

TAF – 8

(TOSCANO ALTA FRECUENCIA)

toscano Línea Electrónica, S.L.

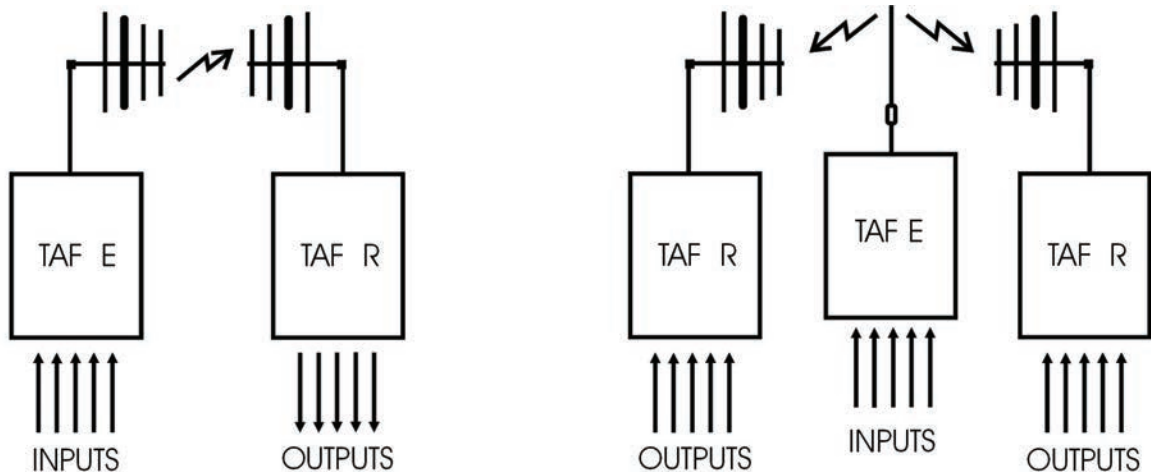
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INTRODUCTION

The Toscano TAF System (Toscano Alta Frecuencia) allows the radio way distance transmission, of the open/closed electrical contacts coming from any type of detector (float switches, limit switches, valves positioning, start/stop orders, etc). The Toscano TAF System is suitable for all the applications where the use of cables is difficult, expensive or impossible.

A basic TAF system includes one unit of TAF-5 E (transmitter), one unit of TAF-5 R (receiver) and both antennas.

The Toscano TAF System is a completely professional system which joins a great functional fiability, installation simplicity and nearly no technical maintenance. Besides the manufacturing with high quality components, the design is the result of a long years experience of Linea Electronica in this field. A special digital date transmission system makes the TAF unit noise immune; the high selective, as well as stable and sensible, radiofrequency circuits, permits to reach the maximum range without producing any interferences to other systems; strong protection circuits, (on inputs, outputs, power supplies, etc.) protect the equipments against discharges.



POINT TO POINT TRANSMISSION

MULTIPOINT TRANSMISSION

BATTERY POWER

TOSCANO, knowing the existing problems in many installations without power supply on the transmitter (frequent case in drinking water tanks), and being aware of the high costs and fiability problems of the traditional alternative power supplies, like fotovoltaic solar panels and rechargeable batteries, has developed the TAF-8E low consumption battery powered unit.

This unit keeps all the features (range, power, etc.) from the unit powered with 230V. Besides this, the receiver TAF-8R includes a low battery indicator in receiver unit with 1 month advance before run out.

- The battery power supply module includes a fiber glass PCB, 8 high quality battery holders and the connector. With the right placed new batteries, you should get aproximate 12V., and the transmitter will have enough power for a normal function over 1 year in most applications.
- Use only 1.5 V. alkaline batteries (size LR-20). Do not mix used batteries with new ones and also do not use long stocked batteries.
- It is recommended to replace the batteries after one year, even if you did not receive any low battery alarm.
- Please pay attention to the right polarity when placing the batteries.

INSTALLATION

The installation and operation of the Toscano TAF System is simple but you should follow some caution and security norms, which are detailed below.

Please remember:

“A good installation avoids most of the possible problems and failures which could appear at the operate period or during the normal running time.”

Equipment installation:

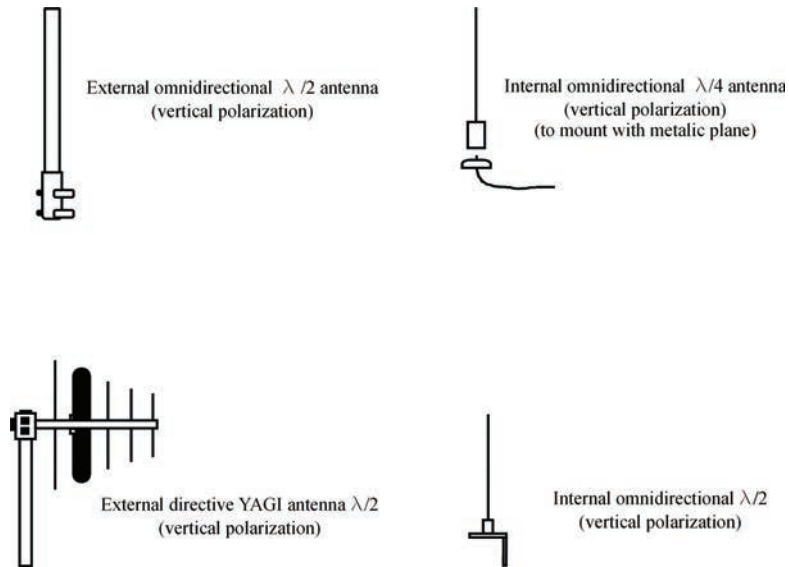
- Protect the equipments against rain and direct sun contact. To ensure a good watertightness and to avoid humidity, dust and insects inside, the equipments should work with the tops screwed. Also seal the cable inputs using the correct cable diameter fixing the cable glands properly.
- Do not put the unit under vibrations during the installation.
- Take care of supply polarity in 12 V. powered units. A connection with inverted polarity could damage them. Check also batteries polarity in battery powered units.
- Do not switch on the transmitter without the antenna connected. This will damage the unit.

Antenna installation:

It is very important to install and connect the antennas in the right way. Use, when possible outside mounting directive antennas. They produce higher signal levels.

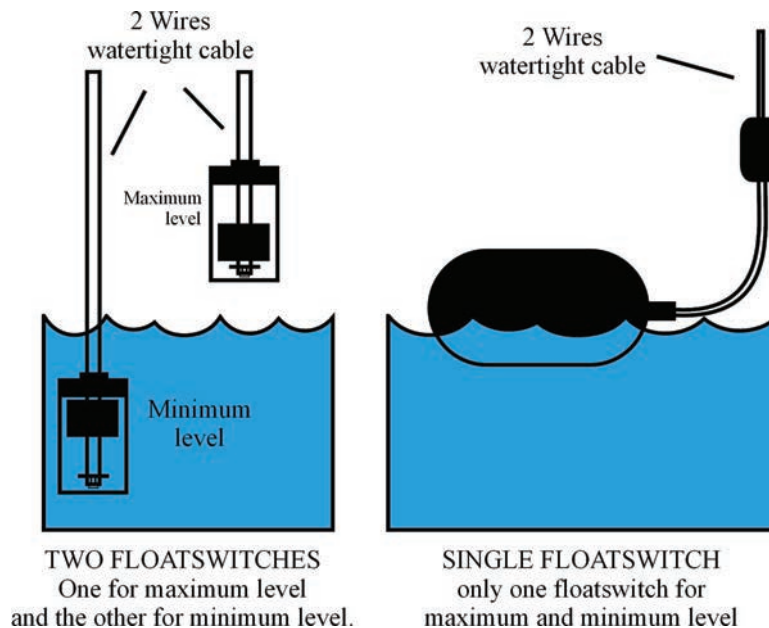
Please pay attention to the following general norms:

- The antenna should be installed far away from any wall, roof, tree, electrical net, etc. If it is not possible, you should keep a minimum distance of 5 times the length of the antenna's active elements.
- Pay attention to avoid buildings or obstacles in the receiver's direction. If this is not possible, increase the installation height.
- If metallic wind guys are used, they have to be placed under the antenna at a minimum distance of 2 times the total antenna's length. (only for directive antennas)
- The antenna's height is also very important. For outside mounting antennas, it is recommended to install it on a pole with a length of minimum 4 times the length of the active element. If there are near obstacles (buildings, trees, etc.), increase the pole height. If metallic wind guys are used, they have to be placed under the antenna at a minimum distance of 3 times the antenna's active element.(only for YAGI type antennas)
- The antenna cable should have an impedance of 50 Ohms. and should be as short as possible to avoid signal attenuations.
- Recommended cable types depending on the band and the installation length:
 - * **RG58:** VHF (max.10m.); UHF (not recommended)
 - * **RG213:** VHF (max.40m.); UHF (max. 25m.)
 - * **CELLLFLEX:** VHF (max.100m.); UHF (max. 60m.)
- The cable connections must be done always with the appropriate connectors. The radiofrecuency connections do not need only a “good contact”, they also have to keep the impedance. Bad connections, produce high transmission and reception losses. Avoid cable folds.
- When there is only one receiver, use directive YAGI type antennas, in horizontal position and faced together (transmitter with receiver)
- If there are more than one receiver, use a omnidirectional antenna for the transmitter and Yagi type for the receivers. The Yagi type antennas should to be installed in horizontal or vertical position depending on the polarity of the omnidirectional transmitter antenna. The receiver Yagi antennas have to be faced to the transmitter.
- The TAF units have an antenna connection on the bottom for SO-239 connector. The cable should has a PL-259 connector.

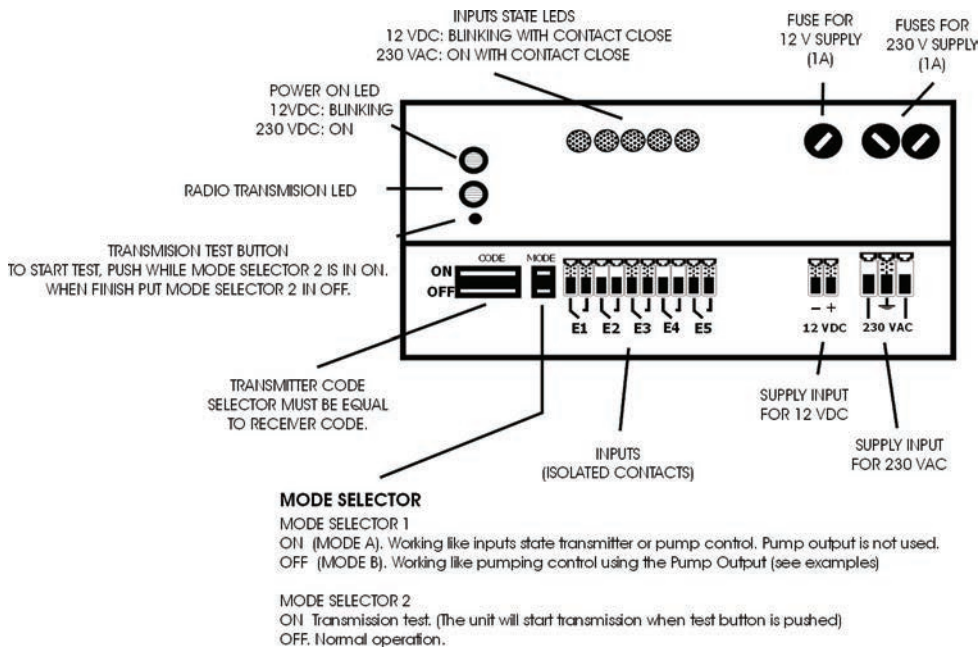


Installation of floatswitches in tanks for max./min. level:

- The max. level floatswitch should be installed to work before the tank overflows.
- Each floatswitch will be fixed, hanging from his cable, at the tank wall inside with a bracket to avoid the friction with the wall. They also have to be placed away from other floatswitches avoiding any possible contact to not disturb the floating movement.
- The bracket has to be stainless steel as well as humidity and chlor damp resistant. It also should permit the floatswitch height regulation and should never can drill or perforate the cable.
- To make the connection between the floatswitch and the unit, you should use a proper cable, resistant to humidity and chlor damp.
- If it is necessary to connect the cable due to distance problems, this should be done inside a connection box and using the correct terminal connection block. It is better to place the connection box outside the tank and using a pipe for the floatswitch cable connection. The pipe connection to the box should be sealed with silicone to avoid that the existing water damp in the tank condens inside the box. A little hole at the connection box bottom is a good drain solution.



TRANSMITTER TAF-8E



INPUTS 1, 2, 3, 4 and 5

- These are the inputs to transmit. The state of these inputs are sent to the outputs of the receiver. They are activated by contact. The maximum input length is 100 meters. The cables should not be installed near the power supply cables. If necessary, use screened cables with the mesh connected only at the right block of each input.

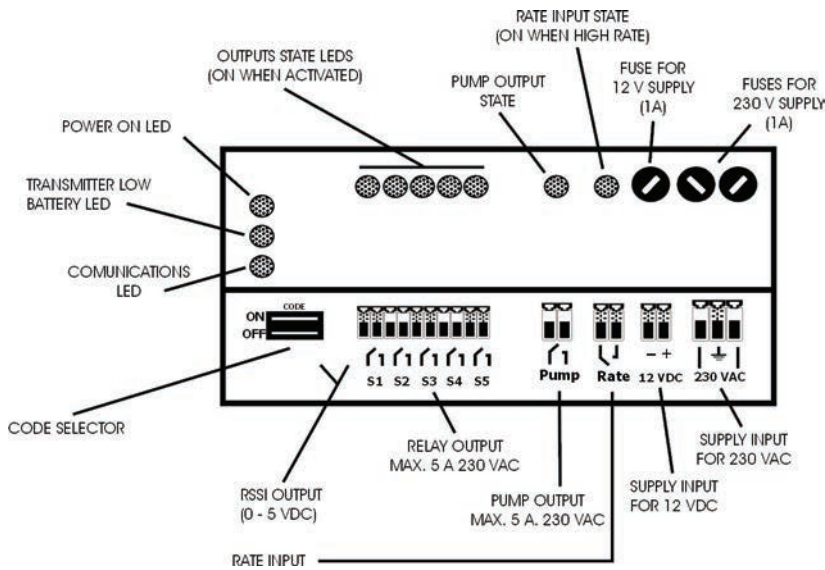
- Do never apply external voltage to the inputs. The TAF-8E supplies voltage to the external contact by himself in order to detect the order (open/closed).

- The external input contacts must be silver-plated or golden, due to the low voltage which the TAF-8E unit makes run through them. It is not recommended to use contacts with alloys for high voltages, because the resistance increase in the course of time.

INPUT 12 VDC

- This input is for use 12 VDC power supply. You can use an incorporated battery module or an external source. If an external source is chosen, the cables have to be marked to assure the right polarity. The cable section should be 1,5 mm. minimum with 2 meters max. length.

RECEIVER TAF-8R



OUTPUTS S1, S2, S3, S4 and S5

- The outputs state are according with the state of the inputs of the transmitter.

PUMP OUTPUT (only in “B” mode)

- It is the pump control output. Closed contact indicates pump running.

RATE INPUT (only in “B” mode)

- Contact input which indicates the current electrical rate. Open contact indicates low cost rate and the PUMP output depends on the inputs 1 and 2 of the transmitter. Closed contact indicates high rate and the PUMP output depends on the inputs 3 and 4 of the transmitter.

POWER SUPPLY LED

- Always lightning with 230 V. or 12 V. power.

TRANSMITTER LOW BATTERY LED

- In normal conditions it should be off. If the transmitter is battery powered and the voltage is low, the led will blink indicating that the battery must be changed. We recommend to check this Led every two weeks.

COMUNICATIONS LED

- Normaly switched off. It gives a flash each time when dates of the transmitter are received. In case of not receiving information (after a moderate time period), the led will blink in alarm mode. During the no date reception period all the leds remain with the contacts open.

SPECIAL CASE: immediately after giving power to the receiver, the led will blink, but it does not mean any communication alarm. The led will stop blinking as soon as it begins to receive dates from the transmitter.

RSSI OUTPUT

- Analogic output from 0 to 5 VDC, with a proportional value to the radio signal level received from the transmitter (see part COMUNICATION TEST). This signal inform us about the radio link quality (antenna direction, etc.) For the measuring, activate the TRANSMISSION TEST mode on the transmitter. Use a multimeter (tester) in the scale 5 VDC.

CODE ASSIGNING

- The possibility of select codes and directions to the equipments, allows that different units, independent and closed to each other, could use the same frequency without interferences. Each receiver only accepts signals from the transmitter with his same code.
- Each transmitter can use one of the 256 possible codes. These 256 codes are the possible combinations which can be made with the 8 code micro-switches of each unit. The receiver code micro switches should be placed exactly in the same way as the corresponding transmitter.
- If it is possible that another TAF unit could be operating with the same frequency and the same code, it is recommended to make a COLISION TEST to avoid interferences. (see COLISION TEST part)

FUNCTIONS

The Toscano TAF System can work with 2 function modes. Mode A and Mode B. The chosen mode is selected only in the transmitter TAF-8E unit:

Mode “A”: For general applications and for tank filling control with MAX-MIN float switch

With this mode, the order each receiver output (1 to 5) is the same as the corresponding transmitter input (1 to 5) (see examples).

Mode “B”: For tank filling control with independent MAX-MIN float switches or in double rate control

With this mode the receiver supplies, in addition, a direct output (PUMP) for the pump control (see examples).

Do not choose this mode for different applications as the specified ones.

COMUNICATION TEST

To verify the radio link quality between the TAF transmitter and the corresponding receiver, there is the TRANSMISION TEST in the transmitter unit and the RSSI FUNCTION in the receiver.

For activating the TRANSMISION TEST, place the microswitch 2 of MODE to position ON and push TX TEST during some seconds. After dropping the TX TEST the TRANSMISION TEST remains switched on. This produces the direct emission of a moduled radio signal.

During this emission, we can measure at the receiver with a multimeter (tester) in the scale of 5 VDC the received radio signal level. The higher is the value of the received signal, the better will be the radio link quality.

During the test it is possible to adjust the orientation of the antennas in order to get the maximum signal.

RSSI (VCC) value	LINK QUALITY	NOTES
More than 4,5	Excellent	
Between 3 and 4,5	Good	
Between 2 and 3	Medium	PROBLEM: There is comunication. Some sporadic interruptions. SOLUTION: Adjust the orientation of the antennas; increase the height; use antennas with higher gain.
Less than 2	Low	PROBLEM: There is no communication or there are frecuent interruptions. SOLUTION: Adjust the orientation of the antennas; increase the height; use antennas with higher gain. It could be necessary to install a radio relay.

With direct vision between the atennas and using directive YAGI elements, it is possible to reach high quality or good links up to 20 and 30 kms.

NOTES:

- The moduled radio signal will switch off after 50 seconds of the beginning. If necessary, you should activate it again by the TX TEST tact swich.
- AFTER ENDING THE TEST PLACE THE MICROSWICH 2 OF MODE TO THE OFF POSITION IN ORDER TO START THE NORMAL FUNCTION.
- If during the instalation you have done several transmission tests and the TAF transmitter unit is powered bty batteries, change the batteries because the tests should produce a significant discharge.

COLISION TEST

This test is for check that any other TAF-8E unit with the same frequency and the same code could disturb the system function. Do this test if you are not sure of this circumstance.

NOTE: This test has to be done with the TAF-8E unit switched off. (without power supply)

This test consists in checking during 15 min., after the TAF-8R unit is powered, that the NO RECEPTION ALARMA SIGNAL continues blinking. This will indicate that the unit are not receiving any information of another TAF-8E.

PUMPING CONTROL IN TANKS

The Toscano TAF System is also indicated for the pumping control of tank fillings.

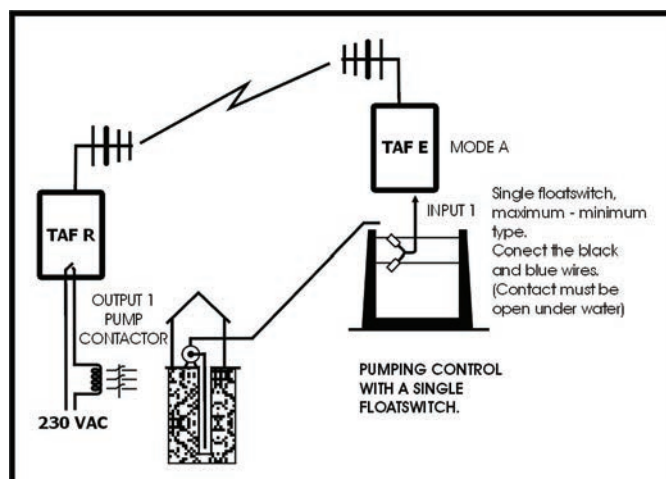
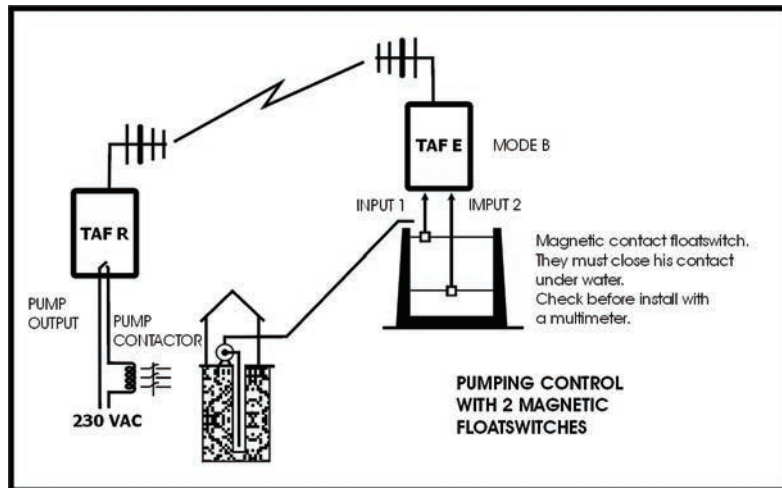
A transmitter TAF-8E, installed at the tank, transmit the on/off orders to the receiver TAF-8R which is installed at the pump station. The TAF-8E transmitters allows both, the using of only one float switch through contact with hysteresis (float type), as well as with two float switches, one for max. level and one for min. level (magnetic type).

In this second case, a specific functional mode makes possible that the receiver controls the pumps by only one relay output (PUMP)

With the Toscano TAF System it is also possible to do the pumping control function with doble rate energy saving. For this case, the receiver TAF-8R has an input for electrical rate.

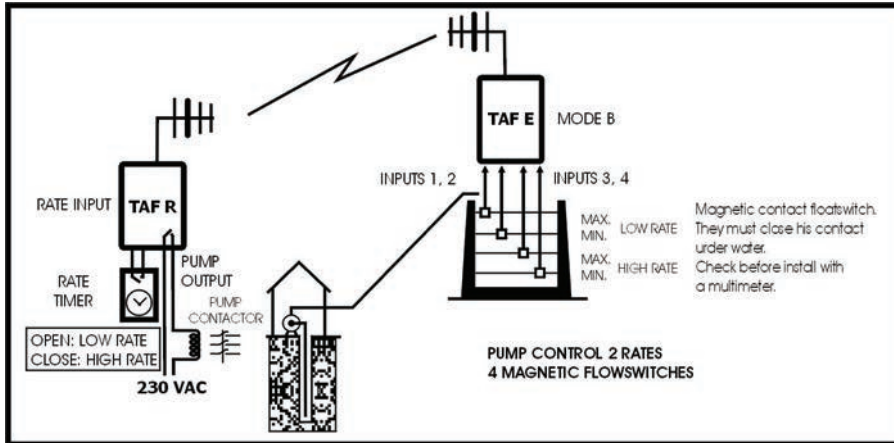
Depending on this input and two pairs of levels, (max. & min. in low rate and max. & min. in high rate) transmitter by the TAF-8E transmitter, the receiver TAF-8R makes the pumping control using only one relay output (PUMP).

EXAMPLES OF PUMPING CONTROL INSTALLATIONS

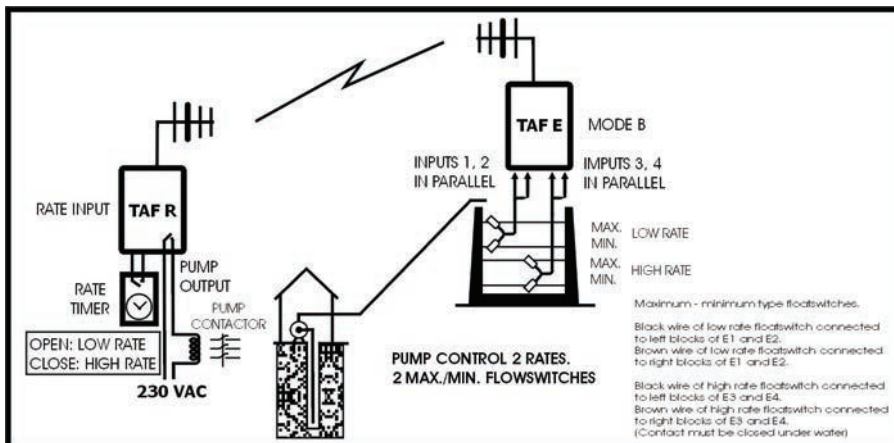


EXAMPLES OF PUMPING CONTROL INSTALLATIONS WITH DOUBLE RATE

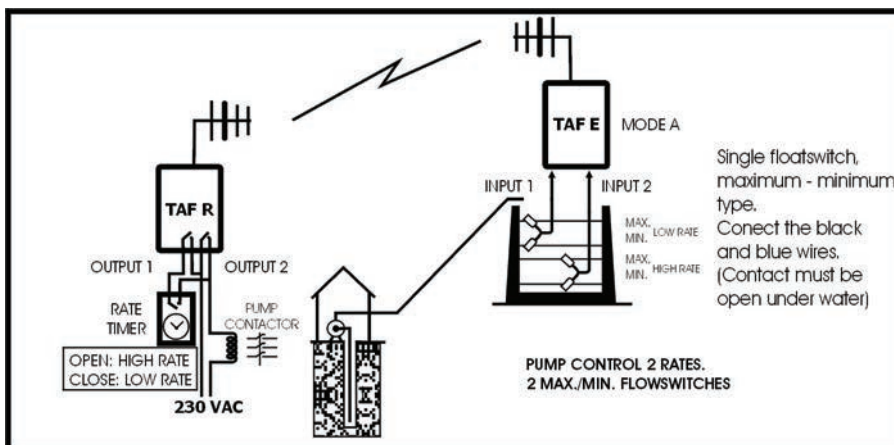
In this mode and during the low rate period, the question is to try to keep the tank between the max. and min. low rate level, during the high rate period, it will be pumping only when the tank level goes down under the min. high rate level, keeping the level between the high rate max. and min. With this method it will be pumped during the high rate period only when it is strictly necessary permitting a great electrical costs saving.



It is necessary to install, together with the TAF-8R, a timer switch with one contact, indicator of the rate in order, similar to the type installed in the electrical rate counters. The timer will be programmed in the same way as the electrical rate counters and the output will be connected to the rate input of the TAF-8R to be informed of the rate in order in each moment.



The TAF-8R unit, depending on the rate in order and on the signal received from the float switches, will control the pumping with the PUMP output.



Special case double rate with float switches type max.-min, without using rate input neither the pump output.

TECHNICAL FEATURES**GENERAL**

- Controlled by last generation microprocessors.
- High antiparasite and atmospheric discharge immunity. (protections included)
- Digital date transmission with RF modem included.
- Transmission failures detector and autocorrector. High reliability and safety date transmission.
- Up to 256 equipments placed near to each other working in the same RF channel, without disturbs, with the direction select (code)
- 2 & 5 channel versions.
- 3 power supply versions for transmitter and receiver:
 - * 12 VDC (10,5 – 15 V.)
 - * 230 VAC (-15%, + 10%)
 - * 230 VAC and 12 VDC for emergency
- TAF transmitter version with battery power supply
- Low transmitter battery indicator in receiver unit with 1 month advance before run out.
- Two function modes to select (by mini switches beside the inside connection block of the TAF-8E.)
- Incorporated: pumping control in normal function and in double rate for costs saving.
- Incorporated: input and output state indicator
- Incorporated: comuncation failure alarm
- Radio range: Depending on the orography and installation conditions. With 6 dB directive antennas and without any disturbing objects between transmitter and receiver, over 15 km (0,5 W) or 30 km. (2 W)
- Communication test for antenna orientation and radio link quality measurement (RSSI) incorporated.
- RF band: VHF or UHF.
- Antenna output by SO-239 connector.
- Homologated by the
- Mounted in watertight IP-65 polycarbonate box with transparent tape. Wall mounting.

TRANSMITTER TAF-8E

- Signal input by potential free contact. Conection max. distance: 100 m.
- Transmitter consumption: with 230 VAC less than 20 VA; battery version: 8 alkaline batteries, 1 year min.
- Dimensions and weight TAF transmitter: 335 x 230 x 88 mm. / 2,2 kg. approx.

RECEIVER TAF-8R

- Relay output: max. 5A. 230 VAC
- Receiver consumption: with 230 VAC less than 20 VA; with 12 VDC less than 200 mA.
- Dimensions and weight TAF receiver: 335 x 230 x 88 mm. / 2,5 kg. approx.