



BKT AL201

Electronic locking & monitoring swinghandle

with mechanical override

- user manual
- version 2



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1 Introduction

1.1 General information

Warning:

This is a Class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

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1.2 Device characteristics

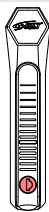
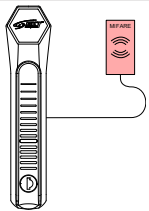
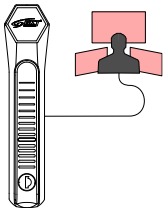
The AL201 is an electronic swinghandle for ICT cabinets. It allows opening of cabinet doors in a standard mechanical way and by electrical remote control. It can operate with any access control system. Together with optional card reader it can also work as a stand-alone access control system. Thanks to the installed cylinder, it is also possible to open it in an emergency with a key.

Basic features:

- Possibility to work autonomously or in the access control system.
- Two connectors providing control and status signals of the handle and for the optional fid card reader.
- Equipped with the optical sensor of the handle position.
- Three-color LED signalling the operation status of the swinghandle.
- Emergency key override.
- Available inserts for the master key system.
- For use with indoor cabinets.
- Installation in a standard 150x25mm cut out.
- Can be installed in a single and multi-point locking system (requires additional elements - cam or cogwheel mechanism, which should be ordered separately).

1.3 Working modes

The handle can work in one of three modes:

<p>1. Standard mechanical handle</p> 	<p>If the electronic opening functionality is not used, the handle works as a standard mechanical handle opened with a key. This solution is used when the cabinet is to be equipped with access control at a later time. For this purpose, you can also use a typically mechanical handle – type ML201, which in a future, can be equipped with the AE201 electronic module. The ML201 handle with the AE201 module creates the AL201 electronic handle. More on this topic can be found in chapter 3.6 <i>Updating the ML201 mechanical handle with an electronic module</i>.</p>
<p>2. Stand-alone access control system</p> 	<p>An optional built-in reader or any other card reader or keyboard with a Wiegand interface can be connected directly to the door handle. The handle together with an optional reader creates an autonomous access control system. It is possible to assign 63 identifiers (cards or PIN codes) of users who will be able to open the handle. Read more in chapters 3.8 <i>Dedicated RFID card reader</i> and 4 <i>Standalone mode</i>.</p>
<p>3. Work in the access control system</p> 	<p>In this mode, the handle works only as an electronic mechanism that opens the cabinet. It is compatible with any access control system. The external access controller controls the opening of the handle. Information about the status of the handle (tilted/not tilted) can be transferred to the superior controller. Read more in chapter 5 <i>Operation mode in the access control system</i>.</p>

2 Technical specifications

Handle data

Parameter	Value
Power supply voltage	Nominal 12V DC, allowed 10-24V DC, recommended power supply 12V DC \geq 500mA. If the handle powers an optional card reader, take into account the supply voltage and the current consumption of the reader.
Quiescent current consumption (not including optional card reader)	25 mA
Maximum current consumption when opening/closing (300ms) (not including optional card reader)	180 mA
Connectors	Type 53047-0810 8-pin connector, type 53047-0410 4-pin connector, type 53047-0310 3-pin connector
Dimensions	212 x 47 x 48 mm (H x W x D)
Weight	160g
Packaging dimensions	250 x 70 x 70 mm (W x D x H)
Packaging weight	200g
Operating conditions	Temperature: 0°C - 50°C, Humidity: 0% - 90% RH (without condensation)
Storage conditions	Temperature: -10°C - 60°C, Humidity: 0% - 95% RH (without condensation)
Enclosure material	Glass fibre reinforced polyamide PA6 GF30
Enclosure colour	Black, RAL 9005
Enclosure protection degree	IP30
Compliance with directives	2014/30/EU (EMC), 2011/65/EU (RoHS)
Compliance with standards	EN 61000-4-2:2009 Electrostatic discharge immunity test. EN 61000-4-3:2007 Radiated, radio-frequency, electromagnetic field immunity test EN 61000-4-4:2012 Electrical fast transient/burst immunity test. EN 61000-4-5:2014 Surge immunity test. EN 61000-4-6:2014 Immunity to conducted disturbances, induced by radio-frequency fields. EN 61000-6-4:2007/A1:2011 Electromagnetic compatibility (EMC) – Emission standard for industrial environments.
Part number	122AL002010

Data for optional reader of any type

Parameter	Value
Reader type	The handle supports any type of reader that has a Wiegand interface. It can be a 125kHz card reader (Unique, HID Prox etc.), 13.56MHz cards (Mifare, HID iClass etc.), biometric reader, keyboard reader etc.
Supported communication interfaces	Wiegand 26bit - 66bit
Reader supply voltage	The handle has a connector for powering the reader. The reader is powered by the same voltage as the handle, so it is necessary to select the value of the supply voltage appropriate for the handle and also for the optional reader.
Maximum allowable power consumption by the reader	200mA

3 Assembly

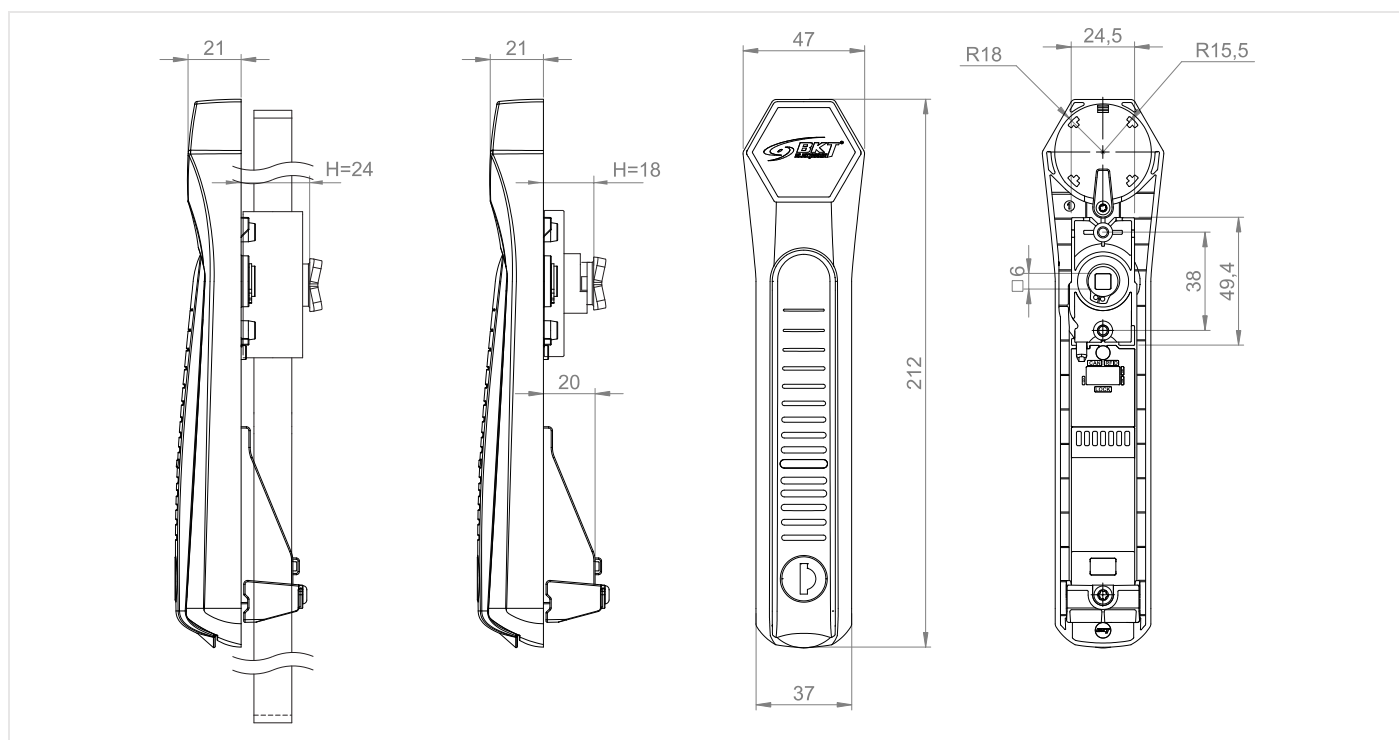
The swinghandle can work in a single-point system (only with a cam) or a multi-point system (with a cogwheel mechanism and a cam). The package does not contain all the mounting elements. Additional mounting elements dedicated to the respective cabinet must be ordered separately.

3.1 Package contents

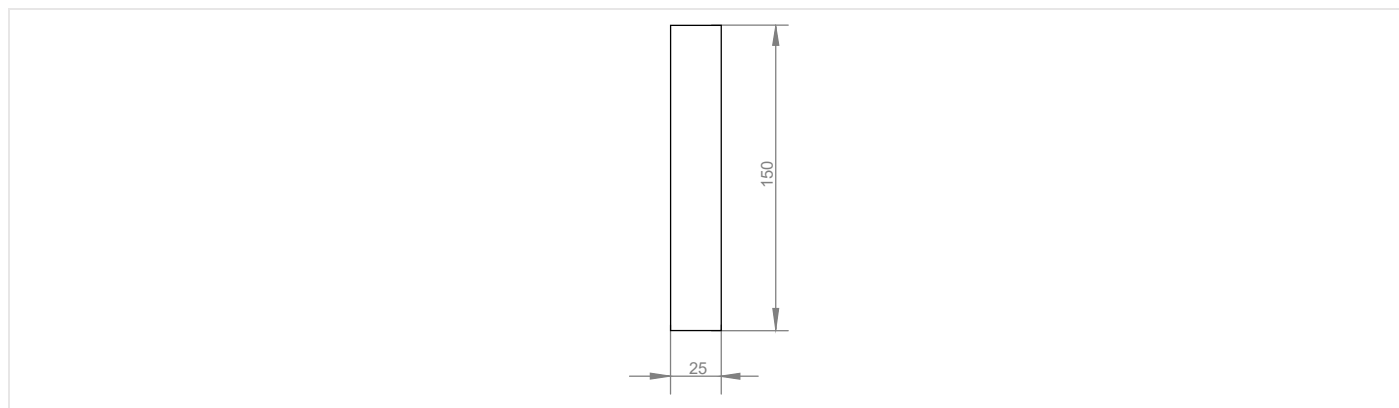
			
Packaging	AL201 swinghandle	Fastening element with screw	Quick Start Guide

3.2 Dimensions

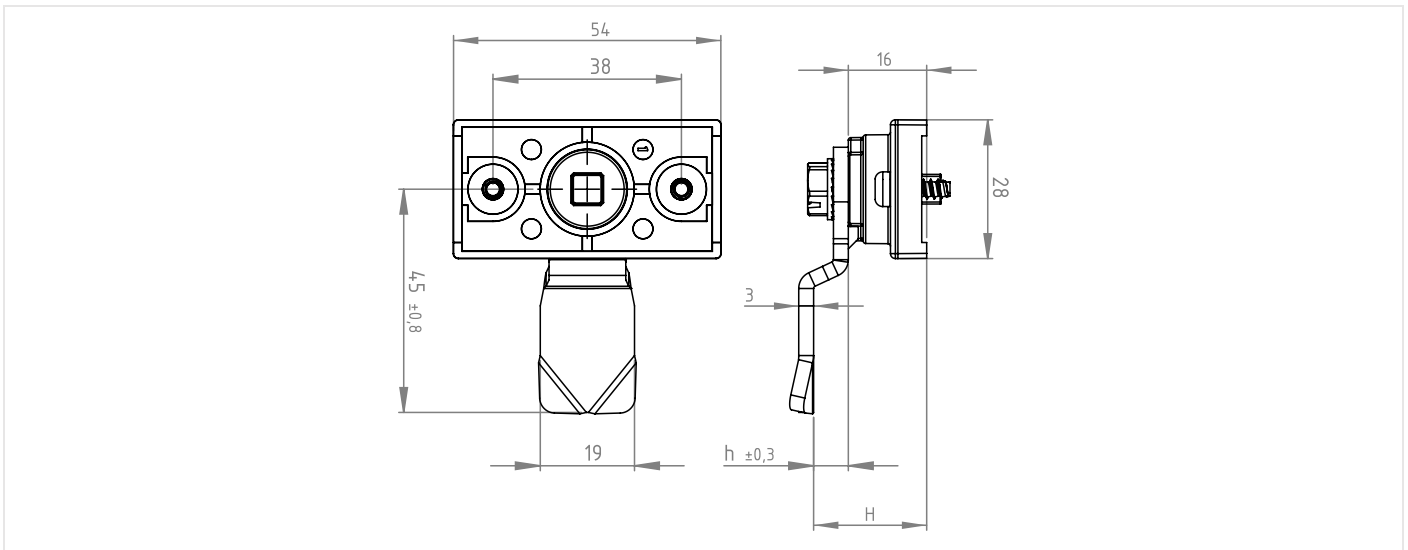
3.2.1 Swinghandle dimensions



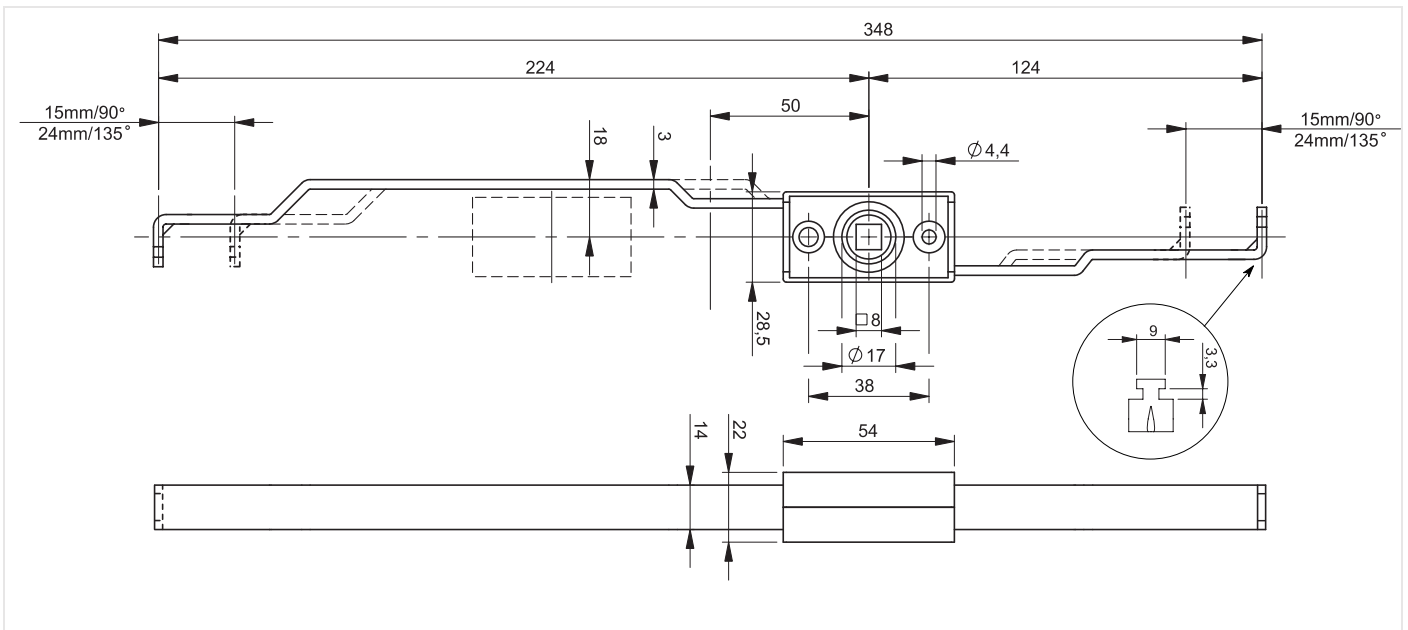
3.2.2 Cut out dimensions



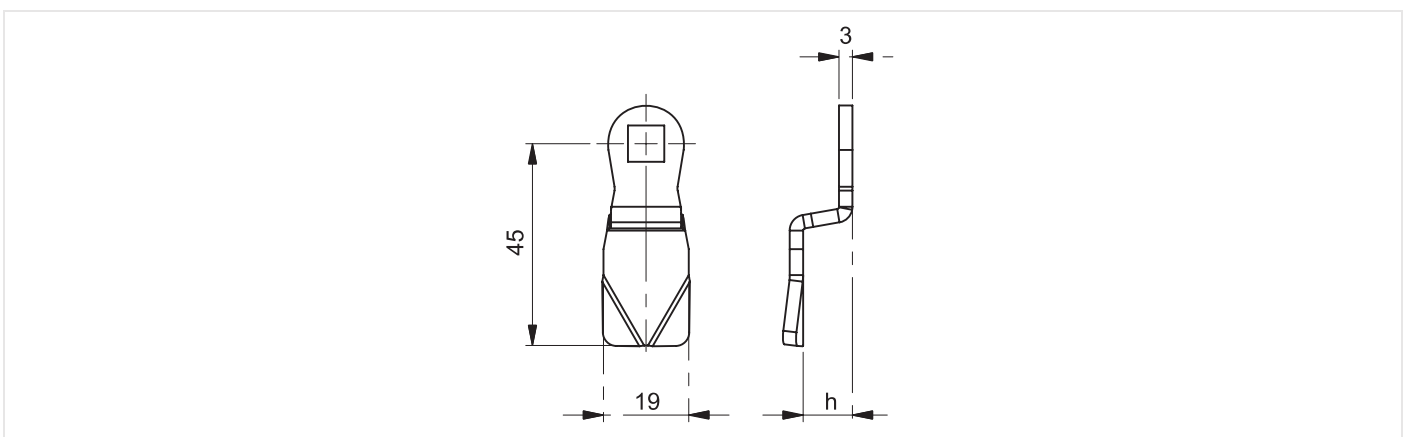
3.2.3 Cap dimensions



3.2.4 Cogwheel dimensions



3.2.5 Cam dimensions

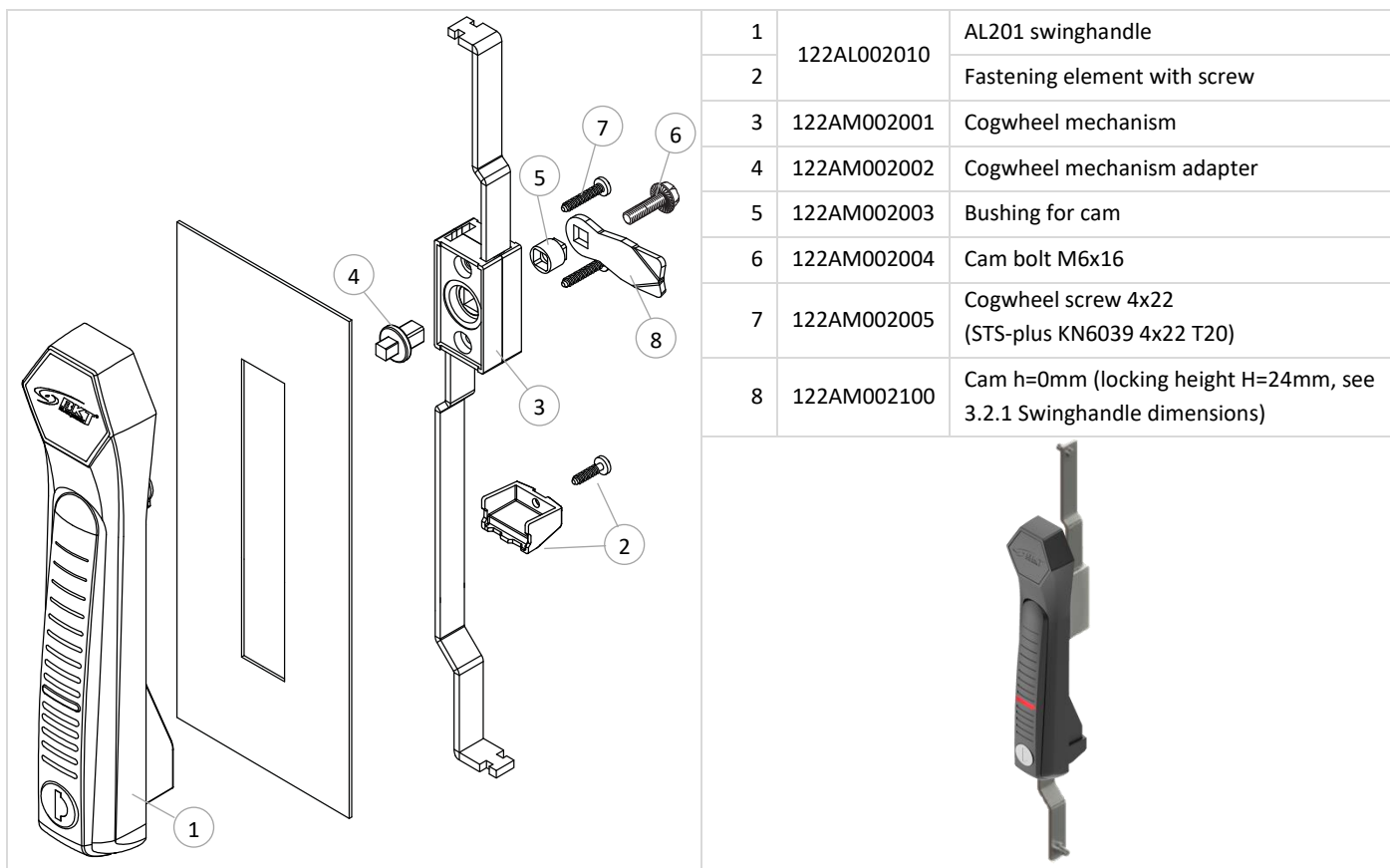


3.3 Single point assembly



1	122AL002010	AL201 swinghandle
2	122AM002010	Fastening element with screw
3	122AM002021	Cap
4	122AM002022	Cap adapter
5	122AM002023	Cap screw 4x12 (STS-plus KN6039 4x12 T20)
6	122AM002024	Cam bolt M6x8
7	122AM002100	Cam h=0mm (locking height H=18mm, see 3.2.1 Swinghandle dimensions)

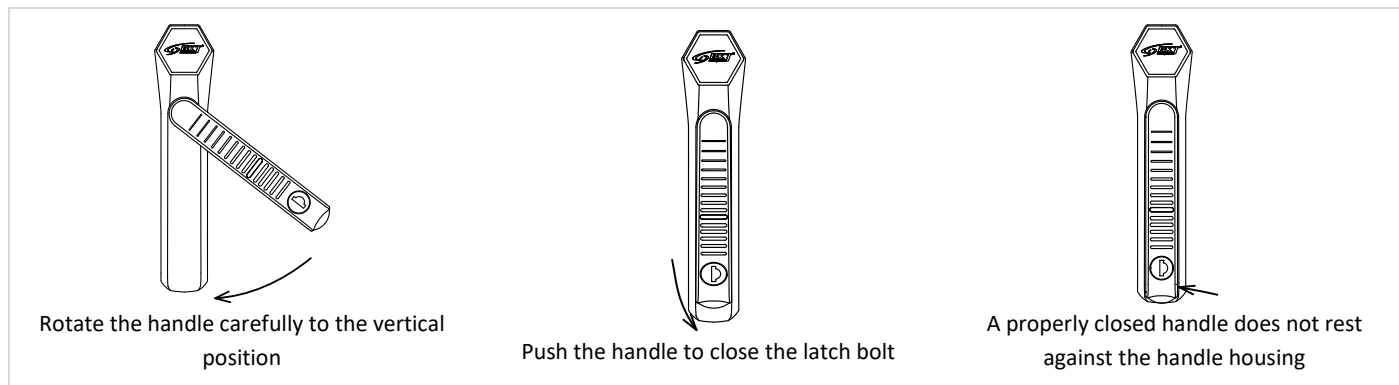
3.4 Multi-point assembly



1	122AL002010	AL201 swinghandle
2	122AM002010	Fastening element with screw
3	122AM002001	Cogwheel mechanism
4	122AM002002	Cogwheel mechanism adapter
5	122AM002003	Bushing for cam
6	122AM002004	Cam bolt M6x16
7	122AM002005	Cogwheel screw 4x22 (STS-plus KN6039 4x22 T20)
8	122AM002100	Cam h=0mm (locking height H=24mm, see 3.2.1 Swinghandle dimensions)

3.5 Handle spring

The spring installed in the lock handle is designed to keep it in a visible open position. In order for the spring to open the handle when the lock is opened electrically, you must ensure that the handle is correctly positioned when closing. After closing the door, the handle should be turned precisely to the vertical position and then pushed to close the latch bolt. Careful rotation of the handle to the vertical position prevents it from resting on the handle housing, which could prevent the handle from being pushed out by the spring the next time it is electrically opened.

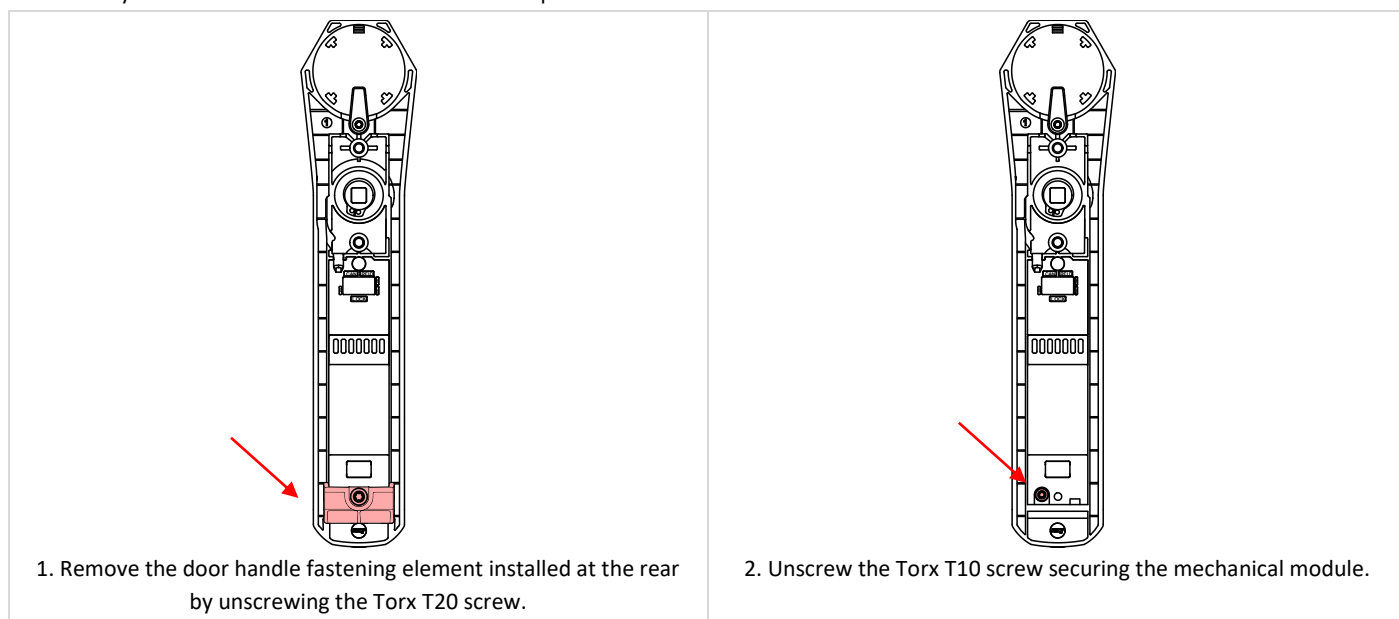


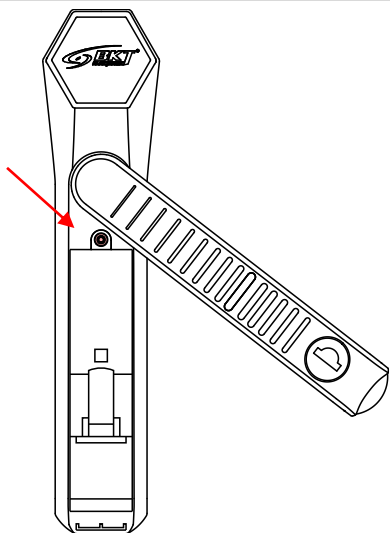
If the spring is not desired, it can be removed using long nose pliers.



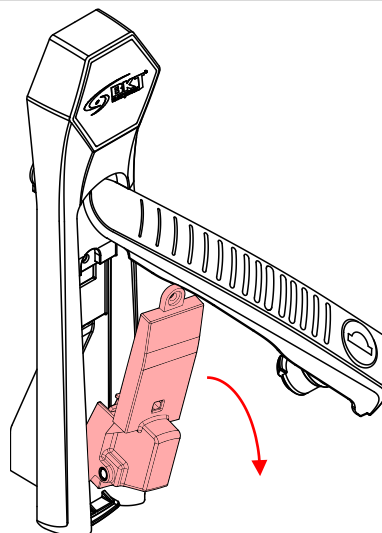
3.6 Updating the ML201 mechanical handle with an electronic module

The typically mechanical ML201 swinghandle can be easily equipped with an electronic module AE201. This way, it will have the same functionality as the AL201 electronic door handle. The procedure is shown below.

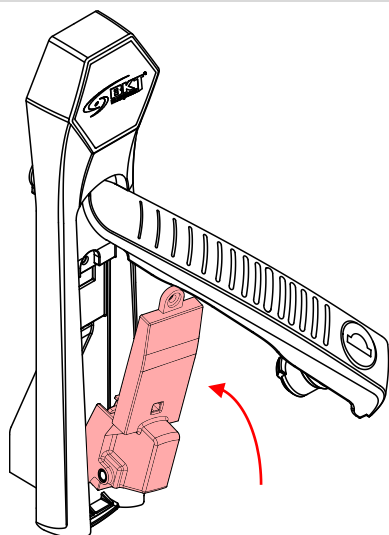




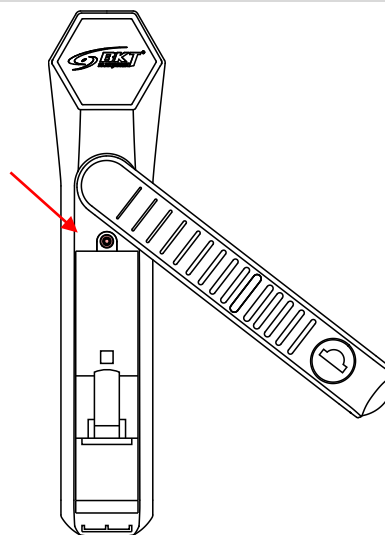
3. Open the door handle and unscrew the second Torx T10 screw securing the mechanical closing module.



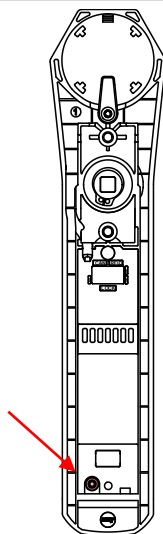
4. Remove the mechanical closing module by tilting it from the top.



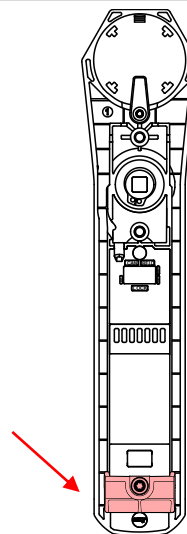
5. Place the electronic module AE201 in the same place, inserting it at the bottom first.



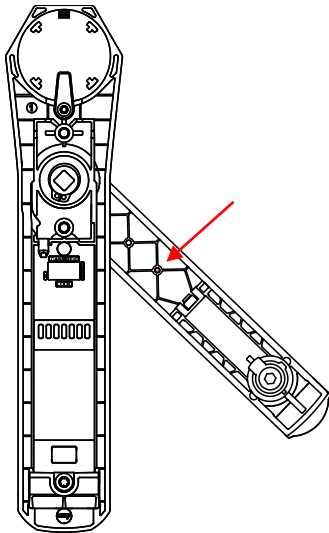
6. Install the module securing screw under the handle.



7. Install the module securing screw at the back of the handle.



8. Reinstall the swinghandle fastening element.



9. Place the magnet into the hole at the back of the handle.

3.7 Connectors

The handle has three connectors: 8-pin, 4-pin and 3-pin. The 8-pin connector is the basic connector that provides power and control signals for the handle. The 4-pin connector is dedicated only to the optional card reader. And the 3-pin connector is used to connect the CAN communication bus. The table below describes the individual pins of the connectors. The given colours apply to the LiYY type cable, eg AW285 and AW240 (see chapter 6 Accessories).

Connectors				
	LOCK		8-pin socket (53047-0810)	
	1	White	GND	Power supply input: GND.
	2	Brown	+12V	Power supply input: +12V.
	3	Green	STATUS	Open collector output for signalling the position of the handle, $I_c=50mA$, $U_{CE}=25V$. Handle open -> transistor on, handle closed -> transistor off.
	4	Yellow	CTRL	Input for controlling the swinghandle from an external system. Opening the handle -> CTRL shorted to GND or +12V. Closing the handle -> CTRL not connected.
	5	Grey	SENSOR	Door sensor input - for the future use. Do not connect.
	6	Pink	GND	GND - for the door sensor - for the future use. Do not connect.
	7	Blue	CANL	CAN bus interface (CANL) - for the future use. Do not connect.
	8	Red	CANH	CAN bus interface (CANH) - for the future use. Do not connect.
	RFID			4-pin socket (53047-0410) for rfid card reader
	1	White	GND	Card reader power supply output (directly connected to GND of 8-pin socket).
	2	Brown	+12V	Card reader power supply output (directly connected to +12V of 8-pin socket).
	3	Green	WIEGAND 0	Wiegand Data0 card reader input.
	4	Yellow	WIEGAND 1	Wiegand Data1 card reader input.
	CAN			3-pin socket (53047-0310) for CAN interface
1	White	GND	GND - for the CAN interface - for the future use. Do not connect.	
2	Brown	CANL	CAN bus interface (CANL) - for the future use. Do not connect.	
3	Green	CANH	CAN bus interface (CANH) - for the future use. Do not connect.	

3.8 Dedicated RFID card reader

3.8.1 AR222 - 125kHz rfid card reader

Device characteristics

- 125kHz RFID ID reader
- For installation in the AL201 type handle
- Reads Unique and HID Prox cards
- Works directly with the AL210 swinghandle or any access control system
- It has a Wiegand 66bit output
- The set includes a cable for connection to the AL201 handle

Package contents

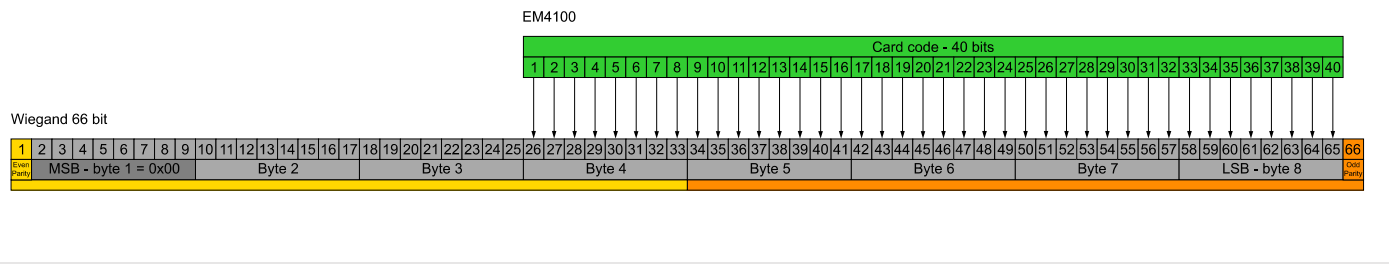
			
Packaging	Czytnik AR222 reader	AW222 cable for connection to the AL201 handle	Quick Start Guide

Reader data

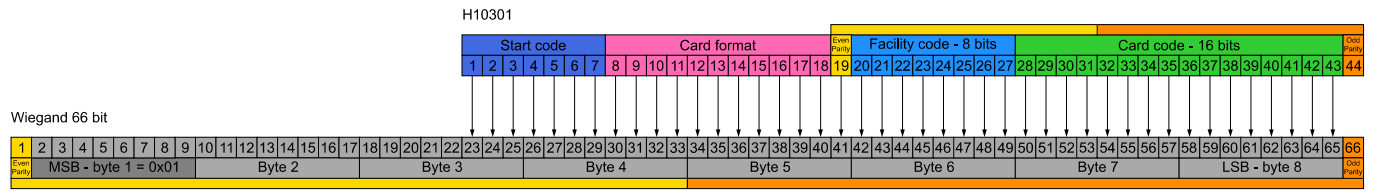
Parameter	Value
Power supply voltage	Nominal 12V DC, allowed 10-24V DC,
Current consumption	25mA
Card support	Unique (series EM4100 A6 – Manchester encoding, bit length: 64 clocks) HID Prox (H10301 – 26bit; H10302 – 37bit; H10304 – 37bit etc.)
Reading range	< 4cm
Working frequency	125kHz
Output interface	Wiegand 66bit (64bity data and 2 parity bits)
Connectors	4-pin socket type 53047-0410
Dimensions	43 x 36 x 9mm (H x W x D)
Weight	10g
Enclosure material	Polyamide PA11
Enclosure colour	Grey
Compliance with directives	2014/53/EU (RED), 2011/65/EU (RoHS)
Compliance with standards	EN 50364:2010 Limitation of human exposure to electromagnetic fields from devices operating in the frequency range 0 Hz to 300 GHz, used in Electronic Article Surveillance (EAS), Radio Frequency Identification (RFID) and similar applications EN IEC 62368-1:2014/ AC:2015 Audio/video, information and communication technology equipment - Part 1: Safety requirements ETSI EN 301 489-1 V1.9.2 Electromagnetic compatibility and Radio spectrum Matters (ERM); ElectroMagnetic Compatibility (EMC) standard for radio equipment and services; Part 1: Common technical requirements ETSI EN 300 330 V2.1.1 Short Range Devices (SRD); Radio equipment in the frequency range 9 kHz to 25 MHz and inductive loop systems in the frequency range 9 kHz to 30 MHz
Part number	122AR002220

A method of decoding cards to the Wiegand 66 bit format

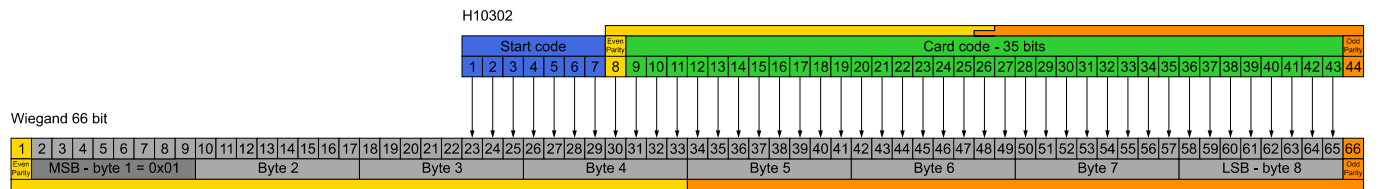
UNIQUE, Manchester encoding, bit length: 64 clock cycles



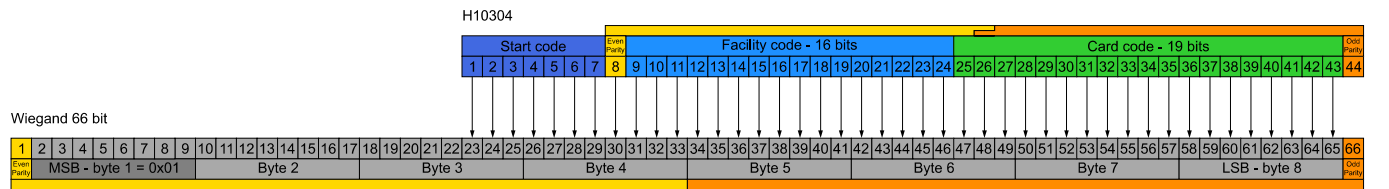
HID Prox, H10301 format, 26 bit



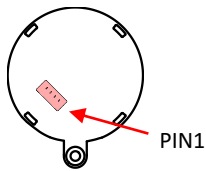
HID Prox, H10302 format, 37 bit



HID Prox, H10304 format, 37 bit



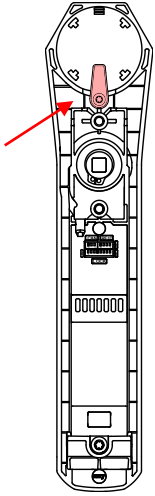
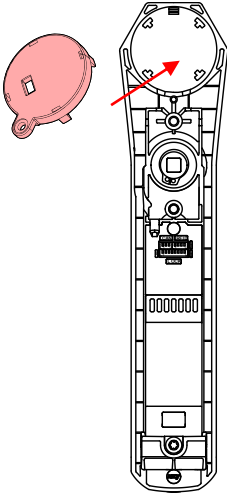
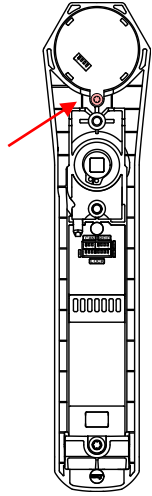
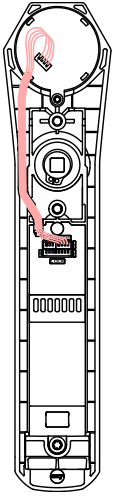
Reader connector



	RFID		4-pin socket (53047-0410)
1	White	GND	Card reader power supply input
2	Brown	+12V	Card reader power supply input
3	Green	WIEGAND 0	Wiegand Data0 output
4	Yellow	WIEGAND 1	Wiegand Data1 output

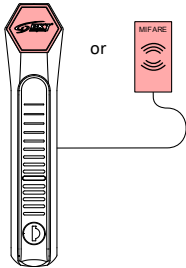
Reader assembly

The drawings below show how to install the AR222 reader in the AL210 swinghandle

 <p>1. Remove the mounting element installed on the back by unscrewing the Torx T10 head screw.</p>	 <p>2. Place the reader inside the swinghandle.</p>	 <p>3. Attach the reader using the previously unscrewed Torx T10 screw.</p>	 <p>4. Connect the reader to the handle using the four-wire cable included with the reader. Route the cable in the dedicated groove as shown in the drawing.</p>
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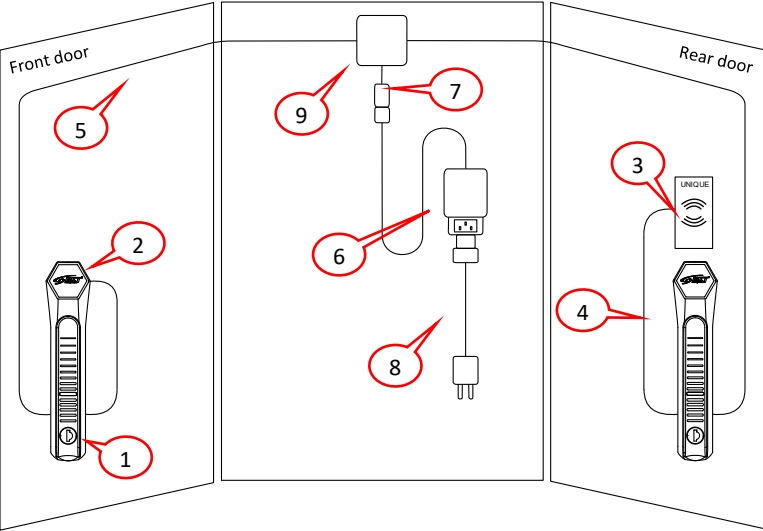
4 Standalone mode



An optional built-in reader or any card reader with a Wiegand interface can be connected to the handle. The handle with a connected reader creates an autonomous access control system. It enables the assignment of 63 user IDs that will be able to open the handle. The process of assigning user cards is performed with the use of the master card. The process of creating a master card is described below. All card assigning procedures are performed without the use of a computer.

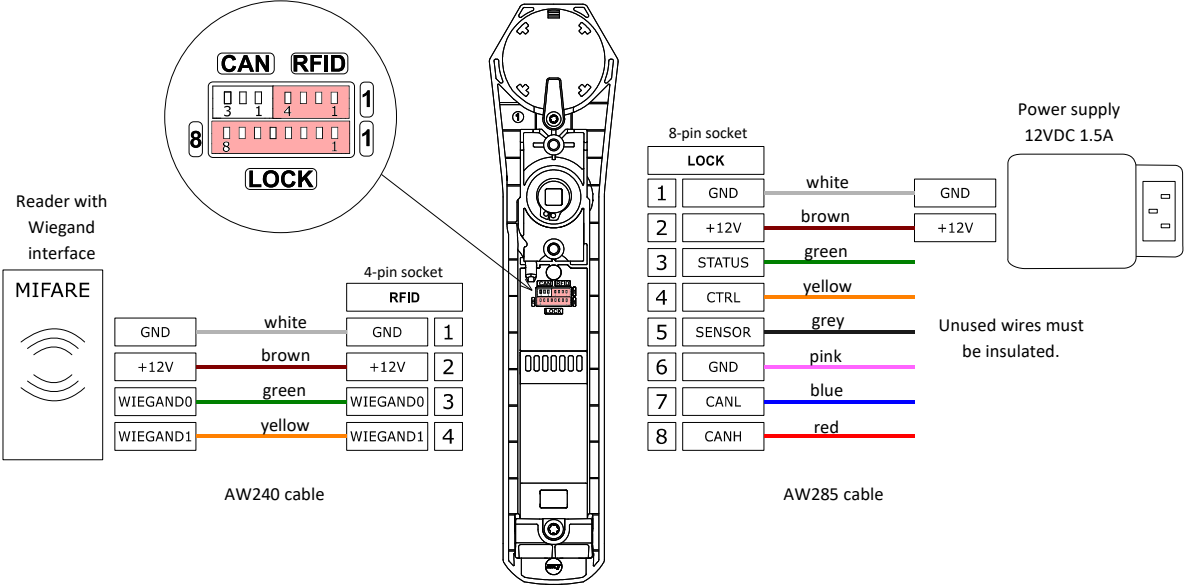
4.1 Connection

Connection diagram of two handles with readers in the cabinet



Devices used (see chapter 6 Accessories)		
1	AL201 swinghandle	122AL002010
2	AR222 optional built-in card reader	122AR002220
3	Any card reader with Wiegand interface	-
4	AW240 cable	122AW002400
5	AW285 cable	122AW002850
6	Power supply 12V 1.5A	122AA100015
7	DC power cord	122AA100016
8	AC power cord	11480784.2
9	Junction box	122AA100006

Connection diagram of the handle with the reader in standalone mode


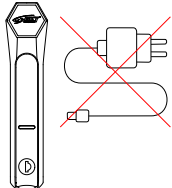
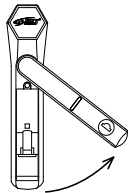
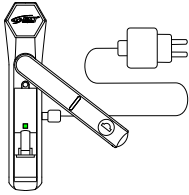
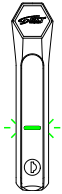
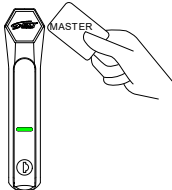
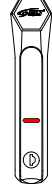


The handle 8-wire cable (AW285) can be extended to a maximum length of 100m when choosing the appropriate wire cross-section and using adequate overcurrent protection. The maximum allowable cable length (AW240) of the reader is 5m.

4.2 Master card programming

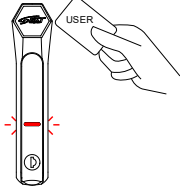
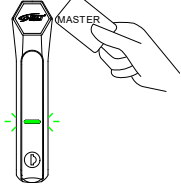
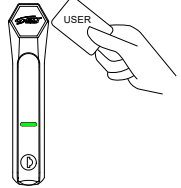
The master card is used for user card programming. It allows to add a new user or delete an existing one. Before programming, prepare a card suitable for a given type of reader.

Note: Programming a new master card deletes all previously saved user cards.

	Action	State after performing the action
1	Prepare a card that will be the master card.	
2	Disconnect the power from the handle.	
3	Open the handle with a key.	
4	Reconnect the power to the handle and wait 3 seconds until the green LED on the handle lights up continuously.	
5	Close the handle when the green LED is on, then the green LED will start blinking (2Hz). The green LED is on for 5 seconds. If the handle is not closed within this time, it will return to normal operation.	
6	Touch the prepared master card to the reader when the green LED is blinking. The green LED flashes for 5 seconds. Correct programming of the user card will be signalled by the green LED lighting for 2 seconds. The master card will be programmed and all user cards will be deleted. When the green diode is flashing and the master card is not applied, the handle will return to the normal operating state and the existing user cards will not be removed from the memory.	
7	Wait 3 seconds for the handle to restart. Keep the master card in a safe place.	

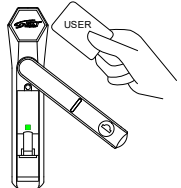
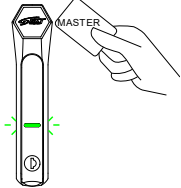
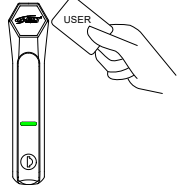
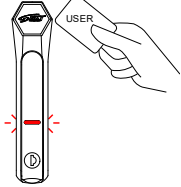
4.3 Adding new user card

The procedure saves to the memory the user card that will be able to open the handle.

Action	State after performing the action
<p>1 Check if the user card has already been saved in the memory. Touching an unsaved card to the reader should cause the red LED to flash once.</p>	
<p>2 Touch the master card to the reader. The green LED should start blinking (2Hz) for 5 seconds.</p>	
<p>3 While the green LED is blinking, apply a new user card. Correct programming of the user card will be signalled by the green LED lighting for 2 seconds. If the red LED lights up for 2 seconds, it means that the user card memory is full. You must then remove a single card (see chapter 4.4 <i>Removing user card</i>) or delete all saved cards (see chapter 4.5 <i>Removing all user cards</i>).</p>	

4.4 Removing user card

The procedure removes a single user card from memory. The removed card will not open the handle.







Action	State after performing the action
<p>1 Check if the user card is already saved in the memory. Touching the written card to the reader should open the handle.</p>	
<p>2 Touch the master card to the reader. The green LED should start blinking (2Hz) for 5 seconds.</p>	
<p>3 While the green LED is blinking, touch the card to be removed from memory.</p>	
<p>4 Make sure the card does not open the handle anymore - the red LED should flash once.</p>	

4.5 Removing all user cards

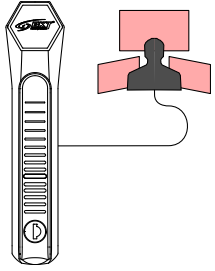
To remove all user cards, use the master card programming procedure (see chapter 4.2 *Master card programming*).

4.6 LED signalling

The handle has a three-color LED indicating the operating status. The basic operating states are summarized in the table below. The particular LED signalling is described in the individual master and user card programming procedures.

	LED state		Swinghandle working state
		Orange is on	The device is in programming mode.
		Orange blinking (1Hz)	The device is booting (within 3 seconds after connecting the power) or firmware error (if it blinks for more than 3 seconds).
		Red is on	The electric lock of the device is closed and handle is closed.
		Red blinking (1Hz)	The electric lock of the device is closed, but the handle is open.
		Green is on	The electric lock of the handle is open for 2 seconds after touching the authorized user card.

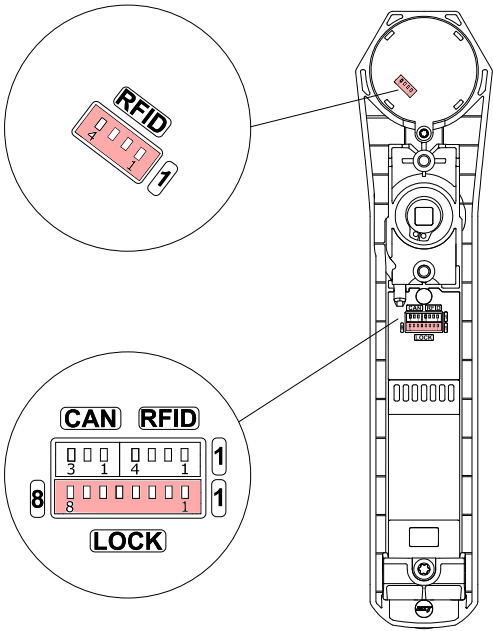
5 Operation mode in the access control system



The handle can work as only a cabinet door opening mechanism in a larger access control system. It can cooperate with any access control system, eg BKT ACS or any other company. The handle should be connected to the access controller that controls its operation. The handle can transmit information to the controller about the current position of the handle (tilted/not tilted).

5.1 Connection

Connection diagram of the handle with the external access control system

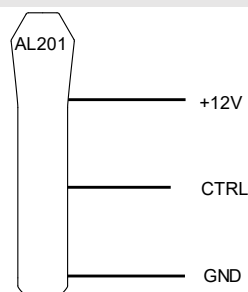
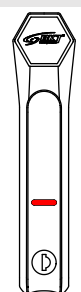


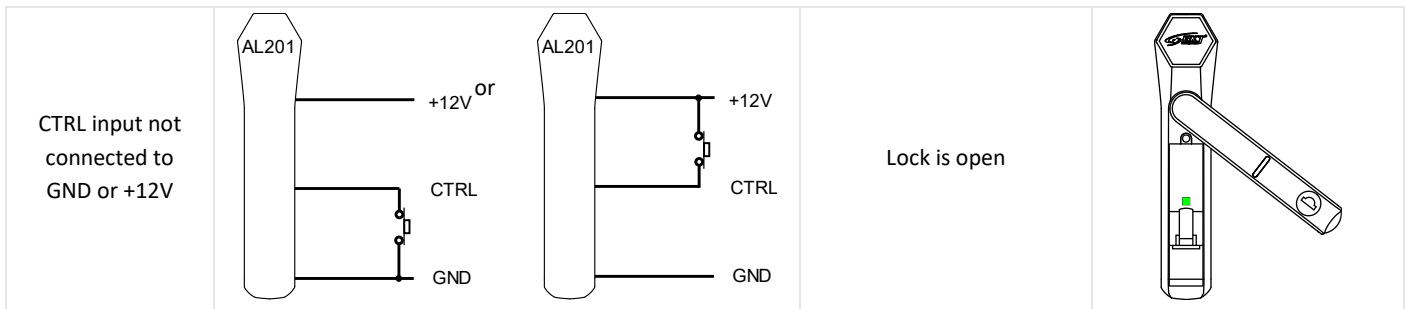
4-pin socket		AW245 cable		External access controller	
RFID					
1	GND	white	GND	Power supply for card reader	
2	+12V	brown	+12V	Wiegand input for card reader	
3	WIEGAND0	green	WIEGAND0		
4	WIEGAND1	yellow	WIEGAND1		
LOCK					
1	GND	white	GND	Power supply for external devices	
2	+12V	brown	+12V	Input for handle position	
3	STATUS	green	INPUT	Relay or OC control output	
4	CTRL	yellow	RELAY		
5	SENSOR	grey			
6	GND	pink		Unused wires must be insulated.	
7	CANL	blue			
8	CANH	red			
8-pin socket		AW285 cable			

The handle 8-wire cable (AW285) can be extended to a maximum length of 100m when choosing the appropriate wire cross-section and using adequate overcurrent protection. The maximum allowable cable length (AW245) of the reader is 5m.

5.2 Electrical opening

Electric opening is made by shorting the CTRL input to the GND or +12V potential. If the CTRL input is not connected anywhere, then the swinghandle remains closed.

	CTRL input state	Swinghandle lock status	LED status
CTRL input not connected		Lock is closed	



5.3 Handle position indication

The device has an optical sensor of the handle position, thanks to which this information can be transferred to an external access control system. The state of the STATUS output corresponds to the position of the handle. The STATUS output has overload protection. If the current through the transistor is greater than 50mA, the output will be turned off. The STATUS output will return to normal operation after removing the overload and changing the position of the handle.




Position of the handle		STATUS output state	
	Handle closed		STATUS output inactive (NPN transistor is OFF)
	Handle open		STATUS output active (NPN transistor is ON)

5.4 LED signalling

The swinghandle has a three-color LED indicating the status of its operation.

	LED state	Swinghandle working state
	Orange is on	The device is in programming mode
	Orange blinking (1Hz)	The device is booting (within 3 seconds after connecting the power) or firmware error (if it blinks for more than 3 seconds)
	Red is on	The electric lock of the device is closed (no control on the CTRL input)
	Red blinking (1Hz)	The electric lock of the device is closed (no control on the CTRL input), but the handle is open.
	Green is on	The electric lock of the handle is open (controlled on the CTRL input)

6 Accessories

Product	Description	Part number
	AE201 - Electronic module for the ML201 swinghandle. ML201 with AE201 module creates AL201 electronic swinghandle	122AE002013
	AR222 - RFID 125kHz reader for AL201 swinghandle, reads Unique, HID Prox cards	122AR002220
	AW285 - AL200 and AL201 swinghandle 8-wire connection cable, length 5m; connectors: 1-plug, 2-ferrules	122AW002850
	AW280 - AL200 and AL201 swinghandle 8-wire connection cable, length 0.5m; connectors: 1-plug, 2-ferrules	122AW002800
	AW245 - AL200 and AL201 swinghandle 4-wire connection cable, length 5m; connectors: 1-plug, 2-ferrules	122AW002450
	AW240 - AL200 and AL201 swinghandle 4-wire connection cable, length 0.5m; connectors: 1-plug, 2-ferrules	122AW002400
	GST18A12-P1J - Power supply 18W 12VDC 1.5A; AC socket C14; DC plug 5.5/2.1; no AC cord	122AA100015
	BKT AC power cord - socket IEC 320 C13 10A, plug DIN 49441(unischuko) 16A, 3 x 1,0 mm ² black 2m	11480784.2
	BKT AC power cord - socket IEC 320 C13 10A, plug IEC 320 C14 10A, 3 x 1,0 mm ² black 2m	11480785.2
	Cable with DC 5.5/2.1 inlet; straight; 0.5mm ² ; black; 3m	122AA100016
	Electrical junction box 86mm x 86mm x 39mm, wall mount, black, IP55	122AA100006

7 Document revisions

Version	Changes	Date
1	Initial version.	December 2023
2	Updated with a AR222 - 125kHz RFID reader.	March 2024