



ARD-AYCF64

RFID - Proximity Reader



BOSCH

en Installation manual

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1 General Information

1.1 Introduction

The ARD-AYCF64 is an ultra-slim, piezo mullion keypad, access control reader. The unit is vandal resistant and water resistant, suitable for indoor or outdoor mounting.

This manual contains the following information:

- *Section 3 Installation*
- *Section 4 Wiring Instructions*
- Operation Instructions
 - *Section 5 Reader Functionality*

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 Bosch office.

- One ARD-AYCF64 unit
- Installation kit
- Installation and operating instructions

1.3 Ancillary Equipment

The following equipment is required to complete your installation:

- Compatible host controller (not supplied) - access control unit.

2 Technical Specifications

Electrical Characteristics

Power supply type	Linear type - recommended
Input current standby	105 mA @ 12 Vdc
Input current max.	140 mA @ 16 Vdc
LED control input	Dry contact N.O.
Tamper output	Open collector, active low, 32 mA max. sink current
Cable distance to host controller	Up to 150 m (500 ft) using an AWG18 cable
Max. proximity card read range*	80 mm (3.0 in.)
Proximity card modulation	ASK at 125 KHz
Proximity card compatibility	EM cards
Card Transmit format (Reader)	26-bit Wiegand or Clock & Data
Keypad Transmit Format (Reader)	Programmable PIN code formats
LED indicators	Two tri-colored LEDs
Communication	Data1/C1, Data0/C2 - open collector, 5 V termination

Environmental Characteristics

Operating temp. range	-35 to 66 ° C (-31 to 151 ° F)
Operating humidity	0 - 95 % (non-condensing)
Outdoor usage	Weather-resistant, meets IP65, epoxy potted, suitable for outdoor use

Mechanical

Size	120 x 76 x 21 mm
(Height x Width x Depth)	(4.72 x 2.99 x 0.83 in.)
Weight	215 g (0.474 lb)

*Measured using Bosch proximity card (ACD-ATR14CS) or equivalent. Range also depends on electrical environment and proximity to metal.

2.1 Key Features

- Built-In 125 KHz ASK EM Proximity card reader
- Red backlit keypad
- Optical back tamper sensor and open collector tamper output.
- Lockout feature on wrong entries (Keypad / Card Tamper)
- Internal buzzer provides audible interface feedback
- Two status / programming interface LEDs (tri-colored)
- Fully potted construction for outdoor use
- Comes with mounting template for easier installation
- Comes with an installation kit that includes a security screw and a security screw tool
- Programmable keypad transmission format
- LED control input
- Programmable facility code
- Programmable Proximity Card Transmission Format
 - Clock & Data
 - 26-Bit Wiegand
 - Card + PIN

3 Installation

3.1 Mounting the ARD-AYCF64

Before starting, select the location to mount the ARD-AYCF64. This location should be at shoulder height.

Drill holes into the back of the unit according to how you want to mount the ARD-AYCF64. For US Gang Box installation, there are two-hole indicators on the back of the cover specifically aligned for the US Gang Box (A, in diagram below).

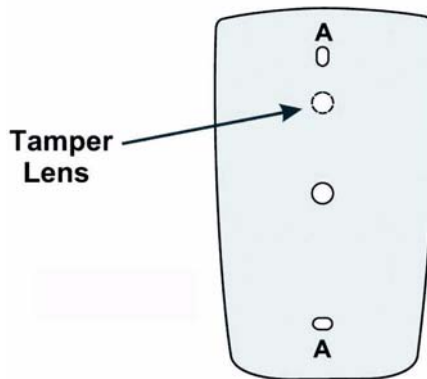


Figure 3.1 Drilling mounting holes

Route the interface cable from the ARD-AYCF64 to the controller.

Screw the ARD-AYCF64 back cover to its mounting location. Return the ARD-AYCF64 front cover to the mounted back plate. Secure the front cover by using the supplied security screw in the controller's installation kit. An L-Shaped tool is provided for use when tightening the security screw.

4 Wiring Instructions

The unit is supplied with a 55 cm (22 in.) pigtail, having a 6-conductor cable. To connect the unit to the controller, perform the following:

- Prepare the unit's cable by cutting the cable jacket back 32 mm (1¼ in.) and strip the wire 13 mm (½ in.).
- Prepare the controller cable by cutting the cable jacket back 32 mm (1¼ in.) and strip the wire 13 mm (½ in.).
- Splice the unit's pigtail wires to the corresponding controller wires and cover each connection.

Refer to the wire color table below, and to the wiring diagrams in *Figure 4.1*.

Reader	Color	Functionality
5~16 Vdc	Red	+DC Input
Shield/ Ground	Black	Ground
Data 1	White	Communication
Data 0	Green	Communication
LEDCTL	Brown	LED Control / Auxiliary Input
Tamper	Purple	Tamper

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



CAUTION!

Trim and cover all unused conductors.

NOTICE!

- The individual wires from the unit are color-coded according to the Wiegand standard.
- When using a separate power supply for the reader, this power supply and that of the controller must have a common ground.
- The reader's cable shield wire should preferably be attached to an earth ground, or 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

The diagram in *Figure 4.1* shows the wiring for the Reader Application.

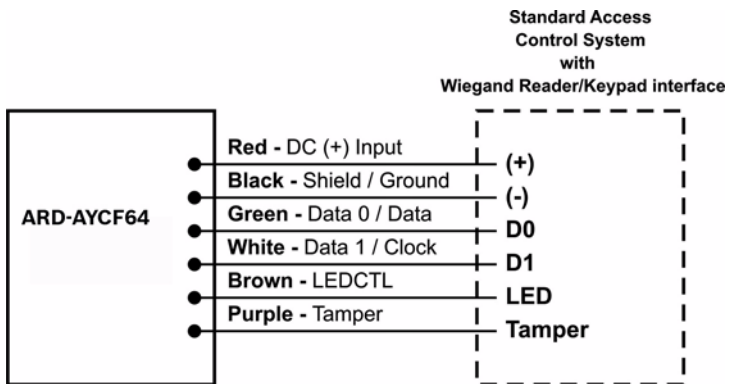


Figure 4.1 Reader Application

5 Reader Functionality

The following explains how to use the ARD-AYCF64 reader.

5.1 Transmit Mode

When the ARD-AYCF64 is in Transmit Mode, it is ready to receive data from a presented proximity card or an entered PIN code.

When the reader is in **Transmit Mode**,

- the Transmit LED (left hand side) is red
- the Program LED (right hand side) is off

When a proximity card or PIN entry is being transmitted,

- the Transmit LED will flash green

PIN data can be sent via one of eight different Keypad Transmission Formats. For more information, see *Section 5.3 Selecting Keypad Transmission Format*.

Proximity cards presented to the reader are always sent in either 26-Bit Wiegand, Clock & Data, or Wiegand Card + PIN format. See *Section 5.4 Selecting Proximity Card Transmission Format* for more information.

5.2 Programming the ARD-AYCF64

Programming the ARD-AYCF64 is done solely via the unit's keypad driven Programming Menu System. To reach the Programming Menu System the ARD-AYCF64 must first be placed into Programming Mode. During the ARD-AYCF64's manufacturing process certain codes and settings are pre-programmed. These settings are called the **Default Factory Settings**.

The table in *Section Programming Menu* below shows the names of all the ARD-AYCF64 menus.

Programming Menu

Default Factory Settings are marked by a "*" sign.

Menu	Description	Default
1	Selecting Keypad Transmission Format <ul style="list-style-type: none"> – Single Key, 6-Bit Wiegand – Single Key, 6-Bit Wiegand with Nibble + Parity Bits – Single Key, 8-Bit Wiegand, Nibbles Complemented – 4 Keys Binary + Facility Code, 26-Bit Wiegand – 1 to 5 Keys + Facility Code, 26-Bit Wiegand – 6 Keys BCD and Parity Bits, 26-Bit Wiegand – 1 to 8 Keys BCD, Clock & Data 	*
2	Selecting Card Transmission Format <ul style="list-style-type: none"> – 26-Bit Wiegand – Clock & Data – Wiegand Card + PIN 	*
3	Changing the Programming Code	1234
4	Changing the Facility Code	0
0	Return to Factory Default Settings	

Entering Programming Mode

1. Press the # key 4 times.
 - Transmit LED will turn off.
 - Program LED will turn red.
2. Enter your 4-digit Programming Code.
If the Programming Code is valid, the Door LED will turn green and the ARD-AYCF64 will be in Programming Mode.



NOTICE!

- The factory 4-digit Programming Code is 1234.
- If a Programming Code is not entered within 30 seconds, the ARD-AYCF64 will return to Transmit Mode.

Exiting Programming Mode

1. To exit the Programming Mode at any time press #:
 - You will hear a beep.
 - The Program LED will be off.
 - The Transmit LED will turn red.
2. This indicates that the ARD-AYCF64 has returned to Transmit Mode.
3. Wrong entries may reset the reader back to Transmit Mode.

While in Programming Mode if no key is pressed for 30 seconds the ARD-AYCF64 will exit Programming Mode and return to Transmit Mode.

5.3 Selecting Keypad Transmission Format

The ARD-AYCF64 has eight different keypad transmission formats to select from. Follow the steps below to select the appropriate Keypad Transmission Format that you wish to use.

1. Enter the Programming Mode.
2. Press **1** to enter.
The Transmit LED will turn red.

3. Enter the appropriate option no. for the Keypad Transmission Format that you wish to select (See the table in *Section Keypad Transmission Format Option Number*). If an incorrect option no. is entered the reader will return to Transmit Mode and the Keypad Transmission Format will remain unchanged
4. See *Section Keypad Transmission Format Option Number* for more information on Keypad Transmission Formats.
5. System returns to Transmit Mode.
 - You will hear three beeps.
 - The Program LED will turn off
 - The Transmit LED will turn red

NOTICE!



- 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 7) an additional input is required to specify the number of keys in the PIN code.
-

Keypad Transmission Format Option Number

See the table below to determine the Option Number for the Keypad Transmission Format you wish to select.

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

* Option No. 1 is the Default Factory Setting.

More information on each of the different Keypad Transmission Formats is available below and in the following sections.

5.3.1 Option No. 1: Single Key, 6-Bit Wiegand

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 = 110100 = "A" *	6 = 101100
1 = 000010	7 = 101111
2 = 000100	8 = 110001
3 = 000111	9 = 110010
4 = 101001	% = 110111 = "B" *
5 = 101010	# = 011001 = "C" *

* = Hexadecimal

5.3.2 Option No. 2: Single Key, 6-Bit Wiegand 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 = 000001	6 = 101100
1 = 000010	7 = 101111
2 = 000100	8 = 110001
3 = 000111	9 = 110010
4 = 101001	% = 110100 = "A" *
5 = 101010	# = 110111 = "B" *

* = Hexadecimal

5.3.3 Option No. 3: Single Key, 8-Bit Wiegand Nibbles Complemented

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" *
5 = 10100101	# = 01001011 ="B" *

* = Hexadecimal

5.3.4 Option No. 4: 4 Keys Binary + Facility Code, 26-Bit Wiegand

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 5.7 Changing the Facility Code* for more information.)

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 the % key or the # key are pressed during PIN code entry, the keypad will clear 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 digits keypad PIN code is disrupted and no number key is pressed within 5 seconds, the keypad will clear the PIN code entry buffer, generate a beep and is ready to receive a new 4 digits 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

5.3.5 Option No. 5: 1 to 5 Keys + Facility Code, 26-Bit Wiegand

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 255. The Factory Default Setting for the Facility Code is 000. (See *Section 5.7 Changing the Facility Code* for more information.)

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, the # key 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 the % key is pressed during PIN code entry or a PIN code greater than 65,535 is entered, the keypad will clear the PIN code entry buffer, generate 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 no number key or # key is pressed within 5 seconds, the keypad will clear the PIN code entry buffer, generate 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

5.3.6 Option No. 6: 6 Keys BCD and parity bits, 26-Bit Wiegand

Sends buffer of 6 keys, adds parity and sends a 26-Bit Binary-Coded Decimal (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 no number key is pressed within 5 seconds, the keypad will clear the PIN code entry buffer, generate 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	=	First key entered	D	=	Fourth key entered
B	=	Second key entered	E	=	Fifth key entered
C	=	Third key entered	F	=	Sixth key entered

5.3.7 Option No. 7: 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 will transmit 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 the % key or the # key are pressed during PIN code entry, the keypad will clear the PIN code entry buffer, generate a beep and is ready to receive a new keypad PIN code.

If the entry of the digit keypad PIN code is disrupted and no number key or # key is pressed within 5 seconds, the keypad will clear the PIN code entry buffer, generate a medium length beep and is ready to receive a new keypad PIN code.

**NOTICE!**

When using the Keypad Transmission Format "1 to 8 keys BCD, Clock & Data" (Option 7) an additional input is required to specify the number of keys in the PIN code.

5.4 Selecting Proximity Card Transmission Format

The ARD-AYCF64 has three different proximity card formats to select from. Follow the steps below to select the appropriate Proximity Card reader Transmission Format that you wish to use.

1. Enter the Programming Mode.
2. Press **2** to enter menu 2.
 - The Transmit LED will turn red.
3. Enter the appropriate option number for the proxy card transmission format that you wish to select (options below).

If an incorrect option is entered the reader will return to Transmit Mode and the keypad transmission format will remain unchanged.

4. System returns to Transmit Mode
 - You will hear three beeps.
 - The Program LED will turn off
 - The Transmit LED will turn red

Proximity Card Transmission Format Option Number:
Option 1: 26-Bit Wiegand
Option 2: Clock & Data
Option 3: Wiegand Card + PIN

5.5 "Wiegand Card + PIN" Transmission Format

This unique mode is intended to let host controllers get card and keypad data simultaneously. This option overrides the selected Keypad Transmission Format and sends the keypad data as described below.

After a card is presented to ARD-AYCF64, the program LED starts to flash in Green and indicates that ARD-AYCF64 is waiting for the PIN code. If the entry of one to five digit keypad PIN code is disturbed and no digit key or # key is pressed within 5 seconds, the keypad will clear the card buffer and the PIN code entry buffer, generate a medium length beep and be ready to receive a new card.

The keypad PIN code can be one to five digits long in the range of 0 to 99,999. When entering a keypad PIN code, the # key must be pressed to signify the end of the PIN entry. When pressing the # key press, the data is sent by the Wiegand data lines. If the * key is pressed, the keypad will clear the card buffer and the PIN code entry buffer, generate a medium length beep and is ready to receive a new card.

AYC-Ex5 output card data in 26-Bit Wiegand with the following keypad data in 26-Bit Wiegand format.

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

Where:

EP = Even parity for first 12 bits (A)
OP = Odd parity for last 12 bits (B)

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

Where:

- EP = Even parity for first 12 bits
- OP = Odd parity for last 12 bits
- A = First key entered D = Fourth key entered
- B = Second key entered E = Fifth key entered
- C = Third key entered

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:

- EP = Even parity for first 12 bits
- OP = Odd parity for last 12 bits
- A = First key entered
- B = Second key entered

5.6 Changing the Programming Code

1. Enter the Programming Mode.
2. Press **3** to enter menu 3.
 - The Transmit LED will turn red.
3. Enter the new 4 digit code you wish to set as the Programming Code.
4. System returns to Transmit Mode:
 - You will hear three beeps.
 - The Program LED will turn off.
 - The Transmit LED will turn red.

**NOTICE!**

- Programming Code can not be erased, i.e. the code 0000 is invalid and will not erase the Programming Code.
 - The factory default 4-digit Programming Code is 1234.
-

5.7 Changing the Facility Code

1. Enter the Programming Mode.
2. Press **4** to enter menu 4.
 - The Transmit LED will turn red.
3. Enter the new 3-digit code you wish to set as the Facility Code
4. System returns to Transmit Mode
 - You will hear three beeps
 - The Program LED will turn off
 - The Transmit LED will turn red

**NOTICE!**

- Facility Code can be in the range of 000 to 255.
 - The default Facility Code is 0.
-

5.8 Return to Factory Default Settings

**CAUTION!**

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

1. Enter the Programming Mode.
2. Press **0** to enter Menu 0.
 - The Transmit LED will flash red.
 - The Program LED will flash red.

3. Enter your 4 digit programming code
 - If the Programming Code is valid, all memory will be erased, you will hear three beeps and the controller will return to Normal Mode
 - If the Programming Code is invalid you will hear a long beep and the controller will return to Normal Mode without erasing the memory of the controller












5.9 Replacing a Lost Programming Code




In the event that the Programming Code is forgotten, the ARD-AYCF64 may 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.

6 Appendix

6.1 LED displays - reader mode

Reader mode/ User action	Mode/Transmit LED (left hand side)	Door/Program LED (right hand side)
Transmit Mode	 red	
Transmitting card or PIN data	 flash green	
Entering Programming Mode		
1. Press 4 times the # key		 red
2. Enter the 4-digit programming code		 green
Exiting Programming Mode		
– Press # or – Wrong input	 red	
or – No input for 30 seconds	1x 	
Selecting Keypad Transmission Format		

Reader mode/ User action	Mode/Transmit LED (left hand side)	Door/Program LED (right hand side)
1. Enter Programming Mode	○	● green
2. Press 1	● red	● green
3. Enter the no. for the Keypad Transmission Format.	● red	○
4. Back to Transmit Mode	3x 	
Selecting Proximity Card Transmission Format		
1. Enter Programming Mode	○	● green
2. Press 2	● red	● green
3. Enter the no. for the Prxy Card Transmission Format.	● red	○
4. Back to Transmit Mode.	3x 	
Changing the Programming Code		
1. Enter Programming Mode	○	● green
2 Press 3	● red	● green
3. Enter the new 4-digit code	● red	○
4. Back to Transmit Mode	3x 	
Changing the Facility Code		

Reader mode/ User action	Mode/Transmit LED (left hand side)	Door/Program LED (right hand side)
1. Enter Programming Mode	○	● green
2. Press 4	● red	● green
3. Enter the new 3-digit code	● red	○
4. Back to Transmit Mode	3x 	
Return to Factory Default Settings		
1. Enter Programming Mode	○	● green
2. Press 0	★ flash red	★ flash red
3. Enter the 4-digit Programming Code	3x 	
4. Back to Transmit Mode	● red	○

6.2 Technical Support

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