

## 1 Introduction

### UHF READER - VER. 1.0.4

#### General description

The DOLCWIUHF-ER-902 is a high-performance UHF RFID integrated reader. It supports fast tag read/write operation with high identification rate. It can be widely applied in many RFID application systems such as logistics, access control, anti-counterfeit and industrial production process control systems.



#### Working principle

This reader generates a continuous RF signal in the band from 902 - 928 MHz.

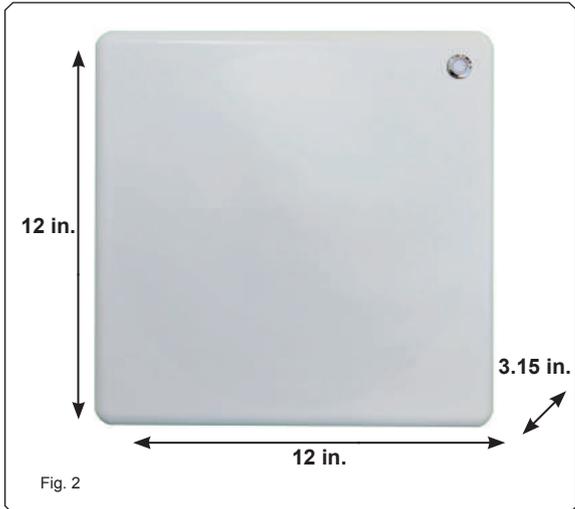
- When a passive tag (card, sticker or car plate type), carried by a user or fixed on a vehicle enters into the RF field, generated by the reader, a small perturbation occurs: the tag then replies with an encrypted signal, that includes its s/n and more information. These are then detected by the reader which transmits the signal to the decrypting I/F device, that makes them available in Wiegand format or activates a relay.
- The Wiegand signal can be read by an Access Control System that that gives the final authorization to the user final authorization to the user.
- The reader comes with the corresponding I/F device which has a built-in RF receiver, operating at 433.92 MHz, with a memory for 100 Erone Keeloq type remote controls.
- The remote control can be used as an alternative means of identification from longer range, with the high security level provided by our Keeloq h

## 2 UHF Readers

All UHF credentials are shown in Section 9 of this manual



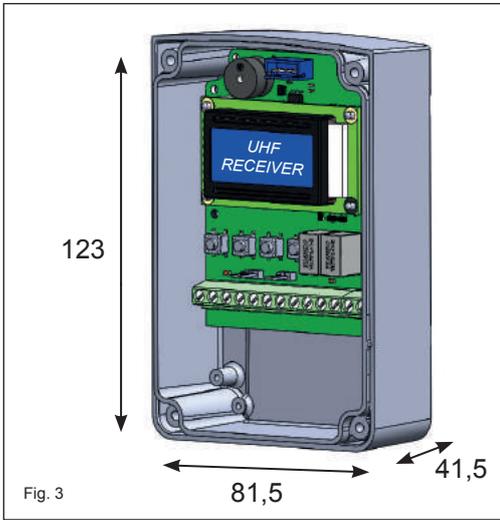
## 3 Technical specifications : Reader



Operating frequency range.....	902 - 928 MHz
Transmission type .....	FHSS
Detection range in open space .....	<20 m (*)
Rated Power supply .....	12 Vdc
Stand-by max current .....	200 mA @12 Vdc
Max current consumption .....	1 A @12 Vdc
Operating temperature.....	-4° F to 131° F
Storage temperature.....	-40° F to 185° F
Operating humidity .....	<95%RH (+77o F)
Weight.....	4lb. 13oz.
Protocol tag supported .....	ISO 18000-6C/6B
RF output power.....	up to 33 dBm (adjustable)
Polarization.....	Circular
Output .....	RS-485
Dimensions.....	12 x 12 x 3.15 in.
IP Class .....	IP65

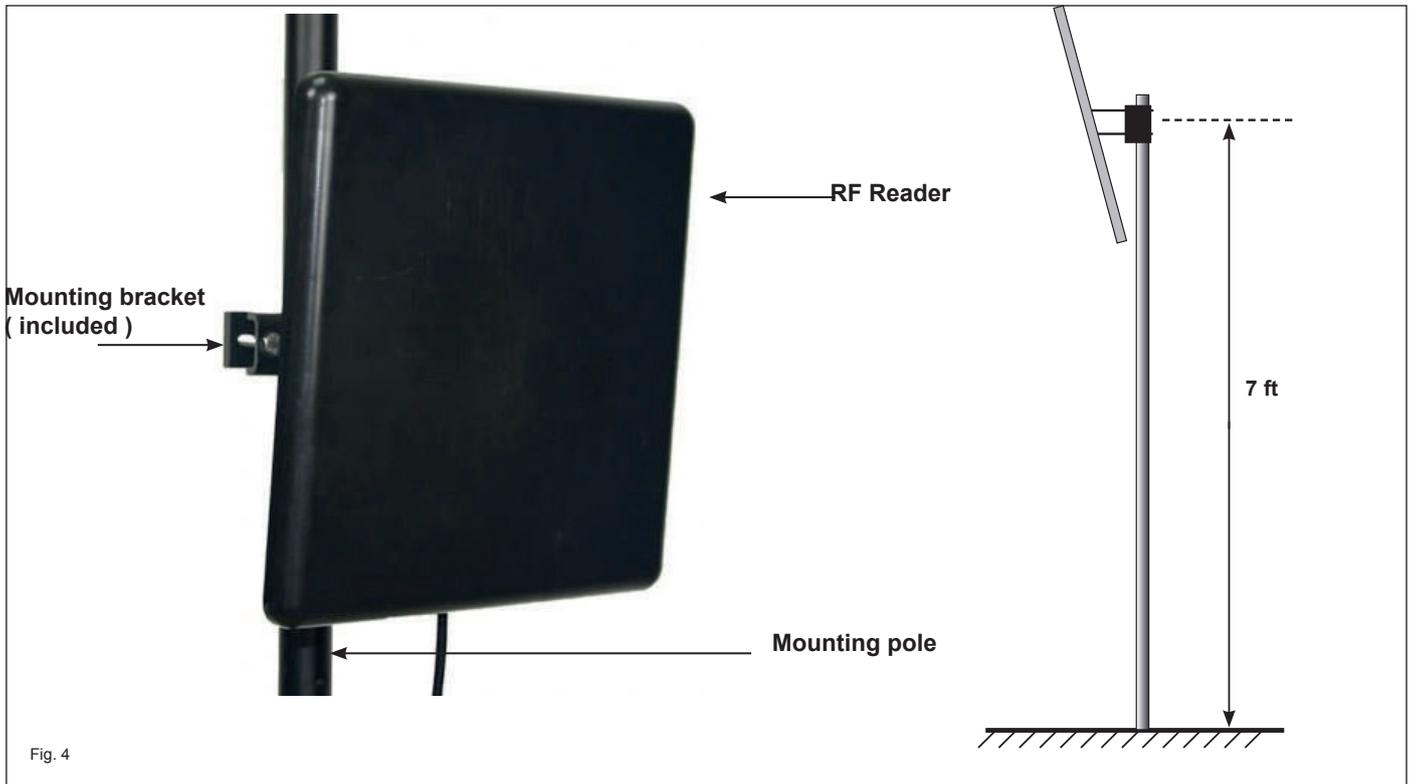
(\*) Effective distance depends on antenna, tag and environmen

**4 Technical specifications : I/F w/built-in radio receiver**

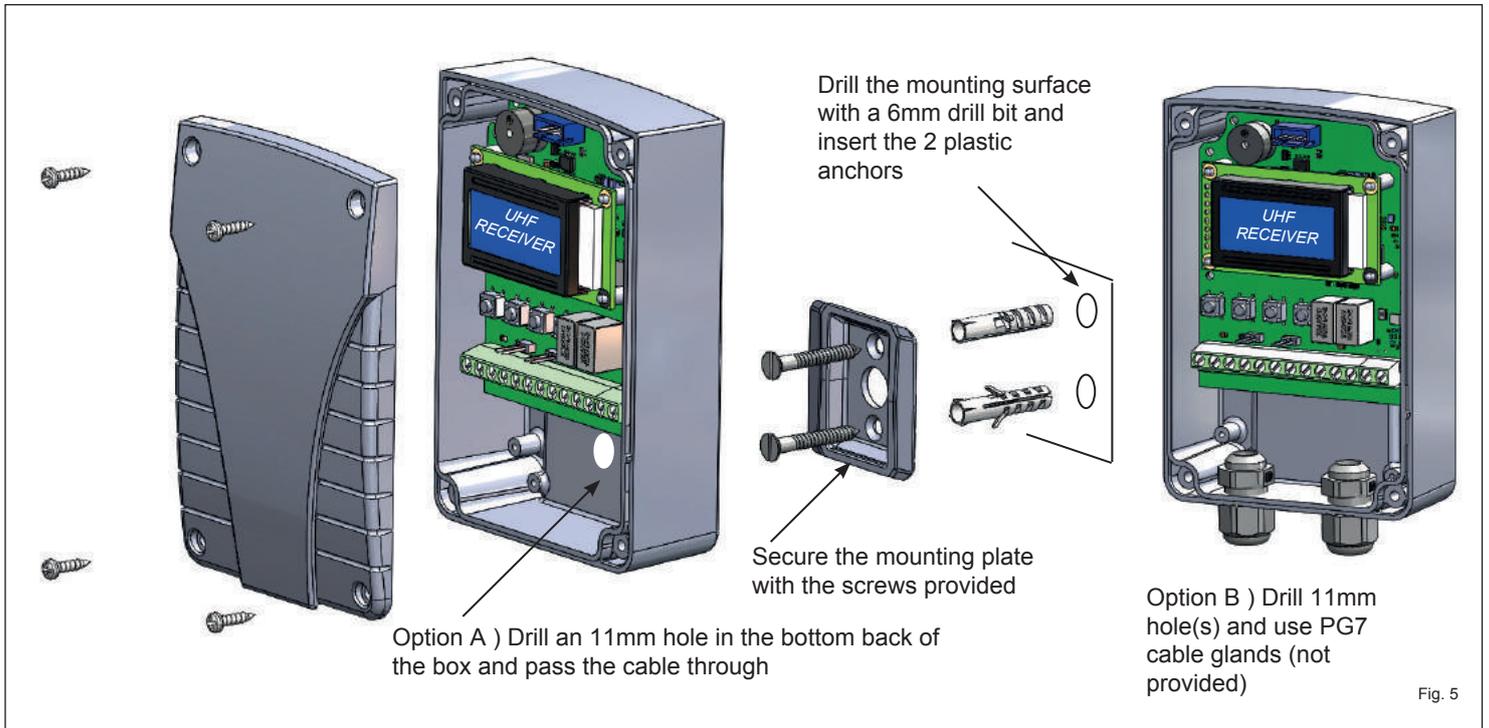


Operating frequency ..... 433,92 MHz  
 Demodulation ..... OOK  
 Sensitivity ( for good signal ) ..... -115 dBm  
 Power supply: ..... 12/24 Vac/dc  
 Current consumption ( @12 Vdc ) ..... from 25 to 50 mA (max)  
 Encryption..... Rolling code w/encoding Keeloq  
 Input ..... RS-485  
 N° UHF readers supported ..... 2  
 Outputs ..... Relay, Wiegand  
 Wiegand protocols supported ..... 26 - 30 - 44 bit  
 Memory capacity ..... 7580 tags  
 ..... 100 remote controls  
 Relays..... 2 x 24 VA - max 48Vdc  
 Relay operating mode ..... pulse , step, delayed  
 Delay ..... from 1 sec. to 23 h : 59 min  
 Retransmission period over wiegand bus... from 100 mS to 2 Sec.  
 Relay pulse ..... 300 mS  
 Operating temperature:..... 14° F to 140° F  
 Enclosure IP protection: ..... IP55  
 Dimensions: ..... 4.7 x 3.2 x 1.7 in.  
 Weight ..... 2.3 oz.

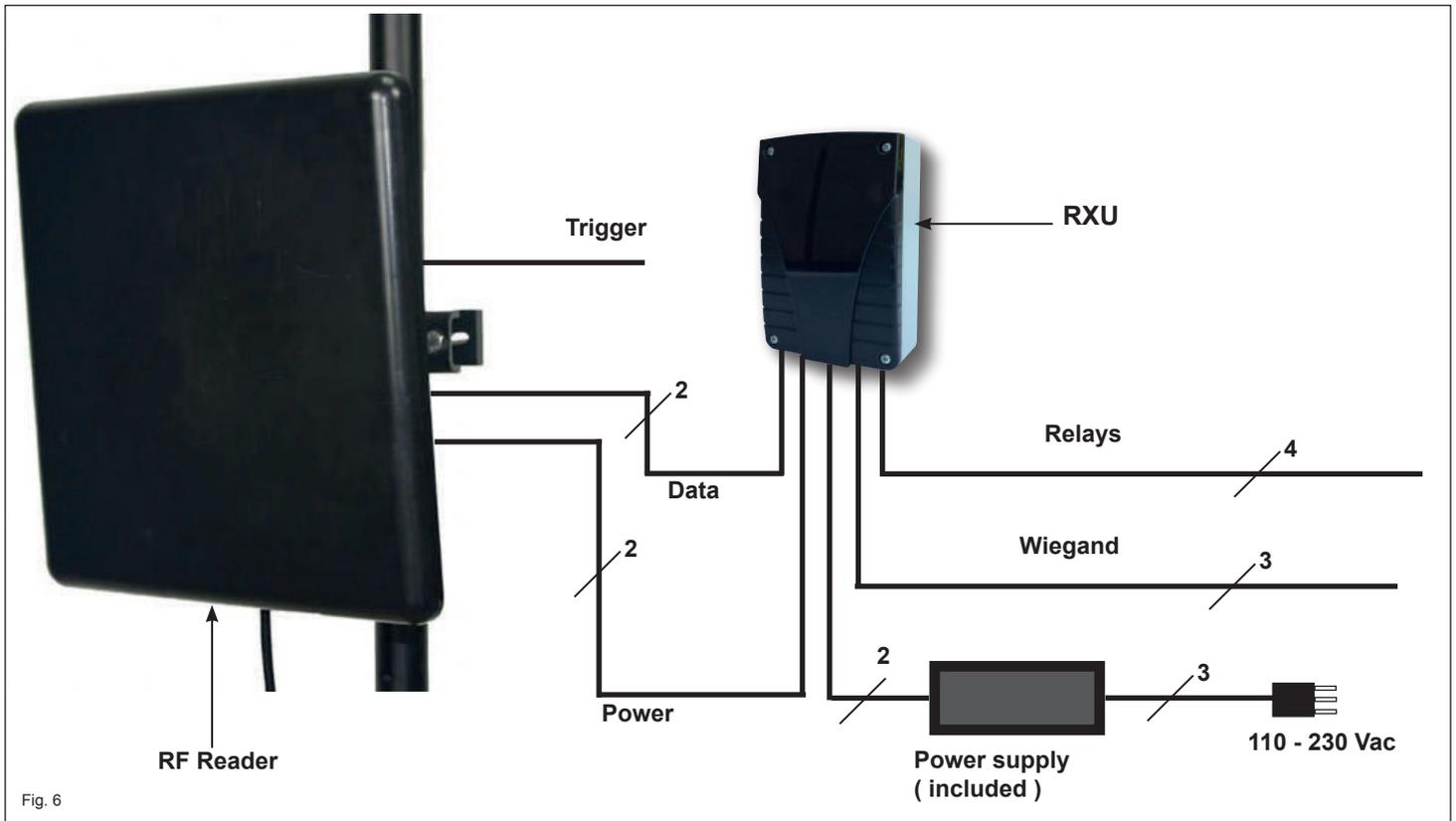
**5 Mounting the reader**



**6** Mounting the I/F receiver



**7** Connections



**8** Wiring Diagram

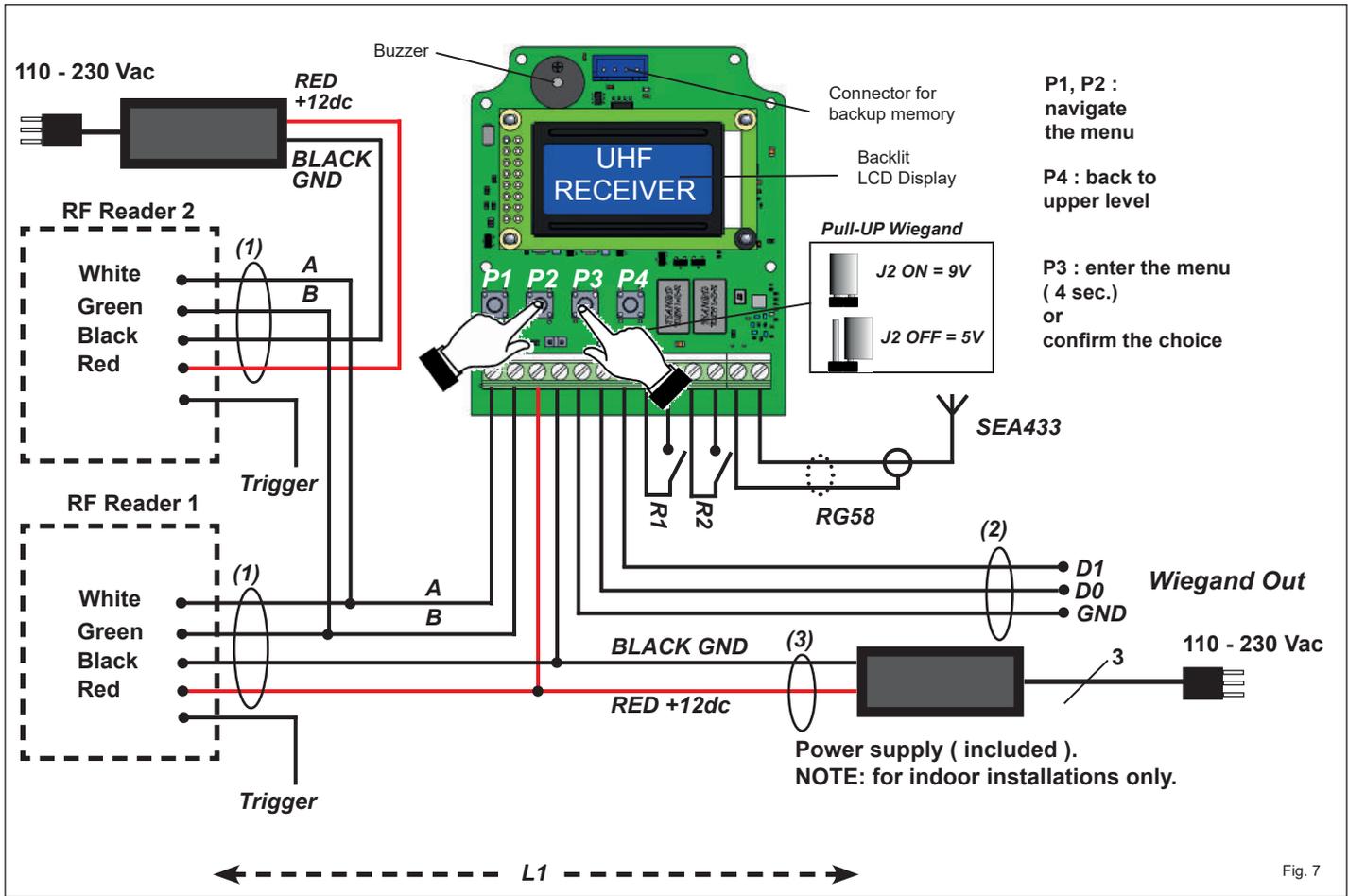


Fig. 7

Trigger signal	Reader operating mode
Floating / connected to GND	Reading
Connected to Vdc	Disabled (*)

(\*) : use an external device with a dry contact to enable/disable the detection of the reader

FFF = FACILITY CODE

NNN = SERIAL NUMBER

Example 1: TX reception

F	F	F	N	N	N	N	N
R 1	a	b	c	d	R 2		

TX Serial number

Button activated a, b, c or d

Relay activated

Example 2 : Status of the relays

R 1						R 1					
P	U	L	S	E		S	T	E	P		

Relay 1 : Pulse

Relay 1 : Step

R 2							
0	0	:	0	1	:	0	5

Relay 2 : Timed

R 2							
D	I	S	A	B	L	E	D

Relay 2 : Disabled

Delay setting

h	h	m	m	s	s		
0	0	:	0	0	:	0	1

The factory value for the timing is 1 sec. Use P1 to scroll the digits and P2 to confirm

Ref	Description	Wire type	Optional extension size	Maximum length
(1)	Cable from reader ( 0,7m )	2 conductors ( RS485 bus )	24AWG ( 0,51 mm <sup>2</sup> )	4000 ft
		2 conductors ( Power supply )	18AWG ( 1,02 mm <sup>2</sup> )	L1 = 100 ft MAX
(2)	Wiegand BUS	3 conductors Belden 9553	22AWG ( 0,64 mm <sup>2</sup> ) to 18AWG ( 1,02 mm <sup>2</sup> )	490 ft
(3)	Power supply	2 conductors	18AWG ( 1,02 mm <sup>2</sup> )	L1 = 100 ft MAX

**9 Compatible UHF Tags**

**V2 UHF Sticker**

Part No: CARMANSTIUHF-ST



**UHF Card Holder**

Part No: MANUHFHOL



**UHF Sticker**

Part No: CARMANSTIUHF



**UHF License Plate Tag**

Part No: CARMANLP



**UHF Card**

Part No: CARMANISOUHF



**Dual Protocol UHF & Mango® Card**

Part No: CARMANISODUOUHF

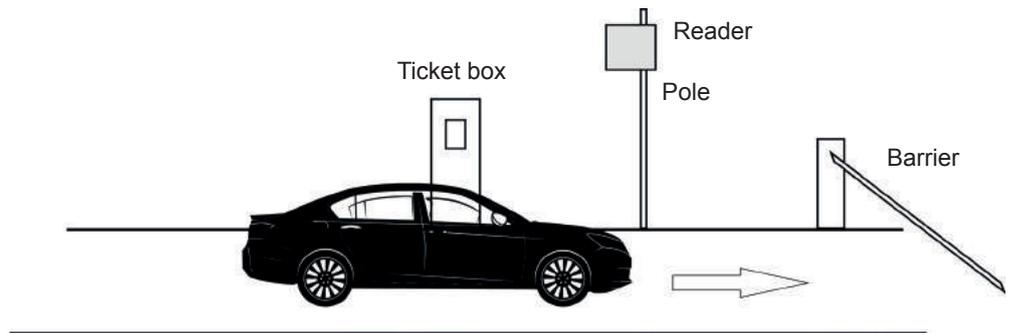
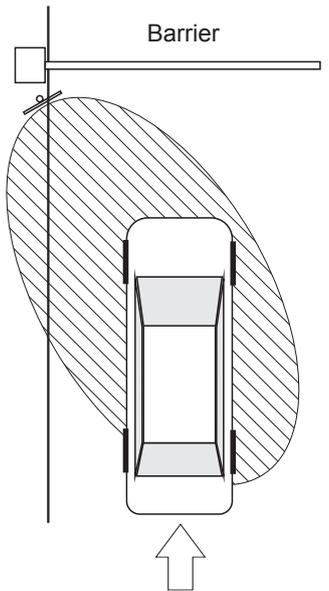


**UHF Hang Tag**

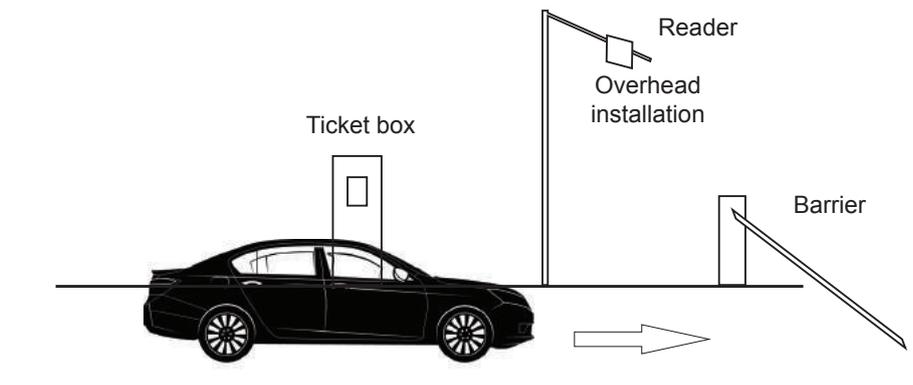
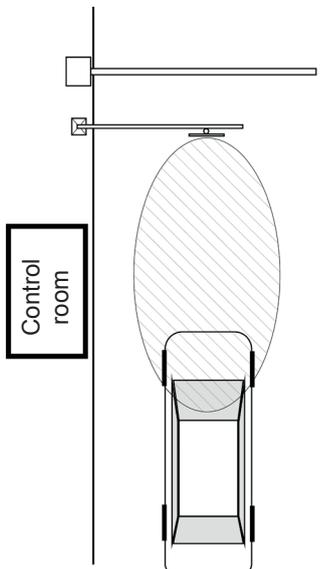
Part No: CARMANHT



**10 Side installation**



**11 Overhead Installation**



## 12 Getting started

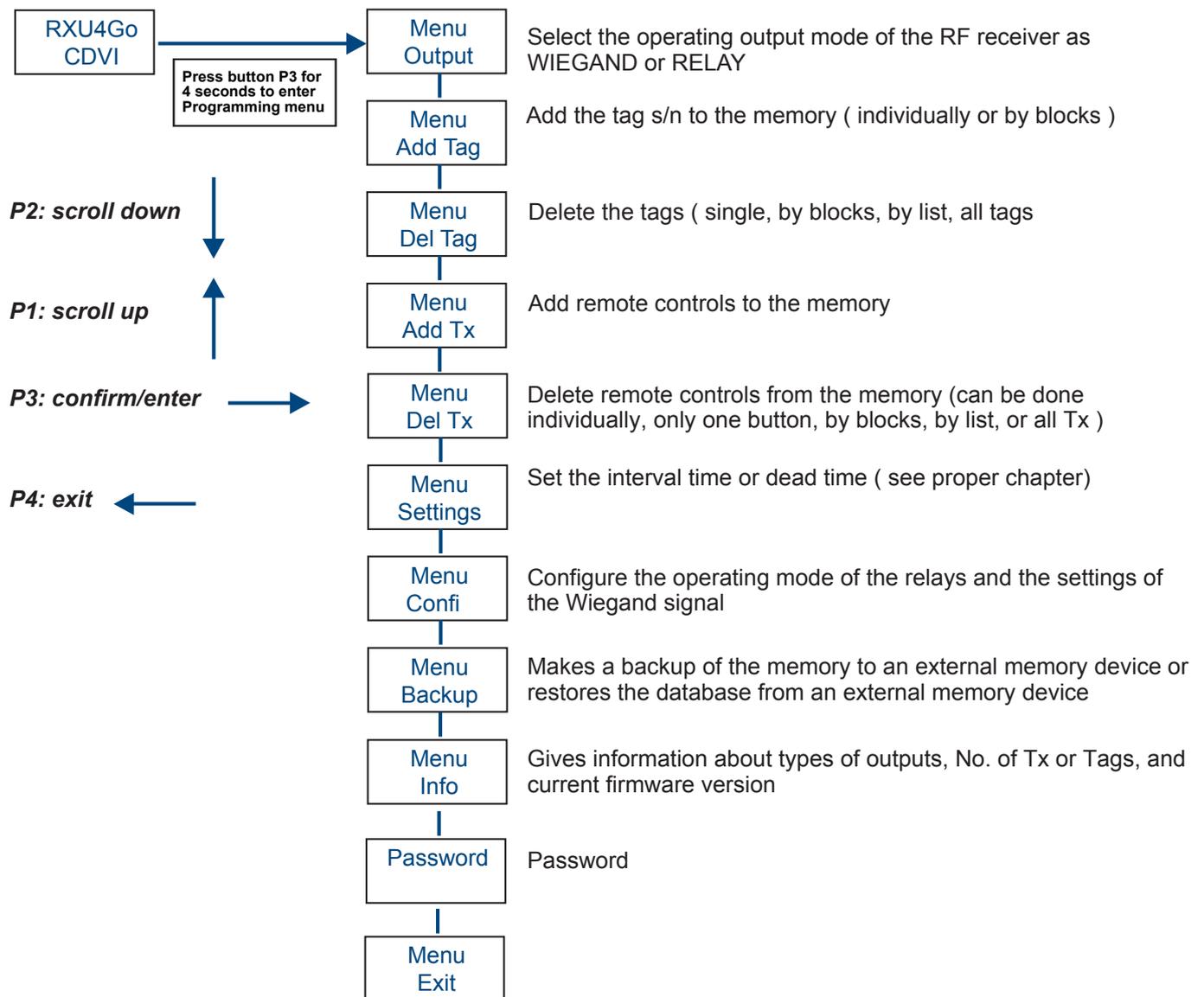
When the antenna installation is complete, it is necessary to determine whether the interface device must activate the relays or simply sends, in Wiegand, the serial numbers of the tags.

**Relay output:** The serial numbers of the tags must be stored (see “Add Card”). the memory can hold up to **7560** cards;

**Wiegand output:** if the interface device is connected to an access control panel through the Wiegand bus, pairing the cards is not necessary and therefore there is **no memory limit**. However, if the SELECTIVE OPERATION MODE is set, the memorization of a single tag will affect the Wiegand communication, so only tags where the s/n has been memorized will be allowed to pass.

Furthermore, if the installation requires the use of Erone Keeloq remote controls, which will be decoded by the built-in receiver, the remote controls must be memorized. The memory contains 100 transmitters.

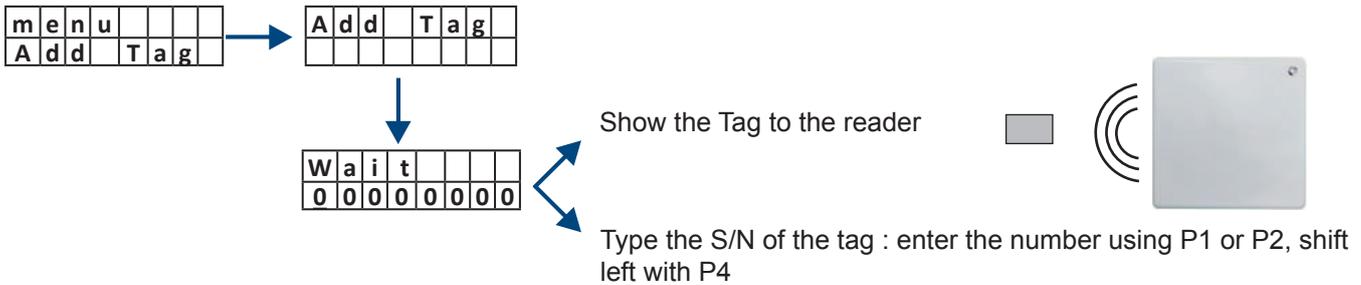
## 13 Programming / Navigation menu



### 14 Add Tag [ Single ]

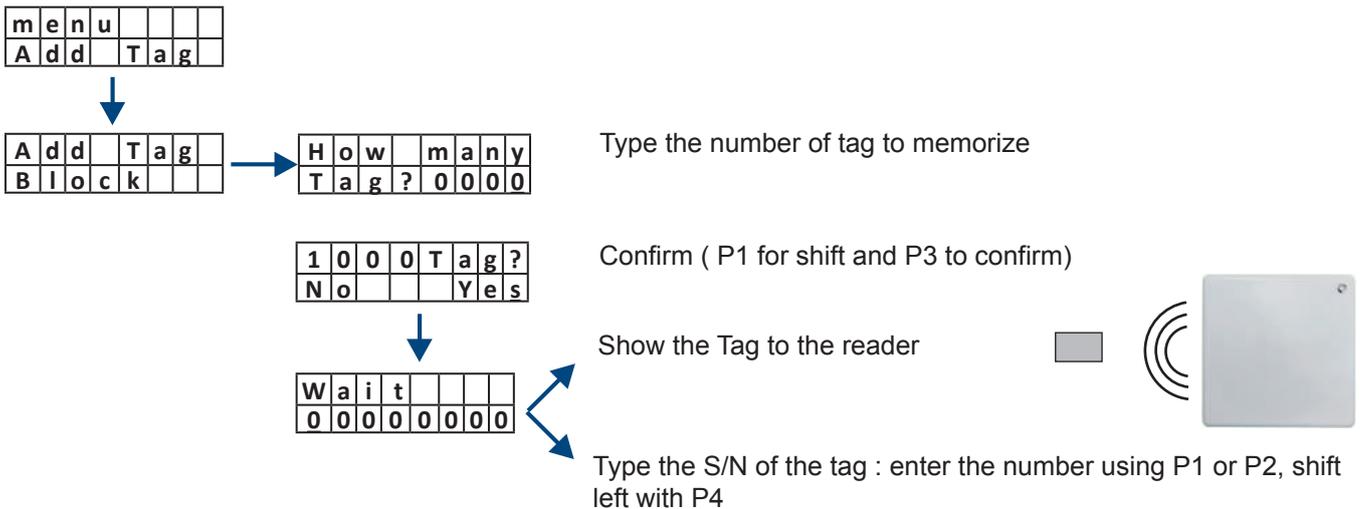
The memorization of even a single tag, enables the SELECTIVE OPERATING MODE. This mode means that from that time on, the interface device filters and sends on Wiegand only the serial numbers of stored tags, and the memory is limited to 7560 tags.  
To operate without any filter, with unlimited memory, it is necessary to delete all memorized tags from the memory.

For adding a tag ( card, plate, sticker ) enter the option “Add Tag” of the main menu and “Add Tag again”.



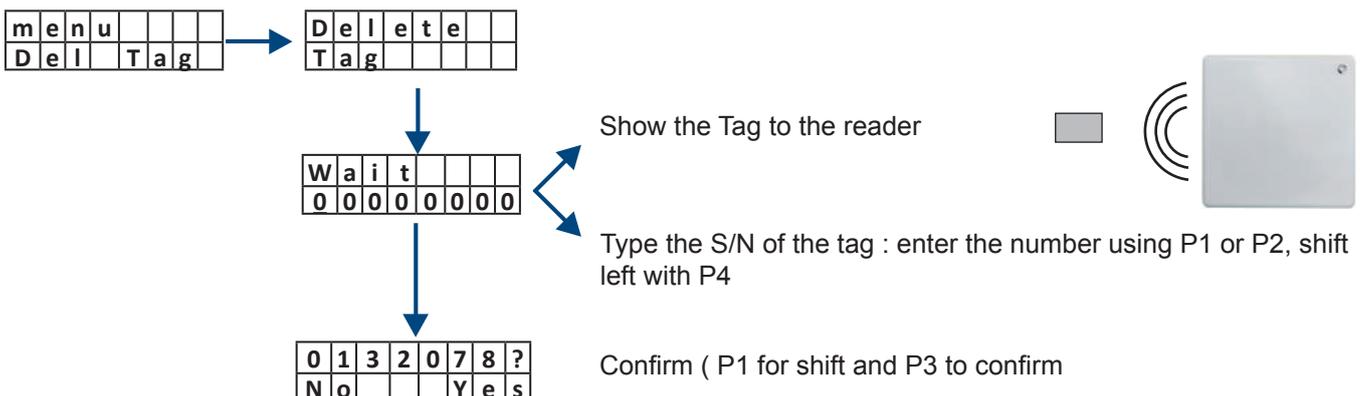
### 15 Add Tag [ Block ]

For adding a block of tags ( card, plate, sticker ) enter the option “Add Tag” of the main menu and “Add Tag Block”.



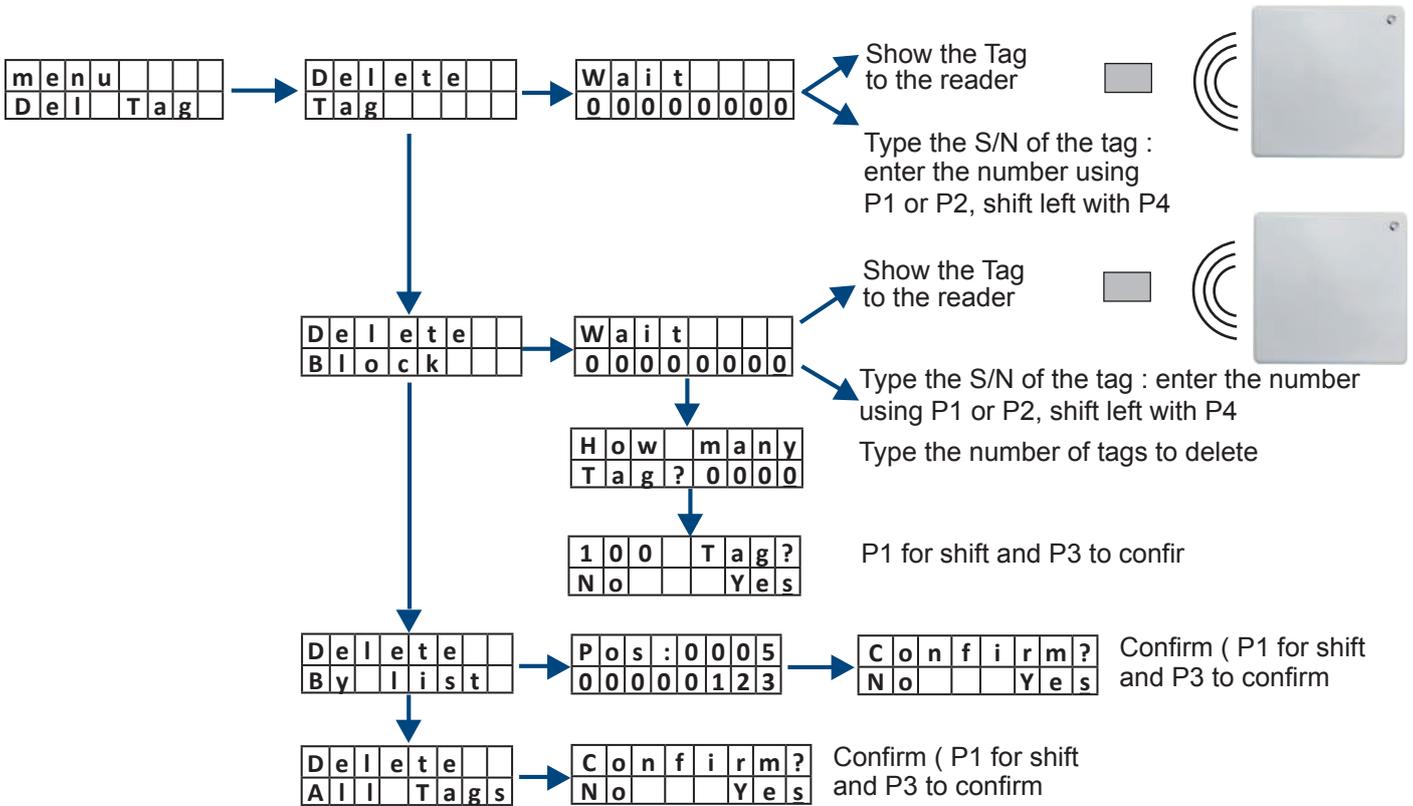
### 16 Delete Tag [ Single ]

For deleting a tag ( card, car-plate, sticker ) enter the option “Add Tag” of the main menu and “Delete Tag”.



## 17 Delete Tag [ Multiple ]

For deleting many tags you can do it by block, selecting them from a list, or delete the full memory.

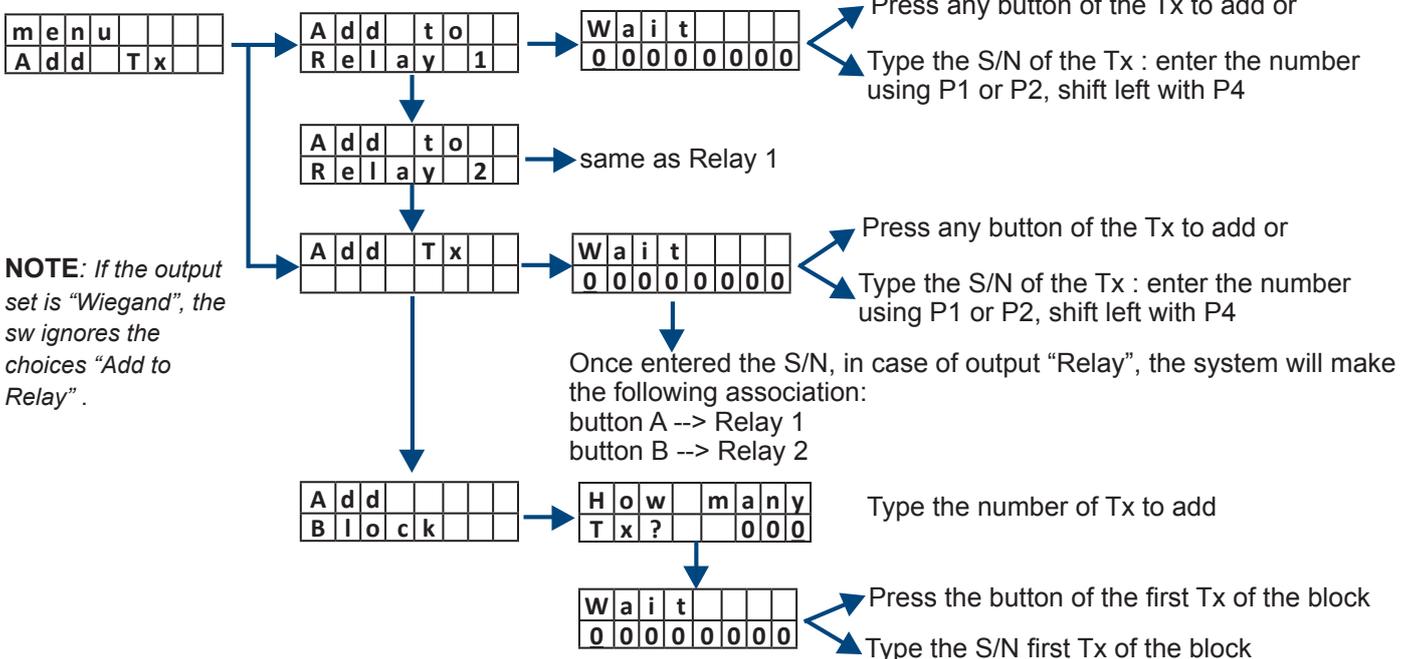


## 18 Add Tx

**ATTENTION:** The memorization of a single Transmitter (Tx), enables the SELECTIVE OPERATING MODE.

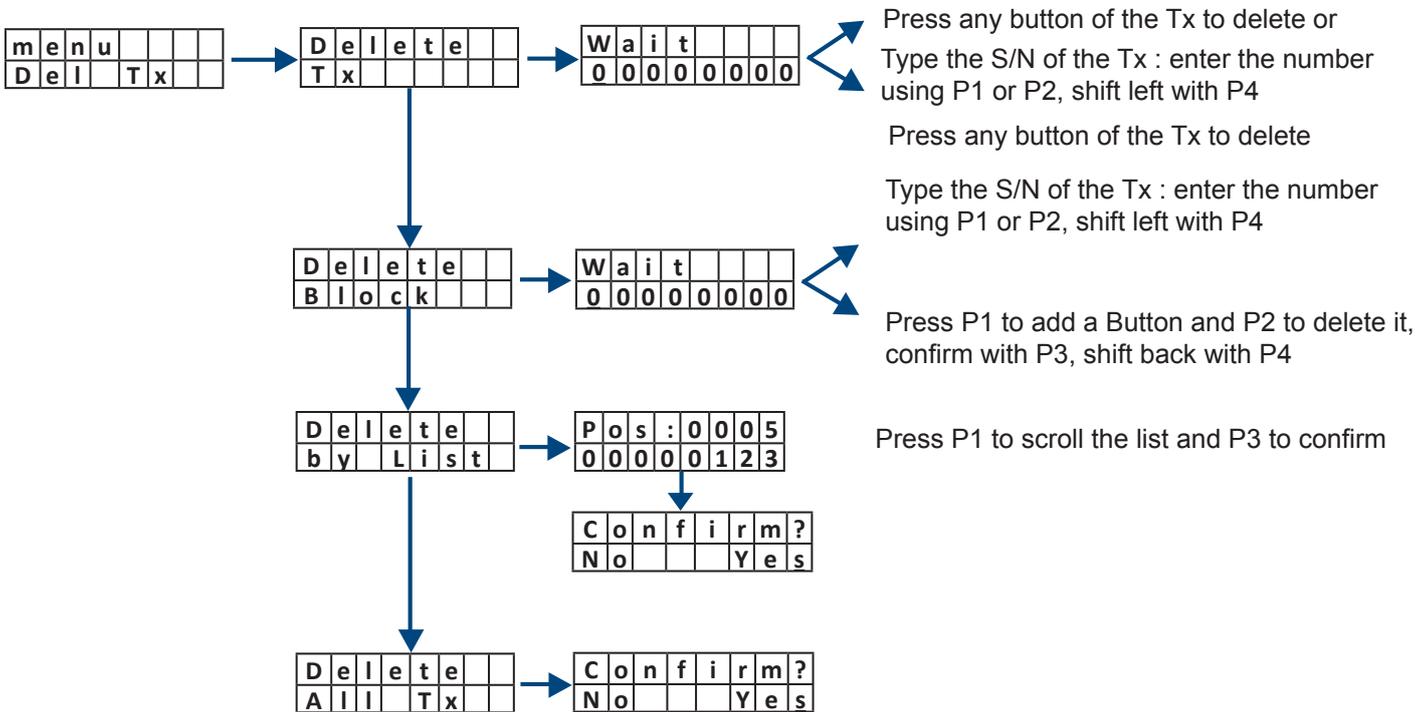
This mode means that from the time that first Tx is memorized, the interface device filters and sends on Wiegand only the serial numbers of memorized Tx (Limit of 100 TX )

Add RF transmitters to the memory ( up to 100 )



**19 Del Tx**

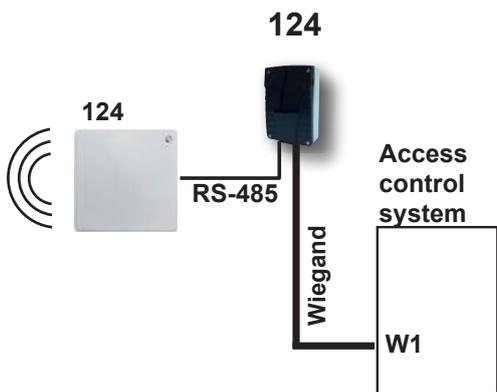
Delete RF transmitters from the memory ( single or multiple



**20 Single or Double Reader Architecture**

The connection shown below can be done with 1 or 2 readers connected on RS-485 to the same interface unit. Each reader is pre-programmed with a unique RS-485 address. The interface automatically assigns the right value to the parameter "Address" The default value of this parameter is 000. During the installation, the first time a UHF card is read, the system changes the default value assigning the address of the activated antenna.

*Example 1 : Single reader configuratio*



*Example 2 : Double reader configuration*

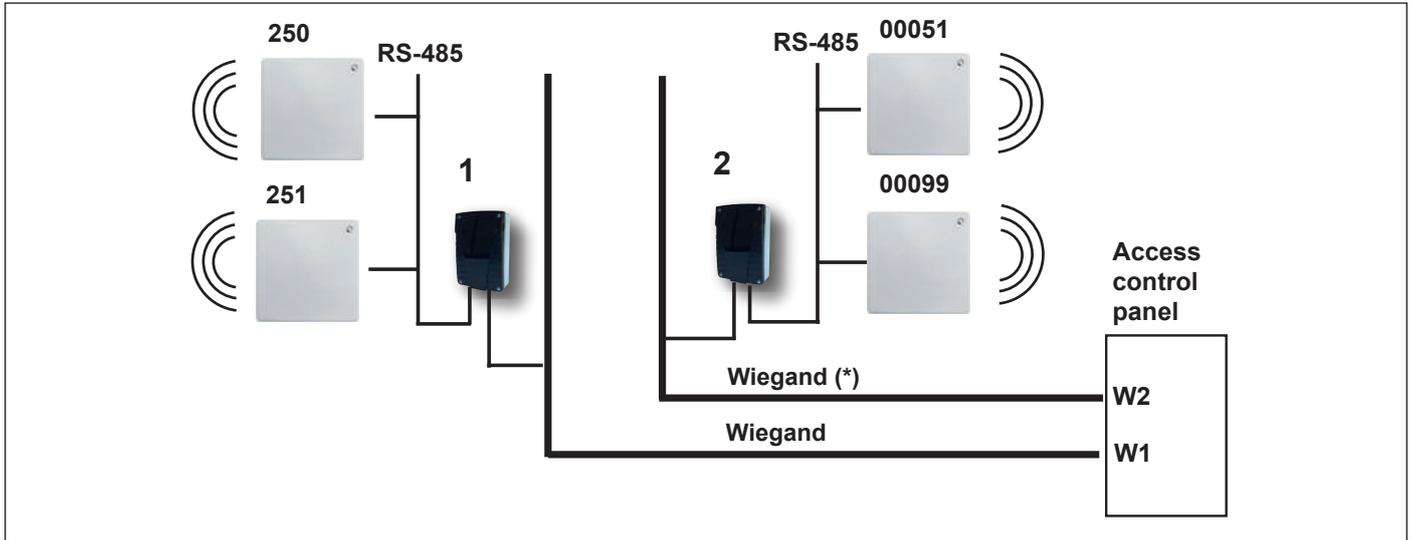
In a double reader installation, the system assigns "Address 1" to the parameter as the address of the first reader activated ( 250 ) and likewise assigns "Address 2" to the parameter as the address of the second reader activated, assigning the value 251.



**AHU49**  
UHF READER

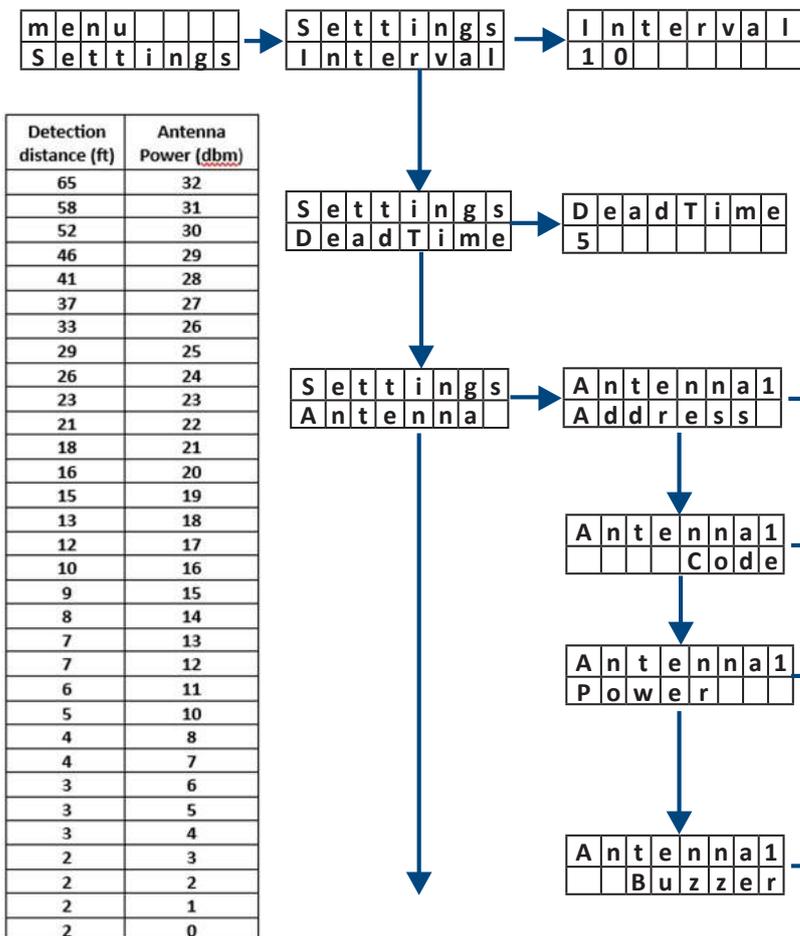
*Example 3 : Double reader and double interface configuratio*

In case of more interfaces connected to an Access Control Panel, it is necessary to assign each a different address , which will be sent on the bus wiegand ( see par.25). This is done by setting the parameter “Code” on the menu Settings to each device. The factory wiegand address is 1.



(\*): Despite having a different wiegand address, it is advisable to use different input ports on the access control to avoid overlap caused by simultaneous activations.

**21 Settings**



Detection distance (ft)	Antenna Power (dbm)
65	32
58	31
52	30
46	29
41	28
37	27
33	26
29	25
26	24
23	23
21	22
18	21
16	20
15	19
13	18
12	17
10	16
9	15
8	14
7	13
7	12
6	11
5	10
4	8
4	7
3	6
3	5
3	4
2	3
2	2
2	1
2	0

Sets the interval time between 2 next trains of bits carrying the S/N of the tag detected by the reader, as long as the tag stands in the field generated by the UHF reader.  
Values available : [0, 5, 10, 20, 30 Sec.]

Set the “deadtime” that is the time in which a tag, once carried out, must remain outside the detection field to be detected again.  
Available values [0, 1, 2, 3, 4, 5, 6, 7, 8 , 9 Sec.]

Set the address of the reader [1 - 254] on RS-485. See the sticker on the reader or make the reading of a card

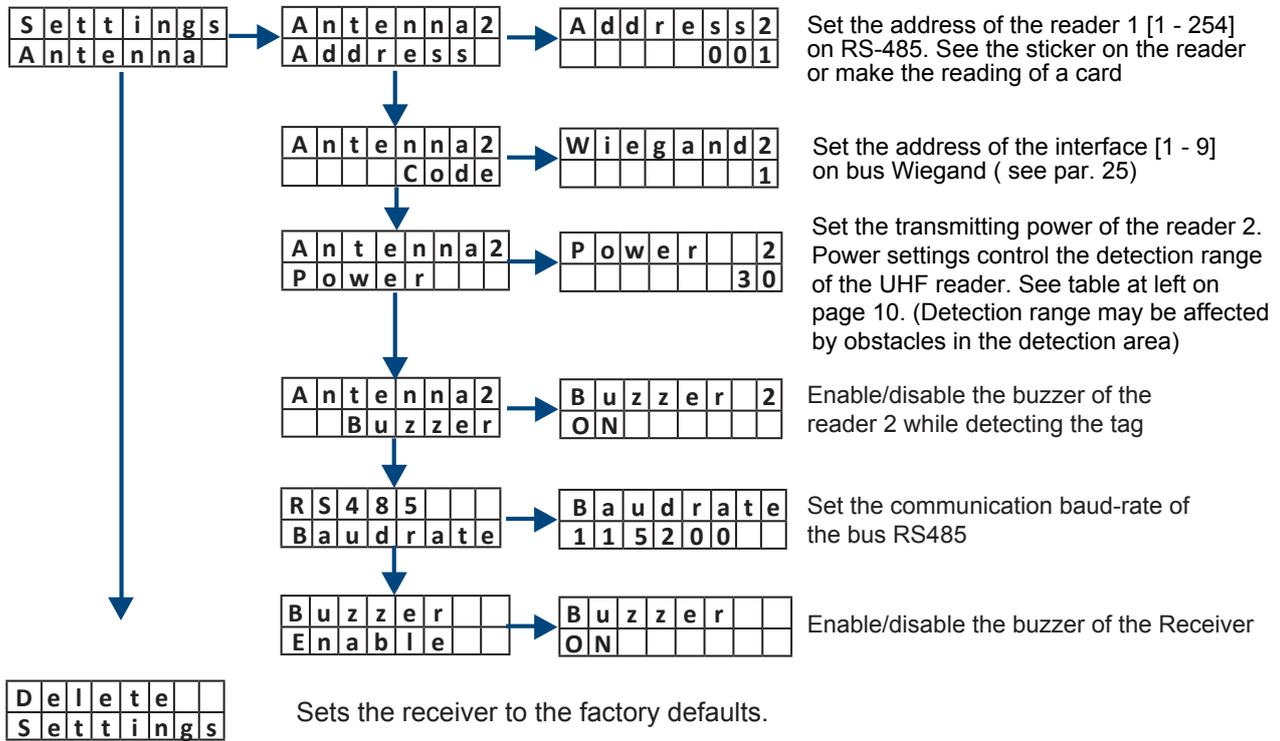
Set the address of the interface [1 - 9] on bus Wiegand ( see par. 25)

Set the transmitting power of the reader. Power settings control the detection range of the UHF reader. See table at left of this page. (Detection range may be affected by obstacles in the detection area)

Enable/disable the buzzer of the reader while detecting the tag

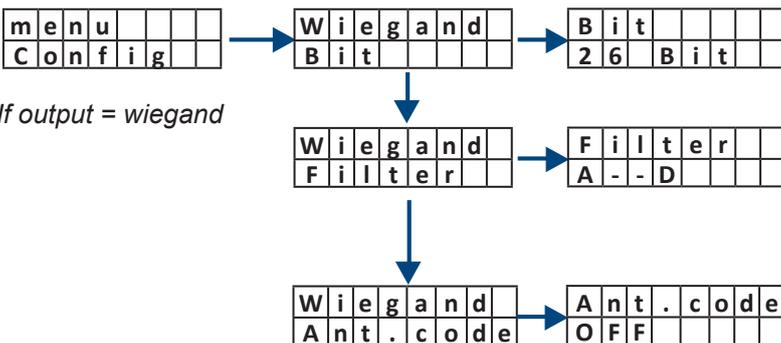
NOTE: the manual assignment of the parameters for Address1 and Address2 is necessary in case of replacement of the antenna as the automatic assignment takes place only if the parameter is 000, factory setting.

**21** Settings (continued)



**22** Config

If the output is "Wiegand", set the Wiegand protocol ( 26, 30 or 44 bit ) and a filter on the Tx buttons. If the output is "Relay" set the operating mode of the 2 relays as Pulse, Step, Timed or Disabled.



If output = wiegand

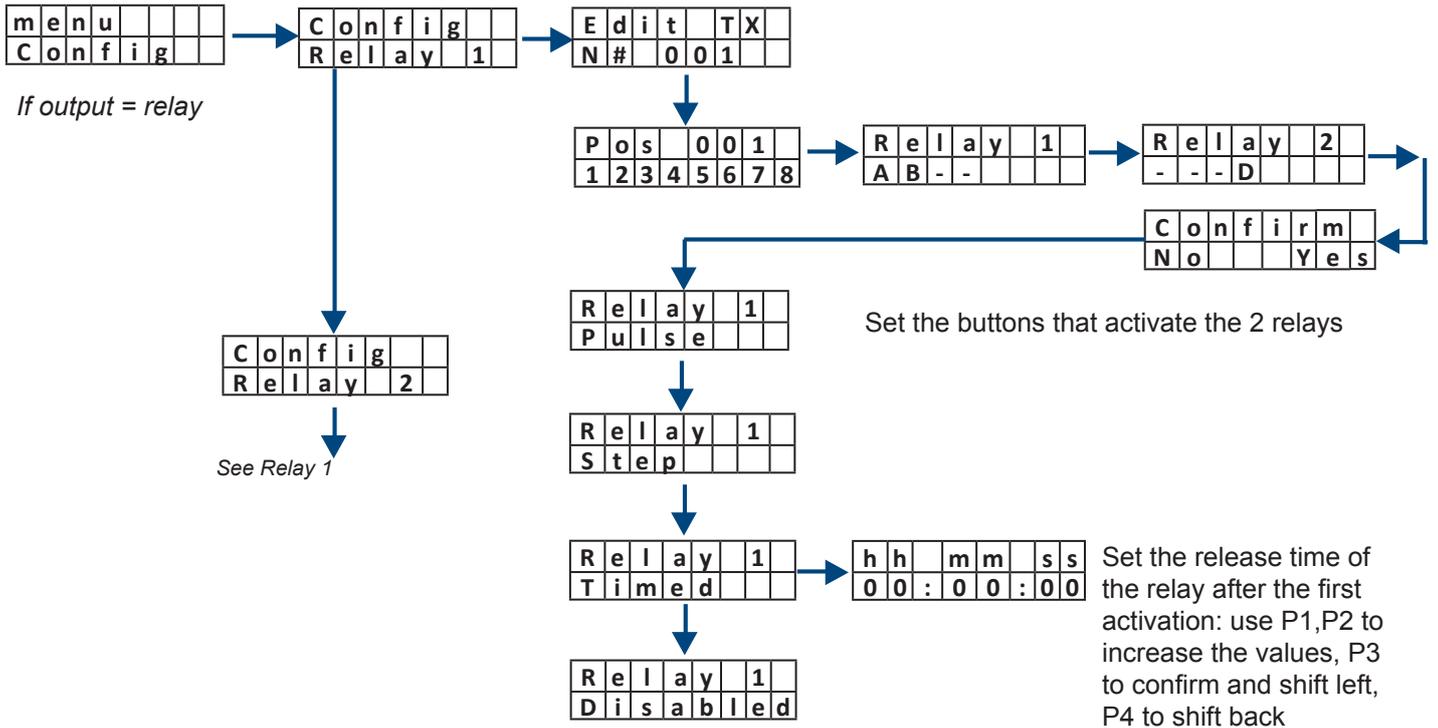
**Set a filter for the Wiegand signal:** this means that a signal is generated only if the button of the transmitter being used has been properly set.

**Example:** A - - D , means that the Wiegand signal will be generated only if buttons A or D are set and if buttons B or C are used no signal is generated

OFF = Facility code unchanged ( factory setting)  
ON = Facility code partly overwritten ( see par. "wiegand output")

**22** Config (continued)

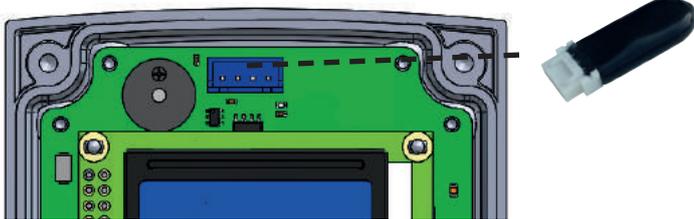
If the output is “Wiegand”, set the Wiegand protocol ( 26, 30 or 44 bit ) and a filter on the Tx buttons. If the output is “Relay” set the operating mode of the 2 relays as Pulse, Step, Timed or Disabled



**23 Backup**

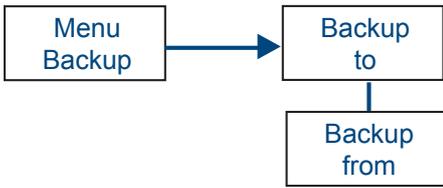
The Backup function allows saving the full internal data-base into an external memory device or the restoration of the data-base from an external memory device

1) 1) Plug-in the memory into the connector as shown below



USB thumb drive – 512 Kb minimum

2) Enter the backup menu and select the option desired.



**ATTENTION:** Restoring the database from an external memory device will overwrite all data in the internal memory at the time of the restoration.

**24 Wiegand Output**

The I/F - receiver converts in Wiegand format both the S/N of the tags UHF and the S/N of the radio transmitters Erone keeloq. The architecture of the Wiegand signal is different according to the number of bits set ( 26, 30 or 44 bit ).

**25.1 Wiegand UHF**

Wiegand 26	Bit 1	Bit 2 - 5	Bit 6 - 25	Bit 26
	Even Parity ( 1 bit )	[ 4 bit Address ] (*)	[ 20 bit S/N ]	Odd Parity ( 1 bit )

Wiegand 30	Bit 1	Bit 2 - 5	Bit 6 - 29	Bit 30
	Even Parity ( 1 bit )	[ 4 bit Address ]	[ 24 bit S/N ]	Odd Parity ( 1 bit )

Wiegand 44	Bit 1-4	Bit 5 - 8	Bit 9 - 16	Bit 17 - 40	Bit 41 - 44
	0000 ( fixed )	[ 4 bit Address ]	00000000	[ 24 bit S/N ]	LRC (**)

(\*) Is the address of the receiver set in the Settings submenu ( see par. 21)    (\*\*) Longitudinal Redundancy Check

**25.2 Wiegand S/N of the radio transmitters**

Wiegand 26	Bit 1	Bit 2 - 5	Bit 10 - 25	Bit 26
	Even Parity ( 1 bit )	[ 4 bit Button ] (*)	[ 20 bit S/N ]	Odd Parity ( 1 bit )

Wiegand 30	Bit 1	Bit 2 - 5	Bit 6 - 29	Bit 30
	Even Parity ( 1 bit )	[ 4 bit Button ] (*)	[ 24 bit S/N ]	Odd Parity ( 1 bit )

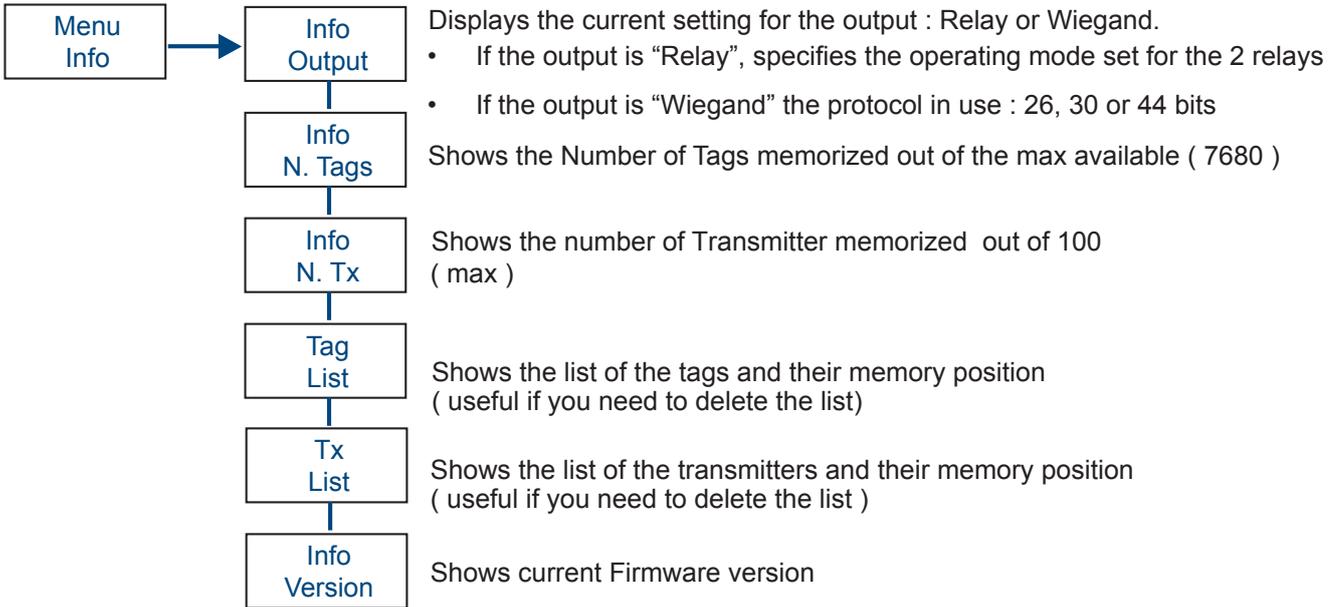
Wiegand 44	Bit 1-4	Bit 5 - 8	Bit 9 - 16	Bit 17 - 40	Bit 41 - 44
	0000 ( fixed )	[ 4 bit Address ]	00000000	[ 24 bit S/N ]	LRC (**)

(\*) Code of the 4 buttons of a transmitter expressed in hex format, according to the table :

Button	Code
A	1010
B	1011
C	1100
D	1101

(\*\*) Longitudinal Redundancy Check

**25 Info**



**26 Password**



The receiver manages 2 different passwords: ADMIN and SERVICE and their use can be activated or deactivated.

The receiver is supplied with the **password disabled**.

The 2 factory passwords are:  
 Password Admin = **11111**,  
 Password Service = **00000**.

By entering the Admin password Admin you are allowed to access the submenu that allows the activation, deactivation and modification of passwords.

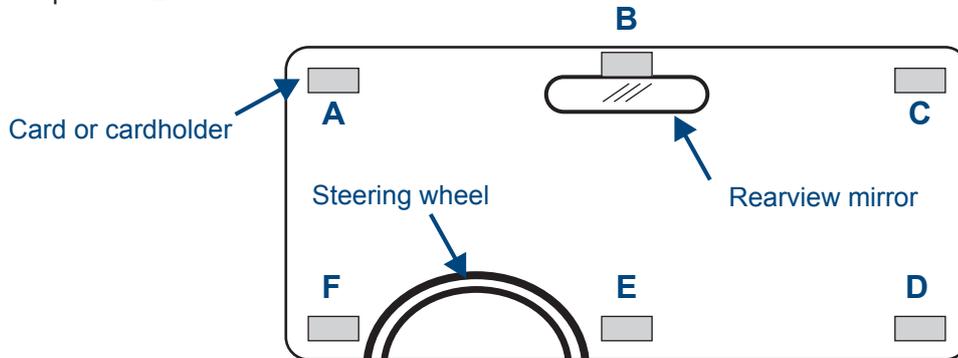
**NOTE:** By entering the Service password you can access the main menu but cannot make any password changes.

Incorrect Password: If you type an incorrect password 5 times, the ID number of the receiver appears on the display: By pressing P3 again, an 8-digit unblocking code (PUK) is requested. To obtain the PUK code, send an email to [sales@transmittersolutions.com](mailto:sales@transmittersolutions.com) or call (866) 975-0101. Once the PUK code is set, the password returns to the factory default value.

**27 Installation of UHF Card tags**

Vehicles without metalized windshields allow the choice of one of the six positions shown on the figure below (A - F) to install the UHF tag.

Vehicles with pre-configured metalized windshields should have a reserved area that is not metalized for RFID tags so choose position B.



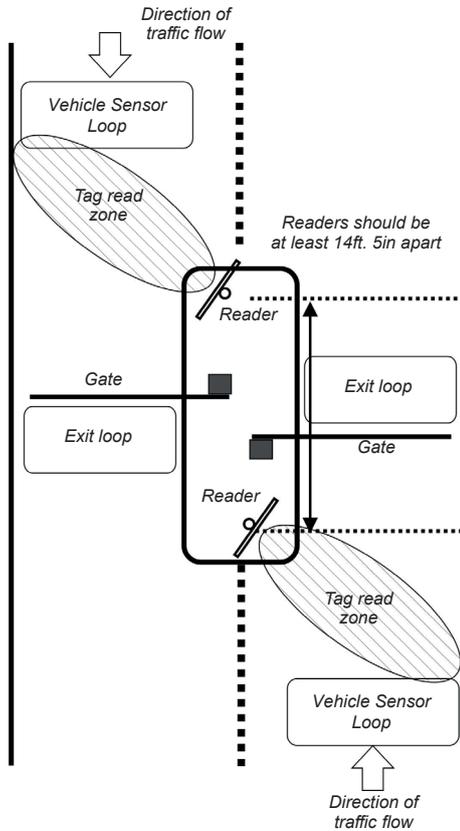
For optimum performance:

- Choose position A or F if the reader is located to the left of your vehicle.
- Choose position C or D if the reader is to the right of your vehicle.
- Choose position B or E if the antenna is in the overhead, above your vehicle

**PLEASE NOTE :** *If your windshield is metalized, the read range of the reader will be affected. Please test the read range before installing the UHF tag.*



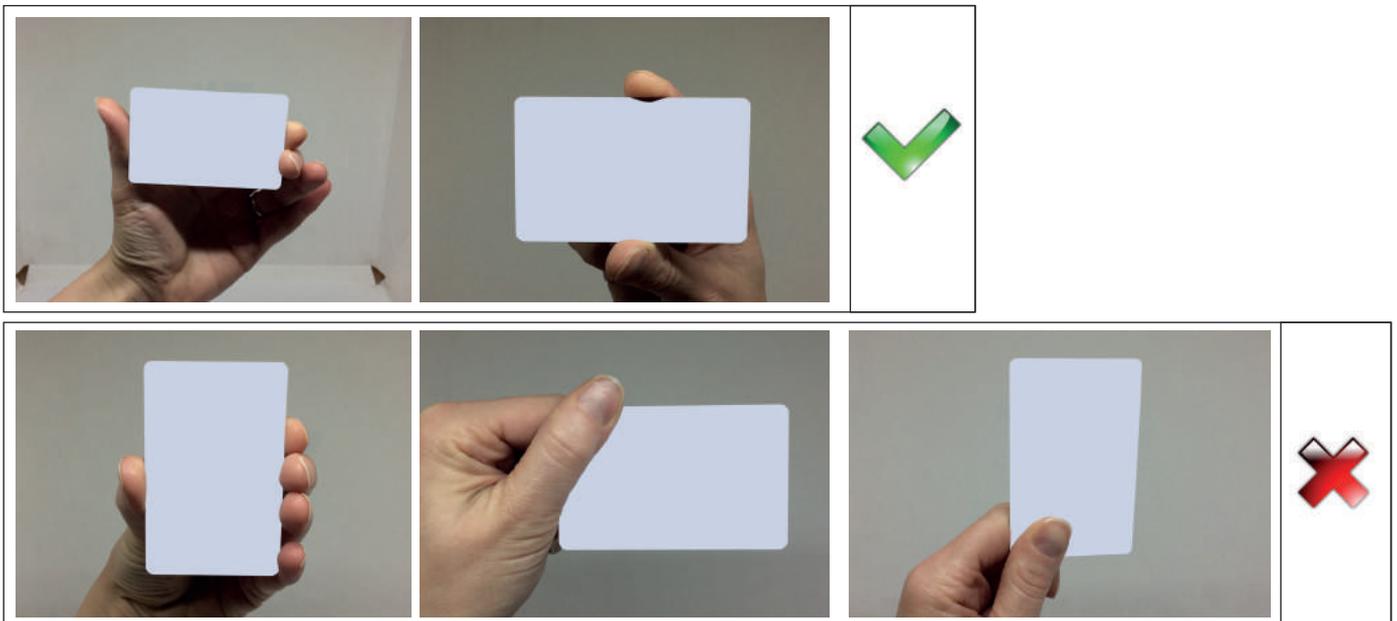
**28** Parking garage application



**29** Hand-held cards

The best position of the reader can be searched, in the first step holding the card by hand.

**PLEASE NOTE:** The card is very sensitive and card detection can change greatly depending on how the card is presented to the reader. Refer to the images Below to understand the best way to hold the card.



Hold the card with your arm outstretched and away from your body. If the card is held near your body, the detection will be significantly decreased. A card in a wallet or a pocket may not be detected.

### 30 Installation of UHF stickers AT49.TS / AT49P.TS

The sticker position placement should be similar to the placement of the card tag, as described in Section 27 above. It is best to apply to the surface of a vehicle's windshield or headlights.

**IMPORTANT:** UHF stickers are thin and fragile. Once applied, they cannot be removed and reused, so please test the performance and detection of the tag in different locations to see what works best before installation.

### 31 Installation of the License plate Tag PT49.TS

Apply only to a vehicle's license plate. Use screws to fix the tag on the bottom edge of the license plate. Please test to ensure performance before installing

### 32 Declaration of Conformity

*Transmitter Solutions hereby declares that the radio equipment type AHU49 complies with the Standard 47 CFR FCC Part 15, subpart B*

### 33 Notice

Any changes or modifications to this equipment not expressly approved by the Transmitter Solutions could void the user's authority to install and operate this equipment and may void the product warranty.

### 34 Warranty

*The warranty period for this product is 24 months, beginning from the manufacturer date.*

*During this period, if the product does not work correctly, due to a defective component, the product will be repaired or substituted at our discretion.*

*This guarantee does not cover the integrity of the plastic container..*

*Any service after the sale is supplied at the factory.*



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