# AY-x55

## Anti-Vandal Piezoelectric PIN Reader
Installation and Programming Manual

**Models:**
AY-S55
AY-T55
AY-T55B

AY-S55     AY-T55     AY-T55B

**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-x55 Family is a series is a vandal resistant programmable piezoelectric reader family that includes the AY-S55, AY-T55 and AY-T55B models.

The AY-x55 supports multiple keypad formats providing a high level of compatibility and connectivity with host controllers. The keypad can be programmed to output eight different data formats.

## 1.1 Key Features

The key features for the AYC-Q65 are:

- Built-in high sensitivity piezoelectric keypad
- Programmable backlit keypad (AY-T55B only)
- Programmable keypad transmission format
- Built-in case and back tamper
- Tamper output and LED control Input
- Programmable Facility code
- Two tri-colored LEDs
- Internal buzzer provides audible interface feedback

## 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-x55 access control unit
- Mounting template
- Installation kit
- Installation and operating instructions

## 1.3 Ancillary Equipment

The following equipment is required to complete your installation:

- Compatible host controller
- Power supply – 5 to 16 VDC (from a regulated power supply)

Rosslare accessories can be found on www.rosslaresecurity.com.

# 2.    Technical Specifications

## Electrical Characteristics

|  | **AY-S55** | **AY-T55** | **AY-T55B** |
|---|---|---|---|
| **Power Supply** | Linear type (recommended) | | |
| **Voltage Range** | 5 to 16 VDC | | |
| **Input Current** | Standby: 30 mA<br>Max: 120 mA | Standby: 30 mA<br>Max: 120 mA | Standby: 90 mA<br>Max: 180 mA |
| **Tamper Output** | Open collector, active low, max. sink current 32 mA | | |
| **LED Control Input** | Dry contact, N.O. | | |

## Environmental Characteristics

|  |  |  |  |
|---|---|---|---|
| **Operating Temp. Range** | -31°C to 63°C (-25°F to 145°F) | | |
| **Operating Environment** | Suitable for outdoor use (meets IP65) | | |
| **Operating Humidity Range** | 0 to 95% (non-condensing) | | |

## Dimensions

|  |  |  |  |
|---|---|---|---|
| **Height x Width x Depth** | 150 x 42 x 27 mm (5.91 x 1.65 x 1.06 in.) | 120 x 65 x 27 mm (4.72 x 2.56 x 1.06 in.) | 120 x 65 x 27 mm (4.72 x 2.56 x 1.06 in.) |
| **Weight** | 400 g (14.11 oz) | 500 g (17.64 oz) | 502 g (17.71 oz) |

# 3.    Installation

## 3.1    Mounting Instructions

Before starting, select the location to mount the unit. This location should be at shoulder height.

### To mount the unit:

1.  Drill holes into the back of the metal according to how you want to mount the AY-x55. For US Gang Box installation, there are two hole indicators on the back of the metal cover specifically aligned for the US Gang Box (marked as "A" in Figure 1). For a four-screw custom installation, there are four indicators on the back (marked as "B" in Figure 1).

**Figure 1: Drilling Mounting Holes**



**AY-T55**                    **AY-S55**
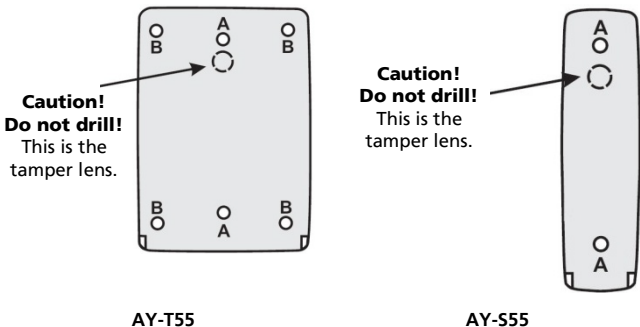
2.  Route the interface cable from the reader to the controller (see Section 3.2). A linear type power supply is recommended.
3.  Screw the AY-x55 back cover to its mounting location.
4.  Return the front cover of the AY-x55 to the mounted back plate.

5. Secure the front cover by using the supplied security screw in the installation kit. An L-shaped tool is provided for use when tightening the security screw.

## 3.2 Wiring Instructions

The reader is supplied with a 41-cm (16") pigtail, having a 6-conductor cable.

### To connect the unit to the controller:

1. Prepare the unit's cable by cutting the cable jacket back 2.5 cm (1") and strip the wire 2.5 cm (1").

2. Prepare the controller cable by cutting the cable jacket back 2.5 cm (1") and strip the wire 2.5 cm (1").

3. Splice the unit's pigtail wires to the corresponding controller wires and cover each connection.

   Refer to Table 1 and to the wiring diagrams provided on the following pages.

**Table 1: Wiring Colors**

| Color | Output |
|-------|--------|
| Red | +VDC |
| Black | Ground |
| White | Data 1/Clock |
| Green | Data 0 / Data |
| Brown | LED Control |
| Purple | Tamper |

4. If the tamper output is used, connect the purple wire to the correct input on the controller.

5. Trim and cover all unused conductors.

# 4.    Functionality

This chapter explains how the functionality of the reader.

## 4.1    Transmit Mode

When the AY-x55 is in Transmit mode, it is ready to receive data from a presented proximity card or from an entered PIN code.

When the reader is in Transmit mode, the Transmit LED is red and the Program LED is off.

Mode/Transmit ● Red ○ Door/Program

When a PIN entry is being transmitted, the Transmit LED flashes green.

Mode/Transmit ☀ Green ○ Door/Program

Keyboard data can be sent via one of eight different keypad transmission formats (see Section 4.2.3).

## 4.2    Programming the AY-x55

Programming the AY-x55 is done solely via the unit's keypad driven Programming Menu System. During the AY-x55's manufacturing process, certain codes and settings are pre-programmed. These settings are called the default factory settings.

Table 2 shows the names of all the AY-x55 reader menus.

Default factory settings are marked by a "*" sign.

#### Table 2: Reader Programming Menus

| Menu Description | Default |
|---|---|
| **1  Selecting Keypad Transmission Format** | |
| 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, Wiegand 4-Bit | |
| **3  Changing the Programming Code** | **1234** |
| **4  Changing the Facility Code** | **0** |
| **6  Backlight Options (AY-T55B only)** | |
| Off | |
| On (default) | * |
| Off until key press when on for 10 seconds | |
| Dimmed until key press when on for 10 seconds | |
| **0  Return to Factory Default Settings** | |

### 4.2.1    Entering Programming Mode

To reach the Programming Menu System, the AY-x55 must first be placed into Programming mode.

#### To enter Programming mode:

1.  Press **#** 4 times.

    The Transmit LED turns off and the Program LED turns red.

    Transmit ◯    ● **Program Red**

2.  Enter your 4-digit Programming code.

    | ? | ? | ? | ? |

---
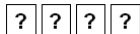
If the Programming code is valid, the door LED turns green and the unit enters Programming mode.

**Transmit** ○　● **Program**
　　　　　　　 **Green**

| Note | • The factory 4-digit Programming code is 1234. |
|------|--------------------------------------------------|
|      | • If a Programming code is not entered within 30 seconds, the unit returns to Transmit mode |

### 4.2.2    Exiting Programming Mode

#### To exit Programming mode:

1. Press **#** to exit the Programming mode at any time.

   **Transmit** ●　○ **Program**
   　　　　 **Red**

   ▪ You hear a long beep.
   ▪ The Transmit LED turns red and the Program LED turns off.

   This indicates that the unit has returned to Transmit mode.

Wrong entries may reset the reader back to Transmit mode.

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

### 4.2.3    Selecting Keypad Transmission Format

The AY-x55 has eight different keypad transmission formats.

See Section 4.2.3.1 for more information on keypad transmission formats.

#### To select the appropriate keypad transmission format:

1. Enter Programming mode.

   **Transmit** ○　● **Program**
   　　　　　　 **Green**

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

   | 1 |

   The Transmit LED turns red.

   **Transmit** ●　● **Program**
   　　　　 **Red　Green**

3. Enter the appropriate option number for the keypad transmission format that you wish to select.

?

> **Note**
> When selecting Option 8, the Program LED turns orange, awaiting an additional key input to select the number of keys.

You hear three beeps.

The Program LED turns off and the Transmit LED turns red.

**Transmit** 🔴 ⚪ **Program**
**Red**

If an incorrect option number is entered, a long beep is emitted 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.

### 4.2.3.1 Keypad Transmission Format Option Number

Table 3 presents the eight different keypad transmission formats.

**Table 3: Keypad Transmission Format Option Number**

| 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 on the following pages.

### Option 1: 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 = "A" in Hexadecimal | 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 1100 1 = "C" in Hexadecimal |

### Option 2: Single Key, Wiegand 6-Bit Nibble and 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 = "A" in Hexadecimal |
| 5 = 1 0101 0 | # = 1 1011 1 = "B" in Hexadecimal |

### Option 3: Single Key, Wiegand 8-Bit Nibbles Complemented

This option inverts the most significant bits in the message leaving the least 4 significant bits as a 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 |

### Option 4: 4 Keys Binary + Facility Code, Wiegand 26-Bit

This option buffers 4 keys and outputs keypad data with a 3-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 4.2.5).

The keypad PIN code is 4-digit 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 **#** are pressed are pressed during PIN code entry, the keypad clears the PIN code entry buffer, generate 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, generate 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 = 16-bit code generated from keyboard

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

Option 5 buffers up to 5 keys and outputs keypad data with a Facility code like a 26-Bit card output.

**Functionality**

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 4.2.5).

The keypad PIN code can be one to five digits in length and can range between 1 and 65,535. When entering a keypad PIN code that is less than 5 digits in length, **#** must be pressed to signify the end of PIN code entry. For keypad PIN codes that are 5 digits in length, 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 ⌂ 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 5-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 = 16-bit code generated from keyboard

### Option 6: 6 Keys BCD and Parity Bits, Wiegand 26-Bit

Option 6 sends buffer of 6 keys, adds parity and sends a 26-Bit Binary BCD message. Each key is a 4-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 no number key is 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:

EP = Even parity for first 12 bits

OP = Odd parity for last 12 bits

| | |
|---|---|
| A = The first key entered | D = Fourth key entered |
| B = Second key entered | E = Fifth key entered |
| C = Third key entered | F = Sixth key entered |

## Option 7: Single Key, 3x4 Matrix Keypad

This unique mode is intended to let the host controller scan the AY-x55 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-x55 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 ) |

### Option 8: 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 in length. 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 **#** are 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 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 keypad PIN code.

> **Note**
> 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.

## 4.2.4 Changing the Programming Code

1. Enter Programming mode.

   **Transmit** ○   ● **Program**
   **Green**

2. Press **3** to enter Menu 3.

   | 3 |

   The Transmit LED turns red.

   **Transmit** ●   ● **Program**
   **Red**   **Green**

3. Enter the new 4-digit code you wish to set as the Programming code.

   | ? | ? | ? | ? |

   The system returns to Transmit mode.

   - You hear three beeps.
   - The Program LED turns off and the Transmit LED turns red.

   **Transmit** ●   ○ **Program**
   **Red**

> *Note*
> - The Programming code cannot be erased, meaning the code 0000 is invalid and does not erase the Programming code.
> - The factory default 4-digit Programming code is 1234.

### 4.2.5 Changing the Facility Code

1. Enter Programming mode.

   **Transmit** ⦿ ● **Program**
   **Green**

2. Press **4** to enter Menu 4.

   | **4** |

   The Transmit LED turns red.

   **Transmit** ● ● **Program**
   **Red   Green**

3. Enter the new 3-digit code you wish to set as the Facility code.

   | **?** | **?** | **?** |

   The system returns to Transmit mode.

   - You hear three beeps.
   - The Program LED turns off and the Transmit LED turns red.

   **Transmit** ● ⦿ **Program**
   **Red**

> *Note*
> - The Facility code can be in the range of 000 to 255.
> - The default Facility code is 0.

## 4.3 Setting the Backlight

1. Enter Programming mode.

   **Transmit** ⦿ ● **Program**
   **Green**

2. Press **6** to enter Menu 6.

   | **6** |

   The Transmit LED turns red.

   **Transmit** ● ● **Program**
   **Red   Green**

3. Enter the appropriate option number for the backlight option that you wish to select:

- ▪ **0** for always off
- ▪ **1** for always on
- ▪ **2** for 10 sec. backlight after a key is pressed otherwise off
- ▪ **3** for 10 sec. backlight after a key is pressed otherwise dimmed

The system returns to Transmit mode.

- ▪ You hear three beeps.
- ▪ The Program LED turns off and the Transmit LED is red.

Transmit ● ○ Program
Red

## 4.4 Return to Factory Default Settings

⚠ **Warning**
You must be very careful before using this command! This erases the entire memory and return all codes to their factory default setting.

1. Enter Programming mode.

Transmit ○ ● Program
Green

2. Press **0** to enter Menu 0.

**0**

The Transmit and Program LEDs flash red.

Transmit ✳ ✳ Program
Red Red

3. Enter your 4-digit programming code.

**?** **?** **?** **?**

If the Programming code is valid, all memory is erased. You hear three beeps and the controller returns to Normal mode.

If the Programming code is invalid, you hear a long beep and the controller returns to Normal mode without erasing the memory of the controller.

## 4.5    Replacing a Lost Programming Code

In the event that the Programming code is forgotten, the AY-x55 can be reprogrammed in the field using the following instructions:

1.  Remove power from the reader.

2.  Activate tamper by removing the reader from the wall or removing the reader's case.

3.  Apply power to the reader.

4.  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.

AY-x55

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