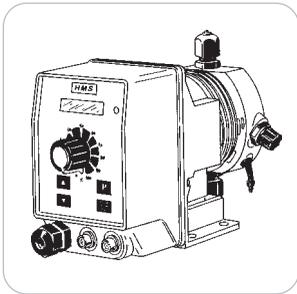




This operating instructions contains safety information that if ignored can endanger life or result in serious injury. They are indicated by this icon.



Use of this pump with radioactive chemicals is forbidden!



OPERATING INSTRUCTIONS MANUAL FOR “HMS” SOLENOID DOSING PUMP



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

Please read it carefully!



English language



"HMS" 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 supplied with 115 VAC are available with certification CSA, except for 20 01, 18 02 and 07 06 models.



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 may cause injury, 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.

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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Design and Function

“HMS” 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 length and stroking rate. The stroke length is adjustable from 0 to 100% using the stroke length adjustment knob. However repeatability is ensure within adjustment 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

HMS MAN

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

HMS EXT

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

HMS EN

Pump with weekly timer, microprocessor, digital controls, LCD display, level probe and electrovalve control.

HMS PH

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

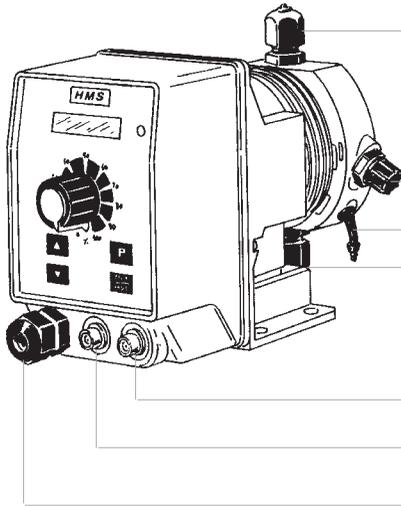
HMS RH

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

HMS CL

Proportional pump for free chlorine (Cl₂) control (from 0 to 10,00 mg/l) with level control, supplied without chlorine probe. It operates with chlorine cells mod. ECL1 or ECL 4/5/6/7/12.

Illustrated views of “HMS” pump



Delivery connection

De-gassing knob

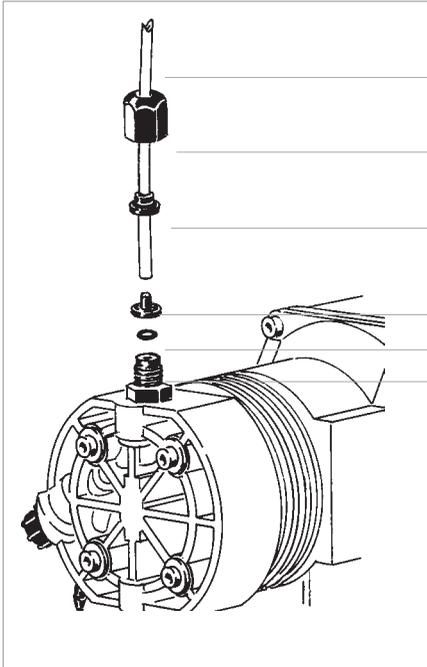
De-gassing outlet

Suction connection

Level probe input signal

External control output

Power supply cable



Discharge hose (PE Hard)

Hose nut

Clamping ring

Nozzle

O-ring

Discharge valve connection

Panels views of “HMS” pump

Model pump (HMS Man / Ext models)

LCD Display

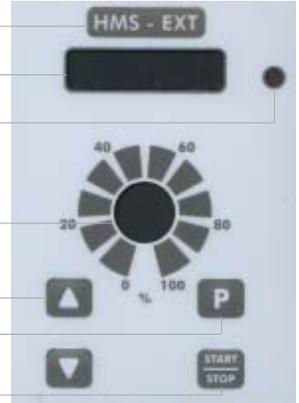
Stroke pulse led status

Stroke length adjustment knob

Navigational keys

Program mode key

Start / Stop pump's dosing activity



LCD Display

Stroke length adjustment knob

Navigational keys

Program mode key



Model pump (HMS EN only)

Model pump (HMS PH / RH / CL)

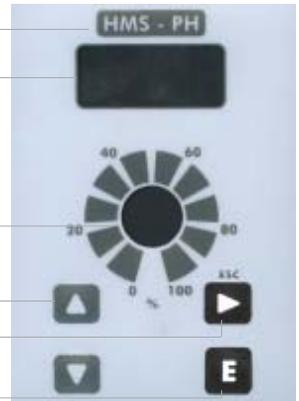
LCD Display

Stroke length adjustment knob

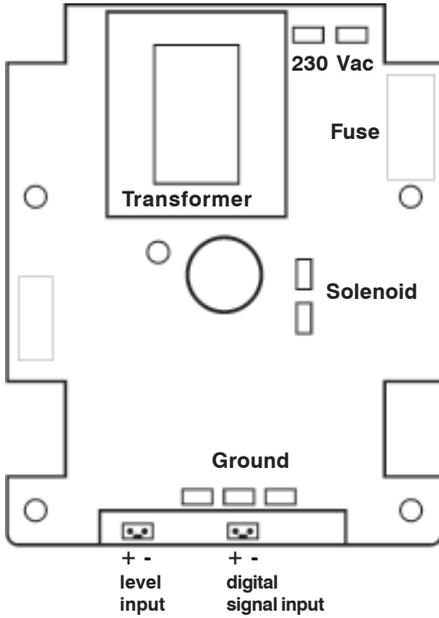
Navigational keys

Exit from program menu / Manual mode function

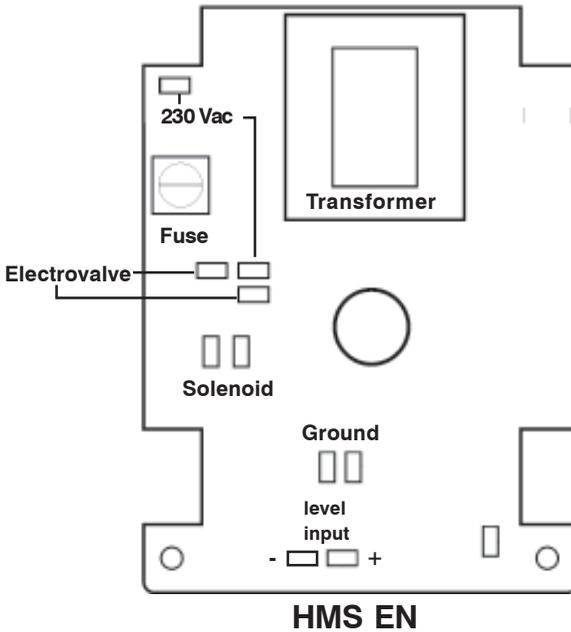
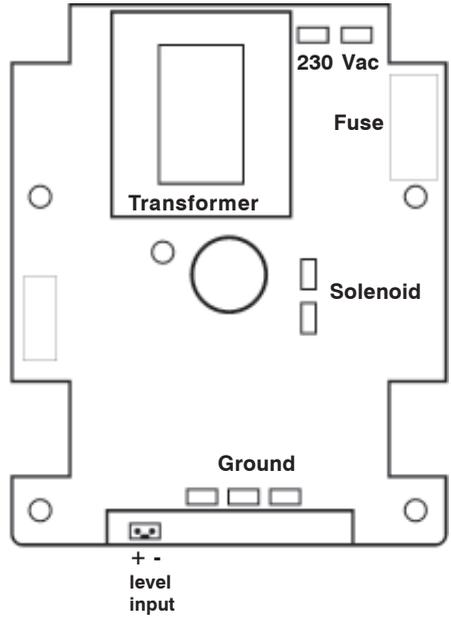
Program key



HMS EXT

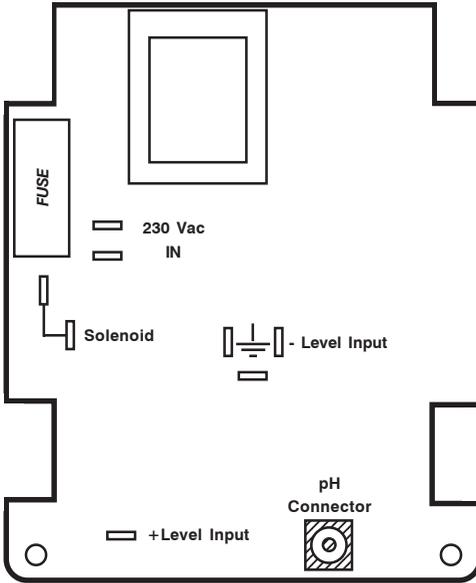


HMS MAN

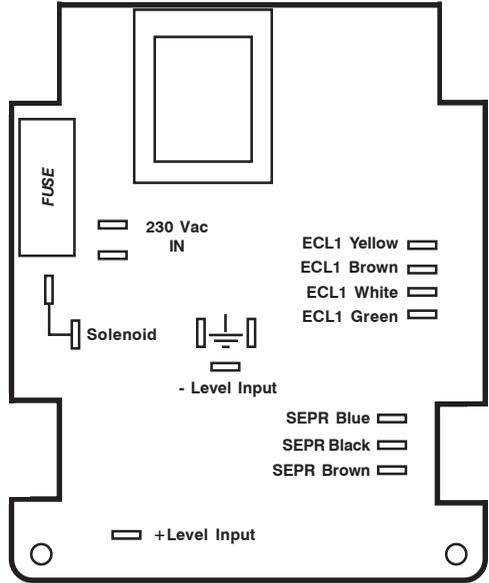


Electronic boards connections

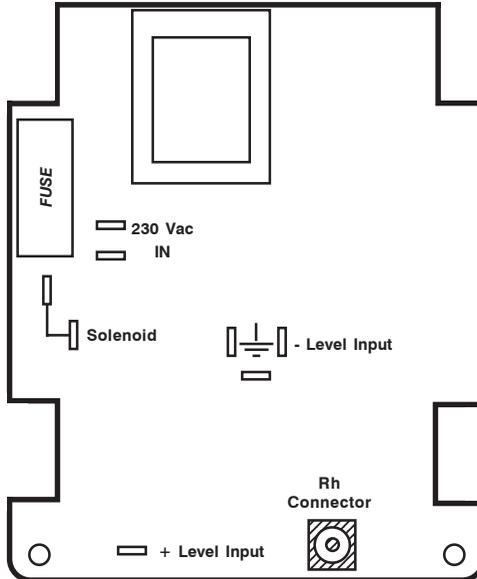
HMS-PH



HMS-CL



HMS-RH



Included into package:

n.4	Inserts ø6
n.4	Self tapping screws 4,5 x 40
n.1	Delayed fuse 5 X 20
n.1	Foot filter with valve
n.1	Injection valve
n.1	Level probe
m 2	Delivery pipe
m 2	Suction pipe
m 2	Discharge pipe
n.1	Instructions manual



**PLEASE DO NOT TRASH 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 doesn't 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!**

Electrical Installation

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

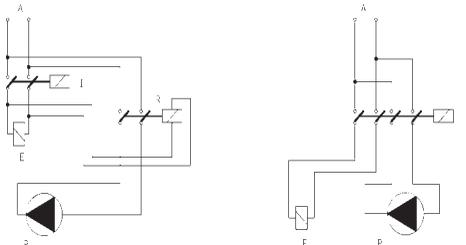
If pump is powered with out of range mains value, the display will show "OUT OF RANGE" (model with display) or power led will blink (model without display).

Average power consumption:

Model Pump	Consumption at 115 Vac	Consumption at 230 Vac
HMSxx 2001	24 W	19 W
HMSxx 1802	24 W	19 W
HMSxx 1801	24 W	19 W
HMSxx 1402	24 W	19 W
HMSxx 1004	24 W	19 W
HMSxx 0706	24 W	19 W
HMSxx 0408	24 W	19 W
HMSxx 0216	24 W	19 W



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

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
- Rotate stroke adjustment knob on 0%
- Remove the 6 screws on back side of 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 in the table here below
- Put back cover in place, take care of seal and piston displacement knob position

<i>Pump's model</i>	<i>Fuse for supply network 230 Vac</i>	<i>Fuse for supply network 115 Vac</i>
HMSxx 2001	800mA T	400mA T
HMSxx 1802	800mA T	400mA T
HMSxx 1801	800mA T	400mA T
HMSxx 1402	800mA T	400mA T
HMSxx 1004	800mA T	400mA T
HMSxx 0706	800mA T	400mA T
HMSxx 0408	800mA T	400mA T
HMSxx 0216	800mA T	400mA T

HMS pump is equipped with an overvoltage protection (275 V, 150V) and a voltage peak protection up to 4KV, 50 μ sec against pulses as shown in fig. 1.

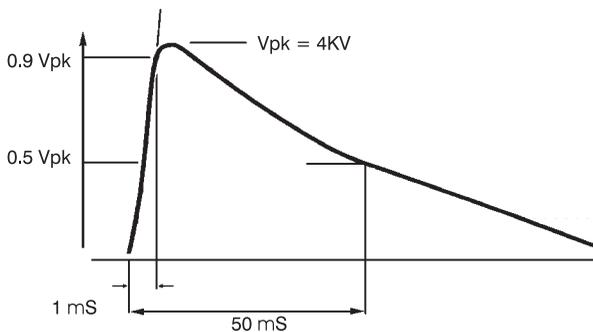


fig. 1

Basic Operations

PRIMING

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

- connect all hoses into proper places (delivery hose, suction hose, 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.

SINGLE INJECTION ADJUSTMENT

The HMS series pumps have a double flow setting that can be operated at same time: the number of strokes per minute and the single stroke capacity. This feature results in a more accuracy of the metering. The single stroke capacity adjustment is a mechanical control on the piston that pushes the diaphragm and it is operated through the central panel knob. This knob is locked to avoid undesired metering by accidental movement. To unlock it push the knob and rotate it on the needed value.

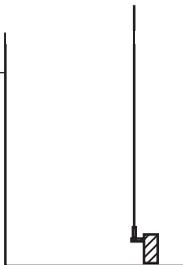


Warning: to avoid mechanical damages the piston displacement adjustment must be done when the pump is working.

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 is not necessary a space to avoid sediment accumulation. Connect the BNC to dosing pump using "LEVEL" input.

*Install it
as shown here*



to BNC Connector
(to pump's level input)

Pump's suction hose

Level's probe

Foot filter



All dosing pumps are equipped with a keyboard that basically works in the same way for all 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 "RIGHT" key



is the "P" key



is the "ESC" key



is the "ENTER" key



is the "PROG" key



is the "START/STOP" key

The buttons feature automatic fast advancement: keeping pressed the button it will gradually advance the value shown. Voltage Visualization: keeping pressed "Down" the display will show the actual mains voltage.

PROGRAMMING "HMS MAN" PUMP

This pump works in constant on/off 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).**

LCD Display

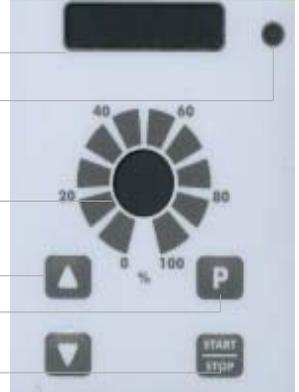
Stroke pulse led status

Stroke length adjustment knob

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

Programming the pump

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 (pulses per hour or per minute) 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 “HMS 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 HMS MAN pump” paragraph.

LCD Display

Stroke length adjustment knob

Navigational keys

Program mode key

Start-Stop pump’s dosing activity



“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.

*** %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” setpoint 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.

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” setpoint 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 pulse. Maximum distribution time is: 2 minutes. If input pulses are too frequent for the multiplying coefficient pump’s display will show [RANGE]. Press again [P]: the display will show the previously programmed pulses, etc. *To exit from program menu keep pressed “P” key for about 4 seconds.*

“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; if the input pulses are too frequent for the multiplying coefficient, the display shows [RANGE]. 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.*

HOW TO DETERMINE “D” or “M” VALUE ?

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

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

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 38 and stroke knob’s position*

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

ppm: product quantity to dose in p.p.m. (gr/m³)

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 increase water meter’s pulses per liter or reduce stroke on pump’s knob.

Programming the pump

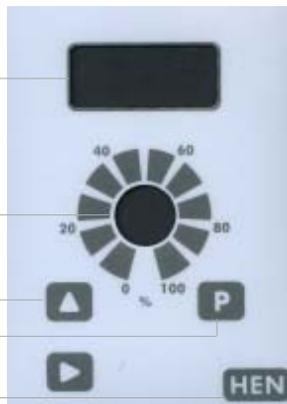
PROGRAMMING “HMS EN” PUMP

LCD Display

Stroke length adjustment knob

Navigational keys

Program mode key



Model pump (HMS EN only)

Turn “ON” the pump. Display shows:

< NEXT >
Tue10:57

This is the next dosing time. For example on Tuesday at 10:57 o'clock. Press the "**RIGHT**" key the display shows:

Cc/day
0.0

This is the product's flow quantity for each day. Press the "**RIGHT**" key the display shows:

Total cc
624.6

Press the "**RIGHT**" key the display shows:

DATE Mon
24/07/00

Press the "**RIGHT**" key the display shows:

TIME
9:44:14

Press the "**RIGHT**" key again, the display will shows the initial picture.

HOW TO PROGRAM “HMS EN” ?

Keep pressed “**P**” key for at least 4 second. The display shows:

CODE

->0 0 0 0

This is the code (password) to enter into pump's "programming mode". Press **"RIGHT"** key to scroll through the numbers and insert the proper code. Default code is 0000. To confirm, press **"P"** key. The display shows:

-> Manual
Clock

Use **"UP"** (scroll up) and **"RIGHT"** keys (scroll down). Options are:

Manual
Clock
Progr.
Inject
Water
Code
LineVo
Exit

Manual option:

To select "Manual" press **"P"** key (option is selected when -> is on it). The display shows:

Cc/day
65.0

To start the pump keep pressed the **"UP"** key. The pump will begin to dose. The dosed quantity does not affect pump's "Total Counter". To stop the pump leave the **"UP"** key. To reset this counter press **"RIGHT"** key. To exit from "Manual" mode press **"P"** key.

Clock option:

The display shows date and time. Using **"UP"** (scroll) and **"RIGHT"** (change value) keys. Date's format is: DD/MM/YY. To confirm press **"P"** key.

Progr. Option:

To select "Progr." press **"P"** key (option is selected when the -> arrow is on it). The display shows:

1) 0:00
Mon Off

The 1) is the program 1 of 16. This pump can be set for a maximum of 16 daily programs (max 16 weekly programs).

Programming the pump

0:00 is the starting time.

Mon is the dosing day. It is possible to scroll it and choose/add another day. An asterisk* means that dosing is activated for that day.

Off is program's status.

Using "RIGHT" key the display shows:

0000 cc
000 min

0000 cc is product's quantity to dose.
000 min is dosing time (minutes).

Example:

The pump must dose 400cc every Tuesday and Friday at 14:30.

In "Progr." Menu the display shows:

1) 0:00
Mon Off

Select the program's number using "RIGHT" key. In this case leave it as appears but remember that it is possible to scroll through 16 programs. Press "UP" key and edit start time (0:00) using "RIGHT" key and enter 1 - 4 - 3 - 0 using "UP" key (the cursor blinks on selected value). Press "RIGHT" key until the cursor will blink on "Mon". Press "UP" key until the display shows "Tue". To enable this day press "P" key. An *asterisk confirm selected day. Press "UP" key until display shows "Tue". To enable this day press "P" key. An *asterisk confirm selected day. Now press "RIGHT" key until the cursor blinks on "On". Leave as it is. To disable the current program 1 press the "UP" key. Press "RIGHT" key until display shows:

0000 cc
000 min

To change the cc value of each digit press "UP" key. To move the cursor to next digit or to "min" press "RIGHT" key. To change min value (minutes required for dosing) for each digit press "UP" key.

Move cursor to next digit with "RIGHT" key. **The "min" parameter must be calculated on pump's flow capacity.** For example: to dose 400cc using a pump with 0.9 cc/stroke (150 stroke/min) and knob set on 100%, dosing time is about 3 minutes ($150 \times 0.9 = 135 \text{cc/min}$. $400/135 = 3$ minutes). Once entered the values press "P" to confirm and save the program. *It is possible to confirm/save the programmed mode during every program's step.*

Important note: Do not set two programs with a common time's period during the same day. Doing this, pump will not accomplish last edited program.

Inject option:

The display shows:

Cc/imp
01.00

This value is set using pump's knob with pump's flow after a complete test of plant: flow, backpressure, product to dose, etc...

Water option:

The display shows:

B -> 04 sec
A 05 sec

"B" means "Before" (min:0 seconds ; max: 60 minutes); "A" means "After" (min:0 seconds; max: 60 minutes). Pump has a 220Vac output for a relay. This function is useful for opening an electrovalve before/after the dosing time. "B" means that output is activated 4 seconds before the program ends. "A" means that output is activated 5 seconds after the program ends. Use "UP" key to change selected value. If entered value is greater than 60 seconds the pump will change unit from seconds to minutes.

Code option:

The display shows:

Mod Code
->0 0 0 0

This is the code (password) for pump "programming mode". Press "**RIGHT**" key to scroll through the numbers and enter proper code. Default code is 0000. Press "**P**" key to enter.

LineVo option:

Not editable. It shows (real-time) the power supply voltage according to pump's working range.

Exit option:

To exit from programming mode.

Programming the pump

HOW TO RESET THE PUMP?

Unplug pump's power cable from supply and while pressing "UP" and "RIGHT" keys connect the pump's power cable. The display shows:

ERROR CK
MAKE SET
Press P
To reset

Press "P" key and pump will shows:

ERASE
EPROM

Remember that after pump's reset all programming values, inject value, date and time, etc have been deleted and must be entered again.

PROGRAMMING “HMS PH” PUMP

LCD Display

Stroke length adjustment knob

Navigational keys

Exit from program menu / Right Key

Program 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.

Programming the pump

PROGRAMMING “HMS RH” PUMP

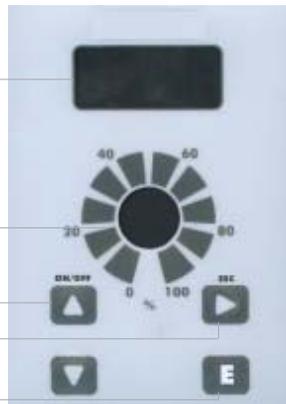
LCD Display

Stroke length adjustment knob

Navigational keys

Exit from program menu / Right Key

Program 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.

PASSWORD

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

Programming the pump

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.

PROGRAMMING "HMS CL" PUMP

Pump model (HMS "CL")

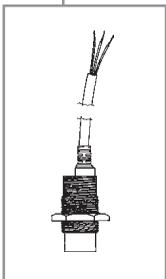
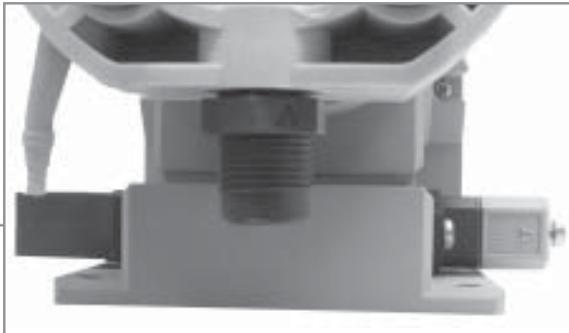
LCD Display

Stroke length adjustment knob

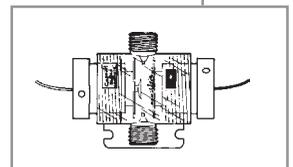
Navigation keys

Exit from program menu / Manual mode function

Program key



Connection for proximity probe mod. "SEPR".



Connection for free chlorine cell.

Programming the pump

Connect the pump to the main power. If pump is switched on for the first time, the display will show:

-.-- Cl
Lowlev

If chlorine probe is connected, the pump will display the read value. “**Lowlev**” advice means pump is out of liquid or there is not water flow into probe holder. Verify that proximity probe led is “On” (there is flow) or “Off ” (there is no flow).

HOW TO PROGRAM “HMS CL” ?

Keep pressed “**E**” key for about 4 seconds. The display shows:

PASSWORD
->0 0 0 0

This is the access code (password) for pump programming mode. Press “**RIGHT**” key to move on digits and use “**UP**” and “**DOWN**” keys to enter the right password. Default password is “0000”. Press “**E**” key to confirm. If password is correct the display will show:

-> Setup
Param

If entered password is wrong, the display will show “Wrong Password” and will move back to main menu.

Use “**UP**” and “**DOWN**” keys to move cursor on functions. If it is the first time that you are using the pump, choose setup and press “**E**”. The display shows:

Setup
1)Point

Press “**E**”. The display shows:

-> 100%
0.50Cl

This is the pump first set point of read chlorine value. The pump works at 100% of its capacity. If chlorine will reach a value under 0.5 Cl, the pump will continue to work at 100%. Use “**UP**” and “**DOWN**” keys to modify the set point. Press “**RIGHT**” to move on next digit (100%).

Press “**RIGHT**” again to move on next set point:

-> 00%
1.00Cl

This is the second set point of the pump. In this condition, the pump do not dose. If read chlorine will reach a value higher than 1.00 Cl, the pump will continue to not dose. Use “UP” and “DOWN” keys to modify the set point. Press “RIGHT” to move on next digit (0%).

The read values are referred to chlorine dosage into PROPORTIONAL mode. Invert percentage values for a dechlorine dosage.

The metering pump may also works into “On/Off” mode. To set it replace maximum and minimum percentage value of both set point with On/Off using “UP” and “DOWN” keys.

Press “E” to exit from “1)Point” menu. The pump will show a confirmation message “DATA SAVED”.

HOW TO CALIBRATE “HMS CL” WITH ECL4/5/6 ?

- use a screwdriver on grey plug from the pump. Remove plug blocker then connect RED or BROWN wire of amperometric cell to plug’s terminal n.4. Connect BLUE or BLACK wire to terminal n.1.

- regulate the flow of amperometric cell and the PEF probe holder to about 48 liter per hour (max). Turn the stroke length adjustment knob until to match the upper part of floating with the graduated label.

- eliminate air bubbles in the amperometric cell because they can compromise the read value.

- let circulate the water of plant in the amperometric cell for about 30 minutes.

- close water flow to amperometric cell and wait few minutes. Select “Setup” from main menu, press “E”, select “2)Calib” and press “E”. The display shows:

-> ZERO
SLOPE

Leave the cursor on “ZERO” and press “E”. The display shows:

R: --- Cl
C: 0.00 Cl

“R” is the read value, “C” is the referring value “0”. During the calibration the “R” value could be different from the buffer solution value. Wait a stable reading in “R”. Press “E” to confirm and exit from calibration menu. **Restore the water flow to the amperometric cell and wait few minutes.**

Check the free chlorine value in the water using a photometer instrument or by DPD1 system.

Select “Setup” from the main menu, press “E”, select “2)Calib” and press “E”. The display shows:

-> ZERO
SLOPE

Move the cursor on “SLOPE” and press “E”. The display shows:

Programming the pump

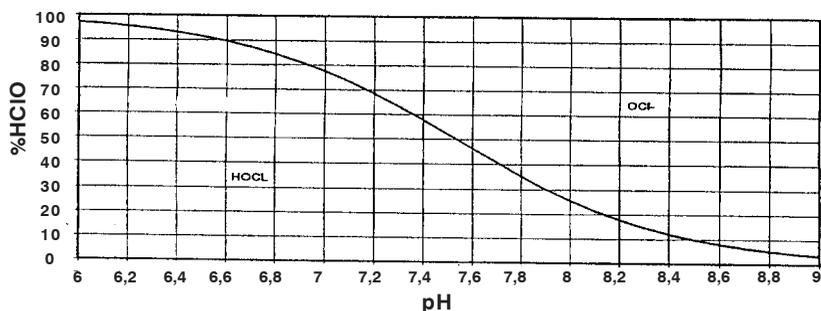
R: 0.80 Cl

C: 1.00 Cl

Use “UP” and “DOWN” keys to insert in set “C” the result of photometric analysis. Press “E” to confirm, then press “RIGHT” until the display moves back to the main menu.

Repeat cell calibration during the firsts days or when needed (see the “HCIO Dissociation Curve”).

HCIO Dissociation Curve



PARAM FUNCTION FOR DELAY

Keep pressed “E” key for about 4 seconds. The display shows:

```
PASSWORD  
->0 0 0 0
```

This is the password for entering into pump program mode.

Press “RIGHT” key to move on digits and then use “UP” and “DOWN” keys to enter the correct password. The default password is “0000”. Press “E” key to confirm. If the password is correct the display will show:

```
-> Setup  
Param
```

If password is wrong, the display will show “Wrong Password” and it will go back to the main menu. Move the arrow on “Param” and press “E”.

The display shows:

```
DEL.: -> 00  
      0 0 0 0
```

It is possible to set a delay during pump boot-up phase using “UP” and “DOWN” keys on “00” value. Minimum value: 0 minutes. Maximum value: 60 minutes.

Using the “RIGHT” key for moving on “0000”. To insert a different password use “UP” and “DOWN” keys to modify the digits. Press “E” to confirm. For a few seconds the display will show the new password, then it will move back to the setup menu. Press “RIGHT” key to move back to the working mode.

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 “RIGHT” key for manual dosing. This function is not available if pump’s display shows “Lowlev”.
- 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 setup. This procedure will return the pump to its shipment condition.

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.

Programming the pump

ECL1/X CELL CALIBRATION

Once pump is correctly installed, to calibrate ECL1/x amperometric chlorine cell, proceed as follow:

- unscrew bottom protection cap (do not touch or remove the membrane!)
- fill the membrane cap with electrolyte keeping electrode in vertical position then reassemble the cell avoiding that hands come in contact with metal parts. If electrolyte drips out when putting cap back, is not a problem.
- if cell is not connected: connect the cell using yellow wire on block n.1, brown wire on block n.2, white wire on block n.3, green wire on block n.4
- run water from system to be treated into Cell and PEF and regulate incoming flow rate to about 30 l/h: adjust flow rate by means of PEF flux meter screw until floater top reaches PEF indicated level.
- remove all air bubbles into the Cell to prevent reading error then let water flow into Cell ECL1/x for approximate 30 minute.
- enter into pump's programming mode and adjust the "Zero" using water without chlorine into amperometric cell.
- from pump's main menu select "Setup" from main menu, press "E", select "2)Calib" and press "E". The display shows:

```
-> ZERO  
    SLOPE
```

Leave the cursor on "ZERO" and press "ENTER". The display shows:

```
R: --- Cl  
C: 0.00 Cl
```

"R" is the read value, "C" is the referring value "0". During the calibration the "R" value could be different from the buffer solution value. Wait a stable reading in "R". Press "E" to confirm and exit from calibration menu. **Restore the water flow to the amperometric cell and wait few minutes.**

Select "Setup" from the main menu, press "E", select "2)Calib" and press "E". The display shows:

```
-> ZERO  
    SLOPE
```

Move the cursor on "SLOPE" and press "E". The display shows:

```
R: 0.80 Cl  
C: 1.00 Cl
```

Use "UP" and "DOWN" keys to insert in set "C" the result of photometric analysis. Press "E" to confirm, then press "RIGHT" until the display moves back to the main menu.

Repeat cell calibration during the firsts days or when needed (see the "HClO Dissociation Curve"). Check the free chlorine value in the water using a photometer instrument or by DPD1 system.

ECL1/x CELL CLEANING AND MAINTENANCE

After a certain period of operation (6 months/1 year and according to the water quality parameters), or whenever calibration is not longer possible, chlorine cell must be cleaned. To carry out electrodes cleaning refer to instructions enclosed with Cell.

If cleaning operation was succesful, after approximate 24 hours measurement will stabilize, on the contrary change the electrodes.

WIRINGS CONNECTION

Pump is equipped with ECL1 probe, proximity sensor mod. "SEPR" and probe holder mod. "PEF1". Use provided connectors for using them.

ECL1

Yellow wire on block n.1, brown wire on block n.2. white wire on block n.3, green wire on block n.4.

SEPR

Blue wire on block n.1, brown wire on block n.2, Black wire on block n.4.

If "SEPR" is not installed, the pump will not work. The user must connect block n.2 and n.4 together.

If "PEF1" and "SEPR" are not installed, reading accuracy is not guarantee.

Troubleshooting

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.

ORINGS

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 “HMS 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
Nitrile	NBR	WAX	green
Silicone	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

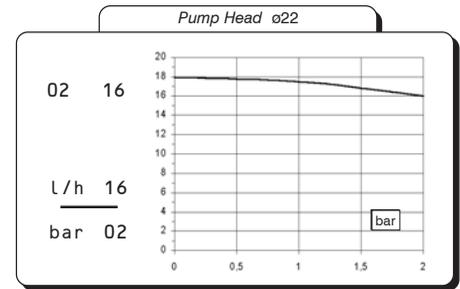
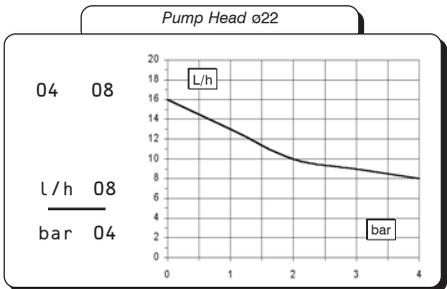
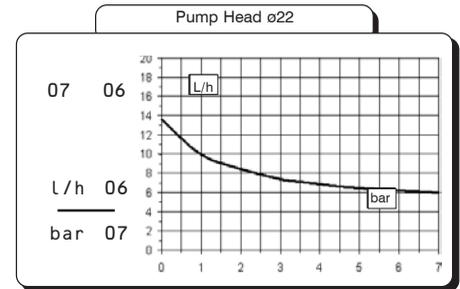
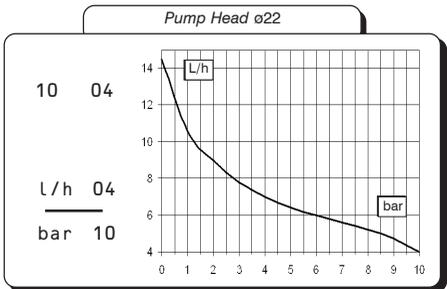
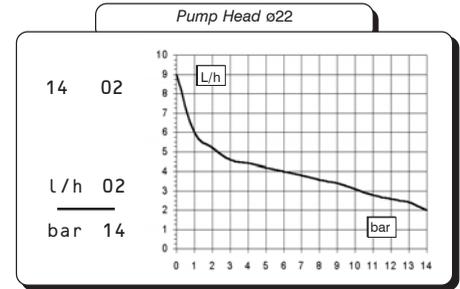
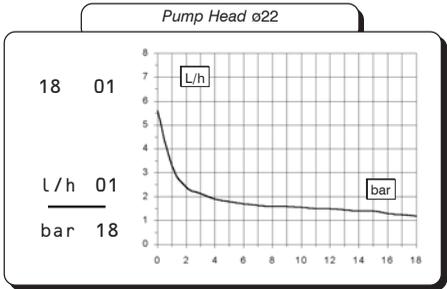
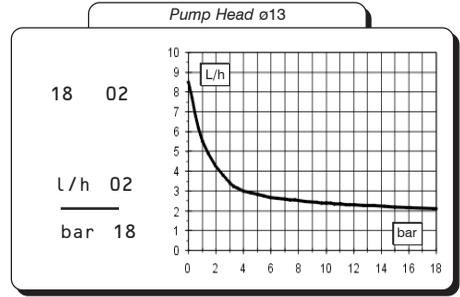
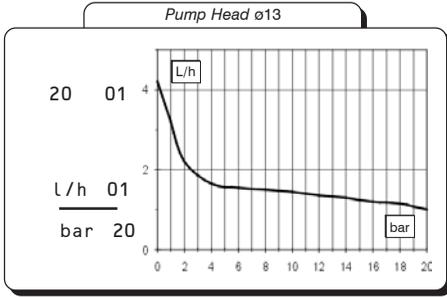
<i>Number of pump injections:</i>	0 ÷ 150 ; 0 ÷ 120 injections/minute
<i>Suction Height:</i>	1,5 metres
<i>Environment Temperature:</i>	0 ÷ 45°C (32 ÷ 113°F)
<i>Chemical Temperature:</i>	0 ÷ 50°C (32 ÷ 122°F)
<i>Installation Class:</i>	II
<i>Pollution Level:</i>	2
<i>Audible Noise:</i>	74dbA
<i>Packaging and Transporting Temperature:</i>	-10÷ +50°C

MANUFACTURING MATERIALS

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

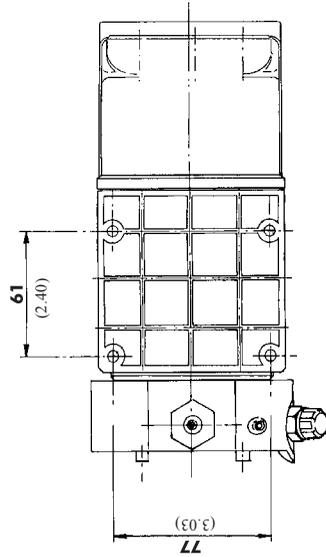
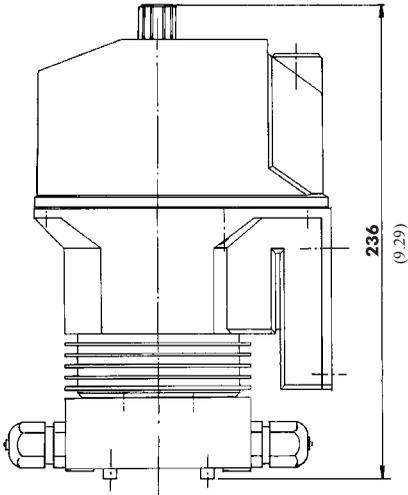
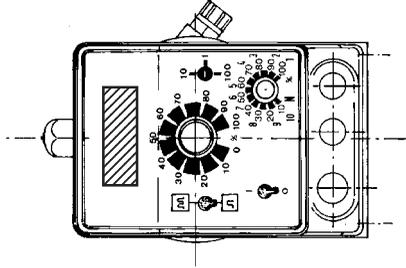
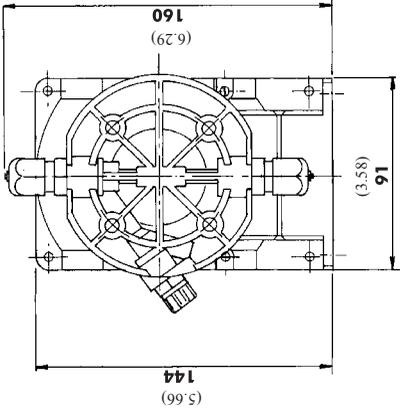
Flow	Max Capacity l/h	Max Pressure bar	Capacity l/h	Pressure bar	ml stroke	Strokes/ min	Hoses mm	Watt W	Shipping weight Kg
20 01	1	20	1,5	10	0,14	120	4 X 8	19 W	4,1
18 02	2	18	3	9	0,23	150	4 X 8	19 W	4,1
18 01	1	18	1,7	9	0,12	120	4 X 8	19 W	4,1
14 02	2	14	3,8	7	0,23	150	4 X 8	19 W	4,1
10 04	4	10	7	5	0,45	150	4 X 6	19 W	4,1
07 06	6	7	7	3,5	0,66	150	4 X 6	19 W	4,1
04 08	8	4	10	2	0,89	150	4 X 6	19 W	4,1
02 16	16	2	17	1	1,8	150	6 X 8	19 W	4,1

Delivery Curves



Flow rate indicated is for H₂O at 20°C at the rated pressure. Dosing accuracy ± 5% at constant pressure ± 0,5 bar.

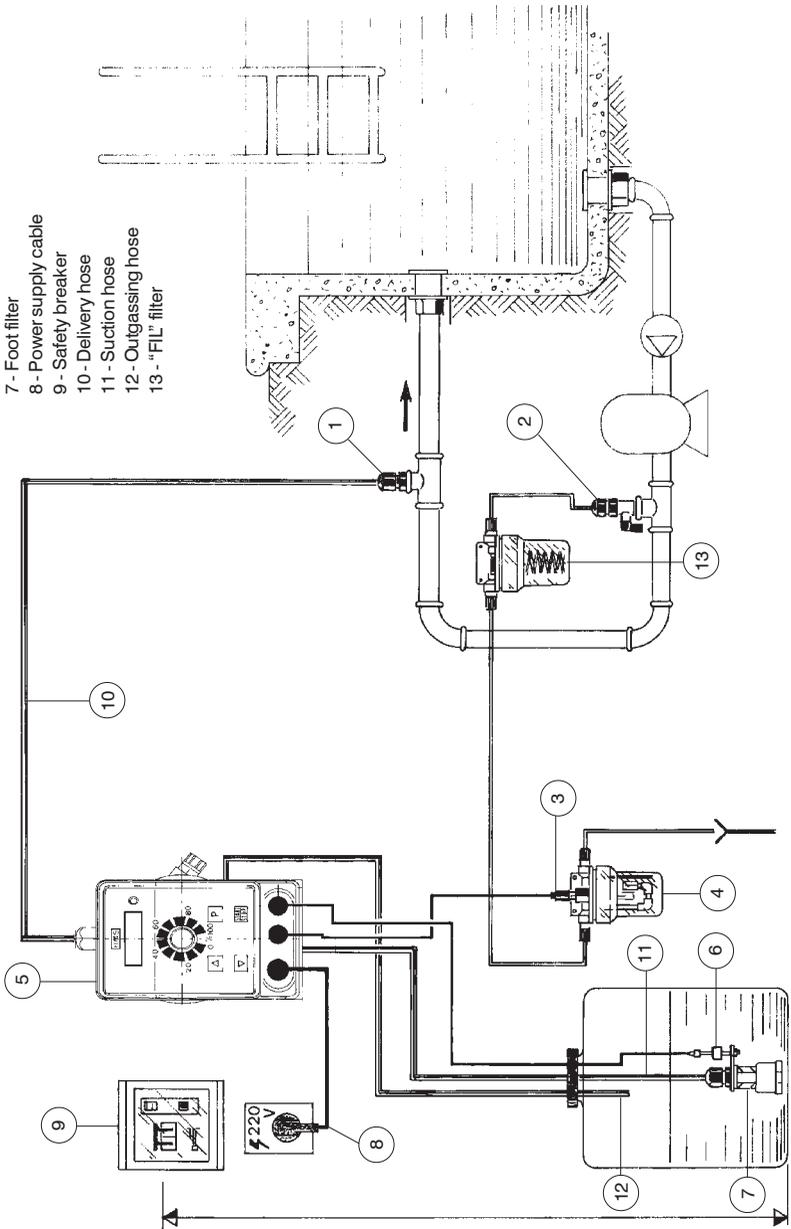
Dimensions



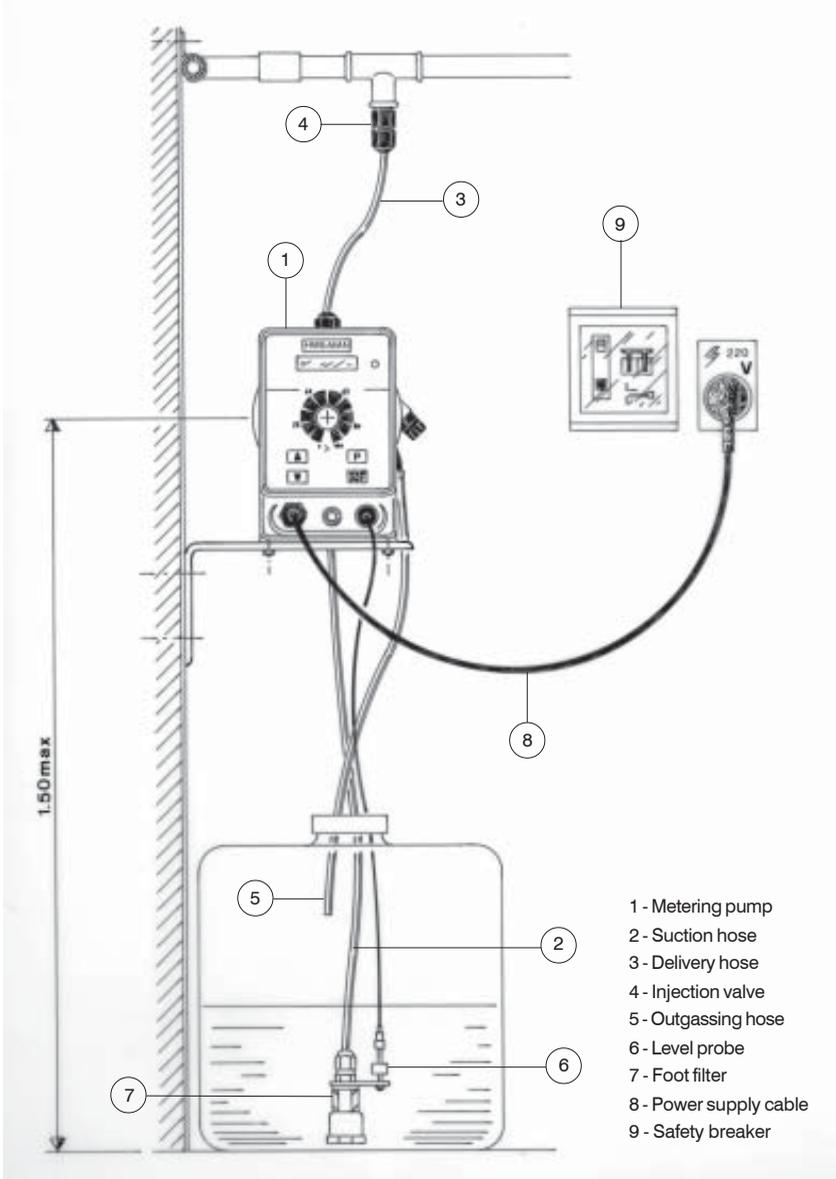
*Bold Values : mm
Parenthesis values : inch*

Installation draw for "HMS PH/RH" metering pumps

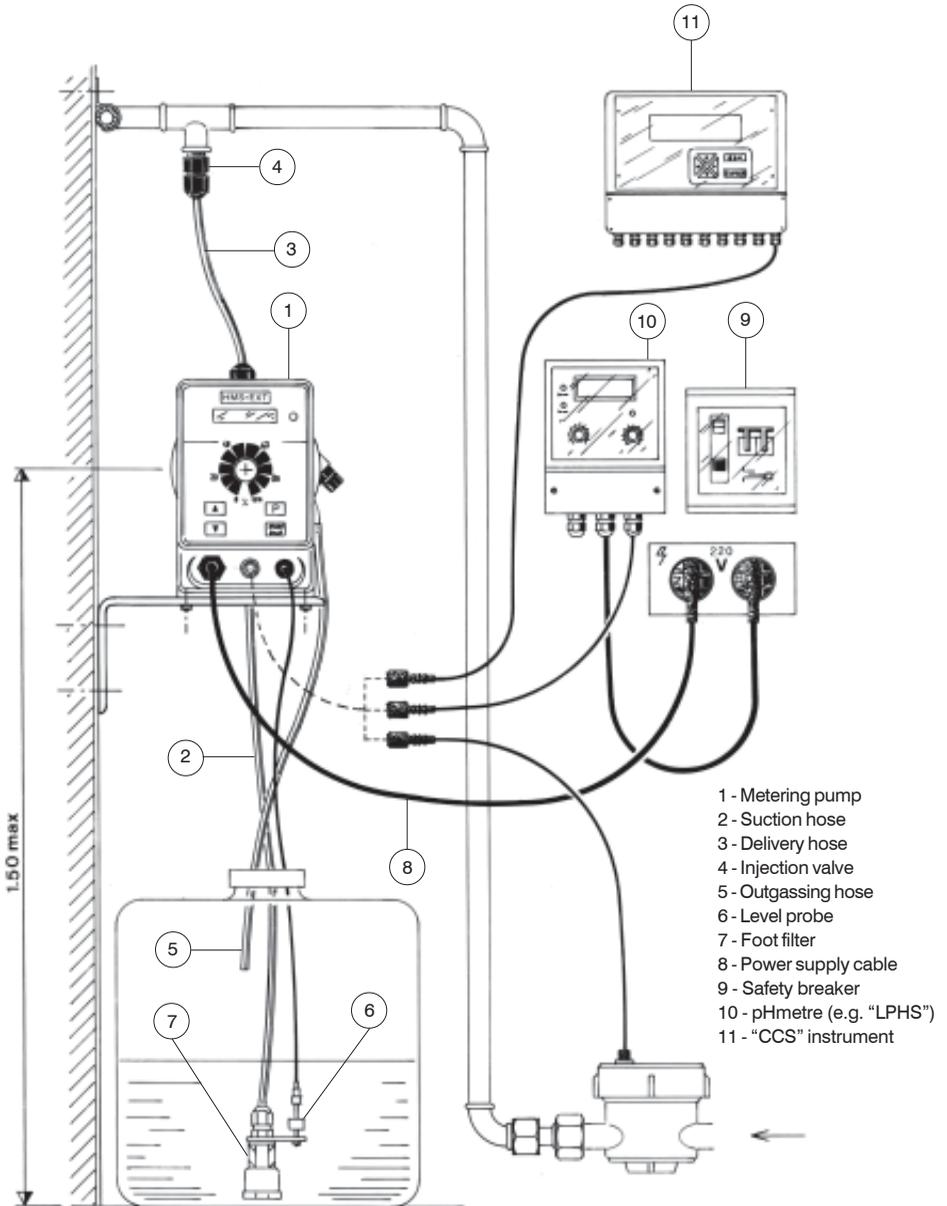
- 1 - Injection valve
- 2 - Sampler point
- 3 - Probe
- 4 - Probe holder
- 5 - Metering pump
- 6 - Level probe
- 7 - Foot filter
- 8 - Power supply cable
- 9 - Safety breaker
- 10 - Delivery hose
- 11 - Suction hose
- 12 - Outgassing hose
- 13 - "FIL" filter



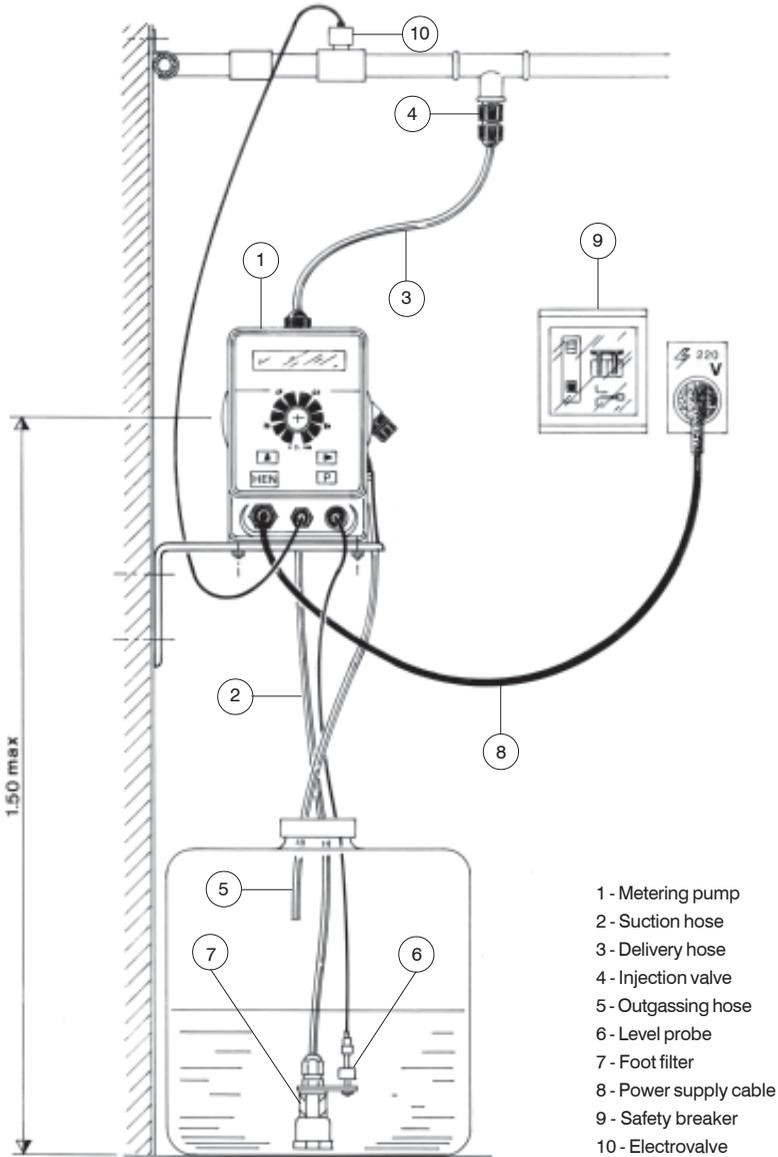
Installation draw for "HMS MAN" metering pumps



Installation draw for "HMS EXT" metering pumps



Installation draw for "HMS EN" metering pumps



ADDENDUM FOR THE PUMPS WITH MAX DOSING TIME ALARM

Set the max dosing time alarm from programming menu.

Supply the pump. Press “ENTER” for 4 seconds. Insert the password and press “ENTER”.

Select “SETUP” from programming menu and press “ENTER”.

Select “Alarm” using the cursor keys and press “ENTER”.

From “Alarm” menu it is possible to switch “on” the alarm by setting the time (from 1 minute to 100 minutes) or to switch “off” the alarm.

LEVEL ALARM CONNECTION

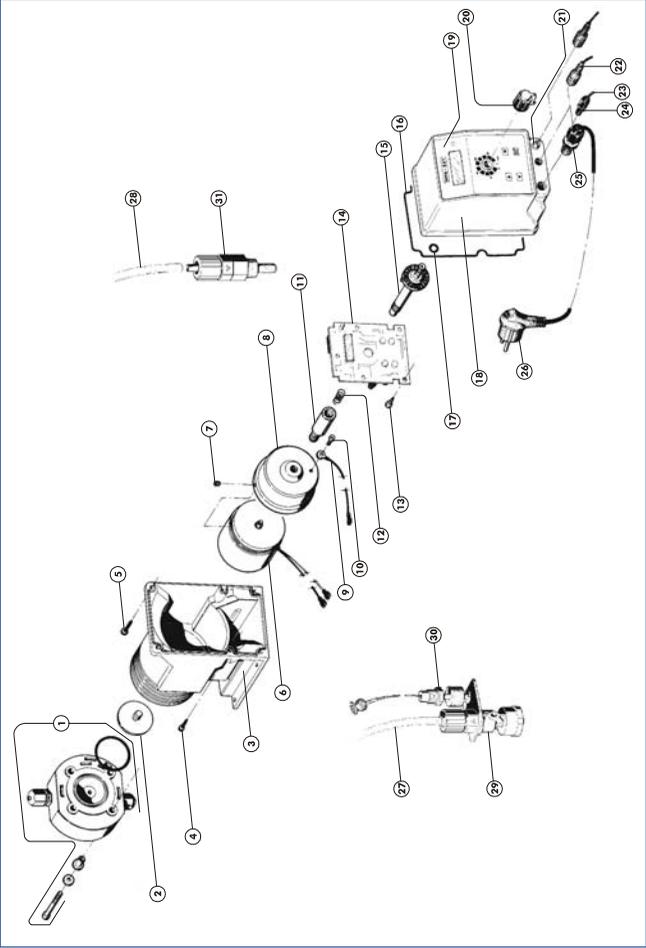
Connect alarm output cable as follow:

Yellow wire: normally closed

Brown wire: common

White wire: normally open

Green wire: do not use

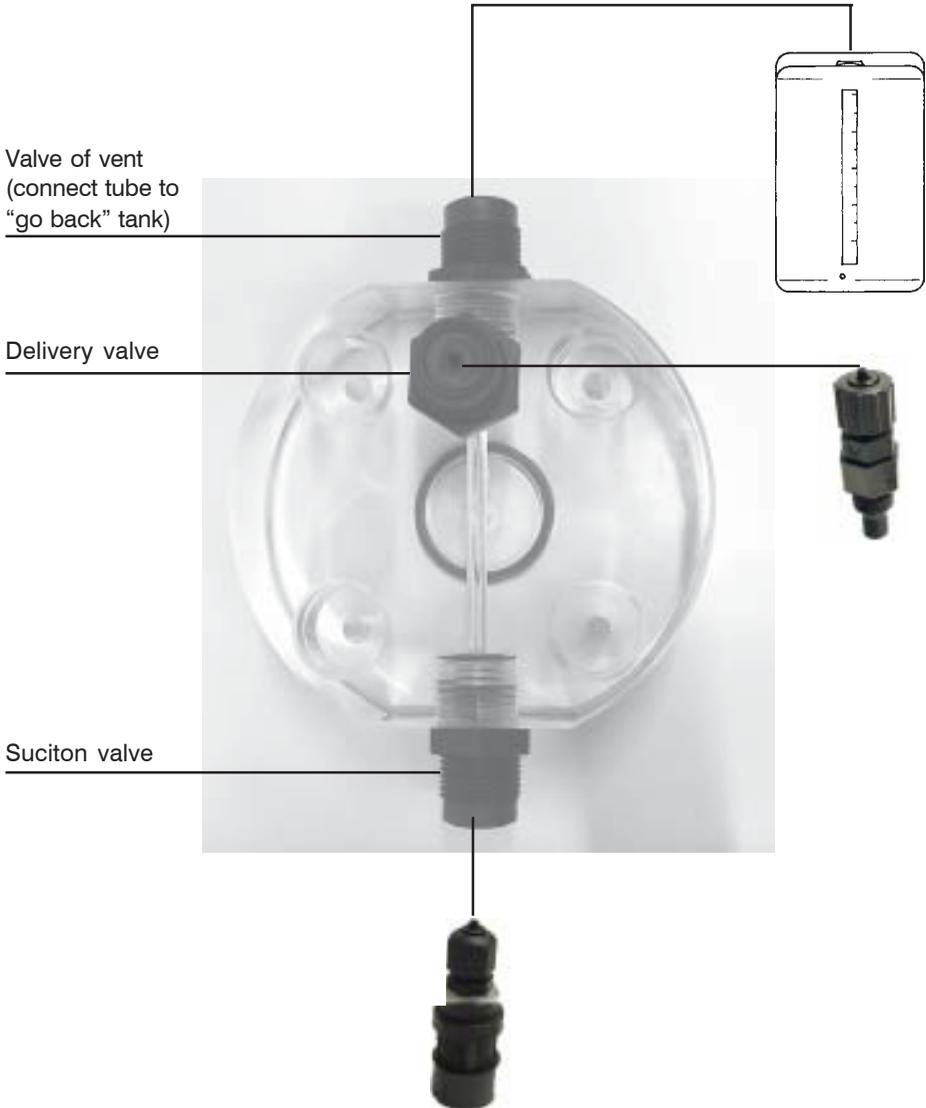


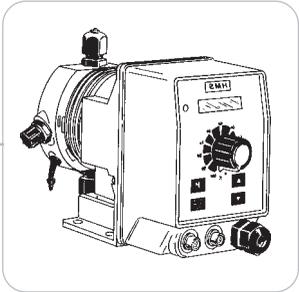
NOTICE: always specify the pump's label when ordering spare parts.

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.*