OPERATIONS MANUAL

USING DIGITAL I/O MODULE INTERFACE FOR ANY ROBOTS

Abstract

This manual is for operating the pneumagiQ, pneuvaQ and casemagiQ series using Digital I/O module interface for any Robots.

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Dear customer,

At Impaqt Robotics, we aim to deliver an impact with every robot deployed globally. This is how we enable simple & faster deployment of robots and impact our partners' bottom line in deploying Robots.

If you have any questions or need assistance with the product, don't hesitate to get in touch with us through support@impaqt-robotics.com.

Best Regards,
Impaqt Robotics team

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Impaqt Robotics Private Limited
pneumagiQ, pneuvaQ & casemagiQ Operations Manual

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1 General Inputs

Download more information and documentation of the products at https://www.impaqt-robotics.com.

1.1 Variants

This operations manual applies to the following product series:

- pneumagiQ
- pneuvaQ
- casemagiQ

1.2 Compatible Machinery

The pneumagiQ, pneuvaQ, and casemagiQ systems offer universal compatibility with diverse mechanical linkage systems including robots, gantries, and specialized machinery.

For simplified integration, our Digital I/O module interface enables straightforward communication via digital signals from any controller, eliminating complex configuration requirements while maintaining robust operational control across platforms.

1.3 Safety Considerations

1.3.1 Personnel Qualifications

Only authorized personnel with a working knowledge of handling pneumatic and electrical circuits should operate the product. Anyone handling the product should have understood the product manuals.

2 pneumagiQ

pneumagiQ is a compact Universal Pneumatic EOAT Interface designed to seamlessly mount two pneumatic EOATs. The compact design of pneumagiQ makes it ideal for tight-spaced material handling applications such as machine tending and material handling. The lightweight design maximizes the payload of the robot for handling heavier parts which is especially important for collaborative robots.

There are multiple variants of pneumagiQ:

- pneumagiQ PQ90-2G2S
- pneumagiQ PQ180-2G4S
- pneumagiQ PQ9020-2G4S

2.1 Installation

pneumagiQ can be operated by Modbus RTU protocol using the Digital I/O module. In the Figure 1, the I/O connector's pin configuration of pneumagiQ is given. To use the Digital I/O module interface with any controller, use the I/O Cable (5 m) [8 pin M8 male to 8 pin free leads] as show in Figure 1. The Pins 1(White) & 2(Brown) of I/O Connector corresponds to the + & - of RS485 communication protocol.

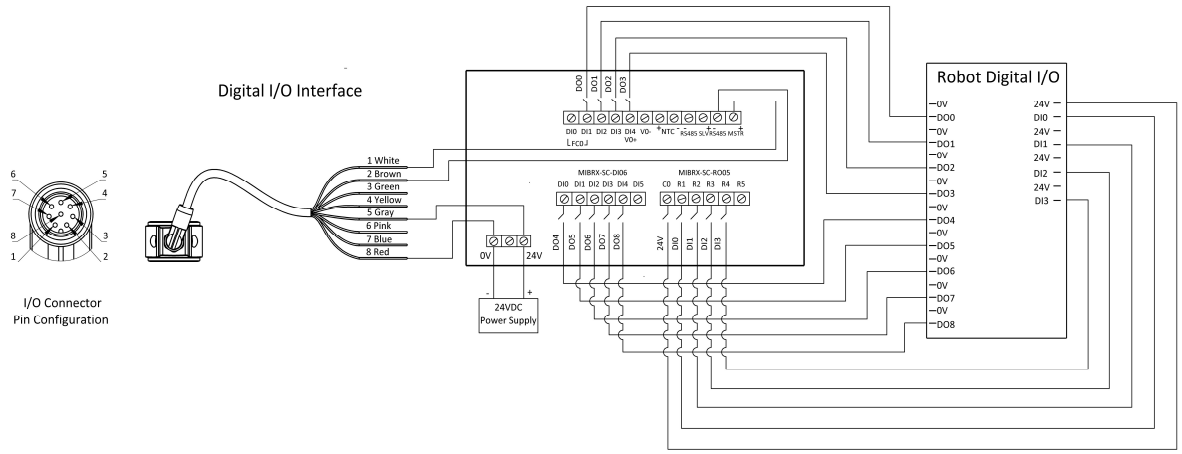

Figure 1: I/O Cable Connection

In the Digital I/O module interface the RS485 MSTR+ (Data A) is connected to the free leads white wire of the I/O Cable (5m) and the RS485 MSTR- (Data B) is connected to the free leads brown wire of the I/O Cable (5 m). The 24V DC is to be provided to the gray wire and the 0V DC to be provided to the red wire.

2.2 Controls

pneumagiQ operations are mapped with the digital inputs of the Digital I/O module interface that can be controlled from any controller. Digital inputs are used for controlling pneumatic tooling mounted on the pneumagiQ and the air blow-off ports, while the digital outputs are used for reading the sensor port status.

2.2.1 pneumagiQ Digital I/O Mapping.

pneumagiQ is controlled by writing the corresponding digital inputs of the Digital I/O module interface. The following table list the control actions with corresponding digital inputs. When a digital input signal is activated on the Digital I/O module interface, the system executes the associated control function. For example, activating digital input DI1 initiates the "Gripper 1 Close" operation.

Note: The number of EOATs, air blow-off and the sensor ports vary dependent on the variant of the pneumagiQ. Hence, refer to the corresponding pneumagiQ installation manual to understand more about each variant of pneumagiQ.

MIBRX Slot No.	Digital Inputs Address	pneumagiQ Control Actions			
		EOAT 1	EOAT 2*	Air Blow Off 1	Air Blow Off 2*
MIBRX main slot (Slot4)	DI1	Close	-	-	-
	DI2	Open	-	-	-
	DI3	-	Close	-	-
	DI4	-	Open	-	-
MIBRX-SC-DI06 (Slot1)	DI0	-	-	ON	-
	DI1	-	-	OFF	-
	DI2	-	-	-	ON
	DI3	-	-	-	OFF
	DI4	Reset			

Table 1: Digital input Mapping

MIBRX Slot No.	24VDC	Sensor 1P	Sensor 1Q	Sensor 2P	Sensor 2Q
MIBRX-SC-RO05 (Slot2)	CO	R1	R2	R3	R4

Table 2: Digital output Mapping

3 casemagiQ

casemagiQ is a compact Universal Case Forming EOAT designed to seamlessly form cases of wide range of dimensions. The compact design of casemagiQ is ideal for case forming / carton erection applications with minimal footprint.

These are variants of casemagiQ:

- casemagiQ CM100
- casemagiQ CM50

3.1 Installation

casemagiQ can be operated by Modbus RTU protocol using the Digital I/O module. In the Figure 1, the I/O connector's pin configuration of casemagiQ is given. To use the Digital I/O module interface with any controller, use the I/O Cable (5 m) [8 pin M8 male to 8 pin free leads] as show in Figure 1. The Pins 1(White) & 2(Brown) of I/O Connector corresponds to the + & - of RS485 communication protocol.

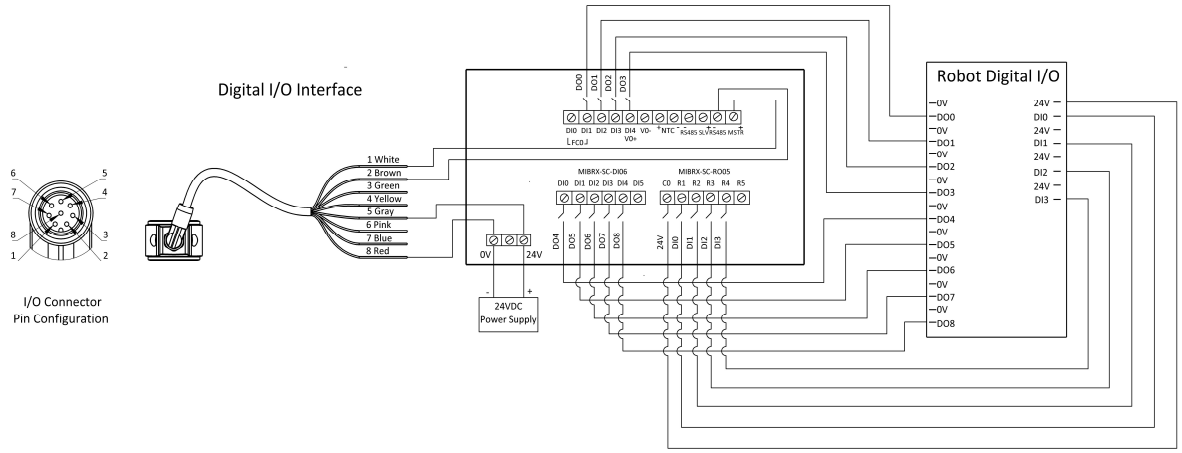

Figure 2: I/O Cable Connection

In the Digital I/O module interface the RS485 MSTR+ (Data A) is connected to the free leads white wire of the I/O Cable (5m) and the RS485 MSTR- (Data B) is connected to the free leads brown wire of the I/O Cable (5 m). The 24V DC is to be provided to the gray wire and the 0V DC to be provided to the red wire.

3.2 Controls

casemagiQ operations are mapped with the digital inputs of the Digital I/O module interface that can be controlled from any controller. Digital inputs are used for controlling vacuum on the casemagiQ and the flap & laser ON and OFF, while the digital outputs are used for reading the sensor port status.

3.2.1 casemagiQ Digital I/O Mapping.

casemagiQ is controlled by writing the corresponding digital inputs of the Digital I/O module interface. The following table list the control actions with corresponding digital inputs. When a digital input signal is activated

on the Digital I/O module interface, the system executes the associated control function. For example, activating digital input DI1 initiates the "Flap ON" operation.

MIBRX Slot No.	Digital Inputs Address	casemagiQ Control Actions			
		Flap	Laser	Main Vacuum	Flap Vacuum
MIBRX main slot (Slot4)	DI1	ON	-	-	-
	DI2	OFF	-	-	-
	DI3	-	ON	-	-
	DI4	-	OFF	-	-
MIBRX-SC-DI06 (Slot1)	DI0	-	-	ON	-
	DI1	-	-	OFF	-
	DI2	-	-	-	ON
	DI3	-	-	-	OFF
	DI4	Reset			

Table 4: Digital input Mapping

MIBRX Slot No.	24VDC	Sensor 1P	Sensor 1Q	Sensor 2P	Sensor 2Q
MIBRX-SC-RO05 (Slot2)	CO	R1	R2	R3	R4

Table 5: Digital output Mapping