
### Pump controller FDC-1

FS-H FS-N FW FW-H FF FF-H FA



- The pump discharge rate can be monitored and maintained at a constant level by connecting an electric air regulator (optional) to the pump air supply line. This enables stable flow and filtering even when the discharge load varies due to increased filter resistance.
- The controller can monitor the flow rate, the number of strokes, and the total count.
- The unit operates either in the AUTO mode using external signals or in the MANU mode for manual control.
- The flow rate can be set at two different values as desired.
- In addition to the sensor mode using the proximity sensors, the timer mode is included as a standard feature. This enables continued pump operation in the timer mode in case of the failure of a proximity sensor.
- The unit is equipped with various alarm displays and output functions, including leak alarm and a pump malfunction alarm.

General specification	Power source	DC24V±10%
	Power consumption	24VA max.
	Ambient temperature	0 - 50°C
	Working atmosphere	Without corrosive gas in surrounding areas
Input specification	Start, Alarm reset	No-voltage contact or open collector Voltage ON: 3V maximum Voltage OFF: 18V maximum
Output specification (External output)	Leak alarm Pump malfunction alarm Life alarm First alarm	Output form: NPN open collector Switching capacity: DC24V 0.4A
Dimensions	W158mm×D152mm×H48mm	



## ■ Chemical replenishing system

### Chemical replenishing system CFD-1T-B

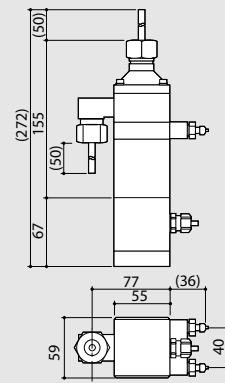
With a resolution of up to 1.0mL/shot fine dispense volumes can be achieved.  
8mL type per shot is also available. Please contact us for details.

- The resolution of the CFD-1T-B has been greatly improved compared to our existing models. The minimum flow of 1mL/shot offers greater accuracy in chemical condensation control that is required in the wafer cleaning process. The CFD-1T-B always feeds the correct quantity of chemical without overshoot eliminating excess liquid wastage. In addition, the anti-siphon mechanism prevents unintentional siphoning.
- The fluoroplastic wet end (PTFE, PFA, PCTFE) is capable of handling strong acids, alkalines and hydrogen peroxide, typical chemicals required for semiconductor processing. PTFE, PFA, PP, PVC external parts and PTFE coated screws provide additional protection against chemical attack from harsh environments.
- Adjustment of the stroke length to give between 1.0-2.7mL/shot is simple by removal of the bottom cover (Factory default is 1.0mL/shot).
- Every unit is equipped with a leakage sensor to immediately detect a leak.

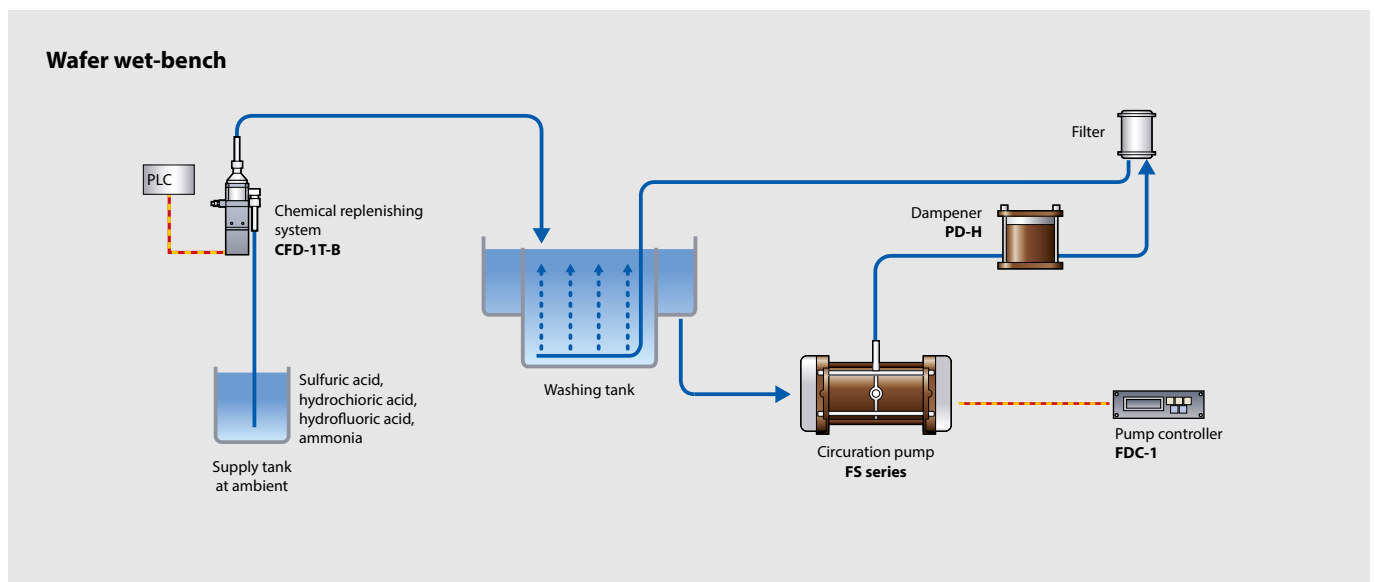


Pump specification	Application	Chemical replenishing	
	Discharge capacity	mL/shot	1
	Max. discharge pressure	MPa	0.05
	Liquid temperature range	°C	20 - 60
	Max. stroke speed	spm	30
	Max. supply air pressure	MPa	0.15 - 0.3
	Max. air consumption	NL/min	2.5
	Wet-end materials		PTFE, PFA, PCTFE
	Liquid port bore		1/4" PFA tube (Ø6.35×Ø4.35mm)
	Supply air port bore		Rc1/8
Photosensor specification	Mass	kg	1.1
	Product name		Transmission type micro photo sensor
	Power voltage		5 - 24V DC±10%
	Output mode		NPN transistor open collector
	Allowable current		50mA or below
Cord			5m PVC four-core cable (Outer dia. 5.2mm) with 0.5 - round terminal

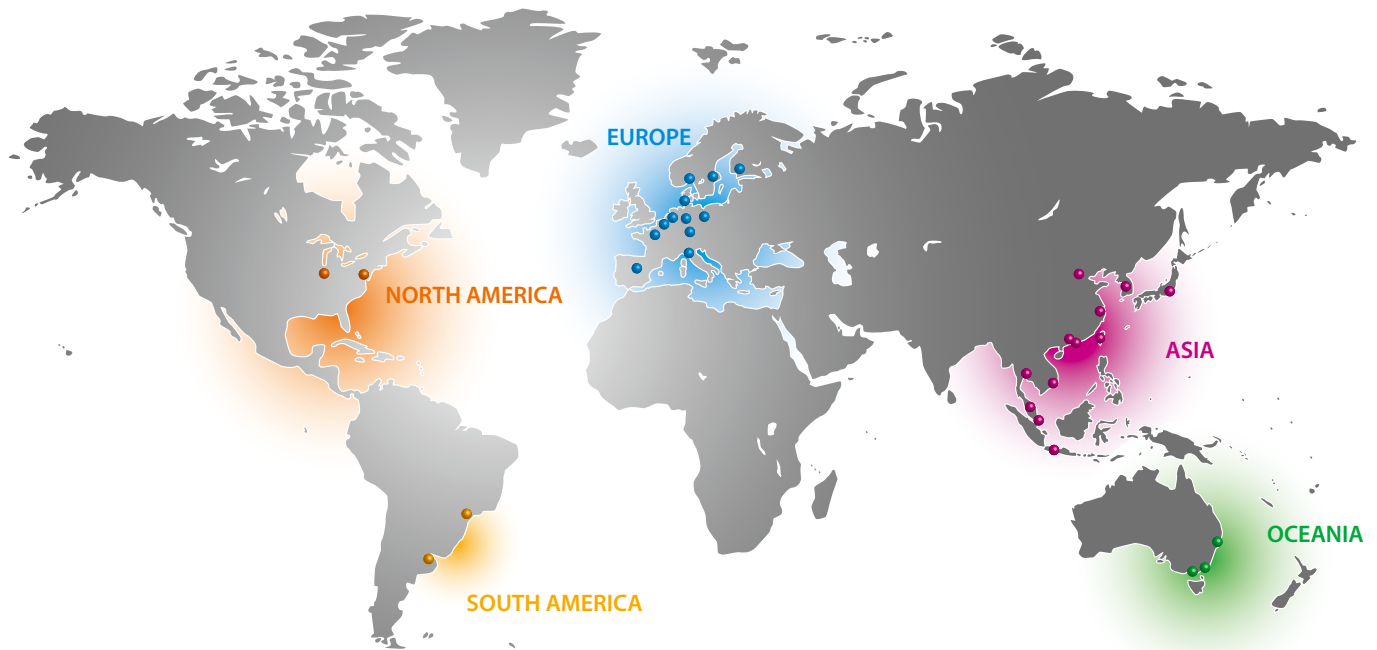
Dimension in mm



• Please request a separate drawing for external dimensions.



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**Caution for safety use:**  
 Before use of pump, read instruction manual carefully to use the product correctly.

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