

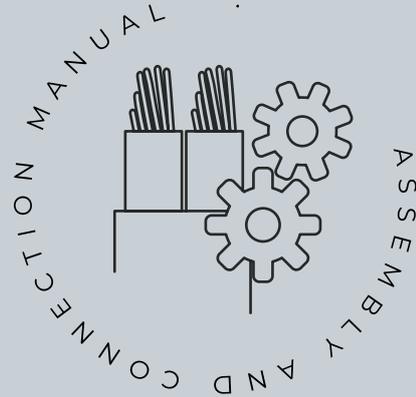
ASSEMBLY AND CONNECTION MANUAL

AGRÓNIC 4500

VERSION 1

Sections contained in the manual:

- Dimensions
- Technical characteristics
- Location of the connections
- Connection
- Installation of options
- Recommendations



The Programming, Manual Actions and Query sections are detailed in the User Manual.

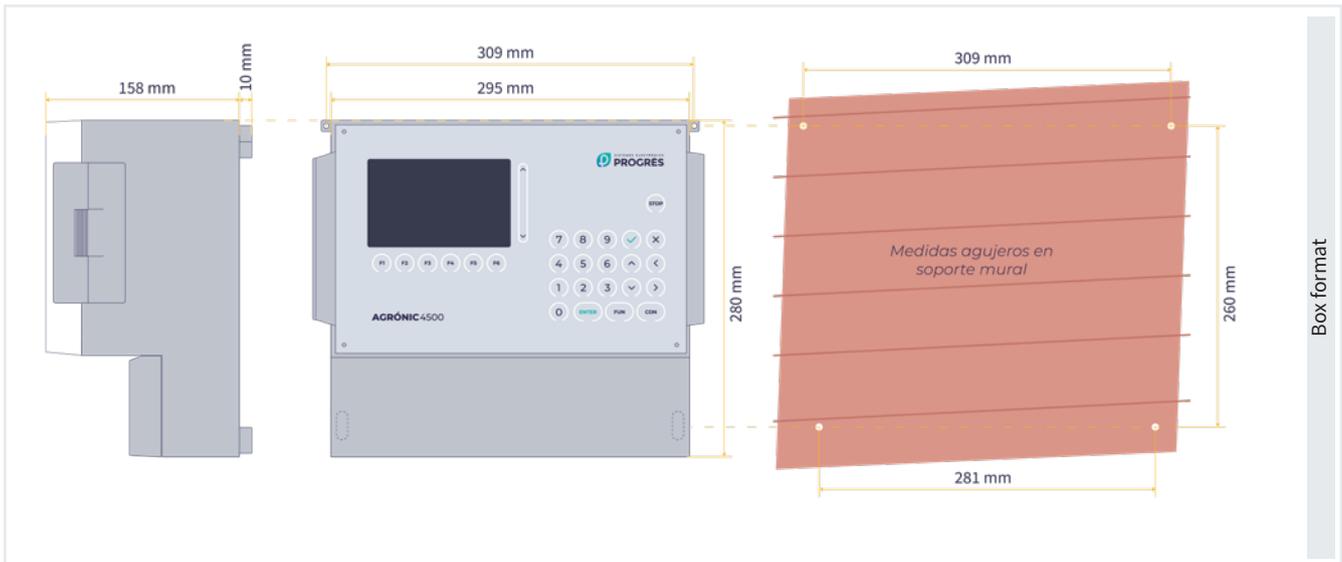
The Parameters and Coding of inputs and outputs sections are detailed in the Installer Manual.

The Communication Parameters section is detailed in the Communication Manual.

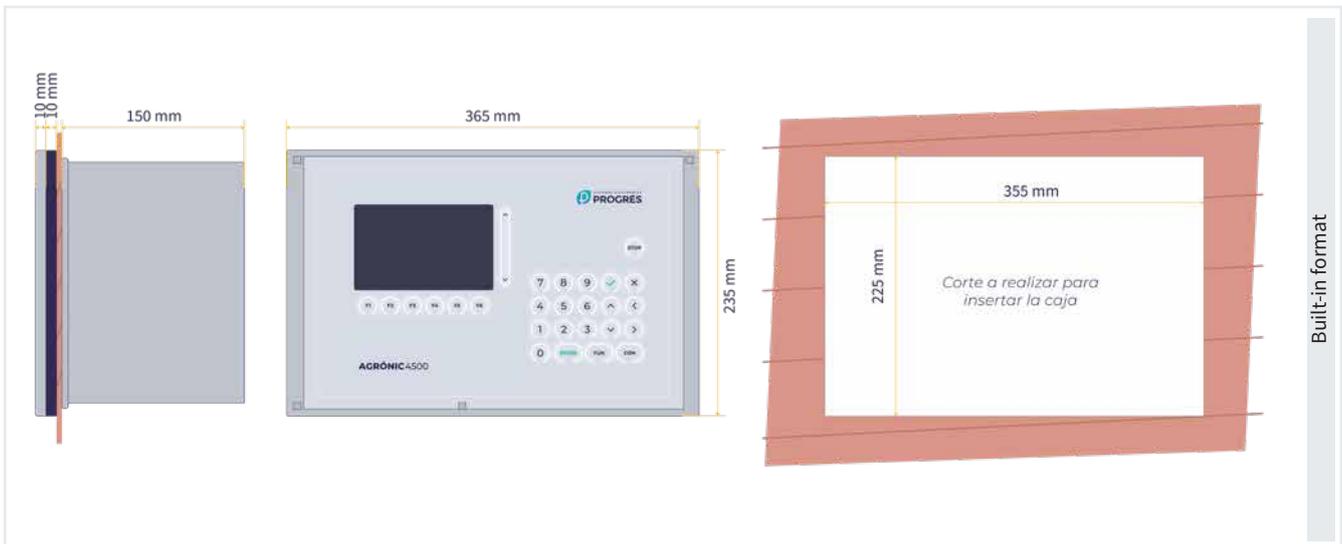
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1 DIMENSIONS



Box format



Built-in format

Agrónic location

Install the Agrónic at the appropriate height and position for good handling. Avoid as much as possible the direct incidence of the sun, humidity, dust and vibrations.

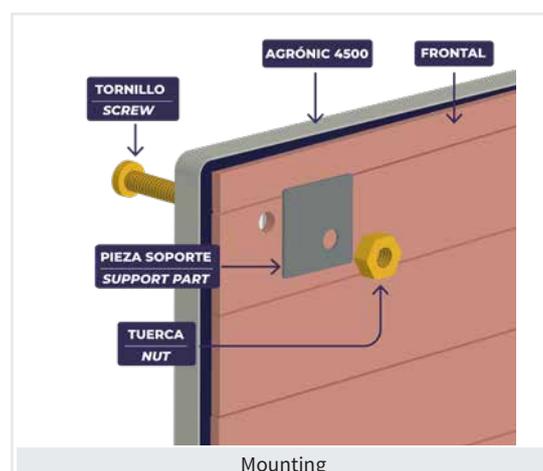
Avoid being close to elements that generate interference and may affect proper operation.

In the box format, the controller is housed in a hermetic box (IP 65) with a transparent front cover for the keyboard/display, and a opaque cover for housing of the connections.

To maintain the tightness, it is necessary to leave the covers always closed and install the cable glands, which are included with the controller, in the outlets of the cables.

The wall fastening is done by the two pierced pieces in the upper corners. The fastening elements can be 2 self-tapping screws (3.5 x 38 mm - DIN 7981) and 2 plugs 6 x 30 mm (SX 6x30).

In the built-in format, a hole will be made in the front of the cabinet or desk according to the measurements and it will be held by the screws in the corners, using the four pieces that are supplied with the controller (4 M3 x 12 mm (DIN 84) screws, 4 M3 nuts (DIN 934) and 4 metal sheets of 20 x 20 x 1 mm).



2 TECHNICAL CHARACTERISTICS

Overall power supply		
Voltage		12 Vdc - 24 Vdc
Energy consumption		Less than 12 W
Fuse	Entrance	Thermal (PTC) 1,1 Amp. at 25 °C, self-resetting

Power supply outputs		
Voltage		From 12 a 24 Vdc ó Vac (maximum 30 V)
Fuse	"R+" input	Thermal (PTC) 6,0 Amp. at 25 °C, self-resetting

Outputs		
Digitals	Number	24, expandable to 40, 56, 72, 88 and 104.
	Type	By relay contact, with 24 Vac potential (external transformer).
	Limits	30 Vac / 30 Vdc, 1 Ampere, 50-60 Hz, CAT II (per ouput)
Analog / Pulsed (option)	Number	5 or 10
	Type	4-20 mA (with galvanic isolation)

All the outputs have double insulation with respect to the network input.

Inputs		
Digital sensors	Number	12
	Type	Optocoupled, operate at 12 ot 24 Vcc/Vac
Analog (option)	Number	5 ó 10
	Type	4-20 mA, (with galvanic isolation)
	Number	1 ó 2
	Type	0-20 V (with galvanic isolation)

Atmosphere		Weight	
Temperature	-5 °C a 45 °C	Box model	De 3,2 kg a 6,3 kg
Humidity	< 85 %	Built-in model	De 4,0 kg a 5,0 kg
Altitude	2000 m		
Pollution	Grade 2		

Memory Backup and Clock	
Memory	Without maintenance, 10 years for parameters, programs and registers in memory in FLASH memory.
Clock	10 years without power

Declaration of conformity	
It complies with Directive 89/336/CEE for Electromagnetic Compatibility and Low Voltage Directive 73/23/CEE for Product Safety Compliance. Compliance with the following specifications was demonstrated as indicate in the Official Journal of the European Communities.	

Symbols that may appear on the product			
	Protective Earth terminal		Danger, risk of electric shock
	Ground Terminal		Double insulation



This symbol indicates that electrical and electronic equipment must not be disposed of with household waste at the end of its useful life. The product must be taken to the corresponding collection point for recycling and proper treatment of electronic equipment in accordance with national legislation.

3 SITUATION OF THE CONNECTIONS

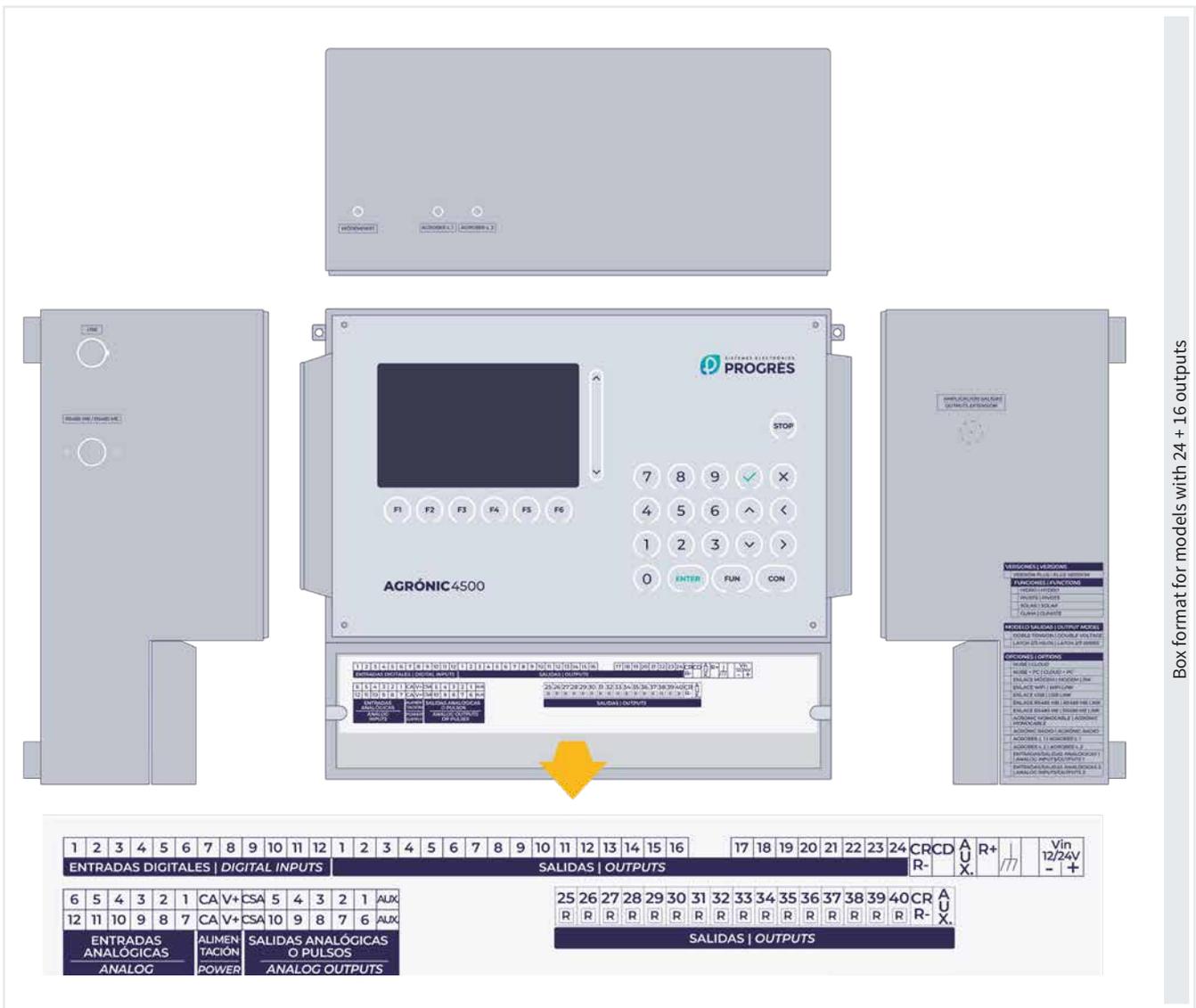
3.1. BOX FORMAT

To make the connection in the controller with box format, remove the bottom cover to access the connectors.

For the cable entry, the necessary knockouts must be removed (do it with connection cover in place and screwed, to avoid possible breakage).

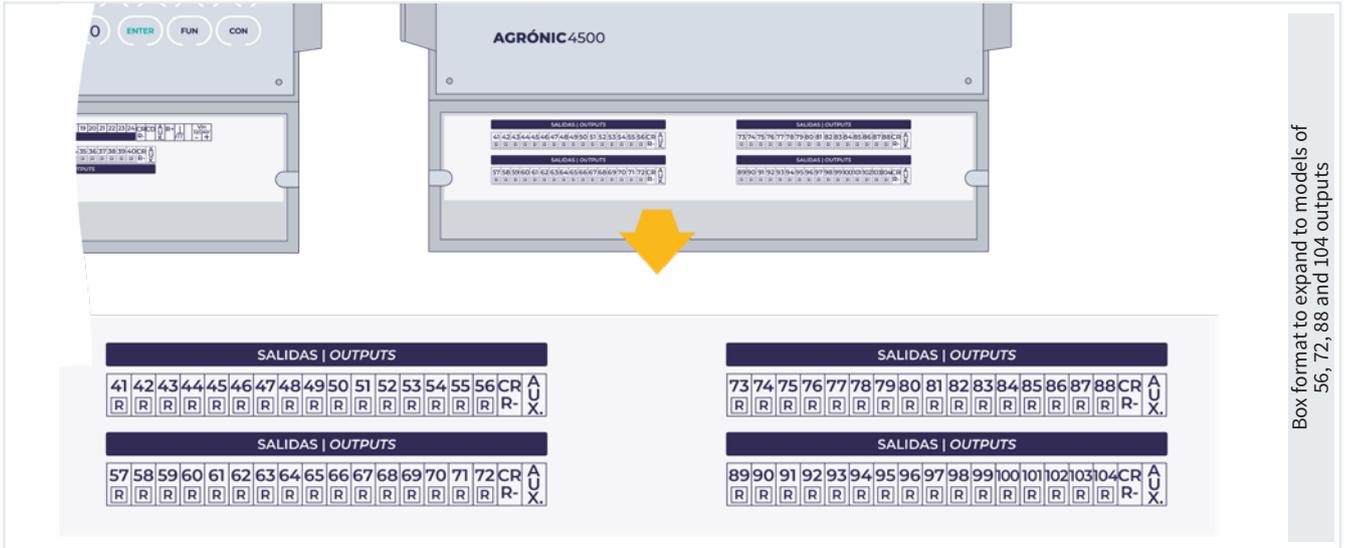
The connectors and antennas for the rest of the options are located on the right side.

It is advisable to connect the cables to the terminals with connection terminals, which are included with the controller. (The terminals accept cables up to 2.5 mm² in section).



Box format for models with 24 + 16 outputs

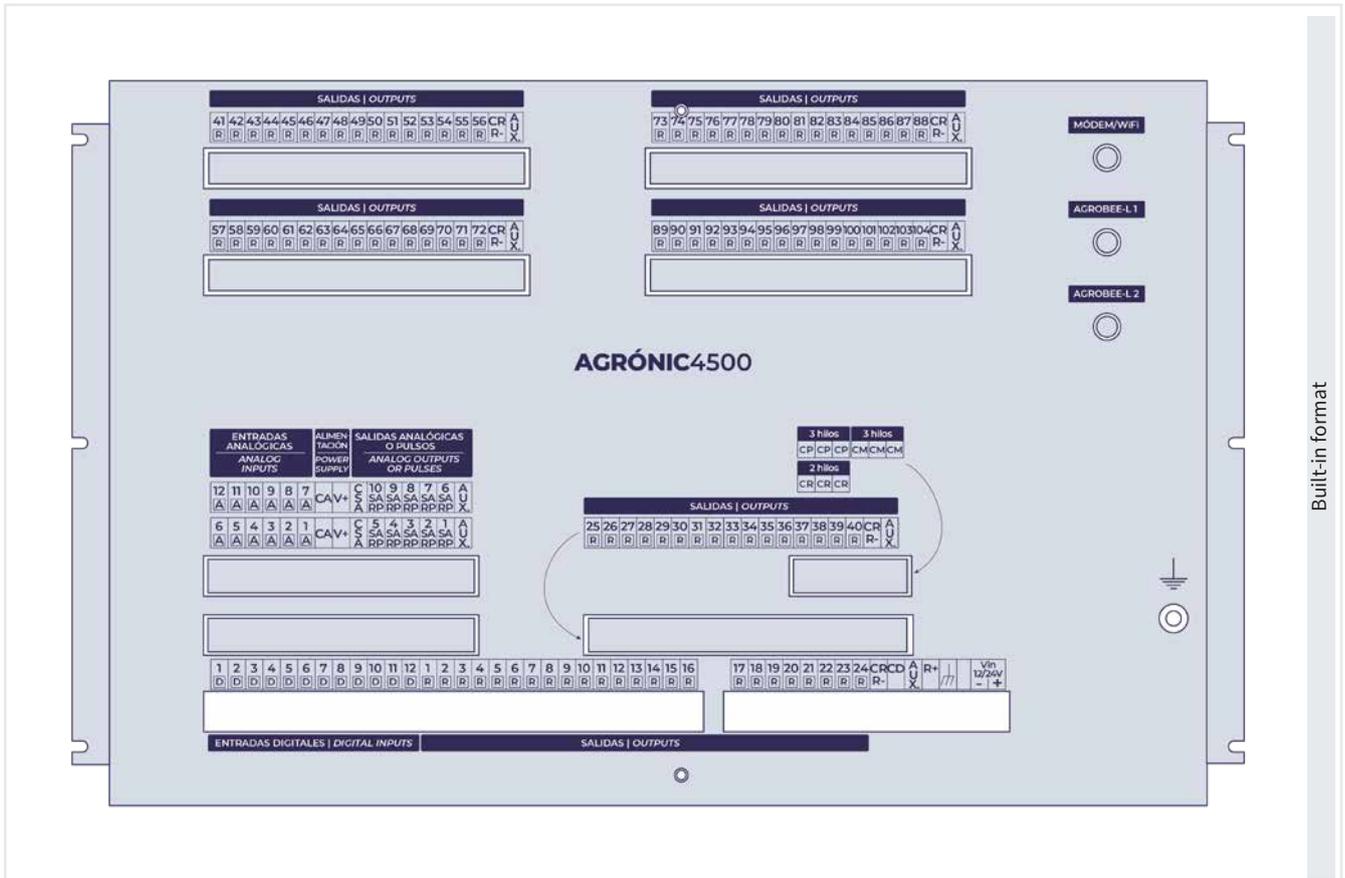
The main box can have up to **40 digital outputs**. If you need more, it will be necessary to expand to a second box, reaching up to **104 outputs**.



3.2. BUILT-IN FORMAT

In the built-in format, access the rear face located inside the desk or cabinet. Here we find the connectors for the power supply, the inputs, the outputs for the models of 24, 40 ...

In addition, when there are options installed, there may be the connectors for the antennas of the AgroBee-L options or for the modem of Wi-Fi. On the sides there can be the connector for the USB port and the RS-485 port.

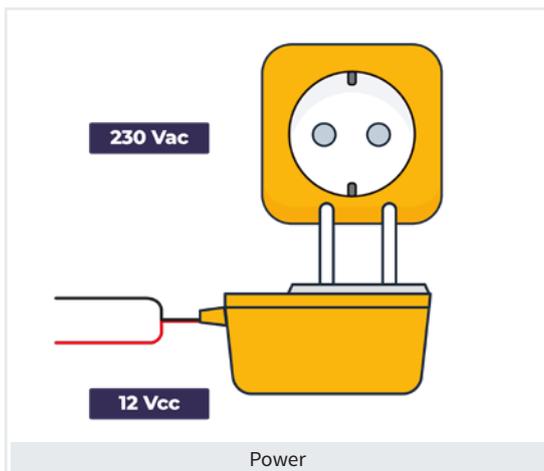


4 CONNECTION

The installation must be carried out in accordance with current regulations for electrical installations. The protection of the controller will not be ensured if it is not used as specified in this manual.

The Agrónic must be installed far from sources of interference such as frequency inverters, motors or power cables. Sensor and communication cables should never pass next to alternating current cables and should preferably be shielded. All the connection terminals of the Agrónic 4500 are pluggable, which allows quick maintenance.

4.1. POWER CONNECTION



Power is 12 Vdc for all models.

In installations with a solar panel, generator set or diesel motor pump, it will be connected to the 12 Vdc battery.

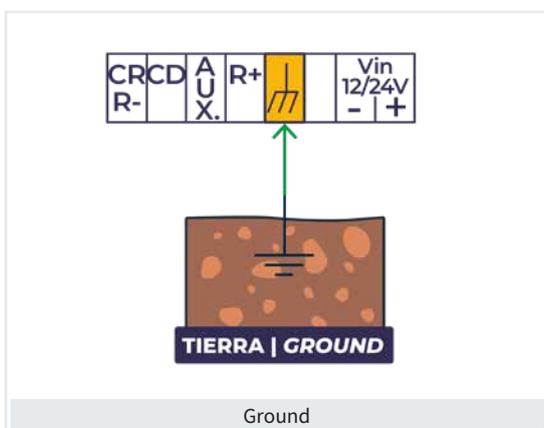
In 110 or 230 Vac systems, a 90-230 Vac / 12 Vdc (50-60Hz) power supply is available as an accessory to connect the controller. The socket outlet to which connect the power should be easily accessible.

The power input has a self-resettable thermal fuse, it is also protected against polarity inversion and overvoltage peaks.

It is necessary to have an independent magnetothermic switch in the installation that protects the Agrónic 4500. The general power and the transformer that power the outputs will be connected at its output.

When a diesel engine is running avoid disconnect the battery as the alternator would considerably increase the supply voltage and damage the Agrónic.

4.2. GROUND CONNECTION



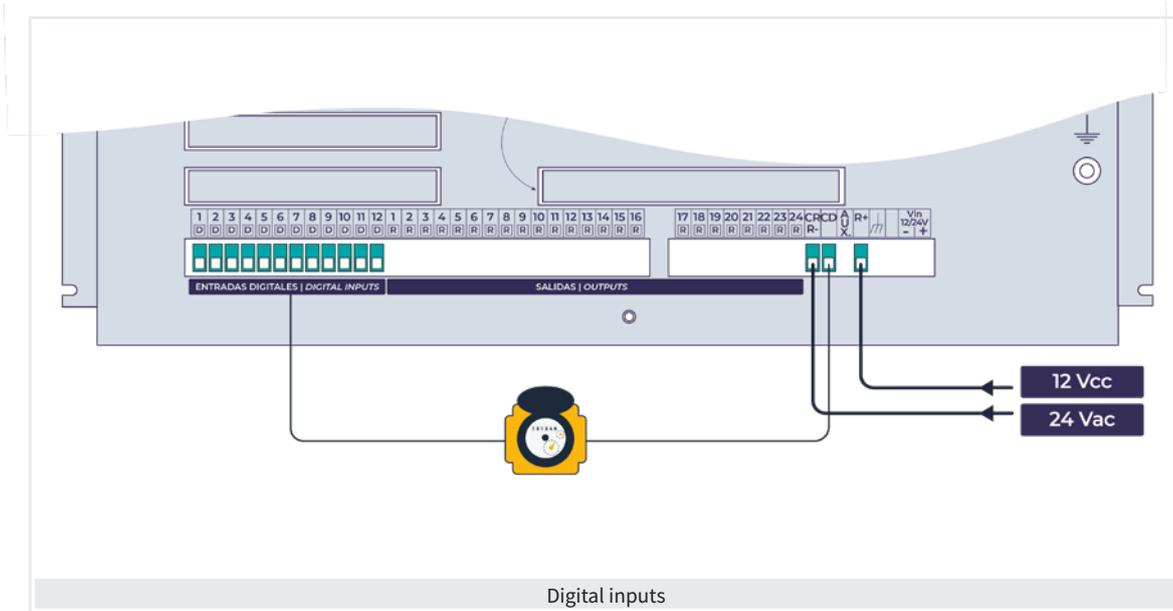
The ground terminal is located next to the power terminals. Its function is to direct possible electrical sparks generated by storms to the ground and that may enter through the input and output cables; arc striking in the internal gas discharge tube occurs from 90 volts.

It is very important to connect this socket, independently, for a complete protection of the controller.

In the built-in model there is an additional earth connection on the side of the metal box in case it is necessary to derive it to earth.

The earth connection must be distinct and separated from the grounding of drives or motors.

4.3. CONNECTING THE DIGITAL INPUTS



Both the digital inputs and the relay outputs are externally powered at 12 Vdc or 24 Vac.

The digital inputs are galvanically isolated by optocouplers from the rest of the circuit.

The contacts of the devices connected to the digital inputs must be free of voltage.

The controller has 12 digital inputs on the base, indicated as **D1** to **D12** and a common marked as **CD**.

4.4. CONNECTION OF THE OUTPUTS

All the outputs are prepared to work both at 12 and 24 volts in alternating or continuous (do not power with voltages higher than 30 volts).

For 24 Vac operation, an external transformer with 24 Vac output with double insulation must be available according to the UNE EN61010 standar.

The input for powering the outputs is marked as “R+” and “R-”.

The “AUX” terminal corresponds to the “R+” input passed through the power supply protection. It is used to connect manual control auxiliary elements and relay extensions.

The solenoids of the electricvalves, the relays or the contactors are connected between a common output “CR” and the corresponding output between “R1” to “R104”.

The outputs are isolated from the internal circuit by relays and protected by a varistor in each one.

The power supply to the outputs and the sensors are protected by a self-resetting thermal fuse, also in the section “Consult - Agrónic” it will indicate whether or not there is voltage for the outputs. When there is a short circuit in any of the outputs, the fuse will enter automatically, limiting the output until the short circuit ends.

In installations where there is a motorized pump, Agrónic can manage the start and stop manoeuvres. To manage it, it uses four outputs (preheating, contact, start and stop) and a digital input (oil pressure switch).

When connecting diesel engine starters, the following details must be taken into account:

ENTRANCE

PA oil pressure switch. The pressure switch input can be connected to any of the 12 digital inputs on the base. It is not necessary to connect the DC digital common to the pressure switch as it is done directly through the motor chassis.

OUTPUT

The outputs deliver the battery positive. And additional relay will be inserted in each of them to avoid damage to the internal relays. The contact output will be connected through the relay to the wire from the “15/54” terminal of the key. It is the controller that is in charge of

giving and removing the contact, so the key must be left in the rest position.

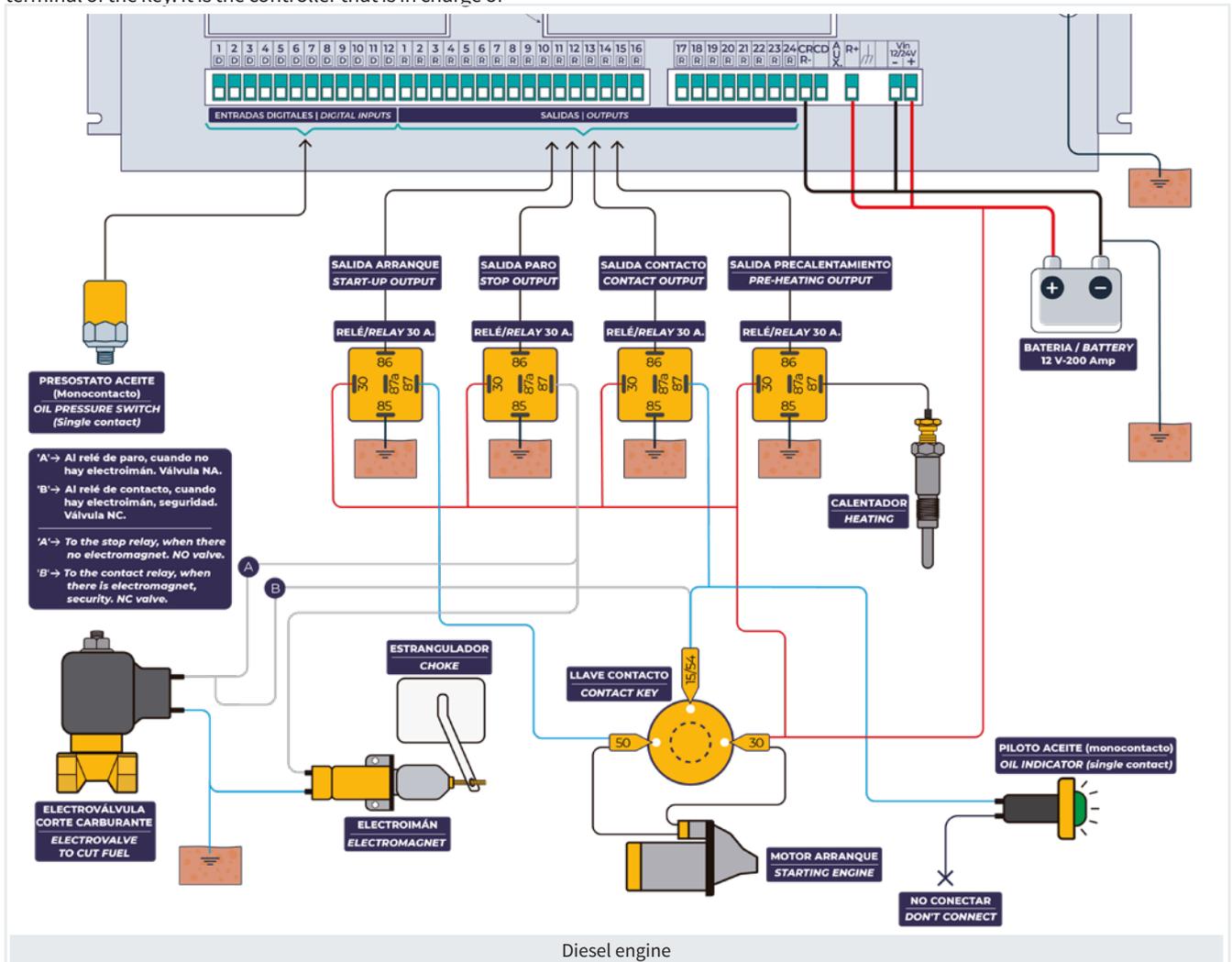
A supplementary relay will be inserted in the starting output, with a capacity of 20 to 30 Amps, connected checking its output with the cable from terminal “50” of the key.

If the motor is stopped by an electromagnet, it will be connected to the supplementary relay of the stop output.

If the stop is made by cutting off the fuel with a solenoid valve, it will be installed at the same inlet of the injector, so that the stop is as quick as possible.

When the solenoid valve is normally open, it will connect directly to the stop output. If the solenoid valve is normally closed, it will be connected to the contact output.

When there is preheating, it will be connected to the relay for activation.



Diesel engine

It may be interesting to have a double stop system for greater safety, with the electromagnet for a quick and effective stop, plus the electromagnet normally closed

valve to cut off the fuel supply when there is a possible break or incident.

4.5. CONNECTION OF THE EXPANSION MODULES (EM)

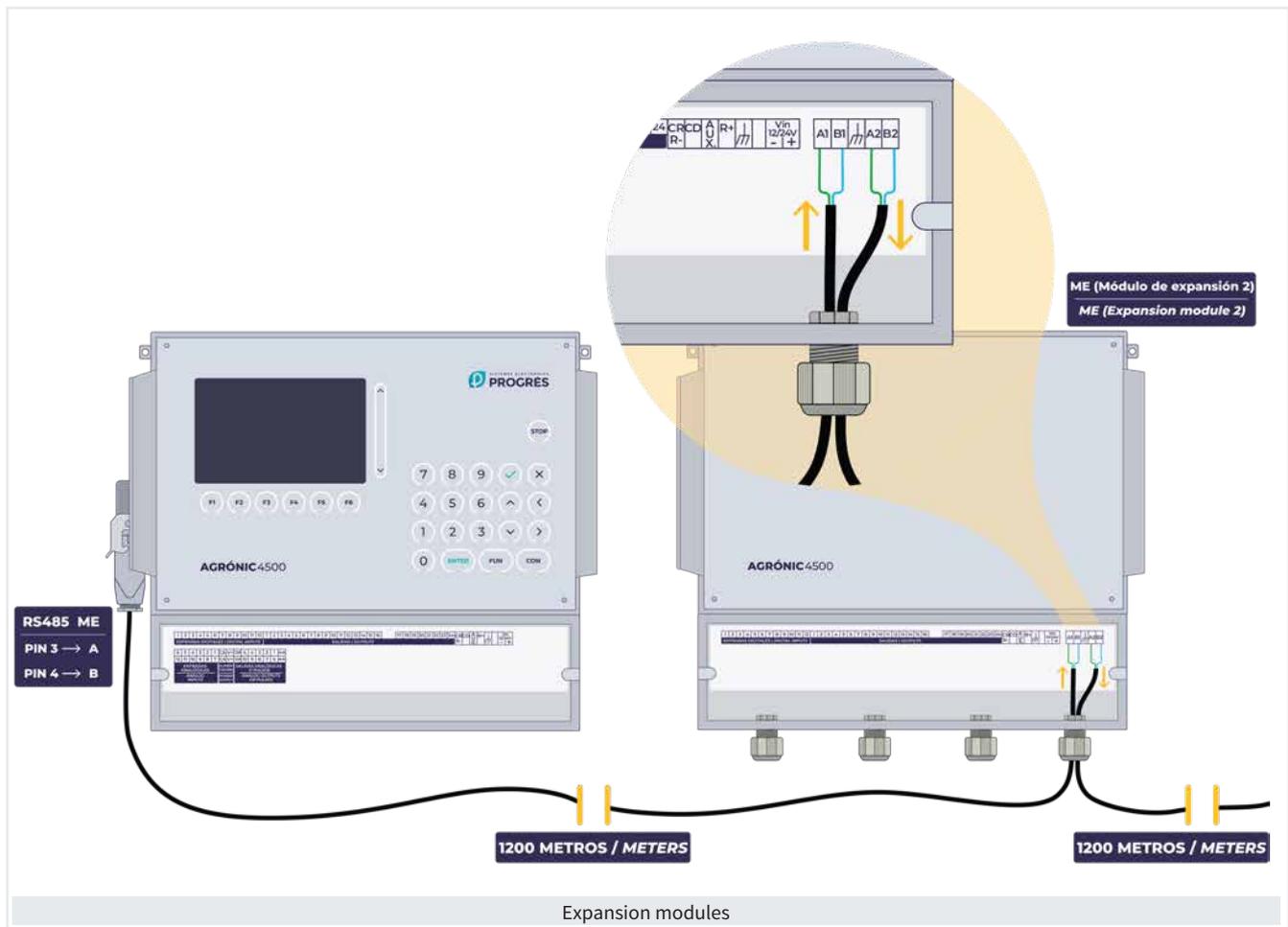
To connect the Expansion Modules (EM) it is necessary to have the “RS485 EM Link” option installed.

The connection will be made with a 2-wire hose of 0.5mm minimum. The maximum distance between the Agrónic and the last of the EM is 1200 meters.

The cable cannot be routed together with alternating current cables or near devices that may produce electrical

interference (inverters and motors).

If more distance is needed, it is possible to add (“RS485 Repeater Option” (06741220) or through the “Radiomodem Option”.



5 INSTALLATION OF OPTIONS

5.1. DOUBLE VOLTAGE OPTION

The dual voltage option is for installations where power comes from a diesel generator. The Agrónic will start the generator when it has to do an irrigation and will stop it when finished.

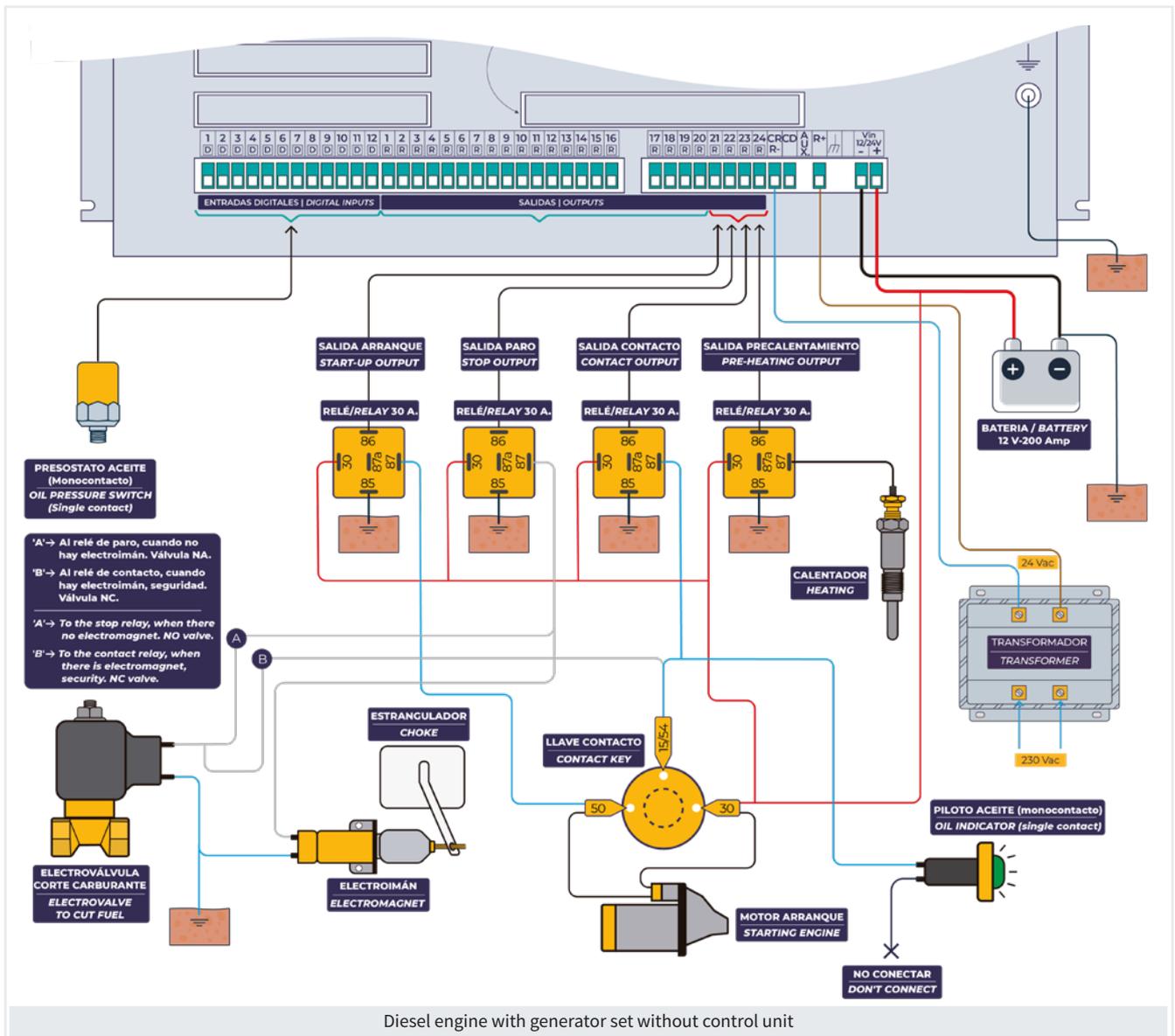
The Agrónic is powered by the groups's 12 Vdc battery. The four outputs that give the orders to start and stop the generator go to 12 Vdc, all the others go to 24 Vac and are operational when the generator is running.

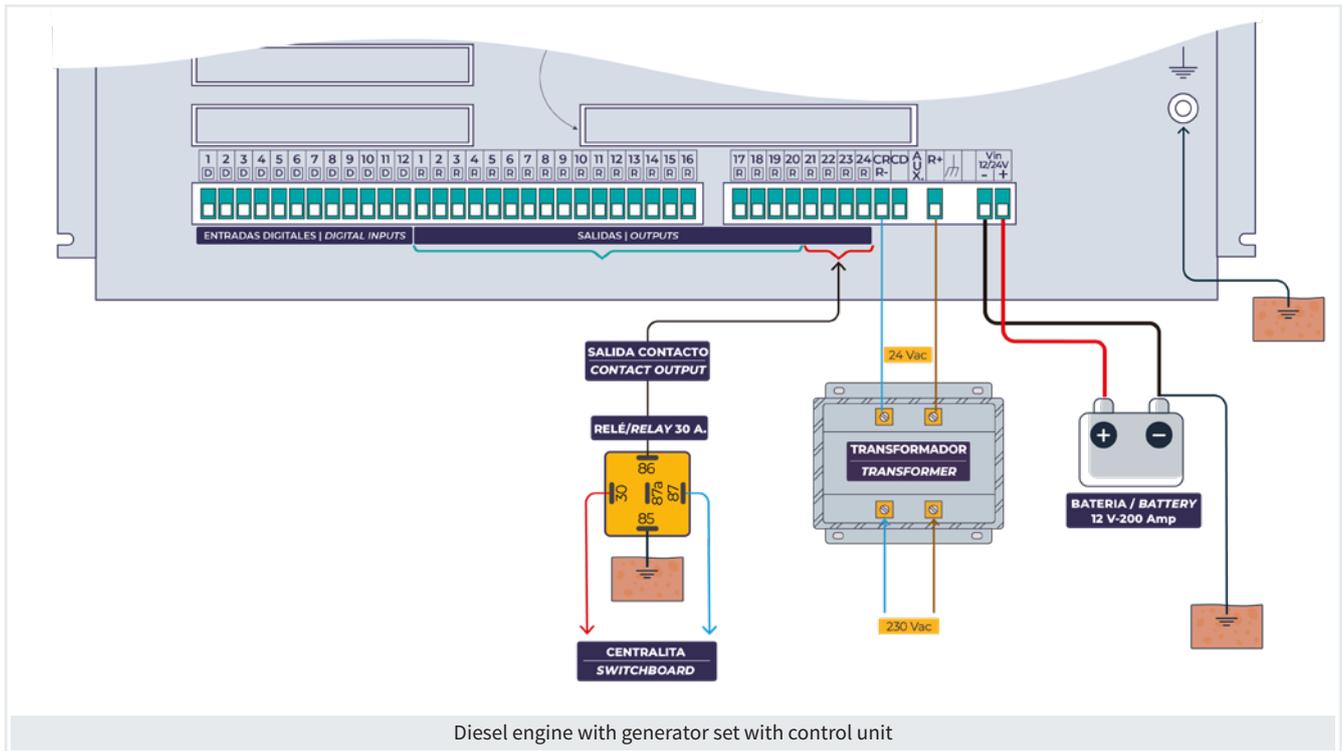
In the Agrónic 4500 base, the 12 Vdc outputs are R21, R22, R23 and R24 (for any model).

The Agrónic can have two functions:

With start and stop management of the diesel engine. In this case the diesel control is used with the outputs of preheating, contact, start, stop and the digital input of the oil pressure swith.

Will starting unit management incorporated in the generator. In this case only one contact signal is needed. To activate this operation, the start and stop times will be '0'.



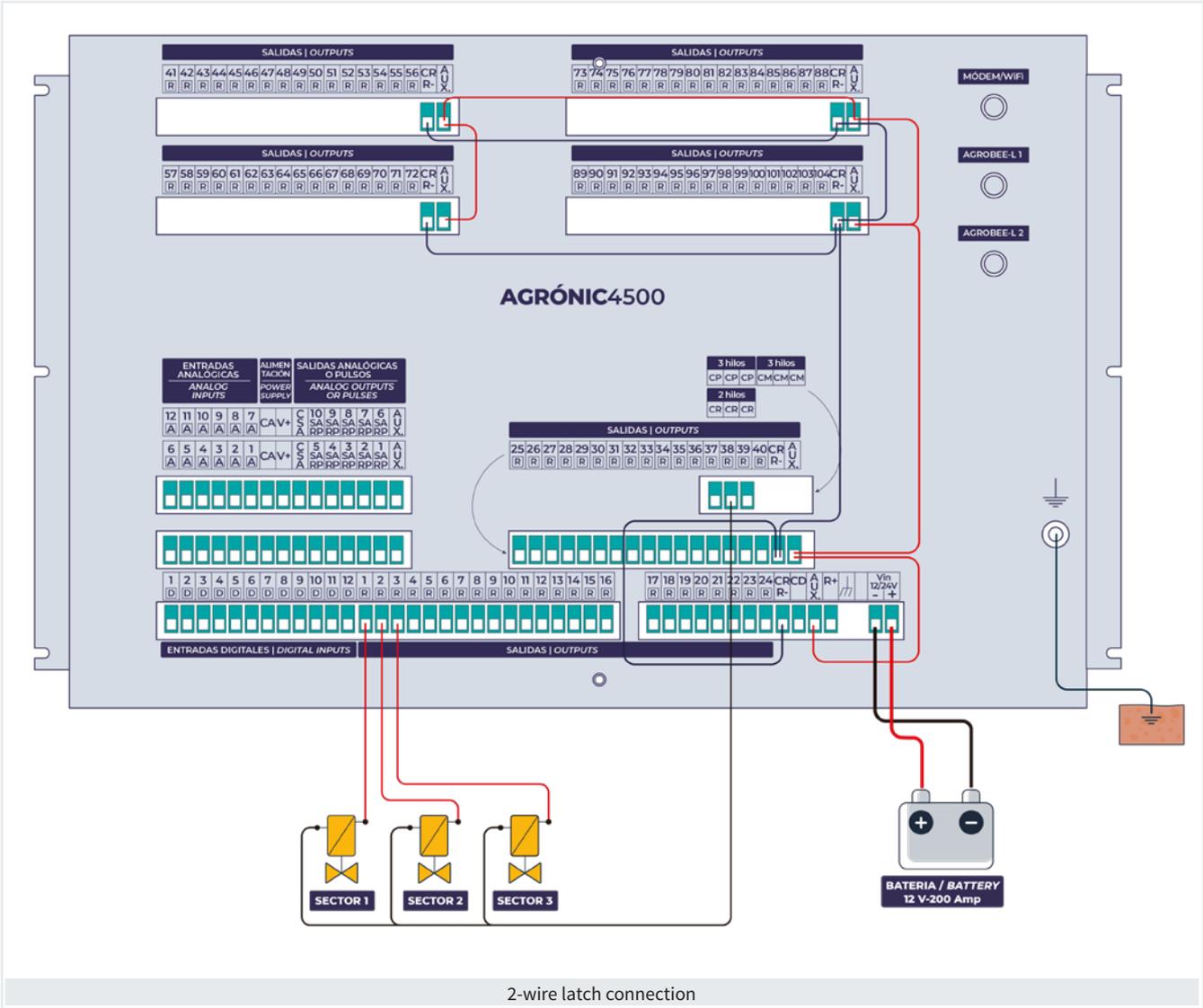


5.2. LATCH OPTION

In installations where a very low energy consumption is needed, latch valves are usually used. Latch solenoid valves, also called impulse valves, work by locking their hydraulic position in opening or closing, consuming energy only at the moment of change. This allows power to be powered by a battery only or by battery and a solar panel. The calculation will be made taking into account options and auxiliary installation systems.

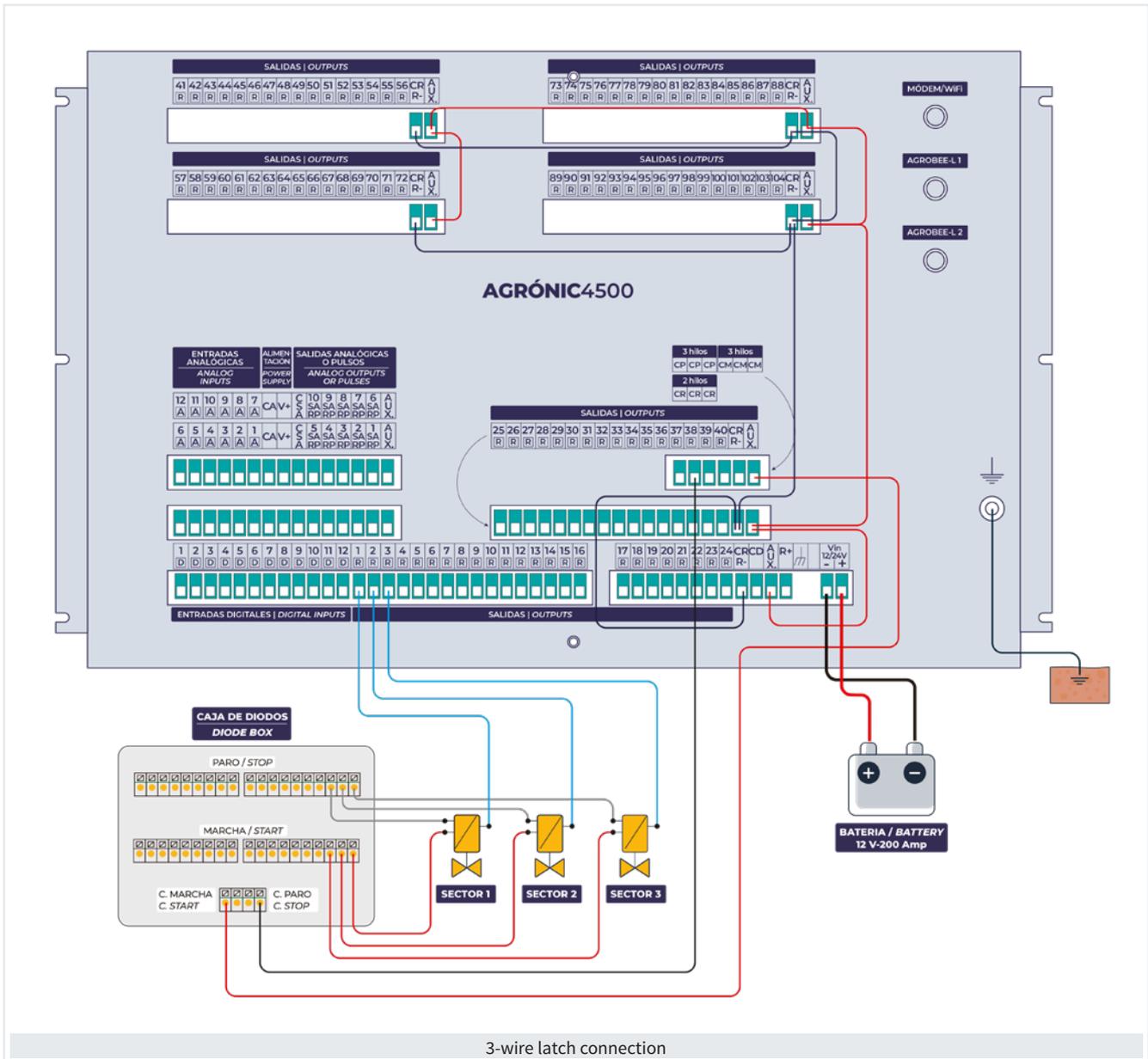
The installer can prepare the controller to use latch solenoid valves in the format of two or three wires and the trip voltage at 12 or 22 volts. See the section “Parameters - Installer”.

When installing **3-wire models** it will be necessary to incorporate in the installation a box of diodes, adequate to the total number of outputs of the controller, to carry out the connection of the start and stop commons. In the 2-wire models is not necessary.



One of the two cables will be connected to the common outputs “CR” and the other to the corresponding output between “R1” to “R104”.

When the solenoid valve actuates hydraulically at the inverse of the order given by the controller, this will be inverted order by entering “Installer Parameters - Variosus”.



This model of solenoid valve has two commons, the running one (normally red) will be taken to the diode box, to one of the terminals marked “Start”, the stop common (usually black) will be connected to a terminal marked as “Stop”, the other cable (usually white) will be connected to the corresponding output between “R1” to “R104”.

On the other hand, the start commons, CM and stop commons CP of the controller and the diode box must be connected. In the event that the order in the valves is inverse to the one desired, invert the Common Start and Common Stop cables.

5.3. ANALOG INPUTS AND OUTPUTS OPTION

Option of one of two boards with 6 inputs and 5 analog outputs each.

Useful for:

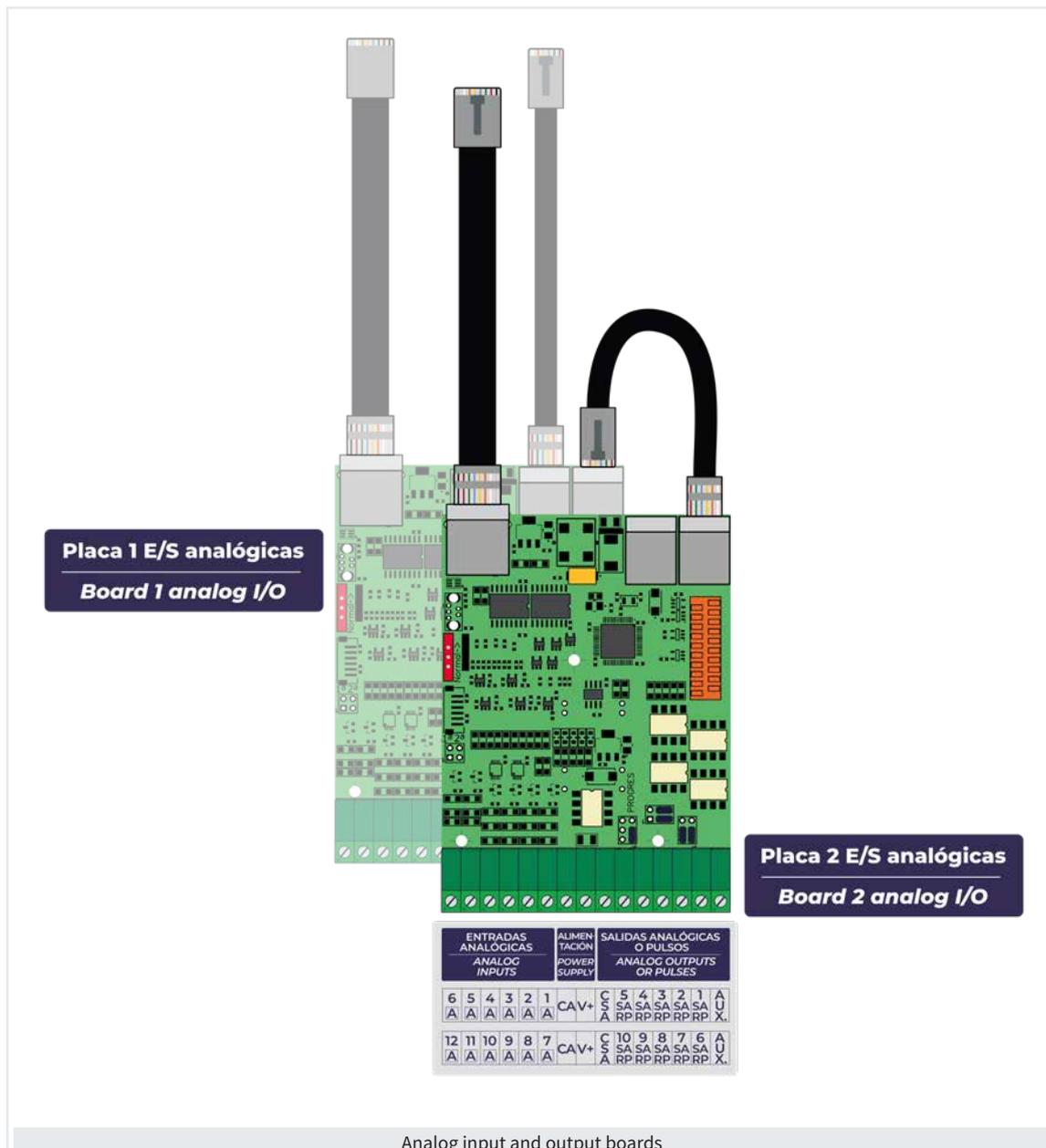
- Regulation of pH and EC.
- The pressure regulation of irrigation water.
- Reading and recording sensors.
- Injection in 'uniform fertilization' mode via analog output.

Five of the inputs operate with sensors and transmitters that generate 4-20mA. It has two terminals for powering 12 volt sensors.

Input 'A6' and 'A12' have a voltage of 0 to 20 volts.

The outputs can be configured independently to operate as analog output at 4-20 mA (default) or pulse output with photorelay.

Independent galvanic isolation on each board, between the analog inputs and outputs in relation to the pulsed outputs or the rest of the inputs and outputs of the Agrónic 4500.



Analog input and output boards

5.3.1 Technical characteristics

General	
Consumption	3,5 W, maximum 0,7 W, at rest (without outputs, without powering sensors)
Work temperature	-10 °C a +60 °C
Isolation	500 V between analog inputs/outputs and other circuitry. 500 V on the pulsed outputs.

Outputs		
Sensor power output, V+ / CA	Voltage	12 volts
	Thermal fuse	0,2 amps
Analog outputs SA1 - SA5 SA6 - SA10	Number	5 + 5 in second extension
	Type	0 - 20 mA
	Resolution	12 bits
	Load resistance	250 Ω (maximum)
Pulsed outputs RP1-RP5 / RP6-RP10 (Incompatible with analog output)	Number	5 + 5 in second extension
	Type	FotoMos Relay
	Limits	30 Vac / Vcc, 1 Ampere

Inputs		
Analog A1 - A5 A7 - A11	Number	5 + 5 in second extension
	Type	4-20 mA
	Resolution	16 bits
A6 - A12	Type	0 - 20 Volts
	Resolution	16 bits

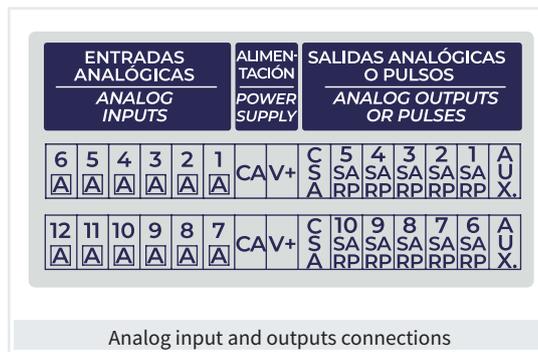
5.3.2 Jumper configurations

It is necessary to connect the analog inputs and outputs with shielded multi-core cable, with sections 0.25 and 0.5 millimeters. The screen will be connected to the ground; the latter will be carried out independently as long as it is free of electrical noise.

The analog input and output cables must be installed away from other cables or elements powered by alternating current.

The 5 analog inputs are prepared to measure current from 4 to 20 mA and can be expanded to a total of 10; the sensor or transmitter element may be located tens of meters from the Agronic. Inputs A6 and A12 are always 0-20 V.

The analog inputs are marked 'A1' to 'A6' and 'A7' to 'A12' on the expansion. The 12 Vdc power output for the sensors is the 'V+' terminal and the common to '0V' is the 'CA'. The power output of the second power board is independent and isolated from the first.



The controller has 5 analog outputs that can be 0/4 - 20 mA or pulses. These are indicated as analog 'SA1' to 'SA5' or pulsed 'RP1' to 'RP5'. The outputs can be expanded up to a total of 10.

Each output can be configured individually if it is to be pulse of 4-20 mA. To do this, jumpers J1, J2 and J3 behind the terminals will be used.

Output	Type	Terminal	Jumper	Circuit image
1 - (6)	4-20 mA	Analog output 1/6	J3. 1.3	
	Pulses	Pulse Relay 1/6	J3. 5-3	
2 - (7)	4-20 mA	Analog output 2/7	J3. 2.4	
	Pulses	Pulse Relay 2/7	J3. 6.4	
3 - (8)	4-20 mA	Analog output 3/8	J1. 1.3	
	Pulses	Pulse Relay 3/8	J1. 5-3	
4 - (9)	4-20 mA	Analog output 4/9	J1. 2.4	
	Pulses	Pulse Relay 4/9	J1. 6.4	
5 - (10)	4-20 mA	Analog output 5/10	J2. 1.3	
	Pulses	Pulse Relay 5/10	J2. 5-3	

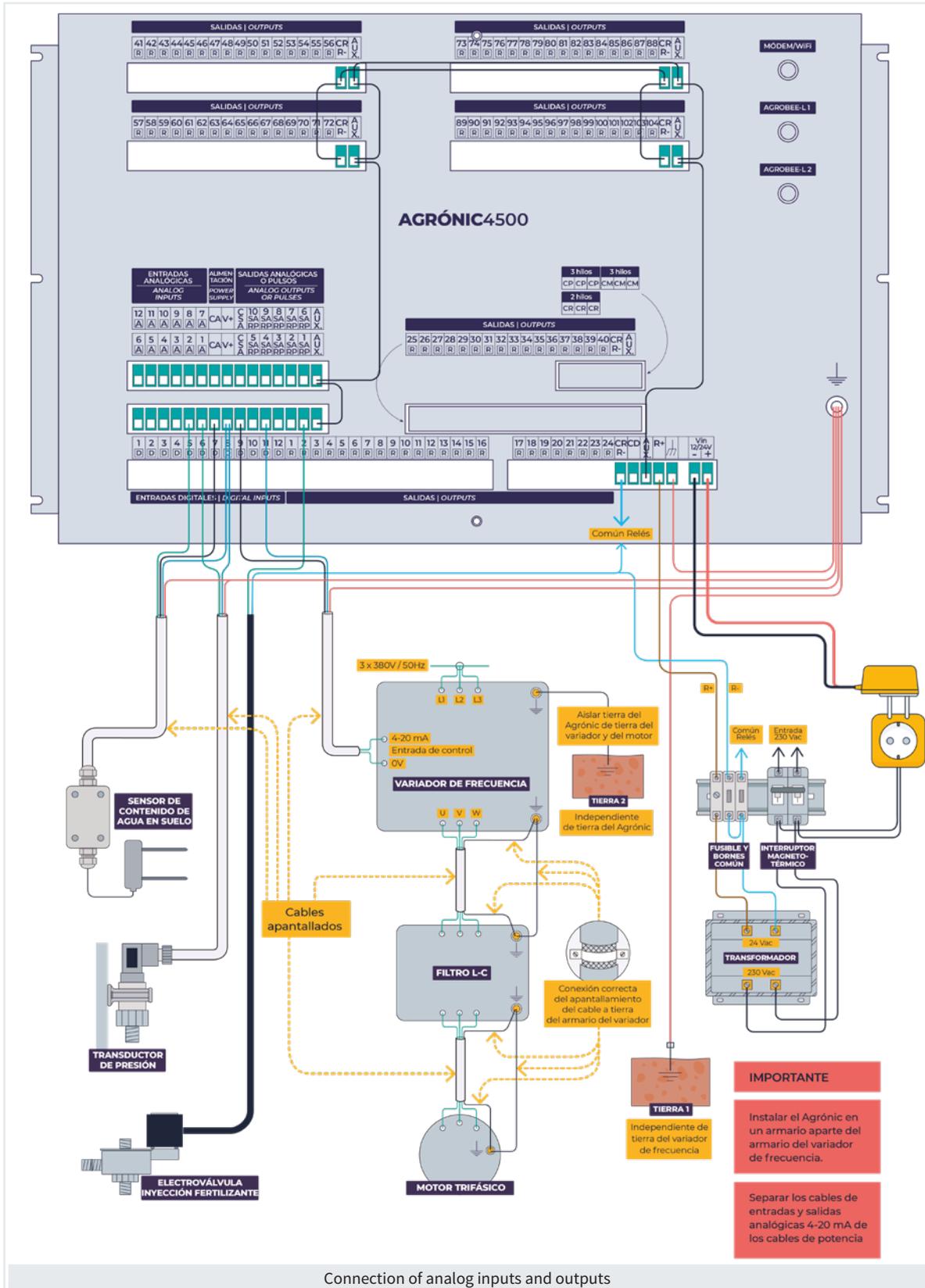
If an output as analog 4 - 20mA, its common must be connected to 'CSA'. (see connection example).

If the output is configured as pulsed, its common will be joined to the General output 'Common', the opposite 24 Vac phase must be connected to 'AUX'. (see connection example).

Important

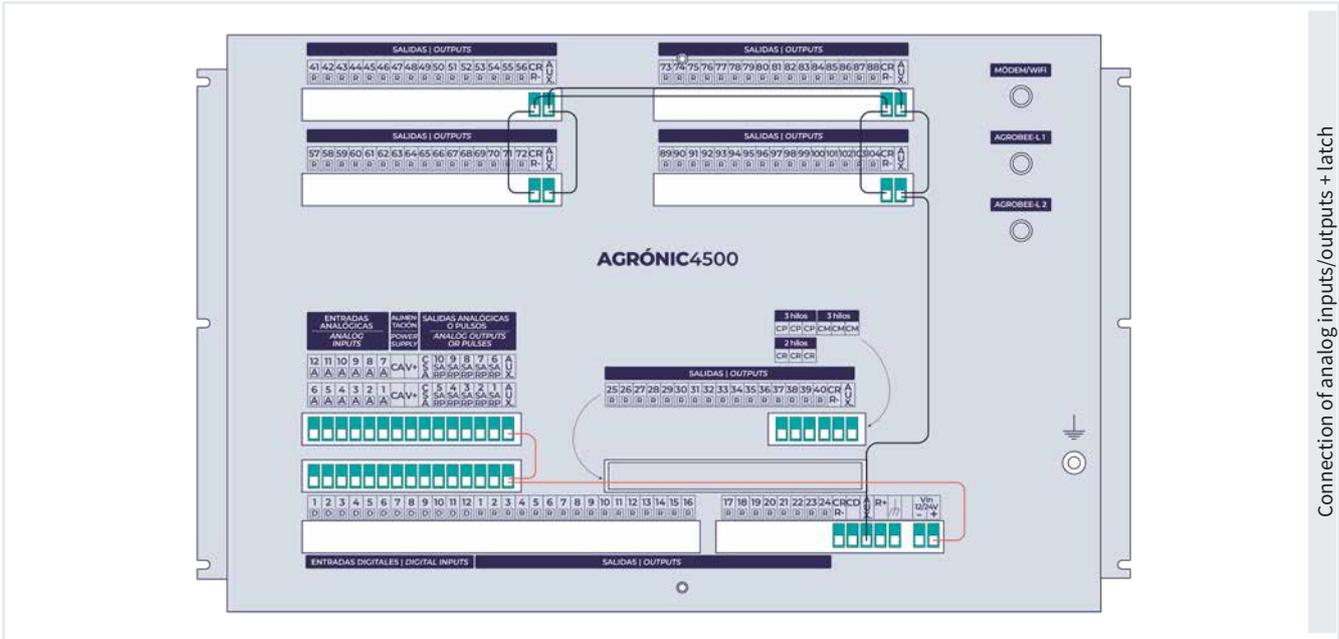
Connect the analog outputs correctly; if done incorrectly, the internal circuitry could be damaged.

In installations where it is necessary to read analog sensors logic or analog outputs for fertilization or pressure regulation this option is required.



5.4. ANALOG INPUTS AND OUTPUTS OPTION + LATCH OPTION

! Important
 It's important to connect the 'Aux' terminal of the analog inputs/outputs to the '+' V.in of the controller.

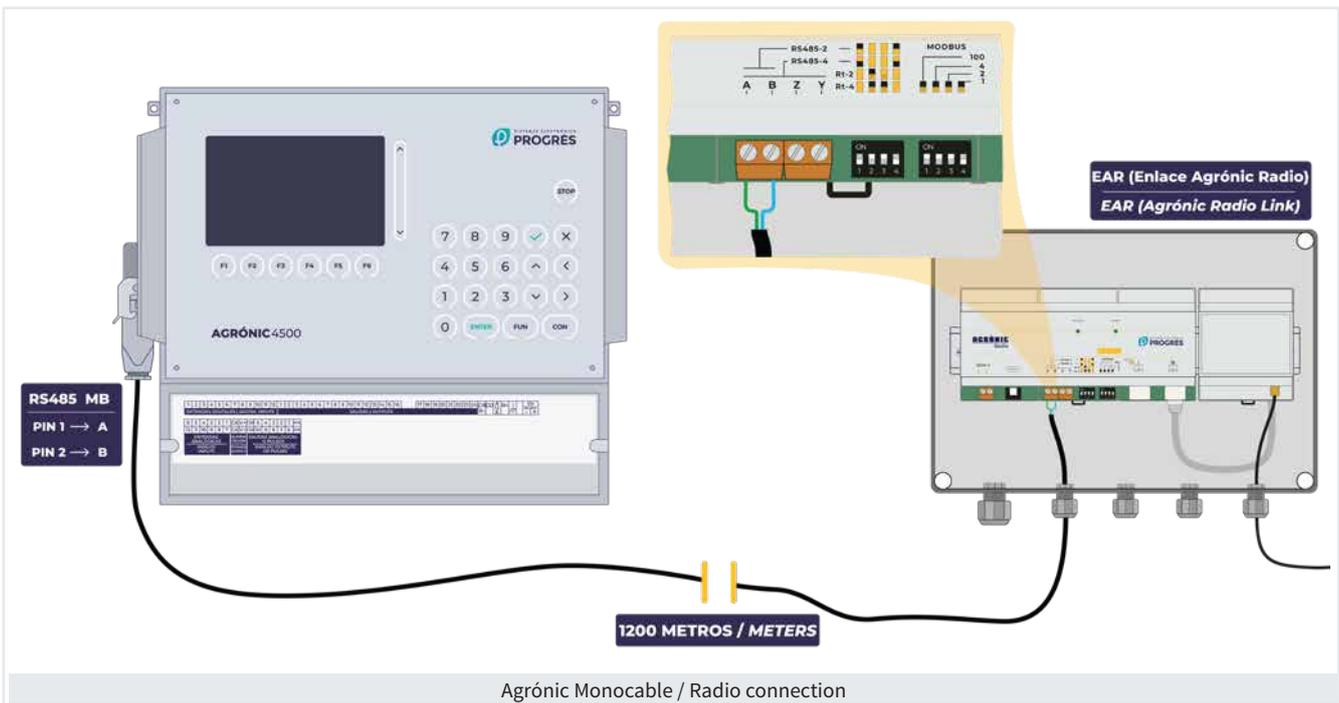


Connection of analog inputs/outputs + latch

5.5. AGRÓNIC MONOCABLE / RADIO OPTION

To connect the Agrónic Monocable (EAM) of Agrónic Radio (EAR) to the Agrónic 4500, the “RS485 Modbus Link” option must be installed. The connection will be made with a 2-wire hose of at least 0.5mm.

The maximum distance between the Agrónic and the EAM or EAR is 12 meters. The cable cannot be routed together with cables with alternating current or near devices that can produce electrical interference (inverters and motors).



Agrónic Monocable / Radio connection

6 RECOMMENDATIONS

Controller location

- Install the controller at the proper height and position for good handling.
- Avoid as much as possible the direct incidence of the sun, humidity, dust and vibrations.
- Avoid being close to elements that generate interference and may affect the proper functioning.
- To maintain the tightness of the box format, it is necessary to keep the lid always closed, as well as to install cable glands in the outlets of the cables.

Installation with frequency inverter

- The ground of the Agrónic must be independent and separate the ground spike from the drive and the engine.
- The sensor cables must be shielded and installed separately from the power cables.
- It is highly recommended to install the Agrónic and the drive in distinct and separate cabinets.
- Between the drive and the motor it is advisable to put a filter to reduce the harmonics of the signal exit, and thus comply with the CE marking regulations. The filter must be located close to the inverter, as well as use shielded cable (EMC).

- In installations that have a pressure transducer, it must be galvanically isolated from the pressure pipe, since interference can propagate through it. The transducer can be attached by means of an insulating support to the wall and connected to the pressure pipe by means of a microtube.
- In the Agrónic 4500, the consequences of a bad installation of the drive can be the random activations of outputs, screen changes without touching the keyboard and poor reading of probes, among others.
- Consult the manual “Installations with Agrónics and frequency inverters” available on the Progrés website.

Wiring of sensors and meters

- Sensor and meter cables must never pass together or parallel to cables with alternating current, there must be a minimum distance of 0.5 meters between them.

Warranty

The Agrónic 4500 complies with the CE marking directives.

The products manufactured by Progrés enjoy a guarantee
two years against all manufacturing defects.

Damage compensation is excluded from the guarantee
direct and indirect caused by the use of the controller.

Sistemes Electrònics Progrés, S.A.

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