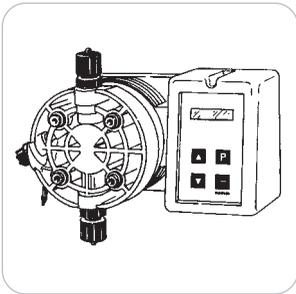




This operating instructions contains safety information that if ignored can endanger life or result in serious injury. They are indicated by this icon.



Use of this pump with radioactive chemicals is forbidden!



## OPERATING INSTRUCTIONS MANUAL FOR “GMS” SOLENOID DOSING PUMP



Keep the pump protected from sun and water.  
Avoid water splashes.

Please read it carefully!



English language



“GMS” series solenoid dosing pumps comply with the following European regulations:

EN60335-1 : 1995, EN55014, EN50081-1/2, EN50082-1/2, EN6055-2, EN60555,3

Based on directive CEE 73/23 c 93/68 (DBT Low voltage directive) and directive 89/336/CEE (EMC Electromagnetic Compatibility)



All metering pumps with 230 VAC and 115 VAC power supply with FP o-rings are listed NSF 50 (except for 00 100 models).



All metering pumps supplied with 115 VAC are available with certification CSA.



## GENERAL SAFETY GUIDELINES

### **Danger!**

In emergencies the pump should be switched off immediately! Disconnect the power cable from the power supply!

When using pumps with aggressive chemicals observe the regulations concerning the transport and storage of aggressive fluids!

When installing outside European Community, always observe national regulations!

Manufacturer is not liable for any unauthorized use or misuse of this product that can cause injury or damage to persons or materials!

### **Caution!**

Pumps must be accessible at all times for both operating and servicing. Access must not be obstructed in any way!

Feeder should be interlocked with a no-flow protection device to automatically shut-off the pump when there is no flow!

Pumps and accessories must be serviced and repaired by qualified and authorized personnel only!

Always discharge the liquid end before servicing the pump!

Empty and rinse the liquid end before work on a pump which has been used with hazardous or unknown chemicals!

Always read chemical safety datasheet!

Always wear protective clothing when handling hazardous or unknown chemicals!

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**Technical features and drawings are subject to changes and modifications without any advice.**

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## Design and Function

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**“GMS” series magnetic membrane batching pumps are ideal for small and medium dosing of liquid products.**

*Main Components:* Casing (PP+Fiber Glass, IP65 rating)  
PCB (Printed Circuit Board)  
Solenoid with stroke adjustment  
Diaphragm (PTFE)  
Pump Head (PP)

*Pump Capacity:* Flow rate is determined by the stroke rate. Repeatability is ensured within range between 30% and 100%.

*Operating Modes:* The pump working mode is intermittent: a magnetic field is created each time a pulse reaches the magnet. The magnetic field pushes the piston. A diaphragm (fixed on the piston head) compresses the liquid into the pump head. The liquid gets out through the delivery valves while the suction valves close. When the pulse ends, a spring takes back the piston and the diaphragm. The vacuum created by the diaphragm movement takes the liquid inside the pump head from the suction valve, while the delivery valve is closed. The pump capacity is proportional to the number of strokes and to the pump head internal volume (Single Stroke Injection Quantity).

*Models available*

### **GMS MAN**

Constant pump with level control, display, digital controls, microprocessor with frequency digital controls.

### **GMS EXT**

Multifunction-Proportional pump with analogic/digital signal input, level control, display and microprocessor.

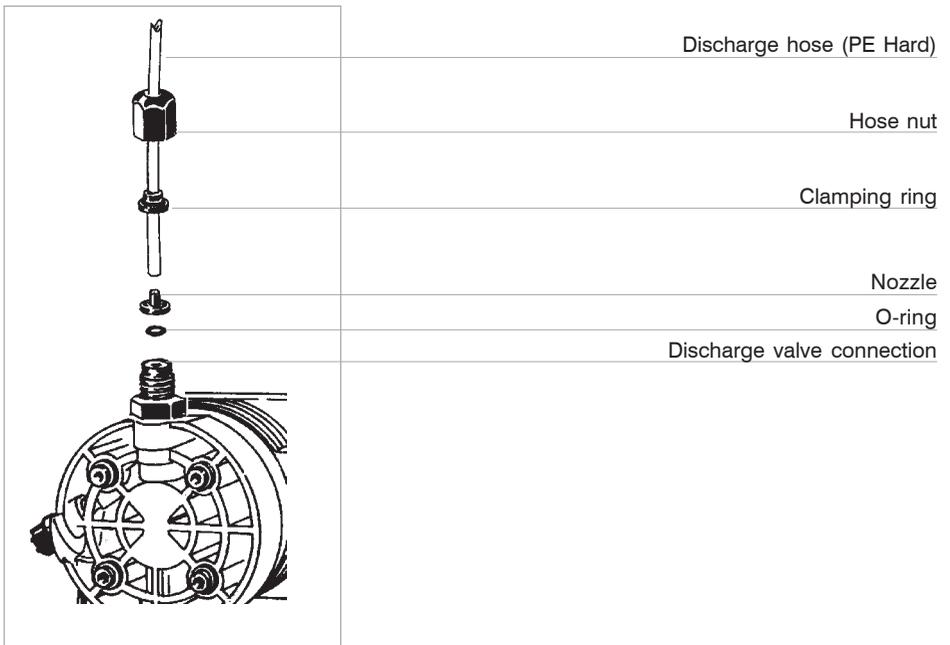
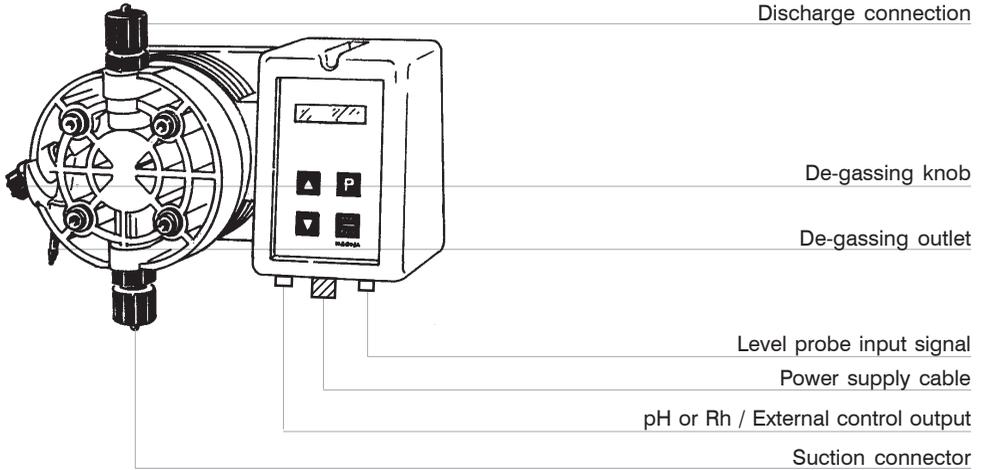
### **GMS PH**

Proportional pump driven by internal built-in pH meter (0÷14 pH) and level control. pH electrode input (electrode not included).

### **GMS RH**

Proportional pump driven by internal built-in Redox (ORP) meter (0÷1000mV) and level control. Redox electrode input (electrode not included).

## Illustrated views of “GMS” pump



## Panels views of “GMS” pump

### Model pump (GMS “MAN” and GMS “EXT” models)

LCD Display

Stroke LED status

Navigational keys

Program key

Start / Stop pump's dosing activity

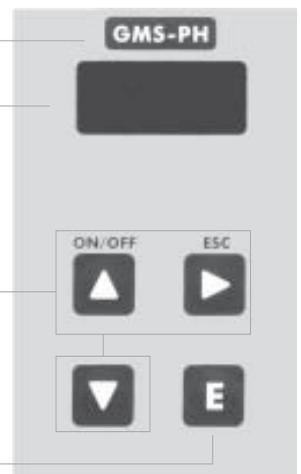


### Model pump (GMS “PH” and GMS “RH” models)

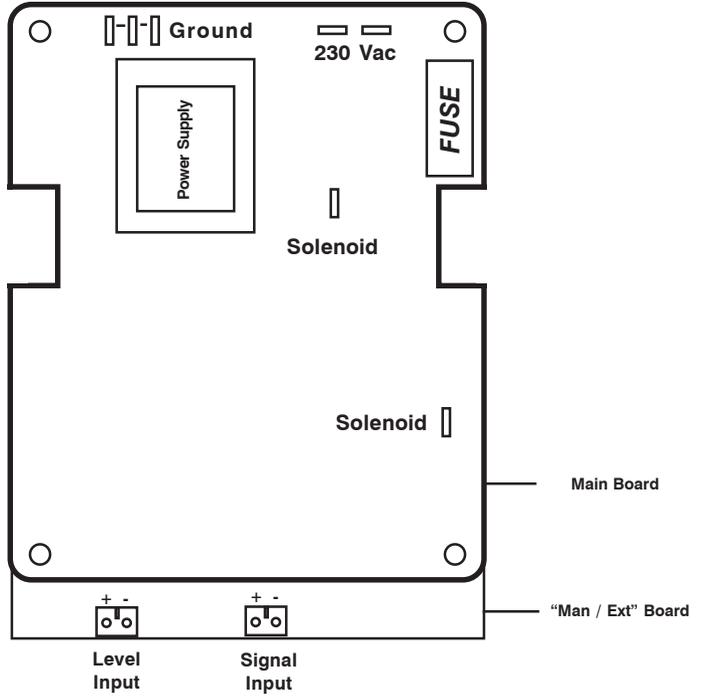
LCD Display

Navigational keys + Special Functions

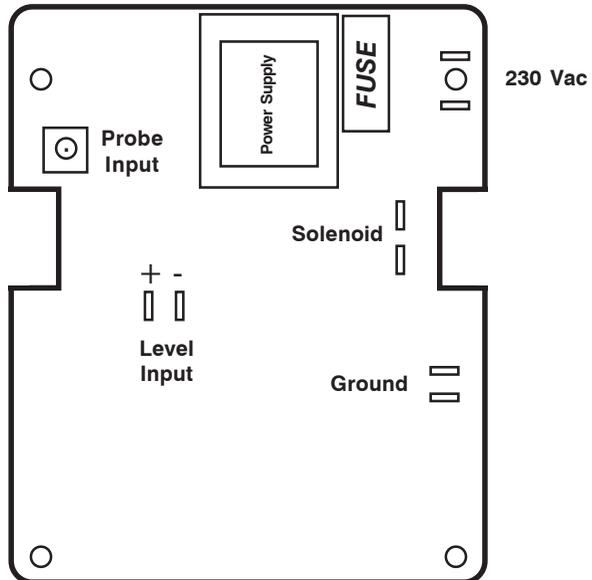
Program key



**Model  
"Man / Ext"**



**Model  
"PH / RH"**



## Pump's package

---

<i>Included into package:</i>	<b>n.2</b>	Inserts ø6
	<b>n.2</b>	Screws 4,5 x 40
	<b>n.1</b>	Delayed fuse 5 X 20
	<b>n.1</b>	Foot filter with valve
	<b>n.1</b>	Injection valve*
	<b>n.1</b>	Level probe
	<b>m 2</b>	Delivery pipe
	<b>m 2</b>	Suction pipe
	<b>m 2</b>	Discharge pipe
<b>n.1</b>	Instructions manual	

\* Injection valve does not apply to GMS 00 100 pump model: injection valve is not included into the packaging.



**PLEASE DO NOT TRASH THE PACKAGING.  
IT CAN BE USED TO RETURN THE PUMP.**

*Commissioning the pump:* Make sure that the pump is fastened into place firmly and will not vibrate during use!



Ensure that the pump is accessible at all times for operating and maintenance purposes!

Suction and discharge valves must be in vertical position!

The metering pump must be installed with the pump's basement on horizontal position!

*Assembly and install hoses:* The suction hose (PVC flexible) should be short and placed vertical to avoid air bubble collecting!

Calculate cross section and length to ensure that negative pressure in the suction hose does not reach the vapour pressure for chemical's feed!

**FREE END OF SUCTION HOSE SHOULD BE INSERTED  
JUST ABOVE THE BASE OF NOZZLE!**



**USE ONLY HOSES COMPATIBLES WITH PRODUCT TO DOSE.  
PLEASE REFERS TO "CHEMICAL COMPATIBILITY TABLE" OF  
PRODUCT TO DOSE!**

Pump has to be connected to power supply using the standard "SCHUKO" plug supplied or the special power supply cable.

**Before starting any electrical connection perform the following operations:**

- ensure a correct ground installation!
- if there is a bad ground, install a differential switch with high sensibility (0,03 A) as additional protection from electric shocks!
- check that pump voltage corresponds to supply voltage!
- make ground connection before any other connection!



Electrical features:

Power supply range for 230 V model: 184÷270 VAC

Power supply range for 115 V model: 92÷136 VAC

Frequency: 50÷ 60 Hz

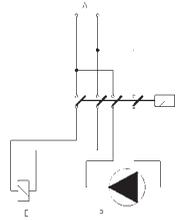
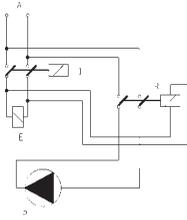
If pump is powered with out of range mains value, the display will show "OUT OF RANGE" and power led will blink.

Average power consumption and fuse replacement:

<i>Pump Model</i>	<i>Consumption at 230 Vac and Fuse Value</i>		<i>Consumption at 115 Vac and Fuse Value</i>	
GMSPH/RH 00 100	230 VAC / 500 mA	27W	115 VAC / 800 mA	21W
GMSPH/RH 01 15	230 VAC / 800 mA	22W	115 VAC / 630 mA	15W
GMSPH/RH 01 50	230 VAC / 500 mA	27W	115 VAC / 800 mA	21W
GMSPH/RH 03 10	230 VAC / 800 mA	22W	115 VAC / 630 mA	15W
GMSPH/RH 03 30	230 VAC / 500 mA	27W	115 VAC / 800 mA	21W
GMSPH/RH 04 20	230 VAC / 500 mA	27W	115 VAC / 800 mA	21W
GMSPH/RH 05 10	230 VAC / 500 mA	27W	115 VAC / 800 mA	21W
GMSPH/RH 07 07	230 VAC / 800 mA	22W	115 VAC / 630 mA	15W
GMSPH/RH 10 05	230 VAC / 800 mA	22W	115 VAC / 630 mA	27W
GMSPH/RH10 10	230 VAC / 500 mA	27W	115 VAC / 800 mA	21W
GMSPH/RH 12 07	230 VAC / 500 mA	27W	115 VAC / 800 mA	21W
GMSPH/RH15 03	230 VAC / 800 mA	22W	115 VAC / 630 mA	15W
GMSPH/RH 18 02	230 VAC / 800 mA	22W	115 VAC / 630 mA	15W
GMSPH/RH 20 01	230 VAC / 800 mA	22W	115 VAC / 630 mA	15W
GMSPH/RH 20 05	230 VAC / 500 mA	27W	115 VAC / 800 mA	21W
GMSPH/RH 05 15	230 VAC / 500 mA	27W	115 VAC / 800 mA	21W
GMSPH/RH 15 05	230 VAC / 500 mA	27W	115 VAC / 800 mA	21W
GMSPH/RH 10 09	230 VAC / 500 mA	27W	115 VAC / 800 mA	21W
GMSMAN/EXT 00 100	230 VAC / 500 mA	27W	115 VAC / 630 mA	14W
GMSMAN/EXT 01 15	230 VAC / 250 mA	17W	115 VAC / 315 mA	23W
GMSMAN/EXT 01 50	230 VAC / 500 mA	27W	115 VAC / 630 mA	14W
GMSMAN/EXT 03 10	230 VAC / 250 mA	17W	115 VAC / 315 mA	23W
GMSMAN/EXT 03 30	230 VAC / 500 mA	27W	115 VAC / 630 mA	14W
GMSMAN/EXT 04 20	230 VAC / 500 mA	27W	115 VAC / 630 mA	14W
GMSMAN/EXT 05 10	230 VAC / 500 mA	27W	115 VAC / 630 mA	14W
GMSMAN/EXT 07 07	230 VAC / 250 mA	17W	115 VAC / 315 mA	23W
GMSMAN/EXT 10 05	230 VAC / 250 mA	17W	115 VAC / 315 mA	23W
GMSMAN/EXT 10 10	230 VAC / 500 mA	27W	115 VAC / 630 mA	14W
GMSMAN/EXT 12 07	230 VAC / 500 mA	27W	115 VAC / 630 mA	14W
GMSMAN/EXT 15 03	230 VAC / 250 mA	17W	115 VAC / 315 mA	23W
GMSMAN/EXT 18 02	230 VAC / 250 mA	17W	115 VAC / 315 mA	23W
GMSMAN/EXT 20 01	230 VAC / 250 mA	17W	115 VAC / 315 mA	23W
GMSMAN/EXT 20 05	230 VAC / 500 mA	27W	115 VAC / 630 mA	14W
GMSMAN/EXT 05 15	230 VAC / 500 mA	27W	115 VAC / 630 mA	14W
GMSMAN/EXT 15 05	230 VAC / 500 mA	27W	115 VAC / 630 mA	14W
GMSMAN/EXT 10 09	230 VAC / 500 mA	27W	115 VAC / 630 mA	14W

## Electrical Installation

**Do not connect the pump in parallel to an inductance load, e.g. motors, to prevent electronic circuitry damages. Always use a connector to cut off spikes due to other devices switching.**



**P** - Dosing Pump  
**R** - Relay  
**I** - Switch or device with many safety poles  
**E** - Electrovalve or inductive load in general  
**A** - Supply voltage

### REPAIR MUST BE PERFORMED BY AUTHORIZED PERSONNEL ONLY

Internal circuitry is protected against noises using the EMC system and with a fuse located under the front cover of pump. To replace the fuse (**trained personnel only**) do as follow:

- unplug power supply
- remove the 8 screws on back side of the pump with a cross-head screwdriver
- remove the frontal cover
- locate fuse on main board and replace it (5x20 T slow blow), use only approved fuses reported on the table on previous page

GMS Digital pump is equipped with an overvoltage protection (300 V, 150V) and a voltage peak protection up to 4KV, 50 $\mu$ s against pulses as shown in fig.1.

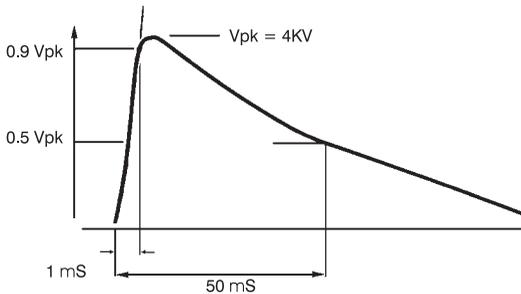


fig.1

### PRIMING

To prime the pump without touching chemicals please performs these operations:

- connect all hoses into proper places (delivery hose, suction hose and outgassing hose).
- open outgassing valve and turn on the pump.
- set pump's single injection at 100% and pulses at 50%.

All air inside the pump head will exit through the outgassing outlet. When product will leak from it, close immediately the outgassing valve. If dosing product is particularly dense, to facilitate the priming, insert on vent pipe a syringe of 20 cc and suck inside.

### DOSING

Pump's technical features are printed on a label located on pump's box: model, supply voltage, working counterpressure (Kpa/bar) and pump capacity (l/h). All these dosing information are calculated by dosing water at 20 °C temperature, at the maximum counterpressure reported on the label, using the injection valve and the % knob set to maximum. Dosing accuracy is  $\pm 2\%$  l/h at constant maximum counterpressure and 1 cps flow (**max viscosity: 60 cps**).

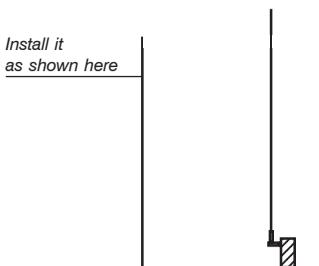


**Caution: injection capacity is a constant value but a variation in counterpressure or product's viscosity may cause some changes. For further details see "Delivery curves" paragraph.**

For recommended chemicals for swimming pools and SPAs, see page 32.

### LEVEL PROBE AND FOOT FILTER INSTALLATION

Level probe must be assembled using the foot valve included into pump's kit. Foot valve is designed to be installed in contact with tank base. It's not necessary a space to avoid sediment accumulation. Connect the BNC to dosing pump using "LEVEL" input.



to BNC Connector  
(to pump's level input)

Pump's suction hose

Level's probe

Foot filter



---

## Programming the pump

---

All dosing pumps are equipped with a keyboard that basically works in the same way for any pump's model. To avoid any misunderstanding during this chapter all keys will be described as shown on this legend:



is the "UP" key



is the "DOWN" key



is the "START/STOP" key



is the "P" key



is the "RIGHT" key



is the "E" key

### PROGRAMMING "GMS MAN" PUMP

Basically this pump works in constant mode. **Constant mode may be set in % ("S" is shown on pump's display) or in pulses per minutes ("F" is shown on pump's display).**

#### Model pump (GMS "MAN" and GMS "EXT" models)

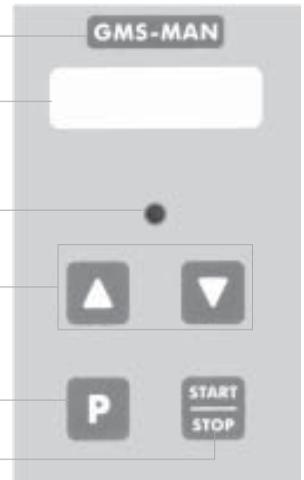
LCD Display

Stroke led status

Navigational keys

Program mode key

Start / Stop pump's dosing activity



#### "S" (stroke) mode program

This mode allows to set pump's stroke capacity from 100% (max) to 1% (min). Step increasing is 1%. If "S" mode is set to 100% then pump's pulses are 150 pulses per minute. If "S" mode is set to 1% then pump's pulses are 1 pulse every 40 seconds.

To set pump into "S" mode, keep pressed the "P" key for at least four seconds. The pump will enter into the main program menu. Using "UP" or "DOWN" keys choose "[S--]". Press "P", then edit percentual value by increasing/decreasing it with "UP" and "DOWN" keys. Keep pressed the "P" key for at least four seconds to return to pump's normal operation.

### *“F” (frequency) mode program*

This mode allows to dose a liquid for a time that may be set from 1 pulse per hour to 150 pulses per minute. To set pump into “F” mode, keep pressed the “P” key for at least four seconds. The pump will enter into the main program menu. Using “UP” or “DOWN” keys choose “[F---]”. Press “P”, then edit value by increasing/decreasing it with “UP” and “DOWN” keys. Keep pressed the “P” key for at least four seconds to return to pump’s normal operation.

## PROGRAMMING “GMS EXT” PUMP

This pump may work in three basic modes: “**Constant mode**”, “**Analog Input Signal**” and “**Digital Input Signal**”. For constant mode instructions, please refers to “Programming GMS MAN pump” paragraph.

### *“ANALOG INPUT SIGNAL” (mA - mV - V) mode program*

This mode allows to dose a liquid proportionally or inversely proportional to the input signal. External signal’s range can be 0÷20 mA for mA mode, 0÷99 mV for mV mode and 0÷9,9 V for Volt mode. For example, this signal may be an instrument’s output (like a chart recorder output). When analog signal reaches pump’s set values (SetPoints) dosing operations start or end. Pump’s pulses, during dosing operations, may be set as described in “*Setting %L and %H values*” paragraph.

### *“mA” mode*

Turn “ON” the pump. Keep pressed the “P” key for at least four seconds. The pump will enter into the main program menu. Using “UP” or “DOWN” keys scroll through the seven working modes:

[S---] (stroke), [F---] (frequency), [M---] (multiply), [D---] (divide), [mA---] (milliamperes), [mV---] (millivolts), [V---] (volts).

Choose [mA--] and press “P” to confirm. The pump shows the lower mA intervention value. For example [A04,0L] where “L” means “Low”. This is the “Low SetPoint”. If “analog input signal” reaches a value lower than this, pump will stop all dosing operation and it will display “[RANGE]”. To change it, use “UP” and “DOWN” keys. Press “P” to confirm the intervention value. Pump will display (for example) [A20,0H] where “H” means “High”. This is the “High SetPoint”. If “analog input signal” reaches a value higher than this, pump will dose at %H value and it will display “[RANGE]”. To change it use “UP” and “DOWN” keys. Press “P” to confirm the intervention value.

### *Setting %L and %H values*

Now pump will display [000%L]. This is the pulse value refers to lower setpoint. To change it use “UP” and “DOWN” keys. Press “P” to confirm. When analog signal reaches the lower mA value pump will not stop the dosing but will decrease pulses until %L. We suggest to use a value different from 0% only for special purpose.

Press “P” to confirm lower % value. The pump will display (for example) [100%H]. This is the pulse value refers to higher setpoint. To change it use “UP” and “DOWN” keys. Press “P” to confirm. When analog signal reaches the higher mA value pump will dose at %H.

---

## Programming the pump

---

\* %L value must be always lower than %H value. Otherwise pump displays [DATA ERROR].

\* Pump may work also in “reverse” mode. Using this mode, pump will stop to dose at maximum setpoint value. To set this mode set “L” setpoint with the highest mA value and set “H” sepoint with the lowest mA value.

### “mV” mode

Turn “ON” the pump. Keep pressed the “P” key for at least four seconds. The pump will enter into the main program menu. Using “UP” or “DOWN” keys scroll through the seven working modes:

[S---] (stroke), [F---] (frequency), [M---] (multiply), [D---] (divide), [mA---] (milliamperes), [mV---] (millivolts), [V---] (volts).

Choose [mV--] and press “P” to confirm. The pump shows the lower mV intervention value. For example [mV00L] where “L” means “Low”. This is the “Low SetPoint”. If “analog input signal” reaches a value lower than this, pump will stop all dosing operation and it will display “[RANGE]”. To change it, use “UP” and “DOWN” keys. Press “P” to confirm the intervention value. Pump will display (for example) [mV99H] where “H” means “High”. This is the “High SetPoint”. If “analog input signal” reaches a value higher than this, pump will dose at %H value and it will display “[RANGE]”. To change it use “UP” and “DOWN” keys. Press “P” to confirm the intervention value.

### Setting %L and %H values

Now pump will display [000%L]. This is the pulse value refers to lower setpoint. To change it use “UP” and “DOWN” keys. Press “P” to confirm. When analog signal reaches the lower mV value pump will not stop the dosing but will decrease pulses until %L. We suggest to use a value different from 0% only for special purpose.

Press “P” to confirm lower % value. The pump will display (for example) [100%H]. This is the pulse value refers to higher setpoint. To change it use “UP” and “DOWN” keys. Press “P” to confirm. When analog signal reaches the higher mV value pump will dose at %H.

\* %L value must be always lower than %H value. Otherwise pump displays [DATA ERROR].

\* Pump may work also in “reverse” mode. Using this mode, pump will stop to dose at maximum setpoint value. To set this mode set “L” setpoint with the highest mA value and set “H” sepoint with the lowest mV value.

### “V” mode

Turn “ON” the pump. Keep pressed the “P” key for at least four seconds. The pump will enter into the main program menu. Using “UP” or “DOWN” keys scroll through the seven working modes:

[S---] (stroke), [F---] (frequency), [M---] (multiply), [D---] (divide), [mA---] (milliamperes), [mV---] (millivolts), [V---] (volts).

Choose [V---] and press “P” to confirm. The pump shows the lower V intervention value. For example [V0,0L] where “L” means “Low”. This is the “Low SetPoint”. If “analog input signal” reaches a value lower than this, pump will stop all dosing operation and it will display “[RANGE]”. To change it, use

“UP” and “DOWN” keys. Press “P” to confirm the intervention value. Pump will display (*for example*) **[V9,9H]** where “H” means “High”. This is the “High SetPoint”. If “analog input signal” reaches a value higher than this, pump will dose at %H value and it will display “**[RANGE]**”. To change it use “UP” and “DOWN” keys. Press “P” to confirm the intervention value.

### *Setting %L and %H values*

Now pump will display **[000%L]**. This is the pulse value refers to lower setpoint. To change it use “UP” and “DOWN” keys. Press “P” to confirm. When analog signal reaches the lower V value pump will not stop the dosing but will decrease pulses until %L. We suggest to use a value different from 0% only for special purpose.

Press “P” to confirm lower % value. The pump will display (*for example*) **[100%H]**. This is the pulse value refers to higher setpoint. To change it use “UP” and “DOWN” keys. Press “P” to confirm. When analog signal reaches the higher V value pump will dose at %H.

**\* %L value must be always lower than %H value. Otherwise pump displays [DATA ERROR].**  
**\* Pump may work also in “reverse” mode. Using this mode, pump will stop to dose at maximum setpoint value. To set this mode set “L” setpoint with the highest V value and set “H” setpoint with the lowest mA value.**

### ***“DIGITAL INPUT SIGNAL” (“D” and “M”) mode program***

Turn “ON” the pump. Keep pressed the “P” key for at least four seconds. The pump will enter into the main program menu. Using “UP” or “DOWN” keys scroll through the seven working modes:

**[S---**] (stroke), **[F---**] (frequency), **[M---**] (multiply), **[D---**] (divide), **[mA---**] (milliamperes), **[mV---**] (millivolts), **[V---**] (volts).

These modes are useful when pump is used with a water meter or another system that sends pulses through a voltage free contact. “D” (divide) mode is used on little “pulse emitter water meter” and pump needs to divide pulses. “M” (multiply) mode is used on big “pulse emitter water meter” (6” size and over) and pump needs to multiply pulses for a more accurate dosing.

### ***“M” MODE***

Turn “ON” the pump. Keep pressed the “P” key for at least four seconds. The pump will enter into the main program menu. Using “UP” or “DOWN” keys scroll through the seven working modes:

**[S---**] (stroke), **[F---**] (frequency), **[M---**] (multiply), **[D---**] (divide), **[mA---**] (milliamperes), **[mV---**] (millivolts), **[V---**] (volts).

Choose “**[M---**”]” and press “P” to confirm. Pump displays [ M 1 ]: choose the value to set using “UP” or “DOWN” keys.

Example: if we set [M6] and water meter gives 1 pulse per minute, when pump receive first pulse, it will deliver 6 fast strokes with rate of 2 pulses per second. On second water meter pulse, the pump will deliver 1 stroke every 10 seconds, and so on until pulses will end. Pulses distribution is recalculated every input pulse. Maximum distribution time is: 2 minutes. Press again [ P ]: the display will show the previously programmed pulses, etc. *To exit from program menu keep pressed “P” key for about 4*

---

## Programming the pump

---

*seconds. If input pulses are too frequent for the multiplying coefficient pump's display will show [ RANGE ].*

### **"D" MODE**

Turn "ON" the pump. Keep pressed the "P" key for at least four seconds. The pump will enter into the main program menu. Using "UP" or "DOWN" keys scroll through the seven working modes:

[S---] (stroke), [F---] (frequency), [M---] (multiply), [D---] (divide), [mA---] (milliamperes), [mV---] (millivolts), [V---] (volts).

Choose "[D---]" and press "P" to confirm. Pump displays [ D 1 ]: choose the value to set using "UP" or "DOWN" keys.

The pump gives a maximum of 2 strokes per second. Pressing again [ P ] the display will show the previously programmed pulses, etc. To exit the programming just press [ P ] for 4 seconds: the display shows a confirmation message [ OK ] for around 1 second. *To exit from program menu keep pressed "P" key for about 4 seconds. If the input pulses are too frequent for set coefficient, the display show [ RANGE ].*

### **HOW TO DETERMINE "D" or "M" VALUE ?**

Dividing (D) or multiply (M) factor (F), may be set on pump using the following formula (strokes on 100%):

$$\left( \frac{10 \times \text{imp/l} \times \text{cc} \times \text{P}\%}{\text{ppm}} \right) = F$$

#### **WHERE:**

F: factor

*imp/l*: pulse per liter given by the water meter

*cc*: pump's single stroke dosing quantity (in cc\*).

*\*For cc quantity please refer to table at page 25 and stroke's value*

P%: product concentration. If product is not diluted enter 100

*ppm*: product quantity to dose in p.p.m. (gr/m<sup>3</sup>)

#### **Results:**

If  $F < 1$  calculate  $M = 1/F$  and set obtained number into pump's program. Use "M"(multiply) mode.

If  $F > 1$  use "D" (divisor) mode and set obtained number into pump's program.

If  $F > 1000$  increase dilution or decrease water meter's pulses per liter or reduce pump's stroke.

### **MANUAL PRIMING**

Keep pressed "START-STOP" button for manual priming. Release it to return into normal mode.

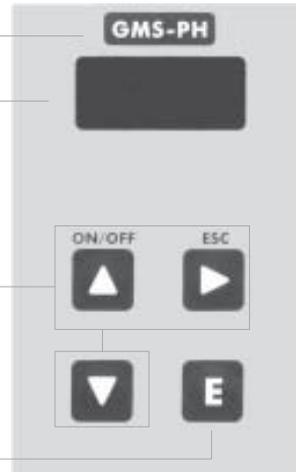
## PROGRAMMING “GMS PH” PUMP

### Model pump (GMS “PH” models)

LCD Display

Navigational keys + Special Functions

Program mode key



**Note: it is possible to program the pump for dosing either acid or alkaline, ensuring that o-rings match the additive chemical compatibility**

### Entering in program mode

Turn on the pump. Keep pressed “E” key for at least 4 seconds to enter in program mode. Pump’s display shows:

**PASSWORD:**

→ 0000

fig.1

Use “UP” and “DOWN” keys to edit the password, press “RIGHT” to move on next digit.

### “SETUP” program

Once entered the password, pump’s display shows:

→ SETUP

PARAM

fig.2

Move arrow on SETUP then press “E” key:

### “SET POINT” program

Setup

1) Point

fig.3

---

## Programming the pump

---

Press “E” key:

**a) → 00%**  
**7.30pH**

**fig.4**

The display shows that pump does not work at 00% if pH is 7.30. Make sure that arrow is on “7.30 pH” to change this value, then use “UP” and “DOWN” keys to enter a new value. Use “RIGHT” key to move on next value. Once on “00%”, change it with “UP” and “DOWN” keys.

**b) → 100%**  
**7.80pH**

**fig.5**

The display shows that pump works when pH is 7.80. Make sure that arrow is on “7.80pH” to change this value, then use “UP” and “DOWN” keys to enter a new value. Use “RIGHT” to move on next value. Once on “100%”, change it with “UP” and “DOWN” keys. Press “E” key to confirm values and quit from programming mode. Display shows for a few seconds: DATA SAVED. To exit from program mode press “RIGHT” key twice. Now the pump will modify proportionally its own dosing capacity in the range between 7.30pH and 7.80pH. On previous example, dosing mode is for “acid”.

### Probe calibration

To obtain a reliable measurement it is necessary (during installation) calibrate the probe. To do this, two buffer solutions are needed: a 7.00pH buffer solution and a 4.00pH or 9.00pH buffer solution. Proceed as follows:

- 1) Measure buffer solution temperature and verify if it is the same printed on solution’s label.
- 2) Insert probe’s connector (blue colour) into pump’s input connector.
- 3) Remove protective cap from probe and wash it into water. Then dry it.

Into “Setup” menu (fig.3), choose “2)Calib” then press “E” key. The display shows:

**R: 7.20 pH**  
**C: 7.00 pH**

**fig.6**

“R” means buffer solution reading value and “C” the calibration to refer to. During the calibration the “R” value could be different from the buffer solution value. Wait a stable reading in “R”. Dip probe in a 7.00 pH buffer solution and use “UP” and “DOWN” keys to change the value in “C:” to have buffer solution value. Wait a stable reading in “R:” then press “E” key to confirm this first calibration. Pump will show:

**R: 7.00 pH**  
**C: 4.00 pH**

**fig.7**

Remove the probe from first buffer solution and repeat the cleaning procedure. Then dip probe into second buffer solution (for example 4.00 pH) and use “UP” and “DOWN” keys to change the value in “C:” to have buffer solution value. Wait a stable reading in “R:” then press “E” key to confirm. The pump will show the new values for a while and will return to main menu.

**59mV / pH**  
**- 000 mV**

**fig.8**

If calibration process fails the pump will show “PH CALIB FAILED”. Not changing any value the program will return to “Calib” mode. To exit press “RIGHT” key twice.

### DELAY

In main menu choose "PARAM" (fig.2) and press "E" key. Display shows:

**DEL.: ->00**  
**0 0 0 0** **fig.9**

The -> arrow is on "DEL". *This value is pump's waiting time after any start up procedure*: pump will wait set time before start dosing every time it is powered on. Use "UP" and "DOWN" keys to change this value. Waiting time may be set from 1 to 60 minutes.

### PASSWORD

In main menu choose "PARAM" (fig.2) and press "E" key. Display shows:

**DEL.: ->00**  
**0 0 0 0** **fig.9**

Press "RIGHT" key to move on 0 0 0 0. All new pumps have "0 0 0 0" as default password, use "UP" and "DOWN" keys to change this value. Press "E" to confirm new data. The pump shows the new password for about two seconds then it'll return to main menu. Press "RIGHT" key to leave main menu.

### MAXIMUM TIME DOSING ALARM

This alarm prevents the pump to dose if a set time is reached. To set this alarm enter into "Setup menu" as shown in fig.3. Use "DOWN" key to choose "3) Alarm" and press "E" key. The pump shows:

**-> AL OFF**  
**DOSING** **fig.10**

To activate the alarm use "UP" or "DOWN" keys to set the time (from 1 to 100 minutes or "AL OFF"). To setup the alarm mode use the "RIGHT" key. Cursor moves on "DOSING". Use "UP" or "DOWN" keys to change this voice. On "STOP" mode the pump will stop the dosing procedure once the set time is reached. The pump's display will show the alarm condition and requires to press a key to continue. On "DOSING" mode the pump will NOT stop the dosing procedure once the set time is reached. The pump's display will show the alarm condition and requires to press a key to continue.

### Special functions

- Keep pressed the "UP" key to turn off the pump. Display shows "OFF" and it will switch off. Keeping pressed the "UP" key the pump will switch on.
- Keep pressed the "DOWN" key to read on display the power supply input.
- Keep pressed the "E" key for manual dosing.
- Pump's reset: turn off the pump, keep pressed "UP" and "DOWN" keys then turn on the pump. Release "UP" and "DOWN" keys and proceed to pump's set-up. This procedure will return the pump to its shipment condition.

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## Programming the pump

---

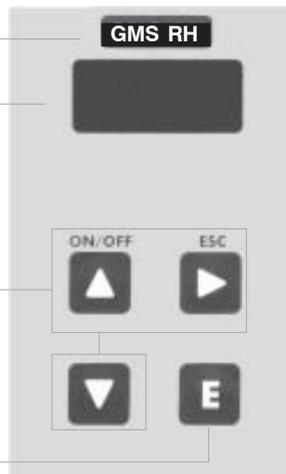
### PROGRAMMING “GMS RH” PUMP

#### Model pump (GMS “RH” models)

LCD Display

Navigational keys + Special Functions

Program mode key



**Note: it is possible to program the pump for dosing either oxidant or anti-oxidant, ensuring that o-rings match the additive chemical compatibility**

Turn on the pump. Keep pressed “E” key for at least 4 seconds to enter in program mode. Pump’s display shows:

**PASSWORD :**

→ 0000

fig.1

Use “UP” and “DOWN” keys to edit the password, press “RIGHT” to move on next digit.

#### “SETUP” program

Once entered the password, pump’s display shows:

→SETUP

PARAM

fig.2

Move arrow on “SETUP” then press the “E” key:

#### “SET POINT” program

Setup

1) Point

fig.3

Press “E”, the display will show:

a) ->100%  
650mV

fig.4

The pump works at 100% of its capacity if ORP value is 650mV. Make sure that arrow is on “650mV” to change it and then use “UP” and “DOWN” keys to enter a new value. Use “RIGHT” key to move on next digit. Move arrow on 100% and change using the “UP” and “DOWN” keys.

b)->00%  
700mV

fig.5

The display shows that pump stops when ORP is 700mV. Make sure that arrow is on 700mV to change this value then use “UP” and “DOWN” keys to enter a new value. Use “RIGHT” key to move on next digit. Move arrow on 100% and change using the “UP” and “DOWN” keys. Press “E” key to confirm values and quit from programming mode. Display shows for a few seconds: DATA SAVED. Pump will change proportionally its dosing capacity between 650mV and 700mV. Now the pump will modify proportionally its own dosing capacity in range between 650mV and 700mV. In previous example pump will dose “chlorine”.

### Probe calibration

To obtain a reliable measurement it is necessary (during installation) calibrate the probe. To do this, a known buffer solutions is needed. Proceed as follows:

- 1) Measure buffer solution temperature and verify if it is the same printed on solution’s label.
- 2) Insert probe’s connector (blue color) into pump’s input connector.
- 3) Remove protective cap from probe and wash it into water. Then dry it.

Into “Setup” menu (fig.3), choose “2)Calib” then press “E” key. The display shows:

R: 600 mV  
C: 650 mV

fig,6

“R” means buffer solution reading value and “C” the calibration to refer to. During the calibration the “R” value could be different from the buffer solution value. Wait a stable reading in “R”. Dip probe in a 650mV buffer solution and use “UP” and “DOWN” keys to change the value in “C”: to have buffer solution value. Wait a stable reading in “R.” then press “E” key to confirm. Display shows probe’s data before to return at main menu. If calibration process fails the pump will show “MV CALIB FAILED”. Not changing any value the program will return to “Calib” mode. To exit press “RIGHT” key twice.

### DELAY

In main menu choose “PARAM” (fig.2) and press “E” key. Display shows:

DEL.: ->00  
0 0 0 0

fig.9

The -> arrow is on “DEL”. *This value is pump’s waiting time after any start up procedure*: pump will wait set time before start dosing every time it is powered on. Use “UP” and “DOWN” keys to change this value. Waiting time may be set from 1 to 60 minutes.

---

## Programming the pump

---

### PASSWORD

In main menu choose "PARAM" (fig.2) and press "E" key. Display shows:

DEL: →00  
0 0 0 0

fig.9

Press "RIGHT" key to move on 0 0 0 0. All new pumps have "0 0 0 0" as default password, use "UP" and "DOWN" keys to change this value. Press "E" to confirm new data and "RIGHT" to exit from programming mode.

### MAXIMUM TIME DOSING ALARM

This alarm prevents the pump to dose if a set time is reached. To set this alarm enter into "Setup menu" as shown in fig.3. Use "DOWN" key to choose "3) Alarm" and press "E" key. The pump shows:

-> AL OFF  
DOSING

fig.10

To activate the alarm use "UP" or "DOWN" keys to set the time (from 1 to 100 minutes or "AL OFF"). To setup the alarm mode use the "RIGHT" key. Cursor moves on "DOSING". Use "UP" or "DOWN" keys to change this voice. On "STOP" mode the pump will stop the dosing procedure once the set time is reached. The pump's display will show the alarm condition and requires to press a key to continue. On "DOSING" mode the pump will NOT stop the dosing procedure once the set time is reached. The pump's display will show the alarm condition and requires to press a key to continue.

### Special functions

- Keep pressed the "UP" key to turn off the pump. Display shows "OFF" and it will switch off. Keeping pressed the "UP" key, the pump will switch on.
- Keep pressed the "DOWN" key to read on display the power supply input.
- Keep pressed the "E" key for manual dosing.
- Pump's reset: turn off the pump, keep pressed "UP" and "DOWN" keys then turn on the pump. Release "UP" and "DOWN" keys and proceed to pump's set up. This procedure will return the pump to its shipment condition.

***If pump does not dose and main green led is off:***

- check power supply cable.
- check correspondence between network voltage and pump voltage.
- check if fuse is blown.

***If pump does not dose and main red led is on:***

- check if there is enough additive to dose.
- check level's probe and avoid the suction of dirty materials.

***If the pump does not dose and the main green led is blinking:***

- check foot filter.
- remove air from pump head (see "Basic operations" chapter).
- remove dirty materials from suction and delivery valves (see "Maintenance" chapter).
- check if valve's o-ring are not swollen or crumbled. Otherwise should be a chemical incompatibility between elastomer and product to dose (see "O rings" chapter).

***If pump blown fuse after a few seconds of operation:***

- check correspondence between network voltage and pump voltage.
  - check pump's main board using a light with adequate voltage on solenoid's output
- If light does not pulse replace the main board (see "Electronic boards connections" chapter).

### **PUMP'S MESSAGES**

During normal operating mode, the pump may show some messages.

**Message:** "LOW VOLT"

**Description:** The pump is low voltage powered. Check main power.

**Message:** "HIGH VOL"

**Description:** The pump is high voltage powered. Check main power.

**Message:** "LOW LEVEL"

**Description:** Product to dose is near to end. Verify the tank.

**Message:** "STAND-BY"

**Description:** The pump is waiting (a specified time) to become operative. See related chapter to set this function.

---

## O-rings, Maintenance and Repair Operations

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The valve sealings are provided in 5 different types to satisfy different chemical compatibility issues. The elastomer that will best fit the requested need can be found on the manufacturer compatibility table. Get in touch with customer support if needed. The elastomer used for the o-rings equipping the “GMS Digital” pumps are characterized by different suction/delivery valve colours.

<i>Elastomer</i>	<i>ISO Code</i>	<i>Manufacturer Code</i>	<i>Valve Colour</i>
Fluorocarbon	FPM	FP	black
Ethylenepropylene	EPDM	EP	grey
Polytetrafluoroethylene	PTFE	PTFE	blue
Nytril	NBR	WAX	green
Silicon	MVQ	SI	yellow

### MAINTENANCE

Every month (when in normal use) pump and accessories should be checked for proper operation. For a correct maintenance, please perform following tasks:

- check electrical connections
- check liquid end screws
- check discharge line connections
- check discharge and suction valve connections
- check the entire liquid end for leakage
- check feed rate: run the pump for a short period in priming mode

### REPAIR



**All repair measures must be performed by authorized and qualified personnel. If pump needs to be repaired in manufacturer's factory send it only if it has been cleaned and after the liquid end has been rinsed!**

If, despite pump's emptying and cleaning, there are still possible safety hazards the information must be declared on return's form!

**If pump needs a replacement use only ORIGINAL spare parts!**

Replacing discharge valve:

- remove discharge line
- unscrew discharge valve from the liquid end
- remove oring from the liquid end
- screw in the new discharge valve with oring up to the stop
- refit discharge line

## Technical Features and Manufacturing materials

### TECHNICAL FEATURES

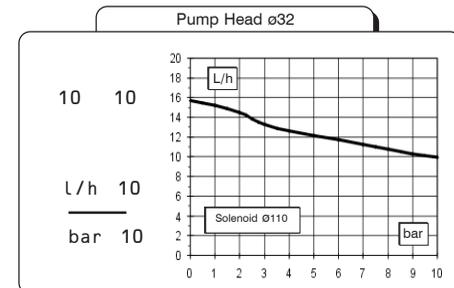
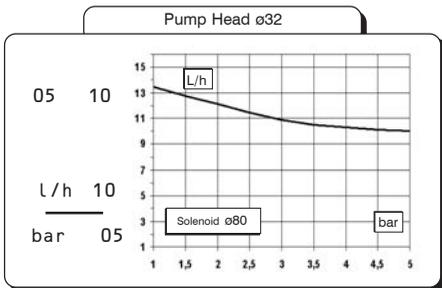
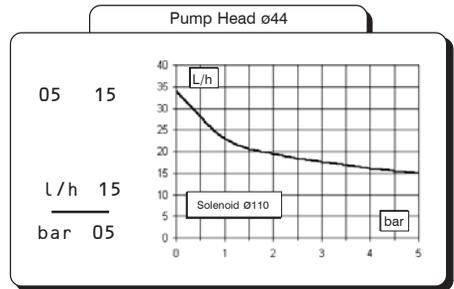
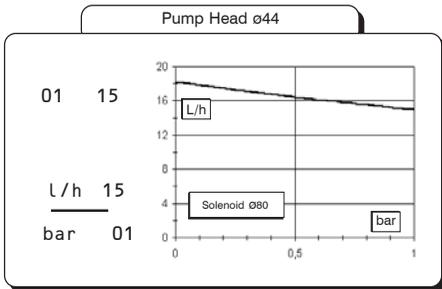
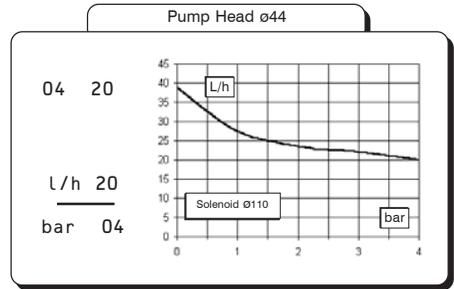
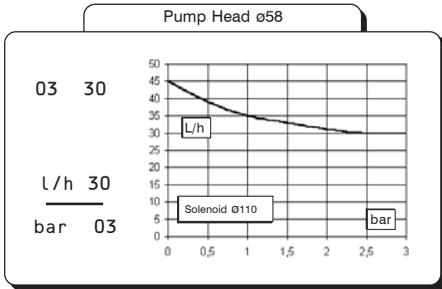
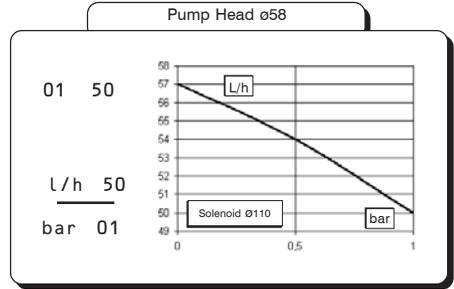
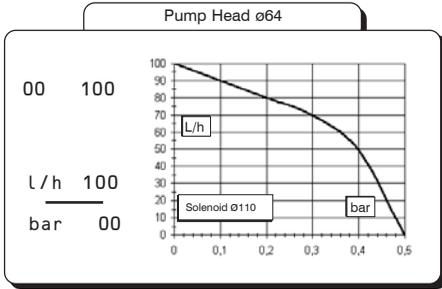
Power Supply:	115VAC ; 230VAC
Pump strokes per minute:	0 ÷ 150 injections/minute (GMS PH/RH) 0 ÷ 120 injections/minute (GMS MAN/EXT)
Suction Height:	1,5 metres
Installation Class:	II
Pollution Level:	2
Audible Noise:	74dbA
Environment Temperature:	0 ÷ 45°C (32 ÷ 113°F)
Chemical Temperature:	0 ÷ 50°C (32 ÷ 122°F)
Packaging and Shipping Temperature:	-10 ÷ +50°C

### MANUFACTURING MATERIALS

Case:	PP
Pump head:	PP (available in PVDF)
Diaphragm:	PTFE
Balls:	CERAMIC (available in glass, PTFE)
Suction Pipe	PVC/PE (available in PE)
Delivery Pipe:	PE
Valve Body:	PP/PVDF (available in PVDF)
O-ring:	as ordered (FP, EP, WAX, SI, PTFE)
Injection connector:	PP (available in PVDF) (glass balls, HASTELLOY C276 spring).
Level Probe:	PP (available in PVDF)
Level probe cable:	PE
Foot Filter:	PP (available in PVDF)

Flow	Max Capacity l/h	Max Pressure bar	Capacity l/h	Pressure bar	ml stroke	Strokes/min.	Hoses mm	Wett W	Shipping weight Kg
<b>20 01</b>	1	20	1,3	10	0,14	120	4 X 8	22 W	5
<b>18 02</b>	2	18	2,5	9	0,23	150	4 X 8	22 W	5
<b>15 03</b>	3	15	4	8	0,33	150	4 x 6	22 W	5
<b>20 05</b>	5	20	6	10	0,7	120	4 X 8	27 W	5,7
<b>10 05</b>	5	10	5,5	5	0,56	150	4 x 6	22 W	5
<b>12 07</b>	7	12	9	6	0,98	120	4 x 6	27 W	5,7
<b>07 07</b>	7	7	7,5	3,5	0,78	150	4 x 6	22 W	5
<b>10 10</b>	10	10	12	5	1,4	120	4 x 6	27 W	5,7
<b>05 10</b>	10	5	11,5	2,5	1,1	150	4 x 6	22 W	5
<b>05 15</b>	15	5	18	2,5	2,1	120	6 X 8	27 W	5,7
<b>01 15</b>	15	1	17	0,5	1,7	150	4 x 6	22 W	5
<b>04 20</b>	20	4	22	2	2,8	120	6 X 8	27 W	5,7
<b>03 30</b>	30	3	33	1,5	4,2	120	8 X 12 PVDF 8 X 10	27 W	5,7
<b>01 50</b>	50	1	54	0,5	7	120	8 X 12 PVDF 8 X 10	27 W	5,7
<b>00 100</b>	100	0	--	--	14	120	8 X 12 PVDF 8 X 10	27 W	5,7

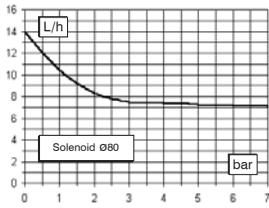
# Delivery Curves



Pump Head ø32

07 07

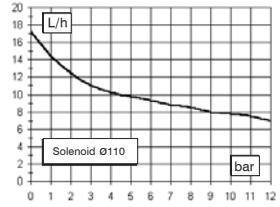
L/h 07  
bar 07



Pump Head ø32

12 07

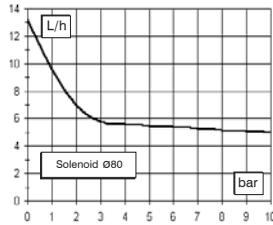
L/h 07  
bar 12



Pump Head ø32

10 05

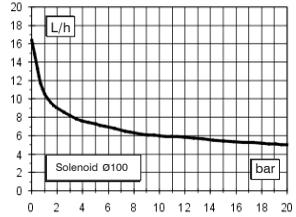
L/h 05  
bar 10



Pump Head ø22

20 05

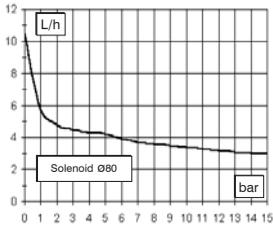
L/h 05  
bar 20



Pump Head ø22

15 03

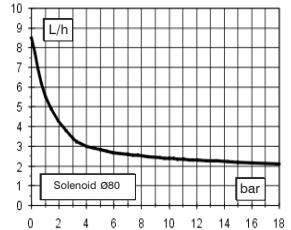
L/h 03  
bar 15



Pump Head ø13

18 02

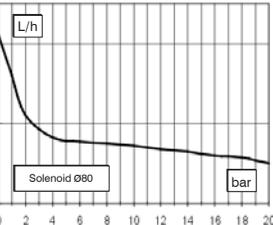
L/h 02  
bar 18



Pump Head ø13

20 01

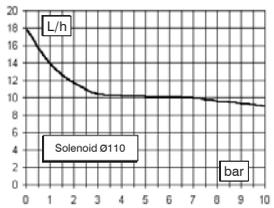
L/h 01  
bar 20



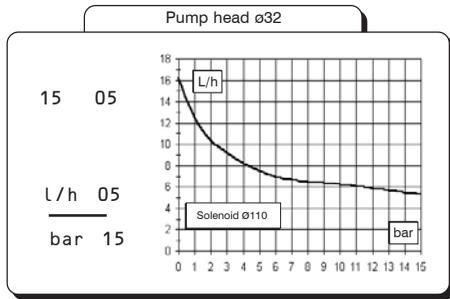
Pump head ø32

10 09

L/h 09  
bar 10

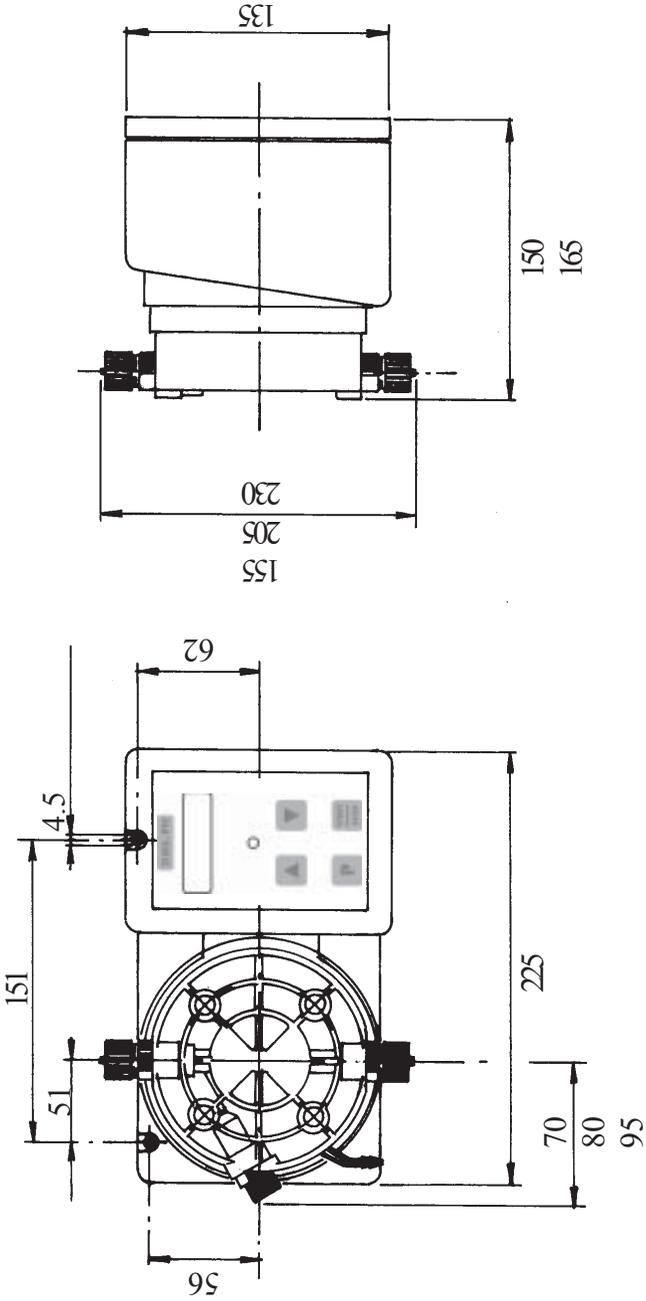


## Delivery Curves

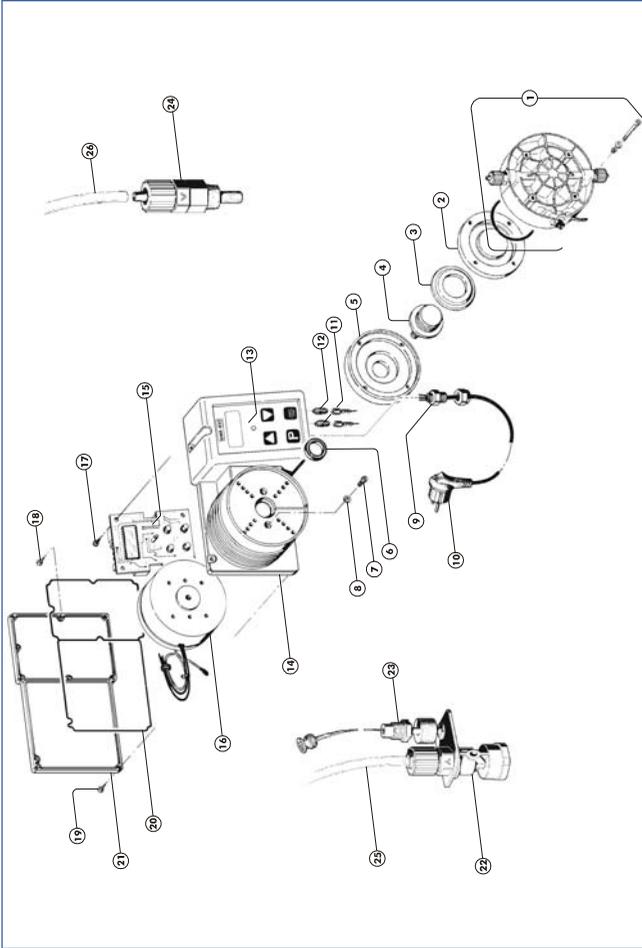


Flow rate indicated is for  $H_2O$  at 20 °C at the rated pressure. Dosing accuracy  $\pm 2\%$  at constant pressure  $\pm 0,5$  bar.

Unit Value : mm



# Exploded View



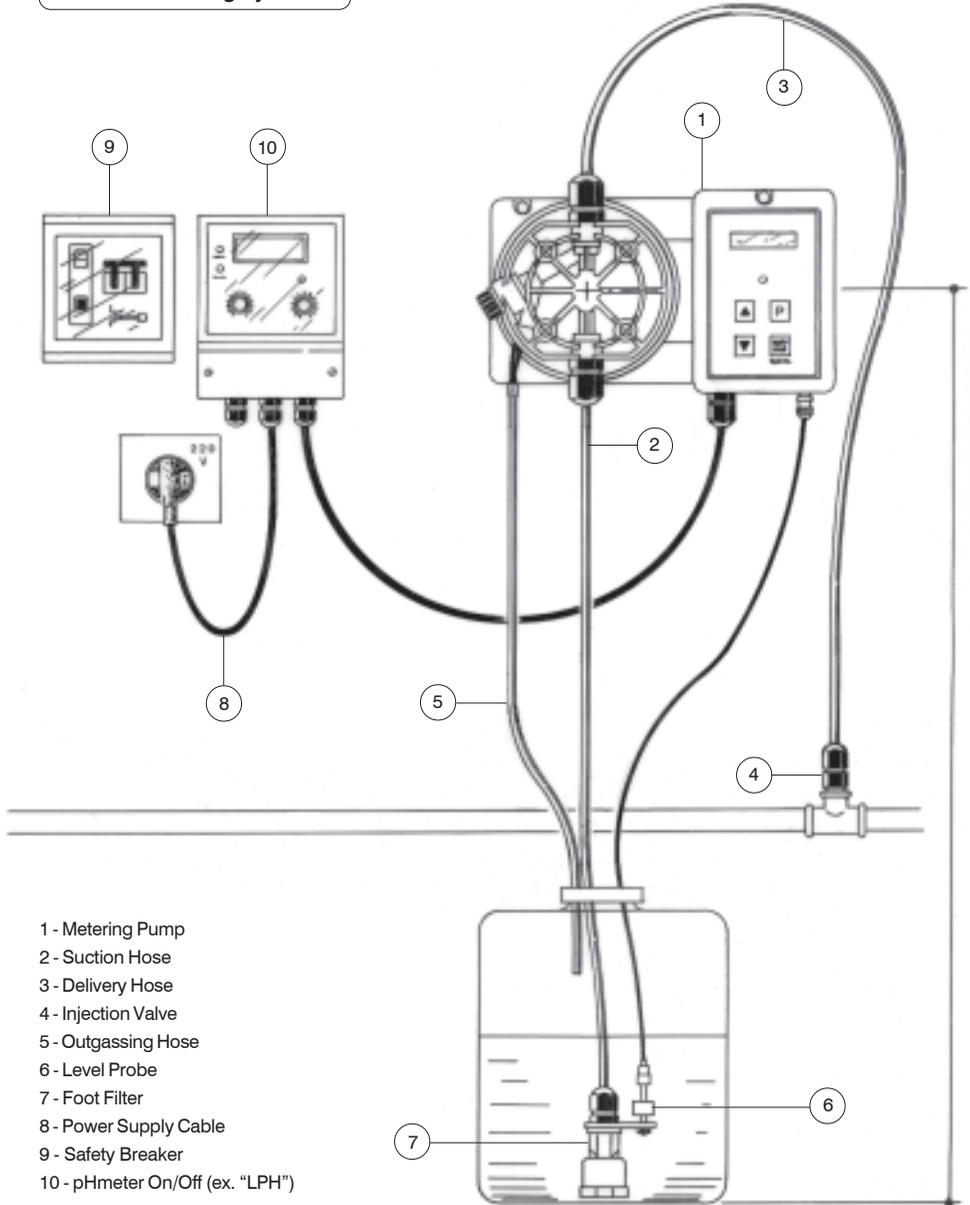
**NOTICE:** always specify the pump's label when ordering spare parts.

<b>Recommended Chemicals Table</b>		
<i>Chemical Product</i>	<i>Formula</i>	<i>Maximum % Concentration</i>
Hydrochloric Acid	<b>HCl</b>	33%
Sulphuric Acid	<b>H<sub>2</sub>SO<sub>4</sub></b>	96%
Sodium Bisulphate	<b>NaHSO<sub>4</sub></b>	37%
Sodium Chlorite	<b>Na ClO<sub>2</sub></b>	30%
Sodium Hypochlorite	<b>Na OCl</b>	13,5%
Calcium Hypochlorite	<b>Ca (ClO)<sub>2</sub></b>	2%
Dichloroisocyanuric Sodium	<b>(CON)<sub>3</sub> Cl Na</b>	4%
Alluminium Sulphate	<b>Al<sub>2</sub> (SO<sub>4</sub>)<sub>3</sub></b>	18%
Ferric Chloride	<b>Fe Cl<sub>3</sub></b>	40%

NSF Listed units must be used with Sodium Hypo Chlorite.

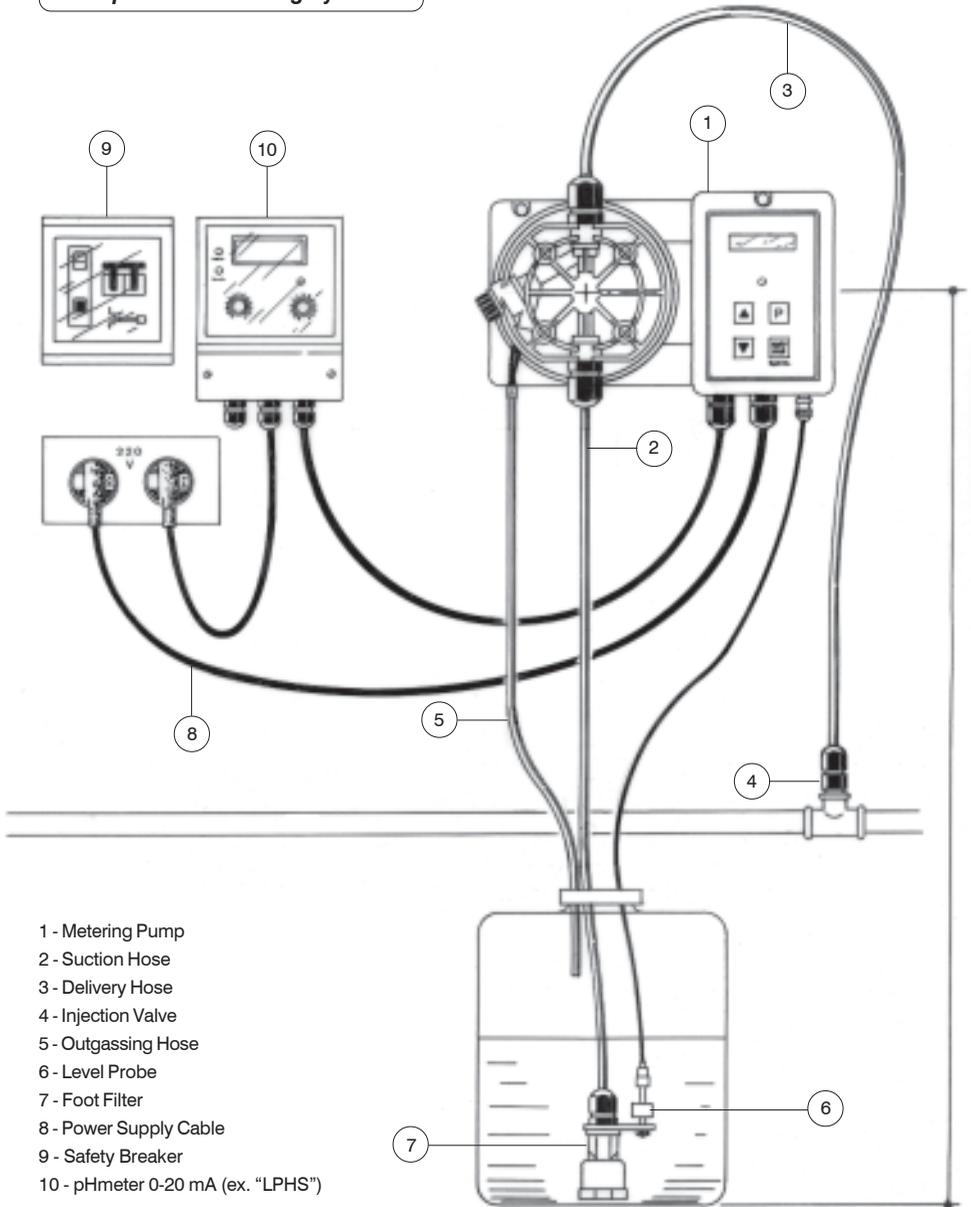
# Installation draw for "GMS MAN" solenoid metering pumps

## On/Off Metering System



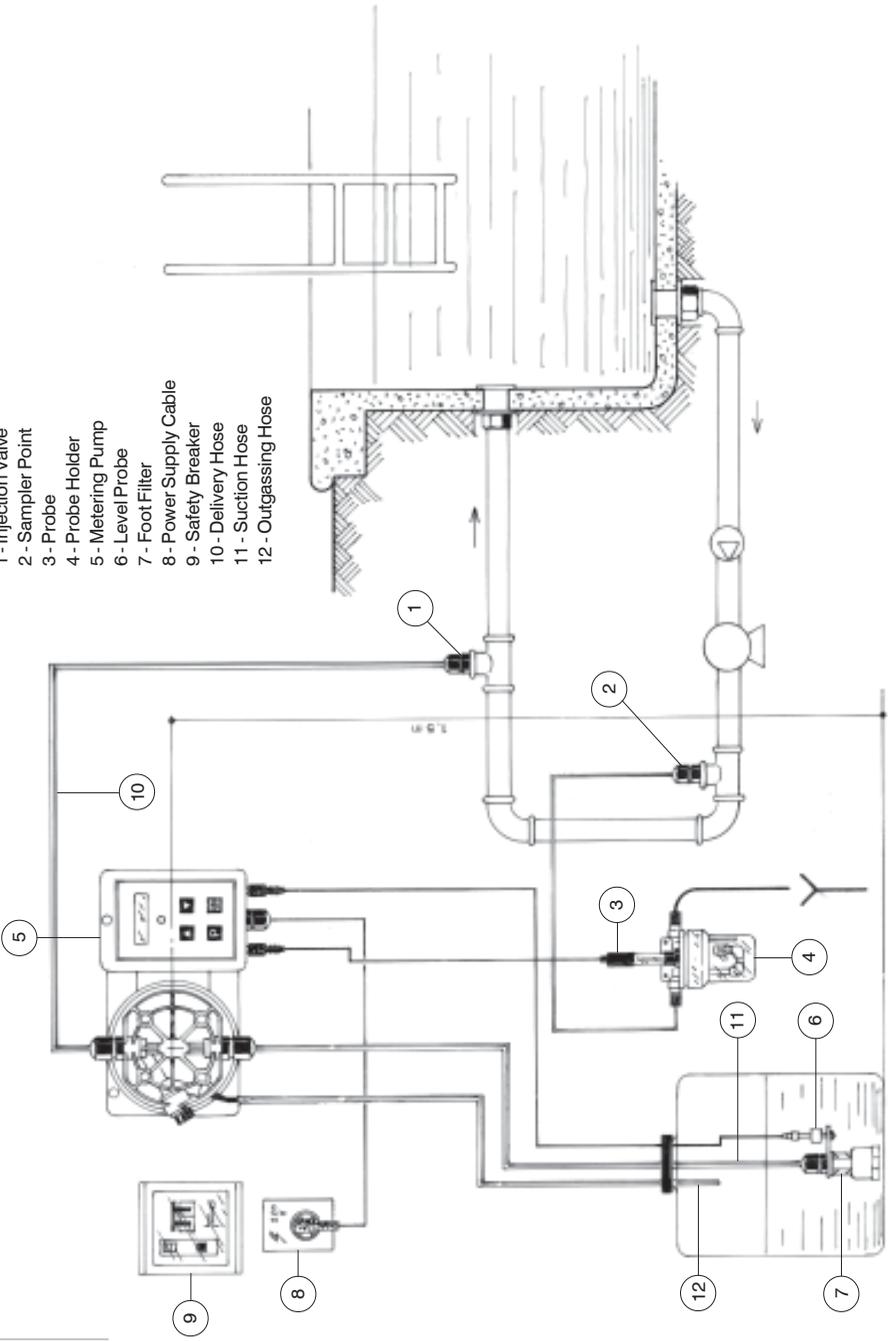
# Installation draw for "GMS EXT" solenoid metering pumps

## Proportional Metering System



# Installation draw for "GMS PH - RH solenoid metering pumps

- 1 - Injection Valve
- 2 - Sampler Point
- 3 - Probe
- 4 - Probe Holder
- 5 - Metering Pump
- 6 - Level Probe
- 7 - Foot Filter
- 8 - Power Supply Cable
- 9 - Safety Breaker
- 10 - Delivery Hose
- 11 - Suction Hose
- 12 - Outgassing Hose



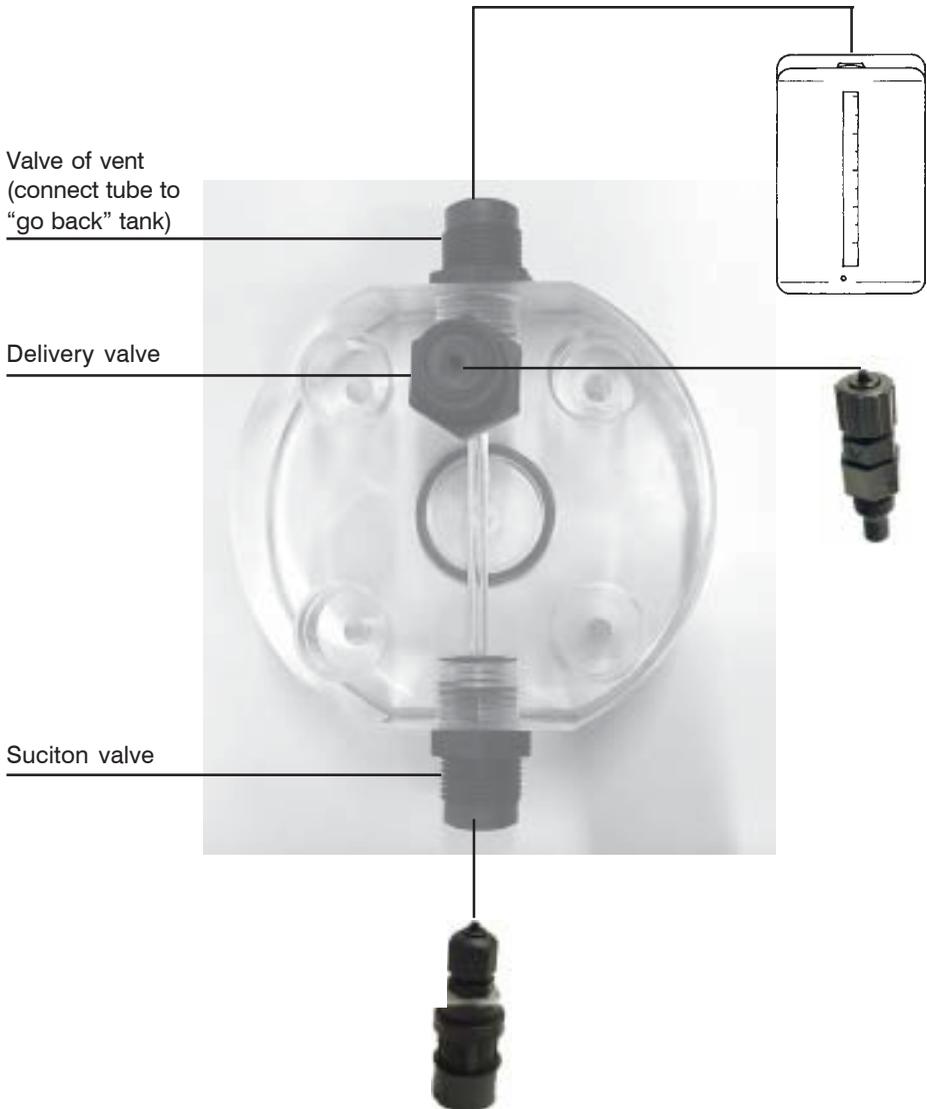
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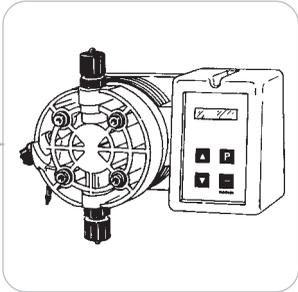
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## Self-venting pump head

This pump head removes the gas from gaseous chemicals during operation, independently of back pressure.

Attention: valves cannot be changed from their original position.





*When dismantling a pump please separate material types and send them according to local recycling disposal requirements.  
We appreciate your efforts in supporting your local Recycle Environmental Program.  
Working together we'll form an active union to assure the world's invaluable resources are conserved.*