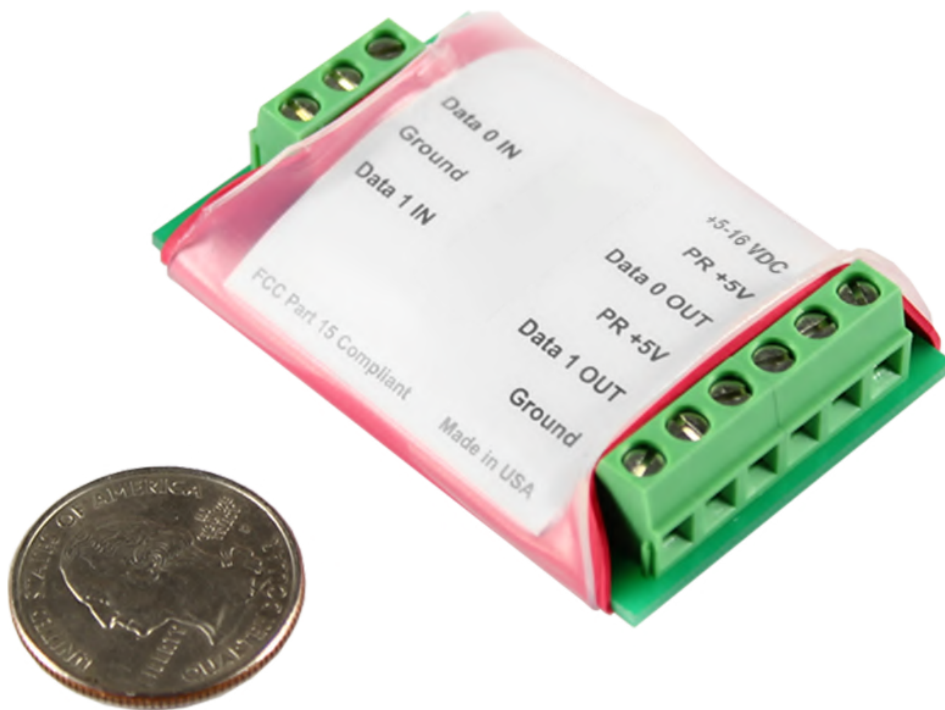


Wiegand Isolator

WSOI-100

Wiegand Signal Optical Isolator

Product Manual



WSOI-100 - Product Overview

The WSOI-100 Wiegand Isolator electrically isolates data signals from two different Wiegand devices using optical couplers, which transmit the Wiegand signal from the J1 input side to the J2 output side. It can be powered with 5-16Vdc; a separate power supply is not required.

There are three main applications in which the WSOI-100 is used:

- 1) Connecting two Wiegand readers to one access controller Wiegand port;
- 2) Connecting one Wiegand reader to two different access controllers;
- 3) Connecting Wiegand devices that operate the Wiegand lines at different voltage levels.

The WSOI-100 is necessary when the Wiegand devices in these applications operate the Wiegand data lines at different voltages. The WSOI-100 may also be used in applications where Wiegand devices are not able to be electrically connected, such as issues with power supplies or pull-up resistors.

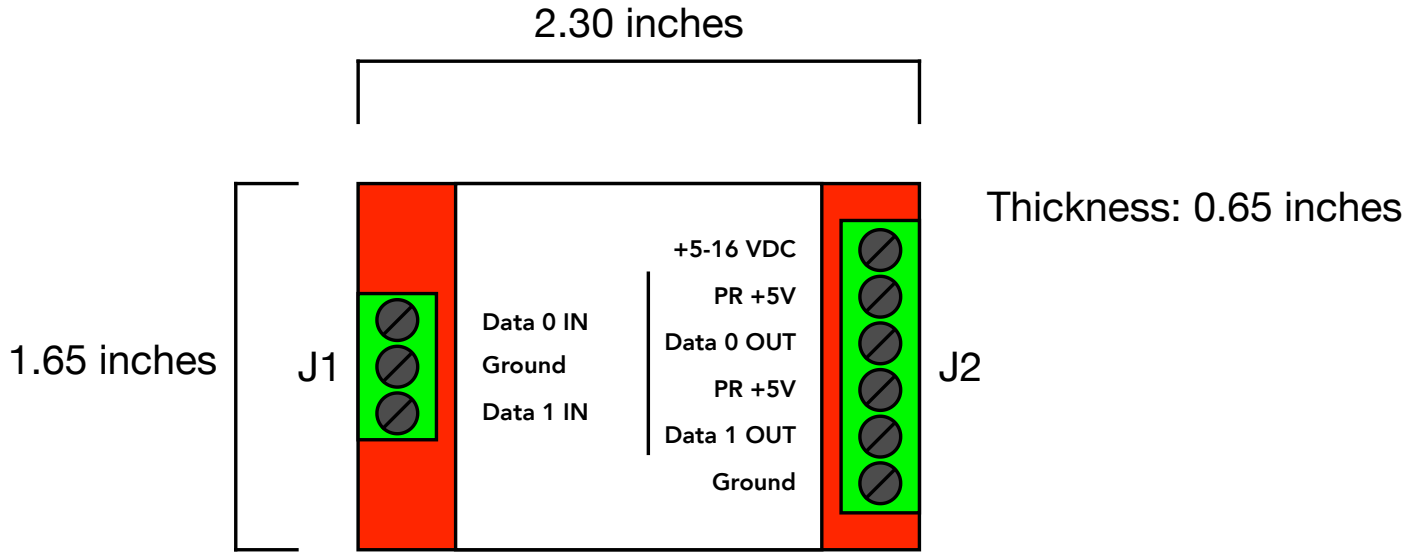
Included in the packaging is the unit, Manufacturer Warranty, and the Quick Start Guide.

Specifications		
Product	WSOI-100	<i>Wiegand Optical Isolator</i>
Physical	Dimensions	2.30" x 1.65" x 0.65" (58.42 x 41.91 x 16.51 mm)
	Weight	0.0625 pounds (1 ounce) (28.35 grams)
Environmental	Storage Temperature	-55°C to 150°C
	Operating Temperature	-40°C to 100°C
Electrical	J2 Header Input Voltage	5-16 Vdc (12V Typical) @ 20mA
	Wiegand Input Voltage Rating	5-24Vdc
	Wiegand Output Voltage Rating	5 Vdc
Range	Wiegand	Typical 500 foot Wiegand limit
Applications	Electrically isolate Wiegand devices	
	Connect two Wiegand readers to one access controller Wiegand port	
	Connect one Wiegand reader to two different access controllers	
Related products	CVX-OPTS Intelligent Splitter OPTW-200 Convert non-standard Wiegand interfaces to standard Wiegand interfaces	

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Physical Dimensions & Pin Designations



J1 Header:

Data 1 IN - Wiegand Data Input 5-24 VDC

Ground - Common Data Ground

Data 0 IN - Wiegand Data Input 5-24 VDC

J2 Header:

+5-16 VDC - Power Input, 12 VDC @ 20mA typical

PR +5V - Connection to pull-up resistor, 1.5K @ 5VDC

Data 0 OUT - Wiegand Data Output 5-24 VDC

PR +5V - Connection to pull-up resistor, 1.5K @ 5VDC

Data 1 OUT - Wiegand Data Output 5-24 VDC

Ground - Power Ground and Common Data Ground

WSOI-100 - Bench Testing

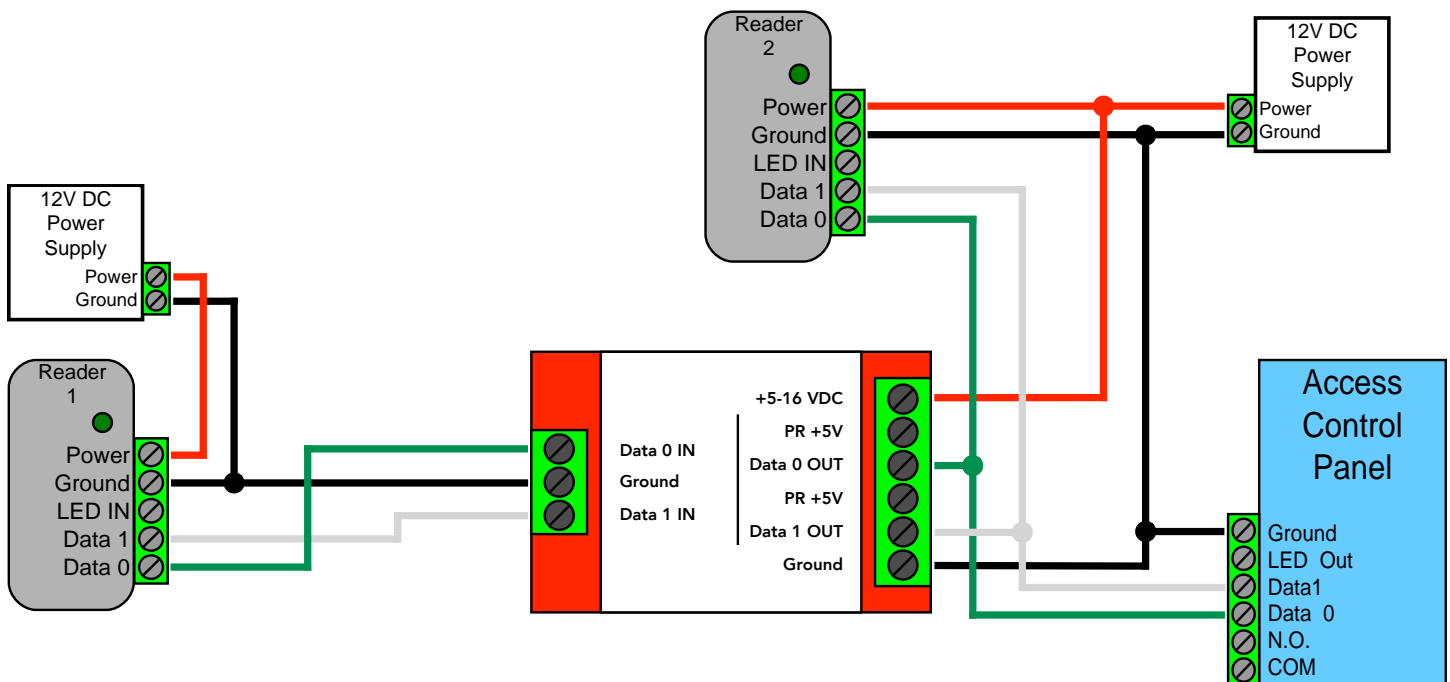
When installing the WSOI-100 with new access control equipment, bench testing is recommended. Refer to the wiring diagrams on pages 4, 5, and 6; find the wiring diagram that matches your application and set up a bench test accordingly.

In many applications, the access control equipment is already installed and a bench test is not practical. In these applications, install the WSOI-100 with the existing access control equipment and test the system thoroughly.

Two Readers to One Panel Wiring Diagram

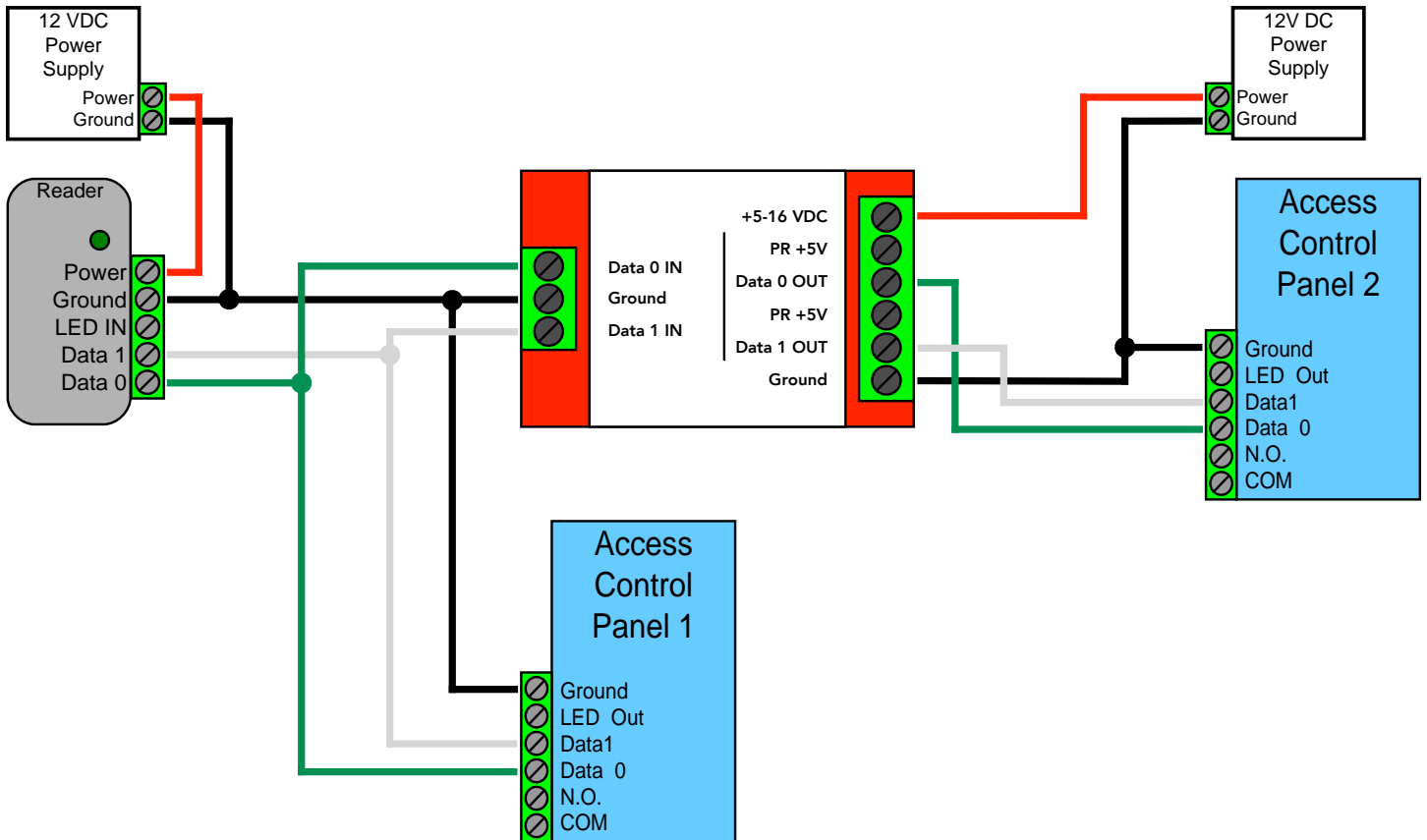
The wiring diagram below shows how to connect two Wiegand readers to one access control panel Wiegand port, using the WSOI-100 to electrically isolate Reader 1 from Reader 2 and the access control panel while passing the Wiegand signals from both readers to the access control panel.

Note: Some new RFID readers have a hybrid data interface, supporting both Wiegand and OSDP data connections. However, when operating in Wiegand mode, the Wiegand interface is not standard Wiegand. This creates issues when paralleling multiple Wiegand readers together, such as high/low readers at vehicle gates or in/out readers at building entrances. For more information, please view the Hybrid Wiegand/OSDP Interfaces section at the end of this document.



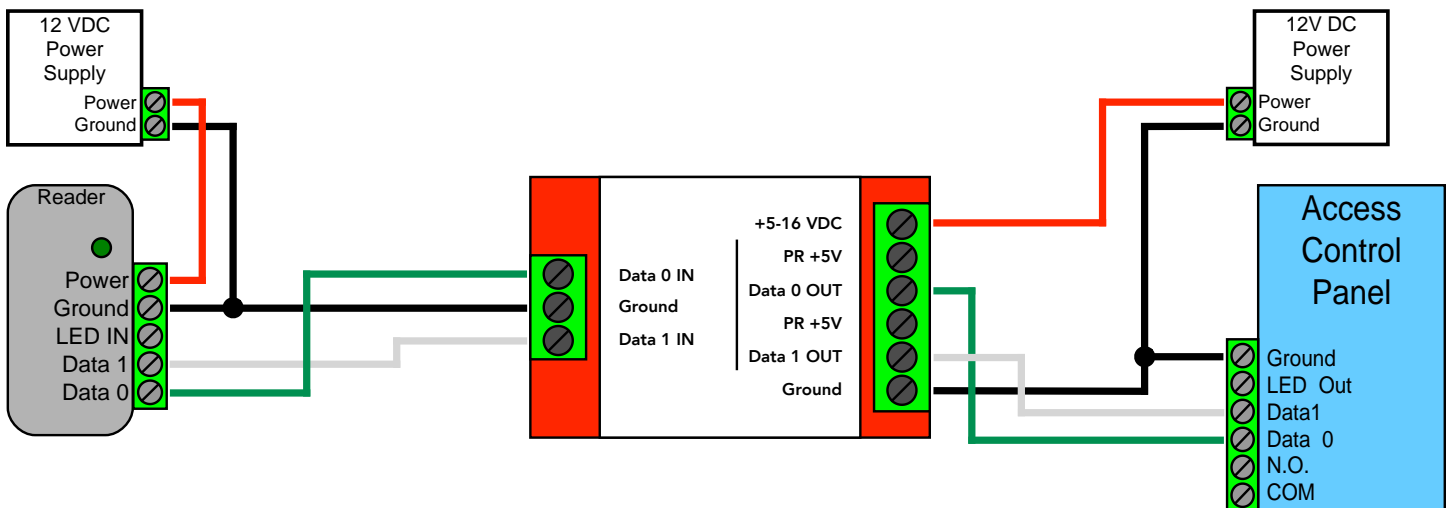
One Reader to Two Panels Wiring Diagram

The wiring diagram below shows how to connect one Wiegand reader to two access control panels, using the WSOI-100 to electrically isolate the Wiegand reader and Access Control Panel 1 from Access Control Panel 2 while passing the Wiegand signals to both access control panels.



One Reader to One Panel Wiring Diagram

The wiring diagram below shows how to connect one reader to one access control panel, using the WSOI-100 to electrically isolate the reader from the access control panel.



Troubleshooting

If Wiegand signals are unable to be passed though, check the following:

The troubleshooting steps below assume 5VDC Wiegand devices

Common ground connections:

- Wiegand input devices must share a common ground connection with the J1 header.
- Wiegand output devices must share a common ground connection with the J2 header, unless they are powered with the same power supply.

Wiegand input data voltage levels:

- Measure DC voltage between Data 0 IN and Ground, and again between Data 1 IN and Ground on the J1 header. Normally the voltage levels should be at 5VDC or equivalent high voltage if using Wiegand devices that operate at higher voltages.
- If the voltage levels are below 4.4VDC, then disconnect the Wiegand device(s) from the J1 header and measure the devices while they are not connected to anything. The J1 header Wiegand inputs are open collector and will be at 0VDC while no devices are connected.
- If the voltage levels of the Wiegand device(s) are below 4.4VDC while not connected to other devices, the problem lies with that device and not the OPTW-100. This may be able to be recovered using external pull-up resistors. Connect a 1K to 2K through-hole resistor to the low data line and a 5VDC output. This will pull the voltage up to 5VDC. If the voltage level for a Wiegand data line is below 1VDC, then the line is clamped to ground and cannot be recovered.

Wiegand output data voltage levels:

- Measure DC voltage between Data 0 OUT and Ground, and again between Data 1 OUT and Ground on the J1 header. Normally the voltage levels should be at 5VDC or equivalent high voltage if using Wiegand devices that operate at higher voltages.
- If the voltage levels are below 4.4VDC, then disconnect the Wiegand device(s) and measure the voltage of the Wiegand lines on each device separately (including the OPTW-100 J2 header).
- If the voltage is between 4.4VDC and 1VDC then reconnect the Wiegand device(s) to the J2 header and jumper the PR +5V pin. This will pull the voltage back up to 5VDC and allow Wiegand data to be passed.
- If the voltage is below 1VDC on any of the Wiegand devices, then that line is clamped to ground and cannot be recovered.

When to Use the Output Pull-up Resistors

The PR +5V pins can be jumpered to the Data 0 OUT and Data 1 OUT Wiegand output pins to pull up the voltage to 5VDC. The PR +5V pins are used when the Wiegand data voltage on the output side is below 5VDC or when the other Wiegand devices connected to the Wiegand output do not have their own pull-up resistors.

When using Wiegand devices on the output side that operate the Wiegand data lines at a voltage other than 5V, the PR +5V pins should not be used. If the PR +5V pins are jumpered to the Wiegand outputs operating at more than 5VDC, they will act as pulldown resistors and pull the voltage down to 5VDC. This will cause the Wiegand data lines to not pass data.

Hybrid Wiegand/OSDP Interfaces

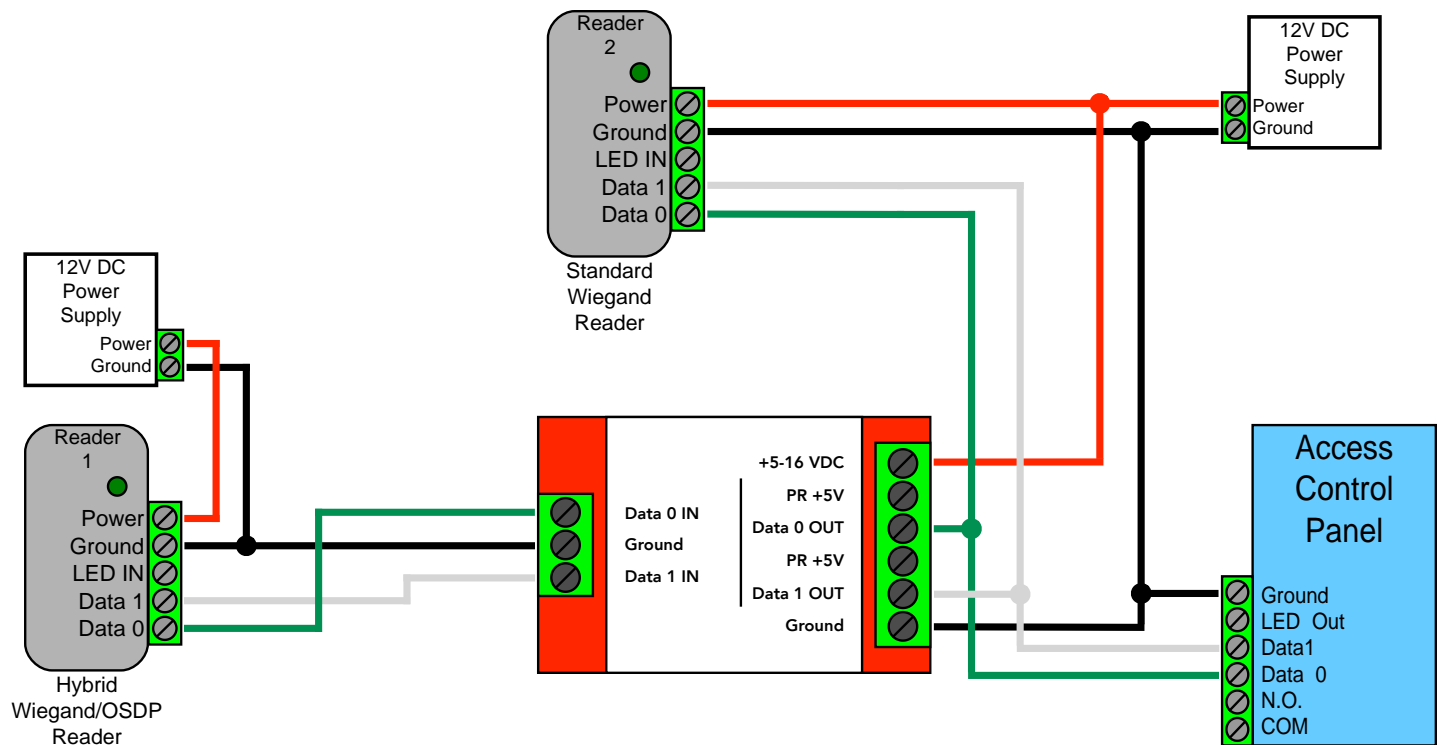
Some new RFID readers have a hybrid data interface, supporting both Wiegand and OSDP data connections. This hybrid data interface uses the same two wires for both OSDP and Wiegand communication. Some of the hybrid data interfaces, when operating in Wiegand mode, do not have a standard Wiegand data interface. This creates issues when paralleling multiple Wiegand readers together, such as high/low readers at vehicle gates or in/out readers at building entrances.

Hybrid Wiegand Is Not Standard Wiegand

These hybrid Wiegand/OSDP interfaces do not generate Wiegand signals following the established Wiegand signaling protocol. In these hybrid readers the Data 0 and Data 1 lines are driven to 5V through a transistor and a 10 Ohm resistor, or similar circuit. While the high side is driven, standard Wiegand readers cannot properly output their data. Additional hardware is required to parallel hybrid data interface readers with a standard Wiegand interface.

Connecting 1 Hybrid Wiegand Reader and 1 Standard Wiegand Reader to a Panel

A standard Wiegand reader and a Wiegand reader with a hybrid data interface cannot connect the Wiegand data lines in parallel to one Wiegand port on the access controller. The reader with the hybrid Wiegand data interface must be standardized. In this scenario, the WSOI-100 serves as a Wiegand standardizer. The WSOI-100 Wiegand input is compatible with the non-standard Wiegand interface. First, attach the Wiegand reader with the hybrid data interface to the input side of the WSOI-100. Then, attach the standard Wiegand reader to the output side of the WSOI-100, in parallel with the access controller. This is demonstrated in the diagram below.



Hybrid Wiegand/OSDP Interfaces (Cont.)

Connecting 2 Hybrid Wiegand Readers to a Panel

This specific implementation requires both hybrid Wiegand/OSDP interfaces to be converted into standard Wiegand. Otherwise, the hybrid Wiegand/OSDP readers will interfere with each other's Wiegand output and credential data will not be transmitted to the access control panel.

A simple workaround is to install 1KΩ resistors installing 1KΩ resistors in-line between the Wiegand output and the output side of the WSOI-100. This will allow both Wiegand readers to send data to the access control panel.

- 1) Attach Reader 1's hybrid Wiegand/OSDP interface lines to the input side of the WSOI-100.
- 2) Attach 1KΩ pull-up resistor to both of Reader 2's hybrid Wiegand/OSDP interface lines.
- 3) Connect the standard Wiegand lines to the panel via the output side.

This is demonstrated in the diagram below.

If the readers are unable to communicate with the panel using the 1KΩ resistors, then the WSOI-200 is needed to standardize the hybrid Wiegand data interface.

