

# *SUPER METERING PUMP*

## *HY SERIES*

Pulse-Free

High Accuracy & High Stability ( $\pm 0.1\%$ )

Triplex Plunger Type

Special Cam Drive

Maintenance-Free



USA, Europe, Japan Patented

## Design Features

### *Cam for triplex plunger drive*

A special designed cam makes the total amount of liquid discharged from three cylinders always constant. Plungers are designed to make different motions in six stages within one revolution of the cam. The Super Metering Pump was so designed that the total amount of discharged liquid is constantly equal. Furthermore, the instantaneous flow velocity of discharge is the same as that of suction, therefore the occurrence of cavitations is suppressed. Even at the time of switching between suction and discharge, movement of the valve ball is so smooth that pulsation and leakage do not occur. As there is little abrasion of the valve ball and valve seats, high precision can be maintained for a long period.

### *Plunger Restoring Device*

Unlike other conventional plunger pumps, Super Metering Pump does not use springs to make the plunger return to bottom dead center(BDC). As a substitution, this pump uses the special device, Plunger Restoring Device; It consists of a hanger rod that connects the front and rear plunger. This device enables the plunger to follow the cam's motion precisely, even in the variation of viscosity and speed without causing any suction failure. As a result, fluid can be pumped without pulsations.

How the plunger restoring device works?

- 1-During discharge stroke like other plunger pumps, the cam pushes the front-plunger forward.
- 2-During suction stroke the cam pushes the rear-plunger backward.
- 3-At the same time, front plunger follows the rear plunger's motion, since they are connected by a hanger-rod.

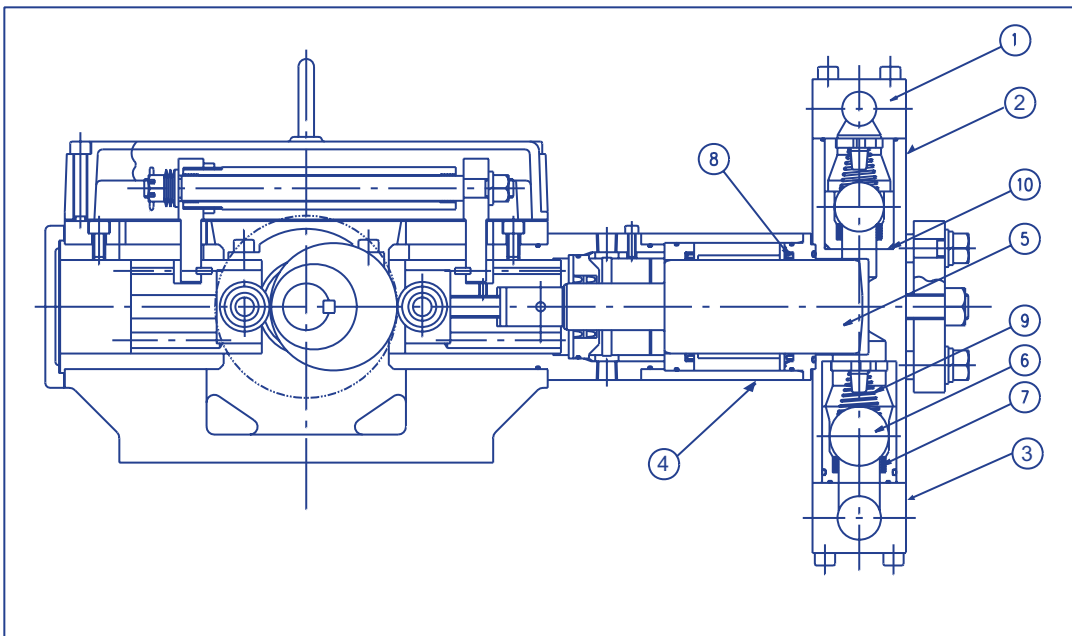
## Applications

- Urethane and other resins
- Feeding additives to extruder
- Explosives
- Line mixing for liquids
- Spray Dryer
- Films
- Chromatography
- Laboratory equipment

## Advantages

- Pulse-Free
- High Accuracy & High Stability ( $\pm 0.1\%$ )
- High stability of flow volume even in suction and/or discharge pressure variation
- High stability of flow volume even in viscosity variation
- Perfect proportional flow volume to revolution

## Structure



## Materials

	Liquid end 1.2.3.4	Plunger 5	Valve Ball 6	Valve Seat 7	Plunger Seal 8	Spring 9	Gasket(O-ring) 10
HYSA HYSB HYSC	*Stainless-steel 316 Titanium Hastelloy-B,C	*Stainless-steel 316 (coated with-self fluxing alloy) Ceramic	*Ceramic	*Hastelloy-C	*Ultra-High-Molecule-Polyethylene PTFE	*Stainless-steel 316 Spron	*Viton(R) Kalrez(R)
HYM	*Stainless-steel 316 Titanium Hastelloy-B,C	*Stainless-steel 316 (coated with self-fluxing alloy) Ceramic	*Ruby	*Stainless-steel 316 Sapphire Hastelloy-B, C	*Ultra-High-Molecule-Polyethylene PTFE	*Stainless-steel 316 Spron	*Viton(R) Kalrez(R)

Note: Mark (\*) refers to maker's standard; others are option.

Kalrez(R) and Viton(R) are registered trademarks of Du Pont Dow Elastomers.

Hastelloy-C(R) is registered trademark of Haynes.

## Standard Specifications

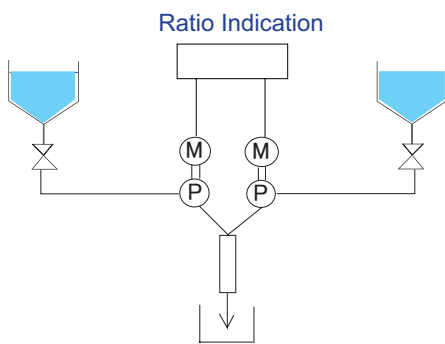
Type	MAX. Flow Rate (/min.)	Flow Rate (ml/rev.)	Max. Discharge Pressure [ ] ; Special Spec.		Speed Range (r.p.m.)	Viscosity Range (CP)	Temperature Range [ ] ; Special Spec.		Weight (about kg)	
			(MPa)	(PSI)			(°C)	(° F)		
HYM	03	15.3ml	0.13	9.8 [24.5]	1422 [3555]	1-120	1-20,000	-30~120 [200]	-22~248 [392]	8
	06	61.1ml	0.51	9.8 [19.6]	1422 [2844]	1-120	1-20,000	-30~120 [200]	-22~248 [392]	8
	08	108.6ml	0.9	9.8	1422 [1988]	1-120	1-20,000	-30~120 [200]	-22~248 [392]	8
HYSA	06	203.6ml	1.70	98	14221	1-120	1-40,000	-30~120 [200]	-22~248 [392]	45
	08	361.9ml	3.02	23.5 [50.0]	3410 [7255]	1-120	1-40,000	-30~120 [200]	-22~248 [392]	45
	10	565.5ml	4.71	23.5 [32.34]	3410 [4693]	1-120	1-40,000	-30~120 [200]	-22~248 [392]	45
	12	814.3ml	6.79	23.5	3410	1-120	1-40,000	-30~120 [200]	-22~248 [392]	45
	16	1.4L	12.06	14.7	2133	1-120	1-60,000	-30~120 [200]	-22~248 [392]	48
	20	2.3L	18.85	9.4	1364	1-120	1-60,000	-30~120 [200]	-22~248 [392]	48
HYSB	16	2.5L	21.11	14.7	2133	1-120	1-60,000	-30~120 [200]	-22~248 [392]	90
	20	4.0L	32.99	11.7	1698	1-120	1-60,000	-30~120 [200]	-22~248 [392]	90
	25	6.2L	51.54	7.5	1088	1-120	1-60,000	-30~120 [200]	-22~248 [392]	105
	30	8.9L	74.22	5.1	740	1-120	1-60,000	-30~120 [200]	-22~248 [392]	105
	40	15.8L	131.95	2.9	421	1-120	1-60,000	-30~120 [200]	-22~248 [392]	105
HYSC	06	0.1L	0.84	200	29018	1-120	1-60,000	-30~120 [200]	-22~248 [392]	145
	25	6.2L	51.54	13.7	1988	1-120	1-60,000	-30~120 [200]	-22~248 [392]	145
	30	8.9L	74.22	9.5	1379	1-120	1-60,000	-30~120 [200]	-22~248 [392]	145
	40	15.8L	131.95	5.3	769	1-120	1-60,000	-30~120 [200]	-22~248 [392]	145
	50	24.7L	206.17	3.4	493	1-120	1-60,000	-30~120 [200]	-22~248 [392]	145
	60	35.6L	296.88	2.3	334	1-120	1-60,000	-30~120 [200]	-22~248 [392]	145
HYSD	60	42.4L	424.12	10.0	1451	1-100	1-100,000	-30~120 [200]	-22~248 [392]	
	65	49.8L	497.75	8.6	1248	1-100	1-100,000	-30~120 [200]	-22~248 [392]	
	80	75.4L	753.98	6.5	943	1-100	1-100,000	-30~120 [200]	-22~248 [392]	
	100	117.8L	1178.1	4.0	580	1-100	1-100,000	-30~120 [200]	-22~248 [392]	

- In case of double head type pump, the discharge quantity becomes double as compared with the standard pump.
- Max. Flow Rate and Speed Range are subjects to be changed according to liquid viscosity.
- In addition to the aforementioned standard specifications, we also manufacture pumps different in capacity, discharge pressure and withstanding temperature.
- Pumps with a jacket as well as of sanitary specifications are also available.

## Typical Processes

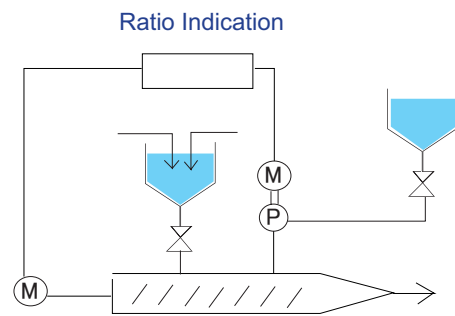
### Line Mixing and Emulsification

Without pulse, excellent property of constant volume and liquid transfer can be obtained in proportion to the pump speed. By using a line mixer and a line homogenizer, emulsification and mixing can be done instantaneously in the piping line. This will replace the need of a batch system in the past.



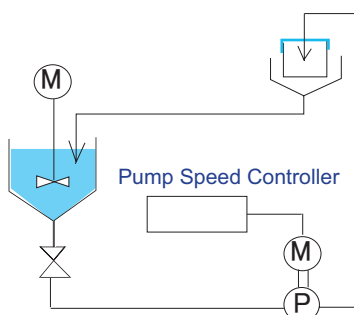
### Proportional Pour of Catalyst and Pigment to Extruder

Unlike the other pumps, the discharge flow rate will not vary by change in pressure because the pump has no pulsation and it is resistant to a load change. The HY Series can precisely pour catalyst and pigment to a kneader with constantly stable volume. This system can also be employed for liquid carbon dioxide.



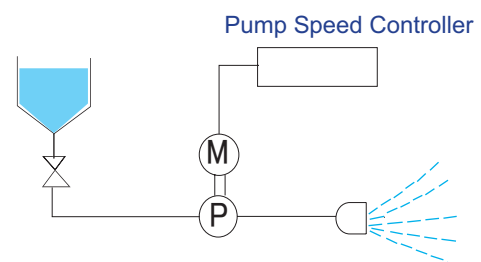
### Precision Coating

For coating application, uniform thickness can be accomplished by the merit of no pulsation and constant volume. Because of the pump structure which hardly gives rise to cavitation, perfect coating is obtained without bubble mix on the coated surface. Moreover, the HY Series is not influenced at all by a little change in suction head nor a change in pressure, caused by clogging of a filter for instance.



### Precision Spray Spray Drying Granulation

Because of no pulsation and constant volume, the diameter of particles sprayed from the nozzle becomes constant, and thus the quality of product will be improved.



## HYM PORTABLE UNIT

HYM portable unit consists of Super Metering Pump HYM, Motor, Speed-Controller, Revolution -Indicator and Touch-Screen. Immediately after turning on the power, this product is ready to use.

As compared with HPLC pumps, HYM series provide superb accuracy and pulse-free feature. In addition, the portable unit is mobile and easy to use.

### 1. Performance

\*Excellent accuracy and reproducibility (+ 0.1% or less)

\*Perfect proportional flow with the variation in r.p.m.

Flow rate can be controlled by adjusting r.p.m.

<Note> The portable unit is able to pass a qualifying examination on high pressure gas safety.

### 2. Maintenance

\*Use of special plunger seals: Highly durable and great sealing capability

\*Simple work: Merely removing a pump head to replace the seals

### 3. Applications

\*Continuous reaction or synthesis by using HPLC or micro-reactor

\*Various analysis, separation and precise dosing

### 4. Pump head \*Standard SUS 316

\*Optional Titanium, Hastelloy, PTFE, PEEK

Model	Flow range	Max. Discharge Pressure
HYM03-P	0.13ml/min ~15.3ml/min	9.8MPa (24.5MPa)
HYM06-P	0.51ml/min ~61.1ml/min	9.8MPa (19.6MPa)
HYM08-P	0.9ml/min ~108.6ml/min	9.8MPa (13.7MPa)



( ) denotes the max. pressure of the high pressure version.

Power source: 100V

## Metal Free Head Type, Metal Free Safety Valve

### 1. Features

\*Metal Free: All liquid end parts are metal free

\*High accuracy of flow:

Deviation +0.1% or less in case of water, 5 r.p.m. or higher, 1 MPa

\*High pressure version is available



Metal Free Type



Metal Free Safety Valve

Model		Max. Flow Rate (/min)	Flow Rate (/min)	Max. Discharge Pressure (MPa)	Speed Range (r.p.m.)	Viscosity Range (mPa · s)	Temperature Range (°C)	Weight (kg)
HYM (PTFE)	03	15.3ml	0.13	2.0	1-120 *1	~10,000 *2	-20~70 *3,*4	6
	06	61.1ml	0.51	2.0	1-120 *1	~10,000 *2	-20~70 *3,*4	6
	08	108.6ml	0.9	2.0	1-120 *1	~10,000 *2	-20~70 *3,*4	6
HYM (PEEK)	03	15.3ml	0.13	3.0[5.0]	1-120 *1	~10,000 *2	-20~70 *3,*4	6
	06	61.1ml	0.51	3.0[5.0]	1-120 *1	~10,000 *2	-20~70 *3,*4	6
	08	108.6ml	0.9	3.0[5.0]	1-120 *1	~10,000 *2	-20~70 *3,*4	6

[ ] denotes the special version.

Please consult with Fuji Techno Industries Corporation in the following cases.

\*1. The pump speed 5 r.p.m. or lower

\*2. Use of liquid with viscosity 100 mPa · s or higher

\*3. Temperature between 18~22°C. PTFE's coefficient of thermal expansion is high in this temperature range

\*4. Temperature is out of the spec. range

\*5. The specification of the safety valve is in accord with that of the pumps.

## Iretaro (precise filling equipment for extruder)

Iretaro is a device that can feed catalyst and pigment to an extruder precisely without pulsation. It consists of Super Metering Pump (core), a tank, a control board, etc. It is fixed on the hand cart, therefore, it is easily to move to anyplace. It corresponds to explosion proof, high temperature, etc., and the max pressure is 39.21MPa. You can choose the flow volume in a wide range. Iretaro has high flexibility and it is adaptable from liquid gases to slurries. (A feasibility test has to be conducted prior to the use of slurry.)

### Specifications

- \* Flow Range: 0.1ml/min - 70L/min.
- \* Max Pressure: 39.21MPa (It differs in types. The high pressure version can handle up to 98MPa.)
- \* Temperature Range: -30°C~+120°C (The high temperature version covers the max. 200°C.)



## Liquid Carbon Dioxide (LCD) Injector

Considering the trend of environmental preservation, in particular the regulation of fluorocarbon, liquid carbon dioxide is getting attention for foaming because it is safer and more efficient than flammable gas (butane, pentane) or toxic liquid (methylane chloride). LCD-Injector can feed the liquid carbon dioxide precisely and continuously for a long period.



All in one type complete system

Can be used in various environments from a laboratory up to a large plant.

### 1. Features

- \* LCD Injector is a complete system from the supply of Liquid Carbon Dioxide contained in a cylinder till its injection into a certain device through Super Metering Pump.
- \* Super Metering Pump is used for feeding, and it can pump liquid carbon dioxide with high accuracy. (Deviation  $\pm 0.1\%$  or less in case of water)
- \* Although Super Metering Pump is a plunger pump, leakage takes place very rare because of special plunger seals. The special seals prevent an occurrence of dry ice and an abnormal abrasion of the plungers and the seals.
- \* An explosion proof type and an outdoor type are available.

### 2. Structure

- \* LCD-injector consists of a pump, a temperature regulator, a controller, a flow meter (option) and a high-pressure cylinder. LCD-injector can be used in a wide range of scales from a compact production facility to a large plant.

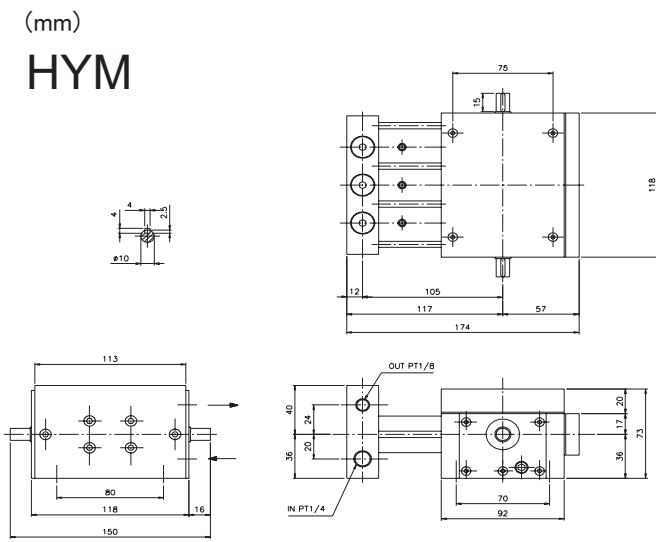
### 3. Specifications

- \* Flow Range 0.1ml/min. - 100L/min.
- \* Max Discharge Pressure 39.21 Mpa (Max discharge pressure varies with the type of the pump. The high pressure version can handle up to 98 MPa)
- \* Temperature Range: -30°C~+30°C

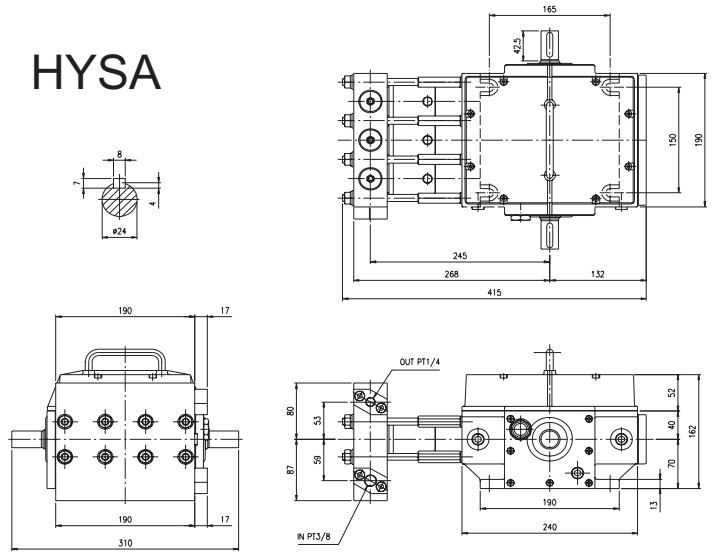
# Dimensions

(mm)

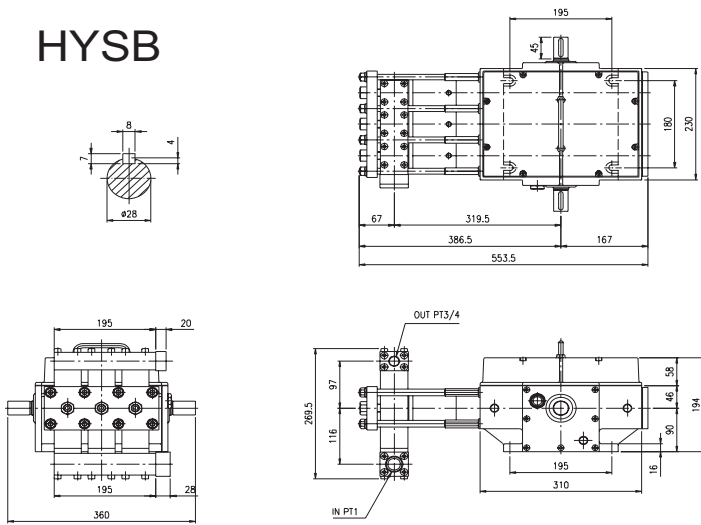
## HYM



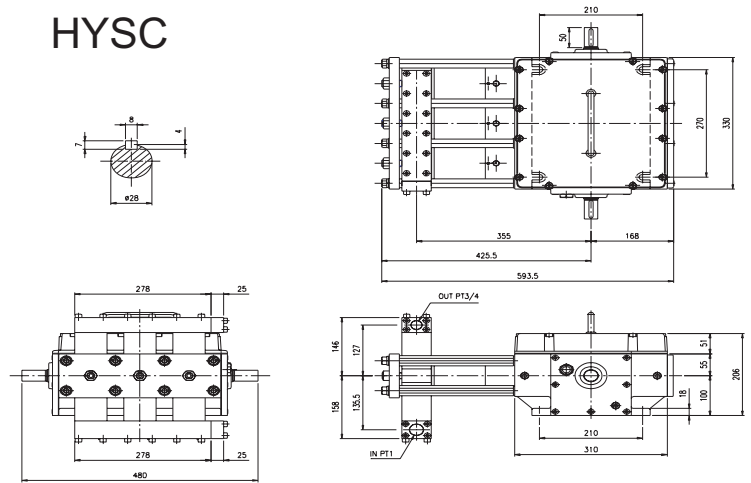
## HYSA



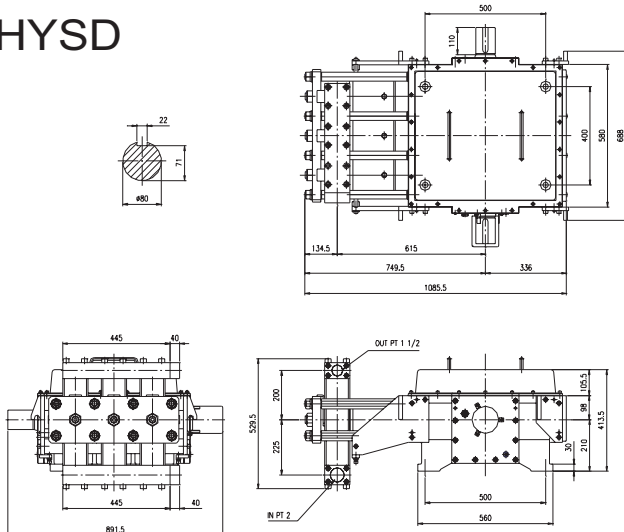
## HYSB



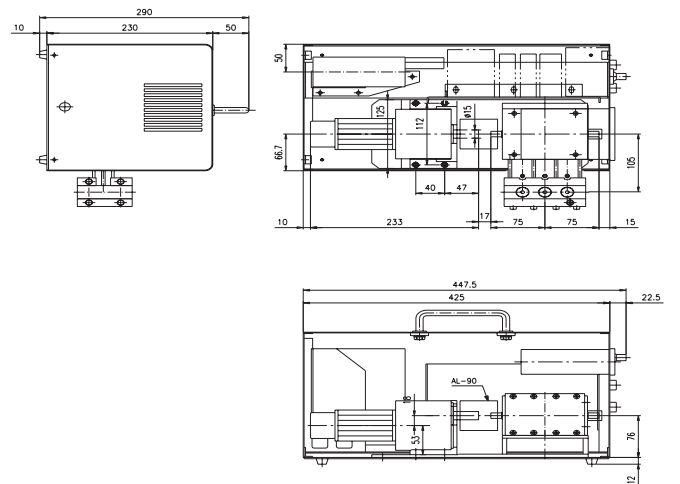
## HYSC



## HYSD



## HYM-Portable



## Manufacturer

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