

IO10-BAC-DIN BACnet MS/TP Input / Output Module, DIN-Rail Mounted

IO10-BAC-DIN has been designed to be a compact DIN-rail mounted BACnet MS/TP input and output module.

The IO10-BAC has 2 volt-free digital inputs for measurements e.g. plant status, alarm signals etc. and 2 digital outputs, 24Vac triacs, switching the plant items on/off.

The IO10-BAC-DIN has 2 RI inputs for measuring NTC10 temperature, resistive measurements (e.g. light level) or volt-free on/off signals. The IO10-BAC-DIN-AI has 2 x 0-10V inputs.

The four analogue 0..10Vdc outputs complete the compact IO-module. With the analogue outputs it is possible to control any modulating plant equipment such as control valves.

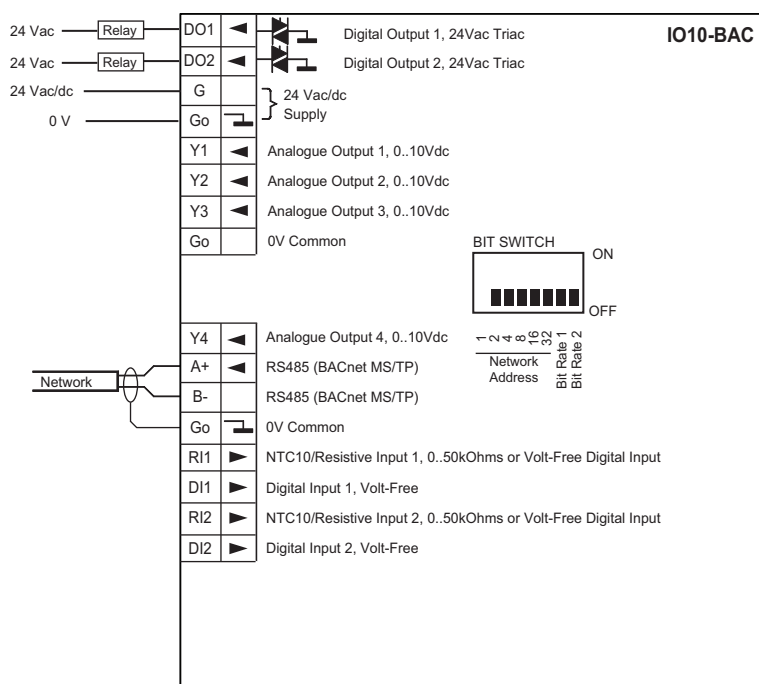
The module supports BACnet MS/TP communications with most commonly used baud rates and parity settings. The module also supports BACnet device and object discovery allowing fast and efficient programming.



Model Type	Model	Description
	IO10-BAC-DIN	BACnet MS/TP Digital Input / Output Module, 2DI, 2DO, 2RI/DI, 4AO
	IO10-BAC-DIN-AI	BACnet MS/TP Digital Input / Output Module, 2DI, 2DO, 2AI, 4AO
Technical Data		
Power Supply	Power supply	24Vac/dc -10%/+15%
Signal Outputs	Analogue Outputs	4 x 0..10V < 5mA; 100k min impedance for 1% accuracy
	Digital Outputs	2 x 24Vac Triacs; 1A maximum per channel; requires 24Vac Power Supply NOTE: Switching to 0V
Signal Inputs	Resistive Inputs (IO10-BAC-DIN)	2 x Universal NTC10/Resistive/Digital Inputs, 0..50kOhms (NTC10/Volt-Free Digital default, configurable via SW-DCT-USB tool to resistive mode)
	Analogue Inputs (IO10-BAC-DIN-AI)	2 x 0..10Vdc Inputs
	Digital Inputs	2 x Volt-Free Contact, Impedance <1KOhm Pulse Counting: Max 25Hz, Min Pulse Length 20mA (Volatile) Adjustable Delay via SW-DCT-USB Tool
Communication	BACnet Communications	
	Protocol	BACnet MS/TP
	Interface	RS485; maximum 63 devices
	MAC Addressing	0..63 via a bit switch; 0..247 via tool / network
Connections	Communication	9k6/19k2/38k4/76k8 Baud; Parity None/Even/Odd, 1 or 2 Stop Bits (baud rate adjustable through bit switch)
	Terminal Connections	Solid and Stranded Cable, Plug-In Connectors Maximum Size: 0.05 to 2.5mm ² (EN ISO) / 12 to 30 AWG (UL) Rising Clamp: Size 2.5 x 2.4mm

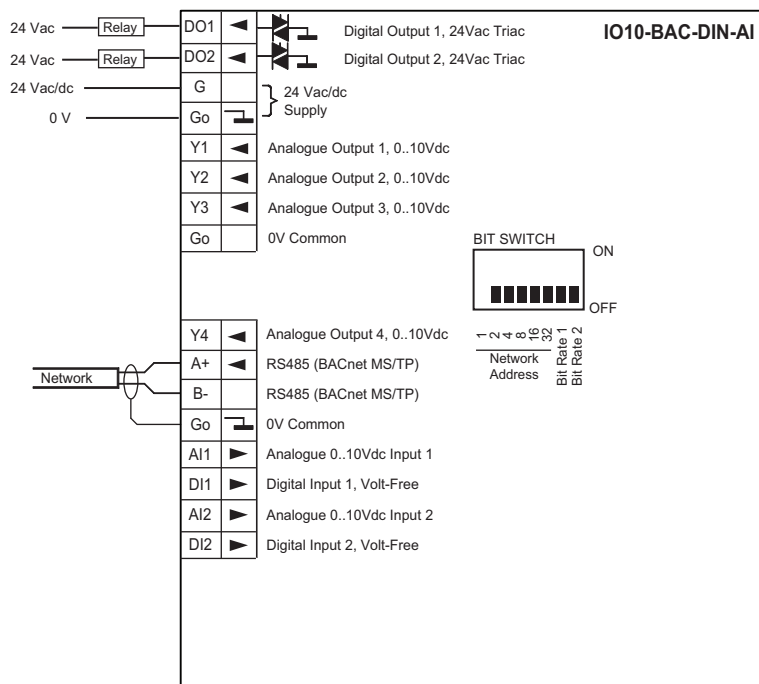
Environmental Conditions	Operating	
	Temperature	0°C...+50°C (32...122°F)
	Humidity	0...95%rh (non-cond.)
	Storage	
Standards	Temperature	-30°C...+70°C (-22...158°F)
	Humidity	0...95%rh (non-cond.)
	CE Conformity	CE Directive 2004/108/EY EN61000-6-3: 2001 (Generic Emission) EN61000-6-1: 2001 (Generic Immunity).
	Degree of Protection	IP20
Housing	Housing Material	ABS Plastics, Self Extinguishing
	Mounting	DIN-Rail Mounting
	Dimensions	W106 x H97 x D38mm
	Weight	200g

Wiring Terminals (IO10-BAC-DIN)



DO1	Digital Output; 24Vac Triac Switching to 0V; max. 2A
DO2	Digital Output; 24Vac Triac Switching to 0V; max. 2A
G	24Vac/dc Power Supply
Go	0V Common
Y1	0..10Vdc Analogue Output
Y2	0..10Vdc Analogue Output
Y3	0..10Vdc Analogue Output
Go	0V Common
Y4	0..10Vdc Analogue Output
A+	RS485 A+ Connection (BACnet)
B-	RS485 B- Connection (BACnet)
Go	0V Common
RI1	NTC10/Resistive Input 0..50kOhms/Volt-Free Digital
DI1	Digital Input; Volt-Free, Max 25Hz, Min Pulse Length 20mS
RI2	NTC10/Resistive Input 0..50kOhms/Volt-Free Digital
DI2	Digital Input; Volt-Free, Max 25Hz, Min Pulse Length 20mS

Wiring Terminals (IO10-BAC-DIN-AI)



DO1	Digital Output; 24Vac Triac Switching to 0V; max. 2A
DO2	Digital Output; 24Vac Triac Switching to 0V; max. 2A
G	24Vac/dc Power Supply
Go	0V Common
Y1	0..10Vdc Analogue Output
Y2	0..10Vdc Analogue Output
Y3	0..10Vdc Analogue Output
Go	0V Common
Y4	0..10Vdc Analogue Output
A+	RS485 A+ Connection (BACnet)
B-	RS485 B- Connection (BACnet)
Go	0V Common
AI1	0..10Vdc Input
DI1	Digital Input; Volt-Free, Max 25Hz, Min Pulse Length 20mS
AI2	0..10Vdc Input
DI2	Digital Input; Volt-Free, Max 25Hz, Min Pulse Length 20mS

Dedicated Digital Input Pulse Counting

Dedicated Digital Inputs (DI1&DI2) can be used for pulse counting up to 25Hz, minimum pulse length 20mS. The pulse count is stored in a dedicated register and can be read over the network. It is possible to write to this register to reset the value. The dedicated digital inputs can also have adjustable delay (configured via SW-DCT-USB tool).

NOTE: The pulse count value is not battery backed, and therefore the network master is required to manage the data synchronisation in case of power failure.

Universal NTC10/ Resistive/Digital Inputs (IO10-BAC-DIN)

The universal inputs can be configured to operate as NCT10/Digital Volt-Free inputs or Resistive Inputs. As default the inputs are configured as NTC10/Digital Volt-Free. The maximum measurement range is -10°C to 100°C (-40°F to 212°F). The NTC10/resistive configuration is changed via the Configuration Software using the USB to IO-Module cable. The digital volt-free mode is automatically activated, and a separate BACnet Binary Input objects are available to read the status.

Analogue 0-10V Inputs (IO10-BAC-DIN-AI)

The device has 2 x 0..10Vdc voltage inputs. The current voltage is available over the BACnet as a network object.

Setting Up BACnet Address and Baud Rate

The BACnet address and the baud rate is normally set through the bit switch. It is also possible to set the address and baud rate over the configuration tool or over the BACnet communication network.

NOTE: The new settings are activated automatically if no changes to bit switches are made for 5 seconds. Alternatively power cycle the device.

SETTING IO-MODULE BAUD RATE

BIT SWITCH ON OFF

BAUD RATE 76800 ON OFF

BAUD RATE 38400 ON OFF

BAUD RATE 19200 ON OFF

BAUD RATE 9600 / NETWORK ON OFF

Note: When the baud rate set 9600 via the bit switch it is possible to configure the baud rate via network / tool.
Note: The device activates the change automatically if any of the bit switches are not change for 5 seconds.

SETTING IO-MODULE BACNET MAC ID

The BACnet MAC ID is set by using bith switches 1 to 6 using binary decoding. Each bit switch represents the binary value and the address is set by the combination of bit switches. Few examples:

BIT SWITCH ON OFF

BACNET MAC ID 2 ON OFF

BACNET MAC ID 9 ON OFF

Note: If all address bit switches are set OFF, then the BACnet ID can be set over the BACnet or through configuration tool.

BACnet Interoperability Building Blocks Supported (Annex K)

Application Service	Initiate	Execute	BIBB
ReadProperty		Yes	DS-RP-B
ReadPropertyMultiple		Yes	DS-RPM-B
WriteProperty		Yes	DS-WP-B
ReinitializeDevice		Yes	
Who-Is		Yes	DM-DDB-B
I-Am	Yes		
Who-Has		Yes	DM-DOB-B
I-Have	Yes		
DeviceCommunicationControl		Yes	DM-DCC-B

BACnet Standard Object Types Supported

No dynamic Creation or Deletion supported. Objects, and object instances, are assigned to fixed functions within the proprietary control application of the product as follows:

Object	Number Of Instances	Instance Assignments
Device Object	1	
Analog Input	7	AI(0) – Not Assigned AI(1) – Not Assigned AI(2) – Not Assigned AI(3) – NTC10/R11 (IO10-BAC-DIN) AI(4) – NTC10/R12 (IO10-BAC-DIN) AI(3) – AI1 (IO10-BAC-DIN-AI) AI(4) – AI2 - (IO10-BAC-DIN-AI) AI(5) – Not Assigned AI(6) – Not Assigned
Analog Outputs	4	AO(0) – Y1 Output AO(1) – Y2 Output AO(2) – Y3 Output AO(3) – Y4 Output
Analogue Value	6	AV(0) – Not Assigned AV(1) – Not Assigned AV(2) – Not Assigned AV(3) – Not Assigned AV(4) – DI1 Pulse Count AV(5) – DI2 Pulse Count
Binary Input	8	BI(0) – DI1 input BI(1) – DI2 Input BI(2) – Not Assigned BI(3) – Not Assigned BI(4) – Not Assigned BI(5) – Not Assigned BI(6) – Not Assigned BI(7) – DI3 input (Universal R11 Input) BI(8) – DI4 Input (Universal RI2 Input)
Binary Output	2	BO(0) – DO1 Output BO(1) – DO2 Output

**Device Object Properties
(Required Object Properties)**

Property Name /ID	Attributes	Range	Default
Object Identifier	R/W		MAC_Address + 651000
Object Name	R/W	32 Characters Max	Concatenation of product type and MAC address i.e. "BIO_001"
Object Type	R		8
System Status	R		STATUS_OPERATIONAL
Vendor Name	R		Produal
Vendor Identifier			783
Model Name	R		URD
Protocol Version	R		1
Protocol Revision	R		10
Max APDU Length	R		480
Segmentation Support	R		No
APDU Timeout	R		3000 ms
Number APDU Retries	R		3
MaxMaster	R		127
Max_Info_Frames	R		1
Database Revision	R		0

Analogue Input Objects

	Property Name /ID	Attributes	Range	Default
Required Object Properties	Object Identifier	R		
	Object Name	R		AI(0) – Not Assigned AI(1) – Not Assigned AI(2) – Not Assigned AI(3) – NTC10 / RI1 (IO10-BAC-DIN) AI(4) – NTC10 / RI2 (IO10-BAC-DIN) AI(3) – AI1 (IO10-BAC-DIN-AI) AI(4) – AI2 (IO10-BAC-DIN-AI) AI(5) – Not Assigned AI(6) – Not Assigned
	Object Type	R		0
	Present Value	R/W	AI(0): Not Assigned AI(1): Not Assigned AI(2): Not Assigned AI(3): -40..50000 AI(4): -40..50000 AI(5): Not Assigned AI(6): Not Assigned	
	Status Flag	R		
	Event State	R		
	Out-Of-Service	R/W		FALSE
	Units	R		AI(0): Not Assigned AI(1): Not Assigned AI(2): Not Assigned AI(3): UNITS_OHMS AI(4): UNITS_OHMS AI(5): Not Assigned AI(6): Not Assigned
Optional Properties	None			
Proprietary Properties	None			

Analogue Output Objects

	Property Name /ID	Attributes	Range	Default
Required Object Properties	Object Identifier	R		
	Object Name	R		AO(0) = "Y1" AO(1) = "Y2" AO(2) = "Y3" AO(3) = "Y4"
	Object Type	R		1
	Present Value	R/W	0..100	
	Status Flag	R		
	Event State	R		
	Out-Of-Service	R/W		FALSE
	Units	R		UNITS_PRECENT
Optional Properties	None			
Proprietary Properties	None			

Analogue Value Objects

	Property Name /ID	Attributes	Range	Default
Required Object Properties	Object Identifier	R		
	Object Name	R		AV(0) – Not Assigned AV(1) – Not Assigned AV(2) – Not Assigned AV(3) – Not Assigned AV(4) - DI1 Pulse Count AV(5) - DI2 Pulse Count
	Object Type	R		2
	Present Value	R/W		
	Status Flag	R		
	Event State	R		
	Out-Of-Service	R/W		FALSE
	Units	R		AV(4) = NO_UNITS AV(5) = NO_UNITS
	Priority Array	R		
	Relinquish Default	R/W		AV(0) = Not Assigned AV(1) = Not Assigned AV(2) = Not Assigned AV(3) = Not Assigned AV(4) = 0 AV(5) = 0
Optional Properties	None			
Proprietary Properties	None			

Binary Input Objects

	Property Name /ID	Attributes	Range	Default
Required Object Properties	Object Identifier	R		
	Object Name	R		BI(0) = DI1 BI(1) = DI2 BI(2) = Not Assigned BI(3) = Not Assigned BI(4) = Not Assigned BI(5) = Not Assigned BI(6) = Not Assigned BI(7) = DI3 (RI1) BI(8) = DI4 (RI2)
	Object Type	R		3
	Present Value	R/W	0..1	
	Status Flags	R		
	Event State	R		
	Out-Of-Service	R/W		FALSE
	Polarity	R/W		POLARITY_NORMAL
	Active Text	R		"on"
	Inactive Text	R		"off"
Optional Properties	None			
Proprietary Properties	None			

Binary Output Objects

	Property Name /ID	Attributes	Range	Default
Required Object Properties	Object Identifier	R		
	Object Name	R		BO(0) = DO1 BO(1) = DO2
	Object Type	R		4
	Present Value	R/W	0..1	
	Status Flags	R		
	Event State	R		
	Out-Of-Service	R/W		FALSE
	Polarity	R/W		POLARITY_NORMAL
	Priority Array	R		
	Relinquish Default	R/W		BINARY_INACTIVE
	Active Text	R		"on"
	Inactive Text	R		"off"
Optional Properties	None			
Proprietary Properties	None			

Proprietary Object Types

No dynamic Creation or Deletion supported

Object	Number Of Instances	Instance Assignments
Application Configuration Object	1	Provides a container for all the proprietary application specific properties.

App_Config Object

	Property Name /ID	Attributes	Range	Default
Required Object Properties	Object Identifier	R		MAC_Address + 651000
	Object Name	R		"App_Config"
	Object Type	R		128
Optional Properties	None			

	Property ID	Description	BACnet Data Type	Range
Proprietary Properties	30100	Firmware Version	Unsigned	Read Only
	40050	MAC Address	Unsigned	0..255
	40051	Baud Rate	Unsigned	0 = 9600 (Default) 1 = 19200 2 = 38400 3 = 57600
	40067	Hold On Delay Setting for Digital Input 1	Unsigned	1..7200 Seconds (Default 10s)
	40068	Hold On Delay Setting for Digital Input 2	Unsigned	1..7200 Seconds (Default 10s)
	40100	Force Reset	Unsigned	0 = Normal 1 = Force Reset
	40101	Non Volatile Memory Update	Unsigned	0 = Normal 1 = Update
	40103	Force Factory Defaults	Unsigned	0 = Normal 1 = Force Defaults
	40104	Force 0..10V Output Calibration Routine	Unsigned	0 = Normal 1 = Force Calibration

Note: Information is subject to change without prior notice.