AR402 FINGERPRINT KEY

Manual **Version 1.6**

e-DATA GmbH

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AR402 Manual
Version 1.5
Firmware 1.717 or higher

Content

1 General Comments

1.1 Symbols

The following symbols have been used in this manual:

Notice	Helpful tips and special characteristics of the AR402.
Careful	Possible danger, which – if the warning is not observed – can result in damage to property, or slight to moderate bodily injury.
Caution	Possible danger, which - if the warning is not observed - can result in death or serious bodily injury.

1.2 Device description

This device exists to identify persons by means of their fingerprints and / or the contents of a smart card and / or a personal number to be entered.
The human interface is implemented by a keyboard and a beeper and several multicoloured Leds.
The device is connected to superordinated data processing systems by a RS485 data line

1.3 Device name

This manual outlines the AR402 and the supported functions.

1.4 Intended Usage

The device may only be used under conditions and for purposes for which it has been designed.
(See Chapter Environment Conditions)

1.5 Protection Class

The device conforms to the conditions of protection class IP65. Protection class III EN60950-1.

Protection class IP65 DIN EN 60529

1.6 Safety Measures

The device has been built according to the current and recognized technical safety rules EN60950-1 and left our manufacturing facility in perfect condition. Improper handling and operation outside the specified conditions can result in dangers due to electrical current. This can endanger the lives of persons and damage the device.

1.7 Before Commissioning

Inspect the device for visible damage resulting from shipment or improper storage. Do not commission a damaged device.

Careful

The device may only be operated with DC voltage 12 to 24V DC.

The device is protected against polarity reversal.

1.8 Operation

Do not subject the device to any mechanical stresses such as impacts, violent shaking or heavy loads. Impacts and shaking can damage the electronics.

1.9 Installation and Service

The device may only be opened by trained specialists. Disconnect the device from the power source before opening.

- You may only perform repairs in collaboration with **e-DATA GmbH**.

1.10 CE Conformance

This device is manufactured according to the safety requirements of EN 60950.

Safety of electrical equipment

- European Norm EN 60950

This device complies with interference resistance criteria according to EN 55022; EN 61000-3-2/-3; EN 55024

1.11 FCC Conformance

This device complies with interference resistance criteria according to FCC Rules 47 CFR Part 15 – Subpart C Section 15.209

NOTE: 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.

2 Technical Data

2.1 Mechanical Structure

- Plastic body + metal wall mount panel
- Resin sealed electronics
- 12 inch cable molded into body

2.2 Hardware Features

- Fingerprint biometric sensor
- MIFARE,DESFire,iCLASS- reader
- 12-key Keypad
- Beeper
- 4 red/green LEDs
- Keyboard illumination
- 3 Opto-Inputs
- Wiegand output
- RS485 host interface

2.3 Biometric Sensor

- Thin optical sensor
- 500 dpi @ 8 bit per pixel
- Active area: 0,5 x 0,9 in
- Template size: 130...250 bytes
- Memory: 1000 templates (optionally 6000)

2.4 Visual and Audible Indicators

- 4 red/green LED user interface
- Beeper (3khz)

2.5 Connection

- Cable with 11 circuits

2.6 Interface

- RS485 interface, 19200 Baud (8/N/1)
- Wiegand Output
- 3 Opto-inputs, active

2.7 Power Supply

- DC Voltage, 12...24V
  Minimum 1A and complying with Limited Power Source according to IEC/EN 60950-1
- Power consumption max 5W
- CSA or UL listing is recommended

2.8 Environment Conditions

- Temperature range 14° to 122º F
- Indoor and Outdoor
- Protection class IP65

2.9 Dimensions and Weight

- 4,5 in x 2,5 in x 2 in (H x W x D)
- Approx. 0.4 lb

2.10 Cable Specifications

- **RS485**
  Shielded twisted pair cable (4000 feet max)

  Examples:

  1. 2x2 strands litz wire AWG24 (0.4 kcmil)
  2. J-Y(ST)Y 2x2x0,6
  3. CAT 5 ... 7 STP (Shielded Twisted Pair)

- **Wiegand**
  Non-twisted shielded cable (500 feet max)

  Examples:

  1. 10 pair shielded wire AWG22 (0.64 kcmil)

  For shorter distances or using higher supply voltage:

  2. 8 pair AWG24 (0.4 kcmil)

3 Installation

3.1 Installation Requirements

Notice

For outdoor use, determine an appropriate place for mounting the AR402. Avoid mounting in direct sunlight as this may affect the function of the biometric sensor.

Direct sunlight may overheat the AR402.

3.2 Condition

Check the following for mounting the AR402

√ Device needs proper clearance.

√ All cabling must be provided, electrical cable, data cable and door opener cabling.

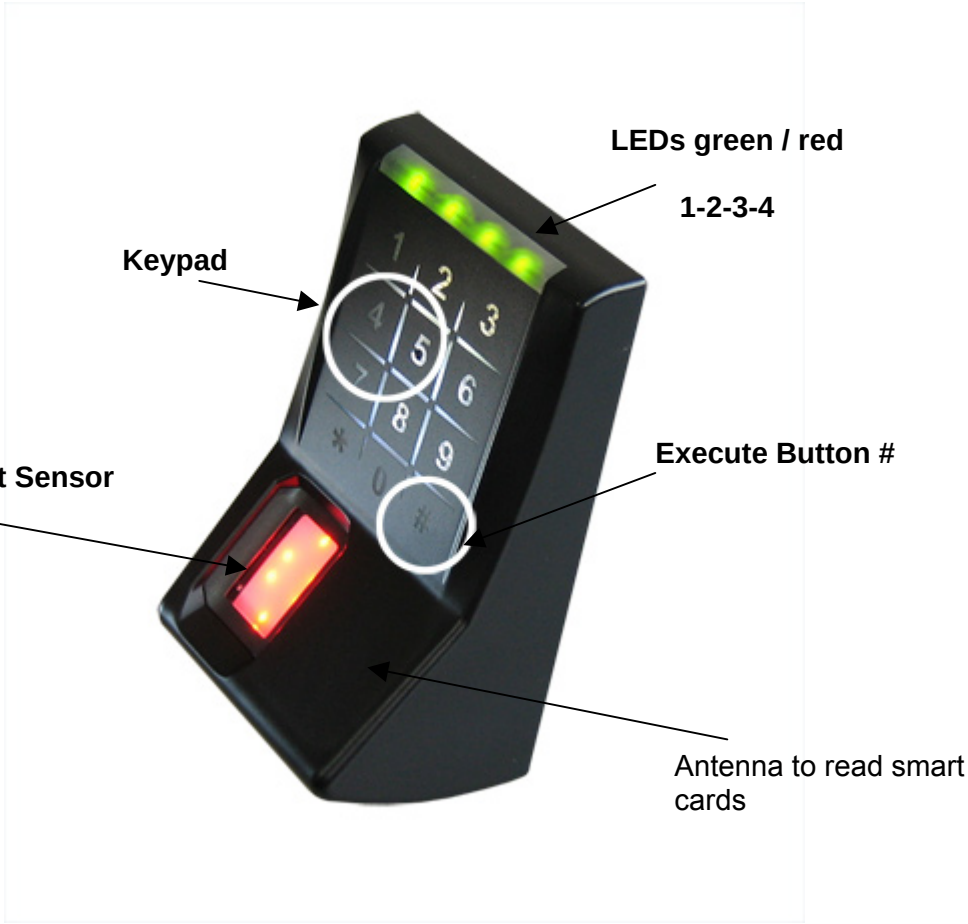
√ Power supply is provided.

3.3 Wiring

Do not install data cables parallel to cables conducting high voltage. If unavoidable, install the data cables in conduit and keep them at a distance of 1 yd to protect them against electromagnetic interference.

4 Operation

4.1 View of the Control Elements



4.2 Basics

The AR402 is manufactured in two versions:

1. AR402 with built-in biometrical sensor and keypad
2. AR402-Card Reader with built-in biometrical sensor and keypad + embedded smart card reader

The AR402 identifies authorized users by scanning their fingerprints (and optionally their PINs and smart cards). Successful identification sends a trigger signal to an access controller within a protected area and is followed by a door lock or release.
The AR402-Card Reader reads fingerprints and smart cards alternatively.

Fingerprint authentication requires that the authorized user's fingerprints have been enrolled in advance and that they have been linked to a unique User ID.
Enrollment can be performed on the AR402, which stores the collected data (Templates).

The 'Template on Card' mode allows you to write Templates onto smart cards (currently 16k2 cards only).

The AR402 can either be run using the RS485 interface or the Wiegand output:

RS485 Configuration Running the reader using the RS485 interface means that administration of the AR402 is done on the NEXTOR Series access controller.
All administrator functions, except for enrollment, are disabled on the AR402.
Fingerprint Templates are managed by the access controller and can be distributed to the connected AR402 readers.

Wiegand Configuration All administrator functions described in this manual, except for enrollment, only apply to the Wiegand configuration. All settings are entered on the keypad of the AR402.
Fingerprint templates are stored on the AR402 and cannot be distributed to connected AR402 readers.

4.3 Basic Operating Principles

General Pressing any key triggers a beep.

Release Beep tone and all LEDs flashing green

Green and Red / Green LEDs Guides an administrator through the setup menus

Red LEDs and Beeps Generally indicates an error

Error Message 3 short beeps and all LEDs flashing red 3 times indicate an error. The desired function was not performed.

3x Key "#" Press "#" three times to reset the reader to keypad default state after typing errors or wait for timeout (10-30 seconds, depending on status) to return to the default position.

4.4 User Operation

4.4.1 Authentication, AR402:

Authorized users who's fingers have been enrolled and who's PIN have been registered are granted access when entering:

Finger without PIN:	Press ✱	=> Bio-Sensor is illuminated	
	Apply Finger	=> Green LEDs	(Access granted)
Finger plus PIN:	Press ✱	=> Bio-Sensor is illuminated	
(Wiegand)	Apply Finger	=> LEDs flash	(Waiting for PIN entry)
	Enter PIN	=> Green LEDs	(Access granted)
Finger plus PIN:	Press ✱	=> Green and Red LEDs 1 and 4 flash	(Waiting for PIN entry)
(RS485)	Enter PIN	=> Bio-Sensor is illuminated	
	Apply Finger	=> Green LEDs	(Access granted)

4.4.2 Authentication, AR402-smart card type:

Authorized users who's fingers have been enrolled and who's card type cards and PIN have been registered on the access controller are granted access when entering:

Finger:	as above		
Card without PIN:	smart card	=> Beep and short green signal	(Indication card was read)
		=> Green LEDs	(Access granted)
Card plus PIN:	smart card	=> Beep and short green signal	(Indication card was read)
(Wiegand)		=> LEDs flash	(Waiting for PIN entry)
	Enter PIN	=> Green LEDs	(Access granted)
Card plus PIN:	smart card	=> Beep and short green signal (LEDs 2/3)	(Indication card was read)
(RS485)		=> Green and Red LEDs 1 and 4 flash	(Waiting for PIN entry)
	Enter PIN	=> Green LEDs	(Access granted)

4.4.3 Authentication, 'Template on Card' (AR402-smart card type only)

Authorized users who's fingers have been stored onto their card and who's smart cards and PIN have been registered on the access controller are granted access when entering:

Card without PIN:	smart card	=> LEDs flash green.	
		Beep when finished reading the card	(Indication card was read)
		=> Green LEDs	(Access granted)
Card plus PIN:	smart card	=> LEDs flash green.	
		Beep when finished reading the card	(Indication card was read)
		=> LEDs flash	(Waiting for PIN entry)
	Enter PIN	=> Green LEDs	(Access granted)

The AR402-smart card type reads fingers and smart cards alternatively without having to switch between operating modes.
If a mistype occurs on the keypad simply press the “#” three times to reset and start over.
The various operating modes are configured in the administrator’s menu as described in section 5.

5 Wiegand Configuration - Administrator Functions

With the exception of enrollment all administrator functions described in this section only apply to the Wiegand configuration, i.e. connecting the AR402 to the access controller via Wiegand.

Administration of the AR402 with Wiegand is done on the reader. The Fingerprint Key user interface is comprised of the keypad, fingerprint reader and smart reader as input devices and the LEDs and beeper as output devices.

The administrator functions allow administrators to configure the operating modes and the Admin code.

e-DATA GmbH delivers the device with the default Admin Code '1234'.

☞ **Notice** **For security reasons the default Admin Code should be changed. (see below)**

In addition to the Admin Code each device has a fixed access code. This code corresponds with the device's serial number, a 12-digit hexadecimal code, which is printed on the back of the reader. The 12-digit code serves as a basis for calculating the access code if your Admin Code is lost. In this case please contact **e-DATA GmbH**.

5.1 Change the Admin Code

The default Admin Code is '1234'.
For security reasons it is advisable to change the Admin Code!
The Admin Code can be a 4-digit to 8-digit code.

Admin Mode		**Green 1+2**	
Default Admin Code **1234**			
or enter your Admin Code		**Green 1+2+3**	
Function Menu		**Green 1+2 flashing**	**Beep**
Change Admin Code		**Green 2+3 flashing**	**Beep**
(Default = 1234)		**Green 1+2 flashing**	**Beep**
Finalize by 3 x #			
or wait for Timeout			

5.2 Enrollment

The AR402 assigns 2 different fingers (e.g. left index finger, right index finger) to the unique User ID of a person. Each of the 2 fingers must be scanned 3 times by the Fingerprint Key reader. The biometric sensor reads fingers best when placing your finger on the sensor with some pressure.

☞ **Notice** Bright daylight may affect the function of the biometric sensor. Shadowing the sensor with your hand will help.

5.2.1 Enroll user

The fingers of a new user are enrolled by entering the following on the reader's keypad:

Admin Mode		**Green 1+2**
Default Admin Code **1234** or enter your Admin Code		**Green 1+2+3**
Enter Enrollment Code		**Green 1+2+3+4 flashing**
Enter User ID *		**Green 1 flashing** **Sensor Red**
Apply 2 Fingers 3x		if successful: **Green 1+2+3+4 flashing**
Finalize by 1 x # **or wait for Timeout**		

Entering a User ID with an incorrect number of digits, an already existing User ID, or variant IDs with Validation enabled and also if your fingers already have been scanned will prompt an error message (all red LEDs flashing three times) and cause the reader to return to it's default position.

* With Validation enabled enter your User ID a second time. After the first entry of your User ID and the '#' key, the four green quickly flashing LEDs indicate the reader to expect your User ID for a second time.

5.2.2 Write Template onto smart Card (AR402-smart card reader type only)

Setting the reader to 'Template on Card' is required for this operation (see "Choose iCLASS Mode", page 21) and the reader must 'know' the encryption of your iCLASS cards. The 'Template on Card' mode does not store fingerprint templates to the AR402 but writes them onto iCLASS cards instead. The reader identifies authorized users by comparing the fingerprint templates stored on the card with the scanned finger of the card holder. If the two match the reader will send the facility code and card number to the controller. 'Template on Card' may be expedient where storing biometric data is prohibited. In addition this mode offers a good alternative using biometric readers in a Wiegand configuration as users will not have to enroll on multiple readers.
At this point 'Template on Card' only works with 16K2 iCLASS cards and in a Wiegand configuration.

The AR402-iCLASS will store the fingers of a new user onto iCLASS cards when entering the following on the keypad:

Admin Mode		**Green 1+2**
Default Admin Code **1234**		
or enter your Admin Code		**Green 1+2+3**
Enter Enrollment Code		**Green 1 flashing** **Sensor Red**
Apply 2 Fingers 3x		if successful: **Green 1+2+3+4 flashing**
Apply Card until the writing process is completed		**Green 1 flashing** **Sensor Red**
Enroll next finger or		
Finalize by 3 x # **or wait for Timeout**		

5.3 Define the Number of Digits for the User ID (optional)

Here the length of the User IDs (Default = 5 digits) can be set to a value between 2 and 9 digits.
In the process of enrollment User IDs need to be entered as a personal and unique ID.

Admin Mode		**Green 1+2**	
Default Admin Code **1234**			
or enter your Admin Code		**Green 1+2+3**	
Function Menu		**Green 1+2 flashing**	**Beep**
Number of Digits for User ID		**Green 3+4 flashing**	**Beep**
(Default = 5)		if successful:	
		Green 1+2 flashing	**Beep**
Finalize by 3 x #			
or wait for Timeout			

5.4 Enable Validation of the User ID (optional)

This menu allows you to enable the validation of the User ID for enrollment to eliminate incorrect entries.

Admin Mode		**Green 1+2**	
Default Admin Code **1234**			
or enter your Admin Code		**Green 1+2+3**	
Function Menu		**Green 1+2 flashing**	**Beep**
Validation of User ID		**Green 3+4 flashing**	**Beep**
Enable		**Green 1+2 flashing**	**Beep**
or Disable (Default)		**Green 1+2 flashing**	**Beep**
Finalize by 3 x #			
or wait for Timeout			

5.5 Delete Specific User(s)

This function allows you to remove a single user (User ID with its fingerprints) or several users of your choice from memory.

Admin Mode		**Green 1+2**
Default Admin Code **1234**		
or enter your Admin Code		**Green 1+2+3**
Delete Specific User(s)		**Green 1+2+3+4 flashing**
User ID		if successful: **Green 1+2+3+4 flashing** **Beep**
Optional: More User IDs		**Green 1+2+3+4 flashing** **Beep**
Finalize by 3 x # **or wait for Timeout**		

5.6 Delete Entire Database

Caution This function deletes all users of the reader's database!

Admin Mode		**Green 1+2**
Default Admin Code **1234**		
or enter your Admin Code		**Green 1+2+3**
Enter Delete Database		**Red 1+2+3+4 flashing** **Beep**
Press ✱ key to confirm		if successful: **Green 1+2+3** **Beep**
Finalize by 3 x # **or wait for Timeout**		

If you see red LEDs after pressing ✱ this indicates the database was not deleted and the procedure needs to be repeated.

5.7 Select iCLASS Mode (AR402-iCLASS only)

In its default setting the iCLASS mode is activated on AR402-iCLASS readers. This mode reads fingerprints and iCLASS cards alternatively.
This menu allows you to disable the iCLASS module or to enable the 'Template on Card' mode instead (cp. "Enrollment with 'Template on Card' enabled, page 18).

Admin Mode		**Green 1+2**	
Default Admin Code **1234**			
or enter your Admin Code		**Green 1+2+3**	
Function Menu		**Green 1+2 flashing**	**Beep**
iCLASS Menu		**Green 3+4 flashing**	**Beep**
Enable iCLASS (Default)		**Green 1+2 flashing**	**Beep**
or Enable 'Template on Card'		**Green 1+2 flashing**	**Beep**
or Disable iCLASS		**Green 1+2 flashing**	**Beep**
Finalize by 3 x #			
or wait for Timeout			

5.8 Define Facility Code

These settings only apply to the trigger signal of the reader's biometric sensor sent to the access controller. The Facility Code of iCLASS cards is sent to the access controller untouched and independent of these settings.
In a Wiegand configuration you can set the Facility Code of the biometric sensor according to your requirements. The Default Facility Code for 37-bit is '830'.

Admin Mode		**Green 1+2**	
Default Admin Code **1234**			
or enter your Admin Code		**Green 1+2+3**	
Function Menu		**Green 1+2 flashing**	**Beep**
Define Facility Code		**Green 3+4 flashing**	**Beep**
		Green 1+2 flashing	**Beep**
37-bit (Default = 830) 26-bit (Default = 1)			
Finalize by 3 x # **or wait for Timeout**			

Caution

If both fingers and iCLASS cards are employed in a Wiegand configuration your range of fingerprint User IDs must not overlap with your range of card numbers!

5.9 Choose 37-bit or 26-bit Format

These settings only apply to the trigger signal of the reader's biometric sensor sent to the access controller. The Facility Code of iCLASS cards is sent to the access controller untouched and independent of these settings.
In a Wiegand configuration the format of the biometric sensor's trigger signal to the access controller can be defined (e.g. Set the biometric sensor's format to the 26-bit format if HID cards with 26-bit standard format are used).

Admin Mode		**Green 1+2**	
Default Admin Code **1234**			
or enter your Admin Code		**Green 1+2+3**	
Function Menu		**Green 1+2 flashing**	**Beep**
Choose Format		**Green 3+4 flashing**	**Beep**
37-bit with Facility Code (Default)		**Green 1+2 flashing**	**Beep**
26-bit with Facility Code		**Green 1+2 flashing**	**Beep**
Finalize by 3 x # **or wait for Timeout**			

5.10 Reset - Manually switch to Wiegand mode

This function allows you to reset the AR402 to its factory defaults. All settings like the changed Admin Code, the enabled Validation of the User ID will be affected. Users however will remain untouched.

The reader will be set to Wiegand mode.

Admin Mode Default Admin Code **1234** or enter your Admin Code **Enable Wiegand Mode**		**Green 1+2** **Green 1+2+3** Device resets to all defaults and reboots

5.11 Reset - Manually switch to RS485 mode

This function allows you to manually set the AR402 to RS485 mode. All settings will be reset. The reader indicates its' offline status by the red flashing LED 4. The AR402 will automatically go online once it is connected via RS485 to a controller of the NEXTOR series.

Admin Mode Default Admin Code **1234** or enter your Admin Code **Enable RS485 Mode**		**Green 1+2** **Green 1+2+3** Device resets and signals its' RS485 offline status

6 RS485 Configuration with NEXTOR Series Access Controller

For detailed information on the administration in the RS485 configuration please turn to the manuals of the NEXTOR Series access controllers.

The AR402 is controlled by the NEXTOR Series access controller. Administrator functions are carried out on the access controller.

For security reasons the identification of the templates is processed by the AR402. Templates are managed by the NEXTOR Series access control system and can be distributed to the connected AR402 readers.

6.1 Status Indication

"Always Open"
All 4 green LEDs are permanently on, further input is accepted.

"Always Closed"
All 4 red LEDs are permanently on, no further input is accepted.

Offline Display
Offline = LED 4 flashing red, no further input is accepted.

User Input is also temporarily disabled when the reader is synchronizing data from the NEXTOR Series access controller. This is indicated by LEDs 2 and 3 flashing red.

6.2 Allocation of IDs on the NEXTOR Series Access Controller

On a RS485 data bus the devices are distinguished by a device ID (address). The NEXTOR Series access controller recognizes serial numbers of AR402 readers on the bus line. These serial numbers are 12-digit hexadecimal codes (e.g. C03859110000) printed on the back of the readers. The access controller assigns the two reader IDs, ID-0 and ID-1, based upon the serial numbers according to the following rationale:

1. The NEXTOR Controller recognizes two unassigned serial numbers:

   The lower value of the two is assigned to ID-0
   The higher value of the two is assigned to ID-1

2. The NEXTOR Controller recognizes an already assigned serial number and one unassigned serial number:

   The assigned serial number will keep its ID assignment
   The unassigned serial number will be assigned the available ID (0 or 1)

3. Both serial numbers are assigned by the NEXTOR Controller:

   The devices keep their ID assignment

The NEXTOR Series access controller allows you to change the automatic allocation.

☞ **Notice** It is good practice to make note of the serial numbers for each reader location during installation.

7 Maintenance

Caution

Danger of electric shock! Disconnect the device from the power supply before opening and before connecting cables.

7.1 Customer Service

First Response identify defects and causes

Contact the **e-DATA GmbH** hotline in the event of any device error. Have the following ready before placing your call:

- Serial number of the AR402
- Customer details
- What troubleshooting steps have you already taken to correct the error?
- LED status
- Device and controller errors
- What occurred before the error?

7.2 Repairs

Careful

You may only undertake repair work after coordination with e-DATA GmbH **International.**

7.3 Warranty, Limitation on Liability to Third Parties

In accordance with national statutory regulations at the place where the device is installed

Caution:
Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.

8 Datasheet

Credentials smart card reading
Template on card
Biometric (fingerprint)
PIN Code

Host Interface
RS485
Wiegand

Biometric Features:

Search Modes
1 to 1 identification
1 to many verification

Response/Reads
Enrollment <= 1 sec
Identification <= 1 sec
Verification <= 0.8 sec
FAR & FRR adjustable

Sensor
Thin optical sensor
500 dpi @ 8-bit per pixel
Active area: .55 x .87 in (14mm x 22mm)

Templates

Template Size: ~130 to 250 bytes
Storage Capacity: 1000 or 6000 templates by model (not valid for template on card)

Power

12 bis 24V DC / 67mA -160mA

Operating Temperature
14 to 122 F (-10 to 50 °C)

Relative Humidity
0 to 95%,

Mechanical
NEMA IP65 rated
Metal Mounting Plate
Resin-sealed hard plastic enclosure

Color Options
Black, Silver and White

Dimensions
4.7 x 2.4 x 1.8 in (120 x 60 x 45 mm)

Appendix

8.1 Quick Guide to Admin Functions

Enter	Functions	Page
# 99 #	**Open Admin Mode**	
1234 #	**Enter Default Admin Code (or your Admin Code)**	
1 #	Reset - Manually switch to Wiegand Mode	23
2 #	Reset - Manually switch to RS485 Mode	23
12 #	Enroll user	17
16 #	Write Template onto iCLASS Card (AR402-iCLASS only)	18
13 #	Delete Specific User(s)	20
1357 #✱	Delete Entire Database	20
14 #	**Open Function Menu**	
15 #	Change the Admin Code (4-8 digits) Default = 1234	16
24 #	Select iCLASS Mode (AR402-iCLASS only) Default = 1 0 = disabled 1 = enabled 2 = enable 'Template on Card'	21
16 #	Define the Number of Digits for the User ID (2-9 digits) Default = 5	19
22 #	Enable Validation of the User ID Default = 0 0 = disabled 1 = enabled	19
19 #	Choose 37-bit or 26-bit Format Default = 0 0 = 37-bit 1 = 26-bit	22
20 #	Define Facility Code Default = 830 0 - 65535 (37-bit) Default = 1 0 - 255 (26-bit)	22
17#	door opener time in 0.1s, 3 digits with leading zeroes	
21#	length of PIN, 2 - 9, # and 0	
23#	display finger match, 0# = yes, 1# = no	
25#	enter 20 digits BBDC secret Nr	
30#	learn admin finger-1 + 6-digit pin (take a different finger than	

Optional

31#	learn admin finger-2 + 6-digit pin (take a different finger than
301#	delete admin finger-1 (delete of both admin fingers or erase data base => "1234" (default)
311#	delete admin finger-2
40#	learn direct access pin-1 (length 4...8, following the '#' position, both pins must have the same length)
41#	learn direct access pin-2 (mismatches: 5 then wait 3 min, 5 more then wait 10 min, 2 more then delete pins)
401#	delete direct access pin-1
411#	delete direct access pin-2
0001#	load SAGEM Firmware
0000#	set default parameters
01#	set_minutiae-size , 170...255, 3 digits, # (default = 255)
02#	set_identification threshold , 00...10, 2 digits with leading zeroes, # (10 = recognition threshold is highest) (default = 5)

8.2 Allocation of the Cable

		Connectors on the Door Unit	
Color	**Purpose**	**RS485**	**Wiegand**
tan	Tamper Switch-2		
pink	RS485A	X38/X39 (3)	
grey	RS485B	X38/X39 (2)	
Red	DC in + 12...24V	X36/X37 (+)	X36/X37 (+)
Black	DC in (–)	X36/X37 (–)	X36/X37 (–)
White	Wiegand Out D1		X38/X39 (2)
green	Wiegand Out D0		X38/X39 (3)
violet	Wiegand Ground		X38/X39 (1)
brown	Green LEDs (Opto-In 1) / Relay-2		X15/X17 (1)
yellow	Beeper (Opto-In 2)		X16/X18 (1)
orange	Red LEDs (Opto-In 3)		
blue	Tamper Switch-1 / Relay-1		

Remarks:

The Opto-Inputs are activated, when connected to "Wiegand Ground" (e.g. when used as a Wiegand reader "Opto-In-1" enables the green LEDs, "Opto-In-2" the beeper and "Opto-In-3" the red LEDs).

"Wiegand out D0/D1" is open collector to "Wiegand Ground".

The "Tamper Switch" is an isolated switch

Wiring Requirements

Notice:
Do not install data cabling parallel to high voltage cables. If unavoidable install data cabling in conduit and keep a distance of 3 ft. to protect from electromagnetic interference.

RS485
Shielded twisted pair cable (4000 feet max) e.g.:

1. 2x2 strands litz wire AWG24 (0.4 kcmil)
2. J-Y(ST)Y 2x2x0,6
3. CAT 5 ... 7 STP (Shielded Twisted Pair)

Wiegand
Non-twisted shielded cable (500 feet max) e.g.:

1. 10 pair shielded wire AWG22 (0.64 kcmil)

For shorter distances or using higher supply voltage:

2. 8 pair AWG24 (0.4 kcmil)

Consider whether or not to supply power with the data cable. Long distances require an increased gauge of cable. Supplying power locally or having an extra power cable pull may be preferable. Because of voltage drop over longer distances use of a 24V power source is the recommended choice.

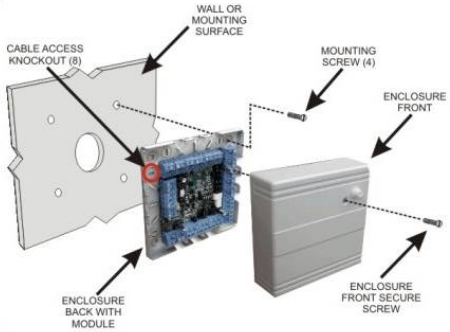
Example for calculating the power supply wiring:

1. AWG22 cable (0,34 mm^2):
   Loop resistance ca 115 ohm / km
   AR402 current with 12V = 0,2A
   Cable length 150m
   Voltage drop: 115 ohm / km * 0.15km * 0,2A = 3.45V
   The supply voltage should be ≥ 15V in this case

2. AWG24 cable (0,25 mm^2):
   Loop resistance ca 180 ohm / km
   AR402 current with 12V = 0,2A
   Cable length 150m
   Voltage drop: 180 ohm / km * 0.15km * 0,2A = 5,4V
   The supply voltage should be ≥ 18V in this case

Quick Set-Up Guide for the NEXTOR Series MU200

Step 1 Mount



Step 2 Wire

A Connect MU200 (Master Unit) and DU (Door Unit)
- RS485 between MU200 and DU modules
- 10 to 28VDC Transformer

B Proximity reader connection to DU (Door Unit)
- 10 to 28VDC (red)
- GND (black-red)
- Data A (yellow)
- Data B (black-yellow)

C Connect door locking hardware
- Locking device (*magnetic lock shown)
- Door contact (Integrated in magnetic lock)
- Request to exit / PIR (*exit button shown)
- Locking hardware power (*12/24VDC Transformer)

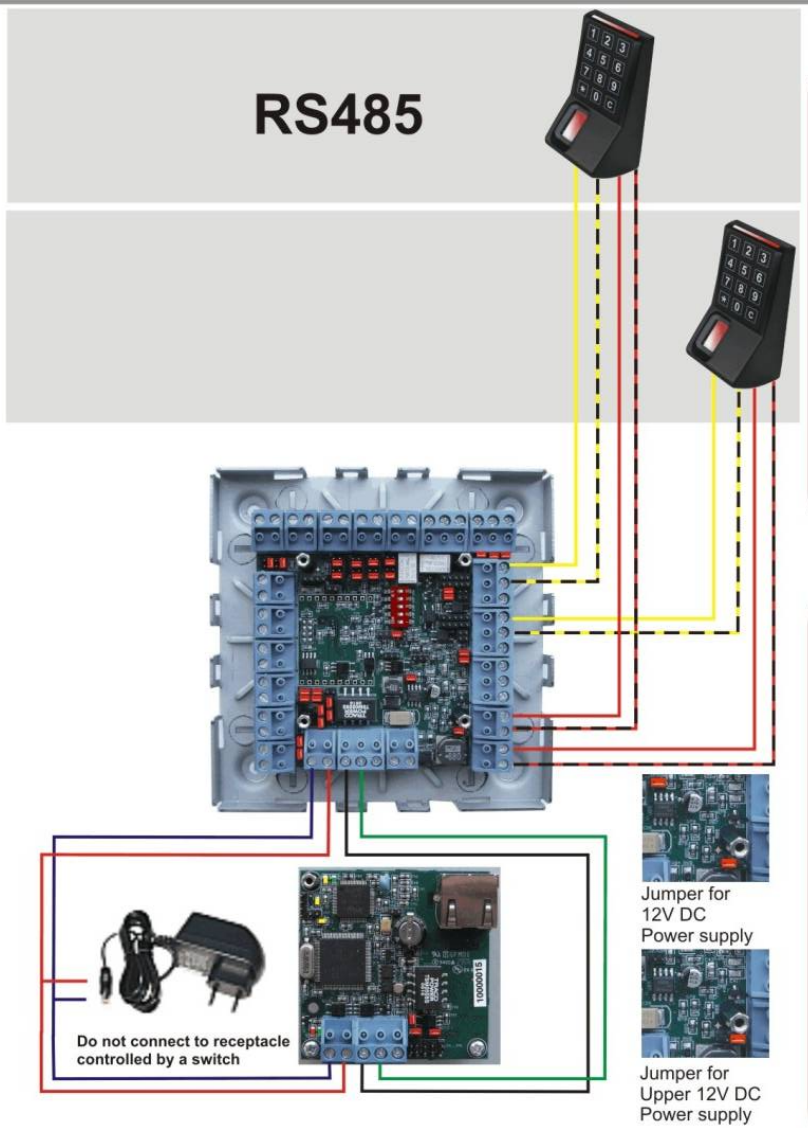
* Configuration example only, not included with packaged solution

Step 3 Network

A Ethernet connection
- Using CAT5 patch cable connect the MU200 (Master Unit) to an Ethernet router or directly to a PC using a CAT5 crossed cable

B Setting the IP address
- Set the IP address of the connected PC to allow connection to the MU200 (Master Unit) default IP address 192.168.50.120

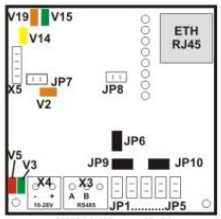
(see Software Configuration Manual for details)



Step 4 Power On

A Plug in transformer to a 120V AC source

B Verify the MU200 (Master Unit) LED indicators
- V2 (On = RS485 data transmission)
- V3 (Blinking = Application software running)
- V5 (On = Power On)
- V14 (On = 100MHz Ethernet connection)
- V15 (On = Ethernet connected)
- V19 (On = Ethernet data transmission)



MU200 (Master Unit)

Step 5 Login and Configure

A Connecting to the MU200 (Master Unit)
- Open the web browser of the connected PC.
- Enter the default IP address of 192.168.50.120 at the address line
- The "Welcome" screen is displayed

B Login to the system
- Enter the name "user1"
- Enter the password "pw"
- Click Login

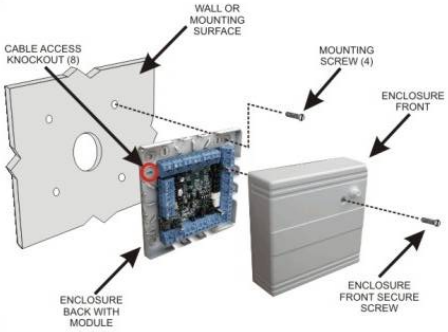
C Modify the system for your unique application
- Modify the pre-loaded configuration to your needs
- Enroll Cards and add Card Holders as required

(see Software Configuration Manual for details)

Quick Set-Up Guide for the NEXTOR Series MU200

≥ Reader Firmware 1.150

Step 1 Mount



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- RS485 between MU200 and DU modules
- 10 to 28VDC Transformer

B Proximity reader connection to DU (Door Unit)
- 10 to 28VDC (red)
- GND (black)
- Data 0 (green)
- Data 1 (white)
- Shield ground
- Beeper (yellow)
- Green LED (orange)

C Connect door locking hardware
- Locking device (*magnetic lock shown)
- Door contact (Integrated in magnetic lock)
- Request to exit / PIR (*exit button shown)
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* Configuration example only, not included with packaged solution

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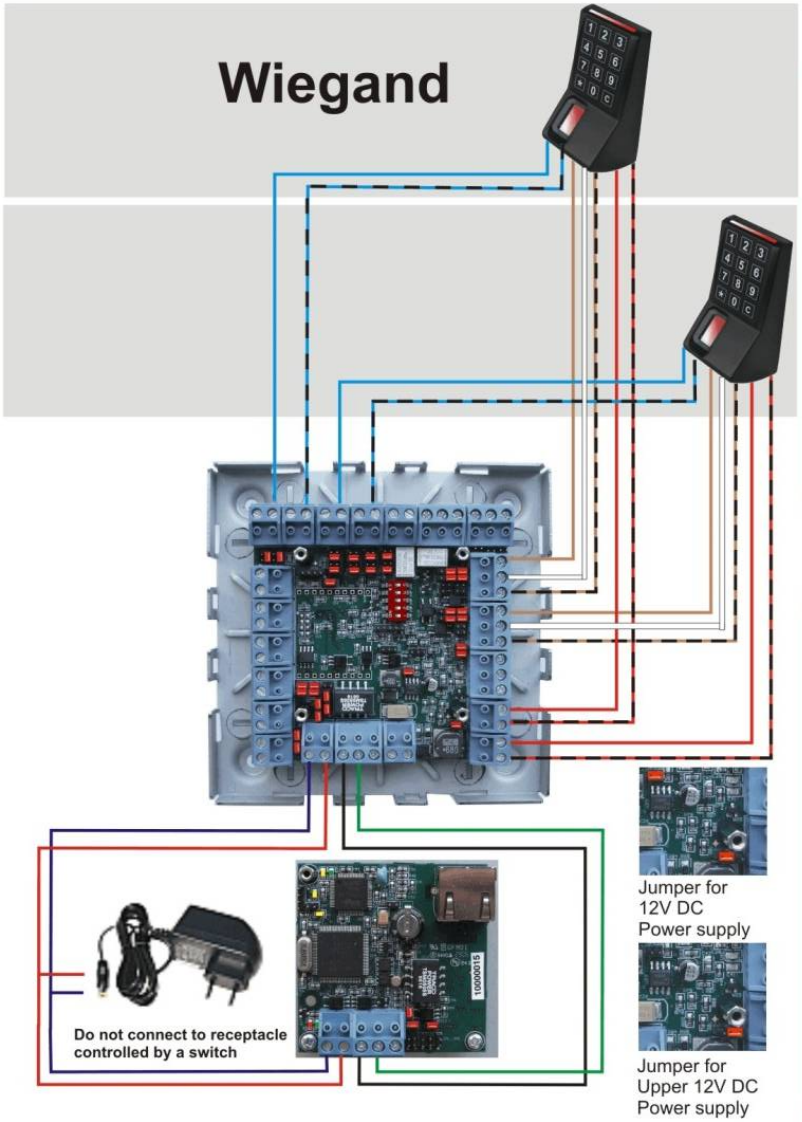

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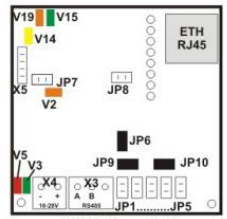

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