TOSHCON JESCO

INSTRUCTION MANUAL

DOSING PUMP

Manufactured By :

TOSHCON JESCO (INDIA) PVT. LTD.

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Model .....

S.No. .....

1. GENERAL

Toshcon Jesco MAGDOS MD solenoid metering pumps are leakage free, electronically controlled magnetically driven diaphragm pumps for accurate dosing of chemicals. One of the advantageous feature of the magnetically driven pumps is its outstanding ability to respond in proportion to pulse-signals. Each pulse-also a continuous pulse-corresponds to only one metering stroke. As the pumps can be pulsed either by an internal control or by contact closures, optocouplers or 0(4)... 20 mA signals, they can be used in a wide range of applications. Diaphragm pumps are also safe against dry running provided that the remnants of the chemical being pumped does not crystalize within the dosing head when air is introduced. The pumps are of modular design consist of Aluminium Housing, metering head, drive and control unit. If correctly installed and handled MAGDOS pumps do not require any maintenance.

HOUSING

The complete pump housing is made up of Aluminium alloy to ensure high temperature stability and resistance to fracture. Heat dissipation is augmented by the large vertical cooling fins, by this means high energy density is achieved. These Housing are powder coated with rugged chemically resistant epoxy material.

METERING HEAD

The metering head in many respects is the most important part of the pump. It is required to regulate the volume being dozed. It is resistant chemically & abrasively to process media. These are available in highly resistant plastic materials like PVC or PP, also available in stainless steel material.

MAGNETIC DRIVE

A low noise DC solenoid which can produce a 4 mm maximum stroke, for models up to 12 Lt./Hr and 6 mm for models up to 100 Lt./Hr. serves as the drive for the metering head. A continuously adjustable, stroke length can be adjusted from 0....4 mm and 0....6 mm depending on the pump size.

No reduction Gear or rotating components are required. This results in high operational reliability and freedom from maintenance. The armature runs in a maintenance free PTFE bush assembly.

DIAPHRAGM

The diaphragm is made up of fabric reinforced rubber, which has a metal part vulcanised into it for attachment to the drive shaft. Rubber used here in its general form and refers to hyplon, Viton or EPDM, that can be protected by Teflon coating.

The main advantage of a diaphragm is that it operates in a sealed environment so that no poisonous, aggrassive & harmful media can escape. The diaphragm itself is usually unaffected by abrassive media.

DIAPHRAGM FLANGE

The diaphragm flanges are so designed that if there is a rupture of diaphragm, chemical does not reach the magnetic drive but it is drained off at the bottom. A leakage probe can be provided to the bottom which enables the pump to be switched off when the first drop appears.

VALVES

The suction & discharge valves perform the most important function to ensure that dosing takes place in one direction only & that there is no return flow. These are double-ball type & available in PVC, PP & SS material. To achieve good flow with high viscosity liquid, the use of spring loaded single ball valves are recommended.

CONTROL UNIT

The electronic Control for the MAGDOS solenoid metering pump allows easy adaption to all requirements of domestic water treatment and waste water treatment. The use of ICs, LEDs, etc. minimizes the number of components and increases reliability. The basic version contains all the necessary standard features :

(A) Ability to switch to either internal control or external pulse control.

(B) (Green) LED operation light indicates continuous stroking action by momentarily extinguishing with each pump stroke. (Red) LED indicates chemical low level.

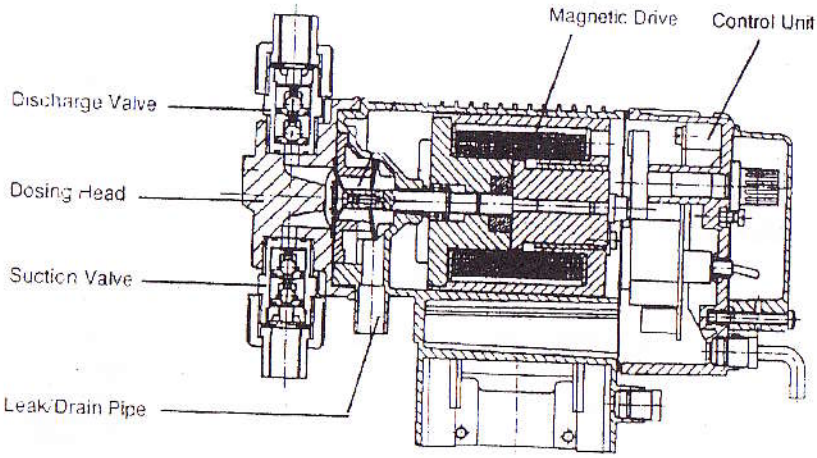
(C) The linear stroke frequency potentiometer together with the manual stroke length adjustment capability provides a total adjust ability ratio of over 1:500 for models up to 12Lt/Hr. and 1:300 for models upto 100 Lt./Hr.

(C) Fuse accessible from outside, integrated fuse with the CSA/UL version.

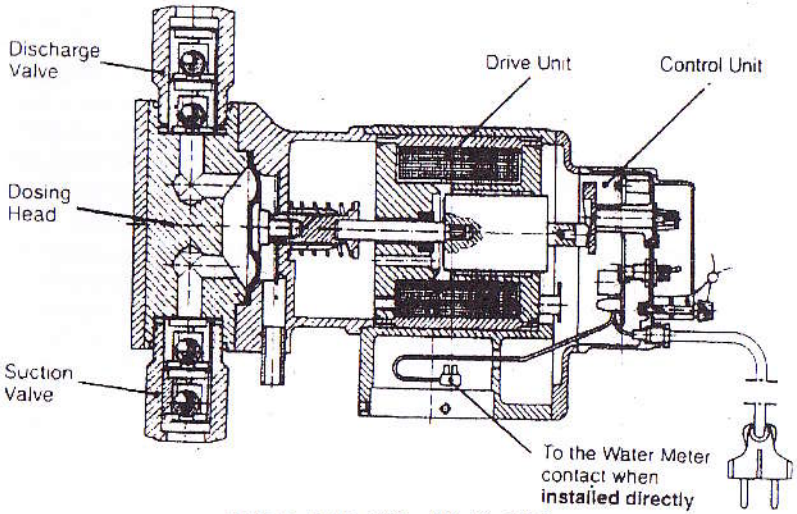
(E) Chemical low level indication with connected level switch (optional). For level control, a conductivity probe (2-bar electrode) is utilized which directly acts on the control unit without interposing a separate leve-relay.

(F) The level control probe can be easily connected using a jack plug. The level control also provides self diagnostics i.e. low level will be indicated even it the cable breaks, and the pump will stop immediately. If low level feature is not used, a dummy plug is inserted. The cables for the external control, e.g. to the water contact meter and level switch, are installed from the main power supply. They have a voltage of about 9V AC for Low capacity & 15V AC for High capacity pumps.

GENERAL ASSEMBLY FOR MAGDOS PUMPS



UPTO MD 12



FOR MD 20, 40 & 100

The water meter can basically be connected in two ways;

1. The pump is directly mounted on the water meter with an internal cable connection.

2. The pump is externally connected to a remote water meter via cable. Maximum stroking speed is limited to no more than 104 strokes per minute for upto 12 Lt./Hr. capacity models & 74 strokes per minute for up to 100 Lt/Hr. high capacity models regardless of pulsing rate from external source.

ADDITIONAL FEATURES

(A) A warning signal relay with volt free change over contacts is available to indicate power supply failure, chemical low level, cable breakage or missing plug/terminal connection in closed circuit configuration. (you may use the power supply as a central control station for this purpose)

(B) A stroke optocoupler is available which switches with every pump stroke (for remote counting of pump strokes).

2. SCOPE OF DELIVERY

Be careful when unpacking the metering pumps and possible accessories in order not to miss small parts. Compare the scope of delivery to the delivery note. If there are any discrepancies, try to findout the reason.

3. INSTALLATION

Both, the designer and the user are responsible to make sure that the whole plant including the metering pump is constructed so that neither parts of the plant nor buildings are severely damaged in the case of chemical leakage due to a diaphragm failure or burst tubing. When constructing chemical Plants, the installation must be carried out so that no consequential damages appear which are unreasonably high in comparison to the value of the pump. Therefore we recommend to install leakage probes and containment tanks.

Operating and maintenance personnel should be able to easily access the pump. We recommend to mount the pump on separate wall brackets which should be fixed to outer vessel instead of interior wall adjacent living rooms etc. It is also recommended to use up to three valve assemblies as shown in installation example in order to increase the metering reliability and accuracy, protect the plant against inadmissible pressures and simplify maintenance. Ambient temperatures exceeding 40° C are not permitted. Radiant heat of apparatus and heat exchangers must be kept in limits allowing the pump to sufficiently carry off its own specific heat. Exposure to direct sunlight should be avoided.

Although the diaphragm metering pumps have protection of class IP65, they should not be installed outside without any roof. The pumps can be mounted directly on chemical tanks, wall brackets or water meters by using an adapter.

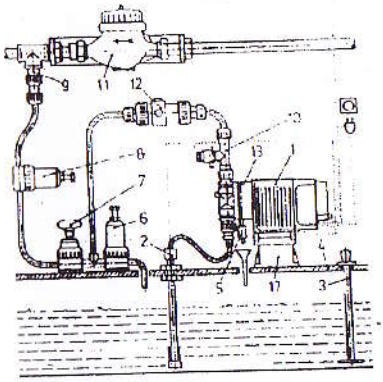
Wiring must be carried out by a specialist according to the local regulations.

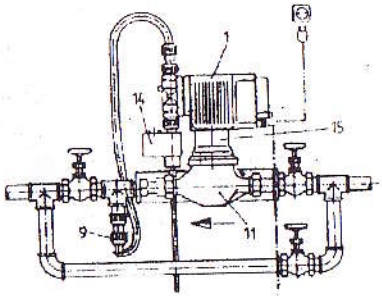
Do not lay signal cables of water meters or 0(4)...20 mA controls parallel to high voltage current or power supply lines. Supply and signal lines must be laid in separate channels. In the case of junctions, a 90° angle is required. If the water meter control cable is more than 2 meters long, it must be shielded.

If the pump is not specially controlled through a switch cabinet, it can be connected to the power supply using a standard power supply plug. For electrical data on different pump versions, refer to Table.

, Fill tank with chemical.

INSTALLATION EXAMPLE





1. MAGDOS
2. Suction line with integrated level control
3. Hand mixer
4. Chemical Tank
5. Leakage probe for monitoring the Diaphragm
6. Relief/Safety valve
7. Shutoff valve for isolating the pump from the plant
8. Back pressure valve for Max. Metering Accuracy
9. Injection Fitting with Non-Return Valve
10. Venting as Separate part or integrated in Metering Head
11. Water Meter with Contact Unit
12. Pulsation Dampener for Reducing pressure peaks and smoothing the flow
13. Separation Chamber (Recommended if the media could damage the pump in the case of a diaphragm failure)

ATTENTION

Leakage must be dischargd into a collection funnel using a short inclining drain pipe (and can then be returned to the chemical tank). The outlet of the drain pipe must be visible in order to see the leakage.

14. Priming Aid. This equipment allows to easily start up particularly small pumps.

The entrained gas serves as a pulsation dampener

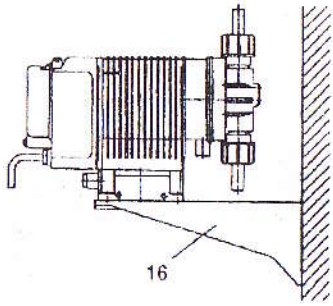
15. Water Meter Spacer

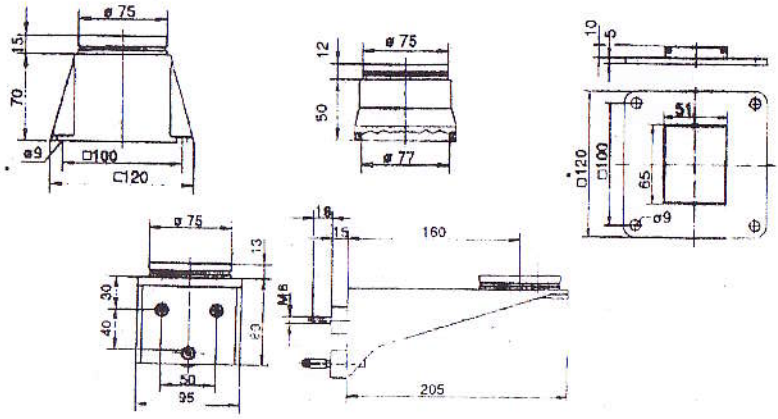
ATTENTION

The spacer is required to avoid the water meter contact that affect the drive solenoid.

16. Wall bracket

17. Tall or short Adapter for Tank Mouting

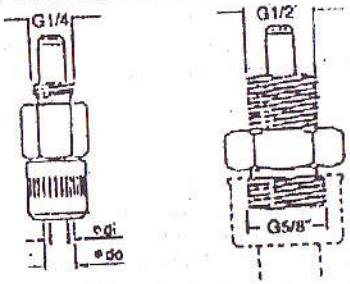




MOUNTING DETAILS OF DOSING PUMP

4. INJECTION FITTING ASSEMBLY

Injection nozzles prevent the liquid from returning to the pump by using either a spring loaded ball valve or a hose valve. We recommend vertical injection from bottom to top to allow air to escape thereby avoiding chemical precipitation. Experiences made with the particular metering chemical and all appropriate characteristics must be taken into account.



5. START-UP

ATTENTION

Adjust the stroke length only while pump is running

(i) Before starting the pump set "internal" (⎍⎍⎍) or press start key and allow to prime. For this purpose it is advisable to set the stroke to "10". If the pump doesn't prime, remove discharge valve and pour water or chemical (if harmless) into head. Mount valve and allow to prime again.

(ii) If a venting facility is integrated in the metering head or available as seperate unit, open it and wait until liquid escapes. Then close it again. In the case of effervescent liquids allow the liquid to escape permanently (approx. 1 drop for 1....3 strokes)

(iii) When correct operation is achieved, set to required output and lock adjusting knob.

(iv) In case of externally actuated pumps, set pump to "external". Initiate the water flow by opening a water valve and check pulsing.

MAGDOS MD as a Regulating Unit

The MAGDOS electronics allow to control the pump with 104 strokes per minute up to 12 Lt./Hr and 74 Strokes per minute up to 100 Lt./Hr capacity models via external pulse signals. Floating and voltfree normally open contact (NOC) of pulse emitters, meters contact water meters or any other contact flow meters can be used for control. Thus externally pumps can also be controlled via contacts provided by process or conveyor belts. The pump is suitable to serve as a regulating unit for pH, Redox and all other controllers with pulse frequency modulated output.

OUTPUT

The output is dependent upon the viscosity of the fluid and the particular hydraulic installation conditions. For water at 20°C and a suction lift of 0.6m (system is air free) the performance curves are shown maximum liquid temperature for PVC heads 35° C, for PVDF and Stainless Steel heads. 50°C.

LINEARITY

The inexpensive optional electronic control module for automatic control with (4)...20 mA signal guarantees a Zero stroke frequency with a direct control signal of 0 or 4mA. But, linearity up to maximum 20mA may deviate typically by ±4 strokes per minute.

ISOLATION

For solenoid metering pumps with automatic control from a 0(4)....20 mA, it is extremely important that the signal doesn't come into contact with earth if the signal source is not isolated & If 2-bar electrodes are used for level control, earth connectioin causing disturbances may occur. Therefore the signal itself must be potential free, or a isolator must be installed.

6. CORRECTION OF STROKE LENGTH SETTING

MD Solenoid Metering Pumps

Due to improper handling e.g. forced adjustment while the pump is not running, the relationship between the output and the scale reading may be disturned. For correction, proceed as follows :

(i) Switch pump to automatic control at frequency setting = "10"

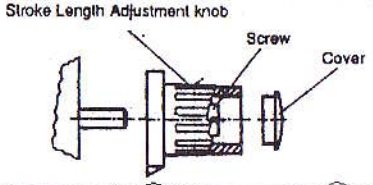
(ii) Regardless of the indicator position, turn the left-hand stroke length adjustment knob counter clockwise until the pump no longer delivers, or in the case of no pressure delivery, had reached the min. flow rate. Switch off the pump.

(iii) Remove the protective cover from the stroke length adjustment knob and loosen the screw.

(iv) Adjust the knob so that indicator is pointing to "0" and with the knob tightly, held at a scale distance of 0.5 mm. fasten the screw. Replace cover. If necessary, run pump according to a setting from the output table. If there is a major discrepancy, correct the knob positioin.

ATTENTION

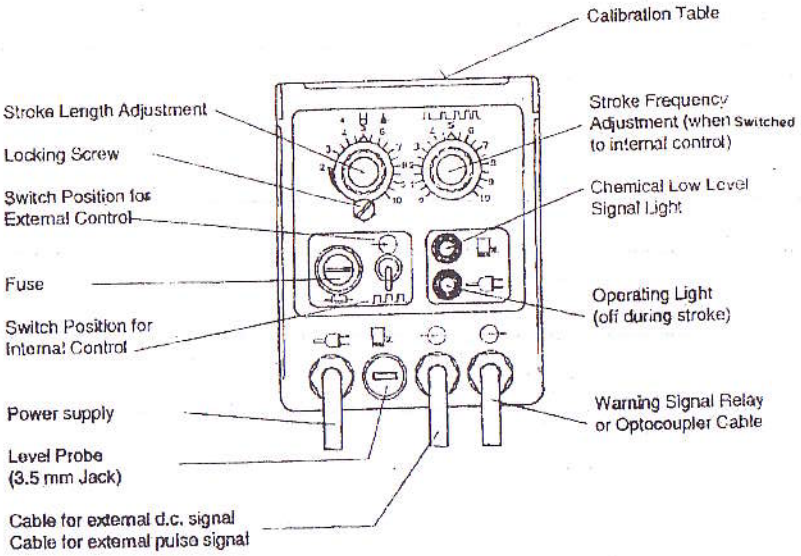
If zero delivery could not be attained because the knob reached the stop position remove the knob after loosening the fastening screw, turn it to the right and reattach it. Then turn again to the left until the pump no longer deliver.



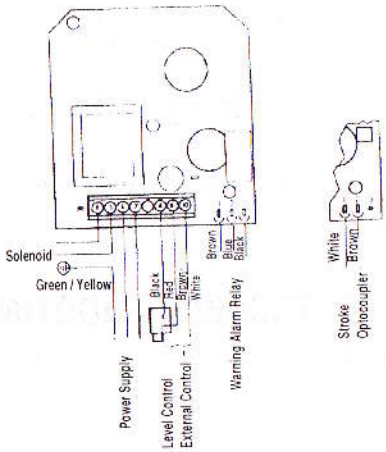
7. TECHNICAL DATA

DESCRIPTION		MAGDOS 01....12	MAGDOS 20, 40, 100
Electrical Connection		230 V AC, 50/60 HZ	230V AC 50/60 Hz
Power Supply Cable		1.5 with standard plug	1.5m with standar plug
Power Consumption (average consumption at max. strokes)		33 W	70 W
Current Consumption during Stroke		max. 2A	max. 3A
Fuse		1.5 Amp.	1.5 Amp
Protection Class		IP65	IP65
Insulation Class		F	F
Input pulse length required to triger a stroke		at least 30 ms	at least 30 ms
Solenoid Excitation Time per Pulse		130 ms	190 ms
Warming	Changeover Contact	max 2.5A 250V	max. 2.5A 250V
Alarm Relay	Making or braking Capacity	500VA 100 Watt	500 VA 100 Watt
Stroke Optocoupler		30 VDC 20mA	30 VDC 20mA
Voltage to the low Level Probe		9V AC	15V AC
Min. Conductivity Required		80 µs	80 µs
Voltage to pulse Control		12 V DC	15 V DC
Resistance for Input 0(4)....20mA		200 Ohm	200 Ohm

8. CONTROL PANEL MAGDOS MD 230 V AC/50 HZ



9. WIRING DIAGRAM



Level Control :

8 & 9 ..... level sufficient
Red LED off.
Green LED on
Voltage approx, 9 V AC & 15 V AC
External pulse Control
9 & 10 closed over 30 ms period. produces 1 stroke. Green LED off during pulse
Voltage approx 12 V DC & 15 V DC
DC Signal Control
Signal entry 9 & 10
0...20 mA or 4... 20 mA correspond to 0...100 stroke/min & 0....70 Stroke/min.

Warning Alam Relay :

1 & 2 closed in case of failure, e.g. low level, power supply failure. defective fuse, dummy plug or level detector jack plug not inserted
RED LED on.
1 & 3 closed during operation.
Green LED on.

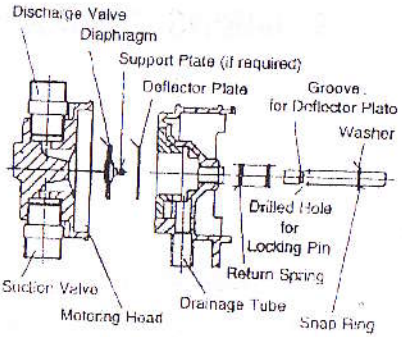
Stroke Optocoupler
1 & 2 closed (low resistance) during stroke

10. REPLACING THE DIAPHRAGM

The diaphragm can be easily removed and replaced according to the exploded drawing. To facilitate removal of the diaphragm, first set the stroke to "0" while pump is running. If the diaphragm rod is turning, it can be stopped by means of a locking pin. The drilled hole in the diaphragm rod can be accessed through the drainage channel.

Grease diaphragm rod with Molycote.

The deflector plate must rest in the diaphragm rod groove. Ensure that it is not clamped between the diaphragm rod and the support plate. Clean or replace the support plate before mounting it.



11. TROUBLE SHOOTING

NATURE OF PROBLEM	POSSIBLE CAUSE	RECOMMENDED ACTION
Pump not delivering or output to low	Valves leaking or Blocked	Clean valves and bleed pump (see also Start-up of pump)
	Valves incorrectly installed	Reassemble valves. Ensure that valve balls are Located above valve seats.
	Suction valve or suction line leaking or blocked	Clean and Seal Suction line.
	Suction lift too high	Install pump at lower position install pulsation dampener on Suction side. Install priming aid.
	Viscosity too high	Install spring loaded valves Enlarge tube cross-section Use special metering head. Contact TOSHCON JESCO
No Stroke Movement observed	Pump set to zero stroke Diaphragm return spring broken	Correctly adjust pump stroke Replace spring
	Fuse blown, LED's off	Check power supply line Replace fuse.
	Solenoid defective	Check coil resistance and isolation. Replace solenoid if required.
Low liquid level indication Red LED on.	Feed tank empty level incorrect or dummy plug incorrectly inserted	Fill tank or check suctiion line
Frequent diaphragm failures	No Support plate ATTENTION Not all diaphragms are supplied with support plates	Fit new diaphragm with support plate when replacing diaphragm, check if deflector plate or diaphragm rod have been corroded by pumped fluid

	Diaphragm was not screwed into the diaphragm rod as far as stop	Screw in new diaphragm as far as stop. Support plate must then be clamped between diaphragm and diaphragm rod.
	Back pressure too high (Measured at discharge connection of pump)	Check system. Clean blocked injection nozzle Reduce Pressure peaks resulting from extremely long tubes by installing pulsation dampeners
	Media sediments in head	Flush metering head
Pump delivering too much	Pressure on suction side too high (pump siphoning)	Install back pressure valve in discharge line.
	Stroke stop shifted	Adjust Stroke Adjuster
	Stroke frequency too high	Reduce frequency

If the problem cannot be corrected on the basis of the above data, contact our After Sales Service Officers or return the pump to the factory. Repairs will be carried out immediately.

ATTENTION

If the maintenance of the pump is not carried out properly as recommended, TOSHCON JESCO will not be responsible for any guarantee.

12. RECOMMENDED ACCESSORIES

(1)	Foot Valve	(2)	Injection fittings
(3)	Pulsation Dampener	(4)	Pressure Relive Valve
(5)	Level Sensor Probe	(6)	Pentablock
(7)	Priming Aid	(8)	Metering Head Venting
(9)	Leak Detector Probe		attachment (For effervescent media)

13. SPARE PARTS

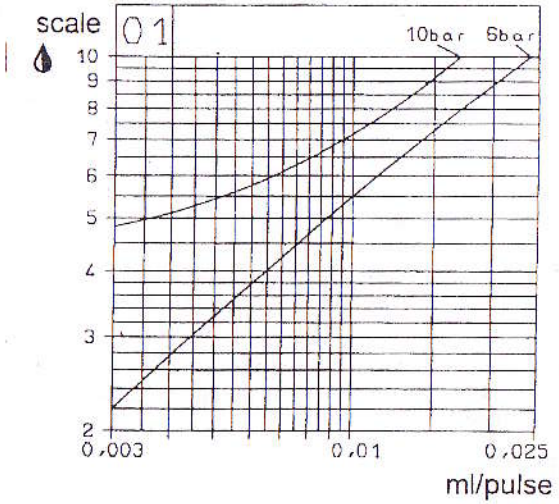
Diaphragm
O-rings for valve body
Gasket for connection
Suction Valve
Discharge Valve
Connection
Foot Valve
Injection Fittings
Electronic Control Board
Dosing head
Foot mounting
Front Cover
Fuse assembly

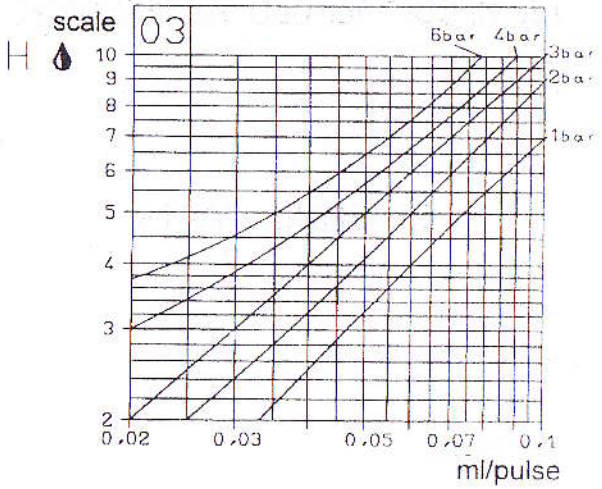
For spares mention model Nos.

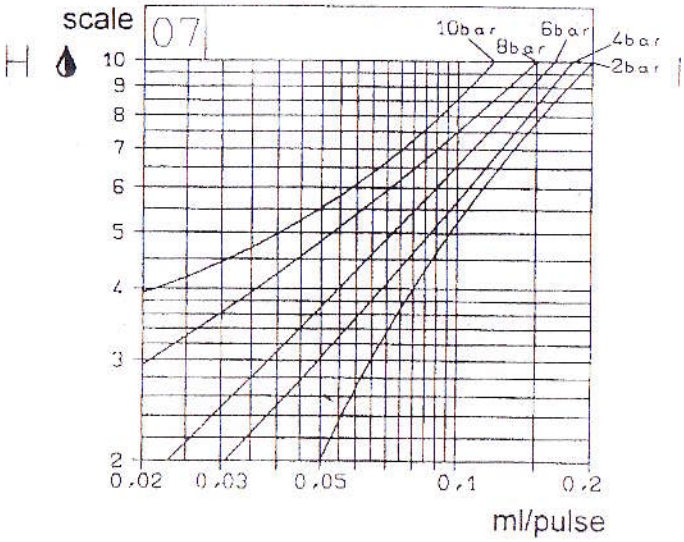
Note :- Improved changes are made always without notice.

14. STANDARD PERFORMANCE CURVES

Conveying capacity for Magdos MD with internal control Stroke/min.



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07
10bar
8bar
6bar
4bar
2bar
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7
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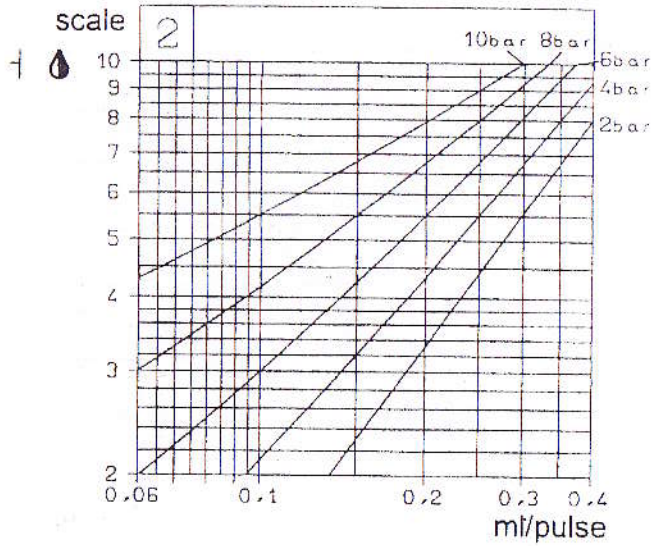
0,2
ml/pulse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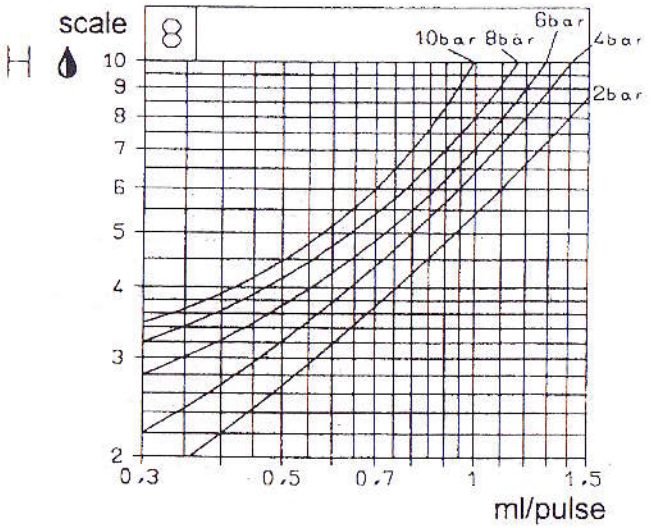
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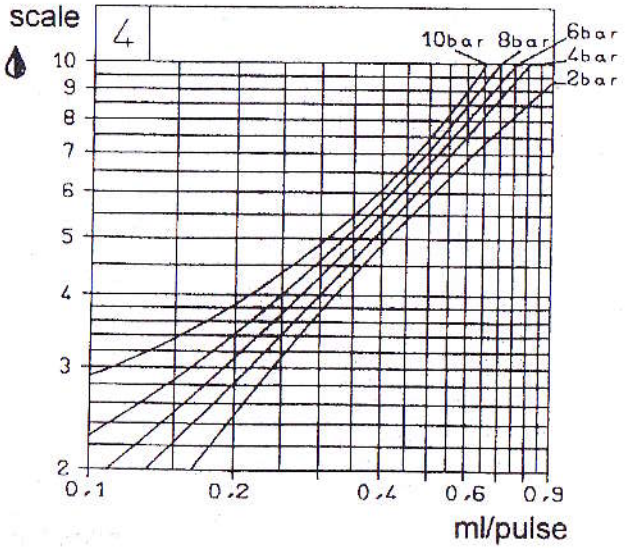
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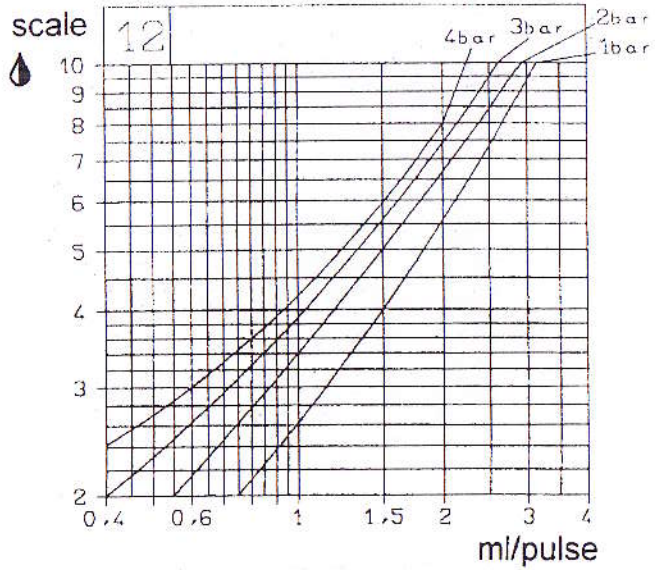
ml/pulse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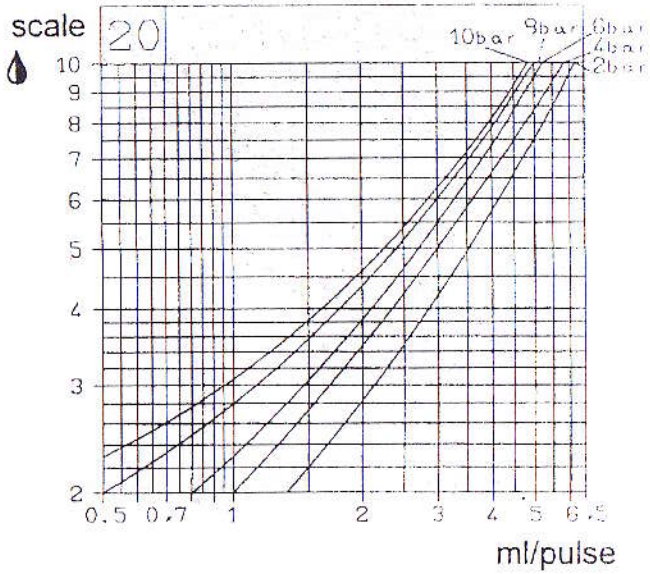
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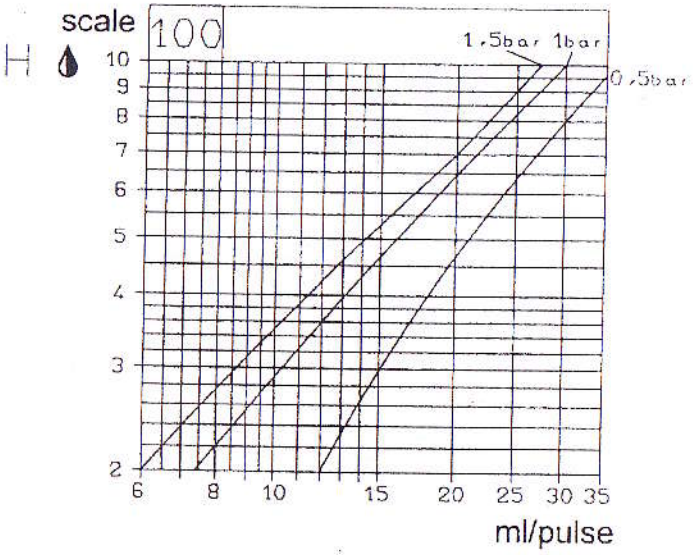
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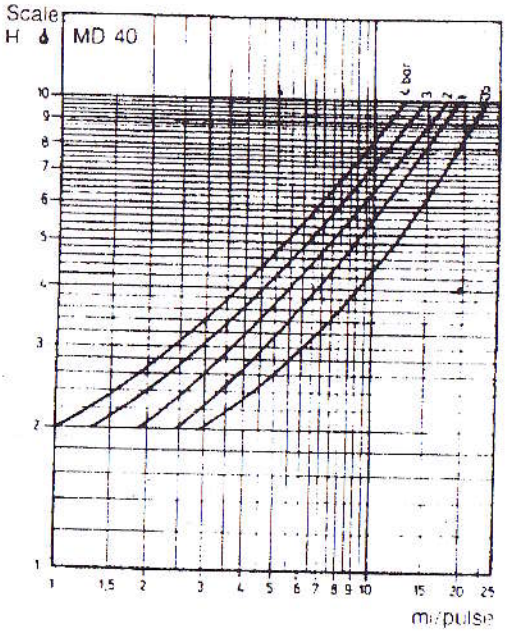
ml/pulse


Scale
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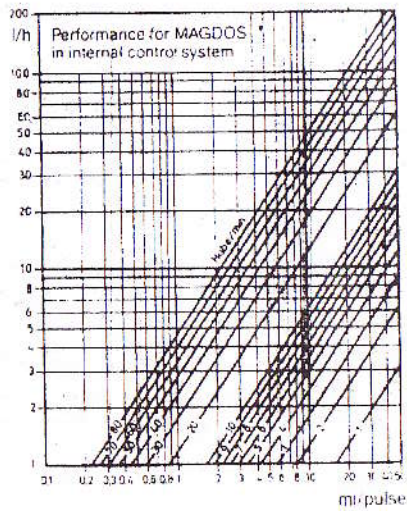
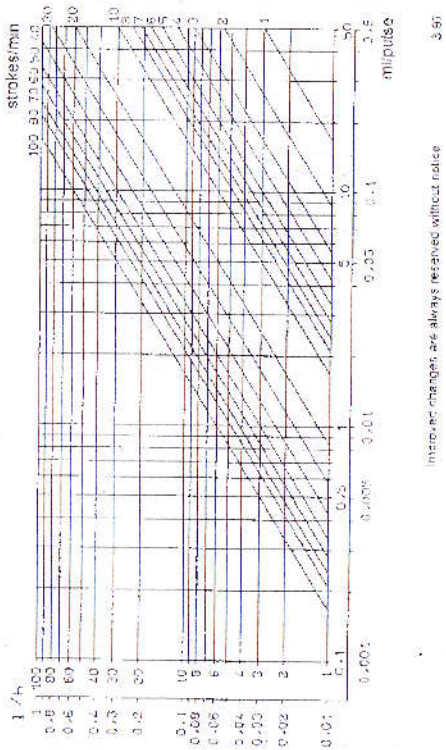
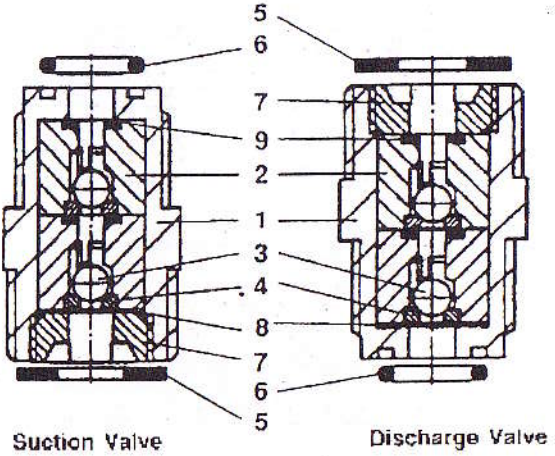
10
15
20
25
ml/pulse

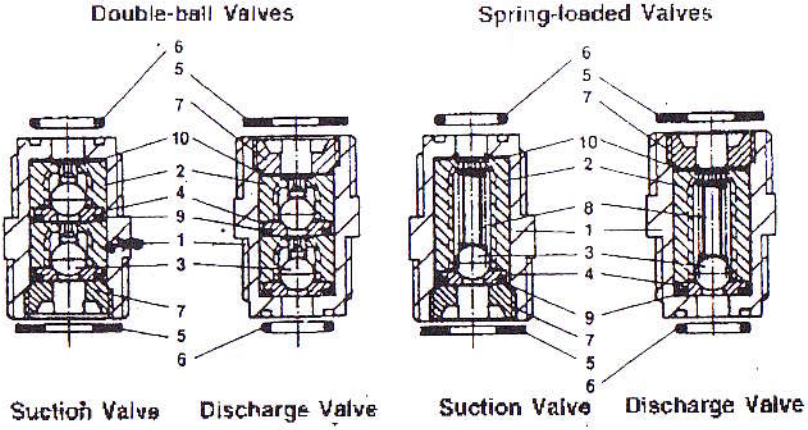

l/h
Performance for MAGDOS
in internal control system
ml/pulse


strokes/min
ml/pulse
l/h
Introvert changes are always reserved without notice

Suction & Discharge Valve DN 3

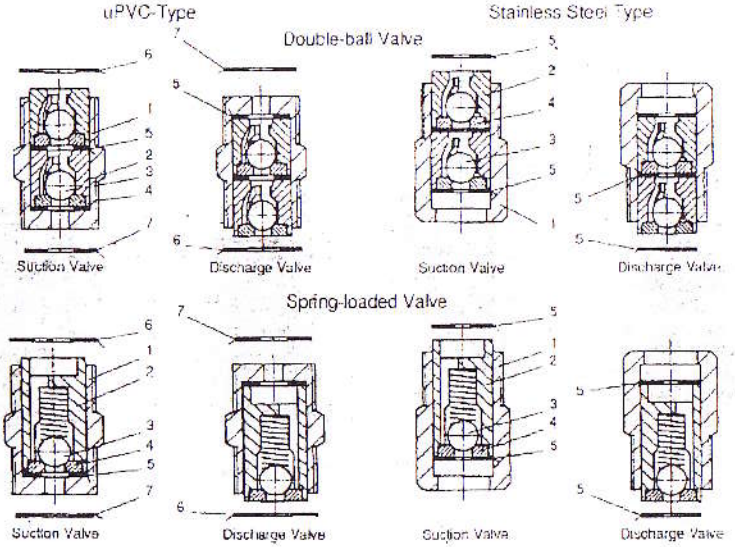


Suction & Discharge Valve DN 4



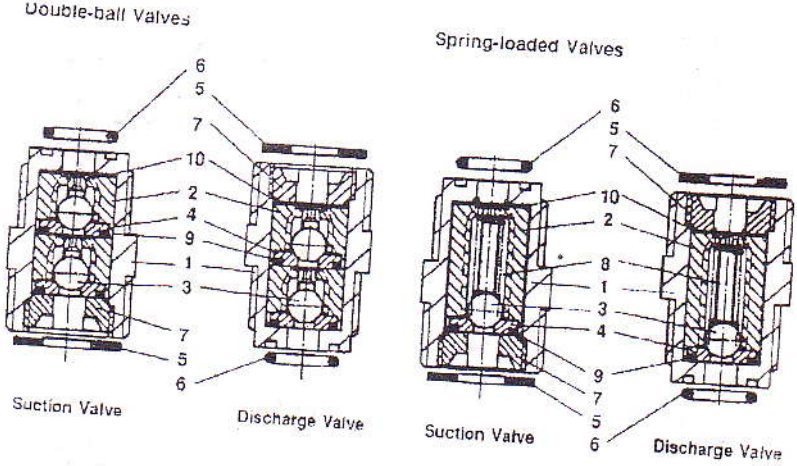
ITEM NO.	DESCRIPTION	ITEM NO.	DESCRIPTION
1.	Valve Body	6.	O-ring
2.	Ball Guide	7.	Cover Plug
3.	Valve Ball θ 6.5	8.	Valve Spring
4.	Valve Seat	9.	O-ring
5.	Flat Gasket	10.	Gasket

Suction & Discharge Valve DN 6



ITEM NO.	DESCRIPTION
1.	Valve Body
2.	Ball Guide
3.	Valve Ball θ 10
4.	Valve Seat
5.	Flat Gasket
6.	Flat Gasket
7.	Flat Gasket
8.	Valve Spring

Suction & Discharge Valve DN 10



ITEM NO.	DESCRIPTION
1.	Valve Body
2.	Ball Guide
3.	Valve Ball θ 16
4.	Valve Seat
5.	Flat Gasket
6.	Flat Gasket
7.	Flat Gasket
8.	Valve Spring