



*METERING PUMPS
INSTRUCTION MANUAL*



HD-PH
■
HD-RX
■
HD-PH/P



TECHNICAL ASSISTANCE AND SALES OFFICES



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0.0 FURTHER HINTS AND WARNINGS

Please read the warning notices given in this section very carefully, because they provide important information regarding safety in installation, use and maintenance of the pump.

- Keep this manual in a safe place, so that it will always be available for further consultation.
- After unpacking the pump, make sure it is completely sound. In case of doubt, do not use the pump and contact qualified personnel. The packing materials (especially bags made of plastics, polystyrene, etc.) should be kept out of the reach of children: they constitute potential sources of danger.
- Before you connect the pump, make sure that the voltage ratings, etc., correspond to your particular power supply. You will find these values on the rating plate attached to the pump.
- The pump should be used only for the purpose for which it has been expressly designed, namely the dosing of liquid additives. Any different use is to be considered improper and therefore dangerous. The makers cannot be held responsible for damage deriving from improper, erroneous or unreasonable use of the pump.
- Use of electrical equipment always implies observance of some basic rules: In particular:
 - 1 - do not touch the equipment with wet or damp hands or feet;
 - 2 - do not operate the pump with bare feet (Example: swimming pool equipment);
 - 3 - do not leave the equipment exposed to the action of the atmospheric agents;
 - 4 - do not allow the pump to be used without supervision by children or incompetent people;
- Before carrying out any maintenance or cleaning operation, disconnect the pump from the power supply by means of the circuit breaker.
- In case of breakdown or improper functioning of the pump, switch it off, but do not touch. Contact our technical assistance for any necessary repairs and insist on the use of original spares. Failure to respect this condition could render the pump unsafe for use.
- When you decide to make no further use of an installed pump, make sure to disconnect it from the power supply.
- The electrical installation to which the pump is connected must comply with the standards and good practice rule in force in the country under consideration.
- The pump complies with EEC directives No.89/336 regarding "electromagnetic compatibility" and No.73/23 regarding "low voltages", as also the subsequent modification No.93/68.
- Maximum environmental operating temperature: 40°C.

Before carrying out any service on the item, check:

1. Disconnect the pins from the mains or by means of a onnipolar switch with 3 mm minimum distance between the contacts. (item 6.0/b)
2. Relieve all the pressure from the pump head and injection tube.
3. Drain or flush all dosing liquid from the pump head. This operation can also be done with the pump disconnected from the plant by turning the pump upside-down for 15 to 30 seconds and without connecting the tubing to the nipples: if this operation is not possible, dismount and remount the pump head using the four mounting screws.

TOXIC AND/OR DANGEROUS LIQUID DOSAGE

To avoid risk from contact with the hazardous liquids or toxic fumes, always adhere to the notes in this instruction manual:

- Follow the instructions of the dosing liquid manufacturer.
- Check the hydraulic part of the pump and use it only if it is in perfect condition.
- Use only the correct materials for the tubing, valves and seals to suit the liquid to be dosed; where possible shield the tubing with PVC conduit.
- Before disconnecting the metering pump read notes 1, 2 and 3 contained in this leaflet; make sure to flush out and neutralise the pump head with the proper reagent liquid.

N.B. The pump has been constructed in accordance with best practice. Both its life and its electrical and mechanical reliability will be enhanced if it is correctly used and subjected to regular maintenance.

WARNING: Any intervention or repair in the interior of the pump must be carried out by qualified and authorized personnel. The makers decline all responsibility for the consequences of failure to respect this rule.

1.0 PRESENTATION OF THE PUMP

This type of metering pump, complete with measuring instrument, intervenes by measuring the pH or Rx value prevailing in the plant and then keeps dosing additive until the pH or Rx value set by the operator is effectively attained. More particularly, the HD-RX and HD-PH pumps utilize an ON/OFF system to stop the dosing as soon as the reading on the display coincides with the set point, while the HD-PH/P performs an intervention of the logarithmic proportional type and keeps dosing at the maximum injection rate until the measured pH value comes to lie within two units of the set point. At this stage the pump gradually reduces the injection rate and eventually comes to a complete standstill as soon as the set point is reached.

The pH and Rx measurements are potential difference measurements that can be affected by such factors as temperature, the pressure existing at the point of insertion of the measuring probe, and the efficiency of the electrical insulation of the plant.

1.1 DESCRIPTION

The HD/-PH/RX and HD-PH/P pumps are available in a standard version consisting of a die-cast aluminium case protected with acid-resisting epoxy paint. Upon request these pumps are can also be supplied in a teflonated case. Rearward protection is assured by means of an ABS plastic panel complete with gasket, while the control panel in anodized aluminium is protected by a transparent polycarbonate cover, again complete with gasket. The pumps incorporate a transformer to feed the electronic circuit and the 48 V electromagnet that protect the equipment against possible supply disturbances. The available pumping capacities are set out in Chapter 2.0 "PRINCIPAL TECHNICAL DATA" and, more precisely, Section 2.2 "Technical data table".

2.0 PRINCIPAL TECHNICAL DATA

STANDARD POWER SUPPLY:

230 V AC, 50-60 HZ SINGLE PHASE

ALTERNATIVE POWER SUPPLY (ON REQUEST):

240 V AC, 120 V AC, 24 V AC, 50-60 HZ SINGLE PHASE (ONLY PH/RX)

MEASURING RANGE:

pH 0-14; Rx -1400 to + 1400

SET POINT (RX):

0 ÷ 1000 mV

TYPE OF ACTION:

ON/OFF (HD-PH/RX); PROPORTIONAL (HD-PH/P)

ON REQUEST:

- **OUTPUT CURRENT 4-20 MA**
- **MANUAL STROKE ADJUSTMENT.** This combined control provides accurate flow adjustment. This system is designed with a self lock devise to ensure accuracy with assured repeatability (PVC pump head).

COMPLETE WITH:

- No.1 flexible PVC suction hose, transparent crystal type, length 2 m;
- No.1 semirigid polyethylene hose, white, length 2 m;
- No.1 injection valve;
- No.1 bottom filter;
- No.1 insulating screwdriver for calibration operations;
- No.1 set of instructions.

The leading dimensions of the HD-RX/PH and HD-PH/P pumps are shown in Figure 1. The diagrams of Figure 2, on the other hand, show how the maximum discharge of the metering pumps varies with the pressure in the plant to be controlled. These diagrams also allow for the loss of head due to the injection valve pressure (I.V.P.). Due to particular production conditions, the discharge at maximum load of our equipment may vary by 10% (ten percent), but the repeatability remains constant in each case.

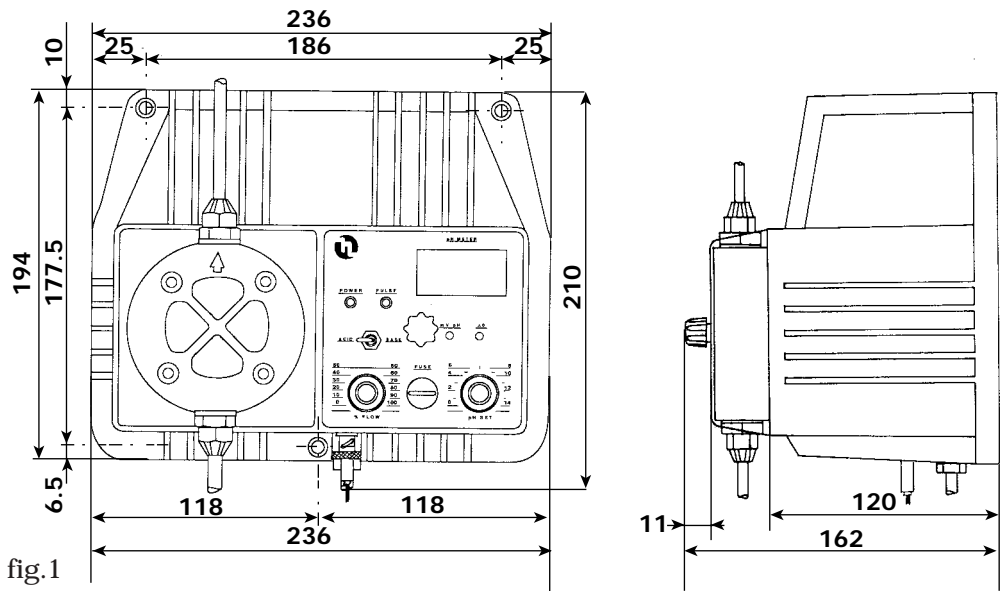


fig.1

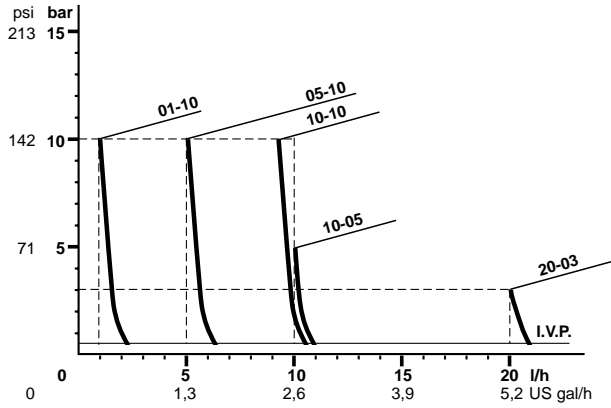


fig.2

GUARANTEE: one year (but exclusive of such normal wearing parts as valves, connectors, hoses, hose clamps, filters and injection valves). Improper use of the equipment terminates the warranty, which is to be understood ex works or authorized distributor.

2.1 MATERIALS IN CONTACT WITH THE ADDITIVE

- **DIAPHRAGM:** PTFE
- **PUMP HEAD:** Polypropylene, **upon request:** PVC, 316 Stainless Steel, PTFE. Stroke Adjustment: PVC pump head
- **NIPPLES:** polypropylene
- **FILTER:** polypropylene
- **INJECTION NIPPLE:** polypropylene
- **SUCTION HOSE:** PVC - flexible
- **DISCHARGE HOSE:** polyethylene
- **VALVES:** “lip” type Viton® upon request available in EPDM (Dutral®), NBR, Silycon.
- **“BALL CHECK” Valves** upon request type in SS 316 and Glass PYREX. Available with Spring Return and **“KALRETZ” Valves.**
- **SEALS:** viton upon request EPDM (Dutral®), NBR, Silycon, PTFE only for ball checks valves

2.2 TECHNICAL DATA CHART

model	type	max flow	max press	Max Freq. imp/min	ml or cc x imp.	suction height	electrom. coil resist.	std power supply	power consum.	current consum.
		l/h	bar			m	Ohm	Volt Hz	Watt	Amp
HD-PH	01-10	1	10	100	0.16	1.5	10.5	230 50-60	70	0.45
	05-10	5	10	110	0.75	2	10.5	230 50-60	73	0.47
HD-RX	10-05	10	05	120	1.4	2	10.5	230 50-60	80	0.50
	10-10	10	10	150	1.1	2	10.5	230 50-60	95	0.57
HD-PH/P	20-03	20	03	170	1.4	2	8	230 50-60	150	0.80

* In the case of pumps bearing the CSA mark, the models of type 10-10 and 20-03 become, respectively, 08-08 and 18-02.

3.0 PROPER USE OF THE PUMP

The pump is intended to be used solely and exclusively for dosing (batching) clean liquid substances. The pump should not therefore be used for applications that were not allowed for in its design. In case of doubt, please contact our offices for further information about the characteristics of the pump and its proper use.

4.0 RISKS

A risk could derive from possible losses in the hydraulic system of the pump (breakage of the "O" ring gasket, the valves or the hoses). In the event of such failures the pump should immediately be brought to a stop, emptying and depressurizing the delivery hose while taking all due safety precautions (gloves, goggles, overalls, etc.). More particularly, injury to people or damage to objects due to contact with noxious liquids or the inhalation of toxic vapours should be avoided by not only rigorously following the instructions given in the present booklet, but also

observing the following more general norms:

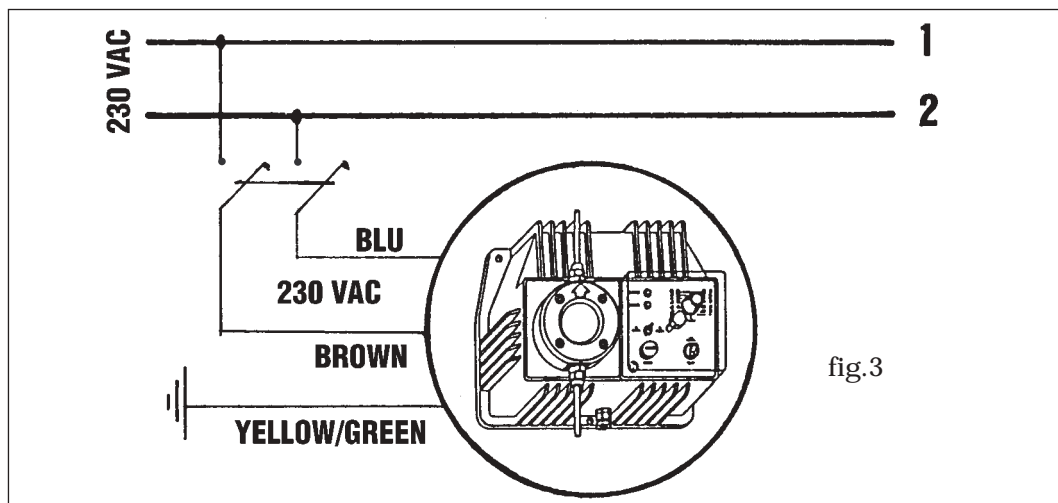
- Always operate in accordance with the recommendations of the liquid that is being used.
- Check that the hydraulic parts of the pump have not been damaged and are devoid of leaks; use the pump only if it is in really perfect conditions.
- Use hoses suitable for the liquid to be injected and the effective operating conditions of the plant, possibly inserting them in protective PVC sheaths.
- Before bringing the pump to a standstill, it is good practice to neutralize the hydraulic parts by flushing them with an appropriate reagent (see Chapter 10.0 "MAINTENANCE").

5.0 SHIFTING AND TRANSPORTING THE PUMP

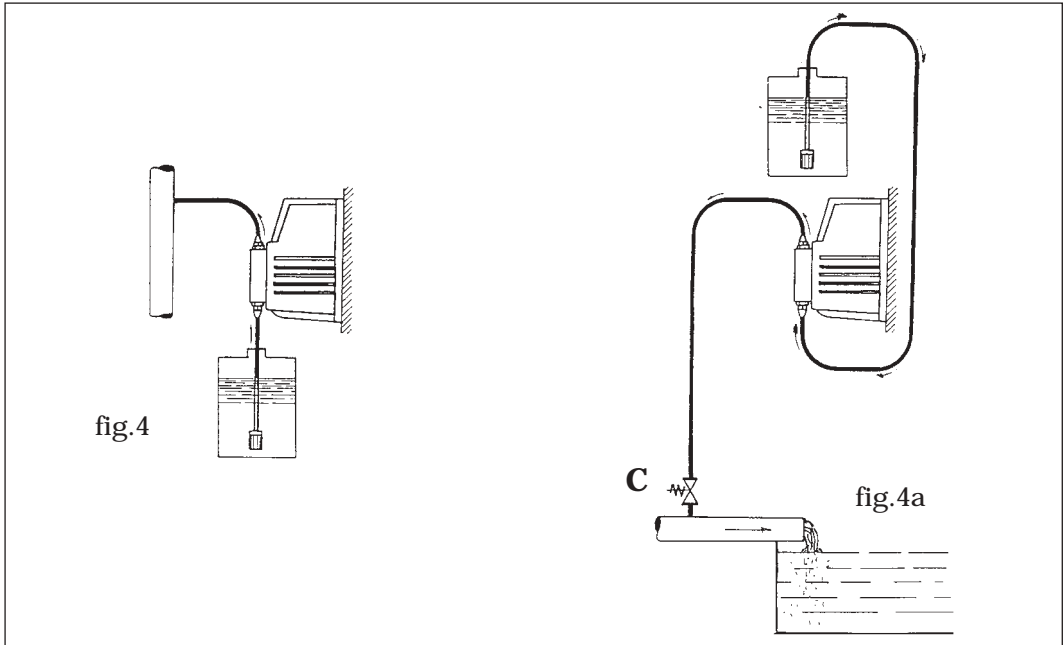
The pump should always be moved in a vertical (and never in a horizontal) position. No matter what the means of transport employed, delivery of the pump, even when free to the purchaser's or the addressee's domicile, is always at the purchaser's risk. Claims for any missing materials must be made within 10 (ten) days of arrival, while claims for defective materials will be entertained up to the 30th (thirtieth) day following receipt. Return of pumps or other materials to us or the authorized distributor must be agreed beforehand with the responsible personnel.

6.0 INSTALLING THE PUMP

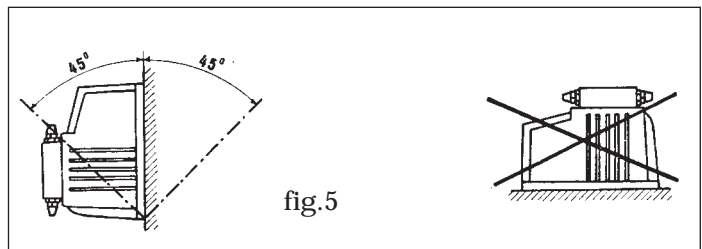
- Install the pump in a dry place and well away from sources of heat and, in any case, at environmental temperatures not exceeding 40°C. The minimum operating temperature depends on the liquid to be batched, bearing in mind that it must always remain in a liquid state.
- Carefully observe the regulations in force in the various countries as regards electrical installations (figure 3). **When the supply cable is devoid of a plug, the equipment should be connected to the supply mains by means of a single-pole circuit breaker having a minimum distance of 3 mm between the contacts. Before accessing any of the electrical parts, make sure that all the supply circuits are open.**



- c. Locate the pump as shown in Figure 4 bearing in mind that it may be installed either below or above the level of the liquid to be dosed, though the level difference should not exceed 2 metres. When the plant in which the pump is installed is operating at atmospheric pressure (additive freely discharged) and the additive tank is situated above the plant fig. 4a), the condition of the injection valve should be checked at regular intervals, because excessive wear and tear could cause additive to drip into the plant even when the pump is shut down. If the problem persists, install a properly calibrate counter-pressure valve (C) between injection point and the valve. In the case of liquids that give rise to aggressive vapours, do not install the pump above the storage tank unless the latter is hermetically sealed.

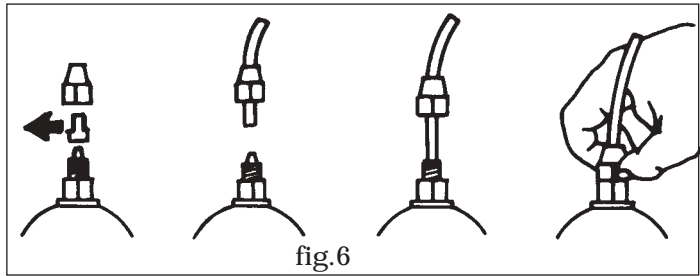


- d. Install the pump in position that does not deviate from the vertical by more than 45° (Figure 5), fixing it either to a wall or some other vertical support with the help of screws passing through the 4.5 mm dia. holes provided along the outer rim of the pump body.

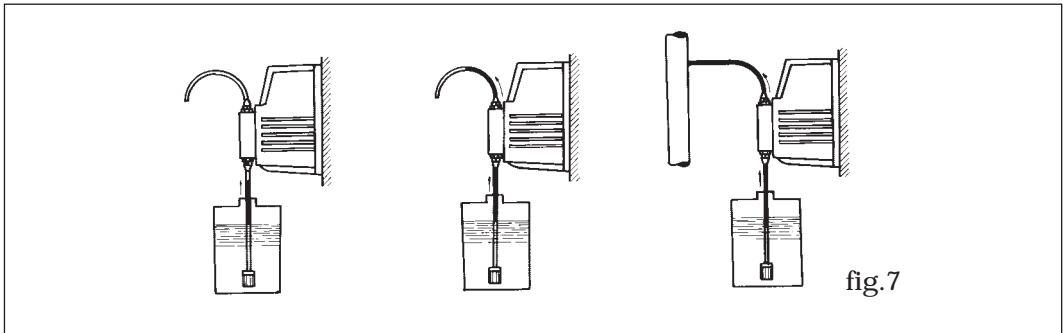


- e. The delivery connector, starting point of the hose that discharges the additive into the plant, will always remain in the upper part of the pump. The suction connector, which serves to attach the hose (with filter) leading into the liquid storage tank, will therefore always be situated in the lower part of the pump.
- f. Remove the protection caps from the two connectors, slide the hoses over the connectors, pushing them right home, and then fix them with appropriate clips

(Figure 6). Whenever the pump is dismantled from the plant, you will be well advised to replace the caps on the connectors to avoid residual liquid being spilled. Before attaching the delivery hose to the plant, prime the metering pump by going through the sequence shown in Figure 7. Before finalizing the installation of the delivery hose, make sure that the pump strokes will not cause it to move and bump into rigid bodies. In case of priming difficulties, use a normal syringe to suck liquid from the delivery connector while the pump is in operation, continuing until you actually see the liquid rise in the syringe. Use a short length of suction hose to connect the syringe to the delivery connector. In case of a pump equipped with an run-off valve, follow the specific instructions.



Before finalizing the installation of the delivery hose, make sure that the pump strokes will not cause it to move and bump into rigid bodies. In case of priming difficulties, use a normal syringe to suck liquid from the delivery connector while the pump is in operation, continuing until you actually see the liquid rise in the syringe. Use a short length of suction hose to connect the syringe to the delivery connector. In case of a pump equipped with an run-off valve, follow the specific instructions.



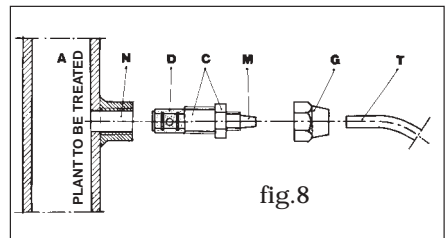
- g. Try to keep both the suction and the delivery hose as straight as possible, avoiding all unnecessary bends.
- h. Select the most appropriate injection point on a pipe of the plant to be treated and there fit a 3/8" female steel gas connector. This connector is not comprised in the supply. Screw the injection valve to the gas connector, inserting a gasket as shown in Figure 8. Then connect the delivery hose to the conical connector on the injection valve and fix it with the supplied clamp G. The injection valve als acts as a non-return valve.

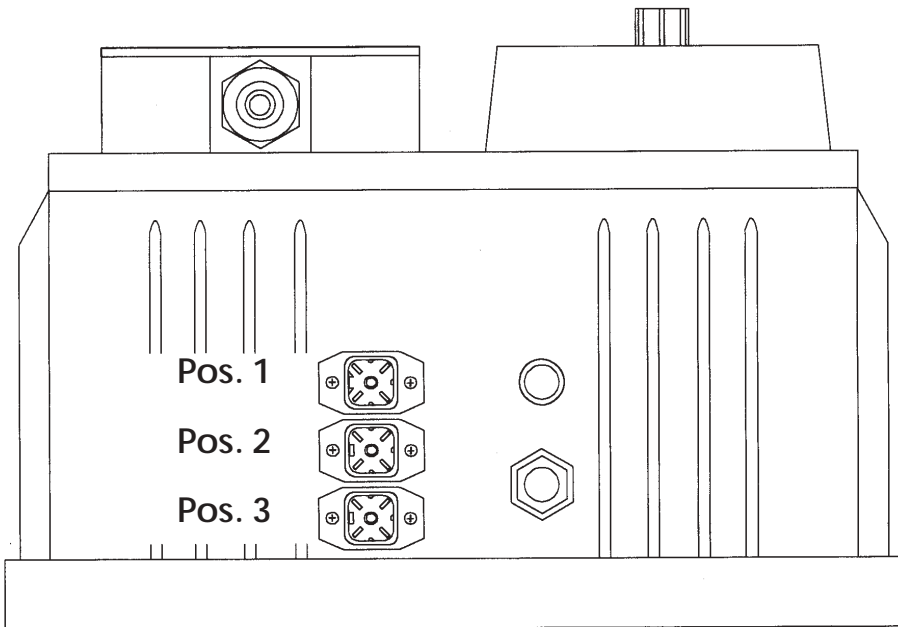
N.B. The gasket ring D must not be removed.


**INJECTION VALVE INSTALLATION
DIAGRAM FIGURE 8**

A - Plant into which the injection is to be made
C - Injection valve
M - Conical connector for attaching the delivery hose

N - 3/8" female steel gas connector
G - Hose attachment clamp
T - Polyethylene hose
D - Gasket ring





Female service connector wire assembly	Functions and technicals information
	<p>Relay service output connection</p> <p>Configuration :</p> <p>Pin 1 = Normally open “ 2 = Normally closed “ 3 = Common “ 4 = No connection</p> 
	<p>Level probe connection</p> <p>Configuration :</p> <p>Pin 1 = No connection “ 2 = No connection “ 3 = Level probe wire “ 4 = Level probe wire</p>
	<p>Output mA signal connection</p> <p>Configuration :</p> <p>Pin 1 = No connection “ 2 = No connection “ 3 = (+) mA signal wire “ 4 = (-) mA signal wire</p>

7.0 ASSEMBLING AND DISMANTLING THE PUMP

7.1 ASSEMBLY

All our metering pumps are normally supplied in fully assembled trim. For greater clarity, please consult the exploded view of the pump appended at the end of the manual, which shows all the pump details and the nomenclature used therefor, thus providing a complete overview of all the pump components. These drawings are in any case quite indispensable whenever defective parts have to be re-ordered. For the same purpose, the appendix also contains other drawings showing the hydraulic parts (pump head and valves).

7.2 DISMANTLEMENT

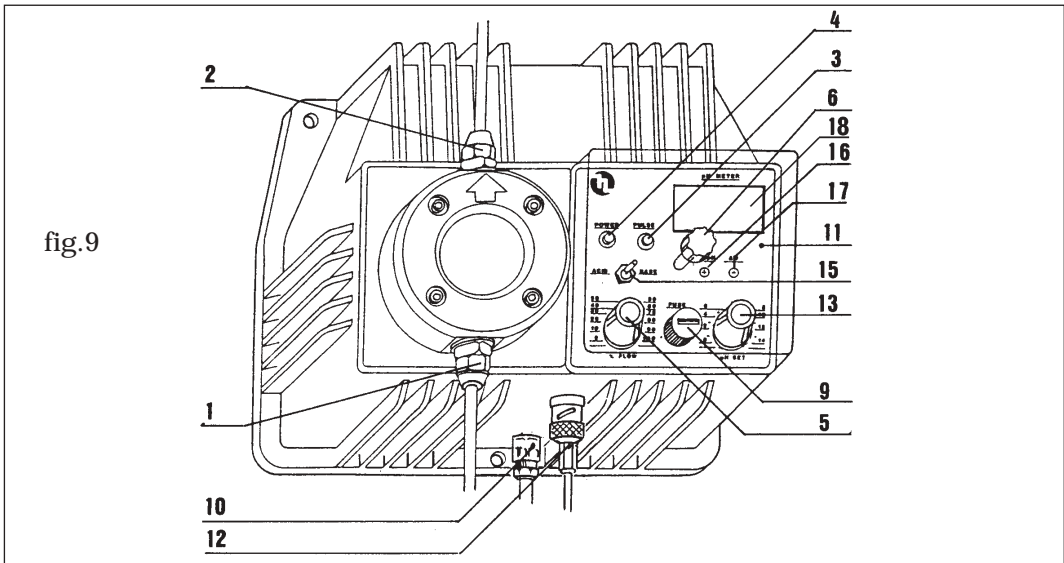
Proceed as follows before you dismantle the pump or perform any other operation on it:

- a. Make sure that the pump has been completely disconnected from the power supply (both polarities).*
- b. Paying careful attention, release any pressure that may have been maintained in either the delivery hose or the pump body.*
- c. Remove all the liquid still contained in the pump by keeping the pump stroking for 15-30 seconds while in an upside down position (if it has been removed from the plant). If this is not possible, remove and then refit the pump body with the help of the four fixing screws. This operation calls for special attention, and you should therefore consult the drawings in Appendix and Chapter **4.0 “Risks”** before you commence the work.*

8.0 COMMISSIONING THE PUMP AND CALIBRATION

8.1 HD-PH (COMMISSIONING THE PUMP)

- | | |
|--|---------------------------------------|
| 1 Suction hose connector nipple | 11 Control panel |
| 2 Delivery hose connector nipple | 12 Electrode cable connector |
| 3 Stroke Led (red) | 13 Set-point selector "pH set" |
| 4 Power Led (green) | 15 Acid/Alk switch |
| 5 Injection frequency regulation knob
"pH/mV" | 16 Calibration trimmer |
| 6 Front cover fixing screw | 17 Calibration trimmer " $\Delta 0$ " |
| 9 Fuse | 18 Display |
| 10 Supply cable | |



- Install the metering pump as described in Chapter 6.0 "PUMP INSTALLATION".
- Place the electrode in the electrode holder.
- Connect the electrode to the metering pump by means of the male BNC connector (12), rotating it through 90°C.
- Position the "pH set" knob (13) to the desired pH value, bearing in mind that the scale dimensions are such as to give rise to a possible discordance between the intervention point and the reading on the display (18). For example, if the "pH set" knob is set to pH 7 and one then notes that pump has not yet come into operation at pH 7.2, it would be desirable to carry out a check and, if necessary, correct the set point by adjusting the "pH set" knob.
- Use the "ACID/ALK" switch (15) to select the required type of intervention (acid or alkaline). Example: If the intervention point is set at pH 9 and an acidification is required, set the switch to ACID. The pump will then start dosing the additive every time the pH rises above 9. If it is desired to alkalize the system, set the switch to ALK, in which case the pump will come into operation every time the pH drops below 9.
- Use the FLOW knob (5) to set the number of injections per minute, reducing or increasing the pump discharge according to requirements. In this connection it

must not be forgotten that adequate time must be allowed for the additive to become uniformly distributed, otherwise the value read on the display will differ from the real system state.

All our pumps are tested at their maximum working pressure; consequently, if the plant is operating at a lower pressure, the maximum discharge of the pump will be greater than the specified value.

8.2 HD-PH (CALIBRATION)

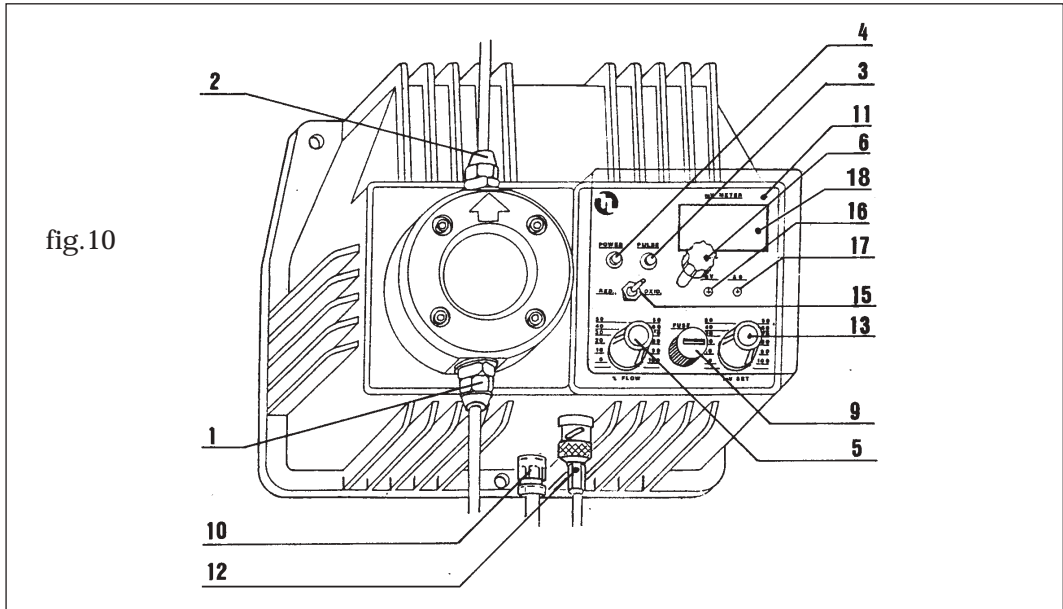
All the pH pumps are calibrated at the works, so that only small regulating adjustments are required on the occasion of installation. These are due for the most part to the type of electrode used and the working temperature prevailing in the plant, since especially the latter exerts a considerable influence on the pH value. We would in any case advise that the calibration curve be checked at least once a month, going through the routine described below.

When checking the curve, use two buffer solutions at pH 4 and pH 7 if you wish to work in the acid range or, alternately, pH 9 and pH 7 if you wish to work in the alkaline range.

- Dip the electrode into a pH 7 buffer solution for few seconds.
- Adjust “Δ0” (17) trimmer until display shows pH 7.00
- Dip the electrode into a pH 4 or pH 9 buffer solution for few seconds.
- Adjust “pH/mV” trimmer (16) until display shows pH value according to the used solution.

8.3 HD-RX (COMMISSIONING THE PUMP)

- | | |
|---------------------------------------|---------------------------------------|
| 1 Suction hose connector nipple | 11 Control panel |
| 2 Delivery hose connector nipple | 12 Electrode cable connector |
| 3 Stroke Led, red | 13 Set-point selector "mV set" |
| 4 Power Led, green | 15 Red/oxid switch |
| 5 Injection frequency regulation knob | 16 Calibration trimmer "/mV" |
| 6 Front cover fixing screw | 17 Calibration trimmer " $\Delta 0$ " |
| 9 Fuse | 18 Display |
| 10 Supply cable | |



- a. Install the metering pump as described in Chapter 6.0 "PUMP INSTALLATION".
- b. Place the electrode in the electrode holder.
- c. Connect the electrode to the metering pump by means of the male BNC connector (12), rotating it through 90°C.
- d. Position the "mV set" knob (13) to the desired Rx value, bearing in mind that the scale dimensions are such as to give rise to possible slight discordances between the intervention point and the reading on the display (18). For example, if the "mV set" knob is set to 700 mV and one then notes that pump has not yet come into operation 720 mV, it would be desirable to carry out a check and, if necessary, correct the set point by adjusting the "mV set" knob.
- e. Use the "RED/OXID" switch (15) to select the required type of intervention (reduction or oxidation). In this case the following must be taken into account, an oxidant product increase the value and a reductant product decreases the value. Example: If the intervention point is set at 700 mV and an oxidation is required, set the switch to OXID. The pump will then start dosing the additive every time the solution potential drops below 700 mV. If it is desired to perform a reducing action, set the switch to RED, in which case the pump will come into operation every time the solution potential rises above 700 mV. Bear in mind that Redox measurements are affected by pH variations; if this factor is subject to considerable oscillations, we would advise you either to supplement the HD-

RX pump with an HD-PH pump or to use an pH instrument together with the pump.

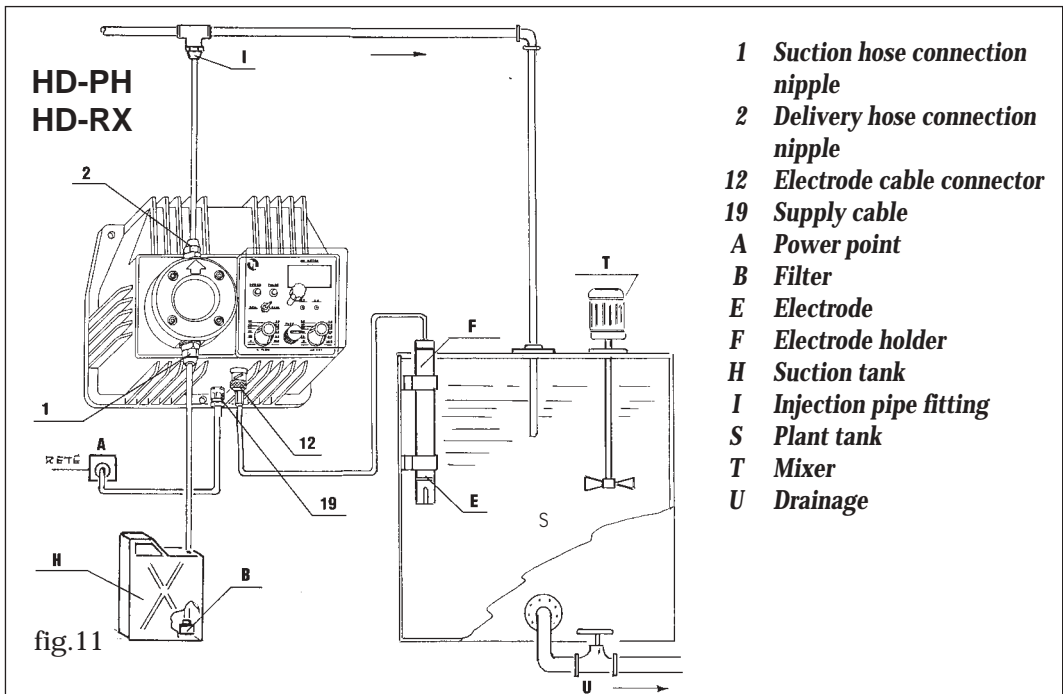
- f. Use the FLOW knob (5) to set the number of injections per minute, reducing or increasing the pump discharge according to requirements. In this connection it must not be forgotten that adequate time must be allowed for the additive to become uniformly distributed, otherwise the value read on the display will differ from the real system state.

All our pumps are tested at their maximum working pressure; consequently, if the plant is operating at a lower pressure, the maximum discharge of the pump will be greater than the specified value.

8.4 HD-RX (CALIBRATION)

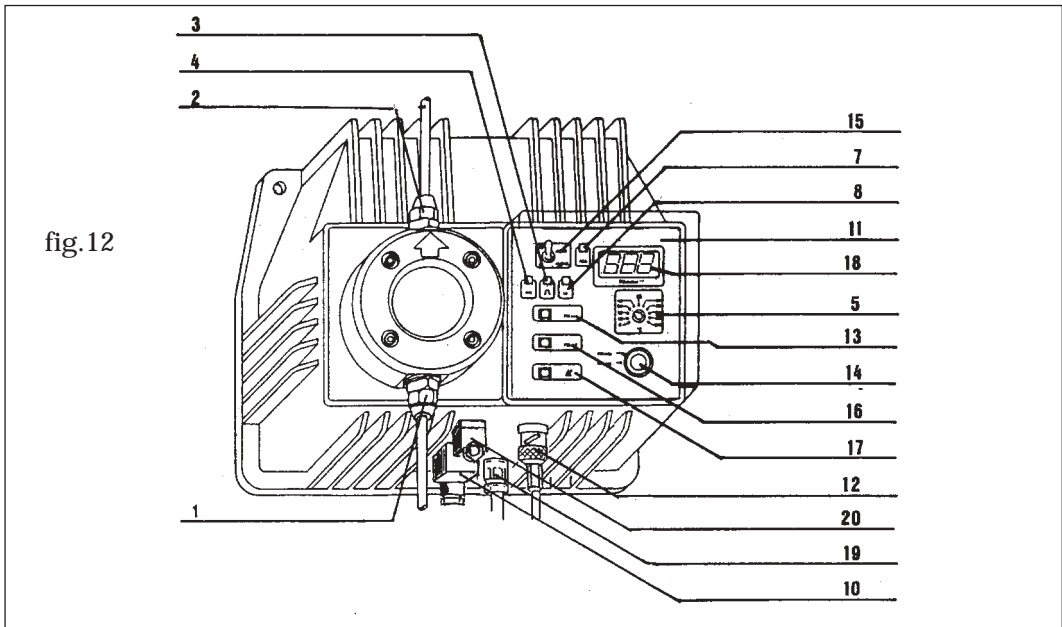
Disconnect the electrode from the pump and short-circuit the female BNC connector of the pump by the use of copper wire, then use the plastic screwdriver supplied as part of the kit to turn the potentiometer marked "Δ0" (17) until the display reading become 00; if a minus sign appears in front of the zeroes, continue rotating the potentiometer until it disappears. Then connect the electrode and immerse it in a buffer solution of well defined mV value, agitate the solution and after a few seconds rotate the potentiometer "mV" (16) until the correct mV value of the buffer solution is read on the display, bearing in mind that the first digit of the three-figure display is reserved for the sign (positive or negative); when a 300 mV buffer solution is used, for example, you will therefore read 30 on the display.

PLANT EXAMPLE



8.5 HD-PH/P (COMMISSIONING THE PUMP)

1	Suction hose connector nipple	14	Functions selector
2	Delivery hose connector nipple		"pH met" display the measured pH value
3	Stroke Led, red		"pH set" display set-point value
4	Power Led, green	15	Acid/Alk switch
5	Temperature compensation knob	16	Calibration trimmer "pH/mV"
7	Warning signaling Led, red	17	Calibration trimmer "Δ0"
8	Level signaling Led, yellow	18	Display
10	Level probe connector	19	Supply cable
11	Control panel	20	Auxiliary output connector
12	Electrode cable connector		
13	Set-point selector "pH set"		



- a. Install the metering pump as described in Chapter 6.0 "PUMP INSTALLATION".
- b. Place the electrode in the electrode holder.
- c. Connect the electrode to the metering pump by means of the male BNC connector (12), rotating it through 90°C.
- d. Position the "FUNCTION SELECTOR" (14) at pH set and then use the screwdriver supplied as part of the kit to adjust the "pH set" trimmer to the desired pH value.
- e. Position the function selector (14) at "pH met". Use the "ACID/ALK" switch (15) to select the required type of intervention (acid or alkaline). Example: If the intervention point is set at pH 9 and an acidification is required, set the switch to ACID. The pump will then start dosing the additive every time the pH rises above 9. If it is desired to alkalinize the system, set the switch to ALK, in which case the pump will come into operation every time the pH drops below 9.
- f. Since the temperature of the liquid exerts an influence on the measured pH value, set the "temperature compensation trimmer" (5) to the temperature existing in the system to obtain an automatic correction of the pH value ascertained

by the probe.

- g.** The function "ALL" (7) is an alarm that comes into operation whenever the measured pH value differs by more than two units from the set value. The alarm is accompanied by the lighting up of the red LED and the closure of an NO/NC (Normally Open / Normally Closed) contact on the output side, which can be used to control external equipment. In this situation the pump will operate at the maximum rate.

This metering pump is predisposed for LEVEL CONTROL. To this end it is sufficient to connect the level probe (not included in the supply) to the pump by means of the connector 10. Level control is an option that will bring the metering pump to a halt whenever the level of the additive in the storage tank attains a minimum set by the operator.

8.6 HD-PH/P (CALIBRATION)

All the HD-PH/P pumps are calibrated at the works at a temperature of 20°C, so that only small regulating adjustments are required on the occasion of installation. These are due for the most part to the type of electrode used and the working temperature prevailing in the plant, since especially the latter exerts a considerable influence on the pH value. The temperature error can readily be compensated by operating on the "temperature compensation trimmer" (5).

The regulators that render calibration possible are located on the front panel. These operations become necessary at regular intervals because the electrodes not only tend to change their physico-chemical composition in the course of time, but will also modify their measuring efficacy.

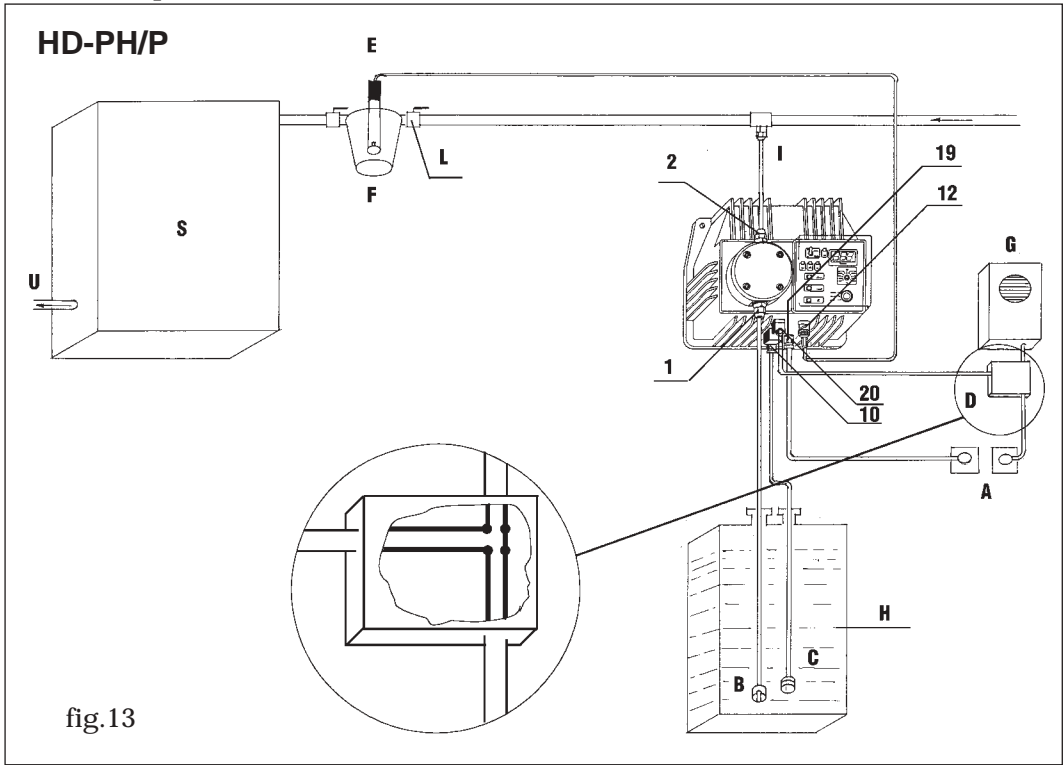
When checking the curve, use two buffer solutions at pH 4 and pH 7 if you wish to work in the acid range or, alternately, pH 9 and pH 7 if you wish to work in the alkaline range.

We would therefore advise that the calibration curve be checked at least once a month, going through the routine described below.

When checking the curve, use two buffer solutions at pH 4 and pH 7 if you wish to work in the acid range or, alternately, pH 9 and pH 7 if you wish to work in the alkaline range.

- Adjust temperature manual compensation trimmer "°C" (5) according installation temperature.
- Dip the electrode into a pH 7 buffer solution for few seconds.
- Adjust "Δ0" (17) trimmer until display shows pH 7.00.
- Dip the electrode into a pH 4 or pH 9 buffer solution for few seconds.
- Adjust "pH/mV" trimmer (16) until display shows pH value according to the used solution.

Plant example



- 1 Suction hose connection nipple**
- 2 Delivery hose connection nipple**
- 10 Level probe connector**
- 12 Electrode cable connector**
- 19 Supply cable**
- 20 Auxiliary output connector
(see 8.3 par. g)**
- A Power point**
- B Filter**
- C Level probe**
- D Auxiliary output electric wiring
box**

- E Electrode**
- F Electrode holder**
- G Warning alarm
(optical/sounding)**
- H Suction tank**
- I Injection pipe fitting**
- L Shutoff valve**
- S Plant tank**
- T Mixer**
- U Drainage**

9.0 ELECTRODES

9.1 ELECTRODE HOLDERS

Three different types of electrode holders are available: monotubular for immersion, electrode cell, and for direct insertion in piping. It is essential to bear in mind that the distance between the injection point and the electrode must never be less than one metre. When this is not possible, an appropriate mixer must be inserted between the injection point and the electrode.

9.2 ELECTRODE CLEANING AND MAINTENANCE

When the electrode is not used for a lengthy period of time, it is important to preserve it immersed in a 3 M potassium chloride (KCl) solution. The formation of deposits on the electrode will produce erroneous readings. The necessary cleaning action depends on the type of deposit under consideration. In the case of thin deposits, shake the electrode in the manner of a thermometer or use a spray of distilled water. Organic residues or particularly resistant deposits should be removed by chemical means. Mechanical cleaning of the bulb should be resorted to only in extreme cases, but bear in mind that abrasion can lead to irreparable damage. If cleaning does not fully re-establish the efficacy of the electrode, it may be that the electrode has aged. Ageing will show itself in the form of either a measurement error or a slow response. Ageing can be ascertained by thoroughly cleaning the electrode and then measuring a solution of known pH: if the error exceeds 10% (ten percent), reconditioning will have to be resorted to. If even this fails to re-establish correct electrode performance, there is no alternative to replacement.

9.3 RECONDITIONING

- Immerse the tip of the electrode in 0.1N hydrochloric acid (HCl) for 15 seconds, then rinse with water and reimmerse the electrode in a 0.1 N solution of sodium hydroxide (NaOH) for 15 seconds, followed by a second rinsing. Repeat this sequence three times, and then carry out another check measurement. If the check measurement still produces unacceptable measurements, it only remains to change the electrode.

10.0 MAINTENANCE

- a. Make periodic checks of the level in the tank containing the additive to avoid the possibility of the pump running empty. Although this will not damage the pump, level checks are strongly advised to avoid possible damage deriving from lack of additive in the system.
- b. Check the proper functioning of the pump at least once every six months, making sure that all screws and gaskets remain tight. Increase the frequency of these checks when the pump is used to dose particularly aggressive liquids.
- c. We would also advise periodic cleaning of the hydraulic parts (valves and filter).

Subject to these general precautions, we would suggest the following maintenance procedure when the pump is working with sodium hypochlorite (as is often the case):

- a. Stop the pump and detach the delivery hose from the plant.
- b. Detach the suction hose with the filter from the storage tank and immerse it in

clean water.

- c. Feed the metering pump and keep it working for five to ten minutes.
- d. Stop the pump, immerse the filter in dilute solution of hydrochloric acid and wait for the acid to terminate its cleaning action.
- e. Feed hydrochloric acid to the pump and keep it working for a further five minutes, realizing a closed circuit with both the suction and the delivery hose connected to the same tank.
- f. Repeat the last operation with clean water.
- g. Reconnect the metering pump to the plant.

11.0 REPAIRS AND BREAKDOWN INTERVENTIONS. TROUBLE-SHOOTING.

Make sure that the pump is completely disconnected from the power supply before undertaking any kind of repair, disconnect the pins from the mains or by means of a onnipolar switch 3 mm minimum distance between the contacts. (itel 6.0/b) Given the robust nature of the pump, mechanical breakdowns in the true sense of the term are extremely unlikely. At times there may be liquid losses, general due to the slackening of a hose clamp or, more simply, a leaking hose, especially on the discharge side. More rarely, such losses may be due to membrane failure or wear and tear of the sealing gasket of the membrane. When this is the case, the defective parts have to be replaced after removing the four screws of the pump body; when replacing these screws, make sure they are tightened in a uniform manner. Once the leak has been eliminated, the pump should be thoroughly cleaned to remove all traces of the additive liquid; if this is not done, the stagnant additive residues could exert an aggressive action on the pump case.

The pump performs its strokes but does not discharge additive into the system:

- a. Dismantle both the suction and the discharge valve, clean them and then reassemble them in their original positions. If the valves are found to be swollen, make sure that the additive is chemically compatible with the type of valve fitted in the pump (standard: viton valves).
- b. Check the filter and make sure it is not clogged.

The pump does not start:

- a. Check the connections to the power supply.
- b. Check that the fuses are intact (only if external).

The pump does not measure correctly:

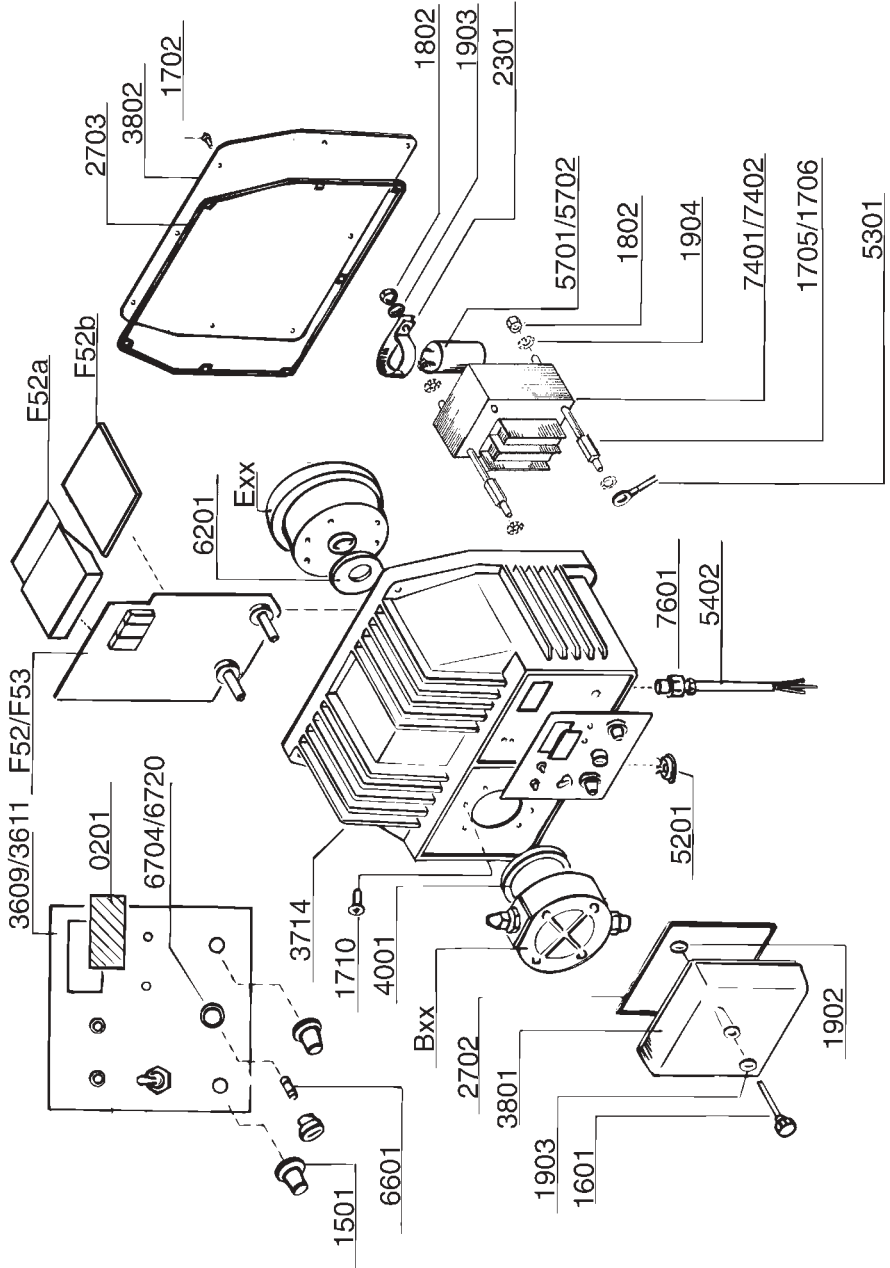
- a. Check the calibration of the instrument.
- b. Check the efficacy of the electrode.

The pump fails to dose:

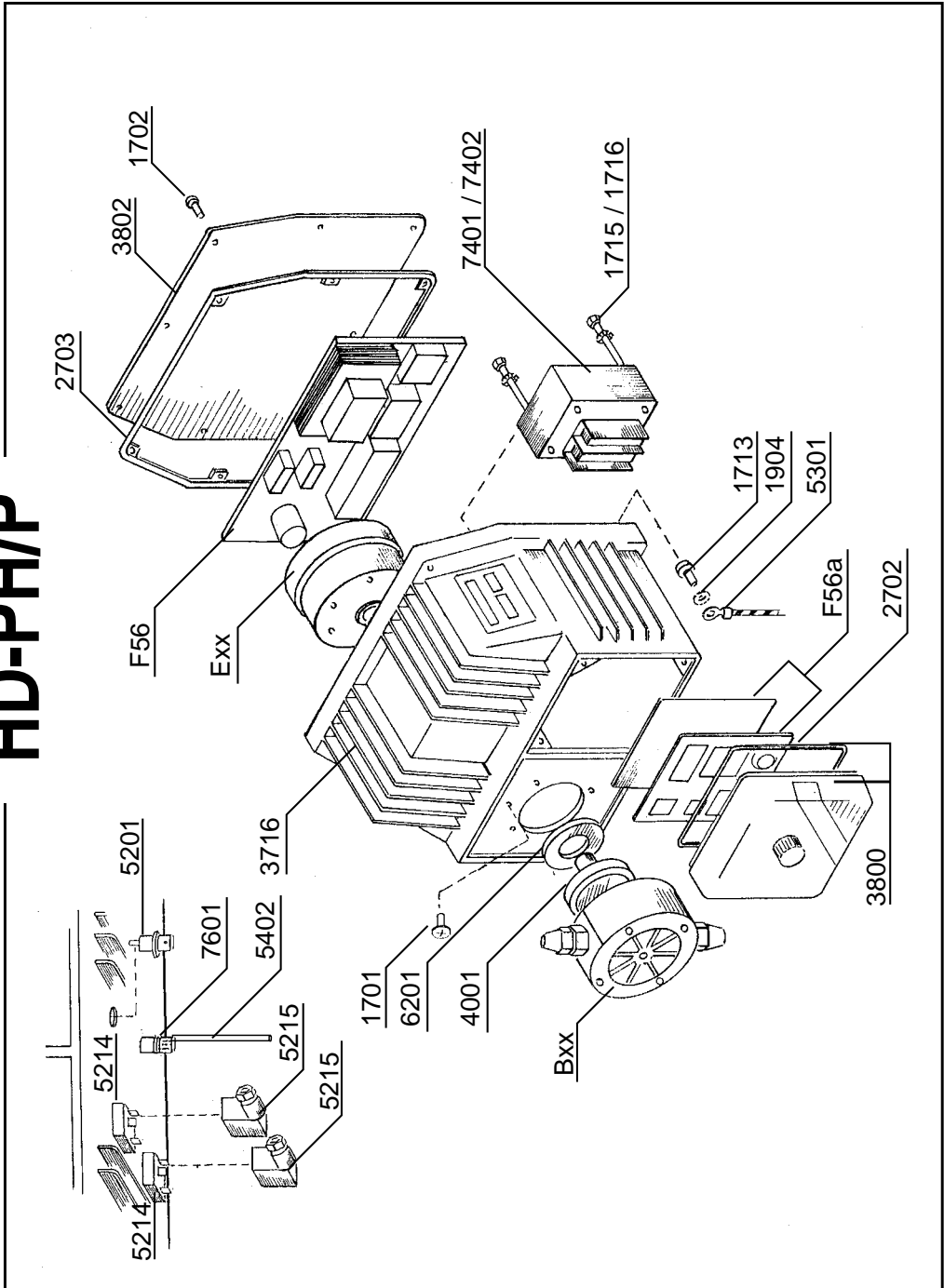
- a. Make sure the "set point" has been correctly set.
- b. Make sure that the "ACID/ALK" or "RED/OXID" switch is in the right position, i.e. that it concurs with the required dosing.

N.B. When removing the pump from the plant, use great care in detaching the delivery hose from the connector nipple, because it could well contain some residual additive.

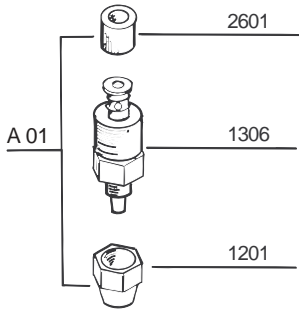
HD-PH/RX



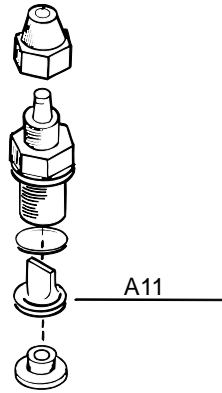
HD-PH/P



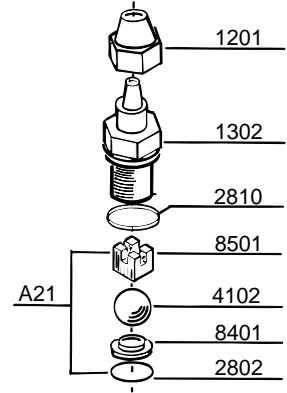
STD. INJECTION VALVE up to 20/h



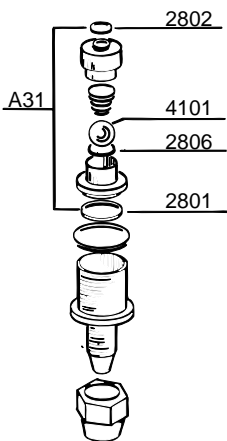
20/h LIP VALVE



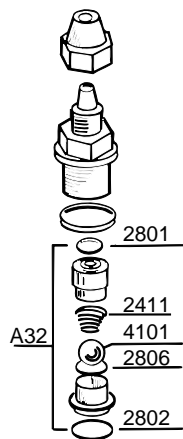
GRAVITY BALL VALVE



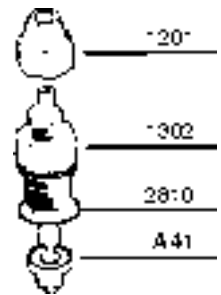
SUCTION BALL VALVE



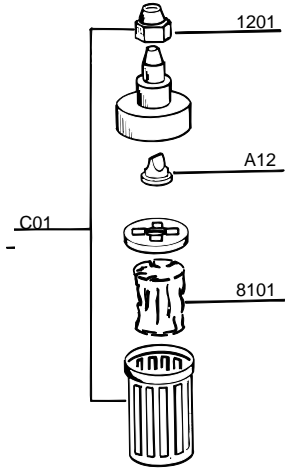
DISCHARGE BALL VALVE



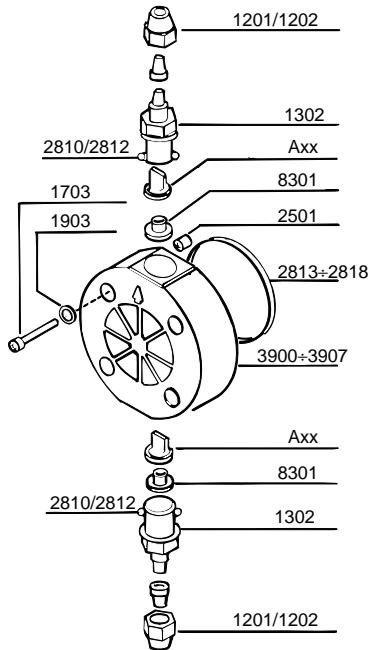
K VALVE



STD. FILTER up to 20l/h



ASSEMBLED PUMP HEAD



COMPLETE ELECTROMAGNET

