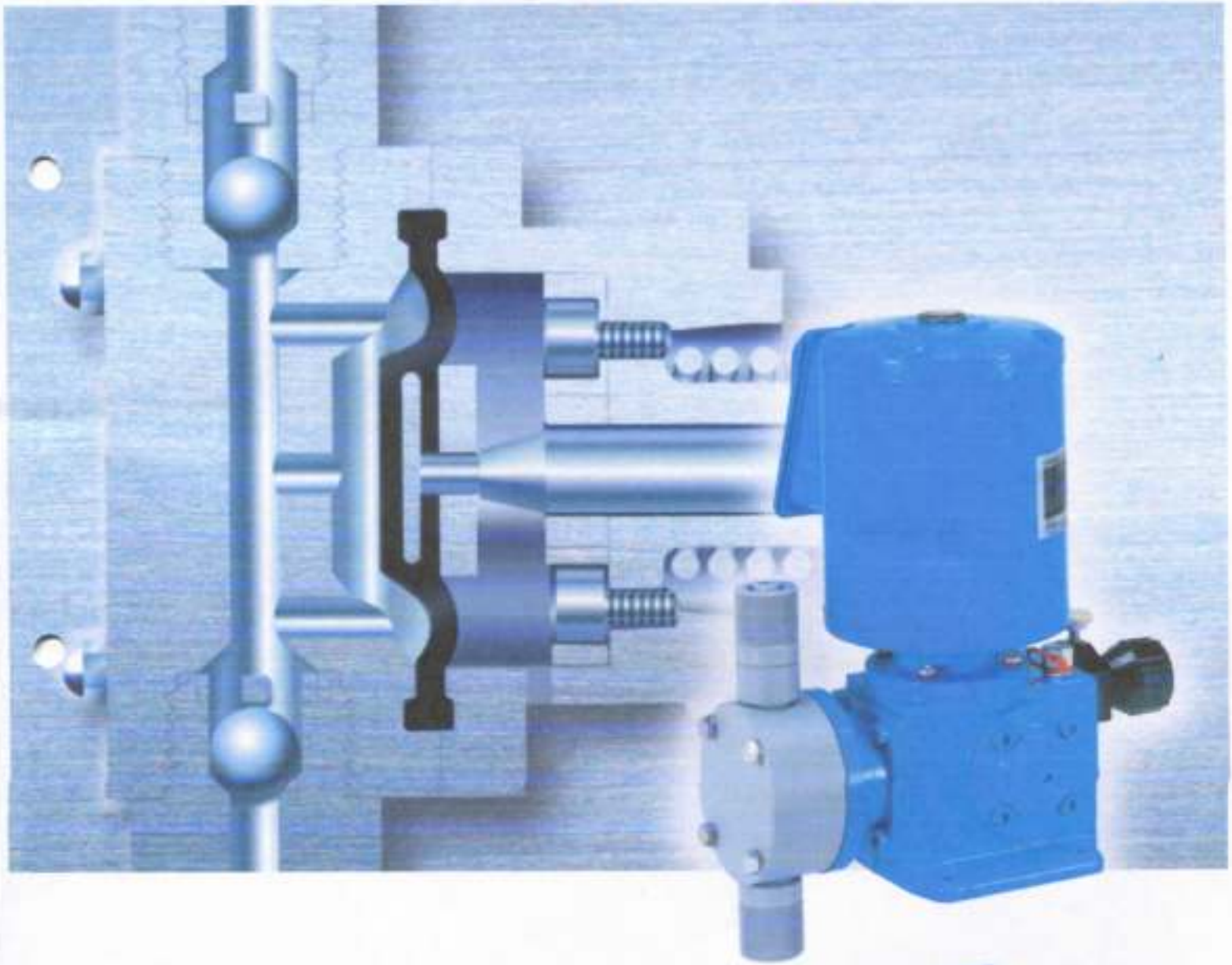
TACMINA

Direct-Driven Diaphragm type

Metering Pump



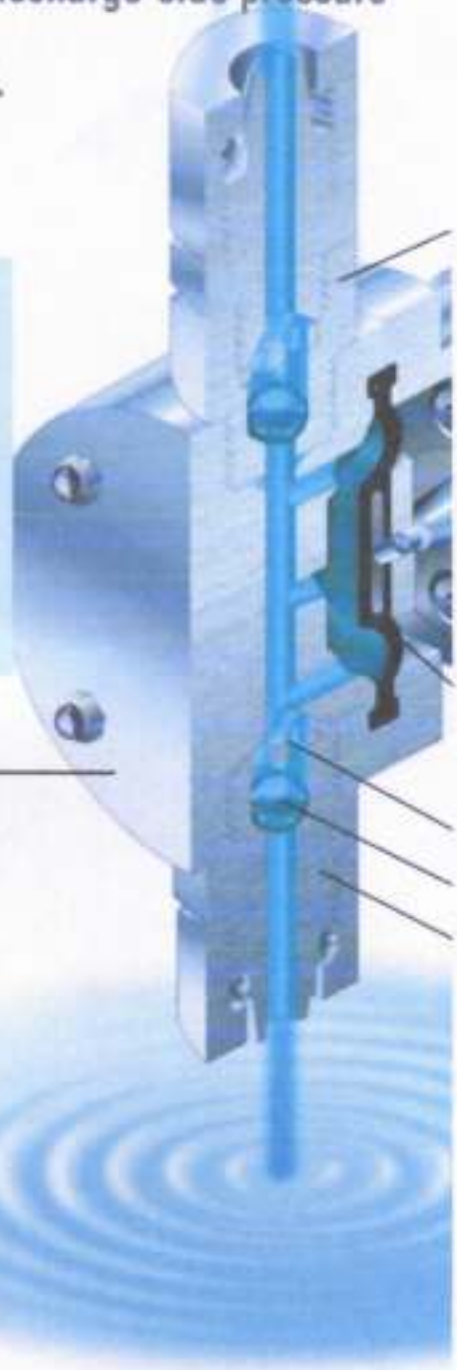
www.tacmina.com

Simple Mechanism! Direct-Driven Diap

The direct-driven diaphragm, metering pump utilizes a simple mechanism to directly connect the highly durable and corrosion-resistant diaphragm to the pump shaft. In addition to providing high accuracy injection and durability, this pump is failure-resistant and allows easy maintenance, making it suitable for use in demanding processes. Tacmina's many years of experience and technical know-how regarding metering pumps has produced yet another line of products that offer superior injection capabilities for application under various conditions including the manufacturing sites, water treatment and waste water treatment facilities.

- Reliable metering performance and repeatability at a low price
- Delivers stable discharge volume hardly effected by the discharge-side pressure
- Capable of microscopic amounts, high-pressure injection.
- Capable of racing

S ~ M



Automatic discharge volume control system

hragm metering pump

【Mechanism】 Utilizing an eccentric mechanism for the rotating motor drive, a reciprocating pump motion is now used for the diaphragm directly connected to the pump shaft to take water into the pump head and discharge it.

Wide range of applications

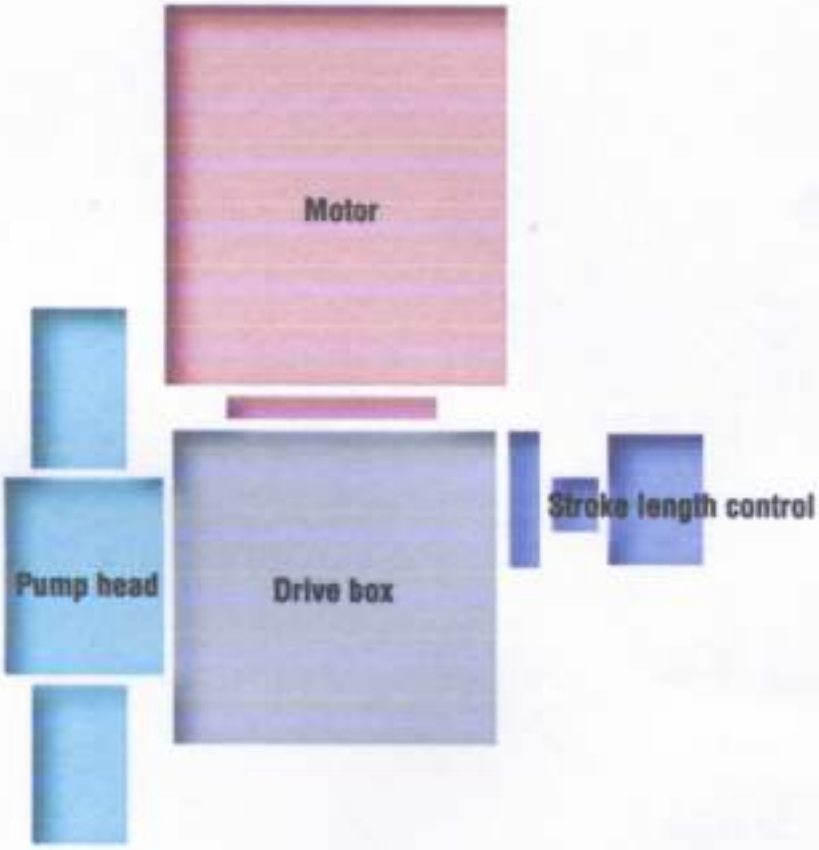
P L E

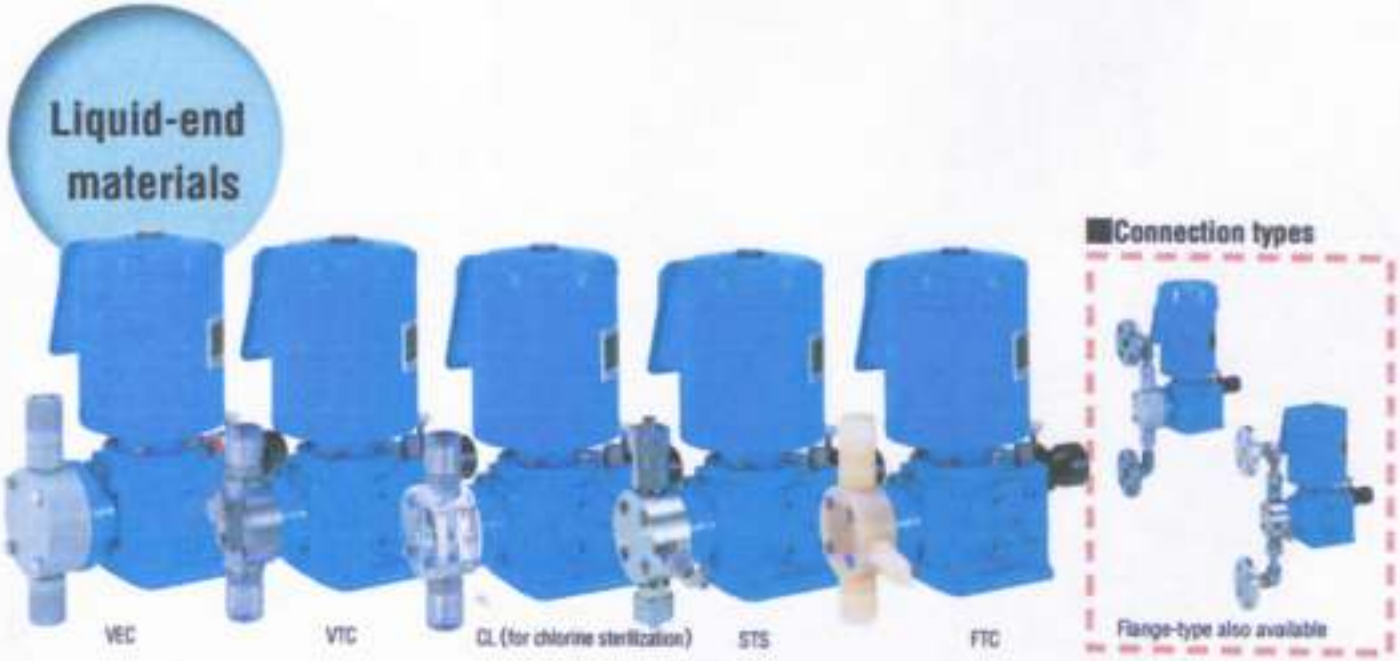
Product variations ranging from 30 mL/min to 43 L/min* in capacity * Per pump head

Many options available for full system support

Tacmina metering pumps improve even further on the standard design.

The functionality and safety of these metering pumps has been further extended to support a full range of applications.





Application Products

From the chemicals being pumped, to the on-site method of operation and installation space available, there are as many injection needs required of metering pumps as there are operation sites. To respond to this variety of needs, Tacmina has prepared a wide lineup of pumps offering improved safety and functionality. Striving to integrate with your company's process, Tacmina utilizes an order-made system that allows you to easily select the exact product you need.
※This application series allows several pumps to be combined.

■Smoothflow pump

Pulseless flow enables your process line to be more continuous and in-line, as a result, that will enhance the product quality.
●Max. discharge volume range:700mL/min to 13L/min
●Various kinds of liquid-end materials
●Five variations (Direct-driven diaphragm type, Double-diaphragm type, Hydraulic type, Hydraulic double-diaphragm type, Plunger type)
●High viscosity liquids transferable

■Smoothflow pump for High-viscosity liquids

High-viscosity liquids transferable due to specially designed pump head.Due to completely sealed structures without mechanical seals, Smoothflow pumps have no fear of liquids leakage to the outside.
●Gentle transferring without changing property of liquid
●Easy maintenance

■Pneumatic drive motor

Accepts the attachment of a compact pneumatic drive motor for use in explosion hazard areas.
(S series)

■Combination pumps

Several pump heads of varying discharge volume can be driven by a single motor, allowing for a wide range of simultaneous proportional injection.

■Multi-head pumps

A single pump can be used for proportional injection for more than one type of liquid or for simultaneous injection of one type of liquid at more than one line. Up to 6 pump heads can be operated at once. This approach is good for reducing installation space and installation costs related to wiring and piping.

■Pump head with relief valve

This pump head combines a pump for relieving excess pressure on the discharge side and a relief valve for protecting the process.
(S series)

■Pulse sensor

A lead switch is used to detect the number of strokes of the pump as a pulse signal. An automatically monitored pumping system can be achieved by using in conjunction with a pulse counter.

Flow Control

Plenty of unique products are available so that you can control the automatic discharge volume according to the exact operating requirements.
Dual control systems that allow discharge volume to be widely adjusted are also available.

Control system		Control hardware	Features	Pump heads
Stroke length control	Remote stroke length control system	■Digital servo controller DSC100 (For use with electrical servos; available for all models.) ●Input signal: Electrical type: DC 4 mA to 20 mA	Used to remotely control the stroke length of both electrical and pneumatic pumps. ●Free power supply (85 V AC to 264 V) ●Automatic drive output ●Includes error output and self-diagnostics function.	●Electrical servo ●Pneumatic servo
Stroke number control	Inverter-based revolution control system (Frequency control system)	■Inverter ●Input signal: DC 4 mA to 20 mA / 0 to 5 V / 0 to 10 V	●Can shift the speed of a general-purpose motor. ●Low cost ●Maximum velocity independent of power supply.	
	Infinite variable-speed drive revolution control system	■Auto rater		
Dual control system		Dual control of stroke revolution and stroke length allows a wide range of control (50:1).	●Maintains high precision while allowing a maximum control range of 50:1. ●Can be easily connected to flow meters and other metering hardware for automatic control.	

Variations

Our lineup includes a wide range of discharge volume levels from 30 mL/min to 43 L/min plus many optional accessories.

■Model Code

Select discharge volume and discharge pressure. → Select operating conditions and installation space. → Indicates pump head is a direct-drive diaphragm type. → Although the standard number of pump heads is 1, up to 6 can be produced. → Indicates discharge volume. → Select the material based on the liquid to be pumped. → Select the connection type based on the piping conditions. → Select the valve construction based on the viscosity of the liquid.

●Series name	●Drive box type	●Pump head type	●Version	●Number of heads		●Model (discharge volume)		●Liquid-end materials				●Connection format	
S	X	D	A	1	–	13	–	S	T	S	–	F	W
								Ⓐ	Ⓑ	Ⓒ		Ⓐ	Ⓑ

- **Series name**: S: S series; E: E series; R: R series
- **Drive box type**: X: Vertical type (special motor with worm gear speed reduction); Y: Horizontal type (general-purpose motor with coupling connection)
- **Pump head type**: D: Direct-Drive diaphragm; W: Double diaphragm
- **Version**: A: Version (S series only)
- **Number of heads**: 1: 1 head = standard model; 2: 2 heads; 3: 3 heads; 4: 4 heads; 5: 5 heads; 6: 6 heads
- **Model (discharge volume)**: 1 3 = 1000mL/min — Number of zero(0) digits — 50 Hz model
  - * The discharge volume per head is standard when two or more of the same pump head are used.
  - * Pump heads with a relief valve are indicated by an "R" at the end of the model number. (S series only)
- **Liquid-end materials**
  - Ⓐ Pump head: V: PVC; S: SUS304 or SCS14; 6: SUS316 or SCS14; F: PVdF; T: PTFE; X: Special order
  - Ⓑ Diaphragm: E: EPDM; T: PTFE
  - Ⓒ Check ball: C: Ceramic; 6: SUS316; S: SUS304; X: Special order; T: PTFE
  - * Certain combinations may not be possible.
- **Connection format**
  - Ⓐ Connection type: H: Hose; U: Union; F: Flange; C: Sanitary clamp; M: IDF thread (male); X: Special order
  - Ⓑ Valve construction: W: Standard; V: High viscosity specification; X: Special order

■Specification and Performance Table

Model		SX(Y)DA-31	SX(Y)DA-61	SX(Y)DA-12	SXDA-22	SX(Y)DA-32	SX(Y)DA-62	SX(Y)DA-82	SX(Y)DA-13	SX(Y)DA-23	SXDA-33	SX(Y)DA-43
Maximum discharge volume (mL/min)	50Hz	30	50 (60)	100	200	300	600	830	1000	1500	2500	3000*1
	60Hz	36	60 (72)	120	240	360	720	1000	1200	1800	3000	3600*1
Maximum discharge pressure (MPa)		1.0	1.0	1.0	1.0	1.0	1.0	1.0	0.5	0.5	0.3	0.25*1
Stroke count (spm)	50Hz	53 (33)	53 (63)	105	105	105	105	105	105	105	105	105
	60Hz	63 (40)	63 (75)	126	126	126	126	126	126	126	126	126
Stroke length (mm)		2 (4)	4	4	4	6	6	8	6	8	6	8
Connection type/Diameter: PVC hose	HW	dia.4×dia.9			dia.6×dia.11		dia.12×dia.18				—	
Connection type/Diameter: PTFE hose	HW	dia.10×dia.12					dia.12×dia.15				—	
Connection type/Diameter: Flange	FW	JIS 10K 15A									JIS 10K 25A (1 head only)	
Connection type/Diameter: Union	UW	Stainless steel model R 3/4									—	
Acceptable liquid viscosity	Standard	50mPa·s or less										
	High-viscosity specification	50–2000mPa·s							50–1000mPa·s			
Standard motor	Specification	Totally Enclosed Self-cooled Outdoor Type (Totally Enclosed Fan-cooled Outdoor Type)						Totally Enclosed Fan-cooled Outdoor Type				
	[illegible]	3-phase, 200 V(50/60 Hz), 220 V/60 Hz/4P										
	Output (kW)	0.1(0.2)						0.2				
	Rated current value/startup current value (A) 200 V/50 Hz	0.58(1.3)/2.7(5.0)						1.3/5.0				
	200 V/60 Hz	0.56(1.1)/2.5(4.6)						1.1/4.6				
	220 V/60 Hz	0.54(1.1)/2.75(5.0)						1.1/5.0				
Paint color		Acryl urethane resin (Munsell 10B 5/10)										
Weight PVC head type		Approx. 10 kg (11 kg)					Approx. 12 kg (13 kg)	Approx. 10 kg (13 kg)			Approx. 11 kg (14 kg)	

*The specifications of the W type are the same as those of the D type. *There is no 82-type PTFE diaphragm type.
*Figures in brackets [ ] are values for the Y (horizontal) type.
*1 The maximum discharge volume (at 50/60 Hz) for a 43-type EPDM diaphragm type (VEC) is 3300/4000 mL/min. In case material of diaphragm is EPDM, maximum discharge pressure is 0.3MPa.

■Liquid-end Materials

Type name in liquid-end parts	VEC	VTC	STS	FTC*2	FTCT*3	FTCF*3	FTCE*3	6T6*4
Pump head	PVC	PVC	SUS304	PVDF	PVDF	PVDF	PVDF	SUS316
Diaphragm	EPDM	PTFE	PTFE	PTFE	PTFE	PTFE	PTFE	PTFE
Check ball	Ceramic	Ceramic	SUS304	Ceramic	Ceramic	Ceramic	Ceramic	SUS316
Joint	PVC	PVC	SUS304	PVDF	PVDF	PVDF	PVDF	SUS316
O-ring	EPDM	Fluoro rubber	PTFE	PTFE	Special Fluoro rubber	Fluoro rubber	EPDM	PTFE

*2 Only for SX(Y)DA-62–43 and SX(Y)DA 31R–32R(with relief valve) *3 Only for SX(Y)DA-31–32 (not available for 31R–32R with relief valve) *4 Custom made
*Only for SX(Y)DA-31, 61 and 12 are available for the CL type (not available for 31R–12R)

■General Options

Flow indicator
Attaching a flow indicator to the discharge-side of a metering pump allows you to easily check pump operation. This aids in discovering and preventing trouble.

Relief valve
This relief valve automatically relieves pressure when excess pressure due to clogging by foreign matter or a shut valve is detected in the piping on the discharge-side of pump.

Back pressure valve
Under some piping conditions, a phenomenon called "overfeeding" occurs (where the discharge volume is excessively high). The back pressure valve serves to prevent this.

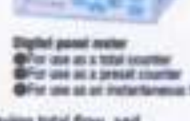
Anti-siphon check valve
Attached to the front of discharge-side piping, this device prevents the overfeeding and reverse flow of chemicals.
※Supplied as standard with hose connection type pumps.

Air chamber
Reciprocating pumps generate a unique pulsation that can cause vibration of piping and overfeeding. Allowing near continuous flow, the use of an air chamber helps reduce problems associated with pulsation.

Hose connection type

Discharge volume checker
This low cost corrosion-resistant compact flow meter can be easily connected to the discharge-side of a metering pump.
- Injection volume measurements and monitoring of injection operations can be performed simultaneously.
- Notification of discharge errors is possible when used in combination with an injection Flow Monitor FM-01 (option).
- A high performance system capable of monitoring discharge flow, displaying total flow, and monitored batch injection can be configured by using this checker in combination with other peripheral hardware such as a preset counter, instantaneous flow indicator, etc.

Flow Monitor FM-01
FM-01
●alarm



Digital panel meter
- For use as a total counter
- For use as a preset counter
- For use as an instantaneous flow indicator

SKDA

SYDA

RYD

Model			RYD-14	RYD-64
Maximum discharge volume (L/min)		50Hz	12.0	43.0
		60Hz	14.4	52.0
Maximum discharge pressure (MPa)			0.5	0.3
Stroke count (spm)		50Hz	97	73
		60Hz	117	88
Stroke length (mm)			15	25
Connection Type-Diameter	PVC hose	HW	—	
	PTFE hose	HW	—	
	Flange	FW	JIS 10K 40A	JIS 10K 65A
	Union	UW	—	
Acceptable liquid viscosity	Standard		50mPa·s or less	
	High-viscosity specification		—	
Standard motor	Specification		Totally Enclosed Fan-cooled Outdoor Type	
	Type (Phase, No. of poles, Pole P)		3-phase, 200 V(50/60 Hz), 220 V/60 Hz/4P	
	Output (kW)		0.4kW	1.5kW
	Rated current value/startup current value (A)	200 V/50 Hz	2.5/7.01	7.0/41.8
		200 V/60 Hz	2.5/7.17	6.3/38.6
		220 V/60 Hz	2.5/7.83	6.0/42.5
Paint color			Epoxy urethane resin (Munsell 10B 5/10)	
Weight	stainless steel head type		Approx.70kg	Approx.120kg

* The specifications of the W type are the same as those of the D type.

■Liquid-end Materials

Type name in liquid-end parts	VEC	VEX	SEX
Pump head	PVC		SUS304 or SCS13
Diaphragm	EPDM		
Check ball	Ceramic	SUS304	
Joint	PVC		SUS304 or SCS13
O-ring	EPDM		

35～100L

100～1000L

PE tank

- Low-density polyethylene construction for superior rigidity and anti-shock characteristics.
- Translucent material allows liquid level to be externally checked.

PVC tank

- This tank uses a hard PVC extrusion plate panel (JIS K 6745 No. 1, Type 1) with plenty of stability and weight.
- High tensile strength with superior flame resistance.

New Lineup

of Direct-Driven Diaphragm Type Metering Pump

Direct-Driven Diaphragm Type

Z series

Direct-Driven Double-Diaphragm Type

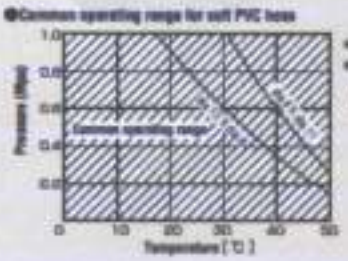
- **Max. Discharge Volume: 3.0～25L/min**
- **Max. Discharge Pressure: 0.3～0.7Mpa**

* As for the detailed specification of Z series, please refer to the catalog of process metering pump "Z series".

〈Precautions Regarding Hose Connections〉

- 4 m of hose (3 m for discharge and 1 m for suction) is supplied. When connecting pipings (particularly viscous type pipings) longer than these lengths, pressure loss may exceed the pump's maximum discharge pressure, thus requiring a thicker piping.
  Please provide: (1) the liquid viscosity, (2) The length of piping required (positional hardware relationships), and (3) the specific gravity of the liquid to be pumped, and we will select the best piping size for you.
  (Details regarding piping selection can be found in the document "Basic Use of Metering Pumps"
  available from Tacmina. Customers requiring this information may request a copy of this document.)

- Common operating range for soft PVC hose

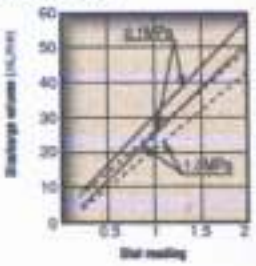


* dia.4 x dia.9 hoses can handle 1.0 MPa at 60°C.
* Be sure to use flange joint-type or union joint-type hoses if the above operating range is to be exceeded.

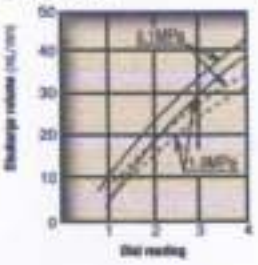
Performance curve

SXDA/SYDA type

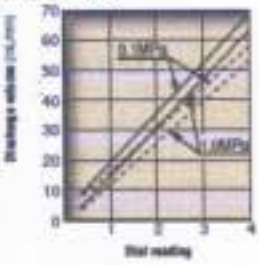
SXDA-31 type



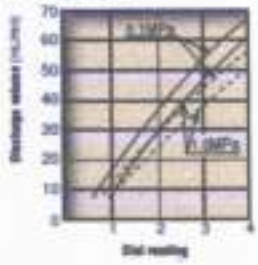
SXDA-31 type



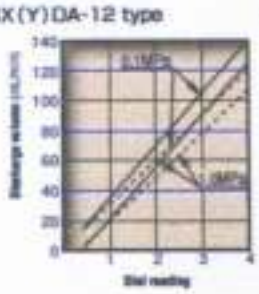
SXDA-61type



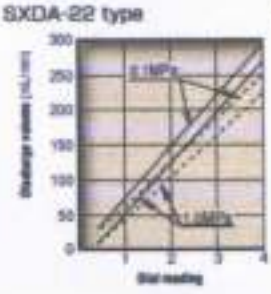
SYDA-61type



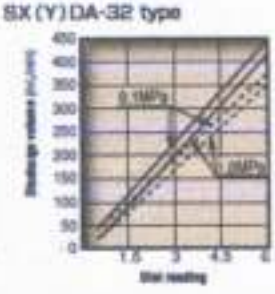
SX(Y)DA-12 type



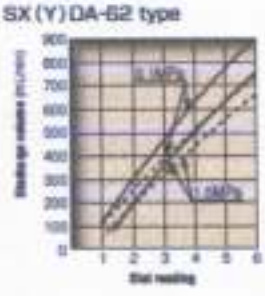
SXDA-22 type



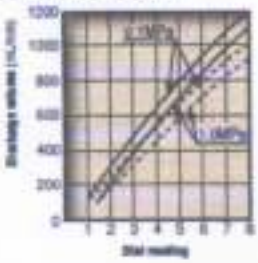
SX(Y)DA-32 type



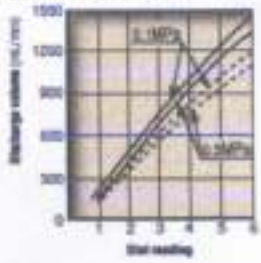
SX(Y)DA-62 type



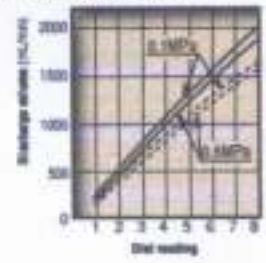
SX(Y)DA-62 type



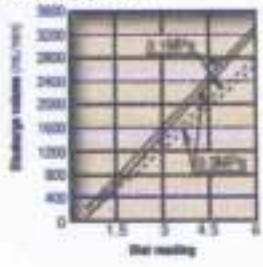
SX(Y)DA-13 type



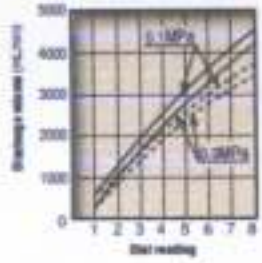
SX(Y)DA-23 type



SXDA-33 type



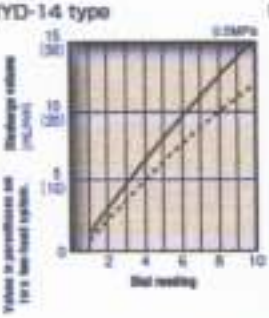
SX(Y)DA-43 type



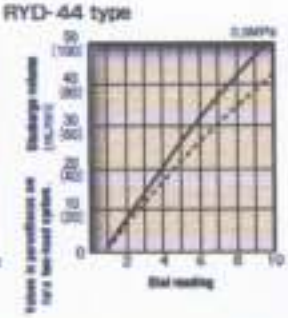
●The performance curves of the W type are the same as those of the D type. ●Discharge volume differs in the case of PTEF diaphragm type pumps.

RYD type

RYD-14 type



RYD-44 type



●The performance curves of the W type are the same as those of the D type.

Request

●Measure the discharge volume based on operating conditions and set the dial according to the performance curve.

Note

●The above performance curves are based on sample measurements performed under fixed conditions at Tacmina's testing facilities. These performance curves may differ slightly from actual on-site values depending on many conditions and differences in hardware.

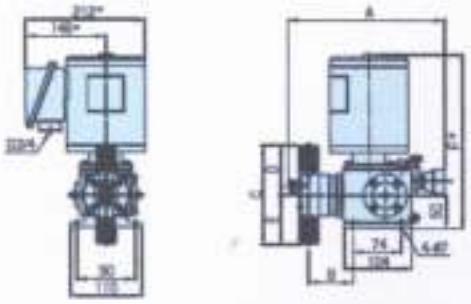
Required room temperature and Clean water

----- 50Hz

——— 60Hz

Outline drawings (PVC pump head)

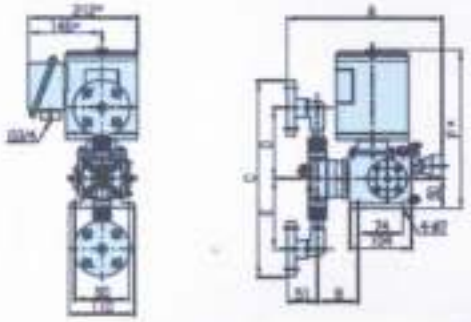
SXDA
Hose type



model	A	B	C	D	E	F
-01	239.5	68	153	76.5	76.5	294
-01	241.5	68	153	76.5	76.5	294
-12	241.5	68	153	76.5	76.5	294
-12	243	69.5	153	76.5	76.5	294
-02	245	69.5	153	76.5	76.5	294
-02	240.5	76.5	176	87	79	294
-42	242.5	76.5	176	87	79	307
-13	251.5	82.5	192	87	87	307
-23	253.5	82.5	192	106	87	307
-33	No hose type is available.					
-43						

*When using a 0.2 kW motor, the dimensions differ slightly. Contact your dealer or TACMINA.

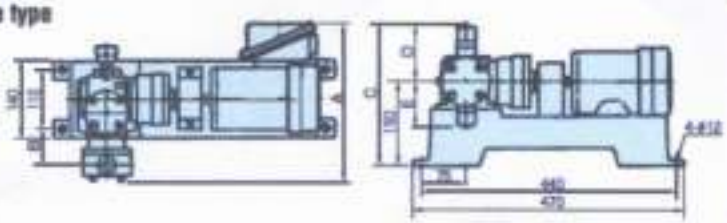
SXDA
Flange type



model	A	B	C	D	E	F
-01	259	68	234	110.5	110.5	294
-01	261.5	68	234	110.5	110.5	294
-12	261.5	68	234	110.5	110.5	294
-12	263	69.5	234	110.5	110.5	294
-22	265	69.5	234	110.5	110.5	294
-02	266.5	76.5	261	142	124	294
-42	268.5	76.5	261	142	124	307
-13	279.5	82.5	277	158	132	307
-23	288.5	82.5	277	158	132	307
-33	The shape differs. Contact your dealer or TACMINA.					
-43						

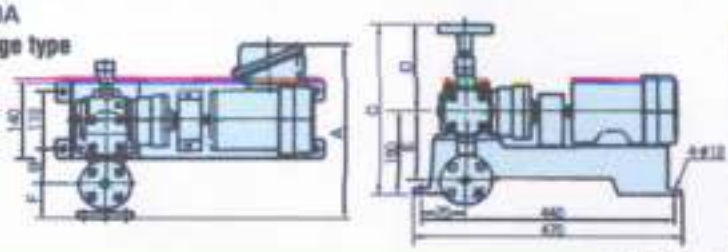
*When using a 0.2 kW motor, the dimensions differ slightly. Contact your dealer or TACMINA.

SYDA
Hose type



model	A	B	C	D	E
-01	288.5	62.5	226.5	76.5	76.5
-01	288.5	62.5	226.5	76.5	76.5
-12	292	62.5	226.5	76.5	76.35
-22	292	64	226.5	76.5	76.5
-02	274.5	66	247	87	79
-02	274.5	66	247	87	79
-13	286.5	77	266	106	87
-23	286.5	77	266	106	87
-43	No hose type is available.				

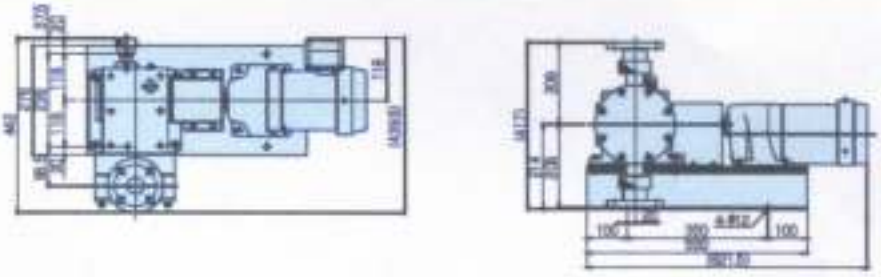
SYDA
Flange type



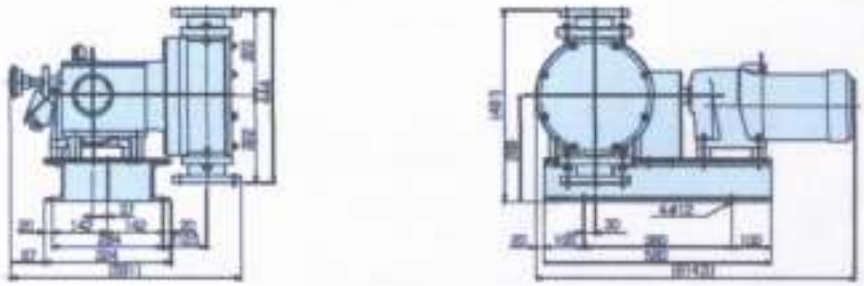
model	A	B	C	D	E	F
-01	309.5	62.5	266.5	110.5	110.5	91
-01	309.5	62.5	266.5	110.5	110.5	91
-12	309.5	62.5	266.5	110.5	110.5	91
-22	309.5	64	266.5	110.5	110.5	91
-02	302	66	291	141	124	91
-02	303	66	291	141	124	91
-13	315	77	298	148	132	91
-23	315	77	298	148	132	91
-43	338	78	318	161	138	78

*The external dimensions of the W type differ from those of the D type. Contact your dealer or TACMINA.

RYD-14
Flange type



RYD-44
Flange type



*The external dimensions of the W type differ from those of the D type. Contact your dealer or TACMINA.

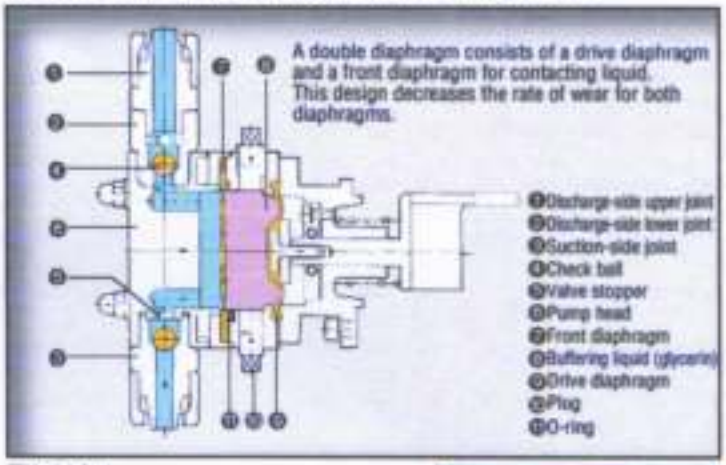
*As for the detailed specification of Z series, please refer to the catalog of process metering pump "Z series".

Pump head variations for customized chemicals injection.

Delivering increased performance and durability, our pump head line-up consists of a total of five types of pump heads including double diaphragm and hydraulic diaphragm designs depending on the application.

W double diaphragm type

Corrosion resistance is improved by using a genuine,thick PTFE diaphragm. Even better performance is possible by filling the space between two diaphragms with a buffering liquid.

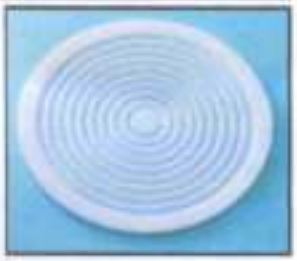


■Mechanism

The reciprocating motion of the drive diaphragm is uniformly transferred to the front diaphragm via buffering liquid (glycerin). This design solves many problems associated with diaphragm durability by reducing diaphragm degradation and preventing scratching and the concentration of pressure in a given area.

●PTFE corrugated diaphragm

Superior in durability and corrosion-resistance, Tacmina's own PTFE corrugated diaphragm is used for the front diaphragm.
(This diaphragm is also used with hydraulic diaphragm (M) and hydraulic double diaphragm (MW) pump heads.)



W type
●Maximum discharge volume
50Hz: 58mL/min~420L/min
60Hz: 69mL/min~521L/min
●Maximum discharge pressure (MPa)
0.3~1.0

(Products Using W and MW Type Diaphragms)

■Sanitary metering pump

For food-related processes.
●Allows extremely simple on-site assembly and disassembly. CIP wash also available.
●Prevents the growth of microorganisms by lacking anyplace for liquid to stagnate.

■Remote head type

For the metering injection of high temperature liquids from 100 to 130℃.
●For the metering injection of liquids that must be kept at a high temperature.
●For applications in which cleaning with steam or high temperature water is required.
●Suitable for transfer of slurry.

■Diaphragm damage alarm and leak monitor

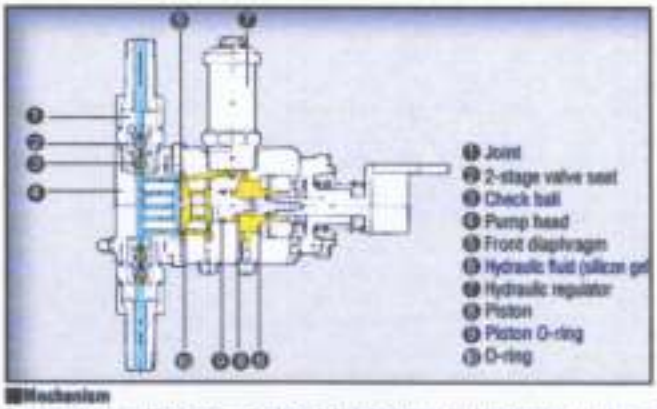
The operator is immediately notified of any damage to the diaphragm as detected by an electrode mounted inside a buffering liquid.

M hydraulic diaphragm type

Bringing the strong points of plunger pumps and diaphragm pumps together.
For petrochemical and chemical processes that require high-precision and safety.

Using a hydraulic regulation valve, this design combines the superior safety, durability, high-pressure capability and high-precision of a plunger pump. Reliable, non-toxic silicon gel is used for the hydraulic fluid to maintain safety and performance.

M type
- Maximum discharge volume
  50Hz: 97mL/min~10.3L/min
  60Hz: 116mL/min~12.4L/min
- Maximum discharge pressure (MPa)
  ~2.5



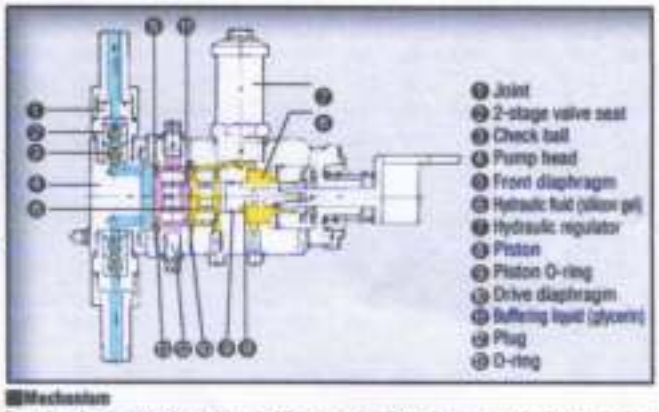
Mechanism
The reciprocating motion of the piston is transferred to the hydraulic fluid (silicon gel) and liquid is taken into and discharged from the pump. A hydraulic adjustment housing is on top of the pump with a hydraulic adjustment valve located inside.

MW hydraulic double diaphragm type

Representing a further upgrade to the hydraulic diaphragm type.
For the metering injection of slurry or highly viscous liquids and for food processes.

Adding a PTFE diaphragm to the hydraulic diaphragm type has resulted in a pump offering greater safety and durability. A buffering liquid (silicon gel, glycerin, pure water or other substance depending on the liquid being pumped) fills the space between two diaphragms to even out the applied pressure and preserve both diaphragms longer. This type of pump head can be used in processes where hydraulic pump heads cannot.

MW type
- Maximum discharge volume
  50Hz: 97mL/min~10.3L/min
  60Hz: 116mL/min~12.4L/min
- Maximum discharge pressure (MPa)
  ~2.5



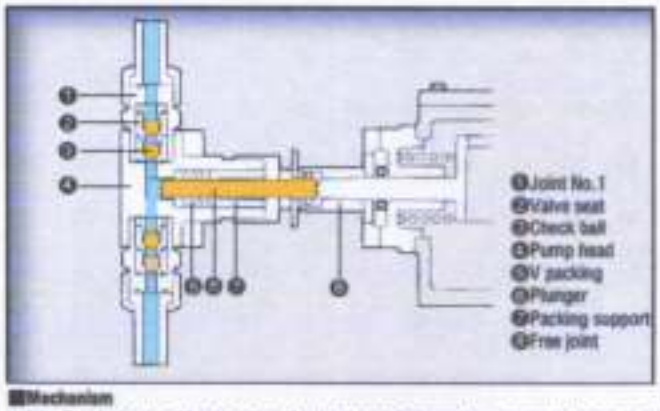
Mechanism
The reciprocal motion of the piston is transmitted through a liquid (silicon gel) to move the drive diaphragm back and forth. A buffering liquid (glycerin) is used to evenly transmit this reciprocal motion to the front diaphragm in order to take in and discharge a stable volume of the liquid being pumped.

P plunger type

High-precision, microscopic amounts, high-pressure injection with an improved seal lifetime.
For the metering injection of boiler chemicals, etc.

This pump head type utilizes a high-performance 2-stage valve seat to achieve the injection of high-precision, microscopic amounts at high pressure.

P type
- Maximum discharge volume (mL/min)
  50Hz: 4.0mL/min~10.7L/min
  60Hz: 5.0mL/min~12.8L/min
- Maximum discharge pressure (MPa)
  ~10.0



Mechanism
Utilizing Tacmina's original free joint, liquid is taken in and discharged by the reciprocating motion of the plunger connected to the drive piston which serves to vary the volume inside the cylinder.
Use of this free joint further increases the life expectancy of the seal (V-packing). ※Construction differs for the Z and R series.

Specification Requirements

When contacting us for consultation or to request an estimate or place an order, please provide us with as much detailed information as possible on the specifications below and other data so that we can ensure that you will use the most suitable equipment under the optimal conditions.

Pumping liquids

Designation	:
Ingredients	:
Concentration (%)	: ●Normal ( ) ●Fluctuation range ( )
pH value	: ●Normal ( ) ●Fluctuation range ( )
Temperature (°C)	: ●Normal ( ) ●Fluctuation range ( )
Viscosity (mPa·s)	: ●Normal ( ) ●Fluctuation range ( )
Specific gravity	:
Does the liquid contain slurry or solids?	: ●Properties:

Usage conditions

Purpose	:
Required discharge volume (mL/min. L/min.)	: ●Normal ( ) ●Maximum ( )
Required discharge pressure (MPa)	: ●Normal ( ) ●Maximum ( )
Suction-side piping	: ●Pipe diameter ( ) ●Pipe length ( ) ●Suction height ( ) ●Others ( )
Discharge-side piping	: ●Pipe diameter ( ) ●Pipe length ( ) ●Suction height ( ) ●Others ( )
Power	: ( )V ( )Phase
Frequency (Hz)	:
Ambient temperature (°C)	: ●Normal ( ) ●Fluctuation range ( )
Installation location and method	:
Operating conditions	: ●Continuous or intermittent operation? ( )
	●Operating duration and operation intervals? ( )
	●Total operating time per day? ( )

Other items

When and where do you want the pump delivered?
Do you have any other requests?

⚠ CAUTION

- Do not use outside the temperature range given below as this may result in failure.
  Ambient temperature: 0 to 40°C
  Requirement for liquid being handled
  Liquid temperature: 0 to 80°C
- Be sure that discharge pressure and viscosity of the liquid being pumped are within the specifications given.
- This pump is not intended to pump slurry.
  Please contact Tacmina if the liquid to be pumped contains slurry.

Product designs and specifications are subject to change without notice for product improvement.

TACMINA CORPORATION

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