

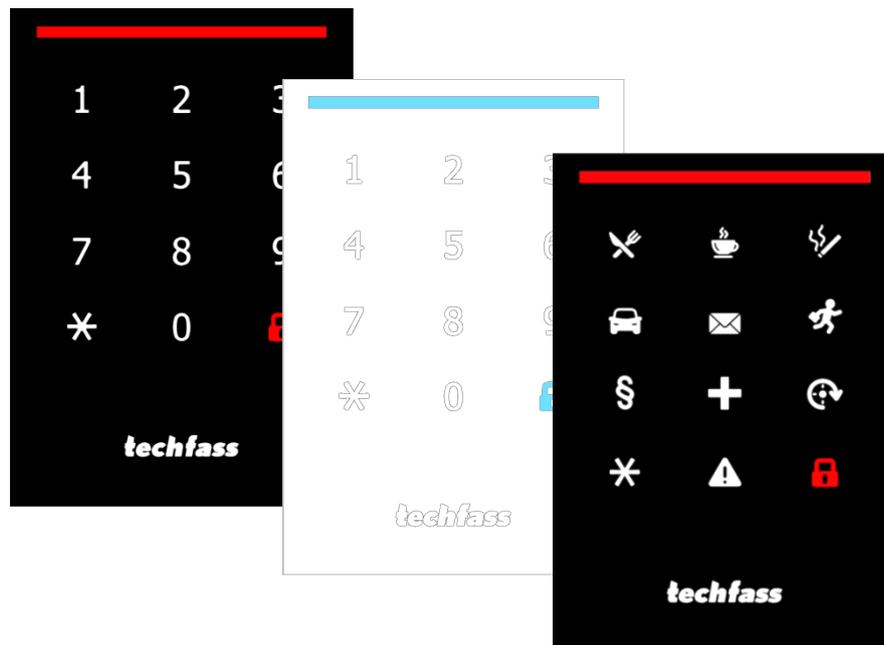
techfass

WRE 121K

WRE 121A

Dual reader with keypad with WIEGAND output and RS-485 interface

User's guide



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1 Content

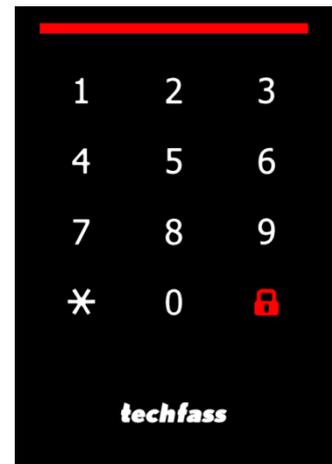
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2 WRE 121K and WRE 121A readers

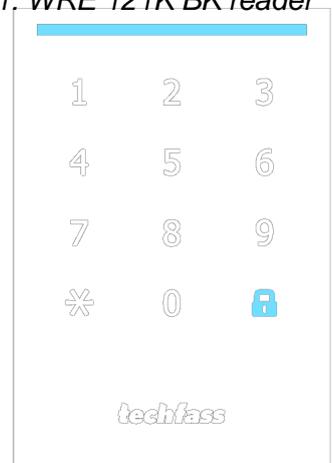
The dual contactless RFID readers **WRE 121K** (numeric keypad) and **WRE 121A** (reason keypad for T&A systems) are equipped with a pair of reading technologies, 125 kHz (e.g. EM Marine) and 13,56 MHz (e.g. MIFARE®, NFC). The reader features configurable standard interfaces, i.e. WIEGAND data output and RS-485 interface.

The reader is suitable not only for door controllers, door modules or Wiegand interfaces of **APS systems**, it can be used for general OEM integration for 3rd party systems. Next to classic RFID cards or tags, the reader is compatible with mobile phones equipped with NFC technology and minimum OS Android® 4.4 Kit Kat (or higher) with installed application TF Mobile ID. The mobile phone can be used for identification instead of classic cards (card emulation mode).

The reader can be wall mounted outdoor or indoor (code IP 55).



Pic. 1: WRE 121K BK reader



Pic. 2: WRE 121K WH reader

2.1 WRE 121K BK reader

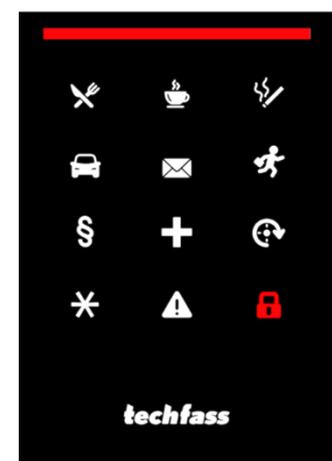
The WRE 121K BK readers are equipped with a numeric keypad suitable for applications requiring PIN or access code entering for valid identification of a user. The readers are supplied in a black glossy box with front surface is made of tempered glass (pic. 1).

2.2 WRE 121K WH reader

The WRE 121K WH readers are equipped with a numeric keypad suitable for applications requiring PIN or access code entering for valid identification of a user. The readers are supplied in a white glossy box with front surface is made of tempered glass (pic. 2).

2.3 WRE 121A BK reader

The WRE 121A BK readers are equipped with a reason keypad suitable for T&A applications, where a code of a pressed key is usually used to distinguish the reason of T&A status change. The readers are supplied in a black glossy box with front surface is made of tempered glass (pic. 3).



Pic. 3: WRE 121A BK reader

MIFARE® and MIFARE Classic® are trademarks of NXP B.V.
Android® is a trademark of Google LLC.

3 Technical parameters

3.1 Product versions

Product version	Product name	Color	Keypad	Catalog number	RFID properties ¹⁾			
					TF	EM	NFC	MIFARE®
	WRE 121K BK	Black glossy	Numeric	56412100	✓	✓	✓	✓
	WRE 121K WH	White glossy	Numeric	56412101	✓	✓	✓	✓
	WRE 121A BK	Black glossy	Reason	56412120	✓	✓	✓	✓

Table 1: Product versions

¹⁾ **TF** – TECHFASS factory ID media reading; **EM** – EM Marin ID media reading; **NFC** – card emulation mode by cell phone; **MIFARE®** – MIFARE® family ID media reading

3.2 Functional parameters

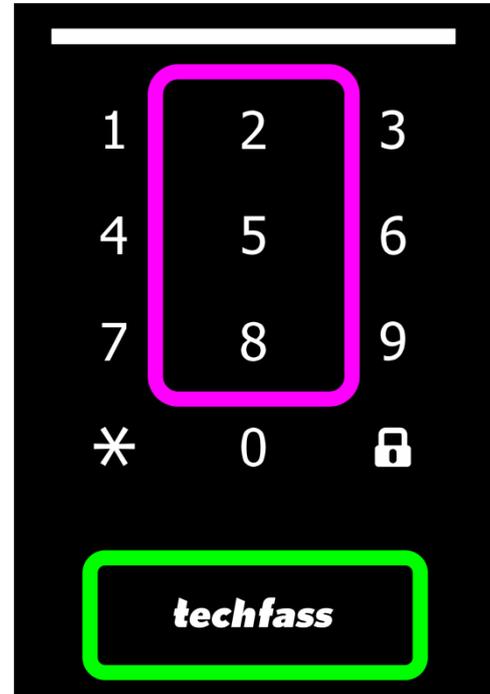
Functional parameters	Power supply		8 ÷ 28 VDC	
	Current consumption	Typical	65 mA @ 12V, 35mA @ 24 V	
		Peak	180 mA @ 12V, 100mA @ 24 V	
	Power save mode		Yes, configurable	
	Typical power, peak power		0,8 W, 2,4 W	
	Keypad	WRE 121K		Numeric, 11 keys + lock symbol key
		WRE 121A		Reason, 11 keys + lock symbol key
	ID technology, typical reading range	EM Marin (125 kHz)		4 cm (card ISO)
		MIFARE® (13,56 MHz)		5 cm (card ISO MIFARE Classic®)
	Inputs			2x potential-free contact, configurable function
	Outputs			1x tamper (OC, TTL)
	Signalization			1x RGB LED bar 1x PIEZO melodic Buzzer
	Tamper protection	Against sabotage		Optical
Data interface 1			WIEGAND output (configurable w/o SW)	
Data interface 2			RS-485	

Table 2: Functional parameters

3.2.1 Antenna placement – where to put EM Marin or MIFARE® / NFC chip

The 125 kHz Antenna for EM Marin chips is placed in the upper middle part of the reader. Please put 125 kHz cards into the purple area for identification. The 13,56 MHz antenna is placed around the *techfass* logo, please put your MIFARE® / NFC cards or your cell phone with TF Mobile ID to the green marked place for identification.

- 125 KHz antenna (eg. EM Marin)
- 13,56 MHz antenna (eg. MIFARE®)



Pic. 3: Placement of antenna 125 kHz & 13,56 MHz

3.3 Identification by the cell phone with OS Android® 4.4+

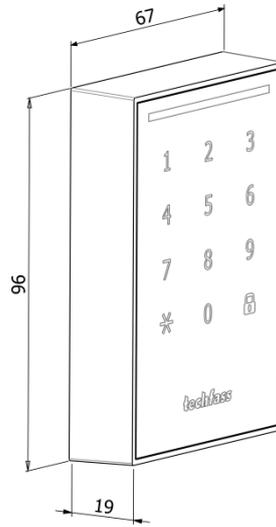
It is possible to use a cell phone equipped with NFC technology, operating system Android 4.4 Kit Kat (or higher) and installed *TF mobile ID* application for identification instead of the cards or chips. You can download the application *TF mobile ID* on Google Play for free.



Pic. 4: TF mobile ID

3.4 Mechanical parameters

3.4.1 Dimensions



Pic. 5: Dimensions of the reader WRE121K and WRE 121A

3.4.2 Mechanical parameters

Mechanical parameters	Weight	207 g	
	Operating temperature range	-25 ÷ 70 °C	
	Relative humidity	5 ÷ 95 %, non-condensing	
	IP code	IP 55	
	IK code	IK 07	
	Cable length	2 m	
	Color	WRE 121K BK, WRE 121A BK	Glossy black
		WRE 121K WH	Glossy white
	Keypad	WRE 121K BK, WRE 121K WH	Numeric, 11 keys + lock symbol key
		WRE 121A BK	Reason, 11 keys + lock symbol key
Dimensions (height x width x depth)	96x67x13,5 mm		
Frame material	Polycarbonate, 94V - 2		
Glass material	Tempered glass (Gorilla g. 2320)		

Table 3: Mechanical parameters

3.4.3 Special tempered glass

The reader WRE121K and WRE 121A readers are equipped with a special tempered glass, which cannot be easily scratched by door keys or other solid objects thus providing good mechanical endurance. This is a great difference compared to similar products on market, which are equipped just with a polycarbonate or plexiglass.

3.4.4 Cable wiring

GND	12V	IN1	IN2	TAM	W0	W1	B	A	GND
1	2	3	4	5	6	7	8	9	10

Table 4: Cable wiring

3.5 Wiring description

Wiring description	#	Color	Meaning
	1	Blue	GND (0 VDC) – power supply
	2	Red	+ 8 ÷ + 28 VDC – power supply
	3	Yellow	Input 1 (IN 1), configurable function and activation level logic
	4	Grey	Input 2 (IN 2), configurable function and activation level logic
	5	Purple	Low level transistor output OUT 1, configurable function
	6	Green	WIEGAND data 0
	7	Pink	WIEGAND data 1
	8	Black	RS – 485 A
	9	White	RS – 485 B
10	Brown	GND (0 VDC) – signal ground	

Table 5: Wiring description

3.6 Indicators description

Indication	LED bar	RGD LEDs (8x), configurable intensity, color, driven by inputs & states
	Logo	White LEDs (8x), configurable intensity
	Buzzer	Melodic buzzer, indication of operation states
	Keypad	White LEDs, configurable intensity
	Lock symbol	RGD LEDs (2x), configurable intensity, color, driven by inputs & states

Table 6: Indicators description

3.7 Keypad

The *table 7* shows a list of reader keys with a code, which is sent via the Wiegand output in preset format (4-bit burst after each keypress by default). There is also a list of key symbol meaning for T&A evaluation purposes for WRE 121A reader.

Keypad	WRE 121K		WRE 121A		
	Symbol	Code sent	Symbol	Code sent	Symbol meaning
1		1		1	Lunch break
2		2		2	Coffee break
3		3		3	Cigarette break
4		4		4	Business trip
5		5		5	Administrative occupation
6		6		6	Common leaving
7		7		7	Paragraph
8		8		8	Leaving for doctor
9		9		9	Overtime work
*		10		0	Cancel
0		0		10	Other reason – notification
		11		11	Enter / command for IDS

Table 7: Keypad

3.8 Installation instructions

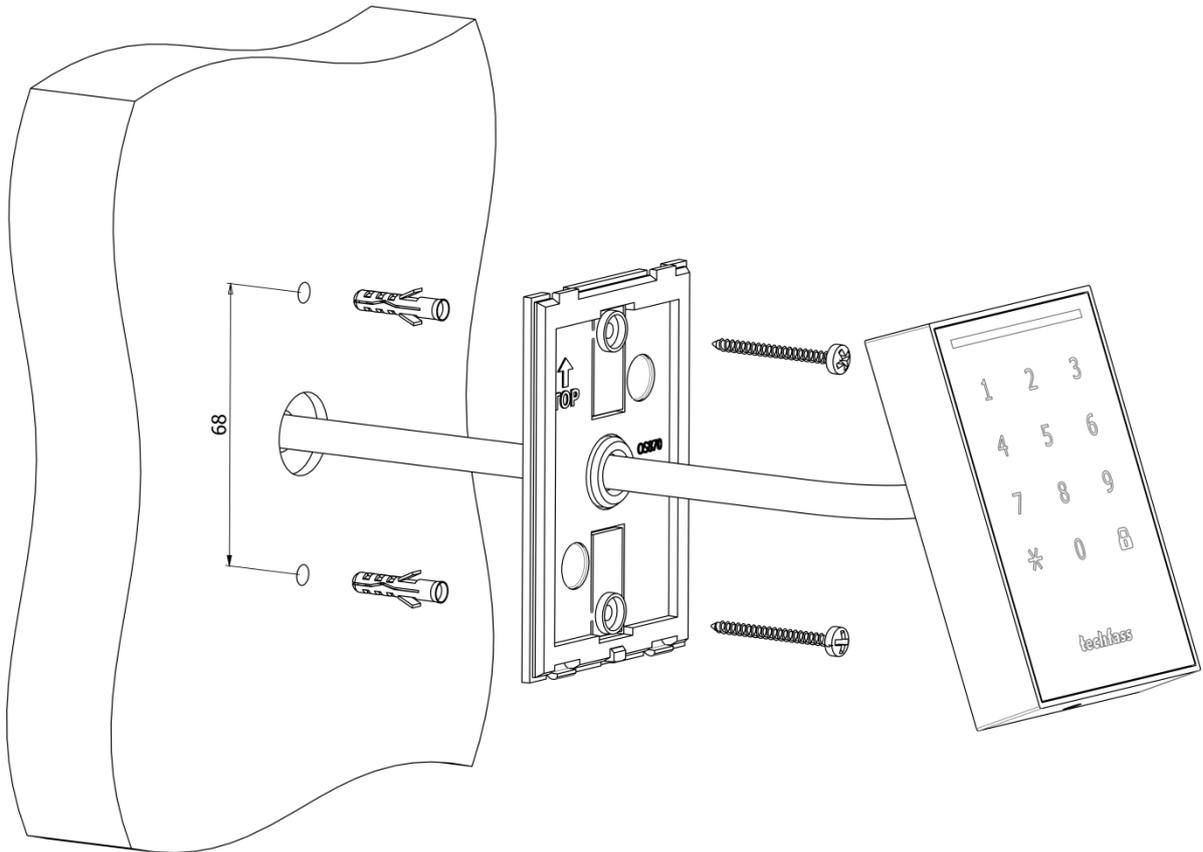
Generally, the noise can influence the reading functionality of the reader, so it is recommended to check the place of installation if there could be some source of noise.

The reader uses passive RFID technology on 125 kHz & 13,56 MHz frequencies, which could be sensitive to RF noise sources, either radiated noise or conducted noise to the cable. This noise could be generated by other equipment, which can generate strong electromagnetic field or by noisy power supply, which inject noise to the cable. If there are any doubts, it is recommended to perform a practical test before final mounting.

Mutual disturbance of a couple of TECHFASS devices working on 125 kHz (standard system reader module + Wiegand output reader) can be avoided by setting up the reading synchronization (see reader configuration chapter). The synchronization is ensured by periodic sending of a special signal via Wiegand interface from the Wiegand output reader to the standard system reader module. There is no need to connect any other wires or make any special configuration on the TECHFASS® system reader module.

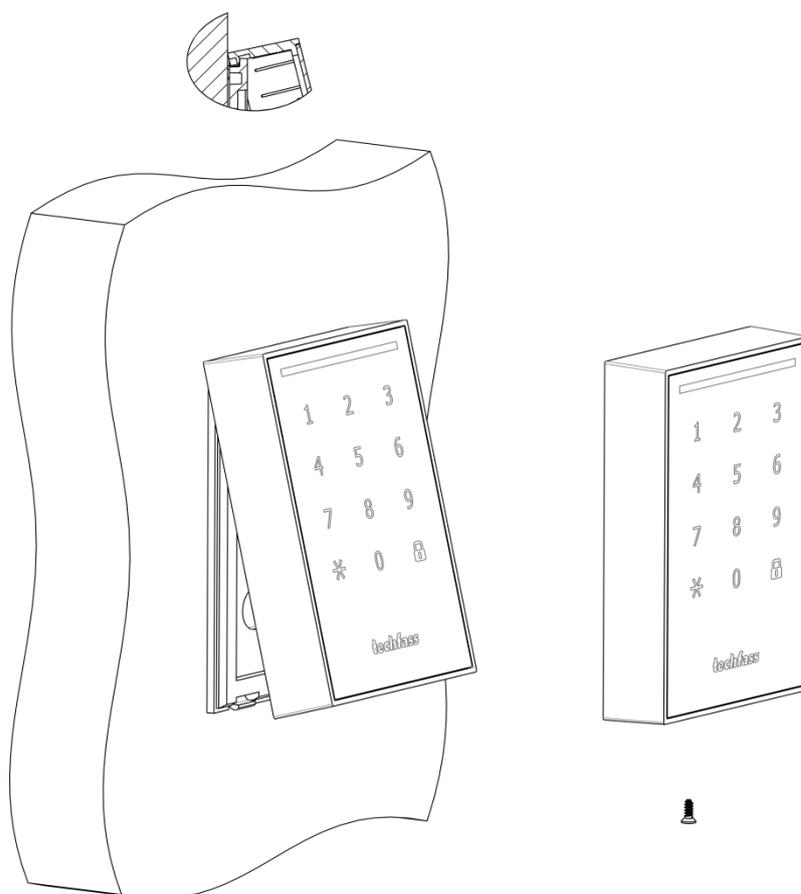
3.9 Mounting and removal of the reader

Use the back part as a template to drill the holes on the right place. Fasten the back part on the wall with attached fasteners and the screws. Note the "TOP" mark on the back part (*pic. 6*). It is recommended to place an installation box for connection of incoming cable on the other side of the wall or into the ceiling.

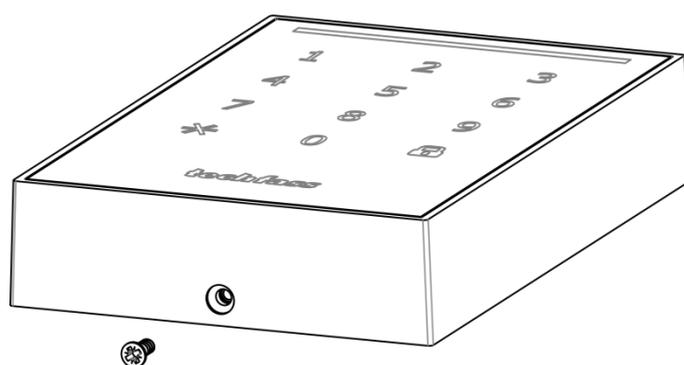


Pic. 6: Mounting the back part on the wall

Set the housing on the upper part of the back part and rotate the housing down until both parts snap down (*pic. 7*).



Pic. 7: Assembly of the housing



Pic. 8: Secure the housing with a screw

Note: The electronic inside is sealed by polyurethane resin to protect the product against water and dust.

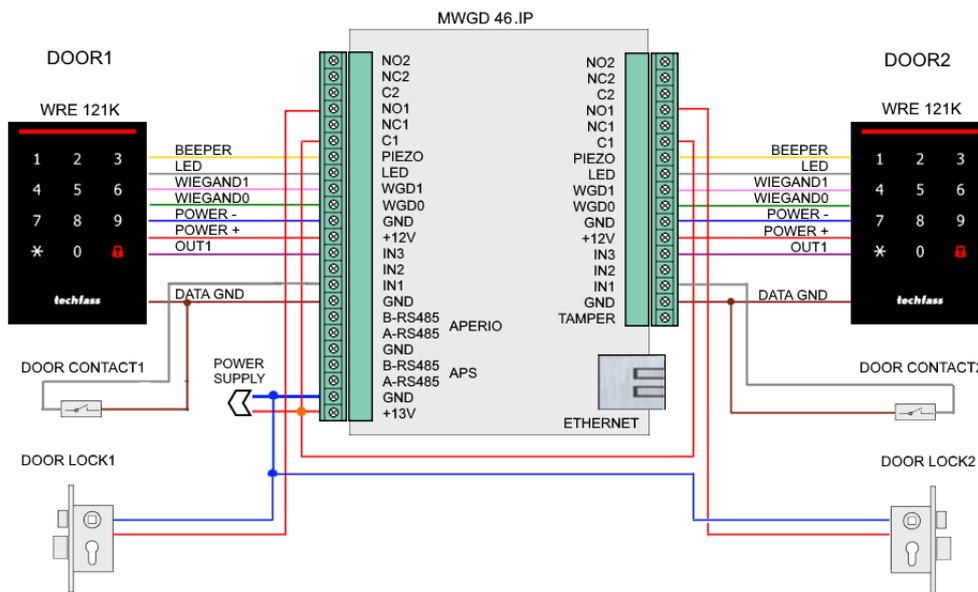
To disassembly the reader from the wall just proceed in reverse order.

4 Wiring diagram

There are simplified connection examples shown in *pictures 9 and 10*. Detailed wiring diagrams are available for TECH FASS partners on our Portal for partners:

<https://office.techfass.cz/support>

4.1 Connecting a pair of WRE 121K(A) readers to MWGD 46 controller



Pic. 9: Connecting a pair of WRE 121K(A) readers to MWGD 46 Wiegand controller

The connection can be secured with a standard UTP cable.

5 Reader setting and functioning

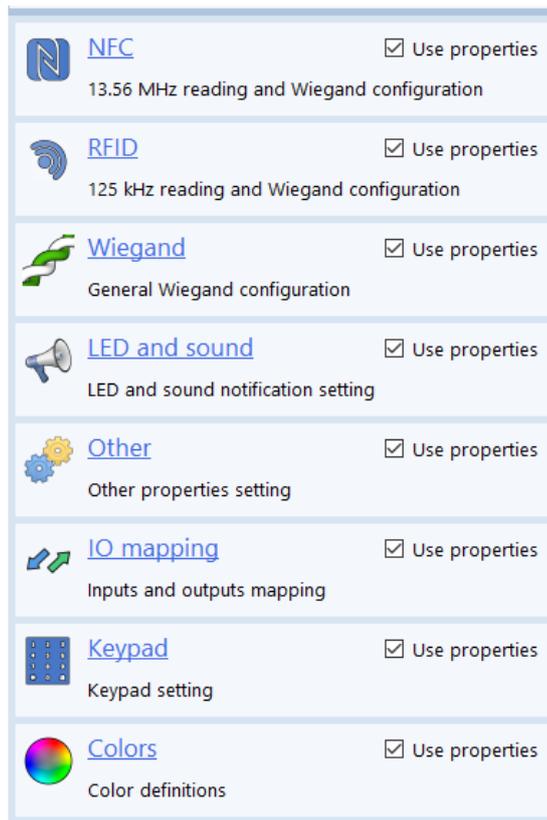
5.1 Reader setting

During 10 seconds after power up, the reader resides in configuration mode (beeps, yellow LED bar). In this mode the reader can be configured by configuration cards. The reader enters the standard operating mode after 10s. This is signaled by single beep and the led bar changes the LED color according to its setting.

The reader can be configured with *APS Configurator* program from a PC as well. Connect the RS-485 interface to a converter (e.g. APSUSB, APSLAN) and connect the converter to the computer. Among others the program is able to change reader parameters configuration, upgrade the firmware or provide other service operations.

5.2 Configuration parameters

A complete list of configurable parameters is shown in the user's guide to the *APS Configurator* program.



Pic. 11: Print screen of configuration parameter categories in APS Configurator program

5.3 Reader default operation

In default mode the reader enters the configuration mode after connecting the power supply. This is indicated by *buzzer* a *yellow color* of the *LED bar*. After 10 seconds, the reader beeps once and switch into the standard operation mode.

The standard operating mode is signaled by *red color* of the *LED bar*.

When an RFID tag is read by a reader, it is signaled with a *short beep* and the *LED bar flashes green*. When a reader is communicating with a mobile application (e.g. TF Mobile ID app), it is signaled with the *LED bar shining white*. Read ID is sent through the *Wiegand* output in a format, which corresponds with the relevant ID media type.

If the reader enters the *intrusion status*, the alarm output *OUT 1* is activated. OUT 1 stays active until the intrusion is solved and the reader can switch back to standard operation mode.

When the signal *0 V* (signal GND) is brought to *IN1* input, the *buzzer* is activated and stays on as long as the signal is present. When the signal *0 V* (signal GND) is brought to *IN2* input, the color of the *LED Bar* is changed to *green* and stays green as long as the signal is present.

The reader sends the *code of pressed key* in 4-bit bursts via *WIEGAND* output immediately after key press.

6 Protection against sabotage - intrusion

The reader WRE 12K and WRE 121A readers are protected by a tamper and a special housing construction to report the alarm immediately when someone tries to tear them off the wall or tries to get in the housing.

7 Declaration of conformity

 The manufacturer TECH FASS Ltd. declares, that the product follows legal requirements and fulfils necessary European directives. The declaration of conformity document can be downloaded from our web site:

<https://www.techfass.com/en/download/11/conformity-declaration>

8 Electrical waste



According to WEEE directive (2012/19/EU), this product cannot be disposed of as unsorted municipal domestic waste and has to be returned to recycling center after its lifetime is over.



9 Legislation

The product is compliant with following harmonized directives of European Union

	Product	List of declared European union directives
Legislation	WRE 121K BK, WRE 121K WH, WRE 121A BK	2014/53/EU; "RED"
		2014/30/EU; "EMCD" (anex of RED)
		2014/35/EU; "LVD"; ČSN EN 62368 – 1 (anex of RED)
		ČSN EN 50130 – 4 ed.2
		2011/65/EU "RoHS"
		Regulation (ES) no. 1907/2006 "REACH"

Table 7: Legislation

The product is designed to fulfil the certification of electronic access control system according to the EN 60839 – 11 – 1. Parallel it fulfils EMC according to the intruder system certification EN 50130-4.