

RFID5 & FD-RFID5 Proximity R/W module for 125KHz H4102 compatible & 13.56MHz ISO14443A tags

Available p/n: 904.500.61 (standard); 904.500.61B (with BLE* receiver)
904.501.61 (with keypad); 904.501.61B (with BLE* receiver & keypad)

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Reading technology

125KHz H4102 64bit read-only compatible tags: 40bit UID with several decodings; RF TX power: 600mW max 13.56MHz ISO14443A (Mifare Classic / Ultralight / DESFire) tags: UID and data blocks; RF TX power: 1W max Bluetooth Low Energy (BLE or Bluetooth 4.0); RF TX power: 4mW max – only on 904.50x.61B models*

Interface

Electrical: TTL or RS232, according to software configuration and pins used.

Data Format: according to software configuration and DIP switches settings.

Proximity: minimum 4 cm, with ISO card, in good conditions. BLE: up to 10 m – only on 904.50x.61B models*

Reading range

Audio-visual indication

Multi Color LED. The Red and Green lights and the buzzer can be controlled by the host device by means of the LR, LG and BUZZ pins respectively, activated by short-circuiting them to GND. If the LED pins are not managed, the Blue LED is permanently ON. If the BUZZ pin is not managed, no sound will be emitted. When configured as a FD-RFID5, LED & buzzer are controlled by special commands sent by the controller.

Power supply

5..15V , 150mA max

Physical data

Dimensions: 80 x 80 x 23 mm (H x W x D, outline); Weight: 150g;

IP65 environmental protection (assuming the screw connector pit is properly sealed with neutral silicone);

temperature range: -20° to +60°C.

9-pins removable screw connector – cable not provided

Physical Interface

Test&Reset button

Installation Notes

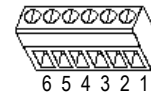
- Equipment must be powered by means of a power adapter certified according to IEC 62368-1. Its output must be classified ES1, PS1 according to IEC 62368-1, short circuit protected and overload protected.
 - The reader must be installed by qualified personnel, at a height of less than 2m and in the absence of children.
 - Don't mount the reader directly on metal surfaces, or at less than 3 cm from metal surfaces
- For outdoor usage, only after you have made and tested the necessary wire connections, just fill the screw connector pit with neutral silicone (making it sure to fully cover the screws) to achieve a full IP65 environmental protection

Point-to-point connection (when configured as a RFID5)

For connections to any terminal / controller provided with a 6-pin external reader screw connector, you can just insert the necessary stripped wires in the correct positions according to the picture at the right.

Screw block on terminal / controllers (Serial TTL / CkData)

Reader	Controller
1	1
2	2
3	3
4	4
5	5
6	6
9	7*



*The 7th pin (BUZZ) is available only on some controllers. In all other cases you may short-circuit pins 9 & 6 on the reader in order to emit a sound as long as the green LED is activated.

Output Assignments

PIN NR. & NAME	CLKDATA MAGSTRIPE	WIEGAND	SERIAL 9600..115200 DEFAULT 57600,N,8,1	FD-Bus (RS485 - SPP) STANDARD CABLING
1. +VIN		Power 5..15V 		+Vdc  Orange + Green
2. GND		Gnd		Gnd  White/Orange + White/Green
3. W0/DA/RX	Data	Data0	RXD (TTL)	N.C.
4. W1/CK/TX	Clock	Data1	TXD (TTL)	N.C.
5. LR/485B		RED LED signal (to Gnd)		B (D-)  White/Blue
6. LG/485A		GREEN LED signal (to Gnd)		A (D+)  Blue
7. 232RX	N.C.		RXD (RS232)	N.C.
8. 232TX	N.C.		TXD (RS232)	N.C.
9. BUZZ		BUZZER signal (to Gnd)		N.C.

WARNING – The protective film which covers the configuration DIP switches has been designed to let you set the DIP switches according to your needs (as explained below) without the need to break it or remove it, otherwise the IP65 protection would be lost.

- 1) **DIP6 = OFF (RFID5 mode – the following is valid only for R/W modules with fw version 36 or subsequent):** in this case DIP switches 1&2 can be used to force a specific autoread output interface, while DIP switches 3,4 and 5 can be used, at the same time, to force the polling of a specific type of tags, no matter which is the current software autoread configuration stored in the R/W module.

As per the default jumpers settings and software autoread configuration, the reader polls all LF (125KHz H4102) tags, HF (13.56MHz ISO14443A) tags & BLE devices*, and outputs their factory preset UID codes converted to decimal in serial format at 57600,N,8,1.

DIP1	DIP2	AUTOREAD OUTPUT INTERFACE
OFF	OFF	According to software autoread configuration
ON	OFF	Forced to CkData MagStripe
OFF	ON	Forced to Wiegand 26bit H10301
ON	ON	Forced to Wiegand 37bit H10302

DEFAULT



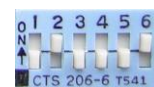
DIP3	DIP4	DIP5	SELECTED TAG TYPE POLLING
OFF	OFF	OFF	According to software autoread configuration
ON	OFF	OFF	Forced polling of LF (125KHz H4102) tags ONLY
OFF	ON	OFF	Forced polling of HF (13.56MHz ISO14443A) tags ONLY
ON	ON	OFF	Forced polling of LF&HF tags ONLY
OFF	OFF	ON	Forced polling of BLE devices* ONLY
ON	OFF	ON	Forced polling of LF tags and BLE devices* ONLY
OFF	ON	ON	Forced polling of HF tags and BLE devices* ONLY
ON	ON	ON	Forced polling of all LF&HF tags and BLE devices*

Note: no matter which is the currently selected autoread output interface, the serial console is always active, so you can send commands to the R/W module and receive the replies at any time, with any TTY terminal emulator or serial communication program.

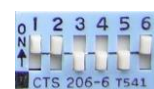
- 2) **DIP6 = ON (FD-RFID5 SPP mode):** in this case DIP switches 1..5 can be used to define the device RS485 address in binary logic: the lowest possible address is '1' (only DIP1 in ON position), the highest is '31' (all DIP switches in ON position). The bi-directional communication interface is fixed and the autoread settings can only be configured by the RS485 Master / Field Manager.



Address 1



Address 2



Address 3



Address 31

Basic X1/X2 terminal configuration:

By keeping the jumpers setting as per default (i.e. all OFF), you can switch among the two following basic "Card UID reading" modes by simply changing the "CardDecode" parameter in the X1/X2 web server section relevant to the reader connector used: the software autoread configuration of the reader will be automatically changed accordingly (this is useful at least for testing purposes, but the actual configuration to be performed depends on your specific needs). **Warning:** the "CardDecode" settings must always be performed after having connected the reader. Any previous setting (it doesn't matter if the parameter already had the desired value) won't affect the reader configuration.

polling of LF (125KHz H4102) tags ONLY
CikData MagStripe interface

Card Decode 00.Magnetic Swipe TK2/RFID 125KHz TMC

polling of HF (13.56MHz ISO14443A) tags and BLE devices* ONLY
Serial Interface at 57600,N,8,1

Card Decode 42.RF3/RF4/RF5 Serial Reader UID

Test&Reset button:

By pressing the Test&Reset button (whose position can be checked in the screw block picture) for either 1 or 2 seconds (the reader emits a short beep after one second and then another after two seconds) then the reader enters a temporary test mode, in which it polls all LF & HF tags and BLE devices* and outputs their factory preset UID codes converted to decimal in serial format at 57600,N,8,1 like as per default, no matter which is the current software autoread configuration (that is not changed permanently). This is meaningful only if all DIP switches are set to OFF, since they have a higher priority; in particular, setting all DIP switches 3, 4 and 5 to ON has the same effect of the "test mode", but with a permanent hardware setting. The reader automatically quits the "test mode" and restores its previous software autoread configuration as soon as it's restarted. Furthermore, if you keep the button pressed for 5 seconds (the reader emits a continuous beep, and at this point you can release the button), then the reader is reset to factory default, i.e. it will poll all LF & HF tags and BLE devices*, and output their factory preset UID code converted to decimal in serial format at 57600,N,8,1, this time permanently changing its software autoread config.

RFID5 mode:

Data transmission: when a card is detected, autoread data can be transmitted either in magstripe reader emulation (Cik&Data), or Wiegand format (37bit H10302 or 26bit H10301), or serial format at 9600 / 19200 / 38400 / 57600 / 115200,n,8,1 in ASCII protocol (with both RS232 or TTL levels available; baud rate is 57600 by default), according to the interface selection DIP switches 1&2 and to the software autoread configuration. For further details and a list of the available commands/answers and their format please refer to the "RF5-RF6-RF9 13.56MHz / 125KHz Manual", that can be downloaded from the AxesTMC web site <http://www.axesstmc.com/> in the *Manuals* section of the partner's area. In the *Utility & SW* section of the same *Partners Area* you can also download a useful program called "RFID2QuickConf" which, among other functions, allows you to load the latest reader firmware version, change the baud rate for the serial interface and change the software autoread configuration, including which data block should be retrieved (in case of 13.56MHz ISO14443A smart tags), its decoding format and the output interface to be used when setting both DIP switches 1&2 to OFF position.

Autoread configuration: the module is preprogrammed for automatic retrieving and transmission of the UID code always present in all tags, when a card enters in the field range. The module can also be programmed for reading and transmission of other content of the card: please refer to the above mentioned "RF5-RF6-RF9 13.56MHz / 125KHz Manual" for the possible options.

Default UID Output Format:

	CLKDATA	SERIAL 9600..115200,N,8,1	WIEGAND 37BIT H10302	WIEGAND 26BIT H10301
125KHz H4102 compatible	5 bytes to 14 digits transmitted (TMC decoding): 0F026BF417 → 00064465138711?	5 bytes to 14 digits transmitted (TMC decoding): 0F026BF417 → 00064465138711<CR>	35 least significant bits transmitted, decoded to 11 digits: 7026BF417 → 30105400343	3 least significant bytes (1+2), i.e. 24 data bits transmitted, decoded to 8 digits (3+5): 6BF417 → 10762487
13.56MHz Mifare Classic®	4 bytes to 10 digits transmitted: A6A7E770 → .2796021616?	4 bytes to 10 digits transmitted: A6A7E770 → 2796021616<CR>	4 bytes, i.e. 32 data bits transmitted, decoded to 11 digits: A6A7E770 → 02796021616	3 least significant bytes (1+2), i.e. 24 data bits transmitted, decoded to 8 digits (3+5): A7E770 → 16759248
13.56MHz Mifare UltraLight® Mifare Desfire® Mifare Classic EV1®	7 bytes (1+2+4) to 20 digits (5+5+10) transmitted: D0020896EEA747BC → .53250021984003940284?	7 bytes (2+2+4) to 20 digits (5+5+10) transmitted: D0020896EEA747BC → 53250021984003940284<CR>	4 least significant bytes, i.e. 32 data bits transmitted, decoded to 11 digits: EEA747BC → 04003940284	3 least significant bytes (1+2), i.e. 24 data bits transmitted, decoded to 8 digits (3+5): A747BC → 16718364

Keypad usage (904.501.61 keypad models only): the code of each key pressed is immediately sent to the terminal / controller on 4 bits if the module is configured for Wiegand output, or on a single ASCII character followed by <CR> if the module is configured for Serial output. Thus, in such cases, you can use the device in any of the following modes, according to the terminal configuration: card reading, card code typing (if parameter AllowTypeCode=1 in the [TimeAttendance] section of the PARAMETERS.TXT file), card reading + 4-digits PIN request (if parameter AskPin=1 in the [AccessControl] section of the PARAMETERS.TXT file), 4-digits "PIN only" typing (if parameter PinOnly=1 in the [AccessControl] section of the PARAMETERS.TXT file).

Warning: remember that when connecting the module to an AxesTMC terminal / controller in Wiegand or Serial mode there is no visual feedback at all until the transaction is completed: the LED status doesn't change even if the terminal is waiting for a key to be pressed.

FD-RFID5 mode: supported functioning modes

Card reading: in idle status the LED is blue still. You can then simply place a card on the reader to transmit the code read to the RS485 Master / Field Manager: in case of valid reading the LED will turn green for a while, otherwise the LED will turn red twice and a multiple beep will be emitted.

Card code typing (904.501.61 keypad models only): while in idle status you can also start typing a user code: as soon as you press the first digit the LED will turn green, which means "waiting for the next card code digit". You must then type as many digits as needed to reach the card code length set in the RS485 Master / Field Manager (leading zeroes must be typed, since there is no automatic filling); you can also press the # button to cancel all the previously entered digits and start again. As soon as you type the last card code digit, the entered user code will be transmitted, and treated exactly as if it was a card reading.

Card reading + 4-digits PIN request (904.501.61 keypad models only): if the card code read requires a security PIN introduction, the LED will turn green after the card reading, which means "waiting for PIN typing". You must then type exactly 4 digits; you can also press the # button to cancel all the previously entered digits and start again. As soon as you type the last PIN digit, in case of a correct PIN you will hear an extended beep, otherwise the LED will blink red twice and a multiple beep will be emitted.

4-digits "PIN only" typing (904.501.61 keypad models only): if you have enabled the "Allow PIN only" function, while in idle status you can also start typing the security PIN of a user: as soon as you press the first digit the LED will turn green, which means "waiting for the next PIN digit". You must then type 3 more digits; you can also press the # button to cancel all the previously entered digits and start again. As soon as you type the last PIN digit, the entered PIN will be transmitted: in case of a correct PIN the RS485 Master / Field Manager will proceed as if the corresponding card code had been read and you will hear an extended beep, otherwise the LED will blink red twice and a multiple beep will be emitted. **Warning:** this functioning mode overrides the "Card code typing" mode should both be enabled, so in this case it would not be possible to type a card code; it's still possible, instead, to read a card and then type the corresponding security PIN.

***Note:** BLE functionality requires either active BLE tags or transmitting devices with **Android 4.4 or higher / iOS 9 or higher** operating system and with the "Entro" app developed by Zucchetti Axes, that can be freely downloaded from the relevant online stores.

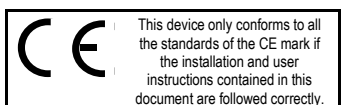
This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation. Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

RF Radiation Exposure Statement:

This product complies with FCC radiation exposure limits set forth for an uncontrolled environment. The antenna should be installed and operated with minimum distance of 20 cm between the radiator and your body. This device and its antenna(s) must not be co-located or operating in conjunction with any other antenna or transmitter except in accordance with FCC multi-transmitter product procedures.



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