

# **AGRÓNIC**

## **4000**

### **INSTRUCTION**

### **MANUAL**

**VERSION 2 AT 220 Vac (or 115 Vac)**

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## **PRESENTATION**

We wish to take this opportunity to thank you for the confidence in us which you have demonstrated in expressing interest or acquiring the AGRÓNIC 4000.

This confidence, for our part, stimulates our efforts to meet and surpass the expectations of our clients to justify the traditional quality of our products.

This manual will explain the specification of the equipment as well as its installation and use.

However, if after reading this you still have any doubts, contact us and we will happily answer them.

## 2. BASIC FUNCTIONAL DESCRIPTION

Electronic unit for the control of irrigation, fertilization, pH, pumping and filter cleaning, plus malfunction detection and with the possibility of telemanaging the data via PC or mobile phone.

Models with 16, 24, 32, 48, 64, 80 and 96 configurable outputs, plus 12 signal inputs at the base. Extension of configurable outputs and inputs for the reading of analogical and digital sensors; both by direct connection to the unit or by means of field modules via cable 24 Vac or Monocable, or through the Agrónic Radio system. Possibility of programming by time and volume, both in irrigation and fertilization as in filter cleaning, with possibility of mixed performance (independent for each sub-program).

By means of climatic or crop sensors, it can influence the start conditions or the irrigation and fertilizer units.

### IRRIGATION

It can control up to 99 irrigation sectors, governed by 40 sequential programs, with 12 sub-programs in every sequence (total 480), and possibility of linking programs in order to carry out sequences of 24, 36, or more sub-programs.

Every sub-program can activate from 1 to 10 irrigation sectors simultaneously.

Every program can start its performance at a concrete time, when another program finishes, when a sensor reaches a certain value (°C, soil moisture, etc.), due to an input when a contact is closed, by mobile telephone via SMS message. It can also start its performance according to the days of the week, the irrigation frequency (irrigate every day, every 2 days, every 3 days, etc.) or irrigate every day with several performances. The period of the year when the program has to work can also be indicated. In a start by sensors, an active period and a margin of time between starts can be chosen.

Modification of irrigation and fertilization units by a manual factor or by sensors which will have an influence depending on their values from the previous irrigation, such as rain, evapotranspiration, integration of the solar radiation, etc.

When an irrigation is taking place, a program can be cancelled temporarily by sensor values such as wind, temperature, level, etc.

Grouping of programs up to 9 groups so that only one program of every group can irrigate at the same time.

Complete control of instantaneous flow of four possible irrigation counters, with programming of the expected flow in each sector and tolerance percentage both for excess or lack.

### FERTILIZATION

Capacity to configure from 0 to 8 fertilizers, in independent tanks.

Independent pre- and post-irrigation values for every program.

The time or volume of application of every fertilizer can be programmed independently for every sub-program.

The use of mixers can be configured, with pre-mixing and intermittent or non-stop mixing.

Fertilizers can be applied in two different ways:

- In series: one type of fertilizer after the other, with just one injector. In proportional fertigation, independent proportions for every fertilizer.
- In parallel: several fertilizers are applied simultaneously, with one injector for every one of them. In proportional fertilization, independent proportions for every type of fertilizer and sub-program.

The injection track can be cleaned automatically, with water, between the application of different types of fertilizer and at the end of the fertilization.

Reading of the instantaneous flow of fertilizers, as in irrigation.

With the option of "control pH", it can be controlled by injecting acid or base with a reference value independent for every sub-program. With values of alarm by excess or lack in the reading of the pH and in the electrical conductivity (EC).

It is possible to choose the control of pH at the pre-irrigation and post-irrigation.

### PUMPING

It has from 1 to 4 general irrigation outputs, which can be assigned to sectors, with independent activation and deactivation temporizations. The general number 1, by means of the "pressure regulation option", can give a 0-10 volt Analog output, in order to connect it to a frequency variator and maintain a pressure in the irrigation pipe line independent for every sector.

Optional control of a diesel engine, with outputs for start, stop, contact and warming up. Start and stop control of the electrical pumps.

### FLOWS

Every irrigation sector can be assigned to one of the 4 possible volumetric counters to irrigate in liters or m<sup>3</sup>. In the totals, the volume of irrigation and fertilizer is shared in proportion to the nominal flow assigned to every sector.

The fertilizer is programmed in liters, deciliters or centiliters with 8 counters.

### FILTER CLEANING

Up to four groups of independent filters, with the following values:

The number of filters to be used in every group can be configured. Two cleaning times for every filter group. Pause time between filters. The cleaning can be started by the differential pressure and/or by the time or volume of water circulation. Start or not of the

sectors when cleaning. Assignment of generals and counters. Control of continuous cleanings.

### MANUAL CONTROL

With manual control, you can start, stop and leave out of service irrigation programs; out of service or general Stop; start or stop the filter cleaning; end of alarms and malfunctions; direct activation of the outputs.

### READINGS

It can have the following records which are always updated:

- Sector totals and a general one to show the irrigation units in time and volume plus the calculated flow and the applied units of every fertilizer.

- Anomalies which have taken place during a period of several weeks, such as a power cut, flow cut, filter cleaning, fertilizer without control, irrigation or fertilizer counters, too much fertilizer, proportional fertilization, lack of communication with external modules, due to inputs of general malfunction, definitive, temporary or conditional stop, intrusion alarm, pH and EC sensors, error in memory, start and pressure in diesel engine, etc. All of them go with the day and time when they took place and the most relevant data in relation to the type of anomaly.

- New anomalies: with this record, the anomalies that have taken place since the last visualization are displayed.

- Record of the last 30 days, where the starts of every program, the filter cleanings that have taken place, the integration of the solar radiation and the room temperature, the rain accumulated that day and the evapotranspiration are showed. It will also show, for every sector, the irrigating units which have been carried out, the average of EC and pH applied and the fertilizer units. When there is a connection to a PC, the average of the readings of every half an hour, of every one of the 30 days will be recorded from the first 20 sensors, and the readings of all the active life of the unit can be stored.

- Sensors: with the instantaneous value of the different sensors connected to extensions, field modules or Microsis connected to the Agrónic 4000.

- Connecting a personal computer (PC), the operations are recorded, showing the day and time of every operation carried out by the unit, such as anomalies, irrigation starts with their main values, performance of the filters, mixers, erasures, etc. The information can be selected by means of the date, programs and anomalies. The Agrónic 4000 has a recording capacity of several weeks.

### ALARMS

It can generate alarms for more than 20 different conditions, activating one of the two alarm outputs (general and fertilization), recording the anomaly and sending a warning by GSM message if necessary.

### VISUALIZATION

Lightened screen of 2 lines of 40 characters, with internal contrast adjustment. Membrane keyboard with 23 keys and pulsing acoustic warning device. "STOP" key.

### MANAGEMENT THROUGH A PC

The unit can be managed through a personal computer by means of a PC program for the Agrónic 4000.

It can be linked via cable (RS232 or RS485) or by means of a telephonic modem (conventional or GSM).

Punctual information of the controller (recording, incidences, situation of the irrigation, etc.) can be obtained from the PC, giving the opportunity of acting on the Agrónic, modifying parameters, programs, ranks, etc., from any place using the PC.

### SMS MESSAGES

Connected to a GSM modem, "SMS messages" can be sent to a digital telephone, with alarms and incidences and regular messages of pre-established values. It can also receive orders such as start or stop a program, set at "Stop", modify the manual factor of a program, give the value of a virtual sensor such as the evapotranspiration, etc.

The sending of one or two reports a day about the irrigations that have taken place to a mobile phone can be configured

### EXTERNAL MODULES

Capacity to connect with external modules of different types:

- Expansion modules: up to 16 modules with 5 relay outputs, 2 digital inputs and 2 Analog inputs every one and communication through the 24 Vac line.
- Agrónic Radio 868 and 868-16: up to 64 modules, it is possible up to 16 latch solenoid outputs, and up to 16 digital inputs, and 2 analog inputs for sensors for each one of them.
- Agrónic Radio 2,4: up to 120 modules, it is possible up to 16 latch solenoid outputs, and up to 16 digital inputs, and 2 analog inputs for sensors for each one of them.
- Agrónic Monocable 64 and 120: up to 120 modules, it is possible up to 8 latch solenoid outputs, and up to 10 digital inputs and 1 analog input at every one.
- Via Radio 400 MHz: up to 31 modules with 4 or 7 outputs for latch solenoids of 2 wires, solar panel and battery for every one of them.
- 4 Microsis with 8 Analog inputs for sensors every one.
- $\mu$ Metos: reading collection station of 24 different probes.

### MODELS AND OPTIONS

- Model to "to built- in" a frame or "box" in a wall.

- Model with power supply at 230 Vac. (115 Vac.) or at 12Vdc.
- Extension of Analog inputs and outputs, 4 inputs and 2 outputs 0-10 V.
- Extension at 3 serial ports.
- Modem for connection to expansion modules.
- Expansion modules for field by cable being able to collect data about sensors.
- Expansion modules for field via radio.
- Option of sending GSM messages.
- Option of link to PC through a serial port RS232, RS485 or by means of GSM modem.
- Option of regulation of the pressure of the irrigation water.
- Option control pH and reading EC with alarm.
- Option conditioning of programs by sensors.
- Option diesel engine.
- Latch outputs (pulses) for two or three wires.
- Double voltage at outputs.
- Option of link with Agrónic radio.
- Option of link Monocable Modules.
- Option of link Microsis.
- Option of link MicroMetos.
- Version in Spanish, French, English, Italian and Portuguese.

#### WARRANTY

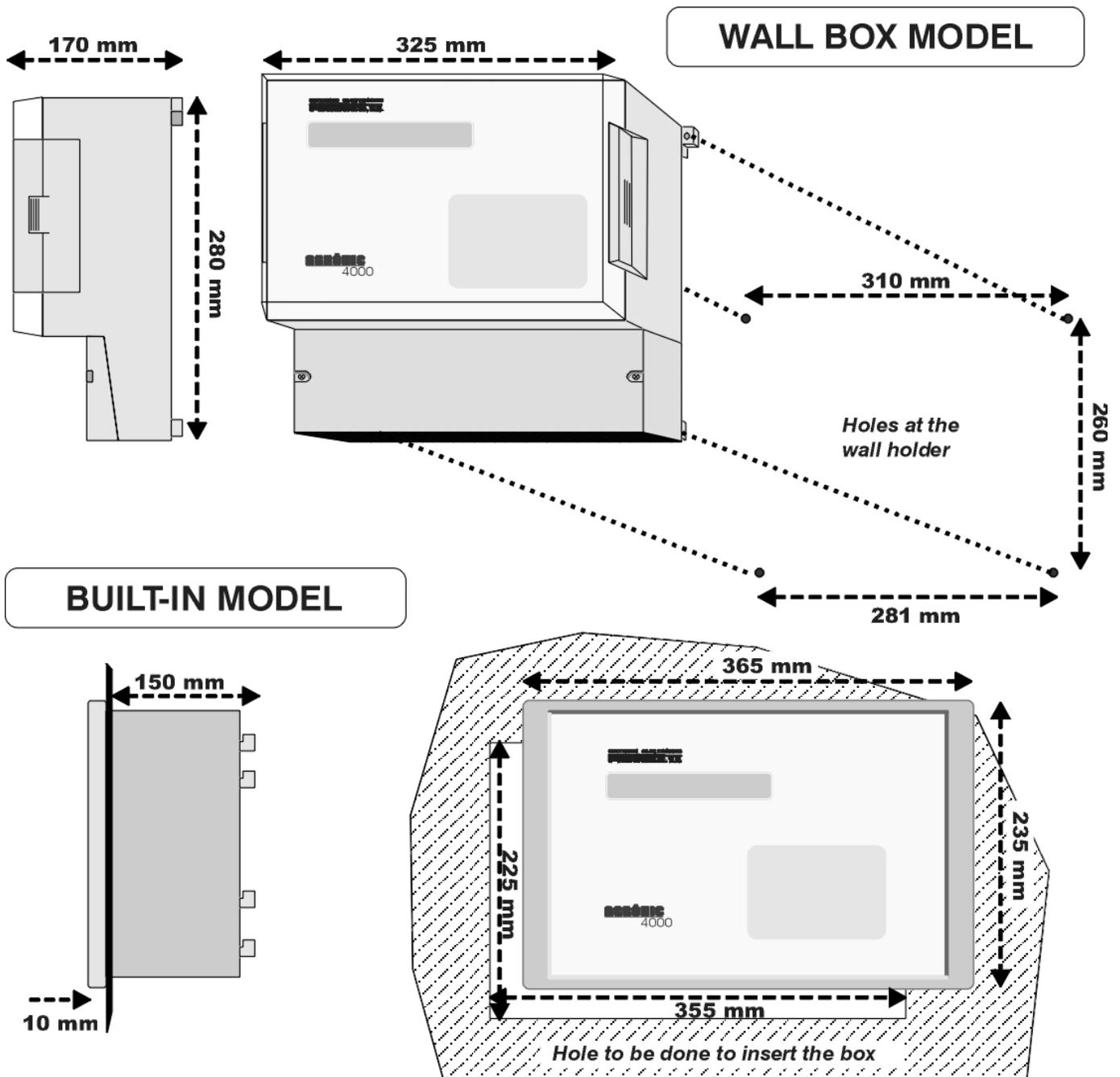
The irrigation controller Agrónic 4000 meets all the norms set by the CE.

The products created by PROGRÉS enjoy a two-year warranty against all manufacturing defects.

Compensation for direct or indirect damage caused by the use of the equipment is excluded from the warranty.



### 3. DIMENSIONS



### 4. INSTALLATION

#### 4.1. PLACING THE UNIT

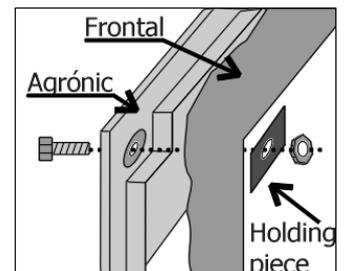
Place the unit at the right position and height.

Avoid direct sun exposure, humidity, dust and vibrations.

Avoid proximity to any source of interference which could affect the correct operation of the unit.

The A-4000 is made up of just one piece, except the built-in models with more than 32 outputs, which go with a second box.

In the “built-in model”, a hole is to be done in the frontal part of the wall or desk, according to the measures in the section DIMENSIONS. It will be held with the screws of the corners, using the four pieces which are included in the unit.



The wardrobe must have a double isolation with protection for the operation relationship to the net power supply circuit.



### 4.3. CONNECTION

The unit has to be installed following the prevailing regulations for electrical installations. The unit will not be completely protected if it is not used according to the information given in the manual.

The unit has to be placed in such a way that the elements which may get interferences, such as the sensor inputs, the sensor power supply, the links to the PC and modem, have their cables in the best emplacement, so that they do not receive interferences from power elements which might be in their surroundings.

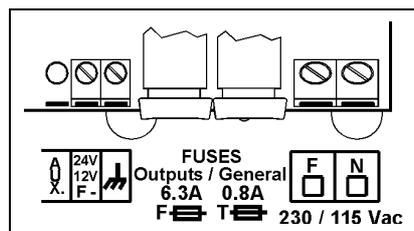
All the connection terminals of the Agrónic 4000 can be switched which allows a fast maintenance.

Progrés also offers a protection box for all the terminals, in case there is a high risk of electrical sparks from storms entering the cables.

#### 4.3.1. Power connection

Before connecting the unit, it is necessary to check its identification label where the characteristics of the power supply are to be found.

The standard power supply is at 230 Vac, being possible at 115 Vac. but it is necessary to ask Progrés about this last one.



Connect the phase and the power supply

neutral to the terminals marked as "N" and "F".

A 6 amp magneto-thermal switch is to be included in the installation. It will be used as a disconnection device and it has to be placed near the unit at an accessible place for the user.

It is recommendable to do this as directly as possible, avoiding that the same cable supplies other devices. Use cable of the H05VV-F type, 1mm<sup>2</sup>.

The power supply input is protected by a fuse, marked as General Fuse and a varistor.

The varistor might short-circuit the fuse automatically, on detecting an overload on the line (lightning, etc.). Replace it with one of the same characteristics.

For unstable or fluctuating voltages use grid stabilizers.

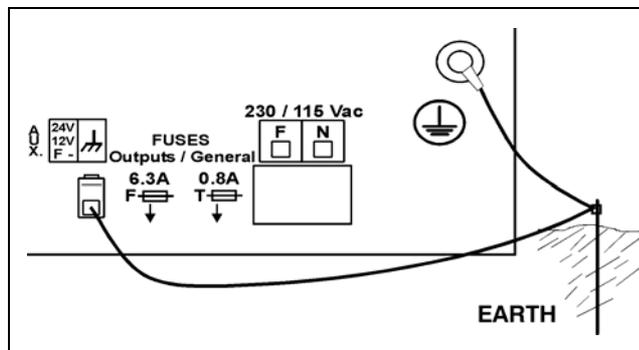
#### 4.3.2. Earth terminal connection

The "built-in" model has a terminal screw to connect the protection earth terminal (in the "box" model it is not necessary as it has not got a metallic casing). A pressed terminal will be applied to the cable when joining it to the screw.

The box terminal marked as  is internally connected to the filters and protections.

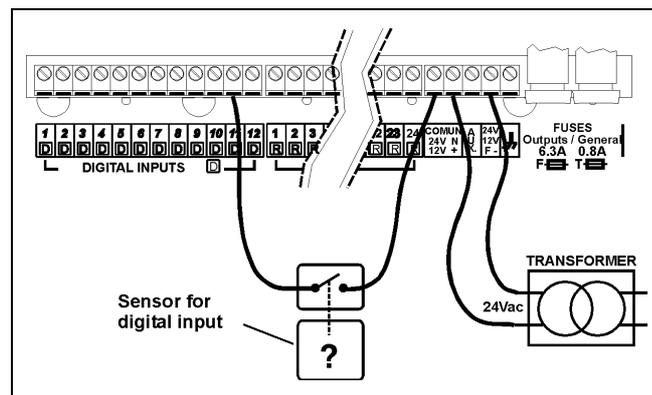
Both the earth and the box terminals are used to screen the circuitry, for this reason, it is very important

that the earth line is correctly installed and free of electric noise. It is also used to protect the unit by directing all electrical sparks through the internal gas discharger to the earth. These sparks can come in through the output cables when lightning strikes during a storm.



#### 4.3.3. Digital input connection

The different elements of the installation, such as pressure gauges, levels, counters, etc. are to be connected to the group of 12 terminals labeled as "Digital inputs (D)". This is done by connecting one contact pole to the corresponding input and the other pole to the 24 Vac "COMMON".



Contacts must normally be open and free of voltage.

One of the 44 possible functions can be assigned to everyone of the inputs in the section "Parameters-Inputs".

The inputs are optically isolated from the internal circuitry and depend on the same 24 Vac power supply of the outputs.

#### 4.3.4. Output connection

All outputs are ready to work at 24 Vac (it is very important not to supply the unit with voltages above to 30V).

The unit must have a external transformer with 24 Vac output and double isolation according to the UNE EN61010 norm. Its input will be connected to the output of the magneto-thermal switch which protects the Agrónic 4000. The 24Vac output is connected to the terminals marked with this voltage, entering a pole of

the output of the transformer into one of the terminals marked as “COMMON / 24 V N”, and the other pole into one of the terminals marked as “24 V F”.

Connect the solenoids, relays, etc. between the output common “COMMON” and the corresponding output.

Do not exceed the maximum power by output of 1 Amp and the general of 6,3 Amp. If this happens insert external relays.

The “output fuse” protects from overloads and short-circuits; to replace it half turn the cover of the fuses box and replace it by another one of similar characteristics.

The “AUX” terminal corresponds to the “PHASE” of the 24 Vac which goes through the fuse. It will be useful to connect auxiliary elements of manual command and extensions of relays above to 32 outputs.

The outputs are isolated from the internal circuitry by relays and protected by a varistor at everyone of them, plus a general gas discharger in the lines of 24 Vac.

The number of outputs can vary from 16 to 24, 32, 48, 64, 80 or 96 in the same unit. It is possible to

extend the outputs at a distance, in external modules “via radio” or “via cable”.

The maximum number of sectors to be controlled by the Agrónic 4000 is 99.

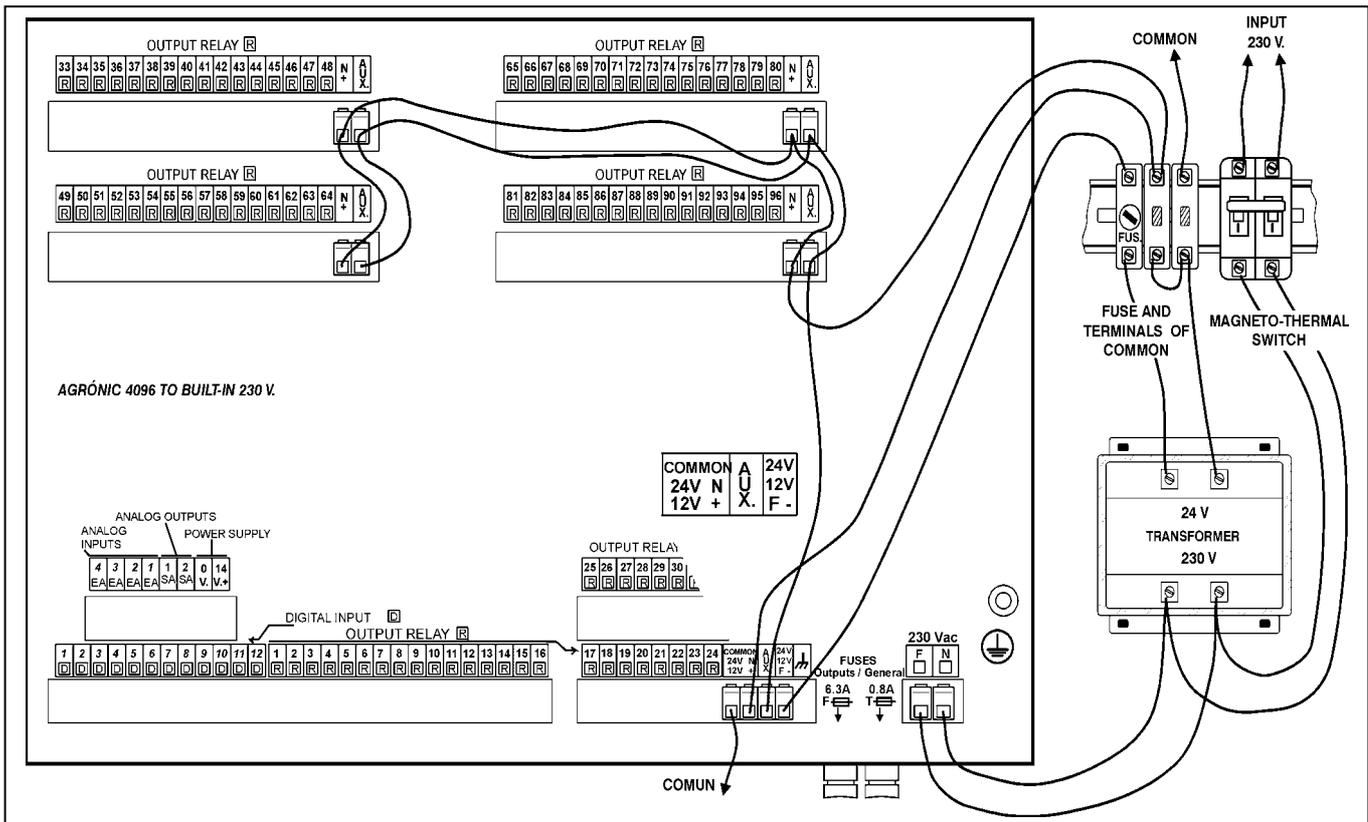
Every output can be assigned to an irrigation sector (one or more electrovalves) or to a general output (pumps, filters, mixers, etc.). To do so, go to the section of “Parameters-Sectors” or “Parameters-Generals”.

### 4.3.5. RS232 and RS485 connection links

An Agrónic 4000 with RS232 option will have a side connector where the power cable may be linked to a PC and an adapter for connection to modem.

An Agrónic 4000 with RS485 link will have a side connector (box model) or on the top (built-in model). This link is always made with bifilar wire: wires A and B. The connection shall be made by inserting wire “A” in terminal “1” of the connector and wire “B” in terminal “2”. To connect different equipment through RS-485 communication a linear bus must be used, with a single start and end; it must not be in star topology.

Example of connection



**Charts to write down the relay outputs to generals and sectors:**

Relay									
00000001		00000021		00000041		00000061		00000081	
00000002		00000022		00000042		00000062		00000082	
00000003		00000023		00000043		00000063		00000083	
00000004		00000024		00000044		00000064		00000084	
00000005		00000025		00000045		00000065		00000085	
00000006		00000026		00000046		00000066		00000086	
00000007		00000027		00000047		00000067		00000087	
00000008		00000028		00000048		00000068		00000088	
00000009		00000029		00000049		00000069		00000089	
00000010		00000030		00000050		00000070		00000090	
00000011		00000031		00000051		00000071		00000091	
00000012		00000032		00000052		00000072		00000092	
00000013		00000033		00000053		00000073		00000093	
00000014		00000034		00000054		00000074		00000094	
00000015		00000035		00000055		00000075		00000095	
00000016		00000036		00000056		00000076		00000096	
00000017		00000037		00000057		00000077			
00000018		00000038		00000058		00000078			
00000019		00000039		00000059		00000079			
00000020		00000040		00000060		00000080			
01000101 → 01000105		01000501 → 01000505		01000901 → 01000905		01001301 → 01001305			Expansion modules
01000201 → 01000205		01000601 → 01000605		01001001 → 01001005		01001401 → 01001405			
01000301 → 01000305		01000701 → 01000705		01001101 → 01001105		01001501 → 01001505			
01000401 → 01000405		01000801 → 01000805		01001201 → 01001205		01001601 → 01001605			
02100101 → 02100108		02100801 → 02100808		02101501 → 02101508		02102201 → 02102208		02102901 → 02102908	Agrónic Radio 868 modules
02100201 → 02100208		02100901 → 02100908		02101601 → 02101608		02102301 → 02102308		02103001 → 02103008	
02100301 → 02100308		02101001 → 02101008		02101701 → 02101708		02102401 → 02102408		02103101 → 02103108	
02100401 → 02100408		02101101 → 02101108		02101801 → 02101808		02102501 → 02102508		02103201 → 02103208	
02100501 → 02100508		02101201 → 02101208		02101901 → 02101908		02102601 → 02102608			
02100601 → 02100608		02101301 → 02101308		02102001 → 02102008		02102701 → 02102708			
02100701 → 02100708		02101401 → 02101408		02102101 → 02102108		02102801 → 02102808			
03100101		03101401		03102701		03104001		03105301	Monocable 64 modules
03100201		03101501		03102801		03104101		03105401	
03100301		03101601		03102901		03104201		03105501	
03100401		03101701		03103001		03104301		03105601	
03100501		03101801		03103101		03104401		03105701	
03100601		03101901		03103201		03104501		03105801	
03100701		03102001		03103301		03104601		03105901	
03100801		03102101		03103401		03104701		03106001	
03100901		03102201		03103501		03104801		03106101	
03101001		03102301		03103601		03104901		03106201	
03101101		03102401		03103701		03105001		03106301	
03101201		03102501		03103801		03105101		03106401	
03101301		03102601		03103901		03105201			

<i>Relay</i>		<i>Relay</i>		<i>Relay</i>		<i>Relay</i>		<i>Relay</i>			
06000101→ 06000115		06000701→ 06000715		06001301→ 06001315		06001901→ 06001915		06002501→ 06002515		Radio modules (400MHz)	
06000201→ 06000215		06000801→ 06000815		06001401→ 06001415		06002001→ 06002015		06002601→ 06002615			
06000301→ 06000315		06000901→ 06000915		06001501→ 06001515		06002101→ 06002115		06002701→ 06002715			
06000401→ 06000415		06001001→ 06001015		06001601→ 06001615		06002201→ 06002215		06002801→ 06002815			
06000501→ 06000515		06001101→ 06001115		06001701→ 06001715		06002301→ 06002315		06002901→ 06002915			
06000601→ 06000615		06001201→ 06001215		06001801→ 06001815		06002401→ 06002415		06003001→ 06003015			
07100101→ 07100108		07102501→ 07102508		07104901→ 07104908		07107301→ 07107308		07109701→ 07109708		Agrónic Monocable 120 modules	
07100201→ 07100208		07102601→ 07102608		07105001→ 07105008		07107401→ 07107408		07109801→ 07109808			
07100301→ 07100308		07102701→ 07102708		07105101→ 07105108		07107501→ 07107508		07109901→ 07109908			
07100401→ 07100408		07102801→ 07102808		07105201→ 07105208		07107601→ 07107608		07110001→ 07110008			
07100501→ 07100508		07102901→ 07102908		07105301→ 07105308		07107701→ 07107708		07110101→ 07110108			
07100601→ 07100608		07103001→ 07103008		07105401→ 07105408		07107801→ 07107808		07110201→ 07110208			
07100701→ 07100708		07103101→ 07103108		07105501→ 07105508		07107901→ 07107908		07110301→ 07110308			
07100801→ 07100808		07103201→ 07103208		07105601→ 07105608		07108001→ 07108008		07110401→ 07110408			
07100901→ 07100908		07103301→ 07103308		07105701→ 07105708		07108101→ 07108108		07110501→ 07110508			
07101001→ 07101008		07103401→ 07103408		07105801→ 07105808		07108201→ 07108208		07110601→ 07110608			
07101101→ 07101108		07103501→ 07103508		07105901→ 07105908		07108301→ 07108308		07110701→ 07110708			
07101201→ 07101208		07103601→ 07103608		07106001→ 07106008		07108401→ 07108408		07110801→ 07110808			
07101301→ 07101308		07103701→ 07103708		07106101→ 07106108		07108501→ 07108508		07110901→ 07110908			
07101401→ 07101408		07103801→ 07103808		07106201→ 07106208		07108601→ 07108608		07111001→ 07111008			
07101501→ 07101508		07103901→ 07103908		07106301→ 07106308		07108701→ 07108708		07111101→ 07111108			
07101601→ 07101608		07104001→ 07104008		07106401→ 07106408		07108801→ 07108808		07111201→ 07111208			
07101701→ 07101708		07104101→ 07104108		07106501→ 07106508		07108901→ 07108908		07111301→ 07111308			
07101801→ 07101808		07104201→ 07104208		07106601→ 07106608		07109001→ 07109008		07111401→ 07111408			
07101901→ 07101908		07104301→ 07104308		07106701→ 07106708		07109101→ 07109108		07111501→ 07111508			
07102001→ 07102008		07104401→ 07104408		07106801→ 07106808		07109201→ 07109208		07111601→ 07111608			
07102101→ 07102108		07104501→ 07104508		07106901→ 07106908		07109301→ 07109308		07111701→ 07111708			
07102201→ 07102208		07104601→ 07104608		07107001→ 07107008		07109401→ 07109408		07111801→ 07111808			
07102301→ 07102308		07104701→ 07104708		07107101→ 07107108		07109501→ 07109508		07111901→ 07111908			
07102401→ 07102408		07104801→ 07104808		07107201→ 07107208		07109601→ 07109608		07112001→ 07112008			
08100101→ 08100116		08101401→ 08101416		08102701→ 08102716		08104001→ 08104016		08105301→ 08105316			Agrónic Radio 868- 16 modules
08100201→ 08100216		08101501→ 08101516		08102801→ 08102816		08104101→ 08104116		08105401→ 08105416			
08100301→ 08100316		08101601→ 08101616		08102901→ 08102916		08104201→ 08104216		08105501→ 08105516			
08100401→ 08100416		08101701→ 08101716		08103001→ 08103016		08104301→ 08104316		08105601→ 08105616			

<i>Relay</i>		<i>Relay</i>		<i>Relay</i>		<i>Relay</i>		<i>Relay</i>	
08100501→ 08100516		08101801→ 08101816		08103101→ 08103116		08104401→ 08104416		08105701→ 08105716	
08100601→ 08100616		08101901→ 08101916		08103201→ 08103216		08104501→ 08104516		08105801→ 08105816	
08100701→ 08100716		08102001→ 08102016		08103301→ 08103316		08104601→ 08104616		08105901→ 08105916	
08100801→ 08100816		08102101→ 08102116		08103401→ 08103416		08104701→ 08104716		08106001→ 08106016	
08100901→ 08100916		08102201→ 08102216		08103501→ 08103516		08104801→ 08104816		08106101→ 08106116	
08101001→ 08101016		08102301→ 08102316		08103601→ 08103616		08104901→ 08104916		08106201→ 08106216	
08101101→ 08101116		08102401→ 08102416		08103701→ 08103716		08105001→ 08105016		08106301→ 08106316	
08101201→ 08101216		08102501→ 08102516		08103801→ 08103816		08105101→ 08105116		08106401→ 08106416	
08101301→ 08101316		08102601→ 08102616		08103901→ 08103916		08105201→ 08105216			
09100101→ 09100116		09102501→ 09102516		09104901→ 09104916		09107301→ 09107316		09109701→ 09109716	
09100201→ 09100216		09102601→ 09102616		09105001→ 09105016		09107401→ 09107416		09109801→ 09109816	
09100301→ 09100316		09102701→ 09102716		09105101→ 09105116		09107501→ 09107516		09109901→ 09109916	
09100401→ 09100416		09102801→ 09102816		09105201→ 09105216		09107601→ 09107616		09110001→ 09110016	
09100501→ 09100516		09102901→ 09102916		09105301→ 09105316		09107701→ 09107716		09110101→ 09110116	
09100601→ 09100616		09103001→ 09103016		09105401→ 09105416		09107801→ 09107816		09110201→ 09110216	
09100701→ 09100716		09103101→ 09103116		09105501→ 09105516		09107901→ 09107916		09110301→ 09110316	
09100801→ 09100816		09103201→ 09103216		09105601→ 09105616		09108001→ 09108016		09110401→ 09110416	
09100901→ 09100916		09103301→ 09103316		09105701→ 09105716		09108101→ 09108116		09110501→ 09110516	
09101001→ 09101016		09103401→ 09103416		09105801→ 09105816		09108201→ 09108216		09110601→ 09110616	
09101101→ 09101116		09103501→ 09103516		09105901→ 09105916		09108301→ 09108316		09110701→ 09110716	
09101201→ 09101216		09103601→ 09103616		09106001→ 09106016		09108401→ 09108416		09110801→ 09110816	
09101301→ 09101316		09103701→ 09103716		09106101→ 09106116		09108501→ 09108516		09110901→ 09110916	
09101401→ 09101416		09103801→ 09103816		09106201→ 09106216		09108601→ 09108616		09111001→ 09111016	
09101501→ 09101516		09103901→ 09103916		09106301→ 09106316		09108701→ 09108716		09111101→ 09111116	
09101601→ 09101616		09104001→ 09104016		09106401→ 09106416		09108801→ 09108816		09111201→ 09111216	
09101701→ 09101716		09104101→ 09104116		09106501→ 09106516		09108901→ 09108916		09111301→ 09111316	
09101801→ 09101816		09104201→ 09104216		09106601→ 09106616		09109001→ 09109016		09111401→ 09111416	
09101901→ 09101916		09104301→ 09104316		09106701→ 09106716		09109101→ 09109116		09111501→ 09111516	
09102001→ 09102016		09104401→ 09104416		09106801→ 09106816		09109201→ 09109216		09111601→ 09111616	
09102101→ 09102116		09104501→ 09104516		09106901→ 09106916		09109301→ 09109316		09111701→ 09111716	
09102201→ 09102216		09104601→ 09104616		09107001→ 09107016		09109401→ 09109416		09111801→ 09111816	
09102301→ 09102316		09104701→ 09104716		09107101→ 09107116		09109501→ 09109516		09111901→ 09111916	
09102401→ 09102416		09104801→ 09104816		09107201→ 09107216		09109601→ 09109616		09112001→ 09112016	

Agrónic Radio 868-16 modules (continuation)

Agrónic Radio 2,4 modules

## 4.4. EXTENSIONS

On installing extensions in the Agrónic 4000, protecting measures have to be taken in order not to damage the circuits. It is very important to disconnect any connection to the mains to avoid electro-shock.

Follow the installation instructions enclosed in the extension element.

## 4.5. MAINTENANCE

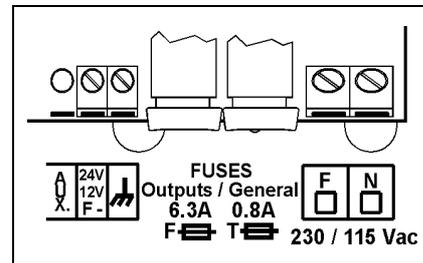
### 4.5.1. Fuses

In order to replace the fuses it is necessary, for precaution, to disconnect the unit from the general mains, half turn the cover of the fuse holder and insert one of the same characteristics, as it is indicated at the label placed next to the fuse holder. Spare fuses are included in the unit.

The fuse marked as “General fuse” protects the power supply input. Replace it with one of the same

characteristics as it may damage the unit if this is not taken into account.

The fuse marked as “Output fuse” protects the outputs from short-circuits. Replace it with one with the same characteristics as it may damage the unit if this is not taken into account.



### 4.5.2. Cleaning

The frontal part is cleaned with a slightly humid cloth, disconnecting the unit from the mains previously.

## 4.6. CODIFICATION OF INPUTS AND OUTPUTS

Both the analog and digital inputs as well as the digital outputs (relays) are coded using an 8-digit number that indicates its physical location. Following tables are shown to help code them.

### 4.6.1. Digital outputs (relays)

Device		Output	
00: Base	0	00001 a 00096	
		Module	Output
01: Expansion modules	0	001 to 016	01 to 05
02: Agrónic Radio 868 module	1	001 to 032	01 to 08
03: Agrónic Monocable 64 modules	1	001 to 064	01
06: Via radio a 400MHz modules	0	001 to 030	01 to 15
07: Agrónic Monocable 120 modules	1	001 to 120	01 to 08
08: Agrónic Radio 868-16 modules	1	001 to 064	01 to 16
09: Agrónic Radio 2,4 modules	1	001 to 120	01 to 16

Examples:

00000001: output 1 of the Base

01000103: output 3 of the Expansion module 1 (ME1)

08100503: output 3 of the Agrónic Radio 868-16, Agrónic Radio module 5 (MAR5)

09102301: output 1 of the Agrónic Radio 2,4, Agrónic Radio module 23 (MAR023)

07101005: output 5 of the Agrónic Monocable 120, Agrónic Monocable module 10 (MAM10)

### 4.6.2. Digital inputs

Device		Module	Input
00: Base	0	000	01 to 12
01: Expansion modules	0	001 to 016	01 to 02
02: Agrónic Radio 868 modules	1	001 to 032	01 to 08
03: Agrónic Monocable 64 modules	1	001 to 064	01
07: Agrónic Monocable 120 modules	1	001 to 120	01 to 10
08: Agrónic Radio 868-16 modules	1	001 to 064	01 to 16
09: Agrónic Radio 2,4 modules	1	001 to 120	01 to 16

Examples:

00000008: digital input 8 of the Base

01000402: digital input 2 of the Expansion module 4 (ME4)

08101502: digital input 2 of the Agrónic Radio 868-16, Agrónic Radio module 15 (MAR15)

09102301: digital input 1 of the Agrónic Radio 2.4, Agrónic Radio module 23 (MAR023)

07109007: digital input 7 of the Agrónic Monocable 120, Agrónic Monocable module 90 (MAM90)

#### 4.6.3. Analog inputs (sensors)

Device		Module	Input
00: Base	0	000	01 to 04
01: Expansion modules	0	001 to 016	01 to 02
02: Agrónic Radio 868 modules	1	001 to 032	01 to 02
04: SMS Messages	0	000	01 to 08
05: Microsis	0	001 to 004	01 to 08
06: Metos	0	000	01 to 24
07: Agrónic Monocable 120 modules	1	001 to 120	01
08: Agrónic Radio 868-16 modules	1	001 to 064	01 to 02
09: Agrónic Radio 2,4 modules	1	001 to 120	01 to 02

Examples:

00000003: analog input 3 of the Base

01001601: analog input 1 of the Expansion module 16 (ME16)

04000003: input of SMS message 3

05000203: analog input 3 of the Microsis 2

07101001: analog input 1 of the Agrónic Monocable 120, Monocable module 10 (MAM10)

## 4.7. INSTALLER'S CONFIGURATION

Upon entering in this section the following menu is displayed:

Erasure : 1	Test : 2	Various: 3
Options : 4	Alarms : 5	Comunic. : 6

Erasure

- Erasure: Carry out a total erasure.
- Carry out an erasure of the record.

Test

- Carry out a test of relays.
- Test of Analog outputs (0-10 V.)
- Test of the serial ports.
- Value of digital adjustment of the clock, normally there is "210" for an average temperature of 25 °C. If the average temperature was higher the value should be lowered.

Various:

- Choose whether to operate the volume in metric units (m<sup>3</sup>) or in U.S.A. units (Gallons).
- Increase the format of the instantaneous volume for irrigation and fertilizing meters, going from 650.00 m<sup>2</sup> o liters per hour to 6500,0.
- The minutes for control of error in watering or fertilizer counters; by default there are 10 minutes.
- When a watering program is outside of the schedule or active period and has pending ac-

tivations to be completed, it must be configured if it is to be cancelled or continued.

- When a program comes out of its active timetable, the watering in progress may be cancelled.
- To be able to keep the motors on when there is a conditional stop by digital or analog sensor.
- In the pH regulation option, choose the regular by output pressed or analog 0-10 volts.
- Fertilization may be stopped on cleaning the filters.
- In parallel and proportional fertilization, the pulses that occur as the proportion ends may be counted (useful when the time between pulses is less than two seconds).

Options:

- Activation or deactivation of options once the equipment is installed, to activate enter the code supplied by PROGRÉS and to deactivate enter an incorrect code.

Alarms:

- Activation of alarms and/or SMS messages for each of the anomalies.

Communications:

Agr.Rad868 : 1	Agr.Rad24 : 2	Agr.Mon. : 3
ModBus : 4	Others : 5	

- Agrónic Radio 868:
  - Agrónic Radio 868-16?. Responding yes indicates that the model connected to the equipment is 868-16 (with 16 outputs), no indicates that it is model 868 (8 outputs).
  - Channel: radio channel to be used in the communication with the modules. It can be from 1 to 6. \*1\*
  - Suspend Agrónic Radio: responding yes puts the Agrónic Radio system in low consumption, stopping communication with the modules. It is recommended that the Agrónic Radio be suspended during periods when watering is not going to be performed, therefore considerably lengthening the life of the batteries. \*4\*
  - Record collisions: answering yes will register incorrect radio communications as an anomaly.
  - If the model selected is the Agrónic Radio 868:
    - Module attempts: number of communication attempts before displaying error with the MR.
    - Connection box attempts: number of communication attempts before displaying error with the CER.

Communication in this model is always through port 2 (RS485).
  - If the model selected is the Agrónic Radio 868-16:
    - Module attempts.
    - ModBus address. \*3\*
    - Net code. \*5\*

Consult the Agrónic Radio 868-16 manual for more information about settings. \*3\*

Communication with this model is performed using the ModBus protocol, and is connected to the serial port that it assigns to the ModBus.
- Agrónic Radio 2,4:
  - Channel: radio channel to be used in the communication with the modules. It can be from 1 to 7. \*1\*
  - Module attempts: number of communication attempts before displaying error with the MAR. \*2\*
  - ModBus address: (consult the Agrónic Radio 2,4). \*3\*
  - Suspend Agrónic Radio: responding yes puts the Agrónic Radio system in low consumption, stopping communication with the modules. It is recommended that the Agrónic Radio be suspended during periods when watering is not going to be performed, therefore considerably lengthening the life of the batteries. \*4\*
  - Net code: (consult the Agrónic Radio 2,4). \*5\*
- Agrónic Monocable:
  - Agrónic Monocable 120?. By responding yes indicates that the model connected to the equipment is the 120 (up to 120 MAM of 8 outputs), no indicates that it is model 64 (up to 64 MM of 1 output).
  - If the model selected is the Agrónic Monocable 64:
    - Module attempts: number of communication attempts before displaying error with the MM. \*2\*
    - Connection box attempts: number of communication attempts before displaying error of CEM.

Communication with this model is always through port 2 (RS485).
  - If the model selected is the Agrónic Monocable 120:
    - Module attempts.
    - ModBus address.
    - Initial waiting time.
    - Vdc anomaly cut-off delay.
    - Vdc action cut-off delay.
    - Vdc action cut-off.

Consult the Agrónic Monocable 120 manual for information about these settings.

Communication with this model is performed using the ModBus protocol, and is connected to the serial port that it assigns to the ModBus.
- ModBus:
  - Serial port: indicates the serial port through which communication is made with the ModBus protocol. It may be ports 1 (RS232) and 2 (RS485). If left at 0 no port is assigned.
  - Transmission velocity: 0-1200 bps, 1-2400 bps, 2-4800 bps, 3-9600 bps, 4-19200 bps.
  - Parity: 0-none, 1-even, 2-odd
  - Length of *timeout*: time that will be waited for a response before reattempting communication.
  - Number of reattempts: number of times that the same thread will be resent in case of error.
- Others:
  - Microsis – attempts: number of communication attempts before displaying error with the Microsis.
  - uMetos – attempts: number of communication attempts before displaying error with the uMetos.
  - SMS messages – attempts: number of attempts to send an SMS.

This programming is only carried out by the installer the first time the unit is started. He is also the only one who can modify it according to the variations or extensions which are incorporated into the installation or the unit.

## 5. TECHNICAL CHARACTERISTICS

<b>Power supply</b>		
Tension		230 Vac or 115 Vac+5% -10% CAT II
Frequency		50-60 Hz
Energy consumption		Below to 43 VA
Fuses	Input	0,800 A, T type, 250 V (slow)
	Output	6,3 A, F type, 250 V (fast)
Keeping the memory which can be erased when there is a power cut		Lithium Battery, at 3 V.

<b>Outputs</b>	Digital	Number	16 extensible to 24, 32, 48, 64, 80, 96.
		Type	By relay contact, with potential of 24 VAC (External transformer)
		Limits	30VAC / 30VDC, 1 Amp, 50-60 Hz, CAT II
	Analog	Number	2
	(option)	Type	By voltage of 0 to 10 volts.

<b>Inputs</b>	Digital	Number	12
		Type	Optolinked, work at 24 VAC
	Analog	Number	4
	(option)	Type	4-20 mA, 0-5 V.(with galvanic separation)

<b>Atmosphere</b>	Temperature	0°C to 45°C
	Humidity	<85%
	Height	2000m
	Pollution	Grade 2

<b>Weight</b> (Kg.)	Box model	Built-in model
	From 3.2 to 6.3	From 4.0 to 5.0

<b>Memory backup</b>	Clock and data	Above to 5 years.
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### DECLARATION OF CONFORMITY

It follows the 89/336/CEE guidelines for the Electromagnetic Compatibility and the 73/23/CEE guidelines of Low tension for the fulfillment of the product security. The fulfillment of the following specifications was demonstrated as indicated in the Official Diary of the European Communities:



Emissions EN 50081-1:94	EN 55022:1994 Type B	Radiated and conducted emissions.
Immunity EN 50082-1:97	EN 61000-4-2 (95)	Immunity to electrostatic discharges.
	EN 61000-4-3 (96)	Immunity to the electromagnetic field of radioelectric frequency.
	EN 61000-4-4 (95)	Immunity to fast transitional in gusts.
	EN 61000-4-5 (95)	Immunity to crash waves.
	EN 61000-4-6 (96)	Current injection
	EN 61000-4-11 (94)	Variations to the power supply.
Harmonics	EN 61000-3-2 (95)	Current harmonics.
Fluctuations	EN 61000-3-3 (95)	Tension fluctuations (Flickers).
Low tension guidelines:	EN 61010-1	Security requirements of measurement electric units, control and use in laboratory.

<b>Symbols which may appear in the product</b>	Protection earth terminal		Danger, risk of electroshock		Box terminal	
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	This symbol indicates that the electrical and electronic equipment should not be disposed of as general household waste at its end-of-life. Instead, the product should be handed over to the applicable collection point for the recycling of electrical and electronic equipment for proper treatment, recovery and recycling in accordance with your national legislation.
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## 6. PARAMETERS

In order to install the unit, it is necessary to enter in the section of "Parameters" to adapt it to the particular necessities of each installation. Press "FUN" (functions) and choose the function by its number (4). Then press "Enter".

Programs : 1	Readings : 2	Erasure : 3
<b>Parameters: 4</b>	Manual : 5	Clock : 6

There are 9 options to choose in the "Parameters" menu:

PARAMETERS	Fertilis.: 1	Cleaning : 2
Generals : 3	Inputs : 4	Flows : 5

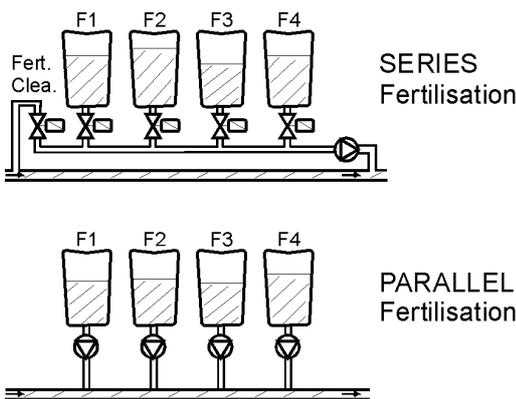
PARAMETERS	Sectors : 6	Programmes : 7
Comunication: 8	Miscellaneous: 9	

In order to get placed in one of the two screens of the menu, press the up and down arrow keys. Then press the number of the option and the "Enter" key.

### 6.1. FERTILIZATION PARAMETERS

Of the 8 possible fertilizers, the ones which are going to work have to be configured. It has to be also defined if the fertilization will be in **series** [1] (apply one fertilizer after the other) or in **parallel** [2] (apply several at a time).

Fertilisers number ( 0 – 8 ) : 3
Fertilisation series (1) parallel (2) : 1



Each one of the types of fertilization can be configured to be applied one after the other or proportionally to the irrigation units.

As shown in the picture above, the **series fertilization** applies each one of the fertilizers for the total of the programmed value once its addition starts. When the series fertilization is programmed the totality is applied before the next one. They are applied at a time

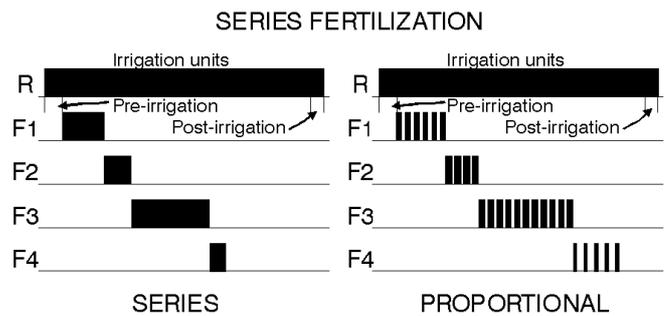
and in its totality when it is programmed in parallel. They stop when the programmed units in one of them finish. Look at the explicative drawings.

The **proportional fertilization** consists in applying each type of fertilizer not one after the other but in several activations, with doses which will maintain a prefixed proportionality in relation to the amount of water circulating.

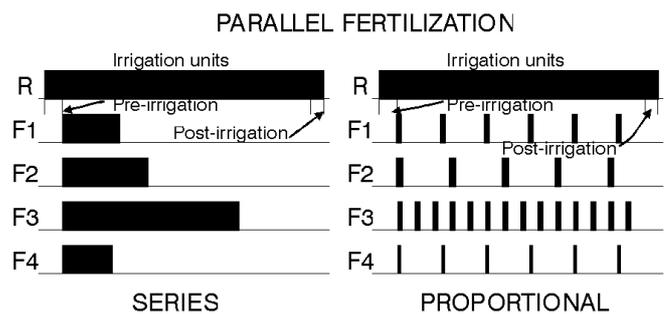
Proportional Fertilization (Y/N) : YES
F1 005/012 F2 005/014 F3 005/009 F4 010/002

If the proportional modality is chosen, at the series application format will ask for the proportions for each one of the fertilizers and at the irrigation programs, the total quantity of water and fertilizer to be applied to the crop will be programmed.

For example, the proportion "010/002" corresponds to 10 irrigation units per each 2 fertilizer units. These units can be in time (hours: minutes, minutes' seconds") or in volume (m<sup>3</sup>, L, dl, cl), in relation to the units each sub-program has.



At the parallel fertilization modality it does not ask here for the proportions of the different fertilizers, but it does for each one of the irrigation programs.



The pre-irrigation and the post-irrigation are independently programmed in each program.

The way of acting of the proportional modality is the next: the pre-fixed pre-irrigation is done, it applies the programmed water/fertilizer proportion, when the fertilizer units conclude, it will wait until the irrigation units of the proportion conclude and it will apply another proportional cycle. It will continue this way until arriving at the post-irrigation or end of the irrigation in the parallel application or it will wait until the fertilizer units of the program conclude in the series one.

The unit allows to do a **cleaning** of the pipe lines and injector with water at the end of each fertilizers at the series application or at the end of them all in the parallel one. If no cleaning is desired, leave the cleaning seconds at 0.

Fertilizer end cleaning : 018"

Each fertilizer can have its associated **mixer**, with independent pre-mixing set on mixing and stop mixing values.

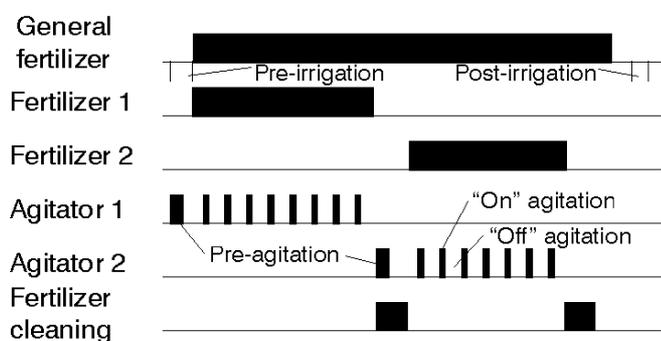
Mixer 1                      Pre-mixing : 035"  
On/off mixing : 015" / 120"

The pre-mixing will enter when the irrigation in the pre-irrigation units start. If pre-mixing is not desired leave the value at 0.

The mixing will enter when starting the correspondent fertilizer and will constantly act during the whole application of the fertilizer if value is only given in the set on seconds. If value is only given to the stop seconds, there will not be mixing. Programming the set on and stop temporization, the mixing will be intermittent.

At the proportional fertilization modality, the mixers will act without having in consideration the pauses of the fertilizer.

**Agitation / Fertilizer cleaning**



[ values for pH/EC control option ]

[Every time a sentence like this appears in shading letters, it means more screens will appear when having this option activated. To work with this option it is necessary to have it discharged and to have the supplement to the explanation manual of this one.]

**6.2. FILTER CLEANING PARAMETERS**

The filters cleaning is another important service of the Agrónic range which allows to clean periodical and automatically the four possible groups of filters by means of a sequenced cleaning.

Before configuring the values for the cleaning of this sector, it is necessary to enter in the sector [6.3]

of "General outputs parameters" to configure the number and the outputs of each group of filters.

Each group of filters is independent, in its configuration and operation, to the others.

First it will ask which group the values will be entered for.

Filters group number : 1

To apply the cleaning two times can be programmed, of utility, for instance, when there are both rings and sand filters, or when there is a first filter which gets dirtier than the other ones. In case of being the cleaning time common to all the filters of the group, the values of the second subgroup will be left at 0.

Let's see a configuration example of a filters cleaning group: there are 8 filters. The 4 first have a 30 second cleaning time and the others a two minute time.

Cleaning time: 030"    sub-g. 1 : 01 a 04  
Cleaning time: 120"    sub-g. 2 : 05 a 08

The pause time between filters is the delay in the starting of each filter's cleaning.

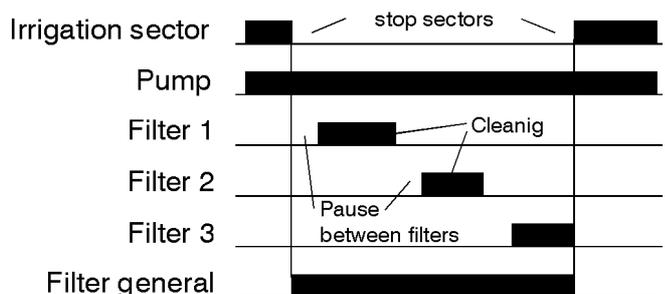
The units between cleanings correspond to the time or volume of water circulating through the filters to make a new cleaning of them. The units will be in minutes, cubic meters or liters, depending on what programmed in the "Irrigation units" of the "Flow parameters" (6.5).

The cleaning can also be started by a differential pressure gauge connected to a digital input. Whenever a filter cleaning takes place, the counter of units between cleanings is reinitiated.

In order to avoid the filters cleaning by units, leave the value at 0.

Pause time between filters : 04"  
Units between cleanings: 02300

**FILTER CLEANING**



Answering affirmatively to the "Stop sectors when cleaning" request, the sectors which have common irrigation pumps assigned with those assigned to the

filters cleaning will temporary stop. Once finished, the sectors will continue at the same point where they stopped.

In order to avoid a continued filter cleaning, a maximum number of cleanings can be configured. When the programmed value is surpassed it enters in the "Filter cleaning without control" malfunction. In order to reactivate the cleaning go to the "manual" function, "malfunctions" sector and stop it.

In order to count a cleaning as a continued one, the time between one cleaning and another must be of 5 minutes.

In order to avoid the control, leave the value at 0.

Stop sectors when cleaning : YES  
Max. Num. of cleanings in a row : 3

At the following screen, the pumps and volume counters are assigned to the filters group. With this the next features are reached:

- Count the time between cleanings when pumps irrigating and coinciding with the assigned in this sector, whenever at flow parameters the irrigation had been configured in units of time.
- Count the volume between cleanings when pulses of the volume counters coinciding with the assigned here arrive, whenever at flow parameters the irrigation had been configured in units of volume.
- Start the pumps configured here when the stop of the irrigation sectors in the filters cleaning has been ordered.
- Take into account the differential pressure gauge correspondent to the group of filters, whenever that any pump of the ones assigned here is set on.

In relation to	P	1	2	3	4	C	1	2	3	4
		Y	Y	N	N		Y	Y	N	N

### 6.3. GENERAL OUTPUTS PARAMETERS

The general outputs necessary for the correct working of the installation are configured in this sector.

Each function (pump, fertilizer, mixer, filter, etc.) is assigned an output relay. This can be placed at the base of the unit or in distance external modules by cable or radio. Section 4.6.1 specifies how the eight digits of the outputs are coded.

The Agrónic 4000 can control 4 independent irrigation pumps which will automatically start or stop if irrigation sectors are set on and have the pump assigned.

An output relay has to be assigned to each pump. In case of avoiding the use, leave the value at 0.

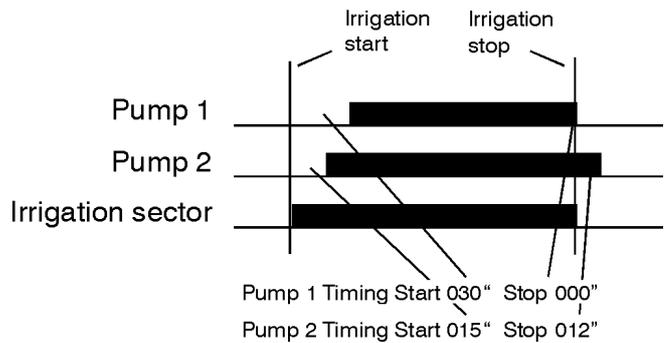
The start temporization corresponds to the time the activation of the relay will be delayed since the

start is ordered. If the value is set at 0, the output activation is immediate.

The stop temporization keeps the output activated as long as programmed here when the order of stop arrives. At 0, the deactivation is immediate.

Pump 1                      Nº of output : 00000024  
Temporisation on/off : 022" / 005"

#### START AND STOP TIMING



The following four screens will be used to assign output relays to the fertilizers and mixers set in the installation. The ones which are not going to be used will be left at 0.

In case of a common mixing to all the fertilizers, the same output relay has to be assigned to all the configured mixers.

Fertilizers	F1	F2
Nº of output :	00000020	00000019
Fertilizers	F3	F4
Nº of output :	00000000	00000000
Fertilizers	F5	F6
Nº of output :	00000000	00000000
Fertilizers	F7	F8
Nº of output :	00000000	00000000

Mixers	F1	F2
Nº of output :	00000017	00000016
Mixers	F3	F4
Nº of output :	00000000	00000000
Mixers	F5	F6
Nº of output :	00000000	00000000
Mixers	F7	F8
Nº of output :	00000000	00000000

If necessary a fertilizer general output can be configured so that whenever one is activated, the general one is activated too.

When applying water is necessary for the fertilizer injector cleaning, an output relay will be assigned.

Fertilizer general output : 00000000  
Fertilizer cleaning output : 00000000

An auxiliary output may be assigned for each of the fertilizers. The output number of the relay may be common for various auxiliaries, with which for example can be obtained different fertilizers.

Auxiliary Fert.	F1	F2
Nº of output :	00000025	00000025
Auxiliary Fert.	F3	F4
Nº of output :	00000000	00000000
Auxiliary Fert.	F5	F6
Nº of output :	00000000	00000000
Auxiliary Fert.	F7	F8
Nº of output :	00000000	00000000

In this chapter it will be configured the filters number for every one of the 4 independent groups that the unit can control, in order to automatically clean the filters.

For every group (G1-G4), enter the output relay of the first filter and the last one, in the next example it is assigned the 15 output for the first one and the 18 for the last one, with this it is defined automatically the control for 4 filters, always it has to be set from minor output to higher. If it is necessary, it can be used a general output that it will be activated anytime that a cleaning of any filters group will be carried out, left to "0" when it will not be used.

The other filters configuration values are introduced in the chapter [6.2.] of "Parameters cleaning filters".

When there are a filters group not used, leave the values to "0".

Filters outputs G1: 00000015 to 00000018  
Filters general outputs G1: 00000000

The units dispose of two alarm outputs, one of general character and the other related to the fertilization.

When the use is required, the correspondent outputs will be assigned in the unit.

General alarm output : 00000000  
Fertilization alarm output : 00000000

The alarm outputs will be activated when an anomaly takes place. The section "Anomalies reading" shows which anomalies will activate the alarm if nothing is set, although at the "installer configuration" the

fact of activating or not the alarm at each anomaly can be modified.

The alarm outputs can act intermittently by giving start or stop temporization, or fixed by giving them when working.

The alarm output can be normally open (YES) or normally closed (NO) configured, in order to have the chance of activating sirens or telephone advisers, for example:

Alarms, temporization, on/off : 008" / 030"  
Alarm output normally open (Y/N) : YES

[ values for pH / EC Control option ]

[ values for DIESEL Control option ]

## 6.4. INPUT PARAMETERS

There are two kinds of inputs, the digital ones to connect elements which act by contact (differential pressure gauge, level, counter, etc.) and the Analog ones for sensors which give a proportional signal to the magnitude that has to be measured (temperature, sun radiation, humidity, etc.)

Once the "Inputs" option has been chosen at the "Parameters" menu, the following screen will be shown to choose the type of input to configure.

INPUT PARAMETERS  
Digitals : 1                      Analogs : 2

### 6.4.1. Digital inputs

Each input can be assigned a function in order to act in a pre-determined way when connecting.

Function code number : 00

At the following list the different function codes and the request it makes to each of them are described:

- Code **01: General Malfunction**
- Code **02: Differential pressure gauge 1**
- Code **03: Differential pressure gauge 2**
- Code **04: Differential pressure gauge 3**
- Code **05: Differential pressure gauge 4**  
-Detection delay: 030"
- Code **06: Stop 1**
- Code **07: Stop 2**
- Code **08: Stop 3**
- Code **09: Stop 4**  
- Detection delay: 030"  
- Conditional, Temporary, Definitive  
- Show it as an Anomaly Y/N?
- Code **10:Intrusion alarm**  
- Detection delay

- Code 11: Irrigation counter 1, pulses
- Code 12: Irrigation counter 2, pulses
- Code 13: Irrigation counter 3, pulses
- Code 14: Irrigation counter 4, pulses
  - Pulse value: 01000 L
  - Maximum time between pulses: 240"
- Code 15: Fertilizer counter 1, pulses
- Code 16: Fertilizer counter 2, pulses
- Code 17: Fertilizer counter 3, pulses
- Code 18: Fertilizer counter 4, pulses
- Code 19: Fertilizer counter 5, pulses
- Code 20: Fertilizer counter 6, pulses
- Code 21: Fertilizer counter 7, pulses
- Code 22: Fertilizer counter 8, pulses
  - Pulse value: 0100 cl
  - Maximum time between pulses: 200"
- Code 23: Irrigation counter 1, frequency
- Code 24: Irrigation counter 2, frequency
- Code 25: Irrigation counter 3, frequency
- Code 26: Irrigation counter 4, frequency
  - Cycles per litre: 009.43 Hz
- Code 27: Fertilizer counter 1, frequency
- Code 28: Fertilizer counter 2, frequency
- Code 29: Fertilizer counter 3, frequency
- Code 30: Fertilizer counter 4, frequency
- Code 31: Fertilizer counter 5, frequency
- Code 32: Fertilizer counter 6, frequency
- Code 33: Fertilizer counter 7, frequency
- Code 34: Fertilizer counter 8, frequency
  - Cycles per centiliter: 128.50 Hz
- Code 35: Rain gauge
  - Liters per pulse: 00.5 L/m<sup>2</sup>
- Code 36: Start 1 of programs
- Code 37: Start 2 of programs
- Code 38: Start 3 of programs
- Code 39: Start 4 of programs
- Code 40: Start 5 of programs
- Code 41: Start 6 of programs
- Code 42: Start 7 of programs
- Code 43: Start 8 of programs
  - Detection delay: 030"
  - Stop Y/N : NO

[ values for **DIESEL Control option** ]

Once the function has been entered, the number of input has to be chosen, to do so, take into account the chart of the section 4.6.2.

Sector 4.3.3 has to be taken into account to deal with the installation and the connection.

For most of the inputs there is a common value which is the "Detection delay". This temporization guarantees the time the input has to keep connected to carry out its function.

The "General malfunction" function is used to stop completely the unit due to the connection of a security element. It is necessary to have any pump

general output operation in order to have the chance of acting.

When a malfunction has taken place and then it has been repaired, the "Manual Function" has to be used in order to finish it and continue with the irrigation proceeding at that moment at the same point where it stopped.

Each one of the four filter group the unit allows can start the cleaning by connecting a "Differential pressure gauge", which measures the difference of pressure between the input and output of the filters. When the power is switched on and the irrigation is working, after the "detection delay" temporization, it will clean the filters.

For the 06 to 09 "Stop" functions, the input operation can be configured in three different ways, besides this, the stop inputs that each irrigation sector has to use are configured at the "Sector parameters" sector.

The "Temporary" one will cancel the irrigation of the sector or group of sectors in order to go to the following sub-program. If the program is reinitiated, it will try to irrigate the sectors were previously affected by the input.

With "Conditional" the irrigation of the sector or group of sectors is stopped and adjourned as long as the input is connected. Once the input is disconnected, the irrigation will continue at the same point where it stopped.

At the "Definitive", all the sectors assigned to the input will stop operation definitively. Enter at the "Function-Manual-Malfunctions" to end the stop.

If in an irrigation program, a group of sectors is irrigating and a "Stop" input is activated, all the group will stop irrigating, even though not all of them are assigned to the input.

The "Intrusion alarm" function is used to protect from vandalism the installation. To do so, connect the protection elements such as radars, door sensors, etc. in series with the normally closed contacts, to the input; the first one that opens, after the detection delay temporization, will activate the alarm output and, if the SMS messages option is installed, will send a text message to a mobile phone (SMS messages sending option).

The four possible irrigation counters, functions 11 to 14, can work with pulses transmitter from 1 to 10.000 liters.

It is necessary to enter the value in seconds of the time between two pulses with the lowest operation flow at the "Maximum time between pulses". This detects the fact that there is no irrigation flow. As an example, we will calculate the time for a flow of 2 m<sup>3</sup>/h and a counter of 100 liters:

$$2.000 \text{ L/h} \div 3600 = 0,5555 \text{ L/sec.}$$

$$100 \div 0,5555 = 180 \text{ seconds.}$$

It is important to give this value when doing the control by lack of flow.

The Agrónic 4000 allows us, as well, to work with the **irrigation counter by frequency**, asking for the cycles per liter the counter sends. At the counter specifications the cycles per liter in relation to the diameter of the pipe line will be indicated.

For the **Fertilizers counters** (codes 15 to 22 and 27 to 34), the operation philosophy is the same as that for the irrigation ones, with the difference that the **pulse** value is in centiliters (100 centiliters = 1 liter), from 1 to 1.000 centiliters. When operating by **frequency**, the cycles have to be entered per each centiliter (cl).

Functions 23 to 34 of the frequency counters can only operate with inputs 1 to 7 of the Agrónic 4000 base.

The **“Rain gauge”** function, number 35, is used to count the liters per m<sup>2</sup> of precipitation, to do so, enter the value corresponding to each pulse given by the rain gauge at the **“liters per pulse”** question. Further on we will see it can be used to condition the irrigation and for the history record. The digital input that has to be used is number 12.

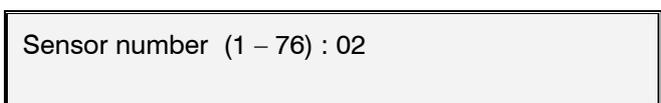
A total of 8 inputs, with function codes 36 to 43, are configured for the **“Programs starting”**, will set the starting of an irrigation program configured to be conditioned by the input (section [6.7] of Parameters-Programs). The question **“Stop Y/N”** allows answering **“YES”**, to stop the program by its input when disconnecting it, and with **“NO”** it will only do the start, finishing when the application of time or volume programmed ends.

**6.4.2. Analog inputs**

The Analog inputs sector has to be chosen at the **“Parameters-Inputs”**



The unit offers to control up to a total of 76 different sensors. Each one will be configured an input where the units of the magnitude to be measured, the input voltage levels, the screen margins and the calibrate will be connected.



A sensor can be connected to different elements of the Agrónic 4000 system. In order to define it, use the chart of the section 4.6.3.



The measure unit each sensor will use is defined at the following screen.

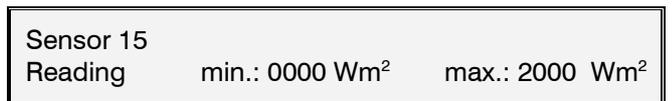


The codes corresponding to each unit of measure are defined below:

	<b>Metrics</b>	<b>USA</b>	
00:	Null	Null	
01:	°C	°F	Temperature (+00,0 °C-°F)
02:	Wm <sup>2</sup>	Wm <sup>2</sup>	Solar radiation (0000 Wm <sup>2</sup> )
03:	cbar	cbar	Soil moisture (000.0 cbar)
04:	%HR	%HR	Relative humidity (000 %HR)
05:	km/h	m/h	Kilometers hour (000 Km/h - m/h)
06:	%	%	Relation (000 %)
07:	Uts	Uts	Units (0000 Uts)
08:	mm	Inch	Level (000 mm - in)
09:	L	gal	Volume (0000 L - gal)
10:	L/m <sup>2</sup>	rain	Rainfall (00.0 L/m <sup>2</sup> - "rain)
11:	m <sup>3</sup> /h	GPM	Flow (000.0 m <sup>3</sup> /h - GPM)
12:	bars	psi	Pressure (00.0 bars - psi)
13:	mS	mS	Conductivity (00.0 mS)
14:	pH	pH	Acidity (00.0 pH)
15:	mm/d	mm/d	Evaporation (0.00 mm/d)
16:	'	'	Temporization (0000 ')
17:	rpm	rpm	Rev. per minute (0000 rpm)
18:	mm	mm	Displacement (±0.00mm)
19:	V	V	Voltage (00.0 V)

This allows us to avoid the limitations of the sensors type. Each one of the Analog inputs can be configured depending on the sensor needed, all the same, all different, or mixed.

For each sensor the voltage margins the input gives have to be configured and then the correspondent reading the screen will show. At the following example, we see that a radiation sensor with a 4-20 mA input connected to a radio module will generate a 0.4 V voltage for 0 Wm<sup>2</sup> and 2 volts for 2000 Wm<sup>2</sup>.



The following items have to be taken into account in the installations with sensors:

- Use a screened cable when connecting the sensors.
- Lay the cable away from the power lines.

- Try not to surpass the inputs voltage limits.
- The voltages generated by the sensors with outputs 4-20 mA in the different units are =
  - In amplification of the base and Microsis (200 ohms) is 800 to 4000 mV.
  - In expansion modules (150 ohms) is from 600 to 3000 mV.
  - In the radio modules (100 ohms) is from 400 to 2000 mV.

In order to calibrate the sensor when its reading is higher than the real one, the “calibrate” value has to be diminished below 100, and increased when the reading is lower.

```
Sensor 15
Calibrate (100 = 0) : 100
```

For example, a temperature sensor records an error of an excess of 0.5 grades. It will be compensated in the calibrate by entering 95.

The evaporation value may come from μMetos, from a SMS message or be entered manually here, in the sensor configuration.

**6.5. FLOW PARAMETERS**

This section is used to configure the constant use of a unit when programming the irrigation and the fertilizers. Whenever the unit of this sector is changed, it will be changed as well in the programs which have not got a sector assigned yet, taking into account that with the “T/V” key the irrigation and fertilizer units can be changed when placing the cursor on the program value, and per program.

The irrigation units can operate in hours/minutes, minutes/seconds, cubic meters or liters.

```
Irrigation units =
hh:mm (0) mm's" (1) m³ (2) L (3) : 2
```

The fertilization units can be in hours/minutes, minutes/seconds, liters, deciliters or centiliters. (10dl=1L, 100cl=1L)

```
Fertilization units =
hh:mm (0) mm'ss" (1) L (2) dl (3) cl (4): 2
```

The flow margins of each counter are used to detect possible flow anomalies, in relation to the expected flow of the sectors related with the counter which is irrigating at the moment. The maximum volume that the controller can control is 650.00 m³/h in irrigation meters, and 650.00 L/h in fertilizer meters. In installation parameters there is the possibility of increasing it to 6500.0 m³/h o L/h. If the anomaly lasts

longer than the time stated in the “Detection delay”, the unit will work according to what is set at “Stop type”.

- With "it does not stop (0)" it will only record the anomaly.
- With "temporary (1)" it will also cancel, in a temporary way, the irrigation of the group of sectors which is taking place, and that have any sector assigned to the counter to go to the next one.
- With "definitive (2)" it will definitively stop the irrigations of the controller.

To start again after a definitive stop by flow, this has to be cancelled from the “Function-Manual”.

Setting the delay at 0 seconds, there is no control of anomalies by flow.

```
Irrigation counter 1
High/low nominal flow margin : 25 / 30 %
```

```
Irrigation counter 1
Detection delay : 280"
```

```
Irrigation counter 1
Stop type, NO (0) Tem. (1) Def. (2) : 1
```

The irrigation “starting delay” is a common to the four counters value. An extra delay is allowed when starting the irrigation in the counter. It is also of use to avoid entering in flow anomaly when filling the pipe lines.

```
Delay at irrigation starting : 480"
```

**6.6. SECTORS PARAMETERS**

The Agrónic 4000 can control up to 99 irrigation sectors. The values of them all are configured in the following screens.

The values are shown in three screens. To go from one to the other the right and left arrow keys will be used. To get placed in another sector, press the up and down arrow keys.

SECTOR	Relay	P1 2 3 4	SI1 2 3 4	IC	m³/h
- 01 -	00000000	YNYN	YYNN	2	088.25

SECTOR	Tempo.	Aux.	F1F2F3F4
- 01 -	+045"	00000045	N N N N

SECTOR	Self.pH	T.auto	Bars
- 01 -	33 %	04"	03.2

Each sector will be assigned an output “Relay”; this one can be placed at the base of the unit or in an external module by cable or radio. Take into account the chart of the section 4.6.1 when the output number is required:

Each sector can be assigned to one or more among the four “P1234” pumps and among the four “SI1234” stop inputs. When entering “YES” a pump, it will automatically activate when the sector activates. In the same way, when the sector is activated the stop inputs (temporary, conditional or definitive) marked with “YES” will be taken into account.

Each sector can be related to one of the four irrigation counters “IC”; once it is assigned and the sector carries out the irrigation, it will be taken into account for the flow control, for the totals and when programming the irrigation by volume.

The “m<sup>3</sup>/h” value corresponds to the foreseen flow which is calculated of consume to the sector. It will be of use when controlling the flow and when distributing the irrigation and fertilizers volumes in the totals, when more than a sector is irrigating with the same irrigation counter.

The “Temporization” is used to delay the sector activation at the beginning of the irrigation, in case of negative temporization (-030”), yet for delaying the deactivation at the end of the irrigation, in case of positive temporization. (+030”).

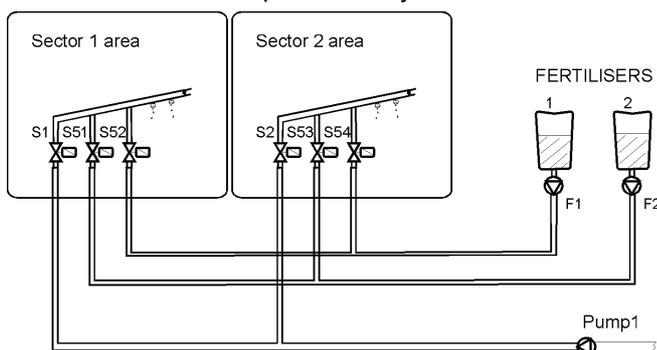
Each sector can be assigned an auxiliary relay output “Aux” which can be common to several sectors. It will be activated each time a sector which has the same relay as an auxiliary activates. As many general valves as needed it can be generated this way.

The fact of assigning a sector to a fertilizer avoids the output activation unless the fertilizer which has been assigned it is activated. This operation way is of utility in installations where each sector has an irrigation valve, fertilizer 1 valve, fertilizer 2 valve, etc.; the fertilizers valves would correspond to sectors with assignation. When programming, these ones are entered in the same way as the irrigation ones.

The sectors assigned to a fertilizer are not irrigation sectors any more. Just one fertilizer can be assigned to each sector.

Only the first four of the 8 disposable fertilizers are suitable to be assigned.

Look at an example of this system:



[ values for pH / EC control options ]  
pH injection self adjustment “Auto. pH”.  
Self adjustment temporization “T. Auto”.

[ values for Pressure regulation option ]  
Pressure for the irrigation sector “Bars”.

## 6.7. PROGRAMS PARAMETERS

First of all, the program number has to be chosen.

Program number: 03

Each program can be a part of an “Irrigation group”. This avoids the irrigation of two programs of the same group at a time. One of them will be at stand by showing in its view the text “Postponed by priority”. The programs assigned to the group “0” do not take part of an association and avoid the postponement.

The “Security time between starts” is used to maintain minimum time between two starts. The security is not taken into account when leaving the value at 0.

These functions are of utility, for instance, when the irrigation start is ordered by sensors, reaching an organized evolution of the irrigations.

P03 Irrigation group : 0  
Security time between starts: 03:45

Each one of the 40 programs has got 4 possible determiners in order to carry out start actions, stop actions, irrigation or fertilizers modifications, according to the following chart:

- Type 01: Start when the sensor surpasses the programmed value.
- Type 02: Start when the sensor is below the programmed value.
- Type 03: Start by integrating the value of a sensor.
- **Type 04**: Start by digital input.
- **Type 05**: Conditional stop when the sensor surpasses a programmed value.
- **Type 06**: Conditional stop when the sensor is below a programmed value.
- Type 07: Irrigation modification by integrating the value of a sensor.
- Type 08: Irrigation and fertilizer modification by integrating the value of a sensor.
- Type 09: Fertilizer modification by integrating the value of a sensor.
- Type 10: To modify the irrigation in ratio to the value of a sensor (evapotranspiration-Eto, ground moisture-cbars - %, etc).
- Type 11: To modify the fertilizer in ratio to the value of a sensor.

[ Types 1,2,3,7,8,9,10,11 are **Programs determiners option** ]

The determiner factors can be digital or analog elements, which can influence the programmed values in order to adapt them to the climatic or environmental changes or changes of the installation itself.

This takes place in two stages:

1. At program parameters the determiner factors that can affect the program and how the determiner will be dealt have to be indicated.
2. At the beginning or at the determiner factor in each program.

**Type 1 and 2 determiners:** Having the option installed, irrigation programs will be started when the sensor level (temperature, soil moisture, etc.) reach a determined value. This value will be asked at the irrigation program as well as the starting time when pressing the “mode” key.

The determiner will be only taken into account when the irrigation is not taking place and when sixty seconds have passed since the sensor value has reached and maintained the starting value.

By answering “YES” to the “Generates a message Y/N” question, a SMS message will be sent to a mobile telephone, whenever the option has been installed. This question appears in all types of start and stop determiners.

P01 Determiner 1, type: 02  
Sensor: 04 Generates a message Y/N : YES

**Type 3 determiner:** Having the option installed, irrigations by integration (total of sensor units in relation to time) can be started. For example, we can integrate with the solar radiation de vats/hour the plant has received since the previous irrigation and order more frequent irrigations in sunny days than in cloudy ones.

The sensor number and a minimum level, from which the integration will be allowed, have to be entered. At the irrigation program, next to the starting time and pressing the “mode” key, the integration value since the previous irrigation will be asked in order to deal with a new irrigation.

P01 Determiner 1, type : 03  
Sensor: 01 Min.: 0200 Wm<sup>2</sup>

**Type 4 determiner:** It allows the starting of irrigation programs by a connected to a digital input element with a starting programs function. Look at [6.4.1 codes 36-43] sector.

Enter which start input functions out of the 8 possible ones will affect the program.

P01 Determiner 2, type : 04  
Starting F. = 1 Generates a message Y/N : Y

**Types 5 and 6 determiners:** They are used to stop conditionally or temporarily an irrigation ordered by a program whenever the sensor value is not a reference value. Type 5 will stop when the value surpasses the reference and type 6 when it goes down.

P01 Determiner 2, type : 05  
Sensor : 16 Temporary? (Y/N): N

P01 Determiner 2, type : 05  
Sensor : 16 Reference : 034 Km/h

Immediately, if the stop is conditional a differential (dead band) from which, more in type 6 or less in type 5, depending on the programmed reference, the irrigation will be reactivated, will be asked.

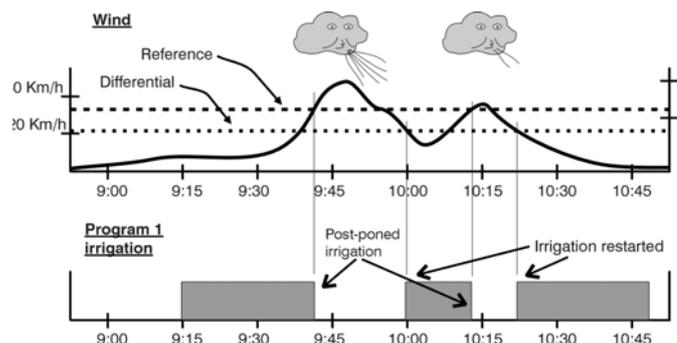
P01 Determiner 2, type : 05  
Differential : 022 Km/h

If the stop is conditional, not timed, when watering is started again, it will do so from the time at which watering was stopped.

If the stop is temporary timed, watering will stop and when it starts again it will move to the next sub-program.

In order to avoid false operations, the sensor level has to last more than 30 seconds out of the margins to be operative.

Some examples for the stopping determiners can be: the fact of stopping a sprinkling due to a wind excess or stopping due to a lack of pressure in a pipe line.



**Type 7, 8 and 9 determiners:** Having the option installed, the irrigation units and/or the fertilization by integration (total of sensor units in relation to time) can be modified. For example, we can integrate with the solar radiation of vats/hour the plant has received since the previous irrigation and order a higher time in volume in sunny days and a lower one in cloudy ones.

The “sensor” number, a “minimum level” from which the integration will be allowed and a “limit” security value in the integration which in case of being surpassed will not be taken into account, have to be entered. In case of having a rain sensor, “99” has to

be entered in the sensor, meaning it is the digital function of the rain gauge.

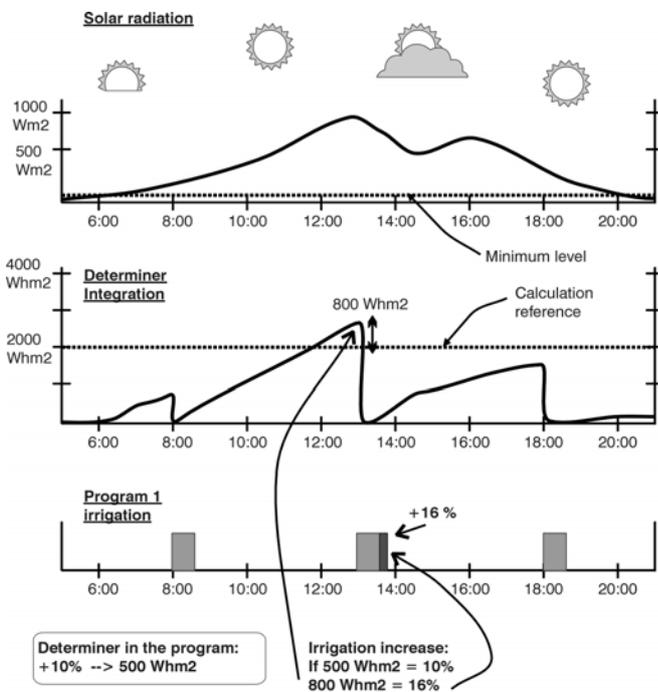
P01 Determiner 4, type : 07  
 Sensor: 01 Min.: 0200 Wm<sup>2</sup> Lim.: 12500 Wh/m<sup>2</sup>

The “calculation reference” is used to define an integration point of reference above which the value modification factor which surpasses the reference will be applied.

P01 Determiner 4, Type : 07  
 Calculation reference : 02000 Wh/m<sup>2</sup>

At the irrigation program, next to the manual factor and pressing the “mode” key, the integration value since the previous irrigation will be asked.

Example:



IRRIGATION INCREMENT ACCORDING TO SOLAR RADIATION

The irrigation units can be increased by solar radiation, temperature, etc., or diminished by rain, etc.

**Type 10 and 11 determiners:** Having the option installed the irrigation and fertilizer units and can be modified in relation to the reading of a sensor (evapotranspiration, soil moisture, etc.).

The number of the “sensor” and the crop constant have to be entered. The units that have to be used are millimeters per day.

P01 Determiner 4, type : 10  
 Sensor : 32 Crop Constant : 0.93

The “reference for calculation” is used to define a point of reference in the units of the sensor above which will be applied the modification factor in ratio to the value that surpasses the reference, when it is a positive value, when negative it will be applied upon going lower than the reference.

P01 Determiner 4, type : 10  
 Reference for calculation : + 0.80 mm/d

In the irrigation program, next to the manual factor, pressing the “mode” button will ask for the modification factor. In an evapotranspiration sensor the “crop constant” is used; in other types of sensors leave the value at 1.00.

$$Etc = Eto * Kc$$

Etc = Evapotranspiration of crop

Eto = Evapotranspiration

Kc = Crop constant

## 6.8. COMMUNICATION PARAMETERS

This section indicates which external elements will be communicated by the equipment. These elements may be:

- PC program
- SMS messages sending and reception (GSM only)
- Agrónic Radio 868
- Agrónic Radio 2,4
- Agrónic Monocable
- Expansion modules
- Microsis
- µMetos

COMMUNICATION PC : 1 SMS : 2 GSM : 3  
 Agr.Rad868: 4 Agr.Rad24 : 5 Agr.Mon. : 6

COMMUNICATION Mod.Exp. :7 Microsis : 8  
 uMetos : 8

It is important to stand out that all the communications are normally non installed options at the base unit. When this takes place the “-non installed option-” message will appear on the screen.

### 6.8.1. Communication with PC program

When linking a PC to several Agrónic 4000 each one of them have to be numbered in order to differentiate them in the net. Enter the value at “Agrónic Number”.

Communication with the PC:  
 Agrónic number : 01

The data "Transmission speed" when linking to a PC can be:

- 0 – 1200 bps
- 1 – 2400 bps
- 2 – 4800 bps
- 3 – 9600 bps
- 4 – 19200 bps

Communication with the PC :  
Transmission speed : 0

The exit of the data to the PC is done from a "serial port"; the Agrónic 4000 has already installed two ports and it is possible to amplify with one additional port.

- Port 1: Link RS232.
- Port 2: Link RS485, in two wires and galvanically isolated.
- Port 3: Link RS232 (option).
- Port 0: Null, the communication remains disabled.

The RS232 link is used with elements placed beside the controller or at a maximum of 30 meters and the RS485 for several elements at a time and at distances of hundreds meters.

Communication with the PC:  
Serial port : 1

The linking to a PC can be done by cable or "Via modem", which can be a conventional one or GSM. When the link is done by modem, the "modem configuration" chain can be modified.

When linking via modem, a SIM card is required in order to make calls (it is the same card used at the mobiles).

In order to modify the texts the up/down arrow keys have to be used and to move the cursor the left/right arrow keys.

Communication with the PC :  
Via modem : YES

Communication with the PC :  
Modem configuration: ATEØVØSØ=2

Compatibility chart:

Link	Port	Compatible with
Link to PC via cable	1, 3	--
	2	- Other Agrónic 4000 - Microsis to PC (not to use with A-4000)
Link to PC via modem	1, 3	- SMS messages

### 6.8.2. SMS messages sending

The SMS messages option is used to send SMS messages to mobile phones, activity of the day reports or messages about any event or anomaly. In addition to this, text messages with operation orders can be sent from the mobile telephone to the Agrónic.

The SMS messages are only applicable when the modem or the telephone that sends or receives the message uses the GSM technology.

Two different times of the day are allowed to send a report; in it the irrigation starts carried out by each program will be indicated. In order to avoid the sending, leave the time at a 00:00.

SMS messages : YES  
Report time 1 : 18:00

The "Services centre" number which has been contracted to the GSM modem card connected to the A-4000 has to be entered.

SMS messages : YES  
Services centre : 340000000000

The destiny number corresponds to the telephone which will receive the message. The numbers have to be initiated by the country code.

SMS messages : YES  
Destiny telephone : 340000000000

The "Transmission speed" can be:

- 0 – 1200 bps
- 1 – 2400 bps
- 2 – 4800 bps
- 3 – 9600 bps
- 4 – 19200 bps

SMS messages: Y.  
Transmission speed : 0

It is necessary to enter the serial port number which will communicate with the modem. Look at section "6.8.1" for further information about the ports.

SMS messages: Y.  
Serial port : 1

Compatibility chart:

Link	Port	Compatible with
SMS messages	1, 3	Link to PC via GSM modem
	2	-

### 6.8.3. Messages sending from a GSM telephone

When the Agrónic 4000 has the “SMS messages” option activated and is connected to a GSM modem, orders can be sent from a digital mobile telephone.

These orders can be to start, stop or modify the manual factor of the programs, to switch on or off the STOP, to do a filter cleaning, to give an Analog value, to deactivate any kind of alarm and to send an immediate report.

The format the SMS message to be sent to the Agrónic 4000 must have, is the next:

- Unit series number (4 digits)
- Blank space “Esp”
- Access code (4 digits: entered by the user at miscellaneous parameters)
- Blank space
- Operation code “OP1, 2 ..”(separated by a blank space between them)

S	S	S	S		X	X	X	X		Z	Z		Z	Z		Z	..	.	
Series number				Esp.	Access code				Spa	OP1	Spa.	OP2	Spa.	OP3	....				

Operation code	OP1	OP2	OP3	OP4	OP5	OP6	OP7	OP8	OP9	OP10	Nomenclature
Activate <b>program</b>	AP	np	ns								np: <b>program</b> ns: <b>sub-program</b> .
Activate <b>program</b> with an irrigation factor for this activation	AP	np	ns	±00							np: program ns: sub-program ±00 : factor
Stop the irrigation of a <b>program</b>	SP	np									np: program
Modify the <b>manual factor</b> of one or more programs	MF	np	±00 (np)	±00 (np +1)	±00 (np +2)	±00 (np +3)	±00 (np +4)	±00 (np +5)	±00 (np +6)	±00 (np +7)	np: program ±00 : factor
Switch on or off the <b>STOP</b>	ST	cd									cd= YES, NO
Start a filter <b>cleaning</b>	FC	gn									gn: <b>group number</b>
Value for virtual inputs	IV	se	xxxx (se)	xxxx (se +1)	xxxx (se +2)	Xxxx (se +3)	Xxxx (se +4)	xxxx (se +5)	xxxx (se +6)	Xxxx (se +7)	se: <b>sensor number</b> 1 to 8
Deactivate any <b>alarm</b> , Stop or out of order.	AL										
Request for immediate “ <b>Send inform</b> ”	SI										
Cancel all the text <b>SMS messages</b>	SM										

Examples of messages =

"0001 1234 AP 01 01"

"0001 1234 AP 05 01 -25"

"0001 1234 MF 01 +12 +18 +05"

"0001 1234 ST YES"

"0001 1234 SM"

Start the program 1 irrigation at the sub-program 1.

Start pro. 5 at the sub-pro. 1 reducing the irrigation a 25%.

Modify the manual factors of programs 1 to 3.

Set the unit at STOP.

Cancel the text messages.

Once the message has been received and executed by the Agrónic 4000, it will send a message with the following text “Message received. Order executed” to the phone which sent the message (except with SM code).

The value of sensor virtual inputs has to be entered in the same format that has been configured at the input. For example, at the most common case of

the evapotranspiration, it is “0.00”.

The “SM” code is used to cancel the text messages, of utility for example, when a message of anomaly by damaged sensor is constantly repeated. In order to send messages again, a number has to be discharged at “serial port” by entering at “SMS messages” [6.8.2] in communications parameters.

#### 6.8.4. GSM modem checking

When entering at the “GSM” section, the cover level of the telephone signal which is being received, the condition of the PIN card and if GSM telephone network (operator where the PIN is contracted) is available is shown.

GSM modem checking :  
Look at coverage? YES

The coverage is correct based on a level of 17.99.

GSM modem checking:  
Look at PIN condition?: YES

GSM modem checking:  
Look if net. Available?: YES

#### 6.8.5. Communication with Agrónic Radio 868

This indicates if communication with the Agrónic Radio is activated or not.

Agrónic Radio communication : Activate : YES

For each of the radio modules it must be specified if communication with it is desired or not.

Agrónic Radio communication:  
Communicate with module 01 : YES

If the model is Agrónic Radio 868 these configuration parameters must be entered in the modules.

Agrónic Radio communication:  
Enter to module 01 configuration : YES

When entering at the configuration the following questions will be asked:

- “Action due to communication error (0-1-2): 0”, at “0” it maintains the status of the electrovalves, at “1” it closes them immediately, at “2” it closes them after being 10 minutes without having a correct communication.
- “Potency level (0 a 7): 4”, it is used to fix the emission potency level.
- “Minutes between sensors readings: 000”, it will be the cadence with which the readings of the elements connected to the Analog inputs of the modules will take place. Leave it at 000’ to avoid the readings.

- “Sensors power supply x10 ms: 000”, it is the time, in units of 10 milliseconds the sensors power supply will last before doing the reading and deactivate them. It will be used to establish the signal according to the type of sensor.
- “Blast power greater than 12 VDC : NO”, to activate solenoid impulse latch to 12 Volts, reply “NO” and to give the blast greater tension, reply “YES”.
- “It is a translation module: YES”, in order that a module can deal with translator functions, “YES” has to be entered and then assign each module of which it is a translator.
- “3 wires output latch”, to connect solenoid impulse latch in 3-wires radio mode enter “YES” and for two way “NO”.
- “Is MR of level 2?: YES”, will show YES whenever the MR it at a level of 2 (after the first relay).
- “Start configuration sending” it is used to update a module configuration when answering “YES”. It is necessary that the module to be configured has the bridge installed to indicate it that it will receive these special data. Once received the new values the pilot light will switch off at the module. Then confirm the question “Finish configuration sending”. For further details look at radio modules characteristics sheet.

#### 6.8.6. Communication with Agrónic Radio 2,4

This indicates if communication with the Agrónic Radio2,4 is activated or not.

Agronic Radio 2,4 communication :  
Activate : Y.

#### 6.8.7. Communication with Agrónic Monocable

This indicates if communication with the Agrónic Monocable is activated or not.

Agronic Monocable communication:  
Activate : Y.

If the model is the Agrónic Monocable 64 it must be specified if communication with it is desired or not

Agronic Monocable communication: YES  
Communicate with module 01 : YES

#### 6.8.8. Communication with Expansion Modules

This indicates which Expansion Modules are connected to the Agrónic.

Communication with the expansion modules :  
Communicate with module 01? YES

It is necessary to install the internal modem in the Agrónic 4000 in order to communicate with the expansion modules by two wires of 24 volts of alternate power.

### 6.8.9. Communication with Microsis

This indicates if communication with the Microsis is to be activated or not.

Communication with Microsis :  
Activate : 2

Communication with Microsis :  
Communicate to Microsis 1 ? Y.

Communication with the Microsis is always through port 2 (RS485). In this case, the RS485 port only it may be shared with the  $\mu$ Metos.

### 6.8.10. Communication with $\mu$ Metos

This allows activation or deactivation of communication with  $\mu$ Metos. Communication is always through port 2 (RS485).

## 6.9. MISCELLANEOUS PARAMETERS

In order to adjust the sonorous level of the keyboard "bip", 1 has to be entered for a low level and 9 for the highest one. It remains disabled at 0.

Keyboard sonorous level: 2

The Agrónic 4000 allows access codes in order to limit the functions and/or parameters use. The codes are formed by four digits and can be modified at this section. To do so, the correct code has to be entered modifying it afterwards if necessary. When it shows the value " - - - - " it means there is a code assigned but there is no code with "0000".

In order to cancel the question, assign code 0 at functions or parameters.

Functions access codes : - - - -  
Parameters access code : 0000

In order to guarantee the correct use of the SMS messages from a mobile phone it is necessary to enter here the access code which will contain a message later on. Further details at section [6.8.3].

SMS Messages access code : 1234

If due to practical needs some programs or sectors want to be copied, it can be done from this section.

Copy programs (Y/N) : YES  
Copy program 00 from 00 to 00

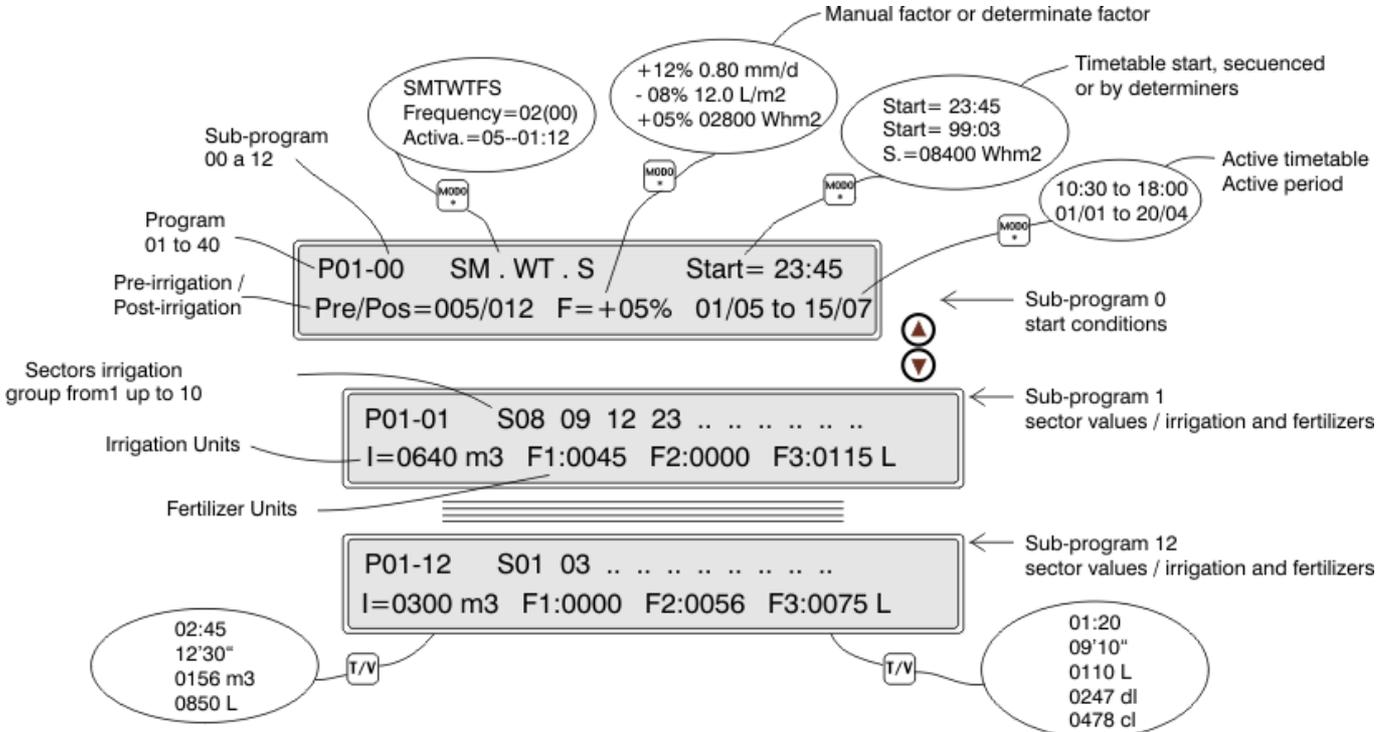
Copy sectors (Y/N) : YES  
Copy sector 00 from 00 to 00

## 7. PROGRAMS

To accede to the irrigation programming press the "FUN" (functions) key, choose number 1 and then press "Enter".

<b>Programs : 1</b>	Readings : 2	Erasure: 3
Parameters: 4 Manual	: 5	Clock : 6

Look at an example of a program resume:



The Agrónic 4000 has **40 independent programs** with **12 sub-programs** or irrigation sequences at each of them.

The number next to the P, at the left of the upper line of the screen, indicates the number of program. The number of the sub-program is indicated after a hyphen.

When 00 is set at the sub-program number it will correspond to the program starting conditions (P01-00).

The value P01-01 would be the first sub-program to enter when the irrigation program started and the P01-12 would be the last one. In necessary programs can be chained forming sequences of 24, 36, 48, etc.

Inside the sub-programs there can be some empty ones or irrigation units without value. They will be automatically passed over when dealing with the irrigation sequence.

Example of an irrigation program:

P01-00	SMTWTFS	Start = 15:10
Pre/Post = 010/030	F= +04%	00/00 to 00/00

P01-01	S33 05	.. .. .
I 02:17	F1 0023	F2 0108 L

The values of a program are the next:

On the first screen at the upper line there is the **program** number and the **sub-program P01-00 number**. Being the sub-program 0, the values of this screen correspond to starting conditions.

At the middle of the line, as a standard, the **days of the week** when it will work are shown. In order to discharge or dismiss a day, press the keys marked with the days of the week (the daily key activates and deactivates all the days).

With the cursor at this position and pressing the "MODE" key, we will cancel the activation by days of the week and it will pass to work by "**frequency**" of days. The entered value corresponds to the days it will take between one irrigation and another. 1 would be a daily irrigation, 2 for alternative days and 3 for an irrigation every 3 days, etc.

The value at the right which is in brackets corresponds to the days real counter: when it arrives at 0 is when the program can work. It has to be taken into account that this value in brackets works automatically when arriving at 0 and when the days changes it takes the value of the days it will be without irrigating. Examples:

- Frequency: 01(00) every day.
- 02(00) every two days, irrigating today.
- 02(01) every two days, irrigating tomorrow.
- 05(04) every 5 days, it will be 4 days without irrigating.

In order to postpone the irrigation some days, a variation would , for example, irrigate in alternate days but waiting initially 8 days: "Frequency02(08)", once 8 days have been taken away, the counter will take the programmed ones.

Another irrigation modality would be pressing the "MODE" key in order to work by daily **activations**. At this modality the irrigation is carried out every day, having the possibility to make several daily activations, separated by a time to be determined by hours and minutes. The first activation will take place at the programmed starting time.

P01-00	<b>SMTWTFS</b>	Start = 15:10
P01-00	<b>Frequency = 03(01)</b>	Start = 15:10
P01-00	<b>Activa.=05—01:30</b>	Start = 15:10

The "**Start**" value corresponds to the time the program will be activated. The **timetable** format is from 00:00 to 23:59 hours. The time 00:00 is not valid. Because of this reason the program will not work by temporization.

There are some variations for the starting which are the next:

- The program can be started when **another ends**. This programs enchainment is done by programming at the starting time the value 99 (as the enchainment code) and at the minutes the number of the program which precedes it. According to this, as each program can deal with an irrigation sequence of 12 sub-programs, when enchaining them will increase to 24, 36, 48, etc. If the preceding program has various activations, it will enchain at each one of them. Besides this the first program moves the manual factor and the determiners to the following programs.

P03-00	Start = <b>99:02</b>
--------	----------------------

- The program can be started by an element (thermostat, level, etc.) connected to a **digital input** with starting functions. To do so, it is necessary to configure a determiner at program parameters [sector 6.7.]. The Agrónic 4000 allows to work the 4,5 and 6 base determiners, thanks to the fact of being already discharged. For the rest of determiners it is necessary to activate the determiners options.
- Having the determiners function installed the irrigation can be started when a sensor value (soil-moisture, temperature, etc.) reaches a determinate level. It is necessary to configure a **type 1 or 2 determiner** at program parameters [sector 6.7.]. In order to program the reference value to

set on the starting, the "MODE" key has to be pressed when the cursor is at the start value.

P03-00	<b>SMTWTFS</b>	<b>Start = 083.5 cbar</b>
--------	----------------	---------------------------

- Having the determiners option installed, an irrigation by integration of a sensor (solar radiation normally) in relation to the time lasted since the previous irrigation can be started. It is necessary to configure a **type 3 determiner** at program parameters [sector 6.7.]. In order to program the reference value to set on the starting, the "MODE" key has to be pressed when the cursor is at the start value. At the program view [sector 12.2] the integration which is being accumulated at each moment can be seen. Each time an irrigation takes place, the total by integration goes to 0.

P03-00	<b>SMTWTFS</b>	<b>S.= 07300 Whm<sup>2</sup></b>
--------	----------------	----------------------------------

In the second line of the starting conditions screen, the **pre-irrigation** and the **post-irrigation** which will work is requested for each one of the sub-programs.

The units that here have been programmed will be discounted when irrigating in relation to the irrigation units of each sub-program, in order to regulate the application of the fertilizers to the irrigation water.

The fertilization will always start when the pre-irrigation ends, finishing when the time or volume of programmed fertilizer ends, but, avoiding always the application of fertilizers during the post-irrigation units.

The following value is the **irrigation manual factor** (F=+00%), with which we can modify in more or less, the irrigation values of all the sub-programs by modifying only this value.

This value is calculated each time a sub-program starts the irrigation. With the +00% value the same units are maintained.

P01-00	<b>SMTWTFS</b>	Start = 15:10
Pre/Post = 010/030	<b>F= +04%</b>	00/00 to 00/00

Having the determiners option the fertigation can be modified by the climatic factors, once configured at program parameters [section 6.7.].

In order to program the **determiners factor**, the "MODE" key has to be pressed when the cursor is placed at the "manual factor", and give a pulse for each configured determiner. In order to give room to the factor and to the determiner reference value, the text "Pre/Post" disappears and these units are moved to the left.

010/030 F=+07% 0.75 mm/d 00/00 to 00/00

Look at examples of determiners:

- o  $F=+07\%$  0.75 mm/d, increase the irrigation a 7 % per each 0.75 millimeters/day of crop evapotranspiration.
- o  $F=-05\%$  02300 Wh/m<sup>2</sup>, diminish the fertilizer a 5% per each 2300 watts of solar radiation accumulated since the previous irrigation.
- o  $F= -15\%$  05.0 L/m<sup>2</sup>, reduce the irrigation units in relation to a 15% per each 5 liters of rain.

For each one of the previous examples have to be taken into account the rest of the values that affect the determiners, to do so, look at the program parameters section [6.7.].

The last values correspond to the operation **active period of the program**, with the format from day/month to day/month. Setting all the values at 0 it would work the whole year. It allows values which go from a year to another (example 01/11 to 15/03).

Pre/Post = 010/030 F=+04% 01/06 to 15/07

When pressing the “MODE” key when the cursor is placed at the **active period** units, it will show the active period values. Its function is to limit the determiners which start the irrigation to do it only at the here marked timetable.

All the values that go from the end of one day to the beginning of the next day are accepted (example: 22:45 a 06:00).

Pre/Post = 010/030 F=+04% 10:00 a 18:30

The start by temporization or manual is not limited by the active timetable.

When a program is operated by activations, it has to be taken into account that the ones which are left to do will be cancelled when the program is left out of the active timetable. In the “installation configuration” it can be configured so that they are not cancelled.

Each program is formed by 12 sub-programs. If it is not necessary to do an irrigation sequence, only the first program will be given values. On the other hand, if some sectors have to be automatically activated when other end, values will be given to the following sub-programs. If a sub-program has not got irrigation sectors programmed or the irrigation value is “0” it will be omitted in the sequence.

The values of a sub-program are the following:

P01-01 S33 05 .. .. .  
I02:17 F1 0023 F2 0108 L

-- -- -- -- --  
-- -- -- -- --

P01-12 S02 04 .. .. .  
I01:08 F1 0017 F2 0083 L

At the first line the sector or **sectors** to be activated are asked. Each sub-program has the possibility to accept up to a maximum of 10 sectors or irrigation valves.

At the second line the **irrigation** (I01:08) and **fertilization** (F2 0083 L) **units** that will be applied to the previously programmed sectors are asked. If the configured fertilizers number to be used is higher than 4, it will show from the fifth on onwards on the following screen.

P01-01 S33 05 .. .. .  
I02:17 F1 0023 F2 0108 F3 0000 F4 0038 L

P01-01 S33 05 .. .. .  
I02:17 F5 0000 F6 0009 L

The type of units will be configured at the parameters sector but at any sub-program they can be modified by using the **T/V** key, both for the irrigation or for the fertilization. To do so, press the key when the cursor is placed at the value to be modified. It is possible to work with different units between sub-programs.

- Time = 00:00 (hours : minutes).
- Time = 00' 00" (minutes seconds)
- Volume = 0000 m<sup>3</sup> (in irrigation)
- Volume = 0000 L (in irrigation and fertilization)
- Volume = 0000 dl (in fertilization)
- Volume = 0000 cl (in fertilization)

The pre-irrigation and the post-irrigation take the same values each sub-program has.

The way of applying the fertilizers will depend on what programmed at the Parameters sectors, having the possibility to be “in series” (one after the other), parallel (all at a time) and for both types with proportional or not application.

In the event of series fertilization, when several programs are operating at the same time and have different fertilizers assigned, the fertilizers will be injected simultaneously. Thus, series fertilization may give way to 8 fertilizers being injected in 8 different programs.

If a "in series" and "proportional" application is programmed, the proportion is configured in parameters of **fertilizers** for each one of them, but, if the application is "**parallel**" and "**proportional**" it is programmed in each one of the sub-programs, as can be seen in the last line of this example screen:

```
I0185 m³ F1 10/03 F2 08/13
```

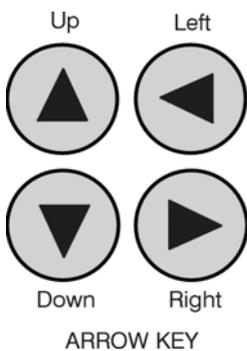
According to this, each fertilizer has two values, an irrigation units one at the left of the bar, and a fertilizer one at the right of it.

If operation at both values by volume, the previous example would be: per each 10 m<sup>3</sup> of water, 3 liters, deciliters or centiliters of "fertilizer 1", and for the second 13 liters, deciliters or centiliters of "fertilizer 2" per each 8 m<sup>3</sup> of water. At "flow-parameters" the units these proportions will be used with are identified.

The irrigation units of the ratio are in time or volume, always depending on the irrigation units configured in "Parameters - Volumes" [6.5.]. The irrigation units can be modified with the key "T/V" for each program. This way, combinations may be used, for example irrigation for 2 hours and injection 3 liters of fertilizer per 10 m<sup>3</sup> of irrigation.

```
I02:00 F1 10/03 F2 08/13
```

In this way of operation a total value of fertilizer to be applied is not given but it is continuously relates to the irrigation quantity programmed.



To move to another program the cursor has to be placed at the program number (P01) and enter the new one by using the up arrow key to increase and the down one to decrease.

In order to accede to a sub-program the cursor has to be placed at the (P01-00) value and enter the new one.

Another possibility is by using the arrows from here or from the different values of the sub-program; use the up arrow to increase and the down one to decrease.

The right-left arrow keys are used to move the cursor between the different values.

To exit any programs screen, press the "Function" or "View" keys.

## 8. READINGS

The READINGS function will be used whenever we want to consult statistical data. To do so, press the "FUN" key, choose the function by its number (2) and then press "Enter".

```
Programs : 1      Readings : 2      Erasure : 3
Parameters: 4    Manual   : 5      Clock   : 6
```

The "Readings" menu is the following:

```
READINGS      Totals: 1   Anomalies : 2
New anomalies : 3  History: 4  Sensors : 5
```

```
READINGS      Agr. Radio 868: 6 Agr.Rad24 :7
Ag.Monocable : 8
```

In order to exit any reading screen press the "Function" or "View" keys.

### 8.1. TOTALS READINGS

At the "Totals" the water and fertilizers units applied by time and volume are shown, in general and in each sector.

The first screen of "**General totals**" informs of the date and time when the last erasure of totals was carried out, the time and total volume of irrigation and the time or total volume of each fertilizer.

```
General totals      15/07/02      17:47.11
Irrigation =      0000:00.00      000000.000 m3
```

```
General totals      F1 000000.00 L
F2 000000.00 L F3 000000.00 L F4 000000.00 L
```

```
General totals      F5 0000:00.00
F6 0000:00.00 F7 0000:00.00 F8 0000:00.00
```

All the other totals screens correspond to the values of the **99 sectors** which can be found in the Agrónic 4000.

```
Sector totals 01      000.00 m3/h
Irrigation =      0000:00.00      000000.000 m3
```

```
Sector totals 01      F1 000000.00 L
F2 000000.00 L F3 000000.00 L F4 000000.00 L
```

```
Sector totals 01      F5 0000:00.00
F6 0000:00.00 F7 0000:00.00 F8 0000:00.00
```

In the irrigation units, the time format is hours, minutes and seconds, and the volume is cubic meters with three decimals. In fertilizer there is only one format depending on the time or volume units assigned to the fertilization at "flow parameters" [6.5.]. If the irrigation units of a program are different, they will not be added. That is why it is very important to take into account that in order to do a correct addition of the applied fertilizers, it is necessary to work with the same units both at flow parameters and at programs.

The totals by volume of the sectors that are irrigating at the same time with the same counter, it will be done distributing the value of each pulse of the counter, depending on the expected flow in each sector. This detail is configured at the "Parameters-Sectors" section [6.6.]. Look at the example below:

*Sector 1, expected flow = 23.6 m<sup>3</sup>/h*

*Sector 2, expected flow = 18.9 m<sup>3</sup>/h*

*A pulse of the 1000 liters volumetric counters arrives, at the totals 555.294 liters will be distributed to sector 1 and 444.706 liters to sector 2.*

## 8.2. ANOMALIES READINGS

The anomalies are incidences that are recorded in the memory and which can be read at the "Anomalies-Reading" section. In case that since the previous reading a new reading has been carried out, we will read them at the previous section and besides this, filtered at the "New Anomalies -Readings"

The anomalies are a part of the general record which is recorded in the memory. The anomalies and any event the controller has done are recorded in it; all the other records can only be seen from a PC when the link to a PC option is installed. It has a 5000 records capacity. When they are filled, the oldest ones start to be erased.

Each anomaly has the date and time when it happened and a descriptive text with the values that affect it.

With the up arrow key a previous anomaly can be seen and with the down arrow a posterior one..

### Description of each type of anomalies:

Each one of the different anomalies can activate an output alarm, and, with the option activated, an SMS message. From the installer configuration, which anomalies activate the alarm and which ones send a message can be modified. A configuration is provided with the unit; in the following description the following symbols will appear in order to indicate which of them activate alarms and/or send messages.

[AL-G] = It activates the general alarm.

[AL-F] = Activation of a fertilizer alarm.

[MSG] = It sends an SMS message to a mobile.

### • Power cut. [ - ] [ - ]

When there is a power cut longer than 1 minute and shorter than 24 hours it records the date and the time when the cut began and when it finished.

### • General Malfunction. [AL-G] [MSG]

It is produced when the safety factor of the installation of irrigation connected to the input of general malfunction activates and produces a definitive stop of the controller. To cancel the definitive stop enter in "Function-Manual-Malfunctions", being reactivated the programming which is being carried out at the same point where it stopped.

### • Flow Anomaly. [AL-G] [MSG]

In the flow control of the irrigation counters, an anomaly is produced by defect or excess of the expected flow, indicating the meter and value of the flow.

### • Irrigation counter malfunction. [AL-G] [MSG]

When an irrigation volumetric counter fails and does not emit pulses, after some temporization, (if nothing is indicated 10'), it goes into anomaly and causes a definitive stop of the controller. Once repaired, enter in "Function-Manual-Malfunctions" to reactivate at the same point where it stopped.

### • No control fertilizer malfunction. [AL-F] [MSG]

When more than 15 pulses of a fertilizer counter are received during a time (if nothing is indicated 10') and there is no order to inject fertilizer, it goes into anomaly and causes a definitive stop of the controller. Once repaired, enter in "Function-Manual-Malfunctions" to reactivate at the same point where it stopped.

### • Fertilizer counter anomaly. [AL-F] [MSG]

When a volumetric counter of fertilizer fails and does not emit pulses, after some temporization (if nothing is indicated 10'), it goes into an anomaly and causes a temporary stop of the fertilizer in the program being carried out (the rest of the fertilizers continue); in a new irrigation start with fertilizer it will try it again.

### • Excess of fertilizer anomaly. [AL-F] [MSG]

In an irrigation with fertilization and a post-irrigation programmed, it can be that the irrigation units arrive at the post-irrigation and the fertilizer is still left to inject, it will stop then to inject it and it will keep the anomaly with the exceeding units of the different fertilizers. It also goes into anomaly when eventually finishes an irrigation with fertilizers.

When more than four fertilizers are configured, two different anomalies will take place, one for the first four and one for the others.

### • Proportional fertilization anomaly. [AL-F] [MSG]

In the application of fertilizer proportional to the irrigation, it goes into anomaly and the program which is being carried out stops the fertilization when, after

three consecutive times the irrigation units of the proportion finish before the fertilizers ones.

- **No control filters cleaning anomaly.** [AL-G] [MSG]

When one cleaning after another is completed in a number configured at "Parameters-Filters" [6.2.], it is an anomaly and stops cleaning until it is restarted at "Function-Manual-Malfuctions".

- **Intrusion alarm anomaly.** [AL-G] [MSG]

An intrusion has been detected at the installation.

- **Error in memory anomaly.** [AL-G] [MSG]

When an erroneous value is detected in the memory, a complete erasure is made and the anomaly is recorded (very exceptional case).

- **I/O communication anomaly.** [AL-G] [ - ]

When a bad control of the inputs and outputs is detected, an anomaly is registered (very exceptional case).

- **Temporary stop anomaly.** [ - ] [ - ]

The security element of the installation connected to the input detects a process which is not correct, causing that the programs that are working with sectors assigned to the input stop and it continues with the following ones in the sequence of irrigation.

- **Conditional stop anomaly.** [ - ] [ - ]

It informs of the conditional stop of a program by an input with a sensor element connected. When the sensor ends, its action will restart the irrigation.

- **Definitive stop anomaly.** [AL-G] [MSG]

An element of safety of the installation activates the input, all sectors assigned to the input will stop definitively until it is not finished at "Function-Manual-Malfuctions".

[ anomalies for DIESEL Control option ]

- **A. do not carry out starting. There is pressure.**

[AL-G] [MSG]

- **Starting anomaly.** [AL-G] [MSG]

- **Oil pressure anomaly.** [AL-G] [MSG]

[ anomalies for pH / EC Control option ]

- **pH alarm anomaly.** [AL-A] [MSG]

- **100 % pH injection anomaly.** [AL-A] [MSG]

- **EC alarm anomaly.** [AL-F] [MSG]

[ anomalies for Communication options ]

- **Microsis communication a.** [AL-G] [ - ]

- **µMetos communication a.** [AL-G] [ - ]

- **Radio communication a.** [AL-G] [MSG]

- **Agrónic Radio Collision a.** [ - ] [ - ]

- **Agrónic Radio battery level a.** [AL-G] [ - ]

- **Monocable communication a.** [AL-G] [MSG]

- **Exp modules communication a.** [AL-G] [ - ]

- **SMS messages communication a.** [AL-G] [ - ]

### 8.3. HISTORY READINGS

The Agrónic 4000 records, independently of the **current day and the last 29 days**, the starts each program has made, the number of filter cleanings, the rain, the integration of radiation and day temperature, besides this, for each one of the 99 sectors, the total units accumulated in the irrigation day and fertilizer in addition to the pH and EC averages.

When entering at the record, it will do it in the current day. To move in between the days use the right arrow key for the day before and the right one for the next day. To move in between the values of one day, use the up and down arrow keys.

On the first four screens it shows the starts each program has carried out during the whole day.

```
23/07 P= 01 02 03 04 05 06 07 08 09 10
Starts = 03 00 00 00 01 00 00 02 00 00
```

In another screen it shows the filter cleanings carried out by each group and besides this, whether some sensors are connected or not, the day integration by solar radiation, the temperature, the evapotranspiration and the integration by temperature.

```
23/07 L. Filters = 005 002
07318 Whm2 00.5 l/m2 0.08 mmd 0435 °C*h
```

On the following screens it shows for each sector, the total of the day in irrigation, the pH and EC average (in case that sensors are connected) and the fertilizers totals.

```
23/07 S01 I= 0000:00 00.0 pH 0.0 mS
F1 0000'00" F2 0000'00"
```

The irrigation units of each sector will be in time or volume depending on the units of the first irrigation of the day of each sector. The fertilizer units will depend on the habitual ones configured at the flow parameters.

The pH and EC average is carried out by taking readings every second in the irrigation temporization of each sector.

The record values can not be modified nor erased.

The first 20 sensors function have the average recorded every 30 minutes of the day in each one of the record days. These values can only be seen from the PC link option.

## 8.4. SENSORS READINGS

In case the Agrónic 4000 had a sensor connected in order to measure climatic values that affect the crop or the installation, they can be read in this section, with a screen per sensor.

Among the 76 possible, the number of sensor is shown in the first line, and at its right the instant value with the sensor units. Where the sensor is connected to is shown in the second line.

```
Sensor 01      0642 Wm²
Input: 04  at the base
```

Use the up and down arrow keys to move among the sensors; press "Function" or "View" to exit.

## 8.5. AGRÓNIC RADIO 868 READINGS

When the Agrónic 4000 is supplied with the Via Radio option, in section 6 of the readings you may consult the status of the different parameters of the different Radio Modules connected to the Agrónic.

If the model is the Agrónic Radio 868 the following reading display appears:

```
Radio module 01  ED : 00100010  SR : 00010010
Bat. level: *02,  rssi: *20 (1 1 0 1)  48
```

The module number that refers to the screen is indicated on the first line of the screen. The status of the Digital Inputs (**ED**) and the Relay Outputs (**SR**) are also indicated. A "1" means that they are activated.

The second line indicates the battery level, which may be from 0 to 7. In the rssi section, the first two numbers indicate the reception level detected by the Radio Module, and the last two numbers indicate the reception level detected by the link CER. The 4 numbers in parenthesis indicate the status of the last 4 communications. A "1" means that they have been performed satisfactorily.

The symbol "\*" next to the value of the reception or battery levels indicates that the value is insufficient to assure proper functioning. In reception levels it will be below 35, and the battery level below 4.

If the model is the Agrónic Radio 868-16, the status of the communication with the EAR, the channel used, the communication protocol and the version of the EAR program are displayed on the first screen:

```
Agr.Rad.  Channel: 1  Protocol: 1
1.01      Active: yes  Communicating: yes
```

The following screens shows the status of communication with each of the MAR.

```
MAR01  Active: yes  Com.: 1111111111111111
rssi EAR: 50  rssi MAR: 50  battery: 3.6V
```

The status of the last 16 receptions is shown on the screen. The level of radio reception (rssi) in the EAR and the MAR (communication is critical when it is below 35). The battery level (should be change when it is below 3.3V).

## 8.6. AGRÓNIC RADIO 2.4 READINGS

When the Agrónic 4000 has the Via Radio option, in section number 7 of Readings the status of the Modules Agrónic Radio 2,4 which are connected to the Agrónic 4000 may be consulted.

The status of the Communication with the EAR, the channel used, and the version of the EAR program will appear on the first screen.

```
Agr.Radio 2,4  Channel: 1
1.00      Active: yes  Communicating: yes
```

The following screens display the status of Communication with each of the MAR:

```
MAR001  Active: yes  Com.: 1111111111111111
rssi EAR: 50  rssi MAR: 50  battery: 4.1V
```

The status of the last 16 receptions is shown on the screen. The level of radio reception (rssi) in the EAR and the MAR (Communication is critical when it is below 35). The battery level (should be change when it is below 3.4V).

## 8.7. AGRÓNIC MONOCABLE READINGS

When the Agrónic 4000 has the single cable option, section 7 of Readings may be consulted for the status of communication with the modules; and, in the first screen, the status of the communication with the EAM and it version of program.

## 9. ERASURE

The ERASURE function will be used to cancel the programming or the totals values. To do so, press the "FUN" (functions) key, choose the function by its number (3) and then press "Enter".

Programs : 1	Readings: 2	<b>Erasure : 3</b>
Parameters: 4	Manual : 5	Clock : 6

The "Erasure" menu is the following:

ERASURE	Programs : 1	All : 2
	Totals : 3	

To exit any erasure screen press the "function" or "View" keys.

Care has to be taken when using this function, yet important values for the irrigation system working can be cancelled.

At sector "1" the program number to be erased will be asked, at sector "2" to erase the whole programs and at number "3" to erase all the totals. Confirmation of the erasure will always be requested.

Are you sure to erase? : NO
-----------------------------

## 10. MANUAL

By using the manual function, the following can be done:

- Start the beginning of a program.
- Stop a program that is irrigating.
- Leave a program out of service; the values of the irrigation which is taking place will be erased.
- Remove a program from the out of service position.
- Stop the system, that it can also be done with the STOP key. The programs are postponed and the outputs deactivated.
- Stop the out of service, that can also be done with the STOP key. The programs will reinitiate at the same place where they stopped.
- Set the Agronic at out of general service, leaving everything stopped and erasure the values of the irrigations that are taking place out of the programs.
- Exit the out of service.
- Start the filter cleaning.
- Finish the filter cleaning.
- Finish the stop by general malfunction.
- Finish the stop by flow malfunction.
- Finish the stop by counter malfunction.
- Finish the stop by fertilizer without control.
- Finish the definitive stop of the sectors.
- Reinitiate the injection by error in the fertilizers proportions.
- Finish the stop of the filters by filter out of control malfunction.
- Finish the activation of the general alarm outputs, fertilizer or acid.
- Finish the stop of the alarm by EC.
- Finish the stop of the injection by pH alarm.

To do so, press the "FUN" key, choose the option by its number (5) and then press "Enter".

Programs : 1	Readings : 2	Erasure : 3
Parameters: 4	<b>Manual : 5</b>	Clock : 6

The "Manual" menu is the following:

MANUAL	Out of service : 1	STOP : 2
Programs : 3	Malfunctions : 4	Filters : 5

MANUAL Outputs : 6
--------------------

To exit any manual screen press the "Function" or "View" keys.

It is possible to move to another screen from the "Out of service" sector in order to do a general or a program one.

General : 1	Program : 2
Out of general service (Y/N) : NO	

Before the out of service is carried out, the confirmation will be asked, yet once it is done the values of the irrigation that is taking place are cancelled from the program which is being carried out or from all of them, at the general. It can be of use when the irrigation of all the programs that are taking place it wants to be cancelled. This can be done by entering for a while at the general out of service and leaving afterwards.

The **“STOP”** can be done from here or through the key. The functions and the unit outputs are stopped then, being reactivated at the same point when the Stop ends. While it is stopped, the programs continue starting but the leave at stand by, besides this, the keyboard beeper emits an advice beep every ten seconds.

At the **“Programs”** manual action, an irrigation programming can be started at any sub-program; on the other hand, if the program has already started it will be possible to finish it.

The number of program and sub-program will be asked at first, and then, the confirmation in order to stop or finish.

Program number : 05-01
Start (Y/N) : YES

The **“Malfunctions”** sector is used to finish, once repaired and according to the user, any anomaly. At most of the cases the irrigation is restarted at the same point it stopped.

At **“Filters”** a cleaning or backflushing can be started or stopped.

When entering at the option **“6” “Outputs”** of the menu, the following screen appears, where it is possible to directly activate the relay outputs. Care has to be extremely taken yet no kind of control exists and damages can be caused to the installation (securities are no taken into account). This function is only of use, for the installer, when setting all the elements.

To exit the screen, the 8 possible outputs have to be at 0, it means, deactivated.

At the **“outputs connection”** [4.3.4.] there is a chart with the relays situation. We recommend consulting it.

## 11. CLOCK

The CLOCK function will be used to set on the internal clock of the Agrónic 4000. To do so, press the **“FUN”** key, choose the function by its number (6) and then press **“Enter”**.

Programs : 1	Readings: 2	Erasure : 3
Parameters: 4	Manual : 5	<b>Clock : 6</b>

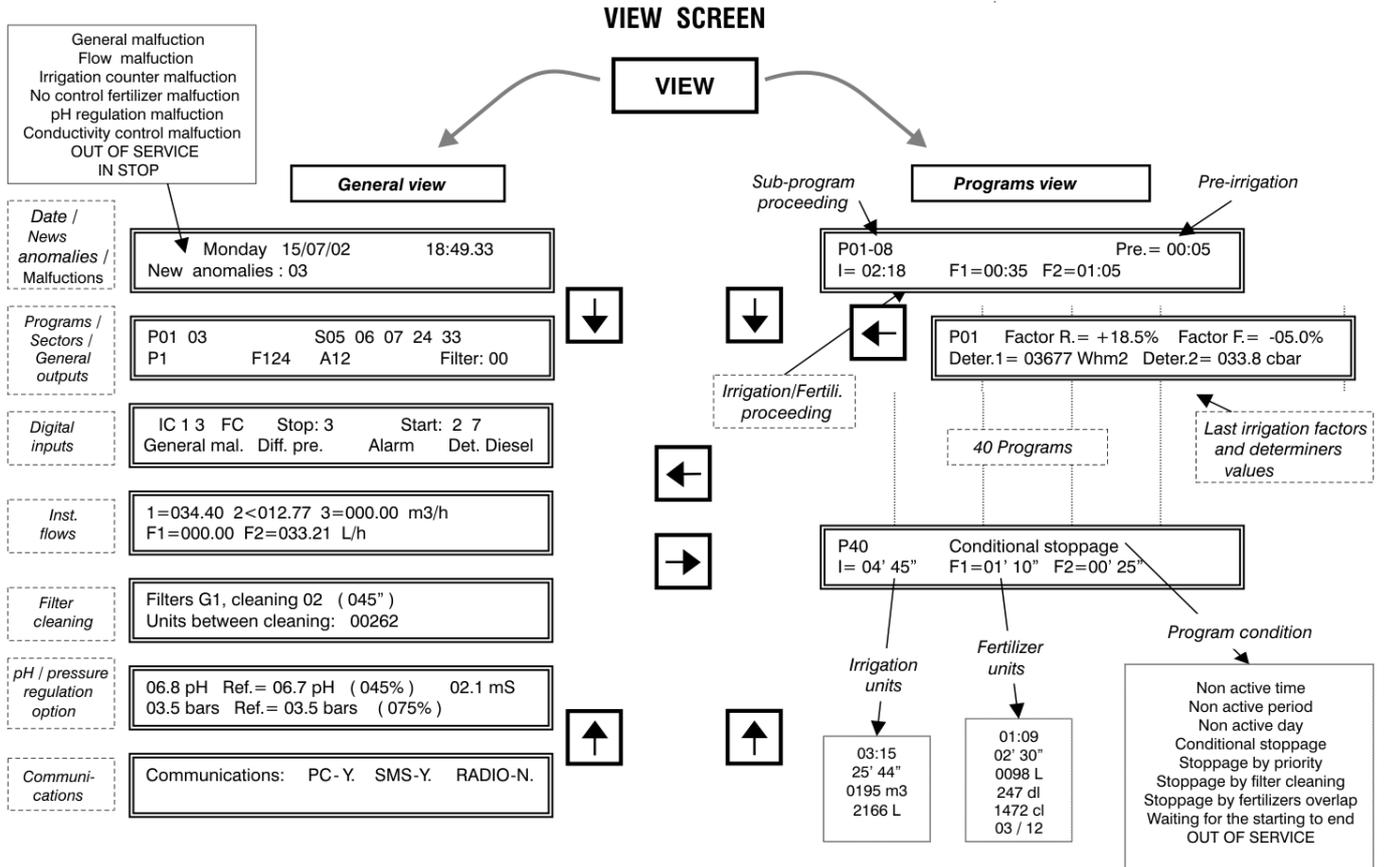
Enter the day of the week, day of the month, the month, the last two digits of the year, the hour, the minutes and the seconds according to this order. When pressing **“Enter”** at the seconds the clock is updated.

Wednesday	17/08/02	20:06.33
-----------	----------	----------

## 12. VIEW

To go into this section press the “View” key. We will find detailed information about what the controller is doing.->

Look at the resume:



The last visited programs and general view screen is always recorded. This is why when coming from “Functions” or “View” it will show again the last screen seen when exiting the “View”.

When a “View” automatically enters after a power cut, it is done through the first screen of the general view.

### 12.1. GENERAL VIEW

The general view is formed by a series of screens with resumed information of the system general operation.

The **first screen** shows the clock information from the seconds to the year.

The second line usually informs about the new anomalies which have taken place since the previous reading, in the same line it also informs if there are some program out of service. When a malfunction or a manual action of the next list which is shown at following takes place, it will be shown intermittently in the second line until the user repairs the anomaly or/and

-> There is a “General view” and a “Programs view”. To move in between the view screens use the up and down arrow keys. To move from a general view to a programs one or to do the opposite, use the right and left arrow keys.

knows it by canceling it at “Function–Manual–Malfunctions” [10].:

- o General malfunction
- o Flow malfunction
- o Irrigation counter malfunction
- o Fertilizer without control malfunction
- o pH regulation malfunction
- o Conductivity control malfunction
- o Out of service
- o At STOP

Monday 12/07/02 18:49.33  
New anomalies : 03 Pro. OUT OF SERVICE

Monday 12/07/02 18:49.33  
Flow malfunction

The **second screen** inform about the programs and sectors operating at that moment, all these in the first line. If more than four programs are activated at a time, it will be intermittently shown in groups of four.

The same occurs with the sectors when more than 8 are activated at a time.

In the lower one it shows the outputs activated, starting by the pumps (M1234), fertilizers (F12345678 LF), mixers (A12345678) and the filters.

P01 03	S05 06 07 24 33
M1	F124 A12 Filter: 00

The **third screen** indicates the digital functions activated, whenever they have been configured. The first ones to be shown at the first line are the irrigation counters ones (IC1234), the fertilizers counters (FC12345678), the stop functions (Stop:1234), the program start ones (Start:12345678) and at the second line, the general malfunction function (Gen. Fai.), the filters differential pressure gauges (Pre. Dif. 1234), the intrusion alarm one (Alarm) and the diesel detector one (D. Diesel).

IC1 3	FC	Stop: 3	Start: 2 7
Av. Gen.	Pre. Dif. 2		Alarm

If volumetric counters for the irrigation or fertilization are set in the installation, it will be explained on the **fourth screen** of the instantaneous flows.

In the first line it shows the irrigation flows. Besides this, if flow control is ordered it can show the ">" of major or the "<" of minor after the irrigation counter number, when the instantaneous flow is going out of the margins. The maximum value that can be displayed on screen in each format is 650.00 or 6500.0 m<sup>3</sup>/h

The second line is for the fertilizers instantaneous flow. When more than four are configured, they will be shown intermittently in two groups. The maximum value that can be displayed on screen is 650.00 or 6500.0 L/h

1=034.40	2<012.77	3=000.00 m <sup>3</sup> /h
F1=000.00	F2=033.21 L/h	

When filters cleaning group has been configured, it will show a screen per group with the information of the filter which is doing the cleaning and the irrigation units (minutes or m<sup>3</sup>) missing for the following cleaning.

Filters G1, Cleaning the 02 (045")
Units between cleanings: 0262

If a pressure or pH regulation option is installed, we will see in the first line of the screen the instantaneous value of the pH sensor, at its right the reference requested for the irrigation that is taking place at that moment, in brackets the injection percentage and finally, the conductivity sensor value (EC).

In the second line the values correspondent to

the pressure regulation, with the pressure sensor value, the reference and the injection %.

06.8 pH	Ref. = 06.7 pH (045%)	02.1 mS
03.5 bars	Ref. = 03.5 bars (075%)	

On the last view screen, it informs about which elements extern to the controller there is communication established with.

Communications: PC=yes	SMS=yes	RADIO=no
Microisis=yes	METOS=yes	MONOCABLE=yes

## 12.2. PROGRAMS VIEW

For each one of the 40 programs, there is an informative screen of the program condition. If it is irrigating it will show in the first line next to the program number the number of the sub-program that is proceeding, next, if some determiners are set for the program it will be shown by the following texts:

- Non active time
- Non active period
- Non active day
- Conditional stop
- Stop by priority
- Stop by filter cleaning
- Stop by filters overlap
- Waiting for the starting to end
- OUT OF SERVICE

When the irrigation is ordered by pressing at several activations, it will show the left ones and the time missing for the next one:

- Activations: 03 01:20

Later, if there is a pre-irrigation proceeding in that moment, it will inform of the units missing to reinitiate the fertilization.

In the second line, when irrigating, there will be the units of irrigation and fertilizer still missing to be applied.

P01-08	Pre.= 00:05
I= 02:18	F1=00:35 F2=01:05

The irrigation units format can vary depending on the following list:

- Hours and minutes, 00:00
- Minutes and seconds, 00'00"
- Volume in cubic meters, 0000 m<sup>3</sup>
- Volume in liters, 0000 L

The fertilizer units one is:

- Hours and minutes, 00:00
- Minutes and seconds, 00'00"
- Volume in liters, 0000 L
- Volume in deciliters, 0000 dl
- Volume in centiliters, 0000 cl

When the fertilization is proportional the format is "00/00", in this way, each fertilizer has two values, an irrigation units one at the left of the bar and the fertilizer one at the right of the bar.

When a program has been configured to work by determiners and the option is installed, further information related to the determiners is shown in another screen: press the right and left arrow keys to go into that screen.

On the first line, next to the program number is indicated the "irrigation" factor that was applied in the last irrigation and to its right the "fertilizing factor"; in the event that there is more than one determiner to be modified, for example, the irrigation, it will be per-

formed applying the sum of the factors with its respective signs, the result is what we see on this consultation screen.

The values of the second line depend on the type of determiner of the program, in which it is initiated or in those that modify the irrigation / fertilizer, it will show the accumulated / integrated units from the previous irrigation; in those modifying the value ratio of a sensor (Eto, ground moisture, etc.) they show the instantaneous value of the sensor by the crop constant.

P01	Factor I.= +18.5%	Factor F.= -05.0%
	Condi. 1 = 03677 Wh/m <sup>2</sup>	Condi. 2 = 03.1 l/m <sup>2</sup>

NOTES:

# VIEW SCREENS

**VIEW**

General malfunction  
 Flow malfunction  
 Irrigation counter malfunction  
 No control fertilizer malfunction  
 pH regulation malfunction  
 Conductivity control malfunction  
**OUT OF SERVICE**  
**IN STOP**

**General View**

Date /  
 New Anoma-  
 lies / Mal-  
 functions

Monday 12/07/02 18:49.33  
 New anomalies : 03

Programs /  
 Sectors /  
 General  
 outputs

P01 03 S05 06 07 24 33  
 M1 F124 A12 Filter: 00

Digital  
 inputs

IC 1 3 FC Stop: 3 Start: 2 7  
 Gen. Fai. Dif. Pre. Alarm Det. Diesel

Instantane-  
 ous Flows

1=034.40 2<012.77 3=000.00 m³/h  
 F1=000.00 F2=033.21 L/h

Filter  
 cleaning

Filters G1, cleaning the 02 ( 045" )  
 Units between cleanings: 00262

pH / pressure  
 regulation  
 option

06.8 pH Ref. = 06.7 pH ( 045% ) 02.1 mS  
 03.5 bars Ref. = 03.5 bars ( 075% )

Communi-  
 cations

Communications: PC=yes SMS=yes RADIO=no

**View Programs**

Sub-program  
 proceeding

Pre-irrigation

P01-08 Pre.= 00:05  
 I= 02:18 F1=00:35 F2=01:05

P01 Factor R.= +18.5% Factor F.= -05.0%  
 Deter.1= 03677 Whm² Deter.2= 03.1 l/m²

Irrig. and ferti.  
 proceeding

40 Programs

Last irrigation  
 factors and deter-  
 miners values

P40 Conditional Stop  
 I= 04' 45" F1=01' 10" F2=00' 25"

Irrigation  
 units

Fertilizer units

Program conditions

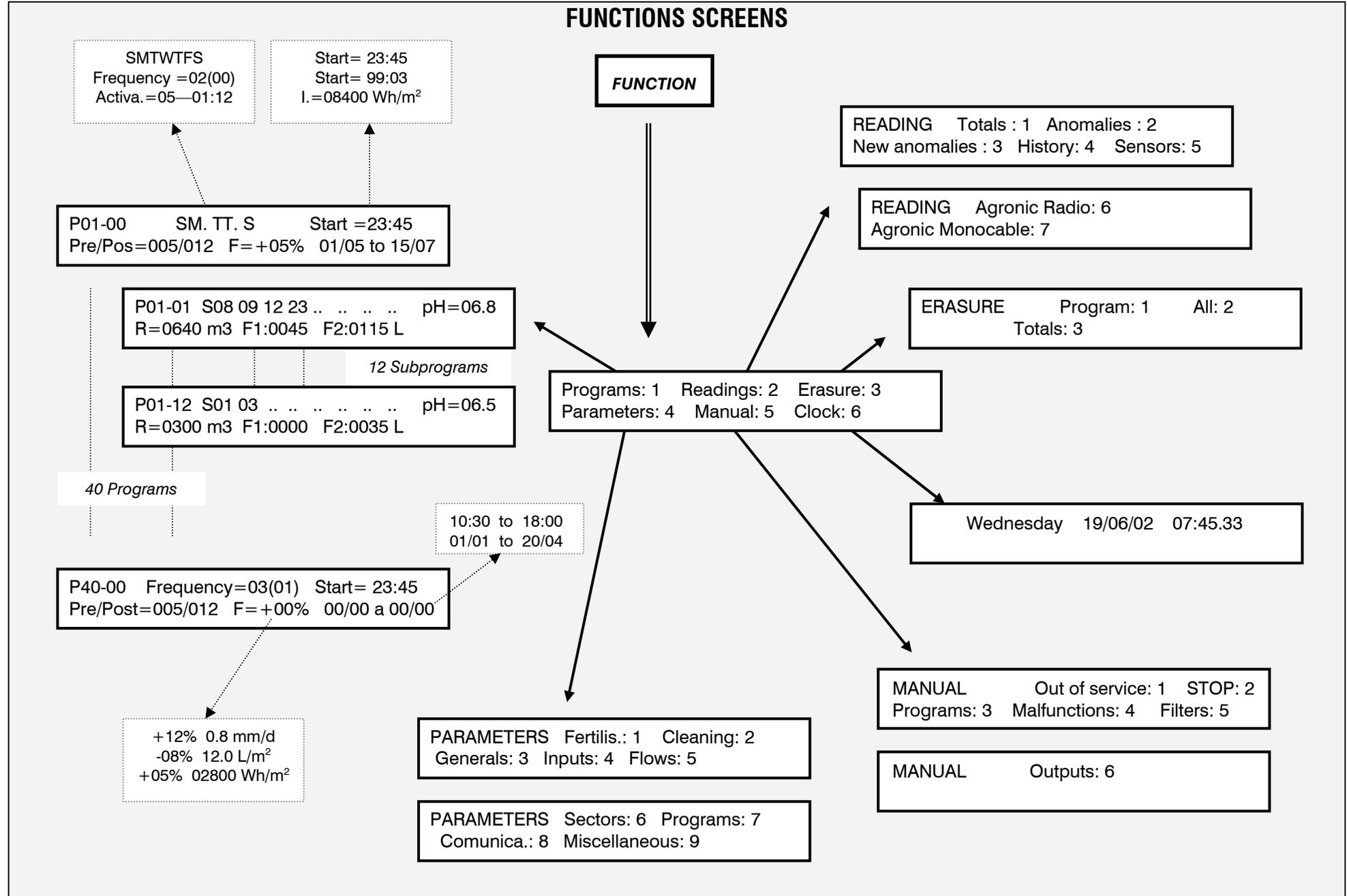
03:15  
 25' 44"  
 0195 m³  
 2166 L

01:09  
 02' 30"  
 0098 L  
 0241 dl  
 1472 cl  
 03 / 12

Non active timetable  
 Non active period  
 Non active day  
 Activations: 03 01:20  
 Conditional stop  
 Stop by priority  
 Stop by filter cleaning  
 Stop by filters overlap  
 Waiting for the starting to end  
**OUT OF SERVICE**



# FUNCTIONS SCREENS



PARAMETERS SCREEN	FUNCTION $\Rightarrow$	Programs : 1 Readings: 2 Erasure: 3 Parameters: 4 Manual: 5 Clock: 6	PARAMETERS Fertiliza.:1 Cleaning: 2 Generals: 3 Inputs: 4 Flows: 5	PARAMETERS Sectors: 6 Programs: 7 Comunica.: 8 Miscellaneous: 9																																																																								
<p style="text-align: center;"><u>Fertilizers parameters 1</u></p> <p>Number of fertilizers ( 0 – 8 ): 4            Fertilization series (1) parallel (2): 2            Proportional fertilization ( Y/N ): YES            Fertilizers end cleaning: 018"            Mixer 1 Pre-mixing: 025"                Start / stop mixing: 015"/120"            Mixer 2 Pre-mixing: 025"                Start / stop mixing: 000"/001"            Mixer 3 Pre-mixing: 000"                Start / stop mixing: 000"/000"            Mixer 4 Pre-mixing: 000"                Start / stop mixing: 000"/000"</p> <p style="text-align: center;">- pH CONTROL OPTION -</p> <p>pH alarm= (+) 0.6 pH (-) 0.4 pH            Detection delay: 038"            Detection delay alarm 100%: 025"            EC Alarm = (+) 02.1 mS (-) 00.8 mS            Detection delay: 105"            Inject for base ( 1 ) acid ( 2 ): 2            Modulation cycle: 2.5"            Proportional band: 2.0            Reaction: 1            Apply acid in pre-irrigation: NO            Apply acid in post- irrigation: YES</p>	<p style="text-align: center;"><u>Flow parameters 5</u></p> <p>Irrigation units =            hh:mm (0) mm'ss" (1) m<sup>3</sup>(2) L(3): 2            Fertilization units =            hh:mm (0) mm'ss" (1) L (2) dl (3) cl (4): 2            Irrigation counter 1            Nominal flow margin high/low: 10 / 08 %            Irrigation counter 2            Nominal flow margin high/low: 12 / 12 %            Irrigation counter 3            Nominal flow margin high/low: 12 / 12 %            Irrigation counter 4            Nominal flow margin high/low: 00 / 00 %            Detection delay: 280"            Stop type, NO (0) Tem. (1) Def. (2): 1            Irrigation detection delay: 033"</p>	<p style="text-align: center;"><u>General outputs parameters 3</u></p> <p>Pump 1 Output number: 0082            On/off temporization: 005" / 018"            Pump 2 Output number: 0083            On/off temporization: 020" / 012"            Pump 3 Output number: 2201            On/off temporization: 004" / 004"            Pump 4 Output number: 0000            On/off temporization: 000" / 000"</p> <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 30%;">Fertilizers</td> <td style="width: 30%;">F1</td> <td style="width: 30%;">F2</td> </tr> <tr> <td>Output number:</td> <td>00000084</td> <td>00000085</td> </tr> <tr> <td>Fertilizers</td> <td>F3</td> <td>F4</td> </tr> <tr> <td>Output number:</td> <td>00000000</td> <td>00000000</td> </tr> <tr> <td>Fertilizers</td> <td>F5</td> <td>F6</td> </tr> <tr> <td>Output number:</td> <td>00000000</td> <td>00000000</td> </tr> <tr> <td>Fertilizers</td> <td>F7</td> <td>F8</td> </tr> <tr> <td>Output number:</td> <td>00000000</td> <td>00000000</td> </tr> <tr> <td>Mixers</td> <td>F1</td> <td>F2</td> </tr> <tr> <td>Output number:</td> <td>00000087</td> <td>00000088</td> </tr> </table> <p style="text-align: center;">---&gt;</p>	Fertilizers	F1	F2	Output number:	00000084	00000085	Fertilizers	F3	F4	Output number:	00000000	00000000	Fertilizers	F5	F6	Output number:	00000000	00000000	Fertilizers	F7	F8	Output number:	00000000	00000000	Mixers	F1	F2	Output number:	00000087	00000088	<p style="text-align: center;">---&gt;</p> <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 30%;">Mixers</td> <td style="width: 30%;">F2</td> <td style="width: 30%;">F4</td> </tr> <tr> <td>Output numbers:</td> <td>00000000</td> <td>00000000</td> </tr> <tr> <td>Mixers</td> <td>F5</td> <td>F6</td> </tr> <tr> <td>Output numbers:</td> <td>00000000</td> <td>00000000</td> </tr> <tr> <td>Mixers</td> <td>F7</td> <td>F8</td> </tr> <tr> <td>Output numbers:</td> <td>00000000</td> <td>00000000</td> </tr> <tr> <td>Auxiliar Fert.</td> <td>F1</td> <td>F2</td> </tr> <tr> <td>Output numbers:</td> <td>00000084</td> <td>00000085</td> </tr> <tr> <td>Auxiliar Fert.</td> <td>F3</td> <td>F4</td> </tr> <tr> <td>Output numbers:</td> <td>00000086</td> <td>00000000</td> </tr> <tr> <td>Auxiliar Fert.</td> <td>F5</td> <td>F6</td> </tr> <tr> <td>Output numbers:</td> <td>00000000</td> <td>00000000</td> </tr> <tr> <td>Auxiliar Fert.</td> <td>F7</td> <td>F8</td> </tr> <tr> <td>Output numbers:</td> <td>00000000</td> <td>00000000</td> </tr> </table> <p>Fertilizer general output: 0080            Fertilizer cleaning output: 0081            Filter output G1: 2161 a 2165            Filter general output G1: 0090            General alarm output: 0091            Fertilizer alarm output: 0092            Start/stop temporization alarm: 008"/030"            Normally open alarm (Y/N): NO</p> <p style="text-align: center;">- pH CONTROL OPTION -</p> <p>pH control general output: 0093            pH control alarm output: 0094</p> <p style="text-align: center;">- DIESEL CONTROL OPTION -</p> <p>Starting output: 0070            Stop output: 0071            Power output: 0072            Pre-heating output: 0000            Time of starting: 04"            Time between attempts: 015"            Time of pre-heating: 000"            Time of stop: 035"            Time between starting and pump: 150"            Time between pump end and stop.: 200"</p>	Mixers	F2	F4	Output numbers:	00000000	00000000	Mixers	F5	F6	Output numbers:	00000000	00000000	Mixers	F7	F8	Output numbers:	00000000	00000000	Auxiliar Fert.	F1	F2	Output numbers:	00000084	00000085	Auxiliar Fert.	F3	F4	Output numbers:	00000086	00000000	Auxiliar Fert.	F5	F6	Output numbers:	00000000	00000000	Auxiliar Fert.	F7	F8	Output numbers:	00000000	00000000	<p style="text-align: center;"><u>Filter cleaning Parameters 2</u></p> <p>Filter group number: 1</p> <p>Cleaning time: 134" subg. 1: 01 to 01            Cleaning ime: 108" subg. 2: 02 to 05            Pause time between filters: 04"            Units between cleanings: 02300            Stop sectors when cleaning: Y.            Maximum num. of cleanings: 3            In relation to P 1 2 3 4 C 1 2 3 4                              Y Y N N Y N N N</p>
Fertilizers	F1	F2																																																																										
Output number:	00000084	00000085																																																																										
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## PARAMETERS SCREENS

PARAMETERS Fertiliza.: 1 Cleaning : 2  
Generals : 3 Inputs : 4 Flows : 5

PARAMETERS Sectors : 6 Programs : 7  
Communica. : 8 Miscellaneous: 9

Digital inputs parameters 4.1

Function code number: 000  
Input number: 00000000

Code 01: General malfunction  
-Detection delay: 030"  
Code 02: Differential pressure gauge 1  
Code 03: Differential pressure gauge 2  
Code 04: Differential pressure gauge 3  
Code 05: Differential pressure gauge 4  
-Detection delay: 030"  
Code 06 : Stop 1  
Code 07 : Stop 2  
Code 08 : Stop 3  
Code 09 : Stop 4  
-Detection delay: 030"  
-Temporary, Conditional, Definitive  
-Anomaly Y/N  
Code 10: Intrusion alarm  
-Detection delay: 010"  
Code 11 : Irrigation counter 1, pulses  
Code 12 : Irrigation counter 2, pulses  
Code 13 : Irrigation counter 3, pulses  
Code 14 : Irrigation counter 4, pulses  
-Pulse value: 01000 L  
-Max. time between pulses: 240"  
Code 15 : Fert. counter 1, pulses  
Code 16 : Fert. counter 2, pulses  
Code 17 : Fert. counter 3, pulses  
Code 18 : Fert. counter 4, pulses  
Code 19 : Fert. counter 5, pulses  
Code 20 : Fert. counter 6, pulses  
Code 21 : Fert. counter 7, pulses  
Code 22 : Fert. counter 8, pulses  
-Pulse value: 0100 cl  
-Max. time between pulses: 200"  
Code 23: Irrigation counter 1, frequency  
Code 24: Irrigation counter 2, frequency

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Code 25: Irrigation counter 3, frequency  
Code 26: Irrigation counter 4, frequency  
-Cicles per litre: 009.43 Hz  
Code 27: Fert. counter 1, frequency  
Code 28: Fert. counter 2, frequency  
Code 29: Fert. counter 3, frequency  
Code 30: Fert. counter 4, frequency  
Code 31: Fert. counter 5, frequency  
Code 32: Fert. counter 6, frequency  
Code 33: Fert. counter 7, frequency  
Code 34: Fert. counter 8, frequency  
-Cicles per centilitre: 128.50 Hz  
Code 35: Rain gauge  
-Litres per pulse: 00.5 L/m<sup>2</sup>  
Code 36: Start 1 programs  
Code 37: Start 2 programs  
Code 38: Start 3 programs  
Code 39: Start 4 programs  
Code 40: Start 5 programs  
Code 41: Start 6 programs  
Code 42: Start 7 programs  
Code 43: Start 8 programs  
-Detection delay: 030"  
-On/off Y/N: NO

- DIESEL CONTROL OPTION -

Code 44: Detector diesel  
-Detection delay: 030"

Input number:

00XXXXXX Base  
01XXXXXX Expansion Module  
02XXXXXX Agrónic Radio 868 Module  
03XXXXXX Agrónic Monocable 64 Module  
07XXXXXX Agrónic Monocable 120 Module  
08XXXXXX Agrónic Radio 868-16 Module  
09XXXXXX Agrónic Radio 2.4 module

Analog inputs parameters 4.2

Input number: 00000001  
Measure unit: 02  
Input margin min.: 0800 max.: 4000 mV.  
Reading min.: 0000 Wm<sup>2</sup> max.: 2000 Wm<sup>2</sup>  
Calibrate (100=0): 100

Input:

00XXXXXX Base  
01XXXXXX Expansion Module  
02XXXXXX Agrónic Radio 868 Module  
04XXXXXX SMS message  
05XXXXXX Microsis  
06XXXXXX Metos  
07XXXXXX Agrónic Monocable 120 Module  
08XXXXXX Agrónic Radio 868-16 Module  
09XXXXXX Agrónic Radio 2.4 Module

Units:

00 : Nule  
01: °C  
02: Wm<sup>2</sup>  
03: cbar  
04: %HR  
05: km/h  
06: %  
07: Uds  
08: mm  
09: l  
10: l/m<sup>2</sup>  
11: m<sup>3</sup>/h  
12: bars  
13: mS  
14: pH  
15: mm/d  
16: '  
17: rpm  
18: mm  
19: V

## PARAMETERS SCREENS

PARAMETERS Fertiliza.: 1 Cleaning: 2  
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Sectors parameters 6

Sectors 1 to 99

Output relay: 00000001

M1 M2 M3 M4

Asign pumps YES YES NO NO

SI1 SI2 SI3 SI4

Asign to stop inputs YES YES NO YES

Irrigation counter: 1

Expected flow: 037.25 m<sup>3</sup>/h

Generator temporisation: +/- 015"

Auxiliary output: 00002051

F1 F2 F3 F4

Asign fertilizers NO NO NO NO

- pH CONTROL OPTION -

pH regulation self adjustment: 41%

pH Self adjustment temporisation: 04"

- PRESSURE REGULATION OPTION -

Irrigation pressure: 03.2 Bars

Programs parameters 7

Programs 1 to 40

Irrigation group: 1

Security time between startings: 01:45

Determiner 1

Determiner 2

Determiner 3

Determiner 4

- Sensor number

- Determiner type:

*Type 01: Start when surpassing the value*

*Type 02: Start when descending*

*Type 03: Start by integration*

*Type 04: Start 1 to 8 per digital input*

*Type 05: Conditional stop when surpassing the value*

*Type 06: Conditional stop when descending*

*Type 07: Modify the irrigation by integration*

*Type 08: Modi. Irrig. and fert. by integration*

*Type 09: Modify the fertilizer by integration*

*Type 10: Modify the irrigation by Eto*

*Type 11: Modify the fertilizer by Eto*

*(program determiners option:*

*types: 1, 2, 3, 7, 8, 9, 10, 11)*

Communication parameters 8

PC communication: YES

SMS messages: YES

GSM Modem checking: YES

Expansion modules communication: YES

Agrónic Radio 868 communication: YES

Agrónic Radio 2,4 communication: YES

Agrónic Monocable communication: YES

Microsis communication: YES

µMetos communication: YES

Miscellaneous parameters 9

Beeper level: 3

Functions acces code: \*\*\*\*

Parameters acces code: \*\*\*\*

Copy program 00 from 00 to 00

Copy sector 00 from 00 to 00

- PRESSURE REGULATION OPTION -

Pressure regulation proportional band: 2.0

Pressure regulation reaction: 1"

# READING SCREEN

**FUNCTION** →

Programs: 1 Readings: 2 Erasure: 3  
Parameters: 4 Manual: 5 Clock: 6

**READINGS** Totals: 1 Anomalies: 2  
New anomalies: 3 History: 4 Sensors: 5

**READINGS** Agr. Radio 868: 6  
Agr.Rad24 : 7

**Totals** Last erasure date

General totals 23/10/01 11:35.02  
Irrigation = 1344:09.18 033600.020 m<sup>3</sup>

Sector totals 01 026.12 m<sup>3</sup>/h  
Irrigation = 0240:00.00 006268.800 m<sup>3</sup>

↑  
↓

99 Sectors Resulting flow

Sector totals 99 026.12 m<sup>3</sup>/h  
Irrigation = 0240:00.00 006268.800 m<sup>3</sup>

Fertilizers  
Sector totals 99 F1:0088:14.30  
F2:0104:38.10 F3:0280.10 L F4:0095.50 L

Sector totals 99 F5:0088:14.30  
F6:0104:38.10 F7:0280.10 L F8:0095.50 L

30 days history

**Record**

20/08 P= 01 02 03 04 05 06 07 08 09 10  
Starts = 03 00 01 01 00 00 02 00 00 00

20/08 P= 11 12 13 14 15 16 17 18 19 20  
Starts = 00 00 01 00 00 05 00 00 00 00

20/08 P= 21 22 23 24 25 26 27 28 29 30  
Starts = 00 00 00 00 00 00 00 00 00 00

20/08 P= 31 32 33 34 35 36 37 38 39 40  
Starts = 00 00 00 00 00 00 00 00 00 00

20/08 L. Filters= 005 002 000 012  
07318 Whm<sup>2</sup> 00.5 l/m<sup>2</sup> 0.08 mmd 0435 °C\*h

20/08 S P= 01 I= 00377 m<sup>3</sup> 06.8 pH 1.7 mS  
F1:0045.2 F2:0016.0 F3:0035.4 F4:0009.1 L

99 Sectors  
99 Sectors  
99 Sectors

20/08 S 99 I= 00000 m<sup>3</sup> 00.0 pH 0.0 mS  
F1:0000.0 F2:0000.0 F3:0000.0 F4:0000.0 L

Startings done by the 40 programs

Filter group cleaning, sensors integration

Totals of the irrigation day, fertilization and pH and EC averages

**SISTEMES ELECTRÒNICS**  
**PROGRES, S.A.**

Avda. Urgell,23 - 25250 BELLPUIG (Lleida) España  
Tel. (+34) 973 32 04 29 - Fax (+34) 973 33 72 97  
info@progres.es      www.progres.es