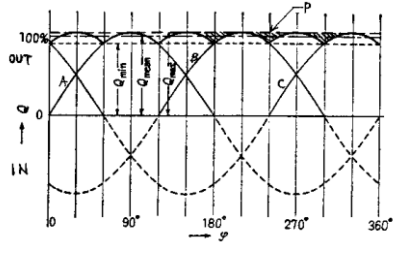
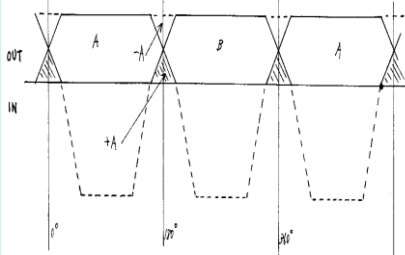
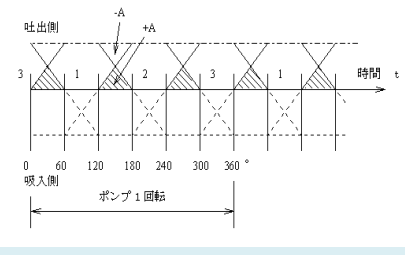


Comparison of the FUJI-TECHNO Super Metering Pump with Competitors Pumps

	Crank Type of Triplex Plunger	Pulse less Metering Pump with Double Plunger	Precision Gear Pump	FUJI TECHNO - Super Metering Pump
Features	It is a crank drive plunger pump, often seen in a washing machines etc. Also, in theory, a pulsation rate of up to 14.2% is generated. Adding the pulsation at the valve changeover, an accumulator is absolutely needed.	The technology adopts a constant velocity cam drive and was recognised as the best performing metering pump until our Super Metering Pump came on to the market. Its pulsation rate is approximately 5~10 times higher than for our SMP.	When a discharge pressure change occurs the accuracy of a gear pump is not reproducible, and in the case of low viscous liquid no more than 10 cp, discharge pressure over 10 kg/cm2G is also impossible to process. Moreover, considerable discharge flow rate fluctuations occur with the viscosity change of the liquid.	Unlike other metering pumps, our Super Metering Pump is developed based on the idea of, in theory, zero pulsation.
Discharge curve				
Accuracy	no better than $\pm 5\%$	$\pm 1\%$	changing with the property of liquid	below $\pm 0.1\%$ (in case of water, under fixed conditions)
Price (%)	100	150	150	200
To meet the accuracy & pulsation rate demanded by the customers	Feedback correction control utilising a flow meter is required, as well as an accumulator, to reduce pulsation.	Feedback correction control utilising a flow meter is required, as well as an accumulator, to reduce pulsation.	It is suitable for pumping a viscous fluid.	Feedback correction control with flow meter and an accumulator is not needed.
Comments	Just reducing the pulsation by increasing the number of plungers results in relatively high pulsation rate and high maintenance cost.	From the above curve, we know that the discharge curve is different from the suction. Compared with the discharge cycle, the suction process is short. That means that the suction speed is faster, which enhances the cavitation effect. Although it seems that there is no pulsation in the discharge side, pulsation does actually occur.	There is an internal leakage problem with the gear pump.	If you take into consideration the overall production process cost, the running cost, and the maintenance cost etc, the price of a SMP pump is comparative with the 'cost of ownership' of other metering pumps.

1. The Features of Our Super Metering Pump

- Unlike other metering pumps our super metering pump was developed on the theory of, not reducing the pumping pulsation, but taking it to zero.
- It has the highest accuracy (performance reproducibility in unit of time) of below $\pm 0.1\%$ (in case of water, under fixed conditions) which outclasses other pump technologies
- It has wide discharge range from extremely small amounts of 0.05 cc/min to large flux of 230 L/min all with the same mechanism.
- The same flow as the bench test can be installed in the production line.
- Special requirements such as high temperature (max for 200 °C), high discharge pressure (max for 200MP) which changes with models, and some special fluid handling can be accommodated. (such as isocyanate, liquefied carbon dioxide etc.)

2. Usage

- Line mixing and emulsification (utilising the high accuracy of SMP, mixing can be done instantaneously in the line instead of batch processing)
- The accurate supply of fluid to the reaction chamber achieves a homogenous reaction.
- Utilised for precision coating (uniform thickness can be achieved)
- Utilised for feeding all kinds of additives, foaming agent (such as water, solvent, liquefied carbon dioxide etc.), constantly in a stable flow rate despite the pressure changing in the discharge side.
- Utilised for liquefied butane burning (cogeneration)
- Utilised for precision spraying (drying granulation, gasoline etc.)

3. Merits of Our Super Metering Pump

Using our SMP, a feedback control with flow meter and an accumulator are not needed. Therefore the whole production line installation cost, the running cost, and the maintenance cost etc. can be reduced.

Evaluating our SMP in all respects, there is also a possibility of cost-down in total.

If your application demands accuracy and/or low pulsation, our SMP will help you.

Moreover, using our SMP, you can simplify your production line and produce the added-value products.

Fuji Techno Industries Corporation