AY-F66

Outdoor Proximity & PIN Reader with Time/Date LED Display

Installation and Programming 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 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 AY-F66 is a proximity card and keypad reader with an integrated time and date 7-segment display.

The AY-F66 supports multiple proximity card and keypad formats, as well as Wiegand and Clock & Data output formats, providing a high level of compatibility and connectivity with host controllers.

The time and date display makes this reader suitable for access control and Time & Attendance control systems. It is suitable for either indoor or outdoor installations.

The unit can be programmed to transmit proximity card data in Wiegand 26-Bit, Clock & Data, or Wiegand Card + PIN format.

The backlit keypad can also be programmed to output eight different data formats. Time & Date may be programmed either locally or by compatible controllers through an RS-485 interface.

1.1   Key Features

- Six-digit red 7-segment LED display
- Time display format – HH:MM:SS
- Various date formats
- Time and date programming locally or by host system
- Built-in proximity card reader (125 kHz ASK modulation)
- Programmable proximity card transmission formats
    - Clock & Data
    - Wiegand 26-Bit
    - Wiegand Card + PIN
- Programmable keypad transmission formats
- Built-in backlit keypad
- Built-in optical back tamper
- Tamper output and LED control Input

- ▪ Programmable Facility code
- ▪ Internal buzzer provides audible interface feedback
- ▪ Comes with an installation kit

1.2 Box Content

Before beginning, verify that all of the following is in the box. If anything is missing, please report the discrepancy to your nearest Rosslare office.

- ▪ AY-F66 reader unit
- ▪ Installation kit:
    - ▪ One mounting template
    - ▪ Two pan head screws and wall plugs
    - ▪ One L-shaped security screw tool
- ▪ Installation and programming instructions

1.3 Ancillary Equipment

Additional non-supplied equipment required:

- ▪ Compatible host controller (AC-115 or AC-215)

Other Rosslare accessories can be found at Rosslare's website:

http://www.rosslaresecurity.com

2.   Technical Specifications

General Characteristics

Display Type	6-digit 7-segment red color LED display
LED Control Input	Dry Contact, N.O.
Tamper Output	Open Collector, active low, 32 mA maximum sink current

Electrical Characteristics

Operating Voltage Range	5 to 16 VDC from a regulated power supply (power usually supplied from host controller)
Input Current	Standby: 180 mA, not including attached devices
	Max: 315 mA, not including attached devices

Real-Time Clock

Time and Date Setting	By keypad or host with leap year capabilities
Date Formats	3 date formats
Time and Date Backup	3 days

Built-In Proximity Reader

Read Range*	50 mm (2 in.)
Modulation Options	Ask at 125 kHz
Transmission Formats	Wiegand 26-Bit, Clock & Data
Compatible Cards	All 26-Bit EM cards

Built-In Keypad

Transmission Formats	Multiple

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

Environmental Characteristics

Operating Temperature Range	-20°C to 60°C (-4°F to 140°F)
Operating Humidity Range	0 to 95% (non-condensing)
Operating Environment	Suitable for outdoor use (IP54)

Mechanical Characteristics

Dimensions (L x W x D)	120 x 71 x 29.6 mm (4.7 x 2.8 x 1.2 in.)
Weight	230 g (8.1 oz)

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.

3.1 Mounting Instructions

Before starting, select the location to mount the AY-F66 reader. This location should be at shoulder height.

To mount the unit:

1. Remove the reader's back cover by unscrewing the security screw and separating it from the reader (Figure 1).

Figure 1: Removing the Back Cover
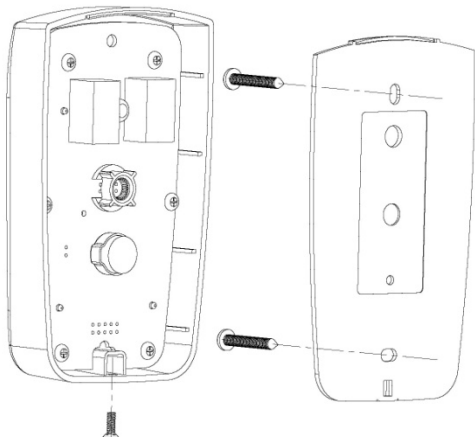
2. Attach the back cover to the wall or to a US Gang Box.

   For wall mounting, use the mounting template as a guide for drilling the mounting and cable holes in the wall.

For US Gang Box installation, there are two hole indicators on the back of the cover specifically aligned for the US Gang Box.

3. Route the interface cable from the reader to the controller (see Section 3.2).

4. Screw the back cover to its mounting location.

5. Reattach the reader to the back cover by first joining the top of the reader to the back cover and then the lower part.

6. Secure the reader using the security screw.

3.2 Wiring Instructions

The reader is supplied with a 41-cm (16") pigtail, having a 10-conductor cable.

To connect the reader to the controller:

1. Prepare the reader cable by cutting back the cable jacket and stripping the wire.

2. Splice the reader's pigtail wires to the corresponding controller's wires (Table 1) and cover each connection.

Table 1: Wiring the Reader to the Controller

Color	Function
Red	+V IN
Black	Ground
Green	Data0/Data
White	Data1/Clock
Brown	LED
Purple	Tamper
Gray	RS485 L1
Blue	RS485 L2
Orange	Not used
Yellow	Not used

4.   Transmit Mode

This is the normal operation mode.

When the AY-F66 is in Transmit mode, it is ready to read data from a proximity card or an entered PIN code and transmit it.

The display initially shows the time of day.

4.1   Time of Day Display

$$01 : 4 \ 3 : 3 \ 7$$
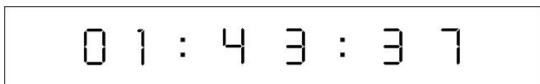
When the reader is in Transmit mode, the time is displayed. The two-color LEDs (between the hours and minutes) are lit.

4.2   Date Display

$$28 \cdot 05 \cdot 05$$
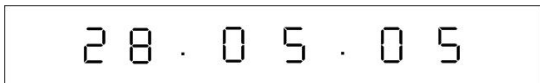
When you press **#** twice, the date is displayed and after 3 seconds toggles back to the time.

When the date is displayed, a single dot LED between the day, month, and year, is lit.

The date display format is programmable.

4.3   Display on Data Transmit
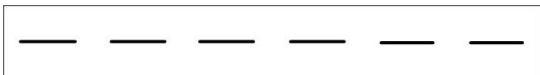
On transmission, the display shows six lines momentarily and then the display of time of day is displayed.

4.4 Display when Time and Date Not Set

If the time and date are not set properly, they flash. Once they are both properly set, they remain lit.

4.5 Keypad Operation

Keypad data can be sent via one of eight different keypad transmission formats (see Section 5.3.1.1).

4.6 Proximity Reader Operation

Proximity cards presented to the reader are always sent in either Wiegand 26-Bit, Clock & Date, or Card + PIN Wiegand format (see Section 5.3.2).

4.7 Display during Card + PIN Wiegand Mode

When the AY-F66 is programmed to send card and PIN Wiegand (Programming Menu 2 and submenu 3 selected), the time display starts flashing when a card is presented until the PIN code is entered completely and data is sent. If no PIN number is entered within 5 seconds or the wrong PIN is entered, no data transmission occurs and the display stops flashing.

5.   Programming the AY-F66

Programming the AY-F66 is done solely via the unit's keypad driven programming menu system.

During the AY-F66's manufacturing process, certain codes and settings are pre-programmed. These settings are the called the default factory settings.

Table 2 shows the names of all the AY-F66 menus.

Table 2: Programming Menus

Menu Description	Menu Number
Selecting Keypad Transmission Format	1
Single Key, Wiegand 6-Bit (Rosslare format)	
Single Key, Wiegand 6-Bit with Nibble + Parity Bits	
Single Key, Wiegand 8-Bit, Nibbles Complemented	
4 Keys Binary + Facility Code, Wiegand 26-Bit	
1 to 5 Keys + Facility code, Wiegand 26-Bit	
6 Keys BCD and Parity Bits, Wiegand 26-Bit	
Single Key, 3x4 Matrix Keypad	
1 to 8 Keys BCD, Clock & Data Single Key	
Selecting Proximity Card Transmission Format	2
Wiegand 26-Bit	
Clock & Data	
Wiegand Card + PIN	
Changing the Programming Code	3
Changing the Facility Code	4
Setting Time and Date	8
Setting Time as HH:MM:SS (Hour: Minutes:Seconds)	
Setting Date according selected date format	

General Settings	9
Selecting RS 485 interface Communication Speed	
1: Select baud rate 9600 bits per second*	
2: Select baud rate 19200 bits per second	
3: Select baud rate 38400 bits per second	
4: Select baud rate 57600 bits per second	
5: Select baud rate 115200 bits per second	
Selecting displayed Date format	
1: DD:MM:YY – Day, Month, Year*	
2: YY:MM:DD – Year, Month, Day	
3: MM:DD:YY – Month, Day, Year	
Return to Factory Default Settings	0

5.1 Entering Programming Mode

To enter Programming mode:

1. While AY-F66 is in Transmit Mode, press **#** four times.

   The letter 'P' and four flashing dashes appear.

2. Enter your 4-digit Programming code. The factory default code is 1234.

   The entered code is not displayed.

   The letter P and one flashing dash remains displayed.

   ```
   P    ⟩—⟨
   ```

   The AY-F66 is now in Programming mode.

5.2 Exiting Programming Mode

To exit Programming mode:

1. Press **#**.

    The reader emits a single beep.

    The displays returns to Time display. This indicates that the reader is now in Transmit mode.

Wrong entries may reset the reader to Transmit mode.

While in Programming mode, if no key is pressed for 30 seconds, the reader exits Programming mode and returns to Transmit mode.

5.3 Programming Menus

5.3.1 Selecting Keypad Transmission Format

The AY-F66 has eight different keypad transmission selectable formats (see Section 5.3.1.1).

To select a keypad transmission format:

1. Enter Programming mode.

2. Press **1** to enter Menu #1.

$$\boxed{\quad \mathsf{P} \quad \mathsf{1} \qquad \diagup\!\!\diagdown \quad}$$
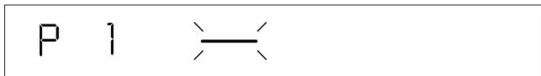
3. Enter the required option number for the keypad transmission format (Section 5.3.1.1).

    After a short delay, the system returns to Transmit mode.

    The reader emits three beeps.

    The displays returns to Time display.

    If an incorrect option number is entered, the reader returns to Transmit mode and the keypad transmission format remains unchanged.

> *Note*
> - Only one keypad transmission format can be active at any one time
> - When using the keypad transmission format "1 to 8 keys BCD, Clock & Data" (Option 8), an additional input is required to specify the number of keys in the PIN code.

5.3.1.1 Keypad Transmission Format Option Number

See Table 3 to determine the option number for the keypad transmission format you wish to select.

Table 3: Keypad Transmission Format

Keypad Transmission Format	Option Number
Single Key, Wiegand 6-Bit (Rosslare Format)	1*
Single Key, Wiegand 6-Bit with Nibble + Parity Bits	2
Single Key, Wiegand 8-Bit, Nibbles Complemented	3
4 Keys Binary + Facility code, Wiegand 26-Bit	4
1 to 5 Keys + Facility code, Wiegand 26-Bit	5
6 Keys BCD and Parity Bits, Wiegand 26-Bit	6
Single Key, 3x4 Matrix Keypad	7
1 to 8 Keys BCD, Clock & Data Single Key	8

* Option 1 is the default factory setting

More information on each of the different keypad transmission formats is available below and on the following pages.

Single Key, Wiegand 6-Bit (Rosslare Format)

Each key press immediately sends 4 bits with 2 parity bits added; even parity for the first 3 bits and odd parity for the last 3 bits.

```
0 = 1 1010 0    6 = 1 0110 0
1 = 0 0001 0    7 = 1 0111 1
2 = 0 0010 0    8 = 1 1000 1
3 = 0 0011 1    9 = 1 1001 0
4 = 1 0100 1    * = 1 1011 1 = "B" in Hexadecimal
5 = 1 0101 0    # = 0 1101 1 = "D" in Hexadecimal
```

Single Key, Wiegand 6-Bit, Nibble & Parities

Each key press immediately sends 4 bits with 2 parity bits added; even parity for the first 3 bits and odd parity for the last 3 bits.

0 = 0 0000 1	6 = 1 0110 0
1 = 0 0001 0	7 = 1 0111 1
2 = 0 0010 0	8 = 1 1000 1
3 = 0 0011 1	9 = 1 1001 0
4 = 1 0100 1	* = 1 1010 0 = "B" in Hexadecimal
5 = 1 0101 0	# = 1 1011 1 = "C" in Hexadecimal

Single Key, Wiegand 8-Bit, Nibbles Complemented

This option inverts the most significant bits in the message leaving the least 4 significant bits as Binary Coded Decimal (BCD) representation of the key. The host system receives an 8-bit message.

0 = 11110000	6 = 10010110
1 = 11100001	7 = 10000111
2 = 11010010	8 = 01111000
3 = 11000011	9 = 01101001
4 = 10110100	* = 01011010 = "A" in Hexadecimal
5 = 10100101	# = 01001011 = "B" in Hexadecimal

4 Keys Binary + Facility Code, Wiegand 26-Bit

This option buffers 4 keys and outputs keypad data with a three-digit Facility code like a standard 26-bit card output.

The Facility code is set in Programming Menu number four and can be in the range 000 to 255. The factory default setting for the Facility code is 000 (see Section 0).

The keypad PIN code must be 4 digits long and can range between 0000 and 9999. On the fourth key press of the 4-digit PIN code, the data is sent across the Wiegand data lines as binary data in the same format as a 26-bit card.

If ***** or **#** is pressed during PIN code entry, the keypad clears the PIN code entry buffer, generates a beep and is ready to receive a new 4-digit keypad PIN code.

If the entry of the 4-digit keypad PIN code is disrupted and no number key is pressed within 5 seconds, the keypad clears the PIN code entry buffer, generates a beep, and is ready to receive a new 4-digit keypad PIN code.

(EP) FFFF FFFF AAAA AAAA AAAA AAAA (OP)

Where: EP = Even parity for first 12 bits

OP = Odd parity for last 12 bits

F = 8-bit Facility code

A = 24-bit code generated from keyboard

1 to 5 Keys + Facility Code, Wiegand 26-Bit

This option buffers up to 5 keys and outputs keypad data with a Facility code like a 26-bit card output.

The Facility code is set in Programming Menu number four and can be in the range 000 to 254. The factory default setting for the Facility code is 000 (see Section 0).

The keypad PIN code can be one to five digits long and can range between 1 and 65,535. When entering a keypad PIN code that is less than 5 digits long, **#** must be pressed to signify the end of PIN code entry. For keypad PIN codes that are 5 digits long, on the fifth key press of the 5-digit PIN code, the data is sent across the Wiegand data lines as binary data in the same format as a 26-bit card.

If ***** or **#** is pressed during PIN code entry or a PIN code greater than 65,535 is entered, the keypad clears the PIN code entry buffer, generates a beep and is ready to receive a new 4-digit keypad PIN code.

If the entry of the 1- to 5-digit keypad PIN code is disrupted and a number key or **#** is not pressed within 5 seconds, the keypad clears the PIN code entry buffer, generates a medium length beep and is ready to receive a new 1 to 5-digit keypad PIN code.

(EP) FFFF FFFF AAAA AAAA AAAA AAAA (OP)

Where: EP = Even parity for first 12 bits

OP = Odd parity for last 12 bits

F = 8-bit Facility code

A = 24-bit code generated from keyboard

6 Keys BCD and Parity Bits, Wiegand 26-Bit

Sends buffer of 6 keys, adds parity and sends a 26-bit BCD message. Each key is a four bit equivalent of the decimal number.

The keypad PIN code must be 6 key presses long. On the sixth key press of the 6-digit PIN code, the data is sent across the Wiegand data lines as a BCD message.

If the entry of the 6-digit keypad PIN code is disrupted and a number key or **#** is not pressed within 5 seconds, the keypad clears the PIN code entry buffer, generates a medium length beep and is ready to receive a new 6-digit keypad PIN code.

(EP) AAAA BBBB CCCC DDDD EEEE FFFF (OP)

Where:

A = First key entered   D = Fourth key entered

B = Second key entered   E = Fifth key entered

C = Third key entered   F = Sixth key entered

Single Key, 3x4 Matrix Keypad (MD-P64)

This unique mode is intended to let the host controller scan the AY-F66 keypad while still keeping the proximity card readers Wiegand 26-Bit or Clock & Data formats active.

An optional interface board must be used between the AY-F66 and the host system. Each key press is immediately sent on DATA0 as an ASCII character at a baud rate of 9600 bits per second.

When a key is pressed, DATA1 is pulled "low" until the key is released at which point DATA1 is set to "high". This allows the controller to detect the duration of the key press.

The MD-P64 interface unit outputs the data received to 7 outputs emulating a keyboard. The interface unit does not affect any data that it receives from the proximity reader whether it is Wiegand 26-Bit or Clock & Data.

Key pressed = ASCII Value

0 = '0' (0x30 hex)	6 = '6' (0x36 hex)
1 = '1' (0x31 hex)	7 = '7' (0x37 hex)
2 = '2' (0x32 hex)	8 = '8' (0x38 hex)
3 = '3' (0x33 hex)	9 = '9' (0x39 hex)
4 = '4' (0x34 hex)	*= '*' (0x2A hex)
5 = '5' (0x35 hex)	# = '#' (0x23 hex)

1 to 8 Keys BCD, Clock & Data

Buffers up to 8 keys and outputs keypad data without a facility code like standard Clock and Data card output.

The keypad PIN code can be one to eight digits long. The PIN code length is selected while programming the reader for Option 8. The reader transmits the data when it receives the last key press of the PIN code. The data is sent across the two data output lines as binary data in Clock & Data format.

If ***** or **#** is pressed during PIN code entry, the keypad clears the PIN code entry buffer, generates a beep, and is ready to receive a new keypad PIN code.

If the entry of the keypad PIN code is disrupted and a number key or **#** is not pressed within 5 seconds, the keypad clears the PIN code entry buffer, generates a medium length beep and is ready to receive a new keypad PIN code.

5.3.2   Selecting Proximity Card Transmission Format

The AY-F66 has three different selectable proximity card transmission formats.

- Option 1 – Wiegand 26-Bit
- Option 2 – Clock & Data
- Option 3 – Wiegand Card + PIN

To select the proximity card transmission format:

1. Enter Programming mode.
2. Press **2** to enter Menu 2.
3. Enter the appropriate option number for the proximity card transmission format that you wish to select.

    After 2 seconds, the system returns to Transmit mode. Three beeps are emitted, and the display returns to Time display.

    If an incorrect option number is entered, the reader returns to Transmit mode and the keypad transmission format remains unchanged.

5.3.2.1   Wiegand Card + PIN Transmission Format

This unique mode is intended to extend the security level of host controllers that do not support a card and PIN high security mode.

Card and keypad data is sent simultaneously. This option overrules the selected keypad transmission format and sends the keypad data as described below.

After a card is presented to the reader, the display starts flashing until a valid PIN code is entered, and then the card and PIN data is transmitted together. If no key is entered within 5 seconds, a medium length beep is emitted and no data is transmitted.

A valid PIN code is 1 to five 5 long with value of 0 to 99,999.

The **#** key has to be pressed when entering a PIN code of less than five digits. If the ***** key is pressed, a medium length beep is emitted and no data is transmitted. The reader is now ready for a new card and PIN sequence.

AY-F66 first outputs the Wiegand 26-Bit card data followed by Wiegand 26-Bit keypad data.

The AY-F66 outputs card data in Wiegand 26-Bit with the following keypad data:

Card Data: (EP) AAAA AAAA AAAA BBBB BBBB BBBB (OP)

Where: EP = Even parity for first 12 A bits

OP = Odd parity for last 12 B bits

PIN data: (EP) 0000 AAAA BBBB CCCC DDDD EEEE (OP)

Where: A = First key entered

B = Second key entered

C = Third key entered

D = Fourth key entered

E = Fifth key entered

EP = Even parity for first 12 bits

OP = Odd parity for last 12 bits

If the PIN code is less than 5 digits, all the most significant nibbles are filled with 0.

Example:

(EP) 0000 0000 0000 0000 AAAA BBBB (OP)

Where: A = First key entered

B = Second key entered

EP = Even parity for first 12 bits

OP = Odd parity for last 12 bits

5.3.3   Changing the Programming Code

To change the Programming code:

1. Enter Programming mode.
2. Press **3** to enter Menu 3.
3. Enter the new 4-digit code you wish to set as the Programming code.

After 2 seconds, the system returns to Transmit mode.

Three beeps are emitted and the display returns to time display

> *Note* The Programming code cannot be erased; the code 0000 is not valid and does not erase the Programming code.

> *Note* The Programming code is displayed as it is entered to visually verify the new code. It is the user's responsibility to hide the entered Programming code from other people or cameras installed in the surrounding area of the reader.

5.4 Changing the Facility Code

To change the Facility code:

1. Enter Programming mode.
2. Press **4** to enter Menu 4.
3. Enter the new 3-digit code you wish to set as the Facility code.

   After 2 seconds, the system returns to Transmit mode. Three beeps are emitted and the display returns to time display.

> *Note* Facility codes can be in the range between 000 and 255.

5.5 Setting Time and Date

To set the time:

1. Enter the Programming mode.
2. Press **8** to enter Menu 8.
3. Press **1** to set the time.
4. Enter six digits representing current time in this order: hour, minutes, and seconds (HH:MM:SS).

Allowed digits are:

- Hour: 00 to 23
- Minutes: 00 to59
- Seconds: 00 to59

Three beeps are emitted to signify that the Time has been set.

To set the date:

1. Enter Programming mode.
2. Press **8** to enter Menu 8.
3. Press **2** to set the time.
4. Enter six digits representing current date.

    The order depends on the selected date format (see Section 5.6):

    Date Format #1: Day, Month, Year

    Date Format #2: Year, Month, Day

    Date Format #3: Month, Day, Year

    Allowed digits are:

    Day: 01 to 28-31

    Month: 01 to 12

    Year: 00 to 99

    After 2 seconds, the system returns to Transmit mode. Three beeps are emitted to signify that the time has been set and the display returns to time display.

> Note
> - The reader does not set the date if the wrong date is entered.
> - The reader's clock supports leap year compensation, so the day entry for February is limited to 1–29 on a regular year and 1–28 on a leap year.
> - Allowed day entry changes depending on the month.

5.6   General Settings

To set the communication speed:

1. Enter Programming mode.
2. Press **9** to enter Menu 9.
3. Press **1** to set communication speed.
4. Enter a digit for selecting required speed:
    - For 9600 bits per second, enter **1**.
    - For 19200 bits per second, enter **2**.
    - For 38400 bits per second, enter **3**.
    - For 57600 bits per second, enter **4**.
    - For 115200 bits per second, enter **5**.

    Three beeps are emitted to signify that the communication speed has been set and the display returns to Time display.

To set the date format:

1. Enter Programming mode.
2. Press **9** to enter Menu 9.
3. Press **2** to set the date format.
4. Enter a digit for selecting required format:
    - For the Day, Month, Year format, enter **1**.
    - For the Year, Month, Day format, enter **2**.
    - For the Month, Day, Year format, enter **3**.

    After 2 seconds, the system returns to Transmit mode. Three beeps are emitted and the display returns to time display.

5.7   Return to Factory Default Settings

> ⚠️ **Warning** You must be very careful before using this command! Doing so erases the entire memory, which includes all user and special codes.

To return to factory default settings:

1. Enter Programming mode.
2. Press **0** to enter Menu 0.
3. Enter your 4-digit Programming code.

> ✎ **Note** The code entered is not displayed for security reasons; instead, dash characters ("-") are displayed.

If the Programming code is valid, all memory is updated with the default values, three beeps are emitted, and the reader returns to transmit Mode.

If the Programming code is invalid, a long beep is emitted and the controller returns to Transmit mode without changing the configuration of the reader.

5.8   Replacing a lost Programming Code

In the event that the Programming code is forgotten, the AY-F66 may be reprogrammed in the field using the following instructions:

1. Remove power from the reader.
2. Activate the tamper by removing the reader from its wall mounting plate.
3. Apply power to the reader.

You now have 10 seconds to enter Programming mode using the factory default Programming code 1234.

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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