



Controller Module

DIGITAL I/O

The **Impro (DIO) Digital I/O Module** adds digital input and output channels to a cluster.

Each DIO Module brings eight dry-contact digital inputs, and four relay outputs to an existing cluster.

The eight digital inputs feature EOL (End-of-Line) sensing that may be configured to raise an alarm if input cables are broken or tampered with.

The NO, NC and Common terminals of all four relays are conveniently accessible via screw terminals. The relays are suitable for 12 V DC or AC mains applications.

The DIO Module is available as a cluster module in a black ABS plastic housing, or an IPS module version for installation into an IPS (Integrated Power Supply) housing.

By clustering up to seven DIO Modules with their Cluster Controller Module (CCM), as many as 56 inputs and 28 outputs are available (per cluster), bringing great flexibility and expandability to the system designer/installer.

Applications include:

- **Four-door controller**, where each relay can operate a door strike or mag lock, the inputs could be used for Door Open Sensing (DOS), and Request To Exit (RTE)*.
- **Indication**: including (but not limited to) sirens and/or lamps for shift start/end, turnstile indicators and emergency / lock-down indication.
- **Elevator control**: The Inputs and Outputs are suitable for the control of elevators (lifts).

* If your application requires entry/exit readers, or PIN entry keypads, consider the Impro (S4) S-Bus Module, which supports up to eight S-Bus Readers / S-Bus Keypad Readers, as well as the above features.

Product specification
CATALOGUE



Key Features

- Cost effective, modular solution that allows for:
 - **scaling** to the size requirement of the application.
 - **expansion** – quick and convenient (plug-in) should needs increase.
 - **zero downtime** – replacing a DIO Module will not require downtime (the transaction buffer resides in the Cluster Controller Module).
- Flexibility in installation, the DIO Module may be:
 - plugged (together with other expansion modules) into the Cluster Controller Module, forming part of a “cluster” of Impro modules.
 - installed up to 150 m away from its Cluster Controller Module (connected via S-Bus).
 - installed (as an IPS module) in an IPS housing.
- An excellent user interface consisting of 14 LED diagnostic indicators.
- Four independent single-pole, double-throw (SPDT) relay outputs which let you interface to door strikes, magnetic locks and other third-party devices (for example electric gates, alarm panels or lighting).
- Eight dry contact digital inputs that (*when used in Access Portal Pro or IXP220 System*) may be configured for other uses, including: Scanner Inhibit, Alarm Interface and Action Request).
- End-of-Line (EOL) sensing on all eight digital inputs.
- A software utility to upgrade firmware while installed on-site, without removal of the DIO Module (provided the DIO Module is clustered with its Cluster Controller Module).

Impro (DIO) Digital I/O Module

HMI900-0-0-GB-XX HMI901-0-0-GB-XX

Physical Specifications

Digital I/O Module in plastic housing

Length	: 186 mm (7.3 in)
Width	: 99 mm (3.9 in)
Height	: 57 mm (2.3 in)
Approximate Weight	: 300 g (10.5 oz.)
Housing Material	: ABS Plastic
Colour	: Black

Environmental specifications

Operating Temperature	: -25°C to +60°C (-13°F to +140°F)
Storage Temperature	: -40°C to +80°C (-40°F to +176°F)
Humidity Range	: 0 to 95% relative humidity at +40°C (+104°F) non-condensing

Approvals

Dust & Splash Resistance	: Designed to work in an indoor (dry) environment similar to IP20. The DIO Module is not sealed against water
Drop Endurance	: 1 m (3.28 ft.) drop (in packaging)

User Interfaces

LED Status and Diagnostic Indicators

Status LED	: Continuous Red for Normal Operation Flashing Red During Firmware Upgrade Off when Supply Voltage outside limits
Data	: Flashing Green as per outgoing data
Relays [1-4]	: Continuous Red on activation of the Relay
Digital Inputs [I1-I8]	: Continuous Green on detected contact closure
Data	: Flashing Green as per outgoing data

Warranty Details

CAUTION: Impro Technologies reserves the right to nullify the product warranty where metal-oxide varistors have not been correctly installed

This product conforms to our Warranty details on www.impro.net.

Electrical Specifications

Power

Input Voltage	: 12 V DC to 15 V DC, (polarity sensitive) when powered separately as necessary for a remote, S-Bus installation	
Power Requirements		
Input Voltage 12 V DC with relays off	: 50	Power (W) 0.6
Input Voltage 12 V DC with all 4 relays activated	: 230	2.7
Power Input Protection	: Reverse polarity, and Transient voltage protection is provided	
Relay Power Requirements	: An additional ~0.4 W per relay in use	

Communications

Direct (Baud Rate 115 200)	: When the DIO Module is plugged (side-by-side) directly into the CPU, or installed as a PCB Card in a 19” Rack Installation.
S-Bus (Device) (Baud Rate: 9600)	: S-Bus allows for the remote installation of the DIO Module, up to 150m away from its CPU.
module Status	: Slave

Digital Inputs

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

Relays

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

Processor

Type	: ARM Cortex M0 operating at 45MHz
Total RAM	: 4 K Byte
Flash	: 48 K Byte

Other

Anti-tamper Switch	: 1 PCB Mounted Switch
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Ordering Information

Order the Digital I/O Module using the following Product Order Codes:

HMI900-0-0-GB-XX	: module in plastic Cluster module Housing
HMI901-0-0-GB-XX	: PCB on a base for installation in an IPS Housing

Related Information

Component Numbers

These are the numbers on the product labels

HMI700-0-0-GB-XX	: module in plastic Cluster module Housing
HMI701-0-0-GB-XX	: PCB on a base for installation in an IPS Housing

For extra information relating to this product refer to the:

- Impro (DIO) Digital I/O Module Hardware Installation Manual (HMI300-0-0-GB-XX).

Flexibility of the Digital I/O Module

The DIO Module could be used for all manner of access control applications that control via relays and digital open/close contact sensing. Below are a few examples that illustrate the flexibility of this module, and the Access Portal Access Control System.

Readerless 4-Door Controller

A single Digital I/O Module (together with its Cluster Controller Module) will control the electric locks on four doors, monitor the door status (open/closed) and allow a person to exit an area by pressing a Request to Exit button. The DIO Module may also be mounted up to 150 m away from its Cluster Controller, connected via S-Bus cable.

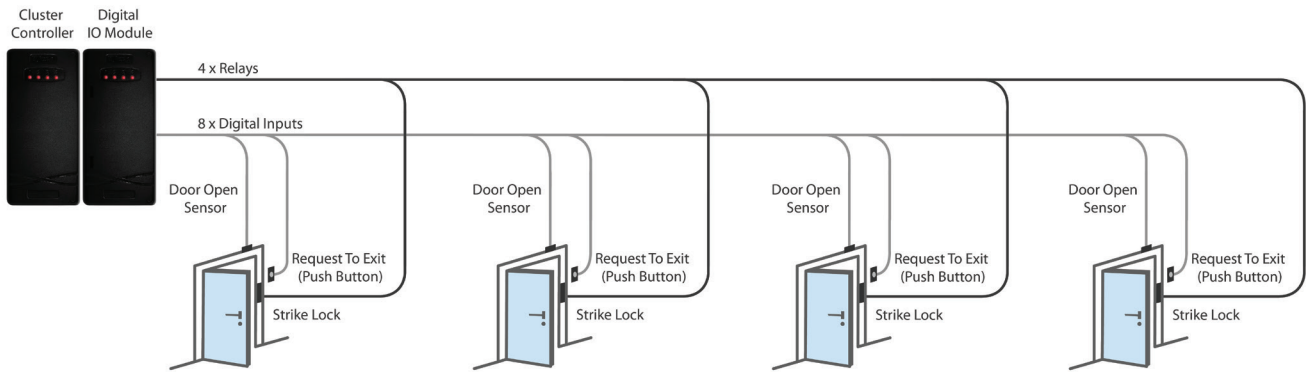


Figure 1 – Digital I/O Module as a 4-Door Controller

Assorted indication and access applications

In this example (Figure 2), a single Digital I/O Module is performing four functions:

1. Indicating the turnstile status (RED when the turnstile is disabled, GREEN when employees can enter/exit)
2. Releasing the turnstile lock when signalled to do so by the Access Portal Control System
3. Allowing access to lockers only during valid shift times
4. Monitoring the open/closed status of the lockers

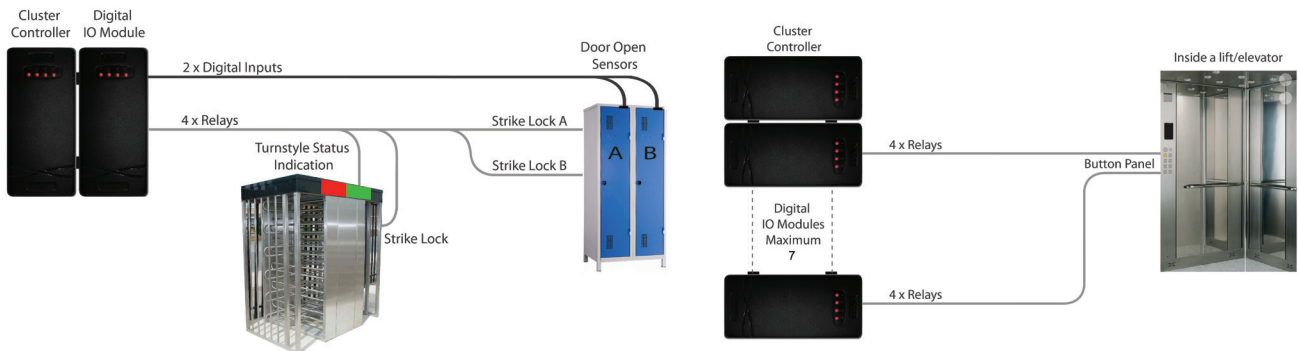


Figure 2 – Assorted Access Control, Monitoring and indication

Figure 3 – Lift Control – keep adding modules / clusters to suit the application

Elevator (Lift) Control Applications

In Figure 3, lift access control and/or remote/automatic lift button-press operation are achieved through two relay wiring methods:

- wiring a relay in series with a lift button will only allow use of that button when the relay contacts are closed.
- wiring a relay in parallel to a lift button will allow for remote control of the lift (Calling the lift to the lobby when a Company Director presents his tag to enter the building, for example).

This Product Specification Catalogue applies to the Impro (DIO Module) Digital I/O Module, HMI900-1-0-GB-XX, HMI901-1-0-GB-XX.
(The last two digits of the Impro stock code point to the issue status of the document or product).

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