

AGRÓNIC 2500

COMMUNICATIONS SUPPLEMENT VERSION 1

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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 2500.

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.

1. DESCRIPTION

The Agrónic 2500 has different remote management options for the entire irrigation system in order to optimize its resources, make user tasks easier and incorporate traceability features to their crops. On the other hand, it simplifies irrigation control by integrating the devices located in the field via radio.

- **Sending and receiving SMS messages.** The equipment can send messages to two mobile phones and one irrigation device or programmer. It can receive messages from any telephone. This option is built right the GSM/GPRS modem into the equipment.

Users can employ their telephones to carry out the following actions via SMS:

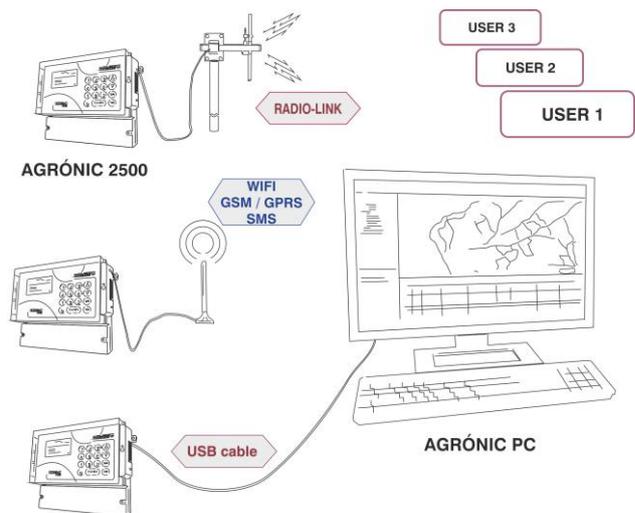
- Execute all the manual commands permitted by the programmer, such as setting the unit to Stop, disabling the equipment, program or determining factor with an out-of-service command, start a filter cleaning; start, stop or delay an irrigation program for a few hours; adjust the time; set a sector to manual start, manual stop or automatic; establish values for virtual sensors such as modifying evapotranspiration or increasing the irrigation of all programs by a specific percentage.
- Modify all the variables in a program or one variable in particular from a single message.
- Request a general consultation or specific reports regarding the time, specific programs or sensors.
- Request a reading from the daily history, from the current day to nine previous days, regarding the sector or meter totals or the sensor averages.



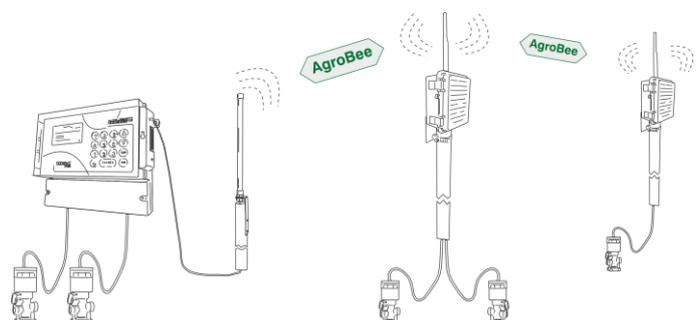
The Agrónic 2500 can send SMS when an event occurs in the equipment, with all 51 events being configurable. It also can send messages concerning all 30 determining factors. Every time the user sends a message to the Agrónic 2500 from their mobile phone, they will receive a response or confirmation message.

- **Links to the Agrónic PC management software.** This extremely useful tool centralizes and facilitates the detailed management of irrigation commands, records, history and reports from different equipment. Up to three users can connect to the Agrónic 2500 via GPRS, or one user via Radio-link and another via cable.

- GPRS Link: the connection is made using a TCP-IP socket through the “GSM-GPRS” network that provides a permanent connection that also includes SMS messages. It provides users with a long distance control center. Telephone company coverage is required. For installations that require low energy consumption, it allows the internal modem to shut down for certain hours a day.
- WI-FI Link: the connection is made using a TCP-IP socket through the “Wi-Fi” network that provides a permanent connection.
- GSM Link: the connection is made through data transfer over time intervals. It also includes SMS messages. No distance limit from control center. Telephone company coverage required.
- Radio-Link: open band radio system that can connect to a control center located a few kilometers away. In addition, the same Agrónic 2500's act as a communication bridge between them, with 1.2 km coverage distance between units. There are 99 radio channels available for allocation.
- USB Cable: the Agrónic 2500 is connected to the PC software within the same installation.
 - PC users: the Agrónic 2500 internally set up to exchange data with three users. Any modification made to the equipment will be updated in all three Agrónic PC software; a modification made from one of the software will be updated on the Agrónic 2500 and also in the other two Agrónic PC software.

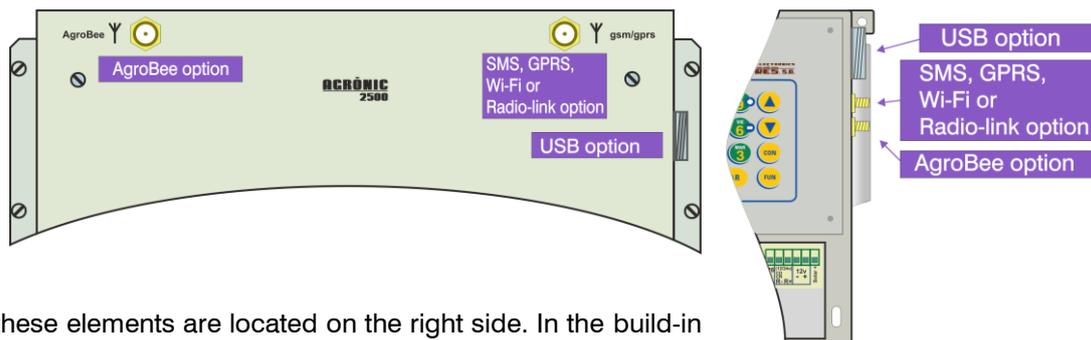


- **External AgroBee modules.** An open band radio system is used to activate latch electrovalves and the acquire digital, analog and meter sensor readings.



2. CONNECTIONS

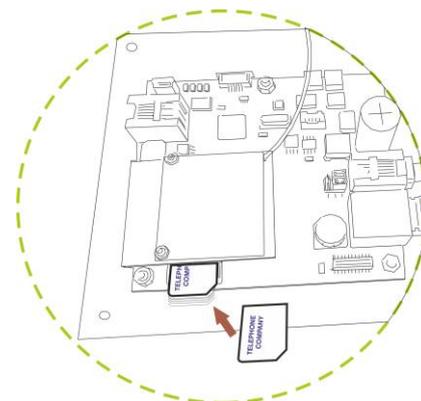
The images show how to connect up the antenna for the SMS message options, GSM/GPRS link or radio-link; the other shows the USB port wire and the antenna in the AgroBee option.



In the box model, these elements are located on the right side. In the build-in model, these are found on the back of the box.

In the SMS message option or the Agronic PC software linking via GSM/GPRS, it will be necessary to insert a SIM card supplied by the telephone company to provide coverage to the location of the Agronic 2500.

The interior of the equipment must be accessed in order to insert the card. To do so, first disconnect the general power supply. Then, in the box model, remove the four screws on the keypad, or in the build-in model, the six screws that attach the front to the metal box. The circuit for the modem is below the LCD screen and just above the connector. Place the SIM card exactly as shown in the figure, making sure to position the slot on one side of the card correctly.



3. TECHNICAL FEATURES

SMS message / PC link with GSM-GPRS options:

- Four-band modem, 850/900/1800/1900 MHz.
- GPRS class 10.
- Modem power consumption runs from 0.94 to 1.62 W.

Radio-link:

- Uses 433 MHz open communication band. 99 available channels.
- The maximum distance between two communication points is 1200 meters.
- Each radio-link acts as a repeater for the other. Up to 9 levels of repetition can be attained. With more levels, the longer it takes to request information from the equipment.
- Power consumption in radio-link; reception: 0.08 W, transmission: 0.15 W.

Wi-Fi:

- Radio protocol IEEE 802.11b/g/n
- Consumption from 0.2 to 0.9W

AgroBee:

- Distance between modules: up to 800 meters. Antennas must be visible to one another and raised 2 to 3 meters above the crops.
- Number of repeaters: 3.
- Number of module between end units and repeaters: 16.
- Time between synchronisms can be configured, default value is 60".
- 1 channel available in 868 MHz, and 10 in 915 MHz. Open band and universal.
- Power consumption of coordinator in the Agronic 2500: 0.07 W.
- Software certified "IEEE 802.15.4 / ZigBee Pro", optimized in routers for reduced power consumption.
- Exterior antenna for the Agronic 2500 coordinator with 10 meters of cable length.
- Field modules that allow for elevations of up to 5 meters.

4. SMS MESSAGES

The Agrónic 2500 has the option of sending and receiving SMS messages. It features a “GSM/GPRS” modem inside the unit and an exterior antenna. The antenna is connected to the right side of the box model and the back of the build-in model and must be situated in such a way that provides the optimal coverage. See the “*Connections*” section [2.].

It is essential to have a SIM card from the telephone company in order to send and receive SMS messages. It first must be inserted in a mobile phone so as to deactivate its “PIN number”. Then it can be inserted into the SIM card connector inside the equipment; see the “*Connections*” section [2.].

To configure the equipment and obtain the maximum features, it will be necessary to enter the installer parameters and communication parameters.

4.1. INSTALLER PARAMETERS

Access these by pressing “*Function – Parameters – Installer*”; then enter the installer code to access the three sections of the menu: “*Communications*”, “*Events*” and “*Access codes*”.

INSTALLER PARAM.
1. Erasure
2. Events
3. Access codes
4. Act. of options
5. Various
6. Communications
7. Language
8. Updating software
9. Backup param.

4.1.1. Installer - Communications

In the section “*Parameters – Installer – Communications*” we find a submenu where we choose the second option, “*SMS Messages*”.

The first question will activate or deactivate the service for sending and receiving SMS messages.

To prevent the excessive emission of messages, whether due to poor configurations or an error in one of the device in the irrigation installation, we can set a limit of messages sent by the equipment in one day, whose default value is 20. When this occurs, a record will also be made regarding the blocking of message emission. To restart and terminate the blocking, it will be necessary to enter “*Manual – Terminate stops*” or send an SMS for terminating “*FP*” stops.

By default, the SMS title sent by Agrónic is the serial number. If a text is entered in “*Title*” it does not send the serial number but this text.

The “*SMS Message*” option also permits the exchange of messages between machines; this may be useful when having to remotely start up an irrigation pump situated in another Agrónic 2500 or an Agrónic 4000, for example. Any event or determining factor can be configured so as to send a message to two user telephones (A and B) or text to a telephone from one machine (C); it is here where we must indicate the text to use.

Six different text messages may be used, the length of which must not exceed twenty characters. Capital and lower case letters, numbers and symbols may also be employed.

To enter text, situate the cursor in the space prior to the text, press the “+” key to modify it, and at this point the keys function in the following way:

“+” key	Moves the cursor one character to the right	“1” key	Capital letters
“-” key	Moves the cursor one character to the left	“2” key	Lower-case letters
Up arrow	New character, the previous one, letter B changes to A	“3” key	Numbers
Down arrow	New character, the next one, letter B changes to C	“4” key	Symbols
ENTER	Accepts the text, skips to next value	“no” key	Deletes and moves to the left

SMS COMMUNICATION
Sent activated: yes
Limit of SMS: 20
Title:
Oranges

SMS COMMUNICATION
Text SMS-C 1:
Text text text...

4.1.2. Installer - Events

All events recorded by the Agrónic 2500 has the option of being an anomaly, sending SMS messages to telephone A or B, sending a text to another machine or indicating if the event is urgent. In this case, as the modem may be off so as to reduce power consumption, it will be turned on in order to send the message and display the incident.

Events table to note down the configuration made: (default values)

Event No.	Description	Anomaly	Telephone A	Telephone B	Machine C	Urgent
1	Power cut less than 1'					
2	Power cut from 1' to 10'	Yes				
3	Power cut from 10' to 60'	Yes				
4	Power cut more than 60'	Yes				
5	Analog sensor, error	Yes				
6	Manual. STOP					
7	Manual. Out of Service					
8	Manual. Program					
9	Manual. Terminate stops					
10	Manual. Sector					
11	Manual. Output					
12	Manual. Totals erasure					
13	Manual. Clock modified					
14	Manual. Virtual Sensor					
15	Manual. Filters					
16	Erasure					
17	Program. Start					
18	Program. Modify irrigation					
19	Program. Fertilizer 1 modified					
20	Program. Fertilizer 2 modified					
21	Program. Fertilizer 3 modified					
22	Program. Fertilizer 4 modified					
23	Program. Postponed					
24	Program. Restarted, irrigation value					
25	Program. Restarted, fertilizer value					
26	Program. Fertilizer terminated	Yes				
27	Program. Irrigation terminated					
28	Filter cleaning. Start					
29	Filter cleaning. No control	Yes				
30	Diesel Motor, oil pressure found	Yes				
31	Diesel Motor, no start-up	Yes				
32	Diesel Motor, oil pressure error	Yes				
33	Determining factor. Definitive Stop	<i>Events 33 to 44 are configured in the "Parameters - Determining factors" section [6.7] of the manual "AGRÓNIC 2500 INSTRUCTION MANUAL with PLUS option"</i>				
34	Determining factor. Temporary stop					
35	Determining factor. Start conditional stop					
36	Determining factor. End conditional stop					
37	Determining factor. Start of Program					
38	Determining factor. End of Program					
39	Determining factor. Start of Warning					
40	Determining factor. End of Warning					
41	Determining factor. Modify irrigation					
42	Determining factor. Modify fertilizer					
43	Determining factor. End due to rain					
44	Determining factor. Fertilizer stop					
45	SMS Message. Limit exceeded	Yes	Yes	Yes		
46	SMS Message. Message received					
47	GPRS Modem. Communication Error					
48	PC communication. PC user					
49	AgroBee. Communication					
50	Radio-link. Communication					
51	Consumption GPRS. Daily consumption.					
52	Consumption GPRS. Monthly limit.	Yes				
53	Wi-Fi. Communication.	Yes				

4.1.3. Installer - Access codes

In order to send commands to the Agrónic 2500 from any mobile phone via SMS message, a four-digit access code must be entered in "SMS Codes".

Note that telephones "A", "B" and "C" that receive messages from the equipment do not need to include the access code within the body of the message, it is mandatory to introduce the "SMS code" on any phone when it differs from zero.

INSTALLER CODES
Code PAR: 0000
Code FUN: 0000
Code SMS: 0000
Code Totals Erasure: 0000

4.2. SMS COMMUNICATION PARAMETERS

To access this section, press "*Function – 4 Parameters – 6 Communications – 2 SMS*".

In this section, two user telephone numbers, **A** and **B**, are entered in order to receive messages and also that of machine **C**, so as to send or receive commands via SMS messages.

It is recommended to begin the number with the country code.

To remove a telephone number, turn every digit to "0", and it will be removed while leaving.

COMMUNICATION PARAM.
1. PC
2. **SMS**

SMS COMMUNICATION
Tel. A: 34123456789
Tel. B: 00000000000
Tel. C: 00000000000

4.3. CONSULTATION - COMMUNICATIONS

The communications consultation shows us the status of the "gsm/gprs" modem with the following indications:

- **"Stopped"**, off hours of activation. No power supply.
- **"No communication"**, no communication to the modem.
- **"Correct"**, there is an operator connection.
- **"Searching"**, the modem is searching for coverage.
- **"Without SIM"**, there is no SIM card in the Agrónic.
- **"PIN activated"**, the connection is not possible because the card block is activated. The code must be entered on "Parameters – Installer – Communications – GPRS Connection". If the PIN is already configured it could be incorrect.
- **"PUK activated"**, the card is blocked and needs the PUK code. The SIM must be removed from the device and introduced into a phone to deactivate it.
- **"Not wifi"**, the configured network Wi-Fi has not been found. It continues to attempt connection.

COMMUNIC. CONSULTATION
Modem: (52%) Correct
SMS: (12) Correct
PC 1: Correct
PC 2: No communication
PC 3: Not configured

As for the status of creating and receiving SMS, we are shown:

- **"Correct"**, SMS can be sent and received.
- **"Error"**, incident when SMS are used.
- **"Not configured"**, or there is no SIM card, or SMS sending has been deactivated (*Installer-Communications* [4.1.1.]).

On the second line, before the modem status, the signal level received by the modem is displayed; an acceptable level is considered as between 35 and 100%. Displayed on the third line, prior to the SMS status, is the number of SMS that have been sent that day so far.

Status of communication with each of the PC User:

- **"Correct"**, there is a PC connection.
- **"No communication"**, there is no PC connection.
- **"Not configured"**, the connection with this user is not configured.

4.4. SENDING SMS MESSAGES TO AGRÓNIC

When writing an SMS message, first the serial number of the Agrónic 2500 must be written, followed by a blank space, and then the access code, which will not be necessary if the message is from one of the telephone numbers registered in the unit (Tel. A-B-C). After that, leave another blank space followed by the first operation (OP1); this will be the first operation that establishes a “command” in the SMS and determines the entry of more operations.

Format for registered telephone numbers:

Serial number, space, OP1 (operation 1), space, OP2 (operation 2), space,

Format for any other phone number:

Serial number, space, code, space, OP1 (operation 1), space, OP2 (operation 2), space,

The serial number is located on the unit’s identification sticker and in “Consultation - Agrónic” [10.7(Basic)/10.9(Plus)].

The message content can be in lower-case or capital letters.

One message may include various commands separated by spaces. After the second command, it is no longer necessary to include the serial number or the code. Messages may not exceed 160 characters.

The commands marked by an “*” are only operative with the PLUS option activated.

MANUAL OPERATIONS												
Operation	Serial No.	code	OP1	OP2	OP3	OP4	OP5	OP6	OP7	OP8	OP9	OP10
Out of service	12345	0000	FS	YES or NO								
	Return: 12345		FS	OK or error								
	Example:	Set to out of service: 12345 FS YES										
STOP	12345	0000	ST	YES or NO								
	Return: 12345		ST	OK or error								
	Example:	Remove STOP: 12345 ST NO										
Start program	12345	0000	IP	00	Progr. No.							
	Return: 12345		IP	OK or error								
	Example:	Start programs 5 and 12: 12345 IP 5 ↓ IP 12										
Stop program	12345	0000	PP	00	Progr. No.							
	Return: 12345		PP	OK or error								
	Example:	Stop program 5: 12345 PP 5										
Set program to out of service *	12345	0000	FSP	00	Progr. No.	YES or NO						
	Return: 12345		FSP	OK or error								
	Example:	Remove out of service on program 15: 12345 FSP 15 NO										
Suspend program *	12345	0000	SP	00	Progr. No.	Hours						
	Return: 12345		SP	OK or error								
	Example:	Suspend irrigation of program 23 for 45 hours:										
Start filter cleaning	12345	0000	IL									
	Return: 12345		IL	OK or error								

Add or subtract minutes				Minutes	
		12345	0000	HM	+ - 00
"HM"	Return:	12345		HM	OK or error
	Example:	Delay clock by 5 minutes:			12345 HM -5

Terminate stops				Yes or No	
		12345	0000	FP	YES or NO
"FP"	Return:	12345		FP	OK or error
	Example:	Terminate stops and cancel postponed irrigation:			12345 FP NO

Set determining factor out of service *				Det.f. No.	
		12345	0000	FSC	00 YES or NO
"FSC"	Return:	12345		FSC	OK or error
	Example:	Set determining factor 8 out of service:			12345 FSC 8 YES

Sector in automatic *				Sector No.	
		12345	0000	SA	00
"SA"	Return:	12345		SA	OK or error

Sector in manual start *				Sector No.	
		12345	0000	SMM	00
"SMM"	Return:	12345		SMM	OK or error

Sector in manual stop *				Sector No.	
		12345	0000	SMP	00
"SMP"	Return:	12345		SMP	OK or error

Virtual sensor *				Sensor No.	Value	
		12345	0000	SV	00	000,00
"SV"	Return:	12345		SV	OK or error	
	Example:	Send daily evapotranspiration:			12345 SV 05 01,3	

Activate pivot				Pivot No.	
		12345	0000	IPVT	00
"IPVT"	Example:	Activate pivot 1:			12345 IPVT 1

Stop Pivot				Pivot No.	
		12345	0000	PPVT	00
"PPVT"	Example:	Stop pivot 1:			12345 PPVT 1

Out of service Pivot				Pivot No.	
		12345	0000	FSPVT	00 YES or NO
"FSP"	Example:	Remove from out of service pivot 1:			12345 FSPVT 1 NO

Pivot in Automatic				Pivot No.	
		12345	0000	PVTA	00
"PVTA"	Example:	Put pivot 4 in automatic:			12345 PVTA 4

Pivot in Manual Start				Pivot No.	Duration	Address	Speed	
		12345	0000	PVTMM	00	00:00	0: right 1: left	0 to 100%
"PVTMM"	Example:	Put the pivot 4 in manual start for 2 hours on right and at 100%: 12345 PVTMM 4 02:00 0 100						

Pivot in Manual Stop				Pivot No.	Duration			
		12345	0000	PVTMP	00	00:00		
"PVTMP"	Example:	Put pivot 4 in manual stop for 1 hour:					12345 PVTMP 4 01:00	

Note for programs: The values of the various operations sent in a program command must maintain the same format values that have been configured in each individual program.

PROGRAM												
Operation	Serial No.	code	OP1	OP2	OP3	OP4	OP5	OP6	OP7	OP8	OP9	OP10
Program				Progr. No.	Sectors	Days w. Frequen. Sequen.	Start	Irrigation	Fert. 1	Fert. 2	Fert. 3	Fert. 4
	12345	0000	PR	00	00 00	D.MX..S 00 00	00:00 000	00:00 000	00:00 000	00:00 000	00:00 000	00:00 000
"PR"	<i>Return:</i>	12345		PR	OK or error							
	<i>Example:</i>	Program 10, sectors 2 and 5, Monday and Friday, start at 8 with three hours of irrigation and 45 minutes of fertilizer 1: 12345 PR 10 2 5 LV 8:00 3:00 0:45 0:00 0:00										
Program sector				Progr. No.	Sectors							
	12345	0000	PRS	00	00 00							
"PRS"	<i>Return:</i>	12345		PRS	OK or error							
Program days				Progr. No.	Days week							
	12345	0000	PRD	00	DLMXJVS							
"PRD"	<i>Return:</i>	12345		PRD	OK or error							
	<i>Example:</i>	Program 3, irrigates Monday and Friday: 12345 PRD 3 LV										
Program frequency *				Progr. No.	Frequen.							
	12345	0000	PRQ	00	00							
"PRQ"	<i>Return:</i>	12345		PRQ	OK or error							
Sequential program				Progr. No.	Sequen.							
	12345	0000	PRC	00	00							
"PRC"	<i>Return:</i>	12345		PRC	OK or error							
Irrigation program				Progr. No.	Units							
	12345	0000	PRR	00	00:00 000.00							
"PRR"	<i>Return:</i>	12345		PRR	OK or error							
	<i>Example:</i>	34.5 m3 for program 12: 12345 PRR 12 34,5										
Fertilizer program				Progr. No.	Fert. No.	Units						
	12345	0000	PRF	00	00	00:00						
"PRF"	<i>Return:</i>	12345		PRF	OK or error							
Program activations *				Progr. No.	Activa.	Frequency						
	12345	0000	PRA	00	00	00:00						
"PRA"	<i>Return:</i>	12345		PRA	OK or error							
Program schedule *				Progr. No.	Hour	Hour						
	12345	0000	PRH	00	00:00	00:00						
"PRH"	<i>Return:</i>	12345		PRH	OK or error							
	<i>Example:</i>	Modify active schedule of Prog 3 from 6:00 to 21:30 : 12345 PRH 3 6:00 21:30										
Program period				Progr. No.	day	month	day	month				
	12345	0000	PRP	00	00	00	00	00				
"PRP"	<i>Return:</i>	12345		PRP	OK or error							

READING OPERATIONS												
Operation	Serial No.	code	OP1	OP2	OP3	OP4	OP5	OP6	OP7	OP8	OP9	OP10
Sector reading *				Sector No.	Day in history							
	12345	0000	LS	00	0	-(day in history): 0 =today, from 1 to 9 = from 1 to 9 days before						
	"LS"	Return:	12345	LS	00/00/00, units time, units volume, units F1, units F2, units F3, units F4							
	Example:	Today's history reading of sector 5 : 12345 LS 5 0 ---> 12345 LS5 24/12/13 1:10 11,2m3 F1:2,1L F2: 3,1L Yesterday's history reading of sector 5 : 12345 LS 5 1 ---> 12345 LS5 23/12/13 3:45 68,3m3 F1:6,9L F2: 12,0L										
Analog sensor reading *				Sensor No.	Day in history							
	12345	0000	LA	00	0	-(day in history): 0 =today, from 1 to 9 = from 1 to 9 days before						
	"LA"	Return:	12345	LA	00/00/00, value (daily average)							
	Example:	Yesterday's history reading of sensor 1 : 12345 LA 1 1 ---> 12345 LA1 14,7 °C										
Meter sensor reading *				Sensor No.	Day in history							
	12345	0000	LC	00	0	-(day in history): 0 =today, from 1 to 9 = from 1 to 9 days before						
	"LC"	Return:	12345	LC	00/00/00, day's total value							
	Example:	Yesterday's history reading of meter 1 : 12345 LC 1 1 ---> 12345 LC1 14,7 m3										
Totals				Sector No.								
	12345	0000	AC	00	-(sector 0 = general total)							
	"AC"	Return:	12345	AC	0 R:hh:mm 000,00m3 F1:000,0L F2:000,0L F3:000,0L F4:000,0L							
	Example:	Total consultation for sector 5: 12345 AC5 ---> 12345 AC5 R48:34 1044m3 F1=8:18 F2=6:05										

MISCELLANEOUS OPERATIONS

MISCELLANEOUS OPERATIONS												
Operation	Serial No.	code	OP1	OP2	OP3	OP4	OP5	OP6	OP7	OP8	OP9	OP10
Activate / Cancel SMS												
	12345	0000	SMS	YES or NO								
	"SMS"	Return:	12345	SMS	OK or error							
Events table				Event No.	SMS A	SMS B	SMS C					
	12345	0000	EV	00	YES/NO	YES/NO	0-5					
	"EV"	Return:	12345	EV	OK or error							
<i>Example:</i> When irrigation finishes notify telephone B: 12345 EV 27 no yes 0												
SMS deter. factors				Det. f. No.	SMS A	SMS B	SMS C					
	12345	0000	CON	00	YES/NO	YES/NO	0-5					-(normally day: Deter. factor No.2 = Temporary malfunction Deter. factor No.3 = Definitive malfunction Deter. factor No.4 = Conditional stop
	"CON"	Return:	12345	CON	OK or error							
<i>Example:</i> A temporary stop is notified to telephone A: 12345 CON 2 yes no 0												
WEB communication (only when WEB option is activated)					Communic. type		TCP port	IP address				
	12345	0000	WEB		4		2332					- Communication type: 4= gprs socket IP address: agronicapp.com
	"WEB"	Return:	12345	WEB	(communication configuration)							
<i>Example:</i> Communication with modem GPRS, TCP port 2332, IP address agronicapp.com 12345 WEB 4 2332 agronicapp.com												
PC communication				User No.	Communic. type	Access level	TCP port	IP address				
	12345	0000	COM	1 to 3	0 to 4 or 200	0 to 2	00000					-Communication type: 0= no connection 1= cable 3= gsm modem 4= gprs socket 200= TCP-S -Access level: 0= total 1= programs 2= consultation -Address or name IP: 000.000.000.000 name.domain.org
	"COM"	Return:	12345	COM	(communication configuration)							
<i>Example:</i> If the type of communication it's configured as TCP-S (200) no other parameter is needed. 12345 COM 1 200 User 1 setting without communication: 12345 COM 1 0 User 3 activating communication gprs socket: 12345 COM 3 4 0 2332 name.dyndns.com												
GPRS Connection. APN				Automatic APN	APN	User	Password					
	12345	0000	APN	yes / no	text	text	text					
	"APN"	Return:	12345	APN	(GPRS connection configuration)							

5. CONNECTING TO AGRÓNIC PC SOFTWARE

An Agrónic 2500 with this option connects to the Agrónic PC management software and does so via cable at the same installation, by radio with the radio-link system to a control center located a short distance away, or by phone via GSM or GPRS.

The same unit manages the data exchange and updating with a maximum of three users or managers. Here we see the possible combinations:

- Cable link, allows for one user and is compatible with radio-link, GSM/GPRS and WI-FI.
- Radio-link, allows for one user and is compatible with cable, but not with GSM/GPRS or WI-FI.
- GSM link, allows for three users, but only one at a time, and is compatible with cable, but not with radio-link or WI-FI.
- GPRS link, allows for three users connected at all times, and is compatible with cable but one user must be left out. It is not compatible with the radio-link or WI-FI.
- WI-FI link, allows for three users connected at all times, and is compatible with cable but one user must be left out. It is not compatible with the radio-link or GPRS link.

The Agrónic PC software provides us with detailed information of the equipment and its record, history, sensor graphs, and workings. It can do the same for consultation and programming that can be done on the unit but with the ease that the software environment provides. It provides a graphic vision of the property (GIS/DXF) and can integrate different models: Agrónic 2500, Agrónic 4000, Agrónic 5500, etc.

5.1. INSTALLER PARAMETERS

To access these, press “*Function – Parameters – Installer*”, enter the installer code and access the “*Communications*” section of the menu.

According to the type of connection, we will enter one or more of the sections.

- 1. GPRS Connection, only links by GPRS modem.
- 3. Radio-link, only for radio connections.
- 4. PSEP Protocol, for all connection.
- 6. Wi-Fi, only links by Wi-Fi.

INSTALLER COMMUNICATION

1. **GPRS connection**
2. SMS messages
3. **Radio-link**
4. **Protocol PSEP**
5. AgroBee
6. Wifi connection

5.1.1. Communications – GPRS connection

The link between the Agrónic 2500 and the Agrónic PC software is made between a GSM/GPRS modem installed inside the unit and an external antenna; this is connected to the plug located on the side of the box model or on the back in the build-in model; the end of the antenna should be located in a position that provides maximum coverage. This option is linked to the SMS message option, so both options imply acquiring a SIM card from a telephone operator who provides good coverage of the area. See the sections “*Connections*” [2.] and “*SMS Messages*” [4.].

“**GPRS data transfer. Monthly limit**”: when data consumption exceeds the limit indicated here, the register is 52. If left at 0 does not record. When the month is changed or there is an overage of the limit, the data counter is set to 0. From 0 to 999 MB (megabytes).

“**GPRS data transfer. Start day**”: It is the day of the month when the accumulated data returns to 0. It corresponds to the day the telephone company sends the invoice (1 to 28).

“**PIN**”: SIM card PIN code (from 0 to 9999). If the SIM card block is not activated this code won't be used.

“**Automatic APN**”: by choosing YES, the device will search for the SIM card's phone operator and set the APN variables. If it cannot find the phone operator automatically, you will have to choose NO and enter the variables manually.

Variables related to the “access point name **APN**”, the “**APN user**” and “**APN password**” so the modem can access the Internet. These parameters will be given by the operator providing the data link.

GPRS PARAMETERS

GPRS data transfer
 Monthly limit: 020 MB
 Start day: 14
 PIN: 1234

Automatic APN: yes

APN:
 movistar.es

APN user:
 movistar

APN password:
 movistar

By voice call: no

To enter text, situate the cursor in the space prior to the text, pressing the “+” key to modify it, and at this point the key function as follows:

“+” Key	Moves the cursor one character to the right	“1” Key	Capital letters
“-” Key	Moves the cursor one character to the left	“2” Key	Lower-case letters
Up arrow	New character, the previous one, letter B becomes A	“3” Key	Numbers
Down arrow	New character, the following one, letter B becomes C	“4” Key	Symbols
ENTER	Accepts the text, skips to the next value	“no” Key	Deletes and shifts to the left

The Agrónic 2500 establishes the connection between users, always taking the initiative to find the user on the Internet and making permanent connections for data exchange. In certain situations, it is best not to have it permanently connected, so it will be necessary to answer “Yes” to the question “**by voice call**” In this situation, it will only connect when a missed call is made and will disconnect when the user closes the communications software on the Agrónic PC.

When the Agrónic 2500 is connected to a battery as well as a diesel motor or solar panel, it may be good to reduce power consumption by not connecting the modem to the power supply for certain times a day; to do this, a schedule program related to the SMS has been set up.

If the modem should be active continuously, all the values must be set to zero.

To activate it for one period of the day, we must give it a **start time** and an **end time**. An example for activating at eight in the morning to five in the afternoon:

Start time 08:00 End time 17:00
Cadence: 00:00 Time: 000 minutes

It is possible to activate the modem for one period of the day, but only at one **time** at a certain **cadence**. For example, activation from eight in the morning until ten at night, every fifteen minutes:

Start time 08:00 End time 22:00
Cadence: 01:00 Time: 015 minutes

SMS COMMUNICATION
Start time: 00:00
End time: 00:00
Cadence: 00:00
Time: 000'

An event marked as “urgent” will send an SMS message at the time the event occurs, powering up the modem to send the message as necessary. This is very useful, for example, when a determining factor acts as a warning alarm and sends an SMS to the users at the same time there is an attempted theft, at any time of day.

5.1.2. Communications – Radio-link

When the Agrónic PC software is connected by radio-link, it uses a radio system over an unregistered open bandwidth. The radio-link has up to 99 channels to transfer information.

RADIO-LINK
Channel: 05

When the Agrónic 2500 is connected to a battery as well as a diesel motor or solar panel, it may be good to reduce power consumption by not connecting the radio-link to the power supply for certain times a day; to do this, a schedule program related to the SMS has been set up. If the radio-link should be active continuously, all the values must be set to zero.

To activate it for one period of the day, we must give it a **start time** and an **end time**. An example for activating at eight in the morning to five in the afternoon:

Start time 08:00 End time 17:00
Cadence: 00:00 Time: 000 minutes

It is possible to activate the radio-link for one period of the day, but only at one **time** at a certain **cadence**. For example, activation from eight in the morning until ten at night, fifteen minutes every hour:

Start time 08:00 End time 22:00
Cadence: 01:00 Time: 015 minutes

RADIO-LINK
Start time: 00:00
End time: 00:00
Cadence: 00:00
Time: 000'

5.1.3. Communications – PSEP Protocol

PSEP protocol is a series of rules used by the Agrónic 2500 to package and exchange information with the Agrónic PC. One of these rules establishes that data is only transferred when a modification occurs; to adjust the exchange times to make these more frequently, there are three available cadences. This is useful in connections whose cost is based on the quantity of information transferred (GPRS socket).

Cadence A corresponds to data updates that are displayed on the Agrónic PC consultation screen; by default, the information refresh time is 5 seconds. Example: If the property parcel map is being displayed, it will show those parcels being irrigating and those that are not; if there is no change in the Agrónic 2500 for these sectors, no information is transferred. When the irrigation of a particular sector has terminated, this information will be updated on the screen in a maximum of 15 seconds.

Cadence B corresponds to the report data that are not displayed on the screen. These will be refreshed in a time of 300 seconds (by default). When the user changes the consultation screen, they will find information no older than this time, even though in a few seconds it will be updated by cadence A. If there is no information transfer cost, this time may easily be lowered to 10 or 20 seconds.

Cadence Totals is the refresh time for sector and meter totals, which by default is set to 600 seconds.

Agrónic IP: The parameters in the following displays must only be changed by an express indication of the Progrés technical service. They are used to enable the user's connection to the PC through Internet.

```

PROTOCOL PSEP
Cadence A: 00015 "
Cadence B: 0300 "
Cadence Totals: 0600 "

```

5.1.4. Communications – WI-FI connection

The link between the Agrónic 2500 and the Agrónic PC software is made between a module Wi-Fi installed inside the unit and an external antenna; this is connected to the plug located on the side of the box model or on the back in the build-in model; the end of the antenna should be located in a position that provides maximum coverage.

Net Name: The name of the Wi-Fi network (SSID) connection. Maximum 39 characters.

Password: The password of the Wi-Fi network. Maximum 39 characters.

When the Agrónic 2500 is connected to a battery as well as a diesel motor or solar panel, it may be good to reduce power consumption by not connecting the module Wi-Fi to the power supply for certain times a day; to do this, a schedule program related to the SMS has been set up. If the Wi-Fi should be active continuously, all the values must be set to zero.

To activate it for one period of the day, we must give it a **start time** and an **end time**. An example for activating at eight in the morning to five in the afternoon:

```

Start time 08:00   End time 17:00
Cadence: 00:00   Time: 000 minutes

```

It is possible to activate the module Wi-Fi for one period of the day, but only at one **time** at a certain **cadence**. For example, activation from eight in the morning until ten at night, fifteen minutes every hour:

```

Start time 08:00   End time 22:00
Cadence: 01:00   Time: 015 minutes

```

```

WIFI PARAMETERS
Net name:
wifexternal

Password:
accesspassword

```

```

WIFI PARAMETERS
Start time: 00:00
End time: 00:00
Cadence: 00:00
Time: 000'

```

5.2. PC COMMUNICATION PARAMETERS

To access these, press:

"Function – 4 Parameters – 6 Communication – 1 PC".

The configuration of the connection to the Agrónic PC is made separately for each of its three possible users. It is common for only one user to manage the controller, but this opens the possibility for the installer to have access and be able to investigate or resolve possible problems or help the property manager improve production.

For each user going to connect to the machine, we must choose the type of connection they will be using.

Communication type:

- No connection, by default.
- Cable, connects to the PC by USB cable.
- Radio-link, via radio modem, point to point, a single Agrónic 2500 to the Agrónic PC.
- GSM Modem, connects by phone call from the Agrónic PC.
- GPRS socket, connects via Internet.
- RDM Radio-link, by radio modem with repeaters, point to multi-point, several Agrónic 2500 to one Agrónic PC.
- WIFI socket, LAN or internet connection.

We must choose the level of access in the Agrónic 2500 permitted to each individual user.

Access level:

- Total, the user can use all the information on the equipment, including its modification.
- Programs, only permits the modification of irrigation programs.
- Consultation, no modification, only consultation.

Disconnection waiting: It is the time that should lapse in which no data is received from the PC to pass into "No Communication" mode and register no communication with the PC. From 30 to 999".

If the communication type is *"GPRS socket" or "WIFI socket"*:

PSEP TCP: Indicates how the connection between the Agrónic and the user's PC is going to be.

- TCP-S: The user PC is connected to the Agrónic. Option recommended and set by default. In order to enable this option, the phone operator must provide you with a real public IP. Beware, not all operators offer this option. When the unit is configured in the "Agrónic PC", the "Socket TCP – GPRS, WiFi (Server)" option must be selected and then enter the password provided alongside with the software. Each computer has a different password. Be careful communicating with the Agrónic from different computers with the same user, each computer must have a different user, up to a maximum of 3.
- TCP-C: The Agrónic connects to the user's PC.

If the communication type is *"GPRS socket" or "WIFI socket" and "PSEP TCP: TCP-C"*:

TCP Port: TCP port where you must connect to and where the Agrónic PC application is. It's the 2332 by default.

IP: IP address of the PC where you must connect to and where the Agrónic PC application is. The IP must be static.

IP Name: if you don't have a fixed IP, you can use some application to convert the name into an IP. In this case the name must go here. If a name is used the IP must remain 0.

COMMUNICATION PARAM.

1. PC
2. SMS
3. Agrónic App / Web

PC COMMUNICATION PARAM.

1. User 1
2. User 2
3. User 3

User 1

Type com.: GPRS socket

Level access: total

Disconnection waiting: 300"

PSEP TCP: TCP-C

TCP port: 00000

IP: 000.000.000.000

IP name:

agronic.noname.org

5.3. AGRONIC APP / WEB PARAMETERS

To access press:

“Function - 4 Parameters - 6 Communications - 3 Agrónic App / Web”.

If you answer "yes" to "Activate" it automatically configures communication with the Agrónic App/Web platform. If you have activated the option PC it will configure in user 3. Before activating the communication, you must have contracted the App/Web service with Progrés.

COMMUNICATION PARAM.
1. PC
2. SMS
3. Agrónic App / Web

Agrónic App
Activate: yes

5.4. CONSULTATION - COMMUNICATIONS

The communication consultation displays the status of communication with the devices connected and the status with each of the PC users.

GSM/GPRS modem installed:

Status of the “gsm/gprs” modem:

- “**Stopped**”, off hours of activation. No power supply.
- “**No communication**”, no communication to the modem.
- “**Correct**”, there is an operator connection.
- “**Searching**”, the modem is searching for coverage.
- “**Without SIM**”, there is no SIM card in the Agrónic.
- “**PIN activated**”, the card's PIN code is enabled, must be disabled to use the modem.

COMMUNIC. CONSULTATION
Modem: (68%) Correct
SMS: (07) Correct
PC 1: Correct
PC 2: No communication
PC 3: Not configured

The level of the signal received by the modem is displayed on the second line to the left of the modem status. We determine a correct level to be a reading between 35 and 100 %.

Radio-link installed:

Status of the “radio-link”:

- “**Stopped**”, off hours of activation. No power supply.
- “**No communication**”, no communication to the radio-link.
- “**Correct**”, there is a connection with the control center.

COMMUNIC. CONSULTATION
Radio-link: correct
PC 1: Correct
PC 2: Not configured
PC 3: Not configured

Module WI-FI installed

Status of the module “Wi-Fi”:

- “**Stopped**”, off hours of activation. No power supply.
- “**Correct**”, there is a connection with the network.
- “**Not wifi**”, the configured network Wi-Fi has not been found.

The level of the signal received by the Wi-Fi is displayed on the second line to the left of the module Wi-Fi status. We determine a correct level to be a reading between 35 and 100 %.

COMMUNIC. CONSULTATION
Wifi: (68%) Correct
PC 1: Correct
PC 2: No communication
PC 3: Not configured

As long as the PC User is configured, it shows the status:

- “**Correct**”, the user link has been established.
- “**No communication**”, there is no PC connection.
- “**Not configured**”, user not operative.

6. AgroBee

This is an option to link to external modules via radio; it allows irrigation valves and digital, analog and meter sensors to be located at a certain distance from the Agrónic 2500. The system uses the universal “Zigbee Pro” communications protocol at an open frequency of 868/915 MHz.

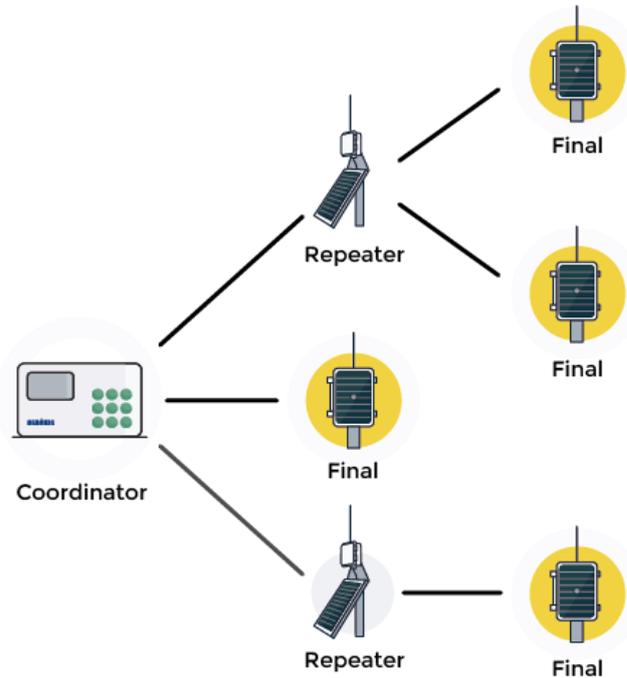
The AgroBee system consists of a **coordinator** located on the Agrónic 2500 and elements located in the field that function as **repeaters** and **terminal devices**. The coordinator manages the network and the pathways that the modules follow in order to connect to each other, with all the devices forming a mesh-like network. The repeater allows to extend the scope range of the coordinator located in the programmer, interconnecting the different modules. The final modules, are most of the time in a mode of very low consumption (are dormant), and are only active momentarily when they have to send/receive data or when they have to meet their irrigation control. A repeater has higher consumption than a final module, since it will be active all the time to be able to cover any module that depends on it.

The low energy consumption of a terminal device allows it to operate with alkaline batteries or a solar panel built into the module itself. The two “AA” batteries can power a terminal device for over two years. The solar panel stores energy in its super-condensers, offering a long operating life and wide range of operating temperatures.

The maximum number of modules that one Agrónic 2500 can manage is 16 units. There are different formats and configurations; see the specifications for each model. The modules can be configured as repeaters, and each repeater can manage up to 5 end modules. The total number of repeater and end modules cannot exceed 16 units.

The Agrónic 2500 includes, as an option, an external antenna and a “Coordinator” device, whose electronics are found inside. It is necessary to connect the antenna to the connector located on the side of the box model or the backside of the build-in model and situate it at a high point that provides greater coverage. See “Connections” [2.] section.

To use the AgroBee modules, it will be necessary to assign outputs to the sectors or generals, and inputs to the digital, analog or meter sensors; all this is found in “Function - Parameters”.



6.1. PARAMETERS

To configure the unit with the AgroBee option, it will be necessary to enter the installer parameters in the communication and AgroBee section.

The configuration is divided into 16 screens for the external modules and one general screen.

INSTALLER PARAM.

1. Erasure
2. Events
3. Access codes
4. Act. of options
5. Various
- 6. Communications**
7. Language
8. Updating software
9. Backup param.

INSTALLER COMMUNICATION

1. GPRS connection
2. SMS messages
3. Radio-link
4. Protocol PSEP
- 5. AgroBee**
6. Wifi

The **channel** is used to determine the frequency band the “coordinator” will be using with its modules (1 channel in 868 MHz, and 10 channels in 915 MHz).

The **network code** has the function of linking all the modules forming part of the group and separating others in the area using the same channel. This does not need to be changed as it comes preconfigured from the factory. In the event of installing the AgroBee option out of factory, it is recommended to enter the same network code number as the serial number of the equipment.

The **cadence** is the communication cycle time in seconds. The default value is 60, the maximum time it takes for an electrovalve to open or close. The communications electronics on a terminal module will remain dormant 99% of the time, while a router module will be dormant for 85-90%. There is a compromise between the cadence, power consumption and response speed. Check the consumption tables on each model to adjust the response speed and adjust the network cadence appropriately. When repeaters are used, the communication cadence must be set to 60 seconds.

The **Latch Voltage** is the trip voltage of the latch solenoids. It can be 16V, 12V, 9V or 6V.

The **Latch Valve** is the type of latch solenoid to connect the AgroBee to. It can be 3-wire, 2-wire or inverted 2-wire.

To configure an AgroBee module, we enter one of the 16 screens that it corresponds to and input the **serial number** that identifies the module. Every AgroBee has a separate internally recorded number, which is also marked on the manufacturing sticker located on the side of the unit. With the serial number, the coordinator can establish what modules it can communicate to and accept in its network. If one of the modules must be replaced, the new serial number must be reentered.

Each AgroBee module forms part of a family of **models** with predefined features:

- Model **2SD**, has control over two 2-wire or one 3-wire latch electrovalves, uses batteries or solar panels, and it has two digital or meter sensors.
- Model **8SD** has control over eight 2-wire or four 3-wire latch electrovalves and uses batteries, solar powered plus a super-condenser, or solar powered plus battery, and it has two digital or meter sensors. The solar powered model with battery can be used as a repeater.
- Model **H2O** can have up to three water content or ground moisture sensors plus an input for a digital sensor or volumetric meter.
- Model **RPT** is used as a repeater, without inputs or outputs, and is solar powered plus battery.
- Model **SDI-12** has sensors that use the bus SDI-12.
- Model **3MA** can have up to three 4-20 mA sensors plus an input for a digital sensor or volumetric meter.
- Model **2SD-2ED-1EA** has control over two 2-wire or 3-wire latch electrovalves, and uses solar powered plus a super-condenser, or solar powered plus battery, and it has two digital or meter sensors, and one analog sensor.
- Model **9SD-2ED-2EA** has control over nine 2-wire or 3-wire latch electrovalves, and uses solar powered plus a super-condenser, or solar powered plus battery, and it has two digital or meter sensors, and two analog sensors.
- Model **6SD-6ED-2EA** has control over six 2-wire or 3-wire latch electrovalves, and uses solar powered plus a super-condenser, or solar powered plus battery, and it has six digital or meter sensors, and two analog sensors.

Module AgroBee 01
Serial No.: 00000
Model: [2SD] [8SD] [...]
Type: [Terminal] [Repeater]

Module AgroBee 01
Sensor: [...]
Soil: [Mineral] [Potting]
Cadence: 5'
S1: yes S2: yes S3: yes

- Model **3LV** can have up to three ultrasonic level sensors with maximum distances of 9 meters and millimeter precision.
- Model **DENDRÓMETRO**, measure of up to two sensors to check the change of diameter in the stem of the plants.
- Model **WATERMARK**, measure of up to three Watermark soil moist sensors.
- Model **PARSHALL**, measure of the flow that passes through an open channel with a Parshall meter.
- **GNSS** model has a GNSS locator. It is used to place on the map the geographical position of a pivot and its movement.

The **type of function** that each module carries out in the network must be entered, whether it is a repeater or a terminal module. If configured as a repeater, it accepts commands from the coordinator to maintain the network connected, and evidently this implies greater consumption.

The allocation of outputs to sectors or generals in the PLUS option or the allocation of inputs to sensors is done using a five-digit code, the most important [A] indicating the device, the next two digits [BB] used for the AgroBee module number, and the last two [CC] for the output number.

Examples:

Allocation of a sector output in the third AgroBee module in its second output: 10302

Allocation of an irrigation meter connected to the second AgroBee module in its first digital input: 10201

- Output allocation table -		
Device [A]	Module [BB]	Output [CC]
Base: 0	00	01 to 27
AgroBee: 1	01 to 16	01 to 09

- Table for digital or meter sensors -		
Device	Module	Input
Base: 0	00	01 to 06
AgroBee: 1	01 to 16	01 to 09

- Analog sensor allocation table -		
Device	Module	Input
Base: 0	00	01 to 02
AgroBee: 1	01 to 16	01 to 16

6.2. COMMUNICATION CONSULTATION

To consult the status of the AgroBee modules, there are several screens within the “Communications Consultation”. The first corresponds to the status of the “Coordinator” located on the Agrónic 2500.

Checking the **status** of the AgroBee Coordinator:

- “Correct”, the coordinator is operative.
- “No communication”, the coordinator’s circuit it’s not located inside the unit, or there is a communication error.

The coordinator software version is displayed on the last line.

The following screens display the status of the AgroBee modules, first the module number and its serial numbers (ns).

The **status** of the module can have different indicators:

- “Not configured”, the module has not been entered.
- “Correct”, it is operating properly.
- “No communication”, the module has been entered but there is no communication.
- “Error”, an incident has occurred in the communications or operation of the module.

The **Rssi** level corresponds to the signal intensity received, expressed in a percentage (%). Advisable/recommended value >42%.

The **Lqi** level indicates the quality of the data package exchange, expressed in a percentage (%). Advisable/recommended value >95%.

The **Vbat** value tells us the electrical voltage of the module; the correct margin runs from 2.5 to 4.2 volts. In solar panel models, the **Vsol** indicator provides us with the voltage reading the panel is supplying.

The module software version is displayed on the last line.

COMMUNIC. CONSULTATION AgroBee. Coordinator: Status: Correct Version: 1.00

COMMUNIC. CONSULTATION AgroBee. Mod. 01 (ns 000000) Status: Correct Rssi: 50% Lqi: 98% VBat: 03.0 V VSol: 06.2 V Version: 1.00

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