Commander EVO

Installation manual

Irritec Spa

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1. DESCRIPTION

The COMMANDER EVO is a powerful automatism, easy to program, designed to process and execute automatically the functions of all existing elements in a modern irrigation control head, including Electric Conductivity objectives in fertilization, acid or base injection referred to pH objective, filters flushing, fertilizer mixer, pumps, etc. This unit is capable to manage the Automatic control of 24 outputs, even if they have different characteristics.
The large number of parameters that COMMANDER EVO can handle makes it a controller practically adaptable to most fertilization systems, able to manage all devices commonly used in them.
Programming COMMANDER EVO by the user (data entering) is aided by a messages display that allows easy communication when entering data as well as when displaying them, making the controller comfortable and easy to operate by the user.

This manual has been carried out by IRRITEC'S technical personnel for the use of its customers and its controller's users.

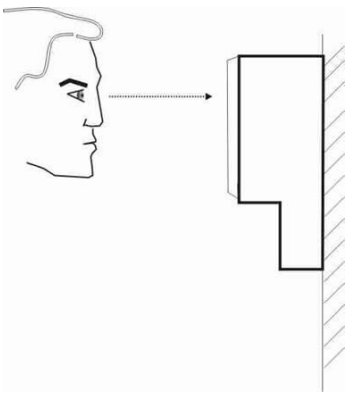
IMPORTANT

The operations described in this manual, in some cases, may pose a physical risk to the operator who executes.

In the models that have 220VAC or 115VAC power supply, the programmer will always be operated with the precaution of turning it off and disconnecting it from the electrical network.

All operations must be carried out using the appropriate tools for this purpose and with the appropriate safety protections.

2. POSITIONING OF THE CONTROLLER



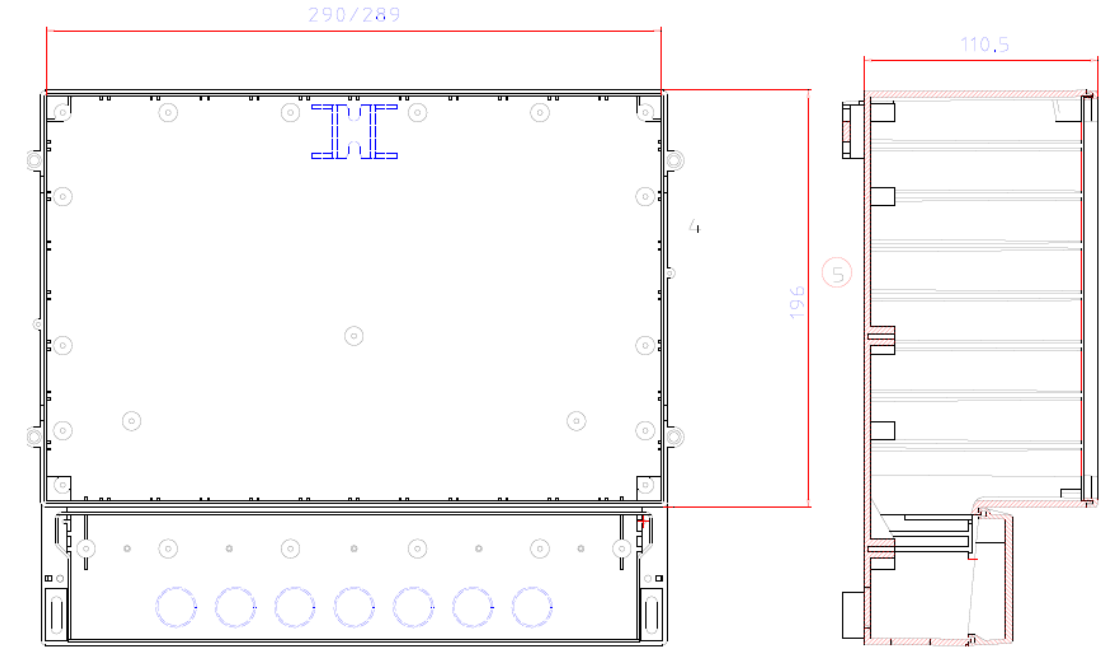
The Commander EVO controller must be located in a dry place and away from sources of heat and electrical noise.

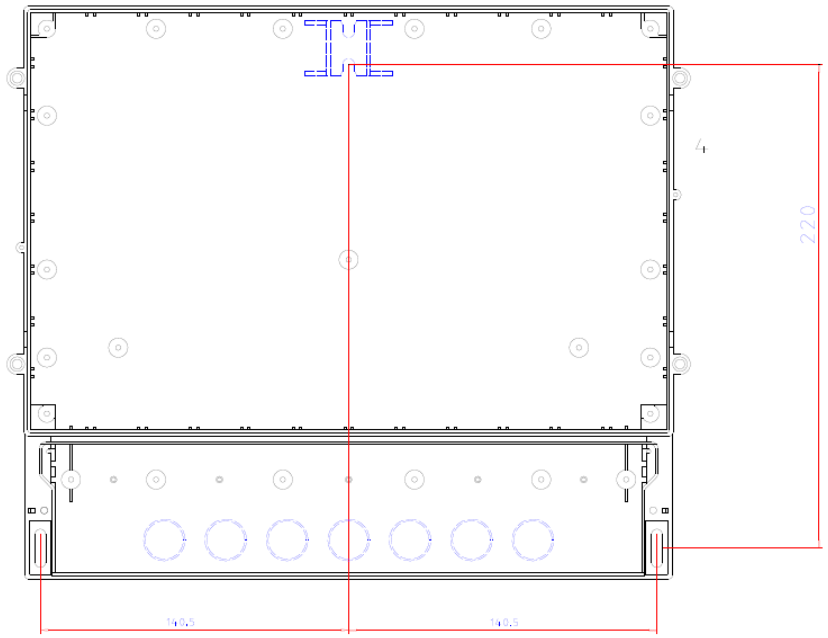
The programmer screen should never be exposed to the direct and continuous action of the sun.

For optimal viewing, position the screen at the user's eye level, or maintain a 90-degree angle to view.

The unit is intended for wall installation, although there is the panel option.
A mounting template according to your measurements and screw arrangement, is supplied with each controller.

The programmer is equipped with 6 gaskets for the cables passage and 3 groups of plug + screw for correct fixing to the wall. In addition, always included in the package, the mounting layout for the correct positioning of the fixing screws on the wall. Fastening is done using three screws.





3. POWER SUPPLY

3.1. General Aspects

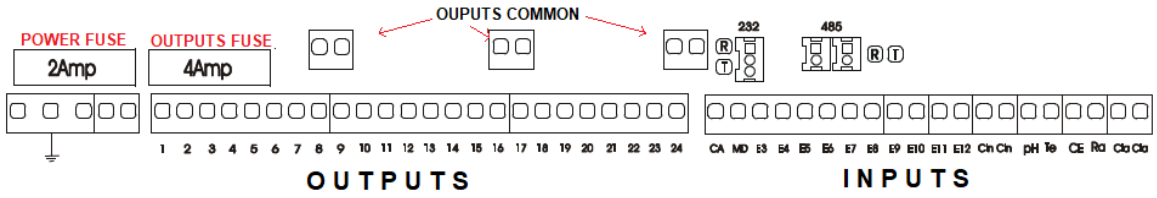
Commander EVO controllers are manufactured for different types of power supply.
Check on the identification label that corresponds to the type of supply source needed.

230 VAC		Installations with 230VAC electric current supply. The controller incorporates the appropriate transformer 230Vac / 24Vac Controller outputs voltage : 24Vac.
115 VAC		Installations with 115VAC electric current supply. The controller incorporates the appropriate transformer 115Vac / 24Vac Controller outputs voltage : 24Vac.
12 VDC		Where electricity power supply not available. The controller is powered by a 12Vdc battery that can be recharged with and external solar panel. Controller outputs voltage : 9-12vdc

Remove the bottom cover of the controller
Here will connect all the devices to be handled and those that will provide information to both digital and analog inputs, if any.

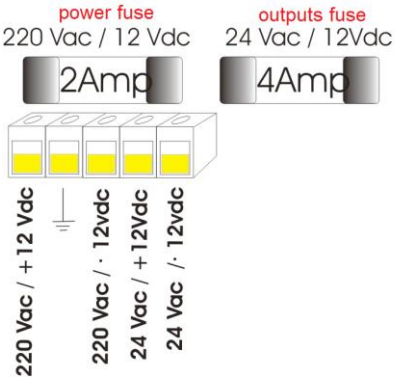
Spare fuses and an indication of the programmer's connections are attached to the front of the same.

Example (may vary depending on the model):



Note:
this terminal block can be adapted according to the type of voltage.

The terminal strip is common for all possible supplies, so each of the possibilities or elements that compose it will be detailed below.

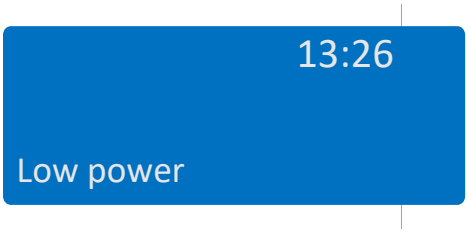


All the connections will be made using cables with a maximum 2mm section taking special care to use the appropriate screwdriver and not leaving loose strands or excess bare wire in sight.

It is advisable to correctly mark the cables to facilitate future maintenance or troubleshooting.

Use the appropriate passage for the cables used, not exceeding Ø 16mm.

The Commander EVO controller will display a warning if the supply voltage is too low.

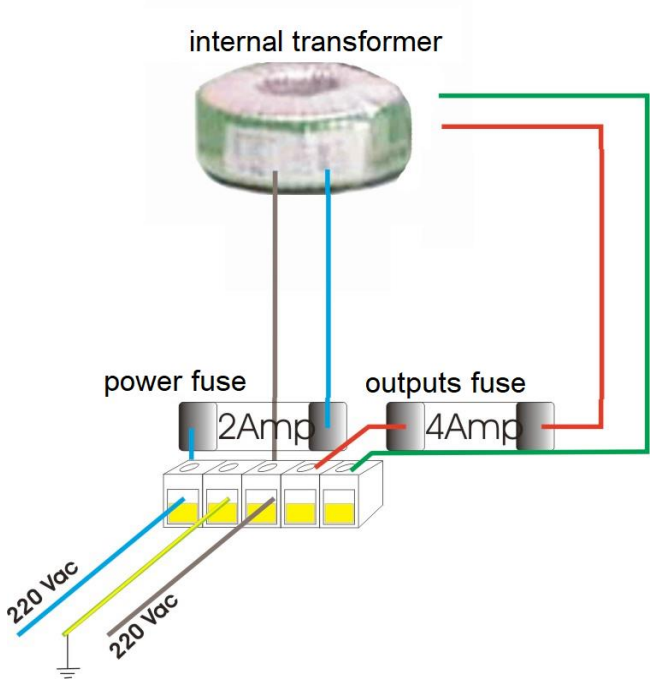


The warning message will be displayed if these conditions:

model 230 VAC	Lower than 218 VAC
model 12-9 VDC	Lower than 8,2 VDC

When in low voltage status, a message is displayed on the screen end the controller gets paused.
Once the right voltage level restored, the display message would disappear, and the programmer would continue with the maneuver it was performing.

3.2. Power supply 230 Vac



The controller needs to be supplied with 230 Vac at the terminals as indicated in the graph.

It is of utmost importance to have the right earth-ground connection so that the protections that it incorporates (varistors, filter, and fuses) do their job in case of need.

The internal transformer generates the output voltage (24Vac).
There are two outputs for this voltage that will be used only in the following cases:

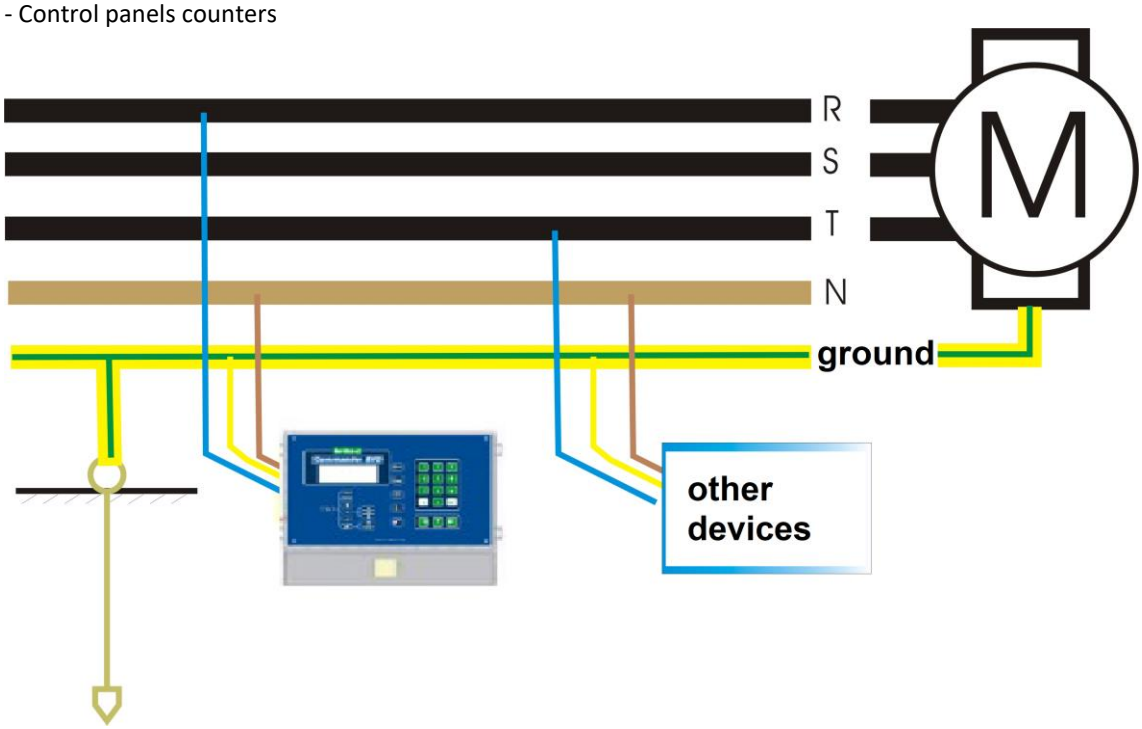
- to check that the system works correctly measuring, at the output level, the presence of 24 Vac voltage (indicative that the internal transformer is supplying the necessary voltage for its operation).

- exceptional cases, conditioned by the consumption of the solenoids connected to the controllers or if more than one connected to the same output, an external transformer of the appropriate power can be installed.

- It can be used to extract the phase that allows installations of automatic-stop-manual operation switches.

As a usual precautionary measure, in the case of having three-phase current, the 230 Vac phase should be extracted from a different one than the one that acts on devices that can cause electrical noise such as:

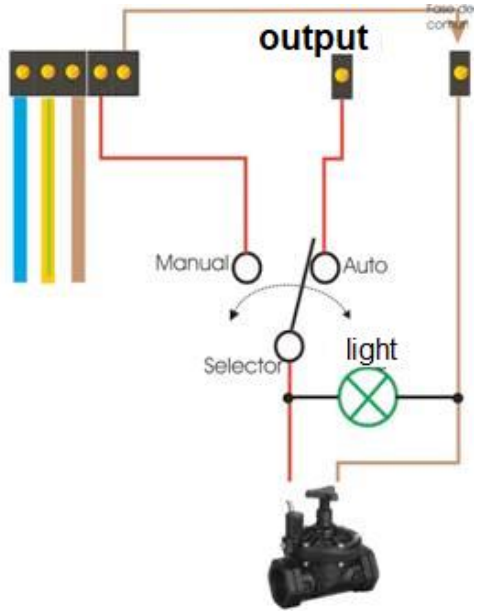
- Cold rooms
- Frequency inverters
- Fertilization pumps
- Control panels counters



The recommended fuse to use is the 2Amp. This value must never be exceeded.
In the event that it is repeatedly melted, contact the technical service of IRRITEC.

If we detect the fuse burned, it may be a sign that the varistors have started operating, so we must inspect them to be replaced (the varistors have the property of short-circuiting when receiving voltage values higher than the nominal one, causing the fuse blown). These varistors are placed between phases and between phase-earth.

Note: Once a varistor acted, it no longer fulfills its function and must be replaced.



The controller's output fuse affects only the output's common.

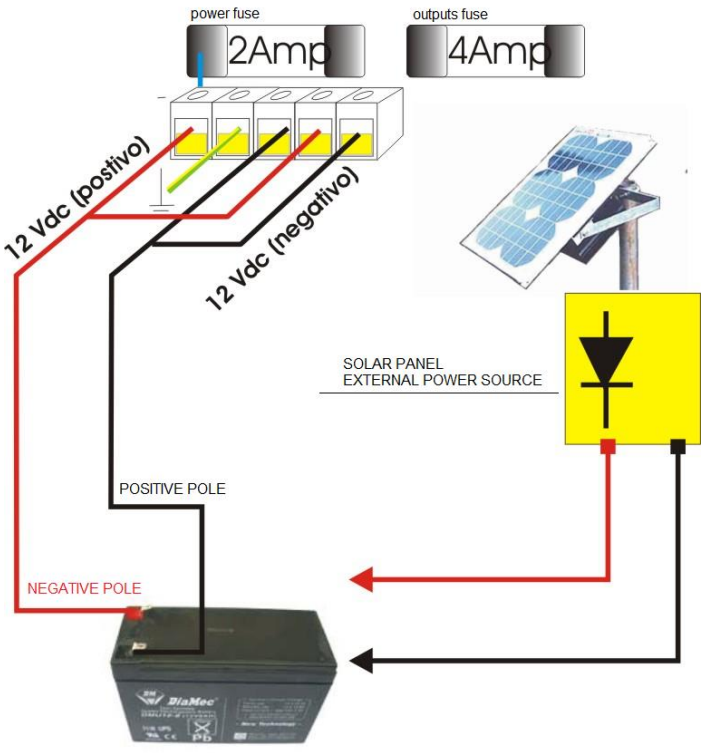
The common phase should never be used as the outputs' common since in that case, the protections included in the controller (varistors, RC circuits, and fuse) remain unused and ineffective.

Furthermore, this connection can be used to derive the phase to be used for the assembly of a synoptic or an alternative manual control, as shown in the diagram. In this case be careful to have or install a second protection fuse for the manual control itself.

The recommended fuse to use is the 2Amp. This value must never be exceeded. In the event that it is repeatedly melted, contact the technical service of IRRITEC.
The output supply circuit is also equipped with a further protective 39V varistor.

3.3. Power Supply 12VDC

In battery-powered controllers, special care must be taken in the quality of the battery and the polarity of the connections made.



As a rule, the following precautions should be kept in high consideration:

- Tighten the battery terminals
- Clean and protect the terminals from rust
- In case of solar panel: cleaning, orientation and conservation of the same

In this model there is only one outlet with polarity (attention to the connection), although all the protection elements and fuses comply with the normal conditions.
The same power cable must be used to power the programmer outputs (in some cases two batteries can be installed). It is advisable to also install the controller grounding.

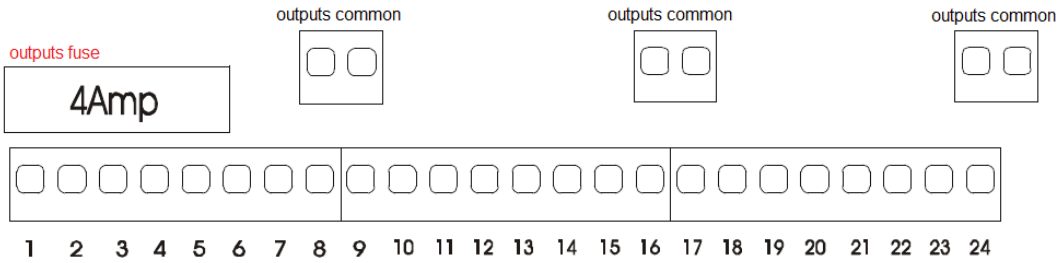
As an option is it possible to connect a solar panel with its regulator to keep the battery supplied greater increasing the autonomy. The autonomy of the same or the characteristics of the necessary load of the solar panel will come given by the number of application of the solenoid per day and their consumption, rather than by the controller's consumption.

Note: The 12Vdc programmers, for obvious reasons of energy saving, do not have an illuminated screen.

The duration or the autonomy of a battery is largely determined by the temperature and humidity conditions to which it is subjected. In inactive periods, it is recommended to remove the battery and keep it charged in a protected and dry place

4. OUTPUTS CONNECTIONS

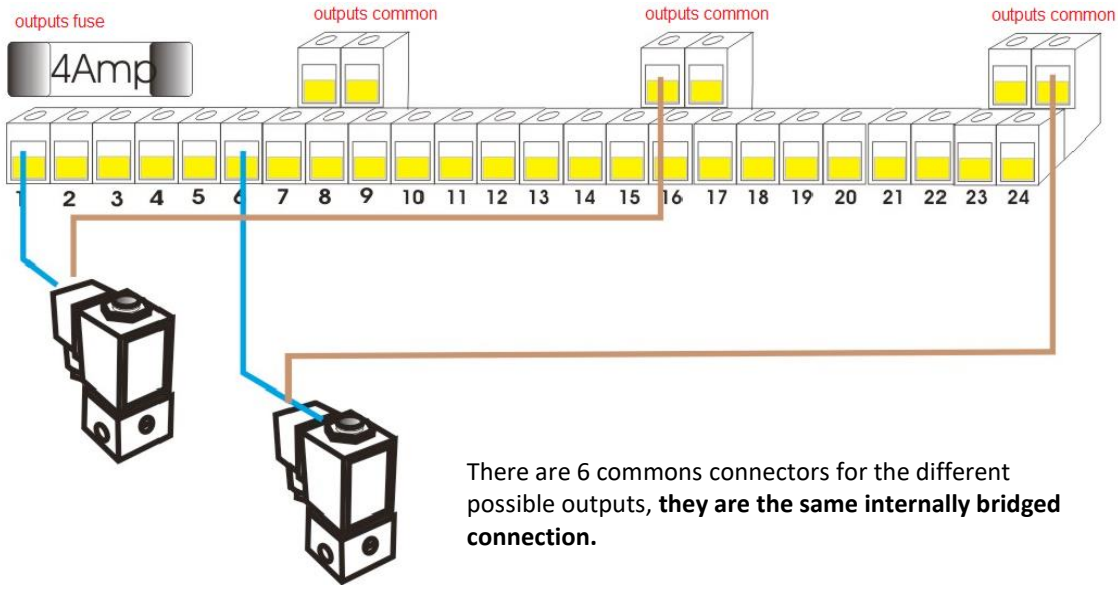
4.1. VALVES



The connection of the irrigation valves is carried out through solenoids, which if they do not have excessive consumption, can be directly connected to the Commander EVO.

The absorption of the internal transformer equal to 110VA - 4.17 A must also be taken into account (for electric power models) when dimensioning and also to determine the maximum consumption, which depends on the number of solenoids and relays operating simultaneously in the most unfavorable case.

Connect the solenoids of the irrigation valves according to the scheme:



There are 6 commons connectors for the different possible outputs, **they are the same internally bridged connection.**

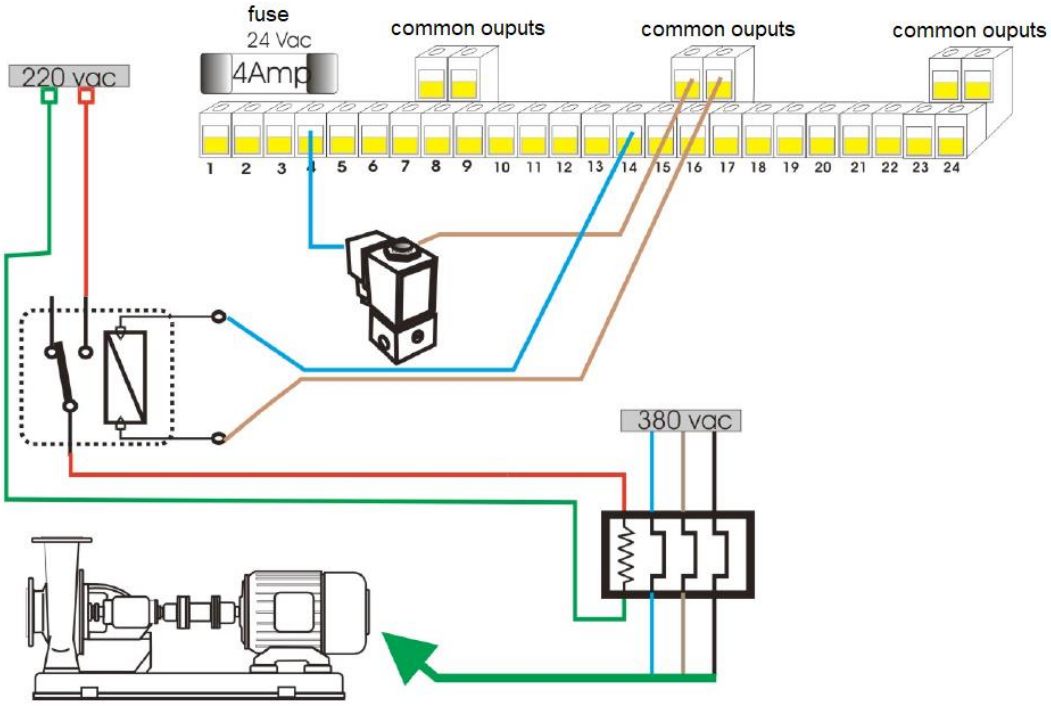
In the event that many cables to connect to these commons, it is advisable to install an external terminal strip joining several cables to reach the controller with the appropriate size's one in order to make the connection appropriately.

If excessive consumption measured in any of the outputs, derived from solenoids absorption or because of a simultaneous connection of several solenoids, it is convenient to install external relays powered from another source or transformer.

As a precautionary measure, especially in controllers that are going to perform many daily operations, it is convenient to consider installing these relays to extend the life of the programmer.
Besides, the installation of an external relay has the advantages of greater galvanic separation between the solenoid and the programmer, and the ability to quickly change or replace the relay in case of fault.

4.2. PUMPS

Along with the Commander controller, in addition to the field valves, there will be other electrical devices such as water pumps, agitators, fertilization pumps, etc ...
These elements are based on electric motors, so their installation and control follow common guidelines.

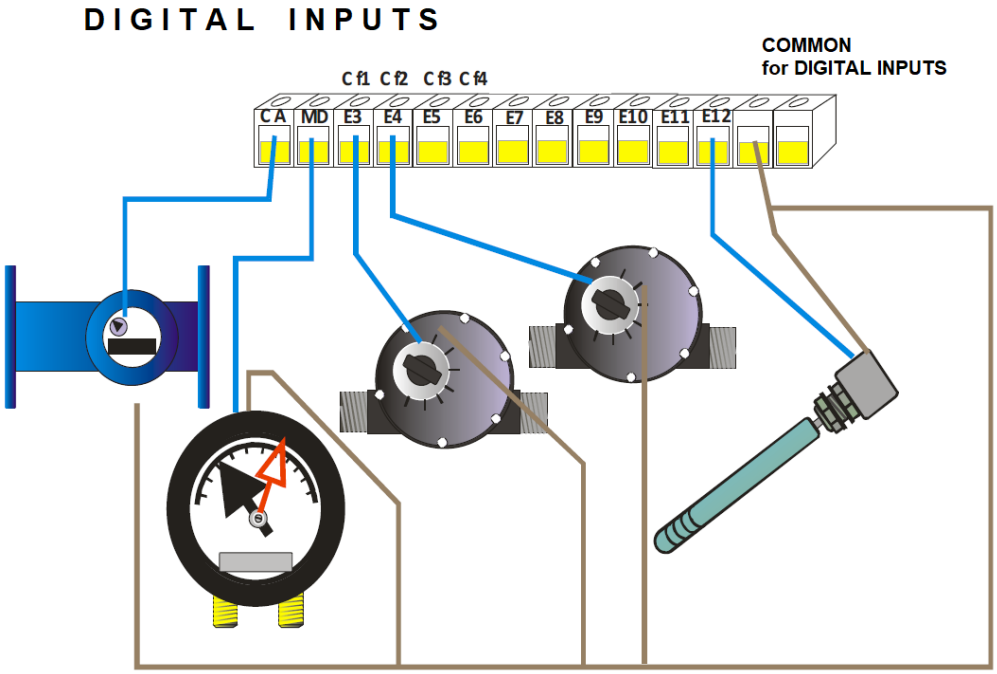


This scheme is valid for the automation of water pump motors, as well as for agitators and electric fertilizer injection pumps.

5. INPUTS CONNECTIONS

5.1. Digital Input

The Commander EVO controller is equipped with several dry contact type (0 voltage) inputs.
In other words, the controller recognizes when a short circuit occurs between the common inputs and the corresponding input.



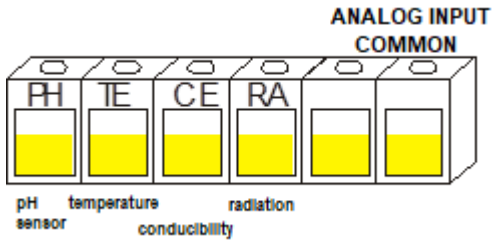
Inputs CA, MD are fixed and dedicated to water counter and pressure differential digital sensors. In the presence of fertilizer counters, they must be connected starting from the input E3 sequentially, as showed in the below table.

LABEL	DESCRIPTION
CA	Water counter
MD	Pressure differential
E3 – FERT1	Aux digital input 3 / Fertilizer counter 1
E4 – FERT2	Aux digital input 4 / Fertilizer counter 2
E5 – FERT3	Aux digital input 5 / Fertilizer counter 3
E6 – FERT4	Aux digital input 6 / Fertilizer counter 4
E7 to E12	Aux digital inputs 7 to 10

5.2. Analog Input

Some Commander Evo models can read one or more analog inputs.
The controller handles these sensors, displaying the variable value within the right range, and react to it according to user-preset programming.

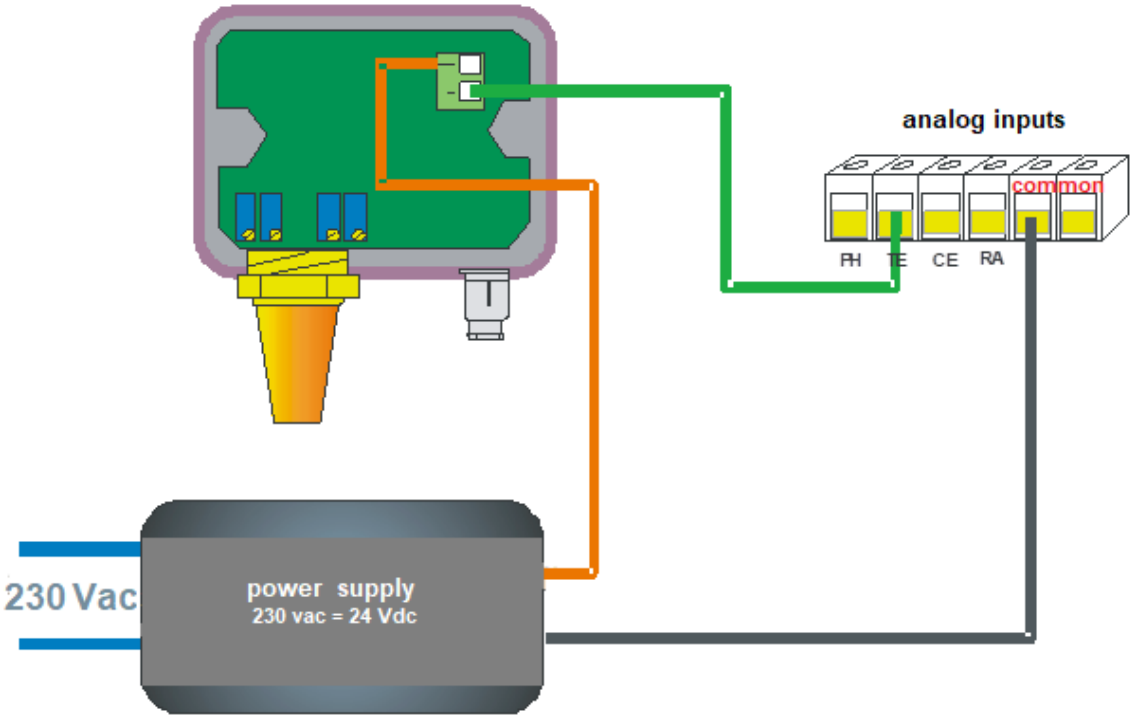
Nota:
Commander Evo controllers handle and accept signals from analog sensors whose range is from 0 to 5 VDC (the common one is the negative inputs).
In case of probes with 0-20mA output, please contact and consult the Irritec technical department.



5.2.1. Temperature (analog sensor)

This probe can read the value of the temperature from an internal sensor (i.e. greenhouse or nursery application) or external (i.e. frost, cooling application)

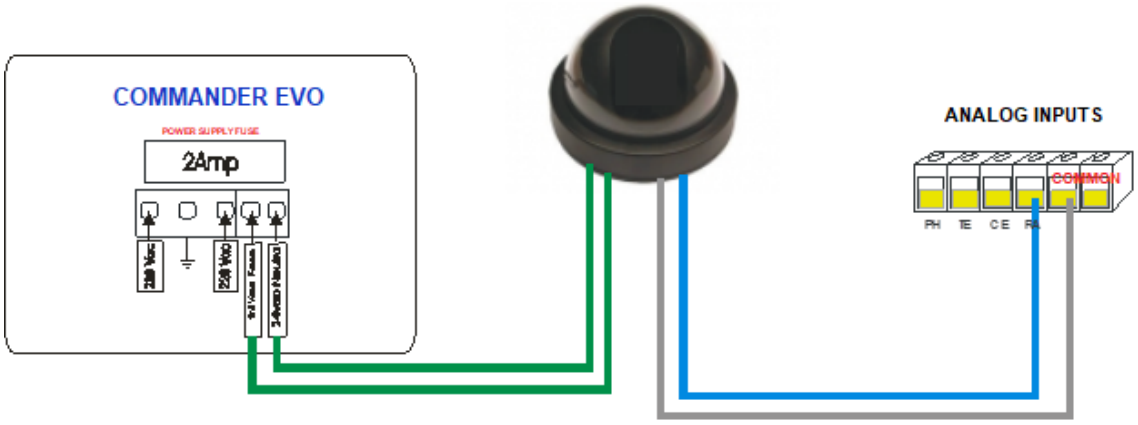
Connection:



Range	**-5 | + 50ºC**
IP Code	**IP65**
Accuracy	**0,5ºC**
Output Signal	**4/20 mA**

5.2.2. Radiation Sensor

Using the Irritec solar radiation probe, the Commander Evo controller can display the instantaneous radiation and handling the accumulated value affecting the programs according to the preset definition.

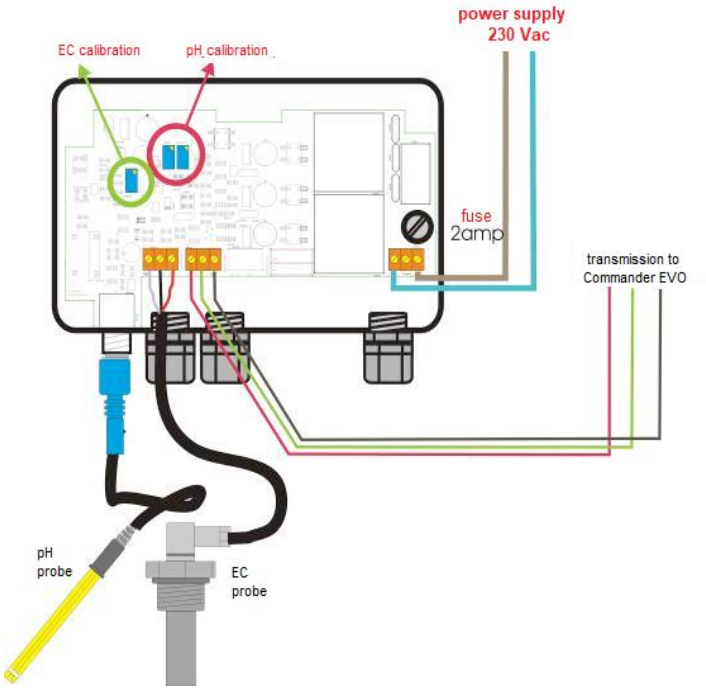


Range	**0 – 1275 W/h**
Accuracy	**10 W / h**
Output Signal	**0 / 5 Vdc**

5.2.3. EC (conductivity) and pH probes

The Commander EVO controller is able to display real-time values and handle the fertigation program by a target. EC and pH Inputs will be connected through an external transmitter.
Please refer to the specific product documentation before any activity on the unit or probes.

Install the transmitter and the controller units as close as possible to the probes to avoid any sort of interferences. Wiring to the COMMANDER EVO programmer using a shielded cable which positioned away from the power channels or other electromagnetic devices such as pumps or frequency inverter panel.



pH PROBE	**MODEL EPHS**
Range	**0-14 pH**
Temp.	**0-70 °C**
Pression	**0-7 bar**
Cover/Body	**Epoxy ø12**

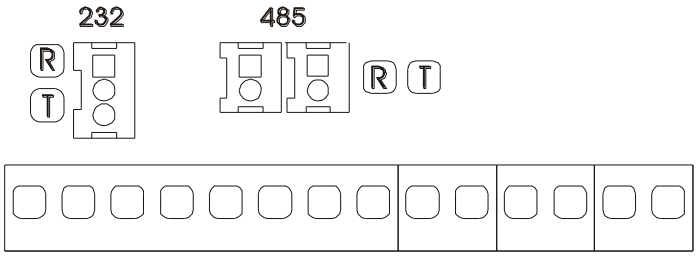
EC PROBE	**MODEL ECDC**
Range	**10-2000 µS**
Temp.	**0-80 °C**
Pression	**0-7 bar**
Cover/Body	**PVDF ¾"M**
Constant	**K=1**
Electrode	**graphite**

6. COMMUNICATION MODULES CONNECTION

The Commander EVO controller can communicate with other devices or external modules and it is equipped with 2 types of connectors located immediately above the terminal strip of the digital inputs. Two light indicators will inform if the programmer is sending or receiving information.

The connectors can be easily identified and are classified :

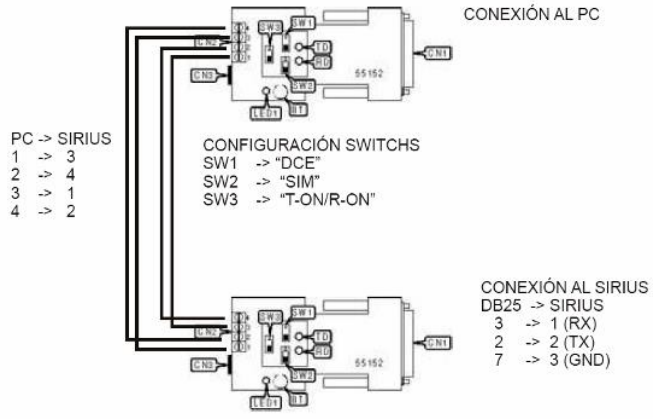
1 x Conector RS232: communication port used to connect external modem (Gprs), Wireless interface and PC direct connection
2 x Conectores RS485: communication ports used to connect external module (outputs extension) and the Radio ICT interface.



6.1. RS-232

Through this connector, the Commander EVO controller may be accessible to communicate through a modem remotely with a PC or through the Internet.
There are many modems available in the market. Irritec Spa has tested and approved its distributed ones. For further information contact the Irritec technical staff or representative.

RS232 connections are designed to link devices that are very close to each other. The distance between the devices never exceeds 30mts distance in between and connections must be made using a shielded cable. For distances greater than 30mt, it is recommended to install an RS232-RS485 converter.
This particular equipment allows the communication up to 2Km.



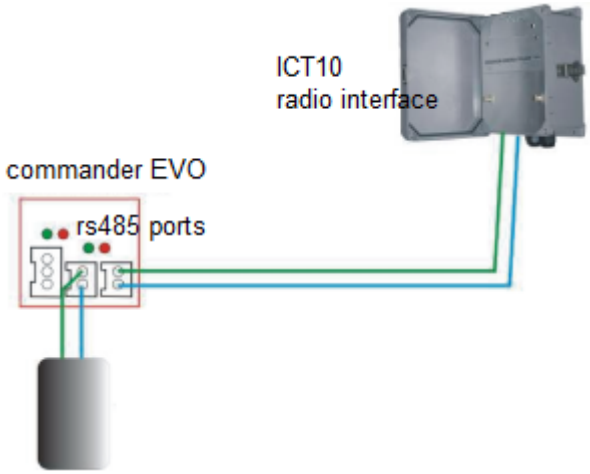
This drawing is an example of how connecting a rs232/rs485 converter and it isn't represent a standard reference.
Always refer to the manufacturer technical manual of the converter purchased.

Note for modems connection
Commander EVO controller can be handled remotely by internet using Gprs or Wifi Modem.
For the correct operating of the GPRS MODEM, the PIN request must be deactivated in the Sim card and the mobile operator settings (APN and security parameters) configured and registered into the modem device itself.For

Wifi connection the local network must be properly configured to permit the communication between the Web server and the controller, SSID and security parameters should be typed and registered into the wifi modem interface.

6.2. RS-485 for Radio Interface connection (ICT10)

Commander Evo controller allows to handle and control of the ICT radio transmitter making it possible to operate hydraulic valves (opening or closing operation) over a long distance (see ICT specifications), without any sort of wiring and electrical cable, directly by radio.
This option allows the controller to add and extend the control of up to 96 more valves/outputs in the system.



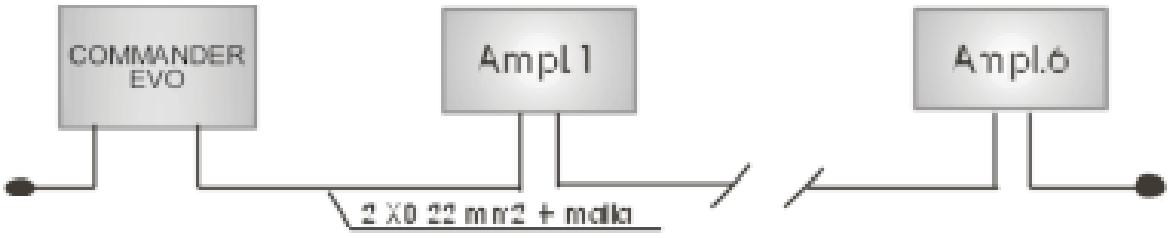
Note: *The distance between devices must be as short as possible, the cable connecting them must be free from the influence of other devices that could generate electromagnetic interferences (power cables, motors, etc. ...)*

6.3. RS-485 for Outputs extension module connection

Commander Evo controllers can be expanded to with external module and handle up to 96 more outlets/valves.

These modules are physical expansion, with 16 or 24 outputs each, and are directly connected to the controller by the Rs 485 port. The system can be added up to 6 modules connected as in the diagram.

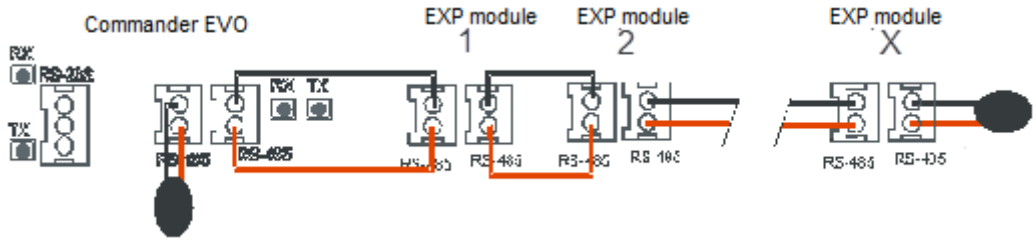
Connection diagram:



There are two types of expansion depending on the power supply, 12Vdc or 24Vac. **It is very important not to reverse the polarity when connecting.**

Communication between the Commander EVO controller and the expansion module is carried out as shown in the following diagram:

If it is required to connect more valves/outputs is possible to install several extension modules (up to 6). The installation process would be analogous to the previous one. The following extensions would simply be connected after the first one as represented in the below diagram:



6.3.1. Configuration and commissioning

Before powering the expansion module, you must configure which valve groups will be governed by the expansion. First, bridge the corresponding entrance to the expansion.

E1	E2	E3	E4	E5	E6
101 - 116	117 - 132	133 - 148	149 - 164	165 - 180	181 - 196

1. Select the valves range that will be managed by the expansion module by bridging the corresponding input

2. Once selected, connect the expansion module to the Commander EVO controller using the communication cable provided.

3. get power to the module.

4. Once connected and powered, the expansion module can be recognized and the outputs connected programmed in the Commander Evo controller.

5. Outputs|valved connected will be finally able to be operated for any purpose as normal in Commander EVO (refer to BLOCKS and PROGRAM menu in the Commander Evo user manual).

7. START and TEST

The Commander EVO controller has some advanced menu to check the configuration, set up the controller, and test the equipment.

One of these screens allows testing the electrical connections and, at the same time, test the connected devices.

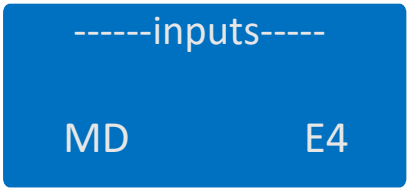
7.1. Outputs test procedure and manual activation

From the main menu of the Commander EVO press the key ✓ immediately the manual activation menu will be loaded.
From this menu is possible to activate the specific outputs, program, filter cleaning, etc. just typing the corresponding number :

When an output is manually operated it means that it is electrically activated.
Once manually activated can only be disconnected performing the manual STOP from the controller (see deactivations procedure in the Commander EVO user manual).

7.2. Inputs test procedure and reading values

From the main menu of the Commander EVO press the key immediately the inputs status screen will be loaded and the active inputs displayed on the bottom line.



Digital inputs are voltage free, their detection should only by the closing contact when the device condition respected (i.e. water meter will be displayed only when the magnet will pass at the measure point closing the contact between the two wires)

NOTES