



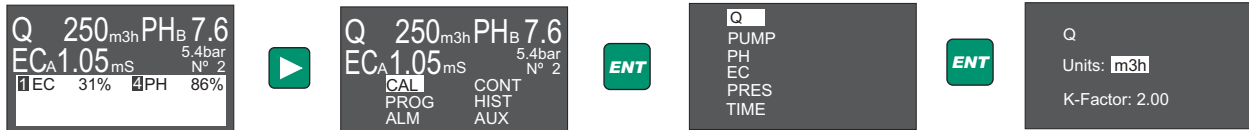
CONTROLLER 3000

3. CONFIGURATION

CONTROLLER 3000

3.1.2 FLOWMETER CALIBRATION

To Calibrate, set the switch to **STOP**



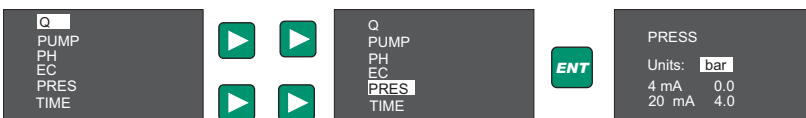
Change Units by pressing +/- and validate by ENT:
 m3h: Water Flow in m³/h
 Dosage Flow in l/h

gal: Water Flow in GPM
 Dosage Flow in GPH

A screenshot of the K-Factor calibration screen showing 'Q' at the top, 'Units: m3h', and 'K-Factor: 2.00' with a cursor over the value.

K-Factor (pulses/litre or pulses/gallon):
 Please refer to Manual Instructions of Flow Meter in accordance with the type and size of the pipes where it is installed.
 Change Value by pressing +/- and validate by ENT

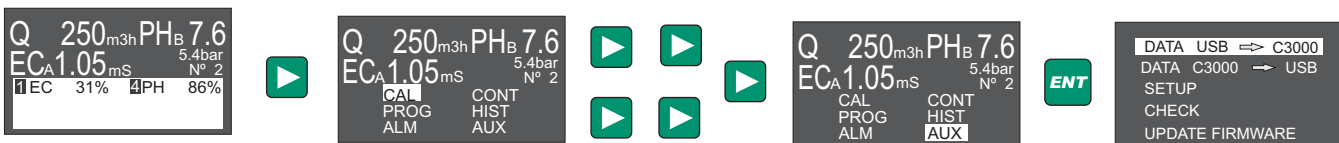
3.1.3 PRESSURE TRANSMITTER CALIBRATION



Change Units by pressing +/- . Press > to scroll on the Menu and introduce the Pressure corresponding to 4mA and 20mA. Validate values pressing ENT.

3.1.4 EC AND PH CALIBRATION

3.1.4.1 Calibration set up



Two screenshots of the SETUP screen. The first shows 'DATA USB → C3000', 'DATA C3000 → USB', and 'SETUP' selected. The second shows 'SET UP' with 'Kp A: 10', 'Kp B: 10', 'CTRL. PH: ACID', 'NUM PROG.: 1', 'EC: 1.40', and 'PH: 4 TIME: 60S'.

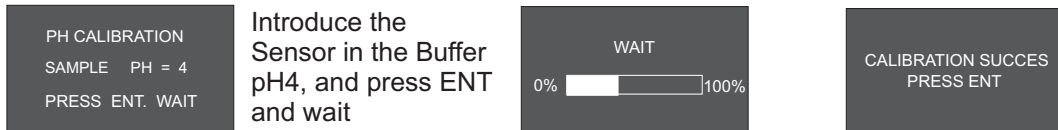
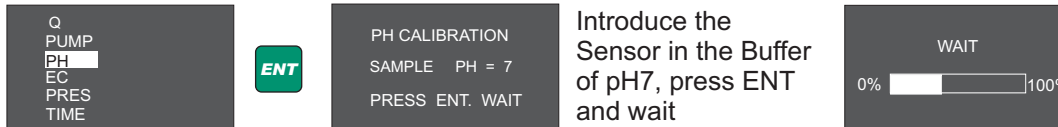
Change Units by pressing +/- and validate by pressing ENT.

CTRL. PH: ACID/ALKALINE: defines if the pH Control is executed by adding Acid (ACID) or Base (ALKALINE)
EC:1.40: defines the EC buffer used. It can be modified by pressing +/-
PH: 4 Time 60s: defines the pH Buffer and the Stabilization Time for the Sensor Calibration.

3. CONFIGURATION

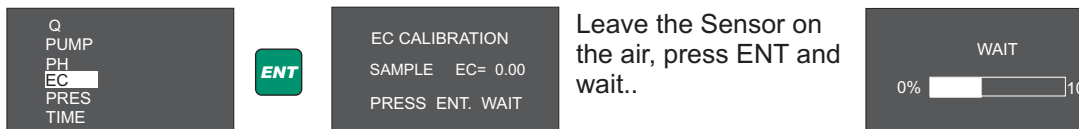
CONTROLLER 3000

3.1.4.2. PH SENSOR CALIBRATION .



Validate the pH Calibration by pressing ENTER.

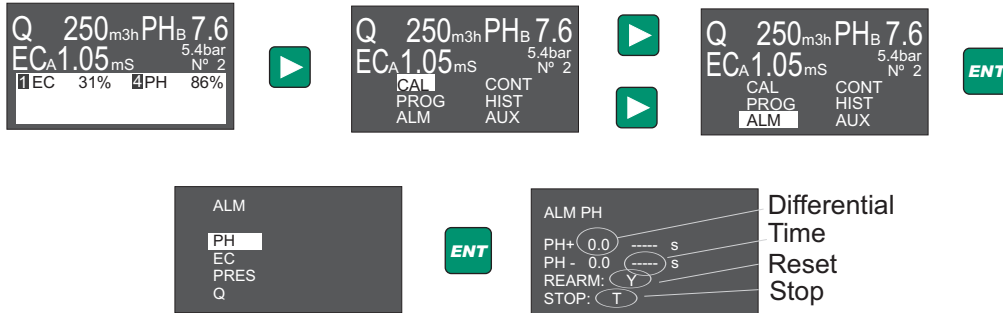
3.1.4.3 EC SENSOR CALIBRATION.



Validate the EC Calibration by pressing ENTER.

3.2. ALARMS

3.2.1 PH ALARM



Change Units by pressing +/- and validate with ENT:

Differential: Value to add/ subtract from the Set Point, from which the Alarm is activated

Time: Time required for activating the Alarm

Reset: automatic Reset of the Alarm when the Reading returns to correct Values.

Y: Reset activated

N: There is no Reset. Press ESC to deactivate the Alarm

STOP: in case of Alarm it stops the Control of:

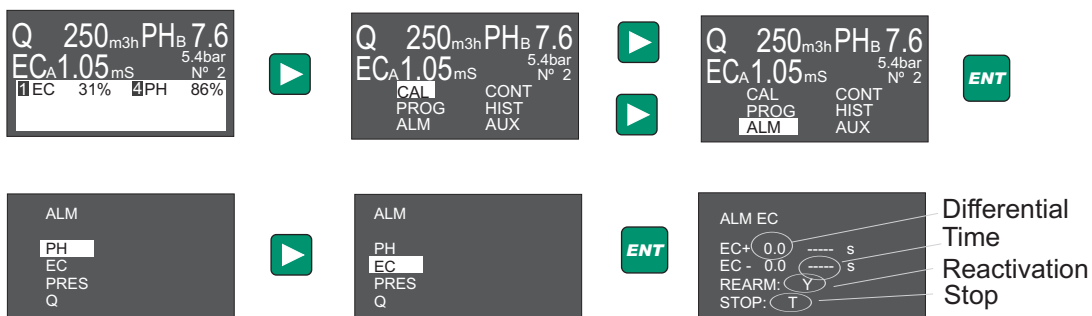
T: Everything

A: Pumps in Channel A

B: Pumps in Channel B

N: Nothing

3.2.2 EC ALARM



Change Units by pressing +/- and validate by ENT.

Differential: Value to add/ subtract from the Set Point, from which the Alarm is activated

Time: Time required for activating the Alarm

Reset: automatic Reset of the Alarm when the Reading returns to correct Values.

Y: Reset activated

N: There is no Reset. Press ESC to deactivate the Alarm

STOP: in case of Alarm it stops the Control of:

T: Everything

A: Pumps in Channel A

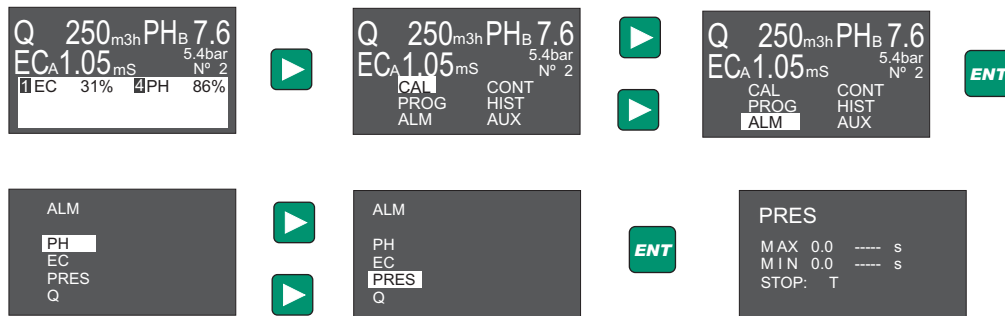
B: Pumps in Channel B

N: Nothing

3. CONFIGURATION

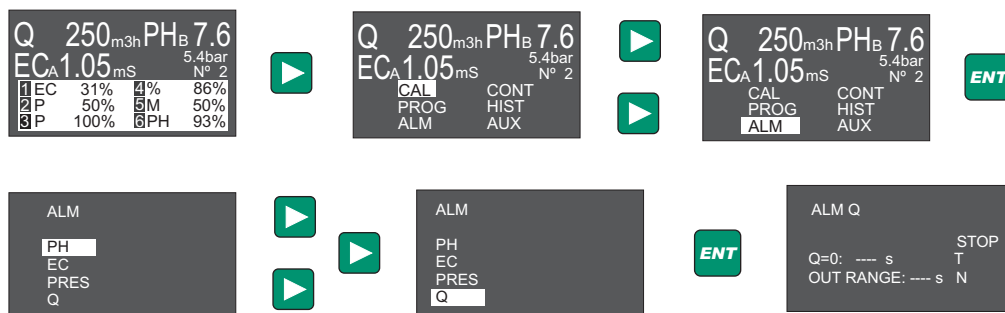
CONTROLLER 3000

3.2.3 PRESSURE ALARM



Change Units by pressing +/- and validate by ENT:
 MAX: Maximum Pressure
 MIN: Minimum Pressure
 Time: Time required for activating the Alarm
 STOP: in case of Alarm stops:
 T: Everything
 N: Nothing

3.2.4 FLOW ALARM



Change Units by pressing +/- and validate by ENT.

Q=0: Alarm when there is no Flow and the Control is activated.
 OUT RANGE: Alarm of Dosing Flow out of the capacity of the Pump.
 Time: time required for activating the Alarm
 STOP: in case of Alarm stops:
 T: Everything
 A: Pumps in Channel A
 B: Pumps in Channel B
 N: Nothing

3.3 ADVANCED CONTROL OPTIONS.

3.3.1. REMOTE CONTROL: CONFIGURATION CHANNELS A/B.

Configuration from channels A and B.



Change Units by pressing +/- and validate by ENT.

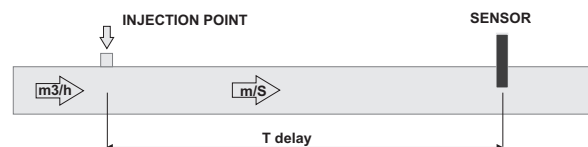
INPUTS: Configuration of the Remote Control Inputs in Channels A and B. It allows configuring each Input with its Channel, and activating both Channels just by one Input.

- A START:** A. Activates pumps programmed A when 24Vac are used at the terminals of channel A.
A+B. Activates pumps programmed A or B when 24Vac are used at the terminals of channel A.
- B START:** A. Activates pumps programmed A when 24Vac are used at the terminals of channel A.
A+B. Activates pumps programmed A or B when 24Vac are used at the terminals of channel A.

3.3.2. PI CONTROL PARAMETERS

OUTPUTS:

Delay Time Configuration in the System for Channels A and B, corresponding to the Time passed between two consecutive Orders from the Controller (see System Start-Up).



A fixed Delay Time can be defined (Q Test=0) or proportionally inverse to the Flow.

Q Test=0: it allows establishing a Flow as Reference for defining the Delay Time (Tdelay) changeable by the Flow. If Q Test =0 Delay Time is constant.

- A Tdelay: 15s** Delay Time in Channel A
- B Tdelay: 15s** Delay Time in Channel B

Example:

For 8" Pipe, Flow 100m3/h, water Speed is approximately 1m/s. If the distance between the Injection and Sensor Point is 10m, the Delay Time of the System will be 10 seconds.

The Sensor will have a Reaction Time (approximately 10 seconds for the pH Sensor), which should be added to the Delay Time of the System. Therefore, we should set a Tdelay = 20 seconds.

If there is a Filter between the Injection and Sensor Point, the Calculation of 10metersx1m/s = 10 seconds is no more valid.

Therefore, **TDelay** changes when the Flow of the System change. To optimize the Adjustment, the TDelay can be associated with a certain Flow (Q Test), so Controller 3000 changes **TDelay** according to Water Flow. **TDelay** is limited from 5 to 120 seconds.

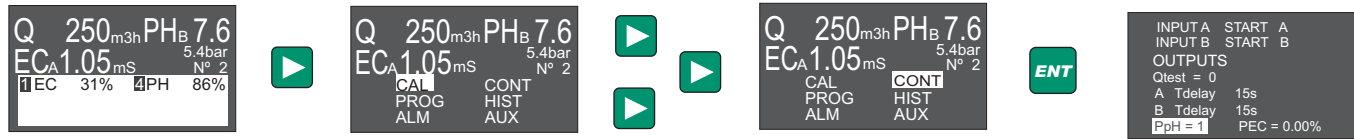
How to find Tdelay

- 1.-Start the irrigation make sure that there is no dosage of products.
- 2.-Wait until the readings of the sensors are stable.
- 3.-Start manually a dosing pump, for example fertilizer. In the same moment start a chronometer.
- 4.-After some time the reading of the sensor will start increasing up until its stable. In this moment the chronometer will stop, and Tdelay is found.

3. CONFIGURATION

CONTROLLER 3000

3.3.3 CONFIGURATION FOR A pH CONTROL IN PIQ MODE (PPH)



Change Units by pressing +/- and validate by ENT.

PIQ control mode for the pH adjustment is a PI algorithm conditioned by the water flow. By means of the PpH parameter the system set an initial proportional dosage. Later on the controller modifies the dosing flow following a standard PI adjustment.

PpH can only be activated by independent pumps (outputs type A to dosify acid). It gives a better stability of pH even with very variable flow and gives a better answer of the system to reach and keep readings at Set Point value.

PARAMETERS OF CONTROL PIQ:

PpH=0: PIQ disabled

PpH = 1-200 The variable PpH corresponds to the initial concentration of applied reagent, expressed in parts for 100.000.

Example: For a flow of 200.000 l/h of water and a PpH = 1, the proportional dosage of acid corresponds to: $(1 / 100.000) \times$

The necessary proportion of reagent to reach a certain pH will depend not only on his nature and concentration, but also on the nature of the water to treat and of the rest of dosed products that they could influence this parameter. Next we detail the status of values PpH advised for a fast answer and stability in the pH.

The following table for different acids is an approach of the value PpH for these acids according to the correction of necessary pH (1 or 2 points of pH).

Table for nitric acid.

A	1point	2 points
60%	4-10	10-20
40%	8-15	15-30
10%	30-60	60-120
5%	60-110	120-200

Table for phosphoric acid.

A	1point	2 points
80%	3-8	8-15
50%	6-15	15-25
10%	30-60	60-120
5%	60-110	120-200

Table for sulphuric acid.

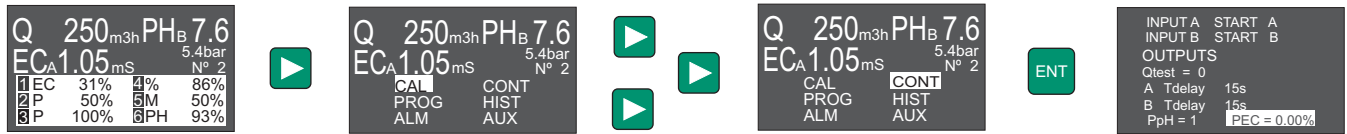
A	1point	2 points
95%	1-3	2-5
50%	2-5	4-10
10%	10-25	20-50
5%	20-50	40-100

Note: The A column corresponds to the concentration of acid.

3. CONFIGURATION

CONTROLLER 3000

3.3.4 CONFIGURATION FOR A EC CONTROL IN PIQ MODE (PEC)

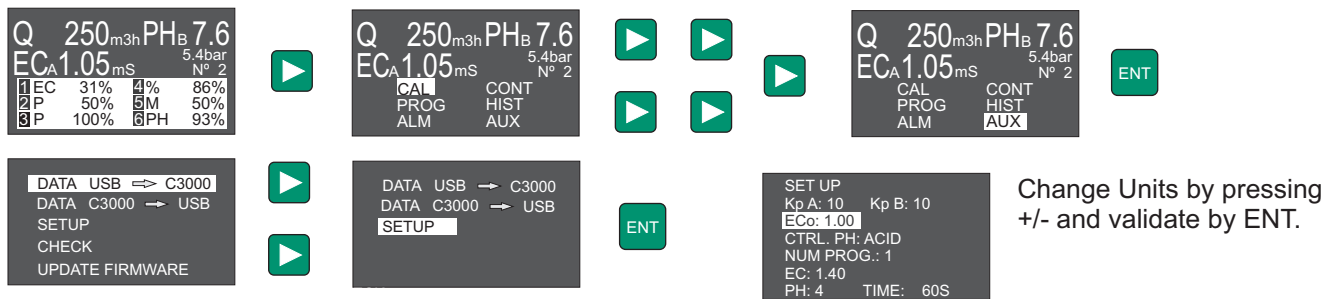


Change Units by pressing +/- and validate by ENT.

PIQ control mode for the EC adjustment is a PI algorithm conditioned by the water flow. By means of the PEC parameter the system set an initial proportional dosage. Later on the controller modifies the dosing flow following a standard PI adjustment.

- PEC=0** Control PI. PIQ disabled.
- PEC= 0.01 - 2%** Initial proportional flow in %.

It is necessary to define the clean water EC value (EC₀)in the Set UP menu.



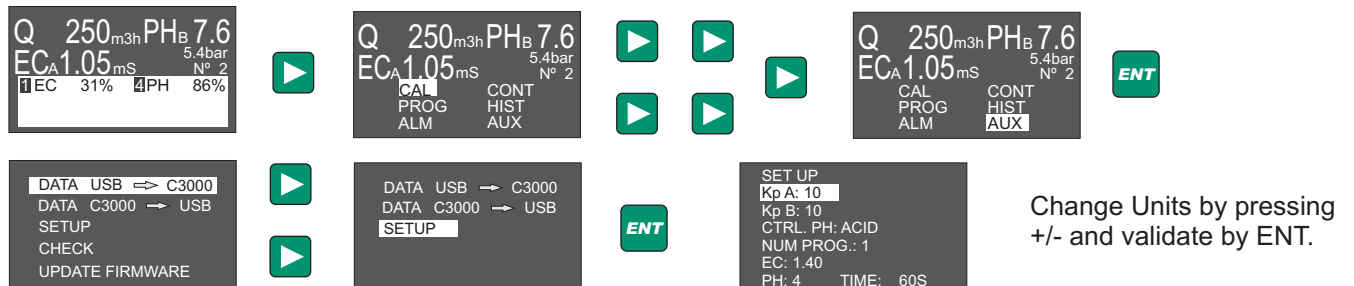
The initial proportional value PEC must be introduced for the fertigation program with lower EC set point (The set points lower than EC₀ are not considered).

The initial proportional value for the other fertigation programs is modified proportionally to the difference between Set Point and EC₀.

3. CONFIGURATION

3.4. ADVANCED SET UP OPTIONS.

3.4.1. ADVANCED CONFIGURATION OF PI CONTROL PARAMETERS



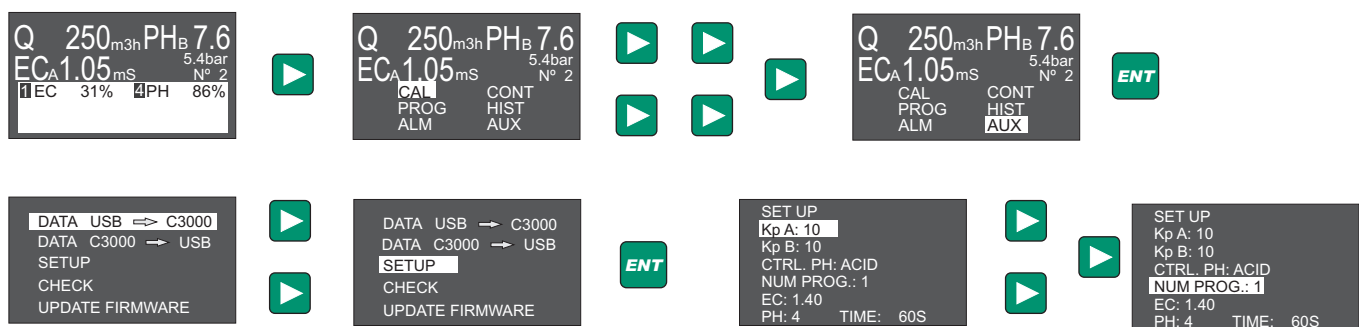
Constant Kp of channel A: it is recommended to maintain the value of 10. A higher value, it will get to the Set Point quicker, but it will not be stable quickly, if the value is too high it can unstabilize the dosage.

Constant Kp of channel B: it is recommended to maintain the value of 10. A higher value, it will get to the Set Point quicker, but it will not be stable quickly, if the value is too high it can unstabilize the dosage.

3.4.2. CONFIGURATION OF NUMBER OF FERTIGATION PROGRAMS.

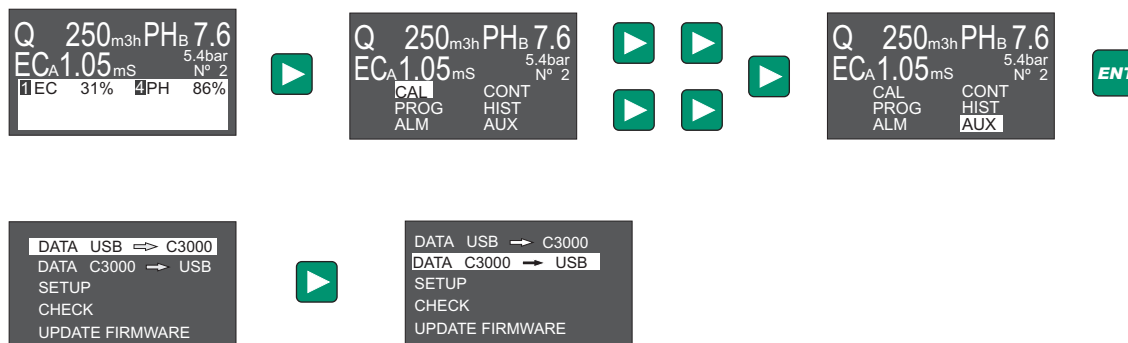
Number of programs: According to the installed equipment it is possible to have 1, 12, 24, 36, or 48 programs. It is necessary to indicate the number of programs to use, which will be lower or equal to the available programs in the equipment.

Exemple: Controller has 12 programs, and just 5 programs are required. Number of programs will be from 5 to 12.



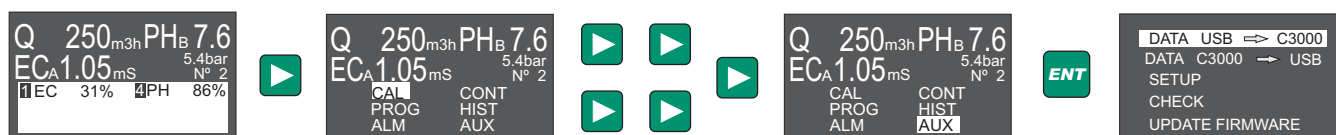
3.4.3. CONFIGURATION FILE

GENERATE CONFIGURATION FILE FROM THE CONTROLLER 3000. PORT USB1.



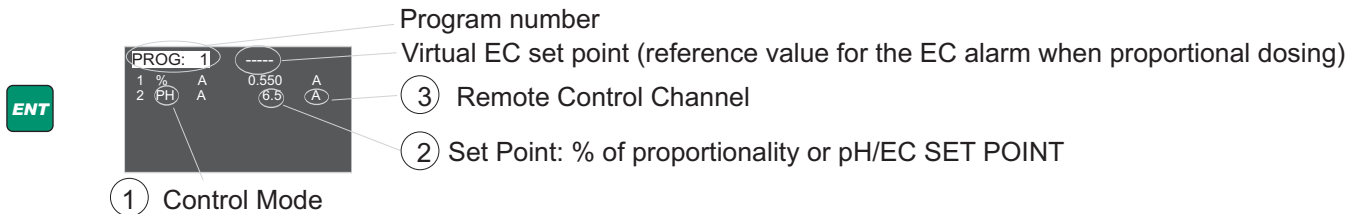
Option of downloading the Configuration and Programming to a pendrive.

LOAD CONFIGURATION FILE IN THE CONTROLLER 3000. PORT USB1.



Option to load the Configuration and Programming from a pendrive.

4.1. CONTROL MODES



Change the program to edit by pressing +/- and validate by ENT.
Use <> to scroll on the Menu and validate the Program by ENT

1 CONTROL MODE

M - Manual: Manual Adjustment of the Dosage, in %.

% - PROPORTIONAL: Proportional Dosage of the Irrigation Flow, in %.

EC - EC Set Point: Dosage of one or some Products to reach a certain EC Value (Set Point).

P - Dosify more than one Product by EC Set Point, a Proportion (P) between these Products must be established. In this case, **Virtual EC Set Point** must be used to introduce the EC Set Point, and specify a Proportion of Relation between the Outputs configured as P.

PH - PH Set Point: Dosage of one or some Products to reach a certain pH Value (Set Point).

2 SET POINT OR DOSE IN % :

When the Outputs are configured as EC or pH, the Value for this field corresponds to the Set Point Value.
For Outputs configured as %, the Value of this Field corresponds to the Proportion Value.
For Outputs configured in manual Mode, the Value of this field corresponds directly to the % of Dosage Adjustment.

3 CONTROL CHANNEL A/B:

It is possible to select two different Remote Control Channels: A and B. Each Channel has an independent Activation Input, which allows to start-up the Pumps programmed for a Channel and keep the Pumps of the other Channel stopped.

Each Control Channel has its PI Control Parameters (see Control Menu), to see each adjustment, pH and EC.



If an intermitent value appears when validating by ENT, it indicates the Program is not correct. Check for errors.

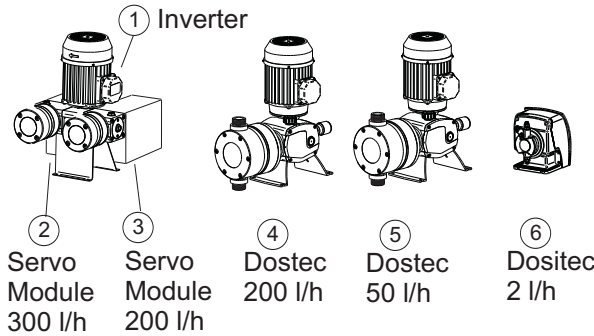
Errors of programming are available in section 4.3 Errors of programming.

4. FERTIRRIGATION PROGRAMS

CONTROLLER 3000

4.2. PROGRAMMING EXAMPLES

1x Multifertic 2 heads with 2 servos, 2x Dostec, 1xDositec.



Pumps configurations

PUMP				
1-	---	L / H	120 %	V
2-	300	L / H	120 %	S
3-	200	L / H	120 %	S
4-	200	L / H	120 %	A
5-	50	L / H	120 %	A
6-	2.0	L / H	100 %	A

Example 1:

- Outs 1,2,3: Modular pump for a proportional addition of 2 products (out 2 and 3)
 - Proportionality out 2: 0.200%
 - Proportionality out 3: 0.300%
- Out 4: Dosing pump for and addition of a product according to an EC set point.
 - EC set point out 5: 2.50mS
- Out 5: Dosing pump for a proportional addition of one product
 - Proportionality out 5: 0.100%
- Out 6: Dosing pump for a pH control.
 - pH set point out 6: 6.5

Programming

PROG: 1			
1 %	V	0.500	A
2 %	S	0.200	A
3 %	S	0.300	A
4 EC	S	2.50	A
5 %	A	0.100	A
6 PH	A	6.50	B

Remote control

The fertilizer outputs are linked to the A channel and the acid control to the B channel. Then the fertilizer can be switched on / off independently to the acid, and the PI parameters too.

Alarm:

The reference value for the EC alarm is the EC set point.

Example 2:

- Outs 1,2,3: Modular pump for a proportional addition of 2 products (out 2 and 3) according to an EC set point.
 - apportion between both products is required.
 - Proportionality out 2: 2 parts
 - Proportionality out 3: 3parts
- Out 4: Dosing pump for a proportional addition of one product
 - Proportionality out 4: 0.100%
- Out 5: Dosing pump for a proportional addition of one product
 - Proportionality out 5: 0.150%
- Out 6: Dosing pump for a pH control.
 - Consigna de pH de la salida 6: 6.5

Programming

PROG: 1			
1 EC	V	2.40	A
2 P	S	2	A
3 P	S	3	A
4 %	S	0.100	A
5 %	A	0.150	A
6 PH	A	6.50	B

Remote control

The fertilizer outputs are linked to the A channel and the acid control to the B channel. Then the fertilizer can be switched on / off independently to the acid, and the PI parameters too.

Alarm:

The reference value for the EC alarm is the EC set point.

4.3. ERRORS REGARDING THE PROGRAMMING.

Errors referred to EC Programming:

- Only one EC Set Point is possible
- If there is any Output configured as P (Proportion), an Ec Set Point must have been introduced.
- If Control Outputs configured as P (Proportion) are Servo Outputs (S) the EC Set Point must be introduced in the V Output.
- If Control Outputs configured as P (Proportion) are independent analogue Outputs (A) the EC Set Point must be introduced as Virtual EC Set Point. It is not possible to assign EC Set Point to an Output between 1 and 6.
- To establish a Relation between some Products that regulate to get the EC Set Point, each output of these products must be programmed with P. Therefore, it is necessary at least two Outputs configured as P.
- An Output configured as V (Variator for Multifertic on Servos) programmed to work with EC Set Point, allows only the Servos Outputs (S) to be programmed as P (Proportion), PH, or M (manual), but not as %.

-Only one pH Set Point is possible.

Errors referred to pH Programming:

- Only one pH Set Point is possible.

Errors referred to % Programming (Proportionality)

-When there is a Control Output configured as V, and it is programmed by Proportionality (%), Servos Outputs (S) must be programmed as % (Proportionality), PH, M (manual) or also a Servo Output as EC, but never as P (Relation of Proportion).

Errors referred to manual Programming (M)

-When there is a Control Output configured as V, and it is programmed as manual (M), Servo Outputs (S) must be programmed as M (manual) or PH.

DATA LOGGER

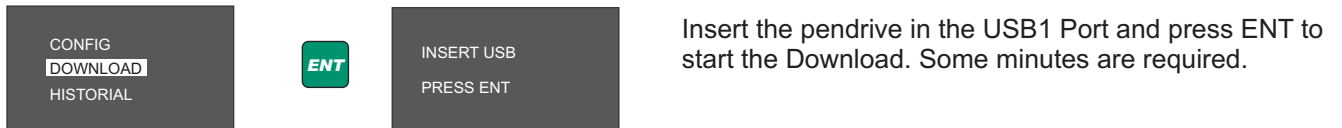
Controller 3000 has 1Mb of storage memory, which can store sensor values and products dosed. Options in History menu can configure Sample Frequency, download Data to a USB Memory Device (pendrive), and check the Records of each Fertigation Programm on the Screen.

5.1 SAMPLE FREQUENCY



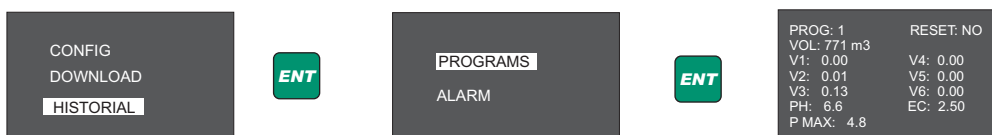
Change the Sample Frequency by pressing +/-.
In saving Period, the maximum Time stored for the introduced Sample Frequency is showed.
Validate pressing ENT.

5.2 SAMPLE DOWNLOAD IN PENDRIVE



Internal memory will keep latest values. When the memory is full, the oldest Value will be overwritten.
There is the option to download just data not transferred previously.

5.3 HISTORICS DATA CHECK



To change program number, press +/- and the information of the selected program will be displayed:
Accumulated volum of water and each product in m3.
PH and EC from last reset.
Maximum pressure reached from last reset.



6. CONTROLLER 3000 TECHNICAL FEATURES



CONTROLLER 3000

Power supply: 230VAC (+/-20%) 50/60Hz
Protection: IP55
Working temperature: 0 -45°C
Max relative humidity: 95% (without condensation)

Inputs:

- Pulse input flow optically insulated for high-frequency flowmeters (pallets or electromagnetic)
- EC: Input optically insulated for ITC conductivity sensor
- PH: Input optically insulated for connecting a pH sensor
- Pressure: 4-20mA analogue input for a pressure transmitter
- Activated area inputs (Controller 3000-6/12): 12-24 V AC/DC digital inputs

Outputs:

- 6 outputs 4-20mA for dosing pump.
- Flow alarm output: Relay output NO. 24 VAC -1A max
- EC alarm output: Relay output NO. 24 VAC -1A max
- PH alarm output: Relay output NO. 24 VAC -1A max
- Pressure alarm output: Relay output NO. 24 VAC -1A max

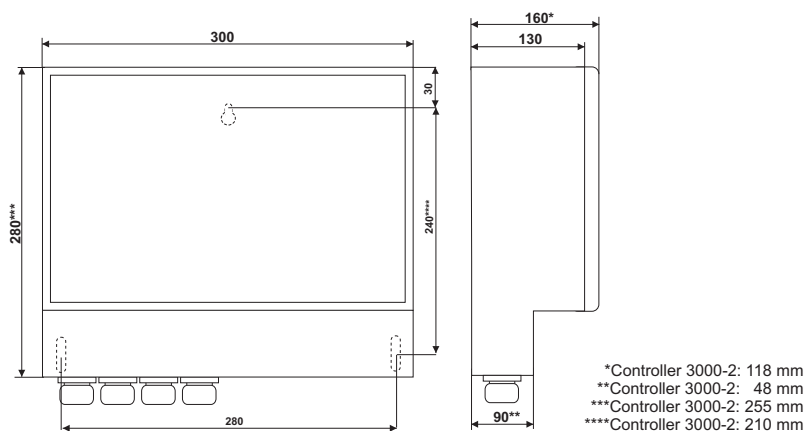
Communications:

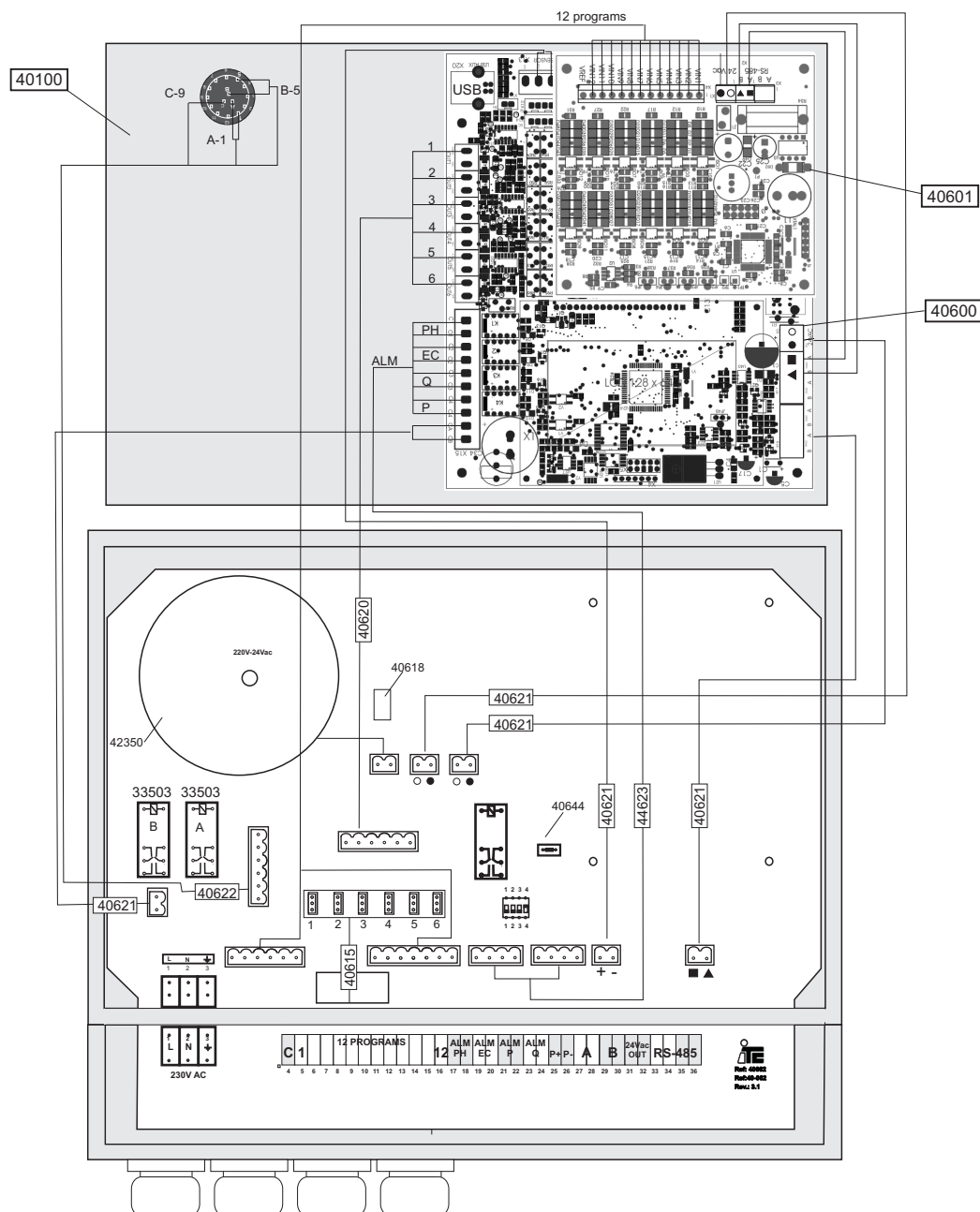
- USB1: for USB Memory Device (pendrive).
- USB2: for permanent connection to PC.



Do not use simultaneously the USB1 and USB2 Ports. Before connecting a pen drive to USB1 Port, disconnect USB2 port.

DIMENSIONS





CODE	DESCRIPTION	UNITS
33503	Relay 24 v ac two circuits	2
33516	Rotative switch	1
40100	Frontal Controller 3000	1
40600	C3000 electronic board	1
40601	Electronic board 12 input module C3000	-/1
40615	Cable C3000 4-20 c-c5p	2/6
40618	Fuse 3A autoreset	1
40620	Cable 6 wire female connector	1
40621	Cable manguera 2 hilos regleta hembra acodada	5
40622	Cable manguera C3000 6x0,25x150 conmutador	1
40644	Fusible 0.65A rearmable	1
42350	Transformador toroidal 220-24v 80va	1
44623	Cable manguera WTRpro 4x0,25x240 r	1
Assembly		
40-050	Conjunto placa C3000 completa	0
40-051	Conjunto placa C3000 + módulo 12 entradas comp	-/1
40-052	Conjunto placa conexiones C3000 completa	1

EC DECLARATION OF CONFORMITY

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

Declares that all the Models of the Controller 3000 Products identified with the Serial Number and Year of Manufacture fulfil the Low Voltage Directive 2006/95/EC and the Electromagnetic Compatibility Directive 2004/108/EC, as long as the Installation, the Use and the Maintenance will be executed in accordance with the current rules and following the instructions of the Manual.

Josep Segura
Manager

WARRANTY

ITC warranties the Product specified in this Document for 1 year period from the Purchase Date, against any manufacture or material Defect, and as long as the Installation, Use and Maintenance have been correct.

The Equipment must be sent, all inclusive charge, to our workshop or to the authorized ITC Technical Service, and its Return will be executed carriage forward.

The Equipment must be accompanied by the Warranty Document with the Purchase Date and the stamp of the Seller's Establishment, or a copy of the Account of goods purchased.

MODEL

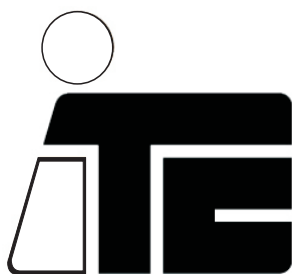
SERIAL NUMBER

Purchase Date and Stamp of the Seller's Establishment

DATE:



Ed:08.05.12-An



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P.O. Box 60
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BARCELONA - SPAIN

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