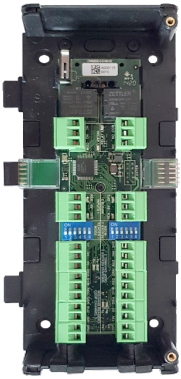
impro technologies®

MODEL NUMBER:
HMX900-0-0-GB-XX HMX901-0-0-GB-XX

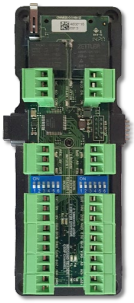
Reader Module

(OSDP/Wiegand/Impro Multi-discipline)

INSTALLATION MANUAL



HMX900



HMX901

SPECIFICATIONS

The Reader Module is a Cluster Expansion Module that works in conjunction with an Impro (CCM) Cluster Controller Module; offering a Wiegand and OSDP Reader Interface solution that is adaptable and scalable, while also accommodating legacy hardware. This module can accommodate up to 2 doors, with entrance readers, or 1 door with entrance and exit readers, supporting anti-passback.

Working Environment

Closed Plastic Module ..... (HMX900)	Designed to work in an indoor (dry) environment similar to IP20. The Module housing is not sealed against water.
Plastic mounting tray for IPS ..... (HMX901)	Designed to work in an indoor (dry) environment similar to IP20. The open module is not sealed against water.

Power

Input Voltage	12 V DC to 15 V DC, polarity protected.	
Power Requirements	**Current (mA)**	**Power (W)**
12 V DC with no Readers connected and relays off	20	0.24
12 V DC with both relays activated and maximum reader load	600	7.2

Communication with the Cluster Controller Module

Electrical Interface	Proprietary Cluster-Bus
Baud Rate	115 200
Encryption	AES Encryption

Reader Options

Wiegand terminals Reader 1 and Reader 2 allow connection to the following hardware:

OSDP Readers, Wiegand readers, Impro (MDR) Multi-discipline Reader, Impro Quad Receiver, TTL Barcode Reader and Magstripe Reader The reader type is selectable via the DIP-switches (See page 8).

Power Output	12 V DC at maximum 200 mA.
Modes Supported	Tag + PIN-code or Reason Code.
Electrical Interface	TTL Full Duplex.
Communications Protocol	Impro Proprietary Protocol.

Relays

Relay Output	2 Relays, Form C, each with NO, COM and NC contacts.
Relay Contact Ratings	10 A at 28 V DC, 5 A at 220 V AC, 10 A at 120 V AC.
Operations	100 000 Minimum.

Digital Inputs

General

Type ..... 4 Dry-contact inputs with End-of-line (EOL) Sensing.

Detection Resistance Range ..... < 2 kΩ.

Protection Range..... +15 V continuous.

Applies to REX and DPS Inputs.

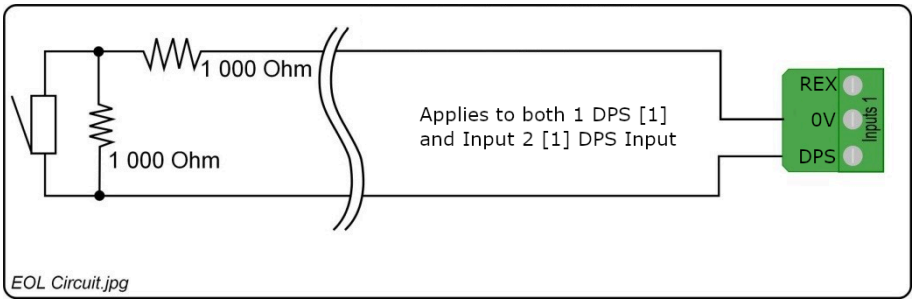


Figure 1: End-of-line (EOL) Sensing Circuit

NOTE: *End-of-line (EOL) Sensing enables the Reader Module to raise an alarm when somebody tampers with the circuit (cutting or shorting the wires) connected to any of the REX or DPS inputs – as long as the End Of Line resistors have been fitted, AND the Access Portal System is configured for End Of Line Sensing.*

When the circuit is tampered with, the resistors are bypassed; the Module detects the resistance change and raises an alarm.

LED Status and Diagnostic Indicators

Status LED (RED)

Supply Voltage Status..... Off when supply voltage is too high, or too low

Upgrade Mode ..... Flashing at a steady rate during upgrade

Communications Failure ..... Two brief flashes, repeating

Data LED (GREEN) Flashing Green during communication

Digital Inputs (1-4) ..... Continuous Green on detected contact closure

Relays (1 and 2) ..... Continuous Red on activation of the Relay

GENERAL INFORMATION

Help

Users are to call the installers of the equipment to solve any issues.

Installers may call Impro Technologies at +27 (31) 717 0750 for 24hr technical support

Servicing/Maintenance

Only certified installers/technicians may install/maintain/service this module

Tool requirement

No special tools are required to install/service this module.

Safety

The installer must use safety equipment in accordance with any/all applicable standards in the country/site where the installation is being conducted.

INSTALLATION INFORMATION

Accessories

CAUTION: DO NOT use the Metal-oxide Varistors (25 Vrms, 500 A, 77 V max clamping) with mains power applications.

Plastic Cluster Module (HMW700)

Each Impro Reader Module is supplied in a Customisable Black, ABS Plastic housing, with the following features / items:

- Housing, consisting of a Base, a Cover and a selection of Cable Entry Gland Plates.
- The Housing Base has:
  - Two slots to hold the User-Selectable Cable Entry Plates
  - Six knock-out Cable Entry Points
  - Four Drill-out Cable Entry Points
- The Housing Cover and Base are held together with two Allen Head Screws (M4 x 10 mm) through the cover of the housing.
- Five Ziploc bags, containing the following:
  - Four Stand-Offs (for spacing the Reader Module away from the mounting surface) and two Cluster Connector Covers (for closing off the cluster connectors when not in use.)
  - Two Metal-Oxide Varistors 25 Vrms, 500 A, 77 V max clamping.
  - A 2mm Allen Key and a spare Hex Head Screw
  - Two extra gland plates
  - An extra Fixed Address Label, for installation site mapping

NOTE: The installer needs to select and obtain fasteners (< 5 mm Diameter to fit through the supplied Stand-Offs) that are suitable for securing the Module to the mounting surface – these are NOT supplied in the kit.

Open Module for mounting within an IPS Housing (HMX901)

Included in the packaging is:

- Impro Wiegand Reader PCB Card on a Base Plate.
- An extra Fixed Address Label, for installation site mapping
- 4 mm machine screws (x 4) for securing the module in the IPS housing.

12V and 12V* terminals

Only power the reader from the 12V terminal. The 12V*(asterisk) terminal is reserved for future use.

Clustering

Clustering allows for the easy addition or replacement of Modules, it saves on wiring and requires only one DC Power Supply connection for the Cluster.

The following applies:

- The Reader Module may be plugged directly into its associated Cluster Controller, or into an existing Cluster consisting of a Cluster Controller and other Expansion Modules.
- No more than 8 Expansion Modules can be clustered with their associated Cluster Controller.
- No more than 16 fixed addresses per cluster can be accommodated. *See page 17 to determine how many addresses your settings will use.*
- The Reader Module is powered and controlled via its Cluster Connector.
- External loads that are switched by the relays must run off a separate power source, see page 12.

OSDP Reader cable length

While the cable suggested for Wiegand readers (up to 150m long) can work for OSDP reader, it is recommended that OSDP cables any longer than 150m should comply fully to the RS-485 EIA/TIA standard.

If the reader cable length exceeds 150m, a local 12V DC power supply will be needed to power the OSDP reader. The volt drop across long cables would otherwise result in insufficient supply voltage at the reader

Wiegand Reader cable length

Install the **Wiegand Readers**, or **Multi-Discipline Readers** no further than 150 m (164 yd) from the terminal The cable individual conductor cross-sectional area should not be less than 0.2 mm^2 (0.0003 in^2).

Distance between Reader Units

To avoid mutual interference, install the Readers at least 500 mm (20 in) apart. (The same rule applies between readers on opposite sides of the same wall.)

Mounting the Impro Reader Module (Model HMX900)

CAUTION: Make certain that you mount the Reader Module on a vibration-free surface.

NOTES: The Reader Module can be mounted onto virtually any surface including metal.

Cluster Modules are Hot-Swappable – it is not necessary to power them down when adding, removing or wiring them up.

The HMX901 model is for installation in a steel IPS (Integrated Power Supply) cabinet, which can accommodate a maximum of 4 HMX901 modules.

Power and address limitations when clustering Reader Modules

1. The Cluster Controller module can power up to 8 clustered expansion modules.
2. A maximum of 16 clustered fixed addresses may be handled by the Cluster Controller. With less readers per module, more modules may be used, if some doors have only one reader. *See page 17 to determine the number of addresses you will be using.*

Installation

- Remove the Housing Cover from the Reader Module and plug the Reader Module into the Cluster Socket on the right hand side of the Cluster Controller – or that of the outermost Expansion Module in the cluster.
- Holding the Reader Module square against its neighbouring Module, mark the mounting hole locations through the mounting holes in the back of the Housing Base.
- Remove the Reader Module, drill the mounting holes.
- Use the plastic Stand-Offs to provide space for cables behind the cluster, or if the other modules in the Cluster are already mounted with stand-offs.
- Mount the Reader Module Housing Base firmly to the mounting surface using fasteners (not included) appropriate for the mounting surface material.
- Select the gland plates that best suit the installation and/or knock out the cable entry points as needed.
- Connect the reader cables, the digital inputs and the relay terminals as necessary for the installation
- Commission the Reader Module (and its readers) via the menu options on the Access Control Application.
- Replace the Reader Module Housing Cover and fasten closed with the two Allen head screws provided.

DIP-switch Settings

NOTE: Whenever the DIP-switch settings are modified reset the Impro Reader Module-OSDP to acknowledge the new settings by disconnecting and reconnecting the power supply to the Reader Module.

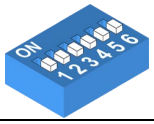
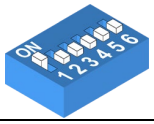
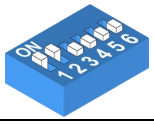
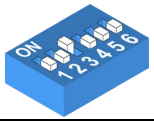
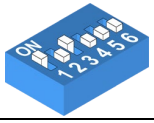
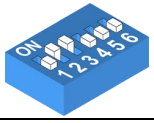
Reader 1 Select and Reader 2 Select DIP-switch Settings

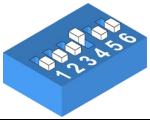
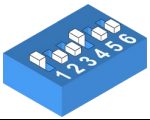
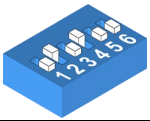
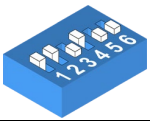
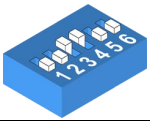
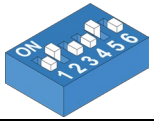
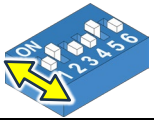
Each of the Reader Ports has a 6-way DIP-switch to select the function of that Port.

NOTES: OSDP Readers must be paired to their ports (See selection 18 and 19 in the table that follows.)

Where you have no Impro Multi-discipline Reader connected, setting both remote DIP-switches to the all off position during an Auto-ID will not return any Fixed Addresses.

When Wiegand and Multi Discipline Readers are used on the same SYSTEM, all DIP Switches should take on the Wiegand settings.

DIP-switch Position	Functionality
0 	Advanced Wiegand Reader (Impro Multi-discipline Readers). Full Tag codes and types – all switches OFF. *(One address/channel activated when connecting an MDR)*
1 	Relay and Digital Inputs only. *(This uses one address, per channel with this setting)*
2	Not Used
3 	Legacy support for Impro RF 4-Channel Receiver and other such hardware – contact Tech Support for further info.
4 	Magstripe. *(This uses one address, per channel with this setting)*
5 	Barcode (code 3 of 9) with Checksum. *(This uses one address, per channel with this setting)*
6 	Barcode (code 3 of 9) without Checksum. *(This uses one address, per channel with this setting)*

DIP-switch Position	Functionality
7 	Wiegand 26, 32, 34, 35, 37, 40, 42, 44, 48-bit, Tag + PIN-code or Reason Code Mode. (Sagem MA100, MA200, MA300 or Sagem J-Series). *(This uses one address, per channel with this setting)*
8 	Wiegand open format. *(This uses one address, per channel with this setting)*
9 	UHF Receiver Support If the UHF Receiver is connected, then Button 1 of the Quad Transmitter reports. *(This uses one address, per channel with this setting)*
10 	UHF Receiver Support If the UHF Receiver is connected, then Button 2 of the Quad Transmitter reports. *(This uses one address, per channel with this setting)*
11 	UHF Receiver Support If the UHF Receiver is connected, then Button 3 of the Quad Transmitter reports. *(This uses one address, per channel with this setting)*
12 	UHF Receiver Support If the UHF Receiver is connected, then Button 4 of the Quad Transmitter reports. *(This uses one address, per channel with this setting)*
13 - 17	Not Used
18 	OSDP One Reader connected to the OSDP terminal
19 	Initiate OSDP pairing by toggling switch #1 (ON then OFF). Follow the instructions for the OSDP reader.
20 - 63	Not Used

Wiegand Modes

Mode	Terminal Action
Tag Only	Treats all codes received as tag codes.
Tag + PIN	Treats the first Wiegand code received as the tag code, and the second Wiegand code received as the PIN-code.
Tag + Reason	Treats the first Wiegand code received as the tag code, and the second Wiegand code received as the Reason Code.
Tag + PIN + Reason	Treats the first Wiegand code received as the tag code. The second and third Wiegand codes received are treated as the PIN-code and Reason Code respectively.

Table 1: Wiegand Modes

Wiegand Mode Rules

- Enter PIN-codes or Reason Codes on the Reader within 10 seconds otherwise the tag code is discarded.
- The System allows 10 seconds each for the entry of the PIN-code and the Reason Code in Tag + PIN + Reason Mode.
- If the Impro Reader Module expects a PIN-code and receives a number greater than 65535, then the Reader Module assumes the number to be a tag code. The Reader Module discards the previously read Tag for the current one and the Reader Module will still expect a PIN-code.
- If the Impro Reader Module expects a Reason Code and receives a number greater than 65535, then the Reader Module assumes the number to be a tag code. The Reader Module discards the previously read Tag for the current one and the Reader Module will still expect a PIN-code or Reason Code, depending on the mode.
- If the Reader Module expects a Reason code and instead receives a number in the range 100 to 65535, the Reader Module assumes this is an error. The Reader Module discards the entire transaction, entering a new tag code starts the process again.
- If using PIN-codes and Reason Codes set the DIP switches for Wiegand standard modes, not Wiegand open format.

Blank Space

ELECTRICAL CONNECTIONS

Key Component Locations

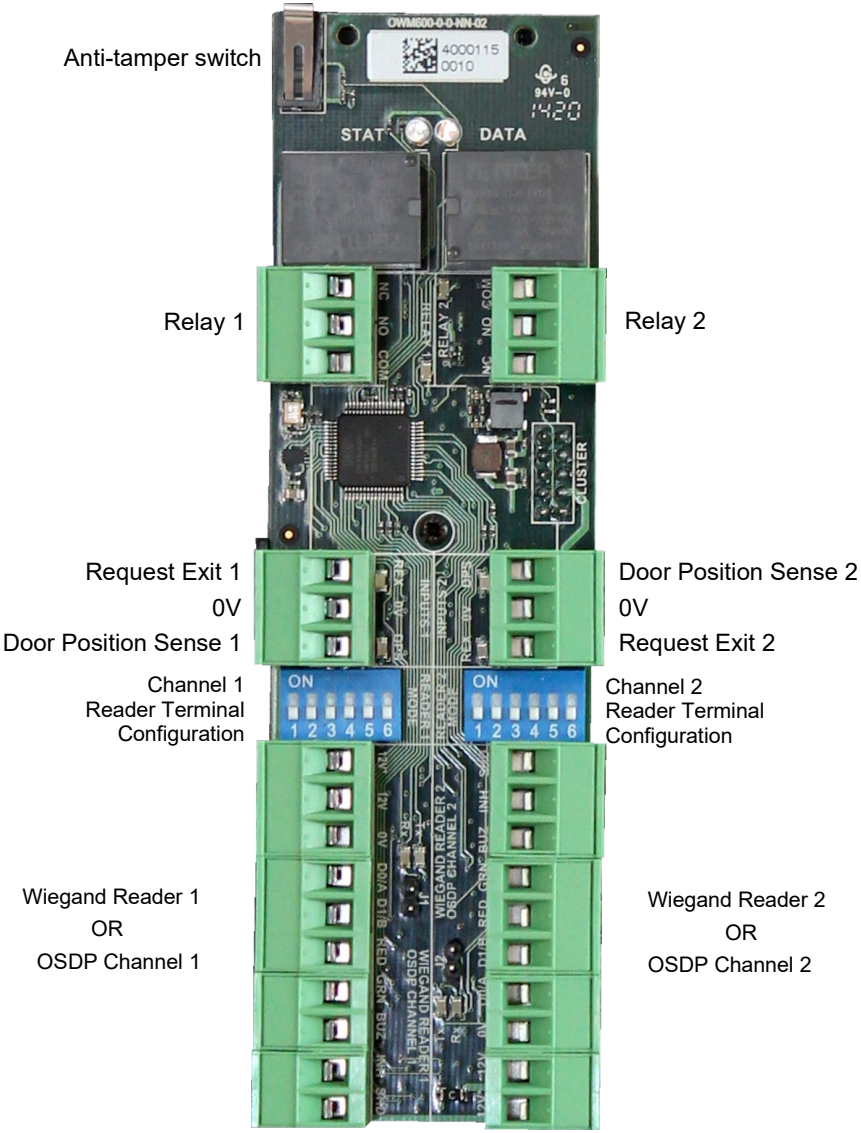


Figure 2: Impro Reader Module PCB - Key Component Positions

Wiring door locks and the digital inputs

While the clustered modules are powered and controlled via the cluster bus, the relays and their loads will need to take power from an external DC Power supply. When adding more hardware to the cluster always consider the power requirements and ensure that the DC Power source is not overloaded.

It is recommended that a separate power supply is used for the external loads - and appropriate care is taken when switching mains loads with the relays.

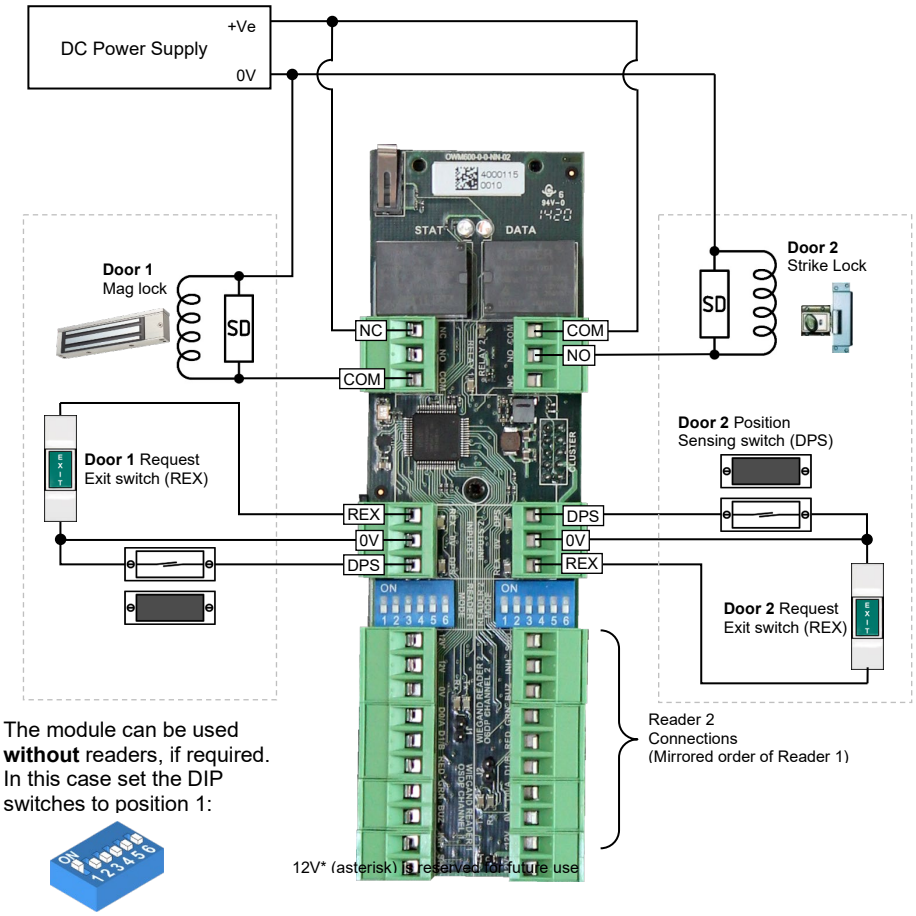


Figure 3: Example of lock and door switchgear wiring with a DC Power Supply

NOTE: SD (Snubber Device) Refer to Figure 4 (page 13) for Arc Suppression details.

Arc Suppression (warranty requirement)

Snubber devices are required for EMF Flyback and arc suppression when driving an inductive load with the Relay, see Figure 4.

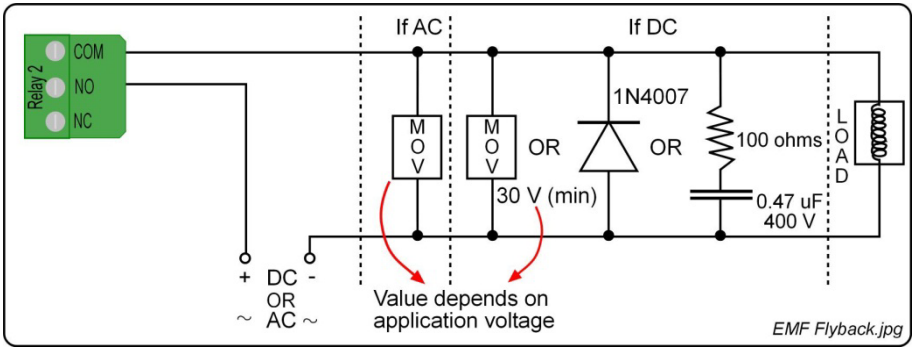


Figure 4: EMF Flyback and Arc Suppression

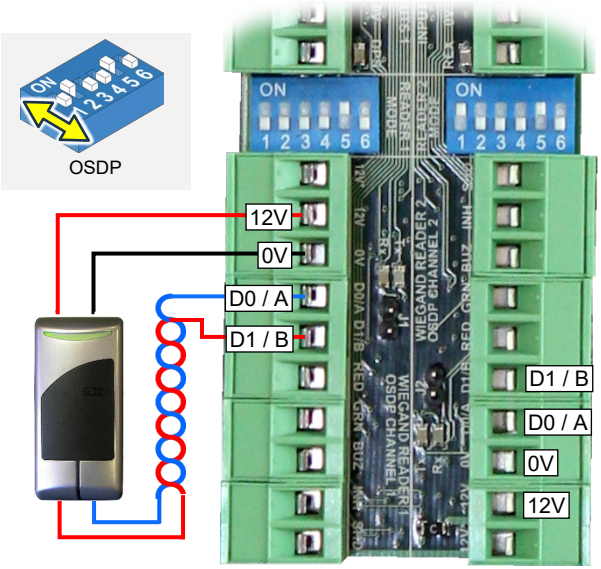
Blank Space

Wiring OSDP Readers

The two sets of reader terminals on the Reader Module are independent and can be set up to accommodate different reader types on each channel.

OSDP readers should be powered from the 12V output terminal provided.

Toggle switch #1 for that reader channel to initiate pairing with the reader



(Impro range of OSDP capable readers)

Figure 5: Connecting an OSDP Reader to a channel.

Wiring Wiegand or Impro Multi-Discipline Readers

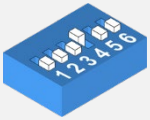
This diagram shows the connections for Wiegand readers and includes the wire colours for the pigtail variants the Impro Wiegand Readers.

Note that only one Wiegand Reader may be connected to each Wiegand Interface.

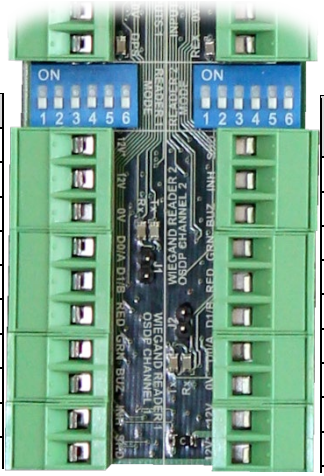
Note the two DIP switch setting options for Wiegand readers.

Wiegand standard and Tag + PIN-code or Reason Code Mode.
(Sagem MA100, MA200, MA300 or Sagem J-Series).

Wiegand open format



Wire Colour	Function
Not Used	
Red	+12V
Black	0V
Green	D0
White	D1
Brown	RED
Orange	GRN
Yellow	BUZ
Blue	INH
(Screen)	SHD



Function	Wire Colour
SHD	(Screen)
INH	Blue
BUZ	Yellow
GRN	Orange
RED	Brown
D1	White
D0	Green
0V	Black
+12V	Red

Impro
Multi-Discipline Readers
(All switches OFF)

(Impro range of Wiegand readers)

(Impro range of Multi-Discipline readers)

Figure 6: Connecting Wiegand or Impro Multi-Discipline Readers

Connecting to a UHF Receiver

The Impro Quad Receiver allows the system to respond to a four-button UHF remote.

One OSDP WRM can handle the monitoring of two buttons (selected by the DIP Switch setting).

Monitoring of all four buttons will require two Reader Module units, as shown in the diagram below:

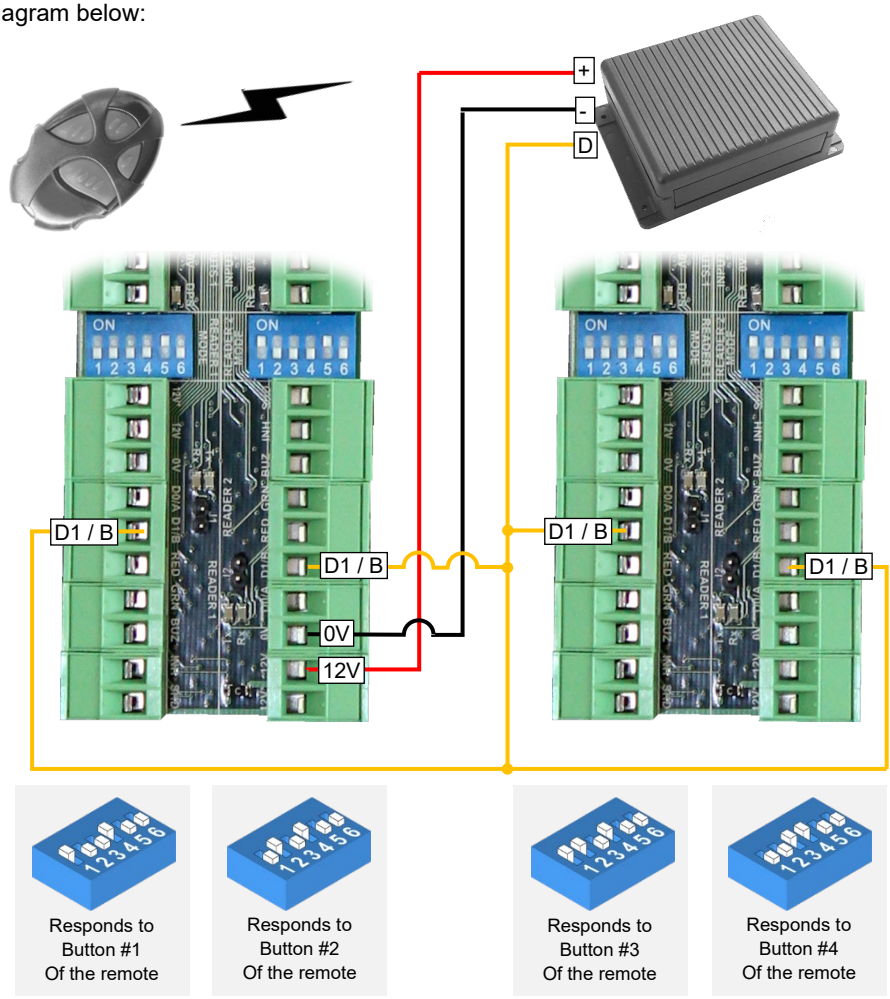


Figure 7: Connecting to a 4-channel UHF Receiver

NOTE: For more information on the Impro Quad Receiver, consult the Quad Receiver Installation Manual, HRR300-0-1-GB-XX.

Reader Module Address usage

Each Impro Reader Module is allocated four unique fixed addresses beginning at an address represented by “n” in the following table.

Channel	Fixed Address	OSDP Reader	MDR / Wiegand
1	n	1	1
	n + 1	Reserved	N/A
2	n + 2	2	2
	n + 3	Reserved	N/A

*NOTE: The module will only present the addresses to the system that are **active**:*

Connecting a Muliti-Discipline Reader (when channel switches are on DIP 0) activates only that address.

Selecting DIP 1 activates one address for communicating REX & DPS for that channel.

Selecting DIP 3 to DIP 12 activates one Wiegand address for that channel.

*Selecting DIP 16 activates **ONE** OSDP address on that channel.*

Selecting DIP 17 is reserved.

Fixed Address Label

Once the Impro Reader Module is installed, sketch a rough site plan. Attach the loose (additional Fixed Address Label packaged with the Reader Module) Fixed Address Label in the position of the Terminal on the sketched site plan. When the system installation is complete and all the units are represented on the site plan by their Fixed Address Labels, file the site plan for future reference.

Notes

Notes

GUARANTEE OR WARRANTY

CAUTION: We reserve the right to nullify the product's guarantee or warranty where you have not properly installed the Metal-oxide Varistors.

This product conforms to our Guarantee or Warranty details placed on our Web Site, to read further please go to www.impro.net.

Waste electrical products should not be disposed of with household/office waste. Please recycle where facilities exist. Check with your Local Authority or retailer for recycling advice.

This manual is applicable to the Impro Reader Module, HMW700-0-0-GB-XX, and HMW701-0-0-GB-XX (The last two digits of the Impro stock code indicate the issue status of the product.)			
PLT-05220, Rev. A1	Issue 02	June 2025	CUSTOMER MANUALS - IMPRO\GEN3 Access Portal Era\Cluster Modules\OSDP-Wiegand Reader Module\English Manual\Latest Issue