

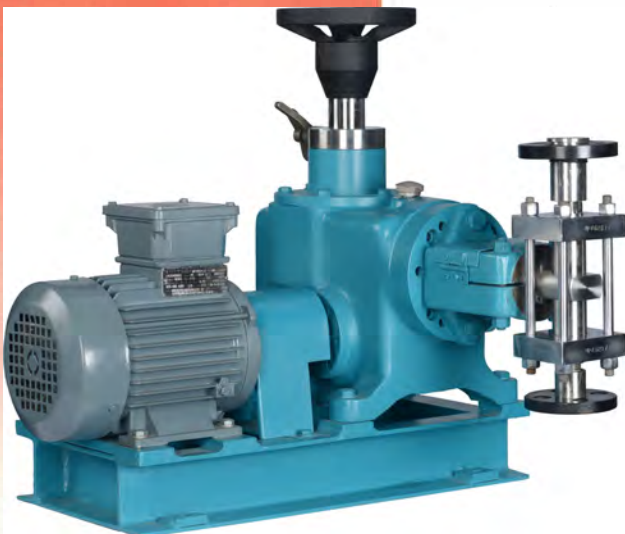
**Model : BL Series**



**As per API 675**



**Penultimate in  
Reliable Precision  
Liquid Flow Control**



**MATZ PUMPS PRIVATE LIMITED**

Plot No. 609, Phase IV, GIDC Vatva

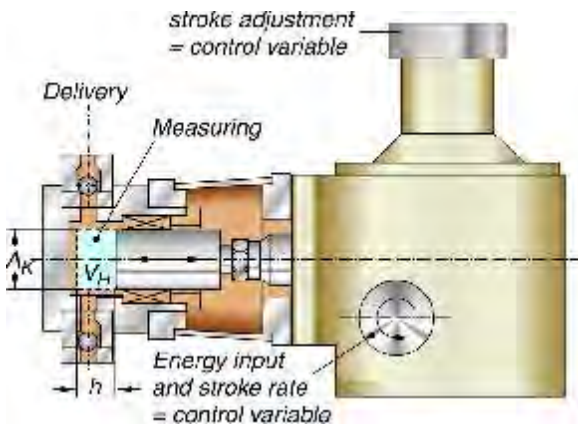
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**UNIVERSAL**



## WHAT IS A METERING / DOSING PUMP :

UNIVERSAL Metering Pumps are positive displacement reciprocating chemical dosing pump with Plunger or Diaphragm type liquid end, with an ability to vary flow of the pump manually or automatically as the process demands.

It features a high level of steady state accuracy, repeatability and linearity over the turn down ratio.

It is capable of pumping a wide range of chemicals including acids, bases, corrosive or viscous liquids and slurries.

The Pumping action is developed by a reciprocating plunger / piston either in direct contact with the process fluid, or is separated from the fluid by a diaphragm. Diaphragms are actuated by hydraulic fluid between the plunger and the diaphragm.

Metering pumps are generally used in applications where one or more of the following conditions exists.

1. Low flow rates in mL/hr are required.
2. High system pressure exists.
3. High accuracy of feed rate is desired.
4. Dosing is controlled by microprocessor, DCS, PLC or flow proportioning.

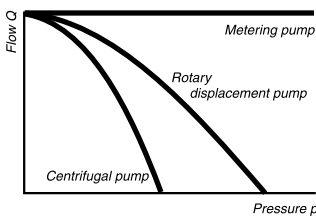
In one compact pump the metering pump combines the following functions.

CONVEYING : Input of energy by the pump as prime mover.

MEASUREMENT : Constantly repeatedly displacement of a set stroke volume (  $V_h$  ).

ADJUSTMENT ( Correcting Variable ) : Adjustability of a defined stroke volume or stroke frequency.

## THE CHARACTERISTICS :



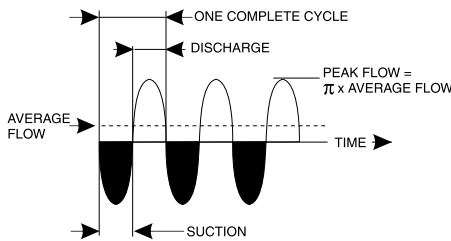
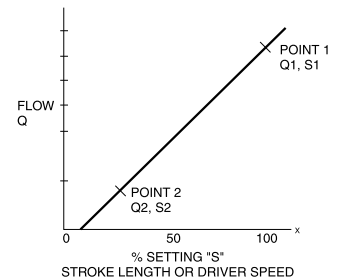
### Pressure firm, accurate :

Compared with other pump systems, the metering pump has the most pressure rigid characteristics. Thus, pressure energy can be fed in at almost any level with a high degree of efficiency and without any draw back.

### Linear

Even at high pressures, pump's linear characteristic is shifted by only a minimal amount ( due to fluid compressibility ). The metering pump flow vs stroke characteristic curve is linear. It is not, however, necessarily proportional. This is due to the fact that the calibration curve may not pass through the zero on both the axis simultaneously.

Typically the Steady State Accuracy of a correctly installed industrial grade metering pump is generally  $\pm 1\%$  or better, Linearity and Repeatability  $\pm 3\%$  or better over the turn down ratio Typically 10 : 1, 100 : 1 can be supplied on request.



### Digital

The metered flow is digital in nature. This feature can be utilized for batch metering by counting displacer strokes when required multihead pumps and other damping techniques can be utilized to provide smooth pulse less flow.

## THE OPERATING RANGE :

- Fluids Metered : Liquids, slurries, foams, suspensions, melts, gases, harmless, abrasive, toxic, aggressive, viscous at all vapor pressures.
- Metered Flow Per Pump Head : from 1 ml/hr to 10,000 l/hr adjustable from zero to maximum, with pump in operation OR at rest. Higher capacities achieved by multiplexing.
- Operating Pressure : Pressure ranges upto 10, 50, 160, 225, 350, 700, Kg/cm<sup>2</sup>.
- Viscosity : from 0.1 upto 250,000 mPa s.
- Temperature : from -80°C to +450°C
- Performance : Steady State Accuracy is better than  $\pm 1\%$  Repeatability  $\pm 3\%$ , and Linearity  $\pm 3\%$  over the turn down ratio. Refer individual performance charts for each pump model separately.

## The Modular Units, Maximum Performance, Reliable and Flexible

The requirement to meet a variety of differing customers requirements, and economical dosing / metering solutions have lead MATZ to develop a Modular pump design.

Our latest series BL can be configured to satisfy virtually any metering service, design /process requirements, and budget with standardized modules, today and in future.

Should a special critical application exceed the requirement than of our modular production range, our over three decades of experience in the metering / dosing pump field is a sound foundation for offering a tailor made solution to cater to your exacting requirements.

Our modular units for individual mix and match combinations comprises of:

### DRIVE ELEMENT

Available in five different power capacities, converts rotary motion into a reciprocating displacement motion and provide the precise and linear adjustment of the stroke.

### PUMP HEAD ( LIQUID END )

A selection of Plunger or Leakless Hydraulically actuated diaphragm, Mechanically actuated diaphragm. Material of construction range from Stainless Steel ( CrNiMo ), Titanium, PTFE, PVC, PP, Nickel and Molybdenum Alloys, etc to name a few.

### DRIVERS

With fixed or variable speed options in standard, explosion proof, intrinsically safe, increased safety, non sparking drives, can also be offered with AC frequency variator.

### STROKE ADJUSTMENTS

Manual, via electric or pneumatic stroke actuators with common electric stroke adjustment and also without stroke adjustment ( fixed stroke length )

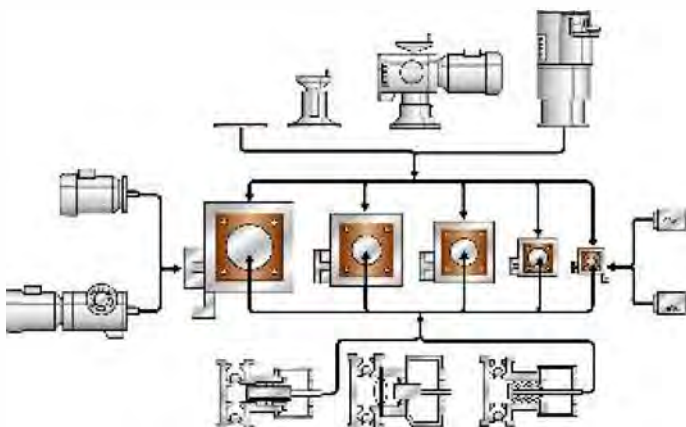
### ATTACHABLE INSTRUMENTATION

A full range of contact initiators and speed transmitters for monitoring and control of dosing.

### MULTIPLEX PUMPS

All pumps of modular design can be combined to form a multiplex metering pumps ( up to nine pumping elements ) in a horizontal inline arrangement.

Mix and match any combination of drive element, pump head, driver, stroke adjustment device with our modular design concept for continuous, accurate, reliable proportioning of different liquid streams.



## The BL variable eccentric drive element :

The drive elements are available in five different power ratings. They are easy to operate, exceptionally accurate, sturdy, precise, and overload safe and meet the requirement of API 675.

The integrated, compact worm gears with different reduction ratios feature a high efficiency and long service life. A positive separation of drive element and hydraulic oil of diaphragm pump, the basic requirement for continuous, zero problem, low wear operation, is guaranteed by a double sealing of the connecting rod.

As an alternative, drive elements are available with out stroke adjustment with vertical motor mounting in space saving applications and also in boxer designs with common stroke control for pulse free double flow rate.

Advantages of adjustable stroke drive elements based on variable eccentric system,

- **Precise** : linear, fully reproducible stroke lengths. The adjustment mechanism is "jamfree" by design and completely sealed from contamination. Turn down ratio 10 : 1, other options possible.
- **Accurate** : as the drive torque is not carried by the stroke adjustment mechanism, there is minimum adjusting force requirement for manual or autoservo stroke setting and a narrow deadband with autoservo setting devices as the stroke adjustment mechanism transmits no drive torque. Full eccentric drive provides positive return of the plunger.
- **Flexible** : adjustment of stroke possible during operation or at rest.
- **Overload safe** : Minimum free play, easy adjustability and high overload capacity with supported beam design with no bending loads. The load transmission is statically clearly determined, with no movement of support bearings.
- **Expandable** : drive elements can be combined with other like or similar drive elements ( upto 9 units ) to form a multiplex ganged unit.
- **Efficient** : low energy requirement.
- **Low life Cycle Cost** : use of hardened and ground parts leads to lesser friction, wear and tear, Low maintenance, less energy requirements, long service life without any major maintenance.

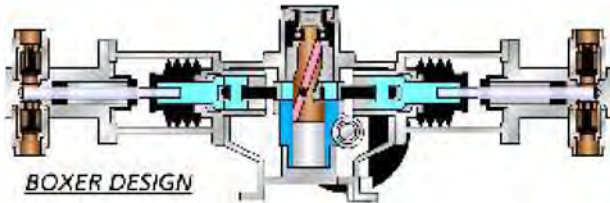
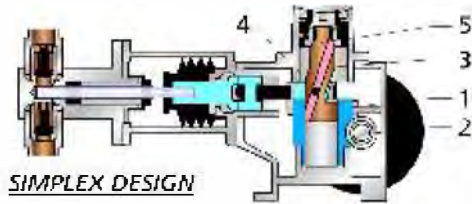
### ALTERNATIVES :

- Units with vertically mounted motors for less floor space.
- Units with fixed stroke lengths no stroke adjustment.
- Opposed pump head boxer design for pulse free double flow rates.
- Pumps with high suction pressures.

## THE PRINCIPLE :

In Series BL drive end the principle of the mechanism is a crank pin, the eccentricity of which can be adjusted between zero and maximum. The length of the stroke imparted to the plunger or diaphragm by the crank pin and therefore, the output of the pump is similarly adjusted.

Rotary motion of the drive is transmitted to the eccentric guide (1) through a worm and worm wheel (2) which is converted to reciprocating motion due to the crank (3). Variation of the eccentricity is achieved by sliding the crank pin (4) along the diagonal groove in the crank. The degree of eccentricity is controlled by a key inside the crank pin, which moves in a diagonal groove in the crank. When the shaft (5) is pushed fully into the crank pin, the eccentricity is maximum full stroke length condition, when the shaft is fully withdrawn eccentricity is minimum, crank pin becomes concentric with the crank minimum stroke length condition; intermediate positions produce corresponding degrees of eccentricity and output.



## Electric Stroke Actuators include modern interface and safety features such as :

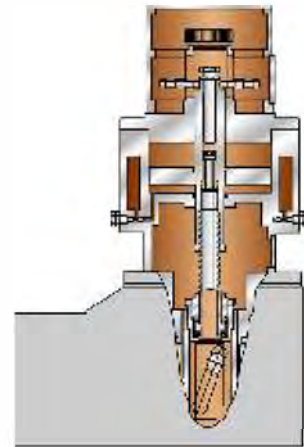
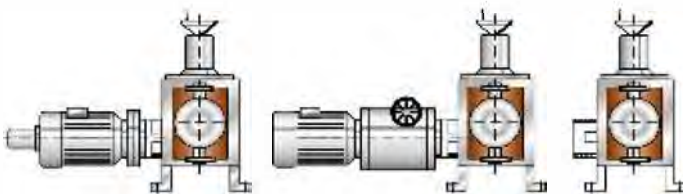
- Non blocking reversible motor.
- Input Signal 0/4 - 20 mA or any other logic signal.
- Input Power 230 V, 1 Ph, 50 Hz, Optional 415 V, 3 Ph, 50/60 Hz, 110V, 1/3 Ph, 50/60 Hz.
- Feed back via potentiometer or 0/4 - 20 mA signal.
- Integrated limit position and overload protection.
- Enclosures to meet most electrical standards.
- Auto - Manual (local) operation.
- Optional auto position controller.

## DRIVE ELEMENT ACCESSORIES OPTIONS

### Drivers,

Standard driver is an AC induction electric motor, in a selection of input power supply options and suitable to various hazardous area, including Explosion proof ( flameproof ), Increased safety, Non Sparking, in fixed or variable speed executions. Other alternatives include :

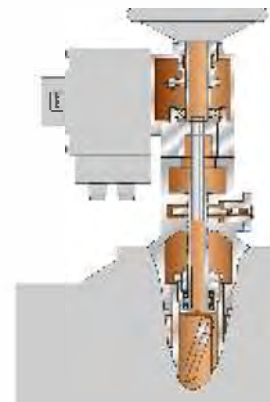
- DC Motors
- IC engines
- Variable speed transmissions or gears or variators.
- Free Shaft end.



Electric Stroke Actuator

## Pneumatic Stroke Actuators are equipped with state of the art features such as :

- 3 - 15 psig ( 0.2 - 1 bar ) control signal.
- Air supply pressures 40 -100 psig.
- Integrated hydraulic dampening.
- Optional control and feed back via 0/4 - 20 mA signal.



Pneumatic Stroke Actuator

## Instrumentation

For monitoring and interfacing pump with the process controls system we offer choicest instrumentation like

- Speed transmitters, contactors.
- Pulse Signal Generators.

## Stroke Adjustment

Series BL drive elements are variable stroke length mechanism, adjustable

- Manually - Local Control.
- Electrically - Local or Remote Control.
- Pneumatically - Local or Remote Control.

This series of drive elements can also be offered with out stroke length adjustment and flow capacity can be varied by varying the speed of the driver and consequently the plunger speed via AC frequency variation or suitable variation device.

## PUMP HEADS

### BASIC PLUNGER PUMP HEADS

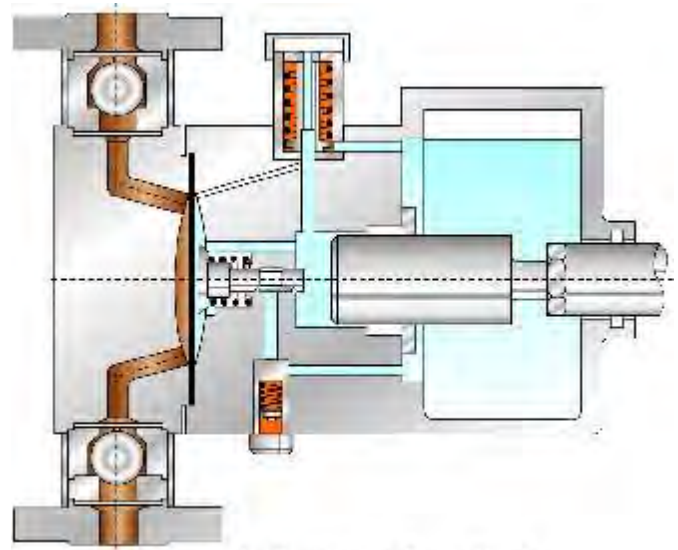
Our Proven, reliable, most economical pump heads with wetted plunger, gland packing seals are ideal choice for simple applications with noncritical, harmless fluids.

Pump head designs are simple, economical, easy to maintain, excellent suction lift capabilities, low NPIP requirement, high discharge pressure capabilities, have minimum dead space, require least maintenance, and are highly accurate.

A wide choice of Plunger coatings from Ceramic Oxides, Stellite, Silicone Carbide and Tungsten Carbide are available for optimal chemical resistance and hardness.

Plunger seals are compression type square braided non asbestos packing as standard, options include but are not limited to provision of lantern rings for gland flushing, cooling or heating, and self tensioning "v" rings.

Special design Pump heads with total jacketing for heating / cooling applications for polymers, melts, molten liquids with accessible valves, pump heads for cryogenic liquids, head holders with protective covers and with drip pan also available.

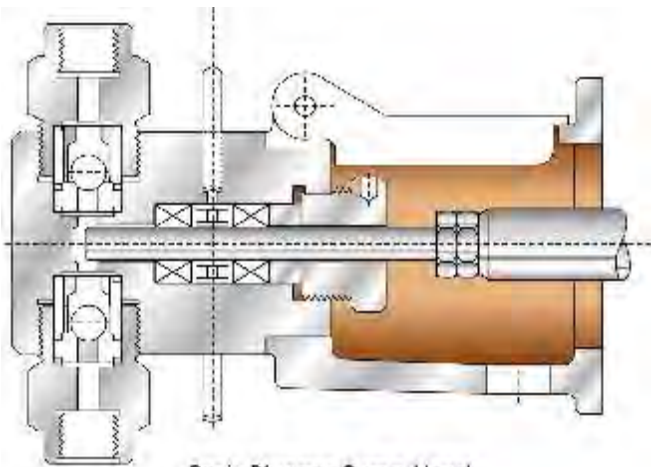


*Hydraulic Diaphragm Pump Head*

Sandwich double diaphragm pump heads with diaphragm condition monitors, can detect any rupture in diaphragm and is immediately signalled, while the pump continues leaktight full performance operation till the pump duty cycle is completed and damaged diaphragm replaced.

### Advantages of diaphragm pump heads :

- High metering accuracy due to pressure stiff with internal auto air / gas bleed device.
- Zero Leakage Leakless operation due to hermetically tight design.
- Sandwich double diaphragm design with reliable diaphragm condition monitors.
- Unobstructed fluid chamber with freely moving synthetic diaphragm provides a clear flow path for viscous liquids and suspensions.
- Built in pressure relief valve protects pumps from over pressures.
- Resilient to dry running.
- Reliable, proven, and volumetrically precise gas venting valve ensures accurate hydraulic volume and correct diaphragm positioning.
- Reliable hydraulic fluid replenishing system with full diaphragm backup support.
- Positive separation of hydraulic fluid and drive element lubricant.
- Full diaphragm back up support permits use of pump with high suction pressures, and with liquids having high vapor pressures.



*Basic Plunger Pump Head*

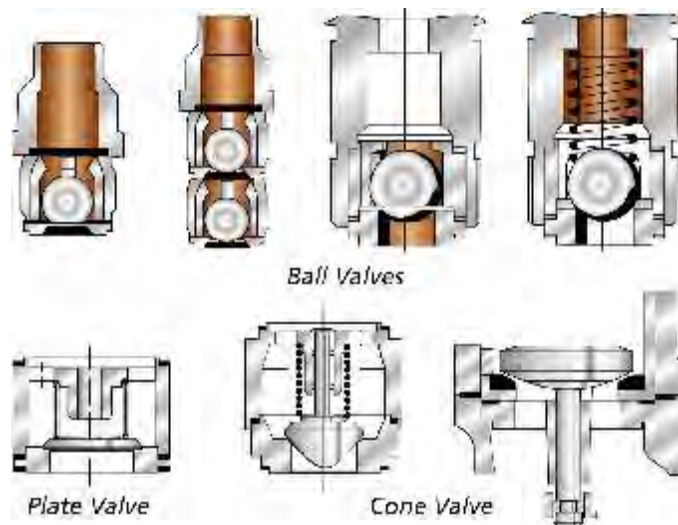
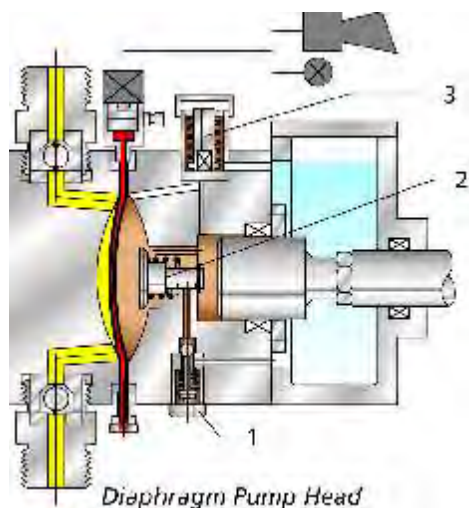
### DIAPHRAGM PUMP HEADS

Our totally leaktight hydraulically actuated diaphragm pumps are ideal selection for all critical, environmentally hazardous or sensitive liquids and suspensions, they are proven cost-effective in a wide range of applications. The hermetically sealed design not only contains hazardous, toxic, or abrasive fluids, but also excludes contaminants where the process fluid must remain pure or sterile. The pressure stiff linear pump characteristics meet all major sensitive dosing applications.

Built-in safety features like 1) Integrated Safety Relief Valve with air / gas bleed device, protects the diaphragm against damage due to excessive system pressure and from malfunctioning of the hydraulic system due to entrapped air / gas, 2) Integrated Diaphragm Actuated Replenishing Valve; controls the oil replenishing in to the hydraulic chamber based on the diaphragm oscillation, safe guards the freely oscillating diaphragm from damages due to cavitations.

**THE PRINCIPLE :**

The hydraulically balanced freely moving diaphragm totally contains the process fluid ( yellow) which is hermetically sealed to the environment.



**HOW IT WORKS :**

The reciprocating plunger displaces hydraulic fluid (blue) causing movement of the diaphragm and a like displacement of process fluid. Our advanced diaphragm position control system is used for highest operating safety. A diaphragm actuated gate valve ( 2 ) controls the replenishing valve (1) forcing the diaphragm to be in the rearmost, fully supported position before any replenishment of hydraulic fluid takes place thereby safely preventing overfilling in any condition of process upset. Likewise, an integral pressure relief valve ( 3 ) with gas venting function protects the pump and system from over pressures.

**Liquid End Valves Key To Liquid End**

**Reliability, Accuracy And Long Service Life,**

Proper selection of liquid end valves is of major importance in suitability of the pump for the service, we offer a wide choice of valves for varied application depending upon the duty conditions, size and construction of the liquid end.

**Ball Valves :** standard valves for nominal sizes upto 20 mm. Optimal flow characteristics, self cleaning and functions reliably even with contaminated fluids.

**Plate Valves :** standard valves for nominal sizes upto 40 mm and up and pressure upto 500 Kg/cm<sup>2</sup>. Suitable for high stroking speeds, highly accurate, long service life.

**Cone Valves :** standard valves for nominal sizes 40mm and up; for high capacities and pressures. Suitable for suspensions, slurries.

**Valve Material :** standard execution valves are of the same material as the pump head. For demanding requirements, optimized combination of materials for valve and valve seat and guide pieces are available.

**Options :**

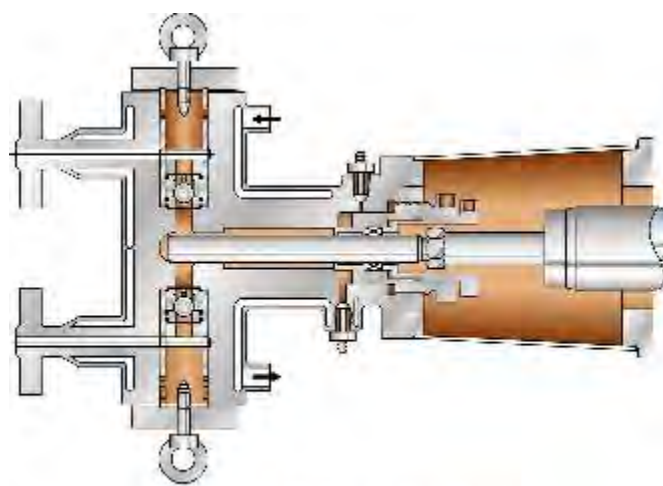
- Double Stage / Triple Stage valve for special applications.
- Non clogging valves for slurry applications.
- Hardened Valve components.
- Spring Loaded valves.
- Hard Metal, Oxide ceramic or Silicon nitride valve parts.
- Valve inserts of plastic materials.
- Hard Faced valves, valve seats.

**SPECIAL EXECUTIONS :**

**Diaphragm Pumps with accessible fluid chambers :**

special designs have been developed for services such as in food, pharmaceuticals, beverage or photo industry where easy clean ability is required for sanitation. Pump head front cover can be quickly removed, cleaned, sterilized and refitted.

Polished surfaces, corrosion resistant diaphragm clamping, and special paint, as well as dairy connections available.



*Jacketed, Plunger Pump Head*

**Metering Pumps with remote head :** For Critical fluids and operation conditions such as

- Suspensions at high temperatures.
- Hot fluids
- Radioactive fluids
- Explosive fluids
- Toxic fluids

The separation between the pump drive with its displacer system and the valve head keeps the critical conditions away from the displacer system. Specific layout of displacer system and valve head in plunger or diaphragm designs.

**Metering Pumps with submerged heads :** for dosing molten sulphur, molten liquids, melts, and handling liquids at high temperature.

- Eliminates leakage of liquids.
- Eliminates solidification of liquids in pump head.
- Positive heating of all pump head parts before pumping.
- Design allows cleaning of Pump head without dismantling the piping.

**Metering Pumps with jacketed heads :** for dosing molten sulphur, molten wax, molten melts and handling liquids at high temperature.

- Design allows cleaning of pump head, and access to non return valves without dismantling the piping.

**ALSO AVAILABLE :**

- Multiple Head metering pumps with individual or single common control for flow variation : an ideal configuration for batch metering of different liquids in equal prefixed or variable ratios, with manual or auto controls.
- Proportionate Dosing Pumps, Duplex or Multiplex with manual or auto; single or individual controls.

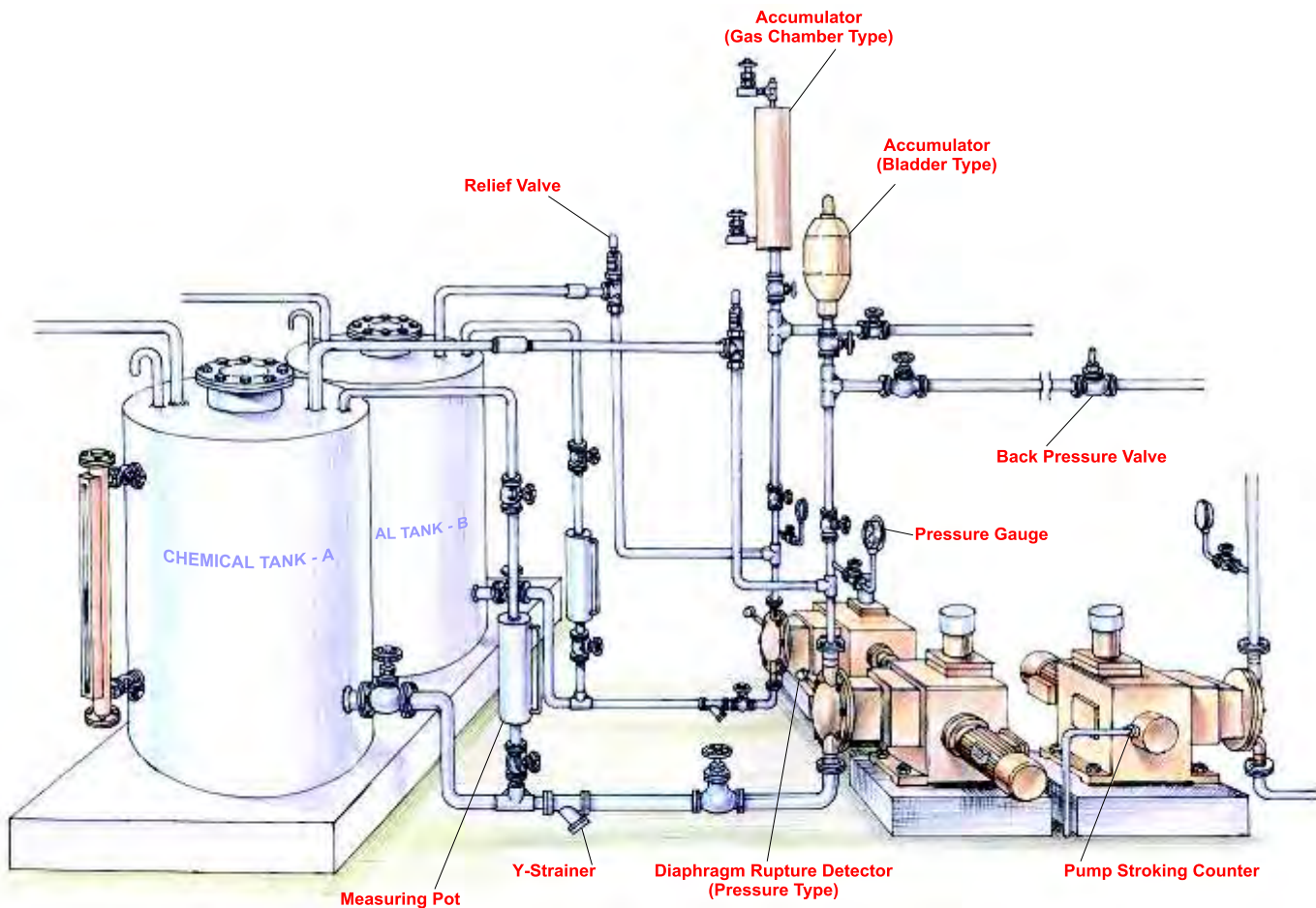
**ACCESSORIES FOR CORRECT INSTALLATION :** an assurance to proper layout and functioning of dosing pumps.

Trouble free operation of the metering / dosing pump is attributed to correct installation for the application and process fluid characteristics. Properly selected, sized and installed accessories turn the pump into a reliable functional system.

We offer a matched and proven selection of accessories, these accessories are designed, and recommended to be fully compatible with our pumps and their operating characteristics.

**Accessories offered by us are :**

- Storage tanks of various sizes, materials, with heating or cooling coils, with manual or mechanical Agitators, with Level Control Switch, Level Control Alarms, Level Gauges etc.
- Pressure Gauges, Pressure Switches, Differential Pressure Switch.
- Suction Strainers, Filters.
- Suction and Discharge, Accumulator or Bladder type Pulsation Dampner for flow and pressure.
- Relief Valves, Injection Valves, Dosing Valves, Back Pressure Regulators.
- Pump stroke counters, Diaphragm Rupture Indicators, Alarms.
- Flow Meters with Digital or Analogue outputs.
- Any other automation instrumentation applicable to the dosing system.



**TYPICAL DOSING SYSTEM LAYOUT AND ACCESSORIES AVAILABLE WITH US.**



\*Owing to Continued design and technology development, we reserve the right to change design than as shown in this Catalogue.

Manufactured by :  
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**Representative in your Area**