



**MODEL NUMBER:**  
WPR900-1-0-AC-XX WMR900-1-0-AC-XX  
WPK900-1-0-AC-XX WMK900-1-0-AC-XX  
WDP900-1-0-AC-XX WKM900-1-0-AC-XX

# WIEGAND READERS

## Wiegand 125 kHz Passive Proximity Readers INSTALLATION MANUAL

### SPECIFICATIONS

<b>Read Capability</b> .....	Slim Tags, Omega Tags, Impro Trinary Tags and HID 125 kHz Tags.  <i>NOTE:     HID is a registered trademark of HID Global Corporation (an ASSA ABLOY Group Brand).</i>
<b>Working Environment</b> WPR900 and WPK900 .....	Designed to work in indoor or outdoor environments similar to IP53.  <i>NOTE:     These Readers are RoHS compliant and do not contain any UV stabilizer.</i>
WMR900 and WMK900 .....	Designed to work in harsh (industrial) indoor or outdoor environments similar to IP53.
WDP900 .....	The IP rating for this Wiegand Reader is dependant on the user supplied housing. The rating of the Reader on its own is similar to IP35.  <i>NOTE:     These Readers are RoHS compliant and do not contain any UV stabilizer.</i>
WKM900 .....	Designed to work in an indoor or outdoor environment similar to IP42.  <i>NOTE:     These Readers are RoHS compliant and do not contain any UV stabilizer.</i>
<b>Input Voltage Rating</b> .....	5 V DC to 16 V DC, polarity sensitive.

Power Requirements		Current (mA)	Power (W)
Supply Voltage 5 V DC all Indicators on.....		50	0.25
Supply Voltage 12 V DC all Indicators on.....		50	0.60
Wiegand Bus			
Electrical Interface.....	'0' and '1' Data streams.		
Data Format .....	Tag information: 44-bit or 26-bit Wiegand. Key information: 26-bit Wiegand only.		
Inputs			
Quantity.....	4.		
Type .....	Dry Contact.		
Function .....	Operation of the Buzzer, LED and Scanner Inhibit.		
Buzzer .....	4 kHz piezo-electric single volume, single tone.		
Status Indicators			
Status LED .....	Tri-colored Red, Green or Amber (Default) (externally visible).		
WPK900, WMK900 and WKM900 models only			
Keypad			
WPK900 and WMK900 .....	12 Alphanumeric keys.		
WKM900 .....	12 Numeric Keys and 1 Bell Button.		
PIN-codes .....	5 Digit codes in the range 00000 to 65535. 4 Digit codes in the range 0000# to 9999#.		

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# INSTALLATION INFORMATION

## Accessories

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Find the following when unpacking the Wiegand Reader:

### WPR900 and WPK900

- Either a Wiegand Plastic Non-keypad Reader (WPR900-1-0-AC-XX) housed in a dark gray, ABS plastic housing. The Wiegand Reader consists of a Front Cover and a Backing Plate (the Backing Plate is attached with a Self-tapping Screw (M3 x 8 mm)). The front cover assembly includes 1 m (3.28 ft) of West Penn 3272, shielded, multi-strand, 10-core cable.
- Or a Wiegand Plastic Keypad Reader (WPK900-1-0-AC-XX) housed in a dark gray, ABS plastic housing. The Wiegand Reader consists of a Front Cover and a Backing Plate (the Backing Plate is attached with a Self-tapping Screw (M3 x 8 mm)). The front cover assembly includes 1 m (3.28 ft) of West Penn 3272, shielded, multi-strand, 10-core cable.
- One 2-Way Programming Pin.
- Four Brass Wood Screws (3.5 mm x 25 mm).
- Four Wall Plugs (7 mm).
- An extra Serial Number Label.

### WMR900 and WMK900

- Either a Wiegand Metal Non-Keypad Reader (WMR900-1-0-AC-XX) housed in a Zinc alloy die-cast housing. The Wiegand Reader consists of a Front Cover and a Backing Plate (the Backing Plate is attached with a Hexagonal Screw (M3 x 8 mm)). The front cover assembly includes 1 m (3.28 ft) of West Penn 3272, shielded, multi-strand, 10-core cable.
- Or a Wiegand Metal Keypad Reader (WMK900-1-0-AC-XX) housed in a Zinc alloy die-cast housing. The Wiegand Reader consists of a Front Cover and a Backing Plate (the Backing Plate is attached with a Hexagonal Screw (M3 x 8 mm)). The front cover assembly includes 1 m (3.28 ft) of West Penn 3272, shielded, multi-strand, 10-core cable.
- An Allen Key (2 mm).
- One 2-Way Programming Pin.
- Four Brass Wood Screws (3.5 mm x 25 mm).
- Four Wall Plugs (7 mm).
- An extra Serial Number Label.

### WDP900

- A Wiegand Door Entry Panel (WDP900-1-0-AC-XX) housed in a Black, ABS Plastic housing. The Wiegand Door Entry Panel includes 1 m (3.28 ft) of West Penn 3272, shielded, multi-strand, 10-core cable.
- One 2-way Programming Pin.
- An extra Serial Number Label.

## WKM900

- A Wiegand Keypad Mullion Reader (WKM900-1-AC-XX) housed in a Black, ABS Plastic housing. The Wiegand Reader consists of a Front Cover and a Mounting Bracket (the Mounting Bracket is attached with a Self-tapping Screw (M2 x 6 mm)).
- A 1 m Wiegand Connector Cable.
- One 2-Way Programming Pin.
- Two Counter-sunk Self-tapping Screws (M2 x 6 mm).
- Two Counter-sunk Self-taping Screws (2. Mm x 25 mm).
- Two Wall Plugs (5 mm).
- An extra Serial Number Label.

## General

Remember the following when installing the Wiegand Readers:

### Maximum Data Communications Distance

**CAUTION:** When implementing the 150 m cable distances with the Wiegand Readers use the 12 V power input option.

Install the Wiegand Readers no further than 150 m (164 yd) from the Host unit. The cable individual conductor cross-sectional area should not be less than  $0.2 \text{ mm}^2$  ( $0.0003 \text{ in}^2$ ).

### Distance between Wiegand Readers

To avoid mutual interference, install the Wiegand Readers no closer than 500 mm (20 in) apart.

## Mounting the Wiegand Readers

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**CAUTION:** Make certain that you mount the Readers on a vibration-free surface.

Select the mounting position of the Wiegand Readers, considering accessibility, routing of wires and visibility of the externally visible LED.

Secure the Wiegand Readers to the mounting surface, using four suitable screws and wall plugs (supplied), nuts and bolts or rivets.

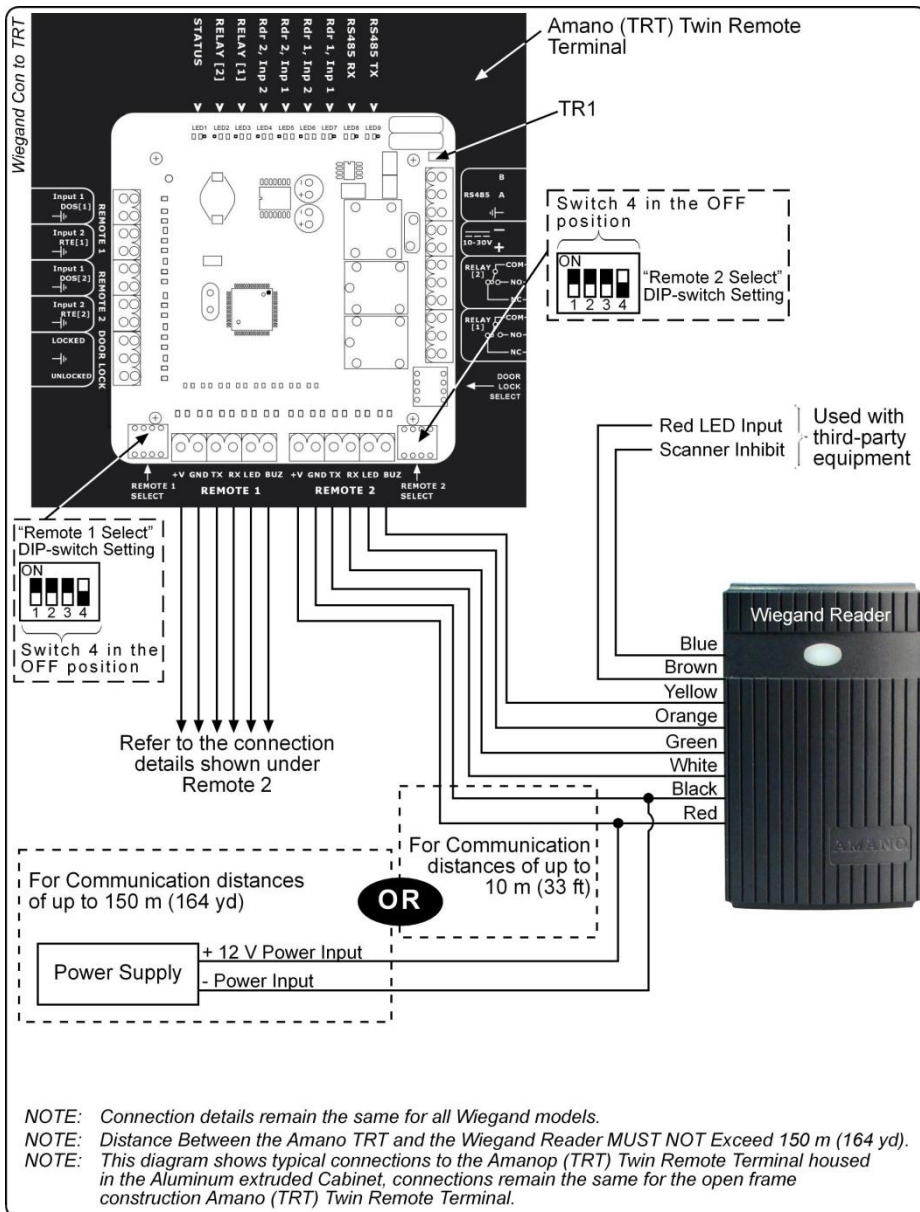
**NOTE:** *The Wiegand Door Entry Panel is designed for mounting in a user supplied enclosure. The Reader has 4 mounting holes, drilled to 4 mm in diameter. The mounting holes accommodate M3 bolts and nuts.*

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# ELECTRICAL CONNECTIONS

## Connecting the Wiegand Reader

Figure 1 to Figure 5 show typical connection diagrams for the Wiegand Reader.



**Figure 1: Wiegand Reader Connected to the Amano TRT**

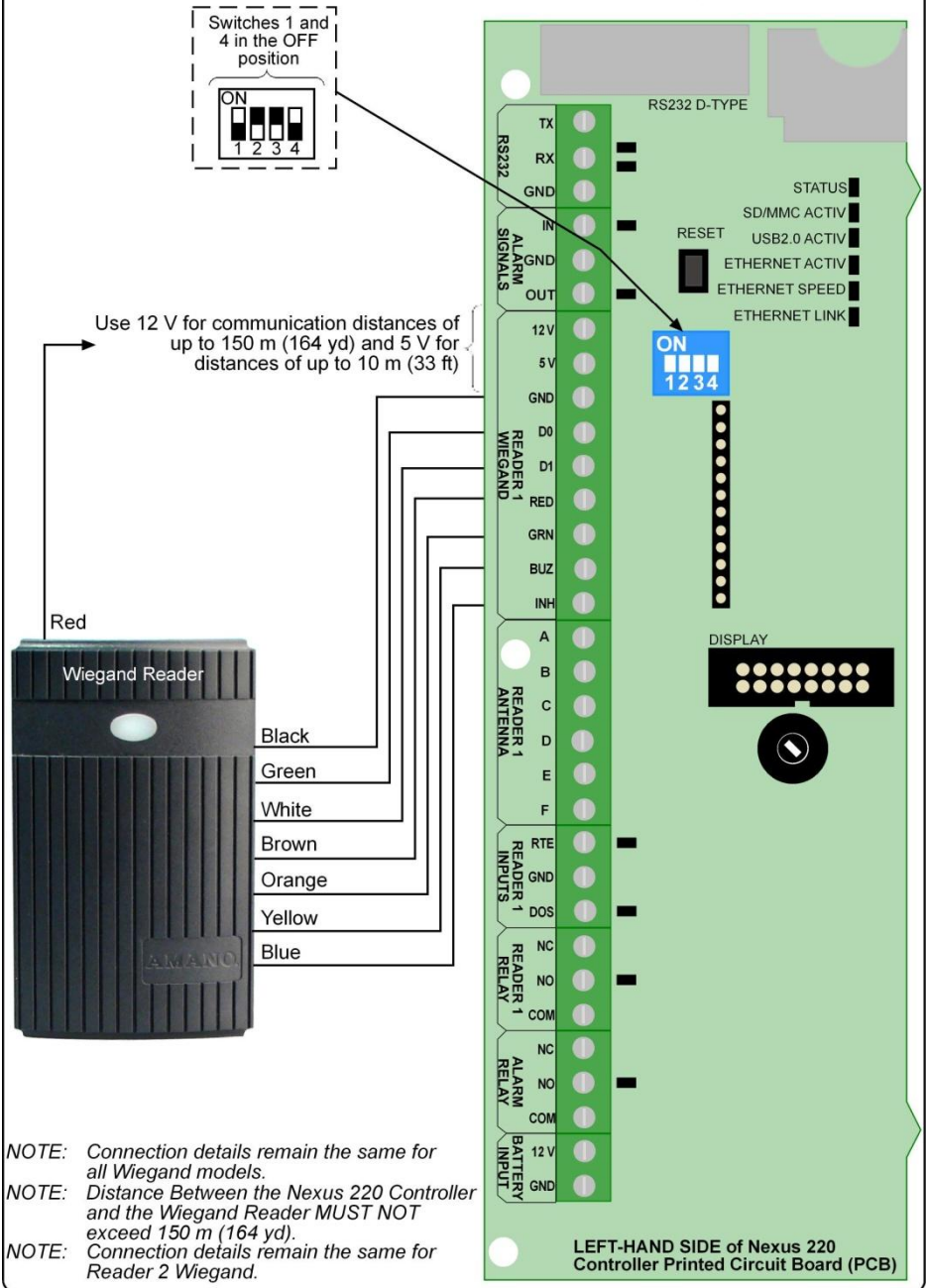
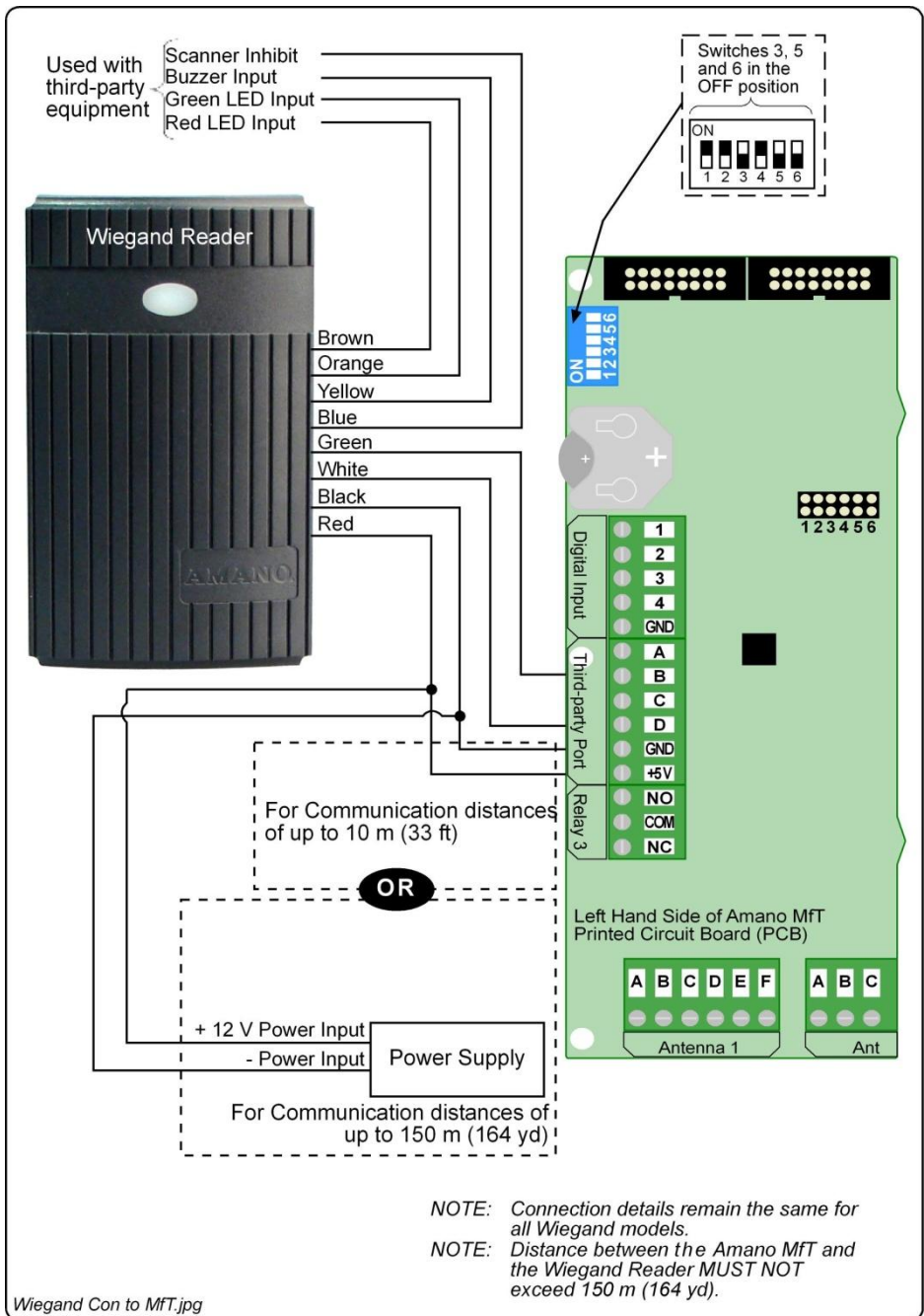
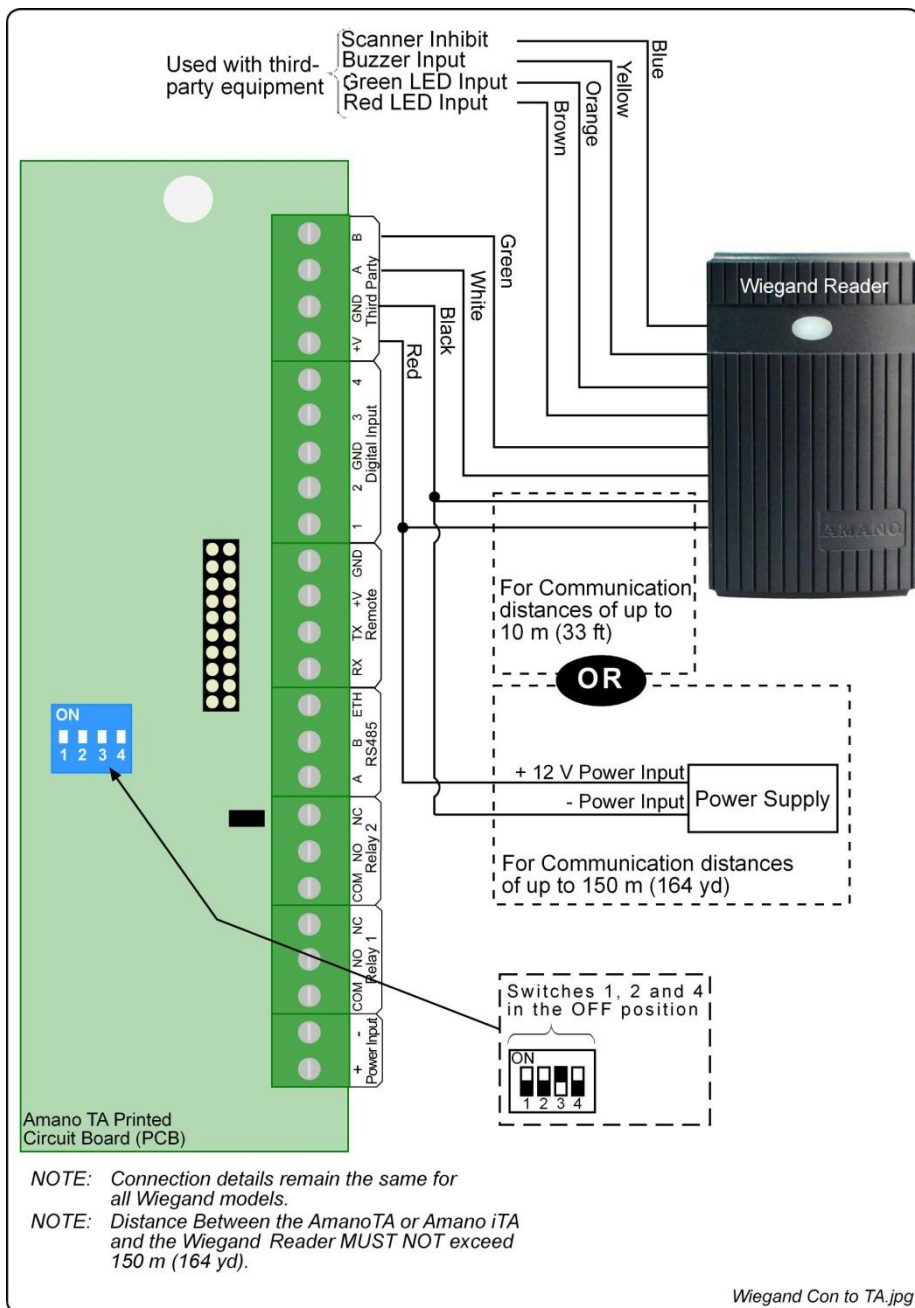


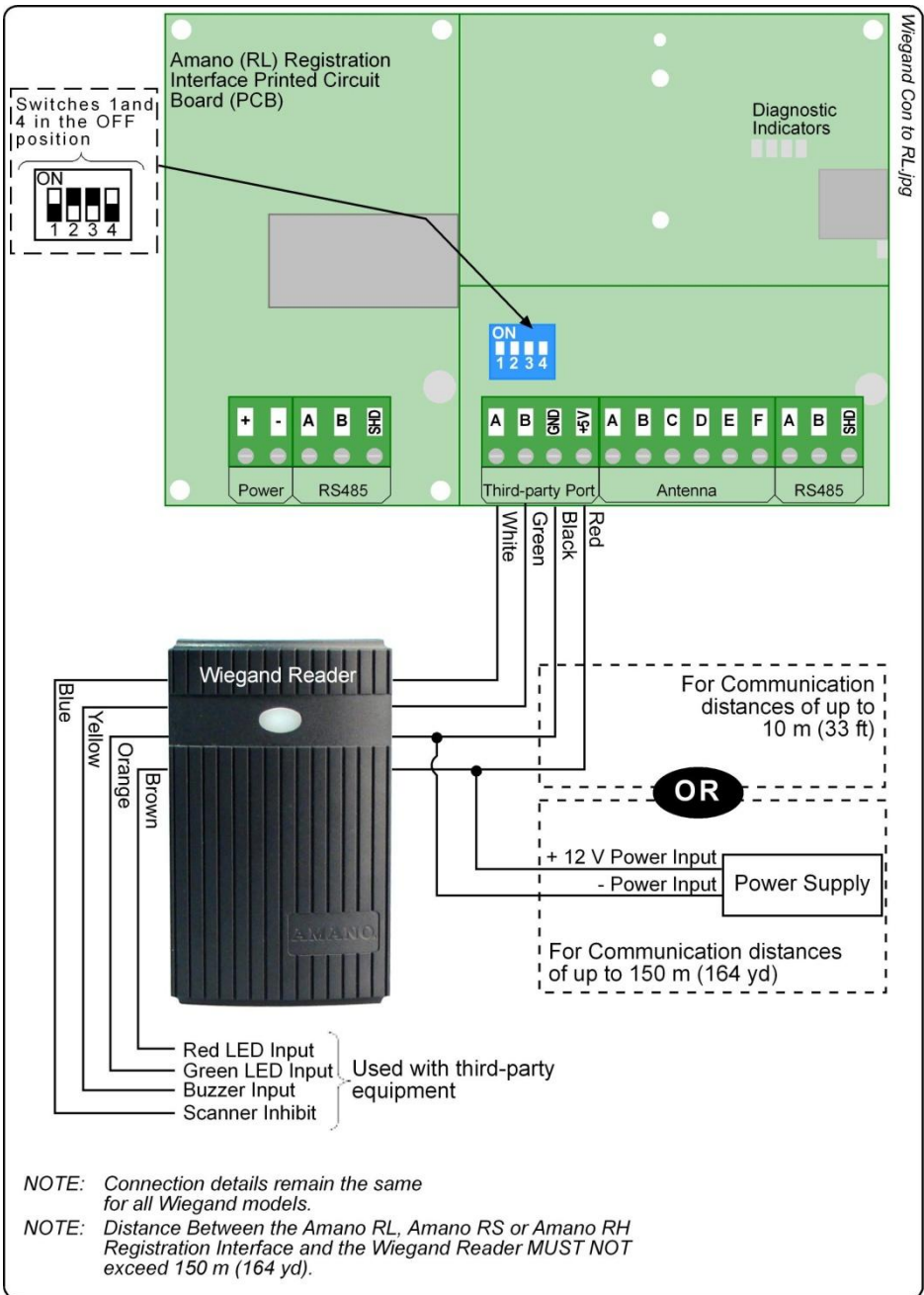
Figure 2: Wiegand Reader Connected to the Nexus 220 Controller



**Figure 3: Wiegand Reader Connected to the Amano MfT or the AXP121 Controller**







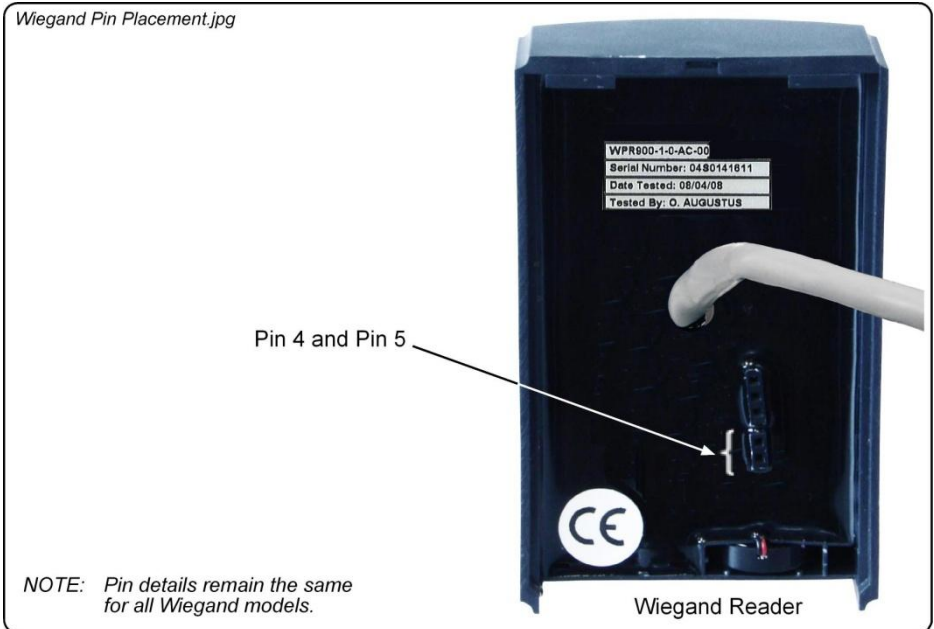
**Figure 5: Wiegand Reader Connected to the Amano RL (Amano RS and Amano RH)**

## Wiegand Mode

The Wiegand Readers offer four different Output Mode Combinations:

- Mode 1 (1 Beep): 26-bit, HID Normal.
- Mode 2 (2 Beeps): 44-bit, HID Normal (Default).
- Mode 3 (3 Beeps): 26-bit, HID Raw.
- Mode 4 (4 Beeps): 44-bit, HID Raw.

The 26-bit and the 44-bit refer to the output format of EMM and Impro Trinary Tags. HID Tags output in either normal or 45-bit raw mode.



**Figure 6: Wiegand Pin Placement**

### Setting the Wiegand Mode

The Output Mode can be selected by doing the following:

1. Remove the Backing Plate from the Wiegand Reader.
2. Short circuit Pin 4 and Pin 5 (as shown in Figure 6) using the 2-Way Programming Pin supplied.
3. Power up the Unit.
4. Remove the 2-Way Programming Pin after hearing the number of beeps corresponding with the required mode (Refer to page 10 for Wiegand Output Mode Combinations).

**NOTE:** The number of beeps on power-up indicates the selected Output Mode.

5. Replace the Backing Plate.

## Wiegand 44-bit Protocol

Tags are reported using Wiegand 44-bit Protocol. An “EMM” Tag has an 8-bit User Code and a 32-bit Serial Number.

These are reported as follows:

- The 8-bit User Code is reported in bits 1 to 8 of the Protocol.
- The 32-bit Serial Number is reported in bits 9 to 40 of the Protocol.
- Bits 41 to 44 of the Protocol are the exclusive OR of the preceding 40 bits taken 4 at a time.

## Wiegand 26-bit Protocol

Key Codes are reported as a 24-bit code consisting of an 8-bit Facility (or Site) Code, and a 16-bit binary representation of the Key Code.

The following format is used:

- Bit 1 is the even parity over the first 13 bits.
- Bits 2 to 9 are the 8-bit Facility Code for Key Codes.
- Bits 10 to 25 are the 16-bit Key Code.
- Bit 26 is the odd parity over the last 13 bits.

## HID Normal

The number of bits to output is determined from the information in the tag and will vary between tags. The 26-bit or 44-bit selection does not impact on HID Tags.

## HID Raw

In this Mode, the entire raw 45-bit HID Tag is output.

## Keypad Model Settings (WPK900, WMK900 and WKM900 only)

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The 12-button Keypad is used to enter 5-digit PIN-codes in the range 00000 to 65535. Wiegand protocol constraints disallow PIN-codes from 65536 to 99999. In this case the Status LED turns Red and the Buzzer activates for 2 seconds.

The Reader can accept 1 to 4-digit PIN-codes by pressing the Hash Key (#) after you have entered the PIN-code.

Errors made while entering the PIN-code can be corrected by pressing the Star Key (\*) followed by the correct PIN-code.

- PIN code up to 5 digits with programmable facility code, output in 26-bit format.
- Fixed length buffered keys from 1 – 11 output in hexadecimal format with optional parity.

An extra button is included at the bottom of the WKM900 model's keypad; this button offers a doorbell facility.

**NOTE:**     *The output of the PIN-code keypad information is in 26-bit Wiegand format.*

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## Fixed Length Key Output Mode

Once the specified number of keys are pressed, all the buffered keys are output in hexadecimal format:

Key	Output
0	0000
1	0001
2	0010
3	0011
4	0100
5	0101
6	0110
7	0111
8	1000
9	1001
*	1010
#	1011
Doorbell (WKM900 only)	00111100

**Table 1: Fixed Length Key Output Mode**

## Setting the Fixed Length Mode

The number of keys to be buffered and the parity option in the Fixed Length Mode is set as follows:

1. Press and hold down key '2' for 3 seconds. The Status LED enters a fast flash Mode and emits a long beep.
2. Enter a 3 digit number followed by the Hash Key (#). The first 2 digits specify the key buffer length and must be in the range 00 to 11 (eleven). The third digit must be a '0' where there is no parity and '1' where parity is added.

**NOTE:** If '00' is entered for the key buffer length then the Key Mode reverts to PIN Mode.

3. On acceptance of the setting the Status LED changes to Green.
4. If the settings are rejected the Status LED changes to Red.

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## Single Key 8-bit Burst Mode

To select this mode, specify the Fixed Length Buffered Mode to be "018". This mode reports each single key press as 8-bit code. Use Single Key 8-bit Burst Mode when using Wiegand Readers in PAC Mode or TAG+PIN Mode.

Key	Output
0	11110000
1	11100001
2	11010010
3	11000011
4	10110100
5	10100101
6	10010110
7	10000111
8	01111000
9	01101001
*	01011010
#	01001011
Doorbell (WKM900 only)	00111100

**Table 2: Single Key 8-bit Burst Mode**

### Setting Single Key 8-bit Burst Mode

1. Press and hold down key '2' until the Reader beeps continuously.
2. Enter '018' and finish by pressing the Hash Key (#).
3. On acceptance of the change, the Status LED will change to Green.
4. If the change is rejected the Status LED will change to Red.

### Entering a Facility Code

A Facility Code only applies when PIN-codes are used. It is reported as part of the Wiegand code and can be used to link a set of Wiegand Readers to a particular Site.

A Facility Code can be entered into the Reader's memory. To set the Facility Code, do the following:

1. Press and hold down key '1' for 3 seconds. The Status LED will enter a fast flash Amber Mode.
2. Enter the Facility Code in the range 0 to 255 and finish by pressing the Hash Key (#).
3. On acceptance of the Facility Code the Status LED will briefly change to Green and the Buzzer will sound.
4. If the Facility Code is rejected the Status LED will change to Red for a longer period and the Buzzer will sound.

## Serial Number Label

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1. Once the Wiegand Reader is installed, sketch a rough site plan.
2. Attach the Wiegand Reader's loose Serial Number Label and the Terminal or Controller's Fixed Address Label, to the sketched site plan in the position of the Wiegand Reader.

The Wiegand Reader does not have its own Fixed Address. When connected to a Terminal or Controller the Wiegand Reader is assigned one of the available Fixed Addresses.

The Serial Number Label identifies the type of Wiegand Reader, and the Fixed Address Label (shipped with the Terminal or Controller) identifies the Fixed Addresses. Both these labels should be attached to the site plan to assist in identifying the hardware once an Auto-ID is performed.

## GUARANTEE OR WARRANTY

This product conforms to our Guarantee or Warranty details placed on our Web Site, to read further please go to [www.impro.net](http://www.impro.net).

## USER NOTES

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This manual is applicable to the Wiegand Readers WPR900-1-0-AC-00, WPK900-1-0-AC-00, WMR900-1-0-AC-00, WMK900-1-0-AC-00, WDP900-1-0-AC-00 and WKM900-1-0-AC-00 (The last two digits of the Impro stock code indicate the issue status of the product).

WPR300-0-0-AC-04

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