Mentioned below are the considerations to be taken into account during the installation of the conductive level sensors with respect to the tank, the wires of the electrodes, etc.

The conductive level control system is based on measuring the electrical resistance of the medium to be controlled. The electrodes in contact with the medium collects this information to close the electrical circuit between the different electrodes and transmitt it to the relay that will act according to their operating mode.

The correct functioning of the whole is based on various factors that may be related to each other:

- The type of the tank
- The resistivity/conductivity of the medium to be controlled
- The location of the electrodes in the tank
- The type of the cable and its length
- The installation of the cable from the sensor up to the relay
- The electromagnetic interference that could be radiated by outside elements

The main features to consider before proceeding with the installation of a set of conductive sensor and relay level are:

- The location of the electrodes, especially the common electrode (also said *reference* electrode)
- The distace between the sensor and the level relay
- The type of the cable
- The proximity of sources of electromagnetic interference

It is understood that before the installation starts, the sensor type is properly selected according to the mechanical characteristics and process connection to the tank. Likewise, the relay must comply with the required level control function.

Common electrode or *reference* electrode

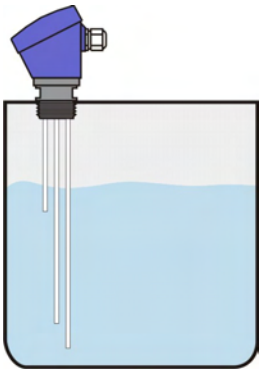
Is a key element in the installation because the reading of the resistivity of the medium is always taken between it and the rest of the electrodes.

The common electrode should always be wetted so it must be installed on the tank bottom or just below the electrode which controls the lower point (minimum level or alarm for minimum level).

The site is ideally located as close as possible to the other electrodes. The greater the distance between the common electrode and the rest, worse behavior may be set because

- The measured resistivity will be greater and may be far from the measuring range of the relay. It exists different relays according to different resistivity ranges.
- The sensitivity to the electromagnetic interference will be greater and they could provoke unexpected effects in the level relay.

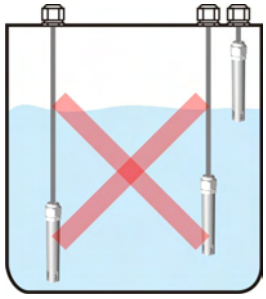
When the tank is metallic, it can be used as common electrode since the medium will always be in contact therewith. It is advisable that the remaining electrodes are to be located as close as possible to the tank walls to prevent the aforesaid problems.



Correct installation:

The electrodes remain close among them.

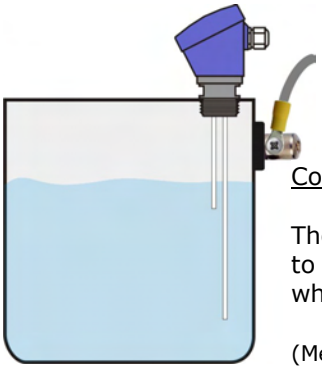
(Any type of tank)



Installation not recommended:

The electrodes remain away from the common electrode.

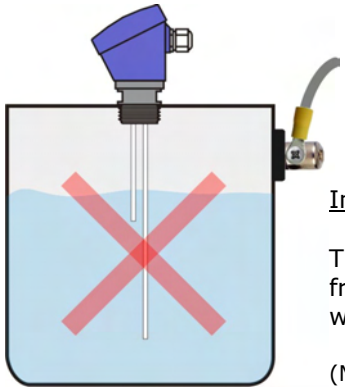
(Any type of tank)



Correct installation:

The electrodes remain near to the common electrode, which is the tank wall.

(Metallic tank)



Installation not recommended:

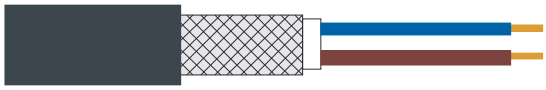
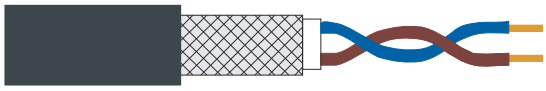
The electrodes remain away from the common electrode, which is the tank wall.

(Metallic tank)

Cables

Depending on the installation conditions, the cables can be decisive for the proper functioning of the whole.

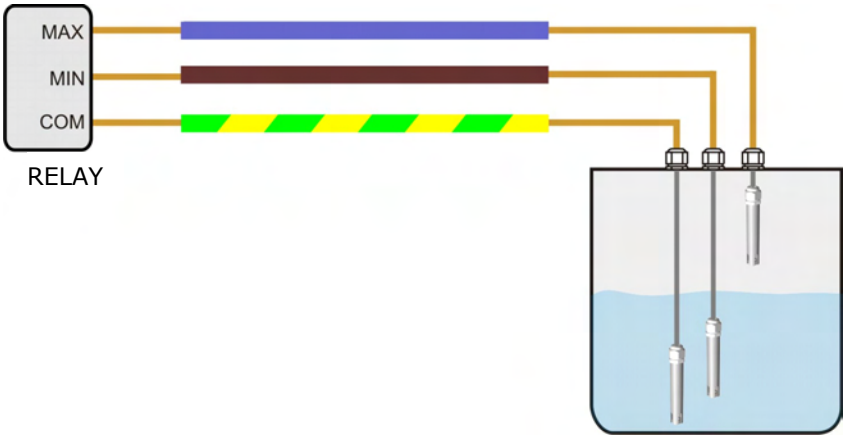
The following lists the recommended cable types. It is not essential to always use the best features cable but must conform to the conditions of distance, pumping elements, electromagnetic interference, etc.. that may exist in the installation.

STANDARD CABLE  Section: 1..2,5 mm²	To be used when there are no special conditions at the installation. It offers no immunity against electromagnetic interference. Each one of the cables is connected to the corresponding electrode.
SHIELDED CABLE  Section: 1..1,5 mm²	It offers a moderate immunity against electromagnetic interference. Each one of the cables is connected to the corresponding electrode. The shield is connected to the electrical ground at one of the sides, with preference to the relay side. If the electrical ground is not trusted, best not to connect the shield.
SHIELDED TWISTED PAIR  Section: 0,52 mm²	It offers greater immunity against electromagnetic interference. One of the cables of each pair is connected to the common electrode. The shield is connected to the electrical ground at one of the sides, with preference to the relay side. If the electrical ground is not trusted, best not to connect the shield.

The recommended cable section depends on the type thereof, as indicated in the table above. As much longer is the cable, greater must be the cable section.

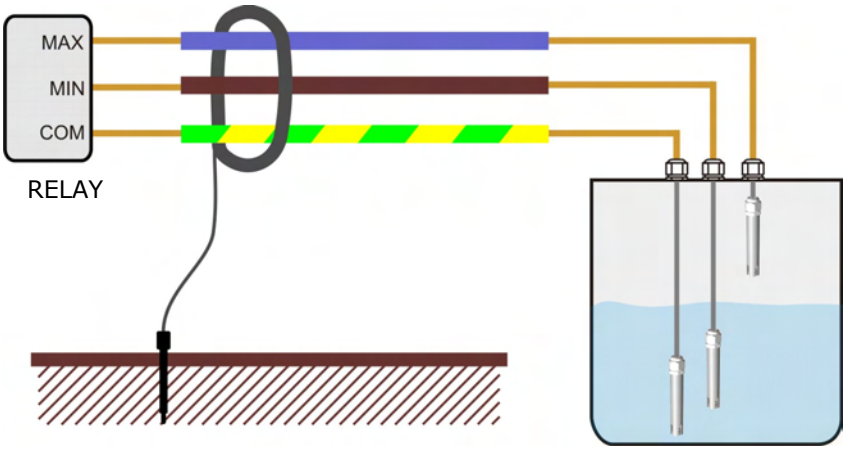
It is highly advisable that the probes cable does not flow in parallel with other cables of power or inductive control (solenoid valves, motors, etc..). In case they have to be installed in parallel, it is recommended that the distance between them be the maximum possible. There is no inconvenience that the probes cable intersects with the power cables.

The maximum distance between the probes and the relay is always based on the factors mentioned so far, so you would have them in mind when planning your installation. Could exceed the 1000 meters with optimal performance or may not work closer than 3 meters.



Installation with standard cable:

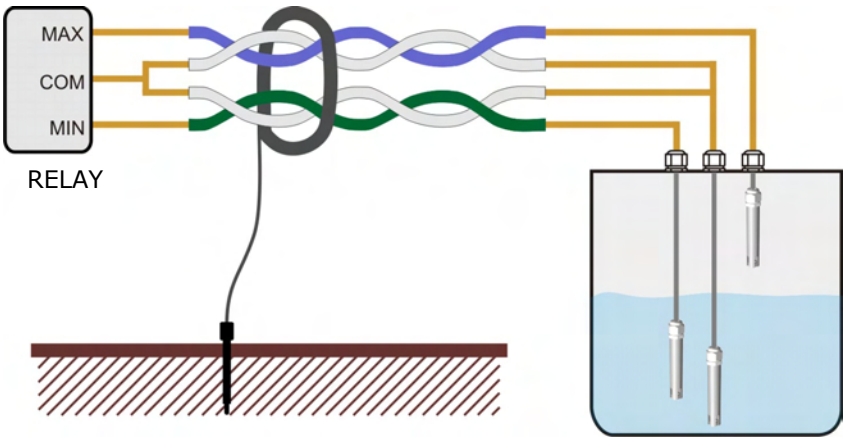
Each wire is connected to the corresponding electrode.



Installation with shielded cable:

Each wire is connected to the corresponding electrode.

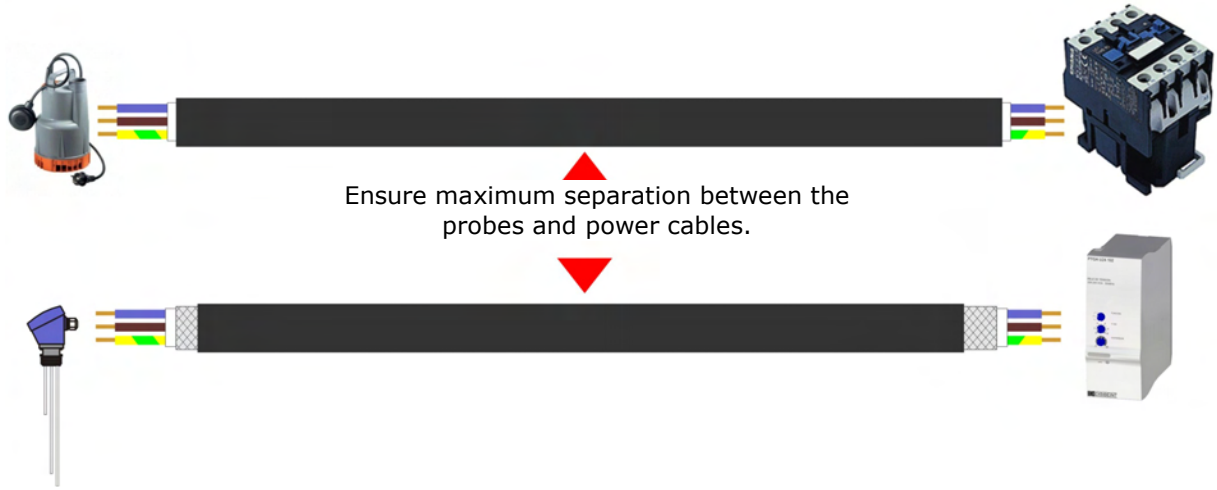
The shield is connected to the electrical ground, with preference at the relay side.



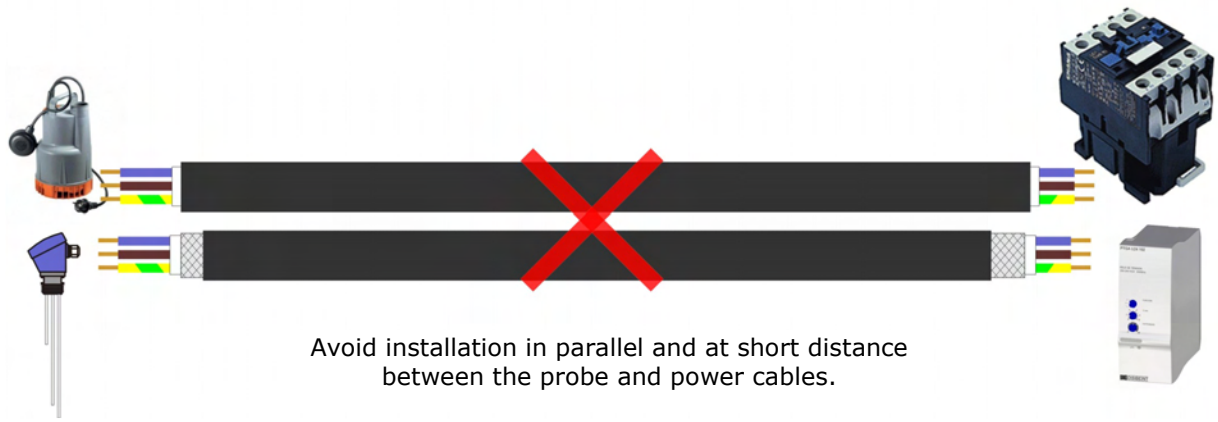
Installation with shielded twisted pair:

Each pair uses one of the wires to connect with the common electrode.

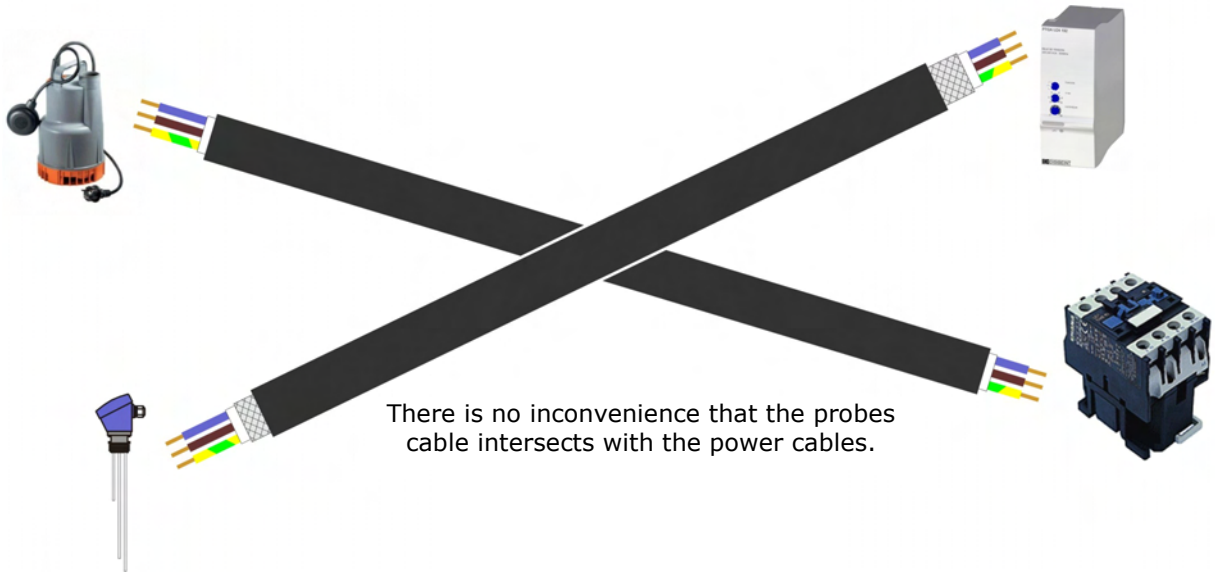
The shield is connected to the electrical ground, with preference at the relay side.



Ensure maximum separation between the probes and power cables.



Avoid installation in parallel and at short distance between the probe and power cables.



There is no inconvenience that the probes cable intersects with the power cables.