AY-Bx663 Family

Fingerprint Swipe Match-on-Card Readers

Installation Manual

Models:
AY-B1663
AY-B3663
AY-B4663

ROSSLARE
SECURITY PRODUCTS

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Notice and Disclaimer

This manual's sole purpose is to assist installers and/or users in the safe and efficient installation and usage of the system and/or product, and/or software described herein.

BEFORE ATTEMPTING TO INSTALL AND/OR USE THE SYSTEM, THE INSTALLER AND THE USER MUST READ THIS MANUAL AND BECOME FAMILIAR WITH ALL SAFETY REQUIREMENTS AND OPERATING PROCEDURES.

- The system must not be used for purposes other than those for which it was designed.

- The use of the software associated with the system and/or product, if applicable, is subject to the terms of the license provided as part of the purchase documents.

- ROSSLARE exclusive warranty and liability is limited to the warranty and liability statement provided in an appendix at the end of this document.

- This manual describes the maximum configuration of the system with the maximum number of functions, including future options. Therefore, not all functions described in this manual may be available in the specific system and/or product configuration you purchased.

- Incorrect operation or installation, or failure of the user to effectively maintain the system, relieves the manufacturer (and seller) from all or any responsibility for consequent noncompliance, damage, or injury.

- The text, images and graphics contained in the manual are for the purpose of illustration and reference only.

- All data contained herein subject to change without prior notice.

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- All graphics in this manual are for reference only, some deviation between the image(s) and the actual product may occur.

- All wiring diagrams are intended for reference only, the photograph or graphic of the PCB(s) are intended for clearer illustration and understanding of the product and may differ from the actual PCB(s).

1.   Introduction

The MIFARE® Smart Card Fingerprint Swipe Sensor Match-On-Card (MOC) readers, utilizing MOC technology developed by Rosslare, are biometric fingerprint readers that are used with access control systems.

The AY-Bx663 series of readers use a swipe type biometric sensor to verify between fingerprint data and a biometric template stored in a MIFARE card. When verification is confirmed, the reader then transmits the Card ID or any ID stored in Sector 0 or 15 to the access controller, which compares the card ID to data stored in the database and determines access granting.

The readers are compatible with most access control hardware, including the following hardware manufactured by Rosslare Security products: AC-015, AC-115, AC-020, AC-215, AC-225, AC-425, AC-525, and ExpansE™.

1.1   Features

The AY-Bx663 series of readers include the following features:

- Three different designs to accommodate customer requirements and preferences
- Three blue LEDs that flash in a pattern that lead users to swipe fingers in the correct direction
- Designed for indoor use (swipe sensor protection required for outdoor use)
- Support back tamper sensor and tamper output signal
- Support lockout feature for increased security
- Compatible with MIFARE (ISO 14443A) 1K and 4K cards
- MIFARE card followed by finger swipe reading
- Reads up to 2 fingerprint templates stored on the card
- Programmable data transmission formats
- Programmable LED control and buzzer control inputs

- Tamper output
- Compliant with CE, UL, and FCC standards for international distribution

2.   Technical Specifications

General Characteristics

Output Formats	• Wiegand 26-Bit (default) • Wiegand 26-Bit with Facility Code • Wiegand 32-Bit Reversed • Clock & Data • Wiegand 32-Bit • Wiegand 34-Bit • Wiegand 40-Bit
Read Range (max)	4 cm (1.6 in.)

Electrical Characteristics

Power Supply Type	Linear type (recommended)
Input Voltage	5 to 16 VDC
Absolute Maximum (non-operating)	18 VDC
Maximum Input Current	Standby: 85 mA @ 12 VDC Read: 300 mA @ 12 VDC
Tamper Output	Open collector, active low, max. sink current 32 mA
Maximum Controller Cable Distance	150 m (500 ft) (using 18-AWG shielded cable)
Frequency	13.56 MHz
Card Compatibility	MIFARE ISO14443A-3 standard

Environmental Characteristics

Operating Temperature Range	-25°C to 60°C (-13°F to 140°F)
Storage Temperature Range	-40°C to 85°C (-40°F to 140°F)
Operating Humidity Range	5% to 95% (non-condensing)

Dimensions

Reader	Height x Width x Depth	Weight
AY-B1663	85.4 x 50.6 x 27 mm (3.36 x 1.99 x 1.06 in.)	65 g (2.29 oz)
AY-B3663	84.1 x 54.1 x 20.9 mm (3.31 x 2.13 x 0.82 in.)	90 g (3.17 oz)
AY-B4663	70.1 x 54.1 x 39.1 mm (2.76 x 2.13 x 1.54 in.)	90 g (3.17 oz)

3.   Installation

3.1   Mounting Instructions

Prior to starting, select the location where the reader unit is to be mounted. Use the supplied drilling template to assist in locating and drilling the appropriate holes (Figure 1).

Figure 1: Mounting Orientations
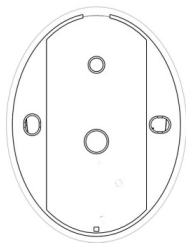
AY-B1663   **AY-B3663**   **AY-B4663**
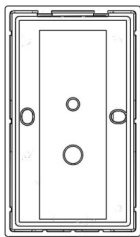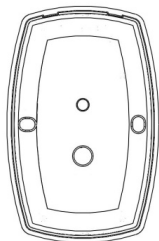
> Note   Be sure to protect the swipe sensor when the reader is mounted outside.

To mount the reader:

1. Determine an approximate surface location for the reader.
2. Peel off the back of the self-adhesive mounting label template and place it on the required mounting location.
3. Using the template as a guide, drill two holes (of the size indicated on the template) on the surface to mount the reader.

> Note   The reader can also be mounted using strong epoxy glue. After application, firmly hold the reader in place until the glue dries.

4. Insert a suitable wall plug into each hole.
5. Drill a 10-mm ($^{7}/_{16}$") hole for the cable. If the surface is metal, place a grommet or electrical tape around the edge of the hole.
6. Unscrew and remove the case security screw at the bottom using the security hex key.
7. Carefully remove the snap-off front cover of the reader to reveal two screw holes (Figure 2).

Figure 2: Removing the Top Cover

AY-B1663   **AY-B3663**   **AY-B4663**
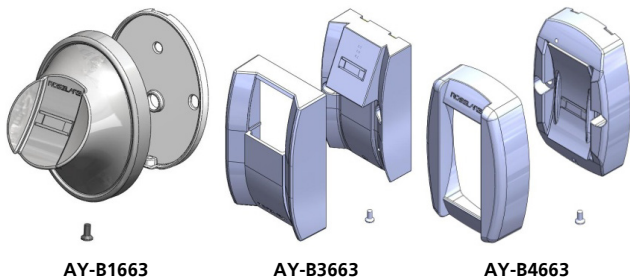
8. Route the interface cable from the reader to the controller (see Section 3.2).
9. Carefully re-attach the snap-off front cover of the reader and secure the case security screw at the bottom using the security hex key.

3.2   Wiring Instructions

The AY-Bx663 readers are supplied with a 7-wire, 46-cm (18") cable.

To connect the reader to the controller:

10. Prepare the unit's cable by cutting the cable jacket back 3.2 cm (1¼") and stripping the wire 1.3 cm (½").
11. Prepare the controller cable by cutting the cable jacket back 3.2 cm (1¼") and stripping the wire 1.3 cm (½").

12. Splice the reader pigtail wires to the corresponding controller wires (see Table 1) and cover each connection.

Table 1: Wiring the Reader to the Controller

Color	Wiring
Black/ Shield	Ground
Red	Vin
Green	Data 0
White	Data 1
Brown	LED control
Orange	Buzzer control
Purple	Tamper

13. If the tamper output is being utilized, connect the purple wire to the correct input on the controller.

14. Trim and cover all conductors that are not used.

> Note
> - The individual wires extending from the reader are color-coded according to the required Wiegand standard.
> - When using a separate power supply for the reader, this supply and the controller's power supply must have a common ground. A linear power supply is recommended.
> - Attach the cable shield wire on the reader to an earth ground (best) or to a signal ground connection at the panel or power supply end of the cable. This configuration is best for shielding the reader cable from external interference.

4. Configuring the Reader

To provide the highest level of security, the reader is programmed to validate only MIFARE cards whose settings correspond to the Master card that is used to prepare the reader for configuration. Then, a configuration card is used to configure the following settings:

- Card transfer format
- Mifare card Key A value
- LED and buzzer control enable
- Lockout settings
- Transmission of Card Serial Number (CSN) or card ID from dedicated sector

> *Note* The configuration card is configured using the Desktop Programmer (CP-R25). Refer to the *CP-R25 Hardware and AS-B01 Software Manual* for more details.

4.1 Configuration Procedure

The reader will not work until it is configured upon initial use. It is recommended to configure the reader one time only, following installation and its initial use. However, if needed, configuring the reader can be done anytime using the same procedure described below.

To configure the reader:

1. Present the Master card.

   A short beep is generated and all three LEDs begin to blink, as the reader goes into Configuration mode.

2. Within 30 seconds (while the reader is still in Configuration mode), present a valid configuration card to the reader.

   If the configuration is valid, 3 short beeps are emitted, and all 3 LEDs flash 3 times quickly together.

If the configuration is not valid, an error beep is generated. If the reader is being configured for the first time, it will not work until a successful configuration is performed.

If the reader is already in use, then following a failed configuration, the reader returns to Standby mode and continues to work with its previous configuration settings.

5.   Testing the Reader

After wiring the reader to the controller and to a power supply, test the reader.

To test the reader:

1. Power up the reader.

    Three long beeps are generated and all 3 LEDs flash simultaneously for 3 seconds. The LEDs then illuminate alternately, from top to bottom.

2. If you have not yet done so, configure the reader as described in Section 4.1.

3. Present the User card to the reader.

    If the card is valid and contains a fingerprint template, a short confirmation beep is generated and all 3 LEDs flash indicating a successful read.

4. Following the confirmation (the LEDs turn on and off in a fast circular mode), swipe your finger on the swipe sensor.

    If the fingerprint matches the template on the card, 3 short confirmation beeps are generated, and all 3 LEDs flash indicating a success.

    If there is a mismatch, a long, low beep is generated and the LEDs turn off.

    If no finger is presented during the 10 seconds, the reader enters Standby mode and the left LED is lit red.

6.   Modes of Operation

The AY-Bx663 readers have the following modes of operation:

- Boot Mode (Reset)
- Configuration Mode
- Standby Mode
- Read Mode
- Lockout Mode

6.1   Boot Mode

The reader enters Boot mode upon power up or upon restoration of power after a power failure where the loader runs separately from the main application. During Boot mode, which lasts for approximately 0.5 seconds, the middle LED is lit and firmware upgrades can be performed.

6.2   Configuration Mode

To enter Configuration mode, you must present the Master card. Once the Master card is presented, all 3 LEDs are lit and there is a short confirmation beep indicating that the unit is in Configuration mode. Configuration mode lasts for 30 seconds.

> The configuration card is configured using the Desktop Reader (CP-R25) and the card programmer and fingerprint enrollment. Refer to the *CP-R25 Hardware and AS-B01 Software Manual* manual for more details.

See Section 4.1 for more on reader configuration.

6.3 Standby Mode

The reader enters Standby mode:

- After the Boot (reset) and Configuration modes
- After the Lockout mode period
- After a successful card or fingerprint read

During Standby mode, the LEDs turn on and off in circular motion at a slow rate to indicate Standby mode and the reader is ready for normal use.

6.4 Read Mode

The reader enters Read mode when a user presents a MIFARE card, followed by a swipe of the finger. The card and/or fingerprint can have a valid or invalid value and/or match.

6.4.1 Valid Card/Fingerprint Read

When card and fingerprint reads are valid, the following sequence occurs:

1. While the reader is in Standby mode, a user presents a Mifare card to the reader.
2. A short beep is generated, followed by all 3 LEDs flashing 3 times in parallel to indicate the card was verified. The LEDS then flash in a fast circular motion to indicate that the reader is waiting for the fingerprint swipe.
3. Swipe your finger along the fingerprint reader.

   When a match is found, a short beep is generated and the 3 LEDs flash 3 times in parallel to indicate that the finger swipe was verified.
4. The data is transmitted to the access controller, according to the reader's configured transmission format. The reader then re-enters Standby mode.

> *Note* If the user does not swipe a finger within 10 seconds, the reader returns to Standby mode and the user must restart the identification procedure.

6.4.2   Invalid Card/Fingerprint Read

An invalid card or fingerprint read can occur when:

- The card is not verified.
- There is an error in fingerprint presentation (for example, the user swipes too fast).
- There is a mismatch between the fingerprint and the template (for example, the user presents the wrong finger).

When a card or fingerprint read is invalid, the following sequence occurs:

1. A user presents a MIFARE card to the reader. This can occur during Standby mode (at the beginning of the identification procedure) or following a successful read of the first means of identification.

2. If the card or fingerprint is wrong, the LEDs turn on and the buzzer emits a long, low, invalid indication beep. After this, the user can re-attempt to present the card or finger.

3. Based on the Lockout mode configuration, explained ahead, several invalid reads within 30 seconds initiates the lockout mode

   If there are fewer than the pre-configured number of invalid card/fingerprint reads within 30 seconds, the reader enters Standby mode.

> *Note* When connected and operating with Rosslare's controllers and the AxTrax software, the readers send specific messages when failures occur. Those messages appear and can be handled on the AxTrax software:
>
> - Fingerprint data reading from card failed
> - Swipe sensor fingerprint reading failed
> - Fingerprint swipe sensor/card verification failed

6.5 Lockout Mode

The reader enters Lockout mode when there are a number of invalid card and/or finger reads within a 30-second period. During Lockout mode, all 3 LEDs flash simultaneously for 1 minute. After 1 minute, the reader enters Standby mode.

> *Note* The default number of invalid reads before the reader enters Lockout mode is 5. The number of invalid reads can be programmed to be 1 to 10.
>
> The default duration of Lockout mode is 1 minute. The duration can be programmed to be 1 to 5 minutes.

A.   Limited Warranty

The full ROSSLARE Limited Warranty Statement is available in the Quick Links section on the ROSSLARE website at www.rosslaresecurity.com.

Rosslare considers any use of this product as agreement to the Warranty Terms even if you do not review them.

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