COMPACT S

FERTIGATION CONTROLLER

SAFETY RULES

To avoid personal or enviromental damages and to guarantee a proper operation of the equipment, the staff in charge of the installation, set up and maintenance of the equipment must follow the instructions of this manual, specially those recommendations and warnings explicitly detailed. In addition, specific instructions for the chemical products to be dosed should be followed.

INDEX

1.-GENERAL DESCRIPTION

COMPACT S allows to control the injection of a head of a dosing pump through a Servomotor

Injection control through PROPORCIONALITY

Control of the injection of a one head dosing pump through a Servomotor, in order to keep a previously established proportion between the water flow and the injection flow.

Constant visualization of the instant FLOW (m3/h , GPM) of the iirigation network, PH y CONDUCTIVITY (mS).

FLOW, CONDUCTIVITY and PH alarms.

Injection control through CONDUCTIVITY

Control of the injection of the fertilizer head of a one head dosing pump through a Servomotor, in order to fit a predetreminated CONDUCTIVITY

Constant visualization of the instant FLOW (m3/h , GPM) of the iirigation network, PH y CONDUCTIVITY (mS).

FLOW, CONDUCTIVITY and PH alarms.

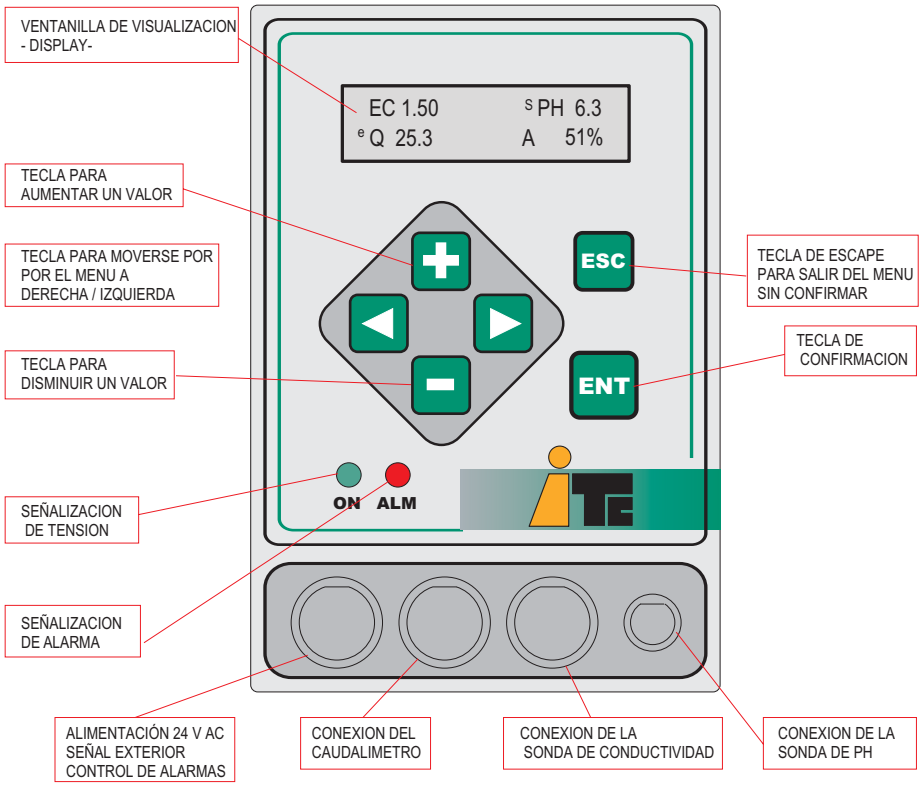
Injection control through PH

Control of the injection of the acid head of a dosing pump through a Servomotor, in order to fit a predetreminated PH

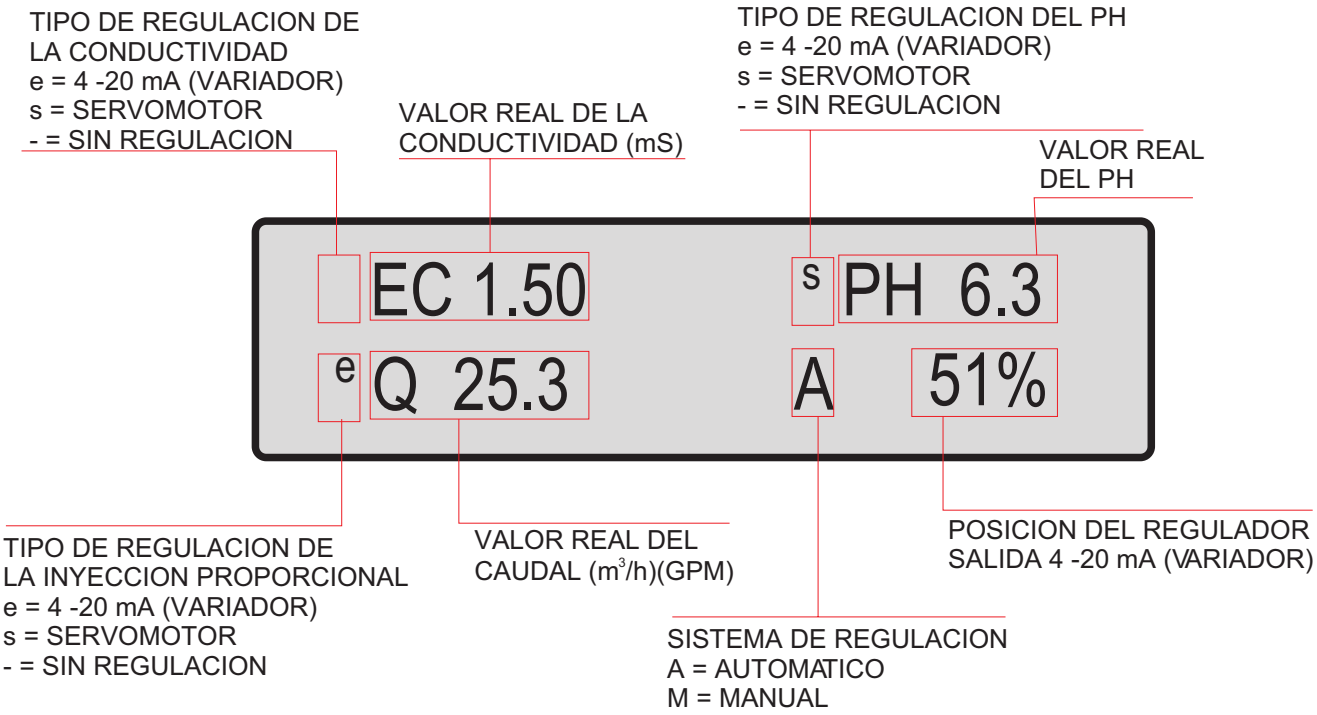
Constant visualization of the instant FLOW (m3/h , GPM) of the iirigation network, PH y CONDUCTIVITY (mS).

FLOW, CONDUCTIVITY and PH alarms.

1.2.- DESCRIPTION OF FRONT PANEL



1.3.- DESCRIPTION OF DISPLAY



2.- CARRIAGE AND MAINTENANCE

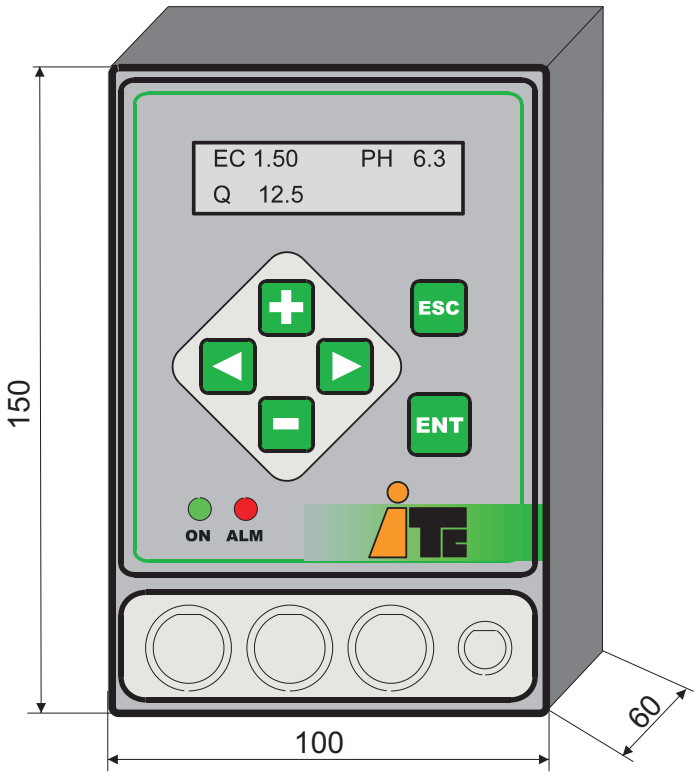
The original packing is prepared so that carriage and storing of the product do not cause any damage to the product, as long as this is done far from heat sources and in dry, ventilated spaces.

Inside packing we include:
Compact S
Handbook

3.- TECHNICAL FEATURES

Power supply: 230 V AC (+/- 20%)
Max. consumption: 6 mA
Entry of electrovalve signal: 10-30 V (AC / DC)
Working temperature : 0 - 45 ºC
Max. relative humidity: 95%
Don't leave outdoors unprotected and keep away from the sun

DIMENSIONS



4.- FUNCTIONEMENT

4.1.-SPECIAL CONFIGURATION MENU

To reach this menu you must push both keys ESC and ENT for three seconds.

To run forward you will use the arrows (forward without validation) and ENTER (forward with validation). To modify values you will use keys +/-.

T SERVO = 15 (see start up)

This value shows the time (seconds) which goes between two consecutive orders from the COMPACT S to regulate the SERVOMOTOR. The time will depend on two factors: distance between injection and reading sensor, and water speed (flow and pipe diameter).

Too low T SERVO value will cause fluctuations in theregulation and therefore in the reading.

For example: if a unit of injected fluid takes 10 seconds to go from the injection pump to the place where the sensor is, the time between two consecutive orders will be longer than 10 sec. therefore the value to be introduced will be aprox. T SERVO= 15.

T EXT = 15

Only for the COMPACT V

EC: 1.40 mS

Value of the conductivity buffer supplied by **ITC**. If another buffer is to be used, the value of the new buffer will have to be introduced.

Q UNIT: LITERS

Visualization of flow in l/hr (m3/hr) or in gallons/minute (GPM).

DIAM UNIT: MM

Visualization of diameter in mm or in inches.

FLOW K: 34.7

Amount of pulses per m/sec given by the flowmeter.

EXT: 4-20 mA

Only for the COMPACT V. Selection of external output signalt, 4-20 mA towards th inverter

T Q = 0 : 5 s

Minimum time to activate the Q=0 alarm (zero flow), in case it is activated.

+Q: 20%

Increase of nominal flow of injection pump (+Q) when it is working at a frequency higher than 50 Hz. (Only in a proportional injection)

NOMINAL FLOW 50 Hz	+Q = 20% 60 Hz
50	60
100	120
200	240
300	360
500	600

N SECTOR: 0

Number of SECTOR equipments connected in the net with the CONTROLLER 2000.

4.2.- GAUGING

GAUGING THE CONDUCTIVITY PROBE

PUSH ▶ WILL APPEAR

EC N.NN	PH N.N
Q N.N	A NN%

EC N.NN
Flashing

PUSH ENT WILL APPEAR

EC	N.NN --
ALM	CAL

N.NN
Flashing

PUSH ▶ ▶ ▶ WILL APPEAR

EC	N.NN --
ALM	CAL

CAL
Flashing

PUSH ENT WILL APPEAR

EC	*N.NN*
0.00	1.40

0.00
Flashing

Unplug the conductivity probe and wait for reading (N.NN) to become stabilized.

PUSH ENT WILL APPEAR

EC	*N.NN*
0.00	1.40

1.40
Flashing

Put the conductivity probe in the buffer liquid 1.40 mS and wait for the reading (*N.NN*) to be stabilized.

PUSH ENT WILL APPEAR

EC N.NN	PH N.N
Q N.N	A NN%

PROBES ARE GAUGED

GAUGING OF THE PH PROBE

PUSH ▶ ▶ WILL APPEAR

EC N.NN	PH N.N
Q N.N	A NN%

PH N.N
Flashing

PUSH ENT WILL APPEAR

PH	N.NN --
ALM	CAL

N.NN
Flashing

PUSH ▶ ▶ ▶ WILL APPEAR

PH	N.NN --
ALM	CAL

CAL
Flashing

PUSH ENT WILL APPEAR

PH	*N.N*
7.0	4.0

7.0
Flashing

Put the pH probe in the buffer liquid pH7, wait for the (*N.NN*) to be stabilized (1 min. Aprox.)

PUSH ENT WILL APPEAR

Ph	*N.N*
7.0	4.0

4.0
Flashing

Put the pH probe in the buffer liquid pH4, wait for the (*N.NN*) to be stabilized (1 min. Aprox.)

PUSH ENT WILL APPEAR

EC N.NN	PH N.N
Q N.N	A NN%

PROBES ARE GAUGED

GAUGING OF THE FLOWMETER AND THE INJECTION FLOW

PUSH	▶ ▶ ▶	WILL APPEAR	EC N.NN PH N.N Q N.N A NN%	Q N.N	Flashing
PUSH	ENT	WILL APPEAR	Q N.NN% -- ALM CAL	N.NN%	Flashing
PUSH	▶ ▶ ▶	WILL APPEAR	Q N.NN% -- ALM CAL	CAL	Flashing
PUSH	ENT	WILL APPEAR	Q *NNN* L/H K 34.7 Di NN mm	*NNN*	Flashing
PUSH	+ -	To set the sum of the flows of the different injection modules, keeping in mind their regulation, and excluding the acid one.			
PUSH	▶	WILL APPEAR	Q NNN L/H K 34.7 Di *NN* mm	*NN*	Flashing
PUSH	+ -	To set the inner diameter in mm of the pipe one which the flowmeter is located.			
PUSH	ENT	WILL APPEAR	EC N.NN PH N.N Q N.N A NN%	THE FLOWMETER IS GAUGED	

4.3.-SET POINTS AND REGULATION

CONDUCTIVITY SET POINT AND REGULATION

PUSH ▶ WILL APPEAR

EC N.NN	PH N.N
Q N.N	A NN%

EC N.NN Flashing

PUSH ENT WILL APPEAR

EC	N.NN --
ALM	CAL

N.NN Flashing

PUSH + / - TO INCREASE OR DECREASE THE SET-POINT VALUE OF CONDUCTIVITY

PUSH ENT TO FIX THE NEW SET-POINT VALUE, WILL APPEAR

EC	N.NN --
ALM	CAL

-- Flashing

PUSH + / - TO CHOOSE THE REGULATION TO CONTROL THE CONDUCTIVITY:
(**e** = External regulation through an signal 4/20 mA (inverter))
s = Regulation through a servomotor
-- = no regulation

When we choose a regulation (e, s, --), this will not be available for regulating another parameter.

PUSH ENT WILL APPEAR

nEC N.NN	PH N.N
Q N.N	A NN%

With the new set-point value chosen and regulation symbol before the EC reading.

PH SET POINT AND REGULATION

PUSH ▶ ▶ WILL APPEAR

EC N.NN	PH N.N
Q N.N	A NN%

PH. N.N Flashing

PUSH ENT WILL APPEAR

PH	N.N --
ALM	CAL

N.NN Flashing

PUSH + - TO INCREASE OR DECREASE THE SET-POINT VALUE OF PH.

PUSH ENT TO FIX THE NEW SET-POINT, WILL APPEAR

PH	N.N --
ALM	CAL

-- Flashing

PUSH + -

TO CHOOSE THE REGULATION TO CONTROL THE PH:
(**e** = External regulation through an signal 4/20 mA (inverter))
s = Regulation through a servomotor
-- = no regulation.

When we choose a regulation (e,s,--), this will not be available for regulating another parameter.

PUSH ENT WILL APPEAR

EC N.NN	nPH N.N
Q N.N	A NN%

With the new set-point value chosen and regulation symbol before PH reading.

PROPOTIONALITY VALUE AND REGULATION

PUSH ▶ ▶ ▶ WILL APPEAR

EC N.NN	PH N.N
Q N.N	A NN%

Q. N.N Flashing

PUSH ENT WILL APPEAR

Q	N.NN% --
ALM	CAL

N.NN% Flashing

PUSH + -

TO INCREASE OR DECREASE THE PROPORTIONAL VALUE OF INJECTION

PUSH ENT TO FIX THE NEW INSTRUCTION VALUE, WILL APPEAR

Q	N.NN% --
ALM	CAL

-- Flashing

PUSH + -

TO CHOOSE THE REGULATION TO CONTROL THE PH::
(**e** =External regulation through an signal 4/20 mA (inverter))
s = Regulation through a servomotor
-- = no regulation

When we choose a regulation (e,s,--), this will not be available for regulating another parameter.

PUSH ENT WILL APPEAR

EC N.NN	PH N.N
nQ N.N	A NN%

With the new set-point value and regulation symbol before the PH reading.

4.4.- ALARMS

CONDUCTIVITY ALARMS

PUSH ▶ WILL APPEAR

EC N.NN	PH N.N
Q N.N	A NN%

EC N.NN Flashing

PUSH ENT WILL APPEAR

EC	N.NN --
ALM	CAL

N.NN Flashing

PUSH ▶ ▶ WILL APPEAR

EC	N.NN --
ALM	CAL

ALM Flashing

PUSH ENT WILL APPEAR

EC > 0.0	T --
< 0.0	T --

0.0 Flashing

PUSH + - To increase or decrease the maximum allowed differentia.

PUSH ▶ WILL APPEAR

EC > 0.0	T --
< 0.0	T --

-- Flashing

PUSH + - To increase or decrease the allowed time with the differential (T -- : no alarm).

PUSH ▶ WILL APPEAR

EC > 0.0	T --
< 0.0	T --

0.0 Flashing

PUSH + - To increase or decrease the minimum allowed differential.

PUSH ▶ WILL APPEAR

EC > 0.0	T --
< 0.0	T --

-- Flashing

PUSH + - To increase or decrease the allowed time with the differential (T -- : no alarm).

PUSH ENT ENT To validate and go back to original screen

PUSH ESC ESC To go back to main screen without validation.

PH ALARMS

PUSH ▶ ▶ WILL APPEAR

EC N.NN	PH N.N
Q N.N	A NN%

PH N.N Flashing

PUSH ENT WILL APPEAR

PH	N.N --
ALM	CAL

N.N Flashing

PUSH ▶ ▶ WILL APPEAR

PH	N.NN --
ALM	CAL

ALM Flashing

PUSH ENT WILL APPEAR

PH > 0.0	T --
< 0.0	T --

0.0 Flashing

PUSH + - To increase or decrease maximum allowed differential.

PUSH ▶ WILL APPEAR

PH > 0.0	T --
< 0.0	T --

-- Flashing

PUSH + - To increase or decrease the time allowed with the differential (T -- : no alarm).

PUSH ▶ WILL APPEAR

PH > 0.0	T --
< 0.0	T --

0.0 Flashing

PUSH + - To increase or decrease minimum allowed differential.

PUSH ▶ WILL APPEAR

PH > 0.0	T --
< 0.0	T --

-- Flashing

PUSH + - To increase or decrease the time allowed with the differential (T -- : no alarm).

PUSH ENT ENT To validate and go back to initial screen.

PUSH ESC ESC To go back to main screen without validating.

FLOW ALARMS

PUSH ▶ ▶ ▶ WILL APPEAR

EC N.NN	PH N.N
Q N.N	A NN%

PH N.N Flashing

PUSH ENT WILL APPEAR

Q	N.NN% --
ALM	CAL

N.NN % Flashing

PUSH ▶ ▶ WILL APPEAR

Q	N.NN --
ALM	CAL

ALM Flashing

PUSH ENT WILL APPEAR

Q	Q = 0	OFF
OUT RANGE		OFF

OFF Flashing

PUSH + -

To choose OFF/ON and so activating (ON) or deactivating (OFF) the zero flow alarm.

PUSH ▶ WILL APPEAR

Q	Q = 0	OFF
OUT RANGE		OFF

OFF Flashing

PUSH + -

To choose OFF/ON. I will activate the alarm in case of the proporcionality set point correspond to injection flow, out of range of injection pump.

PUSH ENT WILL APPEAR

Q	N.NN% --
ALM	CAL

Should it be::
OUT RANGE: OFF

WILL APPEAR

Q MAX	T 30
Q MIN	T 30

Should it be::
OUT RANGE: ON

PUSH + -

To modify the time needed to activate the alarm of maximum flow.

PUSH ▶ WILL APPEAR

Q MAX	T 30
Q MIN	T 30

T 30 Flashing

PUSH + -

To modify the time needed to activate the alarm

PUSH ENT WILL APPEAR

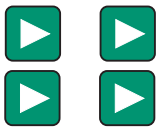
Q	N.NN% --
ALM	CAL

Should it be
OUT RANGE: ON

PUSH ESC

To go back to the initial screen.

4.5.- CHOOSING AUTOMATIC (A) OR HAND (M) REGULATION

PUSH  WILL APPEAR

EC N.NN	PH N.N
Q N.N	A NN%

A

PUSH 

TO CHOOSE :

A: AUTOMATIC REGULATION
M: MANUAL REGULATION

PUSH  WLL APPEAR

EC N.NN	PH N.N
Q N.N	M NN%

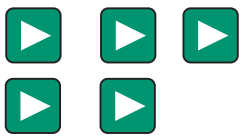
With the new sort of chosen regulation

4.6.- MANUAL REGULATION (M)

With the regulation in the M position (manual) it will be possible to change the regulation (servomotor %, 4-20 mA of the variator) directly with the +/- keys, and therefore to change the injection flow.

To change the servomotor regulation (%), it will be necessary to previously visualize this sort of regulation (NN%).

To change the regulation 4-20 mA of the variator, it will be necessary to previously visualize this sort of regulation (N.N m).

PUSH  WILL APPEAR

EC N.NN	PH N.N
Q N.N	M NN%

NN% Flashing

PUSH 

To increase or reduce flow of injection.

4.7.- SELECTION OF VISUALIZATION OF THE OUTPUT SIGNAL
% : POSITION OF SERVOMOTOR
(4 - 20 mA: INVERTER SIGNAL)

WITH AUTOMATIC REGULATION

EC N.NN	PH N.N
Q N.N	A NN%

PUSH ▶ ▶ ▶ ▶ ▶ WILL APPEAR

EC N.NN	PH N.N
Q N.N	A NN%

NN% Flashing

PUSH ENT WILL APPEAR

REG	SERVOMOT
	4 - 20 mA

SERVOMOT Flashing

PUSH ▶ SELECTION:

SERVOMOT (visualization of position of SERVOMOTOR)
4 - 20 mA (visualización señal variador en mA)

PUSH ENT WILL APPEAR

EC N.NN	PH N.N
Q N.N	A NN%

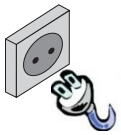
OR

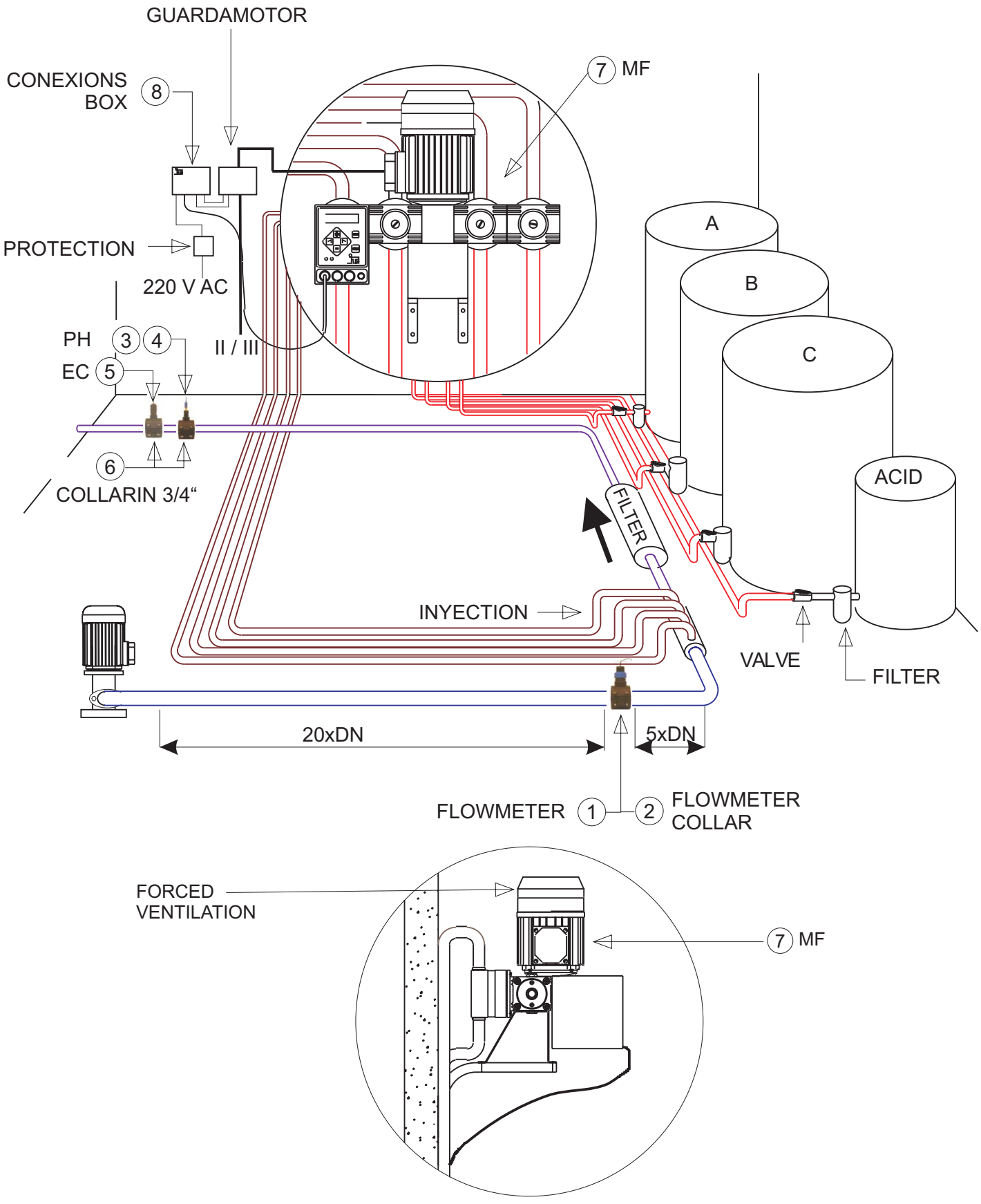
EC N.NN	PH N.N
Q N.N	A N.Nm

According to the selection of visualization of output signal

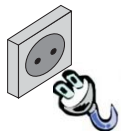
5.- INSTALLATION

To install this pump it it is advisable to choose places protected from water, away from heat sources and with air renewal.

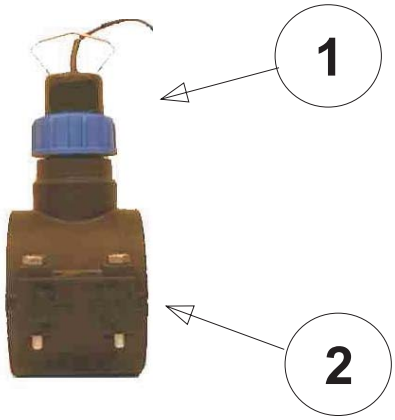




1 *FLOWMETER*

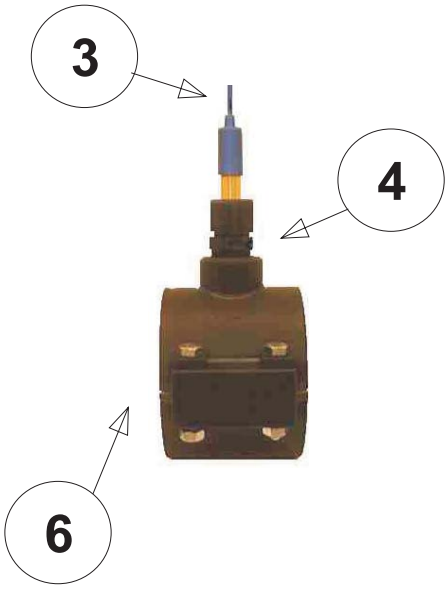


Instant flowmeter.
To set it up follow instructions contained in the relevant Handbook.



2 *CONNECTOR CLAMP FOR FLOWMETER 1" 1/4*

Connector clamp with flowmeter adapter.



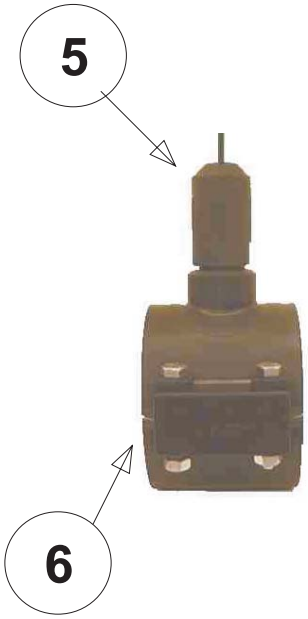
3 *PH ELECTRODE*

To set it up follow instructions contained in the relevant Handbook.

4 *ELECTRODE HOLDER*

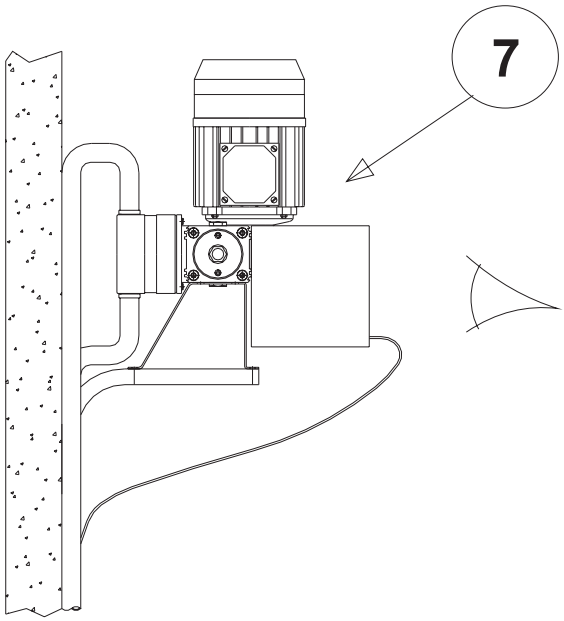
5 *CONDUCTIVITY ELECTRODE*

To set it up follow the instructions contained in the relevant Handbook.



6 *CONNECTOR CLAMP ¾ ”*

Connector clamp for pH and conductivity electrode.



7

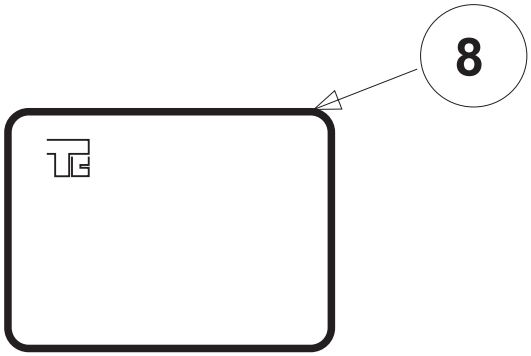
MULTIFERTIC

Modular dosing pump.
We recommend placing it at a level over 1 meter in order to make the display more visible.
To set it up follow the instructions contained in the relevant Handbook, keeping in mind that the frequency variator will work as a motor protection.

8

CONNECTION BOX

Housing for the connection of Controller 2000, Frequency Variator and Forced Ventilation, with a switch for starting up in an AUTOMATIC/MANUAL mode.
Please read chapter on CONNECTIONS for connecting details.



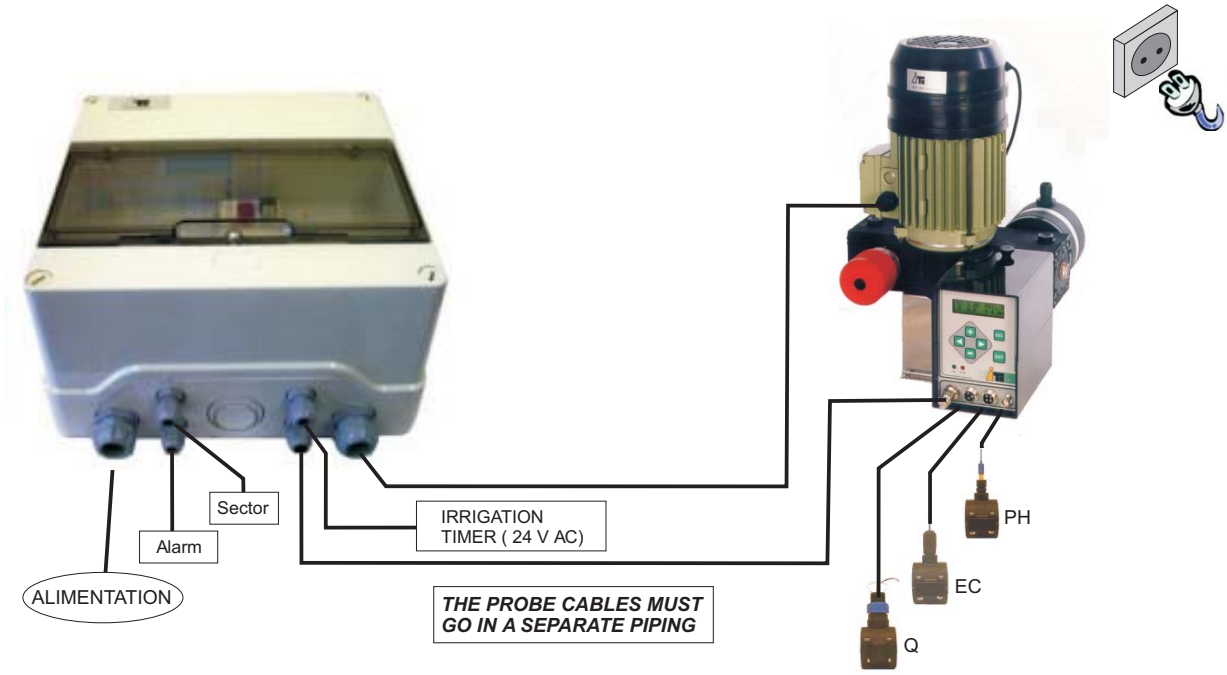
The probe cables must go in a separate piping.

A molded case circuit breaker device must be installed according EN-60204-1.

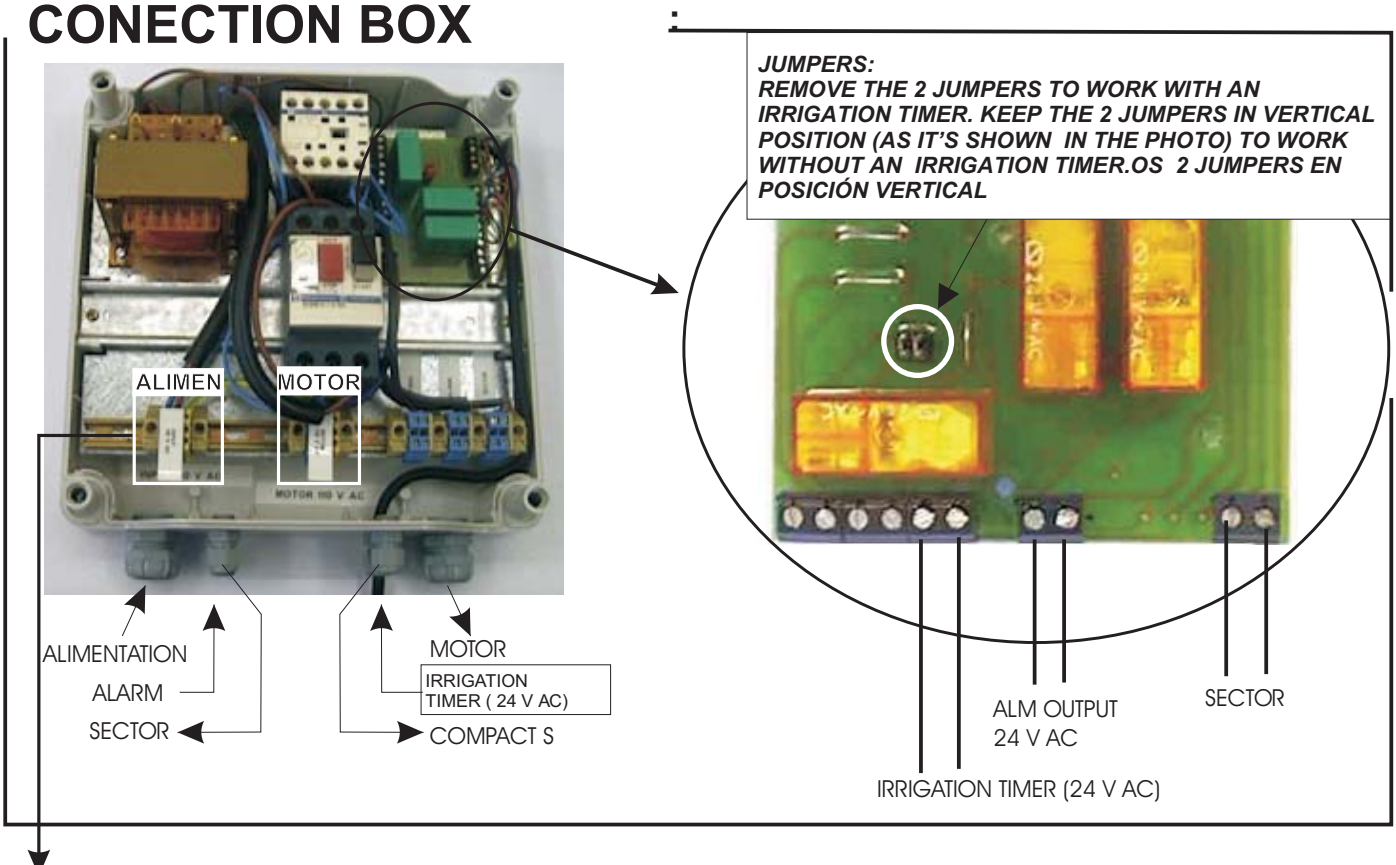
A disconnected dispositive must be installed in case of emergeny.

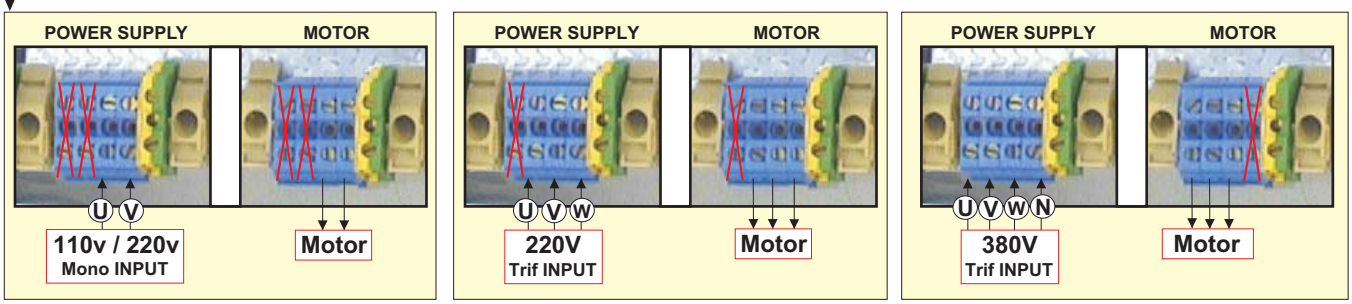
The equipment must be protected to avoid untimetily nsudden starts.

CONEXIONS



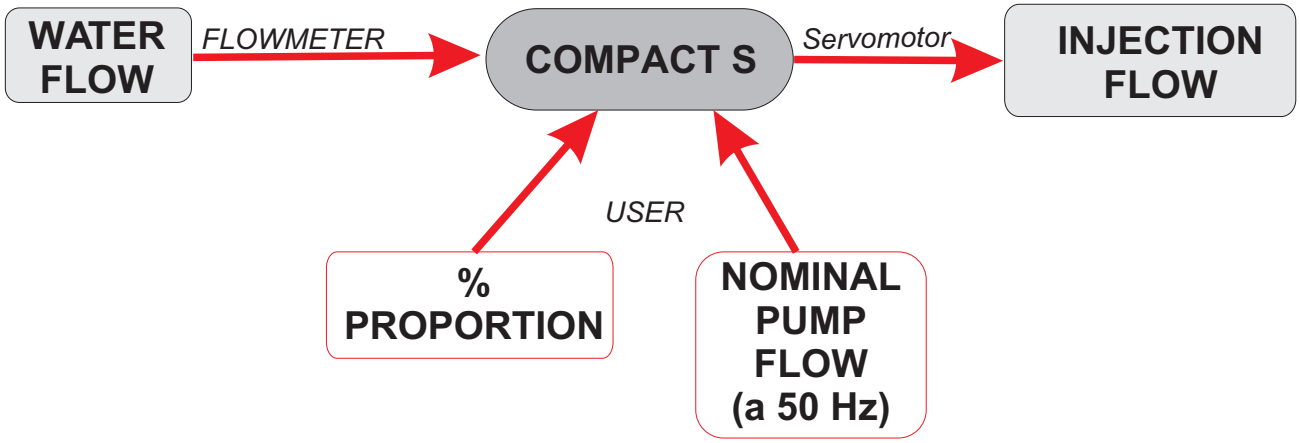
CONECTION BOX





6.- START UP

INJECTION CONTROL THROUGH PROPORCIONALITY



The maximum water flow together with the maximum flow of the dosing Pump (see table of the flow increases through the frequency variator, on page 10), will determine the maximum proportion to be used in every installation:

Max. %= max.Injection flow (l/hr)/ max. Water flow (l/hr)

Ex.: Water flow = 40.000 l/h
Nominal pump flow (a 50 Hz):
MF2- 300/3 - 300 - 50
Keeping in mind that the 50 l/hr model is for acid, and that the 300 l/hr model is regualted at 50%
Nominal pump flow = 300 + 300 x 50/100 = 450 l/h

Expected proportion = 1%

The injection flow will be:
40.000 x 1 / 100 = 400 l/h

Maximum proportion (%máx.) = 450 / 40.000 x 100=
= 1.125 %

(Dosing pump: nominal flow -50 Hz- = 450 l/h
Nominal flow -60 Hz- = 540 l/h)

COMPACT S IN **OFF**

- FIX ALL THE COMPONENTS (chapter 2 and 3), leaving out of the pipe the conductivity and pH electrodes.

- PREPARE THE FERTILIZER AND ACID TANKS WITH THE RIGHT CONCENTRATIONS (See Handbook “HOW TO CHOOSE A FERTIGATION EQUIPMENT”).

- GAUGE THE CONDUCTIVITY ELECTRODE (chapter 7) and place it in the pipe. To gauge with another buffer see Special Configuration Menu (chapter 6).

- GAUGE PH ELECTRODE (chapter 7) and place it in the pipe.

- GAUGE FLOWMETER AND INTRODUCE INJECTION FLOW (chapter 7). To change the units see the Special Configuration Menu (chapter 6).

- INTRODUCE PROPORTIONALITY ORDER AND SELECT **s**: SERVOMOTOR OUTPUT SIGNAL (chapter 8).

- SELECTION OF VISUALIZATION OF THE OUTPUT SIGNAL: **SERVOMOT**: SERVOMOTOR POSITION (%) (chapter 12).

- SELECT AUTOMATIC REGULATION (chapter 10).

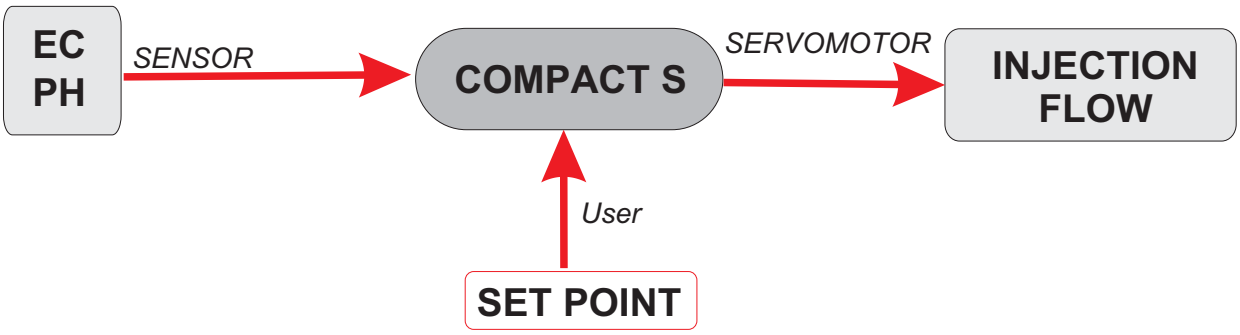
- START IRRIGATION (ONLY WATER) AND CHECK THE READINGS.

COMPACT S IN **ON**

- WAIT FOR THE READINGS TO BECOME STABLE. (If necessarymodify the proportionality order to adjust the conductivity or the pH value).

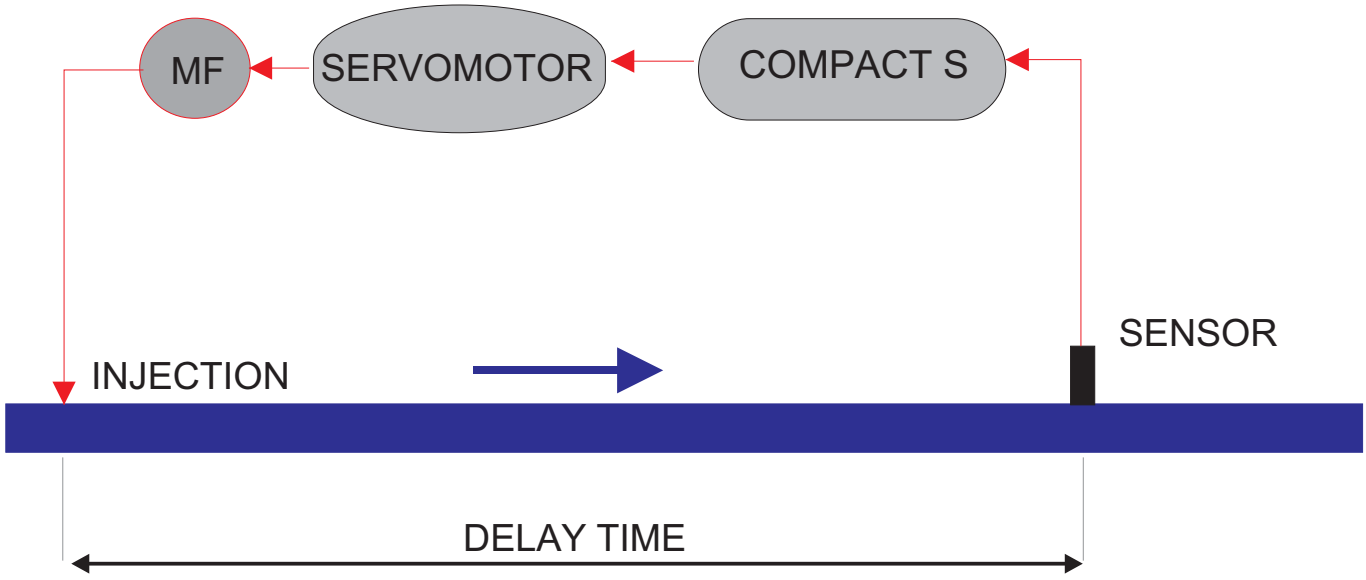
- IINTRODUCE THE NECESSARY ALARMS (chapter 9).

INJECTION CONTROL THROUGH CONDUCTIVITY OR PH SET POINT



The regulation of the injection flow is made through a PI. This sort of control Compares the conductivity reading obtained with the set point, and tries to reduce the difference by modifying the injection flow through the SERVOMOTOR

The COMPACT S will wait for a new order to be given that the effects of the previous order have been received by the conductivity electrode. This waiting time will depend on how long it takes for the injected liquid to come out of the pump and reach the detector (delay time of the installation).



COMPACT S IN **OFF**

- FIX ALL THE COMPONENTS (chapter 2 and 3), leaving out of the pipe the conductivity and pH detector.

- PREPARE THE FERTILIZER AND ACID TANKS WITH THE RIGHT CONCENTRATIONS (See Handbook “HOW TO CHOOSE A FERTIGATION EQUIPMENT”).

- GAUGE THE CONDUCTIVITY ELECTRODE (chapter 7) and place it in the pipe. To gauge with another buffer see Special Configuration Menu (chapter 6).

- GAUGE PH ELECTRODE (chapter 7) and place it in the pipe.

- GAUGE FLOWMETER (chapter 7). To change the units see the Special Configuration Menu (chapter 6).

- INTRODUCE THE SET POINT (PH OR EC) AND SELECT **s**: SERVOMOTOR OUTPUT SIGNAL (chapter 8).

- SELECTION OF VISUALIZATION OF THE OUTPUT SIGNAL: **SERVOMOT**: SERVOMOTOR POSITION (%) (chapter 12).

- SELECT AUTOMATIC REGULATION (chapter 10).

- START IRRIGATION (ONLY WATER) AND CHECK THE READINGS.

COMPACT S IN **ON**

- THE DOSING PUMP WILL START. OBSERVE THE TIME OF THE DELAYOF THE INSTALLATION: the time which goes between starting the dosing pump and the change in the reading produced by this injection
- SWITCH THE COMPACT S TO THE “OFF” POSITION (the injection will stop),
- MODIFY DELAY TIME OF THE INSTALATION IN **T SERVO** OF THE SPECIAL CONFIGURATION MENU (capítulo 6). In PH control the time to be introduced will be the Delay Time, with some extra seconds (10-30secs.) so that the injected acid reacts with the water.

  Example:

  Delay time observed = 10s
  Estimated time for the chemichal reaction = 10s
  T SERVO = 10 + 10 = 20s

- SWITCH THE COMPACT S IN ***ON POSITION.***
- WAIT FOR THE READINGS TO BECOME STABLE.
- INTRODUCE THE NECESSARY ALARMS (chapter 9).

EC CONFORMITY DECLARATION

I.T.C S.L..
Mar Adriàtic, 1
Polígono Torre del Rector
08130 Santa Perpètua de Mogoda

Declares that all models COMPACT S products, identified by a serial number and year of manufacture, strictly fulfill low voltages directives 73/23/CE and electromagnetic compatibility directives 89/336/CE, as long as installation, use and maintenance are carried out following the prevailing regulation and following the instructions contained in the handbook.

Josep Segura
Manager

WARRANTY

I.T.C. S.L. *Warrants the product specified in this document for a period of 1 year from the purchase date. This warranty obligation is limited to the free replacement of the damaged parts due to any material or manufacture defect. This warranty does not include periodic maintenance and damage resulting from misuse.*

The equipment must be sent to ***I.T.C. S.L.*** *Service Center with prepaid transport charges, and will be sent back with transport charges for customer's account.*

The warranty document with sales date and shop stamp, or an invoice copy must be sent with the equipment.

MODEL

_____

SERIAL #

_____

Sales date and shop stamp

DATE: _____

Ed: 04/05/04

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