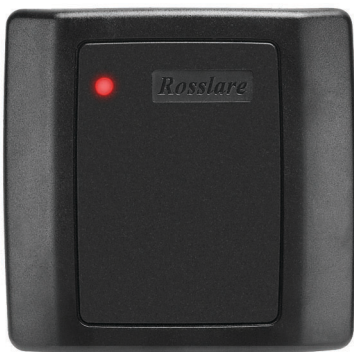


AY-M26

MIFARE® Sector Reader

Installation and Configuration Manual



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.
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- 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 AY-M26 is a contactless smart card reader used in access control system solutions.

The reader scans information from a MIFARE® smart card, which is stored in a specific and protected sector, and sends the data on to a connected access control system.

1.1 Usability

The system reads MIFARE 1K and MIFARE 4K card sector data, as well as the unique ID number of the following cards: MIFARE 1K, MIFARE 4K, MIFARE Ultralight, and MIFARE DESFire. The reader transmits the identification numbers they receive to an access control system.

The reader can also check the validity of cards before scanning them. When checking, the reader only sends card information to the access control system from cards with the correct security pass code. The readers are suitable for both indoor and outdoor installations.

Reader setup and operation is controlled using a Configuration card to adjust settings directly, without having to connect a remote computer or remove the unit. The Configuration card is a regular MIFARE 1K card, which can be pre-programmed using Rosslare's CP-R25 (or CP-R26) desktop MIFARE programmer, together with its associated software the AS-B01.

The AY-M26 reader is compatible with almost all access controllers, including Rosslare's state-of-the-art AC-115, AC-215, AC-225, AC-425, AC-525, and ExpansE™ controllers.

1.2 Main Features

The AY-M26 is a fully-featured smart card proximity reader, ideal for all facility code applications in access control, intrusion, and time and attendance applications:

- Reads MIFARE ISO14443 Type A Standard cards with two operation modes: Secure mode or Card Serial Number mode
- Pre-validation of smart cards by secure pass code
- Configured directly and easily using configuration smart cards
- Suitable for indoor and outdoor use (fully-potted and IP65 compliant)
- Built-in anti-tampering security system
- Multiple, programmable card transmission formats
- Dedicated LED and buzzer control input

1.3 Supported RFID Transponders

The AY-M26 reads the following transponders:

- MIFARE Ultralight (card serial number only)
- MIFARE Classic 1K
- MIFARE 4K
- MIFARE DESFire (card serial number only)

2. Technical Specifications

Electrical Characteristics

Operating Voltage Range	6.5 to 16 VDC
Absolute Maximum	18 VDC (non-operating)
Input Current @ 12V	Standby: 110 mA Maximum: 165 mA
LED/Buzzer Control Input	Dry Contact, N.O.
Tamper Output	Open collector, active low, 30mA maximum sink current

Operational Characteristics

Maximum Cable Distance to Controller	150 m (500 ft) with 18-AWG cable
Proximity Read Range*	45 mm (1.8 in.)
Operating Frequency	13.56 MHz
Transfer Bit Rate	106 Kbits per second
Output Indicators	One tri-colored LED, buzzer
Card Compatibility	MIFARE and all ISO14443A-3 cards
Card Transmit Formats	Programmable

Environmental Characteristics

Operating Temp. Range	-31°C to 63°C (-25°F to 145°F)
Operating Humidity Range	0 to 95% (non-condensing)
Operating Environment	Water resistant, suitable for outdoor use (IP65 compliant)

Dimensions

Height x Width x Depth	89 x 89 x 15 mm (3.5 x 3.5 x 0.6 in.)
Weight	116 g (4.1 oz)

* Measured using a Rosslare proximity card or equivalent. Range also depends on electrical environment and proximity to metal.

3. Installation



Installation of an RFID reader adjacent to metallic surfaces might alter the reader's specifications. To diminish this interference, use a plastic spacer when mounting the reader.

The AY-M26 pack includes everything needed to install and operate the smart card sector reader. You only need to mount the reader on the required surface and connect it to the access control system.

3.1 Unpacking the Reader

Confirm receipt of all items listed below before installing. If any items are missing, contact your dealer immediately.

- One reader
- This manual
- Installation kit including:
 - One self-adhesive drilling template
 - One security spline key
 - One security hex key
 - Two mounting screws
 - Two wall plugs

3.2 Installation Kit

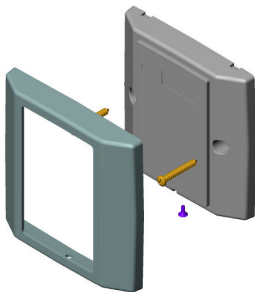
The installation kit comprises the following items that are to be used during the installation procedure:

- One mounting template
- Two pan head screws and wall plugs
- One "L" shaped security screw tool
- One security screw

3.3 Installing the AY-M26 Reader

1. Determine an approximate location for the reader.
2. Peel off the back of the self-adhesive mounting label template and place it at the required mounting location.
3. Using the template as a guide, drill two holes (sizes indicated on the template) used for mounting the reader onto the surface.
4. Insert a suitable wall plug into each hole.
5. Drill a 10-mm ($\frac{7}{16}$ ") hole for the cable. If mounting on metal, place a grommet or electrical tape around the edge of the hole.
6. Route the interface cable from the reader to the controller. A linear type power supply is recommended.
7. Remove the reader's snap-off front cover to reveal the two screw holes, see figure below.

Figure 1: Removing the Top Cover



8. Align the two holes of the reader with those drilled in the wall and firmly attach the reader to the wall with two screws, whose size is indicated on the template.
9. Relocate the front cover onto the reader.



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

3.4 Wiring Instructions

The AY-M26 uses a 46-cm (18") pigtail controller cable, consisting of 10 wires, to connect to the access control system and for power.

Individual wires are color-coded according to the Wiegand standard.



The reader's power supply must either share the access controller's power supply or a common ground with the access control system.

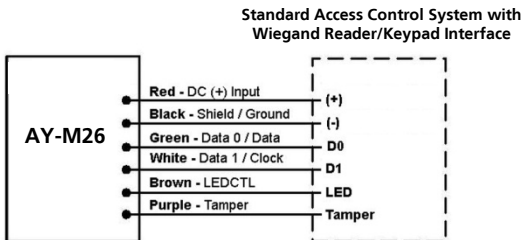
To connect the reader to the controller:

1. Remove 32 mm (1¼") of the reader cable's insulation jacket.
2. Strip 13 mm (½") of the insulation from the wires.
3. Splice the reader's pigtail wires to the corresponding input wires for the access control system, as listed in Table 1 and shown in Figure 2.

Table 1: Wiring Colors

Color	Function
Red	DC+ Input
Black	Ground
White	Data 1 /Clock
Green	Data 0 / Data
Brown	LED/Buzzer Control
Purple	Tamper
Orange	Factory Use
Yellow	N/A
Blue	Factory Use
Gray	Factory Use

Figure 2: Connecting the Reader to an Access Control System



4. Cover the spliced joints with insulating tape and then trim and cover all unused connectors.



Note

To shield the cable from external interference, attach it to one of the following:

- The same earth ground as the access control system
- The signal ground connection at the panel
- The power supply end of the cable

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 settings.

Configuration and Master cards make it possible to set up and adjust a reader's settings directly, without connecting a remote computer and without removing the unit from its place.

Rosslare's CP-R25 (or CP-R26) desktop MIFARE card programmer together with its associated software AS-B01 must be used to set up configuration cards.

4.1 Operation Modes

The readers operate in two modes:

- Card Serial Number mode

The reader scans every card and sends each card's serial number (CSN) to the access control system. This card serial number is unique for each card. In this mode, keypad programming is enabled and can be used to program some reader settings.



In some circumstances, not all serial number digits are transmitted. This depends on selected reader transmit format and on card type being read.

- Secure mode

The reader only scans cards with a valid pass code (predefined key of the MIFARE card). When a user card has the correct pass code, the reader then scans a specified location on the card for an identification number and sends this information to the access control system. A card with the wrong pass code is not transmitted.

The reader's operation mode is controlled by a configuration setting stored on the Configuration Card. All access information and locations for Secure mode operations are also controlled by configuration settings. In this mode, programming the reader via the keypad is not possible.

By default, the reader operates in Card Serial Number mode.



In this mode, MIFARE 1K, MIFARE 4K, and DESFire cards are supported. MIFARE Ultralight cards are non-functional.

4.2 Configuration Card Structure

MIFARE smart cards are split into multiple sectors (on a MIFARE 1K card, for example). Each sector contains 4 blocks of 16 bytes each. The information on how to program and configure readers is stored in sector zero of the configuration smart card.

Refer to the CP-R25 or CP-R26 and AS-B01 manual for further configuration options and descriptions.

4.3 Configuring Settings

The Configuration card stores a variety of preference settings to apply to readers. Settings are stored in sector zero of the card.

4.4 Configuring the Reader

It is recommended to configure the reader one time only, following installation and on 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 the reader LED is orange 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, three short beeps are emitted and the reader LED turns red.

If configuration fails (due to a bad Configuration card), three long beeps are generated and the reader exits Configuration mode.

If the reader has been previously been configured, then following a failed configuration, the reader returns to Standby mode and continues to work with its previous configuration settings.

5. How to Use the Reader

Once the reader is mounted, connected to an access control system, and configured, it is ready for use.

5.1 Normal Operation

Turn on the reader. The LED turns orange, and enters Configure mode. After 30 seconds or after the first card entry, the reader enters normal operation, which is indicated by the LED turning red. The reader now enters one of the modes, according to the previous reader configuration.

5.1.1 Card Serial Number Mode

In this mode, presentation of an access card results in the transmission of the card's factory programmed serial number. A short beep is emitted and the LED momentarily turns green, and then returns to red.



If the card serial number is not fully transmitted, only the LSB portion of the serial number is transmitted. This depends on the reader transmit format of the selected reader and the length of the card serial number. For example, when the Wiegand 26-bit transmit format is selected; the MSB byte of the MIFARE 1K card's serial number is not transmitted.

5.1.2 Secure Mode

In this mode, the reader attempts to read data programmed in the user card sector memory. If the reader's Pass Code A is identical to the card's Key A and access conditions are valid, the reader transmits the data, emits a short beep, and momentarily turns the LED to green and then back to red.

If the reader fails to read the programmed data, it emits a long beep to indicate that an error has occurred. This error may either be the result of the wrong Pass Code A or the wrong access conditions. This mode is intended to support MIFARE 1K and MIFARE 4K cards only.

5.2 Manual LED and Buzzer Control

LED and buzzer behavior depend upon the reader firmware. For example, three beeps on reset and successful configuration, or one short beep and a flashing LED upon card transmission. However, it is possible that the host control panel, to which the reader is connected, may control the LED, the buzzer, or both. This depends upon manipulation of the LED/buzzer control input, and only if these options are enabled by the reader configurations.

These settings can be overridden using the brown LED/buzzer control wire:

- LED/buzzer control wire is left open:
 - LED and buzzer behave naturally based on firmware preferences
- LED/buzzer control wire is connected to ground:
 - If the LED control is enabled, the LED turns green
 - If the buzzer control is enabled, the buzzer continuously buzzes
 - If both LED and buzzer control are enabled, the led turns green and buzzer contentiously operated.

Use the LED/buzzer control wire to determine the behavior of the LED and buzzer directly from the access control software.



LED and buzzer control function can be only programmed by Configuration card. They cannot be programmed using the reader keypad.

5.3 Optical Back Tamper

The AY-M26 includes an optical back tampering mechanism that detects all attempts to dismantle the unit or remove it from the wall.

The status of the tamper mechanism is indicated by the purple tamper control wire.

When the back tamper optical sensor is in “darkness” status, the internal tamper output transistor is pulled to low.

When the back tamper optical sensor is in its "lit" status, the internal tamper output transistor's collector is open. A tamper signal is detected by the host control panel.

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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