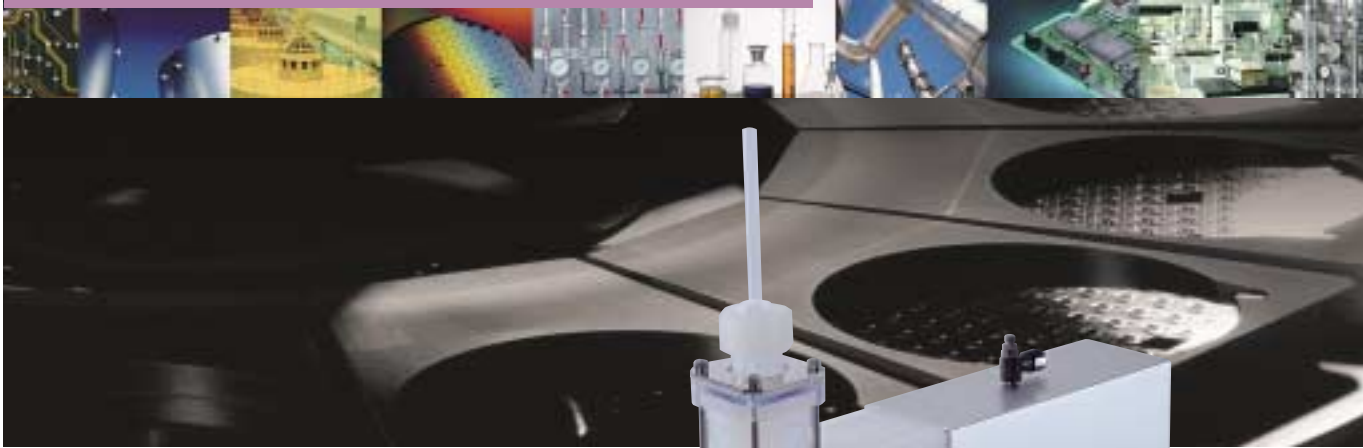


## Photoresist dispensing systems PDS series

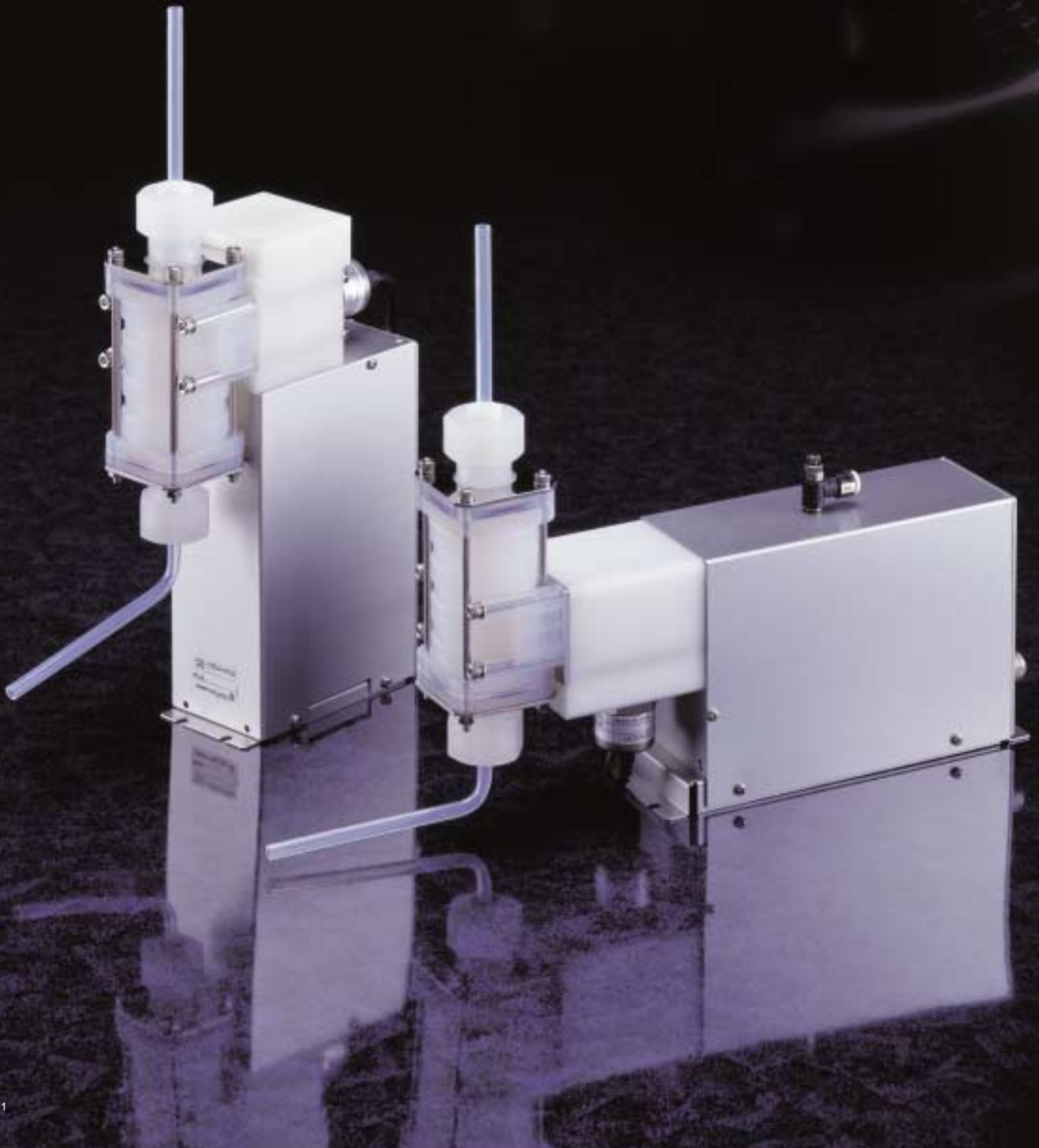


# A resist-saving photoresist dispensing systems

Wasteful use of resist, variation of application amount, contamination, accumulation of bubbles, and so forth—these are problems experienced in the photoresist coating process.

Now, all of them can be solved by the PDS series.

Saving of resist will lead to remarkable cost reduction and improvement of production efficiency.





### **Substantial Saving of Resist**

The use of a high-torque stepper motor as the drive source results in a consistent discharge volume, unimpeded by filter clogging or viscosity change. A repeatable accuracy (0.3%) of discharge is maintained.

- Repeated precision:  $\pm 0.3\%$  (F.S.)
- Linearity:  $\pm 0.5\%$  (F.S.)
- Resolution: 0.01 ml or below

### **Contamination-free**

The pump portion is of tubephragm structure wetted internals are flat and smooth, with a small dead volume. Because the system hardly has a place that allows liquid resist to dwell, production of particles is prevented.

### **Usable for a Variety of Coating Processes**

Since the discharge velocity can be changed freely in a shot, the system is capable of dealing with a variety of resist coating processes including application of a very small amount or in a very short period of time.

### **Reduction of Downtime**

A discharge amount and a discharge time can be set only by entering values in the controller. It can save operator's time and labor and reduce downtime.

### **Mountable on Existing Equipment**

Mountable on existing equipment (a coater, for example). In case the SB pump is mounted on the PDS as a replacement, the use of the pulse controller PDS-230 offered as an option can eliminate the need for changing software and the signal system which are being used.

#### **An Example of Cost Curtailment**

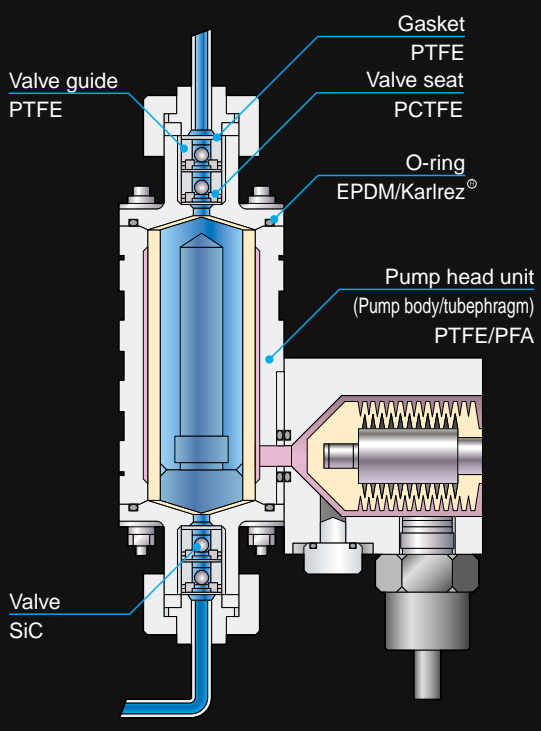
- Amount of saved resist: 1.5 ml/shot
- Number of resist applications: 20 times
- Number of produced wafers: 30,000/month
- Price of resist: \$500/gallon

In the above case, the amount of resist saved annually is:

$1.5 \text{ (ml/shot)} \times 20 \text{ (times)} \times 30,000 \times 12 \text{ (months)} = 10,800 \text{ (liters)} = 2,851 \text{ (gallons)}$

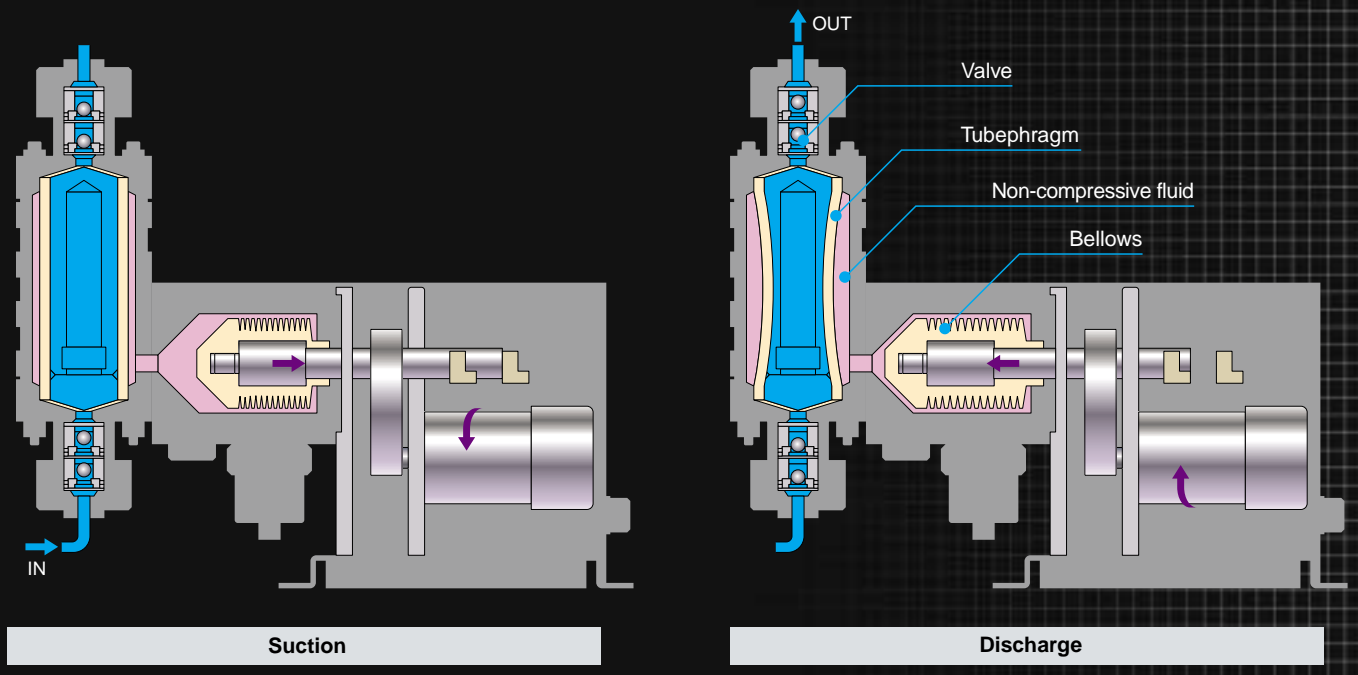
$2,851 \text{ (gallons)} \times 500 \text{ (\$)} = \$1.4 \text{ million}$

# Construction and materials



# Operating principle of pump

- STEP 1.** The bellows stretch and shrink following the reciprocating movement of the motor shaft of the linear stepping motor.
- STEP 2.** Stretch and shrink of bellows cause, via incompressible fluid, the tube-phragm to become deformed.
- STEP 3.** A change of capacity due to deformation of the tube-phragm and the chucking function of the pump cause pumping.



## Pump specifications

Model	PDS-105H / 105V	
Max. discharge capacity	ml/shot	5 (Note 1)
Max. discharge pressure	MPa	0.15
Discharge speed	ml/sec	0.1 - 4.0
Suction speed	ml/sec	0.1 - 3.0
Viscosity limit	mPa·S	100 (Note 2)
Power supply	V	DC24 ± 2.4
Mass	kg	2.3

Note 1: The 10 ml/shot type (PDS-110) is also available. For details, please call us.

Note 2: Viscosity limit depends on piping conditions, suction conditions, etc. For details, please contact us.

### Requirements for Use

Range of liquid temperatures: 15 to 25°C, Ambient temperature: 20 to 25°C, Ambient humidity: 30 to 40%

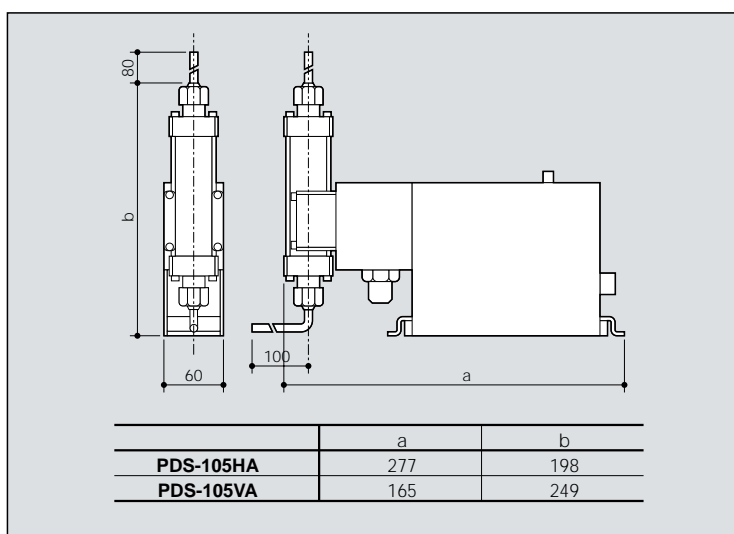
## Identification

**PDS - 1 05 H A - E P W2 - S01**

1   2   3   4   5   6   7   8

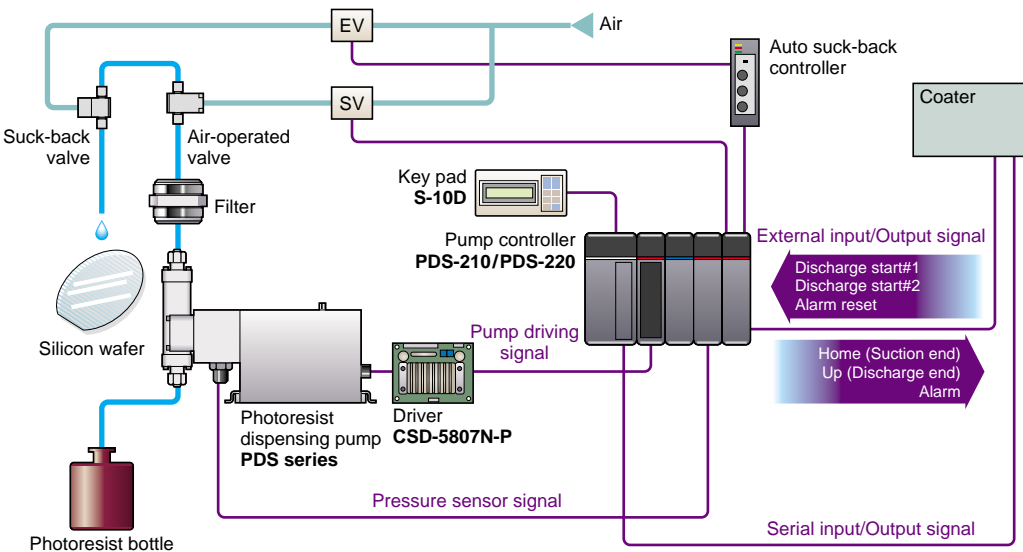
1 Code of product	1: Pump
2 Max. discharge capacity	05: 5ml/shot
3 Form	H: Horizontal V: Vertical
4 Driving unit	A: With home sensor and up sensor and without encoder B: With home sensor and encoder and without up sensor
5 Material of O-ring	E: EPDM K: Kalrez®
6 Pressure sensor	P: With pressure sensor L: Without pressure sensor
7 Connection size	M6: ø6 x ø4 mm PFA tube W2: 1/4" PFA tube Y1: Others
8 Special specification	S01, S02, S03 ...

## Dimensions in mm



# System flow

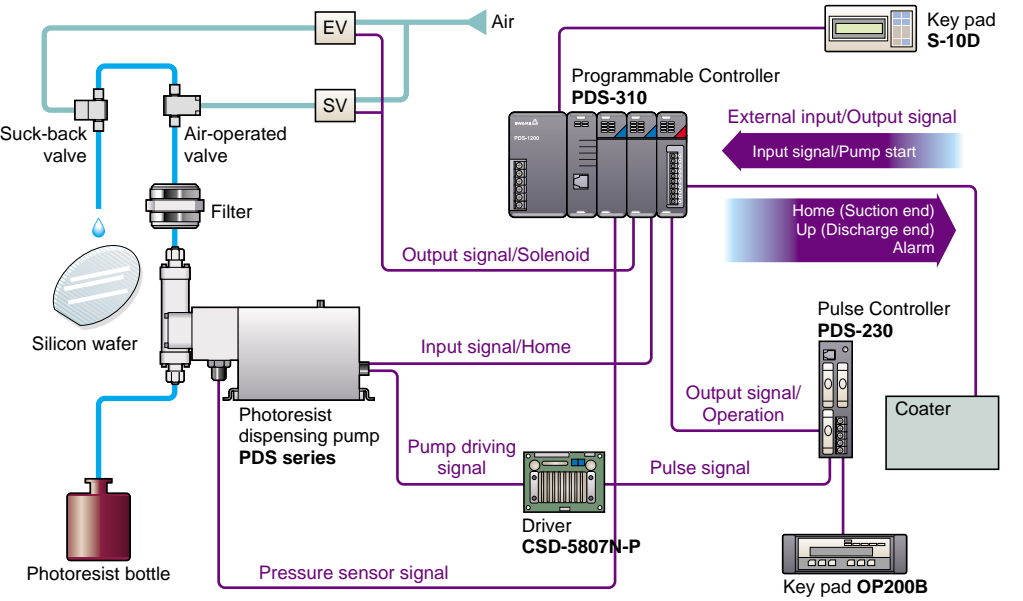
## An example of a system where the start-up signal is an external pulse from the equipment (coater)



Only the pump start signal is given by the equipment (coater). All other pump parameters (discharge volume, speed, etc.) are preset via the pump controller.

Note: Both systems need a separate power supply of DC 24 V and DC 5 V.

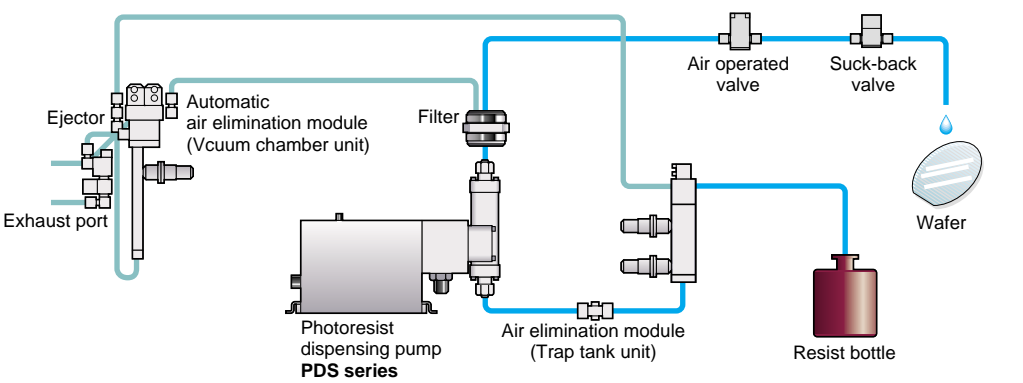
## An example of a system where the start up signal is a solenoid signal (Example: PDS replaces an existing SB pump)



This is an example of a PDS pump installed into equipment with pump controlled by means of a solenoid signal (for example, an SB pump). In principal, the PDS operates correspondingly with the ON and OFF signal from the equipment. Both discharge and suction speed (set in pulses/second) can be set via the pulse controller. The timing operation is preset by a programmable pump controller.

Note: Both systems need a separate power supply of DC 24 V and DC 5 V.

## Automatic air vent



## Component apparatus

### Pumps PDS-105H/105V



A horizontal type (PDS-105H) and a vertical type (PDS-105V) are available as standard products. You may choose either one as both are suitable for a planned installation space. Further, each has Types A and B:

- Type A: With built-in home sensor and up sensor
- Type B: With built-in encoder and home sensor

Note: The 10 ml/shot type (PDS-110) is also available.  
For additional details, please contact us.

### Pump controller PDS-210



A high performance controller. One PDS-210 controller can control a maximum of three PDS pumps. Up to three recipes can be programmed. Complete operation of the pump is controlled, using only a start/stop signal from the equipment. It is equipped with a calibration function.

- Input variables: Discharge (ml/shot), time of discharge (sec.), time to refill pump (sec.), filter pressure (MPa), timing of valve opening/closing (sec.).
- Standard accessory: Setting device S-10D
- Power supply: DC24V
- Dimensions in mm: W293xD200xH150

Note 1: In case the "B" type pump is used, a 5 V relay is additionally required.

Note 2: A single-function controller, PDS-220, is available.  
For further information, please contact us.

### Programmable controller PDS-310



PDS-310

This controller is used as an interface with the PDS-230 and is capable of controlling a maximum of two PDS pumps.

- Input variables: Pump start/stop, timing of valve opening/closing (sec.), filter pressure (MPa)
- Standard accessory: Setting device 10D1
- Power supply: AC100-240V
- Dimensions in mm: W203xD93xH90

### Pulse controller PDS-230



PDS-230

OP200B

This controller operates the PDS pump by generating output pulses corresponding to the length of a signal from the equipment. When used, a PDS-230 controller is required for each pump. Since the PDS-230 is unable to take in a signal directly from the equipment, the PDS-310 programmable controller, or a relay, is necessary.

- Items to be set: Discharge velocity (pulses/sec.), suction velocity (pulses/sec.)
- Standard accessory: Setting device OP200A
- Power supply: DC24V
- Dimensions in mm: W40xD100xH135

Note: For efficient use of the PDS-230, we recommend using it in combination with the PDS-310.

### Driver CSD5807N-P



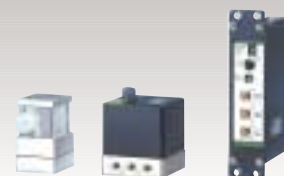
CSD5807N-P

This driver converts a pulse signal output from a controller into a power signal to drive the pump.

- Power supply: DC5V, DC24V
- Dimensions in mm: W72xD63x(H31)

Note: If you prefer a higher resolution, please contact us.

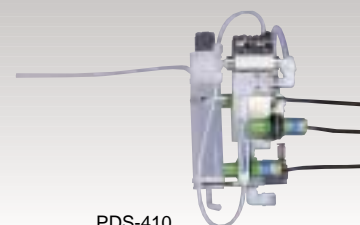
### Automatic suck back unit TQASO



A unit to prevent liquid resist from dripping out of the discharge end of the pump. The amount of suck-back liquid and the suck-back time are both electronically controlled. Unlike in the case of using a conventional speed controller, it never requires complicated adjustments.

- TQASO-6US-5: 6mm dia tube connection
- TQASO-8BUS-5: 1/4" dia tube connection

### Automatic vent unit PDS-410



PDS-410

An air elimination unit comprised of a vacuum-purge system. Air in the system can be extracted in a short period of time without any action required by the operator.

# IWAKI World-wide Network



Thorough quality-control measures and constant pursuit of efficiency have helped Iwaki establish a superior production system.



IWAKI SAITAMA PLANT



IWAKI MIHARU PLANT