

User Manual
D.I.I.O. Digital Input Module (8 Points)
DIIO-DI-A-8

Specifications, Wiring Diagrams and Modbus Register Addresses

Revision: 1
Revision Date: Oct 2008
Publisher: DoZeener Controls
Document Code: DZC-DIO-08009EM-1

TABLE OF CONTENTS

TABLE OF CONTENTS 2

INTRODUCTION..... 3

DEVICE SCHEMATIC AND IO CONNECTIONS..... 4

 TOP CONNECTIONS: 4

 BOTTOM CONNECTIONS AND INDICATIONS 4

 WIRING DIAGRAMS 5

Wiring Diagrams for Card Configuration A: Isolated Internal 5VDC Supply for the digital inputs

Wiring Diagrams for card configuration Type B: Non-Isolated Internal Supply for the digital inputs 6

Wiring Diagrams for card configuration Type C: External 12VDC Supply for the digital inputs (Isolated Inputs)..... 6

MODULE LOGIC..... 7

 LOGIC FOR CHANNEL 1 7

 LOGIC FOR CHANNEL 2 7

 LOGIC FOR CHANNEL 3 8

DEVICE SETUP (DIIO SYSTEM PROGRAMMER SETUP PARAMETERS)..... 9

MECHANICAL 10

SPECIFICATIONS 10

MODBUS ADDRESSES 11

 STANDARD REGISTER SET 11

Read Only Registers 11

Read/Write Registers..... 12

 EXTENDED REGISTER SET 13

Read Only Registers 13

Read/Write Registers..... 13

INTRODUCTION



The DIIO-DI-A-08 is part of the D.I.I.O. (Distributed Intelligent I/O) family. These devices are built up with various cards:

- Power Supply Cards (24VDC or 12VDC amongst others)
- Input/Output Cards (Digital Input, Digital Output, Analogue Input, Analogue Output)
- Microprocessor Cards (Various CPUs depending on the function)
- Communications Cards (Modbus Non Isolated RS232 or RS485 and Isolated RS485)
- Auxiliary Power Supply Cards (Isolated 5V or +/- 15V)

These units are pre-assembled and programmed by the manufacturer (DoZeener Controls) according to the customer's specifications. There are also standard modules such as the DIIO-DI-A-8.

The D.I.I.O. family of products can either be used in a stand-alone system, having a network controller (Example: DIIO-Netcon1) to negotiate information across the system or the individual modules forming part of a third party system comprising of PLCs, BMS Controllers, monitoring systems etc.

When ordering this unit the jumper settings on the IO cards must be specified. Below is a breakdown of the part number of the DIIO-DI-A-08.

Part Number:	DIIO-DI-A-8 (12VDC/MI485/A)
Part Number Description:	Device Code (Power Supply/Comms Card/IO Card Configuration)
Power Supply Options:	12VDC: 12VDC Power Supply 24VDC: 24VDC Power Supply
Comms Card Options:	MI485: Isolated RS485 MN485: Non Isolated RS485 MN232: Non Isolated RS232
IO Card Options:	A: (Configuration Type A: Isolated Internal 5VDC Supply for DIs) B: (Configuration Type B: Non-Isolated Internal Supply for DIs) C: (Configuration Type C: External 12VDC Supply for DIs (Isolated Inputs))

The IO Card Options are the jumper configurations on the IO cards. These can be changed by DoZeener Controls at manufacturing stage, but are not meant to be modified by the user. Opening the module casing will void the warranty of the product.

The digital input statuses are mapped into Modbus registers (Function 03). Appendix A shows a memory map of the Modbus registers.

Apart from the digital input statuses some statistics of the digital inputs are available. These are also shown in Appendix A.

This module as all the others in the DIIO family of products is configurable via the DIIO System Programmer. Please refer to the DIIO System Programmer Manual for more information (Document Code: DZC-DIO-08005EM-1).

DEVICE SCHEMATIC AND IO CONNECTIONS

Depending on which model of the DIIO-DI-A-08 has been purchased, different wiring configurations apply.

TOP CONNECTIONS:

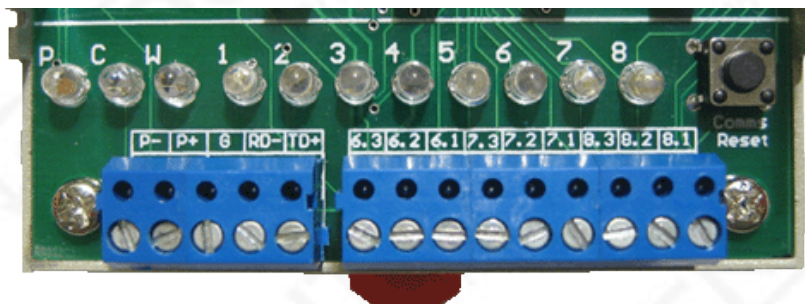


The Top Connections are for digital inputs 1 to 5

The Device Reset button resets the microcontroller. This is particularly useful when a new configuration has been downloaded to the device and needs to be restarted.

When new communication parameters such as baud rate, parity and Modbus address have been downloaded the device must be reset so that it acquires and starts using the new settings.

BOTTOM CONNECTIONS AND INDICATIONS



The bottom connections are for the power supply, communications and inputs 6 to 8.

Also on this side are indications for the following

- P:** Power Supply ON
- C:** Communication activity. Flashes when responding to a request.
- W:** Watchdog. Indicates the unit is healthy
- 1-8:** Input Statuses 1 to 8

The Comms Reset button should be used to reset the unit to default communication setting. When the unit is powered up while holding the button in the depressed position the following default settings are loaded:

Baud Rate: 9600

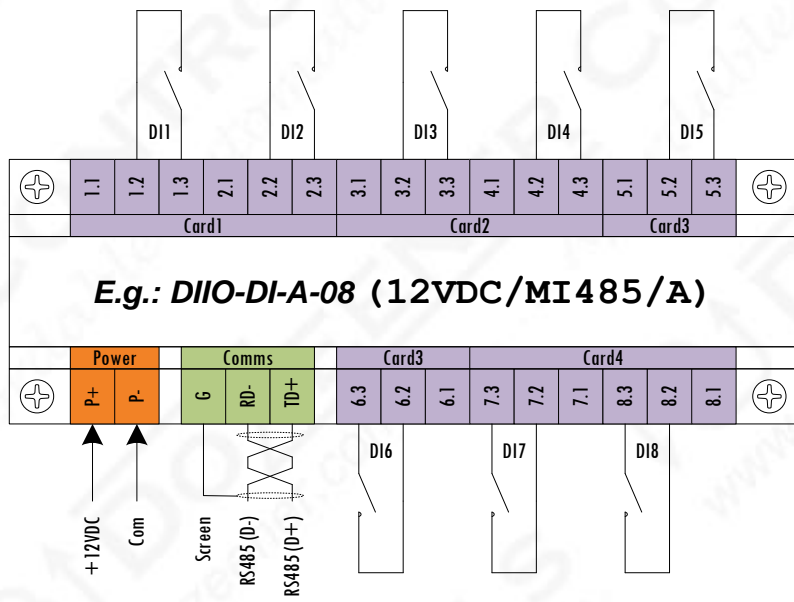
Parity: None

Modbus Address: 1

Stop bits is set to 1 and data bits to 8. These are not configurable

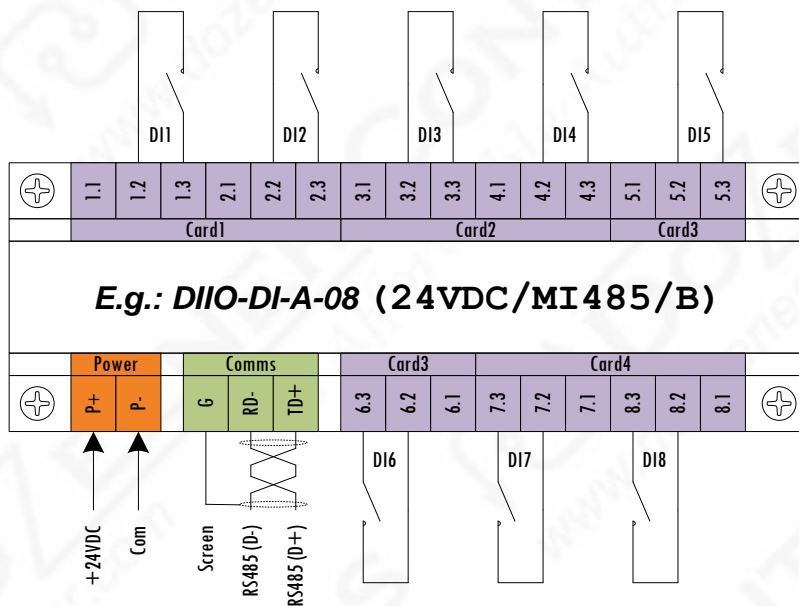
WIRING DIAGRAMS

WIRING DIAGRAMS FOR CARD CONFIGURATION A: ISOLATED INTERNAL 5VDC SUPPLY FOR THE DIGITAL INPUTS



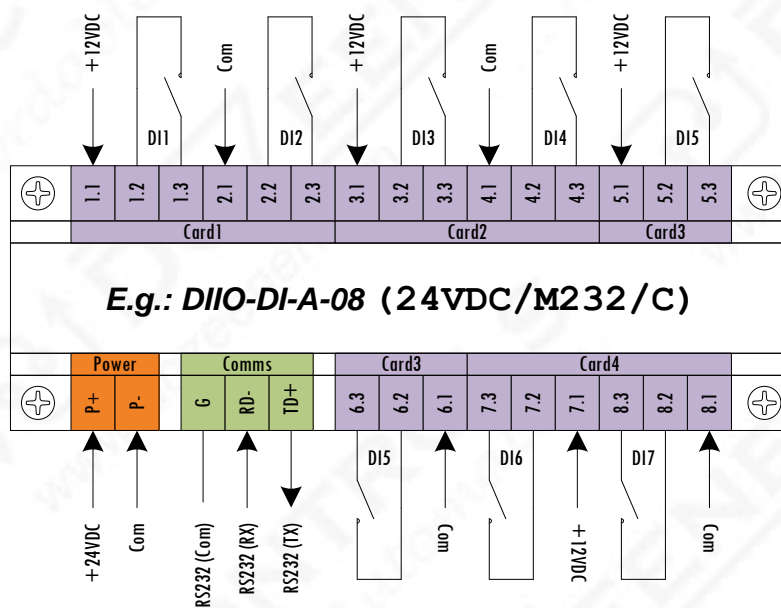
This configuration should not be used if the digital inputs are more than 100m from the device.

WIRING DIAGRAMS FOR CARD CONFIGURATION TYPE B: NON-ISOLATED INTERNAL SUPPLY FOR THE DIGITAL INPUTS



WIRING DIAGRAMS FOR CARD CONFIGURATION TYPE C: EXTERNAL 12VDC SUPPLY FOR THE DIGITAL INPUTS (ISOLATED INPUTS)

Input Circuits are externally supplied by a +12VDC Supply. Input circuits are optically isolated.



This configuration should be used if the digital inputs are further than 100m from the device

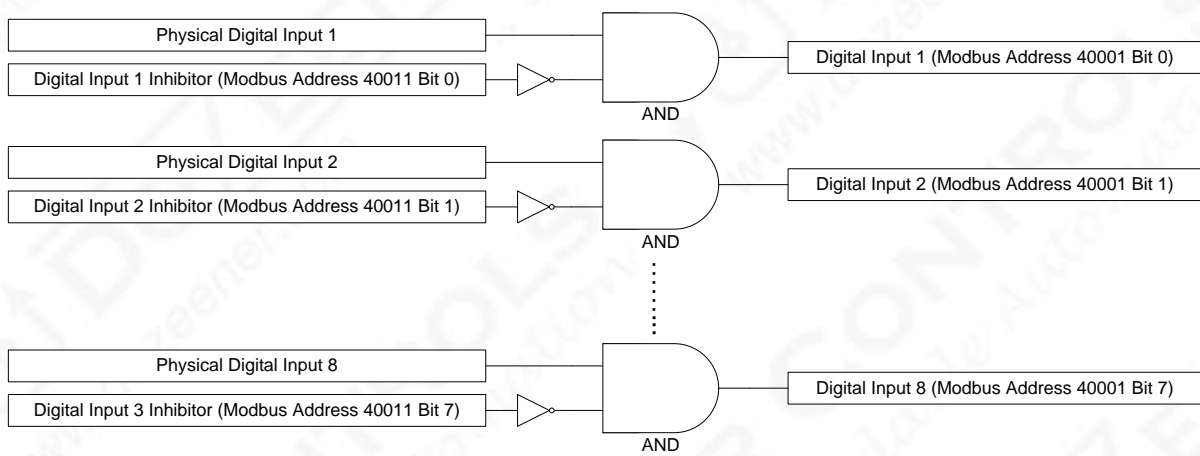
MODULE LOGIC

The 8 digital inputs are mapped to three channels in Modbus registers 40001, 40002 and 40003.

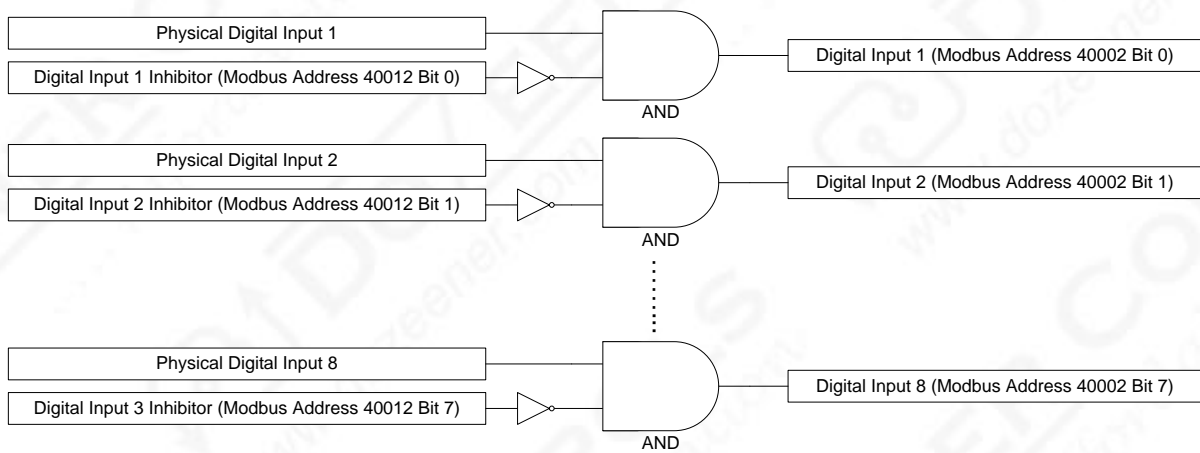
The digital values of these channels can be inhibited by Modbus registers 40011, 40012 and 40013. This feature is very useful when the DIIO-DI-A-08 is connected to other device via the DIIO-NetCon1 (Network Controller).

If the device is used as a Modbus DI module connected to other third parties this feature will probably not be of any use.

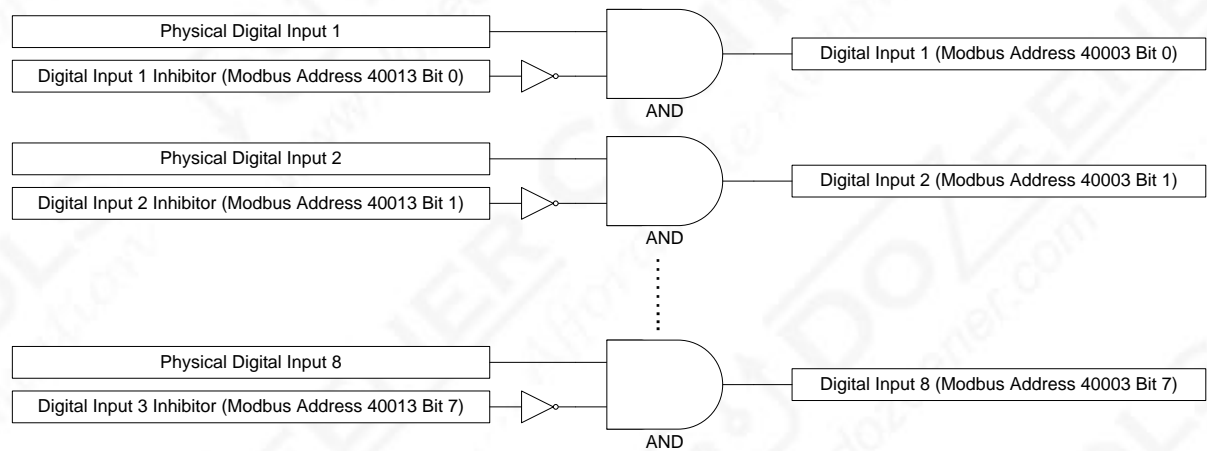
LOGIC FOR CHANNEL 1



LOGIC FOR CHANNEL 2



LOGIC FOR CHANNEL 3



DEVICE SETUP (DIIO SYSTEM PROGRAMMER SETUP PARAMETERS)

The following parameters can be setup for the DIIO-DI-A-08:

The following table shows the parameters as displayed in the DIIO System Programmer:

DIIO-DI-A-08: 8 Digital Inputs, No RTC				
Device Parameters				
Ref No	Description	Range (From)	Range (To)	Value
1	Lock for Register 11 - Channel 1 Inhibits (0 = Unlocked \ 1 = Locked)	0	1	0
2	Lock for Register 12 - Channel 2 Inhibits (0 = Unlocked \ 1 = Locked)	0	1	0
3	Lock for Register 13 - Channel 3 Inhibits (0 = Unlocked \ 1 = Locked)	0	1	0
4	Lock for Register 101 - Statistics Reset (0 = Unlocked \ 1 = Locked)	0	1	0
5	Default Value for Register 11 - Channel 1 Inhibit (8 Bits Represent the 8 Inputs. LSB = Input1)	0	255	0
6	Default Value for Register 12 - Channel 2 Inhibit (8 Bits Represent the 8 Inputs. LSB = Input1)	0	255	0
7	Default Value for Register 13 - Channel 3 Inhibit (8 Bits Represent the 8 Inputs. LSB = Input1)	0	255	0
8	Default Value for Register 101 - Statistics Reset (8 Bits Represent the 8 Inputs. LSB = Input1)	0	255	0

- Items 1 to 3 are locks for the Channel Inhibitors. Items 5 to 6 are default values for the channel inhibitors in the case they are locked.

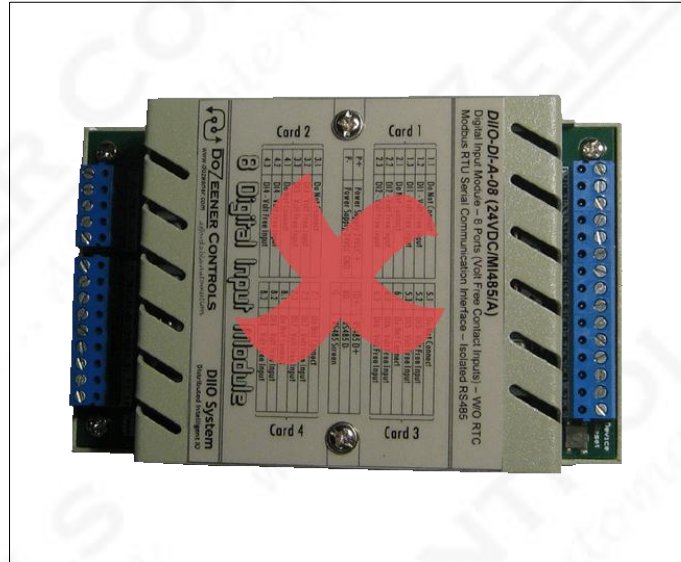
E.g: When value Ref No 1 is set to 0, the Modbus address 40011 which is allocated to Channel 1 inhibitors are not locked, i.e. they can be changed by the user, thus enabling or disabling Channel 1 bits (Modbus Address 40001). Otherwise if they are locked (value 1), the inhibitors are assigned the default value assigned by item ref no 6.

- Item Ref No 4 is the statistic reset lock. Item Ref 8 is the default when the lock is set to 1.

E.g: If the statistics lock is set to 0 (Unlocked), the user can reset the module statistics via the Modbus network. Otherwise if it is set to 1 (Locked), the user has no control on the reset statistics register. If this value is locked then the default value will be used. If the default value is 0 then the statistics can never be reset via the Modbus network. If it is 1 they are always reset to 0.

MECHANICAL

The unit must be installed vertically to help ventilation.



SPECIFICATIONS

- Electrical:** 8 Isolated or Non-Isolated Digital Inputs *
- Dry contact Inputs
 - 5300 VRMS Optical Isolation Protection
 - Power Supply 12VDC to 30VDC *
- Comms:** RS232 or RS485, Isolated or Non Isolated *
- Modbus RTU Protocol, Baud: 9600-38400, Parity: None/Odd/Even/Mark/Space
 - Configurable Modbus Address via software
- Hardware:** Removable Plug-in Terminals. Wire Connection from 28 to 16 AWG (1.5mm²)
- DIN Rail Mounted Metal Enclosure
 - Push Buttons for Communication Parameters Reset and Device Reset
 - Plug In Card Internal Configuration. Inputs paired in two channels per card.
 - Separate Comms Card, Power Supply and IO Cards.
- Software:** Communication parameters are configured via windows based software.

* Different Part Numbers have to be used for the various configurations

MODBUS ADDRESSES

STANDARD REGISTER SET

READ ONLY REGISTERS

Register Name	Modbus Address	Description	Type
InC1DI01	40001:00	Digital Input Status - Channel 1 - DI1	Bit
InC1DI02	40001:01	Digital Input Status - Channel 1 - DI2	Bit
InC1DI03	40001:02	Digital Input Status - Channel 1 - DI3	Bit
InC1DI04	40001:03	Digital Input Status - Channel 1 - DI4	Bit
InC1DI05	40001:04	Digital Input Status - Channel 1 - DI5	Bit
InC1DI06	40001:05	Digital Input Status - Channel 1 - DI6	Bit
InC1DI07	40001:06	Digital Input Status - Channel 1 - DI7	Bit
InC1DI08	40001:07	Digital Input Status - Channel 1 - DI8	Bit
InC2DI01	40002:00	Digital Input Status - Channel 2 - DI1	Bit
InC2DI02	40002:01	Digital Input Status - Channel 2 - DI2	Bit
InC2DI03	40002:02	Digital Input Status - Channel 2 - DI3	Bit
InC2DI04	40002:03	Digital Input Status - Channel 2 - DI4	Bit
InC2DI05	40002:04	Digital Input Status - Channel 2 - DI5	Bit
InC2DI06	40002:05	Digital Input Status - Channel 2 - DI6	Bit
InC2DI07	40002:06	Digital Input Status - Channel 2 - DI7	Bit
InC2DI08	40002:07	Digital Input Status - Channel 2 - DI8	Bit
InC3DI01	40003:00	Digital Input Status - Channel 3 - DI1	Bit
InC3DI02	40003:01	Digital Input Status - Channel 3 - DI2	Bit
InC3DI03	40003:02	Digital Input Status - Channel 3 - DI3	Bit
InC3DI04	40003:03	Digital Input Status - Channel 3 - DI4	Bit
InC3DI05	40003:04	Digital Input Status - Channel 3 - DI5	Bit
InC3DI06	40003:05	Digital Input Status - Channel 3 - DI6	Bit
InC3DI07	40003:06	Digital Input Status - Channel 3 - DI7	Bit
InC3DI08	40003:07	Digital Input Status - Channel 3 - DI8	Bit

READ/WRITE REGISTERS

Register Name	Modbus Address	Description	Type
IIC1DI01	40011:00	Digital Input Inhibit - Channel 1 - DI1	Bit
IIC1DI02	40011:01	Digital Input Inhibit - Channel 1 - DI2	Bit
IIC1DI03	40011:02	Digital Input Inhibit - Channel 1 - DI3	Bit
IIC1DI04	40011:03	Digital Input Inhibit - Channel 1 - DI4	Bit
IIC1DI05	40011:04	Digital Input Inhibit - Channel 1 - DI5	Bit
IIC1DI06	40011:05	Digital Input Inhibit - Channel 1 - DI6	Bit
IIC1DI07	40011:06	Digital Input Inhibit - Channel 1 - DI7	Bit
IIC1DI08	40011:07	Digital Input Inhibit - Channel 1 - DI8	Bit
IIC2DI01	40012:00	Digital Input Inhibit - Channel 2 - DI1	Bit
IIC2DI02	40012:01	Digital Input Inhibit - Channel 2 - DI2	Bit
IIC2DI03	40012:02	Digital Input Inhibit - Channel 2 - DI3	Bit
IIC2DI04	40012:03	Digital Input Inhibit - Channel 2 - DI4	Bit
IIC2DI05	40012:04	Digital Input Inhibit - Channel 2 - DI5	Bit
IIC2DI06	40012:05	Digital Input Inhibit - Channel 2 - DI6	Bit
IIC2DI07	40012:06	Digital Input Inhibit - Channel 2 - DI7	Bit
IIC2DI08	40012:07	Digital Input Inhibit - Channel 2 - DI8	Bit
IIC3DI01	40013:00	Digital Input Inhibit - Channel 3 - DI1	Bit
IIC3DI02	40013:01	Digital Input Inhibit - Channel 3 - DI2	Bit
IIC3DI03	40013:02	Digital Input Inhibit - Channel 3 - DI3	Bit
IIC3DI04	40013:03	Digital Input Inhibit - Channel 3 - DI4	Bit
IIC3DI05	40013:04	Digital Input Inhibit - Channel 3 - DI5	Bit
IIC3DI06	40013:05	Digital Input Inhibit - Channel 3 - DI6	Bit
IIC3DI07	40013:06	Digital Input Inhibit - Channel 3 - DI7	Bit
IIC3DI08	40013:07	Digital Input Inhibit - Channel 3 - DI8	Bit

EXTENDED REGISTER SET

READ ONLY REGISTERS

Register Name	Modbus Address	Description	Type
ONTrDI1	40021	Number of Positive Transitions - DI1	Register
ONTrDI2	40022	Number of Positive Transitions - DI2	Register
ONTrDI3	40023	Number of Positive Transitions - DI3	Register
ONTrDI4	40024	Number of Positive Transitions - DI4	Register
ONTrDI5	40025	Number of Positive Transitions - DI5	Register
ONTrDI6	40026	Number of Positive Transitions - DI6	Register
ONTrDI7	40027	Number of Positive Transitions - DI7	Register
ONTrDI8	40028	Number of Positive Transitions - DI8	Register

READ/WRITE REGISTERS

Register Name	Modbus Address	Description	Type
RsStDI01	40101:00	Reset Statistics - DI1 (1 = Reset, 0 = No Reset)	Register
RsStDI02	40101:01	Reset Statistics - DI2 (1 = Reset, 0 = No Reset)	Register
RsStDI03	40101:02	Reset Statistics - DI3 (1 = Reset, 0 = No Reset)	Register
RsStDI04	40101:03	Reset Statistics - DI4 (1 = Reset, 0 = No Reset)	Register
RsStDI05	40101:04	Reset Statistics - DI5 (1 = Reset, 0 = No Reset)	Register
RsStDI06	40101:05	Reset Statistics - DI6 (1 = Reset, 0 = No Reset)	Register
RsStDI07	40101:06	Reset Statistics - DI7 (1 = Reset, 0 = No Reset)	Register
RsStDI08	40101:07	Reset Statistics - DI8 (1 = Reset, 0 = No Reset)	Register