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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) Receiving unit

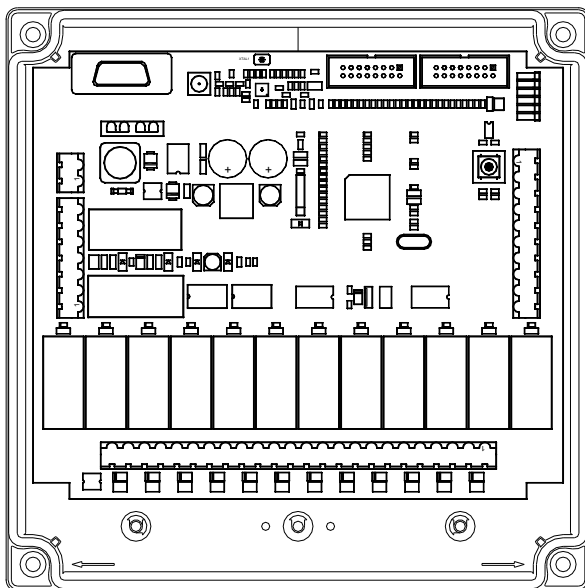
1 (one) TR12RFMC-NF series transmitter (other options are available)

CHARACTERISTICS

- System with conformity certificated in accordance with European Directive 2014/53/EU.
- Wide range of power supply and operating temperature
- Optimal communications reliability with 39 bit digital technology.
- Working range in optimum conditions: 200 metres.
- Immune to radio-electrical disturbance and electromagnetic pollution.
- Receiver unit with IP67 protection.
- Simple rapid installation thanks to prearranged cabling.



INSTRUCTIONS FOR USE



CORRECT INSTALLATION

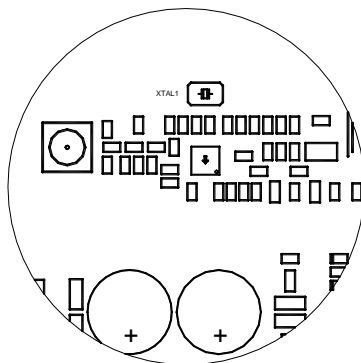
The receiving unit has an IP67 seal, and external installation is therefore possible. However, you are advised to install the unit in a sheltered position (bearing in mind that if you use the internal aerial the latter must not be shielded by any metal structures).

- 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 output cables.
- 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 unit power supply voltage.

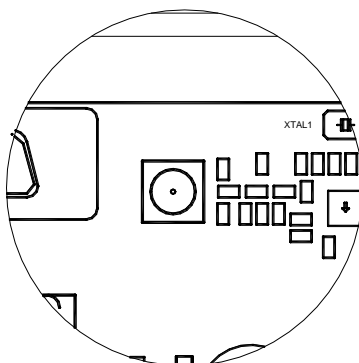
RECEIVING UNIT

- Receiver**



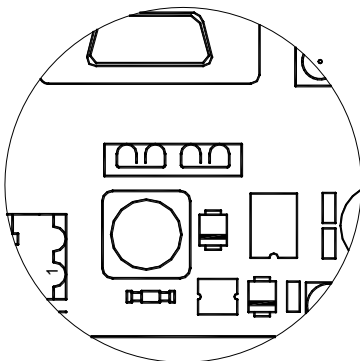
433MHz SUPERHETERODYNE FM/FSK receiver realized in SMT technology, in compliance with the EN 300 220 European standards.

- Aerial**



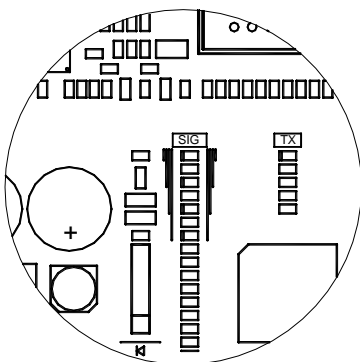
The receiver is supplied with an internal $1/4 \lambda$ aerial with an SMA connection. If higher system performance is required the flexible aerial may be unscrewed and a vehicle aerial can be connected (see page 18).

- **Fuse**

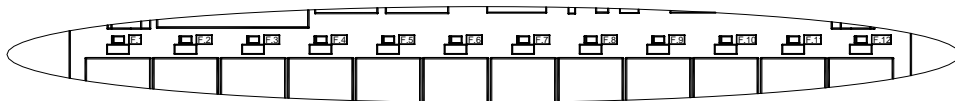


15A protective fuse (maximum) on output power supply line.

- **Led Indicators**

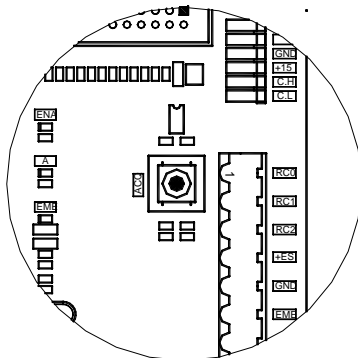


- **SIG:** red led indicators that signal if signals are present in the system's operating frequency. Radio-electrical disturbances may cause the first LED to light up at random and occasionally. This does not jeopardise correct functioning but may reduce maximum receiver range. The functioning of the transmitter can also be checked: all the four leds will light up when any function is activated (in the vicinity of the aerial).
- **ENA:** yellow light indicator. When lit, it indicates that one of the outputs is active.
- **A:** green led indicator:
 - if on with continuous light it means that the device is powered up and operational. The power supply is independent: this red indicator is on also in case the power fuse is cutoff;
 - if flashes to signal that the memory is empty: at least one transmitter code must be inserted.
 - It is used when the codes have to be inserted or cancelled (see page 11).
- **EME:** red LED that signals that the receiver is in emergency mode (stop inserted from transmitter or remote pushbutton panel).



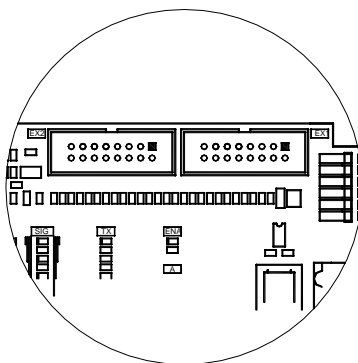
- **F.1-F.12:** series of red leds that signal activation of outputs 1-12 (led on: output voltage)

- **ACQ button**



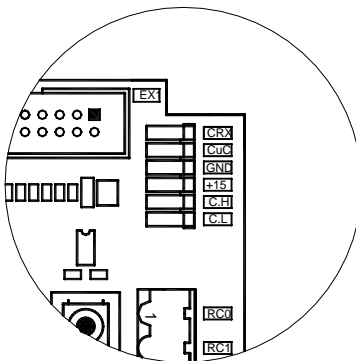
Special button for acquiring and cancelling transmitter codes in memory (see page 11).

- **Expansion board connection**



16 pole IDC connection (optional) to connect one or more expansion boards.

- **Auxiliary connection**



Service connector (optional).

- **Shut down**

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

The system can be supplied with an emergency shut down unit (upon request) (see page 17).

The shut down condition is signalled by the red led 'EME' that shows a continuous light. E-O output is also activated under these conditions.

If the system is shut down, no output will be present.

Normal functioning can be restored in several ways depending on user needs, e.g:

- reset from power on (receiver switching off and switching on);
- reset from transmitter (transmitter switching on);
- reset from run button on shut down unit (optional).

TECHNICAL CHARACTERISTICS

433.125 – 434.725 MHz superheterodyne FM/FSK receiver.

Power supply: 10 Vdc / 30 Vdc.

Power consumption: 150 mA (12V), 105mA (24V) when idle;

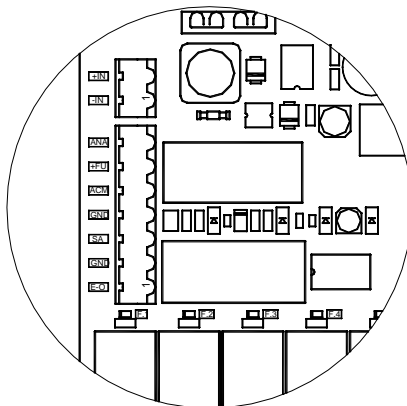
190 mA (24 Vdc) with function activated (without load).

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

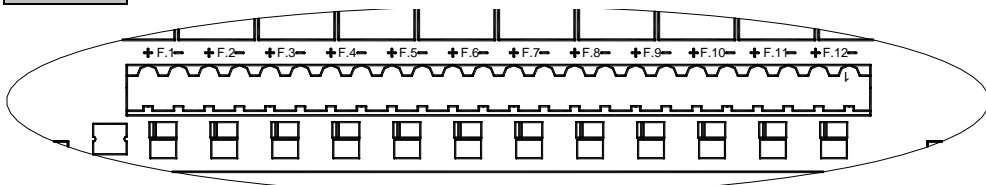
Number of outputs: N + 1 auxiliary + 1 special positive outlet in emergency mode (with kit functions 2 ÷ 48).

Temperature working range: -20 °C ÷ + 70 °C.

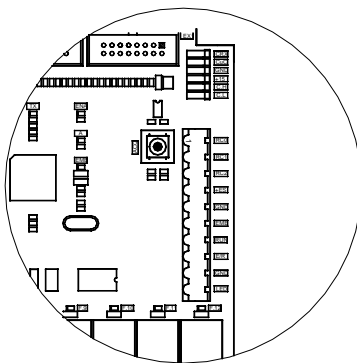
CONNECTIONS



- **+IN:** 10 – 30Vdc power supply (connect to battery positive pole).
- **-IN:** connect to the supply ground (possibly towards the battery negative pole).
- **ANA** auxiliary output (activated during every operation).
- **+FU:** positive output under the fuse.
- **ACM:** common of the auxiliary output relay (normally connected to the positive pole + FU).
- **GND:** connected internally to -IN.
- **SA:** positive output under emergency relay (always active except in emergency).
- **GND:** connected internally to -IN.
- **E-O** shutdown output (active in shutdown mode).

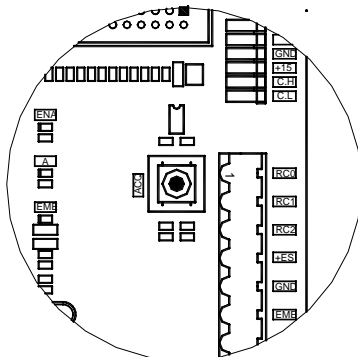


- **Fn+:** function output activated by the respective transmitter key (with number from 1 to 12).
- **Fn-:** (number from 1 to 12) connected internally to –IN.



- **RC0:** IN/OUT auxiliary (to be connected only if the supplier so specifies).
- **RC1:** IN/OUT auxiliary (to be connected only if the supplier so specifies).
- **RC2:** IN/OUT auxiliary (to be connected only if the supplier so specifies).
- **+ES:** expansion board supply (connected internally to SA).
- **GND:** connected internally to –IN.
- **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.
- **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.
- **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).
- **GND:** connected to the cathode of the LED INDICATOR (in case an emergency stop unit is provided).
- **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 the acquisition of the transmitter codes by the receiving unit, as only commands coming from “recognised” transmitters are carried out:

To acquire the code of a new transmitter:

- remove the cover of the receiving unit;
- switch on the transmitter (press the ON key until a beep is heard);
- press the ‘ACQ’ key on the main board and, at the same time, press a function key on the transmitter; the green LED ‘A’ 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: only the transmitters with the same code as the receiver can be inserted.

Note: the unit can acquire a maximum of 16 different transmitters. If a further code (no.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 receiving unit;
- press the red key for at least 10 seconds without using radio controls: the green LED ‘A’ will flash, showing that the memory has been cleared out.

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

TROUBLESHOOTING

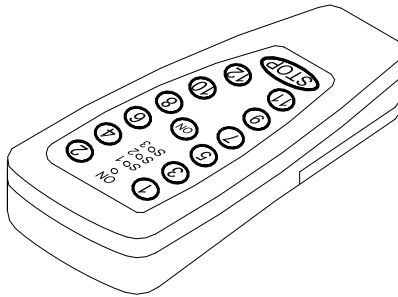
IF THE UNIT DOES NOT OPERATE:

- 1. Is the green LED lamp “A” lit?**
 - NO: the board has no power supply: check voltage on terminals + IN and – IN.
 - YES: but the light is intermittent: no transmitter code has been acquired – carry out the *transmitter code insertion procedure*.
 - YES with steady light:
 - if reception is good (see SIG led indicators) check protection fuse
 - if there is no signal reception or poor reception, check transmitter battery or aerial condition.
- 2. Is the red LED lamp “EME” lit?**
 - NO: press STOP on transmitter; if the led fails to light up, check protection fuse and make sure that all outputs are correctly connected.
 - YES: the receiver is in stop status (a stop signal has been transmitted); if this condition is not needed, reset it (see page 7).
- 3. If a function is activated, the corresponding output is activated as well but it deactivates immediately**
 - Power supply could have excessive drops: check connections and line capacity;
 - Disconnect outputs connector (removable terminal board): if the unit starts working correctly, check cables and users.

IT IS POSSIBLE TO WORK ONLY WHEN NEARBY :

1. Intensity leds are on even if they do not transmit:
strong disturbances that affect radio control working frequency; turn off any devices that are not useful (e.g. motorised flashers) and move to another area. Should the range be insufficient, a high-gain external aerial can be used.
2. The signal received is poor:
In case the signal is not appropriate (4 SIG leds indicators on) when the transmitter is close to the aerial, check:
 - Status of transmitter battery: if, when turned on, the transmitter emits a series of beeps, it will be necessary to charge or replace the battery;
 - Status of aerial.

TRANSMITTER *TR12RFMC*



CHARACTERISTICS OF THE TRANSMITTER

The TR12RFMC transmitter is the result of a multi-year experience gained in the sector of radio controls and is designed to remotely control RXFM12 receivers.

The salient characteristics of the transmitter are as follows:

- ✓ up to 48 functions;
- ✓ transmission type: FM;
- ✓ 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.
- ✓ Back-lighted with EL light for use in low light conditions;
- ✓ fitted with battery charger adapter

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. Turn on the transmitter to make it operational.

Use of the transmitter

If the transmitter is not yet in use, just press the ON key and hold it down until a prolonged two-tone 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 15 minutes. After that inactivity period the transmitter switches itself off and signals the procedure by means of three brief acoustic signals. 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.

Batteries

When switched the transmitter monitors the battery charge signalling when the battery is discharged by emitting a series of acoustic signals in rapid sequence. It is however possible to continue working for a while, although it is advisable 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 switches itself off. To reset the transmitter carry out the procedure for turning it on.

Use of the rear lighting



The rear (back) 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, prolong the pressure on the ON key until the rear lamp comes on.

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

TECHNICAL CHARACTERISTICS



Working frequency: 433.920 MHz \pm 15 KHz at 22 °C.

Type of modulation: FM \geq 20KHz.

Transmitter power: EIRP \leq 10mW.

Power supply: MIN 7V - MAX 10V.

Average consumption @9V:

- Transmitter on: 1.2mA
- Transmitter in transmission: 15mA
- Transmitter in sleep status: 10uA.

Transmission code of the 39 bit digital type.

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:



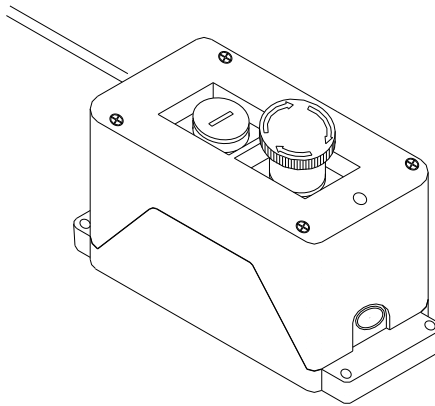
The battery charger supplied with the transmitter is of the type without memory effect, so charging can be carried out at any time. First insert the small plug in the socket on the right side of the transmitter. Recharging can take place with the transmitter on or off (it makes no difference).

When charging begins the transmitter comes on, the keyboard lamp lights up, 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 operational and remains so for 15 minutes; 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.

EXTERNAL VEHICLE AERIAL *(OPTIONAL)*



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.

VA.RE.L reserves the right to modify the characteristics given in this manual without prior notice. V3

	<p>VA.RE.L S.R.L. costruzioni elettroniche via Dell'Artigianato, 18 26029 Soncino CR tel. 0374 83141 fax 0374 83501 http://www.varel.it e-mail: info@varel.it</p>
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