innon
WWW.INNON.COM

Core IO - CR-IO-16DI

User Manual

16 Point Modbus I/O Module, 16 DI

TABLE OF CONTENTS

INTRODUCTION

Overview

In many installations, having cost effective, robust, and simple hardware becomes a key factor in winning a project. The Core line up provides the perfect solution to meet these criteria. Innon have partnered with Atimus, a company with a wealth of experience in the field, and are proud to present Core IO!

The 16DI provides 16 digital inputs. As well as monitoring volt free contacts, the device also allows the use of pulse counters.

BEMS communication is based on the robust and well proven Modbus RTU over RS485 or Modbus TCP (IP model only).

The configuration of the device can be achieved through the network using either the web interface (IP version only) or Modbus configuration registers, or by using an Android device and connecting over Bluetooth using the dedicated app.

This Core IO model

Both the CR-IO-16DI-RS and the CR-IO-16DI-IP modules come with 8 digital inputs.

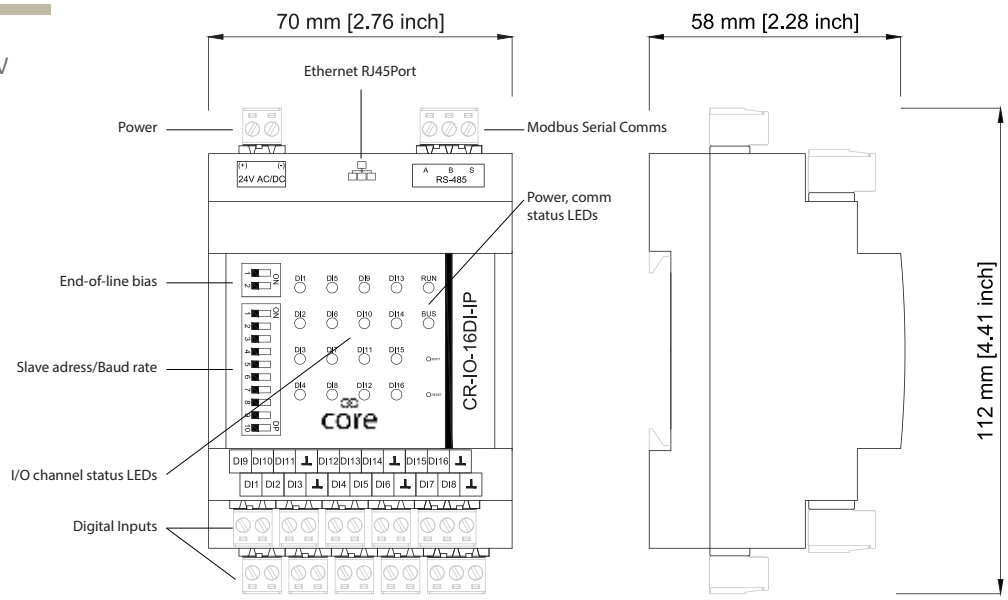
The CR-IO-16DI-RS only comes with the RS485 port, while the CR-IO-16DI-IP comes with both RS485 and IP ports.

Both models also come with Bluetooth on-board, so configuration can be achieved using an Android device and the dedicated app.

The IP CR-IO-16DI-IP model also integrates a web server configuration interface, accessible via a PC web browser.

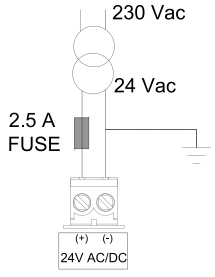
HARDWARE

Overview

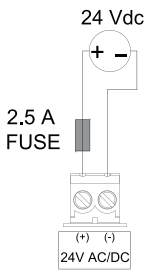


Wiring Power Supply

AC (24Vac)

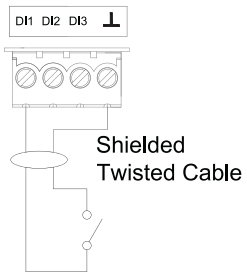


DC (24Vdc)



Wiring Digital Inputs (DI)

Digital Input



Wiring the RS485 network

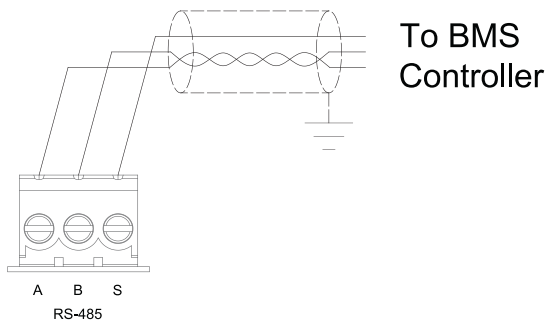
Some useful links to our knowledge base website:

How to wire an RS485 network
https://know.innon.com/howtowire-non-optoisolated

How to terminate and bias an RS485 network
https://know.innon.com/bias-termination-rs485-network

Please note - both IP and RS versions can use the RS485 port to respond to serial Modbus master comms from the BEMS, but neither version can use the RS485 port to act as a Modbus master or gateway.

RS485 to BEMS Master



Front LED Panel

The LEDs in the front panel can be used to get direct feedback on the status of the I/Os of Core IO and more general information.

Below are some tables that will help decode each LED behaviour –

DI 1 to 16		
Digital Input Mode	**Conditions**	**LED Status**
Direct	Open circuit	LED OFF
	Short circuit	LED ON
Reverse	Open circuit	LED ON
	Short circuit	LED OFF
Pulse input	Receiving a pulse	LED blinks ON for every pulse

BUS and RUN		
LED	**Conditions**	**LED Status**
RUN	**Core IO not powered**	**LED OFF**
	Core IO correctly powered	**LED ON**
BUS	**Data being received**	**LED blinks Red**
	Data being transmitted	**LED blinks Blue**
	Bus polarity problem	**LED ON Red**

CONFIGURE I/O

Digital Inputs

Digital Inputs can have a clean/volt free contact connected to Core IO to read its open/closed status.

Each digital input can be configured to be either:

- Digital Input direct
- Digital Input reverse
- Pulse input

While the “direct” and “reverse” mode would basically return status “False (0)” or “True (1)” when the contact is either open or closed, the third mode “pulse input” is used to return a counter value increasing by 1 unit every time the digital input closes; please read section below for more details regarding pulse counting.

Pulse Counting

Digital Inputs and Universal Outputs can be configured specifically to work as pulse counting inputs.

The counting maximum readable frequency is 100Hz, with a duty cycle of 50% and the maximum “contact closed” readable resistance is 50ohm.

When an input is configured to count pulses, a number of Modbus Registers are available with information and commands specifically for the pulse counting function.

The pulse input will, in fact count 2 totalizers as follows –

- The first one is continuous; it will increase by one unit for every pulse received and will keep counting until a reset command is sent over Modbus
- The other totalizer is timed. Basically, it will also increase by one unit for every pulse received but will count only for a specified (adjustable) time (in minutes). When the time expires,

Each pulse counting input has the following Modbus registers associated with it –

• **counter (totalizer):** this is the main totalizer. It will go back to “0” only if a reset command is sent, or if Core IO is power cycled – you can also write to this value to restore a previous count if replacing a module or to reset to 0

• **counter (timer):** this is the second totalizer, the timed one. It will go back to “0” every time the timer reaches the maximum set value (with delay of 1 minute), or if Core IO is power cycled. If the counter reset is activated, the counts within the timed cycle will be ignored and the counter timer reset to 0. The reset will not reset this count to 0 after it has finished a timed cycle and is displaying the result for 1 minute

• **counter timer:** this data point returns the current time of the counter, in minutes. It will of course go back to “0” when it reaches the maximum set value

• **counter timer set:** using this data point you can configure the duration of the timer for the second totalizer (max set value), in minutes. This value is stored within the Core IO memory

• **counter reset:** using this data point you can reset totaliser counter to value “0” and the timed counter will discard counts up to that point in the timed cycle and reset its timer to 0. Core IO will self-reset this data point to value “0” once the command has been executed

CONFIGURING THE DEVICE

FIXED SETTINGS

The RS485 Modbus Slave communication have some settings that are fixed as follows –

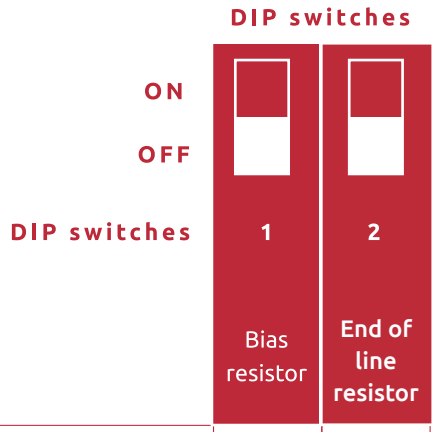
- 8-bit data length
- 1 stop bit
- Parity NONE

DIP SWITCH SETTING

The DIP switches are used to configure the other RS485 settings and the Modbus slave address thus –

- RS485 End-Of-Line (EOL) resistor
- RS485 Bias resistors
- Modbus Slave Address
- RS485 Baud-Rate

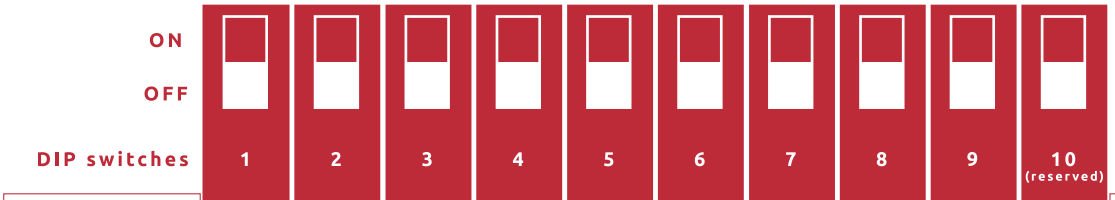
The bank of two EOL (End-Of-Line) blue DIP switches are configured as follows –



No bias, no termination	OFF	OFF
Bias active, no termination	ON	OFF
No bias, termination active	OFF	ON
Bias active, termination active	ON	ON

Please check our dedicated knowledge base article available at the website **http://know.innon.com** where we explain in detail the use of the termination and bias resistors on RS485 networks.

The Modbus ID and baud rate DIP switches are configured as follows –



Slave address	1	2	3	4	5	6	7	8	9	10 (reserved)	Baud rate
1	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF		4800 Kbps
2	OFF	ON	OFF	OFF	OFF	OFF	ON	OFF	OFF		9600 Kbps
3	ON	ON	OFF	OFF	OFF	OFF	OFF	ON	OFF		19200 Kbps
4	OFF	OFF	ON	OFF	OFF	OFF	ON	ON	OFF		38400 Kbps
5	ON	OFF	ON	OFF	OFF	OFF	OFF	OFF	ON		57600 Kbps
6	OFF	ON	ON	OFF	OFF	OFF	ON	OFF	ON		76800 Kbps
7	ON	ON	ON	OFF	OFF	OFF	OFF	ON	ON		115200 Kbps
8	OFF	OFF	OFF	ON	OFF	OFF	ON	ON	ON		230400 Kbps
9	ON	OFF	OFF	ON	OFF	OFF					
10	OFF	ON	OFF	ON	OFF	OFF					
11	ON	ON	OFF	ON	OFF	OFF					
12	OFF	OFF	ON	ON	OFF	OFF					
13	ON	OFF	ON	ON	OFF	OFF					
14	OFF	ON	ON	ON	OFF	OFF					
15	ON	ON	ON	ON	OFF	OFF					
16	OFF	OFF	OFF	OFF	ON	OFF					
17	ON	OFF	OFF	OFF	ON	OFF					
18	OFF	ON	OFF	OFF	ON	OFF					
19	ON	ON	OFF	OFF	ON	OFF					
20	OFF	OFF	ON	OFF	ON	OFF					
21	ON	OFF	ON	OFF	ON	OFF					
22	OFF	ON	ON	OFF	ON	OFF					
23	ON	ON	ON	OFF	ON	OFF					
24	OFF	OFF	OFF	ON	ON	OFF					
25	ON	OFF	OFF	ON	ON	OFF					
26	OFF	ON	OFF	ON	ON	OFF					
27	ON	ON	OFF	ON	ON	OFF					
28	OFF	OFF	ON	ON	ON	OFF					

Slave address DIP switch settings, continued.

ON / OFF / DIP switches	1	2	3	4	5	6
Slave address						
29	ON	OFF	ON	ON	ON	OFF
30	OFF	ON	ON	ON	ON	OFF
31	ON	ON	ON	ON	ON	OFF
32	OFF	OFF	OFF	OFF	OFF	ON
33	ON	OFF	OFF	OFF	OFF	ON
34	OFF	ON	OFF	OFF	OFF	ON
35	ON	ON	OFF	OFF	OFF	ON
36	OFF	OFF	ON	OFF	OFF	ON
37	ON	OFF	ON	OFF	OFF	ON
38	OFF	ON	ON	OFF	OFF	ON
39	ON	ON	ON	OFF	OFF	ON
40	OFF	OFF	OFF	ON	OFF	ON
41	ON	OFF	OFF	ON	OFF	ON
42	OFF	ON	OFF	ON	OFF	ON
43	ON	ON	OFF	ON	OFF	ON
44	OFF	OFF	ON	ON	OFF	ON
45	ON	OFF	ON	ON	OFF	ON
46	OFF	ON	ON	ON	OFF	ON
47	ON	ON	ON	ON	OFF	ON
48	OFF	OFF	OFF	OFF	ON	ON
49	ON	OFF	OFF	OFF	ON	ON
50	OFF	ON	OFF	OFF	ON	ON
51	ON	ON	OFF	OFF	ON	ON
52	OFF	OFF	ON	OFF	ON	ON
53	ON	OFF	ON	OFF	ON	ON
54	OFF	ON	ON	OFF	ON	ON
55	ON	ON	ON	OFF	ON	ON
56	OFF	OFF	OFF	ON	ON	ON
57	ON	OFF	OFF	ON	ON	ON
58	OFF	ON	OFF	ON	ON	ON
59	ON	ON	OFF	ON	ON	ON
60	OFF	OFF	OFF	ON	ON	ON
61	ON	OFF	ON	ON	ON	ON
62	OFF	ON	ON	ON	ON	ON
63	ON	ON	ON	ON	ON	ON

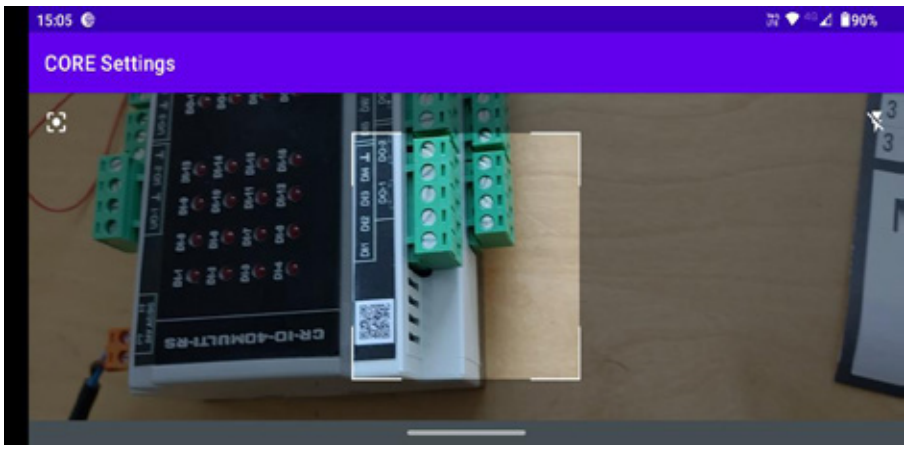
Bluetooth and Android App

Core IO has built-in Bluetooth which allows the Core Settings app running on an Android device to configure the IP settings and I/O.

Please download the app from Google Play – search for “core settings”
Download and install the app, then check/make the following settings changes –

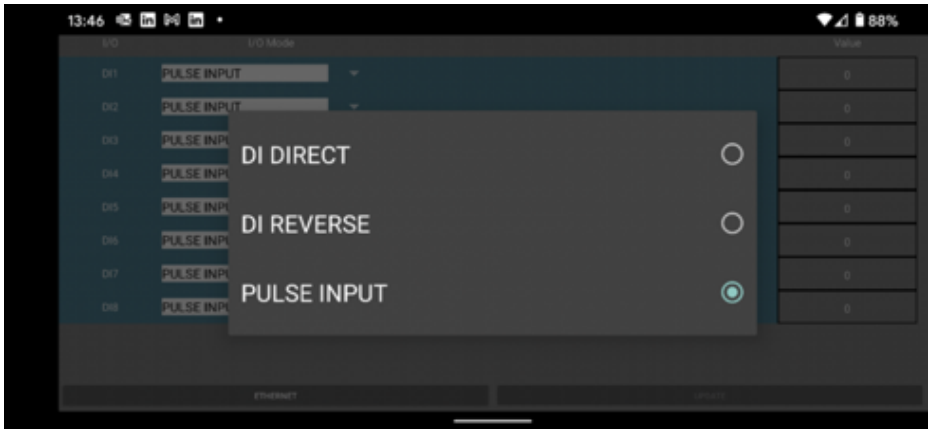
- Open your phone settings (drag down from top, press “cog” icon)
- Click on “Apps”
- Select “Core Settings” app
- Press “Permissions”
- Press “Camera” – set to “Allow only while using the app”
- Go back then press “Nearby devices” – set to “Allow”

When you run the app, the camera will switch on, and you will need to use it to read the QR code on the module you wish to set up, i.e. –



The Android device will ask you to allow the Bluetooth devices to pair on the first connection, watch out for the notifications on your device and accept them.

Once connected, you will land on the I/O setup screen, where you can set up the I/O and read input and output current values –



Use the drop-down arrows in the “I/O Mode” column to select the type of input type by clicking in the respective radio button –

Once you make a change or number of changes, the “UPDATE” button on the bottom right will go from greyed-out to white; press this to commit your changes.

Click on the “ETHERNET” button (bottom left) to set-up the required IP settings.
Set and commit data as per the I/O method above.

Click on “MODE” button (bottom left) to get back to the I/O settings.

Ethernet Port and Web Server Configuration (IP version only)

For the IP models of Core IO, a standard RJ45 socket is available to be used for:

- Modbus TCP (slave) communication
- Web server access to configure the device

The IP models still provide access on the RS485 port for Modbus RTU (slave) communication on these models, so the user can decide which one to use to connect the BEMS to Core IO.

The default settings of the IP port are:

IP address:	192.168.1.175
Subnet:	255.255.255.0
Gateway address:	192.168.1.1
Modbus TCP port:	502 (fixed)
Http port (web server):	80 (fixed)
Web server user:	atimus (fixed)
Web server password:	HD1881 (fixed)

IP address, subnet and gateway address can be changed from the Bluetooth Android app or from the web server interface.

The web server interface looks and works in much the same way as the Core Settings app described in the previous section.

BEMS POINT LISTS

Modbus Register Types

Unless otherwise stated in the tables, all I/O point values/statuses and settings are held as Holding Register Modbus data type and use a single register (16 bit) to represent an Integer (Int, range 0 - 65535) type of data.

Pulse count registers are 32-bit long, unsigned registers, i.e. two consecutive 16-bit registers combined, and their byte order is sent in little endian, i.e. –

• Niagara/Sedona Modbus driver – 1032

• Teltonika RTU xxx – 3412 – also use 2 x “Register count/values” to obtain all 32 bits

For some Modbus master devices, the decimal and hex register addresses in the table will need to be incremented by 1 to read the correct register (e.g. Teltonika RTU xxx)

Bit-field data type uses individual bits from the 16 bits available on the Modbus register to provide multiple Boolean information by reading or writing a single register.

Modbus Register Tables

General Points						
Decimal	**Hex**	**Name**	**Details**	**Stored**	**Type**	**Range**
3002	BBA	Firmware version - units	Most significant number for firmware version e.g. 2.xx	YES	R	0-9
3003	BBB	Firmware version - tenths	2nd Most significant number for firmware version e.g. x.0x	YES	R	0-9
3004	BBC	Firmware version - hundredths	3rd Most significant number for firmware version e.g. x.x4	YES	R	0-9

Digital Input Points						
Decimal	**Hex**	**Name**	**Details**	**Stored**	**Type**	**Range**
40	28	DI 1 mode	Digital Input mode select: 0 = Digital Intput direct 1 = Digital Intput reverse 2 = Pulse input	YES	R/W	0...2
41	29	DI 2 mode				
42	2A	DI 3 mode				
43	2B	DI 4 mode				
44	2C	DI 5 mode				
45	2D	DI 6 mode				
46	2E	DI 7 mode				
47	2F	DI 8 mode				
48	30	DI 9 mode				
49	31	DI 10 mode				
50	32	DI 11 mode				
51	33	DI 12 mode				
52	34	DI 13 mode				
53	35	DI 14 mode				
54	36	DI 15 mode				
55	37	DI 16 mode				
1	1	DI 1	Read Digital Input status (digital input mode): 0 = inactive 1 = active	NO	R	0...1
2	2	DI 2				
3	3	DI 3				
4	4	DI 4				
5	5	DI 5				
6	6	DI 6				
7	7	DI 7				
8	8	DI 8				
9	9	DI 9				
10	A	DI 10				
11	B	DI 11				
12	C	DI 12				
13	D	DI 13				
14	E	DI 14				
15	F	DI 15				
16	10	DI 16				

1111	457	DI 1-16	Read digital input status by bit (only digital input mode, bit 0 = DI 1)	NO	R	0…1
100	64	DI 1 counter (totalizer)	32 bit long, total counter value (totalizer) (pulse input mode)	NO	R/W	0..4294967295
102	66	DI 1 counter (timer)	32 bit long, counter value for the running timer (pulse input mode)	NO	R	0..4294967295
104	68	DI 1 counter timer	Running timer in minutes. Will reset once "counter timer set" reached and start again	NO	R	0…14400
105	69	DI 1 counter timer set	Timer duration configuration in minutes	YES	R/W	0…14400
106	6A	DI 1 counter reset	Reset command to all counted values (goes back to "0" automatically)	NO	R/W	0…1
107	6B	DI 2 counter (totalizer)	32 bit long, total counter value (totalizer) (pulse input mode)	NO	R/W	0..4294967295
109	6D	DI 2 counter (timer)	32 bit long, counter value for the running timer (pulse input mode)	NO	R	0..4294967295
111	6F	DI 2 counter timer	Running timer in minutes. Will reset once "counter timer set" reached and start again	NO	R	0…14400
112	70	DI 2 counter timer set	Timer duration configuration in minutes	YES	R/W	0…14400
113	71	DI 2 counter reset	Reset command to all counted values (goes back to "0" automatically)	NO	R/W	0…1
114	72	DI 3 counter (totalizer)	32 bit long, total counter value (totalizer) (pulse input mode)	NO	R/W	0..4294967295
116	74	DI 3 counter (timer)	32 bit long, counter value for the running timer (pulse input mode)	NO	R	0..4294967295
118	76	DI 3 counter timer	Running timer in minutes. Will reset once "counter timer set" reached and start again	NO	R	0…14400
119	77	DI 3 counter timer set	Timer duration configuration in minutes	YES	R/W	0…14400
120	78	DI 3 counter reset	Reset command to all counted values (goes back to "0" automatically)	NO	R/W	0…1
121	79	DI 4 counter (totalizer)	32 bit long, total counter value (totalizer) (pulse input mode)	NO	R/W	0..4294967295
123	7B	DI 4 counter (timer)	32 bit long, counter value for the running timer (pulse input mode)	NO	R	0..4294967295
125	7D	DI 4 counter timer	Running timer in minutes. Will reset once "counter timer set" reached and start again	NO	R	0…14400
126	7E	DI 4 counter timer set	Timer duration configuration in minutes	YES	R/W	0…14400
127	7F	DI 4 counter reset	Reset command to all counted values (goes back to "0" automatically)	NO	R/W	0…1Ω
128	80	DI 5 counter (totalizer)	32 bit long, total counter value (totalizer) (pulse input mode)	NO	R/W	0...4294967295
130	82	DI 5 counter (timer)	32 bit long, counter value for the running timer (pulse input mode)	NO	R	0...4294967295
132	84	DI 5 counter timer	Running timer in minutes. Will reset once "counter timer set" reached and start again	NO	R	0…14400
133	85	DI 5 counter timer set	Timer duration configuration in minutes	YES	R/W	0…14400
134	86	DI 5 counter reset	Reset command to all counted values (goes back to "0" automatically)	NO	R/W	0…1
135	87	DI 6 counter (totalizer)	32 bit long, total counter value (totalizer) (pulse input mode)	NO	R/W	0...4294967295

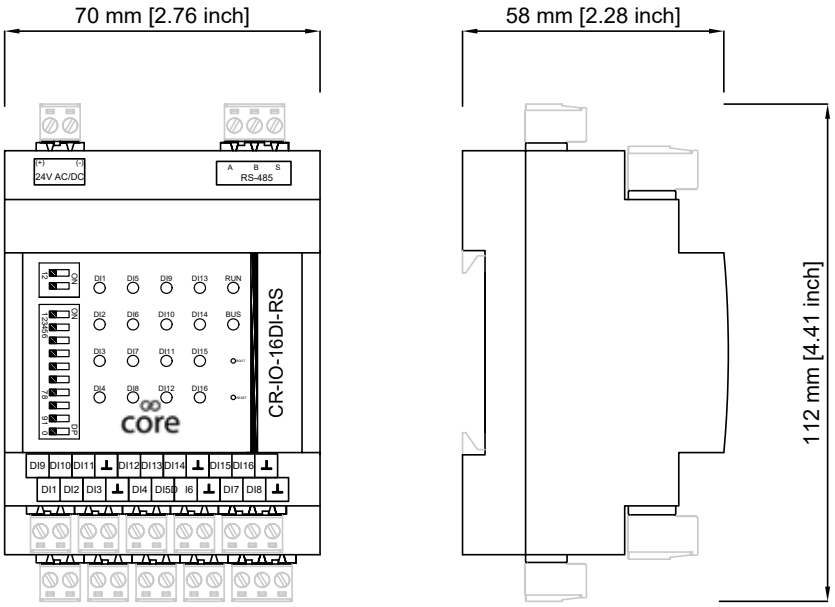
137	89	DI 6 counter (timer)	32 bit long, counter value for the running timer (pulse input mode)	NO	R	0...4294967295
139	8B	DI 6 counter timer	Running timer in minutes. Will reset once "counter timer set" reached and start again	NO	R	0…14400
140	8C	DI 6 counter timer set	Timer duration configuration in minutes	YES	R/W	0…14400
141	8D	DI 6 counter reset	Reset command to all counted values (goes back to "0" automatically)	NO	R/W	0…1
142	8E	DI 7 counter (totalizer)	32 bit long, total counter value (totalizer) (pulse input mode)	NO	R/W	0...4294967295
144	90	DI 7 counter (timer)	32 bit long, counter value for the running timer (pulse input mode)	NO	R	0...4294967295
146	92	DI 7 counter timer	Running timer in minutes. Will reset once "counter timer set" reached and start again	NO	R	0…14400
147	93	DI 7 counter timer set	Timer duration configuration in minutes	YES	R/W	0…14400
148	94	DI 7 counter reset	Reset command to all counted values (goes back to "0" automatically)	NO	R/W	0…1
149	95	DI 8 counter (totalizer)	32 bit long, total counter value (totalizer) (pulse input mode)	NO	R/W	0...4294967295
151	97	DI 8 counter (timer)	32 bit long, counter value for the running timer (pulse input mode)	NO	R	0...4294967295
153	99	DI 8 counter timer	Running timer in minutes. Will reset once "counter timer set" reached and start again	NO	R	0…14400
154	9A	DI 8 counter timer set	Timer duration configuration in minutes	YES	R/W	0…14400
155	9B	DI 8 counter reset	Reset command to all counted values (goes back to "0" automatically)	NO	R/W	0…1
156	9C	DI 9 counter (totalizer)	32 bit long, total counter value (totalizer) (pulse input mode)	NO	R/W	0...4294967295
158	9E	DI 9 counter (timer)	32 bit long, counter value for the running timer (pulse input mode)	NO	R	0...4294967295
160	A0	DI 9 counter timer	Running timer in minutes. Will reset once "counter timer set" reached and start again	NO	R	0…14400
161	A1	DI 9 counter timer set	Timer duration configuration in minutes	YES	R/W	0…14400
162	A2	DI 9 counter reset	Reset command to all counted values (goes back to "0" automatically)	NO	R/W	0…1
163	A3	DI 10 counter (totalizer)	32 bit long, total counter value (totalizer) (pulse input mode)	NO	R/W	0...4294967295
165	A5	DI 10 counter (timer)	32 bit long, counter value for the running timer (pulse input mode)	NO	R	0...4294967295
167	A7	DI 10 counter timer	Running timer in minutes. Will reset once "counter timer set" reached and start again	NO	R	0…14400
168	A8	DI 10 counter timer set	Timer duration configuration in minutes	YES	R/W	0…14400
169	A9	DI 10 counter reset	Reset command to all counted values (goes back to "0" automatically)	NO	R/W	0…1
170	AA	DI 11 counter (totalizer)	32 bit long, total counter value (totalizer) (pulse input mode)	NO	R/W	0...4294967295
172	AC	DI 11 counter (timer)	32 bit long, counter value for the running timer (pulse input mode)	NO	R	0...4294967295

174	AE	DI 11 counter timer	Running timer in minutes. Will reset once "counter timer set" reached and start again	NO	R	0…14400
175	AF	DI 11 counter timer set	Timer duration configuration in minutes	YES	R/W	0…14400
176	B0	DI 11 counter reset	Timer duration configuration in minutes	NO	R/W	0…1
177	B1	DI 12 counter (totalizer)	32 bit long, total counter value (totalizer) (pulse input mode)	NO	R/W	0...4294967295
179	B3	DI 12 counter (timer)	32 bit long, counter value for the running timer (pulse input mode)	NO	R	0...4294967295
181	B5	DI 12 counter timer	Running timer in minutes. Will reset once "counter timer set" reached and start again	NO	R	0…14400
182	B6	DI 12 counter timer set	Timer duration configuration in minutes	YES	R/W	0…14400
183	B7	DI 12 counter reset	Reset command to all counted values (goes back to "0" automatically)	NO	R/W	0…1
184	B8	DI 13 counter (totalizer)	32 bit long, total counter value (totalizer) (pulse input mode)	NO	R/W	0...4294967295
186	BA	DI 13 counter (timer)	32 bit long, counter value for the running timer (pulse input mode)	NO	R	0...4294967295
188	BC	DI 13 counter timer	Running timer in minutes. Will reset once "counter timer set" reached and start again	NO	R	0…14400
189	BD	DI 13 counter timer set	Timer duration configuration in minutes	YES	R/W	0…14400
190	BE	DI 13 counter reset	Reset command to all counted values (goes back to "0" automatically)	NO	R/W	0…1
191	BF	DI 14 counter (totalizer)	32 bit long, total counter value (totalizer) (pulse input mode)	NO	R/W	0...4294967295
193	C1	DI 14 counter (timer)	32 bit long, counter value for the running timer (pulse input mode)	NO	R	0...4294967295
195	C3	DI 14 counter timer	Running timer in minutes. Will reset once "counter timer set" reached and start again	NO	R	0…14400
196	C4	DI 14 counter timer set	Timer duration configuration in minutes	YES	R/W	0…14400
197	C5	DI 14 counter reset	Reset command to all counted values (goes back to "0" automatically)	NO	R/W	0…1
198	C6	DI 15 counter (totalizer)	32 bit long, total counter value (totalizer) (pulse input mode)	NO	R/W	0...4294967295
200	C8	DI 15 counter (timer)	32 bit long, counter value for the running timer (pulse input mode)	NO	R	0...4294967295
202	CA	DI 15 counter timer	Running timer in minutes. Will reset once "counter timer set" reached and start again	NO	R	0…14400
203	CB	DI 15 counter timer set	Timer duration configuration in minutes	YES	R/W	0…14400
204	CC	DI 15 counter reset	Reset command to all counted values (goes back to "0" automatically)	NO	R/W	0…1
205	CD	DI 16 counter (totalizer)	32 bit long, total counter value (totalizer) (pulse input mode)	NO	R/W	0...4294967295
207	CF	DI 16 counter (timer)	32 bit long, counter value for the running timer (pulse input mode)	NO	R	0...4294967295
209	D1	DI 16 counter timer	Running timer in minutes. Will reset once "counter timer set" reached and start again	NO	R	0…14400
210	D2	DI 16 counter timer set	Timer duration configuration in minutes	YES	R/W	0…14400
211	D3	DI 16 counter reset	Reset command to all counted values (goes back to "0" automatically)	NO	R/W	0…1

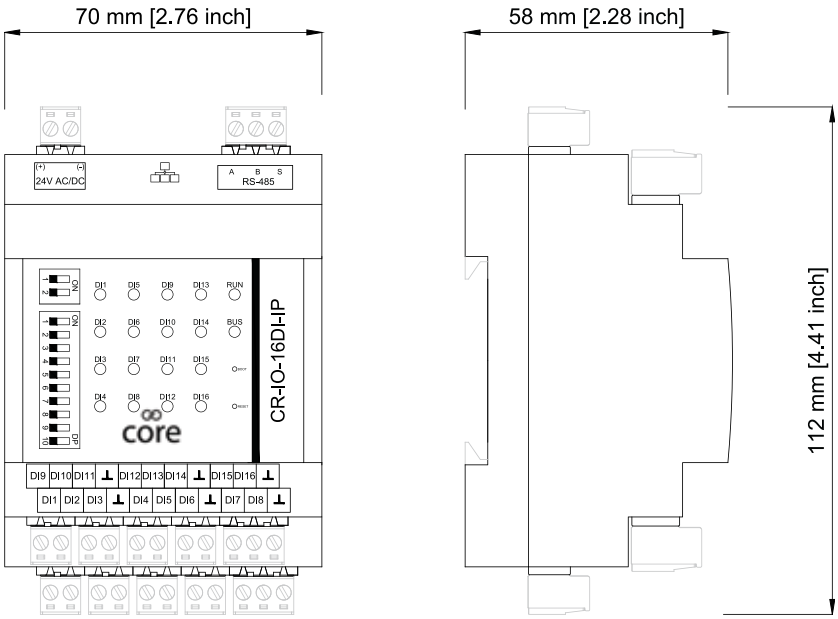
TECHNICAL DATA

Drawings

Part number: CR-IO-16DI-RS



Part number: CR-IO-16DI-IP



Specifications

Power supply	24 Vac +10%/-15% 50 Hz, 24 Vdc +10%/-15%
	Current draw – 70mA min, 80mA max
Digital Inputs	16 x Digital Inputs (volt free)
	DI direct, DI reverse, PULSE (up to 100 Hz, 50% duty cycle, max 50 ohm contact)
Interface to BEMS	RS485, opto-isolated, max 63 devices supported on the network
	Ethernet/IP (IP version)
Protocol to BEMS	Modbus RTU, baud rate 9600 – 230400, 8 bit, no parity, 1 stop bit
	Modbus TCP (IP version)
Ingress Protection Rating	IP20, EN 61326-1
Temperature and humidity	Operating: 0°C to +50°C (32°F to 122°F), max 95% RH (without condensation)
	Storage: -25°C to +75°C (-13°F to 167°F), max 95% RH (without condensation)
Connectors	Plug-in Terminals 1 x 2.5 mm^2
Mounting	Panel mounted (2x on-board sliding screw holders on the back) / DIN rail mounting

Guidelines for Disposal

• The appliance (or the product) must be disposed of separately in accordance with the local waste disposal legislation in force.

• Do not dispose of the product as municipal waste; it must be disposed of through specialist waste disposal centres.

• Improper use or incorrect disposal of the product may negatively affect human health and the environment.

• In the event of illegal electrical and electronic waste disposal, the penalties are specified by local waste disposal legislation.