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INTRODUCTION

Thank you for purchasing this radio control. Before using it you are advised to read this instruction manual carefully. Each paragraph will give you all the information you need on how to carry out the individual operations correctly.

SERIES KIT CONSISTING OF:

- 1 (one) receiver
- 1 (one) TR6RFMC-NF series transmitter

INSTRUCTIONS FOR USE



CORRECT INSTALLATION

The receiver has an IP67 seal, and external installation is therefore possible. However, you are advised to install the unit in a sheltered position (bearing in mind that if you use the internal aerial the latter must not be shielded by any metal structures).

- Mount the aerial (where provided) on a metal base if possible, in a visible position well away from sources of electromagnetic disturbance (motorised circular flashers, etc.).
- Connect the other cables (output, reset, input, and, where provided, auxiliary and shutdown under way output).
- Bring the power supply to the unit directly from the BATTERY using:
 - a) a protection fuse of appropriate capacity (solenoid valve + auxiliary current);
 - b) cables of sufficient diameter for the load to be piloted.
- Connect the aerial cable terminal, where provided.

The output voltage of the selected function is the same as the receiver unit power supply voltage.

Strong radio-electrical disturbance can occasionally cause the red LED lamp to light up inappropriately. In these situations you can connect the filter, using the dip-switch provided for the purpose. Use of this filter gives greater reliability, even when several radio-control systems are operating within the range of the system in question, even if with a lower useful range.



RECEPTION WITH ACTIVE FILTER

NORMAL RECEPTION

RECEPTION MODE SELECTION

CHARACTERISTICS OF THE RECEIVER

The unit is fully integrated and is run by a micro-controller with a fully-shielded 433.920 MHz SUPERHETERODYNE FM/FSK receiver realized in SMT technology, on multi-layer printed circuit in compliance with the ETS 300 220 Europeans standards.

The receiver is fitted with:

Connectors of the fast-on type (an extractable terminal board is optional) for connection of the receiver;

A green Led indicator signalling:

Switching on with a continuous light: board in not operational, that is to say connected to the power with at least one acquired transmitter code.

Switching on with an intermittent light: the board is connected to the power but lacks transmitter recognition codes (the board is not operational because it needs at least one acquired transmitter).

A red LED lamp indicating:

Continuous Light: reception of signals recognized at a frequency of 433.92MHz.

Intermittent light: shut-down command sent from the transmitter.

Shut down

The unit has a radio-controlled shut down function (operated by the transmitter).

Upon request the system is supplied with an emergency shut down unit (see page16).

The shut down condition is signalled by intermittent flashing of the red LED lamp "E" and, where provided, by an external red LED lamp that shows a continuous light. In this condition the STOP output is activated.

With the system switched off, no output will be present.

Normal operation is restored through a RESET input (connect to negative pole for at least 200msec or use the special key, if provided).

TECHNICAL CHARACTERISTICS

433.920 MHz SUPERHETERODYNE FM/FSK receiver.

Reception sensitivity: -105 dBm with 25 KHz SWING

Pass band: 200 KHz.

Attenuation of out-of-band signals: 50 dB.

Power supply: 12 Vdc / 24 Vdc.

Power consumption: 30 mA when idle;

190 mA (24 Vdc) with function activated (without load).

Outputs: ON/OFF to 10 A - 24 Vdc (8A - 30 Vdc) relay.

Number of outputs: N + 1 auxiliary + 1 special positive output in emergency mode (with N= kit functions numbers 2 - 4 - 6).

Temperature working range: $-20 \degree C \div + 70 \degree C$.

ENGLISH CONNECTIONS



- 1. **STOP**: shutdown output (active when shutdown command is sent from the transmitter).
- 2. +Vcc: 12 24Vdc power supply (connect to battery <u>positive pole</u> through a fuse).
- 3. GND connect to the supply ground (possibly direct the battery negative pole.).
- 4. **FUN1** function output activated by the respective transmitter key 1.
- 5. **FUN2** function output activated by the respective transmitter key 2.
- 6. **FUN3** function output activated by the respective transmitter key 3.
- 7. **FUN4** function output activated by the respective transmitter key 4.
- 8. **FUN5** function output activated by the respective transmitter key 5.
- 9. FUN6 function output activated by the respective transmitter key 6.
- 10. **R.MO**: reset input (for use following a shutdown command from the transmitter).
- 11. AUX1: auxiliary output (activated during every operation).
- 12. AUX2: normally connected to supply positive pole.

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CONNECTION OF THE RESET BUTTON AND OF THE LED WARNING LAMP (OPTIONAL)



- 1 **EME:** connected to NC contact of STOP BUTTON in case an emergency stop unit is provided otherwise it is connected to E/R with wire jumper.
- 2 **RUN:** connected to NO contact of RUN BUTTON in case an emergency stop unit is provided otherwise it is connected to E/R with wire jumper.
- 3 **E/R:** connected to the common of contacts NC-NO of the STOP BUTTON and the RUN BUTTON (in case the emergency stop unit is provided).
- **4 GND:** connected to the cathode of the LED INDICATOR (in case an emergency stop unit is provided).
- **5 LED**: connected to the anode of the LED INDICATOR (in case the emergency stop unit is provided).

INSERTION OF TRANSMITTER CODES



Every transmitter has a different code. The generated code consists of a customer code and the personal code of the transmitter: it is necessary to arrange for acquisition of the transmitter codes by the receiver, as <u>only commands coming from "recognised" transmitters are carried out:</u>

To acquire the code of a new transmitter:

- remove the cover of the receiver;
- switch on the transmitter (press the ON key until a beep is heard);
- press the red key on the main board and, at the same time, press a function key on the transmitter; the green LED will start flashing, showing that recognition of the transmitter has taken place;

when the procedure is finished, you can put the cover back on the unit;

Attention! The system is provided with a customer's code: <u>only the transmitters with</u> the same code as the receiver can be inserted.

Note: the unit can acquire a maximum of 16 different transmitters. If a further code (n0.17) is inserted, this will replace the first code that was acquired, and so on.

In case of need (for example following the loss of a transmitter) it is possible to cancel all the acquired codes. Proceed as follows:

- remove the cover of the receiver;
- press the red key for at least 10 seconds without using radio controls: the green LED will flash, showing that the memory has been cleared out.

The acquisition of at least one transmitter is necessary in order to make the receiver operational.

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TROUBLE SHOOTING

IF THE UNIT DOES NOT OPERATE:

- 1. Is the green LED lamp "A" lit?
- NO: the board has no power supply. Check the fuse, the polarity and the supply cables.
- YES, but the light is intermittent: no transmitter code has been acquired carry out the *transmitter code insertion procedure*.
- 2. Is the red LED lamp "E" lit?
- NO: check that the function outputs are correctly connected.
- YES, with an intermittent light: the receiver has been shut down (a shutdown signal has been transmitted). If this condition is not necessary the reset procedure can be carried out using the appropriate input (or button, where provided) or by briefly cutting off the power supply.

If the problem persists contact the supplier of the device.

TRANSMITTER TR6RFMC



CHARACTERISTICS OF THE TRANSMITTER

The TR6RFMC PLL TECHNOLOGY transmitter is the result of a multi-year experience gained in the sector of radio controls and is designed to remotely control RXFM6 receivers.

The salient characteristics of the transmitter are as follows:

- ✓ up to 6 functions;
- ✓ transmission type: FM;
- ✓ high transmission stability;
- ✓ ample range;
- ✓ powered by standard 9V battery;
- ✓ extremely low power consumption;
- ✓ case made of shock-resistant ABS;
- ✓ highly reliable membrane keyboard;
- ✓ easily identifiable function keys and quick stop function;
- ✓ exclusive design.

INSTRUCTIONS FOR USE

Activation of the transmitter



Remove the cover of the battery compartment on the back of the transmitter (unscrewing the two fixing screws), insert a (new) 9V battery in the appropriate space and hook on the transmitter clip, making sure that it is properly in contact, then close the compartment and the relative cover. A double beep signals that the transmitter is now operational.

Use of the transmitter

To start the transmitter, just press the ON key and hold it down until a double beep signals that the transmitter is on.

With the transmitter operational (and the LED lamp flashing) a function can be activated using the appropriate key: the corresponding output of the unit will remain active until the key is released. The transmitter is designed to carry out only exclusive operations, and so it is not possible to activate more than one function at a time (the only exception is the shutdown function, which takes priority over all others).

There is a battery-saving function that provides for automatic switch-off if the transmitter remains unused for more than 10 minutes. After that inactivity period the transmitter switches itself off and signals the procedure through a bitonal acoustic signal. The purpose of this function is not only to reduce power consumption but also to avoid accidental use of the functions. To switch the transmitter on again press the ON key.

Indication of battery charge level

The transmitter is provided with a device monitoring the battery charge.

The transmitter signals:

- low battery;
- very low battery;
- battery totally run-down.

Three different acoustic signals indicate the battery status.

ENGLISH Indication of LOW BATTERY

When switched on, the transmitter emits a slow series of double beeps, then it comes to the normal working status.

Indication of VERY LOW BATTERY

When switched on, the transmitter emits double beeps in very rapid sequence for about 10 seconds. After this acoustic signal, the transmitter will turn itself off.

By pressing again the ON key during the series of acoustic signals, it is possible to go on using the transmitter.

<u>WARNING:</u> when the transmitter signals "VERY LOW BATTERY", it is possible to notice a slight weakening in the range performance, due to the fact that the transmitter automatically reduces the emission power to save energy.

Indicaton of BATTERY TOTALLY RUN-DOWN

If the battery charge is insufficient, when switched on the transmitter will emit a very rapid series of beeps, then it will turn itself off.

To use the transmitter, it is necessary to replace the battery.

Shutdown status

When necessary all functions can be shut down using the special red STOP key. This has priority over all other keys, so the stop command can be given even when other functions are on.

When the stop function is activated the transmitter emits a series of stop commands, signals the function by means of brief acoustic signals, and turns itself off. To reset the transmitter carry out the procedure for turning it on.

TECHNICAL CHARACTERISTICS

Working frequency: 433.921 MHz (39bit,34bit,31bit) 433.925 MHz (UART)

Type of modulation: 2-FSK +-15KHz

Transmitter power: EIRP $\leq 1 \text{ mW}$.

Power supply: MIN 6,5 V - MAX 10 V.

Average consumption @9V:

- Transmitter on: 1.6 mA
- o Transmitter in transmission: 18 mA
- Transmitter on with backlight: 25mA
- o Transmitter in sleep status: 2 uA.

Transmission code of the 39 bit or 31 bit digital type.



TR12RFMC TRANSMITTER (OPTIONAL)



CHARACTERISTICS OR THE TRANSMITTER

- ✓ rear lighting with EL lamp for use in low light conditions;
- ✓ fitted with battery charger adapter.

Use of the rear lighting



The rear lighting allows for quick, easy identification of the keys even in low-light conditions: to light up the keyboard with the transmitter operational press the ON key and hold it down until the rear lamp comes on (signalled by two beeps). If the transmitter is off, it is necessary to turn on the transmitter, and then press the ON key until the rear lamp lights up.

Use of the rear lighting involves higher power consumption and consequently shorter battery life: you are advised to use it only when necessary.

BATTERY CHARGER (OPTIONAL)



The battery charger (supplied as an optional) is capable of accepting an input voltage of 12 to 24 volts and is fitted with a plug for connection to the cigarette lighter of vehicles.

To recharge the battery:



The battery charger supplied with the transmitter (only when predisposed to be recharged) is of the type without memory effect, so charging can be carried out at any time. First insert the small plug in the socket on the right side of the transmitter. Recharging can take place with the transmitter on or off (it makes no difference).

When charging begins the transmitter turns itself on and a long acoustic signal is given. The ON LED lamp lights up, flashing frequently, and remains in this state throughout the charging period.

The transmitter is operative and it can be used as usual: the LED lamp will however flash more frequently than usual to indicate that charging is under way. Recharging also continues with the transmitter off (the LED lamp continues flashing), until the battery is fully charged.

When replacing the rechargeable battery you are advised to use a battery of the NiMH type and to carry out a long charge (24H) before using the transmitter.



EMERGENCY STOP UNIT (OPTIONAL)



OPERATING

To make the unit operational it is necessary to press the run button (check that a shutdown command has not been given).

WARNING: if the power supply to the unit gets cut off, it is necessary to press the run button in order to restore operational status.

SHUTDOWN

In this situation the unit has two stop activating modes, one at radio frequency (STOP from the transmitter) and a manual one which is carried out by pressing on the RED mushroom-head STOP button.

The emergency shutdown status (activated by using the local mushroom-head button) is signalled by the red LED lamp on the stop unit lighting up. In this condition the unit is no longer operational and all outputs are blocked (the primary supply is cut off). To reset normal operating it is necessary to:

- disconnect the red mushroom-head button by rotating it clockwise;
- press the green run button.

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EXTERNAL VEHICLE AERIAL



CHARACTERISTICS OF THE AERIAL

The range of the radio control can be greatly extended by using the vehicle aerial.

Its use is advisable if you have to operate at a substantial distance from the base position (the receiving unit).

The aerial is made of an extremely flexible and very strong innovative material whose gain is great than that of any other aerial as it has been designed and made for this specific application taking account of the system characteristics.

CORRECT INSTALLATION

Mount the aerial in the vertical position, if possible on a metal base and well away from sources of electromagnetic interference (motorised circular flashing lights, etc.), placing it in a visible position on the outside of the bodywork of the vehicle.

CE MARKING

This product meets the essential requirements laid down by the directive 2014/53/EU.

Its conformity with the above-mentioned essential requirements is certified by application of the CE marking on the product.

Attention is drawn to the following actions that could compromise the above-testified conformity, apart from, of course, the product characteristics:

- incorrect electrical supply;
- incorrect installation or incorrect or improper use or use that does not comply with the warnings given in the user manual supplied with the product;
- replacement of original components or accessories with others of a type not approved by the maker, or carried out by unauthorised persons.

CERTIFICATE OF GUARANTEE

- 1. The device is guaranteed for a year from the date of purchase, the date being certified by a transport or delivery document that shows the model of the device and the buyer's name.
- 2. The guarantee covers replacement or repair free of charge of component parts of the device recognised as being defective because of manufacturing faults.
- 3. The guarantee does not cover any parts that are defective as a result of negligence or careless use, or incorrect installation or maintenance, work carried out by unauthorised persons, transport carried out without the necessary precautions, or from any other circumstances that cannot be attributed to manufacturing defects.
- 4. VA.RE.L declines any responsibility for any harm that may occur, directly or indirectly, to persons or things as a result of failure to observe all the indications given in the instructions for use as regards, especially, the warnings concerning installation, use and maintenance of the device.
- 5. The device will be repaired at the main office of the VA.RE.L company. The costs and risks of transport from and to the said office will be at the purchaser's expense.
- 6. Replacement of the device and extension of the guarantee following a repair operation is not possible.