impro technologies®

COMPONENT CODES:

HMI700-1-0-NN-XX HMI701-1-0-NN-XX

Digital I/O Module

Impro (DIO) Digital I/O Module

INSTALLATION MANUAL

Specifications

The DIO is a Cluster Expansion Module that works in conjunction with an Impro (CCM) Cluster Controller Module; offering eight Digital Inputs and 4 output relays.

Working Environment

Plastic Housing.....	Designed to work in an indoor (dry) environment similar to IP20, the Module is not sealed against water.
PCB Card for IPS enclosure	Designed to work in an indoor (dry) environment similar to IP20, the Card is not sealed against water.

Power

Input Voltage.....	12 V DC to 15 V DC, polarity protected.	
Power Requirements	**Current (mA)**	**Power (W)**
Input Voltage 12 V DC, Relays off.....	50	0.6
Input Voltage 12 V DC with all 4 relays activated	230	2.7
Relay Power Requirements	~0.4 W per Relay in use.	

Communication with the Cluster Controller Module

Direct Communications — When the DIO is clustered (plugged side-by-side) directly into the Cluster Controller Module, or into an existing Cluster, or installed in an IPS enclosure.

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

S-Bus Device Port

Electrical Interface	Propriety S-Bus
Baud Rate	9600
Encryption	AES Encryption

Digital Inputs

Type	8 Dry-contact inputs with End-of-line (EOL) Sensing.
Detection Resistance Range	< 2 kΩ.
Protection Range	+15 V continuous.

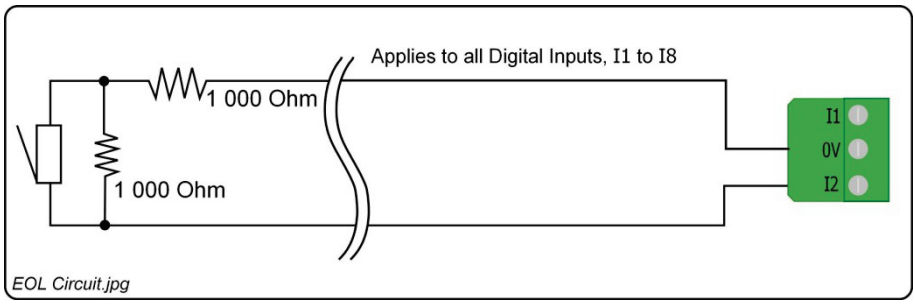

Figure 1: End-of-Line (EOL) Sensing Circuit

Relays

Relay Output	4 Independent, single-pole, double-throw (SPDT) Relays, each with NO, COM and NC contacts.
Relay Contact Ratings.....	10 A at 28 V DC, 5 A at 220 V AC, 12 A at 120 V AC.
Operations.....	100 000 Minimum.

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 (1-8)	Continuous Green on detected contact closure
Relays (1-4)	Continuous Red on activation of the Relay

INSTALLATION INFORMATION

Accessories

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

Find the following when unpacking the DIO:

Plastic Cluster Module Housing (HMI700)

An Impro (DIO) Digital I/O Module is supplied in a Customisable Black, ABS Plastic housing with the following features/components:

- 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 DIO away from the mounting surface) and two Cluster Connector Covers (for closing off the cluster connectors when not in use.)
  - Four 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 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.

PCB Card for IPS Housing (HMI701)

Included in the packaging is:

- Impro Digital I/O PCB Card on a Base Plate.
- An extra Fixed Address Label, for installation site mapping
- Four Metal-Oxide Varistors 25 Vrms, 500 A max clamping

Remember the following when installing the Digital I/O Module:

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 DIO may be plugged directly into its associated Cluster Controller Module, or into an existing Cluster consisting of a Cluster Controller Module and other Expansion Modules.
- No more than eight Expansion Modules can be clustered with their associated Cluster Controller Module.
- The DIO is powered and controlled via its Cluster Connector.

EARTH Connection

Connect the Impro DIO ("ETH" Terminal) to a good EARTH point. Mains EARTH can be used, but electrical noise may exist.

Arc Suppression

Snubber devices are recommended for EMF Flyback and Arc Suppression when driving an inductive load with the Relay, see Figure 2.

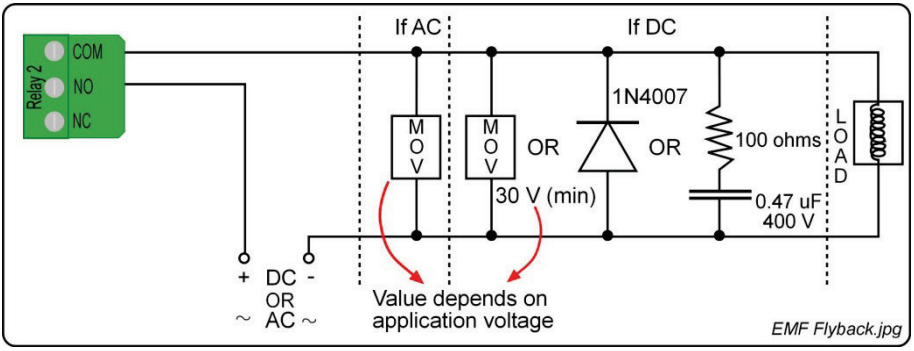

Figure 2: EMF Flyback and Arc Suppression

Blank Space

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

NOTE: The DIO can be mounted onto virtually any surface including metal.

Clustering

Provided there are less than eight other Expansion Modules already clustered with the Cluster Controller Module, you may add the DIO to an existing Cluster:

- Remove the Housing Cover from the DIO and plug the DIO 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 DIO square against its neighbouring Module, mark the mounting hole locations through the mounting holes in the back of the Housing Base.
- Remove the DIO, 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 DIO 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 digital inputs and the relay terminals as necessary for the installation
- Commission the DIO via the menu options on the Access Control Application.
- Replace the DIO Housing Cover and fasten closed with the two Allen head screws provided.

Blank Space

Remote Mounting

When it is advantageous to mount a DIO some distance from the Cluster Controller Module, the DIO may be connected to the Cluster Controller Module using an S-Bus cable up to a maximum of 150 m (490 ft.) long. The procedure is as follows:

- Check to see how many other Device Addresses are already connected to the S-Bus Host “D” Terminal of the Cluster Controller Module. No more than eight Device Addresses should be connected to an S-Bus.
- Obtain a suitable Isolated DC Power supply to power the DIO and any magnetic locks, etc., that may be connected to the DIO.
- Remove the Housing Cover from the DIO and try the DIO against the proposed mounting surface, considering accessibility, routing of cables, the visibility of the LEDs and the possibility of adding further hardware in any future expansion of the system.
- Secure the DIO Housing Base to the mounting surface, using suitable screws and wall plugs, nuts and bolts or rivets. Use the Stand-Offs if rear clearance will assist for cable entry or coping with an uneven mounting surface.
- Select the gland plates and Quick Click Glands that best suit the installation and/or knock out the cable entry points as needed.
- Connect the digital inputs and relay terminals as necessary for the installation.
- Power up the DIO and its peripherals
- Replace the DIO Housing Cover and fasten closed with the two Allen head screws provided.

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ELECTRICAL CONNECTIONS

Key Component Positions

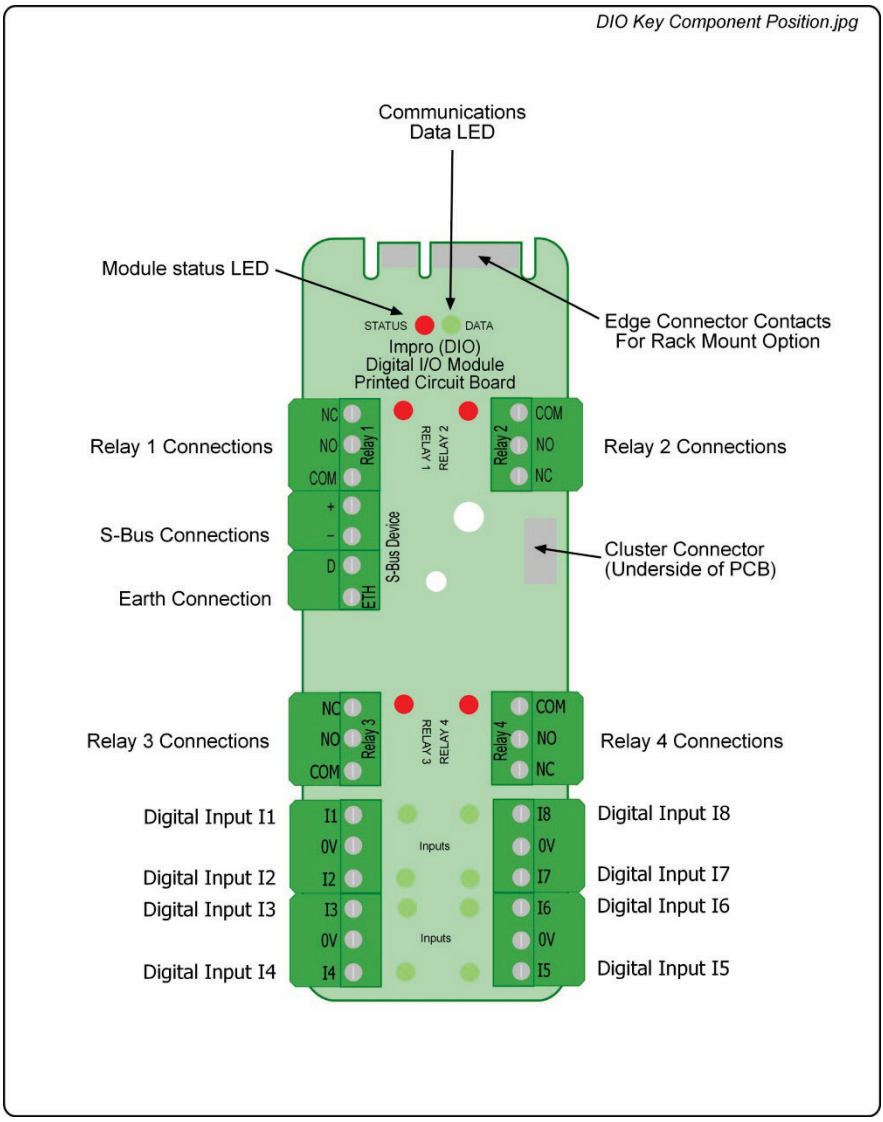

Figure 3: Key Component Positions

Connecting to a clustered Digital I/O Module

Figure 4 shows a detailed electrical connection diagram for the (Clustered) DIO.

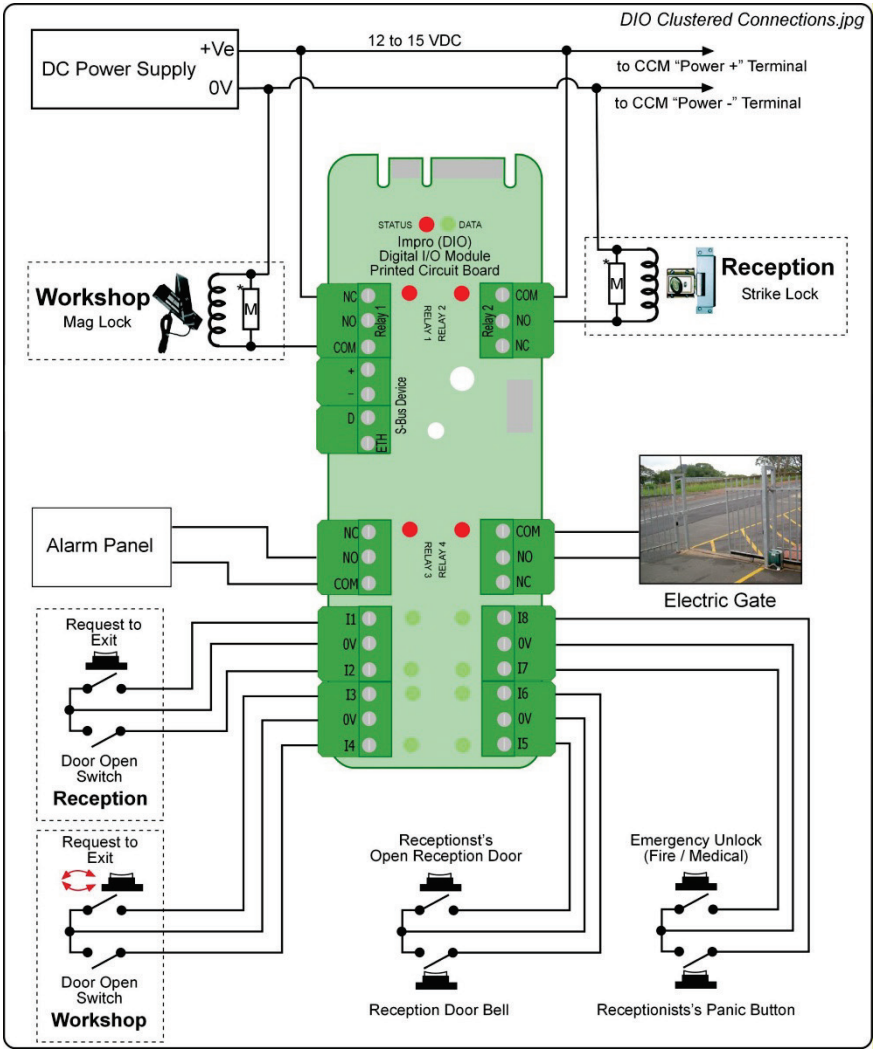

Figure 4: Typical (Clustered) DIO Electrical Connections

*NOTE: * Refer to Figure 2 for Arc Suppression details.*

(See further Notes on the next page)

NOTE: **Figure 4** *shows typical connections to the DIO when clustered with its Cluster Controller Module (Models XYZ930 and XYZ931)*

The 8 digital inputs and the logic driving the 4 relays are configurable from within the Access Portal Software.

Note: ***Figure 4*** *doesn't show the end-of-line resistors on the Digital Input Circuits - See Figure 1 (on page 2) for the correct placement of the 1kΩ EOL Resistors.*

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Connecting to a remotely mounted Digital I/O Module

Figure 5 shows a detailed electrical connection diagram for the remotely installed DIO, which needs an isolated DC power source and an S-Bus connection with its Cluster Controller Module. (End-of-line resistors are not shown, see page 2 for EOL details.)

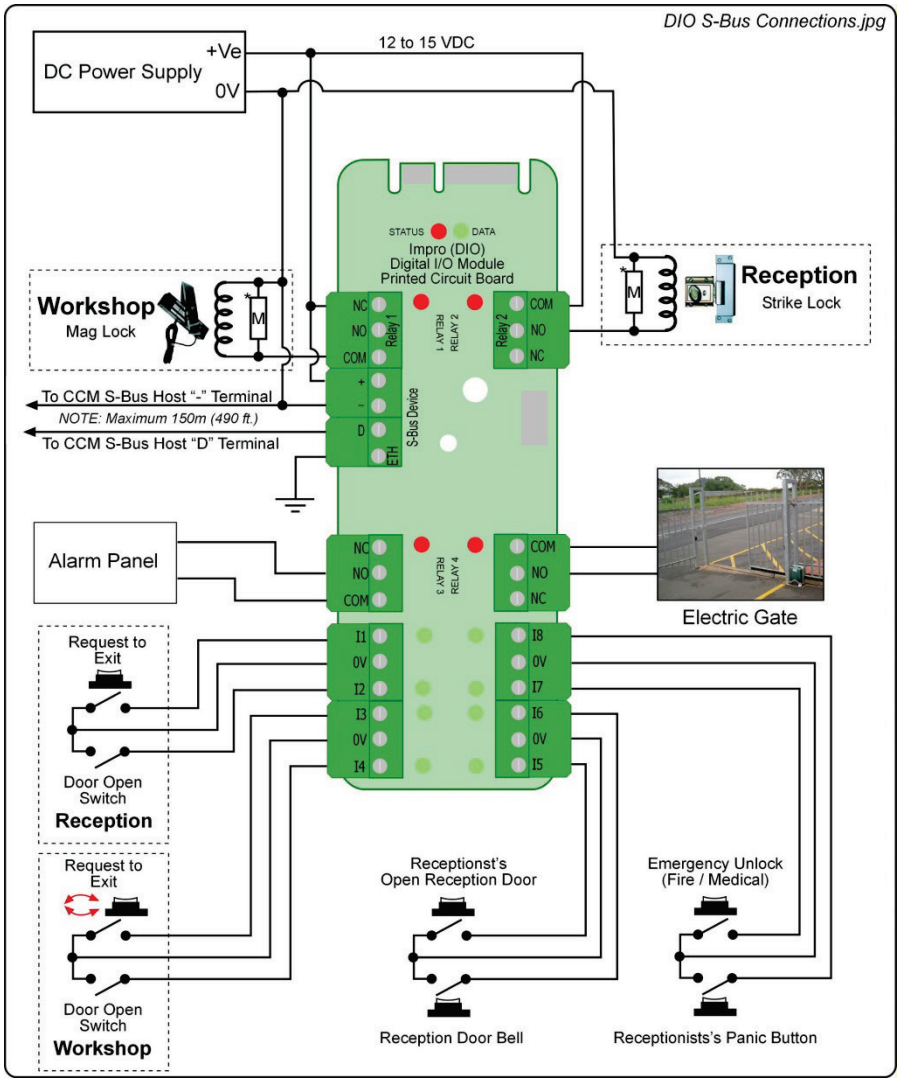

Figure 5: Typical Remotely Mounted DIO Electrical Connections

Fixed Address Label

Once the installation is complete, do the following:

- Sketch a rough site plan.
- Attach the loose additional Fixed Address Label, packaged with the DIO, in the position of the DIO on the sketched site plan.
- When the system installation is complete and all the modules are represented on the site plan by their Fixed Address Labels, file the site plan for future reference.

USER NOTES

GUARANTEE OR WARRANTY

CAUTION: We reserve the right to nullify the products 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.

This manual is applicable to the Impro (DIO) Digital I/O Module, Product Order Codes: HMI900-0-0-GB-XX, HMI901-0-0-GB-XX (The last two digits of the Impro stock code indicate the issue status of the product).			
HMI300-0-0-GB-00	Issue 01	March 2014	Impro\Access Portal\ Digital IO Module\English Manuals\LATEST ISSUE\ condio-insm-en-01.docx