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TECHNICAL CONSTRUCTION FILE

PRODOTTO *(Product)*	Marchio *(Brand)*	**TRANSMITTER SOLUTIONS**	
	Serie *(Serie)*	**INOX**	
	Modelli *(Types)*	**S9TR2645AM1, S9TR2645AM2M**	
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1.0 Introduction

Transmitter Solutions - Monarch 433 TSPW2KC and is a key-chain 2-buttons transmitter operating at 433,92 MHz in FSK modulation.
It has been designed for the system INOX USA to lock and unlock by radio of the electronic lock EL60
The security code, generated by the transmitter, has a rolling system generation: in this way the code changes at each transmission.
The code has an high security algorithm (64 bits – billions of combinations).
Once received the code, the receiver card inside the EL60 can make the decryption and can lock or unlock the door.
The serial number of the security code is set in factory by the manufacturer once for ever: it has been stored into the memory of the corresponding receiver which has a capacity of up of 13 user rolling codes.

The product fully complies with the FCC Rules cfr 47 part 15.

1.1 Product references

BRAND : Transmitter Solutions

SERIES : INOX

TYPES : S9TR2645AM1, S9TR2645AM2M

MANUFACTURER : CDVI WIRELESS S.p.A.
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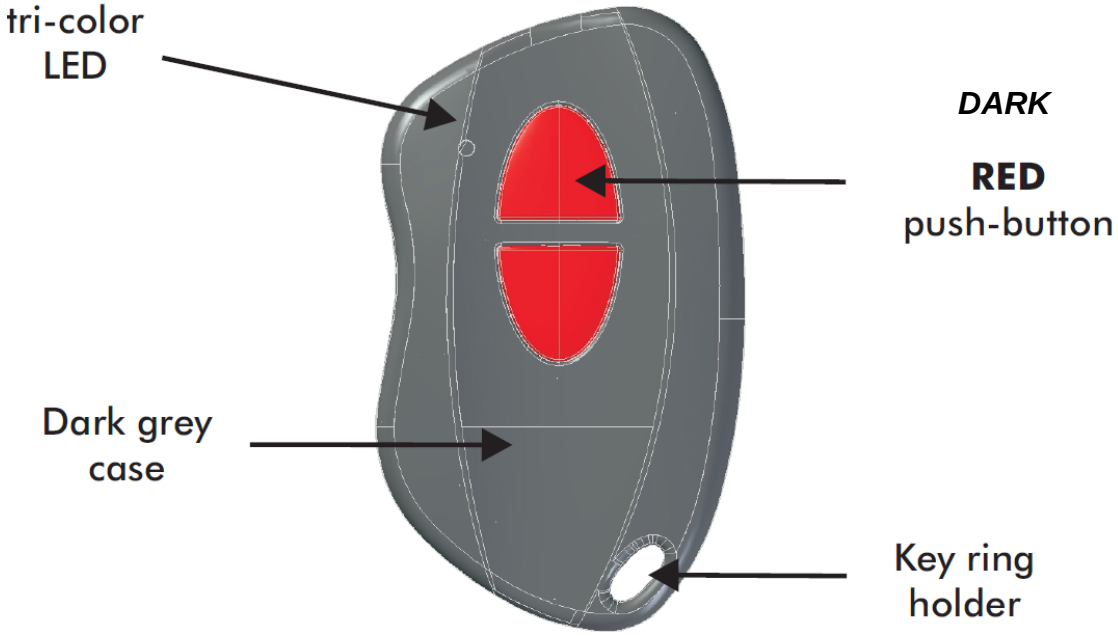
2.0 Technical specifications

Operating frequency .....433,05 ÷ 434,790 MHz
Carrier frequency: .....433,920 MHz
Rated frequency tolerance: .....± 100 KHz
Rated E.R.P. .....1,5 µW
Modulation: .....FM/ FSK
Modulating signal frequency:.....200 kbit/sec
Channel width: .....> 25 KHz
Power supply: .....3 Vdc
Battery .....CR2032 lithium battery
Security code system .....Keeloq® hopping code
N° of code security combinations: .....2^{64}
Channel push-buttons: .....1 or 2
Range .....100 m
Dimensions .....61 x 36 x 13 mm
Weight .....19 g
Antenna .....Integral

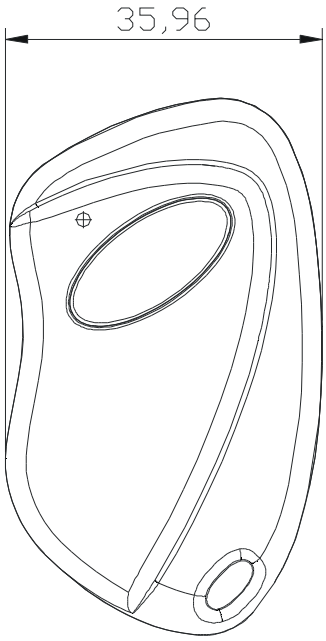
3.0 Mechanical drawings

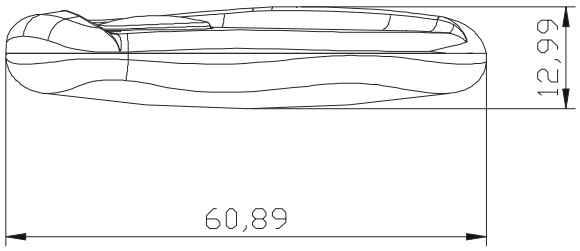
3.1 2-buttons Master external view



S9TR2645AM2M

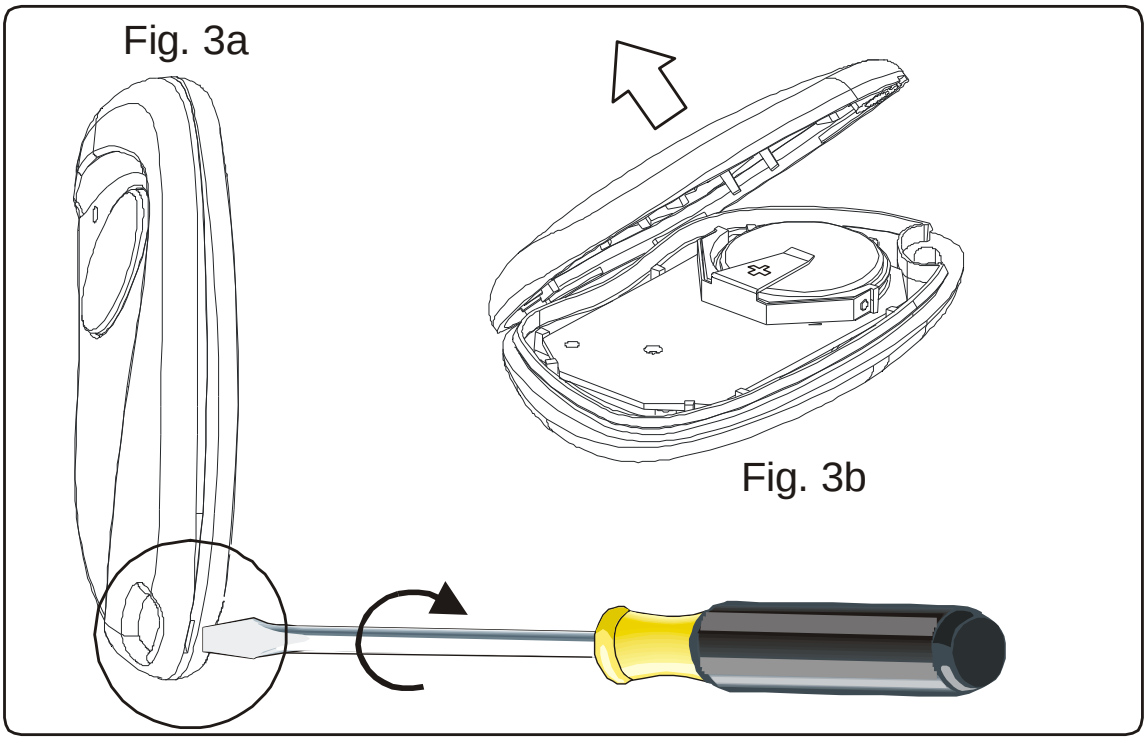
3.2 1-button User transmitter external view





S9TR2645AM1

3.3 Battery access



4.0 Description

4.1 How to Use the INOX Lock with the RF Receiver

The RF system is composed by:
- A RF receiver with cables for internal connections,
- two USER Tx,
- and one Master Tx.

The RF Receiver can handle max 10 User Tx, and 3 Master Tx.
Master Tx has two pushbutton. Master TX is for maintenance, and cannot open the lock.
“A” button is for ADD menu, “B” button is for DELETE menu.
USER Tx has one pushbutton to open the Lock.
On the RF receiver board there is a Push Button for ADD or DELETE operations.
To access the Push button you have to disassemble the lock.

MASTER Tx
If the Lock is already installed you must use the MASTER Tx.
To control one single Lock by RF at a time, a Magnet has been inside the Master Tx, and a magnetic switch on the RF receiver, otherwise you may control unwanted locks in the range!
The Master Tx must be placed on the lock, under the keyboard, to be detected and signalled by a BEEP tone.

“A” Button is to enter the ADD Menu, “B” Button to enter the DELETE_Single_User, or DELETE_ALL Menu.
You can ADD max 3 MASTER Tx. You cannot REMOVE MASTER, to delete Master you have to clear all memory - Factory default. The Master Tx are NOT allowed to open the Lock.

Operate by a MASTER Tx ,

To operate by a Master Tx , you have to ADD Master at first :
- place the Master on the Lock till the BEEP (magnet detected)
- then press “A” Button for 4 seconds till BEEP to enter in ADD MENU (beep pause-beep-pause…)
- Press again the “A” Button to ADD the Master into the memory of the RF receiver (Long beep-pause-beep-pause-beep-pause…).
- The receiver is enabled to add more TX (other Master, and more User) for 15 seconds timeout (beep-pause-bip-pause…).

When there is at least one Master present into the memory of the Lock, than you can use that Master to ADD other Master or USER into the memory of the receiver.

ADDING more TX by an already registered Master Tx:
- place the registered Master on the Lock till the BEEP (magnet detected)
- then press “A” Button for 4 seconds till BEEP to enter in ADD MENU (beep pause-beep-pause…)
- The receiver is enabled to add TX (other Master - max 3 total , and more User – max 10 total) for 15 seconds timeout (beep-pause-beep-pause…)

If you try to ADD an already registered TX : nothing will happen , no signaling.
If you try to add more Tx when memory is full, 3 beep will signal the error: beep-beep-beep.

DELETING USER by Master Tx :
- place the Master on the Lock till the BEEP (magnet detected)
- then press “B” Button for 4 seconds till the DOUBLE BEEP to enter in the DELETE MENU (beep-beep-pause-beep-beep-pause…)
- Press the pushbutton of the USER Tx that you want to remove
- The receiver is enabled to REMOVE more USER TX for 15 seconds timeout (beep-beep-pause-beep-beep-pause…)

DELETING_ALL (Factory Default) by Master Tx:
- place the Master on the Lock till the BEEP (magnet detected)
- then press “B” Button for 4 seconds till the double BEEP to enter in DELETE MENU (beep-beep-pause-beep-beep-pause…)
- Press again “B” Button to DELETE_ALL (clear all memory to Factory default)

OPERATE BY ON BOARD RECEIVER PUSHBUTTON
By the on board pushbutton you can ADD USER Tx (also with no Master Tx installed) ADD MASTER Tx or USER Tx

- Press pushbutton till BEEP and release pushbutton immediately
- After 2 seconds it will BEEP again (beep-pause-beep-pause…)
- You can ADD TX (USER or MASTER) for 15 seconds timeout.

DELETE ALL TX

- Press pushbutton till BEEP and release pushbutton
- Within 2 seconds press again the pushbutton for 4 seconds till a LONG BEEP.

The Receiver is Factory Restored with clear memory.

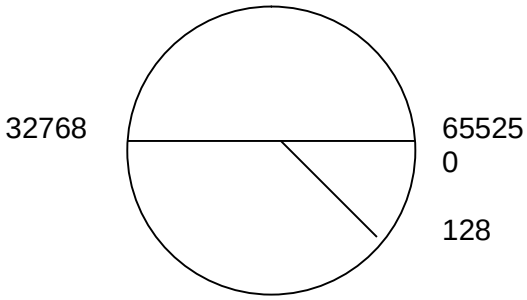
4.2 Rolling code synchronization system

The code transmitted by the transmitted changes at each key activation.
That means that the receiver has to be able to follow the right sequence in order to activate its outputs.
The code actually transmitted is composed by 3 main blocks:

- a manufacturer key
- a serial number
- a counter number

The manufacturer key is proprietary of the manufacturer and is fixed in each transmitter.
The serial number is characteristic of each transmitter and is set-in-factory by the manufacturer during the programming of the micro; for this reason, it is different for each transmitter.
The counter number comes from a counter which increments at every activation.
All the above numbers once assembled are encrypted and then sent to the modulator.

The synchronisation system operates as follows:



Once the serial number of the transmitter has been stored into the receiver memory, is the counter number received and the counter number of the receiver differ for less of 128 the receiver updates its counter and enable the output.

If the difference between the two counter numbers is greater than 128 but less than 32768, the synchronisation can occur only after 2 consecutive received counter numbers (that means two close transmissions without any error of the transmitter).

The device is approved by the FCC and it complies with Part 15 of the FCC Rules.
Its operation is subject to the following 2 conditions:
1. This device may not cause harmful interference.
2. The device must accept any interference that may cause undesired operation.